DVB Carrier Identification
DVB's ID solution to stop satellite interference

What is DVB-CID?

DVB-CID is a digital satellite transmission system developed by the DVB Project that describes the modulation, channel coding and signalling protocol intended for the identification of the host carrier. This is an important tool to stop or at least reduce interference between satellite signals.

The minimum content of the Carrier ID is the DVB CID Global Unique Identifier (GUI), fixed by the equipment manufacturer. Additionally, it may contain other information that is configurable by the user, such as GPS coordinates, contact phone numbers, etc., to simplify and speed up the process to stop the interference event.

The system has been optimized for satellite applications including DVB-S, DVB-S2 and DVB-DSNG, but can be applied to any continuous transmission by satellite. The system is to be used when no other suitable means of identifying the transmitter are available; such means include but are not limited to remote-control facilities that can switch the transmitter on and off.

The standard was published in May 2013 as ETSI TS 103 129: "Framing structure, channel coding and modulation of a carrier identification system (DVB-CID) for satellite transmission".

Background

Radio Frequency Interference (RFI) highly impacts the Quality of Service for satellite operators and their customers. With satellite transmissions it is difficult to identify the source of this interference. This in particular applies to occasional-use satellite transmissions and temporary feeder links, rather than to full time DTH services, where the owners and locations of the uplinks are well known and identified by the respective DVB-SI data. Preferably the uplinkers should add identification information of the source to the transmitted signal in a robust and standardized way.

Whilst RFI can come from many sources, various satellite operators have confirmed that a significant amount of interference comes from so-called "rogue carriers". These are often caused by failed equipment or by a system improperly configured due to human error. Various actions are being taken by operators, customers, vendors and industry groups to tackle interference, including: training for installers and operators; data sharing to improve operational processes; and new innovations such as Carrier Identification (CID).

With the objective to develop a standard system introducing countermeasures against the mentioned 'rogue carriers', in March 2012 DVB has assigned to TM-S2 Ad-Hoc Group the task to define a satellite transmission system for Carrier Identification (Carrier ID), to enable industry to produce interoperable equipment and also ensure an ongoing development and improvement of Carrier ID technology in a standardized manner.

Carrier ID is not expected to be a perfect solution to solve all RFI, but it will be a key technology in contributing to the rapid identification of RFI and reducing its negative impact on operators, customers, and the satellite industry as a whole.

How does it work?

For the Carrier ID to be virtually compatible with all carriers used in satellite today and easy to be included in all satellite modulators, the CID waveform is superimposed on the Host Data Carrier. The system uses Binary Phase Shift Keying (BPSK) spread spectrum modulation, differential encoding, scrambling and a concatenated error protection strategy based on repetition, cyclic redundancy check (CRC) and Bose-Chaudhuri-Hocquenghem (BCH) codes. The CID carrier is assigned a Power Spectrum Density level well beneath the Data Carrier level, thus allowing for a negligible degradation of the Data Carrier performance (typically below 0.1 dB). At the same time, the adoption of Spread Spectrum technique, together with the Differentially Encoded BPSK modulation and a BCH FEC (Forward Error Correction) protection, allows for a very robust Carrier ID system. It should in fact be possible, in most practical cases, to identify the interferer without switching-off the wanted signal, as particularly required by broadcast services.

In some cases it may be necessary to protect the identity and location of transmitting terminals by disabling the Carrier ID in an equipment by hard- or software.

How does it work?
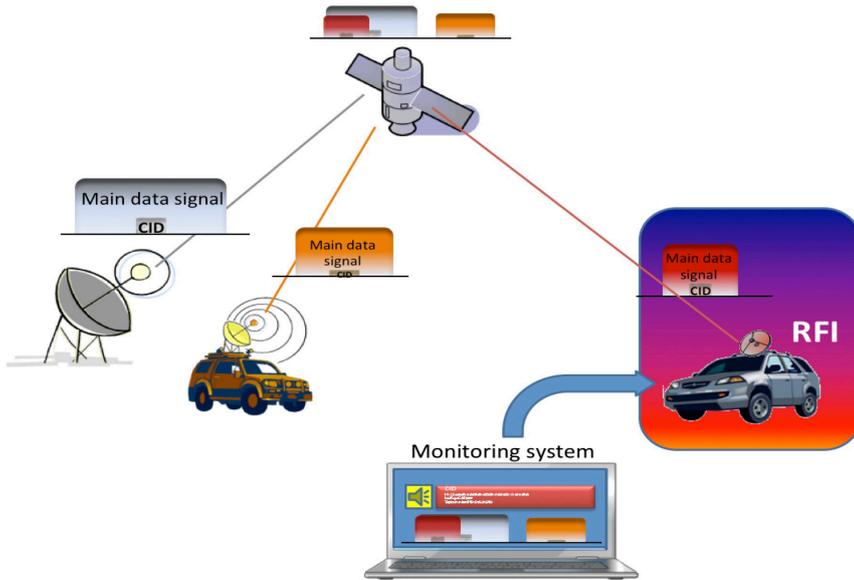
Market Deployment

Combatting satellite interference – often caused by improperly configured equipment or failed equipment -- has taken the industry by storm with unprecedented collaboration through industry groups. After years of industry debate, technical collaboration and, finally, a singular focus to push for a single standard, Carrier ID has arrived.

All recent DVB satellite modulators support the insertion of the Carrier ID and demodulators supporting the extraction of DVB-CID information are also available.

The Satellite Interference Reduction Group (IRG) is the global industry organisation, whose mission is to combat and mitigate radio frequency interference (RFI) for an interference-free Satellite Frequency Spectrum. The Space Data Association (SDA) has a beta CID Database online for members, which will soon be available to all operators. This database will contain, at least, all of the Carrier ID codes and the corresponding name of the satellite operator whose satellite is carrying each respective carrier.

Next Steps

Major satellite operators such as Eutelsat, Intelsat and SES have added DVB-CID to almost all of their transmissions and will make DVB-CID mandatory from January 1st 2018. In the USA, the FCC has also planned a mandatory date of September 3rd 2017. Further regulations to make CID mandatory in Europe are also being discussed

Finally, low-cost DVB-CID embedder devices are being developed in order to insert CID information into older or non-DVB satellite systems.

Links

www.dvb.org	Main DVB website
www.dvbservices.com	Register here to download all the DVB and DVB sub-brand logos.
www.satirg.org	Satellite Interference Reduction Group
www.space-data.org	Space Data Association