NORTEL NETWORKS

EXHIBIT 3

User Documentation

Applicant: Northern Telecom Ltd.

For Type Acceptance/Certification on:

AB6NTGS09AA

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Feasibility Study

During a short feasibility study a number of issues were identified when the CDMA Metrocell is to be used with the MCPA shelf to deliver maximum 50W of output power per single CDMA carrier and 100W per two CDMA carriers measured at the MCPA shelf output port. A list of issues that is provided in this chapter is not complete and more issues are expected to be identified once design of the project is actively initiated.

Each identified issue has been analyzed and current solutions are provided for each of the issues.

Customer should provide +27V/240 Amps of current for 3 MCPA shelves. With this power level maximum 3 MCPA shelves will deliver maximum 100W per sector or 300W per all three sectors. Customer DC power and grounding strategy should meet Nortel and UL requirements for both CDMA Metrocell and TDMA radio frame.

Design will specify the MCPA shelf DC power supply requirements and the customer will be responsible to procure the DC power supply that meets the specifications. If customer procured DC power supply will not meet the specified requirements the performance and reliability of the MCPA shelves could be degraded.

TDMA radio frame is not capable to support more than 2 MCPA shelves. Either two TDMA radio frames are to be used or additional RIP is to be installed in the same TDMA radio frame. Furthermore, customer could provide breakers and power cables for each MCPA shelf in order to limit a number of TDMA radio frames.

One TDMA radio frame will be limited to support 2 MCPA shelves. One RIP with 6 breakers, 50W each, will be used for one TDMA radio frame.

CDMA Metrocell customer alarms will require to develop an Alarm Box that will convert the MCPA shelf alarm logic to the CDMA Metrocell appropriate alarm logic.

No MCPA shelf alarms will be available with the CDMA Metrocell. The customer might be able to support the MCPA shelf alarms via the AMPS equipment, however design is not responsible to either verify or support the MCPA shelf alarms with the AMPS equipment.

Field calibration procedure will be required to ensure that the MCPA shelf is set to the correct output power level. The accuracy of the calibration procedure will be limited by the accuracy of the calibration equipment, MCPA shelf power detector, CDMA Metrocell HIPD as well as attenuator and cable absolute loss variation over the operational temperature.

No additional information is available.

CDMA Metrocell system reported transmitted output power will not be correct as the power level reported by the CDMA Metrocell will be derived based on the 25W SCPA with reference to the DPM ANT port.

No additional information is available.

Receiver sensitivity and/or IIP3 will be somewhat impacted if the transmit signal after the MCPA shelf is to be transmitted via the same DPM that is used to filter and amplify the receive signal.

No additional information is available.

Receiver sensitivity and/or IIP3 will be impacted for configurations where CDMA Metrocell receive signals will be shared with AMPS systems, especially after passing via the AMPS multicouplers.

Excel spreadsheet is available to calculate the CDMA Metrocell degradation with the AMPS multicouplers in-line.

20 dB 150W power attenuators will require to be mounted in the TDMA radio frame where sufficient airflow is available for cooling purposes.

It is recommended to mount the fixed attenuators at the back of the MCPA shelf for modular design and easy accessibility. If thermal or other mechanical issues will be identified, the fixed attenuators will be mounted below the MCPA shelves in the TDMA radio frame.

Variable attenuators will require to be mounted in the TDMA radio frame, possibly in close proximity to the MCPA shelf. In addition, variable attenuators will have to be easily accessible for calibration purposes in the field.

It is recommended to mount the variable attenuators at the back of the MCPA shelf for modular design and easy accessibility. If thermal or other mechanical issues will be identified, the variable attenuators will be mounted below the MCPA shelves in the TDMA radio frame.

A number of new RF and DC cables will be required to interface the CDMA Metrocell with the TDMA radio frame and MCPA shelf.

Development will first try to reuse currently designed and available cables from the CDMA product portfolio.

It is recommended to provision a directional coupler at the output of the MCPA in order to monitor the output power with the external power meter when the system is operational as well as during the calibration process. This will ensure that the cable between the MCPA shelf output and the duplexer will not be taken off every single time during the calibration.

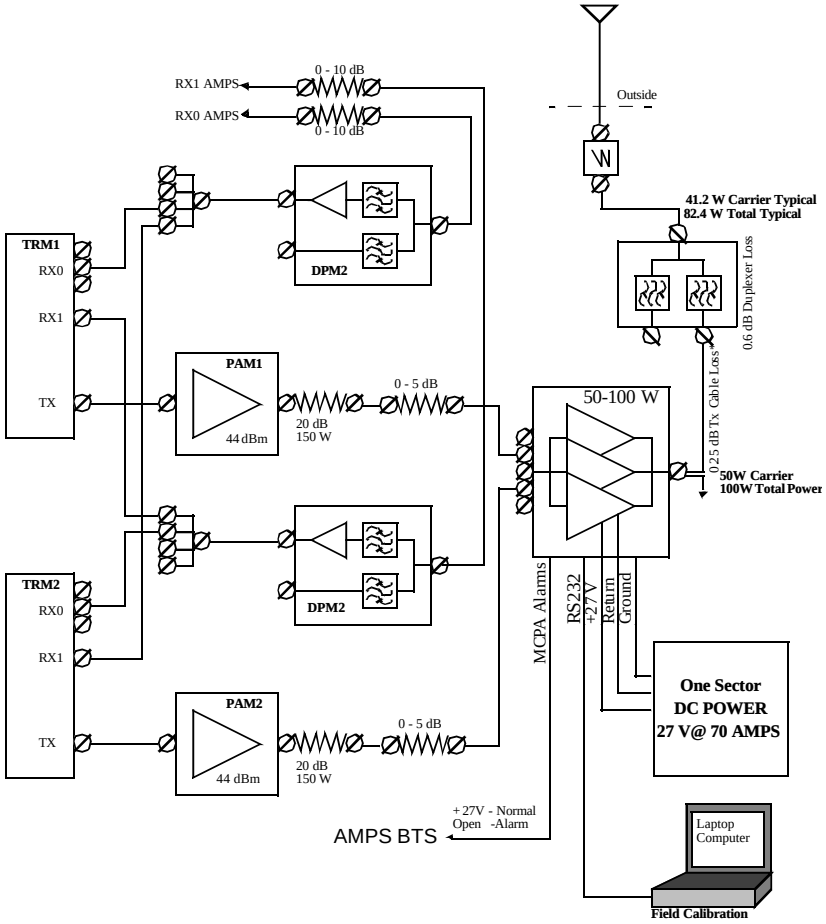
No additional information is available.

Block Level Diagrams

This chapter provides three high level block diagrams that are given in Figure 1, Figure 2 and Figure 3 for the 800 MHz CDMA Metrocell that are being examined to provide 100W of RF power at the MCPA shelf output for 2 CDMA carriers with one or two antennas per sector. In the first case it was assumed that the CDMA Metrocell and the TDMA radio frame are separated by some distance and the receive signals for the CDMA Metrocell are provided from AMPS mupticouplers. In both other cases it was assumed that both CDMA Metrocell and TDMA radio frame are positioned in close proximity to minimize the Tx loss or the Rx loss between the CDMA Metrocell and TDMA radio frame.

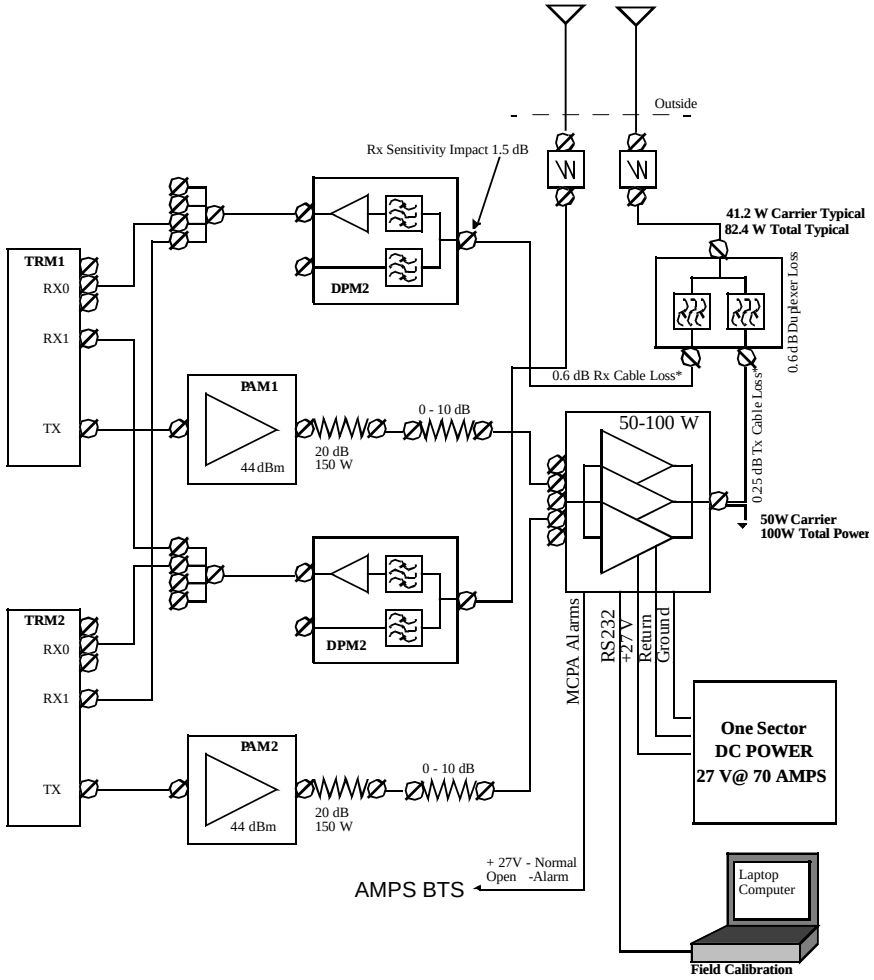
Development has been requested to support only the configuration that is given in Figure 1 of this document. The other two configurations have been included for information and will not be verified as a part of the project. There is some risk that with the configurations that are given in Figure 2 and Figure 3 receiver sensitivity might be slightly impacted due to the higher Tx noise level in the receive band or higher power at the receiver front end.

Please note that the information provided in Figure 1, Figure 2 and Figure 3 is generic and intended for design audience only. This information should not be presented to the customer until it has been approved by design.



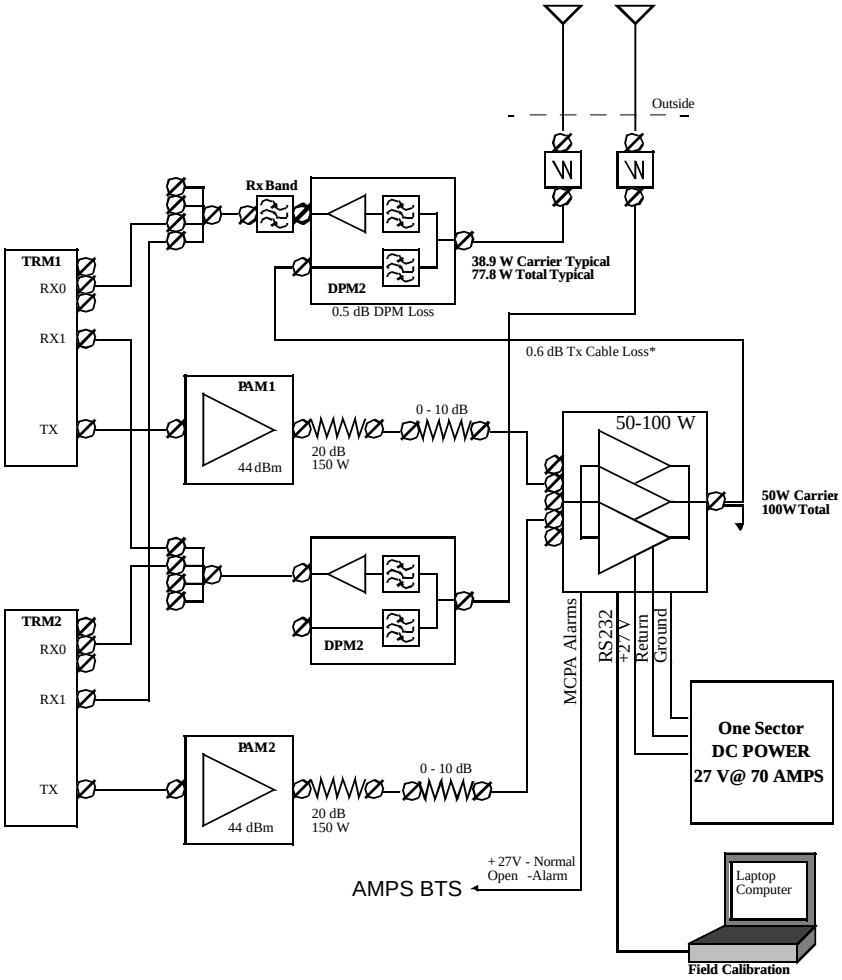
Supported Single Sector 2 Carrier Diagram 1

Configurations where main and diversity receive signals are shared with AMPS multicouplers, especially where the CDMA Metrocell is to receive signals from the AMPS multicouplers, both receiver noise figure and/or receiver equivalent IIP3 will be degraded for the CDMA Metrocell. The amount by witch each parameter will be degraded depends on the overall gain, noise figure and IIP3 of the AMPS multicouplers and cable assembly used to overlay two cellular systems.



Single Sector 2 Carrier Diagram 2

Configuration given in Figure 2 has not been requested by the customer and is not supported by the development. It has been included into the document for future reference only.



Single Sector 2 Carrier Diagram 3

Configuration given in Figure 3 has not been requested by the customer and is not supported by the development. It has been included into the document for future reference only.

System Level Analysis

This chapter provides information that was examined during the initial feasibility and verification process in order to ensure that TDMA MCPA shelf can be used with the CDMA Metrocell to deliver higher output power than is currently available with the CDMA Metrocell 25W SCPA.

CDMA System Software

It is the outmost important to ensure that the system software should not be impacted in any way or the overall system performance should not rely on any changes to the system software. Configurations that are given in Figure 1, Figure 2 and Figure 3 above should not require any software changes to be implemented. However, the transmit and receive power levels reported at the Tx and Rx DPM ANT ports will not be correct until the later system software release is available.

CDMA Metrocell transmitted power reported by the CDMA Metrocell system software will be referenced to the DPM ANT port. Future release of system software should have a capability to enter a loss or gain value to the reported DPM transmitted output power in order to report more accurately transmitted power level at the CDMA Metrocell demarcation point. Nevertheless, any additional HPA modules will not be calibrated over the temperature or frequency range, thus the accuracy of the reported power level will greatly depend on the gain variation of the additional HPA over the temperature, frequency and input power.

50 W HPA Performance

A single MCPA shelf with 3x50W MCPA units was tested to ensure that it could support 2 CDMA carriers delivering 100 W of RF power at the output of the MCPA shelf without any additional filtering. The test results demonstrated that at room temperature single MCPA shelf could deliver, on average, 100 W of RF power while meeting IS-97A specifications of Conducted Spurious Emissions. However, the receiver band noise was found to be some 10 dB higher than the specified level for the 800 MHz CDMA Metrocell 25W SCPA. When used with the CDMA Metrocell DPM, as given in Figure 3, the receiver sensitivity is expected to decrease by approximately 1.0 dB due to excess of spurious noise in the receiver band.

Tx Input and Output Power Levels

The output power of the CDMA Metrocell PAM should not be changed in any way. In addition, all global parameters of the CDMA Metrocell should not be altered in any way to support MCPA shelf in conjunction with the CDMA Metrocell PAM. In addition, any change to the CDMA Metrocell global parameters after the MCPA shelf have been calibrated might result in overdriving the MCPA shelf, possible damage to the MCPA shelf as well as new calibration to be performed.

A single MCPA shelf with 3x50W MCPA units is expected to meet the following power requirements that are given in Table 5.

Description	Specification	Units
Minimum Input Power per Carrier	10	dBm
Minimum Total Input Power	13	dBm
Maximum Input Power per Carrier	20	dBm
Maximum Total Input Power	23	dBm
Maximum Output Power per Carrier	47	dBm
Maximum Total Output Power	50	dBm
Typical Output Power Accuracy	+/- 0.75	dB

MCPA Power Requirements

Receiver Performance

Receiver performance is expected to meet all IS-97A requirements but slightly degrade over the 800 MHz CDMA Metrocell base product performance. This is applicable for configurations that are given in Figure 1 and Figure 3 of this document. In Figure 1 receiver noise figure and/or IIP3 will be impacted to some extend depending on the AMPS multicoupler performance. In Figure 3 receiver noise and/or IIP3 might be impacted due to the higher spurious noise level in the receiver band and higher power level in the transmit band.

IS-97A Performance

It is expected that the CDMA Metrocell with the MCPA shelf delivering maximum of 100W of RF power at the MCPA shelf output with 2 CDMA carriers should meet all IS-97A requirements. Nevertheless, the performance of the CDMA Metrocell with the MCPA shelf delivering maximum power level will somewhat degrade when compared with the 800 MHz CDMA Metrocell base product.

MCPA Alarm Specification

No MCPA shelf alarms will be supported by the CDMA Metrocell. The initial requirement to support the MCPA shelf alarms has been removed due to time and cost constrains of the project.

Customer Power Supply and Grounding

DC power supply and grounding will be provided separately for each TDMA radio frame. This information is the outmost important and should be available to ensure that MCPA shelf could be safely powered up, deliver the appropriate amount of RF power and did not degraded the quality of the CDMA transmit signal and the overall performance of the CDMA Metrocell. At the present time Nortel PLM has informed design that the Nortel customer will supply the DC power that is in agreement with the MCPA shelf specification. Should this not be the case the design will inform the design customer, Nortel CDMA PLM group, that a different power supply should be used by the Nortel customer to guarantee the performance of the MCPA shelf, safety of the

field personnel, quality of the CDMA transmit signal or the overall performance of the CDMA Metrocell.

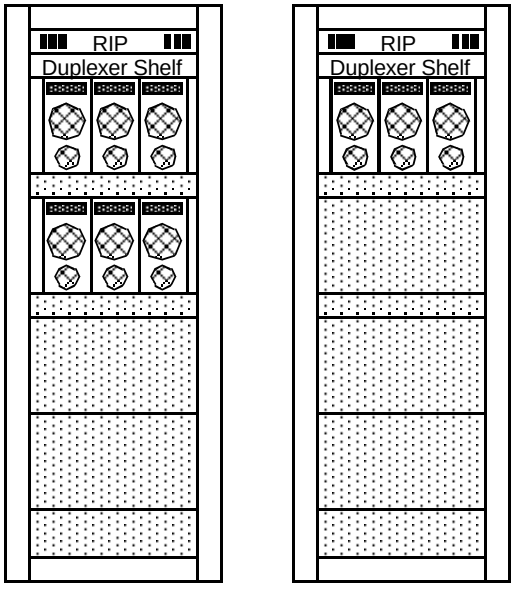
MCPA Field Calibration

There will be a new requirement to perform field calibration of the MCPA shelf in order to guarantee the output power of the MCPA shelf within some degree of accuracy. It is expected that after calibration has been performed and the power levels have been verified the MCPA shelf could be powered down without the need to recalibrate the MCPA shelf when they are powered back up. However, this will be the case only if the input power to the MCPA shelf will not changed. In other words, the calibration of the MCPA shelf should guarantee only the gain setting, and not the output power. Should the input signal to the MCPA shelf change after it has been calibrated, the output power of the MCPA shelf will also change. The accuracy of the calibration procedure will greatly depend on the MCPA shelf power estimation accuracy, field calibration equipment accuracy and the CDMA Metrocell power estimation accuracy. Based on the above factors and currently available information it is reasonable to assume that after MCPA shelf has been calibrated the output power level of the MCPA shelf should be within 1.5 dB of its target value (+/-0.75 dB).

TDMA Radio Frame Assembly

Currently TDMA radio frame supports maximum 2 MCPA shelves. Although there is room available to position an additional MCPA shelf with 3x50W MCPA units, a single RIP is designed to power up maximum 2 MCPA shelves.

In order to support 2 carrier 3 sector CDMA Metrocell with 50W per carrier two TDMA radio frames are required. One TDMA radio frame should have 2 MCPA shelves whereas the second TDMA radio frame should have 1 MCPA shelf. Three sector two carrier TDMA radio frames are given in Figure 4.



TDMA Two Radio Frame Configuration

The Attenuator Shelf might be eliminated if it will be possible to mount fixed and variable attenuators at the back of the MCPA shelf. This would allow to minimize mechanical work required and allow to provision a set of attenuators per each MCPA shelf. However, this solution must be further investigated to ensure that the MCPA shelf cooling will not be hampered as well as the attenuators will not change its characteristics because of the MCPA shelf heat dissipation.

Field Assembly and Installation

Although this project is developed to operate with the 800 MHz CDMA Metrocell, TDMA radio frames will be procured by the Nortel customer separately from the 800 MHz CDMA Metrocell. Furthermore, the attenuator bracket with fixed and variable attenuators as well as the interface cables will also be ordered separately by the customer. The attenuator bracket will be assembled in the field and interfaced with the MCPA shelf and the CDMA Metrocell following instructions.

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Power Supply and Grounding

MCPA DC Power Supply

This chapter provides specifications for the TDMA radio frame and MCPA shelf DC power supply. The Nortel customer is responsible to provision a DC power supply that meets a set of requirements specified in Table 6 and Table 7.

Each TDMA radio frame is capable to support 2 MCPA shelves or 6 50W MCPA units. The DC power supply is specified for one TDMA radio frame with 2 MCPA shelves. The output power per carrier should be limited to 50 W. The output power per TDMA radio frame should be limited to 200 W for a two carrier two sector configuration.

MCPA shelf DC power supply specification for single TDMA radio frame is given in Table 6.

#	Description	Specification	Units	Comments
1	Nominal Operational Voltage	27.00	V_{DC}	
2	Minimum Operational Voltage	21.00	V_{DC}	
3	Maximum Operational Voltage	30.00	V_{DC}	
4	Maximum Length of Stranded 2/0 AWG Power Feed at 30 ^{oC}	4.6	m	Distance from the power plant charge bar to the RIP
5	Maximum Power Plant Voltage Drop	0.25	V_{DC}	
6	Maximum Feed/Return Voltage Drop	0.25/0.25	V_{DC}	
7	Total RF Frame Current Draw	180	A_{DC}	2 MCPA shelves
8	Minimum Voltage for Full Power	24	V_{DC}	
9	Absolute Maximum Voltage	30.5	V_{DC}	No Damage, applied continuously
10	Transient Voltage Immunity for 3 ms	50	V	
11	TSP Shelf Inrush Current at Nominal Voltage - Over 0.3 ms	31	A_{DC}	
12	MCPA Inrush Current at Nominal Voltage - Over 0.2 ms - Over 0.5 ms - Over 1.8 ms - Over 700 ms	 470 470 380 70	 A_{DC} A_{DC} A_{DC} A_{DC}	

13	DC Power Noise Conducted Immunity - Voice Frequency Noise Level - Radio Frequency Noise Level in any 3 kHz Band from 10 kHz to 20 MHz - Broadband Noise Level	 56 100 300	 dB_{rnc} mV_{rms} mV_{p-p}	
14	DC Power Noise Conducted Emissions - Voice Frequency Noise Level - Radio Frequency Noise Level - Broadband Noise Level	 $9+10*\log(I_{DC})$ $(I_{DC)}^{1/2}$ 250	 dB_{rnc} mV_{rms} mV_{p-p}	
15	Supply Voltage Step	+/-3	V_{DC}	Within nominal operating range with 1V/ms maximum rate

Two Carrier Two Sector MCPA DC Power Supply Specification

TDMA radio frame power consumption and current draw are given in Table 7 for configurations with 1 MCPA shelf and 2 MCPA shelves. The power consumption is specified with the Nominal Voltage.

#	Description	Maximum Current ($A_{DC)}$	Nominal Current ($A_{DC)}$	Maximum Power (kW)	Nominal Power (kW)
1	1 MCPA Shelf Feed A	TBD	TBD	TBD	TBD
	1 MCPA Shelf Feed B	TBD	TBD	TBD	TBD
	1 MCPA Shelf Total	TBD	TBD	TBD	TBD
2	2 MCPA Shelves Feed A	TBD	TBD	TBD	TBD
	2 MCPA Shelves Feed B	TBD	TBD	TBD	TBD
	2 MCPA Shelves Total	TBD	TBD	TBD	TBD

TDMA Radio Frame Power Consumption

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TDMA Radio Frame Grounding

North American electrical codes require that there is no current over the grounding conductors (C22.1 part 10-200 and ANSI/NFPA Number 70 article 250-21) and the safety standard specify that electrical codes be adhered to. Therefore, each cell site has to be inspected by the safety authority (UL/CSA approval in North America) such code requirements (refer to UL 1950, third edition/CAN/CSA C22.2 Number 950-M95) are met in order to obtain an approval from that authority. Site installation and power up are subject to NEC and CEC and local codes.

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MCPA Field Calibration

General Information

This chapter will provide detail information on how to perform the calibration of the MCPA shelf in the field in order to achieve 50 W per single CDMA carrier or 100 W per two CDMA carriers at the output of the MCPA shelf. It is the outmost important to ensure that all equipment is calibrated and all measurement are performed as described in this chapter in order to ensure that the output power of the MCPA shelf is fairly accurate and close to the calibrated output power level.

In order to ensure that the maximum MCPA shelf output power is as close as possible to 50W per CDMA carrier it is recommended to set the CDMA Metrocell to transmit maximum output power during the calibration procedure. If it is not possible to set the CDMA Metrocell to transmit the maximum output power during the calibration procedure, current calibration procedure will change.

Calibration Procedure

Set the CDMA Metrocell to output maximum power 42.72 dBm at the DPM ANT port. This power level should be verified with a power meter and confirmed with the CDMA Metrocell reported maximum Tx power level. CDMA Metrocell should be configured to generate the forward waveform with the Overhead Channels and 6 OCNS channels.

Adjust the variable attenuator until the power meter is reading +13 +/- 0.05 dBm.

Connect the input signal to one of 5 available MCPA input ports.

Connect a calibrated 20 dB/150 W attenuator with a short cable to the MCPA output.

Connect the power meter with a thermal sensor to a calibrated 20dB/150W attenuator.

Set the power meter Offset to the measured loss of the 20dB/150W attenuator with a short cable.

Connect a computer with the MCPA shelf with the RS232 cable.

Start Nortel Calibration Software and set Target Power to 50 W and Number of Channels to 1.

Start Calibration of the MCPA.

Ensure the power level measured with the power meter and power level reported by Nortel Calibration Software are accurate within 0.1 dB. It is important to remember that the power meter measurement should always be considered more accurate than the power level reported by the calibration software.

Leave the CDMA Metrocell and MCPA shelf transmitting maximum power for at least 2 hours.

Verify the calibration accuracy after 2 hours by measuring the MCPA output power with a power meter.

If the output power has change from previously calibrated 50W, verify if the Metrocell output power level has changed from the previously recorded power level.

If the Metrocell output power has not changed by the same amount in dB as the MCPA output power level has changed, repeat the calibration procedure from the beginning by adjusting the Metrocell output power to its maximum power level.

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Provisioning Guide

Preferred CDMA Channels

800 MHz Metrocell product is designed to operated over the entire cellular frequency band. However, due to the licence agreements most customers are limited to operate in either A&AÓ or B&BÕ cellular bands. In both A and B cellular bands it is recommended to use the Primary channels as the first CDMA channels for roaming and service availability. This practice is currently used by most Nortel customers. Based on the Primary channels initial deployment it is recommended to introduce additional channels 42 AMPS channels apart or 1.26 MHz. This is important as the IMF and the Combiner are developed for a channel to channel separation of 42 AMPS channels or 1.26 MHz. The list of preferred CDMA channels for the cellular band is given in Table 8.

#	Channel	Rx Frequency (MHz)	Tx Frequency (MHz)	Channel Deployment	Comment
1	31	825.93	870.93	7	A Band
2	73	827.19	872.19	6	A Band
3	115	828.45	873.45	5	A Band
4	157	829.71	874.71	4	A Band
5	199	830.97	875.97	3	A Band
6	241	832.23	877.23	2	A Band
7	**283**	833.49	878.49	**1**	**Primary A Band**
8	**384**	836.52	881.52	**1**	**Primary B Band**
9	426	837.78	882.78	2	B Band
10	468	839.04	884.04	3	B Band
11	510	840.30	885.30	4	B Band
12	552	841.56	886.56	5	B Band
13	594	842.82	887.82	6	B Band
14	758	847.74	892.74	7	BÕ Band

Preferred Cellular Band Channels

Please note that channel 758 might not meet the out of band spurious emissions, thus this channel might not be supported. This information is to be verified during the System Verification process.

Provisioning Guide

This chapter provides generic provisioning guide for Nortel customers to follow while ordering TDMA equipment to support 50W per CDMA carrier. Please note that Table 9 does not contain detail information of the additional equipment required to support 50W per CDMA carrier. The detail information will be provided at a later date after the initial prototype unit has been assembled and functionally verified.

#	Equipment	1 Carrier 1 Sector	1 Carrier 2 Sector	1 Carrier 3 Sector	2 Carrier 1 Sector	2 Carrier 2 Sector	2 Carrier 3 Sector
1	TDMA Radio Frames	1	1	2	1	1	2
2	RIP	1	1	2	1	1	2
3	Duplexer Shelf	1	1	2	1	1	2
4	25 MHz Duplexer Unit	1	2	3	1	2	3
5	MCPA Shelf	1	2	3	1	2	3
6	50W MCPA Unit	2	4	6	3	6	9
7	Attenuator Bracket	1	2	3	1	2	3
8	20dB 150W Attenuator	1	2	3	2	4	6
9	20 dB Variable Attenuator	1	2	3	2	4	6
10	Directional Coupler	1	2	3	1	2	3
11	Variable to Fixed Attenuator Cable	1	2	3	2	4	6
12	Variable Attenuator to MCPA Cable	1	2	3	2	4	6
13	MCPA to Duplexer Cable	1	2	3	1	2	3
14	Field Assembled Metrocell to Fixed Attenuator Cable	1	2	3	1	2	3
15							

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System Verification

It is planned to perform system level verification first at room temperature in the RF Lab and then repeat the same verification over the temperature in the Temperature Chamber to record any deviation over the room temperature. The actual test time will take little time in comparison with the set up time for different conditions.

The following set of tests are planned to be performed at room temperature first. The same test will be repeated over the operational temperature range with the TDMA radio frame as well as fixed and variable attenuators positioned in the temperature chamber. Please note that the Metrocell will not be placed in the temperature chamber and will always be operational at room temperature only. If required, the Metrocell performance over the operational temperature range might be analyze to derive any degradation over the temperature if both systems, CDMA Metrocell and the TDMA radio frame with the MCPA shelf were to be exposed to temperature variation. The TDMA radio frame with the MCPA shelf will be tested at Minimum and Maximum temperature.

MCPA Calibration and Gain Variation for Single Carrier

Set the Metrocell to transmit Overhead and 6 OCNS channels.

Adjust the Metrocell to transmit the maximum output power.

Adjust the MCPA DC power supply voltage to +27 V.

Adjust a single CDMA carrier to output +13 dBm at the MCPA input.

Calibrate the MCPA to generate 47 dBm at the MCPA output.

Measure and record the output power over a 2 hour time period.

Change the MCPA DC power supply voltage to +24 V.

Measure and record the output power.

Change the MCPA DC power supply voltage to +29.5 V.

Measure and record the output power.

Repeat the same procedure for +24 V and +29.5 V.

MCPA Calibration and Gain Variation for Two Carriers

Set the Metrocell to transmit Overhead and 6 OCNS channels.

Adjust the Metrocell to transmit the maximum output power.

Adjust the MCPA DC power supply voltage to +27 V.

Adjust each CDMA carrier to output +13 dBm at the MCPA input.

Calibrate the MCPA to generate 50 dBm at the MCPA output.

Measure and record the output power over a 2 hour time period.

Change the MCPA DC power supply voltage to +24 V.

Measure and record the output power.

Change the MCPA DC power supply voltage to +29.5 V.

Measure and record the output power.

Repeat the same procedure for +24 V and +29.5 V.

MCPA Spurious Emissions and Code Domain Noise

Set the Metrocell to transmit Overhead and 6 OCNS channels.

Adjust the Metrocell to transmit the maximum output power.

Adjust the MCPA DC power supply voltage to +27 V.

Adjust single CDMA carrier to output +13 dBm at the MCPA input.

Calibrate the MCPA to generate 47 dBm at the MCPA output.

Measure and record MCPA conducted spurious emissions.

Measure and record Code Domain Noise.

Change the MCPA DC power supply voltage to +24 V.

Measure and record MCPA conducted spurious emissions.

Measure and record Code Domain Noise.

Change the MCPA DC power supply voltage to +29.5 V.

Measure and record MCPA conducted spurious emissions.

Measure and record Code Domain Noise.

Change the MCPA DC power supply voltage to +27 V.

Adjust second CDMA carrier to output +13 dBm at the MCPA input.

Calibrate the MCPA to generate 50 dBm at the MCPA output.

Measure and record MCPA conducted spurious emissions.

Measure and record Code Domain Noise.

Change the MCPA DC power supply voltage to +24 V.

Measure and record MCPA conducted spurious emissions.

Measure and record Code Domain Noise.

Change the MCPA DC power supply voltage to +29.5 V.

Measure and record MCPA conducted spurious emissions.

Measure and record Code Domain Noise.

MCPA Waveform Quality and Time Accuracy

Set the Metrocell to transmit Pilot Channel only.

Adjust the Metrocell to transmit approximately +36 dBm.

Adjust the MCPA DC power supply voltage to +27 V.

Adjust each CDMA carrier to output +13 dBm at the MCPA input.

Calibrate the MCPA to generate 50 dBm at the MCPA output.

Measure and record Waveform Quality for each carrier.

Measure and record Time Accuracy for each carrier.

Change the MCPA DC power supply voltage to +24 V.

Measure and record Waveform Quality for each carrier.

Measure and record Time Accuracy for each carrier.

Change the MCPA DC power supply voltage to +29.5 V.

Measure and record Waveform Quality for each carrier.

Measure and record Time Accuracy for each carrier.

Installation Method

TDMA Frame Power Distribution

The TDMA frame is powered by two 27 VDC power feeds (A&B). The power feeds are routed through the top panel of the RIP at the top of the TDMA frame. Power is distributed to each MCPA shelf as shown in Figure 5.

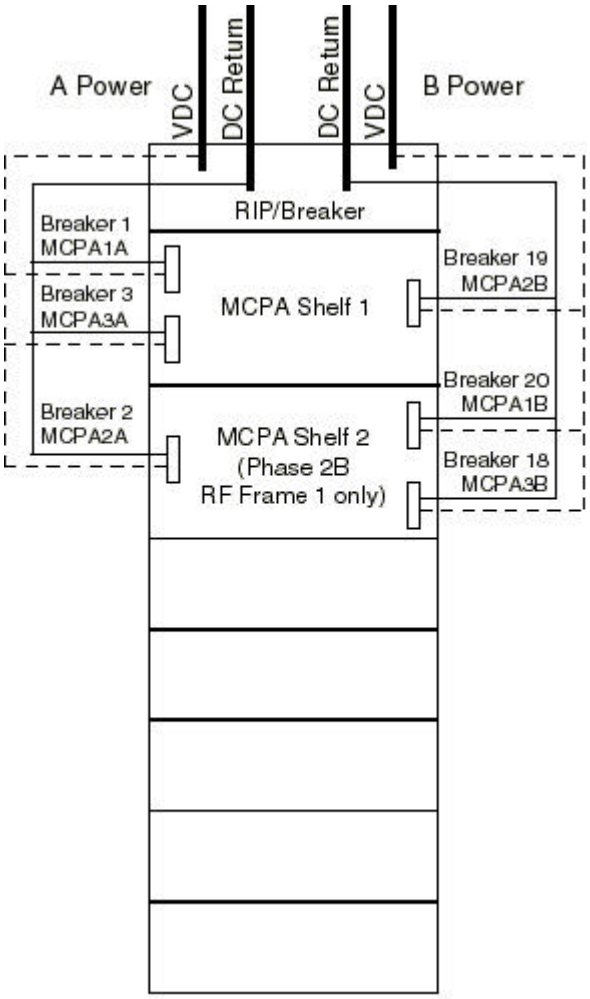
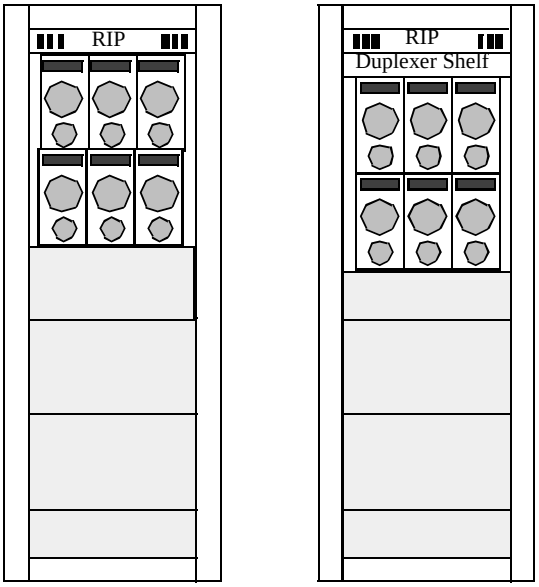


Figure 5: TDMA Frame DC Power Distribution

TDMA Frame Configuration

The TDMA frame (NTFC01AE) will come configured with space and cabling for two MCPA shelves. The MCPA shelves will come positioned at the top of the TDMA frame as shown in Figure #6, config #1. The duplexer shelf does not come standard with the TDMA frame therefore one must be ordered separately (see section 8.5 - TDMA Equipment List). It is necessary to lower the MCPA shelves such that the duplexer shelf can be positioned above the MCPA shelves (config #2 in Figure 6). Alternatively the duplexer shelf could be mounted below the MCPA shelves, but it is recommended to install the duplexer shelf above the MCPA shelves to ensure all interconnect cables will reach.



config #1
(Frame without Duplexers)
NTFC01AE

config #2
(Frame With Duplexers)
NTFC01AE (modified)

Figure 7: TDMA Frame

In order for the duplexer shelf to be mounted above the MCPA shelves, the MCPA shelves and associated support brackets should be lowered by the height of the duplexer shelf of 2U (1U=1.75”). It is also necessary to remove two support brackets from an empty radio shelf location and re-install them at the duplexer location to support the duplexer shelf.

Figure #7 shows a rear view of the TDMA frame with all support brackets in the correct location. The TDMA frame has markers on the left side of the frame that are spaced by 1U. Every tenth marker is labelled with a number. Numbering starts at the bottom of the frame. Figure #10 shows a more detailed diagram of the exact location of each attenuator bracket on the TDMA frame. It is important to mount all shelf support brackets in the proper location as they will determine the position of the duplexer shelf and MCPA shelves, which will determine the position of the attenuator brackets.

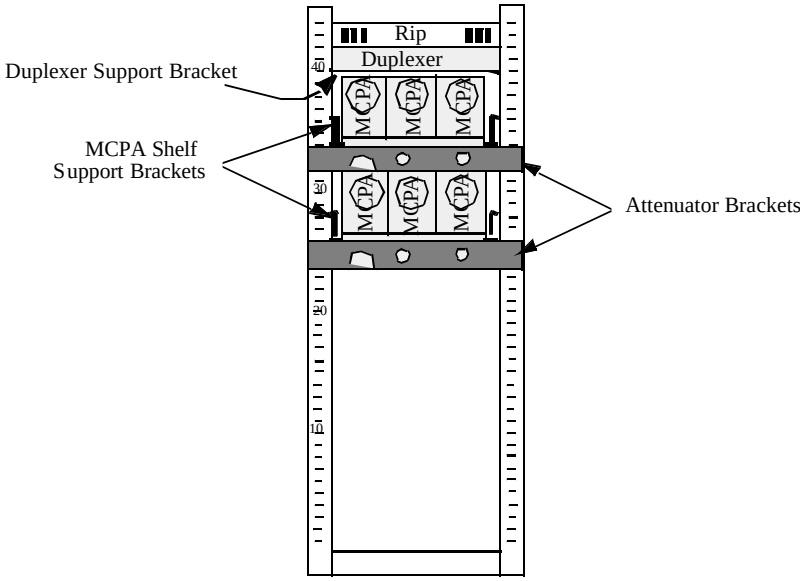


Figure 8: TDMA Frame Rear View

The duplexer support brackets are located such that the bottom of the brackets are in line with the marker indicating 40U. The support brackets for the top MCPA shelf are located such that the bottom of the brackets are in line with the marker corresponding to 34U. The support brackets for the bottom MCPA shelf are located such that the bottom of the brackets are in line with the marker corresponding to 26U

Attenuator Bracket Configuration

Figure #8 shows an exploded view of how the attenuators should be mounted on the bracket:

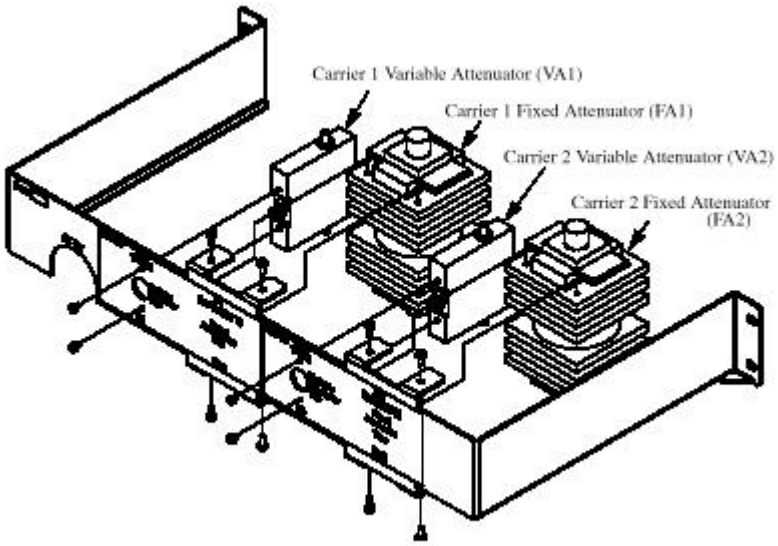


Figure 9: Attenuator Bracket Assembly

The variable attenuators are bidirectional. Turning the screw in the counter-clockwise direction will increase attenuation. These attenuators will typically come from the manufacturer with the screw set for minimum attenuation.

The fixed attenuators are not bidirectional, so care should be taken to ensure the proper orientation of the input and output ports before fastening to the bracket. The input port should face towards the top of the frame, and the output port should face the ground.

The following figure shows a high level view of the attenuator bracket locations on the TDMA frame (MCPA shelves not shown):

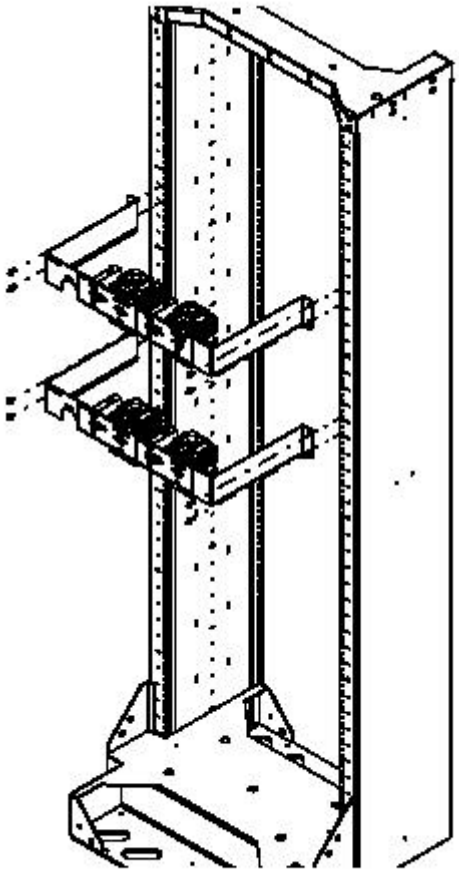


Figure 10: Frame Assembly

The attenuator brackets should be mounted on the rear of the TDMA frame such that they are positioned directly behind the MCPA shelves allowing for the MCPA RF output cable to be routed through the cut away area in the brackets. The mounting ("U") locations for each bracket are shown below (referenced to top edge of attenuator bracket):

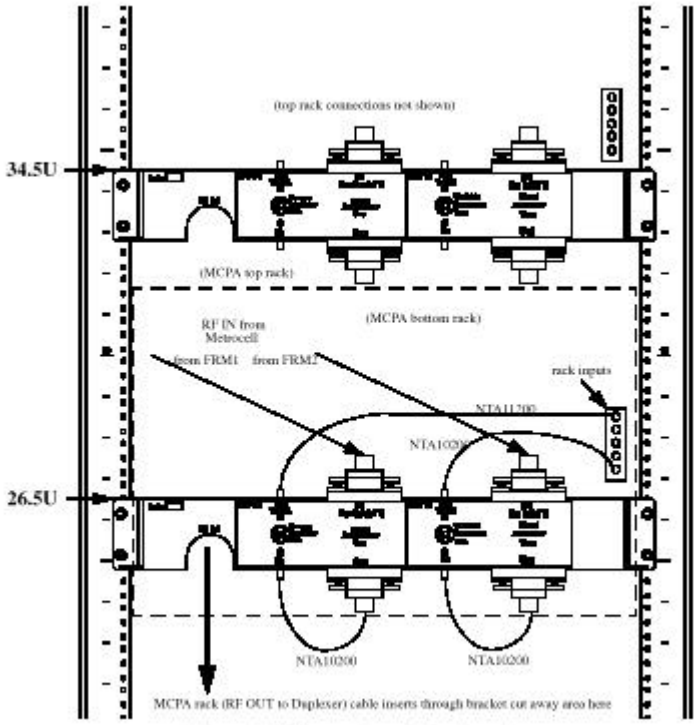


Figure 11: Frame Assembly - Rear view

The above recommended "U" locations for the attenuator brackets assume the duplexer shelf was mounted at 40U, the top MCPA shelf was mounted at 34U and the bottom MCPA shelf was mounted at 26U (see Figure 7).

If these recommended positions are not followed, the installer must at least ensure the attenuator bracket is mounted such that it allows clearance for the MCPA rack RF OUTPUT cable.

FCC labelling

The following figure shows the location where the FCC identification label must be affixed:

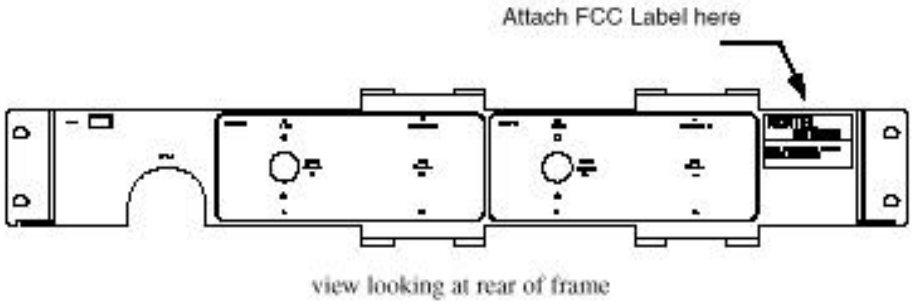


Figure 12: FCC Label Location on Attenuator Bracket

TDMA PA Calibration Software

Calibration of the TDMA system output power must be accomplished via an RS-232 interface to the back of each MCPA rack connector "J6". Each rack (or sector) must be calibrated individually. The MCPA shelf interface software (NTFC07BC) version 1.5 should be executed and the user interface screen should look like the following:

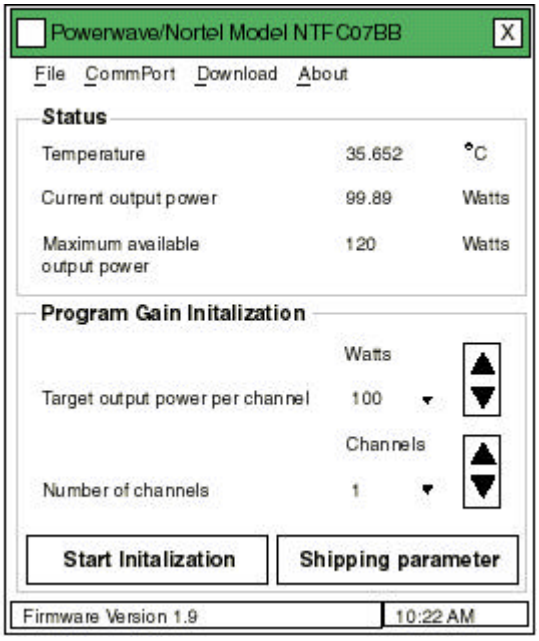


Figure: 13 Computer Screen for 2 Carrier Calibration

Before beginning the initialization, the appropriate Com port for the computer MUST be selected under the "CommPort" pull down menu or the user interface software will shut down and the user will experience run time errors. (See section 8.4.1 below).

Because the TDMA MCPA shelves were originally designed for the Dual Mode Urban TDMA Cellsite product (at a lower power level), it is necessary to enter specific parameters in the fields of the user interface to prevent the MCPAs from being overdriven. When calibrating the MCPA shelf for 2 carriers at 47 dBm each, the following parameters should be entered on the user interface screen. (This assumes that the levels going into the MCPA shelves have been set to 13 dBm per carrier):

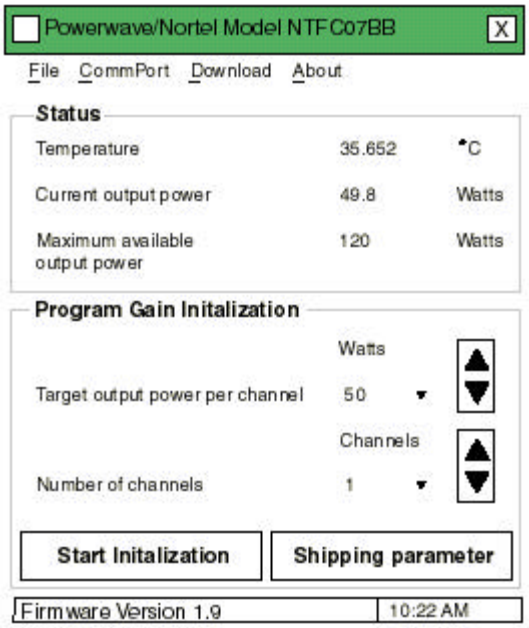
Target output power per channel: enter "100"

Number of channels: enter "1"

Ensure the “RF Enable” switch on the front panel of the PA’s are in the “ON” position

Select “Start Initialization”

The calibration procedure for 1 carrier only is the same as above with the exception of the following parameter changes. (again, this assumes that the level going into the MCPA shelf has been set to 13 dBm):



Computer Screen for 1 Carrier Calibration

Target output power per channel: enter “50”

Number of channels: enter “1” (same as 2 Carrier calibration)

Potential Calibration Problems

If the calibration software reads “trying to connect to Nortel rack” at the bottom of the screen, the software cannot detect the MCPA rack, therefore do the following:

ensure the com port used on the computer is the same as in the “CommPort” pull down menu on the user interface screen.

ensure the RS-232 interface cable is connected to the proper MCPA shelf connector “J6”.

ensure the RS-232 interface cable is connected to the proper MCPA shelf.

If the software sets the output power to the incorrect power level, do the following:

Check that “Maximum Available Output Power” reads 120 Watts (this would indicate the rack recognizes all 3 PA’s). If not, check that all 3 PA’s are enabled. If so, there may be a problem with one of the PA’s.

If a "Run-time error" occurs every time the user interface software is executed, do the following:

Use the Windows Explorer to view the Windows directory.

Double-click on the "REGEDIT.EXE" file

A Registry Editor will open.

Double click on the directory "HKEY_CURRENT_USER"

Double-click on the directory "SOFTWARE"

Double-click on the directory "VB and VBA Program Settings"

Double-click on the directory "Powerwave RD Testing"

Double-click on the directory "System"

In the file panel there is a file called "CommAlarmBoard," double-click on it.

A dialog box will open and a "1" should be typed in the "value data:" entry box. This refers to Comm 1. If there is already a 1, you might want to try 2,3 or 4.

Choose "OK." The number "1" or the number you entered should be displayed in the data column next to the CommAlarmBoard.

Close the Registry Editor.

Try executing the user interface software again.

The reason you get this error is choosing a comm port that is not available. Verify that another program is not open and using the comm port that the user interface software is trying to use.

TDMA Equipment List

The following list identifies the materials required for the TDMA system. It identifies provisionable items and separate piece parts that must be ordered with the TMDA frame. This list does NOT include the materials for the CDMA system or the interconnect kit.

Table 1: **TDMA Equipment List**

Quantity	PEC	CPC	Description
1	NTFC01AE	A0732588	DMU Phase 2B RF Frame
Provision frame with one or two			
1 or 2	NTFC07BB	A0732402	MCPA Shelf
Piece parts			
1 to 6	NTFC07BA		MCPA
1		P0857101	Duplexer Tray
4		P0818520	Mounting Screws
1 or 2	NTFC04AB	A0665954	Full band Duplexer
1	NTFC12AA	A0668379	Floor Anchoring Kit M12 (Seismic)
1	NTFB40AA	A0634172	Frame Leveling Kit
4 to 8		A0689593	50 ohm termination (for MCPA shelf input)
1 or 2		A0723535	RF Cable MCPA Shelf to Duplexer
1	NTFC07BC	A0743941	MCPA Shelf Interface Software (Note 1)