
10 GHZ
THE MAGICAL MICROWAVE BAND
Tomas Vagner
OK2PWY
Milan Vagner
OK2BFF

Motto

All you really need to know for activity

on 10 GHz band

Introduction

- 10 GHz is one of most atractive amateur microwave bands with large number of active stations looking for possibility of DX activity on microvawes from home or portable QTH.
- You can reach nice DX contacts QRB over 500 km

ACTIVITY

- during International contests:
- 1. Subregional Contest - March
- 2. Subregiona Contest - Mai
- Microwave Contest – June
- Alpe Adria UHF MW Contest – June
- 3. Subregional Contest – July
- IARU 1st Region MW Contest - October

Activity

- During VHF, UHF MW Activity Days

  Every 3 rd Sunday in month (January to December)

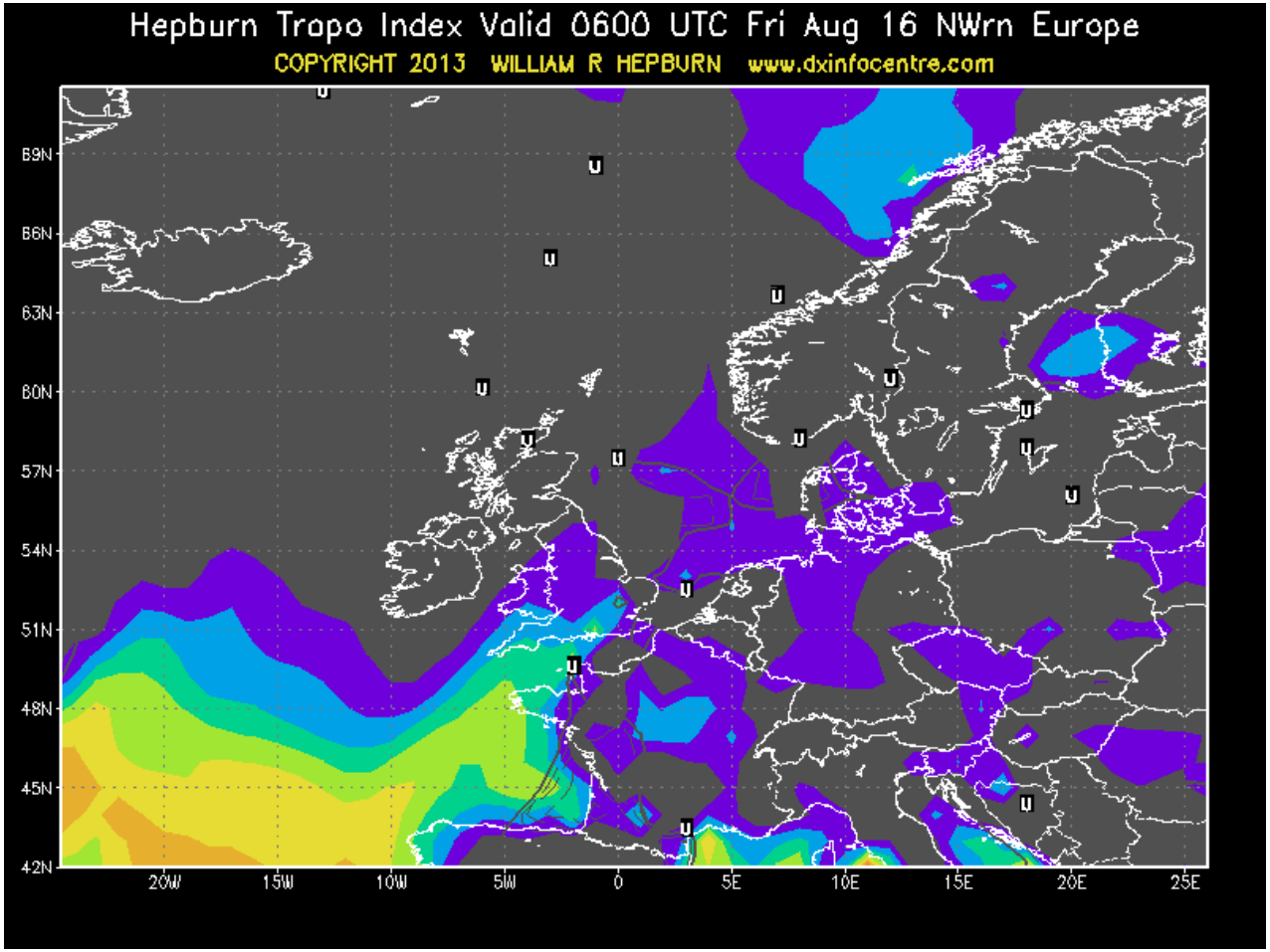
  Rain scatter season Mai – August

  Tropospheric ductin season September to December

Propagation modes

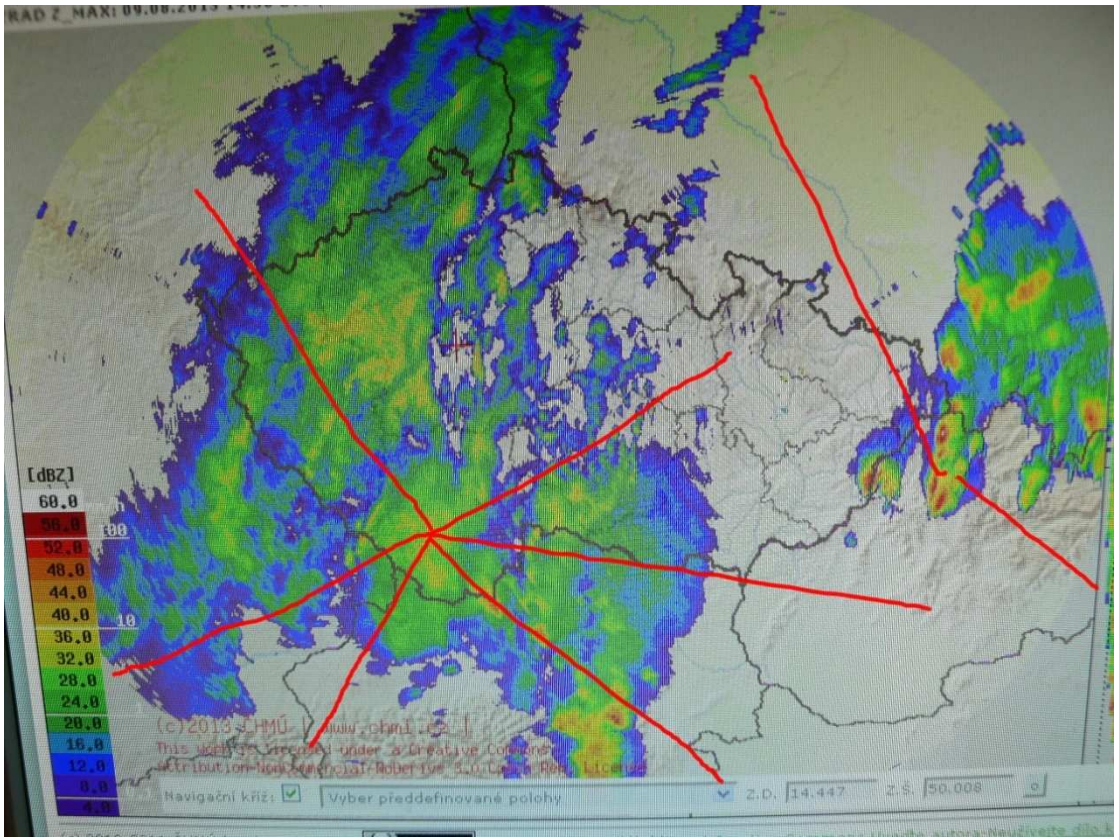
- Tropospheric ducting - frequently possible
- Rain scatter – (Mai to October)
- Snow scatter – during winter
- Aircraft scatter – mostly during contests
- EME

Tropospheric ducting



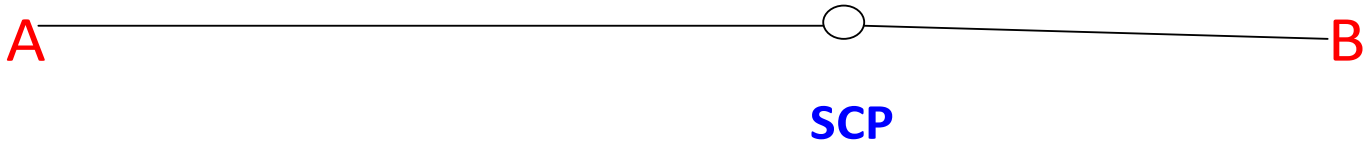
Rain & Snow scatter - types

- Direct
- Side scatter
- Back scatter

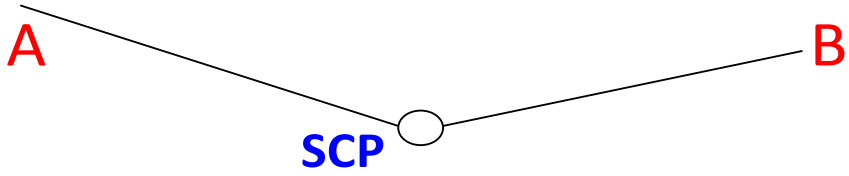


Rain scatter - types

Direct

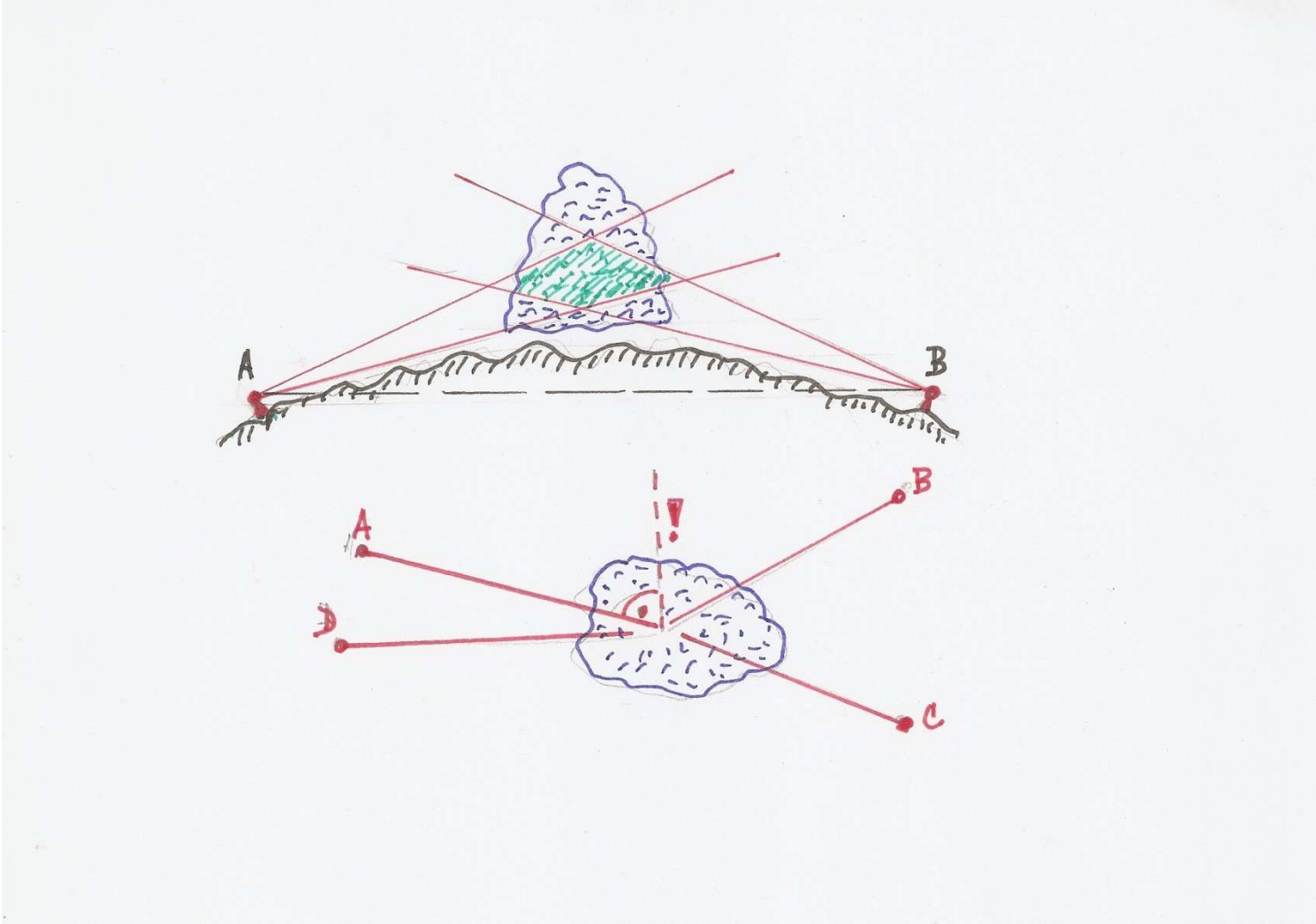


Side scatter



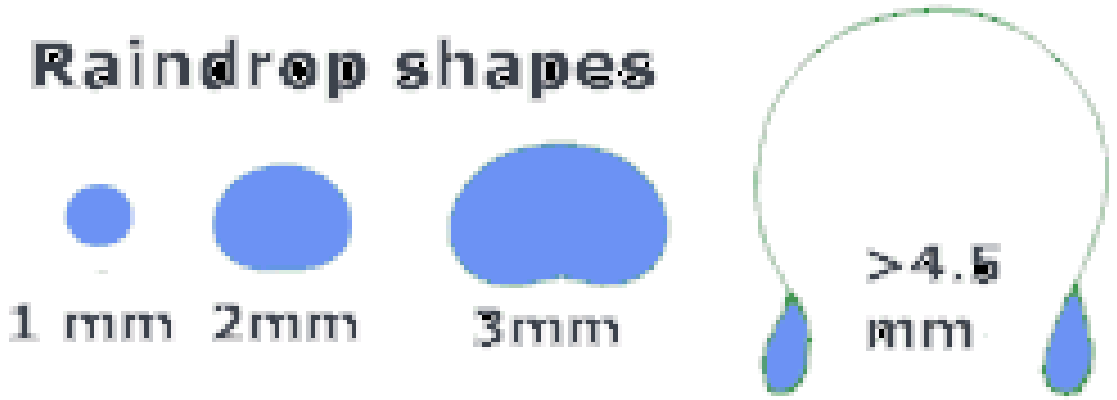
Back scatter

Rain scatter principle



Rain drop shapes

Optimal rain drops size is 0,5 to 3 mm



Aircraft scatter

- Very popular propagation mode during contest on microwave bands 1,2 to 10 GHz
- Using of SDR or panoramatic adapter for week signal detection is advantadge

Used modes

- CW - frequently used mode for its good readability because of large signal distorsion by Rain scatter
- SSB – good in tropo propagation very bad readable by RS
- FM used instead of SSB in strong RS very good readability small signal distorsion only
- PSK (JT4) modulation new issue of WSJT 9.5 have special mode for 10 GHz tropo Dxing & Aircraft scatter

Skeds arranging

- Comunication on MW chat ON4KST
- By phone or SMS – contacts are in RS list
- DX Cluster

- Frequency of the test
- Time (DCF 77)
- Period
- Exact QTF direct or SCP

USEFUL TOOLS

- MW Chat ON4KST
- DX Cluster OH2AQ – MW DX spots
- Hepburns Tropo ducts maps
- Meteorological radars by PA5DD
- Beacons – beacon list
- RS list by OK1JKT

Beacon list

FREQ	CALL	NEAREST TOWN	LOC	MASL	ANTENNA	HEADING	POWER	INFO
10368.040	OK0EL	Benecko	JO70SQ	1030	12 el slot WG	90°/270°	0.5	OK1AIY
10368.064	OK0EA	Trutnov	JO70UP	1355	slot WG	Omni	2	OK1AIY
10368.073	S55ZRS	Mt.Kum	JN76MC	1219	Slot	Omni	0.3	Z.R.S.
10368.150	OE8XXQ	Dobratsch	JN76UO	2166	Horn	0°	1	OE8MI
10368.815	DB0MAX	DOK B 41	JN58SP	420				DL4MDQ
10368.820	DB0KHT	DOK F 13	JO40FE	247	Horn	Omni	3	DJ1RV
10368.830	SR6XHZ	Jelenia gora	JO70SS	1510		40°	1	SP6RYH
10368.833	DB0FGB	DOK B 09	JO50WB	1150	Slot	Omni	7	DB8UY
10368.845	DB0SZB	DOK S 45	JO60JM	767	Slot	Omni	15	DL3JVN
10368.845	SR3XHR	Jarocin	JO81SX		Slot	Omni	0.2	SP3WYP
10368.846	SK0SHI	Edsberg	JO89XK	70		Omni	1	
10368.850	DL0UB	DOK Z 20	JO62KK	120	12 x Slot	Omni	0.1 TX	DL7ACG
10368.850	SR0CWK	Czestochowa	JO90NS	280	Slotted wavegu	Omni	8	SP9NLY
10368.855	DB0SHF	DOK Z 46	JN48WP	800	Horn	260°	0.3 TX	DL1SBE
10368.855	F1BDB	Mt. Doublier	JN33KQ	1200	Slot	Omni	1	F1BDB
10368.856	HG5BSB	Janos-hegy	JN97LM	485	Slot	Omni	0.5	HA5BDJ
10368.870	OE8XGQ	Gerlitze	JN66WQ	1909	Slotted WG	Omni	1.V	OE8MI
10368.875	OE5XBM	Breitenstein	JN78DJ	985	Slotted WG	Omni	10	OE5VRL
10368.880	OE1XVB	Vienna, Simmering	JN88EF	185	Slotted WG	Omni	1.5	OE1WRS
10368.885	DB0TUD	DOK S 07	JO61UA	285	Slot	Omni	5	DL4DTU
10368.905	GB3SCX	Bell Hill, Dorset	IO80UU69	274	Slotted wavegu	Omni	0.9	G0API
10368.910	HG3BSB	Misinateto	JN96CC	535	Slot	Omni	1	HG5AZB
10368.917	SR2XHX	Czluchow	JO83QP	255	Slot	Omni	1	SQ1BVJ
10368.920	OE2XBO	Haunsberg	JN67MW	740	Slotted WG	Omni	1.V	OE2HFO
10368.930	OE3XMB	Muckenkogel	JN77TX	1154	Slot	Omni	0.2	OE3FFC
10368.930	OZ7IGY	Jystrup	JO55WM	98	WG Slot	Omni	5	OZ7IS
10368.963	DB0NBB		JO63PN	110		OMNI	3.0	DJ2BC
10368.965	DF0ANN	DOK B 25	JN59PL	630	12 x Slot	Omni	0.2 TX	DL8ZX
10368.975	HG1BSB	Horman	JN87FI	700	Slot	Omni	0.2 TX	
10368.984	OK0EW	Chomutov	JO60OK	875	16 el slot WG	90°/270°	1.5	OK1JKT

MW Equipment

- IF TRX
- Transvertor
- LO (OCXO)
- LNA
- PA
- Antena

OK2PWY 10 GHz Rig set up

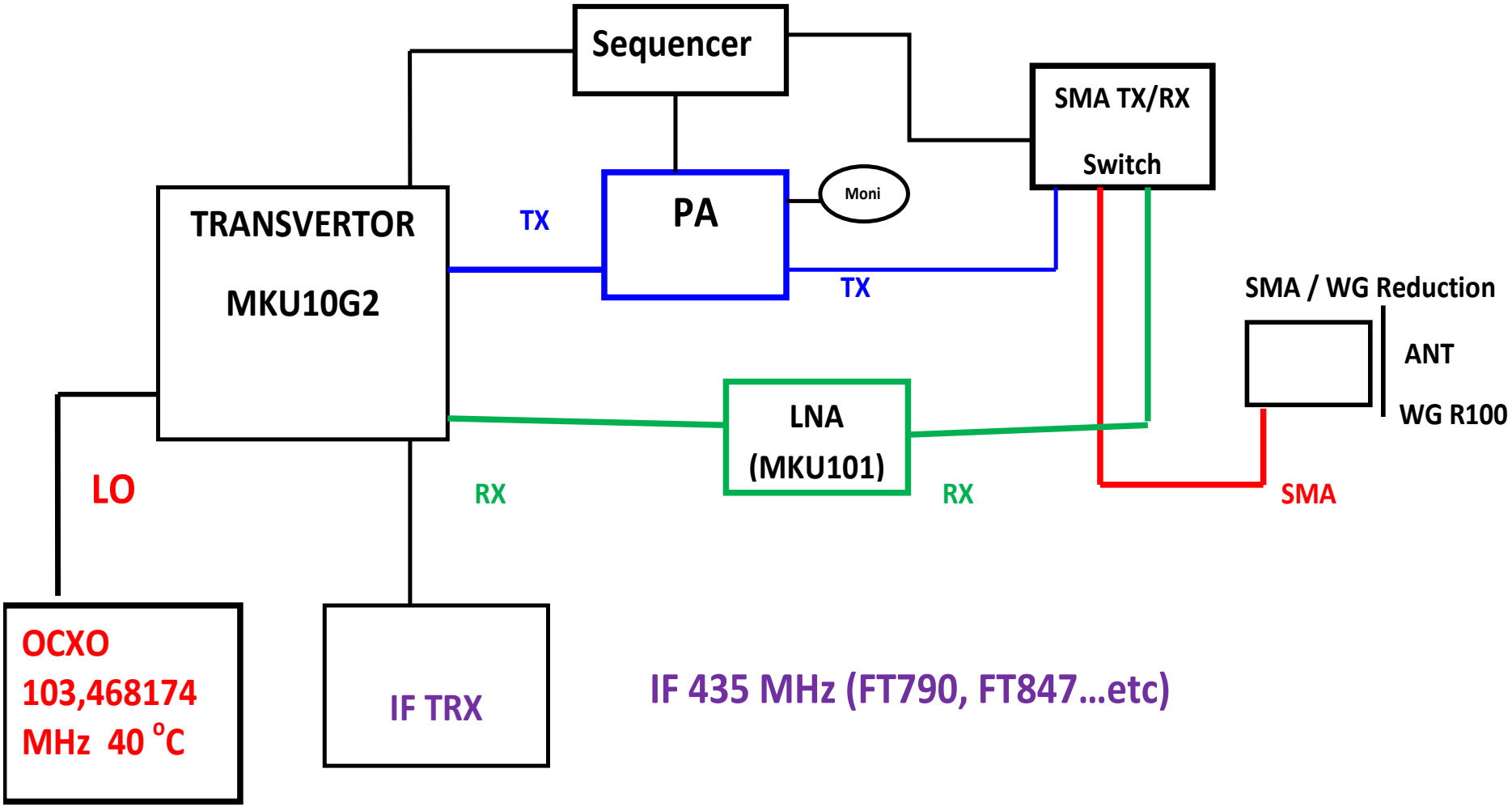
- **Transvertor MKU 10G2 by DB6NT (kit)**
- **P out = 200 mW**
- **NF = 2.5 dB**

- **LO: OCXO 103,468174 MHz / 40 °C better than +/- 1 ppm**
- **IF = 435 MHz**
- **PA 12W output**
- **LNA MKU 101 NF = 0,65dB**
- **Antena 60 cm dish 32dBd**

Measured parameters 10 GHz Rig

- Power output 8,6W
- NF = 1,8 dB
- (Measured on the R100/SMA reduction)

OK2PWY 10 GHz RIG Schematic diagram



10 GHz RIG OK2PWY set up watter proof case IP66

IF TRX

- You can use any TRX for example FT290, FT790, FT 817, FT847 K3, IC…, TS….etc
- IF QRG: 145 or 435 MHz
- IF Tranciever must be stabil on used band
- TRX with small tuning step (1Hz or less) is big advantadge for week signal operation.

PA & LNA

PA:

Kuhne electronic (by DB6NT)

- Fischer Elektronik
- (DL2AM)

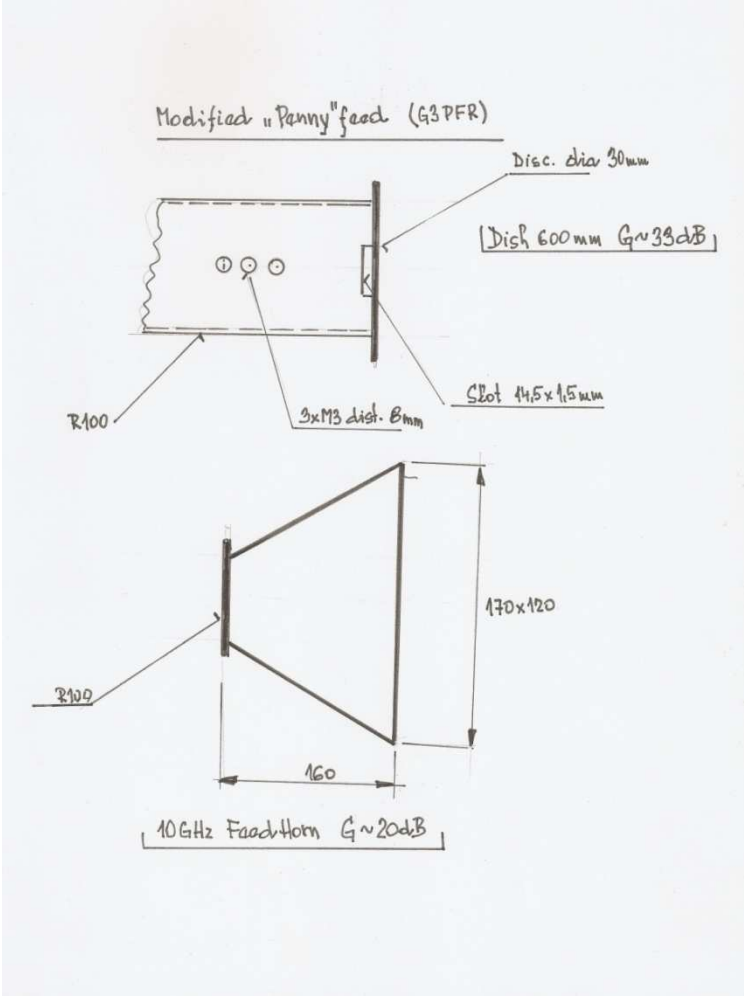
- LNA
- Kuhne electronic (by DB6NT)
- NR6CA
- WB5LUA

Antenas & Feeds

- Horn antena
- Parabolic Dishes
- Off set dishes

- Penny feed
- Cassegrain feed
- Gregorian feed
- Septum feed
- Dual band feed

Penny feed & Horn antena

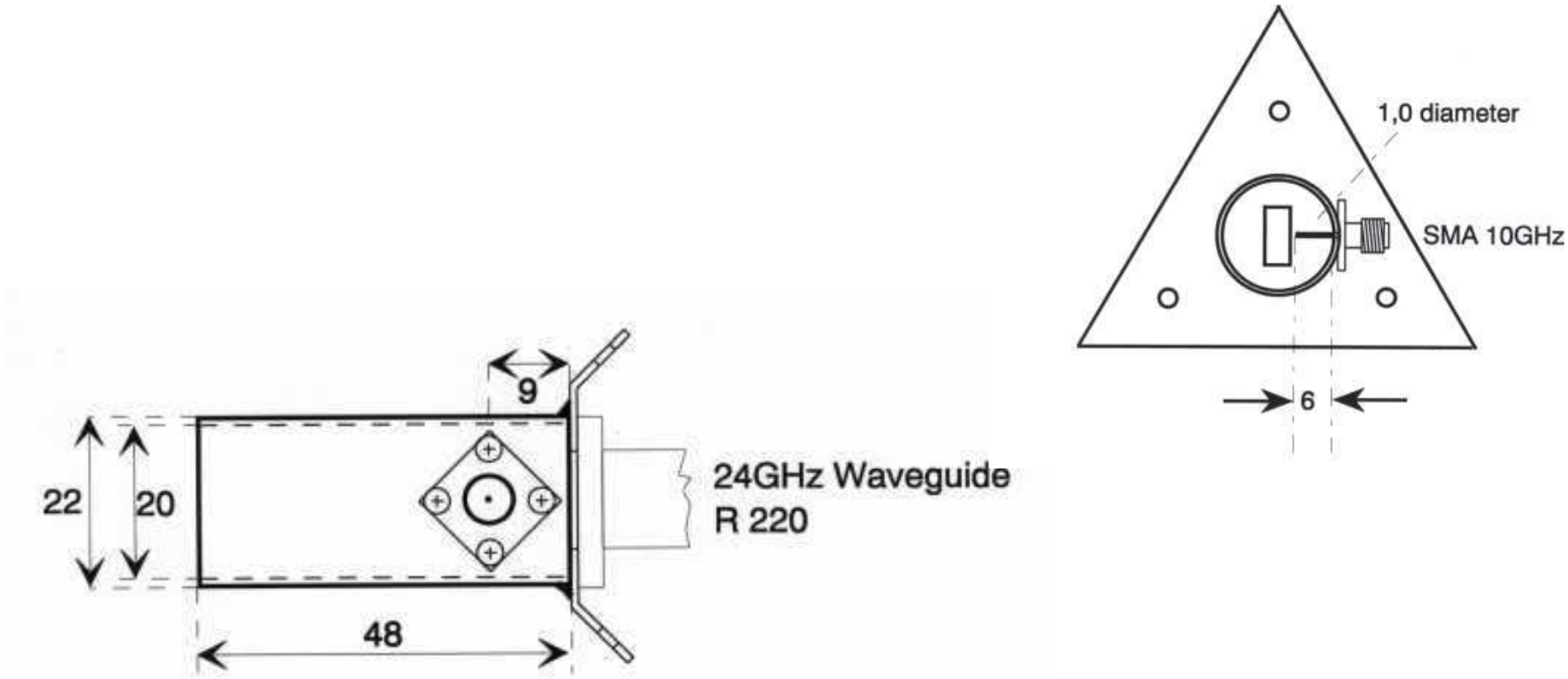


20 dBd Horn antena

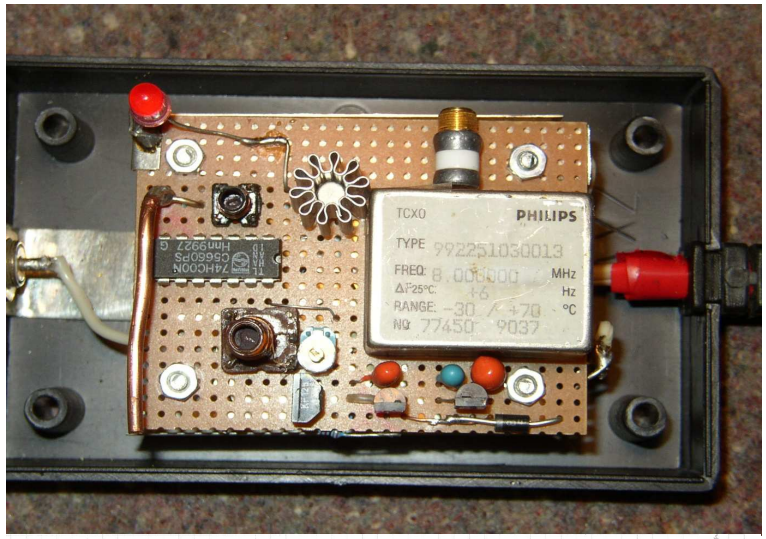
60 cm dish – Penny feed 32 dBd

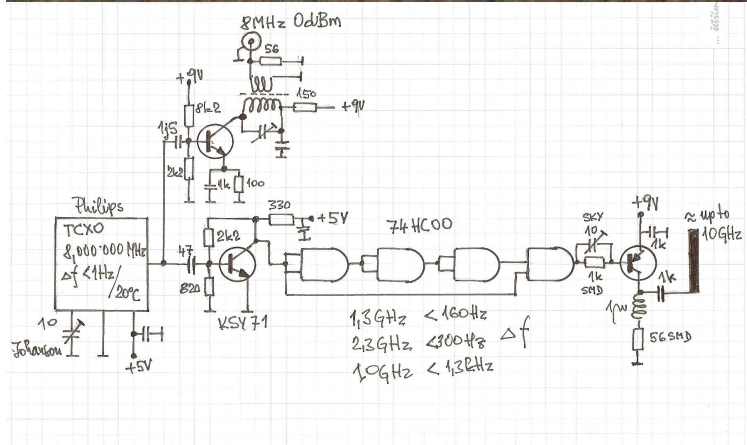
90 cm dish – Cassegrain feed
38 dBd

Dual band feed 10/24 GHz DF9FJ used DL6NCI

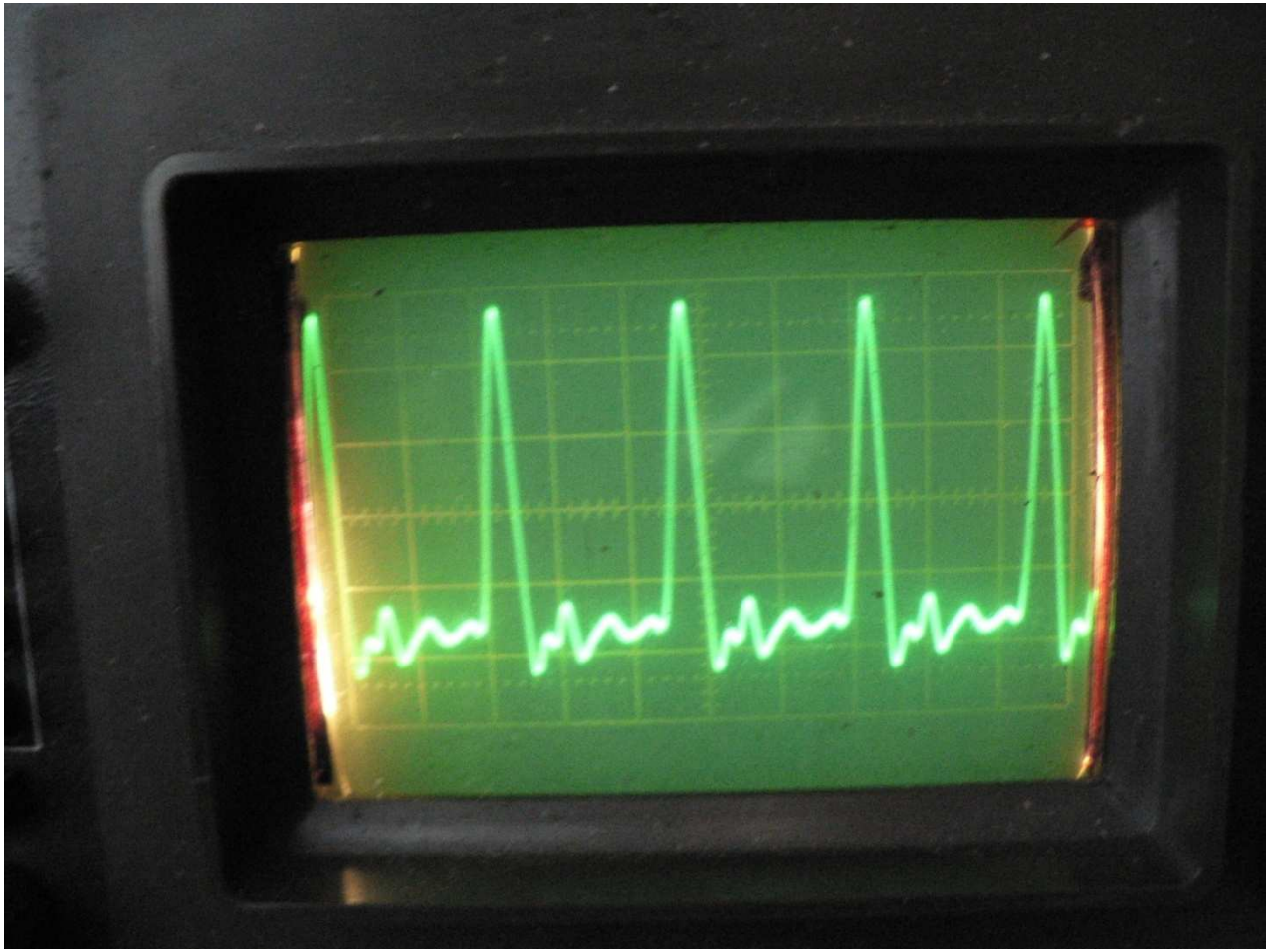


Calibration for 23,13 and 3 cm

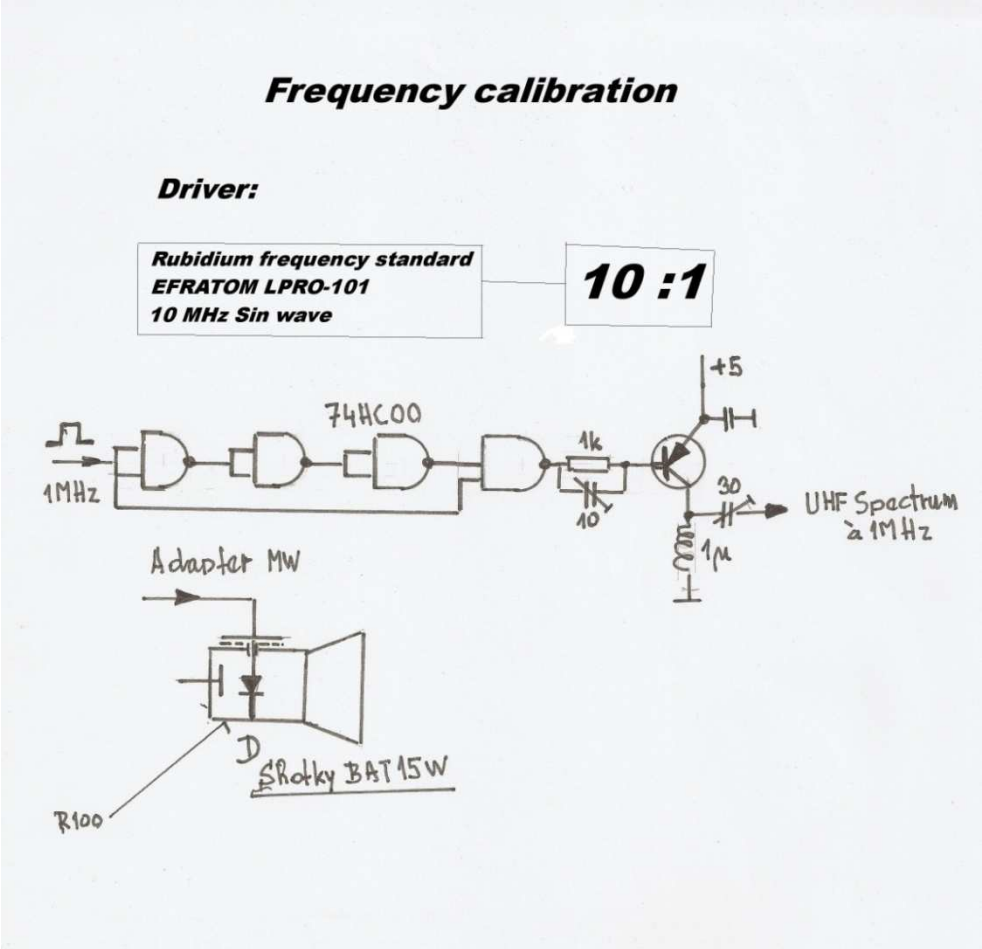




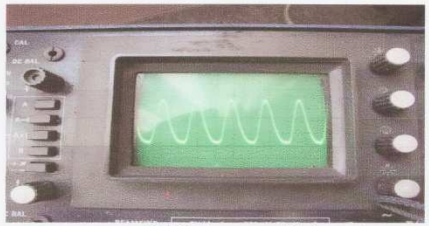
Oscilogram of Philips 8 MHz frequency normal



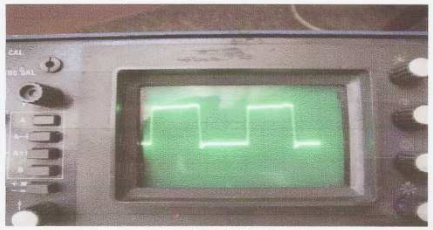
Frequency calibration
10MHz Rubidium normal



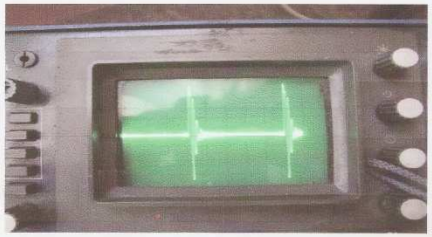
Oscilograms of Rubidium normal



10 MHz sine wave - Efratom out



1 MHz 7490 out



BFP out 1 MHz Impuls - VHF Spectrum

WEB links

- Parabolic dish gain calculator:
- http://www.qsl.net/pa2ohh/jsparabolic.htm
- Lozenz DL6NCI – dual band feed
- http://www.dl6nci.de/
- Kuhne elektronik – Transvertors, PA, LNA….etc
- http://www.kuhne-electronic.de/en/home.html
- DL2AM -PA, components
- http://www.dl2am.de/
- OK1JKT – interesting info 10 GHz – Beacons, RS list
- http://www.ok1jkt.cz/
- OK2KKW – V/U/SHF, MW technical information
- http://www.ok2kkw.com/index_en.html

WEB links

- PA5DD meteorological radar page
- http://home.hccnet.nl/uffe.noucha/
- Czech hydrometeorological institut
- http://www.chmi.cz/portal/dt?portal_lang=cs&menu=JSPTabContainer/P1_0_Home
- Wetterzentrale
- http://www.wetterzentrale.de/
- Hepburns – tropo ducting informations
- http://www.dxinfocentre.com/tropo_nwe.html

My activity since 2001

More than 120 various stations

WW LOC: 48

DXCC: 12

Trope best DX : 558 km

RS Best DX: 759 km