



EXTENDING WIRELESS PERFORMANCE



**PCS 5 MHz
(1 UMTS Channel) LLC
Operating Instructions**

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Document Revision History

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PCS 5 MHz LLC Operating Instructions	1.0	05/7/09	Initial Release
	1.1	9/13/2018	Update the manual to show multiple combining schemes and show the spectrum “Notch” in the “Bandstop” filter; add newer screenshots and method of accessing “Network and Sharing Center;” Also update of the RMA Policy and RMA Forms in Appendices B and C; updated to latest document formatting.

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1 Introduction

1.1 Purpose

This manual contains information and procedures for the setup, tuning, testing / operation, maintenance, and troubleshooting of the 1900 MHz Tunable Narrow Guard Band Low Loss Combiner (LLC) which is used in conjunction with CCI's RX-AIT (Receive Antenna Interface Tray) solution. The 1900 MHz LLC is utilized to share a feed-line between different technologies.

This manual will include sections on Introduction, Safety, Pre-Installation, Operating Instructions, Initial Startup and Operating Instructions, Maintenance, and Troubleshooting. It will also include appendices containing Component Specifications, Valid UARFCN Channel Numbers for 1900 MHz, Preferred CDMA Channels (Frequency Assignments) for Band Class 1 (1900 MHz) Band Subclass 1, and CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 1 and CCI's Return Policy as well as an RMA (Return Material Authorization) form.

Please note that Installation and Integration of the LLC within an RX-AIT solution will be covered within CCI's RX-AIT System Integration Manual.

1.2 Abbreviations

Abbreviation	Definition
A.C.	Alternating Current
Bias-T	DC Injector used to power TMA's
BTS	Base Transceiver Station
CDMA	Code Division Multiple Access
cdmaOne	CDMA Systems based on "IS-95" (2G or 2 nd Generation)
CDMA2000	CDMA Systems based on "IS-2000" (3G or 3 rd Generation)
CDMA2000 1X	CDMA2000 System capable of doubling the Voice Capacity of cdmaOne Systems and with a peak data rate of 307 kbps for both downlink and uplink
CDMA2000 1x-EVDO	CDMA2000 Evolution Data Only (based on IS-856) peak data rate of 2.4 Mbps in the downlink (forward link) and 1X rate in the uplink (reverse link)
CDMA2000 1x-EVDV	CDMA2000 Evolution Data/Voice (based on IS-2000) peak data rate of 3.1 Mbps in the downlink (forward link) and 1.8 Mbps in the uplink (reverse link)
DAB	Dual Amplifier Booster
DAC	Dual Amplifier Combiner
D.C.	Direct Current
DDI	Dual Diplexer Unit (a.k.a. Cross-Band Combiner)
DDP	Dual Duplexer
DUP	Duplexer Unit
ESD	Electro-Static Discharge
EDGE	Enhanced Data Rates for GSM Evolution
GSM	Global System for Mobile Communications
IMD	Intermodulation Distortion
LLC	Low Loss Combiner
Rx	Receiver
RX-AIT	Receive Antenna Interface Tray
RMA	Return Material Authorization
RMC	Receive Multicoupler
TMA	Tower Mounted Amplifier
TTMA	Tower Top Masthead Amplifier
Tx	Transmitter
UMTS	Universal Mobile Telecommunications System

1.3 Product Overview

CCI's Model Number LLC-1900-IN 1900 MHz Tunable Narrow Guard Band Low Loss Combiner (1900 MHz LLC) combines a 5 MHz band pass port with a synchronously tuned band stop port (allows combining of multiple technologies) onto a single feeder without the insertion loss normally associated with passive combiners. Specifications for the 1900 MHz LLC can be found in Appendix A of this manual. A precisely matched UMTS filter (Band Pass) allows the 5.0 MHz UMTS carrier to be positioned anywhere in the band and provides high rejection of unwanted spurious signals and noise. Transmit paths are fully isolated to prevent intermodulation distortion.

Multiple LLC's can be utilized for deployment of additional UMTS, LTE, CDMA or GSM channels for additional feeder reduction. When tuning is not being performed, no power is required, effectively becoming a pure passive low-loss filter combiner. The "BANDPASS TX ONLY" port allows only TX signals to pass, but the "BANDSTOP TX/RX" port is fully duplexed, and allows Tx/Rx signals to pass. Please note that tuning frequencies are available in 100 kHz increments. The unit is housed in a single 19" rack mounted assembly 1u (1.75") in height. See the Block Diagram in Figure 1.1 for signal path identification. Also note that the 1900 MHz LLC provides a DC/AISG path between the Bandstop (Tx/Rx) and ANT (Tx/Rx) ports. DC Power and AISG Control for TMA's and RET Actuators can be provided via this path.

Tuning is performed via an Ethernet connection utilizing TCP/IP requiring only a computer with a web browser. All software is resident internally. If the 1900 MHz LLC is tuned individually, no extra software or controller is required.

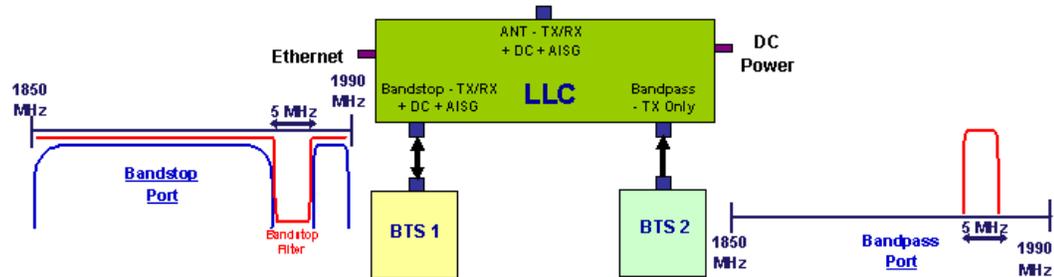


Figure 1.1 - Low Loss Combiner Block Diagram

1.3.1 Application

CCI's Model Number LLC-1900-IN "PCS Band Tunable Narrow Guard Band Low Loss Combiner" can be utilized for combining of two technologies onto a single feeder line without the insertion loss normally associated with passive combiners. CCI's 1900 MHz LLC can be used to combine multiple technologies as follows:

- 1) Combining of UMTS and GSM requires 500 kHz Guard Band on each side of the Bandpass spectrum.
- 2) Combining of UMTS with UMTS requires "0" Guard Band on each side of the Bandpass spectrum.
- 3) Combining of LTE with UMTS requires "0" Guard Band on each side of the Bandpass spectrum for 10 MHz or greater LTE carrier.
- 4) Combining of CDMA with LTE requires "0" Guard Band on each side of the Bandpass spectrum for 10 MHz or greater LTE carrier.

1.3.2 PCS 5 MHz Low Loss Combiner (LLC) Combining Scenarios

1.3.2.1 GSM/UMTS Combining

CCI's 1900 MHz LLC reduces the guard band requirement to only 500 kHz on either side of the UMTS Carrier, when performing GSM/UMTS combining. The GSM signals must be placed outside of the 5.0 MHz (2.5 MHz on each side of the center frequency (f_c) of the UMTS channel). See figure 1.2 below for an example of the Spectrum availability at the Bandstop and Bandpass ports.

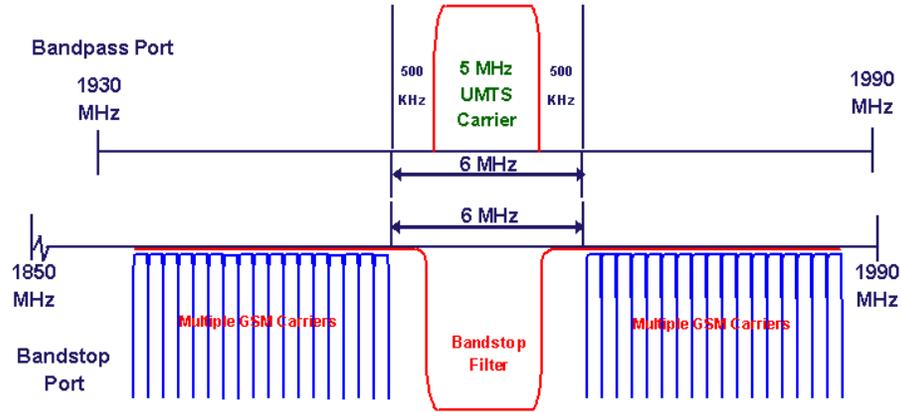


Figure 1.2 - GSM/UMTS Combining: 500 KHz Guard Band (each side) Required

1.3.2.2 UMTS/UMTS Combining

CCI's 1900 MHz LLC does not require any guard band on either side of the UMTS Carrier, when performing UMTS/UMTS combining ("0" Guard Band required). See figure 1.3 below for an example of the Spectrum availability at the Bandstop and Bandpass ports.

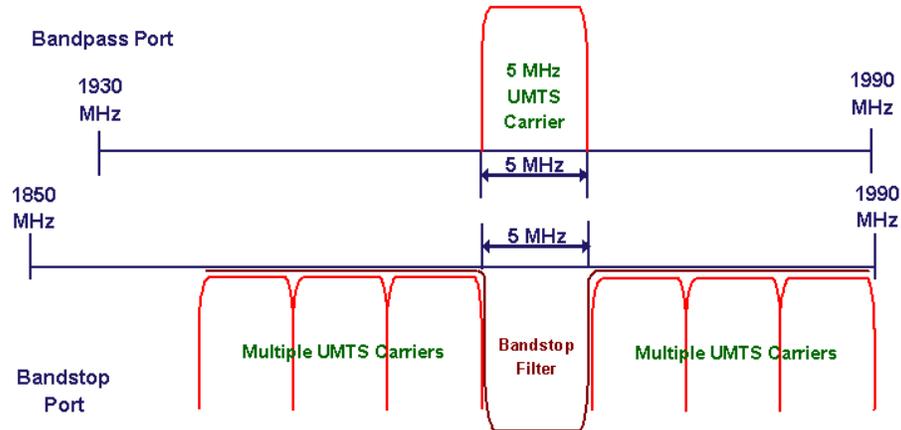


Figure 1.3 - UMTS/UMTS Combining: "0" Guard Band Required

1.3.2.3 LTE/UMTS Combining

CCI's 1900 MHz LLC does not require any guard band on either side of the UMTS Carrier, when performing UMTS/LTE combining ("0" Guard Band required for LTE carriers of 5 MHz or greater). See figure 1.4 below for an example of the Spectrum availability at the Bandstop and Bandpass ports.

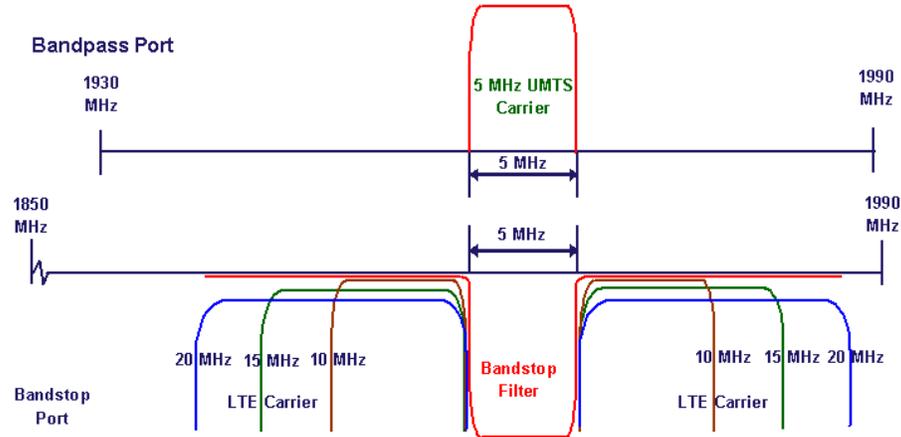


Figure 1.4 - UMTS/LTE Combining: "0" Guard Band Required

1.3.2.4 CDMA/LTE Combining

CCI's 1900 MHz LLC does not require any guard band on either side of the 3 x CDMA 1.25 MHz Carriers, when performing CDMA/LTE combining ("0" Guard Band required for LTE carriers of 5 MHz or greater). See figure 1.5 below for an example of the Spectrum availability at the Bandstop and Bandpass ports.

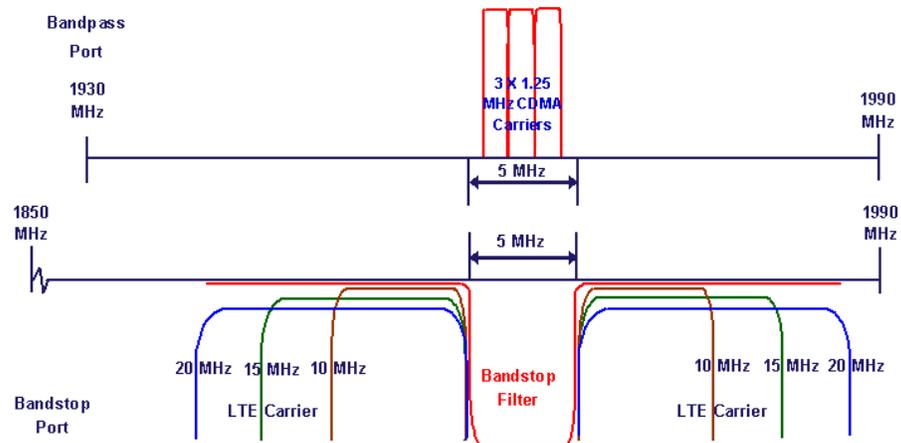


Figure 1.5 - CDMA/LTE Combining: "0" Guard Band Required

1.3.3 Functional and Physical Specification

Electrical and mechanical specifications for the CCI 1900 MHz LLC product line components can be found in Appendix A.

1.3.4 Equipment Changes

CCI reserves the right to make changes to the equipment, including but not necessarily limited to component substitution and circuitry changes. Changes that impact this manual may subsequently be incorporated in a later revision of this manual.

2 Safety

2.1 Safety Instructions

This section illustrates the systems used for presenting safety information.

Note: Reduce the risk of accidents by studying all of the instructions carefully before starting work. If questions arise regarding the safety instructions, contact your supervisor or CCI Technical Support (information below).

Where local regulations exist, these are to be followed first. The safety information in this manual is a supplement to local regulations.

It is your responsibility to make certain that local regulations are known and followed.

This manual including safety information and specific instructions supplied by CCI personnel must be followed in any work performed on these products. A sufficient knowledge of English or any other languages in which the manuals or instructions are printed is required.

The safety information in this manual presupposes that any person performing work on CCI products or systems has the necessary education, training, and competence required to perform that work correctly. For certain work, additional training may be required.

2.2 Warnings

Warnings are used to indicate hazardous activities. The warnings are preceded by the common hazard symbol.



Hazard Symbol

Danger



Danger means that an accident may occur if the safety precautions are neglected. This type of accident is likely to be fatal.

Warning



Warning means that an accident may occur if the safety precautions are neglected. This type of accident may be fatal or cause serious injury. Product damage can occur.

Caution



Caution means that an accident may occur if the safety precautions are neglected. This type of accident may cause serious injury. Product damage can occur.

The following special symbols are used to indicate the risk of radio frequency radiation, electrical hazards, and ESD:



Radio frequency radiation



Electrical hazard



Electrostatic discharge

Warnings are used throughout this manual to alert the reader to special instructions concerning a particular task or operation that may be hazardous if performed incorrectly or carelessly. Therefore, read the instructions carefully. Strict compliance with the special instructions while performing a task is the best way to prevent accidents.

2.3 Electrical Hazards

High Voltage

<p>Danger</p> 
<p>High Voltage is used in the operation of this equipment. Either direct contact with the mains power or indirect contact via dampness or collected moisture can be harmful and/or fatal</p>

The A.C. Installation must be carried out according to local regulations. These regulations may require the work to be carried out by a qualified and authorized electrician.

Remove metal objects from your person that may come in contact with the equipment.
Switch off power if the equipment becomes wet or damp.
Prevent damp or water from entering the equipment in bad weather.

Electrical

Danger



Improper electrical installation may cause fire or electrical shock. Approved circuit breakers for the AC mains and the cable's cross sectional areas must always be selected in accordance with local laws and regulations. Only a qualified and authorized electrician is permitted to install or modify the electrical installation.

Cable marking – Verify cable markings correspond before connecting cables

2.4 ESD

Caution



Sensitive Components such as Integrated Circuits (ICs) can be damaged by discharges of static electricity

2.5 Working at Heights

Caution must be taken when working at heights installing racks. Please ensure that you are trained and have the appropriate equipment for this type of installation.

2.6 Radio Frequency Radiation

Danger



Radio Frequency Radiation (RF) from antenna systems can endanger your health

3 Pre-Installation

3.1 Introduction

Preparation of the site, unpacking, inspection and installation instructions for 1900 MHz Low Loss Combiner (LLC) equipment will be detailed herein.

3.2 Unpacking and Inspection

Once the Low Loss Combiner (LLC) has arrived at the site for installation carefully unpack each container and remove the equipment. Be sure to retain all of the packing material, in the event that any piece of equipment must be returned to the factory.

Visually inspect each piece of equipment at the time it is unpacked. Be sure to check for any physical damage to the frames, faceplates, connectors, indicators, handles as well as all wiring and harnesses. Damage to any of these items could impede the installation or operation of the LLC. Additionally be sure to perform checks for water damage and loose hardware. Finally, all miscellaneous parts supplied should be inspected to insure that nothing is missing or damaged as well.

It is preferred that inspection be performed in the presence of the delivery person. If any damage to equipment is found the claim should be made with the carrier first. Note: When it is not possible, inspection should be performed as early as possible after delivery. When equipment is damaged and must be returned to the factory fill out the website form or if no internet access is available then call the factory to obtain a material return authorization. Please note that an RMA number must be assigned before RX-AIT equipment can be returned to CCI. An RMA form can be found in Appendix C.

4 Operating Instructions

4.1 Introduction

This section contains operating instructions for CCI's 1900 MHz Low Loss Combiner (LLC). Front and Rear Panel controls, indicators, and connections will be described herein.

4.2 Low Loss Combiner (LLC) Controls, Indicators and Connections

The locations of the Controls, Indicators and connections on the 1900 MHz Low Loss Combiner (LLC-1900-IN) are shown in Figure 4.1 for the front panel and figure 4.2 for the rear panel. The functions of the indicators are detailed in the following paragraphs. *Note that the figures are not necessarily to scale.*

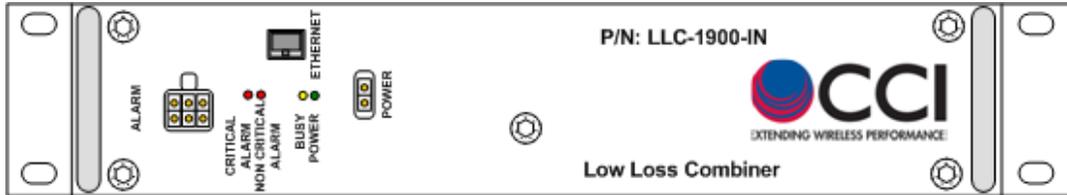


Figure 4.1 – LLC-1900-IN Front Panel Controls, Indicators and Connectors

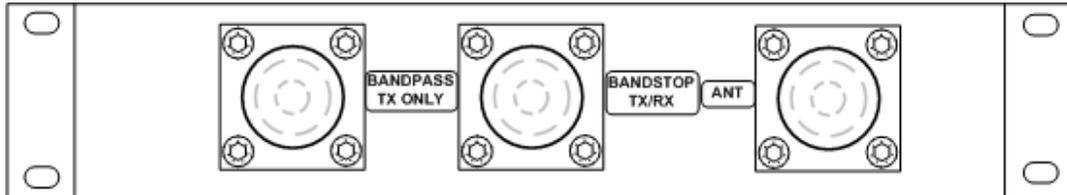


Figure 4.2 – LLC-1900-IN Rear Panel Controls, Indicators and Connectors

4.2.1 Front Panel Status Indicators

4.2.1.1 “POWER” Indicator

When lit, the “POWER ON” indicator (Green LED) indicates that the supply voltage is present greater than or equal to ± 18 VDC, and less than or equal to ± 76 VDC (+24 VDC nominal or -48 VDC nominal).

4.2.1.2 “Busy” Indicator

The “BUSY” Indicator (Yellow LED) illuminates only while the LLC is being tuned or during initial power up.

4.2.1.3 “NON CRITICAL ALARM” Indicator

The “NON CRITICAL ALARM” Indicator (Red LED) will illuminate if there is a failure of one power supply module. In this situation a second backup power supply module will automatically engage.

4.2.1.4 “CRITICAL ALARM” Indicator

The “CRITICAL ALARM” Indicator (Red LED) will illuminate if the unit fails to tune to a requested frequency.

4.2.2 Controls

The 1900 MHz LLC Tuning is controlled via an Ethernet connection to a PC.

4.2.3 RF Connections

The 1900 MHz Low Loss Combiner provides Bandpass and Bandstop input ports (on the rear panel) via DIN connectors (labeled "**BANDPASS TX ONLY**" and "**BANDSTOP TX/RX**" respectively). The two signals are then combined and output to the Antenna via another DIN connector (on the rear panel) labeled "**ANT**."

4.2.4 DC/AISG Path

Note that there is a DC/AISG path from the Bandstop (TX/RX) port to the ANT port on the PCS 5 MHz LLC. TMA's and/or RET Actuators can be biased and controlled via the input to the Bandstop port.

4.2.5 DC Connections

A DC connector (on the front panel) provides power to the 1900 MHz LLC. This connection is only required during tuning. The supply voltage should be greater than or equal to ± 18 VDC, and less than or equal to ± 76 VDC (+24 VDC nominal or -48 VDC nominal).

4.2.6 TCP/IP (Ethernet) Data Connections

An RJ45 (Ethernet) connector on the 1900 MHz LLC front panel provides a TCP/IP data path to control and monitor the LLC. This connection is only required during tuning.

4.2.7 Alarm Out Connector

Two dry contact alarms are provided for non-critical and critical states.

5 Initial Startup and Operating Instructions

5.1 Initial Setup and Connection

The instructions for setup and connections are for the Ethernet connection.

5.1.1 Ethernet Connection

Connect a Standard CAT5 or better Ethernet cable from the PC being used to the PCS 10 MHz LLC. See figure 5.1 to view the Ethernet connector. *When connecting directly to a PC, an Ethernet “Crossover” cable is required for older PC’s which do not have auto-detect Ethernet cards.* Newer PC’s which incorporate auto-detect Ethernet cards generally have auto crossover functionality which allow for the use of a standard Ethernet cable.

5.1.2 Power Connection

Connect the factory supplied DC Power cable from the 1900 MHz Low Loss Combiner (LLC) to a Power Supply capable of delivering 1 ADC at +24 VDC or 5 ADC at -48 VDC. See figure 5.1 to view the Power connection. A 5A breaker is recommended.



Figure 5.1 – Front Panel of the LLC showing Ethernet, Alarm and Power Connections

5.1.3 RF Connections

Connect RF cables (DIN Male to N-type Male) with the DIN Male connectors to the “ANT,” “BANDSTOP TX/RX”, and “BANPASS TX ONLY” ports of the 1900 MHz Low Loss Combiner (LLC). Connect the N-Male connectors to the Anritsu or other Analyzer being used as appropriate to view the desired response. See Figure 5.2 to view the RF connectors on the 1900 MHz LLC.

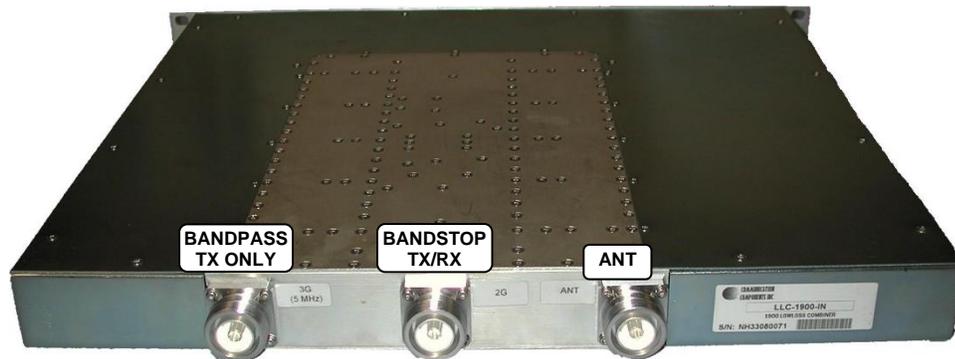


Figure 5.2 – Rear Panel RF showing RF Connections

5.2 Setup of Computer to Access LLC Software via HTML over TCP/IP

Instructions and figures that follow use Microsoft’s Internet Explorer as the Web Browser used to control and monitor the 1900 MHz Low Loss Combiner (LLC).

5.2.1 Turn on PC

Turn on the PC that will be used to access the Low Loss Combiner.

5.2.2 Go To Control Panel

Get to the “Control Panel” from the Main PC Screen, by clicking the selection for Control Panel from the Main Screen as seen in Figure 5.3 below.

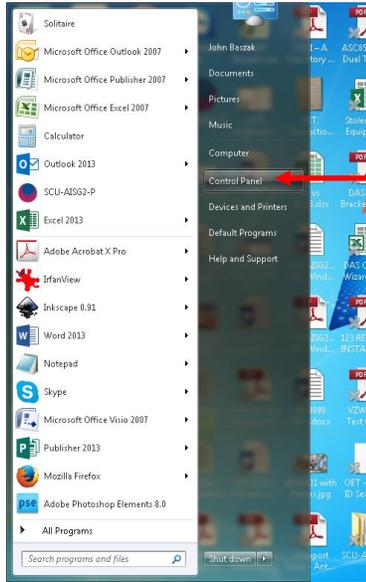


Figure 5.3 – Select “Control Panel”

5.2.3 Selection of Network and Sharing Center

Once in the Control Panel use the PC’s mouse to select the “Network and Sharing Center” icon as seen in figure 5.4 below. Continue by clicking on the “Network and Sharing Center” icon to open the Network and Sharing Center.

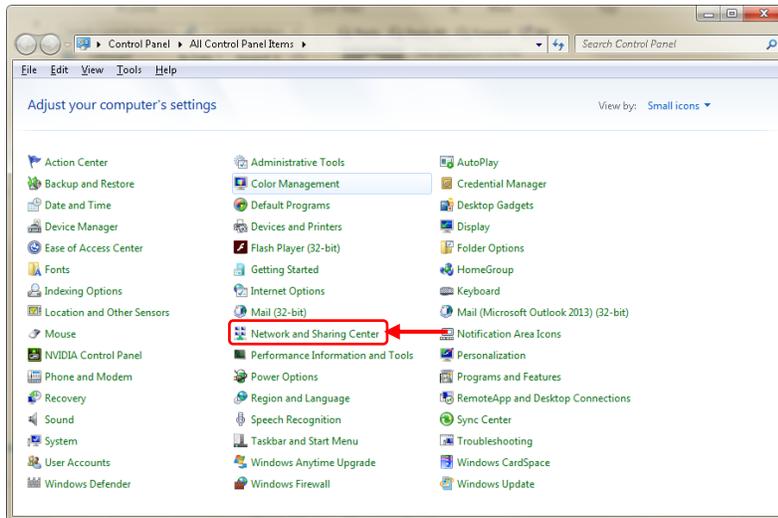


Figure 5.4 - Select “Network and Sharing Center”

5.2.4 Select “Local Area Connection” Icon

After the step taken in paragraph 5.2.3 the Network and Sharing Center window will appear. Using the PC’s mouse, select the “Local Area Connection” icon and text (see figure 5.5) within the “Network and Sharing Center” window.

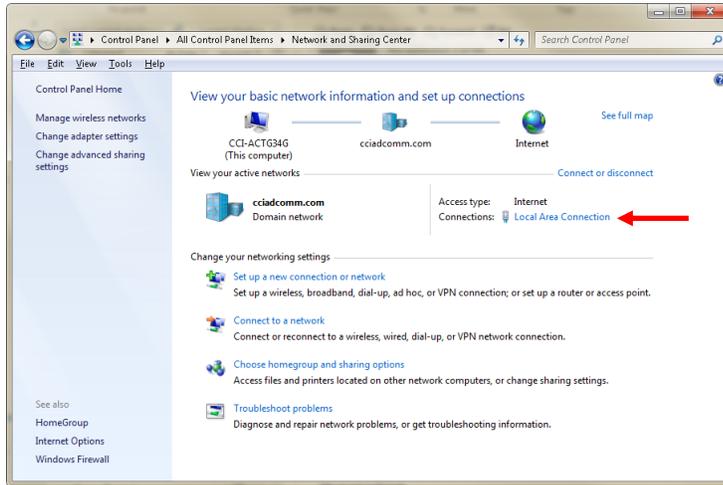


Figure 5.5 – Local Area Connection highlighted within the Network and Sharing Center window

5.2.5 Select “Local Area Connections Properties”

Next, left-click the mouse on the “Local Area Connection” icon and text. This opens up the pop-up menu shown in figure 5.6 below. Move the PC’s mouse over the pop-up menu to highlight the “Properties” label within the Local Area Connection Status pop-up window.

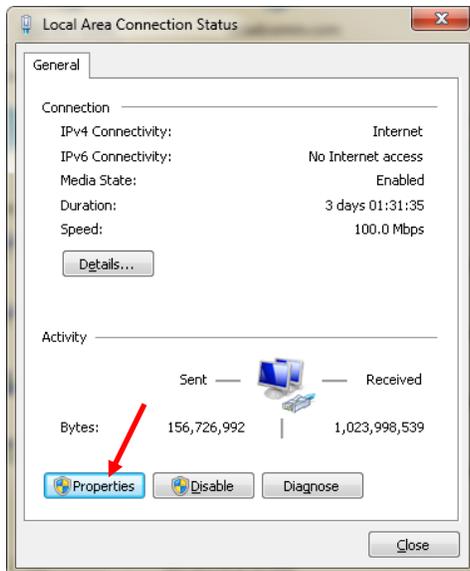


Figure 5.6 – “Local Area Connection Status” Window Display

5.2.6 Select “Internet Protocol Version 4 (TCP/IPv4) Connection Properties”

Use the PC’s mouse (left click) on the “Properties” selection from the menu on the previous figure. This will open up the pop-up window shown in figure 5.7 below. Next, select (left click) the “Internet Protocol Version 4(TCP/IPv4)” label from the menu in the “Local Area Connection Properties” window.

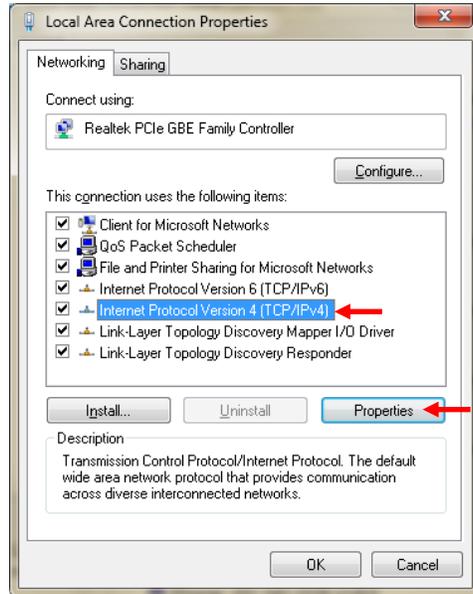


Figure 5.7 – “Local Area Connections Properties” Window Display

5.2.7 Select “Use the following IP address:”

Use the PC’s mouse (left click) on the “Properties” button on the previous figure. This will open up the window shown in figure 5.8. Next, select (left click) the “Use the following IP address:” radio button on the upper portion of the “Local Area Connection Properties” window.

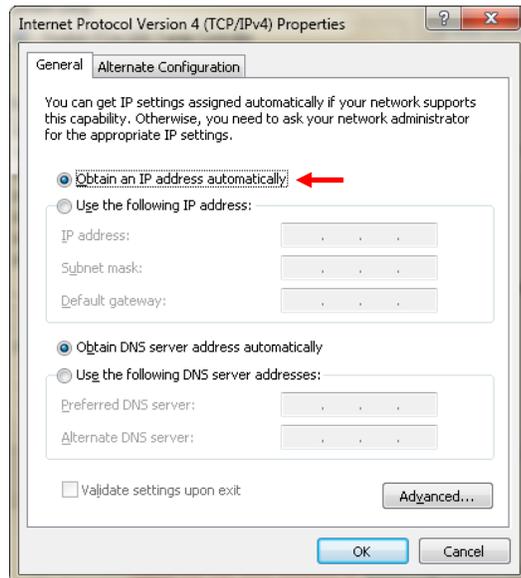


Figure 5.8 – “Obtain an IP address automatically” Window Display

5.2.8 Setting the “TCP/IP Address”

Once you have selected the “Use the following IP address:” radio button in the previous step, this will now make the address entry fields within the window “available” for data entry. See figure 5.9.

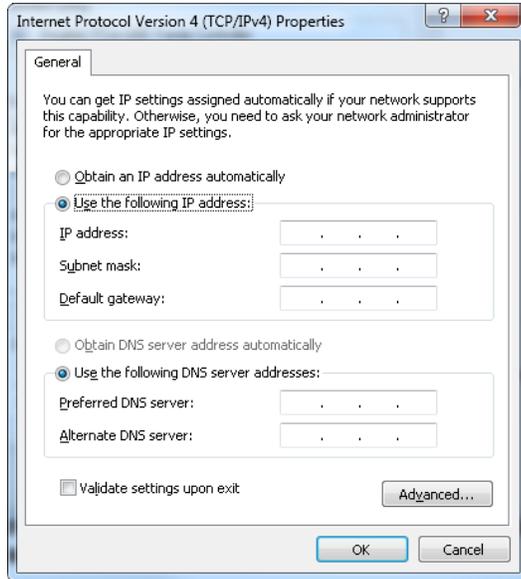


Figure 5.9 – “Use the following IP address:” portion of the Window Display with address fields “available” for data entry

5.2.9 TCP/IP Address Entry

The “IP address:” field will show the blinking cursor after completion of the previous step. Enter “192” into the 1st position in the field. This will move the cursor into the 2nd position in the field. Enter “168” into this 2nd position in the field. This will move the cursor into the 3rd position in the field. Enter “0” into this 3rd position in the field. This will automatically populate the “Subnet mask:” field with “255.255.255.0,” and the “Default gateway:” field with “0.0.0.0.” Go back and enter “1” into the 4th position within the “IP address:” field. See figure 5.10.

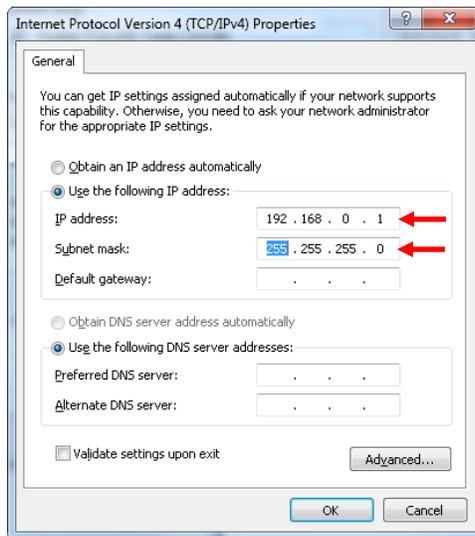


Figure 5.10 - “Use the following IP address:” portion of the Window Display with data entered into the “address” fields

5.2.10 Accept the modified “Local Area Connection Properties”

To accept the “Local Area Connection Properties changes on the PC select the “OK” button for each of the previously opened pop-up windows. Finally, close the “Network and Sharing Center” window.

5.2.11 Finalize PC Setup

To finalize the PC setup, open up the Internet Explorer Browser window and enter “http://192.168.0.3” in the address portion in the Internet Explorer window. See figure 5.11.

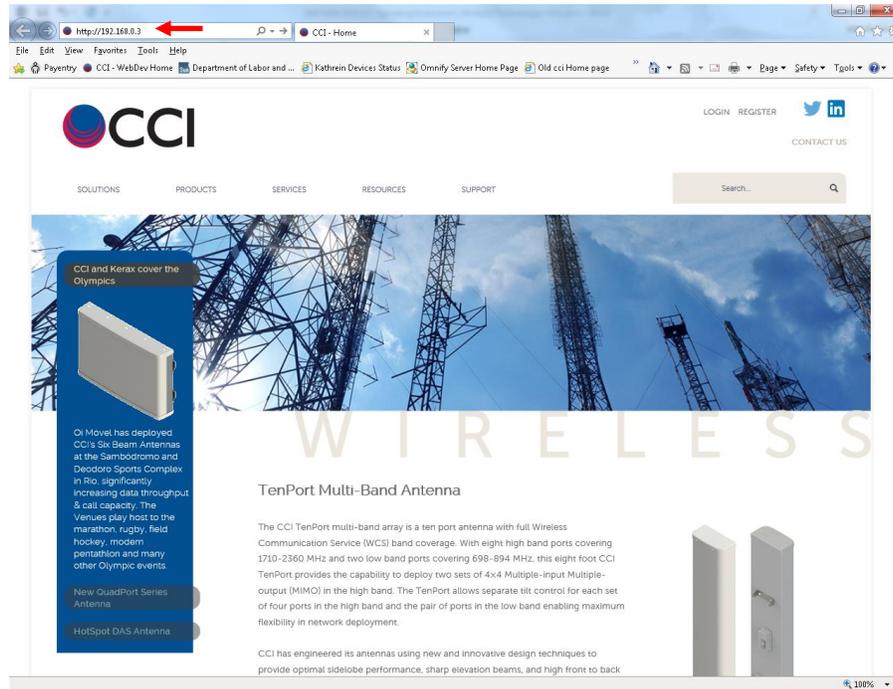


Figure 5.11 – Internet Explorer window with “Address:” field highlighted

5.3 Application of Power to the LLC and initial Screen

5.3.1 Apply Power to the LLC

Apply +24 VDC or -48 VDC to the LLC.

5.3.2 Initial Screen on Browser

Upon application of power to the 1900 MHz LLC the Browser screen should appear per figure 5.12. The Browser screen should list the frequency (in MHz) that the 1900 MHz LLC is presently tuned to.



Figure 5.12 – Initial browser screen upon application of power to LLC.

5.4 LLC Technical Specifications

5.4.1 Viewing LLC Technical Specifications

To view technical specifications for the 1900 MHz LLC use the PC's mouse to highlight (left click on) the "Technical Specifications" link on the initial browser screen. The browser window will display basic technical specifications of the 1900 MHz LLC. Please see figure 5.13 below for an example of how the technical specifications should appear.

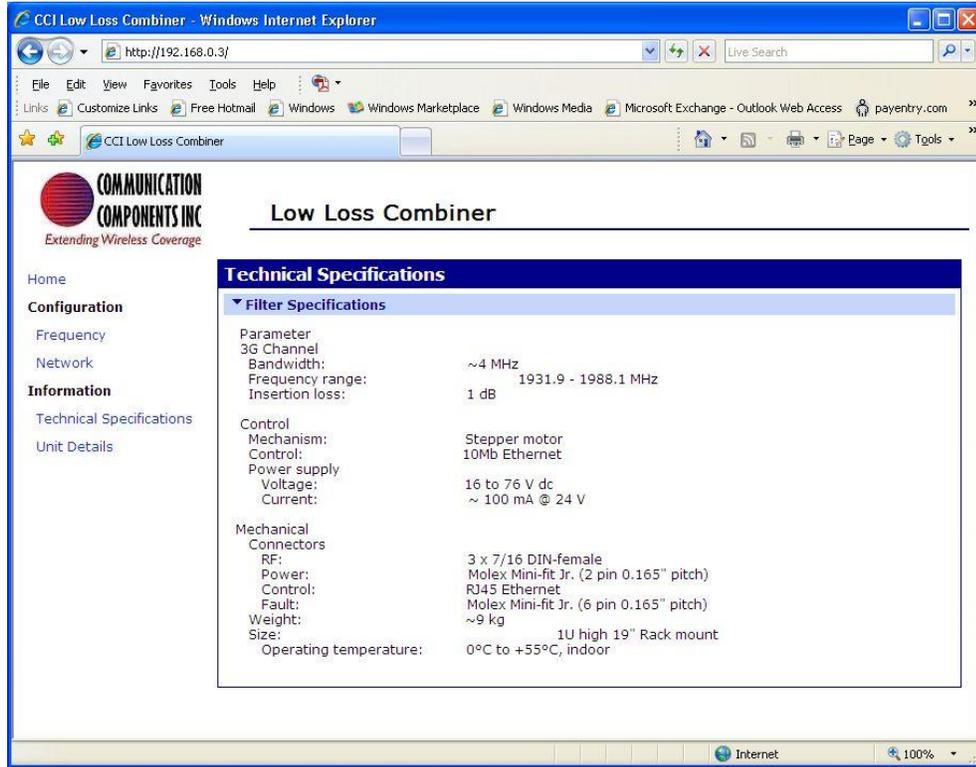


Figure 5.13 – LLC Technical specifications window

5.5 LLC Unit Details

5.5.1 Viewing LLC Unit Details

To view unit details for the 1900 MHz LLC use the PC's mouse to highlight (left click on) the "Unit Details" link on the initial browser screen. The browser window will display the Firmware and Software Details of the 1900 MHz LLC. Please see figure 5.14 below for an example of how the technical specifications should appear.

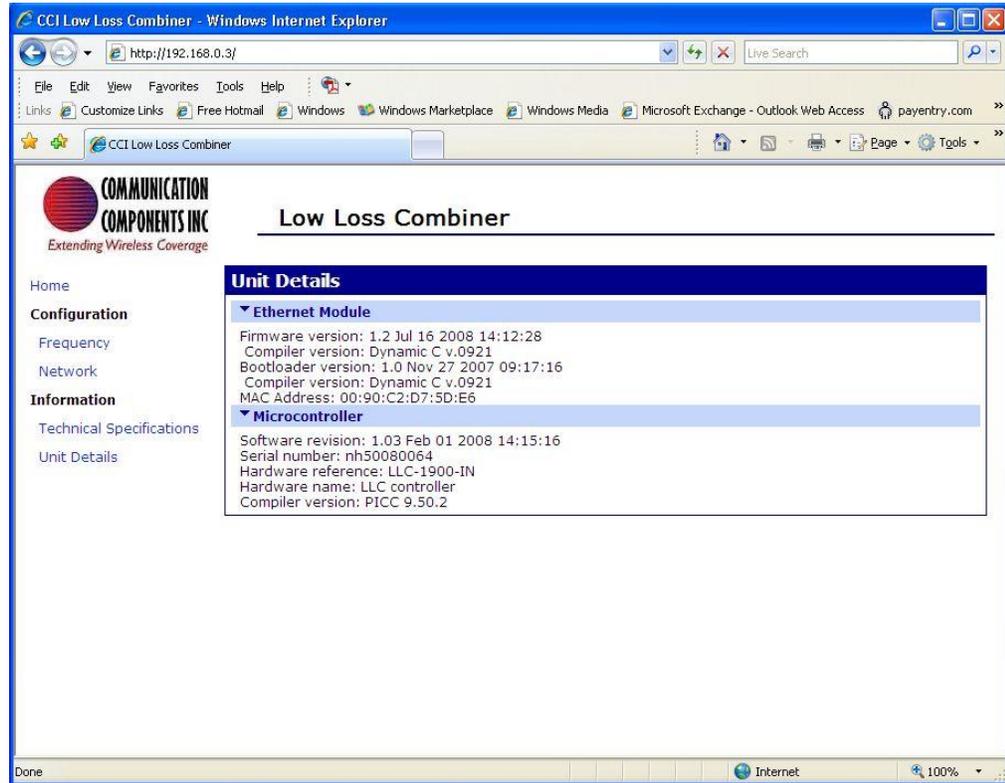


Figure 5.14 – LLC Unit Details window

5.6 Network Configuration Properties

Network configuration properties can be changed if so desired.

5.6.1 Changing Network Configuration Properties

To change the Default IP Address of the LLC, use the PC mouse to highlight (left click on) the “Network” link on the browser screen. There are two ways of assigning an IP address to the LLC. One method involves using a “Dynamic Host Control Protocol” (DHCP) server to assign an IP Address to the unit. The other method allows the assignment of a “Static IP Address” to the LLC. To assign an alternate Static IP Address to the LLC, use the PC mouse to select the “Use the following IP address:” radio button. At this time you must enter the appropriate: 1) IP Address:, 2) Subnet Mask:, and Default Gateway: addresses. Once you have determined that your new address information is correct, select the “Apply” button. See figure 5.15 for details. **Note: It is extremely important to record these changes to ensure future access.**

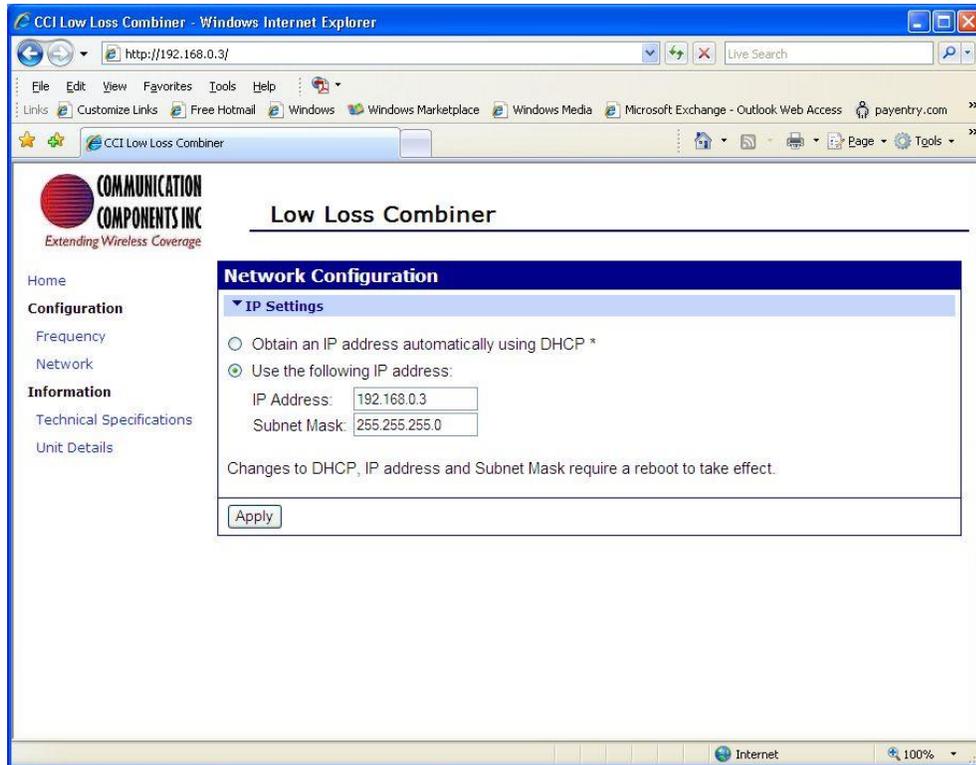


Figure 5.15 – Network Configuration Browser Screen (old address information shown)

5.7 Tuning procedure

The LLC can be tuned to any frequency within the operating band and will remain at the set frequency after the power has been removed.

5.7.1 Tuning with “Enter Frequency”

Tuning with “Enter Frequency” (a user chosen frequency) allows the user to tune the LLC to frequencies between 1931.9 MHz and 1988.1 MHz in 100 kHz increments. In order to perform “Enter Frequency” tuning you must first select (left click) the PC mouse on the Frequency Configuration link at the left of the browser display. Then you must select (left click) the “Enter Frequency” bar. Figure 5.16 highlights the “Frequency Configuration” and “Enter Frequency” selections.

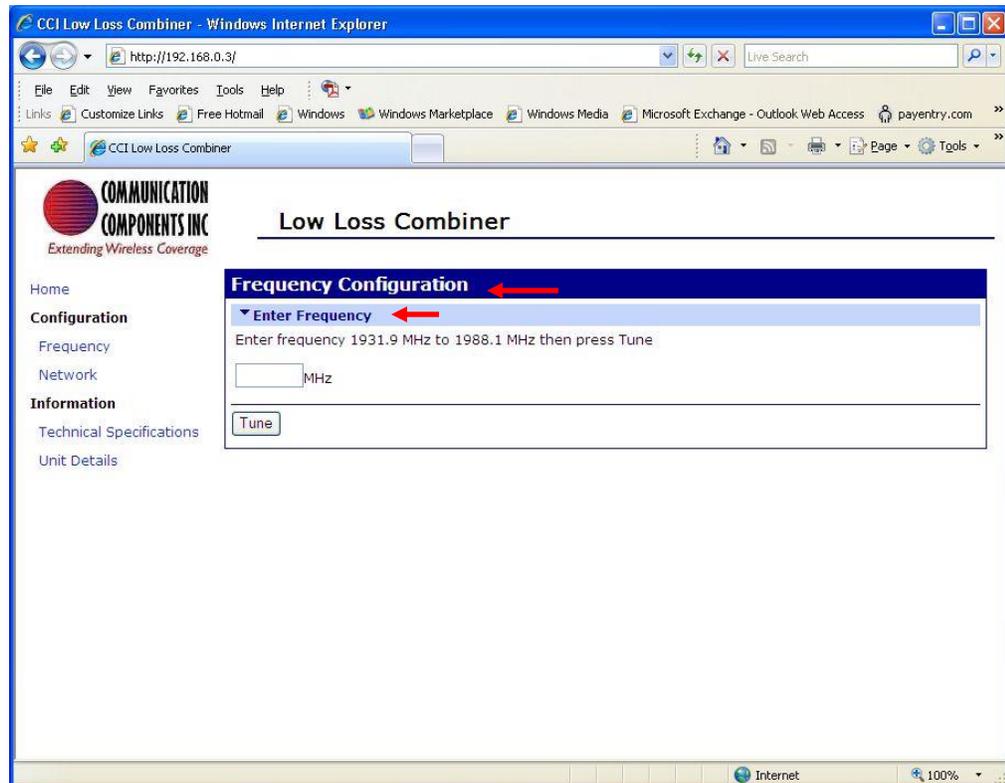


Figure 5.16 - Browser Screen showing “Frequency Configuration” & “Enter Frequency” selection

5.7.1.1 “Enter Frequency” Tuning Process

Use the PC mouse to select the “frequency entry field” and enter the desired UMTS frequency (any frequency between 1931.9 MHz and 1988.1 MHz in 100 kHz increments). Figure 5.17 highlights the “frequency entry field” and which has 1978.1 MHz entered (frequency that will actually be tuned to in the example shown).

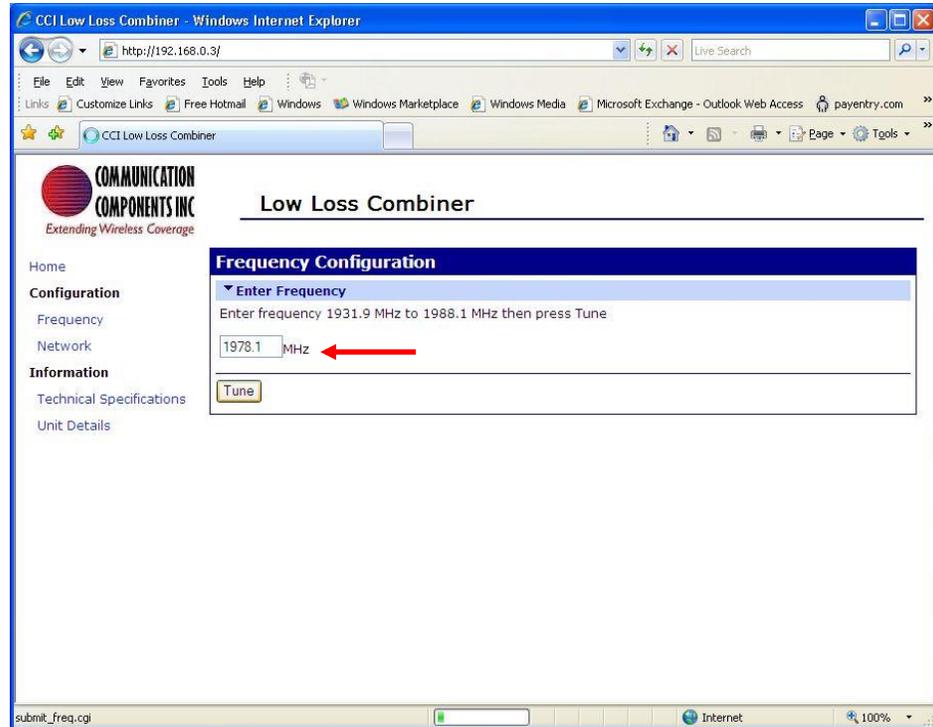


Figure 5.17 – Browser Screen indicating the field used to enter the desired Frequency

5.7.1.1.1 Activities during “Enter Frequency” Tuning

After selecting the “Tune” button during “Enter Frequency Tuning,” the following actions will occur. The display on the analyzer will begin to show a “detuning” action. At the same time the “Activity” LED on the LLC will flash. Similarly, the Ethernet port LED’s will also be active at this time. The LED’s noted can be found (for reference) on Figures 4.1 and 5.1

5.7.1.1.2 Continuing Activities during “Enter Frequency” Tuning

As the tuning process continues the display on the analyzer will begin to show tuning of each stage to the “Chosen” frequency. The “Activity” LED and Ethernet port LED will continue to flash.

5.7.1.1.3 Tuning Completion

Once the tuning process has completed the “Activity” and Ethernet port LED’s will extinguish. The Analyzer will now show the response for the newly tuned frequency selection. The browser screen (see figure 5.18) on the PC will indicate that the filter is now tuned to 1950.1 MHz. *Note: This frequency differs from the 1978.1 MHz shown in the “Enter Frequency” paragraph above.*



Figure 5.18 – Browser screen indicating completion of “Enter Frequency” tuning process

5.7.1.1.4 Analyzer response at Tuning Completion

The analyzer response for S21 (Transmitted Power) and S11 (Reflected Power) is shown as tuned to the UMTS frequency of 1935.1 MHz, in figure 5.19 for connection to the “3G (5 MHz)” (UMTS) port, and figure 5.20 for connection to the “2G” (GSM) port. *Note: This frequency differs from the 1978.1 MHz shown in the “Enter Frequency” or “Tuning Completion” paragraphs above.*

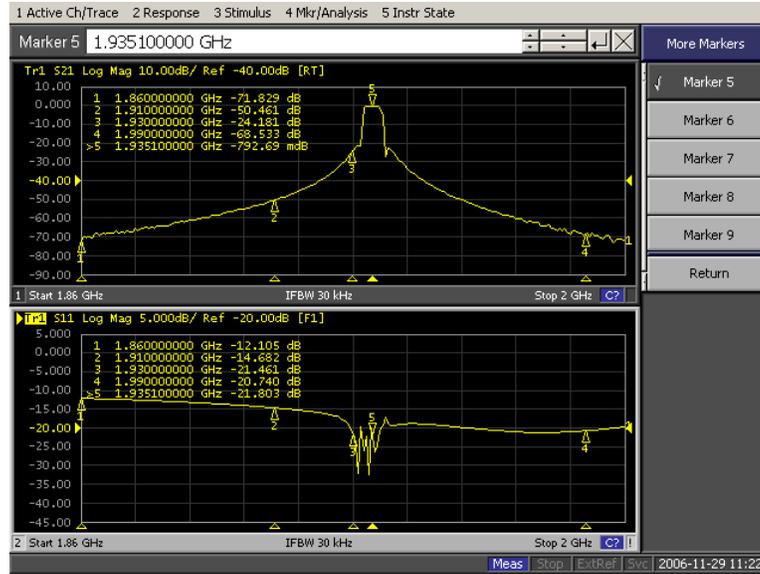


Figure 5.19 – Analyzer response when viewing the “3G (5 MHz)” (UMTS) port (UMTS frequency tuned to 1935.1 MHz)



Figure 5.20 – Analyzer response when viewing the “2G” (GSM) port (UMTS frequency tuned to 1935.1 MHz)

6 Maintenance

6.1 Introduction

There is no requirement for periodic maintenance on an LLC.

6.2 Periodic Maintenance

Not applicable.

6.3 Test Equipment Required for Test

Equipment required for test includes a spectrum analyzer and any additional equipment such as cabling, attenuators, couplers, etc.

6.4 Performance Test

A performance test should be performed to insure that the LLC meets the specifications listed in Appendix A.

6.5 Field Replaceable Parts and Modules

Parts and modules within an RX-AIT solution that can be replaced by a qualified technician in the field include the Low Loss Combiner (LLC).

6.5.1 Low Loss Combiner (LLC) Replacement

To replace an LLC within an RX-AIT solution, perform the following steps:

- 1) Ensure that all RF sources are "Off."
- 2) Set the appropriate circuit breaker (associated with the RX-AIT in the affected sector) on the BTS to "Off."
- 3) Remove the Input and Output RF Cables from the LLC. Also remove the DC and RS232 or Ethernet (RJ45) cables from the LLC. Ensure that the cables are properly labeled for later reconnection.
- 4) Remove the hardware holding the LLC on the 19" rack.
- 5) Remove the LLC from the 19" rack.
- 6) Reverse the order of the procedure to install a new LLC.

7 Troubleshooting (Component Level)

7.1 Introduction

This section will cover the troubleshooting of CCI LLC's which have LED Indicators, as well as RF measurements that can be performed.

7.2 Troubleshooting

The troubleshooting covered herein contains details of the LED Status Indicators and/or the alarm contact pin combinations. In the event of a suspected failure please see section 7.3 "Return for Service Procedures."

7.2.1 Low Loss Combiner (LLC) Troubleshooting

The following paragraphs describe the LED state, trigger conditions and corrective actions for failures of the LLC. The LLC Tuning Manual can also be found on CCI's website at www.cciproducts.com.

7.2.1.1 "POWER ON" Not Illuminated

If the "POWER ON" (green) LED is illuminated, this indicates that the unit is powered (only required when "tuning" is being performed) and is operational. If the green LED is off, check the condition of DC input cable, the associated circuit breaker, and that the DC input cable is properly connected to the DC Input connector on the LLC.

7.2.1.2 "Activity" Not Illuminated

The "Activity" LED (yellow) will only be illuminated during "tuning" of the LLC. If the LED is not illuminated, but the "POWER ON" LED is illuminated during tuning, check to insure the condition of the Ethernet Crossover cable and that it is indeed connected to the RJ45 (Control – Ethernet) port on the LLC, or check the condition of the RS232 cable and that it is connected to the RS232 (Control – RS232) port on the LLC.

7.2.1.3 "ETHERNET ENABLED" Not Illuminated

The "ETHERNET ENABLED" Indicator (Green LED) will only be illuminated while the Ethernet cable is connected to the LLC and the LLC is powered. If the green LED is off but the Ethernet cable is connected while the LLC is powered, then check the other end of the Ethernet cable for a proper connection to an Ethernet adapter.

7.2.1.4 "Tune Error" Illuminated

If the "Tune Error" (Red) LED is illuminated, this indicates that the LLC has failed to tune to a given frequency due to an internal problem. Attempt to retune the LLC. If multiple attempts fail, return the unit to CCI using the RMA process described in section 7.3 and Appendix C.

7.2.1.5 Test

Troubleshooting of the Low Loss Combiner is performed by testing the LLC with a Network Analyzer. This testing validates the UMTS "Pass" frequencies, the GSM "Reject" frequencies, the Return Loss of the UMTS "Pass Band," and the Return Loss of the GSM "Pass Band." The values for these tests can be found in Table A-1 herein for the Low Loss Combiner.

7.3 Return for Service Procedures

7.3.1 Obtaining an RMA

When equipment is damaged and must be returned to the factory be sure to fill out the website form or if no internet access is available then call the factory to obtain a material return authorization. Please note that an RMA # must be assigned before RX-AIT equipment can be returned to CCI. Please note that CCI's return policy and an RMA form can be found in Appendix C.

The following information is required to obtain an RMA:

- 1) Serial number of the unit in question. Serial number is found on the silver label next to the bar code.
- 2) Model number of the unit in question. Model number is also found on the silver label.
- 3) Name and phone number of a contact at your company.
- 4) Detailed description of the reason for return.
- 5) Date Code. Date Code is found either on the silver label as D/C, or on a separate label. Date code is required to determine warranty status. The standard warranty period extends to 1 year after the date shown on the date code label.

7.3.2 Repacking for Shipment

Be sure to retain all of the packing material, in the event that any piece of equipment must be returned to the factory.

A Appendix A Specifications

A.1 1900 MHz Low Loss Combiner; P/N – LLC-1900-IN

Table A-1 1900 MHz Low Loss Combiner (P/N – LLC-1900-IN) Specifications

Description	Typical Specifications
Electrical Specifications	
BANDPASS TX ONLY Port	
Bandwidth	Any 4 MHz within 1930 - 1990 MHz
Channel Positioning	100 kHz steps
Insertion Loss	0.7 dB typ. / 1 dB max.
Insertion Loss Variation	0.3 dB max.
Group Delay Variation	50 ns typ., 70 ns max. (across 4 MHz)
Attenuation in the Bandstop band	15 dB min
Return Loss all port	18 dB min.
BANDSTOP TX/RX Port	
Bandwidth	1850-1990 MHz except 6 MHz for Bandpass Channel + Guardband
Insertion Loss	0.15 dB typ. / 1 dB max.
Insertion Loss Variation	0.3 dB max.
Group Delay Variation	50 ns typ., 70 ns max. (across 4 MHz)
Attenuation in the Bandpass band	15 dB min
Return Loss all port	18 dB min.
Isolation	
Bandstop port to Bandpass port (Bandpass Frequencies)	20 dB min. / 27 dB typ.
Bandpass port to Bandstop port in (Bandstop Frequencies)	30 dB min. / 45 dB typ.
General Characteristics	
Guard Band	
GSM/UMTS Combining	500 kHz each side of Bandpass required
UMTS/UMTS Combining	"0" Guard Band Required
UMTS/LTE Combining	"0" Guard Band Required for 5 MHz or greater LTE
CDMA/LTE combining	"0" Guard Band Required for 5 MHz or greater LTE
Power Handling	500 W / 2000 W PEP
IMD	<-110 dBm (-153 dBc) typical (2 x +43 dBm tones)
DC Pass Current/AISG Pass (BS port to ANT port)	3A/AISG signal (2.176 MHz) per AISG 2.0
Reconfiguring the combiner	
Mechanism	Stepper Motor
Control	Any web enabled computing device with a 10/100 or greater RJ-45 Ethernet Port
DC Supply	
Current	2 A at +24 V
Voltage	+ 18 to + 76 V
Mechanical	
RF Ports	3 x 7/16 DIN-female
Control Port	1 x RS232 / 1 x RJ45 Ethernet
DC Input	1 x Molex "Mini-Fit Jr." (2 Pin – male, .165" Pitch)
Alarm Output	1 x Molex "Mini-Fit Jr." (6 Pin – male, .165" Pitch)
Weight	21 Lbs. (9.53 kg)
Size (Includes Connectors and Handles)	1.75 x 19 x 17.5 in. (44.45 x 482.6 x 444.5 mm)
Indicators	
Power	Green LED (± 18 VDC to ± 76 VDC present)
Busy	Yellow LED (illuminates during tuning or initial power up)
Non Critical Alarm	Red LED (illuminates if a power supply module fails)
Critical Alarm	Red LED (illuminate if LLC fails to tune)
Environmental	
Operating Temperature:	0°C to +55°C, Indoor
MTBF	>5000Khrs

B Appendix B Valid UARFCN Channel Numbers for 1900 MHz

B.1 Valid UARFCN Channel Numbers for 1900 MHz

Table B-1 Valid UARFCN Channel Numbers for 1900 MHz

Block	DL MHz	DL UARFCN	UL MHz	UL UARFCN	UARFCN Fdl offset	UARFCN Ful offset
PCS A3	1932.50	412	1852.50	12	1850.1	1850.1
PCS A4	1937.50	437	1857.50	37	1850.1	1850.1
PCS A5	1942.50	462	1862.50	62	1850.1	1850.1
PCS D	1947.50	487	1867.50	87	1850.1	1850.1
PCS B3	1952.50	512	1872.50	112	1850.1	1850.1
PCS B4	1957.50	537	1877.50	137	1850.1	1850.1
PCS B5	1962.50	562	1882.50	162	1850.1	1850.1
PCS E	1967.50	587	1887.50	187	1850.1	1850.1
PCS F	1972.50	612	1892.50	212	1850.1	1850.1
PCS C3	1977.50	637	1897.50	237	1850.1	1850.1
PCS C4	1982.50	662	1902.50	262	1850.1	1850.1
PCS C5	1987.50	687	1907.50	287	1850.1	1850.1

	1932.40	9662	1852.40	9262	0	0
	1932.60	9663	1852.60	9263	0	0
	1932.80	9664	1852.80	9264	0	0
	1933.00	9665	1853.00	9265	0	0
	1933.20	9666	1853.20	9266	0	0
	1933.40	9667	1853.40	9267	0	0
	1933.60	9668	1853.60	9268	0	0
	1933.80	9669	1853.80	9269	0	0
	1934.00	9670	1854.00	9270	0	0
	1934.20	9671	1854.20	9271	0	0
	1934.40	9672	1854.40	9272	0	0
	1934.60	9673	1854.60	9273	0	0
	1934.80	9674	1854.80	9274	0	0
	1935.00	9675	1855.00	9275	0	0
	1935.20	9676	1855.20	9276	0	0
	1935.40	9677	1855.40	9277	0	0
	1935.60	9678	1855.60	9278	0	0
	1935.80	9679	1855.80	9279	0	0
	1936.00	9680	1856.00	9280	0	0
	1936.20	9681	1856.20	9281	0	0
	1936.40	9682	1856.40	9282	0	0
	1936.60	9683	1856.60	9283	0	0
	1936.80	9684	1856.80	9284	0	0
	1937.00	9685	1857.00	9285	0	0
	1937.20	9686	1857.20	9286	0	0
	1937.40	9687	1857.40	9287	0	0
	1937.60	9688	1857.60	9288	0	0
	1937.80	9689	1857.80	9289	0	0

Block	DL MHz	DL UARFCN	UL MHz	UL UARFCN	UARFCN Fdl offset	UARFCN Ful offset
	1938.00	9690	1858.00	9290	0	0
	1938.20	9691	1858.20	9291	0	0
	1938.40	9692	1858.40	9292	0	0
	1938.60	9693	1858.60	9293	0	0
	1938.80	9694	1858.80	9294	0	0
	1939.00	9695	1859.00	9295	0	0
	1939.20	9696	1859.20	9296	0	0
	1939.40	9697	1859.40	9297	0	0
	1939.60	9698	1859.60	9298	0	0
	1939.80	9699	1859.80	9299	0	0
	1940.00	9700	1860.00	9300	0	0
	1940.20	9701	1860.20	9301	0	0
	1940.40	9702	1860.40	9302	0	0
	1940.60	9703	1860.60	9303	0	0
	1940.80	9704	1860.80	9304	0	0
	1941.00	9705	1861.00	9305	0	0
	1941.20	9706	1861.20	9306	0	0
	1941.40	9707	1861.40	9307	0	0
	1941.60	9708	1861.60	9308	0	0
	1941.80	9709	1861.80	9309	0	0
	1942.00	9710	1862.00	9310	0	0
	1942.20	9711	1862.20	9311	0	0
	1942.40	9712	1862.40	9312	0	0
	1942.60	9713	1862.60	9313	0	0
	1942.80	9714	1862.80	9314	0	0
	1943.00	9715	1863.00	9315	0	0
	1943.20	9716	1863.20	9316	0	0
	1943.40	9717	1863.40	9317	0	0
	1943.60	9718	1863.60	9318	0	0
	1943.80	9719	1863.80	9319	0	0
	1944.00	9720	1864.00	9320	0	0
	1944.20	9721	1864.20	9321	0	0
	1944.40	9722	1864.40	9322	0	0
	1944.60	9723	1864.60	9323	0	0
	1944.80	9724	1864.80	9324	0	0
	1945.00	9725	1865.00	9325	0	0
	1945.20	9726	1865.20	9326	0	0
	1945.40	9727	1865.40	9327	0	0
	1945.60	9728	1865.60	9328	0	0
	1945.80	9729	1865.80	9329	0	0
	1946.00	9730	1866.00	9330	0	0
	1946.20	9731	1866.20	9331	0	0
	1946.40	9732	1866.40	9332	0	0
	1946.60	9733	1866.60	9333	0	0
	1946.80	9734	1866.80	9334	0	0
	1947.00	9735	1867.00	9335	0	0
	1947.20	9736	1867.20	9336	0	0

Block	DL MHz	DL UARFCN	UL MHz	UL UARFCN	UARFCN Fdl offset	UARFCN Ful offset
	1947.40	9737	1867.40	9337	0	0
	1947.60	9738	1867.60	9338	0	0
	1947.80	9739	1867.80	9339	0	0
	1948.00	9740	1868.00	9340	0	0
	1948.20	9741	1868.20	9341	0	0
	1948.40	9742	1868.40	9342	0	0
	1948.60	9743	1868.60	9343	0	0
	1948.80	9744	1868.80	9344	0	0
	1949.00	9745	1869.00	9345	0	0
	1949.20	9746	1869.20	9346	0	0
	1949.40	9747	1869.40	9347	0	0
	1949.60	9748	1869.60	9348	0	0
	1949.80	9749	1869.80	9349	0	0
	1950.00	9750	1870.00	9350	0	0
	1950.20	9751	1870.20	9351	0	0
	1950.40	9752	1870.40	9352	0	0
	1950.60	9753	1870.60	9353	0	0
	1950.80	9754	1870.80	9354	0	0
	1951.00	9755	1871.00	9355	0	0
	1951.20	9756	1871.20	9356	0	0
	1951.40	9757	1871.40	9357	0	0
	1951.60	9758	1871.60	9358	0	0
	1951.80	9759	1871.80	9359	0	0
	1952.00	9760	1872.00	9360	0	0
	1952.20	9761	1872.20	9361	0	0
	1952.40	9762	1872.40	9362	0	0
	1952.60	9763	1872.60	9363	0	0
	1952.80	9764	1872.80	9364	0	0
	1953.00	9765	1873.00	9365	0	0
	1953.20	9766	1873.20	9366	0	0
	1953.40	9767	1873.40	9367	0	0
	1953.60	9768	1873.60	9368	0	0
	1953.80	9769	1873.80	9369	0	0
	1954.00	9770	1874.00	9370	0	0
	1954.20	9771	1874.20	9371	0	0
	1954.40	9772	1874.40	9372	0	0
	1954.60	9773	1874.60	9373	0	0
	1954.80	9774	1874.80	9374	0	0
	1955.00	9775	1875.00	9375	0	0
	1955.20	9776	1875.20	9376	0	0
	1955.40	9777	1875.40	9377	0	0
	1955.60	9778	1875.60	9378	0	0
	1955.80	9779	1875.80	9379	0	0
	1956.00	9780	1876.00	9380	0	0
	1956.20	9781	1876.20	9381	0	0
	1956.40	9782	1876.40	9382	0	0
	1956.60	9783	1876.60	9383	0	0

Block	DL MHz	DL UARFCN	UL MHz	UL UARFCN	UARFCN Fdl offset	UARFCN Ful offset
	1956.80	9784	1876.80	9384	0	0
	1957.00	9785	1877.00	9385	0	0
	1957.20	9786	1877.20	9386	0	0
	1957.40	9787	1877.40	9387	0	0
	1957.60	9788	1877.60	9388	0	0
	1957.80	9789	1877.80	9389	0	0
	1958.00	9790	1878.00	9390	0	0
	1958.20	9791	1878.20	9391	0	0
	1958.40	9792	1878.40	9392	0	0
	1958.60	9793	1878.60	9393	0	0
	1958.80	9794	1878.80	9394	0	0
	1959.00	9795	1879.00	9395	0	0
	1959.20	9796	1879.20	9396	0	0
	1959.40	9797	1879.40	9397	0	0
	1959.60	9798	1879.60	9398	0	0
	1959.80	9799	1879.80	9399	0	0
	1960.00	9800	1880.00	9400	0	0
	1960.20	9801	1880.20	9401	0	0
	1960.40	9802	1880.40	9402	0	0
	1960.60	9803	1880.60	9403	0	0
	1960.80	9804	1880.80	9404	0	0
	1961.00	9805	1881.00	9405	0	0
	1961.20	9806	1881.20	9406	0	0
	1961.40	9807	1881.40	9407	0	0
	1961.60	9808	1881.60	9408	0	0
	1961.80	9809	1881.80	9409	0	0
	1962.00	9810	1882.00	9410	0	0
	1962.20	9811	1882.20	9411	0	0
	1962.40	9812	1882.40	9412	0	0
	1962.60	9813	1882.60	9413	0	0
	1962.80	9814	1882.80	9414	0	0
	1963.00	9815	1883.00	9415	0	0
	1963.20	9816	1883.20	9416	0	0
	1963.40	9817	1883.40	9417	0	0
	1963.60	9818	1883.60	9418	0	0
	1963.80	9819	1883.80	9419	0	0
	1964.00	9820	1884.00	9420	0	0
	1964.20	9821	1884.20	9421	0	0
	1964.40	9822	1884.40	9422	0	0
	1964.60	9823	1884.60	9423	0	0
	1964.80	9824	1884.80	9424	0	0
	1965.00	9825	1885.00	9425	0	0
	1965.20	9826	1885.20	9426	0	0
	1965.40	9827	1885.40	9427	0	0
	1965.60	9828	1885.60	9428	0	0
	1965.80	9829	1885.80	9429	0	0
	1966.00	9830	1886.00	9430	0	0

Block	DL MHz	DL UARFCN	UL MHz	UL UARFCN	UARFCN Fdl offset	UARFCN Ful offset
	1966.20	9831	1886.20	9431	0	0
	1966.40	9832	1886.40	9432	0	0
	1966.60	9833	1886.60	9433	0	0
	1966.80	9834	1886.80	9434	0	0
	1967.00	9835	1887.00	9435	0	0
	1967.20	9836	1887.20	9436	0	0
	1967.40	9837	1887.40	9437	0	0
	1967.60	9838	1887.60	9438	0	0
	1967.80	9839	1887.80	9439	0	0
	1968.00	9840	1888.00	9440	0	0
	1968.20	9841	1888.20	9441	0	0
	1968.40	9842	1888.40	9442	0	0
	1968.60	9843	1888.60	9443	0	0
	1968.80	9844	1888.80	9444	0	0
	1969.00	9845	1889.00	9445	0	0
	1969.20	9846	1889.20	9446	0	0
	1969.40	9847	1889.40	9447	0	0
	1969.60	9848	1889.60	9448	0	0
	1969.80	9849	1889.80	9449	0	0
	1970.00	9850	1890.00	9450	0	0
	1970.20	9851	1890.20	9451	0	0
	1970.40	9852	1890.40	9452	0	0
	1970.60	9853	1890.60	9453	0	0
	1970.80	9854	1890.80	9454	0	0
	1971.00	9855	1891.00	9455	0	0
	1971.20	9856	1891.20	9456	0	0
	1971.40	9857	1891.40	9457	0	0
	1971.60	9858	1891.60	9458	0	0
	1971.80	9859	1891.80	9459	0	0
	1972.00	9860	1892.00	9460	0	0
	1972.20	9861	1892.20	9461	0	0
	1972.40	9862	1892.40	9462	0	0
	1972.60	9863	1892.60	9463	0	0
	1972.80	9864	1892.80	9464	0	0
	1973.00	9865	1893.00	9465	0	0
	1973.20	9866	1893.20	9466	0	0
	1973.40	9867	1893.40	9467	0	0
	1973.60	9868	1893.60	9468	0	0
	1973.80	9869	1893.80	9469	0	0
	1974.00	9870	1894.00	9470	0	0
	1974.20	9871	1894.20	9471	0	0
	1974.40	9872	1894.40	9472	0	0
	1974.60	9873	1894.60	9473	0	0
	1974.80	9874	1894.80	9474	0	0
	1975.00	9875	1895.00	9475	0	0
	1975.20	9876	1895.20	9476	0	0
	1975.40	9877	1895.40	9477	0	0

Block	DL MHz	DL UARFCN	UL MHz	UL UARFCN	UARFCN Fdl offset	UARFCN Ful offset
	1975.60	9878	1895.60	9478	0	0
	1975.80	9879	1895.80	9479	0	0
	1976.00	9880	1896.00	9480	0	0
	1976.20	9881	1896.20	9481	0	0
	1976.40	9882	1896.40	9482	0	0
	1976.60	9883	1896.60	9483	0	0
	1976.80	9884	1896.80	9484	0	0
	1977.00	9885	1897.00	9485	0	0
	1977.20	9886	1897.20	9486	0	0
	1977.40	9887	1897.40	9487	0	0
	1977.60	9888	1897.60	9488	0	0
	1977.80	9889	1897.80	9489	0	0
	1978.00	9890	1898.00	9490	0	0
	1978.20	9891	1898.20	9491	0	0
	1978.40	9892	1898.40	9492	0	0
	1978.60	9893	1898.60	9493	0	0
	1978.80	9894	1898.80	9494	0	0
	1979.00	9895	1899.00	9495	0	0
	1979.20	9896	1899.20	9496	0	0
	1979.40	9897	1899.40	9497	0	0
	1979.60	9898	1899.60	9498	0	0
	1979.80	9899	1899.80	9499	0	0
	1980.00	9900	1900.00	9500	0	0
	1980.20	9901	1900.20	9501	0	0
	1980.40	9902	1900.40	9502	0	0
	1980.60	9903	1900.60	9503	0	0
	1980.80	9904	1900.80	9504	0	0
	1981.00	9905	1901.00	9505	0	0
	1981.20	9906	1901.20	9506	0	0
	1981.40	9907	1901.40	9507	0	0
	1981.60	9908	1901.60	9508	0	0
	1981.80	9909	1901.80	9509	0	0
	1982.00	9910	1902.00	9510	0	0
	1982.20	9911	1902.20	9511	0	0
	1982.40	9912	1902.40	9512	0	0
	1982.60	9913	1902.60	9513	0	0
	1982.80	9914	1902.80	9514	0	0
	1983.00	9915	1903.00	9515	0	0
	1983.20	9916	1903.20	9516	0	0
	1983.40	9917	1903.40	9517	0	0
	1983.60	9918	1903.60	9518	0	0
	1983.80	9919	1903.80	9519	0	0
	1984.00	9920	1904.00	9520	0	0
	1984.20	9921	1904.20	9521	0	0
	1984.40	9922	1904.40	9522	0	0
	1984.60	9923	1904.60	9523	0	0
	1984.80	9924	1904.80	9524	0	0

Block	DL MHz	DL UARFCN	UL MHz	UL UARFCN	UARFCN FdI offset	UARFCN FuI offset
	1985.00	9925	1905.00	9525	0	0
	1985.20	9926	1905.20	9526	0	0
	1985.40	9927	1905.40	9527	0	0
	1985.60	9928	1905.60	9528	0	0
	1985.80	9929	1905.80	9529	0	0
	1986.00	9930	1906.00	9530	0	0
	1986.20	9931	1906.20	9531	0	0
	1986.40	9932	1906.40	9532	0	0
	1986.60	9933	1906.60	9533	0	0
	1986.80	9934	1906.80	9534	0	0
	1987.00	9935	1907.00	9535	0	0
	1987.20	9936	1907.20	9536	0	0
	1987.40	9937	1907.40	9537	0	0
	1987.60	9938	1907.60	9538	0	0

B.2 Preferred CDMA Channels (Frequency Assignments) for Band Class 1 (1900 MHz), Band Subclass 1

Table B-2 Preferred CDMA Channels (Frequency Assignments) for Band Class 0 (1900 MHz), Band Subclass 1

Band Name	DL MHz	DL CDMA	Delta from Previous Channel (MHz)	UL MHz	UL CDMA
A	1931.25	25	-	1851.25	25
A	1932.50	50	1.25	1852.50	50
A	1933.75	75	1.25	1853.75	75
A	1935.00	100	1.25	1855.00	100
A	1936.25	125	1.25	1856.25	125
A	1937.50	150	1.25	1857.50	150
A	1938.75	175	1.25	1858.75	175
A	1940.00	200	1.25	1860.00	200
A	1941.25	225	1.25	1861.25	225
A	1942.50	250	1.25	1862.50	250
A	1943.75	275	1.25	1863.75	275
D	1946.25	325	-	1866.25	325
D	1947.50	350	1.25	1867.50	350
D	1948.75	375	1.25	1868.75	375
B	1951.25	425	-	1871.25	425
B	1952.50	450	1.25	1872.50	450
B	1953.75	475	1.25	1873.75	475
B	1955.00	500	1.25	1875.00	500
B	1956.25	525	1.25	1876.25	525
B	1957.50	550	1.25	1877.50	550
B	1958.75	575	1.25	1878.75	575
B	1960.00	600	1.25	1880.00	600
B	1961.25	625	1.25	1881.25	625
B	1962.50	650	1.25	1882.50	650
B	1963.75	675	1.25	1883.75	675
E	1966.25	725	-	1886.25	725
E	1967.50	750	1.25	1887.50	750
E	1968.75	775	1.25	1888.75	775
F	1971.25	825	-	1891.25	825
F	1972.50	850	1.25	1892.50	850
F	1973.75	875	1.25	1893.75	875
C	1976.25	925	-	1896.25	925
C	1977.50	950	1.25	1897.50	950
C	1978.75	975	1.25	1898.75	975
C	1980.00	1000	1.25	1900.00	1000
C	1981.25	1025	1.25	1901.25	1025
C	1982.50	1050	1.25	1902.50	1050
C	1983.75	1075	1.25	1903.75	1075
C	1985.00	1100	1.25	1905.00	1100
C	1986.25	1125	1.25	1906.25	1125

Band Name	DL MHz	DL CDMA	Delta from Previous Channel (MHz)	UL MHz	UL CDMA
C	1987.50	1150	1.25	1907.50	1150
C	1988.75	1175	1.25	1908.75	1175

¹

B.3 CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 1

Table B-3 CDMA Channel Number to CDMA Frequency Assignment Correspondence for Band Class 1

Transmitter	CDMA Channel Number	Center Frequency for CDMA Channel (MHz)
Mobile Station	$0 \leq N \leq 1199$	$1850.000 + 0.050 * N$
Base Station	$0 \leq N \leq 1199$	$1930.000 + 0.050 * N$

¹ All Numbers in Table are from Band Class 1 Band Subclass 0 of the 3GPP Band Class Specification for cdma2000 Spread Spectrum Systems.

C Appendix N Return Policy & Return Material Authorization (RMA) Form

C.1 CCI's Return Policy

See CCI's separate "Return Material Authorization & Process Guide"

C.2 Return Material Authorization (RMA) Form



CCI
EXTENDING WIRELESS PERFORMANCE

Communication Components, Inc.
99 Leuning Street
South Hackensack, NJ 07606
+1 (201) 342-3338 Telephone

**RETURNED MATERIAL AUTHORIZATION
REQUEST FORM**

SUPPORT DEPARTMENT CONTACT INFO:
Telephone: +1 (201) 342-3338 option 6
Email: SUPPORT@CCIPRODUCTS.COM

RMA DEPARTMENT CONTACT INFO:
Telephone: +1 (201) 342-3338 option 7
Email: RMA@CCIPRODUCTS.COM

FOR ADDITIONAL SUPPORT RESOURCES, PLEASE VISIT US ON THE WEB AT:
WWW.CCIPRODUCTS.COM

Please fill out the information below & email a copy to SUPPORT@CCIPRODUCTS.COM / (201) 342-3338 option 6. To avoid delays in processing, please ensure that all required information is provided. The SUPPORT Department will review the request & upon approval, the RMA department will provide a Returned Material Authorization (RMA) Number. A RMA# **MUST** BE OBTAINED PRIOR TO SHIPPING!

RMA RETURN POLICY

1. Please ensure that all details are complete for proper processing.
2. The Model and Serial# are required to determine the warranty status.
3. All Swaps & Advance Replacement requests are subject to approval.
4. All units for which advance replacements have been sent must be returned within 60 days in order to avoid additional billing.
5. All same day shipment requests **MUST** be received before 3PM EST in order to process the request.
6. Demos/Spare/Samples/Loose returns must be submitted along with the original packing slip for credit.
7. Note: If the unit is determined to have no problem found, an analysis fee and return shipping fees may be assessed.
8. For all declined repairs, shipping & handling arrangements must be provided by customer. RMA follow ups with no customer response within 4 months will be considered closed and unit disposed of by CCI.

WHEN RETURNING PRODUCTS, PLEASE ENSURE THAT THE APPROVED RMA FORM IS INCLUDED IN THE SHIPMENT & THE RMA# IS CLEARLY DISPLAYED ON THE PACKAGE/ BOX.

REQUESTED BY	SHIP TO/ RETURN ADDRESS (if different from Requestor's address)
COMPANY: _____ DATE: _____ ADDRESS 1: _____ ADDRESS 2: _____ CITY: _____ STATE: _____ ZIP: _____ COUNTRY: _____ CONTACT: _____ EMAIL: _____ TEL#: _____ FAX: _____	COMPANY: _____ ADDRESS 1: _____ ADDRESS 2: _____ CITY: _____ STATE: _____ ZIP: _____ COUNTRY: _____ CONTACT: _____ EMAIL: _____ PHONE: _____ FAX: _____

Please Ship Approved RMA(s) to:

CCI - RMA Department
89 Leuning St., S. Hackensack, NJ 07606

ALL RETURNS MUST BE PACKAGED APPROPRIATELY TO AVOID DAMAGE DURING TRANSPORTATION. PRODUCT(S) DEEMED TO HAVE BEEN SHIPPED WITH INSUFFICIENT PACKAGING MAY BE REJECTED AND RETURNED TO SHIPPER

Carrier Information Required

AT&T VERIZON
 SPRINT T-MOBILE

For GENERAL RETURN(S) or REPAIR(S) of ANY CCI COMPONENT, EQUIPMENT or ANTENNA (EXCLUDING RETS)

(CCI USE ONLY)	CCI PART OR MODEL NUMBER	Qty	CCI SERIAL#	CUST. SERIAL# (IF APPLICABLE)	Original CCI PS	FAILURE DESCRIPTION/ REASON FOR RETURN	SITE NAME/#	ADVANCE RPLCMNT REQD?	(CCI USE ONLY) WS	ITEMS REQUIRED (USE FOR SWAPS ONLY)
CCI RMA#										CCI Part # QTY

For RETURN or REPAIR of REMOTE ELECTRICAL TILT ACTUATORS "RETS" (for RETS ONLY)

(CCI USE ONLY)	ANTENNA MODEL	ANTENNA SERIAL #	RET SERIAL #	BAND (LOW, MID, HIGH)	RET LOCATION (LEFT, RIGHT, CENTER)	FAILURE DESCRIPTION/ REASON FOR RETURN	SITE NAME/#	ADVANCE RPLCMNT REQD?	(CCI USE ONLY) WS	ITEMS REQUIRED (USE FOR SWAPS ONLY)
CCI RMA#										CCI Part # QTY

EXAMPLE:

	HPA-6SR-BLU-HB		HJ4516BK01	55-4113-10-022125	HIGH	RIGHT	Jammed / Unresponsive	NY0123	Yes	
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Figure C.1 Return Material Authorization (RMA) Form