Consultation submission by HUBER + SUHNER (UK) Ltd

Licence Exemption.

A document prepared in response to the Ofcom consultation document :
"Licence – Exemption Framework Review".

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Introduction

HUBER + SUHNER (H+S) welcome the opportunity to offer comment on the "Licence exempt framework review" and appreciate the extensive work that has been undertaken by Ofcom in preparing the study, covering as it does such a significant range of frequencies and topics.
H+S consider the ability to make practical comment on the proposals of real value to the company in understanding the views under consideration by Ofcom.

In order to offer comment of potential value to Ofcom, the company has taken the opportunity to discuss with some of our clients the general points under consideration in the review document. Specifically as they directly affect the development and market associated with our product portfolio.

HUBER + SUHNER

H+S are a specialist manufacturer of RF components and equipment with particular interest in High Frequency microwave systems.
The company has recently developed a technology and a series of products aimed at an international market where high volume manufacturing techniques have been applied to the 60GHz and above frequency range.
The product range includes a recently developed short haul link up to 1km using 59/62GHz specifically to provide what is seen as a short fall in service solutions.
This product is seen as a member of a developing family of products across the 60, 70 and 80 GHz spectrum that exploit both the skill set of the company in high volume manufacturing techniques and the unique transmission benefits at these frequencies.

The Ofcom "review" covers a significant number of topics and spectrum areas in which it is inappropriate for the company to comment, therefore our remarks are limited to those areas characterised as 40GHz and above and specifically as of today the 60GHz spectrum.

Submission summary

H+S welcome and fully support the general view in the document, in favour of the development of licence exempt frequency usage in the 59 to 64GHz band.
(ref 6.3.2 conclusions and recommendations page 42)

It is the company's belief that such an approach will encourage efficient usage of the spectrum in outdoor applications, exploiting the unique benefits associated with operation in the O^2 absorption band. We believe this area of the spectrum offers major advantages of minimal frequency planning, high efficient frequency reuse and as a consequence very good spectrum usage.

The unique feature of operating at these frequencies, given the limitation of link distance leads to a "point and play" approach which fits well with a licence exempt deployment strategy.
The limited reach capability of radio links operating at these frequencies, driven by power capability and physical size, determine the deployment decision for a user.

The H+S developed 100Mbit product operating at these frequencies is specifically for outdoor deployment where physical size is kept to an absolute minimum to ensure deployment issues are kept to a minimum.
Currently this product is only available in North America where spectrum has already been released on a licence exempt basis in the frequency range 57-64GHz.
The future development of products within this spectrum will depend upon market place enlargement in order to ensure an economy of scale is developed on a world wide basis.

Activity in North America and Japan offers strong indicators that a harmonisation of frequencies released, technologies and protocols adopted: both aids market development and encourages research into the use of spectrum areas commonly perceived to have few applications.

HUBER+SUHNER whilst fully supporting licence exempt status for the frequency range (59- 64GHz) does have concerns however over the competing demands being placed upon the spectrum by:

a) outdoor user groups, looking for fixed point to point and mesh solutions; where RF power, position and direction are known.

b) developers' of indoor personal communications solutions, where RF power is not necessarily the most significant influence on performance. Within this environment sophisticated modulation techniques or multiple antenna systems are required to overcome multi-path effects.

H+S are concerned therefore that the two differing applications should not be compromised by a single set of parameters being applied to system deployment.

Addressing these concerns we believe there could be a relatively simple solution where outdoor applications would fall under a "light licence" self administration approach such as applies to Band C at 5.8GHz, whilst indoor applications could be RF power limited or controlled.

This approach would negate any requirement to introduce "polite" protocols in point to point link establishment and as a consequence maintain the uniformity of approach to the spectrum being taken elsewhere in the world.
The use of light licensing under a self regulation scheme could also help resolve any issue that may be perceived by the MOD as a co-regulator.
(ref 6.3.2 conclusions and recommendations page 42).
The self regulating, light licence approach could offer a significant data resource to controlling authorities to ensure outdoor usage of these frequencies was monitored and maximised.

It is of interest to note that H+S has established a small number of links at these frequencies in the UK under Non Operational Test and Development licences without any apparent issues regarding other administrations.

Comparative requirements in the 59/64 GHz frequency band

Outdoor applications	Indoor application
Infrastructure (Telecoms /IT centric)	PWAN (personal wide area LAN)
Pt – Pt / Mesh	Access / Mesh
Light licence (self regulated)	Licence exempt
RF power (possible max EIRP 55dBW)	RF power limited or controlled (possible max EIRP 20dBm)
Directivity – narrow beamwidth	Omni directional

Fixed	Nomadic
“impolite” signalling	“polite” signalling

It may be noted that the current frequency allocation being pursued by CEPT/ECC is 57-66GHz for applications similar to those which are manufactured HUBER+SUHNER (FLANE).

Specific 60GHz observations

The Ofcom study undertaken some 2 or so years ago, under the Spectrum Efficiency programme, came to some highly relevant conclusions around the subject of 60GHz operations.

The study found that radio link systems at these frequencies operated well, were simple to establish and would probably find a ready market in the campus environment where rapid deployment, realistic performance and low cost, were perceived as principle requirements. The only secure alternative with comparable performance was the use of Free Space Optics (FSO) which can be prone to installation and weather determined operational difficulties.

At the time the only available commercial equipment was sourced from North America reflecting the licence exempt status in that territory. The reality of the equipment at that time was however a relatively high capital cost that was seen to be a limitation in the deployment of such systems.
The development programme undertaken by H+S addressed this issue by approaching product manufacture from a volume production position using metallised plastics, significantly reducing the cost of volume production by some 50% when compared to these earlier products.

This ability to reduce costs, places the product within the purchasing regime of exactly those users for whom such a unit would solve a frequently occurring issue.
The short haul sub 1Km link is specifically an area not addressed by other radio frequencies as the unique characterisation of transmission

in the O^2 band ensures minimal frequency leakage beyond the end point of the link (sub 1Km) whilst offering an ability to reuse the frequency for onward link extension.

In discussion with potential clients for the product in the UK, a general view that 99.95% availability over 800 metres or so, would adequately satisfy the majority of IP centric deployments under consideration.
What has been seen as a major problem, that is, over a 1Km link 98% of the RF energy is absorbed by O^2, is in fact a unique benefit for a market that had been looking for a solution to a problem.

It is precisely this environment that the release of this band would address.

It is therefore clear to the company that to address the IT sector, where volume deployment is possible, release of the spectrum within either a light licence or licence exempt regime would both address a specific UK need and also bring the UK into line in world wide usage of this valuable resource.

A determination to make the 59 to 64GHz or as proposed by CEPT/ECC 57-66GHz licence exempt would not only enable a market deployment to take place but would also incur minimal frequency usage planning and as a consequence low cost in frequency management for Ofcom.

H+S believe the spectrum to be a valuable resource in national terms within the UK that should not be squandered in a “free for all” by acceding to all demands.
It is this concern about indoor and outdoor usage that these remarks address, by considering the differing needs of both areas. (see table above)
It is imperative that the release of the spectrum is not hindered by unrealistic EIRP limitations or protocol requirements in order to ensure that outdoor applications, the “path finder” product deployment, are not restricted by protocol requirements or power limitations more relevant to nomadic and mobile indoor deployment.

Harmonisation

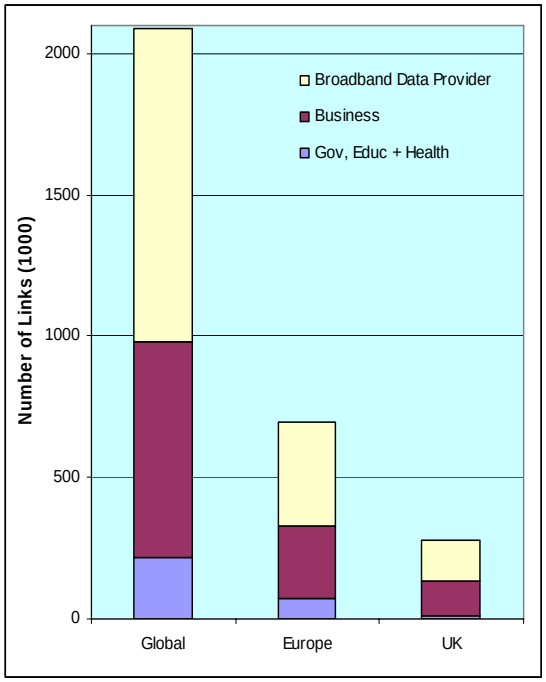
As a European manufacturer, H+S fully supports harmonisation in order to ensure volume market development, but not in technical isolation by the adoption of difficult to achieve technical protocols within Europe.

The availability of chip sets appropriate for use in 60GHz links is a world wide issue where the USA has set the base standard.
It would be retrograde to alter this core availability of components by moving away from comparability with existing products and as such it is our belief that for outdoor applications an adoption of existing (impolite) protocols is essential.
This superficial compatibility with existing manufacturers in North America would enable European manufacturers to enter a level playing field with a European product on a world wide basis.

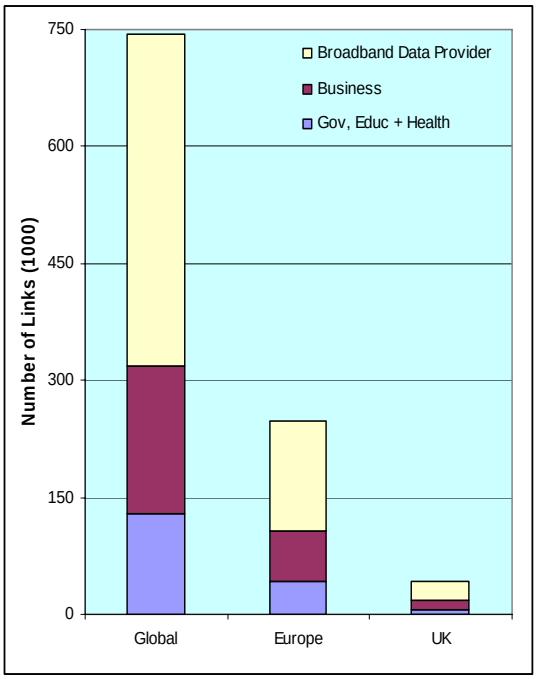
The company believe the “early adopters” to be the IT sector where radio link deployment exposes “new” users to RF solutions. H+S consider this sector, when supported by a low cost manufacturing process, to be capable of generating high usage of a valuable resource in the 60GHz RF spectrum.

Market deployment

The company believe phased deployment would follow release of the 60GHz spectrum with the IT sector taking the lead, but only under a licence exempt or light licensed regime.
Established RF users, such as cellular operators tend to use frequencies with security of tenure. The recent regulation changes in the 71/76 GHz and 81/86GHz sector has set a welcome working solution including as it does, light licensing and licence trading to address operators’ concerns.
We do however believe there are compelling technical reasons why cellular operators should consider 60GHz particularly with the deployment of pico-cells in operator networks where frequency re use will become a major issue.



Total Available Market



Served Available Market

Notes:

1. The above graphs show the estimate links volumes for the period 2008 to 2010.
2. The volumes are based on the assumption that a Light Licence or Licence Except regime is available.
3. That the EIRP is not limited below 55dBW.
4. There are no prescriptive protocols.

Suggestion

HUBER+SUHNER whilst fully supporting a licence exempt regime for the 60GHz area consider there could be a solution to address the indoor/outdoor usage issue, whilst accommodating any MOD concerns, should these concerns offer a delaying impact on the recommended release of spectrum.
It is imperative that spectrum be released as soon as possible to minimise risk of illegal equipment deployment and maximise usage.

Consider: a solution to satisfy both indoor and outdoor applications by:

a) Indoor applications to have limited or controlled RF EIRP – " licence exempt"

b) Outdoor applications could align to other high frequency solutions that are already in place, specifically 71 – 76 and 81 – 86 GHz – light licensed / self regulation. Alignment to the licensing approach taken with 5.8 GHz Band C could offer a working methodology.

In no circumstance in outdoor deployment:

a) Limit EIRP power below 40dBW

b) Enforce a conventional license application process

As either limitation would make outdoor systems unusable and would delay adoption. Either restriction would result in the destruction of the 60GHz sector opportunity.

Consultation questions: Annex 4

The following is a list of consultations questions raised in the review document:

Q1: Do you agree that the spectrum commons model should be the preferred approach for licence-exempt use of spectrum, and that application-specific allocations should only be considered where technical constraints or safety issues require this?

We agree with the concept of "spectrums commons model" however, have concerns that competing applications within some bands could create dissimilar requirements where polite and impolite protocols are in conflict with commercial exploitation of the RF spectrum. We strongly do not agree that all spectrum exempt applications require polite protocols.

Q2: Do you agree with the proposal for multiple classes of spectrum commons?

The model offers a possible solution however, HUBER+SUHNER would suggest consideration be given to the application at higher frequencies. The requirement to implement "polite" protocols for a point to point link operating over 100s of metres could severely limit deployment.
In practical terms the deployment of a point to point link at 60GHz has minimal need for detailed protocols given the O^2 absorption at these frequencies. The absorption of RF energy at these frequencies acts as a "very polite protocol" in interference suppression, minimising any need to implement complex technical protocol solutions.

Q3: Do you agree with the distinction made between the licence-exemption and
light-licensing regimes?

Yes

Q4: Do you agree with the view that the licence-exemption and light-licensing regimes will converge in the future?

We believe whilst there will be a trend for the regimes to merge there will still be applications within a single frequency band which are dissimilar and require differing approaches.

Q5: Do you agree with the proposed mixture of licence-exempt and light-licensed use of the 105–275 GHz spectrum? Do you agree with the bands that have been identified for such use?

Yes

Q6: Do you agree with the view that the use of the 275–1000 GHz spectrum should be licence-exempt?

Yes, we fully support the two recommendations in the review document (p 38)

Q7: Do you agree with the view on the levels of future demand for licence-exempt usage in the 40–105 GHz spectrum? Do you agree that the Group-A bands identified above should be considered for licence-exempt use? Do you agree that licence-exempt and light-licensed use of the Group-C bands identified above should only be considered when there is evidence of demand for such use?

In general terms we support the conclusions reached in the review, however have in our preamble outlined concerns over dissimilar uses within a common band as applicable to 60GHz.
The spectrum 66 – 71 GHz band discussed and its proximity to Group A raises the possibility that its move to Group B could make available significant resource to extend the Group B and continue the alignment to light licensing.

It could be relevant to consider (57) 59 – 64 (66) GHz be categorised as Group B given the dual administration, and the perceived difficulties that could arise should WPAN's and outdoor Point to Point links co exist within the 60 GHz band.
However should the decision be to release 60GHz to a license exempt regime HUBER+SUHNER would fully support and welcome such an approach.

Q8: Do you think it could be desirable for transmissions at levels below certain power spectral density limits to be exempt from licensing?

As applicable to UWB deployment HUBER+SUHNER support the conclusions reached where limited EIRP determines the licensing regime applicable.

Q9: Do you agree with the transmission limits proposed in this document?

We are unable to comment on the spectral mask within the review document but do consider the work done across Europe to be relevant. The greatest difficulty would appear however to relate to equipment that could be used both indoors and outdoors where power limitations/control suitable for indoor applications could be detrimental if the unit was then used in an outdoor environment.

Q10: Do you agree with the harmonisation strategy discussed above in the context of licence-exempt devices?

HUBER+SUHNER fully support the review of harmonisation adopted with case by case consideration, and fully support the application and technology neutral approach.

Q11: Do you agree with the view that no additional regulatory instruments, beyond those available today, are required for the protection of licence-exempt equipment?

We have no knowledge of any area requiring additional legislation in the protection of licence exempt equipment.