CEPT ECC
Electronic Communications Committee

ECC Recommendation (22)02

Guidelines on measures to facilitate compatibility between MFCN operating in 40.5-43.5 GHz and FSS earth stations receiving in 39.5-40.5 GHz and to prevent and/or resolve interference issues

approved 18 November 2022

amended 6 March 2026

Edition 6 March 2026

INTRODUCTION

The band 39.5-40.5 GHz is planned to be used by fixed-satellite service (FSS) and mobile-satellite service (MSS) earth stations (ES) and the band 40.5-43.5 GHz is planned to be used by mobile/fixed communication networks (MFCN) in CEPT.

Although each specific situation can be different, the probability of interference to FSS ESs from MFCN base stations (BS) is expected to be low. ECC however identified a need to develop an ECC Recommendation on measures to address interference issues that can be implemented by CEPT administrations to facilitate the adjacent band compatibility between MFCN operating in 40.5-43.5 GHz and FSS earth stations receiving in 39.5-40.5 GHz.

The compatibility studies conducted by the ECC indicated, based on the current assumptions of MFCN and FSS deployment scenarios, that there is a small probability of interference to FSS earth stations from MFCN equipment using the Operating Band Unwanted Emissions (OBUE) limits in the ETSI Technical Specification. This is particularly the case in sub-urban areas, where an FSS earth station with low antenna height is located within the service area of the MFCN BS at relatively short distance.

Normally, interference issues and measures required to prevent or resolve them, are managed through coordination procedures, however it is necessary to consider the case of deployment of uncoordinated FSS earth stations and/or uncoordinated MFCN base stations. These may require alternative or complementary measures.

In this respect, four compatibility scenarios are considered:

- coordinated FSS earth station and coordinated MFCN BS (location of base station is known);
- coordinated FSS earth station and uncoordinated MFCN BS (unknown location);
- uncoordinated FSS earth station and coordinated MFCN BS;
- uncoordinated FSS earth station and uncoordinated MFCN BS.

Whilst the above scenarios are considered it would appear that in terms of preventing interference that they do not require different measures. There may be a difference in identifying the location and/or operators of the stations of the two services. The measures implemented may be different on a case-by-case basis.

This Recommendation provides guidance to administrations on measures to facilitate compatibility between MFCN BSs and FSS earth stations to prevent and/or resolve MFCN interference issues.

ECC RECOMMENDATION 22(02) OF 18 NOVEMBER 2022 ON GUIDELINES ON MEASURES TO FACILITATE COMPATIBILITY BETWEEN MFCN OPERATING IN 40.5-43.5 GHZ AND FSS EARTH STATIONS RECEIVING IN 39.5-40.5 GHZ, AMENDED 6 MARCH 2026

"The European Conference of Postal and Telecommunications Administrations,

considering

a) that ECC Decision (22)06 [1] provides harmonised technical conditions for Mobile/Fixed Communications Networks (MFCN) in the frequency band 40.5-43.5 GHz;

b) that in the ITU Radio Regulations [2] the frequency band 37.5-42.5 GHz is allocated to the Fixed-Satellite Service (FSS) in the space-to-Earth direction;

c) that ERC Decision (00)02 [3] addresses the use of the band 37.5-40.5 GHz by earth stations of the fixed-satellite service (space-to-Earth) and designates the band 39.5-40.5 GHz for the use of coordinated and uncoordinated FSS receiving earth stations;

d) that ECC Recommendation (22)01 [4] addresses transmitting earth stations in the frequency band 42.5-43.5 GHz and receiving earth stations in the frequency band 40.5-42.5 GHz, for GSO and non-GSO satellite systems;

e) that No. **3.3** and **15.10** of the ITU Radio Regulations address the case of interference issues caused by the out-of-band emissions of transmitting stations to services which operate in adjacent bands;

f) that based on the current assumptions of MFCN and FSS deployment scenarios, there is a small probability of interference to receiving FSS earth stations below 40.5 GHz from MFCN equipment operating in the band 40.5-43.5 GHz, recognizing that each specific situation could be different;

g) that for receiving FSS earth stations and MFCN stations, the interference potential is limited to within or nearby the service area of the MFCN BS. Compatibility within the service area can be achieved by establishing a geographical separation distance for either the FSS earth station, the MFCN BS or by application of mitigation measures;

h) that for uncoordinated FSS earth stations and/or MFCN stations at unknown locations within the same geographical area, a prerequisite to prevent or solve an interference issue is identifying the location and/or operators of a station with which a potential for interference exists;

i) that for an authorisation regime where the locations of base stations are not known in advance of installation, implementation of in band sharing conditions implies the need for information on relative location of/or distance between interferer and victim, or on the location of one of these when planning the location of the other station. This principle applies to FSS below 40.5 GHz and MFCN BS above 40.5 GHz;

j) that implementing databases for FSS and/or MFCN refer to coordinated approach/deployments;

k) that implementing databases for FSS and/or MFCN could potentially be considered also for uncoordinated approach/deployments;

l) that active antenna systems (AAS) used by MFCN and the antennas of FSS earth stations are both directional and may contribute to reduce the risk of interference;

m) that making the guidance available for installers/operators of both MFCN and FSS earth stations could help to limit or prevent any interference issues.

recommends

1. that the measures provided in Annex 1 to facilitate compatibility between MFCN stations operating in 40.5-43.5 GHz and FSS earth stations receiving in 39.5-40.5 GHz to prevent and/or resolve interference issues, should be used by the operators of both services and the administrations, where required:
   a) those measures to prevent/resolve interference issues should also be made available, further to national drafting/review, as guidelines for installers/operators of both services;
   b) those measures should be regularly reviewed based on shared practices including those reported to ECO;
2. that the guidelines on measures should be reviewed in a 5-year period."

Note:

Please check the ECO Documentation Database https://www.docdb.cept.org for the up to date position on the implementation of this and other ECC Recommendations.

ANNEX 1: GUIDELINES ON MEASURES TO FACILITATE COMPATIBILITY BETWEEN MFCN STATIONS OPERATING IN 40.5-43.5 GHZ AND FSS EARTH STATIONS RECEIVING IN 39.5-40.5 GHZ TO PREVENT AND/OR RESOLVE INTERFERENCE ISSUES

A1.1 INTRODUCTION

There is a potential for interference issues from MFCN stations operating in 40.5-43.5 GHz into FSS earth stations (ES) receiving in 39.5-40.5 GHz when the FSS earth station is located within or nearby the service area of a MFCN base stations (BS). Compatibility studies showed that this potential for interference issues exists mainly when MFCN BS and FSS earth station are located less than 100 m from each other.

Where the location of at least one of the stations is known, the establishment of a separation distance around the FSS earth station or in the MFCN station's service area, within which measures to prevent and/or resolve interference issues should be applied, would minimise the risk of interference.

For uncoordinated FSS earth stations and/or MFCN stations at unknown locations, a prerequisite to prevent or solve an interference issue is identifying the location and/or operators of a station with which a potential for interference exists.

It is noted that, in cases where a separation distance is established, this distance is not an exclusion distance within which the compatibility between the MFCN stations and FSS earth stations is not possible. The separation distance is where further considerations (mitigation measures) may be needed to ensure compatibility. In some cases, a more detailed analysis taking into account local clutter may show that compatibility within the separation distance is possible, since the procedure for the determination of the distance is based on conservative assumptions regarding the interference potential.

Although the impact of indoor MFCN BS transmitting in the band 40.5-43.5 GHz on FSS earth station receiving in the band 39.5-40.5 GHz has not been studied, it is expected that the risk of interference from indoor MFCN BS would be extremely low. Hence for this case no further measures may be required in this context.

Guidelines to be used (during planning or deployment/installation) to advise on 'best practices' to avoid interference issues or as interference mitigation:

A record of location, antenna height and pointing direction of existing FSS ES or MFCN BS would assist the operator/installer of the other service to deploy a new station in the best position to avoid an interference issue. Where possible, this should be through an administration database for coordinated stations.

Nevertheless, in the case of uncoordinated stations, a database approach, either through the use of an operator-provided database (with information from the MFCN and FSS operators) or an open database (e.g. made available by the administration), would help the parties to have visibility of the location and characteristics of each other's stations as either potential interferer or victim. As with any database, a prerequisite for this to work, is that the information entered into the database is accurate and complete i.e. to record the location of the station after or before its installation. This latter approach, where implemented, is similar to the coordinated case.

Moreover, in the case of uncoordinated stations, the use of a database to prevent or resolve interference issues is currently in use in a few other bands but in a different coexistence context. Time may be needed to fully assess the effectiveness of this approach in the 40/42 GHz bands. In addition, it can also be noted that this type of database of uncoordinated stations is not exactly of the same nature as a database of coordinated stations and thus may not be subjected to the same level of examination and therefore associated requirements should be clearly defined by administrations.

The incentive for the operator of the FSS station to use and keep a database updated, would be to avoid adjacent band interference issues occurring or risk of having to relocate the antenna after an initial installation.

The incentive for the MFCN operator to use and keep a database updated, would be to avoid interference issues that could result in modification of the MFCN BS after the initial installation and a potential relocation.

More generally, for both services, the cost of relocation of a station at a later date, which may involve planning, digging/routing cables and making good the previous installation location, is such that it will work as an incentive to keep the database up to date and used for planning.

Measures for prevention or mitigation of an interference issue:

- Plan new installations taking into account other stations where an interference potential may be present and avoid line of sight and antenna alignment between the stations;
- A database for MFCN BSs and FSS ES;
- Siting of FSS ES and MFCN BS.

Further technical adjustments can be considered on a case-by-case basis. The measures are described in detail in the following section.

A1.2 POSSIBLE MEASURES TO PREVENT INTERFERENCE ISSUES

Measures to **avoid/prevent** interference issues from MFCN into FSS earth stations:

a) Use of databases where the location, height and pointing of MFCN BSs and FSS ES can easily be recorded together with other relevant information such as the required guidance and separation distances between MFCN BS and FSS ES and thus allow for a suitable siting arrangement to prevent interference issues;

b) Where a database of stations of FSS ESs and/or MFCN BSs exists, consult this to see if there are any stations within approximately 100 m of the planned installation or specific information regarding the separation distances required;

c) When possible, use higher siting of the FSS ES antenna than would normally be required in areas where 40 GHz MFCN BSs can be identified or might be expected (shopping centre/mall, larger sportsground etc.);

d) Physically inspect the planned installation site (site survey from the highest point of either antenna installation) either for installation of MFCN BS or FSS ES to establish if any stations (respectively FSS ES or MFCN BS) are in line-of-sight, and visually examine the surrounding area for signs of a station from or to which interference could occur, e.g. using binoculars or other means;

e) As an additional option, administrations may want to consider introducing a way of visually identifying MFCN BS and/or FSS ES antennas in this band. This could, on a national basis, be supplemented by a colour coding scheme of MFCN BSs and FSS ESs to indicate the frequency band they operate in. (i.e. a fairly large sticker for 40 GHz), or the use of a spectrum analyser during FSS ES installation;

f) For installation of a new MFCN BS in the band 40.5-43.5 GHz, consider installing the BS in a position relative to the planned MFCN service area to avoid pointing within +/- 65° towards any existing FSS ES operating in 39.5-40.5 GHz that is within approximately 100 m of the proposed location of the MFCN BS, and ensure a maximum relative height difference between the BS and ES antennas as far as is practically possible;

g) For installation of a new FSS ES in the 39.5-40.5 GHz band within approximately 100 m and within the MFCN service area, pointing within +/- 65° towards the planned FSS ES, consider installing the FSS ES antenna either at a height above with a maximum relative height difference between the ES and BS antennas as far as is practically possible, or behind a structure (roof, building or other shielding) to avoid line-of-sight, whichever is more practicable;

h) Where it is not practicable to achieve a site geometry outlined in one of the two previous points it should be considered to contact the operator of the other service to see if by working together it is possible to arrive at a combined site geometry that will avoid interference issues. In difficult situations this may involve finding solutions in cooperation with the administration, this may also be required in order to identify the operator of the other service;

i) In situations where it is not possible to implement the previous mitigation measures and the relative positioning of the MFCN BS and the FSS ES antennas to avoid interference issues, the following may be considered:

- Noting that although it is not in the scope to modify the harmonised technical conditions, it may be possible at a local level to consider limiting the maximum transmit power levels for the base station, noting that this would reduce service areas;
- Use frequencies that are farther away from the 40.5 GHz boundary. The mitigating effect will increase the further away from the 40.5 GHz boundary the operating channel can be moved (but still within the spectrum range assigned to the operator);
- Use an FSS ES antenna with higher directivity (Recommendation ITU-R S.580 [5] or larger diameter) for the particular case of low elevation angle issues;
- Placing an RF barrier/shield between the FSS ES in the direction of the MFCN BS antenna.

A1.3 POSSIBLE MEASURES TO RESOLVE INTERFERENCE ISSUES FROM MFCN IN 40.5-43.5 GHZ TO FSS EARTH STATIONS IN 39.5-40.5GHZ

Coexistence measures to **resolve** interference from MFCN into FSS earth stations when this is already established:

- Firstly, check that the site geometry is as outlined in A1.2, f) and g) and if anything can be done to establish a geometry individually or in combination between the two services that will resolve the interference. In difficult situations this may involve finding solutions in cooperation with the administration, which may also be required to identify the other service operator if no database of the FSS ESs and MFCN BSs exists;
- Where the site geometry is unable to provide a solution of the interference issue it may be possible to find a solution in point h) and/or i) of A1.2;
- More generally, administrations are invited to develop administrative procedures and guidance at national level to help to address the resolution of specific cases of adjacent band interference issues in a balanced manner. These procedures, where practicable, should take into consideration the status of each station in respect of its authorisation regime, any information from databases and the national regulation.

A1.4 IMPLEMENTATION OF MEASURES TO PREVENT AND TO SOLVE INTERFERENCES ISSUES

Depending on the national context and the geographical environment considered, the set of technical measures to prevent and solve the interference issues, due to out-of-band emissions of MFCN transmitting stations into FSS receiving earth stations operating in the adjacent band, may vary.

The knowledge of the locations of both MFCN and FSS stations is important information which may help to anticipate possible constraints for subsequent MFCN and FSS deployment and help to better prevent and to solve inference issues when they occur.

Based on the understating that when a station (either FSS earth station or MFCN BS) is coordinated, its location and other relevant parameters are known and recorded in a database, the table below provides the list of measures, as outlined in section A1.2, which could be implemented as possible options to prevent and to solve interference issues in the first place depending on the coordinated status or not of either FSS and/or MFCN stations, although the latter should not preclude the two operators agreeing a relocation of a coordinated station in cases where that is the ‘last resort’ to allow for both services to operate without interference issues.

Table 1: List of possible measures to prevent and to solve interference issues

Measure / Scenario	Coordinated FSS ES and Coordinated MFCN BS	Coordinated FSS ES and uncoordinated MFCN BS	Uncoordinated FSS ES and Coordinated MFCN BS	Uncoordinated FSS ES and Uncoordinated MFCN BS
Use of database (a, b)	Applicable to both	Applicable to FSS ES	Applicable to MFCN BS	Not applicable – see Footnote[1]
Generic siting recommendation in predefined areas (c)	Optional	Applicable	Applicable	Applicable
Site survey (d)	Applicable	Applicable	Applicable	Applicable
Antenna colour code for visual inspection (e)	Optional	Applicable to MFCN BS and optional for FSS ES	Applicable to FSS ES and optional for MFCN BS	Applicable
Siting recommendations in case of nearby or co-located stations (f, g)	Applicable separation distances or guidance (including the database)	Applicable separation distances or guidance (including in the database)	Applicable separation distances or guidance (including in the database)	Applicable separation distances or guidance
Collaborative antenna siting study with administration support (h)	Applicable on a case-by-case basis	Applicable on a case-by-case basis	Applicable on a case-by-case basis	Applicable on a case-by-case basis
Further measures and technical modifications of the 4 included in (i)	Applicable on a case-by-case basis	Applicable on a case-by-case basis	Applicable on a case-by-case basis	Applicable on a case-by-case basis

It should be noted that even if both MFCN BS and FSS earth stations comply with the least restrictive technical requirements of their respective regulatory framework, an interference issue could still occur. National procedures have to be anticipated to resolve this type of issue in a balanced manner and provide regulatory certainty to both FSS ES and MFCN BS.

In this respect, the operators of both FSS earth stations and MFCN BS should be informed of the relevant way to proceed with interference issues as outlined in section A1.3.

When interference issues are confirmed, relevant adjustments to solve the issue should be assessed by the operators, with the support of administrations as necessary, and suitable solution should be implemented in a limited time frame.

Sharing of practices between administrations is encouraged by the ECC framework (ECC Decision (22)06 on MFCN 42 GHz [1]).

[1] In cases where there are no regulatory requirements for providing the location of either FSS ES and/or MFCN BS it may be possible to access the operator database which contains at a minimum the location, pointing direction and the antenna height. Alternatively, an open database could be established, where the operators can enter similar information.

ANNEX 2: LIST OF REFERENCES

[1] ECC Decision (22)06: “Harmonised technical conditions for Mobile/Fixed Communications Networks (MFCN) in the band 40.5-43.5 GHz”, approved November 2022

[2] ITU Radio Regulations, Edition of 2024

[3] ERC Decision (00)02: “Use of the band 37.5-39.5 GHz by the fixed service and by earth stations of the fixed-satellite service (space-to-Earth) and use of the band 39.5-40.5 GHz by earth stations of the fixed-satellite service and the mobile-satellite service (space-to-Earth)”, approved March 2000, amended March 2022

[4] ECC Recommendation (22)01: “Guidelines to support the introduction of MFCN in 40.5-43.5 GHz while ensuring, in a proportionate way, the use of FSS receiving earth stations in the frequency band 40.5 - 42.5 GHz and the use of FSS transmitting earth stations in the frequency band 42.5-43.5 GHz and the possibility for future deployment of these earth stations”, approved November 2022

[5] Recommendation ITU-R S.580: “Radiation diagrams for use as design objectives for antennas of earth stations operating with geostationary satellites”