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FCC ID: BBOESD9201

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Equipment List

Used?	Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
х	3-Meter OATS	TEI	N/A	N/A	Listed 1/13/03	1/13/06
	3/10-Meter OATS	TEI	N/A	N/A	Listed 3/26/01	3/26/04
	Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 8/31/01	8/31/03
	Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 8/31/01	8/31/03
	Tan Tower Quasi- Peak Adapter	HP	85650A	3303A01690	CAL 8/31/01	8/31/03
	Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CHAR 3/4/01	3/4/03
	Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/15/03	4/15/05
	Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 4/15/03	4/15/05
	Blue Tower Quasi- Peak Adapter	HP	85650A	2811A01279	CAL 4/15/03	4/15/05
Х	Silver Tower Spectrum Analyzer	HP	8566B Opt 462	3552A22064 3638A08608	CAL 10/14/02	10/14/04
Х	Silver Tower RF Preselector	HP	85685A	2620A00294	CAL 10/14/02	10/14/04
Х	Silver Tower Quasi- Peak Adapter	HP	85650A	3303A01844	CAL 10/14/02	10/14/04
Х	Silver Tower Preamplifier	HP	8449B	3008A01075	CHAR 1/28/02	1/28/04
	Biconnical Antenna	Electro- Metrics	BIA-25	1171	CAL 4/26/01	4/26/03
Х	Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/03
	Biconnical Antenna	Eaton	94455-1	1057	CAL 3/18/03	3/18/05
	BiconiLog Antenna Log-Periodic	EMCO Electro-	3143 LPA-25	9409-1043 1122	CAL	10/2/03
	Antenna Log-Periodic	Metrics Electro-	EM-6950	632	10/2/01 CHAR	10/2/03
x	Antenna Log-Periodic	Metrics Electro-	LPA-30	409	10/15/01 CAL	3/4/05
Λ	Antenna	Metrics	96005	1243	3/4/03	5/8/05
	Log-Periodic Antenna	Eaton			CAL 5/8/03	
	Dipole Antenna Kit	Electro- Metrics	TDA-30/1-4	152	CAL 3/21/01	3/21/04
	Dipole Antenna Kit	Electro- Metrics	TDA-30/1-4	153	CAL 9/26/02	9/26/05
	Double-Ridged Horn Antenna	Electro- Metrics	RGA-180	2319	CAL 2/17/03	2/17/05
	Horn Antenna *(at 3 meters)	Electro- Metrics	EM-6961	6246	CAL 3/31/03	3/31/05
	Horn Antenna *(at	Electro-	EM-6961	6246	CAL	6/4/05

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10 meters)	Metrics			6/4/03	
Horn Antenna	ATM	19-443-6R	None	No Cal	
				Required	
Passive Loop	EMC Test	EMCO 6512	9706-1211	CHAR	7/10/03
Antenna	Systems			7/10/01	
Harmonic Mixer with	Oleson	M08HW/A	F30425-1	CHAR	4/25/05
Horn Antenna	Microwave Labs			4/25/03	
Harmonic Mixer with	Oleson	M12HW/A	E30425-1	CHAR	4/25/05
Horn Antenna	Microwave Labs			4/25/03	
LISN	Electro-	ANS-25/2	2604	CAL	10/9/03
	Metrics			10/9/01	
LISN	Electro-	EM-7820	2682	CAL	3/12/05
	Metrics			3/12/03	
Termaline Wattmeter	Bird	611	16405	CAL	5/25/01
	Electronic			5/25/99	
	Corporation				
Termaline Wattmeter	Bird	6104	1926	CHAR	9/7/03
	Electronic			9/7/01	
	Corporation				
Oscilloscope	Tektronix	2230	300572	CAL	7/3/05
				7/3/03	
System One	Audio	System One	SYS1-45868	CHAR	4/25/04
	Precision		11010 0	4/25/02	1 /00 /04
Temperature Chamber	Tenney	TTRC	11717-7	CHAR	1/22/04
20 77-14	Engineering	4000	0012214400	1/22/02	10/0/02
AC Voltmeter	HP	400FL	2213A14499	CAL	10/9/03
3G Waltmaken	110	4000	2212214261	10/9/01	10/15/02
AC Voltmeter	HP	400FL	2213A14261	CHAR	10/15/03
AC Voltmeter	HP	400FL	2213A14728	10/15/01	10/15/03
AC VOITMETER	пР	400FL	2213A14/20	CHAR 10/15/01	10/15/03
Digital Multimeter	Fluke	77	35053830	CHAR	1/8/04
Digital Multimeter	riuke	, ,	33033030	1/8/02	1/0/04
Digital Multimeter	Fluke	77	43850817	CHAR	1/8/04
Digital Maltimotel	Tano	, ,	15050017	1/8/02	170701
Digital Multimeter	HP	E2377A	2927J05849	CHAR	1/8/04
Digital Hardimotor		220,,11	2527000015	1/8/02	1, 0, 01
Multimeter	Fluke	FLUKE-77-3	79510405	CHAR	9/26/03
				9/26/01	
Peak Power Meter	HP	8900C	2131A00545	CAL	7/2/05
				7/2/03	
Power Sensor	Agilent	84811A	2551A02705	CAL	7/2/05
	Technologies			7/2/03	
Power Meter	HP	432A	1141A07655	CAL	4/15/05
				4/15/03	
Power Sensor	HP	478A	72129	CAL	4/15/05
				4/15/03	
Power Meter And	Bird	4421-107 &	0166 &	CAL	4/16/05
Sensor		4022	0218	4/16/03	
Digital Thermometer	Fluke	2166A	42032	CAL	1/16/04
				1/16/02	
Thermometer	Traulsen	SK-128		CHAR	1/22/04
				1/22/02	. . .
Thermometer	Extech	4028	14871-2	CAL	3/7/05
	-	445500	0.505	3/7/03	10/4/26
Hygro-Thermometer	Extech	445703	0602	CAL	10/4/04

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				10/4/00	
Frequency Counter HP		5352B	2632A00165	10/4/02 CAL	11/28/03
Frequency Counter	nr	3332B	2032A00103	11/28/01	11/28/03
Frequency Counter	HP	5385A	2730A03025	CAL	3/7/05
		33331		3/7/03	2, 1, 22
Service Monitor	IFR	FM/AM 500A	5182	CAL	11/22/02
		•		11/22/00	
Comm. Serv. Monitor	IFR	FM/AM	6593	CAL	5/12/04
		1200s		5/12/02	
Signal Generator	HP	8640B	2308A21464	CAL	2/15/04
				2/15/02	
Sweep Generator	Wiltron	6648	101009	CAL	4/15/05
				4/15/03	
Sweep Generator	Wiltron	6669M	007005	CAL	3/3/05
				3/3/03	
Modulation Analyzer	HP	8901A	3435A06868	CAL	9/5/03
			10001	9/5/01	4 /4 - / 0 -
Modulation Meter	Boonton	8220	10901AB	CAL	4/15/05
Near Field Probe	IID	HP11940A	2650A02748	4/15/03	2/1/02
Near Fleid Probe	HP	HPI1940A	265UAU2/48	CHAR 2/1/01	2/1/03
BandReject Filter	Lorch	5BR4-	Z1	CHAR	4/17/05
Dandke Ject Filter	Microwave	2400/60-N	21	4/17/03	4/1//03
BandReject Filter	Lorch	6BR6-	Z1	CHAR	4/17/05
	Microwave	2442/300-N		4/17/03	_, _,,
BandReject Filter	Lorch	5BR4-	Z1	CHAR	4/12/05
	Microwave	10525/900-		4/12/03	
		s			
Notch Filter	Lorch	5BRX-	AD-1	CHAR	4/17/05
	Microwave	850/X100-N		4/17/03	
High Pass Filter	Unk	3768(5)-	041	CHAR	12/17/04
		400		12/17/02	
High Pass Filter	Microlab	HA-10N		CHAR	11/17/04
				11/17/02	
High Pass Filter	Microlab	HA-20N		CHAR	12/17/04
344- 0411-b	***	CE23	020 00060	12/17/02	10/1/04
Audio Oscillator	HP	653A	832-00260	CHAR 12/1/02	12/1/04
Audio Generator	B&K Precision	3010	8739686	CHAR	12/1/04
Audio Generator	bak Flecision	3010	8739000	12/1/02	12/1/04
Frequency Counter				T2/ T/ U2	
	HP	5382A	1620A03535	CHAR	3/2/03
rrequency counter	HP	5382A	1620A03535	CHAR 3/2/01	3/2/03
Frequency Counter	HP	5382A 5385A	1620A03535 3242A07460	CHAR 3/2/01 CAL	3/2/03
				3/2/01	
				3/2/01 CAL	
Frequency Counter	НР	5385A	3242A07460	3/2/01 CAL 3/7/03	3/7/05
Frequency Counter	НР	5385A	3242A07460	3/2/01 CAL 3/7/03 CHAR	3/7/05
Frequency Counter Amplifier	нр	5385A	3242A07460	3/2/01 CAL 3/7/03 CHAR 3/1/01	3/7/05
Frequency Counter Amplifier	нр	5385A	3242A07460	3/2/01 CAL 3/7/03 CHAR 3/1/01 CHAR 2/1/02 CHAR	3/7/05
Frequency Counter Amplifier Egg Timer Measuring Tape-20M	HP HP Unk Kraftixx	5385A 11975A 0631-20	3242A07460	3/2/01 CAL 3/7/03 CHAR 3/1/01 CHAR 2/1/02 CHAR 2/1/02	3/7/05 3/1/03 2/1/04 2/1/04
Frequency Counter Amplifier Egg Timer	HP HP Unk	5385A 11975A	3242A07460	3/2/01 CAL 3/7/03 CHAR 3/1/01 CHAR 2/1/02 CHAR 2/1/02 CHAR	3/7/05 3/1/03 2/1/04
Frequency Counter Amplifier Egg Timer Measuring Tape-20M Measuring Tape-7.5M	HP HP Unk Kraftixx Kraftixx	5385A 11975A 0631-20 7.5M PROFI	3242A07460 2738A01969	3/2/01 CAL 3/7/03 CHAR 3/1/01 CHAR 2/1/02 CHAR 2/1/02 CHAR 2/1/02	3/7/05 3/1/03 2/1/04 2/1/04 2/1/04
Frequency Counter Amplifier Egg Timer Measuring Tape-20M	HP HP Unk Kraftixx Kraftixx Insulated Wire	5385A 11975A 0631-20 7.5M PROFI NPS 2251-	3242A07460	3/2/01 CAL 3/7/03 CHAR 3/1/01 CHAR 2/1/02 CHAR 2/1/02 CHAR 2/1/02 CHAR	3/7/05 3/1/03 2/1/04 2/1/04
Frequency Counter Amplifier Egg Timer Measuring Tape-20M Measuring Tape-7.5M Coaxial Cable #51	HP HP Unk Kraftixx Kraftixx Insulated Wire Inc.	5385A 11975A 0631-20 7.5M PROFI NPS 2251- 2880	3242A07460 2738A01969 Timco #51	3/2/01 CAL 3/7/03 CHAR 3/1/01 CHAR 2/1/02 CHAR 2/1/02 CHAR 2/1/02 CHAR 1/23/02	3/7/05 3/1/03 2/1/04 2/1/04 2/1/04 1/23/04
Frequency Counter Amplifier Egg Timer Measuring Tape-20M Measuring Tape-7.5M	HP HP Unk Kraftixx Kraftixx Insulated Wire	5385A 11975A 0631-20 7.5M PROFI NPS 2251-	3242A07460 2738A01969	3/2/01 CAL 3/7/03 CHAR 3/1/01 CHAR 2/1/02 CHAR 2/1/02 CHAR 2/1/02 CHAR	3/7/05 3/1/03 2/1/04 2/1/04 2/1/04

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x	Coaxial Cable #65	General Cable	E9917 RG233/U	Timco #65	CHAR 1/23/02	1/23/04
	Coaxial Cable #106	Unknown	Unknown	Timco #106	CHAR 1/23/02	1/23/04
	Injection Probe	Fischer Custom Communications	F-120-9A	270	CAL 6/1/01	6/1/03
	Power Line	Fischer Custom	FCC-801-	01048	CAL	8/29/03
	Coupling/Decoupling Network	Communications	M2-16A		8/29/01	
	Power Line	Fischer Custom	FCC-801-	01060	CAL	8/29/03
	Coupling/Decoupling Network	Communications	M3-16A		8/29/01	
	VHF/UHF Current Probe	Fischer Custom Communications	F-52	130	CAL 8/30/01	8/30/03
	Passive Impedance	Fischer Custom	FCC-801-	01117 &	CAL	8/29/03
	Adapter	Communications	150-50-CDN	01118	8/29/01	
	Radiating Field	Fischer Custom	F-1000-4-	9859	CAL	10/15/00
	Coil	Communications	8/9/10-L-		10/15/98	
			1M			
	EMC Immunity Test	Keytek	CEMASTER	9810210	CAL	2/1/04
	System				2/1/02	
	AC Power Source	California Instruments	1251RP	L05865		
	AC Power Source	California Instruments	PACS-1	X71484		
	Isotropic Field	Amplifier	FP5000	22839		
	Probe	Research				
	Isotropic Field	Amplifier	FP5000	300103		
	Probe	Research				
	Capacitor Clamp	Keytek	CM-CCL	9811359	No Cal Required	
	Amplifier	Amplifier Research	10W1000B	23117	No Cal Required	
	Field Monitor	Amplifier	FM5004	22288	No Cal	
		Research			Required	
	ELF Meter	F. W. Bell	4060	Not		
				Serialized		

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TEST PROCEDURES

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

RADIATION INTERFERENCE: Testing was done in accordance with ANSI C63.4-2001. Section 15.35(b) specifies the use of an average detector in this band. In addition, the peak level of an emission shall not exceed the average limit by more than 20 dB using a minimum Resolution Bandwidth (RBW) of 1 MHz and minimum Video Bandwidth (VBW) OF 1 MHz. The following procedure is designed to determine if there are any spurious emissions from the local oscillator within the band of interest along with any additional spurious emissions caused by other circuitry within the device.

- Determine the frequency of the peak emission:
 Start Frequency 11.7 GHz
 Stop Frequency 12.2 GHz
 RBW equal to or greater than 1 MHz
 VBW equal to or greater than 1 MHz
 Detector Function Peak
 Maximize the emissions with regards to device orientation, antenna polarization, and antenna height. Sweep the band using Max Hold for a minimum of 2 minutes. Record this frequency for measuring the peak emission. In addition record the frequency of other spurious emissions noted.
- 2) Determine the peak level of the emission:

 Center Frequency Set to the frequency determined in Step 1 RBW

 Equal to or greater than 1 MHz VBW Equal to or greater than 1 MHz

 Detector Function Peak Measure the value of the peak emission

 using Max Hold for a minimum of 2 minutes. This can be done at

 zero span or a frequency span where the analyzer does not show a

 "Measurement Uncalibrated" message. Record the peak value. If

 the peak measurement is compliant with the average limit an

 average measurement is not necessary. If the peak value exceeds

 the average limit by less than 20 dB proceed to Step 3.
- Determine the average level of the emission: Center Frequency Set to the frequency determined in Step 1 Span Zero

RBW Equal to or greater than 1 MHz VBW Equal to or greater than 10 Hz $\,$

Detector Function Peak

This measurement uses video averaging and must be done in Linear mode. The analyzer Reference Level is adjusted so that a signal is clearly visible on the screen. Measure the value of the emission using Max Hold for a minimum of 2 minutes. Record this as the average value. Step 2 and Step 3 should be repeated for other spurious emissions.

The ambient temperature of the UUT was 80°F with a humidity of 70%.

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TEST PROCEDURES CONTINUED

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF = FS

33 20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.4-1992 10.1.7 MEASUREMENT PROCEDURES: The unit under test was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.109

REQUIREMENTS: 30 to 88 MHz: 40.0 dBuV/M @ 3 METERS

88 to 216 MHz: 43.5 dBuV/M 216 to 960 MHz: 46.0 dBuV/M ABOVE 960 MHz: 54.0 dBuV/M 11.7 to 12.2GHz: 54.0dBuV/m

TEST RESULTS: A search was made of the spectrum from 30 to

1000MHz and from 11.7 to 12.2GHz the measurements

indicate that the unit DOES meet the FCC

requirements. Measurements in the 11.7 to 12.2GHz band were made with a Standard Gain Horn. The measurements in the 11.7 to 12.2GHz band represent the ambient noise levels. The attached plots were made with peak detector with the analyzer in a

maximum hold for 2 minutes.

TEST DATA:

Tuned	Emission	Meter	ANT.	Coax		Field	
Frequency	Frequency	Reading	POLARITY	Loss	Correction	Strength	Margin
\mathtt{MHz}	\mathtt{MHz}	dBuV		đВ	Factor	dBuV/m	đВ
					đВ		
10,500.0	11,725.00	1.0	H	9.96	29.80	40.76	13.24
10,500.0	11,725.00	1.9	v	9.96	29.80	41.66	12.34
10,500.0	11,866.00	1.8	v	10.11	29.80	41.71	12.29
10,500.0	11,866.00	2.9	H	10.11	29.80	42.81	11.19
10,500.0	11,892.00	1.3	H	10.14	29.80	41.24	12.76
10,500.0	11,892.00	2.3	v	10.14	29.80	42.24	11.76
10,500.0	12,054.00	1.3	H	10.30	29.70	41.30	12.70
10,500.0	12,054.00	1.9	v	10.30	29.70	41.90	12.10
10,500.0	12,112.00	2.0	v	10.35	29.70	42.05	11.95
10,500.0	12,112.00	2.6	н	10.35	29.70	42.65	11.35

^{*} The EUT is operating on the following bands; 10.525GHz(X-Band), 24.150GHz(K-Band), 33.4-36.0GHz(KA Band)

SAMPLE CALCULATION: FSdBuV/m = MR (dBuV) + ACFdB.

PERFORMED BY: JOSEPH SCOGLIO DATE: JULY 22, 2002

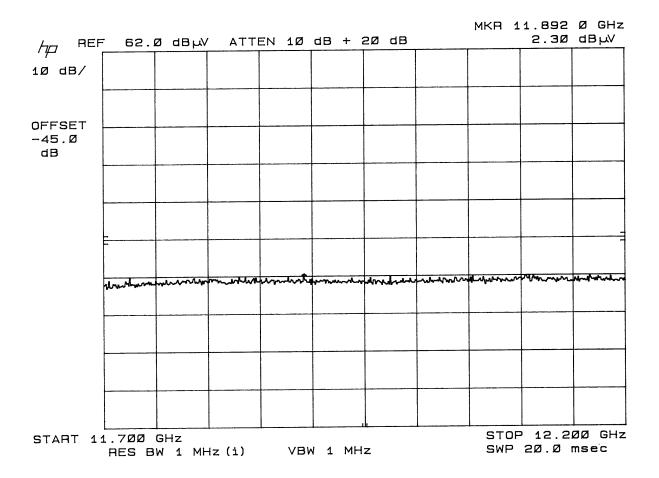
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VERTICAL LINE PLOT



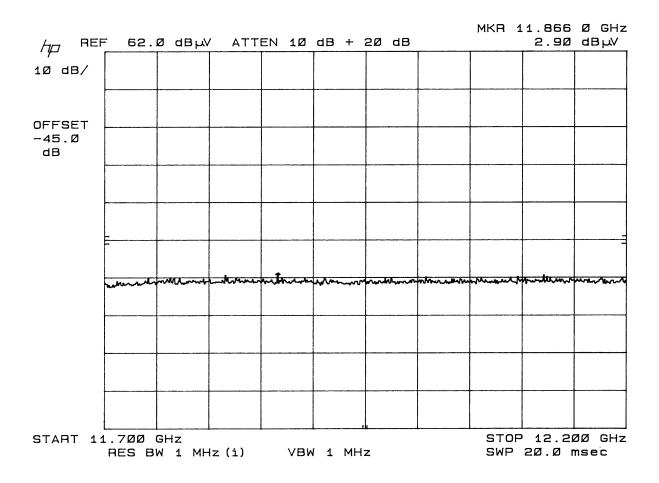
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HORIZONTAL LINE PLOT



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