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TITLE

INTEGRATED TEST SPECIFICATION FOR THE TCAS RT-950/951 COMPUTER UNIT, PART NO. 7517900-VAR, AND TCAS RT-952 COMPUTER UNIT, PART NO. 7517905-VAR

PREPARED BY:	DATE	APPROVED BY TECHNICAL MANAGER	DATE	APPROVED BY ENGINEERING DEPARTMENT MANAGER	DATE
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G	SEE PAGE INDEX SHEET CR-2	C.O. 78163 (BREAK IN*)	MARK D. SMITH 24 JUN 99
H	SEE PAGE INDEX SHEET CR-2	C.O. 78168 (MAKE)	MARK D. SMITH
J	SEE PAGE INDEX SHEET CR-2	C.O. 78175 (MAKE)	MARK D. SMITH 14 DEC 99
K	SEE PAGE INDEX SHEET CR-2	C.O. 96267 (BREAK IN*)	MARK D. SMITH 18 MAY 00
L	SEE PAGE INDEX SHEET CR-2	C.O. 78318 (MAKE)	MARK D. SMITH 26 OCT 00
M	SEE PAGE INDEX SHEET CR-2	C.O. 25256A (BREAK IN*)	Mark D. Smith 14 Jan 02
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H **TITLE: INTEGRATED TEST SPECIFICATION FOR THE TCAS RT-950/951 COMPUTER UNIT, PART NO. 7517900-VAR, AND TCAS RT-952 COMPUTER UNIT, PART NO. 7517905-VAR**

1. SCOPE

H This Integrated Test Specification (IT) establishes the manufacturing and operational requirements that the TCAS RT-950, RT-951 Computer Unit, Part No. 7517900-VAR, and TCAS RT-952 Computer Unit, Part No. 7517905-VAR must meet to ensure that the unit is in proper operating condition.

2. REFERENCE DOCUMENTS

These documents are not required for performance of the test procedure. The purpose of listing these documents is to provide an aid for troubleshooting should any discrepancies occur during the performance of the test procedure.

H	7517900	End Item Drawing - TCAS RT-950/951 Computer Unit
	7517902	External Interconnect Drawing
	7517903	Internal Wiring Drawing
H	7517905	End Item Drawing - TCAS RT-952 Computer Unit
	7517906	Outline and Installation Drawing
	7517940-901	ARINC 615 Harness Assembly Drawing
	7517941-901	Power Supply/Interconnect Harness Assembly Drawing
	7517920-904	A1 Interconnect CCA Drawing
G	7517923	A3A1 Spectrum Filter Assembly Drawing
	7517925-902	A2 Processor CCA Drawing
M	7517925-903	A2 Processor CCA Drawing
	7517930-902	A4 Power Supply/Modulator CCA Drawing
G	7517935-902	A3 Transmitter Drawing
G	7517935-910	A3A2 Transmitter CCA Drawing
	7517945-902	A5 Receiver I/O CCA Drawing
E	7517945-903	A5 Receiver I/O CCA Drawing
M	7517945-904	A5 Receiver I/O CCA Drawing
F	BI7517900	ESS and Post-ESS Requirements for TCAS 2000
	EB7517909	TCAS Bench Test Software Requirements
F	EB7517987	Product Test Software Release Numbers and CRCs
	EB7517999	TCAS 2000 Product Specifications
G	MT7517900	Manufacturing Test Specification – TCAS RT-95X

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3. GENERAL INFORMATION

3.1 General Requirements

3.1.1 All tests shall be performed under the following conditions:

Temperature = 25 ± 5 °C

Relative humidity = 95% maximum

Pressure = between 20 and 32 inHg

3.1.2 Power to the UUT should be removed before attaching or removing any interconnecting systems.

G 3.1.3 For units in initial manufacturing build and test only, perform calibration procedure in Appendices B or C before testing unit for the first time. Note that this does not apply to units that have been tested previously.

3.2 General RF Test Requirements

3.2.1 All antenna ports must be terminated in 50 ohms while power is applied to the UUT.

3.2.2 Test equipment connected to the antenna ports must have a voltage standing wave ratio (VSWR) of less than 1.5:1.

3.2.3 Test equipment connected to the antenna ports shall withstand peak power levels of at least 1000 W and average power levels of at least 2 W.

3.2.4 RF power values are specified as measured at the rear connector of the UUT. If cabling or test equipment introduces losses into the measurement, these losses shall be allowed for in the values reported by the test equipment.

3.2.5 Figures 2 through 6 provide information about pulse identification and the method of measuring pulse parameters for the RF measurements. The actual specification values for these parameters are listed in the RF test procedure tables.

4. POWER REQUIREMENTS

115 V ac, 400 ± 10 Hz, 200 W minimum, voltage variable from 90 to 140 V ac.

28 V dc, 200 W minimum, voltage variable from 16 to 35 V dc.

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5. TEST EQUIPMENT

5.1 Honeywell Test Equipment

TCAS 2000 MTS - Part No. T336255 (This is equivalent to JCAir P/N 01-0956-00. Only one of these is required)

- * Aircraft interface unit - Part No. T336253 (see figure 7)
- * RF interface unit - Part No. T336254 (see figure 8)
- * PDL panel - Part No. T336259

F

- * Tray assembly - Part No. T336255-26

TCAS PC Test Software - Part No. MT7517900

* Identified equipment is included in TCAS 2000 MTS, P/N T336255

5.2 Commercial Test Equipment

JCAir 01-0956-00 TCAS 2000 MTS (This is equivalent to Honeywell P/N T336255. Only one of these is required.)

M

- * HP 8648B signal generator

M

- * HP 8990A peak power analyzer

M

- * HP 84815A peak power sensor

M

- * HP 6032A DC power supply

M

- * Cal Instruments AC power supply 2001L

M

- * Personal Computer requirements or equivalent:

  Intel Pentium 200 based system
  Desk top case
  32 megabytes of memory
  IEEE488 card, National Instruments P/N AT-GPIB/TNT
  ARINC 429 card, Pacific Aviation Corp. P/N PAC-42C-2X4/H-I
  with option PAC-429-S-NTIDLL
  Hard drive EIDE, Western Digital P/N AC22100AB
  3.5” floppy drive
  8X CD ROM IDE
  Microsoft Windows NT 4.0/3.51 (Software operation system)
  1 parallel, 2 serial ports
  Keyboard
  Microsoft 2 button PS2 mouse

M

- * IEEE-488 interface cables - HP Part No. 10833A (seven required)

M

Fluke 97 DVM or equivalent

M

HP 34970A Data Acquisition Unit (optional) as an automated equivalent to the Fluke 97.

M

* Identified equipment is included in TCAS 2000 MTS, P/N T336255.

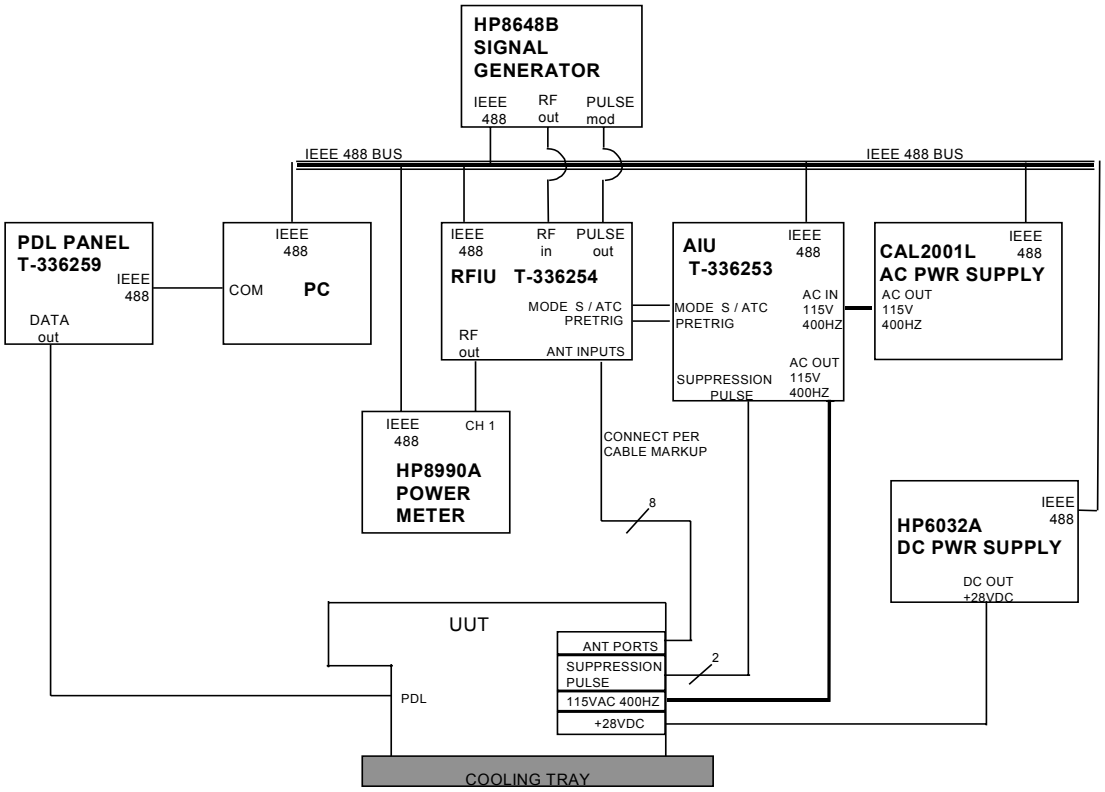

Figure 1. MTS Test Equipment Setup

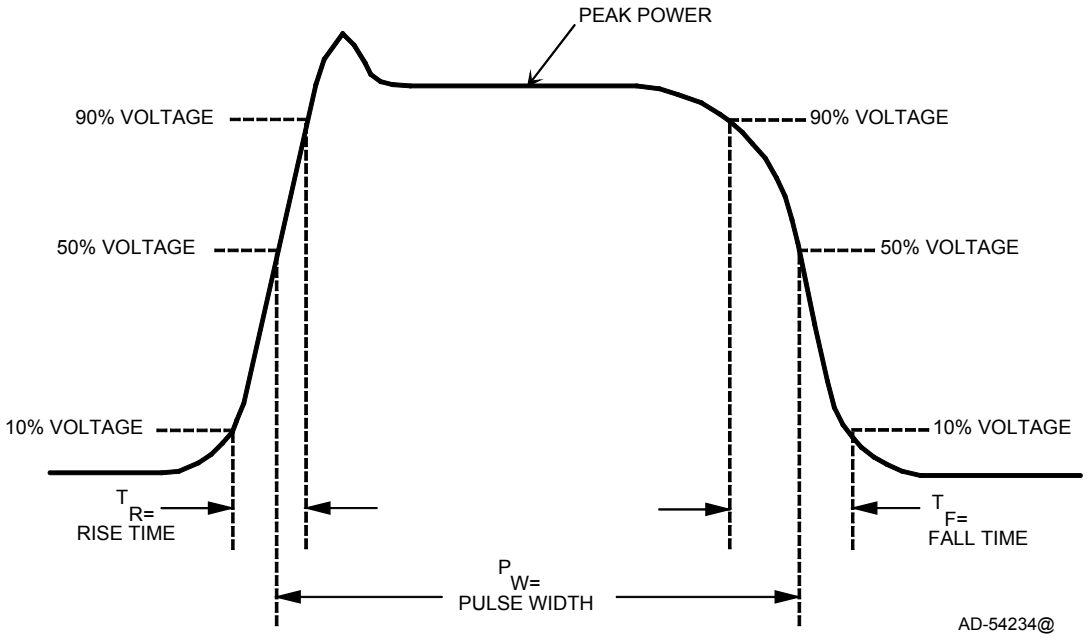

Figure 2. Basic Pulse Measurements

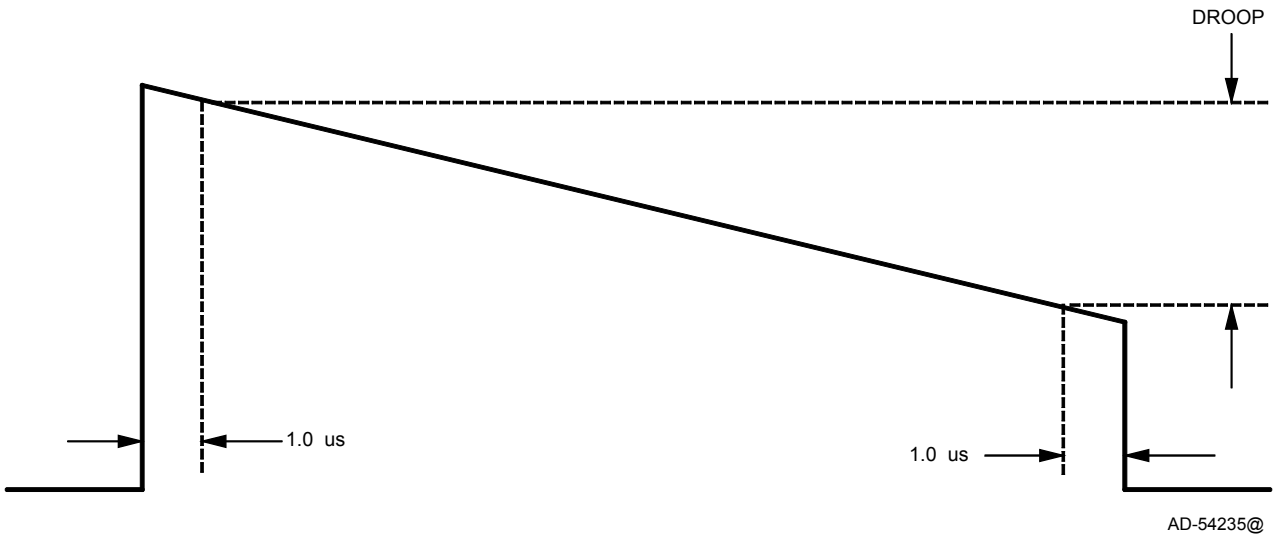

Figure 3. Pulse Droop Measurements

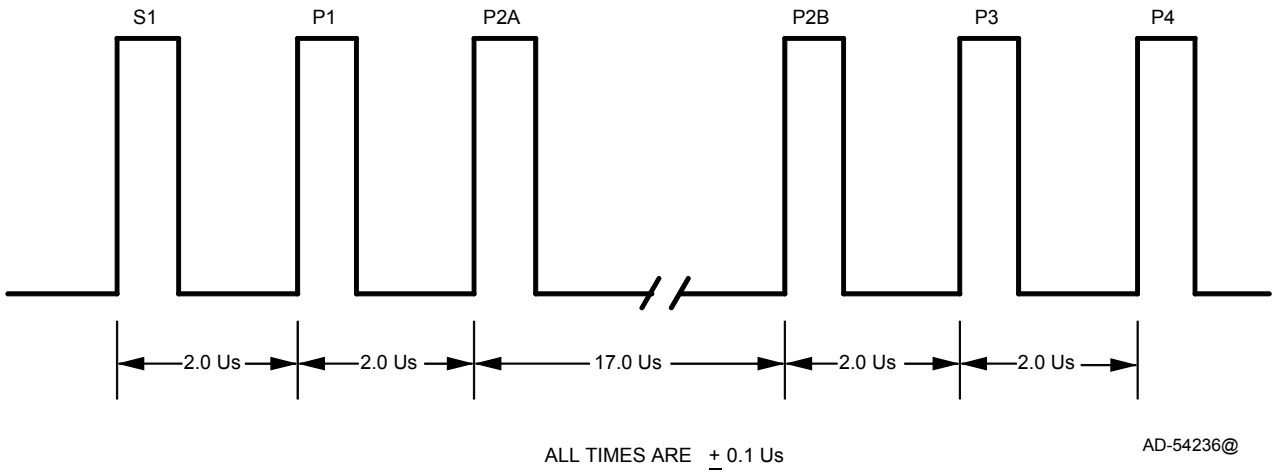

Figure 4. ATCRBS Pulse Format

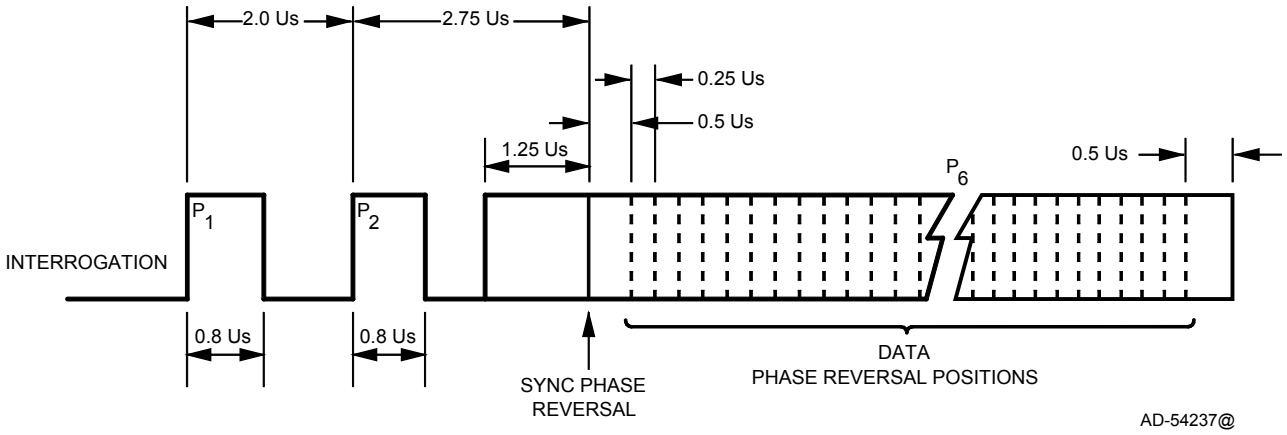

Figure 5. Mode S Pulse Format

Bit
1514131211109 8 7 6 5 4 3 2 1 0
| Z | N | S |<-------- PD --------->|<--------- CV ------------>|

NOTES:

Z = 1 Power at 0 degree port > Power at 180 degree port
Z = 0 Power at 0 degree port < Power at 180 degree port

N = 1 Power at 90 degree port > Power at 270 degree port
N = 0 Power at 90 degree port < Power at 270 degree port

S = 1 Power at 0 or 180 degree port < Power at 90 or 270 degree port
S = 0 Power at 0 or 180 degree port > Power at 90 or 270 degree port

PD = Power Difference in dB, 00 =0.000 dB
3F = 18.207 dB

Multiply the PD (Power Difference in dB) by -1 if:

Z = 1 and N = 1 and S = 1
or Z = 0 and N = 1 and S = 0
or Z = 0 and N = 0 and S = 1
or Z = 1 and N = 0 and S = 0

CV = Composite Video (Overall Power Level) in dBm, 00 = -92.889 dBm
7F = -19.511 dBm

Figure 6. AOA Word Format

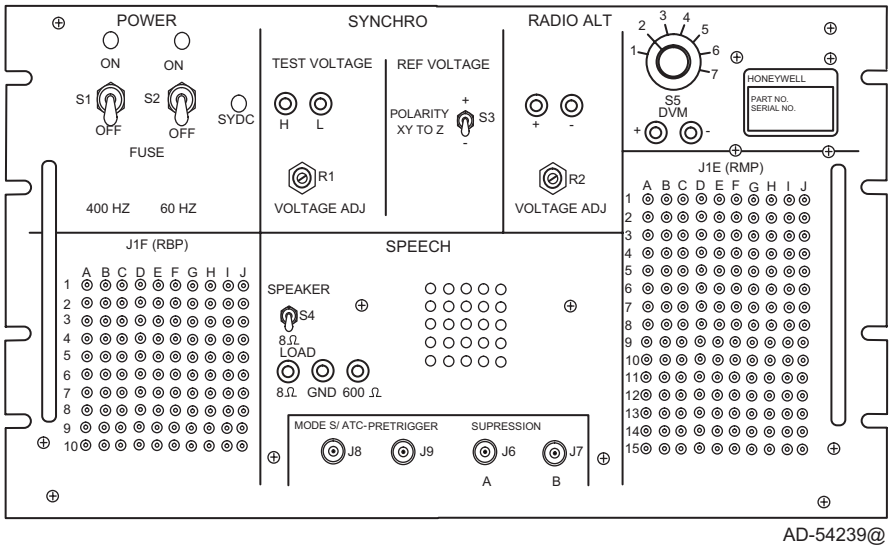

Figure 7. Aircraft Interface Unit

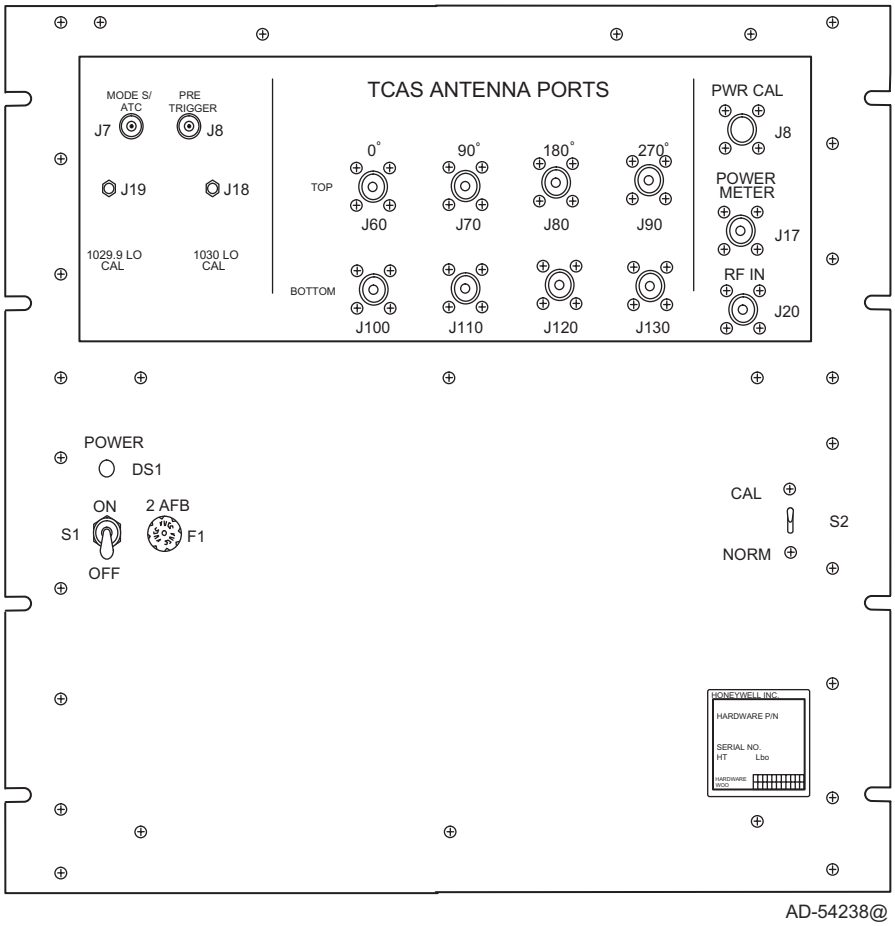

Figure 8. RF Interface Unit

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6. TEST SETUP

6.1 Power up Honeywell and commercial test equipment and allow it to warm up appropriately. Verify that test equipment used is calibrated and functioning properly.

6.2 Connect the test equipment to the UUT (see figure 1). Set IEEE-488 addresses as follows (in Hex):

Aircraft interface unit:	16
RF interface unit:	25
HP 8648B signal generator:	19
Cal Instruments AC power supply 2001L	01
HP 8990A peak power analyzer:	07
HP 6032A DC power supply	05
H HP 34970A Data Acquisition Switch Unit (Optional)	09

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7. TEST REQUIREMENTS

7.1 Within each section of the test procedure (indicated by an underlined title in the Test Description and Work Steps columns), the test steps shall be performed in the order listed. In the event of failure and repair, the section must be performed again from the beginning. It is allowable for the sections requiring user interaction to be grouped together and run in a different order than that specified.

F 7.2 All control settings or external connections that are altered during the course of a section of the procedure shall be returned to their initial settings before starting a new section of the procedure.

7.3 This procedure is intended to be performed by a knowledgeable technician or engineer. It is assumed that the equipment will be energized and deenergized as appropriate when changing connections and setups.

H 7.4 For each end item dash number (7517900-XXXXX or 7517905-XXXXX) and minimum hardware mod level, the corresponding CAS PDL part number, SURV PDL part number and FPGA truth table part number are shown in Table 7-1.

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Table 7-1. CAS PDL, SURV PDL and FPGA Part Numbers

REV LTR	Dash No.	Minimum Hardware Mod	CAS PDL Part Number	SURV PDL Part Number	FPGA TT Part Number
H	10XXX 55XXX	-	PS4084562-101	PS4084562-101	TT7517989-101
H	10XXX 55XXX 61XXX 71XXX	B	PS4084562-102	PS4084562-102	TT7517989-102
H	10XXX 55XXX 56XXX 61XXX 71XXX	C	PS4084562-102	PS4084562-102	TT7517989-103

H 7.5 For each end item dash number (7517900-XXXXX or 7517905-XXXXX) and software mod level, the corresponding Operational software part number is shown in Table 7-2.

Table 7-2. Operational Software Part Numbers

REV LTR	Dash No.	Software Mod	Operational Software Part Number	Operational Software Part Number Displayed
	10001	-	PS4084561-901	3410-HNP-02B-01
E	10002	A	PS4084561-902	3413-HNP-02B-02
K	10003	A	PS4084561-904	3415-HNP-02B-04
M	10004	A	PS4084561-912	3416-HNP-02B-07
	55001	-	PS4084561-901	3410-HNP-02B-01
E	55002	A	PS4084561-902	3413-HNP-02B-02
K	55003	A	PS4084561-904	3415-HNP-02B-04
M	55004	A	PS4084561-912	3416-HNP-02B-07
K	56101	A	PS4084561-904	3415-HNP-02B-04
M	56102	A	PS4084561-912	3416-HNP-02B-07
F	61002	A	PS4084561-902	3413-HNP-02B-02
G	71002	A	PS4084561-902	3413-HNP-02B-02
K	71003	A	PS4084561-904	3415-HNP-02B-04
M	71004	A	PS4084561-912	3416-HNP-02B-07

7.6 The following is a description of the intended interpretation of the column headings:

Column	Description
Rev Ltr	Revision letters are used to identify revised material.
Test No.	Tests are numbered in sequence.
Opr Limits	Unit under test (UUT) shall meet these limits when tested at other than the manufacturing facility. When an item is marked OPTIONAL, the corresponding test is not required except as an aid in troubleshooting.
Test Description	These items are the parameters to which the UUT was designed and aid in troubleshooting by specifying the input and output signal terminals. All conditions required are not repeated for each test, and conditions established in previous tests also apply.
Switch Pos	Positions to which switches must be set are listed in required order and are grouped to correspond to applicable Work Steps.
Work Steps	This column defines the operations necessary to perform a test and achieve a result. Set switches to designated positions before performing corresponding work step.
Mfg Limits	UUT shall meet these limits at final buyoff before customer delivery.

7.7 Naming Convention for Integrated Test Specification works steps:

Equipment	Reference Name	Descriptions
T336253 Aircraft Interface Unit	AIU	Precedes instructions sent via the IEEE 488 to the AIU as specified
T336254 Radio Frequency Interface Unit	RFIU	Precedes instructions sent via the IEEE 488 to the AIU as specified
T336259 Program Data Link Unit	PDL	Precedes instructions to use inputs/outputs on the Program Data Loader panel
T336255 Manual Test Station	MTS	Precedes instructions to make measurements or manual changes on the Station.
Personal Computer Keyboard	PC	Precedes instructions to use the personal computer keyboard input.
Personal Computer Monitor	CRT	Precedes instructions to view a value on the personal computer video screen or evaluate a return from the UUT.
Unit Under Test	UUT1	Precedes instructions sent to the Unit Under Test via RS-422. The instruction notation is defined in EB7517909
Unit Under Test	UUT2	Precedes instructions sent to the Unit Under Test via ARINC-429
+28 VDC Power Supply	PSDC	Precedes instructions sent to DC power supply via IEEE 488 Bus.
115 VAC 400 Hz Supply	PSAC	Precedes instructions sent to AC power supply via IEEE 488 Bus.

G

7.8 The TCAS 1500/2000 Computer Unit shall be tested using product test software as specified in EB7517987. Instructions for loading product test software are given in Appendix A.

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	1.0			AC/DC POWER SUPPLY TEST	Initial Setup: Per figure 1.		AC/DC POWER SUPPLY TEST **MTS**: Insert UUT into mount.	
				Apply 115 ± 5 V ac power to unit. P1C-1 115 V AC(H) P1C-7 115 V AC(C)			**PSAC:** Adjust to 115 ± 5 V AC 3 AMPS.	
	1.1	0.35 to 0.85 Amps (RMS)		With the voltage applied and the unit not transmitting the current draw shall be as specified.			**PSAC:** The amp meter shall be as specified. **WARNING - LETHAL VOLTAGES ARE PRESENT ON THESE PINS**	0.35 to 0.85 Amps (RMS)
	1.2	107 to 123 V ac		Verify that 115 V ac is present on the ARINC 615 PDL Connector pins. P2-20 115 V AC(H) P2-22 115 V AC(C)			**PDL:** Connect an AC DVM to TP1 (H) and TP2 (L). The voltmeter shall read as specified.	107 to 123 V ac
	1.3	C1234NC S1234NC		Verify that the unit initializes as a cold start with no errors. Apply 97 ± 5 V ac power to unit.			**CRT:** Shall return the following data. **PSAC:** Adjust the supply to 97 ± 5 V ac 3 AMPS	C1234NC S1234NC
	1.4	+4.80 to +5.30 V dc		Check the +5 V dc power supply voltage P1F-10A +5 V-MON P1C-8 Signal GND			**AIU:** Connect DC DVM between P1F-10A (+) and signal ground (-). The voltmeter shall read:	+4.80 to +5.30 V dc
	1.5	-5.0 to -6.0 V dc		Check the -5 V dc power supply voltage P1F-10B -5V-MON P1C-8 Signal GND			**AIU:** Connect DC DVM between P1F-10B (+) and signal ground (-). The voltmeter shall read:	-5.0 to -6.0 V dc

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	1.6	+13.25 to +16.25 V dc		Check the +15 V dc power supply voltage P1F-10C +15V-MON P1C-8 Signal GND			**AIU:** Connect DC DVM between P1F-10C (+) and signal ground (-). The voltmeter shall read:	+13.65 to +15.85 V dc
	1.7	-13.80 to -16.80 V dc		Check the -15 V dc power supply voltage P1F-10D -15V-MON P1C-8 Signal GND			**AIU:** Connect DC DVM between P1F-10D (+) and signal ground (-). The voltmeter shall read:	-14.20 to -16.40 V dc
	1.8	+3.50 to +4.00 V dc		With the FAN discrete OFF, check the +80 V dc power supply voltage P1F-10E +80V-MON P1C-8 Signal GND	**UUT1:** "DOUT 1 0000"		**AIU:** Connect DC DVM between P1F-10E (+) and signal ground (-). The voltmeter shall read:	+3.50 to +4.00 V dc
	1.9	+3.20 to +3.70 V dc		With the FAN discrete ON, check the +80 V dc power supply voltage.	**UUT1:** "DOUT 1 8000"		**AIU:** Connect DC DVM between P1F-10E (+) and signal ground (-). The voltmeter shall read:	+3.20 to +3.70 V dc
	1.10	-36.0 to -46.0 V dc		Check the -40 V dc power supply voltage P1F-10F -40V-MON P1C-8 Signal GND			**AIU:** Connect DC DVM between P1F-10F (+) and signal ground (-). The voltmeter shall read:	-36.0 to -46.0 V dc
				Apply 134 ± 5 V ac power to unit.			**PSAC:** Adjust the supply to 134 ± 5 V ac 3 AMPS	
	1.11	+4.80 to +5.30 V dc		Check the +5 V dc power supply voltage P1F-10A +5V-MON P1C-8 Signal GND			**AIU:** Connect a DC DVM between P1F-10A and signal ground. The voltmeter shall read:	+4.80 to +5.30 V dc
				Remove AC power from unit	**AIU:** "S1:OFF"		**PSAC:** Adjust the supply to 0 V AC 0 amps.	
				Apply +27.5 ± 1.0 V dc to unit. P1C-10 28 V dc Power P1C-3 28V dc Return			**PSDC:** Adjust DC power supply for 27.5 V dc 5 AMPS.	
	1.12	1.1 to 2.1 Amps DC		With the voltage applied and the unit not transmitting the current draw shall be as specified.			**PSDC:** The amp meter on the power supply shall be as specified.	1.1 to 2.1 Amps DC
				Apply 20.5 ± 1.0 V dc power to unit.			**PSDC:** Adjust the supply to 20.5 ± 1.0 V dc, 5 Amps.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	1.13	+4.80 to +5.30 V dc		Check the +5 V dc power supply voltage P1F-10A +5V-MON P1C-8 Signal GND Apply +27.5 ± 1.0 V dc to unit.			**AIU:** Connect DC DVM between P1F-10A (+) and signal ground (-). The voltmeter shall read: **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 Amps.	+4.80 to +5.30 V dc
	1.14	25.5 to 29.5 V dc		Verify that 28 V dc is present on the ARINC 615 PDL Connector pins. P2-37 28 V dc Power P2-38 28 V dc Return			**PDL:** Connect a DC DVM to TP3 (+) and TP4 (-). The voltmeter shall measure as specified:	25.5 to 29.5 V dc

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	2.0			DC POWER SUPPLY TEST Section Deleted			DC POWER SUPPLY TEST	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	3.0			FRONT PANEL / FAN TEST	Initial Test Setup **AIU:** "S1:OFF"		FRONT PANEL / FAN TEST **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS.	
	3.1	PASS		Verify that the LEDs are turned on and off according to the following repetitive sequence, approximately 1 second per item: 1. All LEDs on. 2. Only TCAS PASS on. 3. Only TCAS FAIL on. 4. Only TOP ANT on. 5. Only BOT ANT on. 6. Only HDG on. 7. Only TA DISP on. 8. Only RA DISP on. 9. Only RAD ALT on. 10. Only XPDR BUS on. 11. Only ATT on. 12. All LEDs off.			Verify that the LEDs are turned on and off according to the following repetitive sequence, approximately 1 second per item: 1. All LEDs on. 2. Only TCAS PASS on. 3. Only TCAS FAIL on. 4. Only TOP ANT on. 5. Only BOT ANT on. 6. Only HDG on. 7. Only TA DISP on. 8. Only RA DISP on. 9. Only RAD ALT on. 10. Only XPDR BUS on. 11. Only ATT on. 12. All LEDs off.	PASS
	3.2	0000		With the front panel switch in the normal position, verify IDW0 bit 15 is a 0.	**AIU:** **"**P1X D00ZX" "P3X D00ZX" "P4X D00ZX" **UUT1:** "DIN"		Type on PC: Port 1 Select Send 00 HEX DATA Port 3 Select Send 00 HEX DATA Port 4 Select Send 00 HEX DATA "DIN" **CRT:** The first 4 digit word shall read:	0000

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	3.3	8000		With the front panel switch in the depressed position, verify IDW0 bit 15 is a 1.	**UUT1:** "DIN"		**UUT:**Depress & hold the front panel test switch. Release the switch. **CRT:** The first of the 4-digit word shall read:	8000
	3.4	Fan not turning		(-55XXX thru -99XXX units only) Turn the fan off (ODW1 bit 15=0) and verify the fan is not turning.	**UUT1:** "DOUT 1 0000"		Observe the fan operation on the front of the unit. The fan shall be as specified.	Fan not turning
	3.5	Fan turning		(-55XXX thru -99XXX units only) Turn the fan on (ODW1 bit 15=1) and verify the fan is turning.	**UUT1:** "DOUT 1 8000"		Observe the fan operation on the front of the unit. The fan shall be as specified	Fan turning

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	4.0			VOICE OUTPUT	Initial Test Setup **AIU:** "S1:OFF"		VOICE OUTPUT **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS.	
	4.1	13.4 to 22.4 Vpp		Generate a 1KHz audio tone for 0.5 seconds at the maximum amplitude and verify the 8Ω output has the correct level. J1E-2F VOICE-8(H) J1E-2G VOICE-8(L)	**AIU:** "S4-8 OHMS" **UUT1:** "VOICE 13 F0 FF"		**AIU:** Connect the PPM oscilloscope input port (+) to the AIU 8Ω test point and oscilloscope (-) GND to the AIU GND test point. **PPM:** The voltage shall be as specified.	15.2 to 20.6 Vpp
	4.2	9.5 to 15.9 Vpp		Generate 1KHz audio tone with amplitude control DAC set to alternating 1 and 0 patterns and verify the 8Ω output has the correct level.	**UUT1:** "VOICE 13 AA FF"		**PPM:** The voltage shall be as specified.	10.8 to 14.6 Vpp
	4.3	4.8 to 8.0 Vpp		Generate 1KHz audio tone with amplitude control DAC set to complementary alternating 1 and 0 patterns and verify the 8Ω output has the correct level.	**UUT1:** "VOICE 13 55 FF"		**PPM:** The voltage shall be as specified.	5.4 to 7.4 Vpp
	4.4	12.6 to 21.0 Vpp		Generate 1KHz audio tone with amplitude control DAC set to alternating 1 and 0 patterns and verify the 600Ω output has the correct level.	**UUT1:** "VOICE 13 00 AA"		**PPM:** The voltage shall be as specified.	14.3 to 19.3 Vpp

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	4.5	6.3 to 10.5 Vpp		Generate 1KHz audio tone with amplitude control DAC set to complementary alternating 1 and 0 patterns and verify the 600Ω output has the correct level.	**UUT1:** "VOICE 13 00 55"		**PPM:** The voltage shall be as specified.	7.1 to 9.7 Vpp
	4.6	Less than 0.5 Vpp		Generate 1KHz audio tone with the reset discrete active and verify the 600Ω output has the correct level.	**UUT1:** "VOICE 13 00 55 R"		**PPM:** The voltage shall be as specified. **PPM:** Remove oscilloscope leads from speech test points.	Less than 0.5 Vpp
	4.7			Generate voices and verify they are clear and recognizable.	A/C Interface Panel Speaker switch to ON Remove 8 Ohm 10W resistor across 8 Ohm output **UUT1:** "VOICE 0F 80 80"		Type on PC: Verify the following voice and command are output: FEMALE: TCAS Test	Female voice is correct and recognizable

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	5.0			PROCESSOR TESTS	Initial Test Setup **AIU:** "S1:OFF"		PROCESSOR TESTS **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc, 5 AMPS.	
	5.1	PASS		Compute the CRC of CAS Flash Program Memory and verify the computed and stored CRC are equal and match the CRC for the specified product test software.	**UUT1:** "MC"		**CRT:** shall read: 00000000 YYYYYYYY where Y is the CAS Flash Program Memory CRC specified in EB7517987.	PASS
	5.2	PASS		Compute the CRC of SURV Flash Program Memory and verify the computed and stored CRC are equal and match the CRC for the specified product test software.	**UUT1:** "MS"		**CRT:** shall read: 00000000 YYYYYYYY where Y is the SURV Flash Program Memory CRC specified in EB7517987.	PASS
	5.3	PASS		Compute the CRC of CAS Flash Audio Memory and verify the computed and stored CRC are equal.	**UUT1:** "MA"		**CRT:** shall read: 00000000 XXXXXXXX where X is a don't care parameter	PASS
	5.4	Computed and Programmed CRC matches		Compute the CRC of CAS Flash FPGA Memory and verify the computed and stored CRC are equal.	**UUT1:** "MX"		**CRT:** shall read:	Computed and Programmed CRC matches
	5.5	P		Test CAS EEPROM memory and fill all memory locations except calibration memory, hardware dash number and serial number with FFFF's.	**UUT1:** "EE"		**CRT:** shall read:	P
	5.6	Computed and Programmed CRC matches		Compute the CRC of EEPROM calibration data and verify the computed and stored CRC are equal.	**UUT1:** "ME"		**CRT:** shall read:	Computed and Programmed CRC matches

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	5.7	111		Test the 3 CAS General Purpose Timers for all operating modes.	**UUT1:** "TC"		**CRT:** shall read:	111
	5.8	111		Test the 3 SURV General Purpose Timers for all operating modes.	**UUT1:** "TS"		**CRT:** shall read:	111
	5.9	C1234NC S1234NC		Test the CAS Heartbeat Monitor to verify it generates a reset if it is written to with a period of less than 10 milliseconds.	**UUT1:** "HBC F"		**CRT:** shall read:	C1234NC S1234NC
	5.10	C1234NC S1234NC		Test the CAS Heartbeat Monitor to verify it generates a reset if it is written to with a period of greater than 74 milliseconds.	**UUT1:** "HBC S"		**CRT:** shall read:	C1234NC S1234NC
	5.11	S1234NC		Test the SURV Heartbeat Monitor to verify it generates a reset if it is written to with a period of less than 10 milliseconds.	**UUT1:** "HBS F"		**CRT:** shall read:	S1234NC
	5.12	S1234NC		Test the SURV Heartbeat Monitor to verify it generates a reset if it is written to with a period of greater than 74 milliseconds.	**UUT1:** "HBS S"		**CRT:** shall read:	S1234NC
	5.13	100000		Clear CAS interrupt flags Generate a CAS MINT0 (RCDR-INT*) by pulsing the 422 External Reply Inputs. P2-12 422 Reply In(+) P2-13 422 Reply In(-)	**UUT1:** "IC" **AIU:** "P3X D04ZX" "P3X D03ZX" **UUT1:** "IC"		PORT 3 Select Send 04 HEX DATA Send 03 HEX DATA **CRT:** shall read:	100000
	5.14	010000		Generate a CAS MINT1 (SURV-CAS-INT*) by performing a write to the SURV processor at address C0E00H	**UUT1:** "WS C0E00 0000" "IC"		**CRT:** shall read:	010000

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	5.15	001000		Generate a CAS MINT2 (SG-SPCH-INT*) by generating a voice command.	**UUT1:** "VOICE 0 FF FF" "IC"		Wait a minimum of 1 second. **CRT:** shall read:	001000
	5.16	000100		Generate a CAS MINT3 (GATD-429-INT*) by transmitting a 429 word.	**UUT1:** "AL 8 0 H 00000001 FF01" "IC"		**CRT:** shall read:	000100
	5.17	000001		Set CAS ID0 status to a 1 (422-FIFO-EMPTY*) by transmitting a 422 Data Word with an external clock source (no clock present).	**UUT1:** "WC C0411 4000" "WC C0417 0001" "WC C0415 5555" "IC"		**CRT:** shall read:	000001
				Clear SURV interrupt flags	**UUT1:** "IS"		Clear SURV interrupt flags	
	5.18	010000		Generate a SURV MINT1 (CAS-SURV-INT*) by performing a write to the CAS processor at address C0414H.	**UUT1:** "WC C0414 0000" "IS"		**CRT:** shall read:	010000
	5.19	001000		Generate a SURV MINT2 (SURV-TMR1*) by causing Timer 1 to time out.	**UUT1:** "WS C0004 0182" "IS"		**CRT:** shall read:	001000
	5.20	000100		Generate a SURV MINT3 (SURV-TMR2*) by causing Timer 2 to time out.	**UUT1:** "WS C0006 0182" "IS"		**CRT:** shall read:	000100

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	5.21	000010		Generate a SURV MINT4 (REPLY-FIFO-EMPTY*) by generating an internal self-test word.	**UUT1:** "ASIC 1" "WS C020E 0060" "WS C0213 0000" "WS C0213 8000" "IS"		**CRT:** shall read:	000010
	5.22	000011		Set SURV ID0 status to a 1 (REPLY-FIFO-EMPTY*) by generating an internal self-test word.	**UUT1:** "ASIC 1" "WS C0213 0000" "WS C0213 8000" "WS C020E 0060" "IS" "WS C0213 0000"		**CRT:** shall read:	000011
	5.23	See Table 7-1		Read CAS DL part number from UUT.	**UUT1:** "RC 00028 0E"		Read CAS DL part number from CAS memory at specified location.	See Table 7-1
	5.24	See Table 7-1		Read SURV DL part number from UUT.	**UUT1:** "RS 00028 0E"		Read SURV DL part number from SURV memory at specified location.	See Table 7-1
	5.25	See Table 7-1		Read FPGA part number from UUT.	**UUT1:** "RC 68008 10"		Read FPGA part number from CAS memory at specified location.	See Table 7-1

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	6.0			DISCRETE INPUT TESTS	Initial Test Setup **AIU:** "S1:OFF"		DISCRETE INPUT TESTS **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS.	
	6.1	0101 0001 1010 0001		Apply a ground to the following discrete inputs: P1F-9G P1F-9E P1E-12B P1F-7G P1F-7J Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to AA		The IDW0 shall read:	0101 0001 1010 0001
	6.2	0010 1110 0100 0001		Apply a ground to the following discrete inputs: P1F-9F P1F-9D PDL-14 PDL-15 P1F-7H Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to 55		The IDW0 shall read:	0010 1110 0100 0001

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	6.3	1001 0101 0110 1010		Apply a ground to the following “WORD 1” discrete inputs: P1E-13G P1F-5K P1F-5F P1F-5H P1E-7E P1E-14C Apply +15V dc to: RMP-2K RMP-4K Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor	**AIU:** Set P3X to AA Set P4X to AA		The IDW1 shall read:	1001 0101 0110 1010
	6.4	0110 1010 1001 0101		Apply a ground to the following “WORD 1” discrete inputs: P1E-1J P1F-5J P1F-5E P1F-5G P1E-7J P1E-13E Apply +15V dc to: RBP-3C RMP-6C Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to 55 Set P4X to 55		The IDW1 shall read:	0110 1010 1001 0101

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	6.5	0U10 1010 1001 0011		Apply a ground to the following “WORD 2” discrete inputs: P1E-6D P1E-6H P1E-6F P1E-3D P1F-5C P1F-5D Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor. The operating baud rate of the unit is automatically detected by the MTS and bit 14 of IDW2 is tested accordingly. The baud rate is determined by the type of UART present in the UUT.	**AIU:** Set P3X to AA		The IDW2 shall read: (U = 0 for baud rate of 38,400 U = 1 for baud rate of 115,200)	0U10 1010 1001 0011
	6.6	0U01 0101 1010 1100		Apply a ground to the following “WORD 2” discrete inputs: P1E-6J P1E-6G P1E-6E P1F-7D P1F-5A P1F-5B Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor. The operating baud rate of the unit is automatically detected by the MTS and bit 14 of IDW2 is tested accordingly. The baud rate is determined by the type of UART present in the UUT.	**AIU:** Set P3X to 55		The IDW2 shall read: (U = 0 for baud rate of 38,400 U = 1 for baud rate of 115,200)	0U01 0101 1010 1100

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	6.7	0010 1010 1010 1100		Apply a ground to the following “WORD 3” discrete inputs: P1E-10C P1E-10E P1F-7E P1F-8F P1F-8H P1F-8K P1E-10A Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to AA		The IDW3 shall read:	0010 1010 1010 1100
	6.8	1101 0101 0101 0011		Apply a ground to the following “WORD 3” discrete inputs: P1F-6D P1E-12A P1E-10D P1E-10F P1F-7F P1F-8G P1F-8J P1E-10B P1E-12C Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to 55		The IDW3 shall read:	1101 0101 0101 0011
	6.9	1010 1010 1010 1010		Apply a ground to the following “WORD 4” discrete inputs: P1F-8E P1F-8C P1F-8A P1F-7B P1F-6C P1F-4F P1F-4D P1F-4B Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to AA		The IDW4 shall read:	1010 1010 1010 1010

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	6.10	0101 0101 0101 0101		Apply a ground to the following “WORD 4” discrete inputs: P1F-8D P1F-8B P1F-7C P1F-7A P1F-4G P1F-4E P1F-4C P1F-4A Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to 55		The IDW4 shall read:	0101 0101 0101 0101
	6.11	1010 1010 0101 0101		Apply a ground to the following “WORD 5” discrete inputs: P1E-11D P1E-11B P1E-10K P1E-10H P1E-12J P1F-10K P1E-12E P1E-12G Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to AA		The IDW5 shall read:	1010 1010 0101 0101

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	6.12	0101 0101 1010 1010		Apply a ground to the following “WORD 5” discrete inputs: P1E-11C P1E-11A P1E-10J P1E-10G P1E-12K P1E-12H P1E-12D P1E-12F Leave the remaining discretes open. Verify the inputs are correctly read by the CAS processor.	**AIU:** Set P3X to 55		The IDW5 shall read:	0101 0101 1010 1010
	6.13	XX11 XXXX XXXX 4XXX XX8X XXXX		Apply a ground to the following discrete inputs, with the remaining inputs set to an open: P1E-6A P2-50 P2-52 P2-18 Verify the inputs are correctly read by the CAS Processor.	**AIU:** “P1XD55ZX” “P2XD08ZX” “P3XD00ZX” **UUT1:** “DIN”		Port 1 Select Send 55 HEX DATA Port 2 Select Send 08 HEX DATA Port 3 Select Send 00 HEX DATA **CRT:** IDW0 through IDW5 shall read: **(**X is a don’t care parameter**).**	XX11 XXXX XXXX 4XXX XX8X XXXX
	6.14	XX0F XXXX XXXX 8XXX XX0X XXXX		Apply a ground to the following discrete inputs, with the remaining inputs set to an open: P1E-5K P1E-6B P1E-13F P2-53 P1-51 Verify the inputs are correctly read by the CAS Processor.	**AIU:** “P1XD2AZX” “P2X040ZX” **UUT1:** “DIN”		Port 1 Select Send 2A HEX DATA Port 2 Select Send 40 HEX DATA **CRT:** IDW0 through IDW5 shall read: (X is a don’t care parameter).	XX0F XXXX XXXX 8XXX XX0X XXXX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	7.0			DISCRETE OUTPUT TESTS	Initial Test Setup **AIU:** "S1:OFF:"		DISCRETE OUTPUT TESTS **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS	
	7.1	AA AA AA XX		Set the output ODW0 port to A555H and ODW1 port to 8055H and verify the discrete outputs are correctly set.	**UUT1:** "DOUT 0 A555" "DOUT 1 8055" "MTSDIN"		The PC display shall read:	AA AA AA XX
	7.2	55 55 55 XX		Set the output ODW0 port to 5AAAH and ODW1 port to 80AAH and verify the discrete outputs are correctly set.	**UUT1:** "DOUT 0 5AAA" "DOUT 1 80AA" "MTSDIN"		The PC display shall read:	55 55 55 XX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	8.0			ARINC 429 INPUT / OUTPUT TESTS	Initial Test Setup **AIU:** "S1:OFF" **AIU:** "M4X" "C4X"		ARINC 429 INPUT / OUTPUT TESTS Set ports 1-4 as outputs **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS	
				Activate the PDL Link A discrete to select the PDL receiver channel.	**AIU:** "P1X D01ZX" "P3X D00ZX"			
	8.1	VVVVVVVV VNVNNNNN		Set the ARINC 429 receivers to the internal loop-back mode with the receiver mask registers set to FF55 hex, low speed. Transmit D5555555 and verify data is received. by all receiver channels.	**UUT1:** "AL 8 L D5555555 FF55"		The PC display shall read:	VVVVVVVV VNVNNNNN
	8.2	VVVVVVVV VNVNNNNN		Set the ARINC 429 receivers to the internal loop-back mode with the receiver mask registers set to FFAA hex, low speed. Transmit 2AAAAAAA and verify data is received. by all receiver channels.	**UUT1:** **"**AL 8 L 2AAAAAAA FFAA"		The PC display shall read:	VVVVVVVV VNVNNNNN
				Deactivate the PDL Link A discrete to select the ADL receiver channel.	**AIU:** "P1X D00ZX"			

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	8.3	VVVVVVVV VNVNNNNN		Set the ARINC 429 receivers to the internal loop-back mode with the receiver mask registers set to 55FF hex, low speed. Transmit D5555555 and verify data is received. by all receiver channels.	**UUT1:** "AL 8 L D5555555 55FF"		The PC display shall read:	VVVVVVVV VNVNNNNN
	8.4	VVVVVVVV VNVNNNNN		Set the ARINC 429 receivers to the internal loop-back mode with the receiver mask registers set to AAFF hex, low speed. Transmit 2AAAAAAA and verify data is received. by all receiver channels.	**UUT1:** "AL 8 L 2AAAAAAA AAFF"		The PC display shall read:	VVVVVVVV VNVNNNNN
	8.5	NNVNNNNN NNNNNNNN		Transmit 55555501 from RA DISP #1 bus (P1E-13A/B) set to high speed operation and verify the data is received by the RAD ALT #1 bus receiver (P1E-13H/J).	**UUT1:** "AL 0 H 55555501 FF01"		The PC display shall read:	NNVNNNNN NNNNNNNN
	8.6	NNVNNNNN NNNNNNNN		Transmit AAAAAAFE from RA DISP #1 bus set to high speed operation and verify the data is received by the RAD ALT #1 bus receiver.	**UUT1:** "AL 0 H AAAAAAFE FFFE"		The PC display shall read:	NNVNNNNN NNNNNNNN
	8.7	NNVNNNNN NNVNNNNN		Transmit 55555502 from RA DISP #1 and #2 bus (P1E-13A/B and 13C/D) set to high speed operation and verify the data is received by the RAD ALT #1 bus and RAD ALT #2 bus receiver (P1F-3D/E).	**UUT1:** "AL 1 H 55555502 FF02"		The PC display shall read:	NNVNNNNN NNVNNNNN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	8.8	NNVNNNNN NNVNNNNN		Transmit AAAAAAFD from RA DISP #1 and #2 busses set to high speed operation and verify the data is received by the RAD ALT #1 and RAD ALT #2 bus receivers.	**UUT1:** "AL 1 H AAAAAAFD FFFD"		The PC display shall read:	NNVNNNNN NNVNNNNN
	8.9	NVNNNNVN NNNNNNNN		Transmit 55555504 from TA/RA DISP #1 bus (P1E-7C/D) and (P2-33/34) set to high speed operation and verify the data is received by the MAG HDG/ATT bus (P1E-7A/B), ALTITUDE ALERT (P1E-8C/D) receivers.	**UUT1:** "AL 2 H 55555504 FF04"		The PC display shall read:	NVNNNNVN NNNNNNNN
	8.10	NVNNNNVN NNNNNNNN		Transmit AAAAAAFB from TA/RA DISP #1 bus (P1E-7C/D) and (P2-33/34) set to high speed operation and verify the data is received by the MAG HDG/ATT bus (P1E-7A/B), ALTITUDE ALERT (P1E-8C/D) receivers.	**UUT1:** "AL 2 H AAAAAAFB FFFB"		The PC display shall read:	NVNNNNVN NNNNNNNN
	8.11	VNNNNNNN NNNNNNNN		Transmit 55555508 from TA/RA DISP #2 bus (P1E-7G/H) set to high speed operation and verify the data is received by the SPARE #1 bus (P1E-14D/E) receivers.	**UUT1:** "AL 3 H 55555508 FF08"		The PC display shall read:	VNNNNNNN NNNNNNNN
	8.12	VNNNNNNN NNNNNNNN		Transmit AAAAAAF7 from TA/RA DISP #2 bus (P1E-7G/H) set to high speed operation and verify the data is received by the SPARE #1 bus (P1E-14D/E) receivers.	**UUT1:** "AL 3 H AAAAAAF7 FFF7"		The PC display shall read:	VNNNNNNN NNNNNNNN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	8.13	NNNNNVNV NNNNNNNN		Transmit 55555510 from CFDS OUT bus (P1F-6E/F) set to low speed operation and verify the data is received by the CFDS IN bus (P1F-6G/H) and PERF LIMIT (P1E-6A/B) receivers.	**UUT1:** "AL 4 L 55555510 FF10"		The PC display shall read:	NNNNNVNV NNNNNNNN
	8.14	NNNNNVNV NNNNNNNN		Transmit AAAAAAEF from CFDS OUT bus (P1F-6E/F) set to low speed operation and verify the data is received by the CFDS IN bus (P1F-6G/H) and PERF LIMIT (P1E-6A/B) receivers.	**UUT1:** "AL 4 L AAAAAAEF FFEF"		The PC display shall read:	NNNNNVNV NNNNNNNN
	8.15	NNNNNNNN VNNNNNNN		Transmit 55555520 from ADL OUT bus (P1E-9A/B) set to high speed operation and verify the data is received by the ADL IN bus (P1E-8A/B)	**UUT1:** "AL 5 H 55555520 FF20"		The PC display shall read:	NNNNNNNN VNNNNNNN
	8.16	NNNNNNNN VNNNNNNN		Transmit AAAAAADF from ADL OUT bus (P1E-9A/B) set to high speed operation and verify the data is received by the ADL IN bus (P1E-8A/B)	**UUT1:** "AL 5 H AAAAAADF FFDF"		The PC display shall read:	NNNNNNNN VNNNNNNN
	8.17	NNNVNNNN NNNNNNNN		Transmit 55555540 from TX COORD #1 bus (P1E-15J/K) set to high speed operation and verify the data is received by the XT COORD #1 bus (P1E-14F/G)	**UUT1:** "AL 6 H 55555540 FF40"		The PC display shall read:	NNNVNNNN NNNNNNNN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	8.18	NNNVNNNN NNNNNNNN		Transmit AAAAAABF from TX COORD #1 bus (P1E-15J/K) set to high speed operation and verify the data is received by the XT COORD #1 bus (P1E-14F/G)	**UUT1:** "AL 6 H AAAAAABF FFBF"		The PC display shall read:	NNNVNNNN NNNNNNNN
	8.19	NNNNVNNN NNNNNNNN		Transmit 55555580 from TX COORD #2 bus (P1E-14A/B) set to high speed operation and verify the data is received by the XT COORD #2 bus (P1E-14H/J)	**UUT1:** "AL 7 H 55555580 FF80"		The PC display shall read:	NNNNVNNN NNNNNNNN
	8.20	NNNNVNNN NNNNNNNN		Transmit AAAAAA7F from TX COORD #2 bus (P1E-14A/B) set to high speed operation and verify the data is received by the XT COORD #2 bus (P1E-14H/J)	**UUT1:** "AL 7 H AAAAAA7F FF7F"		The PC display shall read:	NNNNVNNN NNNNNNNN
	8.21	VVVV		Transmit D5555555 from TA/RA DISP #1 bus (P1E-7C/D) and (P2-33/34) set to high speed operation and verify the data is received by the MAG HDG/ATT bus (P1E-7A/B), ALTITUDE ALERT (P1E-8C/D), and SPARE #4 (P1E-8J/K) receivers.	**UUT1:** "AX 2 0360 H AA D5555555"		The PC display shall read:	VVVV
	8.22	VVVV		Transmit 2AAAAAAA from TA/RA DISP #2 bus (P1E-7G/H) set to high speed operation and verify the data is received by the SPARE #1 (P1E-14D/E) receivers.	**UUT1:** "AX 3 1111 H 55 2AAAAAAA"		The PC display shall read:	VVVV

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	8.23	VVVV		Transmit D5555555 from TX COORD #1 bus (P1E-15J/K) set to high speed operation and verify the data is received by the XTCOORD #1 bus (P1E-14F/G) and SPARE #2 (P1E-8E/F) bus receivers.	**UUT1:** "AX 6 2424 H AA D5555555"		The PC display shall read:	VVVV
	8.24	VVVV		Transmit 2AAAAAAA from TX COORD #2 bus (P1E-14A/B) set to high speed operation and verify the data is received by the XT COORD #2 bus (P1E-14H/J) and SPARE #3 (P1E-8G/H) bus receivers.	**UUT1:** "AX 7 5757 H 55 2AAAAAAA"		The PC display shall read:	VVVV
	8.25	VVVV		Using internal loopback, transmit all 256 labels and verify that the receiver accepts only those labels whose bits are set in the label recognizer.	**UUT1:** "AX 8 5757 H 100 2AAAAAAA"		The PC display shall read:	VVVV

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	9.0			422 DATA RECORDER TESTS	Initial Test Setup **AIU:** "S1:OFF" **AIU:** "M4X" "C4X"		422 DATA RECORDER TESTS **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS	
	9.1	AA55		Transmit data words AA55 on the RS-422 data recorder port using an internal clock and verify the data is correct. P2-29 422 Data Out(+) P2-30 422 Data Out(-) P2-31 422 Clk Out(+) P2-32 422 Clk Out(-) P2-10 422 Clk In(+) P2-11 422 Clk In(-)	**UUT1:** "D422 E I AA55"		Apply an open to RBP-9K and RBP-10E. The PC display shall read: Write data to UUT memory locations: Address Data 1E411 4000 1E415 AA55 Wait 0.5 ms Read AIU bus feedback. The data shall be as specified.	AA55
	9.2	55AA		Transmit data words 55AA on the RS-422 data recorder port using an internal clock and verify the data is correct.	**UUT1:** "D422 E I 55AA"		Write data to UUT memory locations Address Data 1E415 55AA Wait .05 ms Read AIU bus feedback. The data shall be as specified.	55AA

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	9.3	0123		Transmit data words 0123 on the RS-422 data recorder port using an external clock and verify the data is correct.	**UUT1:** "D422 E E 0123" "MTS422 CLK 16"		Apply a low to RBP-9K. Apply a 19.2 KHz clock to RBP-10H and RBP10J. Write data to UUT memory location: Address 1E415 Data 0123 Wait 2.5 ms Clock the AIU 16 cycles. Read AIU bus feedback. The data shall be as specified.	0123
	9.4	0123		Disable the output port and transmit data word CDEF on the RS-422 data recorder port and verify no data is present	**UUT1:** "D422 D I CDEF"		Write data to UUT memory location: Address 1E415 Data CDEF Read AIU bus feedback. The data shall be as specified.	0123

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	10.0			SUPPRESSION PULSE	Initial Test Setup **AIU:** "S1:OFF" **AIU:** "M4X" "C4X"		SUPPRESSION PULSE **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS	
	10.1	8000 0000 0000 0080 0000 0000 0X00 0000		Generate a Mode S self-test RF wrap test with the suppression pulse disabled and verify a message is received by the receiver.	**UUT1:** "RXMSRF 1000"		**CRT:** The UUT shall report back.	8000 0000 0000 0080 0000 0000 0X00 0000
	10.2	XXXXX0		Generate a Mode S self-test RF wrap test with the suppression pulse enabled and verify no message is received by the receiver.	**UUT1:** "RXMSRFS 1000" "IS"		**CRT:** The UUT shall report back.	XXXXX0
	10.3	125 to 131 μs		Generate a Mode S self-test RF wrap test with the suppression pulse enabled and verify the suppression bus pulse width on P1C-12 is 128 ± 3 μs.	**UUT1:** "RXMSRFS 1000"		**PPM:** Using a x10 probe connect the oscilloscope channel 3 to AIU J6 (SUPPRESSION A)[P1C-12]. The pulse width shall be as specified.	125 to 131 μs
	10.4	24 to 33 V dc		Generate a Mode S self-test RF wrap test with the suppression pulse enabled and verify the suppression bus pulse amplitude on P1C-13 is 28.5 ± 4.5 V dc.	**UUT1:** "RXMSRFS 1000"		**PPM:** Using a x10 probe connect the oscilloscope channel 3 to AIU J7 (SUPPRESSION B)[P1C-13]. The pulse amplitude shall be as specified.	24 to 33 V dc

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	11.0			ANALOG MONITOR TESTS	Initial Test Setup **AIU:** "S1:OFF" **AIU:** "M4X" "C4X"		ANALOG MONITOR TESTS **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS	
	11.1	9.70 to 10.30 V dc		Connect the Radio Altitude Input #1 to +10V dc and verify the signal is read by the processor. P1E-2H Rad Alt #1 (+) P1E-2J Rad Alt #1 (-)	**UUT1:** "ADC"		Send command to UUT for reading A/D converter. Connect DVM (+) to TP254 and DVM (-) to TP253. The UUT A/D converter shall read as specified.	9.70 to 10.30 V dc
	11.2	9.70 to 10.30 V dc		Connect the Radio Altitude Input #2 to +10V dc and verify the signal is read by the processor. P1F-3A Rad Alt #2 (+) P1F-3B Rad Alt #2 (-)			The UUT A/D converter shall read as specified.	9.70 to 10.30 V dc
	11.3	1.0 to 4.0 V dc		Generate a 2 second 1KHz tone and verify the 8 Ohm audio output monitor reads the correct voltage.	**UUT1:** "VOICE 13 F0 AA ADC"		Generate a 2 second 1 KHz tone from the UUT. The UUT A/D converter shall read as specified.	1.0 to 4.0 V dc
	11.4	1.0 to 4.0 V dc		Generate a 2 second 1KHz tone and verify the 600 Ohm audio output monitor reads the correct voltage.	**UUT1:** "VOICE 13 F0 AA ADC"		Generate a 2 second 1 KHz tone from the UUT. The UUT A/D converter shall read as specified.	1.0 to 4.0 V dc
	11.5	+15 to +45 Degrees C		Verify the internal temperature sensor is in the acceptable range at room temperature.			The fifth parameter in the display shall be:	+15 to +45 Degrees C
	11.6	74.0 to 84.0 V dc		Verify the +80V monitor voltage reads the correct voltage.			The sixth parameter in the display shall be:	74.0 to 84.0 V dc

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	11.7	2.00 to 2.10 V dc		Verify the A/D Reference monitor reads the correct voltage.			The seventh parameter in the display shall be:	2.00 to 2.10 V dc
	11.8	0 to 0.05 V dc		Verify the Ground Reference monitor reads the correct voltage.			The eighth parameter in the display shall be:	0 to 0.05 V dc

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	12.0			ASIC TEST	Initial Test Setup **AIU:** "S1:OFF" **AIU:** "M4X" "C4X"		ASIC TEST **PSDC:** Adjust DC power supply for 27.5 ± 1.0 V dc 5 AMPS	
	12.1	7FFF0000 002A002A 002A002A 3FFF		Generate a single, nongarbled ATCRBS internal ASIC self-test reply and verify the reply is decoded. This applies to tests 12.1 through 12.3.	**UUT1:** "ASIC 1"		**CRT:**The display shall read:	7FFF0000 002A002A 002A002A 3FFF
	12.2	7FFF0000 002A002A 002A002A 5FFF					**CRT:**The display shall read:	7FFF0000 002A002A 002A002A 5FFF
	12.3	7FFF0000 002A002A 002A002A 7FFF					**CRT:**The display shall read:	7FFF0000 002A002A 002A002A 7FFF
	12.4	60043FFF 002A0000 0000002A 3FFF		Generate a single, garbled ATCRBS internal ASIC self-test reply and verify the reply is decoded. This applies to tests 12.4 and 12.5.	**UUT1:** "ASIC 2"		**CRT:**The display shall read:	60043FFF 002A0000 0000002A 3FFF
	12.5	6200DFFF 002A0000 0000002A 5FFF					**CRT:**The display shall read:	6200DFFF 002A0000 0000002A 5FFF

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	12.6	60043FFF 002A0000 0000002A 3FFF		Generate a single, garbled ATCRBS internal ASIC self-test reply and verify the reply is decoded. Tests degarbler #1 and #3 interaction. This applies to tests 12.6 through 12.8.	**UUT1:** "ASIC 3"		**CRT:**The display shall read:	60043FFF 002A0000 0000002A 3FFF
	12.7	60000000 002A0000 0000002A 5FFF					**CRT:**The display shall read:	60000000 002A0000 0000002A 5FFF
	12.8	6200DFFF 002A0000 0000002A 7FFF					**CRT:**The display shall read:	6200DFFF 002A0000 0000002A 7FFF
	12.9	11112222 44448888		Test Transmitter Control ASIC Data Bus test applies to tests 12.9 and 12.10.	**UUT1:** "ASIC 4"		**CRT:**The display shall read:	11112222 44448888
	12.10	A50F5AF0 0FA5F05A					**CRT:**The display shall read:	A50F5AF0 0FA5F05A
	12.11	00000101 02020303 04040505 0606		Test Transmitter Control ASIC Address Bus tests apply to tests 12.11 through 12.15.	**UUT1:** "ASIC 5"		**CRT:**The display shall read:	00000101 02020303 04040505 0606
	12.12	07070800 09000A00 0B000C00 0D00					**CRT:**The display shall read:	07070800 09000A00 0B000C00 0D00
	12.13	XXXXFCXX 10101111 12121313 1414					**CRT:**The display shall read: (where X is a don't care parameter)	XXXXFCXX 10101111 12121313 1414
	12.14	XXXX160X XXXXXXXX 1XXX1AXX 1BXX					**CRT:**The display shall read: (X is a don't care parameter)	XXXX160X XXXXXXXX 1XXX1AXX 1BXX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	12.15	1CXX1DXX 1EXX1FXX					**CRT:**The display shall read: (X is a don't care parameter)	1CXX1DXX 1EXX1FXX
	12.16	80000000 00000080 00000000 0100		Generate a Mode S internal ASIC self-test reply and verify the reply is decoded. This applies to tests 12.16 through 12.21.	**UUT1:** "ASIC 6"		**CRT:**The display shall read:	80000000 00000080 00000000 0100
	12.17	0000002A 002A002A 002AYFFF					**CRT:**The display shall read: (Y can be 1 or 9)	0000002A 002A002A 002AYFFF
	12.18	55555555 00000055 55555500 0155					**CRT1:**The display shall read:	55555555 00000055 55555500 0155
	12.19	5555002A 002A002A 002AYFFF					**CRT:**The display shall read: (Y can be 1 or 9)	5555002A 002A002A 002AYFFF
	12.20	AAAAAAAA 000000AA AAAAAA00 01AA					**CRT:**The display shall read:	AAAAAAAA 000000AA AAAAAA00 01AA
	12.21	AAAA002A 002A002A 002AYFFF					**CRT:**The display shall read: (Y can be 1 or 9)	AAAA002A 002A002A 002AYFFF
	12.22	55555555 00000055 55555500 05AA		Generate a Mode S Confidence test. This applies to tests 12.22 through 12.61.	**UUT1:** "ASIC 7"		**CRT:**The display shall read:	55555555 00000055 55555500 05AA
	12.23	51C40042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	51C40042 00420042 0042YFFF
	12.24	AAAAAAAA 000000AA AAAAAA00 05AB					**CRT1:**The display shall read:	AAAAAAAA 000000AA AAAAAA00 05AB

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	12.25	57810042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	57810042 00420042 0042YFFF
	12.26	55555555 00000055 55555500 05AA					**CRT:**The display shall read:	55555555 00000055 55555500 05AA
	12.27	51C40042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	51C40042 00420042 0042YFFF
	12.28	55555555 00000055 55555500 05AA					**CRT:**The display shall read:	55555555 00000055 55555500 05AA
	12.29	51C40042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	51C40042 00420042 0042YFFF
	12.30	55550000 00000055 55000000 06A9					**CRT1:**The display shall read:	55550000 00000055 55000000 06A9
	12.31	C0840042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	C0840042 00420042 0042YFFF
	12.32	AAAA8080 000000AA AA808000 06D2					**CRT:**The display shall read:	AAAA8080 000000AA AA808000 06D2
	12.33	E3650042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	E3650042 00420042 0042YFFF
	12.34	00000000 00000000 00000000 0600					**CRT:**The display shall read:	00000000 00000000 00000000 0600
	12.35	55550042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	55550042 00420042 0042YFFF

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	12.36	80808080 00000080 80808000 0695					**CRT1:**The display shall read:	80808080 00000080 80808000 0695
	12.37	C27B0042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9 except for Mod C or later units). (Y shall be 9 for Mod C or later units).	C27B0042 00420042 0042YFFF
	12.38	55555555 00000055 55555500 02FE					**CRT:**The display shall read:	55555555 00000055 55555500 02FE
	12.39	51D10042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	51D10042 00420042 0042YFFF
	12.40	AAAAAAAA 000000AA AAAAAA00 0201					**CRT:**The display shall read:	AAAAAAAA 000000AA AAAAAA00 0201
	12.41	57AB0042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	57AB0042 00420042 0042YFFF
	12.42	01554055 00000001 55405500 0293					**CRT1:**The display shall read:	01554055 00000001 55405500 0293
	12.43	B6940042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	B6940042 00420042 0042YFFF
	12.44	00AA80AA 00000000 AA80AA00 028F					**CRT:**The display shall read:	00AA80AA 00000000 AA80AA00 028F
	12.45	63870042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	63870042 00420042 0042YFFF

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	12.46	AAAAAAAA 000000AA AAAAAA00 01AB					**CRT:**The display shall read:	AAAAAAAA 000000AA AAAAAA00 01AB
	12.47	57810042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	57810042 00420042 0042YFFF
	12.48	55555555 00000055 55555500 01AA					**CRT1:**The display shall read:	55555555 00000055 55555500 01AA
	12.49	51C40042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	51C40042 00420042 0042YFFF
	12.50	AAAAAAAA 000000AA AAAAAA00 01AB					**CRT:**The display shall read:	AAAAAAAA 000000AA AAAAAA00 01AB
	12.51	57810042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	57810042 00420042 0042YFFF
	12.52	55555555 00000055 55555500 01AA					**CRT:**The display shall read:	55555555 00000055 55555500 01AA
	12.53	51C40042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	51C40042 00420042 0042YFFF
	12.54	01554055 00000001 55405500 0293					**CRT1:**The display shall read:	01554055 00000001 55405500 0293
	12.55	B6940042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	B6940042 00420042 0042YFFF
	12.56	02AAA02A 00000002 AAA02A00 02E1					**CRT:**The display shall read:	02AAA02A 00000002 AAA02A00 02E1

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	12.57	DBE80042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	DBE80042 00420042 0042YFFF
	12.58	AAAAAAAA 000000AA AAAAAA00 0203					**CRT:**The display shall read:	AAAAAAAA 000000AA AAAAAA00 0203
	12.59	57AB0042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	57AB0042 00420042 0042YFFF
	12.60	55555554 00000055 55555400 0205					**CRT1:**The display shall read:	55555554 00000055 55555400 0205
	12.61	A5D80042 00420042 0042YFFF					**CRT:**The display shall read: (Y can be 1 or 9)	A5D80042 00420042 0042YFFF

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.0			RF RECEIVER TESTS Tests 13.1 - 13.52 - Reference: Figure 6 The following tests use replies injected into various antenna ports of the UUT to verify receiver characteristics and reply processing capability.	Initial Test Setup **AIU:** "S1:OFF" **AIU:** "M4X" "C4X"		RF RECEIVER TESTS **NOTE:** The actual output of the signal generator must be adjusted to account for the losses between the signal generator port and the unit antenna port.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.1			**ATCRBS REJECTION: 0/90 (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Initialize MTS reply generator.				
				Replies are injected on the Top 0 and Top 90 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: ATCRBS	**SGEN:**		Set the signal generator to apply a signal to the Top 0/90 antenna ports which is 2 dB below the lowest acceptable MTL amplitude.	
				Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	"Freq: 1090.0 MHz" "Lev: -81.0 dBm"			
				Pulse Width: 500 ± 50 ns	**RFIU:** "OFFSET SEL LEV: 0 dB"		Set the RF level into the Top 90 antenna port equal to the RF level into the Top 0 antenna port.	
				Power: -81.0 dBm on Top 0 -81.0 dBm on Top 90				
				Frequency: 1090 ± 0.1 MHz				
				Set UUT to receive appropriate reply type	**UUT1:** "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
				Set UUT to receive 10 replies	"RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Analyze the reply UUT file	**UUT1:** "RXCHK 6"		Check unit for replies.	
							CRT:	
		PASS					FIFO EMPTY	PASS
		9 or 10					MISSED REPLIES	9 or 10

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.2			**ATCRBS 1090 MHz MTL: 0/90 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string	
				Replies are injected on the Top 0 and Top 90 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a signal to the Top 0 antenna port which is equal to the largest acceptable MTL amplitude.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 0; -78.0 dBm on Top 90 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 90 antenna port to be 3 dB less than the signal on the Top 0 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		1					Z	1
		1					N	1
		10 MAX					MISSED REPLIES	10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.3			**ATCRBS 1087 MHz MTL: 0/90 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string	
				Replies are injected on the Top 0 and Top 90 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: ATCRBS	**SGEN:**		Set the signal generator to apply a signal to the Top 0 antenna port which is equal to the largest acceptable MTL amplitude.	
				Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	"Freq: 1087.0 MHz"			
					"Lev: -75.0 dBm"			
				Pulse Width: 500 ± 50 ns	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 90 antenna port to be 3 dB less than the signal on the Top 0 antenna port.	
				Power: -75.0 dBm on Top 0 -78.0 dBm on Top 90				
				Frequency: 1087.0 ± 0.1 MHz				
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		1					Z	1
		1					N	1
		10 MAX					MISSED REPLIES	10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.4			**ATCRBS 1093 MHz MTL: 0/90 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string	
				Replies are injected on the Top 0 and Top 90 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present. Pulse Width: 500± 50 ns Power: -75.0 dBm on Top 0 -78.0 dBm on Top 90 Frequency: 1093.0 ± 0.1 MHz	**SGEN:** "Freq: 1093.0 MHz" "Lev: -75.0 dBm" **RFIU:** "OFFSET SEL LEV: -3.0 dB"		Set the signal generator to apply a signal to the Top 0 antenna port which is equal to the largest acceptable MTL amplitude. Select an attenuation which causes the signal on the Top 90 antenna port to be 3 dB less than the signal on the Top 0 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS 1 1 10 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA Z N MISSED REPLIES	PASS PASS 1 1 10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.5			**ATCRBS 1090 MHz 0/90 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string	
				Replies are injected on the Top 0 and Top 90 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: ATCRBS	**SGEN:**		Set the signal generator to apply a signal to the Top 0 antenna port which is 3 dB higher than the largest acceptable MTL amplitude.	
				Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	"Freq: 1090.0 MHz" "Lev: -72.0 dBm"			
				Pulse Width: 500± 50 ns	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 90 antenna port to be 3 dB less than the signal on the Top 0 antenna port.	
				Power: -72.0 dBm on Top 0 -75.0 dBm on Top 90				
				Frequency: 1090.0 ± 0.1 MHz				
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-72.0±3.0 dBm					CV	-72.0±2.5 dBm
		3.0 ± 2.3 dB					PD	3.0 ± 2.3 dB
		1					Z	1
		1					N	1
		1 MAX					MISSED REPLIES	1 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.6			**ATCRBS 1090 MHz 0/90 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string	
				Replies are injected on the Top 0 and Top 90 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: ATCRBS	**SGEN:** "Freq: 1090.0 MHz" "Lev: -60.0 dBm"		Set the signal generator to apply a RF signal to the Top 0 antenna port.	
				Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.				
				Pulse Width: 500± 50 ns	**RFIU:**		Select an attenuation which causes the signal on the Top 90 antenna port to be 6 dB less than the signal on the Top 0 antenna port.	
				Power: -60.0 dBm on Top 0 -66.0 dBm on Top 90	"OFFSET SEL LEV: -6.0 dB"			
				Frequency: 1090.0 ± 0.1 MHz				
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT.	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS -60.0±2.5 dBm 6.0 ± 2.3 dB 1 1 0 1 MAX		Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA CV PD Z N S MISSED REPLIES	PASS PASS -60.0±2.0 dBm 6.0 ± 2.3 dB 1 1 0 1 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.7			**MODE S PATTERN 1 0/90 RCVR**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S data string.	
				Replies are injected on the Top 0 and Top 90 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: Mode S Pattern: 80000000018567	**SGEN:** "Freq: 1090.0 MHz" "Lev: -48.0 dBm"		Set the signal generator to apply a RF signal to the Top 0 antenna port.	
				Pulse Width: 500± 50 ns Power: -48.0 dBm on Top 0 -57.0 dBm on Top 90 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -9.0 dB"		Select an attenuation which causes the signal on the Top 90 antenna port to be 9 dB less than the signal on the Top 0 antenna port.	
					UUT1: "RXMS T 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS PASS -48.0±2.5 dBm 9.0 ± 2.3 dB 1 1 0 0		Verify the reply data	**UUT1:** "RXCHK 1"		**CRT:** FIFO EMPTY DATA CV PD Z N S MISSED REPLIES	PASS PASS -48.0±2.0 dBm 9.0 ± 2.3 dB 1 1 0 0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.8			**MODE-S PATTERN 2 0/90 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S data string.	
				Replies are injected on the Bottom 0 and Bottom 90 antenna ports. The reply format is as follows	**RFIU:** "Program"		Program selects Bottom 0 and Bottom 90 ports on T336254.	
				Type: Mode S Pattern: 55555555AA51C4	**SGEN:** "Freq: 1090.0 MHz" "Lev: -36.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 0 antenna port.	
				Pulse Width: 500± 50 ns Power: -36.0 dBm on Bot 0 -48.0 dBm on Bot 90 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Bottom 90 antenna port to be 12 dB less than the signal on the Bottom 0 antenna port.	
					UUT1: "RXMS B 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS PASS -36.0±2.5 dBm 12.0 ± 2.3 dB 1 1 0 0		Verify the reply data	**UUT1:** "RXCHK 2"		**CRT:** FIFO EMPTY DATA CV PD Z N S MISSED REPLIES	PASS PASS -36.0±2.0 dBm 12.0 ± 2.3 dB 1 1 0 0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.9			**MODE-S PATTERN 3 0/90 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S data string.	
				Replies are injected on the Bottom 0 and Bottom 90 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 0 and Bottom 90 ports on T336254.	
				Type: Mode S Pattern: AAAAAAAAAB5781	**SGEN:** "Freq: 1090.0 MHz" "Lev: -24.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 0 antenna port.	
				Pulse Width: 500± 50 ns Power: -24.0 dBm on Bot 0 -25.0 dBm on Bot 90 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -1.0 dB"		Select an attenuation which causes the signal on the Bottom 90 antenna port to be 1 dB less than the signal on the Bottom 0 antenna port.	
					UUT1: "RXMS B 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
				Verify the reply data	**UUT1:** "RXCHK 3"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-24.0±2.5 dBm					CV	-24.0±2.0 dBm
		1.0 ± 2.3 dB					PD	1.0 ± 2.3 dB
		1					Z	1
		1					N	1
		0					MISSED REPLIES	0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.10			**RX SELF-TEST 0/90 RCVRS** This test verifies the RF wrap capability of the UUT. This is a self-test that is "wrapped" through the RF. No externally injected replies are used. For this test, the 0 and 90 degree receivers are enabled. The self-test CV limits are read from memory for this test				
					UUT1: "RXMSRF 1100 10"		Set unit to generate RF Mode S wraparound replies in a test mode without the suppression bus activated during the self-test reply.	
					"RDMSRF 10"		Receive 10 Mode S self-test replies	
				Read self-test lower limit.	**UUT1:** "RC 97F0D 01"		Read word from the CAS CPU memory at this location.	
				Read self-test upper limit.	**UUT1:** "RC 97F0E 01"		Read word from CAS CPU memory at this location.	
				Write self-test lower limit to DTH register.	**UUT1:** "WC C0607 <lower limit>"		Write self-test lower limit to DTH register at this location.	
		PASS PASS ≤ upper limit ≥ lower limit		The CV value shall be below the self-test upper limit stored in memory.	**UUT1:** "RXCHK 1"		**CRT:** FIFO EMPTY DATA CV	PASS PASS ≤ upper limit -3 dB ≥ lower limit +3 dB
		0 ± 3 dB 1 1 0					PD Z N MISSED REPLIES	0 ± 3 dB 1 1 0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.11			**0 RCVR 1065 MHz OUT OF BAND REJECTION** This test verifies the ability of the receiver to reject an out of band reply at 1065 MHz which is 60 dB larger in amplitude than MTL.	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 0 and Top 90 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1065.0 MHz" "Lev: -17.0 dBm"		Set the signal generator to apply a RF signal to the Top 0 antenna port.	
				Pulse Width: 500±50 ns Power: -17.0 dBm on Top 0; -29.0 dBm on Top 90 Frequency: 1065.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Top 90 antenna port to be 12 dB less than the signal on the Top 0 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS 1 MIN		Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 5 MIN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.12			**0 RCVR 1115 MHz OUT OF BAND REJECTION** This test verifies the ability of the receiver to reject an out of band reply at 1115 MHz which is 60 dB larger in amplitude than MTL.	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 0 and Top 90 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 0 and Top 90 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1115.0 MHz" "Lev: -17.0 dBm"		Set the signal generator to apply a RF signal to the Top 0 antenna port.	
				Pulse Width: 500±50 ns Power: -17.0 dBm on Top 0; -29.0 dBm on Top 90 Frequency: 1115.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Top 90 antenna port to be 12 dB less than the signal on the Top 0 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS 1 MIN		Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 5 MIN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.13			**MODE-S EXTENDED RANGE MTL 1090 MHz 0/90 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S data string.	
				Replies are injected on the Bottom 0 and Bottom 90 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 0 and Bottom 90 ports on T336254.	
				Type: Mode S Pattern: 55555555AA51C4	**SGEN:** "Freq: 1090.0 MHz" "Lev: -81.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 0/90 antenna ports.	
				Pulse Width: 500± 50 ns Power: -81.0 dBm on Bot 0 -87.0 dBm on Bot 90 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -6.0 dB"		Select an attenuation which causes the signal on the Bottom 90 antenna port to be 6 dB less than the signal on the Bottom 0 antenna port.	
					UUT1: "RXMS B 1111 20 N"		Set UUT to receive MODE S replies in a test mode.	
					"WS C0C00 2000"		Turn self-test oscillator off.	
					"WS C0609 0017"		Set noise threshold to 17 hex.	
					"WS C060A 0006"		Set noise value to 06 hex.	
					"WS C0602 0012"		Set slope detection to 12 hex.	
					"RDMS 50"		Receive a fixed number of MODE S replies.	
				Inject 50 replies into the UUT	**RFIU:** "MTSTRIG 50"		Generate 50 replies at a nominal spacing of 10 msec.	
		50 MAX (Except Mod C or later units)		Verify the reply data.	**UUT1:** "RXCHK 2"		**CRT:** MISSED REPLIES	50 MAX (Except Mod C or later units)

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M		5 MAX (Mod C or later units only)						5 MAX (Mod C or later units only)

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.14			**ATCRBS REJECTION: 90/180 (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 90 and Top 180 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -81.0 dBm"		Set the signal generator to apply a signal to the Top 90/180 antenna ports which is 2 dB below the lowest acceptable MTL amplitude.	
				Pulse Width: 500 ± 50 ns Power: -81.0 dBm on Top 90 -81.0 dBm on Top 180 Frequency: 1090 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: 0 dB"		Set the RF level into the Top 180 antenna port equal to the RF level into the Top 90 antenna port.	
				Set UUT to receive appropriate replies	**UUT1:** "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
				Set UUT to receive 10 replies	"RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Generate 10 replies	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
				Analyze the reply UUT file				
		PASS 9 or 10		Verify the UUT replies.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 9 or 10

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.15			**ATCRBS 1090 MHz MTL: 90/180 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 90 and Top 180 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 90/180 antenna ports.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 90 -78.0 dBm on Top 180 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 180 antenna port to be 3 dB less than the signal on the Top 90 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS 0 1 10 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA Z N MISSED REPLIES	PASS PASS 0 1 10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.16			**ATCRBS 1087 MHz MTL: 90/180 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 90 and Top 180 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1087.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 90/180 antenna ports.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 90 -78.0 dBm on Top 180 Frequency: 1087.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 180 antenna port to be 3 dB less than the signal on the Top 90 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS 0 1 10 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA Z N MISSED REPLIES	PASS PASS 0 1 10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.17			**ATCRBS 1093 MHz MTL: 90/180 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 90 and Top 180 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1093.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 90/180 antenna ports.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 90 -78.0 dBm on Top 180 Frequency: 1093.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 180 antenna port to be 3 dB less than the signal on the Top 90 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS 0 1 10 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA Z N MISSED REPLIES	PASS PASS 0 1 10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.18			**ATCRBS 1090 MHz 90/180 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 90 and Top 180 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Type: ATCRBS	**SGEN:** "Freq: 1090.0 MHz" "Lev: -72.0 dBm"		Set the signal generator to apply a RF signal to the Top 90/180 antenna ports.	
				Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.				
				Pulse Width: 500±50 ns	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 180 antenna port to be 3 dB less than the signal on the Top 90 antenna port.	
				Power: -72.0 dBm on Top 90 -75.0 dBm on Top 180				
				Frequency: 1090.0 ± 0.1 MHz				
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-72.0±3.0 dBm					CV	-72.0±2.5 dBm
		3.0 ± 2.3 dB					PD	3.0 ± 2.3 dB
		0					Z	0
		1					N	1
		1 MAX					MISSED REPLIES	1 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.19			**ATCRBS 1090 MHz 90/180 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 90 and Top 180 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Type: ATCRBS	**SGEN:** "Freq: 1090.0 MHz" "Lev: -60.0 dBm"		Set the signal generator to apply a RF signal to the Top 90/180 antenna ports.	
				Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.				
				Pulse Width: 500±50 ns	**RFIU:** "OFFSET SEL LEV: -6.0 dB"		Select an attenuation which causes the signal on the Top 180 antenna port to be 6 dB less than the signal on the Top 90 antenna port.	
				Power: -60.0 dBm on Top 90 -66.0 dBm on Top 180				
				Frequency: 1090.0 ± 0.1 MHz				
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-60.0±2.5 dBm					CV	-60.0±2.0 dBm
		6.0 ± 2.3 dB					PD	6.0 ± 2.3 dB
		0					Z	0
		1					N	1
		1					S	1
		1 MAX					MISSED REPLIES	1 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.20			**MODE-S PATTERN 1 90/180 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Top 90 and Top 180 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Type: Mode S Pattern: 80000000018567	**SGEN:** "Freq: 1090.0 MHz" "Lev: -48.0 dBm"		Set the signal generator to apply a RF signal to the Top 90/180 antenna ports.	
				Pulse Width: 500± 50 ns Power: -48.0 dBm on Top 90 -57.0 dBm on Top 180 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -9.0 dB"		Select an attenuation which causes the signal on the Top 180 antenna port to be 9 dB less than the signal on the Top 90 antenna port.	
					UUT1: "RXMS T 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 1"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-48.0±2.5 dBm					CV	-48.0±2.0 dBm
		9.0 ± 2.3 dB					PD	9.0 ± 2.3 dB
		0					Z	0
		1					N	1
		1					S	1
		0					MISSED REPLIES	0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.21			**MODE-S PATTERN 2 90/180 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Bottom 90 and Bottom 180 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 90 and Bottom 180 ports on T336254.	
				Type: Mode S Pattern: 55555555AA51C4	**SGEN:** "Freq: 1090.0 MHz" "Lev: -36.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 90/180 antenna ports.	
				Pulse Width: 500± 50 ns Power: -36.0 dBm on Bot 90 -48.0 dBm on Bot 180 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Bottom 180 antenna port to be 12 dB less than the signal on the Bottom 90 antenna port.	
					UUT1: "RXMS B 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 2"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-36.0±2.5 dBm					CV	-36.0±2.0 dBm
		12.0 ± 2.3 dB					PD	12.0 ± 2.3 dB
		0					Z	0
		1					N	1
		1					S	1
		0					MISSED REPLIES	0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.22			**MODE-S PATTERN 3 90/180 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Bottom 90 and Bottom 180 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 90 and Bottom 180 ports on T336254.	
				Type: Mode S Pattern: AAAAAAAAAB5781	**SGEN:** "Freq: 1090.0 MHz" "Lev: -24.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 90/180 antenna ports.	
				Pulse Width: 500± 50 ns Power: -24.0 dBm on Bot 90 -25.0 dBm on Bot 180 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -1.0 dB"		Select an attenuation which causes the signal on the Bottom 180 antenna port to be 1 dB less than the signal on the Bottom 90 antenna port.	
					UUT1: "RXMS B 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 3"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-24.0±2.5 dBm					CV	-24.0±2.0 dBm
		1.0 ± 2.3 dB					PD	1.0 ± 2.3 dB
		0					Z	0
		1					N	1
		0					MISSED REPLIES	0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.23			**RX SELF-TEST 90/180 RCVRS**				
				This test verifies the RF wrap capability of the UUT. This is a self-test that is "wrapped" through the RF. No externally injected replies are used. For this test, the 90 and 180 degree receivers are enabled. The self-test CV limits are read from memory for this test.	**UUT1:** "RXMSRF 0110 10"		Set unit to generate RF Mode S wraparound replies in a test mode without the suppression bus activated during the self-test reply.	
					UUT1: **"**RDMSRF 10"		Generate and receive 10 Mode S replies	
				Read self-test lower limit.	**UUT1:** "RC 97F0D 01"		Read words from the CAS CPU memory at this location.	
				Read self-test upper limit.	**UUT1:** "RC 97F0E 01"		Read words from CAS CPU memory at this location	
				Write self-test lower limit to DTH register.	**UUT1:** "WC C0607 <lower limit>"		Write self-test lower limit to DTH register at this location.	
		PASS PASS ≤ upper limit ≥ lower limit		The CV value shall be below the upper limit stored in memory.	**UUT1:** "RXCHK 1"		FIFO EMPTY DATA CV	PASS PASS ≤ upper limit -3 dB ≥ lower limit +3 dB
		0 ± 3 dB 0 1 0					PD Z N MISSED REPLIES	0 ± 3 dB 0 1 0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.24			**90 RCVR 1065 MHz OUT OF BAND REJECTION**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				This test verifies the ability of the receiver to reject an out of band reply at 1065 MHz which is 60 dB larger in amplitude than MTL.	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Replies are injected on the Top 90 and Top 180 antenna ports simultaneously. The reply format is as follows:	**SGEN:** "Freq: 1065.0 MHz" "Lev: -17.0 dBm"		Set the signal generator to apply a RF signal to the Top 90 antenna port.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Top 180 antenna port to be 12 dB less than the signal on the Top 90 antenna port.	
				Pulse Width: 500±50 ns Power: -17.0 dBm on Top 90; -29.0 dBm on Top 180 Frequency: 1065.0 ± 0.1 MHz	**UUT1:** "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					UUT1: "RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS 1 MIN		Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 5 MIN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.25			**90 RCVR 1115 MHz OUT OF BAND REJECTION**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				This test verifies the ability of the receiver to reject an out of band reply at 1115 MHz which is 60 dB larger in amplitude than MTL.	**RFIU:** "Program"		Program selects Top 90 and Top 180 ports on T336254.	
				Replies are injected on the Top 90 and Top 180 antenna ports simultaneously. The reply format is as follows:	**SGEN:** "Freq: 1115.0 MHz" "Lev: -17.0 dBm"		Set the signal generator to apply a RF signal to the Top 90 antenna port.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Top 180 antenna port to be 12 dB less than the signal on the Top 90 antenna port.	
				Pulse Width: 500±50 ns Power: -17.0 dBm on Top 90; -29.0 dBm on Top 180 Frequency: 1115.0 ± 0.1 MHz	**UUT1:** "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					UUT1: "RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS 1 MIN		Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 5 MIN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.26			**MODE-S EXTENDED RANGE MTL 1090 MHz 90/180 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S data string.	
				Replies are injected on the Bottom 90 and Bottom 180 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 90 and Bottom 180 ports on T336254.	
				Type: Mode S Pattern: 55555555AA51C4	**SGEN:** "Freq: 1090.0 MHz" "Lev: -81.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 90 antenna port.	
				Pulse Width: 500± 50 ns Power: -81.0 dBm on Bot 90 -87.0 dBm on Bot 180 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -6.0 dB"		Select an attenuation which causes the signal on the Bottom 180 antenna port to be 6 dB less than the signal on the Bottom 90 antenna port.	
					UUT1: "RXMS B 1111 20 N"		Set UUT to receive MODE S replies in a test mode.	
					"WS C0C00 2001"		Turn self-test oscillator off.	
					"WS C0609 0017"		Set noise threshold to 17 hex.	
					"WS C060A 0006"		Set noise value to 06 hex.	
					"WS C0602 0012"		Set slope detection to 12 hex.	
					"RDMS 50"		Receive a fixed number of MODE S replies.	
				Inject 50 replies into the UUT	**RFIU:** "MTSTRIG 50"		Generate 50 replies at a nominal spacing of 10 msec.	
		50 MAX (Except Mod C or later units) 5 MAX (Mod C or later units only)		Verify the reply data.	**UUT1:** "RXCHK 2"		**CRT:** MISSED REPLIES	50 MAX (Except Mod C or later units) 5 MAX (Mod C or later units only)

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.27			**ATCRBS REJECTION: 180/270 (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 180 and Top 270 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 180 and Top 270 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -81.0 dBm"		Set the signal generator to apply a signal to the Top 180/270 antenna ports which is 2 dB below the lowest acceptable MTL amplitude.	
				Pulse Width: 500 ± 50 ns Power: -81.0 dBm on Top 180 -81.0 dBm on Top 270 Frequency: 1090 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: 0 dB"		Set the RF level into the Top 180 antenna port equal to the RF level into the Top 270 antenna port.	
				Set UUT to receive appropriate replies	**UUT1:** "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
				Set UUT to receive 10 replies	"RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Generate 10 replies	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS 9 or 10		Verify the UUT replies.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 9 or 10

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.28			**ATCRBS 1090 MHz MTL: 180/270 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 180 and Top 270 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 180 and Top 270 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 180/270 antenna ports.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 180 -78.0 dBm on Top 270 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 270 antenna port to be 3 dB less than the signal on the Top 180 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS 0 0 10 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA Z N MISSED REPLIES	PASS PASS 0 0 10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.29			**ATCRBS 1087 MHz MTL: 180/270 (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 180 and Top 270 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 180 and Top 270 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present. Pulse Width: 500±50 ns Power: -75.0 dBm on Top 180 -78.0 dBm on Top 270 Frequency: 1087.0 ± 0.1 MHz	**SGEN:** "Freq: 1087.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 180/270 antenna ports.	
					RFIU: "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 270 antenna port to be 3 dB less than the signal on the Top 180 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		0					Z	0
		0					N	0
		10 MAX					MISSED REPLIES	10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.30			**ATCRBS 1093 MHz MTL: 180/270 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 180 and Top 270 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 180 and Top 270 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1093.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 180/270 antenna ports.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 180 -78.0 dBm on Top 270 Frequency: 1093.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 270 antenna port to be 3 dB less than the signal on the Top 180 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		0					Z	0
		0					N	0
		10 MAX					MISSED REPLIES	10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.31			**ATCRBS 1090 MHz 180/270 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 180 and Top 270 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 180 and Top 270 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -72.0 dBm"		Set the signal generator to apply a RF signal to the Top 180/270 antenna ports.	
				Pulse Width: 500±50 ns Power: -72.0 dBm on Top 180 -75.0 dBm on Top 270 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 270 antenna port to be 3 dB less than the signal on the Top 180 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-72.0±3.0 dBm					CV	-72.0±2.5 dBm
		3.0 ± 2.3 dB					PD	3.0 ± 2.3 dB
		0					Z	0
		0					N	0
		1 MAX					MISSED REPLIES	1 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.32			**ATCRBS 1090 MHz 180/270 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 180 and Top 270 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 180 and Top 270 ports on T336254.	
				Type: ATCRBS	**SGEN:** "Freq: 1090.0 MHz" "Lev: -60.0 dBm"		Set the signal generator to apply a RF signal to the Top 180/270 antenna ports.	
				Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.				
				Pulse Width: 500±50 ns	**RFIU:** "OFFSET SEL LEV: -6.0 dB"		Select an attenuation which causes the signal on the Top 270 antenna port to be 6 dB less than the signal on the Top 180 antenna port.	
				Power: -60.0 dBm on Top 180 -66.0 dBm on Top 270				
				Frequency: 1090.0 ± 0.1 MHz				
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-60.0±2.5 dBm					CV	-60.0±2.0 dBm
		6.0 ± 2.3 dB					PD	6.0 ± 2.3 dB
		0					Z	0
		0					N	0
		0					S	0
		1 MAX					MISSED REPLIES	1 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.33			**MODE-S PATTERN 1 180/270 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Top 180 and Top 270 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 180 and Top 270 ports on T336254.	
				Type: Mode S Pattern: 80000000018567	**SGEN:** "Freq: 1090.0 MHz" "Lev: -48.0 dBm"		Set the signal generator to apply a RF signal to the Top 180/270 antenna ports.	
				Pulse Width: 500± 50 ns Power: -48.0 dBm on Top 180 -57.0 dBm on Top 270 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -9.0 dB"		Select an attenuation which causes the signal on the Top 270 antenna port to be 9 dB less than the signal on the Top 180 antenna port.	
					UUT1: "RXMS T 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 1"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-48.0±2.5 dBm					CV	-48.0±2.0 dBm
		9.0 ± 2.3 dB					PD	9.0 ± 2.3 dB
		0					Z	0
		0					N	0
		0					S	0
		0 MAX					MISSED REPLIES	0 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.34			**MODE-S PATTERN 2 180/270 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Bottom 180 and Bottom 270 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 180 and Bottom 270 ports on T336254.	
				Type: Mode S	**SGEN:** "Freq: 1090.0 MHz" "Lev: -36.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 180/270 antenna ports.	
				Pattern: 55555555AA51C4				
				Pulse Width: 500± 50 ns	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Bottom 270 antenna port to be 12 dB less than the signal on the Bottom 180 antenna port.	
				Power: -36.0 dBm on Bot 180 -48.0 dBm on Bot 270				
				Frequency: 1090.0 ± 0.1 MHz				
					UUT1: "RXMS B 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
				Verify the reply data.				
					UUT1: "RXCHK 2"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-36.0±2.5 dBm					CV	-36.0±2.0 dBm
		12.0 ± 2.3 dB					PD	12.0 ± 2.3 dB
		0					Z	0
		0					N	0
		0					S	0
		0					MISSED REPLIES	0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.35			**MODE-S PATTERN 3 180/270 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Bottom 180 and Bottom 270 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 180 and Bottom 270 ports on T336254.	
				Type: Mode S Pattern: AAAAAAAAAB5781	**SGEN:** "Freq: 1090.0 MHz" "Lev: -24.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 180/270 antenna ports.	
				Pulse Width: 500± 50 ns Power: -24.0 dBm on Bot 180 -25.0 dBm on Bot 270 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -1.0 dB"		Select an attenuation which causes the signal on the Bottom 270 antenna port to be 1 dB less than the signal on the Bottom 180 antenna port.	
					UUT1: "RXMS B 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 3"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-24.0±2.5 dBm					CV	-24.0±2.0 dBm
		1.0 ± 2.3 dB					PD	1.0 ± 2.3 dB
		0					Z	0
		0					N	0
		0					MISSED REPLIES	0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.36			**RX SELF-TEST 180/270 RCVRS**				
				This test verifies the RF wrap capability of the UUT. This is a self-test that is "wrapped" through the RF. No externally injected replies are used. For this test, the 180 and 270 degree receivers are enabled. The self-test CV limits are read from memory for this test.	**UUT1:** "RXMSRF 0011 10"		Set unit to generate RF Mode S wraparound replies in a test mode without the suppression bus activated during the self-test reply.	
					UUT1: "RDMSRF 10"		Generate and receive 10 Mode S replies	
				Read self-test lower limit.	**UUT1:** "RC 97F0D 01"		Read words from the CAS CPU memory at this location.	
				Read self-test upper limit.	**UUT1:** "RC 97F0E 01"		Read words from CAS CPU memory at this location	
				Write self-test lower limit to DTH register.	**UUT1:** "WC C0607 <lower limit>"		Write self-test lower limit to DTH register at this location.	
		PASS PASS ≤ upper limit ≥ lower limit		The CV value shall be below the upper limit stored in memory.	**UUT1:** "RXCHK 1"		FIFO EMPTY DATA CV	PASS PASS ≤ upper limit -3 dB ≥ lower limit +3 dB
		0 ± 3 dB 0 0 0					PD Z N MISSED REPLIES	0 ± 3 dB 0 0 0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.37			**180 RCVR 1065 MHz OUT OF BAND REJECTION** This test verifies the ability of the receiver to reject an out of band reply at 1065 MHz which is 60 dB larger in amplitude than MTL. Replies are injected on the Top 180 and Top 270 antenna ports simultaneously. The reply format is as follows: Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present. Pulse Width: 500±50 ns Power: -17.0 dBm on Top 0; -29.0 dBm on Top 180 Frequency: 1065.0 ± 0.1 MHz Inject 10 replies into the UUT Verify the reply data	**RFIU:** "Program" **RFIU:** "Program" **SGEN:** "Freq: 1065.0 MHz" "Lev: -17.0 dBm" **RFIU:** "OFFSET SEL LEV: -12.0 dB" **UUT1:** "RXATC T 1111" **UUT1:** "RDATC 10" **RFIU:** "MTSTRIG 10" **UUT1:** "RXCHK 6"		Program loads FIFO with data pattern to simulate ATCRBS data string. Program selects Top 180 and Top 270 ports on T336254. Set the signal generator to apply a RF signal to the TOP 180 antenna port. Select an attenuation which causes the signal on the Top 270 antenna port to be 12 dB less than the signal on the Top 180 antenna port. Set UUT to receive ATCRBS replies in a test mode. Receive a fixed number of ATCRBS replies. Generate 10 replies at a nominal spacing of 10 msec. **CRT:** FIFO EMPTY MISSED REPLIES	PASS 5 MIN
		PASS 1 MIN						

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.38			**180 RCVR 1115 MHz OUT OF BAND REJECTION** This test verifies the ability of the receiver to reject an out of band reply at 1115 MHz which is 60 dB larger in amplitude than MTL. Replies are injected on the Top 180 and Top 270 antenna ports simultaneously. The reply format is as follows: Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present. Pulse Width: 500±50 ns Power: -17.0 dBm on Top 180; -29.0 dBm on Top 270 Frequency: 1115.0 ± 0.1 MHz Inject 10 replies into the UUT Verify the reply data	**RFIU:** "Program" **RFIU:** "Program" **SGEN:** "Freq: 1115.0 MHz" "Lev: -17.0 dBm" **RFIU:** "OFFSET SEL LEV: -12.0 dB" **UUT1:** "RXATC T 1111" **UUT1:** "RDATC 10" **RFIU:** "MTSTRIG 10" **UUT1:** "RXCHK 6"		Program loads FIFO with data pattern to simulate ATCRBS data string. Program selects Top 180 and Top 270 ports on T336254. Set the signal generator to apply a RF signal to the Top 180 antenna port. Select an attenuation which causes the signal on the Top 270 antenna port to be 12 dB less than the signal on the Top 180 antenna port. Set UUT to receive ATCRBS replies in a test mode. Receive a fixed number of ATCRBS replies. Generate 10 replies at a nominal spacing of 10 msec. **CRT:** FIFO EMPTY MISSED REPLIES	
		PASS 1 MIN						PASS 5 MIN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.39			**MODE-S EXTENDED RANGE MTL 1090 MHz 180/270 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S data string.	
				Replies are injected on the Bottom 180 and Bottom 270 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 180 and Bottom 270 ports on T336254.	
				Type: Mode S Pattern: 55555555AA51C4	**SGEN:** "Freq: 1090.0 MHz" "Lev: -81.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 180 antenna port.	
				Pulse Width: 500± 50 ns Power: -81.0 dBm on Bot 180 -87.0 dBm on Bot 270 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -6.0 dB"		Select an attenuation which causes the signal on the Bottom 270 antenna port to be 6 dB less than the signal on the Bottom 180 antenna port.	
					UUT1: "RXMS B 1111 20 N"		Set UUT to receive MODE S replies in a test mode.	
					"WS C0C00 2002"		Turn self-test oscillator off.	
					"WS C0609 0017"		Set noise threshold to 17 hex.	
					"WS C060A 0006"		Set noise value to 06 hex.	
					"WS C0602 0012"		Set slope detection to 12 hex.	
					"RDMS 50"		Receive a fixed number of MODE S replies.	
				Inject 50 replies into the UUT	**RFIU:** "MTSTRIG 50"		Generate 50 replies at a nominal spacing of 10 msec.	
		50 MAX (Except Mod C or later units) 5 MAX (Mod C or later units only)		Verify the reply data.	**UUT1:** "RXCHK 2"		**CRT:** MISSED REPLIES	50 MAX (Except Mod C or later units) 5 MAX (Mod C or later units only)

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.40			**ATCRBS REJECTION: 270/0 (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 270 and Top 0 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -81.0 dBm"		Set the signal generator to apply a signal to the Top 270/0 antenna ports which is 2 dB below the lowest acceptable MTL amplitude.	
				Pulse Width: 500 ± 50 ns Power: -81.0 dBm on Top 270 -81.0 dBm on Top 0 Frequency: 1090 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: 0 dB"		Set the RF level into the Top 0 antenna port equal to the RF level into the Top 270 antenna port.	
				Set UUT to receive appropriate replies	**UUT1:** "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
				Set UUT to receive 10 replies	"RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Generate 10 replies	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS 9 or 10		Verify the UUT replies.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 9 or 10

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.41			**ATCRBS 1090 MHz MTL: 270/0 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 270 and Top 0 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 270/0 antenna ports.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 270 -78.0 dBm on Top 0 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 0 antenna port to be 3 dB less than the signal on the Top 270 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS 1 0 10 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA Z N MISSED REPLIES	PASS PASS 1 0 10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.42			**ATCRBS 1087 MHz 270/0 (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 270 and Top 0 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1087.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 270/0 antenna ports.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 270 -78.0 dBm on Top 0 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 0 antenna port to be 3 dB less than the signal on the Top 270 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS 1 0 10 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA Z N MISSED REPLIES	PASS PASS 1 0 10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.43			**ATCRBS 1093 MHz 270/0 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 270 and Top 0 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1093.0 MHz" "Lev: -75.0 dBm"		Set the signal generator to apply a RF signal to the Top 270/0 antenna ports.	
				Pulse Width: 500±50 ns Power: -75.0 dBm on Top 270 -78.0 dBm on Top 0 Frequency: 1093.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 0 antenna port to be 3 dB less than the signal on the Top 270 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS 1 0 10 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA Z N MISSED REPLIES	PASS PASS 1 0 10 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	13.44			**ATCRBS 1090 MHz 270/0 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 270 and Top 0 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Type: ATCRBS	**SGEN:** "Freq: 1090.0 MHz" "Lev: -72.0 dBm"		Set the signal generator to apply a RF signal to the Top 270/0 antenna ports.	
				Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.				
				Pulse Width: 500±50 ns	**RFIU:** "OFFSET SEL LEV: -3.0 dB"		Select an attenuation which causes the signal on the Top 0 antenna port to be 3 dB less than the signal on the Top 270 antenna port.	
				Power: -72.0 dBm on Top 270 -75.0 dBm on Top 0				
				Frequency: 1090.0 ± 0.1 MHz				
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
				Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:**	
		PASS					FIFO EMPTY	PASS
		PASS					DATA	PASS
		-72.0±3.0 dBm					CV	-72.0±2.5 dBm
		3.0 ± 2.3 dB					PD	3.0 ± 2.3 dB
		1					Z	1
		0					N	0
		1 MAX					MISSED REPLIES	1 MAX

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
M	13.45			**ATCRBS 1090 MHz 270/0 RCVRS (SURV)**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				Replies are injected on the Top 270 and Top 0 antenna ports simultaneously. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**SGEN:** "Freq: 1090.0 MHz" "Lev: -60.0 dBm"		Set the signal generator to apply a RF signal to the Top 270/0 antenna ports.	
				Pulse Width: 500±50 ns Power: -60.0 dBm on Top 270 -66.0 dBm on Top 0 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -6.0 dB"		Select an attenuation which causes the signal on the Top 0 antenna port to be 6 dB less than the signal on the Top 270 antenna port.	
					UUT1: "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					"RDATC 100"		Receive a fixed number of ATCRBS replies.	
				Inject 100 replies into the UUT	**RFIU:** "MTSTRIG 100"		Generate 100 replies at a nominal spacing of 10 msec.	
		PASS PASS -60.0±2.5 dBm 6.0 ± 2.3 dB 1 0 1 1 MAX		Verify the reply data.	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY DATA CV PD Z N S MISSED REPLIES	PASS PASS -60.0±2.0 dBm 6.0 ± 2.3 dB 1 0 1 1 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.46			**MODE-S PATTERN 1 270/0 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Top 270 and Top 0 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Type: Mode S Pattern: 80000000018567	**SGEN:** "Freq: 1090.0 MHz" "Lev: -48.0 dBm"		Set the signal generator to apply a RF signal to the Top 270/0 antenna ports.	
				Pulse Width: 500± 50 ns Power: -48.0 dBm on Top 270 -57.0 dBm on Top 0 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -9.0 dB"		Select an attenuation which causes the signal on the Top 0 antenna port to be 9 dB less than the signal on the Top 270 antenna port.	
					UUT1: "RXMS T 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS PASS -48.0±2.5 dBm 9.0 ± 2.3 dB 1 0 1 0 MAX		Verify the reply data.	**UUT1:** "RXCHK 1"		**CRT:** FIFO EMPTY DATA CV PD Z N S MISSED REPLIES	PASS PASS -48.0±2.0 dBm 9.0 ± 2.3 dB 1 0 1 0 MAX

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.47			**MODE-S PATTERN 2 270/0 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Bottom 270 and Bottom 0 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 270 and Bottom 0 ports on T336254.	
				Type: Mode S Pattern: 55555555AA51C4	**SGEN:** "Freq: 1090.0 MHz" "Lev: -36.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 270/0 antenna ports.	
				Pulse Width: 500± 50 ns Power: -36.0 dBm on Bot 270 -48.0 dBm on Bot 0 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Bottom 0 antenna port to be 12 dB less than the signal on the Bottom 270 antenna port.	
					UUT1: "RXMS B 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS PASS -36.0±2.5 dBm 12.0 ± 2.3 dB 1 0 1 0		Verify the reply data.	**UUT1:** "RXCHK 2"		**CRT:** FIFO EMPTY DATA CV PD Z N S MISSED REPLIES	PASS PASS -36.0±2.0 dBm 12.0 ± 2.3 dB 1 0 1 0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.48			**MODE-S PATTERN 3 270/0 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S string.	
				Replies are injected on the Bottom 270 and Bottom 0 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 270 and Bottom 0 ports on T336254.	
				Type: Mode S Pattern: AAAAAAAAAB5781	**SGEN:** "Freq: 1090.0 MHz" "Lev: -24.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 270/0 antenna ports.	
				Pulse Width: 500± 50 ns Power: -24.0 dBm on Bot 270 -25.0 dBm on Bot 0 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -1.0 dB"		Select an attenuation which causes the signal on the Bottom 0 antenna port to be 1 dB less than the signal on the Bottom 270 antenna port.	
					UUT1: "RXMS B 1111 55 W"		Set UUT to receive MODE S replies in a test mode.	
					"RDMS 10"		Receive a fixed number of MODE S replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS PASS -24.0±2.5 dBm 1.0 ± 2.3 dB 1 0 0		Verify the reply data.	**UUT1:** "RXCHK 3"		**CRT:** FIFO EMPTY DATA CV PD Z N MISSED REPLIES	PASS PASS -24.0±2.0 dBm 1.0 ± 2.3 dB 1 0 0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.49			**RX SELF-TEST 270/0 RCVRS**				
				This test verifies the RF wrap capability of the UUT. This is a self-test that is "wrapped" through the RF. No externally injected replies are used. For this test, the 270 and 0 degree receivers are enabled. The self-test CV limits are read from memory for this test.	**UUT1:** "RXMSRF 1001 10"		Set unit to generate RF Mode S wraparound replies in a test mode without the suppression bus activated during the self-test reply.	
					UUT1: "RDMSRF 10"		Generate and receive 10 Mode S replies	
				Read self-test lower limit.	**UUT1:** "RC 97F0D 01"		Read words from the CAS CPU memory at this location.	
				Read self-test upper limit.	**UUT1:** "RC 97F0E 01"		Read words from CAS CPU memory at this location	
				Write self-test lower limit to DTH register.	**UUT1:** "WC C0607 <lower limit>"		Write self-test lower limit to DTH register at this location.	
		PASS PASS ≤ upper limit ≥ lower limit 0 ± 3 dB 1 0 0		The CV value shall be below the upper limit stored in memory.	**UUT1:** "RXCHK 1"		FIFO EMPTY DATA CV PD Z N MISSED REPLIES	PASS PASS ≤ upper limit -3 dB ≥ lower limit +3 dB 0 ± 3 dB 1 0 0

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.50			**270 RCVR 1065 MHz OUT OF BAND REJECTION**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				This test verifies the ability of the receiver to reject an out of band reply at 1065 MHz which is 60 dB larger in amplitude than MTL.	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Replies are injected on the Top 270 and Top 0 antenna ports simultaneously. The reply format is as follows:	**SGEN:** "Freq: 1065.0 MHz" "Lev: -17.0 dBm"		Set the signal generator to apply a RF signal to the Top 270 antenna port.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present.	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Top 0 antenna port to be 12 dB less than the signal on the Top 270 antenna port.	
				Pulse Width: 500±50 ns Power: -17.0 dBm on Top 270; -29.0 dBm on Top 0 Frequency: 1065.0 ± 0.1 MHz	**UUT1:** "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					UUT1: "RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS 1 MIN		Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 5 MIN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.51			**270 RCVR 1115 MHz OUT OF BAND REJECTION**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate ATCRBS data string.	
				This test verifies the ability of the receiver to reject an out of band reply at 1115 MHz which is 60 dB larger in amplitude than MTL.	**RFIU:** "Program"		Program selects Top 270 and Top 0 ports on T336254.	
				Replies are injected on the Top 270 and Top 0 antenna ports simultaneously. The reply format is as follows:	**SGEN:** "Freq: 1115.0 MHz" "Lev: -17.0 dBm"		Set the signal generator to apply a RF signal to the Top 270 antenna port.	
				Type: ATCRBS Pattern: F1, A1, A2, A3, B1, B2, B3, and F2 pulses are present:	**RFIU:** "OFFSET SEL LEV: -12.0 dB"		Select an attenuation which causes the signal on the Top 0 antenna port to be 12 dB less than the signal on the Top 270 antenna port.	
				Pulse Width: 500±50 ns Power: -17.0 dBm on Top 270; -29.0 dBm on Top 0 Frequency: 1115.0 ± 0.1 MHz	**UUT1:** "RXATC T 1111"		Set UUT to receive ATCRBS replies in a test mode.	
					UUT1: "RDATC 10"		Receive a fixed number of ATCRBS replies.	
				Inject 10 replies into the UUT	**RFIU:** "MTSTRIG 10"		Generate 10 replies at a nominal spacing of 10 msec.	
		PASS 1 MIN		Verify the reply data	**UUT1:** "RXCHK 6"		**CRT:** FIFO EMPTY MISSED REPLIES	PASS 5 MIN

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	13.52			**MODE-S EXTENDED RANGE MTL 1090 MHz 270/0 RCVRS**	**RFIU:** "Program"		Program loads FIFO with data pattern to simulate a MODE S data string.	
				Replies are injected on the Bottom 270 and Bottom 0 antenna ports. The reply format is as follows:	**RFIU:** "Program"		Program selects Bottom 270 and Bottom 0 ports on T336254.	
				Type: Mode S Pattern: 55555555AA51C4	**SGEN:** "Freq: 1090.0 MHz" "Lev: -81.0 dBm"		Set the signal generator to apply a RF signal to the Bottom 270 antenna port.	
				Pulse Width: 500± 50 ns Power: -81.0 dBm on Bot 270 -87.0 dBm on Bot 0 Frequency: 1090.0 ± 0.1 MHz	**RFIU:** "OFFSET SEL LEV: -6.0 dB"		Select an attenuation which causes the signal on the Bottom 0 antenna port to be 6 dB less than the signal on the Bottom 270 antenna port.	
					UUT1: "RXMS B 1111 20 N"		Set UUT to receive MODE S replies in a test mode.	
					"WS C0C00 2003"		Turn self-test oscillator off.	
					"WS C0609 0017"		Set noise threshold to 17 hex.	
					"WS C060A 0006"		Set noise value to 06 hex.	
					"WS C0602 0012"		Set slope detection to 12 hex.	
					"RDMS 50"		Receive a fixed number of MODE S replies.	
				Inject 50 replies into the UUT	**RFIU:** "MTSTRIG 50"		Generate 50 replies at a nominal spacing of 10 msec.	
		50 MAX (Except Mod C or later units) 5 MAX (Mod C or later units only)		Verify the reply data.	**UUT1:** "RXCHK 2"		**CRT:** MISSED REPLIES	50 MAX (Except Mod C or later units) 5 MAX (Mod C or later units only)

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	14.0			TRANSMITTER AND WHISPER/SHOUT TESTS (0-4dB steps)	Initial Test Setup		TRANSMITTER AND WHISPER/SHOUT TESTS (0-4dB steps)	
		See figures 2 and 4.		This test causes the UUT to generate six-pulse ATCRBS interrogations out the Top 0 antenna port. Whisper Shout step size measurements shall be made by comparing the P2A pulse amplitudes of the appropriate interrogations. The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.	**RFIU:** "Program"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** All pulses are at the same power level. Connect Power meter to TOP 0 antenna port.	
	14.1	+53.33 to +58.5 dBm		Verify that the peak power of the P2A pulse when invoking the 0 dB Whisper/Shout attenuation level is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 00 00 00 00 00 00 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 0 dB Whisper/Shout attenuation level. The Peak power shall be as specified. **Note:** Losses from the antenna port to the peak power meter must be calibrated into the reading.	+53.33 to +58.5 dBm
	14.2	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 0 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 0 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	14.3	40 to 200 ns		Measure the fall time of the P2A pulse (time between the 90% to 10% voltage points on the falling edge of the pulse) when invoking the 0 dB Whisper/Shout attenuation level.			**PPM:** Measure the fall time of the P2A pulse when invoking the 0 dB Whisper/Shout attenuation level. The fall time between the 90% to 10% voltage points of the falling edge of the pulse shall be as specified.	40 to 175 ns
	14.4	Deleted						Deleted
	14.5	0.5 to 1.5 dB		Verify that the step size between the 0 dB and 1 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 01 01 01 01 01 01 01 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 1 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 14.1. The difference shall be as specified.	0.5 to 1.5 dB
	14.6	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 1 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 1 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
	14.7	40 to 200 ns		Measure the fall time of the P2A pulse (time between the 90% to 10% voltage points on the falling edge of the pulse) when invoking the 1 dB Whisper/Shout attenuation level.			**PPM:** Measure the fall time of the P2A pulse when invoking the 1 dB Whisper/Shout attenuation level. The fall time between the 90% to 10% voltage points of the falling edge of the pulse shall be as specified.	40 to 175 ns
	14.8	Deleted						Deleted

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	14.9	0.5 to 1.5 dB		Verify that the step size between the 1 dB and 2 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 02 02 02 02 02 02 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 2 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 14.5. The difference shall be as specified.	0.5 to 1.5 dB
	14.10	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 2 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 2 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
	14.11	Deleted						Deleted
	14.12	Deleted						Deleted
	14.13	Deleted						Deleted
	14.14	Deleted						Deleted
	14.15	0.5 to 1.5 dB		Verify that the step size between the 2 dB and 3 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 03 03 03 03 03 03 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 3 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 14.9. The difference shall be as specified.	0.5 to 1.5 dB
	14.16	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 3 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 3 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
	14.17	Deleted						Deleted

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	14.18	0.5 to 1.5 dB		Verify that the step size between the 3 dB and 4 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 04 04 04 04 04 04 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 4 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 14.15. The difference shall be as specified.	0.5 to 1.5 dB
	14.19	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 4 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 4 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	15.0			TRANSMITTER AND WHISPER/SHOUT TESTS (5-8dB steps)	Initial Test Setup		TRANSMITTER AND WHISPER/SHOUT TESTS (5-8dB steps)	
		See figures 2 and 4.		This test causes the UUT to generate six-pulse ATCRBS interrogations out the Top 0 antenna port. Whisper Shout step size measurements shall be made by comparing the P2A pulse amplitudes of the appropriate interrogations. The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging	**RFIU:** "Program"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** All pulses are at the same power level. Connect Power meter to TOP 0 antenna port.	
	15.1	Deleted						Deleted
	15.2	Deleted						Deleted
	15.3	0.5 to 1.5 dB		Verify that the step size between the 4 dB and 5 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 05 05 05 05 05 05 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 5 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 14.18. The difference shall be as specified.	0.5 to 1.5 dB
	15.4	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 5 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 5 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	15.5	0.5 to 1.5 dB		Verify that the step size between the 5 dB and 6 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 06 06 06 06 06 06 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 6 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 15.3. The difference shall be as specified.	0.5 to 1.5 dB
	15.6	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 6 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 6 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
	15.7	Deleted						Deleted
	15.8	Deleted						Deleted
	15.9	0.5 to 1.5 dB		Verify that the step size between the 6 dB and 7 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 07 07 07 07 07 07 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 7 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 15.5. The difference shall be as specified.	0.5 to 1.5 dB
	15.10	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 7 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 7 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	15.11	0.5 to 1.5 dB		Verify that the step size between the 7 dB and 8 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 08 08 08 08 08 08 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 8 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 15.9. The difference shall be as specified.	0.5 to 1.5 dB
	15.12	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 8 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 8 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	16.0			TRANSMITTER AND WHISPER/SHOUT TESTS (9-12 dB steps)	Initial Test Setup		TRANSMITTER AND WHISPER/SHOUT TESTS (9-12 dB steps)	
		See figures 2 and 4.		This test causes the UUT to generate six-pulse ATCRBS interrogations out the Top 0 antenna port. Whisper Shout step size measurements shall be made by comparing the P2A pulse amplitudes of the appropriate interrogations. The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.	**RFIU:** "Program"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** All pulses are at the same power level.	
	16.1	Deleted						Deleted
	16.2	Deleted						Deleted
	16.3	0.5 to 1.5 dB		Verify that the step size between the 8 dB and 9 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 09 09 09 09 09 09 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 9 dB Whisper/Shout attenuation level. Subtract this measure-ment from the measure-ment recorded in test 15.11. The difference shall be as specified.	0.5 to 1.5 dB
	16.4	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 9 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 9 dB Whisper/Shout attenu-ation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	16.5	0.5 to 1.5 dB		Verify that the step size between the 9 dB and 10 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 10 10 10 10 10 10 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 10 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 16.3. The difference shall be as specified.	0.5 to 1.5 dB
	16.6	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 10 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 10 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
	16.7	Deleted						Deleted
	16.8	Deleted						Deleted
	16.9	0.5 to 1.5 dB		Verify that the step size between the 10 dB and 11 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 11 11 11 11 11 11 40"		**PPM:** Measure peak power of the P2A pulse when invoking the 11 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 16.5. The difference shall be as specified.	0.5 to 1.5 dB
	16.10	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 11 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 11 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	16.11	0.5 to 1.5 dB		Verify that the step size between the 11 dB and 12 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 12 12 12 12 12 12 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 12 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 16.9. The difference shall be as specified.	0.5 to 1.5 dB
	16.12	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 12 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 12 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	17.0			<u>TRANSMITTER AND WHISPER/SHOUT TESTS (13-16 dB steps)</u>	Initial Test Setup		<u>TRANSMITTER AND WHISPER/SHOUT TESTS (13-16 dB steps)</u>	
		See figures 2 and 4.		This test causes the UUT to generate six-pulse ATCRBS interrogations out the Top 0 antenna port. Whisper Shout step size measurements shall be made by comparing the P2A pulse amplitudes of the appropriate interrogations. The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging	**RFIU:** "Program"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** All pulses are at the same power level.	
	17.1	Delete						Delete
	17.2	Delete						Delete
	17.3	0.5 to 1.5 dB		Verify that the step size between the 12 dB and 13 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 13 13 13 13 13 13 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 13 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 16.11. The difference shall be as specified.	0.5 to 1.5 dB
	17.4	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 13 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 13 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	17.5	0.5 to 1.5 dB		Verify that the step size between the 13 dB and 14 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 14 14 14 14 14 14 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 14 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 17.3. The difference shall be as specified.	0.5 to 1.5 dB
	17.6	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 14 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 14 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
	17.7	Delete						Delete
	17.8	Delete						Delete
	17.9	0.5 to 1.5 dB		Verify that the step size between the 14 dB and 15 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 15 15 15 15 15 15 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 15 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 17.5. The difference shall be as specified.	0.5 to 1.5 dB
	17.10	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 15 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 15 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	17.11	0.5 to 1.5 dB		Verify that the step size between the 15 dB and 16 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 16 16 16 16 16 16 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 16 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 17.9. The difference shall be as specified.	0.5 to 1.5 dB
	17.12	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 16 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 16 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	18.0			<u>TRANSMITTER AND WHISPER/SHOUT TESTS (17-20 dB steps)</u>	Initial Test Setup		<u>TRANSMITTER AND WHISPER/SHOUT TESTS (17-20 dB steps)</u>	
		See figures 2 and 4.		This test causes the UUT to generate six-pulse ATCRBS interrogations out the Top 0 antenna port. Whisper Shout step size measurements shall be made by comparing the P2A pulse amplitudes of the appropriate interrogations. The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.	**RFIU:** "Program"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** All pulses are at the same power level.	
	18.1	Delete						Delete
	18.2	Delete						Delete
	18.3	0.5 to 1.5 dB		Verify that the step size between the 16 dB and 17 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 17 17 17 17 17 17 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 17 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 17.11. The difference shall be as specified.	0.5 to 1.5 dB
	18.4	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 17 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 17 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	18.5	0.5 to 1.5 dB		Verify that the step size between the 17 dB and 18 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 18 18 18 18 18 18 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 18 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 18.3. The difference shall be as specified.	0.5 to 1.5 dB
	18.6	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 18 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 18 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
	18.7	Delete						Delete
	18.8	Delete						Delete
	18.9	0.5 to 1.5 dB		Verify that the step size between the 18 dB and 19 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 19 19 19 19 19 19 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 19 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 18.5. The difference shall be as specified.	0.5 to 1.5 dB
	18.10	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 19 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 19 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	18.11	0.5 to 1.5 dB		Verify that the step size between the 19 dB and 20 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 20 20 20 20 20 20 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 20 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 18.9. The difference shall be as specified.	0.5 to 1.5 dB
	18.12	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse) when invoking the 20 dB Whisper/Shout attenuation level.			**PPM:** Measure the rise time of the P2A pulse when invoking the 20 dB Whisper/Shout attenuation level. The rise time between the 10% to 90% voltage points of the leading edge of the pulse shall be as specified.	50 to 100 ns
	18.13	18.0 to 22.0 dB		Verify that the absolute power level of the P2A pulse when invoking the 20 dB Whisper/Shout attenuation level is within specified limits.			Subtract the peak power of the P2A pulse in test 18.11 from the peak power of the P2A pulse in test 14.1. The difference shall be as specified.	18.5 to 21.5 dB
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	19.0			TRANSMITTER AND WHISPER/SHOUT TESTS (21-27 dB steps)	Initial Test Setup		TRANSMITTER AND WHISPER/SHOUT TESTS (21-27 dB steps)	
		See figures 2 and 4.		This test causes the UUT to generate six-pulse ATCRBS interrogations out the Top 0 antenna port. Whisper Shout step size measurement shall be made by comparing the P2A pulse amplitudes of the appropriate interrogations. The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging	**RFIU:** "Program"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** All pulses are at the same power level.	
	19.1	0.5 to 1.5 dB		Verify that the step size between the 20 dB and 21 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 21 21 21 21 21 21 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 21 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 18.11. The difference shall be as specified.	0.5 to 1.5 dB
	19.2	0.5 to 1.5 dB		Verify that the step size between the 21 dB and 22 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 22 22 22 22 22 22 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 22 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 19.1. The difference shall be as specified.	0.5 to 1.5 dB

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	19.3	0.5 to 1.5 dB		Verify that the step size between the 22 dB and 23 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 23 23 23 23 23 23 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 23 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 19.2. The difference shall be as specified.	0.5 to 1.5 dB
	19.4	0.5 to 1.5 dB		Verify that the step size between the 23 dB and 24 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 24 24 24 24 24 24 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 24 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 19.3. The difference shall be as specified.	0.5 to 1.5 dB
	19.5	0.5 to 1.5 dB		Verify that the step size between the 24 dB and 25 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 25 25 25 25 25 25 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 25 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 19.4. The difference shall be as specified.	0.5 to 1.5 dB
	19.6	0.5 to 1.5 dB		Verify that the step size between the 25 dB and 26 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 26 26 26 26 26 26 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 26 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 19.5. The difference shall be as specified.	0.5 to 1.5 dB

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	19.7	0.5 to 1.5 dB		Verify that the step size between the 26 dB and 27 dB Whisper/Shout attenuation levels is within specified limits.	**UUT1:** "XATCSR T 0 0 0 0 0 0 27 27 27 27 27 27 40"		**PPM:** Measure and record peak power of the P2A pulse when invoking the 27 dB Whisper/Shout attenuation level. Subtract this measurement from the measurement recorded in test 19.6. The difference shall be as specified.	0.5 to 1.5 dB
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	20.0			ATCRBS DEVIATION AND SPACING TESTS	Initial Test Setup		ATCRBS DEVIATION AND SPACING TESTS	
		See figures 2 and 4.		This test causes the UUT to generate six-pulse ATCRBS interrogations out the Top 0 antenna port. All pulses are at full power. The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging	**UUT1:** "XATCSR T 0 0 0 0 0 0 00 00 00 00 00 00 40" **RFIU:** "Program"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** All pulses are at the same power level.	
	20.1	0 to 0.5 dB		Measure the amplitude deviation within the ATCRBS six-pulse sequence.			**PPM:** Measure the amplitude of each pulse within the ATCRBS six-pulse sequence. Subtract the peak power amplitude of the lowest amplitude pulse from the peak power amplitude of the highest amplitude pulse. The difference shall be specified.	0 to 0.5 dB
	20.2	2.0 ± 0.1 us		Measure the spacing between the leading edge of the S1 pulse to the leading edge of the P1 pulse (time between the 50% voltage points of the leading edge of each pulse).	.		**PPM:** Measure spacing between S1 and P1. The time between the 50% voltage points of the leading edges of the S1 and P1 pulses shall be as specified.	2.0 ± 0.1 us

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	20.3	2.0 ± 0.1 us		Measure the spacing between the leading edge of the P1 pulse to the leading edge of the P2A pulse (time between the 50% voltage points of the leading edge of each pulse).			**PPM:** Measure the spacing between the leading edge of the P1 pulse to the leading edge of the P2A pulse. The time between the 50% voltage points of the leading edges of the P1 and P2A pulses shall be as specified.	2.0 ± 0.1 us
	20.4	17.0 ± 0.1 us		Measure the spacing between the leading edge of the P2A pulse to the leading edge of the P2B pulse (time between the 50% voltage points of the leading edge of each pulse).			**PPM:** Measure the spacing between the leading edge of the P2A pulse and the leading edge of the P2B pulse. The time between the 50% voltage points of the leading edges of the P2A and P2B pulses shall be as specified.	17.0 ± 0.1 us
	20.5	2.0 ± 0.1 us		Measure the spacing between the leading edge of the P2B pulse to the leading edge of the P3 pulse (time between the 50% voltage points of the leading edge of each pulse).			**PPM:** Measure the spacing between the leading edge of the P2B pulse and the leading edge of the P3 pulse. The time between the 50% voltage points of the leading edges of the P2B and P3 pulses shall be as specified.	2.0 ± 0.1 us
	20.6	2.0 ± 0.1 us		Measure the spacing between the leading edge of the P3 pulse to the leading edge of the P4 pulse (time between the 50% voltage points of the leading edge of each pulse).			**PPM:** Measure the spacing between the leading edge of the P3 pulse and the leading edge of the P4 pulse. The time between the 50% voltage points of the leading edges of the P3 and P4 pulses shall be as specified.	2.0 ± 0.1 us
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	21.0			TRANSMITTER AND WHISPER/SHOUT TESTS (Missing P1/P3)	Initial Test Setup		TRANSMITTER AND WHISPER/SHOUT TESTS (Missing P1/P3)	
		See figures 2 and 4.		This test causes the UUT to generate an ATCRBS interrogation, with the P1 and P3 pulses missing, out the Top 0 antenna port. The format of the interrogation is as follows: S1 full power, P1 missing, P2A full power, P2B full power, P3 missing, P4 full power. The interrogation may be repeated at a maximum rate of once every 25 ms for averaging.	**UUT1:** "XATCSR T 0 0 0 0 0 0 00 99 00 00 99 00 40"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** S1 full power, P1 missing, P2A full power, P2B full power, P3 missing, P4 full power.	
	21.1	+53.33 dBm or greater		Verify that the peak power of the S1 pulse is within specified limits.			**PPM:** Measure the peak power of the S1 pulse. Peak power shall be as specified.	+53.33 dBm or greater
	21.2	less than +35 dBm		Verify that the peak power of the P1 pulse is within specified limits.			**PPM:** Measure the peak power of the P1 pulse. Peak power shall be as specified.	less than +35 dBm
	21.3	+53.33 dBm or greater		Verify that the peak power of the P2A pulse is within specified limits.			**PPM:** Measure the peak power of the P2A pulse. Peak power shall be as specified.	+53.33 dBm or greater
	21.4	+53.33 dBm or greater		Verify that the peak power of the P2B pulse is within specified limits.			**PPM:** Measure the peak power of the P2B pulse. Peak power shall be as specified.	+53.33 dBm or greater
	21.5	less than +35 dBm		Verify that the peak power of the P3 pulse is within specified limits.			**PPM:** Measure the peak power of the P3 pulse. Peak power shall be as specified.	less than +35 dBm

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	21.6	+53.33 dBm or greater		Verify that the peak power of the P4 pulse is within specified limits.			**PPM:** Measure the peak power of the P4 pulse. Peak power shall be as specified.	+53.33 dBm or greater
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	22.0			TRANSMITTER AND WHISPER/SHOUT TESTS (Missing S1, P2A, P2B, P4)	Initial Test Setup		TRANSMITTER AND WHISPER/SHOUT TESTS (Missing S1, P2A, P2B, P4)	
		See figures 2 and 4.		This test causes the UUT to generate an ATCRBS interrogation out the Top 0 antenna port. The format of the interrogation is as follows: S1 missing, P1 full power, P2A missing, P2B missing, P3 full power, P4 missing. The interrogation may be repeated at a maximum rate of once every 25 ms for averaging.	**UUT1:** "XATCSR T 0 0 0 0 0 99 00 99 99 00 99 40"		**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Angle**: 0 deg. **Port which pulse is transmitted from:** 0,0,0,0,0,0 **Whisper/Shout step:** S1 missing, P1 full power, P2A missing, P2B missing, P3 full power, P4 missing.	
	22.1	less than +35 dBm		Verify that the peak power of the S1 pulse is within specified limits.			**PPM:** Measure the peak power of the S1 pulse. Peak power shall be as specified.	less than +35 dBm
	22.2	+53.33 dBm or greater		Verify that the peak power of the P1 pulse is within specified limits.			**PPM:** Measure the peak power of the P1 pulse. Peak power shall be as specified.	+53.33 dBm or greater
	22.3	less than +35 dBm		Verify that the peak power of the P2A pulse is within specified limits.			**PPM:** Measure the peak power of the P2A pulse. Peak power shall be as specified.	less than +35 dBm
	22.4	less than +35 dBm		Verify that the peak power of the P2B pulse is within specified limits.			**PPM:** Measure the peak power of the P2B pulse. Peak power shall be as specified.	less than +35 dBm

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	22.5	+53.33 dBm or greater		Verify that the peak power of the P3 pulse is within specified limits.			**PPM:** Measure the peak power of the P3 pulse. Peak power shall be as specified.	+53.33 dBm or greater
	22.6	less than +35 dBm		Verify that the peak power of the P4 pulse is within specified limits.			**PPM:** Measure the peak power of the P4 pulse. Peak power shall be as specified.	less than +35 dBm
				Turn off the interrogation format.	**UUT1:** “XOFF”		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	23.0			TRANSMITTER AND WHISPER SHOUT TEST (TOP ANTENNA, UNMODULATED P6 PULSE, LONG REPLY)			TRANSMITTER AND WHISPER SHOUT TEST (TOP ANTENNA, UNMODULATED P6 PULSE, LONG REPLY)	
		See figures 2, 3, and 5.		This test causes the UUT to generate a Mode S interrogation out the Top 0 antenna port. The format of the interrogation is as follows: Long P6 pulse, no data. The interrogation may be repeated at a maximum rate of once every 25 ms for averaging.	**UUT1:** "XMS0R T 0 L 00 40"		**XMSO:**Generate a Mode S interrogation with an unmodulated P6 pulse. **R:** repeat at 40 per second. **T:** TOP 0 antenna **L:** Long reply **Whisper/Shout step:** is 00	
	23.1	1030 MHz ± 10 KHz		Verify that the transmitter frequency is within the specified limits.	**RFIU:** "Program"		Connect TOP 0 antenna to the peak power meter. **PPM:** The transmitter frequency shall be as specified.	1030 MHz ± 5 KHz
	23.2	+53.33 dBm or greater		Verify that the peak power of the P1 pulse is within specified limits.			**PPM:** Measure the peak power of the P1 pulse. Peak power shall be as specified.	+53.33 dBm or greater
	23.3	800 ± 50 ns		Measure the pulse width of the P1 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** The pulse width between the 50% to 50% voltage points of the P1 pulse shall be as specified.	800 ± 50 ns
	23.4	2.0 ± 0.1 us		Measure the spacing between the leading edge of the P1 pulse to the leading edge of the P2 pulse (time between the 50% voltage points of the leading edge of each pulse).			**PPM:** The time between the 50% voltage points of the leading edges of the P1 and P2 pulses shall be as specified.	2.0 ± 0.1 us
	23.5	+53.33 dBm or greater		Verify that the peak power of the P2 pulse is within specified limits.			**PPM:** Peak power of the P2 pulse shall be as specified.	+53.33 dBm or greater

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	23.6	800 ± 50 ns		Measure the pulse width of the P2 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** The pulse width of the P2 pulse, between the 50% to 50% voltage points of the pulse, shall be as specified.	800 ± 50 ns
	23.7	+53.33 dBm or greater		Verify that the peak power of the P6 pulse is within specified limits.			**PPM:** Peak power of the P6 pulse shall be as specified.	+53.33 dBm or greater
	23.8	1.5 dB or less		Measure the droop of the P6 pulse (difference in amplitude sampled at a rate faster than 2μs/ sample from 1 μsec in from the leading edge of the P6 pulse to 1 μsec before the end of the P6 pulse). No measurement along the pulse shall be outside the specified limit.			**PPM:** The droop of the P6 pulse shall be as specified. The droop is the (difference in amplitude sampled at a rate faster than 2μs/ sample from 1 μsec in from the leading edge of the P6 pulse to 1 μsec before the end of the P6 pulse). No measurement along the pulse shall be outside the specified limit.	1.0 dB or less
	23.9	30.250 ± 0.125 us		Measure the pulse width of the P6 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** The pulse width of the P6 pulse between the 50% to 50% voltage points of the pulse shall be as specified.	30.250 ± 0.125 us
	23.10	1.250 ± 0.040 us		Measure the delay between the leading edge of the P6 pulse and the SPR position.			**PPM:** The delay between the leading edge of the P6 pulse and the position of the SPR shall be as specified.	1.250 ± 0.035 us
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	24.0			TRANSMITTER AND WHISPER SHOUT TEST (TOP 0 ANTENNA UNMODULATED P6, SHORT REPLY)			TRANSMITTER AND WHISPER SHOUT TEST (TOP 0 ANTENNA UNMODULATED P6, SHORT REPLY)	
		See figures 2 and 5.		This test causes the UUT to generate a Mode S interrogation out the Top 0 antenna port. The format of the interrogation is as follows: Short P6 pulse, no data. The interrogation may be repeated at a maxi-mum rate of once every 25 ms for averaging.	**UUT1:** "XMS0R T 0 S 00 40"		**XMSO:**Generate a Mode S interrogation with an unmodulated P6 pulse. **R:** repeat at 40 per second. **T:** TOP 0 antenna **S:** Short reply **Whisper/Shout step:** is 00	
	24.1	16.250 ± 0.125 us		Measure the pulse width of the P6 pulse (time between the 50% to 50% voltage points on the pulse).	**RFIU:** "Program"		Connect TOP 0 antenna to the peak power meter. **PPM:** The pulse width of the P6 pulse between the 50% to 50% voltage points of the pulse shall be as specified.	16.250 ± 0.125 us
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	25.0			TRANSMITTER AND WHISPER SHOUT TEST (TOP ANTENNA, MODULATED P6 PULSE, LONG REPLY, DPSK DECODING)			TRANSMITTER AND WHISPER SHOUT TEST (TOP ANTENNA, MODULATED P6 PULSE, LONG REPLY, DPSK DECODING)	
		See figure 5.		This test causes the UUT to generate a Mode S interrogation out the Top 0 antenna port. The format of the interrogation is as follows: Long P6 pulse, maximum number of phase changes. The interrogation may be repeated at a maximum rate of once every 25 ms for averaging.	**UUT1:** "XMS1R T 0 L 00 40"		Generate a Mode S interrogation with modulation on the P6 pulse to the TOP 0 antenna using long reply, whisper shout step is 00, at a rate of 40 per sec.	
	25.1	"FFFFFFFFFFFFFFFFFFFFFFF" (28 F's)		A Mode S interrogation with the DPSK data set to all ones (maximum phase reversals) will be transmitted. The transmitted message will be received demodulated by the test fixture. The demodulated data shall be equivalent to the transmitted data. This test will be performed 10 times in succession and must pass at least 9 times.	**RFIU:** "Program"		Generate 10 Mode S interrogations with the UUT. After each interrogation read the decoded DPSK data from the test fixture. The DPSK data shall be as specified 9 out of 10 times tested.	"FFFFFFFFFFFFFFFFFFFFFFF" (28 F's)
				Turn off the interrogation format.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	26.0			RF I/O TESTS WITH S1 AND P4 ON TOP 0 ANTENNA	Initial Test Setup. **RFIU:** "Program"		RF I/O TESTS WITH S1 AND P4 ON TOP 0 ANTENNA Connect TOP 0 antenna to the Peak Power Meter.	
		See figures 2 and 4		This test causes the UUT to generate an ATCRBS interrogation out all four Top antenna ports. This test verifies the directional switching capability of the I/O. Two of the six pulses are present on the Top 0 antenna port (S1 and P4). The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.			**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Port which pulse is transmitted from:** 0,1,2,2,3,0	
	26.1	+53.33 dBm or greater		Verify that the peak power of the S1 pulse is within specified limits.	**UUT1:** "XATCSR T 0 1 2 2 3 0 00 27 27 27 27 00 40"		**PPM:** Measure the peak power of the S1 pulse. The peak power shall be as specified.	+53.33 dBm or greater
	26.2	800 ± 50 ns		Measure the pulse width of the S1 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of S1, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	26.3	50 to 100 ns		Measure the rise time of the S1 pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of S1, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
	26.4	+53.33 dBm or greater		Verify that the peak power of the P4 pulse is within specified limits.			**PPM:** Measure the peak power of the P4 pulse. The peak power shall be as specified.	+53.33 dBm or greater

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	26.5	800 ± 50 ns		Measure the pulse width of the P4 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P4, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	26.6	50 to 100 ns		Measure the rise time of the P4 pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P4, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the interrogations.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	27.0			RF I/O TESTS WITH P1 PULSE ON TOP 90 ANTENNA	Initial Test Setup.		RF I/O TESTS WITH P1 ON TOP 90 ANTENNA	
					RFIU: "Program"		Connect TOP 90 antenna to the Peak Power Meter	
		See figures 2 and 4		This test causes the UUT to generate an ATCRBS interrogation out all four Top antenna ports. This test verifies the directional switching capability of the I/O. One of the six pulses is present on the Top 90 antenna port (P1). The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.			**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Port which pulse is transmitted from:** 0,1,2,2,3,0	
	27.1	+53.33 dBm or greater		Verify that the peak power of the P1 pulse is within specified limits.	**UUT1:** "XATCSR T 0 1 2 2 3 0 27 00 27 27 27 27 40"		**PPM:** Measure the peak power of the P1 pulse. The peak power shall be as specified.	+53.33 dBm or greater
	27.2	800 ± 50 ns		Measure the pulse width of the P1 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P1, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	27.3	50 to 100 ns		Measure the rise time of the P1 pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P1, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the interrogations.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	28.0			RF I/O TESTS WITH P2A & P2B PULSES ON TOP 180 ANTENNA	Initial Test Setup. **RFIU:** "Program"		RF I/O TESTS WITH P2A & P2B PULSES ON TOP 180 ANTENNA Connect TOP 180 antenna to the Peak Power Meter	
		See figures 2 and 4		This test causes the UUT to generate an ATCRBS interrogation out all four Top antenna ports. This test verifies the directional switching capability of the I/O. Two of the six pulses are present on the Top 180 antenna port (P2A and P2B). The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.			**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Port which pulse is transmitted from:** 0,1,2,2,3,0	
	28.1	+53.33 dBm or greater		Verify that the peak power of the P2A pulse is within specified limits.	**UUT1:** "XATCSR T 0 1 2 2 3 0 27 27 00 00 27 27 40"		**PPM:** Measure the peak power of the P2A pulse. The peak power shall be as specified.	+53.33 dBm or greater
	28.2	800 ± 50 ns		Measure the pulse width of the P2A pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P2A, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	28.3	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P2A, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
	28.4	+53.33 dBm or greater		Verify that the peak power of the P2B pulse is within specified limits.			**PPM:** Measure the peak power of the P2B pulse. The peak power shall be as specified.	+53.33 dBm or greater

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	28.5	800 ± 50 ns		Measure the pulse width of the P2B pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P2B, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	28.6	50 to 100 ns		Measure the rise time of the P2B pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P2B, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	29.0			RF I/O TESTS WITH P3 PULSE ON TOP 270 ANTENNA	Initial Test Setup. **RFIU:** "Program"		RF I/O TESTS WITH P3 PULSE ON TOP 270 ANTENNA Connect TOP 270 antenna to the Peak Power Meter	
		See figures 2 and 4		This test causes the UUT to generate an ATCRBS interrogation out all four Top antenna ports. This test verifies the directional switching capability of the I/O. One of the six pulses is present on the Top 270 antenna port (P3). The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.			**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **T:** TOP ANTENNA **Port which pulse is transmitted from:** 0,1,2,2,3,0	
	29.1	+53.33 dBm or greater		Verify that the peak power of the P3 pulse is within specified limits.	**UUT1:** "XATCSR T 0 1 2 2 3 0 27 27 27 27 00 27 40"		**PPM:** Measure the peak power of the P3 pulse. The peak power shall be as specified.	+53.33 dBm or greater
	29.2	800 ± 50 ns		Measure the pulse width of the P3 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P3, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	29.3	50 to 100 ns		Measure the rise time of the P3 pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P3, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	30.0			RF I/O TESTS DIRECTIONAL SWITCHING WITH S1 & P4 PULSE ON BOTTOM 0 ANTENNA	Initial Test Setup.		RF I/O TESTS DIRECTIONAL SWITCHING WITH S1 & P4 PULSE ON BOTTOM 0 ANTENNA	
					RFIU: "Program"		Connect BOTTOM 0 antenna to the Peak Power Meter	
		See figures 2 and 4		This test causes the UUT to generate an ATCRBS interrogation out all four Bottom antenna ports. This test verifies the directional switching capability of the I/O. Two of the six pulses are present on the Bottom 0 antenna port (S1 and P4). The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.			**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **B:** BOTTOM ANTENNA **Port which pulse is transmitted from:** 0,3,2,2,1,0	
	30.1	+53.33 dBm or greater		Verify that the peak power of the S1 pulse is within specified limits.	**UUT1:** "XATCSR B 0 3 2 2 1 0 00 27 27 27 27 00 40"		**PPM:** Measure the peak power of the S1 pulse. The peak power shall be as specified.	+53.33 dBm or greater
	30.2	800 ± 50 ns		Measure the pulse width of the S1 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of S1, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	30.3	50 to 100 ns		Measure the rise time of the S1 pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of S1, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	30.4	+53.33 dBm or greater		Verify that the peak power of the P4 pulse is within specified limits.			**PPM:** Measure the peak power of the P4 pulse. The peak power shall be as specified.	+53.33 dBm or greater
	30.5	800 ± 50 ns		Measure the pulse width of the P4 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P4, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	30.6	50 to 100 ns		Measure the rise time of the P4 pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P4, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	31.0			RF I/O TESTS DIRECTIONAL SWITCHING WITH P1 PULSE ON BOTTOM 270 ANTENNA	Initial Test Setup. **RFIU:** "Program"		RF I/O TESTS DIRECTIONAL SWITCHING WITH P1 PULSE ON BOTTOM 270 ANTENNA Connect BOTTOM 270 antenna to the Peak Power Meter	
		See figures 2 and 4		This test causes the UUT to generate an ATCRBS interrogation out all four Bottom antenna ports. This test verifies the directional switching capability of the I/O. One of the six pulses is present on the Bottom 270 antenna port (P1). The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.			**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **B:** BOTTOM ANTENNA **Port which pulse is transmitted from:** 0,3,2,2,1,0	
	31.1	+53.33 dBm or greater		Verify that the peak power of the P1 pulse is within specified limits.	**UUT1:** "XATCSR B 0 3 2 2 1 0 27 00 27 27 27 27 40"		**PPM:** Measure the peak power of the P1 pulse. The peak power shall be as specified.	+53.33 dBm or greater
	31.2	800 ± 50 ns		Measure the pulse width of the P1 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P1, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	31.3	50 to 100 ns		Measure the rise time of the P1 pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P1, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	32.0			RF I/O TESTS WITH P2A & P2B PULSES ON BOTTOM 180 ANTENNA	Initial Test Setup. **RFIU:** "Program"		RF I/O TESTS WITH P2A & P2B PULSES ON BOTTOM 180 ANTENNA Connect BOTTOM 180 antenna to the Peak Power Meter	
		See figures 2 and 4		This test causes the UUT to generate an ATCRBS interrogation out all four Bottom antenna ports. This test verifies the directional switching capability of the I/O. Two of the six pulses are present on the Bottom 180 antenna port (P2A and P2B). The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging.			**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **B:** BOTTOM ANTENNA **Port which pulse is transmitted from:** 0,3,2,2,1,0	
	32.1	+53.33 dBm or greater		Verify that the peak power of the P2A pulse is within specified limits.	**UUT1:** "XATCSR B 0 3 2 2 1 0 27 27 00 00 27 27 40"		**PPM:** Measure the peak power of the P2A pulse. The peak power shall be as specified.	+53.33 dBm or greater
	32.2	800 ± 50 ns		Measure the pulse width of the P2A pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P2A, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	32.3	50 to 100 ns		Measure the rise time of the P2A pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P2A, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	32.4	+53.33 dBm or greater		Verify that the peak power of the P2B pulse is within specified limits.			**PPM:** Measure the peak power of the P2B pulse. The peak power shall be as specified.	+53.33 dBm or greater
	32.5	800 ± 50 ns		Measure the pulse width of the P2B pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P2B, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	32.6	50 to 100 ns		Measure the rise time of the P2B pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P2B, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	33.0			RF I/O TESTS WITH P3 PULSE ON BOTTOM 90 ANTENNA	Initial Test Setup. **RFIU:** "Program"		RF I/O TESTS WITH P3 PULSE ON BOTTOM 90 ANTENNA Connect BOTTOM 90 antenna to the Peak Power Meter	
		See figures 2 and 4		This test causes the UUT to generate an ATCRBS interrogation out all four Bottom antenna ports. This test verifies the directional switching capability of the I/O. One of the six pulses is present on the Bottom 90 antenna port (P3). The six-pulse interrogation may be repeated at a maximum rate of once every 25 ms for averaging			**XATCS:** Generate a single whisper/shout interrogation with each pulse set individually. **R:** repeat 40 times per second. **B:** BOTTOM ANTENNA **Port which pulse is transmitted from:** 0,3,2,2,1,0	
	33.1	+53.33 dBm or greater		Verify that the peak power of the P3 pulse is within specified limits.	**UUT1:** "XATCSR B 0 3 2 2 1 0 27 27 27 27 00 27 40"		**PPM:** Measure the peak power of the P3 pulse. The peak power shall be as specified.	+53.33 dBm or greater
	33.2	800 ± 50 ns		Measure the pulse width of the P3 pulse (time between the 50% to 50% voltage points on the pulse).			**PPM:** Measure the pulse width of P3, between the 50% to 50% voltage points of the pulse. The pulse width shall be as specified.	800 ± 50 ns
	33.3	50 to 100 ns		Measure the rise time of the P3 pulse (time between the 10% to 90% voltage points on the leading edge of the pulse).			**PPM:** Measure the rise time of P3, between the 10% to 90% voltage points of the leading edge of the pulse. The rise time shall be as specified.	50 to 100 ns
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the Whisper Shout interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	34.0			ANTENNA FAULT SENSING This test verifies the antenna fault sensing capability of the RX/IO CCA. Various values of dc resistance are connected between the center conductor of the antenna ports and ground, and then the RF status register is read to verify proper status.	Initial Test Setup.		ANTENNA FAULT SENSING	
	34.1			Setup the MTS antenna load resistors. Load bottom antenna ports with 50 ohms. Load top antenna ports with nominal resistance.	**RFIU:** "Program" "MTSANT B G G G G" "MTSANT T N N N N"		Set T336254 RK 8, 9, 10, 11 to connect BOTTOM antennas to DCR (49.9 ohms) and TOP antennas to nominal resistance state. Top 0 = 1000 ± 50 ohms Top 90 = 2000 ± 50 ohms Top 180 = 4020 ± 50 ohms Top 270 = 8060 ± 50 ohms	
		PPPPSSSSO		Test antenna DC BITE. Compare output status against specification.	**UUT1:** "ANT"		Cycle through the top (first 4 readings) and bottom (second 4 readings) antenna ports plus the omni discrete. The status register output shall be as specified.	PPPPSSSSO

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	34.2			Load top antenna ports with out of tolerance resistance.	**RFIU:** "Program" "MTSANT T H L H L"			
		OSOSSSSSO		Test antenna DC BITE. Compare output status against specification.	**UUT1:** "ANT"		Cycle through the top (first 4 readings) and bottom (second 4 readings) antenna ports plus the omni discrete. The status register output shall be as specified.	OSOSSSSSO
	34.3			Load top antenna ports with out of tolerance resistance.	**RFIU:** "Program" "MTSANT T L H L H"			
		SOSOSSSSO		Test antenna DC BITE. Compare output status against specification.	**UUT1:** "ANT"		Cycle through the top (first 4 readings) and bottom (second 4 readings) antenna ports plus the omni discrete. The status register output shall be as specified.	SOSOSSSSO
	34.4			Reset the MTS antenna load resistors. Load top antenna ports with 50 ohms. Load bottom antenna ports with nominal resistance.	**RFIU:** "Program" "MTSANT T G G G G" "MTSANT B N N N N"		Load top antenna ports with 50 ohms. Load bottom antenna ports with nominal resistance.	
		SSSSPPPPD		Test antenna DC BITE. Compare output status against specification.	**UUT1:** "ANT"		Cycle through the top (first 4 readings) and bottom (second 4 readings) antenna ports plus the omni discrete. The status register output shall be as specified.	SSSSPPPPD

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	34.5			Reset the MTS antenna load resistors. Load bottom antenna ports with out of tolerance resistance.	**RFIU:** "Program" "MTSANT B H L H L"		Load bottom antenna ports with out of tolerance resistance.	
		SSSSOSOSD		Test antenna DC BITE. Compare output status against specification.	**UUT1:** "ANT"		Cycle through the top (first 4 readings) and bottom (second 4 readings) antenna ports plus the omni discrete. The status register output shall be as specified.	SSSSOSOSD
	34.6			Load bottom antenna ports with out of tolerance resistance.	**RFIU:** "Program" "MTSANT B L H L H"		Load bottom antenna ports with out of tolerance resistance.	
		SSSSSOSOD		Test antenna DC BITE. Compare output status against specification.	**UUT1:** "ANT"		Cycle through the top (first 4 readings) and bottom (second 4 readings) antenna ports plus the omni discrete. The status register output shall be as specified.	SSSSSOSOD
	34.7			Load bottom antenna ports with a second omnidirectional configuration	**RFIU:** "Program" "MTSANT B L H H H"		Load bottom antenna ports with a second omnidirectional configuration	
		SSSSSOOOO		Test antenna DC BITE. Compare output status against specification.	**UUT1:** "ANT"		Cycle through the top (first 4 readings) and bottom (second 4 readings) antenna ports plus the omni discrete. The status register output shall be as specified.	SSSSSOOOO

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	35.0			POWER VALID SENSE This test verifies the Power Valid sense capability of the RX/IO CCA. Odd numbered tests shall start at full power and monitor the power valid bit status as power is reduced 1 dB at a time by invoking whisper-shout steps. Data output shall be the last whisper - shout step invoked which reported valid power. To pass the test, the step number must be greater than or equal to (more attenuation than) 8 dB. Even numbered tests shall start at the 27 dB whisper-shout step and monitor the power valid bit status as power is increased 1 dB at a time. Data output shall be the last whisper-shout step invoked which reported invalid power. To pass the test, the step number must be less than or equal to (less attenuation than) 17 dB.			POWER VALID SENSE	
	35.1			Generate ATCRBS interrogations out the top 0 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS T 0 0 0 0 0 0 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the top 0 antenna port. Only the S1 pulse is actually present.	
M		8 dB or greater		Verify the last whisper-shout step reporting valid power.			The last whisper-shout step reporting valid power shall be as specified.	8 dB or greater
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	35.2			Generate ATCRBS interrogations out the top 0 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS T 0 0 0 0 0 0 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the top 0 antenna port. Only the S1 pulse is actually present.	
		17 dB or less		Verify the last whisper-shout step reporting invalid power.			The last whisper-shout step reporting invalid power shall be as specified.	17 dB or less
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	
	35.3			Generate ATCRBS interrogations out the top 90 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS T 1 1 1 1 1 1 1 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the top 90 antenna port. Only the S1 pulse is actually present.	
		8 dB or greater		Verify the last whisper-shout step reporting valid power.			The last whisper-shout step reporting valid power shall be as specified.	8 dB or greater.
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	35.4			Generate ATCRBS interrogations out the top 90 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS T 1 1 1 1 1 1 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the top 90 antenna port. Only the S1 pulse is actually present.	
		17 dB or less		Verify the last whisper-shout step reporting invalid power.			The last whisper-shout step reporting invalid power shall be as specified.	17 dB or less
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	
	35.5			Generate ATCRBS interrogations out the top 180 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS T 2 2 2 2 2 2 2 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the top 180 antenna port. Only the S1 pulse is actually present.	
		8 dB or greater		Verify the last whisper-shout step reporting valid power.			The last whisper-shout step reporting valid power greater shall be as specified.	
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	35.6			Generate ATCRBS interrogations out the top 180 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS T 2 2 2 2 2 2 2 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the top 180 antenna port. Only the S1 pulse is actually present.	
		17 dB or less		Verify the last whisper-shout step reporting invoked power.			The last whisper-shout step reporting invalid power shall be as specified.	17 dB or less
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	
	35.7			Generate ATCRBS interrogations out the top 270 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS T 3 3 3 3 3 3 3 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the top 270 antenna port. Only the S1 pulse is actually present.	
		8 dB or greater		Verify the last whisper-shout step reporting valid power.			The last whisper-shout step reporting valid power shall be as specified.	8 dB or greater.
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	35.8			Generate ATCRBS interrogations out the top 270 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS T 3 3 3 3 3 3 3 YY 99 99 99 99 99"		Generate ATCRBS interrogations out the top 270 antenna port. Only the S1 pulse is actually present.	
					YY represents the whisper-shout step invoked.			
		17 dB or less		Verify the last whisper-shout step reporting invalid power.			The last whisper-shout step reporting invalid power shall be as specified.	17 dB or less
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	
	35.9			Generate ATCRBS interrogations out the bottom 0 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS B 0 0 0 0 0 0 0 YY 99 99 99 99 99"		Generate ATCRBS interrogations out the bottom 0 antenna port. Only the S1 pulse is actually present.	
					YY represents the whisper-shout step invoked.			
		8 dB or greater		Verify the last whisper-shout step reporting valid power.			The last whisper-shout step reporting valid power shall be as specified.	8 dB or greater
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	35.10			Generate ATCRBS interrogations out the bottom 0 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS B 0 0 0 0 0 0 0 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the bottom 0 antenna port. Only the S1 pulse is actually present.	
		17 dB or less		Verify the last whisper-shout step reporting invalid power.			The last whisper-shout step reporting invalid power shall be as specified.	17 dB or less
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	35.11			Generate ATCRBS interrogations out the bottom 90 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS B 1 1 1 1 1 1 1 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the bottom 90 antenna port. Only the S1 pulse is actually present.	
		8 dB or greater		Verify the last whisper-shout step reporting valid power.			The last whisper-shout step reporting valid power shall be as specified.	8 dB or greater
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	
	35.12			Generate ATCRBS interrogations out the bottom 90 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS B 1 1 1 1 1 1 1 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the bottom 90 antenna port. Only the S1 pulse is actually present.	
		17 dB or less		Verify the last whisper-shout step reporting invalid power.			The last whisper-shout step reporting invalid power shall be as specified.	17 dB or less
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	
	35.13			Generate ATCRBS interrogations out the bottom 180 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS B 2 2 2 2 2 2 2 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the bottom 180 antenna port. Only the S1 pulse is actually present.	
		8 dB or greater		Verify the last whisper-shout step reporting valid power.			The last whisper-shout step reporting valid power shall be as specified.	8 dB or greater
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	35.14			Generate ATCRBS interrogations out the bottom 180 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS B 2 2 2 2 2 2 2 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the bottom 180 antenna port. Only the S1 pulse is actually present.	
		17 dB or less		Verify the last whisper-shout step reporting invalid power.			The last whisper-shout step reporting invalid power shall be as specified.	17 dB or less
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	
	35.15			Generate ATCRBS interrogations out the bottom 270 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS B 3 3 3 3 3 3 3 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the bottom 270 antenna port. Only the S1 pulse is actually present.	
		8 dB or greater		Verify the last whisper-shout step reporting valid power.			The last whisper-shout step reporting valid power shall be as specified.	8 dB or greater
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	35.16			Generate ATCRBS interrogations out the bottom 270 antenna port. Only the S1 pulse is actually present.	**UUT1:** "XATCS B 3 3 3 3 3 3 3 YY 99 99 99 99 99" YY represents the whisper-shout step invoked.		Generate ATCRBS interrogations out the bottom 270 antenna port. Only the S1 pulse is actually present.	
		17 dB or less		Verify the last whisper-shout step reporting invalid power.			The last whisper-shout step reporting invalid power shall be as specified.	17 dB or less
				Turn off transmitter.	**UUT1:** "XOFF"		Turn off the ATCRBS interrogation format.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	36.0			WHISPER/SHOUT PIN DIODE MONITOR This test verifies that the Whisper/Shout PIN diode open/short monitor is functioning. The PIN diode monitor is tested at each whisper/shout step from step 0 through step 27. The test is performed on the top 0 degree antenna port.			WHISPER/SHOUT PIN DIODE MONITOR	
	36.1			Generate ATCRBS interrogations at each whisper/shout step from step 0 through step 27 while reading the status of the PIN diode monitor discrete.	**UUT1**: "XA TO"		Generate ATCRBS interrogations at each whisper/shout step from step 0 through step 27 while reading the status of the PIN diode monitor output.	
		PPPPPPPPPP PPPPPPPPPP PPPPPPPP (28 Ps)		Verify the PIN diode monitor discrete outputs are set as specified.			The PIN diode monitor discrete outputs shall be as specified.	PPPPPPPPPP PPPPPPPPPP PPPPPPPP (28 Ps)

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	37.0			STORE SERIAL NUMBER AND HARDWARE DASH NUMBER IN MEMORY			STORE SERIAL NUMBER AND HARDWARE DASH NUMBER IN MEMORY	
	37.1			Clear all EEPROM memory locations except for calibration constants.	**UUT1:** "FC 90000 1FFF FFFF"		Fill CAS EEPROM at maintenance memory locations with FFFF	
					"FC 92000 5F00 0000"		Fill CAS EEPROM RA/TA recording memory locations with 0000.	
				Enter the 8 digit serial number of the UUT into memory.	**UUT1:** "WC 91FBF 000X" "WC 91FC0 000X" "WC 91FC1 000X" "WC 91FC2 000X" "WC 91FC3 000X" "WC 91FC4 000X" "WC 91FC5 000X" "WC 91FC6 000X"		Enter the 8 digit serial number of the UUT in CAS memory at the locations specified. The X in each command represents one digit in the serial number. A typical serial number, represented by YYMMNNNN, would be stored in the following order: The first command saves the first "Y" in the serial number, the second command saves the second "Y", the third command saves the first "M", etc.	
		PASS		Verify the serial number read from memory is the same as the serial number entered above.	**UUT1:** "RC 91FBF 8"		Read the 8 digit serial number from CAS memory at the location specified and verify that it matches the serial number entered above.	PASS

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	37.2			Enter the 2-digit hardware dash number into EEPROM memory.	**UUT1:** "WC 91FC7 000X" "WC 91FC8 000X"		Enter the 2 digit hardware dash number into CAS memory at the specified locations. The X in each command represents a digit in the hardware dash number. A typical dash number, represented by YZ would be stored in the following order: The first command saves the "Y" in the dash number and the second command saves the "Z" in the dash number.	
		PASS		Verify the hardware dash number read back is the same as that entered.	**UUT1:** "RC 91FC7 2"		Read the 2-digit hardware dash number from CAS memory at the locations specified and verify that it matches the dash number entered above.	PASS
	37.3			This test verifies that the unit has been programmed to be the correct TCAS type.				
		0000 or FFFF (except – 61XXX) BDC3 (-61XXX only)			**UUT1:** "RC 97F31"		Read TCAS type keyword from CAS memory at specified location.	0000 or FFFF (except – 61XXX) BDC3 (-61XXX only)

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M	38.0			READ AND PRINT OUT CALIBRATION DATA FROM MEMORY Read and display calibration memory from the UUT. Print out the calibration data from UUT memory.	**UUT1:** "RC 97F00 30" "RC 97FFE 02"		READ AND PRINT OUT CALIBRATION DATA FROM MEMORY Read the calibration data from the CAS CPU memory at the location specified. Print out the calibration data from UUT memory.	

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M								
	39.0			OPERATIONAL LOAD AND VERIFICATION SOFTWARE			OPERATIONAL LOAD AND VERIFICATION SOFTWARE	
	39.1	PASS		Load the operational software according to the UUT part number and modification status.	**UUT1:** "SWLD <filename>"		The display shall indicate a successful software load.	PASS
	39.2	See table 7-2 for number based on software part number.		Verify the operational software part number displayed on the Portable Data Loader bus matches the UUT part number and modification status. Record the displayed operational software part number on the test report.	**UUT1:** "SWPN"		The display shall be:	See table 7-2 for number based on software part number.
				ALTERNATE PROCEDURE FOR TEST 39.2			ALTERNATE PROCEDURE FOR TEST 39.2	
		Alternate procedure for test 39.2.		The following is an alternate procedure for reading the operational software part number using the TCAS Simulation Panel which may be substituted for test 39.2 at the discretion of the operator: Setup and power up the equipment as described in EB7517947. Perform test 7.5 of the latest revision of EB7517947 titled Optional Part Number Display Test.	Setup per EB7517947			

REV	TEST	SPECIFICATION			PROCEDURE			SPECIFICATION
LTR	NO.	OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
M		See table 7-2 for number based on software part number.		Verify the operational software part number displayed on the VSI/TRA matches the UUT part number and modification status. Record the displayed operational software part number on the test report.			The display shall be:	See table 7-2 for number based on software part number.

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APPENDIX A
RT-950/951/952 SOFTWARE LOADING PROCEDURE

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1. INTRODUCTION

The RT-950/951/952 TCAS 1500/2000 unit contains FLASH EPROM memory which contains the CAS and SURV Dataloader and Operational code, the Audio speech segments, and the FPGA data. The content of the memory is electrically programmable and erasable, and may be modified without removal of the ICs from the CCAs. The unit's operational code may be loaded without opening the unit through the ARINC 615 front panel connector.

G F The RT-950/951/952 has 3 FLASH EPROM memory ICs which are contained on the A2 Processor CCA (7517925). One of the ICs contains the CAS Dataloader code, CAS Operational code, and the FPGA data. The second IC contains the SURV Dataloader code and SURV Operational code. The Third IC contains the Audio speech segments. During factory test, the Product test code is loaded in place of the CAS and SURV Operational code. The function of the Dataloader code (both CAS and SURV) is to allow the Operational code (or Product test code) to be programmed through the ARINC 615 front panel connector. The ARINC 615 front panel connector contains an ARINC 429 bus for programming using a ARINC 615 Portable Data Loader (PDL).

2. SOFTWARE LOADING PROCEDURE

When an A2 Processor CCA is initially manufactured, purchased from stock, or FLASH EPROM ICs are replaced, the CCA is unprogrammed. The following procedure MUST be used when bringing the unit up to an operational state:

G 1. Load BOOT Software using DATALOADER SOFTWARE LOADING PROCEDURE.

G 2. Load Product Test Software (for calibration and IT) per EB7517987 using PRODUCT TEST SOFTWARE AND OPERATIONAL SOFTWARE LOADING PROCEDURE.

G 3. Calibrate Unit (EEPROM, Transmitter CCA and RCVR I/O CCA) using the autocalibration procedure in Appendix C or the manual calibration procedure in Appendix B.

4. Final Test unit and load valid OPERATIONAL code (performed as part of IT test steps).

NOTE: Do not attempt to transmit interrogations until after the end item calibration has been performed to avoid possible transmitter damage.

G When a unit has been returned to an approved repair facility for test or repair, the following procedure must be used to test the unit.

1. Load Product Test Software using PRODUCT TEST SOFTWARE AND OPERATIONAL SOFTWARE LOADING PROCEDURE.
2. Repair unit as necessary. Note it may be required to test per the IT to determine what repairs are necessary.
3. Final Test unit and load valid OPERATIONAL code (performed as part of IT test steps).

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3. DATALOADER SOFTWARE LOADING PROCEDURE

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The Dataloader software must be loaded using a Processor Boot Fixture (T336104). Perform the following procedure to load Dataloader software into the unit:

1. Remove the unit's outside slip-on cover (if attached). Loosen the two Dzus fasteners (cam-locks) located on the back of the box near the ARINC 600 connector. Slide the cover off the chassis assembly.
2. With power removed from the unit, connect the Boot Fixture to J1 and J2 on the A2 Processor CCA.
3. Set all the switch settings on the Boot Fixture to point to the rear of the unit.
4. Apply power to the unit. The lower LED on the Boot Fixture should be flashing at a 1 Hz rate (approximately)
5. Depress and release the test switch on the front of the unit.
6. After approximately 10 seconds, the lower LED on the Boot Fixture should stop flashing and turn off. If the LED does not stop flashing, or remains on, the Dataloader Software did not load properly.
7. Remove power from the unit and remove the Boot Fixture. The Dataloader Program has been loaded.

4. PRODUCT TEST SOFTWARE AND OPERATIONAL SOFTWARE LOADING PROCEDURE

The following procedure may be used to load either OPERATIONAL (flight code) or PRODUCT TEST code (test and troubleshooting). It is preferred to use the MTS to load this software, but it is also acceptable to use a PC equipped with a PAC-429 CCA. Both methods are outlined below.

4.1 Software Loading Instructions Using the MTS

K

1. Place unit on MTS.
2. Connect the PDL ARINC 615 cable to front data loader port of unit.
3. Activate the CVI test executive window on the MTS PC.
4. Click on the ADL button.
5. Select the appropriate file to program into the unit by clicking on it once.
6. Click on the Add button.
7. Click on the OK button. The file should begin to transfer data to the unit.
8. Once the file has completed transferring into the unit, the PC will indicate “Data upload complete”. Press OK to exit. The unit has been successfully programmed if the “Data upload complete” message is displayed. If the file transfer was unsuccessful, a message will be displayed which indicates “Data upload fail”.

4.2 Software Loading Instructions Using a Stand Alone PC

1. Connect the unit to a proper 28VDC power supply, ensuring that the unit remains unpowered (power supply output is disabled).

2. Connect the PAC-429 port of the PC to the ARINC 615 PDL port (using a cable equivalent to that of the MTS).

3. Ground the Air-Ground discrete (RMP5K), Landing Gear up-down discrete (RMP13F), Dataloader Discrete #1 (RBP6A) and Dataloader Discrete #2 (RBP6B) by connecting them to Program Common (RMP6K).

4. From the DOS prompt on the PC, start the ADL simulator by typing “cd ADL”, and pressing enter. Type “ADL” and press enter.

5. Press ALT A and select auto mode from the menu.

6. Press the tab key to highlight the appropriate file to load. Press enter twice.

7. Press tab until cancel is highlighted. Press enter and you will see “Send RTS.”

8. Apply power to the unit. After about 10 seconds, the ADL simulator will start transferring the data to the TCAS 1500/2000 unit. The display will show the amount of data transferred.

9. When all data has been transferred, the ADL simulator will display “Closing File < file name>“.

10. Press ALT A and select stop from the menu. Remove power from the unit. The file transfer is complete.

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APPENDIX B
RT-950/951/952 CALIBRATION PROCEDURE USING A P.C. AND SCRIPT FILES FROM PS7517976

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1. INTRODUCTION

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The RT-950/951/952 TCAS 1500/2000 unit uses computer (electronic) adjustments for most of the circuitry which requires calibration. Computer adjustments are preferable to mechanical adjustments (potentiometers, variable capacitors and inductors) because they can be performed automatically by a computer remotely (without the unit opened up), and are inherently more reliable.

With the exception of four variable capacitors on the Transmitter CCA, a potentiometer on the Receiver I/O CCA and the tuning rods in the spectrum filter, all adjustments are performed from a P.C. using PS7517976. Calibration constants for parameters are stored in EEPROM memory on the A2 Processor CCA. The parameters in EEPROM have an error detection means, so that a loss of data will be detected by the computer. A loss of calibration data could result in invalid TCAS operation.

2. CALIBRATION PROCEDURE

F

The following calibration procedure should be performed in the following order to insure consistent results from the calibration. Prior to the calibration procedure, valid BOOT and PRODUCT TEST software must be loaded into the unit when calibrating at the end item level. See Appendix A for software loading instructions. When a calibration command is executed, the new data can be automatically saved in the EEPROM memory. All tests and calibrations performed on the end item in this Appendix require discretes RBP-9D and RBP-9F to be connected to common RBP-7K to enable test mode.

K

Depending on the type of Universal Asynchronous Receiver Transmitter (UART) present in the UUT, the data communication settings on the PROCOMM software may be different. Generally, if the UUT contains a processor with Part No. 7517925-902, the CCA was assembled with an Intel 82510 UART which communicates at a baud rate of 38,400 with no parity bit, 8 data bits, and one stop bit. If the UUT contains a processor with Part No. 7517925-903, the CCA was assembled with a NS16550 UART which communicates at a baud rate of 115,200 with no parity bit, 8 data bits, and one stop bit.

NOTE: Do not attempt to transmit interrogations until after the RF alignment procedures in section 2.2 and 2.4 have been performed to avoid possible transmitter damage.

2.1 Calibration Test Setup

F

The calibration process may be performed at either the RT-950/951/952 computer End Item level or at module level. Use sections 2.1.1, 2.3, 2.4.2, 2.5, 2.6, 2.7, 2.8.2 and figure B-1A for RT950/951/952 computer End Item level transmitter calibration. Use sections 2.1.2, 2.2, 2.4.1, 2.8.1 and figure B-1B for module level transmitter calibration. Section 2.9 is performed at the receiver module level, while sections 2.10 through 2.13 are performed at the End Item level.

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NOTE: Except where otherwise noted, primary references to the components on the receiver utilize reference designators from the 751945-903. Additional reference designators listed in parenthesis are equivalent reference designators from the 751945-904. If only one reference designator is listed, it is describing a component on the 751945-903 and, if required, the technician should find the equivalent component on the 751945-904 by comparing schematics of the two receiver designs. All connector reference designators are the same on both receiver designs.

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F **2.1.1 End Item Calibration Test Setup**

F a) Set up the transmitter calibration equipment per figure B-1A and make all necessary connections per table B-1. The P.C. must be a 386 minimum with PROCOMM software. All script files referenced in the calibration procedure are available from PS7517976.

G b) Transmitter alignment may require the unit's cover to be removed to gain access to the various test select parts and adjustments which may need to be altered. The spectrum filter must be aligned prior to calibrating the transmitter. Operating the transmitter into an improperly aligned spectrum filter may result in transmitter damage. It is recommended that the spectrum filter alignment procedure be performed at the subassembly level (7517923) prior to assembly in the Transmitter module. The spectrum filter alignment procedure is outlined in section 2.2. Use the following procedure to prepare for RF transmitter alignment and spectrum filter tuning:

- Remove the unit's outside slip-on cover (if attached). Loosen the two Dzus fasteners (cam-locks) located on the back of the box near the ARINC 600 connector. Slide the cover off the chassis assembly.
- The four variable capacitors in the transmitter are accessible through holes in the A2 Processor CCA without any further disassembly of the unit.

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- If the spectrum filter has been aligned per section 2.2, connect the 53 pin circular connector to the ARINC 615 front panel PDL connector, and apply power to the unit per figure B-1A.

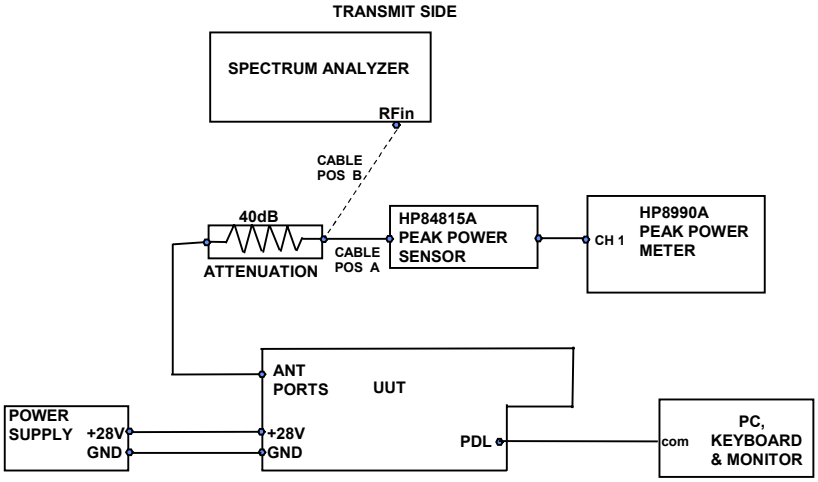

Figure B-1A. End Item Level Transmitter Calibration Setup

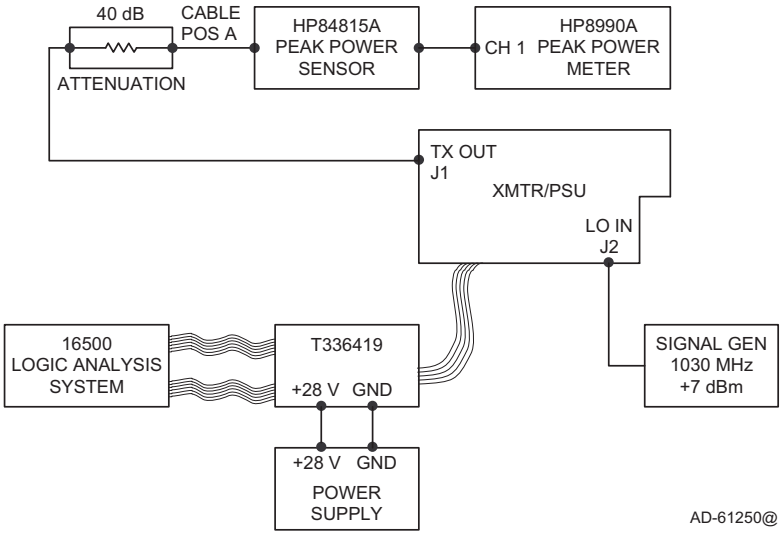

Figure B-1B. Module Level Transmitter Calibration Test Setup

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Table B-1. Calibration Test Setup Interconnections

Interconnections	
From	To
UUT LBP p.3	P.S. - GND
UUT LBP p. 10	P.S. +28 Vdc
G RBP-9D	RBP-7K
G RBP-9F	RBP-7K
UUT PDL p. 41	P.C. - Com Port p. 2
UUT PDL p. 40	P.C. - Com Port p. 3
UUT PDL p. 21	P.C. - Com Port p. 5
F HP16500 pod 3* Data 0 (sig/gnd)	HP8665A pulse mod* input (sig/gnd)
*This connection is required only for end item receiver calibration.	

F **2.1.2 Transmitter/Power Supply Module Calibration Setup**

Refer to figure B-1B for Transmitter/Power Supply Module Calibration Setup.

2.2 Transmitter Spectrum Filter Alignment

K Calibrate a Network Analyzer for S11 and S21 with the center frequency at 1.03 GHz and a span of 50 or 100 MHz. Install the Spectrum Filter Assembly (7517923) into the test fixture (T-336413), connect the pin on A3A1E1 to the PWB on the test fixture and install the cover on the Spectrum Filter. If the test fixture has been modified to clamp the Spectrum Filter, then insert an uncovered Spectrum Filter in the fixture and clamp it in place.

K Connect the output of the Spectrum Filter, A3A1J1 to the S22 input of the Network Analyzer. Connect the S11 port of the Network Analyzer to the input of the Spectrum Filter. Set the network analyzer so that the display appears as in figure B-3. Insert the tuning tool into the tuning access holes as shown in Figure B-2. Note that figure B-2 shows the Spectrum Filter installed in Transmitter module for reference purposes only. Adjust the tuning rods such that the filter response is similar to the Network Analyzer display as shown in Figure B-3.

L **NOTE:** Proper application and cure of conformal coat will result in an shift in the passband frequencies. This is typically less than 3 MHz, but variation may be experienced. Prior to applying conformal coat to the ends of the resonators, the performance should be optimized at a frequency such that when the conformal coat is cured, the performance is optimized at 1030 MHz. As the technician gains experience, a different frequency may be used to ensure that after cure of conformal coat the specifications are met at 1030 MHz.

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- Return loss (S11) shall be greater than or equal to 18 dB over the passband, 1030 ± 1 MHz after conformal coat cure. There shall be only one major lobe.
- Insertion loss (S21) should be minimum, less than or equal to 0.80 dB at the center frequency (1030 MHz after conformal coat cure).
- The 3 dB bandwidth shall be between 16 and 21 MHz.
- Insertion loss shall be greater than or equal to 12 dB at 1030 ± 20 MHz after conformal coat cure.

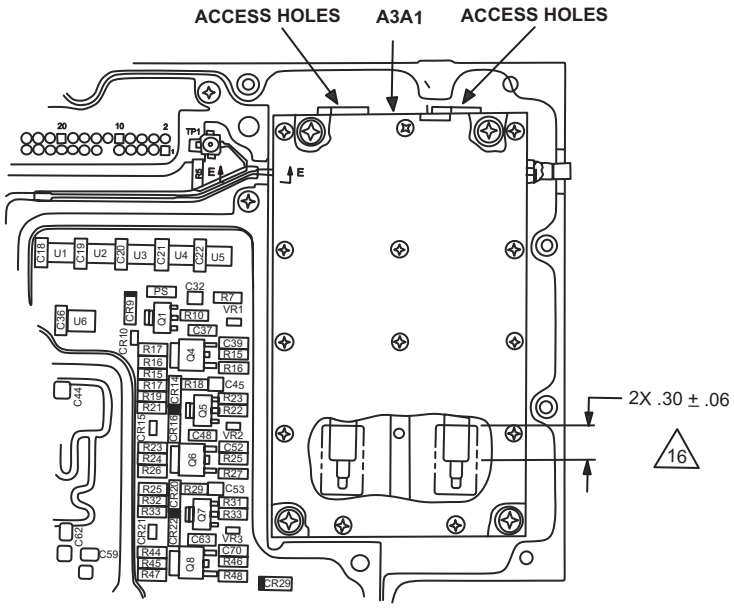

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Figure B-2. Transmitter Assembly

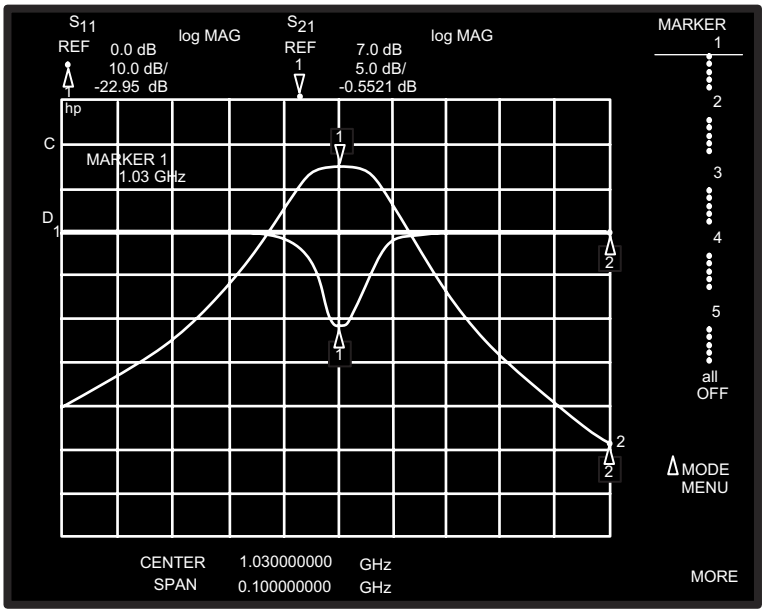

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Figure B-3. Spectrum Filter Response

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Once the Spectrum Filter is tuned, remove the Spectrum Filter cover (7517932-1) and apply conformal coat to the ends of the resonators as shown in Figure B-2 or refer to drawing 7517923. Readjust the Spectrum Filter before allowing the conformal coat to dry for 7 days or bake for 4 to 8 hours at 170 degrees F. After drying the conformal coat, verify the Spectrum Filter meets the specifications stated above. If the unit is not within specification, repeat tuning steps until the unit is within specification requirements.

2.3 Initialize EEPROM and Calibration with Default Data

This step sets the calibration data in the EEPROM memory to default values, computes the CRC and saves the CRC in EEPROM memory. The command should be used when the unit is initially built, a replacement Processor CCA is used, or the EEPROM memory has been replaced.

F

From the script file menu, execute file CAL.ASX. The current calibration settings stored in EEPROM memory will be shown (note that at this point they have not yet been initialized). Next the user will be given the opportunity to save all the defaults. Selecting yes will initialize the calibration settings. Then the user is prompted for each calibration setting whether or not the calibration setting should be updated. Select no (default) for each setting. Finally the calibration settings are stored in EEPROM memory and the CRC is calculated for the new data. Unit calibration is ready to begin. This step must also be repeated at the conclusion of a manual calibration of an end item to calculate and store the new calibration memory CRC in EEPROM memory.

2.4 Transmitter Peak Power and Rise Time Adjustment

To reduce the risk of damaging the transmitter driver and final transistors upon initial power up and to ensure proper calibration of pulse width, the transmitter must be aligned for peak power and rise time prior to any further calibration. The unit must be disassembled to the level listed in paragraph 2.1 to perform this alignment.

G

With a Johanson tuning tool 8777 or equivalent, turn the tuning slug in each of the four trimmer capacitor (C126, C127, C128 and C129 on 7517935-910) approximately 10 turns counter clockwise or until the tuning slug is near the top of the trimmer capacitor barrel. Connect the HP8990A Peak Power Meter Sensor to a 40 dB $\pm$ 1 dB RF attenuator with an average power rating of 5 watts minimum. Attach the other end of the attenuator to the UUT 0 degree bottom antenna port. Ensure that the remaining 7 UUT RF antenna ports are terminated in 50 Ω loads which are capable of dissipating the amount of power they will see.

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2.4.1 Module Level Setup

K

For module level adjustments a Ten Pulse pattern is used instead of the P1, P2 and P6 pattern referenced in this section. Load the 16500 file STEP0009_A from PS7517977and refer to figure B-5 for all adjustments.

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2.4.2 End Item Level Setup

E

From the script file menu, execute file XMTR_MS.ASX. A series of user selections will follow to determine what type of pulse to transmit, which calibration settings to use, and which channel to select. For the MODE-S Data prompt, select all 0's. For the calibration settings for Pulse Width,

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Course DPSK delay and Fine DPSK delay, select the default settings. For the Power Valid Display prompt, select the default (no). After making these selections, the transmitter will begin transmitting. To turn off the interrogation transmissions, press the space bar.

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2.4.3 Adjustments

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The transmitter will be transmitting a three pulse sequence: P1, P2 and P6 pulses as shown in figure B-4. Setup the HP8990A to display the P1 pulse as in figure B-5 and adjust the trimmer capacitors clockwise in the following order for maximum power out of the transmitter: C129 (driver input), C128 (driver output), C127 (final output), C126 (final output). See A3A2 Transmitter CCA drawing 7517935-910 for capacitor locations. With cable losses calibrated out, the power out of the UUT shall be 280 to 630 watts (54.5 to 58 dBm).

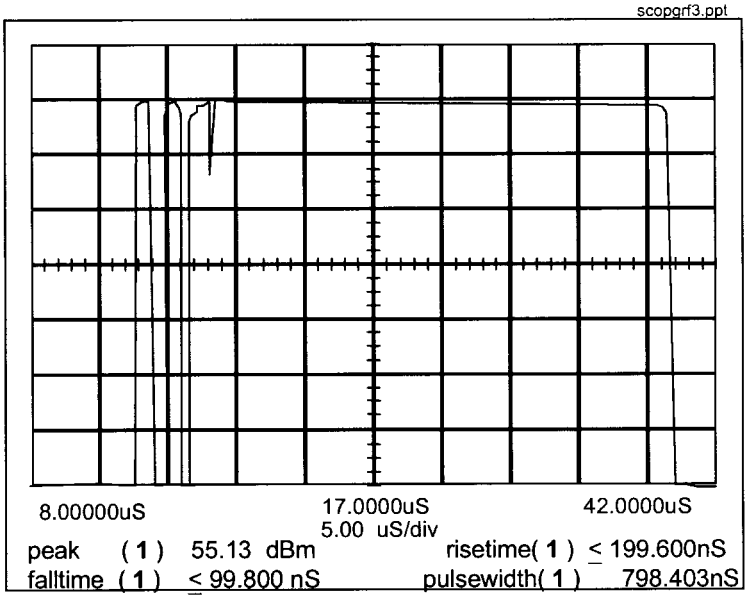

Figure B-4. P1, P2 and P6 Pulses

After adjusting for peak power out of the transmitter, set the HP8990A to display the rise time of the P1 pulse. The rise time shall be less than 100 ns. If rise time is greater than 100 ns, adjust the trimmer capacitors in following order while monitoring both rise time and power output until both requirements are met: C126 (final output), C127 (final output), C128 (driver output) and C129 (driver input).

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If rise times or peak power are not within specification, additional tuning of the transmitter can be achieved by soldering small pieces of Item 708, copper foil, as noted on the 7517935-910 drawing. Copper foil should be tinned prior to soldering to the PWB. Use a capacitive loading stick to determine the optimum tuning location before soldering copper foil to the PWB.

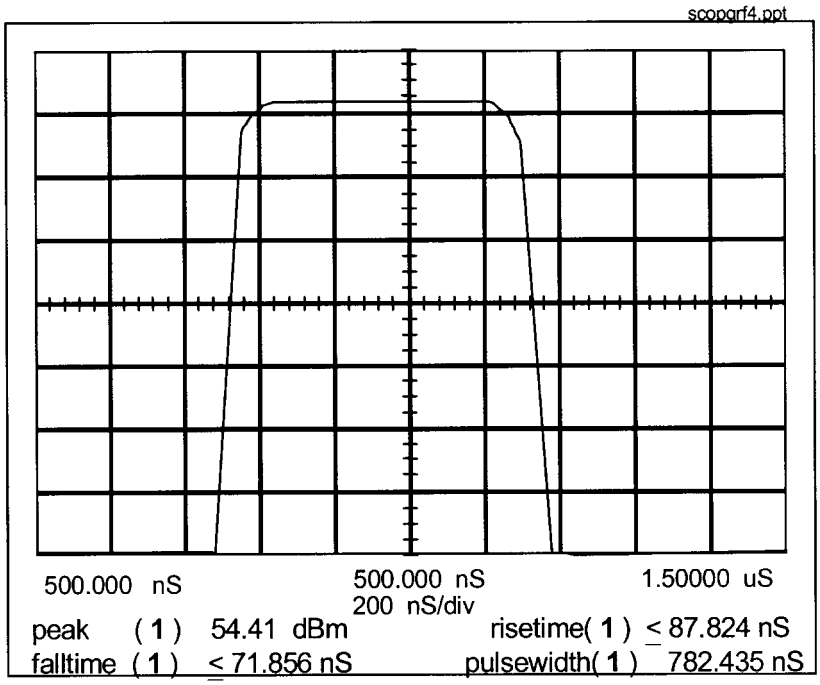

Figure B-5. P1 and P2 Pulse Characteristics

F

Next observe the P2 pulse on the HP8990A. The P2 pulse characteristics should closely resemble those of the P1. If the P2 pulse is similar to the P1 pulse, but does not meet the output power and risetime requirements, adjust the trimmer capacitors as specified above until both P1 and P2 meet all calibration requirements. If the difference between the P1 and P2 pulses is greater than 0.3 dB in peak power or 20 ns in rise time, the UUT needs repair. When P1 and P2 have been shown to be similar and meet the peak power and rise time requirements, this calibration is complete. Press the space bar to stop interrogations.

REV LTR

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2.5 Oscillator Frequency Adjustment

N This step sets the oscillator frequency by adjusting a potentiometer on the A5 RCVR I/O CCA while transmitting full power. The potentiometer can be accessed through a screw hole in the front cover of the TCAS 2000 unit. First remove the large Phillips head screw just above and toward the right side of the unit handle. Potentiometer A5R623 on 7517945-903 (A5R612 on 7517945 904) should now be accessible through the screw hole. A clockwise rotation of the potentiometer will decrease the frequency of the unit. While monitoring the frequency output on the spectrum analyzer, repeat the following commands and adjust the potentiometer until the frequency is 1030.0 MHz +/- 1 kHz.

F Set up the UUT using the test setup shown in figure B-1A with the cable in cable position B. Select the following spectrum analyzer settings:

- VBW=3 kHz
- RBW=1kHz
- Span 100 kHz
- Sweep = 50 msec
- 10 dB/div.
- Ref = 0 dBm
- Atten = 10 dB

N With a minimum of 40 dB attenuation in series with the RF cable, connect the RF cable between the 0 degree top antenna connector and the spectrum analyzer. **NOTE**: It is **critical** that the 40 dB attenuation be present to prevent damage to the spectrum analyzer. From the script file menu, select the file FREQ.ASX. This file will cause the transmitter to transmit a long P6 pulse with no data. Allow the UUT to transmit enough pulses such that the spectrum analyzer display becomes smooth. Identify the peak of the spectrum by performing a peak search on the spectrum analyzer. If the frequency of the peak is within 1030.0 MHz +/- 1 kHz, calibration is complete. Otherwise adjust A5R623 (A5R612), refresh the spectrum analyzer display, and wait until the display on the spectrum analyzer is smooth again and identify the new peak of the spectrum. Repeat this process until the oscillator frequency is within the acceptable range.

Replace the Phillips head screw in the front cover of the TCAS 2000 unit and tighten to the appropriate torque requirement. After calibration of the oscillator frequency, the user must repeat the measurements taken in step 2.4 to verify that the transmitter peak power and rise times still meet the requirements. It is possible that the adjustment in oscillator frequency could slightly affect the peak power or rise time.

N

2.6 Transmitter Pulse Width Calibration

E The pulse width calibration adjusts the pulse width such that the actual transmitted pulse is the desired width to account for variations in delay within the system. Ideally the pulse width of the P1 and P2 pulses should be calibrated as close to 808 ns as possible at room temperature.

E Set up the equipment according to figure B-1, with the cable in cable position A. From the script file menu, execute file XMTR_MS.ASX. A series of user selections will follow to determine what type of pulse to transmit, which calibration settings to use, and which channel to select. For the MODE-S Data prompt, select all 0's. For the calibration settings for Pulse Width, Course DPSK delay and Fine DPSK delay, select the default settings. For the Power Valid Display prompt, select the default (no). After making these selections, the transmitter will begin transmitting. To turn off the interrogation transmissions, press the space bar.

E The transmitter will be transmitting a three pulse sequence: P1, P2 and P6 pulses as shown in figure B-4. Observe the P1 pulse on the HP8990A as in figure B-5 and verify that the pulse width is 808 ns $\pm$ 17 ns. If the pulse width is not within specification, execute file XMTR_MS.ASX and adjust the pulse width as required to meet the 808 ns $\pm$ 17 ns requirement. An increase in the pulse width calibration setting by 1 bit results in an increase in pulse width of 31.25 ns.

2.7 Transmitter P6 Pulse to SPR Delay Calibration

E The SPR delay calibration locates the SPR (Sync Phase Reversal) at a point 1.25 us $\pm$ 0.020 us after the leading edge of the P6 pulse. From the script file menu, execute file XMTR_MS.ASX. A series of user selections will follow to determine what type of pulse to transmit, which calibration settings to use, and which channel to select. For the MODE-S Data prompt, select all 0's. For the calibration settings for Course DPSK delay and Fine DPSK delay, select the default settings. Leave the pulse width setting as determined in section 2.6. For the Power Valid Display prompt, select the default (no). After making these selections, the transmitter will begin transmitting. Figure B-6 shows the leading edge of a P6 pulse with the SPR. To turn off the interrogation transmissions, press the space bar. Measure the delay between the leading edge of the P6 pulse and the minima of the SPR on the HP8990A as shown in figure B-6. Verify that the delay is 1.25 us $\pm$ 0.020 us. If the delay is not within specification, execute file XMTR_MS.ASX and adjust the course DPSK delay and fine DPSK delay as required to meet the 1.25 us $\pm$ 0.020 us requirement. An increase in the course DPSK delay calibration setting by 1 bit results in an decrease in delay of 62.5 ns, while an increase in the fine DPSK delay calibration setting by 1 bit results in an increase in delay of 31.25 ns.

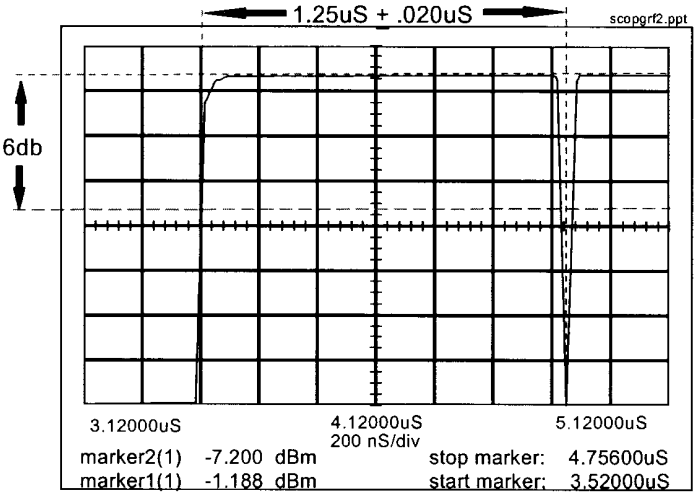

Figure B-6. P6 to SPR Delay Measurement

E **2.8 Transmitter Whisper-Shout Calibration**

F **2.8.1 Module Level Setup**

K The module level and End Item calibration processes are similar. The module calibration uses a Ten Pulse pattern rather than the Six Pulse format. Using files from PS7517977 for the 16500 load STEP0009_A to begin and STEP1019_A, STEP2029_A as required. Refer to Figure B-1B for equipment setup.

F **2.8.2 End Item Level Setup**

F Connect all test equipment to the UUT as shown in Figure B-1A. Verify that the Peak Power Meter is connected to the Top 0 degree port with 40 dB of attenuation between the UUT and the Peak Power Sensor. Apply power to the UUT and run the script file WS_CAL starting with the 0 dB step.

F **2.8.3 Whisper-Shout Adjustments**

G While transmitting, set up the HP8990A Peak Power Meter to display the first group of pulses. The six pulses displayed on the Peak Power Meter consist of an S1, P1, P2A, P2B, P3 and a P4 pulse. To perform a cursory overview check that all attenuator diodes are working correctly, these six pulses may be attenuated 0, 1, 2, 2, 3 and 4 dB, respectively. Press the space bar to view the calibration data which is stored for each whisper/shout step. Verify that the default values are loaded. Press <Y> to store the default values to memory and follow the remaining prompts to display the first group of six pulses. Scroll through successive pulses and record the peak amplitude of each pulse. Either calculate or measure the power differences between successive

pulses using the peak power meter. The power differences between successive steps shall be 1.0 dB ± 0.2 dB. Use the number and letter keys as described in the script file to adjust the attenuation levels of each pulse. The number and letter keys change the attenuation levels by approximately 0.4 to 0.6 dB. The number and letter key assignments are as follows:

For the S1 pulse, press q to increase attenuation, and press 1 to decrease attenuation. For the P1 pulse, press e to increase attenuation, and press 3 to decrease attenuation. For the P2A and P2B pulses, press t to increase attenuation, and press 5 to decrease attenuation.

For the P3 pulse, press u to increase attenuation, and press 7 to decrease attenuation. For the P4 pulse, press o to increase attenuation, and press 9 to decrease attenuation.

Once the requirements stated above are met, press the space bar and store the new calibration data to memory. Continue this procedure starting with the last pulse of the first group of six pulses. The second group of six pulses should be attenuated 4 through 8 dB. Adjust the peak power meter to the appropriate level and display the second group of six pulses. Follow the procedure outlined above to meet the 1.0 dB ± 0.2 dB step size requirement. Remember to store the new calibration data to memory. Continue this procedure through the complete whisper/shout range. Once the calibration of the whisper/shout is completed, run the script file CAL.ASX to calculate a new CRC. If calibration settings are as desired, do not load defaults at the prompt. Instead save the current settings to EEPROM memory.

To perform a more accurate whisper shout step size measurement, it is important to compare the same pulse in the sequence (e.g., P2A as is selected in the whisper shout tests) when invoking the various whisper shout attenuation levels. This will eliminate amplitude variation due to pulse position and transistor heating effects. Compare the amplitudes of the P2A pulse in the various sequences to establish the whisper shout step size.

During calibration it is possible that a step size may be too large or too small and there is no way to meet the 1.0 dB ± 0.2 dB step size requirement. Test select resistors may be used to bring a particular step size into specification. First determine which of the five major attenuators needs to be adjusted (1 dB, 2 dB, 4 dB, 8 dB or 16 dB). By looking at the step size data with the default values loaded, a trend may be noted. For example, if the 4 dB attenuator is too large, every time that step is switched in to create a larger whisper/shout step, the new step may be too large as well. Since all whisper/shout steps are created by a combination of the five major attenuator steps, correcting a lower attenuation step size may also fix higher attenuation steps.

To help determine which attenuator may require a change to a test select resistor, an understanding of the fundamental operation of the whisper/shout attenuator is required. Figure B-7 below shows a block diagram of the whisper/shout circuit.

The whisper/shout circuit consists of pin diode switches which direct the transmitter power through various pi-pad attenuators. The pin diode attenuators themselves are switches which direct the transmitter power through the pi-pad or around it. The transmitter power enters the whisper/shout attenuator and can be switched through one of two paths, the bypass path which is the shortest, or the w/s path which is longer. The bypass path shares the 0/1 dB attenuator with the w/s path and is used for only the 0 and 1 dB whisper/shout steps. The w/s path consists of the 0/2 dB, 0/4 dB, 0/8 dB and the 0/16 dB attenuators before connecting with

the bypass path before the 0/1 dB attenuator. Each of the five major attenuators can be switched between its low loss state (0 dB) or its attenuated state. The whisper/shout was designed with two paths to reduce the overall insertion loss of the whisper/shout circuit in the 0 dB state. If all the attenuators were in series or a single path and switched to the 0 dB state, the overall insertion loss of the whisper/shout would be approximately 2.0 dB to 2.5 dB, since each attenuator has a minimum insertion loss of approximately 0.4 dB to 0.5 dB. By creating a second path for all the larger attenuation steps, four of the five attenuators can be bypassed, reducing insertion loss for the 0 dB step when the bypass path is utilized. As a result, the through insertion loss of the whisper/shout has been minimized to approximately 1.2 dB. The insertion loss of the w/s path in its minimum insertion loss state is approximately 2.0 dB greater than the 0 dB bypass. As a result the w/s path in its minimum attenuation state is used as the 2 dB whisper/shout step. Table B-2 below shows the path and major attenuators that are used to make the default whisper/shout steps.

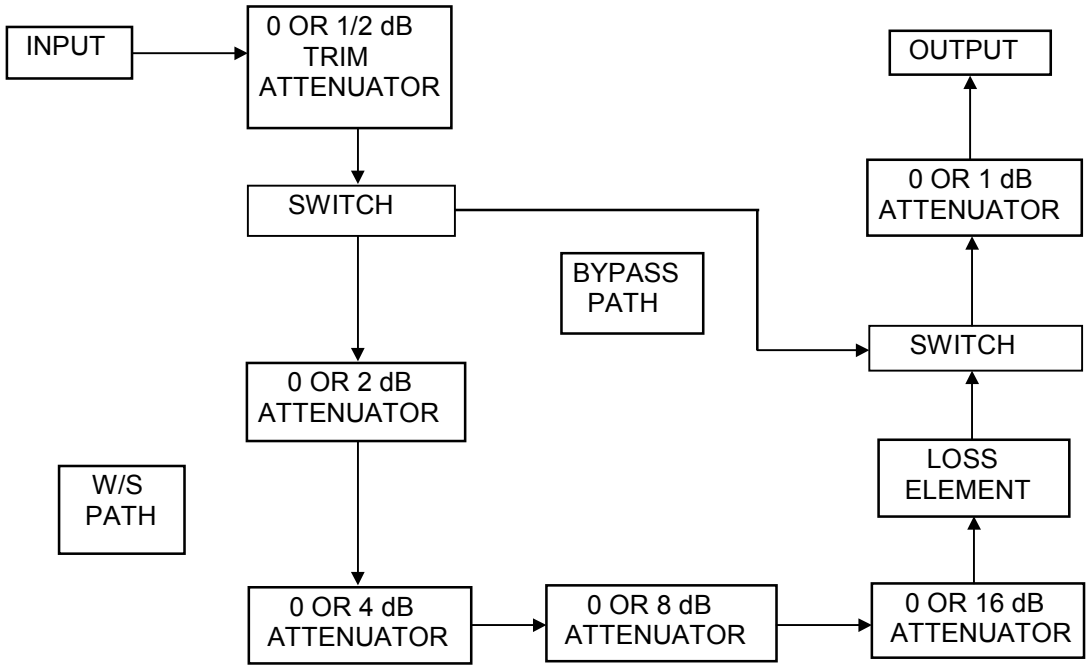

Figure B-7. Whisper/Shout Circuit Block Diagram

Table B-2. Default Path and Attenuators for Whisper/Shout Steps

Whisper/Shout Step	Path and Attenuators	Whisper/Shout Step	Path and Attenuators
0	Bypass (0)	16	W/S (8, 4, 2)
1	Bypass (1)	17	W/S (8, 4, 2, 1)
2	W/S (0)	18	W/S (16)
3	W/S (1)	19	W/S (16, 1)
4	W/S (2)	20	W/S (16, 2)
5	W/S (2, 1)	21	W/S (16, 2, 1)
6	W/S (4)	22	W/S (16, 4)
7	W/S (4, 1)	23	W/S (16, 4, 1)
8	W/S (4, 2)	24	W/S (16, 4, 2)
9	W/S (4, 2, 1)	25	W/S (16, 4, 2, 1)
10	W/S (8)	26	W/S (16, 8)
11	W/S (8, 1)	27	W/S (16, 8, 1)
12	W/S (8, 2)	28	W/S (16, 8, 2)
13	W/S (8, 2, 1)	29	W/S (16, 8, 2, 1)
14	W/S (8, 4)	30	W/S (16, 8, 4)
15	W/S (8, 4, 1)	31	W/S (16, 8, 4, 1)

Once the attenuation step that needs to be adjusted is identified, determine if the attenuation of that step needs to be increased or decreased. If more than one attenuation step appears to be out of specification, start with the lower value attenuation step first. Changing the attenuation will be accomplished by increasing or decreasing the value of the series resistor of the pi pad attenuator which makes up that step. Note that variation among units may be such that certain units may not achieve the step size requirement with the default path and attenuators selected, even if test select resistors are used. In this case it is allowable to select any combination of paths, attenuators and allowable test select resistors in order to achieve the step size requirement. For example, whisper/shout step 17 may need the 16 dB attenuator only instead of the 1 dB, 2 dB, 4 dB and 8 dB attenuators, or it may need only the 2 dB, 4 dB and 8 dB attenuators.

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Table B-3 below shows the typical installed value for the series resistor of each Whisper/Shout attenuator step as well as the allowable test select values. The change to the Whisper/Shout attenuation step for a given test select value is also shown. Note that Table B-3 is applicable to 7517935-910 only, and the reference designators and/or allowable test select values may change if a new Transmitter CCA is released or if a change order is written to the existing drawing. For a current list of installed resistors and allowable test selects refer to the 7517935-910 drawing.

REV LTR

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Table B-3. Whisper/Shout Circuit Test Select Resistor Values

REV LTR	W/S Attenuator	REF DES	Test Select Value (Ω)	Attenuation Change
	16	R36	70	Less Attenuation
	16	R36	84	Less Attenuation
M	16	R36	92	Less Attenuation
L	16	R36	104	Installed Part
	16	R36	110	More Attenuation
	16	R36	117	More Attenuation
	16	R36	133	More Attenuation
	8	R35	28	Less Attenuation
	8	R35	30	Less Attenuation
M	8	R35	32	Less Attenuation
M	8	R35	34	Less Attenuation
L	8	R35	36	Installed Part
F	8	R35	38	More Attenuation
	8	R35	41	More Attenuation
	4	R34	12	Less Attenuation
	4	R34	14	Installed Part
	4	R34	16	More Attenuation
	2	R8	6	Less Attenuation
	2	R8	7	Installed Part
	2	R8	8	More Attenuation
	1	R5	6	Installed Part
	1	R5	7	More Attenuation
	1	R5	8	More Attenuation
	Trim	R2	70	More Attenuation
	Trim	R2	92	More Attenuation
M	Trim	R2	104	More Attenuation
M	Trim	R2	110	More Attenuation
L	Trim	R2	117	Installed Part
	Trim	R2	133	Less Attenuation
F	Trim	R2	150	Less Attenuation

The difference between whisper/shout steps 1 and 2 should generally be greater than 1.0 dB at room temperature to ensure that the unit will pass the temperature tests. This difference typically decreases at cold temperatures. The difference can be adjusted by changing the test select capacitor C130. To increase the difference, use a smaller value of capacitor. To decrease the difference, use a larger value of capacitor.

2.9 Receiver IF Filter Calibration

Generally, wide-band receiver pulse performance measurements should precede filter alignment because initial receiver performance or degradation is easier to identify during pulse testing. Alignment (fine tuning) of the wide-band filters should not affect the wide-band pulse performance characteristics. However, if the band-pass characteristics are not normal because of component failures, or because of technician preference, filter band-pass tuning can be done initially, followed by the pulse performance measurements. Narrow-band pulse amplitude performance is a function of the narrow-band filter amplitude adjustments, but is not measured, since much of the circuitry is common to the wide-band signal path. Section 2.9.5 is optional, and is intended to provide a method of calibration of the self-test function which is only required if PWB variations cause this function to be inconsistent.

The receiver IF filter calibration is performed at the module level. The baseline test equipment setup is shown in Figure B-8 below:

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2.9.1 Receiver IF Filter Alignment Test Equipment Setup

NOTE: Primary reference designators apply to 7517945-903. Reference designators inside parenthesis apply to 7517945-904.

- Remove receiver covers if alignment is to be performed.
- Make sure S20, MAIN POWER switch on the test fixture is in the OFF position.
- Connect the J1 of the test fixture to J1 of the receiver. Carefully align the pins while mating the connector, noting the polarization pin orientation.
- Set up the test equipment as shown in Figure B-8, except do not connect the cable between the T336292 Test Fixture Z-AXIS IN, BNC6, and the Oscilloscope Z-IN connection.
- Set all test fixture switches as shown in Table B-4. Suggested test equipment settings are shown in Table B-4, which may be altered by the technician preference as experience is gained.

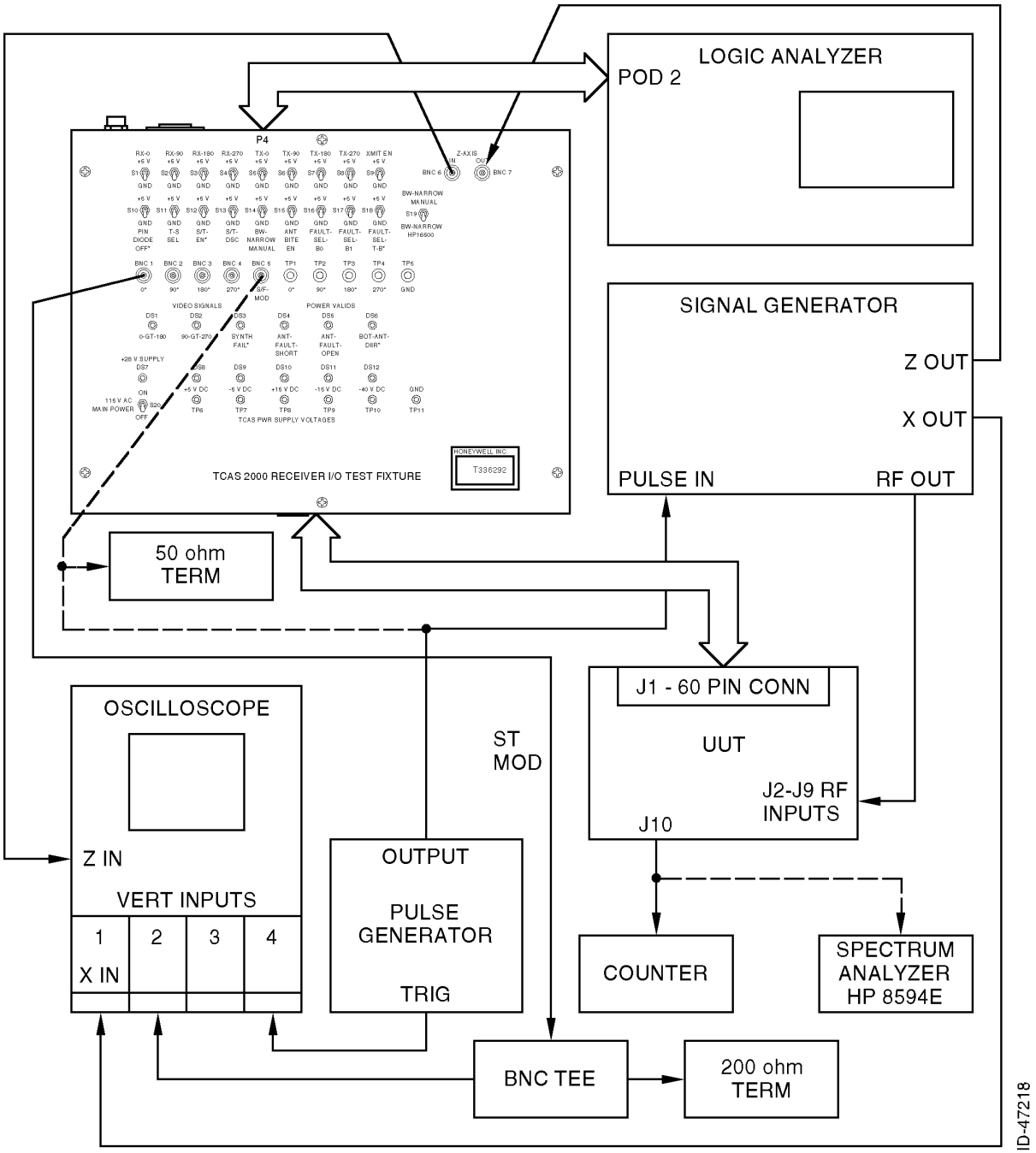

Figure B-8. Block Diagram for Receiver Test Set-up

Table B-4. Test Fixture and Test Equipment Settings

T336292 Test Fixture Settings	S1 (RX-0° *)	GND
	S2 (RX-90° *)	GND
	S3 (RX-180° *)	GND
	S4 (RX-270° *)	GND
	S5 (TX-0° *)	+5V
	S6 (TX-90° *)	+5V
	S7 (TX-180° *)	+5V
	S8 (TX-270° *)	+5V
	S9 (XMIT-EN*)	+5V
	S10 (PIN-DIODE-OFF*)	+5V
	S11 (T*-B-SEL)	GND
	S12 (S/T-EN*)	+5V
	S13 (S/T-OSC)	GND
	S14 (B/W-NARROW)	GND
	S15 (ANT-BITE-EN)	GND
	S16 (FAULT-SEL-B0)	GND
	S17 (FAULT-SEL-B1)	GND
	S18 (FAULT-SEL-T-B*)	GND
	S19 (BW NARROW-MANUAL/HP 16500)	MANUAL
Oscilloscope Settings: TEK 2465A or equivalent	Channel 1	Off
	Channel 2	0.1 V/div; reference ground 1 division above bottom grid.
	Channel 3	(not used)
	Time Base	200 ns/div
	Trigger	Auto; DC Coupled; Level: 0.5 V; Source: Channel 4; Slope: +; Vert: Channel 4
	Cursors	Horizontal, one cursor at GND reference, 2nd cursor set to measure peak pulse amplitude.
Signal Generator Settings: HP 8665A or equivalent	Pulse Modulation:	ON; EXT DC: ON
	Mode Select:	AUTO, ON, MODE 1: ON,
	Amplitude:	-77.2 dBm (calibrated @ UUT J2-J9 Inputs)
	Frequency:	1090.000 MHz
Pulse Generator Settings: HP 8011A or equivalent	Pulse Width:	500 ns (use vernier)
	Pulse Amplitude:	+2.5 V peak (into 50 ohm termination)
	Pulse Period:	20 us (use vernier)

REV LTR

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F **2.9.2 Initial Frequency Check and Performance Check**

- With the test equipment set up as in 2.9.1, connect a coaxial cable from J10 of the receiver to the frequency counter.
- Connect a coaxial cable from signal generator RF output to J2 (0 degree TOP).
- Switch S20, MAIN POWER to the ON position.
- Check L.O. frequency. It should read approximately 1030.000 MHz initially at room temperature. If not, adjust R623 (R612) until frequency is within the desired range. The frequency should be checked again after the receiver has been powered on for 15 minutes and has stabilized. At this time the frequency should be 1030.000 ± 0.001 MHz.
- An optional setup for frequency measurement is to use a Spectrum Analyzer as shown in Figure B-8. This gives the added ability to indirectly measure the L.O. output power in addition to the frequency. The output power from J10 should be between 5.5 and 10 dBm. Ensure that the loss of any cables used in the measurement setup are calibrated out.

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- Measure the Y1 tuning voltage at R139 (R143) p.1. The voltage should be between 6.5 Vdc and 9.5 Vdc.
- Connect a coaxial cable to the 0 degree, BNC1 video output of the test fixture to channel 2 of the oscilloscope. The 200 ohm termination resistor must be attached with a BNC Tee at the scope input (Ch 2).
- Execute the appropriate Logic Analyzer file from PS7517977 using the following commands:

  LOAD “DGPTDEF_A”

  ALL; PATTERN GEN A

  EXECUTE

  SYSTEM; PATTERN GEN A

  RUN; SINGLE

N
- The observed waveform should be one pulse with a minimum amplitude of 505 mV and a maximum amplitude of 593 mV when measured at the peak of the noise. Reselect R31 (R31) to lower value if the minimum level of 505 mV is not attained. Conversely raise the value of R31 (R31) if the maximum level of 593 mV is observed. A nominal amplitude of 544 mV is shown in Figure B-9:
- Move the signal generator cable from J2 to J3 (0 degree Bottom). The pulse should completely disappear. Change S11, T*-B-SEL switch to +5V. The pulse should reappear with the same amplitude as with J2. Return the T*-B-SEL switch to GND.

N
- Move the signal generator cable and repeat the performance check for the 90, 180 and 270 channels using the respective switch settings and video output connectors on the test equipment. Change the respective test select resistors as required to obtain a nominal video amplitude. Reselect R98 (R97) for the 90 channel, R69 (R67) for the 180 channel and R137 (R141) for the 270 channel.

NOTE: Rerun single on Logic Analyzer if power to test fixture has been interrupted.

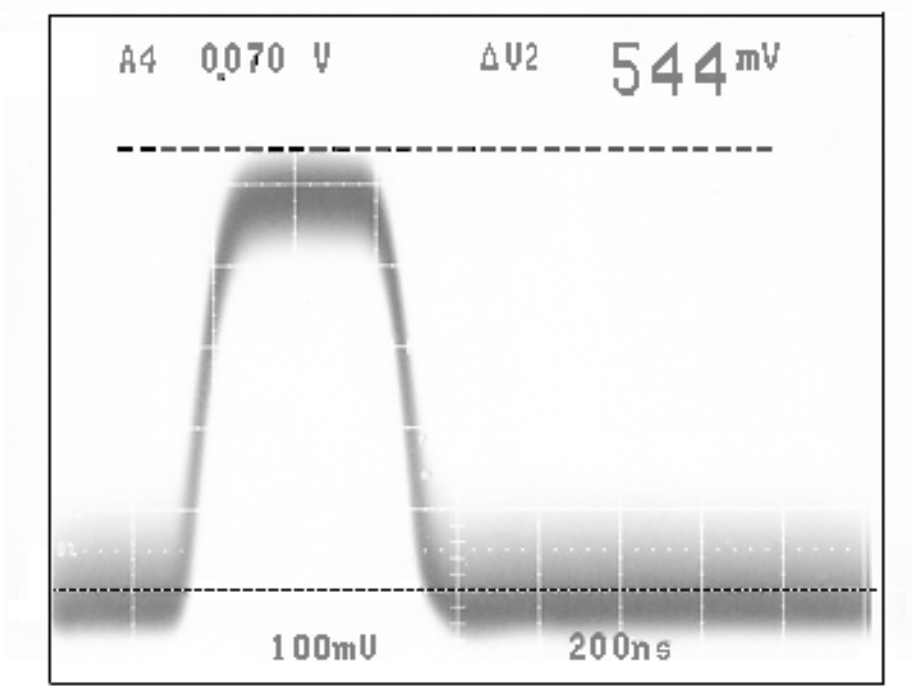

Figure B-9. Video Pulse Response @ -77.2 dBm - 1090 MHz

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2.9.3 Wide-Band Filter Alignment

Reset the Oscilloscope as shown below:

Table B-5. Oscilloscope Settings for Wide/Narrow Band Filter Alignment

Channel 1 (X input)	1.0 V/Div
Channel 2	0.1 V/Div
Channel 3	(not used)
Time Base	X-Y (full CCW)
Trigger	Auto; DC Coupled
Level	0.5 V
Source	Channel 4
Slope	+

- Move the Signal Generator RF output cable to J2 (0 degree Top). Move the video signal coax to BNC1 (0 degree).
- Connect BNC6, Z-AXIS IN, to the oscilloscope's Z-INPUT.
- Change the Signal Generator settings to MODULATION OFF OFF, Sweep = Auto, Amplitude = -60 dBm, SPECIAL: 112, Frequency Span = 10 MHz, Center Frequency Sweep = 1090 MHz, Sweep Time = 10 ms.
- Adjust the Channel 2 vertical position to obtain the swept output as shown in Figure B-10 below:

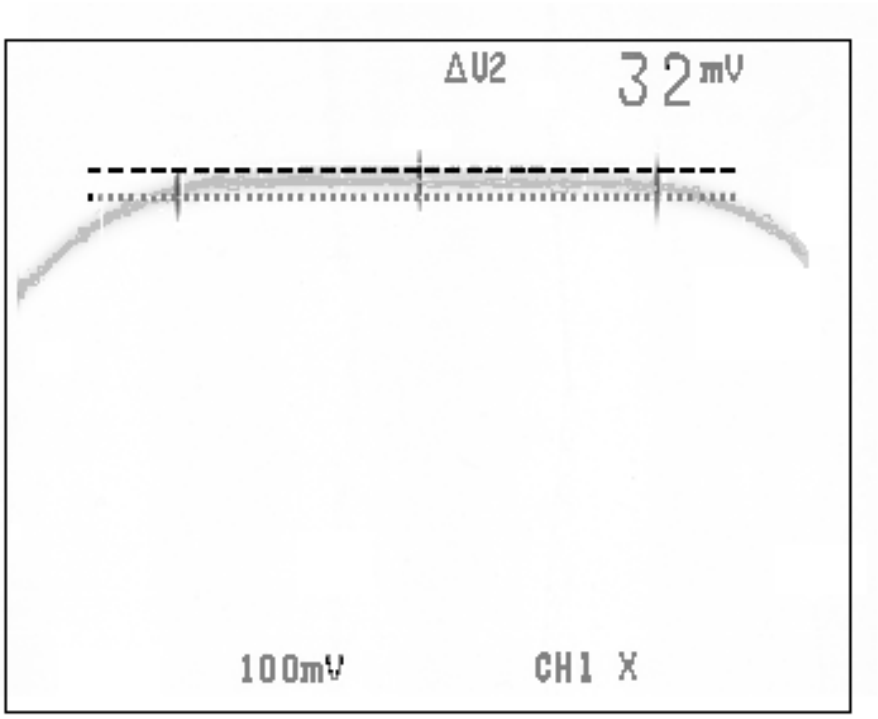

Figure B-10. Wide-Band Swept Video Response @ -60 dBm

- The actual shape of the frequency response may vary. Move the center marker to the middle of the screen and adjust the vertical position so the swept response overlays the top cursor line.

- Set the markers for 1087.0 MHz and 1093.0 MHz. Reposition the lower cursor to determine that the passband flatness is within 33 mV (1 dB) between these two markers. If this requirement is not met, refer to Figure B-11 and Table B-6, which shows a typical filter configuration, indicating which components will change the observed response. Reselect allowable components per Figure B-11 and Table B-6 until the receiver meets the specification.
- Reposition the swept center frequency to 1086 MHz and set marker 1 to 1084.5 MHz and measure response. Reposition the swept center frequency to 1094 MHz and set marker 3 to 1095.5 MHz and measure response. The response at these frequencies must be greater than 100 mV (3 dB) down from the response at 1090 MHz. In addition, balance the two responses so that they are within 33 mV (1 dB) of each other. Again refer to Figure B-11 and Table B-6 for allowable test selectable components and a suggested component to change to bring the receiver into specification.
- Repeat for the 90 degree, 180 degree and 270 degree channels.

NOTE: Use the top antenna connection for each channel.

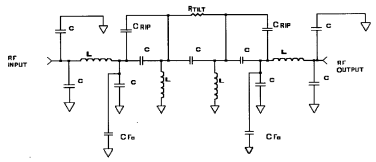

Figure B-11. General IF Bandpass Filter Tuning Schematic for All Receiver IF Filters

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Table B-6. IF Bandpass Filter Tuning Key

COMP	DESCRIPTION
L	Fixed Value (Not selectable, change only if defective)
C	Fixed Value (Not selectable, change only if defective)
CF_O	Center Frequency Adjustment (Larger C lowers frequency) Wide-band IF Filter on Duroid Side: 0 deg: C20 (C23), C38 (C45), 180 deg: C69 (C77), C88 (C97), 90 deg: C112 (C129), C136 (C152), 270 deg: C164 (C183), C186 (C206) Wide-band IF Filter on FR4 Side: 0 deg: C309 (C310), C369 (C365), 180 deg: C424 (C424), C461 (C461), 90 deg: C514 (C514), C550 (C550), 270 deg: C601 (C601), C644 (C644) Narrow-band IF Filter on FR4 Side: 0 deg: C340 (C332), C343 (C329), 180 deg: C411 (C403), C433 (C419), 90 deg: C516 (C505), C535 (C525), 270 deg: C606 (C589), C626 (C614)
C_{RIP}	Adjusts Center Frequency Sag & Excessive Bandwidth (Larger C lowers frequency, narrows bandwidth and reduces center sag) Wide-band IF Filter on Duroid Side: 0 deg: C24 (C29), C31 (C36), 180 deg: C71 (C80), C79 (C88), 90 deg: C117 (C133), C125 (C141), 270 deg: C169 (C189), C180 (C200)
R_{TILT}	Adjusts 1 dB Bandpass Tilt (Lower value R lowers low frequency side of pass-band amplitude) Wide-band IF Filter on Duroid Side: 0 deg: R23 (R23), 180 deg: R62 (R60), 90 deg: R89 (R88), 270 deg: R132 (R136) Wide-band IF Filter on FR4 Side: 0 deg: R316 (R316), 180 deg: R409 (R412), 90 deg: R549 (R540), 270 deg: R649 (R642) Adjusts Gain And Frequency Centering (Lower value R lowers the center frequency and amplitude) Narrow-Band IF Filter on FR4 Side: 0 deg: R317 (R315), 180 deg: R418 (R419), 90 deg: R550 (R538), 270 deg: R651 (R641)

N N N

NOTE: It is recommended but not required to install CF_O and C_{RIP} as identical pairs. If the 7517945-90X drawing allows, certain locations may have no components installed.

F

2.9.4 Narrow Band Filter Alignment

- Move the Signal Generator RF output cable to J2 (0 degree Top). Move the video signal coax to BNC1 (0 degree).
- Change S14 B/W-NARROW on the Test Fixture to +5V. The trace should be as shown in Figure B-12.
- Change the marker frequencies to 1089 MHz and 1091 MHz on the signal generator.

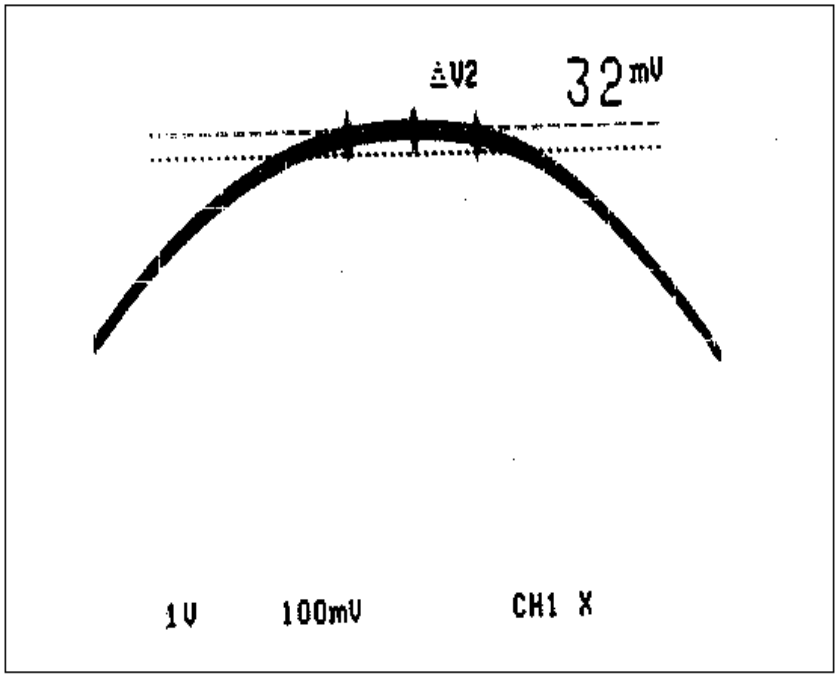

Figure B-12. Narrowband Swept Video Response @ -60 dBm - 1090 Mhz

- The peak of the response should be centered at 1090 MHz within the ± 1 MHz markers, and the ± 1 MHz response markers should be at or less than 32 mV below the peak response. If these requirements are not met, add or change components according to Figure B-11 and Table B-6. Repeat for the 90 degree, 180 degree and 270 degree channels.
- Position a cursor at the 1090 MHz response marker. Change S14, B/W-NARROW, on the Test Fixture to GND and position a second cursor at the 1090 MHz response marker. The difference between the wide-band and narrow-band filter responses at 1090 MHz should be less than 33 mV. The R_{TILT} resistor is used to set amplitude balance between the wide-band and narrow-band settings, however it does also affect the center frequency slightly, and must be considered when selecting the CF_O capacitors. If a change is required to balance the wide-band and narrow-band filter responses, sections 2.9.3 and 2.9.4 must be repeated.
- Rerun section 2.9.2 to verify proper operating frequency and video pulse amplitude.

F

2.9.5 Self Test Amplitude Balance

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- Set the 8011A Pulse Generator to “COMPL ON”. Move the 8011A output cable from the signal generator’s pulse modulation input to the “BNC5, S/T-MOD*” input on the test fixture. Place a 50 ohm shunt load at the S/T Modulation input jack on the Test Fixture. Set S12 S/T-EN* to GND and S13 S/T-OSC to +5V on the test fixture. Adjust the Pulse Duration to 1 microsecond.
- Set oscilloscope settings as shown in the initial setup. Set the signal generator to the initial settings, except select RF OFF.
- Connect a coaxial cable to the BNC1, 0 degree video output of the test fixture to channel 2 of the oscilloscope.
- Disconnect the coaxial cable from BNC6 on the Test Fixture. A pulse of approximately 1.50 V ± 0.3 V amplitude should be visible on the scope, as shown in Figure B-13. Note the voltage of the pulse peak.

G

- Repeat for the 90 degree, 180 degree and 270 degree channels, taking note of the voltage of each pulse peak.

N

- Check the relative amplitudes between the four channels. Reselect R9 (R12) for the 0 channel, R11 (R15) for the 180 channel, R121 (R125) for the 90 channel or R124 (R128) for the 270 channel to set the level and balance the four channels to within 165 mV of each other. The selection of an increased resistance value will lower the pulse amplitude.

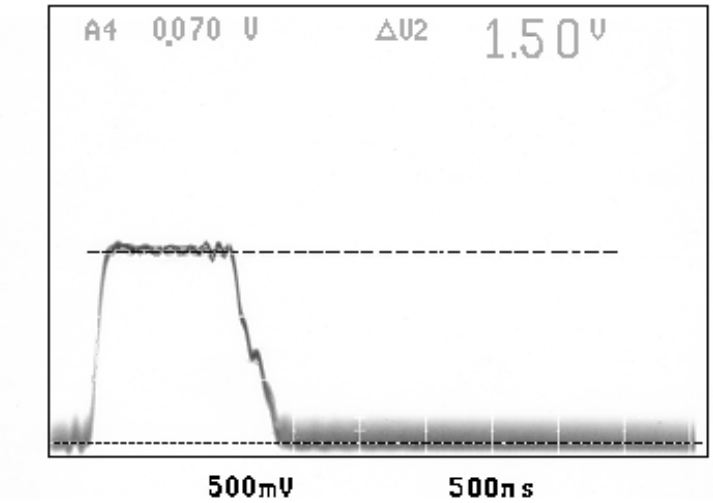

Figure B-13. Self Test Pulse Response

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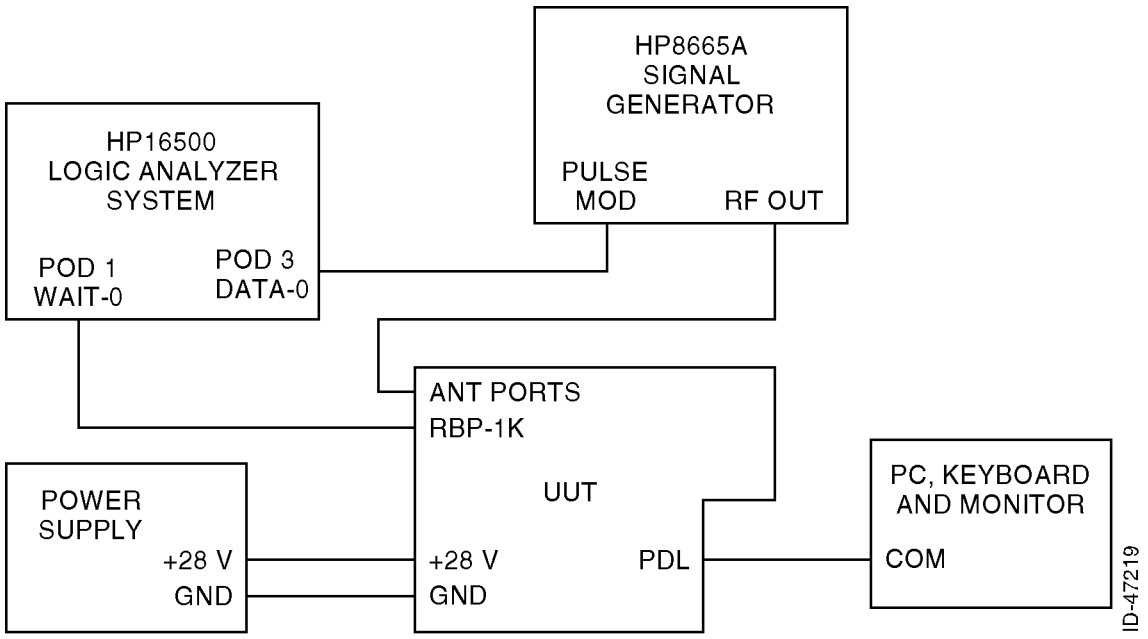
2.10 Receiver MTL Calibration

F

The receiver MTL is defined to be the amplitude of the signal which results in a detection of 90% replies. The TCAS 2000 MTLs are set to occur at an input amplitude of -77.0 dBm at the back of the unit, which is equal to the midrange of the requirements of DO-185. The calibration is performed using ATCRBS replies on only the top channels. Each channel is individually calibrated by adjusting a digital potentiometer whose settings are then stored in EEPROM memory. Since MTL is a statistical measurement, the following procedure must be repeated until the appropriate percentage replies is received. Set up the UUT and test equipment as shown in figure B-14 with the interconnections as specified in table B-1.

L



F

Figure B-14. Receiver Calibration Test Setup

2.10.1 0 Degree Channel MTL Calibration

F

With the test equipment set up as in figure B-14, connect the RF cable from the HP 8665A to the UUT 0 degree top antenna port. Set the amplitude of the HP8665A to -77.0 dBm. Execute PS7517977 file ATC_RX7_A on the HP16500. From the script file menu, execute file RX_CAL.ASX. A series of user selections will follow to determine what settings will be used for the MTL and slope digital potentiometers. The initial receiver MTL calibration must always precede the initial slope calibration. The receiver MTL calibration is always to be performed on the TOP antenna and with self-test ON. Enter the appropriate responses when prompted. For the initial calibration of a channel, select the default values for MTL and slope digital potentiometer settings. Note that it is important to maintain a stable UUT temperature during calibration, since the MTL will vary with temperature.

REV LTR

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B

F

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NOTE: During the MTL calibration, all top antenna ports must be terminated in 50 Ω.

When all user prompts are answered, the signal generator will begin transmitting replies to the unit. The PC will display the decoded reply in one of two modes, which the user can select. The default mode is the “S” or short mode. This mode displays the number of replies generated by the signal generator, the number of missed replies by the UUT and the percentage of replies received by the UUT. The “S” mode is used during MTL calibration. An additional mode is the “L” or long mode. This mode displays the CV values of the four generated pulses, the PD values of the four generated pulses and the status of the ZNS registers for the four generated pulses respectively. The user can switch between either mode simply by entering “S<cr>“ or “L<cr>” at any time. By entering “R<cr>”, the user can restart the counter which determines the percentage of received replies.

Allow the signal generator to transmit a minimum of 50 replies before changing the MTL potentiometer. The replies can be stopped by pressing the space bar. If the percentage of received replies is 90% ± 3%, calibration is complete for this channel, and the MTL potentiometer settings must be saved at the prompt. Otherwise adjust the MTL potentiometer setting (suggested adjustments are shown in hexadecimal in table B-7) and repeat the MTL calibration procedure from the beginning for this channel using the newly calculated MTL potentiometer settings. Depending on the absolute setting of the MTL potentiometer, the adjustment may make a larger or smaller difference in the MTL reading. Operator experience will allow for more efficient selection of potentiometer adjustment.

Table B-7. Receiver MTL Suggested Digital Potentiometer Adjustments

% Replies	100	96	93	87	84	80	78-70	68-50	48-0
Pot adjustment HEX	-07	-03	-01	01	02	03	04	05	07

REV LTR

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N

L

E

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2.10.2 90 Degree Channel MTL Calibration

With the test equipment set up as in figure B-14, connect the RF cable from the HP8665A to the UUT 90 degree top antenna port. Set the amplitude of the HP8665A to -77.0 dBm. Execute PS7517977 file ATC_RX7_A on the HP16500. From the script file menu, execute file RX_CAL.ASX. For a description of the operation of this script file, see the 0 Degree Channel MTL Calibration section.

NOTE: During the MTL calibration, all top antenna ports must be terminated in 50 Ω.

Allow the signal generator to transmit a minimum of 50 replies before changing the MTL potentiometer. The replies can be stopped by pressing the space bar. If the percentage of received replies is 90% ± 3%, calibration is complete for this channel, and the MTL potentiometer settings must be saved at the prompt. Otherwise adjust the MTL potentiometer setting (suggested adjustments are shown in hexadecimal in the table B-7) and repeat the MTL calibration procedure from the beginning for this channel using the newly calculated MTL potentiometer settings. Depending on the absolute setting of the MTL potentiometer, the adjustment may make a larger or smaller difference in the MTL reading. Operator experience will allow for more efficient selection of potentiometer adjustment.

NOTE: The MTL of the UUT is affected by the setting of the slope potentiometer. If the slope potentiometer settings are changed, the MTL must be recalibrated.

2.10.3 180 Degree Channel MTL Calibration

F

With the test equipment set up as in figure B-14, connect the RF cable from the HP8665A to the UUT 180 degree top antenna port. Set the amplitude of the HP8665A to -77.0 dBm. Execute PS7517977 file ATC_RX7_A on the HP16500. From the script file menu, execute file RX_CAL.ASX. For a description of the operation of this script file, see the 0 Degree Channel MTL Calibration section.

E

NOTE: During the MTL calibration, all top antenna ports must be terminated in 50 Ω.

F

Allow the signal generator to transmit a minimum of 50 replies before changing the MTL potentiometer. The replies can be stopped by pressing the space bar. If the percentage of received replies is 90% ± 3%, calibration is complete for this channel, and the MTL potentiometer settings must be saved at the prompt. Otherwise adjust the MTL potentiometer setting (suggested adjustments are shown in hexadecimal in the table B-7) and repeat the MTL calibration procedure from the beginning for this channel using the newly calculated MTL potentiometer settings. Depending on the absolute setting of the MTL potentiometer, the adjustment may make a larger or smaller difference in the MTL reading. Operator experience will allow for more efficient selection of potentiometer adjustment.

NOTE: The MTL of the UUT is affected by the setting of the slope potentiometer. If the slope potentiometer settings are changed, the MTL must be recalibrated.

2.10.4 270 Degree Channel MTL Calibration

With the test equipment set up as in figure B-14, connect the RF cable from the HP8665A to the UUT 270 degree top antenna port. Set the amplitude of the HP8665A to -77.0 dBm. Execute PS7517977 file ATC_RX7_A on the HP16500. From the script file menu, execute file RX_CAL.ASX. For a description of the operation of this script file, see the 0 Degree Channel MTL Calibration section.

NOTE: During the MTL calibration, all top antenna ports must be terminated in 50 Ω.

Allow the signal generator to transmit a minimum of 50 replies before changing the MTL potentiometer. The replies can be stopped by pressing the space bar. If the percentage of received replies is 90% ± 3%, calibration is complete for this channel, and the MTL potentiometer settings must be saved at the prompt. Otherwise adjust the MTL potentiometer setting (suggested adjustments are shown in hexadecimal in the table B-7) and repeat the MTL calibration procedure from the beginning for this channel using the newly calculated MTL potentiometer settings. Depending on the absolute setting of the MTL potentiometer, the adjustment may make a larger or smaller difference in the MTL reading. Operator experience will allow for more efficient selection of potentiometer adjustment.

NOTE: The MTL of the UUT is affected by the setting of the slope potentiometer. If the slope potentiometer settings are changed, the MTL must be recalibrated.

2.11 Receiver Slope Calibration

The receiver slope calibration is used to optimize the linearity of the receiver's response over its entire dynamic range, thus minimizing the bearing error of the receiver. Each channel's slope is calibrated individually by adjusting a digital potentiometer whose setting is then stored in EEPROM memory. The digital potentiometer is adjusted until the digitized output of the TCAS 2000 unit is approximately equal to the input amplitude of the reply. For the initial calibration of a channel, select the default values for the slope digital potentiometer settings. Note that it is important to maintain a stable UUT temperature during calibration, since the recorded CV levels will vary with temperature

F

2.11.1 0 Degree Channel Slope Calibration

With the test equipment set up as in figure B-14 connect the RF cable to the 0 degree channel. Set the amplitude of the HP8665A to -45.0 dBm. Execute PS7517977 file ATC_RX7_A on the HP16500. From the script file menu, execute file RX_CAL.ASX. A series of user selections will follow to determine what settings will be used for the MTL and slope digital potentiometers. The receiver slope calibration is always to be performed on the TOP antenna and with self-test ON. For the first calibration of the slope, use the MTL settings established in step 2.10. Enter the appropriate responses when prompted.

E

NOTE: During the slope calibration, all top antenna ports must be terminated in 50Ω.

When all user prompts are answered, the signal generator will begin transmitting replies to the unit. The PC will display the decoded reply in one of two modes, which the user can select. A description of these modes is provided under the 0 Degree Channel MTL Calibration section.

F

Allow the signal generator to transmit a minimum of 32 pulses (8 replies) before changing the slope potentiometer. The replies can be stopped by pressing the space bar. The user shall average the CV value from the displayed amplitude of the pulses. Note that the displayed amplitudes will be in increments of .578 dB, so the data will appear to be non-continuous. Average the reported amplitudes of the 32 pulses, and adjust the slope potentiometer setting (suggested adjustments are shown in hexadecimal in table B-8) to change the reported amplitude to -45.0 dBm. Repeat the slope calibration procedure from the beginning for this channel using the newly calculated slope potentiometer settings. Depending on the absolute setting of the slope potentiometer, the adjustment may make a larger or smaller difference in the CV amplitude. When 29 or more of the 32 pulses display a CV value of -45.0 dBm, change the amplitude of the HP8665A to -66 dBm and average the reported amplitude of 32 pulses. The average should be -66.0 ± 1.0 dBm. Next change the amplitude of the HP8665A to -24.0 dBm, and average the reported amplitude. The average should be -24.0 ± 1.0 dBm. When the reported values are acceptable at all three amplitudes, calibration is complete for this channel, and the slope potentiometer settings must be saved at the prompt. Operator experience will allow for more efficient selection of potentiometer adjustment.

Table B-8. Receiver Slope Digital Potentiometer Adjustment

F

CV reported (dBm)	-47.0	-46.5	-46.0	-45.5	-44.5	-44.0	-43.5	-43.0
Pot adjustment HEX	18	14	0F	08	-09	-14	-1F	-2A

N

After completion of the slope calibration for the first time, the MTL calibration must be repeated due to the interaction of the MTL and slope potentiometers. If the MTL potentiometer is changed by more than 03 HEX during this recalibration, the slope calibration must be repeated as well.

2.11.2 90 Degree Channel Slope Calibration

F With the test equipment set up as in figure B-14, connect the RF cable to the 90 degree channel. Set the amplitude of the HP8665A to -45.0 dBm. Execute PS7517977 file ATC_RX7_A on the HP16500. From the script file menu, execute file RX_CAL.ASX. For a description of file RX_CAL.ASX, refer to the 0 degree channel slope calibration section.

E **NOTE:** During the slope calibration, all top antenna ports must be terminated in 50Ω.

F Allow the signal generator to transmit a minimum of 32 pulses (8 replies) before changing the slope potentiometer. The replies can be stopped by pressing the space bar. The user shall average the CV value from the displayed amplitude of the pulses. Note that the displayed amplitudes will be in increments of .578 dB, so the data will appear to be non-continuous. Average the reported amplitudes of the 32 pulses, and adjust the slope potentiometer setting (suggested adjustments are shown in hexadecimal in table B-8 to change the reported amplitude to -45.0 dBm. Repeat the slope calibration procedure from the beginning for this channel using the newly calculated slope potentiometer settings. Depending on the absolute setting of the slope potentiometer, the adjustment may make a larger or smaller difference in the CV amplitude. When 29 or more of the 32 pulses display a CV value of -45.0 dBm, change the amplitude of the HP8665A to -66 dBm and average the reported amplitude of 32 pulses. The average should be -66.0 ± 1.0 dBm. Next change the amplitude of the HP8665A to -24.0 dBm, and average the reported amplitude. The average should be -24.0 ± 1.0 dBm. When the reported values are acceptable at all three amplitudes, calibration is complete for this channel, and the slope potentiometer settings must be saved at the prompt. Operator experience will allow for more efficient selection of potentiometer adjustment.

After completion of the slope calibration for the first time, the MTL calibration must be repeated due to the interaction of the MTL and slope potentiometers. If the MTL potentiometer is changed by more than 03 HEX during this recalibration, the slope calibration must be repeated as well.

2.11.3 180 Degree Channel Slope Calibration

F With the test equipment set up as in figure B-14 connect the RF cable to the 180 degree channel. Set the amplitude of the HP8665A to -45.0 dBm. Execute file PS7517977 file ATC_RX7_A on the HP16500. From the script file menu, execute file RX_CAL.ASX. For a description of file ATC_RX7.ASX, refer to the 0 degree channel slope calibration section.

E **NOTE:** During the slope calibration, all top antenna ports must be terminated in 50Ω.

F Allow the signal generator to transmit a minimum of 32 pulses (8 replies) before changing the slope potentiometer. The replies can be stopped by pressing the space bar. The user shall average the CV value from the displayed amplitude of the pulses. Note that the displayed amplitudes will be in increments of .578 dB, so the data will appear to be non-continuous. Average the reported amplitudes of the 32 pulses, and adjust the slope potentiometer setting

(suggested adjustments are shown in hexadecimal in table B-8) to change the reported amplitude to -45.0 dBm. Repeat the slope calibration procedure from the beginning for this channel using the newly calculated slope potentiometer settings. Depending on the absolute setting of the slope potentiometer, the adjustment may make a larger or smaller difference in the CV amplitude. When 29 or more of the 32 pulses display a CV value of -45.0 dBm, change the amplitude of the HP8665A to -66 dBm and average the reported amplitude of 32 pulses. The average should be -66.0 ± 1.0 dBm. Next change the amplitude of the HP8665A to -24.0 dBm, and average the reported amplitude. The average should be -24.0 ± 1.0 dBm. When the reported values are acceptable at all three amplitudes, calibration is complete for this channel, and the slope potentiometer settings must be saved at the prompt. Operator experience will allow for more efficient selection of potentiometer adjustment.

After completion of the slope calibration for the first time, the MTL calibration must be repeated due to the interaction of the MTL and slope potentiometers. If the MTL potentiometer is changed by more than 03 HEX during this recalibration, the slope calibration must be repeated as well.

2.11.4 270 Degree Channel Slope Calibration

F

With the test equipment set up as in figure B-14, connect the RF cable to the 270 degree channel. Set the amplitude of the HP8665A to -45.0 dBm. Execute file PS7517977 file ATC_RX7_A on the HP16500. From the script file menu, execute file RX_CAL.ASX. For a description of file RX_CAL.ASX, refer to the 0 degree channel slope calibration section.

E

NOTE: During the slope calibration, all top antenna ports must be terminated in 50Ω.

F

Allow the signal generator to transmit a minimum of 32 pulses (8 replies) before changing the slope potentiometer. The replies can be stopped by pressing the space bar. The user shall average the CV value from the displayed amplitude of the pulses. Note that the displayed amplitudes will be in increments of .578 dB, so the data will appear to be non-continuous. Average the reported amplitudes of the 32 pulses, and adjust the slope potentiometer setting (suggested adjustments are shown in hexadecimal in table B-8) to change the reported amplitude to -45.0 dBm. Repeat the slope calibration procedure from the beginning for this channel using the newly calculated slope potentiometer settings. Depending on the absolute setting of the slope potentiometer, the adjustment may make a larger or smaller difference in the CV amplitude. When 29 or more of the 32 pulses display a CV value of -45.0 dBm, change the amplitude of the HP8665A to -66 dBm and average the reported amplitude of 32 pulses. The average should be -66.0 ± 1.0 dBm. Next change the amplitude of the HP8665A to -24.0 dBm, and average the reported amplitude. The average should be -24.0 ± 1.0 dBm. When the reported values are acceptable at all three amplitudes, calibration is complete for this channel, and the slope potentiometer settings must be saved at the prompt. Operator experience will allow for more efficient selection of potentiometer adjustment.

After completion of the slope calibration for the first time, the MTL calibration must be repeated due to the interaction of the MTL and slope potentiometers. If the MTL potentiometer is changed by more than 03 HEX during this recalibration, the slope calibration must be repeated as well.

N

2.12 Receiver Self-Test Limit Calibration

The TCAS 2000 internally generates test replies which are then looped back into each channel's receiver. The limits of this test are established by the measured performance of the unit, thus each unit will have unique limits. The receiver self-test limit calibration records the actual amplitudes of the self-test signals for each channel's receiver. Then the upper limit is set to be 6 dB above the largest amplitude recorded previously, and the lower limit is set to be 6 dB below the smallest amplitude recorded previously. These limits are then stored in EEPROM memory. This calibration must be performed after the MTL and slope calibrations are complete and the digital potentiometer settings have been saved. The receiver self-test calibration uses the digital potentiometer settings from EEPROM memory.

E The receiver self-test is performed on the top antenna ports only.

E **NOTE:** The top antenna ports must all be loaded in 50Ω during the receiver self-test.

F From the script file menu, execute file RCVR_ST.ASX. The user is able to select which channel's self-test amplitudes are to be read. Select each channel individually, and record the largest and smallest amplitude values reported during 8 replies (32 pulses). Identify the largest and smallest recorded values for all pulses and all channels combined. Subtract 6 dB from the smallest recorded value to obtain the lower limit value. Calculate the decimal value to be stored as the lower limit using the following formula, where LL is the lower limit value in dB and DEC is the decimal value to be stored.

$$\mathrm{DEC} = \frac{\mathrm{LL} + 92.8889}{0.2889}$$

Store the decimal value for the lower limit in memory location 97F0D.

Add 6 dB to the largest recorded value to obtain the upper limit value. Calculate the decimal value to be stored as the upper limit using the following formula, where UL is the upper limit value in dB and DEC is the decimal value to be stored.

$$\mathrm{DEC} = \frac{\mathrm{UL} + 92.8889}{0.5778}$$

Store the decimal value for the upper limit in memory location 97F0E.

F

2.13 TCAS Type Calibration

F This step stores a keyword into EEPROM memory which determines if TCAS will operate as a TCAS I or TCAS II type system. The default setting is for TCAS II. Use script file TCASTYPE.ASX to establish the correct TCAS type setting. For TCAS I type, the keyword BDC3 is stored into CAS memory location 97F31, while for TCAS II type, the keyword 0000 is stored into the same memory location.

APPENDIX C
RT-950/951/952 AUTOCALIBRATION PROCEDURE USING THE MTS

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APPENDIX C
RT-950/951/952 AUTOCALIBRATION PROCEDURE USING THE MTS

1. INTRODUCTION

The MTS can automate most of the UUT calibration process. When the autocalibration routine is selected, several test steps will be loaded which can be run independently or as a continuous sequence. At the beginning of each the previously stored calibration data is retrieved from the TCAS EEPROM memory. Depending on the test selected, various measurements and calculations are made. If there are problems encountered during any step, notification is made to the operator. An abort switch is provided for each test step and may be toggled to the "Abort" position if termination of the current test is desired. Finally, the CRC for the EEPROM calibration memory is calculated and the values are written back to the TCAS calibration EEPROM memory.

2. AUTOCALIBRATION PROCEDURE

Select the "calibrat.squ" from the File Open dialog of the Test Executive to initiate the autocalibration routine. Run autocalibration steps individually or as a continuous sequence as desired. The following describes the function of each test step within the "calibrat.squ."

2.1 Default Calibration Settings

Stores the known default configuration into TCAS calibration EEPROM memory. This is a relatively good starting point for all the calibration routines and may help to minimize the time required to select various calibration values calculated by the rest of the active calibration steps.

2.2 Transmitter Peak Power and Rise Time Adjustment

This step places the MTS and TCAS in a continuous transmit pulse display mode out the top 0 degree antenna port. This allows for adjustment of the peak power and rise time of the transmitted pulses. To reduce the risk of damaging the transmitter driver and final transistors upon initial power up and to ensure proper calibration of pulse width, the transmitter must be aligned for peak power and rise time prior to any further calibration.

With a Johanson tuning tool 8777 or equivalent, turn the tuning slug in each of the four trimmer capacitors (C126, C127, C128 and C129 on 7517935-902) approximately 10 turns counter clockwise or until the tuning slug is near the top of the trimmer capacitor barrel. Initiate this autocalibration step. A single P1 pulse should be visible on the HP8990A peak power meter as shown in figure B-5. While watching the peak power, adjust the trimmer capacitors in the following order for maximum power out of the transmitter: C129 (driver input), C128 (driver output), C127 (final output), C126 (final output). See A3 Transmitter CCA drawing 7517935 for capacitor locations. Note that the trimmer capacitors are accessible through holes in the A2 Processor CCA. With cable losses calibrated out, the power out of the UUT shall be 280 to 630 watts (54.5 to 58 dBm).

After adjusting for peak power out of the transmitter, monitor the rise time of the P1 pulse. The rise time should be adjusted to between 60 and 80 ns at room temperature. If rise time is outside this window, adjust the trimmer capacitors in following order while monitoring both rise time and power output until both measurements are within their respective ranges: C126 (final output), C127 (final output), C128 (driver output) and C129 (driver input). When finished, select OK from the popup window.

2.3 Frequency Adjustment

This step places the MTS and TCAS in a continuous transmit frequency measurement mode such that the transmit frequency can be changed by adjusting a potentiometer on the A5 RCVR I/O CCA while transmitting full power. If the operator is running the test from Single Pass or Test UUT, the program will automatically check the frequency to be 1030.000 +/- 0.001 MHz. If the frequency passes these limits, the program will continue. If the frequency does not pass these limits, the operator will be allowed to adjust the frequency. If the operator is running the test in Run Test mode, the operator will be allowed to adjust and accept the frequency.

N

The frequency adjustment potentiometer is A5R623 on the 7517945-903 CCA (A5R612 for the 7517945-904). The potentiometer can be accessed through a screw hole in the front cover of the TCAS 2000 unit. First remove the large Phillips head screw just above and toward the right side of the unit handle. Potentiometer A5R623 (A5R612) should now be accessible through the screw hole. A clockwise rotation of the potentiometer will decrease the frequency of the unit. While monitoring the frequency output, adjust the potentiometer until the frequency is 1030.000 +/- 0.001 MHz. Replace the Phillips head screw in the front cover of the TCAS 2000 unit and tighten to the appropriate torque requirement. If the unit has required a significant change in frequency, the user may need to repeat the measurements taken in step 2.2 to verify that the transmitter peak power and rise times still meet the requirements. It is possible that the adjustment in frequency could slightly affect the peak power or rise time. When finished select OK from the popup window.

2.4 Transmitter Pulse Width Calibration

The transmit Pulse Width is automatically measured and set by this routine. No operator intervention is required. The result is stored in TCAS EEPROM memory.

2.5 Transmitter P6 Pulse to SPR Delay Calibration

The transmit Sync Phase Reversal position is automatically measured and set by this routine. No operator intervention is required. The result is stored in TCAS EEPROM memory.

2.6 Transmitter Whisper-Shout Calibration

This step automatically measures all 64 possible whisper/shout levels and selects the optimum combination of steps based on an error function comprised of both relative and absolute errors. The best fit of whisper/shout steps is then saved to TCAS EEPROM memory. No operator intervention is required. Because of the combinations and variations in this step, the results may be such that the UUT will not pass all manufacturing tests. In such a case, the routine will provide a printout of the actual power measurements and the Whisper/Shout selections to assist in transmitter test-select resistor choices. Refer to Appendix B, section 2.8 for detailed information explaining how to select the appropriate values of test-select resistors. In either case, the results are stored in TCAS EEPROM memory.

2.7 Receiver MTL and Slope Calibration

This step sets the digital potentiometers for the Minimum Trigger Level (MTL) and slope (gain) for each of the 4 receiver channels of the TCAS unit. No operator intervention is required. Each iteration of the routine tests percentage of received replies and composite video amplitude for a given input amplitude. The MTL is set to be 90% +/- 3% received replies with an input level at the ARINC 600 connector of -77.0 dBm. The slope is set such that the composite video amplitude is within 1.0 dB of the input amplitude at input amplitudes of -66.0 dBm, -48 dBm and -24 dBm. The slope setting is adjusted based on a weighted error function of all 3 amplitudes. In some cases, a stable combination can not be found. The routine will abort a channel if no combination can be found within 20 attempts. In such cases, a printout is provided with the results of the attempts. In all cases the most optimum setting combinations for all 4 receiver channels are stored in TCAS EEPROM memory.

2.8 TCAS Type Calibration

The operator establishes whether the TCAS unit will operate as a TCAS I or TCAS II type system. The result is stored in TCAS EEPROM memory.

2.9 Display Calibration Data

The TCAS EEPROM memory is read and displayed for recording and review. The results may be observed on the Test Executive screen and/or on the Test Report. No operator intervention is required.

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