ARRL
BAND PLAN UPDATE

RATPAC
Radio Amateur Training Planning
And Activities Committee

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ARRL
The national association for
AMATEUR RADIO

April 7, 2021

DISCLAIMER:

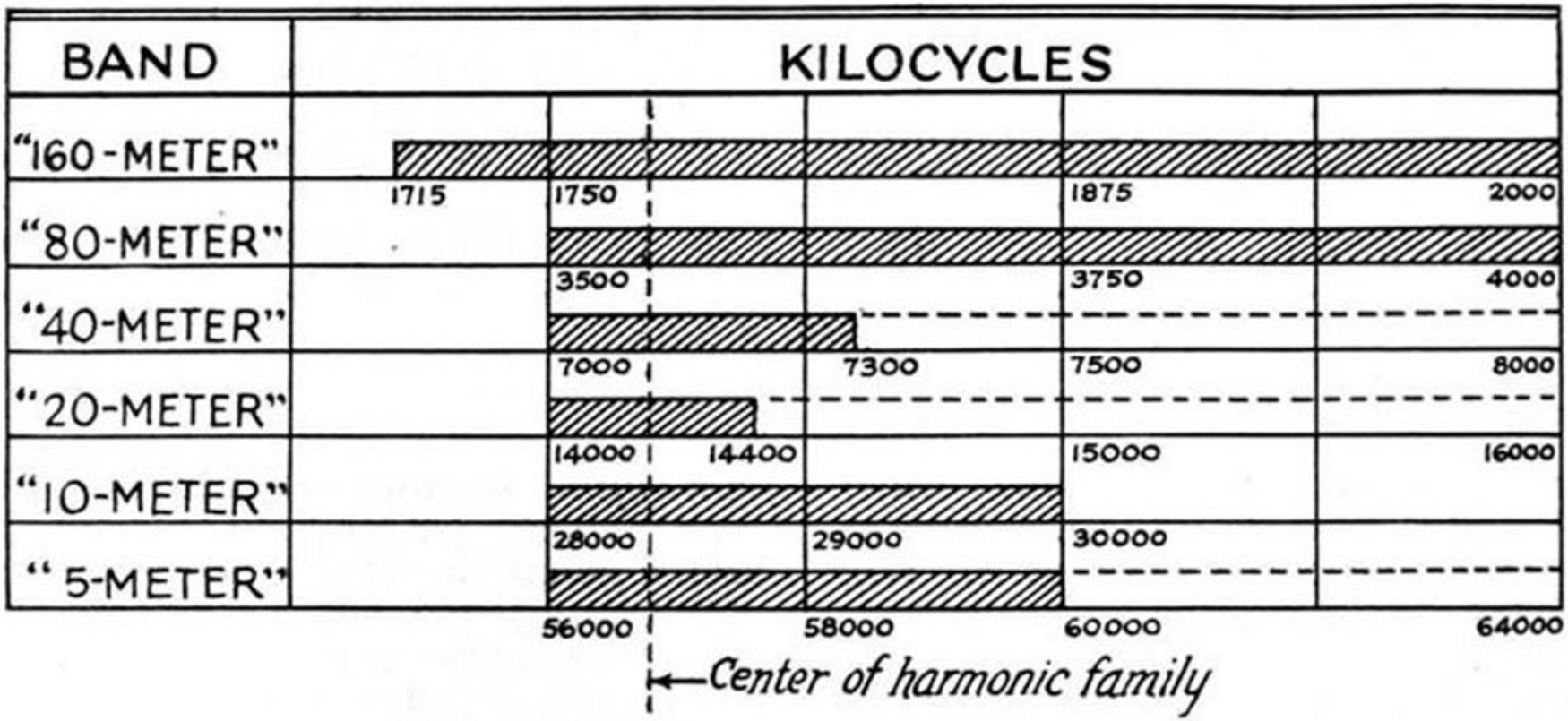
- The content of the following presentation is informational only
- Any views or opinions opined here or as a part of follow-on discussion are mine and mine alone, and may not reflect the official views or opinions of the ARRL, or its management

AGENDA

- A brief history lesson!
- Background information on current FCC dockets (RMs) affecting band planning
- Discussion about the current HF Band Plans
- Latest on FCC actions regarding the 3.3 GHz (9 cm) and 5.8 GHz (5 cm) bands
- Questions or comments?

Some Brief History

- Prior to 1912 there were no band plans, or even bands, everybody was everywhere and anywhere!
- The first "band plan" was incorporated with the ***Radio Act of 1912,*** which limited amateurs to "200 meters or less, as frequencies higher are considered useless"
- Formal ham bands as we mostly know them today came into being as a result of ***The Washington Conference / Radio Act of 1927***



US Ham Bands, 1928,
from QST magazine

Where is 15 meters?

- The 15-meter band was added by the ***1947 International Radio Conference of Atlantic City*** in part to compensate for the effective loss of the 160-meter band to amateurs by the introduction of LORAN during World War II

- Other evolutions in band planning along the way:

  - Example: Novice 75 watt CW allocation in 1952

WARC Bands

- They consist of:
  - 30 meters (10.100–10.150 MHz)
  - 17 meters (18.068–18.168 MHz)
  - 12 meters (24.890–24.990 MHz)
- They were named after the World Administrative Radio Conference, which in 1979 created a worldwide allocation of these bands for amateur use
- The bands were opened for use in the early 1980s.

60 meter band

- Newest of the HF bands, channelized from 5351.5–5366.5 kHz
- Authorized by the ITU in 2002, formalized world wide in the 2015 ITU World Radiocommunication Conference (WRC-15)
- We are on a secondary basis, many other restrictions are in place

FCC activities

- Four FCC Actions pending that are involved:
  - **RM-11828** "Technician Class Enhancement"
  - **RM-11708** "Greater Flexibility in Digital Communications"
  - **RM-11831** "Amateur Digital Mode Transparency"
  - **RM-11759** "Realignment of the 80 meter amateur band"

RM-11828 "Technician Enhancement"

- Would expand the amateur Technician Class privileges to include phone privileges at **3.900 to 4.000 MHz**, **7.225 to 7.300 MHz**, and **21.350 to 21.450 MHz**
  - Does not include 160 or 20 meters, or any of the WARC bands, but does include most EmComm frequencies
- Adds RTTY and digital privileges in current Technician CW allocations on 80, 40, and 15 meters
- Power on the expanded bands would be limited to 200 watts PEP

RM-11708 "Greater flexibility in Digital Communications"

- Increases allowed symbol rate in digital communications to 2.8 kHz bandwidth, rather than specifying a maximum 300 baud data rate
- Authorizes faster PACTOR 4 for ARES EmComm HF Winlink messaging use
- Has been in comment phase since Nov 2013!
- Some want this modified to include a ban on ACDS that does not incorporate "busy" detector technology

RM-11708 "Greater flexibility in Digital Communications"

- In 2016 the FCC released **Docket 16-239**, which states that they agree with removal of symbol rate requirements, but further stated that:

- "We also observe that while a 2.8 kHz bandwidth limitation would accommodate data emissions that are in common use today, **such a limitation could, at the same time, undermine the goal– fundamental to the amateur radio service** – of encouraging advances in technology if amateur radio operators were thereby prevented from stepping beyond today's radio science."

RM-11708 "Greater flexibility in Digital Communications"

- No limits on bandwidth? (!)
  - Be careful what you wish for!
- Raised concerns for many about wide-band digital and Winlink traffic taking over the digital airwaves if enacted

RM-11759

- "Amendment of Part 97 of the Commission's Amateur Radio Service Rules to Facilitate High-Frequency Data Communications"
- Submitted Feb 2016 by the ARRL
- Modifies the 80-meter RTTY/Data sub-band so that it extends from 3500 kHz to 3650 kHz; (**adds 50 kHz**). Takes that 50 kHz away from Extra Class Phone
- Gives back the 3600-3650 kHz segment to General and Advanced Class licensees, as was the case prior to 2006

RM-11759

- Provides that the band segment 3600-3650 kHz will also be available to Novice and Technician Class licensees for telegraphy (consistent with the existing rules that now permit Novice and Technician Class licensees to use telegraphy in the General and Advanced Class RTTY/data subbands at 80, 40, and 15 Meters); (**Goes away with RM-11828)**

- Modify the segment of the 80-meter band that is available for automatically controlled digital operation, and shifts from 3585-3600 kHz (as per the existing rules) to 3600-3615 kHz (consistent with the IARU Region 1 and Region 2 band plans); (**Moves 15 kHz wide ACDS window up, but moot with new proposal**)

- To provide RTTY/data privileges to Novice and Technician licensees in their 15-meter band segment and their 80-meter band segment. (**Overlaps RM-11828**)

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RM-11831 "Amateur Digital Mode Transparency"

- Submitted in 2018, written by Ron Kolarik, K0IDT
- Essentially "Ensures that all digital modes can be received over the air by others"
- Targeting PACTOR/ Winlink messages, and others too
- The real question: Is data compression a form of "encryption with the intent to obscure"?
- Concerns of enforcement and unauthorized use of digital communications by commercial interests
- Concerns by EmComm/sailboat side that Winlink will disappear- Important for ARES in many jurisdictions!

Dear ARRL Director:

What are you idiots doing?

73;
Joe Ham

The HF Band Plan Committee

- The HF Band Plan committee was re-activated to look at current HF ACDS and digital allocations, and see if it's feasible to add spectrum for the future growth of digital communications

Committee Members (2021):

Mike Raisbeck, K1TWF, 1st VP, Chairman
Kermit Carlson, W9XA, Director Central Division
Ria Jairam, N2RJ, Director, Hudson Division
Mike Ritz, W7VO, Director, NW Division
Ned Stearns, AA7A, Vice Director, SW Division
Dale Williams, WA8EFK, Director Great Lakes Division

HF Band plan Committee

- **Mission:** Seek regulatory changes to FCC Part 97
  - Expand digital/cw mode on 80 m back (per RM-11759)
  - Expand messaging/ACDS channel capacity to support Part 97.1, our "Emergency Communications" purpose
    - Part 97.221 (b) deletion or significant change
  - Support existing digital modes, and allow for the future
  - Put narrow-band digital and wide-band digital into separate "sandboxes" to satisfy part of RM-11831
  - Tick off as few hams as possible in the process

- Assumptions: RM-11828, RM-11759, RM-11708 are all enacted
- What we did NOT tackle:
  - "Encryption/Compression" debate per RM-11831
  - Whether or not ACDS is in violation of FCC rules if no "listen before transmit" technology employed
- Intent was not to fully FCC regulate the spectrum, but mostly use *voluntary band planning* to keep harmony between modes
- Result was data driven:
  - Looked at history: skimming and contest data
  - Reviewing current ITU Band plans for Regions 1-3
  - Reviewing band plans for the other major players
- Had to pretend we had a crystal ball to predict the future
  - Increased use of digital over CW, or even SSB
  - More new modes will be invented, higher data rates in less bandwidth

PSK Reporter Snapshot

Mode	Reports (in 2 hours)	% of total
FT8	1018231	94.459
FT4	54213	5.029
CW	3036	0.282
JS8	1461	0.136
PSK31	626	0.058
OPERA	139	0.013
MSK144	70	0.006
PSK63	63	0.006
ROS	33	0.003
SIM31	28	0.003
JT65	10	0.001
SSB	8	0.001
PI4	8	0.001
OLIVIA-4	7	0.001
FSK441	7	0.001
PSK	7	0.001
JT9	7	0.001
QRA64	2	0.000
OLIVIA 1	2	0.000
OLIVIA 8	2	0.000
PSK125	2	0.000
OLIVIA	1	0.000
RTTY	1	0.000
CONTESTI	1	0.000

The results:

- Final version of committee report was submitted to ARRL Board in early February, approved in July 2020
- CW and narrow-band digital "down low", wide-band digital and all ACDS "up high" in each band
- Narrow-band digital and CW also allowed "up high"
  - Expecting voluntary band plans to be developed among users
- ARRL set up a comment location on website and an interactive Groups.io reflector. Several hundred comments on each media
- Time frame for comments is now over!

The Plan

- Addresses changes to HF bands, only
  - No changes to 160 m or 60 m bands
- Band-by-band comparison is provided for current and then recommended band plan
- Uses same format as "US Amateur Bands" graphic available on ARRL website at http://www.arrl.org/graphical-frequency-allocations
  - ACDS operation frequency ranges per Part 97.221(b) not included on existing ARRL chart
  - Current frequencies where ACDS (NB only) permitted shown as overlay to Current Band Plan graphic
- No changes to CW allocations throughout all amateur bands
- RTTY and all other narrowband, non-ACDS modes permitted wherever data modes are allowed

US Amateur Radio Bands

US AMATEUR POWER LIMITS

FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications.
(b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

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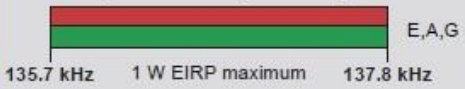
Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at **https://utc.org/plc-database-amateur-notification-process/.** You need only register once for each band.

2,200 Meters (135 kHz)

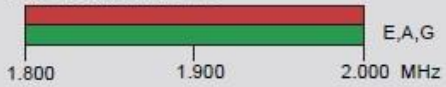


630 Meters (472 kHz)

5 W EIRP maximum, except in Alaska within 496 miles of Russia where the power limit is 1 W EIRP.

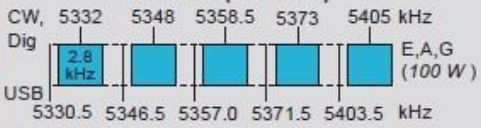
160 Meters (1.8 MHz)

Avoid interference to radiolocation operations from 1.900 to 2.000 MHz



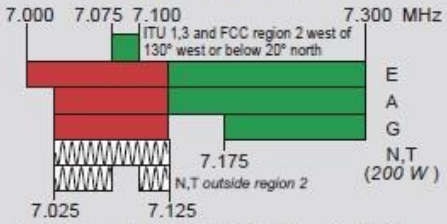
80 Meters (3.5 MHz)

60 Meters (5.3 MHz)



General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III. Only one signal at a time is permitted on any channel.

40 Meters (7 MHz)

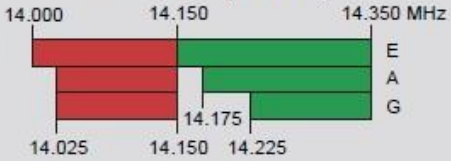


See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.

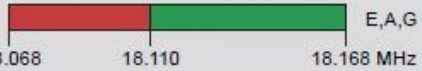
30 Meters (10.1 MHz)

Avoid interference to fixed services outside the US.

20 Meters (14 MHz)



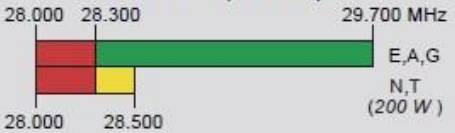
17 Meters (18 MHz)



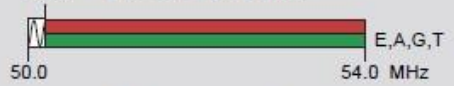
15 Meters (21 MHz)

12 Meters (24 MHz)

10 Meters (28 MHz)

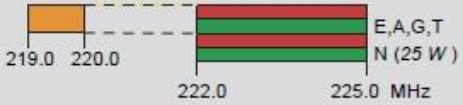


6 Meters (50 MHz)



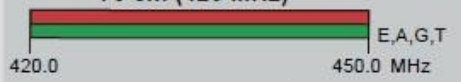
2 Meters (144 MHz)

1.25 Meters (222 MHz)

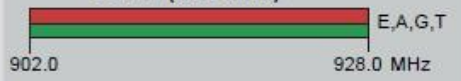


*Geographical and power restrictions may apply to all bands above 420 MHz. See *The ARRL Operating Manual* for information about your area.

70 cm (420 MHz)*



33 cm (902 MHz)*



23 cm (1240 MHz)*

All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz ‡	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3500 MHz	47.0-47.2 GHz	241-250 GHz
5650-5925 MHz	76.0-81.0 GHz	All above 275 GHz

‡ No pulse emissions

KEY

Note:
CW operation is permitted throughout all amateur bands.

MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.

Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- = RTTY and data
- = phone and image
- = CW *only*
- = SSB phone
- = USB phone, CW, RTTY, and data
- = Fixed digital message forwarding systems *only*

E = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice

See *ARRLWeb at www.arrl.org* for detailed band plans.

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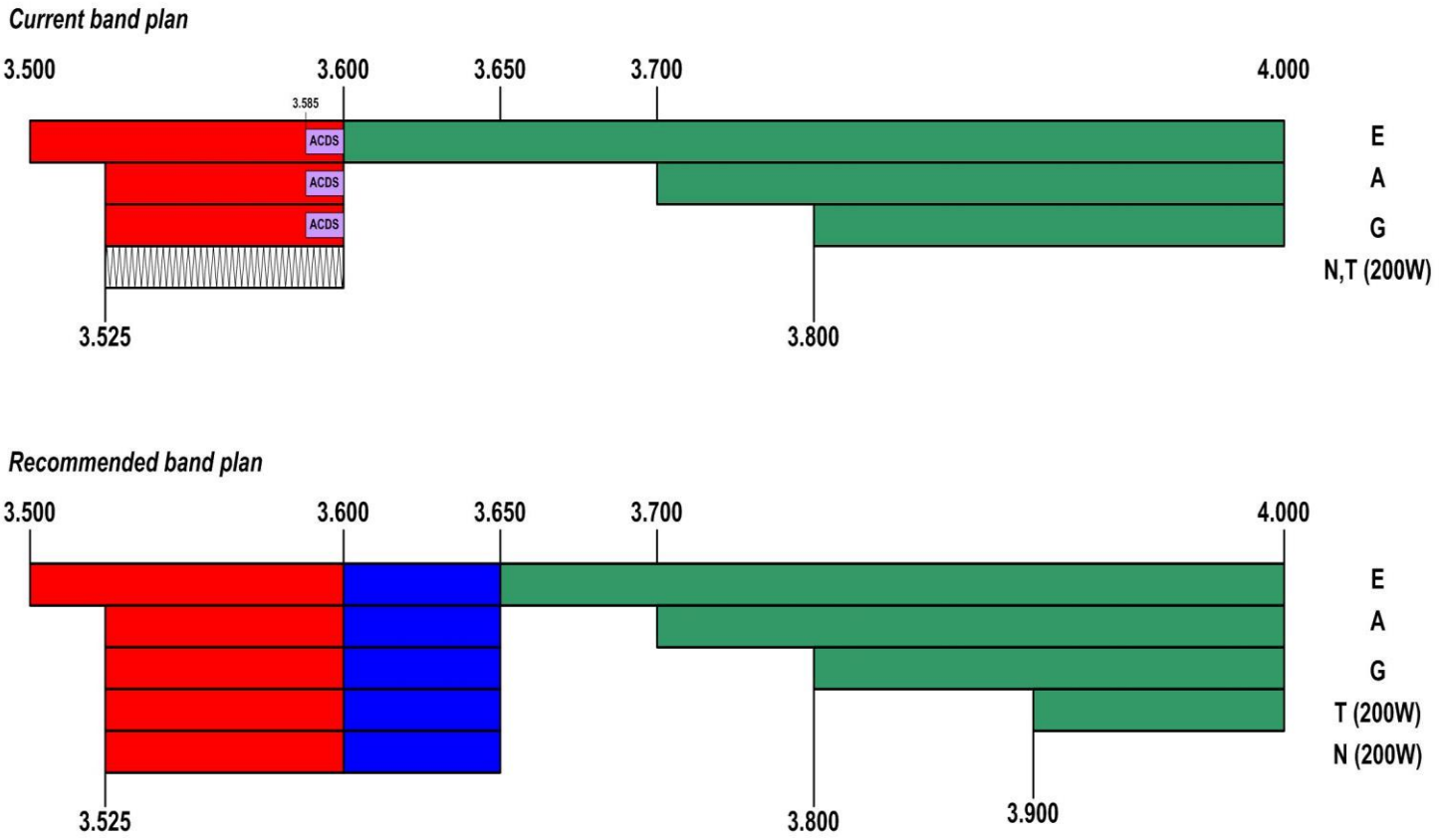
 rev. 9/22/2017

Recommended changes – 80 meters

1. Change low end of phone band up to 3.650 MHz consistent with RM-11759
2. Add NB and WB data between 3.600 and 3.650 MHz
3. Permit ACDS operation between 3.600 and 3.650 MHz
4. Expand A and G class operation from 3.600 to 3.650 MHz
5. Add expanded Technician Class privileges consistent with RM-11828
6. Added RTTY/Data operating privileges for Novice class consistent with RM-11759

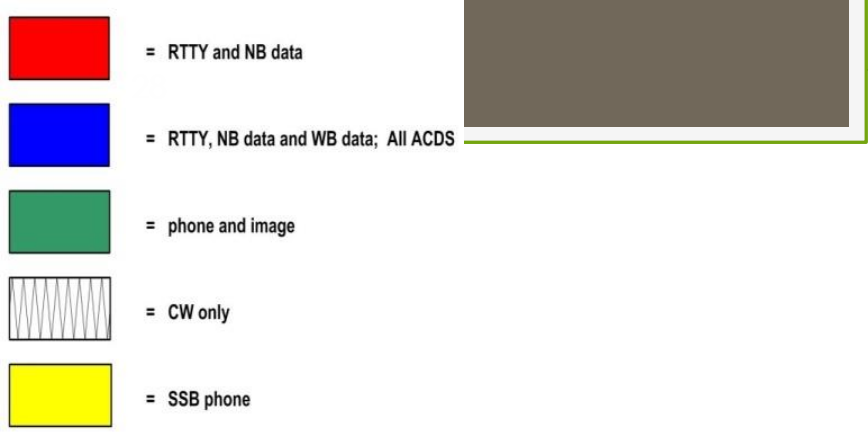
80 meters

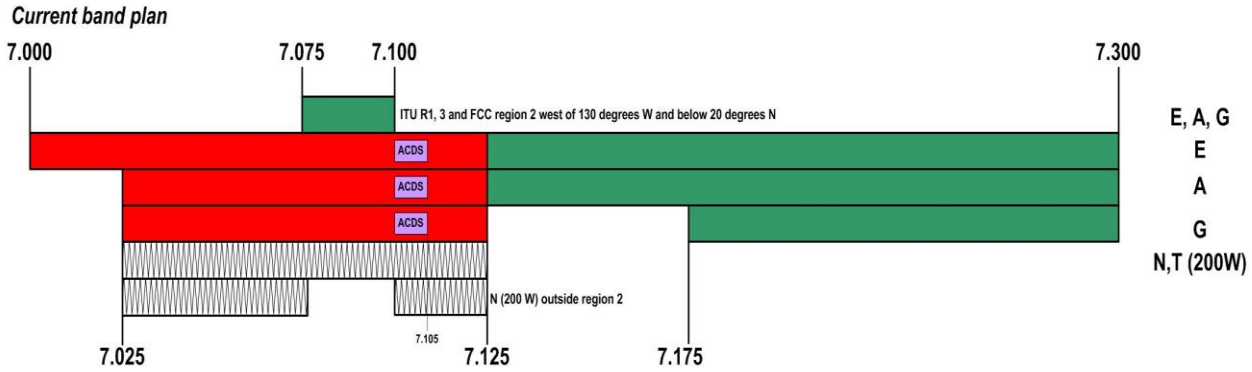

= RTTY and NB data
= RTTY, NB data and WB data; All ACDS
= phone and image
= CW only
= SSB phone
Current band plan
3.500
3.600
3.650
3.700
4.000
3.585
ACDS
ACDS
ACDS
3.525
3.800
E
A
G
N,T (200W)
Recommended band plan
3.500
3.600
3.650
3.700
4.000
3.525
3.800
3.900
E
A
G
T (200W)
N (200W)

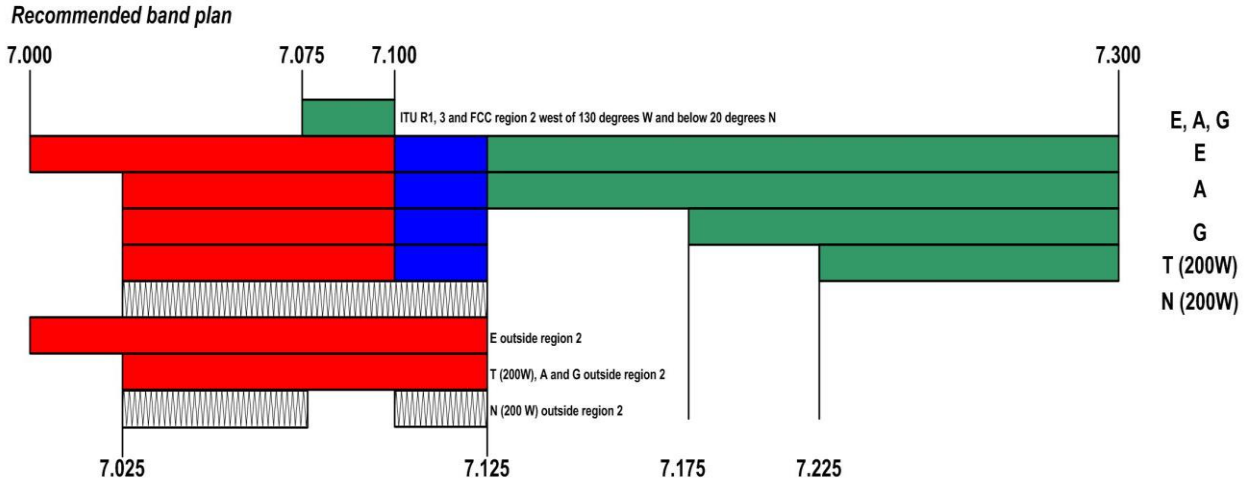
Recommended changes – 40 meters

1. Add WB data between 7.100 and 7.125 MHz
2. Expands ACDS operation from 5 kHz to 25 kHz
3. Changes ACDS operating band to 7.100 to 7.125 MHz
4. Add expanded Technician Class privileges consistent with RM-11828
5. Adds clarification to Band Plan for US Amateurs operating outside Region 2
6. No recommendations for ACDS operation outside Region 2

40 meters


= RTTY and NB data
= RTTY, NB data and WB data; All ACDS
= phone and image
= CW only
= SSB phone


Current band plan
7.000
7.075
7.100
7.300
ITU R1, 3 and FCC region 2 west of 130 degrees W and below 20 degrees N
ACDS
ACDS
ACDS
N (200 W) outside region 2
7.105
7.025
7.125
7.175
E, A, G
E
A
G
N,T (200W)

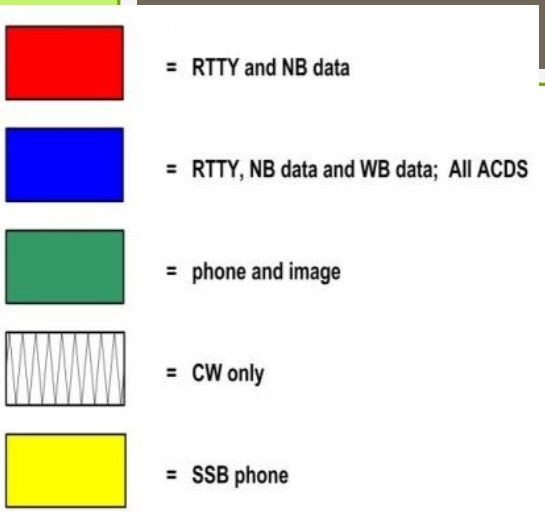

Recommended band plan
7.000
7.075
7.100
7.300
ITU R1, 3 and FCC region 2 west of 130 degrees W and below 20 degrees N
E outside region 2
T (200W), A and G outside region 2
N (200 W) outside region 2
7.025
7.125
7.175
7.225
E, A, G
E
A
G
T (200W)
N (200W)

Recommended changes – 30 meters

1. Adds WB data from 10.135 to 10.150 MHz

2. Expands ACDS operation to 15 kHz from 10.135 to 10.150 MHz

30 meters



Current band plan

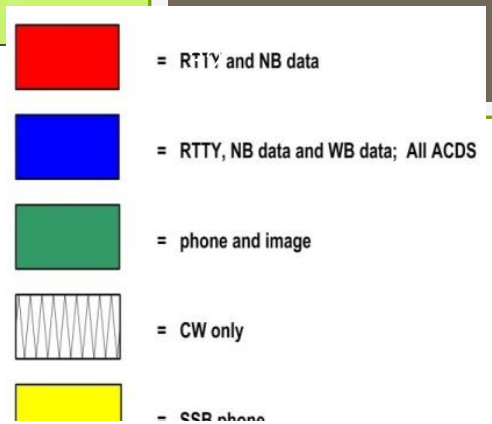
Recommended band plan

Recommended changes – 20 meters

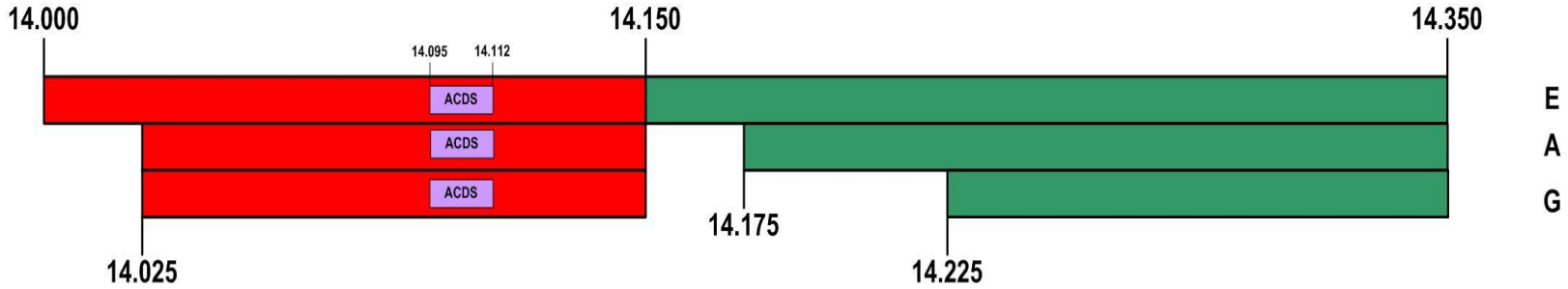
1. Adds WB data from 14.105 to 14.150 MHz

2. Expands ACDS operation to 45 kHz from 14.105 to 14.150 MHz

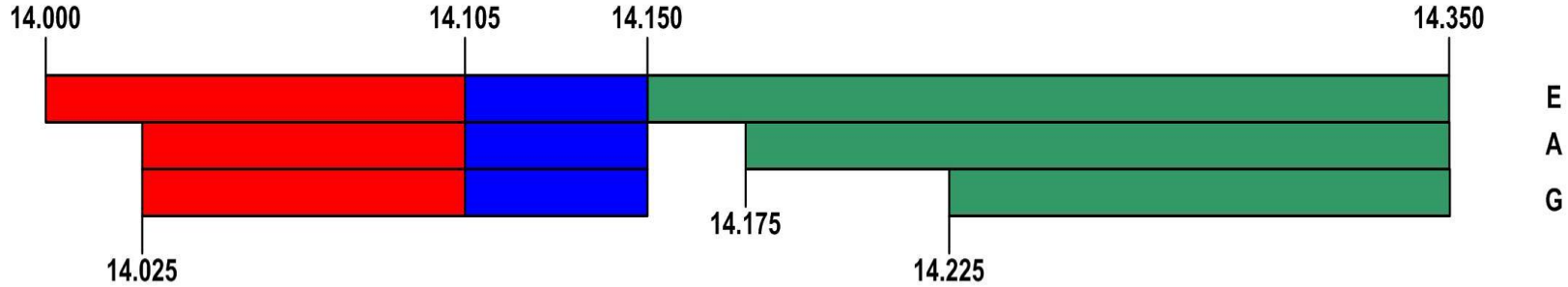
20 meters



Current band plan



Recommended band plan



Recommended changes – 17 meters

- Added WB data from 18.105 to 18.110 MHz

17 meters

= RTTY and NB data

= RTTY, NB data and WB data; All ACDS

= phone and image

= CW only

= SSB phone

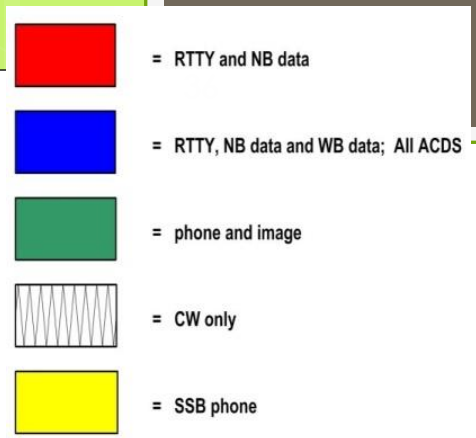
Current band plan

Recommended band plan

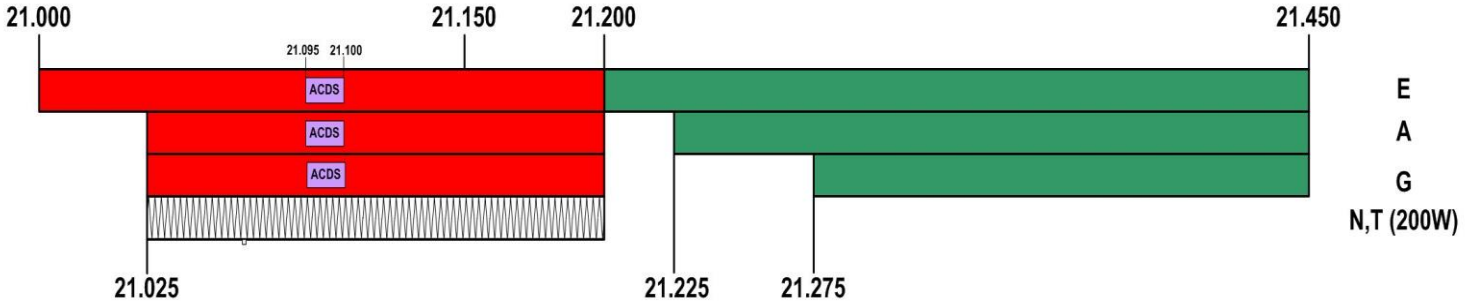
Recommended changes – 15 meters

1. Adds WB data from 21.150 to 21.200 MHz
2. Expands ACDS operation to 50 kHz from 21.150 to 21.200 MHz
3. Add expanded Technician Class privileges consistent with RM-11828
4. Added RTTY/Data operating privileges for Novice class consistent with RM-11759

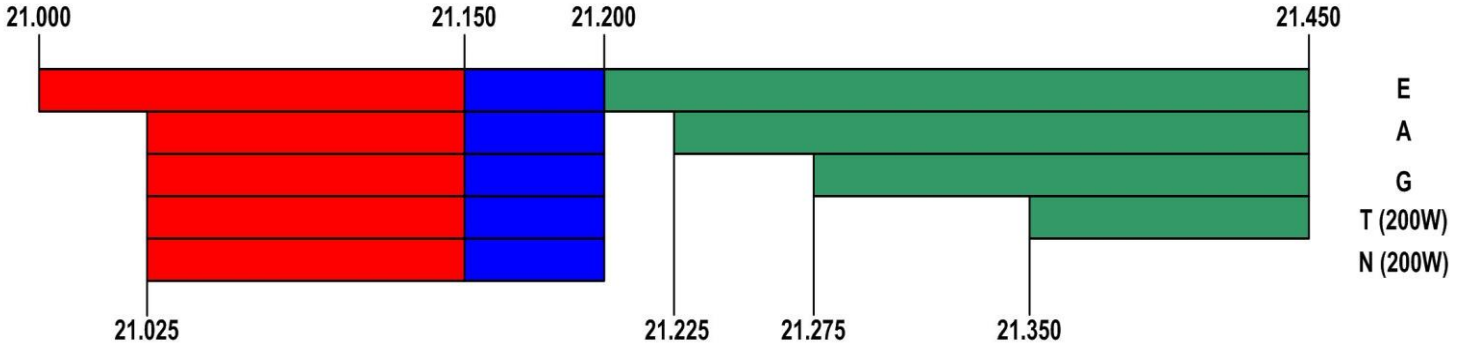
15 meters



Current band plan



Recommended band plan



Recommended changes – 12 meters

- Added WB data from 24.925 to 24.930 MHz

12 meters

= RTTY and NB data

= RTTY, NB data and WB data; All ACDS

= phone and image

= CW only

= SSB phone

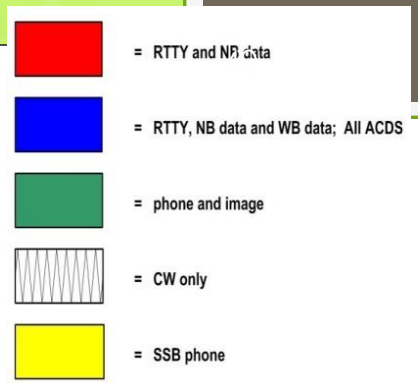
Current band plan

Recommended band plan

Recommended changes – 10 meters

1. Adds WB data from 28120 to 28190 kHz
2. Adds NB and WB data in "Experimental Data Band" from 29.200 to 29.300 MHz for E, A and G license classes
3. Expands ACDS operation additional 100 kHz from 29.200 to 29.300 MHz
4. Add expanded Technician Class privileges consistent with RM-11828

10 meters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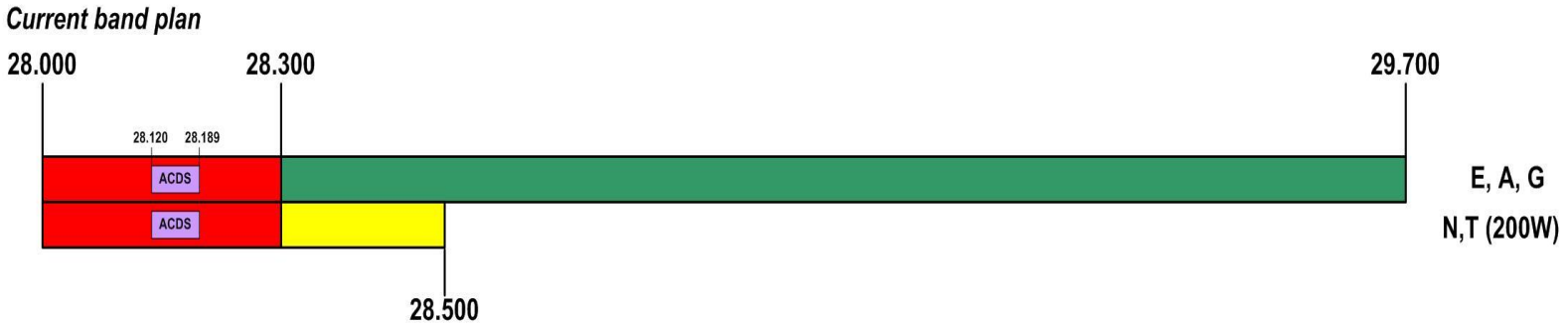
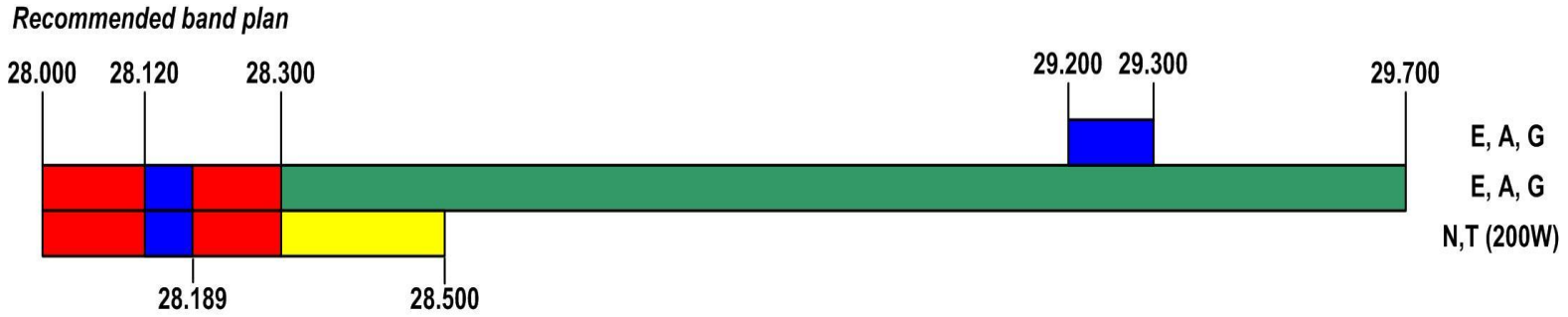
= CW only
= SSB phone


Current band plan
28.000
28.300
29.700
28.120
28.189
ACDS
ACDS
E, A, G
N,T (200W)
28.500


Recommended band plan
28.000
28.120
28.300
29.200
29.300
29.700
E, A, G
E, A, G
N,T (200W)
28.189
28.500

What now?

- ARRL FCC Counsel David Siddall, K3ZJ, has suggested that he expects action sometime in Q3 or Q4 of this year
- Likely enacted as an omnibus action
- Stay tuned for further news!

3.3 GHz (9 cm) and 5.9 GHz (5 cm) Band Updates

- These frequencies are used primarily by AREDN HAMWan mesh networks, but also used for ham experimentation, propagation studies, satellite, and EME use
- Recall that the FCC is auctioning off these frequencies for 5G and commercial telecom use
- Important to note that we were only a secondary allocation on them to begin with

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A deeper dive: 3.3-3.5 GHz (9 cm) Band

- Started with NPRM DOC 19-348: "***Facilitating Shared Use in the 3.1-3.55 GHz Band***" in Nov 2019
  - Call for auctioning off 3.4-3.5 GHz for 5G network expansion
  - Called for sunsetting of ALL amateur activity on the entire band by 2022
  - The ARRL bitterly opposed this proposed action

A deeper dive: 3.3-3.5 GHz (9 cm) Band

- In March 2021 the FCC adopted final rules for 3.45-3.55 GHz:
  - Amateurs can keep secondary allocation from 3.3 to 3.45 GHz indefinitely until further FCC action
  - Amateurs will need to cease operations in 3.45-3.5 GHz sometime in early 2022 to allow for new users
  - Please consider this is a **WIN!**

5.9 GHz band

- Started with FCC Docket 19-138: "***Use of the 5.850-5.925 GHz Band***" in Dec 2019
- Unlike 3.3 GHz, there was no plan to sunset amateur activity, we would remain secondary
- But, would allocate the bottom 45 MHz for unlicensed Wi-Fi routers, etc., and the upper 20 MHz for Ford's autonomous vehicle program
- In Nov 2020 the FCC confirmed we would remain a secondary allocation, but would have to learn to live with new users on the band

Questions?

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