

Communication Server 1000E System Evaluation

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Communication Server 1000E
System Evaluation
Standard Availability (SA)

for

Summary: A system evaluation of the _____ (Customer)
Communication Server 1000E (SA) solution in
_____ (City) was requested by
_____ (Name) of
_____ (Company). The evaluation was
performed on _____ (Date). The nature of the evaluation was
to determine if the Communication Server 1000E (SA) was installed
following Nortel manufacturing specifications and Product Bulletin
requirements.

Distribution:

Evaluated by:

Date:

Nortel Communication Server 1000
Communication Server 1000E System Evaluation
NN43041-318 02.01 Standard
Release 5.5 07 December 2007

Location profile

Site information:

Audit engineer: _____	Evaluation date: _____
Distributor: _____	Customer: _____
Address: _____	Address: _____
_____	_____
Contact: _____	Site telephone: _____
Telephone: _____	Attendees: _____
Email: _____	_____
_____	_____

System Information:

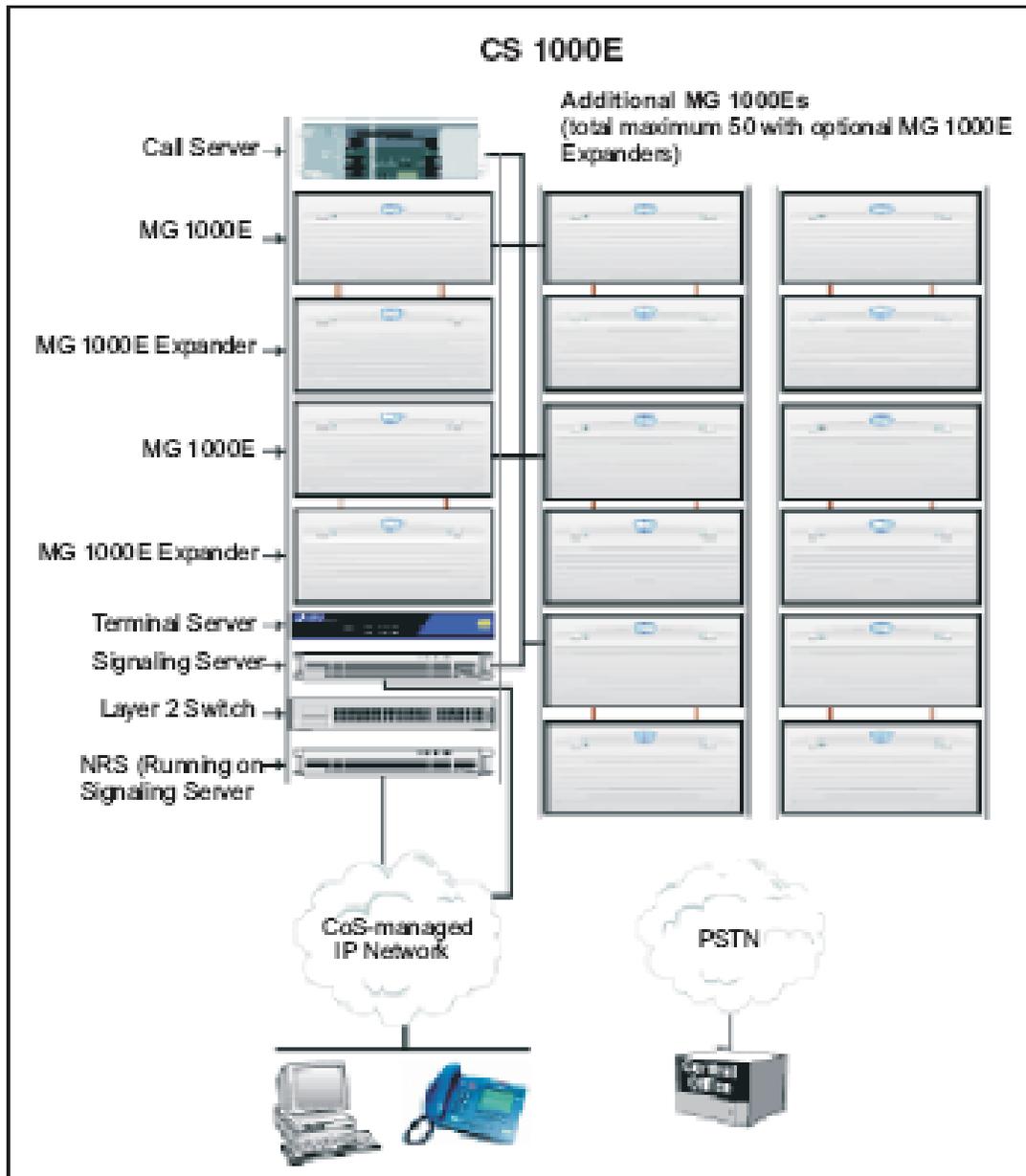
System serial number: _____

	Type or Platform	Software release	Ports
PBX	CS 1000E	_____	XXX
Signaling Server	_____	_____	_____
TM	_____	_____	_____
Call Center Server	_____	_____	_____
CallPilot IPE	_____	_____	_____
VGMC	_____	_____	_____

Equipment information:

	Type	Quantity	Power equipment	Quantity
Cabinets:	_____	_____	UPS Type: _____	_____
Call Server	_____	_____	PoE Yes No _____	_____
Media Gateway	_____	_____	_____	_____
MG Expansion	_____	_____	_____	_____
Signaling Server	_____	_____	_____	_____
CP PM	_____	_____	_____	_____
Signaling Server	_____	_____	_____	_____
COTS	_____	_____	_____	_____
Signaling Server	_____	_____	_____	_____
ISP 1100	_____	_____	Evaluation Type: _____	_____
	_____	_____	_____	_____

CS 1000E Standard Availability Sample site layout



Findings and recommendations

Introduction:

The evaluation of this Nortel CS 1000E (SA) system, located _____ was requested by _____. The request was initiated because _____.

The evaluation was performed on (date) _____ and covered the areas of Equipment Room Environment, Maintenance and Technician Area Environment, Power and Grounding, System Power and Ground Connections, Cabinet Installation, Cabling Installation, System Operation, System Software, and Network Parameters for VoIP.

_____ (name of company representative) was the main contact person during the evaluation process. All questions that pertain to this report can be directed to: _____.

Discrepancies and recommendations:

Equipment room environment

Item #:	
Findings:	
Recommendation:	

Maintenance and technician area environment

Item #:	
Findings:	
Recommendation:	

Power and grounding

Item #:	
Findings:	
Recommendation:	

System power and ground connections

Item #:	
Findings:	
Recommendation:	

Cabinet installation

Item #:	
Findings:	
Recommendation:	

Cabling installation

Item #:	
Findings:	
Recommendation:	

System operation

Item #:	
Findings:	
Recommendation:	

System software

Item #:	
Findings:	
Recommendation:	

Network parameters for VoIP

Item #:	
Findings:	
Recommendation:	

Conclusion:

Note: This report is based on checklist items contained in this document. The checklist item under each subheading is answered with a Y or N, signifying that the installation either complies or does not comply with Nortel specifications. An N/A means that the checklist question does not apply in this instance. The specifications are based on Nortel Practices, Product Bulletins, Product Advisories, and General Release Bulletins. Each checklist item is given a weight. The item can be deemed as Critical, Major, Minor, or Recommended in nature. A system evaluation is found to be noncompliant when one Critical or two Major discrepancies have been identified. Checklist weighting is not given to questions about applications products. The aim of an evaluation is to ensure installation completeness, optimize system performance and reliability, and provide a safe environment for personnel.

Further comments:

Checklist

System and site requirements

Equipment room environment

For additional information refer to:

-NTP NN43041-220 *Communication Server 1000E: Planning and Engineering*

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

Meets
specifications
Y / N

1. Temperature is maintained between 15° and 30°C (59° and 86°F)
Absolute temperature: Temperature does not go below 10°C (50°F) or above 45°C (113°F). Equipment is never exposed to absolute temperature limits for more than 72 hours. [Major] _____
2. Environment temperature for telephones is 0° to 50°C (32° to 122°F). _____
3. Heat sources (such as floor heaters) are not placed near the equipment. _____
4. Temperature does not deviate any more than 10°C (18°F) within any hour. The temperature differential in the equipment room does not exceed ±3.0°C (±5°F).
A temperature of 22°C (72°F) is recommended.
Temperature: _____° (Indicate C or F) [Major] _____
5. Humidity level for equipment: RH 20% to 55%, noncondensing
Absolute humidity level: Humidity level must not go below RH 20% or above 80%, noncondensing
Humidity _____%
[Major, Critical if more than 95% or less than 5%] _____
6. Environment does not show any visible signs of moisture. [Critical] _____
7. Ventilating openings on equipment are free of obstructions. [Major] _____
8. The room is clean, relatively dust-free, and well ventilated.
[Minor, Major if concrete dust] _____
9. Equipment location is not subject to constant vibration. [Major] _____
10. Equipment is located at least 12 ft (3660 mm) away from sources of electrostatic, electromagnetic, or radio frequency interference.
[FCC CFR 47 Part 15 for Class A devices. (<20 milliGauss ELF)]
[Major] _____

Equipment room environment (continued)

Meets
specifications
Y / N

- | | | |
|-----|---|-------|
| 11. | Equipment is not located under liquid-carrying pipes. [Major] | _____ |
| 12. | Equipment room is not conducive to generating electrostatic discharge (ESD) [Major] | _____ |
| 13. | Antistatic wrist straps, sprays, mats, or a combination of these is in evidence on-site. [Recommendation] | _____ |
| 14. | Switch room door has a lock installed. [Minor] | _____ |
| 15. | Electric locks, such as push button access code or card reader locks are not in use unless a battery backup or a key override is provided. | _____ |
| 16. | No tripping or safety hazards exist in the equipment room. [Major] | _____ |
| 17. | Installation is not located close to sources of EMI or RFI, such as high-voltage power lines, radar, broadcast stations, mobile communications, power tools, appliances (such as vacuum cleaners), and office business machines (such as copiers), industrial machines and ultrasonic cleaners, vehicle ignition, arc welders, dielectric heaters, and dimmer switches. [Major] | _____ |
| 18. | Lighting illumination is 50 to 75-ft candles measuring 76 cm (30 in.) above the equipment room floor. [Recommendation] | _____ |
| 19. | Equipment room is protected from receiving direct sunlight. Direct sunlight is prevented from shining on electronic hardware, especially disk units. [Major] | _____ |
| 20. | Adequate floor space has been made available to install equipment racks, patch panels, power systems (UPS), and so on. [Major] | _____ |
| 21. | Flooring is sealed concrete, vinyl, or mastic tile. | _____ |
| 22. | RS-232 terminal and communications devices must not exceed the 50-ft cable length limit unless line drivers are utilized. [Major] | _____ |
| 23. | The storage room for spare parts is secure. [Recommendation] | _____ |
| 24. | If it is not possible that the site maintain the environment of the storage area exactly the same as the environment of the operating equipment, stored materials are allowed time to adjust to the equipment room environment before using them. [Major] | _____ |
| 25. | The storage area is dust-free and away from high humidity and machinery such as electric motors of transformers. [Major] | _____ |
| 26. | Circuit cards that are not in use are stored in a protective antistatic bag. [Major] | _____ |
| 27. | Media Gateway, Call Server covers, and Cabinet covers are installed. [Major] | _____ |

Equipment room environment (continued)

Meets
specifications
Y / N

Reserve power equipment room

28. If the reserve power equipment is located in a separate room, then that room is:
- well-ventilated and operating at optimum temperature; specific gravity readings are based on 25° C (77° F)
 - equipped with protective equipment (such as goggles, face shields, acid-resistant gloves, protective aprons, water for rinsing eyes/skin, and bicarbonate of soda)
 - well-secured
 - accessible (the doorway must not be blocked)
 - in compliance with all floor loading requirements and the noise levels required by OSHA standards 1910.5 (or local standards)

Maintenance and technician area environment

29. A locking cabinet or storage area is in place for backup disks.
[Recommendation]
30. The area contains a table or desk terminal, printer, or equivalent device.
[Recommendation]
31. Maintenance workstation is equipped with a: [Major]
- dial-up modem or connection to the network;
 - terminal emulator application such as Telnet or rlogin;
 - Web browser;
 - operational maintenance telephone
32. Observations or comments:

Power and grounding

For additional information refer to:

-NTP NN43041-220 *Communication Server 1000E: Planning and Engineering*

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

Note: According to Nortel Technical Publication (NTP) NN43041-220 CS 1000E: Planning and Engineering Guide, Nortel recommends using an isolated ground topology as the preferred method of grounds for use as the CS 1000E single-point ground source. In the absence of such facilities, a portable or hardwired UPS system can be used. It is preferable that UPS systems contain load isolation transformers in their design. Isolated Ground topology is not accepted in Canada according to code.

Meets
specifications
Y / N

Nortel CS 1000E System AC service panel

1. The AC supply conductors are dedicated and uninterrupted from the building primary source or transformer to the PBX main AC service panel. (This does not apply to subpanels). [Major] _____
2. Verify that an Isolated Ground (IG) or ACEG conductor is installed from MGN/ X0 to an IG or ACEG bus in the AC panel serving the PBX equipment room. This point becomes the single-point ground reference for the PBX.
Note: In some cases an AC panel is not a requirement. Various UPS systems establish the same intent and purpose as the panel IG/ACEG bus. The engineer performing the evaluation must research the application and determine its intent. [Critical] _____
3. The IG/ACEG conductor is sized per code. (NEC 250).
Note: It is recommended that the ACEG conductor be the same size as the largest phase conductor. [Major] _____
4. The IG/ACEG conductor runs in the same raceway (conduit) as the phase and neutral conductors (NEC 250). [Major] _____
5. The IG/ACEG conductor is insulated, permanent, and continuous (no splices). (NEC 250) [Major] _____
6. A dedicated AC panel is installed in the PBX room for the Nortel CS 1000E and associated equipment only. Circuits being served for purposes such as lighting, air conditioning, heating, generators, copiers, or motors from the Nortel CS 1000E service panel are not recommended. Panel ID: _____ [Major] _____
7. Circuit breakers are identified and labeled at the AC service panel. (NEC 110-22) [Minor] _____
8. Ensure that all voltage and current levels recorded are within the defined limits. **Note: A licensed Electrician must obtain these results. See the AC Power and ground worksheet [Critical]** _____
9. The workspace clearance around the AC service panel is 3-ft. (NEC 110-26) [Major] _____

Power and grounding (continued)

Meets
specifications
Y / N

10. All RS-232 ancillary devices connected to the system I/O circuit cards must be wired from the same AC panel as the PBX power supplies, with individual hot, neutral, and isolated ACEG ground wires.

Note: Protection devices such as electro-optical isolators must be installed for all RS-232 devices (terminal, modem, and so on) not served from the same AC service panel as the Nortel CS 1000E system. [Critical]

Power and grounding (continued)

Meets
specifications
Y / N

11. The following current, power, and cooling requirements are met for CS 1000E components:

Component	Current @ 120/240 V AC (A)		Required UPS power (W)		Thermal dissipation (Btu)	
	Max	Typical	Max	Typical	Max	Typical
NTDU62 Call Server	2.50/ 1.25	1.00/ 0.50	300.00	120.00	1023.90	409.56
NTDU27 Signaling Server	2.00/ 0.90	0.50/ 0.25	200.00	60.00	682.60	204.78
NTDU97 Signaling Server	TBD	TBD	580.00	660.00	1990.00	TBD
NTDU99 Signaling Server	TBD	TBD	350.00	550.00	1024.00	TBD
NTDU14 Media Gateway	1.40/ 0.70	1.17/ 0.58	300.00	190.00	1023.60	648.30
NTDU15 Media Gateway Expander	1.15/ 0.58	1.17/ 0.58	300.00	145.00	1023.60	494.70
MRV Terminal Server	1.60/ 0.80	0.40/ 0.20	192.00	48.00	655.30	163.83
BayStack 470	1.50/ 0.75	0.60/ 0.30	90.00	72.00	324.00	245.74
BayStack 460 (Power over LAN)	4.70/2.40	0.60/0.30	295.00	72.00	335.00	245.74
BayStack 460 (Power over LAN for 24 IP Phones)	4.70/ 2.40	1.20/ 0.60	364.12	141.12	335.00	245.74
Note: The typical values in the table are intended as a rough guide. Maximum AC input for the BayStack 460 includes maximum power of the Power over LAN. The typical rating has been adjusted to reflect configuring for IP Phones (60 mA at 48 V DC).						
Maximum voltage limits:						
North America	90 and 132 V, single phase		Europe and UK		180 and 250 V, single phase	
Frequency:						
North America	60 Hz		Europe and UK Fuse:		50 Hz	
Fuse:						
Germany	16 A					

Meets
specifications
Y / N

Power and grounding (continued)

12. The following power and cooling requirements for Media gateway packs are met:

Media gateway pack	Active off-hook (%)	Power consumption (W)	UPS power (W)	Thermal dissipation	
				W	Btu
NTDW60 Media Gateway Controller Card	N/A	30	TBD	TBD	TBD
NTDW62 MGC DSP daughterboard (32 port)	N/A	4	TBC	TBD	TBD
NTDW64 MGC DSP daughterboard (64 port)	N/A	4	TBD	TBD	TBD
NTDK20 Small System Controller card	N/A	16	24.0	24.0	81.9
NTDK83 100BaseT daughterboard (dual-port)	N/A	6	9.0	9.0	30.7
NTDK99 100BaseT daughterboard (single-port)	N/A	4	6.0	6.0	20.5
NT5K02 Flexible Analog Line card	50	26	39.0	6.6	22.5
NT8D02 Digital Line card	100	26	39.0	13.0	44.4
NT8D03 Analog Line Card	50	26	39.0	6.6	22.5
NT8D09 Analog Message Waiting Line card	50	26	39.0	6.6	22.5
NT8D14 Universal Trunk card	DID-enabled	28	42.0	42.0	143.3
NT8D15 E&M Trunk card	N/A	29	43.5	43.5	148.4
NTAK09 1.5MByte DTI/PRI card	N/A	10	15.0	15.0	51.2
NTAK10 2.0 MByte DTI card	N/A	12	18.0	18.0	61.4
NTAK79 2.0 MByte PRI card	N/A	12	18.0	18.0	61.4
NTAK50 2.0 MByte PRI card	N/A	12	18.0	18.0	61.4
NTRB21 TMDI (1.5 Mbyte DTI/PRIi) card	N/A	12	18.0	18.0	61.4
NTVQ01 Media Card (32 port)	N/A	18	27.0	27.0	92.1
NTDW65 MC32S Media Card (32 port)	N/A	9	TBD	TBD	TBD

ATTENTION

The UPS power requirement is the card's power consumption divided by the efficiency factor for the Media Gateway power supply plus peak inrush. For Media Gateways use 1.5 times the wattage to give the UPS wattage, or volt-amps (VA).

Meets
specifications
Y / N

Power and grounding (continued)

13. Power from each outlet meets the input requirements of at least one Nortel CS 1000E power supply listed in the following tables (continued):

AC input requirements for each MG 1000E or MG 1000E Expander		y/n
(North America)		
Voltage	Recommended: 100-120 Volts Maximum limits: 90 and 132 Volts, single phase	
Frequency	50-60 Hz	
Power (I/P max)	300 VA maximum	
Outlet Type	120 Volts, 15 Amp supply	
(Europe and UK)		
Voltage	Recommended: 208/220 Volts Maximum limits: 180 and 250 Volts, single phase	
Frequency	50-60 Hz	
Power (I/P max)	300 VA maximum	
Outlet Type	208/240 Volts, 15 Amp supply	
Carried out in accordance with local power specifications.		
The supplied power is single-phase 240 or three-phase 208 Y and has a system ground conductor		
(Germany)		
Voltage	Recommended: 230 Volts Maximum limits: 180 and 250 Volts, single phase	
Frequency	50 Hz	
Power (I/P max)	300 VA maximum	
Fuse	16 A	
Outlet Type	Receptacles by DIN regulation	

Meets
specifications
Y / N

Power and grounding (continued)

- 14.. Power from each outlet meets the input requirements of at least one CS 1000E power supply listed in the following tables (continued):

AC input requirements for each Signaling Server		y/n
(North America)		
Voltage	Recommended: 100-120 Volts Maximum limits: 90 and 132 Volts, single phase	
Frequency	50-60 Hz	
Power (I/P max)	200 VA maximum	
Outlet Type	120 Volts, 15 Amp supply	
(Europe and UK)		
Voltage	Recommended: 208/220 Volts Maximum limits: 180 and 250 Volts, single phase	
Frequency	50-60 Hz	
Power (I/P max)	200 VA maximum	
Outlet Type	208/240 Volts, 15 Amp supply	
Carried out in accordance with local power specifications.		
The supplied power is single-phase 240 or three-phase 208 Y, and has a system ground conductor.		
(Germany)		
Voltage	Recommended: 230 Volts Maximum limits: 180 and 250 Volts, single phase	
Frequency	50 Hz	
Power (I/P max)	200 VA maximum	
Fuse	16 A	
Outlet Type	Receptacles by DIN regulation	

Location of power outlets

NOTE: The maximum distance between a power outlet and the system equipment is met, in relation to the length of the power cord.

- In North America, the power cord is 9 ft, 10 in. (3000 mm).
- Outside North America, the power cord is 8 ft, 2 in. (2490 mm).

15. Observations or comments:

AC power and ground worksheet

AC service panel measurements

Note: If a portable UPS system is used, measurements are only taken on the input/output voltage and the neutral-ground voltage. Percent of load must also be notated.

Voltage measurements:	<u>AC</u>	<u>MIN -MAX</u>
Between neutral and phase A	_____ volts	105v 125v
Between neutral and phase B	_____ volts	105v 125v
Between neutral and phase C	_____ volts	105v 125v
Between ground and phase A	_____ volts	105v 125v
Between ground and phase B	_____ volts	105v 125v
Between ground and phase C	_____ volts	105v 125v
Between phase A and phase B	_____ volts	180v 250v
Between phase A and phase C	_____ volts	180v 250v
Between phase B and phase C	_____ volts	180v 250v
Between neutral and ground (ACEG)	_____ Vrms	0.0v 0.5Vrms
UPS percent of load:	_____	
UPS input voltage:	_____	
UPS output voltage:	_____	
Current Measurements:	<u>AC</u>	<u>MAX</u>
Neutral conductor amps	_____ amps	See Note 1
Ground conductor amps (IG or ACEG)	_____ amps	0.5 amps
Phase A amps	_____ amps	
Phase B amps	_____ amps	
Phase C amps	_____ amps	

Note 1: The neutral current must never exceed the current in any single-phase leg.
A licensed electrician must take AC service panel measurements.
Voltage and current values must comply with NTPs.

Voltage between neutral and ground can signify poor or loose connections or noncontinuous grounding.

Current flow in the grounding conductor can indicate that the neutral has been used for equipment grounding.

If currents are balanced in a three phase system and there is significant neutral current, then harmonics are present. Harmonics can deteriorate transformers over time by overheating their internal wiring.
Solution: Use transformers specifically designed for harmonic loading (k-factor-rated).

System power and ground connections

Meets
specifications
Y / N

1. The Signaling Server power cord is plugged into the AC outlet of the rack and the AC outlet of the rack is grounded to its dedicated electrical panel. [Major]

2. In a system with more than one MG 1000E powered by multiple service Panels, a #6 AWG (#40 Metric Wire Gauge) ground wire from the rear panel grounding lug of each MG 1000E is connected to an NTBK80 Ground Bar. The ground bar is connected to the Single Point Ground reference. [Major]

Note: In the UK, the ground wire from the CS 1000E equipment is connected to an NTBK80 Ground Bar or through a Krone Test Jack Frame.

3. The CS 1000E does not connect to a ground bar. It is properly grounded when:
 - The CS 1000E power cord is plugged into the rack's AC outlet. The rack's AC outlet is grounded to its dedicated electrical panel. [Preferred]

 - The CS 1000E power cord is plugged into a wall AC outlet. The CS 1000E is grounded outside of the rack through the safety grounding conductor in the power cord. This method only ensures proper grounding of the CS 1000E itself. It does not provide grounding protection for other rack-mounted pieces of equipment. Therefore, ensure that other devices in the rack are properly grounded as required.

4. If multiple pieces of equipment are installed in a rack, a separate connection is run from the grounding lug on each piece of equipment to the NTBK80 Ground Bar. [Major]

5. In an installation where a dedicated panel cannot provide optimal conditions, a load isolation transformer or load isolation transformer-based UPS/Line conditioner with the following characteristics is used: [Major]
 - 120/208/240 V AC input, over-current protected at primary

 - 120/208/240 V AC available at secondary outputs, each circuit breaker protected

 - primary and secondary windings are completely isolated from one another

 - the load isolation transformer or load isolation transformer-based UPS/Line conditioner is approved for use locally as a stand-alone user product (CSA, UL, or other locally recognized clear markings)

 - the load isolation transformer or load isolation transformer-based UPS/Line conditioner is capable of providing power to all CS 1000E components operating at the same time at full load

System power and ground connections (continued)

Meets
specifications
Y / N

- equipment unrelated to the CS 1000E is not powered from a transformer that provides service to the CS 1000E system
 - the load isolation transformer or load isolation transformer-based UPS/Line conditioner is electrostatically shielded to minimize ELF fields
6. Ground conductors are at least #6 AWG (16 mm²) at any point.
 7. Ground conductors do not carry current under normal operating conditions.
 8. Spliced conductors are not be used. (Continuous conductors have lower impedance and are more reliable.)
 9. All conductors terminate in a permanent way. All terminations are easily visible and available for maintenance purposes.
 10. Ground connections are tagged with a clear message such as “Critical Connection: Do Not Remove or Disconnect”.
 11. The installation meets the specific grounding requirements for the area:
[Major]

Germany	#8 AWG (10 mm ²) green/yellow wire
North America; other areas in Europe	Not smaller than #6 AWG (16 mm ²) at any point
UK	Two green/yellow wires no thinner than two 10 mm ²

System power and ground connections (continued)

Meets
specifications
Y / N

12. A 120VAC non-switched receptacle is provided within 9 ft of the CS 1000E cabinets. It is strongly recommends that each Media Gateway and Media Gateway Expansion pair for 1000E systems are powered from one dedicated 120VAC, 15/20 amp branch circuit with individual hot, neutral, and AC equipment ground or isolated ground wires. **Installation does not exceed 80% of the maximum branch circuit or UPS load rating.** [Major]

Media Gateway

13. The NTBK80 ground bar is capable of grounding up to six Media Gateways (either with or without companion Media Gateway Expanders) back to the SPG. If there are more than six Media Gateways (either with or without companion Media Gateway Expanders), the NTDU6201 ground bar is used.
14. The NTDU6201 can be adjusted for various mounting configurations. It accepts 35 #6 AWG (16 mm²) wire connections. The ground bar terminates at the service panel ground.
15. All equipment located in a series of equipment racks that are physically bonded together are grounded to and powered by the same service panel.
16. If additional service panels are required, they are collocated beside the original service panel.
17. If racks are not bonded together, then the equipment located in the racks can be grounded and powered by separate service panels.
18. A #6 AWG (16 mm²) ground wire is connected from the rear panel grounding lug of each Media Gateway to the ground bar.
19. The ground bar is connected to a ground source in the dedicated service panel.
Note: In the UK, the ground wire is connected from the equipment to a ground bar or through a Krone Test Jack Frame.
20. The Media Gateway and Media Gateway Expander are considered as the same ground. To ground the Media Gateway Expander, the ground wire is jumpered from it to the grounded Media Gateway.
21. Multiple pieces of equipment installed in a rack are grounded with a separate connection from the grounding lug on each piece of equipment to the ground bar.
22. If a piece of equipment in a rack does not have a grounding lug, the rack is grounded to the ground bar.
23. For all CS 1000E system ground paths, route the correct size of insulated copper conductors is routed inside conduit.
24. Each Media Gateway and Media Gateway Expander pair is powered from the same service panel.

System power and ground connections (continued)

Meets
specifications
Y / N

25. A dedicated electrical panel that is connected to the facility's electrical system is used to power the system and this panel provides power only to the CS 1000E system components and related telecommunications hardware such as TTYs and printers. [Recommended].
26. A system ground conductor, sized at a minimum of a #6 AWG stranded, insulated wire is installed from the cabinet ground bus to the ACEG bus in the AC panel. Where UPS systems are employed, a #6 AWG wire can be installed from the cabinet ground bus to the grounded metallic case of the UPS using a ground lug. [Critical if missing; Major if undersized].
27. A #6 AWG insulated, stranded conductor is installed between each CS 1000E cabinet ground lug and the cabinet ground bus. [Major]
28. All grounding conductors are clearly identified and labeled. [Minor]
29. No telecommunications ground bus of the CS 1000E is connected to untested horizontal structural steel, water pipes, or other unreliable ground paths. [Major]
30. The cabinet ground bus is mounted near the CS 1000E cabinets. [Major]

UPS requirements

31. Cabinets are grounded to the same AC service panel or UPS that provides input power to the PBX system. [Major]
32. All UPS systems must have a ground lug (to accommodate a minimum of #6AWG wire) or ground bus installed and bonded to the UPS metallic enclosure to allow connections to the PBX system ground bus and the AC panel ACEG bus.
Note: If the UPS system is equipped with an isolation transformer, the ground lug or bus must be wired from the center tap (X0) of the transformer (The ground lug or bus allows a parallel connection to the CS 1000E single-point ground source in case the UPS power cord is unplugged). [Major]
33. #6 AWG grounding conductors are installed from the UPS ground bus or lug to the CS1000E cabinet ground bus and the ACEG bus in the AC service panel. See items #3 and #10 above. [Major]
34. CSUs (Channel Service Units) are connected to reserve power (UPS) or are span powered. [Major]
35. Equipment unrelated to the CS1000E system in any way is not powered from the same 120 VAC receptacles or UPS system as the PBX. [Major]
36. In isolated ground environments, other equipment, equipment racks, or metallic conduit do not come in contact with the CS1000E equipment rack. [Major]
37. The earth source, which the CS1000E system connects to through the AC service panel, has a resistance of 5 ohms or less. [Major]

System power and ground connections (continued)

Meets
specifications
Y / N

- | | | |
|-----|---|-------|
| 38. | Ground conductors are insulated, permanent, and continuous (not spliced). [Major] | _____ |
| 39. | All terminations are easily visible and accessible for maintenance purposes. [Major] | _____ |
| 40. | The dedicated service panel feeds only the CS 1000E and is located as close to the system as possible. | _____ |
| 41. | Each vertical power bar on the 19-inch rack has its own power feed. | _____ |
| 42. | The system ground conductor is insulated, and the same size as the largest conductor and runs between the Main Service Panel (MSP) and the CS1000E panel. | _____ |
| 43. | Ground conductors are not smaller than #6 AWG. | _____ |
| 44. | Electrical layout is reflective of a typical ANSI/EIA/TIA607 installation with TMGB and TGB ground blocks. | _____ |
| 45. | If installation is not at a ANSI/EIA/TIA607 site then a wire is connected from system ground bar to AC Ground at the Service panel. | _____ |
| 46. | Ground and Neutral bonding occur at either the transformer or at the first disconnect (Main Service Panel). | _____ |
| 47. | The resistance between the ground post of any equipment and the single-point ground to which it connects is less than 0.25 ohms for an installed Call Server, MG 1000E, MG 1000E Expander, or Signaling Server.
[Major] | _____ |
| 48. | The installation uses one of the following bus bars as a system SPG:
[Major] | _____ |
| | <ul style="list-style-type: none"> • building principal ground, normally in a building with one floor • floor ground bar, normally in buildings with more than one floor • dedicated TMGB/TGB bonded to the building grounding system • ACEG bus located inside the PBX service panel | _____ |

System power and ground connections (continued)	Meets specifications Y / N
--	----------------------------------

Other items

49. QUA6 Power Failure Transfer Units (PFTU) are available to transfer trunk lines during a power or system failure. [Recommendation]

Note: The appropriate AC power cord kit is used for the installation as listed in the following table. (These cords connect a CS 1000E system to a commercial AC power source.)

Country / Region	AC Power Cord	Voltage Rating	Current Rating	Plug Type
North America	A0379412	250 V	10 A	NEMA 6-15P
Argentina	A0814961	250 V	10 A	IRAM 2073
North America	NTTK14	125 V	13 A	NEMA 5-15P
Australia/ New Zealand	NTTK15	250 V	10 A	AS3112
Europe	NTTK16	250 V	10 A	CEE(7)VII
Switzerland	NTTK17	250 V	10 A	SEV 1011
UK/Ireland	NTTK18	250 V	10 A	BS1363
Denmark	NTTK22	250 V	10 A	AFSNIT

Cabinet installation

For additional information refer to:

-NTP 43041-310 *Communication Server 1000E: Installation and Configuration*

1. Circuit cards are of allowable vintage (no outstanding Product Advisories or Bulletins). [Major]
2. Circuit cards are locked into place. [Minor]
3. All MDF/IDF blocks are clearly labeled. [Major]
4. PBX cabling is not strapped to the exterior of any conduit or raceway as a means of support. [Major]
5. MICB cards, where installed, use cards slots 1, 2, 3 in Media Gateways and slots 7, 8, 9 in Media Gateway Expanders only. [Major]
6. M2250 consoles utilize 5 consecutive units and are properly cross-wired with three power TNs. The AUX cable can be utilized to take the place of two power TNs only. See console cable wh/sl, rd/or, & rd/grn pairs. [Major]

Meets
specifications
Y / N

Application tapes and messaging system tape cartridges

7. Media is not subject to rapid changes in temperature or humidity. [Major]
8. Media is kept away from strong magnetic fields. [Major]
9. Database backups are routinely performed and are readily available. [Major]
10. System installation CDs, PC cards are available for the PBX and Applications products in the event of severe system hardware malfunction or data corruption. [Critical]
11. Observations or comments:

Cabling installation

For additional information refer to:

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

Meets
specifications
Y / N

Outside plant cabling and protectors

1. Entrance cable sheath is grounded as close as possible at the point of entry to an approved ground source. [Major] (NEC 800-33; 40)
2. Splice cases are properly grounded. [Major]
3. Approved protection devices are used for Telco network and campus cables. (Carbon, Gas tube type for network cables; fast-acting, low let-through type on campus cables). (NEC 800) [Major]
For further details, see Product Bulletin 97040 (April) revision 1 relating to protection.
4. Protection devices are installed at both ends of a cable in a campus environment. (Silicon Avalanche type. see Oneac 5SDP; 5SAP) [Major] ANSI/UL 497-1995 Specs -10V for digital telephones; 48VDC for analog telephones. **For further details, see Product Bulletin 97040 (April) revision 1.**
5. All protection device grounding conductors are grounded to an approved source with an appropriately sized wire. The grounding conductors must be kept as short and straight as possible. (No sharp bends- 8 radius) (NEC 800-40) [Major]

Cabinet cabling

6. Cabling must be installed in a neat and orderly fashion. [Major]
7. MDF cables are seated and secured in place using factory velcro straps. [Major]
8. All cables for cabinets, Call Servers, Media Gateways/Expanders, Signaling Servers (SDI, AUX, VGMC ELAN/TLAN, CE-MUX, DS-30X, and 10/100BaseT cables) and adapters are properly fastened. [Major]
9. Power wiring must not be installed in a parallel fashion with CAT5 cabling. Installing power wires perpendicular to CAT5 cables is preferred and minimizes effects from EMI or ELF fields. [Major]
10. EMI mitigating ferrite rings (NTVQ83AA) are installed on Voice Gateway Media Card TLAN/ELAN patch cables. [Major]
11. NTCW84JA assemblies are used for each VGMC connector. [Major]
12. CAT5 patch cables are not installed near fluorescent lighting fixtures. [Major]
13. ELAN/TLAN patch cables for VGMC and Signaling Server hardware are factory made and kept at 20 cable feet or less. [Recommendation]
14. All patch cables are labeled and correlate to a network infrastructure diagram or schematic. [Minor]

Cabling installation (continued)

Meets
specifications
Y / N

Cross-connect terminal requirements

15. To allow for future expansion and equipment changes at the cross-connect terminal, the cross-connect terminal has enough space for connecting blocks to terminate four 25-pair cables from each Media Gateway and for each Media Gateway Expander. [Recommendation]
16. When Ethernet connections are used instead of traditional cabling, the Media Card Input/Output adapter is used:
- for the 1.5 Mbit DTI/PRI circuit card NTRB21, NTBK04 cable is used
 - for the 2.0 Mbit DTI circuit card NTAK10, 2.0 Mbit PRI circuit card NTAK79, and 2.0 Mbit PRI circuit card NTBK50, NTBK05 cable is used
 - each IPE card slot equipped with a Line or Trunk card uses a 25-pair cable from the host Media Gateway or Media Gateway Expander
 - four conductors for the AUX cable run from the Media Gateway.
 - one 25-pair cable runs from each Power Fail Transfer Unit (PFTU) QUA6
 - wiring is in place from telephones and trunks.
17. In the UK:
If the Krone Test Jack Frame is used, only authorized personnel are allowed access the Krone Test Jack Frame and it is installed in a locked room or in an environment that prevents free access to the equipment. For additional information about the cross-connect terminals, see *Communication Server 1000E: Installation and Configuration* (NN43041-310). [Major]
18. Observations or comments:

System operation

For additional information refer to:

X11 Software General Release Bulletin (shipped with new software)

Meets
specifications
Y / N

System diagnostics

- | | | |
|-----|--|-------|
| 1. | LD 30 Network and Signaling Diagnostic (NWS). [Minor] | _____ |
| 2. | LD 34 Tone and Digit Switch and Digitone Receiver (TDS). Check results from the midnight routines. [Major] | _____ |
| 3. | LD 37 Input/Output Diagnostic (IOD). Use STAT command for TTYs. [Major] | _____ |
| 4. | LD 38 Conference Circuit Diagnostic (CNF). Check results from the midnight routines. [Major] | _____ |
| 5. | LD 43 Data Dump (EDD). Check for successful completion of a manual data dump. [Critical] | _____ |
| 6. | LD 44 Software Audit (AUD). Must be configured in BKGD of Ld-17. Check for normal AUD000 messages. [Major] | _____ |
| 7. | LD 48 Status of ELAN and Mail/ESDI Links. Make sure all AMLs that are in use are Active Empty. [Major] | _____ |
| 8. | LD 60 Digital Trunk Diagnostic (DTI/PRI). Use the SSCK command to check system clocks. Locked on to IP daughterboard #1. Also check midnight routines for frame slips, CRC errors. [Major] | _____ |
| 9. | LD 117 STAT HOST | _____ |
| 10. | LD 137 ELNK STAT ELNK command | _____ |
| 11. | GTR, NTPs, and Backup logs are located in switch room. Note: Ensure appropriate level and system type of NTPs are available. [Minor] | _____ |
| 12. | The PBX maintenance modem and terminal server performs as expected. [Major] | _____ |
| 13. | A terminal server or SEB modem is configured as to allow Telnet access to the system. [Recommendation] | _____ |
| 14. | The system is equipped with a working maintenance terminal and printer. [Major] | _____ |
| 15. | A PC is available on location in order to access Element Manager and NRS [Major] | _____ |
| 16. | Minimum level PEPs are installed in the system. This includes DepList PEPs for the Call Servers, required PEPs for Signaling Servers, and Voice Gateway Media Card PEPs. [Recommendation] | _____ |
| 17. | IP telephones are on the latest recommended firmware. [Recommendation] | _____ |
| 18. | Signaling Servers are load sharing (equal number of registered IP phones) [Recommendation] | _____ |
| 19. | Printouts of Signaling Server config.ini and bootp.tab files are readily available. pdt> cd /u/config, copy config.ini, copy bootp.tab [Minor] | _____ |

Meets
specifications
Y / N

System operation (continued)

Memory size

20. The installation meets the minimum memory requirements for CS 1000 Release 5.5 software.

Processor	Flash memory required	DRAM memory required	Total memory
Call Server (CP PII)	N/A	256 MByte	256 MByte
Call Server (CP PIV)	N/A	512 MByte	512 MByte
Call Server (CP PM)	N/A	1 GByte	1GByte
MG 1000E (MGC)	4 MB ?	144 (128 MB of CSP SDRAM + 16 MB of MSP SDRAM) ?	?
MG 1000E (SSC)	64 MByte	32 MByte	96 MByte
CP PIV and CP PM Call Servers can be upgraded to a maximum of 2 GByte DRAM memory			

21. The installation does not exceed the maximum call register count recommended for CS 1000E Release 5.5 software.

System	Recommended call register count	Memory required (SL-1 words)	Memory required (MByte)
CS 1000E (CP PII)	25 000	6 057 000	23.174
CS 1000E (CP PIV and CP PM)	35 000	8 505 000	32.444
Note: Call registers are 243 SL-1 words long. One SL-1 word is 4 bytes.			

22. Observations or comments:

System software

Meets
specifications
Y / N

Overlay 15/21 Customer data block

1. SRCD (Auto Set Relocation Code) has a value programmed. [Major if SPRE is 1, Minor if other]

Overlay 17/22 configuration record

2. Daily Routine defined as LD 34, 38, 60,137. [Major]
3. LD 44 in background routine. [Major]
4. The number of call registers (NCR) within the maximum value required by GRB documentation regarding port size and features used.
1000M- 800 call registers [Major]
5. 1000M LPIB and HPIB values equal 450. [Recommendation]
6. History file is defined as MTC, BUG and is set at minimum length of 60 000 characters. [Major]
7. ERRM is configured as ERR, BUG, AUD. [Major]
8. RLS IDs are configured for each D-Channel where appropriate. [Major]

Overlay 11/12/13 digital telephones, attendant consoles, and digitone receivers

9. Switchroom phone requires MTA for class of service. [Major]
10. Consoles powered through unused TNs are correctly programmed PWR. [Major]
11. Consoles are cross-wired properly and must utilize consecutive units. [Major]
12. Observations or comments:

Networking parameters for VoIP

Meets
specifications
Y / N

1. A LAN or WAN assessment has been performed on the customer network. [Critical] _____
2. The layer 2 switch ports (Baystack 470) are in place for the CS 1000E ELAN/TLAN are configured for full duplex, autonegotiate. [Major] _____
3. The layer 3 switch ports are in place for the ...[new speed? 100 or 1 gig?] [Major] _____
4. The port speed for ELAN related ports are configured at 10 Mb/s for CS 1000E systems. [Major] _____
5. The ELAN subnet and the TLAN subnet are on separate subnets. [Major] _____
6. All applications on the ELAN subnet are on the same subnet. [Major] _____
7. The port speed for all TLAN ports on the layer 2 switch are configured for 100 Mb/s [Major] _____
8. VGMC circuit cards in the same node are on the same TLAN subnet. [Major] _____
9. Minimum of one DSP resource for every TDM port (T-1 trunks, digital phones, analog phones, analog trunks, CallPilot channels). For non-blocking requirements one DSP per TDM port is a best practice. [Recommendation] _____
10. Layer 2 switches derive UPS power from different branch circuit sources, if possible, in order to minimize single-points of failure. [Recommendation] _____
11. Layer 3 switches derive UPS power from different branch circuit sources, if possible, in order to minimize single-points of failure. [Recommendation] _____
12. Observations or comments: _____



Communication Server 1000E
High Availability (HA)

System evaluation

for

Summary: A system evaluation of the _____ (Customer)
Communication Server 1000E (HA version) solution in
_____ (City) was requested by
_____ (Name) of
_____ (Company). The evaluation was
performed on _____ (Date). The nature of the evaluation was
to determine if the Communication Server 1000E (HA version) was
installed per Nortel manufacturing specifications and Product Bulletin
requirements.

Distribution:

Evaluated by:

Date:

Nortel Communication Server 1000
Communication Server 1000E System Evaluation
NN43041-318 02.01 Standard
Release 5.5 07 December 2007

Location profile

Site information:

Audit engineer: _____	Evaluation date: _____
Distributor: _____	Customer: _____
Address: _____	Address: _____
_____	_____
Contact: _____	Site telephone: _____
Telephone: _____	Attendees: _____
Email: _____	_____
_____	_____

System Information:

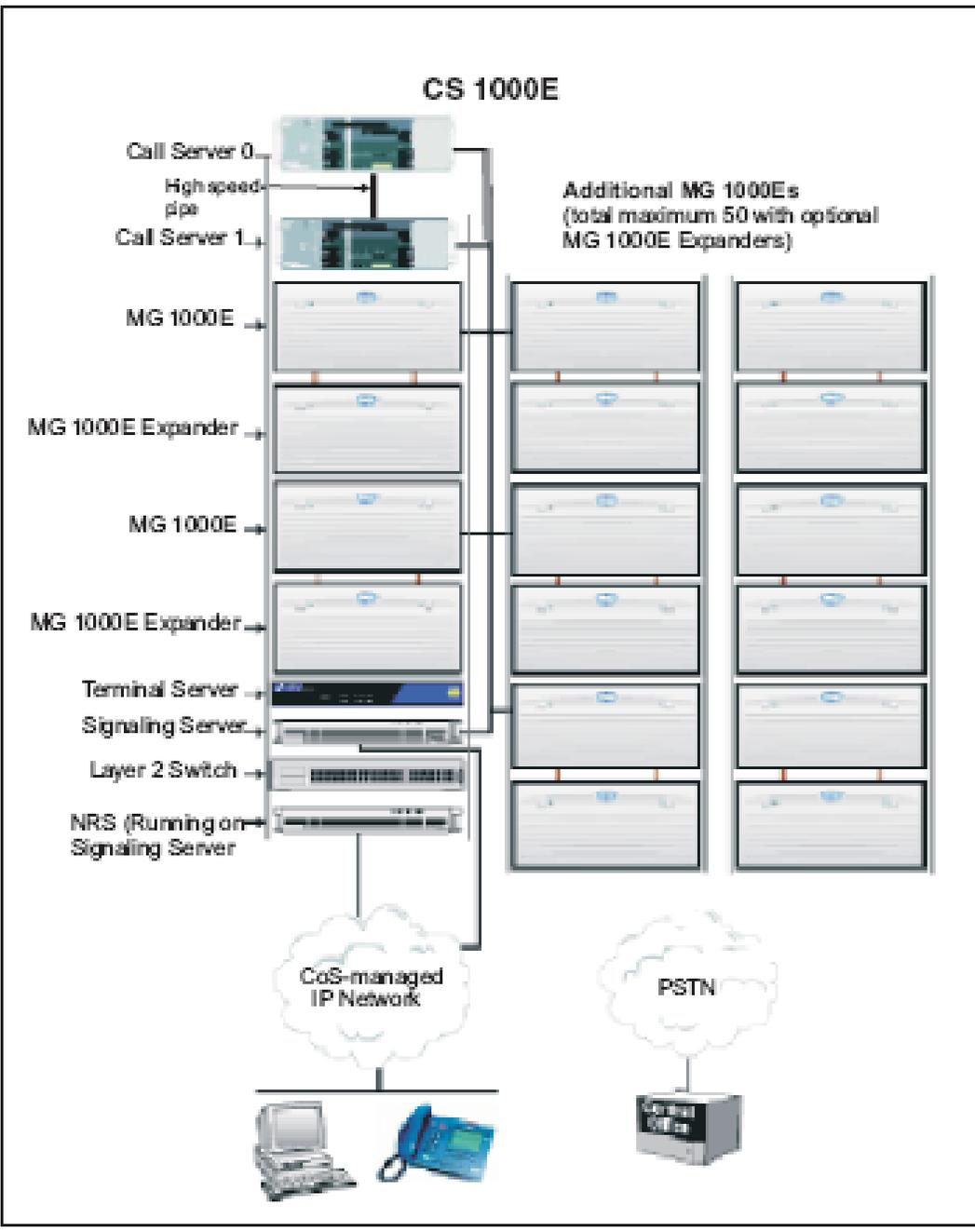
System serial number: _____

	Type or Platform	Software release	Ports
PBX	CS 1000E	_____	_____
Signaling Server	_____	_____	_____
TM	_____	_____	_____
Call Center Server	_____	_____	_____
CallPilot IPE	_____	_____	_____
VGMC	_____	_____	_____

Equipment information:

	Type	Quantity	Power equipment	Quantity
	_____	_____	UPS Type: _____	_____
Call Server	_____	_____		_____
Media Gateway	_____	_____	PoE Yes No _____	_____
MG Expansion	_____	_____	_____	_____
Signaling Server	_____	_____	_____	_____
CP PM	_____	_____	_____	_____
Signaling Server	_____	_____	_____	_____
COTS	_____	_____	_____	_____
Signaling Server	_____	_____	_____	_____
ISP 1100	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	Evaluation Type: _____	_____

CS 1000E High Availability Sample site layout



Findings and recommendations

Introduction:

The evaluation of this CS 1000E (SA) system, located _____ was requested by _____. The request was initiated because _____.

The evaluation was performed on (date) _____ and covered the areas of Equipment Room Environment, Maintenance and Technician Area Environment, Power and Grounding, System Power and Ground Connections, Cabinet Installation, Cabling Installation, System Operation, System Software, and Network Parameters for VoIP.

_____ (name of company representative) was the main contact person during the evaluation process. All questions that pertain to this report can be directed to: _____.

Discrepancies and recommendations:

Equipment room environment

Item #:	
Findings:	
Recommendation:	

Maintenance and technician area environment

Item #:	
Findings:	
Recommendation:	

Power and grounding

Item #:	
Findings:	
Recommendation:	

System power and ground connections

Item #:	
Findings:	
Recommendation:	

Cabinet installation

Item #:	
Findings:	
Recommendation:	

Cabling installation

Item #:	
Findings:	
Recommendation:	

System operation

Item #:	
Findings:	
Recommendation:	

System software

Item #:	
Findings:	
Recommendation:	

Network parameters for VoIP

Item #:	
Findings:	
Recommendation:	

Conclusion:

Note: This report is based on checklist items contained in this document. The checklist item under each subheading is answered with a Y or N, signifying that the installation either complies or does not comply with Nortel specifications. An N/A means that the checklist question does not apply in this instance. The specifications are based on Nortel Practices, Product Bulletins, Product Advisories, and General Release Bulletins. Each checklist item is given a weight. The item can be deemed as Critical, Major, Minor, or Recommended in nature. A system evaluation is found to be noncompliant when one Critical or two Major discrepancies have been identified. Checklist weighting is not given to questions about applications products. The aim of an evaluation is to ensure installation completeness, optimize system performance and reliability, and provide a safe environment for personnel.

Further comments:

Checklist

System and site requirements

Equipment room environment

For additional information refer to:

-NTP NN43041-220 *Communication Server 1000E: Planning and Engineering*

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

- | | Meets
specifications
Y / N |
|---|----------------------------------|
| 1. Temperature is maintained between 15° and 30°C (59° and 86°F)
Absolute temperature: Temperature does not go below 10°C (50°F) or above 45°C (113°F). Equipment is never exposed to absolute temperature limits for more than 72 hours. [Major] | _____ |
| 2. Environment temperature for telephones is 0° to 50°C (32° to 122°F). | _____ |
| 3. Heat sources (such as floor heaters) are not placed near the equipment. | _____ |
| 4. Temperature does not deviate any more than 10°C (18°F) within any hour. The temperature differential in the equipment room does not exceed ±3.0°C (±5°F).
A temperature of 22°C (72°F) is recommended.
Temperature: _____° (Indicate C or F) [Major] | _____ |
| 5. Humidity level for equipment: RH 20% to 55%, noncondensing
Absolute humidity level: Humidity level must not go below RH 20% or above 80%, noncondensing
Humidity _____%
[Major, Critical if more than 95% or less than 5%] | _____ |
| 6. Environment does not show any visible signs of moisture. [Critical] | _____ |
| 7. Ventilating openings on equipment are free of obstructions. [Major] | _____ |
| 8. The room is clean, relatively dust-free, and well ventilated.
[Minor, Major if concrete dust] | _____ |
| 9. Equipment location is not subject to constant vibration. [Major] | _____ |
| 10. Equipment is located at least 12 ft (3660 mm) away from sources of electrostatic, electromagnetic, or radio frequency interference.
[FCC CFR 47 Part 15 for Class A devices. (<20 milliGauss ELF)]
[Major] | _____ |

Equipment room environment (continued)

Meets
specifications
Y / N

- | | | |
|-----|---|-------|
| 11. | Equipment is not located under liquid-carrying pipes. [Major] | _____ |
| 12. | Equipment room is not conducive to generating electrostatic discharge (ESD) [Major] | _____ |
| 13. | Antistatic wrist straps, sprays, mats, or a combination of these is in evidence on-site. [Recommendation] | _____ |
| 14. | Switch room door has a lock installed. [Minor] | _____ |
| 15. | Electric locks, such as push button access code or card reader locks are not in use unless a battery backup or a key override is provided. | _____ |
| 16. | No tripping or safety hazards exist in the equipment room. [Major] | _____ |
| 17. | Installation is not located close to sources of EMI or RFI, such as high-voltage power lines, radar, broadcast stations, mobile communications, power tools, appliances (such as vacuum cleaners), and office business machines (such as copiers), industrial machines and ultrasonic cleaners, vehicle ignition, arc welders, dielectric heaters, and dimmer switches. [Major] | _____ |
| 18. | Lighting illumination is 50 to 75-ft candles measuring 76 cm (30 in.) above the equipment room floor. [Recommendation] | _____ |
| 19. | Equipment room is protected from receiving direct sunlight. Direct sunlight is prevented from shining on electronic hardware, especially disk units. [Major] | _____ |
| 20. | Adequate floor space has been made available to install equipment racks, patch panels, power systems (UPS), and so on. [Major]
Flooring is sealed concrete, vinyl, or mastic tile. | _____ |
| 21. | RS-232 terminal and communications devices must not exceed the 50-ft cable length limit unless line drivers are utilized. [Major] | _____ |
| 22. | The storage room for spare parts is secure. [Recommendation] | _____ |
| 23. | If it is not possible that the site maintain the environment of the storage area exactly the same as the environment of the operating equipment, stored materials are allowed time to adjust to the equipment room environment before using them. [Major] | _____ |
| 24. | The storage area is dust-free and away from high humidity and machinery such as electric motors of transformers. [Major] | _____ |
| 25. | Circuit cards that are not in use are stored in a protective antistatic bag. [Major] | _____ |
| 26. | Media Gateway, Call Server covers, and Cabinet covers are installed. [Major] | _____ |

Equipment room environment (continued)

Meets
specifications
Y / N

Reserve power equipment room

27. If the reserve power equipment is located in a separate room, then that room is:
- well-ventilated and operating at optimum temperature; specific gravity readings are based on 25° C (77° F)
 - equipped with protective equipment (such as goggles, face shields, acid-resistant gloves, protective aprons, water for rinsing eyes/skin, and bicarbonate of soda)
 - well-secured
 - accessible (the doorway must not be blocked)
 - in compliance with all floor loading requirements and the noise levels required by OSHA standards 1910.5 (or local standards)

Maintenance and technician area environment

28. A locking cabinet or storage area is in place for backup disks.
[Recommendation]
29. The area contains a table or desk terminal, printer, or equivalent device.
[Recommendation]
30. Maintenance workstation is equipped with a: [Major]
- dial-up modem or connection to the network;
 - terminal emulator application such as Telnet or rlogin;
 - Web browser;
 - operational maintenance telephone
31. Observations or comments:

Power and grounding

For additional information refer to:

-NTP NN43041-220 *Communication Server 1000E: Planning and Engineering*

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

Note: According to Nortel Technical Publication (NTP) NN43041-220 CS 1000E: Planning and Engineering Guide, Nortel recommends using an isolated ground topology as the preferred method of grounds for use as the CS 1000E single-point ground source. In the absence of such facilities, a portable or hardwired UPS system can be used. It is preferable that UPS systems contain load isolation transformers in their design. Isolated Ground topology is not accepted in Canada according to code.

Meets
specifications
Y / N

CS 1000E System AC service panel

1. The AC supply conductors are dedicated and uninterrupted from the building primary source or transformer to the PBX main AC service panel. (This does not apply to subpanels). [Major] _____
2. Verify that an Isolated Ground (IG) or ACEG conductor is installed from MGN/ X0 to an IG or ACEG bus in the AC panel serving the PBX equipment room. This point becomes the single-point ground reference for the PBX.
Note: In some cases an AC panel is not a requirement. Various UPS systems establish the same intent and purpose as the panel IG/ACEG bus. The engineer performing the evaluation must research the application and determine its intent. [Critical] _____
3. The IG/ACEG conductor is sized per code. (NEC 250).
Note: It is recommended that the ACEG conductor be the same size as the largest phase conductor. [Major] _____
4. The IG/ACEG conductor runs in the same raceway (conduit) as the phase and neutral conductors (NEC 250). [Major] _____
5. The IG/ACEG conductor is insulated, permanent, and continuous (no splices). (NEC 250) [Major] _____
6. A dedicated AC panel is installed in the PBX room for the CS 1000E and associated equipment only. Circuits being served for purposes such as lighting, air conditioning, heating, generators, copiers, or motors from the CS 1000E service panel are not recommended. Panel ID: [Major] _____
7. Circuit breakers are identified and labeled at the AC service panel. (NEC 110-22) [Minor] _____
8. Ensure that all voltage and current levels recorded are within the defined limits. **Note: A licensed Electrician must obtain these results. See the AC Power and ground worksheet [Critical]** _____
9. The workspace clearance around the AC service panel is 3-ft. (NEC 110-26) [Major] _____

Power and grounding (continued)

Meets
specifications
Y / N

10. All RS-232 ancillary devices connected to the system I/O circuit cards must be wired from the same AC panel as the PBX power supplies, with individual hot, neutral, and isolated ACEG ground wires.

Note: Protection devices such as electro-optical isolators must be installed for all RS-232 devices (terminal, modem, and so on) not served from the same AC service panel as the CS 1000E system.
[Critical]

Meets
specifications
Y / N

Power and grounding (continued)

11. The following current, power, and cooling requirements are met for CS 1000E components:

Component	Current @ 120/240 V AC (A)		Required UPS power (W)		Thermal dissipation (Btu)	
	Max	Typical	Max	Typical	Max	Typical
NTDU62 Call Server	2.50/ 1.25	1.00/ 0.50	300.00	120.00	1023.90	409.56
NTDU27 Signaling Server	2.00/ 0.90	0.50/ 0.25	200.00	60.00	682.60	204.78
NTDU97 Signaling Server	TBD	TBD	580.00	660.00	1990.00	TBD
NTDU99 Signaling Server	TBD	TBD	350.00	550.00	1024.00	TBD
NTDU14 Media Gateway	1.40/ 0.70	1.17/ 0.58	300.00	190.00	1023.60	648.30
NTDU15 Media Gateway Expander	1.15/ 0.58	1.17/ 0.58	300.00	145.00	1023.60	494.70
MRV Terminal Server	1.60/ 0.80	0.40/ 0.20	192.00	48.00	655.30	163.83
BayStack 470	1.50/ 0.75	0.60/ 0.30	90.00	72.00	324.00	245.74
BayStack 460 (Power over LAN)	4.70/2.4 0	0.60/0 .30	295.00	72.00	335.00	245.74
BayStack 460 (Power over LAN for 24 IP Phones)	4.70/ 2.40	1.20/ 0.60	364.12	141.12	335.00	245.74
Note: The typical values in the table are intended as a rough guide. Maximum AC input for the BayStack 460 includes maximum power of the Power over LAN. The typical rating has been adjusted to reflect configuring for IP Phones (60 mA at 48 V DC).						
Maximum voltage limits:						
North America	90 and 132 V, single phase		Europe and UK		180 and 250 V, single phase	
Frequency:						
North America	60 Hz		Europe and UK Fuse:		50 Hz	
Fuse:						
Germany	16 A					

Power and grounding (continued)

Meets
specifications
Y / N

12. The following power and cooling requirements for Media gateway packs are met:

Media gateway pack	Active off-hook (%)	Power consumption (W)	UPS power (W)	Thermal dissipation	
				W	Btu
NTDW60 Media Gateway Controller Card	N/A	30	TBD	TBD	TBD
NTDW62 MGC DSP daughterboard (32 port)	N/A	4	TBC	TBD	TBD
NTDW64 MGC DSP daughterboard (64 port)	N/A	4	TBD	TBD	TBD
NTDK20 Small System Controller card	N/A	16	24.0	24.0	81.9
NTDK83 100BaseT daughterboard (dual-port)	N/A	6	9.0	9.0	30.7
NTDK99 100BaseT daughterboard (single-port)	N/A	4	6.0	6.0	20.5
NT5K02 Flexible Analog Line card	50	26	39.0	6.6	22.5
NT8D02 Digital Line card	100	26	39.0	13.0	44.4
NT8D03 Analog Line Card	50	26	39.0	6.6	22.5
NT8D09 Analog Message Waiting Line card	50	26	39.0	6.6	22.5
NT8D14 Universal Trunk card	DID-enabled	28	42.0	42.0	143.3
NT8D15 E&M Trunk card	N/A	29	43.5	43.5	148.4
NTAK09 1.5MByte DTI/PRI card	N/A	10	15.0	15.0	51.2
NTAK10 2.0 MByte DTI card	N/A	12	18.0	18.0	61.4
NTAK79 2.0 MByte PRI card	N/A	12	18.0	18.0	61.4
NTAK50 2.0 MByte PRI card	N/A	12	18.0	18.0	61.4
NTRB21 TMDI (1.5 Mbyte DTI/PRIi) card	N/A	12	18.0	18.0	61.4
NTVQ01 Media Card (32 port)	N/A	18	27.0	27.0	92.1
NTDW65 MC32S Media Card (32 port)	N/A	9	TBD	TBD	TBD

ATTENTION

The UPS power requirement is the card's power consumption divided by the efficiency factor for the Media Gateway power supply plus peak inrush. For Media Gateways use 1.5 times the wattage to give the UPS wattage, or volt-amps (VA).

Meets
specifications
Y / N

Power and grounding (continued)

13. Power from each outlet meets the input requirements of at least one CS 1000E power supply listed in the following tables (continued):

AC input requirements for each MG 1000E or MG 1000E Expander		y/n
(North America)		
Voltage	Recommended: 100-120 Volts Maximum limits: 90 and 132 Volts, single phase	
Frequency	50-60 Hz	
Power (I/P max)	300 VA maximum	
Outlet Type	120 Volts, 15 Amp supply	
(Europe and UK)		
Voltage	Recommended: 208/220 Volts Maximum limits: 180 and 250 Volts, single phase	
Frequency	50-60 Hz	
Power (I/P max)	300 VA maximum	
Outlet Type	208/240 Volts, 15 Amp supply	
Carried out in accordance with local power specifications.		
The supplied power is single-phase 240 or three-phase 208 Y and has a system ground conductor		
(Germany)		
Voltage	Recommended: 230 Volts Maximum limits: 180 and 250 Volts, single phase	
Frequency	50 Hz	
Power (I/P max)	300 VA maximum	
Fuse	16 A	
Outlet Type	Receptacles by DIN regulation	

Meets
specifications
Y / N

Power and grounding (continued)

14. Power from each outlet meets the input requirements of at least one CS 1000E power supply listed in the following tables (continued):

AC input requirements for each Signaling Server		y/n
(North America)		
Voltage	Recommended: 100-120 Volts Maximum limits: 90 and 132 Volts, single phase	
Frequency	50-60 Hz	
Power (I/P max)	200 VA maximum	
Outlet Type	120 Volts, 15 Amp supply	
(Europe and UK)		
Voltage	Recommended: 208/220 Volts Maximum limits: 180 and 250 Volts, single phase	
Frequency	50-60 Hz	
Power (I/P max)	200 VA maximum	
Outlet Type	208/240 Volts, 15 Amp supply	
Carried out in accordance with local power specifications.		
The supplied power is single-phase 240 or three-phase 208 Y, and has a system ground conductor.		
(Germany)		
Voltage	Recommended: 230 Volts Maximum limits: 180 and 250 Volts, single phase	
Frequency	50 Hz	
Power (I/P max)	200 VA maximum	
Fuse	16 A	
Outlet Type	Receptacles by DIN regulation	

Location of power outlets

NOTE: The maximum distance between a power outlet and the system equipment is met, in relation to the length of the power cord.

- In North America, the power cord is 9 ft, 10 in. (3000 mm).
- Outside North America, the power cord is 8 ft, 2 in. (2490 mm).

15. Observations or comments:

AC power and ground worksheet

AC service panel measurements

Note: If a portable UPS system is used, measurements are only taken on the input/output voltage and the neutral-ground voltage. Percent of load must also be notated.

Voltage measurements:	<u>AC</u>	<u>MIN -MAX</u>
Between neutral and phase A	_____ volts	105v 125v
Between neutral and phase B	_____ volts	105v 125v
Between neutral and phase C	_____ volts	105v 125v
Between ground and phase A	_____ volts	105v 125v
Between ground and phase B	_____ volts	105v 125v
Between ground and phase C	_____ volts	105v 125v
Between phase A and phase B	_____ volts	180v 250v
Between phase A and phase C	_____ volts	180v 250v
Between phase B and phase C	_____ volts	180v 250v
Between neutral and ground (ACEG)	_____ Vrms	0.0v 0.5Vrms
UPS percent of load:	_____	
UPS input voltage:	_____	
UPS output voltage:	_____	
Current Measurements:	<u>AC</u>	<u>MAX</u>
Neutral conductor amps	_____ amps	See Note 1
Ground conductor amps (IG or ACEG)	_____ amps	0.5 amps
Phase A amps	_____ amps	
Phase B amps	_____ amps	
Phase C amps	_____ amps	

Note 1: The neutral current must never exceed the current in any single-phase leg.
A licensed electrician must take AC service panel measurements.
Voltage and current values must comply with NTPs.

Voltage between neutral and ground can signify poor or loose connections or noncontinuous grounding.

Current flow in the grounding conductor can indicate that the neutral has been used for equipment grounding.

If currents are balanced in a three phase system and there is significant neutral current, then harmonics are present. Harmonics can deteriorate transformers over time by overheating their internal wiring.
Solution: Use transformers specifically designed for harmonic loading (k-factor-rated).

System power and ground connections

Meets
specifications
Y / N

1. The Signaling Server power cord is plugged into the AC outlet of the rack and the AC outlet of the rack is grounded to its dedicated electrical panel. [Major] _____
2. In a system with more than one MG 1000E powered by multiple service Panels, a #6 AWG (#40 Metric Wire Gauge) ground wire from the rear panel grounding lug of each MG 1000E is connected to an NTBK80 Ground Bar. The ground bar is connected to the Single Point Ground reference. [Major] _____
Note: In the UK, the ground wire from the CS 1000E equipment is connected to an NTBK80 Ground Bar or through a Krone Test Jack Frame. _____
3. The CS 1000E does not connect to a ground bar. It is properly grounded when: _____
 - The CS 1000E power cord is plugged into the rack's AC outlet. The rack's AC outlet is grounded to its dedicated electrical panel. [Preferred] _____
 - The CS 1000E power cord is plugged into a wall AC outlet. The CS 1000E is grounded outside of the rack through the safety grounding conductor in the power cord. This method only ensures proper grounding of the CS 1000E itself. It does not provide grounding protection for other rack-mounted pieces of equipment. Therefore, ensure that other devices in the rack are properly grounded as required. _____
4. If multiple pieces of equipment are installed in a rack, a separate connection is run from the grounding lug on each piece of equipment to the NTBK80 Ground Bar. [Major] _____
5. In an installation where a dedicated panel cannot provide optimal conditions, a load isolation transformer or load isolation transformer-based UPS/Line conditioner with the following characteristics is used: [Major] _____
 - 120/208/240 V AC input, over-current protected at primary _____
 - 120/208/240 V AC available at secondary outputs, each circuit breaker protected _____
 - primary and secondary windings are completely isolated from one another _____
 - the load isolation transformer or load isolation transformer-based UPS/Line conditioner is approved for use locally as a stand-alone user product (CSA, UL, or other locally recognized clear markings) _____
 - the load isolation transformer or load isolation transformer-based UPS/Line conditioner is capable of providing power to all CS 1000E components operating at the same time at full load _____

System power and ground connections (continued)

Meets
specifications
Y / N

- equipment unrelated to the CS 1000E is not powered from a transformer that provides service to the CS 1000E system
 - the load isolation transformer or load isolation transformer-based UPS/Line conditioner is electrostatically shielded to minimize ELF fields
6. Ground conductors are at least #6 AWG (16 mm²) at any point.
7. Ground conductors do not carry current under normal operating conditions.
8. Spliced conductors are not be used. (Continuous conductors have lower impedance and are more reliable.)
9. All conductors terminate in a permanent way. All terminations are easily visible and available for maintenance purposes.
10. Ground connections are tagged with a clear message such as “Critical Connection: Do Not Remove or Disconnect”.
11. The installation meets the specific grounding requirements for the area:
[Major]

Germany	#8 AWG (10 mm ²) green/yellow wire
North America; other areas in Europe	Not smaller than #6 AWG (16 mm ²) at any point
UK	Two green/yellow wires no thinner than two 10 mm ²

System power and ground connections (continued)

Meets
specifications
Y / N

12. A 120VAC non-switched receptacle is provided within 9 ft of the CS 1000E cabinets. It is strongly recommends that each Media Gateway and Media Gateway Expansion pair for 1000E systems are powered from one dedicated 120VAC, 15/20 amp branch circuit with individual hot, neutral, and AC equipment ground or isolated ground wires. **Installation does not exceed 80% of the maximum branch circuit or UPS load rating.** [Major]

Media Gateway

13. The NTBK80 ground bar is capable of grounding up to six Media Gateways (either with or without companion Media Gateway Expanders) back to the SPG. If there are more than six Media Gateways (either with or without companion Media Gateway Expanders), the NTDU6201 ground bar is used.
14. The NTDU6201 can be adjusted for various mounting configurations. It accepts 35 #6 AWG (16 mm²) wire connections. The ground bar terminates at the service panel ground.
15. All equipment located in a series of equipment racks that are physically bonded together are grounded to and powered by the same service panel.
16. If additional service panels are required, they are collocated beside the original service panel.
17. If racks are not bonded together, then the equipment located in the racks can be grounded and powered by separate service panels.
18. A #6 AWG (16 mm²) ground wire is connected from the rear panel grounding lug of each Media Gateway to the ground bar.
19. The ground bar is connected to a ground source in the dedicated service panel.
Note: In the UK, the ground wire is connected from the equipment to a ground bar or through a Krone Test Jack Frame.
20. The Media Gateway and Media Gateway Expander are considered as the same ground. To ground the Media Gateway Expander, the ground wire is jumpered from it to the grounded Media Gateway.
21. Multiple pieces of equipment installed in a rack are grounded with a separate connection from the grounding lug on each piece of equipment to the ground bar.
22. If a piece of equipment in a rack does not have a grounding lug, the rack is grounded to the ground bar.
23. For all CS 1000E system ground paths, route the correct size of insulated copper conductors is routed inside conduit.
24. Each Media Gateway and Media Gateway Expander pair is powered from the same service panel.

System power and ground connections (continued)

Meets
specifications
Y / N

25. A dedicated electrical panel that is connected to the facility's electrical system is used to power the system and this panel provides power only to the CS 1000E system components and related telecommunications hardware such as TTYs and printers. [Recommended].
26. A system ground conductor, sized at a minimum of a #6 AWG stranded, insulated wire is installed from the cabinet ground bus to the ACEG bus in the AC panel. Where UPS systems are employed, a #6 AWG wire can be installed from the cabinet ground bus to the grounded metallic case of the UPS using a ground lug. [Critical if missing; Major if undersized].
27. A #6 AWG insulated, stranded conductor is installed between each CS 1000E cabinet ground lug and the cabinet ground bus. [Major]
28. All grounding conductors are clearly identified and labeled. [Minor]
29. No telecommunications ground bus of the CS 1000E is connected to untested horizontal structural steel, water pipes, or other unreliable ground paths. [Major]
30. The cabinet ground bus is mounted near the CS 1000E cabinets. [Major]

UPS requirements

31. Cabinets are grounded to the same AC service panel or UPS that provides input power to the PBX system. [Major]
32. All UPS systems must have a ground lug (to accommodate a minimum of #6AWG wire) or ground bus installed and bonded to the UPS metallic enclosure to allow connections to the PBX system ground bus and the AC panel ACEG bus.
Note: If the UPS system is equipped with an isolation transformer, the ground lug or bus must be wired from the center tap (X0) of the transformer (The ground lug or bus allows a parallel connection to the CS 1000E single-point ground source in case the UPS power cord is unplugged). [Major]
33. #6 AWG grounding conductors are installed from the UPS ground bus or lug to the CS1000E cabinet ground bus and the ACEG bus in the AC service panel. See items #3 and #10 above. [Major]
34. CSUs (Channel Service Units) are connected to reserve power (UPS) or are span powered. [Major]
35. Equipment unrelated to the CS1000E system in any way is not powered from the same 120 VAC receptacles or UPS system as the PBX. [Major]
36. In isolated ground environments, other equipment, equipment racks, or metallic conduit do not come in contact with the CS1000E equipment rack. [Major]
37. The earth source, which the CS1000E system connects to through the AC service panel, has a resistance of 5 ohms or less. [Major]

System power and ground connections (continued)

Meets
specifications
Y / N

- | | | |
|-----|---|-------|
| 38. | Ground conductors are insulated, permanent, and continuous (not spliced). [Major] | _____ |
| 39. | All terminations are easily visible and accessible for maintenance purposes. [Major] | _____ |
| 40. | The dedicated service panel feeds only the CS 1000E and is located as close to the system as possible. | _____ |
| 41. | Each vertical power bar on the 19-inch rack has its own power feed. | _____ |
| 42. | The system ground conductor is insulated, and the same size as the largest conductor and runs between the Main Service Panel (MSP) and the CS1000E panel. | _____ |
| 43. | Ground conductors are not smaller than #6 AWG. | _____ |
| 44. | Electrical layout is reflective of a typical ANSI/EIA/TIA607 installation with TMGB and TGB ground blocks. | _____ |
| 45. | If installation is not at a ANSI/EIA/TIA607 site then a wire is connected from system ground bar to AC Ground at the Service panel. | _____ |
| 46. | Ground and Neutral bonding occur at either the transformer or at the first disconnect (Main Service Panel). | _____ |
| 47. | The resistance between the ground post of any equipment and the single-point ground to which it connects is less than 0.25 ohms for an installed Call Server, MG 1000E, MG 1000E Expander, or Signaling Server.
[Major] | _____ |
| 48. | The installation uses one of the following bus bars as a system SPG:
[Major] | _____ |
| | <ul style="list-style-type: none"> • building principal ground, normally in a building with one floor • floor ground bar, normally in buildings with more than one floor • dedicated TMGB/TGB bonded to the building grounding system • ACEG bus located inside the PBX service panel | _____ |

System power and ground connections (continued)

Meets
specifications
Y / N

Other items

49. QUA6 Power Failure Transfer Units (PFTU) are available to transfer trunk lines during a power or system failure. [Recommendation]

Note: The appropriate AC power cord kit is used for the installation as listed in the following table. (These cords connect a CS 1000E system to a commercial AC power source.)

Country / Region	AC Power Cord	Voltage Rating	Current Rating	Plug Type
North America	A0379412	250 V	10 A	NEMA 6-15P
Argentina	A0814961	250 V	10 A	IRAM 2073
North America	NTTK14	125 V	13 A	NEMA 5-15P
Australia/ New Zealand	NTTK15	250 V	10 A	AS3112
Europe	NTTK16	250 V	10 A	CEE(7)VII
Switzerland	NTTK17	250 V	10 A	SEV 1011
UK/Ireland	NTTK18	250 V	10 A	BS1363
Denmark	NTTK22	250 V	10 A	AFSNIT

Cabinet installation

For additional information refer to:

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

- | | Meets
specifications
Y / N |
|---|----------------------------------|
| 1. Circuit cards are of allowable vintage (no outstanding Product Advisories or Bulletins). [Major] | _____ |
| 2. Circuit cards are locked into place. [Minor] | _____ |
| 3. All MDF/IDF blocks are clearly labeled. [Major] | _____ |
| 4. PBX cabling is not strapped to the exterior of any conduit or raceway as a means of support. [Major] | _____ |
| 5. MICB cards, where installed, use cards slots 1, 2, 3 in Media Gateways and slots 7, 8, 9 in Media Gateway Expanders only. [Major] | _____ |
| 6. M2250 consoles utilize 5 consecutive units and are properly cross-wired with three power TNs. The AUX cable can be utilized to take the place of two power TNs only. See console cable wh/sl, rd/or, & rd/grn pairs. [Major] | _____ |

Application tapes and messaging system tape cartridges

- | | |
|---|-------|
| 7. Media is not subject to rapid changes in temperature or humidity. [Major] | _____ |
| 8. Media is kept away from strong magnetic fields. [Major] | _____ |
| 9. Database backups are routinely performed and are readily available. [Major] | _____ |
| 10. System installation CDs, PC cards are available for the PBX and Applications products in the event of severe system hardware malfunction or data corruption. [Critical] | _____ |
| 11. Observations or comments: | _____ |

Cabling installation

For additional information refer to:

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

Meets
specifications
Y / N

Outside plant cabling and protectors

1. Entrance cable sheath is grounded as close as possible at the point of entry to an approved ground source. [Major] (NEC 800-33; 40)
2. Splice cases are properly grounded. [Major]
3. Approved protection devices are used for Telco network and campus cables. (Carbon, Gas tube type for network cables; fast-acting, low let-through type on campus cables). (NEC 800) [Major]
For further details, see Nortel Product Bulletin 97040 (April) revision 1 relating to protection.
4. Protection devices are installed at both ends of a cable in a campus environment. (Silicon Avalanche type. see Oneac 5SDP; 5SAP) [Major] ANSI/UL 497-1995 Specs -10V for digital telephones; 48VDC for analog telephones. **For further details, see Nortel Product Bulletin 97040 (April) revision 1.**
5. All protection device grounding conductors are grounded to an approved source with an appropriately sized wire. The grounding conductors must be kept as short and straight as possible. (No sharp bends- 8 radius) (NEC 800-40) [Major]

Cabinet cabling

6. Cabling must be installed in a neat and orderly fashion. [Major]
7. MDF cables are seated and secured in place using factory velcro straps. [Major]
8. All cables for cabinets, Call Servers, Media Gateways/Expanders, Signaling Servers (SDI, AUX, VGMC ELAN/TLAN, CE-MUX, DS-30X, and 10/100BaseT cables) and adapters are properly fastened. [Major]
9. Power wiring must not be installed in a parallel fashion with CAT5 cabling. Installing power wires perpendicular to CAT5 cables is preferred and minimizes effects from EMI or ELF fields. [Major]
10. EMI mitigating ferrite rings (NTVQ83AA) are installed on Voice Gateway Media Card TLAN/ELAN patch cables. [Major]
11. NTCW84JA assemblies are used for each VGMC connector. [Major]
12. CAT5 patch cables are not installed near fluorescent lighting fixtures. [Major]
13. ELAN/TLAN patch cables for VGMC and Signaling Server hardware are factory made and kept at 20 cable feet or less. [Recommendation]
14. All patch cables are labeled and correlate to a network infrastructure diagram or schematic. [Minor]

Cabling installation (continued)

Meets
specifications
Y / N

Cross-connect terminal requirements

15. To allow for future expansion and equipment changes at the cross-connect terminal, the cross-connect terminal has enough space for connecting blocks to terminate four 25-pair cables from each Media Gateway and for each Media Gateway Expander. [Recommendation]
16. When Ethernet connections are used instead of traditional cabling, the Media Card Input/Output adapter is used:
- for the 1.5 Mbit DTI/PRI circuit card NTRB21, NTBK04 cable is used
 - for the 2.0 Mbit DTI circuit card NTAK10, 2.0 Mbit PRI circuit card NTAK79, and 2.0 Mbit PRI circuit card NTBK50, NTBK05 cable is used
 - each IPE card slot equipped with a Line or Trunk card uses a 25-pair cable from the host Media Gateway or Media Gateway Expander
 - four conductors for the AUX cable run from the Media Gateway.
 - one 25-pair cable runs from each Power Fail Transfer Unit (PFTU) QUA6
 - wiring is in place from telephones and trunks.
17. In the UK:
If the Krone Test Jack Frame is used, only authorized personnel are allowed access the Krone Test Jack Frame and it is installed in a locked room or in an environment that prevents free access to the equipment. For additional information about the cross-connect terminals, see *Communication Server 1000E: Installation and Configuration* (NN43041-310). [Major]
18. Observations or comments:

System operation

For additional information refer to:

X11 Software General Release Bulletin (shipped with new software)

Meets
specifications
Y / N

System diagnostics

- | | | |
|-----|--|-------|
| 1. | LD 30 Network and Signaling Diagnostic (NWS). [Minor] | _____ |
| 2. | LD 34 Tone and Digit Switch and Digitone Receiver (TDS). Check results from the midnight routines. [Major] | _____ |
| 3. | LD 37 Input/Output Diagnostic (IOD). Use STAT command for TTYs. [Major] | _____ |
| 4. | LD 38 Conference Circuit Diagnostic (CNF). Check results from the midnight routines. [Major] | _____ |
| 5. | LD 43 Data Dump (EDD). Check for successful completion of a manual data dump. [Critical] | _____ |
| 6. | LD 44 Software Audit (AUD). Must be configured in BKGD of Ld-17. Check for normal AUD000 messages. [Major] | _____ |
| 7. | LD 48 Status of ELAN and Mail/ESDI Links. Make sure all AMLs that are in use are Active Empty. [Major] | _____ |
| 8. | LD 60 Digital Trunk Diagnostic (DTI/PRI). Use the SSCK command to check system clocks. Locked on to IP daughterboard #1. Also check midnight routines for frame slips, CRC errors. [Major] | _____ |
| 9. | LD 117 STAT HOST | _____ |
| 10. | LD 137 ELNK STAT ELNK command | _____ |
| 11. | GTR, NTPs, and Backup logs are located in switch room. Note: Ensure appropriate level and system type of NTPs are available. [Minor] | _____ |
| 12. | The PBX maintenance modem and terminal server performs as expected. [Major] | _____ |
| 13. | A terminal server or SEB modem is configured as to allow Telnet access to the system. [Recommendation] | _____ |
| 14. | The system is equipped with a working maintenance terminal and printer. [Major] | _____ |
| 15. | A PC is available on location in order to access Element Manager and NRS [Major] | _____ |
| 16. | Minimum level PEPs are installed in the system. This includes DepList PEPs for the Call Servers, required PEPs for Signaling Servers, and Voice Gateway Media Card PEPs. [Recommendation] | _____ |
| 17. | IP telephones are on the latest recommended firmware. [Recommendation] | _____ |
| 18. | Signaling Servers are load sharing (equal number of registered IP phones) [Recommendation] | _____ |
| 19. | Printouts of Signaling Server config.ini and bootp.tab files are readily available. pdt> cd /u/config, copy config.ini, copy bootp.tab [Minor] | _____ |

Meets
specifications
Y / N

System operation (continued)

Memory size

20. The installation meets the minimum memory requirements for CS 1000 Release 5.5 software.

Processor	Flash memory required	DRAM memory required	Total memory
Call Server (CP PII)	N/A	256 MByte	256 MByte
Call Server (CP PIV)	N/A	512 MByte	512 MByte
Call Server (CP PM)	N/A	1 GByte	1GByte
MG 1000E (MGC)	4 MB ?	144 (128 MB of CSP SDRAM + 16 MB of MSP SDRAM) ?	?
MG 1000E (SSC)	64 MByte	32 MByte	96 MByte
CP PIV and CP PM Call Servers can be upgraded to a maximum of 2 GByte DRAM memory			

21. The installation does not exceed the maximum call register count recommended for CS 1000E Release 5.5 software.

System	Recommended call register count	Memory required (SL-1 words)	Memory required (MByte)
CS 1000E (CP PII)	25 000	6 057 000	23.174
CS 1000E (CP PIV and CP PM)	35 000	8 505 000	32.444
Note: Call registers are 243 SL-1 words long. One SL-1 word is 4 bytes.			

22. Observations or comments:

System software

Meets
specifications
Y / N

Overlay 15/21 Customer data block

1. SRCD (Auto Set Relocation Code) has a value programmed. [Major if SPRE is 1, Minor if other]

Overlay 17/22 configuration record

2. Daily Routine defined as LD 34, 38, 60,137. [Major]
3. LD 44 in background routine. [Major]
4. The number of call registers (NCR) within the maximum value required by GRB documentation regarding port size and features used.
1000M- 800 call registers [Major]
5. 1000M LPIB and HPIB values equal 450. [Recommendation]
6. History file is defined as MTC, BUG and is set at minimum length of 60 000 characters. [Major]
7. ERRM is configured as ERR, BUG, AUD. [Major]
8. RLS IDs are configured for each D-Channel where appropriate. [Major]

Overlay 11/12/13 digital telephones, attendant consoles, and digitone receivers

9. Switchroom phone requires MTA for class of service. [Major]
10. Consoles powered through unused TNs are correctly programmed PWR. [Major]
11. Consoles are cross-wired properly and must utilize consecutive units. [Major]
12. Observations or comments:

Networking parameters for VoIP

Meets
specifications
Y / N

1. A LAN or WAN assessment has been performed on the customer network. [Critical] _____
2. The layer 2 switch ports (Baystack 470) are in place for the CS 1000E ELAN/TLAN are configured for full duplex, autonegotiate. [Major] _____
3. The layer 3 switch ports are in place for the ...[new speed? 100 or 1 gig?] [Major] _____
4. The port speed for ELAN related ports are configured at 10 Mb/s for CS 1000E systems. [Major] _____
5. The ELAN subnet and the TLAN subnet are on separate subnets. [Major] _____
6. All applications on the ELAN subnet are on the same subnet. [Major] _____
7. The port speed for all TLAN ports on the layer 2 switch are configured for 100 Mb/s [Major] _____
8. VGMC circuit cards in the same node are on the same TLAN subnet. [Major] _____
9. Minimum of one DSP resource for every TDM port (T-1 trunks, digital phones, analog phones, analog trunks, CallPilot channels). For non-blocking requirements one DSP per TDM port is a best practice. [Recommendation] _____
10. Layer 2 switches derive UPS power from different branch circuit sources, if possible, in order to minimize single-points of failure. [Recommendation] _____
11. Layer 3 switches derive UPS power from different branch circuit sources, if possible, in order to minimize single-points of failure. [Recommendation] _____
12. Observations or comments: _____



Communication Server 1000E
System Evaluation
Conversion from CS 1000M Cabinet

for

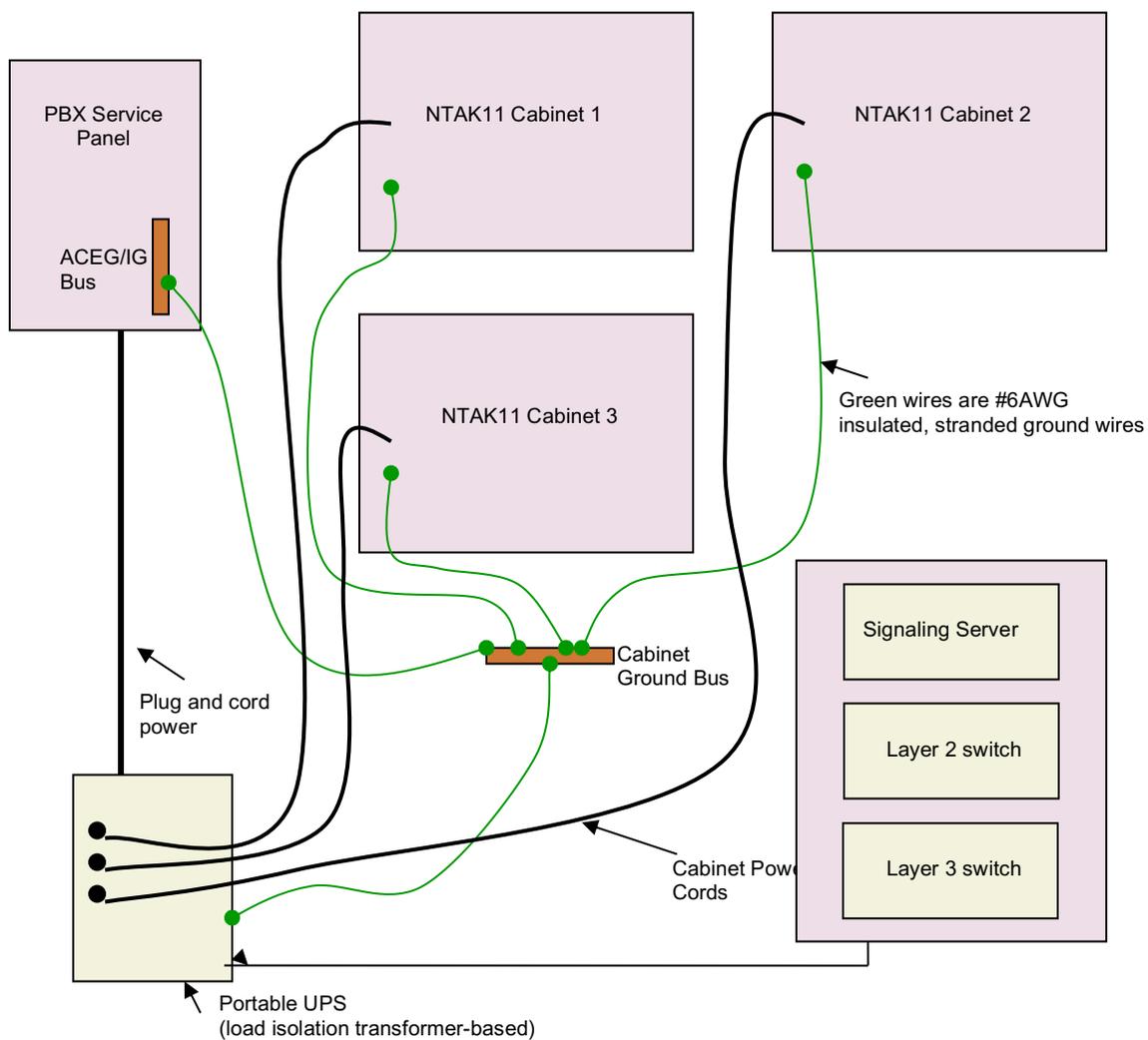
Summary: A system evaluation of the _____ (Customer) Communication Server 1000E (Conversion from CS 1000M cabinet) solution in _____ (City) was requested by _____ (Name) of _____ (Company). The evaluation was performed on _____ (Date). The nature of the evaluation was to determine if the Communication Server 1000E (Conversion from CS 1000M cabinet) was installed following Nortel manufacturing specifications and Product Bulletin requirements.

Distribution:

Evaluated by:

Date:

CS 1000E Conversion from CS 1000M Cabinet Sample site layout



Findings and recommendations

Introduction:

The evaluation of this Nortel CS 1000E (Conversion of CS 1000M Cabinet) system, located

_____ was requested by _____. The request was initiated because

_____.
 The evaluation was performed on (date) _____ and covered the areas of Equipment Room Environment, Maintenance and Technician Area Environment, Power and Grounding, System Power and Ground Connections, Power and Grounding for Systems with DC Power, Battery Installation, Cabinet Installation, Cabling Installation, System Operation, System Software, and Network Parameters for VoIP. _____ (name of company representative) was the main contact person during the evaluation process. All questions that pertain to this report can be directed to _____.

Discrepancies and recommendations:

Equipment room environment

Item #:	
Findings:	
Recommendation:	

Maintenance and technician area environment

Item #:	
Findings:	
Recommendation:	

Power and grounding

Item #:	
Findings:	
Recommendation:	

System power and ground connections

Item #:	
Findings:	
Recommendation:	

Power and grounding for systems with dc power

Item #:	
Findings:	
Recommendation:	

Battery installation

Item #:	
Findings:	
Recommendation:	

Cabinet installation

Item #:	
Findings:	
Recommendation:	

Cabling installation

Item #:	
Findings:	
Recommendation:	

System operation

Item #:	
Findings:	
Recommendation:	

System software

Item #:	
Findings:	
Recommendation:	

Network parameters for VoIP

Item #:	
Findings:	
Recommendation:	

Conclusion:

Note: This report is based on checklist items contained in this document. The checklist item under each subheading is answered with a Y or N, signifying that it either complies or does not comply with Nortel specifications. An N/A means that the checklist question does not apply in this instance. The specifications are based on Nortel Practices, Product Bulletins, Product Advisories, and General Release Bulletins. Each checklist item is given a weight. The item can be deemed as Critical, Major, Minor, or Recommended in nature. A system evaluation is found to be noncompliant if one Critical or two Major discrepancies are identified. Checklist weighting is not given to questions about applications products. The aim of an evaluation is to ensure installation completeness, optimize system performance and reliability, and provide a safe environment for personnel.

Further comments:

Checklist

System and site requirements

Equipment room environment

For additional information refer to:

-NTP NN43041-220 *Communication Server 1000E: Planning and Engineering*

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

Meets
specifications
Y / N

1.
 - If cabinets are mounted side-by-side, temperature is maintained between 0° and 45°C (32° and 113°F) and does not deviate any more than 5°F within a 24-hour period. A temperature of 22°C (72°F) is recommended.
 - If cabinets are mounted one above the other, temperature is maintained between 0° and 35°C (32° and 95°F) and does not deviate any more than 5°F within a 24 hour period. Nortel recommends a temperature of 22°C (72°F).
Temperature: _____ ° (Indicate C or F) [Major]
2. Humidity is between 5% and 95% noncondensing. Humidity _____ %
[Major, Critical if more than 95% or less than 5%]
3. Environment does not show any visible signs of moisture. [Critical]
4. Ventilating openings on equipment are free of obstructions. [Major]
5. The room is clean, relatively dust-free, and well ventilated.
[Minor, Major if concrete dust]
6. Floor is sealed concrete, vinyl, raised floor (no dust or moisture) [Major]
7. Equipment is located at least 12 ft (3660 mm) away from sources of electrostatic, electromagnetic, or radio frequency interference, such as power tools, appliances (such as vacuum cleaners), office business machines (such as copying machines), all electric motors, and electrical transformers. [FCC CFR 47 Part 15 for Class A devices. (<20 milliGauss ELF) [Major]
8. Equipment is not located under liquid-carrying pipes. [Major]
9. Equipment room is not conducive to generating electrostatic discharge (ESD). [Major]
10. Antistatic wrist straps, sprays, mats or a combination of these are in evidence on-site. [Recommendation]
11. Equipment is not exposed to excessive vibration. [Major]
12. Switch room door has a lock installed. [Minor]
13. No tripping or safety hazards exist in the equipment room. [Major]
14. Lighting illumination is 50 to 75-ft candles measured 76 cm (30 in.) above the equipment room floor. [Recommendation]

Equipment room environment (continued)

Meets
specifications
Y / N

- | | | |
|--|---|-------|
| 15. | Equipment room is protected from receiving direct sunlight. Direct sunlight is prevented from shining on electronic hardware, especially disk drives. [Major] | _____ |
| 16. | Adequate floor space has been made available to install equipment racks, patch panels, power systems (UPS), and so on [Major] | _____ |
| 17. | RS-232 terminal and communications devices must not exceed the 50-ft cable length limit unless line drivers are utilized. [Major] | _____ |
| 18. | The storage room for spare parts is secure. [Recommendation] | _____ |
| 19. | If it is not possible that the site maintain the environment of the storage area exactly the same as the environment of the operating equipment, stored materials are allowed time to adjust to the equipment room environment before using them. [Major] | _____ |
| 20. | The storage area is dust-free and away from high humidity and machinery such as electric motors of transformers. [Major] | _____ |
| 21. | Cross-connect terminal or other equipment that can cause debris to fall into the ventilation slots of the system is not located above the cabinet. [Critical] | _____ |
| 22. | Circuit cards that are not in use are stored in a protective antistatic bag. The storage area is dust-free and away from high humidity and machinery such as electric motors or transformers. [Major] | _____ |
| 23. | Cabinet covers are installed. [Major] | _____ |
| Maintenance and technician area environment | | |
| 24. | A locking cabinet or storage area is in place for backup disks. [Recommendation] | _____ |
| 25. | The area contains a table or desk terminal, printer, or equivalent device. [Recommendation] | _____ |
| 26. | Maintenance workstation is equipped with a/an: [Major] | _____ |
| | <ul style="list-style-type: none"> • a dial-up modem or network connection; • a Web browser; • an operational maintenance telephone. | _____ |
| 27. | Observations or comments: | _____ |

Power and grounding

For additional information refer to:

-NTP 43041-310 *Communication Server 1000E: Installation and Commissioning*

-National Electrical Code (NEC) Article 110, 210, 250

Meets
specifications
Y / N

CS 1000E (Conversion from CS 1000M Cabinet System) AC service panel

1. In the AC-powered version of the cabinet system, a dedicated AC service panel is used. Equipment that is not related to the PBX system is not connected to this panel. All electrical devices such as lighting, fans, motors, and air conditioning equipment are not contained in the PBX dedicated AC service panel.
2. If other data communications equipment is in the same rack or equipment cabinet as the PBX, each piece of equipment is powered from a grounded receptacle. The same service panel services all receptacles.
3. The AC supply conductors are dedicated and uninterrupted from the building primary source or transformer to the PBX main AC service panel. (This does not apply to subpanels). [Major]
4. Verify that an Isolated Ground (IG) or ACEG conductor is installed from MGN/ X0 to an IG or ACEG bus in the AC panel serving the PBX equipment room. This point becomes the single-point ground reference for the PBX.

Note: In some cases an AC panel is not a requirement. Various UPS systems will establish the same intent and purpose as the panel IG/ACEG bus. The engineer performing the evaluation must research the application and determine its intent. [Critical]

5. The IG/ACEG conductor is sized according to code. (NEC 250).
Note: Nortel recommends that the ACEG conductor be the same size as the largest phase conductor. [Major]
6. The IG/ACEG conductor runs in the same raceway (conduit) as the phase and neutral conductors (NEC 250). [Major]
7. The IG/ACEG conductor is insulated, permanent, and continuous (no splices).
(NEC 250) [Major]
8. Circuit breakers are identified and labeled at the AC service panel. (NEC 110-22) [Minor]
9. Ensure that all voltage and current levels recorded are within the defined limits. [Critical]
Note: A licensed Electrician must obtain these results. For more information on voltage and current levels, see the AC Power and ground worksheet.
10. The workspace clearance around the AC service panel is 3 ft. (NEC 110-26) [Major]

Meets
specifications
Y / N

Power and grounding (continued)

11. All RS-232 ancillary devices connected to the system I/O circuit cards must be wired from the same AC panel as the PBX power supplies, with individual hot, neutral, and isolated/ACEG ground wires.

Note: Protection devices such as electro-optical isolators must be installed for all RS-232 devices (terminal, modem, and so on) not served from the same AC service panel as the CS 1000E system.

[Critical]

12. Power from each receptacle meets the input requirements of the cabinet system power supply listed in the following table:

AC input requirements for each NTDK70 cabinet power supply		Y/N
Voltage	Maximum-rated input voltage 100-240 Volts RMS, single phase	
Frequency	50-60 Hz	
Power (I/P max)	750 VA minimum	
Receptacle Type	NEMA 5-15R for 120 Volt, 15 Amp supply NEMA 6-15R for 208/240 Volt, 15 Amp supply	

Location of power receptacles

NOTE: The maximum distance between a power receptacle and the system cabinet is met in relation to the length of the power cord.

- In North America, the power cord is 9 ft, 10 in. (3000 mm).
- Outside North America, the power cord is 8 ft, 2 in. (2490 mm).

13. Observations or comments:

AC Power and ground worksheet

AC service panel measurements

Note: If a portable UPS system is used, measurements are only taken on the input and output voltage and the neutral-ground voltage. Percent of load must also be noted.

Voltage measurements:	<u>AC</u>	<u>MIN -MAX</u>
Between neutral and phase A	_____ volts	105v 125v
Between neutral and phase B	_____ volts	105v 125v
Between neutral and phase C	_____ volts	105v 125v
Between ground and phase A	_____ volts	105v 125v
Between ground and phase B	_____ volts	105v 125v
Between ground and phase C	_____ volts	105v 125v
Between phase A and phase B	_____ volts	180v 250v
Between phase A and phase C	_____ volts	180v 250v
Between phase B and phase C	_____ volts	180v 250v
Between neutral and ground (ACEG)	_____ Vrms	0.0v 0.5Vrms
UPS percent of load:	_____	
UPS input voltage:	_____	
UPS output voltage:	_____	
Current measurements:	<u>AC</u>	<u>MAX</u>
Neutral conductor amps	_____ amps	See Note 1
Ground conductor amps (IG or ACEG)	_____ amps	0.5 amps
Phase A amps	_____ amps	
Phase B amps	_____ amps	
Phase C amps	_____ amps	

Note 1: The neutral current must never exceed the current in any single-phase leg. A licensed electrician must take AC service panel measurements. Voltage and current values must comply with NTPs.

Voltage between neutral and ground can signify poor or loose connections or noncontinuous grounding.

Current flow in the grounding conductor can indicate that the neutral has been used for equipment grounding.

If currents are balanced in a three-phase system and there is significant neutral current, harmonics are present. Harmonics can deteriorate transformers over time by overheating their internal wiring. Solution: Use transformers specifically designed for harmonic loading (k-factor-rated).

System power and ground connections

For additional information refer to:

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

-*National Electrical Code (NEC) Article 250*

Meets
specifications
Y / N

1. The Signaling Server power cord is plugged into the AC receptacle of the rack and AC receptacle of the rack is grounded to its dedicated electrical panel. [Major] _____
2. In an installation where a dedicated panel cannot provide optimal conditions, a load isolation transformer or load isolation transformer-based UPS or Line conditioner with the following characteristics is used: [Major] _____
 - 120/208/240 V AC input, over-current protected at primary _____
 - 120/208/240 V AC available at secondary outputs, each circuit breaker protected _____
 - primary and secondary windings are completely isolated from one another _____
 - the load isolation transformer or load isolation transformer-based UPS or Line conditioner is approved for use locally as a stand-alone user product (CSA, UL, or other locally recognized clear markings) _____
 - the load isolation transformer or load isolation transformer-based UPS or Line conditioner is capable of providing power to all CS 1000E components operating at the same time at full load _____
 - it is electrostatically shielded to minimize ELF fields _____
3. The method of grounding used for NCS 1000E depends on whether the same service panel powers all cabinets. This installation uses one of the following grounding scenarios: _____

Cabinet system with one or more cabinets powered by the same service panel:

For each system cabinet, a #6 AWG (#40 Metric Wire Gauge) ground wire is connected from the cabinet to the NTBK80 grounding block. The grounding block is connected to a ground source (the ground bus in the AC power service panel). _____

Cabinet system with more than one cabinet, powered by different service panels:

For each cabinet, a #6 AWG (#40 Metric Wire Gauge) ground wire is connected from the cabinet to the NTBK80 grounding block. If any cabinet cannot be powered from the same service panel, it is ground separately from the other cabinet back to the service panel that supplies it. _____

Note 1: A separately grounded cabinet is grounded the same as a single-cabinet system.

Note 2: In the UK, you can connect the grounding wire from the cabinet to an NTBK80 grounding block or through a Krone Test Jack Frame. _____

System power and ground connections (continued)

Meets
specifications
Y / N

4. **Grounding multiple pieces of equipment in a rack/equipment Cabinet:**
Each piece of equipment in a rack or equipment cabinet is grounded. If a piece of equipment does not have a ground lug, the whole rack or equipment cabinet is grounded.

5. The installation meets the specific grounding requirements for the area:
[Major]

Germany	#8 AWG (10 mm ²) green/yellow wire
North America; other areas in Europe	Not smaller than #6 AWG (16 mm ²) at any point
UK	Two green/yellow wires no thinner than two 10 mm ²

6. A system ground conductor, sized at a minimum of a #6 AWG stranded, insulated wire is installed from the cabinet ground bus to the ACEG bus in the AC panel. Where UPS systems are employed, a #6 AWG wire can be installed from the cabinet ground bus to the grounded metallic case of the UPS using a ground lug. [Critical if missing; Major if undersized].
7. A #6 AWG insulated, stranded conductor is installed between each CS 1000E ground lug and the cabinet ground bus. [Major]
8. All grounding conductors are clearly identified and labeled. [Minor]
9. Ground connections are tagged with a clear message such as “Critical Connection: Do Not Remove or Disconnect”. [Minor]
10. No telecommunications ground bus of the CS 1000E is connected to untested horizontal structural steel, water pipes, or other unreliable ground paths. [Major]
Note: The SPG conductor from the NCS 1000E System is not connected to structural steel members or electrical conduit. This conductor is not tied to a ground source or grounded electrode that is not hard-wired to the building reference conductor.
11. The cabinet ground bus is mounted near the CS 1000Es. [Major]
12. CSUs (Channel Service Units) are connected to reserve power (UPS) or are span powered. [Major]
13. Ground conductors are insulated, permanent, and continuous (not spliced). [Major]
14. All terminations are easily visible and accessible for maintenance purposes. [Major]

System power and ground connections (continued)

Meets
specifications
Y / N

- | | | |
|-----|---|-------|
| 15. | The impedance of the link between the ground post of the system cabinets and the SPG to which they are connected is less than 0.25 ohms. | _____ |
| 16. | For systems equipped with expansion cabinets, a separate receptacle for each cabinet is provided. Each receptacle is powered from separate branch circuits in the same service panel. | _____ |
| 17. | If installed on the wall, receptacles are installed within reach of the chassis or cabinet power cords. | _____ |
| 18. | The ground prong of each receptacle is connected by an insulated conductor to the system SPG. | _____ |
| 19. | If the transformer does not have an isolated secondary ground lug, the chassis ground lug of the transformer is used as the SPG. | _____ |
| 20. | If the transformer does not have a pluggable cord, the transformer is hardwired to an electrical panel. All wires (including grounds) are routed through a single conduit. | _____ |
| 21. | All ground wires are run through the same conduit as the phase conductors that serve the equipment. | _____ |

Ancillary equipment power

- | | | |
|-----|---|-------|
| 22. | Power for the ancillary equipment in the switch room is: <ul style="list-style-type: none"> • powered from the same panel or transformer as the PBX • grounded to the same panel or transformer as the PBX • labeled at the panel to prevent interruption that is not authorized • not controlled by a switch between the breaker and the equipment | _____ |
| 23. | Service receptacles for AC-powered PBX System and related equipment are: <ul style="list-style-type: none"> • rated for 120 or 240 V, 15 or 20A, 50-60 Hz, 3-pole, 3-wire, grounded • grounded to the same location so as to form a SPG | _____ |

System power and ground connections (continued)

Meets
specifications
Y / N

Other items

24. QUA6 Power Failure Transfer Units (PFTU) are available to transfer trunk lines during a power or system failure. [Recommendation]

Note: The appropriate AC power cord kit is used for the installation as listed in the following table. (These cords connect a CS 1000M System Cabinet to a commercial AC power source.)

Country or region	AC power cord	Voltage rating	Current rating	Plug type
North America	A0379412	250 V	10 A	NEMA 6-15P
Argentina	A0814961	250 V	10 A	IRAM 2073
North America	NTTK14	125 V	13 A	NEMA 5-15P
Australia and New Zealand	NTTK15	250 V	10 A	AS3112
Europe	NTTK16	250 V	10 A	CEE(7)VII
Switzerland	NTTK17	250 V	10 A	SEV 1011
UK and Ireland	NTTK18	250 V	10 A	BS1363
Denmark	NTTK22	250 V	10 A	AFSNIT

25. Observations or comments:

Power and grounding for systems with DC power

For additional information refer to:

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

-*National Electrical Code (NEC) Article 300*

Meets
specifications
Y / N

1. Each cabinet in a CS 1000E system powered solely from a DC source is equipped with an NTDK72 DC power supply and an NTAK28 Junction Box.
2. The input terminals of the NTAK28 Junction Box are connected to a clean DC power source meeting the requirements shown in the following table. [Major]

DC power requirements for each NTDK72 DC power supply

	Minimum	Nominal	Maximum
Input Range	-44 V DC	-52 V DC	-54 V DC
Noise (CMESS)	—	—	25 dBrc
Current	—	—	12 Amps
AC Ripple	—	—	100 mv RMS

3. The minimum size of the conductors between the DC source and the Junction Box meets the requirement outlined in the following table. [Major]

Recommended wire size

Size (AWG)	Size (Metric)
6	#40
8	#35
10	#25

N4.TAK75 and NTAK76 battery unit installation

5. The battery units are installed within 3 ft (0.9m) of the equipment cabinet. [Recommendation]
6. The battery units are installed in an open, well-ventilated area.
7. The recommended ambient room temperature where batteries are installed must be no more the 77°F (25°C).
8. The boxes are properly secured to the mounting surface and the box covers are secure. [Major]

Power and grounding for systems with DC power (continued)

Meets
specifications
Y / N

- | | | |
|-----|--|-------|
| 9. | The battery box wires and harness terminations are secure. [Major] | _____ |
| 10. | The dates on all battery cells match. [Recommendation] | _____ |
| 11. | The NTAK75 and NTAK76 breakers are in the ON position and both green LEDs light, indicating the batteries are properly installed. [Major] | _____ |
| 12. | The NTAK76 battery packs are connected in series, with white jumper wires between the + (red) terminal of one battery pack connected to the - (black) terminal of the next battery pack. The remaining red and black jumper cables are connected to red and black terminals of the first and fourth battery pack. The jumper cable is connected to the NTAK76 breaker panel, marked J1.
Note: The red positive (+) wire connects to the red (+) post of battery 1. The black negative (-) wire connects to the black post (-) of battery 4. All connections are secured. | _____ |
| 13. | Battery conductors connected between the batteries and the associated power plant are correctly sized. [Critical] | _____ |
| 14. | Battery cells are floated at the manufacturer's recommended voltage. (13.5 to 13.8 for 12VDC cells; 11.25 to 11.5 for 10VDC cells) [Major] | _____ |
| 15. | Battery cells do not exhibit signs of corrosion. [Major] | _____ |
| 16. | Observations or comments: | _____ |

Battery installation worksheet

Manufacturer: _____ Number of cells per string: _____

Type: _____ Total string voltage: _____

Cell voltages

String A	String B	String C	String D
1 _____	1 _____	1 _____	1 _____
2 _____	2 _____	2 _____	2 _____
3 _____	3 _____	3 _____	3 _____
4 _____	4 _____	4 _____	4 _____
Totals: _____	Totals: _____	Totals: _____	Totals: _____
Cell Float Voltage Requirement:		Minimum	Maximum
		54 VDC _____	_____

Cabinet installation (continued)

Meets
specifications
Y / N

14. Interiors of cabinets are not used as storage for screws, disks, cable ties, and so on [Major]

Application tapes and messaging system tape cartridges

15. Media is not subject to rapid changes in temperature or humidity. [Major]
16. Media is kept away from strong magnetic fields. [Major]
17. Database backups are routinely performed and are readily available. [Major]
18. System installation CDs and PC cards are available for the PBX and Applications products in the event of severe system hardware malfunction or data corruption. [Critical]
19. Observations or comments:

Cabling installation

For additional information refer to:

-NTP NN43041-310 *Communication Server 1000E: Installation and Configuration*

Meets
specifications
Y / N

Outside plant cabling and protectors

1. Entrance cable sheath is grounded as close as possible at the point of entry to an approved ground source. [Major] (NEC 800-33; 40)
2. Splice cases are properly grounded. [Major]
3. Approved protection devices are used for Telco network and campus cables. (Carbon, Gas tube type for network cables; fast-acting, low let-through type on campus cables). **For further information , see Nortel Product Bulletin 97040 (April) revision 1 relating to protection** (NEC 800) [Major].
4. Protection devices are installed at both ends of a cable in a campus environment. (Silicon Avalanche type. see Oneac 5SDP; 5SAP) **For further information, see Nortel Product Bulletin 97040 (April) revision 1.** ANSI/UL 497-1995 Specs -10V for digital telephones; 48VDC for analog telephones. [Major]
5. All protection device grounding conductors are grounded to an approved source with an appropriately sized wire. The grounding conductors must be kept as short and straight as possible. (No sharp bends- 8 radius) (NEC 800-40) [Major]

Cabinet cabling

6. Power cables are installed in correct cabinet grooves, where applicable, and securely fastened. [Major]
7. Cabling must be installed in a neat and orderly fashion. [Major]
8. MDF cables are seated and secured in place using factory velcro straps. [Major]
9. All MDF and IDF blocks are clearly labeled. [Major]
10. All cables for cabinets, Call Servers, Media Gateways and Expanders, Signaling Servers (SDI, AUX, VGMC ELAN/TLAN, CE-MUX, DS-30X, and 10/100BaseT cables) and adapters are properly fastened. [Major]
11. Fiber-optic cables are routed according to the optic cable routing guide. [Major]
12. Fiber-optic cables are not bent beyond a 35mm bend. (90 degree soft bend) [Major]
13. The excess fiber optic cable is wound loosely around the optical cable storage device. [Major]
14. In IP survivable 1000E systems, excess CAT 5 cable length is wound around the storage device. [Major]
15. EMI mitigating ferrite rings (NTVQ83AA) are installed on Voice Gateway Media Card TLAN/ELAN patch cables. [Major]
16. NTCW84JA assemblies are used for each VGMC connector. [Major]

Cabling installation (continued)

Meets
specifications
Y / N

- | | | |
|-----|--|-------|
| 17. | CAT 5 patch cables are not installed near fluorescent lighting fixtures.
[Major] | _____ |
| 18. | ELAN/TLAN patch cables for VGMC and signaling server hardware are factory made and kept at 20 ft or less. [Recommendation] | _____ |
| 19. | All patch cables are labeled and correlate to a network infrastructure diagram/schematic. [Minor] | _____ |
| 20. | PBX cabling is not strapped to the exterior of any conduit or raceway as a means of support. [Major] | _____ |
| 21. | M2250 consoles utilize five consecutive units and are properly cross-wired with three power TNs. The AUX cable can be utilized to take the place of two power TNs only. See console cable wh/sl, rd/or, & rd/grn pairs [Major] | _____ |
| 22. | Observations or comments: | _____ |

System operation

For additional information refer to:

X11 Software General Release Bulletin (shipped with new software)

Meets
specifications
Y / N

System diagnostics

- | | | |
|-----|---|-------|
| 1. | LD 30 Network and Signaling diagnostic (NWS). [Minor] | _____ |
| 2. | LD 34 tone and digit switch and digitone receiver (TDS). Check results from the midnight routines. [Major] | _____ |
| 3. | LD 37 Input/Output Diagnostic (IOD). Use STAT command for TTYs. [Major] | _____ |
| 4. | LD 38 Conference Circuit Diagnostic (CNF) Check results from the midnight routines. [Major] | _____ |
| 5. | LD 43 Data Dump (EDD). Check for successful completion of a manual data dump. [Critical] | _____ |
| 6. | LD 44 Software Audit (AUD). Must be configured in BKGD of Ld-17. Check for normal AUD000 messages. [Major] | _____ |
| 7. | LD 48 Status of ELAN/ Mail/ESDI Links. Make sure all AMLs that are in use are active empty. [Major] | _____ |
| 8. | LD 60 Digital Trunk Diagnostic (DTI/PRI). Use the SSCK command to check system clocks. Also check midnight routines for frame slips, CRC errors. [Major] | _____ |
| 9. | GTR, NTPs, and Backup logs are located in switch room. Note: Ensure appropriate level and system type of NTPs are available. [Minor] | _____ |
| 10. | The PBX maintenance modem and terminal server performs as expected. [Major] | _____ |
| 11. | Recommended level PEPs are installed in the system. This includes DepList PEPs for the call servers, required PEPs for signaling servers, and Voice Gateway Media Card PEPs. [Recommendation] | _____ |
| 12. | A PC is available on location in order to access Element Manager and NRS. [Major] | _____ |
| 13. | IP telephones are on the latest recommended firmware. [Recommendation] | _____ |
| 14. | Signaling Servers are load sharing (equal number of registered IP phones). [Recommendation] | _____ |
| 15. | Printouts of Signaling Server config.ini and bootp.tab files are readily available. pdt> cd /u/config, copy config.ini, copy bootp.tab [Minor] | _____ |

Meets
specifications
Y / N

System operation (continued)

Memory size

16. The installation meets the minimum memory requirements for CS 1000 Release 5.5 software.

CS 1000E Release 5.5 memory requirements			
Processor	Flash memory required	DRAM memory required	Total memory
SSC	64 MB	32 MB	96 MB

17. The installation does not exceed the maximum call register count recommended for CS 1000M Release 5.5 software.

Recommended maximum call register counts			
	Recommended	Memory	Memory
	call register	required	required
System	count	(SL-1 words)	(MByte)
NCS 1000M	800	181 600	0.693
Note: Call registers are 227 SL-1 words long. One SL-1 word is 4 bytes.			

18. Observations or comments:

System software

For additional information refer to:

-NTP NN43001-712 *Software Input/Output: System Messages*

Meets
specifications
Y / N

Overlay 15/21 Customer data block

1. SRCD (Auto Set Relocation Code) has a value programmed (0000 is Okay). [Major if SPRE is 1, Minor if other]

Overlay 17/22 configuration record

2. Daily Routine as defined as LD 34, 38, 60,137. [Major]
3. LD 44 in background routine. [Major]
4. The number of call registers (NCR) within the maximum value required according to GRB documentation regarding port size and features used.
1000M- 800 call registers [Major]
5. 1000M LPIB and HPIB values equal 450. [Recommendation]
6. History File is defined as MTC, BUG and is set at minimum length of 60 000 characters. [Major]
7. ERRM is configured as ERR, BUG, AUD. [Major]
8. RLS IDs are configured for each D-Channel where appropriate. [Major]

Overlay 11/12/13: Digital telephones, attendant consoles, and digitone receivers

9. Switchroom phone requires MTA for class of service. [Major]
10. Consoles powered through unused TNs are correctly programmed PWR. [Major]
11. Consoles are cross-wired properly and must utilize consecutive units. [Major]
12. Observations or comments:

Networking parameters for VoIP

-NTP NN43041-220 *Communication Server 1000E: Planning and Engineering*

Meets
specifications
Y / N

1. A LAN/WAN assessment has been performed on the customer network.
[Critical] _____
2. The layer 2 switch ports (Baystack 470) in place for the CS 1000E
ELAN/TLAN are configured for full duplex, autonegotiate. [Major] _____
3. The port speed for ELAN related ports are configured at 10 Mb/s for
CS 1000M systems. [Major] _____
4. The ELAN subnet and the TLAN subnet are on separate subnets. [Major] _____
5. All applications on the ELAN subnet are on the same subnet. [Major] _____
6. The port speed for all TLAN ports on the layer 2 switch are configured
for 100 Mb/s [Major] _____
7. VGMC circuit cards in the same node are on the same TLAN subnet.
[Major] _____
8. Minimum of one VGMC DSP resource for every TDM port (T-1 trunks,
digital phones, analog phones, analog trunks, CallPilot channels). For
nonblocking requirements one DSP per TDM port is a best practice.
[Recommendation] _____
9. Layer 2 switches derive UPS power from different branch circuit
sources, if possible, in order to minimize single-points of failure.
[Recommendation] _____
10. Observations or comments: _____

