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Annex 28 to Joint Task Group 4-5-6-7 Chairman's Report

WORKING DOCUMENT FOR ATTACHMENT TO
THE JTG 4-5-6-7CHAIRMAN'S REPORT

Adjacent band compatibility studies of IMT-Advanced systems in the mobile service in the band below 1 518 MHz with respect to systems in the mobile-satellite service in the frequency band 1 518-1 559 MHz

Scope

This document describes a framework for adjacent band compatibility studies between geostationary satellite networks in the mobile-satellite service operating in the band 1 518-1 559 MHz and IMT-Advanced systems potentially operating in the bands below 1 518 MHz.

Editor's Note: Doc. 4-5-6-7/699 was considered which addressed the subject of adjacent-band interference to geostationary mobile-satellite service (MSS) (space-to-Earth) links in the 1 518-1 559 MHz from possible IMT-Advanced systems in the mobile service operating in the band below 1 518 MHz. A preliminary framework for the study, based on the input contribution, is presented below. No conclusions were reached, and further study of the subject may be needed in the relevant ITU-R working parties.

1 Introduction

The frequency band 1 518-1 559 MHz (space-to-earth) is allocated to the MSS in Regions 1, 2 and 3 on co-primary basis, though some of these frequencies are not allocated to MSS on an exclusive basis in all countries. This document examines the interference from potential new IMT-Advanced systems in the bands 1 518-1 559 MHz when IMT-Advanced systems would operate in the bands adjacent to the MSS downlink band 1 518-1 559 MHz.

2 Background

The frequency band 1 525-1 559 MHz (space-to-Earth) are currently in use by some GSO MSS operators, and globally, shared among a number of GSO MSS operators. These frequency bands are used globally for MSS operations, among other things for safety related services for the land, maritime and aeronautical communities.

The frequency band 1 518-1 525 MHz (space-to-Earth) was allocated to the MSS at WRC-03 and is being used by some MSS operators. It is noted that in some countries there are substantial constrains that prevent operations of MSS in this band.

The 1 525-1 559 MHz band is also identified as being available for the satellite component of IMT and some of the services offered by some MSS operators form part of the satellite component for IMT-2000, as defined by Recommendation ITU-R M.1850-1.

3 Technical characteristics and analysis

3.1 Assumptions and system parameters

3.1.1 MES parameters

MESs in this band may be operated on land, on aircraft and on ships. [The characteristics of the MESs do not differ significantly depending on whether terminals are used on land, in the air or at sea]. Recommendation ITU-R M.1184 contains a range of characteristics of MSS systems operating in these bands. Only a single set of MSS characteristics is provided below, but others may be used. The characteristics are within the range of characteristics contained in the Recommendation, but may not be *worst case* from an interference perspective.

TABLE 1

MSS terminal characteristics

MES receiver temp (K)	316
MES antenna gain (dBi)	2
MES reference bandwidth (kHz)	200
MES noise in reference BW (dBW)	–150.6
I/N criterion (dB)	[–10]

For the adjacent channel selectivity (ACS), [Document 4-5-6-7/699] proposed to use the value of 30 dB, and for the overload criterion, the proposed value is -82 dBW. It was noted that ETSI standard EN 302 574-2 contains ACS values of 48 dB and 55 dB (albeit for systems operating in a different frequency band).

3.1.2 IMT parameters

Characteristics of IMT-Advanced mobile station and an IMT-Advanced macro base station are in accordance to Report ITU-R M.2292-0 and are reported below.

TABLE 2

IMT stations characteristics

IMT station type	**User equipment**	**Base station**
IMT station e.i.r.p. (dBm)	20	58
Emission bandwidth (kHz)	5 000	5 000
Polarisation loss (dB)	3	3
Antenna Pattern	According to Report M.2292	
Adjacent Channel Leakage Ratio (ACLR) (dB)	According to Report M.2292	

It was noted that specifications for IMT stations (3GPP TS 36.101 and 36.104) contain other requirements for emission masks that may be more stringent that the ACLR requirement.

It was noted that body loss may need to be taken into account.

[aggregate interference]

3.1.3 Propagation models

[an appropriate propagation model will need to be used]

3.2 Interference from adjacent band IMT-Advanced emissions

Due to the low power level of the incoming MSS signals, unwanted emissions generated by IMT-Advanced base stations or user equipment operating in an adjacent frequency band, could create interference to MES receivers operating in the band 1 518-1 559 MHz.

[Results to be provided]

3.3 LNA overdrive

[Note: Document 4-5-6-7/699 studied LNA overdrive on the basis of the following assumptions for the architecture of the MES receiver.]

Earth station low noise amplifiers (LNAs) are optimized for reception of the very low power level of the incoming satellite signal and, hence, without a pre-selector overload filter, have a high sensitivity to interference. Incoming IMT-Advanced signals at much higher power levels can affect the operating point of the LNA and drive it out of its dynamic range to where it exhibits a non-linear behaviour. This results in the creation of intermodulation products and gain compression (within the device) that in turn result in distortion of the MSS signal. Typically LNAs are wideband devices with a low noise figure and flat frequency response over the wanted frequency range. MSS receivers have the bandwidth defining filtering only at intermediate frequency (IF) stage, not at the LNA.

[Results to be provided]

4 Summary

[TBD]

5 Conclusions

[TBD]