Review Analysis of the Intermodulation Distortion (IMD) on The Instrument Landing System (ILS)

Ramini Kutchukhidze
Departmrnt of Engineering, Georgian Aviation University, Tbilisi, Georgia

Teimuraz Kortua
Departmrnt of Engineering, Georgian Aviation University, Tbilisi, Georgia

Abstract:

Our study analyzes electromagnetic interference (EMI) from various sources (sporadic E, aircraft electronics, wireless attack, FM radio broadcasting) affecting instrument landing systems (ILS). Since the compatibility between the FM broadcasting frequency plan and the aeronautical radionavigation service frequency plan has not been fully studied. [1] The paper analytically describes the transmission of CSB (Carrier-Sideband) and SBO (Sideband-Only) signals from the instrument landing system transmitter and how to generate of third-order intermodulation products, can cause phase and amplitude distortion of navigation tone signals (90 Hz, 150 Hz), resulting in incorrect navigation instructions being displayed on the aircraft's course deviation indicator (CDI). Due to this problem, at the end of the paper we have a suggestion on how to increase the immunity of an ILS receiver. In this paper, we present only analytical results that deal only with interference from FM radio transmitters. The research is still ongoing and experimental results will be presented in future studies.

Keywords:

Instrument Landing System (ILS), CSB (Carrier And Sideband) and SBO (Sideband-Only), Difference in Depth of Modulation (DDM), Course Deviation Indicator (CDI), FM Broadcasting, Intermodulation distortion (IMD).