Chairperson, IARU Region 3 HF Band Plan Committee

40m Amateur Band Plan Harmonization Project

1. Executive Summary

One of the key frequency bands used by the amateur service on HF in Region 3 is the 7 MHz (40m) band.

The IARU has for many years provided guidance to amateur radio operators intended to manage interference between different activity groups. This is via band plans that describe preferred uses for different band segments within the Amateur Service spectrum.

A review conducted of the existing IARU Region 3 band plan, as well as the published band plans of many of the member societies of Region 3 has shown some serious mis-alignments exist, both within Region 3 and between Region 3 and Region's 1 and 2. This is creating tension due to interference that arises particularly between data and voice mode operators in the 7030-7080 kHz band segment.

This paper sets out:

1. the case for change,
2. describes what has been viewed as best practice for designing a change,
3. has made an assessment of the required band capacity for each of the major activity modes and
4. has shown how these concepts can come together to provide a solution.

It also proposes the next steps for how to go about progressing building consensus for change, not just across Region 3 but globally, in order to meet the objective of achieving a harmonised 40m band plan.

A set of recommendations is included as well as some questions that the HF Band Plan Committee would like further feedback on. We commend these to the IARU Region 3 membership for consideration.

2. Contents

3. Introduction – The Purpose of Amateur Service Band Plans

For many decades now, the amateur service has voluntarily sought ways of managing the amateur radio spectrum to minimize interference between different modes of operation. This has been achieved by inviting all amateur radio operators to voluntarily follow agreed spectrum use plans (Band Plans). These plans divide amateur spectrum into segments for different types of activities to reduce the chance of interference being caused between different operating modes.

These plans, coordinated through the International Amateur Radio Union (IARU), are intended as guidelines that all radio amateurs are invited to follow and respect. They are intended to reduce on air conflict and operate as an agreement among fellow operators to show respect for each other's interests.

Band plans are also multi-tiered, with the top tier being the regional plans established by the IARU. These are then converted into domestic plans, when required, in cases where domestic regulation may apply additional restrictions to the amateur spectrum in a particular country. Where national plans are produced, they should follow these basic principles:

1) In all cases of conflict between a band plan and the national regulations of a country, the latter shall prevail.

2) Nothing in these band plans shall be construed as prohibiting different national arrangements, provided that harmful interference is not caused to stations in countries operating in accordance with the regional IARU band plan.

3) Notwithstanding item (2) above, Member Societies of IARU Region 3 are strongly urged to use these regional band plans as a basis for their national band plans, and where national band plans conflict with the regional plans due to regulatory constraints, to work with their local regulators to seek revision of their relevant domestic regulations to align with regional and global amateur radio activity (as far as possible).

3.1. Principles guiding how to change a band plan.

The key factor in the success of any amateur band plan is the willingness for most operators to agree to follow the plan. Considerations influencing their behaviour in this regard include:

- Is the band plan simple to understand?
- Is the band plan spectrum segment nomination considered fair and is the plan accepted by the amateur community?
- Are there any special activities or interests that should be included in any deliberations about how a band is structured?

These factors drive the following requirements in any band plan revision discussion:

1. A band plan should be kept simple in structure. Complicated or overlapping segments should be avoided.

2. Consideration should be made to protect activities, particularly that are more susceptible to interference than others. E.g.:

    a. QRP Centres of Activity
    b. Emergency Communications requirements and expectations

3. Channel access control mechanisms and their ability (or otherwise) to manage interference should be considered, particularly for modes where the decision to activate a transmitter relies on some form of automation (e.g. data modes such as those in the WSJT based family or modes used in the automated store and forward mailbox type networks).

4. It needs to be recognised that for any change to a band plan to be successful, it needs to be built on a consensus agreement rather than being imposed. Any attempt to do otherwise should be expected to fail at the adoption phase.

5. Operators need to be convinced that any distribution of spectrum among different operating modes is fair for all.

In considering these factors, our first recommendation to IARU Region 3 is to endorse these principles as the foundation for developing new band plans.

Recommendation #1: Given that this paper is considering the case for change to the 40m band plan, the above 5 listed principles be agreed to, as suitable foundations, for considering any change to HF band plans within Region 3.

4. The case for change: 40m Amateur Band Plan Challenges

4.1. IARU Level Band Plan Challenges

The Amateur Service 7000-7200 kHz band is unfortunately an example of one of the more disorganized amateur radio bands, when viewed on a global basis. Each of the IARU Regions has a different set of priority sub-bands for each of the major activities. This immediately leads to conflict between amateur operators.

For example, looking east across the Pacific, Regions 2 and 3 have differing band allocation outcomes that drive conflict particularly between data, CW and Voice users. Looking west, we also see misalignment across the border between Asia and Europe/Africa where Regions 1 and 3 also have conflicting band plans.

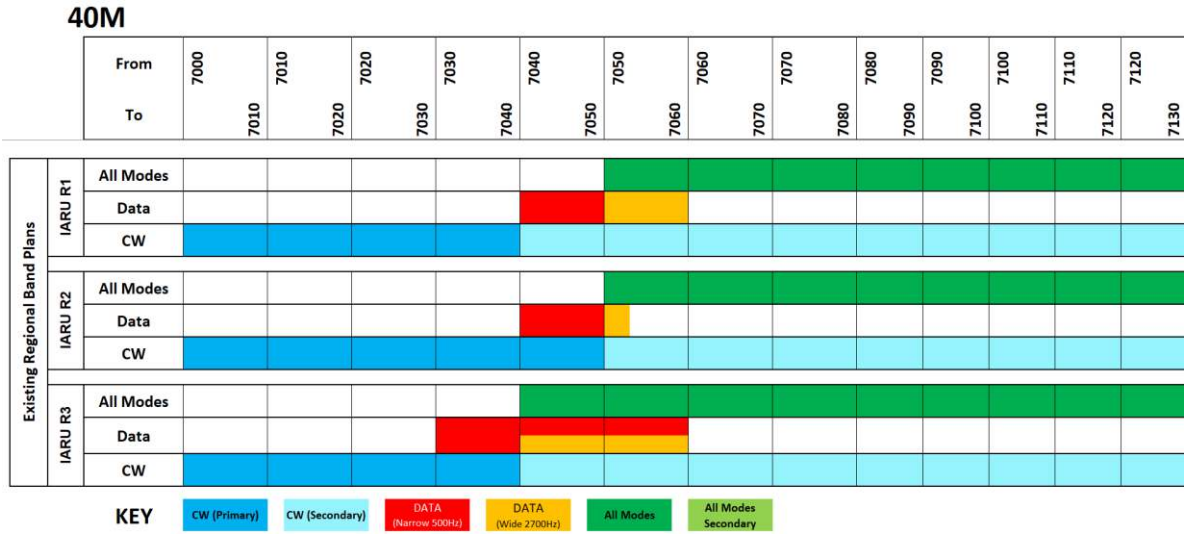


Figure 1 – Excerpt from the Current IARU 40m Band Plans for Region 1[1], 2[2] and 3[3] – September 2024

The conflicts do not just stop at inter-regional borders. Inequity also exists between interest groups. Specifically, while CW and Voice operators enjoy the privilege of substantial almost priority band space for their activities, data operators have been treated as second class citizens, at least in Region 2 and 3, being forced to share their band space with the other modes (often under the "All Modes" banner). This sort of spectrum sharing inevitably leads to conflict on the air.

[1] https://www.iaru-r1.org/wp-content/uploads/2021/06/hf_r1_bandplan.pdf
[2] https://www.iaru.org/wp-content/uploads/2020/01/R2-Band-Plan-2016.pdf
[3] https://www.iaru.org/wp-content/uploads/2020/01/R3-004-IARU-Region-3-Bandplan-rev.2.pdf

It is noteworthy that this lack of a priority data modes only segment is particularly obvious in the Region 3 band plan. To this end, the next recommendation for member societies to consider is as follows:

> ***Recommendation #2:*** when determining the structure of a band plan, there should be clear segments where only one mode has priority in that segment. The practice of grouping data and voice modes or data and CW modes as "All Modes" or "Shared" priority access segments should be discontinued.

4.1. Regional Level Challenges

Within Region 3, the situation is even worse than at an IARU level. There is a poor alignment between countries across Region 3 (based on a survey of posted band plans on member society webpages conducted in September 2024 – see Figure 2 below). While some nations have supported principles like providing dedicated priority segments for CW, Data and Voice modes, others have only done so for CW and Voice, leaving data grouped under an "All Modes" banner.

This "All Modes" grouping is the source of much of the conflict observed on the band, which anecdotally appears to occur more between Voice and Data operators than it does between Data and CW operators. The observed attitude of at least some voice operators towards hearing data signals leaves something to be desired. Their response is often to "ignore the squeaks, whistles and beeps" of the data operators and continue with their voice QSOs regardless, causing interference to amateur operators using data communications modes in the process. Clearly this is not acceptable to data operators, especially given the substantial interest in data mode operation that has developed, particularly over the last decade.

To make matters worse, there is either a lack of clarity or there are outright inconsistencies between the Region 3 national member society band plans and the current Region 3 master plan. Some of the "All Modes" data sub-bands defined appear to be substantial in size or are in inconsistent positions on the band relative to that described by Region 3. This may just be a product of the "All Modes" category being used to guide data operator operations, but none the less, this does fail the "Simplicity" test in our view and is one factor today which is driving ambiguity for amateur operators on the 40m band.

40m Band Plan Comparisons – Region 3 Member Domestic Plans

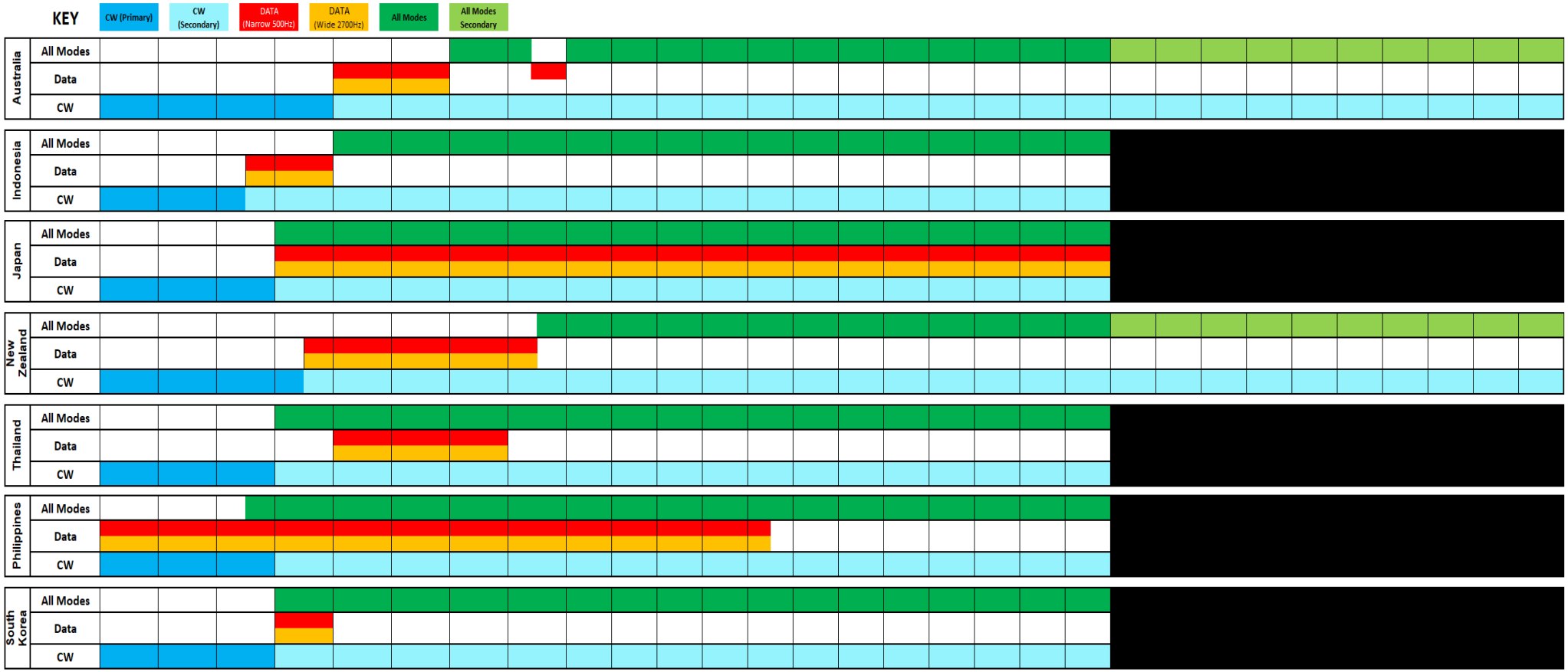


Figure 2 – IARU Region 3 Member Society 40m Band Plans

4.2. The Growth in Data Mode usage

One of the most significant shifts in the character of HF based amateur radio communications over the last decade has been the explosive growth of data communications. The introduction of the WSJT suite of communications modes drove many amateurs to explore the data communications world for the first time. Since its appearance in 2017, FT8 has become one of the most popular modes in use on HF today, due to its weak signal capabilities.

With the take up of FT8, interest is now spilling into other data modes, as more people have equipped their stations with data mode transmission and reception capabilities. Modes such as Olivia, JS8Call, Vara and even RTTY have seen a growing interest base return to the airwaves (to various degrees). All of this, however, has occurred against a backdrop of little to no IARU band plan support for the band positions various modes have taken up residence on within the 40m band.

One of the unfortunate casualties of this uncoordinated growth has been the near destruction of several legacy "Centres of Activity" for older data modes. For example:

- Within the 40m band, we find FT8 activity now on 7041 kHz on what in Region 1 and 3 was the PSK data sub-band for many years.
- FT8 data activity has effectively taken over frequencies between 7070-7080 kHz globally, in what was (in most parts of the world) traditionally a voice mode primary segment.
- We also observe DX-peditions using data modes on frequencies between 7060-7074 kHz in amongst what is (at least in Region 3) priority voice spectrum.
- The next generation of "data mailbox" type stations (often currently using systems like Winlink over Vara and other similar Pactor based modes) have also entered the arena, vying for space in the 7050 - 7070 kHz segment.

From these observations, it is clear that the competition between these interests and traditional voice operators has continued to intensify, to the point where there are regular clashes of activity between them. Up till now, the IARU Region 3 band plan has failed to keep up with these changes and are fast becoming irrelevant in the face of the entrenched "on air" practices we now face.

We believe that by attempting to reduce the inconsistencies and by making a concerted effort to deliver a harmonised global 40m band plan, that many of the problems could be solved.

4.3. "Data" or "DigiModes" definitions verses the information carried.

Another factor to consider is how the band plan is communicated to the wider amateur radio community. Today the IARU band plans use the term "DigiModes" or "Digital Modes" to describe the family of modes where it is data, not voice or CW that is being transmitted as the base underlying signal.

However, soon amateurs are likely to see digital modulation techniques used to transmit voice and image signals on the bands too. Indeed, several such modes already exist:

- Digital SSTV – e.g. EasyPal
- Digital Voice – e.g. FreeDV, HF DSTAR and others

Already there has been some confusion caused, with recent feedback received by the WIA during their recent public consultation, indicating a mix of understandings about where on the bands voice modes based on digital modulation waveforms should be placed. As a result, we argue it is time to reconsider the definitions of what are "data modes" and what are "digital modes," to improve clarity for radio amateurs trying to use the band plans to determine where to conduct their experiments and communications.

To address this situation, it is proposed to redefine "Digital or DigiModes" as "Data Modes" within the band plan documents, reflecting a clear intent that the "Data Mode" segments are used to transmit data that is purely digital in nature, and is not at some point originated as a voice signal before being transcoded from an analogue to digital. In doing so, it allows for voice carried via digital modulation methods to be characterised separately from pure data transmissions in any future band planning.

Recommendation #3: That the term "DigiModes" be replaced in the IARU Region 3 band plan with the term "Data Modes" and that the definition of a "Data Mode" be any signal where the information being transmitted never originated in the analogue domain (i.e. does not include speech).

For clarity,

- image transmission, where the content has first been broken down into a binary stream which is then transmitted using a data type modulation system is considered a data transmission.
- image transmission modes that vary audio tone frequencies to represent luminance information are considered analogue modes and remain in the analogue "All Modes" band segment.

4.4. Spectrum Under Consideration - limiting discussion to 7000-7200 kHz.

In considering the 40m band, the IARU must take a regional view of what is available. This is where the 40m band is complicated by what is made available to amateur operators in Region 2 (7000 – 7300 kHz) compared to Region 1 and 3 (7000 – 7200 kHz). For the sake of clarity, this review will only consider the 7000 – 7200 kHz segment of the band.

At the same time, we acknowledge that several Region 3 countries do have access to the 7200 – 7300 kHz segment of the band on a secondary basis (Australia and New Zealand). Those and any other Region 3 countries with such access should incorporate this into their national band plans as appropriate.

7 000-7 450 kHz

Allocation to services		
Region 1	**Region 2**	**Region 3**
7 000-7 100	AMATEUR AMATEUR-SATELLITE 5.140 5.141 5.141A	
7 100-7 200	AMATEUR 5.141A 5.141B	
7 200-7 300 BROADCASTING	**7 200-7 300** AMATEUR 5.142	**7 200-7 300** BROADCASTING
7 300-7 400	BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D	
7 400-7 450 BROADCASTING 5.143B 5.143C	**7 400-7 450** FIXED MOBILE except aeronautical mobile (R)	**7 400-7 450** BROADCASTING 5.143A 5.143C

Figure 3 - ITU Radio Regulations RR5-24 – 2024 Edition 7000 – 7450 kHz (Extract)

5. Band Planning Considerations & Principles

5.1. Simplicity

For band plans to be effective they need to be simple in structure. They also need use language that is clear and as universal as possible.

The range of understanding about radio transmission systems varies widely throughout the amateur service. There are radio amateurs who have a basic working knowledge through to others with advanced professional radiocommunications experience. Therefore, it is important that the concepts conveyed in a band plan a clear to everyone, regardless of their experience.

Band plans also have a global audience. They need to be drafted ensuring that their meaning and intent is maintained when translated through multiple languages and cultures. Too much detail, or definitions that are too complex, run the risk of being misunderstood or being lost in translation.

For these reasons, band plans in the Amateur Service must be kept simple.

5.2. Principles for Structuring a Band Plan

The Amateur Service adopted voluntary band plans, as it is not always obvious to an operator in one interest group that someone else is using the same frequency from a different interest group.

The simplest way to avoid such clashes is to:

(1) define segments of the amateur bands where operators using particular types of transmission modes congregate. The challenge is understanding the relative amount of activity and interest in each mode, such that the spectrum can be allocated fairly between all modes.

(2) At the same time, it is important that a band plan does not attempt to create "micro segments" for each mode sub-group. Spectrum allocation must be done carefully, to not create unnecessary "spectrum scarcity." The solution is to identify "Centres of Activity."

Using Centres of activity to identify these "special cases" helps radio amateurs find where on air activity is taking place for their particular sub-mode of interest, while not committing absolute band segments to those activities.

Taking these two factors into account, the next step is to explore the broad requirements and activity levels of each mode.

5.3. QRP activity requirements

QRP activity is defined as transmissions using low transmitter power (<10W on voice, and <5W on CW and data modes), where the operators are seeking to maximise the distance communicated, using the least amount of transmitter power possible.

We have noted, from the outcomes of the recent WIA consultation, that they received a considerable amount of feedback from CW operators, expressing concern that CW QRP operations needed to be considered and highlighted in the band plan. The justification for such identification is sound, as weak signals are always difficult to identify, particularly narrow band weak signal modes (e.g. CW and WSPR data modes) when someone is receiving on a wideband (e.g. Voice/SSB) receiver. Hence, such activity is more prone to receiving interference from other types of amateur station activity.

QRP (low power) operation is, however, only a sub class of activity found within every mode interest group in the amateur service. As a result, the best way for highlighting low power - weak signal activity is through defining these as a "Centres of Activity" within each mode segment. Following existing practice, retention of a "CoA" indication at 7030 kHz is the most effective way we can continue to protect such activity.

5.4. General Communications activity requirements

5.5. Nets & Local Activities

Many people use amateur radio to communicate "locally" with others that share common interests or friendships. Such communications may facilitate general comradery on air or may also be used to help further "self-training" (e.g. CW QRS (slow morse) training).

Such local communications typically only use moderate power and antennas that are optimised for "local" contacts. These characteristics imply that these stations are not well equipped to receive or transmit to distant stations, and hence pose an interference risk to other stations who may be seeking out communications with distant stations. It may therefore be appropriate to provide some guidance on a band plan to segments where long-distance communications should be preferred.

5.6. Long Distance (DX)

Another core activity within the amateur radio community, particularly on HF, is the pursuit of communications over long distances. This is carried out across all transmission modes in use on today.

There are two primary interference management factors to consider with this form of communication.

a) Distant signals can be quite weak when they are being received, and so can suffer interference because they are not being heard by everyone else in a region.
b) Stations working distant signals may use high power, increasing the risk of disruption to other local communications in some scenarios.

Long distance communication activities also highlight the problems the lack of global spectrum harmonisation creates. A particular example is how the FCC mandated USA amateur spectrum access rules impact the rest of the world. Unlike most countries today, the USA has rules that

mandate where on the band particular modes of operation can be used. To make matters worse, the FCC has further segmented the spectrum by licence class. The impacts of both decisions globally include:

- Band space for voice operation is restricted to frequencies above 7125 kHz for USA amateurs located in the lower forty-eight states. This is contrasted with the rest of the world where voice mode operation can extend as low as 7030 kHz (in Region 3 currently) (but more typically stays above 7050 kHz).

- Data mode operation extends up to 7125 kHz in the USA, where for the rest of the world, data modes are typically only active below 7060 kHz or below (with global FT8 activity on 7074 kHz an exception to this convention).

- In the CW sphere, only extra class grade amateurs are permitted to operate below 7025 kHz. In 2018, the ARRL published figures[4] indicating that 51% of USA amateurs held a technician grade licence, while 24% held a General class licence and 21% held an Extra class licence. This means that any move to alter the voluntary CW band plan segments must ensure it does not limit USA general and technician class radio amateur's ability to communicate with other CW operators outside of the USA.

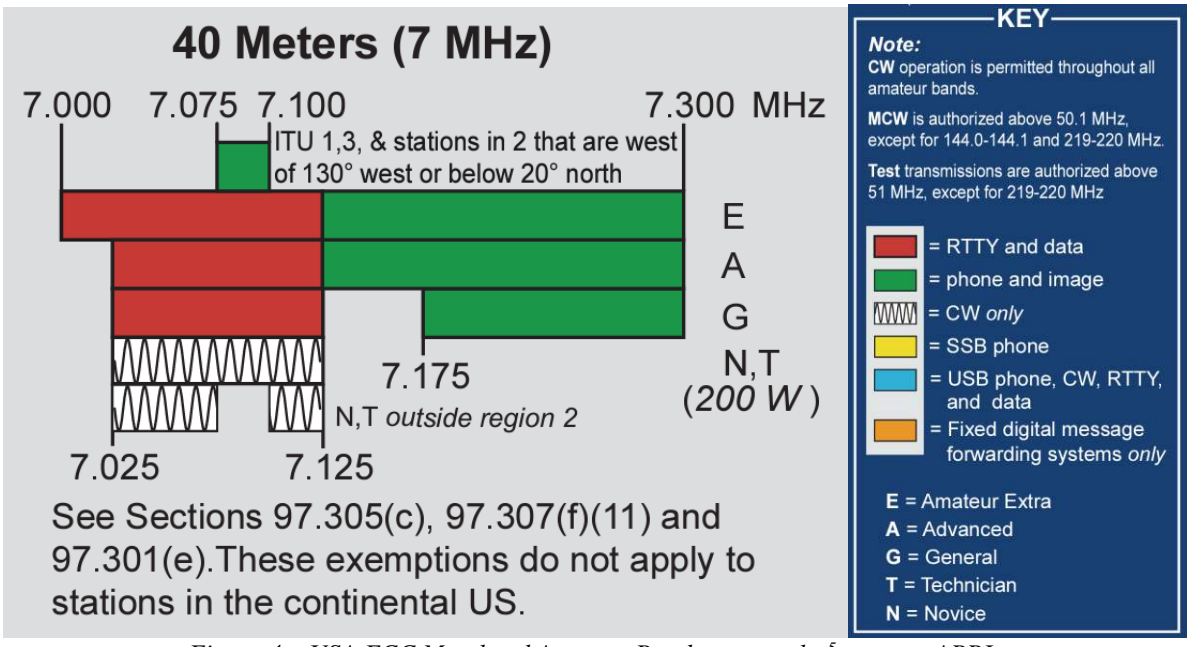


Figure 4 – USA FCC Mandated Amateur Band access rules[5] courtesy ARRL.

Given these facts, any band planning work undertaken by IARU should consider these constraints, given the number of licence operators that would be otherwise impacted. It would be preferable, from a global perspective, for the ARRL to consider lobbying for at least some of these regulatory constraints to be lifted (at least the mode delineation). Such a change would help the global voluntary efforts to manage amateur spectrum interference take precedence over otherwise overly restrictive domestic regulations.

[4] https://www.arrl.org/news/us-amateur-radio-population-grows-slightly-in-2018
[5] https://www.arrl.org/graphical-frequency-allocations

5.7. The case for separation of Local and DX Activity

We note that the WIA consultation paper sought feedback on whether it was appropriate to consider seeking ways of separating local from DX communications. When we reviewed the feedback they received, however, we saw only limited support for such separation.

In the case of voice operation, and again lead by the restrictions imposed by the USA regulator, we note that general class USA amateurs only have access to Voice modes above 7175 kHz. This prompts us to still consider whether to highlight a segment of the band for long distance communications. The committee feels it may be useful to guide DX activity to consider the USA band restrictions for voice operation in the 7175 – 7200 kHz band segment. The Region 1 band plan already has this and therefore it is appropriate that Region 3 consider the same. Recognising it as a Centre of Activity is viewed as the best solution in this case.

5.8. Contesting – Domestic and International - requirements

Another very popular activity is participation in amateur radio contests, where the objective is to contact as many stations as possible in a limited time. These activities generate extremely high instantaneous spectrum access demands due to the number of participants involved.

The obvious interference risk from such activity is that band space for those who are not interested in contesting can become scarce for the duration of the contest. Managing this is a difficult challenge and brings with it some particular constraints on the 40m band.

Temporary band segment capacity shortfalls will always result from contest type activity. These will depend on which country or region a contest is focused on, its particular rules and what operating mode is in use. Band access restrictions in some countries (such as the USA as identified above) can drive activity to concentrate in different segments depending on the contest.

In the case of voice-based contests where USA operators are active, activity tends to concentrate above 7125 kHz. Data contesting also suffers from a split centres of activity on the band, with US based contests tending to generate more data mode activity between 7070-7125 whereas the rest of the world tends to occupy 7030-7080 kHz. CW contests are perhaps the most organised on the band in that they typically start at 7000 kHz and extend up to 7070 kHz.

Overall, however, the current observed contest behaviours make it difficult to determine the best way forward. Two options have been considered at least:

1) The definition of flexible band segments, in the form of spectrum sub-bands where it is acceptable for contesters to expand into on a temporary basis. Successfully encouraging contest operators to follow such plans, however, has been identified as unlikely.

2) Another option, raised by the WIA in their consultation paper, of seeking the support of contest organisers to impose penalties on participants for operating outside of contest defined band segments was not supported by those who responded to that paper. The general feedback was that it was unlikely contest organisers would be willing to engage with such an IARU initiative. Indeed, one respondent to the WIA indicated that where that approach has been used elsewhere (e.g. by RSGB in Region 1), it did not, in his opinion, yield a beneficial outcome. Instead, it left the excluded segments empty and unused while only exasperating congestion in the segment defined for use in a contest.

We note that the overall response the WIA saw in their paper was that most people simply pointed to the WARC bands of 30/17 and 12m as places for non-contesters to move to while contest activity was present on the other bands.

The conclusion we can draw is that the amateur community sees little value in making special provisions for contesting activity. None the less, it would be valuable to obtain a wider viewpoint of this topic to better guide the HFBPC on future best practice.

Request for feedback #1: is there a need to set forth any more specific guidance for how contesting activity interference impacts with other amateur activity should be managed in the Region 3 band plan or are the current arrangements suitable. If a need to improve guidance is believed appropriate, please outline what you believe such arrangements should be.

5.9. Emergency Communications requirements

The need to support emergency communications capabilities delivered via Amateur Radio is enshrined in ITU Article 25 which defines the Amateur Service. Specifically, the following clauses of the ITU Radio Regulations apply to this matter:

ITU Radio Regulations
ARTICLE 25
Amateur services
Section I − Amateur service (extracts)

25.3 2) Amateur stations may be used for transmitting international communications on behalf of third parties only in case of emergencies or disaster relief. An administration may determine the applicability of this provision to amateur stations under its jurisdiction. (WRC-03)

25.9A § 5A Administrations are encouraged to take the necessary steps to allow amateur stations to prepare for and meet communication needs in support of disaster relief. (WRC-03)

Figure 5 – Extracts from ITU Radio Regulations Article 25 – Provisions for services and stations – "Amateur Services".

To accommodate these services, the IARU band plans have always nominated centres of activity for emergency communications. In doing so, the assumption in Region 3 has always been that such services would be delivered via voice communications. As such, it has been sufficient in the past to simply nominate a Centre of Activity (CoA) and ask amateurs to stay clear of that frequency when an emergency is underway.

Recommendation #4: that the IARU Region 3 band plan continues to identify an Emergency Voice communications centre of activity frequency / sub-band for use as required,

However, work undertaken with ARRL and the Winlink community several years ago by the Region 3 HFBPC chairperson looking at the arrangements in Region 2 highlighted the benefits that data networks like Winlink can bring to disaster communications scenarios.

That same work, however, was also critical of the typical behaviour of amateurs, particularly in contests, where attempts to operate networks of Winlink stations to carry disaster communications (as well as other traffic) fail due to interference caused by other operators. The solution instead was to operate such networks on MARS frequencies outside of the amateur radio spectrum. This was a concern, however, in that it may be seen to weaken the case for supporting amateur service access to spectrum considering article 25.3 2) and 25.9A § 5A.

Given these typical emergency service communications requirements, it is prudent that the IARU Region 3 consider at least maintaining current practice for voice services. Further, the R3-HFBPC recommends the Region 3 Emergency Communications coordinator consider what future use data modes might have within Region 3 for emergency communications.

Request for Feedback #2: The Region 3 EmComm coordinator and regional member societies are requested to consider the how Region 2 uses data networks like Winlink in emergency communications situations and provide input to the Region 3 HF Band Plan committee on whether improving provision for that sort of band use in Region 3 is warranted.

5.10. Data Mode Requirements – Channel Access Mechanism Impacts

Data modes can take many forms and are one of the most diverse realms of the amateur radio communications world today. Many modes can be characterized as data modes, including PSK, RTTY, Olivia, WSPR, FT8, FT4, JS8Call, Vara, Domino, Contestia just to name a few.

How each of the modes manages channel access, and hence interference to other stations, however, can typically be grouped into one of three families. The groupings are based on how each mode determines when and where it will activate a transmitter.

5.10.1. Operator controlled “Look before you transmit” based modes.

Traditional RTTY, PSK, Domino, Contestia, Olivia and equivalent type modes are operated by a live operator who is listening or observing the channel before actively deciding when and on what frequency to make a transmission. This type of operation is similar to CW and Voice operators and how they decide when to transmit, due to the direct control of the transmitter by the operator. They are therefore, the most reliable types of data mode activities that can avoid causing interference to other operator’s communications.

It is worth noting that these modes typically do not function well when the signal is interfered with, and so operators prefer to find clear frequencies to use these modes on. This means they will need separate band segments from the other forms of data communications as well as from voice and CW modes.

5.10.2. Time Synchronised (semi) blind access

The second family of data modes, where transmissions are synchronised by time into slots, are typically from the WSJT family of modes (e.g. FT8, FT4, JT65, WSPR etc) or are derivatives of those modes (e.g. JS8Call). The key element of these modes is their resilience to interference and weak signal capabilities, which is a product of the coding technology, and the nature of the transmitted waveform used.

What makes them interesting from a band planning management perspective, however, is that they operate without knowledge of who else is on the actual exact frequency except for the first transmission initiated by an operator in a communications cycle. There is no sensing the channel prior to activating the transmitter on second and subsequent transmission cycles. This means that the probability of inadvertently causing interference to other operators grows with each repeated transmit cycle until the transmission sequence is stopped and the operator can observe the new status of the channel and the position of the signals within it.

In the case of typical FT8 channels, this overlapping transmission characteristic still doesn't block communications – up to a point – until the number of overlapping signals becomes so great that the base noise floor rises above normal background levels. Due to the power density of these busy channels, with multiple (>100) 50Hz wide stations active in any given timeslot, the ability to share that spectrum decreases.

These characteristics mean that these time synchronous modes require specific spectrum to be set aside for them to manage interference between modes. They do not share spectrum well with others. Due to their very high levels of popularity, they also need capacity expansion, so that the "average" noise floor can be reduced allowing weaker stations to maintain long distance communications.

5.10.3. Automated "Carrier Sense Multiple Access"

The third family of data modes typically fall in into the automated transmission category, were the decision to transmit is made by automatically by the data modem rather than by an operator. Modes that use this type of channel access include APRS, AX.25 Packet radio and the underlying modes of systems such as Winlink (Vara, Ardop, Pactor and more).

To control interference, these types of systems will attempt to sense whether the channel is occupied before they transmit using a technique called "Carrier Sense Multiple Access." While such detection mechanisms can be reasonably reliable at detecting transmissions in the same mode as the operating station, they are not very effective at sensing if another operating mode is present (eg voice or a different data mode). As a result, it is prudent to set aside specific centres of activity for these types of modes to avoid interference to other operators.

5.10.4. Data Sub-Band Management – Conclusion

Given the three identified channel access control groups and their relative impacts, it is therefore prudent, when defining centres of activity for data modes, to consider grouping data modes into Centres of Activity that in part consider their channel access control mechanisms,

Recommendation #5: that the Region 3 band plan committee consider defining data sub-mode centres of activity that take into consideration the three families of channel access mechanisms used. Specifically:

- Conversational – "manually look before activating a transmitter" modes.
- Time Synchronised "Semi Blind" channel access modes
- Carrier Sense Multiple Access "Automatic" channel access modes

5.11. Future Communications Modes requirements

Digital modulation-based voice & image transmission modes represent the new future for amateur radio. The nature of these modes, with their long transmission cycles and typically wide bandwidths, mean they are not well suited to mixing with the other digital modulation-based data modes.

However, such modes do not have a clear position on the band to operate on within the current IARU Region 3 band plan. It was noted that the WIA proposed that such operation share the priority voice sub-band (which is used for SSB analogue transmissions today), but that they received mixed feedback to that suggestion. Some concerns were received by WIA that digital voice operators would potentially suffer from interference due to recognition challenges that analogue voice operators face in identifying whether it is a legitimate data signal or whether it is locally generated interference from their local solar panels or VDSL internet services (as examples).

IARU Region 3 also notes that Region 1 has set aside 7070 kHz for digital modulation-based voice activity. The partnering of digital voice and data communications in one band segment will likely reduce the risk of interference, at least for now, between the analogue and digital voice communities. It is a decision, however, that will need reconsideration in the future should interest in digital voice modes expand beyond a purely experimental base that it has today.

Recommendation #6: that digital voice operation, while identified as distinctly separate from data mode operation, be positioned in the band alongside data mode operation at this time, until such time as interest in these modes expands to something more than basic experimentation.

6. What is a fair proportion of spectrum per mode?

One of the hardest questions to answer with any proposed change to an amateur radio band plan is to determine how much spectrum should be made available for each interest group. Invariably, any such process will lead to a reallocation discussion between interest groups. Classic legacy modes invariably find they need to give way to accommodate the new interests, and as is human nature, there will always be resistance to such changes.

We should not, however, shy away from these conversations. It will only be through discussion that we can move forward, and so it is appropriate for all operators from time to time to consider their fellow amateurs, their relative interests in amateur radio, and ask themselves, is the current arrangement fair and equitable?

To begin these deliberations, we have first considered what the current band segment allocations are in various locations around the world.

Existing 40m Band Priority Access Mode Allocations in kHz

Country / Region	Priority CW	Priority Data Modes	Shared Voice / Data Modes	Priority Voice
Region 1	40 kHz	10 kHz	10kHz	140 kHz
Region 2	50 kHz	0 kHz	13 kHz	147 kHz
Region 3	30 kHz	0 kHz	30 kHz	140 kHz
Japan[6]	30 kHz	0 kHz	170 kHz	170 kHz
Australia[7]	40 kHz	26 kHz	0 kHz	134 kHz (234 kHz)
Indonesia [8]	25 kHz	5 kHz	10 kHz	170 kHz
New Zealand[9]	35 kHz	40 kHz	0 kHz	125 kHz (225 kHz)
Thailand	30 kHz	0 kHz	30 kHz	170 kHz
South Korea	25 kHz	0 kHz	10 kHz	160 kHz
United States[10]	80 kHz	45 kHz	0 kHz	175 kHz

Figure 6 – Table of band segment holdings for a selection of IARU Region 3 member societies

What is particularly noteworthy is how little priority spectrum is typically set aside in the band plans for data modes, and how many of the data mode segments are shared with Voice operators under the banner "All Modes." It is also interesting to see how many Region 3 member society band plans compress priority CW access data into the lower 30 kHz (or less) of the band, and how many do not support priority allocations for data modes on the band. It would appear this is a by-product of the pre-WRC2003 expansion of the 40m.

This establishes a clear case that it is time Region 3 member societies considered making updates to their national versions of their band plans as a matter of urgency. After all, a band plan is only effective if it is widely communicated and is followed by the majority. We are failing that basic requirement within Region 3 today.

[6] Japan revised their band plan in September 2023 when their regulations were relaxed relating to data modes
[7] Australian SSB operators have access to an additional 100kHz between 7200-7300 kHz however that is on a secondary basis and is effectively not usable due to broadcasting users in Region 3 during darkness hours. https://www.wia.org.au/members/bandplans/data/
[8] https://www.ybdxc.net/2016/11/08/indonesian-amateur-radio-band-plan/
[9] New Zealand SSB operators have secondary access to 7200 – 7300 kHz which is not usable after dark (broadcasting)
[10] https://www.arrl.org/band-plan

6.1. Band Capacity Modelling Baseline

One of the key principles that we wish to follow when determining how much spectrum each of the major interest groups of Phone, CW and data should be allocated, is to find a fair balance of allocated spectrum compared to an unbiased measure of the level of activity in each area of interest. To do this, we first need to understand what the correct quantum of spectrum is that each mode requires to operate.

After some feedback and investigation, we are proposing that each mode be allocated the following bandwidth's per channel.

Channel bandwidth requirements by operating mode.

Mode	Bandwidth required for one transmission
CW	500 Hz [11]
SSB	2700 Hz
FT8	50 Hz [12]
FT4	83.3 Hz
Data (narrow)	500 Hz
Data (wide)	2700 Hz

Figure 7 – Table of operating mode bandwidths

It is worth noting that in this paper, we have reflected bandwidth requirements per mode based on a combination of previous ITU standards (in the case of CW) and the Region 1 existing Narrowband Data definition.

Having established that as a baseline, we then considered what does this mean in terms of current simultaneous channel capacity. This is a measure that communicates how many simultaneous conversations can be achieved within a given single propagation zone (i.e. ignoring potential frequency reuse because of skip zones, achievable coverage, and day/night impacts etc).

To deal with the Shared modes band segments, we have specifically listed band segments that priority for one mode only verses segments that are shared. The data channel counts are also representative only, given that FT8 can operate with frequency domain collisions present.

Given the aim of eventual global harmonisation, we have then calculated this for each of the main IARU Regions based on their published band plans.

[11] The ITU-R standards previously set in Article 52 Appendix 17 of the radio regulations the minimum bandwidth of 500 Hz for telegraphy

[12] It is noted that these modes with their error correction can operate with overlapped transmissions, however for the purposes of this estimation, noting the channel demand described earlier, this model has used the bandwidth figure as an uncontested bandwidth use figure in a broader % occupancy figure to simplify the assessments.

IARU Region 1 – Channel Capacity vs Existing Band Plan allocation

Mode	Mode BW (Hz)	Priority	Channel count	Shared	Channel count
CW	500	40.0	80	0.0	0
SSB	2700	137.0	50	10.0	3
FT8	50	0.0	0	3.0	60
Data (NB)	500	13.0	26	0.0	0
Data (WB)	2700	0.0	0	7.0	2

Figure 8 – Table of channel counts per mode
(Voice shared includes the FT8 channel on 7074 kHz)

IARU Region 2 – Channel Capacity vs Existing Band Plan allocation

Mode	Mode BW (Hz)	Priority	Channel count	Shared	Channel count
CW	500	40.0	80	10.0	20
SSB	2700	144.0	53	3.0	2
FT8	50	0.0	0	3.0	60
Data (NB)	500	0.0	0	10.0	20
Data (WB)	2700	0.0	0	3.0	1

Figure 9 – Table of channel counts per mode
(Voice shared includes the FT8 channel on 7074 kHz)

IARU Region 3 – Channel Capacity vs Existing Band Plan allocation

Mode	Mode BW (Hz)	Priority	Channel count	Shared	Channel count
CW	500	30.0	60	10.0	20
SSB	2700	137.0	50	23.0	8
FT8	50	0.0	0	3.0	60
Data (NB)	500	0.0	0	10.0	20
Data (WB)	2700	0.0	0	20.0	7

Figure 10 – Table of channel counts per mode
(Voice shared includes the FT8 channel on 7074 kHz)

These charts provide a normalised baseline for channel capacity, so that changes in allocated kHz can be more readily compared in terms of relative channel capacity rather than bandwidth.

6.2. Options for modelling demand – available inputs

Having set what the baseline delivered capacity is today, next we consider what options are there to understand the demand being applied to that capacity. There are multiple ways that might be

suitable to generate that understanding, each with varying levels of validity. The following are the methods that were considered:

Option	Description	Evaluation
1	Conduct a spectrum monitoring campaign following ITU industry standard methodologies	To achieve an unbiased outcome, this would require an extended period of monitoring and an extensive network of monitoring stations to capture the activity that occurs on the band today. The resources required to achieve this, to a standard that would see the results be accepted to the amateur community, may not be practical.
2	Collect data from the Reverse Beacon Network on signals decoded and reported.	This would enable reporting from multiple sites across the world, however it has the significant shortcoming that it only reports on CW activity (and limited RTTY activity). The RBN is unable to provide any insight on how much voice activity is present. The number of RBN nodes across SE Asia is also an issue with gaps in reporting likely.
3	Collect data from the PSKReporter network	PSKReporter has the same problem that the RBN has in that it is only collecting data for part of one of the activity groups (mostly FT8 these days).
4	Collect data from the DX Cluster network on reported activity spots	This was only briefly considered before being dismissed. There are multiple problems with this as a data source including: • Not every QSO is reported on the DXCluster. • Typically, whole groups of activity do not get reported – including nets and general two-way discussion traffic. • Not even every DX QSO is reported. In short, the DX Cluster network is too subjective to yield any meaningful data
5	Collect data from ARRL's Logbook of the world of the volume of logged QSOs by operating mode and region	Statistical data of this nature is not readily available from the LOTW system. It is likely it would miss daily conversational and net traffic as well, as it is geared more towards DXCC reporting rather than band activity logging.

Option	Description	Evaluation
6	Obtain empirical data from user groups to gain an indication of the amount of activity by group	Unfortunately, this approach was set aside as it was seen to have too great a potential for it to be hijacked by special interest groups providing distorted subjective information. Identifying suitable user groups was also viewed as problematic. The only way this may yield semi-unbiased data would be to conduct a widescale survey of operators through every IARU member society across Region 3.
7	Collect data from other open logging systems that capture a data set that contacts insights into all three major activity categories of CW, Voice and Data.	We considered other logging systems, including QRZ.com and Clublog. We also note that the WIA consultation did take an approach of using the available statistical data from Clublog to try and develop a model of usage, but that was widely rejected by the amateur community.

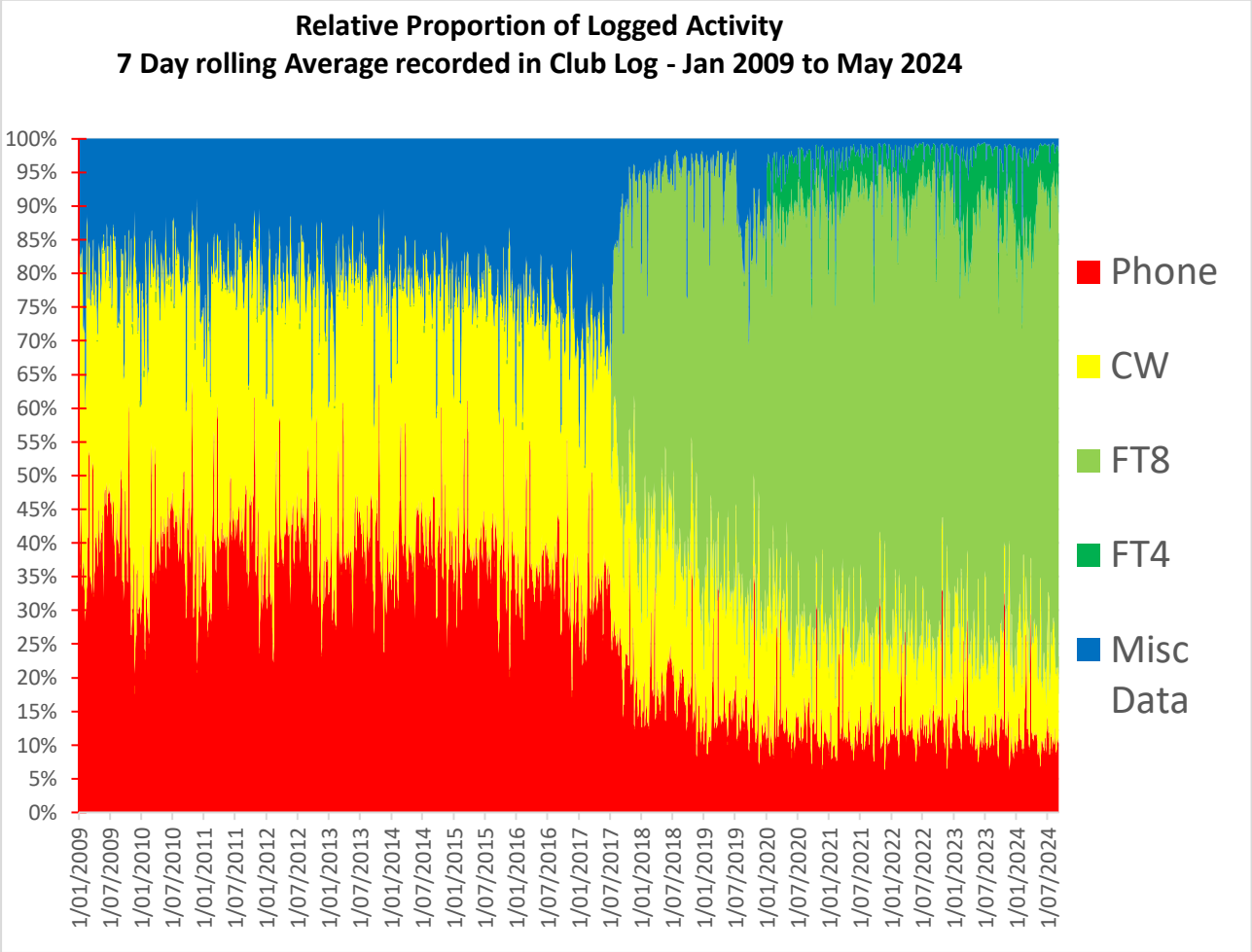
Figure 11 – Usage Evaluation methodologies considered.

As can be seen from the evaluations, none of the methods that have been identified so far have been able to meet the bar set for an impartial unbiased measure of spectrum usage.

The one source where data was at least available for all modes on a logged QSO count/day basis, the Clublog system, has been discounted for the following reasons:

- It was clear that not enough amateurs were using Clublog, and so it was doubtful that the benchmark for statistical significance of the data had been reached.
- Clublog, being designed to cater for the DX community, would have been biased towards long haul HF communications and not been representative of QRP or local communications interests.
- The data could only be sourced for “All Bands” with no breakout for 40m specific data.

Considering these outcomes, while we agree it is not appropriate to directly link Clublog usage to band space proportionality, the one thing that can be drawn from the Clublog data is the undeniable explosion of interest in data modes, specifically the WSJT based modes like FT8. This should be weighed against the fact that data modes have not been given the same recognition in the band plans, a fact that risks the band plans becoming obsolete if not addressed.



Finally, in considering how to model demand, the conclusion has been reached that due to the nature of amateur service communications and activity logging, that no acceptable direct unbiased model of demand will be achievable. This is significant, because it only leaves us with what are subjective means to determine a way forward.

Request for Feedback #3: the Region 3 member societies are invited to propose alternative methods to determine a fair balance of priority spectrum allocations to those evaluated here for consideration to see if we can improve on a method to fairly determine a suitable balance of priority band allocations for each family of modes.

6.3. Alternative Planning Approach – Empirical activity assessment

To progress any new band plan design, it is necessary to determine an alternative method for assessing band utilisation drivers for each of the major sub-sets of modes. Some modes are easier than others to do this, although it is recognised that in moving away from an objective based approach, this more subjective method will be open to influence from special interest groups to achieve consensus.

Having said that, for some forms of activity, it is still a simple matter to propose a particular quantum of spectrum. The data modes are a candidate for that type of capacity assessment. For the

other modes, consideration of factors such as the usability of the spectrum (as opposed to external non-amateur interference) as well as maintenance and avoidance of changes to existing centres of activity may assist in shaping an acceptable outcome.

6.3.1. Data Activity Capacity Assessment

We will start our assessment of required data mode capacity by considering the existing published centres of activity- (e.g. Winlink node listings, WSJT operating channels for Fox and normal mode traffic, WSPR channels and conventions for RTTY, PSK, Olivia and others).

For example, when examining typical data traffic:

- FT8 – traffic is usually on a main 3kHz channel but can regularly have up to 2 DX-pedition stations active at the same time. This suggests that up to 9 kHz should be identified for FT8 data alone. Given the current congestion on the primary 7074 kHz FT8 channel, it may be necessary for the primary centre of activity to be expanded for everyday communications too.

- FT4 usually only requires one 3kHz channel based on activity levels observed on that mode.

- WinLink and similar Store and Forward/Mailbox based activity – when operated in wideband VARA mode, occupies up to 2.7kHz / channel. Based on the number of reported active gateways[13] on disparate frequencies today, it could be argued that a minimum of 10 kHz should be set aside for Winlink activity (and in some regions this needs to be expanded to 15 kHz based on the current number of active mailbox stations).

- Ad Hoc data – PSK/RTTY/Olivia/JS8Call etc are harder to assess, however it is common to see at least 1-2 QSOs in each of these modes active during certain times of the day. On that basis, if we allowed 5kHz conversational "look before transmit" types of data communications for PSK, RTTY, Olivia etc and a further 3kHz for JS8Call we should then set aside ~8 kHz for general data traffic on the band.

All up, this suggests a minimum demand of 30 kHz of data spectrum (not considering the temporary high demand situations created during contests).

A critical point, however, is that unlike the existing arrangements, a future band plan should consider providing this amount of spectrum on a priority basis, and no longer shared with "All Modes." The amount of data mode activity today more than justifies such an allocation.

> ***Recommendation #7:*** That a future IARU Region 3 band plan consider supporting a minimum of 30 kHz of priority data only spectrum.

[13] https://www.winlink.org/RMSChannels?qt-live_winlink_information=1#qt-live_winlink_information

6.3.2. CW Activity Capacity Assessment

When assessing CW activity, there are several considerations we can begin with (a number of which were highlighted repeatedly by members of the CW community who responded to the earlier WIA 40m band consultation).

- CW continues to be challenged by non-amateur based interference, which is still observed across IARU Region 3, particularly in the lower 10-20 kHz. Amateurs located predominantly in VK6 reported this in the WIA consultation responses.

- A core CW interest frequency is 7030 kHz, which is the current global QRP operation Centre of Activity. Often stations using this channel are not frequency agile and so would be challenged to continue their activities if it were to move.

- Licence grade restrictions in the USA (where less than 20% of amateurs there can access the spectrum below 7025 kHz) impact the ability to conduct international communications to and from that region. This is another motivation to preserve priority CW access above 7025 kHz (and indeed considering the IARU Region 3 current band plan, provides a motivation to consider expanding it from 7030 to 7040 kHz).

- Considering the existing IARU Region 1 and 2 arrangements which provide for 40 kHz of un-shared priority access for CW activity, it is beholden on Region 3, as the outlier, to update its arrangements to keep in step with the rest of the world.

Recommendation #8: That a future IARU Region 3 band plan consider expanding its Priority CW access segment to support a minimum of 40 kHz of CW only spectrum (to align with IARU Region 1 and the IARU Region 2 priority segment)

6.3.3. Voice / Image Activity Capacity Assessment

The demand for voice activity varies, particularly during contests. Across Region 3, it is also influenced by the licensing arrangements imposed by our Region 2 neighbours, particularly those defined by the FCC who have limited voice mode operation to frequencies above 7125 kHz for Extra Class amateurs, and above 7175 kHz for General class amateurs. To maximise consistency particularly for long distance communications, it is therefore important that analogue voice modes be given priority at least above 7125 kHz, and where practical, Region 3 domestic only voice communications be guided to use to the voice segments below 7125 kHz.

Three centres of activity have also been identified in the voice segment which should be preserved:

- SSB QRP Activity on 7090 kHz
- SSB Emergency Activation calling frequency on 7110 kHz.
- SSTV Calling frequency on 7171 kHz (to align with Region 2)

Finally, one of the over-arching objectives for voice operation must be to separate out voice and data mode operations onto their own individual Priority band segments. This will reduce the level of interference that currently exists between these modes. This can be achieved without disturbing the existing centres of activity,

The situation to consider is that in Region 1 and 2 today, voice modes only begin above 7050 kHz and then only on a shared basis with data modes. Segments of the band between 7050 and 7080 kHz are also currently heavily used by data modes (most notably 7074 kHz which is occupied by FT8 signals) as well as numerous Winlink stations between 7050-7060 kHz. While Region 3 still lists voice activity down to 7040 kHz, it is uncommon for it not to be challenged with data operator interference in that segment as well.

The question therefore is what is the real impact proposed?

If we were to consider the channel count reduction only for spectrum where voice operation has been given higher priority (which is above 7060 kHz in IARU Region 3) and excluded the shared "All Modes" FT8 centres of activity between 7074-7080 kHz where SSB voice is already effectively excluded, the real net impact to current SSB voice operations is only a reduction of 14 kHz, or 5 channels (7060 – 7074 kHz).

The gain is that with the aggregation of data modes into one priority segment, and voice into another, the conflict between the modes should be reduced if not almost eliminated – at least between amateur operators. This aligns with the primary principle of band planning, to manage interference!

Recommendation #9: that a future IARU Region 3 band plan consider withdrawing the shared "All Modes" spectrum between 7040 – 7080 kHz for voice operation in Region 3 and that this segment be allocated to Data Modes on a priority basis, noting that the net effective impact to SSB operations today is expected to only be a reduction of 14 kHz of usable spectrum (or the equivalent of 5 current channels).

Finally, given that the demand for digital modulation-based voice activity has yet to be established, nor are its real interference impacts to analogue SSB operators clearly understood, it would be prudent for now to continue to nominate a segment either within or adjacent a data modes segment for these experiments to continue.

It is recognised that this will create a barrier to digital voice communications being undertaken with amateurs in the USA, but given the low level of activity, and the remaining "All Modes" designator proposed for the band above 7080 kHz, it would seem a reasonable position at this time to only recommend a lower band segment adjacent the data band, while accepting that ad Hoc international communications experiments may occur into the USA using these modes on higher frequencies as required.

Digital SSTV modes could also be grouped in the same basket. This grouping of digital voice activity, digital SSTV activity and Datamodes activity is particularly helpful as it justifies up to an additional 10kHz of Data mode or Digital modulation-based voice modes being allocated in a single band segment. What this achieves is ultimate simplicity of the band, where CW is at the bottom, Data and Digital modes are in the middle and analogue voice is at the top. This meets one of the primary objectives set forth for band planning earlier in this paper.

6.4. Example: One Method of providing dedicated spectrum per mode

Give the capacity analysis undertaken in section 7.3, we will now bring the picture together and test whether the proposed capacity recommendations can produce a fair outcome. We do this by preparing an example of what those decisions may lead to in terms of a new band plan design.

If we return to the channel capacity view of the current IARU Region 3 band plan, lets then consider which modes are gaining spectrum and which ones are losing it. To make the assessment more realistic, we will also consider that SSB has already lost the 6 kHz around the 7074 kHz FT8 channel, and that common convention in most nations in Region 3 is to already avoid SSB operation between 7030 and 7040 kHz. That then forms the "Current Activity" view below.

From that position, if we then consider the demand assessments above, and calculate the channel count if the above recommendations were to be implemented, we find the following outcome:

IARU Region 3 – Example Channel Capacity vs Existing Band Plan allocation

Mode	Mode BW (Hz)	Current Band Plan				Current Activity (Actual Priority use view)		Proposed Impact	
		Priority Bandwidth	Channel count	Shared Bandwidth	Channel count	Bandwidth	Channel Count	Bandwidth	Channel Count
CW	500	30.0	60	10.0	20	40.0	80	40.0	80
SSB	2700	137.0	50	23.0	8	137.0	50	120.0	44
FT8	50	0.0	0	3.0	60	3.0	60	3.0	60
Data (NB)	500	0.0	0	10.0	20	10.0	20	10	20
Data (WB)	2700	0.0	0	20.0	7	10.0	3	17	6
Digital Voice	2700	0.0	0	3.0	1	0	0	10	3

Figure 12 – Table of channel counts per mode – IARU Region 3 Band plan today vs Future if demand accepted.

Compared to the current activity the summary of the changes would be:

- ~3 SSB channels would be reallocated to support moving the data segment up 10 kHz to align the CW segment globally.
- ~1 unusable SSB channel (that clashes with the FT8 activity today) would be reallocated to DATA priority (FT8) spectrum (3 kHz of spectrum)
- ~2 SSB channels are reassigned to Priority DATA modes.

The net impact of this design is that 6 Priority SSB channels from the 7060-7074 kHz band segment would be reallocated to provide for both an additional 10 kHz to the CW modes (to align with Region 1 and 2), and a new priority DATA and Digital Voice mode only segment between 7040-7080 kHz (after the reallocation of the existing shared 7040-7060 kHz voice channels).

Request For Feedback #4: Region 3 member societies are invited to comment on whether the overall reallocation potential presented by the capacity analysis in this paper yields a fair outcome for spectrum reallocation.

6.5. Relative Positioning of Modes within the band

Having reached the conclusion that rebalancing is required, then the issue to be tackled is how to align the spectrum for each activity. Specifically, what is the best way to arrange the spectrum that supports the objective of minimising conflict between disparate modes.

Some existing rules worth considering and continuing would be:

1) CW operation should always start from the bottom of the band. (This is a long-standing position that does not need to change)
2) SSB operation should always start from the top of the band – (again this is also a long-standing arrangement)
3) Data modes form the boundary between CW/SSB. The high spectrum utilisation, particularly of the primary FT8 calling channel, in fact acts today as a useful marker in many bands for the border between CW and other operating modes.

A particular aspect of band positioning has been the driver to maintain band simplicity. This was initially being made complicated by the fact that justification could only be drawn up for 30 kHz of spectrum for data mode activities. This coupled with the fact that the existing key FT8 channel on the band fell outside of the resulting natural 7040-7070 kHz band segment was a problem.

To address this, we looked back at how the other regions had managed the digital voice activity. We noted that Region 1 had set aside 7070 kHz for this mode and decided that it would be appropriate to retain a band position for that activity around the same frequency. To this end, the notional assignment of a 10 kHz digital voice segment for the purpose of experimentation in the 7064-7074 kHz segment justified removing the disjointed SSB voice segment that had plagued the band plan design for years. This was the key that helps justify 40 kHz data for digital modulation-based modes today and delivers on the requirement to keep the band plan simple.

6.5.1. Contest Activity Considerations

One of the natural results of this situation will be that CW operators will naturally spill across the data mode segment in the event of a large contest. Likewise, data mode operators will spill across the lower end of the voice segment. In the case of Voice operators, some may still operate in the 7050-7070 segment for contests, but it will be discouraged for day-to-day voice operations.

The advantage of following these simple rules is that the overall band plan will remain “simple.” This is key to helping gain understanding and acceptance by the amateur radio community.

7. Final Recommendation for Consideration – Call to Action

Having laid out a case for change, a set of principles for designing the change and arguments for priority access spectrum each mode could be entitled to, the committee feels that there is now a compelling case for change.

Implementation of that change, however, requires much more publicity, and a wider pool of feedback to be gathered form the amateur radio community.

To move the project forward, the committee strongly feels that it is not appropriate, yet, to simply move a new band plan into existence. A first step, however, could be to provide direction to the HF Band Plan committee on what concepts in this paper the IARU Region 3 members support. The recommendations attached to this paper seek to achieve this.

However, that guidance should only be the first step. To achieve global harmonisation, it will be necessary to also work with Region 1 and 2 and have those organisations discuss this with their member societies too.

To this end, the following recommendation is made for consideration:

Recommendation #10: That having received initial guidance from the Region 3 members, that the Region 3 HF Band Plan Committee be requested to work with the Region 3 board to establish a three-way inter-regional committee to discuss the merits of the proposals endorsed by Region 3 and their introduction on a global scale.

The three-way committee is then requested to review the initial work from Region 3 and commence any activities required to build consensus for change to achieve global harmonisation of the 40m band plan as far as practical.

APPENDIX A - Recommendations and Requests for Feedback – Summary

The following is a summary of all the recommendations contained in this paper.

Recommendation #1: Given that this paper is considering the case for change to the 40m band plan, the following five listed principles be agreed to, as suitable foundations for considering any change to band plans within Region 3.

1. A band plan should be kept simple in structure. Complicated or overlapping segments should be avoided.

2. Consideration should be made to protect activities, particularly that are more susceptible to interference than others. E.g.:

    a. QRP Centres of Activity
    b. Emergency Communications requirements and expectations

3. Channel access control mechanisms and their ability (or otherwise) to manage interference should be considered, particularly for modes where the decision to activate a transmitter relies on some form of automation (e.g. data modes such as those in the WSJT based family or modes used in the automated store and forward mailbox type networks).

4. It needs to be recognised that for any change to a band plan to be successful, it needs to be built on a consensus agreement rather than being imposed. Any attempt to do otherwise should be expected to fail at the adoption phase.

5. Operators need to be convinced that any distribution of spectrum among different operating modes is fair for all.

Recommendation #2: when determining the structure of a band plan, there should be clear segments where only one mode has priority in that segment. The practice of grouping data and voice modes or data and CW modes as “All Modes” or “Shared” priority access segments should be discontinued.

Recommendation #3: That the term “DigiModes” be replaced in the IARU Region 3 band plan with the term “Data Modes” and that the definition of a “Data Mode” be any signal where the information being transmitted at no time originated in the analogue domain (i.e. does not include speech).

For clarity,

- image transmission, where the content has first been broken down into a binary stream which is then transmitted using a data type modulation system is considered a data transmission.
- image transmission modes that vary audio tone frequencies to represent luminance information are considered analogue modes and remain in the analogue “All Modes” band segment.

Recommendation #4: that the IARU Region 3 band plan continues to identify an Emergency Voice communications centre of activity frequency / sub-band for use as required,

Recommendation #5: that the Region 3 band plan committee consider defining data sub-mode centres of activity that take into consideration the three families of channel access mechanisms used. Specifically:

- Conversational – "manually look before activating a transmitter" modes.
- Time Synchronised "Semi Blind" channel access modes
- Carrier Sense Multiple Access "Automatic" channel access modes

Recommendation #6: that digital voice operation, while identified as distinctly separate from data mode operation, be positioned in the band alongside data mode operation at this time, until such time as interest in these modes expands to something more than basic experimentation.

Recommendation #7: That a future IARU Region 3 40m band plan consider supporting a minimum of 30 kHz of priority data only spectrum.

Recommendation #8: That a future IARU Region 3 band plan consider expanding its Priority CW access segment to support a minimum of 40 kHz of CW only spectrum (to align with IARU Region 1 and the IARU Region 2 priority segment)

Recommendation #9: that a future IARU Region 3 band plan consider withdrawing the shared "All Modes" spectrum between 7040 – 7080 kHz for voice operation in Region 3 and that this segment be allocated to Data Modes on a priority basis, noting that the net effective impact to SSB operations today is expected to only be a reduction of 14 kHz of usable spectrum (or the equivalent of 5 current channels).

Recommendation #10: That having received initial guidance from the Region 3 members, that the Region 3 HF Band Plan Committee be requested to work with the Region 3 board to establish a three-way inter-regional committee to discuss the merits of the proposals endorsed by Region 3 and their introduction on a global scale.

The three-way committee is then requested to review the initial work from Region 3 and commence any activities required to build consensus for change to achieve global harmonisation of the 40m band plan as far as practical.

In addition to recommendations, the committee is seeking further information from the IARU Region 3 member societies. Specifically:

Request for feedback #1: is there a need to set forth any more specific guidance for how contesting activity interference impacts with other amateur activity should be managed in the Region 3 band plan or are the current arrangements suitable. If your society believes improved guidance is appropriate, please outline what such arrangements could be.

Request for Feedback #2: The Region 3 EmComm coordinator and regional member societies are requested to consider the how Region 2 uses data networks like Winlink in emergency communications situations and provide input to the Region 3 HF Band Plan committee on whether improving provision for that sort of band use in Region 3 is warranted.

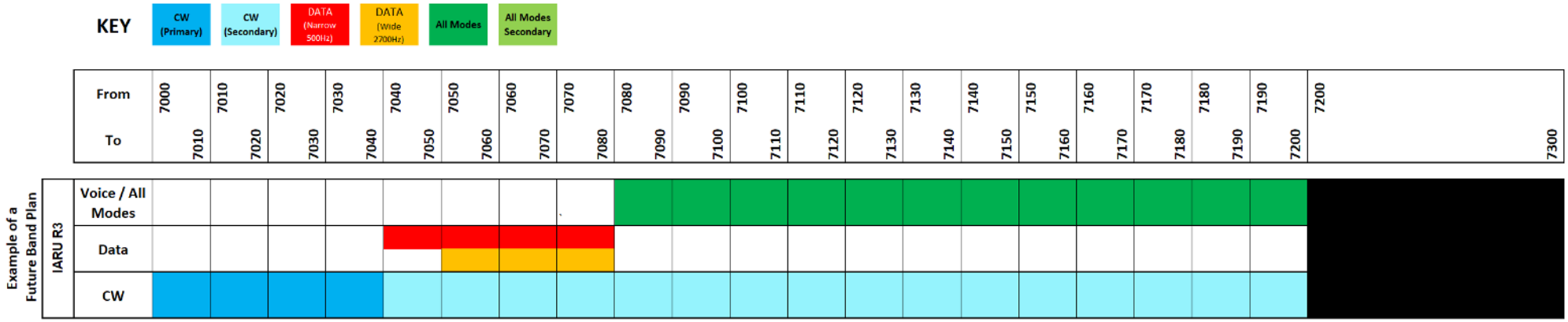
Request for Feedback #3: the Region 3 member societies are invited to propose alternative methods to determine a fair balance of priority spectrum allocations to those evaluated here for consideration to see if we can improve on a method to fairly determine a suitable balance of priority band allocations for each family of modes.

Request for Feedback #4: Region 3 member societies are invited to comment on whether the overall reallocation potential presented by the capacity analysis in this paper yields a fair outcome for spectrum reallocation.

APPENDIX B – Example 40m Band Proposal

Many of the concepts discussed throughout this paper are abstract in nature. The purpose was to lay down a new framework for how a band plan could be designed.

As an attempt to give some meaning to the abstract, we offer the following as an example of how the principles discussed could come together in a revision of the 40m band. This is not meant to be considered for adoption, rather it is merely an example designed to show one optional implementation of the proposals if agreed could deliver an outcome.



Centres of Activity:

CW	Data	Voice	Other
QRP – 7030 kHz	WSPR (QRP) – 7040.1 kHz +/- 200 Hz Conversational Data modes – 7040 – 7050 kHz * Automatic Controlled Modes – 7050 – 7060 kHz Experimental/Digital Voice – 7060 – 7070 kHz Time Synchronised Modes – 7070 – 7080 kHz: • FT8 (Primary Call Channel) – 7074 kHz • FT4 (Primary Call Channel) – 7060 kHz * Least impact to current IARU Region 2 shared priority CW segment activity	QRP – 7090 kHz Contest preferred – above 7110 kHz. Intercontinental preferred – 7175 – 7200 kHz Domestic preferred 7200-7300 kHz (daylight hours only in Region 3 where available)	Image transmission modes – SSTV - 7171 kHz ***(Region 1 and 3 only)*** Emergency Calling – 7110 kHz Emergency Traffic – 7100 – 7110 kHz