

Comments from SIAE Microelettronica SpA to the Ofcom Public discussion document:

***“Award of available spectrum: 10 GHz, 28 GHz, 32 GHz and 40 GHz:  
Spectrum packaging and auction design”***

### **Comment to section 3: Spectrum packaging**

#### **Block size for 10 GHz band**

##### ***Discussion***

The proposed block size as multiple of 2x10 MHz seems deriving from a previous consultation where respondents typically looking to digital FWA or backhaul applications requested 2x28 MHz or 2x56 MHz, while respondents looking for analogue PMSE (e.g. TV connections, often related to provisional links) typically requested 2x20 MHz.

It is a fact that CEPT market of digital fixed wireless systems (either PtP or PtMP) is mostly focused on system bandwidths based on multiples of basic 3.5 MHz slots (ERC/REC12-05 for this band provides also radio frequency channel arrangements for 3.5, 7, 14, 28 MHz and forthcoming revision will provide also 56 MHz option).

In addition, the intra-block coexistence (see next comment to section 4 of the Ofcom consultation) calls for frequency separation with adjacent users typically relate to the system channels used.

Therefore, we believe that it would be more appropriate the tailoring of the spectrum package based on 3.5 MHz or its multiples rather than on 10 MHz.

##### ***Proposal***

From the above we believe that a choice of continuous aggregation of 2x7 MHz, requiring each bidder to bid for at least three such lots (i.e. a minimum of 2x21MHz), will be more tailored to the average need expressed in previous consultation.

### **Comment to section 4: Technical conditions**

#### **Spectrum mask (Block edge mask) for 10, 28 and 32 GHz bands.**

##### ***Discussion***

**We draw Ofcom attention to the fact that the proposed auction provides room for any access and backhaul systems including both Point-to-Multipoint (PtMP) and Point-to-Point (PtP) applications.**

**Therefore, the “block-edge mask” (BEM) provided, is retained appropriate for PtMP applications, mainly for Central Stations (CS) regulations in TDD or mixed TDD/FDD environment. On the contrary, it will severely and unnecessarily affect possible PtP applications (and to some extent also FWA directional Terminal Stations (TS)). It would then result in overregulation, certainly not intended according the usual Ofcom liberal and balanced policy for spectrum assignment.**

Rationale for this comment is as follows:

- The proposed BEM concept has been originally introduced in ECC/REC(01)04 for MWS in 40 GHz band; MWS applications where intended to be of Multipoint nature (PtMP or MESH). We hereby note that ECC/REC(01)04 actually recommends two different BEMs for up-links (TS) and downlinks (CS), while Ofcom one makes only a single “conservative” envelope of them, possibly penalising the TS deployment.
- The actually proposed BEM is derived from ECC/REP 32 “*MECHANISMS TO IMPROVE CO-EXISTENCE OF MULTIPPOINT (MP) SYSTEMS*”; ECC didn’t consider any PtP systems within this report. We are not aware of any study including PtP coexistence in block assignment.
- The only similarity can be found in the FWA TS to TS study in ECC/REP 32 where (§ 3.1.2.2: *TS related interference and EIRP limits*) it is said:  
*“During previous studies, it has already been shown that the TS to TS and TS to CS interference, is generally far less limiting than the CS to CS; this is also due to the fact that the TS antenna higher directivity greatly reduces interference*

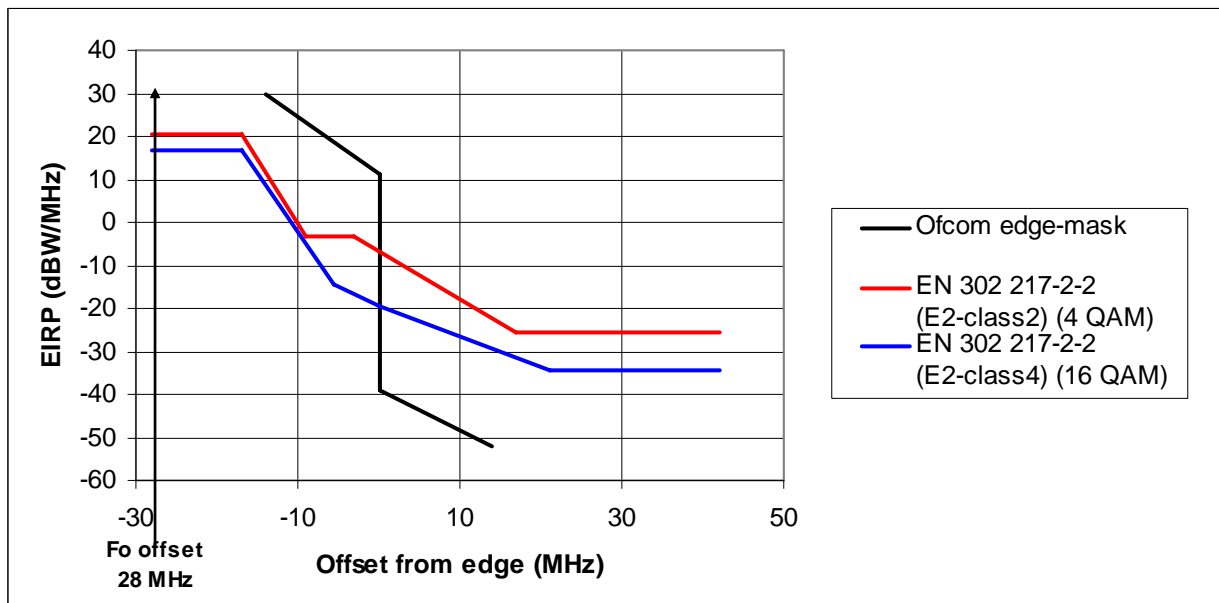
probability.”

The quoted “previous studies” can be found in ERC/REP 99 where (§ 3.4: *The terminal to terminal interference scenario*) it is said:

“*The maximum probability of interference arises when the TSs are served by co-sited CSs. In this case however the C/I ratio distribution is such that virtually no terminals will experience a C/I below threshold (~ 21 dB) even with adjacent channel operation. Rain fading will either improve the C/I or leave it unaffected.*”

Provided that PtP links deployment are far from being assimilated to “co-sited FWA cells” being their directions randomly distributed over the territory, the impact of PtP links may always be considered negligible.

- The above considerations in ECC/REP 32 and ERC/REP 99 indicate that, even if not specifically mentioned, the BEM method presented in ECC/REP 32 is mainly intended for FWA CS (being the CS to CS and CS to TS scenario far more impacting). This is clearly reflected in the 40 GHz MWS ECC/REC(01)04, where two different BEMs are provided for CS and TS emissions, being the latter 20 dB more relaxed in the out-of-block region. Even more clearly this is indicated in studies made on similar scenarios for 3.4-3.8 GHz (see ECC/REP 33 and ECC/REC04-05) where BEM is recommended for CS only; BEM application to TS is considered an overregulation being ETSI masks sufficient for guaranteeing coexistence. In those studies, TS coexistence is considered guaranteed whenever one channel separation is maintained.
- The BEM is therefore a sound methodology for PtMP CS coexistence standing that the low or null directivity of the antennas (sectorial or omnidirectional), used in cellular deployments, widely increases the probability of interference within the coverage area (i.e. main lobe aperture of 90° in sectorial PtMP CS compared to a ~3° in PtP). Therefore the need for keeping down the out-of-block EIRP emission is an unavoidable necessity.
- On the other hand, conventional (and simple) PtP coordination methodology has historically resulted in very high density networks without the need of restriction, in the out of band emissions, tighter than ETSI WG TM4 masks, which had always been used without problems in PtP networks.
- For the same reason, the antenna gain (and consequently the EIRP regulated by Ofcom proposed BEM) of PtP is typically ~25 dB higher than the PtMP CS ones (e.g. 0.6m dish antenna exhibit ~42 dBi gain at 32 GHz, while a 90° sectorial PtMP provides ~16 dBi only). In addition, outside the main lobe, the PtP directivity increase is far steeper.
- Having the same EIRP BEM for both PtMP and PtP, will obviously unnecessarily and severely penalise PtP (and to some extent also PtMP TSs). Figure 1 below shows how a typical 28/32 GHz PtP application according ETSI EN 302 217-2-2, very similar to those successfully used in 23 GHz and 38 GHz bands for high density PtP networks, will be affected by the Ofcom proposed BEM.



**Figure 1: Impact of BEM on typical 28 MHz channels PtP system  
( $P_{out}=+22$  dBm, Antenna gain +42 dBi)**

Figure 1 shows that, placed at 28 MHz from the edge the ETSI masks will significantly exceed the BEM and the situation will not improve with higher offset. In the same situation, a PtMP CS application, with the ~25 dB less antenna gain, will more easily meet the BEM.

- The impact would be even more evident if considering the 10 GHz band where longer hop lengths are usually possible and higher power output and larger antenna size can be used. The reduced typical block size, as shown in Ofcom document, will additionally reduce the potential interest for backhaul providers in this band.

### ***Conclusion and proposal***

We concur that, when block assignment is concerned, some form of restriction should be traded off, however, asking PtP application (and to some extent also to FWA directional TSs) to fulfil the same emission restriction of PtMP CS, seems an unnecessary overregulation that would endanger the possible response to the auction, in particular from PtP backhaul providers (but, to some extent also from FWA providers).

We believe that a sufficient regulation for PtP systems (and to some extent also for PtMP directional TS) may be obtained imposing that, the carrier centre frequency should be removed from the block edge by one system channel (e.g. as in the situation of Figure 1, which maintaining 14 MHz free at the block edge).

For an even better spectrum utilisation, this regulatory provision might not be enforced whenever, after licensing awards, concerned operators are willing to coordinate and, in such case, left free to define other common coexistence methodology permitting the coordinate use of channels closer to the blocks edge.

This regulation would still be fully in line with the above mentioned ECC studies and, in particular, with the more recent and advanced methodology set by ECC/REC(04)05 for the band 3.4-3.8 GHz.

As an alternative, the use of two different BEMs derived from ECC/REC(01)04 for CS and TS/PtP, being the latter more relaxed in the out-of-block region, might be considered.