Appendix II: Round 1 Decisions on Recommendations(DoRs) – *Results of an Interconnection Benchmarking Study for the Telecommunications Sector in Trinidad and Tobago*

The following summarises the comments and recommendations received from stakeholders on May 12, 2017, and the decisions made by the Authority and incorporated in the *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2019* (the Revised Report) dated May 2019.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
General				
General — Use of Benchmarks	TSTT	Use of Benchmarks Comment based on the ruling of Arbitration Panel: 1) TSTT reminds TATT of the ruling of the Arbitration Panel: "Upon review of the benchmark evidence, the Panel finds that the Caribbean and European benchmark evidence presented lacks relevance and does not represent the sort of cost-based benchmarking approach that would be appropriate in the context of establishing cost-based interconnection charges in Trinidad and Tobago under the Act and Concessions. This Panel similarly concludes that the benchmark data and argument submitted in this proceeding are not adequate for the purpose of actually specifying the cost-based rates required by law.	While TSTT recognizes the benefits of the use of benchmark data, we also think that the concerns of the panel as to the relevance of some benchmarks still remain applicable today, particularly in the context of the methodology undertaken by TATT as evidenced in the published study. TSTT reaffirms that the Authority should continue its work to transparently provide a cost model that can be used for the industry and should limit the use of benchmarks as a sanity check - as recommended by the Arbitration Panel's ruling.	The Authority notes TSTT's comment in support of the use of an industry cost model for regulatory purposes. The Authority agrees that a cost model should, ideally, be utilised for the industry. However, the implementation of the long-run average incremental cost (LRAIC) model, the development of which commenced in 2010, has been a moving target. Due to the varying requests by three of the seven operators, the Authority has been stalled in implementing it. For the purpose of clarifying all concerns expressed by operators during the consultation on the 2017 Report regarding the use of the LRAIC model, the Authority has prepared a chronology of the actions taken to develop and implement the model, including all attempts by the Authority to complete testing of the model with updated data (see Annex 1).

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		Notwithstanding that conclusion, the Panel considers that the benchmark evidence can be used as a "sanity check" (or "cross-check") in the establishment of interconnection rates." 2) Also as per Costing Methodology's Interim Regime (Section 6): "This list is not exhaustive and the Authority reserves the right to amend this list as it deems necessary. In addition, the Authority may use benchmarks to determine appropriate ratios for expenditure within a telecommunications company. The Authority shall utilize the interim regime outlined above for determining the cost of all telecommunications and broadcasting services. However, due to the additional regulatory burden that this interim regime may cause with respect to the determination of cost-based interconnection rates, the Authority will allow dominant concessionaires to be guided by the decision of the second arbitration panel during the interim period. The Authority believes that the work conducted by the second arbitration panel with respect to interconnection services is similar to the interim regime identified above, that is, the cost models of dominant concessionaires and benchmarks were		Regarding TSTT's two comments on the Arbitration Panel and *the Costing Methodology for the Telecommunications Sector* (the Costing Methodology): 1) The Authority also acknowledges the ruling of the 2006 Arbitration Panel with respect to limiting the use of benchmarking. However, the Authority draws to TSTT's attention that the benchmarking sample has significantly expanded since 2006 and now includes cost-based benchmarking data from Caribbean jurisdictions. Furthermore, given the time that has elapsed, and the developments undergone within various telecommunications regulatory landscapes in the Caribbean, the comments made by the Arbitration Panel do not diminish the usefulness and validity of the robust exercise undertaken by the Authority. 2) The Authority clarifies that the Costing Methodology recommends the adoption of benchmarks developed by the Authority. Reference is made to page 40 of the Costing Methodology, which states, "During this interim period of 36 months, dominant concessionaires may use their own cost models to determine cost-based rates for telecommunications and broadcasting services. Concessionaires that currently do not have a cost model may use

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		utilized in determining interconnection rates. Therefore, dominant concessionaires will be guided by the second arbitration panel decision when negotiating interconnection rates during the interim period. If a dispute is referred to the Authority on interconnection rates during the interim period, consideration will also be given to the work conducted by the second arbitration panel."		benchmarks developed by the Authority to determine cost-based rates. This approach is preferred as it will quickly and effectively provide a reasonable proxy for cost-based pricing." Furthermore, whilst the Authority also takes note of the general limitations of benchmarking approaches, it posits that recommending benchmarked interim rates is useful in the absence of robust modelling results. Notwithstanding this, the Authority also recommends the move to cost-based interconnection rates as soon as robust, up-to-date, LRAIC data sets become available. Thus, in recognising the limitations of benchmarking and the Authority's intent to move to cost model results, the Authority's recommendation for interim maximum interconnection rates based on its benchmarking analysis, is a conservative one. In this regard, the Authority is only making recommendations on maximum rates (not point recommendations), over a multi-year glide path, which converge to more cost-oriented rates (i.e., those experienced, on average, within the benchmarking countries that have already developed cost models), over several years.
Overall comment	Digicel (T&T) Ltd	As with other operators and TATT, Digicel has invested considerable time and effort in the preparation for TATT's costing methodologies,	Digicel recommends that going forward proposals for such changes in regulatory methodologies should	Of the seven operators who participated in the preparation of the Authority's costing methodologies, costing models and formulaic calculations, three

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		costing models and formulaic calculations. Digicel is awaiting TATT's next communications on the matter of the LRAIC models. This causes regulatory uncertainty for all market participants including Digicel and renders redundant Digicel's previous substantial efforts and investments in the LRAIC regulatory process.	be accompanied by a cost benefit analysis which takes account of the investment of the parties in the previous process.	operators posed objections to the Authority's implementation of the model. The Authority stresses that the implementation of the model was paused in 2011 due to these objections. Since then, the Authority has been engaged in several activities geared towards addressing the concerns raised by these operators including, *inter alia*, requests for more transparency into the model, the need for further testing of the model, requests for full access to the model, requests for a completely different type of model to account for specific networks, and the use of the model for only dominant operators. The Authority involved those operators in several initiatives for a more collaborative approach to moving the model along towards implementation. In one of the most recent initiatives, the Authority held model testing and model access sessions at its offices, during which time, it also underscored and demonstrated that the data presented by these operators during the initial model run had been deficient in many ways. The Authority, therefore, concluded that these initial modelling results were not sufficiently robust to inform interconnection rates in Trinidad and Tobago and that it would thus require more reliable operator data to populate and further test the model.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				Subsequent to the access sessions, several requests were made by the operators including, *inter alia*, for revisions to the model, take-away copies of the model, the creation of a new model that suits particular networks, the continuation of testing, and further consultation on the Authority's costing documents. In response, the Authority has since undertaken consultation on the costing papers, specifically the *Current Cost Accounting (CCA) Reference Paper* and the *LRAIC Specification Paper*. In light of the imminent renewal of the local interconnection agreements between operators, it was necessary for the Authority to act within its mandate to develop alternatives to guide the sector, particularly for the other four operators seeking interconnection. The Authority's benchmarking exercise is in fulfilment of regulation 15(2) of the *Telecommunications (Interconnection) Regulations (2006)* (Interconnection Regulations), which states: "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

Document Sub-Section	**Submission Made By:**	**Comments Received**	**Recommendations Made**	**TATT's Decisions**
				costing benchmarks, as determined by the Authority, that comport with internationally accepted standards for such benchmarks." Digicel is asked to note that the Authority will continue to pursue avenues to advance a cost model which shall be consulted upon in due course.
Figures 1 to 5, Table 1 and References	Digicel (T&T) Ltd	The TATT consultative document does include charts (e.g. Figures 1 to 5), some tables (e.g. Table 1) and a bibliography section (References, page 35) however: • The charts are extremely crowded which makes checking the values very difficult • Table 1 shows only the current rate in USD rather than all values used in the benchmark as well as values in local currency units (LCU) which would allow operators to understand and verify the work done by TATT and its consultant. • The bibliography section includes URL but not the specific paragraph or table from where TATT and its consultant extracted the data As it is, the consultation document puts the onus on the concessionaire to rebuild the benchmark to understand where the numbers came from which is	In order to allow proper scrutiny, TATT should make available to operators the "extensive database of interconnection rates for the Caribbean benchmark jurisdictions" it has collected as well as the source files used to produce it. The failure to properly identify the data sources and the currency exchange rates used means that that it is not possible for respondents to properly assess the adequacy proposed benchmarks. This lack of transparency falls short of accepted standards of practice for public consultations and may amount to procedural defects under administrative law.	The reference section of the *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago 2019* (the Revised Report) identifies the sources of all interconnection rate data included in the benchmarking exercise, all of which are readily available to the public. In addition, Figures 1 and 2 in the Revised Report provide detailed summaries of historical interconnection rates for each Caribbean jurisdiction included in the mobile termination rate (MTR) and fixed termination rate (FTR) benchmarking samples (all of which are expressed in USD). In response to Digicel's request, the Authority is giving local operators a copy of the benchmarking database (in EXCEL spreadsheet format) of monthly MTRs and FTRs for all jurisdictions in the benchmarking sample. This is presented in local currencies and in USD, along with US dollar exchange rates.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		not reasonable given the short duration of the consultation.		It would not be relevant to include local currency rates in Table 1, as suggested by Digicel, since the normalisation analysis presented in that table requires that the MTRs and FTRs be expressed in a common currency for all Caribbean jurisdictions. The provision of the benchmarking database allows Digicel to conduct any additional analysis it considers warranted.
Overall	Digicel (T&T) Ltd	A benchmark cannot be as precise as a cost model for the following reasons: • It does not reflect the characteristics of Trinidad and Tobago (geography, population, topology, operators) but the characteristic of the other countries included in the benchmark • Comparing the average population, landmass, population density, GDP, and market factors (subscribers, penetration etc.) with Trinidad and Tobago misses the fact that the sample countries exhibit very wide range of characteristics, and there is no 'average' Caribbean nation similar to Trinidad and Tobago. • The countries included in the benchmark will have used various methodologies which may in some case be inconsistent with the one that should be used in the	TATT should be extremely careful in interpreting the results of the benchmark and not put so much weight on a single point "average" value. TATT should not accept the 'average' Caribbean nation considered in the benchmark as comparable to Trinidad and Tobago. TATT should have considered adjusting the benchmark for different key characteristics. TATT should ensure that rates set using 'below—average-cost' methodologies – such as pure LRIC – are not included in the benchmark average because this will, by definition lead to a benchmark result	The Authority advises that it shall continue to pursue avenues to advance a cost model which shall be consulted upon in due course. However, in light of the imminent renewal of the local interconnection agreements, it was necessary for the Authority to act within its mandate to develop alternatives to guide the sector, particularly for the other four local operators who are seeking interconnection. The benchmarking exercise is in fulfilment of regulation 15(2) of the Interconnection Regulations, which states: "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." The Authority's recommended costing benchmarks are

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		local market • A benchmark can be done rapidly because it requires little insight and reflection while a cost model takes time because decisions are important and need to be properly established. The results of a benchmarking study can be useful if the appropriate adjusting factors are properly applied, which is not the case here. The benchmark is therefore only a very approximate estimate for the real result of a cost model in Trinidad and Tobago and the regulator should be conservative in its interpretation of the benchmark results. If not, there would be a risk to set rates below the operators' cost which could have negative consequence on investment and competition at the retail level.	which risks being below the operators' cost in Trinidad and Tobago. As the benchmark represents a proxy for a locally modelled rate, only comparators which use the methodology which conforms to that which would underpin such a modelled rate are suitable for inclusion in the benchmark basket.	not based simply on Caribbean "average" rates, as suggested by Digicel but rather on interconnection rate levels and trends in the post-2012 and cost-based post-2012 benchmarking sub-samples, along with international interconnection rate trends. Furthermore, section 6 of the Revised Report includes a normalisation analysis to assess whether any upward or downward demographic, socio-economic and other adjustment factors were necessary relative to the benchmarking sample averages. That analysis suggested that, if anything, a downward adjustment was warranted. However, to be conservative, the Authority opted not to apply such an adjustment. The Authority considers that the need for adjustment factors is adequately addressed in the Revised Report. The Authority believes that, in response to Digicel's comments, it addresses the question of the use of benchmark averages in sufficient detail in section 6.4 and Table 1 of the Revised Report. The Authority disagrees with Digicel's suggestion that "pure" LRIC jurisdictions should not be included in the full benchmarking sample. It notes that the benchmarking sample includes both cost-based and non-cost-based interconnection rates, and its rate

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				recommendations are based on the levels and trends of these two types of rates. They are not based solely on pure LRIC rates. The Authority, therefore, considers that it would not be appropriate to artificially limit the size of the benchmarking sample, as suggested by Digicel. The Authority is not rigid in its approach but, rather, is conservative in its recommendations on the benchmarked results, by requesting that operators consider the rates as regulatory maxima rather than point estimates. The Authority has also conservatively recommended a glide path to these maxima rates, which is flexible and transparent for operators. The Authority advises that cost-based rates were used on the basis of information available for the exercise and, in accordance with regulation 15 of the Interconnection Regulations, the Authority's approach comports with internationally accepted standards for such benchmarks.
Letter[1] accompanying the consultation and Executive Summary of the consultative document	Digicel (T&T) Ltd	The implementation done by TATT produces an average rate (with some countries higher and some lower than the average) which it claims represents regulatory maxima rather than "point recommendations". TATT then goes on to say that domestic MTR and FTR in Trinidad and Tobago	By definition, averaged values of selected countries in the region do not represent regulatory maxima because they are averaged below the maximum but above the minimum	The Authority disagrees with Digicel's suggestion that benchmarking sample averages should not be used to set interconnection rate maxima or caps, as proposed in the *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago* (the 2017 Report).

[1] Letter to the Authority dated March 24, 2017 (Ref 2/17/00008)

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		should not be higher than the "recommended regulatory maxima" which are simply average values. TATT implicitly assumes without evidence that costs in Trinidad and Tobago are similar or lower to average costs in the region. To set and use regulatory maxima, TATT would have needed to define the results as the highest values in the sample.	Digicel recommends that TATT extends its benchmarking approach to aim to identify, correctly, the likely range for the 'regulatory maxima'. It if wants to set regulatory maxima based on benchmarks, it could for instance define the regulatory maxima as the highest values in the sample, the average of the top-half sample, or the average plus one standard deviation. If even one comparator data point is above the average then this proves that the result of a modelled price in Trinidad and Tobago could be above the average and therefore price setting based on the average runs the substantial risk that the mandated benchmark price will be below the actual CCA LRAIC+ level for Trinidad and Tobago. Alternatively, TATT should restrict itself to just making the entire benchmarked data it collected	Benchmarking studies involve collecting relevant data — in this case, on MTRs and FTRs — across a set of suitably comparable jurisdictions. The sample selection criteria set out in section 3 of the 2017 Report are designed to ensure that all jurisdictions included in the benchmarking exercise were suitably and directly comparable with Trinidad and Tobago. Moreover, section 6 of the Revised Report also includes both sensitivity and normalisation analyses, to further ensure that the benchmarking sample averages adopted as rate maxima are fully appropriate for Trinidad and Tobago. As in any benchmarking exercise, there will always be individual jurisdictions or observations that fall above or below the average. A benchmarking approach is designed to avoid reliance on any one jurisdiction for rate determination proposes, be it above or below the average. Consequently, the Authority considers that the benchmarking approach followed is appropriate for interconnection rate capping purposes and, indeed, is fully consistent with standard practice. In this regard, the Authority also notes that the approach is consistent with the benchmarking approaches followed by other regulators, e.g., (i) Turks and Caicos Islands Telecommunications Commission ("TCI-TC"),

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
			available to operators as part of their commercial discussions rather than making it harder for operators to reach an agreement by creating artificial regulatory maxima which are not related to the costs in Trinidad and Tobago.	Telecommunications Decision 2014-4, *Decision on the Review of Interconnection Rates*, June 20, 2014[2]; (ii) TCI-TC, Telecommunications Decision 2011-2, *Decision on the Mobile Termination Rate Review*; January 24, 2011[3]; and (iii) Namibian Interconnection Benchmarking Study, Final Public Report (2009)[4]. It is also consistent with the main principles of the *Practical Guide on Benchmarking Telecommunication Prices*, issued by the International Telecommunication Union (ITU) in August 2014[5]. With respect to the specific use of sample averages for benchmarking purposes, the Authority's approach is also consistent with the approach followed by the Body of European Regulators for Electronic Communications (BEREC) in its periodic benchmarking reports on European interconnection rates, e.g., BEREC's January 2018 Benchmarking Report on *Termination Rates at European Level*[6].

2 http://www.telecommission.tc/content/root/files/20140620101740-TCI-ICR-Review-Decision-final-June-18-2014.pdf

3 http://www.telecommission.tc/content/root/files/20110124152043-TCI-MTR-Review-Decision-_2011-01-24_-final.pdf

4 https://www.researchictafrica.net/countries/namibia/Namibia_Interconnection_Benchmarking_Study.pdf

5 https://www.itu.int/pub/D-PREF-EF.PG.BENCH-2014

6 https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8162-termination-rates-at-european-level-january-2018

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
General	MPU	*Ministry with the responsibility for the telecommunications sector of Trinidad and Tobago, as well as Line Ministry for Government's interest in the telecommunications sector as represented by the entity known as Telecommunications Services of Trinidad and Tobago Company Limited (TSTT).* The Ministry of Public Utilities sees little developmental benefits in reducing the termination rates of inter network traffic in Trinidad and Tobago, but instead is advocating the removal of them altogether and the subsequent introduction of a Bill and Keep regime. Such a change is more progressive and will yield the right results that support the growing transition of telecommunications transmission from circuit based to IP based. Some of the key reasons why this change will be beneficial to all parties in the telecommunications sector are as follows: 1) Lower cost to network operators who do		Under the "bill and keep" (BAK) regime, sometimes called "sender keeps all" (SKA), there are typically no per-minute charges between operators, i.e., each network operator agrees to terminate calls from the other network at no charge (usually based on the condition that traffic is roughly balanced in each direction). Two countries in the Americas region (Colombia and Costa Rica) apply a BAK interconnection charging regime[7]. Two countries in the African region (Benin and Burundi) have the BAK regime, which is usual for Internet service providers but not yet commonly used by telephony operators. In the USA, the default arrangement is that all operators (fixed and mobile) use the same termination rates as charged by the fixed incumbent in that state. Operators are free to negotiate their own rates (typically resulting in a BAK arrangement) or justify why they deserve a higher rate for termination[8].

7 https://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_Lazauskaite_MTRs.pdf

8 The case for "bill and keep" for termination in Europe is not yet proven. (Harbord and Pagnozzi (2010) http://market-analysis.co.uk/PDF/Topical/harbordpagnozzirnemarch2010.pdf)

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		not now have to bear the cost of a termination rate regime. It is expected that an end to the termination rate regime will bring about the following changes: a) removal of interconnection billing costs, b) lower contract negotiation costs due to absence of termination rate c) focus now only on international termination, until that too is soon eliminated by technology redundancy 2) Direct pressure on network operators to reduce retail prices to consumers in the absence of termination charges 3) More direct competition emerging between operators as their only source of revenues will be from their own subscribers and not the customers of their competitors, as is the case with termination rate revenues. 4) Progression in keeping with international markets - The US telecommunications market has initiated measures to eliminate termination rates by 2020 and convert to a system of Bill and Keep. As in the case of the Benchmark Order that ushered in the first reduction to termination rates		However, a move to BAK would directly create winners and losers. Mobile network operators (MNOs) with net outgoing traffic and fixed operators would generally benefit, while larger MNOs would potentially lose significant net revenues, for which they might be compensated by other sources (a "waterbed effect") such as through their own retail prices. Furthermore, if operators are not compensated for terminating calls, this may result in degraded service quality. A move to BAK can also have a major impact on users because a change in the interconnection regime might need to be mirrored by a change in the way the operators recoup their costs at the retail level. Despite its obvious limitations, the Authority would be open to further considering the applicability and justification of BAK in Trinidad and Tobago. Until such time, interconnection services in Trinidad and Tobago shall continue to be carried out in accordance with the Telecommunications Act, Chap. 47:31 (the Act) and the Interconnection Regulations.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		in the nineties by making them cost based, the USA will also usher in internationally a Bill and Keep regime for IP based transmission to eliminate the excessive arbitrage that has been going on internationally for the last decade, between circuit switch termination and IP based termination. These systems of termination(?) have been the source of much market distortion in recent times and not of much benefit to consumers who continue to bear the costs of termination even though economically it has proven to be marginally valued at zero, for duopoly markets such as T&T		
Executive Summary				
Executive Summary	Digicel (T&T) Ltd	TATT proposes benchmarking-based recommendations, including FY2019/20 end-points and three-year glide paths expressed in USD.	Rates should be expressed in TTD	The Authority advises that, in its Revised Report, the recommended costing benchmarks are expressed in both USD and TTD, based on exchange rates in effect when the study was undertaken. USD/TTD exchange rates may change 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.
Executive Summary	TSTT	*"The second step involved the compilation of data into an extensive database of interconnection rates for the Caribbean benchmark jurisdictions. For*	TSTT is suggesting that information used in the developing the rates be adjusted for:	The Authority reiterates that, due to the non-availability of costing data, it is unable to complete its costing model at this time.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		the key rates under consideration—the domestic and international mobile termination rate (MTR); and domestic and international fixed termination rate (FTR)—this included monthly rate information covering a ten-year period 2008 to March 2017." Historical data is a valid form of analysis and a starting point for projections into the future, however, one has to understand and consider the setbacks of using this method. The document also outlines that "This benchmarking process revealed that domestic MTR and FTR in Trinidad and Tobago are much higher than the recommended regulatory maxima and therefore should be reduced." TSTT does not agree that the use of this study alone without the use of an industry cost model should determine that the domestic MTR and FTR in Trinidad and Tobago should be reduced. Similarly, TSTT shares the same view with respect to International Carriage Charges (ICC) that the study alone is insufficient to conclude that rates	i. Trinidad and Tobago unique Industry specifications and ii. Provisions be made in line with the future expectations of the Industry's key players and be reviewed periodically. This statement could be seen as harmful to the industry for reasons mentioned. It is therefore recommended that TATT follow the agreed process of rate determination via a Cost Model for the development of the MTR and FTR.	Notwithstanding the typical limitations of benchmarking, the benchmarked jurisdictions were selected based on transparent selection criteria, as outlined in section 3 of the Revised Report. These provided a robust benchmarking database for a 10-year period and thus the data were reliably representative of the sample for MTRs and FTRs. The use of sampling is consistent with best practice research methods and is, therefore, well accepted for benchmarking purposes. As TSTT would appreciate, a sample is representative of the population from which it is drawn. Moreover, careful execution of the sample selection criteria has resulted in the collection of intensive and exhaustive interconnection data. As the Authority's benchmarking process was a transparent one, and its methodology robust, the Authority stands by the conclusion of the benchmarking exercise that the domestic MTR and FTR are higher than the recommended regulatory maxima. The Authority has further conducted a number of additional benchmarking sensitivities in response to comments received from parties on the 2017 Report. These sensitivities are discussed in other sections of

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		should be reduced. It was noted that the Authority recommends that operators consider the results of the benchmarking study as regulatory maxima rather than "point recommendations." TSTT is of the view that other factors must be taken into consideration when determining margins for rate charges. Indeed, TATT's own price regulatory framework (through which the outputs of this exercise can be implemented) outlines various considerations which are not evident in this study. Further TATT's methodology in arriving at these benchmarks highlights significant weaknesses that undermine any justification for this statement being considered prudent. As such, TSTT is of the view that the quoted statement is arbitrary and ill-founded. TATT must demonstrate due care that the benchmarked rates are transparent and fit for purpose and based on sound Methodology.	TATT should also be consistent with the approach outlined in its Price Regulatory Framework in how the benchmark rates are to be applied in the marketplace, not ignoring that the Authority should ideally provide a cost model that can be used for the industry and thus should limit the use of benchmarking.	these DoRs and also summarised in section 6.3 of the Revised Report. With respect to the Price Regulatory Framework, (which seeks to execute the provisions of section 29 of the Act), the Authority notes that benchmarks are therein specified for efficiency and x factors and for other market analyses. Notwithstanding the fact that the Price Regulatory Framework is still in draft form, the Authority is well within its mandate, pursuant to regulation 15 (2) of the Interconnection Regulations to undertake benchmarking for interconnection rates, to inform the current negotiating period. TSTT is asked to clarify what is meant by "the future expectations of the Industry's key players" within the context of the benchmarking exercise.
Section 1				

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
Section 1 Introduction	TSTT	"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 the operators' services." Information is being requested to support the statement above, to facilitate clarity and a greater understanding. Inherent presumption that "moving [prices] closer to costs" is the same as reducing unit prices. One must consider that in a market where, for example, fixed line traffic is declining regardless of the price savings offered, it should be expected that as the traffic decreases, the cost per minute/call will concomitantly increase due to there being the same (or greater) cost base to spread over a smaller demand.	TATT should carefully consider its statement and its relevance to today's industry which has become more open and competitive. TATT's analysis of the markets seem to assume that cost is the sole determinant in consumer behavior which seemingly ignores instances of regulatory arbitrage that persist in the marketplace despite representations from operators.	The Authority is cognisant that cost is not the sole determinant of consumer behaviour. However, consistent with international best practice, the Authority has determined that termination rates should reflect the efficient cost of providing services so that wholesale users and retail consumers face charges consistent with that cost. Accordingly, inefficiencies which are passed on to users lead to lower welfare[9]. As TSTT would appreciate, wholesale reviews and regulation can be considered one of the least intrusive remedies. For specific markets, wholesale regulation has had the desired impact at the retail level. For example, with regard to retail call markets, the European Commission considers that effective wholesale regulation (carrier selection, carrier pre-selection and, in some countries, wholesale line rental) has significantly reduced the barriers to entry in these markets. This has led to large-scale market entry of alternative suppliers across Europe, leading to significant loss of market share by incumbents and price reductions[10].

9 https://tatt.org.tt/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=227&PortalId=0&TabId=222

10 http://ec.europa.eu/competition/publications/cpn/2007_1_49.pdf

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		Thus, the expectation of lowering consumer prices may not be economically feasible to some of the operators in the industry and can further lead itself to a monopolistic situation. Furthermore, forcing rates below costs artificially can lead to regulatory mandated anti-competitive pricing, with associated acts of unfair competition emerging in the marketplace, which are not in line with the objectives of an efficient and fair market environment.		
Section 1.1[11] and 2[12]	Digicel (T&T) Ltd	TATT argues that the legal basis for the benchmarking consultation is based on Regulation 15 (2) (3) of the Telecommunications (Interconnection) Regulation (2006).	In order to properly ground the legal basis for setting interconnection rates according to a costing benchmark, Digicel believes that TATT must provide evidence 1) that operators have failed to provide the relevant data for the establishment of costing methodologies, models or formula within a reasonable time and 2) that its benchmarking	The Authority has attempted, since 2008, to establish the costing model. However, due to the non-submission of data sets for doing so within a reasonable time period, the Authority, cognisant that the local interconnection agreements between operators were due to expire in April 2017, saw it prudent to fulfil its obligations under regulation 15 of the Interconnection Regulations. Digicel is asked to refer to the chronology set out in Annex 1 of these DoRs. The methodology adopted by the Authority is consistent with internationally accepted standards. According to

11 *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago,* TATT: 2/17/8 dated March 27, 2017

12 Ibid.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
			methodology is consistent with internationally accepted standards. It is Digicel's view that these are necessary pre-conditions for the lawful exercise of powers under Regulation 15 (2) (3) of the Telecommunications (Interconnection) Regulation (2006). TATT has in this document failed to establish that these pre-conditions have been satisfied and is hereby called upon to do so.	Neu (2002), InterConnect Communications Ltd (2009) — the standard for telecommunications benchmarking, particularly interconnection — requires the following considerations: 1. Which services are to be benchmarked? 2. Which countries are to be included in the study? When undertaking a benchmarking study, it is important to choose the most appropriate selection and number of countries. 3. What sources will be used to gather the data? In countries where interconnection rates are regulated, they should ideally also be published. This publication may either be in the form of a price list attached to the reference interconnection offer (RIO), or published notification of interconnection rates. 4. What is the effect of exchange rates on the currencies used in the study? A trusted and consistent source of currency conversion must be applied to the rates which have been gathered, in order to convert them to a single currency for comparison purposes. 5. What methodology is to be used to determine a benchmarked rate? The validity of the benchmarking exercise is enhanced when all the factors detailed above are taken into

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				account, in order to make the analysis and process as robust as possible.
Section 1.1	Digicel (T&T) Ltd	Digicel has been engaging with TATT in its recent process to establish disaggregated network costs, in order that these costs can form the basis of prices for interconnection services. This is pursuant to section 25(2)(m) of the Telecommunications Act, which states "in such manner as the Authority may prescribe". On 31 May 2016 TATT proposed this manner to be top-down CCA-LRAIC+ of Digicel's own (actual) costs[13].	TATT's adoption of CCA-LRAIC+ as the relevant basis on which disaggregated network costs should form the basis for interconnection prices, means that TATT is lawfully constrained to only use benchmark comparators which conform to this methodology.	The Authority disagrees with Digicel's assertion that the reference to "in such manner as the Authority may prescribe" in section 25(2)(m) legally constrains the Authority to use only comparators which conform to the CCA-LRAIC methodology in the completion of its benchmarking exercise. The Authority advises that the top-down CCA-LRAIC cost standard determined by the Authority was the approach chosen for the development of its costing model and the benchmarking of comparator countries is an interim approach being adopted by the Authority in the absence of the cost model. Furthermore, the Authority clarifies that, in accordance with regulation 15(2) (see quoted text below), it is only legally obligated to ensure that the benchmarks chosen comport with internationally accepted standards for such benchmarks. "Where the relevant data for the establishment of the costing methodologies, models or formulae are unavailable within a reasonable time, the concessionaire

13 *Draft Revised Top Down Long Run Average Incremental Cost (LRAIC) Model Specification Paper*, version 1.3; *Draft Revised Current Cost Accounting Reference Paper*, version 1.3)

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				may set interconnection rates with reference to such costing benchmarks, as determined by the Authority, that comport with internationally accepted standards for such benchmarks."
Section 1.1	Digicel (T&T) Ltd	TATT may regulate prices where the terms of sections 29(2) to 29(8) of the Act apply, i.e. when an operator is designated as dominant. Digicel notes that TATT has not issued any designations of dominance upon Digicel and therefore Digicel is not subject to price regulation accordingly which relies on sections 29(2) and 29(8) of the Act for its legal basis.	TATT should confirm that any proposed price setting will not rely on sections 29(2) and 29(8) of the Act.	The Authority highlights that the benchmarking exercise is in fulfilment of regulation 15(2) of the Interconnection Regulations, which states, specifically: "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." The Authority also emphasises that, in accordance with section 29(2)(c) of the Act, it is mandated to regulate prices where it detects anticompetitive pricing and acts of unfair competition. Additionally, the Costing Methodology makes reference to the fact that all providers of termination services are considered dominant in the provision of termination services on their respective networks.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
Section 1.1, Executive Summary, Section 1 and Section 8	Digicel (T&T) Ltd	Digicel disagrees with the pass-through effect claimed by TATT. Mobile penetration in Trinidad and Tobago is saturated (well over 100%) and hence there are not many non-subscribers available to be added to the mobile networks.	Digicel recommends that TATT substantiate its claims that "increased take up could be expected", despite mobile penetration already being well above 100%.	The reference to increased take-up of services relates to the likelihood that, where reductions in interconnection rates do in fact lead to lower average retail calling prices, there will be increased use of mobile and fixed services by consumers. Notwithstanding the existing penetration rate of 100% in the mobile market, there is room for growth in fixed and mobile services. A penetration rate of over 100% does not imply that all persons in Trinidad and Tobago are mobile subscribers but, rather, that some persons may own more than one mobile SIM. Furthermore, the Authority highlights that cost-based interconnection rates can incentivise new market entrants through lower barriers to entry. Also, any potential increase in take-up of services would arise from inter-operator price competition.
Section 1. Introduction	MPU	The Telecommunications Sector of the Ministry is of the opinion that T&T's experience with interconnection termination rates has reached its limit as a tool effective fostering vibrant competition. In fact, since its controversial introduction based on tribunal dispute resolution, termination rates have been a source of market distortion and consumer exploitation and have not been changed since then, i.e. approximately ten	It is the recommendation of the MPU that termination rates be eliminated from the interconnection pricing regime of T&T and that interconnection compensation be replaced by a "bill and keep" regime. Given the international administrative trends and the technological changes that are already flourishing, the time	The Authority would be open to further considering the applicability and justification of BAK in Trinidad and Tobago. Until such time, interconnection services in Trinidad and Tobago shall continue to be carried out in accordance with the Act and the Interconnection Regulations.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		years and so does not reflect advances in the market which have resulted in lower costs(?). The market distortion and exploitation of consumers coupled with the existing high cost of switched circuit calling to which termination rates are tied and priced, has continued to keep telecom service costs in T&T extremely high.	is right for the transition to begin from the operator traffic exchange payment system of "calling party pays" and "receiving party pays" to a system of "Bill and keep" or "sender keeps all" . IP protocol that constitutes data transmission for digital media (which already dominates telecom transmission) promotes the system of "bill and keep" as the most economically efficient means for exchanging telecommunications traffic between networks.	
Section 1.2	Digicel (T&T) Ltd	TATT indicates the possibility to "amend the Study to support the implementation of any new costs or prices which may be identified." While TATT recognises the need for a review cycle in theory, it proposes to do the opposite in practice. Rather than proposing to review the benchmark at regular intervals, it proposes to assume that the benchmark will continue to decline on a purely estimated path. A benchmark of unknown future prices is not reliable, since TATT cannot see into the future and know the	TATT should remove the trend analysis part of its benchmark and only present the current, known benchmark values.	This recommendation is addressed in the Authority's response below to Digicel's comments on section 6.1.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		outcome of the benchmarks in 2018, 2019 and 2020.		
Section 1.2 – Review Cycle	TSTT	"Given the dynamic nature of the sector, the need may arise to amend the Study to support the implementation of any new costs or prices which may be identified. In such a case, the Study would be modified in consultation with the public and with stakeholders as the Authority deems appropriate. The Study's maintenance history would be revised accordingly."	TSTT recommend that the Authority defines and details the review process, to ensure its appropriateness and that transparency is maintained.	The Authority has prescribed a three-year glide path for guiding operators in negotiating interconnection costs. In the absence of a viable cost model and reliable cost data, the Authority will undertake another benchmarking exercise, where necessary.
Section 1 Introduction	CCTL	CCTL thanks the Authority for the opportunity to provide input in the consultation "Results of an Interconnection Benchmark Study for the Telecommunications Sector of Trinidad and Tobago." The views expressed herein are not exhaustive. Failure to address any issue in our response, does not in any way indicate acceptance, agreement or relinquishing of CCTL's rights. In addressing the issue of the consultation we believe it is relevant to frame our response within the wider context of the legal basis for the setting of interconnection rates as described in Section 2 of the consultation document, and also the status of the Long Run Average Incremental Cost (LRAIC) Model project undertaken by TATT.	Consistent with provisions of Section 15(2) of the Telecommunications (Interconnection) Regulations (2006) CCTL supports the use of the results of the benchmark study to inform the setting of interconnection rates in this renewal cycle.	The Authority notes CCTL's support.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		The LRAIC model project had its genesis in December 2006, with the issuing of the first consultation document "The Costing Methodology for the Telecommunications Sector". This was followed by subsequent rounds of consultation, with the publication of the final document in May 2008. Following the publication of this document TATT commenced work towards the development of a LRAIC model, with the expectation that this tool would provide cost outputs to determine interconnections rates, and more broadly, "to provide the Authority with a standardized tool that allow making of informed decisions to enhance the effectiveness and competitiveness of communication services in Trinidad and Tobago." The overly broad nature of the objective, is one of the many factors, (which have been well documented throughout the various consultation processes spanning several years) that have resulted in the current circumstances; namely, the absence of reliable cost model outputs to inform interconnection rates as ordered by the Telecommunications (Interconnection) Regulations (2006). In particular, Section 15(1) states: that		

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		"A concessionaire shall set interconnection rates based on cost determined in accordance with such costing methodologies and models and formulae as the Authority may from time to time establish." However, as Section 15(2) makes clear, rates may also be established with reference to benchmarks. Therefore, given the amount of time, effort and expense stakeholders have incurred to date in this still-ongoing proceeding, CCTL is encouraged by the Authority's decision to expedite the process by considering interconnection rate benchmarks. CCTL supports the use of the results of the benchmark study to inform the setting of interconnection rates in this renewal cycle.		
Section 2				
Section 2 –Legislative Basis	TSTT	TSTT notes that TATT, in this document, limits its review of the regulatory environment to citation of S.25 (2) (m) of the Act and Regulation 15(2) and (3) of the Regulations. TSTT is perplexed that TATT has not also cited its own position, as articulated on documents on its website where it states: "…the Authority may need to intervene with price controls in interconnection markets. Such intervention would be based on Section 29(2) of	TSTT believes that TATT should be consistent in its application of its authority in this matter. Accordingly, TATT should operate within the bounds of its published procedures which limit its intervention in the market to exclude the setting of rates.	The Authority is functioning well within its legal mandate set out in regulation 15(1) which prescribes that, "A concessionaire shall set interconnection rates based on cost determined in accordance with such costing methodologies and models and formulae as the Authority may from time to time establish." However, as section 15(2) makes clear, rates may also be established with reference to benchmarks. Therefore, the Authority has decided to expedite the

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		the Act, which allow for the Authority to implement price regulation regimes where a concessionaire has a dominant position in the relevant market. The proposed mechanism for such intervention would be a combination of price caps and floors, which together form a regulated range for termination rates, in accordance with Section 29 (6) of the Act." "…the relevant Sections of the Act guiding the Authority's functions in this regard are outlined below: • Section 29 (2) states as follows: "The Authority may establish price regulation regimes, which may include setting, reviewing and approving prices, in any case where – (a) there is only one concessionaire operating a public telecommunications network or providing a public telecommunications service, or where one concessionaire has a dominant position in the relevant market; • Section 29 (6) states as follows: "For any public telecommunications service provided on a non-exclusive basis, the Authority may introduce a method for regulating the prices of a dominant provider of such telecommunications service by establishing caps		stalled LRAIC process by considering interconnection rate benchmarks. The Authority reiterates that the Costing Methodology refers to the fact that all providers of termination services are considered dominant in the provision of termination services on their respective networks. The Authority notes that section 6.4 of the Revised Report addresses matters relating to notable differences between the Caribbean jurisdictions included in the benchmarking sample, such as population and population density, along with other geographic, demographic and socio-economic factors. The issue of technology as an additional normalisation factor is addressed below in response to Digicel's comments on section 6.4 and Table 1 of the Revised Report.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		and floors on such prices, or by such other method as it may deem appropriate". According to TATT's Price Regulatory Framework, its mechanism of administering the market would be as follows: "4.1 Price Controls in Competitive Markets The presumption in competitive markets is that price regulation will not generally be required. As indicated in Section 29(1) of the Act, the Authority will generally leave prices to be set by the market on the basis of supply and demand. However, price changes should be notified to the Authority in advance of becoming effective in the market in accordance with the guidelines provided at Section 3.1 above. The Authority may, however, consider waiving the 30 day notice period for price changes in certain circumstances. 4.2 Price Controls in Contested Markets In addition to the price controls that exist in competitive markets, the Authority may apply further price controls in contested markets. These controls may include price caps, price floors (Section 29(6) of the Act), and cost-based or retail-minus pricing controls on dominant concessionaires.	Where TATT seeks to implement price caps and floors, TATT should not base its decisions on markets which are materially divorced from the realities of the Trinidad and Tobago marketplace. Realities related to economies of scale are particularly relevant in these concerns. Markets used for benchmarks must thus materially exclude markets with: - Population numbers and population densities which far outstrips the realities of Trinidad and Tobago; and - Networks that do not conform to those that are deployed in Trinidad and Tobago.	

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		4.3 Price Controls in Uncontested Markets In addition to the price controls that exist in competitive and contested markets, the Authority may apply further price controls to concessionaires in uncontested markets. These controls may include rate of return regulation pursuant to section 29(5) of the Act where it is appropriate, or any other measure for determining the concessionaires profitability, as it deems necessary." TATT would recognize then that, by its own stated position, its oversight of Interconnection rates is unambiguously tied to the Price Regulations Framework. TATT would, acknowledging that as a public body established by statute which is bound to function in accordance with its procedures, recognize that the approach to declare a price – via benchmarks or otherwise – as regulatory maxima, may be construed as price-setting. Which has been eschewed by TATT as an inappropriate form of price regulation as outlined in its Price Regulatory.		
Section 2 Legal Basis	CCTL	The information outlined in this section correctly sets out the legal basis for the setting of	Consistent with provisions of Section 15(2) of the Telecommunications	The Authority notes CCTL's support for the use of the results of the benchmarking exercise to inform the setting

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		interconnection rates. In particular, Section 15(2) of the Telecommunications (Interconnection) Regulations (2006) establishes the circumstances under which concessionaire may set interconnection rates with reference to benchmarks, as follows: "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." Given the circumstances regarding the development of the cost models, as outlined above, we believe that a reasonable time in which to procure model inputs has expired. Therefore, we believe that legal basis for relying on the provisions of Section 15(2) have been met.	(Interconnection) Regulations (2006) CCTL supports the use of the results of the benchmark study to inform the setting of interconnection rates in this renewal cycle.	of interconnection rates in this renewal cycle.
Section 2	Digicel (T&T) Ltd	TATT mentions Section 5(1) of the Interconnection Regulations, regarding non-discriminatory terms. Digicel does not consider this to be relevant to the preparation of a benchmark.	Can TATT confirm that this part of section 2 of the consultation paper is not relevant to the preparation of the benchmark?	Regulation 5(1) is relevant to the aim of the benchmarking exercise, which is to assist operators in their negotiations. The Authority advises that the reference is intended to remind operators of their obligation to negotiate terms on

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				a non-discriminatory basis. The Authority highlights that the current interconnection agreements contain cost waivers which are not applicable to all operators. The Authority views such practice as discriminatory and in contravention of section 25 (2) (g) of the Act and regulation 5(1) of the Interconnection Regulations.
Section 2	Digicel (T&T) Ltd	In its consultation document, TATT has omitted Section 15(1) of the Interconnection Regulations, which requires interconnect rates to be set based on cost determined by a method established by TATT. TATT has previously consulted upon a top-down CCA-LRAIC+ method. While in certain circumstances, benchmarking of prices derived from cost modelling in appropriate comparator markets might be a permitted proxy for cost modelling of operators, in Trinidad and Tobago such benchmark derived prices must still conform to the chosen cost standard determined by TATT, in this case top down CCA-LRAIC+.	TATT's selection of comparator benchmarks should only include those based on CCA-LRAIC+.	The Authority advises that the top-down CCA-LRAIC cost standard determined by the Authority was chosen for the development of its costing model, and the benchmarking of comparator countries is an interim approach adopted by the Authority in the absence of the cost model. The Authority does not agree that benchmarked prices must conform to the costing standard chosen for the cost model. They should, however, comport with internationally accepted standards for such benchmarks, as prescribed in regulation 15(2).
Section 2	Digicel (T&T) Ltd	Section 15(2) refers to the requirement for data in order to establish the costs.	The consultation does not consider any data applicable to establishing the costs in Trinidad and Tobago, as it specifically refers to information from other countries in an attempt to estimate the costs in Trinidad and Tobago.	Interconnection rate benchmarking relies on rate/cost information collected from other comparable countries, ideally as many as possible. The interconnection benchmarking database used by the Authority includes solely Caribbean jurisdictions because they are directly and reasonably comparable to Trinidad and Tobago. Further still, a normalisation analysis was conducted to

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
			As a minimum, some form of assessment is required setting out that the costs within a specific chosen comparator market are equivalent to those in Trinidad and Tobago OR can be modified by an adjustment factor which would render such comparator equivalent in terms of cost assessment.	determine if any adjustments to benchmark averages are warranted, the results of which are presented in section 6.4 of the Revised Report. Consequently, the Authority considers that Digicel's concerns on this matter are fully addressed. In section 6.4 and Table 1 of the Revised Report, the Authority provides further information on this issue, in response to Digicel's comments.
Section 2	Digicel (T&T) Ltd	Section 15(2) is only advisory and not binding on the Concessionaire, since "the concessionaire <u>may</u> set interconnection rates with reference to…" and 15(3) states that "a concessionaire shall…supply to the Authority such data…for the purpose of determining that its interconnection rates are in accordance".	Digicel believes that its current interconnect rate agreement is within the confidence interval range of the information presented in the benchmark, once correcting the benchmark to take full account of the comparable regional countries and excluding jurisdictions with other cost standards. In this context Digicel believes that TATT would be acting in an ultra vires fashion if it intervenes to modify an existing price which is otherwise compliant with the requirements of the Regulations.	The Authority reminds Digicel that the intention of the benchmarking exercise is to recommend regulatory maxima rates rather than point recommendations or point prices. The Authority will not intervene to modify an existing price that is compliant with the requirements of the Act and relevant regulations. Furthermore, it is for the Authority to determine whether or not a concessionaire's interconnection rates are in keeping with the requirements of the regulations.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
			Issues of infringement of property rights arise in the event of TATT seeking to regulate otherwise compliant prices.	
Section 2	Digicel (T&T) Ltd	Digicel believes that while the correct approach is to carry out a proper cost modelling exercise based on local market conditions, a price control derived from benchmarks may be an adequate proxy only if appropriate and equivalent comparators are chosen.	Digicel believes that for each of the benchmark comparators chosen TATT must set out the basis on which it considers it equivalent to the specific market circumstances in Trinidad and Tobago and/or the basis on which the comparator has been adjusted to render it equivalent.	The sample selection criteria, set out in section 3 of the 2017 Report and the Revised Report, ensured that the countries selected were directly and reasonably comparable to Trinidad and Tobago. The comparators were regional geography, physical geography, calling party pays regimes, the number of operators and the availability and confidentiality of interconnection rates. Additionally, the Authority conducted a normalisation analysis to determine whether the differences in demographic, socio-economic and environmental variables between Trinidad and Tobago and the sample selection were significant enough to warrant any normalisation of the results. Table 1 identifies all data which were considered in order to determine whether the comparators had to be adjusted further. The comparators were found to be effectively equivalent, as there was little basis for implementing a normalisation adjustment of any magnitude. Section 6.4 of the Revised Report provides more details. In section 6.4 and Table 1 of the Revised Report, the Authority responds further to this issue raised by Digicel.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				Moreover, the Authority advises that the benchmark jurisdiction selection criteria established in this study were used in previous benchmarking studies in the Caribbean. For example, two consultations were conducted by Turks and Caicos Islands Telecommunications Commission, which led to regulatory decisions on mobile and fixed termination rates. (See footnote 3 in the Revised Report for more information.)
Section 2	Digicel (T&T) Ltd	Digicel notes that TATT has already set in place the foundations for carrying out the cost modelling of networks in Trinidad and Tobago, and now proposes to commit resources to develop an interim benchmarking approach	Digicel recommends that in order to remove the regulatory uncertainty faced by concessionaires which arises due to TATT's change of approach, the Authority should confirm that it is suspending activity on the modelling during the effective period of any price control introduced on the basis of benchmarking.	In light of the imminent renewal of the interconnection agreements, it was necessary for the Authority to act within its mandate to develop alternatives to guide the sector, particularly for all operators seeking interconnection. The benchmarking exercise is therefore in fulfilment of regulation 15(2) of the Interconnection Regulations, which states: "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."

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				Digicel is asked to note that the Authority will continue to pursue avenues to progress a cost model, which shall be consulted upon in due course.
Section 2 Regulation 15(2) and (3) of the Telecommunications (Interconnection)Regulations 2006 (page 6)	MPU	i) Is it to be assumed that relevant interconnection rates are not available because TATT has not been able to implement its service costing model that will provide interconnection cost based on bottom- up or top- down LRIC cost model? What is the reason for the absence of rates for interconnection that have operators resorting to benchmarks? ii) Any relevance to be derived from benchmarking comes only when they are extrapolated from jurisdictional (Trinidad and Tobago) rates that were originally based on actual costs. Where benchmarks are based on comparatives from rates in other jurisdictions that were not at any time derived from true cost or actual costs, then such benchmarks are purely arbitrary and become indefensible under any cost-attestation process.	TATT should make mention of the inconvenience in obtaining cost-based interconnection data to facilitate its setting of interconnection termination rates, both international and domestic. The shortcomings of benchmarking warrant a very solid justification for using them. Especially since the Act makes provisions that empower TATT to seek cost based data above all other preferences.	The Authority advises that it shall continue to pursue avenues to progress a cost model, which shall be consulted upon in due course. However, in light of the pending renewal of the interconnection agreements, it was necessary for the Authority to act within its mandate to develop alternatives to guide the sector, particularly for all interconnection seekers who were involved in the costing process and who would be required to pay termination charges. In the absence of costing data, the Authority has thus resorted to the use of benchmarks. The benchmarking exercise is therefore in fulfilment of regulation 15(2) of the Interconnection Regulations, which states: "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."
Section 3				

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
Section 3 – Benchmark Sample Selection Criteria	TSTT	Under section 3.1 it was indicated that "selected jurisdictions are directly comparable to the target market, in this case Trinidad and Tobago." However, while TSTT acknowledges the categories considered, there are some salient areas that TSTT believes should have been more vigilantly considered, i.e. the economic, social/behavioral, technological, industry and regulatory . As such, we cannot make assumptions and comparisons to develop a rate and not consider these pertinent factors. Under section 3.3: As examples of the relevance of these considerations: Macro-Economic and Social/ Behavioral Factors: In the period 2010 to 2014 Trinidad and Tobago experienced a buoyant economy which, in the telecommunications space, resulted in widespread uptake of services, including the deepening of usage of both fixed and mobile voice services.	TSTT believe that the selection criteria for a proper benchmarking process should be extended to carefully consider: - macro-economic and social/ behavioral factors, - technological and industry factors, and - regulatory factors To foster a more holistic and realistic comparison. TATT should distinguish which of the 23 countries used for direct benchmark determinations, 1) Have their rates set by Court judgements as opposed to Cost Model determinations. Those that were not set by Cost Models may not be appropriate for application in T&T, as the rate is not assured to be reflective of actual costs.	The Authority conducted a normalisation process which considered the differences in demographic, socio-economic and environmental variables between Trinidad and Tobago and the benchmarking sample countries. For example, the number of mobile and fixed competitors, the number of mobile and fixed subscribers and mobile and fixed penetration were considered. These are common denominators which encapsulate intrinsic telecommunications industry/market characteristics. The Authority considers that the normalisation factors appropriately assess the market factors and ensure direct comparability between the benchmark sample jurisdictions and Trinidad and Tobago. The Authority responds further to this issue in section 6.4 and Table 1 of the Revised Report. The benchmarking exercise also took into account the means by which interconnection rates were set in each benchmark sample jurisdiction (e.g., by an NRA or court, and cost-based or otherwise). Further details on this are included in the Revised Report. For clarification, the Authority has only used post-2012 determined rates to establish its recommended costing benchmarks.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		Since 2014, there has been an economic slowdown with concomitant weaknesses evident in customers' consumption patterns in relation to voice services. In selecting appropriate countries for benchmarking, there should be consideration of the macro-economic environment (and associated behavioral patterns of customers) at the time of the determination of rates – especially where those rates were established by Courts, as opposed to pursuant to Cost Models. Technological and Industry Factors: Since 2012, the technological landscape in Trinidad and Tobago's telecommunication sector has been transformed: Both mobile carriers upgraded their networks to UMTS+ technology, with associated network configuration changes. These changes have resulted in higher network operating costs which must be considered. Furthermore, operators continue to roll out infrastructure to support the operating effectiveness of its networks. As all these factors need to be considered in the determination of average price for unit call carriage. Additionally, there has been the emergence of	2) Have market trends which reflect consumed minutes in the fixed and mobile markets trending upwards or otherwise. Markets where the usage trends vary from what persists in T&T at this time may not be appropriate to benchmark against T&T going forward. 3) Have deployed combined GSM/ UMTS+/ LTE networks which all provide voice services to its customers. Countries that do not share this technology mix would be inappropriate to use as benchmark for T&T going forward. 4) Have deployed FTTx networks with NGN Cores. Countries that do not share this technology mix would be inappropriate to use as benchmark for T&T going forward.	

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		various fixed networks i.e. upgrades to fibre to the home (FTTx) network topologies and this drastically redefines the cost base of the fixed operators – as there is widespread reinvestment in new network elements, which replacing elements would have been previously reduced to nominal economic values in cost base determinations. Further, FTTx architectures expand the Core Network closer to the customer. This introduces new elements – previously excluded – from the Interconnection Cost base. As such, these changes should be considered in the determination of the average price for unit call carriage.		
Section 3 Benchmark sample selection criteria (page 7)	MPU	No reference is made to the most important component in the rate justification, the volume of inter- network traffic. The volume of inter network traffic gives an indication of the asymmetry of the flows between networks and also points to the maturity of the competing networks. In jurisdictions of two mobile or even fixed line providers mature networks exhibit an almost even flow of traffic back and forth. That symmetry is a powerful indicator that there are economic reasons to jettison the use of Mobile Termination Rates (MTRs) in such markets.	The continuation of an MTR billing regime is unnecessary. The uneconomic use of MTRs in any market scenario where there is symmetric traffic exchange between networks should be avoided and such flows classified as suitable and ready for policy and system change. TATT has failed to consider the justification for continuing an MTR regime in the face of compelling traffic symmetry. The lack of traffic analysis will result in the waste of resources in	The Authority has captured the network traffic flows between local operators and assessed same within the context of the findings of the benchmarking exercise. The Authority advises that current interconnection traffic flows are not symmetric. As identified in section 8.1 of the Revised Report, the Authority noted that implementation of the findings of the benchmarking exercise would result in gains or losses for individual operators, depending on the relative call traffic volume flows between operators (asymmetric flows).

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		Symmetric traffic usually points to i) uneconomic use of an interconnection billing system and its attendant artefacts and processes and ii) maintenance of a costly and unseemly cash transfer process by each network to the other. Elimination of MTRs (can mean, future cost savings and more cost-efficient interconnection. Since most Caribbean countries have two mobile operators the likelihood of traffic symmetry is great and by extension, the uneconomic use of an MTR regime is highly likely.	continuing the perpetuation of an MTR scheme.	
Section 3.1	Digicel (T&T) Ltd	TATT claims that including in the benchmark sample only jurisdictions from the Caribbean region "ensures a reasonable degree of comparability because operators are providing service in relatively comparable geographic and climatic conditions" while only including islands "ensures a reasonable degree of comparability because operators face comparable cost conditions specifically related to island states that may be different from those cost conditions that apply to continental states." Simple geographic proximity or similar geographic/climatic conditions are not a good predictor of costs. For instance, one would expect volumes of usage (voice plus data), clutter and	TATT should make sure that countries included in the benchmark are comparable. Not all Caribbean jurisdictions are necessarily comparable while other non-Caribbean jurisdictions may be a better fit. The fallacy of TATT's assertion of "…relatively comparable geographic and climatic conditions…" is clear when one considers that Cayman has a maximum elevation of 43m above sea level while Trinidad and Tobago has a maximum elevation of over 900m.	Regional geographic location was used to determine the first degree of comparability. This selection criterion therefore provided a reasonable starting point for identifying the full benchmarking sample. The Authority also investigated, in detail, 10 other comparative conditions, such as demographic, socio-economic and environmental variables. Section 6.4 of the Revised Report provides more details on this. In response to the suggestion that "maximum elevation" be considered as a sample selection criterion and/or normalisation variable, the Authority collected such data for all of the jurisdictions in the full benchmarking sample. In terms of maximum elevation, some jurisdictions are considerably higher than Trinidad and Tobago, such as the Dominican Republic and Jamaica,

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		population density to be related to the costs of the radio access networks (for MTR) while household distribution and fixed traffic consumption would be better predictor of switching and transmission costs (for FTR). The level of wages would have an effect as well in terms of the opex and civil works costs. In addition, the types of services offered as well as the volumes of demand would have an effect on the costs included (e.g. amount of spectrum, type of base stations) and the cost recovery. Small, continental states are not necessarily that different from island states in so far as the domestic rates are concerned (i.e. excluding the international connectivity). For instance, ARCEP in France includes French Guyana with Martinique and Guadeloupe i.e. the same cost model is used for the three territories.		some much lower, such as the Cayman and Turks and Caicos Islands, while others are very similar, such as St. Lucia and St. Kitts and Nevis. Whether considered on a full sample or post-2012 sub-sample basis, Trinidad and Tobago, at 940 m, falls just slightly higher than the average (by less than 100 m in both cases). The Authority saw no reason to believe that maximum elevation would have had a significant effect on interconnection rate levels. Nevertheless, in response to Digicel's suggestion, it measured the correlation coefficients between maximum elevation and FTRs and MTRs in the benchmarking sample jurisdictions. Whether on a full sample or post-2012 sub-sample basis, the Authority found no evidence of any significant correlation between the two variables (i.e., the correlation coefficients near zero). The results of this additional test are included in section 6.4 of the Revised Report. Consequently, the Authority sees no reason to modify its sample selection criteria nor its recommended costing benchmarks in order to take into account maximum elevation differences across jurisdictions included in the benchmarking sample.
Section 3.1	Digicel (T&T) Ltd	TATT explains that it has included "those jurisdictions that have hybrid RPP/CPP regimes	TATT must justify which jurisdictions with hybrid RPP/CPP	The Authority disagrees with Digicel's suggestion that hybrid RPP/CPP jurisdictions should be excluded from

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		and where some or all interconnection rates in such cases are deemed to be reasonably comparable for benchmarking purposes" Hybrid RPP/CPP regimes cannot be considered comparable as the revenue flow in the business model are different from a CPP regime. By definition in hybrid RPP/CPP regimes cost recovery is from both calling and receiving parties. This difference is fundamental and means that TATT must justify their inclusion as comparators The selection of some "hybrid RPP/CPP regimes (…where…) interconnection rates (…) are deemed to be reasonably comparable for benchmarking purposes" is unsupported is subjective and renders these comparators subject to legal challenge if included.	regimes it has included and clearly set out why they are suitable to be included as equivalent comparators. In addition, TATT should run a sensitivity by excluding the jurisdictions with hybrid RPP/CPP regimes.	the benchmarking sample. There are 23 jurisdictions in the full benchmarking sample, only two of which are hybrid RPP/CPP jurisdictions: The Bahamas and Barbados. Sample selection criterion 3.1 (iii) specifically addresses the question of the nature of the interconnection regime in place in jurisdictions considered for inclusion in the benchmarking sample. While the criterion calls for the exclusion of jurisdictions with "pure" RPP regimes, (since they would not be comparable to CPP regimes), it recognises that jurisdictions with hybrid RPP/CPP regimes, where some or all interconnection rates are deemed to be reasonably comparable for benchmarking purposes, can and should be included in the benchmarking sample. With respect to the two jurisdictions in question, with the introduction of mobile competition in 2016 in The Bahamas, the Bahamian NRA implemented a fully allocated cost-based MTR and FTR and, as a result, the interconnection regime in The Bahamas is comparable to those in place in the other Caribbean jurisdictions in the benchmarking sample. In the case of Barbados, the Fair Trading Commission (FTC) used a total service LRIC (TSLRIC) modelling approach to determine its MTR and FTR, which was cost-based, starting in April 2016 (after a glide path) and, therefore, the interconnection rates in Barbados are also comparable to those in place in the

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				other Caribbean jurisdictions in the benchmarking sample. The Authority is, therefore, of the view that The Bahamas and Barbados satisfy the benchmarking sample selection criteria and, along with the Caribbean jurisdictions included in the benchmarking sample, should be taken into consideration for interconnection rate benchmarking purposes in Trinidad and Tobago. That said, in response to Digicel's suggestion on this matter, sensitivity analyses were carried out for the MTRs and FTRs, to assess the impact of excluding The Bahamas and Barbados from the benchmarking sample. The Authority found that their exclusion had no material effect on its MTR and FTR recommendations as set out in the Revised Report, i.e., even if The Bahamas and Barbados were excluded from the benchmarking sample (a proposal that the Authority disagrees with), the Authority's recommended costing benchmarks would not change. The results of these sensitivity analyses are presented in the Revised Report.
Section 3.1	Digicel (T&T) Ltd	TATT explains that "In jurisdictions where some mobile operators claimed confidentiality, the interconnection rates of those that did not claim confidentiality or have disclosed the interconnection rates are used." Using partial information from a country is not a valid benchmark as the disclosed rates do not	TATT should include countries in full and exclude them altogether. TATT should also make clear how a country rate is calculated from the operators' specific rates e.g. arithmetic average, weighted average by volumes of termination traffic, etc.	The Authority does not agree with Digicel's suggestion that jurisdictions with partial interconnection rate information should be excluded from the benchmarking analysis. This proposed limitation, if applied, would unnecessarily and inappropriately exclude jurisdictions where one or more, but not all, operators' interconnection rates are confidential.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		reflect the rates generally active in a country. Countries should be included in full or excluded all together.		The Authority notes that uniform interconnection rates applied across operators for almost all jurisdictions for most of the period under question, with the following exceptions, discussed below: i. The Bahamas, where the incumbent's MTR was slightly lower than the new entrant's MTR for the period beginning November 2016, when The Bahamas first entered the benchmarking sample ii. Guadeloupe and Martinique, where the larger regional operators (Digicel and Orange) had lower MTRs than those of the smaller operators, until December 2012 (when the rates became symmetric). Likewise, for the FTRs, the major incumbent operator (Orange) had a lower FTR than the other operators until October 2011 (when the rates became symmetric). iii. St. Barts and St. Martin, where the larger regional operators (Digicel and Orange) had a lower MTR than those of the smaller operators, until June 2013 (when the rates became symmetric). Likewise, for the FTR, the major incumbent operator (Orange) had a lower FTR than the other operators' FTRs until October 2011 (when the rates became symmetric).

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				In all these cases, the Authority considered how to calculate the average rate for the jurisdictions including whether or not to use weights, and if so, which weights to use. Because the Authority decided against using weights for the determination of the benchmarking samples, it also decided not to use weights for the determination of the jurisdiction-specific samples. Furthermore, because the larger operators have lower MTRs/FTRs, any weighting, by including number of subscribers or traffic, would have the effect of lowering somewhat the jurisdiction-specific averages and slightly lowering the resulting sample averages, thus confirming again that the Authority's approach is conservative. Moreover, in practice, the effect of weighting is limited in duration and, in theory, only The Bahamas observation would have had any bearing on the calculation of the sample averages because of the Authority's preferred approach to include only post-2012 decisions and observations. The Authority notes that Sample Selection Criterion #5, "Availability of Interconnection Rates", only eliminates jurisdictions where all operators' interconnection rates are confidential. This criterion is not intended to eliminate the use of jurisdictions where interconnection rate information for at least one operator is available. Excluding useful partial country information would

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				unnecessarily limit the size of the benchmarking sample. Furthermore, in the context of multi-operator markets, confidential interconnection rates for one competitor are likely to be very similar to publicly available interconnection rates of other competitors in the same jurisdiction. Consequently, the Authority considers that including jurisdictions with partial interconnection rate information is appropriate. It should be noted that, even if Digicel's suggestion in this regard were adopted, its effect on the benchmarking results would be inconsequential. The only "partial information" jurisdiction included in the benchmarking sample is BVI, where the MTR is publicly available for two of the three operators. However, these MTRs were not revised during the post-2012 period and hence BVI is not included in either the post-2012 or the cost-based post-2012 sub-samples. Consequently, BVI had no influence on the Authority's MTR recommendation and, hence, its inclusion/exclusion had no impact on the recommendation.
Section 3.1 (iii) Calling Party Pays ("CPP") versus Receiving Party Pays ("RPP") Regime:	MPU	It is with interest that we enquire why TATT has never examined the use and benefits of CPP as the most effective billing rationale for achieving its market maturity state. A CPP regime(?) was approved by the Regulated Industries Commission (RIC) in 1998, when the Act creating the RIC was	TATT needs to explore the economic plausibility of a "Bill and Keep" settlement within the current CPP call charging system in order to identify whether sliding down interconnection rates is a more efficient price control	The Authority has considered the economic feasibility of a BAK settlement within the current CPP regime and underscores that, based on a review of interconnection data provided by local operators, traffic is not symmetrical amongst parties and, therefore, the regime is not conducive to the removal of barriers to entry and

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
Footnote 4 page 10 "It is pertinent to note that we also reviewed and considered the North American experience with respect to interconnection policies and rates, including those of the US Federal Communications Commission (FCC) and the Canadian Radio-Television and Telecommunications Commission (CRTC), however, since neither has a CPP regime in place, neither were considered relevant to the benchmarking analysis conducted for this study. (page 10)		proclaimed (RIC Act, Chap. 54:73) and which Act initially gave the RIC jurisdiction over the Telecommunications Sector (i.e. before the creation of TATT by the Telecommunications Act, Chap. 47:31. TSTT initially received approval from the RIC to adopt a CPP regime (this occurred partly because the Mobile Market was not initially subject to regulation by the RIC).The CPP regime provided TSTT with a powerful subscriber growth incentive, by moving the initial mobile service investment cost for subscribers downwards. Subscribers were now only required to pay for the calls they made and not also for calls received by them. This tacitly was a movement from the RPP to the CPP system. The result for TSTT was rapid growth in customer base, providing TSTT with a mainstay in the market, before the advent of liberalization. Under the CPP regime, there was no interconnection and hence no inter network traffic for settlement. The introduction of competition brought a case for termination rates which was justified as providing an economic incentive to new market entrants. However, with ten years of liberalization past, the next phase of development is ripe to be ushered in, all in step with the economic developments	regime than conducting a phased transition to bill and keep. This will also keep Trinidad and Tobago in line with the inevitable beckon that comes from IP interconnection for IP based traffic of which all traffic will soon comprise as even TDM mobile switched minutes become pure legacy, and a barrier to new innovative data transmission for voice and all converged traffic.	competition.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		predicted for the progression to a mature liberalized market. Symmetrical traffic flows between networks negate the need for termination rates or settlements thereto, especially if a new strata of economic benefits stand to be fostered on behalf of consumers. TATT has adopted CPP as being the charging system of choice versus RPP as in other regimes. However, this does not bind the market to perpetuating the termination rate settlement regime and TATT too is free to phase in, what at this juncture is, "Bill and Keep" and eliminate what is now no longer necessary for a mature mobile interconnection market. Also, there is no requirement that termination rates be the only settlement method for interconnection, under a calling party pays call charge system. Bill and Keep is also a viable and equitable settlement method for both a CPP or RPP call charge system		
Section 3.3	Digicel (T&T) Ltd	TATT explains it has grouped some jurisdictions in the sample because they were based on the same decision by the same regulatory authority e.g. FWI and former Netherlands Antilles jurisdictions (excluding Aruba).	TATT should consider all rates rather than artificially removing those that happen to have been taken by the same regulatory authority.	The Authority reiterates that the French West Indies (FWI) and the former Netherlands Antilles all have strong political, economic and, above all, regulatory commonalities. Should the commonalities be excluded in determining the appropriate sample, the validity of the results could be compromised.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		It should be noted that this reduces the sample size by about ~26% reducing from 23 to 17. TATT's grouping results in the benchmarking becoming a benchmark of decisions rather than a benchmark of applicable rates. No explanation is provided why this is supposed to be better.		In addition, for the reasons set out in the Revised Report, the Authority considers that FWI should be treated as two rather than four observations for benchmarking purposes. The Authority notes that, traditionally, the NRA in FWI had established the same interconnection rate for all operators in Guadeloupe/Martinique and, separate interconnection rates for each operator in St. Barts/St. Martin. (They have tended to converge through the latter half of the sample). Including each of these four jurisdictions separately in the sample would potentially place a disproportionate weight on the FWI jurisdictions within the two benchmarking sub-samples relied on for the Authority's MTR and FTR recommendations. Additional sensitivity analyses were also carried out to assess the impact of treating FWI as four rather than two observations. Doing so significantly affects the MTR and FTR cost-based post-2012 sub-samples, since they consist of six and four jurisdictions, respectively. Treating FWI as four rather than two observations has the effect of increasing the FWI weight from 33% to 50% for the FTR and from 50% to 67% for the MTR. The impact on all MTR and FTR post-2012 sub-samples is less pronounced, since these are larger in scale (i.e., nine jurisdictions in both cases). However, even with this change in weighting, treating FWI as four rather than two

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				observations does not change the Authority's MTR or FTR rate recommendations. The results of the sensitivity analyses confirming this outcome are presented in the Revised Report. See also the Authority's response below to CCTL's similar comments on section 6.1 regarding the treatment of FWI.
Section 3.1 Benchmark Sample Selection Criteria and Section 3.2. Selected Benchmark Sample Jurisdictions	CCTL	The sample selection criteria as set out in the document includes several factors; i. Regional geography i.e. only Caribbean countries ii. Physical geography i.e. only island nations iii. Interconnection regime i.e. exclusion of pure receiving party pays regimes (RPP) iv. Market structure i.e. exclusion of monopoly markets v. Availability of rates, i.e., only rates that are publicly available We believe that the above considerations provide a reasonable starting point for identifying a benchmark sample. Of note, these criteria result in an initial sample of twenty-three countries. The sample is further refined based on additional benchmark restrictions presented in subsequent stages of the study.	We believe these five criteria used to select the benchmark sample apply an appropriate and necessary set of restrictions. However, we do not find these criteria to be sufficient. Additional criteria must also be applied to arrive at an appropriate and sufficiently refined sample of benchmark countries. As we discuss further in our comments below, additional refinements are made to the benchmark requirements at a later stage in the study. The most important of these subsequent refinements are (1) the vintage and (2) cost basis of interconnection rate decisions. We agree with the exclusion of interconnect rates	The Authority notes CCTL's contribution. The selection criteria provided a reasonable starting point for identifying the full benchmark sample. The sample was further refined based on other comparative conditions, including demographic, socio-economic and environmental variables. Section 6.4 in the Revised Report gives more details on this analysis. With respect to CCTL's comments regarding the reliance on cost-based rather than non-cost-based interconnection rate data, see the Authority's response under section 6.1 below and in the Revised Report.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
			established pre-2012 and likewise we believe any rates that are not cost based must be rejected. We believe these are fundamental criteria--given the requirement that interconnection rates be cost based and the consistently downward trajectory of telecommunications costs--and the transparency of the study would be improved by including these criteria among the five criteria identified in Section 3.1 at the outset of the study.	
Section 3.3 Benchmark Sample Jurisdiction Grouping and 3.4 Supplementary Benchmark Data	CCTL	The first refinement made to the 23-country sample is to group various countries, as specified in Section 3.3, based on political or regulatory commonalities. The study chooses to group only those countries with common interconnection rates, which include the French West Indies and former Netherland Antilles. The effect of this grouping is that it treats multiple countries as a single observation, and in effect under-weights the impact of these grouped countries relative to the other non-grouped countries in the sample. And given the small size of relevant benchmark	We object to the grouping of countries. The decision to group countries is arguably arbitrary, and its impact is significant; it produces rates much higher than would be the case, absent grouping. We, therefore, recommend that each country that meets the benchmark criteria, including the criteria that their rates be current (at least post-2012) and cost-based (which is a requirement of Section 15(1) of the Regulations) be treated as separate observations for purposes of	The Authority reiterates that FWI and the former Netherlands Antilles all have strong political, economic and, above all, regulatory commonalities. Should the commonalities be excluded in the consideration of the appropriate sample, the validity of the results could be compromised. In addition, for the reasons set out in the 2017 Report and the Revised Report, the Authority considers that FWI should be treated as two rather than four observations for benchmarking purposes. The Authority notes that traditionally the NRA in FWI had established the same interconnection rate for all operators in Guadeloupe/Martinique and separate interconnection rates for each operator in St. Barts/St. Martin. (They have

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		sample, the impact of this under-weighting has a very significant and distortionary impact on the results. The relevant sample consists of just six observations and is limited to countries whose rates are (1) based on cost and (2) relatively current, i.e., post-2012. Two of these six observations, however, are grouped: FWI Group 1 (Guadeloupe and Martinique) and FWI Group 2 (St. Martin and St. Bartholomew). And it just so happens that both grouped observations have the lowest interconnection rates in the sample. Therefore, were these countries not grouped, i.e., treated the same as the other four countries in the sample, the benchmark rates would be much lower. The grouping of these countries, in other words, produces artificially high benchmark rates. With regard to the use of supplemental benchmark data from European countries, as specified in Section 3.4, we have no objection to including these data for sensitivity and cross-check purposes.	calculating an average benchmark rate.	tended to converge through the latter half of the sample.) Including each of these four jurisdictions separately in the sample would potentially place a disproportionate weight on the FWI jurisdictions within the two benchmarking sub-samples relied on for the Authority's MTR and FTR recommendations. See also the Authority's response below to CCTL's comments on section 6.1 regarding the treatment of FWI.
Section 4				
Section 4.1 Interconnection Service Rates	CCTL	We agree with the categorization of services into primary and secondary categories. Domestic termination services are clearly of primary	The focus on this analysis should be on primary (domestic) services and not secondary (international)	International termination is an interconnection service that falls under the regulatory purview of the Authority. The current interconnection agreements (of 2012)

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		importance, while international termination services are secondary. The fact that publicly available information focus primarily on the domestic termination services, and not on international termination services, is indicative of the relative importance of these two service categories. With respect to secondary services, international termination, we do not find the benchmarking of these services persuasive or necessary.	services. As we discuss in section 7 below, we believe that mandating reductions to international termination services will not lead to appreciable benefits to consumers and could in fact harm consumer welfare. Any concerns TATT may have in terms of international termination rates being too high are best addressed by competition, not regulation. We recommend TATT continue to forbear from regulating international termination rates.	included newly introduced components of international termination rates (i.e., international carriage charges). In the interest of all commercial stakeholders, the Authority is obligated to determine the cost of such charges, particularly for all providers (including smaller market players) expected to negotiate new interconnection agreements.
Section 4.2 - Interconnection Data Compilation Process	TSTT	It was indicated that an existing Caribbean interconnection rate database (developed by the Consultant) was used as a starting point for this benchmarking process. TSTT is of the view, that using this alone may not accurately facilitate the objectives of the benchmarking process.	TSTT will like to know:- i) The reliability and validity of said inputs as these are key characteristics in ensuring that a reasonable estimate was attained. ii) The relevance of the information in the database given the rapid evolution of networks in Trinidad and Tobago that have effectively replaced the status quo prior to 2014.	The benchmarking database includes publicly available interconnection rate information for all the Caribbean jurisdictions included in the benchmarking sample and, therefore, is reliable, verifiable and valid for the purpose at hand. The Authority is giving local operators a copy of the benchmarking database (in EXCEL spreadsheet format) of monthly MTRs and FTRs for all jurisdictions in the benchmarking sample. This is presented in local currencies and in US dollars, along with US dollar exchange rates.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				The Authority further reminds TSTT that it conducted a normalisation process which carefully considered the differences in demographic, socio-economic and environmental variables between Trinidad and Tobago and the sample jurisdictions. For example, the Authority considered the number of mobile and fixed competitors, the number of mobile and fixed subscribers and mobile and fixed penetration. These are common denominators which encapsulate intrinsic telecommunications industry/market characteristics, including the evolution of networks.
Section 4.2	Digicel (T&T) Ltd	TATT explains that the data compilation was based on the "assessment of publicly-available data from NRA websites (…) and correspondence with NRAs" and that "Data to March 2017 was based on a short-term assessment of a continuation of current arrangements or expected changes, as the case may be, based on NRA websites and or correspondence." Using confidential correspondence with NRAs (not accessible to operators) is not transparent and does not allow for review by operators. Also, the decision to assess "current arrangements or expected change" and use that as a basis to potentially modify the collected benchmark data is	TATT should make available to operators the correspondence it had with NRAs as part of the data compilation so that operators can understand and accept the work done. TATT should fully explain any adjustment it made to the collected data on the basis of "short term assessments".	The consultant collected the benchmarking data during November and December 2016. This exercise involved gathering publicly available information from NRA websites and other relevant sources. Where necessary, the consultant also called and/or emailed some NRAs to clarify and ensure proper understanding of the decisions and related documents available on the public record. The content of any such calls and/or email exchanges is private and also not relevant to the understanding or acceptance of the 2017 Report and the Revised Report. No confidential interconnection rate information was relied on to develop the Authority's interconnection rate recommendations, which are based entirely on publicly available information.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		not reasonable as there is no certainty on future events before they take place. In addition, those assessments are not detailed in the benchmarking study which makes it impossible for operators to comment on them.		In addition, with the objective of having effective historical data for the full 2016/2017 financial year, the consultant also assessed whether the interconnection rates in force in December 2016 would continue without change or if they were scheduled to change via NRA directive during the period January to March 2017. In this respect, there were two jurisdictions for which the consultant considered it reasonable to include new first quarter 2017 interconnection rates: FWI and Jamaica. In 2015, the NRA in FWI had established that, in January 2017, there would be a change in MTRs and FTRs in the corresponding FWI jurisdictions. The consultant was able to confirm that these MTRs and FTRs had been implemented as scheduled in January 2017. Based on correspondence with the NRA of Jamaica, the consultant included a decrease in the FTR that had been scheduled to take effect in March 2017. The consultant was able to confirm post facto that the change in FTR did take place. However, it was delayed relative to initial expectations and implemented in a two-step manner, the last phase of which did not take place until April 2018. This situation in Jamaica only affected the FTR; the MTR was set based on a different process and timeline. This post-facto analysis implies that Jamaica should no longer be included in the FTR post-2012 benchmarking sub-samples because the only previous revision of the

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				FTR was made prior to 2012. Revised "base case" FTR benchmarking results, excluding Jamaica, have been included in the Revised Report. The Authority notes, however, that the exclusion of Jamaica from the FTR post-2012 sub-samples had no material effect on the Authority's FTR rate recommendation, as set out in the Revised Report. In addition, sensitivity analyses were conducted to assess the effect of excluding the decreases in FWI interconnection rates implemented in January 2017. The results of those sensitivity analyses show that the exclusion of these decreases had no material effect on the Authority's MTR and FTR rate recommendations, as set out in the Revised Report. The results of these sensitivity analyses are presented in the Revised Report.
Section 4.2. Interconnection Data Compilation Process	CCTL	We have no objections to the data compilation process, as described.	In order to better evaluate this compilation process and understand and assess the data, we request TATT provide CCTL a copy of the complete dataset used to prepare Figures 1 and 2, as well as the complete dataset used to arrive at the recommended ICC rates presented in Figure 6. We request the data be provided in an Excel spreadsheet and include formulas showing the impact of	As indicated above in response to a similar request, the Authority is giving local operators a copy of the benchmarking database (in EXCEL spreadsheet format) of monthly MTRs and FTRs for all jurisdictions in the benchmarking sample. This is presented in local currencies and in US dollars, along with US dollar exchange rates.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
			exchange rate adjustments and other assumptions.	
Section 4.3 Other Benchmarking Related Data	CCTL	CCTL takes note of the range of variables collected and considered in the study's sensitivity and normalization analyses. As we discuss in further detail below, we believe the analyses based on market/competition variables and regulatory variables are central to the study's results, and support our conclusions that the relevant benchmark sample should only include observations that are (1) cost-based (2) of a recent vintage (post-2012). Furthermore, given the positive impact of market structure/competition on rates, we believe market forces, not regulation, are the best determinants of international termination rates.		The Authority advises that the regulatory maxima recommendations are based on the sample observations that are of recent vintage (post-2012) and both non-cost-based and cost-based, i.e., the post 2012 and cost-based post 2012 sub-samples as defined in the 2017 Report and the Revised Report. The Authority reminds CCTL that existing interconnection agreements (of 2012) included newly introduced components of international termination rates (i.e., international carriage charges). In the interest of all commercial stakeholders, the Authority is obligated to determine the costs of such charges, in accordance with its mandate on matters of interconnection.
Section 5				
Section 5	Digicel (T&T) Ltd	TATT explains how it converted interconnection rates from local currency units (LCU) to USD using either fixed official exchange rates or long-term (9 year) average exchange rates. No consideration seems to have been given to using Purchasing Power Parity (PPP) rates instead of official exchange rates.	TATT should consider using PPP rates instead of official exchange rates.	The Authority notes Digicel's suggestion that consideration be given to the use of purchasing power parity (PPP)-adjusted rather than unadjusted, nominal market exchange rates for the purpose of interconnection rate benchmark comparison. However, the Authority is of the view that PPP-adjusted exchange rates are not required nor necessarily appropriate for this purpose, for a number of reasons.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				First, it is questionable whether the prices of individual services should be compared on a PPP-adjusted exchange rate basis. As Rodney Ludema of the Department of Economics and School of Foreign Service at Georgetown University has noted: "PPP exchange rates were originally created for the purpose of making international comparisons of large macroeconomic aggregates such as GDP or GDP per capita. The idea was that to express these aggregates in "real" terms, free from the effects of international price differences. This continues to be their primary use. The construction of PPPs is a very complicated process, which starts with periodic price surveys conducted by national governments under the supervision of the OECD. For various reasons, PPPs are imprecise estimates of international price relatives, and the OECD warns against using them to create international rankings. Moreover, because spending patterns change over time, PPPs are not necessarily valid for intertemporal comparisons"[14]. Second, while there may be examples of international "retail" product and service price comparisons that are conducted on a PPP-adjusted exchange rate basis, there is little, if any, rationale for following such an approach in the case of "wholesale" products and services. For

[14] R. D. Ludema, *Nominal Prices, Real Prices and Faux Prices: The Perils of Comparing Individual Prices at Purchasing Power Parity Exchange Rates*, March 19, 2010, page 2. Copy available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1575745.

Document Sub-Section	**Submission Made By:**	**Comments Received**	**Recommendations Made**	**TATT's Decisions**
				instance, the ITU notes in its benchmarking guide that: "Converting prices on the basis of PPP is particularly relevant when benchmarking <u>retail</u> prices as consumers tend to compare prices against the cost of other potential purchases. Price conversions on the basis of averaged exchange rates will generally be more appropriate for benchmarks of <u>wholesale</u> prices"[15]. (emphasis added). Third, collecting reliable and comparable PPP data for all the Caribbean countries included in the benchmarking analysis would be difficult, if not impossible. Therefore, even if there was some reasonable rationale for comparing interconnection rates across the benchmark sample, doing so would not be possible. For all of these reasons, the Authority considers that reliance on nominal market exchange rates to convert interconnection rates into a common currency for benchmarking purposes is justified and appropriate as well as common practice[16].
Section 5	Digicel (T&T) Ltd	TATT explains how it converted collected interconnection rates to an average cost per minute using a standard three-minute call and time of day traffic assumptions.	TATT should try and use local conversion factors where available. In any case, it should make its assumptions transparent to operators	Where applicable in jurisdictions that included multiple interconnection charges and/or time-of-day/week rates, the Authority used a set of generally accepted "global" assumptions to convert the rates into equivalent average

15 ITU Telecommunication Development Bureau, *Practical Guide on Benchmarking Telecommunication Prices*, August 2014, page 13, https://www.itu.int/pub/D-PREF-EF.PG.BENCH-2014. See also, the ITU's Regulatory Toolkit at http://ictregulationtoolkit.org/practice_note?practice_note_id=2879.

16 See the references noted previously by the Authority in response to Digicel's letter accompanying their comments on the 2017 Report.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		While it makes sense to convert rates to an average cost per minute, the use of a standard three-minute call duration and distribution of traffic is not necessarily ideal. There can be differences in those parameters between operators and even for a given operator over time so it is not credible to assume standard parameters across 23 jurisdictions.	e.g. what are precisely the time of day traffic assumptions?	per-minute rates. This conversion requirement only applied to FTRs in a limited number of jurisdictions and for a limited duration. The conversion factor assumptions used were as follows: • Average call time = 3.0 minutes • Time-of-day/week distribution: Day = 50%; Evening = 25%; Weekend = 25%. The Authority considers the use of "global" conversion factors to be preferable to "local" conversion factors, as suggested by Digicel. First, the necessary information required to determine local conversion factors is simply not available, as Digicel appears to recognise in its comments. Moreover, as illustrated in the following points, time-of-day/week interconnection charges are rapidly disappearing in favour of uniform per-minute FTRs, as has long been the case with MTRs: i. Five ECTEL member states (Dominica, Grenada, St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines) had multiple interconnection and/or time-of-day charges until 2009, when they were replaced with uniform per-minute FTRs. Regardless, none of these jurisdictions is included in the post-2012 or cost-based post-2012 sub-samples

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				that are the basis of the Authority's FTR recommendation. ii. The Cayman Islands had multiple interconnection and/or time-of-day/week charges until 2010, when they were replaced with uniform per-minute FTRs. Despite this, the Cayman Islands is not included in the post-2012 or cost-based post-2012 sub-samples which are the basis of the Authority's FTR recommendation. iii. Jamaica has had multiple interconnection and/or time-of-day/week charges during the entire period of the study. However, Jamaica is not included in the post-2012 or cost-based post-2012 sub-samples which are the basis of the recommendation for the FTR. iv. Barbados had multiple interconnection and/or time-of-day/week charges until 2015, when they were replaced with uniform per-minute FTRs. Barbados is included in the post-2012 sub-samples and, as such, the choice of conversion factors would impact the calculation of the average per-minute FTR prior to 2015. The conversion factor would

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				not, however, have any impact because a uniform rate was included. The choice of conversion factors would not have any impact on the cost-based post-2012 sub-samples because only the cost-based uniform was included in the sample starting in 2015. In principle, the Authority considers that the use of global rather than local conversion factors for benchmarking purposes is reasonable and appropriate. Furthermore, as shown above, in practice, the choice of conversion factors has minimal impact on the post-2012 sub-samples and no impact whatsoever on the cost-based post-2012 sub-samples and, therefore, the impact of this consideration would have no material impact on the Authority's interconnection rate recommendations.
Section 5 Full Sample Benchmarking Results	CCTL	We have no comment at this time on the adjustments to normalize the data for differences in call related charge differentials, and exchange rates. We reserve comment on these adjustments until after we have received and reviewed the complete data set and the formulas used to make these adjustments. We note the study's stipulation that the full-sample results are presented "for completeness only and	We hereby request TATT to provide CCTL a complete set of the data used in the benchmark study. See also CCTL's recommendation above with regard to Section 4.2.	As indicated above in response to a similar request, the Authority is giving local operators a copy of the benchmarking database (in EXCEL spreadsheet format) of monthly MTRs and FTRs for all jurisdictions in the benchmarking sample. This is presented in local currencies and in US dollars, along with US dollar exchange rates.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		do not constitute the recommended interconnection charges." Our concern with this presentation of full-sample results is that they include many observations that are ultimately not relevant to the study, i.e., are admittedly inappropriate benchmarks. Therefore, we believe the full-sample results presented in Figures 1-3 serve primarily to confuse and dilute the subsequent presentation of relevant benchmarks in Figures 4 and 5.		
Section 5 - Full -sample Benchmarking Results – (Figure 1, 2 and 3)	TSTT	From the period 2008 to 2013, different months were used in comparison to 2014 to 2017 and a trend was developed overall. This may reduce the validity of the end result as the data used is not directly comparable, as data is subject to change due to fluctuation in the market at various time intervals. Also, TSTT will like to be provided with the rational of the exclusion of the outliers, as it appears that only the outliers in the upper range were removed and not those the lower range.	TSTT is requesting that the data used in the analysis be consistent for all time periods.	The Authority notes that the MTR and FTR benchmarking samples differ only in terms of the time period covered, i.e., April 2008 to March 2017 for the MTRs, and April 2009 to March 2017 for the FTRs. The slightly shorter time period in the second case was due to data availability issues. Otherwise, the Authority confirms that all monthly interconnection data included in the benchmarking database were consistently used in the benchmarking exercise. The exclusion of Aruba and the ex-Netherlands Antilles outliers in Figure 3 relative to Figure 2 is purely for presentational purposes. Figure 3 was created to provide a clearer picture of the rates in other benchmarking jurisdictions that all have lower and more similar FTRs. The resultant full sample average in Figure 3 is the same

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				as that presented in Figure 2. Neither Aruba nor the ex-Netherlands Antilles were removed from the benchmarking sample.
Section 6				
Section 6.1. Benchmarking Analysis Methodology	CCTL	This section covers several issues central to the study's results. These issues include: 1. The vintage of interconnection decisions in the benchmark sample jurisdictions; 2. Historical trends in benchmark sample interconnection rates; 3. Alternative benchmark sample averages considered; and 4. Glide path to recommended interconnection rates We address each in turn. First of all, trends in telecommunications costs, generally, and interconnection costs, specifically, have been trending down over time. Therefore, rates established many years ago are less relevant and even irrelevant. Even rates of a more recent vintage, while relevant, must be adjusted downward if they are to be used to establish rates going forward. Therefore, we agree with the study's decision to exclude eight of the 17 observations in the full sample, and limit the potential benchmark candidates to the 9	We agree with the study's decision to exclude observations from the benchmark sample based on their vintage. We believe, however, that the study must go much further than that to achieve an appropriate and relevant benchmark sample. 1. The relevant benchmark sample must only include cost-based benchmarks, thus limiting the sample to the eight countries with cost-based rates introduced post-2012. Namely, the benchmark sample should exclude TCI, Dom Rep and Anguilla, and only include Bahamas, Barbados, Cayman, Guadeloupe, Martinique, Jamaica, St. Martin and St. Barts. 2. The relevant benchmark sample must not group countries and treat them as a single observation. The grouped countries are the four in the	First, the Authority disagrees with CCTL's proposal to limit the benchmarking sample to only jurisdictions where cost-based interconnection rates are in place. The Authority considers it preferable to rely on all relevant information available for benchmarking purposes, including jurisdictions with and without cost-based interconnection rates in place. As explained in the Revised Report, the cost-based post-2012 sub-samples provide a lower-bound benchmark and the post-2012 sub-samples provide an upper-bound benchmark. For both the MTRs and FTRs, the trend lines for these two sub-samples converge by the end-date target of March 2020. Therefore, in the Authority's view, it is unnecessary and inappropriate to rely on just the cost-based post-2012 sub-sample for benchmarking purposes, especially given its size relative to the post-2012 sub-sample jurisdictions. Second, for the reasons set out in the Revised Report, the Authority considers that FWI should be treated as two rather than four observations for benchmarking purposes. The Authority notes that, traditionally, the NRA in FWI

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		observations with rates established post-2012. Second, trending the historical data, i.e., adjusting existing rates downward such that they are forward looking is also central. As we discuss further below with regard to the alternative benchmark samples, we believe it is imperative a downward trend be applied to each of these samples. Third, given the regulatory requirement that rates be cost-based (per Section 15(1) of the Regulations), it is imperative only cost-based rates are included as benchmarks. This should not be a matter of discretion, as is treated in the study, but an imperative. The rates for TCI, Dom Rep and Anguilla are determined by benchmark or negotiation and thus are not appropriate benchmarks. The relevant benchmark sample must therefore exclude these countries and be limited to the eight countries with post-2012, cost-based rates (which given the grouping of four countries into two observations, results in a six-observation benchmark sample). In addition, we refer to comments provided above objecting to the grouping of the four French West Indies countries into two observations. The rates in	French West Indies-- Guadeloupe, Martinique, St. Martin and St. Barts. The grouping of these countries significantly distorts the results and inappropriately overstates the average interconnection rate in the benchmark sample. 3. A downward historical trend must be applied to the relevant benchmark rate. To apply a flatline trend to the rate contravenes observed historical patterns in interconnection rates. 4. New rates must be adopted immediately following the conclusion of this proceeding. Flash-cut implementation is consistent with how rates were introduced recently in Jamaica and the Cayman Islands. And only a 12-month glide path was applied recently in Barbados. If TATT chooses to apply a glide path, we believe a short period at most is warranted, not to exceed 6-months, with 60% of the reduction implemented immediately and the remaining 40% reduction implemented six months thereafter.	had established the same interconnection rate for all operators in Guadeloupe/Martinique and separate interconnection rates for each operator in St. Barts/St. Martin. (They have tended to converge through the latter half of the sample.) Including each of these four jurisdictions separately in the sample would potentially place a disproportionate weight on the FWI jurisdictions within the two benchmarking sub-samples relied on for the Authority's MTR and FTR recommendations. Nevertheless, in response to CCTL's suggestion, sensitivity analyses were carried out to assess the impact of treating FWI as four rather than two observations. Doing so significantly affects the MTR and FTR cost-based post-2012 sub-samples, since these consist of six and four jurisdictions, respectively. Treating FWI as four rather than two observations has the effect of increasing the FWI weight from 33% to 50% for the FTR and from 50% to 67% for the MTR. The impact on the MTRs and FTRs in the post-2012 sub-samples is less pronounced, since these are larger in scale (i.e., nine in both cases). However, even with this change in weighting, treating FWI as four rather than two observations does not change the Authority's MTR or FTR rate recommendations. The results of the sensitivity analyses confirming this are presented in the Revised Report.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		these four FWI countries are the lowest in the Caribbean. Therefore, by grouping these countries their impact is diminished when calculating the average rate within the sample. We also object to the flatline historical trend applied to the cost-based/post-2012 sample, as presented in Figures 4 and 5. It implies arbitrarily and wrongly, in our view that the average rate in this sample is a floor below which interconnect rates in the Caribbean will not fall in the foreseeable future. A more credible case might be made for a zero lower bound, but not at the sample average, which well exceeds zero. (By the way, a similar critique can also be made for the European trend line in Figures 4 and 5, which is arbitrarily specified as a flatline.) We believe a downward historical trend, comparable to that applied to the full sample or post-2012 sample should also be applied to the cost-based/post-2012 sample. Finally, CCTL objects to TATT's proposed 3-year glide path. There is no benefit to consumers or competition from postponing or delaying the implementation of cost-based benchmark rates in Trinidad. For starters, the existing interconnection rates no longer reflect current costs and are thus		

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		contrary to the Regulations. The longer these rates remain in effect, the greater the harm. It should also not be a surprise to any stakeholders in Trinidad that interconnect rate reductions are in the offing. The proceeding to establish lower LRIC-based rates has been underway for over a decade now. Given this lengthy record, operators should by now have the foresight to understand and anticipate the financial impact of lower rates. Furthermore, a 3-year glide path is excessive and inconsistent with recent interconnection rate reductions introduced elsewhere in the Caribbean. For instance, an immediate ("flash cut") implementation was adopted by regulators in Jamaica and the Cayman Islands, and a much shorter, 12-month glide path was adopted by the regulator in Barbados, when significantly lower LRIC-based interconnection rates were introduced in these countries.		
Section 6.1. Benchmarking Analysis Methodology	TSTT	As stated previously, the use of historical data is a valid form of analysis and a starting point for projections into the future, we have to understand and consider the limitations of using this method, particularly in this context – to note: TSTT's network transformations, begun in earnest in 2016	It is recommended that data for Trinidad and Tobago be included in the analysis to ensure a more reasonable result is derived. TSTT is of the view that the	Contrary to TSTT's suggestion, the Authority did, in fact, review and consider data specific to Trinidad and Tobago in the benchmarking exercise and in assessing the impact of the proposed changes in interconnection rates on the market.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		will reflect: 1) a step function in the cost base to be considered in establishing realistic rates. 2) a change in philosophy, recognizing that recovery of historic costs are no longer the commercial reality of the firm. Interconnection rates must now reflect the forward-looking cost recovery requirements of providing the service. Also, TSTT is concerned that in making projections based on that statement above, it is apparent that the data from other Caribbean territories that are deemed to be similar have been used only and Trinidad and Tobago data have not been considered in the analysis for projecting Trinidad and Tobago future rates as Trinidad and Tobago did not form part of the "Post-2012 Sub-Sample".	interconnection cost recovery should be directly linked to the dynamics of the industry. Therefore, as networks are now transforming to NGN's to support enhancement to services – including voice – there needs to be sufficient consideration of forward looking cost recovery in the determination of rates, and thus the appropriateness of the countries used in the benchmark study.	Interconnection rate benchmarking relies on rate/cost information collected from other comparable countries, ideally as many as possible. The interconnection benchmarking database relied on by the Authority includes solely Caribbean jurisdictions because they are directly and reasonably comparable to Trinidad and Tobago. The network dynamics referred to are common to the region (and internationally as well). To account for any potential significant differences, a normalisation analysis was conducted to determine if any adjustments to benchmark averages are warranted. The results are presented in section 6.4 of the Revised Report and fully addresses TSTT's concerns.
Section 6.1. Benchmarking Analysis Methodology (continued) - Glide Path Recommendation	TSTT	TSTT also believes the use of the European market as a benchmark was not the most appropriate for the reasons detailed below. Simple consideration of the economies of scale of the two regions belies the irrationality of such an assumption. In the case of FTR, European jurisdictions have	TATT should reconsider this section and all of Appendix A considering the realities of Caribbean jurisdictions (and Trinidad and Tobago) TATT needs to provide some evidence or model that suggests that despite significant variances in	The Authority notes that it did not use the European market as a benchmark. Rather, the European data were used as a reasonableness check on the primary analysis, which is based on the Caribbean benchmarking. As such, the European results are a complement to, not a substitute for, the primary Caribbean benchmarking. As explained in the 2017 Report and the Revised Report, the Authority's MTR and FTR recommendations for the

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		cities with populations exceeding millions of persons, living in close quarters in cities. This allows for significant aggregation of consumption on common resources resulting in reduced unit costs. Caribbean markets (and Trinidad and Tobago in particular) are fundamentally different. While we use the same technologies, our populations are much smaller, with cities supporting only thousands of persons, and the residence patterns do not facilitate the concentration of resources and assets as evidenced in Europe. There are further considerations about the cost of borrowing and the volume of traffic carries which further underscore this assumption as unrealistic. There is no way that one can realistically assume that the economies of scale of the Caribbean (or Trinidad and Tobago) would ever facilitate a scenario where either FTR or MTR rates of the Caribbean could converge with the rates in Europe. Accordingly, the assumptions and results presented in the diagrams of Figs. 4 and 5 cannot be realistically considered.	context – including geography, volume, population density and call patterns in urban areas, pop density and call density in suburban and rural areas – that it is at all reasonable or rational to expect the operating costs per unit of a network in the Caribbean to equal the operating cost per unit of a network in developed Europe. TATT also needs to reflect on the economic externalities that surround operations in the Caribbean. Without these considerations, TATT's recommendations with respect to the glide path determination needs to be reconsidered.	three-year period 2017/18 to 2019/20 are based on the best-fit statistical projections for the post-2012 sub-samples, together with the straight-line projection of the cost-based post-2012 sub-samples. The two projections provide converging upper and lower limits for forward-looking MTR and FTR rates in Trinidad and Tobago. The Authority considers that this approach provides a more robust basis for setting these rates, since both benchmarking sub-samples lead to similar results. This dual approach also effectively provides a form of validation that reduces the probability of error, i.e., making a rate recommendation that is "too high" (substantially above actual costs) versus "too low" (below costs). The Authority, therefore, continues to be of the view that a glide-path approach to phasing in MTR and FTR changes is appropriate.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		To adopt such an approach may result in the establishment of rates far below that which is required to operate these networks in accordance with the performance standards set by TATT. Blind adherence to these assumptions will ultimately lead to the running down of operations as cost savings are sought, leading to the compromising of the quality of services that operators can provide, or eliminate the capacity of the operators to bring to bear innovations to benefit the wider marketplace.		
Section 6.1. Benchmarking Analysis Methodology (page 16)	MPU	It needs to be emphasized that the issue of CPP or RPP does not make the termination rate under either jurisdiction irrelevant. RPP and CPP merely distinguish how the termination charge is allocated to subscribers between networks with different charging regimes but the critical issue is the cost of actually terminating a call on either party's networks. RPP will assign some of the cost to both caller and receiver while CPP assigns the full cost of termination to the caller. Concerning cost, termination stays the same for either network. Therefore, the inadequacy of per minute benchmark costing will have equally negative impacts on either charging regime. The true challenge remains, how suitable are benchmarked rates as proxies for cost based rates and are they at	TATT must acknowledge that benchmarking, at its best, is a fairly weak surrogate for cost-based pricing and has mainly been tolerated in markets where cost modelling has not advanced. The lack of data on cost based pricing has been due mainly to contentious circumstances with operators and information asymmetry continues to be a barrier to substantive discussion and resolution of disputed cost allocation issues. The Ministry of Public Utilities remains willing to assist in moving the market forward and past the issue of incomplete cost modelling outputs.	The Authority agrees with MPU that a cost model should, ideally, be utilised for the industry. However, the implementation of the LRAIC model, the development of which commenced in 2010, has been a moving target. Due to the varying requests by three of the seven operators, the Authority has been stalled in implementing it. Whilst the Authority is also mindful of the general limitations of benchmarking approaches, it posits that recommending benchmarked interim rates is useful in the absence of robust modelling results. Notwithstanding that, the Authority also recommends the move to cost-based interconnection rates as soon as robust, up-to-date, LRAIC data sets become available.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		this stage representative of the most appropriate point along the cost continuum of "real" current per minute termination costs.	Cost modelling is fundamental to the economic well- being of the market pricing regime and to ensure equitable pricing between the players. One strategic goal for the Ministry of Public Utilities in 2016 - 2017 fiscal year is to facilitate the introduction of cost modelling and adequate follow through on cost separation.	The Authority will welcome any input MPU can offer on cost modelling and cost separation.
Pages 19 and 20 Rates for mobile and Fixed Line termination rates Figures 4 and 5	MPU	It is with a bit of dismay we observe that the average MTR and FTR both fall below the suggested glide-path reductions introduced by TATT. These rates have never been adjusted in Trinidad and Tobago since being set by the Arbitration Tribunal in 2005 and to find them above the Regional Average at this point is somewhat disconcerting. To rationalize this would require a glide path that begins at the average and glides beneath it over the duration of the reduction period. This is plausible since almost half of the MTRs and FTRs sample countries already fall below the average.	Reconsider setting reductions that bring the first reduction of rates below the average of the sample MTR, then set them to fall further thereafter.	The Authority stresses that the purpose of the benchmarking exercise is to recommend interconnection rates which are in line with target benchmark rates for the Caribbean jurisdictions included in the benchmarking samples, at the end of a three-year transition period. The target benchmark MTR is set in relation to data and trends from the post-2012 sub-samples and the cost-based post-2012 sub-samples. While the Authority notes MPU's suggestion that MTR rates should be decreased at a faster pace than recommended, it remains of the view the MTR should be reduced in roughly equal steps, to phase in the changes in a more orderly fashion. Moreover, the Authority advises that the recommended rates are set as maxima or at caps, which implies that operators could agree to set interconnection below the cap. Furthermore, the established maxima rates provide regulatory certainty for the operators for interconnection

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				rate negotiation purposes going forward.
Section 6.1	Digicel (T&T) Ltd	TATT explains that it has excluded some jurisdictions from the sample based on the vintage of the decision that determined current rates. The threshold was set as 2012 as the average vintage in the sample. It should be noted that this reduces the sample size further by about ~47% reducing from 17 to 9. The total sample size reduction is ~61% compared to the initial sample size of 23. One has to wonder what was the point of collecting so many data points if close to two thirds are then ignored on arbitrary grounds. Vintage of a country rate is not a reason for excluding the country: it is a valid benchmark estimate, and it arbitrary to choose countries which have only changed the rate within an arbitrary choice of 'recent time'. The effect is to bias the benchmark to lower rates in the case of MTR, and to higher rates in the case of FTR, as full benchmark shows that steady rates exist in both mobile and fixed markets, and they are not only constant in the high cases. The consultation paper attempts to justify the	TATT should consider all rates rather than artificially and arbitrarily excluding those older than a certain age If TATT believes that rates set before 2012 are indeed obsolete, it must provide evidence that the market conditions which underpinned those rates at that time are so different to the current market conditions in Trinidad and Tobago so as to justify their exclusion.	There is clear evidence in the Revised Report demonstrating that interconnection rates have been declining significantly over time. This is true for the Caribbean jurisdictions as well as the 36 European countries also considered in the benchmarking exercise. The Authority, therefore, considers that greater weight should be applied to more recently established interconnection rates as opposed to dated, older vintage rates. For this reason, which is explained in the 2017 Report and the Revised Report, the Authority's recommended costing benchmarks are based on rates that came into effect in the post-2012 period.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		exclusion of pre-2012 data says "out of date" interconnection rates. Those rates are not out of date, as they are still currently active rates. TATT asserts that rates set in the past are likely to be obsolete. This is beyond TATT's competence as it does not have evidence or jurisdiction over such countries, or a requirement to object to other regulatory choices. The data from TATT shows that pre-2012 trends are not out of line with trends in the region. Rates appear to be declining hence there is no reason to exclude older, still declining rates. The reality is that the prevalence of 4G/LTE usage in Caribbean is lower than in other markets such as the EU hence the relatively higher unit costs of traffic. Ignoring relevant data points is not best practice and is a manifest error on its face and renders the benchmarking approach proposed by TATT amenable to judicial review. The choice of 2012 is arbitrary (as the average vintage) and results in the elimination of close to 50% of the sample (going from 17 measures to 9 measures). The elimination of the five ECTEL rates is particularly questionable. By TATT's own		

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		admission, pre-2012 vintage rates in the five ECTEL jurisdictions are expected to be reviewed shortly. It may have been better in that case to wait until the new rates are announced rather than removing them nearly a third of the jurisdictions from the sample. The elimination of samples older than the average vintage also creates an unacceptable precedent. If new decisions are taken by Caribbean jurisdictions in the new 2 years, will some post-2012 decisions now be considered as obsolete? For instance, adding 5 ECTEL decisions in 2017 would likely shift the average vintage by a few years.		
Section 6.1	Digicel (T&T) Ltd	TATT explains it has determined three alternative benchmark sample averages: The Post-2012 Sub-Sample (based on 9 values), the Cost-Based Sub-Sample (based on 6 values) and European interconnection rate average. The Post-2012 Sub-Sample is flawed as it is based on grouped jurisdictions and excludes measures due to their vintage. The Cost-Based Sub-Sample is flawed as it is based on grouped jurisdictions, excludes measures due to their vintage and includes a mix of 3 measures based on LRAIC+ methodology	TATT should revise its sub-samples to: • de-group jurisdictions • include pre-2012 data • exclude measures based on the pure LRIC methodology including in particular French West Indies	The Authority reiterates that FWI and the former Netherlands Antilles all have strong political, economic and, above all, regulatory commonalities. Should the commonalities be excluded from the determination of the appropriate samples, the validity of the results could be compromised. See the Authority's response above to CCTL's comments on section 6.1 regarding the treatment of FWI. Digicel is advised that the decision by the Authority on the utilisation of CCA-LRAIC as the standard for the development of its cost model is in accordance with

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		(Bahamas, Barbados and Cayman Islands) and 3 measures based on pure LRIC methodology (the two FWI groups and Jamaica). Pure LRIC rates are not applicable to Trinidad and Tobago as the methodology being consulted on by TATT was specifically LRAIC+. Pure LRIC is specifically only incremental cost, below total cost of provision as shown by the fact the rates in the 3 pure LRIC jurisdictions are significantly lower than in the 3 LRAIC+ jurisdictions. The cross-check with European interconnection rate average is irrelevant as EU countries are not comparable to Trinidad and Tobago. Additionally, EU has been moving its cost standard from LRAIC+ to pure LRIC based rates, hence the declining rates are largely due to changes in the costing standard. No inference can therefore be drawn for Trinidad and Tobago cost-based rates as Trinidad and Tobago is not moving from LRAIC+ to pure LRIC. The inclusion of EU cost methodologies by the use of French West Indies as a comparator is fundamentally flawed and is a breach of TATT's own determination that the appropriate cost standard to be used in setting termination rates in Trinidad and Tobago should be top-down CCA-LRAIC+ method.		regulation 15(1) which states: "A concessionaire shall set interconnection rates based on costs determined in accordance with such costing methodologies, models or formulae as the Authority may, from time to time, establish". However, in the absence of such a costing model, the Authority is empowered to determine costing benchmarks that comport with internationally accepted standards in accordance with regulation 15(2).

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
Section 6.1	Digicel (T&T) Ltd	TATT explains how it has extrapolated trends in the Post-2012 Sub-Sample and the Cost-Based Sub-Sample to reach a target rate by March 2020. The use of extrapolation as part of a benchmark is not best practice for the following reasons: • a benchmark is not forward looking, it only reflects the current situation at the time it is done. Only current rates can be benchmarked today. TATT would need to update the benchmark annually to obtain a future result. • a benchmark cannot be used to predict future decisions as it has no ability to anticipate what other regulators may do in the future. Making a statistical best fit projection from the benchmark assumes changes to future rates beyond the competence of a benchmark, and pre-empts the activities of other regulators/operators to change or not change rates in their respective jurisdiction • rates have changed in the past due to market growth effects (e.g. more traffic, leading to lower costs). There is no evidence that future rates will definitively decline in Caribbean region. • the exclusion of the pre-2012 decisions biases the benchmark to those which have been	TATT should remove the forecasting part of its benchmarking and focus on the current rates. If it wants to see how rates evolve over time, it should regularly update its benchmark.	The Authority disagrees with Digicel's suggestion that MTR and FTR recommendations up to 2020 should be based only on historical benchmarks, thereby, eliminating any consideration of projected benchmark rates based on historical trends. As explained in the Revised Report, the Authority's MTR and FTR recommendations for the three-year period 2017 – 18 to 2019 – 20 are based on the best-fit statistical projections for the post-2012 sub-samples, together with the straight-line projection of the cost-based post-2012 sub-samples. The two projections provide converging upper and lower limits for forward-looking MTR and FTR rates. The Authority considers that this approach provides a robust basis for the setting of future MTRs and FTRs in Trinidad and Tobago, since both benchmarking sub-samples lead to similar results. This dual approach is also effectively a form of validation that reduces the probability of error, i.e., making a rate recommendation that is "too high" (substantially above actual costs) versus "too low" (below costs). Alternatively, as proposed by Digicel, the recommended MTR and FTR could be based on "current" benchmark levels, without consideration of rate trends or

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		made recently and hence these are **less** likely to change in the future • TATT is inconsistent in not using a trendline for the Cost-Based Sub-Sample (which shows upwards trend, for example due to inflationary cost effects).		projections. However, such an approach would be problematic. It would require setting recommended rates on the basis of the most-recently available benchmark sub-sample results which, as of the sample end-point date of March 2017, differ significantly. Doing so would also ignore trends in interconnections rates over time. As shown in the Revised Report, average MTRs and FTRs in the Caribbean region have been declining significantly over time. This is consistent with global trends. As also indicated in the Revised Report, average interconnection rates in Europe have also declined significantly. In view of these trends, if current rather than projected rate information was to be relied on, as suggested by Digicel, then the Authority considers that the cost-based post-2012 sub-sample average benchmark rates should be given more weight that those derived from the post-2012 sub-samples. In this respect, Digicel's suggestion is similar in nature to the one advanced by CCTL, i.e., that the Authority rely solely on cost-based jurisdictions for benchmarking purposes. (See also the Authority's response to the previous recommendation made by CCTL.) In such a case, the MTR and FTR recommendations would remain very similar, if not identical, to those adopted by the Authority in the approach taken in the benchmarking exercise, since projected benchmark rates derived from the full

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				and cost-based post-2012 sub-samples tend to converge by March 2012. The Authority, therefore considers the "forward-looking" approach adopted benchmarking exercise to be superior to the "static" approach suggested by Digicel. Lastly, based on its comments on the projection of the cost-based post-2012 sub-sample benchmark average, Digicel appears not to have properly understood the methodology used to calculate the historical benchmark averages. To clarify, the cost-based post-2012 sub-sample average is calculated based only on post-2012 cost-based interconnection rate observations. For example, Barbados, which formerly based its MTR on benchmarks but later, in April 2016, established cost-based MTRs, is only included in the cost-based post-2012 sub-samples as of April 2016. Only as of that date did Barbados have cost-based interconnection rates in place. Changes in the historical cost-based post-2012 sub-sample benchmark average over time, therefore, are due to the addition of new jurisdictions that have adopted cost-based interconnection rates, and not to inflation, as suggested by Digicel. A straight-line projection for the cost-based post-2012 sub-sample benchmark average was used because it was consistent with the general trend of the historical benchmark averages, and the fact that

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				the March 2017 historical end-point date also represented the point in time with the observed number of cost-based sample observations.
Section 6.1	Digicel (T&T) Ltd	TATT explains how it proposes a three-glide path from current rates to the end-point rates calculated based on the projections. Digicel agrees with TATT that "(phasing) interconnection rate changes (…) over a three-year period (…) is a common practice in other jurisdictions". However, the issue is that the end-point TATT proposes is based on a non-existent benchmark (i.e. based on the assumed interconnection rates in 3 years in the sample countries).	TATT should first set an end-point rate based on the current rates (without any extrapolation) then determine a three year glide path to each that end-point rate. During the three years period, TATT should continue to collect data from the benchmark countries so that it has better data by the time the next review cycle comes. This would provide regulatory certainty to the industry.	This further comment on section 6.1 of the 2017 Report is very similar to Digicel's previous comment. As explained in its response to that comment, the Authority disagrees with Digicel's proposal that MTR and FTR recommendations should be based only on historical benchmarks, thereby eliminating any consideration of projected benchmark rates based on historical trends. The Authority also disagrees with Digicel's related additional suggestion that target end-point and glide-path rates be based on the current rates (without consideration of projected benchmark rates based on historical trends) and that, during the three-year glide-path period, the Authority should continue to update the benchmarking results so it will have better data by the time of the next review cycle. Digicel suggested that this would provide greater regulatory certainty to the industry. As discussed in response to Digicel's earlier comments on section 6.1 (see the Authority's previous response and decision), the Authority remains of the view that the use of projections to set three-year end-point interconnection rates is superior to using, as suggested by Digicel, current rates for that purpose. It is not clear what purpose

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				Digicel considers would be served by continuing the benchmarking exercise on an ongoing periodic basis. The Authority does not consider that adjusting interconnection rates on such a basis would be appropriate and feels this would create considerable ongoing regulatory uncertainty, contrary to Digicel's assertion. The Authority is of the view that its recommended interconnection rates, once introduced, would give a clear direction to operators on the maximum allowed MTRs and FTRs for the next three years and, in doing so, would provide regulatory certainty for the industry.
Section 6.2 Primary Service Recommendations	CCTL	We disagree with the recommended rates, for the reasons specified above. The proposed rates wrongly adhere to the rates corresponding to the full post-2012 sample, and do not sufficiently adhere to the rates of the cost-based/post-2012 sample or that of the adjusted cost-based/post 2012 sample with adjustments based on corrections we describe in the previous section. The proposed rates also wrongly apply an excessive three-year glide path, instead of a flash-cut implementation or at most a 6-month implementation period.	We recommend domestic interconnection rates that correspond to the average rate in the cost-based/post-2012 sample after making the four corrections specified in our recommendations to Section 6.1 above.	The Authority disagrees with CCTL's proposal that there should be an immediate "flash-cut" to the cost-based post-2012 sub-sample benchmark average rate — i.e., the lower of the two benchmarking sub-samples — rather than a glide-path transition to the recommended end-point interconnection rates over three years. The Authority maintains its position that benchmark averages for both the post-2012 sub-samples and the cost-based post-2012 sub-samples should be taken into account when setting recommended end-point interconnection rates. The projected interconnection rate trends for these benchmarking sub-samples provide useful upper and lower bounds for recommended

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				interconnection rates going forward, not only for the end-point year 2019 – 2020 but also the intervening two-year transition period. It is common practice in other jurisdictions to use a glide-path process to implement interconnection rate reductions[17]. Therefore, the Authority continues to consider that a three-year phase-in period is appropriate in Trinidad and Tobago, as recommended in the 2017 Report and the Revised Report.
Section 6.3 Sensitivity Analyses	CCTL	We have no objections to the sensitivity analyses as presented in Section 6.3.	We have requested from TATT a copy of the complete data set, in spreadsheet format, including all of the sensitivity analyses conducted. We reserve the right to comment further on these analyses after receipt and review of this spreadsheet.	As noted above, in response to a similar request, the Authority is giving local operators a copy of the benchmarking database (in EXCEL spreadsheet format) of monthly MTRs and FTRs for all jurisdictions in the benchmarking sample. This is presented in local currencies and in US dollars, along with US dollar exchange rates.
Section 6.3	Digicel (T&T) Ltd	In Section 6.3 of its consultative document, TATT indicates that two sensitivities were carried out: Exchange Rate Sensitivity and Benchmark Sample Inclusion Sensitivity. A sensitivity analysis based on currency was unlikely to have a large effect as rates in most benchmark jurisdictions are either in USD currency or have fixed, official USD exchange	TATT should include some proper sensitivities: Digicel suggests the following tests: • removing outliers to make sure the results are not too sensitive to individual values. • PPP exchange rates to observe the effect of purchasing power	Digicel has suggested that several additional benchmarking sensitivities — relating to the exclusion of rates based on pre-2012 decisions, inclusion/exclusion of outliers and PPP adjustments — be conducted to test the benchmarking results and recommendations. While the Authority agrees that further benchmarking sensitivity analyses are warranted, it does not agree with

17 See the references noted previously by the Authority in response to Digicel's letter accompanying their comments on the 2017 Report.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		rates and the latter year currency value have a higher weight than previous years. With regards to the benchmark sample inclusion sensitivity, TATT and its consultant appear to have a bias against decisions taken before 2012. If the trend in the region is indeed towards reduction in rates, one would expect pre-2012 decisions to be reviewed in the coming years. This could then potentially lead to a reduction in the average rates with the arbitrary exclusion of legitimate regulatory or commercial decisions in the region. Relevant comparator markets which have older decisions but which had market conditions at the time of the decision which approximate current conditions in Trinidad and Tobago are legitimate for inclusion in the benchmark, and should not be discarded solely on the basis of an arbitrary cut-off date.	differences in each country TATT should not have excluded decisions taken before 2012. This is an arbitrary decision that does not follow international best practice. Digicel recommends that all rates are valid interconnection rates to be considered in a benchmark of rates in other countries.	all of Digicel's proposed sensitivities. Before addressing Digicel's specific proposals, the Authority advises that it carried out four additional sensitivities for both MTRs and FTRs, for a total of eight scenarios. For completeness, the Authority also applied the two initial sensitivities (full sample and foreign exchange) included in the 2017 Report. The Authority has now, therefore, undertaken a total of 12 scenarios, which include six sensitivities for both the MTRs and FTRs. The results of these additional benchmarking sensitivities are included in the Revised Report. With respect to Digicel's objection to the reliance on benchmarking sub-samples that exclude interconnection rates set in NRA decisions issued prior to 2012 for rate recommendation purposes, the Authority advises that a full benchmarking sample sensitivity is discussed in section 5 and Appendix II of the Revised Report. Therefore, no additional sensitivity analysis is required. Moreover, for the reasons given in the 2017 Report, reliance on the full benchmarking sample for rate recommendation purposes was rejected by the Authority in favour of using both the post-2012 and cost-based post-2012 decision sub-samples.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				The Authority also considers Digicel's proposal to include a sensitivity analysis using PPP-adjusted interconnection rates to be unnecessary, for the reason provided above in response to Digicel's comments on section 5 of the 2017 Report. The Authority is also opposed to Digicel's proposal to exclude outliers from the benchmarking sample. While it may be appropriate for one or more outliers to be excluded if they were unreasonably skewing the benchmark average, this is not the case in this instance. In the absence of such a concern with the benchmarking sample, the Authority is against excluding deemed outlier observations for no reason other than they happen to be furthest above or below the benchmark average. Removing such observations would unduly reduce the number of countries included in the benchmarking sample and would needlessly impact the MTR and FTR cost-based post-2012 sub-samples which, as of March 2017, had relatively modest sample sizes, i.e., six and four countries, respectively. That said, two sensitivity analyses were carried out to assess the impact of excluding the "maxima" and "minima" observations from the MTR and FTR full and cost-based post-2012 sub-samples. The results of these

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				sensitivities showed that these exclusions have no material effect on the Authority's recommended costing benchmarks. These sensitivities are presented in the Revised Report.
Section 6.3.1. Exchange Rate Sensitivity	TSTT	TSTT does not deem the exchange rates sensitivity based on weights to be reasonable, as we believe that other measures should have been considered as well i.e. the Purchasing Power Parity or the Big Mac Index. Also, considering the major changes in relation to the T&T/US exchange rate, using historical data may not give a true representation of what the exchange rate is expected to be in the future taking into account the current variables in the Trinidad and Tobago economy and its impact on foreign exchange.	Sensitivity analysis should incorporate these relevant variables to ensure that the rate developed is adjusted for these factors.	The referenced "Big Mac Index" reflects the cost of a single consumer food item across countries, such as a MacDonald's Big Mac hamburger. TSTT provided no rationale as to why this index would be relevant for restating interconnection rates across countries and the Authority sees no valid reason for using it for interconnection benchmarking purposes. The use of PPP-adjusted exchange rates has been addressed above by the Authority in response to Digicel's comments on section 6.3 of the 2017 Report. TSTT is asked to note that the Revised Report expresses the Authority's rate recommendations in both USD and TTD equivalents, based on exchange rates in effect when the exercise was undertaken. The Authority recognises that the USD/TTD exchange rates may change 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.
Section 6.3.2. Benchmark Sample	TSTT	TSTT agrees with this statement that the use of the full data set does not provide a valid basis for	TSTT recommends that sensitivity analysis be performed using	The Authority's approach in its sensitivity analyses is consistent with international best practice. TSTT is asked

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
Inclusion Sensitivity		developing benchmark interconnection rates and is of the view that this method diminishes the validity of the study as it was established previously that the data was not comparable. As such, it can be concluded that the only form of sensitivity analysis considered was that of exchange rates and TSTT is of the opinion that there are several other factors where sensitivity analysis should have been considered, to derive more realistic rates.	additional significant factors, to ensure that the rates developed are reasonable.	to furnish the Authority with its specific suggestions on alternative factors required in the benchmarking exercise.
Section 6.4 Normalization Analysis	CCTL	We begin our comments on this section by quoting its conclusion: *On balance, while the first three above-noted considerations [re: land area/pop., GDP, and sub. density] provide little if any basis for implementing a normalization adjustment of any magnitude (whether positive or negative), the latter two factors [re: competition and cost-based rates] suggest that, if any anything, a downward adjustment to the benchmark rates may be warranted. However, no normalization adjustment is proposed and for this reason the Interconnection Rate Recommendations, made herein, are considered to be conservative in nature.*	We recommend TATT make the four corrections specified above in our recommendations to Section 6.1. If, however, TATT choose not to, then at minimum TATT must apply the normalization adjustments identified from the study's normalization analysis if they wish to achieve accurate cost-based interconnection rates.	Section 6.4 of the Revised Report provides a normalisation analysis to assess the implications for, and applicability of, the benchmark averages for Trinidad and Tobago. It takes into account 10 demographic, socio-economic and environmental variables that could affect the comparison of interconnection rates among benchmark jurisdictions. The Authority acknowledges that the results of the normalisation analysis suggested that a downward adjustment could have been warranted. However, it decided that the analysis did not provide adequate justification or rationale for any specific level of adjustment. Therefore, to be conservative, it decided not to make an adjustment. It would have done the same regardless of whether the suggested adjustment was

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		These results are quite telling and are consistent with our recommendation that the benchmark rates be further reduced from what the study proposes. For instance, there is no legitimate excuse for limiting the sample to post-2012 observations, but not also excluding non-cost-based observations. And this sensitivity analysis further reinforces this conclusion. The explanation provided—i.e., that such disregard is a feature, not a flaw, since it is "conservative"—completely discounts those harmed "conservative outcome. Only the operator who is currently a net receiver of interconnect payments benefits from this conservatism, and it comes at the expense of consumers and competition. Therefore, a conservatism in this context has little merit. What we should aspire to is accuracy, not conservatism, if we wish to promote consumer welfare and competition.		positive or negative. The Authority acknowledges that there are limitations to conducting any benchmarking exercise and, as a result, it will be moving towards completing and implementing the cost model based on data received from operators.
Section 6.4. Normalization Analysis	TSTT	The first three factors suggest little to no correlation based on the results achieved. Therefore, if we see little to no similarities between the factors used for normalization which are also some of the same factors used for the	It is therefore recommended that in the future if benchmarking is to be considered, correlation should exist.	The Authority reiterates that the purpose of a normalisation analysis is to determine whether there are any specific geographic, demographic and socio-economic factors (e.g., population density, income per capita, mobile or fixed density) across sample

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		country sample selection, how then was it concluded that the countries used in the sample were a reasonable gauge to determine the interconnections MTR and FTR for Trinidad and Tobago? Also, in relation to the latter two factors, TSTT does not believe that these two factors are sufficient to suggest that local MTR and FTRs should be reduced or that the maxima should be as the study suggests. TSTT argues that this normalization analysis validates TSTT's concerns that the countries identified in the benchmark were unsuitable to the determination of benchmark rates (caps) for use in this marketplace. TSTT believes that TATT's normalization analysis also reinforces its view that an inadequate case has been made to reduce MTR's and FTR's the scale that is proposed.		jurisdictions that may justify adjustments to the benchmark targets for Trinidad and Tobago. The lack of a strong correlation for any given variable implies that no adjustment is warranted. As explained in section 6.4 of the Revised Report, the Authority concluded that no adjustments would be applied based on the results of the normalisation analysis. It is important to recognise that the existence of either a weak or strong correlation between normalisation variables and MTRs/FTRs is neither a requirement nor an objective to be met in a benchmarking exercise, as seemingly suggested by TSTT. The normalisation analysis and related correlations simply pertain to the question of whether or not benchmarking targets need be adjusted.
Section 6.4	Digicel (T&T) Ltd	TATT explains how it compared Trinidad and Tobago to the Full-Sample and Post-2012 Sub-Sample benchmark averages and concluded that "if anything, a downward adjustment to the	Rather than trying to define whether it needs to adjust the average of the few data points it kept (6 out of 23 initial values), TATT should avoid	Section 6.4 of the Revised Report presents the normalisation analysis used to assess the implications for, and applicability of, the benchmark averages for Trinidad and Tobago. The analysis took into account the

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		benchmark rates may be warranted". TATT does not explain how it calculated the correlation coefficients (there seems to be a relatively small sample size for so many variables, hence Digicel doubts the statistical significance of the claimed correlations). Also, the final argument that the "latter two factors suggest that, if any anything, a downward adjustment to the benchmark rates may be warranted" is not clear. Other factors (such as technologies launched, volume of traffic) that may have an impact have not been assessed. Digicel submits that TATT does not have sufficient data to perform a statistically valid regression on the data points, hence no downwards bias or "conservative in nature" can be inferred.	excluding valid data points (such as pre-2012 data) and avoid including invalid data points (such as pure LRIC jurisdictions). In addition, reviewing the full sample to make sure countries included are as comparable as possible would be useful. TATT should also explain how it calculated the correlation coefficients. Digicel recommends that TATT removes the claims that the benchmark could be adjusted downwards or be considered conservative, as there is no statistically valid evidence on which to base this claim. As the benchmark is a proxy for a modelled price the benchmark should "aim-up" to avoid setting a price which is too low. The negative market impacts of aiming up are minor as any surplus will be	following 10 demographic, socio-economic and environmental variables that could affect the comparison of interconnection rates in one benchmark jurisdiction relative to another: a) population size b) land area c) population density d) GDP per capita e) fixed subscriber count f) mobile subscriber count g) fixed line density h) mobile density i) number of mobile service providers (as a measure of market competitiveness) j) whether or not interconnection rates were set on the basis of a costs or some other approach As suggested by Digicel, other factors may be relevant as well, such as technologies launched and volume of traffic. While the Authority agrees that the timing of mobile technology adoptions (e.g., 3G and 4G) or fixed network technology adoptions (e.g., NGN and VoIP) may play some role in the relative levels of interconnection rates between the countries included in the benchmarking sample, specifying and quantifying technology variables in a useful and meaningful manner is not straightforward. No suggestions were offered by

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
			competed away in a competitive market and are smaller than the negative investment impacts on setting too low a price causing under-recovery.	Digicel in this respect. The Authority is of the view that the set of 10 variables listed above provides a sufficient basis to conduct a normalisation analysis for MTR and FTR benchmarking purposes. The Authority also disagrees with Digicel's suggestion that traffic volumes should be added to the list of normalisation variables. Such information is generally confidential and, therefore, impossible to collect. Furthermore, the traffic volume data variable is largely redundant given that population and subscriber size and density are already considered, which are likely to be highly correlated with relative traffic volumes. Table 1 in the Revised Report includes correlation coefficients between the MTRs and FTRs and each of the 10 demographic, socio-economic and environmental variables. The correlation coefficients in the table were calculated using the Excel "CORREL" function[18], which calculates how strongly two variables are correlated with one another. A correlation coefficient ranges from -1 (perfect negative correlation) to +1 (perfect positive correlation), and a correlation coefficient of 0 represents no

[18] A specification of the CORREL function along with an explanation of a "correlation coefficient" is available at https://support.office.com/en-us/article/correl-function-995dcef7-0c0a-4bed-a3fb-239d7b68ca92.

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<tr><td></td><td></td><td></td><td></td><td>correlation whatsoever.

For example, the results in the table show that there is virtually no correlation between GDP per capita and the FTRs or MTRs in the countries included in the full benchmarking sample (i.e., the correlation coefficients are 0.3 and -0.11, respectively).

As a further example, there is a moderately negative correlation between population density FTRs or MTRs in the post-2012 sub-samples (i.e., the correlation coefficients are -0.45 and -0.50, respectively).

The Authority considers that the normalisation analysis results and conclusions shown in the Revised Report not only support its recommended costing benchmarks but also support the view that they are conservative in nature, i.e., they could have been adjusted further downwards.</td></tr>
<tr><td>Table 1</td><td>Digicel (T&T) Ltd</td><td>The standard deviation of the benchmark is large as shown below<table><tr><th></th><th>Average less standard deviation</th><th>Average</th><th>Av sta dev</th></tr><tr><td>FTR, Post-2012 Sub-Sample (USD cents)</td><td>0.23</td><td>0.69</td><td>1.1</td></tr></table></td><td>TATT should be extremely conservative in its interpretation of the results given the lack of accuracy of the benchmark.

Rather than using only an arithmetic average based on small sample, TATT should consider looking at other ways to interpret the results</td><td>The Authority disagrees with the suggested changes by Digicel to the benchmarking methodology for the following reasons:
i. The Authority does not agree that the standard deviation of a benchmarking sample should be used to either increase or decrease the benchmark average for interconnection rate recommendation purposes. The objective of a benchmarking analysis is to derive a benchmark average rate</td></tr>
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<tr><td>FTR Cost-Based Sub-Sample (USD cents)</td><td>0.11</td><td>0.48</td><td>0.85</td></tr>
<tr><td>MTR, Post-2012 Sub-Sample (USD cents)</td><td>1.18</td><td>3.21</td><td>5.24</td></tr>
<tr><td>MTR Cost-Based Sub-Sample (USD cents)</td><td>0.88</td><td>1.99</td><td>3.10</td></tr>
</table></td>
<td>such as:
• Relying on the Average plus Standard Deviation as the reliable basis on which to cap termination rates
• Weighting countries by volume of termination traffic
• Calculating the median and the mode of the sample
• Removing outlier values e.g. highest and lowest rates</td>
<td>estimate or target. Once determined, there is no rationale for arbitrarily applying either a single standard deviation adjustment upward or downward. As explained in section 6.4 of the Revised Report, a normalisation analysis was conducted to determine if there was reason to benchmark interconnection rates in Trinidad and Tobago above or below the benchmark average target rates. That analysis demonstrated that a downward adjustment relative to the benchmark averages would be appropriate. However, to be conservative, the Authority decided not to apply such an adjustment when determining its recommended costing benchmarks.

ii. The Authority also disagrees with the suggestion that, instead of using a simple average of rates across benchmark countries, a weighted average should be used, with the weights based on traffic volumes (i.e., presumably the weights would be fixed and mobile interconnection traffic volumes). First, country-specific traffic volume data are not readily available, since such information is typically confidential. Alternative weighting factors could be used instead (e.g., population or subscribers), but ultimately any such weighting factor(s) would be arbitrary in</td>
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Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				nature. Second, and more importantly, the normalisation analysis included in the Revised Report eliminates the need for weighting rates since it takes into account a variety of factors that may influence rate comparisons across countries (i.e., it considers population and subscriber-base size and density). Third, the Authority notes that using weighted averages in the context of telecommunications price benchmarking studies is not common practice[19]. iii. The Authority also disagrees with Digicel's proposal that a benchmark sample median or mode be used instead of a simple average or mean. A median is sometimes used as an alternative to a mean when there are significant outliers in a sample. This was not the case in the sample used for the benchmarking exercise. Indeed, as shown above in the Authority's response to Digicel's comments on section 6.3 of the 2017 Report, the removal of outliers has no material effect on the Authority's recommended costing benchmarks. On the other hand, the mode reflects the most frequent or common value in a sample. Such a measure is not relevant for

19 See the references noted previously by the Authority in response to Digicel's letter accompanying their comments on the 2017 Report.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				interconnection benchmarking purposes. Consequently, the Authority considers the use of a simple average or mean to be the most appropriate approach and it is also most commonly used for interconnection benchmarking purposes[20]. iv. The question of excluding outliers was addressed above in the Authority's response to Digicel's comments on section 6.3 of the 2017 Report and in detail in the Revised Report.
Section 7				
Section 7.1 International Call Termination Charges	CCTL	Section 29(2)(c) of the Telecommunications Act provides that *"…The Authority shall regulate prices for public telecommunications services and international incoming and outgoing settlement tariffs by publishing pricing rules and principles."* In this consultation the international carriage for fixed termination (ICCF) and international carriage charge for mobile termination (ICCM) are categorized as secondary services in this benchmarking study. CCTL notes that this classification is primarily for convenience, given that "relatively limited benchmarking data is	Given the limited information on benchmarks for the secondary services, the results are not robust and should not be used as the basis for setting rates for these services. Further we recommend that the Authority continues to forbear with respect to its power to regulating prices for international call termination rates as there is no overriding policy or market related need to regulate termination rates for	The Authority underscores its reasons for including international termination rates in its benchmarking exercise. CCTL will recall that the current interconnection agreements (of 2012) included unorthodox termination rates in relation to international termination charges. These rates were considered steep by smaller players in the market. The Authority, in the interest of all commercial stakeholders, is obligated to determine, in accordance with its mandate, the relevant costs for these services so that operators are fully informed when negotiating rates. The Authority also emphasises that the commercial

20 Ibid.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		available" on these secondary services." This, we note, is not a ringing endorsement for the benchmark results on these secondary services. For the reasons set out below, CCTL would urge the Authority to continue to forbear with respect to its power to regulating prices for international incoming and outgoing settlement rates. i. The international call market is mature and very competitive and as such is a market ripe for forbearance. ii. There is no reason to regulate settlement rates as it is already subject to various constraining pressures. The current low rates for international termination are the product of a dynamic which combines external intervention (primarily through the FCC Benchmark Order) and increased competition among international carriers. There is no longer any possibility of termination rates, absent TATT's intervention, going in any direction but down. iii. Market developments such as new calling options / new services and the existence of arbitrage will ensure that international termination	international originated traffic, particularly since no domestic operator is exposed to competitive harm or prejudice where the rates are different. On the other hand, permitting market based rates for international originated traffic is beneficial to the market, there is the potential for higher revenues for the voice market and increased foreign exchange earnings to the industry, and the country by extension.	arrangements (settlement tariffs) between local and foreign carriers are not an element of the interconnection benchmarking exercise. This exercise speaks to the rates charged to local carriers, in accordance with the Authority's mandate and consistent with the provision of interconnection services as defined by the Act and the Interconnection Regulations.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		rates remain reasonable. iv. Reduction in the termination rate charged to foreign carriers does little, if anything to lower retail rates abroad. There will be little simulative benefit from the Authority intervening to push rates down, and therefore little if any benefit to call recipients in Trinidad and Tobago. v. The more significant effect will be the harm caused through depressing voice revenues for telecommunications service providers in Trinidad and Tobago. vi. Loss of foreign exchange earning to the local telecommunications sector and by extension the wider economy. As provided for in S 81 of the Act TATT has the power to forebear from regulating such termination rates and in fact has been doing so to this point. Whereas the regulation of termination rates for domestic originated traffic is in the best interests of the domestic market, regulation of international originated termination rates is not. There is no overriding policy or market related need to regulate termination rates for international		

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		originated traffic, particularly since no domestic operator is exposed to competitive harm or prejudice where the rates are different. On the other hand, permitting market forces to dictate rates for international originated traffic is beneficial to local economy.		
Section 7.1. International Call Termination Charges	TSTT	TSTT does not agree that an analysis of two countries can provide sufficient data for determining an international rate especially when they are also not directly comparable on other key factors. More information is needed for each territory in relation its international relationship with international carriers before being deemed a suitable comparison.	TSTT believes that TATT should undertake more robust assessment of the international telecoms market (inbound and outbound) before making the assertions outlined in this document. Such re-evaluation would strengthen any future version of this document.	The Authority advises that, pursuant to its mandate, it has conducted frequent analyses of international telecommunications markets (inbound and outbound). It stresses that the commercial arrangements (settlement tariffs) between local and foreign carriers are not an element of the benchmarking exercise. This exercise concerns the rates charged to local carriers. The Authority emphasises that it relied on the best Caribbean region-specific international call termination rate benchmarking information available at the time the exercise was conducted, to develop its recommended costing benchmarks. It considers that the benchmarking data used for this purpose is sufficiently robust to support the recommendations.
Section 7.1	Digicel (T&T) Ltd	TATT proposes a MICC reducing to USD1.5 cents by 2019/20. However, it has established a difference of USD2.3 cents between the IMTR and MTR for the Post-2012 sub-sample group. It bases this result on an iterative process with 'three considerations'. This approach is not best practice,	Digicel recommends that TATT confines itself to a simple benchmarking using a comparable and consistent set of data, but only one criteria for setting MICC and FICC.	The Authority agrees, in principle, that, where feasible, the same benchmarking methodologies should be applied. However, as explained in section 7.1 of the Revised Report, the available benchmarking data are more limited in the case of mobile and fixed international carriage charges (MICCs and FICCs). Furthermore, the

<table>
<tr><th>Document Sub-Section</th><th>Submission Made By:</th><th>Comments Received</th><th>Recommendations Made</th><th>TATT’s Decisions</th></tr>
<tr><td></td><td></td><td>as it essentially is not a benchmarking exercise using the information obtained, but an optimisation mixing both fixed and mobile rate information together. This approach is inconsistent with the way that FTR and MTR recommendations are set, and TATT’s final choice of USD1.5 cents and USD0.3 cents are demonstrably lower than the benchmarked differences of USD2.3 cents and USD0.5 cents.

Since MTR and IMTR, and FTR and IFTR are directly related, TATT should adopt a consistent benchmark methodology to estimate IMTR and IFTR building on the baseline MTR and FTR benchmark.

As it stands, TATT’s approach is not transparent, inconsistent with the baseline MTR and FTR recommendations, and it is not best practice to attempt a multi-criteria optimisation of benchmark data.</td><td>Digicel recommends that TATT abandons the opaque multi-criteria attempt to optimise MICC and FICC against multiple, by definition mathematically inconsistent, criteria.</td><td>MICCs and FICCs are generally not directly observable but rather must be determined in relation to the prevailing MTRs and FTRs. It is for these reasons a slightly different benchmarking approach was used in the case of the MICCs and FICCs. Rather than relying on “direct” comparisons of IMTRs and IFTRs, “indirect” comparisons were required, using both the ratios and differences between international and domestic MTRs and FTRs in the benchmarking sample jurisdictions.

The table below shows the recommended MICC and FICC in relation to the other benchmark parameters, i.e., the MTR and FTR recommendations and the corresponding ratios. The international/domestic ratio for the MICC is 1.33, while that for the FICC is 1.5, both of which are in the lower end of the range. The ratio between the MICC and FICC, at 5.0:1, is at the mid-point of the ratios. The comparisons to the benchmark ratios and in relation to the recommended MTRs and FTRs provide further confirmation that the recommended MICC and FICC are robust and reasonable.

<table>
<tr><th colspan="5">International Interconnection Benchmarking Results (USD)</th></tr>
<tr><td></td><td></td><td>IMTR*</td><td>IFTR*</td><td>Ratios</td></tr>
<tr><td rowspan="2">Trinidad & Tobago</td><td>Ratio Int’l/Dom</td><td>2.80</td><td>3.31</td><td></td></tr>
<tr><td>Difference Int’l/Dom</td><td>$0.076</td><td>$0.019</td><td>4.1:1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Full Sample**</td><td>Ratio Int’l/Domestic</td><td>1.38</td><td>1.34</td><td></td></tr>
</table></td></tr>
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<tr><th>Document Sub-Section</th><th>Submission Made By:</th><th>Comments Received</th><th>Recommendations Made</th><th>TATT’s Decisions</th></tr>
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<table>
<tr><td></td><td>Diff. Int’l/Domestic</td><td>$0.0180</td><td>$0.0030</td><td>6.0:1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Post-2012 Sub-Sample***</td><td>Ratio Int’l/Domestic</td><td>1.73</td><td>1.77</td><td></td></tr>
<tr><td>Diff. Int’l/Domestic</td><td>$0.0230</td><td>$0.0050</td><td>4.6:1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Mid-Points</td><td>Ratio Int’l/Domestic</td><td>1.55</td><td>1.55</td><td></td></tr>
<tr><td>Diff. Int’l/Domestic</td><td>$0.0205</td><td>$0.0040</td><td>5.1:1</td></tr>
<tr><td colspan="2">2020 MTR/FTR Recommendations</td><td>$0.0200</td><td>$0.0045</td><td>4.4:1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">2020 Recommendations</td><td>Ratio Int’l/Domestic</td><td>1.33</td><td>1.50</td><td></td></tr>
<tr><td>Diff. Int’l/Domestic</td><td>$0.0150</td><td>$0.0030</td><td>5.0:1</td></tr>
<tr><td colspan="5"><u>Notes:</u> * is the average of the “with” and “without” domestic transit for the IMTR and IFTR, respectively.
** The full sample had an average of 16 observations with an average vintage of the corresponding decision being between October 2011 and January 2012.
*** The post-2012 sub-samples had an average of six observations with an average vintage of the corresponding decisions being between April and August 2015.</td></tr>
</table>

The Authority recognises that the recommended MICC ($0.015) is somewhat below the full sample ($0.018) and post-2012 sub-sample ($0.023) differences, while the FICC is at the lower end of the range ($0.003 to $0.005). The Authority advises that it places relatively less weight on this absolute benchmarking value compared to other benchmarks. This is because, as noted in the table, these absolute values are from older vintage data, either October 2011 to January 2012 or April to August 2015.
</td></tr>
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Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				As such, the Authority expects that the absolute value of the MICC and FICC since that time would have declined considerably, in the same way that the average MTR and FTR declined from those dates. In fact, relative to 2020, the average MTR and FTR both decreased by about 80% from the earlier date and by 55% from the latter date. The Authority is satisfied that the MICC and FICC recommendations are reasonable and robust.
Section 8				
Section 8 Assessing the Potential Flow Through Effects	CCTL	With respect to potential flow through impacts of lower domestic termination rates of local retail prices we note the supporting empirical evidence set out in Section 8.1.2. of the consultation document dealing with the relationship between retail calling prices and the underlying termination rates, in particular mobile termination rates. Mobile to mobile post paid off net calling prices tend to be lower in markets where the underlying MTR is lower. On net calls do not appear to be influenced the level of the on net MTR. The ratio of off net to on net prices is higher where MTRs are higher. For the fixed to mobile calls, off net call prices tend to be lower where MTR is lower. High MTRs encourage on net off net price differentials that distorts competition. These findings are consistent with the expectation that lower MTRs promote increased competition.	Given that strong likelihood that lower domestic termination rates will flow through to lower retail off net retail prices (particularly off net) in the market, CCTL recommends that these benchmarks with adjustments recommended above be used as the basis for setting termination rates for domestic calls. Similar simulative impact is not expected, relating to terminations from international incoming calls, as such we recommend that TATT continues to forbear with respect to termination of international incoming calls.	Due to the limitations of any benchmarking approach, the Authority is conservatively recommending regulatory maxima for negotiating parties.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		In the Trinidad and Tobago market data provided in the Annual Market Report 2015, published by the Authority, shows that for domestic mobile to mobile traffic, 85% is on net compared to 15% off net. For the fixed to fixed market 91% of the traffic in on net compared to 9% off net. This significant imbalance in on net to off net traffic is indicative of high termination rates constraining inter operator competition. As such, CCTL fully expects that lowering termination rates will serve to promote more robust competition, including increased flow through of reductions in termination rates to reductions in retail rates. In contrast to potential flow through impacts to domestic retail rates from reductions in termination rates for international incoming calls, similar simulative outcome from regulatory intervention is not anticipated. We reiterate the points made in Section 7.1 on international settlement rates. Reduction in the termination rates charged to foreign carriers does little, if anything to lower retail rates abroad. There will be little simulative benefit from the Authority intervening to push rates down, and		

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		therefore little if any benefit to call recipients in Trinidad and Tobago. The more direct negative impacts are the loss of foreign exchange denominated voice revenues in Trinidad and Tobago.		
Section 8- Assessing the potential Flow-Through effects	TSTT	Table 4: Interconnection Rate Actuals and Recommendations (USD per minute) an error was noted in relation to the formula detailed for Number 5 and 6 respectively. It should be: • IMTR (1+3) • IFTR (2+4)	Make modifications accordingly	The Authority has corrected Table 3 in the Revised Report to rectify the noted error.
Section 8.1.1. Benefits from Reductions in Domestic the MTR and FTR	TSTT	While in principle, reduced wholesale rates can lead to reduced retail prices, this may not be true in the fixed line market as the traffic has been trending downwards for some time, thus, the objective of lowering retail prices may not be economical or realistic. TATT's analysis may have underestimated the impact of societal trends on usage patterns within the voice telecoms market. Thus, it may be erroneous of TATT to assume that prices are the most material determinant of usage patterns of customers.	TATT should reconsider its assumptions (not findings) in this regard, and consider whether the elasticity of the market demonstrates that these assumptions can be supported by historic responses of the marketplace. It is also recommended that TATT complete its long outstanding study on the impact of OTT services on the voice market, and more specifically, understand the revenue leakage/ bypass effect these services are having on traditional voice – on-net, off-net and international – patterns.	The Authority has determined, in accordance with best practice, that wholesale rate regulation is efficient, not only in treating with downstream market prices but for lowering barriers to entry. This is further in keeping with the Authority's regulatory mandate. The effect of reductions in wholesale interconnection rates on retail prices is considered in Appendix III of the Revised Report, which presents empirical evidence of consumer benefits. The evidence provided in the appendix suggests that, with respect to mobile services, off-net call prices tend to be lower when MTRs are lower. With respect to the issue of OTTs, the benchmarking exercise focused on the cost of traditional

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				interconnection services currently in use in the local telecommunications landscape.
Section 8.1.1 Benefits from Reductions in Domestic MTR and FTR (page 29	MPU	One of the main disincentives of the MTR is that it is paid by the subscriber calling from the call originating network and not the subscriber from the terminating network. So, terminating network operators are not held responsible by their subscribers for high termination rates, they can put the blame on the other (originating network) operator for the high termination charges their subscribers are facing. Therefore, their own network operator is unlikely to have its subscribers churn his network, because his termination revenue too is being paid for by the call originating network's subscribers.	One of the main disincentives of the MTR is that it is paid by the subscriber calling from the call originating network and not the subscriber from the terminating network. So, terminating network operators are not held responsible by their subscribers for high termination rates, they can put the blame on the other (originating network) operator for the high termination charges their subscribers are facing. Therefore, their own network operator is	The Authority notes the comment, which highlights the need for the Authority to act on its mandate to prevent inefficient interconnection rates (non-cost-based) from being proliferated in the market.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
			unlikely to have its subscribers churn his network, because his termination revenue too is being paid for by the call originating network's subscribers.	
Section 8.1.2. Supporting Empirical Evidence	TSTT	In relation to the use of historical data our comments in 6.1 applies. It was also noted "While the statistical relation is not strong, it nevertheless suggests that end-users benefit from lower MTRs." As such, how can it be concurred that off-net call prices are lower when the underlying MTR is lower if the relationship has not been proved to be correlated or causal?	TATT should remove this statement, and further, reconsider the relevance of this concept.	The Authority has included in the 2017 Report and the Revised Report statistical evidence that this statement holds true in the Caribbean region, although the statistical evidence is not strong. On a wider scale, numerous studies have been done in international jurisdictions. A study[21] was conducted over the period 2003 to 2008 on the European experience, using econometric methods to assess the impact of MTRs on retail prices and demand for 61 mobile operators from 16 European countries. The study found that lower MTRs resulted in a lower average retail unit price, with a highly significant coefficient of +0.71. The study also showed that the coefficient is less than +1.0, which confirmed the existence of a "waterbed effect". The results also demonstrated, with high significance, that lower MTRs (presumably operating through the mechanism of lower retail prices) tended to result in greater consumption of mobile services in terms

21 http://www.wik-consult.com/fileadmin/Aufsaetze/MARCUS_et_al_Growitsch_MTR.pdf

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				of minutes of use per month per subscription. The Authority has not been misleading in its statements on possible transfer of benefits to consumers.
Section 8.1.3. Benefits from Reductions in International MTR and FTR	TSTT	This section further highlights, that TATT may not have properly considered the cost and revenue drivers in the international marketplace. Furthermore, there is the presumption that the most pertinent determinant in consumption of international MTR's and FTR's is the cost of these services. While this could have been the case many years ago, this may not necessarily be the case today.	TATT would therefore, benefit from closer considerations of the actual market trends than reliance on past precedence which may no longer be relevant or applicable in the contemporary context.	Though the application of a cost-based methodology for determining interconnection rates (via cost models) is preferred, the Authority is proposing the use of benchmarked results for the interconnection rate negotiations, pursuant to existing regulations for same. Whilst the Authority also takes note of the general limitations of benchmarking approaches, it posits that recommending benchmarked interim rates is useful in the absence of robust modelling results. Notwithstanding that, the Authority also recommends the move to cost-based interconnection rates as soon as robust, up-to-date, LRAIC data sets become available. Thus, in recognising the limitations of benchmarking, and given the Authority's intent to move to cost-model results, the Authority's recommendation for the interim maximum interconnection rates to be based on benchmarking is a conservative one. In this regard, the Authority is only making recommendations on maximum rates (not point recommendations), over a multi-year glide path, which aims to converge to more cost-oriented rates (i.e., those experienced, on average, within the

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				benchmarking countries that have already developed cost models) over several years.
Section 8.2. Likely Impacts in Trinidad and Tobago	TSTT	TSTT if of the opinion that the Authority needs to ensure that inputs that are used in the analysis are properly comparable and that an appropriate variety of factors are considered and sensitivities applied.		The Authority assures TSTT that it has applied a robust analysis of inputs and associated sensitivities. TSTT is asked to highlight the specific shortcomings to which it is alluding.
Section 9				
Section 9 Conclusions	CCTL	Current market realities such as high off net prices, as compared to on net prices, and the results of the benchmark study establish that the interconnection rates are above cost. At this point cost based rates in satisfaction of Section 15(1) of Telecommunications (Interconnection) Regulations (2006) are not available. Section 15(2) of Telecommunications (Interconnection) Regulations (2006) allow for the use of cost benchmarks to inform the level of interconnection rates. In order to promote efficiency and encourage increased competition CCTL looks forward to working with the industry to lowering underlying termination rates.		The Authority notes CCTL's comment.
Section 9 Conclusion	TSTT	*The recommendations of this report, if implemented will:* *i) Fulfill the cost-based interconnection pricing objectives of the Act and Regulations*	TATT should review these outcomes, and the unintended consequences of its approach.	As indicated earlier, whilst the Authority is mindful of the general limitations of benchmarking approaches, it posits that recommending benchmarked interim rates, pursuant to regulation 15 of the Interconnection

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		ii) Lower net call termination revenues (in-payments) for some operators while lowering net call termination (out-payments) costs for other operators *iii) Benefit consumers by supporting the implementation of lower retail call prices over time,* *iv) Benefit consumers and operators by promoting increased demand, in terms of both usage and subscription and, more generally, by supporting increased competition to the extent retail prices decline over time.* With respect to (i), TSTT is of the opinion that due to the concerns noted in the report, it may be premature to say that it fulfils the objective of the Act and Regulation. TSTT reiterates that the use of the jurisdictions that do not match our economic scale or technological mix underscores this objective being achieved as we believe these rates may not be reflective of the cost environment in Trinidad and Tobago. With respect to (ii), TSTT maintains that the pursuit of lower rates may be detrimental to the industry if not pursued with care as if rates are too low, this can have negative impact on the ability of	TATT should be mindful of the technological mix and economic realities of Trinidad & Tobago. TATT should be mindful of the experiences of other jurisdictions where regulatory over-reach, coupled with artificially underpricing of networks, resulted in the chilling of investment in the sector.	Regulations, is useful in the absence of robust modelling results. Notwithstanding that, the Authority also recommends the move to cost-based interconnection rates, as soon as robust, up-to-date, cost data sets become available. Thus, in recognising the limitations of benchmarking, and given the Authority's intent to move to cost-model results, the Authority's recommendation for the interim maximum interconnection rates to be based on benchmarking analysis is a conservative one. In this regard, the Authority is only making recommendations on maximum rates (not point recommendations), over a multi-year glide path, which aims to converge to more cost-oriented rates (i.e., those experienced, on average, within the benchmarking countries that have already developed cost models) over several years. The Authority thanks TSTT for its comment and maintains that this benchmarking exercise addresses traditional call and messaging termination services. The documents highlighted by TSTT are currently under review.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		networks to operate efficiently, and could disturb operators innovative processes and upgrade facilities. TSTT reminds TATT of the US experience of mandating artificially low rates in the opening of the Access Loop. This had a chilling effect on investment in the local loop, as parties saw little to no revenue to invest in the new technologies that would have redounded to the benefit of the customer. It was only when these artificial controls were removed, that investment in the sphere was reintroduced. Therefore, we believe that this approach of seeking to install artificially deprecated rates will have a similar effect on industry stakeholder, and thus negatively affect the ability to reinvest and innovate in the core networks elements required to enhance our customers' services. This approach will also work against the benefits gained over the past years where operators have cumulatively enhanced the quality of telecommunications in Trinidad and Tobago. Finally, TSTT regurgitates that it is erroneous to assume that the only variable affecting customer	TATT should reconsider when relooking its report and policy documents the key matters highlighted before making determinations in this process. For example these studies/ policy documents should include: - A Review of the OTT Market on the consumption of voice services in T&T - The completion of the revisions to the Price Regulations Policy and Regulations.	

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		usage patterns are interconnection rates. TSTT reaffirms its argument that there are other factors: economic slowdown, regulatory arbitrage (e.g. OTT services) which are also affecting usage patterns.		
General statement on the way forward.	MPU	While there is much more to be said against the perpetuation of and arbitrary nature of benchmarked rates, we believe enough can be gleaned from our position taken here to at least turn TATT's attention to the reality of a "Bill and Keep" system of settlement. In this light we conclude our response to the consultation without going through our full list of prospects against benchmarking.	1) The glide path offered by TATT for lowering termination rates, to be effective, must accompany a glide path for lowering retail rates. Both rates must maintain a drop that is proportionate for both termination and retail rates at once. 2. TATT should acknowledge the possibilities of Bill and Keep as a succeeding regime for mobile termination rates.	The Authority has determined, in accordance with best practice, that wholesale rate regulation is efficient in treating with downstream market prices (retail). However, consistent with international best practice, the Authority has decided that termination rates should reflect the efficient cost of providing services so that wholesale users and retail consumers face charges consistent with cost. Accordingly, inefficiencies which are passed on to users lead to lower welfare[22]. Wholesale reviews and regulation can be considered as a less intrusive remedy. Under the BAK interconnection charging regime, there are usually no per-minute charges between operators, i.e., each network operator agrees to terminate calls from the other network at no charge (usually based on the condition that traffic is roughly balanced in each direction).

[22] https://tatt.org.tt/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=227&PortalId=0&TabId=222

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				Two countries in the Americas region (Colombia and Costa Rica) apply a BAK regime[23]. Two countries in the African region (Benin and Burundi) have a BAK regime, which is usual for Internet service providers but not yet commonly used by telephony operators. In the US, the default arrangement is that all operators (fixed and mobile) in each state use the same termination rates that the fixed incumbent in that state charges. Operators are free to negotiate their own rates, typically resulting in a BAK arrangement, or justify why they deserve a higher rate for termination[24]. However, a move to BAK would directly create winners and losers: MNOs with net outgoing traffic and fixed operators would generally benefit, while larger MNOs would potentially lose significant net revenues, for which they might be compensated by other sources (a "waterbed effect") such as through their own retail prices.

[23] https://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_Lazauskaite_MTRs.pdf

[24] The case for "bill and keep" for termination in Europe is not yet proven. (Harbord and Pagnozzi (2010) http://market-analysis.co.uk/PDF/Topical/harbordpagnozzirnemarch2010.pdf)

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
				Furthermore, if operators are not compensated for terminating calls, this may result in degraded service quality. A move to BAK can also have a major impact on users because a change in the interconnection regime might need to be mirrored by a change in the way the operators recoup their costs at the retail level. Despite its obvious limitations, the Authority would be open to considering the applicability and justification of BAK in Trinidad and Tobago. Until such time, interconnection services in Trinidad and Tobago shall continue to be carried out in accordance with the Act and the Interconnection Regulations.
Effect of Number Portability	TSTT	Since Number Portability is intended to facilitate customers' choices among carriers, there could be a demand impact, i.e., more churn (customer in- and out movements as a percentage of the customer base) and/or the trend in demand levels (e.g., from established incumbents to new entrants in the initial stages of Number Portability availability). It is possible that accommodating these demand effects could increase costs (either directly associated with interconnection or reasonably	TATT is asked to consider the effects of Number Portability in the development of its rates.	Number portability (NP) may have the likely impact of changing call volumes. However, the fact that interconnection charging will technically persist in the face of NP renders this process of determining efficient cost-based maxima for those rates one of continued, paramount importance. The current experience with mobile NP since that service was launched indicates that the number of subscribers utilising the service has not caused any reported issues with the traffic-carrying capacity of interconnection links amongst the operators, nor the ability of the operators to

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
		allocated to interconnection elements) over and above the costs directly associated with Number Portability and assignable to interconnection. In addition, to the extent that Number Portability affects volume levels over which interconnection costs are recovered, interconnection unit cost rates could be affected.		adjust the capacity of the interconnection links to meet demand. Hence, although fixed NP has not yet been launched (as at the date of this consultation), operators should be able to take the necessary actions in a timely manner to compensate for possible changed traffic flows on interconnection links without incurring significant extra costs associated, for example, with changing from one-way trunks to two-way or re-aligning existing one-way trunk capacity to match new traffic flows. However, if such traffic flow changes do significantly affect the cost base of interconnection links, then the Authority will consider the costs, once the necessary data are provided by the operators.
Annexes				
Annex C	Digicel (T&T) Ltd	TATT has not provided 'R squared' values for the correlations in order to establish how much of the claimed correlation can actually be explained by the data presented in the charts.	TATT should include R squared values for informative interpretation.	As indicated in section 8 of the Revised Report, the graphic information presented in Appendix III was drawn from a referenced 2010 MTR review consultation document issued by the Turks and Caicos Islands Telecommunications Commission (TCI-TC). The R-squared values were not included in that consultation document. However, the TCI-TC had noted in the document that the statistical results were not strong (implying the R-squared values were not high), and this finding was repeated by the Authority in its exercise.

Document Sub-Section	Submission Made By:	Comments Received	Recommendations Made	TATT's Decisions
Annex Figure C3	Digicel (T&T) Ltd	This chart shows that the on-net/off-net ratio of 1.00 exists in the markets with the lowest and higher MTRs. It also shows that for countries with MTR in the range 0.10 to 0.15, there are examples of parity (ratio 1.00) and non-parity (ratio up to 2.00). Digicel believes that this ratio has more to do with market maturity, marketing and consumer preferences, and bears no reliable relationship to MTR.	Digicel recommends that TATT re-examines its claims in relation to the information presented in figure C3, and that there is no reliable correlation to be drawn, nor any causality expectation from changes to MTRs.	Figure C3 in the Revised Report shows that the ratio of off-net to on-net postpaid calling pricing in the Caribbean region is generally higher for higher MTRs. This is consistent with the expectation that allocative efficiency and competition are promoted by lowering MTRs, although the statistical evidence presented in the figure is not strong. On a wider scale, numerous studies have been done in international jurisdictions. A study[25] was conducted over the period 2003 to 2008 on the European experience, using econometric methods to assess the impact of MTRs on retail prices and demand for 61 mobile operators from 16 European countries. This study found that lower MTRs resulted in a lower average retail unit price, with a highly significant coefficient of +0.71. The study also showed that the coefficient is less than +1.0, which confirmed the existence of a "waterbed effect". The results also demonstrated, with high statistical significance, that lower MTRs (presumably operating through the mechanism of lower retail prices) tended to result in greater consumption of mobile services in terms of minutes of use per month per subscription.

[25] http://www.wik-consult.com/fileadmin/Aufsaetze/MARCUS_et_al_Growitsch_MTR.pdf

Telecommunications Authority of Trinidad and Tobago

Chronology of LRAIC Model Implementation

February 13, 2019

Contents

1. Introduction

This document sets out the chronology of the long run average incremental cost (LRAIC) model development and provides a timeline of the main milestones and activities which were undertaken by the Telecommunications Authority of Trinidad and Tobago (the Authority) along the path to model implementation.

2. Background

The requirements for the adoption of cost-based interconnection rates are set out in section 25(2) of the Telecommunications Act, Chap. 47:31 and contained in the decision of the Arbitration Panel which deliberated and ruled on the first interconnection dispute of 2006[26].

3. Development and Implementation of LRAIC

The following sections give details of the action taken by the Authority to develop and implement the LRAIC model.

3.1. Policies and Frameworks

The following is a list of the frameworks, methodologies and regulations developed pursuant to the mandate:

a) The Telecommunications (Interconnection) Regulations (2006)
b) A costing methodology for the telecommunications sector[27] (2008)
c) The LRAIC specification paper[28] and a current cost accounting (CCA) reference paper[29] (2010)
d) The weighted average cost of capital (WACC) (2012)
e) A methodology for conducting an efficiency study[30] (2012)

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[26] https://tatt.org.tt/Portals/0/Documents/Dispute%20Decision%20No.%202.pdf

[27] http://tatt.org.tt/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=227&PortalId=0&TabId=222

[28] http://tatt.org.tt/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=216&PortalId=0&TabId=222

[29] http://www.tatt.org.tt/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=505&PortalId=0&TabId=222

[30] http://tatt.org.tt/DesktopModules/Bring2mind/DMX/Download.aspx?Command=Core_Download&EntryId=220&PortalId=0&TabId=222

3.2. **Model Implementation, 2010 – 2012**

Over the period 2010 to 2011, the Authority embarked on the initial LRAIC data collection process with operators.

Operators were requested to submit 2009 audited financial data, in the required LRAIC and CCA formats. The Authority subsequently utilised this information to populate the model.

Over the period 2011 to 2012, the Authority received correspondence from joint authors — Digicel, TSTT and CCTL — objecting to the implementation of the model. In letters dated September 23, 2011, October 23, 2012, December 6, 2012 and December 13, 2012, these operators outlined the issues they had relating to model access and transparency, data provision and model testing.

3.3. **Model Implementation, 2013 – 2014**

Over the period January to July 2013, the Authority continued its discussions with the operators. (Reference is made to letters dated January 9, 2013, July 5, 2013, March 27, 2013, and July 16, 2013.)

Captured in its letter to operators dated April 16, 2013, the Authority established a collaborative process for moving forward on the LRAIC process. The Authority also met with the CEOs of TSTT, Digicel and CCTL to discuss same. That process identified the phases of model access, updated model runs, beta testing, model finalisation, model publication and implementation of the modelling tool.

Model access and alpha testing sessions were held with operators over the period November 2013 to April 2014 at the Authority's Barataria office. The Authority concluded the sessions and provided concessionaires with a summary report by letter dated May 27, 2014.

Further collaboration between the Authority and concessionaires was agreed upon, based on the operators' responses to the summary report.

3.4. **Model Implementation, 2015**

Based on operators' specific requests to further consult on the costing documents, the Authority engaged with the service providers towards the implementation of the model.

3.4.1. **Consultation**

The Authority held public consultations in 2015 on the LRAIC and CCA reference papers and sought technical assistance from the model builders. The final documents incorporated amendments and additions based on stakeholder comments received during the consultation process, and were published on May 31, 2016.

3.4.2. **Model Testing and Data Provision**

Initial cost modelling results, based on 2009 data, were available for a range of concessionaires. However, due to significant input data limitations, the Authority concluded that these initial modelling results were not sufficiently robust to inform interconnection rates in Trinidad and Tobago.

The Authority requested verified full data sets from operators for the years 2012 to 2014 to conduct further model testing. These data were not submitted by operators, who also made simultaneous requests for the handover of the model to conduct their own testing.

3.5. **The Benchmarking Exercise, 2017 – 2019**

Given the impasse surrounding data provision and concerns by operators on applicability, transparency and use of the model, the Authority sought to address interconnection rates through a formal and detailed benchmarking exercise, in accordance with the legislative mandate.

The legislative basis for the use of benchmarks for setting interconnection rates is set out in regulation 15(1), (2) and (3) of the Telecommunications (Interconnection) Regulations (2006).

Pursuant to this mandate, the Authority, in September 2016, entered into a consultancy agreement with Sepulveda Consulting Inc. for the development of an interconnection benchmarking study of prevailing interconnection rates.

The output of this study was required to be of credible use for informing the interconnection rates, particularly fixed and mobile termination rates in Trinidad and Tobago, to be implemented in 2017 (and for a period of three to five years thereafter).

In accordance with its established procedures for public consultation, the Authority issued the *Results of an Interconnection Benchmarking Study for the Telecommunications Sector of Trinidad and Tobago* (the 2017 Report) for public consultation in March 2017.

Based on comments solicited during the consultation phase, the Authority amended the 2017 Report and shall issue the revised document for a second round of consultation in April 2019, pending relevant approvals.