FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT

FOR

RF TERMINAL

MODEL NUMBER: T701 and LT701

BRAND NAME: RF TERMINAL

FCC ID: JWSLT701

REPORT NUMBER: 03U2162-2

ISSUE DATE: SEPTEMBER 4TH, 2003

Prepared for
WORTH DATA INCORPORATED
623 SWIFT STREET
SANTA CRUZ, CALIFORNIA 95060
U.S.A

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037, USA
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1. TEST RESULT CERTIFICATION

COMPANY NAME: WORTH DATA, INC.
623 SWIFT ST.
SANTA CRUZ, CA 95060 U.S.A

EUT DESCRIPTION: RF TERMINAL

MODEL: T701 AND LT701

MODEL DIFFERENCE: The only difference between the LT701 and the T701 is the addition of an internal barcode scan engine. The LT701 has the engine built-in and the T701 does not.

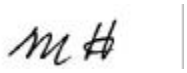
DATE TESTED: AUGUST 18 – SEPTEMBER 4, 2003

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:



MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

YAN ZHENG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is a RF terminal operating in the 902-928 MHz band with 25 channels. The EUT has a peak output power of 20.25 dBm (106 mW) and an antenna gain of 0 dBi.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4/1992, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

4. FACILITIES AND ACCREDITATION

4.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

4.2. TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	IC2324 A,B,C, and F

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measurement instruments utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations, and are traceable to national standards.

5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

5.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST

Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/20/2003
RF Filter Section	HP	85420E	3705A00256	11/20/2003
Antenna, Bicon/Log, 25 ~ 2000 MHz	ARA	LPB-2520/A	1185	3/6/2004
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	9/6/2004
Line Filter	Lindgren	LMF-3489	497	CNR
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	837990	9/6/2004
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/2004
Preamplifier, 1 ~ 26 GHz	Miteq	NSP10023988	646456	4/25/2004
Spectrum Analyzer	HP	E4446A	US42510266	7/23/2004
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/2004
Peak Power Meter	Agilent	E4416A	GB41291160	11/7/2004
Peak / Average Power Sensor	Agilent	E9327A	US40440755	11/7/2004
1.5GHz High Pass Filter	Micro-Tronics	HPM13193	2	N/A
10dB Attenuator	Micro-Tronics	56-10	k16148	N/A
20dB Attenuator	Micro-Tronics	56-20	k16149	N/A

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
AC ADAPTER	GROUP WEST	BUT-09-1600	N/A	DoC

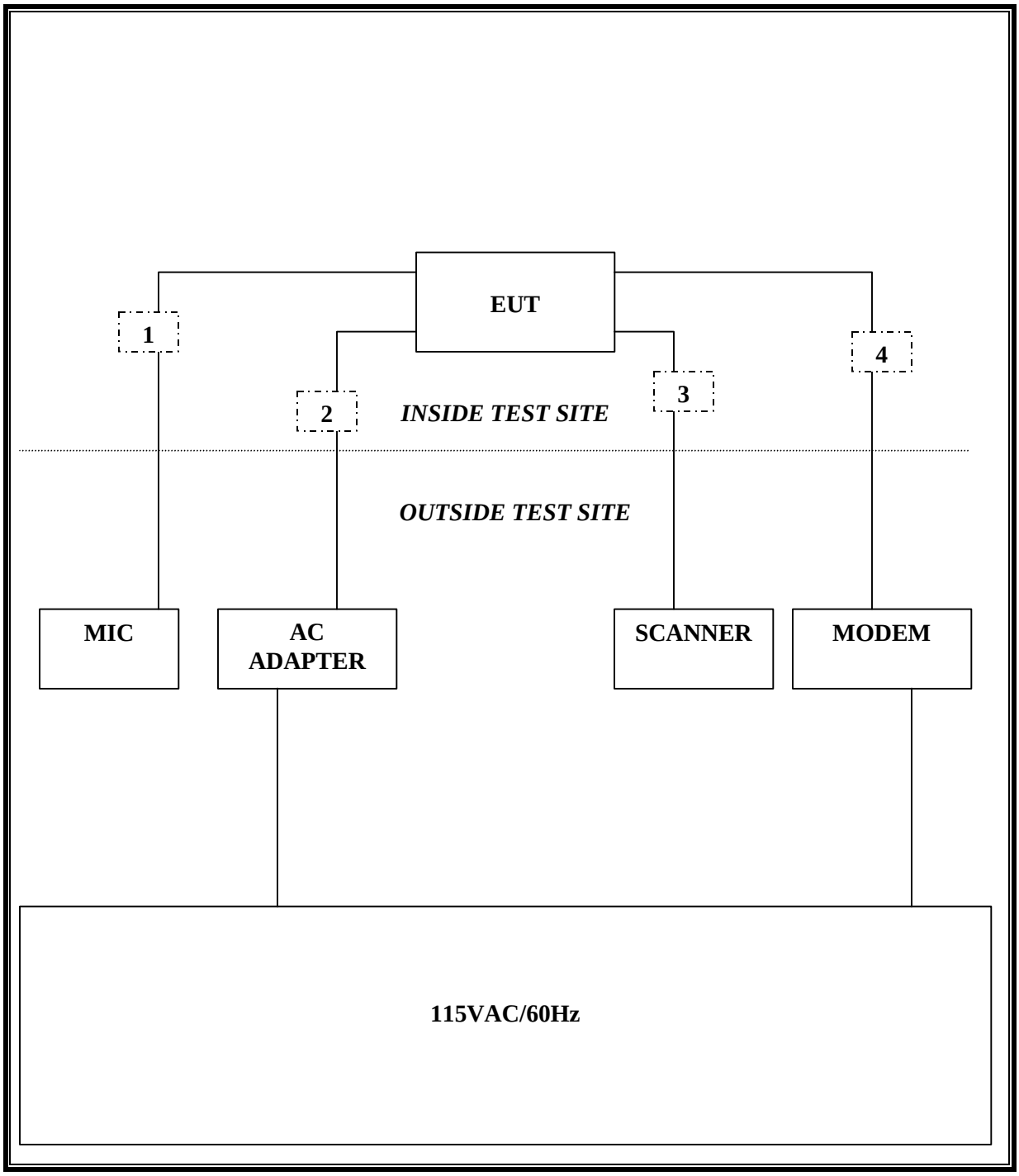
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	MIC	1	¼ STEREO	UNSHIELDED	2M	N/A
2	DC PWR	1	DC PWR	UNSHIELDED	1.86M	N/A
3	SCANNER	1	RJ45	UNSHIELDED	1.86M	N/A
4	SERIAL	1	RJ45	UNSHIELDED	1.86M	N/A

TEST SETUP

The EUT was tested in the X, Y, and Z positions. The worst case was used for the tests. During the testing process the EUT was in continuous transmit mode.

SETUP DIAGRAM



SETUP FOR DIGITAL DEVICE TESTS

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
AC ADAPTER	GROUP WEST	BUT-09-1600	N/A	DoC
SCANNER	WORTH DATA	L150	N/A	DoC
MICROPHONE	QUICKSHOT	QS-5838	N/A	N/A
FAX/MODEM	HAYES	336156K	9013539	IFAXDM1414

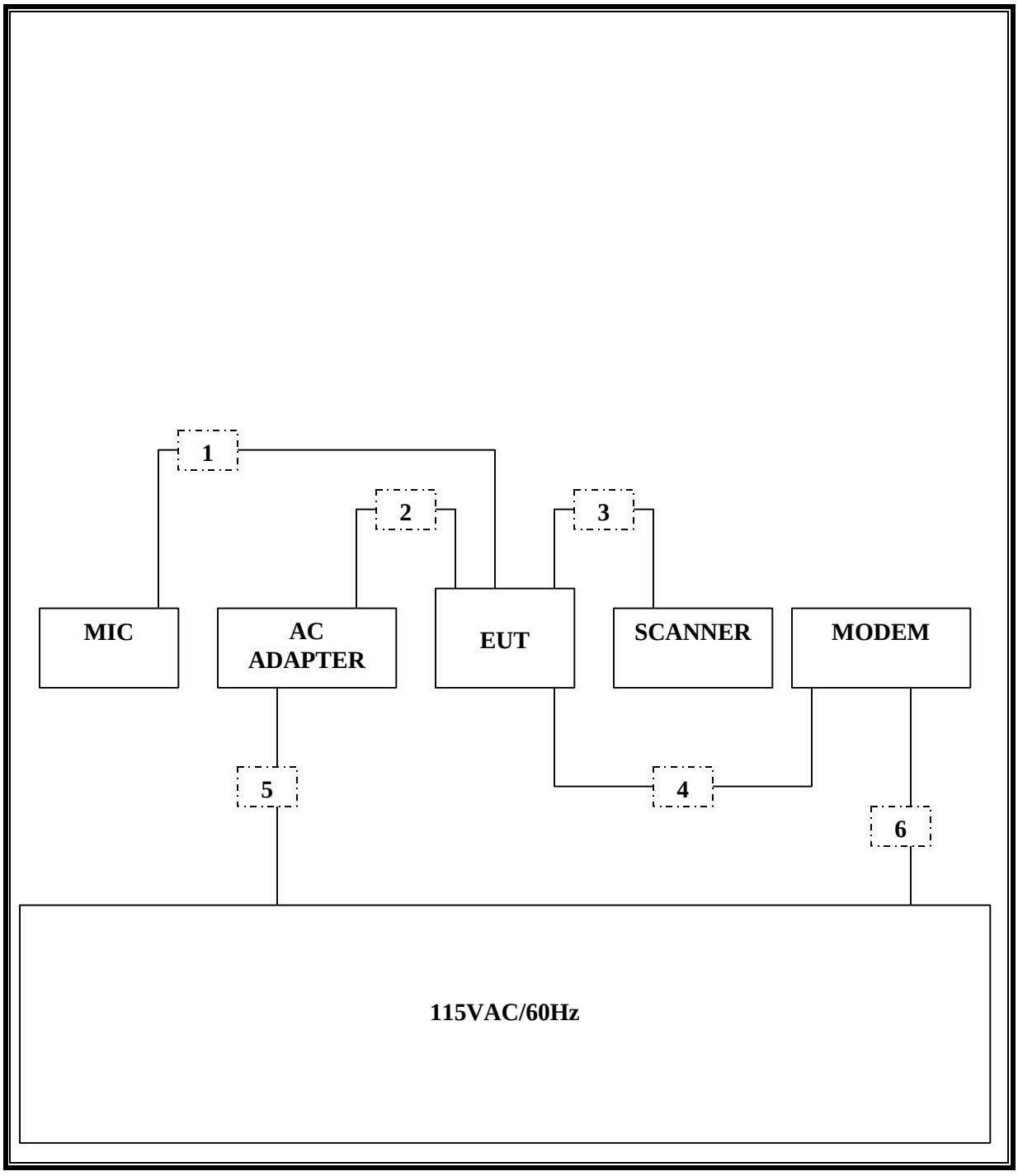
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	MIC	1	¼ STEREO	UNSHIELDED	2M	N/A
2	DC PWR	1	DC PWR	UNSHIELDED	1.86M	N/A
3	SCANNER	1	RJ45	UNSHIELDED	1.86M	N/A
4	SERIAL	1	RJ45	UNSHIELDED	1.86M	N/A
5	AC PWR	1	AC PWR	UNSHIELDED	1.86M	N/A
6	AC/DC PWR	1	DC PWR	UNSHIELDED	1.86M	N/A

TEST SETUP

The EUT was tested in the X, Y, and Z positions. The worst case was used for the tests. During the testing process the eut was in continuous transmit mode.

SETUP DIAGRAM FOR DIGITAL DEVICE TESTS



7. APPLICABLE LIMITS AND TEST RESULTS

7.1. 20 dB BANDWIDTH

LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 3% of the 20 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

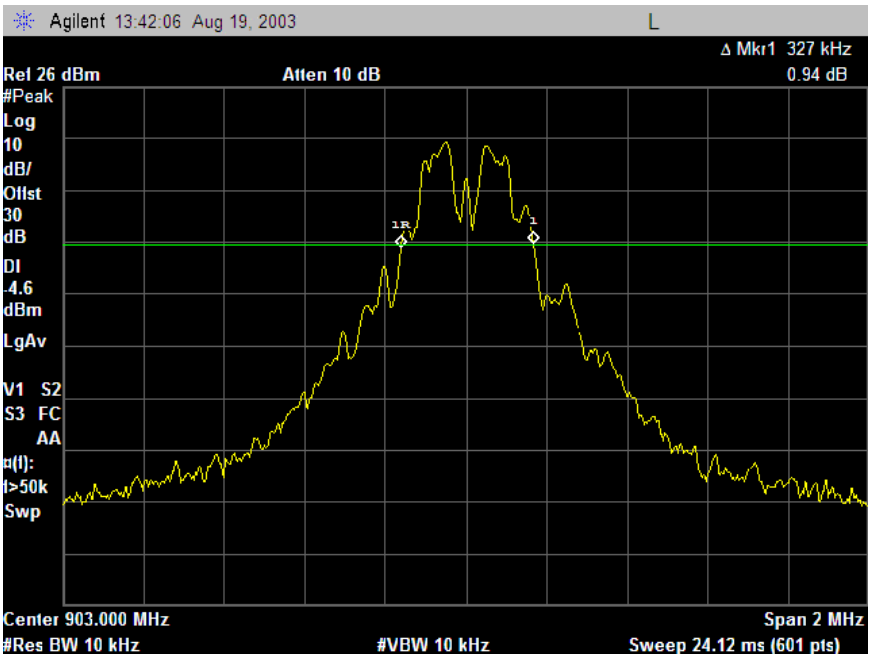
RESULTS

No non-compliance noted:

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)
Low	903	327
Middle	915	390
High	927	497

20 DB BANDWIDTH

20 DB BANDWIDTH LOW CH



20 DB BANDWIDTH MID CH

20 DB BANDWIDTH HIGH CH

7.2. PEAK OUTPUT POWER

PEAK POWER LIMIT

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (1) For frequency hopping systems operating in the 902-928 MHz band employing at least 25 hopping channels: 0.25 watt.

§15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 0 dBi, therefore the limit is 24 dBm.

TEST PROCEDURE

The transmitter output is connected to a peak power meter.

RESULTS

No non-compliance noted:

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	903	20.25	24	-3.75
Middle	915	19.37	24	-4.63
High	927	17.93	24	-6.07

7.3. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 21 dB (including 10 dB pad and 1.0 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11b Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	903	20.16
Middle	915	19.32
High	927	17.86

7.4. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

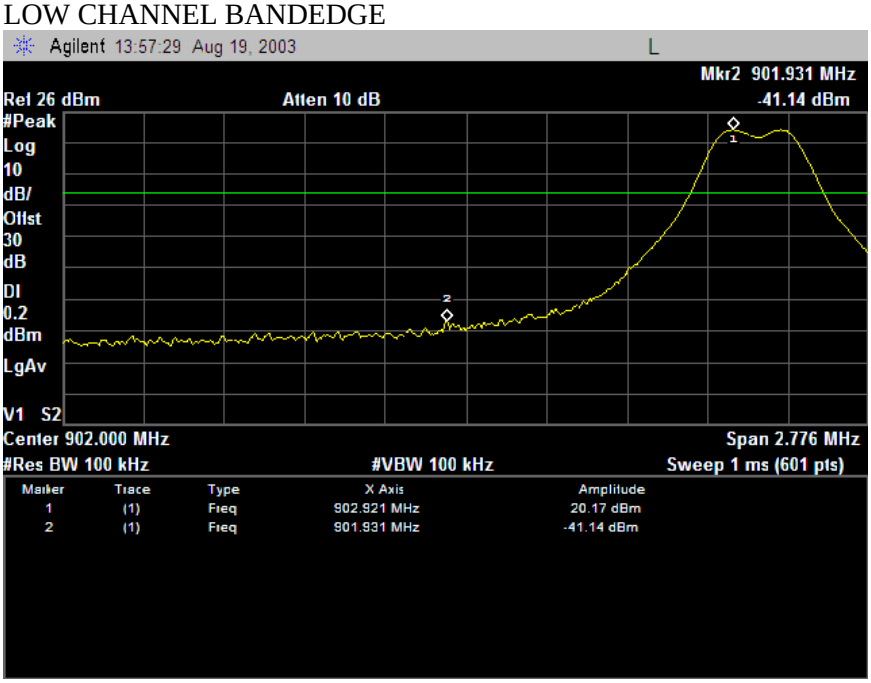
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

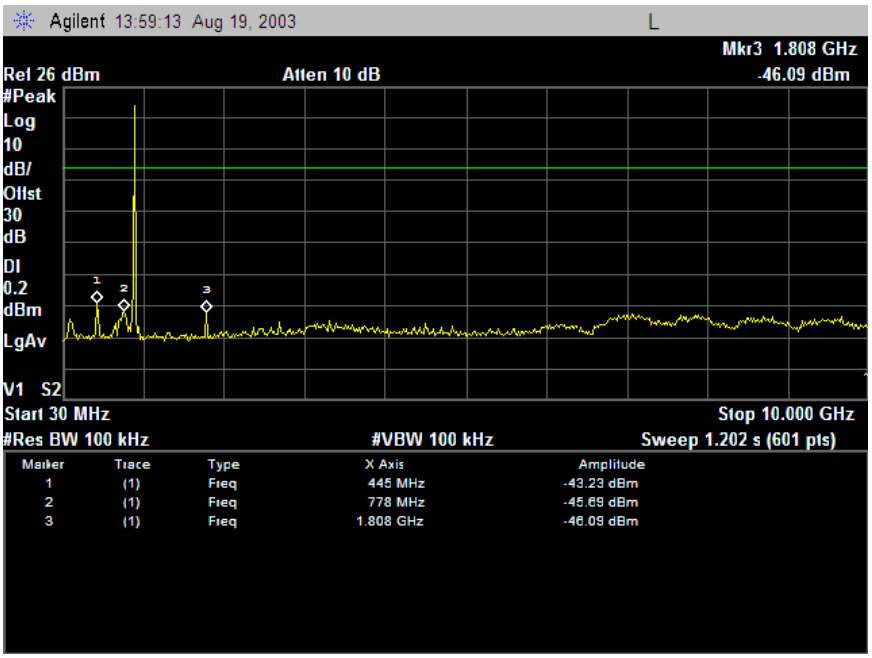
No non-compliance noted:

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

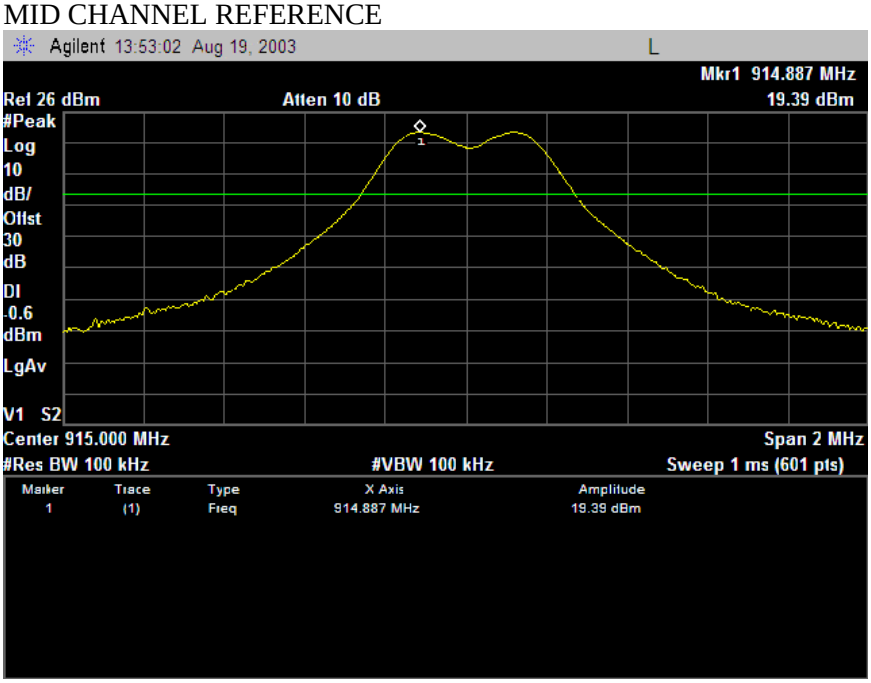


LOW CHANNEL SPURIOUS

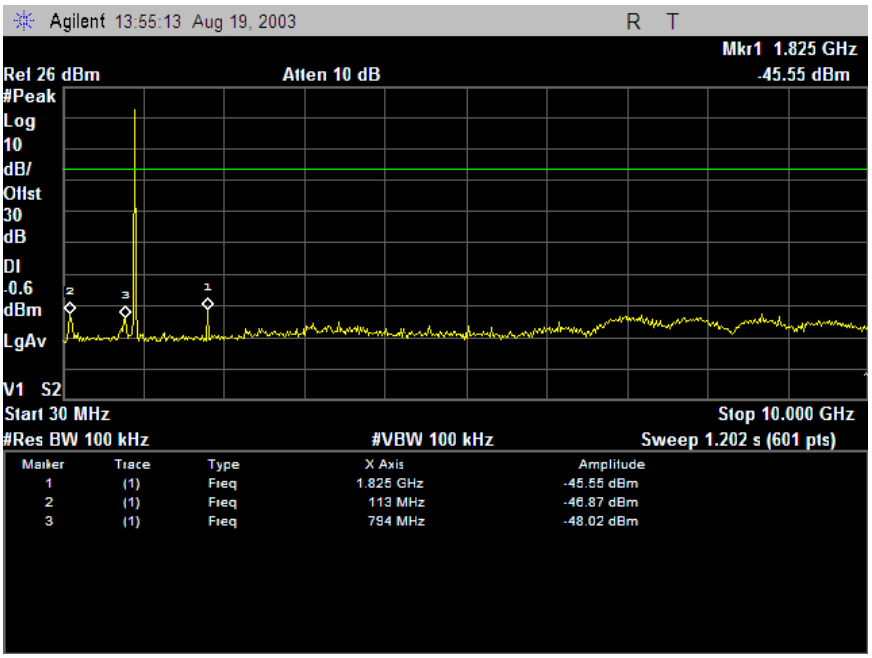


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

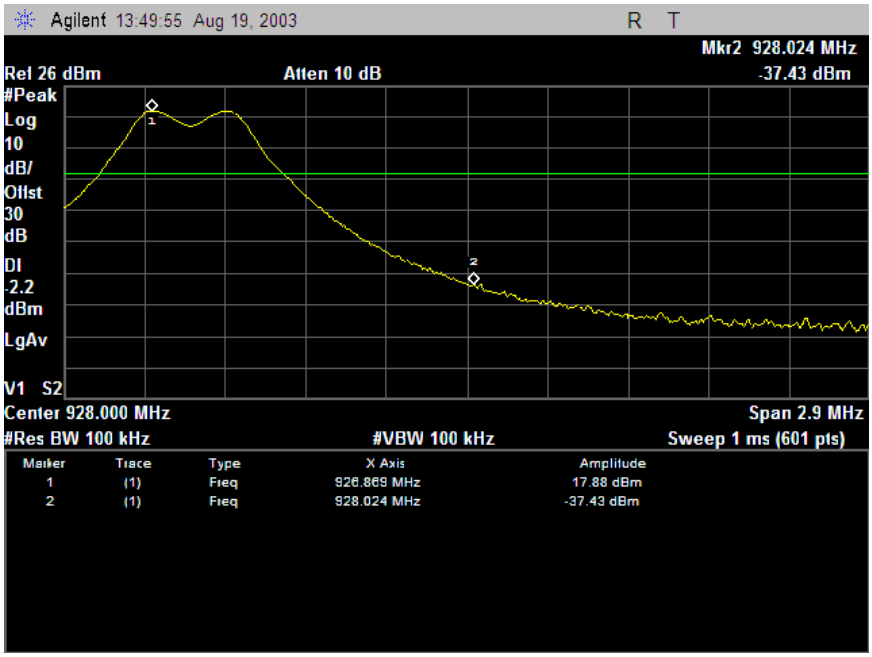


MID CHANNEL SPURIOUS

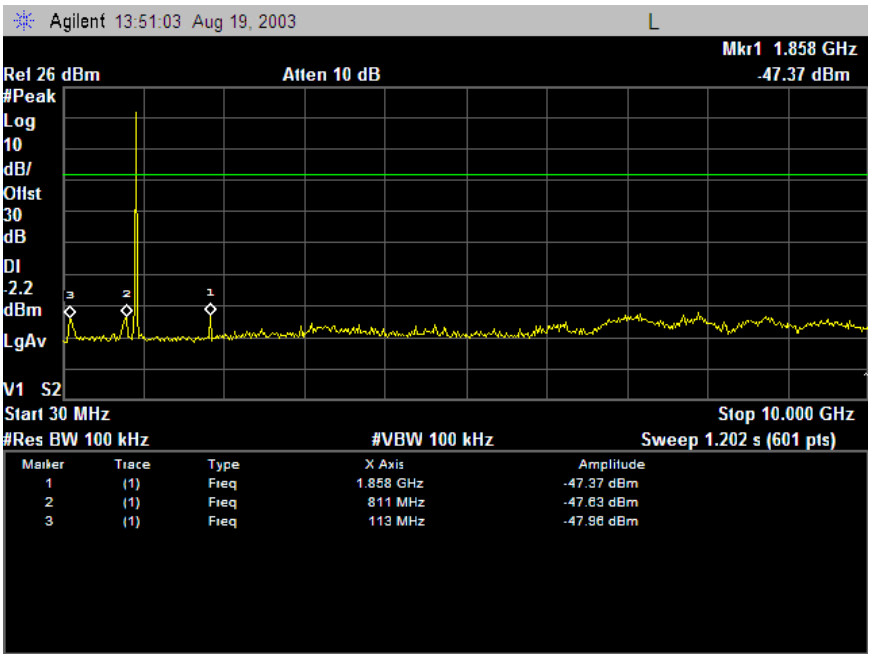


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE

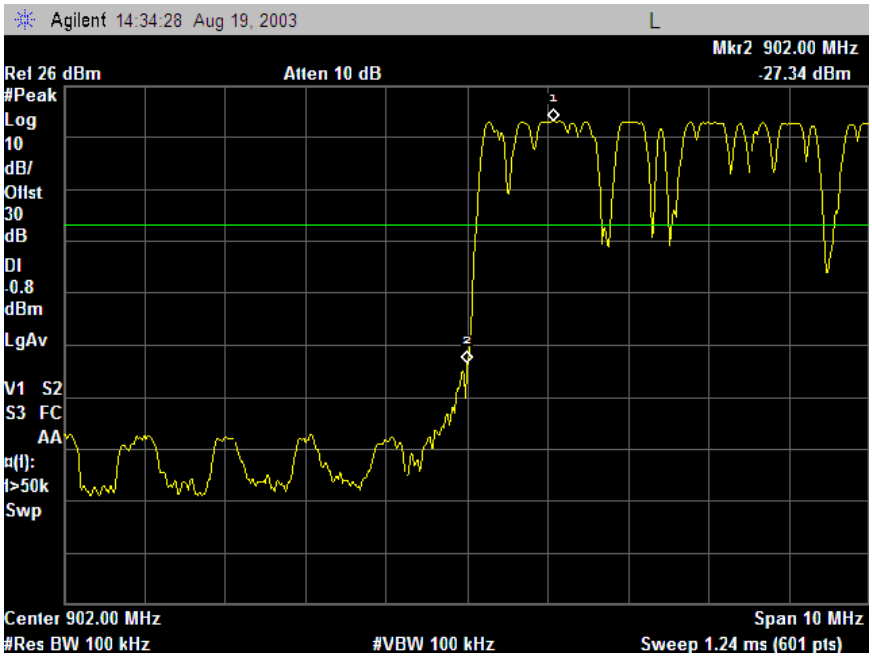


HIGH CHANNEL SPURIOUS

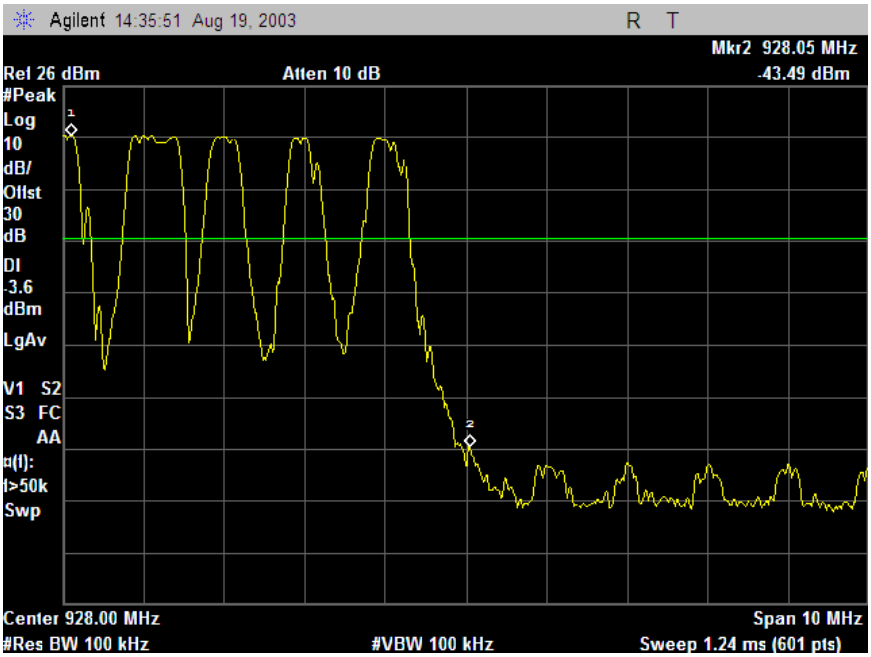


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



7.5. NUMBER OF HOPPING CHANNELS

LIMIT

§15.247 (a) (1) (iii) Frequency hopping systems in the 902-928 MHz band shall use at least 25 non-overlapping channels.

TEST PROCEDURE

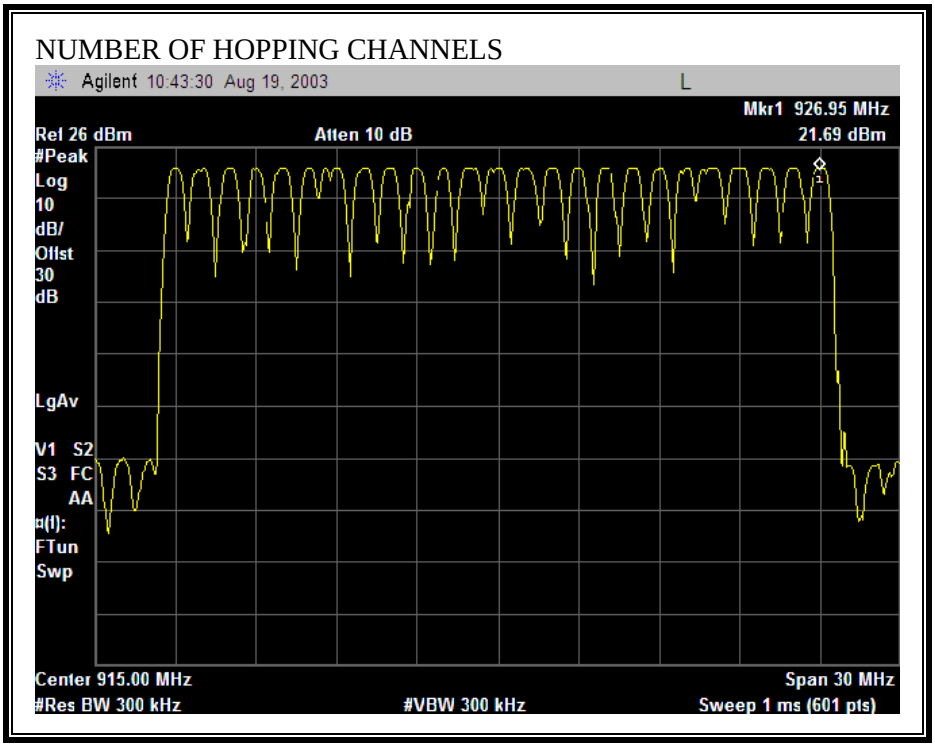
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to 1 % of the span. The analyzer is set to Max Hold.

RESULTS

No non-compliance noted:

25 Channels observed.

NUMBER OF HOPPING CHANNELS



7.6. HOPPING FREQUENCY SEPARATION

LIMIT

§15.247 (a) (1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

RESULTS

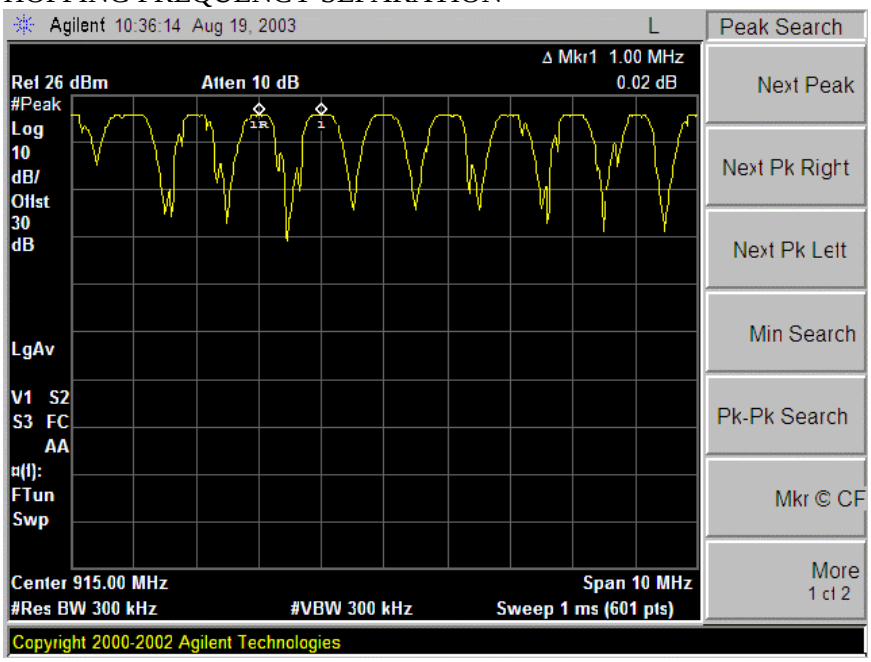
No non-compliance noted:

802.11b Mode

Channel	Frequency (MHz)	CHANNEL SEPARATION (kHz)	20 dB Bandwidth (kHz)	Margin (kHz)
Middle	915	1000	497	503

HOPPING FREQUENCY SEPARATION

HOPPING FREQUENCY SEPARATION



7.7. AVERAGE TIME OF OCCUPANCY

LIMIT

§15.247 (a) (1) (iii) Frequency hopping systems in the 902-928 MHz band shall use at least 25 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10 second period.

TEST PROCEDURE

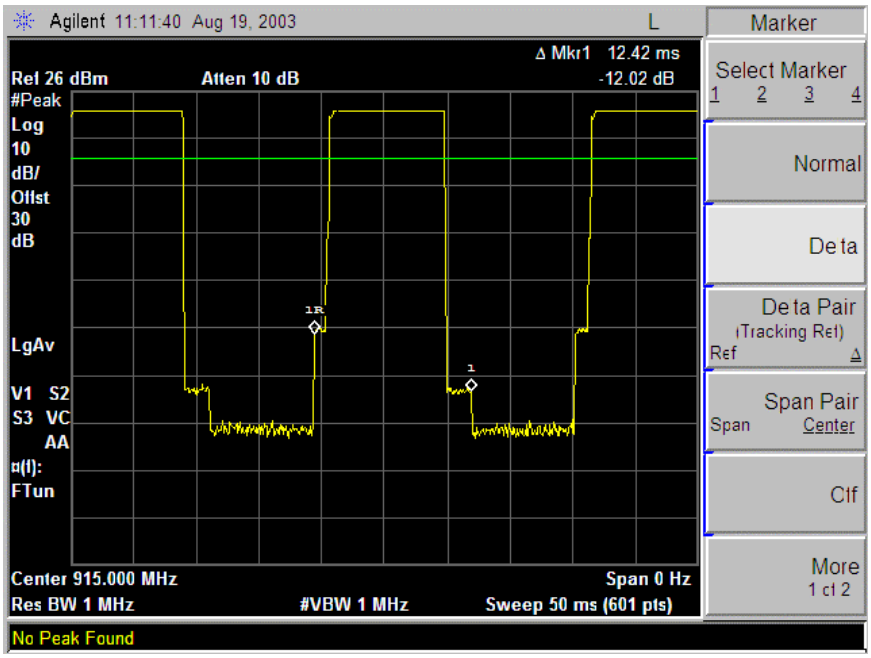
The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a slow scan.

RESULTS

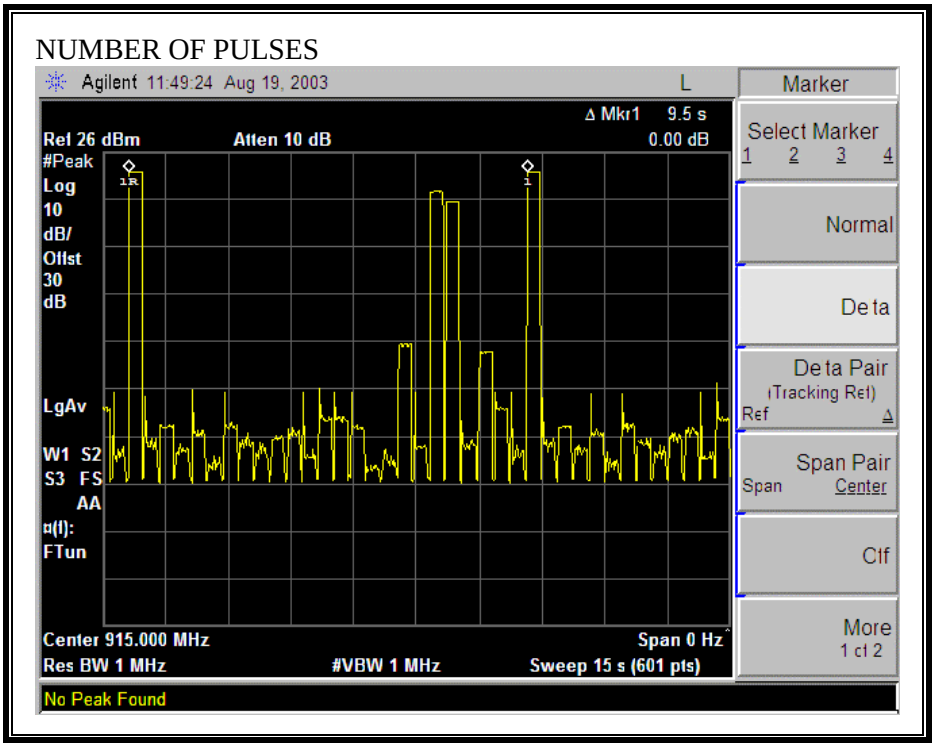
No non-compliance noted:

PULSE WIDTH

PULSE WIDTH



NUMBER OF PULSES



The two highest amplitude pulses occur when the channel frequency equals 915MHz. The lower amplitude pulses occur when the channel frequency is not equal to 915MHz. The amplitude of channel frequencies other then 915MHz will be a function of the delta frequency ($F_{channel}$-915) and the fall-off of the 1MHz RBW filter in the spectrum analyzer.

7.8. RADIATED EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

No non-compliance noted:

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL)

08/23/03 High Frequency Measurement

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:	Frank Ibrahim
Project #:	03U2162-1
Company:	Worthdata Inc.
EUT Descrip.:	900 MHz SS Transmitter
EUT M/N:	T701/LT701
Test Target:	FCC 15.247
Mode Oper:	TX ON at Low Channel

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T87 Miteq 924342	Agilent E4446A Analyzer		FCC 15.205

Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements: 1 MHz Resolution Bandwidth, 1MHz Video Bandwidth

Average Measurements: 1 MHz Resolution Bandwidth, 10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
2.709	9.8	63.3	62.3	29.9	2.2	-43.2	0.0	1.0	53.2	52.2	74.0	54.0	-20.8	-1.8	V
3.612	9.8	62.4	60.8	31.8	2.7	-43.7	0.0	1.0	54.2	52.6	74.0	54.0	-19.8	-1.4	V
4.515	9.8	52.0	44.0	33.1	3.0	-44.4	0.0	1.0	44.6	36.6	74.0	54.0	-29.4	-17.4	V
5.418	9.8	61.0	58.7	33.9	3.4	-44.8	0.0	1.0	54.4	52.1	74.0	54.0	-19.6	-1.9	V
2.709	9.8	62.0	60.6	29.9	2.2	-43.2	0.0	1.0	51.9	50.5	74.0	54.0	-22.1	-3.5	H
3.612	9.8	57.0	55.2	31.8	2.7	-43.7	0.0	1.0	48.8	47.0	74.0	54.0	-25.2	-7.0	H
4.515	9.8	51.6	47.1	33.1	3.0	-44.4	0.0	1.0	44.2	39.7	74.0	54.0	-29.8	-14.3	H
5.418	9.8	53.0	48.6	33.9	3.4	-44.8	0.0	1.0	46.4	42.0	74.0	54.0	-27.6	-12.0	H

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL)

08/23/03 High Frequency Measurement

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:	Frank Ibrahim
Project #:	03U2162-1
Company:	Worthdata Inc.
EUT Descrip.:	900 MHz SS Transmitter
EUT M/N:	T701/LT701
Test Target:	FCC 15.247
Mode Oper:	TX ON at Mid Channel

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T87 Miteq 924342	Agilent E4446A Analyzer		FCC 15.205

Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:	Average Measurements:
1 MHz Resolution Bandwidth	1 MHz Resolution Bandwidth
1MHz Video Bandwidth	10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
2.745	9.8	64.7	63.2	30.0	2.2	-43.2	0.0	1.0	54.7	53.2	74.0	54.0	-19.3	-0.8	V
3.660	9.8	60.0	58.1	31.9	2.7	-43.7	0.0	1.0	51.8	49.9	74.0	54.0	-22.2	-4.1	V
4.575	9.8	51.6	46.3	33.1	3.1	-44.5	0.0	1.0	44.3	39.0	74.0	54.0	-29.7	-15.0	V
2.745	9.8	61.2	59.2	30.0	2.2	-43.2	0.0	1.0	51.2	49.2	74.0	54.0	-22.8	-4.8	H
3.660	9.8	54.0	51.0	31.9	2.7	-43.7	0.0	1.0	45.8	42.8	74.0	54.0	-28.2	-11.2	H
4.575	9.8	52.4	47.9	33.1	3.1	-44.5	0.0	1.0	45.1	40.6	74.0	54.0	-28.9	-13.4	H

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL)

08/23/03 High Frequency Measurement

Compliance Certification Services, Morgan Hill Open Field Site

Test Engr:	Frank Ibrahim
Project #:	03U2162-1
Company:	Worthdata Inc.
EUT Descrip.:	900 MHz SS Transmitter
EUT M/N:	T701/LT701
Test Target:	FCC 15.247
Mode Oper:	TX ON at High Channel

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T87 Miteq 924342	Agilent E4446A Analyzer		FCC 15.205

Hi Frequency Cables: ☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:	Average Measurements:
1 MHz Resolution Bandwidth	1 MHz Resolution Bandwidth
1MHz Video Bandwidth	10Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
2.781	9.8	63.0	61.4	30.1	2.3	-43.2	0.0	1.0	53.1	51.5	74.0	54.0	-20.9	-2.5	V
3.708	9.8	58.2	55.2	32.0	2.7	-43.7	0.0	1.0	50.1	47.1	74.0	54.0	-23.9	-6.9	V
4.635	9.8	55.2	49.8	33.2	3.1	-44.5	0.0	1.0	47.9	42.5	74.0	54.0	-26.1	-11.5	V
2.781	9.8	64.4	62.6	30.1	2.3	-43.2	0.0	1.0	54.5	52.7	74.0	54.0	-19.5	-1.3	H
3.708	9.8	52.8	48.0	32.0	2.7	-43.7	0.0	1.0	44.7	39.9	74.0	54.0	-29.3	-14.1	H
4.635	9.8	50.1	45.3	33.2	3.1	-44.5	0.0	1.0	42.8	38.0	74.0	54.0	-31.2	-16.0	H

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION) (VERTICAL)

Condition: FCC CLASS-A 3m CHAMBER 030306 1185 VERTICAL
Company : WORTH DATA, INC.
EUT Description : 900MHz SS TRANSMITTER
Model Number : T701 RF TERMINALS
Test Configurtion: SCANNER/TERMINAL/MIC/PROGRAMMER/AC ADAP.
Tester : NEELESH RAJ
Test Target : FCC-A
Mode of Operation: TX (915MHz)
Project No : 03U2162

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	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	80.840	20.59	6.54	0.82	0.00	27.94	39.00	-11.06	Peak
2	121.840	17.39	10.50	1.03	0.00	28.92	43.50	-14.58	Peak
3	142.340	21.86	8.73	1.13	0.00	31.72	43.50	-11.78	Peak
4	804.080	13.48	19.83	3.02	0.00	36.33	46.40	-10.07	Peak
5	814.740	15.64	19.92	3.01	0.00	38.57	46.40	-7.83	Peak
6	824.580	15.03	20.00	3.03	0.00	38.06	46.40	-8.34	Peak
7	835.240	11.17	20.09	3.08	0.00	34.34	46.40	-12.06	Peak
1	954.750	7.60	20.94	3.40	0.00	31.94	46.40	-14.46	Peak

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION) (HORIZONTAL)

Condition: FCC CLASS-A 3m CHAMBER 030306 1185 HORIZONTAL
Company : WORTH DATA, INC.
EUT Description : 900MHz SS TRANSMITTER
Model Number : T701 RF TERMINALS
Test Configurtion: SCANNER/TERMINAL/MIC/PROGRAMMER/AC ADAP.
Tester : NEELESH RAJ
Test Target : FCC-A
Mode of Operation: TX (915 MHz)
Project No : 03U2162

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	802.440	10.97	19.82	3.02	0.00	33.81	46.40	-12.59	Peak
2	810.640	14.03	19.89	3.01	0.00	36.93	46.40	-9.47	Peak
3	814.740	15.14	19.92	3.01	0.00	38.07	46.40	-8.33	Peak
4	822.940	14.39	19.99	3.05	0.00	37.42	46.40	-8.98	Peak
5	832.780	10.55	20.07	3.09	0.00	33.71	46.40	-12.69	Peak
1	954.950	11.44	20.94	3.40	0.00	35.78	46.00	-10.22	Peak

7.9. POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

6 WORST EMISSIONS

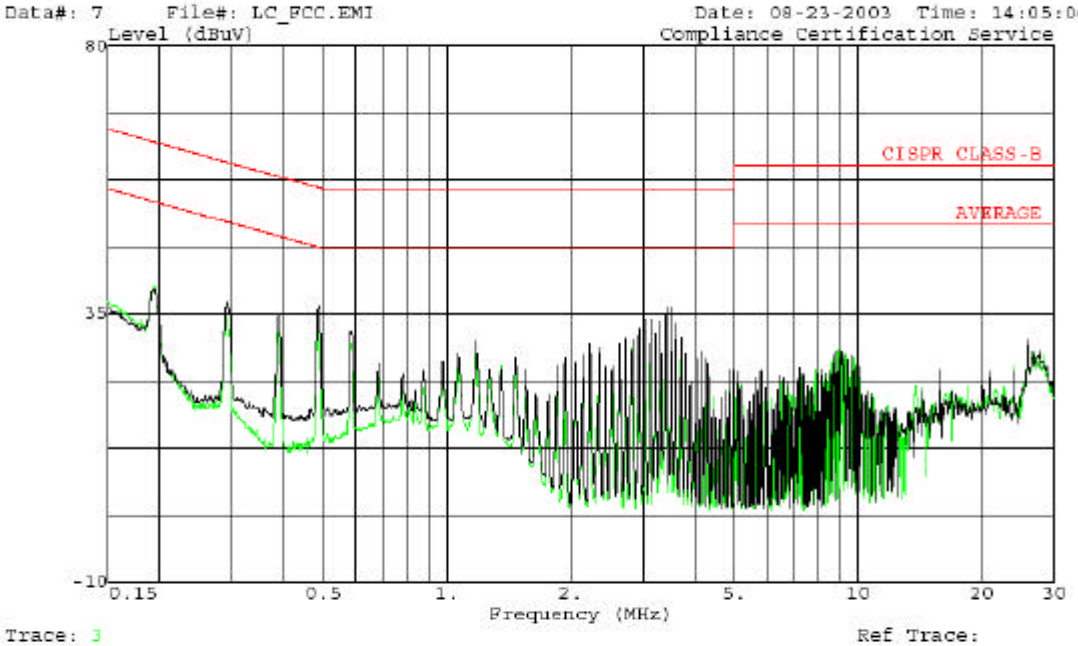
CONDUCTED EMISSIONS DATA (115VAC 60Hz)

Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.19	39.70	--	--	0.00	64.86	54.86	-25.16	-15.16	L1
0.29	34.60	--	--	0.00	62.00	52.00	-27.40	-17.40	L1
0.39	31.94	--	--	0.00	59.14	49.14	-27.20	-17.20	L1
0.19	39.22	--	--	0.00	64.86	54.86	-25.64	-15.64	L2
0.29	37.06	--	--	0.00	62.00	52.00	-24.94	-14.94	L2
0.49	36.50	--	--	0.00	56.29	46.29	-19.79	-9.79	L2

6 Worst Data

LINE 1 AND LINE 2 RESULTS

COMPLIANCE Engineering Services, Inc.
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

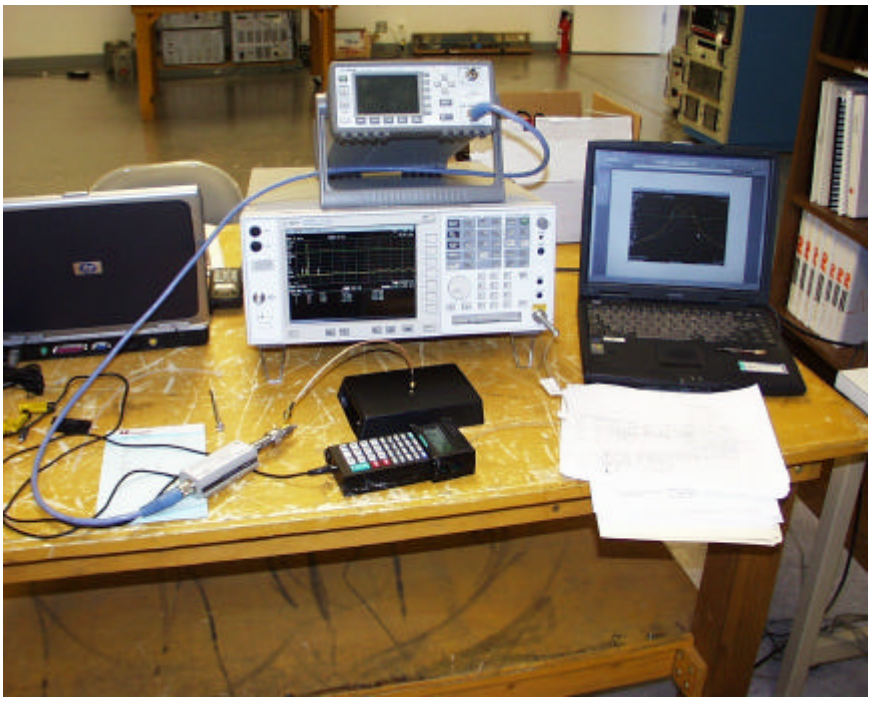


Trace: 3 Ref Trace:
Project # : 03U2162-1
Test Engineer : Frank Ibrahim
Company : WorthData, Inc.
EUT : 900MHz SS Transmitter
Model : T701/LT701
Configuration : EUT (Terminal + Scanner)
Mode of Operation: TX ON at Mid Channel
Target of Test : CISPR-B
Voltage : 115VAC/60Hz
: PK: L1(GREEN), L2(BLACK)

8. SETUP PHOTOS

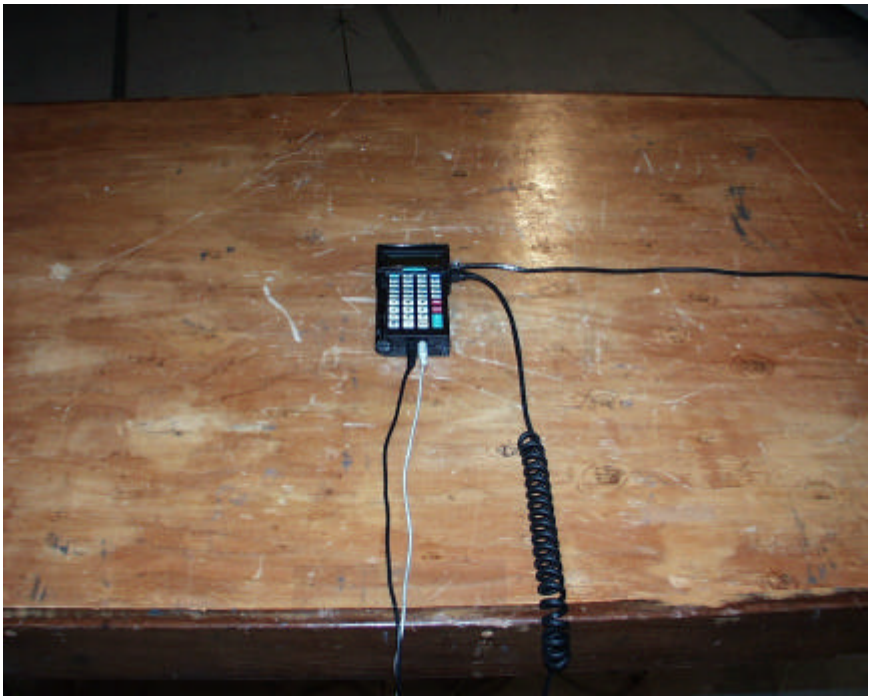
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO



RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO



DIGITAL DEVICE RADIATED EMISSIONS SETUP

DIGITAL DEVICE FRONT PHOTO

DIGITAL DEVICE BACK PHOTO

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO

END OF REPORT