

800-HDBK-0001B

SUBORBITAL AND SPECIAL ORBITAL PROJECTS DIRECTORATE

**Wallops Flight Facility
Frequency Utilization Management
Handbook**

**Version B
Effective April 15, 2004
Expiration April 15, 2009**

Signature on file

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Suborbital and Special Orbital Projects Directorate



National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337

Change History Log

Revision	Effective Date	Description of Changes
Baseline	08/1992	Original
A	04/1993	Revision
B	04/15/2004	Revised all sections in handbook

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Wallops Flight Facility Frequency Utilization Management Handbook

1. INTRODUCTION

The Suborbital and Special Orbital Projects Directorate (SSOPD) (Code 800) is responsible for managing radio frequency (RF) spectrum* utilization at the Goddard Space Flight Center/Wallops Flight Facility (GSFC/WFF). The Wallops Frequency Utilization Management Working Group (WFUMWG) helps to meet this responsibility. The Working Group includes representatives from the SSOPD, Applied Engineering and Technology Directorate (AETD) (Code 500), Surface Combat Systems Center (SCSC), and National Oceanic and Atmospheric Administration (NOAA) Wallops Command Data Acquisition (CDA) Station. The WFUMWG operates under the Charter provided in Appendix A.

2. PURPOSE

This manual is issued by the SSOPD at WFF and establishes the responsibilities and procedures for management and coordination of RF spectrum utilization at GSFC/WFF.

The manual does not contradict or supersede the responsibilities or authority of the Assistant Secretary of Commerce for Communications and Information or the Federal Communications Commission (FCC). Normally, this manual will have little impact on GSFC/WFF organizations' internal procedures for spectrum coordination, management, assignment, or allocation.

Optimum use of the RF spectrum with minimum interference for host and/or tenant operations at WFF will require effective planning, coordination, and cooperation of the Working Group members and their supporting organizations.

3. MEETINGS

The WFUMWG will meet at scheduled or unscheduled times as determined by priorities and workloads. Problems warranting immediate attention that cannot be resolved by telephone, electronic mail (email), or other one-to-one personal communications will justify convening special meetings at any time needed.

Any member of the Working Group can initiate a meeting. Meetings will be open (by invitation) to customers, technical experts, or anyone who will aid in the performance of the Working Group's duties.

Meetings will be convened to coordinate the frequency activities of member organizations and other users, for transferring data, and for formulating recommendations for the Director of SSOPD on matters of significant interest or importance.

* The terms "radio frequency," "frequency," and "spectrum" are interchangeable for purposes of this document.

4. RADIO FREQUENCY SPECTRUM UTILIZATION

Every new frequency radiated from Wallops Flight Facility property shall be authorized according to the procedures in this manual. Additionally, a valid authorization is required from either the National Telecommunications and Information Administration (NTIA) or the FCC. It is the responsibility of the user to determine that the NTIA or FCC assignment does exist and is current. It is also the responsibility of NASA/tenant organizations to ensure that contractors and subcontractors under their jurisdiction abide by the requirements of this manual.

The guidelines delineated in the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management (<http://www.ntia.doc.gov/osmhome/redbook/redbook.html>) should be considered when selecting discrete frequencies or bands of the spectrum for use at Wallops. The impact on currently used frequencies, as well as known frequencies that will be used in the future, should also be considered. Projected areas of spectrum usage should be identified as soon as these data are available. Maximum lead-time is desirable to allow impact studies and alternate planning when conflicts are indicated. When there is a known conflict between two or more frequencies to be used at Wallops by two or more organizations, every effort should be made to resolve this conflict before making formal application for the frequencies. If the frequencies have already been assigned, an effort should be made to resolve the conflict before scheduling is requested for operations at Wallops. This effort will allow organizations to arrive at their own solutions and not place the burden on the WFF Test Director to satisfy two groups with conflicting operational requirements. Options to avoid conflicts include changing one or more frequencies, requesting scheduling of operations during non-conflicting time slots, or planning hardware to tolerate the expected interference; e.g., installing filters, changing radiated power, or modifying antenna configurations.

Frequencies used for “receive only” do not require authorization to be used at WFF; however, it is strongly recommended that a FREQUENCY UTILIZATION REQUEST AND INSTRUCTIONS form (Appendix B) be completed and forwarded to the Chair, WFUMWG, if the receive frequency should be given maximum consideration for radio frequency interference (RFI) protection. The FREQUENCY UTILIZATION REQUEST and a FREQUENCY RECOMMENDATIONS FORM (Appendix C) will then be forwarded to the WFUMWG members for comments and entered into the appropriate database. This information can then be considered during range operations scheduling when requested.

5. RADIO FREQUENCY SPECTRUM APPROVAL PROCEDURES

Careful consideration should be given to the choice of new frequencies. The inherent right of the station first installed at a specific location to operate free from harmful interference is recognized by federal regulations. It is the responsibility of the requestor to identify, to the best of his/her ability, any potential interference problem with existing frequencies being used in the area.

Requests for frequency assignments to be used at Wallops will normally originate from two places:

- A higher organizational level, usually in Washington, DC, where frequency is selected, applied for, and assigned without inputs from the local level of the organization, or
- A local level where the user can participate in the selection of the frequency.

5.1 PREVIOUSLY ASSIGNED RF SPECTRUM APPROVAL PROCEDURES

When a frequency assignment has been acquired at a higher organizational level or from any other source where an opportunity for local participation in its selection has not been possible, it must be submitted to the WFUMWG for review relative to its impact on operations at Wallops. Following is the procedure for submission to and review by the WFUMWG:

1. The FREQUENCY UTILIZATION REQUEST (Appendix B) must be used for documenting the pertinent data on the frequency and requesting authorization to use it at Wallops.
2. The WFUMWG will complete the FREQUENCY UTILIZATION RECOMMENDATIONS (Appendix C) after review and evaluation, including consultation with appropriate technical and management levels of each member organization to assess the impact of the frequency on their operations at Wallops.
3. The WFUMWG will forward the FREQUENCY UTILIZATION REQUEST, FREQUENCY UTILIZATION RECOMMENDATIONS, and RF RADIATION HAZARD EVALUATION FOR WALLOPS FLIGHT FACILITY (Appendix D) to the Director of SSOPD.
4. The Director of SSOPD will further evaluate these documents and issue a CONDITIONAL AUTHORIZATION FOR RF RADIATION AT THE WALLOPS FLIGHT FACILITY (Appendix E). This form will be used to document the known operational restrictions or constraints on using the frequency at Wallops. Due to the dynamic nature of the RF environment at Wallops, these operational restrictions or constraints are subject to reevaluation and change as range configuration dictates.
5. The WFF Test Director will schedule operations based on the CONDITIONAL AUTHORIZATION FOR RF RADIATION AT THE WALLOPS FLIGHT FACILITY.

Figure 1 depicts the procedures necessary to obtain authorization for radiation of frequencies that have been assigned without local participation in their selection.

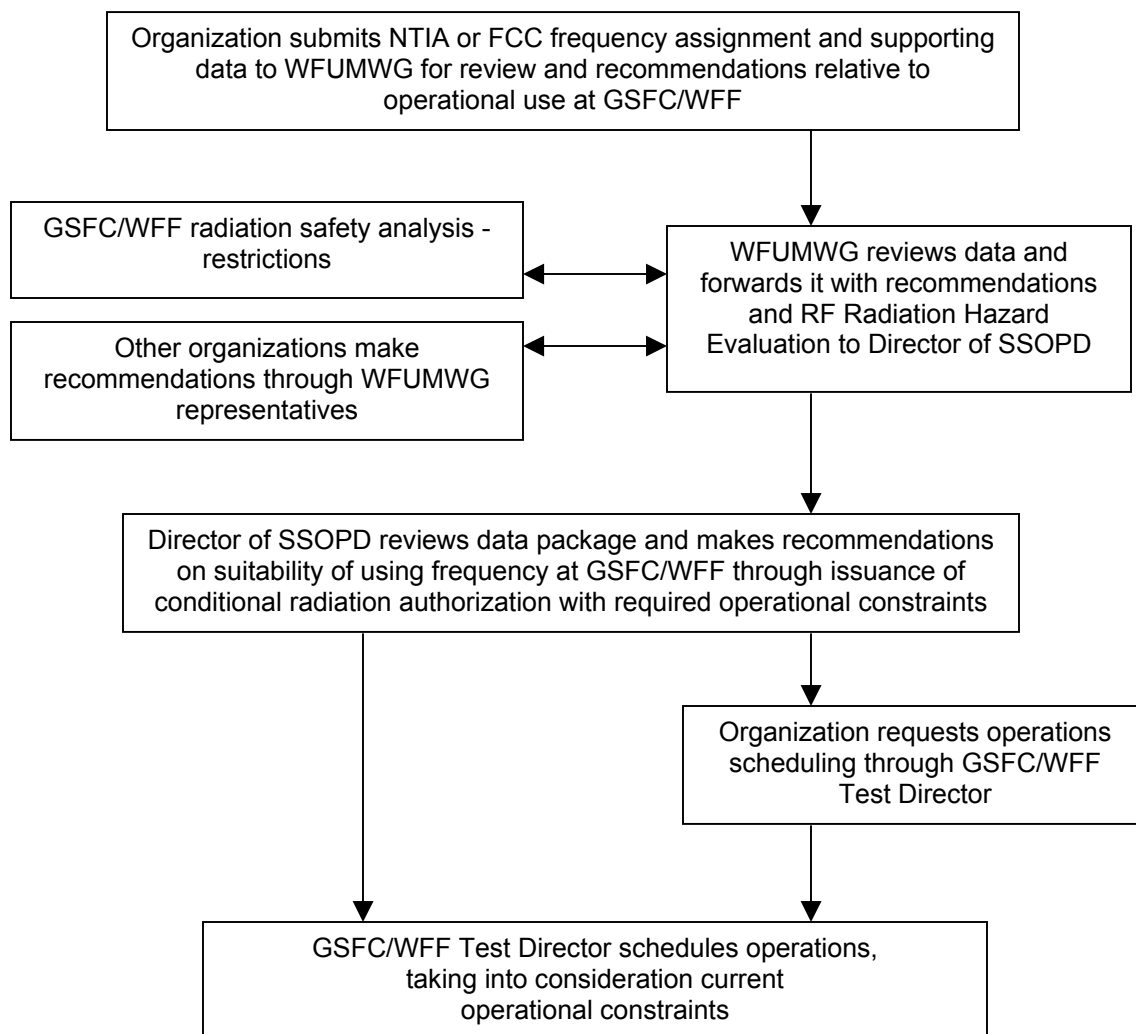


Figure 1. Procedure for Obtaining Authorization to Use Existing Frequencies Assigned Without Local Participation

5.2 LOCAL RF SPECTRUM APPROVAL PROCEDURES

In cases where selection of a frequency is made at the local level of an organization, the request, recommendations, hazard evaluation, and conditional authorization forms will be completed and processed similar to the procedure described in the preceding paragraphs. Following are points to consider when requesting a local RF spectrum utilization:

1. Occasionally, the local **CONDITIONAL AUTHORIZATION FOR RF RADIATION AT THE WALLOPS FLIGHT FACILITY** may include a recommendation not to proceed with the acquisition of the specified frequency. This will occur only in cases where the frequencies and supporting data indicate it will not be feasible to schedule operational use of the frequency in a reasonable or workable manner. This recommendation will be based on inputs from all WFUMWG members and should be given significant weight by

the requesting organization when the decision is made to proceed with a formal request to NTIA or FCC for frequency assignment.

2. In a case where the selected frequency is in conflict with another organization's best interests, it is probable that organization's NTIA or FCC representative will oppose the assignment at the NTIA or FCC level. It can also be anticipated that there will be severe scheduling difficulties when brought into operational use at Wallops.
3. After receipt of a NTIA or FCC assignment, the organization can request scheduling of operations at Wallops through the WFF Test Director. The Test Director will consider all current operational constraints when scheduling these operations.

Figure 2 depicts the major steps necessary to obtain authorization for radiation of frequencies that are selected at a local organization level.

5.3 ADMINISTRATIVE CONSIDERATIONS

A file number will be assigned to each frequency action form (appendixes B through E) to relate authorizations to supporting recommendations and technical data. An equipment code will be assigned to each frequency for the associated transmitting/receiving equipment. This code will appear on the authorization form (Appendix E) and in the database maintained at Wallops.

RFI and safety related factors are given prime consideration in authorizing frequencies to be radiated at Wallops. Changes in authorized RFI and safety parameters will require the frequency utilization request be resubmitted for evaluation and authorization.

Regardless of planning, there will be cases when it will be necessary to radiate without going through normal time consuming approval procedures to allow an operation to proceed as scheduled. These cases occur when an operation is imminent or in progress, when it cannot reasonably be delayed, and when it has been determined that the required authorizations are not available. This situation usually results from real-time changes in such things as frequencies, systems, or participants or from incomplete planning. There are other infrequent cases when it is expedient to radiate without going through the normal approval procedure because the magnitude of the effort outweighs the need for the procedure. This is justified only when the requested radiation period is very short and the potential for RFI or safety problems is insignificant. Upon receipt of data related to the required frequencies, the WFUMWG Chair will make an assessment of RFI or safety considerations and will consult in real time with the appropriate Safety personnel and users of potentially conflicting systems. If warranted, he/she will give temporary unwritten authorization to use the required frequency.

The WFUMWG Chair is authorized to issue temporary unwritten authorization to radiate for the purpose of making radiation hazard measurements to determine radiation hazard restrictions. This will be done under direction of Safety personnel with consideration of RFI impact on systems in use at Wallops.

The WFUMWG Chair is authorized to extend the dates of frequency authorizations for reasonable periods when changes in projects/operations require additional time or rescheduling

to a later date. This will only be done when there are no significant changes in frequencies or equipment parameters or impact on other range users' systems.

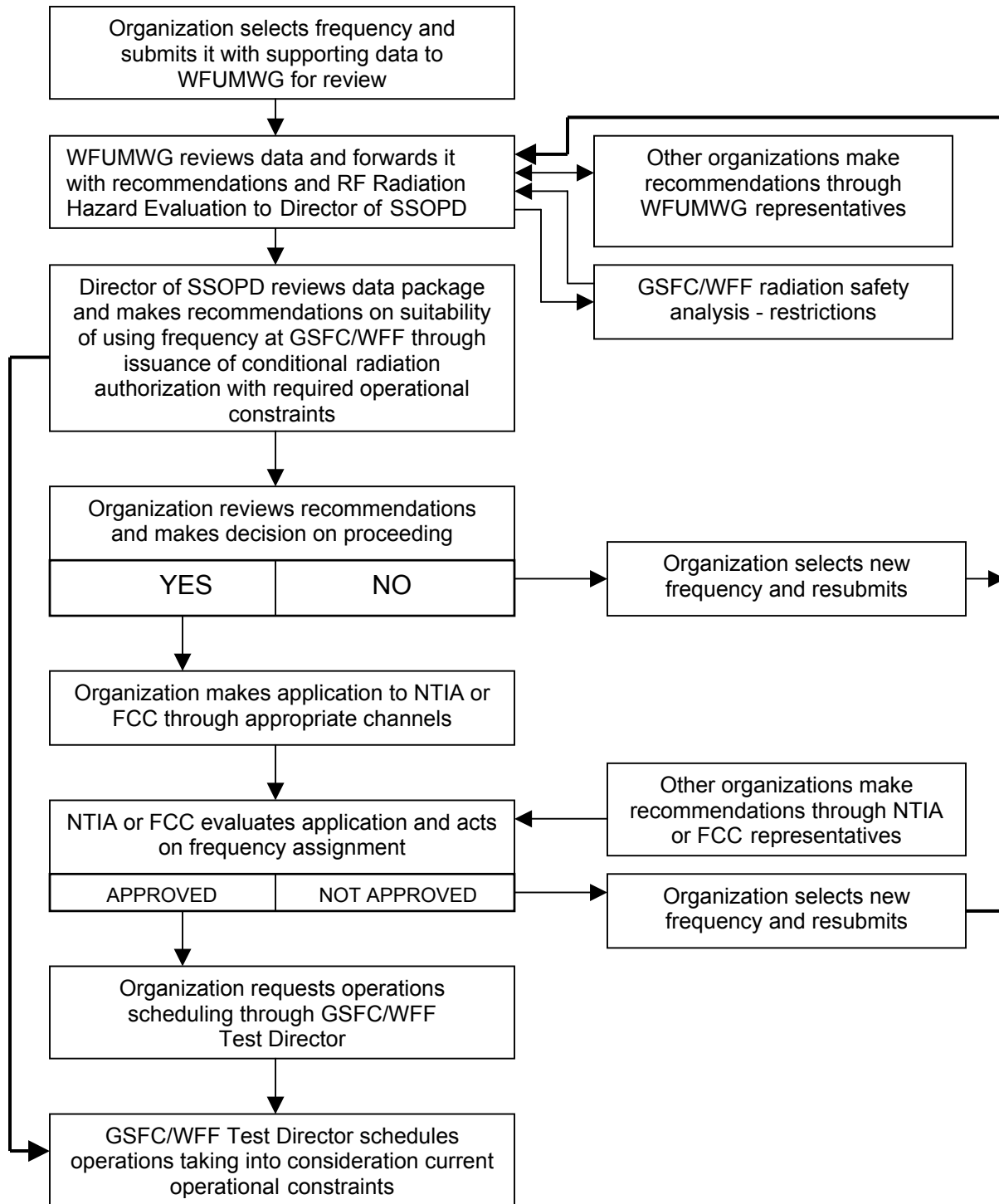


Figure 2. Procedure for Obtaining Authorization to Use Locally Selected Frequencies

6. RADIATION SAFETY

To maintain a hazard free RF environment at Wallops, each FREQUENCY UTILIZATION REQUEST received by the WFUMWG Chair will be routed through the WFF Safety Office (Code 803). The Safety Office will analyze the frequency data relative to hazards of electromagnetic radiation to personnel (HERP) and to electro-explosive devices (ordnance) (HERO). Restrictions will be issued, when necessary, on the use of the frequency. These restrictions will be made part of the CONDITIONAL AUTHORIZATION FOR RF RADIATION AT THE WALLOPS FLIGHT FACILITY and must be observed by the frequency user.

7. RADIO FREQUENCY QUIET ZONE

An RF quiet zone is a controlled area set up to protect sensitive RF receiving systems from interference. An RF quiet zone surrounds the Orbital Tracking and Range Telemetry stations on Wallops Main Base to provide protection for the receiving systems at those stations. RF quiet zone notification signs are located on access roads leading into the area. Radiating in this zone requires special authorization and must be coordinated with the WFF Test Director or Spectrum Manager in advance.

8. AMATEUR/CITIZEN BAND TRANSMITTERS, CORDLESS/CELLULAR TELEPHONES

Operation of amateur band transmitters is not allowed on Wallops. Citizen band transmitters are allowed to operate with legal FCC limitations. Cordless or cellular telephones are allowed on the condition that they do not generate harmful RFI to RF systems at Wallops. In the event that harmful interference is received from these telephones, the owner/operator will be required to change channels, when possible, to a non-interfering frequency. If this is not possible, the telephone will have to be replaced with a phone that does not generate RFI that affects NASA/tenant systems.

9. LASERS

Requests for conducting laser operations at Wallops are reviewed in a manner similar to that used with radio frequencies. However, there are several additional coordination requirements that must be completed prior to their use.

The FREQUENCY UTILIZATION REQUEST should be completed using parameters and units appropriate to the operation of lasers. The Safety Office will review the operational parameters to determine if the laser beam will be confined to the aircraft warning/restricted areas normally used during operations. If it will be, the WFF Test Director will activate the area for laser operations. If it cannot be confined to these areas, the user must provide the Federal Aviation Agency (FAA) with certain specific information relative to the proposed operations. This is required at least three weeks prior to operations. USSTRATCOM, in conjunction with the Air Force Space Command, also reviews all laser operations to determine the possibility of being a threat to satellites. A form must be completed and forwarded to them for review prior to operation of the laser. The FAA or USSTRATCOM, after reviewing the data, may require that certain constraints be applied to the use of the laser. Two additional forms must be filled out for the Wallops Institutional Safety Group to be forwarded to the Laser Safety Officer at GSFC in Greenbelt, Maryland, for review and approval.

Forms and addresses for coordination with other organizations may be obtained from the WFUMWG Chair.

10. RADIATION COORDINATION

The WFF Test Director will be responsible for coordination of all RF radiation at Wallops. In order for range activities to be properly scheduled, he/she must be aware of all RF radiations that have the potential of affecting operations at Wallops. This awareness includes all radiation from systems at Wallops that are used in routine day-to-day operations, radiation from unique sources that are used on an infrequent or irregular basis, and those originating from sources outside of Wallops.

Standard operating procedures require that, on a daily basis, most frequencies to be radiated from Wallops must be coordinated with the WFF Test Director or his/her representative. Coordination is also required for use of receiving frequencies when RFI protection is desired. Coordination of frequencies associated with selected systems, such as the FM Mobile Radio system, microwave links, etc., will not be required due to the impracticality of scheduling their operations.

Frequency, radiation period, and equipment code data should be provided to the WFF Test Director when scheduling is requested. Unless a frequency has specifically been exempted, coordination is required. At his/her discretion, depending on the frequencies involved, range configuration, ongoing projects, etc., the WFF Test Director can request less frequent or more frequent coordination. This coordination will be by way of telephone unless security considerations, quantity, or criticality of data warrant coordination by meetings or by hard copy. Requirements to radiate when the Range Control Center is not manned, i.e., after work hours, weekends, and holidays, should be coordinated through the shift supervisor at the Wallops Orbital Tracking Station (757-824-2375).

It will be necessary to require RF silence of all or selected parts of the spectrum when certain operations involving ordnance, command functions, or other sensitive/critical areas of range operations are scheduled. Requirements for RF silence should be identified sufficiently in advance to allow schedules to be adjusted to accommodate the request. The Wallops Test Director has the responsibility for coordinating with the proper organizations/functional groups to ensure that silence is effected. The Wallops Test Director will confirm RF silence to the requestor immediately before the scheduled period.

While it is recognized that Wallops Flight Facility has no jurisdiction for authorizing or controlling other organizations' radiations beyond the limits of Wallops Flight Facility real estate, there is concern that these radiations may cause RFI to tenants and range users. Therefore, Wallops requests that all data be provided on all frequencies used with programs involving GSFC/WFF when they are to be used in the surrounding area, including airspace. If they have the potential for causing RFI, they will be considered during scheduling.

In the event that a conflict of frequencies, scheduling, etc., becomes apparent at a time immediately before or during an operation and cannot be resolved otherwise, the Wallops Test Director will make the immediate determination of who will radiate from Wallops. He/she will

then determine under what conditions the radiation will take place. When adequate time is available, scheduling procedures will be used to determine priorities. Critical frequencies used by NOAA Wallops CDA Station for operational support of satellites will be given top priority. NOAA Wallops CDA Station will not be required to terminate scheduled radiations except in the case of an emergency that cannot be predicted in advance. The Director of SSOPD will order termination only after appropriate consideration and consultation with the NOAA Wallops CDA Station Manager.

11. RF INTERFERENCE

- A. Potential Interference: All potential (predictable or anticipated) interference problems should be brought to the WFUMWG's attention as soon as it is apparent this possibility exists. Every effort should be made to avert the potential problems before they develop by changing frequencies, schedules, etc. Unresolved problems should be brought to the attention of the appropriate organizations' managers or operations personnel.
- B. Real-Time Interference: The resolutions of real-time interference problems should be expedited by whatever reasonable methods are available. When circumstances warrant and the exact source of interference is known, direct communications between the operational personnel involved should be attempted as a fast resolution with follow-up coordination with the appropriate frequency manager. If the exact source of interference is not known but is thought to originate from the operations of a known organization, the direct contact should be made with the organization's frequency manager or the Wallops Test Director, as appropriate. He/she should then make the necessary contacts within his/her area of responsibility to determine the source and work for a resolution of the problem. The WFUMWG Chair will maintain a log of the frequency interference problems and solutions reported, either real-time or post operation, verbally or in writing. It is expected that all member organizations will cooperate in the resolution of any type of interference problem when requested. The Wallops Frequency Monitoring Facility can be used, upon request and with proper coordination, as an aid in identifying the interfering source (see section 12).
- C. Unmanned Interference Sources: Transmitters that operate in an unmanned configuration must have a method of disabling the RF output available to NASA/GSFC/WFF. RF radiation termination will be required only in cases where safety problems or uncontrolled RFI exists and the responsible custodian of the system cannot be contacted. Detailed information on the appropriate contacts to be made and the proper methods to be used in shutting down the system should be furnished to the WFUMWG Chair.
- D. Post Operation Interference Solutions: Detailed records should be maintained on interference problems that have occurred during previous operations. When the potential exists for a reoccurrence from the same source, the details should be presented either to a specific frequency manager or to the WFUMWG for consideration and resolution.

12. FREQUENCY MONITORING FACILITY

The GSFC/WFF has a Frequency Monitoring Facility that is capable of monitoring and analyzing the RF spectrum. This facility is dedicated to support NASA, tenants, and other range users' operations and to aid in frequency management. Arrangements for using these capabilities can be made by contacting the Wallops Frequency Manager, Range Control Center operations personnel, or on-site Frequency Monitoring Facility personnel.

13. DATABASE

Wallops Flight Facility maintains a computerized database that includes data on all frequencies that are authorized at GSFC/WFF for transmitting at Wallops and selected ones used for receiving. Included in the database are the more important parameters related to the frequency assignments and the equipment with which the frequencies are used. Any member of the WFUMWG can access the database. Data can be extracted in numerous formats pertaining to the particulars of the assignments or to the associated hardware. Authorized frequency list printouts will be provided periodically to members of the WFUMWG.

The Wallops Test Director uses computer programs known as the "Daily Log" and the "Auto Log" as an aid in frequency scheduling. The Auto Log contains data on frequencies that are exempt from scheduling. When the Wallops Test Director makes entries into the Daily Log, they are automatically compared for conflicts among other entries in the Daily Log, as well as for entries in the Auto Log. The database provides the Wallops Test Director with a list of potentially conflicting systems that will be considered during scheduling.

14. DOCUMENTATION

Complete documentation including all frequency database records, forms (appendixes B through E), interference records, etc., will be retained by the WFUMWG Chair. Copies of all documents will be provided to each Working Group member as required for fulfilling their specified responsibilities.

Appendix A

Charter

Wallops Frequency Utilization Management Working Group (WFUMWG)

Charter

Wallops Frequency Utilization Management Working Group (WFUMWG)

The Wallops Frequency Utilization Management Working Group (WFUMWG) is established to advise the Director of Suborbital and Special Orbital Projects Directorate (SSOPD) on all host, tenant, and other range user activities involving RF spectrum utilization at Wallops Flight Facility. In this advisory capacity, the Group will perform the following functions:

1. Develop and maintain the GSFC/WFF Frequency Utilization Management Handbook.
2. Coordinate RF spectrum utilization planning for new and existing frequencies.
3. Evaluate requests for utilization of specific frequencies and make operational impact recommendations to the Director of SSOPD.
4. Coordinate the operational use of authorized frequencies.
5. Investigate and attempt to resolve RF interference affecting operations at GSFC/WFF.
6. Coordinate, when appropriate, frequency utilization activities at GSFC/WFF with other spectrum users in the surrounding area.
7. Hold periodic meetings for the purpose of performing the above duties.

This Group will consist of the following members, who will serve until relieved by their respective management:

1. GSFC/WFF Spectrum Manager – Chair
2. GSFC/WFF Test Director
3. SCSC Spectrum Manager
4. NOAA Wallops CDA Station Spectrum Manager

Appendix B

WFUMWG Frequency Utilization Request and Instructions

WFUMWG Frequency Utilization Request and Instructions

File No. _____

Requestor (print): _____

Organization: _____

Contact if other than Requestor: _____

Contact phone number: _____

Contact Email: _____

This is a request for review of the indicated frequency for use at Wallops Flight Facility:

1. Frequency:
2. Organization:
3. Project:
4. Specify all coordination requirements for areas or organizations outside Wallops Flight Facility:
5. Specify all coordination requirements for areas or organizations within Wallops Flight Facility (NASA or tenants):
6. Station Class:
7. Bandwidth/Emission:
8. If a frequency band is requested, how does the system operate? On discrete frequencies in the band? Spread spectrum? Frequency hopping? Other?

9. Description of how frequency will be used, method of operation, etc.
10. Period of usage (include overall time frame, days/week, hours/day or projected usage or other narrative description):
11. Transmitter Data
 - A. Nomenclature:
 - B. Location:

- C. Transmitter Peak Power Output:
 - D. Transmitter Average Power Output:
 - E. Pulse Width:
 - F. Maximum Duty Cycle:
 - G. Pulse Repetition Frequency:
 - H. Stability:
 - I. Antenna Type:
 - J. Antenna Height Above Ground:
 - K. Antenna Polarization:
 - L. Antenna Gain:
 - M. Antenna, Fixed or Rotatable:
 - N. Antenna, Beam Width – AZ:
 - O. Antenna, Beam Width – EL:
 - P. Fixed Antenna Direction of Radiation:
 - Q. Transmission System Attenuation Losses:
 - R. Antenna Latitude and Longitude:
12. Receiver Data
- A. Nomenclature:
 - B. Location:
 - C. Stability:
 - D. Sensitivity:
 - E. Antenna Type:
 - F. Antenna Polarization:

- G. Antenna Gain:
 - H. Antenna, Fixed or Rotatable:
 - I. Antenna, Beam Width – AZ:
 - J. Antenna, Beam Width – EL:
 - K. Fixed antenna Direction or Pattern:
 - L. Antenna Latitude and Longitude:
13. Has NTIA or FCC already assigned frequency to organization for area in which it will be used? (See instructions attached.)
14. Miscellaneous Comments:

NASA GSFC/WFF Project Manager/Contact

Date

GSFC/WFF Spectrum Manager

Date

Instructions for Completion of WFUMWG Frequency Utilization Request

General

1. Fill out form as completely as possible. Transmitter and antenna data are required for a safety analysis.
2. Fill out all sections that are relevant to frequency being requested.
3. For laser operations, substitute appropriate parameters and units.
 - If data is not available, use NAV.
 - If data is not applicable, use NAP.

Format

1. Frequency: Self-explanatory.
2. Organization: List organization responsible for the frequency assignment and, if different, also the organization using the frequency, e.g., GSFC/WFF – University of Virginia.
3. Project: Official or common project name, e.g., Vandal Project.
4. Specify all coordination requirements for areas or organizations outside Wallops Flight Facility: This is for coordination before usage of frequencies that are shared in the area affected by the radiated signals.
5. Specify all coordination requirements for areas or organizations within Wallops Flight Facility (NASA or tenants): Same as for 4 above, except for area of applicability.
6. Station Class: As defined by the NTIA manual, e.g., FA (Aeronautical Station).
7. Bandwidth/Emission: As defined by the NTIA or FCC Manual, e.g., 1K24F1B.
8. If a frequency band is requested, how does the system operate? On discrete frequencies in the band? Spread spectrum? Frequency hopping? Other?
Self-explanatory.
9. Description of how frequency will be used, method of operation, etc.:
Self-explanatory.

10. Period of usage (include overall time frame, days/week, hours/day or projected usage or other narrative description): Self-explanatory.

11. Transmitter Data

- A. Nomenclature: Manufacturer, model, military designation, etc.
- B. Location: Physical description of transmitter location, e.g., north end of Wallops Island, building V-25.
- C. Transmitter Peak Power Output: Include power amplifier, if used. Do not include antenna gain.
- D. Transmitter Average Power Output: Include power amplifier, if used. Do not include antenna gain.
- E. Pulse Width: Self-explanatory (for pulsed radiations).
- F. Maximum Duty Cycle: Self-explanatory (for pulsed radiations).
- G. Pulse Repetition Frequency: Self-explanatory (for pulsed radiations).
- H. Stability: Percentage of carrier frequency.
- I. Antenna Type: Give type and size if relevant, e.g., 36-foot dish.
- J. Antenna Height Above Ground: To center of radiating element, dish, etc.
- K. Antenna Polarization: Self-explanatory.
- L. Antenna Gain: Self-explanatory.
- M. Antenna, Fixed or Rotatable: Self-explanatory.
- N. Antenna, Beam Width – AZ: Self-explanatory.
- O. Antenna, Beam Width – EL: Self-explanatory.
- P. Fixed Antenna Direction of Radiation: Provide AZ-EL angles.
- Q. Transmission System Attenuation Losses: Loss in connectors, filters, cables, etc., if significant.
- R. Antenna Latitude and Longitude: Self-explanatory.

12. Receiver Data

- A. Nomenclature: Manufacturer, model, military designation, etc.
- B. Location: Physical description of transmitter location, e.g., north end of Wallops Island, building V-25.
- C. Stability: Local oscillator stability in percentage of tuned frequency.
- D. Sensitivity: Expressed in microvolt or dBm.
- E. Antenna Type: Give type and size if relevant, e.g., 36-foot dish.
- F. Antenna Polarization: Self-explanatory.
- G. Antenna Gain: Self-explanatory.
- H. Antenna, Fixed or Rotatable: Self-explanatory.
- I. Antenna, Beam Width – AZ: Self-explanatory.
- J. Antenna, Beam Width – EL: Self-explanatory.
- K. Fixed antenna Direction or Pattern: Provide AZ-EL angles.
- L. Antenna Latitude and Longitude: Self-explanatory.

13. Has NTIA or FCC already assigned frequency to organization for area in which it will be used? Yes or No. If Yes, provide NTIA serial number or FCC license number.

14. Miscellaneous Comments: Self-explanatory.

Appendix C

Wallops Frequency Utilization Management Working Group Frequency Utilization Recommendations

Wallops Frequency Utilization Management Working Group Frequency Utilization Recommendations

Frequency: _____

File No. _____

The indicated frequency has been submitted to the Wallops Frequency Utilization Management Working Group for consideration for use at the Wallops Flight Facility. The supporting information submitted relative to its use has been evaluated and the following recommendations are made:^{**}

	Recommended	Not Recommended	
NASA/GSFC/WFF Spectrum Manager			Date

Comments: _____

	Recommended	Not Recommended	
NASA/GSFC/WFF Test Director			Date

Comments: _____

^{**} For ease of distribution, NASA, SCSC and NOAA Wallops CDA recommendations are on separate pages.

Wallops Frequency Utilization Management Working Group Frequency Utilization Recommendations

Frequency: _____

File No. _____

The indicated frequency has been submitted to the Wallops Frequency Utilization Management Working Group for consideration for use at the Wallops Flight Facility. The supporting information submitted relative to its use has been evaluated and the following recommendations are made:**

	Recommended	Not Recommended	
SCSC	_____	_____	_____
Spectrum Manager			Date

Comments: _____

** For ease of distribution, NASA, SCSC and NOAA Wallops CDA recommendations are on separate pages.

Wallops Frequency Utilization Management Working Group Frequency Utilization Recommendations

Frequency: _____

File No. _____

The indicated frequency has been submitted to the Wallops Frequency Utilization Management Working Group for consideration for use at the Wallops Flight Facility. The supporting information submitted relative to its use has been evaluated and the following recommendations are made:**

_____	Recommended	Not Recommended	_____
NOAA Wallops CDA Station Spectrum Manager			Date

Comments: _____

** For ease of distribution, NASA, SCSC and NOAA Wallops CDA recommendations are on separate pages.

Appendix D

RF Radiation Hazard Evaluation for Wallops Flight Facility

RF Radiation Hazard Evaluation for Wallops Flight Facility

File No. _____

Frequency: _____

System/Equipment: _____

Comments, Restrictions, etc.: _____

This system/equipment and frequency are approved for use as requested without restrictions unless noted above.

Radiation Safety Officer
GSFC/WFF Safety Office

Date

Appendix E

Conditional Authorization for RF Radiation at the Wallops Flight Facility

Conditional Authorization for RF Radiation at the Wallops Flight Facility

File No. _____
Equipment Code _____

Authorization is hereby conditionally granted to radiate the indicated frequency at the Wallops Flight Facility. Use of this frequency is subject to having all other required authorizations, coordination with the Wallops Flight Facility's Test Director, and compliance with current and future operational restrictions. This authorization is subject to review periodically and as dictated by changing GSFC/WFF Test Range requirements.

FREQUENCY: _____

Director
Suborbital and Special Orbital Projects Directorate

Date

Recommendations/Restrictions/Comments: _____

Coordination with GSFC/WFF Test Director required. Yes _____ No _____

Appendix F

Abbreviations, Acronyms, and Initializations

AETD	Applied Engineering and Technology Directorate
CDA	Command Data Acquisition
CDR	Commander
DC	District of Columbia
FAA	Federal Aviation Agency
FCC	Federal Communications Commission
FM	Frequency Modulated
GSFC	Goddard Space Flight Center
HERO	Hazard of Electromagnetic Radiation to Ordnance
HERP	Hazard of Electromagnetic Radiation to Personnel
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NTIA	National Telecommunications and Information Administration
RF	radio frequency
RFI	radio frequency interference
SCSC	Surface Combat Systems Center
SSOPD	Suborbital and Special Orbital Projects Directorate
U.S.	United States
USSTRATCOM	U.S. Strategic Command
WFF	Wallops Flight Facility
WFUMWG	Wallops Frequency Utilization Management Working Group