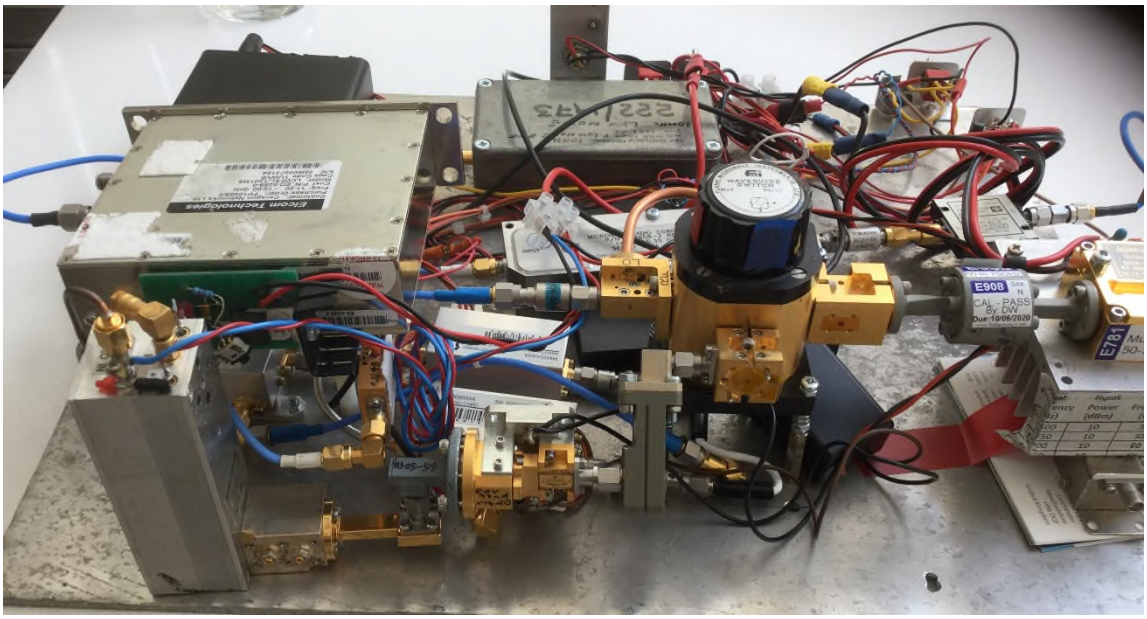
First >275GHz UK Contact

First UK contact under NOV >275GHz.

On 2nd August Roger G8CUB/P worked Chris G0FDZ/P on 288GHz over a distance of 175metres.
Location was Higham Kent JO01FK60 Reports 559 / 599
A one way contact was also made over a distance of 1.246km using 2m talkback 589 / 59.
288GHz Range extension

On 29th August a QSO was made over a distance of 650 metres at Brentwood. This was by gradually increasing the distance along a track, until we ran out of road!
Reports were 539 / 599. This time a 150mm quasi-optical horn was used on one receiver

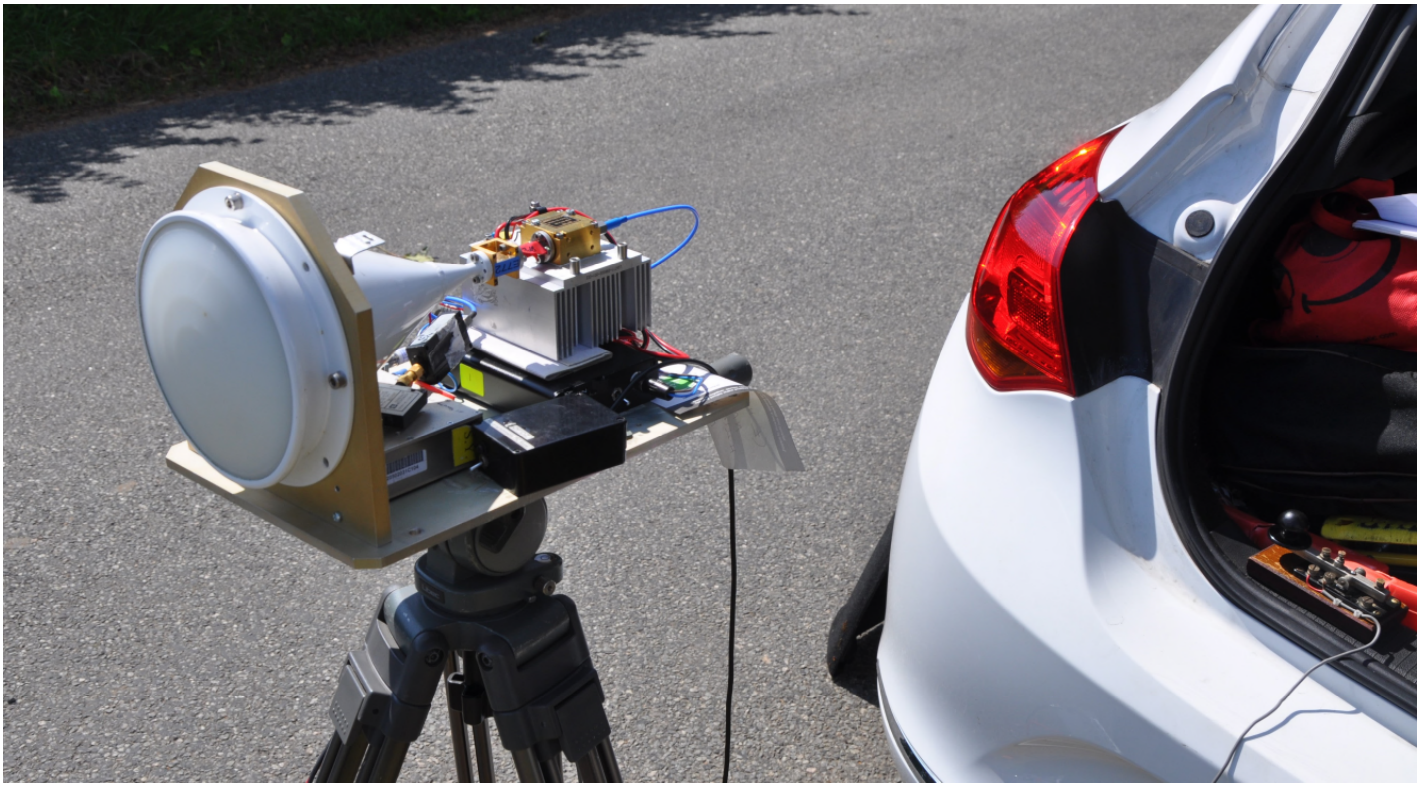
288GHz Equipment



288GHz Receiver 1.
The Teratech sub-harmonic mixer is in mounted in front of a wr-10 waveguide switch (used on 122GHz). On the right of the wg switch is the 60/120Ghz doubler. This is as used on the system at 241GHz.
To the left a pair of wr-28/wr-28 transitions act as a bit of a filter, a transition 2.92mm to 2.4mm, a physical level shift and a dc block.
Next is a 47GHz LNA, a wg-22 to 2.4mm, 2.4mm to small flange wr-19 (Procom), into 47GHz filter. This is bolted onto a DB6NT 47GHz / 144MHz transverter (out of picture). For 288 a ZL14G synth @3.764210GHz is multiplied to 60.228GHz (x4,x4). It is then doubled to 120.456 @ 10mW which is the LO for the sub-harmonic mixer. The IF at 47.088GHz, goes via the LNA, and filter to an old DB6NT transverter to 144MHz (borrowed from coming loan system). Final IF is 143.900MHz.

The most important bit, ultra-low phase noise reference oscillators. Phase noise from 10MHz to 288GHz is increased by a massive 89dB, without considering any additional noise that the multipliers might introduce. This receiver used a Wenzel 10MHz reference. Antenna is a 30cm Alpha Cassegrain fed dish, with 120G feed horn.

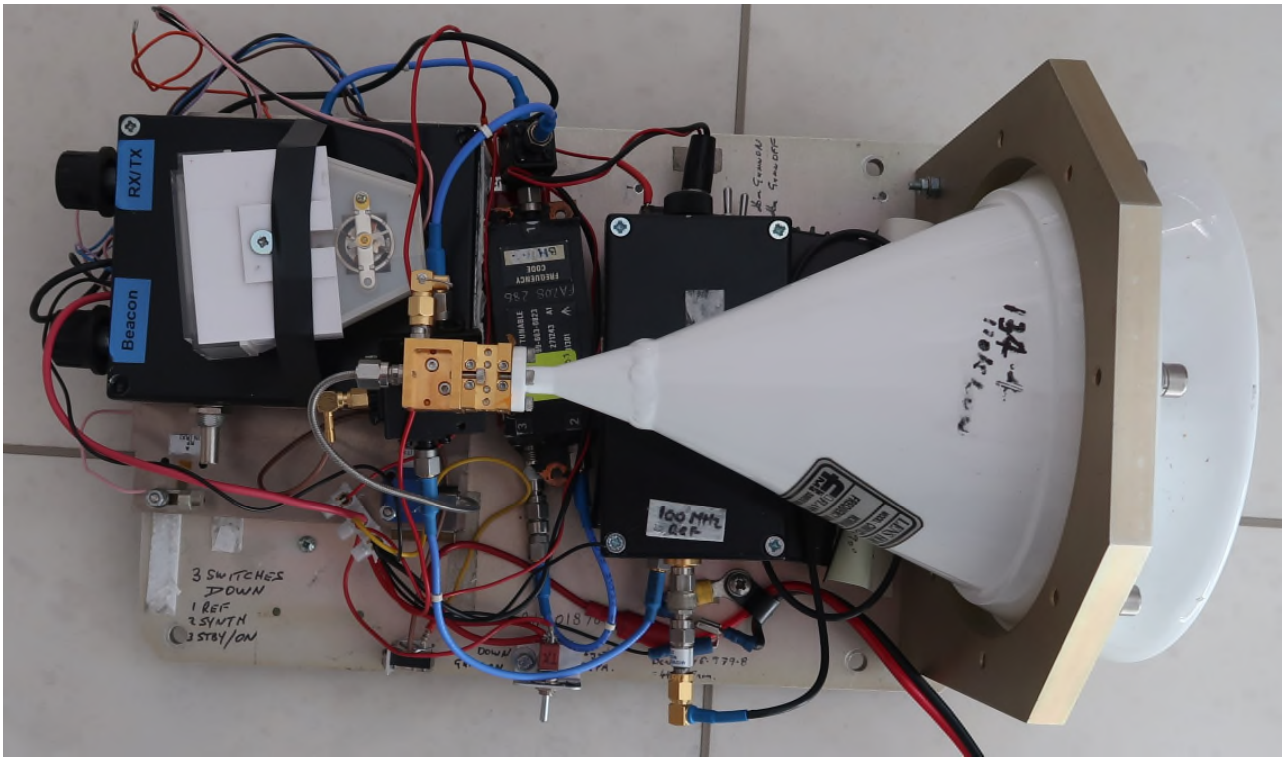
The mixer is specified up to 230GHz, with up to 10GHz IF. Sufficient LO power was only available close to 120GHz, this dictated the 47GHz IF. So it was trial and error. Fortunately it worked exceedingly well, and eclipses the x7 harmonic mixer used in the other receiver by around 45dB!



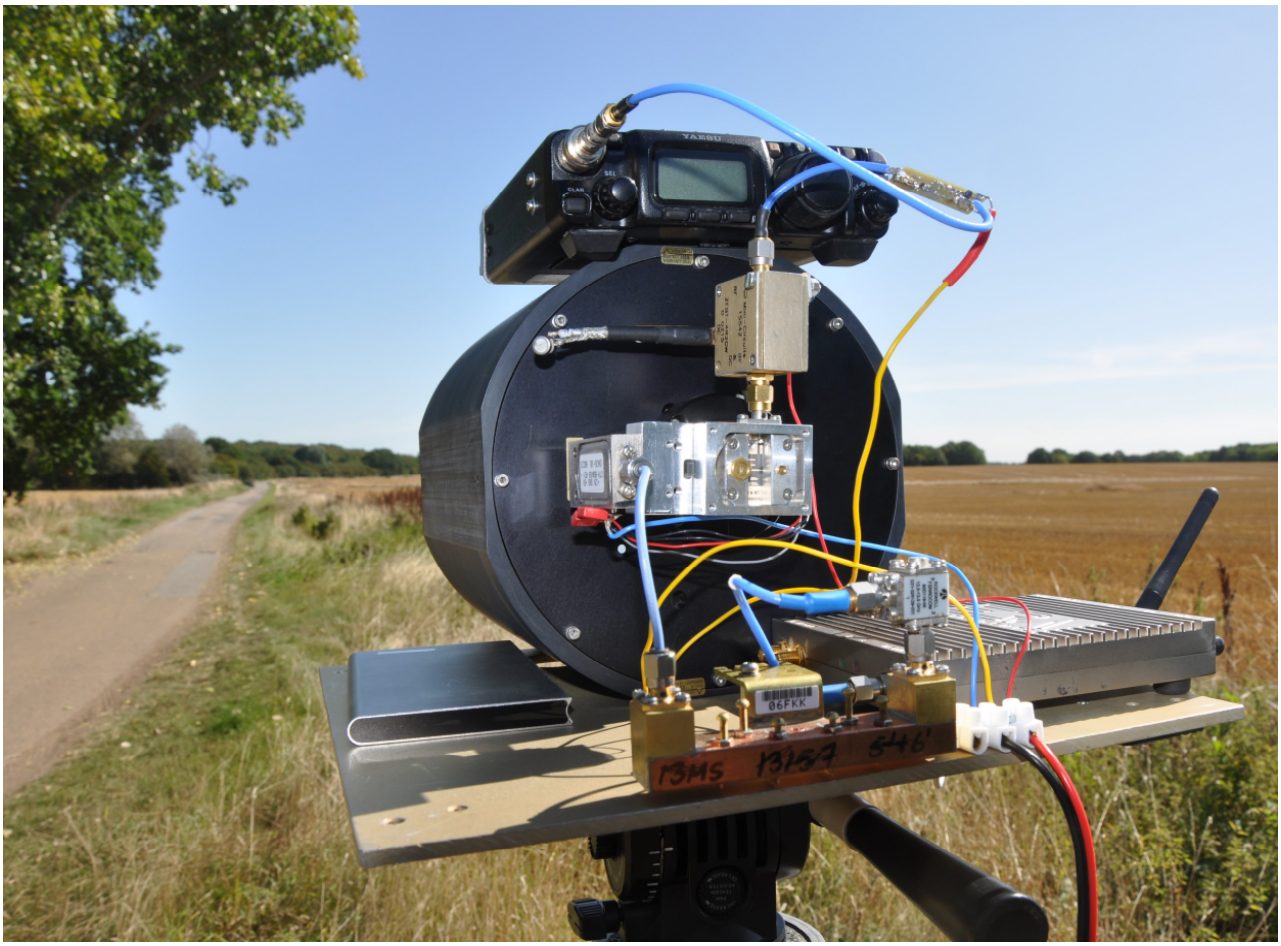
TX 1
ZL14G synthesiser on 8GHz, with 10MHz reference. The output is second harmonic filtered at 16GHz. Then a x6 active multiplier to 96GHz at 20mW. Followed by a Teratech x3 multiplier to 288GHz circa 350uW.
An 80GHz Flann horn is used as the antenna.

Receiver 2

This used another ZL14G synthesiser, with 100MHz reference. Output is on 13.6937GHz, which goes through a band pass filter (important). {Second contact used an ERA-1 synthesiser}.
This drives a CTR960459 multiplier to 41.0811GHz with 50mW output (yes these multipliers work here).
This is the LO for a x7 harmonic mixer. PCB is the x6 240GHz from DB6NT. Block is from DL2AM. Fortunately it is the same multiplier / PCB / block as used on 241GHz (x7 instead of x6).
Antenna is a 30cm Cassegrain fed dish originally used on 76GHz. Second contact used a 150mm quasi-optical horn.



TX 2
ZL14G synthesiser on 10.666666GHz, with 100MHz reference. The output goes into a Broadern x3 multiplier and amplifier. Output is 200mW at 32GHz, which is below the ideal 300mW (as the Broadern multiplier is outside its optimum frequency range). This drives a Teratech x9 passive multiplier to 288GHz circa 50uW.
An 80GHz Flann horn is again used as the antenna.



Receiver 3
As receiver 2, but with quasi-optical antenna. This is being used for the 650 metre QSO.

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On Thursday 12th September Roger G8CUB/P worked Chris G0FDZ/P on **288GHz** over a distance of **1.246km**. Location was Higham Kent JO01FK60UC to JO01FK62JR. Reports 319 / 599