



Sharing & Compatibility Studies Involving IMT towards WRC-15 Agenda Item 1.1

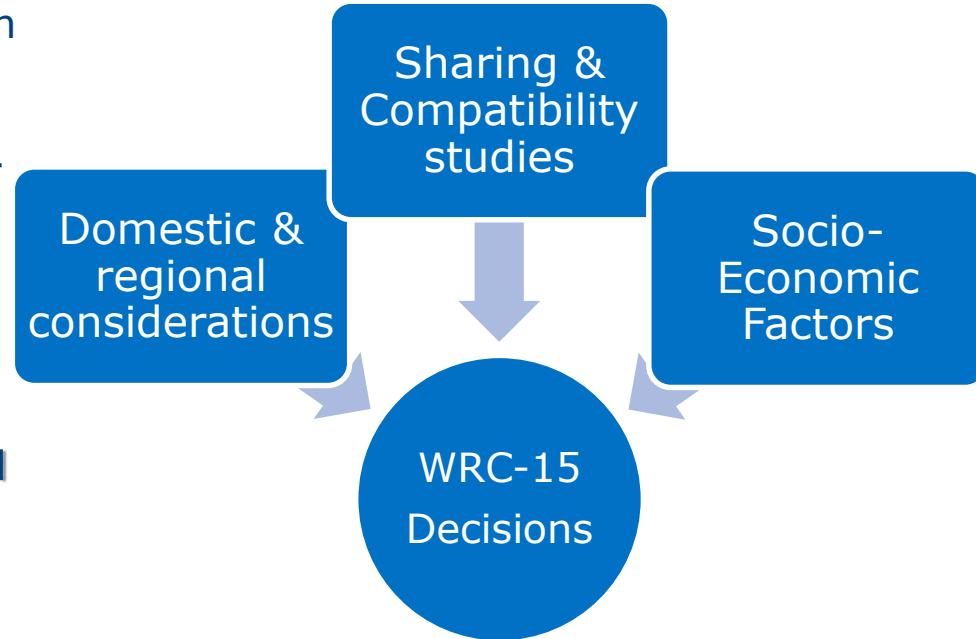
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Ho Chi Min City, Vietnam



WRC-15 Agenda Item 1.1

- Administrations consider a number of factors in deciding their positions with respect to WRC Agenda Item 1.1:
- Domestic or regional regulatory considerations including cross-border scenarios
- Socio-Economic benefits of new allocations to the mobile service and/or identifications for IMT
- Results of sharing and compatibility studies and assessment of associated mechanisms that could facilitate coexistence between new entrants and incumbents



Suitable Frequency Ranges Under Study in JTG 4-5-6-7 Related to AI 1.1

Initial ranges:

- 410-430 MHz
- 470-694/698 MHz
- 1 000-1 700 MHz
- 2 025-2 110 MHz
- 2 200-2 290 MHz
- 2 700-5 000 MHz
- 5 350-5 470 MHz
- 5 850-6 425 MHz

Focus of studies so far:

- 470-694/698 MHz
- 1 300-1 535 MHz
- 1 695-1 710 MHz
- 2 025-2 110 MHz
- 2 200-2 290 MHz
- 2 700-3 100 MHz
- 3 300-3 400 MHz
- 3 400-4 200 MHz
- 4 400-4 990 MHz
- 4 800-5 000 MHz
- 5 350-5 470 MHz
- 5 925-6 425 MHz

**Studies are to be finalized
in Feb 2014 meeting of the
JTG4-5-6-7**

General Observations

- Deadline for finalization of studies extended to Feb. 2014
- For most bands, studies with conflicting results have been reported despite parameter values and simulation methodology communicated by relevant WPs
 - Many differences are due to choices for propagation models, indoor losses, clutter losses, terrain type, etc.
 - Differences also exist in implementation of IMT network in the simulations
- This presentation focuses on IMT – Studies also ongoing in JTG 4-5-6-7 on possible sharing of RLANs in 5350-5470 MHz

Sharing & Compatibility with the Broadcasting Service

- Affected bands
 - 470-694/698 MHz
- Observations
 - Our results show that adjacent channel operation is feasible for distances in the range of a few km with less than 1 IMT channel guardband in all environments
 - IMT user terminals do not create significant harmful interference into Broadcasting Service receivers in any environment

Sharing & Compatibility with the Fixed Service

- Affected bands
 - 470-694/698 MHz, 3400-4200 MHz, 4400-45000 MHz, 4800-4990 MHz, 5925-6425 MHz
- Observations
 - Interference is highly dependent on the orientation of the FS link – Thus, opportunity for coordination and thus mitigation
 - IMT UE interference is negligible or non-existent
 - In cases other than the absolute worst case:
 - **470-694/698 MHz**: Required guardband between the two systems could be reduced to one IMT channel or less at separation distances of about 10 km
 - **3400-4200 MHz**: Required guardband between the two systems could be reduced to one IMT channel or less at separation distances of a few kilometers
 - **4400 – 4990 MHz**: ease of adjacent channel operation reported

Sharing & Compatibility with the Satellite Services

- Fixed Satellite Service
 - Affected bands
 - 3400-4200 MHz, 4500-4800 MHz, 5925-6425 MHz
 - Observations
 - **C-band (DL)**: Our results show that even under very stringent protection criterion for FSS (I/N of -23 dB), with less than 1 IMT channel guardband separation distances could be reduced to a few km.
 - **C-band (UL)**: Co-channel sharing with indoor IMT stations is found to be much easier than with other types of IMT stations which seem to require separation distances up to tens of km.
- Mobile Satellite Service
 - Affected bands
 - 1518-1559 MHz, 1626.5-1660.5 MHz, 1668-1675 MHz
 - Observations
 - Very large separation distances seem to be required to protect MSS from IMT base and mobile stations

Sharing & Compatibility with the Satellite Services

- Broadcasting Satellite Service
 - Affected bands: 1452-1492 MHz
 - Observations
 - Co- and adj-channel sharing problems are reported; while interference into IMT might seem manageable, impact on BSS seems more severe
- Earth Exploration satellite Service
 - Affected bands: 1375-1400 MHz, 1427-1452 MHz, 2025-2110 MHz, 2200-2290 MHz
 - Observations
 - **EESS in adjacent band (1400-1427)**: rather strict adjacent channel emissions could be required
 - **2 GHz**: one study finds sharing not possible
- MetSat
 - Affected bands: 1695-1710 MHz
 - Observations: Studies are not consistent; while some report large separation distances others find sharing possible

Sharing & Compatibility with Radars

- Aeronautical
 - Affected bands: 1300-1400 MHz, 1429-1535 MHz, 2700-3100 MHz, 4400-4990 MHz
 - Observations:
 - **L-band**: Worst case, co-channel sharing seems to be problematic with large separation distances, whereas adjacent channel operation seems doable with sufficient guardband/mitigation techniques. Studies do not exactly align. Cross-border coordination seems possible.
 - **AMT in 4400-4500 & 4800-4990 MHz**: separation distances of a few kilometers, negligible for adjacent channel operation
- Ground
 - Affected bands: 2700-2900 MHz, 2900-3100 MHz, 3300-3400 MHz
 - Observations
 - Severe problems reported for co-channel sharing with large separation distances, whereas adjacent channel operation seems a possibility e.g. through partitioning the band and compressing radars into part of the band. Studies do not align.
- Maritime
 - Affected bands: 2900-3100 MHz
 - Observations – same as ground-based

Sharing & Compatibility with Radio Astronomy Service

- Affected bands
 - 608-614 MHz, 1330-1400 MHz, 1400-1427 MHz, 1610.6-1613.8 MHz, 1660-1670 MHz, 2690-2700 MHz, 4800-4990 MHz and 4990-5000 MHz
- Observations
 - Co-channel sharing is very difficult, requiring very large separation distances
 - Adjacent-channel compatibility could be achieved with separation distances ranging from a few to tens of kilometers

Conclusions

- So far:
 - In most cases, co-channel coexistence seems to be problematic
 - Mitigation techniques could help in some but not all cases
 - Adjacent channel coexistence is, however, achievable in majority of cases with reasonable guardband (1-2 IMT channel) or separation distances (a few km or less)
 - Depending on the scenario, mitigation techniques could be utilized to make coexistence work
- Final studies from the Feb meeting of the JTG4-5-6-7 need to be examined

