

FCC Telefax Cover Sheet



DATE: January 19, 2007

From: Jim Shaffer
Wireless Telecommunications Bureau
445 12th Street, S.W.
Washington, D.C. 20554
Phone - 202-418-0687
Fax - 202-418-2643

TO: Jackie Pillai

REMARKS: Attached is the grant of your request for waiver of Part 87 to allow use of emission type and bandwidth requirements associated with the Inmarsat Swift64 service as implemented in the Honeywell/Thales HD-128 Aeronautical Satellite Communications System transceiver.

Honeywell

Commercial Electronic Systems

Honeywell International Inc.
21111 N. 19th Avenue
Phoenix, AZ 85027

Date: September 7, 2006

ATTN: Ken Crumbacker
FCC
PO Box 358-130
Pittsburg, PA 15251-5130

Re: FCC ID GB6HD-128
Applicant: Honeywell International Inc.

GRANTED

*For the reasons indicated
herein.*

*J. A. Mel
1/19/2007*

Dear Mr. Crumbacker:

It is our understanding that, since 16 QAM is not currently covered in the FCC rules, a waiver is required from the Wireless Telecommunications Bureau (WTB) for systems employing 16 QAM. This letter is a formal request for a waiver of Part 87 rules to allow use of the emission type and bandwidth requirements associated with the Inmarsat Swift64 service as implemented in the Honeywell/Thales HD-128 Aeronautical Satellite Communications System transceiver.

Background

Current Part 87 aeronautical mobile satellite regulations cover the modulation types and transmission characteristics used in the Inmarsat Aero-H, Aero-I, and Aero-L services. The relatively recent Inmarsat Swift64 aeronautical mobile satellite service provides a higher data rate than the three previously mentioned services. [Swift64 does, however, use existing Inmarsat Aero-H antennas and high power amplifiers.]

The higher data rate of Swift64 is accomplished by utilizing 16 phase quadrature amplitude modulation (16QAM) as opposed to the binary phase shift keying (BPSK) and quadrature phase shift keying (QPSK) used in the Aero-H, Aero-I, and Aero-L services. At present, the emission type and bandwidth for 16QAM transmissions are not specifically addressed in Part 87.

Basic specifications for the Swift64 system are:

Modulation type: 16QAM
Symbol rate: 33.6 ksps (134.4 kbps)
User data rate: 64 kbps
Transmit band: 1626.5 to 1660.5 MHz
Receive band: 1525.0 to 1559.0 MHz

The Swift64 service can be used on commercial, military, and private aircraft with user data rates of up to 64 kbps for general applications, e.g. email and internet access. It is not intended or certified for safety-related functions, and the system is designed to provide priority and real-time pre-emptive access for Aeronautical Mobile Service and Aeronautical Mobile-Satellite Service messages. Swift64 transmissions can be suspended if they would interfere with safety-related messages, or if ordered by the captain of the aircraft [per 47 CFR, Section 87.189(e)].

In addition to the Aero-H, Aero-I, and Aero-L services, Inmarsat provides the M4 land mobile service, covered under Part 25, and the Fleet F77 maritime service, covered under Part 80. The Swift64 aeronautical service is essentially an expansion of the M4 and Fleet F77 services, employing the same emission types. Since the three services use the same ground station installations, their protocols are very similar. The Swift64 service does utilize data interleaving techniques to help deal with the signal fading issues encountered in the aeronautical application. Interleaving is not required for the M4 and Fleet F77 services.

The Inmarsat Swift64 service is now operating outside the United States and is available within the U.S. through Telenor, USA. The HD-128 is intended for use both inside and outside the United States.

Emissions Designation

The 16QAM modulation scheme utilizes simultaneous angle and amplitude modulation. Part 2.201, Emissions, Modulation, and Transmission Characteristics, identifies this type of modulation as D1W, i.e. "D", "the main carrier is amplitude and angle-modulated simultaneously; "1", the nature of the signal modulating the main carrier is "a single channel containing quantized or digital information without the use of a modulating sub-carrier...; "W", type of information that could be transmitted is a "combination of..." facsimile, data transmission, telephony, video. D1W is not included in Section 87.137(a).

The current Aero-H, Aero-I, and Aero-L services employ phase modulation which is listed in Section 87.137(a) as G1D, G1E, and G1W (depending on the type of information transmitted as defined in Part 2.201) and are authorized for aircraft earth stations. The authorized bandwidth for these emissions (above 50 MHz) is 25 kHz. Section 87.137(a) does not authorize a bandwidth greater than 25 kHz for aircraft earth stations.

Given that the Swift64 16QAM symbol rate is 33.6 ksps, its bandwidth would obviously exceed a 25 kHz bandwidth. An adequate bandwidth for 16QAM in this application, as filed with the International Telecommunication Union (ITU), is 45 kHz.

Conclusion

A waiver to approve 16QAM with a symbol rate of 33.6 ksps for commercial use in aeronautical satellite communications equipment, specifically, in this case, the Honeywell/Thales HD-128 transceiver, is needed to complete application for FCC certification.

Honeywell International, Inc. is, therefore, requesting a waiver to allow the use of the D1W emission type, specified in Part 2.201, for 16QAM subject to the same 60W power limitation specified in Section 87.131 for Aircraft Earth Stations.

Honeywell International, Inc. is also requesting a waiver of the rules in Section 87.137(a) to permit an authorized bandwidth of 45 kHz for the emissions designator D1W for use by Aircraft Earth Stations utilizing 16QAM in the Inmarsat Swift64 service.

Respectfully submitted,

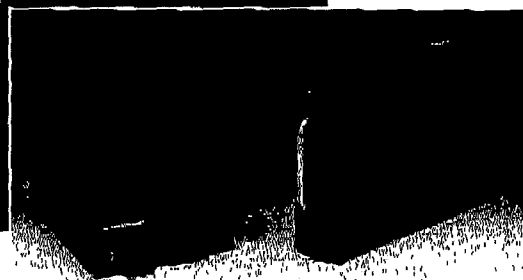
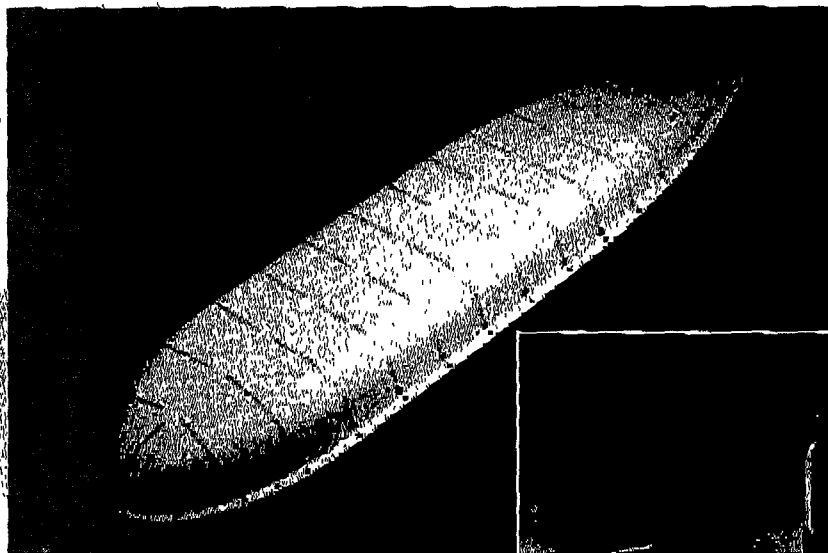
Honeywell International, Inc.

Charlie Dossdall

Charlie Dossdall

Technical Manager Satcom Hardware

CMA-2102



Satcom High Gain Antenna System

A high gain, electronically steerable, phased-array antenna providing hemispherical coverage in a single, low-profile installation.

- Supports Inmarsat Aero-H, Aero-H+ and Swift64 satellite communications services
- Exceeds Inmarsat performance specifications
- Field-proven reliability: MTBFs in excess of 100,000 hours
- Market leader with over 70% marketshare
- Top-mounted antenna with single Beam Steering Unit and Diplexer/LNA
- No coverage blind spots (keyholes)
- True top-mount design virtually eliminates multipath interference
- Conforms to ARINC 741 and Inmarsat SDM
- Only one RF interconnection, for easy installation
- Comprehensive Built-In Test (BIT) with easy to access, front diagnostic BSU port available to maintenance personnel

**CMC electronics**

A World Leader in High-Technology Electronic Products for the Aerospace and Communications Markets

CMA-2102 SATCOM HIGH GAIN ANTENNA SYSTEM - SPECIFICATIONS

FREQUENCY

Receive 1525.0 MHz to 1559.0 MHz
Transmit 1626.5 MHz to 1660.5 MHz

SERVICE COVERAGE

Seamless coverage, independent of aircraft direction over more than 90% of the specified Inmarsat hemisphere. No keyholes. Conforms to ARINC 741.

GAIN

Between 12 dBiC and 17 dBiC over 90% of the Inmarsat hemisphere. Minimum 9 dBiC over 100% of the Inmarsat hemisphere.

POLARIZATION PERFORMANCE

Right hand circular. Axial ratio is less than 6.0 dB for all steering angles and all frequencies of operation within coverage region.

MULTIPATH REJECTION

Exceeds 12.9 dB rejection at 5 degrees elevation.

BEAM SWITCHING

50 microseconds maximum.

SATELLITE DISCRIMINATION (SIDELOBE SUPPRESSION)

Exceeds 13 dB over coverage region.

AERODYNAMICS

The radome shape has been chosen to optimize aerodynamic performance. Equivalent fuel burn penalty: 0.04%.

INSTALLATION

Single top-mounted antenna requires only one 1" (25 mm) diameter access hole for RF and power/control cables. Easy connector access via removable panel. Single Beam Steering Unit can be located up to 100 ft. (30 m) remote.

OPTIONS

Adapter plates, connector kits and mounting racks available on request.

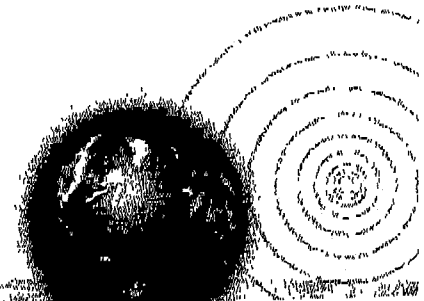
UNIT CHARACTERISTICS

	High Gain Antenna	Beam Steering Unit	Diplexer / LNA
Length	67" (170.2 cm)	2 MCU	11.05" (28.1 cm)
Width	18.5" (47 cm)		7.76" (19.7 cm)
Height	4.75" (12.1 cm)		1.97" (5 cm)
Weight	61.5 lb (27.9 kg)	6.0 lb (2.7 kg)	6.5 lb (3.0 kg)
Form Factor	ARINC 741 compliant		
Power Consumption	45 Watts maximum	12 Watts maximum	12 Watts maximum

CMC electronics

CMC Electronics Inc., 600 Dr. Frederik Philips Boulevard, Ville Saint-Laurent, Quebec, Canada H4M 2S9
Tel: (514) 748-3043 Fax: (514) 748-3055 www.cmcelectronics.ca

For information purposes only. To accommodate product improvements, specifications are subject to change without notice.
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17 October 2007

ATTN: Mr Ken Crumbacker
FCC
PO Box 358-130
Pittsburg, PA 15251-5130
USA

Dear Mr Crumbacker

**Re: Request for a Waiver of Part 87 Rules to Allow Type Acceptance of
Honeywell Aeronautical Satellite Communications System Terminal utilizing
Inmarsat's Swift64 Service**

Inmarsat is writing in support of Honeywell's request for a waiver of Sections 87.131, and 87.137(a) of the Federal Communications Commission's (FCC) rules to permit certification of Honeywell/Thales' aeronautical satellite communication transceiver Type HD-128. The FCC reference ID is GB8HD-128. Honeywell wish to market and sell this transceiver to support Inmarsat's aeronautical data communication service known as 'Swift64'. Inmarsat is convinced that the grant of this waiver would be in the public interest and urges the Commission to agree to Honeywell's request.

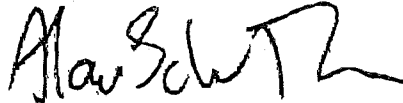
I note that the FCC granted Rockwell Collins an equipment authorization AJK8221772 dated 21 April 2003 for equivalent 'Swift64' aeronautical equipment to that which Honeywell are requesting a waiver for, and that Rockwell Collins also requested similar part 87 waivers.

Permitting the use of Swift64 services in the Aviation Service will not cause harmful interference to safety-of-life satellite users, Radio Astronomy, or other aeronautical mobile satellite users, as the technical requirements related to spurious emissions and Priority and Pre-emption as currently stated in Part 87 are met. This waiver request is only to allow use of the emissions type, and occupied bandwidth associated with the Swift64 service. While these parameters are necessary to limit adjacent channel interference, Inmarsat has filed the appropriate technical parameters with the ITU to ensure non-interference with adjacent L-band operators.

Inmarsat has designed the Swift64 service specifically for aeronautical use. A priority and pre-emption mechanism means that an Aero H/H+ call will pre-empt if necessary, the Swift64 traffic in order to gain access to system resources. This follows the ICAO Annex 10, Volume III AMSS SARPs requirements.

In summary, we believe that Inmarsat Swift64 service is a significant step forward in the provision of aircraft communication service, both in performance and cost, and that the technical issues outlined in the Honeywell request have been adequately dealt with. Accordingly we fully support the Honeywell request for a waiver of Part 87 rules.

Yours sincerely

A handwritten signature in black ink, appearing to read "Alan Schuster Bruce". The signature is stylized with a large, sweeping "A" and a long, horizontal stroke at the end.

Alan Schuster Bruce

Manager, Aeronautical Product Engineering

Tel +44 20 7728 1161

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