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Operations

**SPECTRUM INTERFERENCE RESOLUTION
PROGRAM**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements AFR 10-7, *Command and Control Warfare*, and describes the US Air Force Spectrum Interference Resolution Program (AFSIR). It provides guidance for reporting, identifying, evaluating and controlling electromagnetic interference (EMI) to meet electromagnetic compatibility (EMC) goals of the Air Force Electromagnetic Environmental Effects (E3) program as defined in DoD Directive 3222.3/AFSUP 1, *Department of Defense Electromagnetic Compatibility Program*, August 20, 1990. It tells how to request quick fix interference reduction capability (QFIRC) and related EMC measurements and specialized engineering services. Major commands (MAJCOM) and field operating agencies (FOA) must develop procedures for implementing this instruction. **Attachment 1** lists abbreviations, acronyms, and terms used. **Attachment 2** lists agency responsibilities.

SUMMARY OF REVISIONS

This revision aligns the instruction with AFR 10-7.

1. AFSIR Program. The focus of the AFSIR program is to resolve EMI at the lowest level. A unit affected by an EMI incident must begin an investigation to identify the source. Submit an EMI report within 24 hours of the incident. Once you identify the interference source, report it.

When you can not identify the source you should include the sources you checked and the results of the investigation in your report.

1.1. EMI From Frequency Assignment Problems. When the EMI clearly resulted from problems in assigning a frequency, ask the Air Force Frequency Management Agency (AF FMA), through command frequency management channels, for assistance. Do not go directly to the Federal Communications Commission (FCC). Air Force-owned equipment may cause EMI that appears to originate from a non-government source. AF FMA personnel will coordinate with the FCC and government agen-

cies if their investigation shows that non-Air Force equipment caused the EMI. Air Force high frequency (HF) facilities may directly ask for FCC direction finding (DF) help in identifying the source of interference on assigned Air Force HF channels.

1.2. EMI From Hostile Sources. When you suspect that the interference is coming from a hostile source, have the Joint Electronic Warfare Center (JEWEC) assess the validity of the incident and act as liaison to the intelligence community. Use the identical format to report hostile and friendly interference.

2. EMI Reporting. The reporting requirements of this paragraph are exempt from licensing according to AFI 37-124, *Management and Control of Information Reports Requirements* (formerly AFR 4-38).

2.1. Report Submission:

2.1.1. Check with equipment maintenance personnel to determine if the EMI is the result of maintenance actions or an equipment malfunction. If available, check with base or unit Communications Computer Systems Engineer to determine source of EMI.

2.1.2. Check with other units in the geographical area to determine the area affected. Knowing if other nearby units are experiencing the same type of EMI may aid in determining the interference source.

2.1.3. When you suspect co-channel interference (interference between systems that have been assigned similar frequency allocations), check with local and area frequency management personnel to determine the location of frequency assignments that fall within the bandwidth of the victim receiver.

2.1.4. Attempt to qualify the EMI effects from the affected audio or video. You can determine the bandwidth, relative amplitude, and modulation of the EMI with a spectrum analyzer. Find the approximate bandwidth by varying the receiver frequency to determine the affected frequency band.

2.1.5. Clearly so state if EMI is being reported as part of an exercise. During exercise periods, coordinate all reports with the Command and Control Warfare officer before you submit a report. Do not forward an exercise related report.

2.1.6. If a non-DoD activity or agency experiences interference from an Air Force asset, the Air Force activity or agency causing the EMI collects the required information and submits the EMI report.

2.2. Exceptions to Reporting. Do not report an incident when:

2.2.1. The interference is transient EMI from natural sources (for example, rain, solar activity, lightning, and so forth).

2.2.2. The interference only affects training frequencies assigned on a noninterference basis for training purposes. ***Note: Do notify MAJCOM frequency manager; he or she may be able to resolve the problem.***

2.2.3. The civilian Military Affiliate Radio System (MARS) stations experience interference. Civilian MARS stations must follow the reporting procedures and channels found in MARS directives.

2.3. Types of EMI Reports:

2.3.1. Initial Report. File an EMI report as soon as possible after an EMI incident occurs, preferably within 24 hours of the occurrence. Include all available data and send it to the appropriate agencies outlined in paragraph 2.6. You may ask for frequency management or QFIRC assistance in the initial report.

2.3.2. Supplemental or Follow-on Reports. Submit supplemental reports when you need to add to or modify information previously submitted. Include the date time group of the initial report and any previous supplemental reports and send them to the same addressees that you sent the initial report to. You may use a supplemental report to request 1839 Engineering Installation Group (EIG) QFIRC technical assistance.

2.3.3. Closing Reports. Issue a closing report when the EMI incident is resolved or requires no further action. The engineering service agency may complete the closing report when they perform a requested on-site investigation. They will include preliminary results of the investigation.

2.4. Security Classification of EMI Reports. Units must evaluate the security sensitivity of the EMI on the affected system and classify the report accordingly. Stations with a nonsensitive mission or that judge the EMI to be interference from a nonhostile source should not classify EMI reports unless such a report would reveal a system vulnerability. Stations located in combat areas or having a sensitive military mission must classify every interference report. For space systems EMI, classify the IRON number with type of satellite, or defense object number as Secret..

2.5. Report Precedence. Assign EMI reports a precedence consistent with the urgency of the reported situation. Send reports to information addressees using a routine precedence.

2.6. Report Addressees. Each Air Force unit must submit reports through its chain of command up to major or unified command, or commander in chief (CINC) level. See **Attachment 3** for where to send EMI reports (minimum addressee requirements, others may be included).

2.7. Report Format. Submit an EMI report by electronic message. Include:

- The frequencies of the system experiencing the EMI.
- The location of the system.
- The system function, name, nomenclature, manufacturer with model number or other system description.
- The operating mode of the system, if applicable (frequency agile, pulse doppler, search, etc.).
- The description of the interference (noise, pulsed, continuous, intermittent, on so forth).
- The effect of interference on performance (reduced range, false targets, reduced intelligibility, data errors, etc.).
- The dates and times of interference.
- The location of the interference source (coordinates or line of bearing, if known, otherwise state as unknown.)
- A list of other units also receiving the interference (if known) and their location or distance and bearing from your location.
- A clear, concise narrative summary on what you know about the EMI and what local actions have been taken to resolve the problem.

- Whether or not you want or expect QFIRC technical assistance. If you need technical assistance say what the security clearance requirements for the team are and what the impact is on the mission.
- A point of contact, giving name, Defense Switched Network (DSN) and commercial telephone numbers, and duty hours.

3. Requesting QFIRC and Joint Spectrum Interference Resolution (JSIR) Assistance:

3.1. QFIRC. The QFIRC is an immediate action service to reduce or eliminate unintentional ("friendly") EMI associated with Air Force operational equipment. The QFIRC service analyzes and recommends corrective actions for reported EMI problems. The 1839 EIG, located at Keesler AFB, MS provides QFIRC to all Air Force units. It investigates nonhostile interference and provides people and equipment to perform on-site direction finding and interference problem analysis. They document corrective actions and give recommendations for solving EMI problems in a formal report. They forward the report to the unit that asked for it and to its parent MAJCOM.

3.1.1. Procedures. Units experiencing radio frequency interference should report it using the reporting format shown in paragraph 2.7. If the interference problem persists and the frequency management chain of command cannot resolve it, the affected unit may request QFIRC technical/DF assistance through its higher headquarters. If the unit needs assistance, it should ask for it in the report. The unit should send the original report to its headquarters. Send copies to the addressees in **Attachment 3**.

3.1.2. Local Support. Units that need on-site assistance to resolve interference problems (or their higher headquarters) should directly contact the 1839 EIG/EEX, (601)377-3920/3924 or DSN 597-3920 for an initial analysis/evaluation. They should identify their requirements, mission priority and impact as early as possible.

3.2. JSIR. The Electromagnetic Analysis and Compatibility Center (ECAC) is the office of primary responsibility (OPR) for the JSIR Program. The ECAC JSIR office maintains a central database of EMI cases, resolutions, and lessons learned for all Air Force and Joint military EMI. ECAC/JSIR also provides analytical and on-site assistance in resolving EMI problems. Only ask for JSIR assistance after you have exhausted all Air Force resources. You must ask AF FMA, 1839 EIG, or Headquarters US Air Force to request that help by sending a message to ECAC ANNAPOLIS MD //CJ//JSIR// or by calling (410)-573-7007 or DSN 281-7007. *Note: That number is available 24 hours a day.*

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Attachment 1

GLOSSARY OF ABBREVIATIONS, ACRONYMS, AND TERMS

Abbreviations and Acronyms

AF FMA—Air Force Frequency Management Agency

C2W—Command and Control Warfare

E3—Electromagnetic Environmental Effects

EC—Electronic Combat

ECAC—Electromagnetic Compatibility and Analysis Center

EIG—Engineering Installation Group

EMC—Electromagnetic Compatibility

EMI—Electromagnetic Interference

FOA—Field Operating Agency

JEWC—Joint Electronic Warfare Center

JSIR—Joint Spectrum Interference Resolution

MAJCOM—Major Command

MARS—Military Affiliated Radio System

QFIRC—Quick Fix Interference Reduction Capability

Terms

Electromagnetic Environmental Effects (E3)—The impact of the electromagnetic environment upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all electromagnetic disciplines, including electromagnetic compatibility and electromagnetic interference; electromagnetic vulnerability; electromagnetic pulse; electronic protection (formerly electronic counter-countermeasures), hazards of electromagnetic radiation to personnel, ordnance, and volatile materials; and natural phenomena effects of lightning and p-static. (JCS Pub 1-02)

Electromagnetic Compatibility (EMC)—The ability of telecommunications equipment, subsystems, and systems to operate in their intended operational environments without suffering or causing unacceptable degradation because of electromagnetic radiation or response. Design compatibility is achieved by incorporation of engineering characteristics or features in all electromagnetic radiating and receiving equipment in order to eliminate or reject undesired signals and enhance operating capabilities. Operational compatibility is achieved by the equipment flexibility to insure interference-free operation. It involves the application of sound frequency management and clear concepts and doctrines to maximize operational effectiveness. (JCS Pub 1-02)

Electromagnetic Interference (EMI)—Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment. It can be induced intentionally, as in some forms of electronic warfare, or unintentionally, as a result of spurious emissions and responses, intermodulation products, and the like. (JCS Pub 1-02)

Attachment 2

AGENCY RESPONSIBILITIES

A2.1. DoD Electromagnetic Compatibility and Analysis Center (ECAC):

A2.1.1. Maintains the JSIR program in accordance with the Military Communications Electronics Board guidance.

A2.1.2. Maintains an Air Force EMI database, to include EMI characteristics and methods of resolution for each EMI case reported. Provides database access to Air Force units upon request.

A2.1.3. Assists in the resolution of joint EMI when specifically requested by AF FMA, 1839 EIG or headquarters Air Force.

A2.2. Joint Electronic Warfare Center (JEWEC). When the interference is first assessed to be hostile (or at least potentially hostile) in nature, JEWEC does the following:

A2.2.1. Reviews the assessment for validity.

A2.2.2. Determines countermeasures (if possible).

A2.2.3. Notifies the intelligence community of assessment.

A2.2.4. Provides additional analytic assistance as requested.

A2.3. US Space Command Space Defense Operations Center (SPADOC):

A2.3.1. Acts as focal point for all DoD space systems EMI.

A2.3.2. When necessary, requests assistance from the military services or ECAC in the resolution of EMI.

A2.4. HQ USAF/XOFE (Electronic Combat Division). HQ USAF/XOFE will:

A2.4.1. Monitor all EMI reports.

A2.4.2. Coordinate cross MAJCOM operational issues.

A2.4.3. Monitor and suggest countermeasures when applicable.

A2.4.4. In conjunction with AF FMA, assist in the resolution of operational frequency deconfliction issues.

A2.5. Air Force Frequency Management Agency (AF FMA). AF FMA will:

A2.5.1. Act as Air Force focal point for EMI resolution guidance. Coordinate all policy and instructional guidance with HQ USAF/XO.

A2.5.2. Act as Air Force focal point for the JSIR program.

A2.5.3. Ensure that funds for the QFIRC program are annually programmed and made available to reimburse the 1839 EIG for travel and per diem costs associated with on-site QFIRC support.

A2.5.4. Act as focal point for EMI problems when proposed solution involves changes in frequency assignments. Make frequency assignments in accordance with AFI 33-106, *High Frequency (HF)*,

Land Mobile Radios (LMRs), and Military Affiliate Radio System (MARS) Management (formerly AFRs 700-17 and 700-18) or appropriate CINC guidance.

- Determine the registration priority of the frequencies involved in an EMI problem.
- Resolve EMI resulting from frequency assignment problems through negotiations with MAJCOMs, other agencies, and foreign countries, through appropriate CINC, as required.
- Ensure that EMC requirements are considered before assigning frequencies.
- Coordinate actions to resolve EMI.

A2.6. Air Force Materiel Command (AFMC). AFMC will:

A2.6.1. Review and coordinate EMC standards with other agencies in addition to developing military EMC standards and specifications for the design, development, procurement, production, test, and measurement of electrical, electronic, and telecommunication equipment. Actions will include:

A2.6.2. Designing equipment for maximum suppression of undesirable emissions and optimum rejection of potential EMI.

A2.6.3. Conducting EMI studies and analyses to ensure that equipment in the design or development stages will meet or exceed established specifications and standards and achieve EMC in its intended operational environment.

A2.6.4. Provide funds for managing and procuring common test equipment required to support EMI reduction efforts and centrally procured QFIRC items.

A2.6.5. 1839 EIG. 1839 EIG will:

A2.6.6. Act as focal point for the QFIRC and EMC/EMI measurements.

A2.6.7. Maintain an EMC office to analyze programs for electronic facilities, identify EMI problems and where possible, make or recommend planning adjustments to eliminate or reduce EMI problems.

A2.6.8. Establish and maintain the QFIRC program for the Air Force. QFIRC services include:

A2.6.8.1. Receiving and analyzing reports of EMI to operational equipment and systems and providing technical assistance when requested. Technical assistance will include EMC and EMI consultation, on-site interference investigations including DF measurements to locate the source(s) of EMI, as well as initiating and recommending corrective actions to resolve EMI problems.

A2.6.8.2. Procuring and maintaining reasonable quantities of interference reduction devices to resolve operational EMI problems. Items will be provided directly to the unit experiencing EMI when it the items will be effective in reducing or eliminating the EMI problem.

A2.6.8.3. Advising all working levels of the other military Services, nonmilitary government agencies, and civilian users of electronic equipment, both domestic and foreign, on methods to eliminate or reduce EMI problems, where Air Force equipment is involved.

A2.6.8.4. Upon request, providing technical advice and measurement assistance to AF FMA, and MAJCOMs on EMI problems during equipment and systems acquisition.

A2.6.8.5. Advising HQ AFMC of EMI trends or developments that require changes in maintenance procedures, requirements for new equipment, or modifications to present equipment.

A2.6.8.6. Reviewing and coordinating on EMC standards, as necessary, with other agencies and assisting HQ AFMC in the development of adequate and useful military standards and specifications for the design, development, procurement, production, test and measurement of electromagnetic spectrum-dependent equipment.

A2.6.8.7. Providing Air Force activities with measurement services to analyze and resolve EMI problems. These services include prototyping and testing various configurations of equipment to determine the best installation criteria when parameters cannot be obtained from equipment design specifications or available test data.

A2.6.8.8. Procuring, developing, and employing reliable and accurate measurement techniques and equipment with the sensitivity, accuracy, range, and stability necessary to provide valid electromagnetic measurement data on Air Force electronic equipment and systems to evaluate EMI and EMC, and providing measurements and specialized engineering services as outlined in this instruction.

A2.6.8.9. Maintaining a reference library of technical information on actions taken to resolve EMI problems, and providing available information to ECAC to be included in the Air Force EMI data base.

A2.6.8.10. Publishing a user/maintainer technical guide for resolving EMI at the local level.

A2.7. Major Commands (MAJCOM), Field Operating Agencies (FOA), and Direct Reporting Units (DRU). MAJCOMs, FOAs, and DRUs will:

A2.7.1. Adhere to the policy of the AFSIR program, as set forth in this instruction.

A2.7.2. Identify EMI and EMC requirements and request the appropriate technical assistance to perform the required analysis, measurements, and evaluations.

A2.7.3. Eliminate or control EMI before installing equipment.

A2.7.4. Ensure maintenance and operations personnel and activities implement measures to minimize EMI during operational use of equipment.

A2.7.5. Ensure that off-the-shelf and locally procured and leased equipment is designed to suppress or reject EMI.

A2.7.6. Supplement this instruction, as necessary, or provide a policy letter to establish reporting channels and OPRs at each level of command. Supplements must not impede the reporting of EMI or restrict the direct communication of policy between subordinate units and Air Force engineering agencies that provide QFIRC consulting and technical support, measurements, and specialized engineering services. Coordinate command supplements with AF FMA and send a copy to the 1839 EIG/EEX, 801 Vandenberg Ave, Ste 201, Keesler AFB, MS 39534-2634.

A2.7.7. Provide a command point of contact for EMI and EMC to the 1839 EIG/EEX, DSN 597-3920.

A2.7.8. Ensure that EMI is reported in accordance with the EMI reporting policy and procedures outlined in this instruction.

A2.7.9. Establish training to ensure personnel are familiar with the contents of this instruction and with procedures for reporting EMI and requesting assistance when needed.

A2.7.10. Develop EMI education programs tailored to their mission and equipment.

A2.7.11. Assist subordinate units in identifying, reporting, and resolving EMI.

Attachment 3

ADDRESSEES FOR EMI REPORTS

A3.1. For friendly EMI: Action: 1839 EIG KEESLER AFB MS//EEX// (801 Vandenberg Ave, Ste 201, Keesler AFB, MS 39534-2634)

Info: HQ USAF WASHINGTON DC//XOFE//
AF FREQ MGT AGENCY WASHINGTON DC//SCT//
ECAC ANNAPOLIS MD//CJ/JSIR//, and the DoD Area
Frequency Coordinator when applicable.

A3.2. For hostile EMI: Action: JWC SAN ANTONIO TX//SA//

Info: HQ USAF WASHINGTON DC//XOFE//,
1839 EIG KEESLER AFB MS//EEX//,
AF FREQ MGT AGENCY WASHINGTON DC//SCT//,
ECAC ANNAPOLIS MD//CJ/JSIR//

A3.3. For EMI containing information of possible intelligence value: Info: NSACSS FT GEORGE G MEADE MD//W27//

DIA WASHINGTON DC//DT-4C//
CIA WASHINGTON DC//OSWR/SSD//

A3.4. For EMI involving space systems: Action: USSPACECOM CHEYENNE MTN AFB CO//SPADOC//

Info: HQ USAF WASHINGTON DC//XOFE//
HQ AFSPACECOM PETERSON AFB CO//DOXP//
21 SOPS ONIZUKA AFB CA//DOR//
SMC LOS ANGELES AFB CA//SCUF//CW//
1839 EIG KEESLER AFB MS//EEX//
AF FREQ MGT AGENCY WASHINGTON DC//SCM/SCT//
ECAC ANNAPOLIS MD//CJ/JSIR//

A3.5. For EMI involving NASA: Action: DOD MANAGERS STS CONTINGENCY SPT OFC PATRICK AFB FL//DDMS// USSPACECOM CHEYENNE MTN AFB CO//SPADOC//

Info: HQ USAF WASHINGTON DC//XOFE//
HQ AFSPACECOM PETERSON AFB CO//DOXP//
21 SOPS ONIZUKA AFB CA//DOR//

SMC LOS ANGELES AFB CA//SCUF//CW//
1839 EIG KEESLER AFB MS//EEX//
AF FREQ MGT AGENCY WASHINGTON DC//SCM/SCT//
ECAC ANNAPOLIS MD//CJ/JSIR//

A3.6. For joint military EMI: Action: Appropriate CINC or DoD Area Frequency Coordinator, and
1839 EIG KEESLER AFB MS//EEX//

Info: HQ USAF WASHINGTON DC//XOFE//
AF FREQ MGT AGENCY WASHINGTON DC//SCT//
ECAC ANNAPOLIS MD//CJ/JSIR//

A3.7. For EMI in Europe: Action: HQ USAFE RAMSTEIN AB GE//SCMXF//

Info: HQ USAF WASHINGTON DC//XOFE//
1839 EIG KEESLER AFB MS//EEX//,
AF FREQ MGT AGENCY WASHINGTON DC//SCT//
ECAC ANNAPOLIS MD//CJ/JSIR//

A3.8. For EMI in Hawaii: Action: 15ABW HICKAM AFB HI//SCOUJF//

Info: JFMO PAC HONOLULU HI
HQ USAF WASHINGTON DC//XOFE//
HQ PACAF HICKAM AFB HI//SCMTT//
CDR USARPAC FT SHAFTER HI//APIM-OIO//
CINCPACFLT PEARL HARBOR HI//N6//
CG FMFPAC//G6//
NCTAMS EASTPAC HONOLULU HI//NSMO//
1839 EIG KEESLER AFB MS//EEX//
AF FREQ MGT AGENCY WASHINGTON DC//SCT//
ECAC ANNAPOLIS MD//CJ/JSIR//

A3.9. For EMI in Korea: Action: 7AOG OSAN AB KOR//TKE//

Info: JFMO KOREA SEOUL KOR
HQ USAF WASHINGTON DC//XOFE//
HQ PACAF HICKAM AFB HI//SCMTT//
1839 EIG KEESLER AFB MS//EEX//
AF FREQ MGT AGENCY WASHINGTON DC//SCT//

ECAC ANNAPOLIS MD//CJ/JSIR//

A3.10. For EMI in Mainland Japan: Action: 5AF YOKOTA AB JA//DOKB//

Info: JFMO JAPAN YOKOTA AB JA

HQ USAF WASHINGTON DC//XOFE//

18 CS KADENA AB JA//SCPF//

HQ PACAF HICHAM AFB HI//SCMTT//

1839 EIG KEESLER AFB MS//EEX//

AF FREQ MGT AGENCY WASHINGTON DC//SCT//

ECAC ANNAPOLIS MD//CJ/JSIR//

A3.11. For EMI in Okinawa Japan: Action: 18CS KADENA AB JA//SCPF//

Info: JFMO JAPAN YOKOTA AB JA

HQ USAF WASHINGTON DC//XOFE//

5 AF YOKOTA AB JA//DOKB//

HQ PACAF HICKAM AFB HI//SCMTT//

1839 EIG KEESLER AFB MS//EEX//

AF FREQ MGT AGENCY WASHINGTON DC//SCT//

ECAC ANNAPOLIS MD//CJ/JSIR//

A3.12. For EMI in Guam: Action: 13AF ANDERSON AFB GQ//DOK//

Info: JFMO GU//80//

USCINCPAC REF FMO GU//80//

NCTAMS WESTPAC GU//NSMO//

HQ USAF WASHINGTON DC//XOFE//

633 CS ANDERSEN AFB GU//SCF//

644 CCS ANDERSEN AFB GU//EFA//

HQ PACAF HICKAM AFB HI//SCMTT//

1839 EIG KEESLER AFB MS//EEX//

AF FREQ MGT AGENCY WASHINGTON DC//SCT

ECAC ANNAPOLIS MD//CJ/JSIR//

A3.13. For EMI in Alaska: Action: 11AF ELMENDORF AFB AK//DOK//

Info: JFMO AK ELMENDORF AFB AK

HQ USAF WASHINGTON DC//XOFE//

HQ PACAF HICKAM AFB HI//SCMTT//
1839 EIG KEESLER AFB MS//EEX//
AF FREQ MGT AGENCY WASHINGTON DC//SCT
ECAC ANNAPOLIS MD//CJ/JSIR//