

CHANGE NOTICE

Date Prepared: 9/17/01

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11. Document Title Space Station Electromagnetic Emission and Susceptibility Req				12. Effectivity All Units			
THIS NOTICE INFORMS RECIPIENTS THAT THE DOCUMENT IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS CDCN BEING THOSE FURNISHED HEREWITH AND CARRYING THE SAME DATE AS THIS CDCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4 CONSTITUTE THE CURRENT VERSION OF THIS DOCUMENT.							
13. CDCN No.	14. Pages Changed (Indicate Deletions)				S*	A*	15. Date
019	Revision and History page Pages 3-4, 3-5, and 3-8 Page C-121.				X X X		9/17/01
	Order of Incorporation: DCN 017, 019						
16. Technical Concurrence (Contracting Agency)					Date		

* "S" indicates supersedes earlier page. "A" indicates added page.

REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
-	SDR Version	03-07-94
B	Revision B (Reference SSCBD 000008 R1, Eff. 6-03-94) Revised to Transition from Freedom to ISS. Changes include extensive simplification of requirements and scope.	09-30-94
C	Revision C (SSCD 000263, EFF. 09-04-97) Administrative Update	01-29-97
	DCN 001 incorporates ECP 263 (Supplemental Release)	06-06-97
	DCN 002 incorporates SSCN 000777	07-20-98
	DCN 003 incorporates SSCN 001035	07-20-98
D	Revision D incorporates SSCN 001102	07-21-98
	DCN 004 incorporates SSCN 001462	02-17-99
	DCN 005 incorporates SSCN 001594	02-22-99
	DCN 006 incorporates SSCN 001662	06-15-99
	DCN 007 incorporates SSCN 001920	08-25-99
	DCN 008 incorporates SSCN 002045	08-25-99
	DCN 009 incorporates SSCN 002107	08-30-99
E	Revision E incorporates SSCN 002345	10-25-99
	DCN 010 incorporates SSCN 002485	04-06-00
	DCN 011 incorporates SSCD 003213 Eff. 06-28-00	04-13-01
	DCN 013 incorporates SSCN 003690 Eff. 11-08-00	04-13-01
	DCN 014 incorporates SSCN 003746 Eff. 11-15-00	04-13-01
	The following DCNs have been cancelled. The content of these DCNs have been incorporated into Revision F.	
	DCN 015 incorporates SSCN 004676 Administrative Cancel	
	DCN 018 incorporates SSCN 000256 Administrative Cancel	
F	Revision F incorporates SSCNs 000256, 004676, and 004140.	07-24-01
	DCN 017 incorporates SSCD 005008	08-31-01
	DCN 019 incorporates SSCN 005529	10-23-01

TABLE 3.2.1.3.2-1 CE07 MODE SWITCHING TRANSIENTS ENVELOPE

Time (Microseconds)	Percentage of Nominal Line Voltage
0.1-10	+ 50 percent
10-50	Decreasing log linearly with increasing time from + 50 percent to + 20 percent
50-1000	Decreasing log linearly with increasing time from + 20 percent to + 5 percent or + 6 volts(V), whichever is greater
1000-10,000	+ 6 percent or + 0.5 V, whichever is greater
10,000-100,000	+ 5 percent or + 0.5 V, whichever is greater

3.2.2 CONDUCTED SUSCEPTIBILITY

3.2.2.1 CS01, CONDUCTED SUSCEPTIBILITY

Direct current power leads, 30 Hz to 50 kHz. See appendix C for the exception (EMEP TIA-0369) to this paragraph.

DCN 019

3.2.2.1.1 APPLICABILITY

CS01 is applicable to equipment and subsystems using dc power.

3.2.2.1.2 CS01 LIMITS

The EUT shall not exhibit any malfunction, degradation of performance, or deviation from specified indications beyond the tolerances indicated in the individual equipment or subsystem specification when subjected to electromagnetic energy injected onto its power leads less than or equal to the values as shown in Table 3.2.2.1.2-1. See appendix C for exception (EMECB TIA-0090, EMECB TIA-0145, EMECB TIA-0161, EMECB TIA-0177, EMECB TIA-0178, EMECB TIA-0187, EMECB TIA-0188, and EMEP TIA-0231) to this paragraph.

TABLE 3.2.2.1.2-1 CS01 ELECTROMAGNETIC ENERGY INJECTION

Frequency	Voltage
30 Hz-2 kHz	5 V root mean square (rms) or 10 percent of the supply voltage (E1), whichever is less
2 kHz-50 kHz	Decreasing log linearly with increasing frequency from 5 Vrms, or E1 whichever is less, to either 1 Vrms or 1 percent of the supply voltage, whichever is less

3.2.2.1.3 ALTERNATE CS01 LIMITS

The requirement is also met when the audio power source specified in SSP 30238 adjusted to dissipate 50 Watts in a 0.5 ohm load, cannot develop the required voltage at the EUT power input terminals, and the EUT is not susceptible to the output of the signal source.

3.2.2.2 CS02, CONDUCTED SUSCEPTIBILITY

Direct current power leads, 50 kHz to 50 MHz. See appendix C for the exception (EMEP TIA-0369) to this paragraph.

DCN 019

3.2.2.2.1 APPLICABILITY

CS02 is applicable between 50 kHz and 50 MHz for equipment and subsystem dc power leads, including power returns which are not grounded internally to the equipment or subsystem.

3.2.2.2.2 CS02 LIMITS

The equipment subsystem shall not exhibit any malfunction, degradation of performance or deviation from specified indications beyond the tolerances indicated in the individual equipment or subsystem specification when subjected to 1 Vrms from a 50 ohm source. The test signal shall be applied to the equipment power line near the equipment input terminals. The requirement is also met under the following condition: A 1 Watt source of 50 ohms impedance cannot develop the required voltage at the EUT power input terminals, and the EUT is not susceptible to the output of the signal source. See appendix C for exception (EMECB TIA-0023, EMECB TIA-0051, EMECB TIA-0085, EMECB TIA-0110, EMECB TIA-0162, EMECB TIA-00199, EMEP TIA-0214, EMEP TIA-0215, EMEP TIA-0232, EMEP TIA-0253, and EMEP TIA-0293) to this paragraph.

3.2.2.3 CS06, CONDUCTED SUSCEPTIBILITY

Spikes, power leads. See appendix C for the exception (EMEP TIA-0369) to this paragraph.

DCN 019

3.2.2.3.1 APPLICABILITY

CS06 is applicable to equipment and subsystem dc power leads, including grounds and returns which are not grounded internally to the equipment or subsystem.

TABLE 3.2.3.1.2.1-1 FIELD EMISSION LIMITS

Frequency	Emissions
14 kHz–10 MHz	56 dB μ V/m
10 MHz–259 MHz	Increasing log linearly with increasing frequency from 56 to 86 dB μ V/m (16dB per decade)
259 MHz–10 GHz	Increasing log linearly with increasing frequency from 46 to 72 dB μ V/m (16dB per decade)
13.5–15.5 GHz	72 dB μ V/m

3.2.4 RADIATED SUSCEPTIBILITY

3.2.4.1 RS02, RADIATED SUSCEPTIBILITY

Magnetic induction field. See appendix C for the exception (EMEP TIA-0369) to this paragraph.

DCN 019

3.2.4.1.1 APPLICABILITY

RS02 is applicable for all equipment and subsystems. These susceptibility signals are electromagnetically coupled into the equipment or subsystem wiring. See appendix C for exception (EMEP TIA-0211, EMEP TIA-0218, and EMEP TIA-0239) to this paragraph.

3.2.4.1.2 RS02 LIMITS

The EUT shall not exhibit any malfunction, degradation of performance, or deviation from specified indications beyond the tolerances indicated in the individual equipment or subsystem specification when subjected sequentially to the test spikes, shown in Figure 3.2.2.3.2-1 each having the waveform with the values of E and t are given below:

- Spike #1 E = \pm Twice the nominal line voltage, t = 10 microseconds \pm 20 percent
- Spike #2 E = \pm Twice the nominal line voltage, t = 0.15 microseconds \pm 20 percent.

See appendix C for exception (EMECB TIA-0095, EMECB TIA-0100, EMECB TIA-0116, and EMECB TIA-0155) to this paragraph.

3.2.4.2 RS03, RADIATED SUSCEPTIBILITY

Electric field, 14 kHz to 20 GHz. See appendix C for the exception (EMEP TIA-0369) to this paragraph.

DCN 019

Rationale: The CE07 test is for use on a 120 volts system. The US segments are powered by 120 volts. The CE07 emissions are on tertiary power and will not affect the 120 Vdc secondary power bus. The video systems are criticality 3 items which do not cause loss of life, loss of the station, or loss of the mission.

DCN 017

EMEP TIA-0369

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**C.3.2.2.1 CS01, CONDUCTED SUSCEPTIBILITY,
 C.3.2.2.2 CS02, CONDUCTED SUSCEPTIBILITY,
 C.3.2.2.3 CS06, CONDUCTED SUSCEPTIBILITY,
 C.3.2.4.1 RS02, RADIATED SUSCEPTIBILITY, AND
 C.3.2.4.2 RS03, RADIATED SUSCEPTIBILITY**

DCN 019

Exception: The Pulmonary Function In Flight (PuFF) equipment listed (DSR PCMCIA Card (PN SED46115614-303 or PN SED46115614-305), and ECG electrodes (PN 7663)) do not need to meet the 3.2.2.1 (CS01), 3.2.2.2 (CS02), 3.2.2.3 (CS06), 3.2.4.1 (RS02), and 3.2.4.2 (RS03) requirements. These requirements are contained in SSP 57000, paragraph 3.2.4.4. The PuFF equipment listed (Pressure Flow Module (PN 44100), PFM Data Cable (PN 44150), 8MB Flash Storage Card (PN DP-ATA/B), Fleisch #2 Flowmeter Assembly (PN 44250), ECG Electrodes Pack (PN SDG46117695-801), Assembly, Single Housing PSC Unit (PN SEG46117965-801), Cable Assembly W16 - PSC ECG Data (PN SED46112486-303), Cable Assembly ECG Electrodes Leads (PN SED46113083-303), Battery Pack Assembly (PN SEG46117914-301), DSR PCMCIA Card (PN SED46115614-303 or PN SED46115614-305), and ECG electrodes (PN 7663)) do not need to meet SSP 30243, paragraph 3.2.9 requirements. These requirements are contained in SSP 57000, paragraph 3.2.4.5.

DCN 019

Rationale: Susceptibility - PuFF is criticality 3 hardware. Any failure due to susceptibility will not cause a safety hazard or interfere with other equipment. PuFF equipment is located downstream of the HRF Rack SSPCM which should provide significant protection from ISS ESP transients. HRF plans to conduct abbreviated functional tests of the integrated PuFF hardware using the HRF Rack prior to hardware delivery. This should provide some evidence of the ability to withstand conducted transients. The HRF Program and Principal Investigators accept the risk of science loss due to radiated or conducted susceptibility. There are no operational constraints. The ECG electrodes (PN 7633) are a subassembly of the ECG Electrodes Pack (PN SDG46117695-801) approved in TIA-0348A.

DCN 019

ESD - PuFF hardware contains electronics which may be damaged by the application of 4000 volts to pins. PuFF hardware is criticality 3 hardware. Any failure due to electrostatic discharge will not cause a safety hazard or interfere with other equipment. PuFF hardware uses standard commercial or military specification connectors. The PuFF equipment has connector covers, female connectors, or recessed connectors which will protect the PuFF electronics from ESD until PuFF cabling is connected to other HRF hardware. Once the PuFF hardware is connected to other HRF hardware, it remains redundantly grounded (ground wire and shield) reducing the chance of damage due to ESD. HRF will assume responsibility for determining if the risk of damage due to ESD requires the inclusion of ESD handling techniques in HRF procedures. The HRF Program and Principal Investigators accept the risk of science loss due to ESD. There are no operational constraints.

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