

Spectrum Plan for the Accommodation of Public Mobile Telecommunications Services

Annex II – Decisions on Recommendations Matrix for Second Consultation Round

The following summarises stakeholder comments and recommendations received from stakeholders to the *Consultative Document on the Spectrum Plan for the Accommodation of Public Mobile Telecommunications Services (Second Round)* and the decisions made by the Telecommunications Authority of Trinidad and Tobago have been incorporated in the final approved version, November 2017, where applicable.

Item	Section	Stakeholder	Comments	Recommendations	TATT's Decision
1	General	TSTT	<p>TSTT thanks the Authority for its continuation of its engagement of Stakeholders in the Consultative Process, for the development of the “Spectrum Plan for the Accommodation of Public Mobile Telecommunications Services.” TSTT trusts that its comments and recommendations herein, are received and interpreted in the constructive manner it is intended by TSTT.</p> <p>It would be useful for the Authority to review and explain its philosophy and rationale in identifying the spectrum set aside “...for future use” in all bands to ensure:</p> <ol style="list-style-type: none"> 1) As much as possible, these “<i>expansion bands</i>” provide for concatenation to existing assignments so that there are contiguous spectrum blocks; and 2) The spectrum identified to be set aside 	<p>TSTT respectfully recommends that the Authority undertake a sanitization of its allocation approaches in all bands, not just AWS and APT/CITEL.</p>	<p>The Authority thanks TSTT for its continued participation in the consultation process and for its comments and recommendations made herein.</p> <p>In relation to the comment made by TSTT on the identification of a specific quantum of 850 MHz spectrum “... for future use”, the Authority wishes to clarify that the 10 MHz of spectrum in the 850 MHz band allocated for future use has resulted from the reclamation of spectrum in excess of the spectrum cap.</p> <p>The spectrum “<i>allocated for future use</i>”, provides the opportunity for further optimum use of the band as the need arises. Also, this 850 MHz</p>

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			<p>for “future use” does not create a systemic imbalance in the spectrum assigned to operators in the marketplace.</p>		<p>spectrum is not an “<i>expansion band</i>”.</p>
2	General	TSTT	<p>TSTT also respectfully suggests that the Authority should review the Maximum Technical Operating Specifications for the various bands.</p> <p>At present, there are inconsistencies in:</p> <ul style="list-style-type: none"> a. Presentation (some specifications are presented in dBW and others in watts); and b. Consistency in magnitude. <p>As a result, the following issues arise:</p> <ul style="list-style-type: none"> a. What determines the varying mobile station transmit powers (which vary from 3dBW to 8.45dBW)? b. What determines the varying base station transmit powers (which vary from 27dBW to 32dBW)? <p>Consistency in standards and/or rationale,</p>	<p>TSTT respectfully recommends that the Authority review the Technical Operating Standards across all bands to ensure consistency in assumptions and rationale.</p>	<p>The Authority, in accordance with its <i>Equipment Standardisation and Certification Framework, 2008</i>, may adopt international rules in the development of its technical standards.</p> <p>The mobile and base station RF output power for stations deployed in all of the bands identified in this Plan have been adopted based on Federal Communications Commission (FCC) rules.</p> <p>RF output power is different for different frequency bands. One reason is the radio frequency propagation characteristics are different across the frequency bands.</p> <p>Additionally, recognising that FCC Rules are applicable to a large market, the United States, it is expected that</p>

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			<p>would aid Operators in effectively and efficiently operating networks that are in compliance with the Authority's guidelines. It would also encourage predictability in regulatory intervention.</p> <p>The Authority should seek to present a consistent rationale for these Technical Operating Specifications, and ensure consistency with the MPE limits identified in the license documents.</p>		<p>there will be a sufficiently large ecosystem of both base stations and mobile stations that conform to these adopted standards to support networks deployed in these bands.</p>
3	4.1 The 700 MHz Band	TSTT	<p>TSTT applauds the Authority for its wisdom in having constructively reviewed its proposed allocation of spectrum in this band. The Authority was aware of the global trend of developments in the sector since 2013, as well as the government's apparent tri-partite policy directive in the local market and would have realized the incongruity between adherence to the previous 'two-operator' plan and these trends and policy directives.</p>	<p>TSTT endorses the Authority's adoption of the APT/ CITELE Band Plan for the deployment of FDD LTE networks in accordance with LTE Band 28.</p>	<p>Whilst the Authority notes TSTT's position — that the 700 MHz band should be afforded to commercial operators only — the Authority also has a responsibility and must consider the needs of all stakeholders in its decision-making process.</p> <p>The Authority must ensure that spectrum is allocated, and used, to maximise the benefit to all.</p>

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			<p>Notwithstanding our agreement in principle with the Authority's adoption of the APT band plan, TSTT is perplexed by the Authority's plans for assignment of spectrum in the band, which, in TSTT's considered opinion, might not be the most efficient manner of allocation of this resource.</p> <p>As Figure 2 clearly demonstrates, the APT/CITEL band plan allows for 2x45 MHz of usable spectrum. In this context there is the opportunity to offer at most 2x15MHz of spectrum to each of the three mobile Operators, as opposed to the 2x10MHz proposed.</p> <p>Surely the Authority recognizes that 2x15MHz allocations will facilitate LTE networks with download speeds upwards of 75Mbps, as opposed to 50Mbps that will be achievable with 2x10MHz. We believe that the benefit of the larger spectrum assignment seems self-evident. We are therefore at a loss as to why the Authority would seek to limit Operators' capacity in this manner.</p>	<p>TSTT respectfully recommends that the spectrum cap for the 700MHz Band be 30MHz (2 x 15MHz) so as to allow mobile LTE networks that support up to 75Mbps download speeds.</p>	<p>In this regard, the Authority takes cognizance of the ITU's Radiocommunications Bureau Resolution 646, as cited on page 21 of the Plan, and it is necessary to consider an allotment to PPDR in this band.</p> <p>In addition to the proposed 2 x 10 MHz per operator in the 700 MHz band, additional spectrum is available for mobile broadband and new technologies such as LTE. In particular, the Plan includes the AWS band which can be used for additional capacity to enable aggregate download speeds in excess of 75Mbps.</p>

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3	4.1 The 700 MHz Band (continued)		<p>Further, TSTT wishes to understand the Authority's rationale in having only 5MHz for expansion, to be split amongst three Operators. It is even more puzzling that this expansion band and the spectrum allotted to the Carriers would be non-contiguous.</p> <p>Instead TSTT proposes the following: 10MHz should be made available for immediate acquisition by appropriately authorized concessionaires. Each of these blocks would be associated with 5MHz for expansion spectrum to be assigned upon request, only after deployment of the network when the initial assignment is complete. These blocks can be:</p> <table border="1" data-bbox="564 1062 1125 1328"> <thead> <tr> <th data-bbox="571 1062 730 1214">Mobile Station Transmit</th> <th data-bbox="730 1062 921 1214">Base Station Transmit</th> <th data-bbox="921 1062 1016 1214"></th> <th data-bbox="1016 1062 1119 1214">Block Name</th> </tr> </thead> <tbody> <tr> <td data-bbox="571 1214 730 1328">703 – 708</td> <td data-bbox="730 1214 921 1328">758 – 763</td> <td data-bbox="921 1214 1016 1328">5 MHz</td> <td data-bbox="1016 1214 1119 1328">A'</td> </tr> </tbody> </table>	Mobile Station Transmit	Base Station Transmit		Block Name	703 – 708	758 – 763	5 MHz	A'	<p>TSTT respectfully suggests that each 10MHz assignment be associated with contiguous 5MHz expansion bands.</p>	<p>The Authority wishes to clarify that 2 x 5 MHz of 700 MHz spectrum has been allocated for any future use, not only to operators. This accommodates 2 x 10 MHz for up to three operators and 2 x 10 MHz for PPDR.</p> <p>Should the Authority determine that this spectrum can be made available to operators in the future, it can employ a competitive licensing process, such as an auction process, which would be fair, transparent and non-discriminatory. Such a competitive licensing process can be employed where demand is less than supply.</p> <p>With respect to the comment that “...this expansion band and the spectrum allotted to the Carriers would be non-contiguous”, the Authority wishes to confirm that carrier aggregation, which is employed in LTE, allows non-contiguous spectrum to be used in the same manner as contiguous spectrum.</p>
Mobile Station Transmit	Base Station Transmit		Block Name										
703 – 708	758 – 763	5 MHz	A'										

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			708 – 718	763 – 773	10M Hz	A		The Authority also wishes to inform that the AWS band can be used as expansion spectrum for the 700 MHz band and carrier aggregation across these bands will allow for concatenation of multiple non-contiguous frequency channels, which would equate to contiguous spectrum.
718 – 723	773 – 778	5 MHz	B'					
723 – 733	778 – 788	10M Hz	B					
733 – 743	788 – 798	10M Hz	C					
743 – 748	798 – 803	5 MHz	C'					
<p>In this way, each Operator has an opportunity to access contiguous expansion spectrum, without any need for significant adjustment to the spectrum assignment plan.</p>								
3	4.1 The 700 MHz Band (continued)	TSTT	TSTT recognizes the concern for the allotment of spectrum resources for PPDR services as outlined on pp. 21. However, TSTT respectfully disagrees that this allotment need come from the PMTS spectrum resource.				TSTT endorses the allocation of spectrum for PPDR services. However, TSTT believes that PPDR Services	The Authority confirms that its proposed allotting of spectrum within the 700 MHz band to PPDR takes cognizance of Section 43 of the Telecommunications Act, and in so

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			<p>TSTT believes that, for consistency with its own TTFAT, that public emergency services should NOT be allotted in bands assigned for commercial services. Further, as PPDR services are not PUBLIC mobile telecommunications services, TSTT posits that it is an ill fit for these services to be addressed within the spectrum plan for PMTS.</p> <p>TSTT asks the Authority to consider that as the APT band plan assignment is consistent with FDD LTE Band 28, the allocation of the 10MHz wide duplex spacing gap between Band 28 uplink and downlink allocations (i.e. 748MHz to 758MHz) be instead used for PPDR services. To this end, TATT may allocate that 10MHz to TDD LTE services (in accordance with TDD LTE Band 44) for PPDR services. The users of PPDR spectrum may be required to use additional filtering systems in their deployment. Further, due to this allocation being adjacent to the expansion</p>	<p>should not be treated as PMTS as these services are inherently non-public in nature.</p> <p>TSTT recommends that the Authority considers allocating</p>	<p>doing, aligns with the ITU Convention.</p> <p>The ITU's Radiocommunications Bureau Resolution 646, as cited on page 21 of the Plan, recommends that jurisdictions accommodate such an allotment. The Authority has, therefore, elected to consider an allotment to PPDR in this band. The Authority's consultative <i>Trinidad and Tobago Frequency Allocation Table (8.3 kHz to 3000 GHz)</i> document will be revised to reflect this change.</p> <p>Operators have additional spectrum in the AWS band that can be paired with the 700MHz band and used as additional capacity for LTE networks.</p> <p>The Authority has considered the possibility of using the duplex spacing gap — i.e., band 44 — for PPDR, but it does not view this band as practical for the following reasons:</p> <ol style="list-style-type: none"> 1. As per the first objective of Resolution 646, the identification of

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			<p>bands proposed above, there is sufficient opportunity for any remedial issues to be addressed while Concessionaires pursue commercial deployments of FDD LTE 700 networks.</p>	<p>PPDR services in the duplex spacing gap between 748MHz and 758MHz.</p> <p>TSTT recommends that PPDR services be treated with in the TDD LTE band plan (in accordance with LTE Band 44).</p>	<p>3GPP bands 14 and 28 for PPDR enables harmonisation, so that equipment may be used across borders, particularly to support disaster relief efforts. Therefore, an allotment to PPDR should conform to either band 14 or 28, to maintain harmonisation within the region. The use of band 44 will not be harmonised with other PPDR systems deployed in accordance with the APT Band Plan.</p> <p>2. There is currently no eco-system for handsets or network equipment available for band 44. However, the same handset and network ecosystem employed by commercial operators in the 700 MHz band can also be used by the Ministry of National Security for the deployment of a PPDR network.</p>