Earl J. Lum +1-650-430-2221 elum@ejlwireless.com





NSN W-CDMA/LTE 2100MHz Remote Radio Unit 210W (3 x 70W) 084629A.101 Model FRGP B1

April 2014



Entire contents © 2014 EJL Wireless Research LLC. All Rights Reserved. Reproduction of this publication in any form without prior written permission is strictly forbidden and will be prosecuted to the fully extent of US and International laws. The transfer of this publication in either paper or electronic form to unlicensed third parties is strictly forbidden. The information contained herein has been obtained from sources EJL Wireless Research LLC deems reliable. EJL Wireless Research disclaims all warranties as to the accuracy, completeness or adequacy of such information. EJL Wireless Research LLC shall have no liability for errors, omissions or inadequacies in the information contained herein or for the interpretation thereof. The reader assumes sole responsibility for the selection of these materials to achieve its intended results. The opinions expressed herein are subject to change without notice.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	6
Active/Passive Component Summary	6
Important Note:	6
CHAPTER 1: NSN FLEXI BTS SYSTEM	7
Overview of Flexi Product Offering	7
Chapter 2: Mechanical Analysis	10
Mechanical Analysis	
Fan Carrier Assy	12
DC and RF Cables	
CHAPTER 3: TRANSCEIVER/POWER AMPLIFIER	17
CHAPTER 4: POWER SUPPLY/LNA/FILTER HOUSING	22
CHAPTER 5: TRX SUBSYSTEM	28
Digital Processor and TRx PCB	28
Area A: Baseband Signal Processing	30
Area B: A/D and D/A Converter Functions	
Area C:	
Area D: TX I/Q Modulator and RX Downconversion	
RF Transceiver Block Diagram and Circuit Paths	
CHAPTER 6: POWER SUPPLY SUB SYSTEM	
CHAPTER 7: LNA/OVP SUB SYSTEM	55
Area A: Low Noise Amplifier	
Area B: Filter Tuning Processing	
Area C: LNA/OVP Power Supply	
Area D: Supporting Circuitry	
Area E: Over Voltage Protection (OVP) Circuits	
Area F: RF Detector Circuits and Stepper Motor Circuit and Power Conditioning	
CHAPTER 8: RF AMPLIFIER SUBSYSTEM	
Power Amplifier	
RF Power Amplifier Shield	
RF Power Amplifier Heat Sink	
CHAPTER 9: DUPLEXER CAVITY FILTER RF SUBSYSTEM	
APPENDIX A - PASSIVE COMPONENT MARKET SHARE/CASE SIZE ANALYSIS	93
APPENDIX B - ACTIVE COMPONENT MARKET SHARE ANALYSIS	97

TABLES

Table 1: DC/RF Cables	14
Table 2: Area A Bill of Materials	31
Table 3: Area B1/B3 Bill of Materials	34
Table 4: Area B2 Bill of Materials	35
Table 5: Area C Bill of Materials	37
Table 6: Area D1/D3 Bill of Materials	40
Table 7: Area D2 Bill of Materials	
Table 8: -48V Input PCB Bill of Materials	
Table 9: Power Supply Bill of Materials, Top View	
Table 10: Power Supply Bill of Materials, Top View (con't)	53
Table 11: Power Supply Bill of Materials, Bottom View	54
Table 12: LNA RF Shield Bill of Materials	
Table 13: LNA/OVP Areas A1/A2/A3 Bill of Materials	
Table 14: LNA/OVP Area B Bill of Materials	
Table 15: LNA/OVP Area C Bill of Materials	
Table 16: LNA/OVP Area D Bill of Materials	
Table 17: LNA/OVP Area E Bill of Materials	
Table 18: LNA/OVP Area F Bill of Materials	
Table 19: RF Power Amplifier Bill of Materials	
Table 20: Bill of Materials, Filter Housing Assembly	
Table 21: Passive Component Case Size Distribution by System Subsection	
Table 22: Identified Passive Component Supplier Distribution by System Subsection	
Table 23: Active/Passive Component Distribution by System Subsection	
Table 24: Active Semiconductor/Component Vendor Distribution by System Subsection	98

EXHIBITS

Exhibit 1: NSN Flexi System Module FSMF (L), RRU (R)	
Exhibit 2: Outdoor Installation Example	
Exhibit 3: Flexi RRU System Block Diagram	
Exhibit 4: RRU Connection Interfaces	
Exhibit 5: RRU, Front View	
Exhibit 6: RRU, Back View	11
Exhibit 7: RRU, Top View	11
Exhibit 8: RRU, Bottom View	12
Exhibit 9: Fan Carrier Assy, External View	13
Exhibit 10: Fan Carrier Assy, Internal View	
Exhibit 11: Fan Carrier Assy, Top View	
Exhibit 12: Cable A & B.	14
Exhibit 13: Cable C	
Exhibit 14: Cable 7	
Exhibit 15: Cables Location Diagram	
Exhibit 16: Cables/Connectors System Block Diagram	
Exhibit 17: RRU Top View	
Exhibit 18: TRx Housing Heat Sink Fin Pattern	
Exhibit 19: TRx/Power Amplifier Housing, External View	
Exhibit 20: TRx/Power Amplifier Housing, Internal View	
Exhibit 21: TRx/Power Amplifier Housing w/o Power Amplifiers and Transceiver, Internal View	
Exhibit 22: TRx RF Shield, External View	21
Exhibit 23: TRX RF Shield, Internal View	
Exhibit 24: Power Supply/LNA/Filter Chassis, Bottom View	22
Exhibit 25: Power Supply/LNA/Filter Chassis, Top View	
Exhibit 26: Power Supply/LNA/Filter Chassis Shield, Top View	
Exhibit 27: Power Supply/LNA/Filter Chassis Shield, Bottom View	20
Exhibit 20: Power Supply/LNA/Filter Criassis Silierd, Bottorin View	25
Exhibit 28: Power Supply/LNA/Filter Housing without Shield	20
Exhibit 29: Power Supply and LNA PCBs	21
Exhibit 30: TRx PCB, Top View	29
E 1 11 11 04 TB BOB B 11 11	
Exhibit 31: TRx PCB, Bottom View	
Exhibit 32: Area A Component Diagram	30
Exhibit 32: Area A Component Diagram	30 30
Exhibit 32: Area A Component Diagram	30 30 32
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram	30 32 33
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram	30 32 33
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram	30 32 33 33
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout	30 32 33 36
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram	30 32 33 36 38
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram	30 32 33 36 38 39
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path	30 32 33 36 38 39 39
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3	30 32 33 36 38 39 39
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path	30 32 33 36 38 39 39
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3	303233363839394243
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2	303233363839394243
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path	30323336383939424344
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 46: Area D2 Block Diagram	30 32 33 36 38 39 42 43 44 44
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram	30 32 33 36 38 39 42 43 44 44 45
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path	30 32 33 36 38 39 42 43 44 45 45
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly	30 32 33 36 38 39 42 43 44 45 45 46
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 49: -48V PCB with Insulator Material Removed Exhibit 50: -48V PCB, Front and Back Views	30 32 33 36 38 39 42 43 44 45 45 45 46
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 45: Area D2 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 50: -48V PCB, Front and Back Views Exhibit 51: Power Supply Shield, External View	30 32 33 36 38 39 42 43 44 45 45 46 46 46
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 49: -48V PCB with Insulator Material Removed Exhibit 50: -48V PCB, Front and Back Views Exhibit 51: Power Supply Shield, Internal View Exhibit 52: Power Supply Shield, Internal View	30 32 33 36 38 39 42 43 44 45 45 45 46 46 46
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D Layout Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 49: -48V PCB, Front and Back Views Exhibit 50: -48V PCB, Front and Back Views Exhibit 51: Power Supply Shield, Internal View Exhibit 53: Power Supply PCB, Top View	30 32 33 36 38 39 42 43 44 45 45 46 46 46 46 46
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 49: -48V PCB with Insulator Material Removed Exhibit 50: -48V PCB, Front and Back Views Exhibit 51: Power Supply Shield, Internal View Exhibit 53: Power Supply PCB, Top View Exhibit 54: Power Supply OV and -48V Terminals	30 32 33 36 38 39 42 43 44 45 45 46 46 46 46 46
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 49: -48V PCB with Insulator Material Removed Exhibit 50: -48V PCB, Front and Back Views Exhibit 50: -48V PCB, Front and Back Views Exhibit 51: Power Supply Shield, Internal View Exhibit 52: Power Supply PCB, Top View Exhibit 54: Power Supply OV and -48V Terminals Exhibit 55: Power Supply OV and -48V Terminals Exhibit 55: Power Supply OV and -48V Terminals Exhibit 55: Power Supply Component Diagram, Top View	30 32 33 36 38 39 42 43 44 45 45 45 46 45 46 45 46 45 46 47
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 49: -48V PCB with Insulator Material Removed Exhibit 50: -48V PCB, Front and Back Views Exhibit 50: -48V PCB, Front and Back Views Exhibit 51: Power Supply Shield, External View Exhibit 52: Power Supply Shield, Internal View Exhibit 53: Power Supply Od and -48V Terminals Exhibit 55: Power Supply Component Diagram, Top View Exhibit 56: Power Supply Component Diagram, Top View Exhibit 56: Power Supply Component Diagram, Top View (con't)	30 32 33 36 38 39 42 43 44 45 45 45 45 45 46 47 48 49 49
Exhibit 32: Area A Component Diagram Exhibit 33: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D Layout Exhibit 39: Area D Layout Exhibit 39: Area D Layout Exhibit 40: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 49: -48V PCB, Front and Back Views Exhibit 50: -48V PCB, Front and Back View Exhibit 51: Power Supply Shield, Internal View Exhibit 52: Power Supply Shield, Internal View Exhibit 53: Power Supply PCB, Top View Exhibit 55: Power Supply Ovand -48V Terminals Exhibit 56: Power Supply Component Diagram, Top View Exhibit 56: Power Supply Component Diagram, Top View Exhibit 57: Power Supply Component Diagram, Top View Exhibit 57: Power Supply Component Diagram, Bottom View	30 32 33 36 38 39 42 43 44 45 45 46 46 46 47 48 49 49 50
Exhibit 32: Area A Component Diagram Exhibit 33: Area A Block Diagram Exhibit 34: Area B Layout Exhibit 35: Area B1/B3 Component Diagram Exhibit 36: Area B2 Component Diagram Exhibit 37: Area C Diagram Exhibit 38: Area D Layout Exhibit 39: Area D1/D3 Component Diagram Exhibit 40: Area D2 Component Diagram Exhibit 41: Transmit Digital/RF Circuit Path Exhibit 42: Transmit Block Diagram including B1/B3/D1/D3 Exhibit 43: Transmit Block Diagram including B2/D2 Exhibit 44: Receive RF/Digital Circuit Path Exhibit 45: Area D1/D3 Block Diagram Exhibit 46: Area D2 Block Diagram Exhibit 47: Transmit Monitoring Feedback RF/Digital Path Exhibit 48: -48V DC Power Cable Assembly Exhibit 49: -48V PCB with Insulator Material Removed Exhibit 50: -48V PCB, Front and Back Views Exhibit 50: -48V PCB, Front and Back Views Exhibit 51: Power Supply Shield, External View Exhibit 52: Power Supply Shield, Internal View Exhibit 53: Power Supply Od and -48V Terminals Exhibit 55: Power Supply Component Diagram, Top View Exhibit 56: Power Supply Component Diagram, Top View Exhibit 56: Power Supply Component Diagram, Top View (con't)	303233363839424344454545464748495051

Exhibit 61:	Area A Component Diagram	57
Exhibit 62:	Area A RF Block Diagram	58
Exhibit 63:	Area B Component Diagram	60
Exhibit 64:	Area C Component Diagram	62
Exhibit 65:	Area D Component Diagram	64
Exhibit 66:	Area E Component Diagram	66
Exhibit 67:	Area F Component Diagram	68
Exhibit 68:	RF Power Amplifier Housing	70
Exhibit 69:	RF Power Amplifier Module	71
	RF Power Amplifier Module, Shield Removed	
Exhibit 71:	RF Power Amplifier PCB, Top View	73
Exhibit 72:	Exhibit 73: RF Power Amplifier PCB, Bottom View	74
Exhibit 74:	RF Power Amplifier Component Diagram	75
Exhibit 75:	RF Power Amplifier Block Diagram	76
	Power Amplifier RF Path	
Exhibit 77:	Driver Transistor Matching Circuit	78
	Output Transistor Matching Circuit	
	RF Power Amplifier Construction, Exploded Side View	
	RF Power Amplifier Shield, External View	
	RF Power Amplifier Shield, Internal View	
	RF Power Amplifier Heat Sink, Top	
	RF Power Amplifier Heat Sink, Bottom View	
	RF Power Amplifier Heat Sink, Side View	
	RF Power Amplifier Heat Sink, Front View	
	Flexi 3-Sector Duplexer Filters	
	Flexi 3-Sector Duplexer Filters Tx/Rx Paths	
	Flexi 3-Sector Duplexer Filters w/RF Shield removed	
	Area A Enlarged	
	Tx/Rx Sense Circuit on LNA PCB	
	Duplexer Filters RF Shield, External View	
	Duplexer Filters RF Shield, Internal View	
	Duplexer Filter Tuning Points (x3)	
	Passive Component Case Size Distribution	
Exhibit 95:	Identified Passive Component Market Share by Vendor	96
	Active Semiconductor Component Share	
	High Pin Count IC vs. Discretes	
Exhibit 98:	Active Semiconductor Market Share by Vendor	01
Exhibit 99:	High Pin Count (64+) Active Semiconductor Market Share by Vendor	02