1	FCC Type Acceptance Report for ATC Mode "S" Transponder XS-950S/I Honeywell Inc. Drawing EB7517857, Rev. Original - Test Report Data - Functions of Semiconductors - Circuit Descriptions - Equipment Photographs - Personnel Qualifications
2	Honeywell Inc. Integrated Test Specification for the XS-850 Mode "S" Transponder, Drawing No. IT7517800, Rev. M
3	Honeywell Inc., Circuit Card Assembly, A1 Interconnect, Drawing No. 7517820-902, Rev. B
4	Honeywell Inc., Circuit Card Assembly, A2 Processor, Drawing No. 7517826-941, Rev. Original
5	Honeywell Inc., Circuit Card Assembly, XMTR/RCVR A3, Drawing No. 7517835-904, Rev. D
6	Honeywell Inc., Circuit Card Assembly, ATDL Power Supply Unit A4, Drawing No. 7517830-903, Rev. Original
7	Honeywell Inc., XS-950S/I Data Link Transponder Unit Assembly, Drawing No. 7519350, Rev. A
8	Honeywell Inc., Identification Plate (-45, -46), Drawing No. 7021570, Rev. AR with C.O. 103913 and 103927
9	Honeywell Inc., Outline and Installation XS-950S/I, Drawing No. 7519356, Rev. Original
10	Honeywell Inc., Interconnection Diagram – Transponder XS-950S/I, Publication No. 34-52-07 pages 423 thru 431.

ENGINEERING SPECIFICATION	SECURITY NOTATION	SPEC NO. EB7517857	-
		CAGE CODE 55939	REV LTR

TYPE	CLASS	INITIAL RELEASE DATE
ENGINEERING BULLETIN	A	31-AUG-1999

DIVISION	DEPARTMENT NO.	PRODUCT LINE NO.	CONTRACT NO.
CAS	5810	3839	

TITLE

XS-950S/I FCC TYPE ACCEPTANCE TEST REPORT

PREPARED BY / DATE	APVD BY TECHNICAL MANAGER / DATE	APVD BY TECHNICAL MANAGER / DATE
Jim Proxel 31-AUG-1999	P. Bobrowitz 31-AUG-1999	
APVD FOR SCM / DATE	APVD FOR SQA / DATE	APVD FOR / DATE
for Jim Proxel		

REF AWAEB/PSAEB NO.	CHECKER	PRODUCT DESIGN CHECKER (FOR REF, SPCL CONT PER EPM I-A-40)	COGNIZANCE OF QE SUPVR (FOR REF, SPCL CONT PER EPM I-A-40)

FOR PAGE INDEX, SEE CR-2. REVISION RECORD FOLLOWS PAGE INDEX

TABLE OF CONTENTS

SECTION I

INTRODUCTION

This report consists of data establishing the conformance of the Honeywell Inc. XS-950S/I IFF and Mode S Data Link Transponder to the requirements established by the Federal Communications Commission in its rules and regulations (as referenced in Section II of this paper).

This Transponder is a derivative product from the XS-950 Mode S Transponder built by Honeywell. The XS-950S/I was retested and this new report submitted due to modifications to 3 transistors. The XS-950 Acceptance Test Report was released on 26 May 95, Specification No. EB7517808.

SECTION II

REFERENCES AND ATTACHMENTS

1.0 References

Code of Federal Regulations, Title 47

Part 2, Subpart J

Part 87, Subpart D

XS-950 FCC TYPE ACCEPTANCE TEST REPORT, EB7517808

Environmental Conditions and Test Procedures for Airborne Equipment, RTCA DO-160D

2.0 Attachments

XS-950S/I End Item Assembly	7519350
Circuit Card Assembly - A1 Interconnect	7517820
Circuit Card Assembly - A2 Processor	7517826
Circuit Card Assembly - A3 Transmitter/Receiver	7517835
Circuit Card Assembly - A4 Power Supply / Modulator	7517830
Integrated Test Specification for the XS-950 Mode S Data Link Transponder	IT7517800
Outline and Installation, XS-950S/I Mode S/IFF Transponder	7519356
Interconnect Diagram, XS-950S/I Mode S/IFF Transponder	A15-3839-001
Plate, Identification (115 VAC VERSION)	7021570-45
Plate, Identification (28 VDC VERSION)	7021570-46

SECTION III

TEST CERTIFICATION

I do hereby certify that to the best of my knowledge the technical test data contained in this report are true and correct.

SIGNED: _____

TEST ENGINEER

TEST ENGINEER QUALIFICATION

Pete Bobrowitz

1984 B.S.E.E. University of Wisconsin - Milwaukee

15 Years Experience In Commercial Avionics

SECTION IV

GENERAL INFORMATION

1.0 TYPE DESIGNATION

The equipment has been designated by Honeywell Inc., Commercial Aviation Systems, as an XS-950S/I Mode S and IFF Transponder.

2.0 SERVICE AND RULE FOR INTENDED OPERATION

Air Traffic Control

Part 87, Subpart A

3.0 DESCRIPTION OF EQUIPMENT

3.1	Type of Emission:	18MOP1D
3.2	Frequency Range:	1090 ± 1 MHz
3.3	Power Rating:	250 Watts Minimum, (Pulse)
3.4	Final Power Amplifier:	Solid State Class C amplifier using a pair of MRF10502 silicon bipolar transistors.

3.5 Transistor Functions:

Function	Transistor	Manufacturer
Oscillator	AT00535	Hewlett Packard
Buffer Amplifier	CGY-50	Siemans
Buffer Amplifier	CGY-50	Siemans
Class A Amplifier	MRF1000MB	Motorola
Class C Amplifier	MRF10005	Motorola
Class C Amplifier	MRF10031	Motorola
Class C Amplifier	MRF10120	Motorola
Class C Final Amplifier	MRF10502	Motorola
Pulse Modulator	IRFR220	International Rectifier
Envelope Modulator	IRFR9220	International Rectifier

Voltage Regulator	IRF9540	International Rectifier

3.6 Circuit Diagram:

See attached schematics.

3.7 Instruction Book:

To Be Supplied As Soon As Possible

3.8 Tune-Up Procedure:

No field tuning is normally required. Tuning is done during manufacturing.

3.9 Oscillator Circuit:
The carrier frequency of 1090.0 MHz is generated by a varactor-tuned oscillator located on the Transmitter board. The primary frequency determining element is a ceramic coaxial resonator which provides good temperature stability and noise performance. The output of the oscillator is buffered by a Monolithic Microwave Integrated Circuit (MMIC) amplifier. This 1090 MHz RF signal is divided in frequency by 128 to 8.515625 MHz where it is compared in frequency and phase to a 8.515625 MHz crystal controlled reference oscillator. Any frequency or phase error is amplified by an active loop filter and corrections to the 1090 MHz oscillator are made by varying the varactor tuning voltage.

3.10 Frequency Stabilization:

Single channel phase-locked-loop synthesizer referenced to a crystal oscillator.

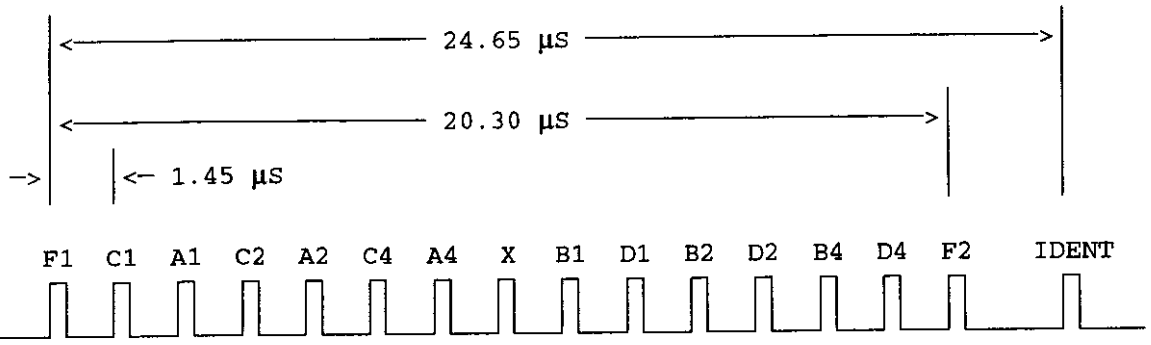
3.11 Modulation Limiting:

Not applicable

3.12 Radiated Interference Suppression:

Transmitter low-pass filter consisting of microstrip printed circuit elements (See Transmitter Schematic 7517835).

3.13 Reply Transmission Pulse Train

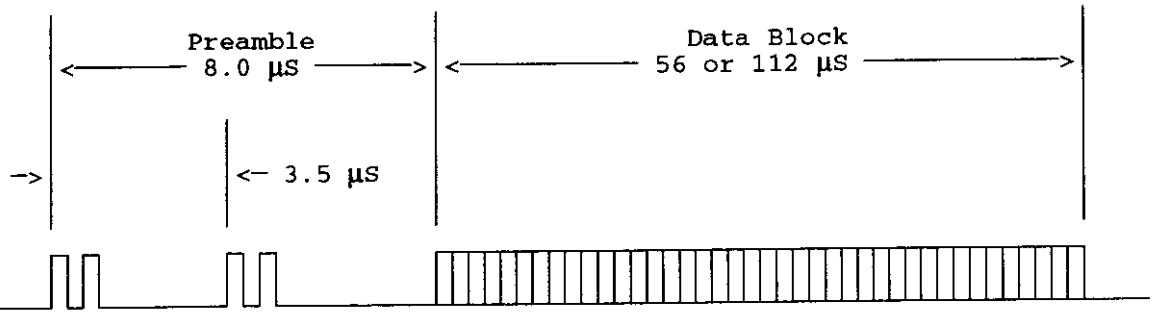


ATCRBS Timing Diagram

Pulse Widths (50% - 50%): 0.45 ± 0.1 µS

Rise Time (10% - 90%): ≤ 0.1 µS

Fall Time (10% - 90%): ≤ 0.2 µS

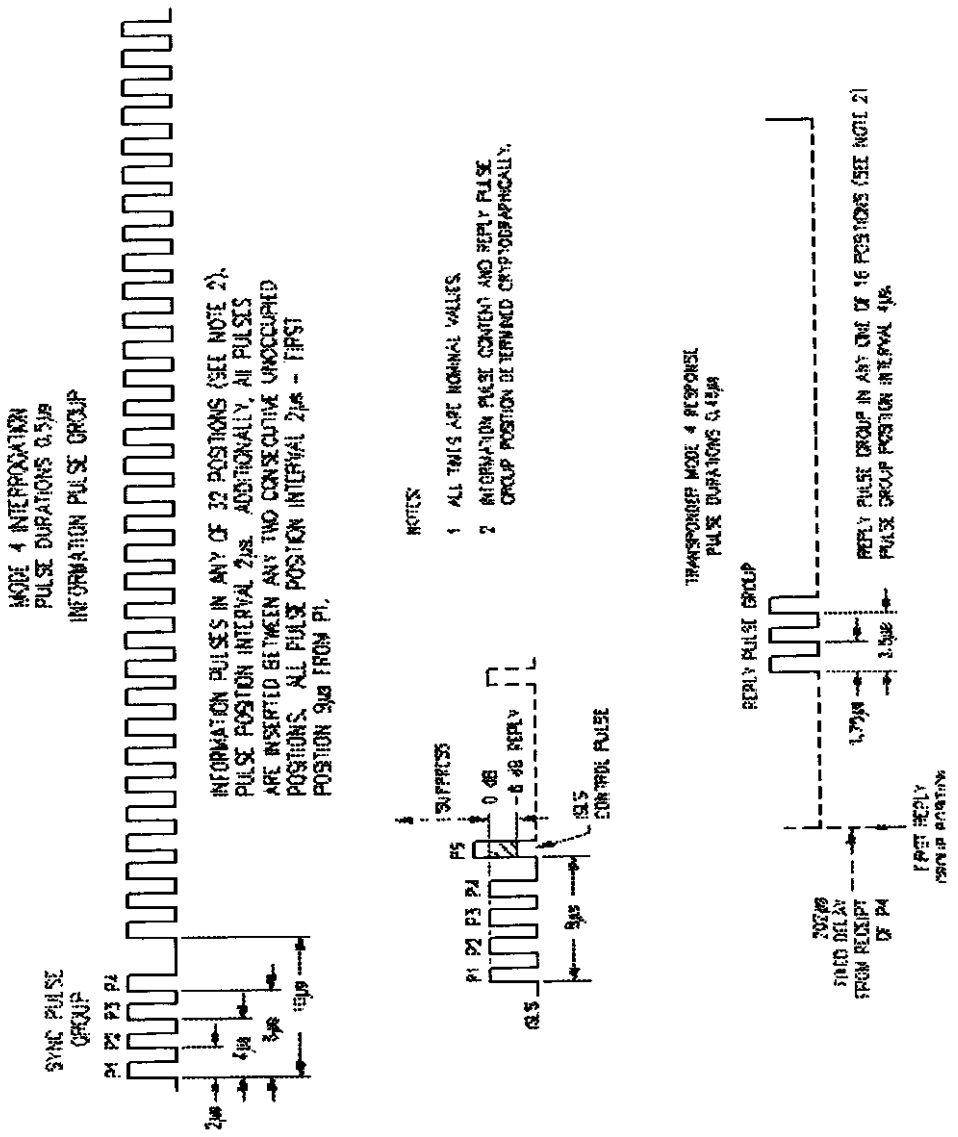


MODE S Timing Diagram

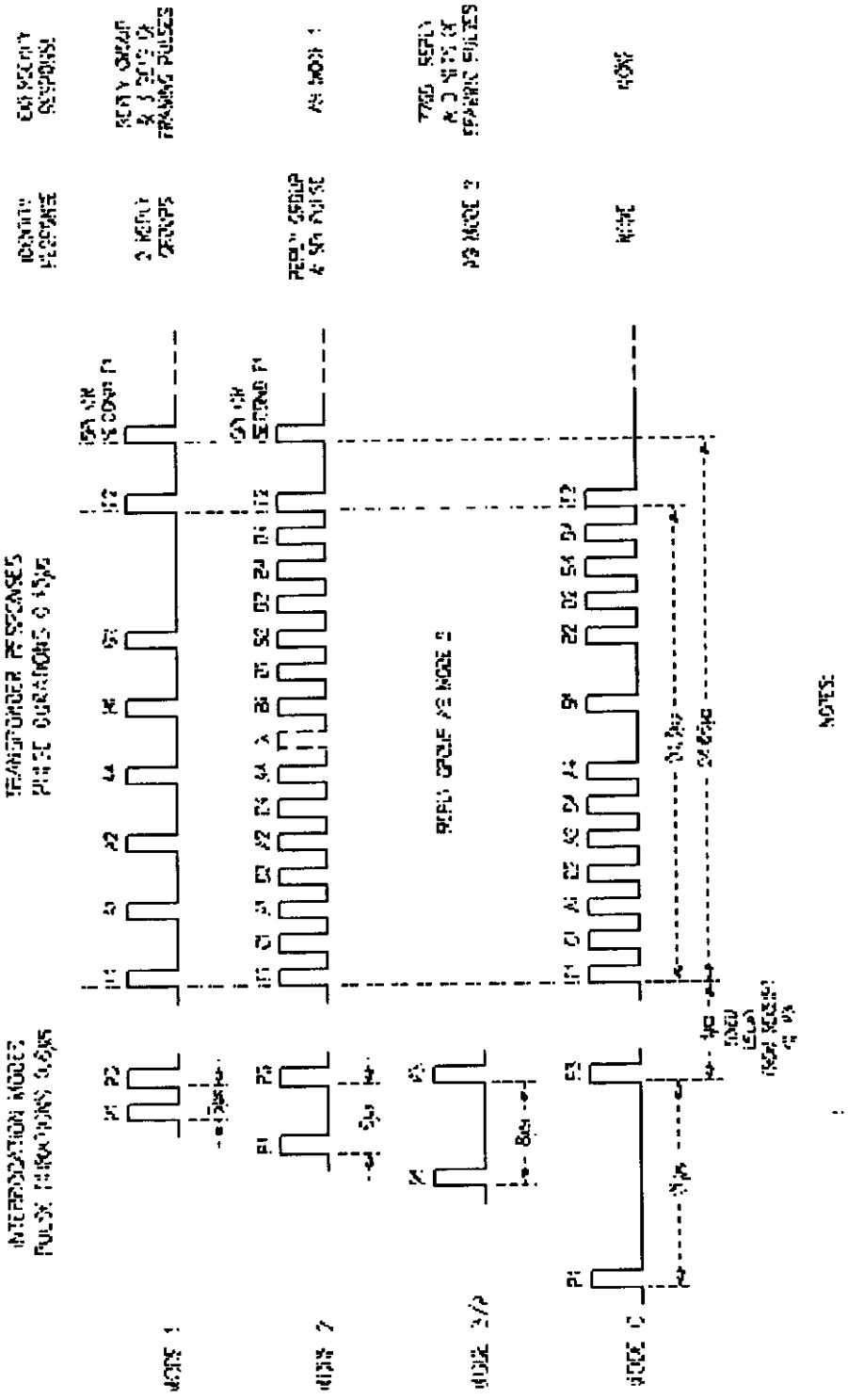
Pulse Widths: 0.5 ± 0.05 µS or 1.0 ± 0.05 µS

Rise Time (10% - 90%): ≤ 0.1 µS

Fall Time (10% - 90%): ≤ 0.2 µS



Mode 4 Pulse Train Diagram



Mode 1 and 2 Pulse Trains

4.0 PHOTOGRAPHS

SECTION V

TEST PROCEDURES AND DATA

TEST NO: 1
Page NO: 1 OF 2

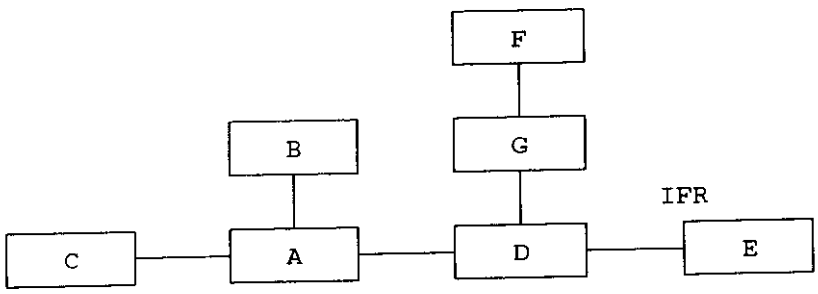
1.0 DESCRIPTION OF TEST: Power Output

2.0 SPECIFICATIONS: 47 CFR 2.985a
47 CFR 2.985c
47 CFR 87.131

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL. INST.	501TC	AV 52189
C	Personal Computer	DELL	OPTIPLEX	
D	Directional Coupler	WAVECOM	L-918-10	61
E	RF Generator	IFR	11404	D400485
F	Peak Power Analyzer	HP	8990A	D400012
G	Attenuator	Narda	776, 768	32114
I				
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



5.0 PROCEDURE:

1. Connect the equipment as shown in the block diagram in Section 4.0 of this document.
2. Using the peak power meter, record the transponder output power under minimum and maximum reply pulse conditions. Note the frequency deviations relating to a change of the output power. (Mode-S rate 60/sec.; Mode A, C, 1, 2, 4 rate 1100/sec.)
3. Compute actual power using measured losses for coupler and attenuator.

6.0 DATA

6.1 Top Antenna measurements

TDR Mode	Reply Code	Path Loss	Actual Power	Freq
C	0000	52.0 dB	554 W	1090.33
A	7777	52.0 dB	554 W	1090.33
S	56 bit DF-11	52.0 dB	570 W	1090.31
IFF MODE 4	CODE A	52.0 dB	558 W	1090.31
IFF MODE 2	0000	52.0 dB	558 W	1090.32
IFF MODE 1	00	52.0 dB	558 W	1090.31

6.2 Bottom Antenna measurements

TDR Mode	Reply Code	Path Loss	Actual Power	Freq
C	0000	52.0 dB	538 W	1090.36
A	7777	52.0 dB	538 W	1090.35
S	56 bit DF-11	52.0	538 W	1090.31
IFF MODE 4	CODE A	52.0	538 W	1090.37
IFF MODE 2	0000	52.0	538 W	1090.36
IFF MODE 1	00	52.0	538 W	1090.36

TEST PERFORMED BY: Royal D. Simmons DATE: 9/3/99

TEST NO: 2
Page NO: 1 OF 3

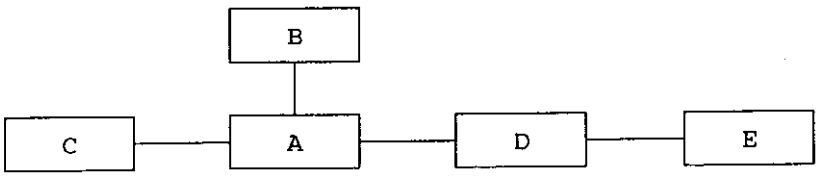
1.0 DESCRIPTION OF TEST: Modulation Characteristics

2.0 SPECIFICATIONS: 47 CFR 2.987d
47 CFR 87.141c

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL INST.	501TC	AV 52189
C	Personal Computer	DELL	OPTIPLEX	
D	Attenuator	Narda	757C	32114
E	Peak Power Analyzer	HP	8990A	D400012
F				
G				
H				
I				
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



5.0 PROCEDURE:

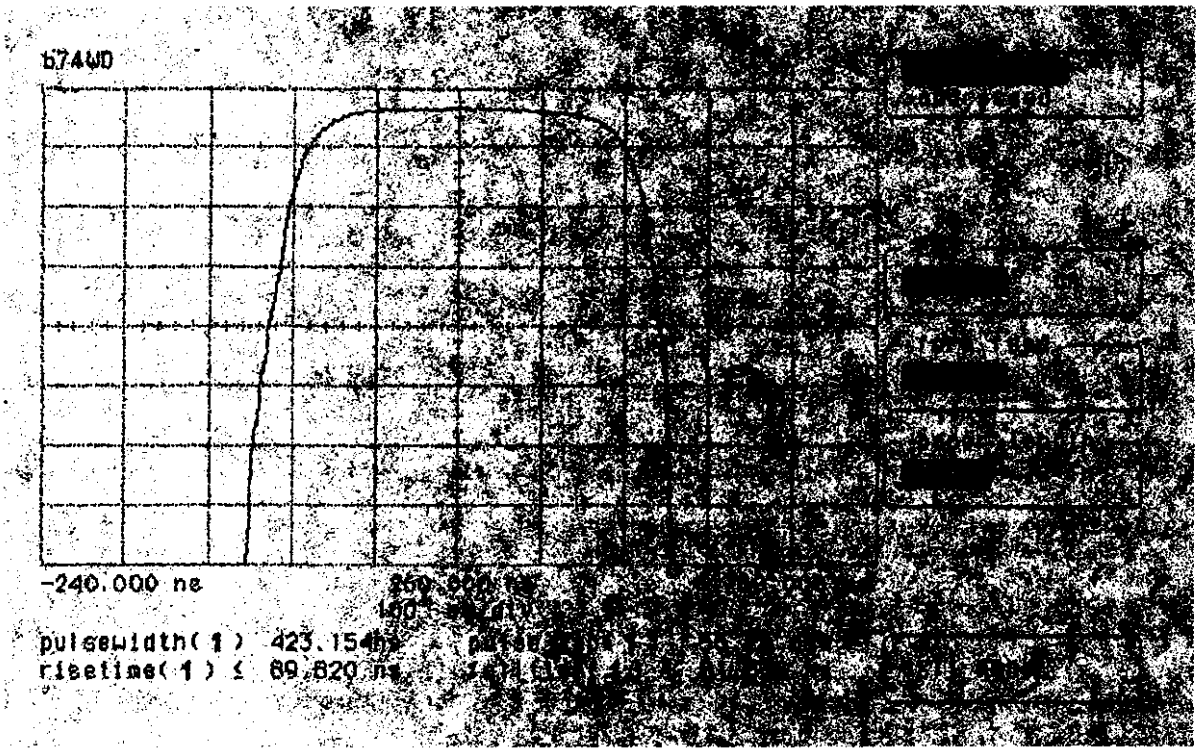
1. Connect the equipment as shown in the block diagram in Section 4.0 of this document.
2. Interrogate the Transponder at a 500 Hz rate and set the reply code to 7777.
3. Record the output pulse characteristics using the Peak Power Analyzer.

6.0 DATA

Pulse Characteristic	Measurement	Specification
Rise Time	91 nS	≤ 100 nS
Fall Time	77 nS	≤ 200 nS
Pulse Width	419 nS	450 ± 100 nS
Pulse Jitter	50 nS	≤ 100 nS

TEST NO: 2
Page NO: 3 OF 3

6.0 DATA (Cont.)



TEST PERFORMED BY: Royal D. Simmons DATE: 9/3/99

TEST NO: 3
Page NO: 1 OF 4

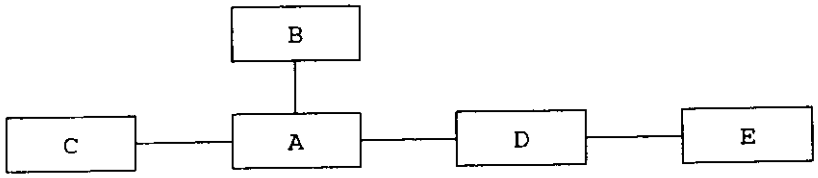
1.0 DESCRIPTION OF TEST: Occupied Bandwidth and In Close Spurrious

2.0 SPECIFICATIONS: 47 CFR 2.989
47 CFR 87.135
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL INST.	501TC	AV 52189
C	Personl Computer	DELL	OPTIPLEX	
D	Attenuator	Narda	757C	32114
E	Spectrum Analyzer	HP	8566B	19065
F				
G				
H				
I				
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



5.0 PROCEDURE:

1. Connect the equipment as shown in the block diagram in Section 4.0 of this document.
2. Insert sufficient attenuation as required for maximum dynamic range.
3. Use 300 kHz IF bandwidth on the Spectrum Analyzer and record spectrum level, for 1 MHz intervals from -25 MHz to +25 MHz.
4. Calculate the spectral energy density using the BASIC program listed below.

6.0 DATA:

```
DATA -9.66,-3.19,-18.13,-12.5,-19.42,-16.09,-24.23,-19.2,-19.69,
DATA -21.55,-33.19,-25.85,-27.08,-29.62,-35.49,-29.16,-34.23,
DATA -34.33,-35.52,-29.16,-42.14,-36.9,-35.82,-36.43,-39.65,-40.83,
DATA -35.97,-38.1,-38.21,-38.51,-38.28,-42.0,-38.37,-51.82,-39.91,
DATA -44.66,-40.59,-53.26,-41.06,-45.68,-44.77,-50.74,-43.33,
DATA -46.16,-45.14,-51.29,-49.02,-48.1,-50.81,-49.44

OPEN "OBW" FOR OUTPUT AS #1
110 DIM X(50)
120 DIM Y(50)
140 INPUT "ENTER CARRIER LEVEL"; X(0)
150 INPUT "ENTER NUMBER OF FREQ INCREMENTS"; K
160 A = 1                              'INITIALIZE SUM TO CARRIER LEVEL
170 FOR I = 1 TO 2 * K - 1 STEP 2
180 READ X(I), X(I + 1)                'INPUT POWER LEVELS
190 X(I) = X(0) + X(I)                 'CONVERT X(I) TO DBC
200 X(I + 1) = X(0) + X(I + 1)         'CONVERT X(I) TO DBC
210 Y(I) = 10 ^ (X(I) / 10)            'CONVERT X(I) TO LINEAR
220 Y(I + 1) = 10 ^ (X(I + 1) / 10)    'CONVERT X(I) TO LINEAR
230 A = A + Y(I) + Y(I + 1)            'SUM UP TOTAL POWER
240 NEXT I
250 INC = 1
260 PRINT #1, "FREQ OFFSET (MHZ)     LEVEL (DBC)    FREQ OFFSET (MHZ)     LEVEL
(DBC)"
270 FOR I = 1 TO K
280 J = I * INC
290 PRINT #1, USING "     +##.#             +##.#       "; -J; X(2 * I - 1); J;
X(2 * I)
300 NEXT I
310 PRINT #1,
320 PRINT #1, "PERCENT TOTAL ENERGY       OCCUPIED BANDWIDTH  (MHZ)"
330 B = 1
340 PRINT #1, USING "      +###.#                    +##.#   "; B / A * 100; INC
350 FOR I = 1 TO K
360 B = B + Y(2 * I - 1) + Y(2 * I)
370 PRINT #1, USING "      +###.#                    +##.#   "; B / A * 100; (2
* I + 1) * INC
380 NEXT I
390 END
```

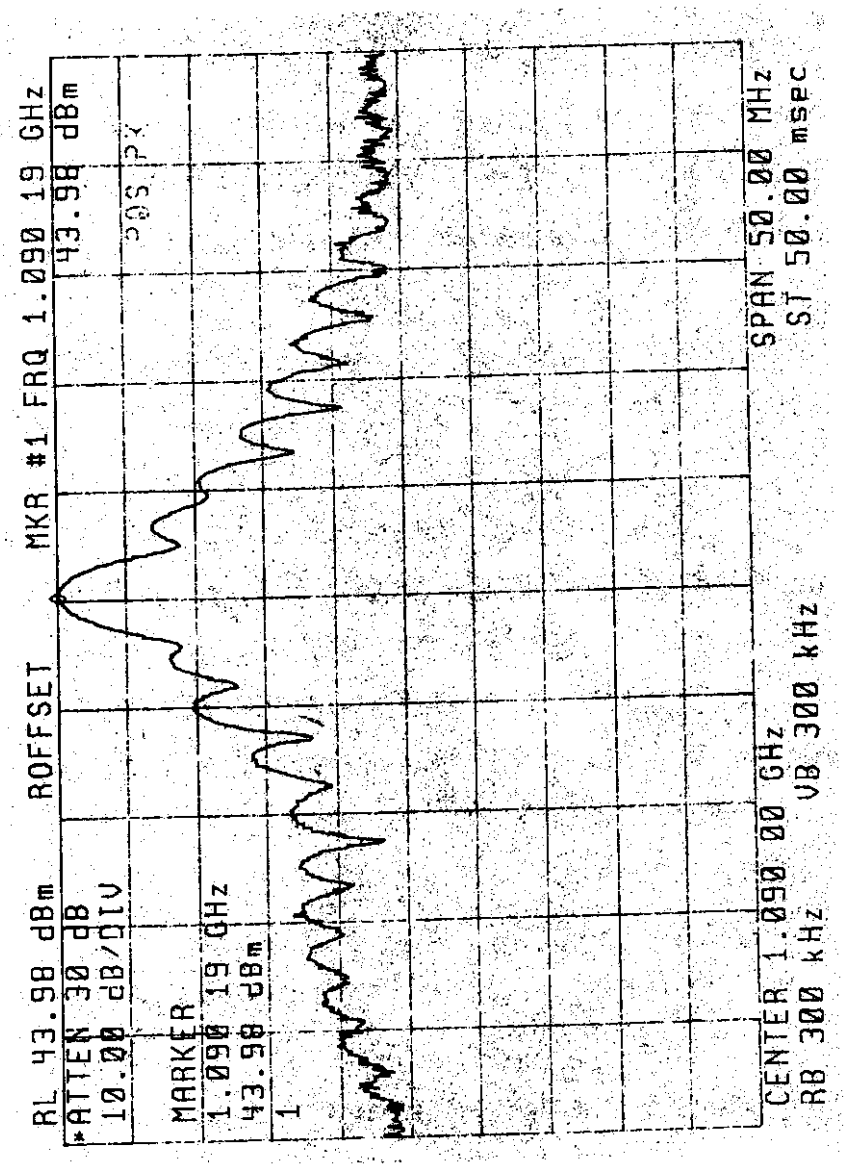
6.0 DATA (Cont.)

FREQ OFFSET (MHZ)	LEVEL (DBC)	FREQ OFFSET (MHZ)	LEVEL (DBC)
-1.0	-9.66	+1.0	-3.19
-2.0	-18.13	+2	-12.5
-3.0	-19.42	+3.0	-16.09
-4.0	-24.23	+4.0	-19.2
-5.0	-19.69	+5.0	-21.55
-6.0	-33.19	+6.0	-25.85
-7.0	-27.08	+7.0	-29.62
-8.0	-35.49	+8.0	-29.16
-9.0	-34.23	+9.0	-34.33
-10.0	-35.52	+10.0	-29.16
-11.0	-42.14	+11.0	-36.9
-12.0	-35.82	+12.0	-36.43
-13.0	-39.65	+13.0	-40.83
-14.0	-35.97	+14.0	-38.1
-15.0	-38.21	+15.0	-38.51
-16.0	-38.28	+16.0	-42.0
-17.0	-38.37	+17.0	-51.82
-18.0	-39.91	+18.0	-44.66
-19.0	-40.59	+19.0	-53.26
-20.0	-41.06	+20.0	-45.68
-21.0	-44.77	+21.0	-50.74
-22.0	-43.33	+22.0	-46.16
-23.0	-45.14	+23.0	-51.29
-24.0	-49.02	+24.0	-48.1
-25.0	-50.81	+25.0	-49.44

PERCENT TOTAL ENERGY	OCCUPIED BANDWIDTH (MHZ)
+57.4	+1.0
+91.2	+3.0
+95.3	+5.0
+97.4	+7.0
+98.3	+9.0
+99.3	+11.0
+99.5	+13.0
+99.6	+15.0
+99.7	+17.0
+99.8	+19.0
+99.9	+21.0
+99.9	+23.0
+99.9	+25.0
+99.9	+27.0
+99.9	+29.0
+99.9	+31.0
+100.0	+33.0
+100.0	+35.0
+100.0	+37.0
+100.0	+39.0
+100.0	+41.0
+100.0	+43.0
+100.0	+45.0
+100.0	+47.0
+100.0	+49.0
+100.0	+51.0

TEST NO: 3
Page NO: 4 OF 4

6.0 DATA (Cont.)



TEST PERFORMED BY: Royal D. Summers DATE: 9/3/99

TEST NO: 4A
PAGE NO: 1 OF 3

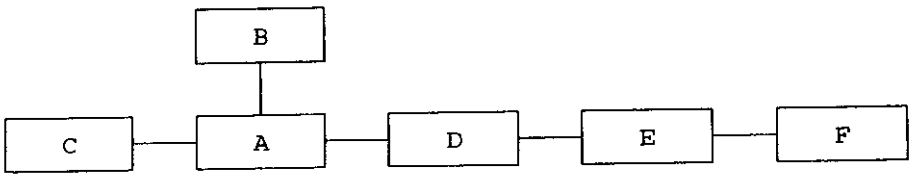
1.0 DESCRIPTION OF TEST: Spurious Emissions (Conducted)
0 - 700 MHz

2.0 SPECIFICATIONS: 47 CFR 2.991
47 CFR 2.993
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL INST	501TC	AV 52189
C	Personal Computer	DELL	OPTIPLEX	
D	Attenuator (10dB)	Arra	4410-10	978
E	Low Pass Filter	MicroLab/FXR	LA-07T	None
F	Spectrum Analyzer	HP	8566B	19065
H				
I				
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



5.0 PROCEDURE

1. Connect equipment as shown.

2. Adjust spectrum analyzer so that no signal exceeds the analyzer's dynamic range.

3. Measure and record all spurious emissions below 700 MHz (corrected for pad/filter/cable losses).

Mean Transmitter Power Calculation:

P_o = 550 Watts
$P_y = P_o * T_w * N * R$
P_y = (550 W)(0.45 µS)(15)(1100 Hz) = 4.08 Watts

Where:
P_y = Mean output power (Watts)
P_o = Peak output power (Watts)
T_w = Pulse width (Seconds)
N = Number of pulses
R = Reply rate (Hz)

Therefore:

$$\text{Limit} = 43 + 10\log_{10}(P_y)$$
$$= 43 + 10\log_{10}(4.08\ W)$$
$$= 43 + 6.1$$
$$= 49.1\text{dB}$$

Spurious outputs must be attenuated at least 49.1dB.

TEST NO: 4A
PAGE NO: 3 OF 3

Peak Spurious Output Power Calculation:

$P_o(dBm) = 10\log_{10}(P_o\ W * 1000\ mW/W)$
$= 10\log_{10}(550\ W * 1000\ mW/W)$
$= 57.4dBm$

$P_s = P_o(dBm) - Limit(dBm)$
$= 57.4dBm - 49.1dBm$
$= 8.3dBm$

Where:

P_s = Peak Spurious Output Power

Therefore:
The peak output power of any spurious outputs must be lower than 8.3 dBm

6.0 DATA:

Frequency	Top Antenna Spurious Output Level (Corrected for Pad etc)	Bottom Antenna Spurious Output Level (Corrected for Pad etc)	Spurious Output Limit
52.5 MHz	-43.62 dBm	-45.15 dBm	+8.3 dBm
135.6 MHz	-69.2 dBm	-79 dBm	+8.3 dBm

TEST PERFORMED BY: Royal D. Simmons DATE: 9/3/99

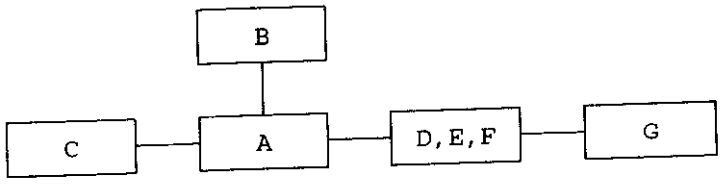
1.0 DESCRIPTION OF TEST: Spurious Emissions (Conducted)
700 MHz - 2000 MHz

2.0 SPECIFICATIONS: 47 CFR 2.991
47 CFR 2.993
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL INST	501TC	AV52189
C	Personal Computer	DELL	OPTIPLEX	
D	Attenuator (20dB)	Tenuline	8340-200	1149
E	Attenuator (20dB)	Tenuline	8340-200	1155
F	Attenuator (20dB)	Narda	757C	32114
G	Spectrum Analyzer	HP	8566B	AV58397
H	Plotter	HP	7475A	AV58285
I				
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



5.0 PROCEDURE

1. Connect equipment as shown.
2. Adjust spectrum analyzer so that no signal exceeds the analyzer's dynamic range.
3. Measure and record all spurious emissions between 700 MHz and 2000 MHz (corrected for pads and cable losses).

6.0 DATA:

Frequency	Top Antenna Spurious Output Level (Corrected for Pad etc)	Bottom Antenna Spurious Output Level (Corrected for Pad etc)	Spurious Output Limit
1090 MHz *	-80.5 dBm	-85 dBm	+8.3 dBm

* Transmitter in standby to measure Local Oscillator leakage.

TEST PERFORMED BY: Royal D. Summers DATE: 9/3/99

TEST NO: 4C
PAGE NO: 1 OF 3

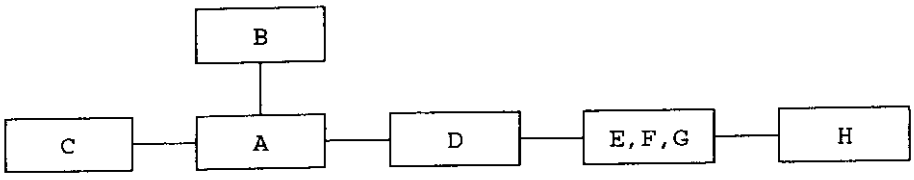
1.0 DESCRIPTION OF TEST: Spurious Emissions (Conducted)
2000 MHz - 11500 MHz

2.0 SPECIFICATIONS: 47 CFR 2.991
47 CFR 2.993
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL INST.	501TC	AV52189
C	Personal Computer	DELL	OPTIPLEX	
D	Attenuator (10dB)	Narda	3042B-10	07022
E	Hi Pass Filter(2GHz)	Microlab/FXR	HD-20N	None
F	Hi Pass Filter(4GHz)	Microlab/FXR	HD-40N	None
G	Hi Pass Filter(6GHz)	Microlab/FXR	HD-60N	None
H	Spectrum Analyzer	HP	8566B	19065
I	Plotter	HP	7475A	AV58285
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



5.0 PROCEDURE

1. Connect equipment as shown.
2. Adjust spectrum analyzer so that no signal exceeds the analyzer's dynamic range. Resolution bandwidth should be set to 3 MHz.
3. Measure and record all spurious emissions between 2 GHz and 4 GHz using the 2 GHz High Pass filter.
4. Measure and record all spurious emissions between 4 GHz and 8 GHz using the 4 GHz High Pass filter.
5. Measure and record all spurious emissions between 8 GHz and 14 GHz using the 6 GHz High Pass filter.
6. Measure and record Pad/Filter/Cable losses for all spurious emissions.

6.0 CALIBRATION DATA:

Frequency	Applicable Filter Type	Calibration Factor (Pad/Filter/Cable)
2180 MHz	2000 MHz	12.0 dB
3270 MHz	2000 MHz	12.0 dB
4360 MHz	4000 MHz	12.4 dB
5450 MHz	4000 MHz	12.5 dB
6540 MHz	4000 MHz	12.9 dB
7630 MHz	4000 MHz	12.9 dB
8720 MHz	6000 MHz	13.3 dB
9810 MHz	6000 MHz	13.7 dB
10900 MHz	6000 MHz	12.8 dB
11990 MHz	6000 MHz	15.8 dB
13080 MHz	6000 MHz	14.1 dB

6.0 MEASUREMENT DATA (Cont.)

Frequency	Top Antenna Spurious Output Level (Corrected for Pad etc)	Bottom Antenna Spurious Output Level (Corrected for Pad etc)	Spurious Output Limit
2180 MHz	Not Observed	Not Observed	+8.3 dBm
3270 MHz	-61.0 dBm	-60.0 dBm	+8.3 dBm
4360 MHz	Not Observed	Not Observed	+8.3 dBm
5450 MHz	Not Observed	Not Observed	+8.3 dBm
6540 MHz	Not Observed	Not Observed	+8.3 dBm
7630 MHz	Not Observed	Not Observed	+8.3 dBm
8720 MHz	Not Observed	Not Observed	+8.3 dBm
9810 MHz	Not Observed	Not Observed	+8.3 dBm
10900 MHz	Not Observed	Not Observed	+8.3 dBm
11990 MHz	Not Observed	Not Observed	+8.3 dBm
13080 MHz	Not Observed	Not Observed	+8.3 dBm

TEST PERFORMED BY: Royald A. Simmons DATE: 9/3/99

TEST NO: 5
PAGE NO: 1 OF 3

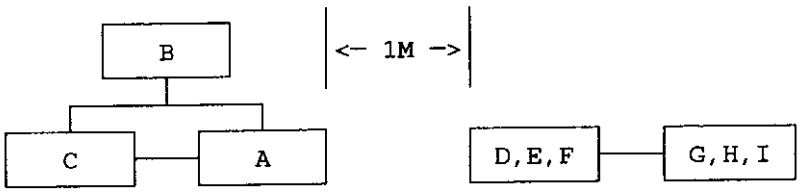
1.0 DESCRIPTION OF TEST: Spurious Emissions (Radiated)

2.0 SPECIFICATIONS: 47 CFR 2.991
47 CFR 2.993
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950	E3
B	Power Supply	Kepco	ATE36-30M	63529
C	Personal Computer	DELL	OPTIPLEX	
D	Amplified Rod to 30MHz	Ailtech	94607-1	302
E	Ant. Horn 2-3.6 GHz	Ailtech	91889-2	E2430-103
F	Ant. Horn 3.6 - 7.5 GHz	Ailtech	94613-1	AV00842
G	Amt/ Cone 200MHz - 1 GHz	Ailtech	93490-1	0815
H	Field Int Meter 9-32 MHz	Carnel Lab	NM-17/27B	91-0117R
I	Field Int Meter 20MHz-1GHz	Carnel Lab	NM-37/57B	91-0770R
J	Field Int Meter 1-18GHz	Carnel Lab	NM-67B	91-0115R
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



5.0 PROCEDURE:

1. Connect equipment as shown in an open area.
2. Measure and record all spurious emissions using the appropriate antenna at a distance of 3 meters.*
3. Calculate field strength using the recorded power measurement, antenna factor, and cable losses for each frequency.

6.0 DATA:

Transmitter field strength calculation:
(The transmitter field strength is calculated rather than measured for safety reasons)

$$p_{3m} = \frac{P_o G_t}{4\pi r^2} = \frac{(550)\ (1.66)}{4\pi (3)^2} = 8.07 \qquad \frac{Watts}{meter^2}$$

$$e_{3m} = \sqrt{p_3 z_o} = \sqrt{(8.07)\ (377)} = 55.2 \qquad \frac{Volts}{meter}$$

$$e_{3m} = 20\ \log_{10}\left[e_3 \frac{V}{m}\ 10^6\right] = 20\ \log_{10}\left[(47.0)(10^6)\right] = 153.4 \qquad \frac{dB\mu V}{meter}$$

Where:

e_{3m} = Field strength a 3 meters
G_t = Transmitter Antenna Gain = 2.2 dB for monopole over ground plane = 1.66 multiplication factor.
P_o = Peak Output Power = 550 Watts for this unit
p_{3m} = Power density at 3 meters
z_o = Characteristic impedance of free space = 377 Ohms

In the previous section, we determined that spurious outputs must be attenuated by at least 49.1 dB.

Therefore the field strength of transmitted spurious shall be 154.8dBμV - 49.1dB = 105.7dBμV

*Note: Tests were performed with antenna to unit spacing of 1 Meter per RTCA DO-160 D.

TEST NO 5
PAGE NO: 3 OF 3

6.0 DATA (Cont.)

Frequency (MHz)	Level (dBµV/m)	Limit dBµV/m
28	27	105.7
32	26	105.7
144	30	105.7
160	33	105.7
220	36	105.7
280	28	105.7
320	26	105.7
350	26	105.7
520	35	105.7
550	36	105.7
1090 (1)	97	NONE
2180 (1)	76	105.7
3270 (1)	75	105.7

(1) Transmitter Transmitting into dummy load

TEST PERFORMED BY: Ronald D Summers DATE: 9/3/99

TEST NO 6
PAGE NO: 1 OF 2

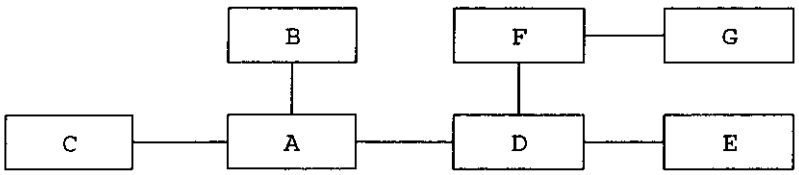
1.0 DESCRIPTION OF TEST: Frequency Stability (Temperature Variation)

2.0 SPECIFICATIONS: 47 CFR 2.995a
47 CFR 87.133

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	Kepco	ATE36-30M	63529
C	Personal Computer	DELL	OPTIPLEX	
D				
E	RF Generator	IFR	1400/1404	D400485
F	Attenuator (30 dB)	Narda	757C	NONE
G	Frequency Counter	IFR	1400A/1404	D400485
J				
K				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



TEST NO 6
PAGE NO: 2 OF 2

5.0 PROCEDURE:

1. Connect the equipment as shown in the block diagram in section 4.0 of this document.
2. Set the temperature chamber to -20°C and allow the transmitter (non-operating) temperature to stabilize.
3. Record the transmission frequency for both the top and bottom antennas.
4. Repeat steps 2 and 3 at -10°C, 0°C, +10°C, +20°C, +30°C, and +40°C, and +50°C.

6.0 DATA

Temperature	Measured Frequency (Top Ant)	Measured Frequency (Bot Ant)	Frequency Limit
-20°C	1090.31 MHz	1090.37 MHz	1090 ± 1 MHz
-10°C	1090.31 MHz	1090.37 MHz	1090 ± 1 MHz
0°C	1090.36 MHz	1090.30 MHz	1090 ± 1 MHz
+10°C	1090.32 MHz	1090.36 MHz	1090 ± 1 MHz
+20°C	1090.32 MHz	1090.37 MHz	1090 ± 1 MHz
+30°C	1090.32 MHz	1090.37 MHz	1090 ± 1 MHz
+40°C	1090.33 MHz	1090.36 MHz	1090 ± 1 MHz
+50°C	1090.33 MHz	1090.36 MHz	1090 ± 1 MHz

TEST PERFORMED BY: Ronald O. Simmons DATE: 9/3/99

TEST NO 7
PAGE NO: 1 OF 2

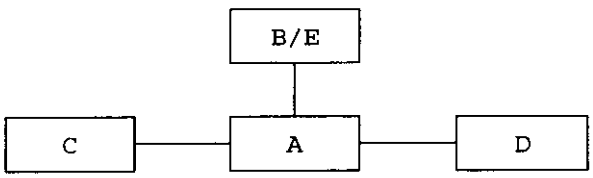
1.0 DESCRIPTION OF TEST: Frequency Stability (Primary Power Variation)

2.0 SPECIFICATIONS: 47 CFR 2.995d
47 CFR 87.133

3.0 EQUIPMENT REQUIRED:

	TYPE	MANUFACTURER	MODEL	SER. NO
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply (115VAC)	CAL INST	1501TPM	L38383
C	Personal Computer	DELL	433/MX	O2255A
D	RF Generator	IFR	1400/1404	D400485
E	Power Supply (28VDC)	Sorenson	QRD40-2	AV4074
F				
G				
I				
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



5.0 PROCEDURE:

1. Connect the equipment as shown in the block diagram in section 4.0 of this document.
2. For the 115VAC unit, vary the power supply voltage from -15% to + 15% of the nominal 115 VAC and record the transmitted frequency.
3. For the 28VDC unit, vary the power supply voltage from -15% to +15% of the nominal 27.5 VDC and record the transmitted frequency

6.0 DATA

115 VAC				
Power Supply Voltage (Vrms)	Power Supply Frequency (HZ)	Measured Frequency Top Antenna (MHZ)	Measured Frequency Bottom Antenna (MHZ)	Frequency Limit (MHZ)
97.75	392	1090.32	1090.37	1090 ± 1
	408	1090.32	1090.37	1090 ± 1
115	392	1090.32	1090.37	1090 ± 1
	408	1090.32	1090.37	1090 ± 1
132.25	392	1090.32	1090.37	1090 ± 1
	408	1090.32	1090.37	1090 ± 1

TEST PERFORMED BY: Ray A Lemmon DATE: 9/3/99

ENGINEERING SPECIFICATION	SECURITY NOTATION	SPEC NO. IT7517800	M REV LTR
		CAGE CODE 55939	

TYPE	CLASS	INITIAL RELEASE DATE
IT	A	29 SEP 95

DIVISION	DEPARTMENT NO.	PRODUCT LINE NO.	CONTRACT NO.
BCAS	5810	3839	

TITLE

INTEGRATED TEST SPECIFICATION FOR
THE XS-950 MODE S DATA LINK TRANSPONDER

PREPARED BY	DATE	APVD BY TECHNICAL MANAGER	DATE	APVD BY TECHNICAL MANAGER	DATE
J.Troxel	9/28/95	R. Fuller	9/28/95		

APVD FOR SCM	DATE	APVD FOR SQA	DATE	APVD FOR	DATE

REF AWAEB/PSAEB NO.	CHECKER	PRODUCT DESIGN CHECKER (FOR REF, SPCL CONT PER EPM I-A-40)	COGNIZANCE OF QE SUPVR (FOR REF, SPCL CONT PER EPM I-A-40)
EB7517801			

FOR PAGE INDEX, SEE CR-2. REVISION RECORD FOLLOWS PAGE INDEX

Honeywell	COPY NO.	SECURITY NOTATION	AW/PS CRITICAL NOTATION	CR-1 TITLE PAGE

ENGINEERING SPECIFICATION PAGE INDEX	SECURITY NOTATION	SPEC NO. IT7517800	M
		CAGE CODE 55939	REV LTR

SEE FIRST PAGE FOR PROPRIETARY OR DATA RIGHTS NOTATIONS

TOTAL PAGES: 124

ENGINEERING SPECIFICATION REVISION RECORD	SECURITY NOTATION	SPEC NO. IT7517800	K REV LTR
		CAGE CODE 55939	

SEE FIRST PAGE FOR PROPRIETARY OR DATA RIGHTS NOTATIONS

REV LTR	PAGE	DESCRIPTION	DATE AND APPROVAL
A	SEE PAGE INDEX SHEET CR-2	C.O. 68772 (MAKE)	1 Nov 95
B	SEE PAGE INDEX SHEET CR-2	C.O. 68773 (MAKE)	18 Jan 96
C	SEE PAGE INDEX SHEET CR-2	C.O. 95464 (MAKE)	9 Aug 96
D	SEE PAGE INDEX SHEET CR-2	C.O. 94595 (NA)	13 Nov 96
E	SEE PAGE INDEX SHEET CR-2	C.O. 95469 (MAKE)	13 Nov 96
F	SEE PAGE INDEX SHEET CR-2	C.O. 96015 (NA)	24 Mar 97
G	SEE PAGE INDEX SHEET CR-2	C.O. 95925 (MAKE)	24 Mar 97
H	SEE PAGE INDEX SHEET CR-2	C.O. 98669 (MAKE)	13 Jan 98
J	SEE PAGE INDEX SHEET CR-2	C.O. 98671 (MAKE)	13 Jan 98
K	SEE PAGE INDEX SHEET CR-2	C.O. 102079 (BREAK IN*)	19 Feb 99

ENGINEERING SPECIFICATION REVISION RECORD	SECURITY NOTATION	SPEC NO. IT7517800	M REV LTR
		CAGE CODE 55939	

SEE FIRST PAGE FOR PROPRIETARY OR DATA RIGHTS NOTATIONS

REV LTR	PAGE	DESCRIPTION	DATE AND APPROVAL
L	SEE PAGE INDEX SHEET CR-2	C.O. 97456 (BREAK IN*)	Ken Reeves 19 Feb 99
M	SEE PAGE INDEX SHEET CR-2	C.O.103706 (NA)	Ken Reeves 6 May 99

TITLE: INTEGRATED TEST SPECIFICATION FOR THE XS-950 TRANSPONDER
PART NO. 7517800

1.0 SCOPE

This Integrated Test Specification establishes the manufacturing and operational requirements that the Transponder (7517800) must meet to ensure that the equipment is in proper operation condition. This specification contains the test procedure and calls out all the necessary tests to insure compliance with Appendix F Part 43 of the Federal Air Regulations.

This test specification covers the following Transponder part numbers:

Honeywell P/N	Model Number/Description
7517800-10xxx thru 54xxx	XS-950 Mode S Data Link Transponder with 115VAC power supply.
7517800-55xxx thru 99xxx	XS-950 Mode S Data Link Transponder with 28VDC power supply.

2.0 REFERENCE DOCUMENTS

Reference documents are not required for performance of the test procedures. The purpose of these documents is to provide an aid for fault isolation should any discrepancies occur during the tests.

7517800	Mode S Data Link Transponder Assembly
7517820-90X	A1 Interconnect CCA
7517826-90X	A2 Processor CCA
7517835-90X	A3 Transmitter/Receiver CCA
7517830-90X	A4 Power Supply/Modulator CCA
7517802	Mode S Data Link Transponder Wiring Diagram
7517840	W1 XS-950 ARINC 615 Harness Assembly
EB7021584	XS-950 Transponder System Requirments Document
K EB7517804	Configuration Listing of Product Test Software

3.0 GENERAL INFORMATION

3.1 All tests shall be performed at a temperature of 25 ± 10 °C with less than 90 percent relative humidity and at a atmospheric pressure of 20 to 32 inches of mercury.

3.2 No warm-up period is required for the module.

3.3 To limit interference and power loss, it is recommended that transponder antenna cables be made of RG-214, or equivalent, 2 to 3 feet in length.

3.4 The transponder power output is specified at the antenna port. All power readings shall be corrected for antenna cable losses and variations in power meter specifications.

3.5 Where two antenna cables are required for testing diversity antenna operations, the two antenna cables shall be matched so that the cable loss between the two cables is within 0.2dB, and the propagation delay at 1090 MHz is within 10nsec.

4.0 POWER AND SIGNAL REQUIREMENTS

4.1 Power Required

115 Vac, 400 ± 10Hz / 200W minumum. Voltage variable from 90 to 140 Vac.
28 Vdc / 200W minimum. Voltage variable from 16 to 35 Vdc.

4.1 Signals

All required signals are generated by the test equipment specified in this document.

5.0 TEST EQUIPMENT

5.1 Honeywell Test Equipment

M T336167 Manual Test Station
or
4067839-901 Mode S Manual Test Station (MTS) Interface Panel.
T336093-901 Mode S MTS Adaptor Panel
T336094-901 XS-950 MTS Tray Assembly
T336097-901 XS-950 DLP Test CCA
T336098-901 XS-950 DLP Test Harness
F MT7517800 XS-950 Manufacturing Test Software

5.2 Commercial Test Equipment

Personal Computer, IBM compatable, (80386 microprocessor) or better with the following minimum configuration:

- 8 MB of RAM
- VGA color monitor
- Math co-processor
- One serial port
- 20MHz clock speed
- K Procomm Plus for Windows, Version 2.0 or later

DVM, FLUKE 8840 or equivalent.

Oscilloscope, Tektronix 2465A or equivalent.

NOTE: A Tektronix 2430A digital storage oscilloscope or equivalent is recommended for testing.

Transponder Test Set, IFR ATC-1400A

Mode S Auxiliary Unit, IFR Mode S-1403

Current meter, or DVM with current capability

ARINC 429 Test Set, JC AIR 429E or equivalent

K 4.99K, 0.5% ¼ W resistor (Honeywell Part Number 2500169-459)

L Power Supply, HP6205B or equivalent

5.3 OPTIONAL Test Equipment For Troubleshooting and Repair

T336096-901 XS-950 Boot Test Assembly
Fluke 9100 with 9132FT-90960CA Pod.

6.0 TEST EQUIPMENT SETUP BLOCK DIAGRAM

Figure 1

7.0 TEST EQUIPMENT SETUP

7.1 TEST SETUP #1

The following equipment settings define TEST SETUP #1:

Table #7-1 MTS Interface Panel and Adaptor Default Switch Positions
Table #7-4 MTS Connections for Synchro Input Testing
Table #7-5 MTS Connections for ARINC 429 Receiver Input Testing
Table #7-6 Default Settings for ATC 1400A and S1403 Test Sets
Table #7-7 Default Settings for JC-AIR 429 Test Set
Table #7-8 Default PC Settings (PROCOMM)

7.2 Table #7-1 - MTS Interface Panel and MTS Adaptor Panel Default Switch Positions

For each panel, an "U" specifies switch is up, "D" specifies switch is down.

MTS Interface Panel Switch Settings

MODE S ADDR (1 to 24):	UDUD UDUD UDUD UDUD UDUD UDUD
ANT PGM:	U
ANT CABLE DELAY:	DUD
GILHAM ALT 1 & 2 (A1 A2 A4 B1 B2 B4 C1 C2 C4 D2 D4):	DUD UDU UDU DU
ANT BITE:	U
FUNC TEST:	U
STBY/ON:	U
SYNC ALT FLAG (1,2)	UD
ALT COMP:	D
ALT SRC:	D
ALT TYPE SEL:	UD
MAX AIRSPEED (15, 16, 17):	UDU
SDI (B, A):	UD
DATA LINK:	U
CNTL PNL:	D
AIR/GND (1, 2):	UD
26VAC POL:	(+) U

MTS Adaptor Panel Switch Settings

DISCRETE IN (1 to 4):	UDUD
ADL LINK A:	D
PDL LINK A:	D
PDL FUNC DISC (1 to 4):	UDUD
XPDR OFF(NO):	D

7.3 Table #7-2 - MTS Interface Panel and MTS Adaptor Panel Complement Switch Positions

For each panel, an "U" specifies switch is up, "D" specifies switch is down.

MTS Interface Panel Switch Settings

MODE S ADDR (1 to 24):	DUDU DUDU DUDU DUDU DUDU DUDU
ANT PGM:	D
ANT CABLE DELAY:	UDU
GILHAM ALT 1 & 2 (A1 A2 A4 B1 B2 B4 C1 C2 C4 D2 D4):	UDU DUD DUD UD
ANT BITE:	D
FUNC TEST:	D
STBY/ON:	D
SYNC ALT FLAG (1,2)	DU
ALT COMP:	U
ALT SRC:	U
ALT TYPE SEL:	DU
MAX AIRSPEED (15, 16, 17):	DUD
SDI (B, A):	DU
DATA LINK:	D
CNTL PNL:	U
AIR/GND (1, 2):	DU
26VAC POL:	(+) U

MTS Adaptor Panel Switch Settings

DISCRETE IN (1 to 4):	DUDU
ADL LINK A:	U
PDL LINK A:	U
PDL FUNC DISC (1 to 4):	DUDU
XPDR OFF(NO):	D

7.4 Table #7-3 - MTS Interface Panel and MTS Adaptor Panel Switch Positions for Software Programming

For each panel, an "U" specifies switch is up, "D" specifies switch is down.

Use the switch settings in Table #1 with the following exceptions:

MTS Interface Panel Switch Settings

FUNC TEST:	D
SYNC ALT FLAG (1,2)	UU
ALT TYPE SEL:	UD
AIR/GND (1, 2):	DD
26VAC POL:	(-) D

MTS Adaptor Panel Switch Settings

DISCRETE IN (1 to 4):	DDDD
ADL LINK A:	D
PDL LINK A:	U

7.5 Table #7-4 - MTS Connections for Synchro Input Testing

Connect the folowing signals on the MTS Interface Panel using test jumper cables:

26VAC REF H to SYNC ALT 1/2 RH.
26VAC REF C to SYNC ALT 1/2 RC.
TEST VAC H to SYNC ALT 1/2 FX, FY, CX and CY.
TEST VAC C to SYNC ALT 1/2 FZ and CZ.

Adjust the amplitude of the TEST VAC signal to 9V RMS.

7.6 Table #7-5 - MTS Connections for ARINC 429 Receiver Input Testing

Connect the output of the ARINC 429 test set (A and B as appropriate) to the following signals on the MTS Panels using test jumper cables:

MTS Interface Panel:

DATA LINK IN A/B	(J1A-2A/2B)
TX COORD A/B	(J1A-5E/5F)
MAINT DATA IN A/B	(J1B-6A/6B)
575 ADC 1 A/B	(J1A-6H/6J)
575 ADC 2 A/B	(J1B-5C/5D)
429 ADC 1 A/B	(J1A-7H/7J)
429 ADC 2 A/B	(J1B-5A/5B)
CNTL DATA A A/B	(J1A-7A/7B)
CNTL DATA B A/B	(J1A-7E/7F)
FLT ID A/B	(J1A-6A/6B)

MTS Adaptor Panel:

COM C/D IN A/B	(J1A-2C/2D)
ADL IN A/B	(J1A-6C/6D)
ADS IN A/B	(J1B-6J/7K)
MODE S ADDR IN A/B	(J1A-3F/3G)
PDL IN A/B	(W1J1-1/2)

7.7 Table #7-6 - Default Settings for ATC 1400A and S1403 Test Sets

ATC 1400A Test Set

FREQ/FUNCT:	1030 Mnz, XPDR
DELTA F:	0.00, OFF
PRF/SQTR:	100, ON
INTF PULSE:	000.0 OFF
DISPLAY SELECT:	XPDR CODE
DME REPLY EFF:	100
XPDR MODE:	A
RF LEVEL:	-73, CW/NORM/OFF: NORM
TACAN:	OFF
IDENT:	OFF
F2/P2-F1/P1:	F1/P1
TO/TAC/TD:	TO
XDPR P2/P3 DEV:	0.00
P2:	CAL
P3:	CAL
DME P2 DEV:	0.0
P2:	CAL
XPDR PULSEWIDTH:	0.00, CAL
SLS/ECHO:	-0, OFF
CAL MARKS:	1.45 Us
CAL ϕ:	FULL CW
INTRF PULSE WIDTH:	FULL CCW
SUPPRESSOR:	OFF
VAR:	Set for +18V pulse amplitude.
RANGE/VEL/ACCEL:	00000, IN/OUT: OUT, NORM/-1NMI: -1NMI

S1403 Test Set

```
SMENU: (1) : FMT D, UF#16, RL=1, CL=0, AQ=0, MU=0..0, ADD=00000001
SMENU: (2) : FMT L, UF#16, Data=2525252525252525252525252525, ADD=52525252
SMENU: (3) : FMT L, UF#23, Data=12525252525252525252525252525252, ADD=25252525
SMENU: (1) ON
SMENU: (2) through (16), OFF

CMENU: (1)
: Func: (2) SEQ (Mode S Only)
: RFLvl: +CABLE LOSS (dB)
: P6: CAL, Wd= CAL, Dv= CAL
: P2: CAL
: AntB: OFF

CMENU: (2)
: Prepulse: OFF
: Ext. Sync.: Out= OFF, Dv= +0.00; In = OFF
: Pulse Power Gate:P  1
: Ext. Mod. In: OFF
```

NOTE: Avarage cable loss in dB for RF cables in test set should be put in the RFLvl command field as a positive quantity.

7.8 Table #7-7 - Default Settings JC-AIR 429 Test Set

```
TX PARITY:    ODD
TX SPEED:     HIGH
RX SPEED:     HIGH
DISPLAY:      DATA
TRANSMIT MODE
LABEL = 125
DATA = 2AAAAA
WORD RATE = 25 Milliseconds
```

7.9 Table #7-8 - Default PC Settings (PROCOMM)

The PROCOMM program should be set up for the following settings (ALT-P) menu:

Baud Rate	38,400 Baud
Data Bits	8
Parity	None
Stop Bit	1
Port	Appropriate COM Port

When uploading software, the XMODEM protocol should be used.

8.0 GENERAL TEST REQUIREMENTS.

8.1 Initial Settings

Appendix A contains a procedure for making the initial adjustments to the transponder prior to testing. This procedure is intended as guideline only and it is not a requirement that it be followed exactly. The settings given are nominal values. Tolerance build-ups on any given module may make it desirable to deviate slightly from the given levels in order to meet the required Integrated Test specifications.

8.2 Test Sequence

For final testing the test sequence is based on functional requirements, it is required that the tests be performed in the order given.

8.3 Test Procedure

The Integrated Test Specification shall be performed in its entirety upon completion of any modifications or repairs to the unit under test.

8.5 I.T. Test Procedure Convention

In the Procedure section, switch position column, of the Integrated Test Specification document the statement "TEST SETUP # 1" will be encountered at the beginning of each test section. This statement is included to allow the operator to break-in at any given section for troubleshooting. When encountered during the final testing of the module the operator will ignore the function and continue on with the next statement.

8.6 Boot Software Part Numbers and CRCs

For each end item dash number (7517800-xxxxx) and minimum hardware mod level, the corresponding BOOT software part number and Boot software CRC is shown in the table.

Table 8-1 - Boot Software

Dash No.	Minimum Hardware Mod	BOOT S/W (Part Number)	BOOT CRC
10XXX	-	PS7021600-901	4F28
20XXX	-	PS7021600-901	4F28
35XXX	-	PS7021600-901	4F28
65XXX	-	PS7021600-901	4F28

8.7 Operational Software Part Numbers and CRCs

For each end item dash number (7517800-xxxxx) and software mod level, the corresponding Operational software part number and CRCs are shown. The operational CRCs are comprised of three segments, OPER, COMP and XLNX.

Table 8-2 - Operational Software

Dash No.	Software Mod	OPER S/W (Part Number)	OPER CRC	COMP CRC	XLNX CRC
10001	-	PS7021601-901	4F3E	E3B2	A80E
10002	B	PS7021601-903	AE1E	E3B2	4E4E
10002	C	PS7021601-904	18A6	E3B2	4E4E
10002	D	PS7021601-905	6B39	E3B2	4E4E
10003	E	PS4087090-907	E6CE	E3B2	4E4E
20012	F	PS7021601-906	7CE0	E3B2	4E4E
55001	-	PS7021601-901	4FE3	E3B2	A80E
55002	B	PS7021601-903	AE1E	E3B2	4E4E
55002	C	PS7021601-904	18A6	E3B2	4E4E
55002	D	PS7021601-905	6B39	E3B2	4E4E
65012	F	PS7021601-906	7CE0	E3B2	4E4E

8.8 Test Format Description

Column	Description
Rev Ltr	This column is 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 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 test 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.

K 8.9 The XS-950 Transponder shall be tested using test software as specified in EB7517804.

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
					Test Setup #1		Connect Equipment per Figure 1 for Test Setup #1	
	1.0			POWER ON CURRENT TEST (-10xxx to -54xxx)			POWER ON CURRENT TEST (-10xxx to -54xxx)	
				Apply 115 ± 2 Vac to unit.	MTS Panel 115VAC: ON		115VAC on MTS Panel	
					MTS Adaptor 115VAC: ON		115VAC on MTS Adaptor Panel	
	1.1	0.3 to 1.0 Amps (RMS)		With the voltage applied and the unit in standby the current draw shall be as specified.			Apply power to the transponder module. The amp meter on the power supply shall be as specified.	0.3 to 1.0 Amps (RMS)
				Set the transponder for the maximum DELM reply rate of 10 16-segment DELM/second. Set +66V supply for the nominal voltage.			Type on PC: "DAC 80" "XREP M D16 10" "MON"	
	1.2	0000		Verify the PWR FAIL warning signal is not active.			The PWR FAIL display on the PC shall be as specified.	0000
	1.3	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits.			The +66V display in the ON column shall be as specified.	50.0 to 60.0 Vdc (55.0 nom)
				Apply 97 ± 2 Vac to unit (LOW Line Voltage).			Adjust the supply to 97 Vac.	
	1.4	0000		Verify the PWR FAIL warning signal is not active.			The PWR FAIL display on the PC shall be as specified.	0000

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	1.5	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits. Apply 134 ± 2 Vac to unit (HIGH Line Voltage).			The +66V display in the ON column shall be as specified. Adjust the supply to 134 Vac.	50.0 to 60.0 Vdc (55.0 nom)
	1.6	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits. Apply 115 ± 2 Vac to unit (Nominal Line Voltage). Set the transponder to normal operational mode.			The +66V display in the ON column shall be as specified. Adjust the supply to 115 Vac. Type on PC: "<ESC>" "XON 1"	50.0 to 60.0 Vdc (55.0 nom)

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
					Test Setup #1		Connect Equipment per Figure 1 for Test Setup #1	
	2.0			POWER ON CURRENT TEST (-55xxx to -99xxx)			POWER ON CURRENT TEST (-55xxx to -99xxx)	
				Turn 115 Vac on for MTS circuitry	MTS Panel 115VAC: ON		115VAC on MTS Panel	
					MTS Adaptor 115VAC: ON		115VAC on MTS Adaptor Panel	
				Apply +27.5 Vdc to unit.	MTS Adaptor 28VDC: ON		+27.5 Vdc to unit	
	2.1	0.7 to 1.3 Amp		With the voltage applied and the unit in standby the current draw shall be as specified.			Apply power to the transponder module. The amp meter on the power supply shall be as specified.	0.7 to 1.3 Amps
				Set the transponder for the maximum DELM reply rate of 10 16-segment DELM/second. Set +66V supply for the nominal voltage.			Type on PC: "DAC 80" "XREP M D16 10" "MON"	
	2.2	0000		Verify the PWR FAIL warning signal is not active.			The PWR FAIL display on the PC shall be as specified.	0000
	2.3	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits.			The +66V display in the ON column shall be as specified.	50.0 to 60.0 Vdc (55.0 nom)
				Apply 18 ± 0.5 Vdc to unit (LOW Line Voltage).			Adjust the supply to 18 Vdc.	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	2.4	0000		Verify the PWR FAIL warning signal is not active.			The PWR FAIL display on the PC shall be as specified.	0000
	2.5	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits. Apply 33 ± 0.5 Vdc to unit (HIGH Line Voltage).			The +66V display in the ON column shall be as specified. Adjust the supply to 33 Vdc.	50.0 to 60.0 Vdc (55.0 nom)
	2.6	50.0 to 60.0 Vdc (55.0 nom)		Veriry the +66VDC Power supply monitor is within specified limits. Apply 27.5 ± 0.5 Vdc to unit (Nominal Line Voltage). Set the transponder to normal operational mode.			The +66V display in the ON column shall be as specified. Adjust the supply to 27.5 Vdc. Type on PC: "<ESC>" "XON 1"	50.0 to 60.0 Vdc (55.0 nom)

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	3.0			RF SELF TEST	Test Setup # 1		RF SELF TEST	
				Turn RF signal generator off.	ATC 1400A: RF LEVEL: OFF			
				Activate Long Mode S RF self-test interrogations			Type on PC "XRF L"	
	3.1	0000 0000		Verify self-test passes with no errors.			Wait a minimum of 15 seconds. The error count on PC shall be as specified.	0000 0000
				Return to normal operational mode			Type on PC "<ESC>" "XON 1"	
				Turn RF signal generator on.	ATC 1400A: RF LEVEL: ON			

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	4.0			MONITOR TEST	Test Setup # 1		MONITOR TEST	
				Set the transponder for 100 Long Mode S replies/second			Type on PC "<ESC>" "XREP M L 100" "DAC 00" "MON"	
	4.1	23.0 to 37.0 Vdc		Verify the input voltage (VIN) Monitor when transmitting is within specified limits.			The VIN monitor in the ON column shall be as specified.	24.0 to 36.0 Vdc
	4.2	61.0 to 73.0 Vdc (67.0 nom)		With the +66V set to the maximum voltage, verify the +66VDC Power Supply Monitor when transmitting is within specified limits.			The +66V monitor in the ON column shall be as specified.	62.0 to 72.0 Vdc (67.0 nom)
				Set the transponder for the nominal +66V power supply voltage.			Type on PC "<ESC>" "DAC 80" "MON"	
	4.3	55.0 to 67.0 Vdc (61.0 nom)		With the +66V set to the nominal voltage, verify the +66VDC Power Supply Monitor when transmitting is within specified limits.			The +66V monitor in the ON column shall be as specified.	56.0 to 66.0 Vdc (61.0 nom)
	4.4	35.0 to 44.0 Vdc (39.5 nom)		Verify the +40VDC Power Supply Monitor when transmitting is within specified limits.			The +40V monitor in the ON column shall be as specified.	36.0 to 43.0 Vdc (39.5 nom)
	4.5	28.0 to 38.0 Vdc (33.0 nom)		Verify the +33VDC Power Supply Monitor when transmitting is within the specified limits.			The +33V monitor in the ON column shall be as specified.	29.5 to 36.5 Vdc (33.0 nom)

REV LTR	TEST NO.	SPECIFICATION	C		PROCEDURE	C		SPECIFICATION
		OPR LIMITS		TEST DESCRIPTION	SWITCH POS		WORK STEPS	MFG LIMITS
	4.6	23.0 to 33.0 Vdc (28.0 nom)		Verify the +28VDC Power Supply Monitor when transmitting is within the specified limits.			The +28V monitor in the ON column shall be as specified.	24.5 to 31.5 Vdc (28.0 nom)
	4.7	12.5 to 17.0 Vdc (14.5 nom)		Verify the +15VDC Power Supply Monitor when transmitting is within the specified limits.			The +15V monitor in the ON column shall be as specified.	13.0 to 16.5 Vdc (14.5 nom)
	4.8	-6.0 to -3.5 Vdc (-4.4 nom)		Verify the -5VDC Power Supply Monitor when transmitting is within the specified limits.			The -5V monitor in the ON column shall be as specified.	-5.5 to -3.75 Vdc (-4.4 nom)
	4.9	-17.0 to -12.5 Vdc (-14.4 nom)		Verify the -15VDC Power Supply Monitor when transmitting is within the specified limits.			The -15V monitor in the ON column shall be as specified.	-16.5 to -13.0 Vdc (-14.4 nom)
	4.10	-100.0 to -170.0 Vdc (-125.0 nom)		Verify the -150VDC Power Supply Monitor when transmitting is within the specified limits.			The -150V monitor in the ON column shall be as specified.	-105.0 to -165.0 Vdc (-125.0 nom)
	4.11	-2.0 to +12.0 Vdc (5.0 nom)		Verify the Transmitter Top PIN monitor when not transmitting is within the specified limits.			The Top PIN display in the OFF column shall be as specified.	0.0 to +10.0 Vdc (5.0 nom)
	4.12	-175.0 to -90.0 Vdc (-120.0 nom)		Verify the Transmitter Top PIN monitor when transmitting is within the specified limits.			The Top PIN display in the ON column shall be as specified.	-170.0 to -95.0 Vdc (-120.0 nom)

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	4.13	-2.0 to +12.0 Vdc (5.0 nom)		Verify the Transmitter Bottom PIN monitor when not transmitting is within the specified limits.			The Bot PIN display in the OFF column shall be as specified.	0.0 to +10.0 Vdc (5.0 nom)
	4.14	-175.0 to -90.0 Vdc (-120.0 nom)		Verify the Transmitter Bottom PIN monitor when transmitting is within the specified limits.			The Bot PIN display in the ON column shall be as specified.	-170.0 to -95.0 Vdc (-120.0 nom)
	4.15	Less than +0.3 Vdc (0.0 nom)		Verify the Transmitter top forward power monitor when not transmitting is within the specified limits.			The Top pwr display in the OFF column shall be as specified.	Less than +0.2 Vdc (0.0 nom)
	4.16	Greater than +1.0 Vdc (3.0 nom)		Verify the Transmitter top forward power monitor when transmitting is within the specified limits.			The Top pwr display in the ON column shall be as specified.	Greater than +1.5 Vdc (3.0 nom)
	4.17	Less than +0.3 Vdc (0.0 nom)		Verify the Transmitter bottom forward power monitor when not transmitting is within the specified limits.			The Bot pwr display in the OFF column shall be as specified.	Less than +0.2 Vdc (0.0 nom)
	4.18	Greater than +1.0 Vdc (3.0 nom)		Verify the Transmitter bottom forward power monitor when transmitting is within the specified limits.			The Bot pwr display in the ON column shall be as specified.	Greater than +1.5 Vdc (3.0 nom)
	4.19	+18.0 to +32.0 Vdc (+22.0 nom)		Verify the Transmitter pulse modulation monitor when transmitting is within the specified limits.			The Pul mod display in the ON column shall be as specified.	+18.5 to +31.0 Vdc (+22.0 nom)

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	4.20	+20.0 to +32.0 Vdc (+26.0 nom)		Verify the Transmitter envelope modulation monitor when transmitting is within the specified limits.			The Env mod display in the ON column shall be as specified.	+22.0 to +30.0 Vdc (+26.0 nom)
	4.21	0.5 to 4.0 Vdc (2.0 nom)		Verify the Local Oscillator Level monitor when transmitting is within the specified limits.			The LO Level display in the ON column shall be as specified.	0.75 to 3.5 Vdc (2.0 nom)
	4.22	1.5 to 10.5 Vdc (6.5 nom)		Verify the Local Oscillator VCO tuning voltage monitor when transmitting is within the specified limits.			The VCO volt display in the ON column shall be as specified.	1.5 to 10.0 Vdc (6.5 nom)
	4.23	3.0 to 5.5 Vdc (4.1 nom)		Verify the Synthesizer Lock Detector monitor when transmitting is within the specified limits.			The Syn lock display in the ON column shall be as specified.	3.0 to 5.5 Vdc (4.1 nom)
	4.24	Less than 2.0 Vdc (1.0 nom)		Verify the Top Antenna Monitor is within the specified limits.			The Top Ant Mon display shall be as specified.	Less than 1.5 Vdc (1.0 nom)
	4.25	Less than 2.0 Vdc (1.0 nom)		Verify the Bottom Antenna Monitor is within the specified limits.			The Bot Ant Mon display shall be as specified.	Less than 1.5 Vdc (1.0 nom)
	4.26	20.0 to 70.0 Deg C.		Verify the Temperature Monitor is within the specified limits.			The Temp display shall be as specified.	20.0 to 70.0 Deg C.
	4.27	3.5 to 5.5 Vdc (4.1 nom)		Verify the Warm/Cold Detector is within the specified limits.			The Warm/Cold display shall be as specified.	3.5 to 5.5 Vdc (4.1 nom)
				Return to normal operational mode			Type on PC "<ESC>" "XON 1"	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	5.0			TRANSMITTER FREQUENCY AND OUTPUT POWER	Test Setup # 1		TRANSMITTER FREQUENCY AND OUTPUT POWER	
	5.1	1089.0 to 1091.0 MHz (1090.0 nominal)		TRANSMITTER FREQUENCY Verify Transmitter Frequency on the BOTTOM Antenna is within the specified limits.			TRANSMITTER FREQUENCY The XMTR/FREQ display on the ATC 1400A shall be as specified.	1089.25 to 1090.75 MHz (1090.0 nominal)
				TRANSMITTER POWER OUTPUT			TRANSMITTER POWER OUTPUT	
				Set ATC test set to measure first pulse of a Long Mode S Reply.	ATC 1400A: F1/P1 F2/P2: F2/P2 S1403: C MENU: 2 Pulse Power Gate:P 1		Set IFR 1400A to measure F2/P2. Set the S1403 to measure first pulse in the reply. NOTE: All attenuations for cable losses must be compensated for when making power measurements per paragraph 3.4.	
	5.2	250 to 630 Watts		Verify Transmitter power on the BOTTOM Antenna, First Pulse of reply is within the specified limits.			The XMTR PWR display on the ATC 1400A shall be as specified.	325 to 630 Watts
				Set ATC test set to measure last pulse of a Long Mode S Reply.	S1403: Pulse Power Gate:P 115		Set the S1403 to measure the last pulse in the reply.	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	5.3	250 to 630 Watts		Verify Transmitter power on the BOTTOM Antenna, Last Pulse of reply is within specified limits.			The XMTR PWR display on the ATC 1400A shall be as specified.	325 to 630 Watts
	5.4	-2.0dB to +2.0dB		Verify the pulse droop (first to last pulse) of the reply is within the specified limits.			Calculate the ratio in dB between the power in test 5.2 and 5.3 according to the following formula: $10 * \text{Log}_{10}$ [Power 5.2/Power 5.3] The ratio shall be as specified.	-1.5dB to +1.5dB
				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
				Set ATC test set to measure first pulse of a Long Mode S Reply.	S1403: Pulse Power Gate:P 1		Set the S1403 to measure the first pulse in the reply.	
	5.5	250 to 630 Watts		Verify Transmitter power on the TOP Antenna, First Pulse of reply is within the specified limits.			The XMTR PWR display on the ATC 1400A shall be as specified.	325 to 630 Watts
				Set ATC test set to measure last pulse of a Long Mode S Reply.	S1403: Pulse Power Gate:P 115		Set the S1403 to measure the last pulse in the reply.	
	5.6	250 to 630 Watts		Verify Transmitter power on the TOP Antenna, Last Pulse of reply is within specified limits.			The XMTR PWR display on the ATC 1400A shall be as specified.	325 to 630 Watts

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	5.7	-2.0dB to +2.0dB		Verify the pulse droop (first to last pulse) of the reply is within the specified limits.			Calculate the ratio in dB between the power in test 5.5 and 5.6 according to the following formula: $10 * \log_{10}$ [Power 5.5/Power 5.6] The ratio shall be as specified.	-1.5dB to +1.5dB
				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	
				Set ATC test set to measure first pulse of a Long Mode S Reply.	S1403: Pulse Power Gate:P 1 ATC 1400A: F1/P1 F2/P2: F1/P1		Set the S1403 to measure the first pulse in the reply. Set IFR 1400A to measure F1/P1.	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	6.0			TRANSMITTER REPLY PULSE WIDTH, RISE AND FALL TIME Select the TOP antenna. With the transponder set to reply to 100 Long Mode S replies/second, connect the test equipment to measure the transmitter reply pulse characteristics.	Test Setup #1 S1403: C MENU: 1 FUNC: 2 AntB: +.00		TRANSMITTER REPLY PULSE WIDTH, RISE AND FALL TIME NOTE: The XMTR Detector on the S1403 MUST be used to measure transmitter reply pulse characteristics. Setup the oscilloscope for the following configuration: CH1: S1403 XMTR Det CH2: OFF TRIGGER A: CH1, Slope+ A-SWP: 20usec B-SWP: 50nsec B-Delayed mode.	
	6.1	50 nsec to 100 nsec		Check the rise time (time between 10% to 90% voltage point on the pulse) of the second preamble pulse of the reply.			Set B-Delay to measure the rising edge of the second preamble pulse of the reply. The rise time (time between 10% to 90% voltage points) on the oscilloscope shall be as specified.	50 nsec to 100 nsec
	6.2	450 nsec to 550 nsec (500 nominal)		Check the pulse width (time between 50% to 50% voltage point on the pulse) of the second preamble pulse of the reply.			Set B-SWP to 100nsec and B-Delay to measure the pulse width of the second preamble pulse of the reply. The pulse width (time between 50% to 50% voltage points) on the oscilloscope shall be as specified.	450 nsec to 550 nsec (500 nominal)

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	6.3	50 nsec to 200 nsec		Check the fall time (time between 90% to 10% voltage point on the pulse) of the second preamble pulse of the reply.			Set the B-SWP to 50nsec and B-Delay to measure the falling edge of the second preamble pulse of the reply. The fall time (time between 90% to 10% voltage points) on the oscilloscope shall be as specified.	50 nsec to 200 nsec
	6.4	50 nsec to 100 nsec		Check the rise time (time between 10% to 90% voltage point on the pulse) of the last pulse of the reply.			Set B-Delay to measure the rising edge of the last pulse of the reply. The rise time (time between 10% to 90% voltage points) on the oscilloscope shall be as specified.	50 nsec to 100 nsec
	6.5	450 nsec to 550 nsec (500 nominal)		Check the pulse width (time between 50% to 50% voltage point on the pulse) of the last pulse of the reply.			Set B-SWP to 100nsec and B-Delay to measure the pulse width of the last pulse of the reply. The pulse width (time between 50% to 50% voltage points) on the oscilloscope shall be as specified.	450 nsec to 550 nsec (500 nominal)
	6.6	50 nsec to 200 nsec		Check the fall time (time between 90% to 10% voltage point on the pulse) of the last pulse of the reply.			Set the B-SWP to 50nsec and B-Delay to measure the falling edge of the last pulse of the reply. The fall time (time between 90% to 10% voltage points) on the oscilloscope shall be as specified.	50 nsec to 200 nsec
				Turn the TOP antenna off.	S1403: C MENU: 1 AntB: OFF		Antenna B OFF	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	7.0			ATCRBS CODE VERIFICATION, REPLY DELAY AND JITTER	Test Setup # 1		ATCRBS CODE VERIFICATION, REPLY DELAY AND JITTER	
				Interrogate the transponder with 1000 ATCRBS Mode A Interrogations at -40 dBm.	S1403: C MENU: 1 FUNC: 1 ATC 1400A: XPDR MODE: A PRF/SQTR: 100 RF LEVEL: -40 dBm		ATC (ATCRBS Only) mode. Mode A 1000 Interogations/sec -40dBm	
	7.1	55% to 75% (65% nominal)		Verify the transponder limits replies to ATCRBS interrogations.			The XPDR %REPLY display on the ATC 1400A shall be as specified.	55% to 75% (65% Nominal)
				Interrogate the transponder with 100 ATCRBS Mode A Interrogations at MTL+3dB.	ATC 1400A: PRF/SQTR: 100 RF LEVEL: -73 dBm		100 Interrogations/sec -73dBm	
	7.2	3.0 to 3.4 usec		Verify the P3 to F1 reply delay is within the specified limits.			The RpDly display on the S1403 shall be as specified.	3.0 to 3.4 usec
	7.3	Less than 0.2 usec		Verify the reply jitter over at least a 10 second interval is within the specified limits.			The absolute value of the difference between the minimum value and maximum value of the RpDly display on the S1403 over a 10 second period of time shall be as specified.	Less than 0.175 usec
				Set ATC CODE to 2525.			Type on PC "XATC 2525 2525"	
	7.4	2525		Verify the ATC CODE of the Mode A Reply is as specified.			The ATC CODE display of the 1400A shall be as specified.	2525

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Set ATC CODE to 5252 with IDENT.			Type on PC "XATC I 5252 2525"	
	7.5	ID5252		Verify the ATC CODE of the Mode A Reply is as specified.			The ATC CODE display of the 1400A shall be as specified.	ID5252
				Interrogate the transponder with ATCRBS Mode C Interrogations.	ATC 1400A: XPDR MODE: C		Mode C	
				Set Mode C code to 2525.				
	7.6	2525		Verify the ATC CODE of the Mode C Reply is as specified.			The ATC CODE display of the 1400A shall be as specified.	2525
				Set Mode C code to 5252.			Type on PC "XATC 0000 5252"	
	7.7	5252		Verify the ATC CODE of the Mode C Reply is as specified.			The ATC CODE display of the 1400A shall be as specified.	5252
				Interrogate the transponder with Mode S Interrogations	S1403: C MENU: 1 FUNC: 2		SEQ (Mode S) mode.	
					ATC 1400A: XPDR MODE: A		Mode A	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	8.0			MODE S CODE VERIFICATION, REPLY DELAY AND JITTER	Test Setup # 1		MODE S CODE VERIFICATION, REPLY DELAY AND JITTER	
5				Set Mode S Interrogation for alternating 1/0 pattern.	S1403: S MENU: (1) OFF (2) ON			
10				Set the transponder to reply to Mode S Interrogations			Type on PC "XON AAAAAA"	
15	8.1	DF16, Data=2525252 525252525252 525252525 ADD= 52525252		Verify the Mode S Reply to a UF=16 interrogation is correct.			The reply data on the S-1403 display shall be as specified.	DF16, Data=2525252 525252525252 525252525 ADD= 52525252
20				Set Mode S Interrogation for the complement alternating 1/0 pattern.	S1403: S MENU: (2) OFF (3) ON			
25				Set the transponder to reply to Mode S Interrogations			Type on PC "XON 555555"	
30	8.2	DF23, Data= 125252525252 525252525252 5252 ADD= 25252525		Verify the Mode S Reply to a UF=23 interrogation is correct.			The reply data on the S-1403 display shall be as specified.	DF23, Data= 125252525252 525252525252 5252 ADD= 25252525
35				Set Mode S for default interrogation	S1403: S MENU: (3) OFF (1) ON			
40				Set the transponder to default state			Type on PC "XON 1"	
45								

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	8.3	127.75 to 128.25 usec (128.0 nominal)		Measure the SPR to First Preamble Pulse Reply Delay on the BOTTOM receiver.			The RpDly display on the S-1403 shall be as specified.	127.80 to 128.20 usec (128.0 nominal)
	8.4	Less than 0.15 usec		Verify the reply jitter over at least a 10 second interval is within the specified limits.			The absolute value of the difference between the minimum value and maximum value of the RpDly display on the S1403 over a 10 second period of time shall be as specified.	Less than 0.125 usec
				Interrogate the transponder with ATCRBS Mode A/Mode S Interogations	S1403: C MENU: 1 FUNC: 4		ACL (ATCRBS/Mode S All Call) mode	
	8.5	127.50 to 128.50 usec (128.0 nominal)		Measure the Leading edge of P4 to the First Preamble Pulse Reply Delay.			The RpDly display on the S-1403 shall be as specified.	127.60 to 128.40 usec (128.00 nominal)
	8.6	Less than 0.20 usec		Verify the reply jitter over at least a 10 second interval is within the specified limits.			The absolute value of the difference between the minimum value and maximum value of the RpDly display on the S1403 over a 10 second period of time shall be as specified.	Less than 0.175 usec
				Interrogate the transponder with Mode S Interrogations	S1403: C MENU: 1 FUNC: 2		SEQ (Mode S) mode	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	9.0			RECEIVER MTL, DYNAMIC RANGE AND LOW LEVEL REPLY RATIO	Test Setup # 1		RECEIVER MTL, DYNAMIC RANGE AND LOW LEVEL REPLY RATIO	
				Interrogate the transponder with ATCRBS Mode A Interrogations	S1403: C MENU: 1 FUNC: 1		ATC (ATCRBS Only) mode.	
	9.1	-78 to -74 dBm (-76 nom)		Verify the BOTTOM receiver MTL for ATCRBS Mode A Interrogations.			Adjust the RF level until the %Reply:ATC display on the S1403 shows 90% average reply. The RF Level display on the 1400A shall be as specified.	-78 to -74 dBm (-76 nom)
	9.2	Greater than or equal to 90%		Verify the BOTTOM receiver Dynamic range for ATCRBS Mode A interrogations between MTL+3dB and -24dBm.			Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
	9.3	Less than or equal to 10%		Verify the BOTTOM receiver Low-level reply ratio for ATCRBS Mode A interrogations at -81dBm.	ATC 1400A: RF LEVEL: -81dBm		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 1%
				Interrogate the transponder with Mode S Interogations	S1403: C MENU: 1 FUNC: 2		SEQ (Mode S Only) mode.	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	9.4	-78 to -74 dBm (-76 nom)		Verify the BOTTOM receiver MTL for Mode S Interrogations.			Adjust the RF level until the %Reply:S display on the S1403 shows 90% average reply. The RF Level display on the 1400A shall be as specified.	-78 to -74 dBm (-76 nom)
	9.5	Greater than or equal to 99%		Verify the BOTTOM receiver Dynamic range for MODE S interrogations between MTL+3dB and -24dBm.			Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
				Interrogate the transponder with ATCRBS Mode C Interrogations	S1403: C MENU: 1 FUNC: 1 ATC 1400A: XPDR MODE: C		ATC (ATCRBS Only) mode. Mode C	
	9.6	-78 to -74 dBm (-76 nom)		Verify the TOP receiver MTL for ATCRBS Mode C Interrogations.			Adjust the RF level until the %Reply:ATC display on the S1403 shows 90% average reply. The RF Level display on the 1400A shall be as specified.	-78 to -74 dBm (-76 nom)
	9.7	Greater than or equal to 90%		Verify the TOP receiver Dynamic range for ATCRBS Mode C interrogations between MTL+3dB and -24dBm.			Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	9.8	Less than or equal to 10%		Verify the TOP receiver Low-level reply ratio for ATCRBS Mode C interrogations at -81dBm.	ATC 1400A: RF LEVEL: -81dBm		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 1%
				Interrogate the transponder with Mode S Interogations	ATC 1400A: XPDR MODE: A S1403: C MENU: 1 FUNC: 2		Mode A SEQ (Mode S Only) mode.	
	9.9	-78 to -74 dBm (-76 nom)		Verify the TOP receiver MTL for Mode S Interrogations.			Adjust the RF level until the %Reply:S display on the S1403 shows 90% average reply. The RF Level display on the 1400A shall be as specified.	-78 to -74 dBm (-76 nom)
	9.10	Greater than or equal to 99%		Verify the TOP receiver Dynamic range for MODE S interrogations between MTL+3dB and -24dBm.			Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	10.0			RECEIVER BANDWIDTH	Test Setup # 1		RECEIVER BANDWIDTH	
				Interrogate the transponder with ATCRBS Mode A Interrogations	S1403: C MENU: 1 FUNC: 1		ATC (ATCRBS Only) mode.	
					ATC 1400A: RF LEVEL: -16 dBm		RF Level -16dBm	
	10.1	Less than or equal to 90%		Verify the BOTTOM receiver bandwidth response at 1005 MHz to ATCRBS Mode A interrogations	ATC 1400A: FREQ: 1005		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 10%
	10.2	Less than or equal to 90%		Verify the BOTTOM receiver bandwidth response at 1055 MHz to ATCRBS Mode A interrogations	ATC 1400A: FREQ: 1055		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 10%
				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
	10.3	Less than or equal to 90%		Verify the TOP receiver bandwidth response at 1055 MHz to ATCRBS Mode A interrogations			The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 10%
	10.4	Less than or equal to 90%		Verify the TOP receiver bandwidth response at 1005 MHz to ATCRBS Mode A interrogations	ATC 1400A: FREQ: 1005		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 10%

REV LTR	TEST NO.	SPECIFICATION		PROCEDURE			SPECIFICATION
		OPR LIMITS	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
			Set the RF test set for standard interrogations.	ATC 1400A: FREQ: 1030 RF LEVEL: -73 dBm		Prequency 1030 MHz RF Level -73dBm	
				S1403: C MENU: 1 FUNC: 2		SEQ (Mode S)	
			Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	11.0			MODE S AND ATCRBS SIDE LOBE SUPRESSION (SLS) Interrogate the transponder with ATCRBS Mode A Interrogations	Test Setup # 1 S1403: C MENU: 1 FUNC: 1		MODE S AND ATCRBS SIDE LOBE SUPRESSION (SLS) ATC (ATCRBS Only) mode.	
	11.1	Less than or equal to 10%		Verify the BOTTOM receiver SLS pulse recognition for ATCRBS Mode A Interrogations with P2 = P1	ATC 1400A SLS/ECHO: -0, ON		Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 5%
	11.2	Greater than or equal to 90%		Verify the BOTTOM receiver SLS pulse NON-recognition for ATCRBS Mode A Interrogations with P2 = P1 - 9dB	ATC 1400A SLS/ECHO: -9, ON		Adjust the RF level from -73 dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 95%
				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
	11.3	Less than or equal to 10%		Verify the TOP receiver SLS pulse recognition for ATCRBS Mode C Interrogations with P2 = P1	ATC 1400A XPDR MODE: C SLS/ECHO: -0, ON		Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 5%
	11.4	Greater than or equal to 90%		Verify the TOP receiver SLS pulse NON-recognition for ATCRBS Mode C Interrogations with P2 = P1 - 9dB	ATC 1400A SLS/ECHO: -9, ON		Adjust the RF level from -73 dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 95%

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	
				Set the RF test set for Mode S interrogations.	ATC 1400A: RF LEVEL: -67 dBm S1403: C MENU: 1 FUNC: 2		RF Level -67 dBm. SEQ (Mode S Only) mode.	
	11.5	Less than or equal to 10%		Verify no replies are generated for a Mode S interrogation with the P5 (SLS) pulse set to the P6 RF Level + 3dB	ATC 1400A: SLS/ECHO: +3, ON		The %Reply:S on the S1403 display shall be as specified.	Less than or equal to 5%
	11.6	Greater than or equal to 99%		Verify replies are generated for a Mode S interrogation with the P5 (SLS) pulse set to the P6 RF Level - 12dB	ATC 1400A: SLS/ECHO: -12, ON		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
				Set the RF test set for default interrogations.	ATC 1400A: RF LEVEL: -73 dBm SLS/ECHO: +0, OFF		RF Level -73 dBm.	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	12.0			P4 PULSE LEVEL, ATCRBS/MODE S AND ATCRBS ONLY ALL CALL	Test Setup # 1		P4 PULSE LEVEL, ATCRBS/MODE S AND ATCRBS ONLY ALL CALL	
				Interrogate the transponder with ATCRBS Mode A/Mode S All Call Interrogations	S1403: C MENU: 1 FUNC: 4 P4: VAR		ACL (ATCRBS/Mode S All Call) mode. P4 level VARIABLE	
	12.1	Greater than or equal to 90%		Verify the BOTTOM receiver recognises interrogations as valid ATCRBS Mode A/Mode S All Call Interrogations when P4 = P3 - 1dB	ATC 1400A SLS/ECHO: -1, OFF		Adjust the RF level from -67dBm to -23dBm in 10dB steps. At each signal level, the %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	12.2	Greater than or equal to 90%		Verify the BOTTOM receiver recognises as a valid ATCRBS Mode A Interrogations when P4 = P3 - 6dB	ATC 1400A SLS/ECHO: -6, OFF		Adjust the RF level from -67dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
				Interrogate the transponder with ATCRBS Mode C-Only All Call Interrogations	S1403: C MENU: 1 FUNC: 3 P4: VAR		ACS (ATCRBS-Only All Call) mode. P4 level VARIABLE	
					ATC 1400A: XPDR MODE: C		ATCRBS Mode C-Only All CALL Interrogations	
	12.3	Less than or equal to 10%		Verify no replies are generated to ATCRBS-Only Mode C All Call interrogations on the BOTTOM receiver when: P4 = P3 - 1dB	ATC 1400A SLS/ECHO: -1, OFF		Adjust the RF level to -67dBm. The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 1%

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
	12.4	Less than or equal to 10%		Verify no replies are generated to ATCRBS-Only Mode A All Call interrogations on the TOP receiver when: P4 = P3 - 1dB	ATC 1400A XPDR MODE: A		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 1%
	12.5	Greater than or equal to 90%		Verify the TOP receiver recognises interrogations as valid ATCRBS Mode C/Mode S All Call Interrogations when P4 = P3 - 1dB	ATC 1400A XPDR MODE: C S1403: C MENU: 1 FUNC: 4 P4: VAR		Adjust the RF level from -67dBm to -23dBm in 10dB steps. At each signal level, the %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	12.6	Greater than or equal to 90%		Verify the TOP receiver recognises as a valid ATCRBS Mode C Interrogations when P4 = P3 - 6dB	ATC 1400A SLS/ECHO: -6, OFF		Adjust the RF level from -67 dBr to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
				Set the RF test set for standard interrogations.	ATC 1400A: SLS/ECHO: -0, OFF RF LEVEL: -73 dBm		SLS 0dB, OFF RF Level -73 dBm.	
					S1403: P4: CAL C MENU: 1 FUNC: 2		P4 Level CAL SEQ (Mode S)	
				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	13.0			P4 PULSE POSITION	Test Setup # 1 S1403: CMENU: 1 FUNC (4) ATC 1400A: XPDR MODE: C		P4 PULSE POSITION ACL (ATCRBS/Mode S All-Call) mode ATCRBS Mode C/Mode S All CALL Interrogations	
	13.1	Greater than or equal to 90%		Verify the BOTTOM receiver does NOT recognise interrogations as ATCRBS Mode C/Mode S All Call when the P3 to P4 spacing is 1.7 usec. The transponder will reply with ATCRBS replies.	S1403: P4: Dv -0.30		The %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
	13.2	Greater than or equal to 90%		Verify the BOTTOM receiver DOES recognise interrogations as ATCRBS Mode C/Mode S All Call when the P3 to P4 spacing is 1.95 usec. The transponder will reply with Mode S replies.	S1403: P4: Dv -0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	13.3	Greater than or equal to 90%		Verify the BOTTOM receiver DOES recognise interrogations as ATCRBS Mode C/Mode S All Call when the P3 to P4 spacing is 2.05 usec. The transponder will reply with Mode S replies.	S1403: P4: Dv +0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%

REV LTR	TEST NO.	SPECIFICATION: OPR LIMITS	C	SPECIFICATION: TEST DESCRIPTION	PROCEDURE: SWITCH POS	C	PROCEDURE: WORK STEPS	SPECIFICATION: MFG LIMITS
	13.4	Greater than or equal to 90%		Verify the BOTTOM receiver does NOT recognise interrogations as ATCRBS Mode C/Mode S All Call when the P3 to P4 spacing is 2.3 usec. The transponder will reply with ATCRBS replies.	S1403: P4: Dv +0.30		The %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
	13.5	Greater than or equal to 90%		Verify the TOP receiver does NOT recognise interrogations as ATCRBS Mode A/Mode S All Call when the P3 to P4 spacing is 1.7 usec. The transponder will reply with ATCRBS replies.	S1403: P4: Dv -0.30 ATC 1400A: XPDR MODE: A		The %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
	13.6	Greater than or equal to 90%		Verify the TOP receiver DOES recognise interrogations as ATCRBS Mode A/Mode S All Call when the P3 to P4 spacing is 1.95 usec. The transponder will reply with Mode S replies.	S1403: P4: Dv -0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	13.7	Greater than or equal to 90%		Verify the TOP receiver DOES recognise interrogations as ATCRBS Mode A/Mode S All Call when the P3 to P4 spacing is 2.05 usec. The transponder will reply with Mode S replies.	S1403: P4: Dv +0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	13.8	Greater than or equal to 90%		Verify the TOP receiver does NOT recognise interrogations as ATCRBS Mode A/Mode S All Call when the P3 to P4 spacing is 2.3 usec. The transponder will reply with ATCRBS replies.	S1403: P4: Dv +0.30		The %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
				Set the RF test set for standard interrogations.	S1403: P4: Dv CAL CMENU: 1 FUNC (2)		P4 Deviation: CAL SEQ (Mode S)	
				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	14.0			MODE S SYNC PHASE REVERSAL (SPR) POSITION	Test Setup #1		MODE S SYNC PHASE REVERSAL (SPR) POSITION	
	14.1	Less than or equal to 1%		Verify no reply is generated when the P6 to SPR delay on the BOTTOM receiver is 1.05 usec.	S1403: C MENU: 1 SPR Dv: -0.20		The %Reply:S on the S1403 display shall be as specified.	Less than or equal to 1%
	14.2	Greater than or equal to 99%		Verify replies are generated when the P6 to SPR delay on the BOTTOM receiver is 1.20 usec.	S1403: SPR Dv: -0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	14.3	Greater than or equal to 99%		Verify replies are generated when the P6 to SPR delay on the BOTTOM receiver is 1.30 usec.	S1403: SPR Dv: +0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	14.4	Less than or equal to 1%		Verify no reply is generated when the P6 to SPR delay on the BOTTOM receiver is 1.45 usec.	S1403: SPR Dv: +0.20		The %Reply:S on the S1403 display shall be as specified.	Less than or equal to 1%
				Set the RF test set for standard interrogations.	S1403: SPR Dv: CAL		SPR Deviation: CAL	

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	15.0			DIVERSITY OPERATION Interrogate the unit with a Mode S interrogation on the TOP and BOTTOM antenna.	Test Setup #1		DIVERSITY OPERATION NOTE: The TOP and BOTTOM antenna cables shall be matched per the requirement in paragraph 3.5.	
	15.1	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: -47dBm DELAY: TOP 125nsec BEFORE BOT Verify transponder replies on the BOTTOM channel.	S1403: CMENU: 1 FUNC: 2 RF Lvl: +0.0 ANT B: -.15 ATC1400A: RF LEVEL: -47		The %Reply:S display on the S1403 shall be as specified.	Greater than or equal to 99%
	15.2	Greater than or equal to 90%		Interrogate the transponder with: ATCRBS Mode A Interrogations. TOP RF Level: -50dBm BOT RF Level: -47dBm DELAY: TOP 125nsec BEFORE BOT Verify transponder replies on the BOTTOM channel.	S1403: CMENU: 1 FUNC: 1		The %Reply:ATC display on the S1403 shall be as specified.	Greater than or equal to 99%

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	15.3	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: -53dBm DELAY: TOP 125nsec BEFORE BOT. Verify transponder replies on the TOP channel.	S1403: CMENU: 1 FUNC: 2 ATC1400A: RF LEVEL: -53		The %Reply:AntB display on the S1403 shall be as specified.	Greater than or equal to 99%
	15.4	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: -53dBm DELAY: TOP 125nsec AFTER BOT. Verify transponder replies on the TOP channel.	S1403: CMENU: 1 ANT B: +.15		The %Reply:AntB display on the S1403 shall be as specified.	Greater than or equal to 99%
	15.5	Greater than or equal to 90%		Interrogate the transponder with: ATCRBS Mode A Interrogations TOP RF Level: -50dBm BOT RF Level: -53dBm DELAY: TOP 125nsec AFTER BOT. Verify transponder replies on the TOP channel.	S1403: CMENU: 1 FUNC: 1		The %Reply:AntB display on the S1403 shall be as specified.	Greater than or equal to 99%

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	15.6	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: -47dBm DELAY: TOP 125nsec AFTER BOT. Verify transponder replies on the BOTTOM channel.	S1403: CMENU: 1 FUNC: 2 ATC1400A: RF LEVEL: -47		The %Reply:S display on the S1403 shall be as specified.	Greater than or equal to 99%
	15.7	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: MTL+3dB DELAY: TOP 375nsec AFTER BOT Verify transponder replies on the BOTTOM channel.	S1403: CMENU: 1 RF Lvl: +CABLE LOSS ANT B: .35 ATC1400A: RF LEVEL: -73		The %Reply:S display on the S1403 shall be as specified.	Greater than or equal to 99%
				Connect TOP antenna cable to ATC 1400A and BOTTOM antenna cable to S1403.			Connect TOP antenna cable to ATC 1400A and BOTTOM antenna cable to S1403.	
	15.8	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: MTL+3dB BOT RF Level: -50dBm DELAY: TOP 375nsec BEFORE BOT Verify transponder replies on the TOP channel.			The %Reply:S display on the S1403 shall be as specified.	Greater than or equal to 99%

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Set the RF test set for standard interrogations.	S1403: ANT B: OFF ATC1400A: RF LEVEL: -73		ANT B OFF	
				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	16.0			DATA LINK OPERATION	Test Setup #1		DATA LINK OPERATION	
				Set the RF Generator for external modulation.	S1403: CMENU: 2 Ext Mod In: ON ATC1400A: RF LEVEL: -67			
				Set the transponder to reply to Mode S Interrogations			Type on PC "XON 1"	
				Exit PROCOMM, keeping the transponder on.			Type "<ALT>-X" on PC	
				Set simulator to generate 8 COMM-C interrogations per second.			Type "COMMC 8" on PC	
	16.1	FAIL = 0		Verify valid replies are generated for the COMM-C interrogations.			Wait for a minimum of 400 interrogations to complete and verify the FAIL display on the PC is as specified.	FAIL = 0
				Exit COMM-C simulator			Type "<ESC>" on PC	
				Set simulator to generate 8 COMM-D interrogations per second.			Type "COMMD 8" on PC	
	16.2	FAIL = 0		Verify valid COMM-D replies are generated for the interrogations.			Wait for a minimum of 400 interrogations to complete and verify the FAIL display on the PC is as specified.	FAIL = 0

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Exit COMM-D simulator			Type "<ESC>" on PC	
				Enter PROCOMM			Type "PCPLUS" on PC Type "<RET> after PROCOMM is running.	
				Set the RF Generator for internal modulation.	S1403: CMENU: 2 Ext Mod In: OFF ATC1400A: RF LEVEL: -73			

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	17.0			MUTUAL SUPPRESSION	Test setup #1		MUTUAL SUPPRESSION	
M	17.1	21.0 to 31.0 V (26.0 nominal)		Verify mutual suppression line goes active when replying to Mode S interrogations.			Monitor Suppression Pulse #2 with an oscilloscope. The amplitude of the mutual suppression pulse shall be as specified.	21.0 to 31.0 V (26.0 nominal)
	17.2	110 to 135 usec (123 nominal)		Verify the duration of the mutual suppression pulse.			The pulse width (50% to 50% voltage point) of the mutual suppression pulse shall be as specified.	110 to 135 usec (123 nominal)
M							Connect the ATC 1400A suppression output to Suppression Pulse #2	
	17.3	Equal to 0%		Externally activate the mutual suppression line with a pulse amplitude of 18.0V. Verify no replies are generated.	ATC 1400A: INTF PULSE: INTRF+, 000.0 SUPP-RESSOR: ON		The %Reply:S on the S1403 display shall be as specified.	Equal to 0%
M				Disconnect mutual suppression output.	ATC 1400A: INTF PULSE: OFF, 000.0 SUPP-RESSOR:OFF		Disconnect the ATC 1400A suppression output from Suppression bus #2	
	17.4	Greater than or equal to 99%		Verify the transponder replies to Mode S interrogations.			The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	18.0			DISCRETE INPUTS	Test Setup #1		DISCRETE INPUTS	
				Set all switches on alternating OPEN(0)/GROUND(1) patterns to the discrete input port for INPUT PORT 0 thru INPUT PORT 4			Set all switches on the MTS Interface panel and MTS Adapter panel to the positions in Table #7-1.	
				Display discrete input ports			Type on PC "DIN"	
	18.1	AAAA AAAA AAAA AAAA EAAA		Verify the input ports are reading the correct discrete status.			The first 5 words of data on the PC screen shall be as specified. (The 6th word is not used).	AAAA AAAA AAAA AAAA EAAA
	18.2	AAAA AAAA AAAA AAAA AAAA		Verify the front panel test switch is operational.			Depress the front panel test switch. The first 5 words of data on the PC screen shall be as specified.	AAAA AAAA AAAA AAAA AAAA
				Complement the setting of all switches to the discrete input port for INPUT PORT 0 thru INPUT PORT 4			Set all switches on the test set to the positions in table 2.	
	18.3	5555 5555 5555 5555 D555		Verify the input ports are reading the correct discrete status.			The first 5 words of data on the PC screen shall be as specified. (The 6th word is not used).	5555 5555 5555 5555 D555
				Set the switches back to default settings.			Set all switches on the test set to the position in table 1.	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	19.0			DISCRETE OUTPUTS AND LEDS	Test Setup #1		DISCRETE OUTPUTS AND LEDS	
				Set Discrete outputs to the "ON" state.			Type on PC "DOUT 11111"	
	19.1	ON ON ON ON		Verify each of the discrete outputs are on.			The 4 LEDs on the MTS panel shall be as specified. XPDR FAIL 1, 2 ALT FAIL 1, 2	ON ON ON ON
	19.2	0111		Verify the over-current monitors for each of the discrete outputs are in the normal mode.			The first 4 digits of the display on the PC screen shall be as specified. (The number after the first 4 digits is not used.)	0111
				Set Discrete outputs to the "OFF" state.			Type on PC "<ESC>" "DOUT 00000"	
	19.3	OFF OFF OFF OFF		Verify each of the discrete outputs are off.			The 4 LEDs on the MTS panel shall be as specified. XPDR FAIL 1, 2 ALT FAIL 1, 2	OFF OFF OFF OFF
	19.4	0111		Verify the over-current monitors for each of the discrete outputs are in the normal mode.			The first 4 digits of the display on the PC screen shall be as specified. (The number after the first 4 digits is not used.)	0111
	19.5	PASS		Verify each of the front panel LED lights work.			The 6 LEDs on the unit front panel shall alternate ON and OFF at approximately a 1 second rate.	PASS
				Set unit to default mode			Type on PC "<ESC>"	

REV LTR	TEST NO.	SPECIFICATION: OPR LIMITS	C	TEST DESCRIPTION	PROCEDURE: SWITCH POS	C	WORK STEPS	SPECIFICATION: MFG LIMITS
	20.0			ADDITIONAL INTERFACES (-55xxx to -99xxx ONLY)	Test Setup #1		ADDITIONAL INTERFACES (-55xxx to -99xxx ONLY)	
				Connect a DVM across the FAN outputs.			Connect DVM with (+) input to FAN +28V and (-) input to FAN RETURN(NO) on MTS test set.	
				Set Discrete outputs to the "ON" state.			Type on PC "DOUT 11111"	
	20.1	Greater than 22Vdc		Measure the voltage across the FAN outputs with the FAN RETURN(NO) output on.			The voltage on the DVM shall be as specified.	Greater than 22Vdc
	20.2	Less than 1.5 Vdc		Verify the over-current monitor for the fan is in the ON state.			The last number of the display (in Vdc) on the PC screen shall be as specified. (The first 4 digit number is not used.)	Less than 1.5 Vdc
				Set Discrete outputs to the "OFF" state.			Type on PC "DOUT 00000"	
	20.3	Less than 0.1Vdc		Measure the voltage across the FAN outputs with the FAN RETURN(NO) output off.			The voltage on the DVM shall be as specified.	Less than 0.1 Vdc
	20.4	Greater than 3.0 Vdc		Verify the over-current monitor for the fan is in the OFF state.			The last number of the display (in Vdc) on the PC screen shall be as specified. (The first 4 digit number is not used.)	Greater than 3.0 Vdc

REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Ground the XPDR OFF(NO) discrete output to turn the unit OFF.			Set the XPDR OFF(NO) switch to the up position.	
	20.5	Less than 0.1A		Measure the input current to the unit to verify that the unit is off.			The power supply input current to the unit shall be as specified.	Less than 0.1A
				Remove ground from the XPDR OFF(NO) discrete output to turn the unit ON.			Set the XPDR OFF(NO) switch to the down position.	
				Set unit to default mode			Type on PC "<ESC>" "XON 1"	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	TEST DESCRIPTION	PROCEDURE SWITCH POS	C	WORK STEPS	SPECIFICATION MFG LIMITS
	21.7	359.0 to 1.0 Degrees		Verify the Course #2 synchro angle is within specification.			The Syn2 CA angle display on the PC screen shall be as specified.	359.0 to 1.(Degrees
	21.8	359.0 to 1.0 Degrees		Verify the Fine #2 synchro angle is within specification.			The Syn2 FA angle display on the PC screen shall be as specified.	359.0 to 1.(Degrees
				Change the polarity of the synchro refrence input to the default setting.	MTS Panel 26VAC POL - +			
				Set unit to default mode			Type on PC "<ESC>"	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	21.0			SYNCHRO ALTITUDE INTERFACES (Steps 21.1 through 21.8 for -10xxx to -19xxx and -55xxx to -64xxx)	Test Setup #1		SYNCHRO ALTITUDE INTERFACES (Steps 21.1 through 21.8 for -10xxx to -19xxx and -55xxx to -64xxx)	
L	21.1			Monitor the output of the synchro circuit.			Type on PC "MON"	
L		179.0 to 181.0 Degrees		Verify the Course #1 synchro angle is within specification.			The Syn1 CA angle display on the PC screen shall be as specified.	179.0 to 181.0 Degrees
	21.2	179.0 to 181.0 Degrees		Verify the Fine #1 synchro angle is within specification.			The Syn1 FA angle display on the PC screen shall be as specified.	179.0 to 181.0 Degrees
	21.3	179.0 to 181.0 Degrees		Verify the Course #2 synchro angle is within specification.			The Syn2 CA angle display on the PC screen shall be as specified.	179.0 to 181.0 Degrees
	21.4	179.0 to 181.0 Degrees		Verify the Fine #2 synchro angle is within specification.			The Syn2 FA angle display on the PC screen shall be as specified.	179.0 to 181.0 Degrees
				Change the polarity of the synchro refrence input.	MTS Panel 26VAC POL - -			
	21.5	359.0 to 1.0 Degrees		Verify the Course #1 synchro angle is within specification.			The Syn1 CA angle display on the PC screen shall be as specified.	359.0 to 1.0 Degrees
	21.6	359.0 to 1.0 Degrees		Verify the Fine #1 synchro angle is within specification.			The Syn1 FA angle display on the PC screen shall be as specified.	359.0 to 1.0 Degrees

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
				(Steps 21.9 through 21.22 for -20xxx and -65xxx)			(Steps 21.9 through 21.22 for -20xxx and -65xxx)	
	21.9			Connect 4.99Kohm resistor between ARINC 600 BP2 and GROUND			On the MTS, connect a 4.99Kohm resistor between ARINC 600 BP2 and GROUND	
		11.5 VDC to 13.7 VDC		Verify the DC voltage between ARINC 600 BP2 and GROUND			Connect a DC DVM to ARINC 600 BP2 (H) and GROUND (L). The DVM shall read as specified.	11.5 VDC to 13.7 VDC
				Remove 4.99Kohm resistor between ARINC 600 BP2 and GROUND			On the MTS, remove 4.99 Kohm resistor between ARINC 600 BP2 and GROUND	
				Connect 4.99 Kohm resistor betsween ARINC 600 BP5 and GROUND			On the MTS, connect 4.99 Kohm resistor betsween ARINC 600 BP5 and GROUND	
	21.10	11.5 VDC to 13.7 VDC		Verify the DC voltage between ARINC 600 BP5 and GROUND			Connect a DC DVM to ARINC 600 BP5 (H) and GROUND (L). The DVM shall read as specified.	11.5 VDC to 13.7 VDC
				Remove 4.99Kohm resistor between ARINC 600 BP5 and GROUND			On the MTS, remove 4.99 Kohm resistor between ARINC 600 BP5 and GROUND	
				Connect SYNCRO ALT #1 CX, SYNCRO ALT #1 CY SYNCRO ALT #2 CX, and SYNCRO ALT #2 CY together			On the MTS connect SYNC ALT 1/2 CX and SYNC ALT 1/2 CY	
				Connect SYNCRO ALT #1 CZ, SYNCRO ALT #2 CZ, and GROUND together			On the MTS connect SYNC ALT 1/2 CZ and GROUND	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
				Apply 12.00 ± 0.05 VDC between SYNCRO ALT #1 CX and GROUND			On the MTS, apply 12.00 ± 0.05 VDC between SYNC ALT 1/2 CX and GROUND	
				Monitor the output of the analog altimeter circuit			Type on PC "MON"	
	21.11	6.500 to 6.650 Volts		Verify the SYNCRO ALT #1 CX voltage is within specification			The SYN1 CX voltage on the PC screen shall be as specified	6.500 to 6.650 Volts
	21.12	6.500 to 6.650 Volts		Verify the SYNCRO ALT #1 CY voltage is within specification			The SYN1 CY voltage on the PC screen shall be as specified	6.500 to 6.650 Volts
	21.13	-0.010 to +0.010 Volts		Verify the difference between the SYNCRO ALT #1 CX voltage and the SYNCRO ALT #1 CY voltage is within specification			The difference between the SYN1 CX and the SYN1 CY voltage on the PC screen shall be as specified	-0.010 to +0.010 Volts
	21.14	6.500 to 6.650 Volts		Verify the SYNCRO ALT #2 CX voltage is within specification			The SYN2 CX voltage on the PC screen shall be as specified	6.500 to 6.650 Volts
	21.15	6.500 to 6.650 Volts		Verify the SYNCRO ALT #2 CY voltage is within specification			The SYN2 CY voltage on the PC screen shall be as specified	6.500 to 6.650 Volts
	21.16	-0.010 to +0.010 Volts		Verify the difference between the SYNCRO ALT #2 CX voltage and the SYNCRO ALT #2 CY voltage is within specification			The difference between the SYN2 CX and the SYN2 CY voltage on the PC screen shall be as specified	-0.010 to +0.010 Volts
				Apply 6.00 ± 0.05 VDC between SYNCRO ALT #1 and GROUND			On the MTS, apply 6.00 ± 0.05 VDC between SYNC ALT 1/2 CX and GROUND	

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
	21.17	3.250 to 3.350 Volts		Verify the SYNCRO ALT #1 CX voltage is within specification			The SYN1 CX voltage on the PC screen shall be as specified	3.250 to 3.350 Volts
	21.18	3.250 to 3.350 Volts		Verify the SYNCRO ALT #1 CY voltage is within specification			The SYN1 CY voltage on the PC screen shall be as specified	3.250 to 3.350 Volts
	21.19	-0.010 to +0.010 Volts		Verify the difference between the SYNCRO ALT #1 CX voltage and the SYNCRO ALT #1 CY voltage is within specification			The difference between the SYN1 CX and the SYN1 CY voltage on the PC screen shall be as specified	-0.010 to +0.010 Volts
	21.20	3.250 to 3.350 Volts		Verify the SYNCRO ALT #2 CX voltage is within specification			The SYN2 CX voltage on the PC screen shall be as specified	3.250 to 3.350 Volts
	21.21	3.250 to 3.350 Volts		Verify the SYNCRO ALT #2 CY voltage is within specification			The SYN2 CY voltage on the PC screen shall be as specified	3.250 to 3.350 Volts
	21.22	-0.010 to +0.010 Volts		Verify the difference between the SYNCRO ALT #2 CX voltage and the SYNCRO ALT #2 CY voltage is within specification			The difference between the SYN2 CX and the SYN2 CY voltage on the PC screen shall be as specified	-0.010 to +0.010 Volts

REV LTR	TEST NO.	SPECIFICATION OPR LIMITS	C	SPECIFICATION TEST DESCRIPTION	PROCEDURE SWITCH POS	C	PROCEDURE WORK STEPS	SPECIFICATION MFG LIMITS
L	22.0			ARINC 429 BUS INTERFACES	Test Setup #1		ARINC 429 BUS INTERFACES	
				Set the unit to generate internal ARINC 429 loop-back tests.	Type on the PC: "AS"			
L	22.1	00000000 00000000 00000000 00000000 0000 0000		Verify that no internal ARINC 429 errors occur.			The 6 words on the PC display shall be as specified.	00000000 00000000 00000000 00000000 0000 0000
				Connect ARINC 429 Test signal (transmitter) output to ARINC 429 Receiver Inputs.			Connect the ARINC 429 Test signal (transmitter) output to the requirements in table 5.	
				Apply ARINC 429 signal to COM A/B In From ADLP bus (P1A-2A/2B).			Type on the PC: "<ESC>" "AR 0 H"	
L	22.2	2AAAAAAA 0000		Verify the data words were received without errors.			The two data words on the PC display shall be as specified.	2AAAAAAA 0000
				Apply ARINC 429 signal to COM C/D In From ADLP bus (P1A-2C/2D).			Type on the PC: "<ESC>" "AR 1 H"	
L	22.3	2AAAAAAA 0000		Verify the data words were received without errors.			The two data words on the PC display shall be as specified.	2AAAAAAA 0000
				Apply ARINC 429 signal to TX Coordination Bus (P1A-5E/5F).			Type on the PC: "<ESC>" "AR 2 H"	
L	22.4	2AAAAAAA 0000		Verify the data words were received without errors.			The two data words on the PC display shall be as specified.	2AAAAAAA 0000
				Apply ARINC 429 signal to Flight ID Input Bus (P1A-6A/6B).			Type on the PC: "<ESC>" "AR 3 H"	