GUIDE TO SPECTRUM MANAGEMENT IN MILITARY OPERATIONS

ACP 190(C)

SEPTEMBER 2007

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FOREWORD

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5. This ACP is to be maintained and amended in accordance with the provisions of the current version of ACP 198.

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THE COMBINED COMMUNICATION-ELECTRONICS BOARD LETTER OF PROMULGATION

FOR ACP 190(C)

1. The purpose of this Combined Communication-Electronics Board (CCEB) Letter of Promulgation is to implement ACP 190(C) within the Armed Forces of the CCEB Nations. ACP 190(C), GUIDE TO SPECTRUM MANAGEMENT IN MILITARY OPERATIONS, is an UNCLASSIFIED publication developed for Allied use and, under the direction of the CCEB Principals. It is promulgated for guidance, information, and use by the Armed Forces and other users of military communications facilities.

2. ACP 190(C) is effective on receipt for CCEB Nations. NATO Military Committee (NAMILCOM) will promulgate the effective status separately for NATO Nations and Strategic Commands. ACP 190(C) will supersede ACP 190(B), which shall be destroyed in accordance with National regulations. The effective status of this publication is shown below.

EFFECTIVE STATUS

Publication	Effective for	Date	Authority
ACP 190(C)	CCEB	Sep 07	LOP

3. This ACP will be reviewed periodically as directed by the CCEB Permanent Secretary.

4. All proposed amendments to the publication are to be forwarded to the national coordinating authorities of the CCEB or NAMILCOM.

For the CCEB Principals

JA STOTT
Lieutenant Commander, Royal Navy
Permanent Secretary to CCEB

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CHAPTER 1

INTRODUCTION

PURPOSE

101. This publication provides guidance to Military Planners and spectrum managers supporting Combined Task Forces, on the organization required and the responsibilities of staff engaged in planning, coordinating, and managing access to the Electromagnetic Spectrum (hereafter referred to as spectrum) in military operations. This guidance is designed to optimise the use of the available spectrum by friendly forces in order to achieve information superiority.

SCOPE

102. This publication covers spectrum management in the full range and intensity of combined military operations to include peacetime, humanitarian operations, and warfare. It covers management of all equipment operating within the electromagnetic spectrum in the frequency range 9kHz to 400GHz. It does not cover specific alliance or national arrangements, which may be covered by either individual supplements to this publication, or by separate publications.

PRINCIPLES

103. The following principles have been applied to the procedures used throughout this publication:

a. Peacetime spectrum management is a function of sovereign nations who have management procedures in place and coordinate with other nations.

b. All military forces deploying to a foreign country and requiring access to the spectrum must provide a competent military spectrum management capability able to coordinate the force's spectrum requirements with civil administrations.

c. Coordinating the force's spectrum requirements can best be accomplished through the acceptance and use of the common spectrum management concepts and procedures identified within this publication.

DEFINITIONS

104. A glossary of terms used in this publication is given at Annex A.

APPLICATION

105. The procedures outlined within this publication are applicable to all Military Departments and Service Command components deploying as part of a combined Task Force. Understanding and adopting these procedures may facilitate a common understanding of

spectrum management processes, thus nurturing an environment to improve the spectrum management process in the future. Any nation may develop additional procedures for complementing guidance either individually or as members of military alliances.

CHAPTER 2

BACKGROUND TO SPECTRUM MANAGEMENT

GENERAL

201. This chapter introduces some of the principles behind spectrum management and the role of, and relationship between, military frequency managers.

ITU AND NATIONAL ADMINISTRATION

INTERNATIONAL TELECOMMUNICATION UNION

202. The need to protect the use of the radio spectrum has been widely recognised since 1903 when the role of the International Telegraph Union was expanded to include access to the spectrum. As worldwide interest in the control of the spectrum expanded, the International Telegraph Union became the International Telecommunication Union (ITU) and in 1947 became a specialised agency of the United Nations. Among its tasks, the ITU regulates the global use of the radio spectrum. The regulatory process is developed at ITU World Radiocommunication Conferences (WRC), where new rules and procedures are adopted. The output of a WRC is published in the "Final Acts" of the WRC, which revise the ITU Radio Regulations. These regulations have treaty status.

SOVEREIGN RIGHTS OF NATIONS

203. An overriding principle in the treaty establishing the ITU is that nations retain sovereign rights over their use of the radio spectrum. Nations may modify the Radio Regulations for national use within their own territory. Nevertheless, ITU members must conform to the Radio Regulations with respect to emissions extending beyond their territory and into space. In addition, Article 48 of the ITU Constitution states that ITU members retain freedom with regard to military radio installations. It further directs that military installations must, so far as possible, observe statutory provisions relative to giving assistance in case of distress and observe measures to avoid harmful radio interference. This article allows for an extension of military use of the spectrum in exceptional circumstances and in derogation of the Radio Regulations. Military commanders must be aware of their responsibilities with respect to these regulations.

NATIONAL ADMINISTRATIONS

204. All ITU member nations (referred to in the ITU as an "Administration") are encouraged to regulate the spectrum for national use. A national plan (which may closely reflect the global plan set out in the ITU Radio Regulations) may be detailed in the national Frequency Allocation Tables. This will cover many aspects of radio regulation; in particular, the type of radio services that are permitted to operate in each frequency band of the spectrum; these are termed frequency allocations. Note that allocation tables are generic in nature; they do not mention specific systems. In this way radio equipment is standardised, cross-border radio frequency interference

is minimised, common terminology and data exchange is available, and systems can be used in many countries.

PRINCIPLES

SPECTRUM MANAGEMENT VS. FREQUENCY MANAGEMENT

205. The importance of understanding the difference between spectrum management and frequency management is paramount to understanding the concepts outlined in this publication. As defined in Annex A spectrum management is concerned with all aspects of planning, co-ordinating, and managing the use of the electromagnetic spectrum. In contrast, frequency management is generally accepted to be a subset of spectrum management. Frequency Managers will only plan, coordinate, and manage the use of specific frequencies within the electromagnetic spectrum.

FREQUENCY PLANNING

206. Frequency planning in general is performed to meet the needs of radio services within a geographic area and is based on the allocation tables in the Radio Regulations. Frequency planning, in peacetime, would normally be developed from a communications plan or strategy in accordance with the national Frequency Allocation Tables, and cannot be effective in the absence of such a communications plan or strategy. For operational deployments the development of a frequency plan to meet the requirements of the deployed force can be complex and time consuming. The production of this plan should start as soon as possible and will include, but is not limited to: the composition of the force, including the international and national involvement, scope and size of a force. Chapter 3 contains additional details of the development of this plan.

FREQUENCY REUSE

207. The simplest way to avoid interference between radio systems is to assign a unique frequency to each radio emitter, link or net. In many situations it will not be possible to assign frequencies uniquely to each entity since the demand for frequency assignments is likely to exceed the spectrum available. As a consequence, the frequency plan must provide for sharing of individual frequency assignments between a number of different radio applications. Frequency sharing between two different applications may result in mutual harmful interference, however interference can be mitigated by:

a. Timesharing. Using the same frequency on a predetermined schedule, in military operations.

b. Geographical Separation. Reusing the same frequency with geographical separation. Geographical separation can be achieved through applying a distance factor over a level plain or the use of hills and mountains as obstructions to screen transmissions in a given direction.

208. To make best use of the available spectrum military frequency managers use these methods. Reuse of frequencies, in a given area, requires computation of relative strengths of the wanted and unwanted signals at the receiver. Methods of calculation have been developed by the ITU and a number of national and international tools have been developed to facilitate such calculations. To ensure that frequency reuse can be achieved in the operational area the frequency manager may also need to impose constraints on the use of an assignment i.e., limit the transmit power and/or limit antenna gain. In some cases, a restriction may be given on the height of the antenna above ground level.

ELECTROMAGNETIC COMPATIBILITY (EMC) EFFECTS

209. When conducting frequency management it is important to take into account the EMC effects created by imperfections in the design of emitters which can cause co-site, and in some cases far-site, interference. These imperfections, such as spurious emissions and intermodulation effects, are the source of Electromagnetic Interference (EMI) effects. To meet the requirement to produce frequency assignment and allotment tables free of interference, the EMC characteristics of an emitter must be known and taken into account during the calculation process.

PROPAGATION CALCULATIONS

210. Knowledge of radio wave propagation is essential to the creation of both a successful communication and a spectrum use plan. In the case of the communication plan, propagation calculations are necessary to guide the choice of the most suitable communications techniques to be used and the placement of radio and repeater sites. In the case of spectrum plans, propagation calculations are necessary to ensure the required protection is maintained when employing frequency reuse or other frequency sharing techniques. It is also used to select an appropriate operating frequency where propagation conditions vary with the frequency and length of the radio path e.g. from the daily variations of the ionosphere for HF Communications. To perform propagation calculations it is essential to have knowledge of the:

a. Power and antenna performance characteristics of the equipment to be used.

b. Terrain over which the signals are to be transmitted.

c. Prevailing ionospheric conditions for HF skywave communications.

d. The effects of atmospheric absorption and climatic conditions for frequencies above about 10 GHz.

PROPAGATION DATA

211. Terrain, littoral and chart data should be provided by accurate military maps and charts, or with the introduction of computer based radio propagation applications, use should be made of digital databases giving a similar resolution. Current ionospheric conditions can be assessed

from soundings (either oblique or vertical incidence) or by an ionospheric prediction service based on historic models and adjusted by a factor achieved through soundings.

ASSIGNMENT

212. For this publication an assignment is authorization given by an appropriate authority for a radio station to use a radio frequency or radio frequency channel under specified conditions. Once an assignment is created it protects the use of a frequency in the appropriate controlled geographical area. If protection beyond national borders is appropriate, the ITU provides a process for coordination and registering of the frequency in its International Frequency List (IFL). Assignments are normally disseminated in the form of a radio licence, but each national administration will determine the specific form and format of the licence. In some countries military frequency bands are allotted to the military authority for their management. In such cases a register of military assignments is also maintained.

ALLOTMENT

213. In military usage an allotment is one or more frequencies or blocks of frequencies within a band, given to a subordinate authority charged with the responsibility of providing frequency assignments. Frequencies within an allotment are usually made available for use within a given area or subject to other constraints.

INTERNATIONAL ORGANISATIONS

214. Some frequency bands are managed on a global basis by international organisations. Requests for military access to these bands should be passed to the national agency concerned. An example of an international organisation is The International Civil Aviation Organisation (ICAO), which plans the civil aviation communications band and the frequency bands for aeronautical navigation systems. Military use of the aeronautical and maritime radionavigation bands should follow the rules established by such organisations. A military example of such an arrangement, although not on a global scale, can be found in NATO, which centrally manages the 233 – 328.6 and 335.4 – 400 MHz bands.

FREQUENCY COORDINATION

215. The application of frequency reuse on a mutually acceptable basis is achieved by coordinating assignments with other users. This is normally accomplished between nations following methods defined by the ITU. The need for frequency coordination of radio transmissions depends largely upon the effective range of the radio transmitter. The potential range of an emitter can vary significantly with the propagation technique and frequency band used. Radio transmissions in some parts of the HF skywave band will travel around the earth, and transmissions from satellites illuminate large parts of the earth's surface, while those from hand held radios will typically only travel a few miles. As a result coordination procedures may vary with each frequency band. As an example communications satellites are subject to a lengthy

coordination process that can result in repeated meetings between the nations concerned to resolve conflicting interests.

RESPONDING TO COORDINATION REQUESTS

216. Prompt responses to frequency coordination requests within the combined or coalition force are essential if military operations are not to be impeded. Some risk of interference must be accepted if adequate spectrum sharing is to be achieved. The judgement of whether an assignment can be approved depends on the probability and degree of interference to the existing user, and also on the relative importance of the circuit supported by the assignment at risk. If the potential for frequency interference between users cannot be effectively coordinated then the reason for the objection should always be given, together with alternative suggestions whenever practical.

TRANSMITTING ON A NON-INTERFERENCE BASIS

217. The radio regulations stipulate that no assignment can be made that is in derogation of the Radio Regulations, except on the express condition that it shall not cause harmful interference to and shall not claim protection from assignments that are made in accordance with the Radio Regulations. Harmful interference is defined as that which endangers the functioning of a radionavigation service or other safety service or seriously degrades, obstructs, or repeatedly interrupts a radiocommunications service operating in accordance with the Radio Regulations. In practice extensive use is made of the corollary to this regulation, which is referred to as operating on a non-interference basis (NIB). Conditions often apply where a radio application does not cause interference in practice to the services allocated to a frequency band. Such operation does not confer the right for the radio application operating on a non-interference basis to be protected from interference that may be caused by a service operating in accordance with the Radio Regulations.

ARTICLE 48 OF THE ITU CONSTITUTION

218. Article 48 of the ITU Constitution, provides additional latitude with respect to the observation by military authorities of the Radio Regulations in exceptional circumstances. It states that for Installations for National Defence Services:

a. Member States retain their entire freedom with regard to military radio installations.

b. Nevertheless, these installations must, so far as possible, observe the statutory provisions relative to giving assistance in case of distress and to the measures to be taken to prevent harmful interference, and the provisions of the Administrative Regulations concerning the types of emission and the frequencies to be used, according to the nature of the service performed by such installations.

c. Moreover when these installations take part in the service of public correspondence or other services governed by the administrative regulations they

must, in general, comply with the radio regulatory provisions for the conduct of such services.

MILITARY FREQUENCY PLANNING STAFF

219. Military frequency planning for operations and exercises will normally be coordinated and controlled by a central staff of a lead nation. This staff will establish a liaison process with the corresponding staff in other countries where arrangements for direct military to military coordination have been agreed (normally within military alliances). Where such formal links do not exist it is normal to make initial use of the appropriate military missions to establish contact. When military forces deploy beyond national borders, the requirement for coordination will vary depending on the circumstances. For peacetime training, coordination will follow these same processes; however, for large training exercises it is normal to deploy a frequency manager in advance of the exercise to work with the host nation's military frequency management staff. The arrangements for operational deployments are considered in the next chapter.

SPECTRUM PLANNING

220. Planning for use of the spectrum resource and the assignment of spectrum management responsibilities to meet an operational requirement must be fully integrated into the operational planning and execution process and must start as early as possible. Each nation's military command should establish planning procedures to address all spectrum-dependent equipment used in support of the operational plan (OPLAN).

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CHAPTER 3

MILITARY SPECTRUM CONTROL CONCEPTS

GENERAL

301. This chapter applies the principles of Chapter 2 to the military context for combined or coalition operations. The aim of military spectrum management is to achieve an effective measure of control of the use of the electromagnetic environment (EME) and not just to assign frequencies. This wider aim is reflected in the use of the term "spectrum management". While recognising the fundamental principle that all nations retain sovereign rights over the control of radio emissions within their territories, it is in the nature of military operations that these rights may be disrupted or temporarily altered. The extent to which this is the case will be dependent on the intensity and scope of operations. Military operations may extend from disaster relief through peacekeeping to full-scale conflict, and the arrangements for spectrum management will vary accordingly. The control concepts are described in the following paragraphs and form the basis for military forces to use their radio equipment, with and without prior coordination. The application of these control concepts to hostilities is referred to as Battlespace Spectrum Management (BSM).

TYPES OF OPERATION AND THE COMMANDER'S MANDATE

TYPES OF OPERATION

302. The scope of this publication (as stated in Chapter 1) is to cover the full range of scale and intensity of combined and coalition operations to include peacetime, peacekeeping and warfighting. It provides a common basis for differing forces drawn from the international community, to work together to achieve spectrum management objectives. Very few military operations will deploy without some combination of forces. The types of operation with their differing spectrum management requirements may be categorised as follows:

a. Humanitarian Relief. Military forces may be deployed to provide aid to the civil administration in a mix of civil and military disaster relief agencies. The civil administration (if one exists) should provide a spectrum management framework for the deployed military force. Where an administration does not exist, then this responsibility may be delegated to a lead military force.

b. Peace Support. Increasingly military forces are performing peacekeeping or peace enforcement functions in areas of the world where administration and the rule of law have failed. Deployment for such operations will normally be unopposed. The spectrum management framework for this type of operation will follow the process outlined within the paragraph on Humanitarian Relief. Where an administration does not exist at the start of the operation, then the restoration of the administration including a civil frequency management capability, will be an aim of the operation.

c. Restoration of Administrative Control. Similar to peacekeeping but with an opposed deployment. In this case operations are likely to be more protracted and at a higher level of intensity.

d. Regional and Interstate Conflict. Such deployments may see a forced entry into one or more countries. Where forced entry occurs, liaison and frequency coordination with the sovereign nation's administration will not be possible; however coordination with friendly neighbouring administrations is essential.

e. Defence of National Territory. This would most probably be within the context of an alliance, involving the mixed forces of several nations over a wide area. The achievement of information superiority is likely to be essential to the defence of national territory and military spectrum management would be conducted in conjunction with the host nations' civil and military administrations.

THE COMMANDER'S MANDATE.

303. Regardless of the type of operation, the Commander, as part of his direction, should receive details of the mandate under which his force is to operate. This may for example originate from the United Nations. The mandate should specify or imply the extent to which the Commander may assume the temporary authority of an administration within the area of conflict. Such a mandate may bring with it not only the freedom to make frequency assignments within the area specified but also the requirement to co-ordinate with neighbouring administrations for those radio services that extend beyond the specified area.

OPERATIONS WITH HOST NATION SUPPORT.

304. The frequency management arrangements for operations with host nation support will be very similar to those for exercises. The force frequency manager will establish contact with the military or civil administration, as appropriate, at the earliest possible time to identify the size and location of the force and seek the necessary frequency support to meet the force's requirements. The mandate, for a force to deploy into the sovereign territory of another nation, should specify access to sufficient spectrum to meet the requirements of the force. The ability of the host nation to provide unique frequencies to the guest military force will depend on the current use of the spectrum within the host country. In some cases the host nation may be in a position to allot whole bands to the Force Commander's control.

OPERATIONS WITHOUT HOST NATION SUPPORT

305. Coordination will not be extended to enemy nations or their military; however, consideration must be given to friendly or neutral neighbouring countries when selecting those frequencies to be used by the force. In any scenario, the Commander must consider the effects on civilian safety services of all nations and consider issuing Notices to Aviators and Mariners (NOTAMs) warning of the dangers to them in the area of conflict. In the initial stages of conflict it may not be possible to coordinate with friendly countries; however, the Commander must take account of the possible effects of interference to their radio services. Establishing links with the administration at an early stage should minimise the effects of the lack of prior coordination by providing a channel of communication for the reporting of unacceptable cases interference.

SPECTRUM MANAGEMENT ORGANISATION AND RELATIONSHIPS

SPECTRUM MANAGEMENT FOR INFORMATION SUPERIORITY

306. Military operations rely heavily on equipment using the limited resources of the spectrum to achieve and maintain information superiority. In combined and coalition operations, frequency requirements may well exceed the amount of spectrum available. Also, the EMC characteristics may well negatively impact the way in which the limited available spectrum can be used. This has the effect of further reducing the spectrum available for use. As a result, efficient use and control of the available spectrum is critical to national security in terms of information operations (IO) and combat operations. Effective spectrum management (the efficient control and use of the spectrum) is fundamentally essential to sound defensive IO and Command and Control (C2) protection. This in turn ensures that operations can be conducted with minimal unintentional friendly interference (fratricide) and without negative Electromagnetic Environmental Effects (E3). Lack of concise, preplanned frequency coordination may have an adverse effect upon friendly users in the form of interference.

SPECTRUM AVAILABILITY

307. Pressure on access to the spectrum will increase as technology offers greater capability, which may have the effect of requiring greater access in terms of numbers of equipment, new capabilities and increased bandwidths. The available spectrum may be further constrained by national legislation designed to protect the rights of sovereign governments by requiring approval prior to transmit, in any portion of the spectrum that lies within a particular country's national borders. Combined force operations must also consider the spectrum requirements for a coalition force when planning for future contingencies. Therefore, an effective spectrum management structure is essential not only to satisfy the spectrum needs of military users, but also to coordinate with host nations to facilitate effective use of this finite resource. Overall, effective spectrum management will be an important element in achieving information superiority.

EXTENDING SPECTRUM MANAGEMENT

308. Depending on the type of operation and its intensity legal and regulatory constraints can be modified as follows:

a. Operating on a Non-Interference Basis (NIB). Operating on a NIB is a useful concept for military operations. Operations are authorised that will not cause harmful interference to host nation radio services or those in surrounding countries. This may be because of the absence of such radio services in the operating area or because there is sufficient separation or terrain screening to prevent harmful interference. In the latter case, calculations should be used to demonstrate that harmful interference may not result. Should there be complaints of interference these must be addressed. In all cases, only the Force Commander or his delegated representative can authorise operations on a NIB.

b. Article 48 of the ITU Constitution. The Radio Regulations are intended to apply to the peaceful use of the radio spectrum by all member nations. These regulations when extended to situations involving military armed conflict will clearly break down at some point. Article 48 of the ITU Constitution covers this situation.

SPECTRUM PLANNING, COORDINATION, AND CONTROL

309. To achieve successful military spectrum management, all users must work together by exchanging vital spectrum information, to include the parameters and EMC characteristics of deployed emitters, from the beginning of the planning process through the execution to the recovery phase of any operation. Spectrum information for military operations should be capable of being exchanged electronically and in a format acceptable to all participants. Spectrum managers must be prepared however to deal with less sophisticated forces with no automated spectrum management capabilities. The BSM process and plan are achieved with the involvement of three branches: Intelligence (C2), Operations (C3) and Communications (C6). Spectrum management forms part of battlespace management with C6 providing the lead. In consultation with C2 and C3 it formulates, coordinates and controls the spectrum requirements in terms of the functional areas plan. Additionally, to optimise the use of automated spectrum management systems at the combined level, there is a requirement for vertical and horizontal interoperability. Where a coalition partner deploys with a unique automated frequency management tool, to manage the whole or part of its allotment, they should be capable of importing and exporting information in the accepted format.

SPECTRUM MONITORING.

310. Monitoring of friendly force emissions can be an important aid to spectrum management. If authorised, monitoring may identify misuse, and help with the resolution of interference.

CONCEPT OF CONTROL

311. The authority to assign/allot frequencies to operational forces rests with the Combined Task Force Commander (CTFC) and the Combined Spectrum Management Cell (CSMC). The CSMC will normally further delegate authority for frequency assignment within allotments to Component Spectrum Managers. Where this is implemented, component level frequency assignments should be reported back to the CSMC.

COMBINED SPECTRUM MANAGEMENT CELL (CSMC)

312. Normally the Combined Task Force Commander or Coalition Force Commander will establish a CSMC within the C6 to establish and implement the policies governing the use by military forces of the radio frequency spectrum. In the development of the force frequency control organization, provision must be made to incorporate the requirements of all allied or national military forces that are operating within the area of operations. Within the limits imposed by higher authority, and subject to coordination with other administrations or military forces operating in contiguous areas, the commander of an active force has authority to assign frequencies for his forces use within his area of operations. The responsibilities of the CSMC and national responsibilities are developed more fully in Chapter 4.

NATIONAL SUPPLEMENTS

313. This chapter has been concerned with spectrum management for operations of either national or coalition forces. National supplements to this publication can cover in more detail the spectrum management organisation and procedures appertaining to national forces. The subsequent chapters of this publication will focus on combined operations.

CHAPTER 4

SPECTRUM MANAGEMENT RESPONSIBILITIES IN OPERATIONS

GENERAL

401. It is envisaged that the majority of future military activity will take place as a formed coalition or allied force under the leadership of a single nation or alliance. This chapter is designed to provide guidance on the functions and responsibilities of different operational levels of spectrum management within a deployed force while outlining the concepts used when planning, coordinating, and controlling the spectrum in combined military operations. Implementation of these concepts by all participating nations will speed up the spectrum management process.

LEAD NATION AND ALLIANCE RESPONSIBILITIES

402. When a coalition is formed a nation or alliance is given the responsibility to act as the Lead Nation. Acceptance of this task places a number of responsibilities on the nation or alliance concerned including that of providing and sustaining frequencies for the force through a spectrum management process. To execute this responsibility correctly, the lead nation will provide technical support to the CSMC, providing the necessary data to enable the spectrum management process within the operational area.

TRAINING

403. Each nation should ensure their spectrum management personnel are trained to operate at the Combined level, and equipped to meet the operational concepts outlined in this publication.

PHASES OF AN OPERATION

404. For the purpose of this publication the spectrum management process for a military operation has been split into four phases:

a. Routine or Pre-Planning Phase.

b. Planning Phase.

c. Deployment or Implementation Phase.

d. Recovery Phase.

ROUTINE OR PRE-PLANNING PHASE

SPECTRUM DATA COLLECTION – PRE-PLANNING

405. A successful spectrum management process for combined and coalition operations relies upon accurate spectrum related information. The collection of this data is the responsibility of each nation, which collects and stores this information on a continuous basis. An appropriate specialised technical authority may provide this function. Where this capability does not exist, then such information will have to be assembled during the planning phase. NOTE: This could delay the implementation of the BSM Plan.

PLANNING PHASE

FORCE STRUCTURE - PLANNING

406. Initial planning will identify the requirement for one or more components to be established with the possibility that different nations may be nominated to lead each component. The components may be drawn from the following: Maritime, Land, Air, Log, Special Forces or any additional components as defined.

SPECTRUM MANAGEMENT STRUCTURE - PLANNING

407. Once the force structure has been established and if the deployment is a single nation, it's staff produces the plan using national doctrine, C2 processes and procedures. For all other deployments, a nation (which may or may not be the lead or framework nation) or an alliance is nominated to take the lead. Each participating nation will provide a spectrum management capability (with tools) and should also be prepared to provide, to include deployment, a skilled, highly trained spectrum manager to the Combined Spectrum Management Cell (CSMC) (the CSMC is explained later). Selected individuals should be knowledgeable in their national elements spectrum requirements.

NATIONAL SPECTRUM MANAGEMENT RESPONSIBILITIES - PLANNING

408. Each nation should have a central, strategic planning and coordinating headquarters with it's own spectrum management cell to coordinate the spectrum processes of all their national forces. Based on the premise that frequencies should be assigned and allotted at the highest level, with the resolution of interference taking place at the lowest level, the responsibilities of the national spectrum managers within the planning phase include, but are not limited to:

a. In conjunction with the appropriate staffs identify all types of radio equipment to be deployed, to include equipment parameters and pass the information to the CSMC. (The equipment parameters and EMC characteristics for national and alliance equipment should be known and held within a database).

b. In conjunction with the operations staff, identify the operational locations of forces using emitters and systems requiring assignments.

c. Identify the operational areas for those elements of the force using emitters and system requiring allotments.

d. Collect and maintain all spectrum requirements supporting their national requirements.

e. Identify and inform the CSMC of national military radio equipment to be deployed to include equipment parameters, EMC characteristics, and any frequency constraints.

f. Identify and inform the CSMC of the overall spectrum requirements of the national element.

CSMC RESPONSIBILITIES - PLANNING

409. The CSMC, part of the operational headquarters staff, has the overall responsibility to coordinate the spectrum requirements for the force. The overall spectrum requirement is expressed as the Electronic Order of Battle (EOB). Once the requirement is known, the CSMC will acquire the necessary spectrum to meet the force's requirements, usually from a host nation. It also has the responsibility to produce a BSM Plan used to inform the force of issues related to management of the spectrum and will include individual frequency assignments and allotments. The BSM Plan should be disseminated to deploying forces prior to actual deployment. A possible structure for a BSM Plan follows (see also Annex B).

a. CONOPS. The spectrum concept of operations (CONOPS) for the operation should include:

(a) Management structure and the responsibilities of each nation's spectrum management cells.

(b) Policy and procedures.

(c) Agreed message formats.

(d) Interference reporting procedures.

(e) The use of frequency assignment and frequency allotment methods, agreed by the partners, for delivering frequencies to the coalition partners and their components.

b. Frequency Allotment Tables. For allotting frequencies to those coalition partners, components and systems requesting frequencies to be allotted.

c. Frequency Assignment Tables. For assigning frequencies to those coalition partners and components requesting frequencies to be assigned.

d. Combined Restricted Frequency List. For coordination process with all elements and approval by the C3. See Chapter 5 and Annex B.

e. Frequency Utilisation Tables. A list of available frequencies and their use.

NATIONAL ELEMENTS - PLANNING

410. An individual within each National element should be identified to inform the National Spectrum Manager of the individual elements spectrum requirements. The National Spectrum Manager will forward all requests for frequencies to the CSMC.

DEPLOYMENT IMPLEMENTATION PHASE

GENERAL - DEPLOYMENT

411. Prior to deployment the BSM Plan should be disseminated to all Spectrum Managers. On arrival in theatre the CSMC, which could differ from that of the planning phase, implements the procedures and processes outlined within the BSM Plan Strategy and assumes responsibility for spectrum control and utilisation within the defined area of operation. This will include all forces deploying as part of the Task Force.

RESPONSIBILITIES - DEPLOYMENT

412. The responsibilities of the Spectrum Manager at each level of command in this phase are given below:

a. CSMC

(a) Provide National Spectrum Managers with advice on the BSM Plan.

(b) Establish and maintain a close relationship with the Spectrum Authorities of the Host Nation and Adjacent Nations.

(c) Provide the Combined Task Force Commander with advice on the use of the available EMS.

(d) Resolve spectrum conflicts between components.

(e) Update the BSM Plan to meet contingency operations and changes in the overall structure of the force.

(f) Act as a Civil Administration for frequency management where appropriate.

b. Component Spectrum Manager

(a) Implement the BSM Plan as received from the CSMC.

(b) Control and manage the spectrum within their area of responsibility.

(c) Resolve spectrum conflicts between their elements.

(d) Providing advice to the Component commander on the use of the EMS and the potential and actual effects of the enemies use.

(e) Advise the CSMC of future plans which may impact on the BSM Plan.

c. Individual Elements of Each Nation

(a) Resolve external and internal interference affecting own forces radio systems.

(b) Issue Interference Reports on experienced interference.

(c) React to spectrum changes issued by the Component Spectrum Manager.

RECOVERY PHASE

GENERAL - RECOVERY

413. The Recovery Phase is a period of transition. Forces exiting the area are responsible for consolidating spectrum usage tables and passing them to the incoming force and/or the civil administration. For some operations, individual elements may change at different times and either be replaced or not replaced.

RESPONSIBILITIES - RECOVERY

414. The spectrum management responsibilities during this phase follow.

a. CSMC

(a) Reviewing and consolidating the frequency utilisation plan in current use by the force.

(b) Incorporating force changes into a new BSM Plan to meet the requirements of the new force.

(c) Passing the BSM plan to the newly established administration.

b. Component Spectrum Manager

(a) Reviewing and consolidating the frequency utilisation plan in current use by their forces.

(b) Identify element changes which may need to be passed to the CSMC for incorporation into any new BSM Plan. (This could include a new electronic order of battle for the incoming forces that differs from that of the current elements of the force).

c. Individual Elements of Each Nation

(a) Handing back frequencies to the Component Spectrum Manager, for re-assignment, as they are made free by the unit.

(b) Informing the Component Spectrum Manager of the date and time when the element will stop using its assigned/allotted frequencies in order to make them available for other uses.

CHAPTER 5

SPECTRUM MANAGEMENT – THE PROCESS

GENERAL

501. A key feature in the planning and conduct of combined or coalition operations is a clear understanding of the process outlined within this chapter and the responsibilities as outlined in Chapter 4.

SPECTRUM MANAGEMENT IN ALLIANCES

502. Formal military Alliances, when formed, allow for the formulation of common doctrine and procedures, which are practiced during training. Training effectiveness is degraded since it is difficult or impossible to exercise the CSMC, as such training occurs inside a member nation and cannot take over for the national administration. But, such cooperation is effective in formulating the spectrum requirements for a force and the procedures to be used once deployed. Currently when a coalition is formed, there may be no "in place" agreed spectrum management procedures. This creates difficulties and cause delays with the provision of frequencies. Spectrum management procedures used within alliances should be detailed in future supplements to this publication.

ROUTINE OR PRE-PLANNING PHASE

TECHNICAL SUPPORT

503. The responsibilities and activities for technical support are given in Chapter 4.

THE PLANNING PHASE

AIM

504. The aim of the planning phase is to produce a BSM Plan. This provides allotment and frequency assignment tables, spectrum management policy and procedures, a Combine Restricted Frequency List (CRFL) and frequency utilisation tables. It therefore follows that a BSM Plan will consist of a number of parts. A possible structure for a BSM Plan is outlined in Chapter 4 and further defined at Annex B.

REQUIREMENT

505. The initial stage for the spectrum manager within the planning phase is to establish the overall frequency requirements. Establishing the overall requirement affects all areas of the BSM Plan.

CONOPS

506. Establishing an agreed spectrum management CONOPS for an operation may be a difficult and protracted process. This publication attempts to reduce the time taken to achieve this by outlining processes and procedures, which can be adopted by any combined, or coalition force. Activities which should be addressed within the CONOPS are given below and amplified in later paragraphs within this chapter:

a. Information Exchange Format. Wherever possible the format should be agreed as early as possible in the planning process.

b. Access. Identify a procedure that enables participating nations to inform the CSMC of the initial and changing spectrum access requirements. This is achieved by exchanging equipment parameters and the EOB.

c. Defence of a Member Nation. Where military forces deploy to defend a coalition or alliance nation, the host nation should establish specific policy and guidance for the use of the spectrum in situations that uniquely apply to the host nation's territory.

d. Structures and Procedures. Establish a standing frequency management structure and procedures to support planned and ongoing operations. Specific actions required are:

(a) Spectrum Management Structure. A spectrum management structure should be established for each operation. The structure should identify the location and responsibilities of managers within the spectrum management process.

(b) Coordination. Ensure operation plans (OPLANs) and communication plans (COMPLANS) address coordination among spectrum users to achieve effective exchange of information, elimination of duplication of effort and mutual support.

(c) Augmentation. Identify any necessary augmentation of national frequency management offices (FMO).

(d) Conflicts. Establish a process for the resolution of frequency conflicts.

(e) Releasability/Classification of spectrum use information. Make all attempts to have all spectrum use information available at all levels. Ensure the guidance is distributed to all levels. See also para 704.

AREA OF OPERATION

507. Once the geographical area for the operation has been defined, the topographical data can be assembled. This may be provided in the form of maps and charts and if automatic tools are to be used, the relevant topographical information needs to be loaded in electronic form. This data is required to predict the propagation of radio equipment to be established in order to identify where re-use of frequencies is possible and is crucial to the frequency management process. Geographical data can assist the communications managers in the design of their networks and the selection of the equipment to be used to meet the Commander's information exchange requirements. It can also be used to predict the electronic environment and the possible effects of both civilian and enemy emitters on friendly forces.

EQUIPMENT PARAMETERS

508. Radio emitters designed and built by different manufacturers may have different parameters and EMC characteristics. It is an essential part of the planning process that the CSMC and National Spectrum Managers know the equipment criteria for use in the frequency allotment/ assignment process. Assembling radio frequency equipment databases is a routine activity of each nation's technical support. Some alliances have a frequency supportability process, which enables allied nations to capture the necessary data as member nations register the equipment parameters of new equipment as it is developed. For coalition operations, some coalition partners may deploy radio frequency equipment, which is unknown to the lead nation. In these circumstances it is important that the coalition partners release the required information when requested. When this information is not made available, the CSMC has to make assumptions about the spectrum requirements. This could place a significant constraint on the ability to optimise the use of the radio spectrum available to the force.

ELECTRONIC ORDER OF BATTLE (EOB)

509. The CSMC is responsible for assembling an electronic order of battle (EOB) for the force. This will consist of the radio equipment and platforms associated with each member nation of the force and will identify the overall frequency requirement to meet the needs of the nets, links and other systems.

INTERNATIONAL FREQUENCY LIST (IFL)

510. An important part of Spectrum planning is to identify and assemble the appropriate emitter information for the area of operation contained within the ITU IFL.

COMBINED RESTRICTED FREQUENCY LIST (CRFL)

511. Spectrum planners must seek information from partner nations, C2, C3 and other C6 elements concerning those frequencies and nets that require protection within an electronic warfare environment. See Annexes A and B for more information about the CRFL.

IDENTIFYING THE SPECTRUM REQUIREMENT

MODEL SPECTRUM REQUIREMENT

512. Once the above information is known, it should be possible to model the overall spectrum requirement for an operation. The method used will depend on the tools that are available to the CSMC. This task may be undertaken through appropriate technical support activities with the aim of identifying the minimum overall spectrum required to meet the needs of the deploying force. This process should also identify any constraints to be applied to frequency assignments. Issues to be addressed will include:

a. Frequency Constraints. Restricting the operation of equipment to the accepted military allocations, unless specific agreement has been reached with the host nation or approval of ITU Article 48.

b. Channel Utilisation. Using frequency hopping, free channel search and frequency agile modes may incur an overhead in the requirement for additional frequencies compared to single channel use. Modelling should identify the number of frequencies required to meet each of these modes of operation and the procedures and any constraints to be used when such modes are authorised for use.

c. Use of High Ground. Radio wave propagation from high ground offers greater ranges to radio systems. If access to these sites is not controlled then the potential for friendly interference is increased.

d. Airborne Emitters. Airborne emitters have the potential to radiate over large distances. The exact distance will depend on the height being flown. Constraints such as time management may have to be applied to the way in which channels are used to prevent interference.

e. Protection of Global Systems. The CSMC should identify those global systems the force may wish to use, such as the Global Positioning System (GPS). These systems should be added to the CRFL to ensure they are adequately protected.

f. Operation in the Littoral. When an operation includes amphibious operations, special consideration should be given to the conflicting effects of the naval, land and air emitters within the same congested battlespace. Where conflict is identified within the modelling process, the CSMC should apply the necessary techniques to mitigate potential interference.

g. Preferred Frequency Allotment. Using EMC characteristics during the modelling process will identify constraints on the way a frequency request to a host nation is structured. Failure to recognise these constraints may lead to some allotted frequencies being unusable. This situation may arise when single contiguous blocks of frequencies are issued.

h. Unique Frequency Users. Emitters requiring access to a unique frequency throughout the battlespace, sometimes call "single use frequency", should be identified and documented very early in the planning process. Such use will impact on the overall frequency requirement, as any other friendly emitters cannot use the frequency.

SPECTRUM ACQUISITION

CONSOLIDATING THE SPECTRUM REQUIREMENT

513. The result of the above activities is the spectrum requirement for the force, which will include any constraints. This will usually be expressed in terms of frequency bands, the number of frequencies and the overall spectrum required. Once the requirements have been consolidated, the CSMC's actions are based on the type of deployment.

a. Supported by a Host Nation's Administration. Where a Host Nation has an administration in place which has agreed to support an operation, the CSMC should establish a liaison with the appropriate authority. This is often the case for humanitarian operations. Once contact has been made, a frequency request should be submitted in a format specified by the Host Nation. All frequency constraints identified within the modelling process should be taken into account when requesting frequencies.

b. Not Supported by a Host Nation's Administration. Where a Host Nation administration does not exist or is unavailable, a situation found in warfighting and some peacekeeping operations, then available spectrum will have to be identified through electronic monitoring or other data gathering methods. These methods are essential in identifying those frequencies not being used in the area of operations and therefore available for interference free use. Where use can be linked to location, then it may be possible to co-use the same frequency, deconflicted by terrain, at other locations within the operational area. The precise way of gathering this information is the responsibility of the CSMC.

PRODUCTION OF THE BSM PLAN

514. When the available spectrum has been allotted by the Host Nation, developed from a predetermined communications plan (COMPLAN), or identified through monitoring, the CSMC will produce the Allotment and Assignment tables and incorporate them within the BSM Plan. Any constraints on the use of frequencies including power output and antenna height should be identified within these tables.

DISSEMINATION OF THE BSM PLAN

515. Dissemination of the BSM Plan is controlled by the CSMC who will decide what elements of the plan are required by each element. This will be based on the communications channels available. Where a fully integrated automated spectrum management system is in place

with replicated databases, dissemination will be achieved by the system. In such cases the CSMC may have to coordinate the access available to users.

DEPLOYMENT PHASE

INITIALISING THE BSM PLAN

516. It is important that the BSM Plan is issued before deployment if possible. This will enable radio systems to be operated on arrival within the staging area or at the final destination. Where an operation has a number of phases, then a new plan may be required for each phase. Once the force is deployed, real time spectrum management may be delegated to the appropriate component spectrum manager to control the spectrum within their defined areas of operation. Where frequencies are used which requires the coordination between components, then the CSMC may become involved.

ENCOUNTERING INTERFERENCE

517. As the BSM Plan is implemented, interference may be encountered. It is important within a combined and coalition operation that interference is investigated in order to identify the cause. Interference created by host nation emitters should be reported to the host nation administration. Interference created by un-reported friendly EMC characteristics should be identified and documented within the equipment database in order to prevent re-occurrences of similar interference. In all cases, once interference is recognised, the priority is to restore a required capability.

CIVIL ADMINISTRATION ACTIVITIES

518. For some operations a civil administration may not exist for the country or area of operation. In such circumstances the CSMC should be prepared to act as both the civil and military spectrum management authority. This activity may require additional resources to be allocated to the CSMC. In particular the CSME will be responsible for assigning frequencies in civil and military bands to Non Governmental Organisations (NGO).

RESTORATION OF A CIVIL ADMINISTRATION

519. Where the military has acted as the civil administration for spectrum management during an operation, they should be prepared to assist with the restoration of the civil activity as the situation becomes stable. Assistance may be in the form of training, identification of supporting equipment, or even with physical presence during the transition from military to civilian control. Portions of the BSM Plan may need to be made available to the administration.

RECOVERY PHASE

TRANSITIONING ELEMENTS

520. At the end of an operational deployment, all Spectrum Managers are responsible for providing their respective incoming military spectrum authorities with the “in force” spectrum strategy, frequency assignment and allotment tables, and the master frequency list provided by the host nation.

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CHAPTER 6

INTERFERENCE RESOLUTION

GENERAL

601. A basic problem in frequency assignment is the establishment of geographical, operational and technical limitations on the use of frequencies to enable the required number of users to operate without experiencing interference. In making frequency assignments, full consideration must be given to the technical capabilities and limitations of equipment. Within congested portions of the spectrum some interference is to be expected, and providing it does not become harmful (See paragraph 602), should be tolerated. Assignment of replacement frequencies should be considered only when other efforts to alleviate interference are ineffective.

HARMFUL INTERFERENCE

602. Harmful interference as formally defined by the ITU is listed in Annex A. In the military context harmful interference is defined as any emission, radiation or induction that degrades, obstructs or repeatedly interrupts military operational systems to the extent that operational effectiveness is impaired.

PERMISSIBLE AND ACCEPTED INTERFERENCE

603. The terms Permissible Interference and Accepted Interference are gaining acceptance for international frequency co-ordination (particularly space systems). It is possible to quantify precisely both these terms using the parameters, relative signal strength of the wanted and unwanted signal, and the probability of both signals being received simultaneously. The ITU definitions for these terms are listed in Annex A, but because there are no generally accepted quantified definitions, these terms should be used with caution in official correspondence.

ELIMINATION OF HARMFUL INTERFERENCE

604. When harmful interference occurs, action should be taken at the local level in the following order:

a. If possible, determine the source.

b. If the source is local, endeavour to reduce the interference or eliminate by appropriate action.

c. If local action is impractical, or unsuccessful, report the circumstances to higher authority, in accordance with instructions issued by the CSMC.

INTERFERENCE REPORTING FROM DEPLOYED FORCES

605. The requirement for interference reports will depend greatly on the type of operation. The BSM Plan should give specific guidance on the extent, purpose, format and distribution of the interference reporting required. A suggested format for interference reports are in Annex C. In some cases interference reporting may even be considered unnecessary or optional, however the following purposes should be considered:

a. Seek an alternative assignment or modified allotment.

b. Seek technical support to identify the source or cause of the interference.

c. Seek technical support to eliminate the cause of an identified source of interference.

d. Inform higher authority of a loss of capability.

e. Inform EW staff of enemy jamming, intrusion or meaconing.

f. Seek actions from another administration to resolve interference.

INTERFERENCE REPORTING TO AND FROM ADMINISTRATIONS

606. Interference reporting to and from administrations (outside of the Task Force) should be a function of the CSMC. The procedures for such reporting can be found in the ITU Radio Regulations, Article S15 and Appendix S10.

CHAPTER 7

INFORMATION EXCHANGE

GENERAL

701. Spectrum management processes can only be performed satisfactorily if a full set of data is available. It is therefore essential that, for combined and coalition operations, there are standardised means of exchanging information.

STANDARD DATA FORMATS

702. Standard data exchange formats are essential in effecting rapid data exchange between nations and force elements. The format currently used extensively by member nations is the US-developed Standard Frequency Action Format (SFAF). Also, currently NATO is leading an effort to develop another format, the Spectrum Management Allied Data Exchange Format (SMADEF). Both developers intend the data field formats maintain similarity to effectively be interoperable.

703. The CSMC will determine the data format and data fields required for requesting spectrum support. This information will be promulgated in the BSMP. See Annex B for more specific information.

704. These formats, together with explanatory text covering definitions of listed parameters, are included in Annexes D and E, respectively.

DATA TRANSFER STANDARDS

705. The CSMC must be capable of prosecuting the BSM Plan in a timely and efficient manner. This can be achieved most effectively by transferring frequency requirements and assignments electronically over a secure network. However, it is also recognised some spectrum users may not have access at all times. The CSMC should detail the acceptable standards in the BSM Plan.

RELEASABILITY OF DATA

706. The greater the intensity of operations, the greater is the need for the BSM Plan to be carried out centrally by the CSMC. The efficiency with which this can be done will depend critically on the quality, completeness and standardisation of the data provided by the component forces. Nations that withhold information for security, or other reasons will impede the creation and application of a comprehensive spectrum use plan. This may force the CSMC to delegate frequency control to lower formations, possibly placing unnecessary constraints on the employment of these forces. Each nation should review their spectrum data for releasability to the CSMC.

THE REQUIREMENT FOR AUTOMATED TOOLS

707. Historically spectrum management lists and plans were prepared on paper; however, as the complexity increased and personal computers became available it was natural to take advantage of electronic spreadsheets and databases to assist in the preparation and maintenance of these lists and plans. Further development has now led to the development of specific tools, such as the US Spectrum XXI, to meet the requirements of the processes described in Chapter 4. In practice a suite of tools is required in order to generate the BSM Plan. This will cover not only the generation of the necessary lists but also the modelling required to optimise the use of the available spectrum and respond to interference and jamming.

CHAPTER 8

IONOSPHERIC SOUNDER OPERATIONS.

GENERAL INTRODUCTION

801. Ionospheric Oblique Sounding : (Chirpsounder) Chirpsounders have been set up at distant ends of an HF circuit to provide a measurement of operating parameters such as received power, propagation modes and signal strength. The “Chirpcomm” system employed by CCEB nations in the main consists of TCI/BR transmitters and receivers. The transmitter sends a CW signal, which starts at 2MHz and steps up in frequency, at a rate of 50kHz/sec for 2-16MHz sweep and 100kHz/sec for a 2-32MHz sweep. At the other end of the circuit the receiver starts sweeping synchronously with the transmitter and tracks precisely the transmitted signal. The transmitter uses a vertically polarized antenna for long distance transmission while the receiver requires an antenna capable of efficiently receiving HF signals. The RF power output of the transmitter is 100 Watts average chirp with sweep duration of 280 seconds. When the transmitted signal is received and processed, the receiver displays this information as traces of delay time versus frequency thus providing real-time measurement of propagating modes of the HF circuit.

POLICY FOR IONOSPHERIC SOUNDER OPERATION

802. Introduction. High frequency (HF) communications systems play a vital role in satisfying command and control communications requirements of almost every nation. The ionospheric sounder affords the communications staff the ability to identify in "real time" the optimum frequencies from those assigned for use over a given circuit path. Ionospheric data also provides vital information for those who are engaged in communications, direction finding, and scientific applications. This document establishes the basic standard for ionospheric sounder operations. Over the Horizon (OTH) sounder systems are exempt from this policy.

803. Worldwide Sounder Operations. Ionospheric sounder operations shall comply with the policy and procedures contained in this section. This policy shall be reviewed and updated every two years, or more frequently if required.

804. Authority to Operate. Authority to operate ionospheric sounders in any country rests with the host nation. The allocation of a start time does not constitute authority to operate. Requests for sounder operations are to be made using established national procedures for frequency coordination and assignments.

805. Temporary Operations. Temporary operations need only contain proposed transmit/receive (TX/RX) locations, geographic coordinates, and proposed sounder components. These requests may be submitted as part of a normal or exercise frequency proposal for HF.

806. Classes of Sounder Operations. Sounder transmitters shall be classified as either common-user or special-purpose.

a. Common-User. The general distinction is that common-user transmitters are intended to constitute a common-user network of transmitters installed in a permanent location, the data from which are regularly available to all users.

b. Special-Purpose. Special-purpose sounder transmitters are operated to serve tactical commanders and other specialized requirements (e.g., natural disasters, contingencies, exercises, special operations, etc.) and are typically easily relocated. They will usually be more limited in operating times, emission bandwidth, antenna direction, and frequency range.

807. Common-User Sounder Network. CCEB nations may establish a network of common-user sounder transmitters which will operate full-time. This network is intended to provide ionospheric data to a large number of users engaged in communications, direction finding, and scientific applications. Each transmitter in the network shall be required to provide:

a. Full-time operation (24 hours/day, 7 days/week) with sweep intervals of 15 minutes or more.

b. An omni directional antenna.

c. Normal operating power shall be 10 watts, except for periods of initial synchronization, when 100 watts may be used.

d. Start-sweep timing accurate to 1 microsecond, preferred, but at least to 100 milliseconds.

e. ChirpcommTM transmission, if authorized.

808. Special-Purpose Sounders. Special-purpose sounder transmitters shall be operated under the following guidelines:

a. Operations 24 hours/day, 7 days/week are to be avoided. Sweep intervals of less than 15 minutes should be avoided. The transmitter shall be operated only for the duration of the contingency, special operation, or exercise.

b. An antenna with a directional beam shall be used whenever operational requirements permit. The objective is to reduce the potential for interference.

c. Normal operating power shall be 10 watts, except for periods of initial synchronization, when 100 watts may be used.

d. Start-sweep timing accurate to 1 microsecond, preferred, but at least to 100 milliseconds.

e. There shall be no more than 4 sounder transmitters operating at any time per area unless dictated by special circumstances.

809. Blanking. Sounder transmitters shall be capable of blanking entire bands (i.e., Aeronautical, Amateur, Broadcast, Maritime, etc.) in accordance with the ITU Table of Frequency Allocations.

PROTECTION OF EMERGENCY, DISTRESS AND SAFETY FREQUENCIES

810. In accordance with the International Radio Regulations interference to Emergency, Distress and Safety Frequencies is not permitted. Accordingly sounder operations must observe the requirements not to cause harmful interference to emergency, distress and safety frequencies listed in relevant sections of the International Radio Regulations.

START TIMES

811. To precede mutual interference, start times must be carefully coordinated. Annex F to this publication provides a list of current ionospheric sounders for use by CCEB nations. Nations are responsible for assigned their own national start times to national ionospheric sounder assets. Wherever possible start times should be coordinated with the CCEB Frequency Planners Working Group. Any changes/additions to the list in annex F should be passed to the Chair FPWG for amendment action to this publication.

ADDITIONAL IONOSPHERIC SOUNDER INFORMATION

812. Further information on ionospheric sounder operations can be obtained from the University of Massachusetts Lowell Atmospheric research Center.

813. Information relating to Ionospheric Sounders can be found on the World Wide Web at http://uml.edu/index.html.

ANNEX A TO
CHAPTER 8 TO
ACP 190(C)

TERMS AND DEFINITIONS

GENERAL

1. The following definitions are listed for the purposes of this document only but conform to those ITU radio regulations where appropriate. They are listed here, together with abbreviations if applicable, for convenience. They are listed in alphabetical order. Only those terms that appear in the text of this publication are included. Details of many technical terms used by frequency managers can be found in the supplements to this publication that cover data exchange formats.

GENERAL TERMS AND ORGANISATIONS

2. **Battlespace Spectrum Management (BSM)**. In the context of this publication, it is the application of the concepts of spectrum management in other than routine military operations.

3. **Combined (when applied to Forces).** In the context of this publication, this term applies to the combination of forces from any 2 or more nations.

4. **Electromagnetic Spectrum (EMS).** The range of frequencies or wavelengths of electromagnetic radiation from 0 to infinity. (See also Chapter 1, para 102).

5. **Frequency Management (Operational/Tactical).** The function of planning, coordinating, and managing use of individual frequencies through tactical operational, engineering, and administrative procedures.

6. **International Telecommunication Union (ITU).** A specialised agency of the United Nations Organisation whose purpose is to maintain and extend international cooperation among its entire member states for the improvement and rational use of telecommunications of all kinds.

7. **North Atlantic Treaty Organisation (NATO).** An alliance of countries whose primary mission is defence of Europe.

8. **Radio.** A general term applied to the use of radio waves.

9. **Radio Services (Radiocommunication Services).** A service involving the transmission and or reception of radio waves for specific purposes.

10. **Radio Waves.** Electromagnetic waves of frequencies arbitrarily lower than 3,000 GHz, propagated in space without artificial guide.

11. **Spectrum Management (Strategic/Operational).** Planning, coordinating, and managing use of the electromagnetic spectrum through operational, engineering, and administrative procedures with the objective of enabling military electronic systems to perform their functions within intended environments without causing or suffering harmful interference.

12. **Spectrum Management Allied Data Exchange Format (SMADEF).** A common data exchange format for frequency management under development by NATO.

13. **Standard Frequency Action Format (SFAF).** A common data exchange format for frequency management developed and implemented by the United States.

SPECIFIC TERMS

14. **Allocation (of a frequency band).** Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radio communication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned.

15. **Allotment.** Entry of a designated frequency channel in an agreed plan.

16. **Assignment.** Authorization given by a designated authority for an electromagnetic emitter to use a frequency or frequency channel under specified conditions.

17. **Battlespace Spectrum Management (BSM) Plan.** A plan that is developed to instruct personnel involved in the spectrum management process within a Combined Task Force.

18. **Combined Restricted Frequency List (CRFL).** An approved list of frequencies used to provide different levels of protection to those frequencies, which if disrupted by harmful, friendly interference, would have a detrimental impact on the operation. Within a single nation/multiple component context, this is referred to as a Joint Restricted Frequency List (JRFL).

19. **Combined Spectrum Management Cell (CSMC)**. The office containing the staff supporting the Combined Task Force (CTF), with delegated responsibility for spectrum management.

20. **Frequency.** A specific point in the spectrum normally the centre of the emission modulation; however, the modulation envelope is not always symmetrical. This frequency is known as the assigned frequency. The word frequency is often used a shorthand for an assignment since this is the principle parameter used to describe an assignment.

OPERATIONAL TERMS

21. **Information Operations (IO).** Actions taken to affect adversary information and information systems while defending ones own information and information systems.

SPECTRUM AND TYPES OF INTERFERENCE

22. **Electromagnetic Compatibility (EMC).** The ability of equipments and systems to function as designed in their intended environments without adversely affecting the operation of, or being affected adversely by, other equipments or systems.

23. **Electromagnetic Environmental Effects (E3)**. Impact of the electromagnetic environment upon operational capability of military forces, equipment, systems, and platforms. Encompasses all electromagnetic disciplines, including electromagnetic compatibility/interference, electromagnetic vulnerability, electromagnetic pulse, hazards of electromagnetic radiation to personnel, ordnance, and volatile materials, and natural phenomena effects.

24. **Harmful Interference**. Interference which endangers the functioning of a radio-navigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radio-communication service.

25. **Interference**. The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radio-communication system, manifested by and performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy.

26. **Intrusion**. The intentional insertion of electromagnetic energy into transmission paths in any manner, with the objective of deceiving operators or of causing confusion.

27. **Jamming**. The deliberate radiation, reradiation, or reflection of electromagnetic energy for the purpose of preventing or reducing an enemy's effective use of the electromagnetic spectrum, and with the intent of degrading or neutralizing the enemy's combat capability.

28. **Meaconing.** A system of receiving radio beacon signals and rebroadcasting them on the same frequency to confuse navigation. The meaconing stations cause inaccurate bearings to be obtained by aircraft or ground stations.

ANNEX B TO
CHAPTER 8 TO
ACP 190(C)

STRUCTURE OF A BATTLESPACE SPECTRUM MANAGEMENT PLAN

GENERAL

2. Chapter 4 introduces the requirement for a BSM Plan. The BSM Plan is used for operations under hostile conditions when the operational area is best considered as a battlespace. This annex describes the format for a BSM Plan. The outline plan in this annex is based on a BSM Plan but it should be noted that the actual content of a BSM Plan would depend on the type of operation.

BSMP

3. A BSM Plan is required for each operation; it is produced by the CSMC as part of its planning process and is usually published as part of the C6 Plan. Although the plan is produced within the C6 branch it is to be integrated with the overall C3 Operations and C2 Intelligence Plan. The BSM Plan relates to the whole of the electromagnetic environment including both communication and non-communication emitters in the frequency range 9 kHz to 400 GHz. It should consist of a minimum of four parts, with additional parts being added as required. The individual parts are identified below:

PART 1 - STRATEGY (FREE TEXT)

4. This part outlines the Commander's mandate and the spectrum management strategy for the operation. It identifies the constraints, restraints, assumptions, requirements and procedures to establish a robust optimised spectrum usage plan for the force. The style of Part 1 will differ for each deployment depending on the size and shape of the force and the type of operation. Some of the major elements expected to be contained within Part 1 are given below:

a. The Commander's Spectrum Strategy. This will reiterate the aim of the operation and the mandate the commander has received to accomplish the aim. In particular it will define the extent of his authority with respect to management of the spectrum and his relationship with host nation or other national administrations.Spectrum management control process. To include a description of the agreed spectrum management structure and responsibilities for each level of command.Force Spectrum Requirements. This element will include a breakdown of the force structure to identify all deployed friendly emitters and the overall spectrum requirement for each component and coalition partner. The requirement may be displayed as a matrix, broken down into pre-determined frequency bands. Additionally, the Maritime Component may be operating from a predetermined communications plan (COMPLAN). In such cases, the component frequency manager must coordinate with and receive approval from the CSMC to use the COMPLAN.Assignment or Allotment. Many systems, particularly communications, have their own frequency management tools that assign frequencies for

particular links and nets, such systems will require frequency allotments. Others have no such tool and may require frequencies to be assigned. The BSM plan will identify the agreed method of providing de-conflicted frequencies. Procedures for Reporting Interference. Where common operating procedures do not already exist, procedures such as interference reporting will have to be contained within the plan.

b. Assumptions. The planning phase for rapid deployments may be short. In such situations, there may be insufficient time to establish the true force spectrum requirements and assignment and allotment tables will have to be produced based on a number of assumptions. It is important that these assumptions about the parameters of an equipment or platform are published in order to correct potential problems at a later date. Within the CSMC it is anticipated that a number of defaults will be established for different classes of equipment.

c. Constraints and Restraints. A number of constraints that affect the way spectrum can be used within a theatre of operation may be recognised prior to deployment. Such constraints are to be published to ensure that the planning process is fully understood by all managers.

d. Adjacent Nation Liaison. Electromagnetic radio waves have no respect of national borders. It is therefore a requirement that the deployed force, whenever possible, liaise with administrations of adjacent nations, when it is probable that the force will cause international interference. The liaison process should be described in this part.

e. Response to Spectrum Congestion. Once the electronic order of battle is determined it will become apparent whether parts of the spectrum are likely to be overloaded. The means that will be adopted to deal with spectrum congestion should be described since this may mean some constraints leading to a loss of capability.

f. Land/Sea/Air Co-ordination. The area of operations is most often concentrated in a land environment but naval or air operations may also predominate in the battlespace. The relationships between these three elements and their use of the spectrum should be detailed. In particular this section will deal with forces moving into or through the battlespace.

PART 2 – FREQUENCY ASSIGNMENT TABLES

5. These tables will indicate frequencies assigned to combined or coalition partners in accordance with the requirements established at part 1. The tables should, unless otherwise stated, place forces and their subordinates in a hierarchical format, and include the classification and formation or unit. All constraints on the use of frequencies should be included. Part 2 may be broken down into sections to meet the requirements of the distribution process. One method of splitting the assignment table into sections is:

a. Communications Frequency Assignment Tables. The Emission Control Policy may require some, but not all tactical communications systems to change frequency on a regular basis. The tables should be constructed to meet this requirement.

b. Non-communications Frequency Assignment Tables. Constructed in a manner that enables easy identification of the system and equipment associated with its component.

PART 3 – FREQUENCY ALLOTMENT TABLES

6. These tables will indicate frequencies allotted to coalition partners, components and individual systems. The tables should appear in a Force hierarchical sequence and system order. The individual table should describe the area in which the allotment is to be used. This part may be broken down into sections to aid distribution. Using the following two sections may assist with the distribution process.

a. Communications Frequency Allotment Tables. Mainly required to provide frequencies to a communications system possessing a frequency management tool.

b. Non-communications Frequency Allotment Tables. Primarily lists those frequencies provided to radars that are channelized.

PART 4 – COMBINED RESTRICTED FREQUENCY LIST

7. This list contains frequencies designated as taboo, protected, and guarded. The table should be presented in a logical sequence based on the status i.e. taboo, guarded etc, and frequency listing starting at 9 kHz and ending with 400 GHz.

PART 5 – FREQUENCY UTILISATION TABLE

8. This table will identify all spectrum/frequencies made available by the host nation, developed from a predetermined communications plan (COMPLAN), or identified through observation, and their users.

PART 6 – FURTHER PARTS

9. Depending on the scope of the operation, additional parts may be required. One such part would be the Assignment Table for Non-Military Emitters. This would be required where no civil administration exists. It may include in country civil emitters and NGO requirements. This

information will most probably have a lower classification than Parts 2, 3 and 4 and may be handed to a civil administration once formed.

ANNEX C TO
CHAPTER 8 TO
ACP 190(C)

INTERFERENCE REPORT FORMAT

GENERAL

1. The following information is a format example for interference reports. The CSMC will provide the expected format for each Task Force when it publishes the BSMP.

SAMPLE FORMAT

INTERFERENCE REPORT

1. Receiving station experiencing interference.

a. Aircraft Report:
(1) type, tail number, callsign,
(2) Type emission (strike, recon, training) and nicknames, if any,
(3) departure point and destination
(4) true course, ground speed, and mean sea level altitude,
(5) parent organization;

b. Ground Site Report:
(6) victim designation and call sign,
(7) victim function (surveillance, ground-controlled intercept, communications, etc),
(8) parent organization (when applicable);

c. Ship Report:
(9) type, callsign, number and name,
(10) route or operations area,
(11) true course and speed,
(12) type mission (training, patrol, etc);

d. Satellite Report:
(13) type, nickname, space defense object number, and inter-range operations number,
(14) orbit (apogee, perigee, inclination, and revolution number),
(15) name and co-ordinates of servicing ground station.

2. Type incident (meaconing, intrusion, jamming or interference).

3. Operator or point of contact, function, e-mail addresses, and telephone number.

4. Weather conditions.

5. Nomenclature of equipment affected.

6. Were photos, drawings, or signal recordings made? If so, show to whom sent.

NOTE: On photos or drawings, include azimuth, heading, range mark values, and other orientation data, and identification or nomenclature o scope used to obtain photos or drawings. On tapes, show recording speed and approximate location of MIJI signal, annotate with operator's comments if possible.

7. Date, time (Z), and co-ordinates interference began.

8. Date, time (Z), and co-ordinates interference most effective.

9. Date, time (Z), and co-ordinates interference ended.

10. List any bearings to interference source with corresponding time (Z) and direction finder (DF) facility co-ordinates communications.

11. Transmitter being affected (call sign, frequency, bandwidth, type omission, or audio characteristics).

12. Interfering signal (call sign, frequency, bandwidth, type emission, or audio) characteristics.

13. Use or purpose of frequency affected.

14. Interference effectiveness (percent of copy lost).

15. Other stations or units confirming interference.

16. How did interference begin or end (faded, abruptly, victim, or shifted frequency)?

17. Electronic counter-countermeasures (ECCM) use and results (alternate frequencies used successfully.

NAVAIDS

18. Identification and location of NAVAID affected.

19. Type of NAVAID, frequency; or channel.

20. Interference call sign heard.

21. Interference effects or characteristics.

22. Other NAVAIDS being monitored.

RADAR

23. Victim operating frequency.

24. Interference signal bandwidth.

25. Sector width of main lobe jamming and azimuth of strongest intensity (use optimum gain).

26. Sector width of side or back lobe jamming and azimuth of strongest intensity. Report whether back or side lobe.

27. Type interference (continuous wave (CW), pulse, noise, etc).

28. Interference effectiveness (percent degradation of target detection capability inside and outside the sector affected by interference).

29. Persistence of interference (steady, varied, on, off, explain).

30. Was interference present in standby mode, sector scan, with antenna stopped or after changing range modem?

31. Antenna tilt or elevation for maximum interference.

32. ECCM used and results.

33. Best ECCM mode.

34. If electronic support measures receivers available, results of frequency spectrum check. Attempt to relate interference signal to other activity (this is, check for synchronization, pulse recurrence frequency, scan with other signals on interference line of bearing).

35. Interference effect of RWR: Billboards illumination, strobe (type, length, and bearing) audio?

36. Chaff

a. rack length, width and altitude?
b. coordinates for start, stop, and turn points;
c. estimated rate of fall;
d. chaff and aircraft fade time?
e. type of drop (random, streak etc)?
f. wind direction and velocity?
g. were chaff samples obtained? If so, show to whom sent. If available, send according to item 6.

37. Electro-Optics (E-O)

a. frequency or wavelength of victim equipment;
b. bandwidth (bandpass) of victim equipment;
c. frequency or wavelength of interference;
d. bandwidth of interference;
e. coherent or non-coherent radiation?
f. collimated beam, specular, or diffuse?
g. extent of E-O radiation in azimuth, and elevation at victim location?
h. pulsed or CW radiation?
i. modulation characteristics;
j. type of E-O equipment affected;
k. use of purpose of victim E-O equipment;
l. effect of E-O interference on victim equipment;
m. effectiveness of E-O interference;
n. how did E-O interference start (abrupt, fade-in)?
o. persistence of E-O interference (steady, on-off; explain)?
p. how did E-O interference end (abrupt, fadeout)?
q. if victim E-O equipment has an active E-O mode (that is, active source) is interference present in all modes (active, passive, standby)?
r. were any E-O counter-countermeasures used? If so, with what results?
s. presence of any concurrent audio, visual, or electromagnetic indications of E-O interference;
t. were any non E-O equipment victim of interference activity concurrently and if so, report applicable data under proper item numbers;
u. expand upon weather conditions (item 4) to include temperature, relative humidity, visibility (haze, fog smoke, clouds), and precipitation.

SATELLITES

38. Victim data:

a. uplink or downlink signal affected;
b. frequency, signal strength, bandwidth, and modulation;
c. receiver bandwidth and sensitivity;
d. antenna size, type and gain;
e. interfering signal:
    (1) frequency, bandwidth, signal strength,
    (2) bearing data (azimuth or elevation);
    (3) description (type, duty factor, variations in signal strength, etc),
    (4) effectiveness (percentage of degradation),
    (5) suspected sources;
f. identification of, location of, and bearing from other interception stations.

39. Narrative

a. summarize the interference incident. Operator's explanation of just what happened.
b. list ships, ground units, aircraft in vicinity that might be interference source. (Use only secure communications to discuss interference with other units);
c. state mission phase at the time of incident (routine operations, in combat, flying to target, etc);
d. include the term "final report" if additional reporting is not anticipated.

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ANNEX D TO
CHAPTER 8 TO
ACP 190(C)

EXAMPLES OF SPECTRUM MANAGEMENT ALLIED DATA EXCHANGE FORMAT

(Reserved for Examples of Spectrum Management Allied Data Exchange Format)

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ANNEX E TO
CHAPTER 8 TO
ACP 190(C)

GUIDE TO THE STANDARD FREQUENCY ACTION FORMAT

GENERAL

1. The following information has been extracted from the US Military Communications Electronics Board (USMCEB) Publication 7, Appendix A with Annexes. This information is provided to help standardise information exchange. The following list is not all inclusive. The CSMC will provide detailed instructions on required fields, formats and expected information.

NOTE: The formatting of the original document may have changed to facilitate including this information in this publication.

SFAF Data Item Number	Title	Maximum Input Lengths	Maximum Occurrences
	ADMINISTRATIVE DATA		
005	Security Classification	2,10	1
006	Security Classification Modification	2,10	1
010	Type of Action	1	1
014	Derivative Classification Authority	8,60	10
015	Unclassified Data Fields	72	1
016	Extended Declassification Date	35	1
017	Downgrading Instructions	1,8	1
018	Original Classification Authority	60	1
019	Reason for Classification	35	1
102	Agency Serial Number	10	1
	EMISSION CHARACTERISTICS		
110	Frequency (ies)	11,11-11,11(11)	1
111	Excluded Frequency Band	23	30
112	Frequency Separation Criteria	35	1
113	Station Class	4	20
114	Emission Designator	11	20
115	Transmitter Power	9	20
116	Power Type	1	20
117	Effective Radiated Power	6	20
118	Power/ERP Augmentation	1	20
	TIME/DATE INFORMATION		
130	Time	4	1

SFAF Data Item Number	Title	Maximum Input Lengths	Maximum Occurrences
140	Required Date	8	1
141	Required Date	8	1
	ORGANIZATIONAL INFORMATION		
200	Agency	6	1
201	Unified Command	8	10
202	Unified Command Service	8	10
204	Command	18	1
205	Subcommand	18	1
206	Installation Frequency Manager	18	1
207	Operating Unit	18	10
208	User Net/Code	6	1
	TRANSMITTER LOCATION DATA		
300	State/Country	4	1
301	Antenna Location	24	1
303	Antenna Coordinates	15	1
306	Authorized Radius	5	1
	SPACE STATIONS		
315	Equatorial Inclination Angle	4	1
316	Apogee	5	1
317	Perigee	5	1
318	Period of Orbit	7	1
319	Number of Satellites	2	1
321	Power Density	4	1
	TRANSMITTER EQUIPMENT		
340	Equipment Nomenclature	1,18	10
341	Number of Stations, System Name	5,29	3
345	Radar Tunability	2	1
346	Pulse Duration	9,9-9	30
347	Pulse Repetition Rate	9,9-9	30
	TRANSMITTER ANTENNA DATA		
354	Antenna Name	10	10
355	Antenna Nomenclature	18	10
356	Antenna Structure Height	3	10
357	Antenna Gain	4	10
358	Antenna Elevation	5	10
359	Antenna Feedpoint Height	5	10
360	Antenna Horizontal Beamwidth	4	10
361	Antenna Vertical Beamwidth	3	10
362	Antenna Orientation	3 3,3 3,3-3 3,3/3	10
363	Antenna Polarization	1	10

SFAF Data Item Number	Title	Maximum Input Lengths	Maximum Occurrences
	RECEIVER LOCATION DATA (max 30)		
400	State/Country	4	1
401	Antenna Location	24	1
403	Antenna Coordinates	15	1
406	Authorized Radius	4	1
408	Repeater Indicator	1	1
	SPACE STATIONS (max 30)		
415	Equatorial Inclination Angle	4	1
416	Apogee	5	1
417	Perigee	5	1
418	Period of Orbit	7	1
	RECEIVER EQUIPMENT (max 30)		
440	Equipment Nomenclature	1,18	10
	RECEIVER ANTENNA DATA (max 30)		
454	Antenna Name	10	10
455	Antenna Nomenclature	18	10
456	Antenna Structure Height	3	10
457	Antenna Gain	4	10
458	Antenna Elevation	5	10
459	Antenna Feedpoint Height	5	10
460	Antenna Horizontal Beamwidth	4	10
462	Antenna Orientation	3 3,3 3,3-3 3,3/3	10
463	Antenna Polarization	1	10
	SUPPLEMENTARY DETAILS		
502	Description of Requirement	1440	1
505	NATO Pooled Frequency Code Number	5	1
511	Major Function Identifier	30	1
512	Intermediate Function Identifier	30	1
513	Detailed Function Identifier	30	5
520	Supplementary Details	1080	1
	OTHER ASSIGNMENT IDENTIFIERS		
701	Frequency Action Officer	3	1
702	Control/Request Number	15	1
705	Systems Identifier	24,32	1
	ADDITIONAL INFORMATION		
801	Coordination Data/Remarks	60	20
803	Requestor Data	60	1
804	Tuning Range/Tuning Increments	60	30
805	Date Response Required	8	1

SFAF Data Item Number	Title	Maximum Input Lengths	Maximum Occurrences
806	Indication if Host Nominations are Acceptable	60	10
	ADDITIONAL INFORMATION (cont')		
982	JCEOI Line Number	5	1
983	JCEOI Master Net List Name	16	1
984	Net Frequency Range	11-11	1
985	Joint Restricted Frequency List Protection Code	1,1/2	1
986	Net Tactical Call Word	15	1
987	Net Tactical Call Sign	3	1
988	Net Tactical Air Designator (TAD)	5	1
989	Net Color Word	16	1
990	Net Color Number	2	1
991	Net Restoral Priority	3	1
992	Net Push Number	3	1
993	Band Usage	1	1
994	Check Sum	1	1
995	COMSEC Keymat	15	1
996	Circuit Type, Line Item, Group Category	8	1
997	JCEOI Special Net Instructions	63	1
998	Net Notes	3	1
999	Guard Requirements	20	50

Table 0-1 Summary Table

NOTE: A maximum of 30 receiver locations are allowed in a frequency assignment record. The number of occurrences in items 400 – 473 is related to the number of occurrences that are permitted at each receiver site. For example, only one item 400 is permitted at a site, while 10 equipment nomenclatures are permitted at any single receiver site. In other items, the maximum number of occurrences relate to the number of occurrences permitted in a complete record.

DATA ITEMS

2. ADMINISTRATIVE DATA - Data items 005 through 007, 010, 020, and 102 through 108 provide data to initiate the processing of frequency assignments.

Security Classification 005
2,10 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: FOI (for any Special Handling Code listed below), (CLA, CDD if the same as sent to NTIA.)

3. **Description:** Data Item 005 has two parts. Part one contains a 2-letter designator representing the security classification of the record and the record special handling instructions. The second part of the item contains a 10-character field containing the record declassification

instructions. The record declassification instructions must always be entered if the first character of the security classification is a "**C**," "**S**," or "**T**."

CLASSIFICATION CODES - FIRST CHARACTER

U - UNCLASSIFIED **C** - CONFIDENTIAL **S** - SECRET **T** - TOP SECRET

SPECIAL HANDLING CODES - SECOND CHARACTER

4. A Special Handling Code is required in all UNCLASSIFIED frequency assignment records as well as in TOP SECRET, SECRET, or CONFIDENTIAL records to reflect the fact that if the classified data were removed from the record, the remaining UNCLASSIFIED data must still be protected in accordance with the applicable special handling code. Remember, this could apply in instances where SECRET or CONFIDENTIAL records are sent to NTIA as UNCLASSIFIED records for inclusion in the GMF automated database.

A - Approved for public release; distribution is unlimited (DoD Directive 5230.24).

B - Releasable to soil country and the North Atlantic Treaty Organization (NATO); otherwise, not releasable outside the US Government in accordance with (IAW) Section 552 (b)(1) of Title 5 of the US Code.

E - Not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

F - Not releasable to foreign nationals and not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

H - Releasable to soil country only; otherwise, not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

J - Contingency Assignment - The record contains unified commander comments only; not releasable to foreign nationals unless formally coordinated; otherwise, not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code

K - Permanent assignment. Available for contingency use within the theater after coordination with and approval of the cognizant unified commander - releasable to soil nation; otherwise, not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

N - Releasable to NATO; otherwise, not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

P - Proprietary; otherwise, not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

5. The following special handling codes are used within TOP SECRET stand-alone databases and are not to be used within the FRRS worldwide SIPRNET database system:

L - Sensitive Compartmented Information [SCI]; otherwise, not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

Q - Special Category (SPECAT); otherwise, not releasable outsidethe US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

R - Special Access Required (SAR); otherwise, not releasable outside the US Government IAW Section 552 (b)(1) of Title 5 of the US Code.

DECLASSIFICATION INSTRUCTIONS

6. For TOP SECRET, SECRET, or CONFIDENTIAL records, follow the security classification with a comma, and the appropriate declassification instruction, using one of the following formats:

DEYYYYMMDD - Declassify on: Enter **DE** followed by the year (**YYYY**), the month (**MM**) and the day of the month (**DD**). If the declassification date set at the time of the original classification action is to be extended beyond 10 years, a data entry is required in Data Item 014.

DEOADR - Declassify on: Originating Agency Determination Required. If DEOADR is used in a record, an entry is required in Data Item 014.

Examples:
005. UE
005. CB,DE20051130
005. SE,DEOADR

DEXnnnnnnn - Declassify on: Exempt from automatic declassification. The letters "nnnnnnn" indicate one or more reasons (see list below) why TOP SECRET, SECRET, and CONFIDENTIAL records cannot be automatically declassified. Enter **DEX** followed by one to seven numbers, in numerical order, applicable to the appropriate reason(s) listed below.

a. Reveal an intelligence source, method, or activity, or a cryptologic system or activity.

b. Reveal information that would assist in the development or use of weapons of mass destruction.

c. Reveal information that would impair the development or use of technology within a US weapons system.

d. Reveal US military plans or national security emergency preparedness plans.

e. Reveal foreign government information.

f. Damage relations between the US and a foreign government, reveal a CONFIDENTIAL source, or seriously undermine diplomatic activities that are reasonably expected to be ongoing for a period greater than ten years.

g. Impair the ability of responsible US government officials to protect the president, the vice president, and other individuals for whom protection services, in the interest of national security, are authorized.

h. Violate a statute, treaty or international agreement.

Examples:
005. SH,DEX1 (one reason for exemption from automatic declassification)
005. CJ,DEX134 (three reasons for exemption from automatic declassification)

DE25Xn - Declassify on: Permanently valuable information (as defined by the national archivist) is exempt from automatic declassification 25 years beyond the original classification date. (The letter ”n” indicates why a TOP SECRET, SECRET, or CONFIDENTIAL record cannot be automatically declassified 25 years after the original classification date.) Enter **DE25X** followed by a number ”n” from the applicable paragraph below. Note: When the value of ”**n**” is greater than ”**1**", an entry is required in Data Item 016

a. Reveal the identity of a CONFIDENTIAL human source, or reveal information about the application of an intelligence source or method, or reveal the identity of a human intelligence source when the unauthorized disclosure of that source would clearly and demonstrably damage the national security interests of the US.

b. Reveal information that would assist in the development or use of weapons of mass destruction.

c. Reveal information that would impair US cryptologic systems or activities.

d. Reveal information that would impair the application of state-of-the-art technology within a US weapon system.

e. Reveal actual US military war plans that remain in effect.

f. Reveal information that would seriously and demonstrably impair relations between the US and a foreign government, or seriously and demonstrably undermine ongoing diplomatic activities of the US.

g. Reveal information that would clearly and demonstrably impair the current ability of US Government officials to protect the president, vice president, and other officials for whom protection services, in the interest of national security, are authorized.

h. Reveal information that would seriously and demonstrably impair current national security emergency preparedness plans.

i. Reveal information that would violate a statute, treaty, or international agreement.

Example:
005. SH,DE25X5

7. **Input** Requirement**:** Data Item 005 is always required. Enter the overall security classification of the frequency proposal or assignment and the appropriate special handling code. When applicable, each UNCLASSIFIED frequency assignment must have a special handling code so it can be identified as a record that has been separated from a CONFIDENTIAL group defined in the *DoD Frequency Assignment Security Classification Guide*.[1]) As a security precaution, this data item cannot be deleted from a record and can only be changed by use of Data Item 006.

Security Classification Modification 006
2,10 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: See Data Item 005.

8. **Description:** Data Item 006 specifies the **new** security classification and/or special handling code that is to be assigned to an existing record and/or a change to the declassification instructions.

9. **Input Requirement:** If the record's security classification, special handling code, or declassification instructions are to be changed, enter the new security classification data and make appropriate classification code changes to the data items that are affected. (Data Item 006 must always be preceded by Data Item 005 to show the record's **existing** security classification.)

Examples:
006. UE
006. CB,DEOADR
006. SB,DE19980715

Missing Data Indicator 007
1 character - 1 occurrence
Submitted to IRAC: yes GMF tag: MSD

10. **Description**: A "Z" in this data item indicates that SECRET data is missing from the automated record sent to NTIA. (The SECRET record is separately submitted to NTIA as a paper document).

11. **Input Requirement**: Not used by DoD. Non-DoD organizations enter the letter Z to indicate that this record would be classified SECRET if all data submitted to NTIA were provided.

Example:
007. Z

Type of Action 010
1 character - 1 occurrence
Submitted to IRAC: yes GMF tag: TYP

12. **Description:** Data Item 010 indicates the type of action required to process the frequency assignment transaction.

13. **Input Requirement**: Data Item 010 is always required and must contain one of the type of action codes described below.

a. Administrative Modification. This action is similar to a Modification (M) action; however, it is used to make three specific types of changes:

(a) Changes due to typographical errors in the authorizing document

(b) Changes in administrative data items (e.g., 200 series)

(c) Mass changes required for compliance with international, national, or DoD rules and regulations.

14. The review date (Data Item 142) will not be automatically changed if a Administrative Modification action is used.

D - **Delete**. Used to remove an existing record from a database.

E - **Expired**. A computer-generated code used by NTIA to remove an expired record from the GMF and its matching record from the FRRS.

F - **Notification**. Used to notify the activation of a frequency for a particular station or stations under the authority of a group assignment. Data Item 105 must also be specified.

M - **Modification**. Used to add, substitute, or remove one or more data items in an existing record.

N - **New**. Used to create a new record and place it in the appropriate online database.

R - **Renewal**. Used to extend the expiration date of a temporary assignment. Other data may be changed as necessary.

Example:
010. M

Derivative Classification Authority 014
8,60* characters - 10 occurrences
Submitted to IRAC: yes GMF tag: *CLF

15. **Description:** This data item indicates the date, title, and publishing organization of the source document from which one or more TOP SECRET, SECRET, or CONFIDENTIAL data entries in the record were derived.

16. **Input Requirement**: This data entry is required when the DECLASSIFICATION INSTRUCTIONS in Data Item 005 contain "DEOADR" or when the classification of data is "Derived From" other sources such as security classification guides, J-12 documents, or operations plans. The data entry will be the source date (formatted YYYYMMDD (year-month-day)), a comma followed by the title and the publishing organization. (An entry in Data Item 018 is not required when Data Item 014 is used.) Whenever all of the multiple sources are entered, the most restrictive declassification instruction from all of the sources used must be entered in the second part of Data Item 005.

Examples:

014. 19930815, B-1B SCG, OC-ALC/LAB	(a single example)
014. 19921122, OPLAN 2104, CINCPAC	(a two document example)
014/2. 19870614, J-12 5502/4, USAFFMA	

17. When the original classification authority extends a declassification date in Data Item 005 beyond the initial ten-year period, this field may be used to identify the date the declassification date was extended, the individual, and individual's agency or organization that approved the extension. This entry is not necessary when the classification is derived from another source, and the source is identified in accordance with the subparagraph above.

Example:

014. 20051105,CDR CINCPAC

* Data in records where SFAF Data Item 144 equals "Y" cannot exceed 35 characters until NTIA lengthens the GMF field.

Unclassified Data Fields 015
72* characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *CLU

18. **Description:** This data item alerts the reader of a printed or automated displayed record that there are instances when UNCLASSIFIED data entries are not preceded by the entry (U) in a CONFIDENTIAL, SECRET, or top secret assignment.

19. **Input Requirement:** This data item is required for all classified records. Note, even though all data entries in a record are classified, there are UNCLASSIFIED data entries, computer-generated by the JSC.

Example A: (for use in CONFIDENTIAL and SECRET FRRS records)
015. DATA ENTRIES NOT PRECEDED WITH (C) OR (S) ARE UNCLASSIFIED

Example B: **(**for use only in TOP SECRET stand-alone operations)
015. DATA ENTRIES NOT PRECEDED WITH (C), (S) OR (T) ARE UNCLASSIFIED

* Data in records where SFAF Data Item 144 equals "Y" cannot exceed 35 characters until NTIA lengthens the GMF field. The current GMF data entry is automatically converted from the above

SFAF data entry to the standard GMF entry: REMnn ALL DATA FIELDS NOT LISTED IN *CLD

Extended Declassification Date 016
35 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *CDE

20. **Description**: Data Item 016 contains a declassification date (in the format YYYYMMDD) that is beyond 25 years from the date of original classification.

21. **Input Requirement**: Data Item 016 is required when Data Item 005 contains DE25Xn, where the value of "n" is greater than 1.

Example:
016. 20351231 (for Dec 31, 2035)

22. In rare instances, a textual entry may be present.

Downgrading Instructions 017
1,8 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *AGN,DNG-

23. **Description:** This data entry is a two-part field. The entry contains the new classification level ("C" for Confidential or "S" for Secret), followed by a comma and the date (YYYYMMDD) the record is to be downgraded from SECRET to CONFIDENTIAL or downgraded from TOP SECRET to either SECRET or CONFIDENTIAL.

24. **Input Requirement**: Data Item 017 is required whenever there are downgrading instructions contained in the source from which the classified data in the record was derived.

Example:
017. C,19991105

Original Classification Authority 018
60* characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *CLA

25. **De**scription: This data item indicates the title and organization of the individual who determined the original classification of the classified data in the assignment record.

26. **Input Requirement**: Required when classification information is not derived from another document such as a classification guide, J-12 paper, or operations plan (see Data Item 014). Enter the title and organization of the original classification authority.

Examples:
018. CDR,AMC
018. CDR,AFMC
018. CDR,7FLT

27. If the identification of the original classification authority reveals additional classified information, an entry of "018. EXCLUDED, 1.7.B" is permitted.

* Data in records where SFAF Data Item 144 equals "Y" cannot exceed 35 characters until NTIA lengthens the GMF field.

Reason for Classification 019
35 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *CLR

28. **Description:** This data item contains a coded data entry indicating the reasons the original classification authority determined that the data in this assignment was classified.

29. Input Requirement Required when classification information is not derived from another document such as classification guides, J-12 documents, or operations plans. Enter the reason for the classification from the list provided below. The data entry will be 1.5 followed by one or more letters in alphabetical order applicable to the appropriate paragraphs below.

A- Military plans, weapons systems, or operations

B- Foreign government information

C- Intelligence activities (including special activities), intelligence sources or methods, or cryptology

D- Foreign relations or foreign activities of the US, including confidential sources

E- Scientific, technological, or economic matters relating to the national security

F- US Government programs for safeguarding nuclear materials or facilities

G -Vulnerabilities or capabilities of systems, installations, projects or plans relating to national security.

Examples:
019. 1.5A
019. 1.5EG

30. In rare instances, a textual entry may be present such as "Foreign RELATIONS."

Example:
019. FOREIGN RELATIONS

Proposal References 020
64 characters - 10 occurrences
Submitted to IRAC: no GMF tag: None

31. **Description:** Data Item 020 is the originating requester's message date-time-group (DTG), E-mail or letter reference.

32. Input Requirement: (Optional). Enter the requester's message DTG with a Plain Language Address Designator (PLAD) or other reference. This information will appear in FRRS transaction files only; it will not appear in the GMF or FRRS central databases.

Example:
020. NFCWUS 041325Z DEC 87

Agency Serial Number 102
10 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: SER

33. **Descript**ion: Data Item 102 is the primary FRRS record identifier. It is unique and cannot be changed.

34. **Input Requirement:** The agency serial number is required for all types of actions that will be entered into the FRRS central database. The serial number is formatted as AAAAYYNNNN. The agency abbreviation (identifier) for the assignment (as defined in the *NTIA Manual* or as listed below) is entered in characters 1-4 (AAAA). When AAAA is less than four characters, trailing spaces are required; the next two numbers (YY) identify the calendar year in which the assignment initially is processed; the following four numbers (NNNN) are specified to uniquely identify the assignment. The following are agency serial number identifiers for MILDEP/JFP frequency assignments:

IDENTIFIER	ORGANIZATION	
AF	Air Force	
AR	Army	
CEN	USCINCCENT	- Commander-in-Chief, Central
EUR	USCINCEUR	- Commander-in-Chief, Europe
J	DoD	
LA	CINCUSJFCOM	- Commander-in-Chief, Joint Forces
N	Navy	
NS	NSA	
PAC	USCINCPAC	- Commander-in-Chief, Pacific
SOU	USCINCSO	- Commander-in-Chief, Southern

Example:
102. N 775163

EMISSION CHARACTERISTICS

35. Data items 110 through 118 contain the command process of designating a required frequency, and the relationship of the frequency with controlling factors such as station class, emission designators, and power.

Frequency(ies)110
11 or 11-11 or 11(11) characters - 1 occurrence
Submitted to IRAC: yes GMF tag: FRQ or *FRB

36. **Description**: Data Item 110 is the frequency band or discrete frequency assigned to the unit and/or required for the equipment described in the assignment. A reference frequency, if included, is the assignment of a suppressed or reduced carrier sideband.

37. **Input Requirement:** This data item is always required. Enter the discrete frequency or frequency band assigned to the unit and/or required for the equipment described in the assignment. A reference frequency, if included in parenthesis, is the assignment of a suppressed or reduced carrier sideband. For a frequency band assignment, enter the lower frequency and the upper frequency (separated by a dash) with the frequency unit indicator preceding the lower frequency. An upper frequency range unit indicator is required if the units of the upper frequency range is different from the units of the lower frequency range, e.g. 110. K2000-M35. For certain operations, the assignment of a range of frequencies (frequency band) may be required in lieu of a specific operating frequency. These types of assignments shall only be requested when specific frequencies will not satisfy the requirements. Frequency band assignments are normally authorized for the following:

a. Transmitters which automatically sweep through all frequencies in a band.

b. Radiosonde transmitters operating in either of the bands: M400.15 - 406.0 or M1670 - 1700.

c. Frequency-agile radar beacons (racon) operating in either of the bands: M2900 - 3100 or M9300 - 9500.

d. Transmitters that use automatic frequency selection based on changing propagation conditions along the transmission path.

e. Transmitters that automatically pause at 15 or more specific operating frequencies within a band.

f. Operations that require the use of 15 or more specific operating frequencies within a band for Research, Development, Test and Evaluation (RDTE) purposes.

g. Operations that involve a multitude of mobile radiolocation or radionavigation transmitters. Whenever possible, at the option of the applicant, operational frequencies may be recorded in Data Item 503.

h. Tactical and/or training assignments (above 30 Megahertz (MHz)) that require the use of 15 or more specific operating frequencies within a band.

i. Operations devoted exclusively to Electronic Warfare (EW), Electronic Countermeasures (ECM), and/or Electronic Counter-Countermeasures (ECCM). For sideband operations, enter the reference frequency in parentheses after the assigned frequency.

38. Precede the frequency value with unit indicators as follows:

K - if frequency is less than 30 MHz
M - if frequency is at least 30 MHz, but less than 100 GHz
G - if frequency is at least 100 GHz, but less than 3 THz
T - if frequency is 3 THz or greater.

39. Insert a decimal point only if there is a significant digit to the right of the decimal point.

Examples:
110. K17034
110. K6737.5(6736)
110. K2000-M30

40. For frequency band(s) that are to be excluded from a given frequency band, enter the excluded bands in Data Item 111.

Example:
110. M13250-15700
111. M14770-14930

SPECIAL CONSIDERATION FOR PROCESSING FREQUENCY ENTRIES

41. Frequency(ies), frequency bands, or reference frequencies listed in FRRS records cannot be changed. Frequency data is required (as part of a computer triple check of frequency (Data Item 110), record security classification (Data Item 005), and record serial number (Data Item 102)) to ensure that the correct record is being modified.

42. Failure to enter the complete frequency, upper frequency limit, or reference frequency (Data Item 110) when using a Modification action is a frequent mistake that is overlooked during computer processing; **however, mistakes made in entering the security classification of Data Item 110 are not overlooked during computer processing.** The security classification of Data Item 110 is processed the same way as a data item being modified using a Modification action. For example, a modification input of **110. M9345** would change a record containing **110. (C) M9345-9465** to read **110. M9345-9465**. In this example, the frequency data (M9345-9465) remained unchanged, but the classification of the frequency data was **declassified from (C) to (U)**.

Excluded Frequency Band 111
23 characters - 30 occurrences
Submitted to IRAC: yes GMF tag: *FBE

43. **Description:** Data Item 111 is used in conjunction with a frequency band assignment to designate portions of the band excluded from the assignment.

44. **Requirement**: If a portion of a frequency band entered in Data Item 110 is to be excluded, enter the frequency band(s) to be excluded (in ascending order). An upper frequency range unit indicator is required if the unit of the upper frequency range is different from the unit of the lower frequency range.

Example:
111. M960-1770
111/2. M2200-2400

Frequency Separation Criteria 112
35 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

45. **Descrip**tion: Data Item 112 identifies the required frequency separation between the different radio sets operated at one transmitter or receiver location.

46. Input Requirement: Data Item 112 is required for USCINCEUR and USCINCCENT assignments. It is optional for all others. Enter the required frequency separation (Δ), in MHz, between the different radio sets operated at one location.

0.5 MHZ - For a transmitter power below 24.8 dBW (300 watts), enter 0.5 MHZ

2 MHZ - For a transmitter power above 24.8 dBW (300 watts), enter 2 MHZ

2.0 - 9.9 MHZ - For an exceptionally high transmitter powers, enter values between 2.0 MHz and 9.9 MHz.

47. If radio sets have two or more power stages, enter the dBW value and F for each power stage. Note: This data is required in order to avoid desensitizing the receivers if two or more UHF radio sets are operated at one location simultaneously, e.g., at a tower. This data also is required to establish the prerequisites for an interference-free radio communication.

48. If, in radio relay frequency requests, a minimum frequency separation between a number of transmitters or between a transmitter and a receiver must be observed, these separation frequencies are to be entered. Enter the value in MHz. Use the following abbreviations and separate them with slashes:

TX - Transmitter
RX - Receiver

Examples:
112. 0.5 MHZ
112. 2.0 MHZ
112. TX/TX40MHZ/TX/RX100MHZ

Station Class 113
4 characters - 20 occurrences
Submitted to IRAC: yes GMF tag: STC

49. **Description:** Data Item 113 identifies the functional use of the assigned frequency at a particular transmitting station. See Annex A to this appendix for a list of acceptable station class symbols and their definitions. The suffix R is included if a station is used primarily as a repeater and operates in the bands 29.89-50 (exclusive Government use), 138-144, 148-148.9, 150.05-150.8, 162-174, and 406.1-420 MHz.

50. **Input Requirement:** Enter one or more standard station class symbol(s). (Data items 113, 114, 115 and (116 for Europe only) are interrelated, and an entry in any of the three data items must be accompanied by a corresponding entry in the other data items.)

Example:
113. FX
113/2. FX

Emission Designator 114
11 characters - 20 occurrences
Submitted to IRAC: yes GMF tag: EMS

51. **Description:** Data Item 114 identifies the necessary bandwidth and emission classification symbols. The bandwidth can be determined by using formulas shown in the ITU Radio Regulations, CCIR Recommendations, or the NTIA Manual. Emission classification

symbols consist of the three required symbols and the two optional symbols shown in Tables A-B-1 and A-B-2 in Annex B to this appendix.

52. **Input Requirement:** Enter one or more emission designator(s) containing the necessary bandwidth and the emission classification symbols. Enter the necessary bandwidth using the first four characters (three digits and a unit designator letter are required), with the unit designator in the position the decimal would normally occupy. Use:

H - If the value is less than 1000 Hz
K - 1 kHz to values less than 1000 kHz
M - 1 MHz to values less than 1000 MHz
G - 1 GHz or greater.

53. A doppler shift shall not be included in the frequency tolerance or bandwidth of emission; however, when a doppler shift is significant, it should be reported in Data Item 520.

Examples:

a. For a frequency assignment with a single emission designator, enter :
114. 3K00J3E

b. Similarly, for a frequency assignment with two emission designators, enter:
114. 1K24F1B
114/2. 3K00J7B

c. If the same emission is to be used for two different station classes, enter the emissions twice:
114. 100H00F1B
114/2. 100H00F1B

d. To enter multiple emission designators, enter them on subsequent lines as shown below:
114. 3K00J3E
114/2. 3K00J1D
114/3. 1K10F1B
114/4. 100H00A1A
114/5. 3K00J3E
114/6. 100H00A1A

e. To change the third emission designator in a record containing three or more emissions, enter:
114/3. 1K24F1B

f. If the third emission designator is to be deleted, the corresponding entries in data items 113/3 (Station Class) and 115/3 (Power), 116/3 (Power Type) must also be deleted. For example:
113/3. $
114/3. $

115/3. $
116/3. $ (For Europe only)

Transmitter Power 115
9 characters - 20 occurrences
Submitted to IRAC: yes GMF tag: PWR

54. **Description:** Data Item 115 identifies the maximum transmitter power output authorized to be used.

55. **Input Requirement:** Enter one or more power data entries. Enter (1) carrier power (pZ) for A3E sound broadcasting in the broadcasting service, (2) mean power (pY) for other amplitude modulated emissions using unkeyed full carrier, and for all frequency modulated emissions, and (3) peak envelope power (pX) for all emission designators other than those referred to in (1) and (2) above, including C3F television (video only). Express the power to a maximum of five decimal places and precede the entry with the unit designator as follows:

W - If power is less than 1000 watts
K - If power is at least 1 kW but less than 1000 kW
M - If power is at least 1 MW but less than 1000 MW
G - If power is 1 GW or greater.

Example:
115. W0.5
115/2. K1.5

Power Type 116
1 character - 20 occurrences
Submitted to IRAC: no GMF tag: None

56. **Description:** Data Item 116 describes the power type code for either carrier, mean, or peak envelope power emitted. The power type code will depend on the type of emission of the transmitter equipment.

57. **Input Requirements**: Data Item 116 is required for USCINCEUR and USCINCCENT assignments. It is optional for all others. Enter the power type code as defined below. The number of occurrences should match the number of occurrences in Data Item 115. The types of power codes are listed below:

C - Carrier Power
Use this for "N0N" and for "A3E" sound broadcasting service (Station Class "BC").

M - Mean Power

(For all A/A & A/G/A). Use this for most AM emissions using unkeyed full carrier and all frequency modulated emissions. Typical emissions include A2A, A2B, A3C, A3E, A3F, A7B, AXX, F1B, F1C, F2B, F3E, F3F, F7B, FXX, H2A, H3E, and H7B.

P - Peak Envelope Power
Use this for all pulsed equipment, C3F Television, and the following classes: A1A, A1B, A7B, B7B, B8C, B8E, BXX, C3F, G3E, J2B, J3E, J7B, JXX, K1B, K2B, K3E, K3F, L2B, M2B, M3E, P0N, PXX, R2B and R3C.

Example:
116. P
116/2. P

Effective Radiated Power 117
6 characters - 20 occurrences
Submitted to IRAC: no GMF tag: None

58. **Description:** This is the power radiated from the transmitter antenna. It is the sum of the power supplied to the antenna and the gain of the antenna, expressed in dBm.

59. **Input Requirements**: Data Item 117 is filled in some Federal Communications Commission (FCC) and ITU records and is computer-generated by the JSC in other instances. The Effective Radiated Power (ERP) is entered in dBm.

Example:
117. 40

Power/ERP Augmentation 118
1 character - 20 occurrences
Submitted to IRAC: no GMF tag: None

60. **Description:** This is a coded data entry that is used to indicate when either Data Item 115 (Power) or Data Item 117 (ERP) is computer-generated.

61. **Input Requirement:** This is a JSC computer-generated output data item. One of the following codes was used:

P - power field (Data Item 115) computer-generated
E - ERP field (Data Item 117) computer-generated
"blank" - neither field was computer-generated

Example:
118. P

TIME/DATE INFORMATION

62. Data items in this section contain data related to implementation of the assignment, time period when frequency is to be used, expiration/review data, indicators for further processing,

registration through international channels, and identifiers of trunk service and/or joint assignment use.

Time 130
4 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: TME

63. **Description:** Data Item 130 describes the period of time when the frequency will be either guarded (monitored) or used for transmission. The period indicated is not a limitation or a restriction, but rather the period when the frequency must be available to satisfy its operational requirement. The data entered shall indicate (1) whether the frequency is required occasionally or on a regular basis, and (2) whether it is required only during the normal workweek (between 0600 and 1800, Monday through Friday) or for additional periods of time.

64. **Input Requirement:** This data item is required on regular assignments using frequency bands 29.89-50, 138-144, 148-149.90, 150.05-150.80, 162-174, and 406.10-420 MHz, except those for experimental stations and those with IRAC Notes (Data Item 500) S321 and S322. For all other bands at 29890 kHz and above, this data item is required for assignments with US, USA, or USP in Data Item 300 (transmitter State/Country). Use the appropriate number as follows:

1 - Regular, not limited to workweek
2 - Regular, workweek
3 - Occasional, not limited to workweek
4 - Occasional, workweek.

65. For stations in the fixed service below 29890 kHz, the above number will be followed by one of the following symbols to indicate the time of availability on a daily basis:

HX - For stations operating intermittently throughout the 24-hour day or for circuits with no specific working hours
HN - Night service
HJ - Day service
H24 - Continuous 24-hour service
HT - For transition period service.

Examples:
130. 2
130. 1H24

Required Date 140
8 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

66. **Description:** Data Item 140 is the date a new assignment or modification to an assignment is to be operational.

67. **Input Requirement:** Enter the year, month, and day (YYYYMMDD) the new assignment, or modification to an existing assignment, is required by the operating unit. For temporary or exercise proposals, enter the date frequencies will first be used.

Example:
140. 19990101

Expiration Date 141
8 Characters - 1 occurrence
Submitted to IRAC: yes GMF tag: EXD

68. **Description:** Data Item 141 is the date when a temporary assignment is to expire. Temporary assignments are not to exceed five years. This data item is blank when Data Item 142 contains data.

69. **Input Requirement:** If the assignment is for less than five years, enter the year, month, and day (YYYYMMDD) the requirement for use of the assignment will end. This data item is used in conjunction with Data Item 140 to specify the period of time an assignment will be used. For example, a proposal for an exercise or test from 7 September 1990 through 21 September 1990 would contain the entries **140. 19900907** and **141. 19900921**. Note: Assignments will be automatically canceled on their expiration date and deleted from the DoD central database. If an assignment is being changed from a temporary assignment to an assignment with a review date, then Data Item 141 must be deleted, i.e., **141. $**.

Example:
141. 20020622

ORGANIZATIONAL INFORMATION

70. Data items 200 through 209 serve two major purposes: (1) As applicable, they identify the frequency management chain responsible for managing the assignment and the organizations having an area interest in the assignment area, and (2) they are also used for the selection and distribution of records. These data items are especially important when assignments are needed promptly to meet mission requirements.

71. Each frequency assignment has a management chain, from the service headquarters or CINC down to the operating unit. If logically and consistently entered into the records, the data concerning the organizations in the frequency management chain can be used to select and sort records in the manner most efficient for use by each management level in the chain. Data Item 200 (Agency) and Data Item 207 (Operating Unit) should always be filled in. There may be occasions when members of the management chain are entered in more than one data item. For example, ACC (the command listed in Data Item 204) could be the operator of a net at Langley AFB. In this case, Langley (the base FMO listed in Data Item 206) could have ACC as an operating unit (Data Item 207). Consistency is the key factor in making these data items work for the good of the system. Each organizational level, from the top down, to and including operating units, must enter its data the same way each time. Although some higher level data entries are standardized by the service or CINC, at the operating unit level they are frequently

not standardized. Therefore, all frequency management levels should ensure the consistency of the data being entered by those elements subordinate to them. Where organizational data content has not been specified by a higher authority, operating units can develop their own, but they **must** be consistent when making data entries in subsequent transactions. Previous variations in organizational data are being "cleaned up" and a periodic review system has been established to maintain data item consistency.

72. To make this system work, each agency, CINC, and area frequency coordinator (AFC) should look at its subordinate frequency management structure and decide which frequency management elements will be reflected at which level. In most cases, it is clear; however, there will be situations where it is not clear to the level concerned. For example, in Europe, should the NCTAMSMED entry be entered in data items 203, 204 or 205? Careful, thorough planning and execution should yield a database that can, with a high degree of certainty, provide the proper records via automated data distribution for each FRRS participant.

73. Some organizations having frequency management responsibility may not need all the organizational data items listed. However, those data items used should be entered consistently. For example, if 8AF was also entered as 8F or 8 AF, then all the records for the 8AF would not be grouped together. To reduce this type of problem, the elimination of spaces is required.

Agency 200
6 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

74. **Description:** Data Item 200 identifies the agency responsible for managing the frequency assignment. Within the DoD this is normally USA, USN, USAF, or NSA. If an assignment is in joint use by two or more agencies, then both Data Items 147 and 200 must be completed. The responsible DoD agency will be entered as the first data entry in Data Item 147 followed by the other joint agencies. For example, an assignment between USAF and NASA would be entered as **147. USAF**, **147/2. NASA** and **200. JNTSVC**.

75. **Input Requirement:** Enter one of the following service or agency abbreviations as appropriate: USA, USN, USAF, NSA, or JNTSVC. If JNTSVC is entered, Data Item 147 must be completed.

Example:
200. USA

Unified Command 201
8 characters - 10 occurrences
Submitted to IRAC: no GMF tag: None

76. **Description:** Data Item 201 identifies the unified command (CINCPAC, CINCEUR, CINCSO, CINCCENT, JFMOLANT) or designated representative for the area in which the assignment will be used.

77. **Input Requirement:** This data item is required for all assignments where either the transmitter or a receiver is located OUS&P.

Example A:
201. CINCPAC

Example B:
201. CINCEUR
201/2. CINCSO

Unified Command Service 202
8 characters - 10 occurrences
Submitted to IRAC: no GMF tag: None

78. **Description:** Data Item 202 identifies the service-level organization within the unified command area that is responsible for managing the assignment. Within the CONUS, Data Item 202 identifies the Air Force or Army MAJCOM host responsible for the installation listed in Data Item 206.

79. **Input Requirement:** Enter the Major Command (MAJCOM) or Specified/Unified Command that has operational control of the installation or region of the world where the transmitter is located (this is not necessarily the Command that has operational control of the assignment). Within the CONUS, Air Force and Army organizations, enter the MAJCOM of the host installation.

Examples:
202. PACAF
202. FORSCOM

Bureau 203
4 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: BUR

80. **Description:** Data Item 203 identifies the Bureau to be included in the record.

81. **Input Requirement:** Data item 203 is required for Army assignments within the US&P and for all United States Marine Corps (USMC) assignments worldwide.

Examples:
203. PA (An Army assignment in the CINCPAC area)
203. USMC (A Marine Corps assignment)

Command 204
18 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

82. **Description:** Data Item 204 identifies the Major Command or other applicable organization frequency management level that is subordinate to the responsible agency identified in Data Item 200.

83. **Input Requirement:** This data item is required in all assignments. Enter the major command or other applicable organization.

Examples:
204. ACC
204. TRADOC

Subcommand 205
18 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

84. **Description:** Data Item 205 indicates the frequency management level between the command (Data Item 204) and the installation frequency manager (Data Item 206), or a level of command below the organization entered in Data Item 204.

85. **Input Requirement:** Enter the frequency management level between the command and installation frequency manager.

Example:
205. 5AF

Installation Frequency Manager 206
18 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

86. **Description:** Data Item 206 normally indicates the station, base, installation, or fort-level frequency management office responsible for the location of the operating unit.

87. **Input Requirement:** Enter the installation frequency manager when it exists.

Examples:
206. ANDREWS
206. BRAGG
206. NASPAXRV

Operating Unit 207
18 characters - 10 occurrences
Submitted to IRAC: no GMF tag: None

88. **Description:** Data Item 207 indicates the name or designation of the organization using the frequency assignment.

89. **Input Requirement:** This data item is required. Enter the short name or designation of the organization using the frequency assignment. For CINCPACFLT: Enter ACFT and/or SHIPS when Data Item 300 equals PAC, LANT, INDO, etc.

Examples:
207. 602TCW
207. SUBRON18
207. 517ARTY

User Net/Code208
6 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: NET (Only the first five characters of the first data entry)

90. **Description:** Data Item 208 is a unique code that identifies the specific user of the frequency, i.e., the command, activity, unit, project, etc.

91. **Input Requirement:** Enter codes as directed by the responsible agency, as follows:

Army: Enter one Net Control Code.
Navy: Enter the one Unit Identification Code (UIC) of either the operating unit identified in Data Item 207 or in Data Item 302.
Air Force: Enter a standard use code as directed by Air Force Frequency Management Agency.

Examples:
208. N53618
92. 208. ACEUS

TRANSMITTER LOCATION DATA

93. Transmitter data items 300 through 306 include all technical information pertaining to a single transmitter location. Only one transmitter location is allowed per assignment record.

State/Country 300
4 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: XSC

94. **Description:** Data Item 300 is an authorized abbreviation for the state, country, or geographical area in which the transmitting station is located. This data item cannot be changed in an FRRS record containing 144. Y.

95. **Input Requirement:** This data item is required. Enter the name or standardized abbreviation (as listed in Annex C to this appendix) of the state, country, or area in which the transmitting antenna is located.

Examples:
300. IN
300. LANT

300. SPCE

Antenna Location 301
24 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: XAL

96. **Description:** Data Item 301 is the name of the city, base, or geographical area of operation within which the transmitting antenna is actually located.

97. **Input Requirement:** This data item is required. Enter the name of the city, base, or geographical area where the transmitter antenna is located. Abbreviate the data entry if necessary; however, if an abbreviation is not required, the entry should be spelled the same as that in the US postal zip code directory or applicable gazetteer. After being entered the first time, all future entries for that same location should be spelled the same. If the transmitter antenna location is the same as the entry in Data Item 300, the antenna location should be abbreviated using the same abbreviation as that entered in Data Item 300. In addition to the above, the following will apply:

The following standard abbreviations will be used even if the entry is less than 24 characters:

Abbreviation	**Location Word**
ARPT	Airport
ARA	Army Area
CP	Camp
CY	City
CGD	Coast Guard District
CO	County
DI	District
DIV	Division
FT	Fort
IAP	International Airport
IS	Island(s)
LNB	Large Navigational Buoy
MT	Mont, Monte, Mount(s)
MTN	Mountain(s)
MAP	Municipal Airport
PG	Proving Ground(s)
PT	Point
ST	Saint

If the location name exceeds 24 characters after applying the standard abbreviation(s) listed in "a." above and the entry has not been previously used, then shorten the entry to 24 characters and enter the full text in Data Item 801 for review by the assignment authority.

98. If an area of operation is selected, it may be described as a radius, in kilometers, extending from a given location. For example, if an assignment is for transmission anywhere within a 50-kilometer radius of Dallas, then insert DALLAS in this data item and the radius in Data Item 306 (Authorized Radius). An area of operation may also be described by geographical

coordinates. For example, if an assignment is for one or more land mobile stations operating south of 33 degrees north in the state of Arizona, then insert AZ in this data item and the coordinate data in Data Item 530 (Authorized Areas).

99. An area of operation within several states may also be described in this data item as US or USA, with the included or excluded states being shown in Data Item 531 (Authorized States). Similarly, US&P may be used if the area includes a possession. For locations described as an area of operation, note that operations might not occur in every square mile of the area selected and the area described might overlap into states not shown in Data Item 300 (State/Country).

100. Although the data inserted shall normally be geographical names or descriptions, exceptions may be made for experimental operations, mobile operations where the state/country and antenna location data items are identical (such as 300. PAC, 301. PAC, etc.), and/or space operations. For an assignment to an experimental station, other than one in space, or to a mobile station having identical state/country and antenna location names, words such as AIRCRAFT, BALLOONS, or SHIPS may be used, as appropriate. For an assignment to a station aboard a geostationary satellite, insert GEOSTATIONARY. For an assignment to a station aboard a nongeostationary satellite, insert NONGEOSTATIONARY. For an assignment to a station located on a natural object in space, insert the name of the object, e.g., MOON.

Examples:
301. FT BRAGG
301. NASHVILLE
301. NONGEOSTATIONARY

Antenna Coordinates 303
15 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: XLA, XLG

101. **Description:** Data Item 303 is the World Geodetic System 1984 (WGS 84) datum latitude and longitude (expressed in degrees, minutes, and seconds) of the transmitter antenna location entered in Data Item 301.

102. **Input Requirement:** This data item is required except when the site named in Data Item 301 is an area of operation for which coordinates cannot be applied or for nongeostationary satellites. Enter geographical coordinates (degrees, minutes, and seconds) for the antenna location. If the seconds are not known, insert 00 for the seconds, except in the case of navigation aid system (NAVAIDS), geostationary satellites, and microwave facilities where seconds are required. Use leading zeros as appropriate for degrees, minutes, or seconds. Degrees latitude require two digits; degrees longitude require three digits. Enter N or S for latitude and E or W for longitude. If *GEOSTATIONARY* has been entered in Data Item 301, enter the latitude as 000000N and the longitudinal position of the satellite (in degrees, minutes, and seconds east or west). Note, when older maps are used, the coordinates may vary as much as 300-400 meters from locations determined by using DoD standard WGS 84 datum maps or Global Positioning System (GPS) equipment. Organizations are encouraged to obtain GPS equipment to determine the position of fixed antennas.

Examples:
303. 214216N1171039W (Coordinates for a fixed location)
303. 000000N1750000E (Coordinates for a geostationary satellite)

Authorized Radius 306
5 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *RAD

103. **Description:** Data Item 306 defines the area of operation for a portable, mobile, or transportable transmitter station. This area is expressed as a radius in kilometers extending from the geographical coordinates listed in Data Item 303.

104. **Input Requirement:** If the station is portable, mobile, and/or transportable, and a circular area is used to describe the area of operation, enter a radius (in kilometers) from the coordinates listed in Data Item 303 to describe the area in which the transmitter station will operate. Add the suffix T to the entry if the radius applies only to the transmitter station, or B if the radius applies to both the transmitter and receiver stations (Note: When both fixed and mobile stations are to transmit on the same frequency, leave this data item blank and enter the radius of the mobile station in Data Item 406).

Examples:
306. 30T (Indicates a 30-kilometer radius of operation for the transmitter)
306. 150B (Indicates a 150-kilometer radius of operation for both transmitter and receiver stations)

SPACE STATIONS

105. Data items 315 through 321 are to be used for transmitter space-station data. Leave data items 315 through 319 blank for geostationary satellites.

Equatorial Inclination Angle 315
4 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *ORB preceding IN

106. **Description:** Data Item 315 indicates the angle at which the transmitting NONGEOSTATIONARY satellite's orbit crosses the equator. A nongeostationary satellite is defined as one whose circular orbit does not lie in the plane of the earth's equator and has a specific equatorial inclination, apogee, and perigee.

107. **Input Requirement:** Enter an equatorial inclination angle (in degrees), using a decimal point for fractional degrees for nongeostationary space transmitter stations.

Example:
315. 34.7

Apogee 316
5 characters - 1 occurrence

Submitted to IRAC: yes GMF tag: *ORB preceding AP

108. **Description:** Data Item 316 indicates the point in the orbit of a NONGEOSTATIONARY satellite at which it is farthest from the earth.

109. **Input Requirement:** Enter apogee (in kilometers) for nongeostationary space transmitter stations.

Example:
316. 23500

Perigee317
5 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *ORB preceding PE

110. **Description:** Data Item 317 indicates the point in the orbit of a NONGEOSTATIONARY satellite at which it is nearest to earth.

111. **Input Requirement:** Enter perigee (in kilometers) for nongeostationary space transmitter stations.

Example:
317. 200

Period of Orbit 318
(7 characters - 1 occurrence)
Submitted to IRAC: yes GMF tag: *ORB

112. **Description:** Data Item 318 indicates the time it takes for a NONGEOSTATIONARY transmitter satellite to make one complete orbit.

113. **Input Requirement:** Enter the period of orbit for nongeostationary space transmitter stations. If the period of orbit is less than 24 hours, enter the time in hours followed by the letter H. If it is 24 hours or more, enter the number of days, followed by the letter D. Enter the data, using a decimal point for a fractional unit.

Example:
318. 19.6H

Number of Satellites 319
2 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *ORB preceding NR

114. **Description:** Data Item 319 indicates the number of NONGEOSTATIONARY satellite transmitters in a system having similar orbital characteristics.

115. **Input Requirement:** Enter the number of nongeostationary satellites in the system.

Example:
319. 1

Power Density 321
4 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: SPD

116. **Description:** Data Item 321 indicates the maximum power density, per hertz (in dBW), supplied to an earth or space station's antenna or to those of terrestrial stations (including experimental) employing earth or space-station techniques. For frequencies below 15 GHz, the power shall be averaged over the worst 4 kHz band; for frequencies 15 GHz and above, the power shall be averaged over the worst 1 MHz band. The worst 4 kHz and 1 MHz bands are defined as those having the highest power density within the assigned emission bandwidth.

117. **Input Requirement:** For earth, space, or terrestrial stations (including experimental stations) employing earth or space-station techniques, insert the maximum power density per Hz (in dBW) supplied to the antenna. For negative values, insert a minus sign (-) before the value.

Example:
321. 8

TRANSMITTER EQUIPMENT

118. Data items 340 through 349 are used for the Transmitter Equipment. When both fixed and mobile stations (FA/MA, FB/ML, etc.) are used, enter the fixed transmitter data first.

Equipment Nomenclature 340
1,18 characters - 10 occurrences
Submitted to IRAC: yes GMF tag: *EQT

119. **Description:** Data Item 340 has two parts. The first part identifies the type of equipment (government, commercial, or unassigned) and the second part identifies either the standard military nomenclature or the commercial make and model number of the equipment at each specific transmitter station location. If both a military nomenclature and a commercial model number are assigned to the same equipment, the military nomenclature will be used.

120. **Input Requirement:** This data item is required. Enter the equipment type code followed by the equipment system or component nomenclature for the transmitter location. (If available, the system nomenclature is preferred rather than the component nomenclature; however, either is acceptable. Data items 340 and 343 are interrelated, and an entry in Data Item 340 should be accompanied by a corresponding entry in Data Item 343, if known. If Data Item 343 is known, enter the nomenclature exactly as it is recorded in the Spectrum Certification System (SCS) database or J-12 document DD Form 1494.) Enter one of the following equipment type codes:

G - Government nomenclature
C - Commercial model number
U - Unassigned nomenclature

121. After the equipment type code, enter a comma and then the nomenclature subject to the following:

For a government equipment nomenclature, enter the standard military nomenclature.

Examples:

340. G,AN/GRC-103 (A system nomenclature)
340. G,T128 (A transmitter component nomenclature)

If only a commercial model number is available, indicate the manufacturer of the equipment, using the manufacturer's code listed in Annex D to this appendix, followed by the model number. If no manufacturer code exists or is unknown, enter the full name of the manufacturer in Data Item 801.
Example:

340. C,MOTH23FFN1130E (A commercial handie-talkie manufactured by Motorola, model number H23FNN1130E. A partial nomenclature such as MOTH23 is incomplete since it applies to several different models of Motorola handie-talkies. The manufacturer's name and the complete model number should be obtained from data plates on equipment whenever possible)

If the nomenclature includes a modification, insert MOD and a number, if applicable, immediately following the nomenclature. For the word MARK, insert MK immediately following the nomenclature.

Example:

340. G,T238MK1

If the transmitter does not have an assigned government nomenclature or commercial model number, enter the manufacturer's name and a brief description of the equipment listed in Data Item 801.

Example:

801. COLLINS RADIO EXPERIMENTAL
801. RADAR

Number of Stations, System Name 341
5,29 characters - 3 occurrences
Submitted to IRAC: yes GMF tag: *NRM

122. **Description:** Data Item 341 is a two part data item. The first part identifies the number of transportable, land-mobile and portable-type stations associated with the assignment and the second part identifies the name of the system involved. A station is one or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment necessary at one location for carrying on a radio communication service. A system is considered two or more equipment having a common property, usually geographic, administrative, functional, or operational in nature.

123. **Input Requirement:** In the 30-50, 138-144, 148-149.9, 150.05-150.8, 162-174, and 406.1-420 MHz bands, enter the number of land mobile stations, ship stations, and transportable stations associated with the assignment (if desired this data may be entered on assignments in

other bands or for aircraft stations). The number entered shall represent either the exact number of stations or a range of numbers as follows:

124. **Number of Stations Enter**

1-10	10
11-30	30
31-100	100
101-300	300
301-1000	1000
1001-3000	3000
3001-10000	10000
Above 10000	Nearest 10000

125. If the exact number is to be recorded, and it is 10, 30, 100, 300, 1000, 3000, or a multiple of 10000, add one to the number to distinguish it from a figure that represents a range of numbers. System names shall be determined by the applicant and must not be longer than 18 characters. The word NET (or letter □N□) may be used as the system name.

Example:
341. 1001,NET

126. Also, you may enter N if the assignment represents an entire system; enter S for all other cases. To enter a system name only, enter XXXXX, a comma, and the system name (see the last Example).

Examples:
341. 31,N
341. XXXXX,RANGE COORDINATION

Radar Tunability 345
2 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *EQT

127. **Description:** Data Item 345 is a coded entry describing the tuning capabilities of both pulsed and nonpulsed radars.

128. **Input Requirement:** For all radars, enter one of the following symbols:

FA - Frequency-agile radars that operate on various frequencies within a band, either specified or random mode
FV - Radars that operate on a discrete frequency determined by the characteristics of a fixed magnetron or similar radio frequency generating device
FX - Radars capable of operating on a single discrete frequency
TC - Radars capable of being tuned to any frequency within the requested band
TS - Radars capable of being tuned across the authorized or requested band in discrete steps or increments. This includes crystal control.

Example:
345. TC

Pulse Duration346
9 or 9-9 characters - 30 occurrences
Submitted to IRAC: yes GMF tag: *EQT following PD

129. **Description:** Data Item 346 indicates the width of the transmitted pulse (measured in microseconds or milliseconds at the half-power (3 dB) points) for all equipment using pulsed emission.

130. **Input Requirement:** For all stations using pulsed emissions, insert a numeric value(s) indicating the characteristic pulse duration(s) of the equipment at the half-power points. Pulse duration (PD) will be indicated in microseconds up to and including 999 microseconds and in milliseconds at one millisecond and above. Add the letter M at the end of the numeric value when expressed in milliseconds. Fractions may be shown to the nearest tenth by using a decimal. For equipment having a capability for continuously variable PDs over wide range(s), insert upper and lower numerical values separated by a dash.

Example:

346. 1	(Inserts or changes the PD values of 1, 3, and 5.6
346/2. 3	microseconds for the first three values and inserts
346/3. 5.6	a 1 to 25 millisecond PD range for the fourth value.)
346/4. 1M-25M	

Pulse Repetition Rate 347
9 or 9-9 characters - 30 occurrences
Submitted to IRAC: yes GMF tag: *PR

131. **Description:** Data Item 347 indicates the number of pulses per second (PPS) for all equipment using pulsed emission.

132. **Input Requirement:** For all stations using pulsed emissions, enter the numeric value(s) for the pulse repetition rate(s) (PRRs) of the equipment. PRRs will be indicated in pulses per second (PPS) up to and including 999 PPS and in thousands of pulses per second at 1000 PPS and above, adding the letter K after the numeric value. For equipment having a capability for continuously variable PRRs over a wide range(s), insert upper and lower numerical values separated by a dash.

Example:

347. 500	(Inserts the PRR values of 500, 750, and 1000 PPS
347/2. 750	for the first three entries and a 200 to 999 PPS
347/3. 1K	range for the fourth value.)
347/4. 200-999	

TRANSMITTER ANTENNA DATA

133. Transmitter antenna data consists of data items 354 through 374. When both fixed and mobile stations (FA/MA, FC/MS, etc.) are used, enter the fixed antenna data first.

Antenna Name 354
10 characters - 10 occurrences
Submitted to IRAC: yes GMF tag: part of XAD

134. **Description:** Data Item 354 is the generic name for the type of antenna normally associated with the transmitter.

135. **Input Requirement:** This data item is required for transmitter antennas at terrestrial stations, except experimental and mobile stations, that operate at 29890 kHz and above. If necessary, abbreviate to 10 characters. Entry not required if application is (a) below 29890 kHz, (b) space or earth station. Required for USCINCCENT assignments.

Examples:
354. WHIP
354. PARABOLIC

Antenna Nomenclature 355
18 characters - 10 occurrences
Submitted to IRAC: yes GMF tag: *EQT following the $ symbol

136. **Description:** Data Item 355 is the standard military nomenclature or commercial manufacturer's make and model number of the transmitter antennas.

137. **Input Requirement:** Data Item 355 is required except when it is part of a satellite transponder. Indicate antenna's nomenclature or commercial manufacturer's model number, but omit the model number if the antenna is part of a satellite transponder. If only a commercial model or nomenclature is known, enter the manufacturer's code (from Annex D to this appendix) followed by the antenna model number.

Examples:

355. AS102	(Inserts a government antenna nomenclature)
355. RCATVM000IA	(Inserts an RCA Corporation commercial antenna nomenclature.)

Antenna Structure Height 356
3 characters - 10 occurrences
Submitted to IRAC: no GMF tag: None

138. **Description:** Data Item 356 identifies the overall height (in meters) of the transmitter antenna support structure above ground level.

139. **Input Requirement:** Data Item 356 is required for CINCEUR assignments. It is optional for all others. Enter in meters the overall height of the antenna structure above ground level. This entry is not applicable to Mobile services.

Example:
356. 17

Antenna Gain 357
4 characters - 10 occurrences
Submitted to IRAC: yes GMF tag: part of XAD: negative gains are in *EGN, *SGN

140. **Description:** Data Item 357 indicates the antenna gain, in decibels, with reference to an isotropic source (dBi) in the direction of maximum radiation.

141. **Input Requirement:** Enter the antenna gain (in dB with reference to an isotropic source) in the direction of maximum radiation. The gain may be omitted on applications for terrestrial stations below 29890 kHz if the gain is for other than fixed (FX) or aeronautical fixed (AX) stations in the 3000 to 29890 kHz band, or for terrestrial stations operating at 29890 kHz and above for experimental and mobile stations. For a negative gain (earth and space stations only), enter a dash before the value of the gain. Required for USCINCCENT assignments.

Examples:
357. -10
357. 20

Antenna Elevation 358
5 characters - 10 occurrences
Submitted to IRAC: yes GMF tag: part of XAD

142. **Description:** Data Item 358 specifies the site's terrain elevation, in meters above mean sea level (AMSL), at the base of a fixed station's transmitter antenna. If the antenna is installed on a structure such as a tower or a building, the site elevation is specified as the ground elevation at the base of the structure.

143. **Input Requirement:** Data Item 358 is required except for applications for frequencies below 29890 kHz or for terrestrial stations operating at 29890 kHz and above if for experimental and mobile stations. Enter the site (terrain) elevation (at the base of the transmitting antenna structure) in meters AMSL.

Example:
358. 980

Antenna Feed Point Height 359
5 characters - 10 occurrences
Submitted to IRAC: yes GMF tag: Part of XAD

144. **Description:** Data Item 359 indicates the distance (in meters) between the transmitter antenna's feedpoint and the terrain.

145. **Input Requirement:** Data Item 359 is required except for applications for frequencies below 29890 kHz or for terrestrial stations operating at 29890 kHz and above if for experimental and mobile stations. Enter in meters, the antenna feed point height above the terrain. In the case where the antenna is mounted pointing vertically to a reflector on the same structure, enter the height of the reflector above ground.

Example:
359. 10

146. For airborne satellite terminals, enter the maximum operational altitude of the aircraft in meters AMSL.

Example:
359. 10000

Antenna Horizontal Beamwidth 360
4 characters - 10 occurrences
Submitted to IRAC: yes GMF tag: part of XAD, sometimes entered in *EBW, *SBW

147. **Description:** Data Item 360 describes the angular beamwidth (measured in degrees at the half-power (3 dB) points) of space, earth or terrestrial station antennas (including experimental) employing earth or space-station techniques.

148. **Input Requirement:** For space, earth, or terrestrial stations (including experimental) employing space or earth station techniques, enter the antenna beamwidth (in degrees at the half-power (-3 dB) points. For a fractional beamwidth, add a zero before the decimal.

Examples:
360. 0.5
360. 12
360. 17.2

Antenna Vertical Beamwidth 361
3 characters - 10 occurrences
Submitted to IRAC: no GMF tag: None

149. **Description:** Data Item 361 indicates the transmitter antenna vertical beamwidth, measured in degrees and normally taken as the angle between the half power points (-3 dB points) from the pattern of the antenna.

150. **Input Requirement:** Data Item 361 is required for CINCEUR assignments. It is optional for all others. Enter the half-power vertical beamwidth in degrees, measured between the -3 dB points.

Example:

361. 23

Antenna Orientation 362
3 or 3,3 or 3,3-3 or 3,3/3 characters - 10 occurrences
Submitted to IRAC: yes GMF tag: XAZ, Enter in XAD when this is a space assignment.

151. **Description:** Data Item 362 describes the physical direction or movement of the transmitter antenna. A second entry indicating the azimuth angle of the antenna's main beam may also be given. This second entry, given in degrees clockwise from true north, applies only to earth stations or terrestrial stations employing earth-station techniques.

152. **Input Requirement:** This data item is required for all earth, space, and terrestrial stations.

Terrestrial Antenna: Enter the three-digit azimuth in degrees from true north or one of the codes listed below for the transmitter antenna.

ANTENNA CODES

ND - nondirectional
R - rotating through 360 degrees
S - fixed direction but steerable in the horizontal plane
SSH - scanning horizontally through a limited sector
SSV - vertical scanning (nodding)
T - tracking that can observe a moving object.

Examples:
362. 225
362. ND

Earth Station: Enter the antenna's minimum operating elevation in degrees consisting of V followed by a two-digit value. Follow the vertical data with a comma and the three-digit azimuth in degrees from true north to the geostationary satellite. For two geostationary satellites, enter the three-digit azimuth to each satellite, separated by a slant bar. For more than two nongeostationary satellites, enter the maximum range of the azimuth angle in three-digit values separated by a dash.

Examples:
362. V09,133
362. V10,132/150
362. V12,122-160

Space Station: Enter either NB for narrow beam or EC for earth coverage.

Example:
362. EC

Antenna Polarization 363
1 character - 10 occurrences
Submitted to IRAC: yes GMF tag: XAP

153. **Description:** Data Item 363 is a one-character code indicating the polarization of the electromagnetic radiation from the antenna.

154. **Input Requirement:** Enter the polarization of the antenna using one of the following symbols:

Code	Polarization
A	Elliptic, left
B	Elliptic, right
D	Rotating
E	Elliptical
F	45-degrees
H	Fixed horizontal
J	Linear
L	Left-hand circular
M	Oblique, angled left
N	Oblique, angled right
O	Oblique, angled, crossed
R	Right-hand circular
S	Horizontal and vertical
T	Right and left-hand circular
V	Fixed vertical
X	Other or unknown

155. Data Item 363 is required for each transmitter antenna as described below:

Assignments above 1000 MHz that must be coordinated (by the IRAC) with the Canadian Department of Communications.
Assignments to earth or space stations or to terrestrial stations (including experimental stations) employing earth or space-station techniques.
Assignments to terrestrial stations at 420 MHz and above except for the optional cases shown below:

(a) Experimental stations

(b) Mobile stations

(c) Meteorological aids in the 1660-1700 MHz band

(d) TACAN/DME in the 960-1215 MHz band

(e) Aeronautical telemetry in the 1435-1535, 2200-2290, or 2310-2390 MHz bands

Example:
363. V

RECEIVER LOCATION DATA

156. A maximum of 30 receiver locations are permitted in a frequency assignment record. Receiver location data consists of data items 400 through 408 . When multiple occurrences of receiver location data occur, the data entries must correspond in the same sequence throughout; that is, proper alignment of multiple occurrence entries must be maintained so each specified data item will be associated with the correct receiver. Additionally, each set of equipment and antenna data must be associated with a particular occurrence of a receiver location site.

157. When more than one receiver location is involved, the corresponding information in the data items will be designated as R01 or R02, etc. For example, **401. TAMPA,R01 401. MIAMI,R02** indicates that receiver number one is in Tampa and receiver number two is in Miami. **Only one occurrence of each of the 400-408 series data items is permitted for a particular receiver location.**

State/Country 400
4 characters - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: RSC

158. **Description:** Data Item 400 is an authorized abbreviation for the state, country, or geographical area in which the receiving station is located. The approved list of abbreviations are listed in Annex C to this appendix.

159. **Input Requirement:** This data item is required. Enter the name or abbreviation of the state, country, or area in which the receiving antenna is located.

Example A:
400. NC (a single or first occurrence for a receiver)

Example B:
400. TN,R01 (an example of two receivers)
400. SPCE,R02

Antenna Location 401

24 characters - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: RAL

160. **Description:** Data Item 401 is the name of the city, base, or geographical area of operation within which the receiving antenna is actually located.

161. **Input Requirement:** This data item is required. Enter the name of the city, base, or geographical area where the receiver antenna is located. Abbreviate the data entry if necessary; however, if an abbreviation is required, the entry should be spelled the same as that in the US Postal Zip Code Directory or applicable gazetteer. After a name has been entered the first time, all future entries for that same location should use the same spelling. If the receiver antenna location is the same as the entry in Data Item 400, the antenna location will be abbreviated using the same abbreviation entered in Data Item 400.

In addition to the above, the following standard abbreviations will be used even if the entry is less than 24 characters.

Abbreviation	**Location Word**
ARPT	Airport
ARA	Army Area
CP	Camp
CY	City
CGD	Coast Guard District
CO	County
DI	District
DIV	Division
FT	Fort
IAP	International Airport
IS	Island(s)
LNB	Large Navigational Buoy
MT	Mont, Monte, Mount(s)
MTN	Mountain(s)
MAP	Municipal Airport
PG	Proving Ground(s)
PT	Point
ST	Saint

If the location name exceeds 24 characters after applying the standard abbreviation(s) listed in "a" above, and the entry has not been previously used, then shorten the entry to 24 characters and enter the full text in Data Item 801 for review by the assignment authority.

162. If an area of operation is involved, it may be described as a radius, in kilometers, extending from a given location. For example, if an assignment is for transmission anywhere within a 50-kilometer radius of Dallas, then insert DALLAS in this data item and the radius in Data Item 306 (Authorized Radius). An area of operation may also be described by geographical coordinates. For example, if an assignment is for one or more land mobile stations operating south of 33 degrees north in the state of Arizona, then insert AZ in this data item and the coordinate data in Data Item 530 (Authorized Areas).

163. An area of operation within several states may also be described in this data item as US or USA, with the included or excluded states being shown in Data Item 531 (Authorized States). Similarly, US&P may be used if the area includes a possession. For locations described as an area of operation, note that operations might not occur in every square mile of the area concerned and that the area described might overlap into states not shown in Data Item 300 (State/Country).

164. While the data inserted shall normally be geographical names or descriptions, exceptions may be made for experimental operations, mobile operations where the state/country and antenna location data items are identical (such as PAC PAC, etc.), and/or space operations. For an assignment to an experimental station, other than one in space, or to a mobile station having identical state/country and antenna location names, words such as AIRCRAFT, BALLOONS, or SHIPS may be used as appropriate. For an assignment to a station aboard a geostationary satellite, insert GEOSTATIONARY. For an assignment to a station aboard a nongeostationary satellite, insert NONGEOSTATIONARY. For an assignment to a station located on a natural object in space, insert the name of the object, e.g., MOON.

Examples:
401. FT BRAGG
401. NASHVILLE,R05
401. NONGEOSTATIONARY

Antenna Coordinates 403
15 characters - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: RLA, RLG

165. **Description:** Data Item 403 is the WGS 84 datum latitude and longitude (expressed in degrees, minutes, and seconds) of the receiver antenna location(s) entered in Data Item 401.

166. **Input Requirement:** Data Item 403 is required except when the site named in Data Item 401 is an area of operation for which coordinates cannot be applied and for nongeostationary satellites. Enter geographical coordinates (degrees, minutes, and seconds) for the antenna location. If the seconds are not known, insert 00 for the seconds, except in the case of the NAVAIDS, geostationary satellites, and microwave facilities where seconds are required. Use leading zeros as appropriate for degrees, minutes, or seconds. Degrees latitude require two digits; degrees longitude require three digits. Enter N or S for latitude and E or W for longitude. If *GEOSTATIONARY* has been entered in Data Item 401, enter the latitude as 000000N and the longitudinal position of the satellite (in degrees, minutes, and seconds east or west). Note, when older maps are used, the coordinates may vary as much as 300-400 meters from locations determined by using DoD standard WGS 84 datum maps or Global Positioning System (GPS) equipment. Organizations are encouraged to obtain GPS equipment to determine the position of fixed antennas.

Examples:
403. 422615N1263228W
403. 000000N0925300W

Authorized Radius 406

4 characters - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: *RAD

167. **Description:** Data Item 406 defines the area of operation for portable, mobile, or transportable receiver stations. This area is expressed as a radius in kilometers extending from the coordinates listed in Data Item 403.

168. **Input Requirement:** If Data Item 306 is blank and the receiving station is portable, mobile, or transportable and a circular area is used to describe the area of operation, enter the radius (in kilometers from the coordinates entered in Data Item 403) to describe the area in which the receiving station will operate. (Note: When both fixed and mobile stations transmit on the same frequency, an entry in Data Item 406 indicates that the mobile station will be operating within the area described).

Example:
406. 250

Repeater Indicator 408
1 character - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: *RPT

169. **Description:** Data Item 408 indicates if the receiver station is used primarily as a repeater. A direct coupling between the station's receiver and the station's transmitter allows the incoming signal to be retransmitted exactly as received.

170. **Input Requirement:** Input for Data Item 408 is applicable only between 29890 and 420 MHz. Enter the letter R for each receiver location when a station in the fixed or mobile service is used primarily as a repeater.

Example:
408. R,R02

SPACE STATIONS

171. A maximum of 30 space-station receiver stations are permitted in a frequency assignment record. Data items 415 through 419 are to be used for unique space station data. Leave data items 415 through 419 blank for geostationary satellites.

Equatorial Inclination Angle 415
4 characters - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: *ORB preceding IN

172. **Description:** Data Item 415 indicates the angle at which the nongeostationary receiving satellite's orbit crosses the equator. A nongeostationary satellite is defined as one whose circular orbit does <u>not</u> lie in the plane of the earth's equator and that has a specific equatorial inclination, apogee, and perigee.

173. **Input Requirement:** Enter equatorial inclination angle (degrees) for nongeostationary space receiver stations.

Example:
415. 34.7

Apogee 416
5 characters - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: *ORB preceding AP

174. **Description:** Data Item 416 indicates the point in the orbit of a nongeostationary receiver satellite at which it is farthest from the earth.

175. **Input Requirement:** Enter apogee (in kilometers) for nongeostationary space receiver stations.

Example:
416. 23100

Perigee417
5 characters - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: *ORB preceding PE

176. **Description:** Data Item 417 indicates the point in the orbit of a nongeostationary receiver satellite at which it is nearest to the earth.

177. **Input Requirement:** Enter perigee (in kilometers) for nongeostationary space receiver stations.

Example :
417. 200

Period of Orbit 418
7 characters - 1 occurrence per receiver location
Submitted to IRAC: yes GMF tag: *ORB

178. **Description:** Data Item 418 indicates the time it takes for a nongeostationary receiver satellite to make one complete orbit.

179. **Input Requirement:** Enter period of orbit for nongeostationary space receiver stations. If the period of orbit it is less than 24 hours, enter the time in hours followed by the letter H. If the period is 24 hours or more, enter the number of days followed by the letter D.

Example:
418. 19.6H

RECEIVER EQUIPMENT

180. A maximum of 30 receiver locations are permitted in a frequency assignment record. When both fixed and mobile stations (FA/MA, FC/MS, etc.,) are used in data items 440 through 443, enter the fixed receiver data first.

Equipment Nomenclature 440
1,18 characters - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: *EQR

181. **Description:** Data Item 440 is a two-part data item. The first part identifies the type of equipment (government, commercial, or unassigned), and the second part identifies either the standard military nomenclature or the commercial make and model number of the equipment at each specific receiver station location. If both a military nomenclature and a commercial model number are assigned to the same equipment, the military nomenclature will be used.

182. **Input Requirement:** This data item is required. Enter an equipment type code followed by the equipment system or component nomenclature for the receiver location. (Data items 440 and 443 are interrelated, and an entry in Data Item 440 should be accompanied by a corresponding entry in Data Item 443, if known and if it is different from the entries in data items 340 and 343.) If Data Item 443 is known, enter the nomenclature exactly as it is recorded in the SCS database or J-12 document, DD Form 1494. Enter one of the following codes:

G - Government nomenclature
C - Commercial model number
U - Unassigned nomenclature

183. After the equipment type code, enter a comma and then the nomenclature subject to the following:

For government equipment nomenclatures, enter the standard military nomenclature.

Example:
440/2. G,AN/ARC-121,R03 (The second receiver equipment at the third receiver location)

If only a commercial model number is available, indicate the manufacturer of the equipment using the manufacturer's codes listed in Annex D to this appendix, followed by the model number. If no manufacturer code exists, enter the full name of the manufacturer in Data Item 801.

If the nomenclature includes a modification, insert MOD and a number, if applicable, immediately following the nomenclature. For the word MARK, insert MK immediately following the nomenclature.

If the receiver does not have an assigned government nomenclature or commercial model number, enter the manufacturer's name and a brief description of the equipment in Data Item 801.

Example:

440. C,MOTH23FFN1130E (An equipment nomenclature at the first receiver location)

RECEIVER ANTENNA DATA

184. A maximum of 30 receiver locations are permitted in a frequency assignment record. Receiver antenna data (consists of data items 454 through 463) is required for space and earth stations, fixed (point-to-point) and fixed station receivers or repeaters to which a mobile station transmits. (In other instances, the data entry is optional.)

Antenna Name 454
10 characters - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: part of RAD

185. **Description:** Data Item 454 is the generic name for the type of antenna.

186. **Input Requirement:** Enter the generic name for the type of the antenna. Data Item 454 is required for each receiver antenna for terrestrial stations, except experimental and mobile stations, that operate at 29890 kHz and above. If necessary, abbreviate the data entry to 10 characters. This entry not required if the application is (a) below 29890 kHz, (b) a space or earth-station, or (c) a mobile-to-mobile station.

Example:
454. WHIP,R02 (Two antennas at the second receiver location)
454/2. DIPOLE,R02

Antenna Nomenclature 455
18 characters - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: *EQR following the $ symbol

187. **Description:** Data Item 455 is the standard military nomenclature or commercial manufacturer’s make and model number of the antenna.

188. **Input Requirement:** Data Item 455 is required except when it is part of a satellite transponder. Indicate antenna's military nomenclature or commercial manufacturer's model number. If only a commercial model or nomenclature is known, enter the manufacturer's code (from Annex C of this appendix) followed by the antenna model number.

Examples:
455. AS102 (Inserts a government antenna nomenclature)
455. RCATVM000IA (Inserts RCA Corporation’s commercial antenna nomenclature.)

Antenna Structure Height 456
3 characters - 10 occurrences per each receiver location
Submitted to IRAC: no GMF tag: None

189. **Description:** Data Item 456 identifies the overall height in meters of the receiver antenna support structure above ground level.

190. **Input Requirement:** Data item 456 is required for USCINCEUR assignments. It is optional for all others. Enter, in meters, the overall height of the antenna structure above ground level. This entry not applicable to mobile services.

Example:
456. 17

Antenna Gain 457
4 characters - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: RAD; negative gains are in *SGN, *EGN

191. **Description:** Data Item 457 indicates the antenna gain in decibels with reference to an isotropic source (dBi) in the direction of maximum radiation.

192. **Input Requirement:** Enter the antenna gain (in dB with reference to an isotropic source) in the direction of maximum radiation. Gain may be omitted on applications for terrestrial stations below 29890 kHz if the gain is for other stations than fixed (FX) or aeronautical fixed (AX) stations in the 3000 to 29890 kHz band, or for terrestrial stations operating at 29890 kHz and above for experimental or mobile stations. For a negative gain (earth and space stations only), enter a dash before the value of gain.

Examples:
457. -27
457/1. 0,R02 (Gains for two antennas at the second receiver location)
457/2. 1,R02

Antenna Elevation 458
5 characters - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: part of RAD

193. **Description:** Data Item 458 specifies the site's terrain elevation, in meters AMSL, at the base of a fixed station's receiver antenna. If the antenna is installed on a structure such as a tower or a building, the site elevation is specified as the ground elevation at the base of the structure.

194. **Input Requirement:** Data Item 458 is required except for applications for frequencies for terrestrial stations operating at 29890 kHz and above for experimental or mobile stations. Enter the site (terrain) elevation in meters AMSL.

Antenna Feed Point Height 459
5 characters - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: part of RAD

195. **Description:** Data Item 459 indicates the distance (in meters) between the receiver antenna's feedpoint and the terrain.

196. **Input Requirement:** Data Item 459 is required except for frequencies for applications below 29890 kHz, or for terrestrial stations operating at 29890 kHz and above for experimental or mobile stations. Enter in meters, the antenna feed-point height above the terrain. In the case where the antenna is mounted pointing vertically and the signal is received from a reflector on the same structure, enter the height of the reflector above ground. For airborne satellite terminals, enter the maximum operational altitude of the aircraft in meters AMSL.

Examples:
459. 10000 (an aircraft satellite antenna)
459. 30 (a terrestrial antenna)

Antenna Horizontal Beamwidth 460
4 characters - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: part of RAD, sometimes entered in *EBW, *SBW

197. **Description:** Data Item 460 describes the angular beamwidth (measured in degrees at the half-power (3 dB) points) of space, earth, or terrestrial stations antennas (including experimental) employing space or earth-station techniques.

198. **Input Requirement:** For space, earth, or terrestrial stations (including experimental) employing space or earth-station techniques, enter the antenna beamwidth (in degrees) at the half-power (-3 dB) points. For a fractional beamwidth, prefix the decimal with a zero. Data may be omitted for terrestrial stations operating at 29890 kHz and above for experimental or mobile stations.

Examples:
460. 0.5
460. 12

Antenna Orientation 462
3 or 3,3 or 3,3-3 characters - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: RAZ, Enter in RAD when this is a space assignment.

199. **Description:** Data Item 462 describes the physical direction or movement of the receiver antenna. A second entry indicating the azimuth angle of the antenna's main beam may also be given. This second entry, given in degrees, clockwise from true north, applies only to earth stations or terrestrial stations employing earth station techniques.

200. **Input Requirement:** This data item is required for all earth, space, and terrestrial stations.

Terrestrial Antenna: Enter the three-digit azimuth in degrees from north or enter one of the antenna codes listed below for the receiving antenna:
ND - Nondirectional

R - Rotating through 360 degrees
S - Fixed direction steerable in the horizontal plane
SSH - Scanning horizontally through a limited sector
SSV - Vertical scanning (nodding)
T - Tracking to observe a moving object.

Examples:
462. 225
462. ND

Earth Station: Enter the antenna's minimum operating elevation, in degrees, consisting of a V followed by a two-digit value. Follow the vertical data with a comma and the three-digit azimuth, in degrees, from true north to the geostationary satellite. For nongeostationary satellites, or mobile or transportable stations communicating with geostationary satellites, enter the maximum range of the azimuth angle in three-digit values separated by a dash.

Examples:
462. V09,133
462. V12,122-160

Space Station: Enter either NB for narrow beam or EC for earth coverage.

Example:
462. EC

Antenna Polarization 463
1 character - 10 occurrences per each receiver location
Submitted to IRAC: yes GMF tag: RAP

201. **Description:** Data Item 463 is a one-character code indicating the polarization of the electromagnetic radiation from the antenna.

202. **Input Requirement:** Data may be omitted for terrestrial stations operating at 29890 kHz and above for experimental or mobile stations. Enter polarization of the antenna using one of the following symbols:

Code	Polarization
A	Elliptical, left
B	Elliptical, right
D	Rotating
E	Elliptical
F	45-degree
H	Fixed horizontal
J	Linear
L	Left-hand circular
M	Oblique angled, left
N	Oblique angled, right
O	Oblique angled, crossed

R Right-hand circular
S Horizontal and vertical
T Right and left circular
V Fixed vertical
X Other or unknown

203. Data Item 463 is required for each receiver antenna as described below:

Assignments above 1000 MHz that must be coordinated (by the IRAC) with the Canadian Department of Communications.
Assignments to earth or space stations or to terrestrial stations (including experimental stations) employing earth or space-station techniques.
Assignments to terrestrial stations at 420 MHz and above except for the optional cases shown below:

(a) Experimental stations

(b) Mobile stations

(c) Meteorological aids in the 1660-1700 MHz band

(d) TACAN/DME in the 960-1215 MHz band

(e) Aeronautical telemetry in the 1435-1535, 2200-2290, or 2310-2390 MHz bands

Example:
463. R

SUPPLEMENTARY DETAILS

204. Data items 500 through 531 contain various coded or free-text remarks generally relating to the assignment as a whole or clarifying the authorized area of operations.

Description of Requirement 502
1440 Characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

205. **Description:** Data Item 502 is used to record those agency remarks which, while pertinent to the assignment, are <u>not</u> intended to be part of the application processed through the IRAC. These remarks, therefore, will be excluded from the GMF.

206. **Input Requirement:** Data Item 502 is optional. Enter as many lines of remarks as necessary; however, precede each line with the data item identifier 502. Order of occurrence identifiers are not permitted, e.g., 502/2. Do not split words between lines, and do not exceed 77 characters per line (including the data item number, punctuation, and spaces). Do not duplicate data entered in data items 503/520. To modify existing data, delete the entire entry and replace it with new data as shown in the following example.

Example:
502. $
502. THIS ASSIGNMENT PROVIDES TWO ADDITIONAL VOICE CHANNELS
502. DCS 77BB01 DURING CONTINGENCY SITUATIONS.

NATO Pooled Frequency Code Number 505
5 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

207. **Description:** Data Item 505 provides data on communications associated with ground transmitters/receivers as well as aircraft operating in the 225-400 MHz frequency band.

208. **Input Requirement:** Data Item 505 is required for CINCEUR and USJFCOM assignments. For air/ground/air and air to air requirements in the 225-400 MHz band, enter a Type Special Assignment code. Use of this data item is optional for all other bands.

Code Type Special Assignment

B - air/ground/air requirements
A - air to air requirements
P - air/ground/air pool requirement

209. Upon approval of USCINCEUR assignments only, the Frequency Management Sub-committee (FMSC) will assign, from the groupings below, a code number identifying the type and nationality of a frequency pool:

0001 – 0199 United States
0700 – 0999 Special Operations Pools
2000 – 2299 Command and Miscellaneous Pools

Example data input:
505. P

Example of data returned from FMSC:
505. P0803

FUNCTION IDENTIFIERS

210. The costs associated with the operational use of the spectrum are of increasing concern to the DoD. The function identifier fields permit the analysis of spectrum usage by major, intermediate, and detailed function identifiers. These fields are the replacement for SFAF Data Item 705 for DoD organizations. The standardization of data entries in Data Items 511 and 512 are controlled at the MCEB level. Any suggested changes, additions, or deletions will be forwarded to the MCEB, J-208B Working Group. These changes can be addressed via e-mail to frrs@jsc.mil. Some data entries are standardized for Data Item 513 and are also controlled by the MCEB, J-208B Working Group. However, CINCs and MILDEPs may also set up any **"standard"** data entries to capture information about any function identifier not listed in the

Detailed Function Identifier column in the table in Annex I to this appendix. Periodically, the MCEB J-208B Working Group will review new "**standard**" entries to determine if they should be added to the MCEB standard lists.

Major Function Identifier 511
30 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *MFI

211. **Description:** Data Item 511 identifies the major (or primary) function of the frequency assignment.

212. **Input Requirement:** This entry is required in all DoD assignments. It may be used to eliminate entries in data items 503 (Free-text), 502 (Description of Requirement), and 520 (IRAC Supplementary Details) to reduce redundant database entries when the function and purpose of the assignment is adequately described in Data Items 511, 512, and 513. Select an entry from the approved standardized Major Function Identifier column in Annex I to this appendix. Each of the following examples are related in the same order to the examples in Data Items 512 and 513.

Examples:
511. AIR OPERATIONS
511. GROUND OPERATIONS
511. C3

Intermediate Function Identifier 512
30 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *IFI

213. **Description:** Data Item 512 identifies the intermediate function of the frequency assignment.

214. **Input Requirement:** This entry is required in all DoD assignments. It will be used to reflect those function identifiers that are subordinate to the Major Function Identifier listed in Data Item 511. Select an entry from the approved standardized Intermediate Function Identifier column in Annex I to this appendix. Each of the following examples are related in the same order to the examples in Data Items 511 and 513.

Examples:
512. AIR TRAFFIC CONTROL
512. INFANTRY
512. DATA LINK

Detailed Function Identifier 513
30 characters - 5 occurrences
Submitted to IRAC: yes GMF tag: *DFI

215. **Description:** Data Item 513 identifies the detailed function of the frequency assignment.

216. **Input Requirement:** This entry is required in all DoD assignments if the function identifier is listed in the Detailed Function Identifier column in the table in Annex I to this Appendix. Otherwise, an entry in this data item may be made at the discretion of the applicant. If a new entry is used, subsequent entries in other frequency assignment applications/records should be identical so data may be grouped together in support of spectrum requirements analysis (SRA) activities. If available, select an entry from the approved standardized Detailed Function Identifier column in Annex I to this appendix. Otherwise, enter new function identifiers when applicable and in accordance with any applicable CINC or MILDEP directives. Each of the following examples are related in the same order to the examples in Data Items 511 and 512.

Examples:
513. GROUND CONTROL
513. AIRBORNE INFANTRY
513. LINK 11

Supplementary Details 520
1080 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: SUP

217. **Description:** Data Item 520 includes the following data, if applicable, plus any additional amplifying information that would facilitate processing:

Doppler shift, if a significant factor in the particular system
A general description of the assignment requirement (applies to experimental stations)
Sounder justification
Coordination data
Refer to NTIA manual, Chapter 9, for further details.

218. **Input Requirement:** This is a free-text data item. This data item is required on several assignments, e.g., experimental stations, transportable receiving earth stations, frequency diversity, sounders, etc. Order of occurrence identifiers are **not** permitted, e.g., 520/2. To modify existing data, either delete the entire entry and replace it with new data as shown in Example A, or add new data to the existing text as shown in Example B. Additional details may be found in the NTIA Manual. Each line should be preceded by data item identifier 520. Do not split words between lines, and do not exceed 77 characters per line (including the data item number, punctuation, and spaces). Enter as many data lines as necessary to give a general description of the requirement, indicating specific use of the frequency(ies) or band(s).

Example A:
520. $
520. COORDINATED WITH FAA AS0406

(The dollar sign deletes the existing entry, regardless of the number of lines, and permits new data to be added)

Example B:
520. COORDINATED WITH AF AND NAVY

(Inserts new entry or adds to existing entry for Renewal, or Modification type of transactions. See paragraph 3f(2) at the front of the document.)

OTHER ASSIGNMENT IDENTIFIERS

219. Data items 701 through 716 are used to identify the major headquarters' Frequency Action Officer and miscellaneous reference numbers relating to the assignment coordination process. Some data items are used to code assignments as various types of functional groupings or provide additional technical data for certain aeronautical assignments.

Frequency Action Officer 701
3 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *AGN, FAO-

220. **Description:** Data Item 701 is a MILDEP code identifying the person or group responsible for the assignment. This item is not used if Data Item 010 equals A.

221. **Input Requirement:** This data item is required for Air Force assignments. It is optional for all others.

Examples:
701. 322
701. T04

Control/Request Number 702
15 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *AGN, CNO-

222. **Description:** Data Item 702 is the control/request number that allows subordinate organizations to track specific frequency applications.

223. **Input Requirement**: Enter the organizational control number as directed by the responsible agency or CINC.

224. **Air Force MAJCOMs**: Use the MAJCOM symbol followed by a space, the two-digit number for the year, a dash, and the annual sequential number.

Example:
702. ACC 81-007

225. **Army Organizat**ions in the Continental US (CONUS) Reporting to the Army Communication**s-Electronics (C-E) Services Office**: Use the two-digit-letter code for AFC or command, followed by the last digit of the current year and sequential four-digit annual number. Use leading zeros as needed.

Example:
702. AC81011

226. **Navy Organizations**: Enter the control/request number.

Example:
702. N-431-88

227. **Europe**: Use the EUCOM control number. Use leading zeros as needed.

Example:
702. USAREUR81-266

228. **USACOM Organizations:** The Joint Frequency Management Office, Atlantic (JFMOLANT) will either assign the control/request number or provide guidance for creating a unique organizational numbering sequence.

System Identifier 705
24 characters, 32 characters - 1 occurrence
Submitted to IRAC: yes GMF tag: *SYS

229. **Description:** Data Item 705 is a two-part data item. Part one identifies the primary function or purpose of the frequency assignment and part two provides amplifying information if necessary.

230. **Input Requirement:** This data item is only used by non-DoD organizations. This entry may be used to eliminate entries in data items 503 (Free-text), 502 (Description of Requirement), and 520 (IRAC Supplementary Details) to reduce redundant database entries when the function and purpose of assignment is adequately described in Data Item 705. This data item is required for IRAC assignments using frequency bands 29.89-50, 162.0-174.0, or 406.1-420.0 MHz if the assignments do not contain IRAC Notes S141 or S322 in Data Item 500. Use in other frequency bands is optional, but must comply with listed identifiers. Select an entry from the approved standardized functions/purposes to be used as data entries for this data item from the list at Annex G to this appendix.

Examples:
705. LAW ENFORCEMENT
705. NAVAIDS CONTROLS,RUNWAY LIGHTS
705. MISC,FLIGHT SUPPORT

ADDITIONAL INFORMATION

231. In this data category, only data items 803 through 804 and 901 through 953 will be stored in the database record.

Coordination Data/Remarks 801
60 characters 20 occurrences
Submitted to IRAC: no GMF tag: None

232. **Description:** Data Item 801 indicates the agencies with which coordination has been effected and contains any other free text remarks appropriate for processing the assignment.

233. **Input Requirement:** List agencies with which coordination has been effected (e.g., FAA, GAFC, etc.) and include any remarks that may be appropriate for processing the assignment. Data Item 801 is not stored in the FRRS central database. Order of occurrence identifiers are not permitted, e.g. 801/2.

Example:
801. GAFC 021200Z AUG 82

Requestor Data 803
60 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

234. **Description:** Data Item 803 reflects the name and DSN number of the individual submitting the request.

235. **Input Requirement:** This data item is required. Provide name and telephone number of individual submitting request.

Example:
803. BROWN, 281-3824

Tuning Range/Tuning Increments 804
60 characters - 30 occurrences
Submitted to IRAC: no GMF tag: None

236. **Description:** Data Item 804 indicates the tuning range and the tuning increments of the equipment used on this record.

237. **Input Requirement:** Data Item 804 is required for USCINCEUR and USCINCCENT assignments. It is optional for all others. Enter the tuning range of the equipment. Enter units followed by the lower-and upper-frequency of the equipment. Separate frequencies with a dash. Also enter one of the following to indicate the largest tuning increment of the frequency(ies) listed in Data Item 110. Separate entries with a comma. Order of occurrence identifiers are not permitted, e.g. 804/2.

TUNING INCREMENTS

CONTINUOUSLY TUNABLE	50 KHZ
10 HZ	75 KHZ
100 HZ (.1 KHZ)	100 KHZ
500 HZ (.5 KHZ)	125 KHZ
1 KHZ	200 KHZ
5 KHZ	250 KHZ
10 KHZ	500 KHZ
12.5 KHZ	1 MHZ (1000 kHz)
20 KHZ	CRYSTAL (not tunable)
25 KHZ	OTHER (explain with text)

Example:
804. M250-300, 100 KHZ

Date Response Required 805
8 characters - 1 occurrence
Submitted to IRAC: no GMF tag: None

238. **Description:** Data Item 805 is the date by which either an assignment or nonassignment of requested frequencies is required to provide notifications to potential users.

239. **Input Requirement:** Data Item 805 is required only for frequency proposals to be processed within the European theater. It is optional for all others. Except in an unusual circumstance, this date should be at least 65 days from the date of the message release or initial request date. Enter the date as YYYYMMDD. Data Item 805 is not stored in the FRRS central database.

Example:
805. 19820315

Indication if Host Nominations Are Acceptable 806
60 characters - 10 occurrences
Submitted to IRAC: no GMF tag: None

240. **Description:** Data Item 806 indicates the user's acceptance or rejection of host-nation nominations for substitute frequencies entered in Data Item 110.

241. **Input Requirement:** Data Item 806 is required for CINCEUR assignments. It is optional for all others. Enter YES followed by a statement indicating band limitations and channelization requirements if host nation nominations are acceptable to fulfill the requirement. Enter NO followed by the reason why if other nominated frequencies cannot be used. Data Item 806 is not stored in the FRRS central database. Order of occurrence identifiers are not permitted, e.g. 806/2.

Example:
806. YES, BAND LIMITATIONS ARE...

JCEOI RELATED ITEMS

242. SFAF data item numbers 982-999 are used to support the integration of standard spectrum management software and the new Joint Communications-Electronics Operation Instruction (JCEOI) software, Joint Automated CEOI System (JACS). Data items 982 through 998 are interrelated in that an entry in any of the data items are related to an entry in any of the other data items. Not all items have to be filled to complete the information needed for a net in the JCEOI Master Net List.

JCEOI Line Number 982
5 characters – 1 occurrence

Submitted to IRAC: no

243. **Description:** Data Item 982 is the line number associated with a JCEOI master net list entry.

244. **Input Requirement:** None. This is a JACS computer-generated output data item.

Examples:
982. 00001
982. 01373

JCEOI Master Net List Name 983
16 characters – 1 occurrence
Submitted to IRAC: no

245. **Description:** Data Item 983 is the name entered in the JCEOI Master Net List in JACS. This is a required item for the JCEOI.

246. **Input Requirement:** Enter the name of the net the assigned frequency will support. Revised Battlefield Electronics CEOI System / Revised DTD (Data Transmission Device) Software (RBECS/RDS) will only support 16 characters. Common Tier Three (CT3) will only support 15 characters and will truncate the last character.

Examples:
983. CINC1
983. JTF17
983. 3BDE CMD

Net Frequency Range 984
11-11 characters – 1 occurrence
Submitted to IRAC: no

247. **Description:** Data Item 984 is the frequency range within which the JACS software must select a frequency for the net listed in data item 983, JCEOI Master Net List Name.

248. **Input Requirement:** This is a required item for the JCEOI. (The format is the same as SFAF data item 110 frequency band (11-11) entries.) Enter the frequency band from which the net operating frequency will be selected by the JACS software.

Examples:
984. K3000-29999
984. M30-79.975
984. M88000-G110

Joint Restricted Frequency List (JRFL) Protection Code 985
1 or 1/2 (1 slash 2) characters – 1 occurrence
Submitted to IRAC: no

249. **Description:** Data Item 985 may have two elements. The first element contains the JRFL protection code that is applicable to the frequency assigned to this net. The first data element is followed by a slant bar and a locally assigned priority code. (Note when this data item is blank the frequency assigned to this net will not be included in the JRFL.

250. **Input Requirement:** If the frequency assigned to this net is to be included in the JRFL, enter the protection code from the list below that was requested for the corresponding master net list entry. If required, then enter a slash followed by the assigned priority code.

T - Taboo. Safety of life, stop buzzer, etc. If priorities are used, Taboo should always be A1.
G - Guarded. Frequencies with interest to the Intelligence sections.
P - Protected. Frequencies that have importance to the operation, but may be jammed because of geographic or time separation.

251. The locally assigned priority code consists of a letter followed by a number in the range A1 through Z9, with A1 being the highest.

Examples:
985. T
985. G/F2
985. P/A4

Net Tactical Call Word 986
15 characters – 1 occurrence
Submitted to IRAC: no

252. **Description:** Data Item 986 is the tactical call word assigned to the net. A tactical call word is defined as a pronounceable word which identifies a communications facility, a command, an authority, an activity, or a unit.

253. **Input Requirement:** Enter a Y if requesting a tactical call word, or enter the call word if a specific word is requested. The word assigned by JACS may not be the same as requested.

Examples:
986. Y
986. ALL AMERICAN
986. EAGLE

Net Tactical Call Sign 987
3 characters – 1 occurrence
Submitted to IRAC: no

254. **Description:** Data Item 987 is the tactical call sign assigned to the net. A call sign is defined as any combination of alphanumeric characters or phonetically pronounceable characters (trigraph), which identifies a communications facility, a command, an authority, an activity or unit; used primarily for establishing and maintaining communications.

255. **Input Requirement:** Enter a Y if requesting a tactical call sign. The call sign will be assigned by JACS, if requested.

Example:
987. Y

Net Tactical Air Designator (TAD) 988
5 characters – 1 occurrence
Submitted to IRAC: no

256. **Description:** Data Item 988 is the TAD assigned to the net. A tactical air designator is a series of alphanumeric characters which can be used to identify frequencies and nets. These designators are usually listed in the Air Tasking Order (ATO) to prevent inadvertent disclosure of classified information.

257. **Input Requirement:** Enter the TAD, if known.

Examples:
988. 3
988. 115

Net Color Word 989
16 characters – 1 occurrence
Submitted to IRAC: no

258. **Description:** Data Item 989 is the Color Word assigned to the net. A tactical color word is a series of alpha characters which can be used to identify frequencies and nets. These words are usually listed in the Air Tasking Order (ATO) to prevent inadvertent disclosure of classified information.

259. **Input Requirement:** Enter the Color Word, if known. This item must contain information if data is entered in Data Item 990 Color Number.

Examples:
989. BLUE
989. ORANGE

Net Color Number 990
2 characters – 1 occurrence
Submitted to IRAC: no

260. **Description:** Data Item 990 contains a two digit Color Number assigned to the net. These numbers are usually listed in the Air Tasking Order (ATO) to prevent inadvertent disclosure of classified information.

261. **Input Requirement:** Enter the Color Number, if known. A leading zero is required for numbers less than ten. This data item must contain information if data is entered in data item 989 Color Word.

Examples:
990. 22
990. 03

Net Restoral Priority 991
3 characters – 1 occurrence
Submitted to IRAC: no

262. **Description:** Data Item 991 is the restoral priority assigned to the net. The first character identifies the type of network, and the second and third numbers prioritize the net within that type of network. This priority will be established by the JTF commander.

263. **Input Requirement:** Enter the restoral priority of the net, if any.

Examples:
991. H15
991. A01

Net Push Number 992
3 characters – 1 occurrence
Submitted to IRAC: no

264. **Description:** Data Item 992 is the Push Number assigned to the net. A push number is a series of alphanumeric characters assigned to a frequency to assist the aircrew in moving to an alternate frequency.

265. **Input Requirement:** Enter the Push Number of the net, if any.

Examples:
992. 15
992. 123

Band Usage 993
1 characters – 1 occurrence
Submitted to IRAC: no

266. **Description:** Data Item 993 is the Band Usage of the net, if required. This character defines the frequency band label the net uses.

267. **Input Requirement:** Enter the corresponding Band Usage of the net, if required.

H - Hertz
K - KiloHertz
M - MegaHertz

Examples:
993. K
993. M

Check Sum 994
1 characters – 1 occurrence
Submitted to IRAC: no

268. **Description:** Data Item 994 is the check sum for the frequency. The frequency check sum is the units digit of the number derived from adding together the individual digits in the frequency. For example, the check sum for M235.625 would be 3 (2+3+5+6+2+5=2**3**).

269. **Input Requirement:** None. This is a JACS computer-generated output data item.

Examples:
994. 3
994. 8

COMSEC Keymat 995
15 characters – 1 occurrence
Submitted to IRAC: no

270. **Description:** Data Item 995 contains the short title of the communications security (COMSEC) keying materiel (Keymat) that is used for the net.

271. **Input Requirement:** Enter the COMSEC Keymat for the net, if required.

Examples:
995. USKAT 619
995. USKAT 3120

Circuit Type, Line Item, Group Category 996
8 characters – 1 occurrence
Submitted to IRAC: no

272. **Description:** Data Item 996 contains the Circuit Type (first two alpha characters), Line Item (next three digits), and Group Category (last three alphanumeric positions).

273. **Input Requirement:** Enter the Circuit Type, Line Item, and Group Category for the net, if required.

Examples:
996. AO164ZA1
996. ED253HO3

JCEOI Special Net Instructions 997
63 characters – 1 occurrence
Submitted to IRAC: no

274. **Description:** Data Item 997 contains any special instructions applicable to the net.

275. **Input Requirement:** Enter any applicable special instructions pertaining to the net listed in data item 983, JCEOI Master Net List Name.

Examples:
997. AOR WIDE SAR EXERCISE OPERATIONS
997. SPECINST
997. RESTORAL

Net Notes 998
3 characters – 1 occurrence
Submitted to IRAC: no

276. **Description:** Data Item 998 contains the Net Notes associated with any Special Instructions (SPECINST).

277. **Input Requirement:** Enter the corresponding abbreviation for the SPECINST, if required. If this data item is to be used, Data Item 997 must contain SPECINST.

Examples:
998. Y11
998. AA1

Guard Requirements 999
20 characters – 50 occurrences
Submitted to IRAC: no

278. **Description:** Data Item 999 is a listing of organizations required to guard (monitor) the net.

279. **Input Requirement:** Enter organizations required to guard this net, if any.

Examples:
999. JTF CMD CTR
999/2. MARFOR CMD CTR
999/3. AFFOR CMD CTR
999/4. G-NMZ,TR,CV8

ANNEX F TO
CHAPTER 8 TO
ACP 190(C)

ALPHABETICAL LIST OF IONOSPHERIC SOUNDER STATIONS

Location	Start Time	Sweep Time	Status
5TH SIG CMD (US), GE	2:20	05,20,35,50	OC
5TH SIG CMD (US), GE	2:24	10,25,40,55	OC
264 SIG SQN MBL 1(UK), UK	1:52	00,15,30,45	O
264 SIG SQN MBL 2(UK), UK	1:06	00,15,30,45	O
AKROTIRI (UK), CYP	1:14	10,25,40,55	O
ALDERGROVE (US), CAN	0:26	00,15,30,45	O
AMERSFOORT (NL), NL[E]	2:36	00,15,30,45	OC
ANDOEYA (SACLANT), NO	1:40	00,15,30,45	O
ASCENSION ISLAND (UK), ATL	4:02	Every 5 Minutes	O
ASCENSION ISLAND (US), ATL	0:38	05,20,35,50	O
AUCKLAND (NZ) NZ	3.:28	00,15,30,45	O
AVON PARK (US), FL, US	0:06	00,15,30,45	O
BERGSTROM AFB (US), TX, US	0:40	00,15,30,45	O
BOEBLINGEN (US), GE	2:32	00,15,30,45	OC
EDINGEN (US), GE [E]	2:48	00,15,30,45	OC
EGLIN AFB (US), FL, US	0:00	00,15,30,45	O
FARNBOROUGH (UK), UK	1:04	00,15,30,45	O
HAVELTE (NL), NL	2:36	00,15,30,45	O
HQ3 COMMANDO BRIGADE MOB 1, UK	2:40	00,15,30,45	O
HQ3 COMMANDO BRIGADE MOB 2, UK	1:50	00,15,30,45	O
HUNTINGTON (US), NY, US	0:30	00,15,30,45	OC
INSKIP, (UK), UK	1:38	Every 5 Minutes	O
IQALIUT (CAN), NWT	0:37	Every 5 Minutes	OC
IZMIR (TU), TU	1:28	05,20,35,50	O
JAN MAYEN (SACLANT), NO	1:40	10,25,40,55	O
LISBON (SACLANT), PO	1:24	00,15,30,45	O
MACDILL AFB (US), FL, US	0:24	00,15,30,45	O
MT PLEASANT (UK), FI	4:04	Every 5 Minutes	O
NEWPORT CORNER (SACLANT), CAN	0:32	00,15,30,45	O
PATRICK AFB (US), FL, US	0:04	00,15,30,45	OC
PIRMASENS (US), GE	2:54	05,20,35,50	OC
RIMOND (UK), UK	1:22	10,25,40,55	O
RM POOLE MBL 1, UK	1:58	00,15,30,45	O
RM POOLE MOB 2, UK	2:12	00,15,30,45	O
ROBINS AFB (US), GA, US	0:08	05,20,35,50	OC
SAMSUN (TU), TU	1:08	00,15,30,45	O

SAN TORCAZ (SP), SP	2:38	00,15,30,45	O
SAN TORCAZ (SP), SP	2:52	00,15,30,45	O
SAN TORCAZ (SP), SP	2:56	00,15,30,45	O
SOUTH GEORGIA, (UK)	4:30	00, 15, 30, 45	O
ROYALSCHOOL OF SIGNALS, UK	1:56	Every 5 Minutes	TA
TCOMMWG RAF MBL 1, UK	1:10	10,25,40,55	O
TCOMMWG RAF MBL 2, UK	1:26	10,25,40,55	O
TCOMMWG RAF MBL 3, UK	1:32	10,25,40,55	O
TCOMMWG RAF MBL 4, UK	2:00	10,25,40,55	O
TCOMMWG RAF MBL 5, UK	1:20	10,25,40,55	O
TCOMMWG RAF MBL 6, UK	1:16	10,25,40,55	O
TOULON (FR), FR	2:10	00,15,30,45	O
WAINWRIGHT AB (CAN), CAN	0:34	Every 5 Minutes	OC
WAIOURU (NZ), NZ	3:40	05,20,35,50	O
WARRENTON (US), VA, US	0:35	10,25,40,55	O

Legend: () - Operating Nation O - Operational OC - On Call
T - Training A - When Activated

ANNEX G TO
CHAPTER 8 TO
ACP 190(C)

COALITION MANAGEMENT OF ACCESS OFSOFTWARE DEFINED RADIO TO THE ELECTRO-MAGNETIC SPECTRUM

1. Purpose. The purpose of this annex is to provide guidance to coalition spectrum managers on the management of Software Defined Radios (SDR). It is expected that this process will evolve as the full potential of SDR matures.

2. The term SDR has been variously defined. As a minimum, a "Software Defined Radio" (SDR) is any radio that uses software to define the functionality of both the receiver and transmitter chain, quite possibly including the antenna(s) and cryptography. SDRs have the key advantage for military mobile use of allowing the technical parameters of the radio set and therefore the functionality to be readily changed under field conditions according to the scale, intensity and tempo of operation. This has the potential to provide greater interoperability.

3. Initially, existing spectrum management processes will be used to deploy SDR emulating legacy and newly developed systems. The evolution of SDR will present challenges and opportunities that need to be addressed. As a result, spectrum management processes will also require review.

4. There maybe multiple certification phases depending on the individual nation's requirements to process supportability request. Certification may cover both the software and/or the hardware with the embedded software. In certain countries this may require the SDR to be submitted to a test house for certification, whereas other countries may approve the SDR, possibly with certain constraints, on the basis of the submission of a supportability request.

5. Because an SDR can take many forms and function depending on its software, a naming convention is required to inform the spectrum manager of what to expect. Although not yet having a precise definition the term "waveform" is commonly used to describe the way an SDR behaves. A waveform may include a number of alternate and/or sequential modes and these collectively represent a recognised radio set. The nomenclature of the waveform may also include the version of the software.

6. Another issue to consider is the process to control and issue waveforms for SDR radios. Each country that utilises SDR radios may require a central agency that will control these functions and host the waveform library. This process is separate from, but must take place in parallel with, the spectrum management processes otherwise described in Allied Communication Publications (ie ACPs 190 & 194).

7. The spectrum management process requires the exchange of data in a standard data exchange format (eg. Standard Frequency Action Format - SFAF). The process will have a

degree of central and distributed control appropriate to the type of operation. This process is best completed in advance of operations as part of the planning process. The planning staff (J3/J6) will identify those waveforms that may be required for an operation. Increasing tempo of operations will demand an approach towards dynamic frequency management requiring sophisticated and fast acting spectrum management tools. Also, for the full advantage of this flexibility to be realised for networks, some activities of spectrum managers and network managers may merge.

8. As the Joint Tactical Radio System (JTRS) is deployed, its management is expected to follow the process for SDR deployment as detailed above. CCEB countries are expected to follow this path, which will require further development as SDR technology matures.