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MILITARY STANDARD
DEFINITIONS AND SYSTEM OF UNITS, ELECTROMAGNETIC
INTERFERENCE AND ELECTROMAGNETIC COMPATIBILITY TECHNOLOGY



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1 June 1977

DEPARTMENT OF DEFENSE
Washington, D. C. 20301

Definitions and System of Units, Electromagnetic Interference
and Electromagnetic Compatibility Technology

MIL-STD-463A

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.
2. Beneficial comments (recommendations, additions, deletion) and any pertinent data which may be of use in improving this document should be addressed to: US Army Electronics Command, Attn: IERSEL-RD-TS-S, Fort Monmouth, New Jersey 07703, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-STD-463A
1 June 1977

FOREWORD

The electromagnetic interference and compatibility language will undoubtedly continue to expand. It is, therefore, important that constructive suggestions be made by all users of the document. No particular format is prescribed. For new terms, a complete definition should be provided, together with sufficient explanation of the item for the benefit of the editorial staff. If definitions are quoted from any source, the source must be identified. Copyright material cannot be included in this standard. The active participation of individuals, organizations, and agencies in submitting changes, corrections, and additions is essential to the continued usefulness of this standard and is encouraged.

Whenever possible, definitions conform to those of the American National Standards Institute, the Institute of Electrical and Electronic Engineers, Society of Automotive Engineers, ASCC (Air Standardisation Coordinating Committee), NATO, Department of Defense Standards, the Radio Regulations of the International Telecommunications Union, the Manual of Regulations and Procedures for Radio Frequency Management of the Office of Telecommunication Policy and CISPR (International Special Committee on Radio Interference).

MIL-STD-463A
 1 June 1977

CONTENTS

		<u>Page</u>
Paragraph	1. SCOPE - - - - -	1
	2. REFERENCED DOCUMENTS- - - - -	1
	2.1 Issues of documents - - - - -	1
	2.2 Other publications - - - - -	2
	3. SYMBOLS AND ABBREVIATIONS - - - - -	3
	3.1 Symbols - - - - -	3
	3.1.1 Quantities- - - - -	3
	3.1.2 Multiplying symbols - - - - -	4
	3.2 Abbreviations - - - - -	4
	3.2.1 Power levels - - - - -	4
	3.2.1.1 dB - Decibel - - - - -	5
	3.2.1.2 dBm - Decibels relative to one milliwatt- - - - -	5
	3.2.1.3 dBm/m ² - Decibels relative to one milliwatt per square metre - - - - -	5
	3.2.1.4 dBm/m ² /MHz - Decibels relative to one milliwatt per square metre per megahertz bandwidth - - - - -	5
	3.2.2 Other abbreviations - - - - -	5
	3.2.3 Frequency spectrum designations and symbols - - -	7
	4. DEFINITIONS AND TERMINOLOGY - - - - -	7
	4.1 Absorber - - - - -	7
	4.2 Ambient level (electromagnetic) - - - - -	7
	4.3 Anechoic enclosure (radio frequency)- - - - -	7
	4.4 Antenna effective area (in a given direction) - -	7
	4.5 Antenna effective length- - - - -	7
	4.6 Antenna, Elevatable - - - - -	8
	4.7 Antenna factor - - - - -	8
	4.8 Antenna, Fixed elevation- - - - -	8
	4.9 Antenna gain (relative) - - - - -	8
	4.10 Antenna induced voltage - - - - -	8
	4.11 Antenna, Isotropic - - - - -	8
	4.12 Antenna pattern - - - - -	8
	4.13 Antenna, Phased array - - - - -	8
	4.14 Antenna, Rotatable- - - - -	8
	4.15 Antenna, Semi-elevatable- - - - -	8
	4.16 Antenna, System - - - - -	9
	4.17 Antenna terminal conducted interference - - - - -	9

MIL-STD-463A
 1 June 1977

CONTENTS - Continued

		<u>Page</u>
Paragraph	4.18 Antenna, Test - - - - -	9
	4.19 Attenuation - - - - -	9
	4.20 Bandwidth, Impulse - - - - -	9
	4.21 Bandwidth, Necessary - - - - -	9
	4.22 Bandwidth, Occupied - - - - -	9
	4.23 Bandwidth, Required acceptance - - - - -	9
	4.24 Baseband - - - - -	9
	4.25 Bond (noun) - - - - -	10
	4.26 Bonding - - - - -	10
	4.27 Bonding jumpers - - - - -	10
	4.28 Communication device, Low-power - - - - -	10
	4.29 Communication-Electronic (C-E) equipment - - - - -	10
	4.30 Compatibility, Inter-system electromagnetic - - - - -	10
	4.31 Compatibility, Intra-system electromagnetic - - - - -	10
	4.32 Counterpoise - - - - -	10
	4.33 Cross coupling - - - - -	11
	4.34 Cross modulation - - - - -	11
	4.35 Crosstalk - - - - -	11
	4.36 Decade - - - - -	11
	4.37 Decibel (dB)- - - - -	11
	4.38 Decibels relative to one milliwatt (dBm)- - - - -	11
	4.39 Decibels relative to one milliwatt per square metre (dBm/m ²) - - - - -	12
	4.40 Decibels relative to one milliwatt per square metre per megahertz bandwidth (dBm/m ² /MHz) - - - - -	12
	4.41 Degradation - - - - -	12
	4.42 Desensitization - - - - -	12
	4.43 Detector, Average - - - - -	12
	4.44 Detector, Peak - - - - -	12
	4.45 Detector, Quasi-Peak- - - - -	13
	4.46 Detector, RMS - - - - -	13
	4.47 Deviation from normal, Allowable--- - - - -	13
	4.48 Duty cycle - - - - -	13
	4.49 Earthing - - - - -	13
	4.50 Electromagnetic Compatibility (EMC) - - - - -	13
	4.51 Electromagnetic interference control- - - - -	13
	4.52 Electromagnetic Interference Safety Margin (EMISM) - - - - -	13
	4.53 Electromagnetic Pulse (EMP) - - - - -	13
	4.54 Emission - - - - -	13
	4.55 Emission, Conducted - - - - -	14
	4.56 Emission, Electromagnetic interference- - - - -	14
	4.57 Emission, Harmonic - - - - -	14
	4.58 Emission, Impulse - - - - -	14

MIL-STD-463A
 1 June 1977

CONTENTS - Continued

		<u>Page</u>
Paragraph	4.59 Emission, Parasitic - - - - -	14
	4.60 Emission, Radiated - - - - -	14
	4.61 Emission spectrum - - - - -	14
	4.62 Emission, Spurious - - - - -	14
	4.63 Environment, Electromagnetic - - - - -	14
	4.64 Environment, Elevated - - - - -	14
	4.65 Environment, Ground level- - - - -	14
	4.66 Environment, Operational - - - - -	15
	4.67 Equipment - - - - -	15
	4.68 Equipment, Telecommunications- - - - -	15
	4.69 Equipment Under Test (EUT) - - - - -	15
	4.70 Error rate (bit, block, character, element)- - -	15
	4.71 Error Rate, Bit (BER)- - - - -	15
	4.72 Facsimile - - - - -	15
	4.73 Far-Field (minimum test site distance) - - - - -	15
	4.74 Far-Field region - - - - -	16
	4.75 Field Intensity (strength) Meter (FIM) - - - - -	16
	4.76 Field strength - - - - -	16
	4.77 Frequency allocation - - - - -	16
	4.78 Frequency band, Assigned - - - - -	16
	4.79 Frequency assignment - - - - -	16
	4.80 Frequency, Characteristic- - - - -	17
	4.81 Frequency, Reference - - - - -	17
	4.82 Frequency Selective Voltmeter (FSVM) - - - - -	17
	4.83 Frequencies, Standard test - - - - -	17
	4.84 Frequency tolerance - - - - -	17
	4.85 Frequency, Waveguide cutoff- - - - -	17
	4.86 Grounding - - - - -	17
	4.87 Ground plane - - - - -	17
	4.88 Ground, Single-point - - - - -	17
	4.89 Hazards of Electromagnetic Radiation to Fuel (HEMF) - - - - -	18
	4.90 Hazards of Electromagnetic Radiation to Ordnance (HERO) - - - - -	18
	4.91 Hazards of Electromagnetic Radiation to Personnel (HEMP)- - - - -	18
	4.92 Hertz - - - - -	18
	4.93 High power effects - - - - -	18
	4.94 Image frequency- - - - -	18
	4.95 Image rejection- - - - -	18
	4.96 Impulse- - - - -	18
	4.97 Impulse Generator (IG) - - - - -	18

MIL-STD-463A
 1 June 1977

CONTENTS - Continued

		<u>Page</u>
Paragraph	4.98	Impulse strength or spectrum amplitude - - - - - 19
	4.99	Industrial, Scientific, and Medical Equipment (ISM) - 19
	4.100	Industrial heating equipment - - - - - 19
	4.101	Insertion loss - - - - - 19
	4.102	Interference, Broadband- - - - - 19
	4.103	Interference, Conducted- - - - - 19
	4.104	Interference, Electromagnetic- - - - - 19
	4.105	Interference, Harmful - - - - - 19
	4.106	Interference, Narrowband - - - - - 19
	4.107	Interference, Radiated - - - - - 19
	4.108	Intermodulation - - - - - 20
	4.109	Jitter - - - - - 20
	4.110	Jitter, Phase- - - - - 20
	4.111	Jitter, Time - - - - - 20
	4.112	Lightning- - - - - 20
	4.113	Lightning surge- - - - - 20
	4.114	Malfunction, EMC - - - - - 20
	4.115	Medical diathermy equipment- - - - - 20
	4.116	Mid-Pulse Minimum Visible Signal (MPMVS) - - - - - 20
	4.117	Minimum Visible (Discernible) Signal (MVS), (MBS) - - 20
	4.118	Modulation techniques, Baseband- - - - - 21
	4.119	Modulation types - - - - - 21
	4.120	Near-Field regions - - - - - 22
	4.121	Noise, Impulsive - - - - - 22
	4.122	Noise, Random - - - - - 22
	4.123	Octave - - - - - 23
	4.124	Open area - - - - - 23
	4.125	Operate- - - - - 23
	4.126	Operation, Duplex- - - - - 23
	4.127	Operation, Simplex - - - - - 23
	4.128	Phase lock loop- - - - - 23
	4.129	Point, Critical- - - - - 23
	4.130	Point, Monitor - - - - - 23
	4.131	Point of Entry (POE) - - - - - 24
	4.132	Power- - - - - 24
	4.133	Power, Carrier - - - - - 24
	4.134	Power density - - - - - 24
	4.135	Power, Effective Radiated (ERP)- - - - - 24
	4.136	Power, Equivalent Isotropically Radiated (EIRP)- - - 24
	4.137	Power, Mean - - - - - 24
	4.138	Power, Peak envelope - - - - - 24
	4.139	Pulse duration (pulse width, pulse length) - - - - 24
	4.140	Pulse rise time- - - - - 24

MIL-STD-463A
 1 June 1977

CONTENTS - Continued

		<u>Page</u>
Paragraph	4.141 Radar - - - - -	25
	4.142 Radar cross section - - - - -	25
	4.143 Radar effective echo area - - - - -	25
	4.144 Radiation - - - - -	25
	4.145 Radiation device, Incidental- - - - -	25
	4.146 Radiation device, Restricted- - - - -	25
	4.147 Radiation Hazards (RADEHAZ)- - - - -	25
	4.148 Radio - - - - -	25
	4.149 Radio altimeter - - - - -	25
	4.150 Radio astronomy - - - - -	25
	4.151 Radiocommunication- - - - -	25
	4.152 Radio frequency systems, Wired- - - - -	25
	4.153 Radio waves (or Hertzian waves) - - - - -	26
	4.154 Reflection coefficient- - - - -	26
	4.155 Response, Image - - - - -	26
	4.156 Response, Malfunction level - - - - -	26
	4.157 Response, Minimum discernible level - - - - -	26
	4.158 Response, Spurious- - - - -	26
	4.159 Response, Standard- - - - -	26
	4.160 Response, Undesirable level - - - - -	26
	4.161 RF stabilized arc welder- - - - -	26
	4.162 Scatter, Ionospheric- - - - -	26
	4.163 Scatter, Tropospheric - - - - -	26
	4.164 Secondary power lead- - - - -	27
	4.165 Shield- - - - -	27
	4.166 Shielded enclosure- - - - -	27
	4.167 Spectrum power density- - - - -	27
	4.168 Standard reference output - - - - -	27
	4.169 Station - - - - -	27
	4.170 Subsystem - - - - -	27
	4.171 Subsystem, Sheltered- - - - -	28
	4.172 Suppression - - - - -	28
	4.173 Survive - - - - -	28
	4.174 Susceptibility, Conducted - - - - -	28
	4.175 Susceptibility, Electromagnetic - - - - -	28
	4.176 Susceptibility, Radiated- - - - -	28
	4.177 Susceptibility threshold- - - - -	28
	4.178 System - - - - -	28
	4.179 Tailoring - - - - -	28
	4.180 Telecommunication - - - - -	28
	4.181 Telegraphy- - - - -	29
	4.182 Telemetering- - - - -	29

MIL-STD-463A
1 June 1977

CONTENTS - Continued

		<u>Page</u>
Paragraph	4.183	Telephony - - - - - 29
	4.184	Test sample or Equipment Under Test (EUT) - - - - 29
	4.185	Transients- - - - - 29
	4.186	Transmission line - - - - - 29
	4.187	Vulnerability, Electromagnetic (EMV)- - - - - 29
	5.	APPLICABLE DOCUMENTS- - - - - 29
	5.1	Issues of documents - - - - - 29
	5.2	Other publications - - - - - 31
	6.	NOTES - - - - - 31
	6.1	International standards - - - - - 31
	6.2	National standards- - - - - 31

MIL-STD-463A
1 June 1977

DEFINITIONS AND SYSTEMS OF UNITS, ELECTROMAGNETIC INTERFERENCE
AND ELECTROMAGNETIC COMPATIBILITY TECHNOLOGY

1. SCOPE

1.1 This standard is designed to assist in reaching a more common understanding of the meaning of terms used in the various military standards which provide a basis for assuring electromagnetic compatibility within the operational military environment. Definitions of terms and abbreviations are limited to statements of meaning related to this and applicable standards, rather than encyclopedia or text book discussions. For definitions of other engineering terms, the user is referred to ANSI C42.100-1972, (IEEE Std 100-1972), MIL-STD-188-120, and NATO Glossary, AAD-6.

2. REFERENCED DOCUMENTS

2.1 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this standard to the extent specified herein:

SPECIFICATIONS

MILITARY

MIL-B-5087(ASG) - Bonding, Electrical, and Lightning Protection for Aerospace Systems.

STANDARDS

MILITARY

MIL-STD-188-120 - Military Communications System Standards Terms and Definitions.

MIL-STD-285 - Attenuation Measurements for Enclosures, Electromagnetic Shielding for Electronic Test Purposes, Method of.

HANDBOOK

MILITARY

MIL-HDEK-216 - RF Transmission Lines and Fittings.

MIL-STD-463A
1 June 1977

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

2.2 Other publications. The following documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

OFFICE OF TELECOMMUNICATIONS POLICY (OTP)
Manual of Regulations and Procedures for Radio Frequency
Management.

(Application for copies should be addressed to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).

U.S. DEPARTMENT OF COMMERCE/NATIONAL BUREAU OF STANDARDS
NBS Special Publication 330 - The International System of
Units (SI).

(Application for copies should be addressed to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402). Order by SD Catalog No. C13.10:330/3).

THE INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS, INC. (IEEE)
IEEE Std. 100-1972 - Dictionary of Electrical and Electronic
Terms (ANSI C42.100-1972).

(Application for copies should be addressed to IEEE Standards Office, 345 East 47th Street, New York, N. Y. 10017).

NORTH ATLANTIC TREATY ORGANIZATION (NATO)
NATO Glossary, AAD-6

(Application for copies should be addressed to NATO Headquarters, Evere, Brussels, Belgium, ATTN: Military Agency for Standardization).

MIL-STD-463A
 1 June 1977

3. SYMBOLS AND ABBREVIATIONS¹

3.1 Symbols.

3.1.1 Quantities. The following units and symbols shall be used to indicate the applicable quantity:

Quantity	Name of SI Unit	Symbol of SI Unit
Length	metre	m
Electric current	ampere	A
Electric potential, Potential difference, Electromotive force	volt	V
Electric field strength (E-Vector)	volts per metre	V/m
Magnetic field strength (H-Vector)	ampere per metre	A/m
Magnetic flux density	tesla	T
Power	watt	W
Frequency	hertz	Hz
Time	second	s
Electric resistance	ohm	Ω
Electric capacitance	farad	F
Inductance	henry	H
Magnetic flux	weber	Wb
Pulse width	second	s

¹The units, symbols and physical constants used comply with the International System of Units (SI). See National Bureau of Standards Special Publication 330.

MIL-STD-463A
 1 June 1977

Quantity	Name of SI Unit	Symbol of SI Unit
Pulse rise time	second	s
Wavelength	metre	m
Frequency deviation	hertz	Hz

3.1.2 Multiplying symbols. The following symbols shall be used to indicate the applicable multiplier:

<u>Multiplier</u>	<u>Symbol</u>
tera (10^{12})	T
giga (10^9)	G
mega (10^6)	M
kilo (10^3)	k
hecto (10^2)	h
deka (10^1)	da
deci (10^{-1})	d
centi (10^{-2})	c
milli (10^{-3})	m
micro (10^{-6})	μ
nano (10^{-9})	n
pico (10^{-12})	p
femto (10^{-15})	f
atto (10^{-18})	a

3.2 Abbreviations.

3.2.1 Power levels.

MIL-STD-463A
1 June 1977

3.2.1.1 dB - Decibel.

3.2.1.2 dBm - Decibels relative to one milliwatt.²

3.2.1.3 dBm/m² - Decibels relative to one milliwatt per square metre.

3.2.1.4 dBm/m²/MHz - Decibels relative to one milliwatt per square metre per megahertz bandwidth.

3.2.2 Other abbreviations.

BER	- Bit Error Rate.
C-E	- Communication-Electronic.
CE	- Conducted Emission.
CS	- Conducted Susceptibility.
ECM	- Electronic Counter-Countermeasures.
ECM	- Electronic Countermeasures.
EFS	- Electric Field Strength.
EIRP	- Power, Equivalent Isotropically Radiated.
EM	- Electromagnetic.
EMC	- Electromagnetic Compatibility.
EMCP	- Electromagnetic Compatibility Program.
EMCS	- Electromagnetic Compatibility Standardization.
EMI	- Electromagnetic Interference.
EMISM	- Electromagnetic Interference Safety Margin.

²dBm is not in accordance with the International System of Units (SI), and is not to be considered a recommended abbreviation, or unit. It should properly read dBmW, with a multiplying symbol plus an SI unit symbol. However, in the United States, dBm is widely used and accepted. dBm is also cited in the OTP Manual in regard to electromagnetic emission limits.

MIL-STD-463A
1 June 1977

EMP - Electromagnetic Pulse.
EMS - Electromagnetic Susceptibility.
EMV - Electromagnetic Vulnerability.
ERP - Effective Radiated Power.
EUT - Equipment Under Test.
EW - Electronic Warfare.
FIM - Field Intensity Meter.
FSVM - Frequency Selective Voltmeter.
HERF - Hazards of Electromagnetic Radiation to Fuel.
HERO - Hazards of Electromagnetic Radiation to Ordnance.
HERP - Hazards of Electromagnetic Radiation to Personnel.
IBW - Impulse Bandwidth.
IG - Impulse Generator.
ISM - Industrial, Scientific and Medical Equipment.
le - Antenna effective length for electric-field antennas.
lem - Antenna effective length for magnetic-field antennas.
MDS - Minimum Discernible Signal.
MFS - Magnetic Field Strength.
MPMVS - Mid-Pulse Visible Signal.
MVS - Minimum Visible Signal.
POE - Point of Entry.
RADEHAZ - Radiation Hazards.
RE - Radiated Emission.
RFI - Radio Frequency Interference.
RS - Radiated Susceptibility.

MIL-STD-463A
 1 June 1977

3.2.3 Frequency spectrum designations and symbols. The following symbols shall be used to indicate the applicable portion of the frequency spectrum: (OTF)

Frequency Subdivision

VLF (very low)	3 kHz to 30 kHz
LF (low)	30 kHz to 300 kHz
MF (medium)	300 kHz to 3000 kHz
HF (high)	3000 kHz to 30 MHz
VHF (very high)	30 MHz to 300 MHz
UHF (ultra high)	300 MHz to 3000 MHz
SHF (super high)	3000 MHz to 30 GHz
EHF (extremely high)	30 GHz to 300 GHz
---	300 GHz to 3000 GHz

4. DEFINITIONS AND TERMINOLOGY

The following definitions and terms are given for use in the applicable documents and apply to the restricted field of electromagnetic interference and compatibility.

4.1 Absorber. A material which causes the irreversible conversion of the energy of an electromagnetic wave into another form of energy as a result of its interactions with matter. (IEEE)

4.2 Ambient level (electromagnetic). The values of radiated and conducted signal and noise existing at a specified test location and time when the test sample is not activated. (IEEE) Atmospheric noise, and signals from man-made and natural sources all contribute to the "ambient level".

4.3 Anechoic enclosure (radio frequency). An enclosure especially designed with boundaries that absorb incident waves thereon to maintain an essentially reflection free field condition in the frequency range of interest.

4.4 Antenna effective area (in a given direction). The ratio of the power available at the terminals of an antenna to the incident power density of a plane wave from that direction, polarized coincident with the polarization that the antenna would radiate. (IEEE)

4.5 Antenna effective length. The ratio of the antenna open circuit induced voltage to the intensity of the field component being measured. (IEEE)

MIL-STD-463A
1 June 1977

4.6 Antenna, Elevatable. An antenna designed to be elevated, either automatically, semi-automatically or manually, through an angle.

4.7 Antenna factor. That factor that, when properly applied to the meter reading of the measuring instrument, yields the electric field strength in volts/meter or the magnetic field strength in amperes/meter. Note: This factor includes the effects of antenna effective length, and mismatch and transmission loss. (IEEE)

4.8 Antenna, Fixed elevation. An antenna designed for operation at a selected angle of elevation and not adjustable except by removing or replacing mounting hardware.

4.9 Antenna gain (relative). The ratio of the power required at the input of a reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field at the same distance. When not otherwise specified, the gain figure for an antenna refers to the gain in the direction of the radiation main lobe. Note: In applications using scattering modes of propagation the full gain of an antenna may not be realizable in practice, and the apparent gain may vary with time. (OTP)

4.10 Antenna induced voltage. The voltage which is measured at, or calculated to exist across, the open-circuited antenna terminals.

4.11 Antenna, Isotropic. A hypothetical antenna that radiates or receives energy of all polarization equally well in all directions. An isotropic antenna is a lossless point source used as the theoretical reference in describing the absolute gain of a real antenna.

4.12 Antenna pattern. A graph of the radial component of the Poynting vector at a constant radius, as a function of some angle in the coordinate system used.

4.13 Antenna, Phased array. An array antenna whose beam direction or radiation pattern is controlled primarily by the relative phases of the excitation coefficients of the radiating elements. (IEEE)

4.14 Antenna, Rotatable. An antenna designed for operational rotation in the azimuth plane.

4.15 Antenna, Semi-elevatable. An antenna designed to be elevated continuously through an angle of less than 80 degrees, or stepped in increments in the vertical plane.

MIL-STD-463A
1 June 1977

4.16 Antenna, System. An antenna which is designed for and normally provided with the system whose characteristics are being measured.

4.17 Antenna terminal conducted interference. Any undesired voltage or current generated within a receiver, transmitter, or their associated equipment appearing at the antenna terminals.

4.18 Antenna, Test. The antenna, of known performance characteristics, associated with the measurement equipment.

4.19 Attenuation. A general term used to denote a decrease in magnitude (of power or field strength) in transmission from one point to another. It may be expressed as a ratio or, by extension of the term in decibels. (IEEE)

4.20 Bandwidth, Impulse. The peak value of the response envelope divided by the spectrum amplitude (impulse strength) of an applied impulse. (IEEE)

4.21 Bandwidth, Necessary. For a given class of emission, the minimum value of the occupied bandwidth sufficient to ensure the transmission of information at the rate and with the quality required for the system employed under specified conditions. Emissions useful for the good functioning of the receiving equipment as, for example, the emission corresponding to the carrier of reduced carrier systems, shall be included in the necessary bandwidth. (OTP)

4.22 Bandwidth, Occupied. The frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. In some cases, for example, multichannel frequency division systems, the percentage of 0.5 percent may lead to certain difficulties in the practical application of the definitions of occupied and necessary bandwidth; in such cases a different percentage may prove useful. (OTP)

4.23 Bandwidth, Required acceptance. The receiver bandwidth which includes the fundamental frequency response and extends from the lowest to the highest frequencies on the selectivity curve outside of which the image response and all other responses are specified levels below the fundamental frequency response.

4.24 Baseband. The band of frequencies occupied by the signal before it modulates the carrier (or subcarrier) frequency to form the transmitted line or radio signal. (IEEE)

MIL-STD-463A

1 June 1977

4.25 Bond (noun). A bond is any fixed union existing between two objects that results in electrical conductivity between two objects. Such union occurs either from physical contact between conducting surfaces of the objects or from the addition of a firm electrical connection between them (5087)

4.26 Bonding. In electrical engineering, the process of connecting together metal parts so that they make low resistance electrical contact for direct current and lower frequency alternating current. (NATO)

4.27 Bonding jumpers. (A) A braided wire or metal strap used for bonding. (B) A braided wire or metal strap that provides the necessary electrical conductivity between the unit and structure which would not otherwise be in sufficient electrical contact. (5087)

4.28 Communication device, Low-power. A restricted radiation device, exclusive of those employing conducted or guided radio frequency techniques, used for the transmission of signs, signals (including control signals), writing, images and sounds of intelligence of any nature by radiation of electromagnetic energy. Examples of such devices include wireless microphone, phonograph oscillator, radio-controlled garage door opener, and radio-controlled models. (OTP)

4.29 Communication-Electronic (C-E) equipment. Any item generating, transmitting, conveying, acquiring, receiving, storing, processing or utilizing electronic and electromagnetic information in the broadest sense. Such devices are used to meet a variety of operational requirements such as communications, surveillance, identification, navigation, guided missile control, sonar, countermeasures, and space operations.

4.30 Compatibility, Inter-system electromagnetic. The portion of EMC program dealing with the interaction of a given system with its operational electromagnetic environment or with other systems. The intersystem EMC effects are primarily antenna coupled through signal or power transmission systems.

4.31 Compatibility, Intra-system electromagnetic. The portion of EMC program dealing with the interaction of subsystem equipments and components within a given system. Coupling modes are primarily inductive, capacitive, E-Field, and H-Field for wire to wire coupling; common impedance coupling and antenna to antenna coupling within the system.

4.32 Counterpoise. A system of wires or other conductors, elevated above and insulated from the ground, forming the lower system of conductors of an antenna. For overhead lines, a conductor or system of conductors arranged beneath the line, located on, above, or most frequently below the surface of the earth, and connected to the footings of the towers or poles supporting the line. (IEEE)

MIL-STD-463A
 1 June 1977

4.33 Cross coupling. Undesired signal coupling between two or more different communication channels, circuit components or parts.

4.34 Cross modulation. A type of intermodulation due to modulation of the carrier of the desired signal by an undesired signal. (IEEE)

4.35 Crosstalk. An undesired signal disturbance introduced in a transmission circuit by mutual electric or magnetic coupling with other transmission circuits.

4.36 Decade. A frequency ratio of 10 to 1, or 3.32 octaves.

4.37 Decibel (dB). A unit used as a measure of the ratio of two power levels.

$$\text{dB} = 10 \log \frac{W_1}{W_2}$$

The expressions

$$\text{dB} = 20 \log_{10} \frac{V_1}{V_2} = 20 \log_{10} \frac{A_1}{A_2}$$

are accepted definitions of dB. However, it assumes that both values of electric potential or current measured have the same impedance. If the two impedances are not the same, revert to the basic definition in terms of power. Note: Values to be compared must be in the same units, i.e., with appropriate multiplying symbols, if required.

4.38 Decibels relative to one milliwatt (dBm). The absolute power value in decibels referred to a power level of one milliwatt.³

$$\text{dBm} = \text{dBmW} = 10 \log_{10} \text{Power}$$

Where Power is in milliwatts, and zero dBm equals one milliwatt.

³ dBm is not in accordance with the International System of Units (SI), and is not to be considered a recommended abbreviation, or unit. It should properly read dBmW, with a multiplying symbol plus an SI unit symbol. However, in the United States, dBm is widely used and accepted. dBm is also cited in the OTP Manual in regard to electromagnetic emission limits.

MIL-STD-463A
 1 June 1977

4.39 Decibels relative to one milliwatt per square metre (dBm/m²).

$$\text{dBm/m}^2 = \text{dBmW/m}^2 = 10 \log_{10} \frac{\text{Power}}{\text{Area}}$$

Where Power is in milliwatts, and Area is the effective area over which the power is measured, in square metres. The reference is one milliwatt per square metre. This is a measure of the radiated power density of a narrowband signal. Note: Power density units shall not be used when the power distribution across the area measured is not uniform, such as in the near field of antennas.

4.40 Decibels relative to one milliwatt per square metre per megahertz bandwidth (dBm/m²/MHz).

$$\text{dBm/m}^2/\text{MHz} = \text{dBmW/m}^2/\text{MHz} = 10 \log_{10} \frac{\text{Power}}{(\text{AREA})(\text{IBW})}$$

Where Power is in milliwatts, Area is the effective area in square metres over which Power is measured, and IBW is defined as the impulse bandwidth of the receiver, in MHz. The reference is one milliwatt per square metre of radiated power, normalized to one MHz bandwidth. Note: This normalization does not apply to thermal noise or to noise which is random in time and phase relationship. Power density units shall not be used when the power distribution across the area measured is not uniform, such as in the near fields of antennas.

4.41 Degradation. Any out-of-tolerance condition that occurs during EMC testing.

4.42 Desensitization. A reduction in receiver sensitivity to the desired signal due to the presence of a high level undesired signal which overloads the receiver circuits.

4.43 Detector, Average. A detector, the output voltage of which approximates the average value of the envelope of an applied signal. (IEEE)

4.44 Detector, Peak. A detector having an output which approximates the true peak value (maximum instantaneous value during a given interval of time) of an applied signal. (IEEE)

MIL-STD-463A
1 June 1977

4.45 Detector, Quasi-Peak. A detector having specified electrical time constants, which when regularly repeated pulses of constant amplitude are applied to it, delivers an output voltage which is a fraction of the peak value of the pulses, the fraction increasing towards unity as the pulse repetition rate is increased. (IEEE)

4.46 Detector, RMS. A detector having an output which approximates the rms value of an applied signal. (IEEE) Note: This must be so regardless of waveform.

4.47 Deviation from normal, Allowable. Changes in indication which are acceptable during a susceptibility test, provided they do not deviate beyond the tolerance given in the individual equipment specification.

4.48 Duty cycle. The ratio of the sum of all pulse durations to the total period, during a specified period of continuous operation. (IEEE)

4.49 Earthing. The process of making a satisfactory electrical connection between the structure, including the metal skin, of an object or vehicle, and the mass of the earth, to ensure a common potential with the earth. (NATO)

4.50 Electromagnetic Compatibility (EMC). The condition which prevails when telecommunications (communication-electronic) equipment is collectively performing its individual designed functions in a common electromagnetic environment without causing or suffering unacceptable degradation due to electromagnetic interference to or from other equipments/systems in the same environment. (OTF)

4.51 Electromagnetic interference control. The control of radiated and conducted energy such that the emissions unnecessary for system, subsystem, or equipment operation are minimized or reduced. Electromagnetic radiated and conducted emissions, regardless of their origin within the equipment, subsystem or system are therefore controlled. Successful EMI control, along with susceptibility control, leads to EMC.

4.52 Electromagnetic Interference Safety Margin (EMISM). The ratio between the susceptibility threshold and the interference present on a critical test point or signal line.

4.53 Electromagnetic Pulse (EMP). Broadband high power effect encompassing the totality of a system as an antenna, such as would result from a nuclear burst.

4.54 Emission. Electromagnetic energy propagated from a source by radiation or conduction.

MIL-STD-463A

1 June 1977

4.55 Emission, Conducted. Electromagnetic emissions propagated along a power or signal conductor.

4.56 Emission, Electromagnetic interference. Any conducted or radiated emission which causes electromagnetic interference.

4.57 Emission, Harmonic. Electromagnetic radiation from a transmitter which is not part of the information signal, but whose frequency is an integral multiple of the carrier frequency.

4.58 Emission, Impulse. That emission produced by impulses having a repetition frequency not exceeding the impulse bandwidth of the receiver in use.

4.59 Emission, Parasitic. Electromagnetic radiation from a transmitter which is not part of the information signal or harmonically related to the carrier, and is caused by undesired oscillations in the circuitry.

4.60 Emission, Radiated. Desired or undesired electromagnetic energy which is propagated through space. Such an emission is called "radiated interference" if it is undesired.

4.61 Emission spectrum. A power versus frequency distribution of a signal about its fundamental frequency which includes the fundamental frequency, the associated modulation sidebands, as well as non-harmonic and harmonic emissions and their associated sidebands.

4.62 Emission, Spurious. Any electromagnetic emission on a frequency or frequencies which are outside the necessary emission bandwidth, the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emission, parasitic emission, and intermodulation products, but exclude emissions in the immediate vicinity of the necessary emission bandwidth, which are a result of the modulation process for the transmission of information. (OTP)

4.63 Environment, Electromagnetic. The power and time distribution, in various frequency ranges, of the radiated or conducted electromagnetic emission levels which may be encountered by an equipment, subsystem or system when performing its assigned mission. The electromagnetic environment may also sometimes be expressed in terms of field strength.

4.64 Environment, Elevated. The electromagnetic environment observed as a result of measurements made above the ground level.

4.65 Environment, Ground level. The electromagnetic environment observed as a result of measurements taken at or below the height above the ground level of the system antenna.

MIL-STD-463A
1 June 1977

4.66 Environment, Operational. The aggregate of all conditions and influences that may affect the operation of a composite system, vehicle system, and ground system and their respective subsystems and equipment.

4.67 Equipment. Any electrical, electronic or electromechanical device, or collection of items intended to operate as an individual unit and performing a singular function. As defined herein, equipments include but are not limited to, the following: receivers, transmitters, transceivers, transponders, power supplies, electrical office machines, hand tools, processors, test apparatus and instruments, and material handling equipment.

4.68 Equipment, Telecommunications. Any equipment which transmits, emits, or receives signs, signals, writing images, sound, or information of any nature by wire, radio, visual, or other electromagnetic means.

4.69 Equipment Under Test (EUT). See Test sample.

4.70 Error rate (bit, block, character, element). The ratio of the number of bits, blocks, characters or elements incorrectly received to the total number of bits, blocks, characters or elements sent in a specified time interval.

4.71 Error Rate, Bit (BER). The number of erroneous bits divided by the total number of bits over some stipulated period of time. The two types are: transmission BER - number of erroneous bits received versus total number of bits transmitted; and information BER - number of erroneous decoded (corrected) bits versus total number of decoded (corrected) bits. The BER is usually expressed as a power of 10, e.g., 2×10^{-5} .

4.72 Facsimile. A system of telecommunication for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form. (OTP)

4.73 Far-Field (minimum test site distance). That distance between two antennas equal to D^2/λ or 3λ , whichever is larger, where D is the maximum aperture dimension of the largest antenna, and λ is the wavelength at the fundamental frequency. If the test antenna aperture (D_2) is larger than one-tenth of the aperture of the antenna being measured (D_1), then the minimum test site distance is $(D_1 + D_2)^2/\lambda$. This is the minimum range that will yield a satisfactory approximation of the far-field pattern.⁴

⁴For directional antennas, these formulas apply primarily to the on-axis distance required to be in the far field of the main beam. Generally, the required distance decreases as a function of the angle off the main beam axis.

MIL-STD-463A
1 June 1977

4.74 Far-Field region. The region of the field of an antenna where the angular field distribution is essentially independent of the distance from the antenna. Notes: (1) If the antenna has a maximum overall dimension D that is large compared to the wavelength, the far-field region is commonly taken to exist at distances greater than $2D^2/\lambda$ from the antenna, λ being the wavelength. (2) For an antenna focused at infinity, the far-field region is some times referred to as the Fraunhofer region. (IEEE)⁵

4.75 Field Intensity (strength) Meter (FIM). A calibrated radio receiver for measuring field strength. (IEEE)

4.76 Field strength. A general term that usually means the magnitude of the electric field vector, commonly expressed in volts per meter, but that may also mean the magnitude of the magnetic field vector, commonly expressed in amperes or ampere turns per meter. (IEEE) Note: As used in the field of EMC/EMI, the term "Field Strength" shall be applied only to measurements made in the far field and shall be abbreviated as FS. For measurements made in the near field, the term "electric field strength" (EFS) or "magnetic field strength" (MFS) shall be used, according to whether the resultant electric or magnetic field, respectively, is measured. The EFS shall be expressed as V/m and the MFS as A/m. In this near field region, the field measured will be the resultant of the radiation, inductive and quasi-static ($1/r$, $1/r^2$, and, if present, the $1/r^3$) components, respectively, of the field where r is the distance from the source. Inasmuch as it is not generally feasible to determine the time and space relationships of the various components of this complex field, the energy in the field is similarly indeterminate.

4.77 Frequency allocation. The process of designating radio-frequency bands for use by specific radio services. (IEEE)

4.78 Frequency band, Assigned. The frequency band, the center of which coincides with the frequency assigned to the station and the width of which equals the necessary bandwidth plus twice the absolute value of the frequency tolerance. (OTP)

4.79 Frequency assignment. The process of authorizing a specific frequency, group of frequencies, or frequency band to be used at a certain location under specified conditions (bandwidth, power, azimuth, duty cycle, modulation, etc.)

⁵ For directional antennas, these formulas apply primarily to the on-axis distance required to be in the far field of the main beam. Generally, the required distance decreases as a function of the angle off the main beam axis.

MIL-STD-463A
1 June 1977

4.80 Frequency, Characteristic. A frequency which can be easily identified and measured in a given emission. (OTP)

4.81 Frequency, Reference. A frequency having a fixed and specified position with respect to the assigned frequency. The displacement of this frequency with respect to the assigned frequency has the same absolute value and sign that the displacement of the characteristic frequency has with respect to the center of the frequency band occupied by the emission. (OTP)

4.82 Frequency Selective Voltmeter (FSVM). A frequency selective radio receiver calibrated as a two terminal voltmeter.

4.83 Frequencies, Standard test. That group of frequencies to which transmitters or receivers are tuned during the test procedure.

4.84 Frequency tolerance. The maximum permissible departure by the center frequency of the frequency band occupied by an emission from the assigned frequency, or by the characteristic frequency of an emission, from the reference frequency. The frequency tolerance is usually expressed in parts in 10^6 or in hertz. (OTP)

4.85 Frequency, Waveguide cutoff. That frequency below which there is not real propagation of energy, and the incident fields are attenuated exponentially. For a hollow rectangular waveguide with broad wall dimension, a - equal to or greater than twice the wall dimension, b - the cutoff frequency is defined by $f_c = c/2a$, where f_c is the cutoff frequency of the guide, c is the velocity of light, and the distance dimensions of a and c are in the same units. For the method of determining cutoff frequencies for other type waveguide, see MIL-HDBK-216.

4.86 Grounding. (A) The bonding of an equipment case, frame or chassis, to an object or vehicle structure to ensure a common potential. (NATO) (B) The connecting of an electric circuit or equipment to earth or to some conducting body of relatively large extent which serves in place of earth. (188-120 Modified)

4.87 Ground plane. A conducting surface or plate used as a common reference point for circuit returns and electrical or signal potentials.

4.88 Ground, Single-point. A scheme of circuit/shield grounding in which each circuit/shield has only one physical connection to ground, ideally at the same point for a given subsystem. This technique prevents return currents from flowing in the structure.

MIL-STD-463A
1 June 1977

4.89 Hazards of Electromagnetic Radiation to Fuel (HERF). Potential for electromagnetic radiation to cause spark ignition of volatile combustibles, such as aircraft fuels.

4.90 Hazards of Electromagnetic Radiation to Ordnance (HERO). Potential for munitions or electroexplosive devices to be adversely affected by electromagnetic radiation.

4.91 Hazards of Electromagnetic Radiation to Personnel (HERP). Potential for electromagnetic radiation to produce harmful biological effects in humans.

4.92 Hertz. A unit of frequency which is equivalent to one cycle per second. (OTF)

4.93 High power effects. Effects that only occur in the presence of strong signals. High power effects are neither predictable nor preventable using the classical frequency-oriented methods of analysis (i.e., frequency assignment, intermodulation, spurious response, etc.) The term includes both permanent electromagnetic damage and temporary performance degradation, and may or may not be dependent on the presence of an antenna.

4.94 Image frequency. In heterodyne frequency converters in which one of two sidebands produced by beating is selected, the image frequency is an undesired input frequency capable of producing the selected frequency by the same process. The word "image" implies the mirror-like symmetry of signal and image frequencies about the beating oscillator frequency or the intermediate frequency, whichever is the higher. (IEEE)

4.95 Image rejection. The decrease in response of a superheterodyne receiver to the image frequency as compared with its response to the desired signal, usually expressed in decibels.

4.96 Impulse. An electrical pulse of short duration relative to a cycle at the highest frequency being considered. Mathematically, it is a pulse of infinite amplitude, infinitesimal duration, and finite area. Its spectral energy density is proportional to its volt-time area, and is uniformly and continuously distributed through the spectrum up to the highest frequency at which it may be considered an impulse. Regularly repeated impulses of uniform level will generate a uniform spectrum of discrete frequencies (Fourier Components) separated in frequency by an amount equal to the repetition frequency.

4.97 Impulse Generator (IG). A standard reference source of impulse energy. (IEEE)

MIL-STD-463A

1 June 1977

4.98 Impulse strength or spectrum amplitude. The rms unmodulated sine wave voltage, at the tuned frequency, required to produce in a circuit a peak response equal to that produced by the impulse in question, divided by the impulse bandwidth of the circuit. For the purpose of this Standard, it is expressed in terms of $\mu\text{V}/\text{MHz}$ or $\text{dB}\mu\text{V}/\text{MHz}$.

4.99 Industrial, Scientific, and Medical Equipment (ISM). Radiation devices which use radio waves for industrial, scientific or medical purposes, including the transfer of energy by radio, and which are neither used nor intended to be used for radio communication. (OTP)

4.100 Industrial heating equipment. Any apparatus which utilizes a radio frequency oscillator or any other type of radio frequency generator and transmits radio frequency energy used for or in connection with industrial heating operations utilized in a manufacturing or production process. (OTP)

4.101 Insertion loss. The reduction in power which takes place at the load on insertion of a network between the source and the load. It is generally expressed as a ratio in decibels.

4.102 Interference, Broadband. An undesired emission which has a spectral energy distribution sufficiently broad that the response of the measuring receiver in use does not vary more than 3 dB when tuned over $\pm$ two impulse bandwidths.

4.103 Interference, Conducted. Undesired electromagnetic energy which is propagated along a conductor.

4.104 Interference, Electromagnetic. Any electromagnetic energy which interrupts, obstructs, or otherwise degrades or limits the effective performance of telecommunications (communication-electronic) equipment.

4.105 Interference, Harmful. Any emission, radiated or conducted, which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service. (OTP Modified)

4.106 Interference, Narrowband. An undesired emission which has its principal spectral energy lying within the pass band of the measuring receiver in use.

4.107 Interference, Radiated. Undesired electromagnetic energy that is radiated from any unit, antenna, cable, or interconnecting wiring.

MIL-STD-463A
1 June 1977

4.108 Intermodulation. The mixing of two or more signals in a non-linear element to produce signals at new frequencies which are sums and differences of the input signals or their harmonics. The nonlinear element(s) may be internal to the system, subsystem or equipment, or may be some external device(s).

4.109 Jitter. Short time instability of a signal. The instability may be in either amplitude or phase, or both. Random departure from regularity of repetition.

4.110 Jitter, Phase. That phenomena, from causes known or unknown, which results in a relative shifting in the phase of the signal. The shifting in phase may appear to be random, cyclic or both. The amount of phase jitter may be expressed in degrees with any cyclic component expressed in hertz.

4.111 Jitter, Time. A measure of the uncertainty of the repetitive position of a time mark. Time related, abrupt, spurious variations in the duration of any specified, related interval.

4.112 Lightning. A sudden discharge of static electric potential that occurs naturally in the atmosphere in the presence of clouds.

4.113 Lightning surge. A transient electric disturbance in an electrical/electronic circuit caused by lightning.

4.114 Malfunction, EMC. A failure of a system or associated subsystem/equipment due to electromagnetic interference or susceptibility that results in loss of life, loss of vehicle, mission abort, or permanent unacceptable reduction in system effectiveness.

4.115 Medical diathermy equipment. Any apparatus (other than surgical diathermy apparatus designed for intermittent operation with low power), which utilizes a radio frequency oscillator or any other type of radio frequency generator and transmits radio frequency energy used for therapeutic purposes. (OTP)

4.116 Mid-Pulse Minimum Visible Signal (MPMVS). The minimum input pulse signal power level which permits visibility of the center of the output pulse. This level is obtained in the same manner as the MVS signal.

4.117 Minimum Visible(Discernible)Signal (MVS), (MDS). The minimum input pulse signal power level which permits visibility of the output pulse. This level is obtained by initially setting the input signal level above the detection threshold and then slowly decreasing the amplitude.

MIL-STD-463A
1 June 1977

4.118 Modulation techniques, Baseband.

a. Composite Modulation: Applying more than one baseband process to a single carrier for transmission of digital information. It is possible to superimpose PAM on PSK or PSK signals as a means of increasing the information throughput rate without significantly increasing the system bandwidth. Likewise PPM and PDM or PAM and PPM may co-exist in the same channel.

b. Frequency-Shift Keying (FSK): The form of frequency modulation in which the modulating wave shifts the output frequency between predetermined values, and the output wave has no phase discontinuity. (IEEE)

c. Phase-Shift Keying (PSK): The form of phase modulation in which the modulating function shifts the instantaneous phase of the modulated wave between predetermined discrete values. (IEEE)

d. Pulse-Amplitude Modulation (PAM): Modulation in which the modulating wave is caused to amplitude modulate a pulse carrier. (IEEE)

e. Pulse-Code Modulation (PCM): A modulation process involving the conversion of a waveform from analog to digital form by means of coding. Note: The term is commonly used to signify that form of pulse modulation in which a code is used to represent quantized values of instantaneous samples of the signal wave. (IEEE)

f. Pulse-Duration Modulation (PDM) or Pulse Width Modulation (PWM): Pulse-time modulation in which the value of each instantaneous sample of the modulating wave is caused to modulate the duration of a pulse. Note: In PDM, the modulating wave may vary the time of occurrence of the leading edge, the trailing edge, or both edges of the pulse. (IEEE)

g. Pulse-Position Modulation (PPM): Pulse time modulation in which the value of each instantaneous sample of a modulating wave is caused to modulate the position in time of a pulse. (IEEE)

4.119 Modulation types.

a. AM (amplitude modulation) - modulation in which the amplitude of a wave is the characteristic subject to variation.

b. CW (continuous wave) - an electromagnetic wave that varies sinusoidally in amplitude and remains constant in frequency.

c. DSB (double sideband) - AM transmission of a carrier accompanied by both sidebands.

MIL-STD-463A
1 June 1977

d. FM (frequency modulation) - modulation in which the instantaneous frequency of a wave differs from its carrier frequency by an amount proportional to the instantaneous amplitude of the modulating signal.

e. ISB (independent sideband) - AM with the carrier either suppressed or reinserted, accompanied by both sidebands, each of which contains separate information.

f. PM (phase modulation) - modulation in which the instantaneous phase of a wave differs from its carrier phase by an amount proportional to the instantaneous amplitude of the modulating signal.

g. SSB (single sideband) - AM in which one sideband is transmitted and the other sideband is suppressed. The carrier wave may be either transmitted or suppressed.

4.120 Near-Field regions.

A. Radiating. The region of the field of an antenna between the reactive near field region and the far field region wherein the angular field distribution is dependent upon distance from the antenna.

Notes: (1) If the antenna has a maximum overall dimension which is not large compared to the wavelength, this field region may not exist. (2) For an antenna focused at infinity, the radiating near field is sometimes referred to as the Fresnel region. (IEEE)

B. Reactive. The region of the field immediately surrounding the antenna wherein the reactive field predominates.

Note: For most antennas the outer boundary of the region is commonly taken to exist at a distance $\lambda / 2\pi$ from the antenna surface. (IEEE)

4.121 Noise, Impulsive. Characterized by wide spacing of individual impulses and measured in units of volts per megahertz. Differs from random noise in which individual pulses overlap. Measured voltage is directly proportional to measurement bandwidth.

4.122 Noise, Random. Characterized by almost continuous overlapping impulses; unpredictable except in a statistical sense. Measured in terms of interference power. The unit dBm/Hz is used in the United States. Differs from impulse noise which occurs as isolated or well spaced pulses. Measured power is proportional to measurement bandwidth.

MIL-STD-463A
1 June 1977

4.123 Octave. A frequency ratio of 1 to 2, e.g., from 1 to 2 MHz, 2 to 4 MHz, 500 to 1000 MHz, etc.

4.124 Open area. A site for radiated electromagnetic measurements which is open flat terrain at a distance far enough away from buildings, electric lines, fences, trees, underground cables, and pipe lines so that effects due to such are negligible. The ambient electromagnetic level of the open area should be at least 6 dB below the applicable emission level.

4.125 Operate. The ability of an equipment, subsystem or system to perform its intended function, without unacceptable degradation, while exposed to the electromagnetic environment.

4.126 Operation, Duplex. A method of operation in which transmission is possible simultaneously in both directions. Half-duplex is the utilization of equipment on a one way basis, while retaining the capability to operate in both directions simultaneously.

4.127 Operation, Simplex. A method of operation in which communication between two stations takes place in one direction at a time. Note: This includes ordinary transmit-receive operation, press-to-talk operation, voice-operated carrier and other forms of manual or automatic switching from transmit to receive. (IEEE)

4.128 Phase lock loop. A circuit which, normally, automatically controls an oscillator so that it remains in a fixed phase relationship with a reference signal. The phase lock loop is used in a variety of applications such as tracking filters and frequency discriminators.

4.129 Point, Critical. A point in a subsystem considered most susceptible to interference, due to sensitivity, inherent susceptibility, importance to mission objectives, or exposure to the electromagnetic environment. The critical point is electrical in nature and normally precedes the subsystem output stage.

4.130 Point, Monitor. Describes one or more points in a subsystem or system used to observe or measure responses of the subsystem or system. Monitor points for determining unacceptable response shall be at the system or subsystem output and need not be electrical in nature. Monitor points used in conjunction with critical points to determine that no inadvertent response exists may be located at either internal system points or at the system or subsystem output. If monitor points are chosen at internal subsystem locations, particular caution must be exercised to insure that the monitoring instrumentation does not influence the test results.

MIL-STD-463A
1 June 1977

4.131 Point of Entry (POE). A localized critical point of a system to EMP interaction resulting in appreciable propagation of EMP energy further into the system, subsystem, or equipment.

4.132 Power. Whenever the power of a radio transmitter is referred to, it shall be expressed in one of the following terms: peak envelope power (P_p), mean power (P_m), or carrier power (P_c). (OTP)

4.133 Power, Carrier. The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle under conditions of no modulation. This definition does not apply to pulse modulated emissions. (OTP)

4.134 Power density. (A) Value of the Poynting vector at a point in space. (IEEE) (B) The magnitude of an electromagnetic wave at a point in space in terms of power per unit area. Note: In the United States, it is usually expressed in dBm/m^2 .

4.135 Power, Effective Radiated (ERP). The power supplied to the antenna multiplied by the relative gain of the antenna in a given direction. (OTP)

4.136 Power, Equivalent Isotropically Radiated (EIRP). The product of the power of an emission as supplied to an antenna and the antenna gain in a given direction relative to an isotropic antenna. (OTP)

4.137 Power, Mean. The power supplied to the antenna transmission line by a transmitter during normal operation, averaged over a time sufficiently long compared with the period of the lowest frequency encountered in the modulation. A time of 0.1 second during which the mean power is greatest will be selected normally. (OTP)

4.138 Power, Peak envelope. The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the highest crest of the modulation envelope, taken under conditions of normal operation. (OTP)

4.139 Pulse duration (pulse width, pulse length). The duration between the 50 percent amplitude points on the leading and trailing edge of the pulse, unless otherwise specified.

4.140 Pulse rise time. The interval between the instant at which the instantaneous amplitude first reaches specified lower and upper limits, namely, 10 percent and 90 percent of the peak pulse amplitude, unless otherwise stated. (IEEE)

MIL-STD-463A

1 June 1977

4.141 Radar. A radio determination system based on the comparison of reference signals with radio signals reflected, or retransmitted, from the position to be determined. (OTP)

4.142 Radar cross section. The portion of the back-scattering cross section of a target associated with a specified polarization component of the scattered wave. (IEEE)

4.143 Radar effective echo area. The area of a fictitious perfect electromagnetic reflector that would reflect the same amount of energy back to the radar as the target.

4.144 Radiation. The emission of energy in the form of electromagnetic waves. (IEEE)

4.145 Radiation device, Incidental. A device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy. (OTP)

4.146 Radiation device, Restricted. A device in which the generation of radio frequency energy is intentionally incorporated into the design, and in which the radio frequency energy is conducted along wires or is radiated, exclusive of transmitters for which provisions are made under those parts of Chapter 7 other than part 7.9 in the OTP Manual, and exclusive of Industrial, Scientific and Medical (ISM) equipment. (OTP)

4.147 Radiation Hazards (RAHAZ). Describes the hazards of electromagnetic radiation to fuels, electronic hardware, ordnance and personnel.

4.148 Radio. A general term applied to the use of radio waves. (OTP)

4.149 Radio altimeter. A radionavigation equipment on board an aircraft which makes use of the reflection of radio waves from the ground to determine the height of the aircraft above the ground. (OTP)

4.150 Radio astronomy. Astronomy based on the reception of radio wave of cosmic origin. (OTP)

4.151 Radiocommunication. Telecommunication by means of radio waves. (OTP)

4.152 Radio frequency systems, Wired. Systems employing restricted radiation devices in which the radio frequency energy is conducted or guided along wires or in cables, including electric power and telephone lines. (OTP)

MIL-STD-463A
1 June 1977

4.153 Radio waves (or Hertzian waves). Electromagnetic waves of frequencies lower than 3000 GHz propagated in space without artificial guide. (OTP)

4.154 Reflection coefficient. The ratio of the phasor magnitude of the reflected wave to the phasor magnitude of the incident wave under specified conditions. (IEEE)

4.155 Response, Image. The specific spurious response of a super-heterodyne receiver to a signal that differs from the tuned frequency by twice the intermediate frequency and is on the opposite side of the local oscillator or injection frequency from the actual frequency of the tuned signal.

4.156 Response, Malfunction level. A deviation from the standard reference output that could cause a malfunction as defined in 4.114.

4.157 Response, Minimum discernible level. Any detectable undesirable deviation from the nominal standard reference output.

4.158 Response, Spurious. Any undesired response of an electronic device, through its intended input terminal, to energy outside its designed reception bandwidth.

4.159 Response, Standard. A 10 dB $(S + N)/N$ output ratio for AM and SSB receivers and for FM receivers under modulated conditions, 20 dB of quieting for FM receivers under unmodulated conditions, and minimum or midpulse minimum visible signal for pulsed receivers.

4.160 Response, Undesirable level. A deviation from the standard reference output that exceeds the tolerances as defined in the equipment specification.

4.161 RF stabilized arc welder. Any welding equipment that utilizes radio frequency energy to initiate and stabilize the arc. An RF stabilized arc welder includes the source of the RF and welding current, the welding torch, and all interconnecting cables. (OTP)

4.162 Scatter, Ionospheric. The propagation of radio waves by scattering as a result of irregularities or discontinuities in the physical properties of the ionosphere. (OTP)

4.163 Scatter, Tropospheric. The propagation of radio waves by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere. (OTP)

MIL-STD-463A
1 June 1977

4.164 Secondary power lead. Any lead conducting AC or DC current which is conditioned, regulated, rectified, filtered, isolated, transformed, converted, or modified in any way within a unit of an equipment or subsystem.

4.165 Shield. A barrier that encloses or shadows a device for the purpose of preventing or reducing the transmission of electrical energy. The barrier can be conductive, dielectric, or have a nonmetallic absorptive core.

4.166 Shielded enclosure. A specially designed enclosure which affords attenuation to outside RF ambients thereby permitting measurements of electromagnetic emissions from the test sample to be measured without interference from undesired external electromagnetic radiators.

4.167 Spectral power density. The power density per unit bandwidth. (IEEE) In the United States, it is usually expressed in dBm/m²/Hz.

4.168 Standard reference output. The output level of a particular test sample for a given input level that defines normal operational performance, and is used as a reference level when relating any deviation from normal operational performance which occurs during susceptibility testing (e.g., signal-plus-noise ratio in the receiver for a specified input signal). The standard reference output should be defined in the individual equipment specification.

4.169 Station. One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment necessary at one location for providing a telecommunications service.

4.170 Subsystem. For the purpose of establishing EMC requirements either of the following shall be considered as subsystems. In either case, the devices or equipments may be physically separated when in operation and will be installed in fixed or mobile stations, vehicles, or systems.

A. A collection of devices or equipments designed and integrated to function as a single entity but wherein no device or equipment is required to function as an individual device or equipment.

B. A collection of equipments and subsystems as defined in A, designed and integrated to function as a major subdivision of a system and to perform an operational function or functions. Some activities consider these collections as systems, however, as noted above, they will be considered as subsystems.

MIL-STD-463A

1 June 1977

4.171 Subsystem, Sheltered. Equipments and components designed specifically for installation in standard military shelters which comply with MIL-STD 285 and the individual shelter specification.

4.172 Suppression. The reduction or elimination of undesired emission by such techniques as filtering, bonding, shielding, absorption, and grounding or any combination thereof.

4.173 Survive. The ability of an equipment, subsystem or system to resume functioning without evidence of degradation following temporary exposure to an adverse electromagnetic environment. This implies that the system performance will be degraded during exposure to the environment but the system will not experience any damage such as component burnout, which prevents it from operating when the levels are removed.

4.174 Susceptibility, Conducted. A measure of the interference signal current or voltage required on power, control, and signal leads to cause an undesirable response or degradation of performance.

4.175 Susceptibility, Electromagnetic. The degree to which an equipment, subsystem or system evidences undesired responses caused by electromagnetic radiation to which it is exposed.

4.176 Susceptibility, Radiated. A measure of the radiated interference field required to cause equipment degradation.

4.177 Susceptibility threshold. The signal level at which the test sample exhibits a minimum discernible undesirable response.

4.178 System. A composite of equipment, subsystems, skills, and techniques capable of performing or supporting an operational role. A complete system includes related facilities, equipment, subsystems, materials, services, and personnel required for its operation to the degree that it can be considered self-sufficient within its operational or support environment.

4.179 Tailoring. As applied during the advanced engineering development phase, tailoring is the process by which the requirements of a standard are adapted (that is, modified, deleted or supplemented) to the peculiarities, characteristics or operational requirements of the material in an individual equipment or subsystem specification. The tailoring process does not constitute a waiver or deviation.

4.180 Telecommunication. Any transmission, emission or reception of signs, signals, writings, images, and sounds or intelligence of any nature by wire, radio, visual or other electromagnetic systems. (OTF)

MIL-STD-463A

1 June 1977

4.181 Telegraphy. A system of telecommunication which is concerned in any process providing transmission and reproduction at a distance of documentary matter, such as written or printed matter or fixed images, or the reproduction at a distance of any kind of information in such a form. For the purposes of the International Radio Regulations (1959), however, unless otherwise specified therein, telegraphy means "A system of telecommunications for the transmission of written matter by the use of a signal code". (OTP)

4.182 Telemetering. The use of telecommunication for automatically indicating or recording measurements at a distance from the measuring instrument. (OTP)

4.183 Telephony. A system of telecommunication setup for the transmission of speech or other sounds. (OTP)

4.184 Test sample or Equipment Under Test (EUT). The device, equipment, subsystem or system to be tested or under test.

4.185 Transients. Single-shot impulses or pulses of low repetition rates generated by a switching action, by relay closures or other cyclic events.

4.186 Transmission line. A material structure forming a continuous path from one place to another, for directing the transmission of electric or electromagnetic energy along this path. The term transmission line(s) includes telephone lines, power cables, waveguides, coaxial cables, and other similar items.

4.187 Vulnerability, Electromagnetic (EMV). The characteristics of a system which cause it to suffer a finite level of degradation in performing its mission as a result of having been subjected to a certain level of threat mechanism in a man made hostile environment.

5. APPLICABLE DOCUMENTS

5.1 Issues of documents. This standard forms a part of the following documents of the issue in effect on date of invitation for bids or request for proposals:

MIL-STD-463A
1 June 1977

SPECIFICATIONS

MILITARY

MIL-B-5087	Bonding, Electrical and Lightning Protection for Aerospace Systems.
MIL-E-6051	Electromagnetic Compatibility Requirements for Systems.

STANDARDS

MILITARY

MIL-STD-220	Method Insertion Loss Measurement for Radio Frequency Filters.
MIL-STD-285	Attenuation Measurements for Enclosures, Electromagnetic Shielding, for Electronics Test Purposes, Method of.
MIL-STD-449	Radio Frequency Spectrum Characteristics, Measurement of.
MIL-STD-461	Electromagnetic Interference Characteristics Requirements for Equipment.
MIL-STD-462	Electromagnetic Interference Characteristics, Measurement of.
MIL-STD-469	Radar Engineering Design Requirements Electromagnetic Compatibility.
MIL-STD-1310(NAVY)	Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility.

HANDBOOKS

MILITARY

MIL-HDBK-235(NAVY)	Electromagnetic (Radiated) Environment Considerations for Design and Procurement of Electrical and Electronic Equipment.
MIL-HDBK-237	Electromagnetic Compatibility Program Requirements.

MIL-STD-463A
1 June 1977

5.2 Other publications.

ANSI C95.3-1973

Potentially Hazardous Electromagnetic
Radiation at Microwave Frequencies,
Techniques and Instrumentation for the
Measurement of.

6. NOTES

6.1 International standards. Certain provisions of this standard are the subject of international standardization agreement, such as NATO STANAG 3516 and the International Radio Regulations of 1968 as revised by the World Administrative Radio Conference, Geneva, 1971. When amendment, revision, or cancellation of this standard is proposed, the department custodians will inform their respective Departmental Standardization Offices so that appropriate action may be taken respecting the international agreement concerned.

6.2 National standards. Certain provisions of this standard are the subject of national standards such as the "Manual of Regulations and Procedures for Radio Frequency Management" issued by the Office of Telecommunications Policy (OTP). Revisions or amendments of this standard must be consistent with the latest OTP definitions.

MIL-STD-463A
1 June 1977

Custodians:

Army - EL
Navy - EC
Air Force - 11

Preparing activity:

Army - EL

(Project EMCS-0005)

Review activities:

Army - AT, AV, GL, MD, ME, MI, SC
Navy - AS, MC, OS, SE, YD
Air Force - 15, 17

User activities:

Army - AR, CE, MI, TE
Navy -
Air Force - 13, 15, 19, 99

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