Introducing a new band number is a well-known technique for RAN4, which has been used to differentiate between different (sub-)bands or portions thereof already in 3G WCDMA specifications. Previously n90 was introduced as a new band, identical to n41, except that it supported the 7.5 kHz uplink shift and the 100 kHz raster.

One technique to address the issue of adding regional sub-bands within an existing 3GPP band is for 3GPP to define a new band or new band number that contains the added sub-bands. 3GPP would pro-forma select a new band number based on regional frequency allocations within an existing 3GPP band, referred to as the parent band.

To avoid that a legacy device supporting only the parent band (but not indicating support for the new band or band number) will camp on a cell in the new sub-band, the network can indicate only the new band or band number on cells in the new sub-band.

Current specifications ensure that if a cell is broadcasting only band number(s) that UE doesn’t support, that UE will not be camping on the cell. But if a cell broadcasts multiple band numbers and UE supports even one of the band numbers indicated by the cell, the UE can camp on the cell and when doing so, will select the first supported band number. The technique of a new band number is therefore ensuring that UEs which are not complying to the requirements of the new sub-band will not camp on or access the cell in such sub-band. And the gNB sees from UE capabilities the bands that the UE supports and hence the gNB knows if the UE can be handed over to a cell in the new sub-band.

For this technique, the new band or new band number would reference the parent band for RF requirements. In addition, the new band or new band number should be a collection of a new sub-band and previously introduced sub-block(s) in order to avoid having inter-band CA within the parent band. To avoid market fragmentation and to support roaming, it should be mandated that the new band or band number can only be supported by a UE which also supports the associated parent band, just as UEs supporting n90 are also required to support n41. If a UE including roaming UE is not certified to operate in new band or band number (e.g. potential new band or band number which is subset of parent band n77 in US) based on regional regulatory certification, it isn’t allowed for UE to support the new band or band number. Furthermore, adding a new band or band number normally triggers introduction of new band combinations, which would add many new band combinations to the specification and UE capability signalling. To ensure that UE capability signalling is not adversely impacted by the number of supported band combinations, this technique requires that the new band number corresponding to the new sub-band has a reference to the parent band for signalling carrier aggregation (CA) and dual-connectivity (DC) band combinations. Band combinations will only be created for parent bands, not for regional sub-bands.

This technique requires no new signalling and can work for any release UEs, but it does change the semantics of 3GPP frequency bands and 3GPP should clarify the association between a new band or new band number and their parent band in signalling requirements. If applied, the new band or new band number approach is applied, 3GPP RAN4 should:

• Consider accommodations for cases where the UE subset support precludes the possibility to test some MSD exceptions:If the UE supported subset precludes the possibility to test some MSD exceptions, just like with Note 12 for n77 either the MSD configuration can be changed so the MSD is testable in the country that uses the sub-band or a note can be added to waive the MSD.

• Ensure that the number of new band definitions does not exhaust the range of possible band numbers: Since there are 1024 NR band numbers and the addition of regional sub-bands is not supposed be common, this is not anticipated to be an issue. New band numbers would only be needed for countries like the US and Canada which only certify devices to operate in part of a band where regulations exist at the time of device regulatory certification.

• Manage the additional procedural work due to the need to approve a new WID for the introduction of a new band introduction: New bands are added regularly, and the procedural work for adding a new band number should be simpler because there are no new RF or performance requirements required.