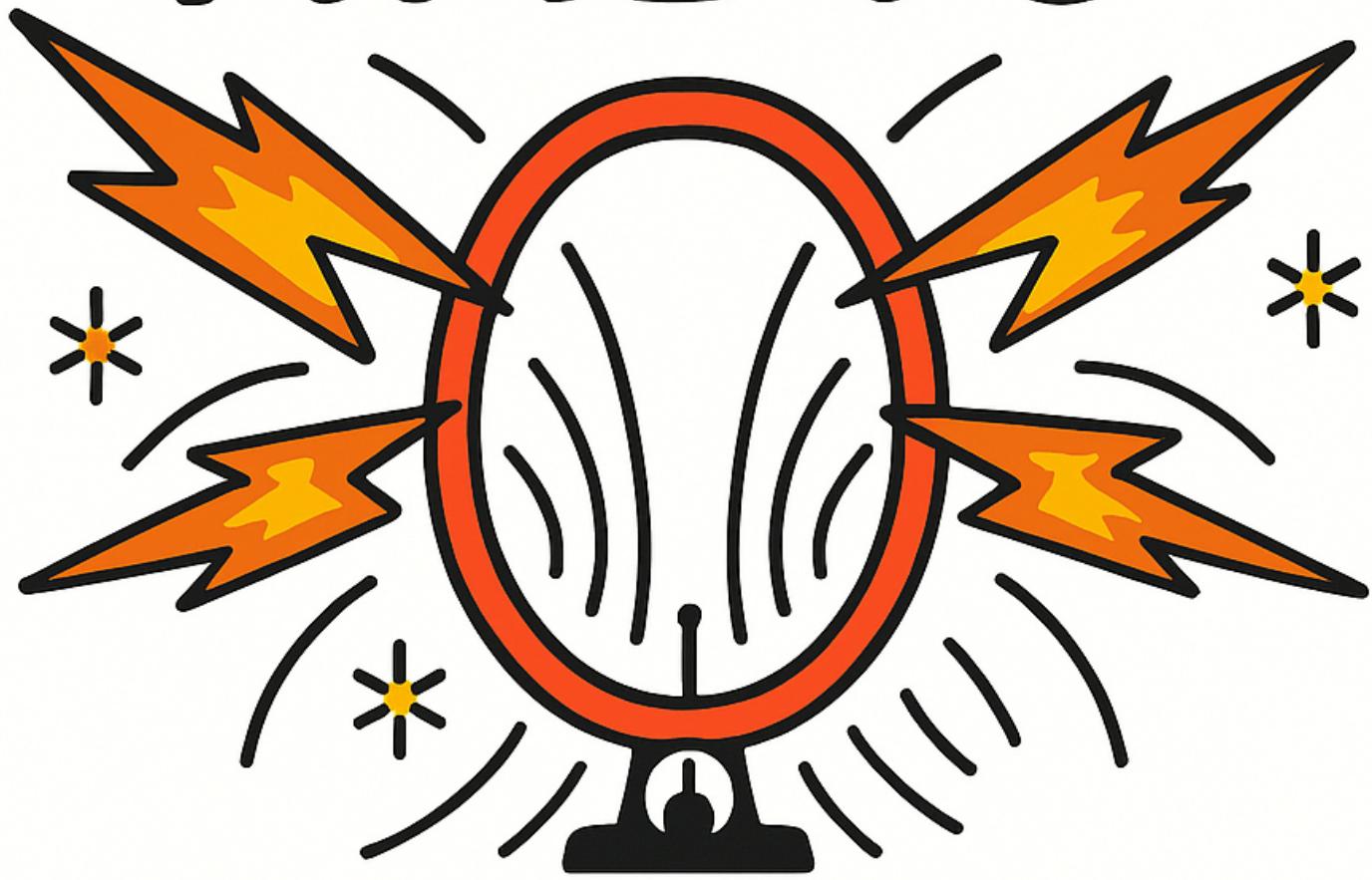


# AMATEUR RADIO



## POCKET REF



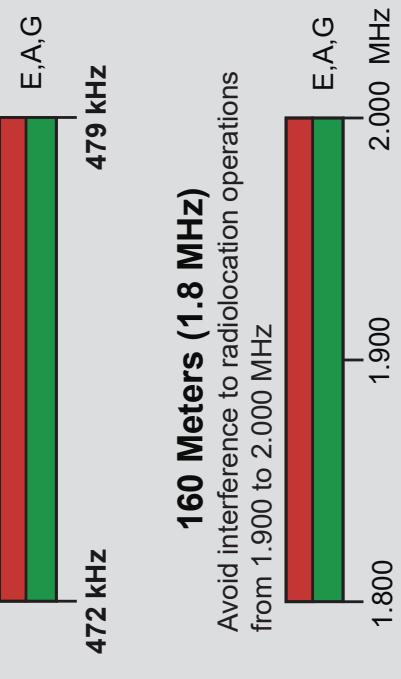
# **US Amateur Radio Bands**

**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.

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

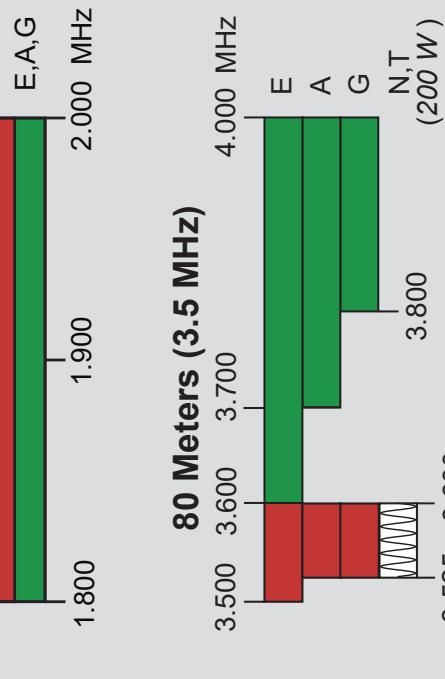


**630 Meters (472 kHz)**  
5 W EIRP maximum, except in Alaska within 496 miles of Russia where the power limit is 1 W EIRP.



160 Meters (1.8 MHz)

Avoid interference to radiolocation operations from 1.900 to 2.000 MHz



**60 Meters (5.3 MHz)**

Section	Frequency Range (kHz)
CW, Dig, USB	5332 - 5405
2.8 kHz	5332 - 5334.8
E, A, G	5348 - 5358.5
(100 W)	5358.5 - 5373
	5373 - 5405

General, Advanced, and Extra licensees may operate on a secondary basis with a maximum ERP of 100 W (relative to a half-wave dipole antenna).

- 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 <i>only</i>
	= SSB phone
	= USB phone, CW, RTTY and data
	= Fixed digital message forwarding systems <i>only</i>

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

See [www.arrl.org/band-plan](http://www.arrl.org/band-plan) for detailed band plans.

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Getting Started in Amateur Radio:  
Toll-Free 1-800-326-3942 (860-594-0355)  
email: newham@arrl.org

Exams: 860-594-0300 email: vec@arrl.org

**10 Meters (28 MHz)**

Power (W)	E, A, G, T	N
28.500	28.300	29.700
28.000	28.000	29.000

**6 Meters (50 MHz)**

Power (W)	E, A, G, T	N
50.0	50.0	54.0
28.500	28.500	30.000

**144.1 2 Meters (144 MHz)**

Power (W)	E, A, G, T	N
144.0	144.0	148.0
220.0	220.0	225.0

**1.25 Meters (222 MHz)**

Power (W)	E, A, G, T	N
222.0	222.0	225.0

**70 cm (420 MHz)\***

Power (W)	E, A, G, T	N
420.0	420.0	450.0

**33 cm (902 MHz)\***

Power (W)	E, A, G, T	N
902.0	902.0	928.0

**23 cm (1240 MHz)\***

Power (W)	E, A, G, T	N
1240	1240	1300
1270	1270	1295

\*Geographical and power restrictions may apply to all bands above 420 MHz. See FCC Part 97.303 for information about your area.

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

Frequency (MHz)	Power (W)	Mode
2300-2310	10.0-10.5	GHZ ‡
2390-2450	24.0-24.25	GHz
3400-3450	47.0-47.2	GHz
5650-5925	76.0-81.0	GHz

‡ No pulse emissions

# Considerate Frequency Usage

1.800–2.000	CW	14.233	D-SSTV
1.800–1.810	Digital Modes	14.236	Digital Voice
1.810	CW QRP calling frequency	14.285	QRP SSB calling frequency
1.843–2.000	SSB, SSTV and other wideband modes	14.286	AM calling frequency
1.910	SSB QRP	18.100–18.105	RTTY/Data
1.995–2.000	Experimental	18.105–18.110	Automatically controlled data stations
1.999–2.000	Beacons	18.110	IBP/NCDXF beacons
3.500–3.510	CW DX window	18.162.5	Digital Voice
3.560	QRP CW calling frequency	21.060	QRP CW calling frequency
3.570–3.600	RTTY/Data	21.070–21.110	RTTY/Data
3.585–3.600	Automatically controlled data stations	21.090–21.100	Automatically controlled data stations
3.590	RTTY/Data DX	21.150	IBP/NCDXF beacons
3.790–3.800	DX window	21.340	SSTV
3.845	SSTV	21.385	QRP SSB calling frequency
3.885	AM calling frequency	24.920–24.925	RTTY/Data
3.985	QRP SSB calling frequency	24.925–24.930	Automatically controlled data stations
7.030	QRP CW calling frequency	24.930	IBP/NCDXF beacons
7.040	RTTY/Data DX	28.060	QRP CW calling frequency
7.070–7.125	RTTY/Data	28.070–28.120	RTTY/Data
7.100–7.105	Automatically controlled data stations	28.120–28.189	Automatically controlled data stations
7.171	SSTV	28.190–28.225	Beacons
7.173	D-SSTV	28.200	IBP/NCDXF beacons
7.285	QRP SSB calling frequency	28.385	QRP SSB calling frequency
7.290	AM calling frequency	28.680	SSTV
10.130–10.140	RTTY/Data	29.000–29.200	AM
10.140–10.150	Automatically controlled data stations	29.300–29.510	Satellite downlinks
14.060	QRP CW calling frequency	29.520–29.580	Repeater inputs
14.070–14.095	RTTY/Data	29.600	FM simplex
14.095–14.0995	Automatically controlled data stations	29.620–29.680	Repeater outputs
14.100	IBP/NCDXF beacons		
14.1005–14.112	Automatically controlled data stations		
14.230	SSTV		

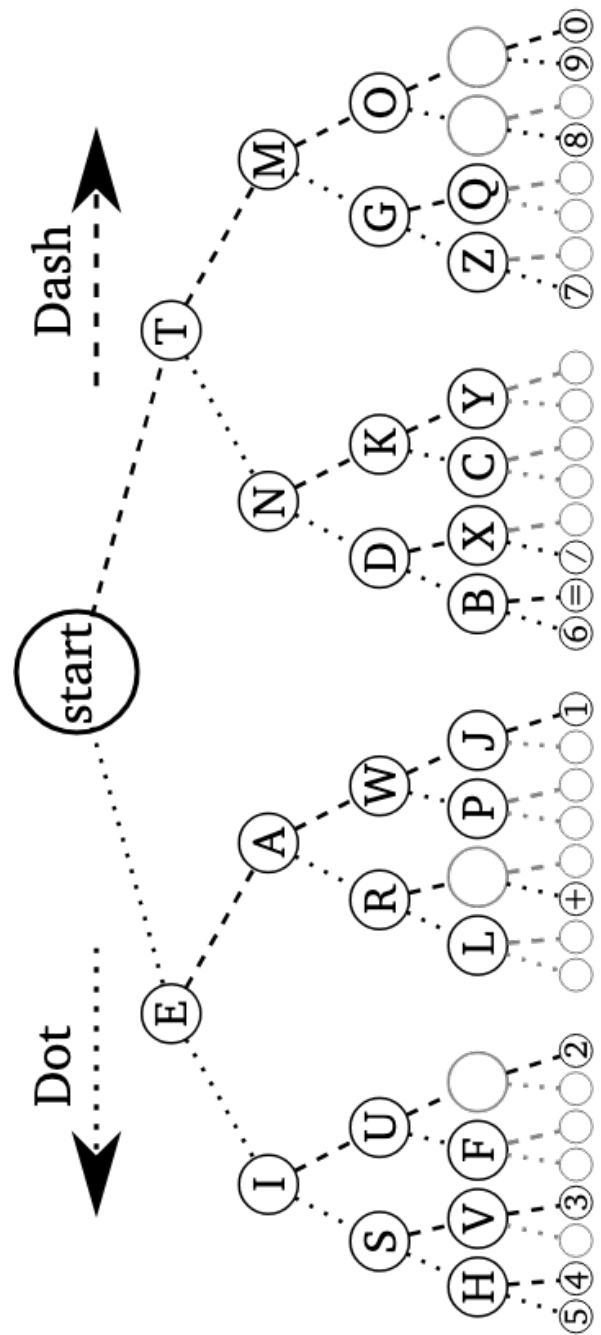
# Q Codes

QRG	Your exact frequency (or that of __) is ____kHz.	Will you tell me my exact frequency (or that of __)?
QRL	I am busy (or busy with __).	Are you busy? (Used to ask if frequency is in use)
QRM	Your transmission is being interfered with __ (1-5).	Is my transmission being interfered with?
QRN	I am troubled by static __ (1-5).	Are you troubled by static?
QRO	Increase power.	Shall I increase power?
QRP	Decrease power.	Shall I decrease power?
QRQ	Send faster (___wpm).	Shall I send faster?
QRS	Send more slowly (___wpm).	Shall I send more slowly?
QRT	Stop sending.	Shall I stop sending?
QRU	I have nothing for you.	Have you anything for me?
QRV	I am ready.	Are you ready?
QRX	I will call you again at __ (on __kHz).	When will you call me again?
QRZ	You are being called by __ (on __kHz).	Who is calling me?
QSB	Your signals are fading.	Are my signals fading?
QSK	I can hear you between signals.	Can I break in on your transmission?
QSL	I am acknowledging receipt.	Can you acknowledge receipt?
QSO	I can communicate with __ direct (or via __).	Can you communicate with __ direct or by relay?
QSP	I will relay to __.	Will you relay to __?
QST	General call to all amateurs (CQ ARRL).	-
QSX	I am listening to __ on __kHz.	Will you listen to __ on __kHz?
QSY	Change to another frequency (or __kHz).	Shall I change to another frequency?
QTC	I have __ messages for you (or for __).	How many messages have you to send?
QTH	<b>My location is __.</b>	<b>What is your location?</b>
QTR	The time is __.	What is the correct time?

# Prosигнс

AR	End of message	Often sent as “di-dah-di-dah-dit” (•—••)
AS	Stand by	“di-dah-di-di-dit”; used to ask someone to wait
BK	Break	Used to invite the other station to transmit immediately
BT	Separator	Break between thoughts or paragraphs (“dah-di-di-di-dah”)
CL	Closing down	Used when signing off the air permanently or for the day
CQ	Calling any station	General call: “dah-di-dah-di” then “dah-dah-di-dah”
CT	Start of message	Used to begin formal traffic messages
EE	Error	Correcting a mistake; usually sent as “di-di-di-di” rapidly
K	Go ahead	Invitation for the other station to transmit
KN	Go ahead, named station only	Stronger version of K—only the called station should respond
R	Roger (message received)	Confirms receipt of last transmission
SK	End of contact	“Silent Key”; final sign-off (di-di-di-dah-di-dah)
SN	Understood	Used in formal message handling (equivalent to “QSL” or “Roger”)

A	Alpha .-	N	November -.	0	-----	'	-----
B	Bravo -...	O	Oscar ---	1	-----	!	-...-
C	Charlie -...-	P	Papa -...-	2	.....	/	-...-
D	Delta -..	Q	Quebec ---.	3	....-	(	-...-
E	Echo . .	R	Romeo -..	4	....-	)	-...-
F	Foxtrot ...-	S	Sierra ...	5	.....	&	-...-
G	Golf ---.	T	Tango -_	6	-....	:	-...-...
H	Hotel ....	U	Uniform ---	7	-----	;	-...-...
I	India ..	V	Victor ...-	8	-----	=	-...-
J	Juliet .-...	W	Whiskey ---	9	-----	+	-...-
K	Kilo --	X	X-ray ---	.	-----	-	-...-...
L	Lima -...-	Y	Yankee -...-	,	-----	—	-...-...
M	Mike --	Z	Zulu -...-..	?	....-	@	-...-...



## **SSB**

**A (Calling CQ):** "CQ CQ CQ, this is K1ABC, Kilo One Alpha Bravo Charlie, calling CQ and standing by."

**B (Responding):** "K1ABC, this is W2XYZ, Whiskey Two X-ray Yankee Zulu."

**A:** "W2XYZ, good afternoon, you're 59 here in Boston, Massachusetts. Name is John, Juliet Oscar Hotel November. Back to you, W2XYZ from K1ABC."

**B:** "Thanks John, you're 59 as well in New Jersey. Name is Mike, Mike India Kilo Echo. Nice to meet you, John. K1ABC, this is W2XYZ."

**A:** "Very good Mike, thanks for the QSO. 73 and have a great day. K1ABC is now clear."

## **SSB Contest**

**Activator (A) calling:** "CQ POTA, CQ Parks on the Air, this is K1ABC, Kilo One Alpha Bravo Charlie, calling CQ POTA and standing by."

**Hunter (B) responds:** "K1ABC, this is W2XYZ."

**Activator (A):** "W2XYZ, you're 59 into park US-1234."

**Hunter (B):** "Thanks for the 59. You're 57 in New Jersey. 73!"

**Activator (A):** "Copy the 57 New Jersey. Thanks for hunting! QRZ, this is K1ABC, park K-1234."

## **CW**

**A (Calling CQ):** "CQ CQ CQ DE K1ABC K1ABC K1ABC K"  
(Calling any station, this is K1ABC, standing by)

**B (Responding):** "K1ABC DE W2XYZ W2XYZ K"  
(*K1ABC, this is W2XYZ, over*)

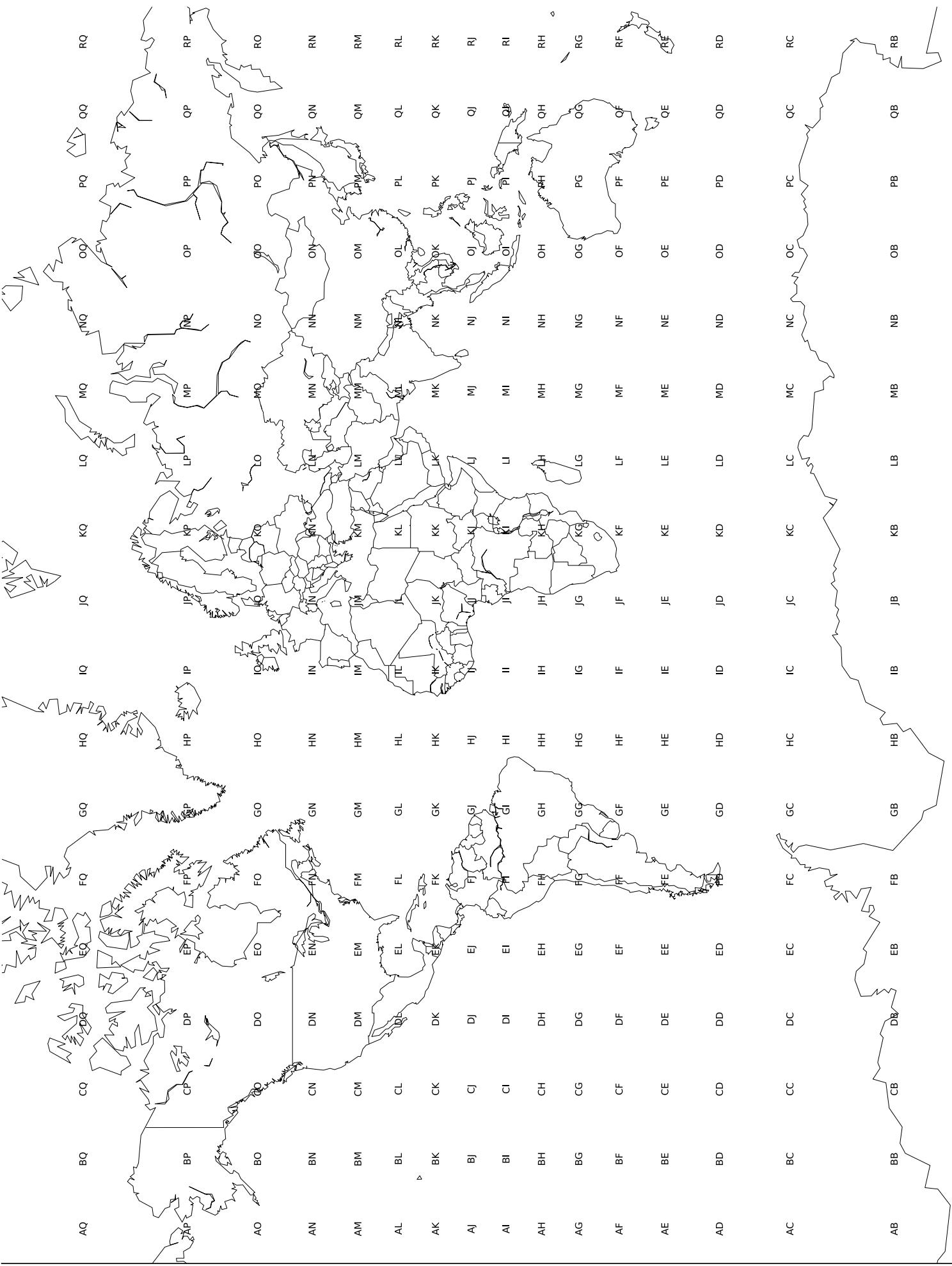
**A:** "W2XYZ DE K1ABC UR 599 IN MA = NAME JOHN = HW? W2XYZ DE K1ABC K"  
(*You're 599 in Massachusetts. My name is John. How do you copy?*)

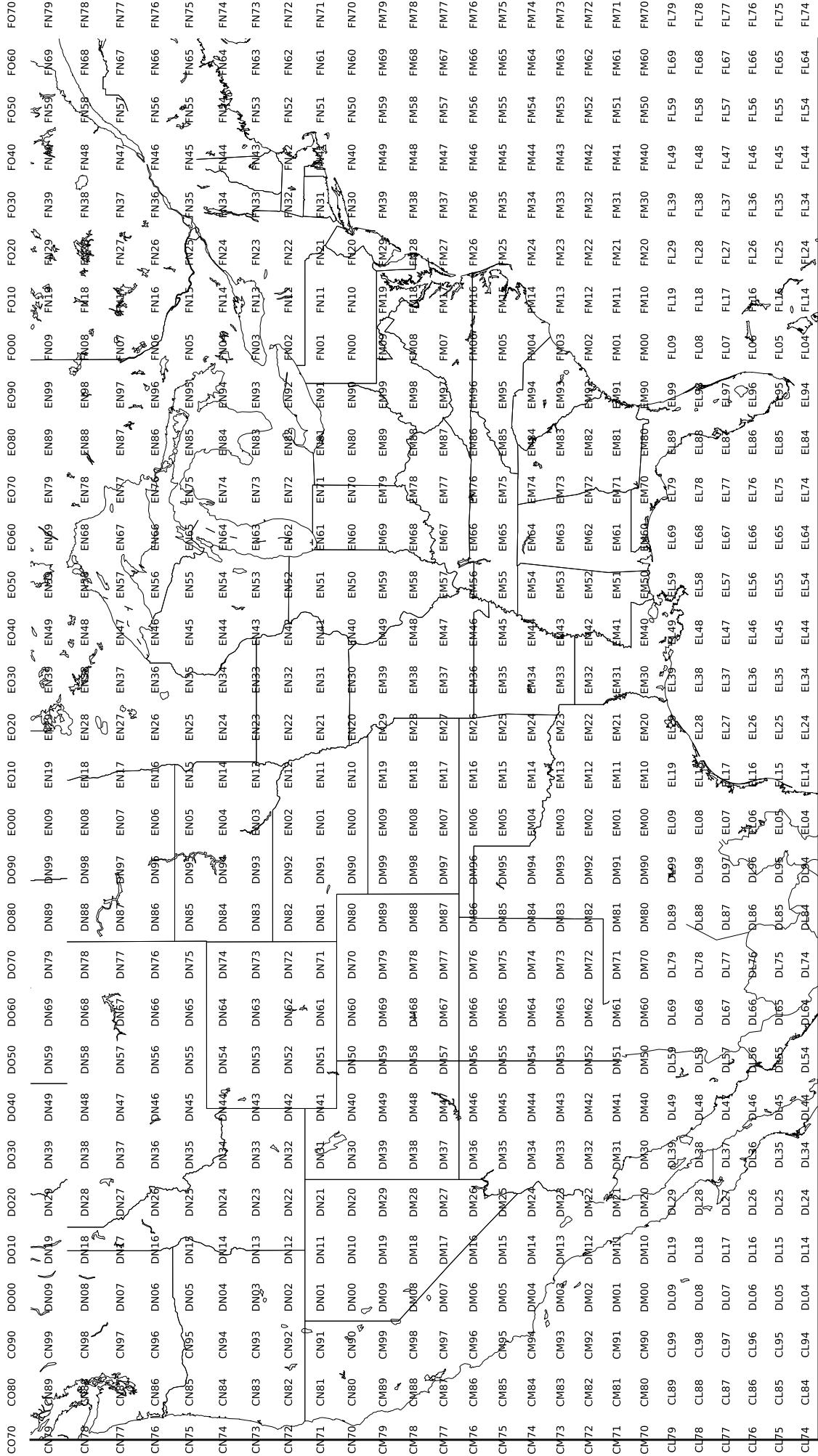
**B:** "K1ABC DE W2XYZ R UR 589 IN NJ = NAME MIKE = RIG KX3 10W = WX SUNNY = K1ABC DE W2XYZ K"  
(*Roger, you're 589 in New Jersey. My name is Mike. My rig is a KX3 running 10 watts. Weather is sunny.*)

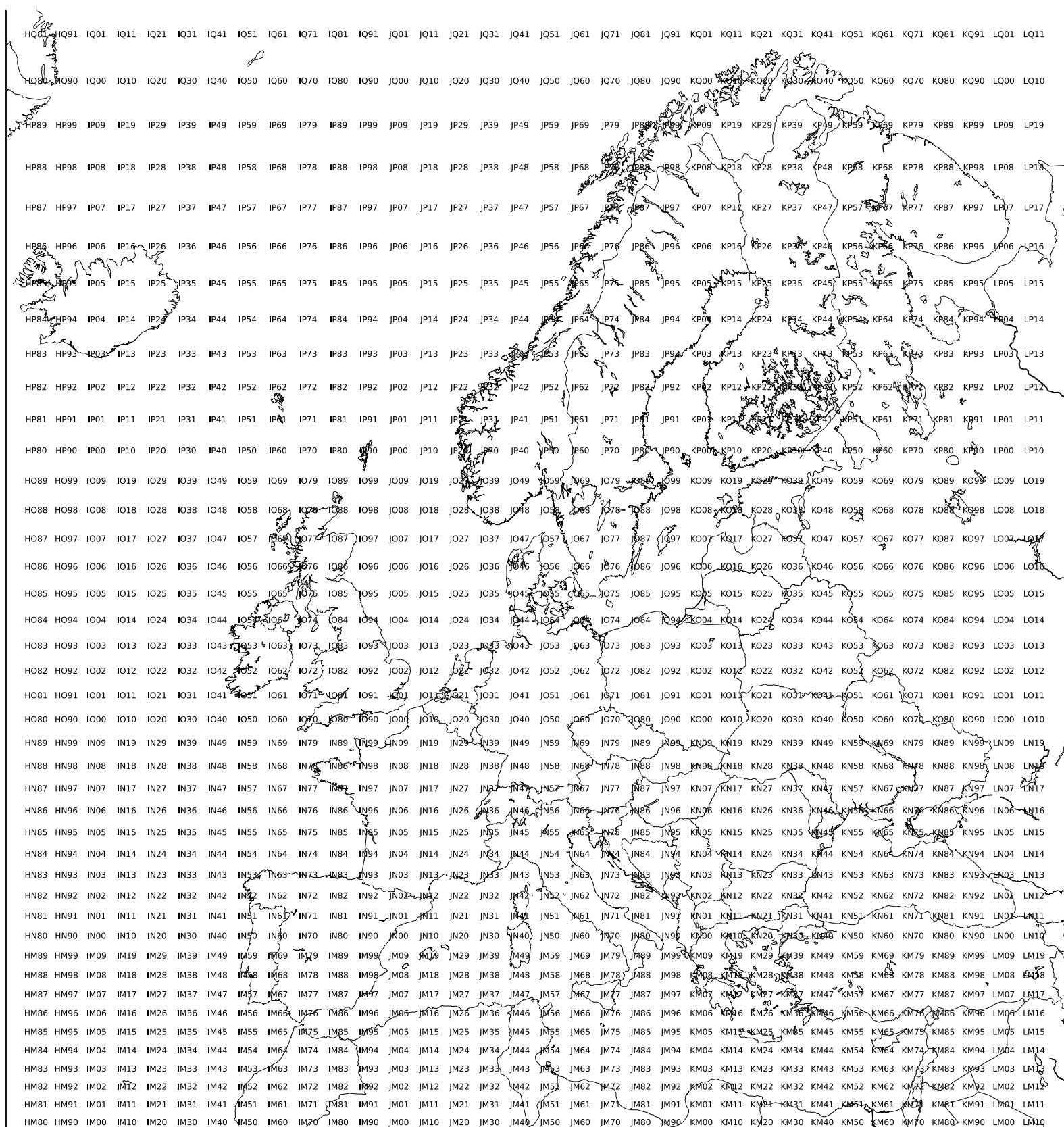
**A:** "R TNX MIKE = 73 ES HPE CUAGN = W2XYZ DE K1ABC SK"  
(*Roger, thanks Mike. Best regards and hope to see you again. Signing off.*)

# Callsign Country Prefixes

K, N, W	United States	CT	Portugal
AA–AL	United States	LU	Argentina
VE	Canada	PY	Brazil
VA, VO, VY	Canada	CX	Uruguay
ZL	New Zealand	YV	Venezuela
VK	Australia	XE	Mexico
JA, JE, JH	Japan	TI	Costa Rica
G, M	United Kingdom	OA	Peru
F	France	CE	Chile
DL	Germany	HL	South Korea
I	Italy	BY, BG, BH	China
ON	Belgium	HS	Thailand
PA	Netherlands	9V	Singapore
SM, SA	Sweden	VU	India
OH	Finland	4X, 4Z	Israel
LA, LB	Norway	ZS	South Africa
OE	Austria	SU	Egypt
OK	Czech Republic	A6	United Arab Emirates
SP	Poland	A7	Qatar
HA	Hungary	A9	Bahrain
YU	Serbia	9K	Kuwait
EA	Spain		







# References

## CW Parse Tree

<https://commons.wikimedia.org/wiki/File:Morse-code-tree.svg>

## World Maidenhead Grid Map

<https://www.dxengineering.com/techarticles/dxegeneralnews/download-a-free-worldwide-grid-square-map-from-dx-engineering>

## ARRL Frequency Allocation Chart

<https://www.arrl.org/graphical-frequency-allocations>

## ARRL Considerate Operator's Frequency Guide

<https://www.arrl.org/considerate-operator>

## ARRL Communicating with Other Hams

<https://www.arrl.org/files/file/Get%20on%20the%20Air/Comm%20w%20Other%20Hams-Q%20Signals.pdf>

## Icom US Grid Square Map

[https://www.icomamerica.com/lineup/amateur/Band\\_Plan\\_Map/](https://www.icomamerica.com/lineup/amateur/Band_Plan_Map/)

## Icom Common Prefixes of Countries

<https://www.hamql.com/bandchar.pdf>