

1296 EME

KG0D August, 2026

Path Loss Revisited

Frequency (MHz)	Average Path Loss = $10 \log R$ (dB)
50	-242.9
144	-252.1
222	-255.8
432	-261.6
902	-268.0
1296	-271.2
2304	-276.2
3456	-279.7
5760	-284.1
10368	-289.2
24048	-293.5

June 2026

Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4
5	6	7	8	9	10	11

Today: 6/17/2026

< Change Month with arrow buttons
Select any day by clicking on that day.

Monthly Data Overview

KG0D Sequim

Home Station

Close [Esc]

Declination

Set Azimuth

Path Loss

Rise Azimuth

Distance

↑

1296 MHz

↓

Libration

UTC Time

Illumination

Composite

Rise and Set

☒ Declination
☒ Path Loss
☒ Distance

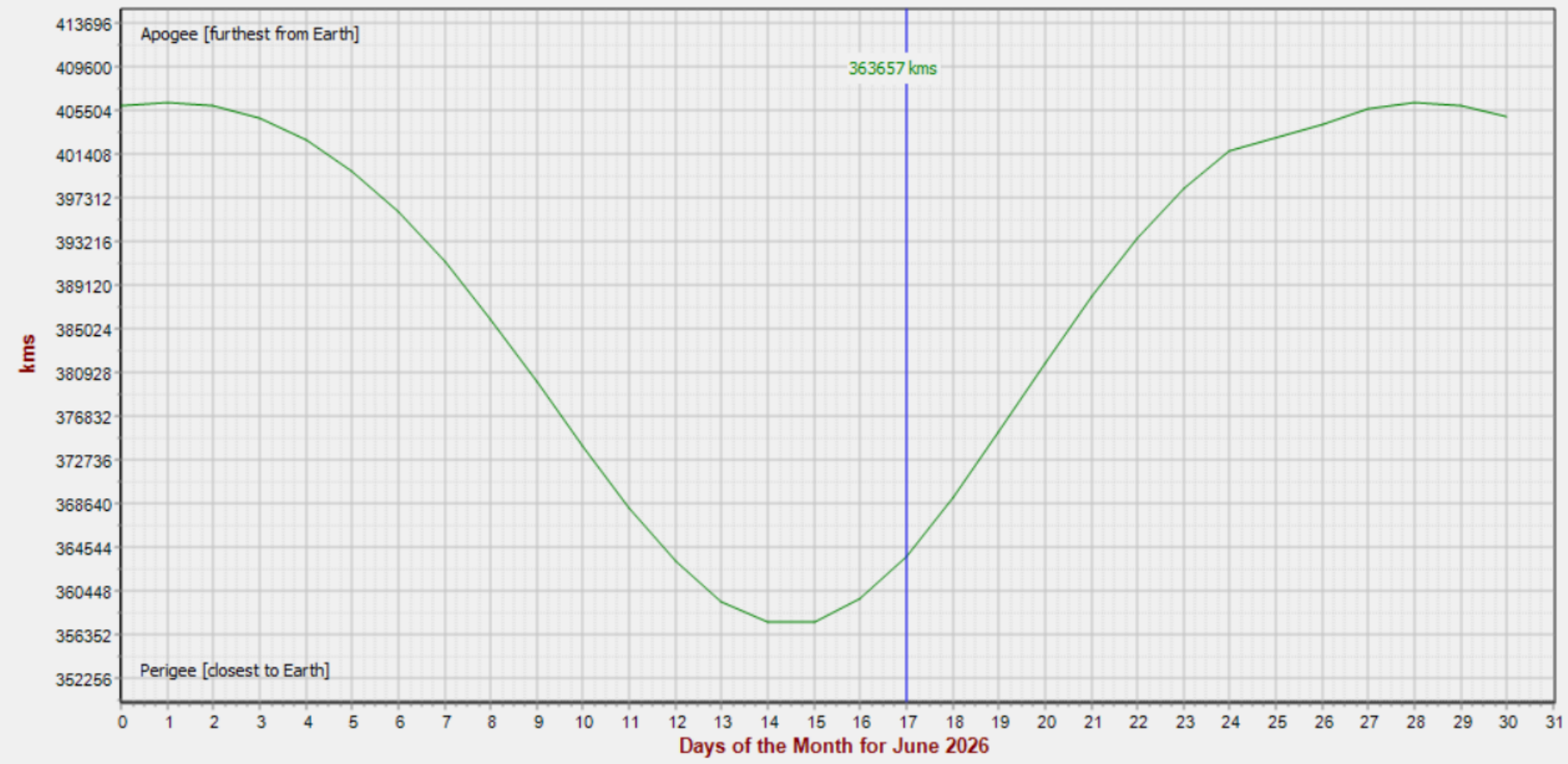
Sun to Moon

☒ Libration
☒ Illumination
☒ Sun to Moon

Sky Noise

Moon Temp

Moon distance kms



June 2026						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	1	2	3	4	5	6
7	8	9	10	11	12	13
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Rise and Set

Sun to Moon

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Rise Azimuth



1296 MHz



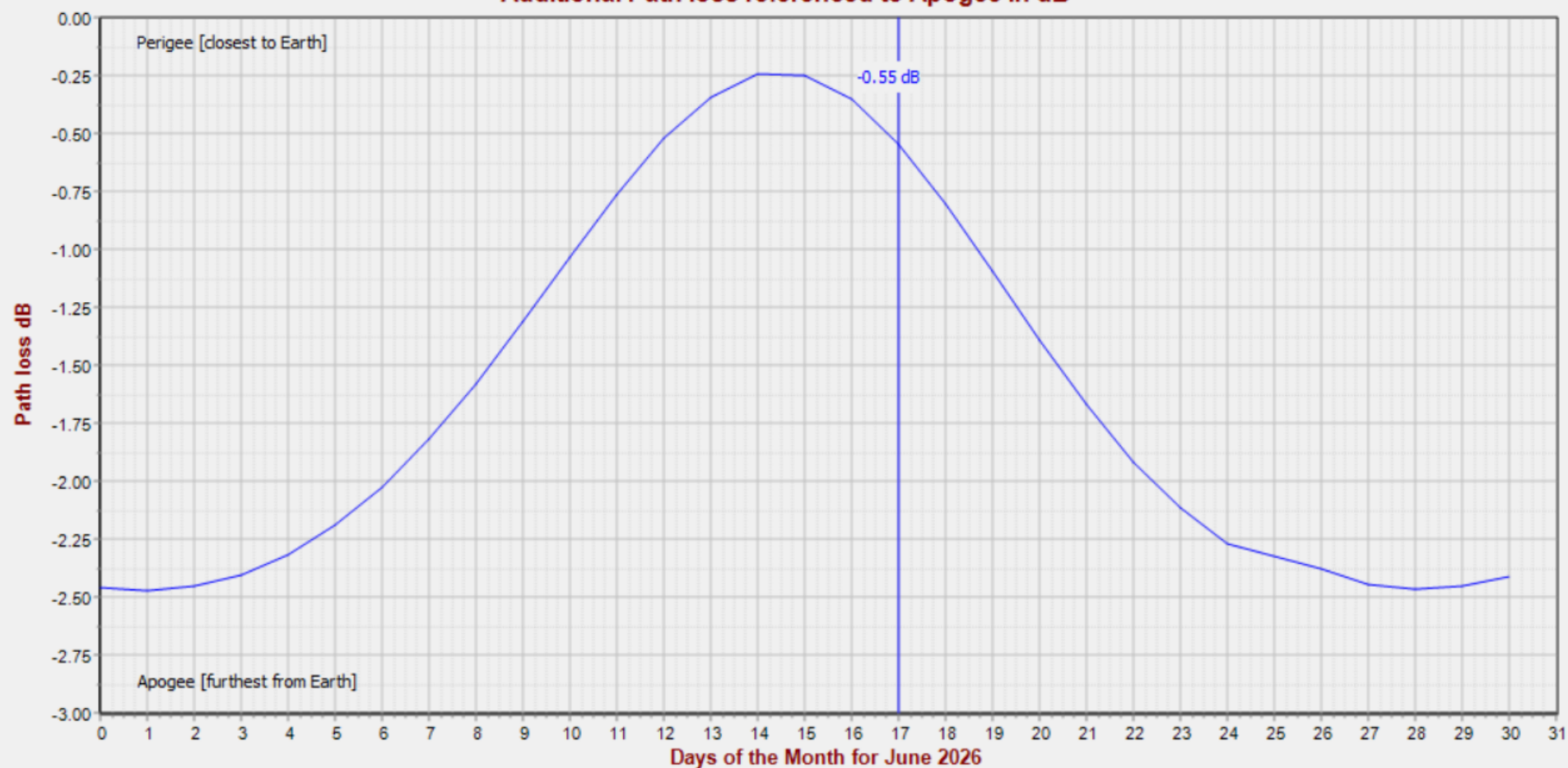
UTC Time

Composite

- ☒ Declination
- ☒ Path Loss
- ☒ Distance

- ☒ Libration
- ☒ Illumination
- ☒ Sun to Moon

Additional Path loss referenced to Apogee in dB



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Sun	Mon	Tue	Wed	Thu	Fri	Sat
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Sun to Moon

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Rise Azimuth



1296 MHz

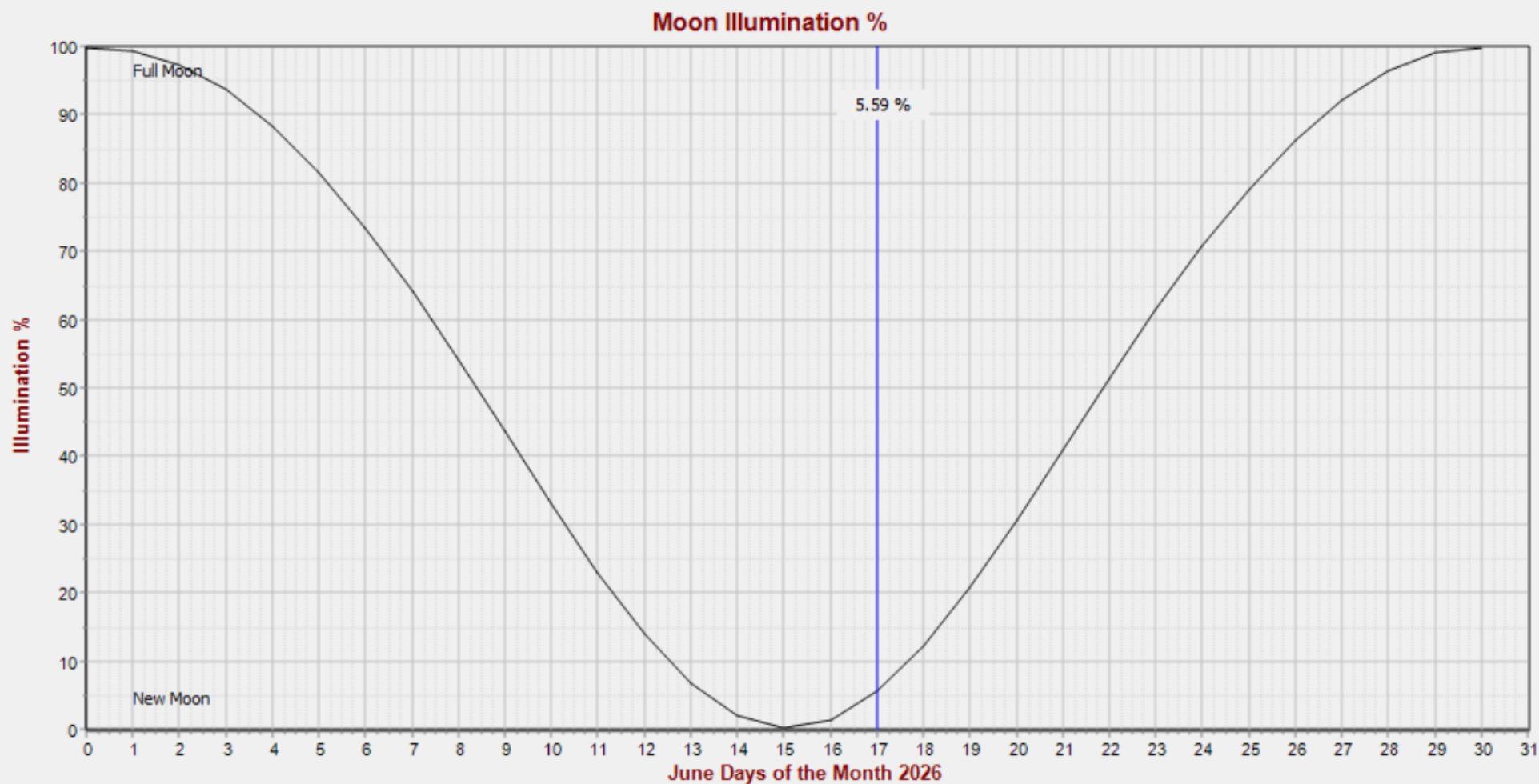


UTC Time

Composite

☒ Dedination
☒ Path Loss
☒ Distance

☒ Libration
☒ Illumination
☒ Sun to Moon



June 2026						
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Set Azimuth

Rise Azimuth



1296 MHz



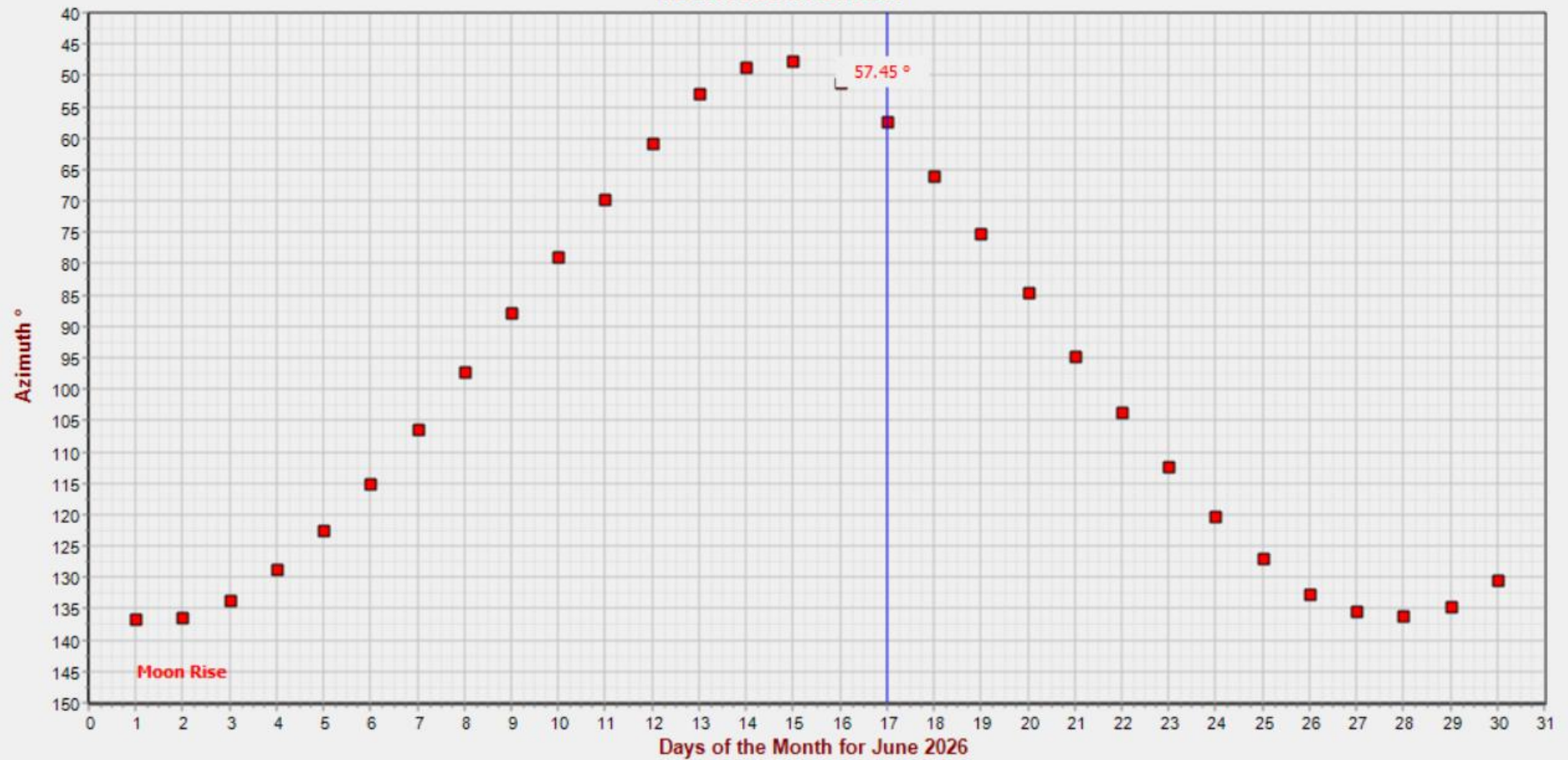
UTC Time

Composite

- ☒ Dedination
- ☒ Path Loss
- ☒ Distance

- ☒ Libration
- ☒ Illumination
- ☒ Sun to Moon

Moon Rise .. Azimuth



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Dedination

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Rise and Set

Sun to Moon

Sky Noise

Moon Temp

Set Azimuth

Rise Azimuth



1296 MHz



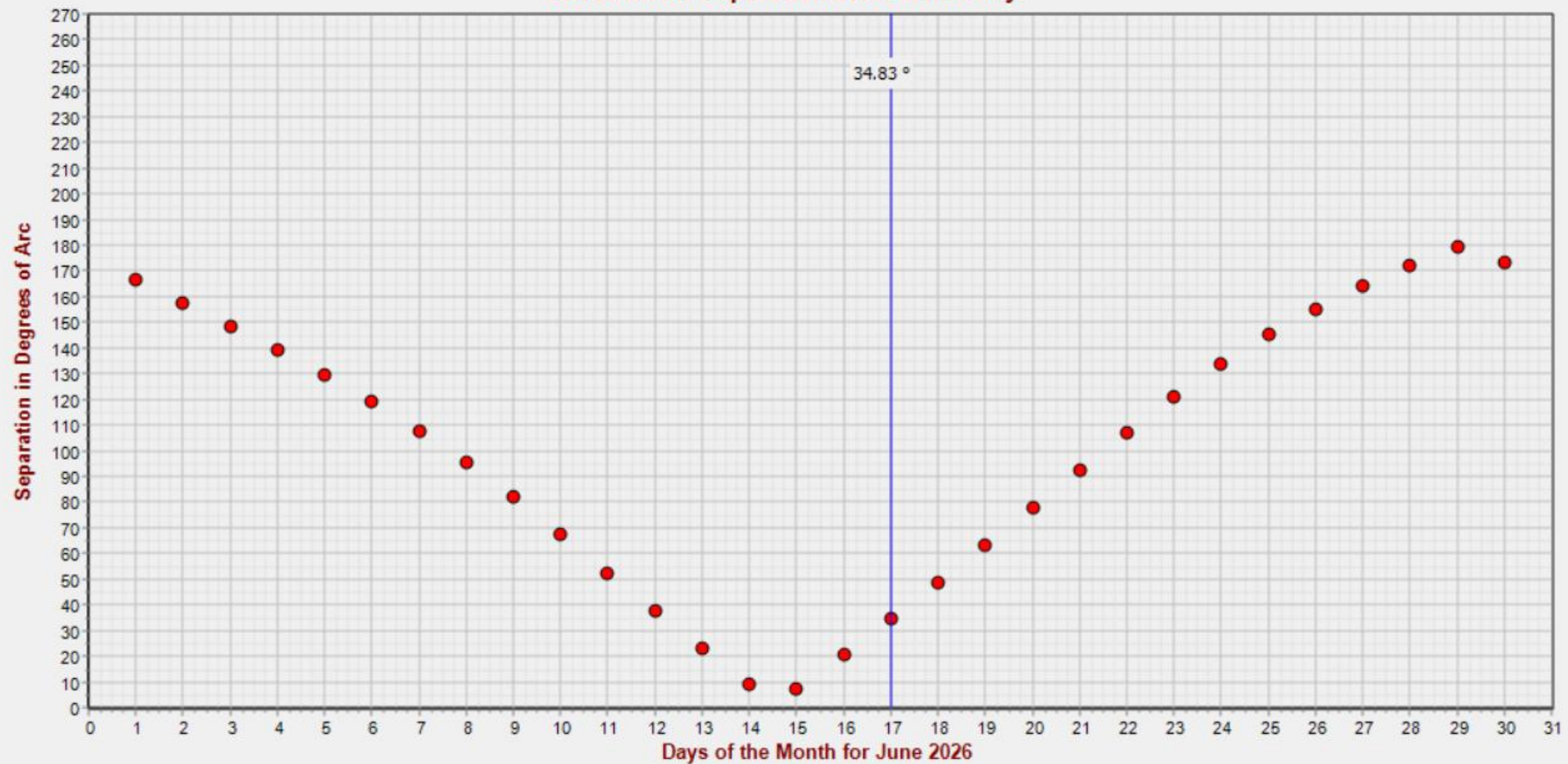
UTC Time

Composite

- ☒ Dedination
- ☒ Path Loss
- ☒ Distance

- ☒ Libration
- ☒ Illumination
- ☒ Sun to Moon

Sun to Moon Separation at local mid day.



June 2026

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Sun to Moon

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1296 MHz



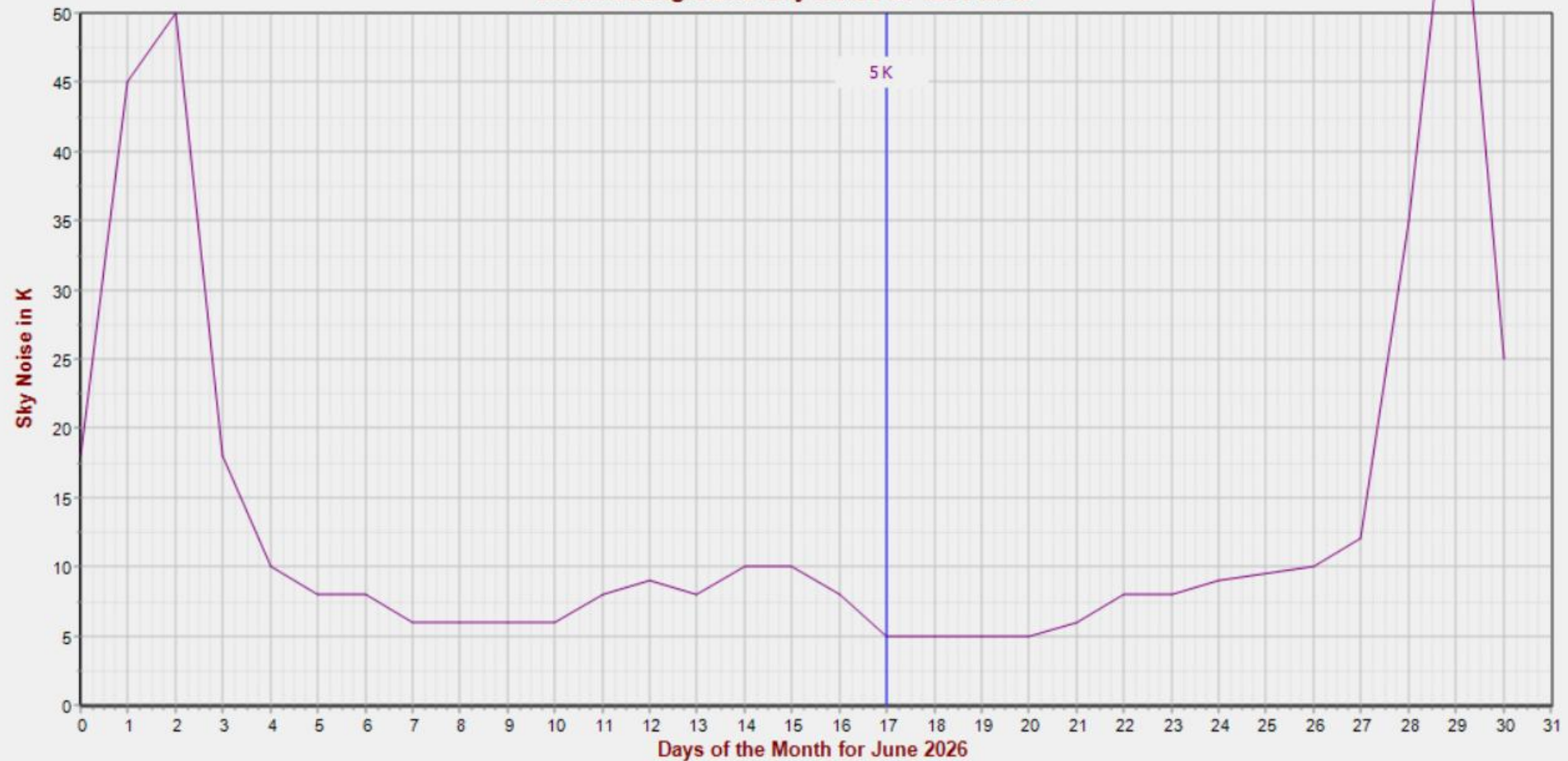
UTC Time

Composite

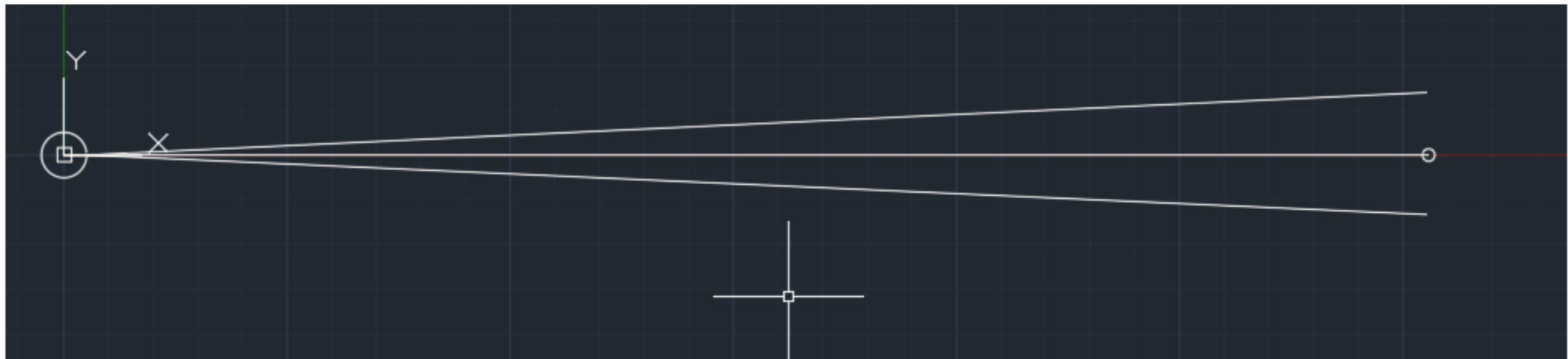
- ☒ Declination
- ☒ Path Loss
- ☒ Distance

- ☒ Libration
- ☒ Illumination
- ☒ Sun to Moon

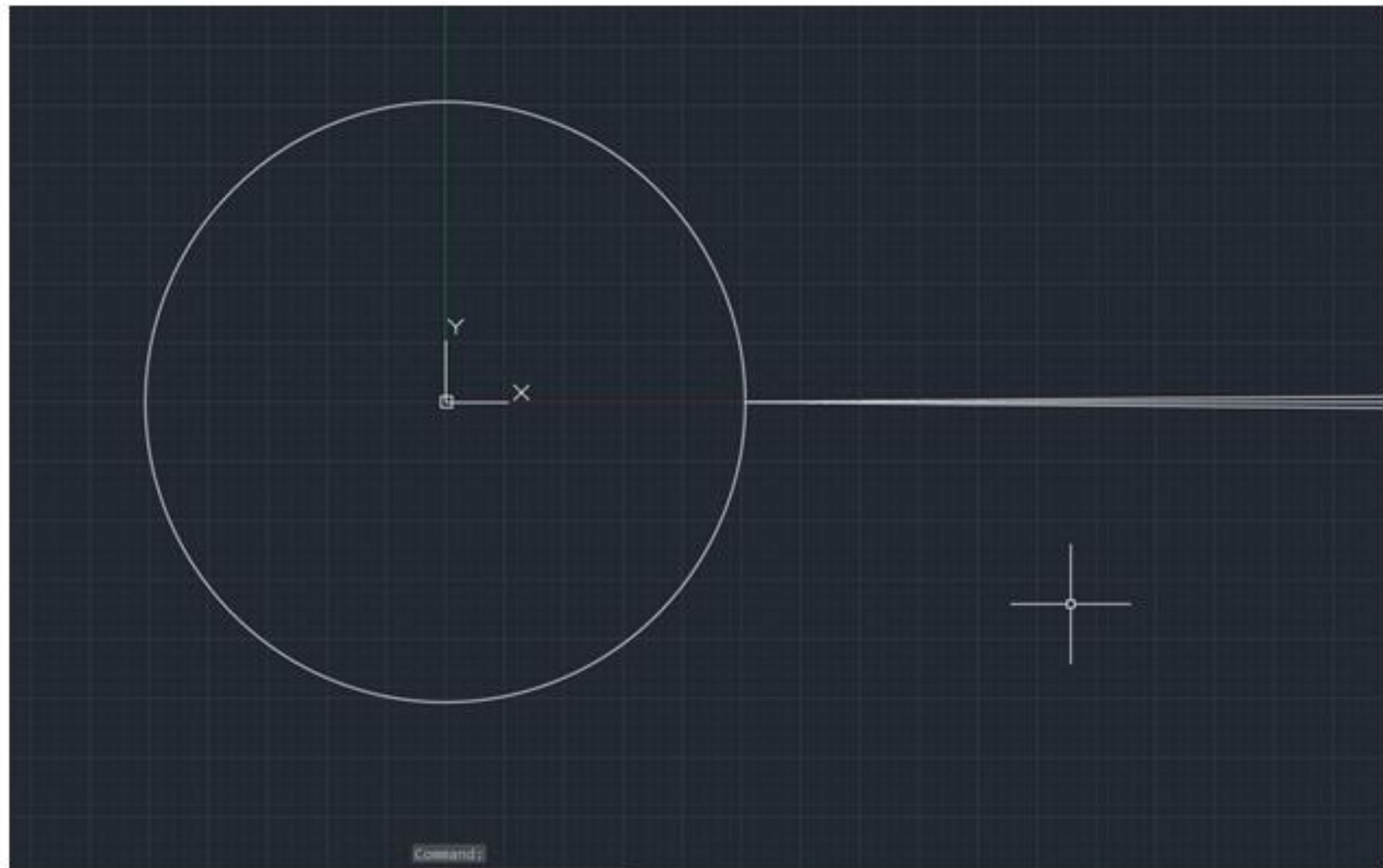
Moon background Sky Noise at 1296 MHz

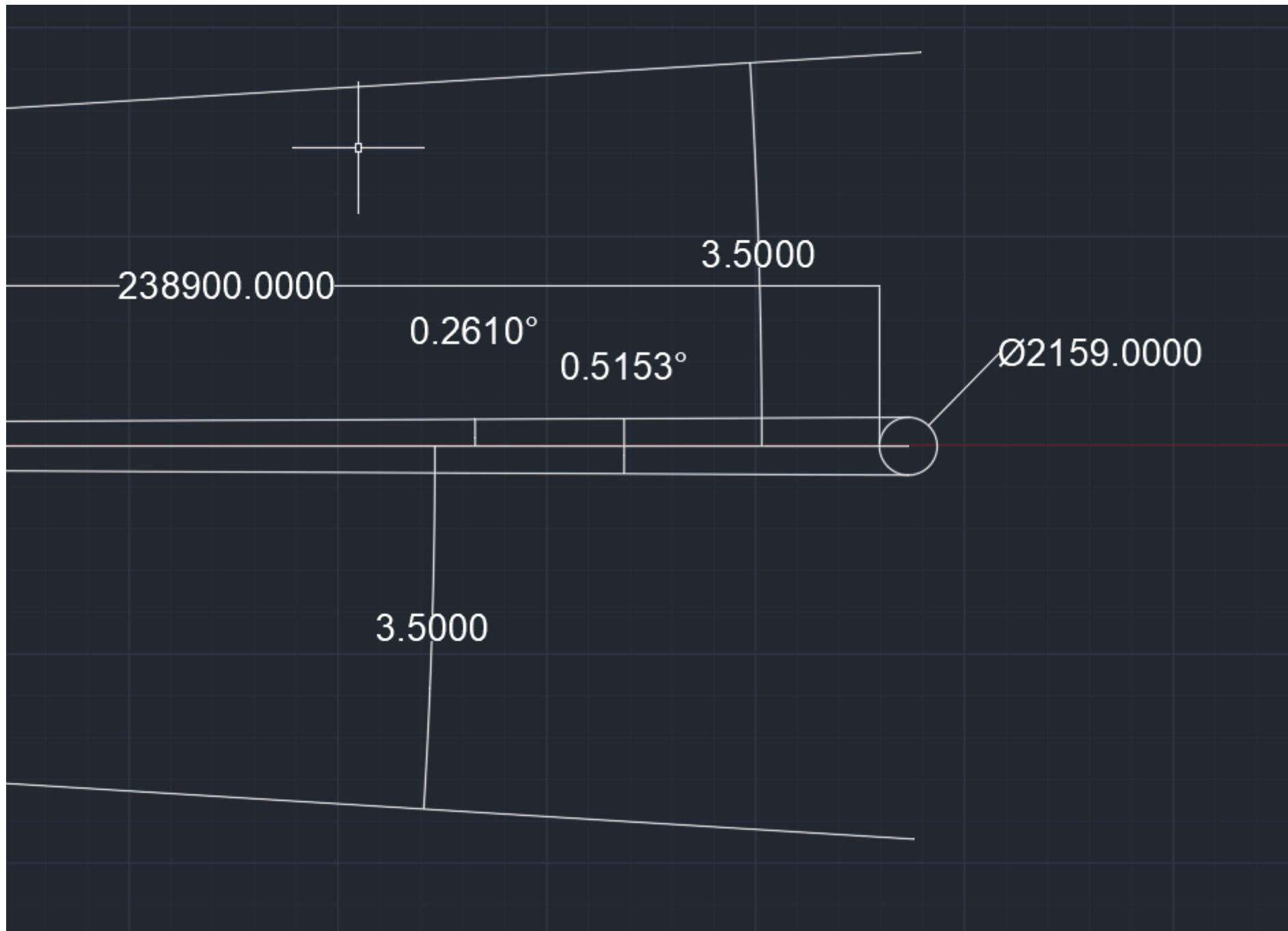


Earth 7917
Moon 2159
Length 238900
Degree 3.5 off equator

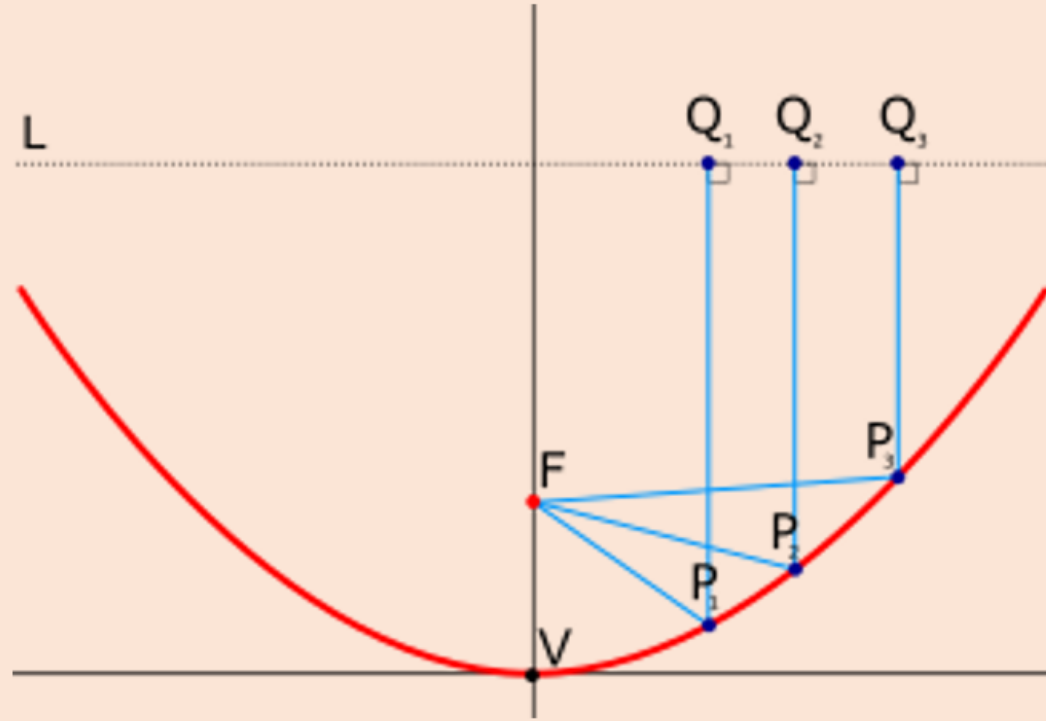


Earth side.





The Dish Antennas Used for EME Are Parabolic

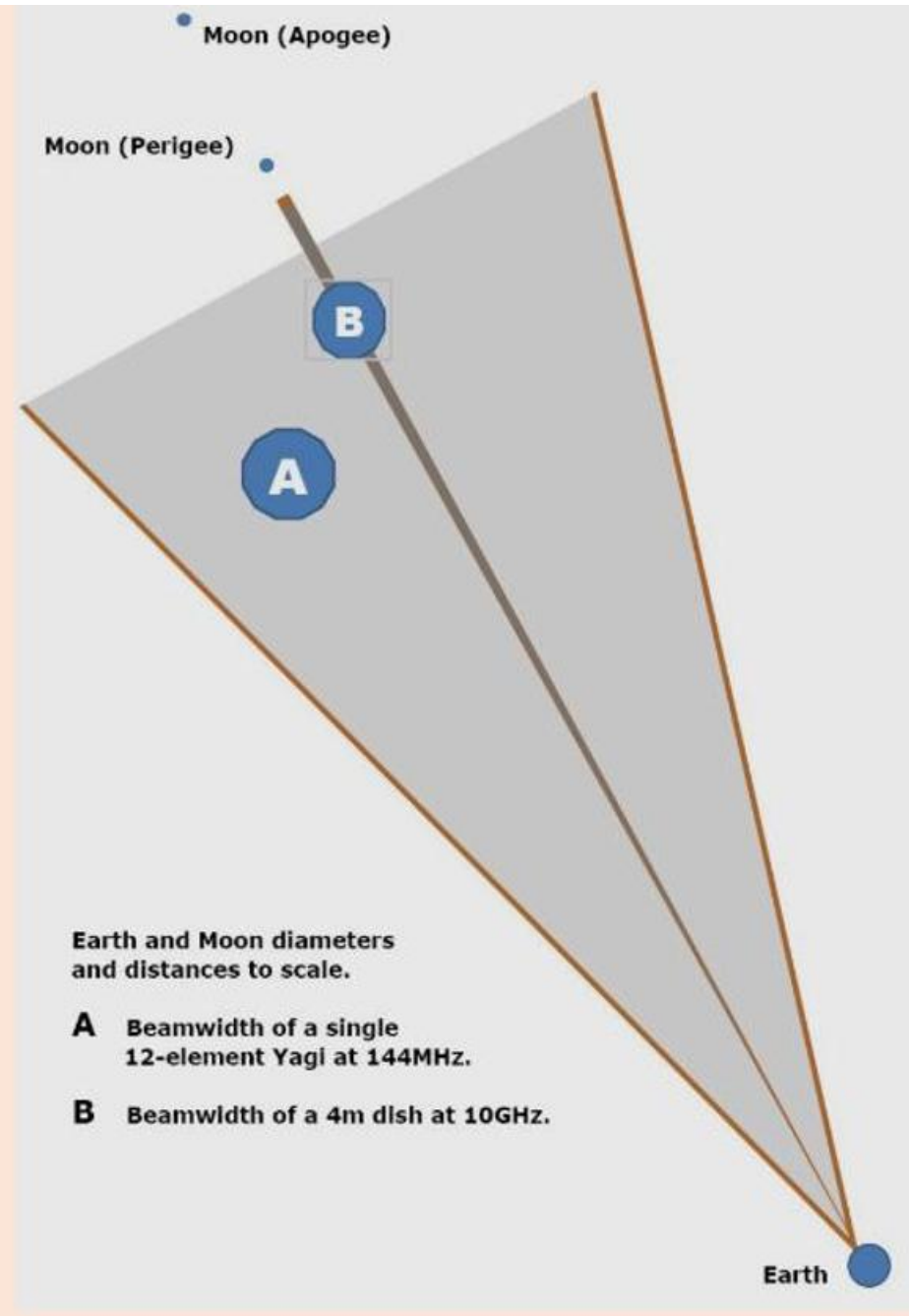


Parabolic antennas are based on the geometrical property of the paraboloid that the paths FP_1Q_1 , FP_2Q_2 , FP_3Q_3 are all the same length. Thus, a spherical wavefront emitted by a feed antenna at the dish's focus F will be reflected into an outgoing plane wave L travelling parallel to the dish's axis VF .

	A	B	C	D	E	F
1		Parabolic dish reflector gain at 65% Efficient				
2		KA1GT Formula	https://www.bobatkins.com			
3		Dave Fisher KG0D 9-13-23				
4						
5		1296				
6		At 65% efficient				
7		Dish,	Approx	Beam		
8		Meters	dB Gain	Width		
9	Calculations	1	20.8	16.20		
10		1.5	24.3	10.80		
11		1.8	25.9	9.00		
12		2	26.8	8.10		
13		2.4	28.4	6.75		
14		3	30.6	5.40		
15		3.2	31.2	5.06		
16		3.7	32.4	4.38		
17		4	33.1	4.05		
18		5	35.0	3.24		
19		7	38.0	2.31		
20		10	41.1	1.62		
21						
22	YAGI'S					
23	M2 23CM49	1296		Beam		
24	49 elements	Yagi	dB	Width		
25	14.4 Ft Long	Single	20.36	14		
26	\$468 USD	Double	22.86			
27		Quad	25.86			
28						

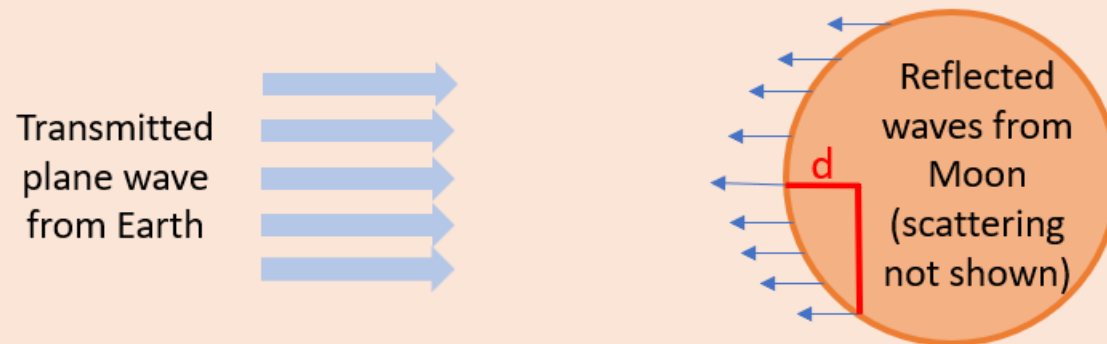
10 GHz with a Dish
VS.
144 Mhz with a Yagi

More power is focused on
the Moon and more is
collected back on Earth.



Echo Delay and Time Spread

- EME signals undergo 2.2 to 2.8s of delay.
- Can be a challenge, especially for synchronous communication modes.
- The lunar surface not only absorbs and scatters RF; it is also convex!
- This introduces a time spread in the return signal of $\Delta t \approx 2d/c$



PREFS



CN88ka07 ↑ 998ft

MAIL

MAP

02/22/23



08:44:17

LOG

-00.7°



-00.8°



▶ SHOW EXTRAS...

096° S84E 1707mils TRUE



ZERO

A-B

CAL

60

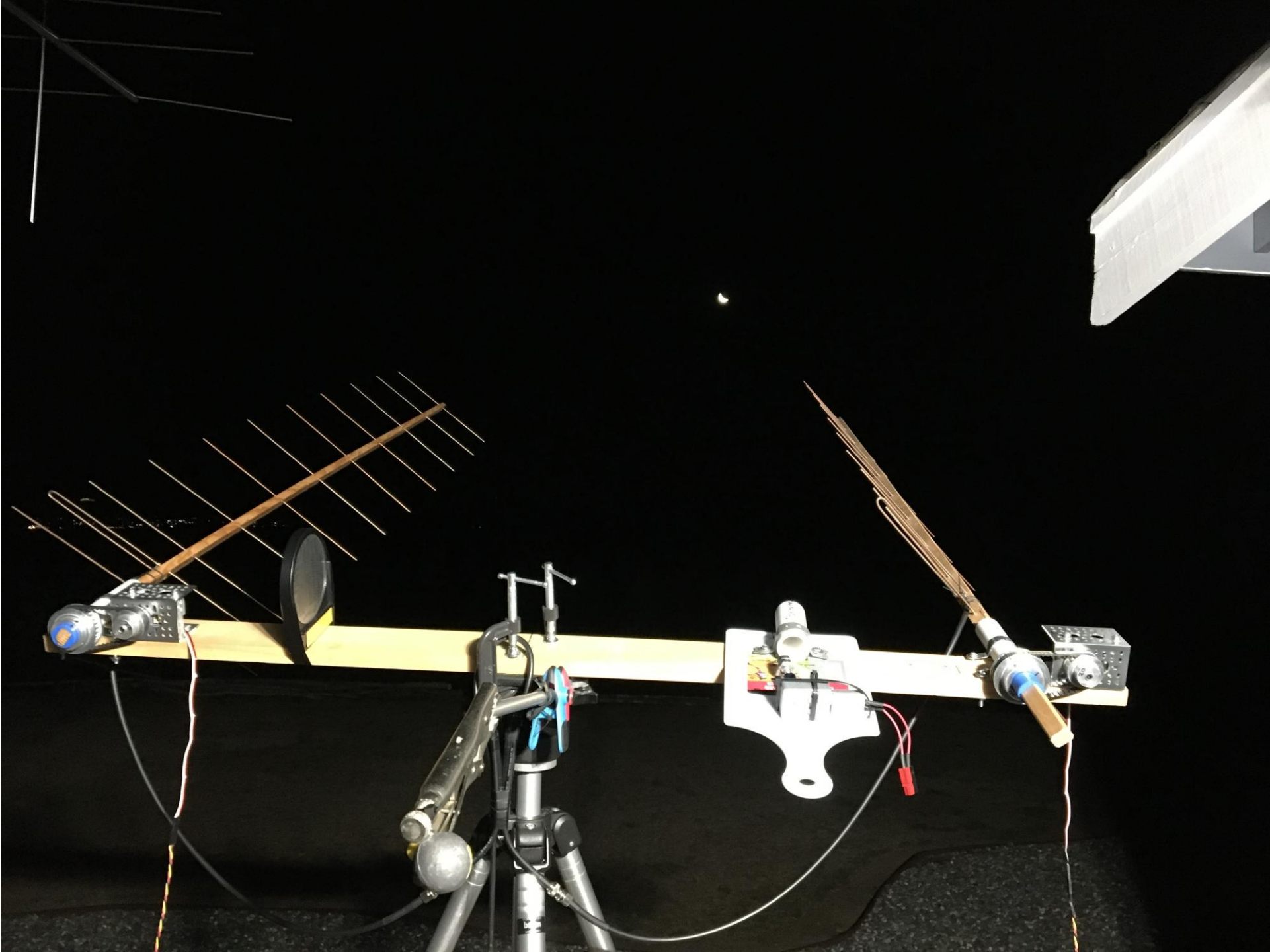
E

120

COLOR

1.0 X

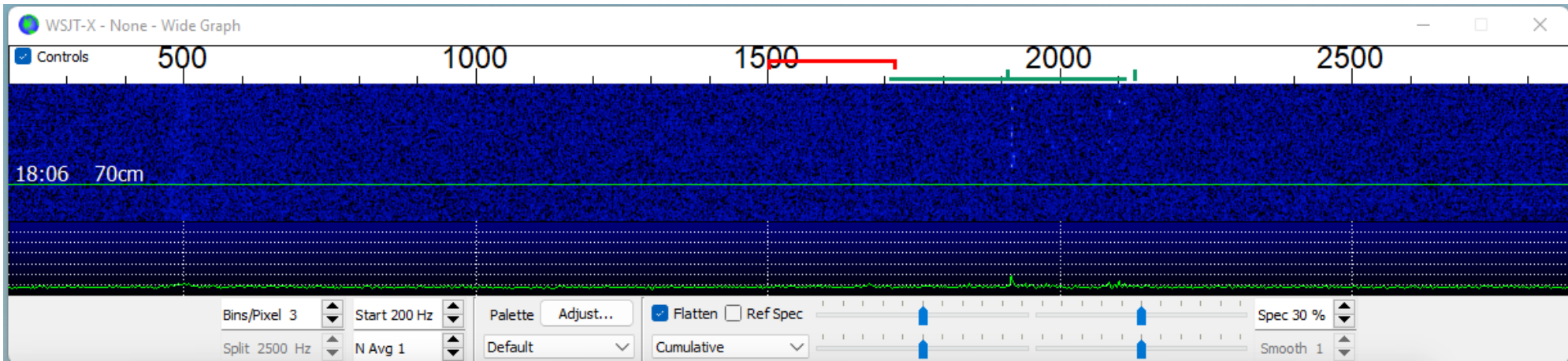




Bernd



The array for 70cms was made up of 128 x 11-element Yagi antennas which had a calculated gain of 33.7 dBd. He first got a licence in 1975, made his first moon bounce contact on 432 MHz in 1983, got DXCC on 432 MHz in 2012 and finally worked all 50 US states in 2016, all from his home in Germany.



WSJT-X - None v2.5.4 by K1JT, G4WJS, K9AN, and IV3NWW

File Configurations View Mode Decode Save Tools Help

Single-Period Decodes

UTC	dB	DT	Freq	Message
----- 70cm				
1754	-15	2.6	1894	: EA3EA DL7APV -22 q0
----- 70cm				
1756	-12	2.6	1897	: EA3EA DL7APV RR73 q0
----- 70cm				
1758	-16	2.6	1902	: CQ DL7APV JO62 q3
----- 70cm				
1800	-15	2.6	1907	: KG0D DL7APV -19 q3
----- 70cm				
1802	-15	2.6	1910	: KG0D DL7APV RR73 q3
----- 70cm				
1804	-15	2.6	1915	: CQ DL7APV JO62 q3

Log QSO Stop Monitor Erase Clear Avg Decode Enable Tx Halt Tx Tune Menus

70cm S 432.062 992 Tx even/1st Tx 1500 Hz F Tol 200 Submode B

DL7APV KG0D CN88

Generate Std Msgs Next Now Pwr Tx 1

Average Decodes

UTC	dB	DT	Freq	Message
1755	Tx		1500	: DL7APV KG0D CN88
1756	-12	2.6	1897	: EA3EA DL7APV RR73
1757	Tx		1500	: DL7APV KG0D CN88
1757	Tx		1500	: DL7APV KG0D CN88
1758	-16	2.6	1902	: CQ DL7APV JO62 q3
1759	Tx		1500	: DL7APV KG0D CN88
1800	-15	2.6	1907	: KG0D DL7APV -19 q3
1801	Tx		1500	: DL7APV KG0D R-15
1802	-15	2.6	1910	: KG0D DL7APV RR73 q3
1803	Tx		1500	: DL7APV KG0D 73
1804	-15	2.6	1915	: CQ DL7APV JO62 q3

WSJT-X - None - Astronomical Data

2023 Feb 22

UTC: 18:06:22
Az: 106.8
El: 14.7
SelfDop: 640
Width: 4
Delay: 2.45
DxAz: 253.5
DxEI: 12.4
DxDop: -130
DxWid: 4
Dec: 0.1
SunAz: 141.9
SunEl: 24.2
Freq: 432.1
Tsky: 18
Dpol: -75.5
MNR: 1.2
Dist: 366628
Dgrd: -0.8

Doppler tracking

☐ Full Doppler to DX Grid
☐ Own Echo
☒ Constant frequency on Moon
☐ On DX Echo
☐ Call DX
☐ None

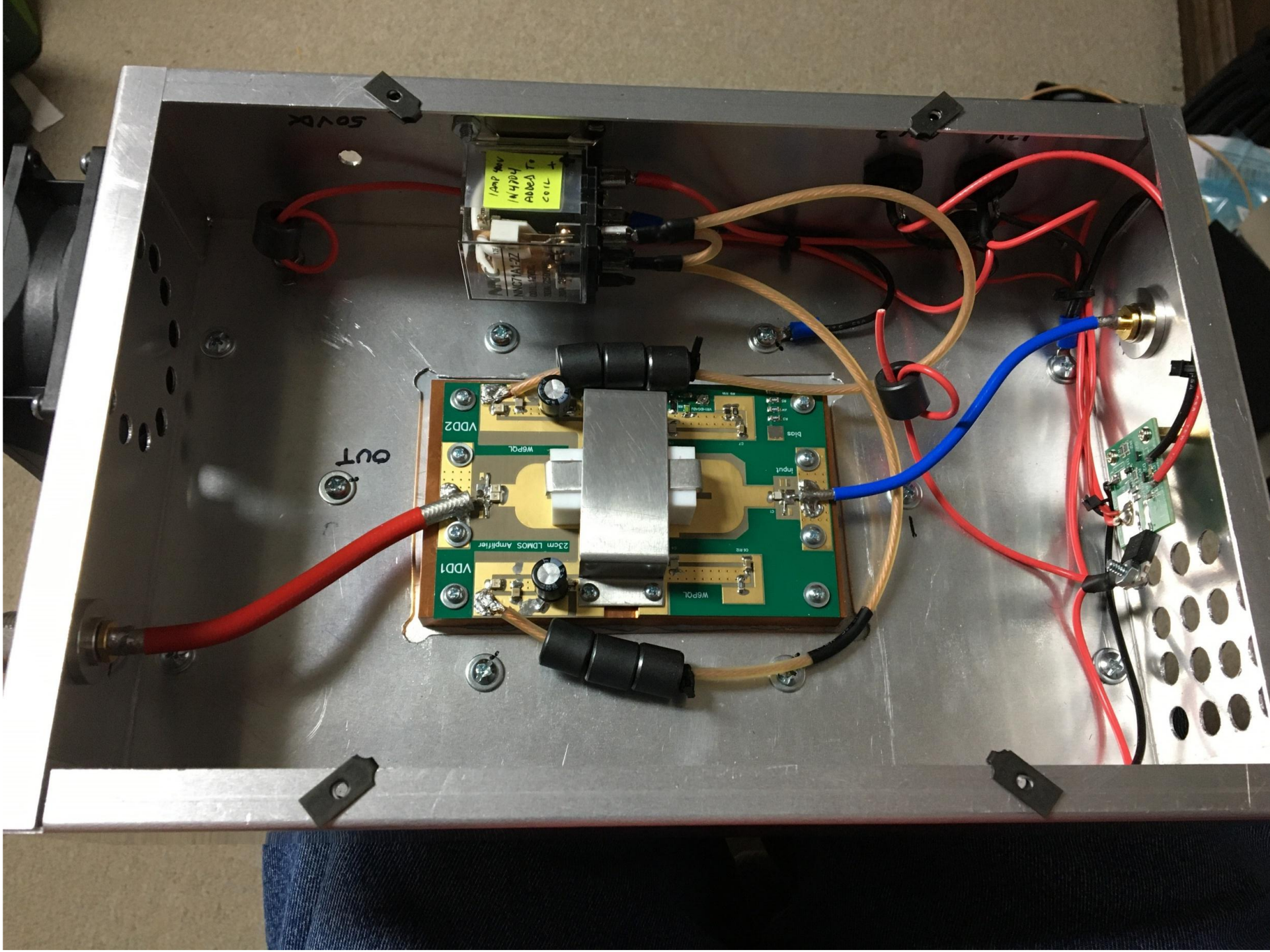
Sked frequency

Rx: 432.062 672
Tx: 432.062 672

Press and hold the CTRL key to adjust the sked frequency manually with the rig's VFO dial or enter frequency directly into the band entry field on the main window.

☒ Doppler tracking

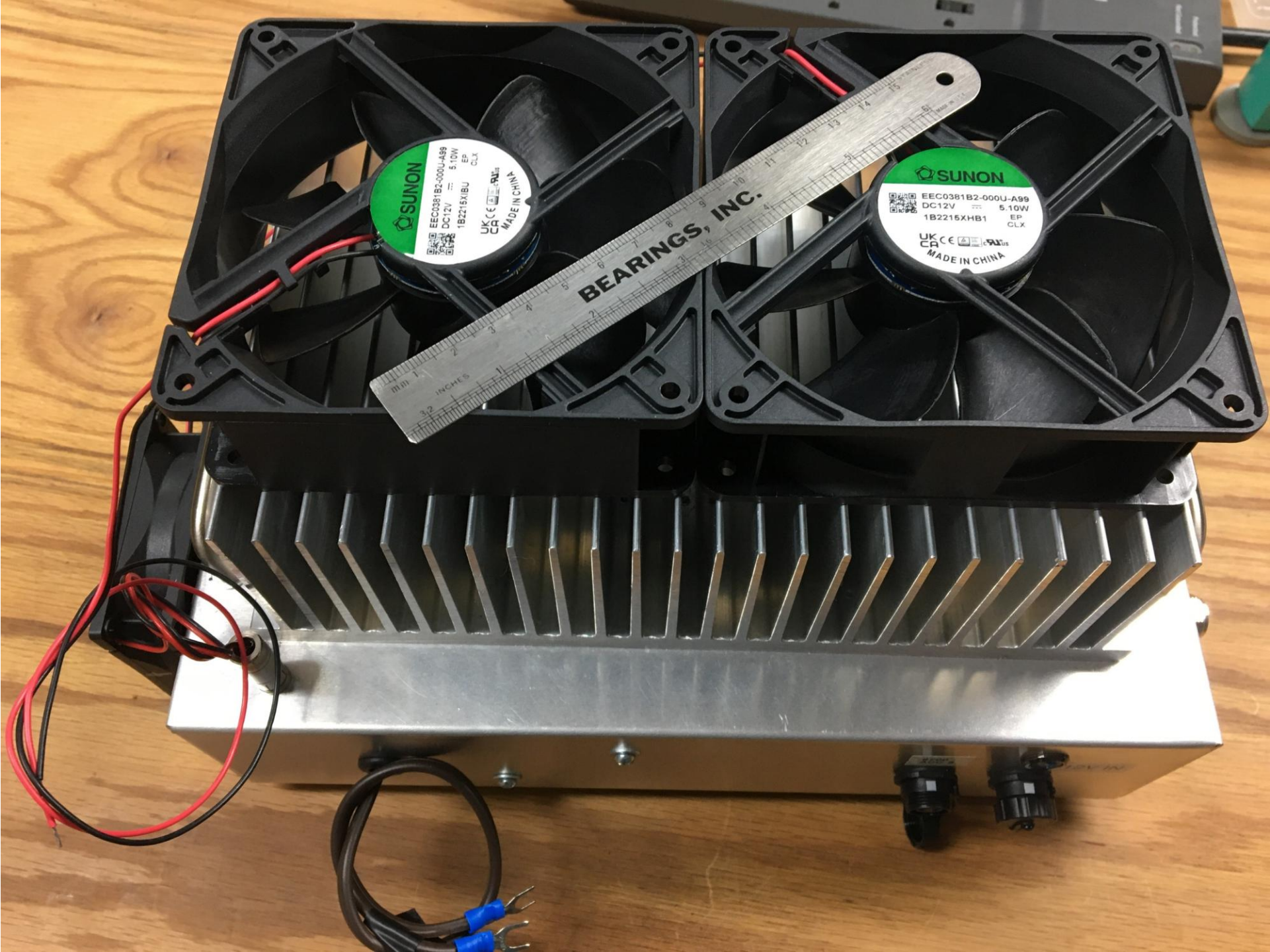




W6PQL.COM





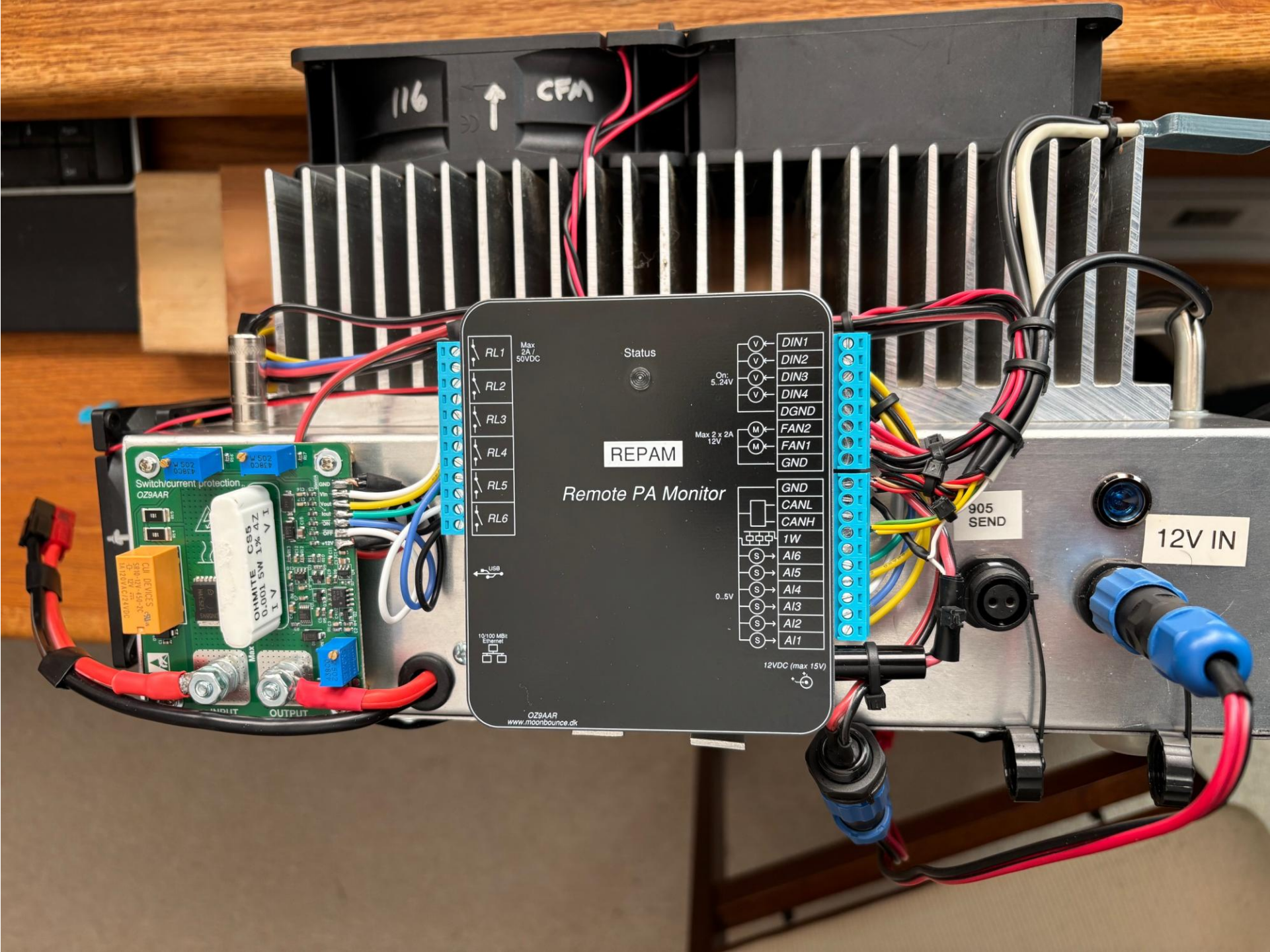


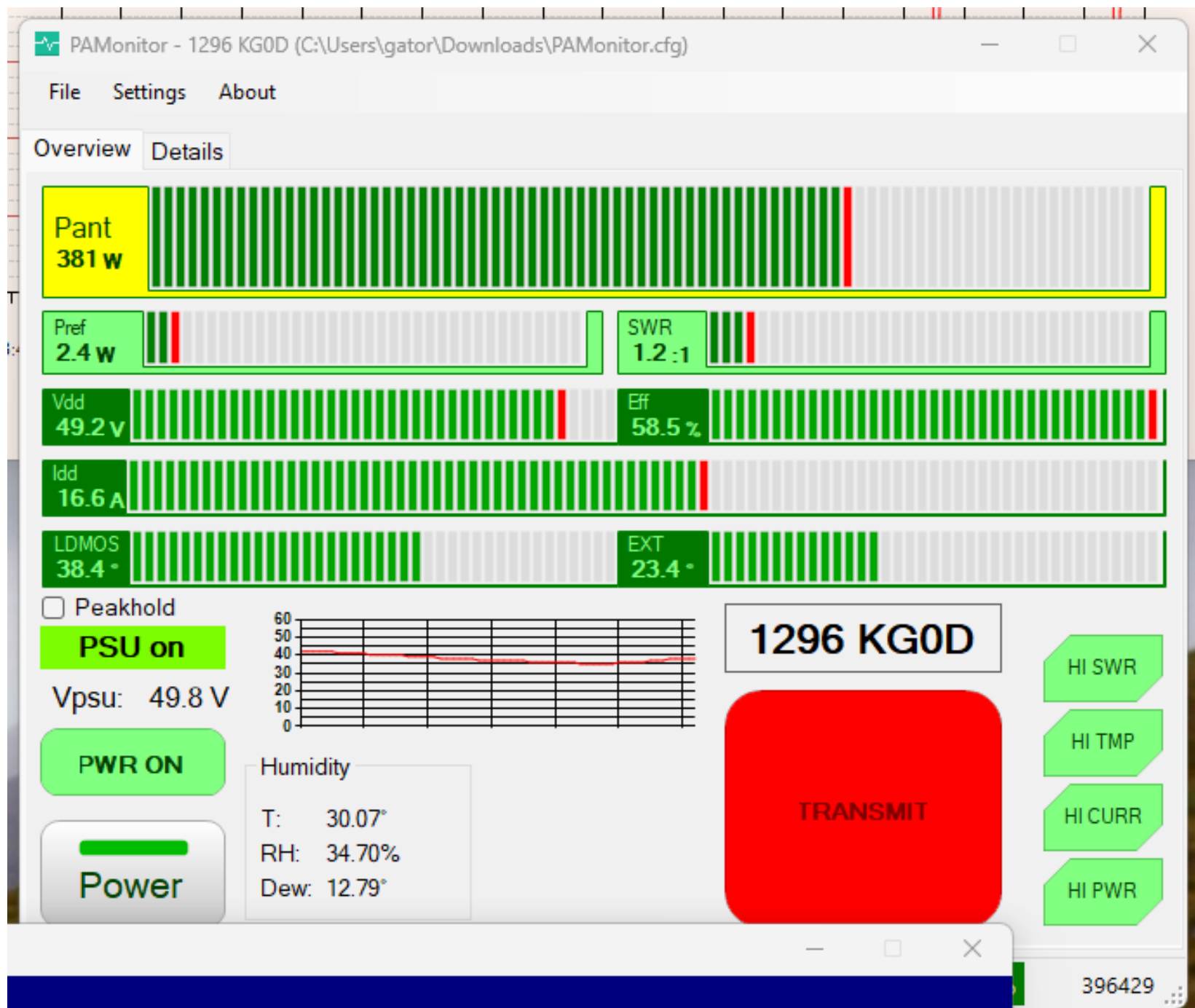
	A	B	C	D	E	J	K	L	M	N	O	P	Q	R
1		Coax ratings			FEET									
2		Dave Fisher KG0D			30									
3		10-Dec-23	Loss at		VARIABLE				\$ USD/	USD				
4			1296 MHz	Feet/	LENGTH		Outer	Watts at	Foot	Cost/				
5			dB/100FT	One dB	dB Loss		Diameter	Mhz	(note 2)	30 feet				
6		RG-401	12.0 at 1000	8.3	3.60		0.141	450 at 1000			Fairview Microwave.com			
7		RG-402	7.5 at 1000	13.3	2.25		0.25	1400 at 1000			Fairview Microwave.com			
8		RG-142	13.2 at 1000	7.6	3.96		0.195	650 at 1000	\$7.79	\$233.70	Fairview Microwave.com			
9		RG-142	19.1 at 2000	5.2	5.73									
10		LMR240UF	11.8 at 1500	8.5	3.54		0.24	170 at 1500	\$1.39	\$41.70	DX Engineering			
11		LMR240	9.9 at 1500	10.1	2.97		0.24	380 at 450	\$1.14	\$34.20	DX Engineering			
12		Hyperflex5	9.3	10.8	2.79		0.212	71 at 1000	\$0.72	\$21.60	buytwoayradios.com			
13		RG213	8.4	11.9	2.52		0.4	306 at 1000	\$1.60	\$48.00	DX Engineering			
14		Ultraflex7	6.8	14.7	2.04		0.287	225 at 1000	\$0.93	\$27.90	buytwoayradios.com			
15		LMR400UF	6.2 at 1500	16.1	1.86		0.4	360 at 1500	\$2.33	\$69.90	buytwoayradios.com			
16		DXE 400 MAX	6.2 at 1500	16.1	1.86		0.4	700 at 450	\$1.45	\$43.50	DX Engineering			
17		SPP-250	5.3 at 850	18.9	1.59		0.28	1,000 at 450			Times Microwave - copper tube jacket			
18		SPP-250	8.1 at 1900	12.3	2.43			470 at 1900			Times Microwave - copper tube jacket			
19		LMR400	5.1 at 1500	19.6	1.53		0.4	830 at 450	\$1.62	\$48.60	DX Engineering			
20		SPP-375	3.6 at 850	27.8	1.08		0.402	2110 at 450			Times Microwave - copper tube jacket			
21		SPP-375	5.5 at 1900	18.2	1.65			970 at 1900			Times Microwave - copper tube jacket			
22		Ultraflex10	5	20.0	1.50		0.4	503 at 1000	\$1.46	\$43.80	buytwoayradios.com			
23		Hyperflex10	4.7	21.3	1.41		0.4	516 at 1000	\$1.48	\$44.40	buytwoayradios.com			
24		Airborne10	4.1	24.4	1.23		0.4	610 at 1000	\$1.27	\$38.10	buytwoayradios.com			
25		LMR600UF	4.0 at 1500	25.0	1.20		0.6	1100 at 450	\$4.37	\$131.10	DX Engineering			
26		Ultraflex13	3.6	27.8	1.08		0.5	893 at 1000	?	#VALUE!	buytwoayradios.com			
27		Hyperflex13	3.5	28.6	1.05		0.5	907 at 1000	\$2.69	\$80.70	buytwoayradios.com			
28		LMR600	3.3 at 1500	30.3	0.99		0.6	1350 at 450	\$2.92	\$87.60	DX Engineering			











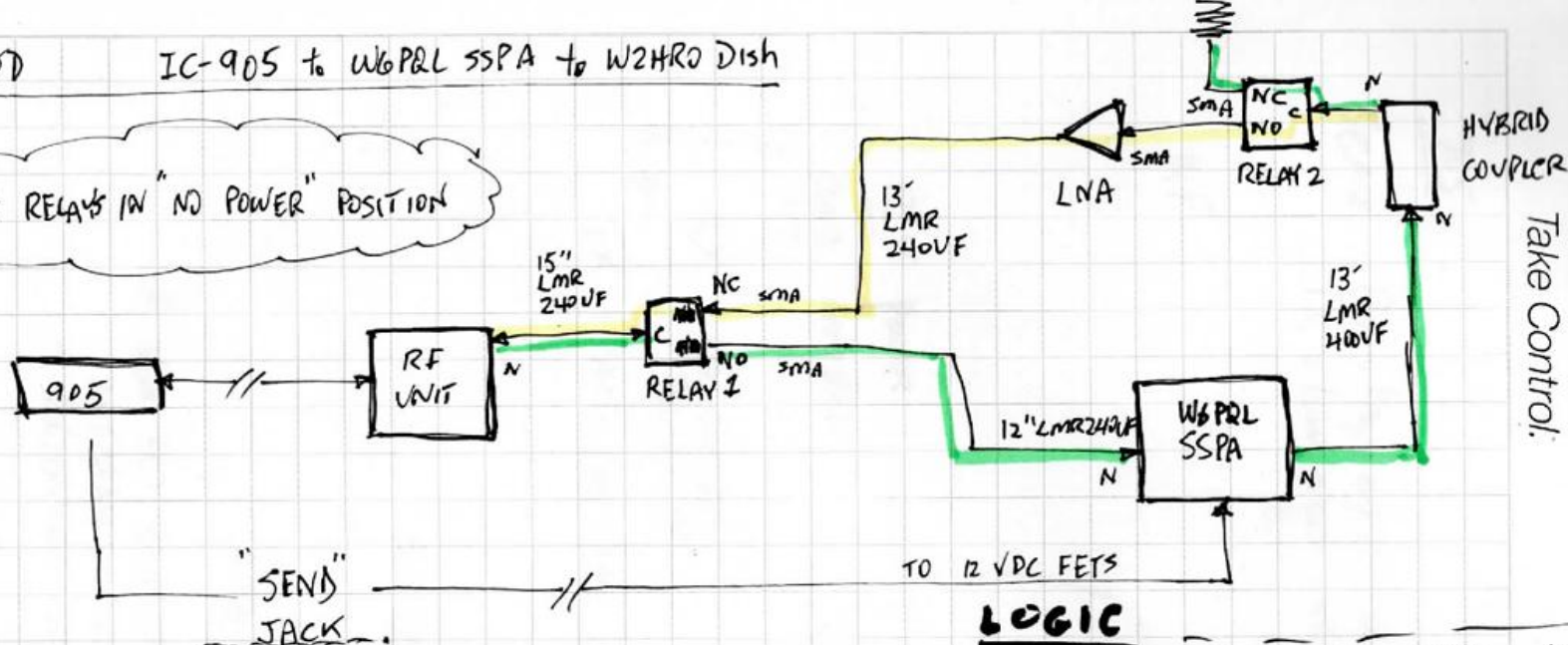
OZ9AAR



KG0D

IC-905 to W6PRL SSPA to W2HRO Dish

* RELAYS IN "NO POWER" POSITION



Take Control.

Frick

RX = 4.6V
TX = 0.0V

max 200 mA

★ EACH FET NEEDS JUST 5 mA AT INPUT

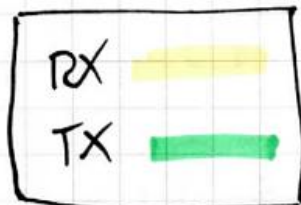
FET #1 SWITCHES ON WITH LOW INPUT FROM 'SEND'

FET #2 BEING HELD ON WITH ENABLE TO GROUND AND SWITCHES OFF WITH LOW INPUT FROM 'SEND'

★ WSJT-X .2 SEC TX DELAY - NO SEQUENCE BOARD - NO SSB OR CW

KG0D
OCT 13, 2024

KN2K INSPIRED
FLOWCHART



LOGIC

- INSIDE SSPA AND TEND W6PRL 12VDC FETS
- FET #1 POWERS RELAY #1 + 50VDC RELAY
- FET #2 POWERS RELAY #2 + LNA + LED
- ON RX FET 2 POWERS RELAY 2 + LNA
- ON TX FET 2 IS OFF + FET 1 POWERS RELAY 1 AND 50VDC RELAY INSIDE SSPA
- 50VDC WITH 120VAC MEANWELL P.S.
- 12VDC LIPO BATTERY FOR RELAY 1 + 2 PLUS LNA AND SOME LED LIGHTS

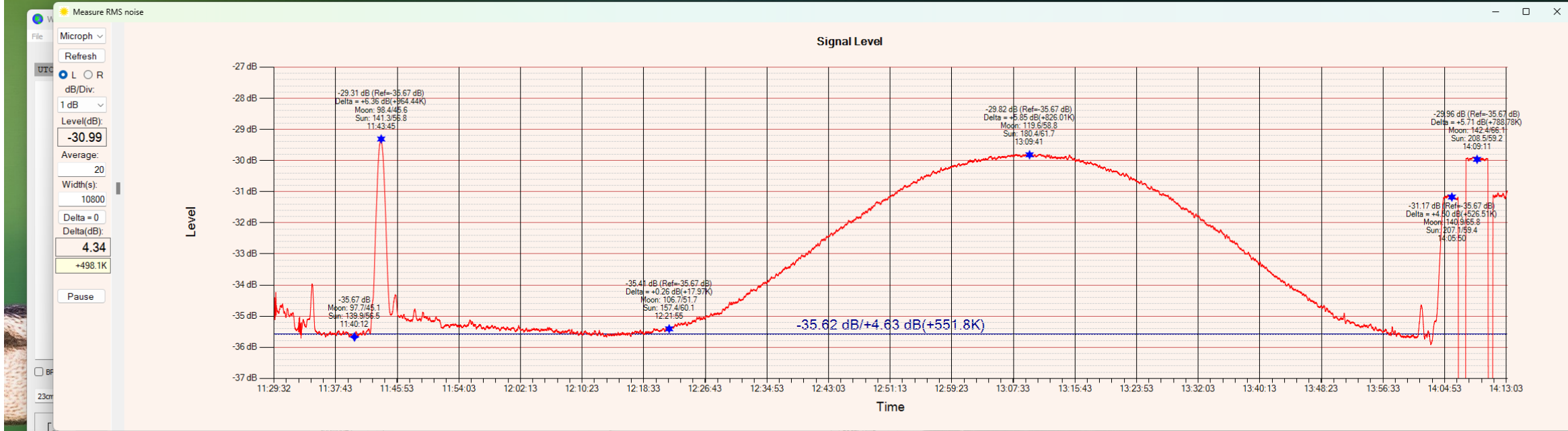
CURRENT	
RELAY #1 COIL	115 mA
RELAY #2 COIL	115 mA
50VDC RELAY COIL	95 mA
LED - PANEL MOUNT	5 mA
LED @ LNA	15 mA

1N4004 DIODE ACROSS EACH RELAY COIL









SimpleCalc - Cascaded noise figure and sun noise calculator. By OZ9AAR V.1.0.0.16

File Get SFU data.. Measure noise.. Two station echoes.. Settings.. About..

Ham bands

S. Italy - San Vito

2026-05-18 1200 UTC

SFU 10.7 cm: 100

50 MHz 1.0

144 MHz 4.5

222 MHz 9.3

432 MHz 29.9

900 MHz 75.5

1296 MHz 75.9

2304 MHz 93.5

3400 MHz 112.3

5760 MHz 160.2

10368 MHz 322.3

Antenna ohmic losses (dB): 0.10

6.755 K

Ta(K): 13.00

Enable terminator

Enable crosscheck

SFU data

S. Italy - San Vito

2026-05-18 1200

SFU 10.7 cm: 100

Band

50 MHz

144 MHz

222 MHz

432 MHz

900 MHz

1296 MHz

2304 MHz

3400 MHz

5760 MHz

10368 MHz

0 MHz

Results

Receiver NF/temperature (from antenna connector to radio) 0.740 dB

53.85 K

Overall NF/temperature (incl ohmic losses and Ta): 1.00 dB

74.86 K

Figure of merit, M (G/T): 5.36 dB(K^-1)

Expected Y-Sun level: 7.01 dB

Current Az/EI of sun: 210.20° 58.85°

SFU @ Band: 75.9

Line 1

Loss (dB): 0.41

28.712 K

LNA1

NF (dB): 0.26

17.892 K

Gain (dB): 34.00

Line 2

Loss (dB): 1.00

75.088 K

LNA2

NF (dB): 0.00

0.000 K

Gain (dB): 0.00

Line 3

Loss (dB): 0.45

31.661 K

RX/Radio/transverter

NF (dB): 15.00

8880.605 K

Load default values

Save values as default

Edit comments

Freq Time stamp Left N Avg 3 Digipan Q65_Sync Smooth 1

WinTrak EME Tracking System v2.37

Mon May 18 21:13:11 2026

KG0D

Sequim, WA

Rise: 05-18 12:28

Set: 05-19 03:46

1.011576 AU

LHA 0.00 DEC 19.70

AUTO PARK

139.98

210.21

2.95

58.84

TX<-RX 1296.00000

RX<-TX 1296.00000

CN88ka

OmniRig is inactive

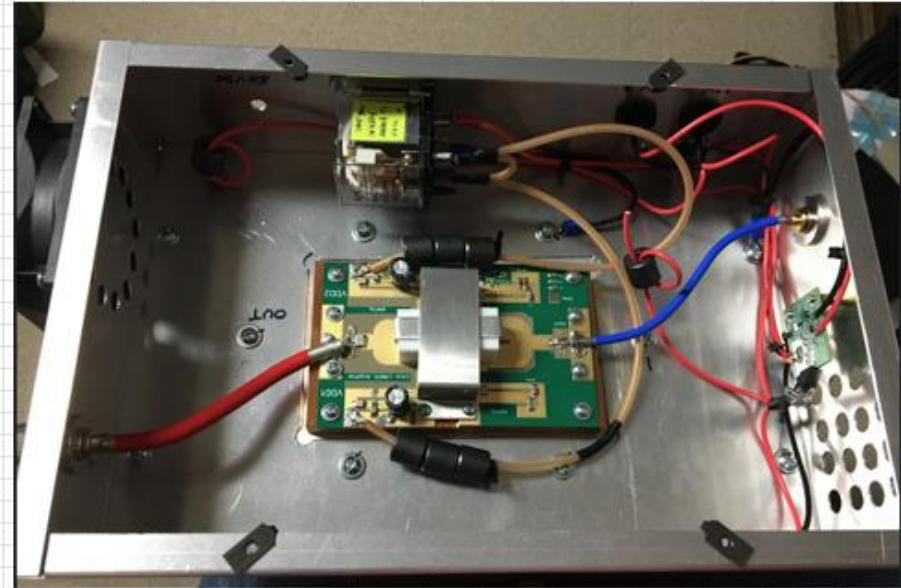
Azimuth 139.98

Elevation 58.84



KG0D						
		EME Resources				
	VK3UM (sk)	https://www.vk5dj.com/doug.html				
		https://bobatkins.com/radio/				
		www.K7MEM.com				
		https://logger/hb9q.ch				

1	600 Watt 1296 SSPA		
2	Simple design by KB7Q		
3	Built by KG0D Dec 20, 2023		
4			
5	Double check part numbers and quantities to verify this is what you really want!		
6	SSPA		
7	1 48 VDC power Supply Mean Well RSP-2000-48 (Includes shipping & Tax)	Internet	\$ 440.00
8			
9	1 600 Watt Pallet by W6PQL, assembled/soldered	W6PQL	\$ 710.00
10	1 HeatsinkUSA E006 10.08" wide 6" length	HEATSINKUSA	\$ 58.00
11	1 Box by Bud Industries 12"x8"x3" Bud AC-424	DigiKey	\$ 52.00
12	1 Lid (Base) for box BPA-1519	DigiKey	Incl
13	1 12 VDC W6PQL FET Switch	W6PQL	\$ 22.00
14	2 12 VDC Fans	Amazon/DigiKey	
15	1 12 VDC 30 A DPDT Relay JQF-12F 22 DC 12 30A DPDT	Amazon/DigiKey	\$ 17.00
16	1 Sucoform 250-50 coax RG-401 (1 meter length)	DigiKey	
17	1 Bulkhead N fitting for above cable / Amphenol 172153	DigiKey	
18	10 Feet RG402 .141 semi rigid coax	Custom Cable	\$ 38.00
19	1 Bulkhead N fitting for above cable / Amphenol 172137	DigiKey	
20	40 Laird 28B0562-100 Ferrite Cores	DigiKey	\$ 23.97
21	Your choice plug for IC-9700 signal input		
22	Your choice (Anderson or RC or??) 50 VDC power in to relay		
23	Your choice plug for 12 VDC input		
24	Your choice LED light(s)		
25	Feet/Handles/U Clips (lid to Box)	Home Depot	
26			
27	2 Relays by Radiall R570-312-000 (Review this) 3 GHz 12 VDC SMA	DigiKey	\$ 317.00
28			
29			
30	Coaxial Dynamics wattmeter 81000-ANF	DigiKey	\$ 475.00
31	Watt meter element 500Watts 900-1300 Mhz	DigiKey	\$ 275.00
32			
33	BIAS-T Switch		
34	1 2 for remote LNA control	W6PQL	\$ 22.00
35	1 Bud Industries Box	DigiKey	\$ 21.00
36	0 Radiall relay (See above - only two needed)		
37	1 Your choice 12 VDC power IN fitting		
38	1 Your choice 12 VDC FET Switched power OUT fitting		
39	1 Your choice LED light(s)		
40	2 Bulkhead N fitting for RG-142 coax		
41			
42	Misc coax of your study/choice for connections		
43	I used LMR400UF and LMR-240UF, N and SMA crimp fittings		
44	All about dB loss and power rating.		
45	Read W6PQL Install tips for all components		
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W6PQL Bias-T FET prototype below

Here's a photo of the original prototype mounted in a small 3 x 4 box I made from some aluminum sheet.

