

EMC EMISSION - TEST REPORT

UNITED STATES STANDARD 47 CFR PART 15, SUBPART B

Test Report File No. : **9223-06** Date of Issue: 06 May 1999

Model / Serial No. : 469T / N/A

Product Type : Code-GM Transmitter

Applicant : DIRECTED ELECTRONICS, INC.

Manufacturer : DIRECTED ELECTRONICS, INC.

License holder : DIRECTED ELECTRONICS, INC.

Address : 2560 Progress Street
 : Vista, CA 92083

Test Result : **Positive** **Negative**

Test Project Number
 Reference(s) : 9223-06

Total pages - Test Report : 10

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**DIRECTORY - EMISSIONS
Test Report**

	Pages
Test Report	1 - 10
Directory	2
Test Regulations	3
General Remarks and Summary	10
Equipment	
Conducted Emissions 10/150/450 kHz - 30 MHz	5
Radiated Emissions 30 MHz - 1000 MHz	6
Equivalent Radiated Emissions 30 MHz - 3.144 GHz	7

Technical Documentation

Test Data Sheets and Test Setup Drawing(s)	TD1
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Appendices

Appendix A	A1
Test Setups (Photographs)	
Appendix B	B1
Product Information Form(s)	
Appendix C	C1
Change History	
Appendix D	D1
Supplemental Information	

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to the following regulations:

- EN 50081-1 / 1991
- EN 55011 / 1991 - Group 1 - Group 2
- EN 55013 / 1990 - Class A - Class B
- EN 55014 / 1987 - Household appliances and similar
- EN 55014 / 1987 - Portable tools
- EN 55014 / 1987 - Semiconductor devices
- EN 55014 / A2:1990
- EN 55014 / 1993 - Household appliances and similar
- EN 55014 / 1993 - Portable tools
- EN 55014 / 1993 - Semiconductor devices
- EN 55015 / 1987
- EN 55015 / A1:1990
- EN 55015 / 1993
- EN 55022 / 1987 - Class A - Class B
- EN 55022 / 1998 - Class A - Class B
- BS
- VCCI - Class A ITE - Class B ITE
- 47 CFR Part 15, Subpart B
 - 107(b)
 - 107(a)
 - 107(e) - Class A - Class B
 - 109(b)
 - 109(a)
 - 109(g) - Class A - Class B
 - 231(b)
- AS/NZS 3548: 1995 - Class A - Class B
- CISPR 11 (1990) - Group 1 - Group 2
- CISPR 11 (1990) - Class A - Class B
- CISPR 22 (1998) - Class A - Class B

Environmental Conditions In The Laboratory:

	<u>Actual</u>
Temperature:	: 23 °C
Relative Humidity:	: 50 %
Atmospheric Pressure:	: 100.0 kPa

Power Supply Utilized:

Power supply system : Battery

Symbol Definitions:

- - Applicable
- - Not Applicable

Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The **CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)** measurements were performed at the following test location:

■ - Test not performed - see remarks

- SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
- SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
- SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
- SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
- CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, & H/P 9836 HP-1B Computer	156, 162-166	Automated RFI Measurement System (ARMS), NO. 1	Eaton/Ailtech	(multiple)	
NM-17/27, NM-37/57, CA-7, and H/P 9826 Computer	168, 170, 177, 178	Automated RFI Measurement System (ARMS), NO. 2	Eaton/Ailtech	(multiple)	
H/P Spectrum Analyzer, Model 8568B; Display Section RF Analyzer Section; H/P 85650A, Quasi-Peak Adapter H/P Computer System, Model 310 with HP 85869A Software	187, 188	Automated RFI Measurement System (ARMS)	Various	(multiple)	
LISN-3, 50 A	262-263	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	Fischer Custom Communications, Inc.	3-4	
LISN-3, 50 A	264, 265	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	Fischer Custom Communications, Inc.	5-6	
LISN-2, 25 A	413	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	Fischer Custom Communications, Inc.	7	
LISN-2, 25 A	--	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	Fischer Custom Communications, Inc.	7	
FCC-LISN-50-25-2	553	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	Fischer Custom Communications, Inc.	112	
FCC-LISN-50-25-2	552	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	Fischer Custom Communications, Inc.	113	
8012-50-R-12-BNC	266	LISN, 50 μ H/50 Ω /0.1 μ F	Solar Electronics Co.	--	
9252-50-R-24-BNC	458	LISN, 50 μ H /250 μ H/50 Ω / 0.25 μ F	Solar Electronics Co.	941719	
9252-50-R-24-BNC	457	LISN, 50 μ H /250 μ H/50 Ω / 0.25 μ F	Solar Electronics Co.	941720	
MDS-21	277	Absorbing Clamp	Rohde & Schwarz	821023	
ESHS 20	428	EMI Test Receiver	Rohde & Schwarz	837055/001	
ESHS 30	459	EMI Test Receiver	Rohde & Schwarz	832354/004	
CAT-20	598	20 dB Attenuator	Mini-Circuits	--	
CAT-20	615	20 dB Attenuator	Mini-Circuits	--	

Remarks: EUT battery operated.

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

■ - Test not performed - see remarks

- Roof (Small Open Area Test Site)
- Canyon #1 (10- and 30-Meter Open Area Test Site), Carroll Canyon, San Diego
- Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of :

- 3 meters
- 10 meters
- 30 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
NM-37/57A	420	OATS measurement set	Eaton/Ailtech	0561-09261	
CCA-7	373	(Roof)		0773-03117	
NM-37/57	171	OATS measurement set	Eaton/Ailtech	0709-82078	
CCA-7	172	(Canyon)		0187-0322	
HFH 2-Z2	208	Antenna, Loop	Rohde & Schwarz	880	
3104	235	Antenna, Biconical	EMCO	3031	
3110	451	Antenna, Biconical	EMCO	1378	
94455-1	231	Antenna, Biconical	Eaton/Ailtech	0811	
3110B	491	Antenna, Biconical	EMCO	9508-2	
CBL6111	460	Antenna, Bilog	Chase	1013	
3146	243	Antenna, Log Periodic Dipole	EMCO	106X	
3146	244	Antenna, Log Periodic Dipole	EMCO	1063	
7405	570	Loop Probes	EMCO	9104-1959	
8566B	404	Spectrum Analyzer	Hewlett Packard	2311A02209	
85662B	406	Spectrum Analyzer Display	Hewlett Packard	2309A04682	
ESVS 30	427	EMI Test Receiver	Rohde & Schwarz	830350/006	
ESVS 30	466	EMI Test Receiver	Rohde & Schwarz	833825/003	

Remarks: Pre-scan in shielded room detected no measurable emissions from 30 MHz - 1 GHz except fundamental and harmonics of fundamental for this frequency range.

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz - 5 GHz were performed in a horizontal and vertical polarization at the following test location :

- Test not applicable

- - Roof (Small Open Area Test Site)
- Canyon #1 (10- and 30-Meter Open Area Test Site), Carroll Canyon, San Diego
- Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of:

- 1 meters
- - 3 meters
- 10 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
8566B	720	Spectrum Analyzer	Hewlett Packard	2115A00842	03/00
85662B	721	Spectrum Analyzer Display	Hewlett Packard	2112A02185	03/00
3115	453	Antenna, Double Ridge Guide	EMCO	9412-4363	
AFD3-0208-40-ST	367	Pre-Amplifier (30 dB gain), 2 to 8 GHz	Miteq, Inc.	155382	*
3146	257	Horn Antenna (12 to 18 GHz)	Eaton	--	09/99

Remarks: (*) Verified internally.

Equipment Under Test (EUT) Test Operation Mode - Emissions Tests :

The equipment under test was operated under the following conditions during emissions testing:

- Standby
- Test Program (H - Pattern)
- Test Program (Color Bar)
- Test Program (Customer Specified)
- Practice Operation
- Normal Operating Mode
- Continuous

Configuration of the equipment under test:

- See Constructional Data Form in Appendix B - Page B2
- See Product Information Form(s) in Appendix B - Page B2

The following peripheral devices and interface cables were connected during the testing:

- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- unshielded power cable
- unshielded cables
- shielded cables MPS.No.: _____
- customer specific cables
- _____
- _____

Emissions Test Results:

Conducted Emissions, 10/150/450 kHz - 30 MHz

- PASS - FAIL - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz
 Maximum limit exceeding _____ dB at _____ MHz

Remarks: EUT battery operated.

Radiated Emissions (Electric Field), 30 MHz - 1000 MHz

- PASS - FAIL - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz
 Maximum limit exceeding _____ dB at _____ MHz

Remarks: Pre-scan in shielded room detected no measurable emissions from 30 MHz - 1 GHz except
fundamental and harmonics of fundamental for this frequency range.

Equivalent Radiated Emissions, 30 MHz - 3.144 GHz

- PASS - FAIL - NOT APPLICABLE

Minimum limit margin 2.4 dB at 2829.7 MHz
 Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

GENERAL REMARKS:

- (*) Conducted Emissions - EUT battery operated.
Radiated Emissions (30 MHz - 1000 MHz) - Pre-scan in shielded room detected no measurable emissions from 30 MHz - 1 GHz except fundamental and harmonics of fundamental for this frequency range.

SUMMARY:

All tests according to the regulations cited on page 3 were

- Performed
- **Not** Performed*

The Equipment Under Test

- **Fulfills** the general approval requirements cited on page 3.
- **Does not** fulfill the general approval requirements cited on page 3.

Statement of Measurement Uncertainty

The data and results referenced in this document are true and accurate. There may be some degree or level of measurement uncertainty. As EN 45001 does not allow recommendations to be included in the test report, the reader is encouraged to request a copy of the TÜV policy concerning pass or fail judgment with respect to possible measurement uncertainties.

Equipment Received Date: 05 May 1999
Testing Start Date: 05 May 1999
Testing End Date: 05 May 1999

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:



Scott Davies
(EMC Engineer)

Responsible Engineer:



Mary Washington
(EMC Engineer)

Technical Documentation

Test Data Sheets

and

Test Setup Drawing(s)

See photograph in Appendix A for test setup.

REPORT No: S9223 TESTED BY: MW SPEC: FCC Part 15, 15.231(b)
 CUSTOMER: Directed Electronics, Inc. *Mary Winkler* TEST DIST: 3 Meters
 EUT: Code-GM Transmitter, Model 469T TEST SITE: 3
 EUT MODE: Contin^uous Transmit BICONICAL: N/A
 DATE: 5-May-99 LOG: 244
 NOTES: Duty Cycle= 10% OTHER: 453
 RBW and VBW = 100 kHz below 1 GHz.
 RBW and VBW = 1 MHz above 1 GHz.
 EUT flat on table.

v.beta

FREQ (MHz)	VERTICAL (dBuv)		HORIZONTAL (dBuv)		CORRECTION FACTOR (dB/m)	MAX LEVEL (dBuV/m)		SPEC LIMIT (dBuV/m)		MARGIN (dB)		Rotation	EUT	Antenna Height
	pk	av	pk	av		pk	av	pk	av	pk	av			
314.41	51.7	31.7	66.3	46.3	17.1	83.4	63.4	95.6	75.6	-12	-12	241	1	
628.82	30.5	10.5	39.3	19.3	23.0	62.3	42.3	75.6	55.6	-13	-13			
943.23	28.4	8.4	40.8	20.8	27.5	68.3	48.3	75.6	55.6	-7.3	-7.3	179	1	
1257.6	33.7	13.7	40.2	20.2	28.3	68.5	48.5	75.6	55.6	-7.1	-7.1	178	1.1	
1572.1	25.3	5.3	25.4	5.4	30.6	56.0	36.0	74	54	-18	-18			
1886.5	27.1	7.1	30.3	10.3	32.4	62.7	42.7	75.6	55.6	-13	-13			
2200.9	26.7	6.7	26.4	6.4	33.7	60.4	40.4	74	54	-14	-14			
2515.3	29.8	9.8	29.4	9.4	34.8	64.6	44.6	75.6	55.6	-11	-11			
2829.7	34.9	14.9	30.9	10.9	36.7	71.6	51.6	74	54	-2.4	-2.4	18	1	
3144.1	25	5	24.4	4.4	38.2	63.2	43.2	75.6	55.6	-12	-12			

Appendix A

Test Setups
(Photographs)

Photograph of Test Setup:
Radiated Emissions 30 MHz - 3.144 GHz



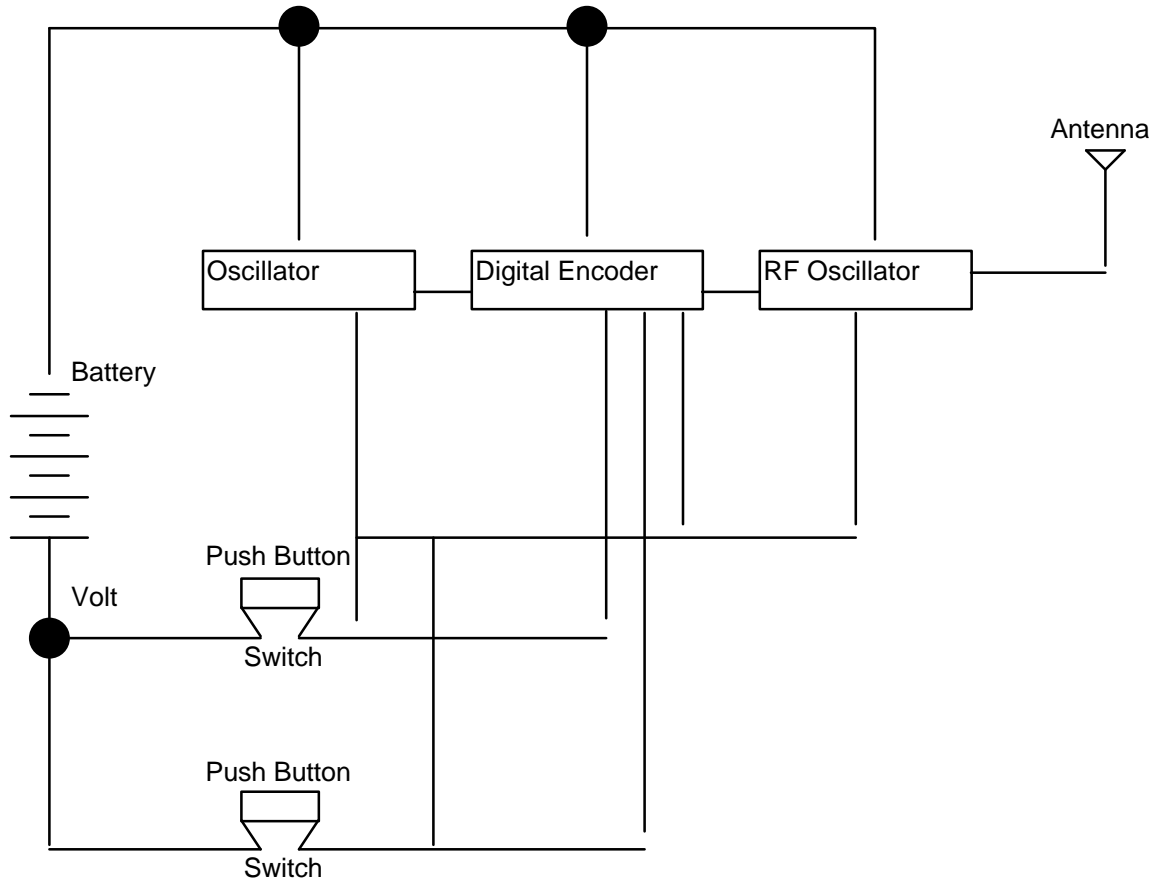
Photograph of Test Setup:
Radiated Emissions 30 MHz - 3.144 GHz



Appendix B

Product Information Form(s)

CUSTOMER INFORMATION				
COMPANY NAME:		DIRECTED ELECTRONICS, INC.		
COMPANY ADDRESS:		2560 Progress Street		
		Vista, CA 92083		
PHONE NUMBER:		760 598 6200 266		
FAX NUMBER/E-MAIL ADDRESS:		760 598 6400 / marting@directed.com		
CUSTOMER CONTACT:		Martin Gonzales		
PRODUCT DESCRIPTION				
NAME, MODEL, SERIAL # OF EUT:		Code-GM Transmitter, Model 469T, S/N N/A		
DESCRIPTION OF EUT:		314-315 MHz Crystaly controlled Security/Remote Control Transmitter		
Components of EUT				
Description	Model Number	Serial Number	FCC ID Number	
Code/GM Transmitter	469T	N/A	EZS469	
OPERATING MODE(S):		Manually operated by operator by pressing one of the momentary switches. Transmission deactivates within 5 seconds of being released. Transmission automatically concludes after 15 seconds if transmitter button is held on. Transmitter will be configured to transmit continuously for testing purposes only.		
I/O CABLES				
CONNECTION	N/A			
SHIELD				
CONNECTORS				
TERMINATION TYPE				
LENGTH				
REMOVABLE				
POWER CORDS		N/A		
POWER INTERFACE				
FREQUENCY/AC/DC VOLTAGE:		Battery 12 Vdc		
PHASES/CURRENT:		--		
OSCILLATOR FREQUENCIES				
FREQUENCY	EUT LOCATION	DESCRIPTION OF USE		
N/A				
POWER SUPPLY				
DESCRIPTION	MANUFACTURER	MODEL #	SERIAL #	SWITCHING/LINEAR FREQ.
N/A				
POWER LINE FILTERS				
MANUFACTURER	MODEL NO.	QTY.	LOCATION ON EUT	
N/A				
CRITICAL EMI COMPONENTS				
DESCRIPTION	MANUFACTURER	PART # OR VALUE	QTY.	LOCATION ON EUT
--				
DESCRIPTION OF ENCLOSURE:		--		
INTERFACING AND/OR SIMULATORS PERIPHERAL EQUIPMENT:				
DESCRIPTION	MANUFACTURER	MODEL #	SERIAL #	FCC ID
--				
BLOCK DIAGRAM:		See page B3.		



Appendix C

Change History

Not Applicable

Appendix D

Supplemental Information

Not Applicable