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Subject	Beacon Guidance		
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Author:	Murray Niman, G6JYB		

Updates to VHF/Microwave Beacon Technical Guidance

Introduction

The Interim Region-1 meeting in February 2010 noted progress with MGM for beacons and introduced guidance for such developments into v5.42 of the VHF Handbook. It also discussed band plan changes for some beacons, notably in the 50 MHz band. Subsequent developments indicate that further technical options and guidance may be needed to ensure that there is sound basis for developing a first class coordinated beacon network.

Background

Previous Region 1 Interim meetings and Conferences have led to a series of updates to beacon sub-bands and broader guidance (notably in Chapter-11 of the VHF Managers Handbook v5.42) in order to support coordination and technical progress.

The use of precision frequency timing and MGM has been growing. In many respects, this is to be encouraged as it facilitates propagation research and weak signal DX reception, including automated monitoring.

At the same time, we have noted the following

- Beacon bandwidth and the alignment of MGM tones relative to the centre frequency are not explicitly defined. Such ambiguities or an inappropriate MGM choice can thus lead to overlaps or excessive bandwidth, particularly in the lower VHF bands where beacons are nominally on a tight 1 kHz spacing.
- Common MGM sequences have so far been based on a two-minute cycle. However, we are aware of new developments such as PI4 based on a shorter one-minute cycle, as well as suggestions for IBP style systems. It is of course recognised that many beacons remain as simpler CW systems.
- In the higher microwave bands we believe experiments with wider tone spacing than current JT4G may be beneficial in order to underpin developments above 10 GHz where frequency stability, Doppler, spreading, phase noise etc become more challenging
- Updates may be timely as they could also underpin general beacon coordination, as well as larger projects such as the proposed changes to 50 MHz

- Beacons at VHF which may have to operate at higher transmit powers than many microwave ones would benefit from modes that permitted more efficient power amplifiers

Key Points & Proposals

The conference would thus be an ideal opportunity to review and act on the points above as well as any other comments from coordinators and member societies

Recommendations

Based on the above and any feedback; that the IARU VHF/Microwave Handbook guidance on beacons is enhanced by:-

- Adding a new generic one minute CW + MGM sequence to the current examples
- Adding a convention for the alignment of MGM tones relative to the nominal centre frequency (particularly for the lower VHF bands where 1 kHz spacing is in use).
- Adding guidance to encourage good practice for both timing/frequency accuracy and phase noise to enhance general performance for the benefit of all.
- Adding new notes that encourage ongoing development of modes optimised for beacons, which may either enhance DX reception or permit more efficient power amplifiers (and thus lower electricity costs) to enhance sustainability – and that Society and IARU coordinators be kept updated on such developments.
- If proposed/agreed, to also add a formal description of any IBP type timing scheme