



**Summer 2024**

**DL3IAS/p**

**Rainscatter**

**DX with**

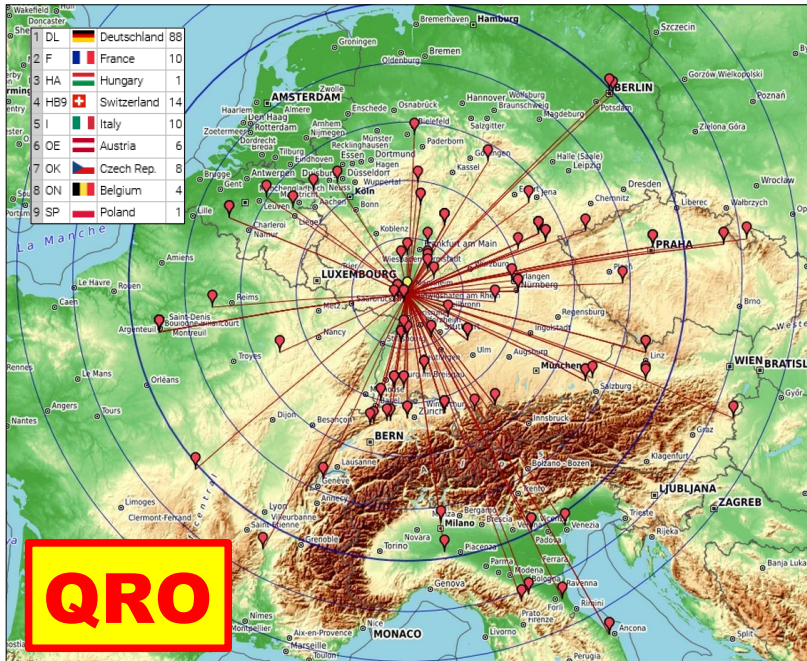
**2 mW QRPp**

**on 10 GHz**



## Introduction: The possibilities of QRO on 10 GHz And why it was time to try something new: QRPp!

In 2021 I decided after 27 years of 10 GHz operation @ home (Schifferstadt JN49EJ) to switch to portable operation only. I have already written about the reasons that motivated me to do this [REF 01](#). With an ERP (Effective Radiated Power) of around 4 000 W (10 watt PA by DL2AM plus 35 cm dish with 27 dBd gain minus relay and cable attenuation). Here I will call it “QRO”.



All my QRO QSOs as DL3IAS/p since 2021  
For the sake of simplicity, the centre point is JN49EJ

My “QRO” setup, here from 13. August 2023  
at my favourite portable QTH in JN49DJ

The initial successes, especially southwards to Italy, were remarkable. See also [REF 02](#) to [REF 09](#). But at some point I realised that I had worked almost every new possible station. And only rarely a new station was added to my log. So why not start from the beginning again? But now with a little "less" output power. Do not worry: I will continue to operate with QRO (10 watt power amplifier) in the future.

As some of you have already noticed, I have been QRV since last year with a new mini transverter that is called the "Portable Simple". It is a design by Jürgen Dahms DC0DA from the late 1980s [REF 10](#). I will not go into technical details here, as this will be the scope of a separate report. Just this much: The output power is only 0,25 mW, and the noise figure about 10 dB. Together with a small 16 dBd horn antenna, an ERP of 10 mW can be achieved. To call it QRPp is a total exaggeration. Or would be “QRPppp” even better?





### The QSOs achieved so far under “normal” conditions

When calculating the possible signal levels with an online tool [REF 11](#), I made an interesting observation: If there is LOS (line of sight), narrowband QSOs over several hundred km are possible with only 10 mW ERP!

For example: The 228 km LOS path Feldberg / Schwarzwald (JN47AU) – Zugspitze (JN57LK) has a free-space path loss of 160 dB. With antenna gains of 18 dBi (Horn) & 29 dBi (e.g. 48 cm PROCOM), an output power of minus 6 dBm (0,25 mW) produced a signal of minus 119 dBm. This is more than enough for a QSO.

The following table gives an overview of my QRPp activities so far. All QSOs were made during contests. The mini transverter was also used by other hobby colleagues. As you can see, the ODX improved gradually.

Contest	QTH	Locator	Operator(s)	No. of QSOs	ODX [km]	Report
May Contest 2023	Gunzenau	JO40QL	Only me as DR2X	3	42	<a href="#">REF 12</a>
10 GHz Summer BBT 2023	Kalmit	JN49AH	Helmut DC1UR, Carsten DJ2CS and me	12	88	No Report
July Contest 2023	Between Ulmbach and Sarrod	JO40QI	Eberhard DG7NCY and me	4	16	<a href="#">REF 13</a>
March Contest 2024	Between Dannstadt and Böhl	JN49DJ	Only me	1	16	<a href="#">REF 14</a>
10 GHz Summer BBT 2024	Bockenheim an der Weinstraße	JN49CO	Only me	6	111	<a href="#">REF 15</a>
July Contest 2024 (Saturday)	Gunzenau	JO40QL	Eberhard DG7NCY and Eugen DL3ZAL	3	87	<a href="#">REF 16</a>
July Contest 2024 (Sunday)	Herchenhainer Höhe	JO40PL	Only me	1	153	

As I did not write a separate report about the 10 GHz Summer BBT 2023, here some pictures about this activity. **Attention:** The first photo is a “historical”, because it was taken by Helmut DC1UR in they year 1982. But the location was the same (Kalmit JN49AH).



Historical Photo by Helmut DC1UR

22. May 1982: Winfried DL4IV using a Gunnplexer for 10 GHz FM QSOs to the Black Forrest and Karlsruhe



Same QTH, but 41 years and 6 days later: Winfried (left) and Helmut (right)



For Carsten DJ2CS (left) the first activity on 10 GHz, Helmut (right) in QSO with DL3IAE

## After increasing the ERP: Is much more possible now?

In the meantime, the ERP has been increased by further 20 dB. Firstly by replacing the small horn antenna with a bigger 48 cm dish by PROCOM. Secondly, with some modifications, the output power was increased to 2 mW. However, this is subject to the restriction that only CW is possible on one single frequency! I have chosen 10368,150 MHz. Alternatively, I can still operate with 0,25 mW on all frequencies and modes.

The mini transverter has now an ERP of 1 watt. What is possible with this? By Tropo DX several hundred km and big signals will be sure if both stations are right inside the duct. But if we disregard air plane reflections and EME, there is another important type of propagation mode on 10 GHz: Rainscatter!

But is QRPp rainscatter possible at all? Beacons on 10 GHz provide us valuable information about it. You can find an excellent database [REF 17](#) on the Internet, where previous DX cluster spots from VHF/UHF/SHF beacons are archived. I took a closer look at the rainscatter spots of the few beacons that have only 1 watt to 2 watts ERP like DB0UX (Karlsruhe), DB0GG (Stuttgart), DB0UL (Ulm) or DB0GW (Duisburg).

**The result: In the past, there have always been spots via rainscatter. And some even over long distances!**

Here as an example the evaluation of 10 GHz rain scatter DX cluster spots for DB0UL (2 watt ERP) in JN48XK:

Call	RST	Locator	QRB [km]
I0NLK	???	JN62NO	694
I6XCK	55s	JN63QO	599
9A4ZM	55s	JN64WU	498
IU4MES	57s	JN54QH	469
PA0BAT	53s	JO31FX	466
IV3DXW	53s	JN65QQ	401
IK3GHY	53s	JN65DM	370
IK3HHG	59s	JN65DO	361
DK5AI	53s	JO51GO	355
IK3HAR	52s	JN55RK	353
OK1JKT	53s	JO60RN	347
OE5LJM	51s	JN78DB	324

*Rainscatter DX cluster spots with QRB of more than 300 km for the 10 GHz beacon DB0UL*

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### BEACONSPOT.uk

Beacon map for 10368 MHz - 10370 MHz

Click on any beacon marker for info. The marker colour shows the status:-  
Operational, Offline off spec, Offline, Planned, or ? Uncertain.  
View as a list in Callsign order OR in Frequency order OR in Date last spotted order OR Locator order

Call: DB0UL - JN48XK  
Frequency: 10368.8020 MHz  
Location: Unavailable  
Status: OPERATIONAL  
Date Last Spot: 2024-07-10  
Freq Last Spot: 10368.8050  
Heading: 132degrees  
Distance: 158km  
From: JN49EJ  
Keying: QTF: OMNI  
MGM: Keying: QTF: OMNI  
ERP: 2.000W  
Antenna(s): 10 SLOTS  
Keeper: DL1SBM  
More information: [HERE](#)  
Last 50 spots for DB0UL: [CLICK HERE](#)

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### BEACONSPOT.uk

Last 50 spots for DB0UL (JN48XK) on 10,368.8020 MHz

On 2019-07-07 it was heard by I0NLK in locator JN62NO for an ODX of 694km. It is 158km from DL3IAS in JN49EJ, and the bearing to the beacon is 132 degrees.

You may View OR Update data for DB0UL. OR View spots as a Beacon Spot Map. OR List the last 50 spots for this Band. To access ALL spots for this beacon, rather than just the last 50, use Downloads from the menu.

Date	Time	Beacon	Frequency	RPT	Prop	Comments	Dist(km)	Source	Spotter	Spotter Loc
2024-07-10	16:11	DB0UL	10368.8050	41s	RS	jn78db<rs>jn48xk 41s	324	DXC	OE5LJM	JN78DA23
2024-06-21	09:43	DB0UL	10368.8050	529	TR	jn48xk 529 tr	322	DXC	OE5VRL	JN78DK75
2024-06-05	14:37	DB0UL	10368.8050	559	TR	jn59j<tr>jn48xk 559	111	DXC	DL3NDX	JN59JG
2024-02-10	10:37	DB0UL	10368.8050	59	TR	59r jn48xk jn78dk	322	DXC	OE5VRL	JN78DK75
2023-12-17	20:00	DB0UL	10368.8050	59	TR	jn48xk s9-20 in jn78dk	322	DXC	OE5VRL	JN78DK75
2023-11-22	10:19	DB0UL	10368.8050	559	TR	559r jn48xk jn78dk	322	DXC	OE5VRL	JN78DK75
2023-10-29	07:25	DB0UL	10368.8050	599	TR	599+ jn48xk jn78dk	322	DXC	OE5VRL	JN78DK75
2023-10-18	08:34	DB0UL	10368.8050	599	TR	jn48xk 599 in jn78dk	322	DXC	OE5VRL	JN78DK75
2023-10-02	08:07	DB0UL	10368.8050	579	TR	jn68pf<tr>jn48xk 579	249	DXC	OE5LJM	JN68PF67
2023-09-27	12:38	DB0UL	10368.8050	559	TR	jn48xk 559	322	DXC	OE5VRL	JN78DK75
2023-09-08	15:32	DB0UL	10368.8060	549	TR	549 jn48xk jn78dk	322	DXC	OE5VRL	JN78DK75
2023-08-25	06:53	DB0UL	10368.8060	549	TR	549r jn48xk jn78dk	321	DXC	OE5VRL	JN78DK75
2023-08-21	08:17	DB0UL	10368.8060	549	TR	jn48xk 549tr in jn78dk	321	DXC	OE5VRL	JN78DK75
2023-08-18	08:57	DB0UL	10368.8050	559	TR	559r jn48xk jn78dk norm. nil	321	DXC	OE5VRL	JN78DK75
2023-08-15	15:06	DB0UL	10368.8054	51s	RS	jn78db<rs>jn48xk 51s	322	DXC	OE5LJM	JN78DB00
2023-07-19	08:29	DB0UL	10368.8056	41s	RS	jn78da<rs>jn48xk 41s	324	DXC	OE5LJM	JN78DA23
2023-07-16	19:24	DB0UL	10368.8056	51s	RS	jn78db<rs>jn48xk 51s	322	DXC	OE5LJM	JN78DB00
2023-07-03	18:30	DB0UL	10368.8050	539s	RS	539s	353	DXC	IK3HAR	JN55RK
2023-06-22	17:55	DB0UL	10368.8064	52s	RS		322	B'SPOT	OE5LJM	JN78DB00
2023-02-14	15:02	DB0UL	10368.8050	539	TR	jn77dx<tr>jn48xk 539	346	DXC	OE5LJM	JN77DX08
2022-12-20	13:13	DB0UL	10368.8050	579	TR	579 jn48xk jn78dk	321	DXC	OE5VRL	JN78DK75
2022-11-11	08:58	DB0UL	10368.8050	599	TR	599+ jn48xk jn78dk	321	DXC	OE5VRL	JN78DK75
2022-10-29	22:27	DB0UL	10368.8050	579	TR	579 jn48xk	321	DXC	OE5VRL	JN78DK75
2022-10-23	15:53	DB0UL	10368.8050	559	TR	jn77dx<tr>jn48xk 559	323	DXC	OE5LJM	JN77DX04
2022-10-19	20:31	DB0UL	10368.8050	599	TR	599 jn48xk jn78dk	321	DXC	OE5VRL	JN78DK75
2022-08-12	14:21	DB0UL	10368.8057	51s	RS	jn78db<rs>jn48xk 51s	324	DXC	OE5LJM	JN78DB00
2022-07-01	12:29	DB0UL	10368.8050	52s	RS	jn48xk<rs>jn54qh 5-2-s	469	DXC	IJ4MES	JN54QH07
2022-06-21	12:05	DB0UL	10368.8070	55s	RS	jn48xk<rs>jn54qh 5-5-s	469	DXC	IJ4MES	JN54QH07
2022-06-14	13:28	DB0UL	10368.8050	519	TR	519tr jn48xk normal nil	353	DXC	OE5VRL	JN78DK75
2022-05-26	20:25	DB0UL	10368.8040	52s	RS	52s scp jn56nq	353	DXC	IK3HAR	JN55RK
2022-05-03	12:07	DB0UL	10368.8020	53s	RS	53s jn37up<rs>jn48xk scp jn47	189	DXC	DK3SE	JN37UP
2022-01-12	18:01	DB0UL	10368.8050	599	TR	599 jn48xk jn78dk	321	DXC	OE5VRL	JN78DK75
2021-11-24	17:35	DB0UL	10368.8050	579	TR	579 jn48xk jn78dk	321	DXC	OE5VRL	JN78DK75

### 3cm-Bake DB0UL

**DB0UL**

JN48XK  
9° 57.39' East 48° 25.42' Nord

**10 GHz Beacon Ulm**  
10368.802MHz

In the beginning of may 2001 beacon operating began with some tests.  
&nb

Technical data:  
OCXO at 60°C: 128.0099MHz  
Multiplier to 1152MHz  
2. Multiplier to 10368.802MHz  
Pin-Diode Modulator  
Amplifier 26dBm Output  
Slotted waveguide Antenna with 10 slots

Responsible: DL1SBM Bernd

Technical Beacon Team:  
DL1GGT Tom  
DL5BT Ingo  
helped by:  
DF2C Wolfram  
DL1SAN Wolfgang

<https://www.darc.de/der-club/distrikte/portsverbände/14/relais-baken/3cm-bake-db0ul/>



## First signals via Rainscatter and from (near) Deep Space

Even though the mini transverter with his noise figure of 10 dB is not anything but sensitive, I was able to hear first noisy signals last year with the small horn antenna. Especially the 10 GHz beacon DB0ANU from Ansbach JN59GG (Distance 157 km) can be heard very frequently due to its high ERP.

**VIDEO** DB0ANU from JN59GG via Rainscatter (4 MB)  
<https://c.web.de/@337150638448182491/sCbsMs3LT--JyJ4m9tdcGA>

And of course my radio neighbour Daniel DL3IAE from JN49DG. Here a video of his backscatter signal in SSB during an QSO with F1CNE/p. However, my 10 mW ERP in CW (before the boost by 20 dB) was not enough for a QSO. Backscatter makes things even worse, as the signal is spread very wide.

**VIDEO** DL3IAE in QSO with F1CNE/p (7 MB)  
<https://c.web.de/@337150638448182491/ZwX8ISq8T9qZgHUqBqiiKQ>

But I was also able to copy Maurice F6DKW calling CQ from JN18CS in Paris (distance of 454 km). I just had to go outside the front door. However, another year needed before first serious attempts for making a QSO makes any sense.

**VIDEO** F6DKW from Paris calling CQ (4 MB)  
<https://c.web.de/@337150638448182491/8sRhWuAWS4WdfxBjVqZQBw>

And what about receiving much greater distances? Let us say more than 36 000 km! Yes, but for that I have to raise the elevation to 30,9 degree and change to almost vertical polarisation. Before the “QRO” modification, it was possible to switch the 10 GHz LO by DF9NP from 10224 MHz to 10345 MHz. This enabled me to receive the downlink of geostationary satellite QO-100 at 10489 MHz. The first antenna set up last year looked indeed very strange, but it worked. This year I tried again with the 48 cm PROCOM dish. Both times the signals were just above the noise, but a clear copy. And even a signal from Antarctica have been received.

**VIDEO** Receiving DP0GVN from Antarctica via QO-100 (5 MB)  
<https://c.web.de/@337150638448182491/alyCZ2LjSWmca-9mcVQUbA>



*Yes, I am fully aware that a 16 dBD horn as feed under-illuminated this 75 cm offset dish!*



*Of course there are better antennas than a PROCOM dish  
But at least only one tripod was needed for this set up*

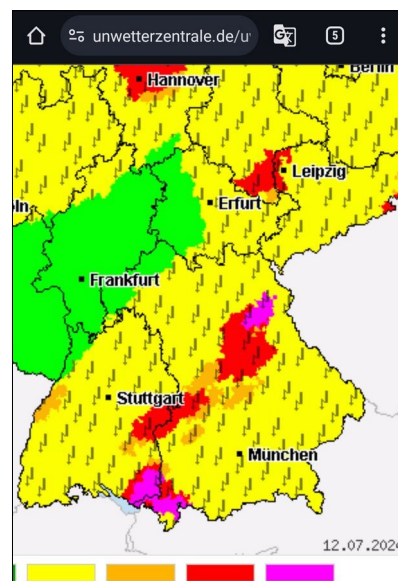
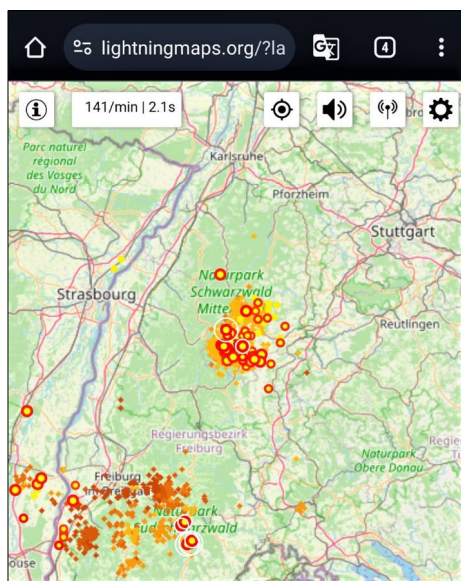


## Some kind of strategy is needed

So I can hear now signals from places where only Captain James T. Kirk is travelling with his USS Enterprise. And the 2 mW modification also works. How are my rain scatter attempts with QRPp going? Just driving to a portable QTH, set up the station and calling CQ in a direction where might be a SCP (Scatterpoint)? And with only one single frequency for transmitting and 30 dB to 40 dB less output power than everyone else? No, this will definitely not lead to success!

So here is my strategy:

- Observing the weather forecasts: When are strong thunderstorms expected up to 400 km away?
- When the time comes, I follow the weather on the Internet @ home.
- For this I am monitoring the “**Spooky Triumvirate of Weather Forecasting**” as I called it:
  1. The rainfall radar by “**Wetteronline**” [REF 18](#)
  2. The “**Lightningmaps**” [REF 19](#)
  3. and the “**Unwetterzentrale**” (Alerting before severe weather) [REF 20](#)



- At the same time, I am monitoring the ON4KST microwave chat [REF 21](#) to see if any rainscatter activities are already underway and which potential sked partners are available.
- I ask my potential sked partners how long they will be still QRV.
- If everything speaks in favour of a “Go!”, then loading the equipment into my car, driving to the portable QTH (I have more than one to choose from), and setting up the station.
- While the 10 MHz OCXO still warms up, I log into the ON4KST microwave chat with my smartphone.
- There is an excellent browser based client for the ON4KST chat [REF 22](#) which I can highly recommended.
- Alternative ways to get in contact are: WhatsApp, telephone or SMS.
- Checking that my station is OK: Listening to local beacons, and searching for first rainscatter signals.
- On the chat I am asking my sked partner to make a longer call on 10368,150 MHz.
- If I can hear something, I can optimise my antenna.
- Giving feedback: Copy anything or nothing at all.
- If nothing can be heard or the signal is not strong enough for my QRPp: Saying “Thank you”.
- But if the signal is loud enough, I will start with a CQ loop while my sked partner is listening.
- My sked partner can now optimise his antenna if he can copy anything.
- Waiting for feedback.
- And with a little bit of luck and patience: A complete QSO will follow!
- I will always give a 59S report. Why? Is anyone else besides me that stupid to transmit with only 2 mW?
- During the QSO I will try to make a video with my smartphone.
- At my request, and if possible, my QSO partner will also do a video/audio recording.
- For this I can run a CQ loop again after the QSO is completed.
- Now it is time to say a big “Thank You!”
- Watching the band and the chat for further QSO opportunities.
- Going QRT at some point. At the latest when a thunderstorm is not far away.



## The first small success: Different than expected

My first attempt was made on 29. June. Thunderstorms were forecast from France and Maurice F6DKW from Paris was QRV. My portable QTH was in JN49FI (Otterstadt) instead of the usual JN49DJ, because it is further away from the mountains (Palatinate Forest) in the West. I could hear Maurice well. But it was not good enough for my signal. And to make things worse Maurice also had QRM on the 150 from another station in France.

17:28:26Z	F6DKW Maurice 23-3-1.2	(DL3IAS) Ge Nino. Any good Scp ?
17:28:57Z	DL3IAS Nino 10GHz	(F6DKW) Between us?
17:30:25Z	DL3IAS Nino 10GHz	(F6DKW) Aaround St Die de vosges?
17:30:58Z	F6DKW Maurice 23-3-1.2	(DL3IAS) Sure I have HB9F Qth 90°. I can bcn on 120
17:32:01Z	F6DKW Maurice 23-3-1.2	(DL3IAS) 10° more to south. Ben on 120 now
17:32:12Z	DL3IAS Nino 10GHz	(F6DKW) Fine Copy but maby Not loud enough, pse QSY 150
17:32:38Z	F6DKW Maurice 23-3-1.2	Pse 180 Qrm on 150
17:32:52Z	DL3IAS Nino 10GHz	(F6DKW) Pse Call 150
17:33:15Z	F6DKW Maurice 23-3-1.2	(DL3IAS) Pse 180
17:33:32Z	DL3IAS Nino 10GHz	(F6DKW) No i can only TX 150
17:33:54Z	DL3IAS Nino 10GHz	(F6DKW) In "QRP" mode
17:33:58Z	DL3IAS Nino 10GHz	(F6DKW) QRO
17:34:23Z	F6DKW Maurice 23-3-1.2	(DL3IAS) on 150 now but Qrm
17:34:34Z	DL3IAS Nino 10GHz	(F6DKW) Ok
17:34:40Z	DL3IAS Nino 10GHz	(F6DKW) Now CW beacon
17:35:03Z	F6DKW Maurice 23-3-1.2	(DL3IAS) RR
17:37:13Z	F6DKW Maurice 23-3-1.2	(DL3IAS) maybe 219. but not sure even..
17:37:36Z	DL3IAS Nino 10GHz	(F6DKW) I Stop tx
17:38:07Z	DL3IAS Nino 10GHz	(F6DKW) Can u hear DB0UX? In 900
17:38:11Z	F6DKW Maurice 23-3-1.2	(DL3IAS) How stong U get me ?
17:38:12Z	DL3IAS Nino 10GHz	(F6DKW) On 900
17:38:34Z	DL3IAS Nino 10GHz	(F6DKW) 59 but must bei louder
17:39:46Z	F6DKW Maurice 23-3-1.2	(DL3IAS) nil on UX. 25W at feed, big delta
17:40:30Z	F6DKW Maurice 23-3-1.2	150 Vy bad for me..!
17:40:34Z	DL3IAS Nino 10GHz	(F6DKW) I Start again beacon
17:41:13Z	F6DKW Maurice 23-3-1.2	(DL3IAS) me or U ?
17:41:15Z	DL3IAS Nino 10GHz	(F6DKW) SCP at Lac du Der Not vosges
17:41:19Z	DL3IAS Nino 10GHz	(F6DKW) I call
17:41:38Z	F6DKW Maurice 23-3-1.2	OK
17:43:03Z	F6DKW Maurice 23-3-1.2	(DL3IAS) nil..
17:44:22Z	F6DKW Maurice 23-3-1.2	(DL3IAS) Trnx test Nino 73

21:59:24Z	DL3IAS Nino 10GHz	(DL2EAA) Hallo Dirk, Sked via JO40 SCP?
21:59:55Z	DL2EAA Dirk 3cm only	(DL3IAS) Ok, ich rufe mal.
22:00:47Z	DL3IAS Nino 10GHz	(DL2EAA) Bitte 150
22:00:58Z	DL3IAS Nino 10GHz	(DL2EAA) Hat einen bestimmten Grund
22:02:59Z	DL2EAA Dirk 3cm only	(DL3IAS) Ok
22:03:03Z	DL3IAS Nino 10GHz	(DL2EAA) Copy kam sehr leise sein
22:07:01Z	DL3IAS Nino 10GHz	(DL2EAA) Ich rufe wieder 150 bitte audio aufzeichnung
22:07:37Z	DL2EAA Dirk 3cm only	(DL3IAS) Ok, muesste eigentlich immer mitlaufen.
22:07:40Z	DL3IAS Nino 10GHz	(PA00) Only 150 possible
22:07:58Z	DL3IAS Nino 10GHz	(PA00) Ok
22:08:15Z	DL2EAA Dirk 3cm only	(PA00) Aehnlich hier, 70cm, 7W
22:08:20Z	DL3IAS Nino 10GHz	(DL2EAA) Aufzeichnung OK?
22:09:03Z	DL2EAA Dirk 3cm only	(DL3IAS) Ich hoffe schon, das geraet speichert auf sd-karte, muss ich dann auf dem pc kopieren
22:09:17Z	DL2EAA Dirk 3cm only	(DL3IAS) Pa0o ruft dich
22:11:59Z	DL3IAS Nino 10GHz	(PA00) Sri Nil so far
22:13:08Z	DL2EAA Dirk 3cm only	(PA00) Still copy you, but getting weaker
22:16:02Z	DL3IAS Nino 10GHz	(DL2EAA) berraschung: rate mal welche Leistung ich hatte?
22:16:56Z	DL3IAS Nino 10GHz	(DL2EAA) 2mW an 48cm = 1Wat ERP
22:17:00Z	DL2EAA Dirk 3cm only	(DL3IAS) Nicht sicher, wenn der rapport 59 fuer mich stimmte sehr wenig :- ) warst ziemlich leise
22:17:18Z	DL2EAA Dirk 3cm only	(DL3IAS) Ohja, nicht schlecht
22:17:31Z	DL3IAS Nino 10GHz	(DL2EAA) Ich rufe wieder 150
22:18:07Z	DL3IAS Nino 10GHz	(DL2EAA) War das erste RS QSO mit diesem Mini Transverter
22:18:41Z	DL3IAS Nino 10GHz	(PA00) Here only 2m and 48cm, and Not all direction free
22:18:48Z	DL3IAS Nino 10GHz	(PA00) 2mW
22:20:28Z	DL2EAA Dirk 3cm only	I think you both have slightly different scp, maximum qth for you both is different
22:21:18Z	DL3IAS Nino 10GHz	(DL2EAA) Hab nicht alle Richtungen frei, aus dem Schlafzimmer Fenster
22:22:01Z	DL2EAA Dirk 3cm only	(PA00) Perfekt, heute gebaut und dann direkt rs qso.73 gute nacht

*Left: And so the drama. The ON4KST chat review makes it possible  
Above: No drama any more, but victory*

Later, before midnight, after I was back at home, the storm front passed to the north-west. The distance was not far, so there was big lightning almost every second when I looked out of my bedroom window. I spontaneously had the idea to check the local 10 GHz beacons. So I quickly set up my station by the window. Of course DB0ANU was heard immediately with a good signal. But shortly afterwards I copied DB0MOT, and even DB0UX with only 2 watt ERP. Elevation was necessary. But this allowed me to get over the rooftops of the neighbouring buildings.

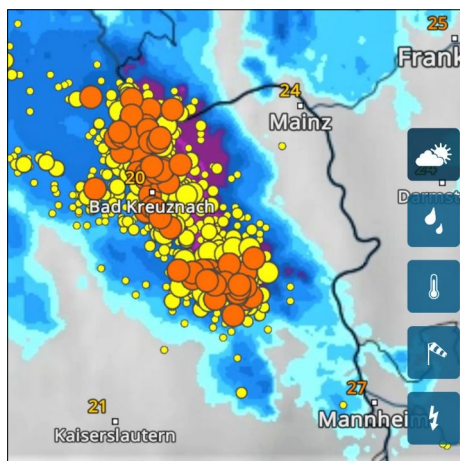
On the ON4KST chat I saw Dirk DL2EAA south of Stuttgart JN48LQ (90 km) testing with Jaap PA00 in JO33HG. I asked Dirk for a sked and immediately he made a transmission. A few days before I had sent an e-mail to some potential sked partners that I am planning QRPp tests in the coming weeks. But Dirk was not on the mailing list. So he had no idea what kind of adventure awaited him. I could hear him immediately with a loud signal. And vice versa, he could hear my signal. After Dirk adjusted his antenna, he was very loud. Making a backscatter QSO shortly after midnight was no problem.

**So my first rainscatter QSO with only 2 mW was made!**



**VIDEO** Big Lightning and Backscatter from Dirk DL2EAA (1,5 MB)  
<https://c.web.de/@337150638448182491/E652qczCQQtSqXVE729c3Tg>

**AUDIO** My 2 mW QRPp CQ received by DL2EAA (0,6 MB)  
<https://c.web.de/@337150638448182491/ua3BlexXRROZY1uK12dZlw>





## Long distances to the East and South

After the first rain scatter QRPp success from home, there were ups and downs. During July contest I was able to increase my tropo ODX to 153 km. Together with my DR2X colleague Matthias DL8DAU, I visited Walter DH6FAE and Frank DG5FEB at the Herchenhainer Höhe in JO40PL. Daniel DL3IAE in JN49DG was worked from there with the mini transverter. And I had no LOS to the southern Palatinate! For pictures and videos see [REF 16](#).

The second rain scatter attempt with Maurice F6DKW on 9. July failed again. This time the signal from Paris was even weaker. Later I was able to hear Daniel DL3IAE via an SCP in the Eiffel (JO30). But again, the signal was not loud enough so I was not heard at all.

But the next activity just three days later on 12. July turned out to be a big success. Major thunderstorms were forecast in the east and south.

I had to hurry a little bit to get to my regular portable QTH in JN49DJ. Rudi OE5VRL in JN78DK north of Linz was only QRV for a limited time.

Shortly after the station was ready, everything happened very quickly. I could immediately hear a very loud signal from Austria. And I was also immediately been heard in OE5. After a short time the QSO was in the log with a new ODX of 451 km.

14:43:41Z	DL3IAS	Nino	10G	QRPp	(OE5VRL)	Servus Rudi, bist Du noch etwas l nger QRV? Ich wr rde mit dem QRP XV auf den Acker fahren ...
14:43:41Z	OE5VRL	Rudi	4 - 47	GHz	(OE3JPC)	ich drehe die ant
14:44:52Z	OE5VRL	Rudi	4 - 47	GHz	(DL3IAS)	servus Nino, eine Stunde etwa
14:45:21Z	OE5VRL	Rudi	4 - 47	GHz	(OE3JPC)	mach nochmal
14:51:52Z	DL3IAS	Nino	10G	QRPp	(OE5VRL)	Ich fahre jetzt los
14:52:25Z	OE5VRL	Rudi	4 - 47	GHz	(DL3IAS)	okay, ich bleibe noch hier
14:56:05Z	OE5VRL	Rudi	4 - 47	GHz	(DL5FDP)	servus Stefan, glaube schon. ich schau mal nach scp
15:00:02Z	OE5VRL	Rudi	4 - 47	GHz	(DL5FDP)	sollte direkt ueber rs gehen. ich sende auf .1100 cw
15:00:17Z	OE5VRL	Rudi	4 - 47	GHz	(DL5FDP)	10368.100
15:10:43Z	OE5VRL	Rudi	4 - 47	GHz	(DL5FCW)	zum schluss gings in den Keller, aber alles okay. 73
15:14:20Z	DL3IAS	Nino	10G	QRPp	(OE5VRL)	Bin QRV
15:14:49Z	OE5VRL	Rudi	4 - 47	GHz	(9A2SB)	an we try 23cm pse
15:15:02Z	OE5VRL	Rudi	4 - 47	GHz	(DL3IAS)	okay, ich ruf mal .100 cw
15:15:12Z	DL3IAS	Nino	10G	QRPp	(OE5VRL)	150 bitte
15:15:34Z	OE5VRL	Rudi	4 - 47	GHz	(DL3IAS)	okay. 150 cw
15:15:43Z	DL3IAS	Nino	10G	QRPp	(OE5VRL)	RX bitte
15:19:37Z	DL3IAS	Nino	10G	QRPp	(OE5VRL)	Super!!!!!! Bitte Audio Aufnahme rufe Cq150
15:19:55Z	OE5VRL	Rudi	4 - 47	GHz	(DL3IAS)	mach e ich gerade
15:20:20Z	DL3IAS	Nino	10G	QRPp	(OE5VRL)	2mW 1 Watt ERP
15:20:57Z	OE5VRL	Rudi	4 - 47	GHz	(9A2SB)	sri. now 3cm
15:21:16Z	OE5VRL	Rudi	4 - 47	GHz	(DL3IAS)	ist gut ich stoppe die aufnahme
15:21:37Z	DL3IAS	Nino	10G	QRPp	(OE5VRL)	Vielen Dank Rudi

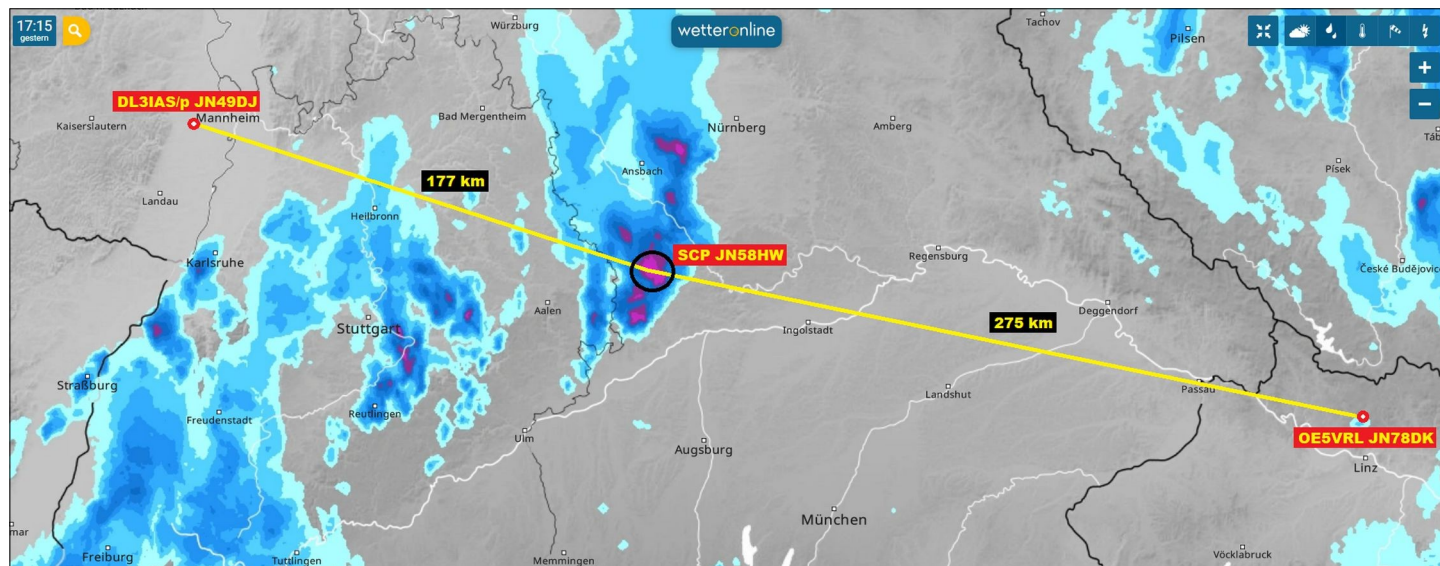


*In contrast to my QRO station, this setup takes just 5 minutes*

**VIDEO** Big Forwardscatter from Rudi OE5VRL (4,9 MB)  
<https://c.web.de/@337150638448182491/xnFX4BrTRKybGFP-XpyjRg>

**AUDIO** My 2 mW QRPp Signal received by OE5VRL (0,3 MB)  
<https://c.web.de/@337150638448182491/P1EBSQRhSuGsP83N-pw61g>

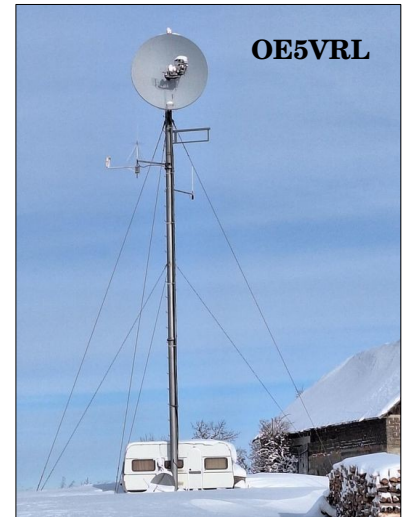
Later @ home I analysed this QSO by using the rain radar map:





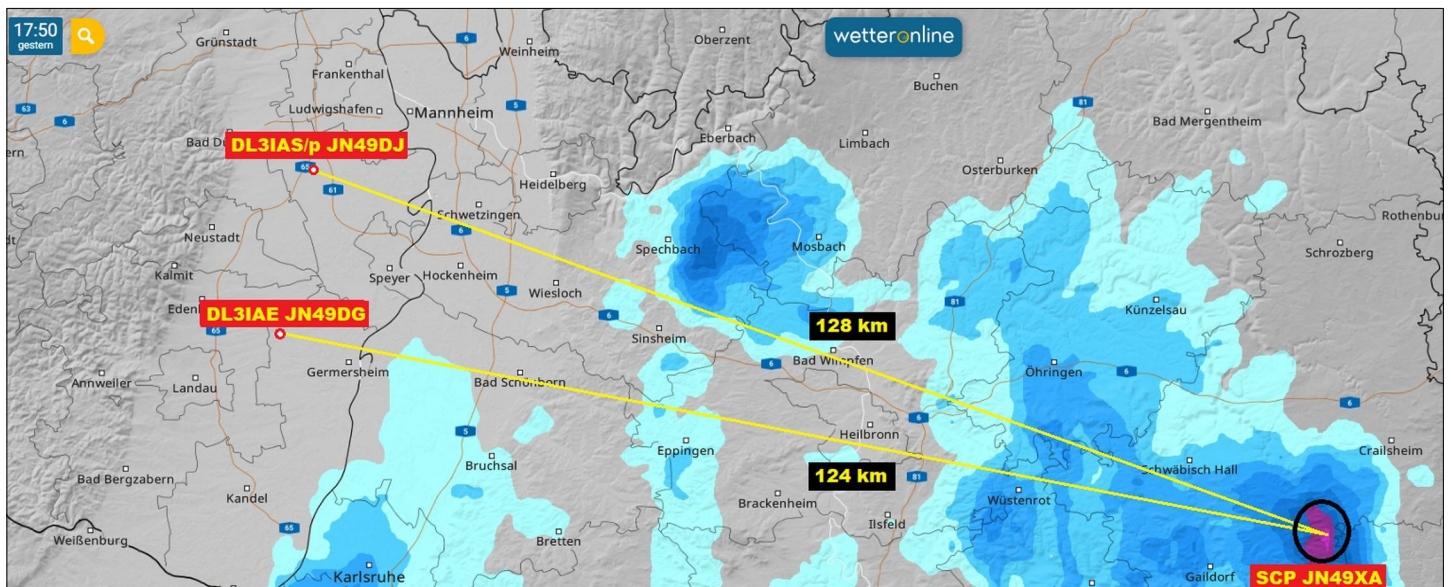
The following findings have been made:

- As you can see, the SCP was almost directly between Rudi and me.
- So my signal was not spread very much.
- My distance to the SCP was 177 km.
- So I was somewhat closer as Rudi with 275 km.
- The SCP was over Hainsfarth (locator JN58HW).
- Having a “Locator Deja Vu”? Maybe because it is the QTH of the 10 GHz beacon DB0MFI.
- Another advantage: The view to the SCP itself was reasonably clear from both directions.
- It is not unusual for a good SCP to be followed by a large area of rain.
- And this rain then causes a lot of additional attenuation.
- This was probably one of the reasons why the first attempt with F6DKW failed.



The next rain scatter QSO was to follow half an hour later. Even though the 16 km to Daniel DL3IAE would have been possible directly. The SCP was closer this time, and located south-east of Crailsheim.

**VIDEO Backscatter Signal from Daniel DL3IAE (7,8 MB)**  
<https://c.web.de/@337150638448182491/ltDyrHEpQnS-Edc6LJyQIQ>



15:40:27Z	DL3IAE Daniel 1-24GHz	(DL3IAS) hallo Nino
15:42:48Z	DL3IAS Nino 10G QRPp	(DL3IAE) 2mW QSO mit Rudi!!!!
15:43:03Z	DL3IAS Nino 10G QRPp	(DL3IAE) Lust auf Versuch?
15:43:21Z	DL3IAE Daniel 1-24GHz	(DL3IAS) super, welcher SCP?
15:43:49Z	DL3IAS Nino 10G QRPp	(DL3IAE) N mberg, und nicht mal violett in der Unwetter-Zentrale
15:44:36Z	DL3IAE Daniel 1-24GHz	(DL3IAS) ja der ist aber gut, Rudis Bake war zu hoeren vorhin obwohl der SCP noch 370km weg war
15:45:05Z	DL3IAS Nino 10G QRPp	(DL3IAE) 150?
15:45:23Z	DL3IAE Daniel 1-24GHz	(DL3IAS) ich rufe mal QTF100
15:45:34Z	DL3IAE Daniel 1-24GHz	(DL3IAS) auf 150
15:46:49Z	DL3IAS Nino 10G QRPp	(DL3IAE) Hoet mal
15:47:23Z	DL3IAE Daniel 1-24GHz	(DL3IAS) ich sehe etwas im Wasserfall aber 2 kHz breit
15:47:27Z	DL3IAS Nino 10G QRPp	(DL3IAE) Laut aber wei nicht ob reich, Cq schleife
15:47:55Z	DL3IAS Nino 10G QRPp	(DL3IAE) Backscatter :-)
15:48:07Z	DL3IAE Daniel 1-24GHz	(DL3IAS) hab dich
15:52:36Z	DL3IAE Daniel 1-24GHz	(DL5FDP) 85 GRad
15:52:40Z	DL3IAS Nino 10G QRPp	(DL3IAE) War was zu sehen?
15:53:30Z	DL3IAE Daniel 1-24GHz	(DL3IAS) nicht wirklich. Dein CW Signal war am Anfang ca. 12 dB im 1 KHz Filter



I also copied Pascal F5LEN near Nancy not very loud via sidescatter (SCP near Strasbourg). But he could not hear me. Fiorello HB9DWK was not QRV at all, because his antenna was in permanent “survival mode” this evening.

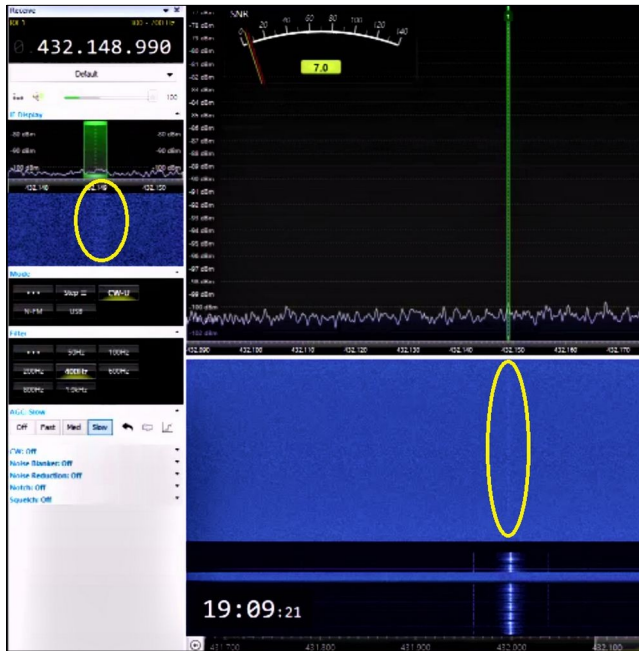
**VIDEO Really no good weather at the QTH of Fiorello HB9DWK (4,1 MB)**  
<https://c.web.de/@337150638448182491/zonAJk9WRpiln00qPAqwEw>



But the day was not over yet. I had send an SMS to Carlo IU4MES (old callsign I4CYH), who is located in JN54QH south of Bologna. After a longer time, he appeared on the ON4KST chat. There were still a some thunderstorms around JN47 and JN57. So why not a test to Italy? I copied Carlo actually quite good. But would it be enough vice versa? I gave a warning on the chat what my signal could be very very weak! And so it did. But as an experienced EME operator, Carlo was able to master the challenge.

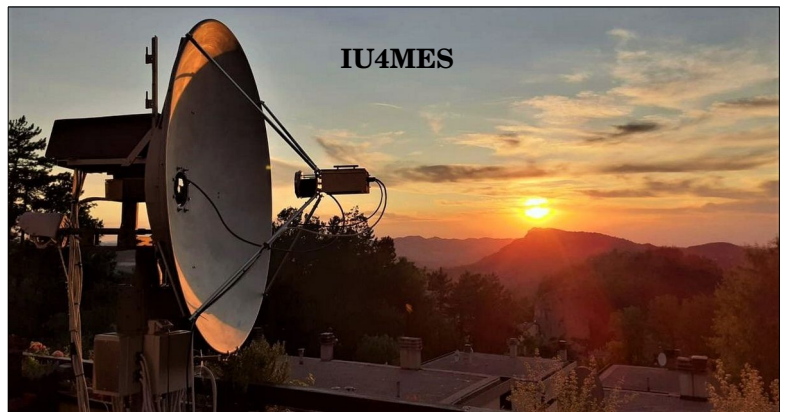
**And so we could complete this DX QSO with a new ODX of 611 km.**

My weak signal in Italy is clearly visible by SDR. The smaller waterfall on the top left shows also the typical spreading caused by rainscatter.



Above: My weak signal in the waterfall  
Right: Carlo always use a big dish antennas

16:57:12Z IU4MES Carlo 23-3-1.2cm (DL3IAS) Nino GA. I was busy. Free now.  
 17:01:24Z DL3IAS Nino 10G QRPp (IU4MES) OK, can you pse TX in 150 via JN47 SCP?  
 17:01:57Z IU4MES Carlo 23-3-1.2cm (DL3IAS) ok. 150 Just a moment.  
 17:02:20Z IU4MES Carlo 23-3-1.2cm (DL3IAS) tx  
 17:03:18Z DL3IAS Nino 10G QRPp (IU4MES) OK RX but maby Not loud enough, pse RX and optimize ant  
 17:03:48Z DL3IAS Nino 10G QRPp (IU4MES) Now CVW loop  
 17:04:15Z DL3IAS Nino 10G QRPp (IU4MES) It can bei very weak  
 17:04:35Z IU4MES Carlo 23-3-1.2cm (DL3IAS) I got U but vy weak  
 17:05:15Z DL3IAS Nino 10G QRPp (IU4MES) OK i Go RX again  
 17:05:18Z IU4MES Carlo 23-3-1.2cm (DL3IAS) PSE slow CVW  
 17:10:46Z DL3IAS Nino 10G QRPp (IU4MES) Tnx u!!!! Only 2mW. I make again Loop i  
 17:11:11Z DL3IAS Nino 10G QRPp (IU4MES) Make Cq Loop again, pse audio Recording If possible  
 17:11:33Z IU4MES Carlo 23-3-1.2cm (DL3IAS) WOW : Congrats Nino . I have a little clip of your signal. Very weak  
 17:11:48Z DL3IAS Nino 10G QRPp (IU4MES) Pse send ON WhatsApp  
 17:12:33Z DL3IAS Nino 10G QRPp (IU4MES) Or e-mail  
 17:14:41Z IU4MES Carlo 23-3-1.2cm (DL3IAS) in your WA



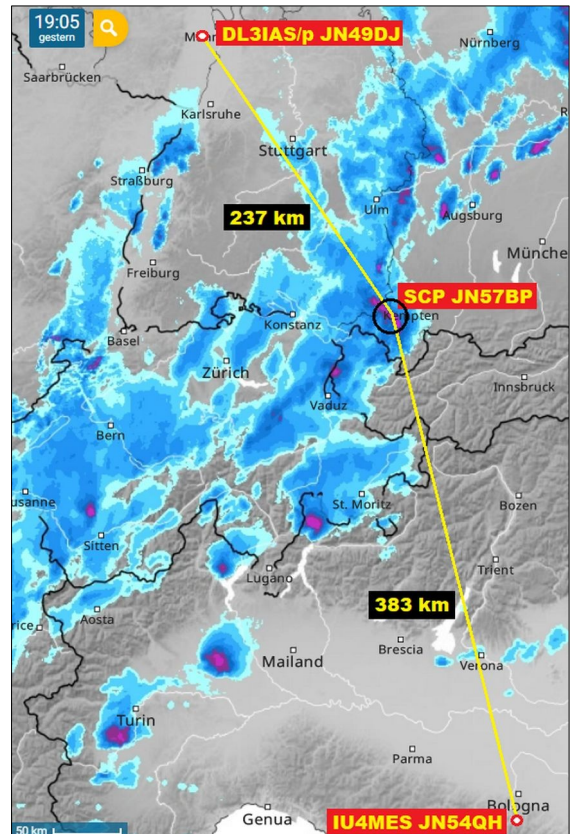
**Attention: The following video is not for faint-hearted ears!**

**VIDEO DL3IAS very very weak at IU4MES (9,4 MB)**  
<https://c.web.de/@337150638448182491/tHFPDrKZRUmeYMGdI581dq>

With some concentration you can hear 'R R R R 73 73 73' in the first 15 seconds, and both callsigns in the second 15 seconds. Here the signal from the Emilia-Romagna, as it was heard in the Palatinate.

**VIDEO A solid Copy of IU4MES at DL3IAS (5,9 MB)**  
[https://c.web.de/@337150638448182491/xl\\_NRH-xQMmMdl0aSE\\_UVg](https://c.web.de/@337150638448182491/xl_NRH-xQMmMdl0aSE_UVg)

For me it was "only" a distance of 237 km to the Allgäu, but 383 km for Carlo. Distances of more can 380 km can be critical, because of no LOS to the SCP any more. Unless it is very high and/or you have a very good take off like at Carlo's QTH (Apennines Mountains).



DK3SE	10368120.0	IU4MES	59s	JN37UP:RS:JN54QH via JN45	1809z	2024-Jul-12
IK3HAR	10368160.0	DK3SE	59s	jn55rk:rs:jn37up	1742z	2024-Jul-12
DK3SE	10368160.0	IK3HAR	+ 59s	JN37UP:RS:JN55RK via JN46	1741z	2024-Jul-12
IU4MES	10368120.0	DL4DBX		JN54QH(RS)JN59NK jn57 scp	1730z	2024-Jul-12
IU4MES	10368150.0	F5LEN		+ JN54QH(RS)JN38B0 59	1721z	2024-Jul-12
IU4MES	10368150.0	DL3IAS		JN54QH(rs)JN49DJ 51 JN47scp	1720z	2024-Jul-12
F5LEN	10368150.0	IU4MES		JN54:RS:JN38 595S	1718z	2024-Jul-12
IK1YWB	10368120.0	F1RJP/P		59 scp jn34ps hi hi	1712z	2024-Jul-12
F1RJ	10368120.0	IK1YWB		JN12MQ:RS:JN35TA 59s	1711z	2024-Jul-12

Extract of 10 GHz spots from the DX cluster of Pascal F5LEN



## Big success in the West at last

After two failed attempts, the third one finally succeeded to direction Paris. On 15. July, a large storm front was approaching from France. Shortly after I arrived at my portable QTH in Otterstadt JN49FI, I was able to copy loud SSB signals on 100 (DL3IAE & F6DKW). And only some minutes later on 150 the QSO with Maurice F6DKW from JN18CS (460 km) was completed! Maurice was delighted, because he had never before a 10 GHz contact with a station using only 2 mW. By the way: This was for me QSO number 70 with Maurice on 10 GHz.

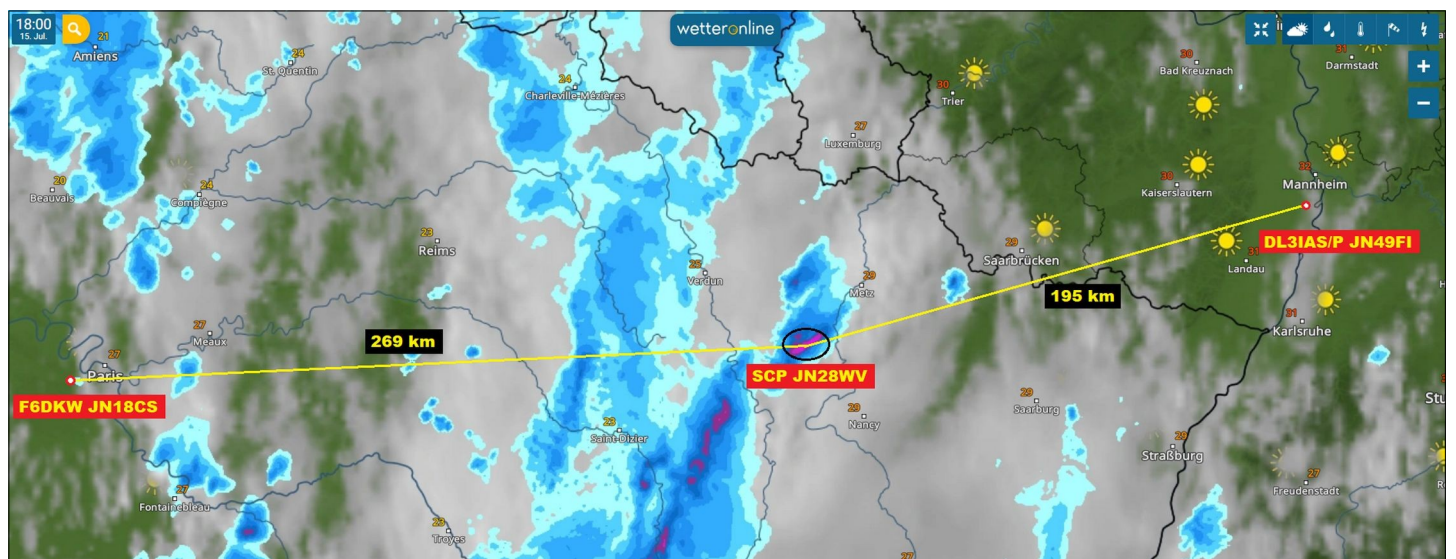


15:44:43Z	DL3IAS	Nino not QRV	(F6DKW) Qrv
15:45:36Z	F6DKW	Maurice 23-3-1.2	(DL3IAS) Me too Daniel loud
15:45:49Z	DL3IAS	Nino not QRV	(F6DKW) 150 CW?
15:46:06Z	F6DKW	Maurice 23-3-1.2	(DL3IAS) RR I tx
15:46:48Z	F6DKW	Maurice 23-3-1.2	(DK3SE) Ga Salvo rr Qrx testing with Nino
15:47:23Z	DL3IAS	Nino not QRV	(F6DKW) RX pse
15:47:40Z	DL3IAS	Nino not QRV	(F6DKW) RX pse
15:51:09Z	F6DKW	Maurice 23-3-1.2	(DL3IAS) Vy nice Nino ! Super with Qrpp
15:51:21Z	DL3IAS	Nino not QRV	(F6DKW) Super! Audio Recording possible?
15:51:35Z	DL3IAS	Nino not QRV	(F6DKW) Cq Loop ON 150
15:51:36Z	F6DKW	Maurice 23-3-1.2	!!! Tr?
15:54:57Z	DL3IAS	Nino not QRV	(F6DKW) OK?, stopped tx
15:55:16Z	F6DKW	Maurice 23-3-1.2	(DL3IAS) record done ! Ill send U ..Up to 52/53s now Incredible !!
15:56:04Z	F6DKW	Maurice 23-3-1.2	(IK2MMB) Ciao Sergio Any Scp for U ?
15:57:23Z	DL3IAS	Nino not QRV	(F6DKW) Merc!
15:58:01Z	F6DKW	Maurice 23-3-1.2	(IK2MMB) Sure Have nice holidays and hope to work U again ! 73
15:58:55Z	F6DKW	Maurice 23-3-1.2	(DL3IAS) Who is Odx me or Rudi ?
16:00:09Z	F6DKW	Maurice 23-3-1.2	(IK2MMB) Crossing finger for good rs like before..
16:00:52Z	DL3IAS	Nino not QRV	(F6DKW) IU4MES 611 km
16:01:20Z	F6DKW	Maurice 23-3-1.2	Wow !!



**VIDEO** Big Forwardscatter from Maurice F6DKW (9,8 MB)  
<https://c.web.de/@337150638448182491/Uvb1E7-ORUuqkKCLF0U75g>

**AUDIO** My 2 mW QRPp Signal received by F6DKW (1,5 MB)  
[https://c.web.de/@337150638448182491/eEhglm0GQwGK2Of-9\\_sYrQ](https://c.web.de/@337150638448182491/eEhglm0GQwGK2Of-9_sYrQ)

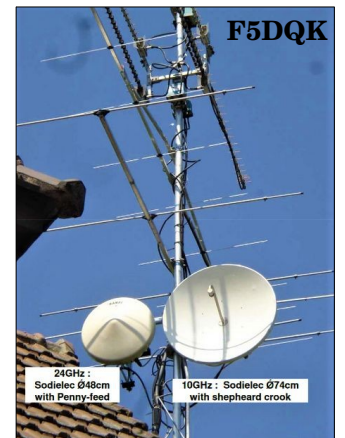


But two more QSOs to France should be possible this evening! Marc F8DLS from JN19SE (357 km) near Reims, and Marcel F5DQK from JN18GR (434 km) near Paris.

**VIDEO** The SSB signal from Marc F8DLS (6,0 MB)  
<https://c.web.de/@337150638448182491/xiJaAlvtjWGLLItopmSuQ>

**VIDEO** The CW signal from Marcel F5DQK (4,0 MB)  
<https://c.web.de/@337150638448182491/4LxN4r9DQqFeH-WWZOHoDlw>

- Via the big SCP in Lorraine it was also possible to hear Fiorello HB9DWK, but not vice versa.
- On the ON4KST Daniel DL3IAE gave me a solid 53S.
- Pascal F5LEN was not far away from the SCP in Metz. But he could not see it as he is blocked to the north.



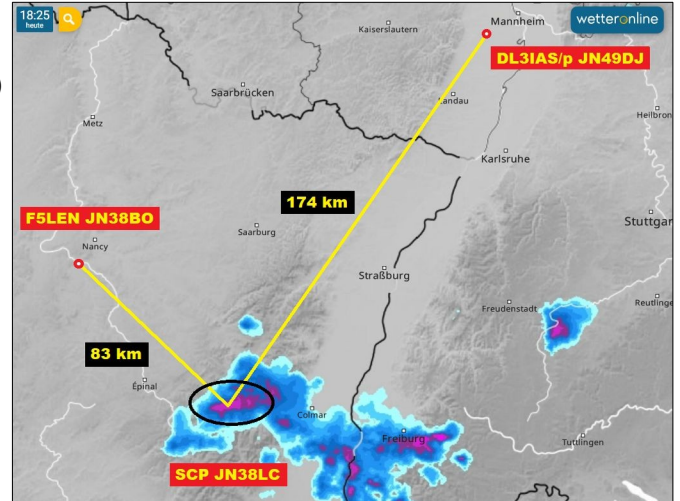


### It does not always have to be the direct way

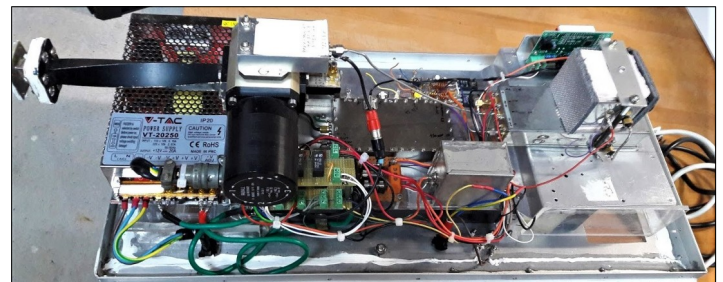
Only my activity after next should be successful again from JN49DJ. On 31. July the SCPs were in the south. But by using rainscatter you do not always have to take the “direct” way. After two previous failed attempts, I was finally able to work Pascal F5LEN who is located south of Nancy in JN38BO (181 km). As Pascal is also blocked to the north-west, the QSO had to be made via sidescatter. The SCP was in Gérardmer / Vosges Mountains.

**VIDEO** Sidescatter from Pascal F5LEN (1,6 MB)  
<https://c.web.de/@337150638448182491/r14oYfEsTsO1IM0WiK9D6A>

**AUDIO** My 2 mW QRPp Signal received by F5LEN (2,0 MB)  
<https://c.web.de/@337150638448182491/-AMXj157SqCRuqvoWrwfHA>



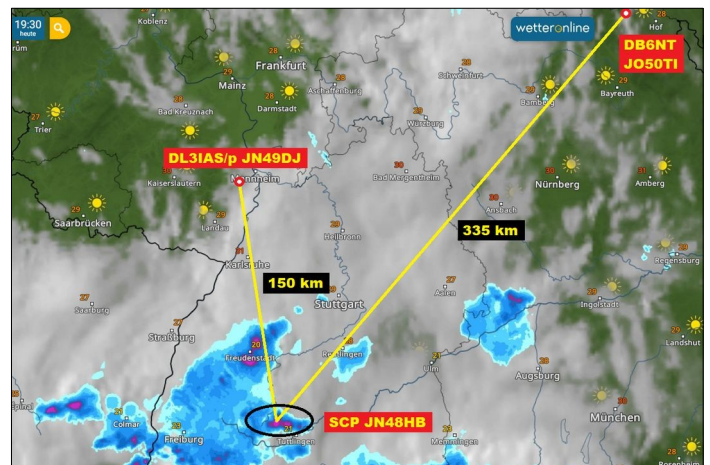
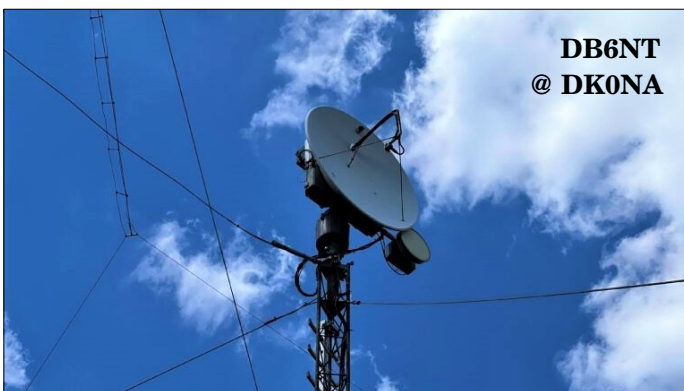
16:15:33Z	DL3IAS Nino 10G	(HB9DWK) Salut Fiorello QRV
16:15:58Z	DL3IAS Nino 10G	(OE5VRL) Servus Rudi
16:16:11Z	DL3IAS Nino 10G	(F5LEN) BJ Pascal, i am qrv
16:16:41Z	F5LEN Pascal 3cm	(DL3IAS) Slt Nino, around 110 I'm Cqing
16:19:13Z	DL3IAS Nino 10G	(F5LEN) Heard u pse 45 kHz Up you are 5 to low
16:19:59Z	DL3IAS Nino 10G	(F5LEN) Pse Call again ON 150
16:20:15Z	F5LEN Pascal 3cm	(DL3IAS) RR
16:20:17Z	DL3IAS Nino 10G	(F5LEN) For u 155
16:21:00Z	DL3IAS Nino 10G	(F5LEN) I Call nie
16:21:03Z	DL3IAS Nino 10G	(F5LEN) Now
16:21:18Z	F5LEN Pascal 3cm	(DL3IAS) ok
16:21:51Z	DL3IAS Nino 10G	(F5LEN) CPI?
16:22:04Z	F5LEN Pascal 3cm	(DL3IAS) No I call agn
16:26:12Z	DL3IAS Nino 10G	(F5LEN) Super!!! Cq Loop, ist audio Recording possible SVP?
16:26:34Z	F5LEN Pascal 3cm	(DL3IAS) Good one Nino 73
16:26:51Z	F5LEN Pascal 3cm	(DL3IAS) I have a record yes
16:26:58Z	DL3IAS Nino 10G	(F5LEN) And pse DX spot :-
16:27:01Z	DL3IAS Nino 10G	(F5LEN) Merci



A look inside the transverter of Pascal F5LEN

The second QSO this evening was Michael DB6NT, who was QRV at the club station DK0NA in JO50TI (262 km). Here the SCP was above Trossingen. And with a distance of 335 km this was quite a distance from Michael's QTH.

**VIDEO** CQ by Michael DB6NT via Backscatter (9,9 MB)  
<https://c.web.de/@337150638448182491/8nSulKYds1qVE38iYzqfCw>



What else was (not) possible on this last day of the month? Rudi OE5VRL and Carlos IU4MES were both heard. Rudi could not hear me at all via sidescatter. And it was not enough signal strength for a QSO with Carlo either. But at least he was able to see my very weak signal on the waterfall. They would actually have been very good SCPs for a sked with Fiorello HB9DWK. But without going into details, Murphy unfortunately struck again. And so I missed him by just a few minutes



## Summary and Conclusions

You may have noticed that everything is kind of repetitive. So I will leave it at that for now and conclude this report. Even though this year's rainscatter season is not yet over.

Here is a tabular overview of the nine (9) rainscatter QSOs that have been made with 2 mW QRPp so far. Including the output power and parabolic dish sizes of my QSO partners.

Date	Time UTC	Call	RST send	RST receive	Locator	QRB	Power	Dish size
29. Jun 2024	22:05	DL2EAA	59S	52S	JN48LQ	90 km	7 Watt	70 cm
12. Jul 2024	15:16	OE5VRL	59S	53S	JN78DK	451 km	25 Watt	300 cm
12. Jul 2024	15:49	DL3IAE	59S	55S	JN49DG	16 km	20 Watt	65 cm
12. Jul 2024	17:07	IU4MES	59S	51S	JN54QH	611 km	15 Watt	180 cm
15. Jul 2024	15:48	F6DKW	59S	51S	JN18CS	460 km	25 Watt	90 cm
15. Jul 2024	16:22	F8DLS	59S	55S	JN19SE	357 km	8 Watt	75 cm
15. Jul 2024	16:46	F5DQK	59S	41S	JN18GR	434 km	8 Watt	74 cm
31. Jul 2024	16:23	F5LEN	59S	52S	JN38BO	181 km	25 Watt	75 cm
31. Jul 2024	17:30	DB6NT	59S	53S	JO50TI	262 km	50 Watt	120 cm

Some days later during another brief portable activity Fiorello HB9DWK was able to see my weak signal in the waterfall. Willy LX1DB from JN39CO also heard my signal weak during a spontaneous attempt from my home QTH. But no QSO here either.

It could be shown that even with only 2 mW QRPp it is possible to do long distances rainscatter QSOs. This required very good SCPs in the right position, the use of CW and some patience. With 10 mW, the power level of earlier Gunnplexer, more QSOs would certainly have been possible. And with 200 mW, the typical output power of a transverter? You probably will not going to win a contest or make 500 km DX QSOs every day. But with skilful use of rainscatter or tropo, nice DX connections are reliably possible here.

Many thanks to everyone who was able to hear my really weak signal this time or at least tried to. But also for your patience, because some QSOs required several attempts. I will be QRV again with my 10 watt PA in the future. But that does not rule out doing QRPp occasional when the opportunity arises.

Vy 73 and best DX,  
**Nino DL3IAS**



*The author of this report, after not having shaved for 10 days? No!*





## References

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