

Impact of EME 101

**The 2024 Introduction to EME Seminar
Attendee Follow-up and the Future**

**Dedicated to the memory of
Allan Katz K2UYH (SK)**

Rick Rosen K1DS EL96





**K1DS
FN20**



**K1DS
EL96**



**K1DS
EL96**

How Was “Introduction to EME” Developed?

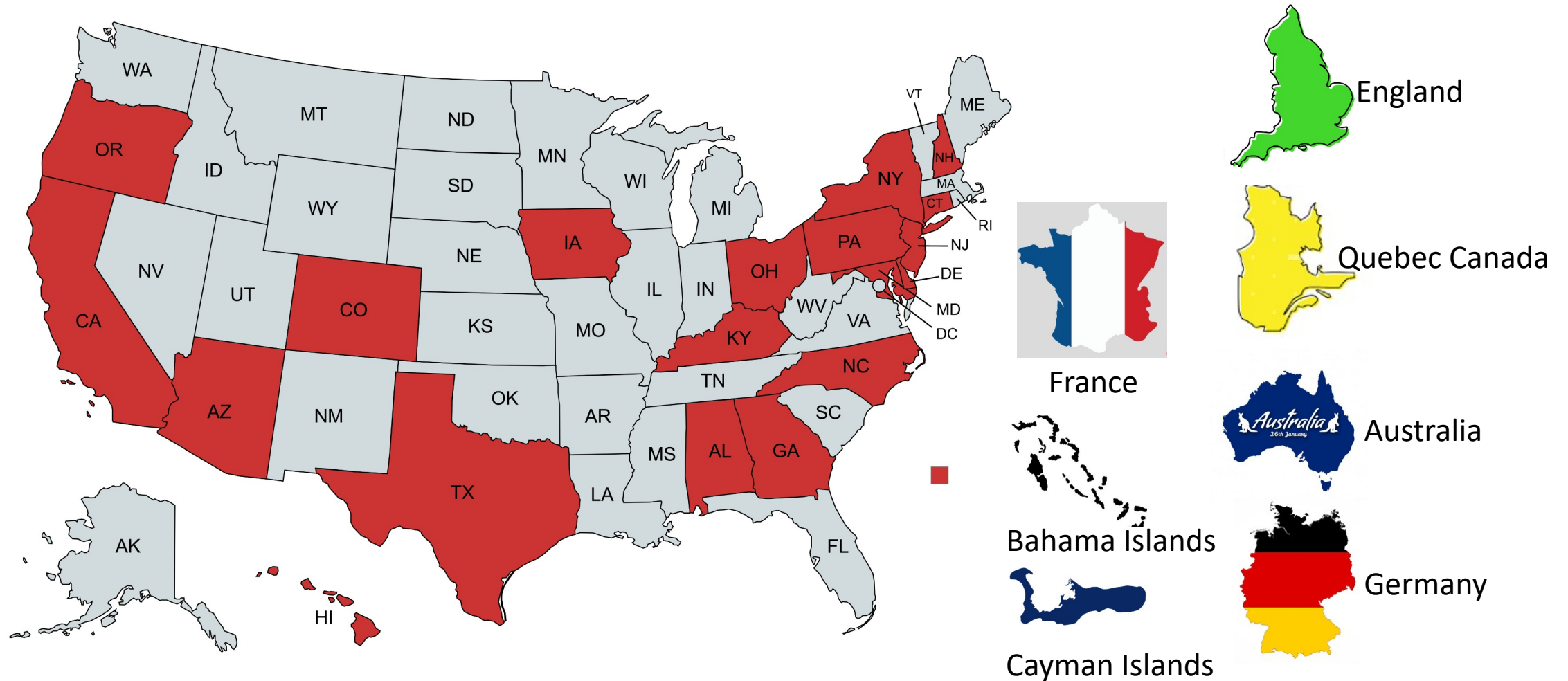


What Facilitated the Attendance

- Publicity to many VHF on-line boards
- Location in a population dense area
- One day registration included for a modest cost
- Did not require hotel package and costs
- Option to add Saturday Banquet dinner
- Exposure to successful EME operators
- Many were considering or getting ready to operate EME



Where Were the 43 Registrants From?



Registrant Readiness for EME

- 22 owned an IC-9700 all-mode transceiver for 2m, 70cm, and 23cm bands, featuring direct sampling for VHF/UHF
- 4 owned IC-905
- 4 owned IC-705
- 7 had other VHF radios and antennas
- 3 already had dishes and were making EME QSOs
- 8 had minimal or no VHF gear and were interested in EME
- 2 belonged to clubs with EME stations



EME 101 Presentations

- Story of EME: Its Evolution from 1940 to Present by F2CT (combined)
- Earth to the Moon and Back by KA1GT presented by K1DS & K6JEY
- Making EME Easier by K1DS
- Building your first EME station by K6JEY
- Field Trip / Lunch at W2ZQ and Live EME demonstration
- EME Band & Mode Activity by K1DS
- Troubleshooting by K1DS & K6JEY
- Small Group Discussions- Planning Next Steps by K1DS & K6JEY
- Expert Panel - VE4MA, K2TXB, K1DS, K6JEY, W5ZN and KN0WS
- K1JT - EME Fundamentals, from Basic Physics to Digi-Modes (combined)
- W2ZQ Open House - 5PM to 7PM





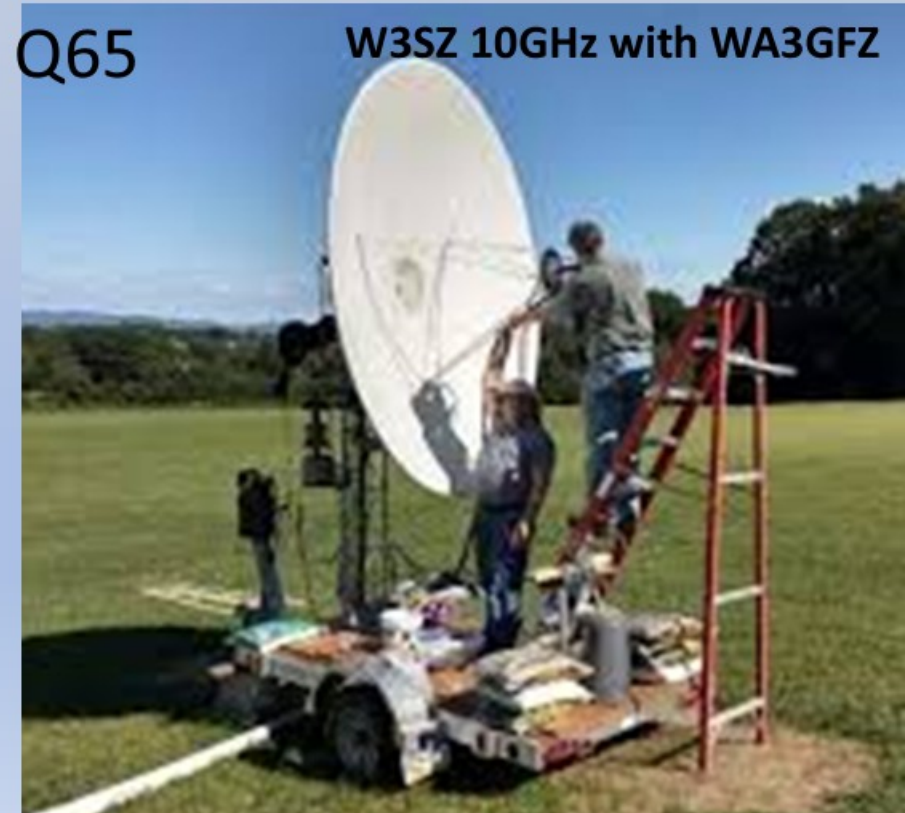
W2ZQ Field Trip

EME Rover/Portable demonstration

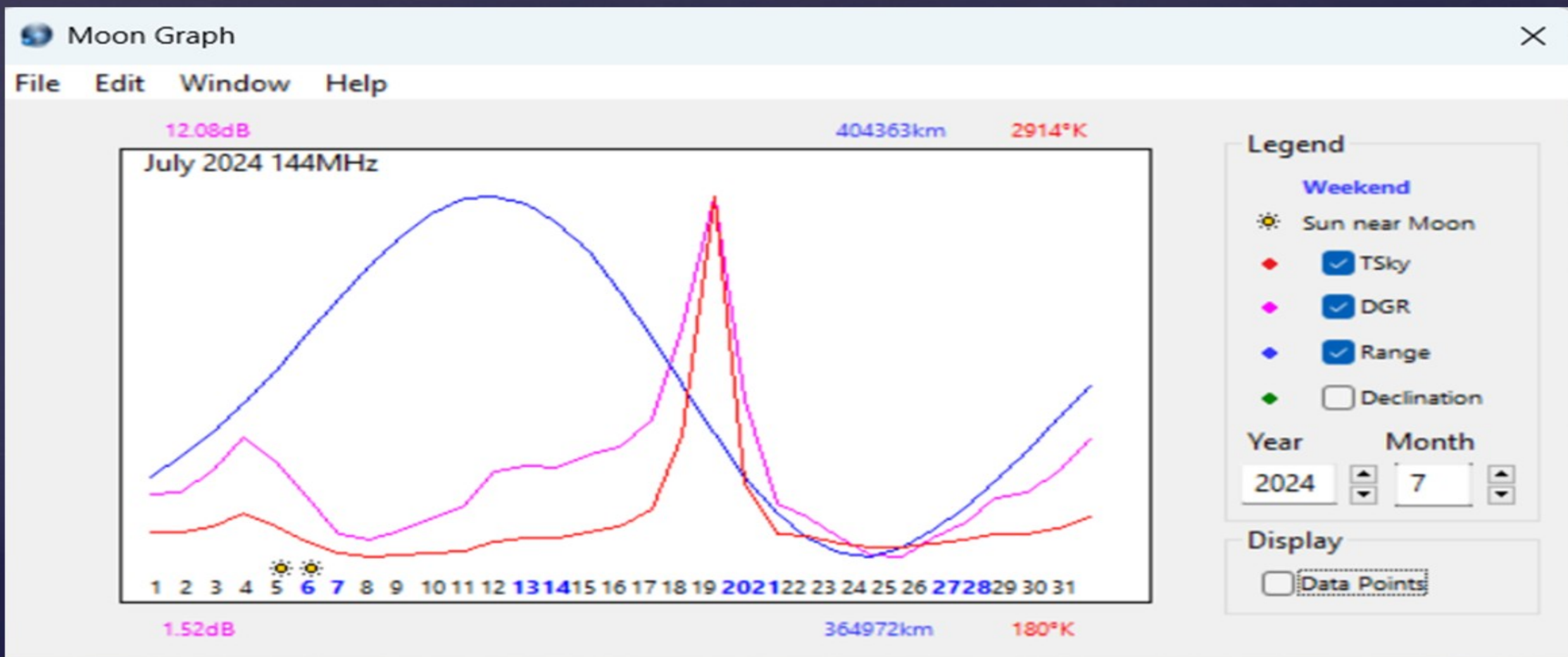


Developments Which Enhance EME

- EME Beacons on 1296MHz, 10.3GHz, 24GHz
- 10Mhz disciplined oscillators
- Microwave solid state power devices
- Pallet SSPAs from the analog to digital TV conversion
- Digital communications and the newest mode: Q65
- Activation of large dishes
- Dedicated loggers N0UK, HB9Q , ON4KST
- Dx-peditions dedicated to EME
- Portable state EME adventures
- Commercial suppliers
- PA0PLY band operator lists



Moonsked Moon graph for July 24th is close to the sun, but good path.



Yagi Array ..

Single Yagi Gain in dBi

Number of Yagis

G/T

E 26.04 °

Array Type and Gain User Defined

Beam Width

16.00 dBi

18.15 dBi

16.00 dBi

1.00

0.00

26.04 °

User Defined Yagi

Parabolic Reflector

Focal length 3.68 m

Feed Type

W2IMU dual-mode

Linear Pol.

Circular Pol.

Diameter

Size

f / D

Efficiency

Beam Width

Gain

Dish Gain

8.55 m

Metric

0.43

63.2%

1.89°

8494

37.14 dBi

39.29 dBi

37.0 Lambda

Home Station ... Y Factor Calc

Noise Source (Hot)

Sagittarius A

Taurus A

Cassiopeia A

Virgo A

Cygnus A

Termination

Centaurus A

Quiet Source (Cold)

Aquarius or Leo

TSky (variable)

Noise[hot] Flux

1718 Jy

Quiet [cold] Sky

10 K

System TK

41.89 K

Point Source Y Factor

1.87 dB

YU1AW Aperture Source calculations. These are only valid for 144 and 432 MHz. Point Sources should be used for 1296 MHz and above.

Noise Source Positions.

Y Figure Information

Yagi Array ..

Single Yagi Gain in dBd

Number of Yagis

G/T

E

41.27 °

ArrayType and Gain

User Defined

-->

12.00 dBd

1

0.00

H

41.27 °

12.00 dBd

14.15 dBi

User Defined Yagi

Parabolic Reflector

Feed Type

VE4MA (Super)

☐ Linear Pol. ☒ Circular Pol.

Focal length 1.07 m

Diameter

Size

f / D

Efficiency

Beam Width

Gain

Dish Gain

-->

2.49 m

Metric

0.43

67.2%

6.50°

766

26.69 dBd

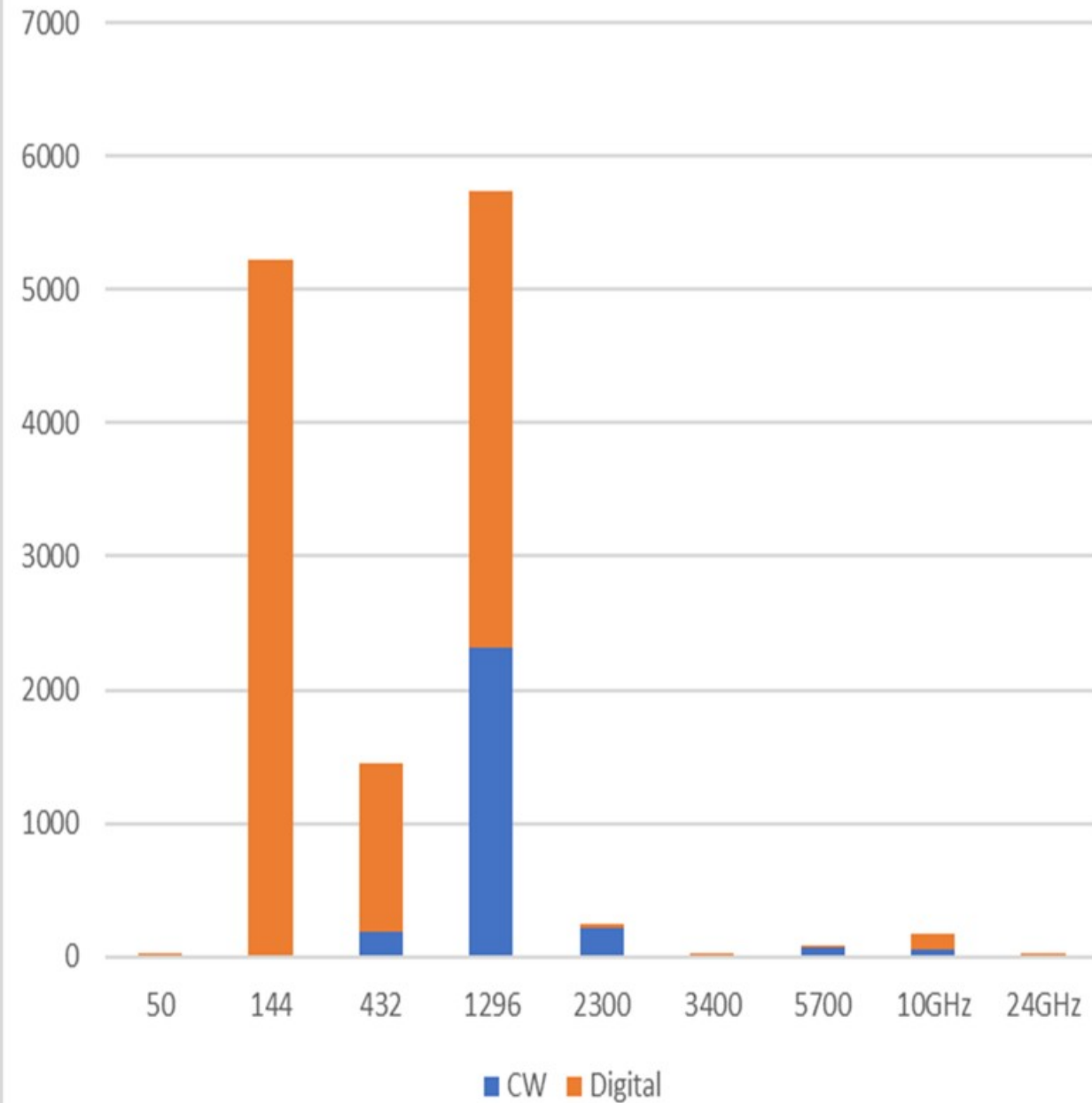
28.84 dBi

10.8 Lambda

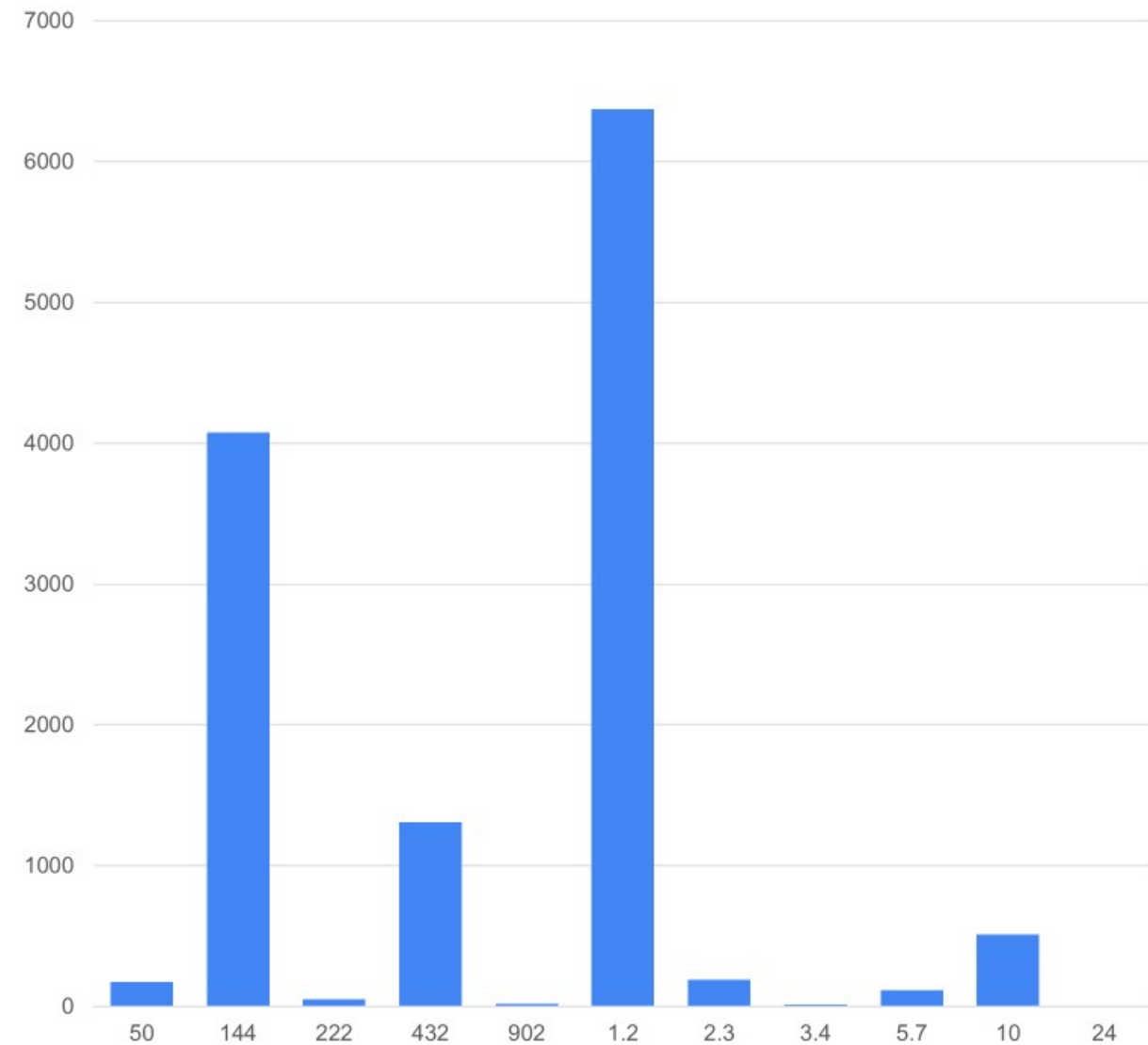
Effective Aperture		Beam Width Ratio		Set Current Moon		Moon Data	
TxA	36.17 M ²	0.26		S/F	Update Moon	Phase 0.08	
TxB	3.26 M ²	0.08				Illum 6.4 %	
Moon Beam Fill Factor		Sun Beam Fill Factor		G/T Ratio		4th Quarter	
TxA	1.02	0.10dB	1.03	0.12dB	202.77 23.07dB	P Angle 28°	
TxB	1.00	0.01dB	1.00	0.01dB	10.03 10.01dB		

 Save Data
 Get Data
 Default

Reported QSOs by Band & mode **2020**

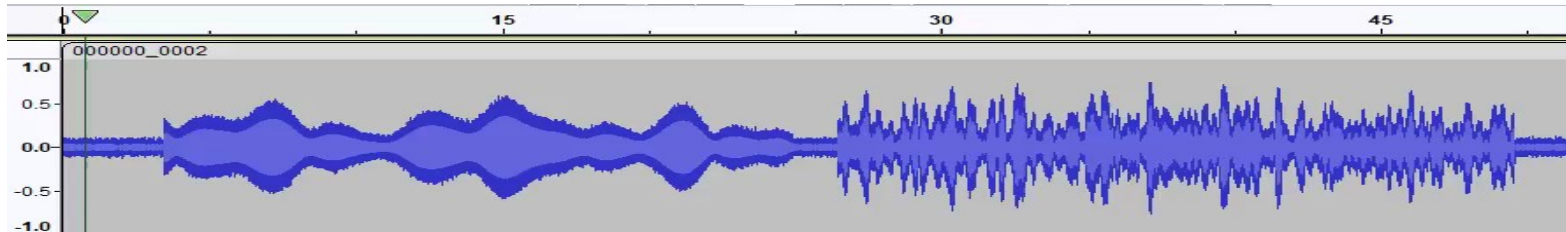


Reported QSOs by Band **2023**



Libration Fading

As reflection from different parts of the moon add up in the reflected signal, differences in amplitude and phase cause fading. The rate of fading is higher (faster) at higher frequencies. Perhaps 1Hz at 2m, a few Hz at 70cm and up to maybe 10Hz at 23cm. Libration fading is a type of multi-path fading or Rayleigh fading. It increases as Libration spreading increases.



1Hz +20dB carrier 144MHz

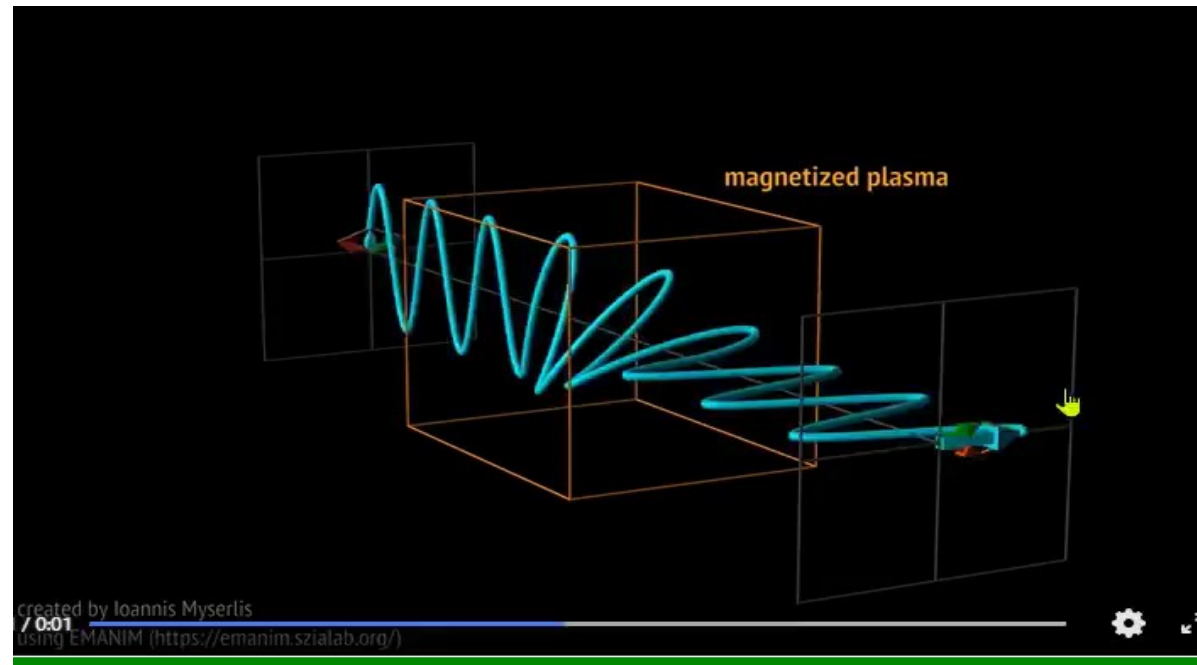
10Hz +20dB carrier 1296MHz

Courtesy of Bob KA1GT

The Faraday Effect

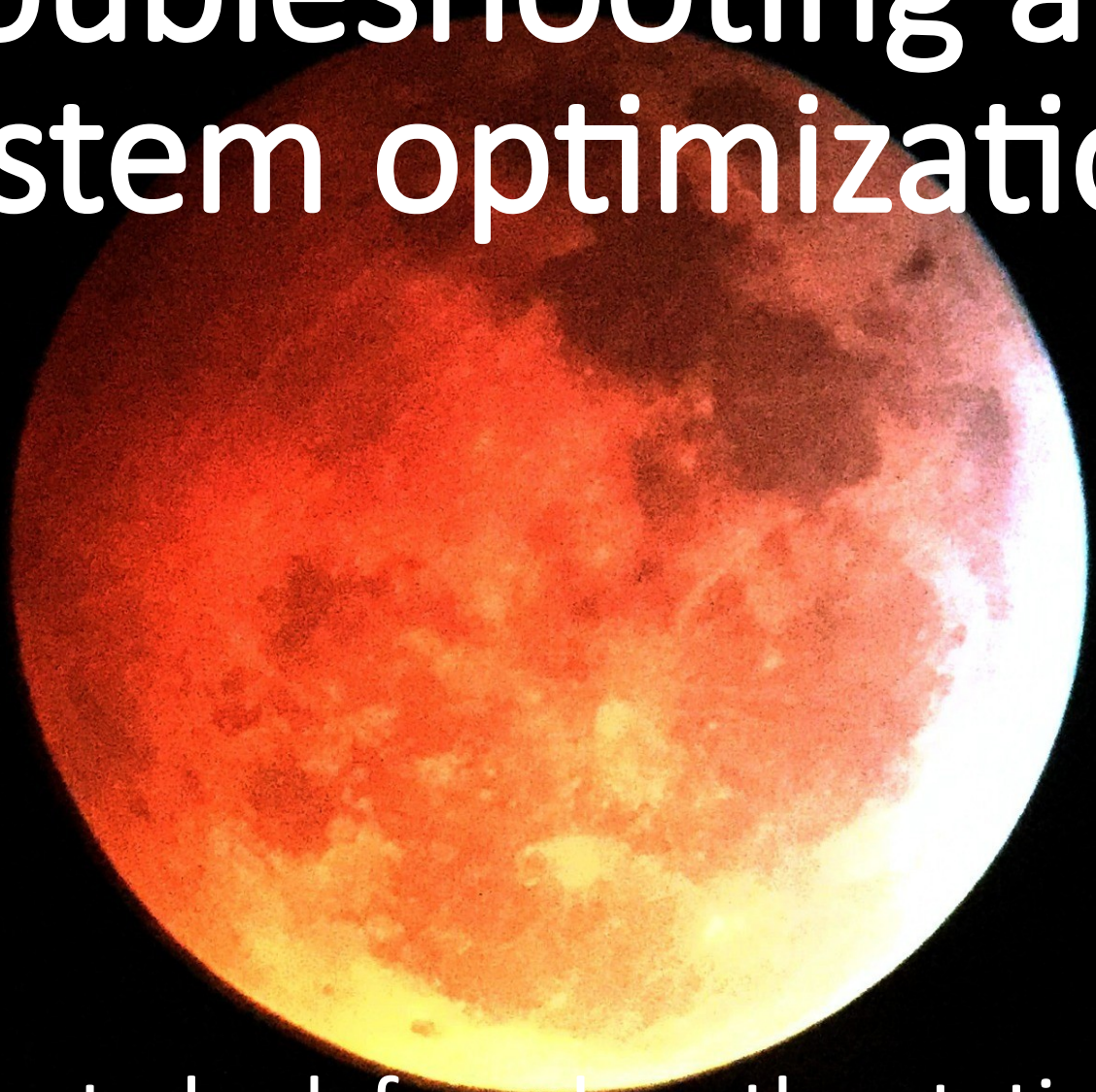
- Free electrons and the earth's magnetic field combine to form a magnetized plasma and induce polarization changes known as Faraday Rotation

This animation shows a 90 degree shift in polarization, from vertical to horizontal. In actual fact it may rotate multiple times depending on the frequency and conditions in the ionosphere



Courtesy of Bob KA1GT

Troubleshooting and system optimization



- **Accurate moon tracking**
- **Sun Noise measurement**
- **Cable & connector checks**

- **Sequencer operation**
- **Time accuracy**
- **Faraday**

Things to look for when the station isn't working as it should.

144432129623xx

@call write your message here...

UTC CQ 1296.065 1st 2nd Q65-60C 2nd per

search...

18:56 qrv test @ IZ4VSS Luca

18:41 @DK3WG: TNX will try @ OK1DFC Zdenek

18:13 I can be qrv at half hour @ 4X1AJ Andrey

18:13 @OK1DFC: Hi,Zdenek! Would you like to try 1268/1296 split? @ 4X1AJ Andrey

18:12 Hi all! @ 4X1AJ Andrey

18:08 stop cq @ DJ7FJ Joe

17:53 ***** CQ 1296.065 1st Q65-60Ccfom 1500Hz ***** @ DJ7FJ Joe

17:23 @OK1DFC: ge, I got Yasers QSL via EA5KB.....fer 70cm..... @ DK3WG Jurg

17:17 @9K2YM: ge Yaser, can we try 29/30. June on 23cm ? @ DK3WG Jurg

17:14 @9K2YM: Yaser, I do not know how to deliver QSL to you. I will pay via PayPal post cost and send me your QSL please. I am missing that in DXCC collection. @ OK1DFC Zdenek

17:10 @OK1DFC: Hello sorry no received @ 9K2YM Yaser

16:18 @9K2YM: Hi Yaser, did you received my QSL? Already send to you 3 of my. @ OK1DFC Zdenek

11:19 @DK3WG: Im not always in front of the logger but I will keep checking back @ VK3NFI Dean

11:18 @DK3WG: No prob I will be around for a while yet @ VK3NFI Dean

10:58 @VK3NFI: ga, we can try when moon in better positions....need more Elevation (trees). @ DK3WG Jurg

06:00 Stopped CQ on 065. @ KB2SA Bill

05:51 ***** CQ 1296.065 1st Q65-30B CFOM @ 1500 hz ***** @ KB2SA Bill

01:41 Stopped CQ on 065. ORV. @ KB2SA Bill

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Who is online

K1DS (ME)

@ 9H1BN - Mark

@ 9K2YM - Yaser

@ DJ7FJ - Joe

@ DK0TE - Hardy

@ DK3WG - Jurg

@ F4DWB - Stéphane

@ IQ2DB - A.Volta EME team

@ IZ4VSS - Luca

@ K6RA - Bruce

@ LZ4FR - KRASSY

@ OK1DFC - Zdenek

@ OM4XA - Fero

@ PA1EMT - Rob

@ G4YTL - David

@ ZS4TX - Bernie

last seen on logger >1h

@ DL4DTU - Norbert

@ G1YLB - Steve

@ G4YTL - David

@ SP5GDM - Jan

LiveCQ By PA9RX 144 432

Chat boards and alerts

Latest 25 spots

Freq	Date	Time	Signal	DF	DT	Call	Loc	Pol	Mode	Spotter	
144.128	18-Jun	1847	-21	+071	2.7	CQ	UA1ASA	KO48	2	JT65b	S52LM
144.133	18-Jun	1839	-21	+017	2.7	CQ	UA1ASA	KO48	1	JT65b	S52LM
144.115	17-Jun	2134	-18	+292	2.8	CQ	EB5HRZ	IM99	174	JT65b	S52LM
144.111	17-Jun	2134	-21	-431	2.8	CQ	F4HBY	IN97	2	JT65b	S52LM
144.132	17-Jun	2126	-22	-419	2.7	CQ	F4HBY	IN97	2	JT65b	S52LM
144.122	16-Jun	1736	-26	+248	2.6	CQ	EB5EA	IM99	H	JT65b	UA3PTW
144.120	16-Jun	1647	-13	-285	2.6	CQ	I2FAK	JN45	H	JT65b	TK5JJ
144.120	16-Jun	1647	-15	-051	2.8	CQ	I2FAK	JN45	87	JT65b	G8EOH
144.120	16-Jun	1647	-10	+013	2.6	CQ	I2FAK	JN45	H	JT65b	UA3PTW
144.130	16-Jun	1618	-25	+180	2.8	CQ	OM3BY	JN99	97	JT65b	G8EOH
144.116	16-Jun	1616	-16	+020	2.4	CQ	IK1FJI	JN44	H	JT65b	UA3PTW
144.116	16-Jun	1616	-23	-044	2.6	CQ	IK1FJI	JN44	34	JT65b	G8EOH
144.138	16-Jun	1610	-24	+442	3.0	CQ	IK2DDR	JN55	148	JT65b	G8EOH
144.139	16-Jun	1610	-14	-498	2.8	CQ	IK2DDR	JN55	H	JT65b	UA3PTW
144.138	16-Jun	1606	-16	+493	2.9	CQ	IK2DDR	JN55	H	JT65b	UA3PTW
144.117	15-Jun	2205	-23	+248	0.1	CQ	9A2HV	JN75	H	JT65b	R1CCX
144.122	15-Jun	2157	-20	+245	-1.6	CQ	OK1PDQ	JO60	H	JT65b	R1CCX
144.122	15-Jun	2155	-22	+243	4.5	CQ	DL1BAB	JO42	H	JT65b	R1CCX
144.119	15-Jun	2141	-23	+240	4.5	CQ	F6HBP	JN25	H	JT65b	R1CCX
144.122	15-Jun	2143	-25	+025	2.8	CQ	WQ5S	EM13	84	JT65b	S52LM
144.120	15-Jun	2130	-26	+243	-3.4	CQ	HG9VHF	KN08	H	JT65b	R1CCX

Hosting Jun 2024 sponsored by PA9RX

A website like this with huge databases and traffic make cost for hosting. I got a new bill for 2024, we are open for donations for 2024

Donate

Made by PA9RX, thanks to PE1LWT, PA3FPQ all spotters are sponsors. MAP65 users are welcome!, send email to PA9RX

Use of data is not Allowed without permission!

EME (all bands/modes) MESSAGES High lat. AU warning

02:26:56 NN7J Dan Anybody know how to program M2 RC2800P-A

02:12:52 S57RR Bert 4X6 Elev. CQ EME 50193 2nd 1500 hz Q65

02:12:44 JA9SJI Mitsuru 4X6 EL You TOO!

02:12:13 S57RR Bert 4X6 Elev. (JA9SJI) Fb easy qso, 73 and have a nice weekend!

02:11:00 JA9SJI Mitsuru 4X6 EL 0209 -21 2 6 1512 JA9SJI S57RR 73 It was your Vest

02:10:35 JA9SJI Mitsuru 4X6 EL (S57RR) Thanks Also, VY good Sig

02:10:00 S57RR Bert 4X6 Elev. 0208 -23 2 9 920 S57RR JA9SJI RR73 q3

02:09:50 S57RR Bert 4X6 Elev. (JA9SJI) Tnx for another fb eme qso Mitsuru-san

02:07:10 JA9SJI Mitsuru 4X6 EL I have copy every SQ your Sig Bert

02:01:08 JA9SJI Mitsuru 4X6 EL Thanks

02:00:39 S57RR Bert 4X6 Elev. (JA9SJI) GM Mitsuru RR 182

01:59:57 JA9SJI Mitsuru 4X6 EL (S57RR) Bert 193 has QRM on SSB HW abt QSY 50 182?

01:46:05 S57RR Bert 4X6 Elev. CQ EME 50193 2nd 1500 hz Q65

UTC SPOTTER ORG DX INFO

0106 py2hc 144174.0 PJMGR -12 py2hc

0019 sp5oc 144300.0 K3PA weak signal from SA

2356 kp4ed 144300.0 K3PA weak signal from SA

2035 f5oc 144300.0 K3PA weak signal from SA

2205 a50ta 144360.0 ON4BCV M5K144 +1 dB replaying U

2159 yk3t 144360.0 OM3WC M5K144 +10 dB

2144 d5ag 144360.0 OM3WC M5K144 +10 dB

2138 k5ss 144200.0 JMT0CW

2130 yk3t 144360.0 DJ4AG M5K144 -4 dB

2105 ew5on 144174.0 UT5EJA F18 -8 dB 1712 Hz

2102 ur5ur 144175.0 US4BCG Q65 TDX TR QSO

2046 ur7em 144175.0 UT5UR <TR> Q65A -14 dB 1206 Hz

2044 d5ag 144173.9 OK1UM trk for qso 173

2041 d5ag 144173.9 OK1UM trk for qso 173

2037 d5ag 144173.9 OK1UM trk for qso 173

2026 d5ag 144174.0 OK1AZ JN65-TR-JO73ce bot

2021 ur5ur 144174.0 US4BCG TDX QSO<TR> F18

2019 em5o 144360.0 PA9V TDX QSO ONLY 100W 4 E Y 4M UP

2017 em5o 144174.0 UA4AGL F18

2017 ur5ur 144174.0 UT5EJA F18 -14 dB 636 Hz q3

2014 ur5ur 144174.0 US4BCG KN69TA->KN67UX F18

2012 ur5ur 144174.0 US4BCG KN69TA->KN67UX F18

2008 em5o 144174.0 R04G F18 -19 dB

2010 ur5ur 144174.0 US4BCG KN69TA->KN67UX F18

2010 ur5ur 144174.0 EU1AJ <TR> F18 -18 dB 1367 Hz

2005 em5o 144174.0 R04G F18 -14 dB

2005 ur5ur 144174.0 EU1AJ KN69TA->K0335V F18

1959 ur5ur 144174.0 R04G F18 -17 dB 1375 Hz

1957 em5o 144174.0 UT5UR F18 -11 dB

WSJT EME - 1.

PingJockey Central WSJT Terrestrial WSJT EME - 2 CW EME Who's Earwigging?

Distance/Bearing Locator Refresh Look back Update User details Refreshed 18Jun 18:52

Due to recent abuse of this system, you will be unable to post any messages until you complete the User Details page

Exchanging any contact details on here before you're complete, invalidates the contact, and, if it's not WSJT via Moonbounce it doesn't belong here!

Enter your message here Go!

DDMMYY UTC

18Jun 18:51 HI ALLE ===== {EB5HRZ/4X9H} Mario xx IM99sm }

18Jun 18:50 S52LM Milos, 4-dk7zb 500w ===== {UA1ASA Aleks xx KO48gh }

18Jun 18:49 S52LM Milos, -17fb ===== {UA1ASA Aleks xx KO48gh }

18Jun 18:49 UA1ASA Aleks , your antenna and power ? ===== {S52LM/4X14HV/1K} Milos xx JN65tx }

18Jun 18:47 S52LM Milos, tnx ===== {UA1ASA Aleks xx KO48gh }

18Jun 18:46 UA1ASA Aleks GE, 128 77 0 1845 2.8 -19 # CQ UA1ASA KO48 1 179 26 H ===== {S52LM/4X14HV/1K} Milos xx JN65tx }

18Jun 18:43 GE all CQ 2st 128 10 min ===== {UA1ASA Aleks xx KO48gh }

18Jun 16:18 Stop CQ .132 ===== {OM4CW/1X18H/750} Vlado xx JN88un }

18Jun 16:10 == CQ CQ .132 JT65B 1st for a while == ===== {OM4CW/1X18H/750} Vlado xx JN88un }

18Jun 16:07 =====Stop CQ on .133===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 16:07 OM4CW Noise today Vlado ===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 16:06 I3MEK Oggi rumore sul mare !! ===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 16:05 TK5JJ Jean that's not my signal, I calling you second nw ===== {OM4CW/1X18H/750} Vlado xx JN88un }

18Jun 16:05 I3MEK Ciao Mario .. Grazie RPT ===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 16:04 Ciao Jean :133 172 3 1602 3.0 -22 # CQ TK5JJ JN42 ===== {I3MEK/4X13HV/K} Mario xx JN55sj }

18Jun 16:02 OM4CW I see your trace ... ===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 16:01 TK5JJ Jean see weak trace but no decode ===== {OM4CW/1X18H/750} Vlado xx JN88un }

18Jun 15:59 OM4CW HI Vlado ===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 15:57 OM4CW OK ===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 15:56 TK5JJ HI Jean pse continue I lsn for you ===== {OM4CW/1X18H/750} Vlado xx JN88un }

18Jun 15:52 =====Stop CQ 144.133===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 15:43 =====CQ CQ 15T 144.133 JT65B===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 15:40 UA9VJM HI Sergey ===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 15:34 TK5JJ Jean-Jacques ,HI! ===== {UA9VJM/4X10H300} Sergey xx NO13vm }

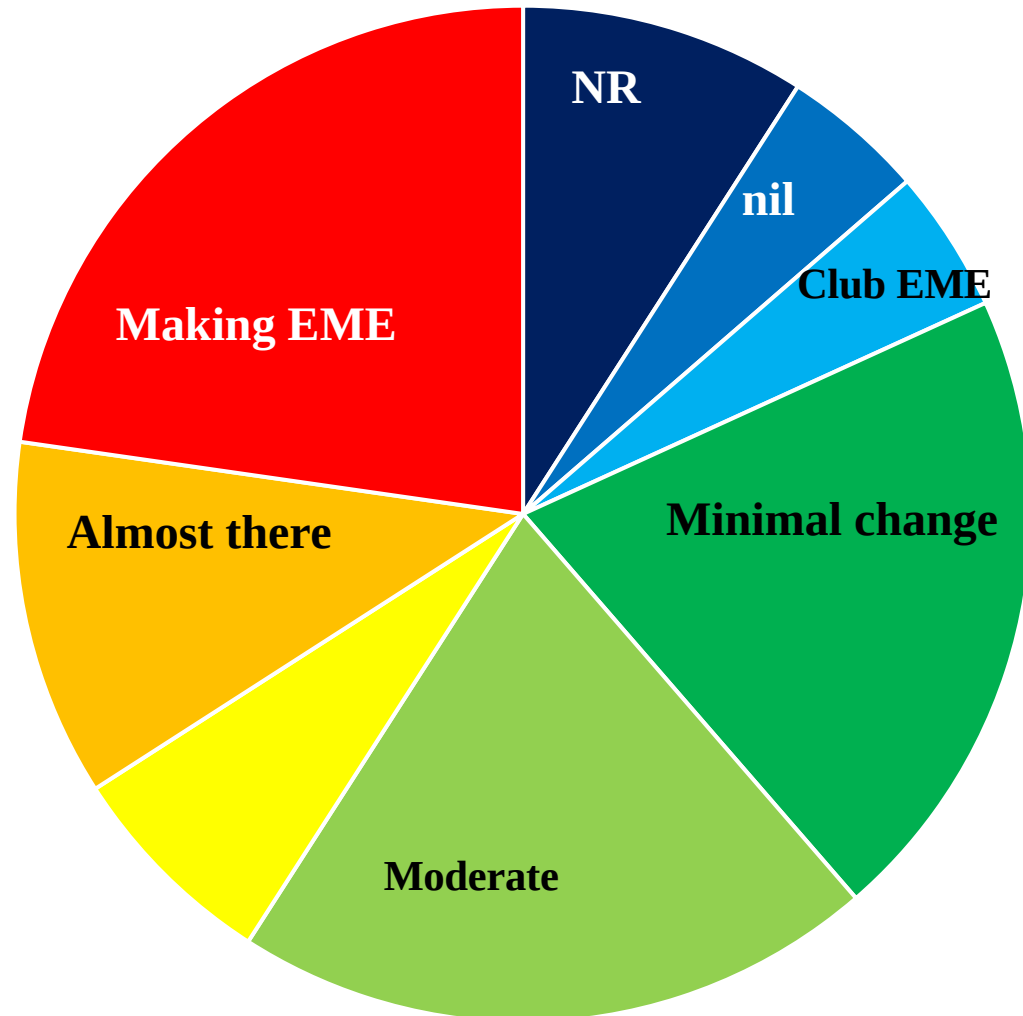
18Jun 15:32 HI all ===== {TK5JJ/2X12H/K} Jeanj xx JN42rh }

18Jun 08:10 ZL1HD Peter thanks for moral support ===== {W6KC Phil CA DM05ie }

EME 101 Attendee Follow-up

- All attendees were contacted by K1DS and K6JEY several times after the seminars. All were asked recently about their EME progress and 39 of 43 responded.

Progress of EME 101 attendees





I joined the WC8RK team we went from 69 initials to nearly 100 after our last session. We are building two 1296 stations. I am also beginning to work with Mike KA8ABR and Jim N8ECI on the big 10 GHz Cassegrain dish over at the VOA. In the year and a half since Trenton I have gone from a total newbie to a true fan of "The Ultimate DX" and am truly hooked.

EME Trenton Conference was a definite success and a real goal modifier for me. I learned SO much even though it was like "drinking from the firehose." I wish I could go to Tenerife! Mitch N8XS



The Future of EME 101

- The overwhelmingly positive feedback suggests that this course be run in parallel to the biennial 432 & Up International EME Conference
- Having a live EME station on-site helps newcomers to visualize what it takes to have an operational set-up
- The group setting where experienced EME hams are available to answer questions and follow-up when newcomers have additional needs and guidance is a great resource
- The foundational curriculum and slides are available.

Questions and Comments

73, Rick K1DS

