Oaseirys Çhelinsh
Communications Commission

Ofcom

MEMORANDUM OF UNDERSTANDING ON FREQUENCY CO-ORDINATION BETWEEN ISLE OF MAN AND THE UNITED KINGDOM CONCERNING THE SPECTRUM COORDINATION OF LAND MOBILE RADIOCOMMUNICATION NETWORKS IN THE FREQUENCY BANDS 2300-2400 MHz AND 3400-3800 MHz

1 INTRODUCTION

Ofcom (the Administration of the United Kingdom (UK)) and the Isle of Man Communications Commission, taking into account the recommendations of the International Telecommunication Union, have concluded this MoU, under Article 6 of the Radio Regulations, on the coordination of frequencies used by land mobile radio communication networks in the 2300-2400 MHz and 3400-3800 MHz frequency bands.

Ofcom is responsible for all relations with the Isle of Man and UK operators concerning this agreement.

This MoU covers frequency coordination for Land Mobile Radiocommunication networks following the spectrum arrangements below:

Frequency Band	Base receive	Base transmit
TDD 2300 MHz	2300-2400 MHz	2300-2400 MHz
TDD 3500 MHz	3400-3600 MHz	3400-3600 MHz
TDD 3800 MHz	3600-3800 MHz	3600-3800 MHz
FDD 3500 MHz	3410-3500 MHz	3510-3600 MHz

All UK operators operate in accordance with the TDD 2300 MHz, TDD 3500 MHz and TDD 3800 MHz arrangements.

The provisions of this MoU add to the mandatory requirements of the ITU Constitution and the ITU Radio Regulations, which have both the status of an International Treaty, and in particular:

- Article°**15.2** of the ITU Radio Regulations: "*Transmitting stations shall radiate only as much power as is necessary to ensure a satisfactory service*"
- Articles°**15.3**, **15.4** & **15.5** of the ITU Radio Regulations: "*In order to avoid interference [...], a) locations of transmitting stations and, where the nature of the service permits, locations of receiving stations shall be selected with particular care; b) radiation in and reception from unnecessary directions shall be minimized by taking the maximum practical advantage of the properties of directional antennae whenever the nature of the service permits*"

This frequency coordination MoU has been established with a view to:

- reducing problems of harmful interference[1] between land mobile radio communication systems operating in neighbouring countries;
- optimising the use of spectrum resources in the border areas.

In particular, this MoU has been established with a view to finding a balanced solution between:

- minimising harmful emissions coming from the neighbouring territories. These harmful emissions may cause harmful interference, harmful coverage (international roaming issues) or may prevent an Administration from utilising / allocating portions of its national spectrum; and

- defining satisfactory frequency-usage conditions for land mobile operators to operate their networks while maintaining a good quality of service and good coverage upon the national territory.

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[1] Article°1.169 of the ITU Radio Regulations

This leads Administrations to accept and agree upon a certain level of interference (as defined in Article°1.168 of the ITU Radio Regulations[2]) and/or a certain level of coverage from neighbouring countries.

This MoU applies to base stations and fixed terminal stations in the main land areas of Isle of Man and the United Kingdom. Mobile stations, including airborne ones are excluded.

The co-ordination procedure is based on the principle of equitable access to the spectrum resource.

Where all or part of a licensees spectrum is not awarded/licensed in the other nation then the thresholds may be exceeded in that spectrum i.e. the trigger values in section 2 only need apply to spectrum which is used in both nations. Where the spectrum is, or subsequently becomes, awarded/licenced in both nations then the licensees will need to comply with the trigger values.

Commitment of UK Administration

Ofcom is committed to ensuring that the radio-communications stations, operating in the bands listed above, respect the limits for the establishment of base stations without co-ordination as outlined in this MoU, unless the stations are specifically planned for outside the co-ordination procedure, in accordance with section 4 of this document.

2 SPECTRUM COORDINATION FOR SYSTEMS IN THE 2300-2400 MHz AND 3400-3800 MHz FREQUENCY BANDS

Base stations may be operated without coordination if the predicted mean field strength of each carrier produced by the base station does not exceed the following values at the given height above ground at the coastline of the neighbouring country.

Frequency Band	Coordination threshold at 3 m above ground at the coastline of the neighbouring country	Prediction parameters
TDD 2300 MHz	30 dBµV/m/5 MHz	ITU-R Recommendation P.452[3] • 10% of the time • 3m receiver height
TDD 3500 MHz	32 dBµV/m/5 MHz	ITU-R Recommendation P.452 • 10% of the time • 3m receiver height
TDD 3800 MHz	32 dBµV/m/5 MHz	
FDD 3500 MHz	32 dBµV/m/5 MHz	

[2] Accepted interference: Interference at a higher level than that defined as permissible interference and which has been agreed upon between two or more administrations without prejudice to other administrations.

[3] Recommendation ITU-R P.452 "Prediction procedure for the evaluation of interference between stations on the surface of the Earth at frequencies above about 0.1 GHz"

LTE physical-layer cell-identity groups:

In order to ensure the optimum network performance for LTE systems deployed in the border areas, the UK Administration shall encourage operators to coordinate the use of physical-layer cell-identity groups for LTE and other radio parameters, in accordance with ECC Recommendations 14(04) and (15)01 for LTE signals **using the same centre frequency in border areas**.

3GPP TS 36.211 defines 168 "unique physical-layer cell-identity groups" in § 6.11, numbered 0...167, hereafter called "PCI groups". Within each PCI group there are three separate PCIs giving 504 PCIs in total. Each territory can use all PCI groups away from the border areas.

PCI GROUPS	168 - 343	344 - 419
UK	PREFERENTIAL	NON PREFERENTIAL
ISLE OF MAN	NON PREFERENTIAL	PREFERENTIAL

3 PREDICTION OF PROPAGATION

The field strength prediction method shall be according to the latest version of Recommendation ITU-R MP.1452 with the parameters given in the table in Section 2 of this document, and taking account of:

- Terrain profile for the base station in all main directions;
- Type of terrain (e.g. land, sea, mixed path);
- Effective radiated field strength;
- Antenna tilt and azimuth;

Including model components:

- Mixed land/sea paths;
- Receiving/mobile antenna height;
- Terrain clearance angle;

And standard values:

- DeltaN = 40 (N0m-N1000m).

4 ARRANGEMENT FOR PLANNING AT AN OPERATIONAL LEVEL

Planning arrangements may be made directly between operators for deviations from this MoU including, but not limited to, changes from preferential frequency allocations referred to in this MoU, approval of base stations from which interference field levels may exceed the limits prescribed in this MoU.

All planning arrangements between mobile radiocommunications operators falling outside the scope of this MoU shall be subject to approval by Ofcom.

Operators may only negotiate arrangements only in respect of the part of the frequency band for which they are licensed from Ofcom to use radio frequencies, without affecting the rights of third parties which are not involved.

Arrangements between operators shall be null and void where:

- One of the operators loses its licence to set up and operate a network;
- The channels allocated to one of the operators, covered by the Bilateral Agreements, are changed;
- One of the operators ceases to operate a network covered by the arrangement;
- The Bilateral Agreements are terminated or revised. In such cases, a transitional period must be negotiated;
- Interference persists and cannot be eliminated by mutual agreement between the operators. In such cases, the arrangement shall be null and void only in respect of the base station or stations concerned.

5 HARMFUL INTERFERENCE

If an operator suffers from harmful interference and/or notices a degradation of the quality of service on its network - due to the rise of the field strength coming from a neighbouring territory for example - it should immediately inform the United Kingdom Administration.

6 CO-ORDINATION PROCEDURE

Exchanges of information for co-ordination/notification purposes shall be in the format set out in the HCM agreement Annex 2A (revised at Vilnius 2005)[4]

A co-ordination request must be sent by the licensee through the UK Administration.

The co-ordination procedure shall follow the one described in the HCM Agreement.

In the event of interference between authorised users of the bands listed, the affected users shall exchange information between themselves with a view to resolving the interference by mutual agreement. A report of the interference and the details of the information exchanged shall be sent to the UK Administration who can, if requested, advise on resolution. The Administrations of the UK can facilitate the exchange of information between authorised users of the band.

[4] Agreement between the administration of ... on the Coordination of frequencies between 29.7 MHz and 39.5 GHz for fixed service and land mobile service (HCM Agreement) Vilnius, 2005

7 REVIEW AND FOLLOW UP OF THE MOU

Signatories may request a review of this MoU. Any part of this MoU may be revised in the light of future developments, i.e. introduction of new technologies and experience in the operation of the networks covered by the MoU.

8 Date of entry into force

This MoU will enter into force on the date of signature.

Done in London, 09 December 2015

For the Administration of the United Kingdom	For the Isle of Man Communications Commission
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