Commission for
Communications Regulation

Submissions to Consultation

Responses to Consultation – Increased FWALA Licence Flexibility

Submissions received from respondents

Document No:	**07/29s**
Date:	**15 May 2007**

Consultation:	**06/59**
Response to Consultation:	**07/29**

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
Abbey Court Irish Life Centre Lower Abbey Street Dublin 1 Ireland
Telephone +353 1 804 9600 *Fax* +353 1 804 9680 *Email* info@comreg.ie *Web* www.comreg.ie

Contents

1 Respondent A - Clearwire

clearwire®

Submission

Increased FWALA licence flexibility
Document 06/59

This Document

This document is prepared by Clearwire Ireland Ltd. in response to the request for comments to the ComReg consultation paper 06/59 with 'Increased FWALA licence flexibility'.

Thank you for the opportunity afforded by ComReg to welcome submissions.

Clearwire welcomes this opportunity to provide feedback on the options made available by The Commission for Communications Regulation (ComReg) for the Increased FWALA licence flexibility.

We believe the aims of ComReg are worthy in attempting to solve issues concerning areas that might 'miss out' on wireless broadband on account of the local area nature of present licenses.

We would support the ability to 'build-out' to the interference zone limit within existing licenses as set out in Option One and also support the current system whereby mutual agreements with other licensees on frequency coordination are manageable. This is working right now and current operators do meet to resolve issues.

However, when taken in total, we think the six options that are discussed in this document have no significant advantage for the operator or customer and introduce more complications to the current system.

Clearwire suggests taking a step back and looking at the spectrum based on geographical areas. ComReg would then have to work with each licencee to define these geographical areas. Therefore each operator can frequency co-ordinate on the edges of these 'map based' geographical areas.

There are a number of options available to achieve a geographical area license (call it a GAL) , based on track record, willingness to invest and initiative. Existing licenses should remain with their relative service and interference zone limits, possibly with a relaxation to option one, and thereafter, GAL licenses surrounding FWALA licenses based on operator intent and track record.

ComReg may wish to consider various ways of working with existing licensees in each block to co-ordinate these GAL licenses for transparency. Also, it is well established in the mobile industry that additional licenses are offered to existing licensees on account of their willingness to invest already and their track record.

We apologise if this is brief and without elaboration but when we tried to look at the merits of each option in detail, they became much too complicated to address with granularity and our view was that if they were unworkable in theory, they would also be unworkable in practise.

The current system of operator mutual co-ordination is working now, often without the direct knowledge or intervention of ComReg and this is as it should be.

We believe existing licensees would enter into mutual co-ordination on GAL given the opportunity and the issues surrounding ability and willingness to invest and who finally is offered what area, can be addressed transparently.

Thank you again for this opportunity to provide our views. We are happy to discuss further at any time.

Brefne Sweeney
Engineering Manager

Brent Smith
CTO, Director

2 Respondent B – Digiweb

Q. 1.	**In your view is option 1 a workable solution? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.**

Digiweb response – Digiweb do not feel that option 1 provides for an optimal solution in increasing the flexibility of the licensing scheme for two main reasons :-

a) An operator needs to make a decision if they are going to operator on a licensed or a non licensed basis. There is a cost difference in terms of equipment and license fees depending on the route chosen by that operator. Licensed operators, who take higher financial risks, should enjoy the benefits of protected spectrum and indeed consumers can make an informed decisions, in particular in the Business market, if they are going to select a licensed or unlicensed operator in terms of the Service levels agreements on offer.

b) By allowing a Quasi “protected” area this would dilute the value of licensed spectrum to operators and could lead to consumer confusion.

While Digiweb acknowledges the ease of implementation of such a solution we feel that it would damage the industry & the value of licensed spectrum and we further question the ability to correctly manage operators in terms of using directional antenna and power limits.

Q. 2.	**In considering option 2, in your view what is the maximum service area that could be permitted in each of the 3 FWALA frequency bands <u>while still maintaining</u> the existing interference threshold contour and field strength? Where possible please support your view with practical data or examples.**
Q. 3.	**Do you agree with the proposed increases to the service area in each of the 3 FWALA frequency bands as indicated above? (Please note that the existing interference threshold contour and field strength would be maintained if this option was adopted.)**

Digiweb response – of the options outlined Digiweb feel that option 2 is the only one of the options outlined that could yield a beneficial result.

There are several reasons that option 2 should be considered :-

a) 802.16e – Wimax mobility. In order for operators to allow for mobility under 802.16e there is a requirement for adjacent cells to be close to each other in order for a "handover" to take place. One of the issues currently facing Wimax operators in Ireland is the fragmented way in which the networks are constructed – this would further be complicated by allowing usage of spectrum between existing cells for many operators who may NOT be using Wimax technology.
b) As the radiated power from the CPE (Customer equipment) is going back to the base station (which by default is in the centre of the coverage area) it reduces the potential for spurious or leaked emissions to the adjacent cell.
c) Operators could offer lower speeds in these areas, as it done with rate adaptive DSL and as is proposed to do with the new DSL "mid band" product. This would mean that the lower power levels could be used for lower service levels but still offering a substantial increase on Dial up of ISDN speeds.
d) Many operators have adjacent cells but currently have dead zones due to the exclusion zone. This makes no sense as the potential for interference is only a threat to the existing operator. Allowing for installations within the exclusion zone in this instance makes practical and technical sense.
e) As the power limits do not change, it is a known entity, i.e. interference issues are dealt with as they are today.

Digiweb would fully support the options outlined in question 2 & 3 and also the cell sizes and conditions outlined by Comreg.

Q. 4.	**In your view is option 3 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.**

Digiweb response – Digiweb would strongly disagree with this approach for the following reasons

a) It would be very difficult to enforce and existing operators would most likely not grant permission for the new operator in the "dead zone" unless the new operator could show strong evidence that no interference would be caused.
b) The cumulative impact of many such operators could seriously impact on existing cells given the number of devices that could be operating in close proximity.
c) Existing CPE could possible "see" two base stations and by using adaptive modulation could cause a serious degradation of service to the end user of such a device.

Q. 5.	**Do you agree with the view that combining Options 1, 2 and 3 is the most effective way to eliminate 'dead zones'? Please give reasons for your answer.**

Digiweb response – Digiweb can not stress how strongly we disagree with this statement. While Digiweb is a wireless operator and welcome Comreg's approach to increasing the usefulness of FWALA licensing, Digiweb feel that if all 3 of the options above were allowed that the quality of service, manageability and enforcement aspects of such a complex regime would be completely unworkable.

Digiweb genuinely feel that the protection afforded by licensed spectrum, the financial costs of operating under a licensed spectrum banner and the Service level agreements already in place with existing business customers could be seriously undermined if all 3 options were put into force.

Digiweb would cite by way of example the serious impact of a single source of interference in Digiweb's 10.5Ghz spectrum that caused major revenue loss over a short period of only 4 weeks.

Q. 6.	**In your view is Option 4 a viable solution is addressing the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.**

Digiweb response – Digiweb would feel that this option may offer some limited scope to reduce dead zones but as Comreg have outlined would question how financially feasible such a deployment would be.

Such a deployment may be suited to costal areas of areas that back onto mountains or other such terrain where a physical limitation may allow for use of such a license without impacting on existing license areas.

Q. 7.	**In your view is Option 5 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.**

Digiweb response – Like in Question 6, Digiweb would see some benefit in this option but again would question the impact it would have on technologies such as 802.16e as it will effectively end any scope for offering mobility between operator cells as networks grow and expand.

Comreg should very carefully consider the impact of any action in relation to 802.16e to ensure that Ireland is not effectively ruled out of the technology developments due to the licensing scheme.

Smaller "fill in" schemes are likely to yield a short term benefit only and would cause serious difficulties in the longer term. The issue will further become much more complex when spectrum trading is opened up and where one license may be moved to a different designation.

Q. 8.	**In your view is Option 6 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.**

Digiweb response – Digiweb do not see this as a workable solution in any form.

As the existing licenses are based on fixed cell sizes, network planning, optimisation, future growth planning and development are all build around an existing format.

Completely changing the format to something that allows for a total uncertainty would create massive market confusion and would be almost totally unenforceable in terms of interference, in particular in a cumulative deployment.

Q. 9.	**Which of the 6 options or combination of options as outlined in this document best address the issues in your view? Please give details as to why.**
Q. 10.	**In your view are there other viable options that ComReg has not considered in this document? If so please give details.**
Q. 11.	**In your view would a combination of Options 1, 2 and 3 be sufficient to eliminate the issue of 'dead zones'? Please give reasons for your answer.**
Q. 12.	**In your view do the existing maximum permitted Field Strength (dBμV/m) limits at the Interference Contour need to be revised? If so, please provide technical details to substantiate alternative levels.**

Digiweb response Q9 – Digiweb feel that only option 2 should be considered for now with the possibility of looking to use a partial circle deployment for costal or similar type environments.

ANY decision taken that could impact on interference or the value and service level agreements of existing deployments would be viewed by Digiweb as seriously worrying, in particular following the recent interference issues Digiweb experienced and how long it took to have them resolved.

Digiweb response Q10 – Digiweb feel that Comreg have given a lot of thought to this consultation and welcome it's publication.

Digiweb feel that one option that Comreg might consider is granting national or semi national licenses to operators who have gained "critical mass" in all or large portions of the Country. This would eliminate all "dead zones", allow for easy expansion for

that operator and create clarity. It would also fully encourage and support technology developments in 802.16e and similar technologies. By creating a more fragmented solution, Comreg would effectively undo all of the items already listed.

Digiweb feel this option may work very well in achieving Comreg's objectives due to the following reasons :-

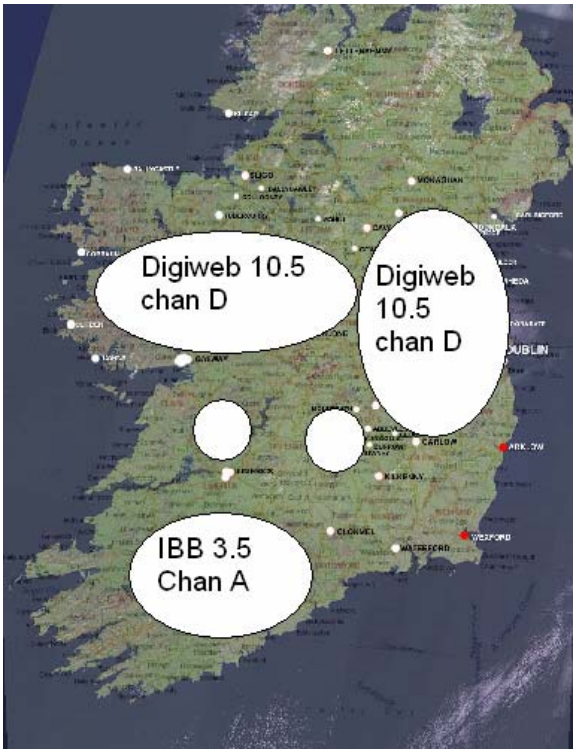
a) It would eliminate the "dead zones" completely.
b) It would actively encourage 802.16e
c) It would not impact on interference
d) It would make the licensing simple
e) It would be easy to implement
f) It would promote co-operation on 802.16e between operators
g) "fill in solutions" would still have dead zones, this would not happen with Digiweb's proposal
h) It would make for easier backhaul
i) It would make network expansion more cost effective
j) It is a better longer term solution
k) If combined with Digiweb's response to Q12 it could be deployed rapidly

Existing operators such as Digiweb, Clearwire, Irish Broadband and others have many areas where this could be applied in a complimentary fashion over all licensed bands giving "blanket" coverage of the Island. Further with some simple co-ordination some bands within the existing allocation could be freed up for new entrants or smaller operators, again encouraging competition.

This approach also allows for the existing scheme to be used for smaller or new operators and when an operator has significant deployments they could move to the national or semi national scheme – this also encourages the operator to rapidly expand to get a better class of license and achieves Comreg's and the Government objectives.

An example of high this might look is as over (Bigger circles are semi national coverage and smaller ones are exisitng FWALA zones)

It is important to note this is purely for illustration only and does not relate to any currnet license awards.



Digiweb response Q11 – As already outlined, Digiweb would be strongly against such a development.

Q12 Digiweb response – In the main we feel existing limits work well. Digiweb feel that Comreg should operate a scheme where operators could have power limits revised for certain areas, following a written request and technical justification.

This would be particularly interesting if Comreg were to consider Digiweb's proposal for national or semi-national licensing areas as outlined above.

3 Respondent C – eircom

Response by eircom Limited

to

Commission for Communications Regulation Consultation

Increased FWALA Flexibility (ComReg 06/59)

eircom, ComReg

DOCUMENT CONTROL

Document name	*eircom* Response to ComReg Consultation 'Increased FWALA Flexibility' (ComReg 06/59)
File name	**Response by eircom to ComReg re 06-59 Issue 1.doc**
Version	Issue 1
Document owner	***eircom***
Document type	Word
Status	**-**

`

Executive Summary

eircom welcomes this opportunity to respond to the consultation 'Increased FWALA Flexibility'.

eircom consider that the licensing of spectrum should ensure that service is guaranteed free from interference for both the service provider and the end customer. The use of spectrum should be monitored to ensure that it is used for the purpose for which it was assigned.

Legal consent should be required for the installation of any base station, not just for the initial application for an FWALA licence. While this may have potential technical difficulties, it would maintain flexibility in the use of the spectrum while ensuring legal protection for existing users of licensed spectrum. There would need to be a formal structure for the processes associated with gaining legal consent and enforcing the conditions of the agreement.

4. Options for increasing FWALA Flexibility

4.1 Allow use outside service area

Q.1. in your view is option 1 a workable solution? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

No.

The licensing of spectrum should ensure that service is guaranteed free from interference for both the service provider and the end customer. Allowing the provision of service outside the service area on a non-interference non protected basis undermines the whole principle of licensed spectrum. There are many challenges associated with the provision of a quality based broadband service to end-users. The removal of the inherent protection, normally afforded by a licence, will ultimately reduce the quality of service received by the end user.

Allowing the provision of service, outside the service area, will encourage operators to locate their base station or Base stations close to the boundary of the service area to cover the “non service” area. This effectively completely removes the benefit of the “non service” area as a protection buffer for adjacent operators.

In addition, out door CPE are quite high powered and are normally located as high as possible to ensure optimum transmission at the highest modulation over the furthest distance. Some modern technologies allow the CPE to be more than 30 km from the base station. It is quite possible and probable that outdoor CPE, located in the “non service” area, even with directional antenna, could breech the field strength limit at the interference contour.

4.2 Increase the service area

Q.2. In considering Option 2, in your view what is the maximum service area that could be permitted in each of the 3 FWALA frequency bands <u>while still maintaining</u> the existing interference threshold contour and field strength? Where possible support your view with practical data or examples.

The original service area limits should be maintained, as technology evolution has actually improved the range of radio propagation since the initial limits were designed. See more detail in the answer to question 3.

Q.3. Do you agree with the proposed increases to the service area in each of the 3 FWALA bands as indicated above? (Please note that the existing interference threshold contour and field strength would be maintained if this option was adopted)

The current arrangements should be maintained. The distance between the edge of the service area and the interference contour should allow for

1) The practical reality that Operators can place their Base Stations anywhere in the service area and may come close to the service boundary in order to maximise customer coverage or to provide sufficient capacity. Even with sectored base stations, signal can spread into areas outside the required coverage area e.g. a 120-degree sector will actually spread out further than 120 degrees.
2) Modern radio systems using high powers and modulation techniques such as OFDM or SOFDMA are designed for maximum transmission in line of sight and non line of sight conditions.

This means that an adequate distance must be left between the service level boundary and the interference contour boundary. The original service area limits should be maintained, as technology evolution has actually improved the range of radio propagation since the initial limits were designed.

4.3 Obtain legal consent

Q.4. In your view is option 3 a workable solution? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Yes however legal consent should be required for each base station to be installed and not just for the initial application for an FWALA licence. While there are many potential technical difficulties with implementing this proposal, it maintains flexibility in the use of the spectrum while ensuring legal protection for existing users of licensed spectrum

There would need to be a formal structure for the processes associated with gaining legal consent and enforcing the conditions of the agreement.

Q.5. Do you agree with the view that combining Options 1,2 and 3 is the most effective way to eliminate 'dead zones'? Please give reasons for your answer

No. Options 1 and 2 can undermine the value of licensed spectrum and the quality of service to the end user and should not be implemented. Option 3 has some risks to quality for service for the end users, but it does allow flexibility while maintaining a degree of protection for existing operators.

4.4 'Partial Circle' FWALA Licence

Q.6. In your view is option 4 a viable solution in addressing the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

No. Technically, it is harder to constrain the radio signal inside such a partial circle even if only using a single base station (See previous answers for further detail). The use of multiple base stations would make this situation even more difficult.

In practice multiple base stations are generally required for maximum coverage or capacity. In areas where a single base station can provide coverage, the mast height, terrain and clutter are such that radio propagation is very good and a large buffer zone between the service area and the interference contour is required to protect adjacent operators from interference.

As mentioned in an earlier answer, radio signals from a 120 degrees antenna, will actually spread out further than 120 degrees. This means that a simple sector shape for the interference contour may not be sufficient.

4.5 'Reduced Size' FWALA Licence

Q.7. In your view is option 5 a workable solution in addressing the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

This option is not feasible for the same reasons as those given in answer 6. In practice, the use of a reduced distance to the interference contour will

further result in increased interference issues to end users outside its own service area, and conversely to its own customers, due to interference from other Operators.

4.6 'Map Based' FWALA Licence

Q.8. In your view is option 6 a workable solution in addressing the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

No. While ITU-R P.452 is a good semi empirical model, there would still be times when the prediction failed to reflect the actual coverage achievable. In addition very detailed up to date clutter (5m resolution) would be required to ensure a high level of accuracy.

In practice ComReg would need to accurately model the signals from all base stations in the service area and not just the initial base station. It would take time for ComReg to carry out the analysis and identify the operational constraints for the different base stations. This would effectively reduce the Operators flexibility in deploying services, which goes against the objective of this consultation.

The fact that the interference contour area and the service area are the same makes this one of the worst options proposed in terms of potential interference to the operator's own customers and to adjacent operators customers.

It would be extremely difficult to ensure licence compliance for this type of solution. In addition the coverage area would not be as clear to adjacent

operators and removes clarity on coverage areas currently associated with the FWALA process.

4.4 Summary

Q.9. Which of the 6 options or combinations of options as outlined in this document best address the issues in your view? Please give details as to why.

Option 3 subject to a formal structure for the processes associated with gaining legal consent and ongoing compliance. Legal consent should apply for all base stations and not just the initial FWALA licence application.

Q.10. In your view are there other viable options that ComReg has not considered in this document? If so please give details.

No

Q.11. In your view would a combination of Options 1, 2 and 3 be sufficient to eliminate the issue of 'dead zones'? Please give reasons for your answer.

No

Q.12. In your view do the existing maximum permitted Field Strength (dBμV/m) limits at the Interference Contour need to be revised? If so, please provide technical details to substantiate alternative levels.

4 Respondent D – High Speed Data Solutions Ltd

High Speed Data Solutions Ltd.
Reference: Submission re ComReg 06/59

Response to Q1 (Option 1)
HSDS believes that this option is appropriate in the vast majority (if not all) cases throughout the country. Under the current provisions where each cell has an interference contour of 30km, the minimum distance between base stations in adjacent cells operated by different operators is 60km. In this situation the probability of interference from a CPE device with a base station in an adjacent cell is minimal because

1. In many cases a LoS will not exist between the CPE and both base stations. For the 3.5GHz band where a LoS does not exist the probability of interference is negligible.
2. Where an LoS does exits between both base stations, the CPE antenna will be directed towards the intended base station and in a huge number of cases will radiate negligible power towards the other base station.
3. For most technologies used by operators the upstream channel bandwidth is typically not more than 3.2MHz. The licensed bands are typically 25MHz. It should therefore be possible in an unusual situation where an LoS does exist to both base stations AND the CPE antenna MAY radiate power towards both base stations for operators to cooperate to use different channels.
4. HSDS would suggest that there should be a provision whereby Comreg can adjudicate in extreme situations and can limit those service area to the current 15km in these very unusual situations.
5. This option increases maximum base station coverage from 700sq km to 2,800 sq. km and therefore increases availability of broadband significantly, particularly in rural, sparsely populated areas that are particularly well suited to wireless technology. Availability of existing masted high-sites is limited in the country and therefore maximum use should be made of these sites. HSDS does not believe that there is any reasonable technical argument to continue limit service in these areas.

Response to Q2 (Option 2)
HSDS believe that the proposed limit of 20km for a service area should apply (for base stations/repeaters) and that CPE devices should be located within 30km of the service area center (see previous).

We cite as an example a situation in North Cork. A suitable high base station site exists at 43km from another operators license (to the south) and is therefore not available for use. However it is proposed to use this base station to serve a large rural area to the North. This high site can cover a valley area extending 20-30km to the North, West and East, So the base station should ideally be situated on the southern boundary of a 20km service area covering this community. Geographic barriers (and antenna positioning can be used to) ensure no interference to the operator to the south.

Response to Q3 (Option 2)
HSDS agree with the proposed increases to service area size.

Response to Q4 (Option 3)
HSDS believes that there is no reasonable argument against this option. Our only reservation is that identification of other impacted operators may prove difficult. We suggest that where a license application is made in these circumstances Comreg should assist the operator seeking the license to identify any and all other operators who would need to provide the necessary consent.

Response to Q5 (Options 1,2,3)
HSDS believe that these PLUS the following (response to Q6) are the best options available to resolve the dead zone issues.

Response to Q6 (Options 4)
HSDS believes that this option is only suitable where the proposed service area/ interference contour is limited BOTH by antenna selection AND existing geographic boundaries. In other words it must be demonstrated that the terrain (first of all) limits interference with existing installations and that these are further protected where necessary by antenna selection and positioning.

Response to Q7 (Option 5)
HSDS believes that this option is not workable. The difference in base station power required to provide a given RSL to a CPE 5km, rather than 15km from a base station is approx 10dB. For most technologies in use if interference occurs at a CPE site between base stations, then reducing the base station power of the smaller cell by 10dB is unlikely to resolve the problem.

Response to Q8 (Option 6)
See response to Q6.

Response to Q9
Please see response to Q5.

Response to Q10
We also propose the suggestion in response to Q6.

Response to Q11

Response to Q12
In order to provide efficient use of limited spectrum, it is necessary at least in the downstream direction (to subscriber) to use a higher order modulation e.g. QAM16. Qam16 provides approx 10Mbps per 3MHz channel. This type of modulation typically requires an RSL at the CPE of -70Bm min. A reasonably sized typical 3.5GHz CPE antenna has a gain of approx 20dBi, whereas a typical 90º base antenna has a gain of approx 13dBi.

To deliver an RSL of –70dBm at 15km (path loss 128dB) the base station output power must be 25dBm min. (25+13-128+20= -70dBm).

However if the base station is to output 25dBm using a 13dBi antenna it is virtually impossible to ensure that the power at 30km from the base station does not exceed the 33dBuV limit at 30km.

The goals of delivering high quality wireless true broadband services to a wide area and at the same time maintaining extremely low power levels are incompatible. If a level is to be set it needs to be sufficiently high to allow operators to use high order modulation over a wide area. We suggest that a level of 46dBuV/m is a step in the right direction.

5 Respondent E – Irish Broadband Internet Services Ltd

INCREASED FWALA LICENCE FLEXIBILITY

IRISH BROADBAND'S RESPONSE TO THE CONSULTATION

1. Introduction

Irish Broadband is the largest fixed wireless access broadband provider in Ireland. The company has deployed an extensive wireless network including Dublin, Cork, Galway, Limerick, Waterford, Drogheda, and Dundalk and is continuing to expand this network to other regional centres throughout the country. Irish Broadband holds 3.5GHz in each of its service areas, and also a number of regional 10.5GHz regional licences. The company has invested significantly in its network roll-out and is a leading provider of broadband services in Ireland with more than 35,000 wireless broadband customers.

Recent highlights for the company include:

- Development of an extensive retail presence for Ripwave (Broadband in a Box) which now extends to almost 200 stores.
- Launch of Go! in November 06. Go! provides mobile broadband service using a PCMCIA (laptop) card for a single monthly fee of €39.99.
- Launch of Talk in November 06. Talk is a Voice over IP service that allows Irish Broadband customers to make and receive phone calls over their wireless broadband connection. This eliminates the need to have a fixed telephone line and pay line rental charges.
- Launch of DSL in December 06. Irish Broadband now provides a full range of DSL services. DSL compliments Irish Broadband's wireless services as it allows Irish Broadband to provide service in many locations that are not within range of its wireless network.

3. Response to Questions

Q. 1. In your view is option 1 a workable solution? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Option 1 is acceptable to Irish Broadband.

This is for the following reasons:

- There is no requirement to coordinate with other operators. This simplifies the implementation of option 1.
- The existing licence areas are maintained.
- Possibility of interference from alternative operators is minimised, since it is highly unlikely that CPE of other operators will interfere with Irish Broadband's network.

Irish Broadband does not foresee any circumstances where it will interfere with or cause interference to other operators as a result of implementation of option 1.

Q. 2. In considering option 2, in your view what is the maximum service area that could be permitted in each of the 3 FWALA frequency bands while still maintaining the existing interference threshold contour and field strength? Where possible please support your view with practical data or examples.

Irish Broadband's analysis shows that the expected signal range to be comfortably within the existing threshold contour is:

3.5GHz – 8km

10.5GHz – 2km

These results are somewhat subjective, since they rely upon a number of different parameters or settings in the radio planning models. However, they are based on simulations using real-world data for the Navini and WalkAir systems in much the way we would plan any site on our network.

Therefore the maximum service area for 3.5GHz could be set to 22km, and for 10.5GHz could be set to 28km. In this context, the proposal to increase the service areas to 20km for 3.5GHz and 13km for 10.5GHz are technically sound.

It should also be noted, that 10.5GHz service is unlikely to operate effectively at ranges beyond 15km due to rain fading considerations, and therefore extending the range beyond this would be impractical.

Q. 3. Do you agree with the proposed increases to the service area in each of the 3 FWALA frequency bands as indicated above? (Please note that the existing interference threshold contour and field strength would be maintained if this option was adopted.)

Option 2 is acceptable to Irish Broadband.

This is for the following reasons:

- There is no requirement to coordinate with other operators. This simplifies the implementation of option 2.
- The existing licence areas are maintained.
- Possibility of interference from alternative operators is minimised, since it is highly unlikely that CPE of other operators will interfere with Irish Broadband's network.

Irish Broadband does not foresee any circumstances where it will interfere with or cause interference to other operators as a result of implementation of option 2.

Q. 4. In your view is option 3 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Irish Broadband is not in favour of option 3.

The reasons Irish Broadband is not in favour of option 3 are:

1. **Investment:** Option 3 has the potential to affect the integrity of the existing licences. This increases the risk that FWALA licences will be seen to be inferior to national licences, or open to compromise. This could potentially affect the ability of operators to attract continued investment in their networks.

2. **Competition:** As a national operator, Irish Broadband competes with eircom in the broadband market. Eircom has recently announced that it is to deploy wireless broadband services using its national licence. Irish Broadband does not think that further fragmenting the FWALA licences into additional sub-units that need ongoing management is appropriate in the context of competition from the incumbent operator with a single national 3.5GHz licence. In effect, this means that FWALA operators that are already operating without the certainty offered by a national licence would be further disadvantaged.

3. **Future Growth:** Option 3 could potentially restrict the ability for Irish Broadband to grow service into the dead zones in the future. As WiMax services become commercially available in 2007 and 2008, Irish Broadband may wish to provide mobile broadband services into these locations, as well as expanding its fixed broadband service. Therefore, fragmenting the existing FWALA licences even further may restrict the ability of FWALA operators to provide such services. This would be extremely negative for service deployment and infrastructure competition for fixed and mobile broadband services.

4. **Licence Amalgamation:** As national operator with service in more than 25 towns and cities, Irish Broadband has outgrown the initial intent of the FWALA scheme. This is largely a function of the success of the FWALA scheme in allowing operators such as Irish Broadband to expand. However, Irish Broadband proposes that instead of licensing Dead Zones, that overlapping service areas which are held by a single operator are amalgamated and allocated as a single regional licence defined by the borders of the FWALA licence areas. This would provide greater licence certainty and would help investment in continued roll-out of broadband wireless services.

Q. 5. Do you agree with the view that combining Options 1, 2 and 3 is the most effective way to eliminate 'dead zones'? Please give reasons for your answer.

Irish Broadband supports options 1 and 2.

Irish Broadband does not support option 3.

The reasons are outlined above.

Q. 6. In your view is Option 4 a viable solution in addressing the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Irish Broadband does not support option 4 for the same reasons as option 3.

In addition, the potential for interference between base stations in this scenario should make legal consent with the adjacent operator mandatory.

Q. 7. In your view is Option 5 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Irish Broadband does not support option 5 for the same reasons as option 3.

In addition, the potential for interference between base stations in this scenario should make legal consent with the adjacent operator mandatory.

Q. 8. In your view is Option 6 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Irish Broadband does not support option 6 for the same reasons as option 3.

In addition, the potential for interference between base stations in this scenario should make legal consent with the adjacent operator mandatory.

Q. 9. Which of the 6 options or combination of options as outlined in this document best address the issues in your view? Please give details as to why.

Irish Broadband supports options 1 and 2.

The remaining options are not supported for the reasons outlined.

Q. 10. In your view are there other viable options that ComReg has not considered? If so please give details.

Licence Amalgamation

Irish Broadband proposes that existing overlapping FWALA licences should be amalgamated into a single regional licence.
This would provide greater certainty regarding licence conditions and coverage areas, remove dead zones, and help attract further investment into FWALA network deployment.

Q. 11. In your view would a combination of Options 1, 2 and 3 be sufficient to eliminate the issue of 'dead zones' ? Please give reasons for your answer.

In Irish Broadband's view, options 1, 2, plus amalgamation of overlapping FWALA licences which are held by the same operator would effectively eliminate the issue of "dead zones"

Q. 12. In your view do the existing maximum permitted Field Strength (dBµV/m) limits at the interference contour need to be revised? If so, please provide technical details to substantiate alternative levels.

The current limits are appropriate and do not require revision for Irish Broadband's network roll-out. This is particularly the case in the context of implementation of options 1 and 2 above.

It is also Irish Broadband's experience that interference is more likely to be caused by operators operating in adjacent bands co-locating on same tower than by spurious signals from adjacent operators operating in the same band. To

date, interference from geographically adjacent operators has not been a material issue.

6 Respondent F – Last Mile Broadband

Last Mile Limited response to ComReg Consultation Paper 06/59

Question 1
Last Mile Limited position on this question is that we are in agreement with this proposal.

Question 2
Depends on Base Station location and local topology also the operator of adjacent licences would need to be taken into consideration. Our view on this proposal would be to allow base station deployment any where within the interference contour on a non interference basis with adjacent cells licenced by another operator. In the case where adjacent cells are licenced by the same operator we propose that interference contours should be eliminated between cells. We feel that this proposal would be of benefit in lower density rural areas.

Question 3
Last Mile Limited position on this question is that we are in agreement with this proposal. This option would allow greater flexibility in deploying Base Stations where suitable Mast Sites are difficult to obtain and the business case for coverage of small communities could not justify the cost of additional licences.

Question 4
Last Mile Limited position on this question is that we are in agreement with this proposal. Our view on this proposal is that this may be a practical workable solution where agreement between operators can be achieved. A further proposal is that any additional spectrum that becomes available in the future in particular Channel E, F and G in the 3.4-3.8 GHz band would be used to alleviate these situations where licenced operators that are prevented from providing services in dead zones and cannot obtain consent of other operators for licensing of the dead zone.

Question 5
Last Mile Limited position on this question is that in the absence of additional spectrum being available we are largely in agreement that a combination of options 1, 2, 3 is the most effective way of eliminating dead zones.

Question 6
Last Mile Limited position on this question is that we are not in agreement with this proposal for the following reasons.
1 Licenced service area would be too small to be practical
2 Radiated power levels would need to be closely controlled and monitored to prevent interference with adjacent cells.

Question 7
Last Mile Limited position on this question is that we are not in agreement with this proposal for the following reasons.
1 Licenced service area would be too small to be practical.
2 Radiated power levels would need to be closely controlled and monitored to prevent interference with adjacent cells.

Question 8
Last Mile Limited position on this question is that we are not in agreement with this proposal for the following reasons.

1 Licenced service area would be too small to be practical.
2 Radiated power levels would need to be closely controlled and monitored to prevent interference with adjacent cells.

Question 9
We believe that options 1 and 2 address the issue of providing services to consumers within the licenced area up to the interference contour. These options also partly address the issue of licence cost in low density rural areas. Option 3 could be a partial solution to the dead zone issue although we are concerned that gaining consent from competing operators may be a challenge in some areas.

Question 10
Our position on this question is that the only real option to solve the dead zone issue is to allocate any additional spectrum that may become available in the future in each respective FWALA Licenced band on a priority basis to operators that are currently prevented from offering licenced services in these areas.

Question 11
Options 1,2,3 will not completely eliminate the dead zone issue for reasons outlined in our answer to question 9.

Question 12
Our position on these issues is that ETSI regulations should be applied in the Republic Of Ireland.

John Gibbons
Last Mile Broadband
Block B
Monksland Business Park
Athlone
Co. Roscommon

7 Respondent G – P. Gavigan

I welcome your paper on FWALA flexibility, however it is by pure chance that I stumbled across it. First of all it is a reasonable delay allocation for individuals and companies alike to respond within such a short time scale? Sincerely, you are asking much in so little time and free of charge???

People have bussiness to run, engineering to do, orders to place and faults to repair....etc.

I have delt with radio properties for more than 20 years now (the last 19 in France) and welcome you initial starting point approach. Radio issues are 3 dimentional, certainly not cartisian as proposed in your paper.

(Urban, suburban), and Rural should be considered as input to dual layered radio.
For a given height above sea-level an electrical tilt may also be imposed upon suburban/urban omnidirectional/directional antenna.
An electrical downtilt of 2° has a two fold advantage:
a) The air interface access site (or base station) will be less likely to receive strong(er) distant neighbouring cell signals,potentially causing interference, or rendering a frequency unavailable. b)the limited 1 watt radiated energy will be put to better effect by concentrating the superior part of the lobe into the locality to be serviced. We can provide you with a more detailed and graphical response as the French would say <<si besoin est....>>> Here are just two ideas providing you with some thought we hope...(i) Dual-layer....ii)Tilt X Height product)

If more time be allocated it may be possible to provide you with more clear demonstrative replies to your well intensioned questions.

Yours Sincerely,

Peter Gavigan

8 Respondent H – South West Regional Authority

Title : Consultation Paper - Increased FWALA Licence Flexibility

Respondents Name : Billy Sheehan

Comments:

The restricted operational coverage of the present FWA licencing structure has nemt that a number of Broadband schemes under GBS2 were not established.Because of the limited number of available licenses it is vital the the maximun coverage is allowed for eack licence.
Q9 . The preferred options 1,2,and 3 used in combination would provide much additional coverage.
Q11.and Q4. Q5 To provide coverage in some remote small settlements the use of Directional sector coverage or Reduced size,may be required.These should be catered for now so as to avoid having to visit at another time.I would expect that the applicants for this license type would be from existing holders of a licence in an adjacent area, that have backhaul vailable.This could also be used to feed back into the dead zone of their licenced area that does not have coverage due to the topology. Q12 perhaps a reduces field strenght should apply to the reduce ssize option 5, as it would be used in exception to cover some specific areas, in this way it should be possible to have a number of these orbital around the main license.I am not in a position to give field strenght figures.

Thanks

Billy Sheehan
South West Regional Authority

9 Respondent I – Titan

Commission for
Communications Regulation

Consultation Paper

Increased FWALA licence flexibility

Document No:

06/59

Date:

8 November 2006

All responses to this consultation should be clearly marked:- "Reference: Submission re ComReg YY/NN" as indicated above, and sent by post, facsimile, e-mail or on-line at www.comreg.ie (current consultations), to arrive on or before 15 December 2006, to:

Ms. Tara Kavanagh Commission for Communications Regulation Irish Life Centre Abbey Street Freepost Dublin 1 Ireland

Ph: +353-1-8049600 Fax: +353-1-804 9680 Email: Tara.kavanagh@comreg.ie

Please note ComReg will publish all respondents submissions with the Response to this Consultation, subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24

Contents

1 Foreword

The availability of broadband to support the provision of data services to the public is a key national objective. The Commission for Communications Regulation (ComReg) is committed to ensuring that every avenue is explored in terms of meeting this objective and has already introduced a number of initiatives such as the Fixed Wireless Access Local Area (FWALA) and the Wideband Digital Mobile Data Services (WDMDS) licensing schemes.

In 2003, ComReg developed the Fixed Wireless Access Local Area (FWALA) licensing scheme, allowing licensees to provide services in a local area as defined by them. This licensing scheme has proved very successful and currently there are over 160 FWALA licences issued to 11 different operators[1]. As of June 2006[2] ComReg estimated that there were in excess of 52,500 broadband subscribers served via Fixed Wireless Access which represents a 192% year on year increase. Growth in the take up of these services is continuing at a high rate and ComReg is keen to promote further competition in this area.

This document sets out a number of propose modifications to the existing FWALA Licensing Scheme[3] which are designed to allow operators increased flexibility in the deployment of their current and future FWALA networks. Greater flexibility in deploying FWALA networks should in turn improve the availability of wireless broadband to consumers, particularly those in rural areas.

We look forward to receiving your views.

Isolde Goggin,
Chairman.

[1] See FWA Broadband webpage on ComReg website for more information
http://www.comreg.ie/FWABroadband/FWABroadband.asp

[2] See page 18 of ComReg Document 06/52

http://www.comreg.ie/_fileupload/publications/ComReg0652.pdf

2 Introduction

The FWALA licensing scheme was launched in 2003. Since then, this scheme has proved to be very successful with ComReg estimating that 14% of the broadband market, or 52,500 subscribers, were served via Fixed Wireless Access in June 2006[2]. As of October 2006, there were in excess of 160 FWALA licences issued to 11 operators in both the 3.5 GHz and 10.5 GHz bands[1].

While the FWALA local area licensing scheme has met ComReg's objectives in terms of increased competition and broadband rollout, the nature of the licensing scheme has resulted in 'black spots' or 'dead zones' between licences where no further FWALA licences can be issued in the same band (see Figure 1 below).

As shown in Figure 1 below, a 'dead zone' arises when two FWALA licences are in close proximity to each other, thereby not leaving enough space between them to allow another FWALA licence to be issued on the same channel. Within these dead zones there may be a demand for broadband services which cannot be met under the current FWALA licensing process[3].

One option could be to provide services in these zones by using licence exempt spectrum in the 2.4 GHz or 5.8 GHz. However, with a few exceptions, this is unlikely to be a long term solution due to the inability to guarantee service in these bands which can be very congested in certain areas of the country. In an effort to address this issue ComReg has decided to issue this consultation paper seeking the views of interested parties on how the FWALA licensing process may be modified to address the 'dead zones' issue.

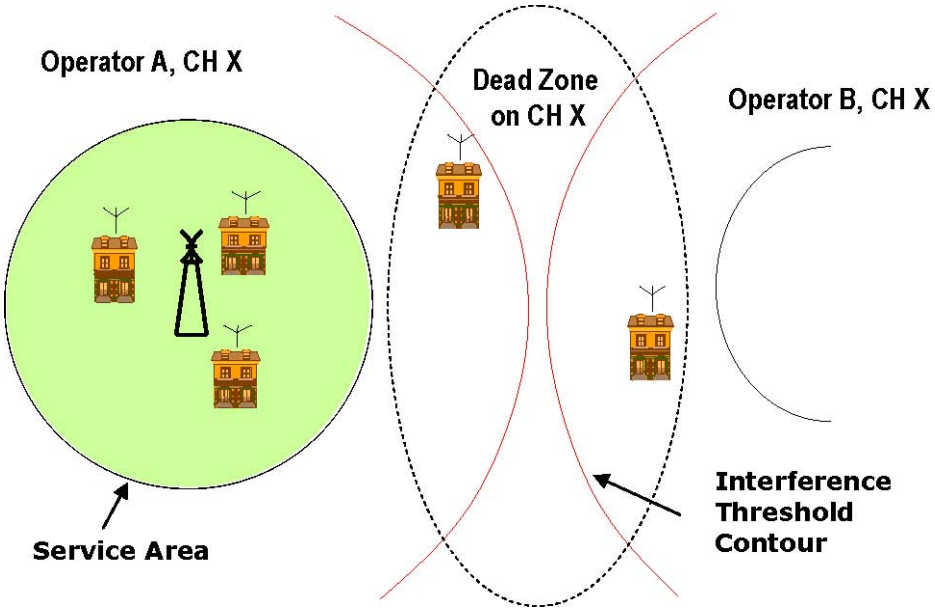


Figure 1: Illustration of 'dead zones'.

3 Existing Service Area and Interference Contour Thresholds

ComReg document 06/17 sets out the existing FWALA licensing process and defines the current service area and interference contour thresholds. Table 1 below sets out the maximum permitted Service Area radius, the interference contour radius and the maximum permitted field strength to be used at the interference contour for each FWALA frequency band.

Frequency Band (GHz)	Maximum Service Area Radius (km)	Interference Contour Radius (km)	Maximum permitted Field Strength (dBµV/m) at the Interference Contour
3.5	15	30	33
10.5	10	30	43.3
26	6	12	50.8

Table 1: FWALA Parameter Limits

The **FWALA service area** is defined as the geographic area within which an operator may offer telecommunications services by means of a local area fixed wireless access network. The service area for a licence is defined by a centre point and a maximum permitted radius from that point. The centre point is normally the geographic location of the base station. The maximum size of a service area is set by ComReg and is dependent on the frequency band employed, as shown in Table 1 above.

It is intended that Customer Premises Equipment (CPE) and outlying stations[4] may only be deployed within the service area of a FWALA licence and may only operate on the frequency range covered by the FWALA licence and do not cause the field strength limit specified in Table 1 above to be exceeded.

The **interference contour** is defined by means of a circle around the centre point of the service area. The contour is set by ComReg and is dependent on the frequency band employed, as shown in Table 1 above.

The interference contours determine whether an application can be accommodated on a FWALA channel in a particular area with the exception of particular cases where a natural obstacle e.g. mountains, permits overlapping of interference contours. An application will be rejected if its interference contour overlaps with the interference contour of another applicant/licensee.

The **field strength** applied at the interference contour is intended to ensure that any interference to a FWALA receiver in a service area outside of this contour is at least 6dB below the thermal noise floor. The field strength is dependent on the frequency band employed, as shown in Table 1 above.

[4] Outlying stations are defined as base stations other than the central base station, which is generally located at the centre of the FWALA service area, which are used to provide telecommunications services within the operator's licensed service area.

4 Options for increasing FWALA flexibility

This section presents six options which are designed to allow operators increased flexibility in the deployment of their current and future FWALA networks. This may allow operators to address the 'dead zones' issue.

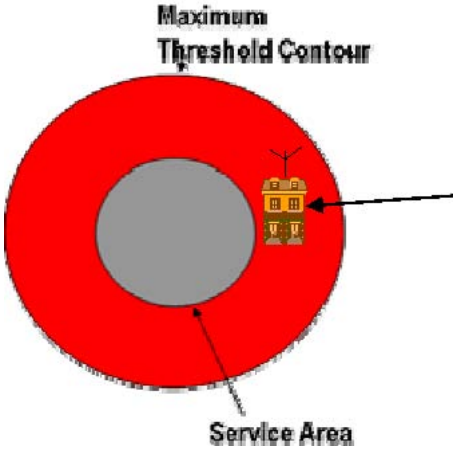
The options listed in this section are not mutually exclusive and it may be the case that two or more of these options may work together.

Additionally, the list of options presented in this section is not exhaustive and ComReg would welcome other suggestions and supporting technical arguments on how to resolve the 'dead zone' issue.

4.1 Option 1: Allow use outside service area

One option to increase flexibility in the current licensing scheme would be to permit the use of Customer Premises Equipment (CPE) equipment in the area outside the service area but within the interference contour. This is the red area indicated in Figure 2. The service in this area would be provided on a noninterference, non-protected basis and FWALA Operators would still have to adhere to the existing interference field strength contour limits as detailed in Table 1. The use of directional antennas at the CPE locations would further facilitate this option.

This option would enable operators to effectively increase their service area but it may affect the quality of service to customers as it is on a non-interference non protected basis. The main advantage of this option is the ease of implementation provided.



CPE on a non-interference, non-protected basis

Figure 2: Illustration of CPE equipment deployed outside the service area but within the maximum threshold contour.

Q. 1.In your view is option 1 a workable solution? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

A. Yes, possible with 10.5 and 26 , because of the rapid fall off of signal strength and the absence of reflections.

4.2 Option 2: Increase the service area

The maximum service area for a FWALA licence per frequency band is defined in Table 2 below.

Frequency Band (GHz)	Maximum Service Area Radius (km)	Interference Contour Radius (km)	Maximum permitted Field Strength (dBµV/m) at the Interference Contour
3.5	15	30	33
10.5	10	30	43.3
26	6	12	50.8

Table 2: Existing FWALA Parameter Limits

ComReg is of the view that it may be possible to increase the size of service area of each licence but maintain the interference threshold contour and field strength at the current limits for each of the different bands.

Option 2 proposes to increase the service area in each frequency band as follows while still maintaining the existing interference threshold contour and field

strength;

- 3.5 GHz service area would increase from 15km to 20km,
- 10.5 GHz service area would increase from 10km to 13km and
- 26 GHz service area would increase from 6km to 8km.

The advantage of this proposal is its ease of implementation and that is would increase the availability of wireless broadband in all existing and future licensed service areas. However, increasing the size of the service area may affect the quality of service provided to existing customers.

Q. 2.	**In considering option 2, in your view what is the maximum service area that could be permitted in each of the 3 FWALA frequency bands while still maintaining the existing interference threshold contour and field strength? Where possible please support your view with practical data or examples.** **A. 3.5 17 km, 10.5 15km, 26 not applicable , any radio equipment in the higher frequencies will depend on line of sight and therefore unless the area being covered is very flat , and the power levels increased dramatically I would no foresee any cost effective way of extending the service are**
Q. 3.	**Do you agree with the proposed increases to the service area in each of the 3 FWALA frequency bands as indicated above? (Please note that the existing interference threshold contour and field strength would be maintained if this option was adopted.)** **YES**

4.3 Option 3: Obtain legal consent

As outlined in Chapter 1, 'dead zones' arise when two FWALA licences are in close proximity to each other, thereby not leaving enough space between them to allow another FWALA licence to be issued on the same channel. In these

instances, ComReg cannot issue a FWALA licence in that area, as the interference contour of the new licence would overlap with the interference contour of an existing FWALA licence.

Under option 3, when a FWALA application overlaps with the interference contour of one or more existing FWALA Licensees, this option proposes that a FWALA licence may be issued to this applicant provided that written consent from all the affected existing FWALA Licensees is forwarded to ComReg on application.

Figure 3 below shows an example of how Option 3 could work. Under this option, ComReg would be able to issue a FWALA licence to Operator X in the 'dead zone', provided that Operator X had obtained the written consent from the existing FWALA operators (i.e. Operator A and Operator B).

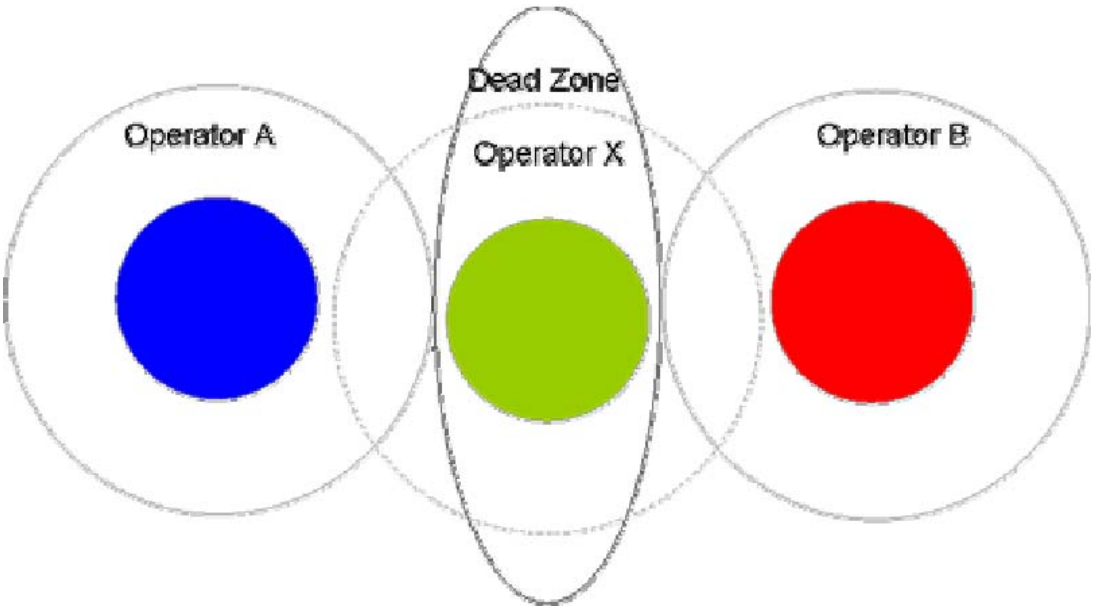


Figure 3: Option 3 example: Operator X obtains a FWALA licence in the 'dead zone' area with the consent of the neighbouring Licensee(s).

Q. 4.In your view is option 3 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

No, Frequency deployment would be impossible in the 10.5 Range and and administration and repeat testing would be required at all affected sites to ensure the interference contour is being complied with.

Although Options 1, 2 and 3 individually go some way to resolving the issue of 'dead zones' none of the Options alone would completely eliminate them. It is ComReg's view that combining Options 1, 2 and 3 would prove the simplest and most effective way to eliminate 'dead zones'.

Q. 5.Do you agree with the view that combining Options 1, 2 and 3 is the most effective way to eliminate 'dead zones'? Please give reasons for your answer.

1, and 2

4.4 Option 4: 'Partial Circle' FWALA licence

Option 4 proposes that ComReg develop a framework to licence 'partial circle' FWALA licences using the exact deployment and coverage details of the application. This would be a 'non-standard' FWALA application which ComReg would only consider using on a very limited basis in dead zone areas.

Figure 4 below shows an example of a 'partial circle' FWALA licence. In this instance, there is a sectored antenna at the new base station and (possibly) directional antennas at the CPE locations.

Each non-standard 'partial circle' FWALA application would have to be assessed on a case by case basis to determine the likelihood of interference to existing licensees. The limited size of the FWALA licences proposed under Option 4 may not be commercially viable and thereby could reduce the attractiveness of such licences to potential operators. However it may appeal to smaller operators wishing to serve rural communities.

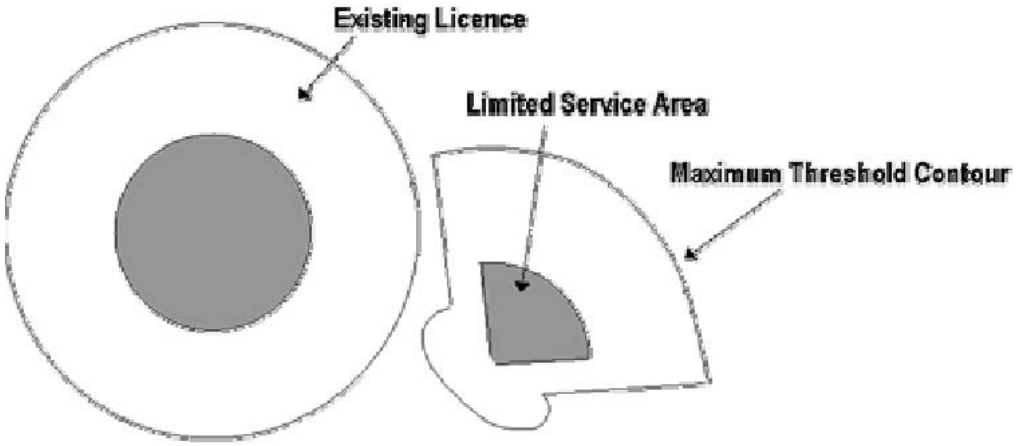


Figure 4: Illustration of a 'partial circle' FWALA licence

Q. 6.In your view is Option 4 a viable solution is addressing the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Yes . most deployments on th 3.5 and 10.5 are will use 90 and 60 degree sectors , this would require a record of the sector alignment to be recorded ? ?

4.5 Option 5: 'Reduced Size' FWALA licence

Option 5 proposes that ComReg develop a framework to allow the licensing of 'reduced size' FWALA licences using the exact deployment and coverage details of the application. This would be a 'non-standard' FWALA application which ComReg would only consider using on a limited basis in dead zone areas.

When assessing an application under this option, ComReg will

carry out interference analysis checks using the propagation model ITU-R p.452[5] to determine the likelihood of interference to existing licensees.

A 'reduced size' FWALA licence is one where a reduced service area and interference contour radius is issued (see Figure 5 below). ComReg proposes that the maximum permitted Field Strength (dBµV/m) at the Interference Contour for this licence would be the standard FWALA threshold limits, as outlined in Table 2 above.

This option may facilitate the provision of FWALA services in some of the areas not currently serviced by existing Licensees, but may also result in increased interference issues between adjacent Licensees due to the reduced distance between service areas. As this Option is for a reduced size service area it has a reduced attractiveness given that the limited number of likely customers could well impact into commercial viability.

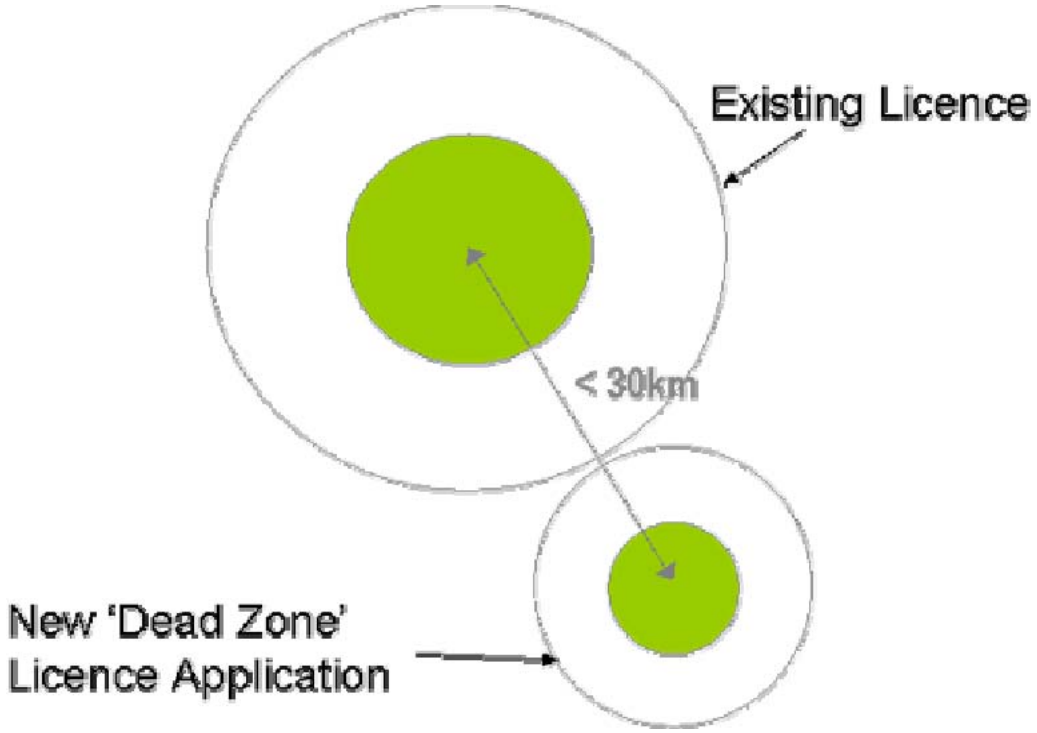


Figure 5: Illustration of 'reduced size' FWALA licence

Q. 7.In your view is Option 5 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Yes , limited coverage should be reflected in license cost

4.6 Option 6: 'Map Based' FWALA licence

Option 6 proposes that ComReg develop a framework to allow the licensing of 'map based' FWALA licences using the exact deployment and coverage details of the application. This would be a 'non-standard' FWALA application which ComReg would only consider using on a limited basis in dead zone areas.

Under option 6, the service area and interference contour area are the same. The boundaries of the service area / interference contour of the FWALA licence are set on the basis of a map generated from a radio propagation planning tool (see Figure 6 below). The maximum permitted Field Strength (dBµV/m) at the Interference Contour boundary for this licence would be the standard FWALA threshold limits, as outlined in Table 2 above.

For example, an applicant would submit an application to ComReg for a particular area stating the transmitter power, antenna characteristics and site parameters that they intend to use in order to provide a service. Using that information, ComReg would undertake an analysis using the ITU.R P.452 propagation model to see if the interference threshold contour is exceeded at the edge of the proposed service area. If the interference threshold contour level is exceeded then the transmit power will be reduced until the interference threshold contour is reached and the application can be licensed using the adjusted parameters.

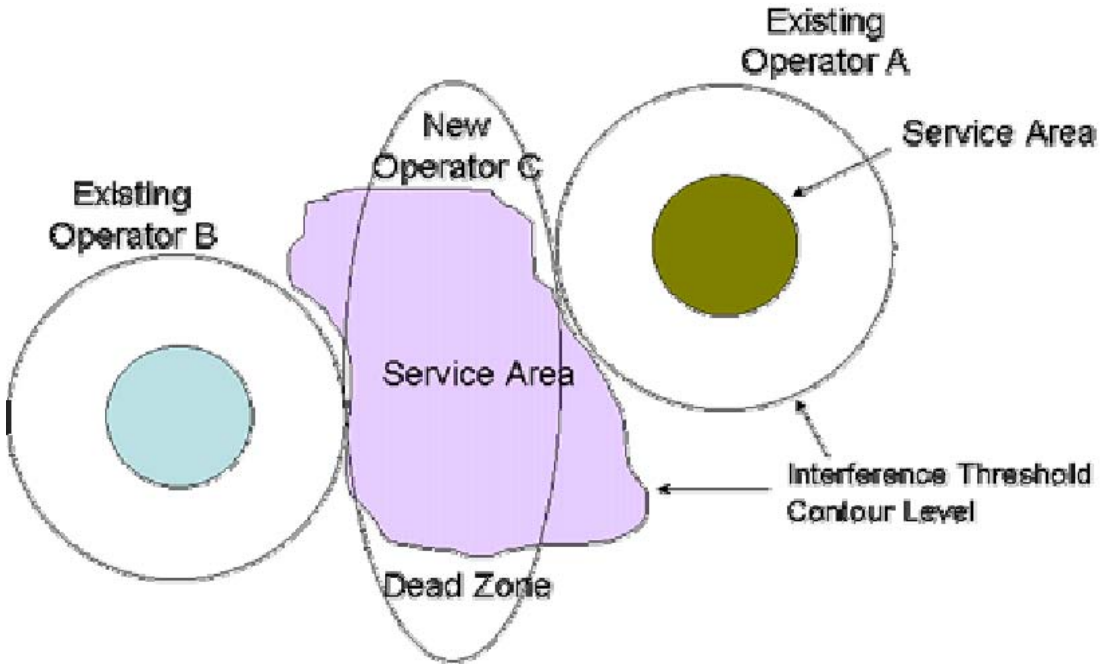


Figure 6: Illustration of 'Map Based' FWALA licence

This Option may prove unattractive to the applicant if the adjusted power levels required by ComReg make the service area commercially unattractive. Given that the service area is not as strictly defined as with the existing licences it may also prove difficult to ensure licence compliance.

Q. 8.In your view is Option 6 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

No very difficult to manage

4.7 Summary

Each of the options presented in this section have various advantages and disadvantages.

ComReg's preliminary view is that Options 1, 2 and 3 are the most feasible and least complex solution to implement as they build upon the existing FWALA licensing process. Options 1 and 2 will increase the area where FWALA services can be deployed, while Option 3 can be used to obtain a licence in a 'dead zone' area. Combining Options 1, 2 and 3 may prove the most effective method of eliminating 'dead zones'.

ComReg notes that Option 4, 5 and 6 may have limited appeal. However, ComReg is of the view that the benefits from introducing a 'non-standard' FWALA licensing process may not be sufficient to outweigh the drawbacks associated with a more complicated licensing process and licence compliance regime.

As clearly stated, the list of options presented in this section is not exhaustive. ComReg welcomes any additional suggestions not discussed in this paper.

Q. 9.	**Which of the 6 options or combination of options as outlined in this document best address the issues in your view? Please give details as to why.** **1,2 , 4, 5**
Q. 10.	**In your view are there other viable options that ComReg has not considered in this document? If so please give details.** **This is more applicable to 3.5 range as 10.5 is extreamly controllable in range and direction**
Q. 11.	**In your view would a combination of Options 1, 2 and 3 be sufficient**

to eliminate the issue of 'dead zones'? Please give reasons for your answer.

No , 1,2,4,5

Q. 12. In your view do the existing maximum permitted Field Strength (dBµV/m) limits at the Interference Contour need to be revised? If so, please provide technical details to substantiate alternative levels.

NO.

5 Submitting Comments

All comments are welcome, however it would make the task of analysing responses easier if comments were referenced to the relevant question numbers from this document.

The consultation period will run from 9 November 2006 to 15 December 2006 during which the Commission welcomes written comments on any of the issues raised in this paper.

Having analysed and considered the comments received, ComReg will review the flexibility in deployment of FWALA networks and publish a report on the consultation which will, inter alia summarise the responses to the consultation.

In order to promote further openness and transparency ComReg will publish all respondents submissions to this consultation, subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24. We would request that electronic submissions be submitted in an-unprotected format so that they can be appended into the ComReg submissions document for publishing electronically.

Please note
ComReg appreciates that many of the issues raised in this paper may require respondents to provide confidential information if their comments are to be meaningful.

As it is ComReg's policy to make all responses available on its web-site and for inspection generally, respondents to consultations are requested to clearly identify confidential material and place confidential material in a separate annex to their response.

Such Information will be treated subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24.

Appendix B – Consultation Questions

List of Questions

Q. 1.In your view is option 1 a workable solution? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your

answer.

Q. 2.In considering option 2, in your view what is the maximum service area that could be permitted in each of the 3 FWALA frequency bands while still maintaining the existing interference threshold contour and field strength? Where possible please support your view with practical data or examples.

Q. 3.Do you agree with the proposed increases to the service area in each of the 3 FWALA frequency bands as indicated above? (Please note that the existing interference threshold contour and field strength would be maintained if this option was adopted.)

Q. 4. In your view is option 3 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Q. 5.Do you agree with the view that combining Options 1, 2 and 3 is the most effective way to eliminate 'dead zones'? Please give reasons for your answer.

Q. 6.In your view is Option 4 a viable solution in addressing the issue of dead zones? ? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Q. 7. In your view is Option 5 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Q. 8.In your view is Option 6 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

Q. 9.Which of the 6 options or combination of options as outlined in this document best

address the issues in your view? Please give details as to why.

Q. 10.In your view are there other viable options that ComReg has not considered? If so please give details.

Q. 11.In your view would a combination of Options 1, 2 and 3 be sufficient to eliminate the issue of 'dead zones' ? Please give reasons for your answer.

Q. 12. In your view do the existing maximum permitted Field Strength (dBµV/m) limits at the interference contour need to be revised? If so, please provide technical details to substantiate alternative levels.

10 Respondent J - WestNet

Response to Comreg Consultation 06/59 "Increased FWALA Licence Flexibility"

Paul Cunnane/Brendan Minish
WestNet

December 2006

This document is WestNet's response to ComReg's Consultation Paper 06/59 of 8 November 2006, "Increased FWALA Licence Flexibility". Our responses to the questions contained in the consultation paper are by and large confined to the 3.5GHz spectrum, as that is the only band for which WestNet hold or intend to hold licences.

Option 1: Allow use outside service area

Q1. In your view is option 1 a workable solution? If yes what constraints, if any, should apply? If no what difficulties do you foresee? Please give reasons for your answer.

The advantage of this approach is that it offers more effective use of access points (which can easily have a 30km range) and potentially quadruples the coverage area for a given licence.

A practical aspect of FWA deployment that should be taken into account when considering this option is that FWA CPEs tend, by their nature, to have relatively high-gain directional antennas. Also, CPEs deployed outside the service area would necessarily be faced toward an AP within the service area — in other words, away from APs in any neighbouring service area. As such, the potential for the CPE to cause interference to a neighbouring AP, or vice-versa, is relatively low.

The disadvantage of this option is illustrated in figure 1 on the following page. In the example shown, the shaded area represents a geographical location that falls between licenced areas. Even with the extended coverage offered by option 1, potential customers in these areas would never be in a position to receive service.

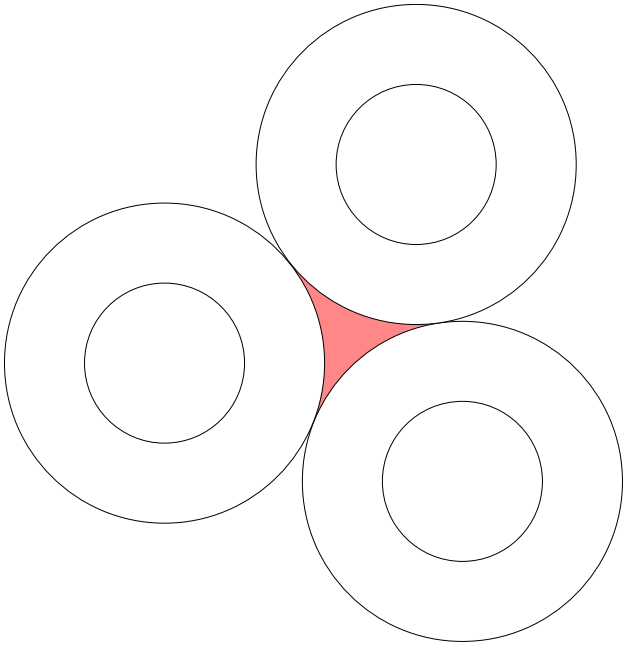


Figure 1: Problem with option 1

On this basis, option 1 alone would not be an appropriate solution.

This option does have a useful aspect for an operator who aims to provide widespread coverage in a given geographical area. Figure 2 on the next page shows the maximum area in which blanket coverage can be provided with three licences under the current regime, while figure 3 on the following page shows the maximum area that could be blanket covered by three licences with option 1 in effect — a much larger coverage area.

Option 2: Increase the service area

Q2. In considering option 2, in your view what is the maximum service area that could be permitted in each of the three FWALA frequency bands *while still maintaining* the existing interference threshold contour and field strength? Where possible please support your view with practical data or examples.

As discussed in the response to Q10 on page 7, we believe that service could be permitted all the way to the edge of the interference contour while maintaining the field strength limits, with careful engineering. That said, there is a case to be made for defining a service area, as discussed in the response to Q4 on page 4.

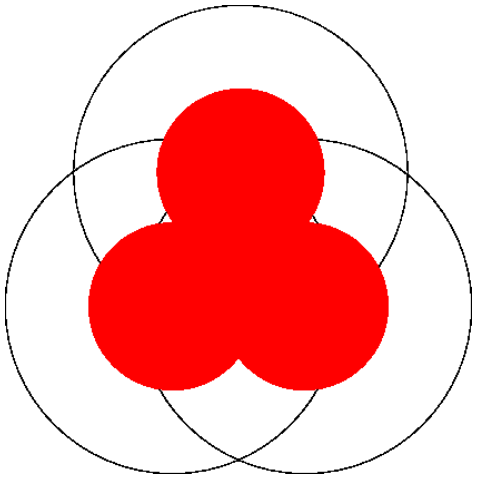


Figure 2: Blanket coverage with the current regime

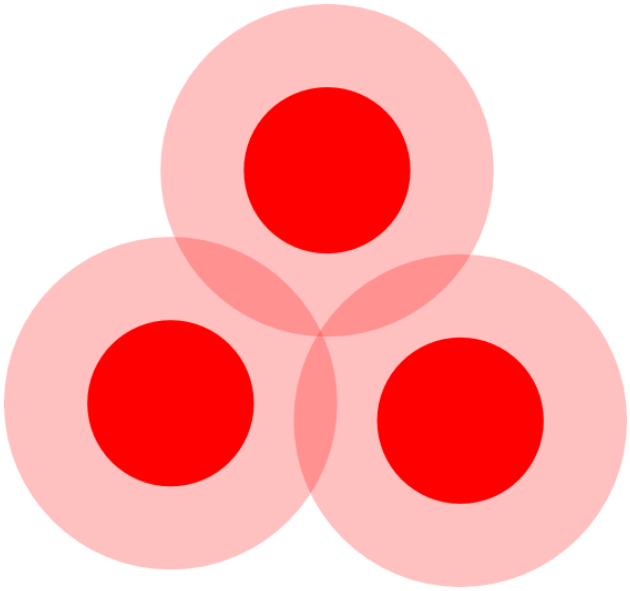


Figure 3: Blanket coverage with option 1

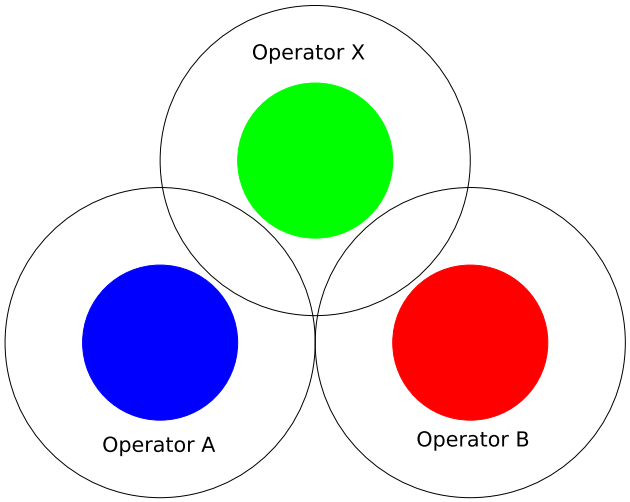


Figure 4: Option 3 still leaves large gaps in coverage

Q3. Do you agree with the proposed increases to the service area in each of the 3 FWALA frequency bands as indicated above? (Please note that the existing interference threshold contour and field strength would be maintained if this option was adopted.)

An increase to the service area would be welcome. Under the current regime (for 3.5GHz), the no-coverage area within the interference contour is three times bigger than the service area. With the proposed amendment, the area within the interference contour would remain bigger than the service area, but — in conjunction with other options — this option would be a positive change.

Option 3: Obtain legal consent

Q4. In your view is option 3 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee? Please give reasons for your answer.

This option addresses the concern expressed in the response to Q.1 above, in that it would allow more extensive coverage. However, taken alone it would not completely address the issue.

Figure 4 illustrates the problem. Operator X has obtained consent from operators A and B to overlap interference contours. This still leaves large geographical areas within the interference contours without coverage.

A potentially bigger problem is that an existing operator could use the

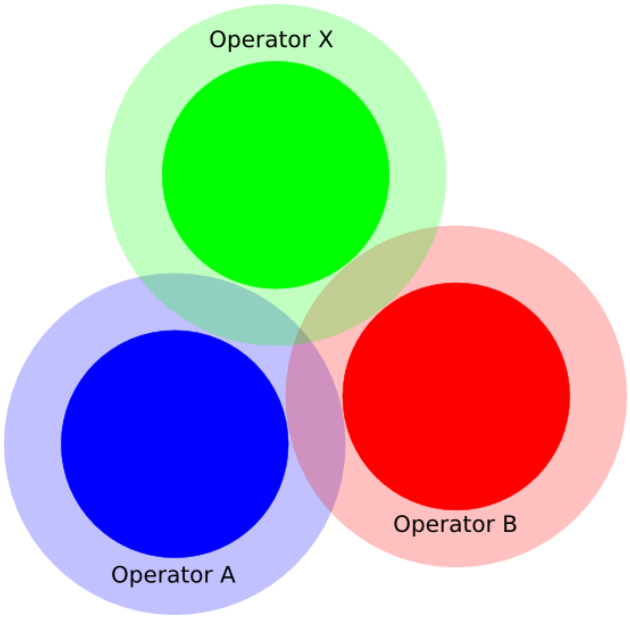


Figure 5: Combining options 1, 2 and 3.

interference contour as a tactical way to prevent a competitor from offering service in a neighbouring area. This leads to the question: what process can be put in place to ensure that an operator has valid reasons for refusing to allow a competitor to overlap interference contours?

The other question that arises is: to what extent should interference contours be allowed to overlap? We propose that overlaps should be permitted to the extent that an operator's interference contour does not encroach on a neighbouring operator's service area — that is, that such overlaps should be automatically agreed to unless there is a compelling technical reason to the contrary, but that greater overlaps can be agreed by the operators if appropriate.

Q5. Do you agree with the view that combining Options 1, 2 and 3 is the most effective way to eliminate 'dead zones'? Please give reasons for your answer.

A combination of these options would help to address the issue. Figure 5 illustrates an example of such a combination. Each operator can provide service to customers anywhere within the licence area; the service area has been enlarged; interference contours overlap, with mutual consent. As can be seen from the figure, there are no areas between the three operators' licence areas where coverage is impossible.

As mentioned in the response to Q4, this combination would lose its effectiveness as a strategy to address gaps in coverage if operators are allowed to arbitrarily veto overlapping interference contours without a valid technical reason.

On balance — with caveats — this is the best approach within the constraints of the existing "circular" FWALA licencing regime.

Option 4: 'Partial Circle' FWALA licence

Q6. In your view is Option 4 a viable solution is addressing the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

There may be a relatively small number of situations where this solution is appropriate, but only in conjunction with options 1 and 2. It may be useful for the purposes of flexibility to allow this as an option.

Given the reduced coverage potential of such a licence, it may be appropriate to offer such a licence at a reduced cost, similar to the reduced cost for partial spectrum allocations that was initially on offer for 3.5GHz licences.

Option 5: 'Reduced Size' FWALA licence

Q7. In your view is Option 5 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

As with the answer to Q6 above, it may be useful for the purposes of flexibility to offer this solution as an option in conjunction with the other options, and to consider making such a licence available at reduced cost.

Option 6: 'Map Based' FWALA licence

Q8. In your view is Option 6 a workable solution to address the issue of dead zones? If yes what constraints, if any, should apply? If no what difficulties do you foresee. Please give reasons for your answer.

In our opinion, option 6 is not a particularly appropriate option in the context of the existing FWALA licencing regime.

Q9. Which of the 6 options or combination of options as outlined in this document best address the issues in your view? Please give details as to why.

As discussed in the response to Q5 on page 5, a combination of options 1, 2 and 3 would best address the issues. Options 4 and 5 should also be considered for special cases where appropriate.

Q10. In your view are there other viable options that ComReg has not considered in this document? If so please give details.

Another option that we believe should be considered is allowing the siting of base stations outside the defined service area, in such a way as to comply with the field strength limits at the interference contour. This could be done through engineering approaches such as the use of directional antennae, output power reduction and so on. This would allow greater flexibility in coverage, particularly in the more difficult terrain encountered in more rural areas where a centrally-located base station is unlikely to provide adequate coverage to outlying parts of the service area.

Naturally this is more likely to lead to a situation where interference may be encountered. Should this happen, a process should be in place to facilitiate voluntary co-ordination to resolve the issue, followed by a decision process involving ComReg.

We recognise that this proposed change in approach to FWALA licencing alters the landscape in terms of coverage that can be provided by a licence, and in terms of the optimum number and locations of licences required by existing operators. Accordingly, we propose that it may be appropriate to allow a short time window after any change of licencing parameters to allow operators to submit requests for alterations to existing licences; in particular, to allow licence areas to be re-centred in potentially more appropriate locations.

Q11. In your view would a combination of Options 1, 2 and 3 be sufficient to eliminate the issue of 'dead zones'? Please give reasons for your answer.

As discussed above, a combination of these options would eliminate dead zones, but only if option 3 is allowed by default and absent a compelling reason to deny it.

Q12. In your view do the existing maximum permitted Field Strength (dBμV/m) limits at the Interference Contour need to be revised? If so, please provide technical details to substantiate alternative levels.

We believe that the field strength limit of 33dBμV/m for 3.5GHz FWALA licences is appropriate, and should be maintained in conjunction with the combination of options 1, 2 and 3 as described.