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Subject	5650-5850 MHz Band plan update for HAMNET backbone and ATV coexistence		
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Introduction

In the perspective of loosing the 2300 MHz band for amateurs, existing and new HAMNET backbone links are being moved up to the 5700 MHz band. Many sites have now to host several directional links to cope with the network topology and each beam need to work on separate frequencies to limit interferences.

In the mean time, Varna IARU conference asked the ATV to move up, following the 430-440 MHz reorganization and interference issues on 1260 MHz.

Current band plan is not well suited for organizing multiple links and ATV+HAMNET coexistence.

Background

HAMNET is an amateur private network based on TCP/IP protocols and IEEE-802-11 standards. It is organized with point-to-point long-distance radio links and access points for local coverage. These links are generally using off-the-shelf IEEE 802-11 equipments, when their firmware allows them to work on amateur frequencies. Typically, within a band of 10 MHz, it is possible to connect remote points with a throughput reaching 70 Mbits/sec.

A typical HAMNET node contains:

- One “backbone incoming link” transceiver, working on frequency f_1 , connected to another HAMNET remote point;
- At least one “access point” for local users, working on frequency f_2 ;
- At least one “backbone forward link”, extending the network to another remote node, working on frequency f_3 .

Most of the time it is possible to set the access point to work on the 2400-2450 MHz segment as any “WIFI” access point. Some may prefer to use also the 5700 MHz band for the access points.

When more than one forward link is required, the setup becomes complex as there is a need to make sure the two chosen channels do not overlap. For minimal interference, it is required to keep at least 20 MHz between two adjacent links. In the previous node description, this means at least 20 MHz between f_1 and f_3 .

Current band-plan does not specifically target HAMNET transmissions, but allocations can be done in the following segments:

- 5670 to 5700 MHz (30 MHz) – Max 2 backbone links;
- 5720 to 5760 MHz (40 MHz) – Max 2 backbone links;
- 5762 to 5790 MHz (28 MHz) – Max 1 backbone link.

ATV is meanwhile restricted to 5700-5720 MHz, that is to say up to 3 analogue channels. Even if some HAMNET equipments can be tuned to use less bandwidth (reducing to 5 or 8 MHz), this band reduction implies also throughput reduction.

Key point and proposal

Band plans have been designed before the raise of HAMNET backbones and their relatively wide band requirements. Meanwhile, ATV operations have been requested to “move up” since Varna 2014. Both systems need high points for long distance coverage and most of the time ATV and HAMNET will have to share the same pylons with high risk of mutual interferences.

One practical solution would be to interleave HAMNET and TV systems so that analogue TV channels could be set in the gap of 20 MHz required between two links.

Varna 2014 started to revisit the band plans and remove the “per modulation” notes. To keep going in this direction, we suggest to merge the different sub-bands when possible, with specific footnotes for ATV and HAMNET interleave suggestions.

Resulting band-plan could be:

Frequency	Max. Bandwidth	Mode	Usage
5650.000	2700 Hz	ALL MODES	AMATEUR SAT SERVICE (UPLINK)
5668.000			
5668.000	2700 Hz	ALL MODES	5668.200 Narrow band center of activity
5670.000			AMATEUR SAT SERVICE (uplink)
5670.000		ALL MODES	TV / HAMNET (footnote)
5760.000			
5760.000	2700 Hz	ALL MODES	5760.200 Narrow band center of activity
5760.800			5760.750-5760.800 Local Beacon
5760.800		Telegraphy MGM	BEACONS ONLY
5760.990			
5761.000	2700 HZ	ALL MODES	
5762.000			
5762.000		ALL MODES	TV / HAMNET (footnote)
5790.000			
5790.000		ALL MODES	AMATEUR SATELLITE SERVICE (down-link)
5850.000			

Footnote: for optimal coexistence, HAMNET and TV systems should be interleaved.