7STARLAKE
Military Computer Guide

7STARLAKE.com

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7STARLAKE Land Systems

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Introduction

7STARLAKE military computers are based on industry standard Commercial Off-The-Shelf (COTS) open, scalable, modular architecture-technologies that enable prime contractors and system integrators to deploy quickly while meeting size, weight, power and cost (SWaP-C) budgets.

Panel Computer

7StarLake's Smart Display and Panel Computers are equipped with 6 to 20 programmable function keys made of rugged rubber, allowing configurability based on various mission requirements. These programmable function keys provide convenience and efficiency for users when in critical battle conditions.

Xeon D VMware Workstation

VMware software powers the world's complex digital infrastructure. The company's cloud, app modernization, networking, security, and digital workspace offerings help battlefield deliver any application on any cloud across any device. SR800 & AV800 series based on Intel Xeon DE platform covering multi-core processor up to 16 cores featured by D-1587 & D-2183IT.

MXM-GPU EDGE Computer

Traditionally, sensors on military vehicles collect massive amounts of battlefield data and store it locally before transporting it for analysis and interpretation by highly sophisticated, remote deep learning systems. Edge GPGPU systems allow extraordinary amounts of data to be collected and processed right on the battlefield in real time.

MXM-GPU Rack-Mount Server

Our HORUS 420 & HORUS 430 series offer the high performance of various NVIDIA QUADRO MXM GPUs paired with the latest Intel Xeon CPUs in a 2U fanless rugged chassis. With patented design in conduction cooled technology, this server series can survive in the harshest environments (MIL-STD-810, vibration up to 5 GRMS and shock up to 40 g).

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Selection Guide

Xeon-D GPU Server
AV800-D27

Xeon-D GPU Server
SR800-D27

GPU Computer
THOR200-DL

PANEL Computer
Cloud15-P20

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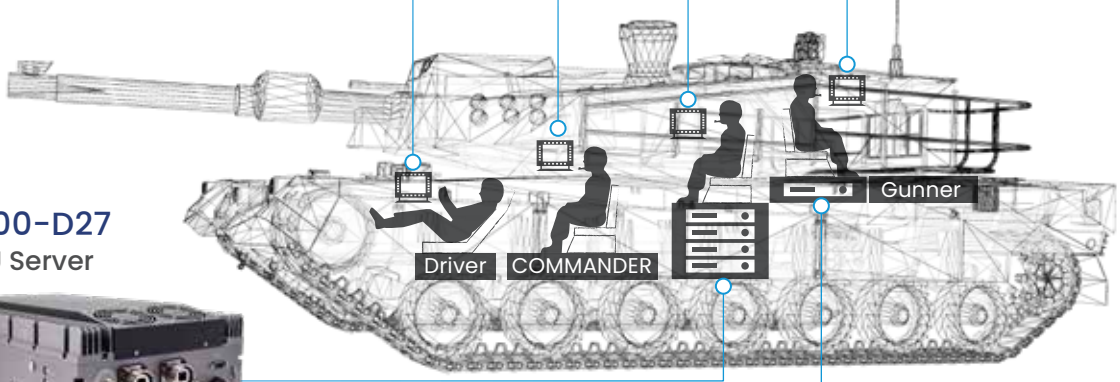
Command & Control Systems in Armored Vehicles Systems

Armored Ground Vehicle , one of the core-supports in defense industry, regardless for combat or transportation, has been continuously progress on technique evolution. To heighten the speed of reaction, system performance plays an indispensable role. Facilities, computers, and displays, the components in the system, require high functionality in analysis, connection and transmission.

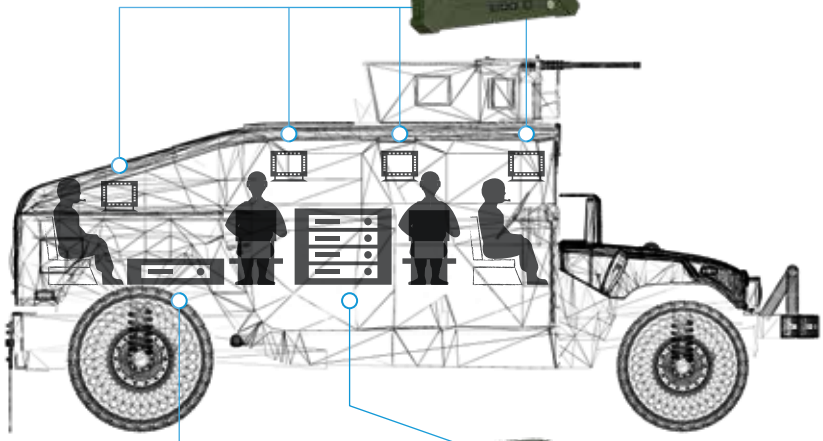
Cloud15-P20
Defense Display Computer



SR800-D27
GPU Server

THOR200-X11
GPU Computer

SKY15-PX6
Defense Display

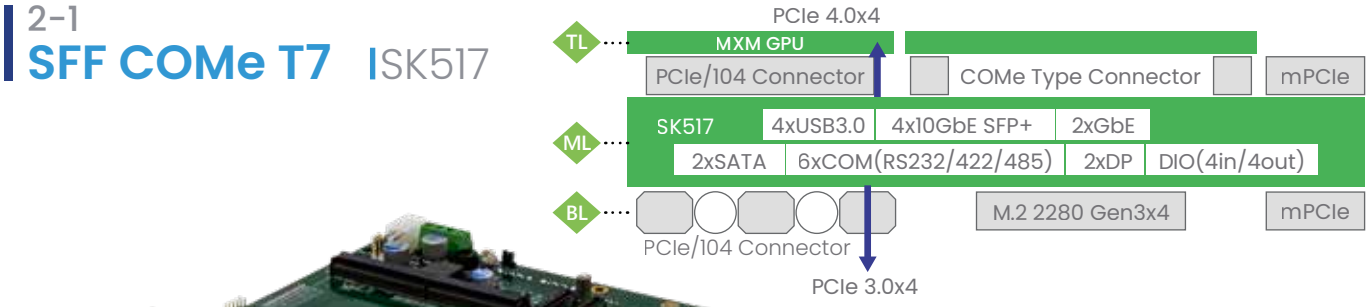


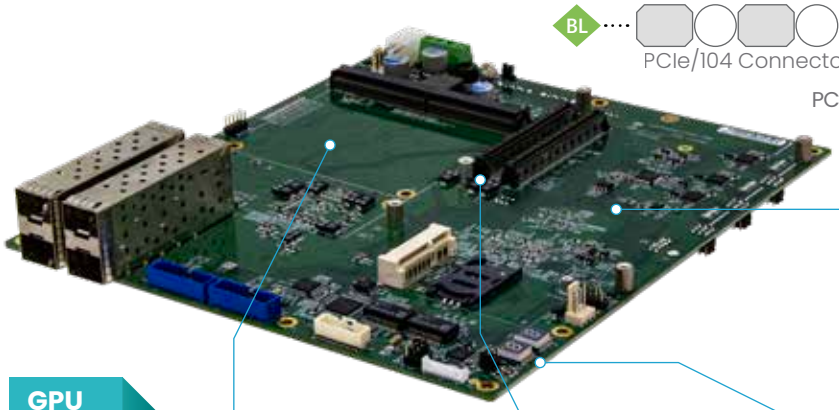
Harnessing information and data as new source of powerful weapon has become crucial nowadays. And real-time reaction is vital. That's why 7STARLAKE's Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) solutions emphasize on ultra-high performance system integration. We focus on the capabilities to control - because control lead to dominance.

THOR200-DL
GPU Computer

HORUS430-X1A45
GPU Server

2-1
SFF COMe T7 I SK517





GPU

Geforce
- A730M
- A370M

Quadro
- RTX 2060S
- GTX 1660S
- GTX 1080M

ARC
RTX 3000
- RTX 5000
- RTX A1000
- RTX A2000
- RTX A4500

SK517

PCIe-104 Support

COM Express®

- PCIe signal by COMe Type7 connector
- PCIe/104 support

CPU

- Xeon® D-1746TRE(10C)
- Xeon® D-1735TR(8C)
- Xeon® D-1732TE(8C)
- Xeon® D-1715TER(4C)
- Xeon® D-1712TR(4C)

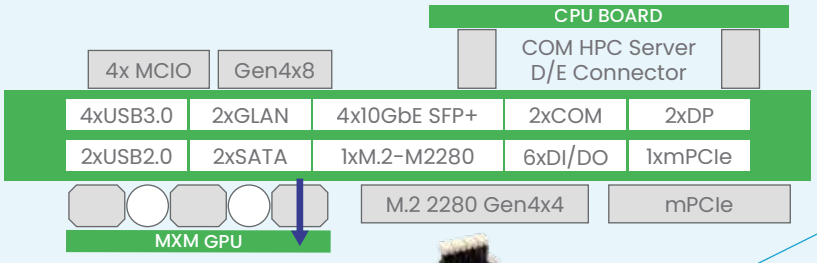
NIC

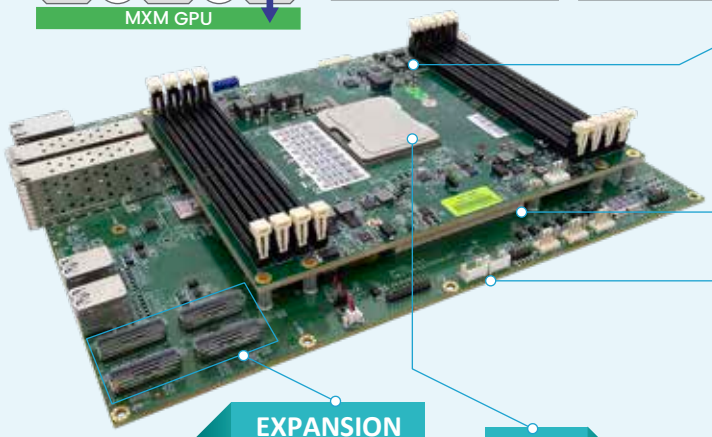
10x2 GbE — SK502

4 GbE — SK506

- PCIe signal by PCIe/104 & FPE
- 2 x LAN support

2-2
SFF COM HPC I SK521





SPECIFICATION

MXM Support

COM +HPC

- GPU signal by COM-HPC connector
- MXM 3.1 A/B support

MXM 314pins Connector

COM-HPC Connector

MXM GPU

Geforce
- GTX 1660S
- GTX 1080M
- RTX 2060S

Quadro
- RTX A1000
- RTX A2000
- RTX A4500
- 3500 ADA
- 5000 ADA

ARC
- A730M
- A370M

EXPANSION

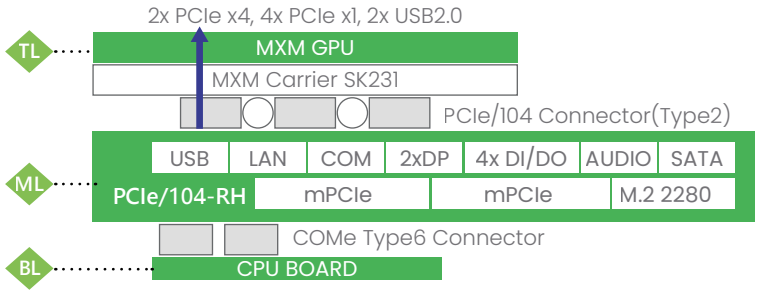
4x Gen4.0 x 8

- PCIe Gen4.0 signal by MCIO
- NVMe U.2 Gen 4.0 SSD Link
- Function Card Link

CPU

- Xeon® D-2796TE(20C)
- Xeon® D-2775TE(16C)
- Xeon® D-2752TER(12C)
- Xeon® D-2733NT(8C)
- Xeon® D-2712T(4C)

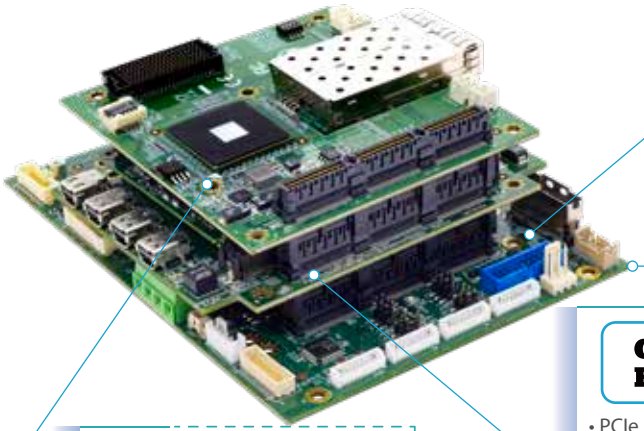
2-3
SFF- PCIe/104 RH



GPU

Geforce
- RTX 3080
- RTX 3090
- RTX 4080
- RTX 4090

Quadro
- RTX A1000
- RTX A2000
- RTX A4500
- 3500 ADA
- 5000 ADA



CPU

- I7-11850HE
- W-11865MRE
- W-11865MLE
- I7-13800HRE
- I7-13800HE
- I5-13600HE
- Ultra7 165H
- Ultra7 155H
- Ultra5 125H
- Ultra5 125H

SPECIFICATION

- PCIe signal by COMe Type6 connector
- MXM Carrier Support

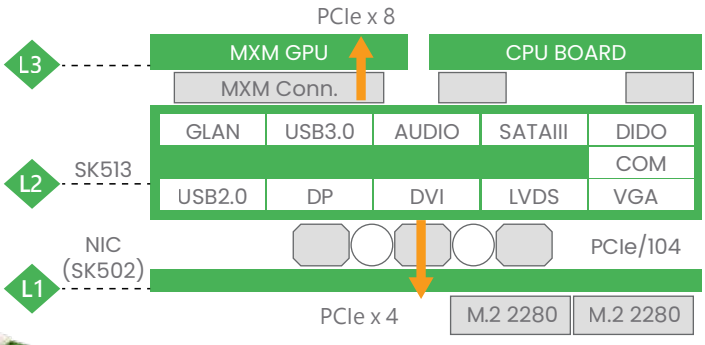
NIC

10x2 GbE SK502

1x4 GbE SK506

- PCIe signal by PCIe/104

2-4
SFF COMe T6 I SK515M-T6RH



GPU

Geforce
- RTX 3070
- RTX 2060
- GTX 1660S
- GTX 1050Ti

Quadro
- RTX A1000
- RTX A2000
- RTX A4500
- 3500 ADA
- 5000 ADA

CPU

- E-2276ME
- E-2276ML
- I7-11850HE
- I7-9850HE
- I7-9850HL
- I7-13800
- W-11865MRE
- W-11865MLE

SPECIFICATION

- PCIe signal by COMe Type6 connector
- MXM Carrier support

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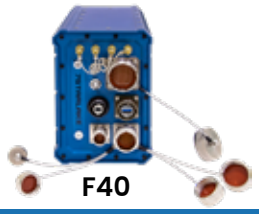
MIL-STD 810

PCIe / 104	COMe T6		COMe T7
			
F40	AV600RH-A45	THOR200-X11	THOR200-DL
Vibration test (Operating) Frequency：20 Hz to 2000 Hz Acceleration：10 grms Test Axis：X, Y, Z axis Test Time：30 mins (Each axis) Total Test Time：1.5 hrs	**Vibration test (Operating)** Frequency：10 Hz to 500 Hz Acceleration：7 grms Test Axis：X, Y, Z axis Test Time：30 mins (Each axis) Total Test Time ：1.5 hrs		**Vibration test (Operating)** Frequency：10 Hz to 500 Hz Acceleration：5 grms Test Axis：X, Y, Z axis Test Time：30 mins (Each axis) Total Test Time ：1.5 hrs
Shock test (Non-Operating mode) Wave Form：Saw tooth wave Acceleration ：75 grms Duration Time：6 mS No. of Shock：3 times (Each axis) Shock Direction：+Z axis	**Shock test (Non-Operating mode)** Wave Form：Half Sine Wave Acceleration：40 grms Duration：11 mS No. of Shock：1 time (Each axis) Shock Direction：+Z axis		**Shock test (Non-Operating mode)** Wave Form：Half Sine Wave Acceleration：25 grms Duration：11 mS No. of Shock：1 time (Each axis) Shock Direction：+Z axis

MIL-STD 810

The military standard MIL-STD-810 addresses a range of environmental conditions that include : exposure to high and low temperatures plus temperature shock (both operating and in storage), low pressure for altitude testing, rain (windblown and freezing rain), humidity, fungus, salt fog, sand and dust exposure, explosive atmosphere, leakage, and acceleration.

7Starlake's computers are designed to meet the strict standards of MIL-STD 810. When it comes to true ruggedness, MIL-STD-810 standard is considered the upmost principle. Originally established by the US government to simulate how materials would hold up to harsh environments, It provides a series of testing procedures for resistance to shock, vibration, dust, humidity, and extreme temperatures.

Testing photos (Operating)

1. Vibration

- **MIL-STD-810 Test Method 514.6 Vibration Procedure IV Non-Operating**
- **MIL-STD-810 Test Method 514.6 Vibration Procedure III Operating**

Vibration test is conducted to create an environment, in which long-term and high level vibration is simulated. The test is performed with both the system operating/non. Various levels and duration of vibration is simulated in three axis (X, Y, and Z), with up to 7g transitions.

2.Mechanical Shock

- **MIL-STD-810 Test Method 516.6 Shock-Procedure IV Non-Operating**
- **MIL-STD-810 Test Method 516.6 Shock-Procedure III Operating**

Mechanical Shock test is conducted to ensure that equipment can withstand drops encountered during handling, transportation, and normal use. The test is performed with both the system operating/non. We expose the system to 3 pulses/direction of sawtooth shock at 100g 11ms. 6 directions for a total of 18 pulses.

3. Temperature Shock

- **MIL-STD-810 Test Method 503.5 Temperature Shock Procedure I-C / Storage (Multi-cycle shocks from constant extreme temperature, From 85° C to -40° C, Three cycles)**

Temperature Shock test, also named Thermal Shock test, is to ensure that systems can thrive even in extreme temperature range. We place the system at ambient temperature into chamber at -40°C and stabilize it, then transfer in less than 1 minute to chamber at +85°C and stabilize. Return the system to ambient temperature and perform operational check.

MIL-STD 810

4.High Temperature

▸MIL-STD-810G Test Method 501.5 high Temp (96 hours @75° C non-operating + 72 hours @ 75° C operating)

This testing method is broken down into two procedures.

- Procedure I (storage) exposes the system to high temperatures while it is turned off, and its purpose is to test the durability of the materials that make up the system. The chamber temperature is 75°C and the test duration is 96 hours.
- Procedure II (operation) is to test how the device puts up with heat while having it turned on and used.
- The chamber temperatures used in an operational cyclical test is 75°C, and the test duration is 72 hours. The temperature needs to cycle from one end to the other a minimum of three times while testing that the device functions at every point in the test.

5.Low Temperature

▸MIL-STD-810G Test Method 502.5 Low Temp (96 hours @ -40° C non-operating +72 hours @ -40° Coperating)

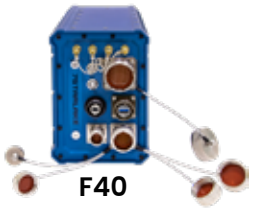
There are two parts in this test to determine whether the system can persevere in extremely cold environment.

- Procedure I (storage) exposes the system to low temperatures while it is turned off, and its purpose is to test the durability of the materials that make up the system. The chamber temperature is -40°C and the test duration is 96 hours.
- Procedure II (operation) testing involves slowly cooling the device to the low temperature and leaving it at that temperature for at least two hours, checking to see that it is still functioning during that time. The chamber temperature is -40°C and the test duration is 72 hours.

MIL-STD 810		
Temperature	Operating	Low temperature Method 502.5, Procedure 2 → -20°C, 4 hours, ±3°C
		High temperature Method 501.5, Procedure 2 → +55°C, 4 hours, ±3°C
	Non-Operating	Non-operating low temperature Method 502.5 → -33°C, 4 hours, change rate:≦20°C/ Hour
		Non-operating high temperature Method 501.5 Procedure 1 → +71°C, 4 hours, change rate:≦20°C/Hour
Vibration	Operating	Vibration Method 514.6 → 5-500Hz, Vertical 2.20 grms, Transverse 1.62 grms, Longitudinal 2.05 grms. 40mins , x 3axis
	Non-Operating	Non-operating Vibration Method 514.6 → 5-500Hz, Vertical 3.20Grms, 40mins , x 3axis.
Shock	Operating	Shock Method 516.6 → 20 Grms, 10 times for each direction, 6 directions, 60 times in total 11ms, 3 axis.
	Non-Operating	Non-operating Shock Method 516.6 → 20 Grms, 11ms, 3 axis.
Humility		Method 507.4 , Pre-conditioning period: 23±2°C and 50±5%RH, maintain for 24 hours. → 30°C~60°C, 85%~95%RH without condensation, 24 hours/cycle, conduct 10 cycles
Salt Fog		Method 509.7 Salt Spray (50±5)g/L
Sealing		IEC 60529/ IP65
Fungus		Method 508.6
Altitude	Operating	Method 500.5, Procedures I and II → 12,192M, (40,000 ft) for the initial cabin altitude (18.8Kpa or 2.73 Psia)
	Non-Operating	Method 500.5, Procedures III and IV → 15,240, (50,000 ft) for the initial cabin altitude (14.9Kpa or 2.16 Psia)

MIL-STD 461/1275

PCIe / 104 | **COMe T6** | **COMe T7**



F40

AV600RH-A45

THOR200-X11

THOR200-DL

ELECTROMAGENETIC
MIL-STD-461

Ensures function properly within electromagnetic (EM) environments
and avoid releasing EM energy cause EM interference (EMI) with nearby devices.

CE 102	RE 102	RE 103
10 kHz-30 MHz	**30 MHz - 5 GHz**	**80 MHz - 3 GHz**
Conducted Emissions, Radio Frequency Potentials & Power Leads, basic curve	Radiated Emissions, Electric Field	Radiated susceptibility, Electric Field

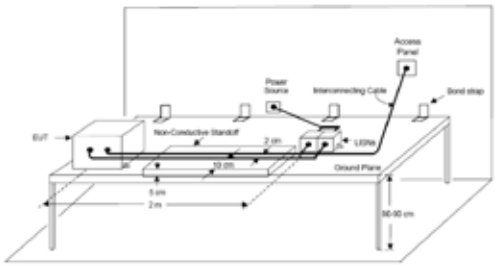
when powered from a 28V supply, ensuring that
electronics survive in the field when faced with input voltage spikes and surges.

Surge High	Surge Low	Steady State
100V / 500ms	**18V / 500ms**	**18V~33V**

VEHICLE
MIL-STD-1275

MIL-STD 461

MIL-STD-461 is a military standard that establishes the control of electromagnetic interference (EMI) emissions and susceptibility characteristics of electronic, electrical & electromechanical equipment and subsystems for military equipment. EMI encompasses any undesired signals, “noise”, generated by electronic equipment. Keeping EMI under control is crucial for military applications, because if it’s out of control, the military will be detected by the enemy and it might cause a great loss. To design a product that meets strict requirements, engineers should possess extensive knowledge of both electrical and mechanical design to avoid unintentional generation, propagation and reception of electromagnetic energy, which may cause unwanted effects, for example, physical damage in operational equipment.



Test Method / Installation/Platform	CE101	CE102	CE106	CS101	CS103	CS104	CS105	CS109	CS114	CS115	CS116	CS117	CS118	RE101	RE102	RE103	RS101	RS103	RS105
Surface Ships	A	A	L	A	S	L	S	L	A	S	A	L	S	A	A	L	L	A	L
Submarines	A	A	L	A	S	L	S	L	A	S	L	S	S	A	A	L	L	A	L
Aircraft, Army (Fit Line)	A	A	L	A	S	S	S		A	A	A	L	A	A	A	L	A	A	L
Aircraft, Navy	L	A	L	A	S	S	S		A	A	A	L	A	L	A	L	L	A	L
Aircraft, Air Force		A	L	A	S	S	S		A	A	A	L	A		A	L		A	
Space Systems (Launch)		A	L	A	S	S	S		A	A	A	L			A	L		A	
Ground, Army		A	L	A	S	S	S		A	A	A	S	A		A	L	L	A	
Ground, Navy		A	L	A	S	S	S		A	A	A	S	A		A	L	L	A	L
Ground, Air Force		A	L	A	S	S	S		A	A	A		A		A	L		A	
Description	CE, AF Currents, Power Leads	CE, RF Currents, Power Leads	CE, Antenna Port	CS, Power Leads	CS, Antenna Port, Intermodulation	CS, Antenna Port, Rejection of Undesired Signals	CS, Antenna Port, Cross-modulation	CS, Structure Current	CS, Bulk Cable Injection (RF)	CS, Bulk Cable Injection (Impulse)	CS, Damped Sinusoidal Transients	CS, Lightning Induced Transients	CS, Personnel Borne ESD	RE, Magnetic Field	RE, Electric Field	RE, Antenna Spurious & Harmonic Outputs	RS, Magnetic Field	RS, Electric Field	RS, Transient Electromagnetic Field

- A= Applicable; L=Limited Applicability; S=Specified in Procurement Documentation
- Tailoring of requirements permitted
  (specialized limits, adjusted frequency range, alter applicability, etc.)
- Each test method may include various test limits or susceptibility test levels

MIL-STD 461

	MIL-STD 461 (Ground Vehicle)	MIL-STD 461/1275 (Aircraft)	MIL-STD 461/1275/704 (Aircraft)
CE102	CE102 basic curve, 10kHz - 30 MHz		
RE102-4	N/A	RE102-4, (10 KHz)-2.0 MHz	
	RE102-4, (1.5 MHz) -30.0 MHz	RE102-4, (1.5 MHz)-30.0 MHz	
	RE102-4, (30.0 MHz) - 5.0 GHz	RE102-4, (30.0 MHz)-5.0 GHz	
	N/A	RE102-4, (5 GHz)-18 GHz	
RS103	RS103, (200 MHz) - 3 GHz,		
	RS103, (1.5 MHz) - 200 MHz, 50 V/m equal for all frequencies		
	RS 103,(3.0 GHZ) - 5.0 GHz 50V/m equal for all frequencies		
EN61000	EN 61000-4-2: Air discharge: 8 kV,Contact discharge: 6kV		
	EN 61000-4-3: 10V/m		
	EN 61000-4-4: Signal and DC-Net: 1 kV		
	EN 61000-4-5: Leads vs. ground potential 1kV, Signal und DC-Net: 0.5		
EN55022	EN 55022, Class A		
CS	CS101 (30HZ~150KHZ)		
	CS114 (10kHz~200MHz)		
	CS11550v/m		
	CS116 50v/m		
MIL-STD-1275	N/A	Steady State - 20V~33V,	
		Surge Low - 18V/500ms,	
		Surge High - 100V/500ms	
		Emitted spikes	
		Injected Voltage surges	
		Emitted voltage surges	
		Voltage ripple (2V)	
		Voltage spikes	
		Starting Operation	
		Reverse polarity	
MIL-STD-704	N/A	N/A	Load Measurements (LDC101)
			Steady State Limits for Voltage(LDC102)
			Voltage Distortion Spectrum (LDC103)
			Total Ripple (LDC104)
			Normal Voltage Transients (LDC105)
			Power Interrupt (LDC201)
			Abnormal Steady State Limits forVoltage (LDC301)
			Abnormal Voltage Transients (LDC302)
			Emergency Steady State Limits forVoltage (LDC401)
			Starting Voltage Transients (LDC501)
			Power Failure (LDC601)
			Phase Reversal (LDC602)

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