



# FlexRadio SMARTLINK



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*Ria Jairam, N2RJ  
FlexRadio Community Elmer  
Hamvention 2018*

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Creativity is just connecting things.



- *Steve Jobs*

# THE FLEX-6000 SYSTEM

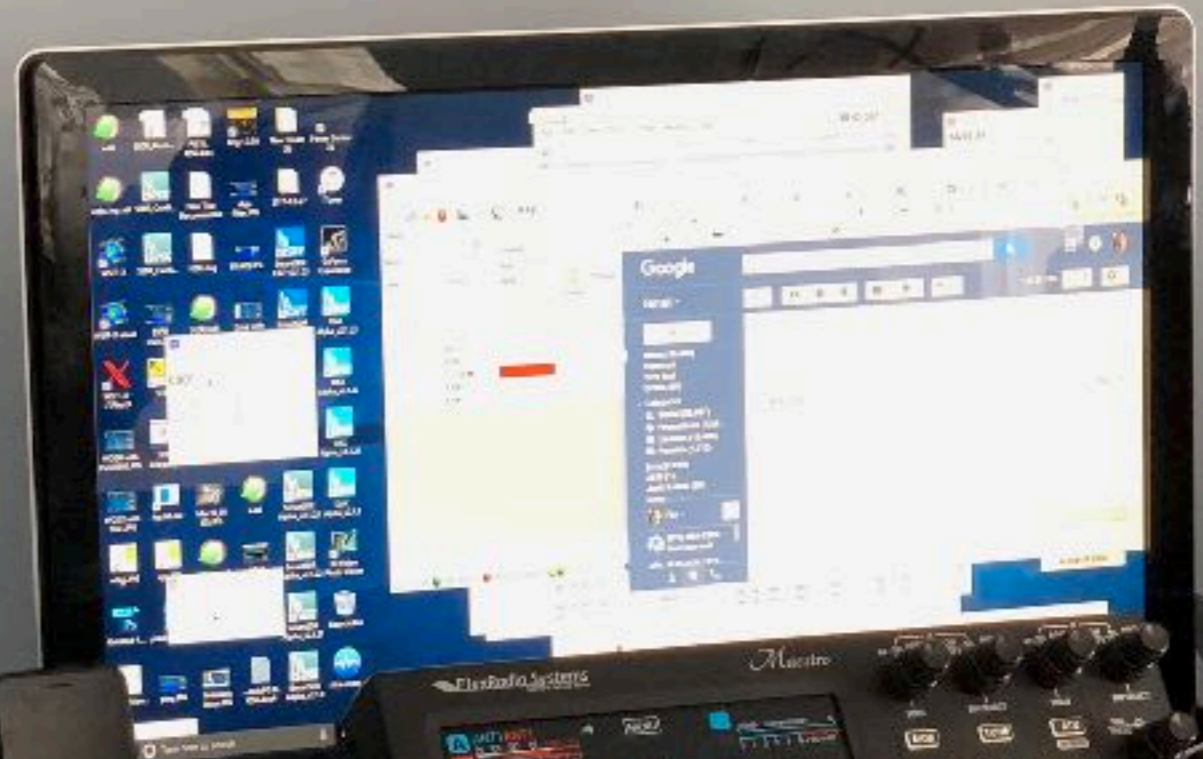
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- Ethernet connected radio
- Thin client (low bandwidth)
- Built for remote operation
- CAT, Audio (DAX), Winkeyer (CW)  
available over the network

## OTHER THINGS - CURRENT AND ANNOUNCED

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- SmartSDR for iOS
- Third party Mac clients
- Maestro
- Power Genius XL amplifier
- Tuner Genius
- and more... TBA





# OLD WAY - VPN ACCESS

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- Raspberry Pi SoftEther VPN
- Worked well
- Gave access to your entire network (security implications)
- Required setup under Linux (scripted install made it easier)
- Required router configuration
- Did not work with Maestro (unless you used a 2nd Pi)

# ENTER SMARTLINK

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- Access your FlexRadio Flex-6000 transceiver(s) and connected devices anywhere you have an Internet connection
- Security built in - TLS, MFA, physical verification (PTT)
- Optional social login (Facebook, Google)
- No router configuration required in many cases
- Ability to use Maestro, including knobs and CW with a real key or paddle



# WHAT IT DOESN'T DO

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- No DAX support.
- Can't be used with carrier grade NAT on the radio end (Satellite, 4G LTE, some land based ISPs)
- Needs UPnP or manual port forwarding. If your router doesn't do these, then no go.
- 6600M/6400M front panel can't be used as a SmartLink client
- No completely remote setup. Must physically key radio to pair to account.
- Windows client version must match radio (no upgrade/downgrade via SmartLink) - but iOS and Mac will work



# REQUIREMENTS

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- Flex-6000 series radio (6700/R, 6600/M, 6500, 6400/M, 6300).
- Version 2 SmartSDR software license (\$199 or included with some radios)
- Internet connection at the radio end without Carrier Grade NAT
- Router that supports port forwarding or UPnP
- Client - Windows PC, Mac, iPhone/iPad, Maestro

# SECURITY

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- All radio commands via TCP are encrypted with TLS
- Authentication supports Multi Factor Authentication (MFA)



# HOW IT WORKS – RADIO PAIRING

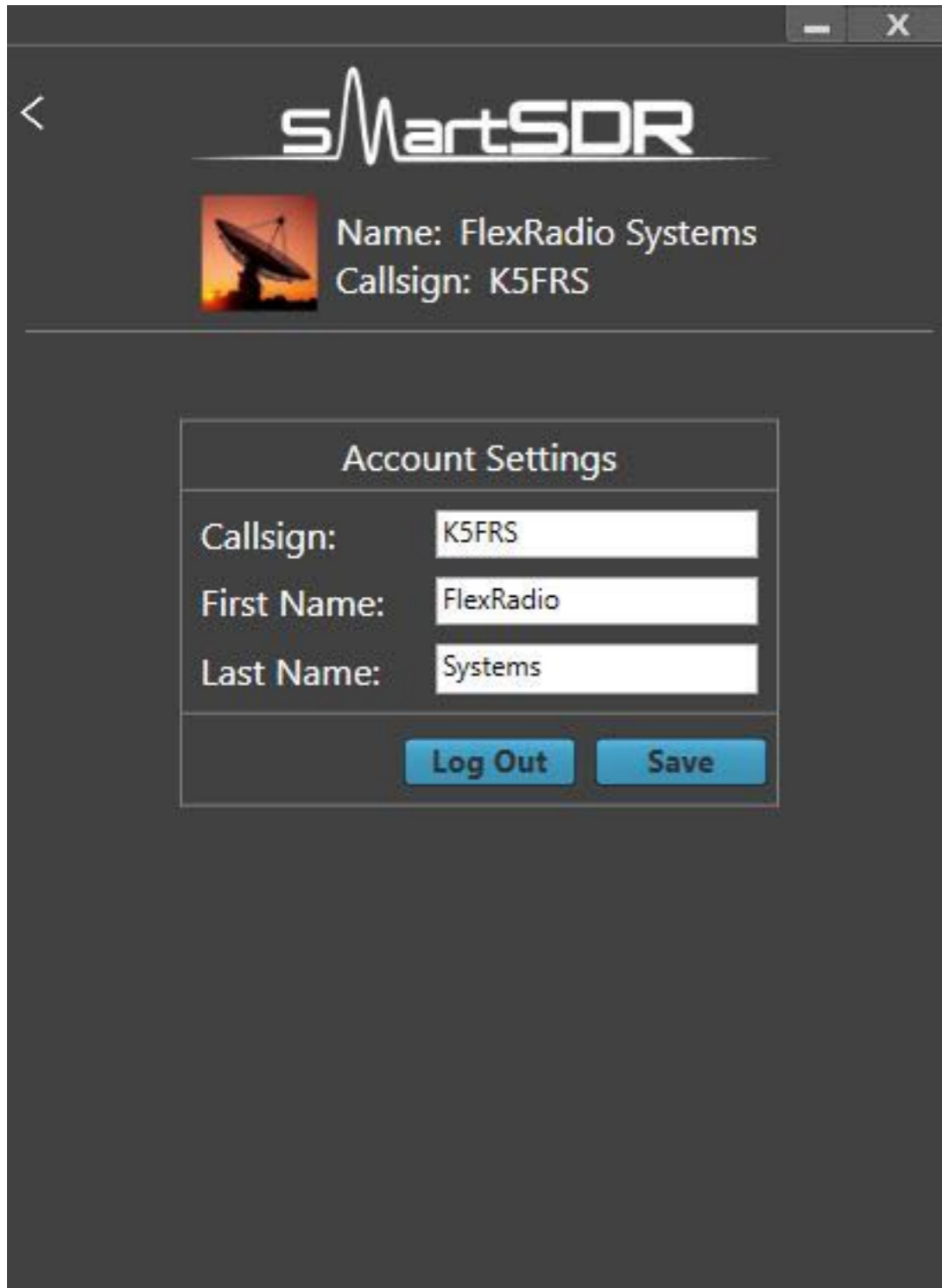
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- Sign in to or create your Smartlink account. Account exists “in the cloud” at FlexRadio.
- Pair your radio to your account.
- Press PTT when prompted, and confirm via audio tone.
- DONE. Beautifully simple, no?

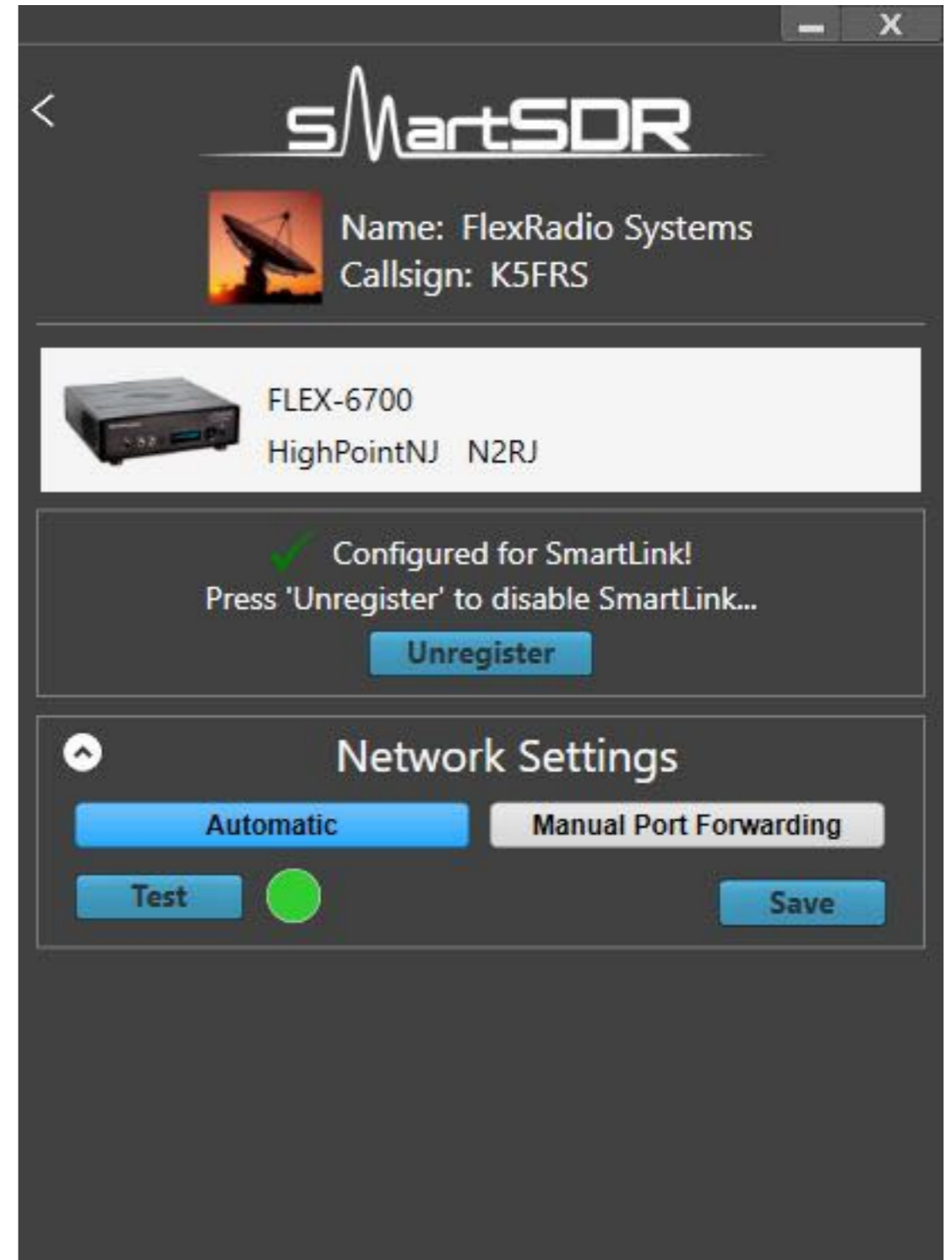


# RADIO PAIRING

*Step 1 - login*



*Step 2 - pair*



# HOW IT WORKS – CLIENT SETUP

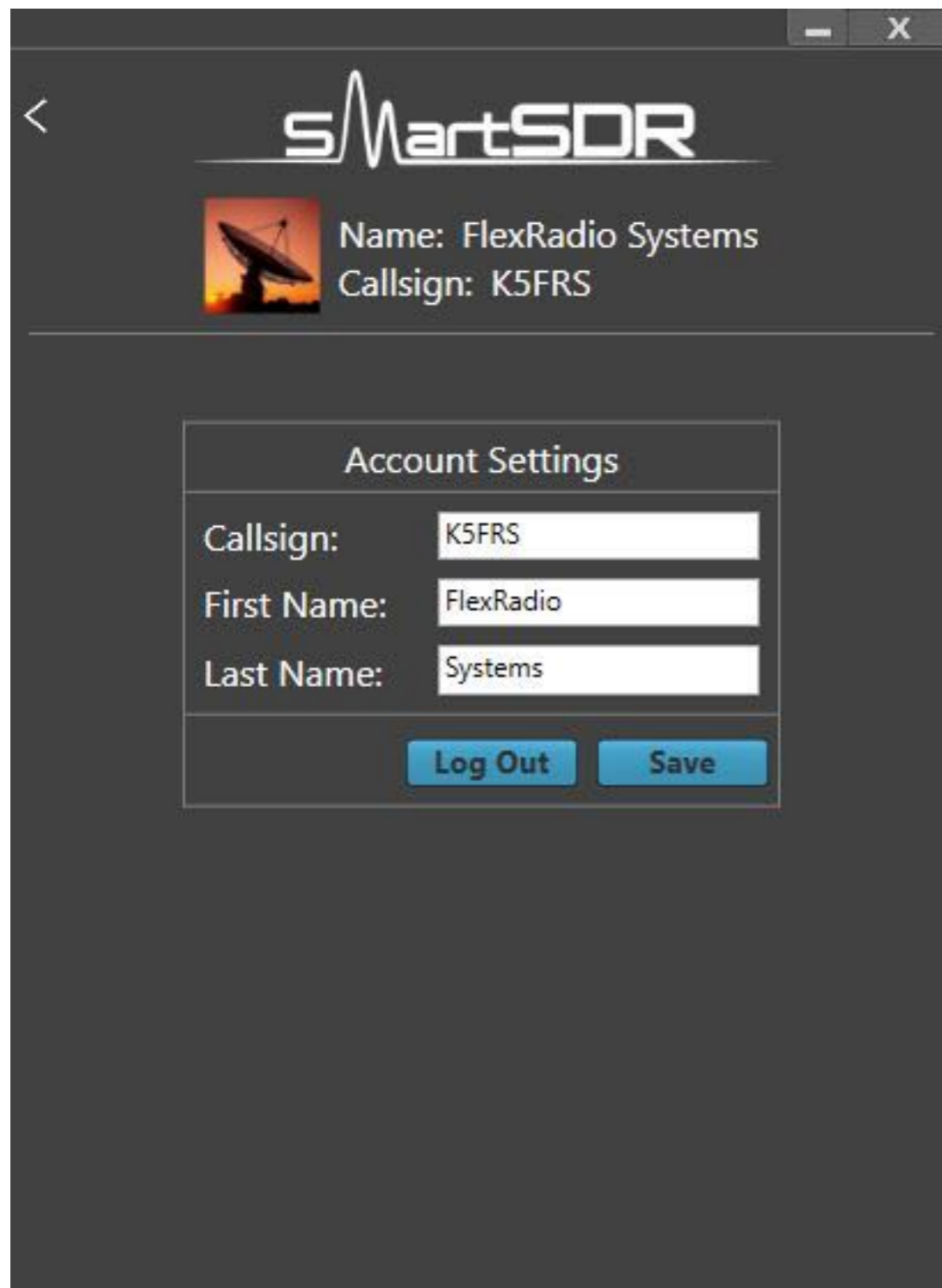
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- Sign in to your SmartLink account on your remote device
- Click or tap the remote radio with the SmartLink icon
- FlexRadio Smartlink app in the cloud brokers the connection
- Radio and client are connected, Smartlink cloud app no longer in the picture



# CLIENT SETUP - WINDOWS

## 1. Login



The login window displays the SmartSDR logo and user information for FlexRadio Systems (Callsign: K5FRS). Below this is an 'Account Settings' form with input fields for Callsign, First Name, and Last Name, and buttons for 'Log Out' and 'Save'.

**SmartSDR**

Name: FlexRadio Systems  
Callsign: K5FRS

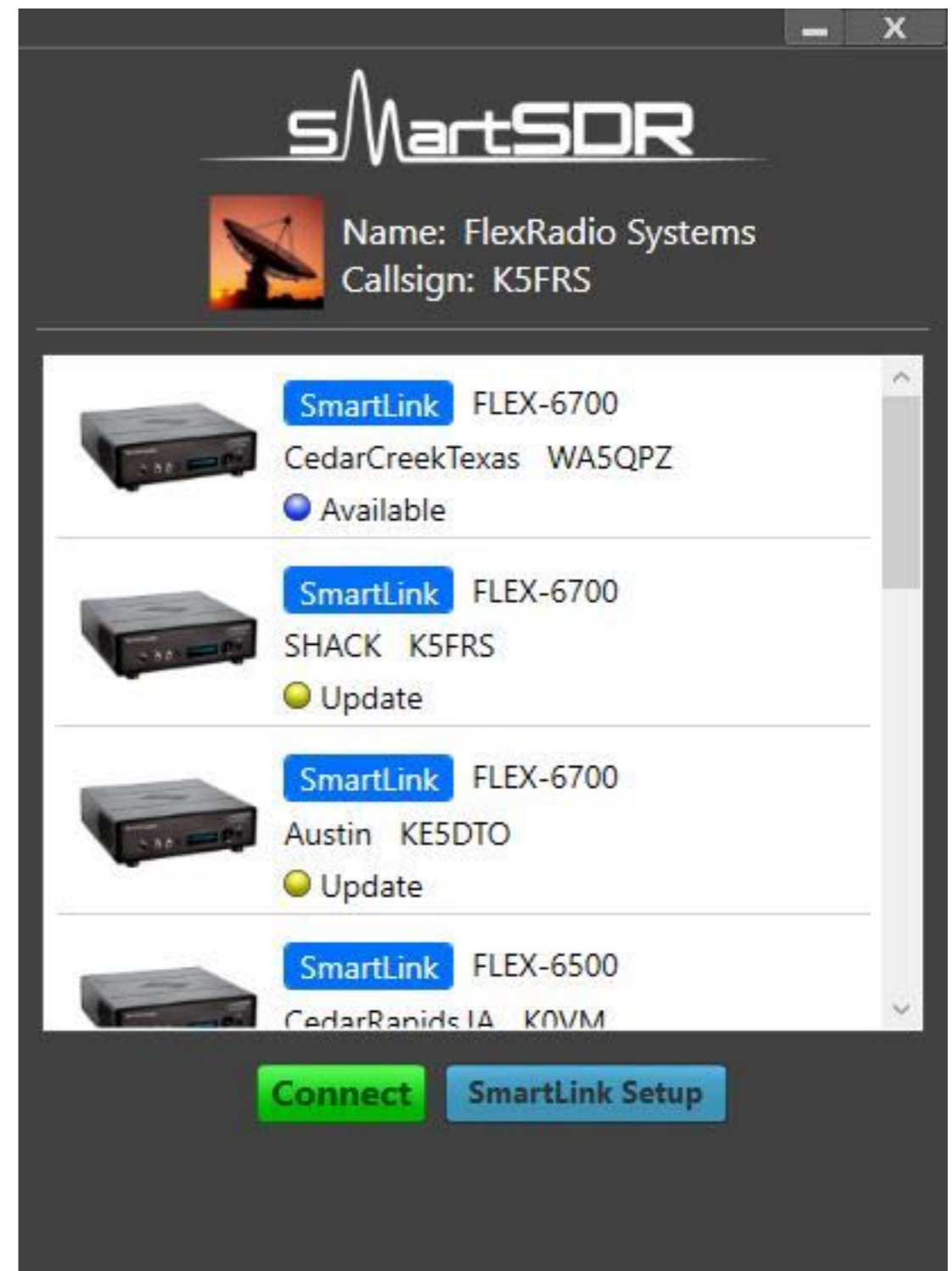
**Account Settings**

Callsign:

First Name:

Last Name:





## 2. Connect



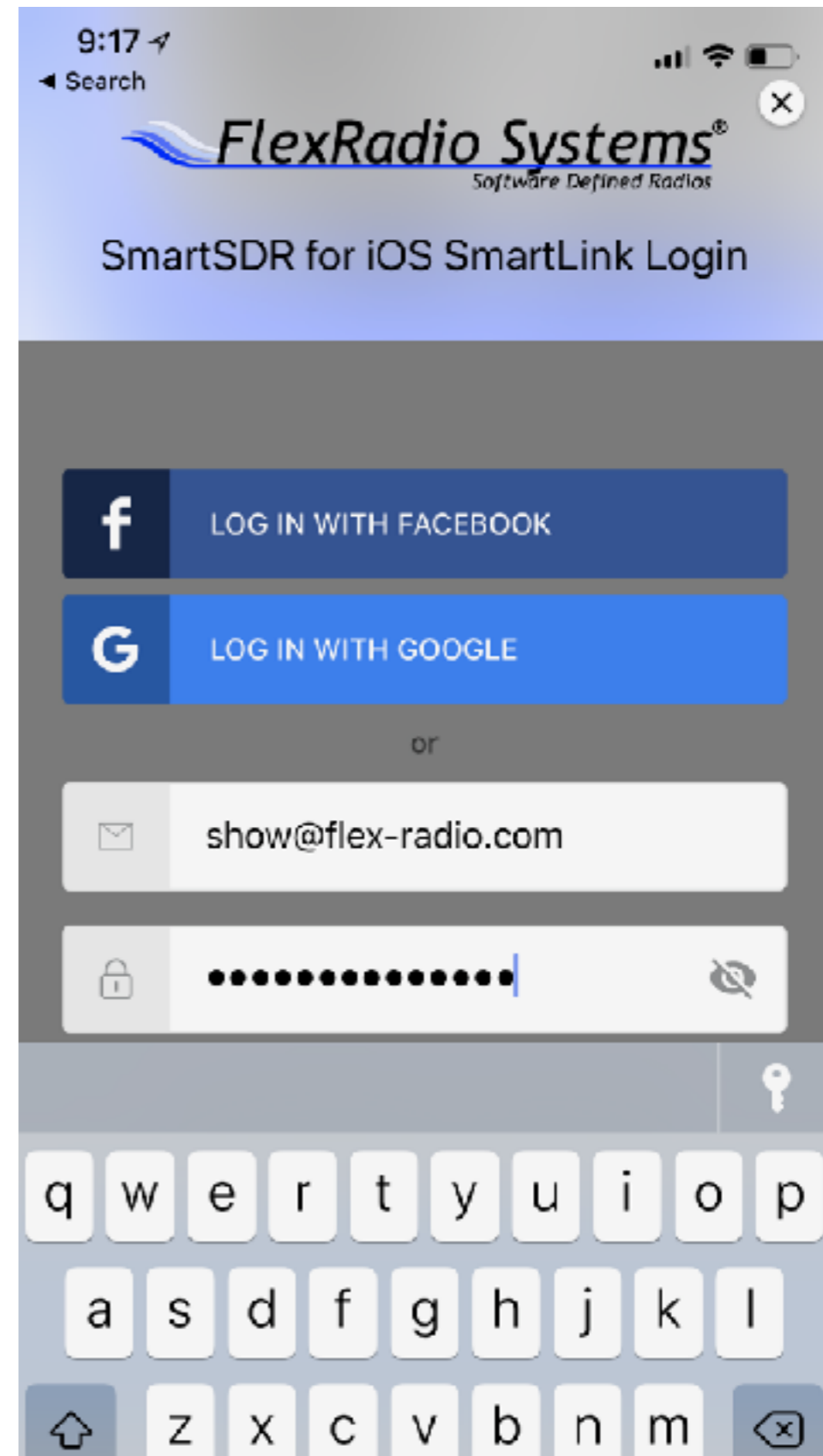
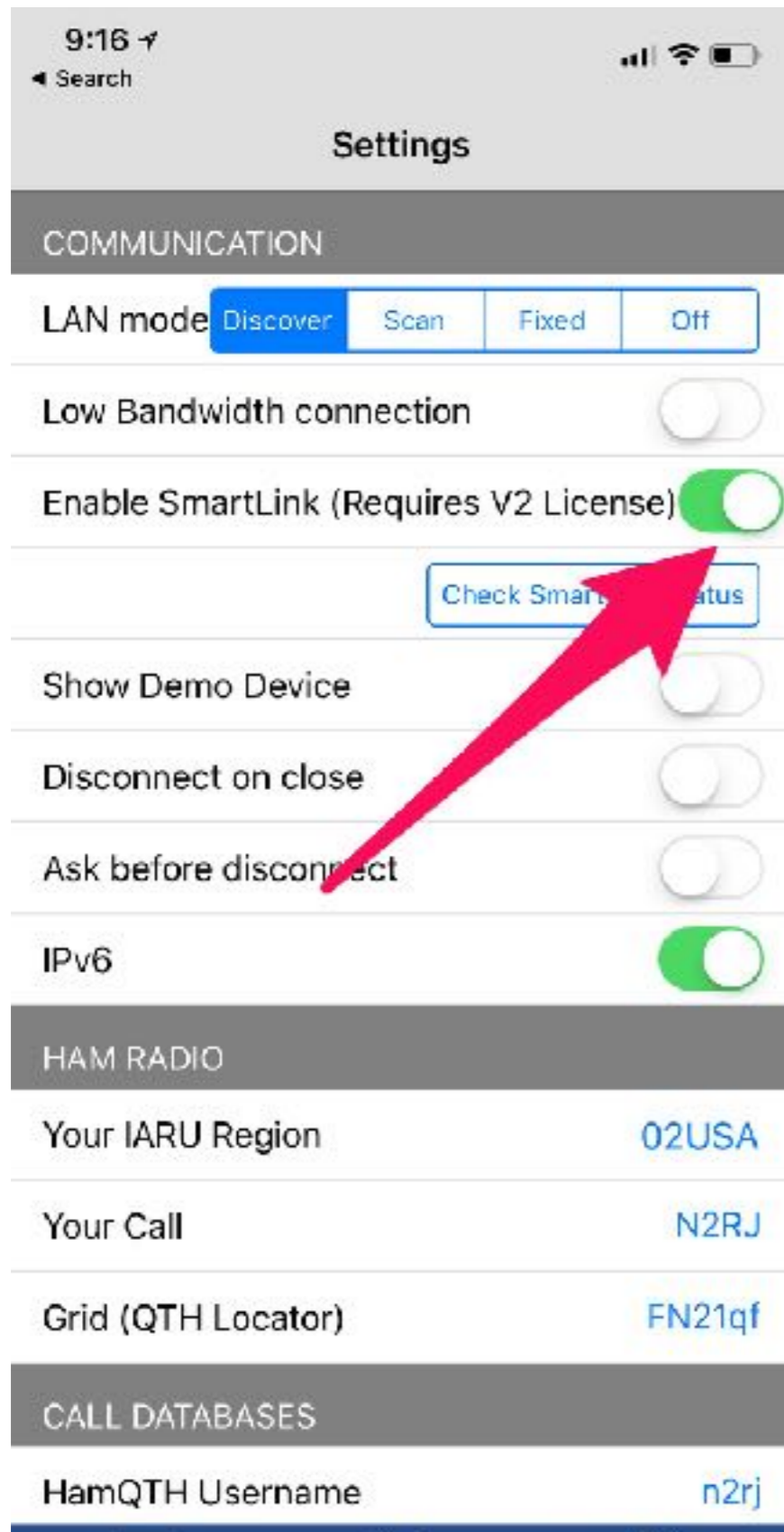
The connect window displays the SmartSDR logo and user information for FlexRadio Systems (Callsign: K5FRS). Below this is a list of SmartLink devices with their status (Available or Update) and buttons for 'Connect' and 'SmartLink Setup'.

**SmartSDR**

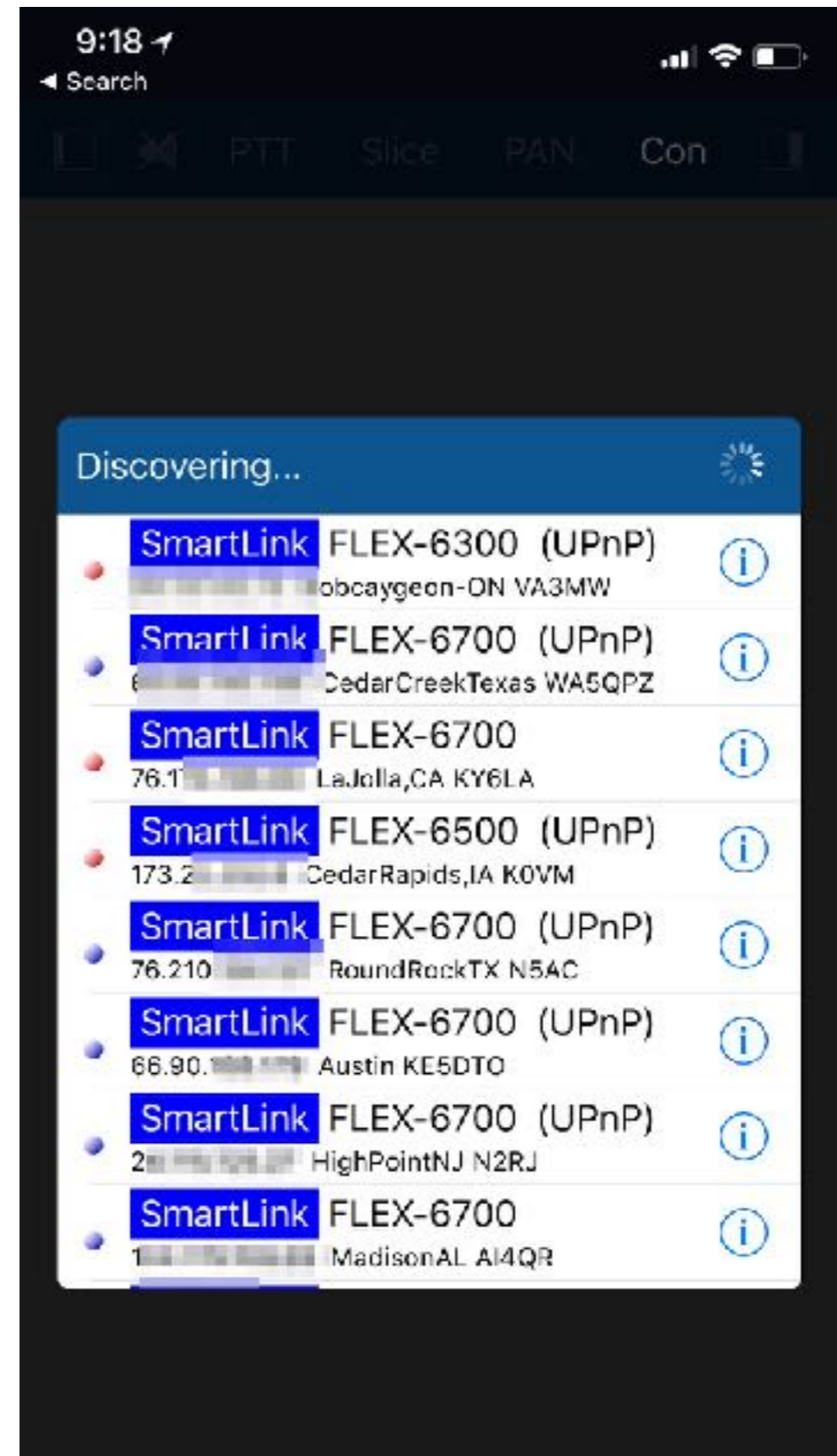
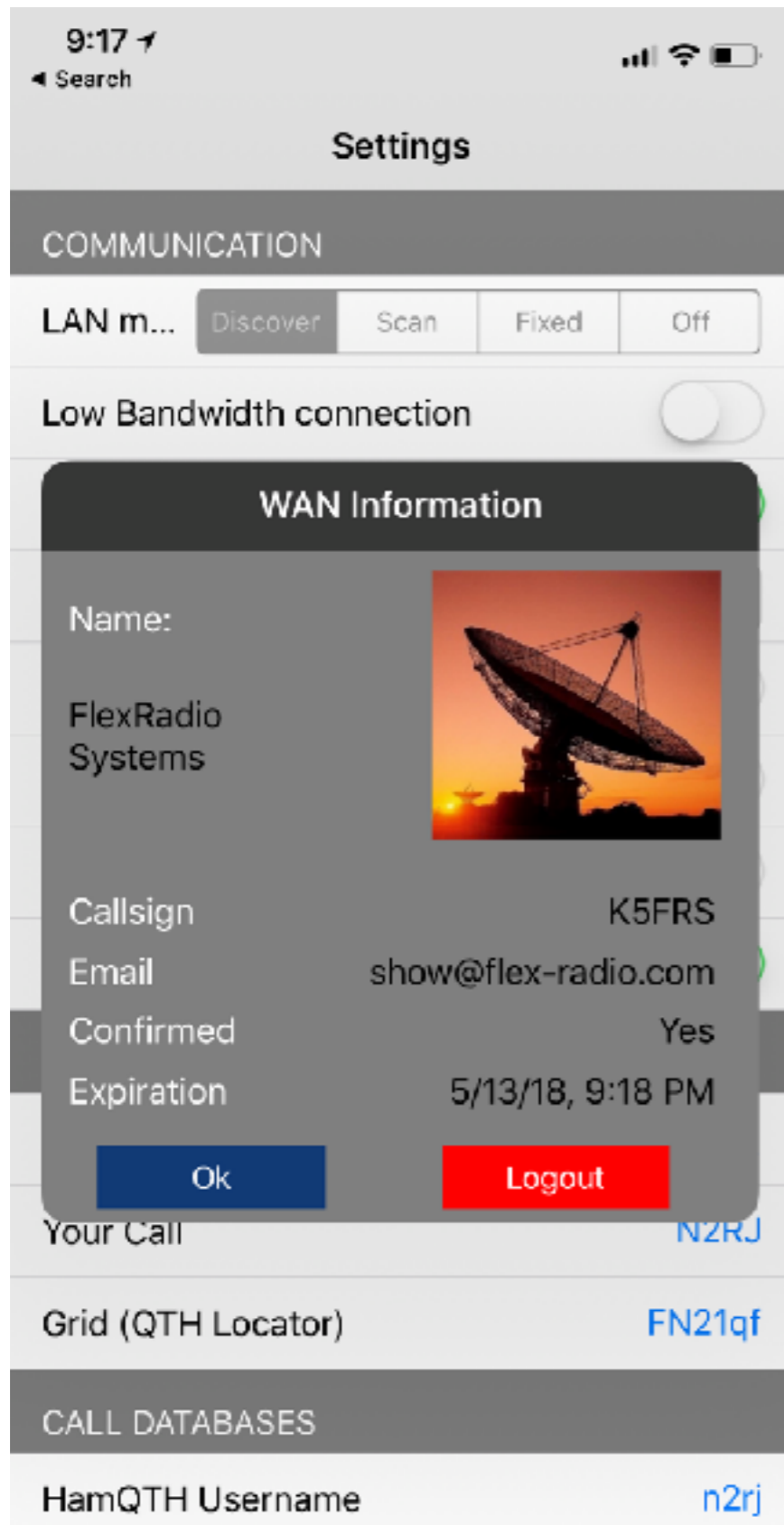
Name: FlexRadio Systems  
Callsign: K5FRS

-  **SmartLink** FLEX-6700  
CedarCreekTexas WA5QPZ  
 Available
-  **SmartLink** FLEX-6700  
SHACK K5FRS  
 Update
-  **SmartLink** FLEX-6700  
Austin KE5DTO  
 Update
-  **SmartLink** FLEX-6500  
CedarRanids IA K0VM

# CLIENT SETUP - IOS



# CLIENT SETUP - IOS

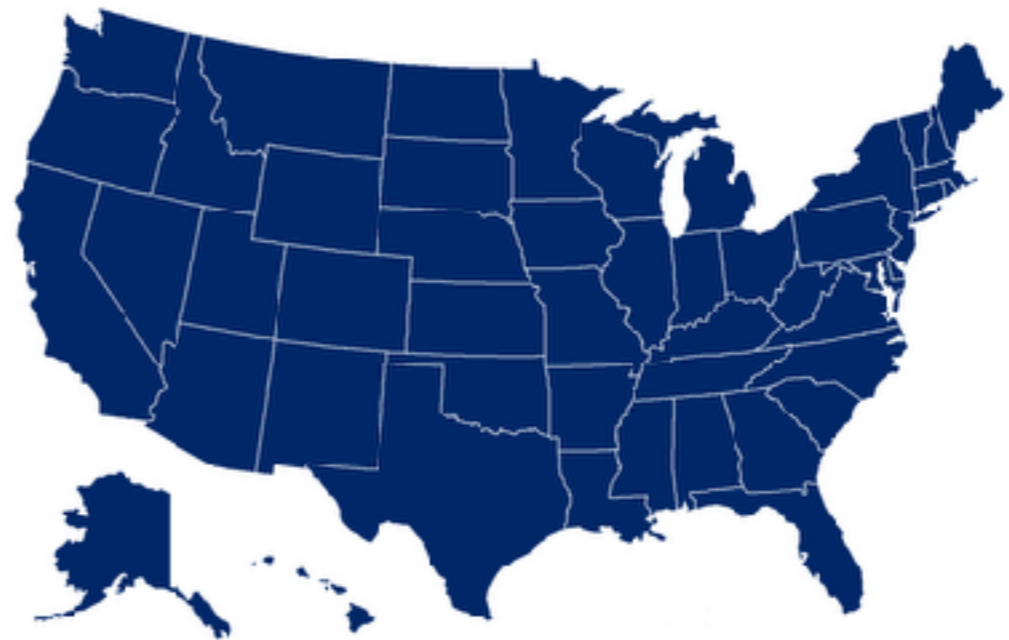




# LEGAL ISSUES – US LICENSEES AND STATIONS

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- Radio will stop transmitting after a short period of time if control link is interrupted (97.213(b) )
- Control point is the client software (97.109 (c) ). You are always in full, exclusive control.
- If you let others use your station, verify they can legally operate. You can monitor their operation via DAX.
- CEPT operators not physically present in the US may not operate US remote stations.



# LEGAL ISSUES – WORLDWIDE

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- Check your local regulations
- Some may prohibit remote operation entirely
- Some may require a special license/variation
- Some may limit who/when/where/license class

Physical Map of the World, February 2016



# ETHICS WHEN OPERATING REMOTELY

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- Always identify where your transmitter is, NOT where you, the operator physically are
- Awards are largely on the honor system. Some ban or restrict remote receivers. However most are fine if receiver and transmitter are in the same location.
- DXCC now allows remote operation.

# CONTROLLING OTHER EQUIPMENT

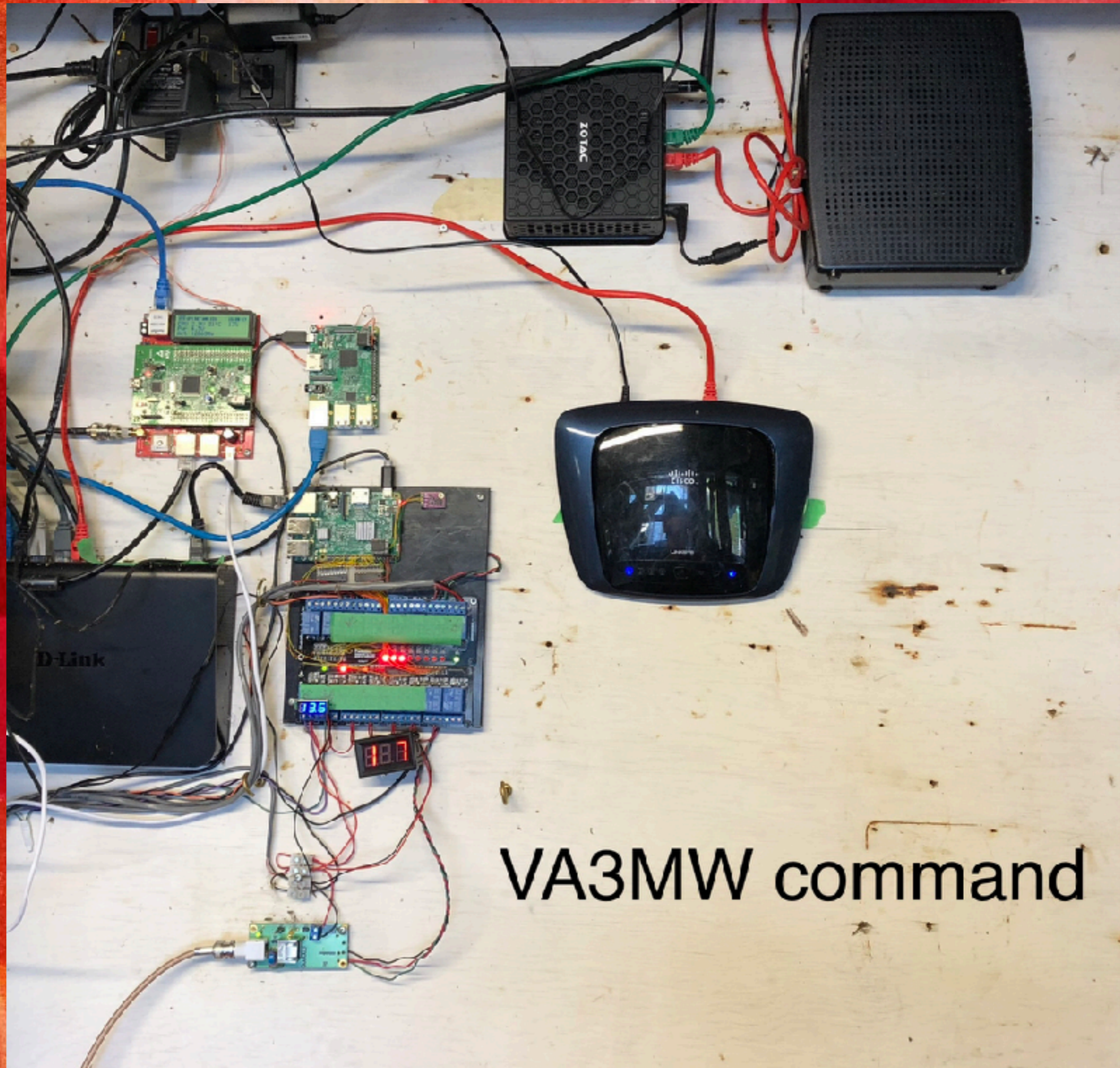
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- Smartlink and SmartSDR has limited ability to control other equipment.
- Flex-6000 radios can send ethernet commands or serial commands via USB, which relay the frequency of a slice or TX antenna port.
- No rotor control. PSTRotator or DDUtil works.
- Basic tunable antenna (SteppIR) control. (controller follows slice frequency)
- Power Genius XL amplifier is fully controllable within SmartSDR
- SmartLink cannot reset the radio, nor can it power on/off (radio must be always on or you must have external means to power off/on)

# SOLUTIONS!

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- Remote web switch
- RemoteQTH using Raspberry Pi
- Other home automation solutions
- Windows PC with teamviewer
- VPN



VA3MW commmand

VA3MW Remote Base PstRotatorAz - Registered to VA3MW v13.21

Location Setup Tracker Map View Show Preset Help



**DXCC**  
 DX Local Time: ?  
 1A: Gov Mil Order of Malta  
 15: Spratly Islands  
 3A: Monaco  
 386: Agalega & St. Brandon  
 388: Mauritius  
 389: Rodriguez Island  
 3C: Equatorial Guinea

**Mode**  
 Manual  Tracking

**QRB**  
km

**QTH Locator**  
 **GO to Locator**

**Az**  
 31  41 **GO**

**BD**  0  30 **ANT**  1 **STOP**

**UTC**  
15:14:13

**Call**  **GO**

**Flex-6000 Setup**

**FlexRadio**  
 Use Flex-6000  
 IP Address  
  
**Connected**  
 50.323 MHz

**CMD**

**Commands**

- Ground
- 40M Array
- 80M SSB
- 40 V
- SteppIR
- Dummy Load
- 160/80M CW
- spare
- spare
- spare

Elecraft W2 - Server

Help

**Sensor2 = HF 2KW**

SENSOR  S1  S2 **SETUP**

2W  20W  20CW  2KW  AUTO

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
0.00W																			
0.00W																			
1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.5	3	3.5	4	5				
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>				
0.00:1																			

ROP PWR(ser) PWR(led) PEAK DECAY LED ALARM **CAL** +/-

FAST PEP AVG ON SLOW ON OFF 509

VA3MW Remote Base SteppIR Controller

Setup Calibrate Radio View

**To SteppIR**  **From SteppIR**

**Bands**  
 80  40  30  20  17  15  12  10  6

**Normal**  
 180  
 Bi-Dir  
 3/4  
 160 Auto

**Auto** **Home** **Manual** **Relay** **DN**

VA500 Remote by Elecraft®

Connect Disconnect Mini Mode About

**Operate**  Operate  **Standby** Band

0 W  
 0.0 to 1  
 0.0 A  
 0.0 V  
 C  
 Speed: Auto

**PWR OFF** Clear Fault

Antenna control

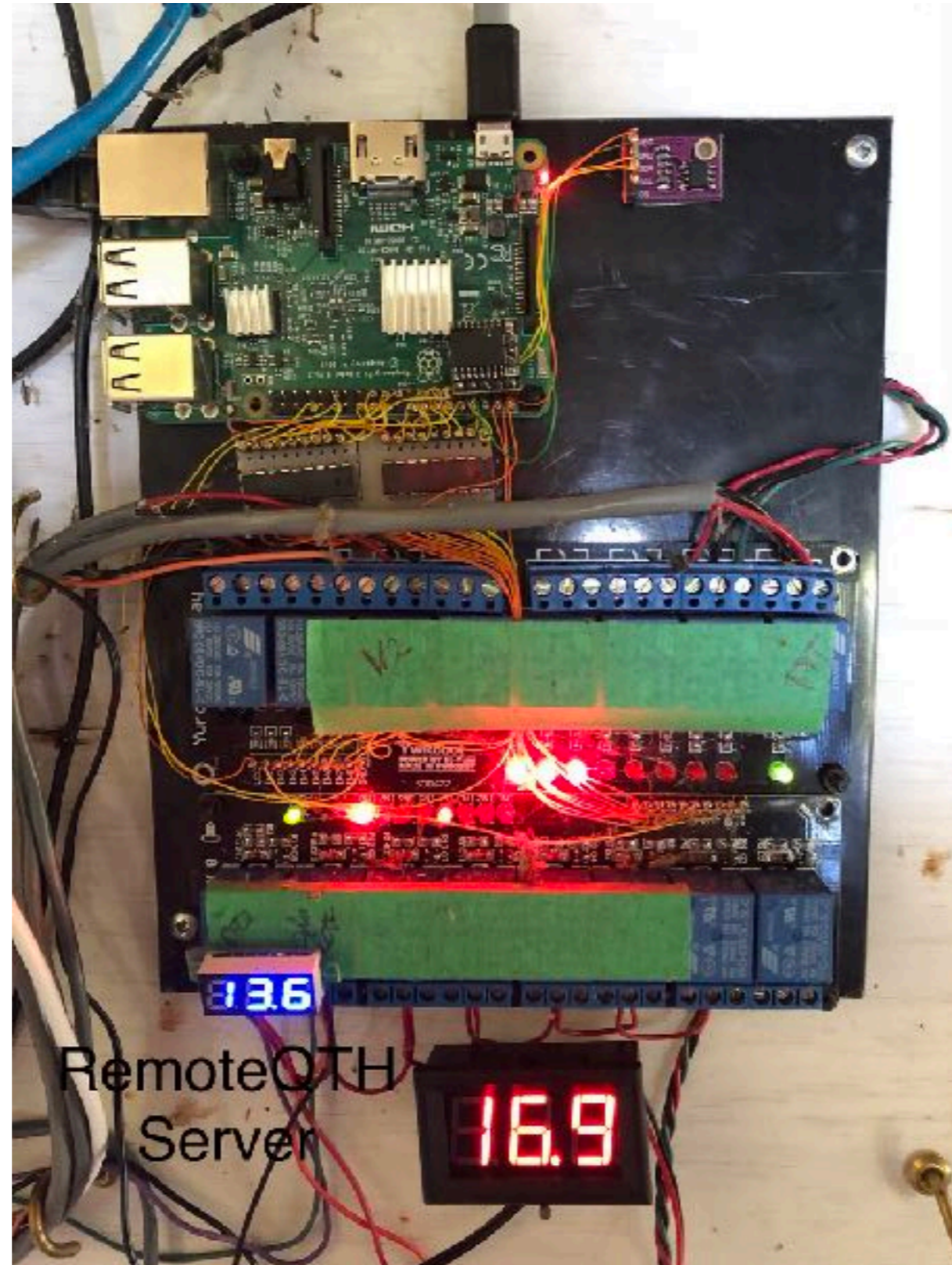
RPT Internal 37.0 °C  
 Bathouse 17.0 °C

**AC Power** **6300 PWR** **W2 PWR** **RX 1/2**

**PTT Auto-OFF** **40M E/W** **480 6300**

# THE BRAIN

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RemoteOTH  
Server



# REMOTE OPERATING EXAMPLES

# N2KOJ OPERATING 13 COLONIES

THE US. ORIGINAL 13 COLONIES SPECIAL EVENT GROUP PRESENTS THE 9TH ANNUAL  
★ 4th Of July Week - The Original 13 Colonies Special Event ★

INDEPENDENCE WEEK 2017

MAY GOD BLESS AMERICA

JULY 1ST - JULY 6TH

## LIBERTY OR DEATH



# S A M P L E



## DONT TREAD ON ME



IN RECOGNITION FOR PARTICIPATING IN THIS 4TH OF  
JULY WEEK - 13 COLONIES SPECIAL EVENT, THIS  
CERTIFICATE IS AWARDED TO ARS: - KU2US

# 73'



ALL 13 COLONY STATES  
CLEAN SWEEP



WM3PIN



GB13COE



K2A  
NY

K2B  
VA

K2C  
RI

K2D  
CT

K2E  
DE

K2F  
MD

K2G  
GA

K2H  
MA

K2I  
NJ

K2J  
NC

K2K  
NH

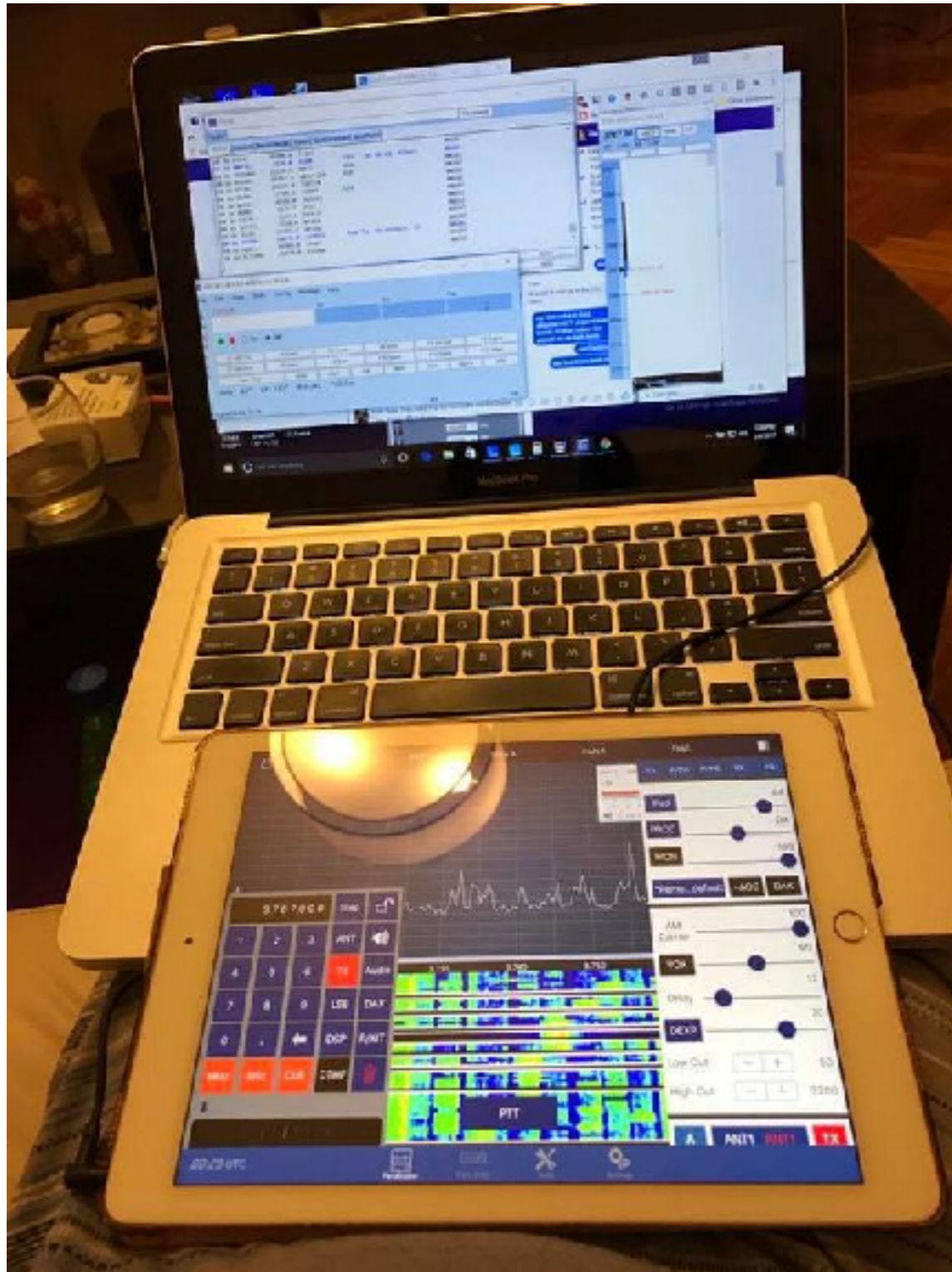
K2L  
SC

K2M  
PA

KEN VILLONE-KU2US-EVENT MGR: *Ken Villone*

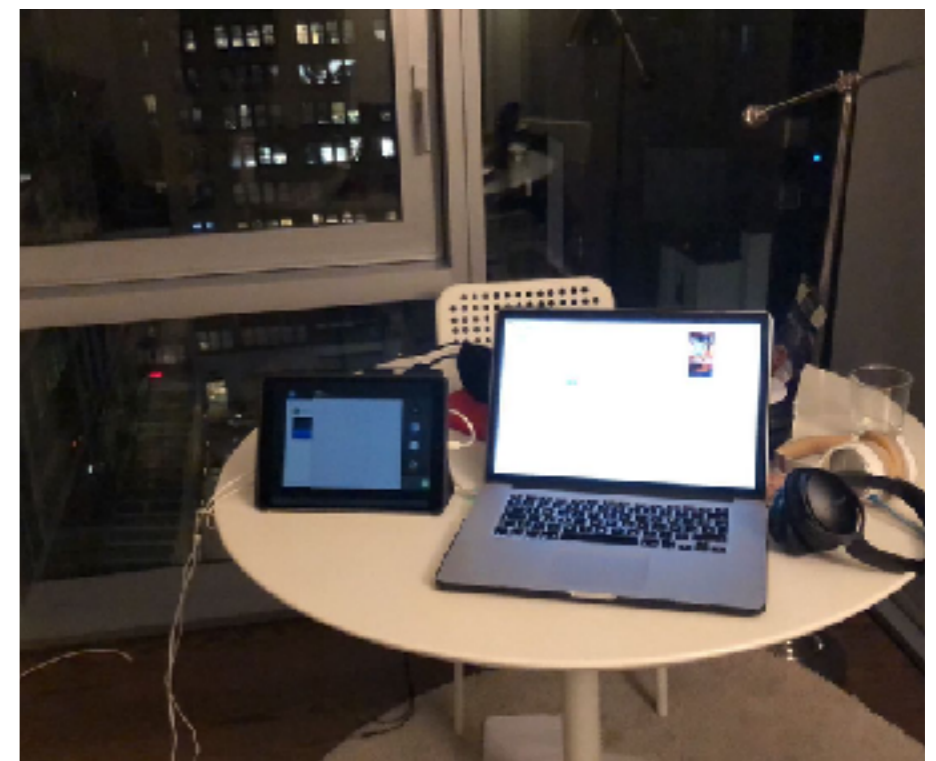
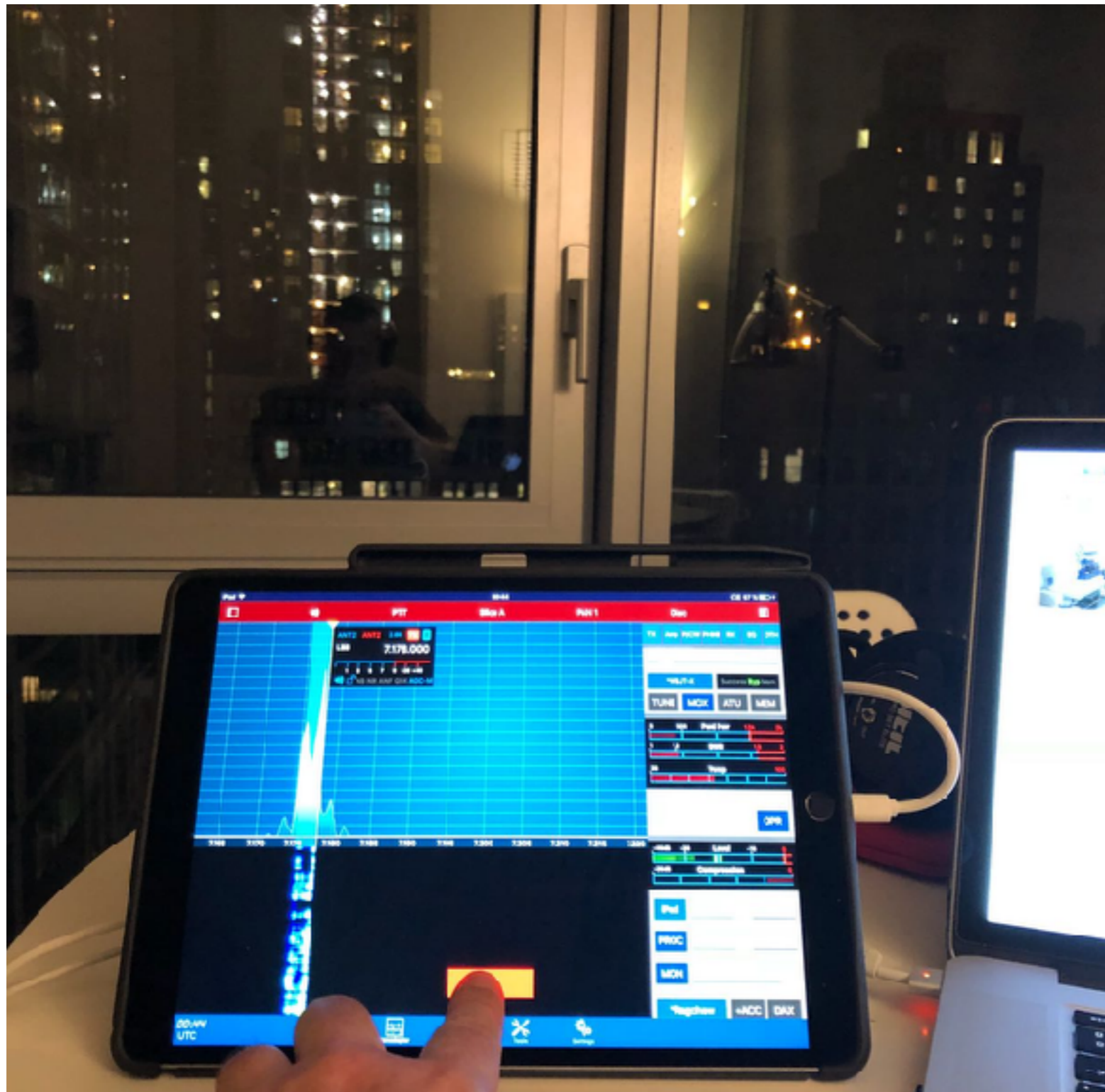
# ARRL DX SSB REMOTELY FROM BUENOS AIRES, ARGENTINA

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*SmartLink with iPad*

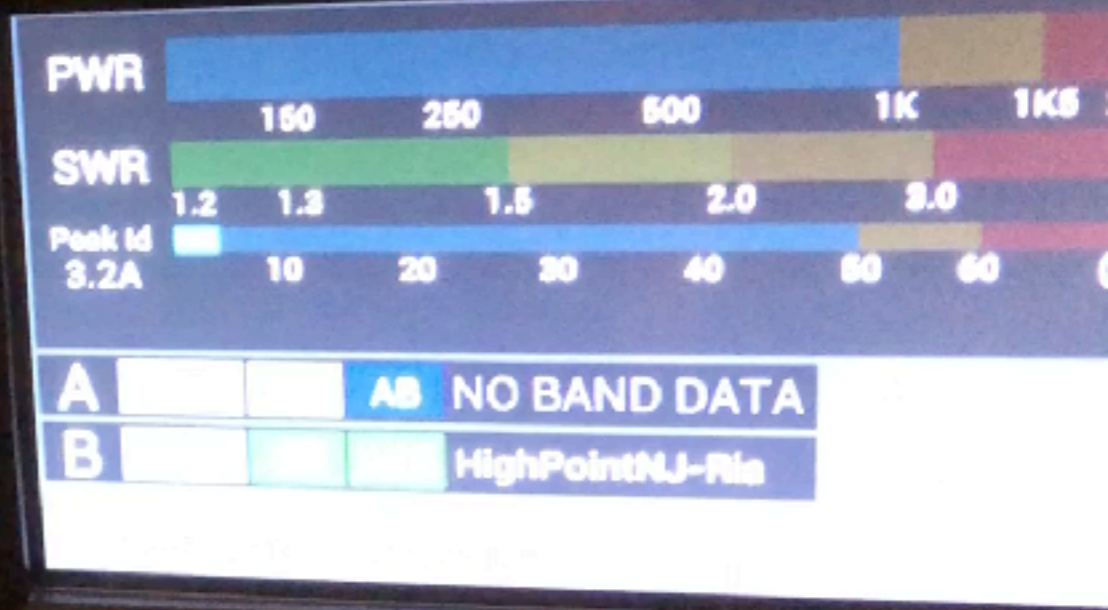
*SmartLink CAT for N1MM+*



*Allan, EA3HSO operating as W2/EA3HSO on his iPad and Bluetooth headset  
Physically present in NYC, operating N2RJ station in NJ*

FlexRadio

HF/6M AMPLI



STBY/OPER

POWER GENIUS XL

4 3A in

# QUESTIONS AND LIVE DEMO

[n2rj@arrl.net](mailto:n2rj@arrl.net)

<http://n2rj.com>

<https://www.flexradio.com>