FCC CFR47 PART 24 SUBPART E
CLASS II PERMISSIVE CHANGE TEST REPORT

FOR

MCBTS 1900 SINGLE CARRIER POWER AMPLIFIER

MODEL: ORIOLE 2

FCC ID: I2O-ORIOLE1
(GRANTED ON 02/02/1999)

REPORT NUMBER: 99U0485

ISSUE DATE: AUGUST 31, 1999

Prepared for
SPECTRIAN, INC.
350 WEST JAVA DRIVE
SUNNYVALE, CA 94089

Prepared by
COMPLIANCE CERTIFICATION SERVICES, INC.
d.B.a.
COMPLIANCE CERTIFICATION SERVICES
1366 BORDEAUX DRIVE
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NVLAP®

LAB CODE:200065-0

TABLE OF CONTENTS PAGE

COMPLIANCE CONSULTING SERVICES DOCUMENT NO:CCSUP4031A
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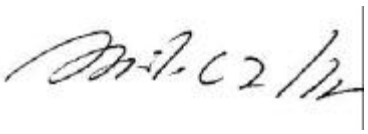
1. VERIFICATION OF COMPLIANCE

COMPANY NAME:	SPECTRIAN, INC. 350 WEST JAVA DRIVE SUNNYVALE CA 94089
CONTACT PERSON:	BILL HENNING Jr. / MANAGER , AMPLIFIER ENGINEERING
TELEPHONE NO:	(408) 543-5977
MODEL NO/NAME:	ORIOLE 2
SERIAL NO:	N/A
DATE TESTED:	AUGUST 13, 1999

TYPE OF EQUIPMENT:	MCBTS 1900 SINGLE CARRIER POWR AMPLIFIER
MEASUREMENT DISTANCE:	(X) 3 METER ( ) 10 METER
FCC RULES:	PART 2, PART 15, PART 24 SUBPART E
EQUIPMENT AUTHORIZATION PROCEDURE	CLASS II PERMISSIVE CHANGE
MODIFICATIONS MADE ON EUT	☐ YES ☒ NO
DEVIATIONS FROM MEASUREMENT PROCEDURE	☐ YES (refer to section 20 for comments) ☒ NO

The above equipment was tested by Compliance Certification Services for compliance with the requirements set forth in the FCC CFR 47, PART 2, PART 15 and PART 24. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Reviewed By



MIKE C.I. KUO / VICE PRESIDENT
COMPLIANCE CERTIFICATION SERVICES

2. CLASS II PERMISSIVE CHANGE :

The differences to the previous (I2O-ORIOLE1) filing include, a replacement device in the output stage, an additional MMIC device on the pre-amplifier located on the correction board, and use of a delay line filter to replace the coaxial delay line used in the correction topology.

3. FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J

2.1033(c)(1) Applicant: Spectrian, Inc.
350 West Java Drive
Sunnyvale CA 94089

2.1033(c)(2) FCC ID: I2O-ORIOLE1 GRANTED ON :02/02/1999

2.1033(c)(3) Instruction Manual

2.1033(c)(4) Types of Emissions

CDMA : F9W

2.1033(c)(5) Frequency Range

1931 – 1989 MHZ

2.1033(c)(6) Range of Operating Power

40.4- 44.4dB gain (42.4 dB nominal)

2.1033(c)(7) Maximum Power Rating

The maximum output power is 17.8 Watts.

2.1033(c)(8) Applied voltages and currents into the final transistor elements

25.5 – 26.5 Vdc.

2.1033(c)(9) Tune-up/Optimization Procedure

Not applicable for this product. This amplifier is Plug-n-Play.

2.1033(c)(10) Complete Circuit Diagrams and Functional Diagram

Refer to Schematics Diagram. **Confidentiality is requested for this item.**

2.1033(c)(10)(a) Means for Frequency Stabilization

Not applicable for this product.

2.1033(c)(10)(b) means for suppressing spurious radiation

Not applicable

2.1033(c)(10)(c) Means for Limiting Modulation

Not applicable.

2.1033(c)(10)(d) Means for Limiting Power

The output power of this amplifier is 42.5dBm maximum. There are no power level controls within the amplifier. These are controlled by the system. The amplifier does contain a closed loop for correction.

2.1033(c)(11) Equipment Identification

Proposed FCC ID label format attached.

2.1033(c)(12) Photographs

Photographs of the equipment, internal and external views, are found in the External photos and internal photos files.

2.1033(c)(13) Description of Digital Modulation

Not applicable eut is power amplifier.

2.1033(c)(14) Standard Test Conditions

The transmitter was tested under the following conditions:
Room Temperature: 20 - 23 °C
Relative Humidity: 35 - 50%
DC Supply Voltage: 25.5 – 26.5 Vdc.

Section 2.1033 Description of Various Base Station Configurations

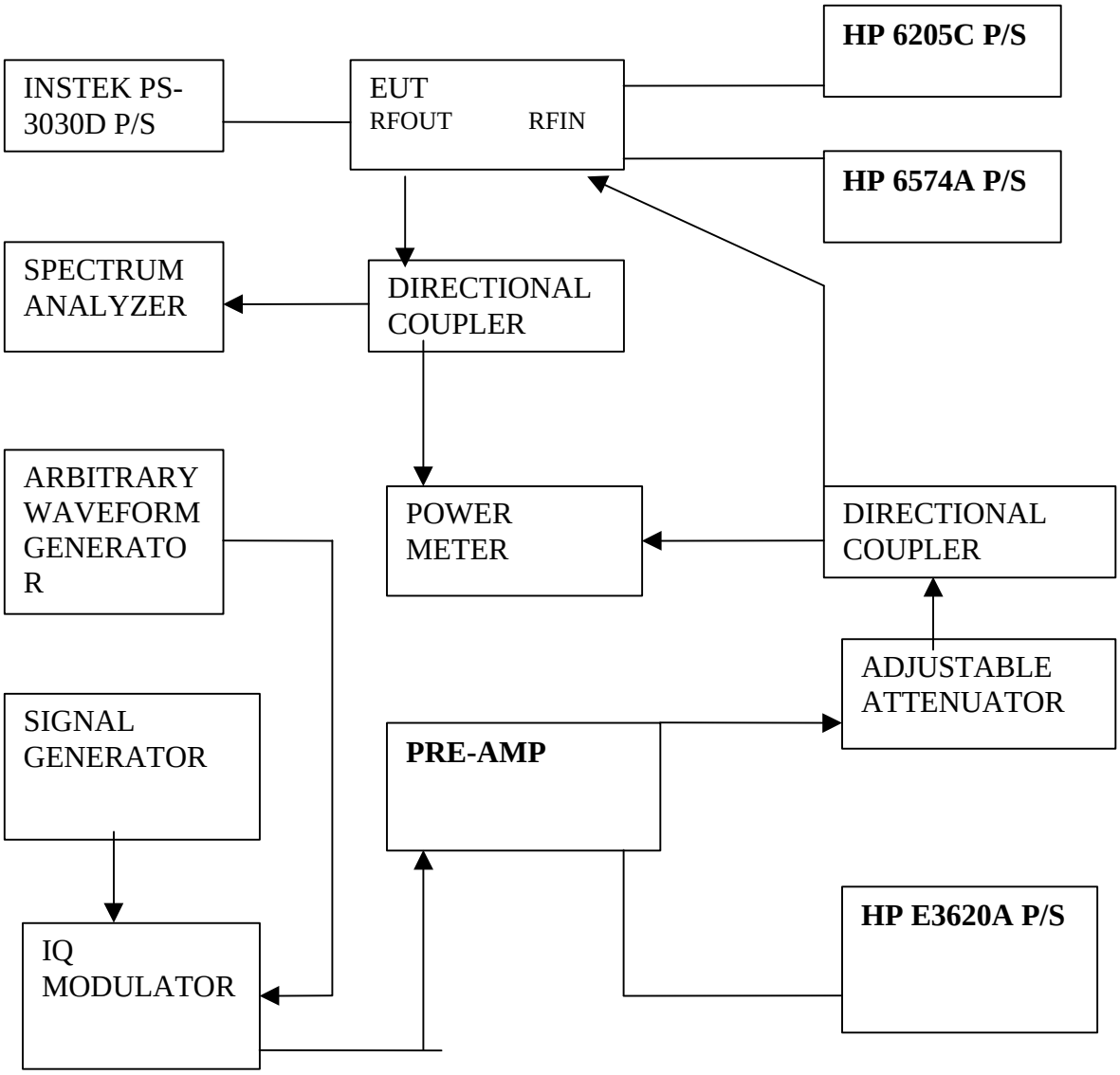
Not Applicable

Section 2.1033 Use of Various Power Supplies

Not Applicable.

4. TEST SETUP AND TEST RESULT :

Test Set-up

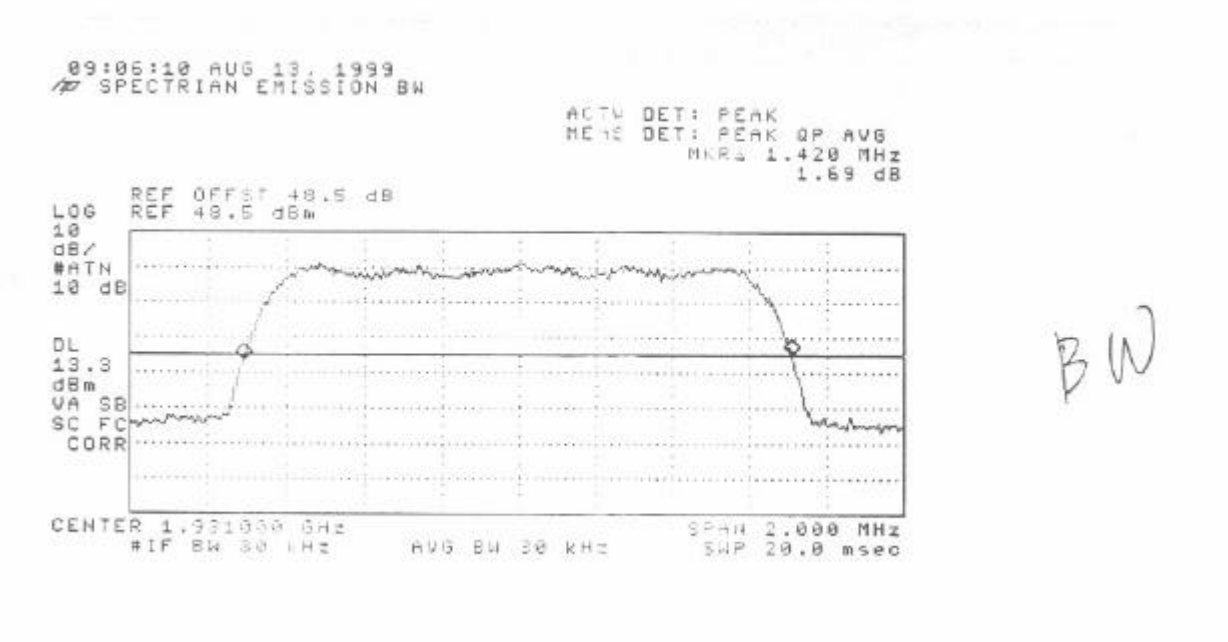


SECTION 2.1047 MEASUREMENT REQUIRED: MODULATION CHARACTERISTICS

Not Applicable

SECTION 2.1049 MEASUREMENT REQUIRED: OCCUPIED BANDWIDTH

Data on the bandwidth occupied by this transmitter is presented in graphical form using spectrum analyzer plots. Emission bandwidth (per 24.238b, the 26dB BW) was measured with RBW=30KHz, VBW=30KHz. Spectrum plot is supplied. Measured occupied bandwidth was 1.42MHz.



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SECTION 2.1051 MEASUREMENTS REQUIRED: SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINALS (**SECTION 24.238 LIMITS**)

Minimum standard: The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under conditions specified in the instruction manual and/or alignment procedure, shall not be less than 43+10 log(mean output power in watts) dBc below the mean power output outside a licensee's frequency block.

24.238 (b) & (c) Compliance with out of band emissions requirement is based on test being performed with 1MHz analyzer RES BW. At block edges, RES BW may be adjusted to a level at least as large as 1% of emission bandwidth. For the EUT this is at least

For CDMA
.01 * 1.42MHz = 14.2kHz. A RES BW of 30kHz was used for measurement.

Test Results

Please refer to the following table which indicates the chart number.

PLOT DESCRIPTION	PLOT NUMBER
BOTTOM BLOCK A	1
TOP BLOCK A	2
BOTTOM BLOCK D	3
TOP BLOCK D	4
BOTTOM BLOCK B	5
TOP BLOCK B	6
BOTTOM BLOCK E	7
TOP BLOCK E	8
BOTTOM BLOCK F	9
TOP BLOCK F	10
BOTTOM BLOCK C	11
TOP BLOCK C	12
OUT OF BAND LOW	13
OUT OF BAND HI	14
2^{ND} HARMONIC AVERAGE READING	15
INPUT PLOT	16

Plots at band edges use average.

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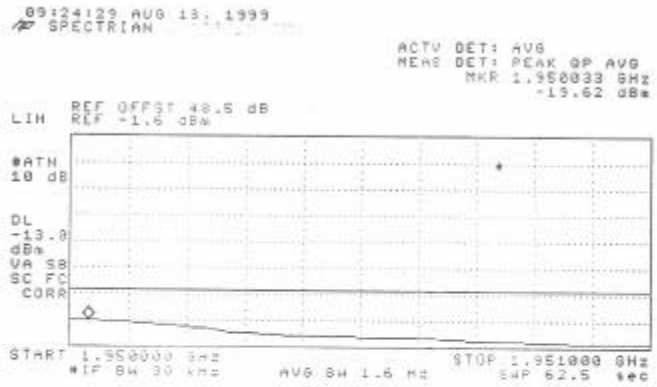

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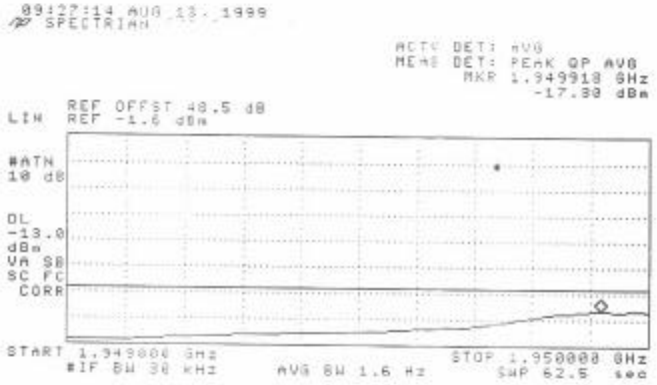

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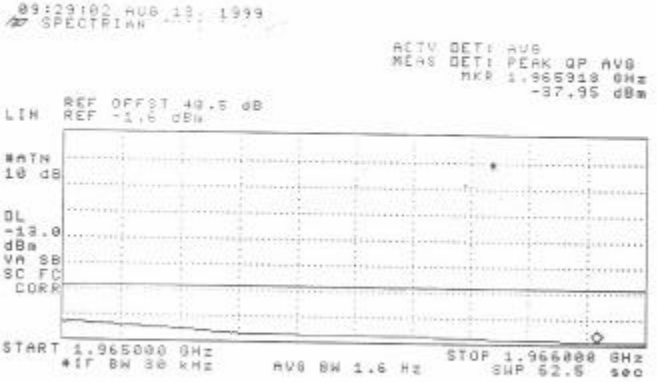

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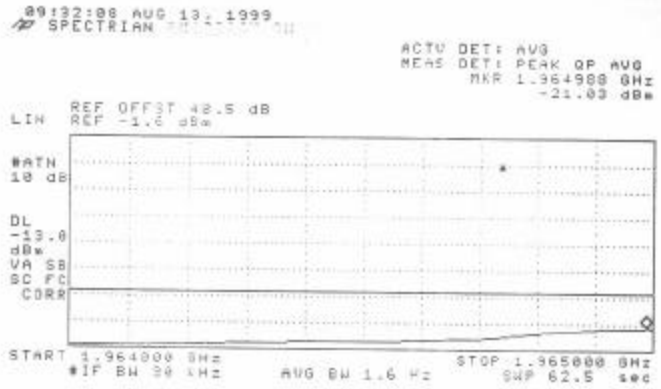

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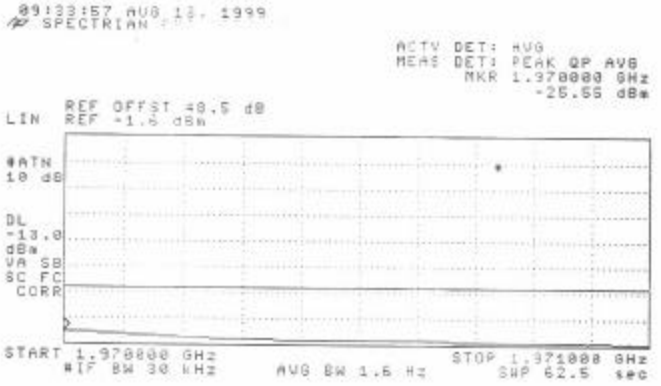

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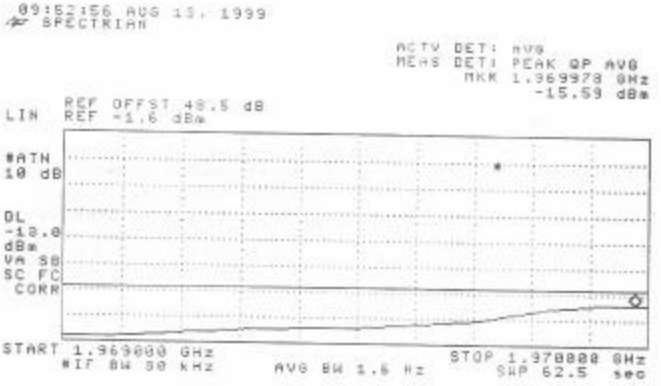

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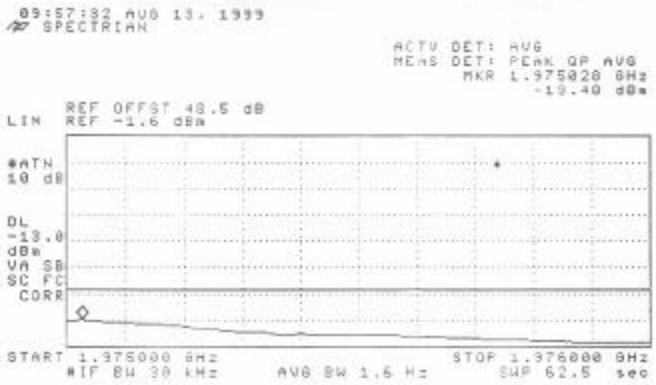

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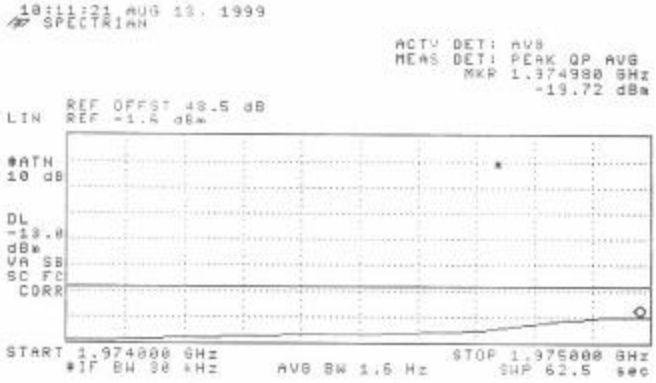

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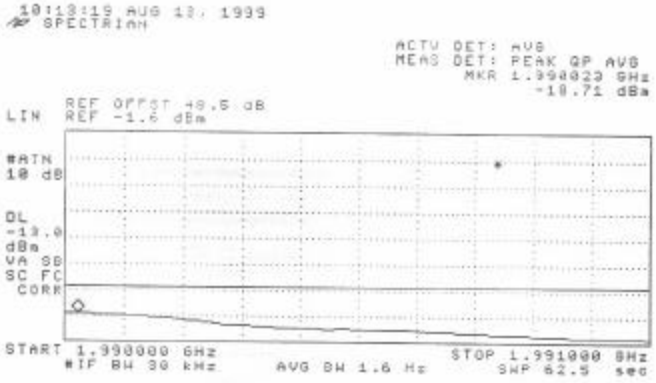

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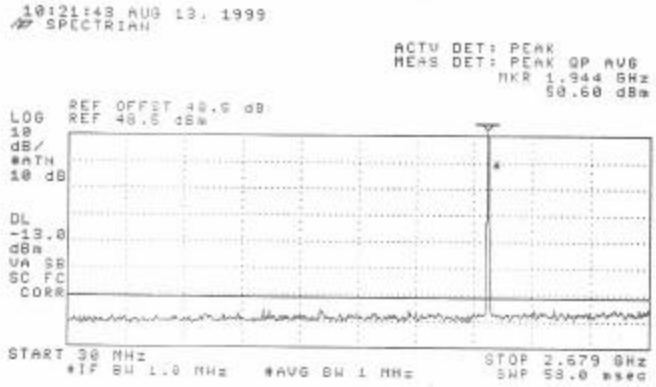

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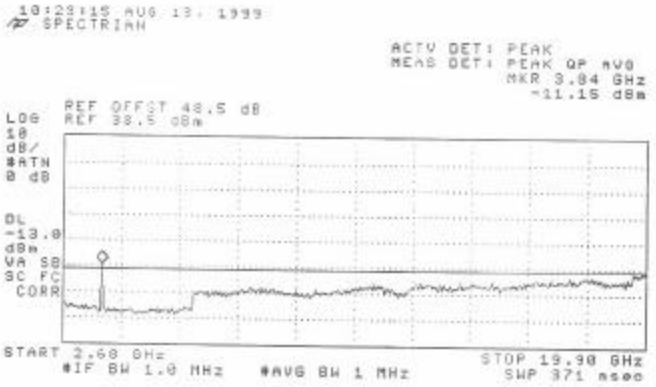

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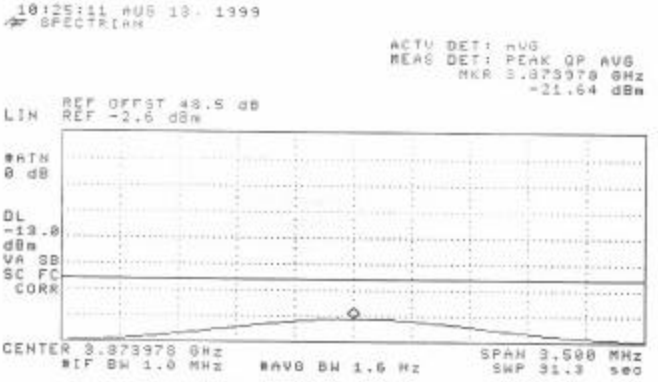

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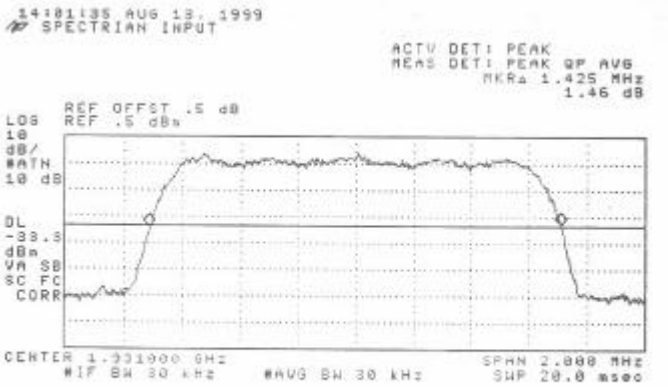
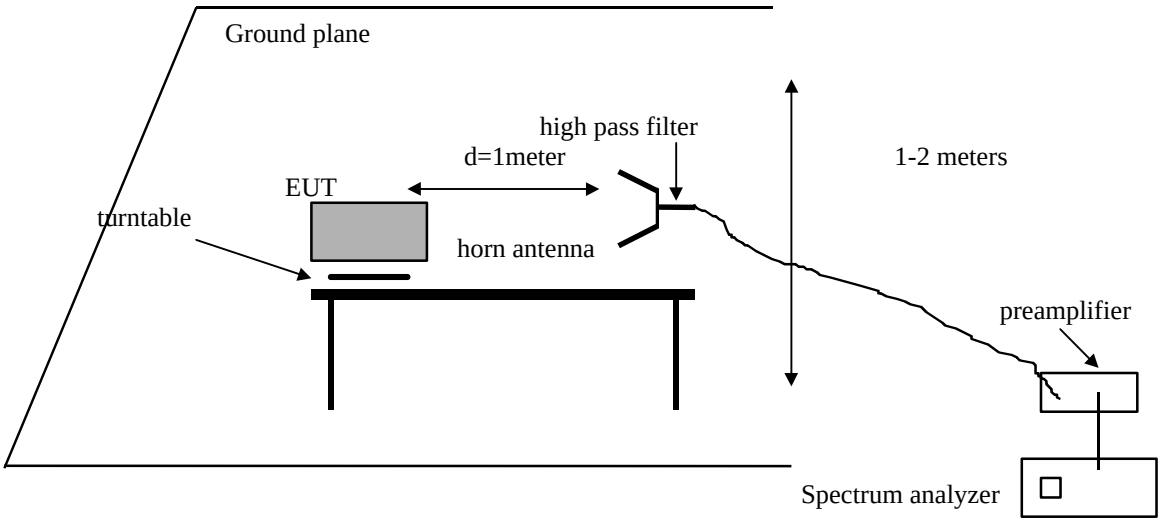


16

SECTION 2.1053 MEASUREMENT REQUIRED: FIELD STRENGTH OF SPURIOUS AND HARMONIC RADIATION

Measurement Equipment Used:
HP 8593EM Spectrum Analyzer
HP 8449 B Preamplifier, 1-26 GHz
EMCO/3115 Double Ridged Horn antenna, 1 - 18 GHz
QIM "The Workhorse" low loss cable, 9 ft (loss: 0.85 dB/ft@ 26 GHz)

Test Set-Up



Minimum Requirement

The magnitude of each spurious and harmonic emission detected as being radiated from the EUT must be at a level more than 43 + 10 log(mean output power, watts) dB below the mean power output (= -13 dBm).

Using the relationship between field strength and RF power into an isotropic transmit antenna:

$$E\ (V/m) = \frac{\sqrt{30 \times P \times G}}{D}$$

P= Amplifiers Maximum Power (Watts)
G= Antenna in Numeric Gain (Assume 1)
D= Distance (Meters)

$$E = \frac{\sqrt{30 \times 17.8 \times 1}}{3} = 7.703 \text{ V/m}$$

20 * log (7.703 x 1,000,000) = 137.73 dBuV/m @ 3 meters

Emission Mask: 43 + 10 * log (P) dB P= Amplifiers Maximum Power (Watts)

43 + 10 * Log (17.8) = 55.504 dB

137.73 – 55.504 = **82.2 dBuV/m @ 3 meters**

Resultant radiated field at 3 meters from –13d Bm source feeding isotropic antenna: **82 dBuV/m**

Test Method
The antenna output port of the EUT was terminated with a 50 ohm shielded termination. With the transmitter operating at full power, the EUT was rotated 360° and the search antenna was raised and lowered in both polarities, all in an attempt to maximize the levels of the received emission for each harmonic and spurious emission up to 10 fo.

Test Results
Corrected field strength readings extrapolated to 3m.

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Compliance Certification Services
24.238(b)

8/13/1999

Pete Krebill
A-site (1Meter)

Spectrian
1900 MHz Amplifier

fo=1931MHz

F(MHz)	*PK* dBuv	AF (dB)	CL (dB)	AMP (dB)	DIST (dB)	OTHER (dB)	TOTAL (dBuV/m) *PK*	LIMIT (dBuV/m) *PK*	MARGIN (dB) *PK*
Vertical									
3862	69.6	32.3	4.86	-35.5	-9.5	1	62.76	82	-19
5793	54.8	35.1	5.94	-35.5	-9.5	1	51.84	82	-30
7724	52.9	36.9	6.48	-35.5	-9.5	1	52.28	82	-30
9655	46.6	38.2	8.1	-35.5	-9.5	1	48.9	82	-33
11586	49.5	38.9	8.64	-35.5	-9.5	1	53.04	82	-29
13517	50.6	41.3	9.54	-35.5	-9.5	1	57.44	82	-25
15448	50.9	39.5	10.8	-35.5	-9.5	1	57.2	82	-25
17379	53	45.9	12.24	-35.5	-9.5	1	67.14	82	-15
19310	60	23.7	13.14	-35.5	-9.5	1	52.84	82	-29
Horizontal									
3862	71.8	32.3	4.86	-35.5	-9.5	1	64.96	82	-17
5793	52	35.1	5.94	-35.5	-9.5	1	49.04	82	-33
7724	51.1	36.9	6.48	-35.5	-9.5	1	50.48	82	-32
9655	46.3	38.2	8.1	-35.5	-9.5	1	48.6	82	-33
11586	48.9	38.9	8.64	-35.5	-9.5	1	52.44	82	-30
13517	51.2	41.3	9.54	-35.5	-9.5	1	58.04	82	-24
15448	50.7	39.5	10.8	-35.5	-9.5	1	57	82	-25
17379	52.9	45.9	12.24	-35.5	-9.5	1	67.04	82	-15
19310	61.1	23.7	13.14	-35.5	-9.5	1	53.94	82	-28

Spectrum Analyzer

	RES	VBW
PK:	1MHz	1MHz

***PK*: Peak**

n.f.: Noise Floor
AF: Antenna Factor
AMP: Pre-amp gain
CL: Cable loss
DIST: Distance Correction(-9.5dB, 1 meter)
20 * log (1 M / 3M) = -9.5 dB

OTHER: High pass filter insertion loss
*FSY Microwave high pass filter (1.804GHz)

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SECTION 2.1055 MEASUREMENT REQUIRED: FREQUENCY STABILITY

Not applicable

SECTION 2.1046: RF POWER OUTPUT

Measured with power meter. All outputs were adjusted between 42.4 and 42.8dBm, during testing.

SECTION 1.1307 ROUTINE ENVIRONMENTAL EVALUATION

Not applicable

SECTION 15.109 RADIATED EMISSION LIMITS:

```
                                                Project No. : 99U0485
        Compliance Engineering Services Inc.     Report No. : 990816A1
                                                      Date : 08/16/1999
                                                      Time : 10:07
            >> 3 M RADIATED EMISSION DATA <<      Test Engr : PETE K


                    Company : SPECTRIAN
         Equipment Under Test : 1900MHZ AMP
           Test Configuration : EUT/4-POWER SUPPLIES/WAVEFORM GENERATOR/SIGNAL
                                GENERATOR/IQ MODULATOR/PRE-AMP
                 Type of Test : FCC CLASS B
            Mode of Operation : IDLE

    Freq.   dBuV   PreAmp   Ant   Cable  dBuV/m  Limit  Margin  Pol  Hgt(m)  Az
  Bilog 2049 ; Pre-amp = 8447D-P1 2944A06833:
NO EMISSIONS DETECTED WITHIN 20dB OF LIMITS.

  Total # of data 0
  V. a2.2
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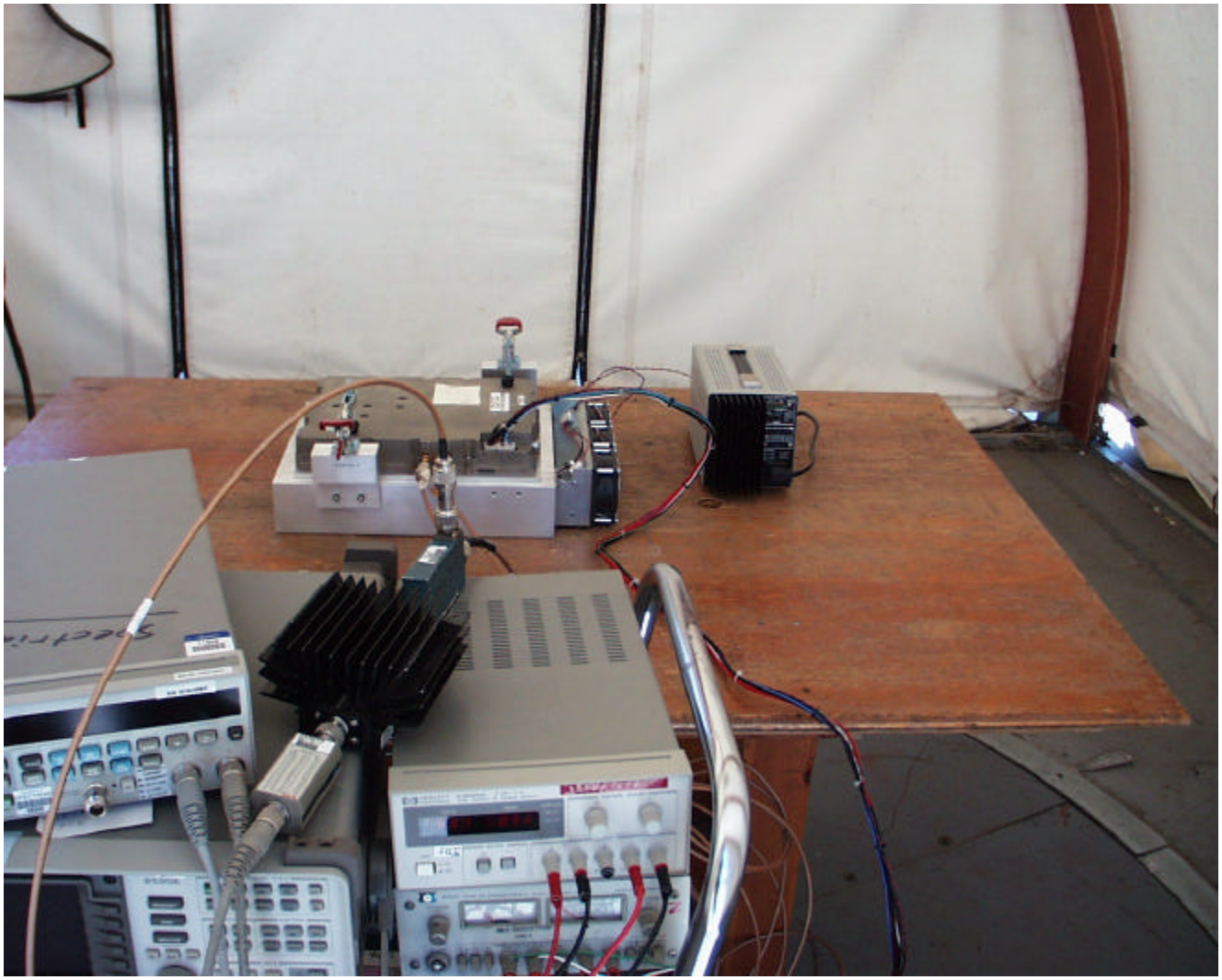
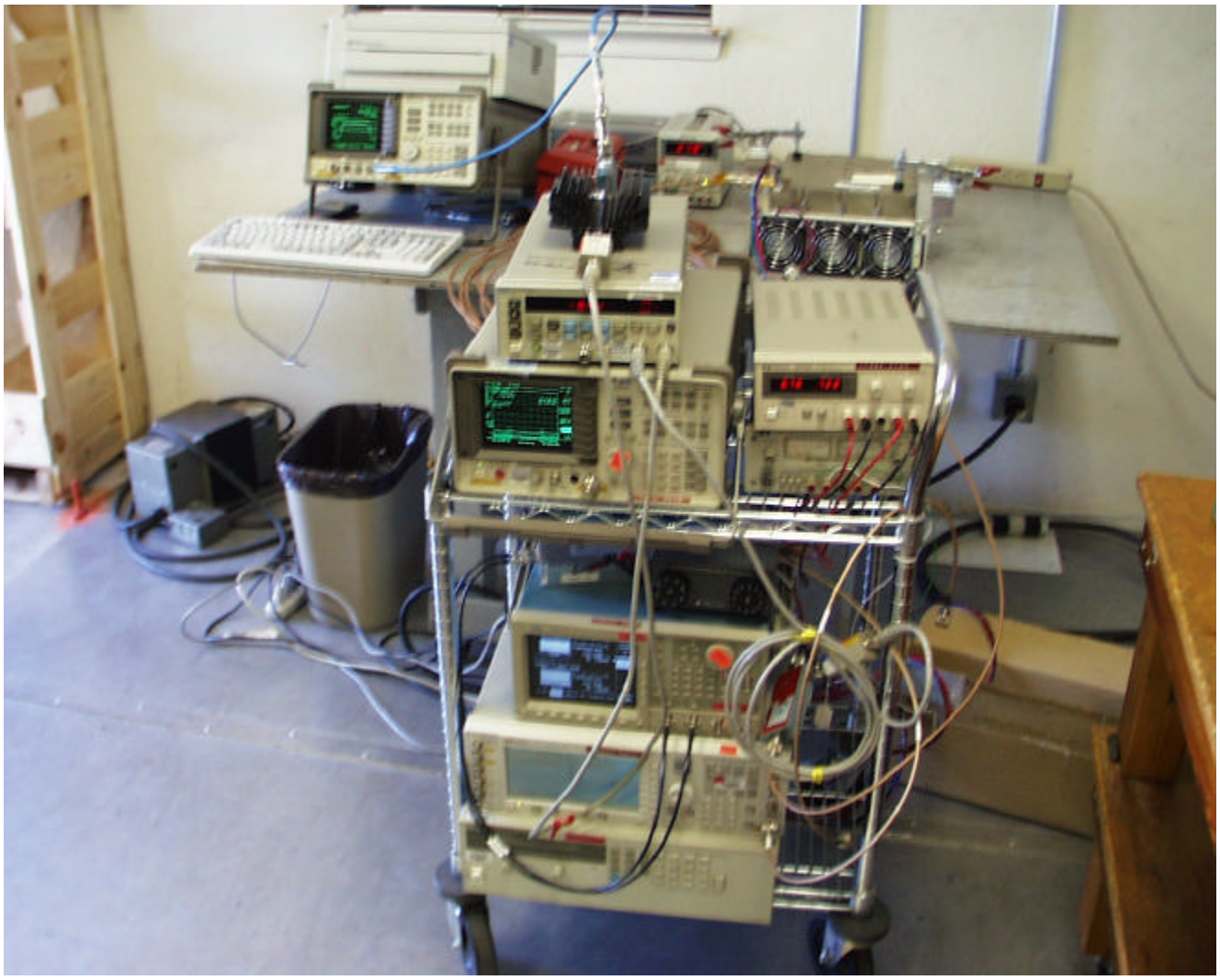
5. TEST SETUP PHOTOS





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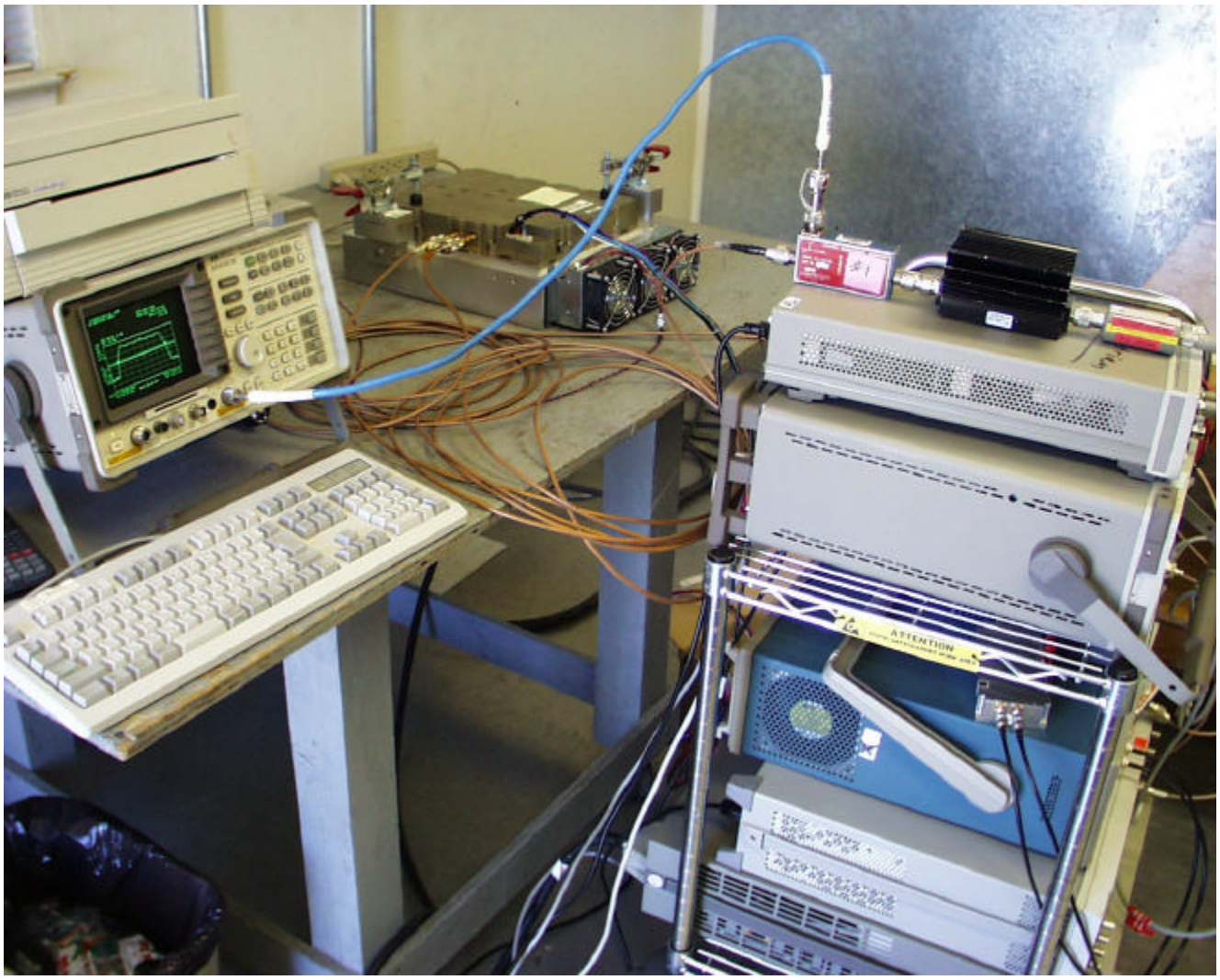

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