FIGHTING WITH SATELLITE INTERFERENCE

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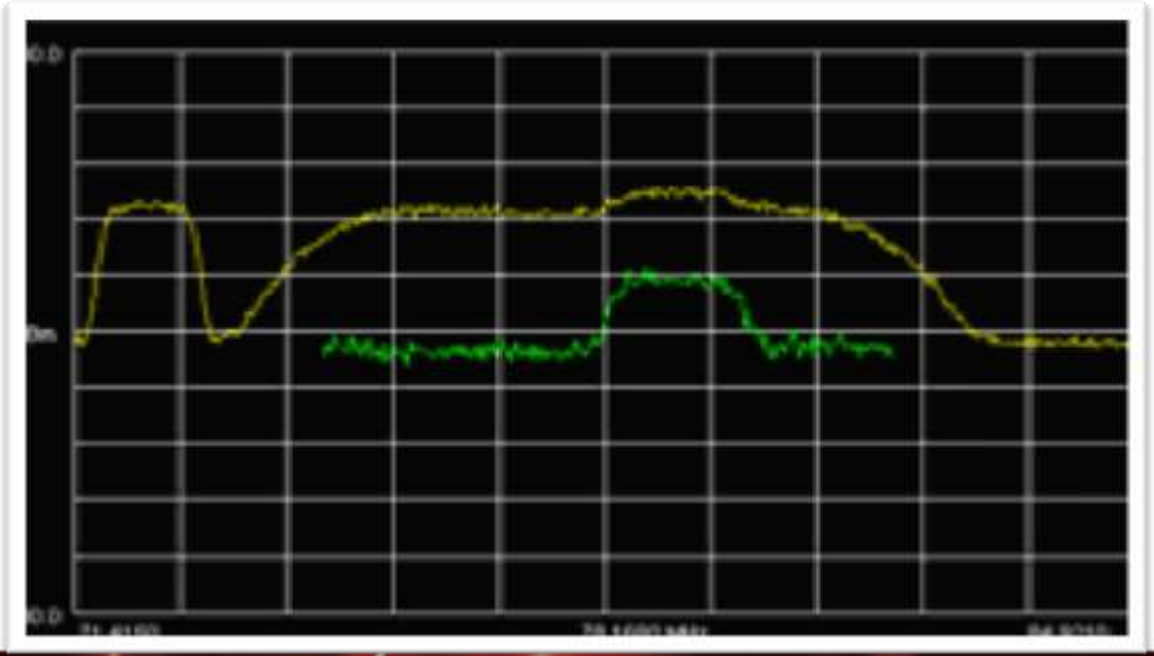
FIGHTING WITH SATELLITE INTERFERENCE

- Satellite interference is a major problem that all satellite operators and users face with all the time.

- Interference is a big challenge avoiding uninterrupted transmission environment and harming both the operators and users.

- Interference can be categorized into two main groups:
  - Deliberate interference
  - Accidental interference



ACCIDENTAL INTERFERENCE

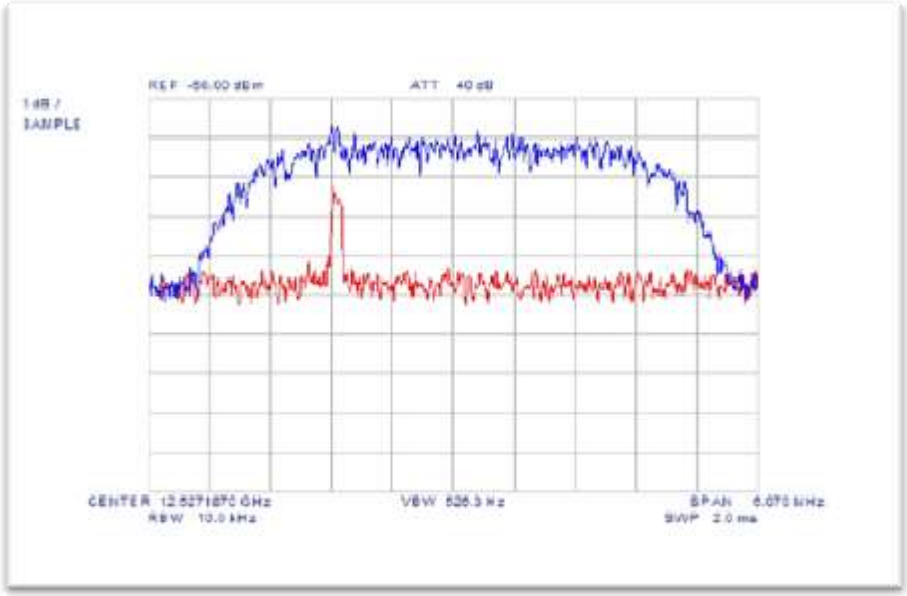
Accidental interference categorization:

- Uplink personnel mistakes (human error)
- Cross-pole interference caused by misaligned uplink signal in opposite transponders.
- Unknown carriers (Interference source is not identified, rogue carrier)
- Hardware problems
- Adjacent satellite interference
- Terrestrial service interference

RESULTS

Harms caused by interference:

- A tremendous drain on company resources including man power
- Degradation of available satellite capacity
- Financial impact

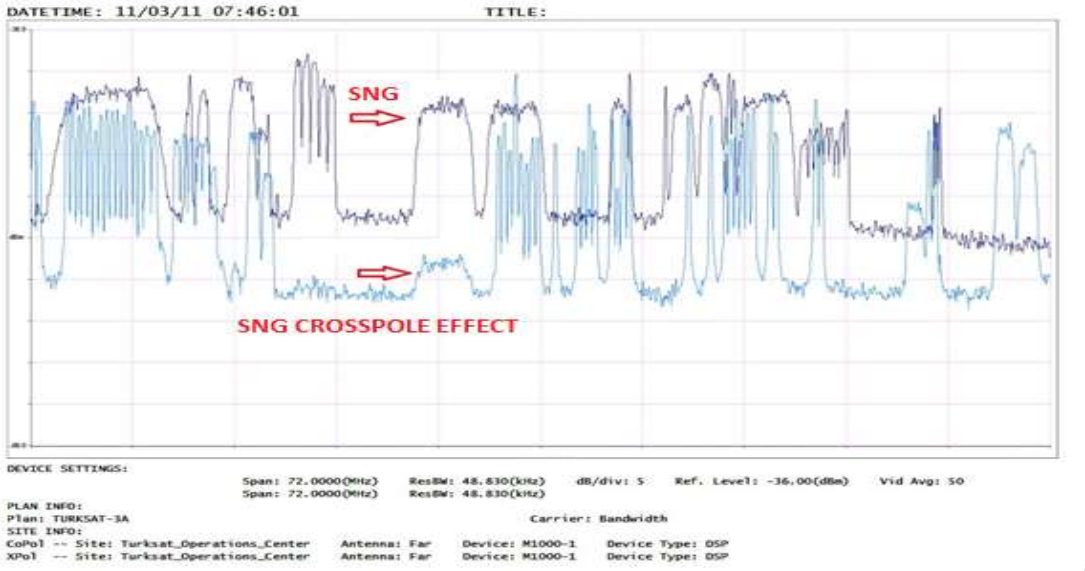


EXAMPLES OF INTERFERENCE

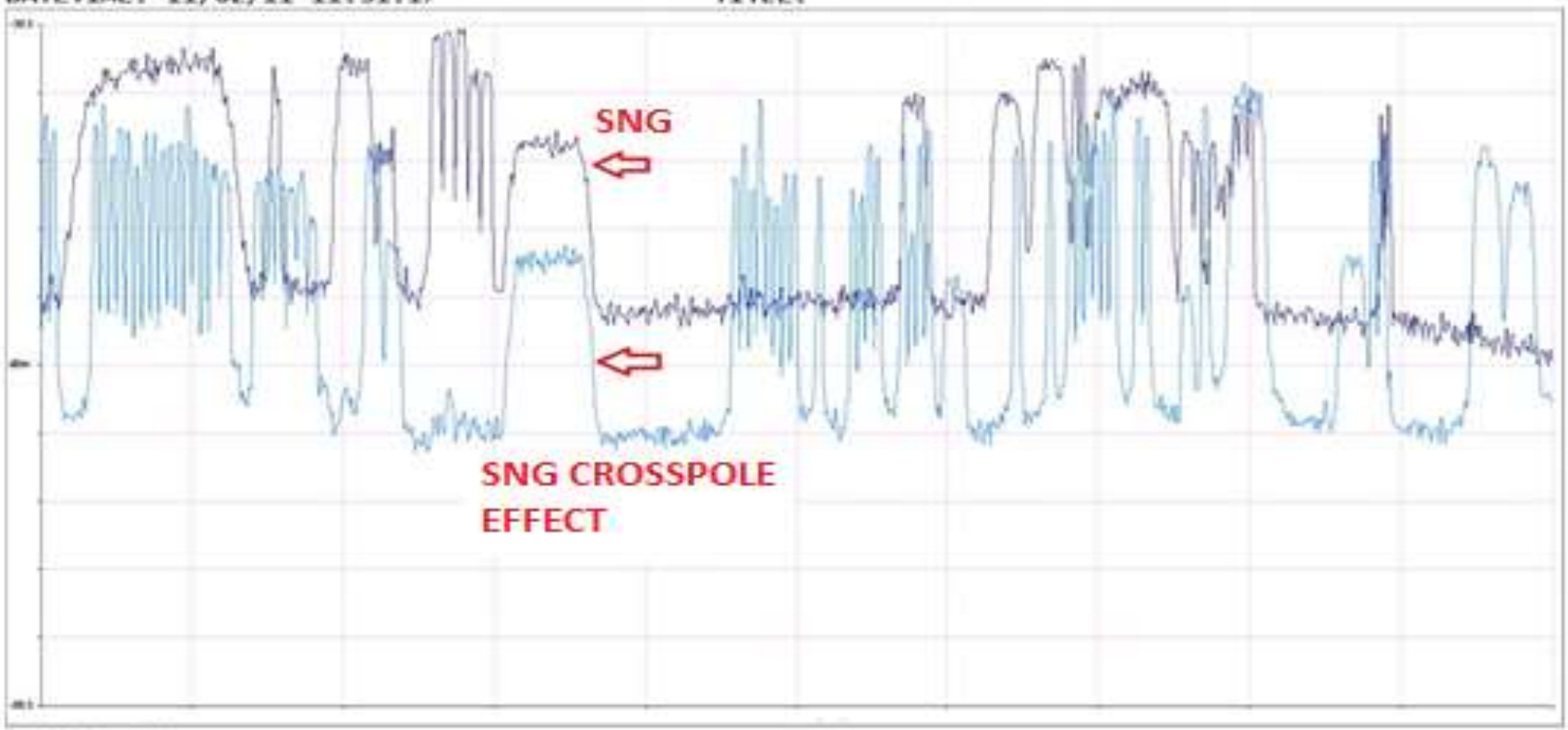
1. CROSSPOLE EFFECT

Before the transmission, every user must set their antennas to correct polarization alignment.

This setting can minimize cross-pole effect however sometimes uplink personnel doesn't obey the uplink procedures and try to carry its content to the head end immediately causing such interferences.



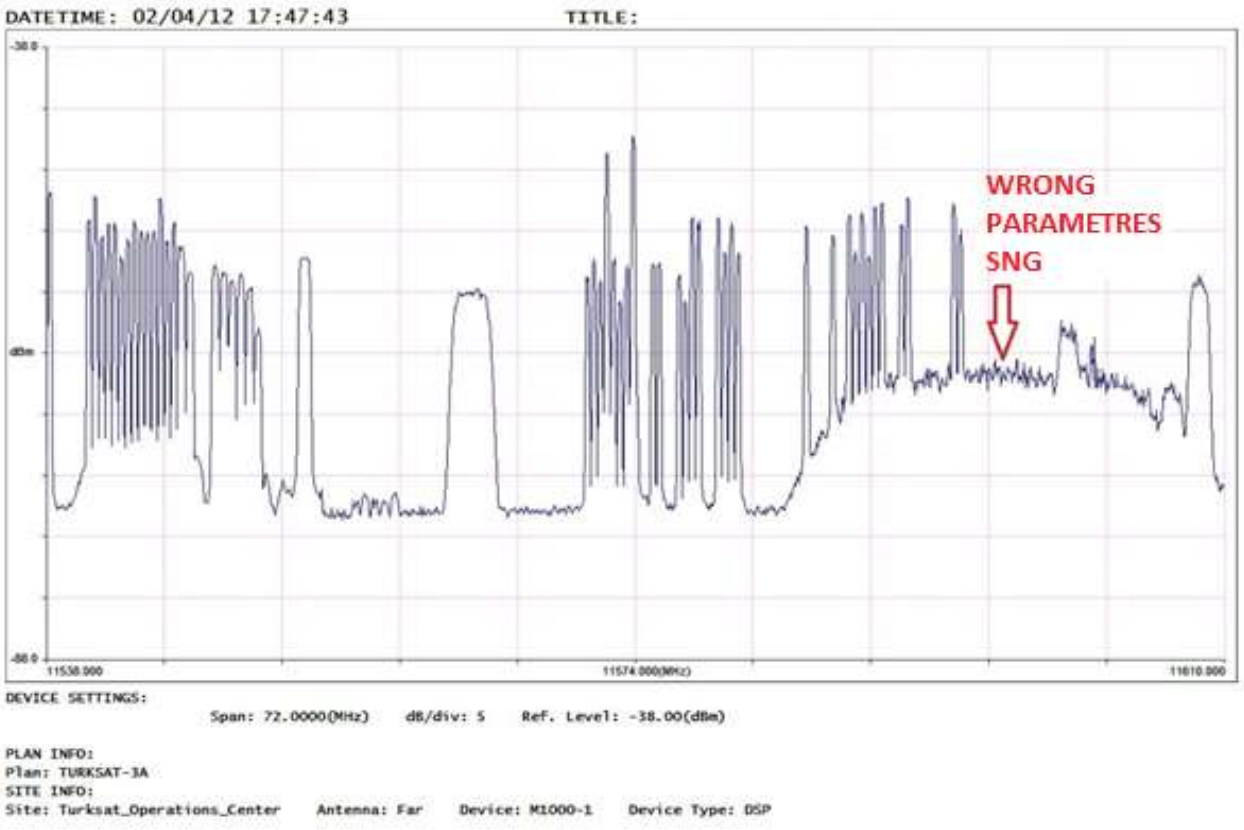
EXAMPLES OF INTERFERENCE



EXAMPLES OF INTERFERENCE

2. HUMAN ERROR

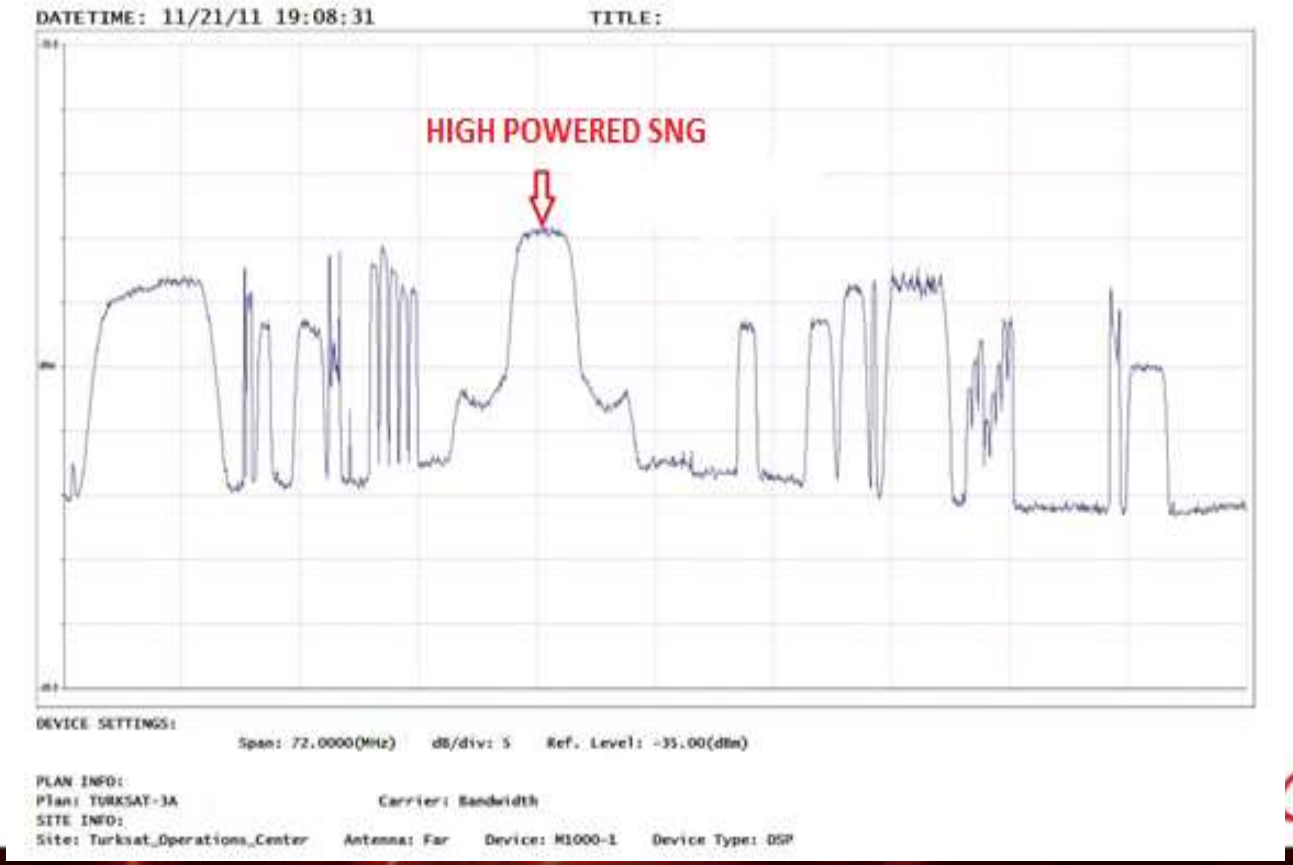
Uplink personnel may enter incorrect parameters such as center frequency or symbol rate resulting in interference to other carriers.



EXAMPLES OF INTERFERENCE

3. EQUIPMENT ERROR

Equipment faults such as malfunctioning of Uplink Power Control systems could cause the carrier to increase its power level dramatically impacting other carriers.



EXAMPLES OF INTERFERENCE

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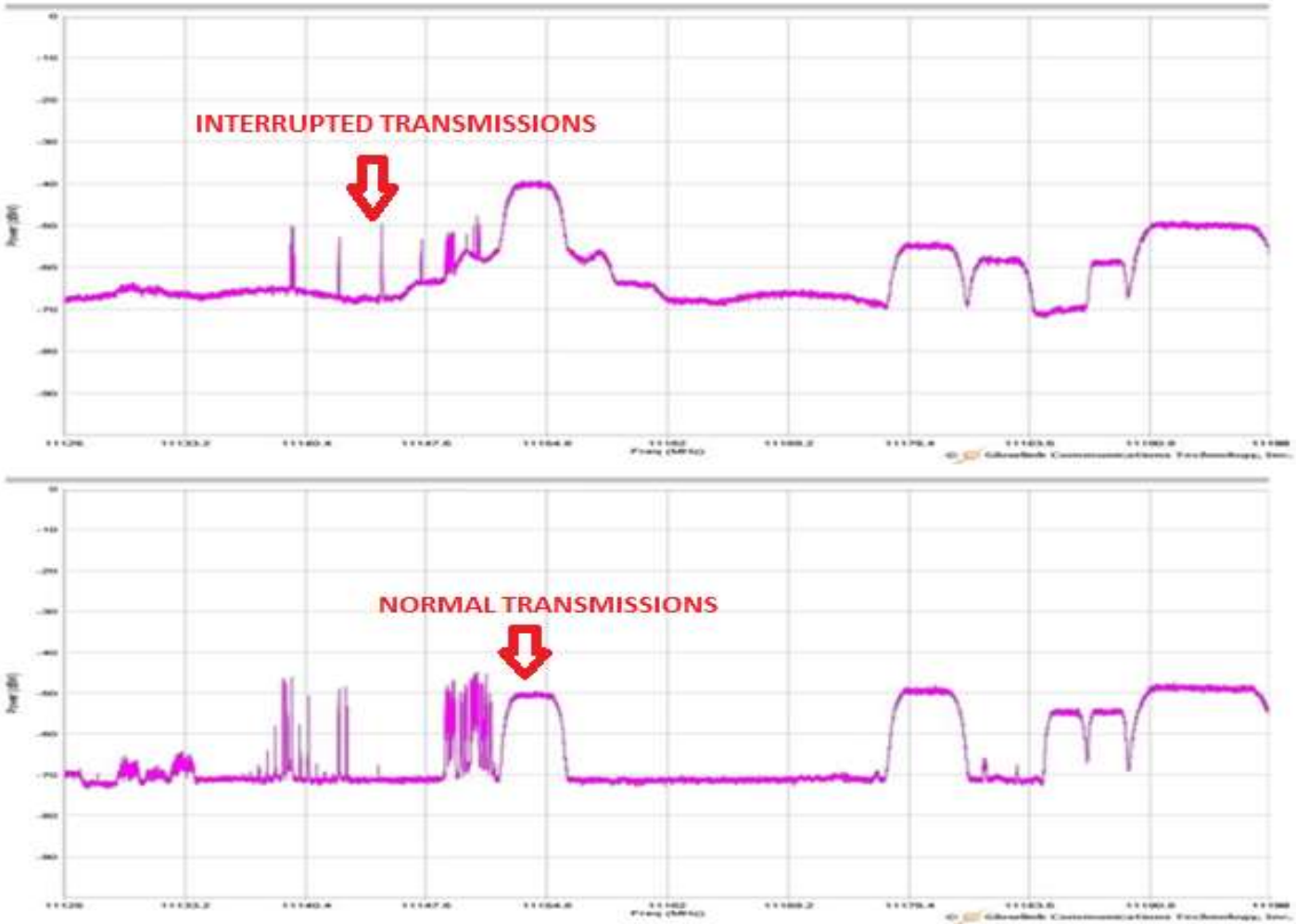
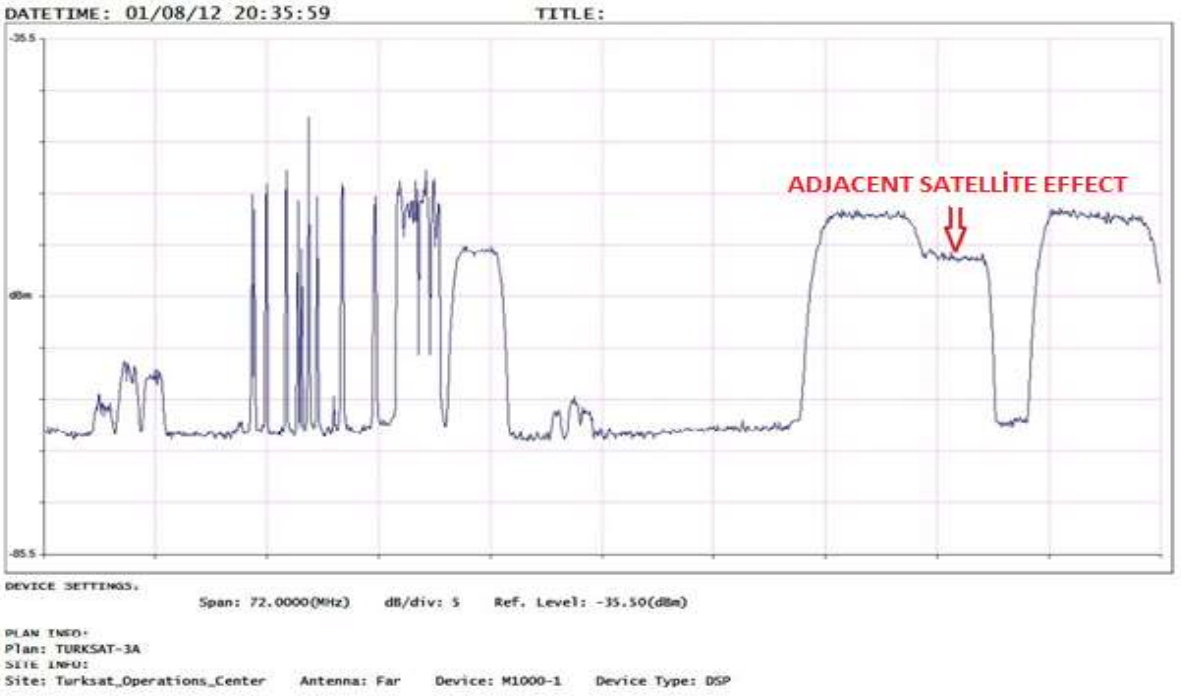


EXAMPLES OF INTERFERENCE

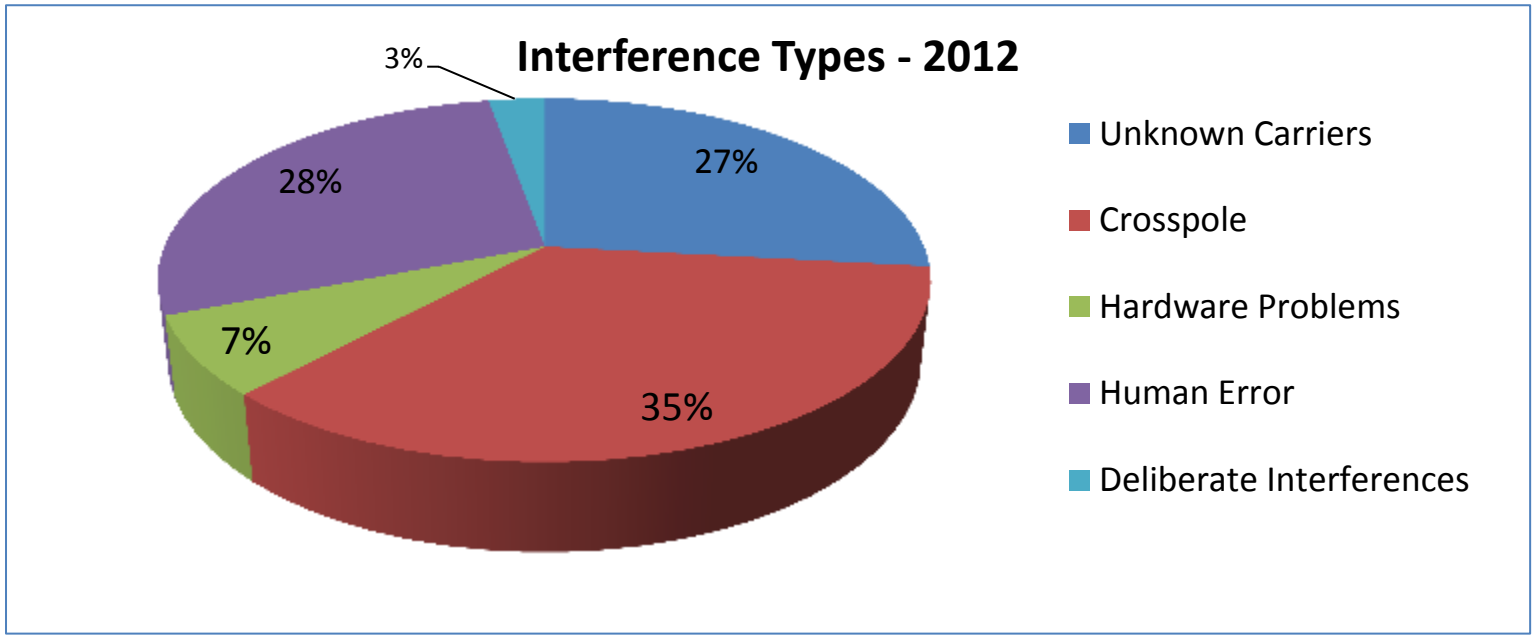
4. ADJACENT SATELLITE – ANTENNA ALIGNMENT ERROR

Uplink systems trying to uplink to a close by satellite may cause interference if the antenna is not aligned correctly to the intended satellite.



SATELLITE INTERFERENCES – 2012 EXPERIENCE

The interferences occurred on satellites in 2012 have been categorized as below:



Biggest share belongs to cross pole interferences.

Overall, in most of the interference cases we see human factor since we can consider cross pole interference and unknown carrier as human error too.

STUDIES and PRECAUTIONS

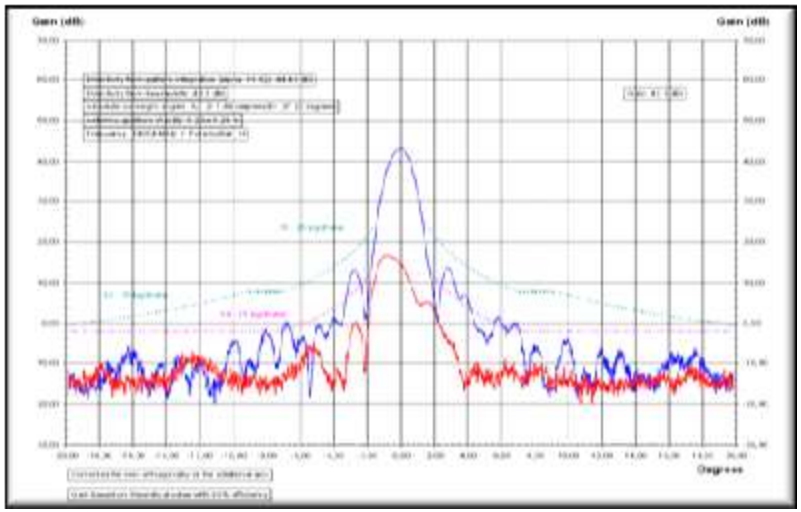
TURKSAT AS is putting major efforts to avoid interference occurrences and when happens to resolve them. We can categorize precautions taken in three groups:

- Registration Process and Uplink Personnel Training
- Geolocation
- Carrier ID

STUDIES and PRECAUTIONS

1. TURKSAT REGISTRATION CODE PROCESS

Fixed and mobile uplink systems, which are used for transmission via TURKSAT A.S satellites, are being subjected to the required tests to check compliance with the international standards.



TURKSAT trains users' uplink personnel through this registration process and through different events in order to give them an insight why interference occurs and what the harmful results could be.

STUDIES and PRECAUTIONS

2. Geographical Location Search of Interference Source

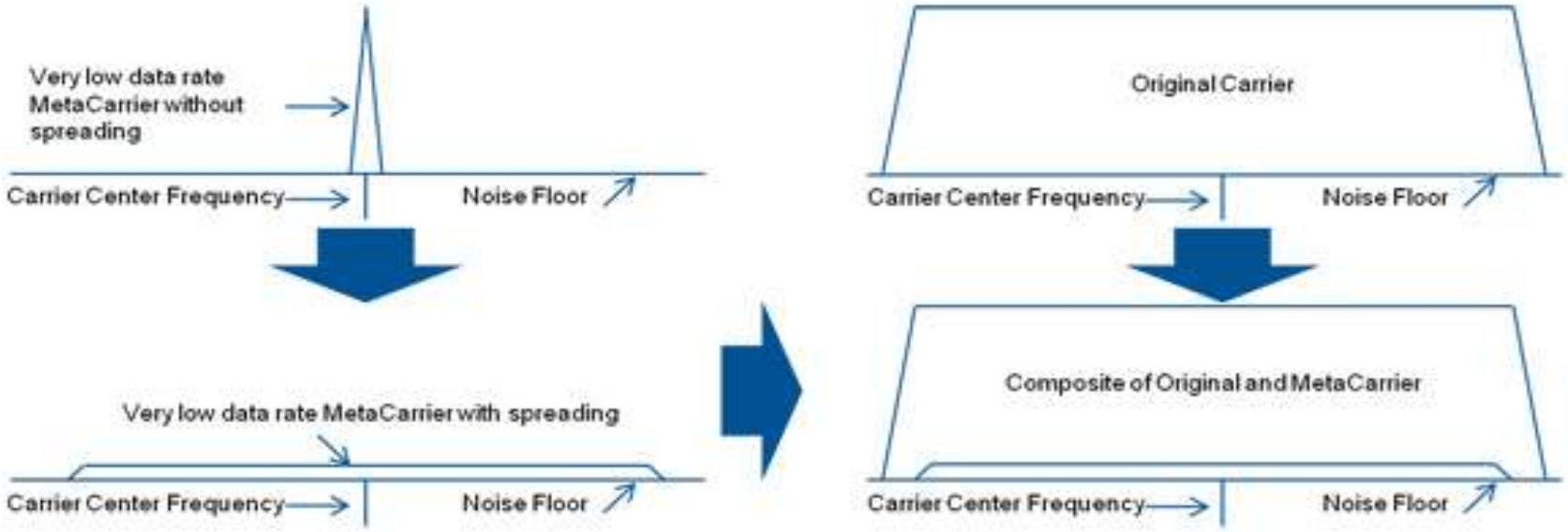
Turksat has set up a Geolocation System to detect the uplink location of interferences. This tool along with regular techniques to identify the cause of the problem helps us to locate the place of interference and to resolve it.

STUDIES and PRECAUTIONS

3. CARRIER ID

The Carrier ID technology embeds and detects a small message and unique ID within a video or data satellite carrier. This embedded message and ID significantly reduce the time to identify and clear interference sources.

Carrier ID standard is undergoing formal approval, bluebook A164 specification file is already published by DVB.



CONCLUSION

- Most of the interferences are caused by **human error** and they are easy to resolve once the source of the signal is determined.

- **Carrier ID** is a promising technology that will ease the solution process dramatically and Satellite communication community has to work together to spread the use of Carrier ID.

- It is important to resolve interference once it occurs whereas it is more desirable to avoid and reduce the number of interference cases

  => **Training, Awareness**