UK 76GHz Beacon GB3SWM

Roger Ray G8CUB

Crawley RT 2025

UK first 76GHz Beacon

Eggardon Hill IO80QR38

Directional along South coast

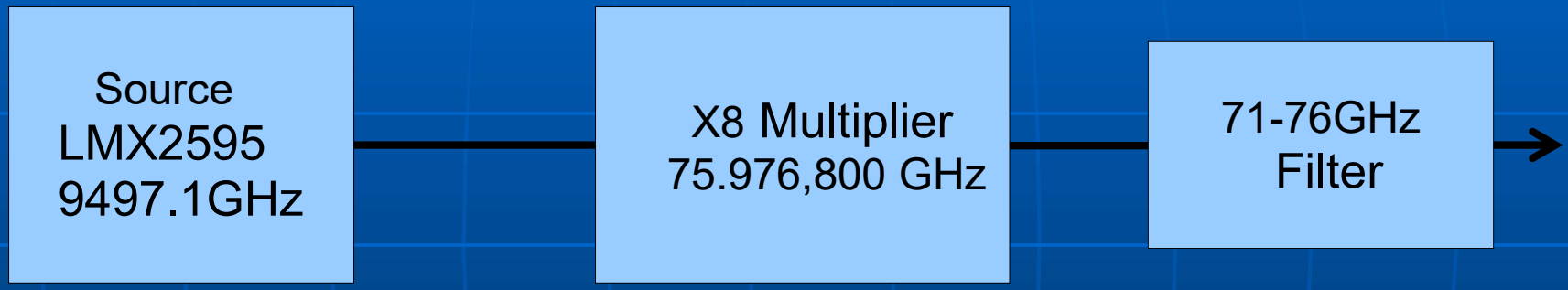
ENE

76GHz Beacon

- 75,976,800
- 150mW
- 23dBi horn (25W eirp)
- CW / JT4
- 230m asl

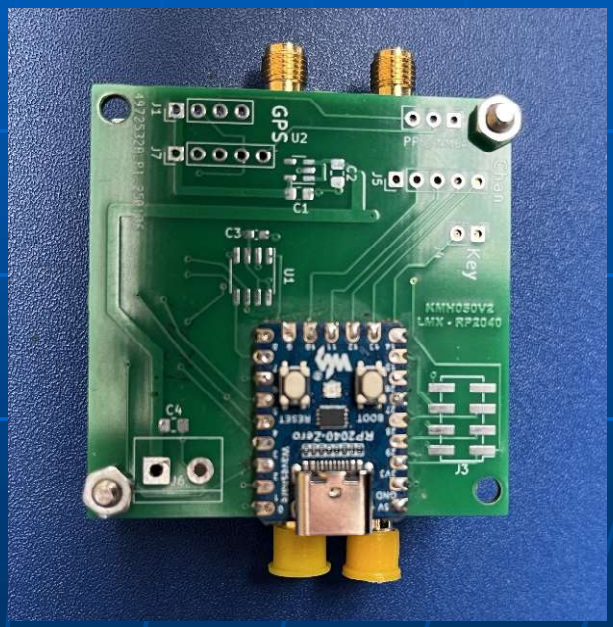
76GHz

- **76GHz Beacon**



76GHz

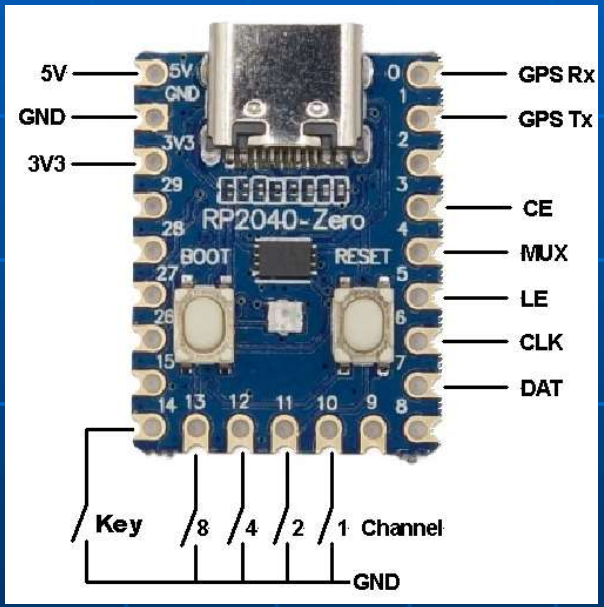
- **LMX2595 Synthesiser**



Crawley 2025

76GHz

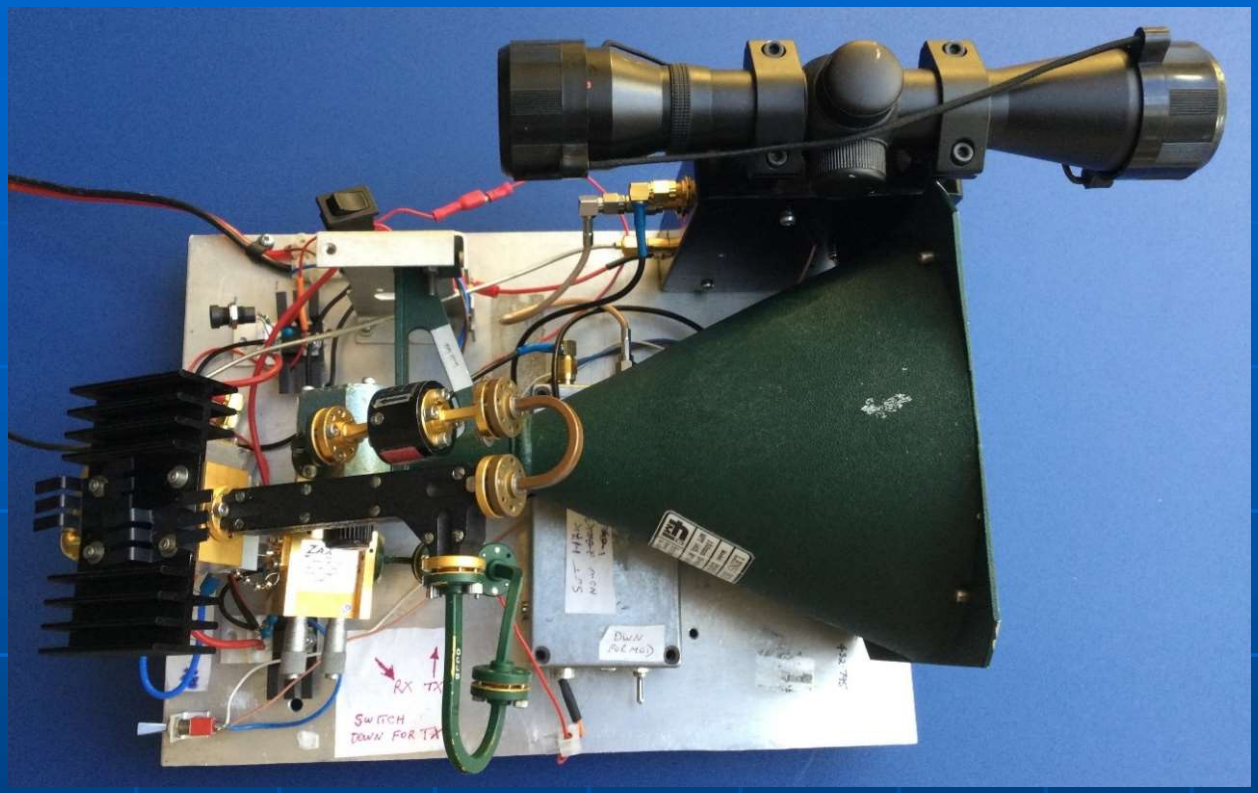
- **LMX2595 Synthesiser Control**



No channel selection
No external keying
+5V in
GPS in

G4EML Control

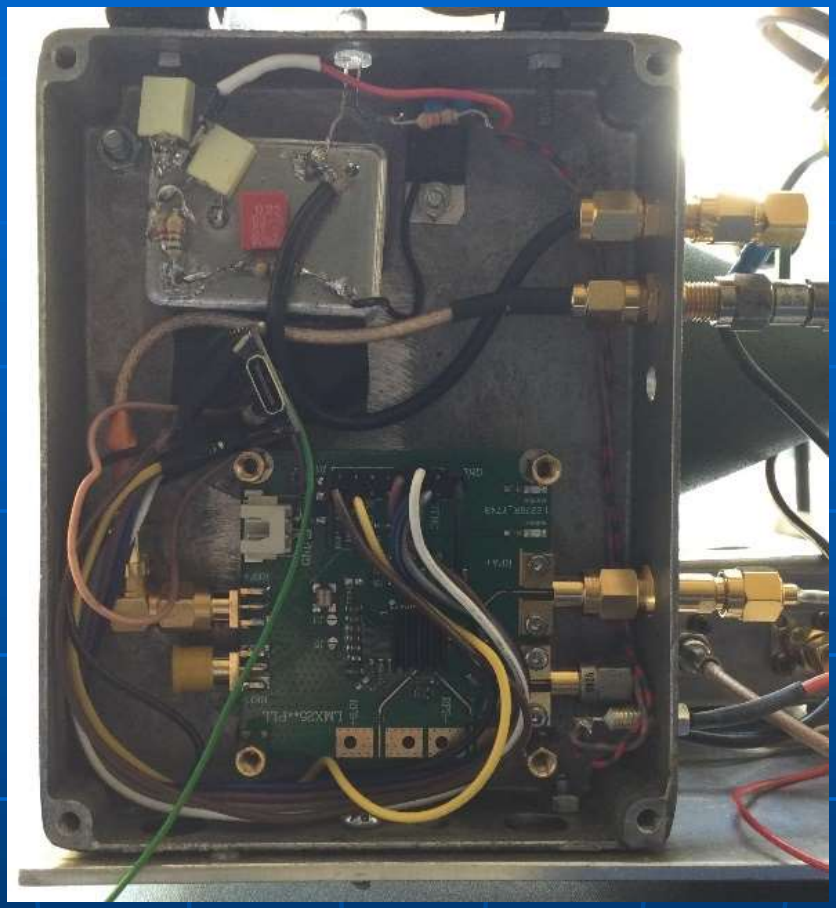
76GHz TX & RX



76GHz FM/FSK TX and RX mixer. LMX2595 Synth in black box. Phase modulator under the horn
The x8 Millitech multiplier under the black heatsink, produces 200mW at 76GHz.
The LO is derived from the 10dB directional coupler output.

Crawley 2025

76GHz TX & RX

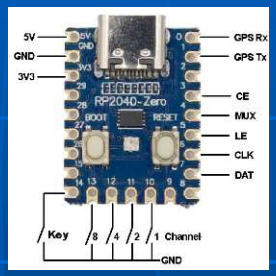


LMX2595 Synth, 10MHz reference, G4EML RP2040
Wired together – before Lehane G8KMH interface!

Crawley 2025

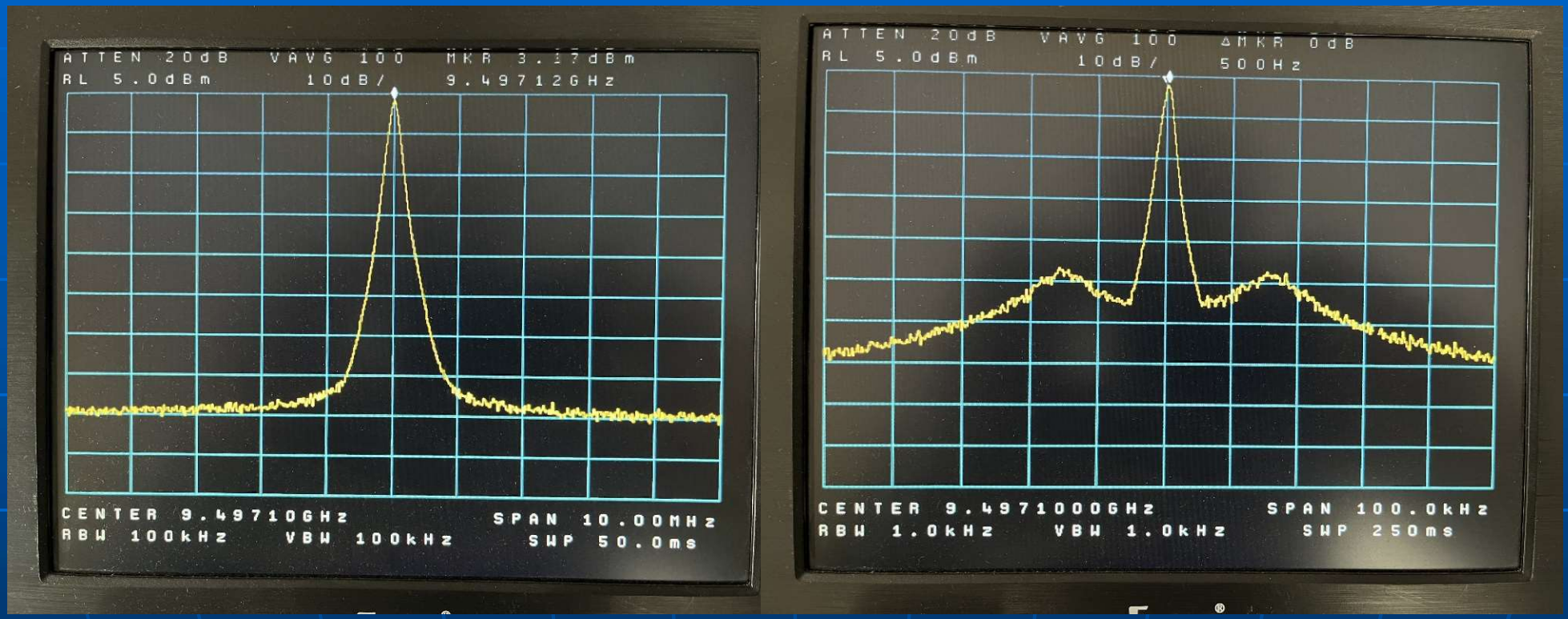
76GHz

- **LMX2595 Synthesiser Control**



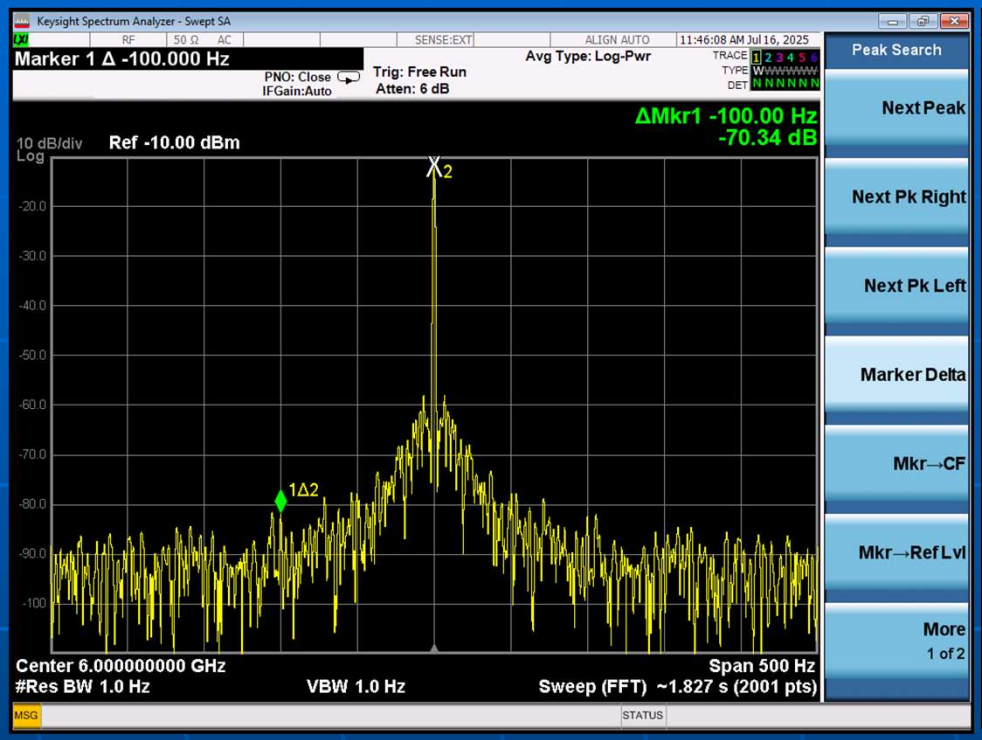
Colin's Program
X8 Multiplier setting
(75976.800)
Internal CW ident
10 wpm, -400Hz FSK
JT4G
GPS connected
All done in RP2040!

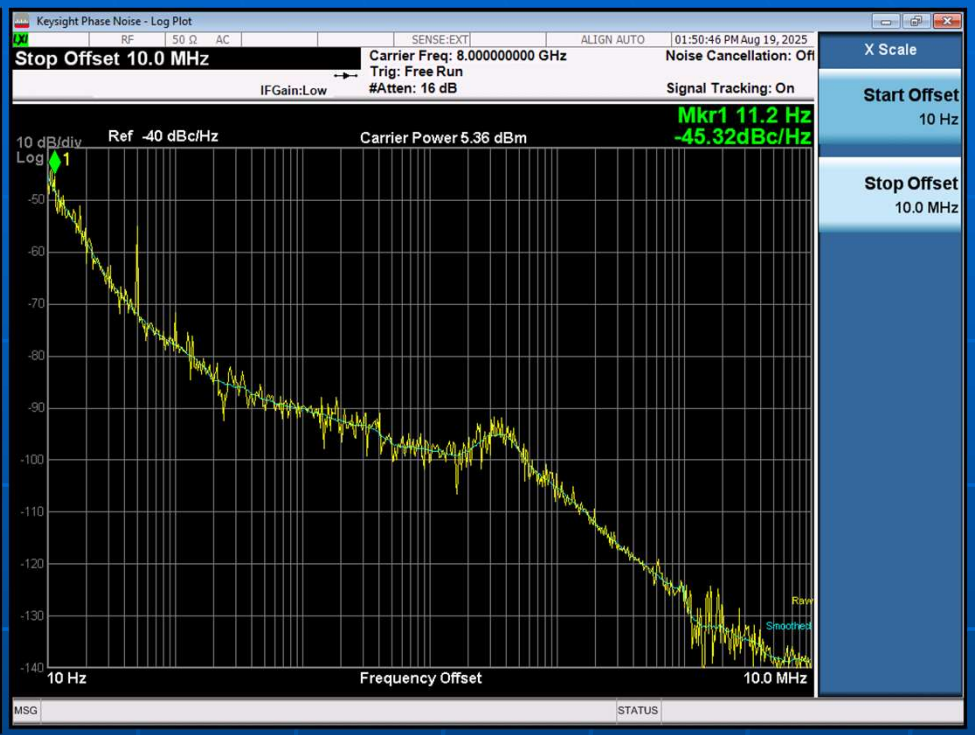
LMX2595 Synthesiser



Crawley 2025

LMX2595 Synthesiser



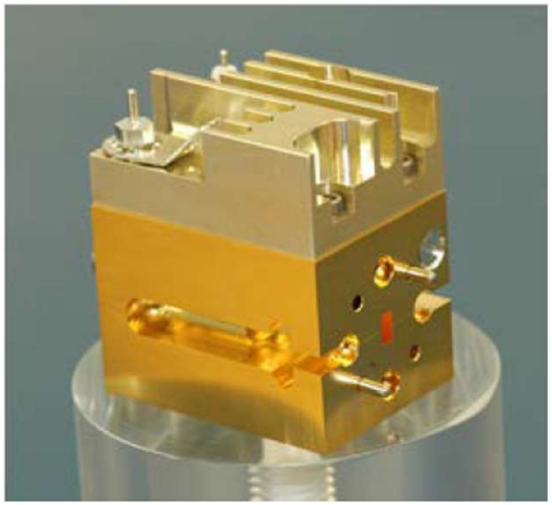


LMX2595 100MHz reference 8GHz Signal
Plots from Graham G8FXB

Crawley 2025

Millitech AMC-12-RNHB2 X8 Multiplier

ACTIVE MULTIPLIER CHAIN



FEATURES:

- Full waveguide bandwidths
- Optional Removable Heatsink
- Compact package

APPLICATIONS:

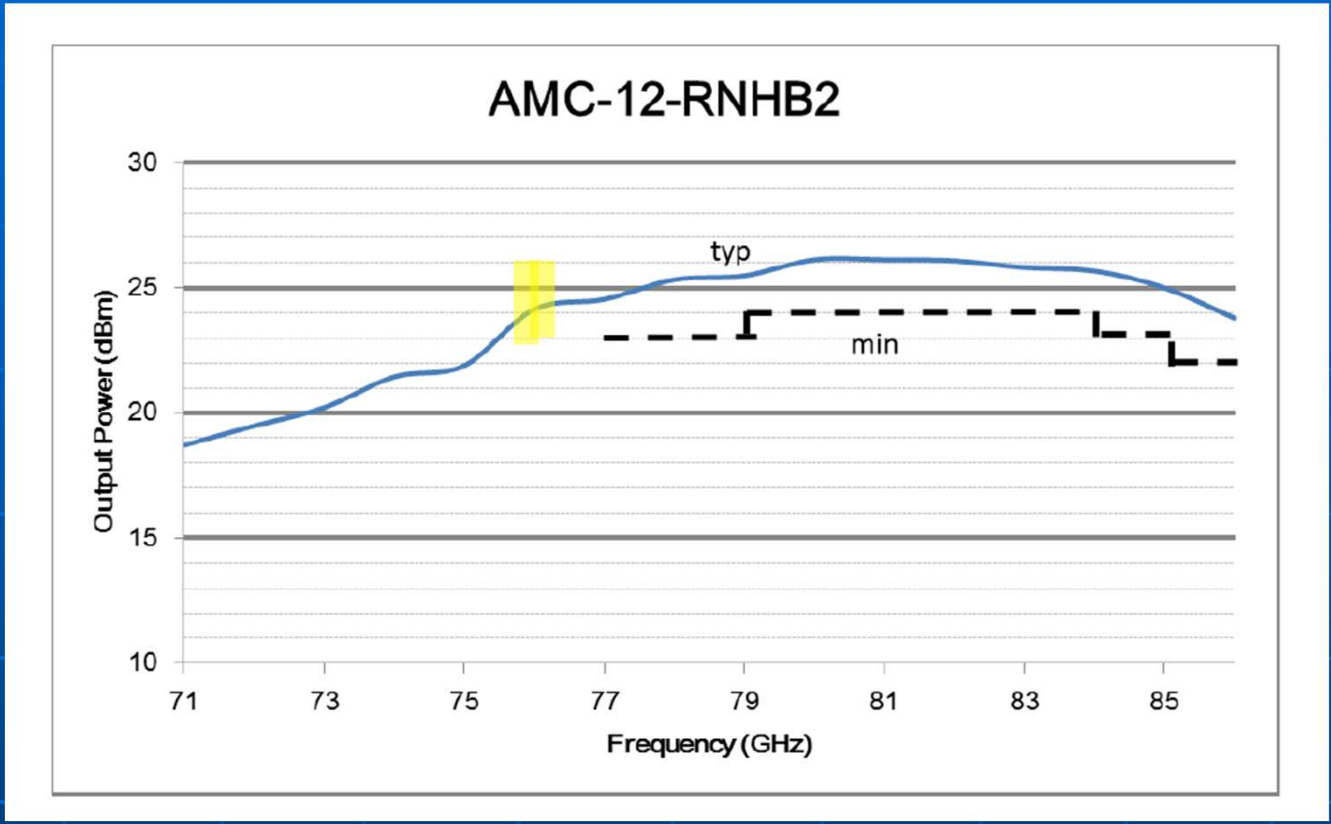
- LO source for up/down converters
- Frequency extenders

Model Number	Output frequency (GHz)	Input frequency (GHz)	Multiplication factor	Output power	DC input (typ.)	Outline drawing
AMC-12-RNHB2	77 to 86	9.625 to 10.75	8	See plot	8 – 12 V @ 1.6A	TBA

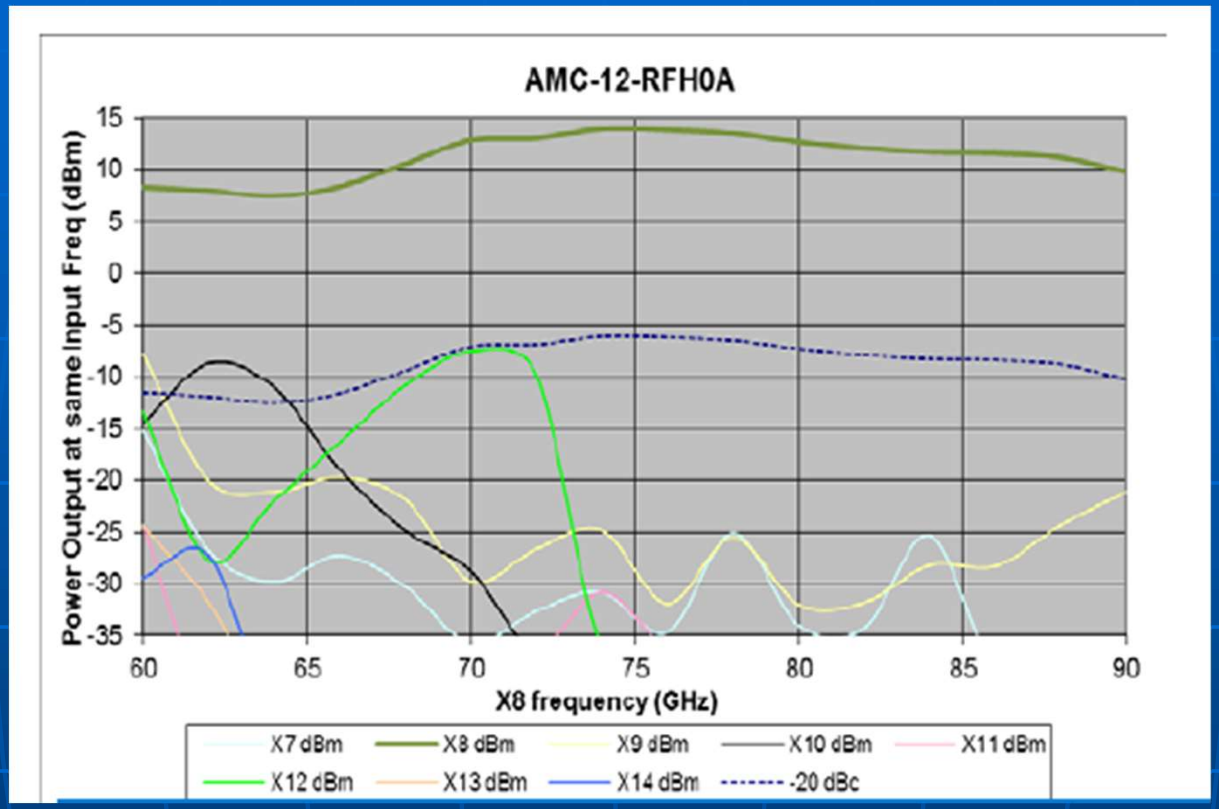
Notes:

1. The units must be heat sunk to keep the case temperature at or below +45°C.
2. If required, heatsinks can be omitted. See "How To Order" section.
3. All testing will be at room temperature.
4. The output power is saturated.
5. The maximum DC input current is 200 mA above the typical values.
6. Signal purity is -20dBc typ.
7. Input power is +3dBm nom.

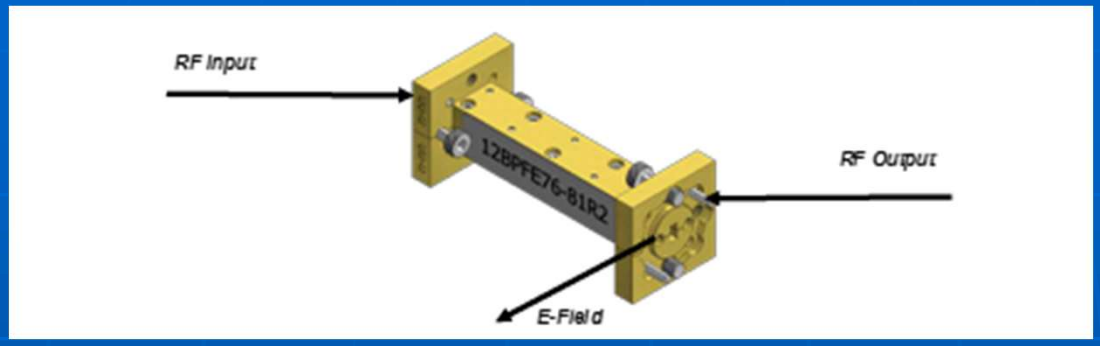
Millitech AMC-12-RNHB2 X8 Multiplier

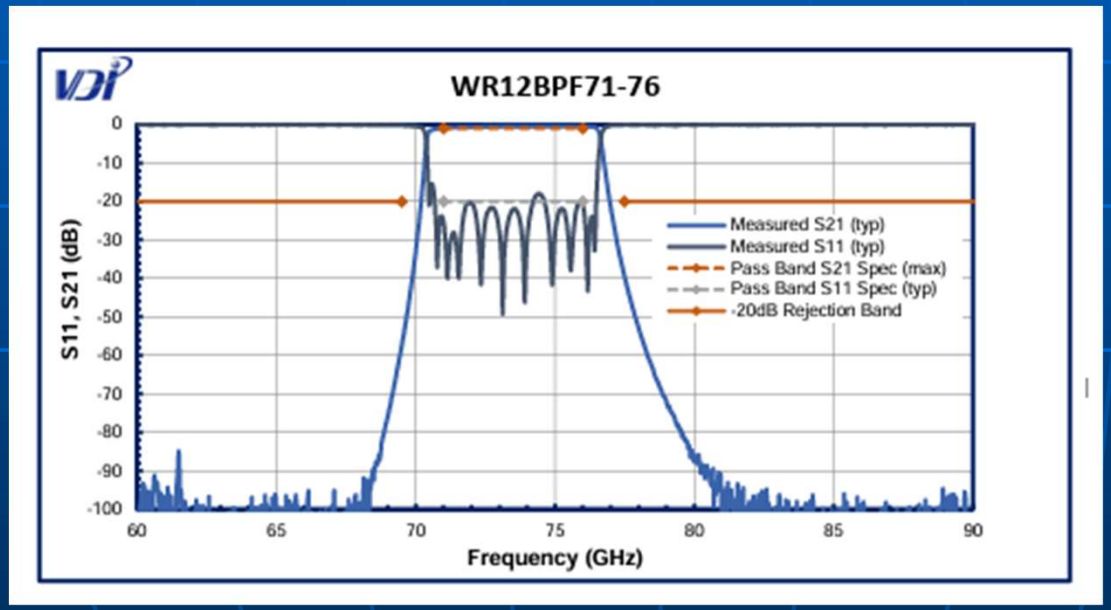


Millitech AMC-12-RNHB2 X8 Multiplier

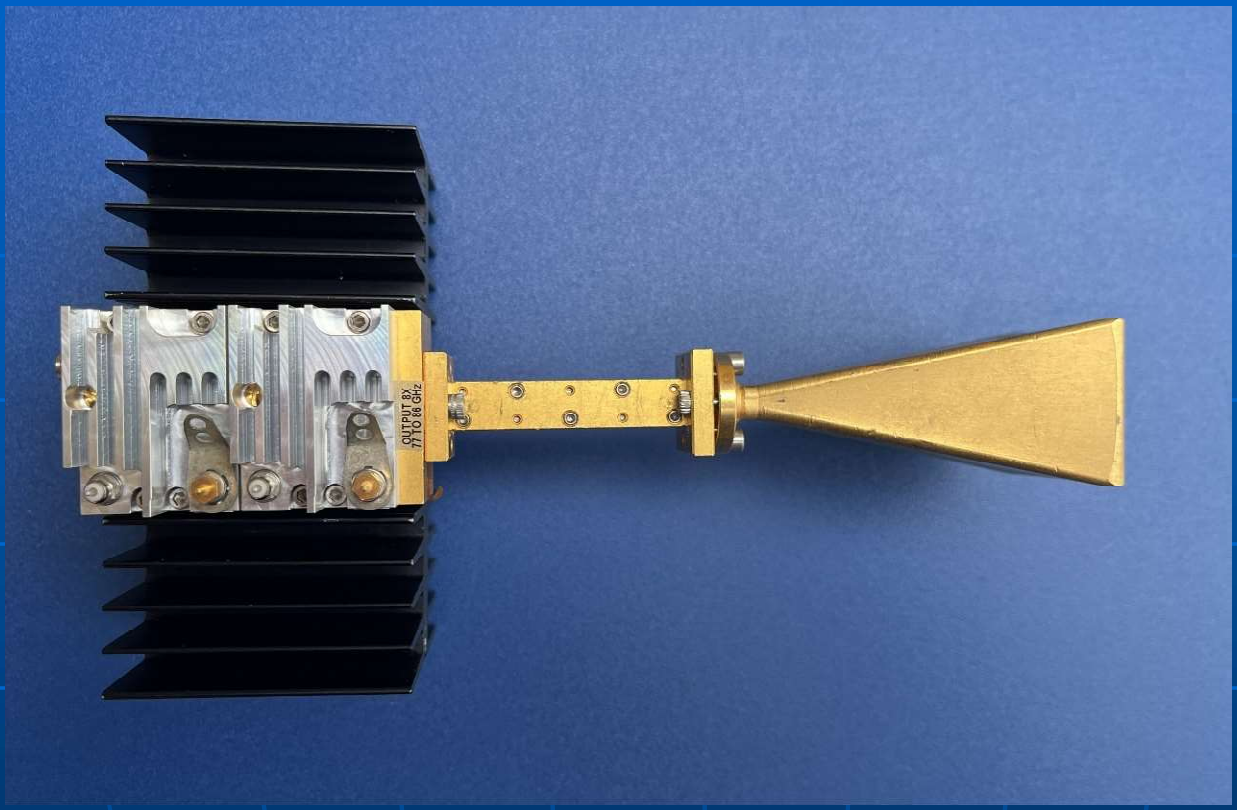


VDi WR12 BPF 71 – 76GHz





Multiplier Filter and Horn



Millitech SGH Horn

SERIES SGH

Millimeter-Wave Technology & Solutions

millitech

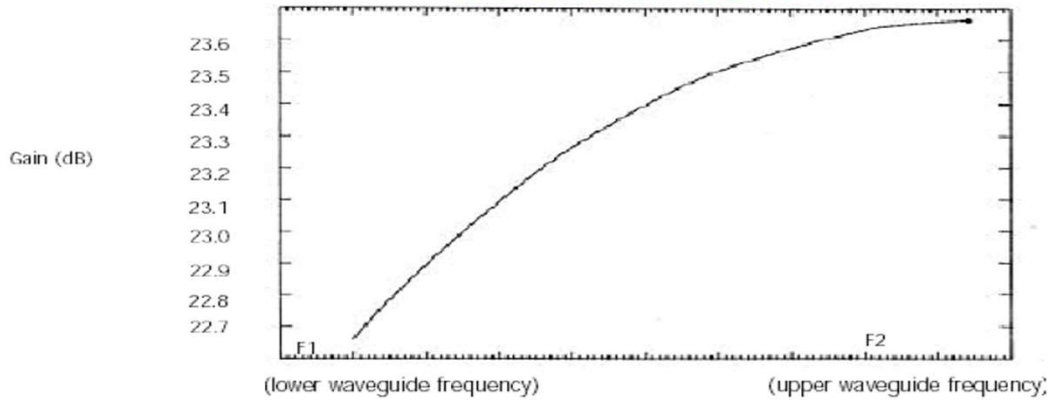
ELECTRICAL SPECIFICATIONS*

Pyramidal Horns												
Model Number	**SGH-42**	**SGH-28**	**SGH-22**	**SGH-19**	**SGH-15**	**SGH-12**	**SGH-10**	**SGH-08**	**SGH-06**	**SGH-05**	**SGH-04**	**SGH-03**
Frequency band and range (GHz)	K 18-26.5	Ka 26.5-40	Q 33-50	U 40-60	V 50-75	E 60-90	W 75-110	F 90-140	D 110-170	G 140-220	- 170-260	- 220-325
Gain (dB)	24	24	24	24	24	24	24	24	24	24	24	24
VSWR	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1
Conical Horns												
Gain (dB)	21	21	21	21	21	21	21	21	21	21	21	21
VSWR	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.2:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

*All specifications listed are typical values.

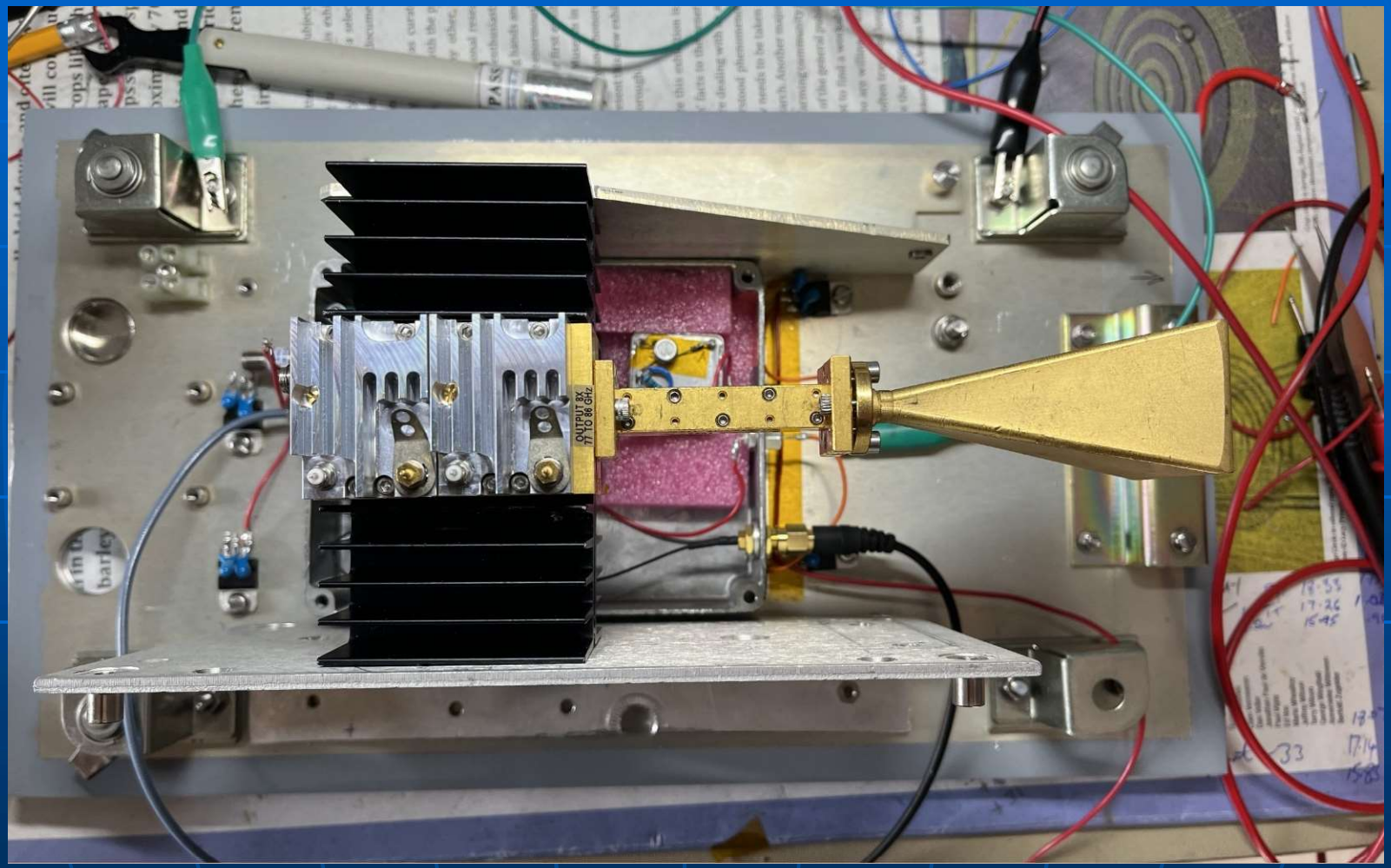
Pyramidal horns have a typical beamwidth of 25° and a typical midband gain of 24 dBi.

TYPICAL PERFORMANCE

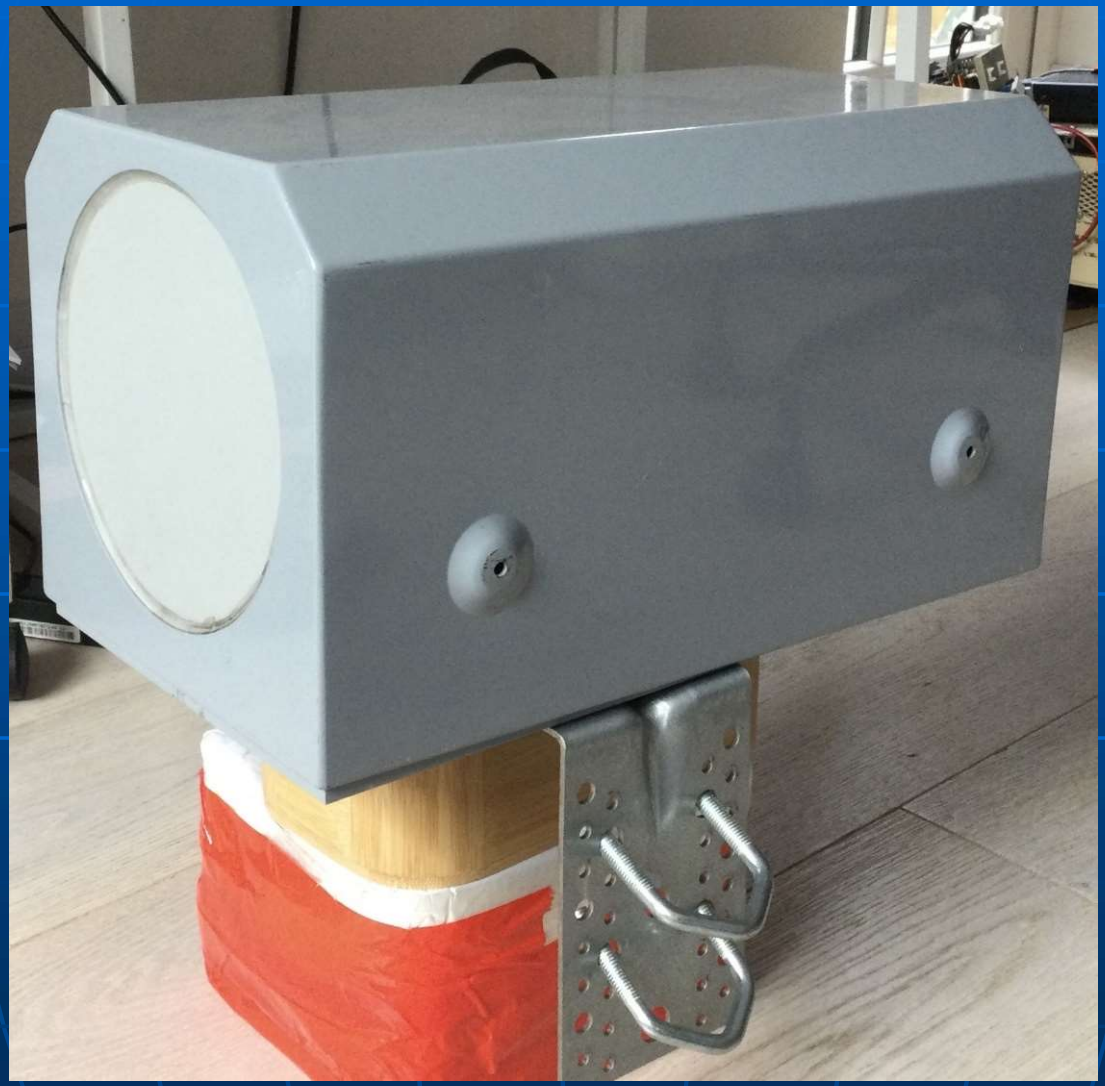


NOTE: Band specific plots available upon request.

All together



Housing



On the Mast

Martin G8JNJ mounting the beacon on the tower at 20m agl

On the Mast

Tower Height is
22.5 metres
Site 230m asl

Crawley 2025

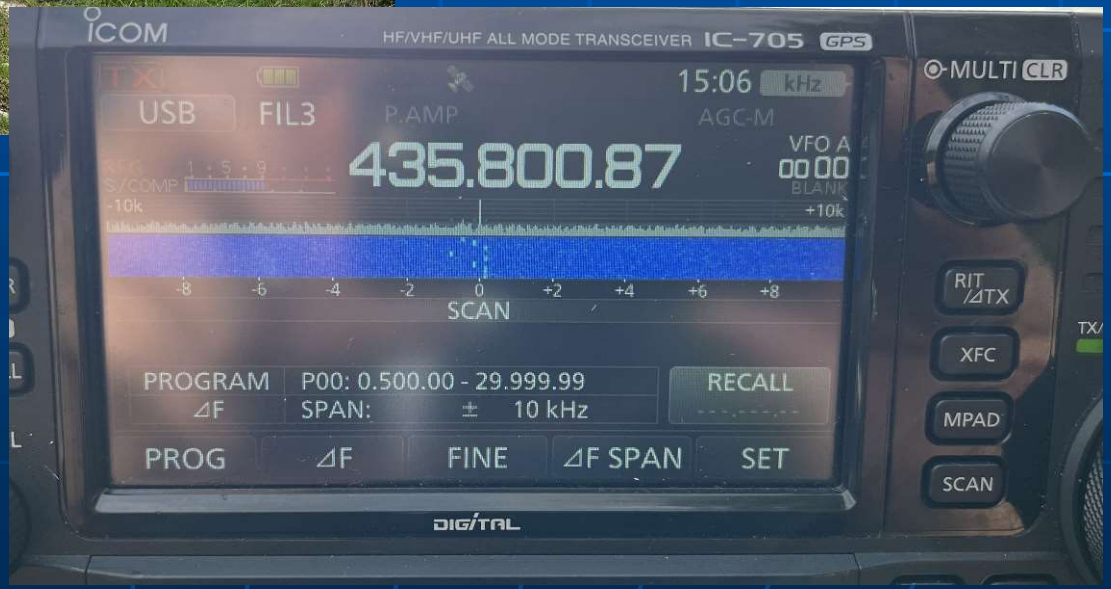
Reception of the Beacon

Hardy Monument
IO80RQ34
8.75km
(off heading)

Crawley 2025

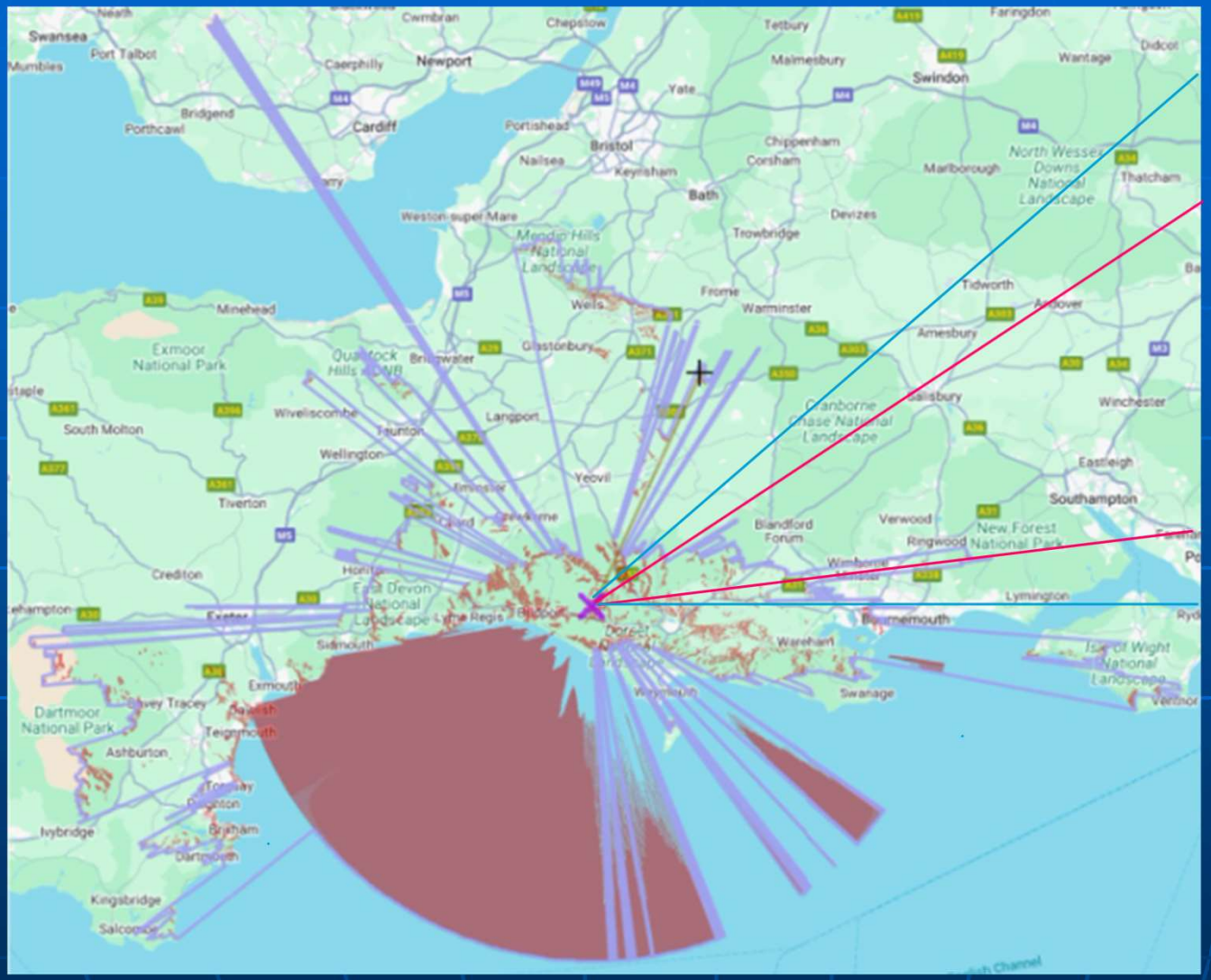
Reception of the Beacon

Bulbarrow Hill
IO80UU13
25.11km



Crawley 2025

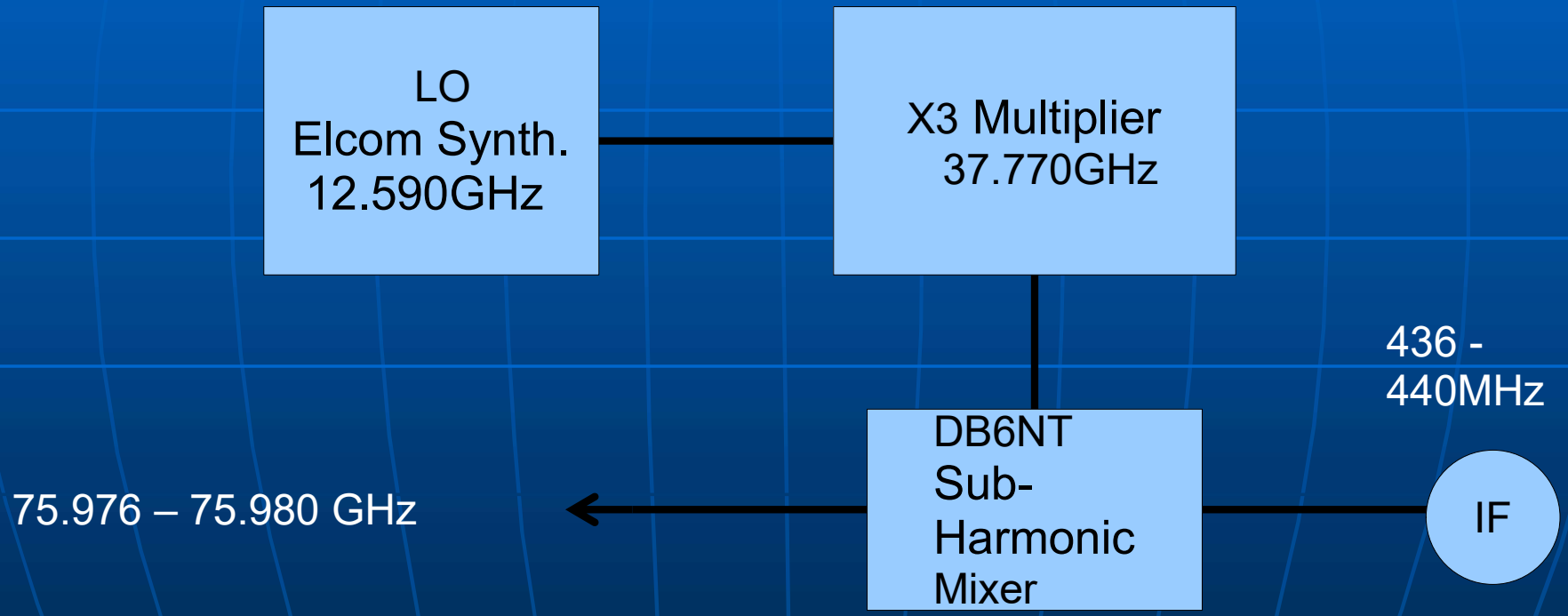
Coverage of the Beacon



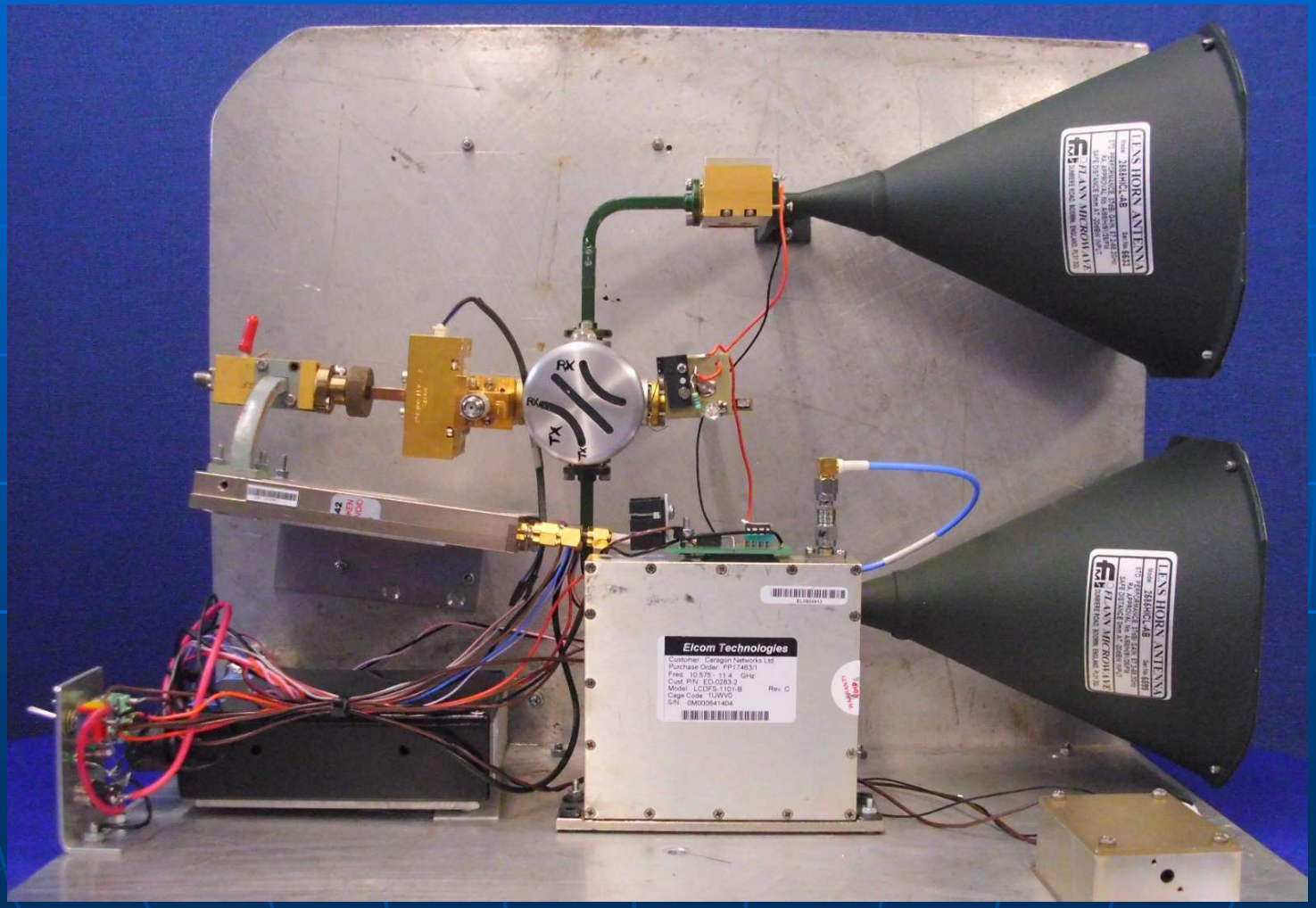
Coverage of the Beacon

76GHz

- **76GHz Transverter**



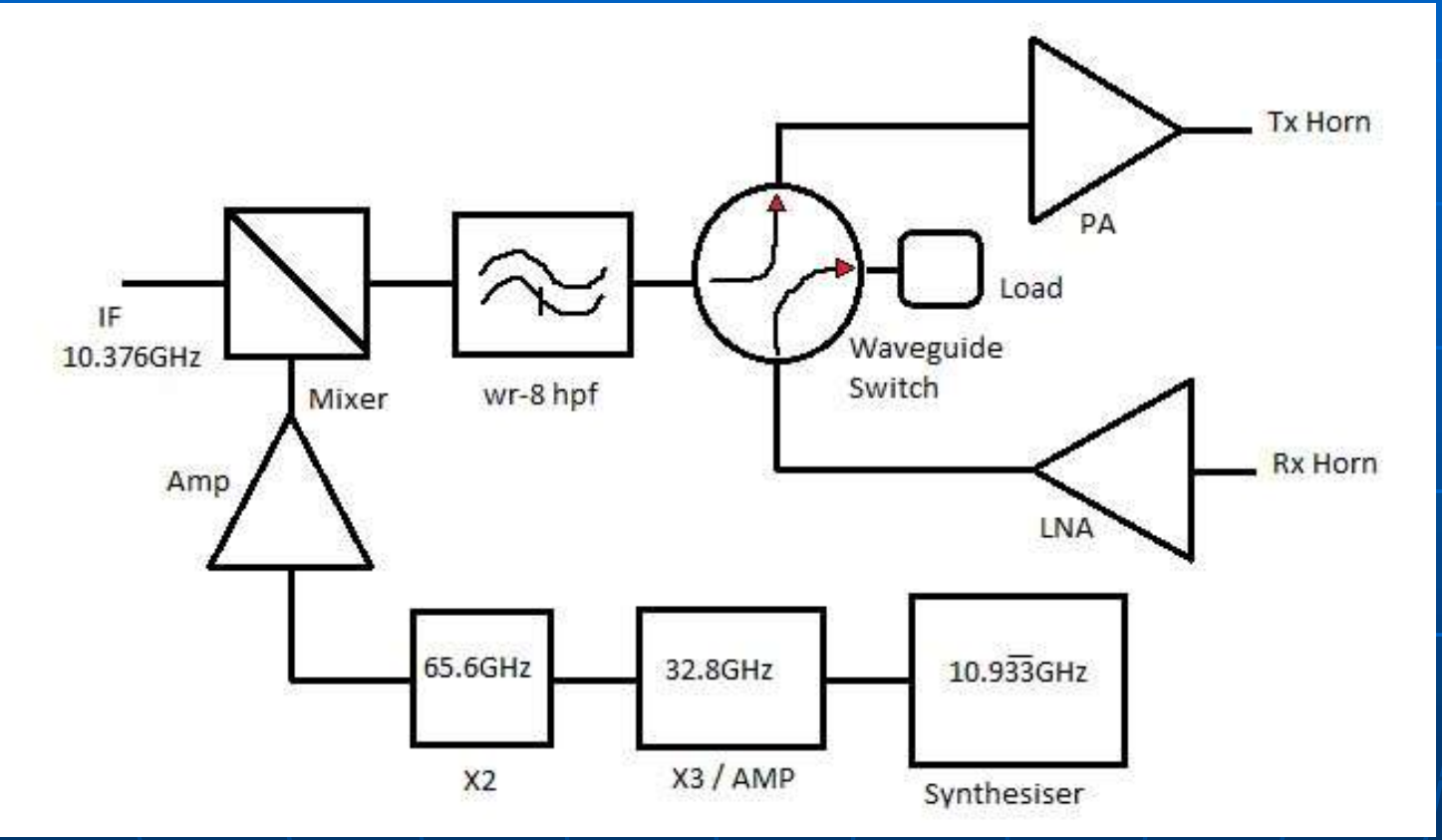
76GHz



Early G8CUB 76GHz Transverter

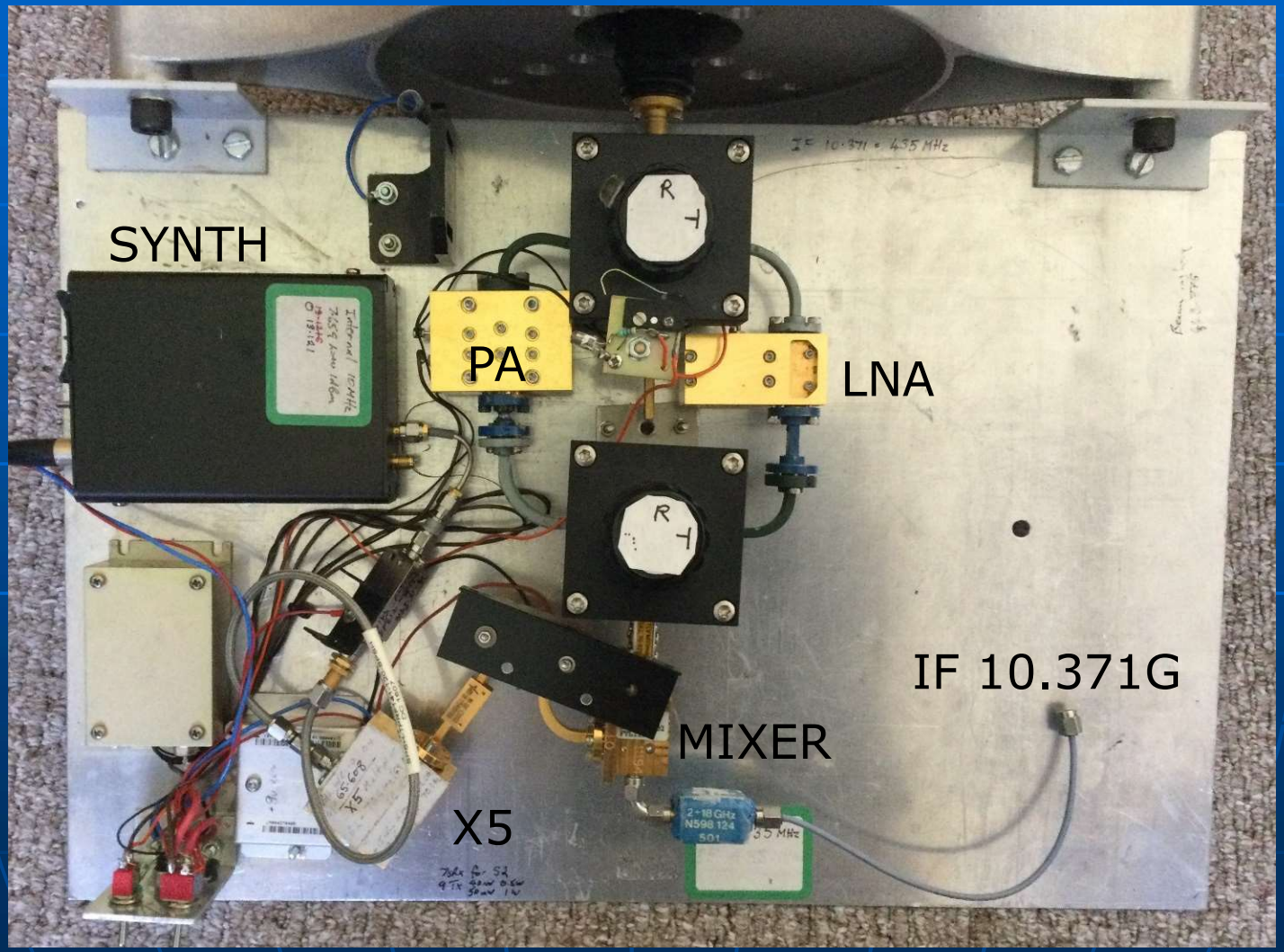
Crawley 2025

76GHz

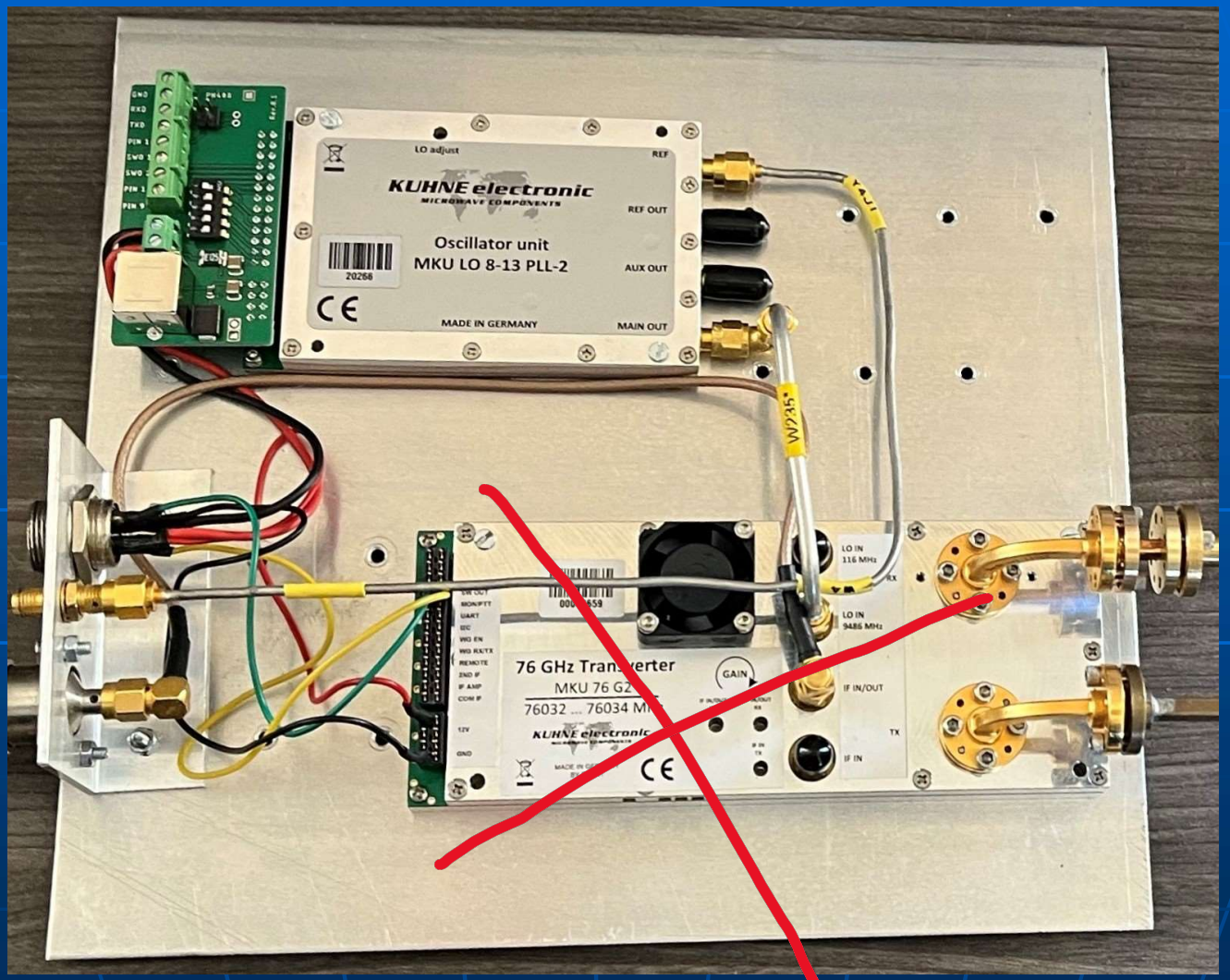


Recent Transverter with 10GHz IF

76GHz

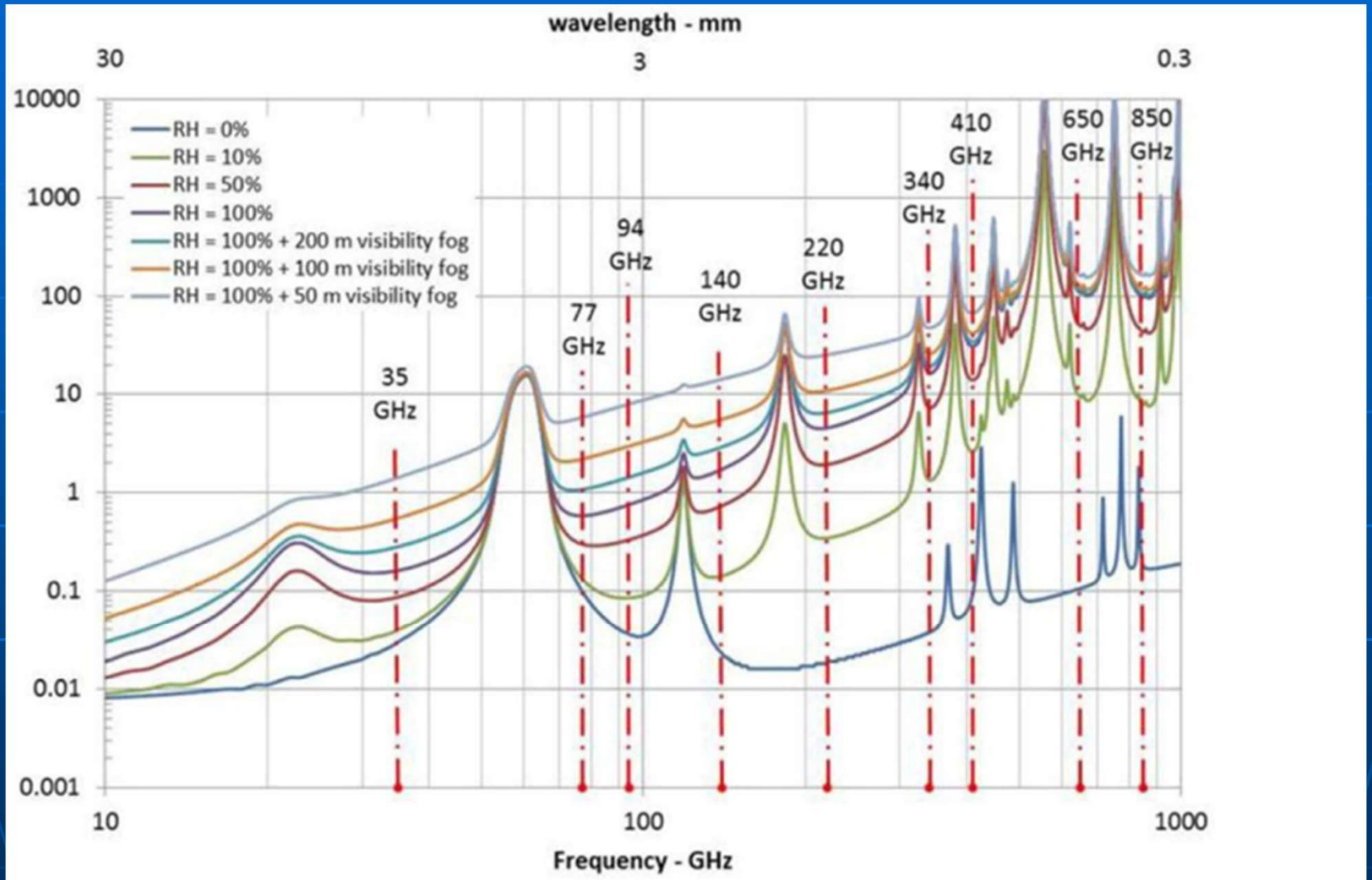


76GHz



Kuhne 76GHz System – transverter no longer available

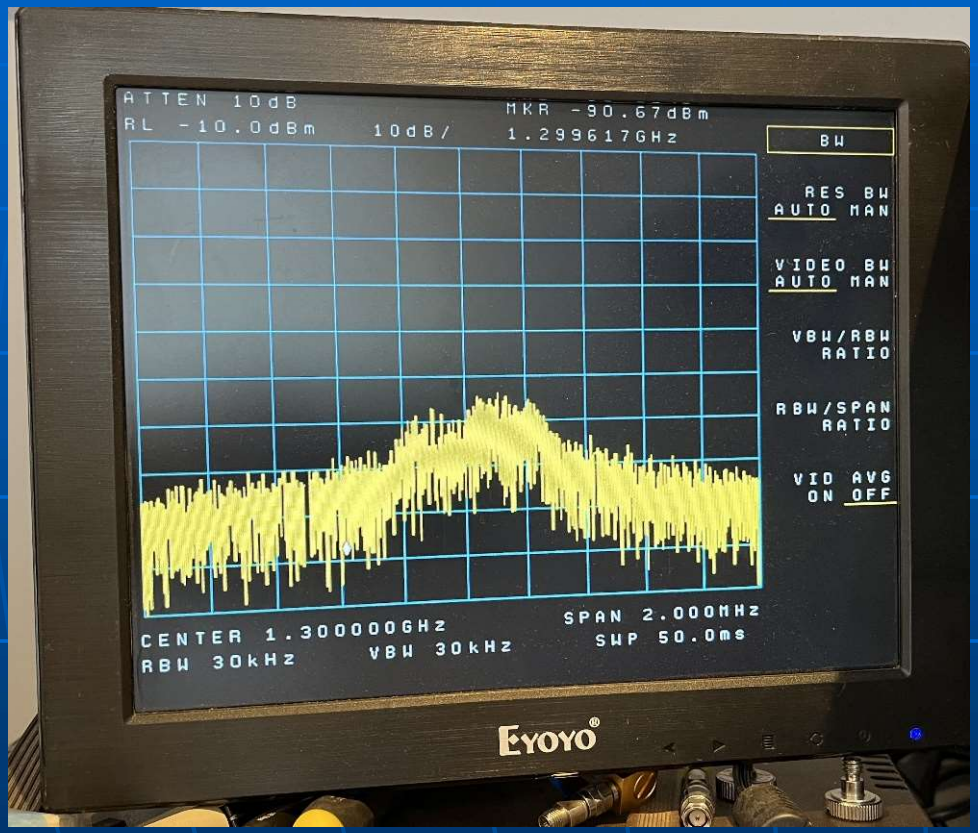
Crawley 2025

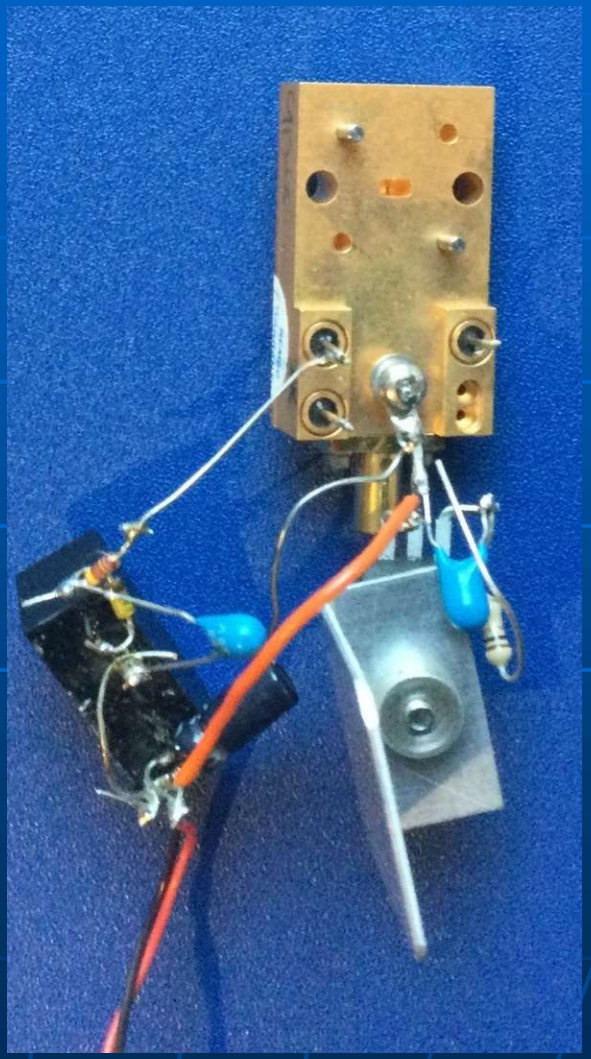


Atmospheric attenuation characteristic from 10 GHz to 1 THz

Crawley 2025

76GHz Remote Monitoring





Unlocked Rx for Monitoring?

Crawley 2025