MTN'S RESPONSE TO ICASA'S DRAFT IMT ROAD MAP FOR CONSULTATION AS PUBLISHED IN GOVERNMENT GAZETTE NO 37948 DATED 27 AUGUST 2014

7th October 2014

1. INTRODUCTION

The Independent Communications Authority of South Africa ("ICASA") on 27th August 2012 published the IMT Road Map for consultation.

MTN welcomes the initiative of the Authority in publishing this draft paper on the proposed roadmap for radio frequency spectrum for International Mobile Telecommunications (IMT).

MTN is grateful for the opportunity to provide written comments on the aforementioned proposed roadmap. We believe the approach adopted by the Authority in releasing this draft consultative paper is the correct approach. MTN maintains that constructive engagement and consultation is a necessity in order to bring about a framework that would be to the optimum benefit of all South Africans.

MTN's submission in respect of the IMT Road Map is structured as follows:

- Section 1: This introduction; and
- Section 2: General Comments in respect of the proposed IMT Road Map.
- Section 3: Specific Comments in respect of the proposed IMT Road Map.

MTN fully supports the primary objectives of the IMT Road Map, namely:

- Ensure universal availability of broadband services
- Ensure a vibrant and competitive telecommunications industry
- Promote investments

It is MTN's opinion that for this sector to thrive and flourish, regulatory certainty is paramount. Without this regulatory certainty, the large amounts of capital investment required to grow the sector will not necessarily flow into this sector. Indeed, should investors not perceive the required certainty of protection of their investments against interventions that are not based on principle; such investors may divert the required capital expenditure to other, more investor friendly jurisdictions.

Faced with the scale of the challenge of providing universal availability of broadband services, a much more pragmatic and inclusive approach is needed. In this regard, the Authority's proposed IMT Roadmap is a step in the right direction. Given the targets and (now much shorter) timeframes mentioned in South Africa's broadband policy, SA Connect, MTN maintains that this is only achievable by leveraging the existing scale and investments made by existing operators.

MTN confirms its willingness to participate in any oral hearings which may be scheduled in regard to the IMT Road Map for consultation.

2. GENERAL COMMENTS

MTN commends the Authority for a well drafted document. There can be no doubt that ICASA has thoroughly applied their minds in regards to the development and future growth of this sector in order to achieve the objective of universal availability of broadband services.

The developing world has seen spectacular growth of broadband penetration and uptake. However, this is from a small base and still lags in the adoption and use of broadband when compared to more developed economies. This inequality if not addressed properly may threatens to create a new digital divide. It is a major hurdle to economic development and social inclusion. Without access to broadband connectivity, governments, businesses, communities, and individuals will be unable to participate fully in the global information society and knowledge economy[1].

Unlike developed economies in Europe, fixed line infrastructure in Southern Africa is limited. Unless drastic action is therefore taken, South Africa will likely become a victim of this new digital divide.

Hence, it is heartening to note that ICASA has taken cognizance of the important role that wireless communications play in achieving this objective.

It is widely acknowledged that any significant increase in broadband uptake in the short to medium term will be through mobile networks, mainly in part because of the high penetration rates that already exist within the mobile market and the speed at which network operators can leverage their existing infrastructure to incorporate broadband access.
In addition, because of its cost advantage over a wide geographic area, the mobile platform is likely to be the primary delivery mechanism and well be the focus of the largest aggregate investment in the short to medium term.

The challenge for the industry will be to ensure that continued investment can flow without the threat of being cut-off from the broadband market through spectrum. This implies a balanced approach to the (early) release of LTE spectrum. It must take into account the

[1] *Building Broadband: Strategies and Policies for the developing world (2010)*

benefits of the substantial scale, reach and know-how of existing licensees as well as the global trend towards consolidation in markets where there are more than four players.

This debate (the optimal market structure for LTE, the balance between network and service competition, and the role of regulation in fostering the latter) requires a careful and comprehensive consultation because getting it wrong carries a major economic and social opportunity cost for South Africa.

3. SPECIFIC COMMENTS

450 – 470 MHz

ICASA has noted the need for broadband connectivity in rural areas in order to support the National Development Program, and has proposed that the 450-470MHz band be reallocated in order to support these efforts. The 450-470MHz band provides the ideal medium to provide wireless broadband communications in rural areas due to its low frequency and limited bandwidth, however it is currently allocated for a variety of alternative applications and the migration of existing licensees will take some time.

ICASA has conducted an extensive feasibility study to determine how the 450-470MHz band should be utilised, which has resulted in the following three alternative scenarios for the use of the 450-470 MHz band:

1. **Scenario 1**: Do not allocate the 450-470MHz band to IMT services.
2. **Scenario 2**: Allocate the entire 450-470MHz band to IMT services and migrate existing licensees out of the band. It is anticipated that the migration process could take 2-9 years.
3. **Scenario 3**: Allocate portions of the 450-470MHz band to IMT services and migrate relevant existing licensees out of the band. It is anticipated that the migration process could take 2-9 years.

In the event that Scenario 2 or 3 are selected, ICASA has also proposed two applications/configurations for the 450-470 MHz band, which are described as follows:

1. A 2x5 MHz FDD configuration that could be used to provide Public Protection and Disaster Relief (PPDR) services.
2. A 15MHz TDD configuration (Frequency arrangement D8 in ITU-R M.1036-4) that could be used to provide broadband connectivity in rural areas. Due to the limited

bandwidth, ICASA notes that it may be necessary to pair the 450-470MHz spectrum with a higher frequency TDD band, so as to provide the licensee with sufficient bandwidth to offer high-speed broadband services.

MTN acknowledges that there is a need for broadband rural connectivity, and that the 450-470MHz band could be used to provide such services in a cost efficient manner. As such, MTN supports ICASA's "Scenario 2" in the 15MHz TDD configuration, as it provides an optimal use of the spectrum for IMT services. Although network equipment that operates in this band is limited at present, the period required to migrate the existing licensees out of the band should provide sufficient time for the necessary network equipment to be developed.

MTN notes that this is a relatively small band with a relatively immature ecosystem that would not be able to support allocations to multiple operators. However, we believe that this particular band would be well placed to provide a single Broadband Public Protection and Disaster Recovery service, which system infrastructure would facilitate communications between different groups including SAPS, SANDF, the ambulance service, metro police and Fire-fighting services involved in public safety.

This form of allocation would recognize the importance of having a band dedicated for public safety which would be free of any other potential sources of interference.

IMT700 and IMT800

ICASA has proposed three scenarios for the 700/800MHz digital dividend allocation:

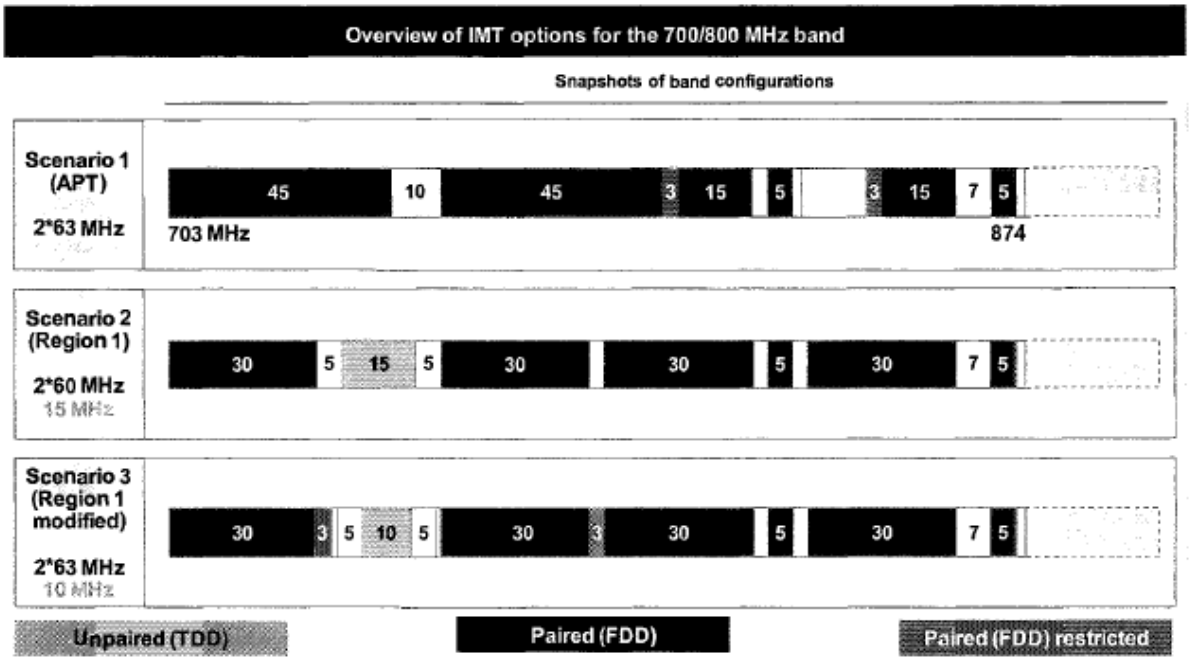
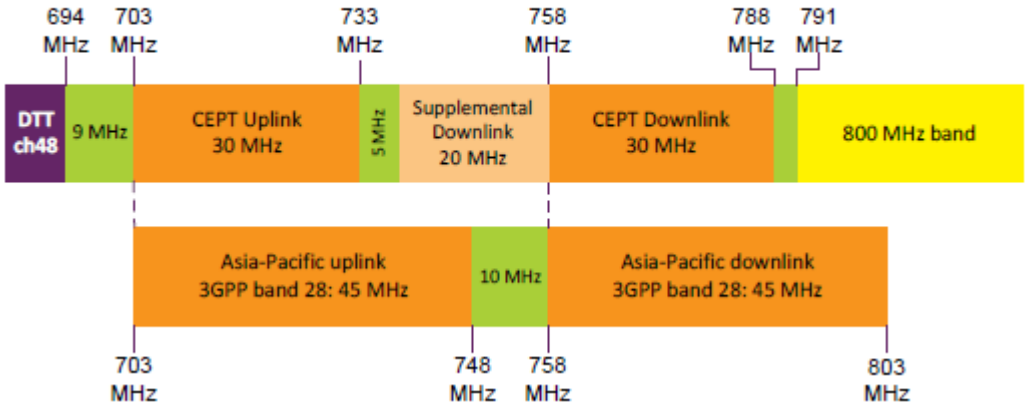


Table 15: Overview of IMT options for 700/800 MHz band

MTN notes that the European Conference of Postal and Telecommunication Administrations (CEPT) has considered its options and has decided to move forward with a 2x30 MHz arrangement utilising part of the 3GPP Band 28 (APT700). In addition, it has opted for *20 MHz of supplemental downlink in the centre gap*; as illustrated below [source: OFCOM's "Consultation on the future use of the 700MHz band" document]

Figure 8: 2x30 MHz band plan option based on utilising part of 3GPP band 28



Europe has a significant number of countries in which 3GPP Band 20 (IMT800) is allocated and/or already in use; hence MTN is of the opinion that ICASA's Scenario 1 is not optimal and does not align with what is currently being performed by NRA's in Europe (Region 1). In addition, CEPT is also moving forward with a lower out-of-band emission limit (-42 dBm/8 MHz below 694 MHz) than in the current 3GPP specification for band 28; and intends to

seek to ensure that technical conditions in the 3GPP band 28 specification would change to reflect CEPT's preferred value for out-of-band emissions.

Analysys Mason has identified this OOBE variance in their document "Harmonising the 700MHz band in Region 1: Europe and MEA must overcome their different viewpoints":

> **"***Out-of-band emissions (OOBE): Even if we assume an agreement is reached on the band plan, the MEA region will have to decide whether to align with the APT threshold for OOBE (–25dBm/8MHz) or CEPT's threshold for Europe (–42dBm/8MHz). CEPT recently defined this significantly more-stringent OOBE threshold to ensure interference risks between DTT and mobile are kept to an absolute minimum. However, MEA may be tempted to adopt the APT threshold, which would ensure that both APT700 and CEPT700 handsets are allowed to operate in the MEA region, while still keeping the risk of interference between mobile and DTT relatively low. However, this would result in complexity in the testing and certification processes for handsets across Region 1."*

Further to this, it should also be noted that the GSMA has released a policy position on the preferred 700MHz band plan for Region 1 in which they state "the GSMA recommends a 2x30MHz band plan for the 700MHz band, consisting of 703–733MHz (uplink) paired with 758–788MHz (downlink). This band plan is based on the reuse of the lower duplexer of the APT band plan (i.e., 2x30MHz from the APT 2 x 45MHz)." Note too that in 2013 the United Arab Emirates already adopted the 2x30MHz 700 FDD base plan as recommended by the GSMA and CERT.

To MTN's knowledge, the SADC region has not yet allocated/implemented 3GPP Band 20 (IMT800), hence it has more freedom in deciding between "prioritisation" of IMT700 or IMT800, as reflected by ICASA's proposed Scenario 1.

The following table summarises the pros and cons of ICASA's proposed scenarios:

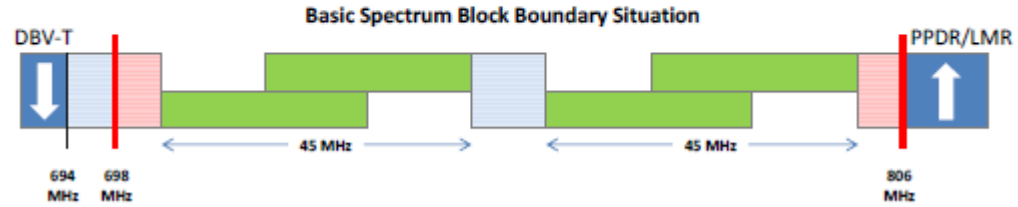
IMT 700/800 Scenario	**Pros**	**Cons**
Scenario 1: 2x45MHz 700 FDD + 2x15MHz 800 FDD + 2x3MHz 800 FDD$^{(restricted)}$	• Extra 3MHz (restricted) 800 FDD spectrum compared to Scenario 2.	• Terminal support for full Band 28 requires two duplexers. • Potentially less spectrally efficient than other scenarios. • Less flexible spectrum allocation options than other scenarios.
Scenario 2: 2x30MHz 700 FDD + 2x30MHz 800 FDD + 1x15MHz 700 TDD	• Additional 15MHz of (750) TDD spectrum (or alternatively 20MHz or supplementary downlink) spectrum when compared to	• 3MHz less FDD spectrum than Scenario 1 & 3,but given the fact that technologies such as LTE utilise carriers in multiples of 5MHz, it appears

	Scenario 1. • More flexible assignment options when compared to Scenario 1 i.e. Scenario 1 only makes sense to assign 4 x 2x15MHz blocks, but Scenario 2 could be assigned in 4 x 2x15MHz blocks, or 6 x 2x10MHz blocks. • Terminal support for the lower 30MHz of Band 28 only requires a single duplexer. • Potentially the most spectrally efficient scenario. • Compliant with other ITU Region 1 (expected) assignments.	that the additional 3MHz would not be practically useable
Scenario 3: 2x30MHz 700 FDD + 2x3MHz 700 FDD(restricted) 2x30MHz 800 FDD + 1x10MHz 700 TDD	• Extra 3MHz (restricted) 700 FDD spectrum compared to Scenario 2. • More flexible assignment options when compared to Scenario 1 • Compliant with other ITU Region 1 (expected) assignments.	• 5MHz less (750) TDD spectrum (than Scenario 2). • Difficult for operator to leverage 3MHz FDD spectrum. • When compared to Scenario 2, different terminal duplexer requirements to gain the 3MHz FDD – may have impact if Europe aligned to Scenario 2.

MTN has in addition taken note of a whitepaper by Telstra with regards to the 700MHz band and extract of which is provided below.

Note from Telstra ATP 700MHz Whitepaper

The relatively wide bandwidth available in the band 28 plan means that two duplexers are required in the UE terminal. These two duplexers overlap by some amount allowing operators with centrally located spectrum to still be served from a single duplexer. The upper and lower green bars below represent the UE duplexers. A UE can switch between both duplexers via a front end switch.



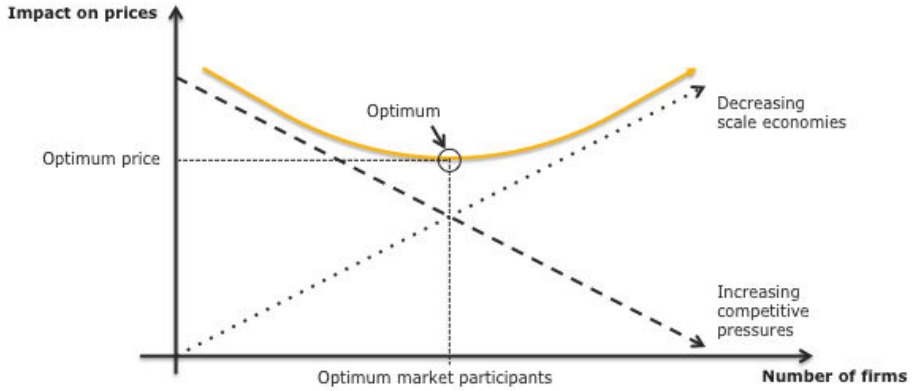
Based on research and the above table, MTN supports Scenario 2. However, MTN suggests that it would be more prudent to allocate 4 x 2x15MHz FDD blocks of spectrum rather than 6 x 2x10MHz FDD blocks, as larger contiguous blocks of spectrum will result in more efficient

use of the spectrum with an effective lower "cost per megabyte" to rollout and maintain the networks than if the spectrum was fragmented into smaller blocks.

ICASA would be cautioned against the aspiration to increase competition through the licencing of additional spectrum to new entrants. To this end, MTN provides the following papers and findings from other economies with similar aspirations but with rather less than optimum results.

In a 2008 paper[2], Benzoni and Geoffron suggest that forcing market outcomes towards competitive fragmentation via licensing carries competitive and end-user price risks, as the benefits of more competitive pressures can be more than outweighed by the loss of economies of scale (driving higher production costs). See figure 1.

Figure 1. The price quid-pro quo between competitive intensity and scale economies[1]



Observing 14 European markets, they find that markets with both 2 players and 4-5 players have higher end-user prices than 3-player markets:

"The comparative analysis of 14 European countries thus reveals that the markets with a three-operator structure present both lower average prices per minute, and higher average consumption per user."

They are careful not to suggest that a 3-player structure is the golden rule of optimal market structure, but nevertheless advance that their findings:

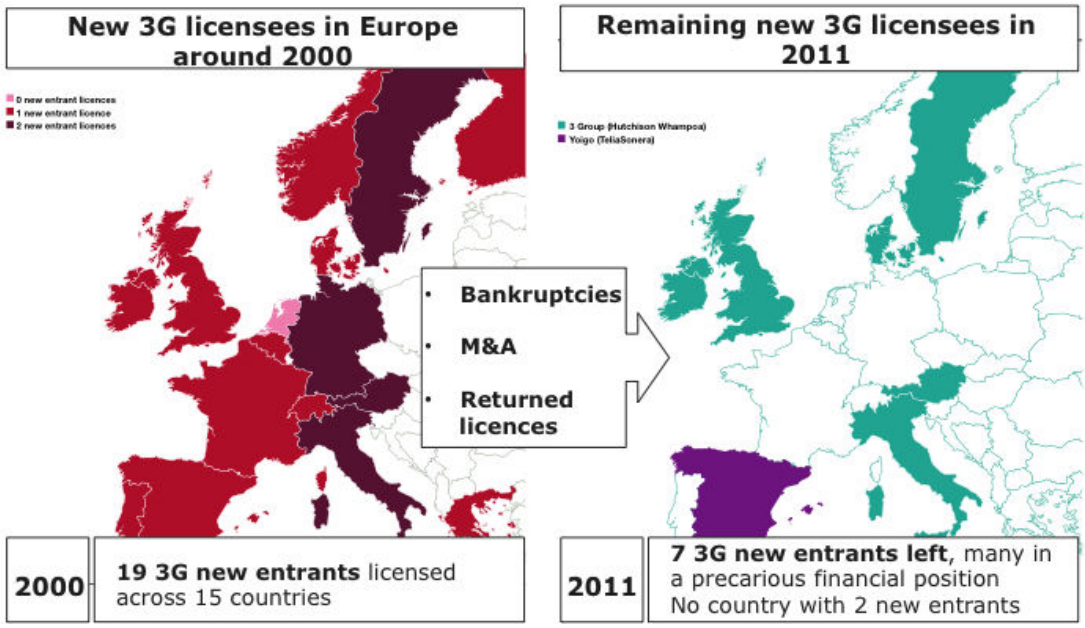
"should incite reflection relating to the European Commission's policy that attempted to promote market structures with four or five players when third generation licenses were granted, and to any regulatory authority that would like to believe that, in a sector of

[2] *Laurent Benzoni, Patrice Geoffron (2008) Optimal Mobile Telephony Market Structure in Europe: "Two are too Few and Four are too Many"?*

infrastructures such as mobile networks, no matter what the circumstances, granting additional licenses is a gauge of the increased collective long-term welfare."

Indeed, the European 3G experience is telling. At the turn of the millennium, European regulators used the 3G licensing process to try to introduce new network competition. A total of 19 new 3G entrants were licensed across 15 countries in the process. In 2011, as a result of bankruptcy, M&A or returned licenses, just 7 of these new licensees were still active, many in a precarious financial situation (6 of these were sustained through the "deep pockets" of Hutchison Whampoa). See figure 2.

Figure 2. Competition engineering through licensing does not work



The findings are also supported by global consolidation activity in markets where there are more than four licensed infrastructure players. In the UK, for example, Orange and T-mobile merged to form Everything Everywhere and bring the market structure from 5 to 4 (this is in addition to intense network–level consolidation through RAN sharing). In the Netherlands, the successive merger of KPN with Telfort and Orange with T-Mobile brought the market from 5 to 3 players. In Austria, the market structure was reduced from 5 to 4 via the Acquisition of Telering by Telekom Austria in 2006, and from 4 to 3 in February 2012 through the acquisition of Orange Austria by Hutchison's smaller 3. This consolidation trend is even true in much larger markets (where there are inherent scale benefits from population size, such as the US or India).

This trend is driven by the substantial investment and economies of scale required to deploy next generation mobile networks in a mature revenue pool. This makes clear the potential opportunity costs (from delayed consolidation) and real end-user costs (both in terms of user experience and broadband pricing) of spectrum fragmentation in a market characterized by substantial scale effects. At the same time, it also highlights the critical role of infrastructure sharing, including spectrum pooling and a very liquid spectrum market (through spectrum trading) to meet the Broadband for All objective pragmatically and efficiently.

In this context, it would appear to be counter-productive to use next generation spectrum licensing as a way to substantially fragment the South African mobile infrastructure market. International experience and evidence suggests this may well delay and/or increase the cost of mobile Broadband for All delivery in South Africa.

As regards the licensing of the spectrum, it is key that the price paid for this spectrum is not excessive and does not follow the problematic examples in Europe during the 3G frequency auctions. The methodology used to price the spectrum must take into account the vast costs that will be borne by successful operators in complying with the coverage obligations (geographic and population coverage).

MTN has in the past advocated the use of smart auctions that incorporate initiatives, that incentive the objectives of rural deployment and increased competition. An excellent example of the use of smart auctions is the French auction of LTE spectrum completed in December 2011. The use of smart incentive auctions have been replicated in jurisdictions such as Germany and Romania.

In addition MTN recommends aligning more closely with CERT by allocating 20MHz of spectrum in the 700 FDD duplex gap to supplementary downlink (SDL) rather than to 700 TDD. The rationale behind this is that this allows for a more spectrally efficient use of the spectrum (as the 5MHz guard band between the TDD allocation and the FDD DL spectrum is not required). It is questionable whether or not an operator assigned 1x15MHz of 700 TDD spectrum is able to compete effectively against operators assigned 2x15MHz of 700 FDD spectrum. The SDL option would appear to be an ideal scenario for the deployment of eMBMS (Multimedia Broadcast Multicast Service)services.

However, MTN reiterates that it is critical that ICASA simultaneously licenses and makes available for use, both the 700MHz and 800MHz spectrum. It is our opinion that there is

likely to be a significant degree of active antenna system (AIR / AAS / AAU) modernisation available in operators network by the time operators would be able to make use of such spectrum (i.e. analogue TV switch-off). There is a concern that current user equipment (LTE devices) only support the 800MHz band and not the newer 700MHz band but it is expected that the LTE device ecosystem will be supporting both bands (due to large Asian & European demand for such devices) by the time this spectrum is available, to the extent that the iPhone 6 already supports both bands.

In respect of the proposed adjustment of Neotel's IMT850 (CDMA2000) spectrum to avoid overlap with GSM-R, MTN has no objection to this.

MTN suggests the immediate requirement for the development of a migration plan for the band 694 -790 MHz. MTN again reiterates that it would be beneficial if the migration of existing uses and users within this band be run in parallel with the migration of existing services in the 1st Digital Dividend, instead of a staggered approach. MTN further proposes that 2015 should be set as the deadline for the completion of the migrations for both Digital Dividend bands.

880 – 960 MHz (3GPP Band 8 – GSM 900)

ICASA has proposed 3 scenarios for harmonisation, (see figure below).

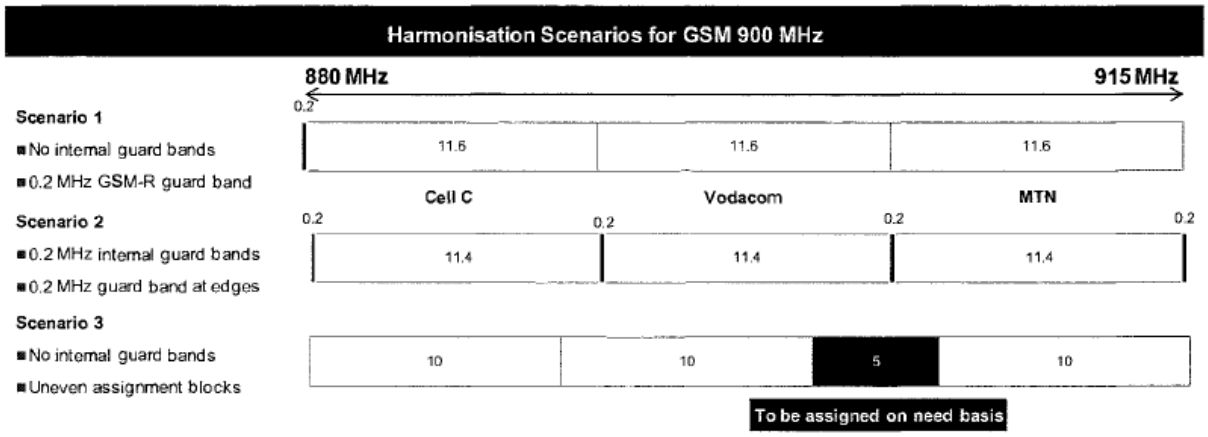


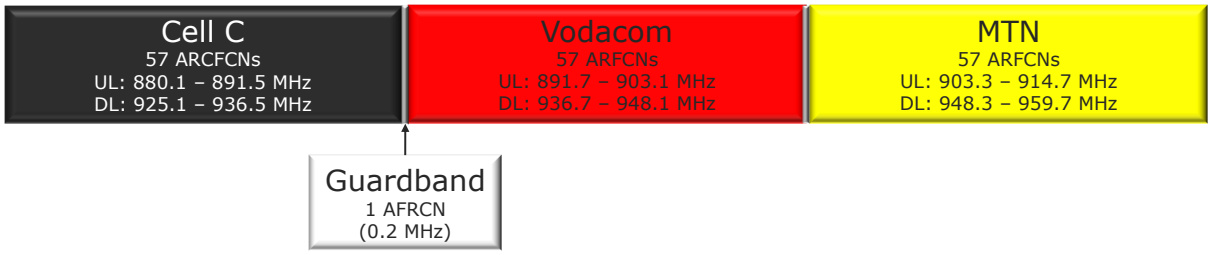
Figure 22: Harmonisation scenarios for GSM 900 MHz

It appears ICASA seem to focus on two main reasons for 900 band harmonisation:

1. the need for contiguous spectrum for mobile broadband (as 3G/LTE require contiguous 5MHz / 10MHz blocks of spectrum), and

2. the need to improve spectral efficiency i.e. remove or reduce the 2MHz of spectrum used for guard bands.

MTN is not adverse, it in fact supports, the proposed 900MHz Band harmonization given that there can potentially be improved spectrum efficiency in the form of two additional GSM channels (ARFCNs) for the three operators currently using this spectrum; so long as the harmonized allocation is as follows:



Additionally, both Cell C and MTN would eventually be able to benefit from 2 x 5 MHz U900 carriers, due to the contiguous assignment, once the UMTS Capable Customer Mobile Handset Landscape changes to be more UMTS dominated.

However what is a major concern to MTN is the complexity of the process required to achieve the proposed harmonization, as well as the associated man hour cost and the cost of cell extender re-tuning/replacement that would be required in order to achieve such a migration without significant impact to MTN's customers.

MTN has in excess of 4500 affected cell extenders of which an estimated 70% would need to be re-tuned on site, and the remaining 30% would need to be replaced or retuned in factory. Despite the associated cost, in many instances gaining access to customer's premises in order to achieve such cell extender re-tuning/replacement is a challenge in itself (and the impact (nuisance, logistics) of which is our biggest concern).There is also the issue of:

- Many Illegal cell extenders in MTN's network and other operator networks, the re-tune impact of which is unknown.
- The location of all cell extenders not being known (Cell extenders could have moved with the subscriber).

MTN believes the following process would need to be followed in order to best achieve the migration without significant customer impact (refer to attached presentation for details):

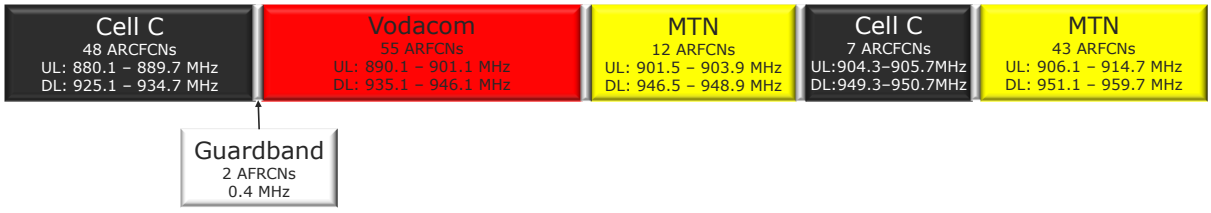
- Cell C would need to re-plan their GSM 900 network to vacate the current spectrum block sandwiched between MTN's spectrum i.e. UL:904.3–905.7MHz, DL:949.3–950.7MHz.
- Cell C re-tunes/replaces Cell Extenders they have deployed so as not to repeat the signal in the vacated spectrum block.
- MTN verifies that the vacated spectrum is "clean"; most likely requiring extensive drive testing with a scanner
- Cell-by-Cell: MTN then re-tunes/replaces all Cell Extenders deployed within the GSM cell's coverage area to the new harmonised spectrum, and adjusts the cell's channel allocation to migrate the cell to the new harmonised spectrum allocation.

This approach will require one customer CE visit per site but will still suffer from a network quality degradation during the transition phase, impacted by re-tuning not being simultaneous (Band needs to be changed first then the cell extenders need to be re-tuned. In the interim subscribers will be impacted by degraded network quality (direct (Subscriber where CE is installed) and surrounding area). The Authority would need to take cognisance of and accept the impact of such an in-band migration as it relates to the Quality of Service requirements the Authority has placed on mobile operators. If not, the migration action of the Authority would lead to a degradation over which the operator concerned has little or no control.

In addition to the above-mentioned impact on existing cell-extenders, more than 100 shared IBS (in-building systems) systems would need to be re-programmed.

900 Band Harmonization- Immediate Benefit proposal

As an interim and more immediate solution, MTN proposes a reduction in the 0.4MHz guard band to a 0.2MHz guard band between each operators 900MHz allocations. This is an acceptable separation for the current network technology. As can be seen below, this will "free" up four (4) 0.2 khz channels to be used by operators towards improvement in operator spectrum efficiency and quality. Operators would however have to use these frequencies within the realms of Operator Cell Extender limitations.



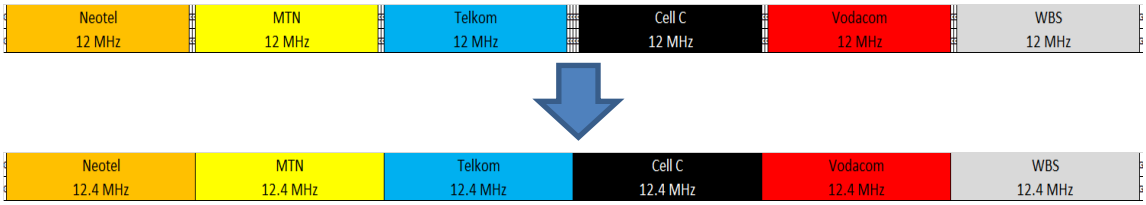
MTN supports Scenario 1 as proposed by ICASA; this removes all guard bands between operators, resulting in 0.6MHz (3 GSM channels) gained by each operator. This scenario essentially allows operators to take care of any required co-ordination themselves, but also allows for maximum spectral efficiency e.g. operators could agree not to place BCCH and to only use hopping TCHs at the edge of their spectrum.

For the required co-ordination to work it is absolutely essential that the migration is throughly planned and that there is consultation between the operators with regulatory oversight; to reach agreement on the methodology to follow and to establish all necessary procedures for co-ordination during the migration.

Further to this MTN would request ICASA to consider the waving of the annual spectrum fees for this band to off-set the significant cost of performing this migration.

1710 – 1880 MHz (3GPP Band 3 – GSM1800)

MTN, suggests the removal of the guard bands in the 3GPP Band 3 (1800MHz) band too (in line with the principle suggested in the 900MHz band) There is 2.8MHz of spectrum used for guard bands within the 1800MHz band. Each operator could gain 0.4MHz (2 GSM ARFCNs) by re-assigning the internal guard band channels to the operators; thereby improving spectral efficiency in the band. As illustrated below.



IMT2100 (in 1700-2290 MHz frequency arrangement)

MTN supports ICASA's proposal to extend the IMT2100 band (As defined in Section 8.7.4.3), as it will significantly increase the amount of spectrum available to South Africa's four Mobile Network Operators (MNO) and enable them to increase the capacity of the Voice and Data services being provided in this band.

MTN also notes ICASA's comments relating to MTN's licensing of spectrum in the 2010-2025MHz band (Section 8.7.4.2), and acknowledges that the 5MHz of spectrum at the start of the band is unusable as it would provide a guard band to the neighbouring FDD spectrum. As such, MTN also supports ICASA's suggestion that the spectrum in the 2015-2025MHz band should be reassigned for other purposes, but MTN disagrees with the proposal to allocate the spectrum to a TDD wholesale/operator consortium. Instead, MTN recommends that ICASA consider two alternative proposals that are depicted in **Figure 3** and described below:

- **IMT2100 Extension**: MTN's first recommendation is to expand ICASA's IMT2100 Extension proposal to incorporate the 2010-2025MHz band, which would create an additional 15MHz of spectrum for IMT Services. As the IMT2100 is an FDD band, this recommendation would require paired spectrum in the 2200-2215MHz, which would reduce spectrum in the 2200-2285MHz band by 15MHz. Should ICASA agree to follow MTN's recommendation, then an additional 2x45MHz would be created for IMT Services in the 2100 band.

  As MTN is currently assigned 10MHz TDD spectrum in the 2010-2025MHz band, the adoption of this proposal would impact MTN detrimentally. ICASA would be required to accommodate MTN's migration from that band to an equally compatible frequency band. It is apparent from the documentation that this is not an unreasonable request as ICASA is seeking to fulfil this for both Neotel and WBS who are impacted by similar migrations in the 850MHz and 2.6 Ghz bands respectively.

  However it does conflict with point 5.391 in ICASA's draft document that references an ITU-R recommendation not to allocate 2200 – 2290MHz to high-density mobile allocations.

- **Direct-Air-to-Ground Communications (DA2GC)**: MTN's second recommendation is to accept the European Conference of Postal and Telecommunication's (CEPT) proposal to use 1900-1920MHz and 2010-2025MHz bands to provide DA2GC Services to aircraft. This application will have significant social and economic benefits, and South Africa could benefit from economies of scale should the CEPT proposal be accepted by European Union (EU) and implemented by European MNOs. The CEPT has conducted extensive research into the allocation of the 1900-1920MHz and 2010-2025MHz bands for alternative services, and ICASA is requested to review their proposals in the Draft CEPT Report 52 for additional information.

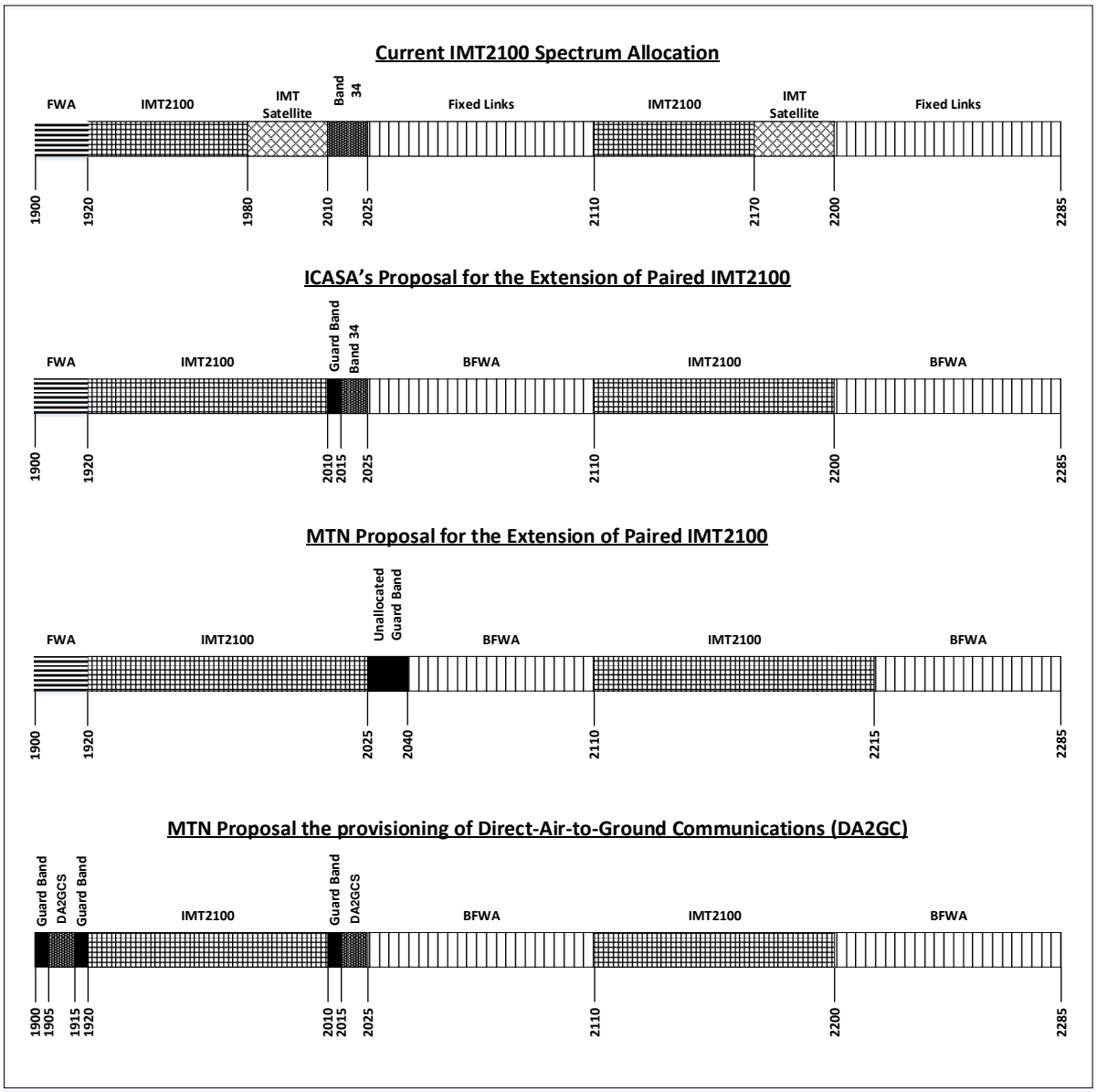


Figure 3: Current and Extension Proposals for the IMT2100 Spectrum Allocation

IMT2300

As indicated within the IMT Roadmap for consultation document the band 2300-2400 has been earmarked for IMT2300 TDD (ITU-R M.1036) mobile broadband services. Currently the SADC Frequency Allocation Plan proposes the harmonising of the 2300-2400MHz band within the SADC region for:

Fixed links/ PTP/PTMP (Paired)

IMT band 40 (LTE-TDD)

BFWA (Broadband Fixed Wireless Access)

It is recommended by MTN to define the 2300-2400MHz band as an unpaired band only, therefore excluding Fixed Link and PTP/PTMP paired allocations. Ensuring only unpaired TDD access technologies within this band will simplify the allocation of spectrum and align to global trends as shown within the IMT Roadmap document.

Current 2300-2400 MHz assignment

The current ICASA assignment of the 2300-2400MHz band spectrum is shown in Figure 4 – In the row entitled 'Current Assign'. It shows that Telkom has been assigned a 60MHz portion from 2300-2360MHz (deploying 3x20MHz LTE FDD carriers for BFWA), and Cloudseed/SMMT has been assigned a 20MHz portion from 2360-2380MHz. ICASA has suggested in the IMT Roadmap document to possibly assign WBS a 20MHz (2380-2400MHz) block of spectrum to deploy TDD-SCDMA (currently unallocated). MTN will comment on the questionable process followed further in this section

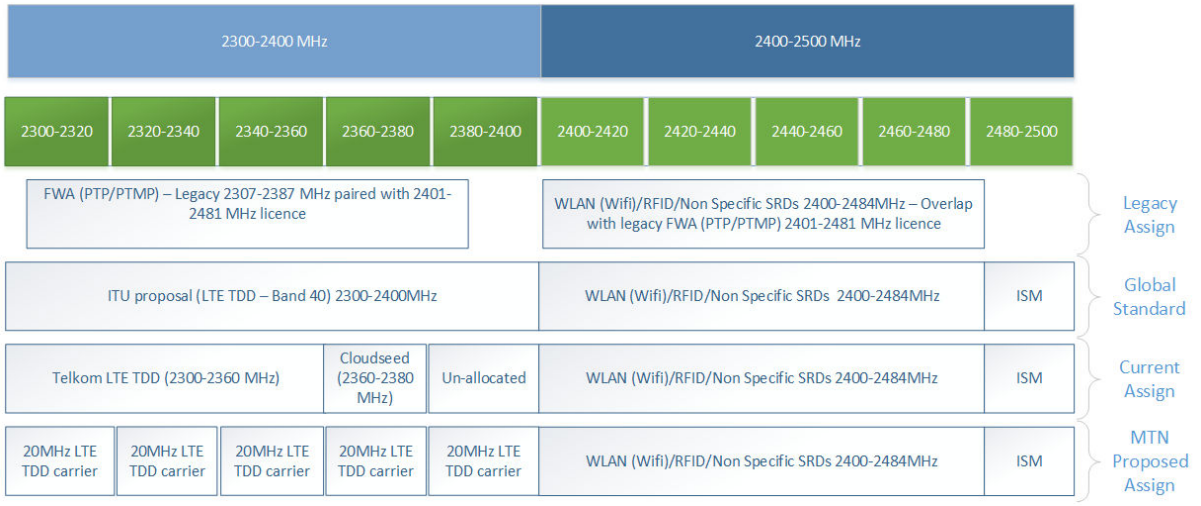


Figure 4: Legacy, global, current and proposed spectrum assignment for 2300 & 2400 band

Support for LTE-TDD deployments in Band 40

The 2300-2400 MHz band is currently the most popular band globally to deploy LTE-TDD mobile broadband. Figure 5 shows a table sourced from a GSA report (Status of the Global LTE TDD Market- Released 8 August 2014) indicating the number of MNO deploying LTE-TDD in the various available 3GPP bands.

3GPP band	Frequency	Number of networks
40	2.3 GHz	19
38	2.6 GHz	9
41	2.6 GHz	8
42	3.5 GHz	6
39	1.9 GHz	1

Figure 5: Global Number of Network LTE-TDD band deployments

The GSA report indicates the global ecosystem for LTE-TDD in Band 40 is strengthening which will ensure more band 40 capable devices in the future.

ICASA's proposed assignment of this Band to BFWA and IMT band 40 therefore aligns with global trends and should be accepted by the SADC region.

Harmonising 2300-2400 MHz band for the future

The current 2300-2400MHz assignments globally (as shown in Figure 32 of the IMT Roadmap document) are fragmented and in many cases not conducive to spectrally efficient network deployments.

What is also apparent from the global allocation of the 2300-2400MHz band is that the assignment of 60MHz portion of this licenced spectrum to one operator is an exception rather than a norm.

It is MTN's recommendation for the most optimal spectral utilisation that ICASA channelize the 2300-2400 MHz band into five 20MHz TDD carriers (shown in figure 1). A 20MHz carrier size allows for appropriate UL and DL bandwidth allocation for an improved user experience over current HSPA+ deployments.

Formally defining these 5x20MHz carriers aligns with the current assignments of Telkom (3x20MHz) and Cloudseed/SMMT (1x20MHz). It furthermore enables the alignment of the

2300-2400 MHz band within the SADC region and the flexible carrier allocation to relevant operators.

With the 20MHz blocks of licenced spectrum defined it will be possible for ICASA to assign each block to a different operator to ensure maximum utilisation of the spectrum and reduced cost per bit.

Operators licenced to use the 20MHz TDD carriers would be able to utilise the carrier for either BFWA deployments or mobile broadband aligning with ICASA's goals for this band.

It is an industry trend for operators having both TDD and FDD spectrum allocations to aggregate these carriers. MTN highlights that there are already more than 100 devices supporting the dual mode functionality

However MTN notes the absence of how the operators in this band are going to avoid adjacent channel interference between each other e.g. no guard bands, restricted use blocks, or operator synchronisation with frame structure alignment is mentioned? MTN suggests that a possible solution is to limit the upper 5/10MHz of current Telkom's allocation to "restricted use". MTN also refers the Authority to Huawei's "LTE in the 2300MHz band" and "White Paper on Spectrum" documents for further information on the TDD adjacent channel interference issues. In any event ICASA must ensure that synchronisation and compatible frame structures for the operators sharing the band are put in place.

MTN's understanding of the assignment of radio frequency spectrum is in line with what the Authority has outlined in their Frequency Migration Regulations and 2nd Frequency Migration Plan as published in Government Gazette 36031 dated December 2012. That is to say assignments were made for fixed links. We are also under the impression that Telkom is assigned 2 x 34MHz Duplex within this band and that no spare capacity is available within this band. We are therefore left slightly perplexed by how 8ta, a division of Telkom can claim they have 60MHz of spectrum within this band, which they intend to utilise for the deployment of TDD-LTE.

It is MTN's opinion that a change in application such as what is being implemented by Telkom is beyond the scope of the initial allocation of that frequency band and would require that firstly the allocation be amended. This is currently proposed in the draft update of the National Radio Frequency Plan (GG 36025). It is only once the allocation has been amended that any frequency assignments could follow. However, we believe that this frequency band would be seen as a high demand frequency band and would then only be capable of assignment once the Ministerial policy directive process has been finalised and

then subject to Part IV Procedures for Radio Frequency Spectrum Licensing and Assignment, specifically section 7 Procedure in respect of 31(3), of the Radio Frequency Spectrum Regulations as published in the Government gazette 34172 on the 31st March 2011.

Section 31(3) of the ECA states "*The Authority may, taking into account the objects of the Act, prescribe procedures and criteria for awarding radio frequency spectrum licences for competing applications or instances where there is insufficient spectrum available to accommodate demand."*

We are therefore unable to fathom how a FDD assignment to the fixed line incumbent for fixed (microwave) services has been converted for TDD use in the absence of a public process and seemingly without Regulatory approval.

It is quite possible that Telkom has sought regulatory approval from the Authority and that this has not been communicated to the market. In which case, existing mobile operators are left at a severe disadvantage as they are unable to deploy a commercial LTE network on a ubiquitous level as mobile operators have been unable to obtain high demand spectrum within the digital dividend and 2.6GHz bands.

If such approval was sought and obtained then MTN is of the opinion that there has been a disregard of the objects of the Act more specifically Section 2(g) which is to "promote an environment of open, fair and non-discriminatory access to broadcasting services, electronic communication networks and electronic communication services."

The process used by ICASA to assign the 2300-2400MHz spectrum to operators should be more transparent. It is the opinion of MTN that the allowance made to Telkom to use their initial paired spectrum for the LTE-TDD deployment was not done transparently. Furthermore the 20MHz assignment to Cloudseed/SMMT seems to have been without due process as MTN is not aware of any published process that had been followed in the assignment.

IMT2600

MTN supports the C1 configuration for the IMT2600 band. This has already been adopted in the National Band Plan. The configuration of the licenced bands within the C1 configuration is suggested as follows:

FDD:

- Assign operators as far as possible the same amount of spectrum within the FDD portion of the band to ensure an equal playing field regarding network performance. MTN recommend the following configuration for four operator assignments with 2x2x20MHz and 2x2x15MHz.

TDD:

- MTN supports ICASA's proposal for an immediate migration of WBS from the FDD-part to the TDD-part of the spectrum.
- Allow additional assignments of 15MHz each within the TDD part of the band to ensure a competitive environment.
- MTN is in agreement with ICASA that it is necessary to ensure synchronisation is implemented across the operators within the TDD part of the band to avoid additional guard bands and ensure optimal spectral efficiency. However we suggest that ICASA's statement "*their 5MHz guard band to IMT-FDD in a protected mode not to interfere with FDD*" is ambiguous. Is it ICASA's intention that the 5MHz blocks adjacent to the FDD spectrum are intended to be guard bands or rather for "restricted use"? It is MTN preference that these blocks be used as guard bands to ensure the integrity of the FDD allocation.

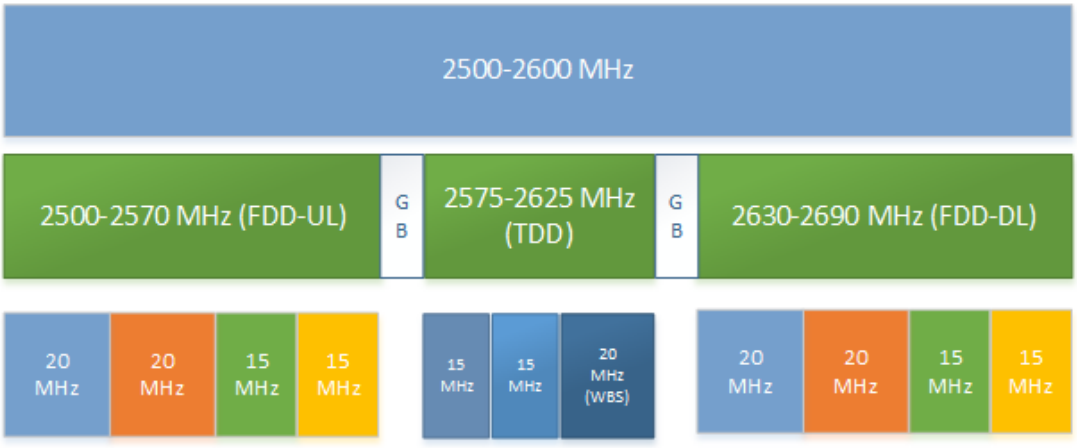


Figure 6: Proposed FDD and TDD configuration of the IMT2600 band.

IMT3400 – 3600

MTN agrees with ICASA's proposal to utilize the 3400-3600MHz band for IMT services, as this spectrum will be required to support the significantly increased data volumes that are predicted to occur within the next few years. MTN notes that in the previous draft National Radio Frequency plan (December 2012) ICASA proposed the FDD channel arrangement (3GPP Band 22) for the 3400-3600MHz spectrum, whereas the TDD channel arrangement (3GPP Band 42) is now proposed. However, as the device and network equipment ecosystem for this band is immature at present, and as there are a myriad of different frequency arrangements that could be implemented, MTN proposes that ICASA delay the finalisation of the channel arrangement for the 3400-3600MHz band until this band becomes more widely supported and deployed. In the meantime, the current licensees should begin to migrate their equipment out of this band, so that the band can be licensed as soon as global trends surrounding the 3400-3600MHz band become apparent.