Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title: **Making Spectrum Available in the 71-76 & 81-86GHz Bands**

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Name: *M.J.Niman G6JYB MIEE* Signed (if hard copy)

Making Spectrum Available in the 71-76 & 81-86GHz Bands

Joint response from the Radio Society of Great Britain, UK Microwave Group and Amsat-UK.

August 2nd 2006

Introduction

This response is a joint one from the Radio Society of Great Britain (RSGB, www.rsgb.org.uk) and its affiliates UK Microwave Group (UKuG, www.microwavers.org) and Amsat-UK (www.uk.amsat.org) to the above Ofcom consultation that considers both Amateur Service allocations and licensing of the new Links themselves.

RSGB and its affiliates have in the past few years attached considerable importance to protecting and promoting activity in both the 24GHz and 76GHz Primary allocations. In parallel, both of these bands have been subject to intrusions by ultra-wideband licence-exempt Car Radar and more recently the issue of sharing with the links that are the topic of this consultation with which we maintain we can coexist on a Co-Primary basis.

We maintain that there is a strong case to retain 75.5-76GHz on a Co-Primary basis and explain the basis of this in the main response along with the nature of current activities. Further, where we have ample Primary and Secondary spectrum side-by-side, it is the Amateur Services' policy (supported by the International Amateur Radio Union – IARU) to concentrate activity in the Primary sections and not use the Secondary ones – a point that is included in regard to the 81-81.5GHz allocation that is also "on offer".

We thank Ofcom for this opportunity to comment. We would be pleased to provide any additional information on request or participate in any future discussions.

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RSGB, UKuG & Amsat-UK, August 2006

Consultation Question and Answers

Question 1
Do you agree that the Amateur and Amateur-Satellite allocations in the 75.5–76GHz band should remain in the UK Frequency Allocation Table after 31st December 2006 on a secondary basis? If not, what would you suggest as an alternative approach?

Also, what is your view on permitting the secondary Amateur and Amateur-Satellite allocation in the 81–81.5GHz band within the UK Frequency Allocation Table?

Answer 1:

75.5-76GHz

The Amateur Services should remain in the UK Table on a **CO-PRIMARY** basis as per ECC Decisions and the recently revised European Allocation Table (ERC Report-25) which fully reflects EU Allocation Table Note EU35 that permits Amateur Services to remain at 75.5-76GHz on a Primary basis.

A more detailed regulatory 'paper-trail' for this is provided in Annex-A. We would highlight that RSGB also directly participated in the ECC REC 05(07) process where it was explicitly recognised that Links and Amateur services would be sharing on a Co-Primary basis and no incompatibility was found by ECC.

UK Amateur systems are low power narrowband CW/SSB at 75.976GHz (outside of the main data channels, in a guardband) making sharing particularly easy. In this regard we also note that Gigabeam who are specialists in this field are comfortable with a coordination zone of needing to be within 5° and 100m - a very low probability for Amateur users who are generally on a listen-before-transmit basis. Noting the consultation documents comments about the nature of amateur activity, we would emphasise that significant self-training and experimentation is occurring at this frequency. The current Amateur stations are largely portable ones operated from hilltops as per the activity map in Annex-B (which can be interactively zoomed and queried on the UK Microwave Group Website, www.microwavers.org)

Ofcom's 'Better Policy Making' Para-5.13 requires that a no new intervention should be the default, though naturally this does not exclude future evidence/reviews. *"When identifying the possible options, we will generally start by considering the option of not changing the regulatory framework, either by not introducing regulation or by retaining existing regulation."*

"Good regulation" should be an evidence-based approach and until such time that a problem is actually found, we submit that a unilateral downgrade of a Primary User to Secondary status would be an unjustified over-reaction. It would also obviously have significant symbolism, and may be seen as an unfortunate example in the wider Spectrum User Rights context. In any case, under the Radio Regulations, Co-Primary would not permit Amateurs to claim priority over other Primary Services, but it would reassure us of our standing in future sharing scenarios with other secondary or licence-exempt systems.

81-81.5GHz

A modest number of European states have already implemented the 81-81.5GHz allocation on a Secondary basis to Amateur Services in line with ITU recommendations. Such an allocation is fully understood to be a Secondary one on a non-interference basis with respect to licensed links. Whilst we would normally welcome such an allocation in the UK (on the grounds of harmonised European allocations), we highlight its use would be very low priority for the foreseeable future. Provided that 75.5-76 remains allocated on a Co-Primary basis there would be ample spectrum for operations to continue at 75.976GHz in line with IARU policy/bandplans. **Indeed we would be prepared to forgo the 81.5GHz allocation if it contributed to 75.5-76GHz being retained by the Amateur Services in the UK as Co-Primary, as we also understand this would ease planning for link users in the 81-86GHz segment**

Question 2

Do you agree that a light licensed approach is appropriate to facilitate access to the 71-76 GHz and 81-86 GHz bands?

What are your views on the need to provide a regulatory mechanism for interference protection of fixed links operating in the 71-76GHz and 81-86GHz bands?

Do you agree that links registered in the database require a date/ time priority rule for establishing interference protection of links?

Answer 2

A light-licensed approach seems reasonable and is preferable to the licence-exemption we have seen at adjacent frequencies for Car Radar applications.

Question 3

Do you agree that a fee based on £50 per link per year provides the right balance between allowing access to spectrum and discouraging the hoarding of 'paper' links within the registration Database. If not, what would you suggest as an appropriate fee to achieve these aims?

Answer 3

We note that the fee is a very modest one relative to the likely equipment and service values and may not deter hoarding of 'paper' links by unscrupulous players. The latter would make coordination of future commercial as well as amateur usage more difficult. We would request that Ofcom include suitable licence conditions and a database checking procedure to guard against this possibility. In addition we would find coordination easier ourselves if the database was open to general read-access as this would help when planning any future amateur beacons..

Question 4

Do you agree that the CEPT channel plan ECC/Rec(05)07 should not be mandated and that a flexible band structure comprising of two national spectrum blocks of 4.75GHz is appropriate for facilitating access to the 71-76GHz and 81-86GHz bands?

Answer 4

A flexible yet compatible approach that permits aggregating channels seems entirely reasonable.

Question 5

In addition to the date/time priority rule do you think it would be beneficial for Ofcom to set a maximum interference threshold policy for the 71-76GHz and 81-86GHz bands? If so, do you have suggestions for the criteria and how this could be assessed?

Answer 5

The approach referred to by Gigabeam (being within 5° and 100m of boresight) seems worthy of further consideration.

Question 6

Are there any regulatory impacts or other considerations not otherwise mentioned in this consultation that you believe are relevant to the 71-76GHz and 81-86GHz bands?

Answer 6

During the consultation period we have noted a number of relevant developments:-

Car Radar Interference

ETSI Standard EN-301-091 (which is currently open for comments via Ofcom) has 0dBm/MHz Spurious Out-of-Band emissions permitted as low as 73.5GHz which is well outside of its regulated 76-77GHz range. As band usage rises this inordinately high level would create undue harmful interference to both Commercial Links and Amateur systems. Whilst this specification may have been acceptable at an earlier stage of Car-Radar maturity, it would be deleterious in future as equipment numbers rise. We request that Ofcom comments on this to ETSI and asks them to consider a more typical OOB level such as the -41dBm/MHz figure promulgated by UWB proponents as minimising interference.

Spectrum Efficiency and Range

Whilst the Links concerned are nominally 1-2km, the 76GHz band does permit relatively long ranges. Even with the current low power, high noise figure equipment used, UK amateur distances using carefully focussed/directed dishes and narrowband modes are regularly in the 20-30km range, with the UK distance record currently being 79km. We would request that Ofcom fully open up the high-attenuation 60GHz band which would be more appropriate for spectrally-efficient short-range licence-exempt applications. The 60GHz band permits considerable frequency re-use, has equipment available and would ensure a balanced approach that would leave the longer-range spectrum resource in the 76-86 GHz bands more appropriately utilised.

Ofcom SES & EU mm-Wave Studies

The UK Microwave Group has recently participated in Ofcom Study SES2006-10 (by Quotient Associates) and a shorter but similar EU survey regarding lighter regulation and/or licence-exemption at all frequencies above 30GHz. Whilst we are pleased to have been engaged at an early stage this has created some nervousness and uncertainty. We would appreciate an interim statement by Ofcom on its thinking as this licensed spectrum does fall within the SES Study remit.

Ongoing Discussions & Timing

The UK Amateur Licence is currently being revised in a collaborative Ofcom-RSGB exercise with the results rolling out from August 21st and October 1st onwards. We would welcome any additional discussions that would lead to a timely and positive decision regarding the retention of the 75.5-76GHz allocation and an update of the new Amateur Licence Schedule. We are understandably keen to seek assurances for current amateur users that their pioneering work and equipment has not been in vain. A statement ahead of the annual Martlesham Microwave Roundtable on November-11/12 would be particularly helpful.

Annex-A: Previous CEPT Decisions in respect of the Amateur Services at 76GHz

On p3, paragraph h) of ECC/DEC/(04)03 (on ultrawideband CAR Radar at 77-81GHz), it is stated that:-

> **"the use of SRR within the band 77-81 may be incompatible with the Radio Amateur Service which has been resolved by allowing the Amateur Service to remain in the 75.5-76GHz band after 2006 (see footnote 5.559A);"**

This was a direct result of CEPT ECC Report 56. The Executive Summary on p2 of ECC Report 056 states:-

> **"However, it was agreed within CEPT to extend the timescale for Radio Amateur Service on a primary basis within the band 75.5-76GHz beyond 2006**." This modification was made in the update of the European Common Allocation Table, January 2004 (footnote 5.559A). This was done to compensate potential incompatibility problems with the Amateur (Satellite) Service that operates with a primary status in the 77.5-78GHz band.

Similarly on p4 of ECC Report 056 it states:-

> **"As for the Amateur (Satellite) Service, it was concluded that the use of 79GHz SRR systems might be incompatible. WGFM agreed consequently to extend the timescales given in footnote 5.559A, which permits Radio Amateur Service on a primary basis within band 75.5-76GHz beyond 2006. This change was included in the update of the European Common Allocation Table, January 2004."** This Frequency Management solution compensates for potential incompatibility problems with the Amateur (Satellite) Service that operates with a primary status in the 77.5-78GHz band

On the basis of EU35 being implemented, the RSGB and the UK Microwave Group adopted the pragmatic attitude that technology development in the 77-81GHz band for vehicle radar be 'welcomed'. The logic for this was that it would assist migration from, and reduce interim use of, the 24GHz band for vehicle SRR (also, in part, an Amateur Primary band), whilst permitting Amateurs to continue operating and experimenting in their original 75.5-76GHz band. Of course this would be assisted by low OOB emissions from 76-77GHz radars

Note: Papers by RSGB and IARU for the September 2005 IARU Conference in Davos focussed on promoting activity at 75.5-76GHz and recommend avoiding activity in other allocations, particularly Secondary ones, accepting that 500MHz of interference-free bandwidth on a Primary basis is sufficient for all foreseen future needs of amateurs

Frequency, GHz	Allocation	Comment
75.5-76.0	**Primary**	Existing allocation, permitted for continued use beyond 2006 by EU35
76.0-77.5	Secondary	Subject to LRR/SRR interference
77.5-78.0	**Primary**	Subject to SRR interference
78.0-81.0	Secondary	Subject to SRR interference

Table-1: Amateur Service Allocations in the 75.5 – 81.0GHz bands

[1] "ECC Decision of 19 March 2004 on the frequency band 77–81GHz to be designated for the use of Automotive Short Range Radars", CEPT Electronic Communications Committee ECC/DEC/(04)03

[2] "Compatibility of Automotive Collision Warning Short Range Radar Operating at 79GHz with Radiocommunication Services ", CEPT ECC Report 56, Stockholm, October 2004

Referring to EU35 Ofcom stated in 2005 (in a public statement on Car Radar, responding to the UK Microwave Group input to the Ofcom 79GHz Car SRR implementation consultation):

> *"Ofcom is aware of Footnote EU35 of the European Frequency Tables and will take all necessary steps to permit Amateur and Amateur Satellite services in 75.5-76 GHz after 2006;"*

Later that same year in August 2005, CEPT consulted on REC-05(07) for the wideband datalinks involved in this current consultation. RSGB submitted a public domain response that re-quoted the EU35 justification and requested some consideration in the 75.5-76 overlap. Below is an extract of the minutes of the meeting that reviewed this, available on the ERO website:-

32nd meeting of PT SE 19 Budapest, 22-23 September 2005

Date issued: 23 September 2005, Source: SE19
Subject: Final Summary of the 32nd PT SE19 meeting

3. Results of consultation of Draft ECC/REC(05)07 on FS in 71-76/81-86 GHz

The chairman presented Doc. 71 from ERO with the summary of results of public consultation of deliverables, approved by the June meeting of WGSE.

One of the consultation documents was the draft ECC/REC(05)07 on FS in 71-76/81-86 GHz, previously developed in SE19. This document received comments from 5 organisations.

The meeting reviewed the comments to the draft ECC/REC(05)07 given in Doc. 71 as well as the Doc. 74 presented to this meeting by Sweden. As a result of detailed consideration of comments, SE19 decided on the following principal points:

1. *to support the idea of aggregating any number of channels, as proposed by GigaBeam, Huber+Suhner;*
2. *not support the proposal from Nokia to reduce the channel raster size to 125 MHz, as there was little evidence that such small channels would be utilised by high-bit rate systems envisaged for this band;*
3. *not support the proposal from Huber+Suhner to replace the Annex 4 by a simple reference to future ETSI EN/TS, instead to make a more clear status of Annex 4 as an example of technical specifications until the relevant ETSI specifications (EN) have been publicised;*
4. *to note the concerns of Radio Society of GB on the protection of radio amateur services in portion of these bands, and that these concerns should be sufficiently covered by a reference in considering (a) and by the fact that protection of other services would be ensured through the national considerations;*
5. *not support the proposal from ELVA-1 on introduction of concept of point-to-multipoint services in this recommendation, although noting that the current wording does not explicitly prohibit such services. The decision in this case being left to the national decision and the design of the national licensing arrangement for FS in these frequency bands;*
6. *to support the proposal from ELVA-1 to allow the combination of duplex channels with duplex separation of less than 10 GHz, i.e. to allow both duplex parts of one channels to be located in the same sub-band, either 71-76 or 81-86 GHz;*
7. *to support the proposal from Sweden in Doc. SE19(05)74 to include a new considering with recognition of long term solution for automotive Short Range Radars in the band 77-81 GHz.*

The result is that REC05(07) contains this:-

Considering

a) that ITU Radio Regulations (RR) and the European Table of Frequency Allocations and Utilisations (CEPT/ERC Report 25) allocate the bands 71 - 76 GHz and 81 - 86 GHz on a primary basis to Fixed Service as well as other co-primary services;

European Frequency Allocation Table – ERC Report 25

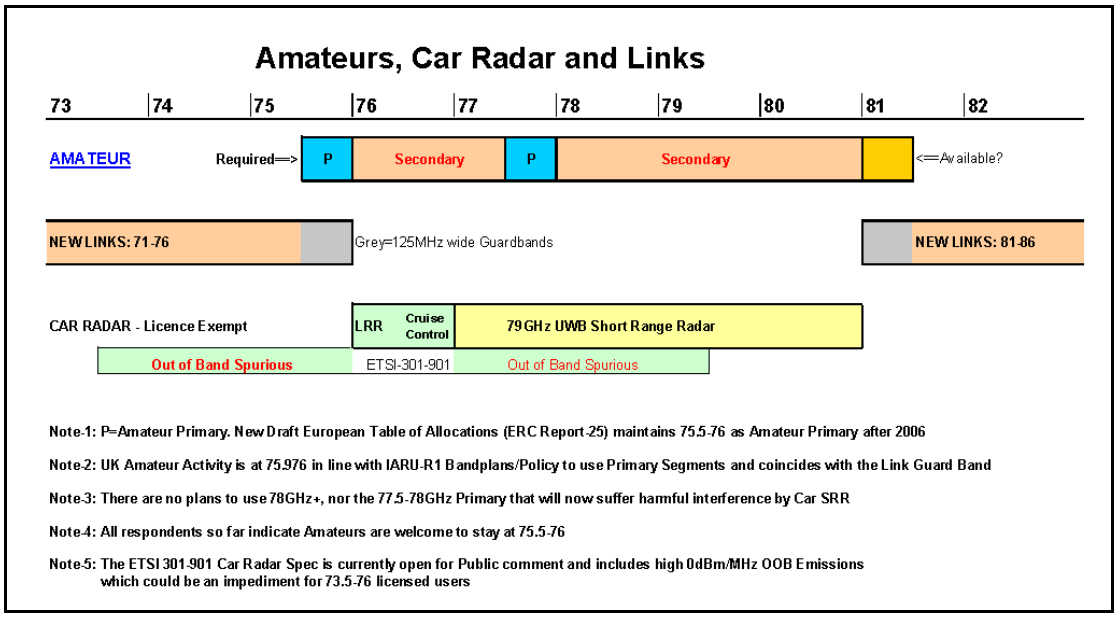
Most recently the European Table of Frequency Allocations, ERC Report-25, has been thoroughly updated to incorporate a number of CEPT decisions etc and a draft of this was released on the ERO website in June 2006 for public comment.

For convenience we reproduce the extract below where it now clearly shows the Amateur Services remaining as Co-Primary in the CEPT area as a result of the EU35 process and unaffected by the REC05(07) process:-

Draft revised ERC REPORT 25

RR Region 1 Allocation and RR footnotes and Frequency Band	European Common Allocation	Major utilisation	EU footnote	ECC/ERC document	Standard	Note
75.5 - 76 GHz						
BROADCASTING BROADCASTING-SATELLITE FIXED FIXED-SATELLITE (S/E) MOBILE Space Research (S/E)	BROADCASTING BROADCASTING-SATELLITE FIXED FIXED-SATELLITE (S/E) MOBILE AMATEUR AMATEUR SATELLITE Space Research (S/E)	Amateur Amateur Satellite Fixed links	EU35	ECC REC 05-07	EN 301 783	
5.559A 5.561	EU2 5.561 EU35	Space Research				VLBI
76 - 77.5 GHz						
RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-Satellite Space Research (S/E)	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-Satellite Space Research (S/E)	Amateur Amateur Satellite Automotive SRR		ECC DEC (04)03	EN 301 783 EN 301 783	
5.149	5.149 EU2	Civil radiolocation				
		Radio astronomy				Spectral line and wide band continuum observations
		RTTT		ECC DEC (02)01 ERC REC 70-03	EN 301 091	Within the band 76-77 GHz Radar. Road Transport and Traffic Telematic

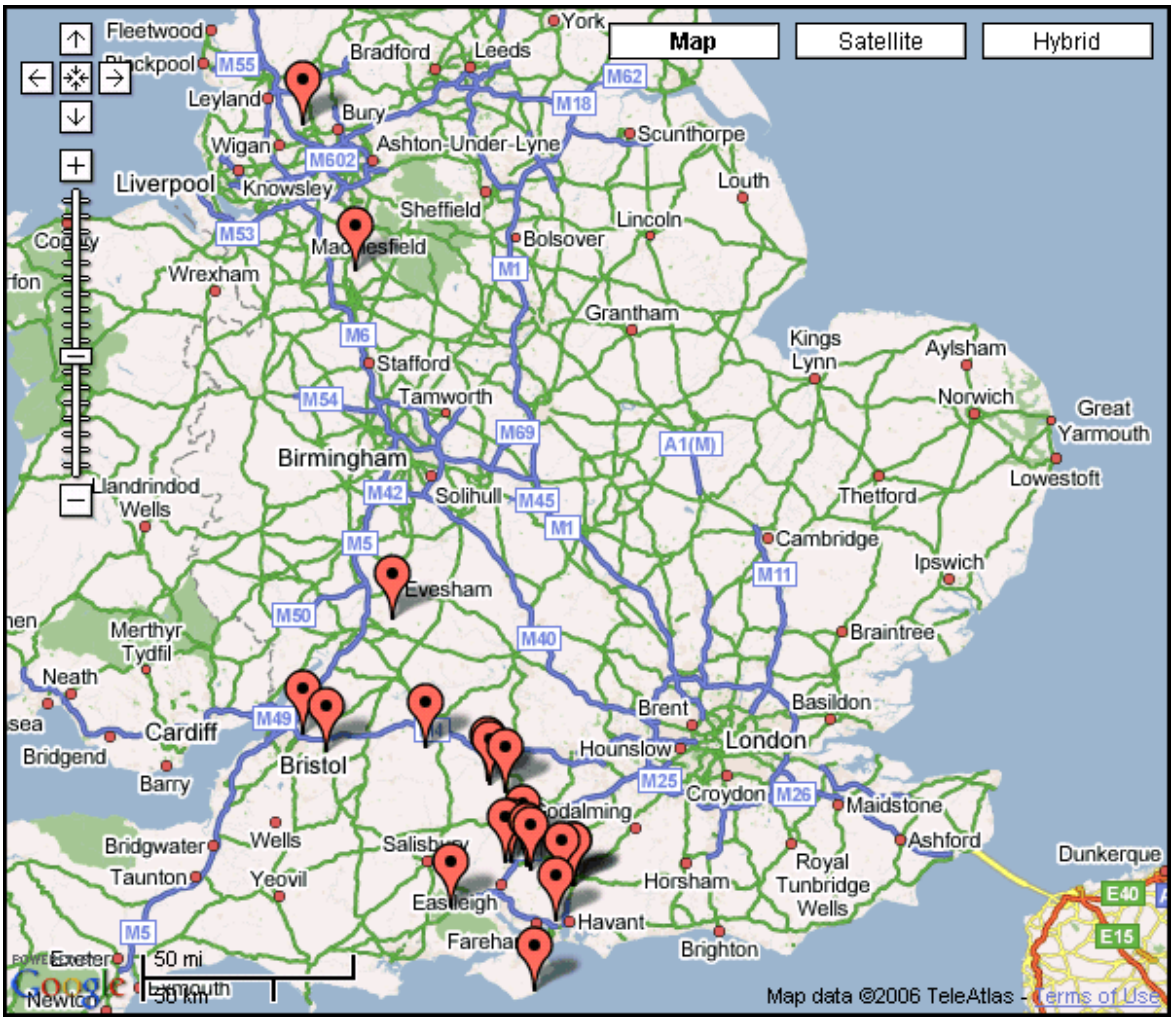
In addition the same revised table has a note on a later page indicating 81-81.5GHz being allocated to the Amateur Services on a Secondary Basis. This results in the following allocation scenario:-



Annex-B: UK Amateur Activity at 75.976GHz

For information below we reproduce where 75.976GHz Amateur Transmissions have been most active. At present the are no 76GHz beacons or amateur satellites (largely due to technology availability and spare time/money), and activity is the very epitome of the 'self-training' and experimentation ethic that the Amateur Services seeks to promote.

The map below (which can be zoomed up and interrogated on the UK Microwave Group website) is a result of gathering in logbook data from current 'Southern Group' operators over the past few years.



To shed further light on performance here is an extract of the that logbook analysis, showing the distances being achieved (largely by portable stations on hilltop sites)

CALLSIGN	LOCATION	Lat	Long	WORKED	LOCATION	Lat	Long	DISTANCE km
G3PYB/P	IO90MX24 Butser, Hants	50.977	-0.981	G8ACE/P	IO91JA47 Lane End	51.0320	-1.2156	17.5
G3PYB/P	IO90MX24 Butser, Hants	50.977	-0.981	G8BKE/P	IO91JA47 Lane End	51.0320	-1.2156	17.5
G8ACE/P	IO91JB01 Cheesefoot Head, Ha	51.047	-1.244	G8BKE/P	IO91GI44 Walbury Hill, Be	51.3517	-1.4629	37.2
G8ACE/P	IO91CL22 Hackpen Hill, Berks	51.467	-1.814	G8BKE/P	IO91GI44 Walbury Hill, Be	51.3517	-1.4629	27.7
G8ACE/P	IO91GI44 Walbury Hill, Berks	51.352	-1.463	G3PYB/P	IO90MX24 Butser, Hants	50.9771	-0.9814	53.5
G0HNW/P	IO83RO Winter Hill	53.604	-2.542	G7MRF/P	IO83VC47 Mow Cop, Staf	53.1142	-2.2092	58.0
G3PYB/P	IO90JO54 Ventnor IoW	50.603	-1.200	G8BKE/P	IO91HH64 Highclere	51.3123	-1.3657	79.6
G3PYB/P	IO90JO54 Ventnor IoW	50.603	-1.200	G8ACE/P	IO91HH64 Highclere	51.3123	-1.3657	79.6
G3FYX	IO81RM93 (home)	51.516	-2.500	G8BKE/P	IO81TK40 Tog Hill	51.4522	-2.3785	11.0
G3PYB/P	IO90LX44 Salt Hill, Hampshire	50.976	-1.043	G8ACE/P	IO91JA47 Lane End	51.0320	-1.2156	13.6
G3PYB/P	IO91IC85 Bridgets Farm	51.107	-1.266	G8ACE	IO91IB05 home	51.0642	-1.3306	6.6
G3PYB/P	IO90LU05 Portsdown Hill, Hants	50.855	-1.081	G8ACE/P	IO91HB65 Crabwood, Har	51.0631	-1.3664	30.6
G3PYB/P	SU71402020 Butser	50.976	-0.983	G8ACE/P	SU384602, IO91GI61	51.3391	-1.4487	51.9
G3PYB/P	IO91JB01 Cheesefoot Head, Ha	51.047	-1.244	G8ACE/P	IO91GI44 Walbury Hill, Be	51.3517	-1.4629	37.2
G3PYB/P	IO90DV96 Ocknell Plain	50.903	-1.667	G8BKE/P	IO91HB65 Crabwood, Har	51.0631	-1.3664	27.6
G3PYB/P	IO90DV96 Ocknell Plain	50.903	-1.667	G8BKE/P	IO91JA47 Lane End	51.0320	-1.2156	34.7
G3PYB/P	IO90MX24 Butser, Hants	50.977	-0.981	G8ACE/P	IO91JA47 Lane End	51.0320	-1.2156	17.5
G3PYB/P	IO91GI44 Walbury Hill, Berks	51.352	-1.463	G8ACE/P	IO91HB65 Crabwood, Har	51.0631	-1.3664	32.8
G3PYB/P	IO91JA47 Lane End	51.032	-1.216	G8ACE/P	IO91GI44 Walbury Hill, Be	51.3517	-1.4629	39.5
G3PYB/P	IO90LX44 Salt Hill, Hampshire	50.976	-1.043	G8ACE/P	IO91GI44 Walbury Hill, Be	51.3517	-1.4629	51.0
G8ACE/P	IO91JA47 Lane End	51.032	-1.216	G3PYB/P	IO90MX24 Butser, Hants	50.9771	-0.9814	17.2
G8FYX/P	IO91JA47 Lane End	51.032	-1.216	G3PYB/P	IO90MX24 Butser, Hants	50.9771	-0.9814	17.2
G8ACE/P	IO91JA47 Lane End	51.032	-1.216	G8BKE/P	IO90DV96 Ocknell Plain	50.9025	-1.6672	32.6
							Average	**34.4**

Included above is the current UK 79km distance record, and the fact that 20-30km contacts can be achieved with highly directional and selectively tuned equipment using milliwatt powers, as per below on Walbury Hill.