



# International Amateur Radio Union Region 1

Europe, Middle East, Africa and Northern Asia

Founded 1950

## Committee C4 (HF Matters) Interim Meeting 16-17 April 2016 InterCity Hotel, Vienna

<b>SUBJECT</b>	30m band planning		
<b>Society</b>	DARC	<b>Country:</b>	Germany
<b>Committee:</b>	C4	<b>Paper number:</b>	VIE16_C4_06
<b>Contact:</b>	Ulrich Mueller, DK4VW	<b>e-mail:</b>	dk4vw@darcd.de

### Introduction

Over the years the interest in operation with Digimodes has increased very much leading to congestion in those parts of the bands which are indicated for preferred mode 'Digimodes' in the IARU Region 1 band plan.

### Background

The IARU Region 1 Conference Davos 2005 adopted a new band plan philosophy based on bandwidth. A band plan working group made proposals for the width of different segments based on usage in the years before the Davos Conference.

Since then a lot of innovation in digital communication technique has taken place and is still going on. One major role of amateur radio is experimenting and this justifies the right to require bands allocated by ITU to the amateur service.

The width of Digimode preferred segments now seems to be insufficient to allow experiments and usage with digital modes without congestion. This can be observed especially on the 30m band, where the band plan shows 10 kHz for Digimodes and 40 kHz for CW. Operations in CW concentrate in the lower 30 kHz of the band.

A further reason is the increasing need to harmonise band plans in IARU Regions. This is most imminent for digimode segments because modern weak signal modes allow communication on minimum SNR levels never imagined before.

This issue has been discussed at the Varna conference where quite a few delegates had concerns with respect to discussions with administrations on a 5 MHz allocation in preparation of WRC-15. This was due to the fact that 10 MHz could be presented as an example of good coexistence of the amateur radio service and fixed and mobile services. Since the reference to 30m as proof of compatibility was rejected in the preparation process of WRC-15 and a 5 MHz allocation has been made, no such consideration is required anymore.

## Recommendation

It is recommended that the IARU Region 1 HF Committee C4 at the 2016 Interim Meeting discusses the congestion in the segments for preferred usage by digital modes. It is further recommended to modify the IARU Region 1 band plan for 30m:

FREQUENCY SEGMENT (kHz)	MAX BANDWIDTH (Hz)	PREFERRED MODE AND USAGE	
10100 - 10130	200	CW	10116 kHz - CW QRP Centre of Activity
10130 - 10150	500	Narrow band modes	Digimodes

## Annex 1: IARU Band Plan Comparison

The IARU Regions currently specify following bandwidth limits in the 30m band:

Frequency	◀ 10100	◀ 10110	◀ 10120	◀ 10130	◀ 10140	◀ 10150
Region 1	200 Hz				500 Hz	
Region 2	200 Hz			500 Hz	2700 Hz	
Region 3	CW (whole band) *			NB *		

\* Note that in contrast to other regions Region 3 does *not* specify any bandwidth limits in a graph, but instead just refers to the terms “CW” and “NB” and defines “NB” in notes as “Narrow bandwidth modes including CW, RTTY, Packet and modes with similar bandwidth not exceeding 2 kHz”.

## Annex 2: Spectrum Occupancy Surveys

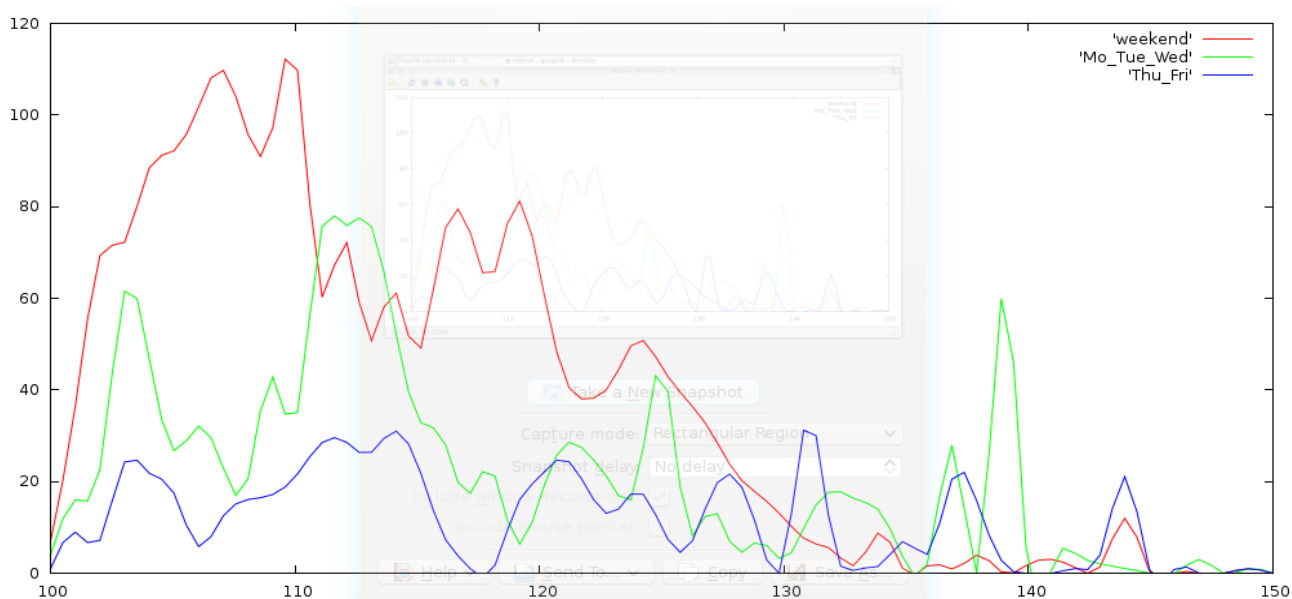
### 2.1 Total Registered Activity on RBN (by DL4UNY)

RBN is a globally operating system where receiving stations (called “skimmers”) constantly monitor and report CW activity in amateur bands. The following survey use 1 kHz wide channels and includes beacons (e.g. DK0WCY on 10144 kHz plus others not coordinated by IARU Region 1 below 10140 kHz).

#### Methodology

Graphs show number of distinct stations (“spots”) detected over a time range of 4 weeks. There are separate graphs for first half of the week (Monday through Wednesday, *green*), second half of the week (Thursday and Friday, *blue*) and weekend (*red*).

#### Graph



#### Conclusion

Most activity was detected between 10100 and 10120 kHz. Almost no activity was found above 10130 kHz.

### 2.2 Registered Activity on RBN during a day (by DJ1YFK)

#### Methodology

Reverse beacon network raw data from single days was used to compile a “heat map” style diagram of the band activity over full day. The band was segmented into 50 channels of 1 kHz bandwidth on the frequency scale and 96 slots of 15 minutes on the time scale. The number of RBN spots for each of the  $50 * 96 = 4800$  slots was counted and plotted.

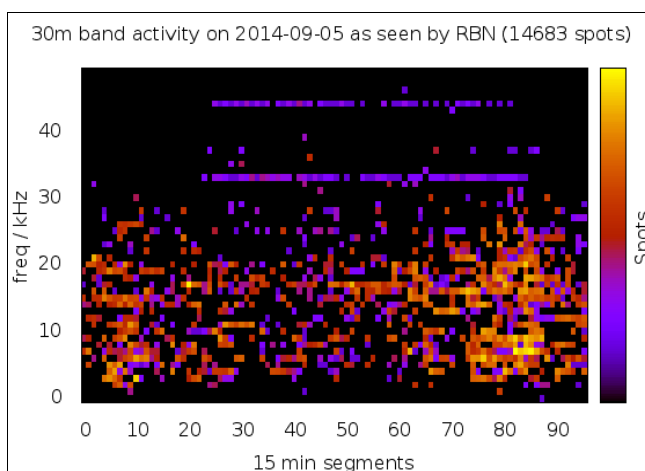
Since not all CW skimmers cover the whole 30m amateur band two plots were made: One that used raw data from *all* available skimmers and one that only used spots from those skimmers which are known to cover the *whole* band up to 10.150 kHz. These selected skimmers were ON5KQ, OH6BG and HB9DCO.

Below four graphs are shown. The first two show the typical band occupancy on a week day (Friday, September 5th, 2014), for the full data set (Figure 1) and the selected skimmers (Figure 2). The latter two (Figure 3 and 4) show the same for a day at a weekend (Saturday, September 6th, 2014).

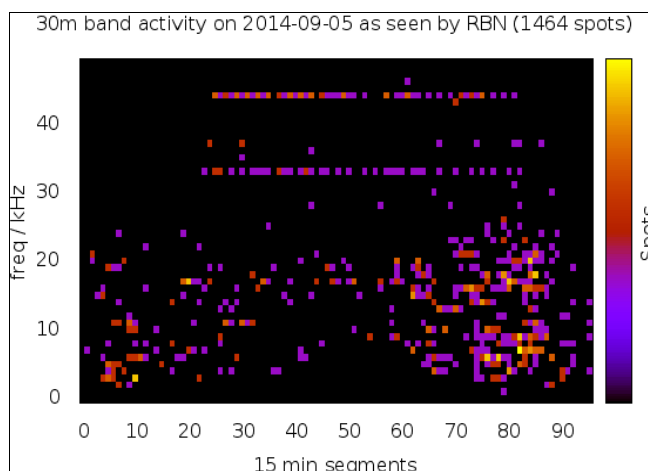
The number of RBN spots for each of the  $100 * 96 = 9600$  slots was counted and plotted. (0 => 0h, 96 => 24h)

Note that frequency runs from bottom to top in these illustrations and the time runs on the horizontal line from 0 (0h utc) to 96 (24h utc).

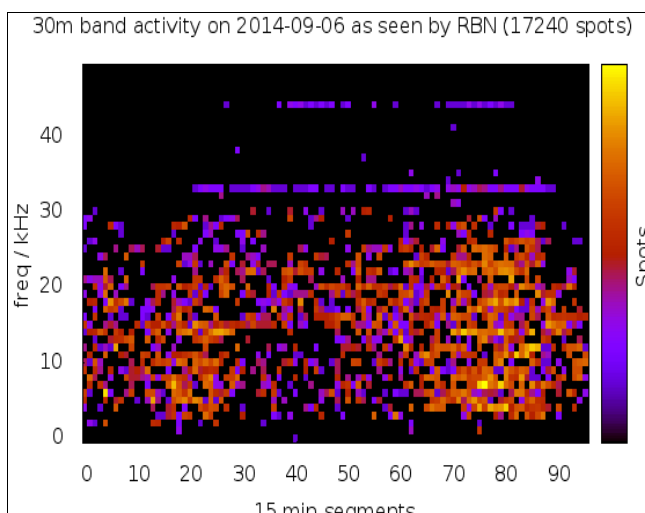
### Heat Maps (in year 2014)



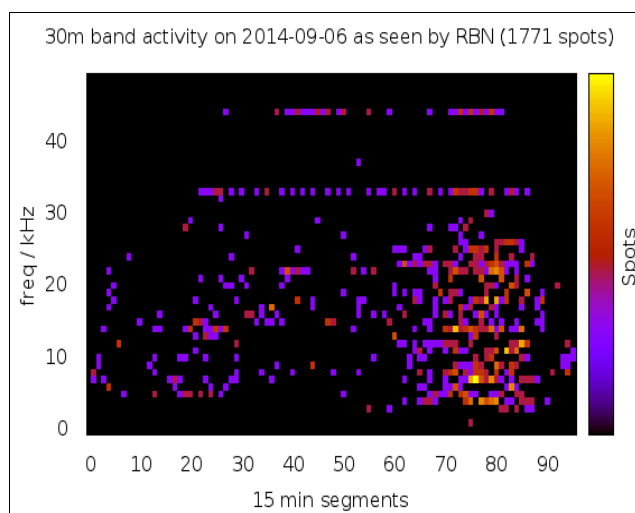
**Figure 1:** Activity from all skimmers on a Friday



**Figure 2:** Like Fig. 1 with selected skimmers (see text)



**Figure 3:** Activity from all skimmers on a Saturday



**Figure 4:** Like Fig. 3 with selected skimmers (see text)

Additional diagrams (heat maps) for first Wednesday and first Saturday (with contest activity) in month of March, June, September and December in 2015 were produced with RBN data using only skimmers covering the whole 30m band.

These skimmer stations were: HB9DCO, ON5KQ, OH6BG, DF4UE, DF7GB, DJ9IE, DL9GTB, DQ8Z, ES5PC, ES5TO, GW8IZR, HA1VHF, HB9DCO, ON5KQ, and SK3W.

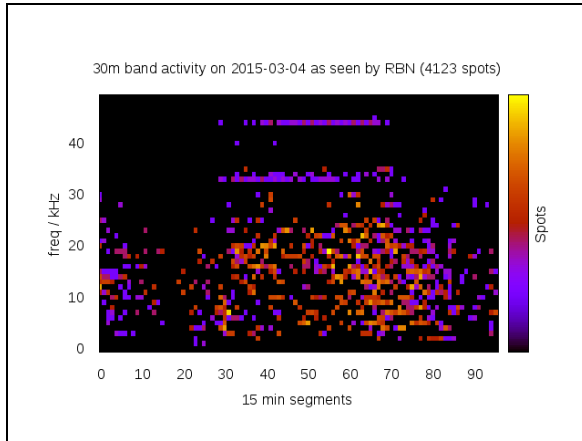


Figure 5: Activity on Wednesday 4 March 2015

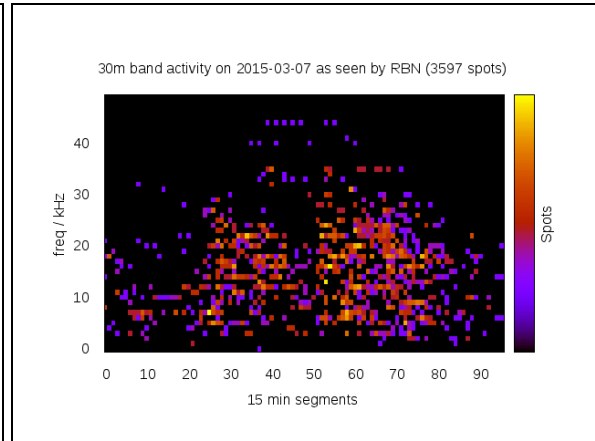


Figure 6: Activity on a Saturday 7 March 2015

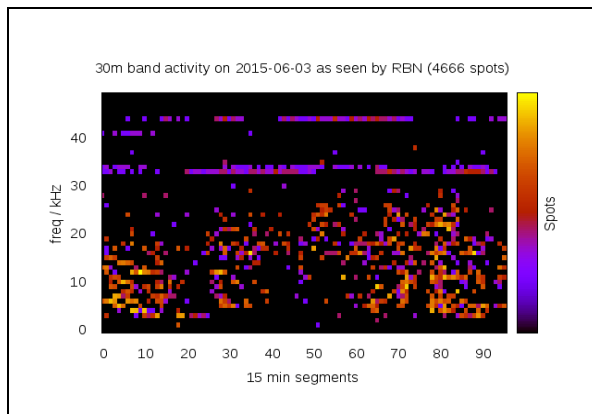


Figure 7: Activity on Wednesday 3 June 2015

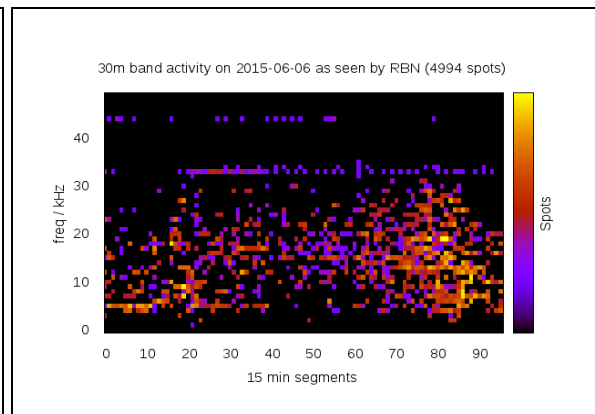


Figure 8: Activity on Saturday 6 June 2015

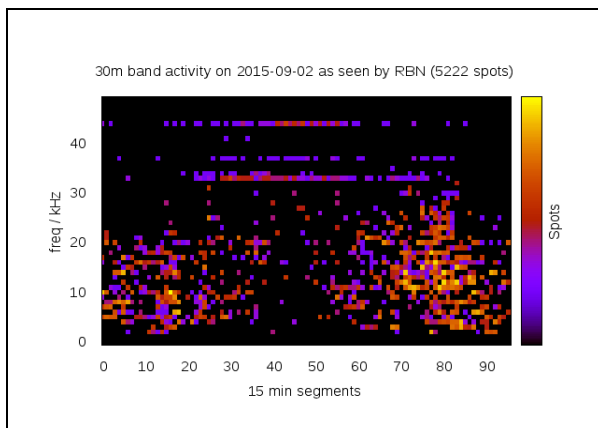


Figure 9: Activity on Wednesday 2 September 2015

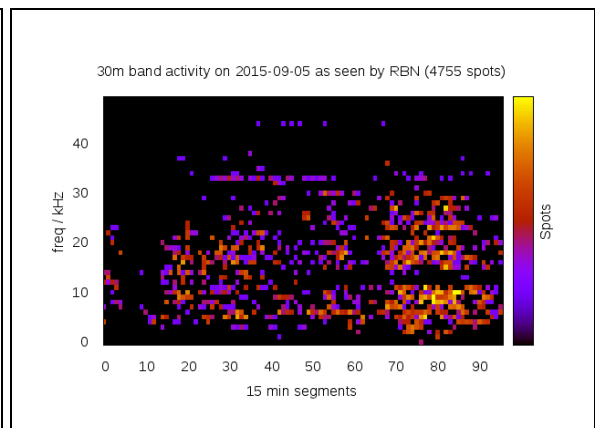


Figure 10: Activity on Saturday 5 September 2015

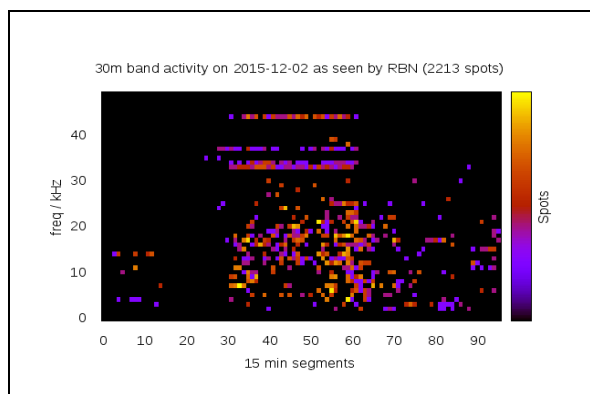


Figure 11: Activity on Wednesday 2 December 2015

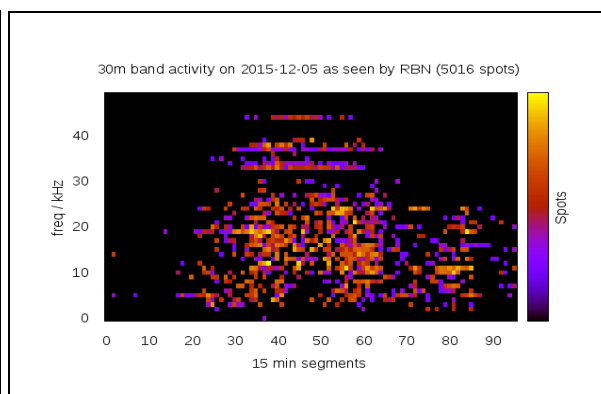
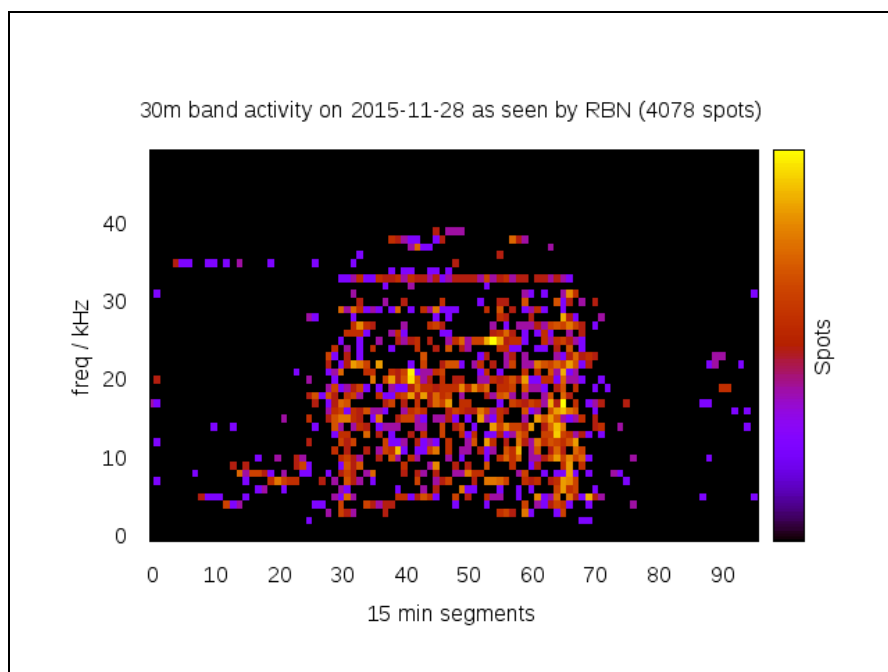


Figure 12: Activity on Wednesday 5 December 2015

The following diagram shows the CW activity on Saturday 28 November 2015, the date of CQWW CW contest which might lead non-contesters to use the 30m band.



Activity above 10130 kHz is mostly by beacons\*\* (SK6RUD 10133.0 kHz, OK0EF 10134, IT9LBK/B 10135, IK6BAK/B 10137, IK3NWX 10137, IK1HGI/B 10141, and DK0WCY 10144.0 kHz).

(\*\* IARU Region 1 discourages beacon operation on 10MHz (DK0WCY excepted)).

### Conclusion

Morse activity is concentrated in the lower 25 kHz of the 30m band. Despite the very generous assumptions that are made for a part of the band to be occupied (1 kHz channel width, 15 minute slots), there are still enough free frequencies to work CW QSOs at almost any time, even during the weekend, below 10130 kHz.

## 2.3 Band Utilisation as shown in SDR recordings (by DL8MDW)

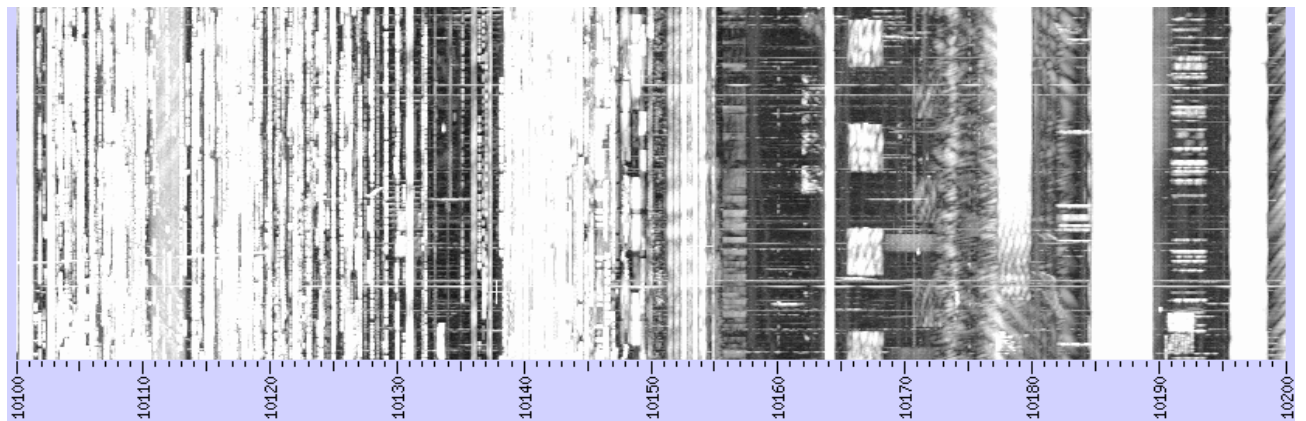
### *Methodology*

Between February and August 2014 a total of 101 samples of the frequency range 10100 to 10200 kHz<sup>1</sup> were recorded using a SDR. Each sample has a length of 1 minute. Recording times were random but most samples (> 80%) were recorded during times of increased amateur radio activity (i.e. on evenings and weekends).

From these samples two composite “waterfall” (spectrogram) pictures were processed, an *Aggregate View* and an *Activity View*.. Bright areas show the presence of signals.

### *Aggregate View*

This view shows all samples aggregated, i.e. if all received signals would have been present at the same time.

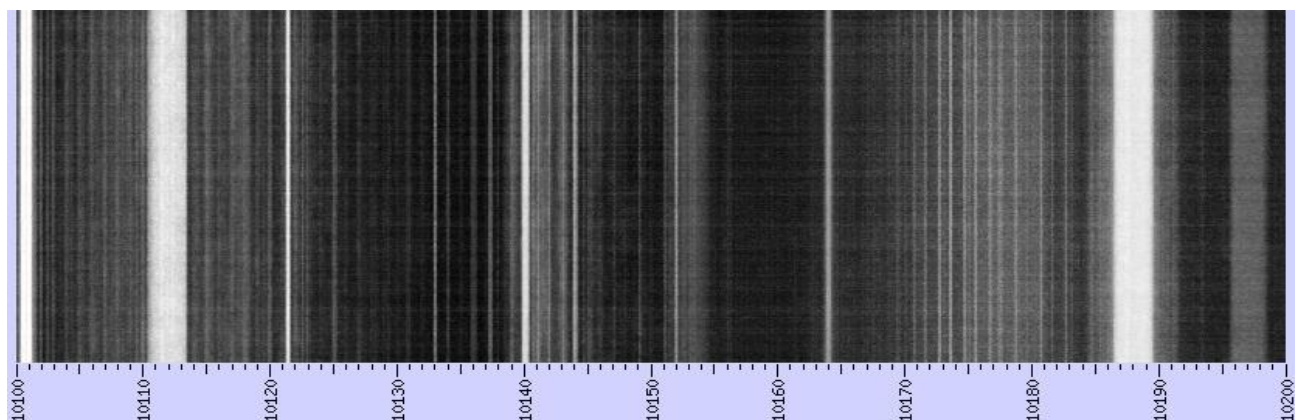


This allows distinguishing heavily used from less occupied areas. We see the 30m amateur radio band is heavily occupied from its beginning up to 10127 kHz when utilisation starts to decrease with a minimum between 10132 and 10138 kHz. From there utilisation is again intense (digimodes) up to the upper band limit.

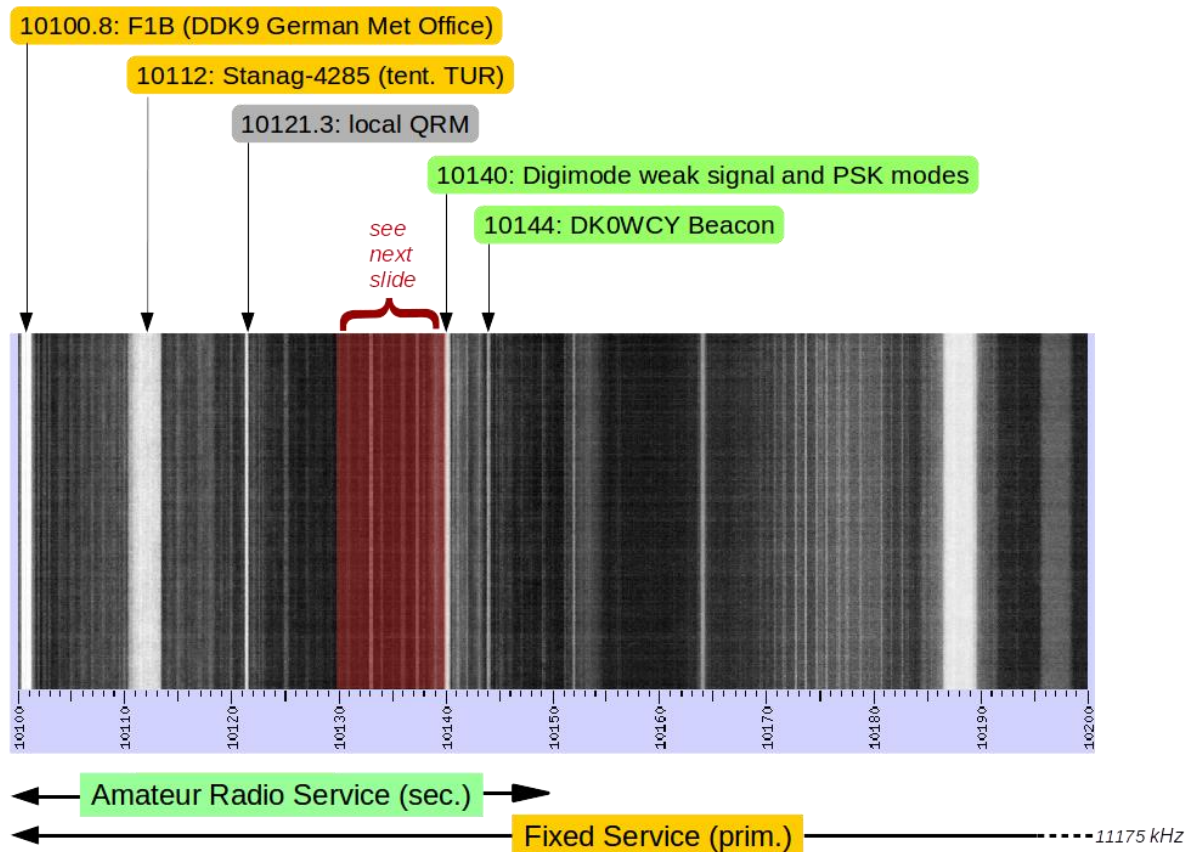
### *Activity View*

A second composite was produced where each spectrum slice in each sample was evaluated whether a signal is present in this slice or not. Each slice has a size of 120 Hz. The more often a slice was found occupied the brighter it. This means that in this view brightness does *not* express signal strength (as in the above aggregate view) but instead how frequently this slice is used.

### *Analysis*

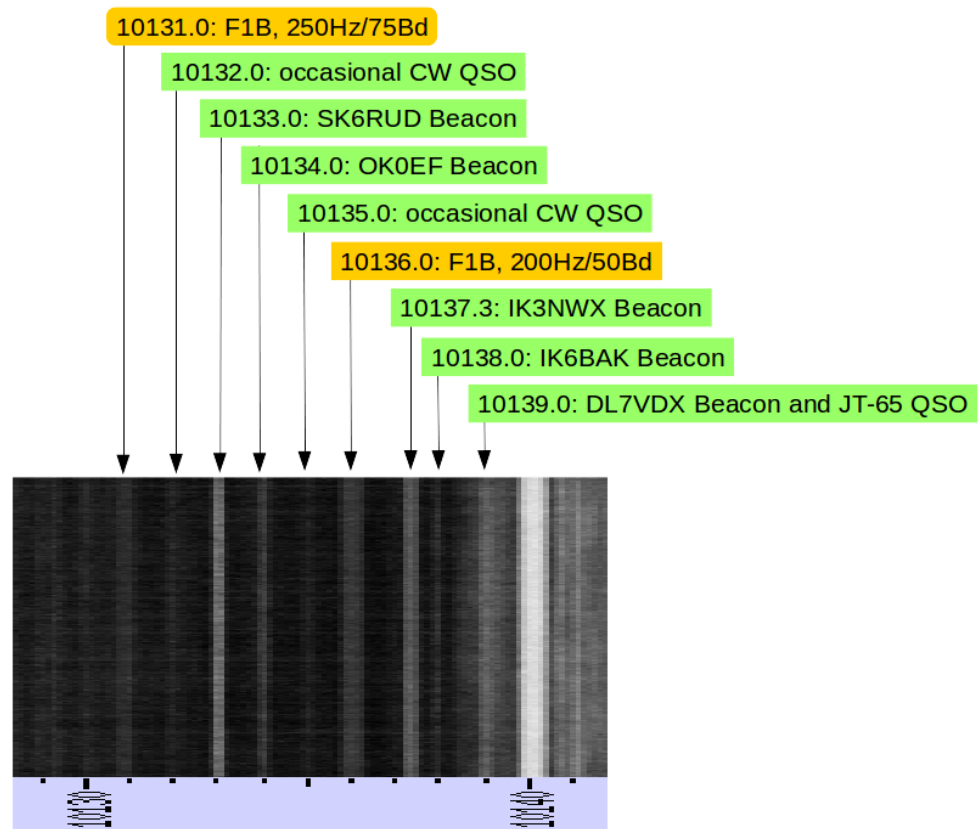


Immediately apparent are four very bright areas near 10101, 10112, 10121 and 10140 kHz. These areas are occupied virtually all the time. An analysis shows that only the utilisation around 10140 kHz is caused by amateur radio stations:



The frequency range under discussion (10130 to 10140 kHz, in the above image highlighted in red) also shows some frequently used areas. A deeper analysis yields the following result:





The increased usage above 10138 kHz is caused by digimode signals which are too low in frequency. As these are mostly JT-65 transmissions, it is likely that operators take the published “dial frequencies” as the actual transmit frequencies which is wrong. As the audio modulation frequency has to be added, transmission frequencies should be 1300 to 1500 Hz higher. Some signals may also originate from Regions 2 and 3 where the segment below 10140 kHz is already allocated to digimodes.

### **Conclusion**

The frequency segment from 10130 to 10140 kHz is only sparsely occupied by CW signals. Most utilisation happens in kHz steps. From the nine frequency slices identified as used, two belong to Fixed Service signals and five to QRP CW beacons. These beacons are not in agreement with the IARU Region 1 band plan.

### Annex 3: 30m Band Utilisation Chart (by G3NRW)

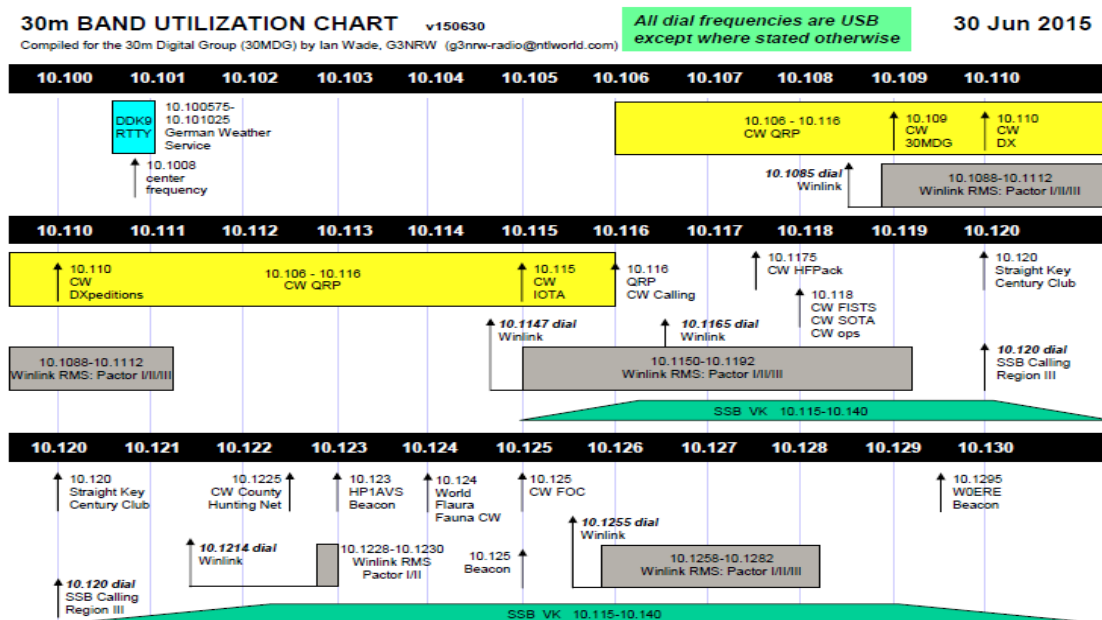
Source: [http://homepage.ntlworld.com/wadei/30m\\_band\\_utilization.htm](http://homepage.ntlworld.com/wadei/30m_band_utilization.htm)

Quote from this web page:

*The "30m Band Utilisation Chart" is exactly that. It is not a "band plan", nor even an "unofficial band plan".*

*Rather, it is an attempt to graphically portray the many modes that are actually in use on 30m today.*

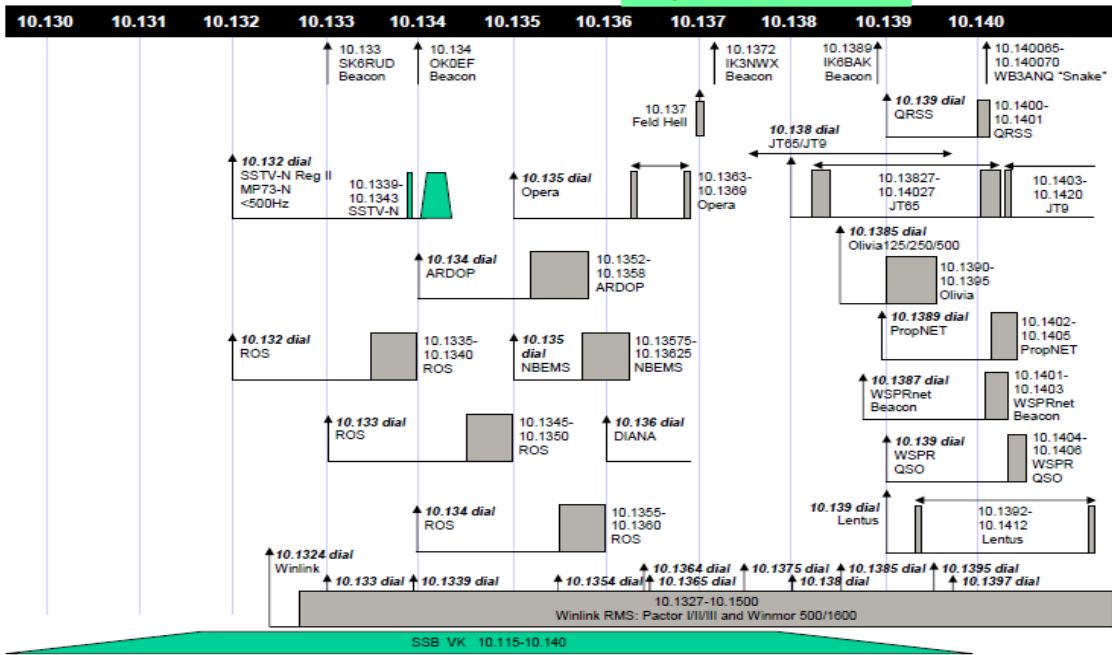
*There is a clear distinction between dial frequencies and emitted frequencies, helping you to accurately set the correct frequency and to identify signals as they appear on the waterfall.*



30m BAND UTILIZATION CHART v150630

All dial frequencies are USB  
except where stated otherwise

30 Jun 2015



30m BAND UTILIZATION CHART v150630

All dial frequencies are USB  
except where stated otherwise

30 Jun 2015

