

Response to TRAI Consultation Paper dated 8th February 2018

Method of allocation of spectrum for Public Mobile Radio Trunking Service (PMRTS) including auction, as a transparent mechanism.

Response Submitted by:

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CHAPTER V: ISSUES FOR CONSULTATION

- Q1. Do you agree that existing License Service Area (LSA) based authorization criteria For PMRT service license is appropriate? If not, should there be a city/district based authorization aligned with spectrum allocations?**

Circle wide LSA for PMRTS, as per Unified License Agreement, is appropriate. The spectrum allocation procedure for an additional city/area in an already licensed service area should be made simpler and should happen upon filing of application with WPC within reasonable timeframe of 10 days of filing of application.

- Q2. Do you suggest any other criteria/change in license/ area of authorization for PMRT Service? Elaborate your suggestions with supporting facts.**

Existing authorization procedure for PMRTS under UL seems okay. But we would like to submit following suggestions:

1. Spectrum to be allocated for the period till authorization of License. Procedure of renewal of WOL every year should be withdrawn like other access services/operators.
2. Operators should be free to relocate/splitting of their base stations in a given service area of 30 Km radius within a Licensed service area, without taking prior permission from WPC subject to site being SACFA approved.
3. Import of Mobile Radios and Handheld Radios should be in OGL, as in case of GSM operators and no capping on the number of terminals to be imported.
4. DPL is not mandatory for a PMRTS licensee. As there is ambiguity on inclusion of sales of hardware/accessories in the definition of AGR, the PMRTS operators are buying/selling hardware through separate companies which necessitates requirements of a DPL by the company dealing in hardware. We suggest that the definition of AGR should exclude hardware sales to take care of this complexity.
5. Operators should be permitted to do test coverage of the installed systems and carry out terminal performance testing/repairs without need of an Experimental license which is issued with a time limit of 3 months thus causing hindrances to PMRTS operators in conducting their business. This coverage testing and radio repairs being an ongoing process, the requirement of Experimental License should be explicitly excluded for PMRTS operators.
6. With the availability of spectrally efficient digital technologies, we suggest that spectrum allocation should be done based on a unit of 6.25 KHz or 6.25 KHz equivalent. WPC should have separate channeling plan for 6.25 KHz, 12.5 KHz and 25 KHz technologies.
7. Ambiguity on whether the end PMRTS customer is required to have a separate user license from WPC needs to be clarified.

Q3. Do you suggest any change in the duration of license from the present duration of 20 years? Please provide supporting justification.

Present duration of PMRTS license of 20 years is appropriate. Duration of WOL to be linked with the period of License Agreement to avoid cumbersome procedure of renewal every year. As the PMRTS infrastructure and user terminals are expensive and have a lifespan of 20 years for infrastructure and 8-10 years for user terminals, hence any period lesser than 20 years would not justify the investments made by the operator and the end users thus discouraging any potential businessmen to enter into PMRTS market. Moreover there is sufficient residual life in the existing network and terminals.

Q4. Keeping in view the existing PMRT services market size and growth potential, Which methodology of allocation of spectrum will be most suitable for PMRT services?

- (a) Auction (or)
- (b) Administrative allocation

Kindly provide supporting arguments for your choice.

We do not think that auction is appropriate method for PMRTS, mainly on the following grounds:

1. There is sufficient availability of carriers. Current spectrum reserved for analog PMRTS is 5 MHz & for Digital PMRTS is 3 MHz in 800 MHz band.
2. PMRTS is a mission critical communication service licensed with several restrictions – restricted PSTN interconnect (1 PSTN line for every 5 channels, no numbering scheme, semi-duplex conversation, one way PSTN dialling however no operator is offering the PSTN connect).
3. The USP of the service is one to many voice communication in times of emergency caused by manmade or natural disasters (fire, floods/cyclones) or other mission critical communication applications like plant maintenance of a refinery, co-ordination between a crane operator & an operator on the ground etc. Also the customers for PMRTS are confined only to Institutional/Business category and not individuals. The total industry has merely 56,500 subscribers, each paying between Rs 6,000 to Rs. 7000 p.a. on a fixed billing ,unlimited talk time basis. Because the cell radius is 30 km , frequency reuse is virtually nil. The same 5 channels can be reused in other cities in given LSA subject to the two base stations being far apart to avoid interference.
4. Key applications are public safety, disaster management and improving operational efficiency.
5. PMRTS is the most spectrum efficient option since DOT/WPC issues one RF Carrier for every 90 users in analogue mode and 180 users in digital Mode.

6. Moreover spectrum for PMRTS is being assigned on administrative basis with initial startup spectrum of 5 carriers which can be augmented upon reaching a defined subscriber loading/norms of 90 subscribers per channel. This ensures that there is no scope of accumulation/hoarding of spectrum by the operator. Further the business is viable only in select cities in a given LSA hence there is no reason for an operator to pay and keep the spectrum without putting it to use.
7. The Statistics as per TRAI CP shows that the growth of subscriber numbers and revenue is having slow progress and it has taken more than 2 decades to reach the current subscriber levels and auction would be detrimental to new entrants incase the same is applied.
8. Besides paying an 8% license fee to the Government from the above revenue, current spectrum fees comes to approximately 3 % of revenues which is higher than the other access services.
9. Because the industry is small, operators have to make significant investments in people and network infrastructure to meet customer expectations of RF coverage and service levels. Typically manpower costs are between 20-25% of revenues and infrastructure costs (site rentals, electricity, depreciation and interest on Capex) exceed 50% of revenues. There is thus hardly any room from the financial viability viewpoint to significantly increase regulatory costs (license fee or spectrum).
10. To give an analogy, supposing a new city is being developed and the Government is planning on deciding how it should sell the real estate. The Government cannot release all the land it has to real estate developers for commercial /residential use on an auction. It has to reserve some land for parks, schools, hospitals ,public utilities, police stations, small/local shopping centres etc. where the commercial basis and the potential to generate revenue for the Government is very different from revenue generated by prime real estate. PMRTS is a niche service which is valued worldwide for its utility for mission critical /emergency communication and thus needs to co-exist with high revenue earning industries like Cellular, just like a hospital and a Mall in a city.
11. PSTN offers no additional value to end customers. Nowhere in the world has a PMRTS service regulated like in India, has exceeded a few tens of thousands of customers. Applications other than voice form only a miniscule (read insignificant) percentage of the voice revenue. It is because of this reason that most Governments use international benchmarks for spectrum allocation and pricing. The subscriber growth is also between 8-10% and not exponential as has been witnessed for Cellular.
12. For any industry where the total size of the revenue is only Rs 40 Cr, how much room can be there for the auction to yield incremental revenue for the Government to justify the rigmaroles of an auction?

We suggest for Administrative allocation mainly on the following grounds

1. Despite all the above, new technology provides a lot of room for the Licensor and the Regulator to drive more efficient resource of the spectrum, even if it is given administratively. Presently the Industry is using a channel spacing of 25 KHz for analog PMRTS. Since analog equipment is no longer available now, the industry is forced to use Digital technology which, because of technical advancements offers a speech path even with a 6.25 KHz channel spacing. If the Licensor were to plan the migration process properly a 5MHz band kept reserved for analog PMRTS today can allow 4 times the number of subscribers to be loaded once full migration to Digital takes place.
2. Presently WPC is allocating channels with spacing of 25 KHz. Digital PMRTS technologies on the other hand, irrespective of make /supplier, offer two voice paths in a 12.5 KHz spacing and 6.25 KHz spacing. A migration plan can be worked out in a manner that all new channel allocations can be made in multiple units of 6.25 KHz Channel Spacing in the 800 MHz band. Where each 6.25 KHz spectrum unit can be charged at the present spectrum price determined for 25 KHz channel spacing. Thus, the 25 KHz spacing spectrum can be charged at 4 times the spectrum fee determined for a 6.25 KHz spectrum unit. This will result not only in increasing the availability of spectrum by four times (mean 4 times more subscriber can be serviced on the same spectrum) but shall also quadruple the revenue for the Licensor since the unit of spectrum now suggested would be 6.25 KHz in lieu of current 25 KHz. This will provide enough room for both licensor and licensee to grow the revenue of PMRTS business within the reserved band for PMRTS.

Q5. Do you propose any other methodology other than the options provided in Q4 above for allocation of spectrum for PMRTS? Please provide detailed justifications.

As PMRTS is a niche service having only institutional customers requiring communication from one to many in mission critical applications, we strongly believe that administrative allocation/assignment of spectrum on "first come first serve basis" seems to be the most appropriate and transparent mechanism because:-

1. Supply far exceeds demand. There is sufficient availability of carriers in 25 KHz in PMRTS bands which shall increase by four times after migration to spectrally efficient digital technologies making new unit of spectrum as 6.25 KHz.
2. PMRTS Operator is being issued initial startup spectrum of five carriers and additional allocation can be sought by operator only after achieving defined loading criteria/norms.
3. PMRTS is a service targeted at extremely narrow niche segment of institutional customers only.
4. PMRTS is viable only in select metros/mini-metros and industrial towns where only institutional customers exist in certain select segments in critical mass.

5. As per TRAI's CP on practices being followed in other countries (examples for three countries) clearly shows that spectrum for PMRTS is issued administratively only.
6. DOT has been allocating spectrum on administrative basis to CMRTS which is deploying similar technology for same end use. This differentiation is seriously disturbing the level playing field between PMRTS and CMRTS.
7. Moreover CMRTS loading efficiency is very poor as compared PMRTS which is completely defeating the very purpose of National Telecom Policy of optimum use of scarce national resource like spectrum.
8. Other reason that the auction is not being suggested is that for any industry where the total size of the revenue is around 40 Cr and the national subscriber numbers is only 56500 approx., how much room can be there for the auction to yield incremental revenue for the Government to justify the rigmaroles of an auction?

Q6. If you have opted for auction as the methodology for allocation of spectrum for PMRTS,

- (a) **What criteria/norms should be there for auction of spectrum so that efficient utilization of the spectrum is ensured? Should there be preference for Digital PMRTS networks?**
- (b) **Should the spectrum auction be held on LSA basis or city basis?**
- (c) **What should be the effective date of allocation of spectrum (if won through the process of auction)?**
- (a) **What should be the rollout obligations for PMRT service providers? What should be the penalty to be imposed in case of non-compliance of roll out obligation? Please provide detailed justifications?**

We believe that auction is not good option for PMRTS, as traditionally Mobile Trunked Radio Service subscriber base is 1% of the cellular subscriber base. Considering 1200 Million cellular subscriber base in India, the PMRTS subscriber should have been 12 Million. But unfortunately the current Trunked subscriber base is not even 0.1 Million. In order to achieve its full potential, DOT to arrive at the License fee which enables the industry to grow which would be the current system of administrative allocation of spectrum with defined loading norms/criteria. Secondly DOT to discourage Captive networks & CMRT in area where PMRTS is in operation, to achieve the dual objective of better spectrum utilization and higher revenue generation per spectrum. The licensing /pricing can be based on a unit of spectrum being equal to 6.25 KHz and the spectrum can be allocated based on the channeling plan for 6.25 KHz/12.5 KHz/25 KHz depending upon the technology adopted by the PMRTS operator/end user.

Q7. If you feel administrative allocation is the best methodology, then

- (a) Are the existing criteria of assignment of RF carriers sufficient or should there be different criteria/norms for assignment of spectrum? If existing criteria is not sufficient, what are the proposed criteria for such assignments so that efficient utilization of the spectrum is ensured?**

We understand that the current criteria for assignment of spectrum is sufficient but with only one change suggested that the basic unit of spectrum chargeable should be 6.25 KHz or 6.25 KHz equivalent as compared to 25 KHz allocation currently. This shall essentially mean that Government shall increase its revenue from PMRTS by four times. We would strongly suggest that the current spectrum held by the PMRTS Operator should be protected for next 5 years and they should be encouraged to migrate faster to spectrally efficient digital Trunking technologies enabling the department to charge the basic unit of spectrum at 6.25 KHz as compared to 25 KHz rate currently prevalent. This shall result in higher loading per KHz as well as higher revenue per KHz to the department. The capacity of 5 MHz analog spectrum with 25 KHz channel spacing (200 Channels) having a loading of 90 subscribers per channel is 18000 subscribers. With spectrally efficient digital technologies i.e. 6.25 KHz or 6.25 KHz equivalent this shall increase to 72000 subscribers for 5 MHz band.

We suggest that existing PMRTS Operators currently in the 811-814 MHz (Digital) and 814-819 MHz (Analog) band may continue to be allocated the same bands with analog operations being given adequate time (5-6 years) to migrate to Digital technologies. This shall allow accommodating all existing PMRTS operators/users in the 800 MHz band only (811 to 819 MHz) without any disruptive migration, while quadrupling the spectrum charges to the Licensor/Regulator

- (b) Should administrative price of spectrum be calculated LSA wise? If yes, what should be the basis and formula for determination of administrative price? Suggest alternate calculations, if any.**

We have suggested spectrum allocation to be based on a service area of any 30 Km radius within the Licensed Service Area (LSA) of PMRTS operator as the niche PMRT services is viable in Metros/Mini-Metros and certain Industrial towns only and operator shall only put up network in those areas. Therefore the price of the spectrum shall be calculated not on LSA basis but on new definition of service area proposed (with 30 KM radius) within the LSA. There should be no restriction on number of service areas of 30 Km radius within LSA.

Moreover there are different types of technologies available in Digital PMRTS viz. 6.25 KHz/12.5 KHz and 25 KHz channel spacing. Based on the technology chosen by service provider spectrum equivalent to certain minimum number of voice paths say 8-12 depending upon whether the service area is non-metro or Metro should be allocated administratively as startup spectrum with defined roll out obligations and additional spectrum can be allocated based on specified/defined loading norms.

Q8. Out of the bands discussed in Table 3.2 above, which are the preferable bands for The PMRT services in India? List out in the order of priority. Are the bands suggested by DoT as mentioned in the Table 3.3 will be adequate to cater for the spectrum requirements of PMRTS?

Out of the bands discussed in Table 3.2 we have following inputs for considerations:-

1. As per the consultation paper, the three sub bands proposed (preferred) by DOT have two sub bands in 800 MHz and one band in 300/400 MHz band. The second sub-band of 5 MHz in 800 MHz band (819-824 MHz/864-869 MHz) proposed by DOT is not fully available as 2 MHz from this sub-band is already de-licensed for RFID applications and another 1 MHz is being considered for M2M/IOT communications. So effectively only 2 MHz out of the sub band 819-824 MHz (paired with 864-868 MHz) is available for PMRT services.
2. PMRT services is viable only is select Metros/mini-metros and industrial towns where in 800 MHz, because of its propagation characteristics, is the band of choice.
3. Keeping in mind the DOT intent not to allocate more than 8 MHz to PMRT services in 800 MHz band , one of the sub-band proposed by DOT is not fully available and causing no disruption to the industry, we suggest the allocation of following bands for PMRT services

814-819 MHz/859-864 MHz : 5 MHz
811-814 MHz/856-859 MHz : 3 MHz

4. We also suggest that DOT/WPC should allocate spectrum for all the available digital technologies viz. 6.25 KHz/12.5KHz/25 KHz and should create separate channeling plan for allocation of spectrum to accommodate all technologies.

Q9. Taking into consideration the existing allocation by DoT and Authority's latest recommendation for delicensing spectrum for M2M, would it be feasible to consider the band 819-824 MHz/ 864-869 MHz for allocation to PMRTS licensees?

We request your attention to the following points from the Consultation Paper:-

1. 2 MHz (865-867 MHz) out of the above mentioned band has already been delicensed for the use of low power equipment/devices with maximum transmitted power of 1 W, maximum Effective Radiated Power 4W and maximum channel bandwidth 200 KHz. This is primarily delicensed for RFID applications.
2. Additional 1 MHz (867-868 MHz) has already been recommended for delicensing for catering to M2M/IOT deployments by TRAI vide its recommendations dated 5th September 2017.
3. There are currently no allocations for PMRTS and CMRTS in this band as well as there is no specific demand pending with DOT in this band.

Hence from the above out of 5 MHz only 2 MHz can be considered for PMRTS which in our strong opinion is not sufficient to cater to the requirement of PMRTS industry. Therefore it is not viable to consider the band 819-824 MHz/864-869 MHz for allocation to PMRTS licenses

Q10. Which other candidate band will be most suitable for PMRTS if the band 819-824 MHz/ 864-869 MHz (5 MHz) is not to be considered for allocation to PMRT services? Please support your answer with facts.

As 3 MHz (865-867 MHz & 867-868 MHz) from the suggested band (864-869 MHz) is not available due to delicensing, we suggest the following bands for PMRT services in order of priority as below:-

814-819/859-864 MHz	:	5 MHz
811-814/856-859 MHz	:	3 MHz

Q11. What should be the minimum block size of spectrum to be put for auction? How Contiguity of spectrum can be ensured.

As already mentioned PMRT services is viable in Metros/Mini-Metros and certain industrial pockets only. Although the PMRT service license is issued circle-wise, the spectrum is issued based on 30 KM service area which could be a city/town or an industrial pocket. There are different digital technologies available in the market viz. 6.25 KHz Channel spacing, 12.5 KHz Channel spacing and 25 KHz Channel spacing. All the three technologies provide one voice path per 6.25 KHz spectrum.

So based on the technology chosen by service provider spectrum equivalent to certain minimum number of voice paths say 8-12 depending upon whether the service area is non-metro or metro should be allocated administratively as startup spectrum with defined roll out obligations and additional spectrum can be allocated based on specified/defined loading norms.

We have already recommended continuing with administrative allocation of spectrum to a niche and mission critical application like PMRTS. The channeling plan should ensure that the carriers allocated in the startup spectrum should have a minimum channel spacing of 250 KHz and DOT/WPC should come out with a channeling plan accommodating all available digital technologies viz. 6.25 KHz Channel spacing, 12.5 KHz Channel spacing and 25 KHz Channel spacing. Moreover we don't envisage any requirement of Contiguous spectrum in PMRTS

Following technical points should be taken in consideration while creating the channeling plan:-

1. Technical considerations such as minimum adjacent channel separation in the same combiner & potential intermodulation distortions (IMD) dictate that spectrum allocation on a discreet basis shall be the correct approach to satisfy operational requirements & implementation challenges of all available Digital technologies.
2. Since the RF sub-systems, especially combiner has a limiting maximum capacity of 20 channels across the landscape of any Digital PMRTS Technology, a separation of 250 KHz for the first 20 channels allocated is essential.
3. In case 'customer density' dictates having another 20 channels in the same site, the additional 20 channels, while having an adjacent channel separation of 250 KHz within themselves, can be separated even by 25 KHz from the first lot of 20 channels.
4. Though there are RF combiners available with a channel separation of 150 KHz, the insertion loss however increases by a whopping 30% (typical specs), thereby drastically reducing coverage in a Group Call across multiple sites. This will no doubt result in the PMRTS operator having to put up more number of sites at a significantly higher cost.
5. It is also a known fact that a PMRTS operator typically chooses the tallest buildings within a Service area. Given this cell radius is very large and because the repeaters are transmitting at 100 watts frequency re-use is non-existent even in a large service area like the National Capital Region. This is another reason, why unlike cellular, a contiguous spectrum allocation is not required/justified in case of PMRTS.

Q12. In case spectrum is to be auctioned, which methodology / approach(s) should be adopted for valuation and associated reserve price of Spectrum for PMRTS and why? Please justify your answer.

Based on the data/reports available at TRAI website and other websites the following can be deduced.

- The PMRTS industry is already paying a much higher licensee fee and SUC including upfront auction fee being paid by other Access Services.
- The Government revenue from PMRTS industry shall quadruple by charging the basic unit of spectrum at 6.25 KHz in lieu of 25 KHz today for the rates currently applicable to 25 KHz after migration to spectrally efficient digital technologies
- The same principle can be extrapolated as more sophisticated digital technologies evolve which enable the basic unit of spectrum to be allocated even lower than 6.25 KHz.

The above approach will ensure that no additional spectrum beyond 8 MHz need to be provisioned for the PMRTS industry while increasing revenue on a per KHz basis for the Government, thus eliminating the need for auction altogether.

Q13. In case spectrum is to be auctioned, which methodology/ approach(s) should be adopted for calculation of spectrum usage charge? Please justify your answer.

We do not recommend auction, however we have already explained that PMRTS industry is already paying higher Spectrum usage charge as compared to other access services.

Q14. Whether the concept of spectrum cap shall be applicable on assignment of Spectrum to the licensees for PMRTS? Justify your answer.

In our view, the holding of spectrum should not be subject to a cap, as number of Customers and Operators are very small. PMRTS is a niche service and the subscriber growth is also between 8-10% and not exponential as has been witnessed for Cellular. Spectrum Cap should be preferred when demand is expected to exceed supply, but currently sufficient carriers are available for PMRTS in the band allocated for this niche service.

Moreover with migration to spectrally efficient digital technologies, the capacity of the current spectrum shall quadruple thus allowing four times more subscribers loading in the given spectrum. We have seen that it has taken 20 years for PMRTS to reach the current subscriber base and still we have sufficient spectrum available as on date even after considering the channels held up for allocation.

We therefore strongly believe that in the current scenario spectrum caps are not required for PMRTS which is a niche industry and should be allowed to grow to reach its full potential.

Q15. In case you are of the view that provision of spectrum cap should be there, what should be the mechanism for applicable spectrum cap?

- (a) Whether any one of the spectrum cap i.e. intra-band or overall shall suffice the requirement as of now or**
- (b) both caps should be made applicable simultaneously?**
- (c) What should be the appropriate criteria for spectrum cap?**

Based on the current assignments of spectrum to PMRTS operators we see that the percentage of spectrum held by a single operator to the maximum spectrum available for PMRTS is a single digit in most cases. Moreover this percentage shall become miniscule after the operators migrate to spectrally efficient digital technologies quadrupling the available channels thus there is no concern in the foreseeable future for availability of spectrum for PMRTS hence we don't recommend any spectrum cap. In case the authority wants to put a cap in order to avoid any monopolistic situation in future, we suggest a spectrum cap of 50% across bands for a given service area.

Q16. What should be the duration/validity of assignment of spectrum to PMRT service provider? Should it be with the same duration as that of the license (20 Years)? Please support your answer with facts.

The PMRTS operator is allotted initial startup spectrum of five channels and based on specified norms/criteria of loading can be allotted more channels. The Licensor can withdraw the spectrum issued if either the operator is unable to meet the loading criteria or is unable to meet the rollout obligations. We strongly recommend that the validity of spectrum assignments should be concurrent with the duration of the license without the need to get a Wireless Operating License every year as the cost of putting up PMRTS network and cost of terminals is very high and the Infrastructure equipment has a lifespan of 18-20 years whereas terminals are having lifespan of 8-10 years. Thus with the kind of investment to be made by PMRTS operator and the end user, the validity of spectrum assignment should be same as the license agreement so as to make it viable for any operator to make investments in putting up and running a PMRT service.

Q17. If the duration of validity of spectrum is to be made lesser than the validity of license, should there be an option with the licensee to renew? What should be the specific conditions for such renewal?

PMRTS operator is being allotted initial startup spectrum of 5 channels with roll out obligation to cover the 30 Km radius within a licensed service area. The additional spectrum beyond 5 channels can be sought by PMRTS operator only after achieving loading criteria and maintaining it for a period for 3 months which can be withdrawn by the authority if the roll out obligations and loading criteria is not met. This approach ensures that there is no possibility of either unnecessary accumulation of spectrum by the operator or any possibility of excess allocation beyond the indicated norms/criteria. The regulator may provide incentives to operators to migrate to spectrally efficient digital technologies enable create better availability of the current spectrum thus accommodating current as well as future operators. Hence there is no need for the validity of spectrum as in the first place it is allocated based on certain loading norms/ criteria and secondly can be withdrawn if the operator fails to sustain the defined loading norms/criteria. In fact the requirement of annual renewal of Wireless Operating License by the Operators should be done away with.