ZTE: The following text is a copy of the official Anacom determination of 23.11.2006 about a public consultation on Broadband Wireless Access. ZTE Corporation as one of the biggest telecommunications and systems manufacturer is pleasantly answering to this consultation point-by-point in blue colour text below.

http://www.anacom.pt/template31.jsp?categoryId=221062

Determination of 23.11.2006

Public consultation on Broadband Wireless Access

1. General Framework

Broadband Wireless Access is a term used to describe new broadband wireless technologies that involve mobile, nomadic and fixed applications. Growing demand for bitstream access to provide multimedia services at fixed locations has led the industry to develop new technological solutions capable of surmounting the technical hurdles involved (such as line of sight), with more efficient modulation techniques than those that have added mobility.

ANACOM has been following the course of discussions in various international fora on the introduction of this type of technology. This debate has looked at both the technical issues involved (e.g. technical solutions, the spectrum and standards) and at a regulatory framework for this technology, with the aim of achieving harmonisation in the adopted solutions.

At the same time, it should be noted that several market players have expressed an interest in bringing this technology to Portugal, and that several requests have been received to make part of the spectrum available for BWA technical trials with WIMAX type systems.

In light of this growing interest, ANACOM is launching this public consultation, taking into account the positions that have been debated in international organisations, especially the European Commission and the European Conference of Postal and Telecommunications Administrations (CEPT), as well as the results of ANACOM's own public consultation on Fixed Wireless Access (FWA), with the aim of reformulating usage rights of the spectrum as allocated

in Portugal.

In this scope, the European Commission, acknowledging the importance of broadband communications within the i2010 initiative, conferred a mandate upon CEPT to identify the technical conditions, with a view to the operating frequency bands deemed more appropriate and harmonized for BWA purposes and with consideration to such issues as technological neutrality and possible licensing regimes.

It is noted that, in accordance with the current regulatory framework for electronic communications, no technological system is identified in this mandate. A response to the mandate is in preparation by the CEPT's Project Team – JPT BWA, with conclusion expected by the end of this year.

Key to this EC mandate is the issue of BWA spectrum harmonisation. This issue is crucial for spectrum management, bringing as it does, a range of benefits from a reduction in equipment development costs (economies of scale), interoperability, and faster development and introduction times for solutions that benefit the user.

The choice of frequency bands could be determined by the success of new technologies and their dependant services, and should, whenever possible, be for harmonised bands and not one-off solutions. Accordingly, various frequency bands are being considered for BWA's introduction. It should be noted that it is BWA applications in generic terms that are at issue, and not any particular technological system (without limit to or exclusion of WiMAX type systems or any other technology already in the market).

The work accomplished to date has led to the conclusion that the priority bands for BWA applications are the 3.6 GHz and 5.8 GHz bands. Concretely, the JPT BWA is studying the technical and regulatory framework for BWA systems in

these bands as follows:

.. A CEPT/ECC decision that would govern BWA applications in the 3.6 GHz (3400-3800 MHz) frequency bands. It is noted that BWA applications encompass fixed, nomadic and mobile technological systems, allowing the inclusion of a mobility component. In Annex 1 there is a Draft of this document, which is expected to be adopted for CEPT public consultation by the end of this year.

.. A CEPT/ECC Recommendation (06)04 on BFWA systems (Broadband Fixed Wireless Access) in the 5.8 GHz (5725-5875 GHz) frequency band, which is shortly to be approved; This document can be seen in Annex 2.

In order to get an overall picture of the BWA issue, it is important to emphasise the most recent activities that ICP-ANACOM has been involved in and that could impact any decision that may be adopted.

As one of the bands under discussion is the 3400-3800 MHz band, it should be also be noted here that ICP-ANACOM has concluded a public consultation on Fixed Wireless Access (FWA). It is further highlighted that the action plan set out in Administrative Rule no. 1062/2004 of 25 August envisages two stages of execution (Stage I and Stage II).

In the initial stage (Stage I), ANACOM, having heard those companies holding FWA licenses, readjusted their rights to use the radio spectrum in accordance with the model set out in Administrative Rule no. 1062/2004 and with the proven interests and needs of the companies. The readjustment of these rights applied only to formerly allocated spectrum with a view to maintaining it and did not encompass requests for additional spectrum or for change of use.

The second stage (Stage II) will see ANACOM defining the allocation process, in view of the available spectrum (e.g. spectrum released by companies who in the course of this process gave up their interest in determined zones) and interest in spectrum acquisition by other entities (including for example existing

holders of FWA frequency usage rights or other entities not currently in the market).

Accordingly, it is important to note that any action taken on BWA, especially with regard to the 3.6 GHz frequency band should be viewed in conjunction with the stages above.

With this public consultation ICP-ANACOM hopes to gather opinions from a range of market stakeholders (manufacturers, operators, users and others), before making a decision on the future framework that will govern how BWA applications can be introduced in the frequency bands concerned.

Accordingly and in order to gather information from a wide range of interested parties, ANACOM has posed the set of questions in the following section:

2. Questions

ZTE response:

Brief introduction to 802.16d and 802.16e:

802.16-2004 (802.16d) uses Orthogonal Frequency Division Multiplexing (OFDM) and supports fixed and nomadic access in Line of Sight (LOS) and Non Line of Sight (NLOS) environments.

802.16-2005 (802.16e) optimized for dynamic mobile radio channels, and provides support for handoffs and roaming. It uses Scalable Orthogonal Frequency Division Multiplexing Access (SOFDMA), a multi-carrier modulation technique that uses sub-channelization. Service providers that deploy 802.16e can also use the network to provide fixed service.

1. BWA Framework

a) Define and describe the technologies covered by BWA, indicating positive aspects and possible fragilities.

ZTE response:

On a comparative basis, some of the advantages of 802.16-2004 OFDM equipment could be:

- Less Complex OFDM Modulation: Could be OK for deployments that do not require upgradeability and mobility.
- License-Exempt Bands: Fixed deployments could use license-exempt bands in areas where interference levels are acceptable or low (rural deployments).
- Higher Throughput: Higher spectrum bands and lower overhead for 802.16-2004 OFDM results in higher throughput. This is a clear advantage for backhaul systems with outdoor antennas.
- Better Time to Market: Earlier availability of 802.16-2004 OFDM products.

On the other hand, it would be worthwhile to wait for 802.16-2005 SOFDMA equipment for the following reasons:

- Wider coverage and better signal propagation compared to 16d OFDM: Sub-channelization provides an OFDMA gain of 6 dB on the downlink and 12 dB on the uplink. This results in better coverage for range limited suburban and rural deployments. Coverage area simulations performed by ZTE indicate significant range advantage with OFDMA compared to OFDM.
- Better use of frequency resources: Sub-channelization allows flexible use of frequency resources for seamless coverage requirements. Four or more channels are needed for frequency planning with OFDM. With the PUSC deployment option of OFDMA, one frequency channel allows seamless coverage. For example illustrations of seamless coverage frequency planning with OFDMA.
- Higher system capacity with Advanced Antenna Technologies: Channel reciprocity of TDD enables better implementation of advanced antennas techniques. Spatial correlation allows advanced antenna and MIMO

schemes to better perform in TDD mode. There is more efficient resource management and lesser complexity with TDD. For capacity limited systems there would be a significant advantage with OFDMA mode. This would be one of the ways to incrementally increase system capacity based on increasing market requirements.

- Migration to mobility: There would be no challenges due to incompatible PHY mode of 16d OFDM. Seamless migration path to portable/mobile deployments with software upgrades would be supported. Support for power saving and sleep modes would also benefit battery powered devices.
- Simplified Profiles for fixed/nomadic use: Though initial 'profiles' for SOFDMA 16e system are targeted for mobility; there have been initiatives in the WiMAX Forum for simplified SOFDMA profiles to support fixed/nomadic options. Simplicity is expected to be with regards to core network requirements, with less emphasis on complex handoffs, and absence of power saving modes. Enhancements to portable/mobile systems can be enabled via software upgrades and by the addition to needed core-network functional elements.
- Efficient use of spectral resources with asymmetric DI/UL partitioning: Uplink and downlink data throughput requirements for data services are asymmetric: with typical DL/UL partitioning ranging from 1:1 to 3:1. Flexible TDD frame partitioning based on DL/UL throughput requirements would allow for efficient use of spectral resources.
- Choice of IP-CS and ETH-CS convergence layers to meet carrier requirements: 16d OFDM profiles are based on ETH-CS. Whereas the initial target for 16e SOFDMA profiles has been IP-CS. In view of the increasing requirements from the eco-system for support of fixed/nomadic options with SOFDMA, optional ETH-CS mode has been accepted for 16e profiles. This would allow 16e SOFDMA systems to be deployed for all envisioned usage modes. This would be conducive to wider roaming relationships as well.
- WiMAX profile compliance for a wider range of band classes. Surveys conduced by WiMAX Forum indicate vendor and carrier interest for a wider range of band-classes for 16e SOFDMA mode, compared to the

OFDM mode. Of special interest is the support for WCS band (Bandclass 2.A) for 16e SOFDMA certification profiles.

- Flexible approach of regulatory administrations: Regulatory agencies worldwide have been showing flexibility in allowing the use of TDD even for paired radio channels that have typically been targeted for FDD mode. TDD mode can thus be deployed both for paired and unpaired bands.
- Evolution path to 3.5/4G: OFDMA/MIMO have been the technology of choice of 3GPP for evolution to LTE framework, and for 4G systems as well. This allows evolution and co-existence of 16e SOFDMA WiMAX systems with other evolving technologies.
- Better Business Case: Wider acceptance of SOFDMA 16e technology by the eco-system enables larger market pie and lower expected CapEx and OpEx for carriers. Wider choice of interoperable equipment form several sources could be critical to carrier business decisions.

To be brief, the positive aspects of WIMAX16e are:

1.Qos enable
2.support VoIP
3.support meshing
4.Max throughput is up to 70Mbps
5.support NLOS

Possible fragilities:

1.It is still ongoing development and not as mature as 3G.

b) Define the radio parameters of the technologies mentioned above, including:
i. Power;
ii. Channels;
iii. Duplex mode (TDD/FDD);
iv. Modulation;
v. Standard applicable (if existing);
vi. Coexistence of various technologies and variations of the same technology;

ZTE response:

The proposed system includes the following technology:

- OFDMA based, with MIMO/AAS to enhance link budget;
- 16e mobile MAC based;

- Centralized architecture based on 3G, with separated BSC for mobile control;
- Seamless data/voice handover realized.
- Frequency Band: 2.5GHz below required.
- TDD/FDD mode: TDD supported.
- Subscribers: PCMCIA card/PDA/PC/Mobile phone.

More details please refer to ZTE WIMAX16e technical specification.pdf.

c) What type of use is best suited to BWA technologies: connection to end user, transmission network or both?

ZTE response：Connection to end user is the best suited to BWA technologies. Residential and Office subscribers can access to the Wireless broadband network via PC, PDA, Cell phone and other intelligent terminals.

d) What types of service could be offered by each technology? Please explain in concrete terms the amount of spectrum needed to provide these services and the capabilities of the identified technologies.

ZTE response:

Wimax support 5 classes of application, they are:

1. Multi-player Interactive Gaming.
2. VOIP and Video Conference
3. Streaming Media
4. Web Browsing and Instant Messaging
5. Media Content Downloads

		BANDWIDTH		LATENCY		JITTER	
Class	Application	Guideline		Guideline		Guideline	
1	Interactive Gaming	Low Bandwidth	50 kbps	Low Latency	< 25 msec	N/A	
2	Voice Telephone (VoIP) Video Conference	Low Bandwidth	32064 kbps	Low Latency	160 msec	Low Jittering	<50 msec
3	Streaming Media	Low to High Bandwidth	5 Kbps - 2 Mbps	N/A		Low Jittering	<100 msec
4	Instant Messaging Web Browsing	Moderate Bandwidth	10 kbps - 2 Mbps	N/A		N/A	
5	Media Content Download	High Bandwidth	> 1~2 Mbps	N/A		N/A	

e) What is the target market and how big is the market envisaged for the technologies/services offered?

ZTE response:

16e Mobile WiMAX is the first technology which combines both MOBILE and BROADBAND. The attributes and performance capability of Mobile WiMAX makes it a compelling solution for high performance, low cost broadband wireless services. Based on Mobile WiMAX platform, many new applications can be developed to meet the ever-increasing demand from end users. Some applications of 16e Mobile WiMAX are listed as below:

Mobile Government

The higher data through, flexible bandwidth allocation and mobile nature of ZTE 16e Mobile WiMAX system enable the government to build up and enhance the "Mobile Government" reputation in fields like Public Safety, Emergency Rescue, Transportation, Healthcare, Telemedicine, Environment, e-government, etc.

ICT (Information and Communication Technology) Solution for SME and Mobile Workers

There are many small medium-sized businesses require cost-effective high-speed connectivity to the Internet and to remote offices. Many of these businesses want to share resources across the network, including synchronous data storage, VoIP PBX, video conferencing, FAX, etc. With the built-in QoS and security support, ZTE 16e Mobil WiMAX can serve as an ideal platform to deliver quality quad-service including data, streaming, voice and wireless.

Vertical Industry

The Vertical Industry like Electrical, Water, Logistic, Finance, Education, Campus has special communication requirements. One common requirement ZTE has understood from vertical industry is that they require point-to-point or point to multi-point links which interconnect central office, customer centers, outdoor fields to provide instant messaging, quality voice, internet access, Realtime Video, Video Conferencing, etc.

Traditional Telecom Market

- ☐ IP TV, Mobile TV

☐ Residential Broadband

☐ Entertainment

☐ Complementary Data Services of 3G Network

2. Frequency Use

a) What comments do you have on the content of the CEPT/ECC decision and recommendation in Annex?

ZTE response:

We comment to use 2.5GHz band as the frequency of Wimax 16e. Because 2.5GHz has more

Advantages than 3.5GHz, such as capacity, coverage and so on.

Recently, 2.5GHz has become the focus for mobile WiMAX, and many operators are evaluating the opportunity for static, portable and mobile usage models. The range and building penetration of 2.5G make it more suitable for regional broadband in lower-density rural areas than 3.5G.

b) Under what conditions do you consider that an operator authorized to operate FWA in the 3.5 GHz and/or 24.5 GHz or 27.5 GHz bands could expand their services, changing their current technology to use BWA technology?

ZTE response:

Operators are using WiMAX to deploy DSL extension-type services to suburban and rural areas in Western Europe, North America and parts of Asia (such as Australia and South Korea), while in Central and Eastern Europe, the Middle East and Africa, Latin America and Asia/Pacific, WiMAX is being used to replace fixed network infrastructure that is in bad shape, even delivering primary PSTN services. Many incumbent operators that are going out of their network to become competitive local exchange carriers (CLECs) in neighboring countries, especially in Central Europe, Eastern Europe and the Middle East and Africa, are deploying WiMAX to offer broadband Internet access as well as voice over IP (VoIP) as a competitive service bundle.

Unlicensed frequency will bring higher interferer.

c) Which frequency bands do you consider suitable for the provision of BWA, taking into account such factors as international harmonisation, the state of technological development and the costs involved, the type of authorisation (with waiver or not of radio license), as well as the need for coexistence with other technology systems? Please state reasons.

ZTE response:

2.5GHz is suitable for the provision of Wimax 16e. Global-scale production will be required to make WiMAX successful, so harmonization is key. An example of where harmonization really worked is in the Wi-Fi space.

3. BWA implementation in Portugal

a) Do you consider that access to BWA frequencies should be restricted to certain bodies? If so, please indicate which ones, and give reasons who you consider it necessary to put such restrictions in place.

ZTE response:

With the mobile and broadband characteristics, WiMAX can fulfill various networking modes flexibly. It is able to expand the bandwidth of 2G network, enrich the data service of the future 3G network, and support independent networking as well.

b) Do you consider that BWA services should be offered nationwide or would it be more suitable to limit them geographically (in which case please give details of the geographic location(s) you consider the service should be limited to)

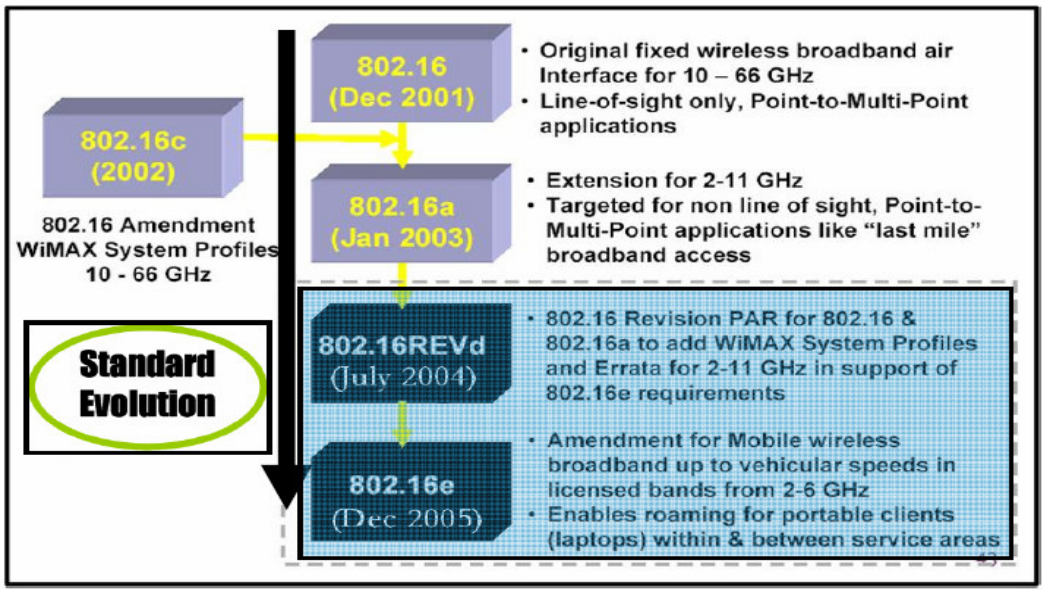
ZTE response:

In the works for years, WiMax (Worldwide Interoperability for Microwave Access), is a wireless technology that provides high-speed broadband connectivity over long distances. It can be used for several applications including last mile/last km broadband connections, high speed connectivity for businesses, and cellular/hot-spot backhaul applications. WiMax is the popular name for the IEEE 802.16 wireless MAN (Metropolitan Access Network) standard.

c) What type of procedures do you consider most suitable for the allocation of rights/selection criteria for BWA systems in the bands mentioned in the Annexes?

ZTE response:

The following picture is showing the WIMAX forum evolution route.



d) What type of requirements, as regards coverage obligations, quality of service, interoperability or other, do you consider should apply to usage rights?

ZTE response:

Please refer to the documentation ***ZTE WiMAX16e Technical Specification.pdf***.

e) Do you consider that BWA services will complement or coincide with other existing or future technologies (in operation or planned) in the same or other frequency bands?

ZTE response:

Wimax 16e can cover all functions of Wimax 16d. With the mobile and broadband characteristics, WiMAX can fulfill various networking modes flexibly. It is able to expand the bandwidth of 2G network, enrich the data service of the future 3G network, and support independent networking as well.

Potential applications for WiMax include:

- Last mile/last km connectivity applications: Network operators, like traditional phone companies and cable providers, see WiMax as a great alternative for last mile connectivity. Certainly cheaper than deploying fiber, WiMax can serve customers in rural areas who do not have access to broadband cable or DSL.
- Backhaul applications: WiMax can also effectively connect Wi-Fi hotspots and cellular towers to the Internet.
- Network overlay: 3G service providers can offer an overlaid WiMax service targeted towards laptop subscribers. Some experts believe WiMax can bridge the gap between applications designed for broadband landline and mobile wireless

networks.

4. Introduction of BWA systems in the market

a) What conditions do you consider important for the successful implementation of BWA technologies?

ZTE response:

1. It is crucial that WiMax becomes an important building block to enable fixed/mobile convergence and to ensure its success.
2. Ability to offer ease of use is crucial to the success of WiMAX service providers.
3. Success of WiMAX may depend on the ability to combine fixed and mobile access over the same infrastructure.

b) When do you consider that BWA technologies will have the necessary conditions for successful implementation in the Portuguese market?

ZTE response:

The pre-WiMAX products currently in the marketplace will be superseded by certified WiMAX products that will enter the market in late 2006 for fixed WiMAX (IEEE 802.16-2004) and in the next year,2007, time frame for mobile WiMAX. Fixed WiMAX will initially be attractive to greenfield operators that want to establish themselves as wireless broadband operators and for an xDSL fillin by established wired operators in areas that are not suitable for wired xDSL services. The real economies of scale for WiMAX will come with mobile WiMAX in the 2008 time frame.

c) In what way would you be interested in using and eventually commercialising BWA technologies?

ZTE response:

Wireless broadband Internet access as a good, or great, WiMAX opportunity, the same for voice over IP (VoIP) over WiMAX. Various video services, including TV, videoconferencing and video on demand (VOD), were scattered, but the "triple play" as a good opportunity for WiMAX in the future.

5. Are they any other points you consider relevant?

ZTE response:

WiMAX faces an uphill struggle to achieve widespread market penetration. It will continue to play catch-up with other wired and mobile technologies for several years to come. However, WiMAX is ideally suited for several market opportunities, such as broadband fill-in, enterprise E1 and mobile backhaul.

Concluding from all the points above, 802.16e is definitely the trend of WiMAX industry. Since there is no migration path from 802.16d to 802.16e, the early investment on 802.16d will be waste as the result. The 16e roadmap of advanced

equipment vendors including ZTE are mostly towards the end of 2006. Furthermore, based on the timeline of WiMAX forum, the first certified 16e products will get into the market by the end of December 2006.

3. Consultation procedures

The statutory attributions of ICP-ANACOM include the promotion of competition and development in communications markets, the regulation and supervision of the communications sector and the management of the radio spectrum with powers to enact processes of public consultation and expressions of interest.

The principle of effective and efficient use of frequencies is fundamental in issues that affect this resource. The implication of this is that allocated frequencies should be used in a similarly effective and efficient manner in accordance with their allocation.

With this public consultation ICP-ANACOM hopes to gather opinions on the introduction of BWA in Portugal from a range of market stakeholders (manufacturers, operators, users and others), before making a decision on the future framework that will govern how BWA applications can be introduced in the frequency bands concerned.

ICP-ANACOM will publish the results of the consultation and undertakes not to disclose comments which respondents to the consultation have expressly marked as confidential.

This public consultation does not in any way bind ICP-ANACOM to adopt particular solutions, even where these are cited in the consultation questions.

Observations and comments should be submitted by 2 January 2007, in writing to ICP-ANACOM, Ava Jos Malhoa 12, Lisbon, or by email to consultaBWA@anacom.pt.

A specific web page has also been created (http://www.anacom.pt/template12.jsp?categoryId=221723), containing the document in question.

ANNEX 1*

CEPT/ECC Draft Decision on BWA systems at 3,6 GHz (3400-3800 MHz)

* The information provided belongs to CEPT - European Conference of Postal and Telecommunications Administrations.

ECC(06)154

JPTBWA(06)128

ELECTRONIC COMMUNICATIONS COMMITTEE

ECC Decision

of [dd] [month] 2006

on availability of frequency bands between 3400-3800 MHz

for the Harmonised implementation of

Broadband Wireless Access systems

(BWA)

(ECC/DEC/(06)[xx])

EXPLANATORY MEMORANDUM

INTRODUCTION

This CEPT/ECC Decision addresses the availability of frequency bands between 3400-3800 MHz for the harmonised implementation of Broadband Wireless Access systems (BWA). These frequency bands are allocated to the fixed service on a primary basis and to the mobile service on a secondary basis in ITU Region 1.

Broadband Wireless Access ("BWA") is a descriptive term for the wireless delivery, mainly but not exclusively to an end user, of broadband traffic that can encompass fixed, nomadic and mobile applications. It is also considered that BWA systems might include backhauling services for the same or a second operator.

Results of CEPT/ECC studies clearly identify the band 3 400-3 600 MHz as the widest available choice for current and future BWA deployment in CEPT. The band 3 600-3 800 MHz has been identified as a possible additional or alternative frequency band. On the basis of a survey undertaken by ERO in 2005, updated in 2006, a clear majority of European countries indicated that they already use the 3.5 GHz band for FWA. In addition, it was also indicated in that survey the use of the 3.7 GHz band for Wireless Access purposes was at that time limited to a few European countries.

To prepare the harmonisation of the frequency bands 3 400-3 600 MHz and 3 600-3 800 MHz for BWA, the following sharing considerations have already been carried out:

. The intra-service sharing (i.e. coexistence rules for two BWA systems/cells of different operators) was originally addressed in ECC Report 33 (February 2006) for FWA/NWA deployment. The subsequent studies of mobile usage mode (MWA) were based on certain assumptions that included un-coordinated deployment as well as possible concentration of users (with active user density representative of BWA scenarios) in indoor environment. These studies indicated that a guard band of around one channel might be needed between MWA TS-TS, which is understood to be implicitly provided by CS Block Edge Mask requirements.

. The inter-service sharing of BWA vs. other systems and/or services in the 3.4–3.8 GHz band. The other systems and/or services considered in this study are ENG/OB (Electronic News Gathering and Outside Broadcasting), Fixed Point-to-Point links, Fixed-Satellite Service (Space-to-Earth) and Radiolocation Service (primary allocation below 3.4 GHz and secondary allocation above 3.4 GHz). The results of these studies are contained in ECC Report 100. This Report provides guidance for Administrations on co-ordination between BWA and other systems / services in the band, the details of the coordination depending upon the other systems/services characteristics and the BWA characteristics and usage mode. This includes guidance for co-channel sharing scenarios as well as for some adjacent compatibility cases, such as the impact from BWA operation in the 3.4-3.6 GHz band into FSS earth station receivers operating above 3.6 GHz.

BACKGROUND

In 1998 the band 3.4-3.6 GHz was identified as a preferred frequency band for Fixed Wireless Access (FWA) (ERC/REC13-04, ERC/REC14-03, ERC Report 25 refer). The band 3.6-3.8 GHz is also used in some CEPT countries for multipoint Fixed Wireless systems in accordance with provisions of ERC/REC 12-08. Consequently, many CEPT administrations have already delivered FWA licences to operators in order to provide Fixed Wireless applications. These authorisations are more often, technological neutral and provide flexibility and freedom for operators to choose the best use of the spectrum for Fixed applications. Any modification of the use of the spectrum, especially on the usage mode, shall be analysed in terms of compatibility and general policy for the licensed band.

During recent years the broadband connectivity has been increasing in Europe dramatically, boosted by the demand for high speed access to the Internet, large volume e-mailing, video and audio streaming and file sharing and further innovative multimedia services. The prospects of BWA take up have been changing recently after the consolidated industry efforts resulted in development of open inter-operability standards and new modulation technologies, allowing to

overcome the line-of-sight requirements, hence allowing deployment of easy-to-install indoor user terminals. Recognising this ever increasing demand for broadband connectivity and the improved prospects of radiocommunication systems in satisfying these demands in a most universal way, the ECC has studied the advantages and disadvantages of the development of a regulatory framework for BWA in the frequency band 3 400-3 800 MHz.

BWA systems are expected to be mainly deployed in all usage modes Fixed Wireless Access (FWA), Nomadic Wireless Access (NWA) and Mobile Wireless Access (MWA), where the Central Stations (CS) will be at a fixed location, while Terminal Stations (TS) will be deployed in a ubiquitous way. This Decision did not consider MultiPoint to MultiPoint (Mesh) architectures. Therefore further studies might be necessary in order to verify the applicability of this Decision for MP-MP (Mesh) systems subject to market availability of such systems.

It should be noted that terminal stations may use either directional or omni directional antenna. It is assumed that for Fixed and Nomadic use the vast majority of terminal stations using omni directional antennas will be operated indoor, this may not necessarily be the case for Mobile use.

The more traditional authorisation approach required the regulator to make decisions between the service definitions identified for each particular frequency band within an allocation table (e.g. ECA). This then required the regulator to define specific operating conditions. These conditions were required to manage the interference potential for the specific usage mode (e.g. Fixed and Mobile). Therefore, this may have meant that not all of the usage modes would be permitted. In some CEPT countries there has already been a move towards spectrum authorisations which allow operators flexibility in the manner in which networks are deployed and configured. These are spectrum block geographical area authorisations. This is where the operator is given authorisation for a defined area, rather than defining the operating conditions (e.g. transmitter specific location, specific bandwidth etc.). In this regime it could be possible, depending on the national situation, to give to the operators the flexibility to determine the usage mode. However it has to be acknowledged, that the need for managing the different interference potential related to the specific usage mode might result in limiting this additional flexibility, or in different constraints for the use of some modes.

REQUIREMENT FOR AN ECC DECISION

The allocation or designation of frequency bands for use by a service or system under specified conditions in CEPT administrations is laid down by law, regulation

or administrative action. ECC Decisions are required to deal with the radio spectrum related matters and for the carriage and use of equipment throughout Europe. The harmonisation on an European basis supports the Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity. A commitment by CEPT administrations to implement an ECC Decision will provide a clear indication that the required frequency bands will be made available on time and on an European-wide basis.

ECC Decision

of [dd] [month] 2006

on availability of frequency bands between 3400-3800 MHz

for the Harmonised implementation of

Broadband Wireless Access systems

(BWA)

(ECC/DEC/(06)[xx])
"The European Conference of Postal and Telecommunications Administrations, considering

a. that the frequency bands 3 400-3 600 MHz and 3 600-3 800 MHz are allocated to the fixed service and to the fixed-satellite service (space-to-Earth) on a primary basis in ITU Region 1;

b. that the bands in considering "a" are allocated to the mobile service on a secondary basis and the band 3 400-3 600 MHz is also allocated to the radiolocation service on a secondary basis in ITU Region 1;

c. that definitions of BWA (Broadband Wireless Access) applications encompassing FWA (Fixed Wireless Access), NWA (Nomadic Wireless Access), MWA (Mobile Wireless Access) can be found in Recommendation ITU-R F.1399;

d. that within the European Common Allocation Table (ECA) the frequency band 3 400-3 800 MHz is also allocated on a primary basis to the mobile service;

e. that the ECA indicates the major co-primary use of the band 3400 – 3600 MHz for BWA and coordinated SAP/SAB applications for occasional use;

f. that the ECA indicates the major co-primary use of the band 3600 – 3800 MHz for BWA, medium/high capacity Fixed links and FSS applications;

g. that the band 3400 – 3600 MHz is identified as a preferred frequency band for FWA (ERC/REC13-04, ERC/REC14-03 refer);

h. that the band 3600 – 3800 MHz is also used in some CEPT countries for multipoint Fixed Wireless systems in accordance with provisions of ERC/REC 12-08;

i. that in some countries the band 3400 MHz to 3410 MHz is used by land, airborne and naval military radars;

j. that radio Amateur Services are authorised in the frequency band 3400 – 3410 MHz on a secondary basis;

k. that spectrum authorisations for BWA in the bands in considering "a", based on assignment/allotment of spectrum blocks over a defined geographical area, may allow one or more of the applications of BWA referred to in considering "c";

l. that for spectrum authorisations for BWA in the bands in considering "a" that are assigned, by
Administrations, to individual equipment (i.e. Central Stations), the conditions of use may need to be
qualified to manage the technical arrangements between a number of different operators;

m. that for an efficient introduction of BWA in the frequency bands identified in considering "a",
administrations will have to consider an appropriate co-ordination regime, e.g. licensing on a regional, local
area or on an individual equipment basis, that takes in to account the extent of the use of these bands by
other systems or services (e.g. FSS, Point-to-Point FS, etc);

n. that in general, if suitable separation distance is set up between BWA central stations and other systems the
impact of BWA terminal stations is not significant. Therefore registration for central stations alone may be
sufficient for managing sharing issues;

o. that within the two frequency bands defined in considering "a", if completely available, paired sub-bands
3.4-3.5 GHz / 3.5-3.6 GHz and 3.6-3.7 GHz / 3.7-3.8 GHz provide suitable frame conditions for FDD and
TDD systems or a combination;

p. that ECC Report 33 on "The analysis of the coexistence of point-to-multipoint Fixed Wireless Systems
cells in the 3.4-3.8 GHz band" (February 2006) provides guidelines for efficient, technology independent
deployment of 3.5 GHz and 3.7 GHz point-to-multipoint fixed wireless systems;

q. that ECC Report 76 on "Cross-border coordination of multipoint fixed wireless systems in frequency bands
from 3.4-33.4 GHz" (February 2006) addresses the issue of finding a most

suitable method and criteria for
cross-border coordination between point-to-point systems and multipoint fixed wireless access systems
located on different sides of a national border;

r. that ECC Recommendation (04)05 (adopted in February 2006) provides "Guidelines for accommodation
and assignment of multipoint fixed wireless systems in frequency bands 3.4-3.6 GHz and 3.6-3.8 GHz";

s. that CEPT/ECC Report 100 on "Compatibility studies in the band 3 400-3 800 MHz between Broadband
Wireless Access Systems (BWA) and other services" addresses the inter-service sharing of BWA vs. other
existing services/systems (point-to-point, ENG/OB, fixed-satellite service (space-to-Earth) and
radiolocation service);

t. that taking into account the availability of spectrum on a national basis, some CEPT administrations have
already released spectrum within the 3.4-3.6 GHz band and may also consider providing spectrum within
the 3.6-3.8 GHz band as far as compatible operation with earth stations in the fixed-satellite service (s-E) as
well as with existing Point-to-point links in the fixed service is possible;

u. that it is important to make spectrum available in order to meet an overall demand for broadband
connectivity;

v. that the identification of the bands defined in considering "a" for BWA does not preclude the future use of
these bands by other systems and services to which these bands are allocated or designated;

w. that the frequency assignment/allotment for BWA should also take into account the existing bi- or multi-
lateral international agreements and general cross-border co-ordination procedures to ensure suitable
protection of similar or different systems and services in neighbouring countries;

DECIDES

1. that spectrum shall be designated for BWA deployment, within the band 3 400-3 600 MHz and/or 3 600-
3 800 MHz, subject to market demand and with due consideration of other services deployed in these bands;

2. that in EU/EFTA countries the use of BWA equipment in frequency bands identified in Decides 1 shall
comply with the R&TTE Directive. Conformity with the essential requirements in its Article 3(2) may be
demonstrated by compliance with harmonised standard(s) (e.g. ETSI EN 302 326-2) or equivalent technical
specifications;

3. that administrations shall consider allowing flexible usage modes within authorised BWA deployments in
the frequency bands identified in Decides 1, taking into account the considerations as described in the
Annex;

4. that for the deployment of BWA networks in the frequency bands identified in Decides 1, administrations
shall take into account the situation regarding the use of the frequency band in the concerned area by other
services/systems (e.g. FS, FSS, ENG/OB, etc) and that coordination of the BWA central stations with the
other existing services/systems may be required;

5. that this Decision enters into force on [dd] [month] 2007;

6. that CEPT administrations shall communicate the national measures implementing this Decision to the ECC
chairman and the Office when the Decision is nationally implemented."

Note:

1 The following Members have a derogation to implement this Decision until [xx yy zzzz].

2 Please check the Office web site (http://www.ero.dk) for the up to date position on the implementation
of this and other ECC Decisions.

Annex

Considerations for Implementation of Flexible Usage Mode for BWA in 3400-3600 MHz
and/or in 3600-3800 MHz

1. Definitions

The reference to "flexible usage mode" means regulatory provisions (e.g. licence conditions), which
would allow BWA licence holder to deploy various types of Terminal Stations (TS): fixed (Fixed
Wireless Access - FWA), nomadic (Nomadic Wireless Access - NWA) or mobile (Mobile Wireless
Access - MWA).

The detailed definitions of FWA, NWA and MWA are given in Recommendation ITU-R F.1399.

A typical example of FWA TS could be a stationary roof-top user equipment. An example of NWA TS
could be a desk-top portable user equipment or laptop PC equipped with the internal BWA access card.
An example of MWA TS could be a handheld user terminal.

2. General considerations

When deciding on granting flexible usage mode rights to BWA licence(s), administrations shall
consider following issues:

. Compliance with relevant provisions of legal instruments governing the field of radiocommunications, such as the ITU Radio Regulations, EU legislation and corresponding
national telecommunications laws (i.e. national acts transposing ITU and EU acts, as well as
any further sovereign regulations in the field);
. Legacy situation, e.g. consider the regulatory limitations and conditions of existing
(previously issued) authorisations in the frequency bands subject to this Decision;
. Technical provisions established by existing international frequency co-ordination
agreements.

3. Technical considerations

As a starting point, the guidance given in ECC Recommendation (04)05 on technical conditions for
implementation of flexible usage mode, to be set in the technology neutral BWA licence process, shall
be considered.

Furthermore, the introduction of MWA usage mode will be subject to following additional
requirements for deployment of mobile terminal stations (TS):

a. Maximum radiated power density of 25 dBm/MHz;
b. Minimum ATPC range of 15 dB;
c. When blocks are assigned contiguously (without external guard bands) care should
be taken not to allow a TS transmit centre frequency closer than one channel width
from the block edge unless co-ordination between operators is undertaken. Co-ordination may include the application of other specific interference mitigation measures. However it is understood that such a "virtual guard channel" is implicit,
under normal circumstances, through application of the CS BEM as recommended in
ECC/REC(04)05.

ANNEX 2 *

CEPT/ECC Recommendation on BWA at 5,8 GHz (5725-5875 MHz)

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* The information provided belongs to CEPT - European Conference of Postal and Telecommunications Administrations.

DRAFT ECC RECOMMENDATION (06)04

USE OF THE BAND 5 725 – 5 875 MHz FOR BROADBAND FIXED WIRELESS ACCESS (BFWA)

Recommendation adopted by the Working Groups Frequency Management (FM) and Spectrum Engineering (SE)

INTRODUCTION

This CEPT/ECC Recommendation provides guidance for those CEPT administrations intending to make the
frequency band 5 725-5 875 MHz available for the implementation of Broadband

Fixed Wireless Access (BFWA)
systems. This guidance is based on the need to protect primary services in this frequency band.

The intended scope of this recommendation is for BFWA networks in which the use of the terminal stations may be
fixed and/or nomadic. These types of applications may be considered to fall into the ITU-R categories Fixed
Wireless Access (FWA), Nomadic Wireless Access (NWA) as defined in ITU-R Recommendation F.1399. In the
future the usage of this band may be considered, subject to further studies, for Broadband Wireless Access (BWA)
systems, which may also include Mobile Wireless Access (MWA).

BFWA systems are broadband radiocommunications systems, which can be deployed either inside or outside
buildings, usually covering a geographically defined area. Typical BFWA systems include public and private
applications offered to users in homes, schools, hospitals, hotels, conference centres, railway stations, airports,
shopping centres etc. BFWA systems enhance the capacity of existing telecommunications solutions and enable new
applications, in particular in rural areas.

BFWA systems enable a variety of architectures, including combinations of access as well as interconnection to
some extent. BFWA architectures, which have been considered within ECC Report 68, are Point-to-Multipoint (P-
MP), Point-to-Point (P-P), Mesh (Multipoint-to-Multipoint, directional or omni-directional) and Anypoint-to-
Multipoint (AP-MP, hybrid of Mesh and P-MP).

ECC started to consider the use of the band 5 725-5 875 MHz for BFWA systems following liaison from industry,
expressing an interest in the possibilities for larger area, licence-exempt (or

lightly licensed) wireless access, based
originally on the ETSI HiperMAN air interface standard described in ETSI TR 102 079. ETSI has been also
developing a technology neutral harmonised standard (EN 302 502) to address the regulatory compliance matters.
As a result of inter-service sharing studies conducted within CEPT/ECC, ECC Report 68 has been published. The
results indicated that given certain constraints, sharing between BFWA systems and existing radiocommunication
services and applications in this band is possible. Subsequently, further development of the regulatory framework
was considered.

ECC Report 68 concluded that sharing is possible based on technical conditions as shown in Annexes 1-4 of this
recommendation, considered for the BFWA system characteristics in the band 5 725-5 875 MHz. Additional
provisions are required to ensure compatibility with systems in the Fixed Satellite Service within 5850-5875MHz.
The eirp limits for BFWA systems noted within ECC Report 68, showed lower limits of eirp for P-P systems
compared to P-MP systems. The studies undertaken in Report 68 may not have been in a position to fully assess the
types of P-P systems that might be deployed in the 5.8 GHz band (i.e. P-P systems will share similar access
technologies to those of P-MP). The recommended eirp figures for both systems have been aligned.

In parts of the world access to the 5.8 GHz band has been allowed for wireless access devices on a licence-exempt
or lightly licensed basis. Many countries have followed the example of the USA which designated the band 5 725-
5 850 MHz for so called Unlicensed National Information Infrastructure devices (UNII devices). As there has been
no existing European regulatory framework for BFWA systems in this band so far, this recommendation identifies a
basis for suitable regulatory framework for CEPT administrations, which intend to open the band for this
application. It should be adequate to provide a sufficient amount of spectrum to commercial operators, even though
individual frequency assignments and channel co-ordination is not envisaged in

the band 5 725-5 875 MHz.

"The European Conference of Postal and Telecommunications Administrations,

Electronic Communications Committee (ECC)

within the European Conference of Postal and Telecommunications Administrations (CEPT)

considering

a) that Broadband Fixed Wireless Access (BFWA) systems in the range 5725–5875 MHz can provide
telecommunication services with user capacity of up to several Mbit/s;
b) that within CEPT some administrations have introduced BFWA systems within the range 5725–5875MHz,
based on national implementations;
c) that a harmonised approach to the availability of this band for BFWA systems within the CEPT administrations
is beneficial;
d) that the frequency band 5725–5875 MHz is allocated to the Fixed Satellite Service (E-s) on a primary basis;
e) that the range 5725–5850 MHz is worldwide allocated to the Radiolocation Service on a primary basis;
f) that the frequency band 5725–5875MHz is designated for non-specific SRDs by CEPT/ERC Recommendation
70-03;
g) that the frequency band 5795–5815 MHz is designated for RTTT applications by CEPT/ECC Decision (02)01;
h) that the frequency band 5725–5875 MHz is designated for ISM applications by footnote 5.150 of the ITU Radio
Regulations;
i) that ECC Report 68 details spectrum sharing studies between BFWA systems and the other services and
applications in the band, i.e. FSS (E-s), Radiolocation, RTTT, Amateur Service (including Amateur-Satellite
Service (s-E)), Fixed Service (P-P) and Non-specific SRDs;

j) that ECC Report 68 identifies operational conditions for BFWA systems that will facilitate spectrum sharing
with the services and applications mentioned in considering (i);
k) that a simplified authorisation regime, e.g. licence-exempt or light licensing, can stimulate the development of
new and innovative BFWA systems;
l) that the harmonised standard EN 302 502 contains technical requirements for BFWA systems in this frequency
band;
m) that tests regarding the Dynamic Frequency Selection (DFS) functionality and efficiency have already been
carried out and will continue to be carried out;
n) that the results of these DFS tests may have an impact on the future usage conditions for BFWA systems in the
5.8 GHz band,

recommends

1) that administrations making the frequency band 5 725 – 5 875 MHz, or parts of it, available for Broadband
Fixed Wireless Access (BFWA) systems should apply the provisions and parameters detailed in the
recommends below;
2) that BFWA equipment should implement power limitations and Transmit Power Control (TPC) as described in
Annex 1;
3) that for the band 5 725 – 5 850 MHz, BFWA equipment should use mitigation techniques as described in
Annex 2 to ensure compatible operation with systems in the Radio determination Service;
4) that BFWA installations should comply, where appropriate, with the e.i.r.p. density limits in the elevation plane
as described in Annex 3;
5) that administrations wishing to authorise both BFWA and RTTT systems in 5795-5815MHz in the same
geographic area should consider the guidance given in Annex 4;
6) that administrations should consider applying simplified authorization procedures for BFWA in this band, e.g.
licence-exempt or light licensing regime.

Note:

Please check the Office web site (http://www.ero.dk) for the up to date position on the implementation of this and
other ECC Recommendations

ANNEX 1

Power limitations and TPC range for Broadband Fixed Wireless Access (BFWA) systems operating in
the frequency range 5 725-5 875 MHz

Parameters for BFWA stations depending on the system architecture:

Parameter	
P-MP (Point-to-Multipoint)	
P-P (Point-to-Point)	
Mesh	
AP-MP	

(Any point-to-
Multipoint)

Maximum mean e.i.r.p. (Note 1)

36 dBm

36 dBm (Note 3)

33 dBm

33 dBm

Maximum mean e.i.r.p. density

23 dBm/MHz

23 dBm/MHz
(Note 3)

20 dBm/MHz

20 dBm/MHz

TPC range for each station (Note
2)

12dB

12dB

12dB

12dB

Note 1: The "mean e.i.r.p." refers to the e.i.r.p. during the transmission burst, which corresponds to the highest
power, if transmitter power control (TPC) is implemented;

Note 2: The TPC has a range of 12 dB with respect to the maximum permitted radiated output power of the station,
to provide on average a mitigation factor of approximately 5 dB on the aggregate interference effect into
the Fixed-Satellite Service (Earth-to-space);

Note 3:

In remote rural areas higher e.i.r.p. limits may be needed in order to increase link distance, this should be
achieved by using the high gain directional antennas, not by increasing output power. In the band 5725-
5850 MHz the higher interference potential of eirp increase should be carefully considered (e.g. impact on
DFS efficiency for Radar protection and FSS Protection).

ANNEX 2

DFS Requirements for Broadband Fixed Wireless Access (BFWA) systems operating in
the frequency range 5725-5850 MHz

INTRODUCTION

DFS procedures and requirements are defined in Recommendation ITU-R M.1652 for WAS/RLANs in the 5 GHz
range. The detection, operational and response requirements are described in Annex 1 of that recommendation.

For the purposes of the sharing studies detailed in ECC Report 68 for BFWA systems in the band 5725 – 5875 MHz,
it was assumed that the DFS timing requirements and operational procedures are broadly the same as those
published in Rec. ITU-R M.1652 (Annex 1).

PRINCIPLES

Every BFWA station, when operating in the frequency range 5 725-5 850 MHz, employs a DFS mechanism with a
radar interference detection function to detect radar signals which have a level above the interference detection
threshold as defined in Recommendation ITU-R M.1652. Every BFWA station uses the radar interference detection
function in order to check for any co-channel radar signal prior the usage of a channel but also during normal
operation.

Finding an initial available channel:

. Before a BFWA station transmits, and if no available channel has yet been identified, it shall
undertake a channel availability check on a radio channel before it is used for transmission;
. Having identified an available channel, the BFWA station can start operation on that channel; the
checking of other radio channels to identify other available channels is optional;
. In-service monitoring is performed by the BFWA station to re-check the operating channel for
co-channel radar signals that may have come within the range of the BFWA station or started
operation on the BFWA operating channel.

DFS PARAMETERS

The essential operational and timing requirements are unchanged from those in Annex 1 of Recommendation ITU-R
M.1652.

DETECTION THRESHOLD

ECC Report 68 details a specific detection threshold derived from the specific characteristics of BFWA systems in
the 5725 – 5850 MHz range. This accounts for the expected system e.i.r.p. and has been evaluated in the sharing
studies considering the specific antenna characteristics for BFWA systems. The DFS mechanism should be able to
detect signals above a minimum DFS detection threshold. The interference threshold is the required radar signal
strength expressed as equivalent power in dBm in front of the BFWA receive antenna.

The corresponding DFS detection threshold (Th) at the input of the receiver is obtained by adding the gain of the
BFWA receive antenna to the interference threshold:

DFS Detection Threshold (dBm) = -69 + 23 – e.i.r.p.Spectral Density (dBm/MHz) + G

Examples:

Max. Tx e.i.r.p. (dBm)

ChS (MHz)

G (dBi)

Th (dBm)

36

20

0

-69

36

20

10

-59

33

20

0

-66

33

10

0

-69

30

20

0

-63

30

10

0

-66

In this table:

. Max. Tx e.i.r.p. - is the maximum allowed mean radiated output power for the BFWA station in
dBm (the "mean e.i.r.p." refers to the e.i.r.p. during the transmission burst which corresponds to
the highest power, if transmitter power control (TPC) is implemented)
. ChS - is the BFWA nominal occupied channel bandwidth in MHz,
. G - is the receiver antenna gain in dBi (it is assumed that the receiving antenna is also used for
transmitting).

DFS ESSENTIAL REQUIREMENTS AND TESTING PROCEDURES

The DFS essential requirements and testing procedures for BFWA equipment in the 5.8 GHz range have been
included in the harmonised standard ETSI EN 302 502 in accordance with article 3.2 of the R&TTE Directive. The
testing procedures for DFS are based on a selection of radar test signals that would cover fixed frequency and
frequency hopping radars.

ANNEX 3

E.I.R.P. Spectral Density Limits in the Elevation Plane for BFWA installations to protect GSO Satellite
Receivers in the Fixed Satellite Service in the frequency range 5725-5875 MHz

INTRODUCTION

Fixed Satellite Service (FSS) Earth-to-space deployments use the whole band 5725-5875 MHz and the majority of
satellites are in geostationary orbits. In the 125 MHz portion of the band up to 5850 MHz, this is an ITU Region 1
allocation only (i.e. only Europe, Africa and some of the northernmost countries in Asia). Above 5850 MHz the
band is part of the heavily utilised FSS global uplink band.

In these frequency bands, the satellite beams cover very large areas of the Earth (using global, hemispherical, zoned
or regional beams). Hence, in Europe, a large number of BFWA devices may lie within the beam.

The studies presented in ECC Report 68 derived information about the projected total number of BFWA devices
over the whole of the European region, in various system configurations, which could share with FSS networks. The
e.i.r.p. and characteristics of the various types of antennas used with the BFWA devices have a direct impact on the
aggregate interference into the receivers of the geostationary satellites. This has an impact on the total number of
BFWA devices that can be deployed, but the numbers that could be accommodated were considered suitable for the
predicted market penetration of BFWA devices in this band.

It was shown in the studies that sharing is feasible in the band 5725-5850 MHz depending on the ability of BFWA
devices to limit their e.i.r.p. density in the direction of GSO satellites. However, in the band 5850-5875MHz, the
conditions to make sharing feasible are more restrictive for certain types of BFWA devices.

The sharing studies described in ECC Report 68 took the characteristics of BFWA systems into account including
typical antenna patterns that restrict the amount of radiated energy in the direction of the satellite receivers. This
enabled e.i.r.p. spectral density envelopes to be derived for any positive elevation angle and it is recommended that
administrations ensure that BFWA operators are able to provide a combination of antennas and power sources that
enable these limits to be met.

The sharing situation between various BFWA systems and the FSS is summarised in the table below.

It is considered that BFWA systems that conform to the elevation plane e.i.r.p. density envelopes given in the
following section will provide the best sharing environment with FSS satellites. Note that for BFWA devices which
use an omni-directional mesh configuration, the use of the top 25 MHz of the band is not recommended to be used.

BFWA Type

BFWA Conditions

(See Note 1)

Frequency Band

5725-5850 MHz

5850-5875 MHz

Point-to-Multipoint

e.i.r.p.: 36 dBm

Bandwidth : 20 MHz

TPC: 5 dB

Sharing is feasible

Sharing is feasible

Any point-to-Multipoint

e.i.r.p.: 33 dBm

Bandwidth : 20 MHz

TPC: 5 dB

Sharing is feasible

Sharing is feasible

Omni-directional Mesh

e.i.r.p.: 36 dBm

Bandwidth : 22 MHz

TPC: 5 dB

Sharing is feasible with
restrictions (See Note 2)

Sharing is not feasible
(see Note 2)

Point-to-Point

e.i.r.p.: 33 dBm (See Note 3)

Bandwidth : 20 MHz

TPC: 5 dB

Sharing is feasible

Sharing is feasible

Table A3.1: Summary of Sharing Results in Report 68 for BFWA and FSS (E-s) in the band 5725 - 5875 MHz

Note 1: The TPC value in the table is the assumed average reduction of e.i.r.p, not the maximum TPC range

Note 2: A tightening of the e.i.r.p. level by 3 dB promotes a more favourable sharing situation for the case of omni-
directional mesh devices. In the case of sharing with satellites that require low elevation angles from parts of
Europe (where a substantial number of BFWA devices may be deployed) and which lie within the main
elevation lobe of the BFWA antennas, sharing appears less straightforward. The low elevation satellites do not
use the part of the band below 5850 MHz so the difficulty in sharing here is only constrained to the top 25
MHz of the band, so this consideration does not apply to the whole of the band

Note 3: In remote rural areas higher e.i.r.p. limits may be needed in order to increase link distance, this should be
achieved by using the high gain directional antennas, not by increasing output power. In the band 5725-5850

MHz the higher interference potential of eirp increase should be carefully considered (e.g. impact on DFS
efficiency for Radar protection and FSS Protection).

RECOMMENDED E.I.R.P. DENSITY LIMITS

The e.i.r.p. spectral density of the BFWA transmitter emissions should not exceed the following values for the
elevation angle θ (degrees) above the local horizontal plane (of the Earth):

. For sectorised (e.g. P-MP Central or Base Station) and Omni-directional deployments:

.7 dB(W/MHz) for 0° ≤ θ <4°

.2.2 - (1.2*θ) dB(W/MHz) for 4° ≤ θ ≤ 15°

.18.4 - (0.15*θ) dB(W/MHz) for θ > 15°

. For P-MP Customer Terminal Station and P-P deployments:

.7 dB(W/MHz) for 0° ≤ θ <8°

.2.68 -(0.54*θ) dB(W/MHz) for 8° ≤ θ < 32°

.20 dB(W/MHz) for 32° ≤ θ ≤50°

.10 - (0.2*θ) dB(W/MHz) for θ > 50°

Examples are provided in ECC Report 68 to demonstrate that these limits can comfortably be achieved using typical
antenna radiation pattern envelopes.

ANNEX 4

Ensuring co-existence of BFWA and RTTT in the band 5795-5815 MHz

The studies presented in ECC Report 68 indicated that interference may occur between BFWA and RTTT
applications if they were to be deployed in the same/adjacent geographic areas, operating in the same frequency
band 5795-5815 MHz. In particular, it was shown that co-channel interference range from BFWA into RTTT could
be in the order of 200-2000 m depending on the scenario, whereas the range of interference from RTTT into BFWA
could be in the order of 2000 m – 20 km.

Considering that RTTT does not operate across the entire band proposed for BFWA, that it is only deployed in a
limited number of locations and that it will interfere with BFWA at a greater distance than vice versa (and hence
BFWA installations would avoid operating in active RTTT channels), sharing between FWA and RTTT systems
was deemed to be generally feasible. It should also be noted that the DFS mechanism might be effective for RTTT
protection.

However, to completely avoid any interference cases, the administrations wishing to authorise deployment of both
BFWA and RTTT applications in their countries should consider applying one or more of following measures:

1. To design the authorisation process for BFWA in such a manner as to ensure certain degree of co-
ordination between the BFWA CS (central station) and RTTT Road Side Unit installations (light-licensing
regime could be one suitable option);

2. To authorise BFWA deployment only in areas where RTTT installations are not envisaged (using the
BFWA licensing process to enforce this requirement);
3. To authorise BFWA deployment only in the sub-bands outside RTTT frequency range;
4. To require additional mitigation techniques, following guidance in Report 68.