



2BSIQ

Two Bands Synchronized Interleaved QSOs



CT1BOH – José Nunes

CT1BOH

Active in CQWW since 1989

54 CQWW's

More than 250.000 QSOs



Operations in CQ WW Contest

| Year | Mode | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------|------|------|------|--------|------|--------|-------|-------|-------|-------|------|
| 1980'S | SSB | | | | | | | | | | |
| | CW | | | | | | | | | | CR2A |
| 1990'S | SSB | | KP2A | KP2A | KP2A | P40E | P40E | P40E | P40E | SU2MT | P40E |
| | CW | CT3T | HC5M | 4M2BYT | PY0F | PY0FF | PY0FF | 9Y4H | P40E | P40E | P40E |
| 2000'S | SSB | KH7R | K5ZD | PT0F | PT0F | CQ9K | CT3YA | CT3YA | CQ9K | CQ9K | CR3A |
| | CW | P40E | PT5T | P40E | P40E | EA8ZS | CT3EN | CT3NT | CT3NT | CT3NT | CR3E |
| 2010'S | SSB | CR3A | CR3A | CR3A | CR3A | CT1BOH | CR3A | CR3A | | | |
| | CW | CR3E | CR3E | CR3E | CR3E | CR3A | CR3OO | CR3OO | | | |

Contents

Two Bands, Synchronized, Interleaved, QSOs

- Definition of 2BSIQ
- Dynamics of 2BSIQ
- 2BSIQ set-up
- “Secrets” of 2BSIQ
- Origins of 2BSIQ
- CT1BOH road to 2BSIQ
- Is 2BSIQ better than SO2R?
- Can the SOAB world record be broken with 2BSIQ?
- Is zone 33 still the best QTH for record breaking?



Definition of 2BSIQ

- **Definition**
- **Two bands**
- **Synchronized**
- **Interleaved**
- **Operating protocol**

Definition

2BSIQ (Two Bands Synchronized Interleaved QSOs) is a complex contest operating mode that in a protoled synchronized way enables interleaved two radio running on two bands to dramatically increase QSO rates

- SO2R set-up
- Alternate moment running
- No inter-station interference
- Only one signal on the air

- Management of QSO moments
- Time estimation of TX/RX pairs
- Management audio/QSO field focus

Two Bands

Synchronized

2BSIQ

Interleaved

Protocol

- Grouping RX/TX moments of QSOs
- Fitting almost 2 QSO in 1 QSO time frame

- Protocol to manage delays
- Protocol to manage synchronization disruption
- Protocol to re-synchronize

Two Bands

2BSIQ requires the capability to RUN with no interstation interference, in an alternate way, on two bands, interleaving transmitting signals one at a time



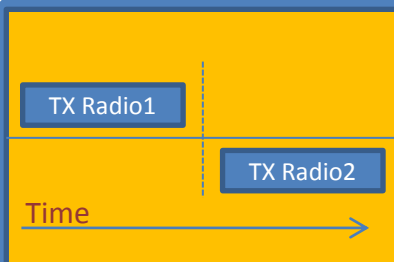
SO2R set-up

- Two radios; No inter-station interference
- No interference to be able to RUN on any two bands



Alternate running on two bands

- If radio1 on band 1 is TX, radio2 on band 2 must be RX
- If radio1 on band 1 is RX, radio 2 can be TX

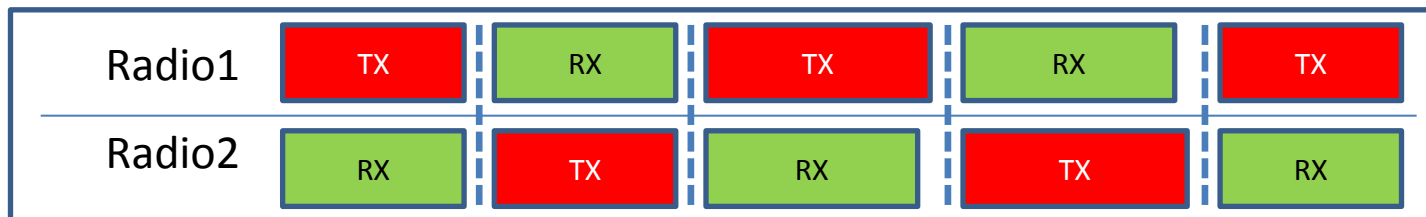
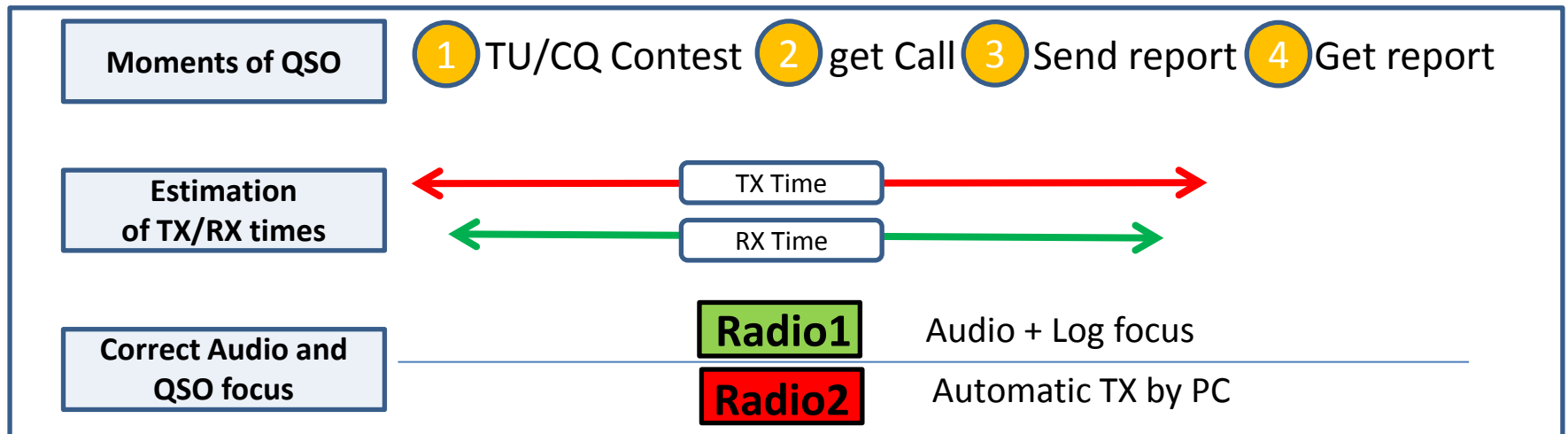


Only one signal on the air

- To comply with SOAB only one signal on the air
- To comply with SOAB each TX signal to different band

Synchronized

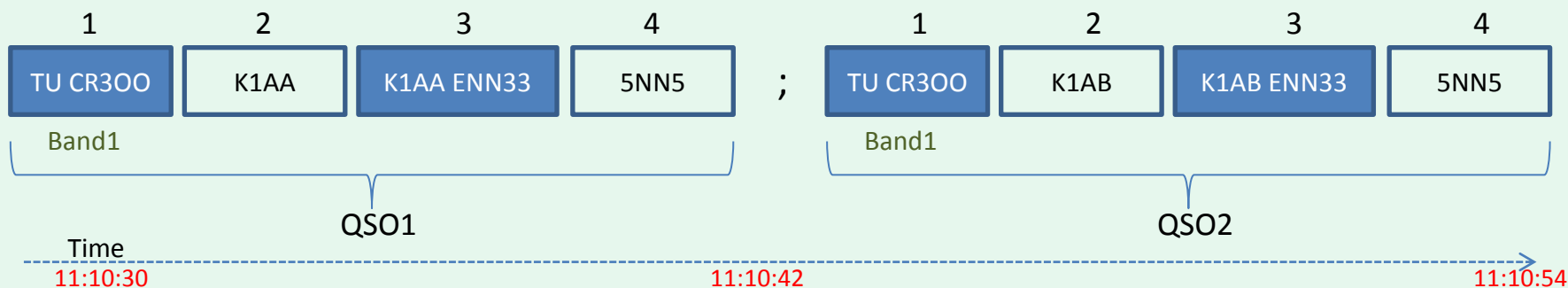
Synchronization on two bands is the key to a dramatic increase in QSO rates, obtained with management of key QSO moments, estimation of exact length of TX and RX pairs and correct focus of audio and QSO focus



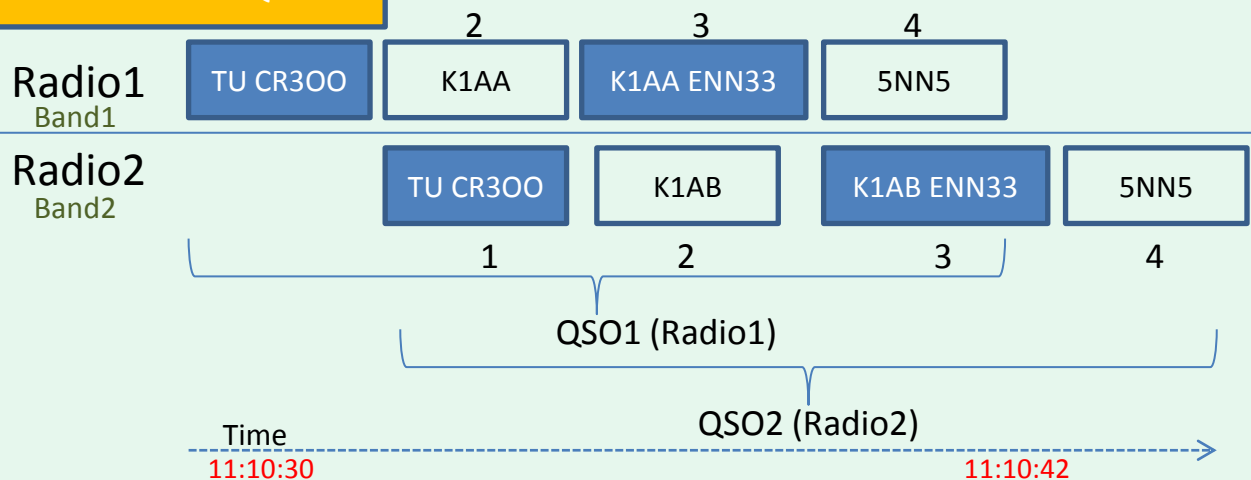
Interleaved QSOs

2BSIQ changes the paradigm from consecutive (one radio, one band) to interleaved (two radios, two bands). "Two QSOs" fit in the approximate time frame needed for one QSO

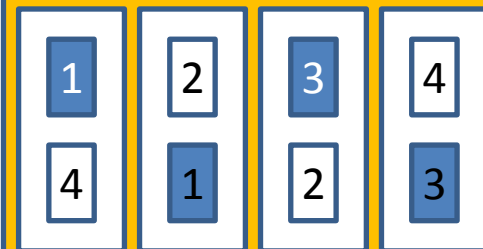
Consecutive QSOs



Interleaved QSOs

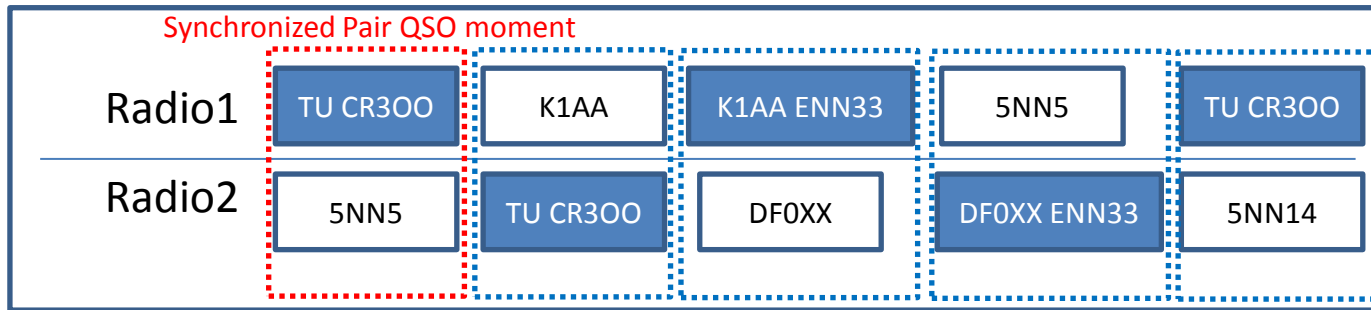


Interleave of Pair QSO moments

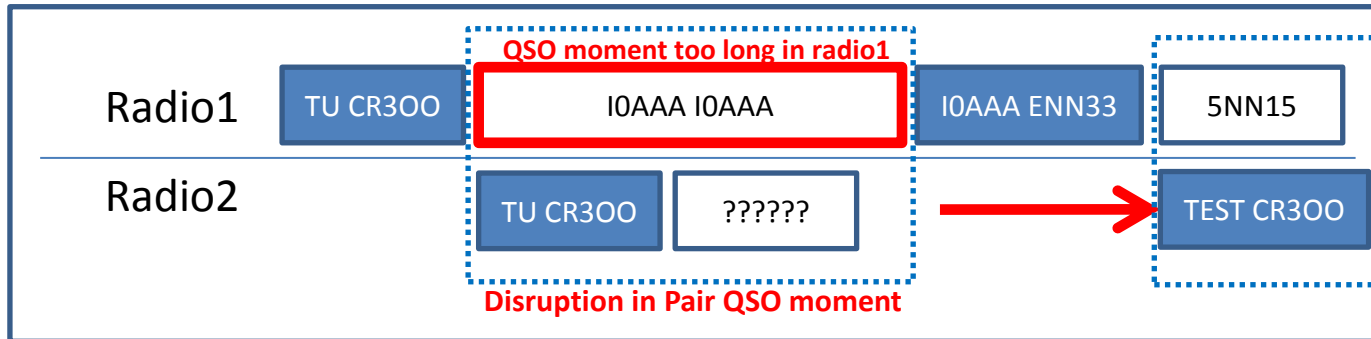


Operating Protocol

Perfect synchronization of “pair QSO moments” in two bands is not always possible, therefore an operating protocol must be followed to handle efficiently those situations



Perfect “pair QSO moment” synchronization



Disruption in “pair QSO moment” synchronization

Operating protocol
“What to do when”:

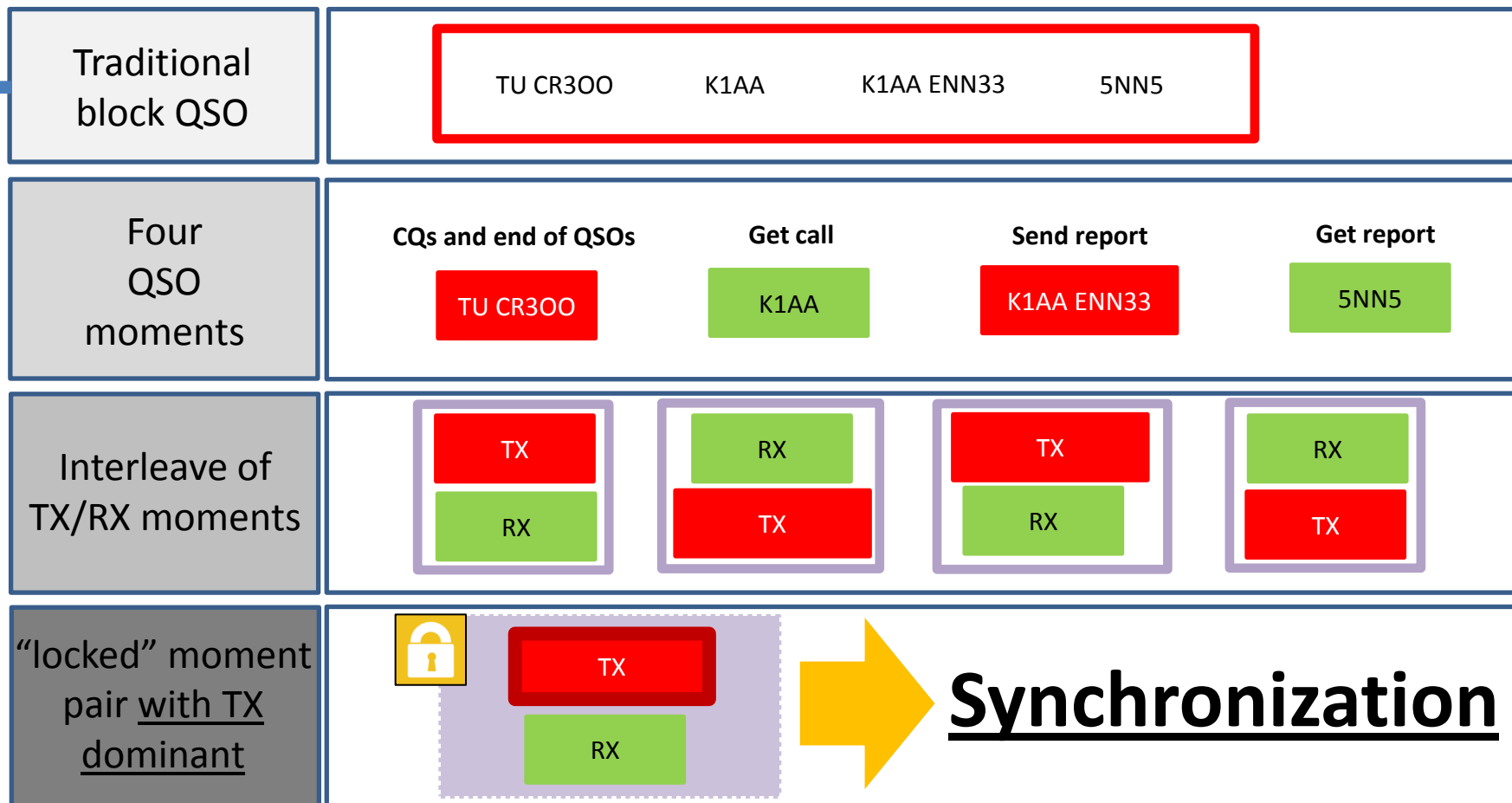
1. There are situations that push forward next pair QSO moment
2. There is disruption of synchronization
3. Re-synchronization of moments of QSO is needed

Dynamics of 2BSIQ

- **From QSO to locked moment pair**
- **TX the dominant element of the pair**
- **CW Length of TX element, calls and exchanges**
- **Delay and reaction times**
- **Four operator actions in a pair**

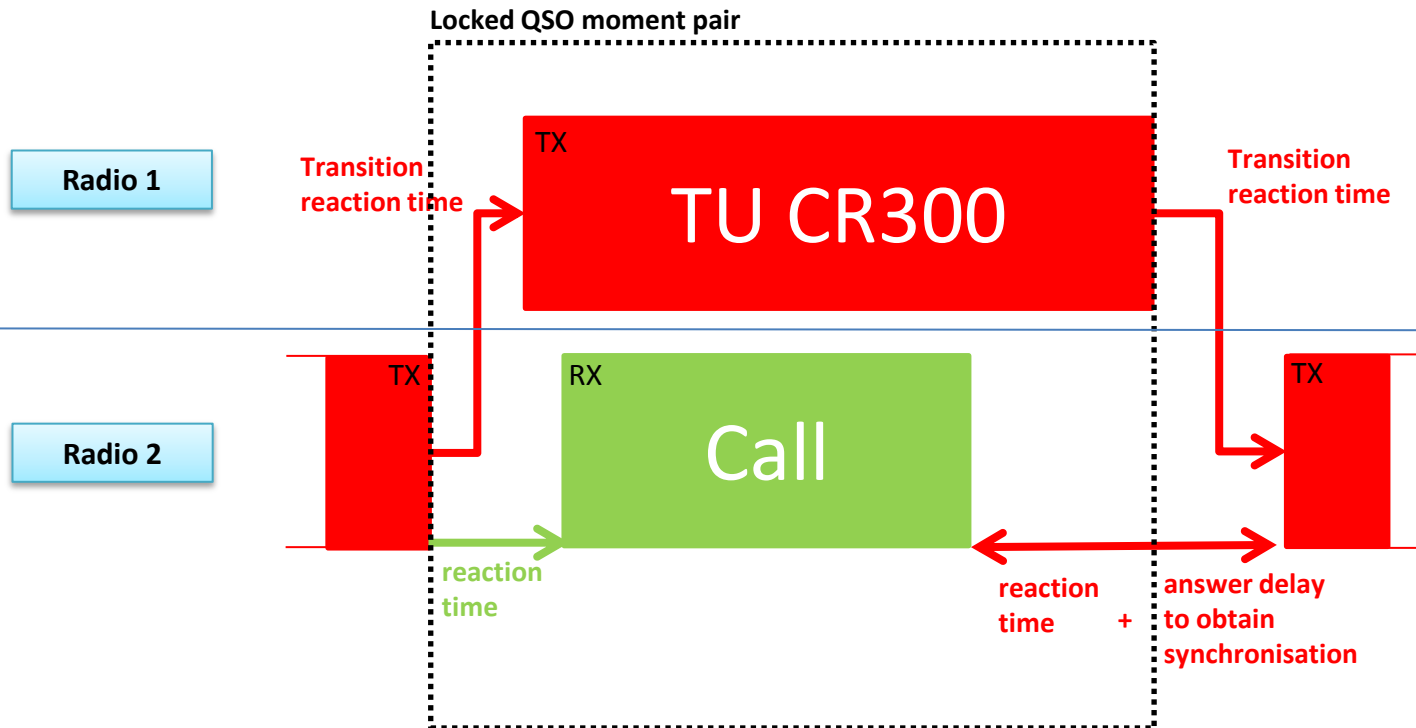
From QSO to Locked Moment Pair

To understand the dynamics of 2BSIQ, one has to go from the concept of a traditional block QSO to a “locked” QSO moment pair, otherwise synchronization will not occur



The TX element of a pair must be dominant

If the TX element is not the dominant one in the pair, perfect synchronization will not occur



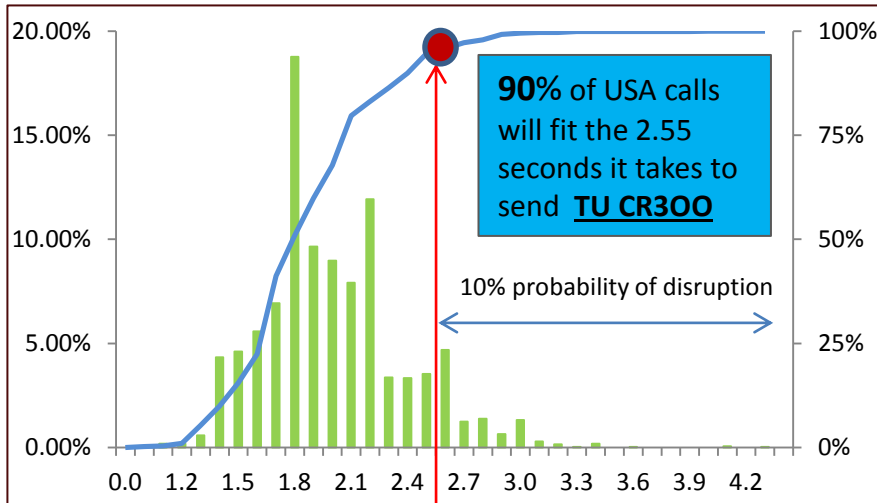
The rabbit, the fastest (shorter) element of the pair, rides on the turtle, the slowest (longer) element of the pair, hopefully in good timing – this is the essence of 2BSIQ



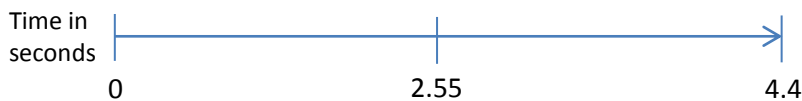
CW Length of TX/RX elements, calls and exchanges

The CW time length of the elements plays a very important part in the quest for perfect synchronization, and is dependent on many variables. Pile-up geographical area, because of the different structure of calls, also plays a very important part

CW length distribution of USA calls @ 30 WPM



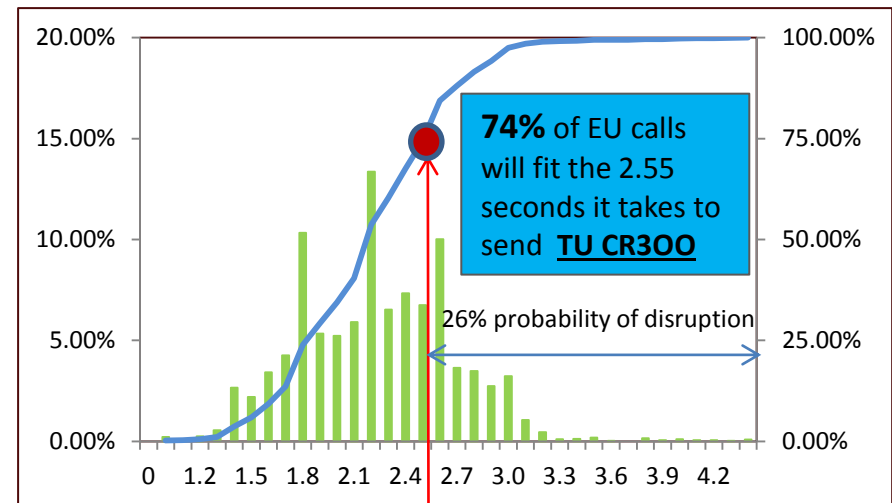
TU CR300



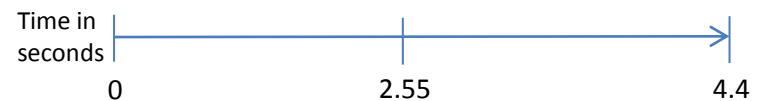
Average US call

2.044

CW length distribution of EU calls @ 30 WPM



TU CR300



Average Non US call

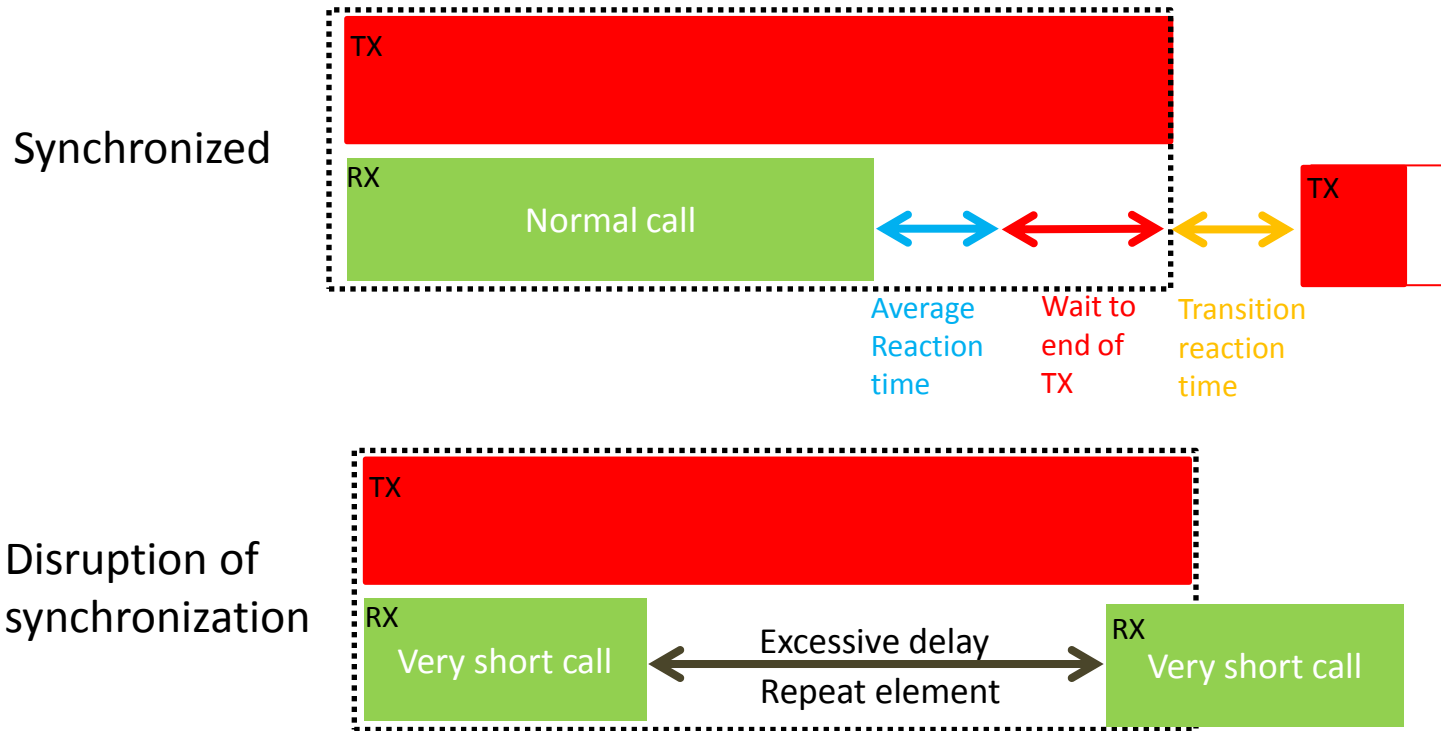
2.286

Note 1: Data from CR300 CQWW 2016 log: 3118 USA calls; 5444 Non USA calls assuming all transmission @ 30 WPM

Note 2: TU CR300 sent @ 40 WPM

Delays and reaction times

Delays and reaction times are critical to achieve perfect synchronization and a smooth operation, so that the stations calling/working do not notice answer delay



If there is an excessive delay, probably there will be a repeat, disrupting synchronization. When there is disruption of synchronization the protocol must be applied. The tools for this protocol are – skip, shift, delay and anticipating

Four operator actions in a pair

Doing 2BSIQ requires four actions from the operator in a pair



Key press

- 1 CR300 press F1 on keyboard for radio1 (TEST CR300)
Headphones are set to radio 2 both ears (R2R2)

Copy and type

- 2 Headphones are on radio2 (R2R2) while radio1 is TX
Copy a call (K1AA,IOZY,N7TT) and type it (in radio2 log field)

Wait

- 3 Headphones still on radio2 (R2R2) while radio1 is TX
N7TT typed in log field but waiting for end F1 on Radio1

Transition

- 4 Transition time, end of TX, moving to next pair
Headphones are set to both radios (R1R2) while no TX



Key press

- 1 CR300 press INSERT on keyboard for radio2 (N7TT ENN33)
Headphones are set to radio 1 both ears (R1R1)

Copy and type

- 2 Headphones are on radio1 (R1R1) while radio2 is TX
Copy a call (G3AB,N2AA,N8YY) and type it (in radio1 log field)

Wait

- 3 Headphones still radio1 (R1R1) while radio2 is TX
N8YY typed in log field but waiting for end INSERT on Radio2

Transition

- 4 Transition time, end of TX, moving to next pair
Headphones are set to both radios (R1R2) while no TX

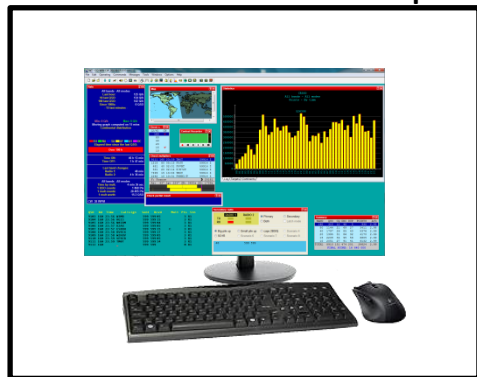
2BSIQ set-up

- **Possible 2BSIQ set-ups**
- **CR300 set-up during 2016 CQWW CW**
- **CR300 QTH**
- **CR300 Antennas**

Possible 2BSIQ set-ups

The are different possibilities regarding Computer, Audio-box, CW-messages, Keyboards and Logger

CR300 2015 set-up



| | |
|-------------|----------------------------|
| Computer | One |
| Audio-box | Micro Ham u2r |
| CW messages | 2BSIQ personalized scripts |
| Keyboards | One |
| Logger | Win-Test |

CR300 2016 set-up



| | |
|-------------|----------------------|
| Computer | One |
| Audio-box | Home Made |
| CW messages | Standard CW messages |
| Keyboards | Two |
| Logger | Dxlog.net |

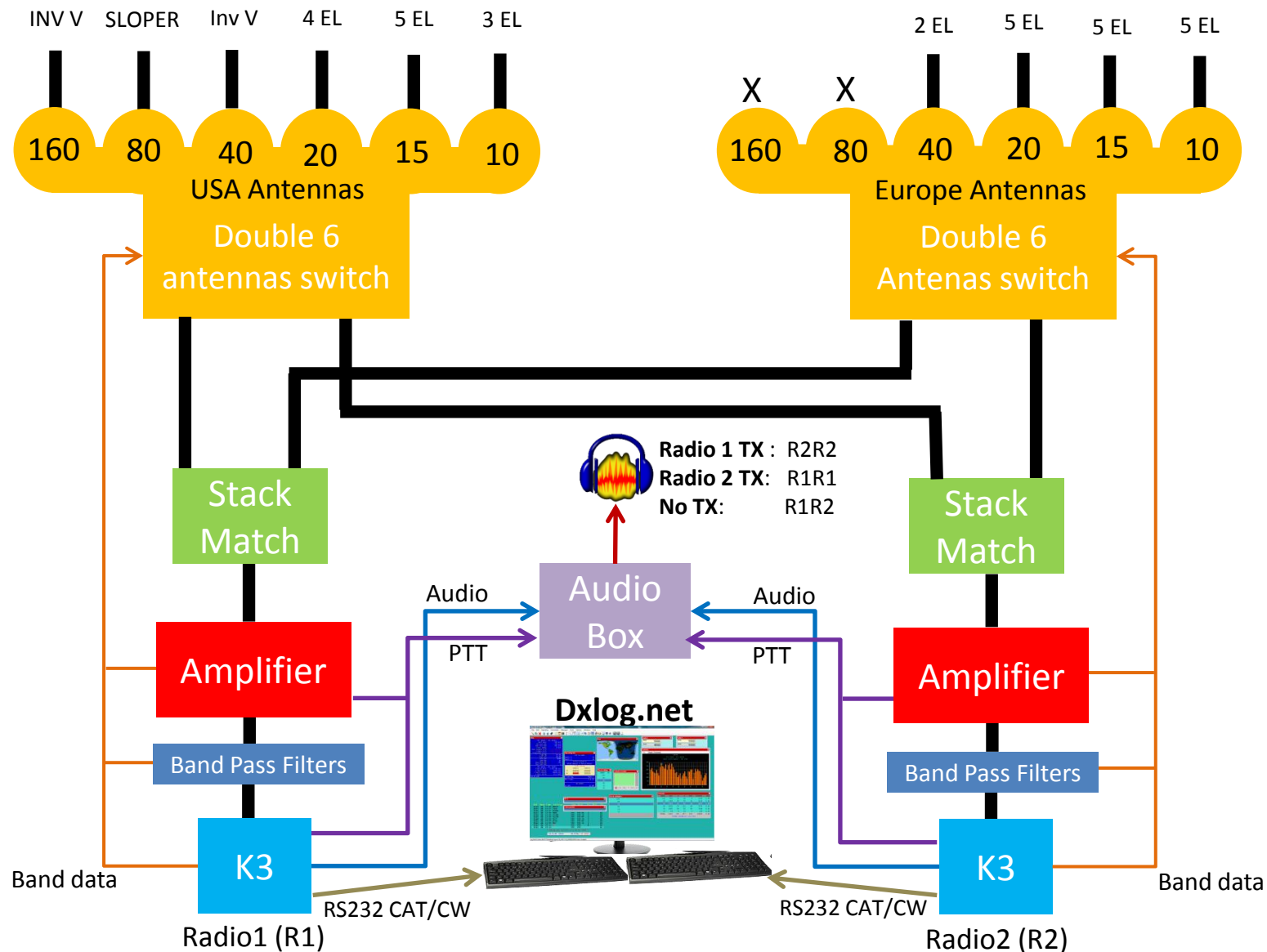
Two computers in a network may be considered as a third choice, but it should be discarded, because it requires an additional lock-out hardware to prevent two signals on the air

Although one or two keyboards may be a matter of personal preference, **two keyboards offers more flexibility**

CR300 2016 audio box is a simple audio splitter with PTT logic to control left R1 and right R2 headphones:

TX1 -- then R2R2
 TX2 -- then R1R1
 No TX -- then R1R2

CR300 set-up during 2016 CQWW CW



CR300 QTH

USA direction



Europe direction



CR300 antennas



“Secrets” of 2BSIQ

“Secrets” of 2BSIQ

2BSIQ secrets have to do with different aspects that enable synchronization and maintain synchronization throughout the 48 hours of the contest. Having these 10 points in mind will enable all interested to pursue their journey into 2BSIQ

1. Understanding all four components of QSO moment
2. Understanding “QSO pair moment” in order to obtain synchronization
3. Managing “delay” situations
4. Transition from QSO pair to QSO pair
5. Phones focus, keyboards focus and QSO log field focus management
6. Optimum TX time and distribution
7. Time length distribution of calling calls and exchanges
8. Fine tuning with CW speed
9. The four basic aspects of the protocol (**“Skip”, “Shift”, “Delay” and “Anticipating”**)
10. Training with a 2BSIQ simulator (Dxlog.net has a built in 2BSIQ simulator)

Origins of 2BSIQ

- SO2R, Inband, T07A Interleave
- Why isn't T07A making more QSOs?

SO2R, Inband, Interleave

2BSIQ has its origins in SO2R mode, in Inband technique of Multi Single operations and in “interleave QSO” operation by UT5UGR from TO7A

SO2R

- Alternate CQs on two bands
- Working a multiplier on another band in-between Run QSO

Inband

- RW1AC and RU1AA developed modern inband technique operations from RU1A
- P33W team excels in Inband operation from Cyprus skyrocketing QSOs from 7000 to 11000

TO7A Interleave

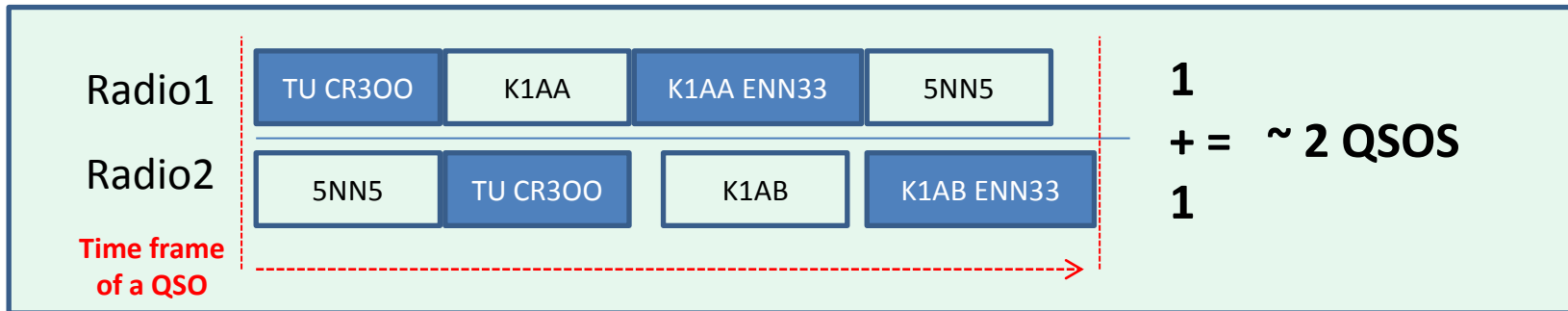
- UT5UGR from TO7A interleave QSOs for 48 hours during CQWW CW 2013 and 2014

Why isn't TO7A making more QSOs?

2BSIQ is much more than just “interleave of QSOs” and the “*trigger*” that led CT1BOH from “interleave of QSOs” into 2BSIQ originated from a simple question

Question?

If theoretically in the time frame of a “normal QSO”, two can be interleaved...
... why isn't UT5UGR/TO7A making a lot more QSOs than N2NT/V47T ?



| | TO7A (UT5UGR) | V47T (N2NT) | Delta QSOS |
|-------------|---------------|-------------|------------|
| CQWW CW2014 | 7892 | 7772 | +1.5% |
| CQWW CW2013 | 7916 | 7181 | +10.2% |

Note: In 2013/4 N2NT/V47T operated from similar location of TO7A, and in a classic SO2R set-up

CT1BOH “road” to 2BSIQ

- Alternating run from KH7R in 2000
- Dual CQ with advanced SO2R
- Understanding Multi-Single Inband operation
- Inband technique
- Increasing QSO totals with Inband
- CR300, P33W, 4O3A teams
- TO7A/UT5UGR interleave QSO mode
- TO7A/UT5UGR YouTube videos
- 357.8 QSOs/hour rate is not good enough?!
- TO7A 20% QSO increase far from 40%
- TO7A graphical waterfall reveals the problem
- Perfect interleave synchronization graphic waterfall
- 2BSIQ “is born”
- Training 2BSIQ with Simulator for CQWW CW 2015

Alternating RUN from KH7R in 2000

In 2000 CT1BOH as KH7R used alternate RUN with great success and good rates (up to 5 QSOs per minute). **This of course was not 2BSIQ nor interleaved QSOs**, just alternating from one band to the other, with two keyboards, two microphones and two footswitches

| | | | | | | | | |
|------|-----|----|-------------------|---|---------|----|----|---------------|
| 1774 | 40m | PH | 28-Oct-2000 06:29 | 6 | XE2MX | NA | XE | Mexico |
| 1775 | 80m | PH | 28-Oct-2000 06:30 | 4 | W7VJ | NA | K | United States |
| 1776 | 40m | PH | 28-Oct-2000 06:30 | 4 | K7BTW | NA | K | United States |
| 1777 | 80m | PH | 28-Oct-2000 06:30 | 4 | K8PO | NA | K | United States |
| 1778 | 40m | PH | 28-Oct-2000 06:30 | 6 | W6EEN | NA | K | United States |
| 1779 | 80m | PH | 28-Oct-2000 06:30 | 6 | XE2MX | NA | XE | Mexico |
| 1780 | 40m | PH | 28-Oct-2000 06:31 | 2 | K7DHD | NA | K | United States |
| 1781 | 80m | PH | 28-Oct-2000 06:31 | 4 | W6KNB | NA | K | United States |
| 1782 | 80m | PH | 28-Oct-2000 06:31 | 1 | NY7T | NA | K | United States |
| 1783 | 80m | PH | 28-Oct-2000 06:31 | 4 | K6AA | NA | K | United States |
| 1784 | 40m | PH | 28-Oct-2000 06:31 | 3 | W6GWE | NA | K | United States |
| 1785 | 40m | PH | 28-Oct-2000 06:32 | 4 | N7DV | NA | K | United States |
| 1786 | 80m | PH | 28-Oct-2000 06:32 | 5 | K7HBN | NA | K | United States |
| 1787 | 40m | PH | 28-Oct-2000 06:32 | 1 | NA5S | NA | K | United States |
| 1788 | 40m | PH | 28-Oct-2000 06:32 | 4 | K9BGL | NA | K | United States |
| 1789 | 40m | PH | 28-Oct-2000 06:32 | 2 | XE2EED | NA | XE | Mexico |
| 1790 | 40m | PH | 28-Oct-2000 06:33 | 2 | KB7XL | NA | K | United States |
| 1791 | 80m | PH | 28-Oct-2000 06:33 | 6 | VE6SV | NA | VE | Canada |
| 1792 | 80m | PH | 28-Oct-2000 06:33 | 6 | K5MR | NA | K | United States |
| 1793 | 80m | PH | 28-Oct-2000 06:33 | 5 | KL7Y | NA | KL | Alaska |
| 1794 | 40m | PH | 28-Oct-2000 06:33 | 4 | VE5RI | NA | VE | Canada |
| 1795 | 80m | PH | 28-Oct-2000 06:34 | 5 | K5NA | NA | K | United States |
| 1796 | 40m | PH | 28-Oct-2000 06:34 | 5 | W6HYK | NA | K | United States |
| 1797 | 40m | PH | 28-Oct-2000 06:34 | 5 | W6HYK | NA | K | United States |
| 1798 | 40m | PH | 28-Oct-2000 06:34 | 1 | K8WKM | NA | K | United States |
| 1799 | 40m | PH | 28-Oct-2000 06:35 | 5 | W6HYK | NA | K | United States |
| 1800 | 40m | PH | 28-Oct-2000 06:35 | 5 | KI6CG | NA | K | United States |
| 1801 | 80m | PH | 28-Oct-2000 06:35 | 1 | ZL4NR | OC | ZL | New Zealand |
| 1802 | 40m | PH | 28-Oct-2000 06:35 | 4 | W6AX | NA | K | United States |
| 1803 | 80m | PH | 28-Oct-2000 06:36 | 6 | WA5VGI | NA | K | United States |
| 1804 | 40m | PH | 28-Oct-2000 06:36 | 2 | W7FCB | NA | K | United States |
| 1805 | 40m | PH | 28-Oct-2000 06:36 | 3 | K6AUC | NA | K | United States |
| 1806 | 80m | PH | 28-Oct-2000 06:37 | 1 | KQ6JI | NA | K | United States |
| 1807 | 40m | PH | 28-Oct-2000 06:37 | 4 | K7JJ | NA | K | United States |
| 1808 | 80m | PH | 28-Oct-2000 06:37 | 1 | WB6YAW | NA | K | United States |
| 1809 | 40m | PH | 28-Oct-2000 06:38 | 2 | VE5UA/6 | NA | VE | Canada |

- KH7R was a big multi-multi station
- The strategy was to try to increase rate in low bands when rate was slow
- There was never an attempt to interleave QSOs
- 2BSIQ concept was very far away

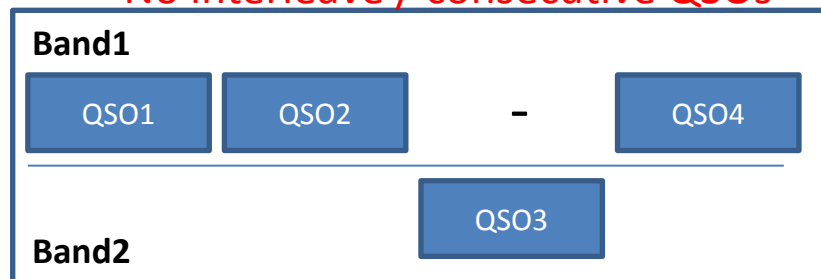
Dual-CQ with advanced SO2R

In 2005 when CT1BOH and F5MZN developed Win-Test Advanced SO2R scenario modes, the “Alternate CQ” mode was standard from the beginning and has been used from CR3E throughout the years

| | | | | | | | |
|-----|----|-------------------|---|--------|----|-----|----------------------|
| 10m | CW | 23-Nov-2013 10:07 | 1 | RA6CU | EU | UA | European Russia |
| 15m | CW | 23-Nov-2013 10:07 | 8 | ES9C | EU | ES | Estonia |
| 10m | CW | 23-Nov-2013 10:07 | 2 | IK1RQQ | EU | I | Italy |
| 15m | CW | 23-Nov-2013 10:08 | 1 | DL8ULO | EU | DL | Fed. Rep. of Germany |
| 10m | CW | 23-Nov-2013 10:08 | 3 | S53RA | EU | S5 | Slovenia |
| 15m | CW | 23-Nov-2013 10:08 | 2 | DL5QS | EU | DL | Fed. Rep. of Germany |
| 15m | CW | 23-Nov-2013 10:09 | 2 | DL7ARJ | EU | DL | Fed. Rep. of Germany |
| 10m | CW | 23-Nov-2013 10:09 | 1 | DL1ARD | EU | DL | Fed. Rep. of Germany |
| 10m | CW | 23-Nov-2013 10:09 | 1 | SV1EML | EU | SV | Greece |
| 10m | CW | 23-Nov-2013 10:10 | 2 | RX3Z | EU | UA | European Russia |
| 15m | CW | 23-Nov-2013 10:10 | 4 | PA0O | EU | PA | Netherlands |
| 15m | CW | 23-Nov-2013 10:10 | 2 | DL1YCF | EU | DL | Fed. Rep. of Germany |
| 15m | CW | 23-Nov-2013 10:11 | 2 | OK1DVA | EU | OK | Czech Republic |
| 15m | CW | 23-Nov-2013 10:11 | 1 | SP4JFR | EU | SP | Poland |
| 10m | CW | 23-Nov-2013 10:11 | 1 | RV4LC | EU | UA | European Russia |
| 10m | CW | 23-Nov-2013 10:12 | 1 | OE2UKL | EU | OE | Austria |
| 10m | CW | 23-Nov-2013 10:12 | 2 | OZ1AAR | EU | OZ | Denmark |
| 10m | CW | 23-Nov-2013 10:12 | 2 | DK6OR | EU | DL | Fed. Rep. of Germany |
| 15m | CW | 23-Nov-2013 10:12 | 3 | DM1TT | EU | DL | Fed. Rep. of Germany |
| 10m | CW | 23-Nov-2013 10:13 | 1 | IK1QFP | EU | I | Italy |
| 10m | CW | 23-Nov-2013 10:13 | 3 | UA9AX | AS | UA9 | Asiatic Russia |
| 10m | CW | 23-Nov-2013 10:13 | 1 | IV3ARJ | EU | I | Italy |
| 10m | CW | 23-Nov-2013 10:14 | 1 | G0TPH | EU | G | England |
| 10m | CW | 23-Nov-2013 10:14 | 2 | IK2RLS | EU | I | Italy |
| 15m | CW | 23-Nov-2013 10:14 | 3 | YU7KW | EU | YU | Serbia |
| 15m | CW | 23-Nov-2013 10:14 | 2 | OG5G | EU | OH | Finland |
| 10m | CW | 23-Nov-2013 10:15 | 4 | DM5Z | EU | DL | Fed. Rep. of Germany |
| 15m | CW | 23-Nov-2013 10:15 | 5 | RT5G | EU | UA | European Russia |
| 15m | CW | 23-Nov-2013 10:15 | 1 | G3TVW | EU | G | England |
| 10m | CW | 23-Nov-2013 10:16 | 1 | DL1GZW | EU | DL | Fed. Rep. of Germany |
| 15m | CW | 23-Nov-2013 10:16 | 1 | LB1GB | EU | LA | Norway |
| 15m | CW | 23-Nov-2013 10:16 | 1 | P33P | AS | 5B | Cyprus |
| 15m | CW | 23-Nov-2013 10:16 | 1 | DK6XZ | EU | DL | Fed. Rep. of Germany |
| 10m | CW | 23-Nov-2013 10:17 | 4 | S55OO | EU | S5 | Slovenia |
| 15m | CW | 23-Nov-2013 10:17 | 1 | RA3EA | EU | UA | European Russia |
| 15m | CW | 23-Nov-2013 10:17 | 2 | DK9CG | EU | DL | Fed. Rep. of Germany |
| 10m | CW | 23-Nov-2013 10:17 | 4 | SP2LNV | EU | SP | Poland |
| 10m | CW | 23-Nov-2013 10:18 | 2 | DQ7A | EU | DL | Fed. Rep. of Germany |
| 15m | CW | 23-Nov-2013 10:18 | 1 | DL1EFW | EU | DL | Fed. Rep. of Germany |
| 10m | CW | 23-Nov-2013 10:18 | 1 | RN3FA | EU | UA | European Russia |
| 10m | CW | 23-Nov-2013 10:19 | 6 | OM7ZM | EU | OM | Slovak Republic |

But “Alternate CQ” mode, does not increase the possible number of QSOs in a time frame of a QSO, it just replaces an empty space (no QSO on a band) with a QSO on another band

No interleave / consecutive QSOs



Understanding Multi-Single Inband operation

“Interleave QSOs” originated in inband Multi Single operations. In order to fully understand and experience the concept I co-organized the successful 2014 CQWW CW CR3A Multi Single operation with OM8A team

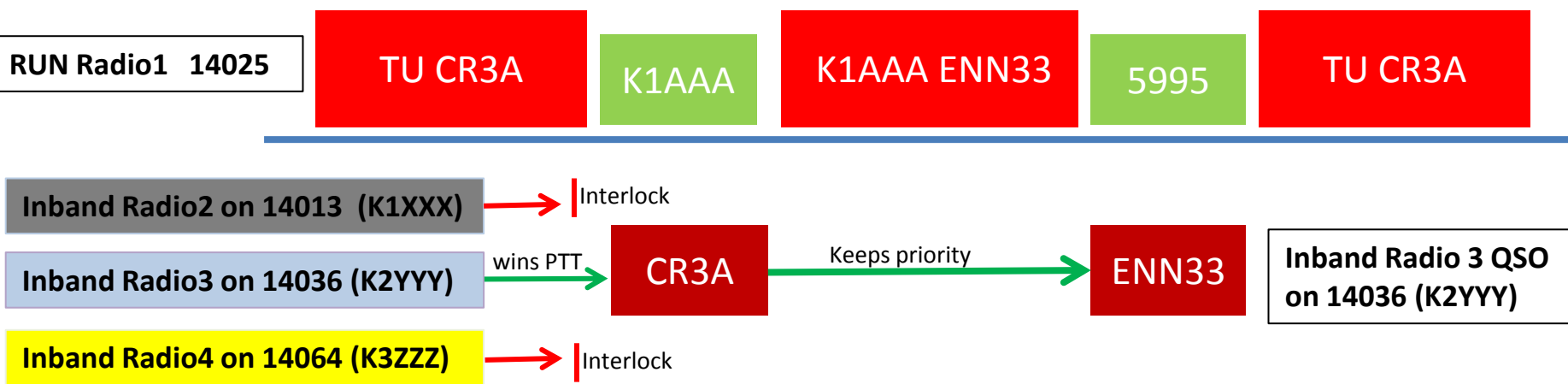
You can check details of the operation following the link

https://twitter.com/2014_cw_cr3a

The image shows a screenshot of a Twitter profile for the event 'CR3A CQWW CW MS @2014_cw_cr3a'. At the top, there is a search bar and a link to 'Você possui uma conta? Entrar'. Below this is a row of eight profile pictures of team members with their call signs: CT1BOH, OM3RM, 9A3XV, 9A4M, OM2VL, OM3BH, OM3GI, and OM7JG. The main banner image features the text 'CR3A 2014 CW Multi/Single' and the CQ Contest logo. Below the banner, there are statistics: 90 tweets, 1,156 followers, and 522 following. A 'Seguir' button is visible. The profile also shows a recent tweet titled 'Team CR3A' with a photo of the team members.

Inband technique

Inband Multi Single operation, have sky-rocket QSOs and scores. The “RUN” station is now comprised of a “classic” RUN, and several Inband Stations that call stations on the same band but on a different frequency of “Run”, interleaving the QSOs when the RUN is not transmitting



- RUN Radio1 is running on 14025 (working K1AAA) – Traditional MS run station
- Three Inband stations “fight” to win PTT by calling respective stations on 14013 (K1XXX), on 14036 (K2YYY) and on 14064 (K3ZZZ), while CR3A RUN is QRX listening to K1AAA on 14025
- First Inband Station to TX wins PTT; The other two Inband Stations are “locked-out” by interlock
- Inband Radio3 who won PTT, *squeezes* the QSO with K2YYY and goes looking for other new stations to work while Inband Radio2 and 4 continue trying to work their stations on 14013 and 14064

Increasing QSO total with Inband

Advanced inband in Multi Single have left “Classic Multi Single” way behind. Managing correct timing, synchronization and delays in inband operation was fundamental to understand “interleave QSOs” and move closer to 2BSIQ definition

| P33W | 10 | 15 | 20 | 40 | 80 | 160 | Total |
|---------------|-----------|-----------|-----------|-----------|-----------|------------|--------------|
| Run | 1939 | 1468 | 1424 | 1416 | 845 | 291 | 7383 |
| Inband | 807 | 794 | 535 | 667 | 427 | 71 | 3301 |
| Mult | 110 | 129 | 113 | 41 | 114 | 73 | 580 |
| QSOs | 2856 | 2391 | 2072 | 2124 | 1386 | 435 | 11264 |

P33W added 3301 QSO to his “RUN station” from S&P inband (+45%)

| CR3A | 10 | 15 | 20 | 40 | 80 | 160 | Total |
|---------------|-----------|-----------|-----------|-----------|-----------|------------|--------------|
| Run | 2024 | 1605 | 2070 | 1405 | 501 | 46 | 7646 |
| Inband | 651 | 548 | 603 | 554 | 193 | - | 2549 |
| Mult | 98 | 153 | 46 | 127 | 121 | 82 | 627 |
| QSOs | 2773 | 2306 | 2719 | 2086 | 815 | 128 | 10822 |

CR3A added 2549 QSO to his “RUN station” from S&P inband (+33%)

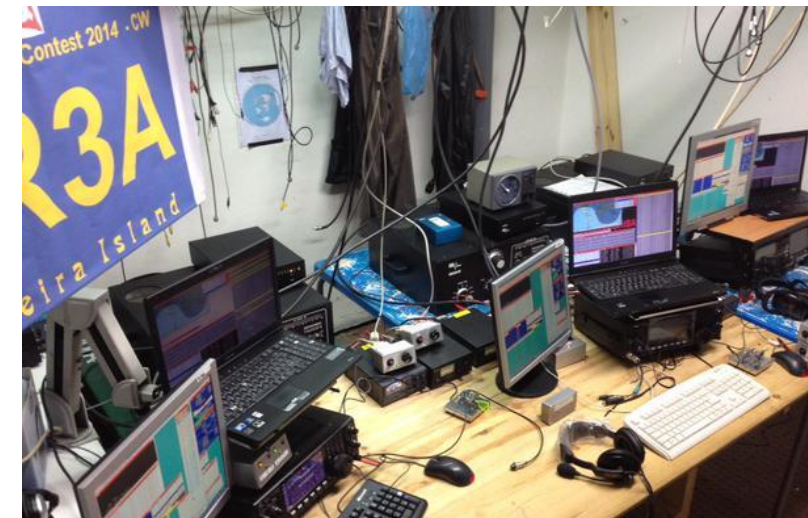
| 403A | 10 | 15 | 20 | 40 | 80 | 160 | Total |
|---------------|-----------|-----------|-----------|-----------|-----------|------------|--------------|
| Run | 1441 | 1292 | 1258 | 1827 | 853 | 211 | 6882 |
| Inband | 464 | 440 | 450 | 567 | 264 | - | 2185 |
| Mult | 138 | 90 | 119 | 31 | 126 | 95 | 599 |
| QSOs | 2043 | 1822 | 1827 | 2425 | 1243 | 306 | 9666 |

403A added 2185 QSO to his “RUN station” from S&P inband (+32%)

P33W greater experience with Inband operation was the key to their #1 in CQ WW CW 2014

CR3A, P33W, 4O3A teams during 2014 CQWW CW

CR3A RUN and Inband Stations



P33W Multi Single team at work



4O3A Multi Single Team at work



TO7A/UT5UGR interleave QSO mode

UT5UGR started interleaving QSOs from TO7A in 2011. Looking at CQWW public logs I could check that 2011 and 2012 were years he was testing this way of operation, just during some hours of the contest. Only in 2013 and then in 2014, he was “interleaving QSOs” for the 48 hours of the contest

| | TO7A(UT5UGR) | V47T(N2NT) | 8P5A(W2SC) |
|------|--------------|------------|------------|
| 2014 | 7892 | 7772 | 7214 |
| 2013 | 7916 | 7181 | 7294 |
| 2012 | 7165 | - | 7230 |
| 2011 | 6757 | - | 7285 |
| 2010 | - | 7293 | 7097 |

Interleaving QSOs made TO7A operation jump from 7000 QSOs to 7900 QSOs, approximately 12% more QSOs, but, very far from 40% more, Inband MS stations get with S&P Inband

1. Comparing the 2014 operations we only see a small difference in favor of “interleave QSOs mode” of TO7A versus “classic SO2R mode” of V47T (+1.5%)
2. If theoretically, in the time frame of a “normal QSO”, one can interleave two QSOs
3. What is wrong with UT5UGR/TO7A “interleave QSO mode” ?

TO7A/UT5UGR YouTube videos

UT5UGR posted on YouTube, a video of his set-up for 2013 contest, and videos with audio of four hours of 2014. The 2014 Videos were instrumental to analyze in depth TO7A “interleave QSO” operation



YouTube PT

20131124 165348 03

4:43 / 7:47

- 29 Nov 14 19 03z by UT5UGR 873 views 39:26
- 29 Nov 14 00 04z by UT5UGR 1,145 views 1:00:01
- 29 Nov 14 02 06z by UT5UGR 227 views 58:13
- 29 Nov 14 11 06z by UT5UGR 253 views 32:33

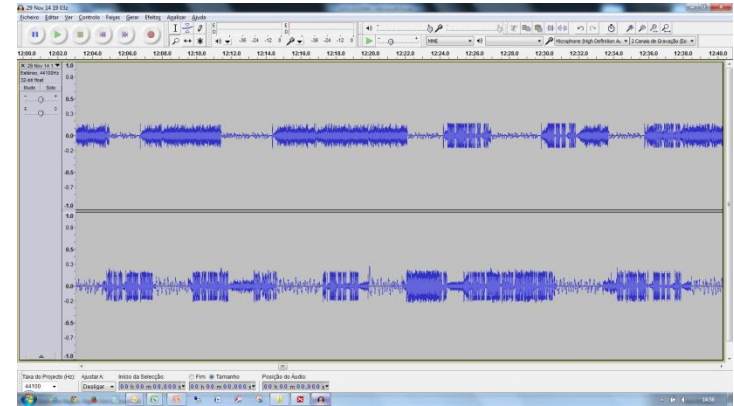
Links:

- <https://www.youtube.com/watch?v=2rDkZokun-8> (2013)
- <https://www.youtube.com/watch?v=xD1qr51cV-s> (2014)
- <https://www.youtube.com/watch?v=EOKcbgk-OZ8> (2014)
- <https://www.youtube.com/watch?v=QmQlz2eVFYQ> (2014)
- <https://www.youtube.com/watch?v=zvdsbep9koE> (2014)

357.8 QSO/hour is not good enough?!

With TO7A Videos, the corresponding audio and log in hand, I selected the best rate and the best period of consecutive interleave QSOs.

| QSO # | date | H | M | band | mode | freq | call | zone | dx | dx zone |
|-------|------------|----|----|------|------|--------|------|------|--------|---------|
| 3896 | 29-11-2014 | 19 | 15 | 10 | CW | 28.094 | TO7A | 8 | PY4RGS | 11 |
| 3897 | 29-11-2014 | 19 | 15 | 15 | CW | 21.076 | TO7A | 8 | EI5JC | 14 |
| 3898 | 29-11-2014 | 19 | 15 | 10 | CW | 28.094 | TO7A | 8 | KS4X | 4 |
| 3899 | 29-11-2014 | 19 | 15 | 15 | CW | 21.076 | TO7A | 8 | K2LS | 5 |
| 3900 | 29-11-2014 | 19 | 15 | 10 | CW | 28.094 | TO7A | 8 | K1ZE | 5 |
| 3901 | 29-11-2014 | 19 | 16 | 15 | CW | 21.076 | TO7A | 8 | S54A | 15 |
| 3902 | 29-11-2014 | 19 | 16 | 15 | CW | 21.076 | TO7A | 8 | K1LD | 5 |
| 3903 | 29-11-2014 | 19 | 16 | 10 | CW | 28.094 | TO7A | 8 | N3RJ | 5 |
| 3904 | 29-11-2014 | 19 | 16 | 15 | CW | 21.076 | TO7A | 8 | W9LHG | 4 |
| 3905 | 29-11-2014 | 19 | 16 | 10 | CW | 28.094 | TO7A | 8 | NU7P | 3 |
| 3906 | 29-11-2014 | 19 | 16 | 15 | CW | 21.076 | TO7A | 8 | N0AT | 4 |
| 3907 | 29-11-2014 | 19 | 17 | 10 | CW | 28.094 | TO7A | 8 | K2TQC | 5 |
| 3908 | 29-11-2014 | 19 | 17 | 15 | CW | 21.076 | TO7A | 8 | KG7H | 3 |
| 3909 | 29-11-2014 | 19 | 17 | 10 | CW | 28.094 | TO7A | 8 | W1GQ | 5 |
| 3910 | 29-11-2014 | 19 | 17 | 15 | CW | 21.076 | TO7A | 8 | N6XI | 3 |
| 3911 | 29-11-2014 | 19 | 17 | 10 | CW | 28.094 | TO7A | 8 | K2TW | 5 |
| 3912 | 29-11-2014 | 19 | 17 | 15 | CW | 21.076 | TO7A | 8 | W8HAP | 5 |
| 3913 | 29-11-2014 | 19 | 18 | 10 | CW | 28.094 | TO7A | 8 | W2NO | 5 |
| 3914 | 29-11-2014 | 19 | 18 | 15 | CW | 21.076 | TO7A | 8 | N2MM | 5 |
| 3915 | 29-11-2014 | 19 | 18 | 10 | CW | 28.094 | TO7A | 8 | W7VV | 3 |
| 3916 | 29-11-2014 | 19 | 18 | 15 | CW | 21.076 | TO7A | 8 | KF2O | 5 |
| 3917 | 29-11-2014 | 19 | 18 | 10 | CW | 28.094 | TO7A | 8 | W7FI | 3 |
| 3918 | 29-11-2014 | 19 | 18 | 15 | CW | 21.076 | TO7A | 8 | W1CU | 5 |
| 3919 | 29-11-2014 | 19 | 19 | 10 | CW | 28.094 | TO7A | 8 | K6KQV | 3 |



With the help of Audacity wave-audio program above I dissected the log section left (down to the millisecond):

| | |
|---------------|---------------|
| Audio length: | 241.5 seconds |
| QSOs 10M: 12 | 178.9 Q/Hour |
| QSOs 15M:12 | 189.0 Q/Hour |
| Total QSO: 24 | 357.8 Q/Hour |

357.8 QSOs/rate seems fantastic, but, listening to the audio there was something not right ... I remember thinking - *I must be crazy to dispute a 357.8 /rate is not good enough.* In order to solve this paradox I had to investigate deeper

TO7A 20% QSO increase far way from 40%

Why doesn't "Interleave QSO" mode by UT5UGR sound right even though there is an apparent high rate result? Why can't the very high rate be sustained throughout the contest?

- With graphic horizontal waterfall below I determined the length of a "normal" QSO



PY4RGS QSO seems like a good candidate. No delays, 12,1 seconds to complete the 4 moments of the QSO

- If one QSO takes 12.1 seconds to complete, then with just one radio, in 241.5 seconds (the section under scrutiny) we should expect 20 QSOs.
- Using two radios, with "interleave mode", TO7A log shows 24 QSOs. An increase of 20%
- Better than the overall 1.5% increase he managed against V47T in the entire 2014 contest, but still very far away from 40% of MS stations

TO7A graphical waterfall reveals the problem

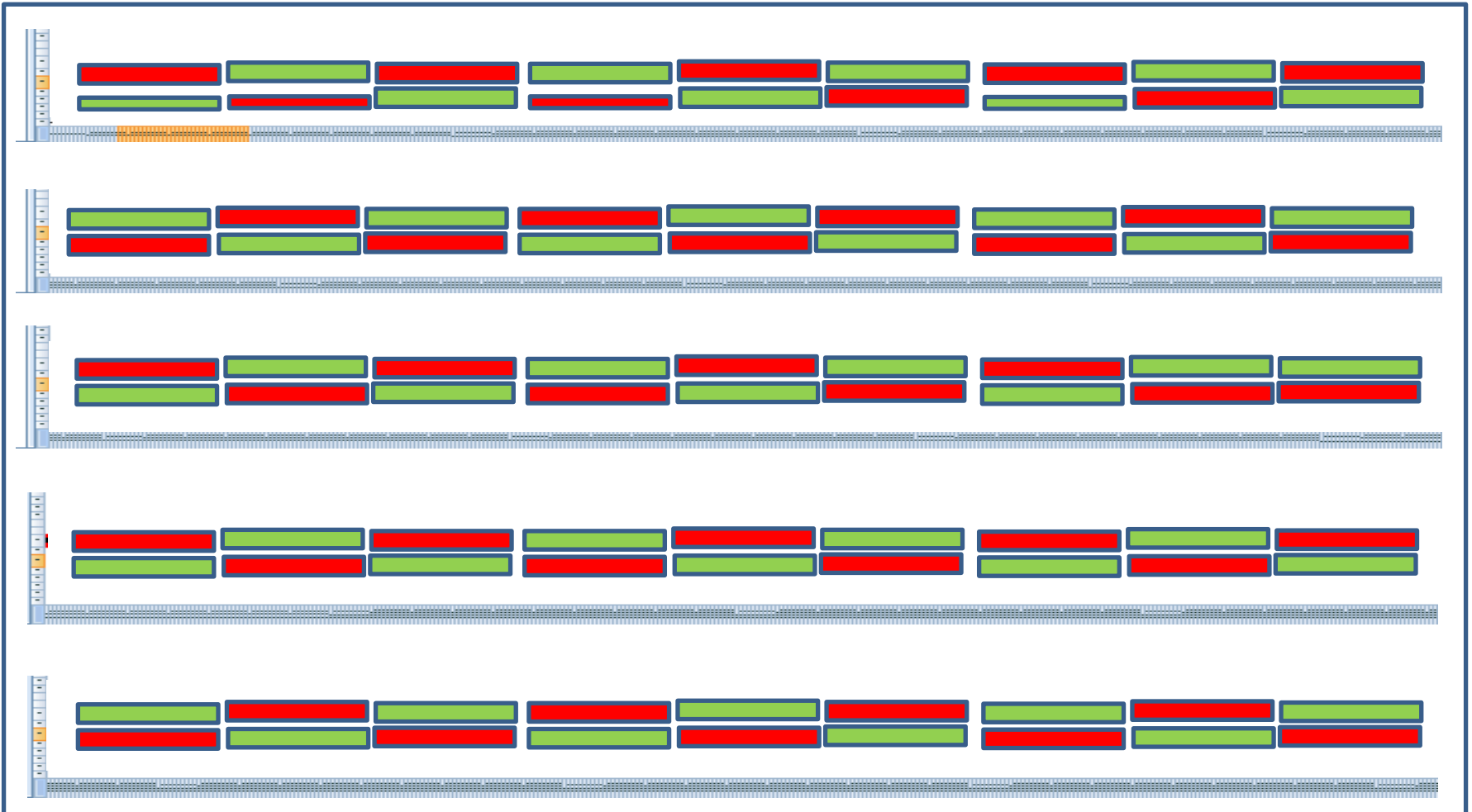
Plotting the 4 minute "graphic waterfall" below, from TO7A best consecutive interleave period reveals the problem - **TO7A is not able to maintain synchronization**

TO7A graphical waterfall log (from PY4RGS to N2MM – 19 QSOs)



Perfect interleave synchronization graphic waterfall

The same 4 minute "graphic waterfall" below, with perfect interleave synchronization would be like this



2BSIQ concept is born

Conceptually 2BSIQ is born in this very moment, when CT1BOH realizes synchronization is the key, and then proceeds to establish key success factors for this operating mode

UT5UGR “Interleave QSO” mode

1. Interleave of QSOs
2. Constant disruption of “QSO pair moments” synchronization
3. Lack of information of end of transmitting of other radio in each moment
4. Unawareness of optimum length for each QSO moment
5. Improper protocol to re-synchronize QSOs , control delays and “spill-over’s”



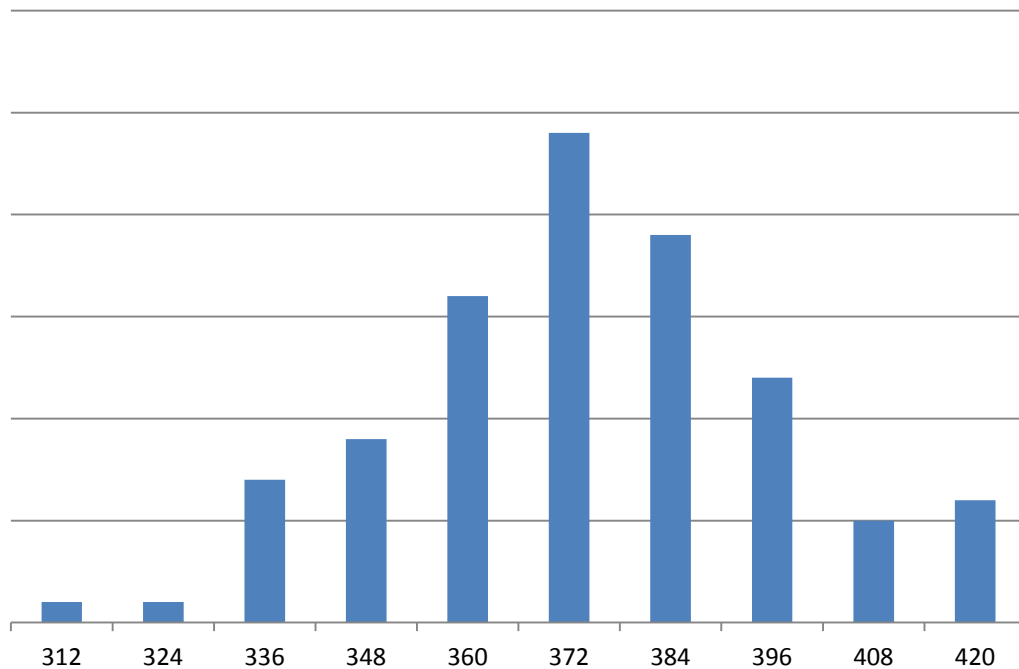
CT1BOH 2BSIQ

1. Synchronized interleave of QSOs
2. “Locking” “QSO pair moments” to obtain synchronization
3. Information of end of transmitting of other radio in each moment
4. Exact and optimum calculation of each QSO moment
5. Protocol rules to re-synchronize QSOs, control delays and “spill-over's”

Training 2BSIQ with CW simulator for CQWW CW 2015

Because CT1BOH home QTH is in a city building, chances to test 2BSIQ on air were very limited. As a result two Morse Runner were used instead of live contests for validation and training. The simulator was fundamental to calibrate synchronization and the protocol

QSO/hour rate distribution of 240 2BSIQ simulator sessions



Prior to CQWW CW 2015 Tests with two Morse Runner in two PCs validated 2BSIQ concept to obtain very high rates:

- 20 hours spent with simulator
- 240 session of 5 minutes each
- 7500 2BSIQ QSOs
- Average rate of 375 QSOs/Hour

Note: Since 2016, Dxlog.net has a built in 2BSIQ simulator

Worst case
synchronization



Perfect
synchronization

With a constant flow of calls, rates distribution ranged from 312 QSO/hour (minimum) to 420 QSOs/Hour (maximum)

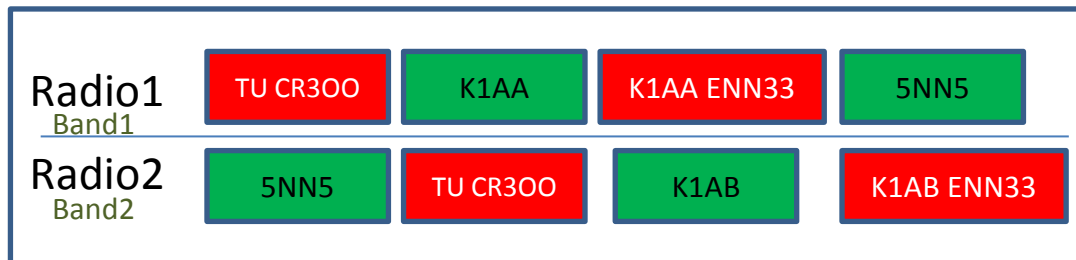
CT1BOH jumped from simulator into live action during CQWW CW 2015

Is 2BSIQ better than SO2R?

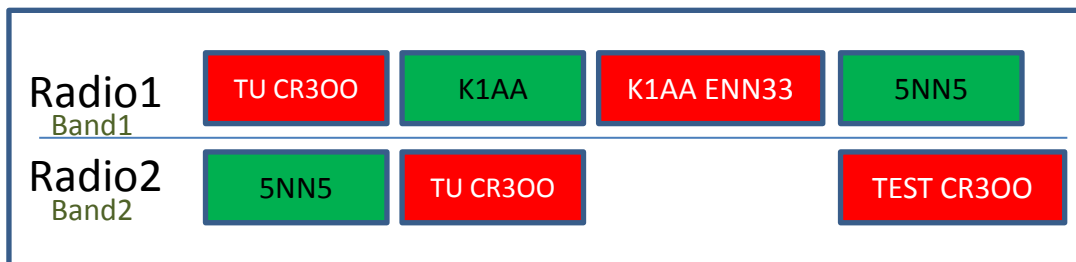
- 2BSIQ increases QSO but...
- Is that enough to overcome decrease of multipliers?
- Comparing S&P, RUN, SO2R, 2BSIQ from a baseline score
- Comparing CR3E (SO2R) with CR300 (2BSIQ)

2BSIQ will increase QSO total, but...

In theory almost two QSOs can fit in the time frame of one. But there are moments with less or no additional callers or disruption of synchronization



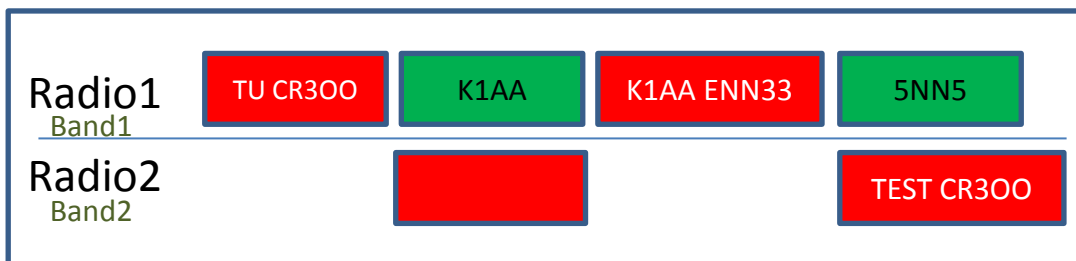
1
+ = \sim 2 QSOS
1



1
+ = \sim 1.75 QSOS
0.75



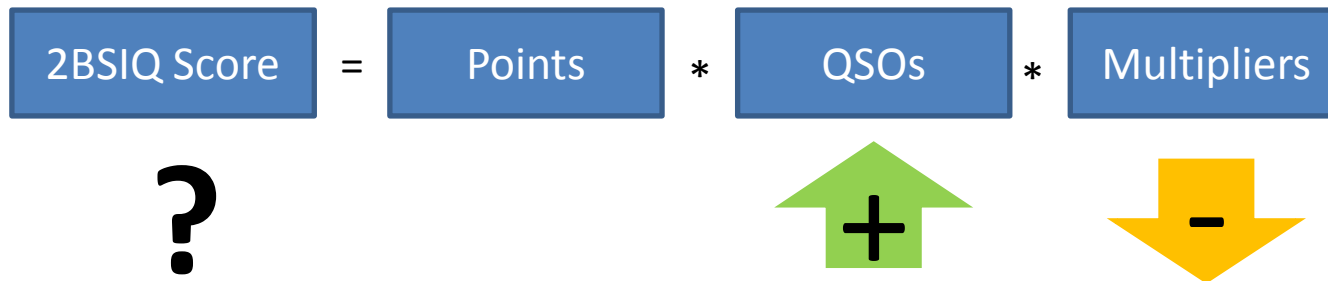
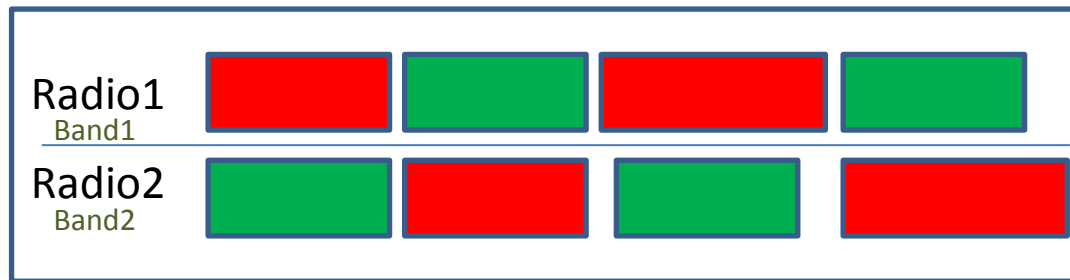
1
+ = \sim 1.5 QSOS
0.5



1
+ = \sim 1.25 QSOS
0.25

...is that enough to overcome the decrease of Multipliers?

Having two stations continuously running will have a negative impact in the multipliers



Is the increase in number of QSOs enough to consider 2BSIQ (with two running stations) a clear winning contest mode versus SO2R (with one running station and a S&P station)?

Comparing S&P, RUN, SO2R, 2BSIQ from a baseline score

Determining a base line score (CR3E as SO2R) and making rate and multiplier assumption for a next hour performance is the starting point to compare 2BSIQ with S&P only, RUN only and SO2R (Run and S&P)

1 Determining Baseline Score (CR3E last four SO2R contests from Madeira)

| Year | Category | Score | QSOs | Zn | Cty | Hours | Operator(s) | mult |
|------|-----------|------------|-------|-----|-----|-------|-------------|------|
| 2012 | SO HP ALL | 15,221,316 | 7,275 | 170 | 556 | 48 | CR3E/CT1BOH | 726 |
| 2011 | SO HP ALL | 15,151,668 | 7,212 | 168 | 564 | 48 | CR3E/CT1BOH | 732 |
| 2010 | SO HP ALL | 14,208,754 | 7,243 | 157 | 522 | 48 | CR3E/CT1BOH | 679 |
| 2013 | SO HP ALL | 13,667,670 | 6,962 | 165 | 516 | 48 | CR3E/CT1BOH | 681 |

CR3E SO2R base line score = 7,200 QSOs * 700 Mults * 2.97 points = 14,968,800 points

2 Rate and Multiplier Assumptions for each "mode" for a next hour performance

| Contest Mode | QSOs per hour | Multipliers per hour interval | |
|-----------------------|---------------|-------------------------------|---------|
| | | Minimum | Maximum |
| S&P Only | 40 | 0 | 15 |
| RUN Only | 165 | 0 | 5 |
| SO2R | 150 | 4 | 9 |
| 2BSIQ + 10% over SO2R | 165 | 0 | 5 |
| 2BSIQ + 20% over SO2R | 180 | 0 | 5 |
| 2BSIQ + 63% over SO2R | 245 | 0 | 5 |

Adding 20% QSOs makes 2BSIQ equal to SO2R

Using CR3E baseline score we can check the interval score of the different contest modes one hour later varying worked multipliers

Base line score 7200 700 2.97 14,968,800

↓ 1 hour later using each mode

| | | | | |
|-----------------|------|-----|------|------------|
| SO1R - S&P Only | 7240 | 700 | 2.97 | 15,051,960 |
| | | 715 | 2.97 | 15,374,502 |

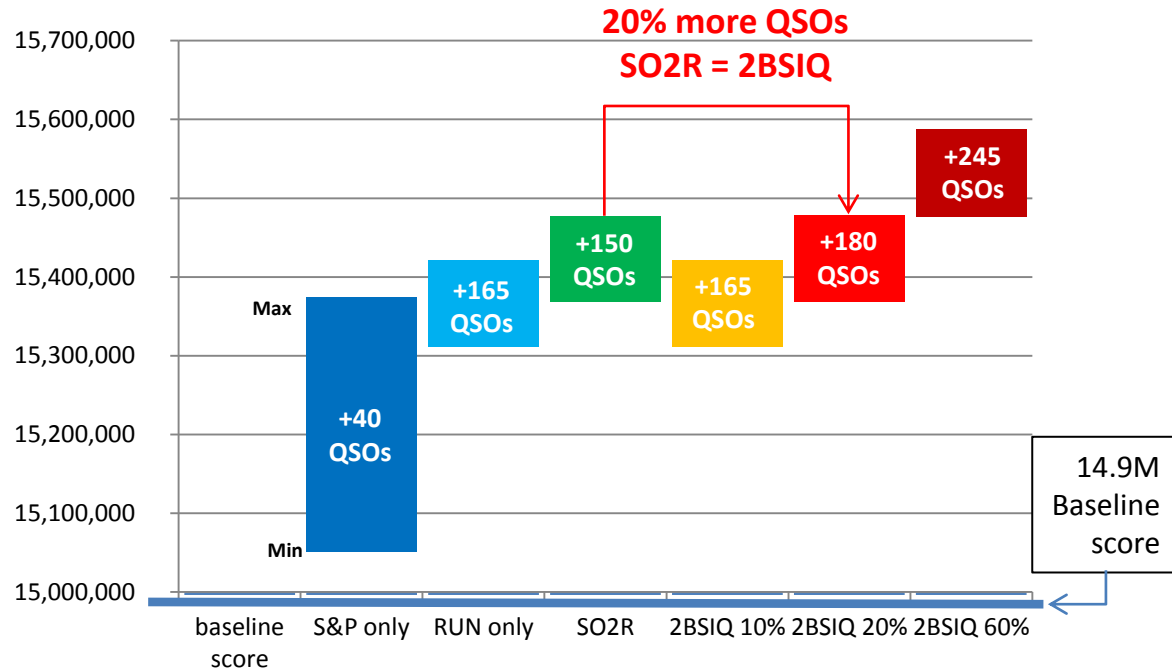
| | | | | |
|-----------------|------|-----|------|------------|
| SO1R - RUN only | 7365 | 700 | 2.97 | 15,311,835 |
| | | 705 | 2.97 | 15,421,205 |

| | | | | |
|------------------|------|-----|------|------------|
| SO2R - RUN & S&P | 7350 | 704 | 2.97 | 15,367,968 |
| | | 709 | 2.97 | 15,477,116 |

| | | | | |
|-------------|------|-----|------|------------|
| 2BSIQ + 10% | 7365 | 700 | 2.97 | 15,311,835 |
| | | 705 | 2.97 | 15,421,205 |

| | | | | |
|-------------|------|-----|------|------------|
| 2BSIQ + 20% | 7392 | 700 | 2.97 | 15,367,968 |
| | | 705 | 2.97 | 15,477,739 |

| | | | | |
|-------------|------|-----|------|------------|
| 2BSIQ + 63% | 7445 | 700 | 2.97 | 15,477,116 |
| | | 705 | 2.97 | 15,587,666 |



Adding 10% rate is not enough to make 2BSIQ better than SO2R *

Adding 20% rate makes 2BSIQ equal to SO2R

Adding 63% rate makes 2BSIQ better than the best SO2R/mult interval

* If you followed UT5UGR/TO7A disqualification due to multiplier log padding during CQWW CW 2014, this is probably the reason for it...

Comparing CR3E (SO2R) with CR300 (2BSIQ)

To compare SO2R and 2BSIQ we would need two twins in two twin stations. CR3L operations in 2011 and 2015, will be used to estimate what would be CR3E (SO2R) operation in 2015 and compare it with CR300 2BSIQ real operation in 2015

CR3E SO2R from Madeira

| Year | QSOs | Multipliers | Score |
|------|------|-------------|--------|
| 2011 | 7301 | 738 | 16.0 M |

CR3L Operations from Madeira

| Year | QSOs | Multipliers | Score |
|------|--------|-------------|--------|
| 2011 | 13.260 | 965 | 38.0 M |
| 2015 | 12.628 | 899 | 32.2 M |

Estimate of CR3E SO2R in 2015

| Year | QSOs | Multipliers | Score |
|------|------|-------------|--------|
| 2015 | 6623 | 688 | 13.6 M |
| | -9% | -7% | -15% |

-9% -7% -15%

Estimating CR3E SO2R score using CR3L score

CR300 2BSIQ from Madeira

| Year | QSOs | Multipliers | Score |
|------|------|-------------|--------|
| 2015 | 8910 | 625 | 16.6 M |
| | +35% | -9% | +23% |

2BSIQ versus SO2R

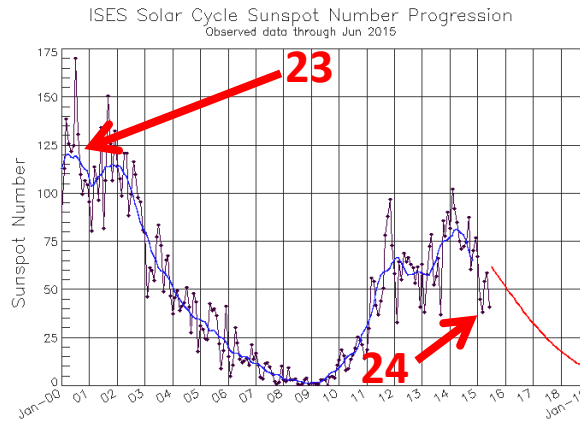
+ 35% QSOs
 - 9% Multipliers
 + 23% Score

Can the SOAB World Record be broken with 2BSIQ ?

- Targeting EA8BH record**
- 2BSIQ opens a new possibility**
- CR300, TI5W and ZF2MJ operations**
- Is the record still possible this cycle?**

Targeting EA8BH World Record

Breaking EA8BH 2000 World Record presents an extremely difficult challenge



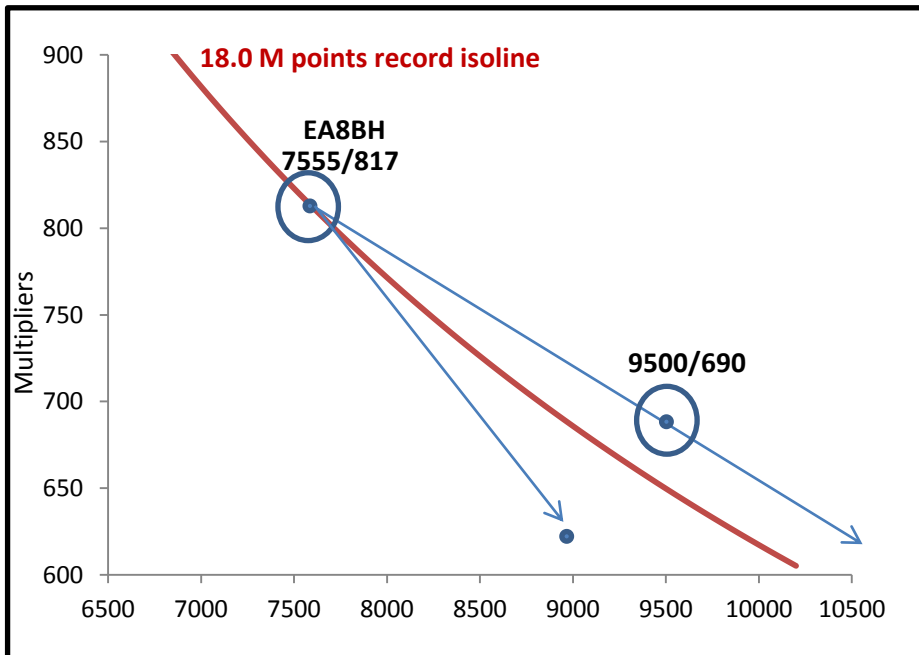
World Record and best 10 SO2R scores

| Rank | Call | Year | Score | QSOs | Mults | Zn | Cty | Operator(s) |
|------|-------|------|------------|-------|-------|-----|-----|-------------|
| 1 | EA8BH | 2000 | 18,010,765 | 7,555 | 817 | 183 | 634 | N5TJ |
| 2 | P40E | 2003 | 15,943,070 | 7,828 | 715 | 169 | 546 | CT1BOH |
| 3 | EF8M | 2011 | 15,846,012 | 7,873 | 691 | 160 | 531 | RD3A |
| 4 | PZ5T | 2011 | 15,673,940 | 7,592 | 718 | 173 | 545 | VE3DZ |
| 5 | CR3E | 2012 | 15,221,316 | 7,275 | 726 | 170 | 556 | CT1BOH |
| 6 | CR3E | 2011 | 15,151,668 | 7,212 | 732 | 168 | 564 | CT1BOH |
| 7 | EF8M | 2010 | 15,117,795 | 7,598 | 693 | 158 | 535 | RD3A |
| 8 | HC8N | 1999 | 14,626,579 | 7,001 | 731 | 185 | 546 | N5KO |
| 9 | P40E | 1998 | 14,372,964 | 6,853 | 729 | 176 | 553 | CT1BOH |
| 10 | P40E | 2002 | 14,251,216 | 7,026 | 724 | 161 | 563 | CT1BOH |

- Great operator
- Top of the sun spot cycle 23 (Higher MUF), much better than current cycle 24
- 24 hour around the clock propagation on 20/15/10 meters (not seen this cycle on CW)
- Great location - "Faro del Sardina" (Lighthouse del Sardina)
- No other serious multi band operation from Canary Islands ("Unique" multiplier)

2BSIQ opens a new possibility

2BSIQ seems to open a new possibility to break the record with a “*more QSOs*” strategy, that was not available until now



Targeting EA8BH record is possible, if and only if, two conditions are met:

- **2BSIQ provides a dramatic increase of QSO numbers**
- **Sufficient multipliers will call the 2BSIQ RUN stations to break the record isoline**

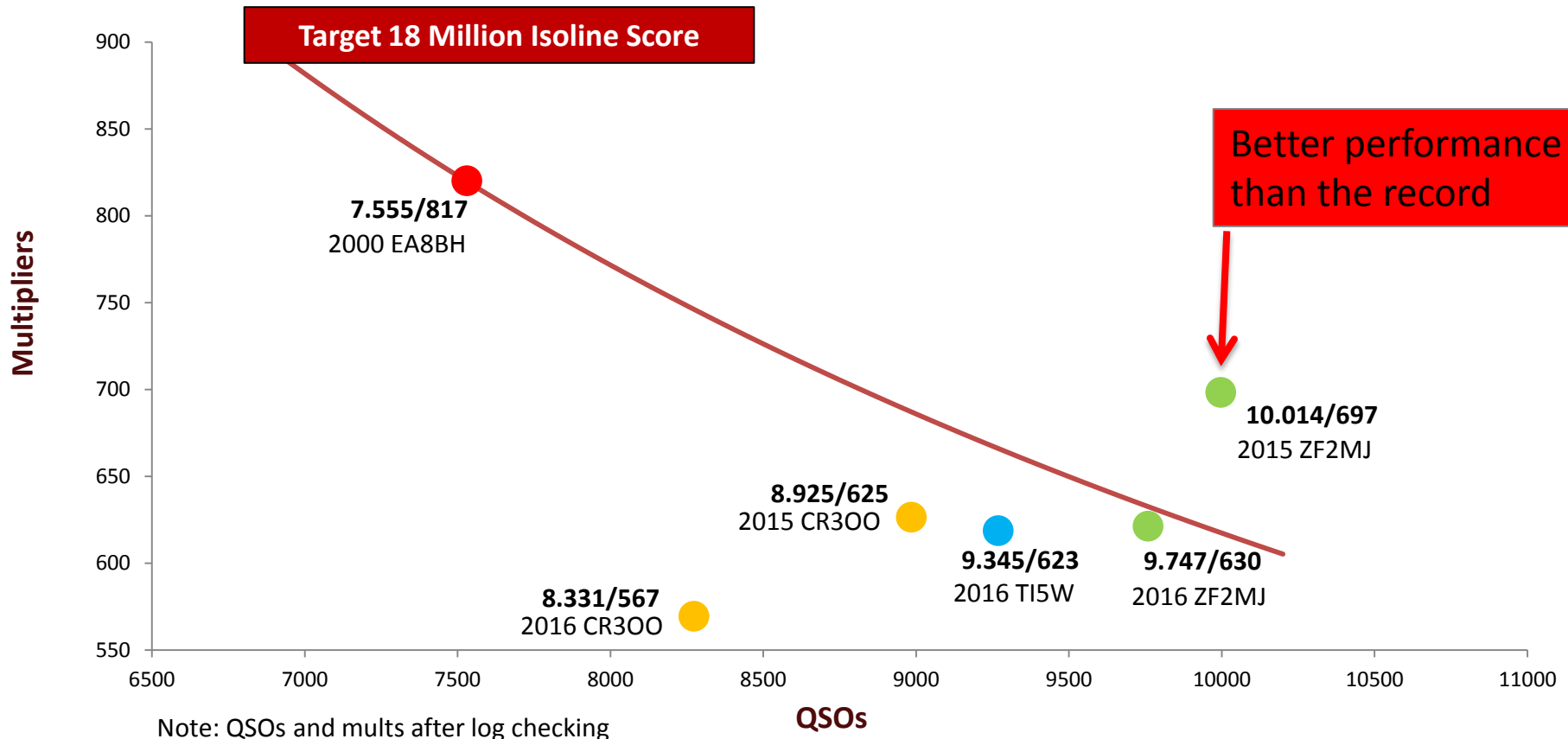
• **(9.500 QSOs and 690 Mults) for example will break the record with 19.4 Million**

• **In 2015 CR300 only made (8.910 QSOS and 625 Mults)**

• **In 2016 CR300 only made (8.300 QSOs and 567 Mults) but only 44 QSOs on 10 meters**

CR300, TI5W and ZF2MJ operations

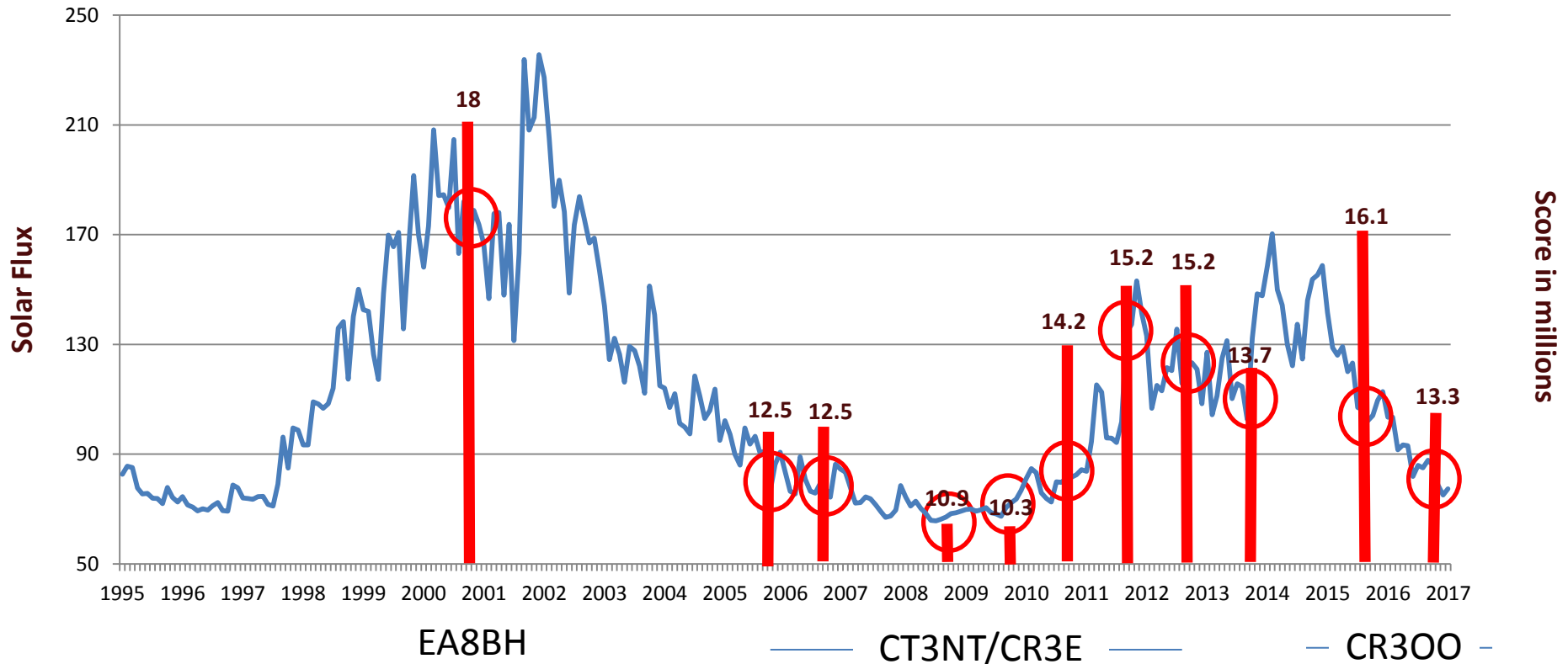
Already several serious 2BSIQ operations have occurred by CR300, TI5W and ZF2MJ



- The “record” has been beaten (in “performance”) by ZF2MJ in 2015, but because it is in zone 8, the world record was not broken. If in zone 9, score would be around 20M
- In 2016, with marginal 10 meter conditions, all scores were below the world record performance

Is the record still possible this cycle?

With 10 meters already marginal, it seem reasonable to say that breaking the record from zone 33, this late in the cycle is becoming a mirage, even with 2BSIQ, unless there is a glimpse of life on 10 meters



But what about other geographies?

Is Zone 33 still the best place in the world for SOAB or has 2BSIQ changed that?

Is zone 33 still the best QTH for record breaking?

- Super High QSO rates with 2BSIQ
- TI5W and ZF2MJ minutes with 10 QSOs
- % of USA in normal and super rate minutes
- Impact of high % of USA, simultaneously on the two radios
- QSOs per hour according to % of USA
- The importance of having many hours with USA
- Why hours with higher % of USA are better for 2BSIQ
- Time to fly to zone 9 or 10
- Listen to 2BSIQ from CR300 in CQWW CW

Super High QSO rates with 2BSIQ

With 2BSIQ, super high rate (6 or more QSOs per minute) becomes possible, pushing QSO total to new heights

| | SO2R | 2BSIQ | | |
|------------------------|------|-------|------|-------|
| QSOs per minute - Rate | CR3E | CR300 | TI5W | ZF2MJ |
| 1 QSOs – 60 rate | 467 | 401 | 318 | 253 |
| 2 QSOs – 120 rate | 669 | 582 | 500 | 464 |
| 3 QSOs – 180 rate | 751 | 631 | 616 | 601 |
| 4 QSOs – 240 rate | 550 | 506 | 492 | 557 |
| 5 QSOs – 300 rate | 202 | 322 | 362 | 401 |
| 6 QSOs – 360 rate | 31 | 157 | 232 | 249 |
| 7 QSOs – 420 rate | - | 58 | 123 | 135 |
| 8 QSOs – 480 rate | - | 13 | 51 | 53 |
| 9 QSOs – 540 rate | - | 2 | 11 | 10 |
| 10 QSOs – 600 rate | - | - | 7 | 1 |
| Super High Rate QSOs | 186 | 1470 | 2830 | 2963 |

Both TI5W and ZF2MJ achieved minutes with 10 QSOs

Note1: CR3E in 2012 was CT1BOH's most QSO operation from Madeira

Note2: QSO totals with dupes

SO2R operation by CR3E only had 31 super high rate minutes for a total of 186 QSOs

2BSIQ operation by CR300 had 230 super high rate minutes for a total of 1470 QSOs

TI5W and ZF2MJ minutes with 10 QSOs

Looking at TI5W and ZF2MJ best super high rate minutes (10 QSOs per minute) there seems to be a pattern – high percentage of QSOs with USA during those minutes. Is USA a critical element in 2BSIQ?

TI5W

| | | | | | | |
|--------------------|--------------------|--------------------|--------------------|---------------------|--------------------|---------------------|
| K3WWP | K3QF | W1RM | JA2HYD | W9DCA | OG6N | AB9YC |
| N4FY | N5FO | K5KJ | NN2NN | W1ZT | CN2R | K4AB |
| DL6IAK | N6JV | NW0M | W2RD | WN6K | RW1C | KE2D |
| N3ED | N6MU | PA6NB | W1TO | NE6I | UT4U | W3UA |
| WA1ZAM | K1RV | KT8K | WB5HJV | K2LS | VE3IAE | KM5G |
| K8ZT | N2BEG | N2CU | N9JR | K6TA | DL4CF | K9MA |
| DO4DXA | WK2H | AA1V | N4TB | N4TL | K3FMQ | N2AN |
| N4RA | NC6B | N2WK | VE3GFN | N0RB | DL0XM | W6YA |
| N2LBR | XE1H | HG1S | JA0UMV | K3DQB | G4KFT | N4WO |
| AA4V | K2RET | VE3KZ | AB4Z | N5IR | W1HIS | NE2V |
| 80% USA | 90% USA | 80% USA | 80% USA | 100% USA | 30% USA | 100% USA |

ZF2MJ

| |
|---------------------|
| W7IDG |
| WN6K |
| AC0W |
| N6GQ |
| NQ7R |
| KD5R |
| VE3XT |
| K6YK |
| W6HD |
| N2YB |
| 100% USA |

Note: Check that TI5W minute with 30% USA, four Non USA calls are all short 2X1 (OG6N, CN2R, RW1C and UT4U)

Note: For simplicity all stations from zones 3,4,5 are considered USA

% of USA in normal and super high rate minutes

Clearly USA provides a big boost for Super High rate QSOs. Super high rate can be obtained with lower percentages of USA, but not in the same magnitude

| | 2BSIQ | | |
|-------------------------|-------------|-------------|-------------|
| QSOs per minute - Rate | CR300 | TI5W | ZF2MJ |
| 1 QSOs – 60 rate | 401 | 318 | 253 |
| 2 QSOs – 120 rate | 582 | 500 | 464 |
| 3 QSOs – 180 rate | 631 | 616 | 601 |
| 4 QSOs – 260 rate | 506 | 492 | 557 |
| 5 QSOs – 300 rate | 322 | 362 | 401 |
| Normal rate QSOs | 7092 | 6944 | 7216 |
| % USA | 36% | 56% | 57% |

| | | | |
|-----------------------------|-------------|-------------|-------------|
| 6 QSOs – 360 rate | 157 | 232 | 249 |
| 7 QSOs – 420 rate | 58 | 123 | 135 |
| 8 QSOs – 480 rate | 13 | 51 | 53 |
| 9 QSOs – 540 rate | 2 | 11 | 10 |
| 10 QSOs – 600 rate | - | 7 | 1 |
| Super High Rate QSOs | 1470 | 2830 | 2963 |
| % USA | 38% | 73% | 68% |

% of USA in Minutes

| With QSOs per minute | CR300 | TI5W | ZF2MJ |
|----------------------|-------|------|-------|
| 1 | 31% | 41% | 42% |
| 2 | 32% | 46% | 49% |
| 3 | 35% | 51% | 54% |
| 4 | 37% | 61% | 60% |
| 5 | 41% | 66% | 61% |
| 6 | 39% | 70% | 65% |
| 7 | 33% | 73% | 70% |
| 8 | 42% | 79% | 74% |
| 9 | 56% | 75% | 69% |
| 10 | - | 80% | 100% |

Note: For simplicity all stations from zones 3,4,5 are considered USA

Impact of high % of USA, simultaneously on the two radios

Because 2BSIQ synchronizes QSOs in two bands, having a high % of USA on each of the two radios, maximizes super high rate. The probability of disruption is much smaller

| QSOs per minute - Rate | CR300 | ZF2MJ |
|-----------------------------|-------------|-------------|
| 6 QSOs – 360 rate | 157 | 249 |
| 7 QSOs – 420 rate | 58 | 135 |
| 8 QSOs – 480 rate | 13 | 53 |
| 9 QSOs – 540 rate | 2 | 10 |
| 10 QSOs – 600 rate | - | 1 |
| Super High Rate QSOs | 1470 | 2963 |
| % USA | 38% | 68% |

| | | >=0% and <40% | >=40% and < 60% | >= 60% |
|---------------------|--------------------|---------------|-----------------|---------------------------|
| % of USA in Radio 2 | ZF2MJ 2963 QSOs | | | |
| | >=0% and <40% | 290 | 77 | 249 |
| | >=40% and < 60% | 119 | 58 | 160 |
| | >= 60% | 328 | 249 | 1433^{48%} |

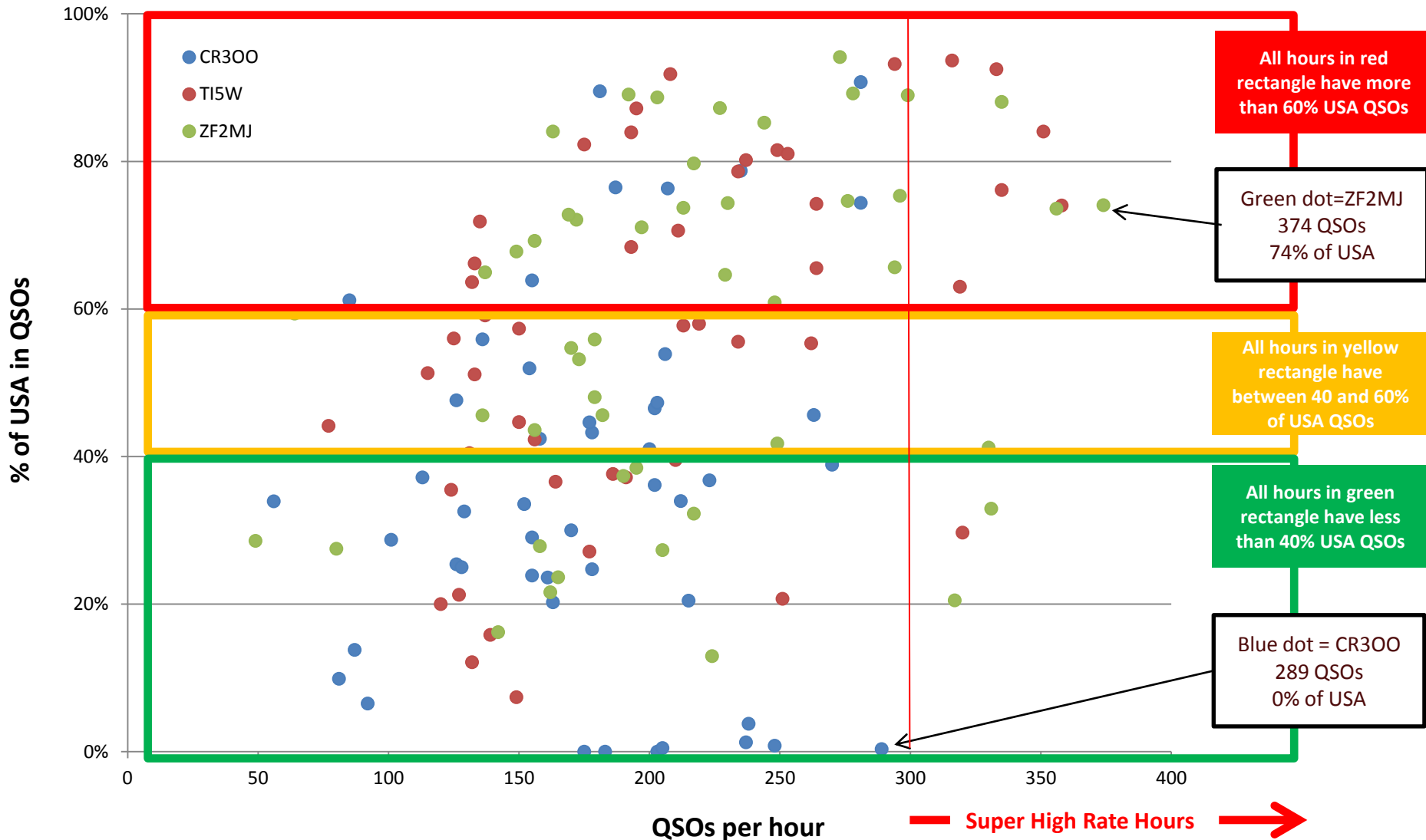
| | | >=0% and <40% | >=40% and < 60% | >= 60% |
|---------------------|--------------------|---------------|-----------------|--------------------------|
| % of USA in Radio 2 | CR300 1470 QSOs | | | |
| | >=0% and <40% | 632 | 76 | 235 |
| | >=40% and < 60% | 52 | 18 | 65 |
| | >= 60% | 86 | 0 | 306^{21%} |

Almost 50% of ZF2MJ super high rate QSO happen in minutes, where there is a percentage of USA, at the same time in Radio1 and in Radio2, >=60%

A QTH that can sustain high percentage of USA on two bands simultaneously will have a great advantage in 2BSIQ

QSOs per hour according to % of USA

The graph below plots for CR300, TI5W and ZF2MJ all 48 hours of the contest



The importance of having many hours with USA

More hours of high % of USA available, more chances of Super High Rate

| % USA | CR300 | TI5W | ZF2MJ |
|-----------------------------|--|--|--|
| >=60% | 8 HOURS 1612 QSOs 202 RATE | 22 HOURS 5382 QSOs 245 RATE | 25 HOURS 5927 QSOs 237 RATE |
| >=40% and <60% | 11 HOURS 2003 QSOs 182 RATE | 14 HOURS 2312 QSOs 165 RATE | 10 HOURS 1818 QSOs 182 RATE |
| <40% | 29 HOURS 4947 QSOs 171 RATE | 12 HOURS 2080 QSOs 173 RATE | 13 HOURS 2435 QSOs 187 RATE |

Rates are about the same when working hours with less than 60% USA

QSO Total
With dupes

8.562

9.774

10.180

Why hours with high % of USA are better for 2BSIQ?

2BSIQ related reasons:

- USA calls are shorter than Non USA calls (on average 242 ms)
- A TX leading pair, when there is a variable call element from USA is shorter
- A fixed RX element where there is a zone report from (zone 3,4,5) is shorter
- Sending enn7, enn8, enn9 is shorter than enn33
- With shorter calls and exchanges the probability of a disruption in synchronization is smaller
- USA pile-up is better behaved

Propagation and geographical related reasons

- With the decline of sunspot cycle, a location south of USA will enjoy great North/South propagation
- A location near USA will have simultaneously more USA on two bands

Time to fly to zone 9 or 10

With the importance of having high percentage of USA QSO on the two radios for maximizing 2BSIQ, it seems it is time to fly to zone 9 or 10



The best place in the World for SOAB is now HC8

Listen to 2BSIQ from CR300 in CQWW CW



<https://www.youtube.com/watch?v=42TCOtmJuEI>

You can listen to CT1BOH operating CR300 in 2BSIQ.

Make sure to put your headphones in order to understand from which radio (Radio1 or Radio2) stations are coming from.

Also Understand that CT1BOH never listens to his Transmission. He is always listening on the radio in RX, alternating from one band to the other.

This 2 minute section nets 17 QSOs at an instant rate of 510 QSOs per hour.

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