Security Level:

26/ 10/ 2018

ICASA migration plan 2018 Public Hearings

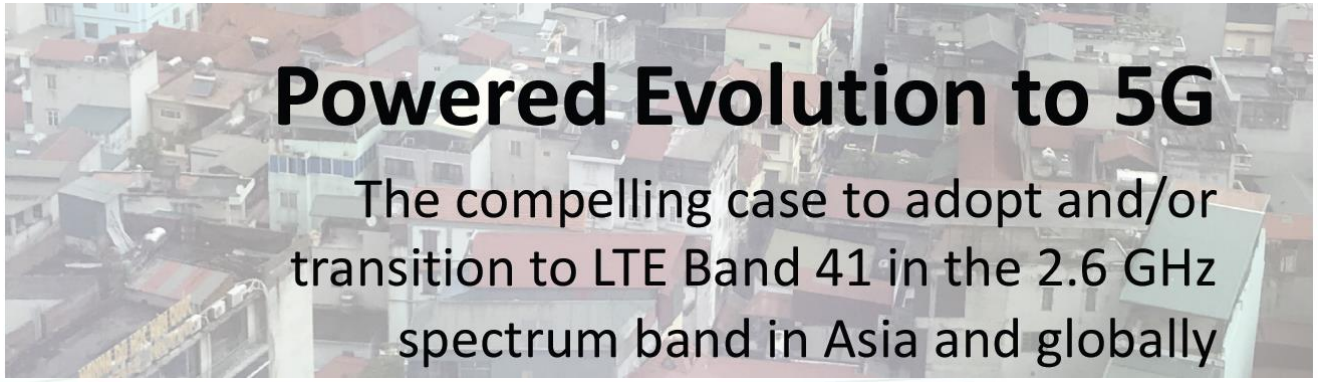
Contents

2500 - 2690 MHz (section 4.10.29)

Huawei welcomes the progress towards opening this band for mobile services, but we would like to suggest ICASA to reconsider the channel plan. A TDD only plan, in line with 3GPP Band 41, would provide 190 MHz contiguous spectrum and would have several advantages over the arrangement in notice no. 277.

P.S. WPC(Windsor Place Consulting) recently released a whitepaper on the benefits of a TDD band plan over the traditional FDD+TDD band plan on 2.6G, which can also be referenced.

https://www.linkedin.com/pulse/wpc-report-compelling-case-tdd-26-ghz-spectrum-band-scott-w-minehane/

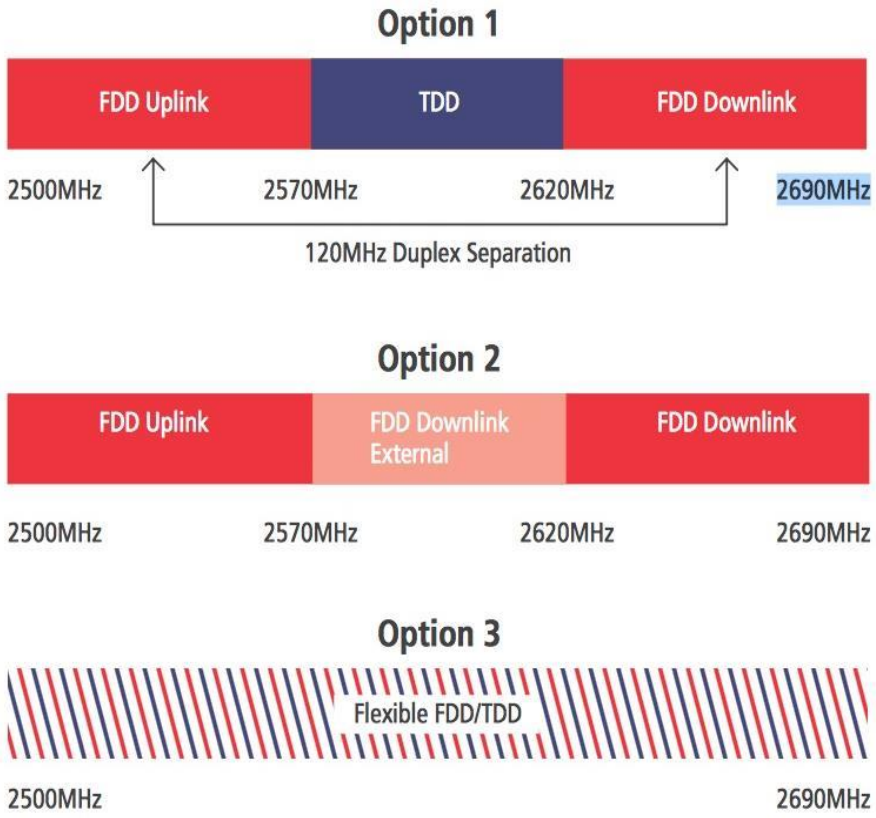


Background on the 2.6 GHz spectrum band

The ITU identified the medium frequency spectrum 2500-2690 MHz (or the 2.6 GHz spectrum band) as a global band for IMT, and was formally included in the Radio Regulations in accordance with Resolution 223 (Rev. WRC-15).

- Importantly, this frequency band is available globally across all three ITU regions.

The ITU, in Recommendation ITU-R M.1036-5 (10/2015) has defined three alternative channel arrangements for the 2.6 GHz band plan, as outlined right.



Benefits of the TDD option in today's 4G deployments (1)

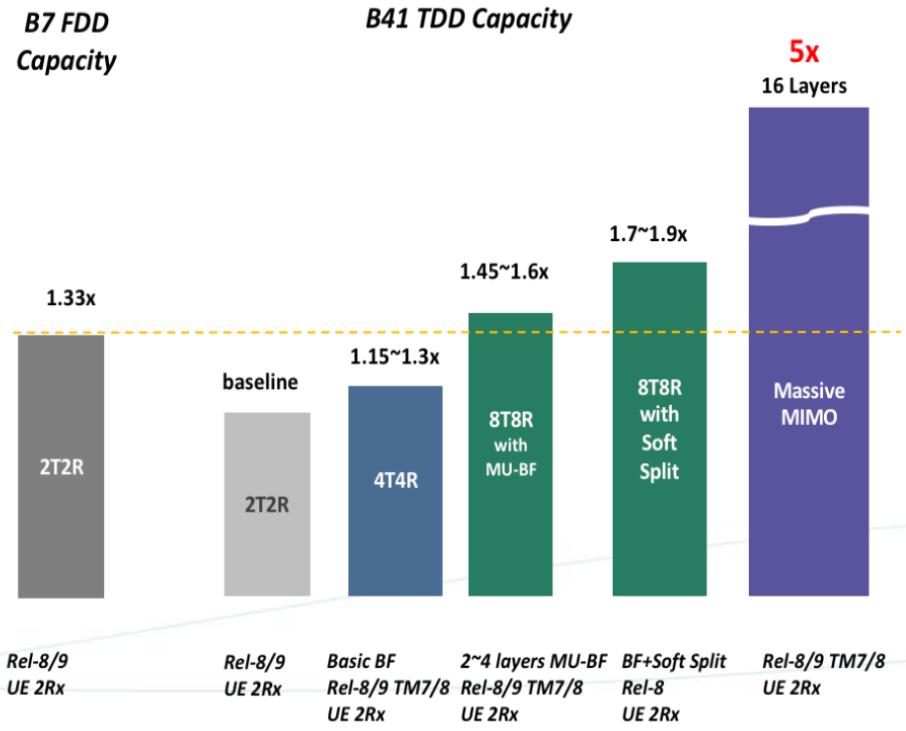
The use of the LTE Band 41 unpaired TDD configuration gives significant benefits over employing the hybrid LTE Bands 7/38 configuration.

Primarily, TDD deployments based on this band plan facilitate the delivery of high quality wireless broadband services at lower cost per MB/GB for MNOs due to:

- Higher throughput performance based on massive MIMO antenna technology
- Lower capex including less need for filers, as no filtering is needed between FDD and TDD services
- Lower opex, due to compact equipment size

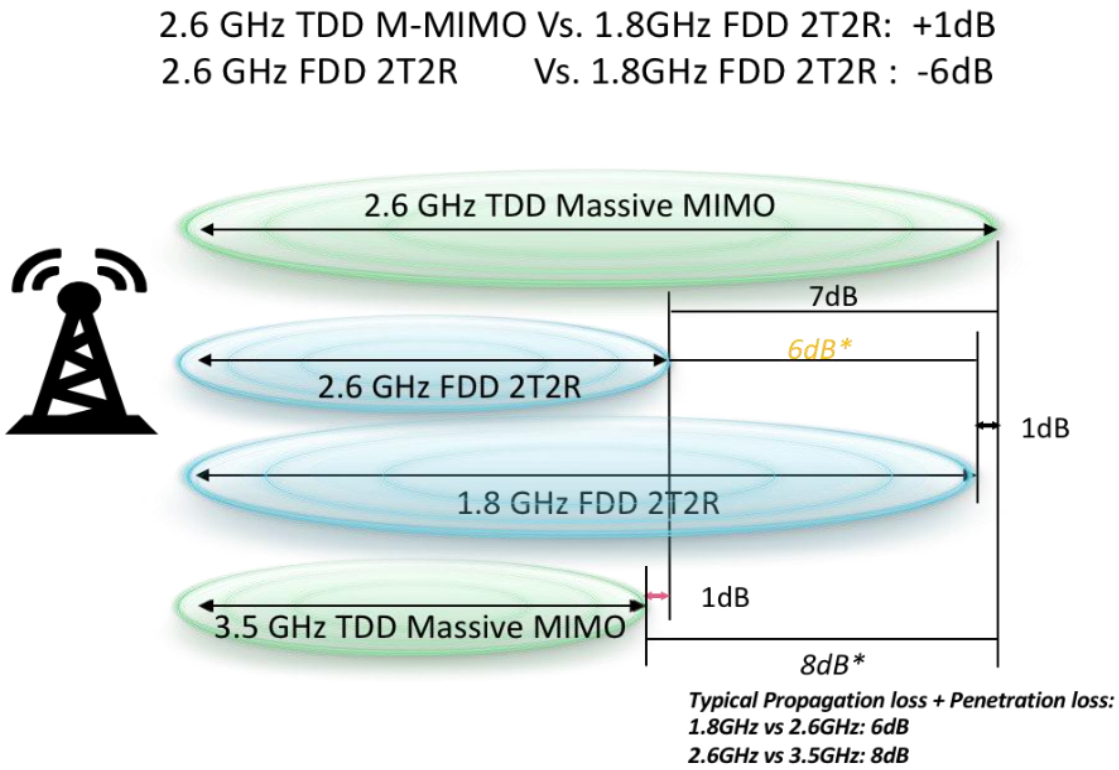
In addition, **LTE Band 41 benefits** include:

- Provides more capacity & increased efficiency
- Advantages in dealing with traffic asymmetry
- Comparable network coverage
- Avoids inter-band interference
- Simplified network operation
- Key global roaming band
- Typically lower spectrum cost for TDD
- Easier to transition LTE Band 41 to 5G NR.

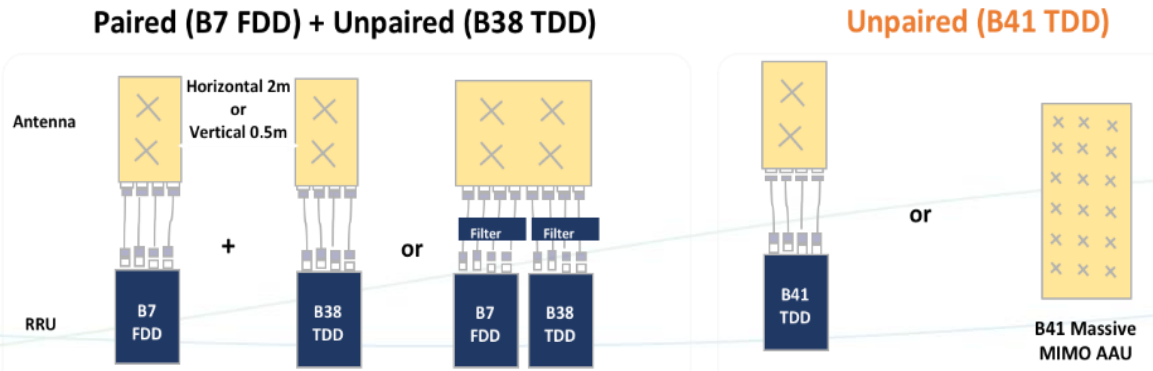


Benefits of the TDD option in today's 4G deployments (2)

Coverage of deployments in 2.6 GHz using FDD or TDD technology are very similar. Equipment vendor studies and MNO operator experience with deploying LTE Band 41 with massive MIMO services is that it has comparable coverage to 1.8 GHz coverage using FDD



With Band 41, there is no inter-band interference. If deploy Bands 7/38, it is necessary to allocate two 5 MHz of guard band spectrum between the FDD and TDD allocation, utilise customized filters and have site space isolation



Benefits of the TDD option in today's 4G deployments (3)

Use of TDD in the 2.6 GHz band offers the following benefits for 5G transition:

- ***Accurate Beamforming*.** Due to uplink and downlink channel reciprocity TDD technology has unique coordination abilities, including Beamforming. Beamforming improves the system performance by utilising channel state information to achieve transmit-array gain.

- ***Advanced antenna solutions***. Advanced antenna solutions, like Massive MIMO and Distributed MIMO, utilise TDD's uplink and downlink channel reciprocity to improve performance and capacity. Massive MIMO technology will unleash the powerful capability of the 5G network by taking the advantage of wide bandwidth when available, allowing for the flexible and accurate control of cell coverage radius. LTE Band 41's spectral efficiency of approximately 48 bits/Hz greatly exceeds the 5G requirement of 30 bits/Hz and is almost 3.5 times the spectral efficiency of 14 bits/Hz for LTE Band 7.

- ***Smaller Equipment Size*.** In particular frequencies, the TDD antenna size is 50 percent smaller than the FDD antenna size. This implies easy deployment, and lower opex will be saved. It may also have advantages in tower space.

- ***Unpaired TDD bands can be made available more easily than paired bands.*** High performing mobile networks require wide channel bandwidths of say 60-70 MHz or 100 MHz. From a spectrum management perspective, there are challenges making sufficient spectrum and wide channels available.

A rapidly growing ecosystem and increasing number of LTE Band 41 Networks

A growing maturity of the ecosystem in LTE Band 41. LTE Band 41 is currently the 3rd most popular of all LTE TDD devices and 11th out of all LTE devices, with at least 2,749 compatible devices.

HUAWEI NOKIA micromax SAMSUNG

Increasing number of LTE Band 41 deployments in Asia and globally. The GSA reports 25 commercially launched networks which utilise the 2.6 GHz spectrum band in the LTE Band 41 configuration in over 13 countries with a population over 3.5 billion!

	Country	Operator
1	Angola	Net One
2	Cambodia	Kingtel
3	Cameroon	MTN
4	Canada	Sasktel
5	China	China Mobile
6	China	China Telecom
7	China	China Unicom
8	Ghana	NITA
9	Iraq	Tishknet
10	India	BSNL
11	India	Idea Cellular
12	India	Vodafone
13	Japan	Softbank
14	Japan	UQ Communications
15	Madagascar	Blueline
16	Malawi	TNM
17	Philippines	Smart
18	Philippines	Globe
19	Trinidad & Tobago	TSTT
20	Uganda	MTN
21	USA	Redzone Wireless
22	USA	Rise Broadband
23	USA	Speedconnect
24	USA	Sprint

SoftBank Idea Sprint 中国移动 China Mobile BSNL Globe vodafone MTN

3300 - 3400 MHz and 3400 - 3600 MHz (section 4.10.30)

The 3300-3600 MHz range will be key for the development of 5G in South Africa.

Huawei fully supports ICASA´s plans to introduce IMT in 3400-3600 MHz and to put in place a TDD channel arrangement.

We also encourage ICASA and the government to expedite the investigations on band 3300-3400 MHz

We note that one important aspect of 5G is the need for large blocks for each operator. The common view of the industry is that ideally a contiguous block of 100 MHz should be made available nationally for each mobile operator.

3600 - 4200 MHz (section 4.10.30)

Huawei welcomes ICASA´s plans to introduce BFWA on the basis of sharing with fixed links and fixed satellite services.

Huawei also supports ICASA´s decision to move VSAT use to the Ku band - as ICASA rightly identifies, it is not possible to coordinate ubiquitous and un-identified VSAT terminals with terrestrial services

3300-4200 MHz primary band for the introduction of 5G globally

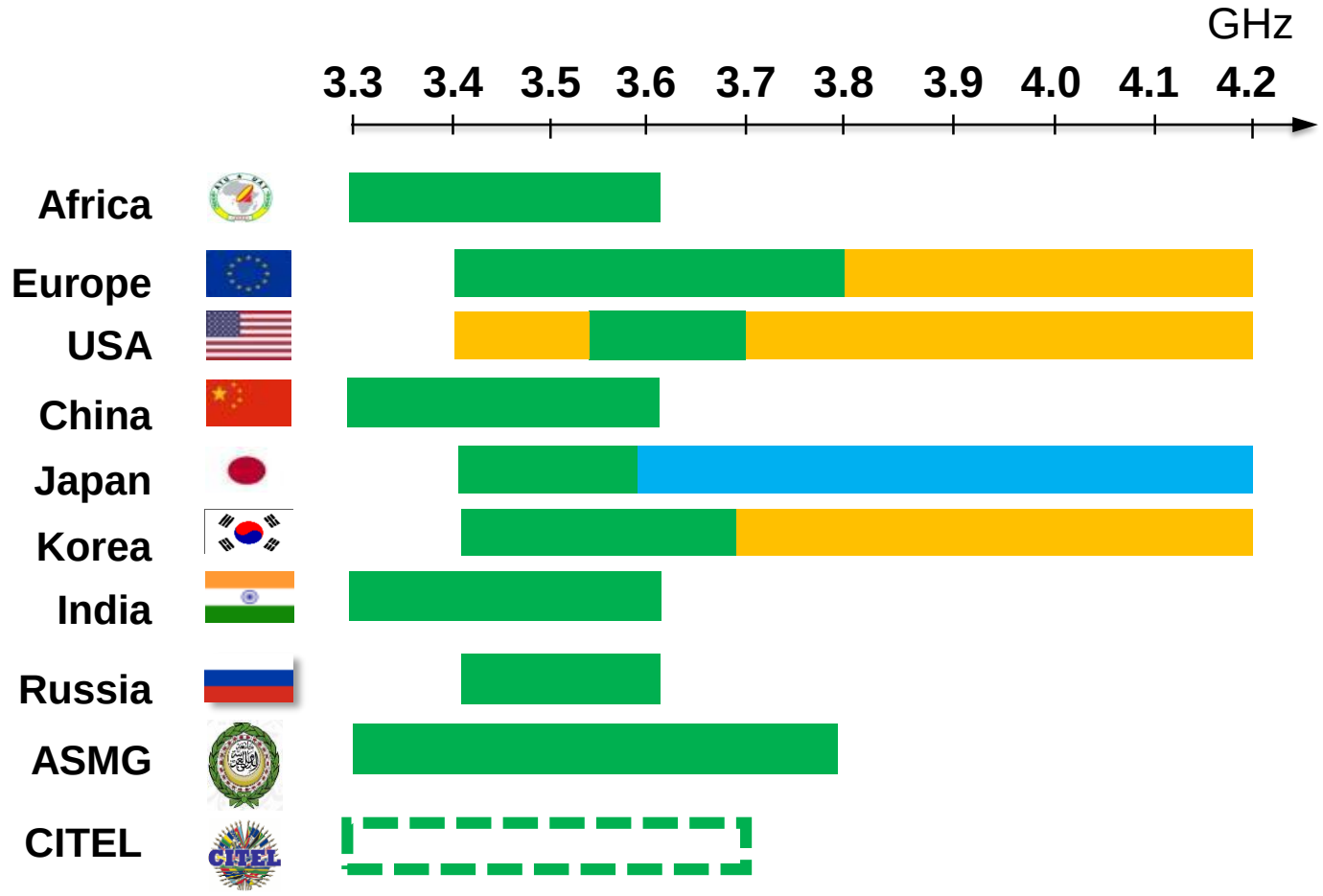
Widest contiguous spectrum (below 6GHz)

Best compromise in capacity vs. coverage

- n x Gbps connectivity
- Continuous coverage, beyond hotspots

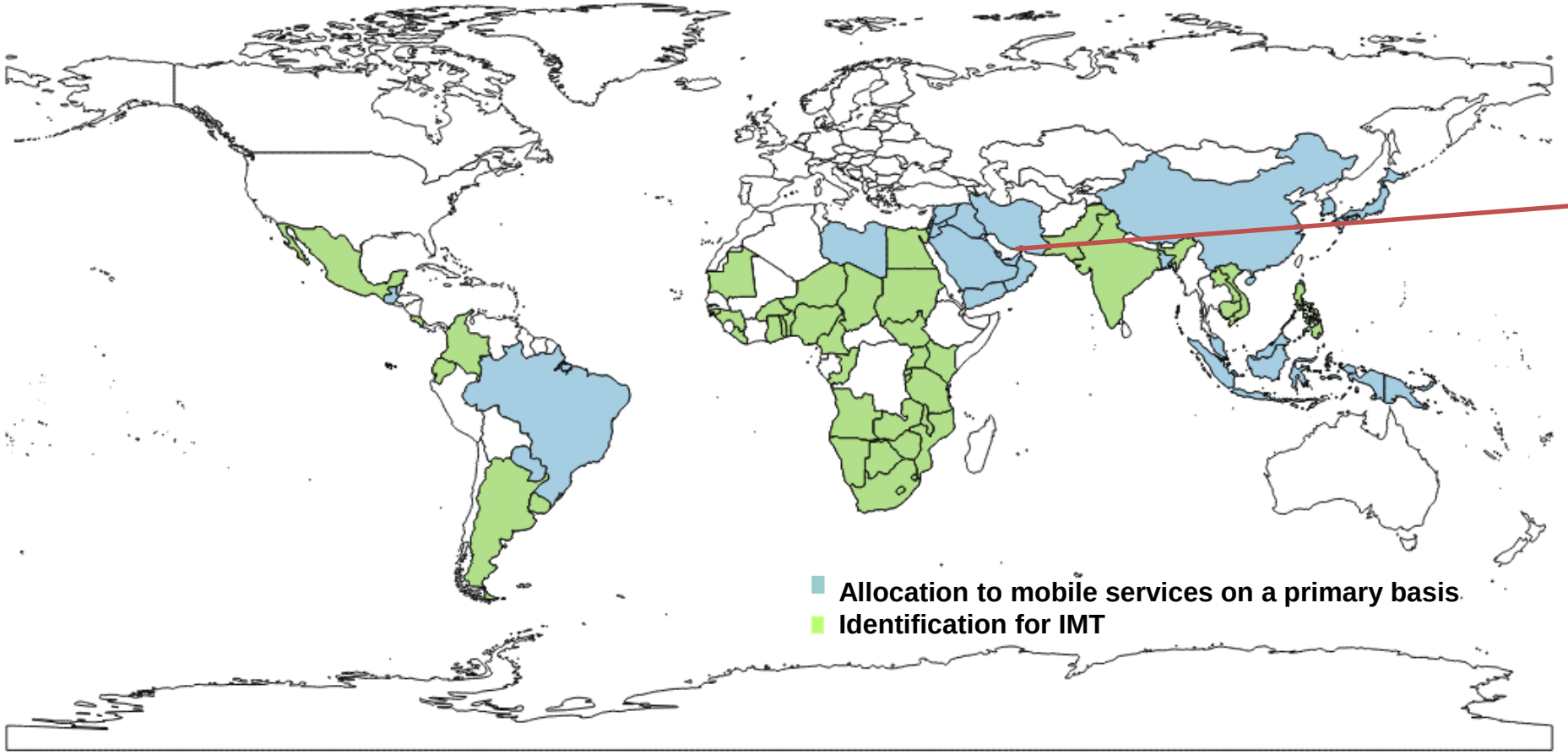
Global ecosystem

- **3400-3600 MHz** globally harmonized
- Different regions targeting different portions within **3300-4200 MHz and 4400-5000 MHz**
- Supported by **3GPP NR** specifications from start (Rel. 15)
- Countries planning 300M ~ 500M bandwidth. Target +100MHz/MNO
- Inter-operator sync to be required



3300 – 3400 MHz is a key band for mobile in Africa

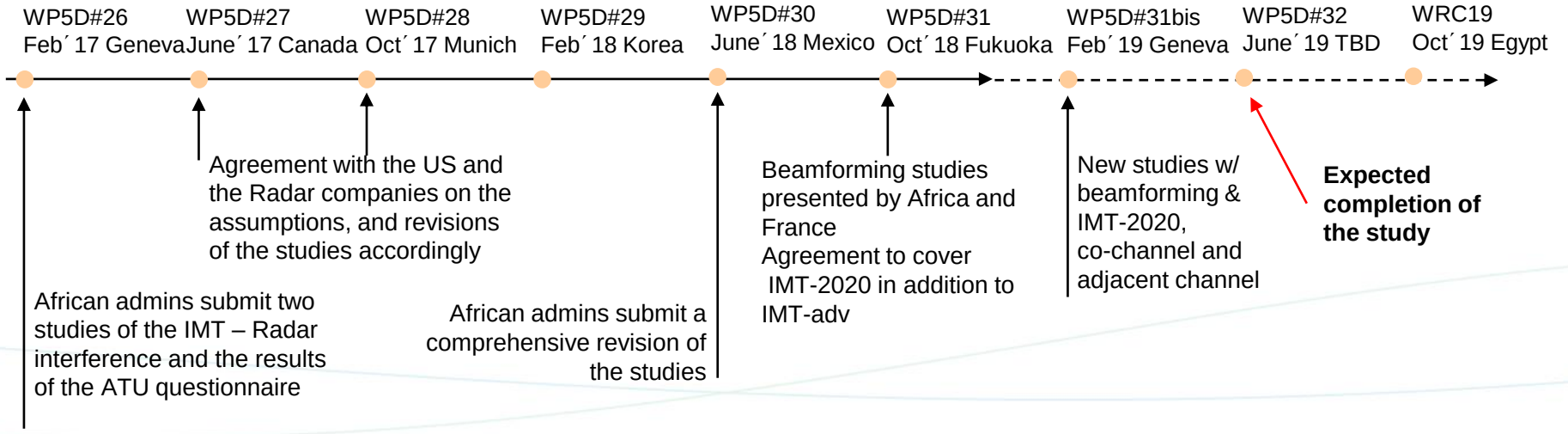
33 African countries identified the band for IMT in WRC´15, together with several other Region 2 and Region 3 countries



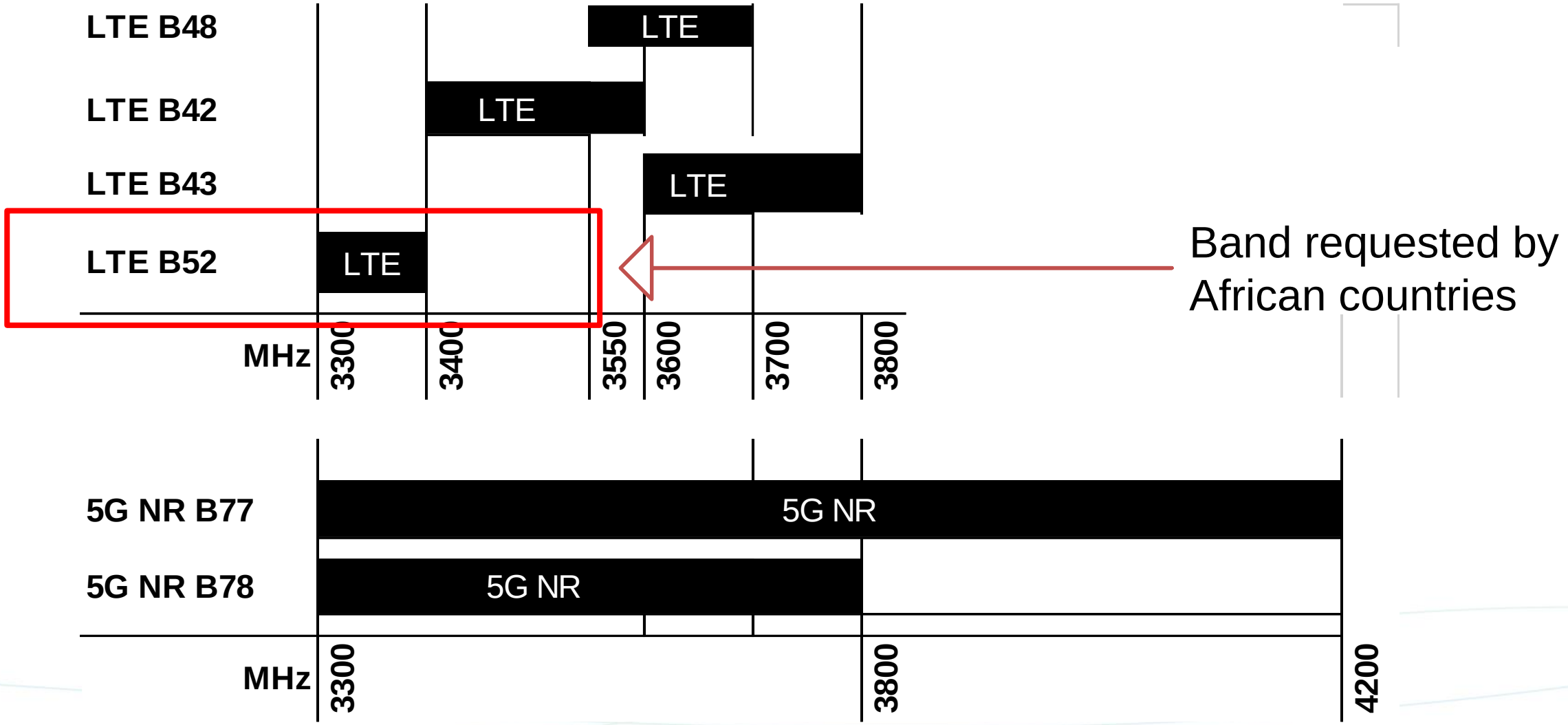
Actual use will come first in UAE: Etisalat has already been granted a licence

Update on ITU WP5D studies on IMT-radar coexistence in 3300-3400 MHz

Africa leads the work in WP5D	• Baxton Sirewu (Zimbabwe) chairs the drafting group • Roughly half of the studies have been submitted by African countries
Status	IMT-adv scenarios, without beamforming, have been the bulk of the work so far • Very large number of scenarios because of different combinations of radar types, location, IMT deployment, propagation assumptions, etc. This results in a large range of results • However, the results show that cochannel coexistence requires large separation distances, **up to hundreds of km** Introduction of beamforming helps reduce the separation distances, the new studies will use this assumption • African admins and France presented some results already for adjacent channel. Studies suggest that a out of block emission limits in the range of -44 to -58 dBm/MHz (depending assumptions) would ensure compatibility with radars in an adjacent band
Next steps	• The simulation assumptions for beamforming need to be harmonized. Following this, a next round of results is expected in Feb 2017. • Once the report is completed, WP5D is likely to produce an ITU-R Recommendation based on the results of the studies



Update on standardization: 3GPP specifications already support LTE and 5G NR in the 3300-4200 MHz range



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380 - 400 MHz (section 4.10.10)

As for 400MHz band is a typical LMS (Land Mobile Service) band around world is supported

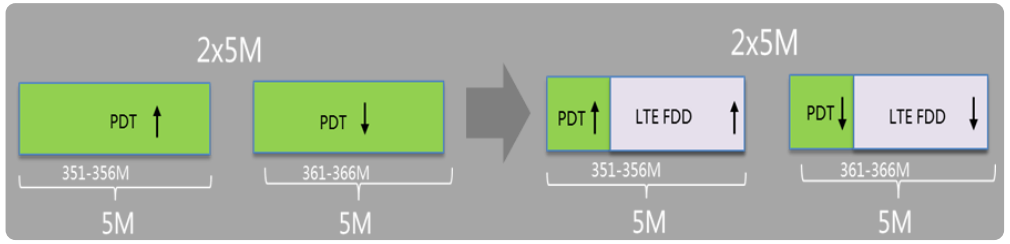
Propose a technology neutrality approach, this would be possible through.

- For continuous narrow channels ICASA should allow combining them into a wider channel to support higher data rate
- For discrete narrow channels use of carrier aggregation to support higher data rate
- Recommends use of both paired and non-paired spectrum fashion for more flexibility

All these technology innovations can get an higher efficiency of spectrum usage. They can also introduce a harmonized spectrum migration

- China's police has 2*5MHz spectrum.
- The existed communication system is a NB system which is based on 12.5kHz
- Now they want to introduce BB service.

NB-BB convergence became a suitable solution.



- 230M is shared by 5~6 different departments.
- spectrum refarming is difficult among departments, China's regulator allows using CA as the BB wireless solution.

频点	.025	.050	.075	.100	.125	.150	.175	.200	.225	.250	.275	.300	.325	.350	.375	.400	.425	.450	.475	.500
223	0	1	2	震	4	建	6	军	8	9	气	轻/建	12	气	14	震	16	17	气	军
223.5	电	21	22	23	气	25	电	27	电	29	30	军	32	电	34	35	36	电	38	39
224	电	水	42	军	电	45	电	47	电	水	50	51	电	53	54	军	电	57	电	59
224.5	电	61	电	63	64	电	66	军	水	69	70	水	72	73	74	轻/震	76	77	78	79
225	80	81	82	83	84	85	86	军/震	88	89	90	91	92	93	94	95	96	97	98	99

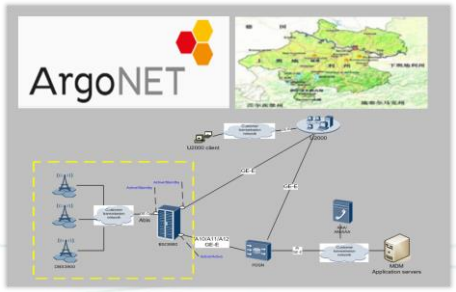
China's 230M spectrum allocation

Water Service	weather bureau	Power Grid	Military	Seismological Bureau

450 - 470 MHz (section 4.10.12)

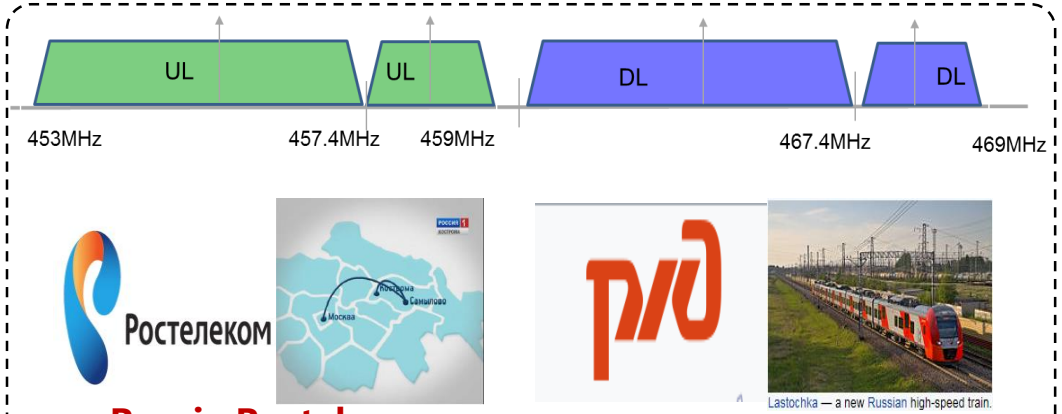
- Support proposal on allocation of 450-470 MHz band for IMT. This ensures that wireless equipment is available and a harmonized service can be provide both around Southern African region and other countries in region 1.
- Note that this band is also suitable for industry use, such as **railway, mining**. Some these would be area-limited network, the band can be shared by multiple industries. This can introduce a more efficient spectrum use.
- In Europe, this band is heavily used by a lot of industries

Finland UKKO
Rail/M2M /MBB



Austria ArgoNet
Power Grid

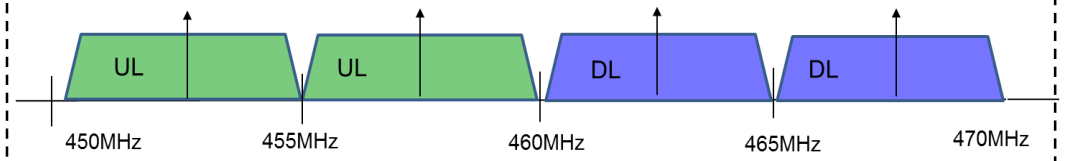
450M spectrum sharing in China & Russia



Ростелеком

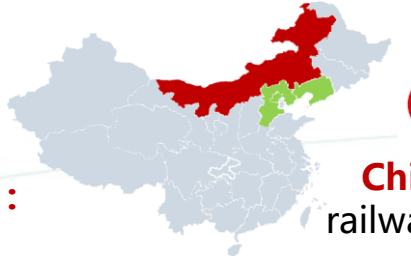
Russia Rosteleco :
WISP

Russia RZD :
rail company



China unicom中国联通

China Unicom :
MNO



China Rail :
railway company

694 - 790 MHz (section 4.10.14) :Suggestion for PPDR Spectrum

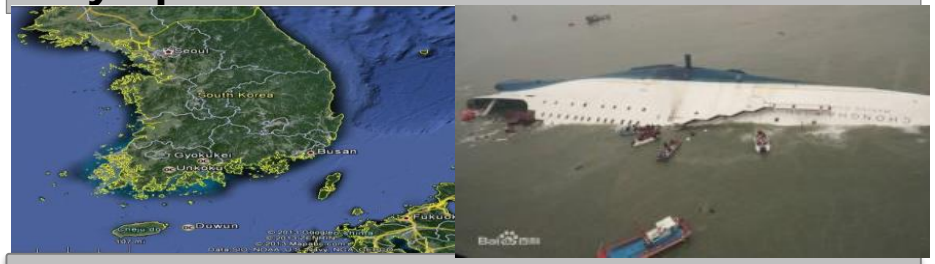
- Support of 700MHz migrations
- Consideration of to accommodate dedicated PPDR spectrum has become a common view in the world.
- Sufficient bandwidth which is very important for BB PPDR service.

- Allocating 700M as PPDR spectrum can fully use the mature industry chain.

US FirstNet : world first nationwide BB PPDR network

700M:UL 788-798//DL 758-768

Korea SafeNet : 700MHz PPDR network has served for 2018 winter Olympic Games



700M:UL 718-728//DL 773-783

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Thank You.