



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Telecommunications and**  
**Information Administration**  
Washington D.C. 20230

**DATE:** September 02, 2003

**TO:** Richard Lancaster  
Chairman, SPS

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**SUBJECT:** NTIA Preliminary Assessment of the Air Force's Honeywell Next Generation  
ACAS II, Stage 4

## **INTRODUCTION**

This memorandum presents the results of the NTIA preliminary assessment of the Air Force request for Stage 4 review of the Honeywell Next Generation ACAS II. The goal of this system is to provide traffic alert and collision avoidance protection per FAA and European Civil aviation requirements. This system is being developed as the next generation Traffic Alert and Collision Avoidance System (TCAS) for all transport, business, and regional aircrafts while serving as the base system for military TCAS derivatives including the MILACAS-XR and MILACAS-FR. This system will be operational on over 3000 aircrafts. The cost is estimated to be less than \$10 million with operations at Stage 4 conducted in the US&P and worldwide.

Spectrum certification issues are discussed hereinafter.

**Technical & Operating Characteristics Summary:**  
**Honeywell Next Generation ACAS II**

**Table 1**

Requested Frequency Band (MHz)	Mean Power (watts)	Functions	Service and Station Class (Stage 4)	Emission Designators
1090 (Receive only)	N/A	Interrogator	Aeronautical Radionavigation, AM	14M0K1D 14M0V1D
1030	0.8			10M0K1D 10M0V1D

**Table 2**

Honeywell Next Generation ACAS II Assessment Summary Stage 4		
ISSUES	FINDINGS	REMARKS
<b>Data Adequacy</b>	Y   N <input checked="" type="checkbox"/> <input type="checkbox"/> Adequate per Chapter 10 of the NTIA Manual	Related: SPS-13944  Per SPS-13944, the Air Force has requested a Stage change from Stage 3 to Stage 4 that has been principally agreed upon by the FAA.  Per conversations with the Air Force, the 2 <sup>nd</sup> , 3 <sup>rd</sup> , and other harmonic levels of the subject system's transmitter should read -83 dB instead of -30 dB from the original submission.
<b>Allocations Conformance</b>	<b>FREQUENCY: 960-1215 MHz</b>  NATIONAL: Y   N   Primary   Secondary <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	Pertinent Footnotes are: 5.328, US224 (See Endnote 1)

Table 2 (continued)

Honeywell Next Generation ACAS II Assessment Summary, Stage 4 (continued)			
ISSUES	FINDINGS	REMARKS	
Spectrum Standards Conformance	<b>FREQUENCY TOLERANCE:</b>  Y N <input checked="" type="checkbox"/> <input type="checkbox"/> Conforms	Applicable Standard is Section 5.2.1 of the NTIA Manual  <u>NG ACAS II</u> <u>NTIA Standard</u>  20 ppm                      194 ppm	
	<b>PRIMARY EMISSION:</b>  Y N <input type="checkbox"/> <input checked="" type="checkbox"/> Does not conform	Applicable Standard is Subsection 5.2.2.2 of the NTIA Manual.  The Primary emissions, 10M0K1D and 10M0V1D (same emission envelope), do not conform to the NTIA Subsection 5.2.2.2 Standard, as shown in Figure 1. (See Endnote 2)	
	<b>HARMONIC LEVELS:</b> 2 <sup>nd</sup> , 3 <sup>rd</sup> & other Y N	<u>NG ACAS II</u> <u>NTIA Standard</u>	
	<input checked="" type="checkbox"/> <input type="checkbox"/> Conforms	2 <sup>nd</sup> : -83 dB	-43 dB
	<input checked="" type="checkbox"/> <input type="checkbox"/> Conforms	3 <sup>rd</sup> : -83 dB	
	<b>SPURIOUS LEVELS:</b> Y N	<u>NG ACAS II</u>	<u>NTIA Standard</u>
	<input checked="" type="checkbox"/> <input type="checkbox"/> Conforms	-90 dB	-43 dB

Table 2 (continued)

Honeywell Next Generation ACAS II Assessment Summary, Stage 4 (continued)		
ISSUES	FINDINGS	REMARKS
<b>Radiation Hazard</b>	The Honeywell Next Generation ACAS II is expected to produce power densities in excess of both the 10 mw/cm <sup>2</sup> criterion of 29 CFR 1910.97, and the ANSI standard C95.1 criterion of 3.43 mW/cm <sup>2</sup> at a frequency of 1030 MHz, at distances less than 1 meter from the antenna in the mainbeam.	Input data used: NG ACAS II Antenna Average power: 0.8 W Antenna gain: 3.6 dBi Frequency: 1030 MHz
<b>Applicable Policy</b>	Section 1.4.1 of the NTIA Manual applies.	See Endnote 3.
	The Honeywell Next Generation ACAS II operations are subject to coordination with the FAA Regional coordinators in accordance with section 8.3.16 of the NTIA Manual.	See Endnote 4.
<b>EMC</b>	<p>Unclassified Assignment Statistics from the Government Master File for the operation on the Frequency of 1030 MHz.</p> <p>No unmanageable EMC problems are expected for this system provided the Air Force follows established frequency assignment and coordination procedures.</p>	<p>There are 974 total assignments in the US&amp;P. The following agencies holding the majority of the assignments are:</p> <p>479 FAA assignments (Almost all Radionavigation Land Stations). 441 Department of Defense assignments (Mostly Radionavigation Land Stations).</p> <p>In addition to U.S. assignments, the GMF contains 1 Canadian assignment.</p>

## CONCLUSION

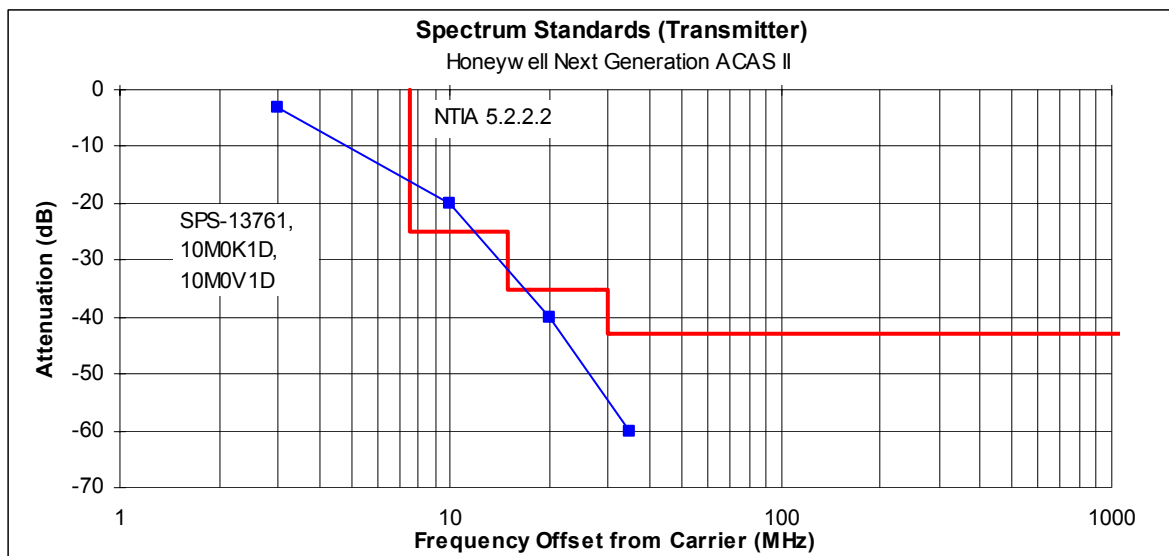
The Air Force Honeywell Next Generation ACAS II does not strictly conform to NTIA emission standards; specifically, the primary emissions of this system exceed recommended limits. Therefore, Air Force should be aware that if any unwanted emission results in harmful interference to other systems, the responsibility for eliminating harmful interference shall rest with the agency operating in non-conformance. Spectrum resources adequate to support the subject system at Stage 4 are expected to be available in accordance with conditions set forth in the attached draft certification.

## ENDNOTES

1. **5.328** The use of the band 960-1215 MHz by the aeronautical radionavigation service is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities

**US224** Government systems utilizing spread spectrum techniques for terrestrial communication, navigation and identification may be authorized to operate in the band 960-1215 MHz on the condition that harmful interference will not be caused to the aeronautical radionavigation service. These systems will be handled on a case-by-case basis. Such systems shall be subject to a review at the national level for operational requirements and electromagnetic compatibility prior to development, procurement or modification.

2. Although the primary emissions of the Next Generation ACAS II do not conform to Subsection 5.2.2.2 of the NTIA Manual unwanted emission standards (as seen in figure 1), they must comply with FAA required spectrum limits for interrogator transmitters. Per conversations with the FAA, the Next Generation ACAS II primary emissions meet the applicable constraints for unwanted emissions.



**Figure 1**

3. Section 1.4.1 of the NTIA Manual specifies that the Aeronautical Assignment Group (AAG) chaired by the Federal Aviation Administration is responsible for engineering AAG frequency assignment action regarding the frequencies 1030 and 1090 MHz.
4. Section 8.3.16 of the NTIA Manual provides guidance for field level use of the 1030 and 1090 MHz frequencies on which the Honeywell Next Generation ACAS II operates. In particular, agencies requiring the use of 1030 MHz for interrogators or 1090 MHz for ground transponders are advised of the requirement to cooperate with the FAA in coordinating, selecting and controlling critical operational parameters to provide optimum sharing and maximum assurance of compatible operations. The policy also defines requirements for coordination with FAA regional coordinators. Annex D of the NTIA Manual provides supplemental information to assist agencies in coordinating transponder operations using the subject frequencies. The Air Force's Honeywell Next Generation ACAS II's system operations will be subject to these coordination requirements.

FORM NTIA-44 (3/91)		U.S. DEPARTMENT OF COMMERCE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION		Classification <b>UNCLASSIFIED</b>	Control Number <b>SPS-13xxx</b> <b>FAS ADM xxxxxx/x</b> <b>EPS-xxx</b>
<b>CERTIFICATION OF SPECTRUM SUPPORT</b>					
Recipient Agency Air Force		System Honeywell Next Generation ACAS II			Stage of Review 4 - Operational
<b>Section 1: OPERATING CHARACTERISTICS FOR WHICH SUPPORT IS CERTIFIED</b>					
Frequency (MHz)	Emission	Mean Power (watts)	Station Class (Stage 4)	Operating Location	
1030	10M0V1D 10M0K1D	0.8	AM	US&P	
1090 (Receive only)	14M0V1D 14M0K1D	N/A			
<b>Section 2: SOURCE DOCUMENTS</b>					
Docket Number	Description of Document				Dated
SPS-13958	NTIA Preliminary Assessment				September 02, 2003
SPS-13761	Air Force Request for Stage 3 Support				April 29, 2003
SPS-13944	Air Force Request for Stage change from Stage 3 to Stage 4				August 27, 2003
<b>Section 3: SPS RECOMMENDATIONS</b>					
<p>The Spectrum Planning Subcommittee has reviewed this system under the provisions of Chapter 10 of the NTIA Manual and recommends that:</p> <ol style="list-style-type: none"><li>1. NTIA certify Stage 4 spectrum support for the Honeywell Next Generation ACAS II as specified in Section 1.</li><li>2. Air Force be aware that this system must operate under Section 5.1.2 of the NTIA Manual due to non-conformance with the NTIA Manual Section 5.2.2.2 unwanted emission standard.</li><li>3. Air Force coordinate this system's operations with the FAS Aeronautical Assignment Group (AAG) and with the FAA in accordance with Sections 1.4.1 and 8.3.16 of the NTIA Manual.</li><li>4. Air Force be responsible for upgrading the Honeywell Next Generation ACAS II hardware and software, as necessary, to maintain compliance with current U.S. civil aviation standards.</li><li>5. Air Force ensure that personnel are protected from radiation levels that exceed generally accepted exposure levels.</li></ol>					
Name/Title of Recommending Official		Signature			Date
Richard A. Lancaster, Chairman Spectrum Planning Subcommittee					
<b>Section 4: NTIA CERTIFICATION</b>					
<p>The office of Spectrum Management certifies Stage 4 spectrum support for this system. This office concurs with the SPS recommendations in Section 3.</p>					
Name/Title of Certifying Official		Signature			Date
Karl B. Nebbia Deputy Associate Administrator					
Downgrading Instructions			Classification	Distribution	
			<b>UNCLASSIFIED</b>	IRAC, SPS, FAS	