Public Consultation Paper

Response to IDA's proposal on proposed framework for the reallocation of spectrum for 4G telecommunication systems and services.

7 June 2012

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Executive Summary

This paper is prepared by Packet One Singapore Pte Ltd in response to Public Consultation Paper on proposed framework for the reallocation of spectrum for 4G telecommunication systems and services published on 10th April 2012.

We are in the view that TDD spectrum to be used to build a wireless wholesale network to serve incumbents and the operator than be tasked to focus on higher value verticals and niche applications such Machine to Machine and Near Field Communications.

Seamless mobility with will allow users to enjoy uninterrupted connectivity and promotes broadband usage. We commend IDA for its farsightedness in having this public consultation on this matter, and we hope this will further compliment with Next Generation Nat Next Generation Nationwide Broadband Network as this will address the issue of much needed wireless capacity that comes with IMT-2000 and IMT-Advanced technology.

Question 1

IDA seeks views on the proposed allocation of the 1800 MHz, 2.3 GHz and 2.5 GHz spectrum bands.

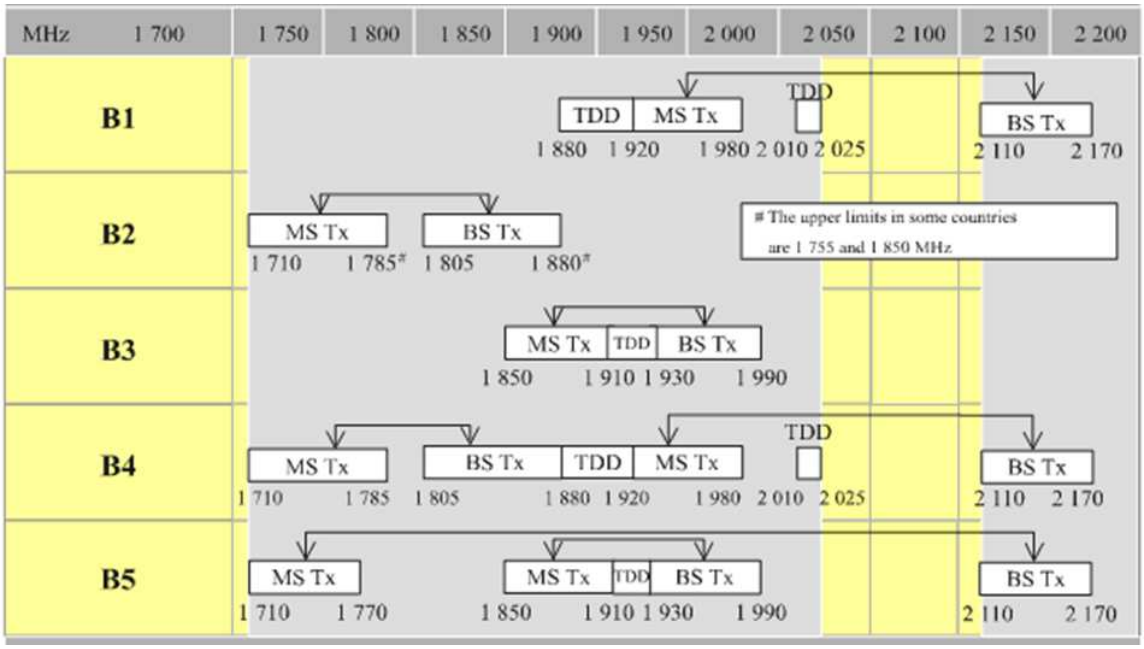
P1 supports the IDA's recommendation to reallocate the spectrum bands for 4G Services. Nevertheless we would recommend that the reallocation is for IMT-2000 and IMT-Advanced. This is to provide clarity amongst the stakeholders what are the technologies that can be deployed on the reallocated spectrums and to take into consideration the spectrum and technology harmonization with the neighbouring countries.

Question 2 & Question 4

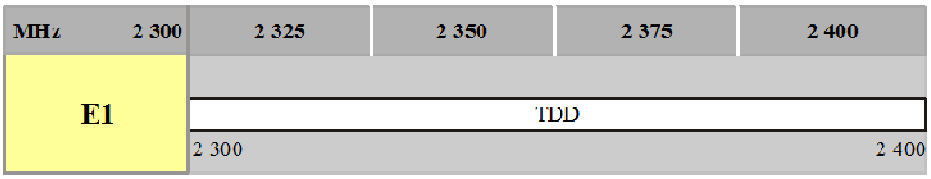
IDA seeks views on the amount of spectrum to be made available for allocation in the 1800 MHz, 2.3 GHz and 2.5 GHz bands.

IDA seeks views on the proposed block size per spectrum lot, the number of spectrum lots, and the arrangement of the spectrum lots to be made available for reallocation.

With reference to ITU-R RECOMMENDATION M.1036-3 we are agreeable to the proposed frequency allocation for 1800MHz spectrum band. However to achieve the objectives of IMT-2000, Beyond IMT-2000 and IMT-Advanced, we proposed that at the spectrum lots should be at least in 2x10MHz. This would allow more robust and rich media mobile applications implemented using this spectrum band. With the proposed allocation, "new entrant"s can register their interest in this spectrum band. Option B2 is preferred and potentially B4.

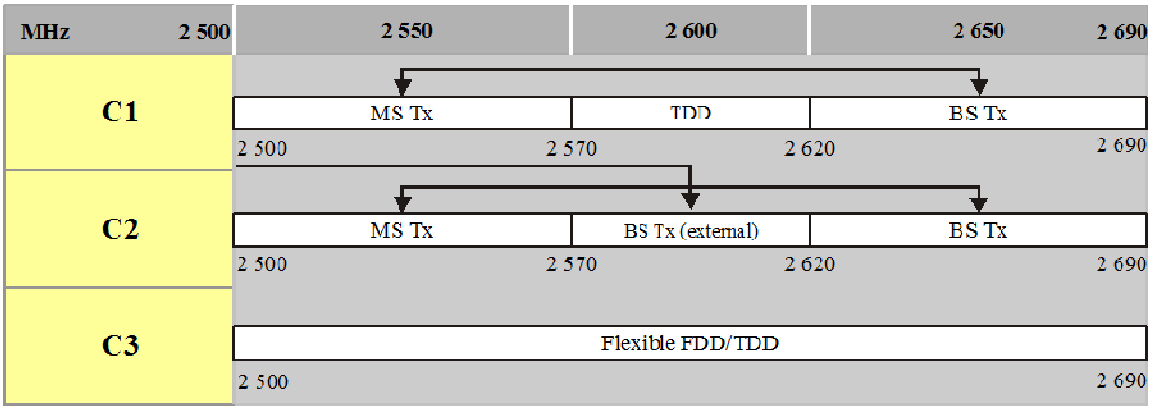


With reference to the same document listed above, the proposed plan for 2300MHz spectrum band, ideally will only allow introduction maximum of 2 service provider. Although we do take note that current standards for IMT-2000 does have system profile that starts at 1.25MHz to 1.5MHz. Nonetheless, it is optimum to allocate 30MHz to allow the services to achieve IMT-2000 and potentially IMT-Advanced requirements in the future. With potentially only one or two operators, there is a need to provide mechanisms to achieve spectrum efficiency as what UQ Communications has achieved in Japan with its usage of the same spectrum albeit with its ownership of full spread of the 2300MHz band. The introduction of MVNOs allows more participants in the 2300MHz spectrum band. This may be replicated in Singapore.



M.1036-01-Ann4

In the 2500MHz spectrum band and with reference with the same document as above, we agreed with the spectrum band allocation. However, we proposed that 2x20MHz allocation is more optimum and to achieve the IMT-2000 and IMT-Advanced requirements. Option C1 is preferred.



M1036-01-Ann5

On the reserved spectrum for each of the spectrum band plans, we propose that it should only be allocated for trial on advanced technologies such as carrier aggregation. 3GPP is actively pursuing it that potentially allows carrier aggregation combining spectrum band (FDD) 1800MHz and 2500MHz. On the reserved spectrum in the 2300MHz, essentially for trial on 20MHz system profile for other future IMT technologies such as 1x Advanced, DO Advanced, HSPA+ Advanced, LTE Advanced, and Wimax 2 (802.16m).

Question 3

IDA seeks views on the benefits of an earlier start date for the full-band sharing arrangement, and what an appropriate start date might be.

We are agreeable with earlier start date to allow comprehensive design and implementation of the services in the border area. Earlier start date will allow the operators to design their commercial network at early stage of network deployment and will eliminate the network reconfiguration if the full-band sharing is implemented at a later stage. We hope that IDA will facilitate with its region partners to become mediator in operator to operator spectrum alignment, potential interference and disputes.

Question 5

IDA seeks views on its proposal for operators to co-ordinate the use of different services and not to set aside guard bands at the frequency boundaries between FDD and TDD technologies in the 2.5 GHz band.

We firmly believed on coordination between operators will effectively optimise the spectrum usage instead of introducing guard bands. For such coordination, operators can always refer to ITU-R documents for references. The documents are as listed below:

1. *REPORT ITU-R M.2113-1 Sharing studies in the 2 500-2 690 MHz band between IMT-2000 and fixed broadband wireless access systems including nomadic applications in the same geographical area.*
2. *REPORT ITU-R M.2146 Coexistence between IMT-2000 CDMA-DS and IMT-2000 OFDMA-TDD-WMAN in the 2 500-2 690 MHz band operating in adjacent bands in the same area.*

3. *REPORT ITU-R M.2045 Mitigating techniques to address coexistence between IMT-2000 time division duplex and frequency division duplex radio interface technologies within the frequency range 2 500-2 690 MHz operating in adjacent bands and in the same geographical area.*

Question 6

IDA seeks views on its proposed definition of 4G technologies and the proposal to assess on a case-by-case basis alternative technologies to be deployed in the 4G spectrum bands.

The 4G definition should be in synchronise between actual consumer experience and the actual network service capability. As such we are agreeable with IDA's proposed definition with slight amendment as follows:

" An all-IP packet switched wireless communications system capable of evolving to achieve the targeted peak data rates of 100Mbits/s for high mobility and 1Gbits/s for low mobility as defined by ITU-IMT-Advanced; meeting at minimum standards and specifications of either LTE Advance (i.e 3GPP Release 8) or WiMAx 1.0 (i.e IEEE802.16-2009)"

Question 7

IDA seeks views on its proposal that successful bidders of 4G spectrum should meet nationwide 4G systems and service coverage requirements by the dates specified.

We are agreeable to the mechanism proposed as in item 40, we hope based on the economics of deployments, IDA will facilitate and further research in understanding equipment market availability before decide on the actual implementation date.

We fully support item 41, to promote infrasharing amongst the operators. With current technology trends and future initiatives, this can be realised in circa 2016 and the proceeding years. We however of the opinion that item 44 on quality of service need further deliberation to reflect technology standard and deployed systems.

Question 8

IDA would like to seek the industry's views on the proposed auction parameters for the 4G spectrum rights.

We are the opinion that the proposed Clock Plus Auction Format, will give flexibility to the operator to bid the spectrum based on their own strategy and requirement. This approach will optimise the usage of spectrum and potentially give level playing field among the bidders/operators.

Question 9

IDA would like to solicit interest from potential new entrants in the market. In addition, IDA seeks views on the proposed spectrum set-aside and nationwide 4G systems and service coverage obligations for the new entrant.

Interested parties may submit their comments on the "new entrant" rules in a confidential annex if required.

IDA would also like to seek the industry's views on whether the reserve price for the spectrum set aside for a new entrant should differ from the spectrum to be auctioned to non-new entrants.

We commend the initiatives taken by IDA in an effort to introduce "new entrant" to the market, this will give more choice for the consumers and promotes broadband usage in the country. We propose further items need to be included by IDA on top of providing more lead time. Definition of the "new entrant" is needed as this can be interpreted differently. Initially, the ability for customers of any "new entrant" to "roam" onto existing operators' networks when necessary while the "new entrant" builds out its own infrastructure. Other than that, site sharing, network and hardware sharing and competitive pricing by core and access network providers to allow rapid deployments by the "new entrant".

Question 10

IDA invites views and comments on the adoption of the ECC/REC/(11)05 Recommendation for cross border coordination in the 2.5 GHz band in Singapore.

Pending the actual implementation scenario, we took note and agreed on the Annex 1, Annex 2 as written in the ECC/REC/(11)05, we further conclude that items in methods in Annex 3 and Annex 4 is agreeable with assistance by IDA. We propose that the parameter to be reviewed on a case by case basis during the actual network deployment.

Question 11

IDA invites views and comments on the practical measures for the deployment of 4G base stations at the border areas for the harmonised co-existence with the BSS in Indonesia.

We are agreeable to recommendations by IDA on tilting the antennas and limiting the power emission to 20W. IDA facilitates the introduction of HetNets in the near future to overcome the coverage limitations.

Question 12

IDA invites views and comments on the possible practical measures that the operators would implement to allow coexistence of mobile services and radar services in the adjacent band.

IDA also invites views and comments on the required mitigation parameters indicated in the ECC Report 174 and the regulatory limit proposed by IDA for the co-existence between mobile services in 2.5 GHz with S-band radars.

We took note the ECC Report 174, and agreed to techniques stipulated in the report. Nevertheless, a further study by IDA is needed to reflect the actual situation where both mobile services and radar services exist.

Question 13

IDA would like to seek the industry's views on whether IDA should: (1) allow the 2G service providers to individually decide on when to shut down their 2G networks; or (2) intervene or assist to facilitate in any aspect of a possible winding down of 2G services in Singapore in order to

manage the efficient use of spectrum. Such intervention could include the possibility of IDA centrally managing the 2G spectrum made available, e.g., by specifying spectrum, to be used by the 2G service providers on a shared basis for a shared 2G network.

In accordance to the Act and current market, we are in favour of item 2, as this will assist to hasten the transition process. Further understanding is needed on Voice services as IMT-Advanced promotes all IP infrastructure. The vacant spectrum can then be reallocated to beyond IMT-2000 technologies at this juncture IMT-Advanced.