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RADIO TRUNKING SERVICE

QUICKCALLS

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Response to TRAI Consultation Paper dated 29th August 2023

Review of terms and conditions of PMRTS & CMRTS Licenses

Response submitted by:
QuickCalls Private Limited,
Mumbai

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Q1. Whether there is a need to review the terms and conditions of PMRTS License and PMRTS Authorization under Unified License? Kindly provide adetailed response with justifications.

A1. There is need to review the terms and conditions of the PMRTS License and PMRTS under Unified License *because DoT has not taken action on any of the TRAI recommendations relating to PMRTS which TRAI made on 20th July 2018 after extensive consultation with all concerned stakeholders.*

Meanwhile the PMRTS industry has been starved for spectrum and unlike Captive/CMRTS applicants, has also been refused any provisional /interim allocation of spectrum, even when the PMRTS Industry was willing to accept furnishing the same undertaking being given by Captive /CMRTS.

Also most fixed-line Service Providers have switched to providing SIP Trunks by and large, instead of the traditional E1/PRI trunks because of which PSTN connectivity part may require review.

Q2. In case it is decided to review the terms and conditions of PMRTS Licenseand PMRTS Authorization under Unified License, in what manner should the following conditions be amended?

(a) Scope of the license
(b) Roll out obligation
(c) Technical conditions
(d) Network interconnection
(e) Security conditions
(f) Any other (please specify).

A2. Since these recommendations are more than 5 years old and fixed-line Service

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Providers have migrated from E1/PRI to SIP trunks, we shall require a 30 channel SIP trunk for a Digital System for every 2,700 subscribers.

We are suggesting that the PSTN connectivity criteria be changed from 10,000 to 2,700 subscribers both for initial allocation of a 30 channel SIP /E1/PRI trunks or additional 30 Channel SIP/E1/PRI trunks for each additional 2,700 subscribers.

The reason we are recommending 2,700 subscribers is based on anticipated reduction in subscriber loading per channel from 180 per digital channel based on present loading norm (12.5 KHz) to 90 subscribers per digital channel (12.5 KHz) after PSTN connectivity is implemented. (Post PSTN connectivity conversations will be longer because of which loading per channel would come down drastically.

We do not recommend any change in the Service Area definition, Scope of PMRTS Service, Roll Out Obligations, Technical conditions or Security Conditions.

For PMRTS Service providers Site Interconnectivity is far more important than PSTN Connectivity.

Q3. Whether PMRTS providers should be permitted Internet connectivity withstatic IP addresses? Kindly provide a detailed response with justification.

A3. Interconnection of sites within the same Service Area should be permitted for the following reasons: -

- **In a Metro Service Area (e.g. NCR) all the base station sites should be allowed to be interconnected to offer seamless coverage, given that most customers have their offices in the main city(Delhi) and factories/warehouses in the suburbs (Noida/Gurugram) , requiring seamless coverage between main city and suburbs.**
- **Even in a Service Area which spans a Telecom Circle , the same extended coverage requirement exists for a main city and its suburbs e.g., Chennai and its suburbs of Sriperumbudur, Chengalpattu, Mahabalipuram and Kanchipuram etc.**

In view of the above PMRTS providers require Internet Connectivity with static IP

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for: -

- Site to site networking
- Trunking system backhaul connectivity to Central Server
- For inter-suburb and intra-service area roaming voice calls.

Q4. Whether there is a need to review the extant provisions relating to service area for PMRTS Authorization under Unified License? If yes, whether it would be appropriate to grant PMRTS Authorization for three different categories with service area as (a) National Area; (b) Telecom circle/ Metro Area; and (c) Secondary Switching Area (SSA)? Kindly provide a detailed response with justification.

A4. There is need to review the extant provisions relating to authorization of PMRTS Service area under unified license for the following reasons:

a) Since subscriber loading criteria per channel is clearly defined, PMRTS operators need operational flexibility to relocate their sites in a given city to optimize RF coverage based on both site availability/cost scenarios from time to time as well as migration of customers from main city to suburbs.

Presently PMRTS operators have to seek approval of WPC for re-locating an existing site (completely or partially relocating, say 2 of the 5 allocated channels) or setting up a new site in the suburbs based on demand from both existing and new subscribers coming up in the suburbs.

Since 2014 DOT has not allocated any spectrum even on an interim basis (like being given to CMRTS/Captive systems based on undertaking furnished by them), all permissions even for relocating a site had been held up citing reasons furnished under point 2.27 of the TRAI consultation paper)

Some PMRTS operators may like to simultaneously offer PMRTS in more than one city in a Telecom Circle (in case it is a State) based on demand from an anchor

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customer or an existing customer with operations extending to 2 cities or more. Just like in the case of an ISP, PMRTS operators may either like to start with just one city or more in the Telecom Circle/Metro Service Area. For this purpose, we recommend that the License/Authorization for PMRTS be granted for three different Categories namely Category 'A', Category 'B' and Category 'C'.

- **The Service Area for Category 'A' authorization shall be the National Area.**
- **The Service Area for Category 'B' authorization shall be the Telecom Circle/Metro area.**
- **The Service Area for Category 'C' authorization shall be the Secondary switching Area (SSA) /City.**

We also recommend that the Royalty for spectrum, if assigned administratively, for the above three categories be fixed as follows:

1. **Category C – The Royalty charge for spectrum fee finalized for SSA/City for each SSA. For better understanding the present royalty fee of Rs 48,000/-for 5 channels shall become the royalty charge for each SSA, after final recommendations of TRAI for Royalty payable.**

   Under Unified License, for more than four SSAs in a Telecom Circle, the Licensee shall be required to obtain PMRTS Category 'B' authorization for that Service Area.

2. **Category B – The Royalty charge for spectrum fee for the Category B authorization shall be 4 times the Category C fee for one SSA. This suggestion is based on the cumulative experience of demand assessment for PMRTS for a Telecom Circle – if we look across all the PMRTS providers today the number of SSAs in each Telecom Circle (except Metro Service Area) is between 1-2 in the majority of Telecom Circles (the only exception being Gujarat which has PMRTS being provided in 5 SSAs). In Metro Service Areas the number of SSAs ranges**

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from 3-4.

3. Category A – For prospective PMRTS operators wanting to start National Operations, Category A authorization shall be applicable. We suggest Royalty charge for spectrum fee for the Category A authorization to be 10 times the fee applicable for Category C authorization.

Q5. Whether there is a need to review the extant provisions relating to the authorized area for use of a particular frequency spectrum to PMRTS providers? If yes, in what manner should these provisions be amended? Kindly provide a detailed response with justification.

A5. There is definitely a need to review the extant provisions of relating to authorized use of spectrum to PMRTS providers, which presently is confined to assignment at a city specific level.

In order to prevent delay, PMRTS providers should be given the flexibility to reuse the spectrum issued for a Service Area in the same Service area based on intimating WPC and pay location-wise Royalty and Spectrum charges for the same.

This will result in the PMRTS Industry being able to respond in a timely manner to all new business opportunities emerging in the Service Area already licensed as well as continue optimizing coverage through site relocation/optimization and serve both existing and new customers better.

Q6. Whether there is a need to review the mechanism of shifting the fixed station from one location to another location within the authorized area for use of a particular frequency spectrum? If yes, what should be the terms and conditions for such permission? Kindly provide a detailed response with justification.

A6. With the new proposed definition of Licensed Categories A & B, the fee for extended

coverage (as argued by DOT) is already paid by the PMRTS licensee, thus eliminating the need to seek any further approval from DOT.

In case of shifting the fixed station from one location to another within the SSA (Category C), DOT should not raise any objection as long as the shifting does not result in extending coverage *beyond the point of reuse of the spectrum*. (Our view is that any frequency which is location specific can't be reused up to 120 Kms from the location where spectrum was being used earlier, given both the transmit power of 100 W and an average transmit height above MSL of 200m+, with the exception of coastal area, for a typical PMRTS site).

Q7. Whether there is a need to permit PMRTS providers to shift a few frequency carriers out of a pool of frequency carriers, assigned to an existing Fixed Station, to a new Fixed Station located within the authorized area for use of the pool of frequency carriers? If yes, in what manner the challenges arising out of such partial shifting of frequency carriers may be mitigated? Kindly provide a detailed response with justification.

A7. Already explained as above in our answer to under Q6 above.

Q8. Whether there is a need to review the requirement of obtaining Wireless Operating License (WOL) by PMRTS providers? Kindly provide a detailed response with justification.

A8. The requirement to obtain renewal of WOL every year as mentioned in the frequency assignment, frequency allocation, or frequency earmarking letters already issued to PMRTS Providers under unified License for PMRTS authorization stand deleted. As it has been done in case of Access Service authorization vide DOT Circular No. L-14004/01/2012-NTG dated 02/11/2016. All PMRTS Operators are paying their Royalty Fee and WPC License FEE regularly every year in the m/o July and January

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on the basis of their nos of subscribers and nos of allocated frequency channels as on 30th June and 31st December. WPC may give notice if operators fail to pay WPC-Royalty and License fee on the due date.

Q9. Whether there is a need to review the provisions related to sale, lease andrent of the radio terminals of PMRTS? Kindly provide a detailed response with justification.

A9. On the issue of definition of AGR for PMRTS, it is requested that DoT, while including the sale proceeds of instruments in the definition of the "Adjusted Gross Revenue", should provide for the cost of the instruments to be reduced from the AGR i.e. including only the gross margin made on revenue from sale proceeds of instruments.

Lease and rental issue of radio terminals of PMRTS is now being permitted by DOT for those DPL holders who are supplying radios to customers availing services from PMRTS operator under the SARAL SANCHAR ONLINE Web portal.

"Rental" as an option is not available on Saral Sanchar Portal, therefore all rental radio terminals on portal at the beginning of the year are shown as radios received back from the customer, again to be issued the same radio terminals back to l the same customers. Therefore, a separate rental option at Saral Sanchar portal needs to be provided.

We are also suggesting key changes in the DPL renewal format for which please refer Annexure 4.

Q10. In case your response to the Q9 is in the affirmative, what kind of changeswill be required in PMRTS licenses and Dealer Possession License (DPL) and guidelines? Kindly provide a detailed response with justification.

A10. This is now resolved under SARAL SANCHAR Scheme as explained above.

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Q11. Whether there is a need to review the provisions related to import of the radio terminals of PMRTS? Kindly provide a detailed response with justification.

A11. DOT has instituted a procedure to seek an import license every time the PMRTS operator wishes to procure radios from overseas OEMs. (radios are not available in India) From DOT's point of view the purpose is twofold:

- **To collect license fee for use of spectrum by the PMRTS operator @ Rs 100/- per radio.**
- **To monitor and ensure compliance with the Channel Loading norms defined by DOT, which have been stipulated by DOT @ 99 and 198 radios per channel for Analog & Digital PMRTS respectively.**
- **To regulate and prevent unauthorized import of radios by a DPL holder we propose the following to mitigate challenges being faced by the PMRTS operators, while addressing concerns of DOT.**

    - **For ensuring that the fee for usage of spectrum is paid, DOT should replace the present system of charging Rs 100/- per radio by a Spectrum Usage Charge (SUC) equal to 1% of AGR as also earlier recommended by TRAI. (TRAI recommendations for PMRTS dated 20th July 2018)**

    - **While DOT can enforce the channel loading criteria already stipulated for the purpose of assigning spectrum, DOT should dispense with specifying any upper ceiling for import of radios (linked to channel loading criteria) for the following reasons:**

        - **We have explained to DOT on no. of occasions that many customers who buy radios and avail PMRTS, later stop using the service, but neither return nor sell back the radios as they reflect in their books of accounts under current assets.**

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- **DoT's present linkage of allowing radio import linked to channel loading is a big disincentive to target higher spectrum efficiency where possible. Moreover, higher the no. of radios imported by the PMRTS operator, higher would be the AGR and the 1% SUC proposed shall result in additional revenue for the exchequer as well.**
- **In many cases, customers lose radios or radios are rendered beyond economic repairs or get subjected to attrition through wear and tear or declared unserviceable because of OEM declaring them as EOL**

- ***In order to prevent unauthorized import of radios, DOT may allow only Licensed PMRTS operators for import of radios under OGL***

Q12. Whether there is a need to review the provisions related to replacement of unserviceable network elements of PMRTS? Kindly provide a detailed response with justification.

A12. Since none of the network elements of PMRTS are available in India DoT should process requests for replacing unserviceable network elements of PMRTS on an expeditious, automatic approval basis.

Q13. Whether there is need to review the recommendation No 4.5 (mentioned below) of the TRAI's Recommendations on 'Method of allocation of spectrum for Public Mobile Radio Trunking Service (PMRTS) including auction, as a transparent mechanism' dated 20.07.2018, which are underconsideration of DoT?

"4.5 The Authority recommends that-

(a) Carrier size for assignment to PMRTS licensee (both for analog or digital) shall be 6.25 KHz and multiples thereof.

(b) Carriers (frequency pairs) of 25 KHz already assigned to the serviceproviders should be allowed to be retained by the service providers.

(c) Additional assignment of carriers for the existing analogue system shall continue @ carrier size of 25 KHz (counted as 4 carriers of 6.25 KHzeach).

(d) Assignment in new cities/ service areas shall be made for digitalsystems

only.

(e) Initially for each city, twelve carriers (frequency pairs) of carrier size 6.25 KHz in metro licensed service area and eight carriers (frequency pairs) in non-metro license service area shall be assigned for PMRTS (Digital system) depending on the availability."

Kindly provide a detailed response with justification.

A13. PMRTS industry categorically endorses the above recommendations and urges TRAI and DOT to ensure their urgent and immediate implementation to help the industry to migrate from Analog to the long-awaited Digital Infrastructure.

Since analog infrastructure equipment has long been unavailable, we recommend that all new or additional assignment of carriers for the existing analogue system with a Carrier width of 25 KHz shall no longer be required. A 25 KHz Carrier being used by present analogue system can be counted as 4 carriers of 6.25 KHz each for the purpose of collecting royalty for spectrum usage from PMRTS operators.

Q14. Whether there is a need to mandate PMRTS providers to migrate to spectrally efficient digital technologies in a time-bound manner? If yes, what should be the time frame for mandatory migration to spectrally efficient digital technologies? Kindly provide a detailed response with justification.

A14. The 5-year delay in DOT accepting & announcing the final recommendations for the PMRTS industry has adversely affected the PMRTS industry in many ways:

- **The PMRTS industry has been deprived of spectrum since Aug'2014 affecting both subscriber growth in existing service areas and preventing the industry to venture into new service areas.**

- **Lack on new spectrum has resulted in the PMRTS industry not being able to migrate to Digital and has been forced to continue making investments in analog infrastructure and radios. As a result, the industry has built an analog radio**

population which is more than 70% of the total. Based on our assessment the average residual life of the radios is between 4-5 years before the end of which customer shall not accept making a new investment in the digital radio.

- **The PMRTS operators also have an additional challenge of making new investments in Digital Infrastructure to migrate approx. 350-400 25KHz channels from Analog to Digital requiring a capex of Rs 70-80 Crs. Given the present state of the industry it will take at least 4-5 years to be able to afford making this investment.**

- **Besides, the long life span of radios will also result in a huge resistance from the end customers for being forced to replace their analog radios with Digital despite 3-5 years life still remaining for Analog radios.**

Q15. In case your response to Q14 is negative, what measures should be takento nudge and encourage PMRTS providers to migrate to spectrally efficientdigital technologies? Kindly provide a detailed response with justification.

A15. Immediate measure required by DOT is to put in place a frequency allocation plan for Digital PMRTS for 6.25 KHz, 12.5 KHz and 25 KHz channel spacing with required threshold adjacent channel spacing (depending on Digital technology deployed) and urgent assignment of above spectrum to PMRTS operators even if it has to be on an interim/provisional basis, without waiting either for new TRAI recommendations (based on conclusion of this Consultation Paper) or the New Telecom Bill. As it is, DOT is assigning spectrum on a provisional/ Interim basis to CMRTS (Captive Mobile Radio Trunking Service) and Captive users based on an undertaking that the recipient company shall pay the final price of spectrum as determined by DOT.

We strongly urge TRAI to restore a level playing field for the PMRTS industry which for the last 9 years has been distorted unjustifiably in favor of PMRTS alternatives and substitutes i.e., CMRTS and Captive Radio users

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Q16. Whether it is possible to deliver the PMRTS/ CMRTS, which are mission- critical in nature, using 4G/ 5G Network Slicing or any other technology? If yes, in what manner should the delivery of PMRTS/ CMRTS using 4G/ 5G network slicing be enabled in the license? What should be safeguardsto ensure that the quality-of-service for cellular networks is not adverselyimpacted? Kindly provide a detailed response with justification.

A16. Ever since the launch of 5G providing various services through network slicing had been hotly debated topic. While delivery of PMRTS/ CMRTS using 5G is technically feasible it is not viable to consider going for the same for the following reasons:

- **There are no PMRTS terminals either available today or in the roadmap of existing radio vendors which will be compatible with the 5G network. In our business standard 5G terminals will not work since the user requires ruggedized, terminals with enhanced audio to be heard even in high noise operating environment.**
- **Also the large legacy installation of PMRTS Infrastructure equipment and radio population will not be compatible with the new 5G terminals, whenever they are launched.**
- **If we consider the price of 5G spectrum paid by TSPs, and the millions of subscribers they count on for absorbing the amount paid in the spectrum auction, the PMRTS operator shall be both dependent on the TSP's rollout plan (which may be completely different from what is required by the PMRTS operator) as well as the likely minimum tariff imposed by TSP, given the price paid in spectrum auction, the opportunity cost of the network slice a TSP may have to reserve for a customer with just tens of thousands of subscribers and the low paying capacity of the PMRTS Operator given its revenue potential.**

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- **The issue of interoperability with legacy infrastructure and terminals will be another challenge as also the customer having to migrate from legacy to 5G dedicated terminals for a considerable new investment.**

- **What may evolve for the PMRTS Industry in the next decade is a 4G/5G based Walky Talky which may through an IoT SIM use the 5G network for non-mission critical applications of some user segments (4G /5G PoC or also known as Broad band PTT over Cellular). However the legacy system is likely to run for at least another 10 years, if not more.**

Q17. Whether there is a need to review the terms and conditions of PMRTS Authorization under Unified License (VNO)? Kindly provide a detailed response with justification.

A17. Since the DOT guidelines issued for VNOs in 2016 not a single VNO has come forward to offer PMRTS, to the extent we are recommending review of the terms and conditions of PMRTS authorization under UL, the same may be made applicable for VNO under UL regime.

Q18. In case it is decided to review the terms and conditions of PMRTS authorization under Unified License (VNO), in what manner should the following existing provisions be amended?

2.26.1 Service area

2.26.2 Scope of the license

2.26.3 Network interconnection

2.26.4 Any other (Please Specify).

Kindly provide a detailed response with justification.

A18. As explained in our answers to Q1-Q17 above

Q19. Whether there is any other issue relevant for review of terms and conditions of the PMRTS License, PMRTS Authorization under Unified License, and PMRTS authorization under Unified License (VNO)? Kindlyprovide a detailed response with

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justifications.

A19. As explained in our answers to Qs 1-18 above.

Q20. Whether there is a need to review the terms and conditions of CMRTSlicense? Kindly provide a detailed response with justifications.

A20. There is a need to review the terms and conditions of a CMRTS license because of the following:

a) The authority should consider an application for CMRTS license only if the requirement is strictly captive to the applicant e.g., for the sole and dedicated use of the applicant only. We have seen many cases of CMRTS license being issued to an applicant who is providing a Radio Trunking Service on a chargeable basis to different agencies not falling in the ownership of the applicant.

i. Some examples are Airports Authority of India taking up a CMRTS license and then charging all Airlines for usage of the same; a private operator (HCL Ltd.,) taking a Delhi wide CMRTS license and charging various user departments of the Delhi administration for usage of the same.

ii. There is no difference in either the use case or the end use of Radio Trunking Service between CMRTS and PMRTS in the examples provided above. Hence for the use cases described above only PMRTS license should be made available

b) It is well established that spectrum efficiency achieved by PMRTS operators is far higher than captive usage - typically channel loading achieved by PMRTS is 3 to 4 times that of a captive system. The spectrum efficiency for PMRTS is much higher because of increased no. of channels per site (leading to disproportionate increase in traffic handling capacity) as well as diverse usage-based customers (intensive usage at various points of time during the 24-hour day) and balanced distribution of

simultaneous conversations (talk groups) for a given no. of radios per customer

In order to encourage efficient use of spectrum and given the limited spectrum available the authorities must discourage applicants for CMRTS in case their coverage requirements can be met by an existing PMRTS operator *Please refer chart in Annexure 1 for improvement in loading per channel based on no of channels deployed per site.*

i. **Quite the opposite has in-fact happened since July-2014. While the PMRTS industry has been completely deprived of any new spectrum allocation, both Captive and CMRTS applicants have been assigned spectrum on a provisional basis after obtaining an undertaking from the applicant, thus distorting the level playing field between PMRTS and CMRTS / Captive**

ii. **Our view is that the License and Spectrum Fee for both CMRTS and Captive should be disproportionately higher than PMRTS for the above reasons. Also since the end use and purpose of both PMRTS and CMRTS is the same, assignment of spectrum, even on a provisional basis, should continue either for both PMRTS & Captive/CMRTS or no one.**

c) **CMRTS/ Captive also need to necessarily have to deploy only Digital Technology, like with PMRTS as well as be governed by the same loading criteria as stipulated for PMRTS, in the interest of keeping a level playing field. However since Captive/CMRTS systems will never be able to achieve the same Spectrum efficiency, the Spectrum Fees & Royalty for Captive /CMRTS should be disproportionately higher, especially since PMRTS is also paying a License Fee which is 8% of AGR.**

Q21. What should be the eligibility conditions for obtaining CMRTS license?Further, what should be the application processing fee for CMRTS license? Kindly provide a detailed response with justification.

A21. Unless the applicant requires a specific technology or customized RF coverage

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(tunnels, under ground stations etc., no Captive / CMRTS license should be issued if there is a PMRTS operator serving the geographical area in which the applicant is requesting for Captive/ CMRTS license. Also as discussed in the earlier section Captive/ CMRTS license should not be given unless the usage is strictly captive (Please ref. point 1 under answer to question no.20)

We have no comments on the application processing fee.

Q22. In case it is decided to review the terms and conditions of CMRTS license, in what manner should the following terms and conditions be amended?

A22. a) Service area:

Ans: Should be co-terminus with the desired coverage area for Captive/ CMRTS usage. Given that the requirement is for Captive use, no Telecom Circle Wide License should be given to Captive/CMRTS.

b) Period of validity:

Ans: As desired by applicant but not exceeding 20 years, beyond which applicant needs to apply for an extension

c) Scope of the license:

Ans: Strictly captive usage in an area where no PMRTS operator is providing service or there are special coverage requirements as mentioned in answer to question 20 above of TRAI Consultation paper.

d) Technical conditions;

Ans: Same as PMRTS and should not cause any interference to any other networks in the same coverage area

e) Channel assignment and loading:

Ans: Channel loading criteria shall be same as PMRTS. However, channel assignment should be made after satisfying PMRTS industry requirements for spectrum.

f) Operating conditions:

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Ans: Like PMRTS, Captive/CMRTS applicant should require a License for import of radio terminals. Also only Digital Terminals should be allowed for import. The present conditions of Fixed terminals not exceeding 10% of total should continue.

g) Conditions relating to suspension, revocation or terminationof license:

Ans: Same as PMRTS but may be appropriately modified in the context of Captive/ CMRTS usage. Additionally, any violation evidenced w.r.t either Captive Usage or commercial exploitation by way of charging any users should lead to suspension and revocation of license

h) Any other (please specify):

Ans: Roll out obligation should be the same as PMRTS and after imposing a penalty as applicable for delayed roll out, the license should be revoked if roll out is still not implemented

In the recent past DoT vide gazette notification dated 18th October 2018 opened up a License Free band from 446.0 MHz to 446.2 MHz for Personal Mobile Radios.

These mobile radios were to conform to a maximum transmit power (effective radiated power) not exceeding 500 milliwatts. An additional condition imposed was that these personal mobile radios were not to be used with any base station or repeater. However there is a rampant misuse of this provision, hurting both the Captive usage as well as PMRTS.

Annexure 3 provides information of how these Personal Mobile Radios are being sold with an effective radiated power of even 5 Watts and how some Companies are even selling base stations and repeaters in the 446.0 to 446.2 MHz band.

In view of the failure of the Authorities to control rampant violations , on behalf of the PMRTS Industry, we urge TRAI to recommend withdrawing this gazette

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notification to the Authorities, especially since it is distorting the level playing field for PMRTS.

Q23. Whether there is a need to mandate CMRTS licensees to migrate to spectrally efficient digital technologies in a time-bound manner? If yes, what should be the time frame for mandatory migration to spectrally efficient digital technologies? Kindly provide a detailed response with justification.

A23. In the interest of preserving the level playing field between PMRTS and CMRTS, especially with the end use (user application) and the end customer being same, the mandate to migrate to the spectrally efficient digital technologies should be enforced with the same time frame.

We recommend that the mandate for migrating all Analog systems to Digital should be 5 years after assignment of spectrum to PMRTS & 2 years from the date guidelines are finalized by DOT for Captive/CMRTS (since spectrum assignment as required by CMRTS/Captive applicants has continued from 2014 till date to Captive/CMRTS while being denied to PMRTS).

Q24. In case your response to Q23 is in the negative, what provisions should be made to nudge and encourage CMRTS licensees to spectrally efficient digital technologies? Kindly provide a detailed response with justification.

A24. We have provided our recommendations in an affirmative response to Q23

Q25. Whether there is any other issue relevant for review of terms and conditions of the CMRTS License? Kindly provide a detailed responsewith justifications.

A25. Not applicable

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Q26. Is there a need to review the license fee prescribed for PMRTS/CMRTS? Please justify your answer. If yes, please suggest detailed methodology for arriving at the license fees for PMRTS/CMRTS with justification.

A26. Given the size of the industry and the earlier consultation by TRAI on PMRTS we don't see any need to review the license fee prescribed for PMRTS. However, we would like to suggest reviewing the license fee prescribed for CMRTS for ensuring a level playing field.

Minimum license fee shall be as prescribed today for a specific service area not exceeding 30 Kms where coverage is desired. The only exceptions shall be Police, Fire, Defense and Government security.

Q27. Whether there is a need to review the allocation of spectrum for PMRTS? If yes, what changes should be made in the allocation of spectrum for PMRTS in the National Frequency Allocation Plan? Kindly provide a detailed response with justifications.

A27. There is no need to review the allocation of spectrum for PMRTS given the latest NFAP-2022 plan where PMRTS is allocated 811-814 MHz & 814-819 MHz on a dedicated basis as these are the very bands where PMRTS is has been presently assigned spectrum for Digital & Analog systems respectively. In view of the spectrum allocation applications pending with DOT and considering THE spectrum presently assigned by W.P.C together with estimated demand forecasted for the next 10 years, the PMRTS industry shall need a minimum of 8 MHz of spectrum allocation in the 800 MHZ band (with all new assignments being in Digital and migration from Analog to Digital in next 5 years) . This was recognized by TRAI even in their recommendations made in 2018.

The PMRTS industry shall migrate from Analog to Digital systems through a new channeling plan within the 811-814 MHz and 814-819 MHz bands (and their

corresponding bands 45 MHZ apart) only as detailed in Annexure -1. The PMRTS industry is confident of completing this migration within 5 years of the new channeling plan and spectrum assignment from the same being made available by WPC.

Q28. What should be the method of assignment of spectrum for PMRTS?

(a) Auction; or

(b) Administrative

In the case of auction, what should be the methodology for auction of spectrum? Kindly provide a detailed justification.

Q29. In case it is decided to auction the frequency spectrum allocated toPMRTS, -

(a) What should be the eligibility conditions for participating in auction?

(b) Whether the entire available spectrum in the frequency bands identified for PMRTS in National Frequency Allocation Plan (NFAP) should be put to auction?

(c) What should be the block size of spectrum, and minimum bid quantity in terms of number of blocks?

(d) What should be the spectrum cap for each authorized area for useof spectrum?

(e) What should be the roll-out obligations associated with the assignment of spectrum? What should be the penalties upon non-conforming the roll-out obligations?

(f) What should be the period of assignment of spectrum?

(g) What should be the minimum period beyond which the spectrum acquired through auction may be permitted to be surrendered?

(h) What should be the process and associated terms and conditionsfor permitting surrender of spectrum through auction?

Kindly provide a detailed response with justification in respect of eachof the above.

A28.&

A29. Unlike cellular access services, PMRTS is a relatively small industry and hence

methodology of spectrum allocation can be different.

Assignment of spectrum through auction can only be considered if demand for spectrum is exceeding supply and there is a possibility of having to move to new frequency band to meet spectrum requirements in future.

In the present (continuing since 1997) and NFAP-2022 mandated Analog PMRTS band of 814-819 MHz/859-864 MHz, there are 200 channels available with 25 KHz channel spacing. In this band of 5 MHz, if migration to spectrally efficient digital technologies is mandated through construction of an appropriate channeling plan as detailed in Annexure-2, it would result in 800 channels/800 Voice paths with a channel spacing of 6.25 KHz/12.5 KHz respectively , depending upon the Digital technology chosen. *This shows that there is no impending scarcity of spectrum for PMRTS.*

Even considering 25 KHz Channel spacing as it exists today in the 814-819 MHz band , there are more than 130 channels (65% of all available channels) available for assignment in the highest populated PMRTS market like Delhi/NCR , evidencing abundant availability without any doubt.

In the cellular industry, millions of subscribers with high usage of voice, video and data results in constant demand for additional spectrum. On the contrary, PMRTS is a niche service used essentially for voice only by limited institutional clients in certain geographical pocket. With a total PMRTS subscriber base of less than 65,000 radio users nationally with a revenue of less than Rs 50 Crs., the Royalty and Spectrum Fee charges paid by the PMRTS providers is less than Rs.1.2 Crs today.

Therefore, there is no comparison possible between the PMRTS industry and a Wireless Access Service under the licensing framework of CMTS, UASL and UL in terms of either business potential, subscriber base, or spectrum requirement or revenues possible.

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In view of the foregoing, it appears that there are adequate channels of spectrum available for assignment to PMRTS licensees. The supply is far exceeding the demand of spectrum and due to niche type of service the likely growth trajectory cannot be expected to go beyond 3-5 times the present size of the industry in the foreseeable future.

The PMRTS industry is of the view that auction of spectrum for such a small industry with a revenue potential of less than 0.1% of the cellular industry revenue for 2022-23, along with abundant availability of spectrum, does not appear to be a worthwhile consideration at all.

Also if we look at the financials of a PMRTS industry operator, based on the present license fee, spectrum fee and royalty the profit will not exceed 15% of the revenues. The PMRTS industry , vide its response to the TRAI Consultation *paper is already recommending increase of spectrum royalty by 4 times the present tariff.* Since ARPU cannot be significantly increased beyond present levels, the above increase in spectrum royalty recommended is likely to drive the profitability down only.

Thus given the total PMRTS Industry revenue of less than Rs 50 Crs, the total room available to the entire PMRTS Industry today is far less than Rs 2.5 Crs (assuming that the PMRTS operator will be allowed to make at least a PBT equal to 10% of revenues).

Moreover a study of the spectrum assignment methodologies adopted by countries other than India also reveals that in most countries the assignment is done on an administrative basis and at tariffs (License Fee and Spectrum Royalty & Fee combined) far lower than those being made applicable in India.

Thus, from whichever angle we examine there is no merit in assignment of spectrum to PMRTS industry by auction.

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Even if auction is chosen as the method of allocation of spectrum for PMRTS with a reserve price determined in accordance with the nature of service, the spectrum auction is very unlikely to be successful as in all likelihood the total bidding pool available with the PMRTS industry shall be less than Rs 2.5 Crs for the entire spectrum in the band 811-819 MHz pan India.

Therefore, auction of spectrum does not appear to be the appropriate method for assignment to the PMRTS Industry.

In conclusion, the PMRTS industry recommends that taking into consideration factors viz. PMRTS total earning potential; low spectrum demand and high spectrum availability and spectrum assignment practices prevalent in majority of countries outside India, the assignment of spectrum for PMRTS should be made administratively on the basis of demand in the foreseeable future

Q30. In case auction methodology is to be followed for assignment of spectrum:

a) Whether the value of frequencies assigned to the PMRTS providers be derived by relating it to the value or auction determined prices of other IMT/5G bands by using technical efficiency factor? If yes, with which spectrum band, should these frequencies be related and what efficiency factor or formula should be used? Please justify your suggestions.

b) Given the city wise allocation and the potential difference in financial/market parameters of PMRTS with respect to access services,should the valuation of frequency spectrum for these services derivedon the basis of IMT/5G prices be adjusted in order to account for the said distinctions? Please explain the adjustment methodology in detail.

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c) Apart from the above approaches, which other valuation approaches can be adopted for valuation of spectrum assigned to PMRTS providers? Kindly support your suggestions with detailed methodologies, assumptions, and other relevant factors.

d) Is it appropriate to take the reserve price as 70% of the valuation of spectrum? If not, what should be the ratio adopted between the reserve price for the auction and valuation of spectrum and why?

e) What should be the payment terms and conditions relating to upfront payment, moratorium period, number of installments to recover deferred payments, rate of discount etc.?

Please support your answer with detailed justification.

A30. Our response is provided in our answer to Q29 of the TRAI Consultation paper

Q31. Whether there are any other issues/ suggestions relevant to subject ? If yes, the same may kindly be furnished with proper justification.

A31. In conclusion, we would like to state the following:

- **The PMRTS Industry has been starved of spectrum since July 2014 ! No spectrum has been issued , even on a provisional or interim basis , to the Industry as in the case of Captive /CMRTS, despite the Industry's willingness to furnish the same undertaking as given by the Captive/CMRTS applicant.**

- **It has been established beyond any doubt that the both the use case (user application) as well as the end customer are the same for PMRTS and Captive /CMRTS. An oil refinery like BPCL has an option to set up its own network**

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(Captive/CMRTS or subscribe to PMRTS). Both business models can be seen in operation on the ground and both approaches are equally commercial in nature- BPCL wants to improve communication efficiency and effectiveness to make their operations more productive and profitable. It is also evident that PMRTS is far more spectrum efficient as compared to Captive/CMRTS and deserves to be allowed to flourish, given the spirit of making the best use of Spectrum, the country's national resource.

- **The total size of the PMRTS industry is less than Rs 50 Crs in revenue, dwarfed by long delays and indecision over how to assign spectrum to the Industry. The industry has its own unique niche of mission critical, short bursts of one-to-many voice communications, which is unique and time and again , the PMRTS Service has come to the rescue of both Government and private agencies for disaster relief in the wake of man-made and natural disasters like cyclones, floods, maintenance shut downs of a refinery, handling emergency communications or simply mission critical communication when alternate means of communication are failing or not available. It is because of this unique landscape or canvas that countries outside of India have let this industry flourish and blossom into its rightful size.**

- **The total spectrum required to be reserved for the industry is a mere 8 MHz in the 800 band, owing to operation in dense urban areas. Whatever methodology, whether administrative or is eventually chosen by the Authorities , it cannot and should not threaten the viability of the Industry.**

In view of TRAI recommendations for PPDR made in 2018, and the role that private parties can play in setting networks we feel that *both PPDR and PMRTS offer MCPTT as their unique value proposition.* In the last 5 years we have not witnessed any interest in either any private operator interested in setting up a PPDR network, nor any Government agency coming forward to do so. Yet an inordinately large number of applications are pending with WPC for Spectrum assignment for PMRTS.

It may thus a good idea to presently keep 811-819 MHz for PMRTS and 806-811

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MHz as well as 819 to 822 MHz for PPDR/ CMRTS. Based on the technology options available from PPDR vendors in the 800MHz band, there is no requirement of contiguous spectrum for PPDR. In future , for 5G or higher technologies, NFAP 2022 has already reserved 50 MHz in the 4940-4990 MHz band.

We would also suggest that a PMRTS Operator be encouraged to run a PPDR Service in the assigned PPDR band , especially if a large part of the state geography is being targeted. In such a case, a PMRTS Operator should be allowed to run both PPDR as well as PMRTS from the same Equipment Infrastructure.

Apart from the other arguments furnished in our response to the TRAI Consultation paper above, we would like to comment on the " auction being the best methodology for allocation of all natural resources , including Spectrum" viewpoint.

If for example an entirely new township was being built from scratch in an otherwise uninhabited area , would it be possible to auction all the land at the highest possible commercial real estate prices? Our humble submission is that many large tracts of land may have to allocated administratively for free or at tariffs way lower for end use such as parks, schools, hospitals, police stations, or other unique amenities with a considerably lower earning potential than prime real estate. PMRTS Industry is not prime real estate in the same context when compared with Access Services such as Cellular, where auction is the best methodology given its earning potential, billion plus subscribers over which the auctioned cost for Spectrum can be apportioned so as to form a small fraction/ miniscule percentage of their ARPU.

We urge the Authorities to take emergent steps to expeditiously decide and implement the spectrum allocation methodology in order to breathe some life into the long neglected PMRTS Industry and help it attain its rightful position in the canvas of Value Added Telecom Service !

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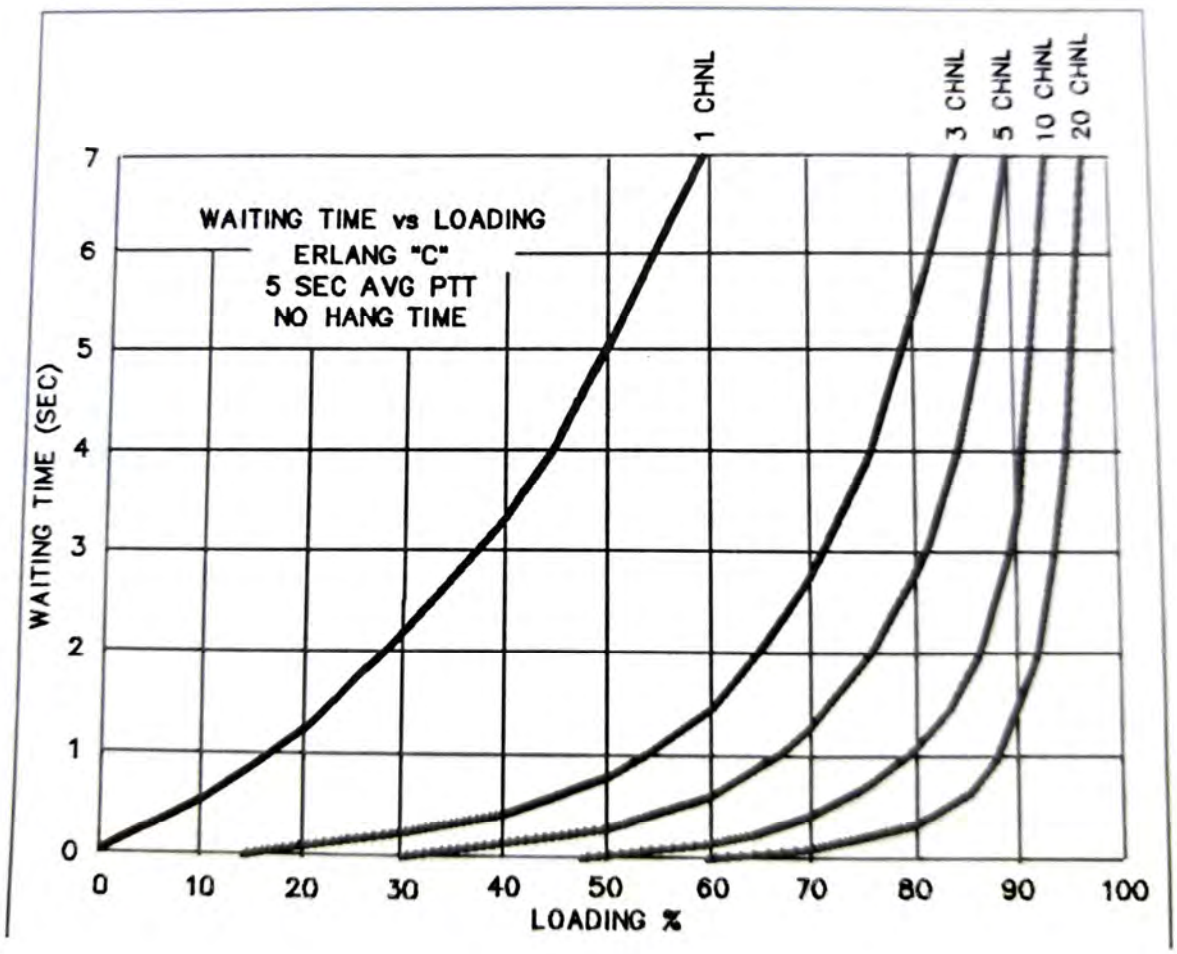
Annexure 1

Improvement in Trunking Efficiency with increase in no. of Channels



ACCESS DELAY TIMES
FIGURE 2–3

It is clear that CMRTS, typically a 10 channel system will have a far lower spectrum efficiency (no of radios per channel) as compared to a PMRTS system with a 20 channel system

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Annexure 2

Proposed Channeling Plan for PMRTS migration to Digital

(For Public Mobile Radio Trunking Service (PMRTS) providers operating in 814 MHz- 819 MHz / 859 MHz- 864 MHz band)

Contents

1. INTENT
2. GENERAL
3. CHANNELING PLAN
4. REQUIREMENTS FOR USING SPECTRUM
5. PRINCIPLES OF ASSIGNMENT
6. PROPOSED IMPLEMENTATION PLAN
7. NEW ALLOCATION METHOD PROPOSED
8. APPENDIX-A-TABLE OF CURRENT 25 KHz CHANNELING PLAN NO.6 AS PER NFAP
9. APPENDIX –B CHANNELING PLAN 12.5 KHZ AND 6.25 KHZ AT A GLANCE
10. APPENDIX –C CHANNEL BANDWIDTH ARRANGEMENTS (25 KHZ, 12.5 KHZ & 6.25 KHZ)
11. APPENDIX- D CHANNELING ALLOTMENT PLAN(12.5 KHZ & 6.25 KHZ)

1. INTENT

As per National Telecom Policy usage of spectrally efficient technologies should be encouraged so as to create a win-win situation for all stake holders viz. Regulator/Licensor, Operators and the end users. The current PMRTS Operators are offering the PMRT service largely using analog technology (barring few Operators who are migrating to Digital) and for them the assignment of spectrum is being done as per Channeling plan 6 (25 KHz bandwidth) of the NFAP which is reproduced in Appendix –A. As the PMRTS operators migrate from analog to digital technology there is a need to create a channeling plan for narrow bandwidth (12.5 KHz) and very narrow bandwidth (6.25 KHz) technologies, since there are different types of Digital technologies available requiring different channel bandwidth and hence different allocation of spectrum. As the regulation is technology neutral in India as in most of countries around the world, so the choice of technology is left to the Operator or market forces to determine.

Digital Trunked Radio Systems (DTRS) are two-way mobile radio systems consisting of mobile terminals, multiple-channel base stations and control stations. Trunking is the

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pooling of radio channels of a DTRS, whereby users have automatic access to free channels of the system. DTR Systems may also have roaming capabilities and permit Direct Mode Operation (DMO) between mobile terminals.

DTRS applications include transmission of voice, data, image, paging, short messaging, facsimile and PSTN interconnection (if regulator permits) for host of user groups such as construction, fire & safety Departments of public utilities, transport companies, service and maintenance companies, airline services and government agencies. The intended users of the said band (806-824 MHz & 851-869 MHz) may be Public Operators of DTRS networks as well as private organizations/ corporation or government agencies. The operation of DTRS systems may be area based or of nation-wide roaming capabilities.

2. GENERAL

The PMRTS/CMRTS licenses in India are technology neutral as in most countries of the world. There are many technologies available in the market for Digital PMRTS/CMRTS and prominent amongst them are:-

- 12.5 KHz, 2-slot TDMA technology like DMR/ MotoTrbo, APCO phase –II
- 6.25 KHz FDMA technology like dPMR/NXDN
- 25 KHZ 4-slot TDMA technology like TETRA

All these technologies are spectrally efficient and can either provide 6.25 KHz or 6.25 KHz equivalence considering number of voice paths possible in 12.5 KHz 2-slot TDMA being two or 25 KHz 4-slot TDMA having four voice paths.
The following is an overview of some DTRS technologies in the industry:

2.1 **TETRA**

TETRA (Terrestrial Trunked Radio) is a standard developed by the European Telecommunications Standards Institute (ETSI). The purpose of the TETRA standard is to meet the needs of various Professional Mobile Radio (PMR) user organizations. The first version of TETRA standard was published in 1995.

TETRA is based on a 4-slot TDMA (Time Division Multiple Access) with 25 KHz physical radio channel bandwidth. TETRA standard supports Trunking mode and IP-based TETRA solutions are available.

TETRA 2 is the enhancement of the TETRA standard which provides improvement on data speed and voice codec. TETRA 2 has introduced TETRA Enhanced Data Service (TEDS) which offers higher data rates utilizing multiple bandwidths and modulation schemes. The TEDS offers 4 different RF channel bandwidths of 25 KHz, 50 KHz, 100 KHz and 150 KHz.

2.2 **APCO-P25**

APCO-P25 (Association of Public-Safety Communications Officials – Project 25) is a common standard for Digital Trunked Radio Systems used by public safety agencies in North America to enable them to communicate with other agencies and mutual aid

response teams in emergencies.
APCO-P25 is based on FDMA (Frequency Division Multiple Access) capable of operating in 12.5 kHz and/or 25 kHz physical radio channel bandwidths. This standard allows backward compatibility with analogue systems and supports both trunked and conventional operation models. IP based APCO-P25 solutions are also available.

2.3 **APCO-P25 Phase 2**

The APCO-P25 standard (also known as APCO-P25 Phase 1) is further improved on spectrum efficiency with the development of APCO-P25 Phase 2 using 2-slot TDMA scheme.

2.4 **NXDN**

NXDN is a digital air interface protocol for mobile communication. It was developed jointly by ICOM Incorporated and Kenwood Corporation, Japan. This standard is based on FDMA (Frequency Division Multiple Access) and defines both trunked and conventional modes of operation. There are currently over 30 companies who are part of the NXDN forum; please visit www.nxdn-forum.com.

NXDN is a digital radio communications protocol using 4-Level FSK (4LFSK) modulation capable of fitting into both 12.5 kHz and 6.25 kHz physical radio channel bandwidths (9600 bps and 4800 bps respectively).
NXDN has been designed keeping the current Analog users in mind so that current investments in the analog infrastructure and terminals can be protected. NXDN has backward compatibility with the Analog Trunked Radio Systems (LTR), allows graceful migration from Analog to Digital and protects investments in RF sub-systems and power amplifiers and offers Dual/Mixed mode capability that allows both Digital and analog radio terminals to be operated together on the same infrastructure.

DPMR is a 6.25 KHz FDMA standard like NXDN developed by ETSI.

2.5 DMR

DMR (Digital Mobile Radio) is a standard developed by the European Telecommunications Standards Institute (ETSI) under its Electromagnetic compatibility and Radio spectrum Matters (ERM). The standard (ETSI TS 102 361) is based on a two-slot TDMA protocol. DMR applies TDMA method of spectral efficiency where 12.5 kHz channel will be divided into two equivalent time slots. The DMR design is capable to support trunked radio networks range from 12.5 kHz physical radio channel to wide area systems incorporating multiple physical radio channels extended over many radio sites. It provides a migration path from analogue to digital with its ability to operate in both analogue and digital modes. MotoTrbo is a 12.5 KHz 2 slot TDMA technology from Motorola that is a variant of DMR.

3. CHANNELING PLAN

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The Mobile Trunked Radio Operators Association (MTROA) recommends that in order to ensure most efficient use of the scarce spectrum resource, use of spectrally efficient technologies must be encouraged. WPC needs to build a separate channeling plan for 6.25 KHz FDMA technology besides keeping flexibility to also allocate spectrum with a 12.5 KHz channel spacing (for 2 slot TDMA)and a 25 KHz channel spacing (for four slot TDMA). The allocation can be made based on the Trunked Radio Technology chosen by the PMRTS Operator.

This document considers the band currently being used by analog PMRTS operators i.e. 814 MHz -819 MHz/ 869 MHz -864 MHz This band has 200 Channels of 25 KHz which are being allocated as per channeling plan 6 of NFAP placed at Appendix –A. The same band is proposed to be split into 400 channels of 12.5 KHz bandwidth and 800 channels of 6.25 KHz bandwidth as per Appendix- B.

Although the standard channel spacing is 12.5 KHz, it provides flexibility to operate two or more contiguous channels of 12.5 KHz. Operators may also utilize smaller channel bandwidth of 6.25

KHz channel spacing. WPC should assign a single channel based on channel spacing of 6.25 KHz or 12.5 KHz or combination of multiple channels of 12.5 KHz channel spacing depending on the technology to be deployed by the operator or user. The channeling plan for 6.25 KHz and 12.5 KHz is shown in Appendix B and the general channeling arrangement for 25 KHz, 12.5 KHz and 6.25 KHz is shown in Appendix C.

Channels may be allotted according to the channel allotment plan in Appendix D.

The channel allotment plan is designed to minimize inter-modulation and frequency interference problems by assigning co-sited channels that are 250 KHz apart. The frequency blocks A/A'& B/B' each containing 200 channels of 12.5 kHz, are divided into ten (10) sub-blocks (i.e. A01-A10 and B01-B10,) respectively.

Co-location assignments will be by sub-blocks (or part thereof) of up to a maximum of twenty (20) channels within the same sub-block per DTRS base/repeater station. The number of channels/sub-blocks assigned should be based on the service requirement of the Operator and to be determined by the WPC.

4. REQUIREMENTS FOR USING SPECTRUM

National Telecom Policy – 2012 recognizes that the evolution from analog to digital technology has facilitated the conversion of voice, data and video to the digital form. Increasingly, these are now being rendered through single networks bringing about a convergence in networks, services and also devices. Hence, it is now imperative to move towards convergence between various services, networks, platforms, technologies and overcome the existing segregation of licensing, registration and regulatory mechanisms in these areas to enhance affordability, increase access, delivery of multiple services and reduce cost. Under the Indian Telephone & Telegraphs Act 1885 & its amendments thereof, PMRTS providers were previously classified under the PMRTS license category. DOT now requires companies to migrate to the Unified License category for new PMRTS

Licenses.

The minimum key characteristics of the equipment to be deployed shall be governed by the minimum specifications viz.

Max RF power output

- Base station up to 100 Watts
- Vehicle Mobile up to 30Watts
- Hand-held up to 03 Watts

On a case to case basis, higher power may be permitted if acceptable technical justification is provided;

Adjacent channel spacing 800 MHz band: 25 KHz (11KOF3E)
Duplex Spacing 800 MHz band: (TX-RX Spacing) 45 MHz

Capacity enhancing techniques are continually being developed. This allows for the adoption of such techniques for more efficient use of spectrum, without reducing quality of service. Good cell-planning practice and frequency reuse should be adopted to maximize spectrum usage.

Channel loading of DTRS should be such that the maximum use is made of the available spectrum while providing reasonable Grade of Service (GoS). This requires the loading of Public and Private Systems to be such as to provide a GoS of not exceeding 5%.

The Erlang C model should be used as a guide to assess the channel needs of the applicant. This model is adopted as the reference as it assumes that the system will queue a certain number of blocked calls. The GoS will be defined by a specified delay, in message lengths, such that delayed calls will not exceed the specified delay with a probability P (t) of 0.05 (5%). That is, 95% of the calls placed will not be delayed by greater than the specified delay. An Erlang C table is provided in Appendix E for reference.

The GoS is critical for emergency services as well for local government agencies. The corresponding GoS for public safety systems (e.g., police, ambulance and fire department) is 2.5%. However, the level of GoS may be changed if deemed necessary by WPC based on specific service requirements.

5. PRINCIPLES OF ASSIGNMENT

The assignment shall be done based on a 'first come first served' basis to the new applicants. The existing PMRTS operators holding the spectrum as per APPENDIX-F shall be allocated channels based on the following criteria:-

a) the number of channels held currently in analog Trunked Radio System (TRS) in Appendix F;
b) requirements of the Technology chosen; and

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c) Spectrum allocation efficiency.

The new allocation should be equal to the number of channels held for either 12.5 KHz channel bandwidth or 6.25 KHz channel bandwidth depending on the Technology chosen by the Operator. The current holding is of 25 KHz channel bandwidth and the new allocation shall be based on 25 KHz or 12.5 KHz or 6.25 KHz depending on the Technology chosen by the PMRTS operator. The same approach can be applied to existing CMRTS users as per Appendix-F.

The current loading criterion operative is of 90 subscribers per channel for a 25 KHz channel bandwidth. Initial spectrum of 5 channels is allocated and on achieving a loading of 450 subscribers, additional channels are considered for allocation. Based on the same criteria and assuming that the loading efficiency would degrade by 30% due to one channel of each site getting occupied in a multi-site digital system for group calls the proposed loading efficiency for Digital systems should be 10.08 radios per KHz for 2 slot TDMA technologies giving 6.25 KHz equivalence or a 6.25 KHz channel bandwidth FDMA technologies.

The existing operators should be given a defined time frame to migrate to Digital technology with a spectrally efficient 6.25 KHz technology or a 6.25 KHz equivalent channel bandwidth and they should be given spectrum equivalent to the current spectrum held by them as per Annexure-G. Additional spectrum allocation to the existing PMRTS Operators should be assigned based on the loading criteria of 10.08 radios/KHz of spectrum.

The new entrants should be assigned spectrum on a 'first come first served' basis. In the event of unavailability of spectrum, applicants should be placed in the queue that should be reviewed periodically.

Based on the same principle the existing CMRTS users should be asked to migrate to spectrally efficient technologies in a time bound manner with equal number of channels allocation done in Digital as being currently held by them as in Appendix-G.

6. PROPOSED IMPLEMENTATION PLAN

The reservation of the spectrum blocks for the migration of the listed PMRTS Operators in Appendix-F of the 800MHz band shall be made for the new frequency allocations as per new channeling plan, as required by the Operator in 12.5KHz or 6.25KHz band.

The new PMRTS entrants should be assigned spectrum on a *'first come first served'* basis.

7. NEW ALLOCATION METHOD PROPOSED

Following examples illustrate the proposed allocation plan for existing operator.

EXAMPLE 1: Migration from Analog 25 KHz (Existing) to Digital 12.5 KHz (Proposed New)

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PMRTS Operator : Quick calls Pvt. Ltd.
Service Area : Chennai
Current Spectrum Allocated : 7D

Centre frequencies of block 7D allocated as per plan 6 of NFAP are

		Channel No.	RX Freq.	TX Freq.
Existing 25 KHz Plan 6 of NFAP	I	37	818.0875	863.0875
	II	77	817.0875	862.0875
	III	117	816.0875	861.0875
	IV	157	815.0875	860.0875
	V	197	814.0875	859.0875

Current Subscriber Loading :450

Now after loading of 450 subscribers on 5 Channels, the PMRTS operator requesting migration to Digital (12.5KHz Technology) for all new subscribers and asking for 5 years to migrate current Analog Subscribers to Digital.

Solution for above migration from Analog to Digital for 12.5 KHz band will be

Look for the free spectrum block for Chennai region from within NFAP Plan 6 such that there is a minimum separation of 250 KHz between adjacent channels (refer proposed 12.5 KHz channel allocation plan). All Spectrum blocks except 1, 3,5,7,9 and 10 are allocated.

Supposing WPC chooses block 1A for allocation of spectrum for 12.5 KHz technology. Hence the new allocation of 12.5 KHz center frequencies to be issued (5 Channel Pairs) shall be

		Channel No.	RX Freq.	TX Freq.
Refer 12.5 KHz Plan Block 1 A to be allocated	I	1	818.99375	863.99375
	II	41	818.49375	863.49375
	III	81	817.99375	862.99375
	IV	121	817.49375	862.49375
	V	161	816.99375	861.99375

After completion of migration as per period granted for migration the analog frequencies are surrendered by the operator and these frequencies can be reused or re-allotted as per new digital plans as the case may be.

EXAMPLE 2: Migration from Analog 25 KHz (Existing) to Digital 6.25 KHz (Proposed New)
PMRTS Operator: Bhilwara Telenet Services Private Limited
Service Area: Mumbai Metro
Current Spectrum Allocated: 9A

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Centre frequencies of block 9A allocated as per plan 6 of NFAP are
1A from existing 25 KHz Plan

		Channel No.	RX Freq.	TX Freq.
Existing 25 KHz Plan	I	9	818.7875	863.7875
	II	49	817.7875	862.7875
	III	89	816.7875	861. 7875
	IV	129	815.7875	860.7875
	V	169	814.7875	859.7875

Current Subscriber Loading : 450

Now after loading of 450 subscribers on 5 Channels, the PMRTS operator requesting migration to Digital (6.25 KHz Technology) for all new subscribers and asking for 5 years to migrate current Analog Subscribers to Digital.

Solution for above migration from Analog to Digital for 6.25 KHz band will be

Look for the free spectrum block for Mumbai Metro region from within NFAP Plan 6 such that there is a minimum separation of 250 KHz between adjacent channels (refer proposed 6.25 KHz channel allocation plan). All Spectrum blocks except 2, 6 and 7 are allocated.

Supposing WPC chooses block 2A for allocation of spectrum for 6.25 KHz technology. Hence the new allocation of 6.25 KHz center frequencies to be issued (5 Channel Pairs) shall be

		Channel No.	RX Freq.	TX Freq.
Refer 6.25 KHz Plan Block 2 A to be allocated	I	2a	818. 978125	863.978125
	II	42a	818. 478125	863. 478125
	III	82a	817. 978125	862. 978125
	IV	122a	817. 478125	862. 478125
	V	162a	816. 978125	861. 978125

After completion of migration as per period granted for migration, the analog frequencies shall be surrendered by the operator and these frequencies shall be reused or re-allotted afresh as per new digital plans of 12.5 KHz or 6.25 KHz as the case may be.

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8. APPENDIX-A-TABLE OF CURRENT 25 KHz CHANNELING PLAN NO.6 AS PER NFAP

Channeling Plans

(Plan No-6)

R.F. CHANNEL ARRANGEMENT FOR MOBILE RADIO TRUNKING SERVICE FOR THE FREQUENCY OF 814-819 MHz AND 859-864 MHz

S.No.	Channel Arrangement					Block No.	
1	1	41	81	121	161	----------	1A
	21	61	101	141	181	----------	1B
	11	51	91	131	171	----------	1C
	31	71	111	151	191	----------	1D
2	2	42	82	122	162	----------	2A
	22	62	102	142	182	----------	2B
	12	52	92	132	172	----------	2C
	32	72	112	152	192	----------	2D
3	3	43	83	123	163	----------	3A
	23	63	103	143	183	----------	3B
	13	53	93	133	173	----------	3C
	33	73	113	153	193	----------	3D
4	4	44	84	124	164	----------	4A
	24	64	104	144	184	----------	4B
	14	54	94	134	174	----------	4C
	34	74	114	154	194	----------	4D
5	5	45	85	125	165	----------	5A
	25	65	105	145	185	----------	5B
	15	55	95	135	175	----------	5C
	35	75	115	155	195	----------	5D
6	6	46	86	126	166	----------	6A
	26	66	106	146	186	----------	6B
	16	56	96	136	176	----------	6C
	36	76	116	156	196	----------	6D
7	7	47	87	127	167	----------	7A
	27	67	107	147	187	----------	7B
	17	57	97	137	177	----------	7C
	37	77	117	157	197	----------	7D

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R.F. CHANNEL ARRANGEMENT FOR MOBILE RADIO TRUNKING SERVICE FOR THE FREQUENCY OF 814-819 MHz AND 859-864 MHz

8	8	48	88	128	168	----------	8A
	28	68	108	148	188	----------	8B
	18	58	98	138	178	----------	8C
	38	78	118	158	198	----------	8D
9	9	49	89	129	169	----------	9A
	29	69	109	149	189	----------	9B
	19	59	99	139	179	----------	9C
	39	79	119	159	199	----------	9D
10	10	50	90	130	170	----------	10A
	30	70	110	150	190	----------	10B
	20	60	100	140	180	----------	10C
	40	80	120	160	200	----------	10D

Note: - Each set of 5 frequency pairs shall be assigned in the order of A then B then C and then D

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R.F. CHANNEL ARRANGEMENT FOR MOBILE RADIO TRUNKING SERVICE		
FOR THE FREQUENCY OF 814-819 MHz AND 859-864 MHz		
25 KHz PLAN WITH 45 MHz DUPLEX SEPERATION		
CHL.PAIR NO.	**BASE TRANSMIT (KHz)**	**BASE RECEIVE (KHz)**
200	814012.5	859012.5
199	814037.5	859037.5
198	814062.5	859062.5
197	814087.5	859087.5
196	814112.5	859112.5
195	814137.5	859137.5
194	814162.5	859162.5
193	814187.5	859187.5
192	814212.5	859212.5
191	814237.5	859237.5
190	814262.5	859262.5
189	814287.5	859287.5
188	814312.5	859312.5
187	814337.5	859337.5
186	814362.5	859362.5
185	814387.5	859387.5
184	814412.5	859412.5
183	814437.5	859437.5
182	814462.5	859462.5
181	814487.5	859487.5
180	814512.5	859512.5
179	814537.5	859537.5
178	814562.5	862537.5
177	814587.5	859587.5
176	814612.5	859612.5
175	814637.5	859637.5
174	814662.5	859662.5
173	814687.5	859687.5
172	814712.5	859712.5
171	814737.5	859737.5

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170	814762.5	859762.5
169	814787.5	859787.5
168	814812.5	859812.5
167	814837.5	859837.5
166	814862.5	859862.5
165	814887.5	859887.5
164	814912.5	859912.5
163	814937.5	859937.5
162	814962.5	859962.5
161	814987.5	859987.5
CHL.PAIR NO.	**BASE TRANSMIT (KHz)**	**BASE RECEIVE (KHz)**
160	815012.5	860012.5
159	815037.5	860037.5
158	815062.5	860062.5
157	815087.5	860087.5
156	815112.5	860112.5
155	815137.5	860137.5
154	815162.5	860162.5
153	815187.5	860187.5
152	815212.5	860212.5
151	815237.5	860237.5
150	815262.5	860212.5
149	815287.5	860287.5
148	815312.5	860312.5
147	815337.5	860337.5
146	815362.5	860362.5
145	815387.5	860387.5
144	815412.5	860412.5
143	815437.5	860437.5
142	815462.5	860462.5
141	815487.5	860487.5
140	815512.5	860512.5
139	815537.5	860537.5
138	815562.5	860562.5
137	815587.5	860687.5
136	815612.5	860612.5
135	815637.5	860637.5
134	815662.5	860662.5
133	815687.5	860687.5
132	815712.5	860712.5
131	815737.5	860737.5

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130	815762.5	860762.5
129	815787.5	860787.5
128	815812.5	860812.5
127	815837.5	860837.5
126	815862.5	860862.5
125	815887.5	860887.5
124	815912.5	860912.5
123	815937.5	860937.5
122	815962.5	860962.5
121	815987.5	860987.5
120	816012.5	861012.5
119	816037.5	861037.5
118	816062.5	861062.5
CHL.PAIR NO.	**BASE TRANSMIT (KHz)**	**BASE RECEIVE (KHz)**
117	816087.5	861087.5
116	816112.5	861112.5
115	816137.5	861137.5
114	816162.5	861162.5
113	816187.5	861187.5
112	816212.5	861212.5
111	816237.5	861237.5
110	816262.5	861262.5
109	816287.5	861287.5
108	816312.5	861312.5
107	816337.5	861337.5
106	816362.5	861362.5
105	816387.5	861387.5
104	816412.5	861412.5
103	816437.5	861437.5
102	816462.5	861462.5
101	816487.5	861487.5
100	816512.5	861512.5
99	816537.5	861537.5
98	816562.5	861562.5
97	816587.5	861587.5
96	816612.5	861612.5
95	816637.5	861637.5
94	816662.5	861662.5
93	816687.5	861687.5
92	816712.5	861712.5
91	816737.5	861737.5

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90	816762.5	861762.5
89	816787.5	861787.5
88	816812.5	861812.5
87	816837.5	861837.5
86	816862.5	861862.5
85	816887.5	861887.5
84	816912.5	861912.5
83	816937.5	861937.5
82	816962.5	861962.5
81	816987.5	861987.5
80	817012.5	862012.5
79	817037.5	862037.5
78	817062.5	862062.5
77	817087.5	862087.5
76	817112.5	862112.5
75	817137.5	862137.5
CHL.PAIR NO.	**BASE TRANSMIT (KHz)**	**BASE RECEIVE (KHz)**
74	817162.5	862162.5
73	817187.5	862187.5
72	817212.5	862212.5
71	817237.5	862237.5
70	817262.5	862262.5
69	817287.5	862287.5
68	817312.5	862312.5
67	817337.5	862337.5
66	817362.5	862362.5
65	817387.5	862387.5
64	817412.5	862412.5
63	817437.5	862437.5
62	817462.5	862462.5
61	817487.5	862487.5
60	817512.5	862512.5
59	817537.5	862537.5
58	817562.5	862562.5
57	817587.5	862587.5
56	817612.5	862612.5
55	817637.5	862637.5
54	817662.5	862662.5
53	817687.5	862687.5
52	817712.5	862712.5
51	817737.5	862737.5

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50	817762.5	862762.5
49	817787.5	862787.5
48	817812.5	862812.5
47	817837.5	862837.5
46	817862.5	862862.5
45	817887.5	862887.5
44	817912.5	862912.5
43	817937.5	862937.5
42	817962.5	862962.5
41	817987.5	862987.5
40	818012.5	863012.5
39	818037.5	863037.5
38	818062.5	863062.5
37	818087.5	863087.5
36	818112.5	863112.5
35	818137.5	863137.5
34	818162.5	863162.5
33	818187.5	863187.5
32	818212.5	863212.5
CHL.PAIR NO.	**BASE TRANSMIT (KHz)**	**BASE RECEIVE (KHz)**
31	818237.5	863237.5
30	818262.5	863262.5
29	818287.5	863287.5
28	818312.5	863312.5
27	818337.5	863337.5
26	818362.5	863362.5
25	818387.5	863387.5
24	818412.5	863412.5
23	818437.5	863437.5
22	818462.5	863462.5
21	818487.5	863487.5
20	818512.5	863512.5
19	818537.5	863537.5
18	818562.5	863562.5
17	818587.5	863587.5
16	818612.5	863612.5
15	818637.5	863637.5
14	818662.5	863662.5
13	818687.5	863687.5
12	818712.5	863712.5
11	818737.5	863737.5

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10	818762.5	863762.5
9	818787.5	863787.5
8	818812.5	863812.5
7	818837.5	863837.5
6	818862.5	862862.5
5	818887.5	863887.5
4	818912.5	863912.5
3	818937.5	863937.5
2	818962.5	863962.5
1	818987.5	863987.5

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9. APPENDIX–B CHANNELING PLAN 12.5 KHZ AND 6.25 KHZ

New Frequency Allocation plan (derived from existing NFAP Scheme No.6)

<table>
<tr><td>1</td><td>Existing Centre Frequency 25 KHz spacing</td><td colspan="4">863.9875 (Channel I defined in NFAP Plan No. 6)</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Proposed 12.5KHz Channel Spacing spots (new center frequencies will be)</td><td colspan="2">(Subtracting -6.25 KHz from above Channel I)</td><td colspan="2">(Adding +6.25 KHz from above Channel I)</td></tr>
<tr><td colspan="2">863.98125 (Channel 1 defined in new table below)</td><td colspan="2">863.99375 (Channel 2 defined in new table below)</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Creation of 4 No 6.25 KHz Channel spacing spots (new center frequencies will be)</td><td>(Subtracting -3.125KHz from Channel 1)</td><td>(Adding +3.125KHz from channel 1)</td><td>(Subtracting -3.125KHz from channel 2)</td><td>(Adding +3.125KHz from channel 2)</td></tr>
<tr><td>863.978125 (Channel 1a defined in new table below)</td><td>863.984375 (Channel 1b defined in new table below)</td><td>863.990625 (Channel 2a defined in new table below)</td><td>863.996875 (Channel 2b defined in new table below)</td></tr>
</table>

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10. AT A GLANCE

814- 819 MHz / 859-864 MHz Band

Existing Channels	1	2	3	4	5	6	7	8	up to ----------	198	199	200
No of Existing Blocks and Channels			10 Blocks with 20 channels each									

Overview of spectrum issued & available for 12.5 KHz/6.25 KHz Digital Technologies

Region	No of Blocks issued as per existing scheme (NFAP Plan 6)	No of Channels Issued	No of Blocks available for proposed plan	No of Channels Available	No of Blocks Reserved for 12.5 KHz allocation	No of Channels reserved for 12.5 KHz allocation	No of Blocks Reserved for 6.25 KHz allocation	No of Channels reserved for 6.25 KHz allocation
Delhi NCR	3.50	3.50 x 20 = 70	10 - 3.50 = 6.50	6.50 x 20 = 130	6.50	6.50 x 20 = 130*	6.50 x 2= 13.0	13 x 20 = 260**
Mumbai	3.75	3.75 x 20 = 75	10 - 3.75 = 6.25	6.25 x 20 = 125	6.25	6.25 x 20 = 125*	6.25 x 2 = 12.5	12.5 x 20 = 250**
Pune	1.25	1.25 x 20 = 25	10 - 1.25 = 8.75	8.75 x 20 = 175	8.75	8.75 x 20 = 175*	8.75 x 2 = 17.5	17.5 x 20 = 350**
Bangalore	2.25	2.25 x 20 = 45	10 - 2.25 = 7.75	7.75 x 20 = 155	7.75	7.75 x 20 = 155*	7.75 x 2 = 15.5	15.5 x 20 = 310**
Chennai	2.25	2.25 x 20 = 45	10 - 2.25 = 7.75	7.75 x 20 = 155	7.75	7.75 x 20 = 155*	7.75 x 2 = 15.5	15.5 x 20 = 310**
Hyderabad	1.00	1.00 x 20 = 20	10 – 1.00 = 9.00	9.00 x 20 = 180	9.00	9.00 x 20 = 180*	9.00 x 2 = 18.0	18 x 20 = 360**
Jaipur	0.50	0.50 x 20 = 10	10 - 0.50 = 9.50	9.50 x 20 = 190	9.50	9.50 x 20 = 190*	9.50 x 2 = 19.0	19 x 20 = 380**
Ahmedabad	0.50	0.50 x 20 = 10	10 - 0.50 = 9.50	9.50 x 20 = 190	9.50	9.50 x 20 = 190*	9.50 x 2 = 19.0	19 x 20 = 380**
Baroda	0.75	0.75 x 20 = 15	10 - 0.75 = 9.25	9.25 x 20 = 185	9.25	9.25 x 20 = 185*	9.25 x 2 = 18.5	18.5 x 20 = 370**

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Surat	0.75	0.75 x 20 = 15	10 - 0.75 = 9.25	9.25 x 20 = 185	9.25	9.25 x 20 = 185*	9.25 x 2 = 18.5	18.5 x 20 = 370**
Bharuch	0.25	0.25 x 20 = 05	10 - 0.25 = 9.75	9.75 x 20 = 195	9.75	9.75 x 20 = 195*	9.75 x 2 = 19.5	19.5 x 20 = 390**
Dahej	0.25	0.25 x 20 = 05	10 - 0.25 = 9.75	9.75 x 20 = 195	9.75	9.75 x 20 = 195*	9.75 x 2 = 19.5	19.5 x 20 = 390**
Indore	0.50	0.50x 20 = 10	10 - 0.50 = 9.50	9.50 x 20 = 190	9.50	9.50 x 20 = 190*	9.50 x 2 = 19.0	19 x 20 = 380**
Kolkata Metro	1.00	1.00x 20 = 20	10 – 1.00 = 9.00	9.00 x 20 = 180	9.00	9.00 x 20 = 180*	9.00 x 2 = 18.0	18 x 20 = 360**
Visakhapatnam	1.50	1.50 x 20 = 30	10 - 1.50 = 8.50	8.50 x 20 = 170	8.50	8.50 x 20 = 170*	8.50 x 2 = 17.0	17 x 20 = 340**
Khandala	0.25	0.25 x 20 = 05	10 - 0.25 = 9.75	9.75 x 20 = 195	9.75	9.75 x 20 = 195*	9.75 x 2 = 19.5	19.5 x 20 = 390**

* Number of channels can be allocated as per 12.5 KHz (2 Voice paths per channel)

** Number of channels can be allocated as per 6.25 KHz

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CHANNELING PLAN 12.5 KHZ AND 6.25 KHZ

Ch. No.	1		11		21		31		41	
Base Rx	818.99375		818.86875		818.74375		818.61875		818.49375	
Base Tx	863.99375		863.86875		863.74375		863.61875		863.49375	
Ch. No.	1a	1b	11a	11b	21a	21b	31a	31b	41a	41b
Base Rx	818.990625	818.996875	818.865625	818.871875	818.740625	818.746875	818.615625	818.621875	818.490625	818.496875
Base Tx	863.990625	863.996875	863.865625	863.871875	863.740625	863.746875	863.615625	863.621875	863.490625	863.496875
Ch. No.	2		12		22		32		42	
Base Rx	818.98125		818.85625		818.73125		818.60625		818.48125	
Base Tx	863.98125		863.85625		863.73125		863.60625		863.48125	
Ch. No.	2a	2b	12a	12b	22a	22b	32a	32b	42a	42b
Base Rx	818.978125	818.984375	818.853125	818.859375	818.728125	818.734375	818.603125	818.609375	818.478125	818.484375
Base Tx	863.978125	863.984375	863.853125	863.859375	863.728125	863.734375	863.603125	863.609375	863.478125	863.484375
Ch. No.	3		13		23		33		43	
Base Rx	818.96875		818.84375		818.71875		818.59375		818.46875	
Base Tx	863.96875		863.84375		863.71875		863.59375		863.46875	
Ch. No.	3a	3b	13a	13b	23a	23b	33a	33b	43a	43b
Base Rx	818.965625	818.971875	818.840625	818.846875	818.715625	818.721875	818.590625	818.596875	818.465625	818.471875
Base Tx	863.965625	863.971875	863.840625	863.846875	863.715625	863.721875	863.590625	863.596875	863.465625	863.471875
Ch. No.	4		14		24		34		44	
Base Rx	818.95625		818.83125		818.70625		818.58125		818.45625	
Base Tx	863.95625		863.83125		863.70625		863.58125		863.45625	
Ch. No.	4a	4b	14a	14b	24a	24b	34a	34b	44a	44b
Base Rx	818.953125	818.959375	818.828125	818.834375	818.703125	818.709375	818.578125	818.584375	818.453125	818.459375
Base Tx	863.953125	863.959375	863.828125	863.834375	863.703125	863.709375	863.578125	863.584375	863.453125	863.459375
Ch. No.	5		15		25		35		45	
Base Rx	818.94375		818.81875		818.69375		818.56875		818.44375	
Base Tx	863.94375		863.81875		863.69375		863.56875		863.44375	
Ch. No.	5a	5b	15a	15b	25a	25b	35a	35b	45a	45b
Base Rx	818.940625	818.946875	818.815625	818.821875	818.690625	818.696875	818.565625	818.571875	818.440625	818.446875
Base Tx	863.940625	863.946875	863.815625	863.821875	863.690625	863.696875	863.565625	863.571875	863.440625	863.446875
Ch. No.	6		16		26		36		46	
Base Rx	818.93125		818.80625		818.68125		818.55625		818.43125	
Base Tx	863.93125		863.80625		863.68125		863.55625		863.43125	
Ch. No.	6a	6b	16a	16b	26a	26b	36a	36b	46a	46b
Base Rx	818.928125	818.934375	818.803125	818.809375	818.678125	818.684375	818.553125	818.559375	818.428125	818.434375
Base Tx	863.928125	863.934375	863.803125	863.809375	863.678125	863.684375	863.553125	863.559375	863.428125	863.434375
Ch. No.	7		17		27		37		47	
Base Rx	818.91875		818.79375		818.66875		818.54375		818.41875	
Base Tx	863.91875		863.79375		863.66875		863.54375		863.41875	
Ch. No.	7a	7b	17a	17b	27a	27b	37a	37b	47a	47b
Base Rx	818.915625	818.921875	818.790625	818.796875	818.665625	818.671875	818.540625	818.546875	818.415625	818.421875
Base Tx	863.915625	863.921875	863.790625	863.796875	863.665625	863.671875	863.540625	863.546875	863.415625	863.421875
Ch. No.	8		18		28		38		48	
Base Rx	818.90625		818.78125		818.65625		818.53125		818.40625	
Base Tx	863.90625		863.78125		863.65625		863.53125		863.40625	
Ch. No.	8a	8b	18a	18b	28a	28b	38a	38b	48a	48b
Base Rx	818.903125	818.909375	818.778125	818.784375	818.653125	818.659375	818.528125	818.534375	818.403125	818.409375
Base Tx	863.903125	863.909375	863.778125	863.784375	863.653125	863.659375	863.528125	863.534375	863.403125	863.409375
Ch. No.	9		19		29		39		49	
Base Rx	818.89375		818.76875		818.64375		818.51875		818.39375	
Base Tx	863.89375		863.76875		863.64375		863.51875		863.39375	
Ch. No.	9a	9b	19a	19b	29a	29b	39a	39b	49a	49b
Base Rx	818.890625	818.896875	818.765625	818.771875	818.640625	818.646875	818.515625	818.521875	818.390625	818.396875
Base Tx	863.890625	863.896875	863.765625	863.771875	863.640625	863.646875	863.515625	863.521875	863.390625	863.396875
Ch. No.	10		20		30		40		50	
Base Rx	818.88125		818.75625		818.63125		818.50625		818.38125	
Base Tx	863.88125		863.75625		863.63125		863.50625		863.38125	
Ch. No.	10a	10b	20a	20b	30a	30b	40a	40b	50a	50b
Base Rx	818.878125	818.884375	818.753125	818.759375	818.628125	818.634375	818.503125	818.509375	818.378125	818.384375
Base Tx	863.878125	863.884375	863.753125	863.759375	863.628125	863.634375	863.503125	863.509375	863.378125	863.384375

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Ch. No.	251		261		271		281		291	
Base Rx	815.86875		815.74375		815.61875		815.49375		815.36875	
Base Tx	860.86875		860.74375		860.61875		860.49375		860.36875	
Ch. No.	251a	251b	261a	261b	271a	271b	281a	281b	291a	291b
Base Rx	815.865625	815.871875	815.740625	815.746875	815.615625	815.621875	815.490625	815.496875	815.365625	815.371875
Base Tx	860.865625	860.871875	860.740625	860.746875	860.615625	860.621875	860.490625	860.496875	860.365625	860.371875
Ch. No.	252		262		272		282		292	
Base Rx	815.85625		815.73125		815.60625		815.48125		815.35625	
Base Tx	860.85625		860.73125		860.60625		860.48125		860.35625	
Ch. No.	252a	252b	262a	262b	272a	272b	282a	282b	292a	292b
Base Rx	815.853125	815.859375	815.728125	815.734375	815.603125	815.609375	815.478125	815.484375	815.353125	815.359375
Base Tx	860.853125	860.859375	860.728125	860.734375	860.603125	860.609375	860.478125	860.484375	860.353125	860.359375
Ch. No.	253		263		273		283		293	
Base Rx	815.84375		815.71875		815.59375		815.46875		815.34375	
Base Tx	860.84375		860.71875		860.59375		860.46875		860.34375	
Ch. No.	253a	253b	263a	263b	273a	273b	283a	283b	293a	293b
Base Rx	815.840625	815.846875	815.715625	815.721875	815.590625	815.596875	815.465625	815.471875	815.340625	815.346875
Base Tx	860.840625	860.846875	860.715625	860.721875	860.590625	860.596875	860.465625	860.471875	860.340625	860.346875
Ch. No.	254		264		274		284		294	
Base Rx	815.83125		815.70625		815.58125		815.45625		815.33125	
Base Tx	860.83125		860.70625		860.58125		860.45625		860.33125	
Ch. No.	254a	254b	264a	264b	274a	274b	284a	284b	294a	294b
Base Rx	815.828125	815.834375	815.703125	815.709375	815.578125	815.584375	815.453125	815.459375	815.328125	815.334375
Base Tx	860.828125	860.834375	860.703125	860.709375	860.578125	860.584375	860.453125	860.459375	860.328125	860.334375
Ch. No.	255		265		275		285		295	
Base Rx	815.81875		815.69375		815.56875		815.44375		815.31875	
Base Tx	860.81875		860.69375		860.56875		860.44375		860.31875	
Ch. No.	255a	255b	265a	265b	275a	275b	285a	285b	295a	295b
Base Rx	815.815625	815.821875	815.690625	815.696875	815.565625	815.571875	815.440625	815.446875	815.315625	815.321875
Base Tx	860.815625	860.821875	860.690625	860.696875	860.565625	860.571875	860.440625	860.446875	860.315625	860.321875
Ch. No.	256		266		276		286		296	
Base Rx	815.80625		815.68125		815.55625		815.43125		815.30625	
Base Tx	860.80625		860.68125		860.55625		860.43125		860.30625	
Ch. No.	256a	256b	266a	266b	276a	276b	286a	286b	296a	296b
Base Rx	815.803125	815.809375	815.678125	815.684375	815.553125	815.559375	815.428125	815.434375	815.303125	815.309375
Base Tx	860.803125	860.809375	860.678125	860.684375	860.553125	860.559375	860.428125	860.434375	860.303125	860.309375
Ch. No.	257		267		277		287		297	
Base Rx	815.79375		815.66875		815.54375		815.41875		815.29375	
Base Tx	860.79375		860.66875		860.54375		860.41875		860.29375	
Ch. No.	257a	257b	267a	267b	277a	277b	287a	287b	297a	297b
Base Rx	815.790625	815.796875	815.665625	815.671875	815.540625	815.546875	815.415625	815.421875	815.290625	815.296875
Base Tx	860.790625	860.796875	860.665625	860.671875	860.540625	860.546875	860.415625	860.421875	860.290625	860.296875
Ch. No.	258		268		278		288		298	
Base Rx	815.78125		815.65625		815.53125		815.40625		815.28125	
Base Tx	860.78125		860.65625		860.53125		860.40625		860.28125	
Ch. No.	258a	258b	268a	268b	278a	278b	288a	288b	298a	298b
Base Rx	815.778125	815.784375	815.653125	815.659375	815.528125	815.534375	815.403125	815.409375	815.278125	815.284375
Base Tx	860.778125	860.784375	860.653125	860.659375	860.528125	860.534375	860.403125	860.409375	860.278125	860.284375
Ch. No.	259		269		279		289		299	
Base Rx	815.76875		815.64375		815.51875		815.39375		815.26875	
Base Tx	860.76875		860.64375		860.51875		860.39375		860.26875	
Ch. No.	259a	259b	269a	269b	279a	279b	289a	289b	299a	299b
Base Rx	815.765625	815.771875	815.640625	815.646875	815.515625	815.521875	815.390625	815.396875	815.265625	815.271875
Base Tx	860.765625	860.771875	860.640625	860.646875	860.515625	860.521875	860.390625	860.396875	860.265625	860.271875
Ch. No.	260		270		280		290		300	
Base Rx	815.75625		815.63125		815.50625		815.38125		815.25625	
Base Tx	860.75625		860.63125		860.50625		860.38125		860.25625	
Ch. No.	260a	260b	270a	270b	280a	280b	290a	290b	300a	300b
Base Rx	815.753125	815.759375	815.628125	815.634375	815.503125	815.509375	815.378125	815.384375	815.253125	815.259375
Base Tx	860.753125	860.759375	860.628125	860.634375	860.503125	860.509375	860.378125	860.384375	860.253125	860.259375

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Ch. No.	301		311		321		331		341	
Base Rx	815.24375		815.11875		814.99375		814.86875		814.74375	
Base Tx	860.24375		860.11875		859.99375		859.86875		859.74375	
Ch. No.	301a	301b	311a	311b	321a	321b	331a	331b	341a	341b
Base Rx	815.240625	815.246875	815.115625	815.121875	814.990625	814.996875	814.865625	814.871875	814.740625	814.746875
Base Tx	860.240625	860.246875	860.115625	860.121875	859.990625	859.996875	859.865625	859.871875	859.740625	859.746875
Ch. No.	302		312		322		332		342	
Base Rx	815.23125		815.10625		814.98125		814.85625		814.73125	
Base Tx	860.23125		860.10625		859.98125		859.85625		859.73125	
Ch. No.	302a	302b	312a	312b	322a	322b	332a	332b	342a	342b
Base Rx	815.228125	815.234375	815.103125	815.109375	814.978125	814.984375	814.853125	814.859375	814.728125	814.734375
Base Tx	860.228125	860.234375	860.103125	860.109375	859.978125	859.984375	859.853125	859.859375	859.728125	859.734375
Ch. No.	303		313		323		333		343	
Base Rx	815.21875		815.09375		814.96875		814.84375		814.71875	
Base Tx	860.21875		860.09375		859.96875		859.84375		859.71875	
Ch. No.	303a	303b	313a	313b	323a	323b	333a	333b	343a	343b
Base Rx	815.215625	815.221875	815.090625	815.096875	814.965625	814.971875	814.840625	814.846875	814.715625	814.721875
Base Tx	860.215625	860.221875	860.090625	860.096875	859.965625	859.971875	859.840625	859.846875	859.715625	859.721875
Ch. No.	304		314		324		334		344	
Base Rx	815.20625		815.08125		814.95625		814.83125		814.70625	
Base Tx	860.20625		860.08125		859.95625		859.83125		859.70625	
Ch. No.	304a	304b	314a	314b	324a	324b	334a	334b	344a	344b
Base Rx	815.203125	815.209375	815.078125	815.084375	814.953125	814.959375	814.828125	814.834375	814.703125	814.709375
Base Tx	860.203125	860.209375	860.078125	860.084375	859.953125	859.959375	859.828125	859.834375	859.703125	859.709375
Ch. No.	305		315		325		335		345	
Base Rx	815.19375		815.06875		814.94375		814.81875		814.69375	
Base Tx	860.19375		860.06875		859.94375		859.81875		859.69375	
Ch. No.	305a	305b	315a	315b	325a	325b	335a	335b	345a	345b
Base Rx	815.190625	815.196875	815.065625	815.071875	814.940625	814.946875	814.815625	814.821875	814.690625	814.696875
Base Tx	860.190625	860.196875	860.065625	860.071875	859.940625	859.946875	859.815625	859.821875	859.690625	859.696875
Ch. No.	306		316		326		336		346	
Base Rx	815.18125		815.05625		814.93125		814.80625		814.68125	
Base Tx	860.18125		860.05625		859.93125		859.80625		859.68125	
Ch. No.	306a	306b	316a	316b	326a	326b	336a	336b	346a	346b
Base Rx	815.178125	815.184375	815.053125	815.059375	814.928125	814.934375	814.803125	814.809375	814.678125	814.684375
Base Tx	860.178125	860.184375	860.053125	860.059375	859.928125	859.934375	859.803125	859.809375	859.678125	859.684375
Ch. No.	307		317		327		337		347	
Base Rx	815.16875		815.04375		814.91875		814.79375		814.66875	
Base Tx	860.16875		860.04375		859.91875		859.79375		859.66875	
Ch. No.	307a	307b	317a	317b	327a	327b	337a	337b	347a	347b
Base Rx	815.165625	815.171875	815.040625	815.046875	814.915625	814.921875	814.790625	814.796875	814.665625	814.671875
Base Tx	860.165625	860.171875	860.040625	860.046875	859.915625	859.921875	859.790625	859.796875	859.665625	859.671875
Ch. No.	308		318		328		338		348	
Base Rx	815.15625		815.03125		814.90625		814.78125		814.65625	
Base Tx	860.15625		860.03125		859.90625		859.78125		859.65625	
Ch. No.	308a	308b	318a	318b	328a	328b	338a	338b	348a	348b
Base Rx	815.153125	815.159375	815.028125	815.034375	814.903125	814.909375	814.778125	814.784375	814.653125	814.659375
Base Tx	860.153125	860.159375	860.028125	860.034375	859.903125	859.909375	859.778125	859.784375	859.653125	859.659375
Ch. No.	309		319		329		339		349	
Base Rx	815.14375		815.01875		814.89375		814.76875		814.64375	
Base Tx	860.14375		860.01875		859.89375		859.76875		859.64375	
Ch. No.	309a	309b	319a	319b	329a	329b	339a	339b	349a	349b
Base Rx	815.140625	815.146875	815.015625	815.021875	814.890625	814.896875	814.765625	814.771875	814.640625	814.646875
Base Tx	860.140625	860.146875	860.015625	860.021875	859.890625	859.896875	859.765625	859.771875	859.640625	859.646875
Ch. No.	310		320		330		340		350	
Base Rx	815.13125		815.00625		814.88125		814.75625		814.63125	
Base Tx	860.13125		860.00625		859.88125		859.75625		859.63125	
Ch. No.	310a	310b	320a	320b	330a	330b	340a	340b	350a	350b
Base Rx	815.128125	815.134375	815.003125	815.009375	814.878125	814.884375	814.753125	814.759375	814.628125	814.634375
Base Tx	860.128125	860.134375	860.003125	860.009375	859.878125	859.884375	859.753125	859.759375	859.628125	859.634375

SMARTMOBILE
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Andheri (W), Mumbai - 400 053.
Mobile No. (+91 9930262518)
CIN:U74899DL1995PTC063989

Ch. No.	351		361		371		381		391	
Base Rx	814.61875		814.49375		814.36875		814.24375		814.11875	
Base Tx	859.61875		859.49375		859.36875		859.24375		859.11875	
Ch. No.	351a	351b	361a	361b	371a	371b	381a	381b	391a	391b
Base Rx	814.615625	814.621875	814.490625	814.496875	814.365625	814.371875	814.240625	814.246875	814.115625	814.121875
Base Tx	859.615625	859.621875	859.490625	859.496875	859.365625	859.371875	859.240625	859.246875	859.115625	859.121875
Ch. No.	352		362		372		382		392	
Base Rx	814.60625		814.48125		814.35625		814.23125		814.10625	
Base Tx	859.60625		859.48125		859.35625		859.23125		859.10625	
Ch. No.	352a	352b	362a	362b	372a	372b	382a	382b	392a	392b
Base Rx	814.603125	814.609375	814.478125	814.484375	814.353125	814.359375	814.228125	814.234375	814.103125	814.109375
Base Tx	859.603125	859.609375	859.478125	859.484375	859.353125	859.359375	859.228125	859.234375	859.103125	859.109375
Ch. No.	353		363		373		383		393	
Base Rx	814.59375		814.46875		814.34375		814.21875		814.09375	
Base Tx	859.59375		859.46875		859.34375		859.21875		859.09375	
Ch. No.	353a	353b	363a	363b	373a	373b	383a	383b	393a	393b
Base Rx	814.590625	814.596875	814.465625	814.471875	814.340625	814.346875	814.215625	814.221875	814.090625	814.096875
Base Tx	859.590625	859.596875	859.465625	859.471875	859.340625	859.346875	859.215625	859.221875	859.090625	859.096875
Ch. No.	354		364		374		384		394	
Base Rx	814.58125		814.45625		814.33125		814.20625		814.08125	
Base Tx	859.58125		859.45625		859.33125		859.20625		859.08125	
Ch. No.	354a	354b	364a	364b	374a	374b	384a	384b	394a	394b
Base Rx	814.578125	814.584375	814.453125	814.459375	814.328125	814.334375	814.203125	814.209375	814.078125	814.084375
Base Tx	859.578125	859.584375	859.453125	859.459375	859.328125	859.334375	859.203125	859.209375	859.078125	859.084375
Ch. No.	355		365		375		385		395	
Base Rx	814.56875		814.44375		814.31875		814.19375		814.06875	
Base Tx	859.56875		859.44375		859.31875		859.19375		859.06875	
Ch. No.	355a	355b	365a	365b	375a	375b	385a	385b	395a	395b
Base Rx	814.565625	814.571875	814.440625	814.446875	814.315625	814.321875	814.190625	814.196875	814.065625	814.071875
Base Tx	859.565625	859.571875	859.440625	859.446875	859.315625	859.321875	859.190625	859.196875	859.065625	859.071875
Ch. No.	356		366		376		386		396	
Base Rx	814.55625		814.43125		814.30625		814.18125		814.05625	
Base Tx	859.55625		859.43125		859.30625		859.18125		859.05625	
Ch. No.	356a	356b	366a	366b	376a	376b	386a	386b	396a	396b
Base Rx	814.553125	814.559375	814.428125	814.434375	814.303125	814.309375	814.178125	814.184375	814.053125	814.059375
Base Tx	859.553125	859.559375	859.428125	859.434375	859.303125	859.309375	859.178125	859.184375	859.053125	859.059375
Ch. No.	357		367		377		387		397	
Base Rx	814.54375		814.41875		814.29375		814.16875		814.04375	
Base Tx	859.54375		859.41875		859.29375		859.16875		859.04375	
Ch. No.	357a	357b	367a	367b	377a	377b	387a	387b	397a	397b
Base Rx	814.540625	814.546875	814.415625	814.421875	814.290625	814.296875	814.165625	814.171875	814.040625	814.046875
Base Tx	859.540625	859.546875	859.415625	859.421875	859.290625	859.296875	859.165625	859.171875	859.040625	859.046875
Ch. No.	358		368		378		388		398	
Base Rx	814.53125		814.40625		814.28125		814.15625		814.03125	
Base Tx	859.53125		859.40625		859.28125		859.15625		859.03125	
Ch. No.	358a	358b	368a	368b	378a	378b	388a	388b	398a	398b
Base Rx	814.528125	814.534375	814.403125	814.409375	814.278125	814.284375	814.153125	814.159375	814.028125	814.034375
Base Tx	859.528125	859.534375	859.403125	859.409375	859.278125	859.284375	859.153125	859.159375	859.028125	859.034375
Ch. No.	359		369		379		389		399	
Base Rx	814.51875		814.39375		814.26875		814.14375		814.01875	
Base Tx	859.51875		859.39375		859.26875		859.14375		859.01875	
Ch. No.	359a	359b	369a	369b	379a	379b	389a	389b	399a	399b
Base Rx	814.515625	814.521875	814.390625	814.396875	814.265625	814.271875	814.140625	814.146875	814.015625	814.021875
Base Tx	859.515625	859.521875	859.390625	859.396875	859.265625	859.271875	859.140625	859.146875	859.015625	859.021875
Ch. No.	360		370		380		390		400	
Base Rx	814.50625		814.38125		814.25625		814.13125		814.00625	
Base Tx	859.50625		859.38125		859.25625		859.13125		859.00625	
Ch. No.	360a	360b	370a	370b	380a	380b	390a	390b	400a	400b
Base Rx	814.503125	814.509375	814.378125	814.384375	814.253125	814.259375	814.128125	814.134375	814.003125	814.009375
Base Tx	859.503125	859.509375	859.378125	859.384375	859.253125	859.259375	859.128125	859.134375	859.003125	859.009375

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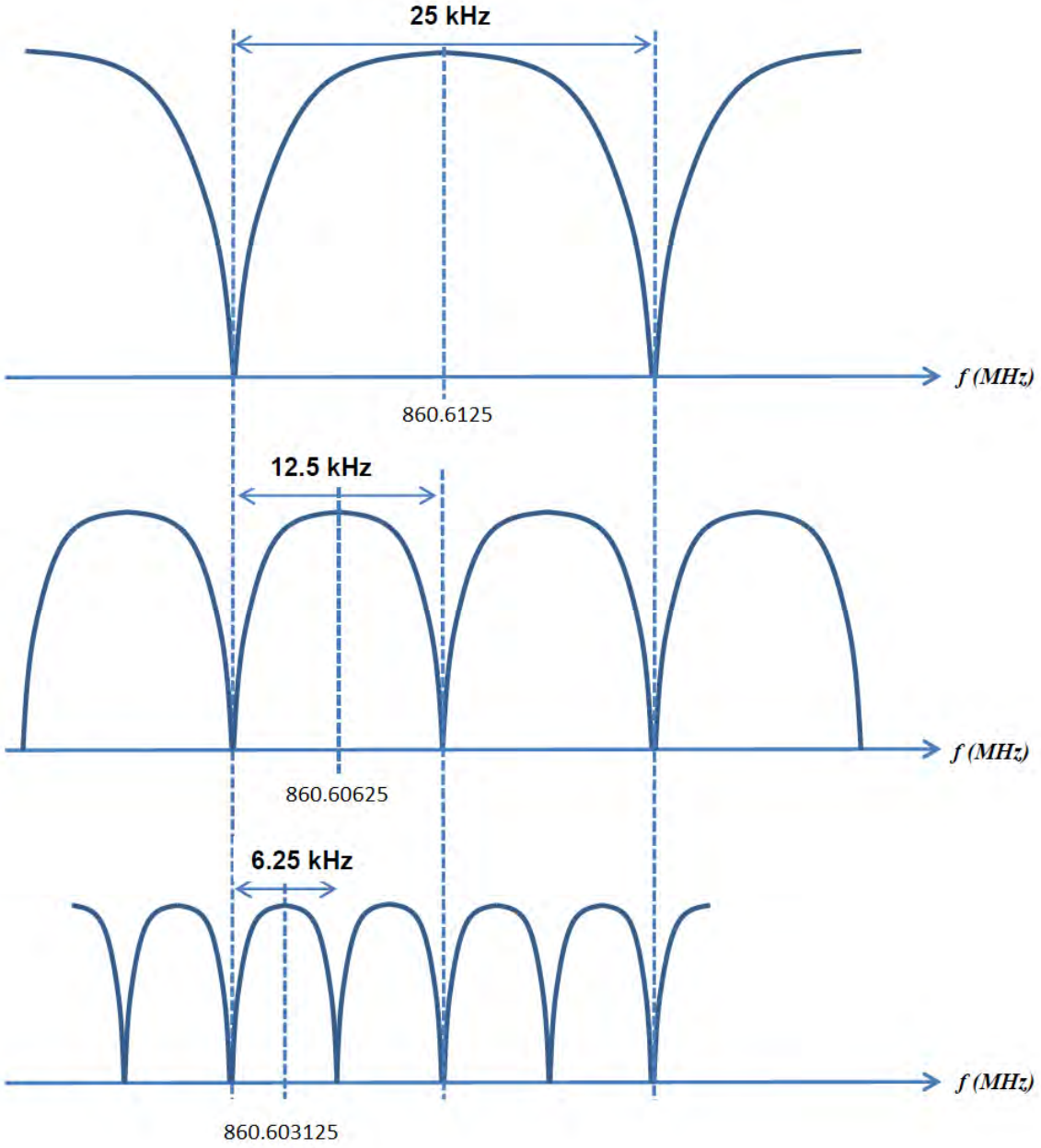
CIN:U74899DL1995PTC063989

APPENDIX –C CHANNEL BANDWIDTH ARRANGEMENTS (25 KHZ, 12.5 KHZ & 6.25 KHZ)



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APPENDIX- D CHANNELING ALLOTMENT PLAN (12.5 KHZ & 6.25 KHZ)

Block	Sub Block																							
	1		2		3		4		5		6		7		8		9		10					
A	1		2		3		4		5		6		7		8		9		10					
	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11a	11b	12a	12b
	21		22		23		24		25		26		27		28		29		30		31		32	
	21a	21b	22a	22b	23a	23b	24a	24b	25a	25b	26a	26b	27a	27b	28a	28b	29a	29b	30a	30b	31a	31b	32a	32b
	41		42		43		44		45		46		47		48		49		50		51		52	
	41a	41b	42a	42b	43a	43b	44a	44b	45a	45b	46a	46b	47a	47b	48a	48b	49a	49b	50a	50b	51a	51b	52a	52b
	61		62		63		64		65		66		67		68		69		70		71		72	
	61a	61b	62a	62b	63a	63b	64a	64b	65a	65b	66a	66b	67a	67b	68a	68b	69a	69b	70a	70b	71a	71b	72a	72b
	81		82		83		84		85		86		87		88		89		90		91		92	
	81a	81b	82a	82b	83a	83b	84a	84b	85a	85b	86a	86b	87a	87b	88a	88b	89a	89b	90a	90b	91a	91b	92a	92b
	101		102		103		104		105		106		107		108		109		110		111		112	
	101a	101b	102a	102b	103a	103b	104a	104b	105a	105b	106a	106b	107a	107b	108a	108b	109a	109b	110a	110b	111a	111b	112a	112b
	121		122		123		124		125		126		127		128		129		130		131		132	
	121a	121b	122a	122b	123a	123b	124a	124b	125a	125b	126a	126b	127a	127b	128a	128b	129a	129b	130a	130b	131a	131b	132a	132b
	141		142		143		144		145		146		147		148		149		150		151		152	
	141a	141b	142a	142b	143a	143b	144a	144b	145a	145b	146a	146b	147a	147b	148a	148b	149a	149b	150a	150b	151a	151b	152a	152b
	161		162		163		164		165		166		167		168		169		170		171		172	
	161a	161b	162a	162b	163a	163b	164a	164b	165a	165b	166a	166b	167a	167b	168a	168b	169a	169b	170a	170b	171a	171b	172a	172b
	181		182		183		184		185		186		187		188		189		190		191		192	
	181a	181b	182a	182b	183a	183b	184a	184b	185a	185b	186a	186b	187a	187b	188a	188b	189a	189b	190a	190b	191a	191b	192a	192b
B	201		202		203		204		205		206		207		208		209		210		211		212	
	201a	201b	202a	202b	203a	203b	204a	204b	205a	205b	206a	206b	207a	207b	208a	208b	209a	209b	210a	210b	211a	211b	212a	212b
	221		222		223		224		225		226		227		228		229		230		231		232	
	221a	221b	222a	222b	223a	223b	224a	224b	225a	225b	226a	226b	227a	227b	228a	228b	229a	229b	230a	230b	231a	231b	232a	232b
	241		242		243		244		245		246		247		248		249		250		251		252	
	241a	241b	242a	242b	243a	243b	244a	244b	245a	245b	246a	246b	247a	247b	248a	248b	249a	249b	250a	250b	251a	251b	252a	252b
	261		262		263		264		265		266		267		268		269		270		271		272	
	261a	261b	262a	262b	263a	263b	264a	264b	265a	265b	266a	266b	267a	267b	268a	268b	269a	269b	270a	270b	271a	271b	272a	272b
	281		282		283		284		285		286		287		288		289		290		291		292	
	281a	281b	282a	282b	283a	283b	284a	284b	285a	285b	286a	286b	287a	287b	288a	288b	289a	289b	290a	290b	291a	291b	292a	292b
	301		302		303		304		305		306		307		308		309		310		311		312	
	301a	301b	302a	302b	303a	303b	304a	304b	305a	305b	306a	306b	307a	307b	308a	308b	309a	309b	310a	310b	311a	311b	312a	312b
	321		322		323		324		325		326		327		328		329		330		331		332	
	321a	321b	322a	322b	323a	323b	324a	324b	325a	325b	326a	326b	327a	327b	328a	328b	329a	329b	330a	330b	331a	331b	332a	332b
	341		342		343		344		345		346		347		348		349		350		351		352	
	341a	341b	342a	342b	343a	343b	344a	344b	345a	345b	346a	346b	347a	347b	348a	348b	349a	349b	350a	350b	351a	351b	352a	352b
	361		362		363		364		365		366		367		368		369		370		371		372	
	361a	361b	362a	362b	363a	363b	364a	364b	365a	365b	366a	366b	367a	367b	368a	368b	369a	369b	370a	370b	371a	371b	372a	372b
	381		382		383		384		385		386		387		388		389		390		391		392	
	381a	381b	382a	382b	383a	383b	384a	384b	385a	385b	386a	386b	387a	387b	388a	388b	389a	389b	390a	390b	391a	391b	392a	392b

Block	Sub Block																							
	1		2		3		4		5		6		7		8		9		10					
A	11		12		13		14		15		16		17		18		19		20					
	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11a	11b	12a	12b
	21		22		23		24		25		26		27		28		29		30		31		32	
	21a	21b	22a	22b	23a	23b	24a	24b	25a	25b	26a	26b	27a	27b	28a	28b	29a	29b	30a	30b	31a	31b	32a	32b
	41		42		43		44		45		46		47		48		49		50		51		52	
	41a	41b	42a	42b	43a	43b	44a	44b	45a	45b	46a	46b	47a	47b	48a	48b	49a	49b	50a	50b	51a	51b	52a	52b
	61		62		63		64		65		66		67		68		69		70		71		72	
	61a	61b	62a	62b	63a	63b	64a	64b	65a	65b	66a	66b	67a	67b	68a	68b	69a	69b	70a	70b	71a	71b	72a	72b
	81		82		83		84		85		86		87		88		89		90		91		92	
	81a	81b	82a	82b	83a	83b	84a	84b	85a	85b	86a	86b	87a	87b	88a	88b	89a	89b	90a	90b	91a	91b	92a	92b
	101		102		103		104		105		106		107		108		109		110		111		112	
	101a	101b	102a	102b	103a	103b	104a	104b	105a	105b	106a	106b	107a	107b	108a	108b	109a	109b	110a	110b	111a	111b	112a	112b
	121		122		123		124		125		126		127		128		129		130		131		132	
	121a	121b	122a	122b	123a	123b	124a	124b	125a	125b	126a	126b	127a	127b	128a	128b	129a	129b	130a	130b	131a	131b	132a	132b
	141		142		143		144		145		146		147		148		149		150		151		152	
	141a	141b	142a	142b	143a	143b	144a	144b	145a	145b	146a	146b	147a	147b	148a	148b	149a	149b	150a	150b	151a	151b	152a	152b
	161		162		163		164		165		166		167		168		169		170		171		172	
	161a	161b	162a	162b	163a	163b	164a	164b	165a	165b	166a	166b	167a	167b	168a	168b	169a	169b	170a	170b	171a	171b	172a	172b
	181		182		183		184		185		186		187		188		189		190		191		192	
	181a	181b	182a	182b	183a	183b	184a	184b	185a	185b	186a	186b	187a	187b	188a	188b	189a	189b	190a	190b	191a	191b	192a	192b
B	201		202		203		204		205		206		207		208		209		210		211		212	
	201a	201b	202a	202b	203a	203b	204a	204b	205a	205b	206a	206b	207a	207b	208a	208b	209a	209b	210a	210b	211a	211b	212a	212b
	221		222		223		224		225		226		227		228		229		230		231		232	
	221a	221b	222a	222b	223a	223b	224a	224b	225a	225b	226a	226b	227a	227b	228a	228b	229a	229b	230a	230b	231a	231b	232a	232b
	241		242		243		244		245		246		247		248		249		250		251		252	
	241a	241b	242a	242b	243a	243b	244a	244b	245a	245b	246a	246b	247a	247b	248a	248b	249a	249b	250a	250b	251a	251b	252a	252b
	261		262		263		264		265		266		267		268		269		270		271		272	
	261a	261b	262a	262b	263a	263b	264a	264b	265a	265b	266a	266b	267a	267b	268a	268b	269a	269b	270a	270b	271a	271b	272a	272b
	281		282		283		284		285		286		287		288		289		290		291		292	
	281a	281b	282a	282b	283a	283b	284a	284b	285a	285b	286a	286b	287a	287b	288a	288b	289a	289b	290a	290b	291a	291b	292a	292b
	301		302		303		304		305		306		307		308		309		310		311		312	
	301a	301b	302a	302b	303a	303b	304a	304b	305a	305b	306a	306b	307a	307b	308a	308b	309a	309b	310a	310b	311a	311b	312a	312b
	321		322		323		324		325		326		327		328		329		330		331		332	
	321a	321b	322a	322b	323a	323b	324a	324b	325a	325b	326a	326b	327a	327b	328a	328b	329a	329b	330a	330b	331a	331b	332a	332b
	341		342		343		344		345		346		347		348		349		350		351		352	
	341a	341b	342a	342b	343a	343b	344a	344b	345a	345b	346a	346b	347a	347b	348a	348b	349a	349b	350a	350b	351a	351b	352a	352b
	361		362		363		364		365		366		367		368		369		370		371		372	
	361a	361b	362a	362b	363a	363b	364a	364b	365a	365b	366a	366b	367a	367b	368a	368b	369a	369b	370a	370b	371a	371b	372a	372b
	381		382		383		384		385		386		387		388		389		390		391		392	
	381a	381b	382a	382b	383a	383b	384a	384b	385a	385b	386a	386b	387a	387b	388a	388b	389a	389b	390a	390b	391a	391b	392a	392b

Block	Sub Block																							
	1		2		3		4		5		6		7		8		9		10					
A	21		22		23		24		25		26		27		28		29		30					
	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11a	11b	12a	12b
	41		42		43		44		45		46		47		48		49		50		51		52	
	21a	21b	22a	22b	23a	23b	24a	24b	25a	25b	26a	26b	27a	27b	28a	28b	29a	29b	30a	30b	31a	31b	32a	32b
	61		62		63		64		65		66		67		68		69		70		71		72	
	41a	41b	42a	42b	43a	43b	44a	44b	45a	45b	46a	46b	47a	47b	48a	48b	49a	49b	50a	50b	51a	51b	52a	52b
	81		82		83		84		85		86		87		88		89		90		91		92	
	61a	61b	62a	62b	63a	63b	64a	64b	65a	65b	66a	66b	67a	67b	68a	68b	69a	69b	70a	70b	71a	71b	72a	72b
	101		102		103		104		105		106		107		108		109		110		111		112	
	81a	81b	82a	82b	83a	83b	84a	84b	85a	85b	86a	86b	87a	87b	88a	88b	89a	89b	90a	90b	91a	91b	92a	92b
	121		122		123		124		125		126		127		128		129		130		131		132	
	101a	101b	102a	102b	103a	103b	104a	104b	105a	105b	106a	106b	107a	107b	108a	108b	109a	109b	110a	110b	111a	111b	112a	112b
	141		142		143		144		145		146		147		148		149		150		151		152	
	121a	121b	122a	122b	123a	123b	124a	124b	125a	125b	126a	126b	127a	127b	128a	128b	129a	129b	130a	130b	131a	131b	132a	132b
	161		162		163		164		165		166		167		168		169		170		171		172	
	141a	141b	142a	142b	143a	143b	144a	144b	145a	145b	146a	146b	147a	147b	148a	148b	149a	149b	150a	150b	151a	151b	152a	152b
	181		182		183		184		185		186		187		188		189		190		191		192	
	161a	161b	162a	162b	163a	163b	164a	164b	165a	165b	166a	166b	167a	167b	168a	168b	169a	169b	170a	170b	171a	171b	172a	172b
B	201		202		203		204		205		206		207		208		209		210		211		212	
	181a	181b	182a	182b	183a	183b	184a	184b	185a	185b	186a	186b	187a	187b	188a	188b	189a	189b	190a	190b	191a	191b	192a	192b
	221		222		223		224		225		226		227		228		229		230		231		232	
	201a	201b	202a	202b	203a	203b	204a	204b	205a	205b	206a	206b	207a	207b	208a	208b	209a	209b	210a	210b	211a	211b	212a	212b
	241		242		243		244		245		246		247		248		249		250		251		252	
	221a	221b	222a	222b	223a	223b	224a	224b	225a	225b	226a	226b	227a	227b	228a	228b	229a	229b	230a	230b	231a	231b	232a	232b
	261		262		263		264		265		266		267		268		269		270		271		272	
	241a	241b	242a	242b	243a	243b	244a	244b	245a	245b	246a	246b	247a	247b	248a	248b	249a	249b	250a	250b	251a	251b	252a	252b
	281		282		283		284		285		286		287		288		289		290		291		292	
	261a	261b	262a	262b	263a	263b	264a	264b	265a	265b	266a	266b	267a	267b	268a	268b	269a	269b	270a	270b	271a	271b	272a	272b
	301		302		303		304		305		306		307		308		309		310		311		312	
	281a	281b	282a	282b	283a	283b	284a	284b	285a	285b	286a	286b	287a	287b	288a	288b	289a	289b	290a	290b	291a	291b	292a	292b
	321		322		323		324		325		326		327		328		329		330		331		332	
	301a	301b	302a	302b	303a	303b	304a	304b	305a	305b	306a	306b	307a	307b	308a	308b	309a	309b	310a	310b	311a	311b	312a	312b
	341		342		343		344		345		346		347		348		349		350		351		352	
	321a	321b	322a	322b	323a	323b	324a	324b	325a	325b	326a	326b	327a	327b	328a	328b	329a	329b	330a	330b	331a	331b	332a	332b
	361		362		363		364		365		366		367		368		369		370		371		372	
	341a	341b	342a	342b	343a	343b	344a	344b	345a	345b	346a	346b	347a	347b	348a	348b	349a	349b	350a	350b	351a	351b	352a	352b
	381		382		383		384		385		386		387		388		389		390		391		392	
	361a	361b	362a	362b	363a	363b	364a	364b	365a	365b	366a	366b	367a	367b	368a	368b	369a	369b	370a	370b	371a	371b	372a	372b

Block	Sub Block																							
	1		2		3		4		5		6		7		8		9		10					
A	31		32		33		34		35		36		37		38		39		40					
	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11a	11b	12a	12b
	41		42		43		44		45		46		47		48		49		50		51		52	
	21a	21b	22a	22b	23a	23b	24a	24b	25a	25b	26a	26b	27a	27b	28a	28b	29a	29b	30a	30b	31a	31b	32a	32b
	61		62		63		64		65		66		67		68		69		70		71		72	
	41a	41b	42a	42b	43a	43b	44a	44b	45a	45b	46a	46b	47a	47b	48a	48b	49a	49b	50a	50b	51a	51b	52a	52b
	81		82		83		84		85		86		87		88		89		90		91		92	
	61a	61b	62a	62b	63a	63b	64a	64b	65a	65b	66a	66b	67a	67b	68a	68b	69a	69b	70a	70b	71a	71b	72a	72b
	101		102		103		104		105		106		107		108		109		110		111		112	
	81a	81b	82a	82b	83a	83b	84a	84b	85a	85b	86a	86b	87a	87b	88a	88b	89a	89b	90a	90b	91a	91b	92a	92b
	121		122		123		124		125		126		127		128		129		130		131		132	
	101a	101b	102a	102b	103a	103b	104a	104b	105a	105b	106a	106b	107a	107b	108a	108b	109a	109b	110a	110b	111a	111b	112a	112b
	141		142		143		144		145		146		147		148		149		150		151		152	
	121a	121b	122a	122b	123a	123b	124a	124b	125a	125b	126a	126b	127a	127b	128a	128b	129a	129b	130a	130b	131a	131b	132a	132b
	161		162		163		164		165		166		167		168		169		170		171		172	
	141a	141b	142a	142b	143a	143b	144a	144b	145a	145b	146a	146b	147a	147b	148a	148b	149a	149b	150a	150b	151a	151b	152a	152b
	181		182		183		184		185		186		187		188		189		190		191		192	
	161a	161b	162a	162b	163a	163b	164a	164b	165a	165b	166a	166b	167a	167b	168a	168b	169a	169b	170a	170b	171a	171b	172a	172b
B	201		202		203		204		205		206		207		208		209		210		211		212	
	181a	181b	182a	182b	183a	183b	184a	184b	185a	185b	186a	186b	187a	187b	188a	188b	189a	189b	190a	190b	191a	191b	192a	192b
	221		222		223		224		225		226		227		228		229		230		231		232	
	201a	201b	202a	202b	203a	203b	204a	204b	205a	205b	206a	206b	207a	207b	208a	208b	209a	209b	210a	210b	211a	211b	212a	212b
	241		242		243		244		245		246		247		248		249		250		251		252	
	221a	221b	222a	222b	223a	223b	224a	224b	225a	225b	226a	226b	227a	227b	228a	228b	229a	229b	230a	230b	231a	231b	232a	232b
	261		262		263		264		265		266		267		268		269		270		271		272	
	241a	241b	242a	242b	243a	243b	244a	244b	245a	245b	246a	246b	247a	247b	248a	248b	249a	249b	250a	250b	251a	251b	252a	252b
	281		282		283		284		285		286		287		288		289		290		291		292	
	261a	261b	262a	262b	263a	263b	264a	264b	265a	265b	266a	266b	267a	267b	268a	268b	269a	269b	270a	270b	271a	271b	272a	272b
	301		302		303		304		305		306		307		308		309		310		311		312	
	281a	281b	282a	282b	283a	283b	284a	284b	285a	285b	286a	286b	287a	287b	288a	288b	289a	289b	290a	290b	291a	291b	292a	292b
	321		322		323		324		325		326		327		328		329		330		331		332	
	301a	301b	302a	302b	303a	303b	304a	304b	305a	305b	306a	306b	307a	307b	308a	308b	309a	309b	310a	310b	311a	311b	312a	312b
	341		342		343		344		345		346		347		348		349		350		351		352	
	321a	321b	322a	322b	323a	323b	324a	324b	325a	325b	326a	326b	327a	327b	328a	328b	329a	329b	330a	330b	331a	331b	332a	332b
	361		362		363		364		365		366		367		368		369		370		371		372	
	341a	341b	342a	342b	343a	343b	344a	344b	345a	345b	346a	346b	347a	347b	348a	348b	349a	349b	350a	350b	351a	351b	352a	352b
	381		382		383		384		385		386		387		388		389		390		391		392	
	361a	361b	362a	362b	363a	363b	364a	364b	365a	365b	366a	366b	367a	367b	368a	368b	369a	369b	370a	370b	371a	371b	372a	372b

Block	Sub Block																							
	1		2		3		4		5		6		7		8		9		10					
A	41		42		43		44		45		46		47		48		49		50					
	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11a	11b	12a	12b
	61		62		63		64		65		66		67		68		69		70		71		72	
	21a	21b	22a	22b	23a	23b	24a	24b	25a	25b	26a	26b	27a	27b	28a	28b	29a	29b	30a	30b	31a	31b	32a	32b
	81		82		83		84		85		86		87		88		89		90		91		92	
	41a	41b	42a	42b	43a	43b	44a	44b	45a	45b	46a	46b	47a	47b	48a	48b	49a	49b	50a	50b	51a	51b	52a	52b
	101		102		103		104		105		106		107		108		109		110		111		112	
	61a	61b	62a	62b	63a	63b	64a	64b	65a	65b	66a	66b	67a	67b	68a	68b	69a	69b	70a	70b	71a	71b	72a	72b
	121		122		123		124		125		126		127		128		129		130		131		132	
	81a	81b	82a	82b	83a	83b	84a	84b	85a	85b	86a	86b	87a	87b	88a	88b	89a	89b	90a	90b	91a	91b	92a	92b
	141		142		143		144		145		146		147		148		149		150		151		152	
	101a	101b	102a	102b	103a	103b	104a	104b	105a	105b	106a	106b	107a	107b	108a	108b	109a	109b	110a	110b	111a	111b	112a	112b
	161		162		163		164		165		166		167		168		169		170		171		172	
	121a	121b	122a	122b	123a	123b	124a	124b	125a	125b	126a	126b	127a	127b	128a	128b	129a	129b	130a	130b	131a	131b	132a	132b
	181		182		183		184		185		186		187		188		189		190		191		192	
	141a	141b	142a	142b	143a	143b	144a	144b	145a	145b	146a	146b	147a	147b	148a	148b	149a	149b	150a	150b	151a	151b	152a	152b
B	201		202		203		204		205		206		207		208		209		210		211		212	
	161a	161b	162a	162b	163a	163b	164a	164b	165a	165b	166a	166b	167a	167b	168a	168b	169a	169b	170a	170b	171a	171b	172a	172b
	221		222		223		224		225		226		227		228		229		230		231		232	
	181a	181b	182a	182b	183a	183b	184a	184b	185a	185b	186a	186b	187a	187b	188a	188b	189a	189b	190a	190b	191a	191b	192a	192b
	241		242		243		244		245		246		247		248		249		250		251		252	
	201a	201b	202a	202b	203a	203b	204a	204b	205a	205b	206a	206b	207a	207b	208a	208b	209a	209b	210a	210b	211a	211b	212a	212b
	261		262		263		264		265		266		267		268		269		270		271		272	
	221a	221b	222a	222b	223a	223b	224a	224b	225a	225b	226a	226b	227a	227b	228a	228b	229a	229b	230a	230b	231a	231b	232a	232b
	281		282		283		284		285		286		287		288		289		290		291		292	
	241a	241b	242a	242b	243a	243b	244a	244b	245a	245b	246a	246b	247a	247b	248a	248b	249a	249b	250a	250b	251a	251b	252a	252b
	301		302		303		304		305		306		307		308		309		310		311		312	
	261a	261b	262a	262b	263a	263b	264a	264b	265a	265b	266a	266b	267a	267b	268a	268b	269a	269b	270a	270b	271a	271b	272a	272b
	321		322		323		324		325		326		327		328		329		330		331		332	
	281a	281b	282a	282b	283a	283b	284a	284b	285a	285b	286a	286b	287a	287b	288a	288b	289a	289b	290a	290b

SMARTMOBILE
RADIO TRUNKING SERVICE

QUICKCALLS

QUICKCALLS PRIVATE LIMITED
(An Agrani Enterprise)
Office No. 1/57, 1st Floor, Om Heera
Panna Premises Co-op. Society Ltd.,
Opp. City International School,
Behind Oshiwara Police Station,
Andheri (W), Mumbai - 400 053.
Mobile No. (+91 9930262518)
CIN:U74899DL1995PTC063989

R.F. CHANNEL ARRANGEMENT FOR MOBILE RADIO TRUNKING SERVICE FOR THE FREQUENCY OF 814-819 MHz AND 859-864 MHz (12.5 KHz CHANNEL BANDWIDTH PLAN

S.No.	Channel Arrangement					Block No.	
1	1	41	81	121	161	----------	1A
	21	61	101	141	181	----------	1B
	201	241	281	321	361	----------	1C
	221	261	301	341	381	----------	1D
2	2	42	82	122	162	----------	2A
	22	62	102	142	182	----------	2B
	202	242	282	322	362	----------	2C
	222	262	302	342	382	----------	2D
3	3	43	83	123	163	----------	3A
	23	63	103	143	183	----------	3B
	203	243	283	323	363	----------	3C
	223	263	303	343	383	----------	3D
4	4	44	84	124	164	----------	4A
	24	64	104	144	184	----------	4B
	204	244	284	324	364	----------	4C
	224	264	304	344	384	----------	4D
5	5	45	85	125	165	----------	5A
	25	65	105	145	185	----------	5B
	205	245	285	325	365	----------	5C
	225	265	305	345	385	----------	5D
6	6	46	86	126	166	----------	6A
	26	66	106	146	186	----------	6B
	206	246	286	326	366	----------	6C
	226	266	306	346	386	----------	6D
7	7	47	87	127	167	----------	7A
	27	67	107	147	187	----------	7B
	207	247	287	327	367	----------	7C
	227	267	307	347	387	----------	7D
8	8	48	88	128	168	----------	8A
	28	68	108	148	188	----------	8B
	208	248	288	328	368	----------	8C
	228	268	308	348	388	----------	8D
9	9	49	89	129	169	----------	9A
	29	69	109	149	189	----------	9B
	209	249	289	329	369	----------	9C
	229	269	309	349	389	----------	9D
10	10	50	90	130	170	----------	10A
	30	70	110	150	190	----------	10B
	210	250	290	330	370	----------	10C
	230	270	310	350	390	----------	10D

SMARTMOBILE
RADIO TRUNKING SERVICE

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Andheri (W), Mumbai - 400 053.
Mobile No. (+91 9930262518)
CIN:U74899DL1995PTC063989

R.F. CHANNEL ARRANGEMENT FOR MOBILE RADIO TRUNKING SERVICE FOR THE FREQUENCY OF 814-819 MHz AND 859-864 MHz (12.5 KHz CHANNEL BANDWIDTH PLAN

S.No.	Channel Arrangement					Block No.	
11	11	51	91	131	171	----------	11A
	31	71	111	151	191	----------	11B
	211	251	291	331	371	----------	11C
	231	271	311	351	391	----------	11D
12	12	52	92	132	172	----------	12A
	32	72	112	152	192	----------	12B
	212	252	292	332	372	----------	12C
	232	272	312	352	392	----------	12D
13	13	53	93	133	173	----------	13A
	33	73	113	153	193	----------	13B
	213	253	293	333	373	----------	13C
	233	273	313	353	393	----------	13D
14	14	54	94	134	174	----------	14A
	34	74	114	154	194	----------	14B
	214	254	294	334	374	----------	14C
	234	274	314	354	394	----------	14D
15	15	55	95	135	175	----------	15A
	35	75	115	155	195	----------	15B
	215	255	295	335	375	----------	15C
	235	275	315	355	395	----------	15D
16	16	56	96	136	176	----------	16A
	36	76	116	156	196	----------	16B
	216	256	296	336	376	----------	16C
	236	276	316	356	396	----------	16D
17	17	57	97	137	177	----------	17A
	37	77	117	157	197	----------	17B
	217	257	297	337	377	----------	17C
	237	277	317	357	397	----------	17D
18	18	58	98	138	178	----------	18A
	38	78	118	158	198	----------	18B
	218	258	298	338	378	----------	18C
	238	278	318	358	398	----------	18D
19	19	59	99	139	179	----------	19A
	39	79	119	159	199	----------	19B
	219	259	299	339	379	----------	19C
	239	279	319	359	399	----------	19D
20	20	60	100	140	180	----------	20A
	40	80	120	160	200	----------	20B
	220	260	300	340	380	----------	20C
	240	280	320	360	400	----------	20D

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Mobile No. (+91 9930262518)
CIN:U74899DL1995PTC063989

R.F. CHANNEL ARRANGEMENT FOR MOBILE RADIO TRUNKING SERVICE FOR THE FREQUENCY OF 814-819 MHz AND 859-864 MHz (6.25 KHz CHANNEL BANDWIDTH PLAN)

S.No.	Channel Arrangement										Block No.	
1	1	a	41	a	81	a	121	a	161	a	----------	1A
	21	a	61	a	101	a	141	a	181	a	----------	1B
	201	a	241	a	281	a	321	a	361	a	----------	1C
	221	a	261	a	301	a	341	a	381	a	----------	1D
2	2	a	42	a	82	a	122	a	162	a	----------	2A
	22	a	62	a	102	a	142	a	182	a	----------	2B
	202	a	242	a	282	a	322	a	362	a	----------	2C
	222	a	262	a	302	a	342	a	382	a	----------	2D
3	3	a	43	a	83	a	123	a	163	a	----------	3A
	23	a	63	a	103	a	143	a	183	a	----------	3B
	203	a	243	a	283	a	323	a	363	a	----------	3C
	223	a	263	a	303	a	343	a	383	a	----------	3D
4	4	a	44	a	84	a	124	a	164	a	----------	4A
	24	a	64	a	104	a	144	a	184	a	----------	4B
	204	a	244	a	284	a	324	a	364	a	----------	4C
	224	a	264	a	304	a	344	a	384	a	----------	4D
5	5	a	45	a	85	a	125	a	165	a	----------	5A
	25	a	65	a	105	a	145	a	185	a	----------	5B
	205	a	245	a	285	a	325	a	365	a	----------	5C
	225	a	265	a	305	a	345	a	385	a	----------	5D
6	6	a	46	a	86	a	126	a	166	a	----------	6A
	26	a	66	a	106	a	146	a	186	a	----------	6B
	206	a	246	a	286	a	326	a	366	a	----------	6C
	226	a	266	a	306	a	346	a	386	a	----------	6D
7	7	a	47	a	87	a	127	a	167	a	----------	7A
	27	a	67	a	107	a	147	a	187	a	----------	7B
	207	a	247	a	287	a	327	a	367	a	----------	7C
	227	a	267	a	307	a	347	a	387	a	----------	7D
8	8	a	48	a	88	a	128	a	168	a	----------	8A
	28	a	68	a	108	a	148	a	188	a	----------	8B
	208	a	248	a	288	a	328	a	368	a	----------	8C
	228	a	268	a	308	a	348	a	388	a	----------	8D
9	9	a	49	a	89	a	129	a	169	a	----------	9A
	29	a	69	a	109	a	149	a	189	a	----------	9B
	209	a	249	a	289	a	329	a	369	a	----------	9C
	229	a	269	a	309	a	349	a	389	a	----------	9D
10	10	a	50	a	90	a	130	a	170	a	----------	10A
	30	a	70	a	110	a	150	a	190	a	----------	10B
	210	a	250	a	290	a	330	a	370	a	----------	10C
	230	a	270	a	310	a	350	a	390	a	----------	10D

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R.F. CHANNEL ARRANGEMENT FOR MOBILE RADIO TRUNKING SERVICE FOR THE FREQUENCY OF 814-819 MHz AND 859-864 MHz (6.25 KHz CHANNEL BANDWIDTH PLAN)

S.No.	Channel Arrangement										Block No.	
11	11	a	51	a	91	a	131	a	171	a	----------	11A
	31	a	71	a	111	a	151	a	191	a	----------	11B
	211	a	251	a	291	a	331	a	371	a	----------	11C
	231	a	271	a	311	a	351	a	391	a	----------	11D
12	12	a	52	a	92	a	132	a	172	a	----------	12A
	32	a	72	a	112	a	152	a	192	a	----------	12B
	212	a	252	a	292	a	332	a	372	a	----------	12C
	232	a	272	a	312	a	352	a	392	a	----------	12D
13	13	a	53	a	93	a	133	a	173	a	----------	13A
	33	a	73	a	113	a	153	a	193	a	----------	13B
	213	a	253	a	293	a	333	a	373	a	----------	13C
	233	a	273	a	313	a	353	a	393	a	----------	13D
14	14	a	54	a	94	a	134	a	174	a	----------	14A
	34	a	74	a	114	a	154	a	194	a	----------	14B
	214	a	254	a	294	a	334	a	374	a	----------	14C
	234	a	274	a	314	a	354	a	394	a	----------	14D
15	15	a	55	a	95	a	135	a	175	a	----------	15A
	35	a	75	a	115	a	155	a	195	a	----------	15B
	215	a	255	a	295	a	335	a	375	a	----------	15C
	235	a	275	a	315	a	355	a	395	a	----------	15D
16	16	a	56	a	96	a	136	a	176	a	----------	16A
	36	a	76	a	116	a	156	a	196	a	----------	16B
	216	a	256	a	296	a	336	a	376	a	----------	16C
	236	a	276	a	316	a	356	a	396	a	----------	16D
17	17	a	57	a	97	a	137	a	177	a	----------	17A
	37	a	77	a	117	a	157	a	197	a	----------	17B
	217	a	257	a	297	a	337	a	377	a	----------	17C
	237	a	277	a	317	a	357	a	397	a	----------	17D
18	18	a	58	a	98	a	138	a	178	a	----------	18A
	38	a	78	a	118	a	158	a	198	a	----------	18B
	218	a	258	a	298	a	338	a	378	a	----------	18C
	238	a	278	a	318	a	358	a	398	a	----------	18D
19	19	a	59	a	99	a	139	a	179	a	----------	19A
	39	a	79	a	119	a	159	a	199	a	----------	19B
	219	a	259	a	299	a	339	a	379	a	----------	19C
	239	a	279	a	319	a	359	a	399	a	----------	19D
20	20	a	60	a	100	a	140	a	180	a	----------	20A
	40	a	80	a	120	a	160	a	200	a	----------	20B
	220	a	260	a	300	a	340	a	380	a	----------	20C
	240	a	280	a	320	a	360	a	400	a	----------	20D

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S.No.	Channel Arrangement										Block No.	
21	1	b	41	b	81	b	121	b	161	b	----------	21A
	21	b	61	b	101	b	141	b	181	b	----------	21B
	201	b	241	b	281	b	321	b	361	b	----------	21C
	221	b	261	b	301	b	341	b	381	b	----------	21D
22	2	b	42	b	82	b	122	b	162	b	----------	22A
	22	b	62	b	102	b	142	b	182	b	----------	22B
	202	b	242	b	282	b	322	b	362	b	----------	22C
	222	b	262	b	302	b	342	b	382	b	----------	22D
23	3	b	43	b	83	b	123	b	163	b	----------	23A
	23	b	63	b	103	b	143	b	183	b	----------	23B
	203	b	243	b	283	b	323	b	363	b	----------	23C
	223	b	263	b	303	b	343	b	383	b	----------	23D
24	4	b	44	b	84	b	124	b	164	b	----------	24A
	24	b	64	b	104	b	144	b	184	b	----------	24B
	204	b	244	b	284	b	324	b	364	b	----------	24C
	224	b	264	b	304	b	344	b	384	b	----------	24D
25	5	b	45	b	85	b	125	b	165	b	----------	25A
	25	b	65	b	105	b	145	b	185	b	----------	25B
	205	b	245	b	285	b	325	b	365	b	----------	25C
	225	b	265	b	305	b	345	b	385	b	----------	25D
26	6	b	46	b	86	b	126	b	166	b	----------	26A
	26	b	66	b	106	b	146	b	186	b	----------	26B
	206	b	246	b	286	b	326	b	366	b	----------	26C
	226	b	266	b	306	b	346	b	386	b	----------	26D
27	7	b	47	b	87	b	127	b	167	b	----------	27A
	27	b	67	b	107	b	147	b	187	b	----------	27B
	207	b	247	b	287	b	327	b	367	b	----------	27C
	227	b	267	b	307	b	347	b	387	b	----------	27D
28	8	b	48	b	88	b	128	b	168	b	----------	28A
	28	b	68	b	108	b	148	b	188	b	----------	28B
	208	b	248	b	288	b	328	b	368	b	----------	28C
	228	b	268	b	308	b	348	b	388	b	----------	28D
29	9	b	49	b	89	b	129	b	169	b	----------	29A
	29	b	69	b	109	b	149	b	189	b	----------	29B
	209	b	249	b	289	b	329	b	369	b	----------	29C
	229	b	269	b	309	b	349	b	389	b	----------	29D
30	10	b	50	b	90	b	130	b	170	b	----------	30A
	30	b	70	b	110	b	150	b	190	b	----------	30A
	210	b	250	b	290	b	330	b	370	b	----------	30C
	230	b	270	b	310	b	350	b	390	b	----------	30D

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S.No.	Channel Arrangement										Block No.	
31	11	b	51	b	91	b	131	b	171	b	----------	31A
	31	b	71	b	111	b	151	b	191	b	----------	31B
	211	b	251	b	291	b	331	b	371	b	----------	31C
	231	b	271	b	311	b	351	b	391	b	----------	31D
32	12	b	52	b	92	b	132	b	172	b	----------	32A
	32	b	72	b	112	b	152	b	192	b	----------	32B
	212	b	252	b	292	b	332	b	372	b	----------	32C
	232	b	272	b	312	b	352	b	392	b	----------	32D
33	13	b	53	b	93	b	133	b	173	b	----------	33A
	33	b	73	b	113	b	153	b	193	b	----------	33B
	213	b	253	b	293	b	333	b	373	b	----------	33C
	233	b	273	b	313	b	353	b	393	b	----------	33D
34	14	b	54	b	94	b	134	b	174	b	----------	34A
	34	b	74	b	114	b	154	b	194	b	----------	34B
	214	b	254	b	294	b	334	b	374	b	----------	34C
	234	b	274	b	314	b	354	b	394	b	----------	34D
35	15	b	55	b	95	b	135	b	175	b	----------	35A
	35	b	75	b	115	b	155	b	195	b	----------	35B
	215	b	255	b	295	b	335	b	375	b	----------	35C
	235	b	275	b	315	b	355	b	395	b	----------	35D
36	16	b	56	b	96	b	136	b	176	b	----------	36A
	36	b	76	b	116	b	156	b	196	b	----------	36B
	216	b	256	b	296	b	336	b	376	b	----------	36C
	236	b	276	b	316	b	356	b	396	b	----------	36D
37	17	b	57	b	97	b	137	b	177	b	----------	37A
	37	b	77	b	117	b	157	b	197	b	----------	37B
	217	b	257	b	297	b	337	b	377	b	----------	37C
	237	b	277	b	317	b	357	b	397	b	----------	37D
38	18	b	58	b	98	b	138	b	178	b	----------	38A
	38	b	78	b	118	b	158	b	198	b	----------	38B
	218	b	258	b	298	b	338	b	378	b	----------	38C
	238	b	278	b	318	b	358	b	398	b	----------	38D
39	19	b	59	b	99	b	139	b	179	b	----------	39A
	39	b	79	b	119	b	159	b	199	b	----------	39B
	219	b	259	b	299	b	339	b	379	b	----------	39C
	239	b	279	b	319	b	359	b	399	b	----------	39D
40	20	b	60	b	100	b	140	b	180	b	----------	40A
	40	b	80	b	120	b	160	b	200	b	----------	40B
	220	b	260	b	300	b	340	b	380	b	----------	40C
	240	b	280	b	320	b	360	b	400	b	----------	40D

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APPENDIX- E: ERLANG C TABLE

Maximum Offered Load versus B and N

B is in %

N/B	0.01	0.05	0.1	0.5	1	2	5	10	15	20	30	40
1	0.0001	0.0005	0.0010	0.0050	0.0100	0.0200	0.0500	0.1000	0.1500	0.2000	0.3000	0.4000
2	0.0142	0.0319	0.0452	0.1025	0.1465	0.2103	0.3422	0.5000	0.6278	0.7403	0.9390	1.1170
3	0.0860	0.1490	0.1894	0.3339	0.4291	0.5545	0.7876	1.0400	1.2310	1.3930	1.6670	1.9030
4	0.2310	0.3533	0.4257	0.6641	0.8100	0.9939	1.3190	1.6530	1.8990	2.1020	2.4400	2.7250
5	0.4428	0.6289	0.7342	1.0650	1.2590	1.4970	1.9050	2.3130	2.6070	2.8470	3.2410	3.5690
6	0.7110	0.9616	1.0990	1.5190	1.7580	2.0470	2.5320	3.0070	3.3440	3.6170	4.0620	4.4280
7	1.0260	1.3410	1.5100	2.0140	2.2970	2.6330	3.1880	3.7250	4.1030	4.4060	4.8970	5.2980
8	1.3820	1.7580	1.9580	2.5430	2.8660	3.2460	3.8690	4.4630	4.8780	5.2100	5.7440	6.1780
9	1.7710	2.2080	2.4360	3.1000	3.4600	3.8830	4.5690	5.2180	5.6680	6.0270	6.6000	7.0650
10	2.1890	2.6850	2.9420	3.6790	4.0770	4.5400	5.2850	5.9860	6.4690	6.8530	7.4650	7.9590
11	2.6340	3.1860	3.4700	4.2790	4.7120	5.2130	6.0150	6.7650	7.2800	7.6880	8.3360	8.8570
12	3.1000	3.7080	4.0180	4.8960	5.3630	5.9010	6.7580	7.5540	8.0990	8.5300	9.2120	9.7610
13	3.5870	4.2480	4.5840	5.5290	6.0280	6.6020	7.5110	8.3520	8.9260	9.3790	10.09	10.67
14	4.0920	4.8050	5.1660	6.1750	6.7050	7.3130	8.2730	9.1580	9.7600	10.230	10.980	11.580
15	4.6140	5.3770	5.7620	6.8330	7.3940	8.0350	9.0440	9.9700	10.600	11.090	11.870	12.490
16	5.1500	5.9620	6.3710	7.5020	8.0930	8.7660	9.8220	10.790	11.440	11.960	12.770	13.410
17	5.6990	6.5600	6.9910	8.1820	8.8010	9.5050	10.610	11.610	12.290	12.830	13.660	14.330
18	6.2610	7.1690	7.6220	8.8710	9.5180	10.250	11.400	12.440	13.150	13.700	14.560	15.250
19	6.8350	7.7880	8.2630	9.5680	10.240	11.010	12.200	13.280	14.010	14.580	15.470	16.180
20	7.4190	8.4170	8.9140	10.270	10.970	11.770	13.000	14.120	14.870	15.450	16.370	17.100
21	8.0130	9.0550	9.5720	10.990	11.710	12.530	13.810	14.960	15.730	16.340	17.280	18.030
22	8.6160	9.7020	10.240	11.700	12.460	13.300	14.620	15.810	16.600	17.220	18.190	18.960
23	9.2280	10.360	10.910	12.430	13.210	14.080	15.430	16.650	17.470	18.110	19.100	19.890
24	9.8480	11.020	11.590	13.160	13.960	14.860	16.250	17.510	18.350	19.000	20.020	20.820
25	10.480	11.690	12.280	13.900	14.720	15.650	17.080	18.360	19.220	19.890	20.930	21.760
26	11.110	12.360	12.970	14.640	15.490	16.440	17.910	19.220	20.100	20.790	21.850	22.690
27	11.750	13.040	13.670	15.380	16.260	17.230	18.740	20.080	20.980	21.680	22.770	23.630
28	12.400	13.730	14.380	16.140	17.030	18.030	19.570	20.950	21.870	22.580	23.690	24.570
29	13.050	14.420	15.090	16.890	17.810	18.830	20.410	21.820	22.750	23.480	24.610	25.500
30	13.710	15.120	15.800	17.650	18.590	19.640	21.250	22.680	23.640	24.380	25.540	26.440
31	14.380	15.820	16.520	18.420	19.370	20.450	22.090	23.560	24.530	25.290	26.460	27.380
32	15.050	16.530	17.250	19.180	20.160	21.260	22.930	24.430	25.420	26.190	27.390	28.330
33	15.720	17.240	17.970	19.950	20.950	22.070	23.780	25.300	26.320	27.100	28.310	29.270
34	16.400	17.950	18.710	20.730	21.750	22.890	24.630	26.180	27.210	28.010	29.240	30.210
35	17.090	18.670	19.440	21.510	22.550	23.710	25.480	27.060	28.110	28.920	30.170	31.160
36	17.780	19.390	20.180	22.290	23.350	24.530	26.340	27.940	29.000	29.830	31.100	32.100
37	18.470	20.120	20.920	23.070	24.150	25.360	27.190	28.820	29.900	30.740	32.030	33.050
38	19.170	20.850	21.670	23.860	24.960	26.180	28.050	29.710	30.800	31.650	32.970	34.000
39	19.870	21.590	22.420	24.650	25.770	27.010	28.910	30.590	31.710	32.570	33.900	34.940
40	20.580	22.330	23.170	25.440	26.580	27.840	29.770	31.480	32.610	33.480	34.830	35.890
41	21.280	23.070	23.930	26.230	27.390	28.680	30.630	32.370	33.510	34.400	35.770	36.840
42	22.000	23.810	24.690	27.030	28.210	29.510	31.500	33.260	34.420	35.320	36.700	37.790
43	22.710	24.560	25.450	27.830	29.020	30.350	32.360	34.150	35.330	36.230	37.640	38.740

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ERLANG C TABLE

N/B	0.01	0.05	0.1	0.5	1	2	5	10	15	20	30	40
44	23.430	25.310	26.220	28.630	29.840	31.190	33.230	35.040	36.230	37.150	38.580	39.690
45	24.150	26.060	26.980	29.440	30.670	32.030	34.100	35.930	37.140	38.070	39.510	40.640
46	24.880	26.820	27.750	30.240	31.490	32.870	34.970	36.830	38.050	39.000	40.450	41.590
47	25.600	27.570	28.520	31.050	32.320	33.720	35.840	37.720	38.960	39.920	41.390	42.540
48	26.340	28.330	29.300	31.860	33.140	34.560	36.720	38.620	39.870	40.840	42.330	43.500
49	27.070	29.100	30.080	32.680	33.970	35.410	37.590	39.520	40.790	41.760	43.270	44.450
50	27.800	29.860	30.860	33.490	34.800	36.260	38.470	40.420	41.700	47,69	44.210	45.400
51	28.540	30.630	31.640	34.310	35.640	37.110	39.350	41.320	42.610	43.610	45.150	46.360
52	29.280	31.400	32.420	35.120	36.470	37.970	40.230	42.220	43.530	44.540	46.100	47.310
53	30.030	32.170	33.210	35.940	37.310	38.820	41.100	43.120	44.440	45.470	47.040	48.270
54	30.770	32.950	33.990	36.760	38.150	39.670	41.990	44.020	45.360	46.390	47.980	49.220
55	31.520	33.720	34.780	37.590	38.990	40.530	42.870	44.930	46.280	47.320	48.930	50.180
56	32.270	34.500	35.570	38.410	39.830	41.390	43.750	45.830	47.200	48.250	49.870	51.130
57	33.030	35.280	36.370	39.240	40.670	42.250	44.640	46.740	48.120	49.180	50.820	52.090
58	33.780	36.060	37.160	40.070	41.510	43.110	45.520	47.640	49.040	50.110	51.760	53.050
59	34.540	36.850	37.960	40.900	42.360	43.970	46.410	48.550	49.960	51.040	52.710	54.010
60	35.300	37.630	38.760	41.730	43.200	44.830	47.290	49.460	50.880	51.970	53.650	54.960
61	36.060	38.420	39.560	42.560	44.050	45.700	48.180	50.370	51.800	52.900	54.600	55.920
62	36.820	39.210	40.360	43.390	44.900	46.560	49.070	51.270	52.720	53.830	55.550	56.880
63	37.590	40.000	41.160	44.230	45.750	47.430	49.960	52.180	53.640	54.770	56.490	57.840
64	38.350	40.800	41.970	45.060	46.600	48.300	50.850	53.100	54.570	55.700	57.440	58.800
65	39.120	41.590	42.780	45.900	47.450	49.160	51.740	54.010	55.490	56.630	58.390	59.760
66	39.890	42.390	43.580	46.740	48.300	50.030	52.640	54.920	56.420	57.570	59.340	60.720
67	40.660	43.180	44.390	47.580	49.160	50.900	53.530	55.830	57.340	58.500	60.290	61.680
68	41.440	43.980	45.200	48.420	50.010	51.770	54.420	56.750	58.270	59.440	61.240	62.640
69	42.210	44.780	46.020	49.260	50.870	52.650	55.320	57.660	59.200	60.370	62.190	63.600
70	42.990	45.580	46.830	50.100	51.730	53.520	56.210	58.570	60.120	61.310	63.140	64.560
71	43.770	46.390	47.640	50.950	52.590	54.390	57.110	59.490	61.050	62.250	64.090	65.520
72	44.550	47.190	48.460	51.790	53.450	55.270	58.010	60.410	61.980	63.180	65.040	66.480
73	45.330	48.000	49.280	52.640	54.310	56.140	58.900	61.320	62.910	64.120	65.990	67.440
74	46.110	48.810	50.100	53.490	55.170	57.020	59.800	62.240	63.840	65.060	66.940	68.400
75	46.900	49.610	50.920	54.340	56.030	57.900	60.700	63.160	64.760	66.000	67.890	69.370
76	47.680	50.420	51.740	55.190	56.890	58.780	61.600	64.070	65.690	66.940	68.850	70.330
77	48.470	51.230	52.560	56.040	57.760	59.650	62.500	64.990	66.630	67.880	69.800	71.290
78	49.260	52.050	53.380	56.890	58.620	60.530	63.400	65.910	67.560	68.820	70.750	72.250
79	50.050	52.860	54.210	57.740	59.490	61.410	64.300	66.830	68.490	69.760	71.700	73.220
80	50.840	53.680	55.030	58.600	60.360	62.300	65.210	67.750	69.420	70.700	72.660	74.180
81	51.630	54.490	55.860	59.450	61.220	63.180	66.110	68.670	70.350	71.640	73.610	75.140
82	52.430	55.310	56.690	60.300	62.090	64.060	67.010	69.590	71.280	72.580	74.570	76.110
83	53.220	56.130	57.520	61.160	62.960	64.940	67.920	70.520	72.220	73.520	75.520	77.070
84	54.020	56.950	58.350	62.020	63.830	65.830	68.820	71.440	73.150	74.460	76.470	78.040
85	54.810	57.770	59.180	62.880	64.700	66.710	69.730	72.360	74.080	75.400	77.430	79.000
86	55.610	58.590	60.010	63.730	65.570	67.600	70.630	73.280	75.020	76.350	78.380	79.970
87	56.410	59.410	60.840	64.590	66.450	68.480	71.540	74.210	75.950	77.290	79.340	80.930
88	57.210	60.230	61.670	65.450	67.320	69.370	72.450	75.130	76.890	78.230	80.300	81.900
89	58.020	61.060	62.510	66.320	68.190	70.260	73.350	76.060	77.820	79.180	81.250	82.860
90	58.820	61.880	63.340	67.180	69.070	71.150	74.260	76.980	78.760	80.120	82.210	83.830

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(An Agrani Enterprise)
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Opp. City International School,
Behind Oshiwara Police Station,
Andheri (W), Mumbai - 400 053.
Mobile No. (+91 9930262518)
CIN:U74899DL1995PTC063989

ERLANG C TABLE

	0.01	0.05	0.1	0.5	1	2	5	10	15	20	30	40
91	59.620	62.710	64.180	68.040	69.940	72.040	75.170	77.910	79.690	81.060	83.160	84.790
92	60.430	63.540	65.020	68.900	70.820	72.920	76.080	78.830	80.630	82.010	84.120	85.760
93	61.230	64.360	65.860	69.770	71.700	73.810	76.990	79.760	81.570	82.950	85.080	86.730
94	62.040	65.190	66.700	70.630	72.570	74.710	77.900	80.690	82.500	83.900	86.030	87.690
95	62.850	66.020	67.540	71.500	73.450	75.600	78.810	81.610	83.440	84.840	86.990	88.660
96	63.660	66.850	68.380	72.360	74.330	76.490	79.720	82.540	84.380	85.790	87.950	89.620
97	64.470	67.690	69.220	73.230	75.210	77.380	80.630	83.470	85.320	86.740	88.910	90.590
98	65.280	68.520	70.060	74.100	76.090	78.270	81.540	84.390	86.260	87.680	89.870	91.560
99	66.090	69.350	70.900	74.970	76.970	79.170	82.460	85.320	87.200	88.630	90.820	92.530
100	66.910	70.190	71.750	75.840	77.850	80.060	83.370	86.250	88.130	89.580	91.780	93.490

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Annexure 3

Violations in License Free band (446MHz) Walky Talkies

A) The following vendors from India are supplying 446MHz License Free band walkies:

1) Aspera
2) Talkpro
3) Thinux
4) Sanchar
5) T82, Motorola
6) Bofeng
7) Access

The License Free band Walky Talky **Model Aspera V7** is provisioned with an RF power switching (high and low power modes) through a side button. While importing the button is kept in low power mode to comply whereas for high power mode selection, the Walky Talky is evidenced to transmit at 5W output RF power on antenna port, in blatant violation of the gazette notification. Click on the video link
https://drive.google.com/drive/folders/18PczqS606jNOfO_RVOqhZCDZmzN6ByzT?usp=sharing

B) Repeaters/ Boosters/ Signal Extenders – being openly sold by Sanchar Communications, Okhla, and New Delhi for License Free band 446 MHz Walky Talky signal enhancement in clear violation of the License Free notification.

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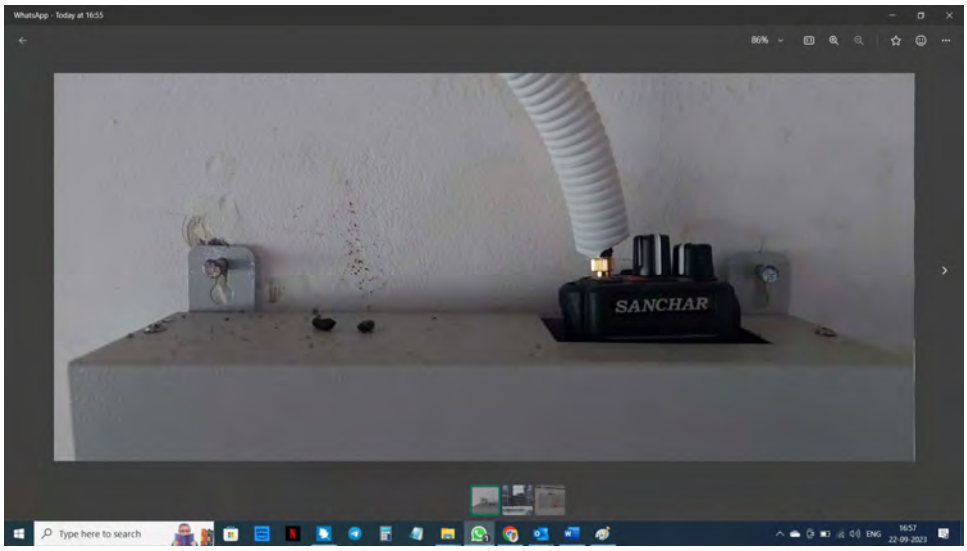

C) Following are the web at browsed images, wherein the License Free band suppliers/ vendors are quoting long coverage range Walky Talkies going from a few kms to 6kms and even 10kms

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Talk Pro LF446

₹ 7,500/ Piece Get Latest Price

Minimum Order Quantity: **2 Piece**

Product Brochure Watch Video

Model Name/Number	LF446
Product Type	License Free Walkie Talkie
Brand	Talk Pro
Warranty	1 Year
Range	6 Kms
License Requirment	License Free

Product feature-TalkPro LF446 Model

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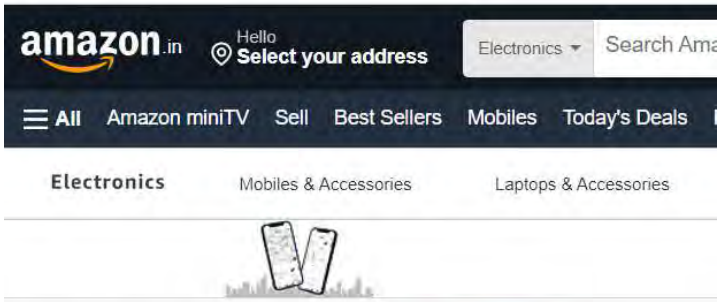

Similar items

TalkPro LF446 | Short Range (4-6 Kms) | License-Free Walkie Talkie|

★★★★☆ 9

₹7,300^{00}

Interested in this product?

LF446 License Free Model Walkie Talkie

₹ 7,500/ Piece Get Latest Price

Minimum Order Quantity: **1 Piece**

Product Brochure Watch Video

Model Name/Number	LF446
Product Type	License Free Walkie Talkie
Brand	Talk Pro
Warranty	1 Year
Range	6 Kms
License Requirment	License Free
Walkie Talkie Size	98 x 60 x 34 mm
Battery Capacity	2500 mAH
Battery Backup Time	13 hours

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IndiaMART

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Annexure 4

Key Changes suggested in DPL Renewal License

1. **Point no. 3 "The Equipment covered under the possession license should not be shifted from the premises (Location)" should be deleted.**
2. **Point no. 5 "Particulars of equipment received/sold/transferred/delivered are to be entered in the appropriate register" should be changed to "Particulars of equipment received/sold/rented/transferred/delivered are to be entered in the appropriate register"**
3. **Point no. 10 "You shall not operate/sell/deliver these wireless equipments to any party who does not hold appropriate permission/license from the Wireless**

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Planning & Co-ordination wing of Ministry of Communications" should be changed to

"You shall not operate/sell/rent/lease/deliver these wireless equipments to any party who does not hold appropriate permission/license from the Wireless Planning & Co-ordination wing of Ministry of Communications except for a customer who is availing PMRTS services/subscription from a licensed PMRTS Operator."