Electromagnetic Compatibility Test Report

Model: 460
(Digital STL Transmitter)

EMCE Test Report Number: ER050105-3

Dated: 2/2/05

Prepared for:
TFT, Inc.
1330 Concourse Drive
San Jose, CA 95131

Prepared by:
EMCE Engineering
44366 South Grimmer Blvd
Fremont, Ca 94538

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1.0 PURPOSE

Measurements were performed on the TFT, Inc. Digital STL Transmitter Model 460 (hereinafter referred to as the "EUT") to determine the electromagnetic emissions as they relate to Part 74 of CFR 47. Measurements were performed at the test facilities of:

EMCE Engineering
44366 S. Grimmer Blvd
Fremont, Ca 94538

See appendix D for list of laboratory accreditations.

2.0 DESCRIPTION OF TEST SAMPLE

Testing was conducted to determine the individual EMC characteristics of the Digital STL Transmitter (Model 460, no S/N).

The TFT 460 Digital STL Transmitter transmits on one RF channel between 944.0 MHz and 952.0 MHz per CFR 47, 74.502(b).

3.0 DISPOSITION OF TEST SPECIMEN

Upon completion of the specified EMC tests the EUT was returned to TFT, Inc. in San Jose, CA, by TFT personnel.

4.0 NARRATIVE ABSTRACT

4.1 Conclusions

After completion of all EMC measurements, all measured data was reviewed and compared with the applicable sections from CFR 47, Part 74 (i.e., Applicable sections of 47CFR 74: 74.1 and Subpart E which consists of: 74.501, 74.502, 74.503, 74.531, 74.532, 74.533, 74.534, 74.535, 74.536, 74.537, 74.550, 74.551, 74.561, 74.562, 74.564, and 74.582), and test methods described in CFR 47, Parts 2 and 74. Individual test results will be presented in this section of the report. Table 1 summarizes the test results.

TABLE 1: SUMMARY OF TEST RESULTS

CFR Section	Title	Comments	Results
2.1046, 74.534	RF Power Output		PASSED
2.1047, 74.535	Modulation Characteristics		PASSED
2.1049, 74.535	Occupied Bandwidth		PASSED
2.1051	Spurious Emissions		PASSED
2.1055, 74.561	Frequency Stability		PASSED
2.1057	Investigation of Frequency Spectrum		PASSED

4.2 EMC Testing Summary

4.2.1 *RF Power Output (CFR 2.1046, 74.534)*

Test results may be found in Appendix A.

4.2.2 Modulation Characteristics (CFR 2.1047, 74.535)

Test results may be found in Appendix A

4.2.3 Occupied Bandwidth (CFR 2.1049, 74.535)

Test results may be found in Appendix A.

4.2.4 Spurious Emissions (CFR 2.1051)

Test results may be found in Appendix A.

4.2.5 Frequency Stability (CFR 2.1055, 74.561)

Test results may be found in Appendix A

4.2.6 Radiated Spurious Emissions / Investigation of Frequency Spectrum (CFR 2.1053, 2.1057)

Test results may be found in Appendix A

APPENDIX A

Test Data
For
Digital STL Transmitter
M/N: 460

RF Power Output (CFR 2.1046, 74.534), Modulation Characteristics (CFR 2.1047, 74.535), Occupied Bandwidth (CFR 2.1049, 74.535)

Test Location: EMCE Engineering •44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer:	**TFT, Inc.**		
Specification:	**TFT Mask 950**		
Work Order #:		Date:	12/20/2004
Test Type:	**Radiated Scan**	Time:	10:24:39 AM
Equipment:	**Digital STL Transmitter**	Sequence#:	21
Manufacturer:	TFT, Inc.	Tested By:	Bob Cole
Model:	460		
S/N:	N/A		

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8593EM Spectrum Analyzer	N/A	08/11/2004	08/11/2005	123

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Digital STL Transmitter	TFT, Inc.	460	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Attenuator	WJ	3514-20	N/A

Test Conditions / Notes:

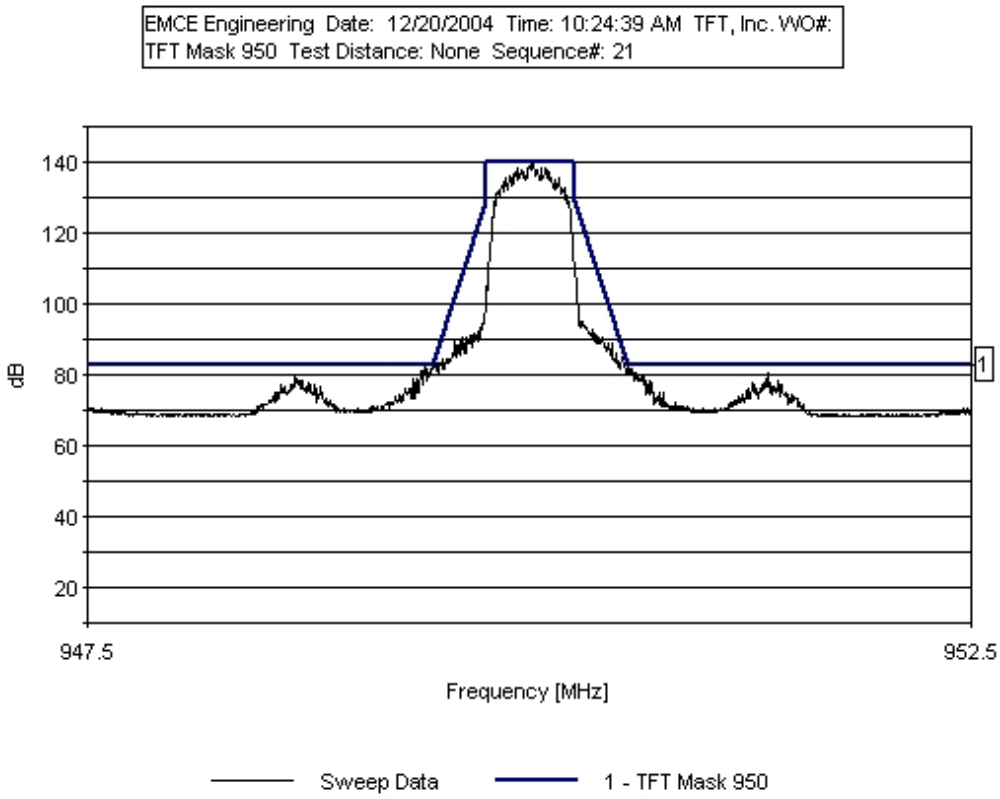
2W power out

Transducer Legend:

T1=20 dB Attenuator	T2=Chamber Receive Cable to 1 GHz
T3=Attenuator TX Cable	

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB	Spec dB	Margin dB	Polar Ant
1	950.014M	108.5	+20.0	+5.5	+5.7		+0.0	139.7	140.0	-0.3	None


EMCE Engineering Date: 12/20/2004 Time: 10:24:39 AM TFT, Inc. WO#:
TFT Mask 950 Test Distance: None Sequence#: 21
140
120
100
80
60
40
20
dB
1
947.5
952.5
Frequency [MHz]
Sweep Data
1 - TFT Mask 950

Spurious Emissions (CFR 2.1051)

Test Location: EMCE Engineering •44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **TFT, Inc.**
Specification: **TFT 2W 1-26GHz**
Work Order #: Date: 12/20/2004
Test Type: **Radiated Scan** Time: 4:50:14 PM
Equipment: **Digital STL Transmitter** Sequence#: 2
Manufacturer: TFT, Inc. Tested By: Scott
Model: 460
S/N: N/A

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
AH Systems DR Horn Antenna	1291	07/28/2004	07/28/2006	389
HP 8593EM Spectrum Analyzer	N/A	08/11/2004	08/11/2005	123

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Digital STL Transmitter*	TFT, Inc.	460	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Attenuattor	WJ	3514-20	N/A

Test Conditions / Notes:

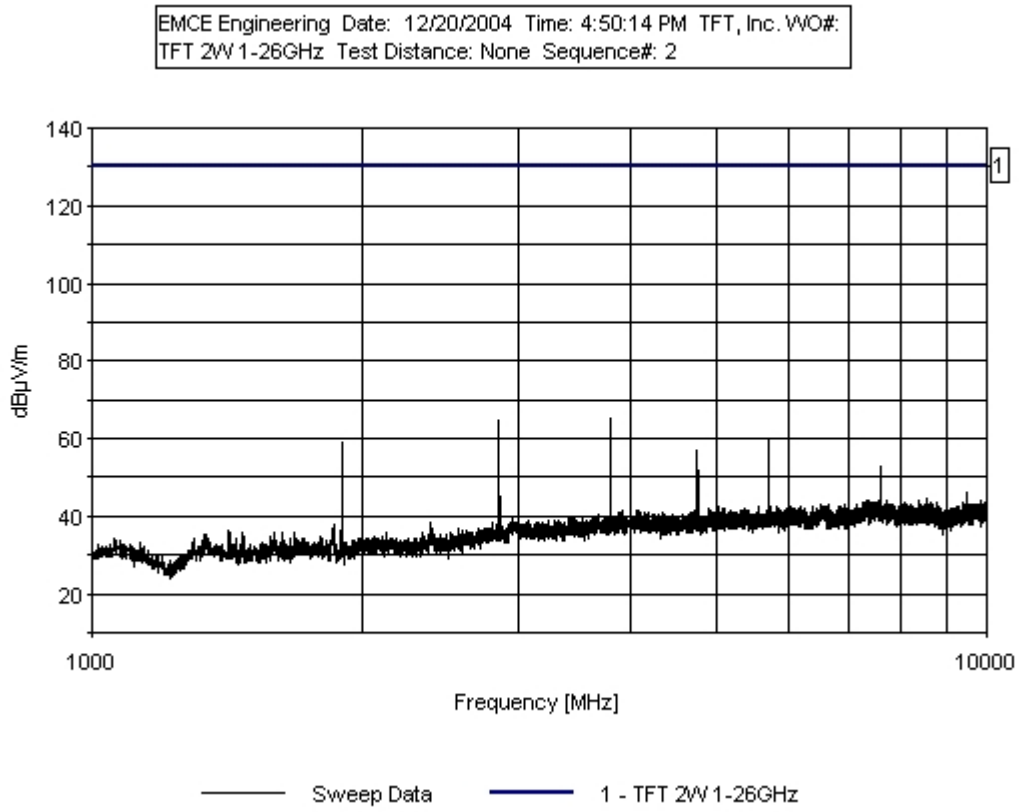
ANTENNA CONDUCTED SCAN

Transducer Legend:

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	3800.985M	65.1					+0.0	65.1	130.0	-64.9	Vert
2	2851.617M	64.5					+0.0	64.5	130.0	-65.5	Vert
3	5701.725M	59.9					+0.0	59.9	130.0	-70.1	Vert
4	1900.245M	59.0					+0.0	59.0	130.0	-71.0	Vert
5	4750.353M	56.7					+0.0	56.7	130.0	-73.3	Vert
6	7600.460M	52.7					+0.0	52.7	130.0	-77.3	Vert
7	9501.200M	46.1					+0.0	46.1	130.0	-83.9	Vert
8	8551.832M	44.5					+0.0	44.5	130.0	-85.5	Vert

9	7347.830M	44.2	+0.0	44.2	130.0	-85.8	Vert
10	7576.400M	44.0	+0.0	44.0	130.0	-86.0	Vert
11	9837.575M	44.0	+0.0	44.0	130.0	-86.0	Vert
12	7736.800M	43.9	+0.0	43.9	130.0	-86.1	Vert
13	8027.525M	43.9	+0.0	43.9	130.0	-86.1	Vert
14	8396.445M	43.9	+0.0	43.9	130.0	-86.1	Vert
15	7397.955M	43.8	+0.0	43.8	130.0	-86.2	Vert
16	8652.082M	43.7	+0.0	43.7	130.0	-86.3	Vert
17	7555.348M	43.6	+0.0	43.6	130.0	-86.4	Vert
18	7506.225M	43.5	+0.0	43.5	130.0	-86.5	Vert
19	7562.365M	43.5	+0.0	43.5	130.0	-86.5	Vert
20	9421.000M	43.5	+0.0	43.5	130.0	-86.5	Vert



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Frequency Stability (CFR 2.1055)

Temperature (Celcius)	Voltage	Frequency (MHz)	PASS/FAIL
50	97	950.01	**PASS**
50	115	950.014	**PASS**
50	132	950.014	**PASS**
40	97	950.008	**PASS**
40	115	950.014	**PASS**
40	132	950.005	**PASS**
30	97	950.005	**PASS**
30	115	950.003	**PASS**
30	132	949.997	**PASS**
20	97	950.005	**PASS**
20	115	950.022	**PASS**
20	132	950.016	**PASS**
10	97	949.944	**PASS**
10	115	950.018	**PASS**
10	132	949.999	**PASS**
0	97	950.016	**PASS**
0	115	950.014	**PASS**
0	132	950.016	**PASS**
-10	97	950.012	**PASS**
-10	115	950.003	**PASS**
-10	132	950.53	**PASS**
-20	97	Non-Operational	**N/A**
-20	115	Non-Operational	**N/A**
-20	132	Non-Operational	**N/A**
-30	97	Non-Operational	**N/A**
-30	115	Non-Operational	**N/A**
-30	132	Non-Operational	**N/A**

Radiated Spurious Emissions / Investigation of Frequency Spectrum (CFR 2.1053. 2.1057)

The following Radiated Spurious Emissions readings were determined by first identifying the frequencies using the test methods from ANSI 63.4. The signal amplitudes were then verified using the "substitution method" detailed in TIA 603-2004, section 2.2.12.2, and the results included here.

Test Location: EMCE Engineering •44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **TFT, Inc.**
Specification: **TFT 2W 1-26GHz**
Work Order #:
Test Type: **Radiated Scan**
Equipment: **Digital STL Transmitter**
Manufacturer: TFT, Inc.
Model: 460
S/N: N/A

Date: 1/5/2005
Time: 11:50:35 AM
Sequence#: 1
Tested By: Bob Cole

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
AH Systems DR Horn Antenna	1291	07/28/2004	07/28/2006	389

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Digital STL Transmitter*	TFT, Inc.	460	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Attenuattor	WJ	3514-20	N/A
Tuned Dipole Antenna Set	A. H. Systems	TDS 535-2	4048
Signal Generator	Hewlett Packard	8350A	32095A119

Test Conditions / Notes:

Transducer Legend:

Measurement Data: Reading listed by margin. Test Distance: 1 Meter

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2851.617M	68.9					+0.0	68.9	130.0	-61.1	Vert
2	1901.248M	61.7					+0.0	61.7	130.0	-68.3	Vert

Appendix B

EMCE Laboratory Accreditations

National Institute of Standards and Technology **NVLAP®** National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200092-0

UNIVERSAL COMPLIANCE LABS DBA EMCE ENGINEERING
44366 South Grimmer Boulevard
Fremont, CA 94538-6385
Mr. Bob Cole
Phone: 510-490-4307 Fax: 510-490-3441
E-Mail: bob@universalcompliance.com
URL: http://www.universalcompliance.com

NVLAP Code	*Designation / Description*
Emissions Test Methods:	
12/CIS22	IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)
12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/FCC15b1	ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators
12/T51	AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

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ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200092-0

UNIVERSAL COMPLIANCE LABS DBA EMCE ENGINEERING

NVLAP Code	*Designation / Description*
Immunity Test Methods:	
12/I01	IEC 61000-4-2, Ed. 2.1 (2001), A1, A2; EN 61000-4-2: Electrostatic Discharge Immunity Test
12/I03	IEC 61000-4-4(1995), A1(2000), A2(2001); EN 61000-4-4: Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test
12/I04	IEC 61000-4-5, Ed. 1.1 (2001-04); EN 61000-4-5: Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
12/I05	IEC 61000-4-6, Ed. 2.0 (2003-05); EN 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/I06	IEC 61000-4-8, Ed. 1.1 (2001); EN 61000-4-8: Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
12/I07	IEC 61000-4-11, Ed. 1.1 (2001-03); EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

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United States Department of Commerce
National Institute of Standards and Technology

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ISO/IEC 17025:1999
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Certificate of Accreditation

DEPARTMENT OF COMMERCE ★ UNITED STATES OF AMERICA ★

UNIVERSAL COMPLIANCE LABS DBA EMCE ENGINEERING

FREMONT, CA

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ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

December 31, 2005

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