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Spectrum Sharing : Opportunities & Challenges

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Introduction

2

Spectrum :
Status
Context
Types

3

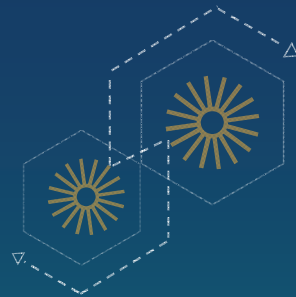
Encash
Opportunities &
Overcome
Challenges

4

Summary

Presentation Outline

Spectrum : Status, Context, Types



Spectrum : Types

Spectrum Types

Liberalized

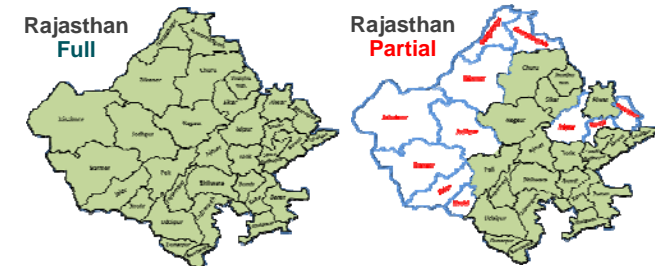
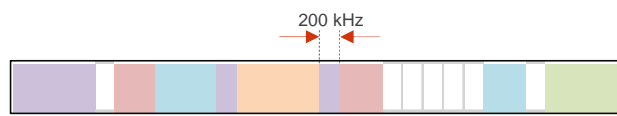
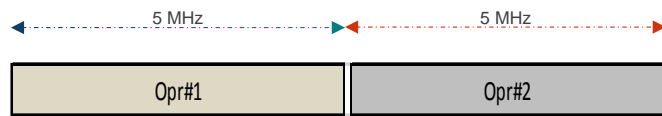
- Assigned through Auctions
- Full flexibility on choice of technology
- Full flexibility on choice of services

Un-Liberalized

- Assigned Administratively
- No Flexibility on choice of technology
- No Flexibility on choice of services

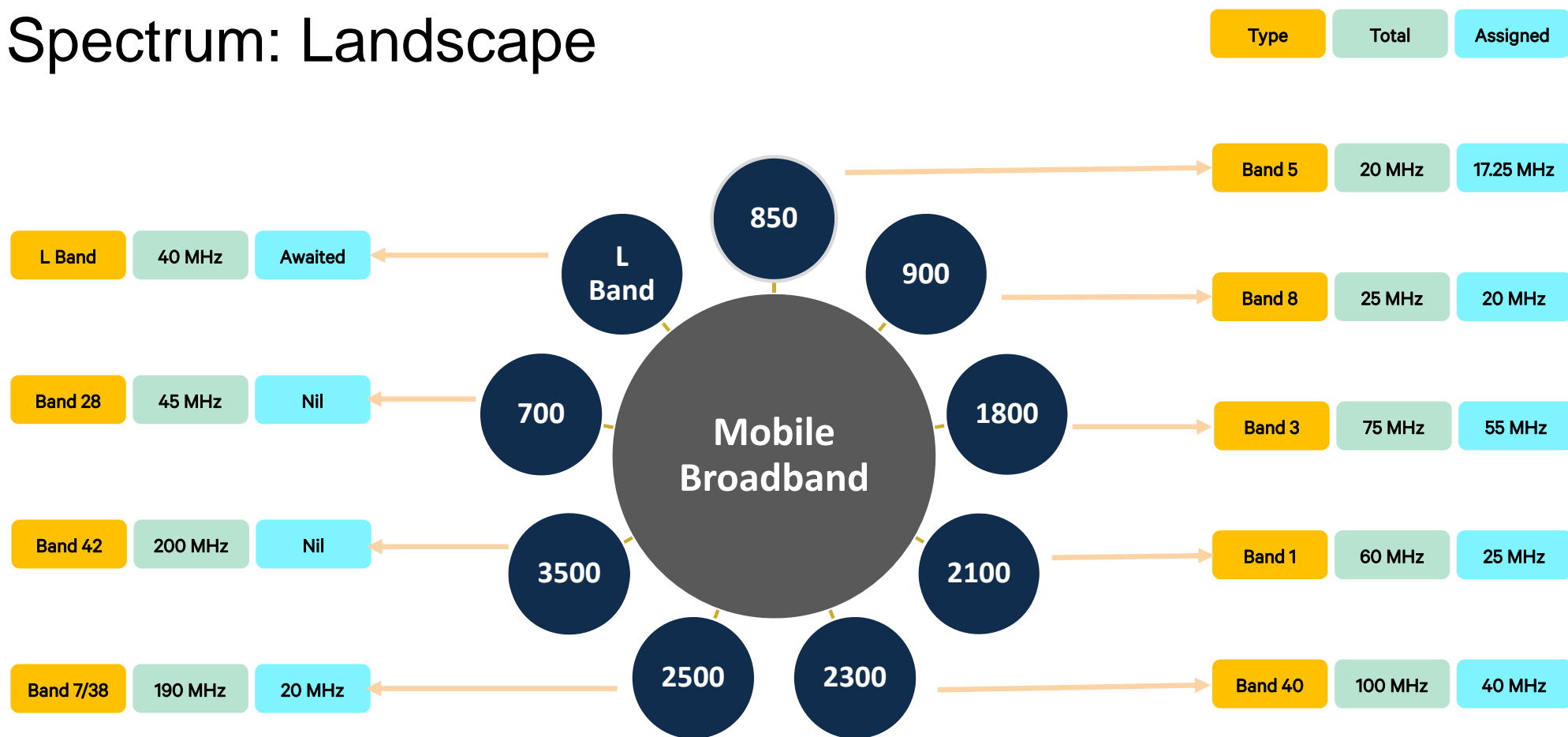
Partial

- Assigned in both ways
- Not Available throughout SA
- Mix Flexibility on choice of services



Spectrum Fragmented Across - Frequency, Space, Usage Rules, License Expiry

Spectrum: Landscape



Indian Spectrum Bands are Harmonized with Region 3

Spectrum : Sharing Possibilities

Spectrum Sharing

Within Operators

- Limited to same band
- Fragmented assignments
- Staggered Expiry dates
- Spectrum cap limitations
- Usage rules for Adm spectrum
- SUC increase by 0.5% of AGR

With Agencies

- Holding in majority commercial bands
- Not used 24x7, can be shared
- Can be in time/space domain
- Necessity of confidence building



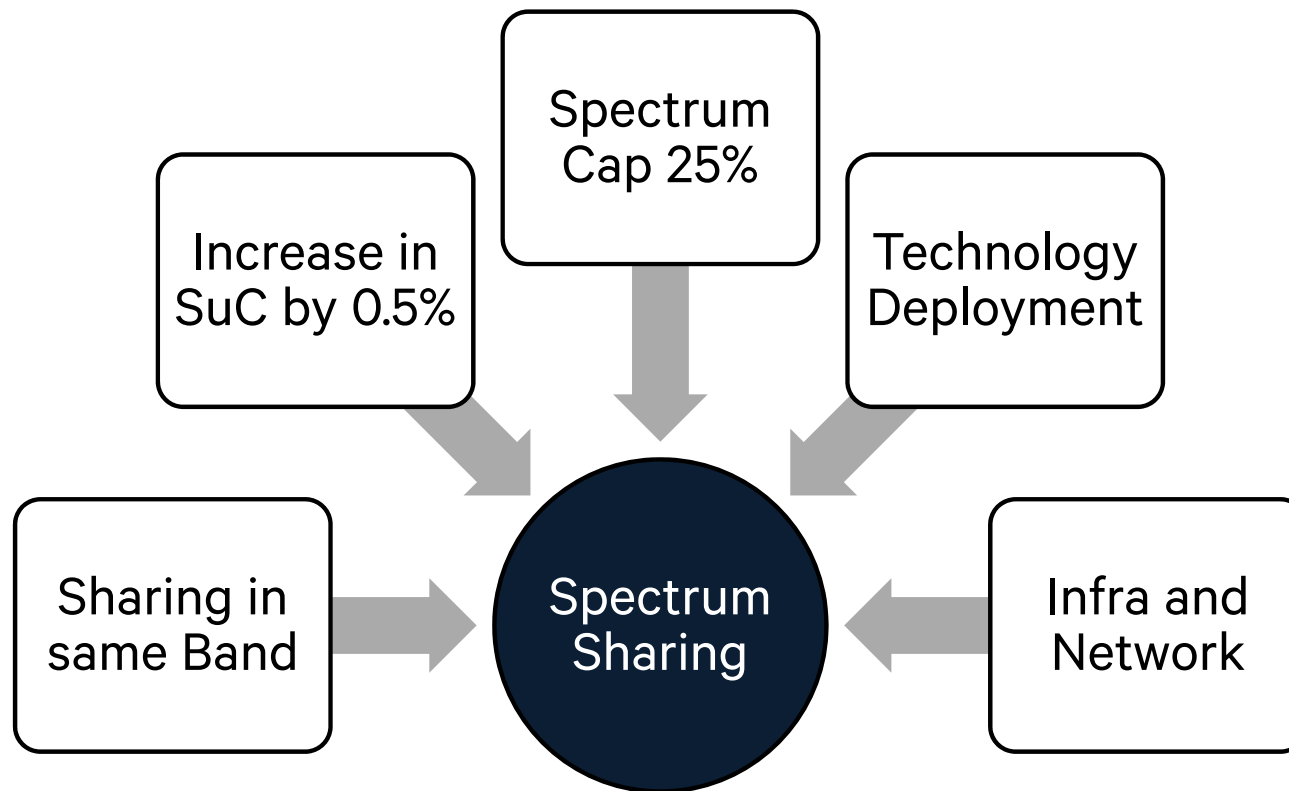
Opr#1

Opr#2

Opr#3

Spectrum sharing requires coordination across - Frequency, Technology, Space, Usage Rules

Sharing : Key Challenges



In its current format sharing is challenging

850 MHz

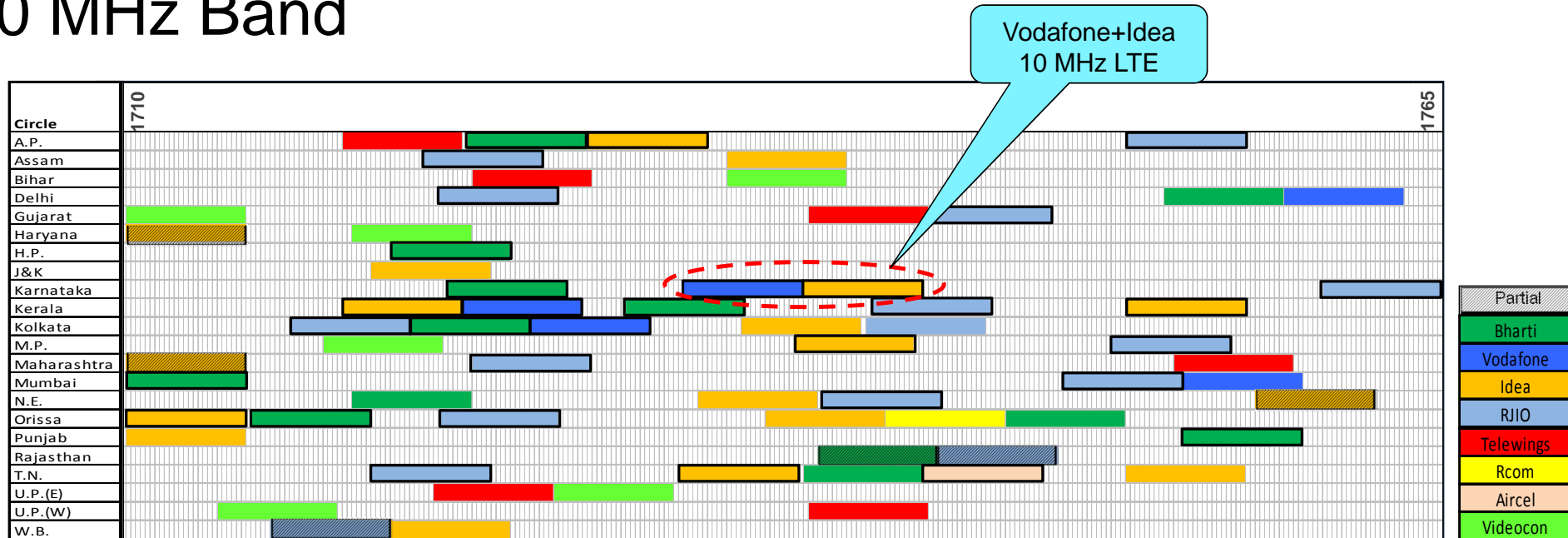
Ch#	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Circles														
A.P.														
Assam														
Bihar														
Delhi														
Gujarat														
Haryana														
H.P.														
J&K														
Karnataka														
Kerala														
Kolkata														
M.P.														
Maharashtra														
Mumbai														
N.E.														
Orissa														
Punjab														
Rajasthan														
T.N.														
U.P.(E)														
U.P.(W)														
W.B.														

Un-Liberalized
BSNL
Govt.
HFCL
MTS
Rcom
RJIO
Tata

- Maximum assignments un-liberalized
- Liberalization required to deploy LTE
- Re-alignment of carriers
- Staggered Expiry dates

2x5 MHz – RJIO in 4 SAs, RCOM in 17 SAs & (RJIO+RCOM) in 20 SAs

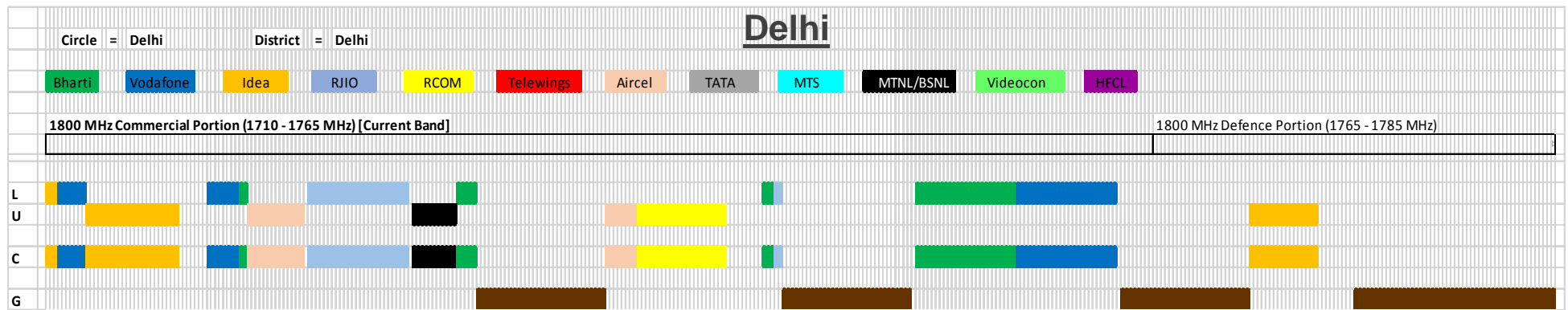
1800 MHz Band



- Scattered assignments
- Re-alignment of carriers
- Existing 2G services
- Staggered expiry dates
- Spectrum cap limitations
- 10 MHz LTE possible in – Delhi, Kolkata, AP, TN, Karnataka, Kerala and Orissa

Harmonization and realignment within operators and with Defence must

1800 MHz Band - Harmonization



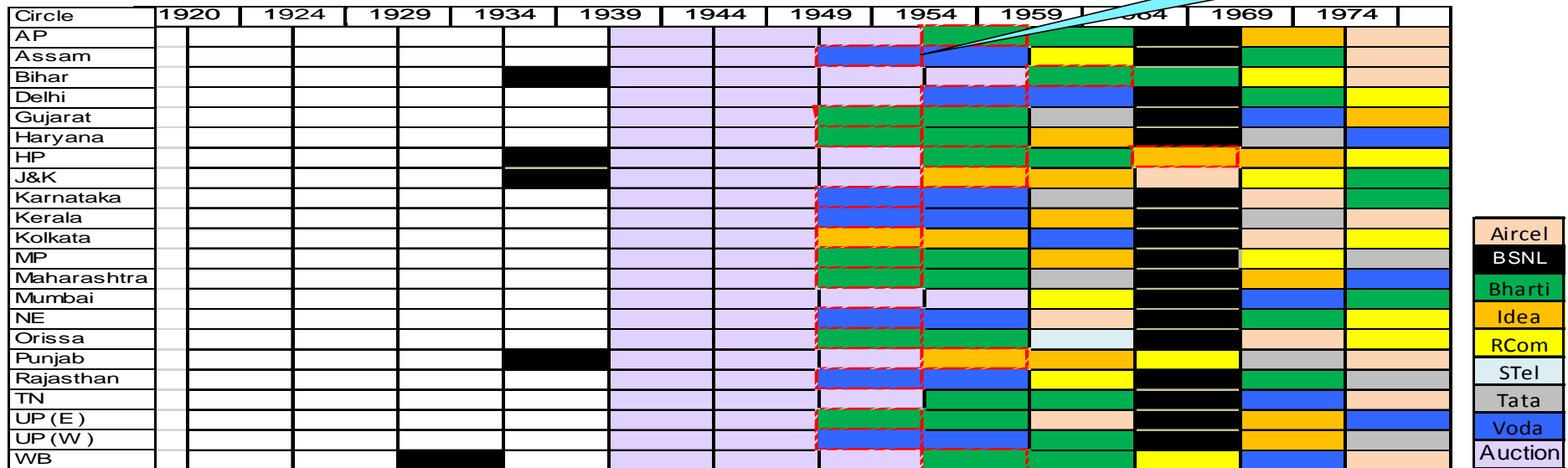
- Scattered assignments get defragmented
- Harmonization will create contiguous blocks
- It creates a better scenario for sharing
- Availability of additional contiguous spectrum

Delhi
A contiguous block of 13 MHz becomes available

Harmonization process will create many opportunities

2100 MHz Band

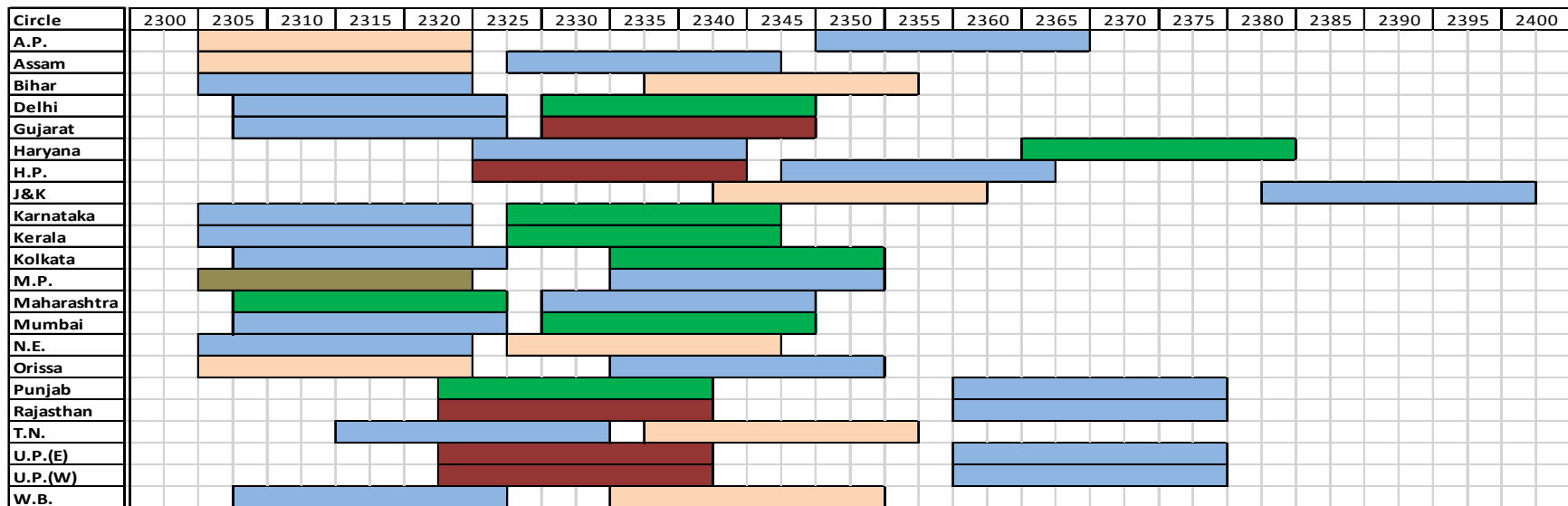
DC HSPA+
2100 MHz



- Adjacent operators can share for DC-HSPA+
- Realignment of slots to create 10 MHz block
- Spectrum cap limitations

Sharing of adjacent slots to create capacity

2300 MHz Band



- Maximum cap for band sharing – 50%
- Spectrum in this band cannot be shared
- Re-alignment of slots to mitigate interference issues

Sharing in 2300 MHz band has spectrum cap limitations

Summary

Indian Spectrum Situation is Unique and Complex

Innovative Approach and Customization will Enhance Value

Sharing will help increase in adoption of advance technologies (3G, 4G)

Overcoming Challenges through Capacity, Continuity and Collaboration

Thank you

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