

**INTERIM MEETING OF THE IARU REGION 1 VHF/UHF/MICROWAVE COMMITTEE
VIENNA 19.- 21. April 2013**

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Subject	2400MHz Amateur Satellites
Society	RSGB
Contact	Graham Shirville and AMSAT-UK
Status	Information

Introduction

The 2300-2400MHz band is subject to increasing pressure from new Broadband Wireless Systems (notably LTE-TDD). The adjacent 2400-2450MHz band is allocated to both the amateur and amateur satellite service – but is itself subject to interference from ISM and short-range devices (Wi-Fi etc).

This paper provides background data on Amateur Satellite usage in 2400-2450MHz to promote awareness and assist planning.

Background

Whilst IARU-R1 continues its efforts to protect the 2.3GHz amateur service allocation, for some countries only the 2400-2450MHz amateur allocation may remain. Operating within that band in the presence of interference from Wi-Fi can be exceptionally difficult.

Partly to counter this, amateur satellites in the 2400MHz band are usually configured for downlinks, so that their uplink receivers can be placed in alternative lower noise/doppler allocations. In addition many downlinks frequencies are set for the bottom of the band, as reception above 2402MHz can be rendered unusable due to Wi-Fi etc.

Information

Based on information kindly provided by AMSAT-UK and the IARU-R1 Satellite Coordinator, the annex gives a list of known 2400MHz satellites/frequencies.

These include a new DATV downlink from the International Space Station and frequency coordination support of many projects, including the prestige EU Framework-7 QB50 programme.

Please use this to promote greater awareness and understanding.

Annex: 2.4GHz Amateur Satellites

(Data from AMSAT-UK / IARU-R1 Satellite Coordinator, Jan-2013)

Known/Planned:-

Satellite	Frequency, MHz	Launch Date
Phonesat V2-1	2420(?)	March-2013
Triton-2	2408.00	2013 Q2/3
Phonesat V2-2	2401.2 – 2431.2	2013 Q3
KickSat	2401.2 – 2436.2	2013 Q3
Argus-1	2403.0-2403.4	2013 Q3
Copper	2403.0-2403.4	2013 Q3
UKube-1 (UK-Space)	2401.0	2013 Q3
HiakaSat (U.Hawaii)	S-Band	tbd
Phase-3E (AMSAT-DL)	2400	tbd
Space Station HamTV Downlink 9dBW	2422 Main + 2437 Backup	2013Q2/3
QB50 Constellation https://www.qb50.eu/	16 cubesats on 2.4GHz out of 50 total	2015Q2

Active

Name	Norad-ID	Uplink	Downlink	Beacon	Mode
Aeneas	38760	-	437.600 / 2425.000	-	1200bps AFSK

(1W Tx RFID tracking experiment)

Available in orbit but not activated**:-

Name	Norad-ID	Uplink	Downlink	Beacon	Mode
AO-7	07530	-	-	2304.100 (100mW)	CW

**Regulatory permission from FCC to activate the Oscar-7 beacon not achieved, but OSCAR-7 is operational.

In orbit but offline / mission complete:-

Name	Norad-ID	Uplink	Downlink	Beacon	Mode
UO-11	14781	-	145.826 / 435.025	2401.500	(V)FM,(S)PSK
AO-16	20439	145.920	437.026	2401.143	1200bps
DO-17	20440	-	145.825	2401.220	1200bps AFSK
SAFIR-S	28898	-	-	2401.900	9600bps FSK
AO-40	26609	-	2400.100-2400.600	2401.323	400bps PSK
A051	28375	145.860/880	2401.200	435.150	9600bps FSK
XO-53	28894	-	2401.835	437.250	9600bps FSK
MAST	31126	-	2400-2483.5	-	FHSS
ALMASat	38078	-	437.465 / 2407.850	437.465	1200bps FSK