

Performance Certification to EMC Directive

Normative Standards: EN 61000-6-3, FCC Part 15, Subpart J

Test Unit Description and Serial Number:

TFT WIRELESS REMOTE

S/N: Production EMI Unit

Test Report # 2644

Dates of Test: 10/25/06 through 10/31/06

Test Laboratory:

Midwest EMI Associates, Inc.
Electromagnetic Interference Laboratory
21234 W. Commercial Drive
Mundelein, Illinois 60060
Tel: (847)-918-9886

EN 61000-6-3 EMISSIONS

TEST METHOD	LIMITS
IEC 61000-6-3 Am 1:2002-11 (Cispr 11) Radiated Emissions FCC PART 15 Subpart J	B B

EN 61326 IMMUNITY

TEST METHOD	LEVEL

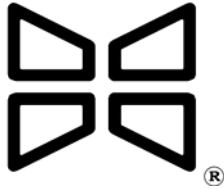
Performance Level:

- A- During testing, normal performance occurs within the specification limits.
- B- During testing, temporary degradation, or loss of function or performance occurs that is self recovering without operator intervention.
- C- During testing, temporary degradation, or loss of function or performance occurs that requires operator intervention or system reset.
- D- Degradation or loss of function that is not recoverable occurs due to damage to equipment, components, software, or to loss or corruption of data.



Report by: George Bowman
Midwest EMI Associates
Narte Certified Engineer, EMC-000738NE





Midwest EMI Associates, Inc.
Electromagnetic Interference Laboratory
21234 W. Commercial Drive
Mundelein, IL 60060

**Midwest EMI Associates Test Service
Report No. 2644**

Test Specifications

EN 61000-6-3, FCC B Radiated Emissions

Test Device:

TFT WIRELESS REMOTE

Serial Number:

Production EMI Unit

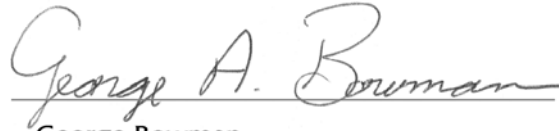
Conducted For:

Tim Miller
Senior Design Engineer
Task Force Tips
2351 Industrial Drive
Valparaiso, IN 46383
tsm@tft.com
219-548-1116, 219-548-1094 fax

Dates of Test:

10-25-06 through 10-31-06

Technical Data Taken by and
Report Written by:



George Bowman
Midwest EMI Associates

NARTE Certified Engineer, EMC-000738NE

Approved By:

Mr. Tim S. Miller
Principal Engineer
TFT, Inc.

1.0 PURPOSE:

The purpose of this test sequence is to qualify the compliance of the TFT WIRELESS REMOTE to the 61000-6-3 commercial and FCC Part 15 Subpart J standards. A separate report covers the unintentional radiator emissions of the TFT wireless device

2.0 TEST FACILITY:

All susceptibility testing was performed on the indoor three-meter site located at Midwest EMI Associates, 21234 W. Commercial Drive, Mundelein, Illinois 60060. Some testing utilized the screened room facility. The personnel access door measures 36" by 82" as shown in the attached room diagram, Figure A. Each power lead is filtered by a low-pass line filter. This interference filter provides substantially more insertion loss than that required for testing. The shielded room has within it a steel table with a copper ground plane (36"W X 72"L X 1/16"D thick) that is attached to the wall of the cage and is 3 feet off the floor of the cage, and has a DC resistance of less than 2.5 milliohms, complying with Military Standards 461. It also has a movable wooden table of 80 cm. height for CISPR testing. Power, which is available, consists of 120/230 VAC, 50/60 Hz.

Referring to Figure A, the major parts of the room which are used during testing are the interference filter which provides protection against external conducted signals, the screened viewing window which allows visual access to the device under test, AC line capacitors which properly terminate the line and neutral leads, and various antennas used for radiated emissions testing. The positions at which the device under test may be placed are identified on Figure A.

3.0 DESCRIPTION OF TEST SAMPLE/INSTALLATION:

The TFT WIRELESS REMOTE is a battery operated wireless sensor for control of fire control apparatus. It uses 4 AA cell lithium batteries and measures approximately 9 inches tall by 6 inches wide by 2 inches thick.

3.2 POWER REQUIREMENT:

The primary power supplied to the test sample was four AA lithium cells. No conducted emissions testing was performed.

3.3 GROUNDING:

The test sample was not grounded since it is battery operated.

3.4 RADIATED CONFIGURATION:

The test sample was oriented so that the area exhibiting the greatest amount of radiation was facing the antenna that was on one side of the device.

3.5 TEST SAMPLE OPERATION:

The device was operated in its measuring function during the test.

4.0 DISPOSITION OF TEST SAMPLE:

Upon completion of the test, the test sample was returned to the sponsor group.

5.0 REFERENCES:

EN 61000-6-1 (2005-03), "Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 1: Immunity for residential, commercial and light-industrial environments"

EN 61000-6-2 (2005-01), "Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments"

EN 61000-6-3 (1996-12), "Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 3: Emission standard for residential, commercial and light-industrial environments"

EN 61000-6-4 (1997-01), "Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 4: Emission standard for industrial environments"

EN 61326-(2002-02), "Electrical equipment for measurement, control and laboratory use - EMC requirements"

IEC 60601-1-2 (2004-11), "Medical Electrical Equipment, Part 1: General requirements for safety. 2. Collateral Standard: Electromagnetic compatibility – requirements and tests"

Mil Std 461E, Part 4 "Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference"

Federal Communications Commission Document MP-4 "FCC method Measurement of Radio Noise Emissions from Computing Devices"

VDE 0871 through 877 European documents

Current IEC Standards 61000-4-1 through 61000-4-11 and IEC Standard "Medical Electrical Equipment Part 1, General Requirements for Safety" issued by TC62A

EN55022, 2005-04, "Limits and Measurement of Radio Frequency Interference Characteristics of Information Technology Equipment"

EN55011, 2004-06, "Limits and Methods of Measurement of Radio Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-frequency Equipment"

CISPR Publication Number 16-1, (2003-10) Edition 1.1, "Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods, Part 1, Radio Disturbance and Immunity Measuring Apparatus, 1998

MDS-201-0004, "Electromagnetic Compatibility Standard for Medical Devices", 1979

IEC 50 (161), "International Electrotechnical Vocabulary, Chapter 161, Electromagnetic Compatibility"

6.0 GENERAL INFORMATION:

A diagram of the EMI facility and test equipment used is shown in the Appendices to this manual. The spectrum analyzer and other equipment are calibrated periodically by using their manufacturers' services.

6.1 TEST PROCEDURES:

The test limits for CISPR and IEC test configurations are located at the end of the various appendices for convenience. All test results and procedures are shown in the Appendices. Hereinafter, the equipment under test will be referred to as the E.U.T. or by its full description.

6.2 TEST DESCRIPTIONS:

All procedures below not referenced by individual protocol ("MEMI-XXX") numbers fall under the master EMI protocol, MEMI-7 "Electromagnetic Interference". Presently commercial devices are tested to 1 GHz per international convention for emissions and susceptibility.

The possible range of tests that could have application either domestically or internationally are listed below along with applicable protocol numbers. The references supplied provide information on how to perform the test. CISPR 11 & 22, Military Standard 462, and EN 61000 part 4 series are used as references for all procedures.

Midwest EMI assumes no liability for the performance of designs in the field derived from these protocols and the recommended criteria of acceptability. Midwest EMI will perform these tests as a service exclusively and will make every effort to assure the data is presented accurately and that the testing is uniformly applied per standards but we cannot guarantee to our customers that the product will gain acceptance by the market. In particular for life sustaining equipment, Midwest EMI recommends that a larger base of tests be performed to gain an accurate understanding of product performance.

6.2.1 Appendix A (CISPR Radiated Emissions) - Limits are plotted for FCC or CISPR requirements for Level B emissions. For some equipment this may include electric and VDE style magnetic emissions. *Criterion of acceptability for Europe is that A or B level emissions must be passed.*

6.3 SPECTRUM ANALYZER CHARACTERISTICS:

This facility uses a type TEK 2756P/TEK 2712 automated spectrum analyzer and a USAFlex 486 Advanta 50 MHz measuring system. The 6 dB impulse bandwidth settings and wideband correction factors are listed below:

TEK 2756P Analyzer

<u>Bandwidth Setting</u>	<u>Wideband 6dB Bandwidth</u>	<u>Correction Factor</u>	<u>Factor Applied</u>
3 MHz	3.028 MHz	-9.623 dB	-10 dB
1 MHz	915.0 KHz	.7716 dB	0 dB
.1 MHz	116.4 KHz	18.68 dB	20 dB
10 KHz	9.96 KHz	40.03 dB	40 dB
1 KHz	926 Hz	60.67 dB	60 dB
.1 KHz	96 Hz	80.35 dB	80 dB
10 Hz	10 Hz	100 dB	100dB

TEK 2712 Analyzer (Dual Analyzers in Use)

Bandwidth Setting	Wideband GdB Bandwidth	Correction Factor	Factor Applied
5 MHz	4.92 MHz	-13.84 dB	-14 dB
1 MHz	.932 KHz	.6117 dB	0 dB
.3 MHz	.31 KHz	10.173dB	10.5 dB
9 KHz	8.48 KHz	41.43 dB	41 dB
3 KHz	3300 Hz	49.63 dB	50.5 dB
1 KHz	860 Hz	61.31 dB	60 dB
200 Hz	200 Hz	73.98dB	74 dB

For test purposes, the correction factors are chosen to be at the nearest 20dB increment.

6.4 Certificates of Calibration

All certificates of calibration are maintained in a binder located at Midwest EMI Associates and are available for inspection. The present expiration dates of certified calibration by our manufacturers are:

a)	Tek2756P Spectrum Analyzer	BO20224	26 Mar 07
b)	Wavetek 2520A RF Generator	0222011	30 Mar 07
c)	Carver TFM-35 250 W/Ch. Audio Amp	3097104	1 Jun 01
d)	ENI RF Power Amplifier (525LA)	367	N/A
e)	ENI RF Power Amplifier (2100L)	129	N/A
f)	Eaton 15100B Power Amplifier	1529-07090	24 Mar 07
g)	Tektronix TDS 420 Oscilloscope	B021212	24 Mar 07
h)	EMCO 3109 Power Biconical (1/3/10 Meters)	9011-2504	17 Mar 07
i)	EMCO 3101 Power Conical	9007-3450	7 Nov 93 (1/3m)
j)	EMCO 6502 Active Loop	1038	18 Mar 07
k)	EMCO 3301B Active E Field	9009-3044	19 Mar 07
l)	EMCO 3147 Wide Range Log Periodic	9102-1019	23 Mar 07
m)	EMCO 3107B Power E Field	9310-2435	N/A
n)	Amplifier Research FM1000	12456	N/A
o)	Amplifier Research FP1000	60701	21 Mar 07
p)	Amplifier Research FP1000	60488	3 Mar 07
p)	IFI EFS-4 E Field Susceptibility (Holladay 3004EX with HSE405 Probe)	39883	14 Mar 07
q)	IFI LMT-B Light Modulator	1117-B	N/A
r)	IFI EFS-1 E Field Susceptibility	245738	1 Feb 99
s)	Solar 6741-1 RF Current Probe	911308	N/A
t)	Fluke 45 True RMS Voltmeter	EJ574714013	24 Mar 07
u)	Schaffner NSG 433 ESD Gun and Contact Discharge Adapter	107 402-664/0	30 Mar 07
v)	Solar Loop Sensor 7334-1	-----	N/A
w)	Solar Loop Sensor 9311-1	931101	N/A
x)	Solar RF Coupler 7415-3	906016	N/A
y)	Solar Line Impedance Stabilization Network	8028-50-TS-24-BNC	N/A
z)	Solar VDE Filter Network	8907-250-TS-24-BP	N/A

Midwest EMI Associates Test Services
Standard Test Report 2644

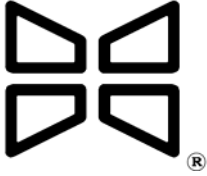
Ref: TPT WIRELESS REMOTE.doc

aa)	Ohmic Instrument BET-300-ADL	522	25 Mar 07
ab)	Werlatone C1795 Dir. Coupler	3442	30 Mar 07
ac)	Solar Current Injection Probe Type 9108-1N	935012	N/A
ad)	Tektronix TR 503B Tracking Generator	B011216	25 Mar 07
ae)	Acme 2KVA Isolation Transformer	T-3-53042-S	N/A
af)	Xentek Extreme Isolation Transformer Model 5410 (2 in use)		
ag)	Tektronix P6202 RF Probe	-----	N/A
ah)	Staco Power Variac Type 3PN2210 (0-140VAC) 3.1KVA		N/A
ai)	Helmholtz Coil Stepdown Xfrmr-Chicago Xfrmer Type P-6492		N/A
aj)	Goldstar Signal Generator Mod FG-2002c	201621	25 Mar 07
ak)	Holladay Magnetic Field Probe Model HI-3624	83957	15 Mar 07
al)	Tektronix 2712 Spectrum Analyzer (Quasipeak)	B022520	24 Mar 07
am)	Voltec PM100 Power Analyzer	AA04/8495	25 Mar 07
an)	EMCO 3142 Biconilog Antenna	1052	1 Mar 07
ao)	Haefely P90.1 EN 61000-4-4 Fast Transient Tester	083 593-14	19 Mar 07
ap)	Hewlett Packard 3400A AC Voltmeter	1218A14443	24 Mar 07
aq)	Amplifier Research FP2031 Isotropic Probe	18309	5 Mar 07
ar)	Haefely 250 600/00 (61000-4-5 Surge Tester)	583 334-05	19 Mar 07
as)	Fischer CISPR 14 Absorbing Clamp type F-201	235	7 Mar 07
at)	Fischer IEC 801-6 Transducer	165	23 Mar 07
au)	Solar 9123-1N Current Clamp	956015	23 Mar 07
av)	Fischer IC 801-6 CDN FCC-801-M3-25	95	7 Mar 07
aw)	Tektronix 2712 Spectrum Analyzer (Quasipeak)	B022981	24 Mar 07
ax)	C. C. Moore Automated Mast Assembly Model DAPM4/6		N/A
ay)	C. C. Moore Automated Turntable Model DTT-4		N/A
az)	Antenna Research LPB2520	1152	20 Mar 07
ba)	Behlman Power Pass 50 Hz AC Source (50, 60, 400 Hz)	0005	N/A
bb)	California Instruments WP1251 AC Source (50, 60 Hz)		N/A
bc)	Plitron Extreme Toroidal Isolation Transformers (2)		
bd)	Edmund Scientific Thermometer/Hygrometer	None	31 Mar 07
be)	Coaxial Bird Pads (x2) 8306-030-N3DB	None	30 Mar 07
bf)	High Current Source, Associated Research 3030D	A140006	25 Mar 07
bg)	California Instruments 5001ix High Power Source	HK52945	25 Mar 07
bh)	Line Leakage tester, Associated Research 510L	130007	25 Mar 07
bi)	Hipot Tester, Associated Research 3570D	090595	25 Mar 07
bh)	GAASfet Preamplifier	None	30 Mar 07
bi)	Ametek Tachometer Model 1726	R035292	24 Mar 07
bj)	Bird Attenuator (x2), 75 Watt, 75-A-MFN-10	R035290	30 May 04
bk)	HP 8482A Power Sensor S/N: 2652A18474		24 Mar 07
bl)	HP 435B Power Meter S/N: 2702A17563		24 Mar 07
bm)	Simpson Model 383 Thermometer	B001531	24 Mar 07
bn)	Wavetek 27XT Voltmeter	96120787	24 Mar 07
bo)	HP 8657A Programmable Synthesizer	365	17 Mar 07
bp)	Fluke 75		24 Mar 07
bq)	Fluke 21 Series III		24 Mar 07
br)	ENI 525LA		19 Mar 07
bs)	Tek 495P Opt 5/7	B020147	30 Mar 07
bt)	Amplifier Research FP2036 (.5-5Ghz)		04 Sep 06

7.0 CONCLUSION OF RADIO FREQUENCY INTERFERENCE EMISSIONS AND SUSCEPTIBILITY TESTS:

The TFT WIRELESS REMOTE was evaluated for all tests in the configuration requested by the sponsor group for compliance with the FCC Part 15 Subpart J FCC B level and IEC 61000-6-3:2002. The configuration requested was that of the packaged unit system in an orientation that exercised wireless transmitter function at a frequency near the Cell Phone band.

The prototype “meets” both Cispr B and FCC Level B emissions requirements.



APPENDIX A

FCC/VDE RADIATED EMISSIONS TEST (EN55011, EN55022, EN55014)

1.0 PURPOSE:

The purpose of this test sequence is to perform compliance testing to FCC Part 15, VDE 0871, CISPR 11 and 22 and other tests that can be run on a 3 meter indoor test site or in a screen room.

2.0 INDOOR TEST FACILITY DESCRIPTION:

The indoor test site is situated inside a 3000 sq. ft. building located at Midwest EMI Associates, 21234 W. Commercial Drive, Mundelein Illinois. This site has flat plane above which is situated multiple 1/2" thick 4 x 8 foot wood panels with double-sided galvanized steel plates comprising an overall dimension of approximately 24 by 32 feet. The plates are interconnected by "top hat" grounding connections that is further grounded by connection to the main power ground into the earth satisfying ANSI requirements. These tests require that the antenna be raised and lowered over a 1 to 4 meter distance on an antenna mast such that the radials clear obstructions by at least 1 meter. The size of the site will accommodate three-meter Cispr measurements. All objects are clear of the ellipse defined in ANSI for a three-meter site. The antenna mast is the C.C. Moore Company automated mast assembly Model DAPM4/6 and the antenna turntable is the C.C. Moore Company automated turntable Model DTT-4.

3.0 CONFIGURATION AND OPERATION OF TEST SAMPLE:

3.1 POWER REQUIREMENT:

The **TFT WIRELESS REMOTE** was operated in its normal mode using 4 AA cell lithium batteries.

3.2 GROUNDING:

The test sample was not grounded

The EMC receiver, a Tektronix 2712, is located outside the screen room and is grounded with a two inch copper strap at the rear of the instrument and a 2 AWG welding cable at the front of the instrument.

3.3 RADIATED CONFIGURATION:

In radiated tests, the test sample was oriented so that the area exhibiting the greatest amount of radiation was facing the antenna. This was determined to be the rear side of the unit.

All measurements were performed using the peak and quasi peak reading capability of the Tek 2712.

3.4 TEST SAMPLE OPERATION:

All test measurements were made with the unit in its normal measuring mode after a 3-minute power up period. The EUT was measuring thicknesses at a very fast rate.

3.5 TEST PROCEDURES/LIMITS OF ACCEPTANCE:

The general procedures are dictated in the individual protocols listed such as ANSI 63.4, FCC Part 15, CISPR 11, and CISPR 22. The limits for FCC rules presently are given in Part 15.109 of 47 CFR 1 (10-9-1990) Edition of the Federal Code of Regulations. **The antenna used is the Antenna Research LPB 2520 Biconilog antenna in both its horizontal and vertical modes for 5-meter compliance tests.**

VDE LIMITS (ELECTRIC FIELDS - CISPR 11)

Above 30 MHz the limit is written at 30 meters. From 30 MHz to 230 MHz the "A" level allowed is 30 uV/m, and 37 dBuV/m) from 230 MHz to 1000 MHz. Since the specification is written at 30 meters the extrapolated allowed values to 3 meters are 50 dBuV/m and 57 dBuV/m respectively. If this requirement is passed and the Cispr 11 B level limit is not passed then the following warning is recommended to be included in the instructions for use:

This (Equipment and/or System) is suitable for use in all establishments other than domestic and those directly connected to the low voltage power supply network that supplies buildings used for domestic purposes.

Sale of devices is not restricted when this warning is included in the instructions.

For CISPR 11 B level, the allowed radiated emissions are measured at a 10 meters distance. The allowed levels are 30 dBuV/m from 30 to 230 MHz, and from 230 to 1000 MHz the level is 37 dBuV/m. The levels have been linearly extrapolated on the graphs to 5 meters, which reflects a 6 dB increase.

Hereinafter, the equipment under test will be referred to as the E.U.T. All radiated tests above 30 MHz are made with horizontal and vertical polarizations where applicable.

4.0 CONCLUSION OF RADIO FREQUENCY INTERFERENCE EMISSIONS TESTS:

Preliminary Test

The device was oriented with the front of the EUT facing the antenna initially. The unit was varied in position and antenna height with a 1 or 2 meter antenna height found typically to be worst case. The orientation of the unit was typically with the EUT facing front at 0 degrees wrt the antenna.

Final Testing 10-25-06 to 10-30-06

The data for this testing is shown on pages B1-B18. Graph B1 shows the ambient, B2 shows the peak mode, and Graph B2A shows the quasipeak mode in comparison in the range of 20-75 MHz and Page B2B shows the tabular data. All areas appeared compliant with Cispr and FCC Class B level. Several frequencies were individually searched and found not to be from the EUT. Other emissions above the line were due to TV channel 2 and the beginning of the FM band.

In the 75-170 MHz range, Graph B3 shows the ambient, B4 shows peak and B4A shows peak against both Cispr and FCC B level and B4B shows quasi peak data. The reason why peak and quasipeak was taken is to show none of the spurs are due to the EUT. Tabular data is shown on B4C and B4D. Ambient emissions consist of TV channel 5, FM band the intentional radiators at 152-158 and 162 MHz. Emissions in the mid band area were discovered to be airplane emissions.

In the 170-300 MHz range, the ambient is shown on Graph B5 & B6 while peak level is on B7 and QP level is on B8. Tabular data is on B9 and a second peak mode graph showing both Cispr B and FCC B is shown on B10A. No areas of emission from the EUT appeared to exceed the limit. Other emissions seen were from TV Channels 7, 9, and 11, and a common carrier at about 220 MHz.

In the 300-640 MHz, the ambient is shown on B10B and B11 while the peak level emissions are shown on B12 and QP emissions are on B13

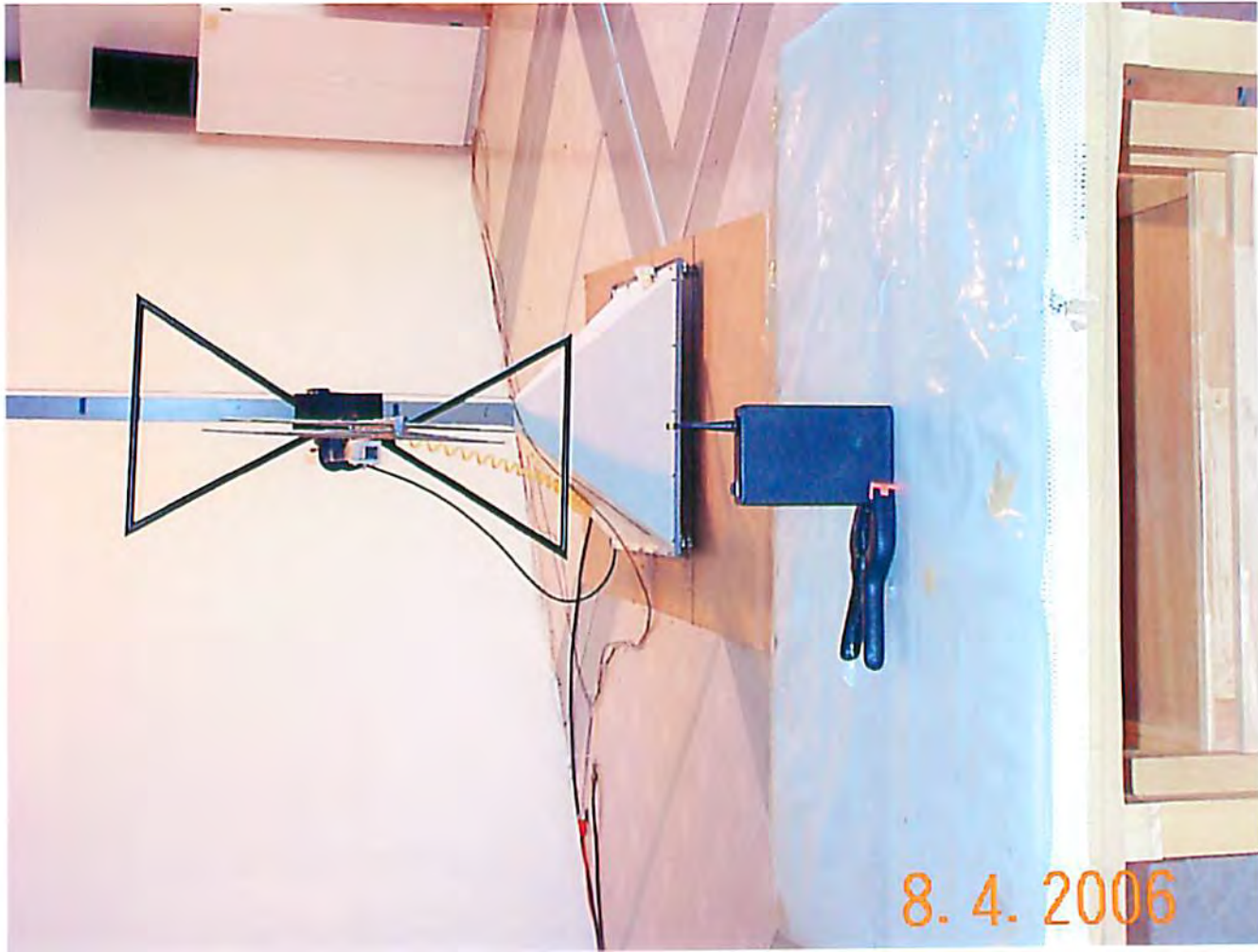
with tabular data on B14. Other high emissions are numerous UHF TV stations. Individual emissions from the ambient were individually inspected by overlay and not found to be due to the EUT. They were primarily TV stations.

In the 620-1000 MHz, the ambient is shown on B15 and peak level on B16 while QP emissions are shown on B17 and tabular data on B18. Other high emissions are numerous UHF TV stations and the cell telephone band around 900 MHz. When the graphs were overlaid, no excess level introduced by the EUT was seen.

The **TFT WIRELESS REMOTE** was fully compliant with the Cispr 11 B and FCC level B specification without further alteration.



8. 4. 2006

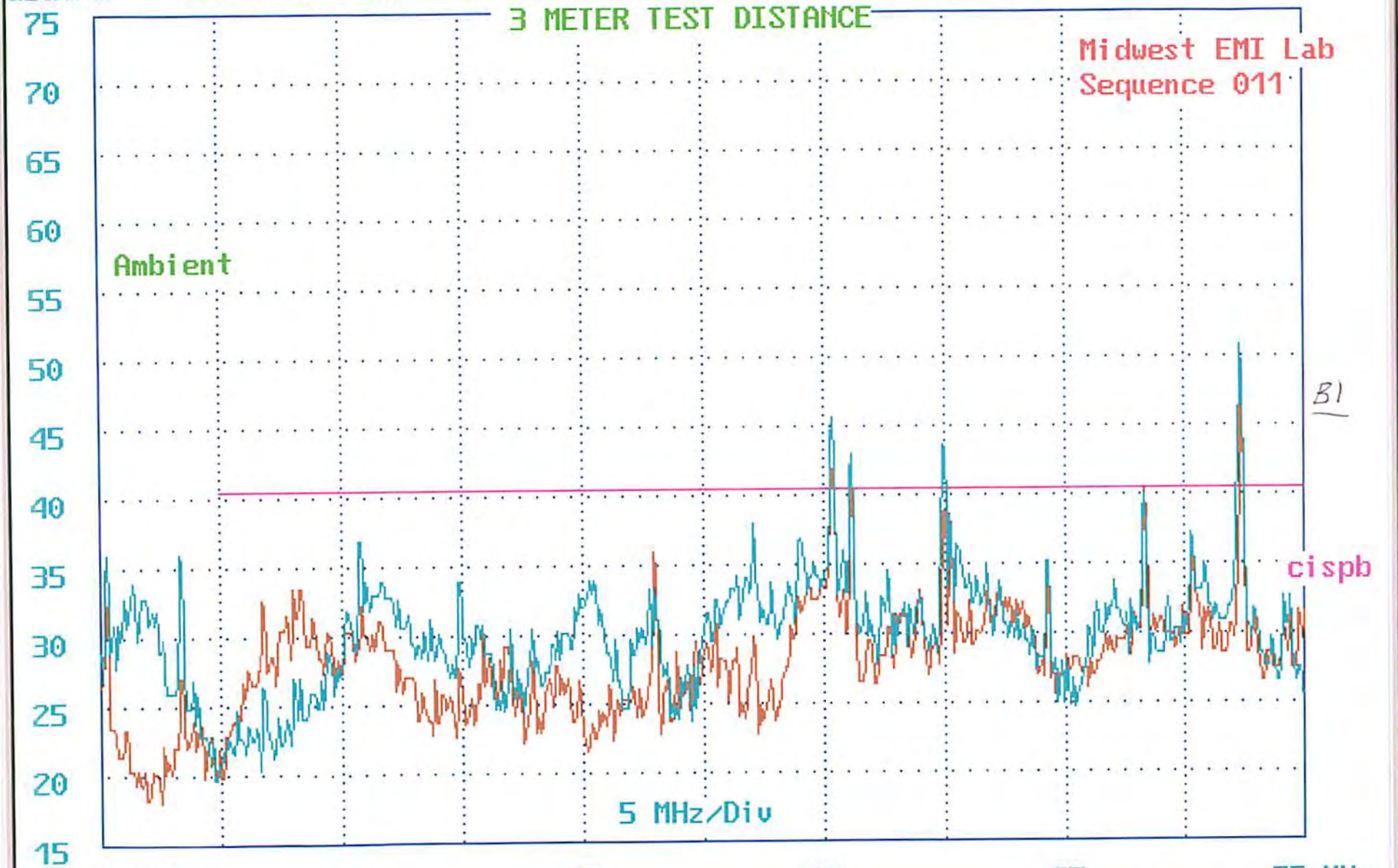


8. 4. 2006

RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

dBuV/m



Midwest EMI Lab
Sequence 011

B1

cispr

5 MHz/Div

25 MHz

35

45

55

65

75 MHz

TFT Remote

Y5700

12:32:41

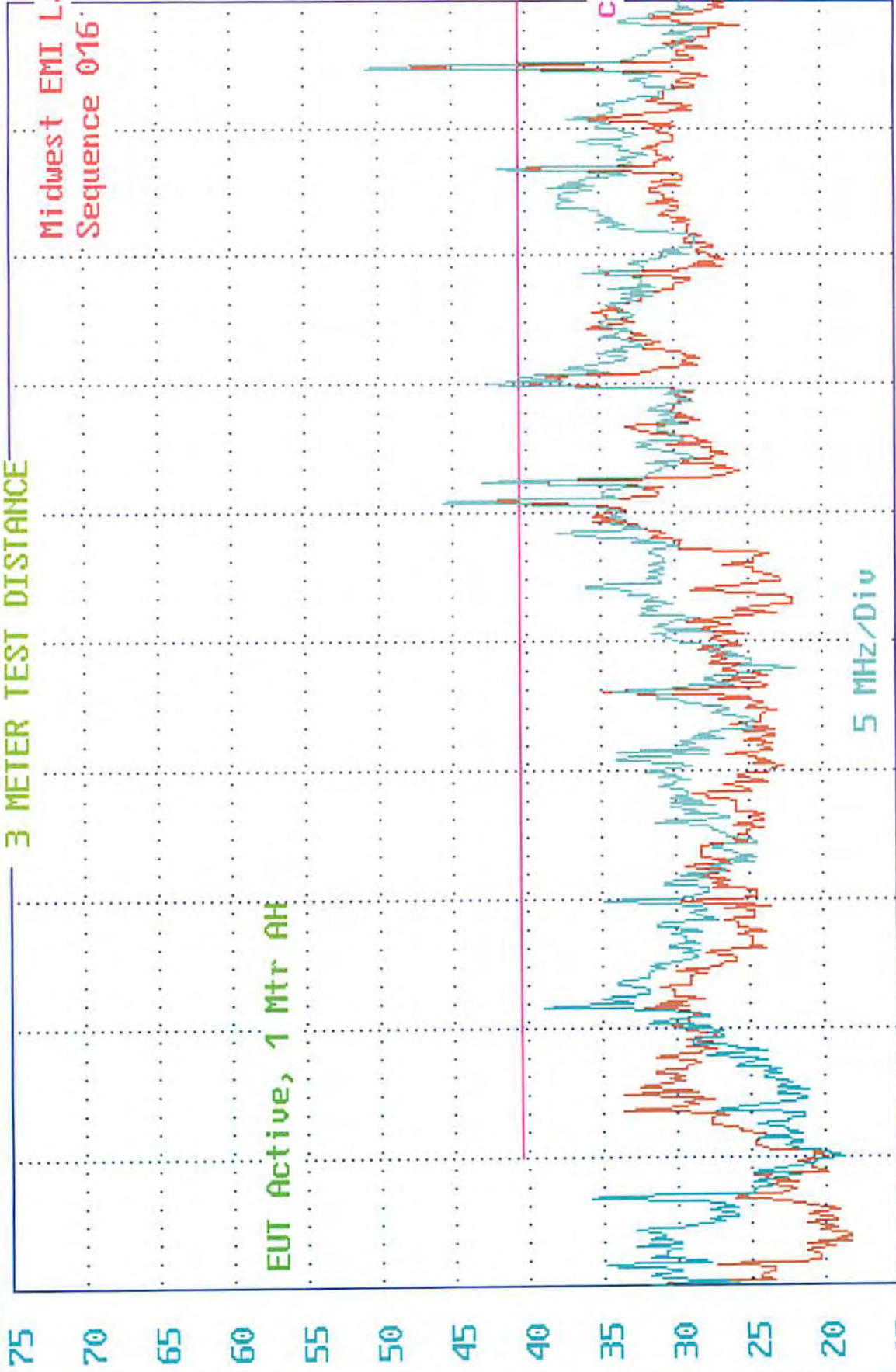
10-31-2006

Sitting on Wood Table at 80cm., Battery Powered

George Bowman

RADIATED EMISSIONS

dBuV/m CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

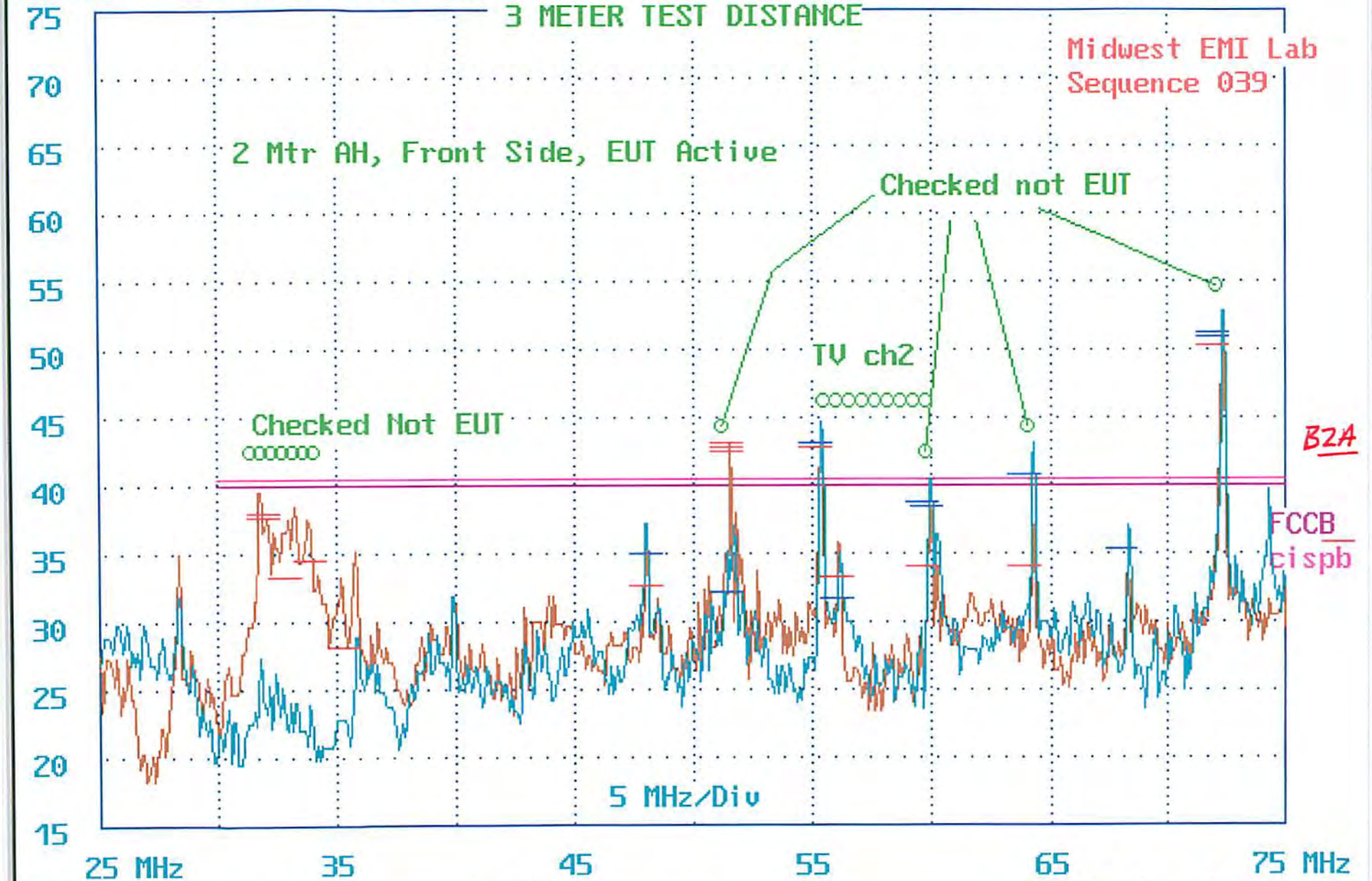


RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment

3 METER TEST DISTANCE

dBuV/m



SHEET 1 **cispb RADIATED QUASI-PEAK REPORT**
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

TIME: 12:46:18
DATE: 11-12-2006

Midwest EMI
Associates

B2B

TEST ITEM: TFT Remote

SERIAL NUMBER: Y5700 **Sequence Number: 039**

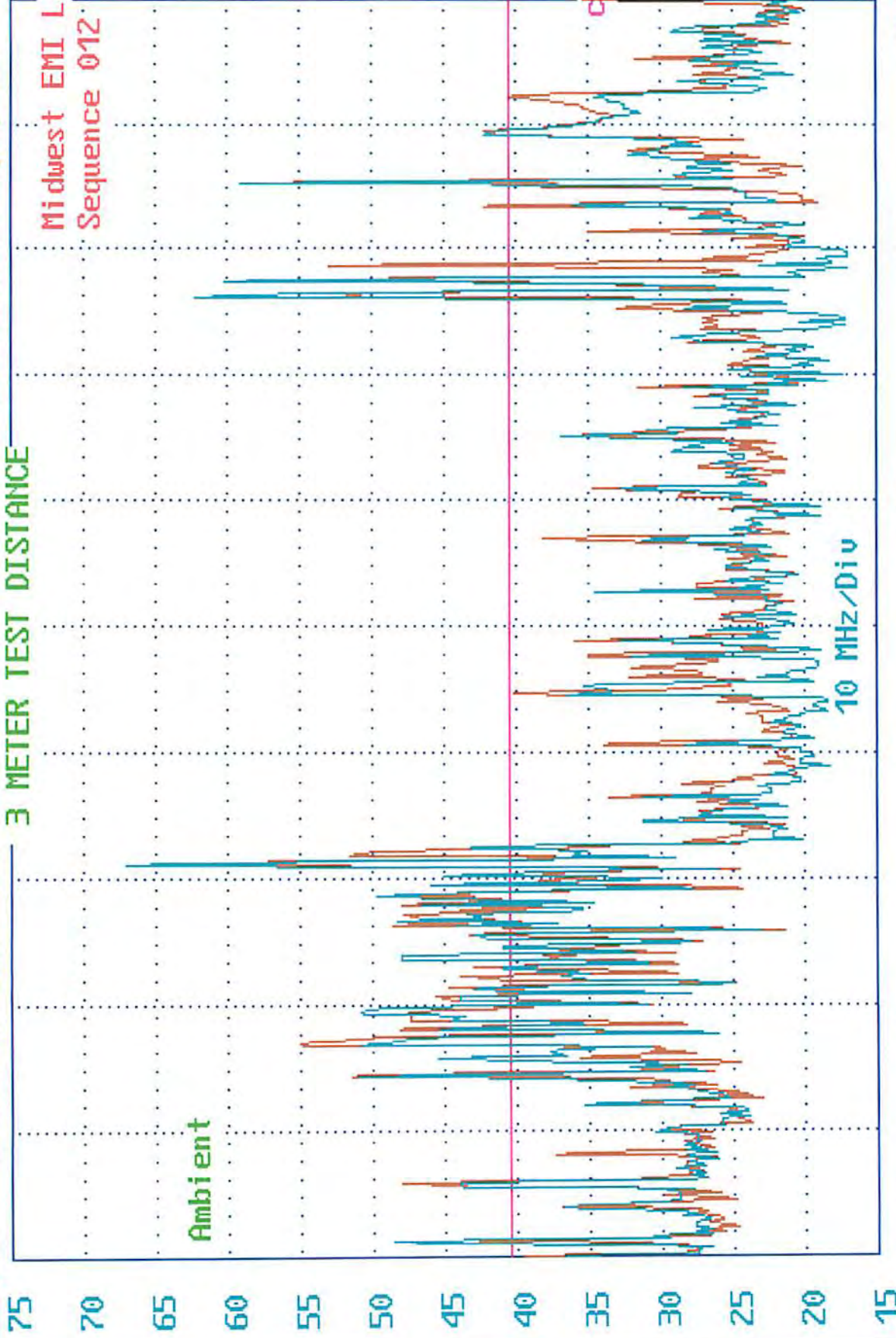
COMMENTS: Sitting on Wood Table at 80cm., Battery Powered

TEST PERFORMED BY: George Bowman

Peak Frequency (MHz)	Peak Interfer. (dBuV/m)	Quasi-peak Freq. (MHz)	Quasi-peak Interfer. (dBuV/m)	Spec. Level (dBuV/m)	Antenna Polarization (H/V)
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77.24222	35.57	77.2598	35.82	40.50	Horizontal
83.23718	35.56	83.2364	28.44	40.50	Horizontal
88.00157	37.22	87.9944	34.64	40.50	Horizontal
120.246	37.08	120.0468	30.38	40.50	Horizontal
123.0362	37.22	122.9338	32.83	40.50	Horizontal
125.1671	36.12	125.0127	24.72	40.50	Horizontal
140.0067	41.60	140.0075	39.23	40.50	Horizontal
143.9965	38.07	144.0141	34.10	40.50	Horizontal
147.7923	35.07	147.9859	28.95	40.50	Horizontal
158.0318	45.74	158.1046	44.03	40.50	* Horizontal
164.2709	41.22	164.0741	38.81	40.50	Horizontal
166.8867	39.38	166.8355	38.92	40.50	Horizontal
31.98937	42.19	32.0262	37.76	40.50	Horizontal
32.13672	40.04	32.0183	38.06	40.50	Horizontal
33.02091	40.36	32.9121	33.29	40.50	Horizontal
33.84894	39.32	34.0145	34.60	40.50	Horizontal
35.56857	37.78	35.3726	28.15	40.50	Horizontal
47.99541	37.15	47.9954	32.72	40.50	Horizontal
51.52764	44.62	51.4676	42.63	40.50	* Horizontal
51.54364	43.26	51.4884	42.92	40.50	* Horizontal
51.58858	35.51	51.3886	43.25	40.50	* Horizontal
55.24209	44.51	55.2565	42.88	40.50	* Horizontal
55.92238	37.33	56.0104	33.33	40.50	Horizontal
59.74615	38.72	59.7286	34.09	40.50	Horizontal
63.99263	38.48	63.987	34.14	40.50	Horizontal
71.9988	53.42	72.0012	50.42	40.50	* Horizontal
48.02482	39.86	47.9968	35.12	40.50	Vertical
48.02334	38.12	47.9993	35.12	40.50	Vertical
51.60613	37.99	51.4757	32.33	40.50	Vertical
55.24578	45.60	55.253	43.18	40.50	* Vertical
55.94931	37.91	56.0045	31.83	40.50	Vertical
59.75944	40.81	59.7426	38.45	40.50	Vertical
59.82907	38.02	59.7283	38.76	40.50	Vertical
63.99877	43.47	63.9988	40.83	40.50	* Vertical
68.05759	37.65	67.9992	35.37	40.50	Vertical
71.9988	54.26	72.002	51.32	40.50	* Vertical
71.9988	41.34	72.002	51.02	40.50	* Vertical

RADIATED EMISSIONS
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE



Midwest EMI Lab
Sequence 012

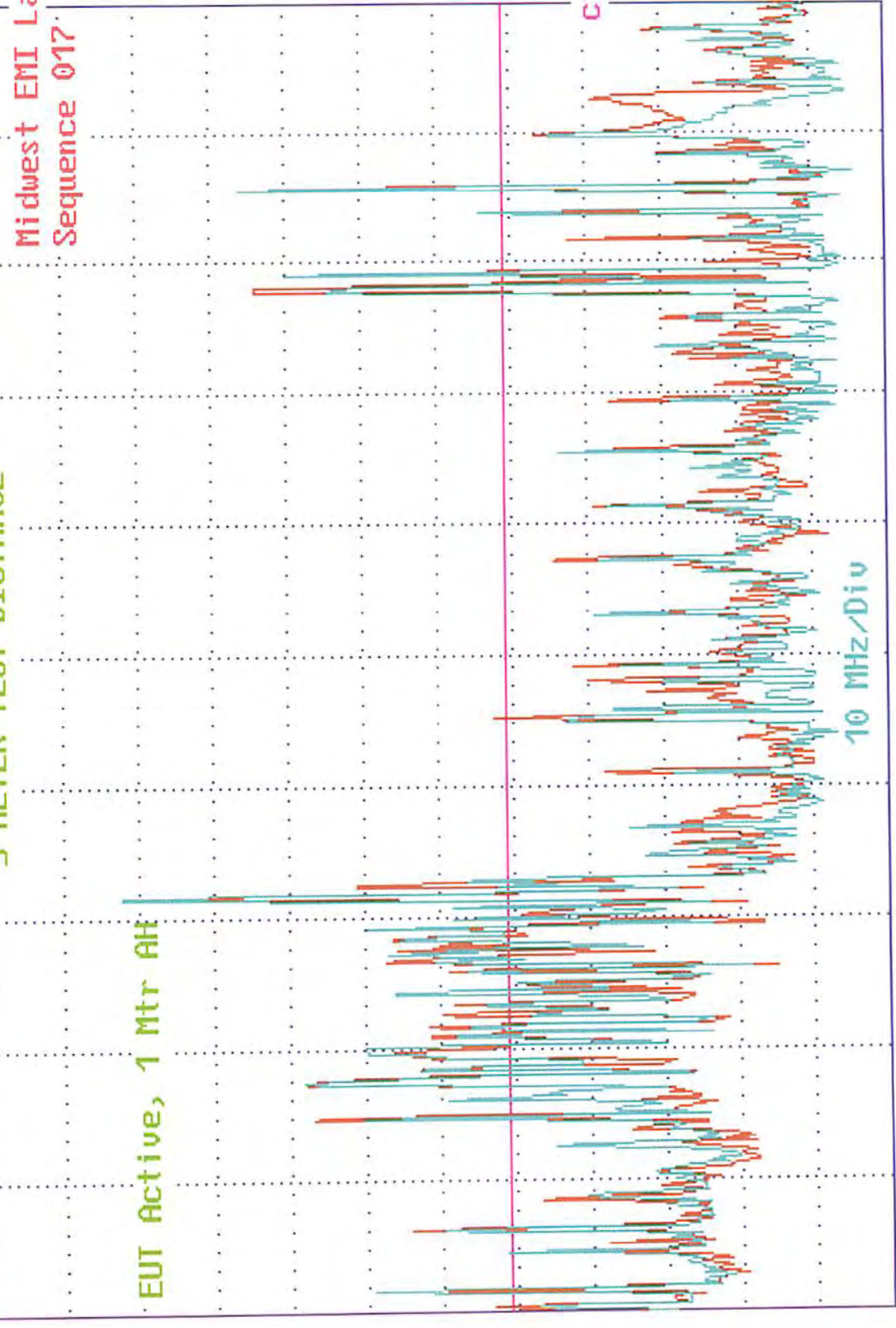
Ambient

B3

cispb

10 MHz/Div

RADIATED EMISSIONS
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE



Midwest EMI Lab
Sequence 017

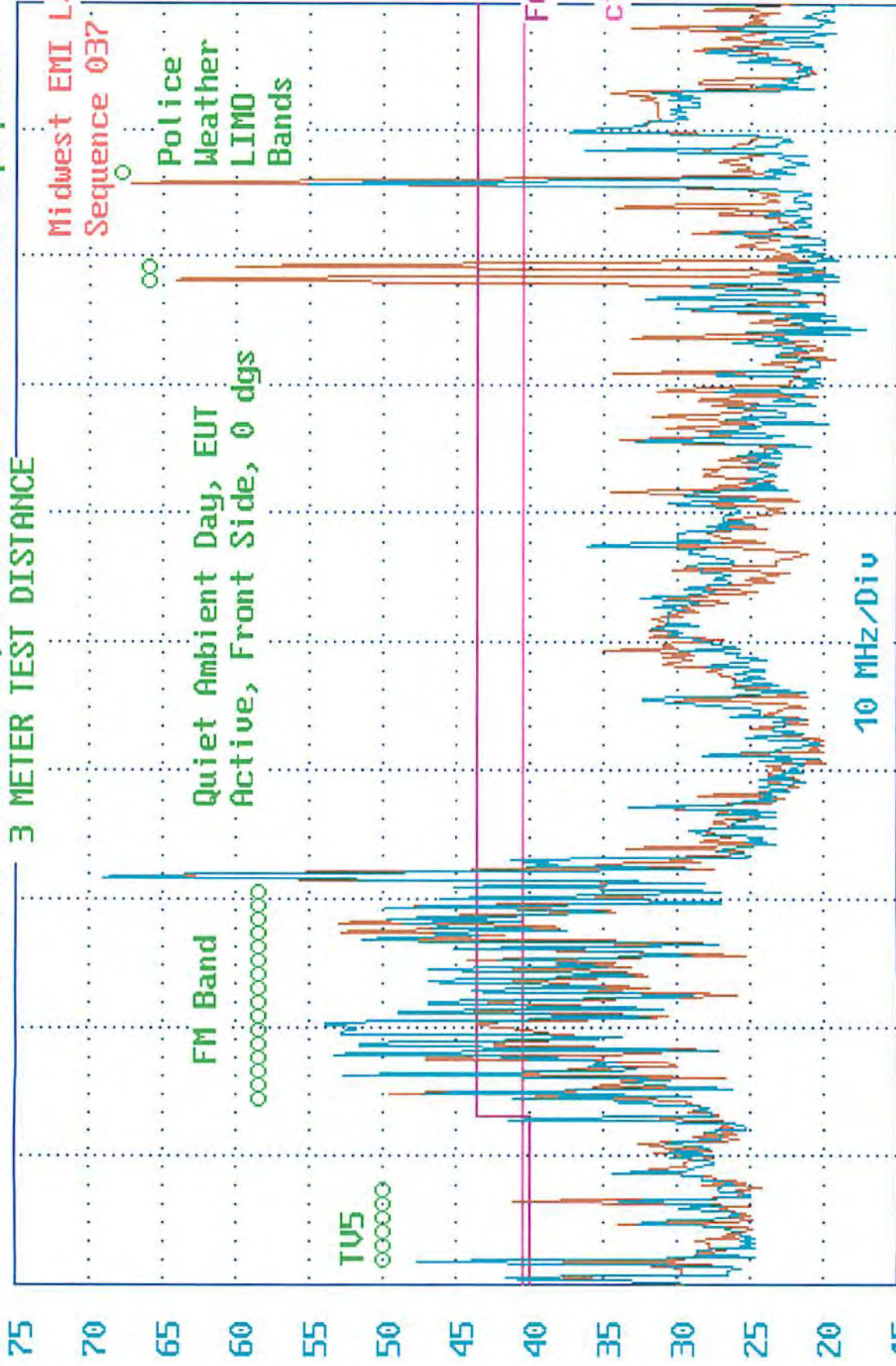
EUT Active, 1 Mtr AH

75 MHz 95 115 135 155 175 MHz
 IFT Remote Y5700
 Sitting on Wood Table at 80cm., Battery Powered
 12:32:41 10-31-2006
 George Bowman

RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment

3 METER TEST DISTANCE



75 MHz

95

115

135

155

175 MHz

TFT Remote

Y5700

12:46:18

11-12-2006

Sitting on Wood Table at 80cm., Battery Powered

George Bowman

RADIATED EMISSIONS

dBuV/m

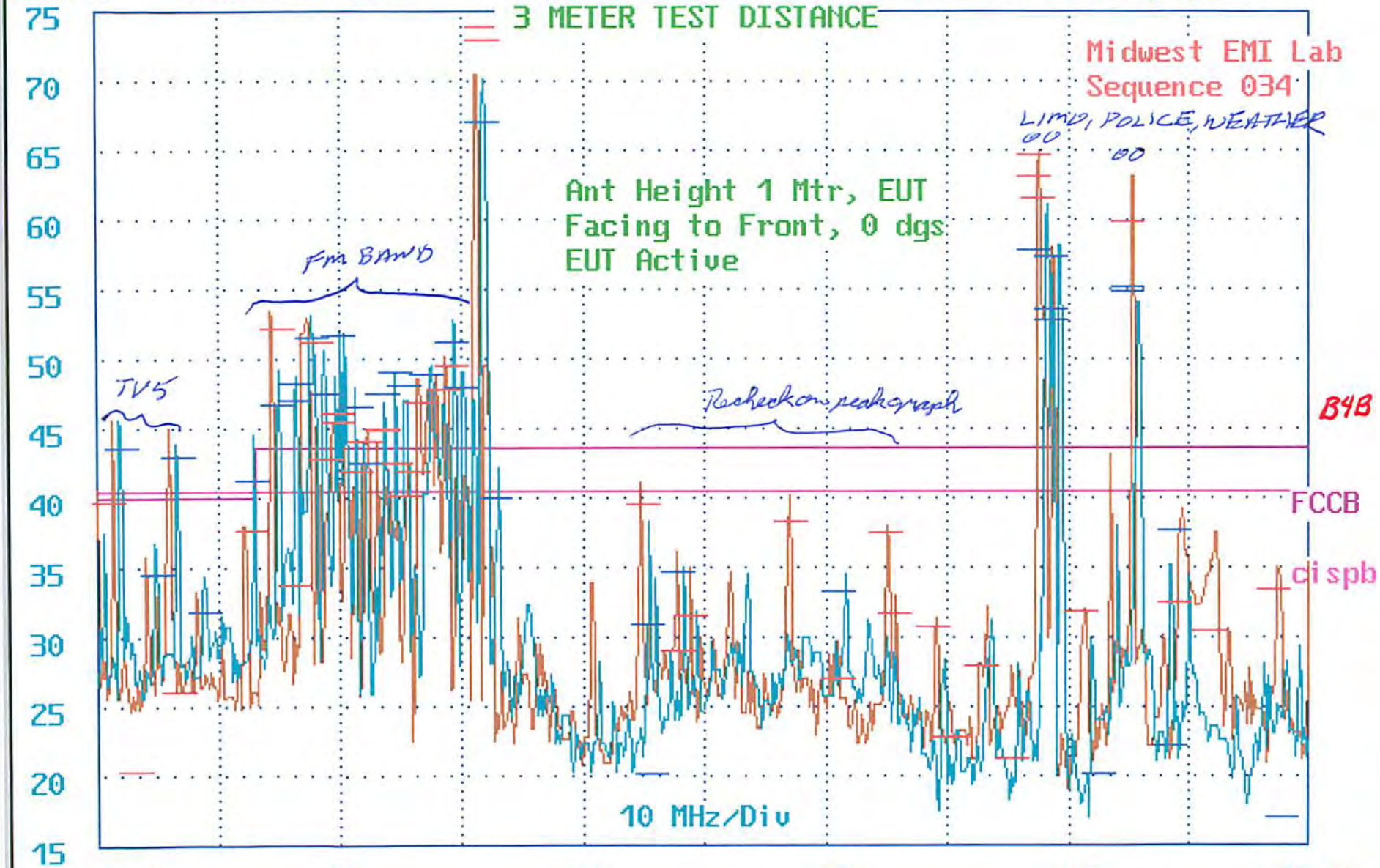
CISPR11B Level for Industrial, Scientific and Medical Equipment

3 METER TEST DISTANCE

Midwest EMI Lab
Sequence 034

LIMB, POLICE, WEATHER
00 00

Ant Height 1 Mtr, EUT
Facing to Front, 0 dgs
EUT Active



75 MHz 95 115 135 155 175 MHz

TFT Remote Y5700 10:41:39 11-02-2006

Sitting on Wood Table at 80cm., Battery Powered George Bowman

BAC

SHEET 1 cispb RADIATED QUASI-PEAK REPORT
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

TIME: 10:41:39 Midwest EMI
DATE: 11-02-2006 Associates

TEST ITEM: TFT Remote
SERIAL NUMBER: Y5700 Sequence Number: 034

COMMENTS: Sitting on Wood Table at 80cm., Battery Powered
TEST PERFORMED BY: George Bowman

Peak Frequency (MHz)	Peak Interfer. (dBuV/m)	Quasi-peak Freq. (MHz)	Quasi-peak Interfer. (dBuV/m)	Spec. Level (dBuV/m)	Antenna Polarization (H/V)
----------------------	-------------------------	------------------------	-------------------------------	----------------------	----------------------------

76.2	46.34	76.012	39.72	40.50	Horizontal
78.33161	38.14	78.1324	20.38	40.50	Horizontal
81.46116	44.52	81.6596	26.23	40.50	Horizontal
88.00060	40.28	88.0094	37.74	40.50	Horizontal
90.09389	54.30	90.0979	52.33	40.50 *	Horizontal
91.5262	52.93	91.4918	33.83	40.50	Horizontal
93.10004	45.94	93.104	51.26	40.50 *	Horizontal
93.90004	46.93	93.8832	42.82	40.50 *	Horizontal
95.0996	45.31	95.042	45.56	40.50 *	Horizontal
95.1024	44.03	95.072	46.16	40.50 *	Horizontal
96.30686	44.14	96.2717	42.02	40.50 *	Horizontal
97.10096	45.64	97.1074	44.13	40.50 *	Horizontal
98.69947	45.34	98.7011	44.93	40.50 *	Horizontal
98.70009	42.35	98.6889	45.13	40.50 *	Horizontal
99.50046	41.12	99.49809	42.64	40.50 *	Horizontal
100.3019	43.07	100.3171	40.29	40.50	Horizontal
101.1002	48.63	101.065	41.99	40.50 *	Horizontal
101.9004	49.26	101.9172	47.03	40.50 *	Horizontal
103.5024	50.28	103.448	47.84	40.50 *	Horizontal
104.2999	42.44	104.2743	49.66	40.50 *	Horizontal
106.6091	43.84	106.7027	73.99	40.50 *	Horizontal
106.7	72.81	106.704	73.99	40.50 *	Horizontal
106.6998	48.99	106.7046	72.99	40.50 *	Horizontal
119.9951	42.05	120.0023	39.68	40.50	Horizontal
120.07	39.47	120.002	39.58	40.50	Horizontal
123.1924	38.34	122.9924	29.12	40.50	Horizontal
123.9534	36.58	124.007	31.57	40.50	Horizontal
131.9947	41.06	132.0035	38.33	40.50	Horizontal
136.1384	33.77	136.0008	27.14	40.50	Horizontal
140.0103	39.63	140.0095	37.53	40.50	Horizontal
140.4588	35.55	140.6324	31.85	40.50	Horizontal
144.094	35.80	144.0028	30.80	40.50	Horizontal
145.2078	31.46	145.4086	22.84	40.50	Horizontal
148.0596	34.05	147.9836	28.05	40.50	Horizontal
150.3328	33.91	150.2752	21.31	40.50	Horizontal
152.315	58.82	152.3622	61.62	40.50 *	Horizontal
152.315	65.62	152.3102	64.82	40.50 *	Horizontal
152.4777	58.23	152.2777	63.22	40.50 *	Horizontal
156.0001	35.37	156.0089	31.97	40.50	Horizontal
159.9752	63.58	159.9712	59.88	40.50 *	Horizontal
164.1312	42.51	164.0184	32.61	40.50	Horizontal
166.898	42.16	166.8412	30.62	40.50	Horizontal
171.9581	37.31	172.0021	33.56	40.50	Horizontal
77.25018	47.01	77.25579	43.62	40.50 *	Vertical
81.75023	46.35	81.7606	43.02	40.50 *	Vertical

B4D

SHEET 2 cispb RADIATED QUASI-PEAK REPORT
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

TIME: 10:41:39 Midwest EMI
DATE: 11-02-2006 Associates

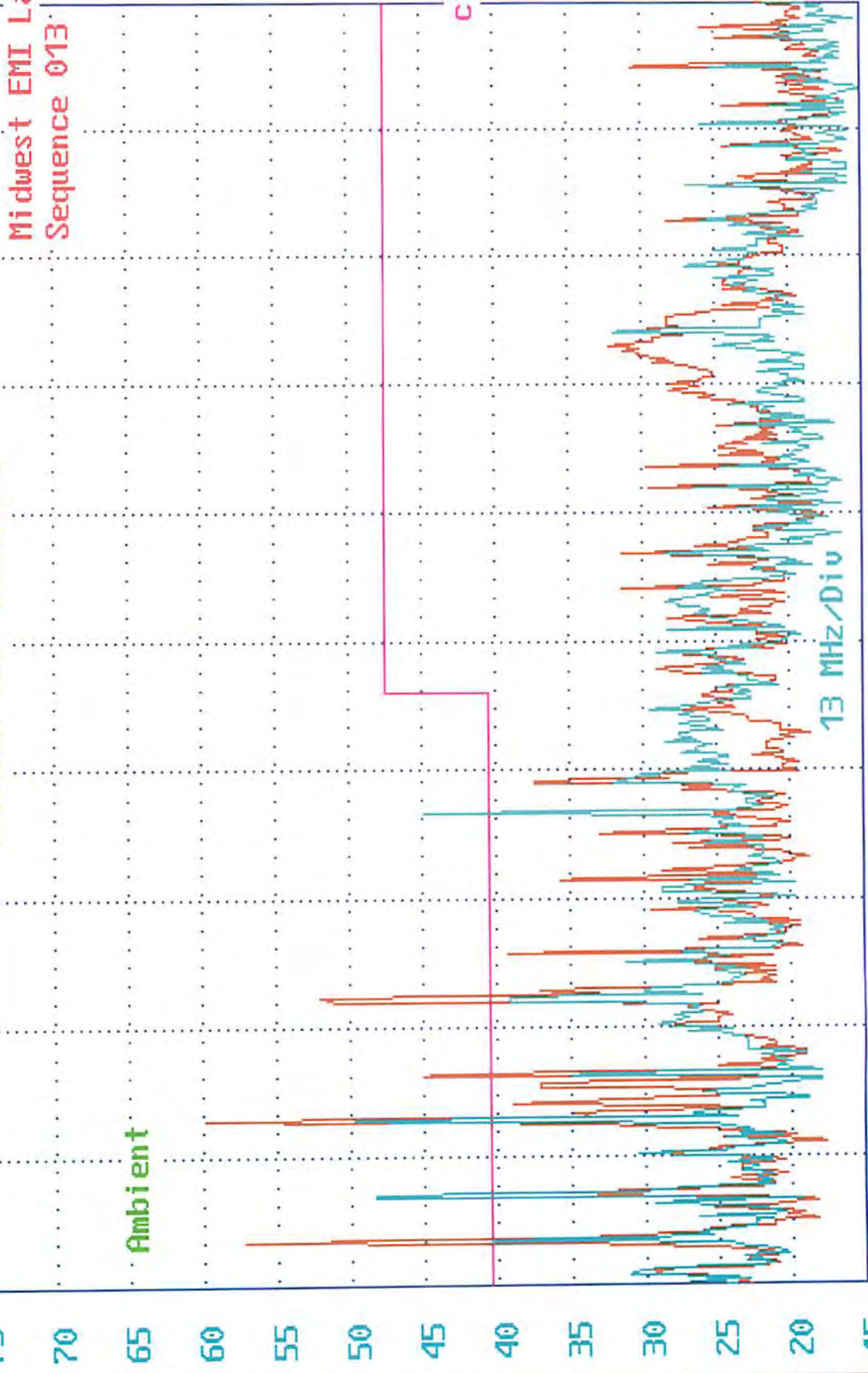
TEST ITEM: TFT Remote
SERIAL NUMBER: Y5700 Sequence Number: 034

COMMENTS: Sitting on Wood Table at 80cm., Battery Powered
TEST PERFORMED BY: George Bowman

Peak Frequency (MHz)	Peak Interfer. (dBuV/m)	Quasi-peak Freq. (MHz)	Quasi-peak Interfer. (dBuV/m)	Spec. Level (dBuV/m)	Antenna Polarization (H/V)
----------------------	-------------------------	------------------------	-------------------------------	----------------------	----------------------------

80.13574	37.30	80.0069	34.61	40.50	Vertical
84.08305	36.66	84.00230	31.99	40.50	Vertical
87.99872	43.60	87.9923	41.26	40.50 *	Vertical
90.09958	50.15	90.02119	46.82	40.50 *	Vertical
91.48142	49.34	91.48699	47.04	40.50 *	Vertical
91.51103	43.15	91.50060	48.34	40.50 *	Vertical
92.71019	53.73	92.7518	51.68	40.50 *	Vertical
93.90016	49.57	93.8546	47.56	40.50 *	Vertical
95.10592	52.95	95.0667	51.85	40.50 *	Vertical
96.29900	48.44	96.2662	46.64	40.50 *	Vertical
97.07941	44.93	97.04259	42.53	40.50 *	Vertical
98.72094	48.41	98.70650	47.61	40.50 *	Vertical
99.5004	49.31	99.53319	49.10	40.50 *	Vertical
100.1794	47.45	100.3138	48.27	40.50 *	Vertical
102.3003	49.81	102.2899	49.03	40.50 *	Vertical
104.3001	52.87	104.2977	51.39	40.50 *	Vertical
105.1001	47.86	105.1073	48.06	40.50 *	Vertical
106.7005	71.84	106.7013	67.13	40.50 *	Vertical
107.8618	43.20	107.8946	40.09	40.50	Vertical
120.2713	39.35	120.4681	31.02	40.50	Vertical
121.0298	39.52	120.8738	20.16	40.50	Vertical
123.0543	36.85	123.0343	34.78	40.50	Vertical
135.9978	37.25	136.0074	33.32	40.50	Vertical
152.2392	64.55	152.2864	57.93	40.50 *	Vertical
153.4401	60.31	153.4449	53.69	40.50 *	Vertical
153.4401	57.59	153.4217	52.89	40.50 *	Vertical
153.4401	59.27	153.4145	57.49	40.50 *	Vertical
157.3887	33.22	157.4999	20.31	40.50	Vertical
159.9752	44.09	159.9936	54.88	40.50 *	Vertical
160.0241	55.54	159.9865	55.28	40.50 *	Vertical
163.575	37.21	163.6638	22.23	40.50	Vertical
164.0881	38.31	164.0233	37.75	40.50	Vertical
173.0315	33.07	172.9787	17.07	40.50	Vertical

RADIATED EMISSIONS
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE



RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment

3 METER TEST DISTANCE

dBuV/m

75

70

65

60

55

50

45

40

35

30

25

20

15

Ambient

Midwest EMI Lab
Sequence 028

B6

cispr

13 MHz/Div

170 MHz

196

222

248

274

300 MHz

TFT Remote

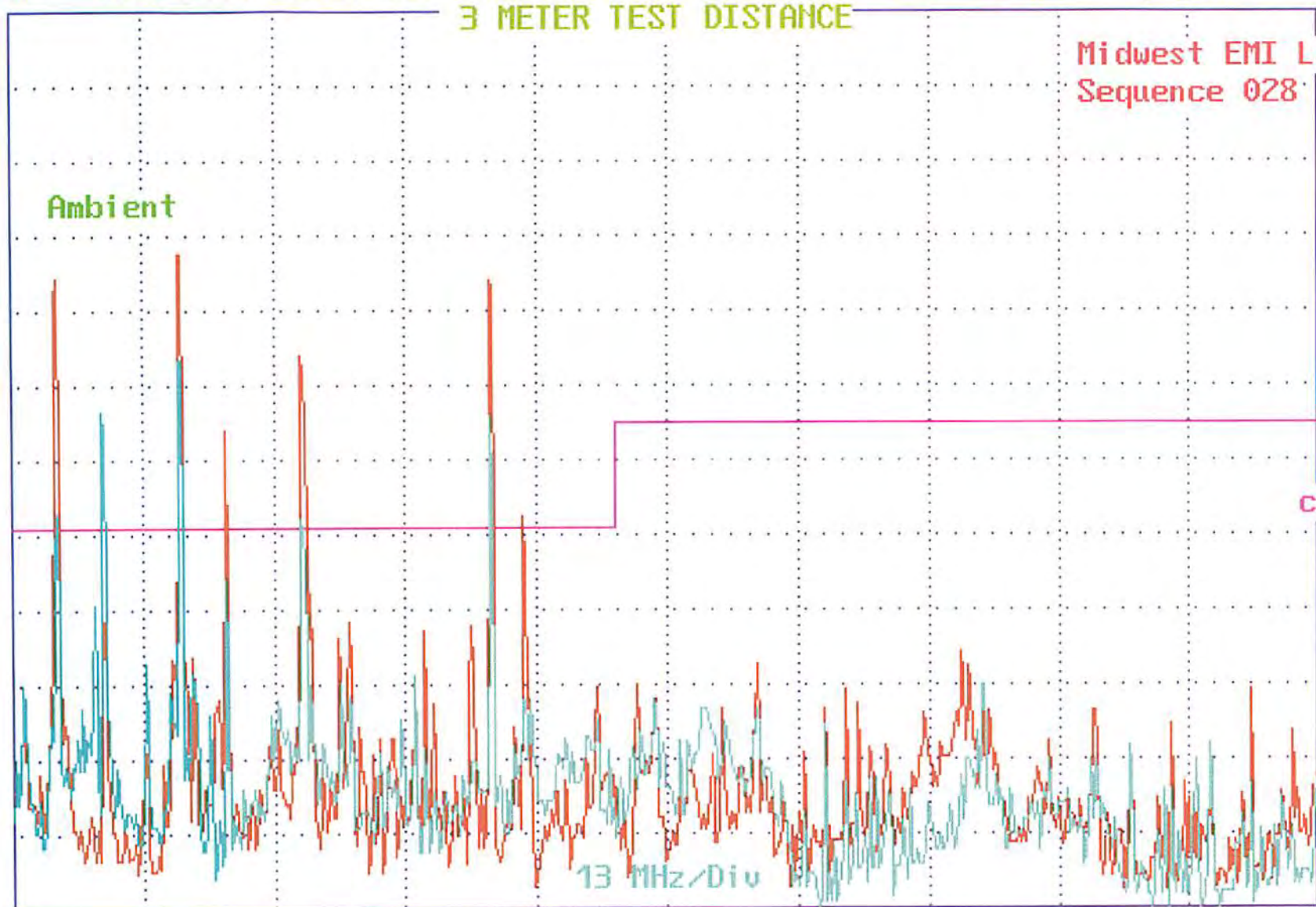
Y5700

12:32:41

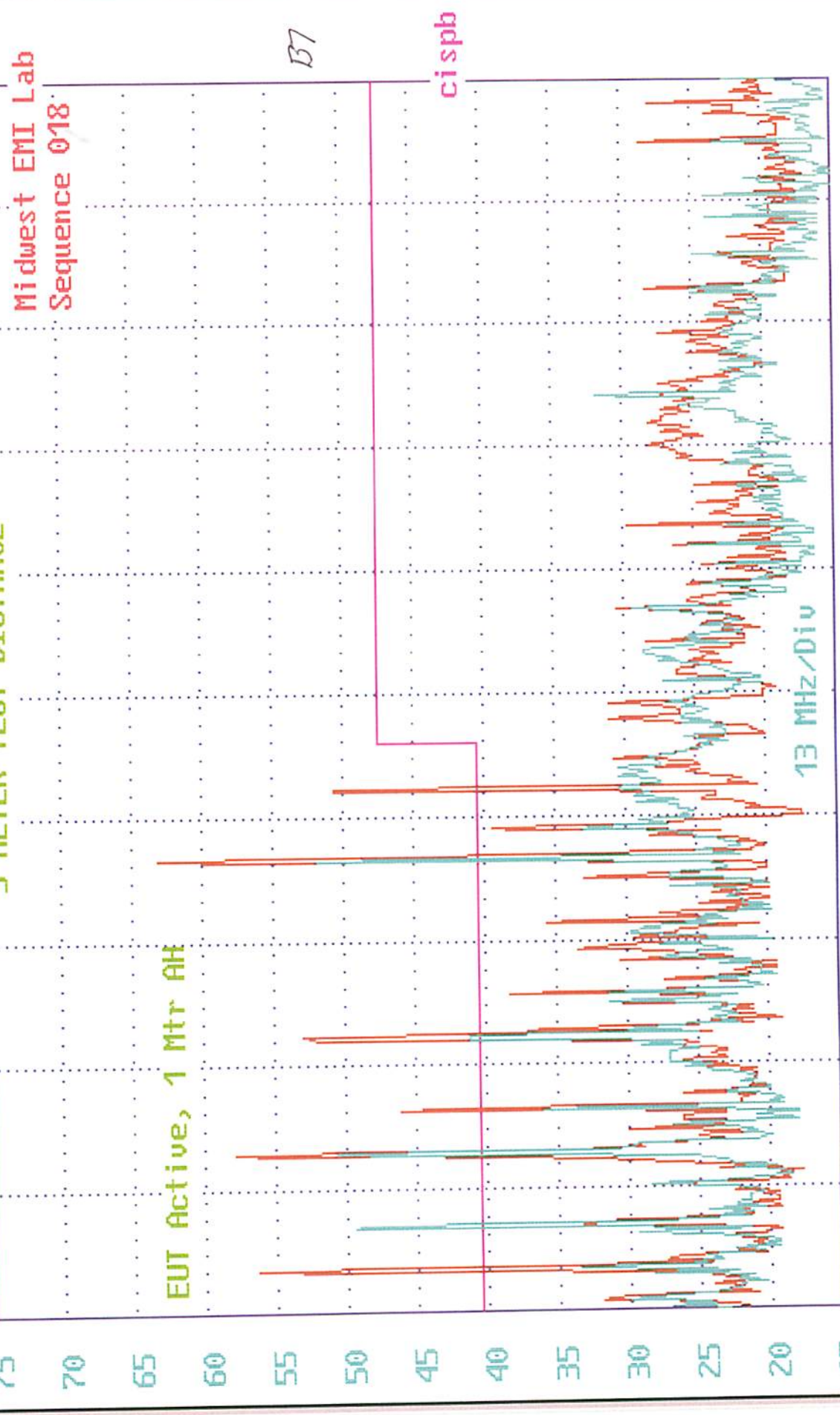
10-31-2006

Sitting on Wood Table at 80cm., Battery Powered

George Bowman



RADIATED EMISSIONS
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE



Midwest EMI Lab
Sequence 018

EUT Active, 1 Mtr AH

cispr

13 MHz/Div

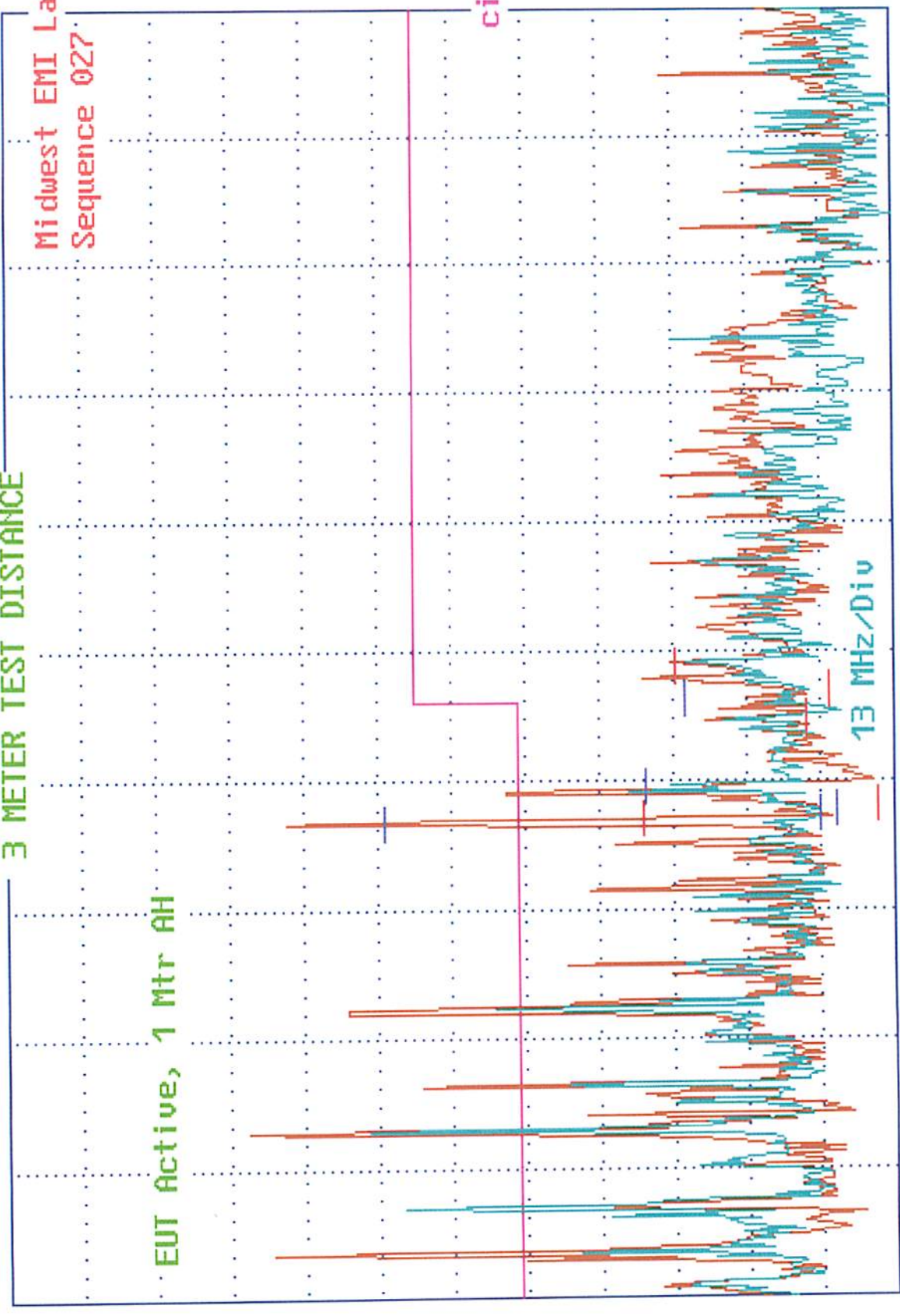
170 MHz 196 222 248 274 300 MHz

12:32:41 10-31-2006
George Bowman
y5700
Sitting on Wood Table at 80cm., Battery Powered

RADIATED EMISSIONS
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

Midwest EMI Lab
Sequence 027

EUT Active, 1 Mtr AH



B8

cispb

B7

SHEET 1 **cispb RADIATED QUASI-PEAK REPORT**
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

TIME: 12:32:41 **Midwest EMI**
DATE: 10-31-2006 **Associates**

TEST ITEM: TFT Remote
SERIAL NUMBER: Y5700 **Sequence Number: 027**

COMMENTS: Sitting on Wood Table at 80cm., Battery Powered
TEST PERFORMED BY: George Bowman

Peak Frequency (MHz)	Peak Interfer. (dBuV/m)	Quasi-peak Freq. (MHz)	Quasi-peak Interfer. (dBuV/m)	Spec. Level (dBuV/m)	Antenna Polarization (H/V)
-----------------------------	--------------------------------	-------------------------------	--------------------------------------	-----------------------------	-----------------------------------

218.5546	56.31	218.465	32.17	40.50	Horizontal
219.396	41.92	219.5136	16.14	40.50	Horizontal
228.4111	32.90	228.3743	21.02	40.50	Horizontal
231.3423	46.36	231.4887	19.40	47.50	Horizontal
233.5476	33.89	233.586	29.89	47.50	Horizontal
217.778	51.40	217.6564	49.61	40.50 *	Vertical
218.8967	57.01	218.9575	20.04	40.50	Vertical
219.0955	34.03	219.0883	18.95	40.50	Vertical
221.5458	33.70	221.5034	31.90	40.50	Vertical
230.6	40.58	230.432	29.37	47.50	Vertical

RADIATED EMISSIONS

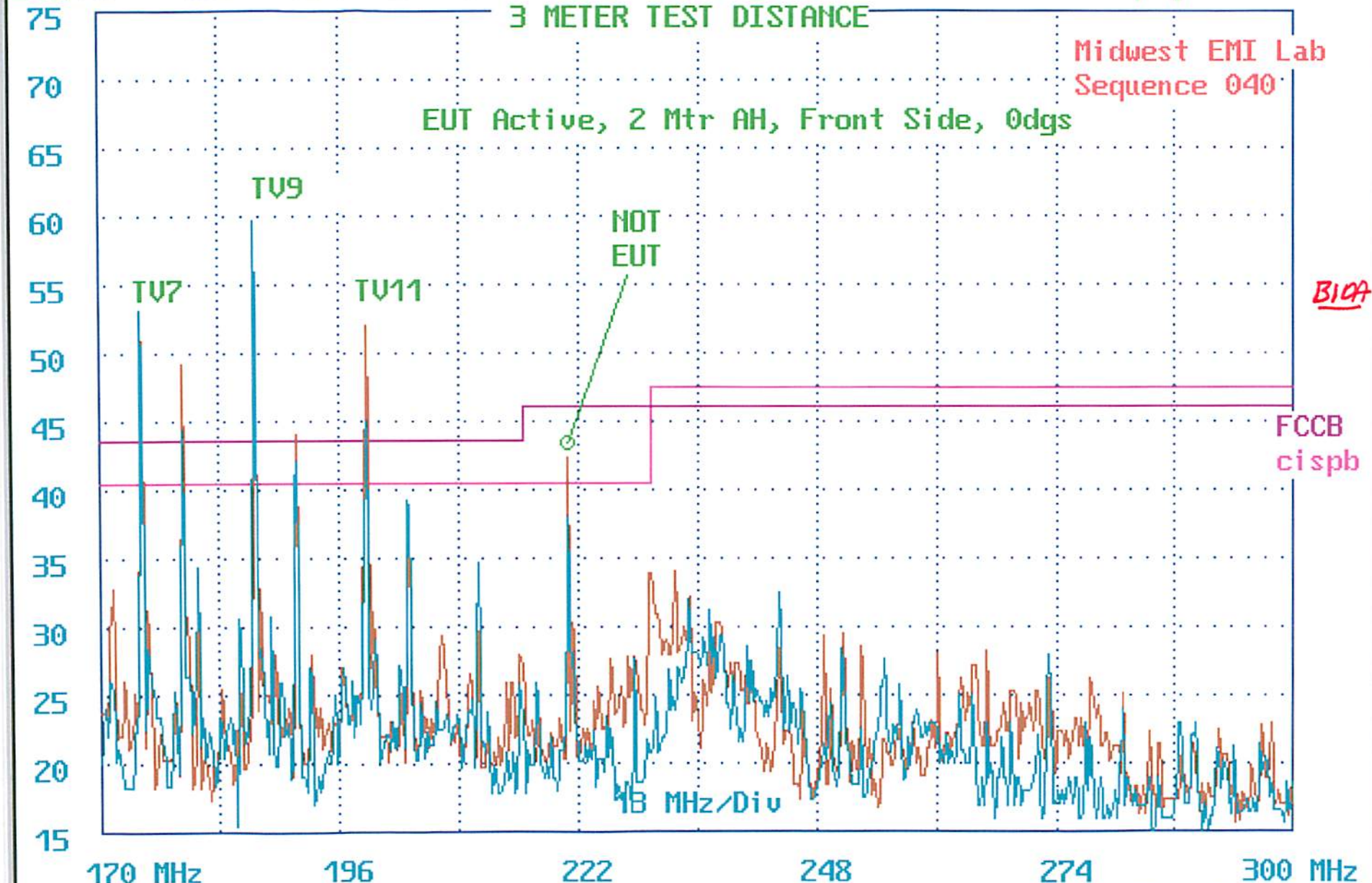
CISPR11B Level for Industrial, Scientific and Medical Equipment

3 METER TEST DISTANCE

dBuV/m

Midwest EMI Lab
Sequence 040

EUT Active, 2 Mtr AH, Front Side, 0dgs



TFT Remote

Y5700

12:46:18

11-12-2006

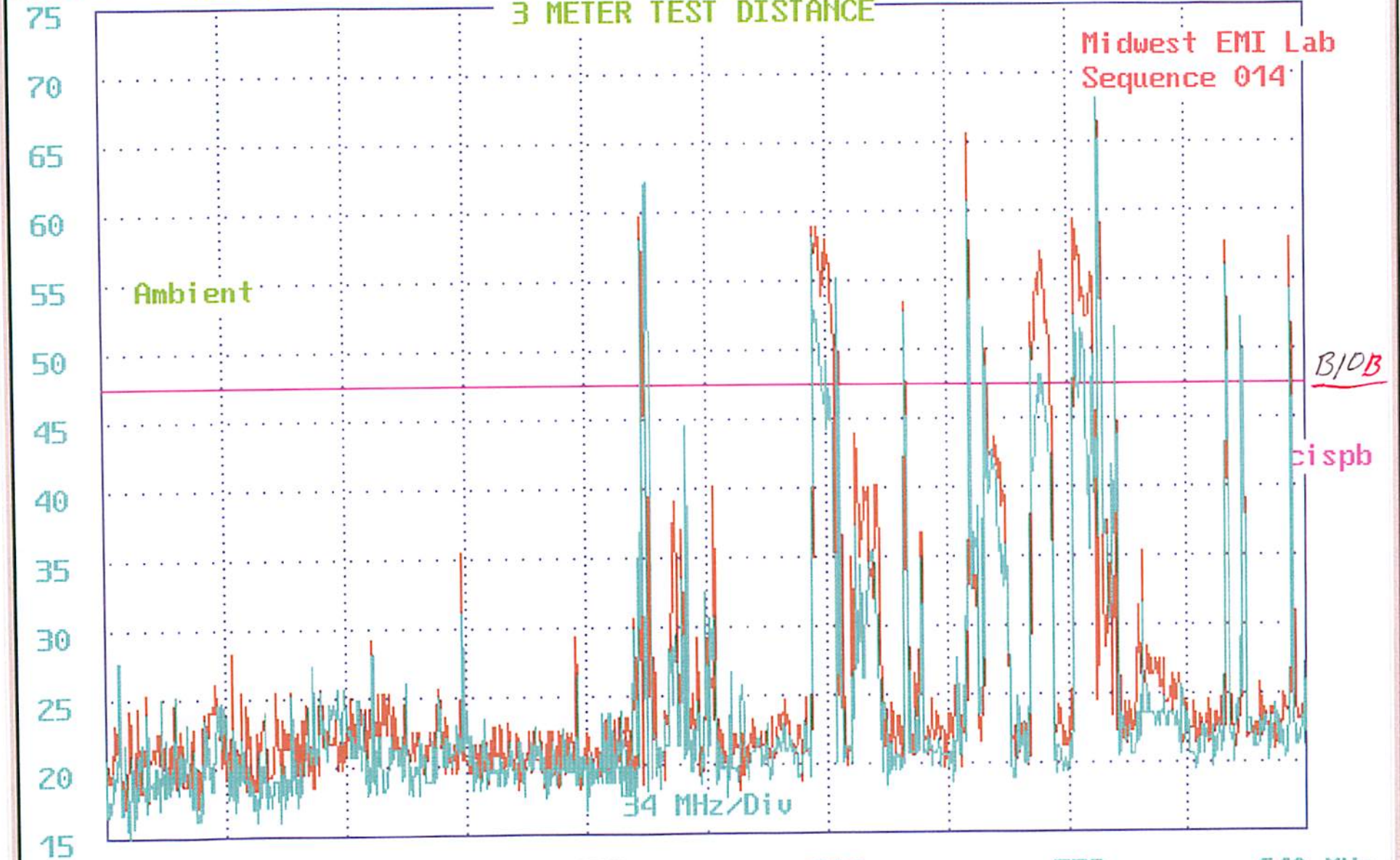
Sitting on Wood Table at 80cm., Battery Powered

George Bowman

RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

dBuV/m



300 MHz

368

436

504

572

640 MHz

TFT Remote

Y5700

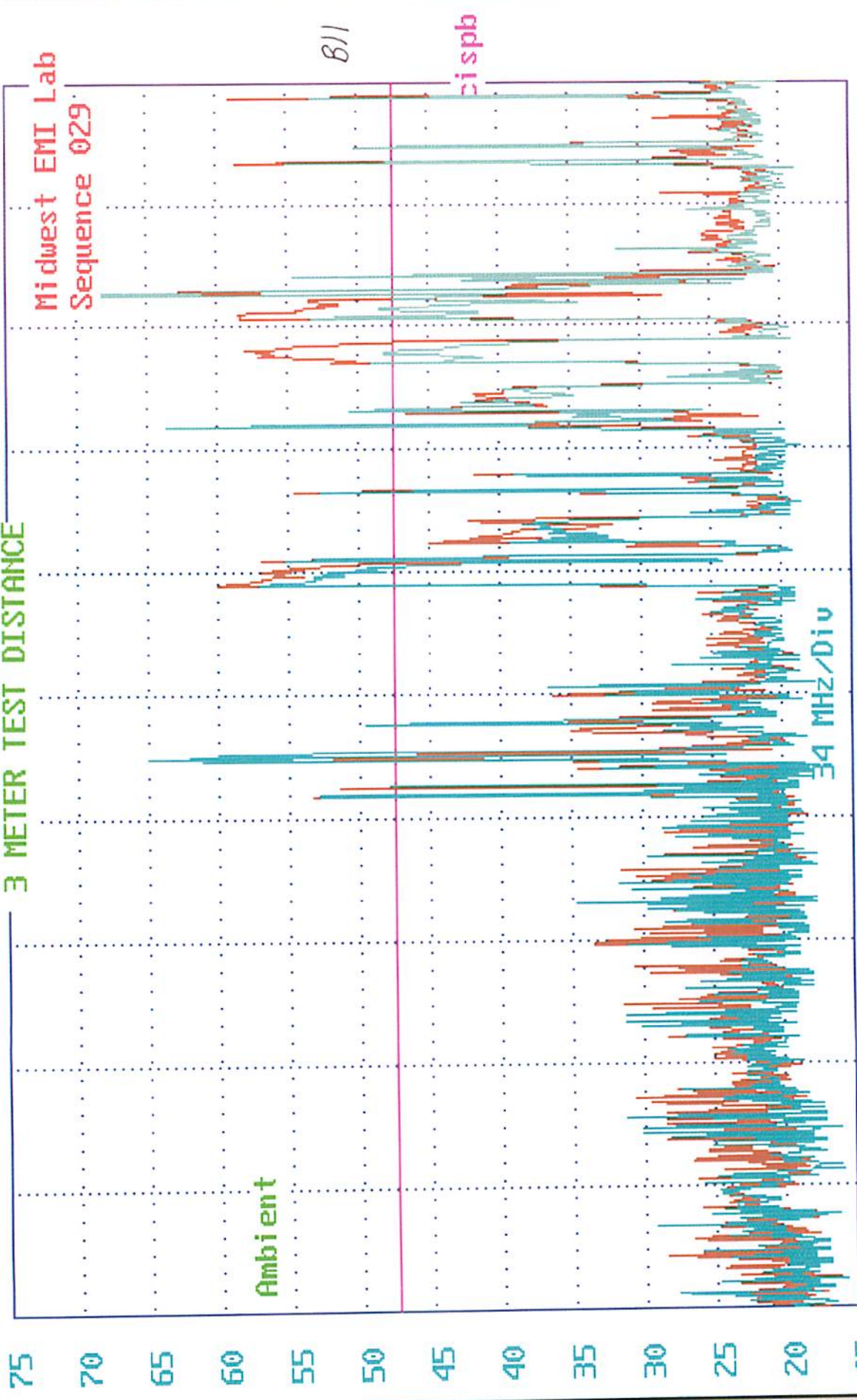
12:32:41

10-31-2006

Sitting on Wood Table at 80cm., Battery Powered

George Bowman

RADIATED EMISSIONS
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE



RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

dBuV/m

75

70

65

60

55

50

45

40

35

30

25

20

15

Midwest EMI Lab
Sequence 019

EUT Active, 1 Mtr AH

B12

cispr

34 MHz/Div

300 MHz

368

436

504

572

640 MHz

TFT Remote

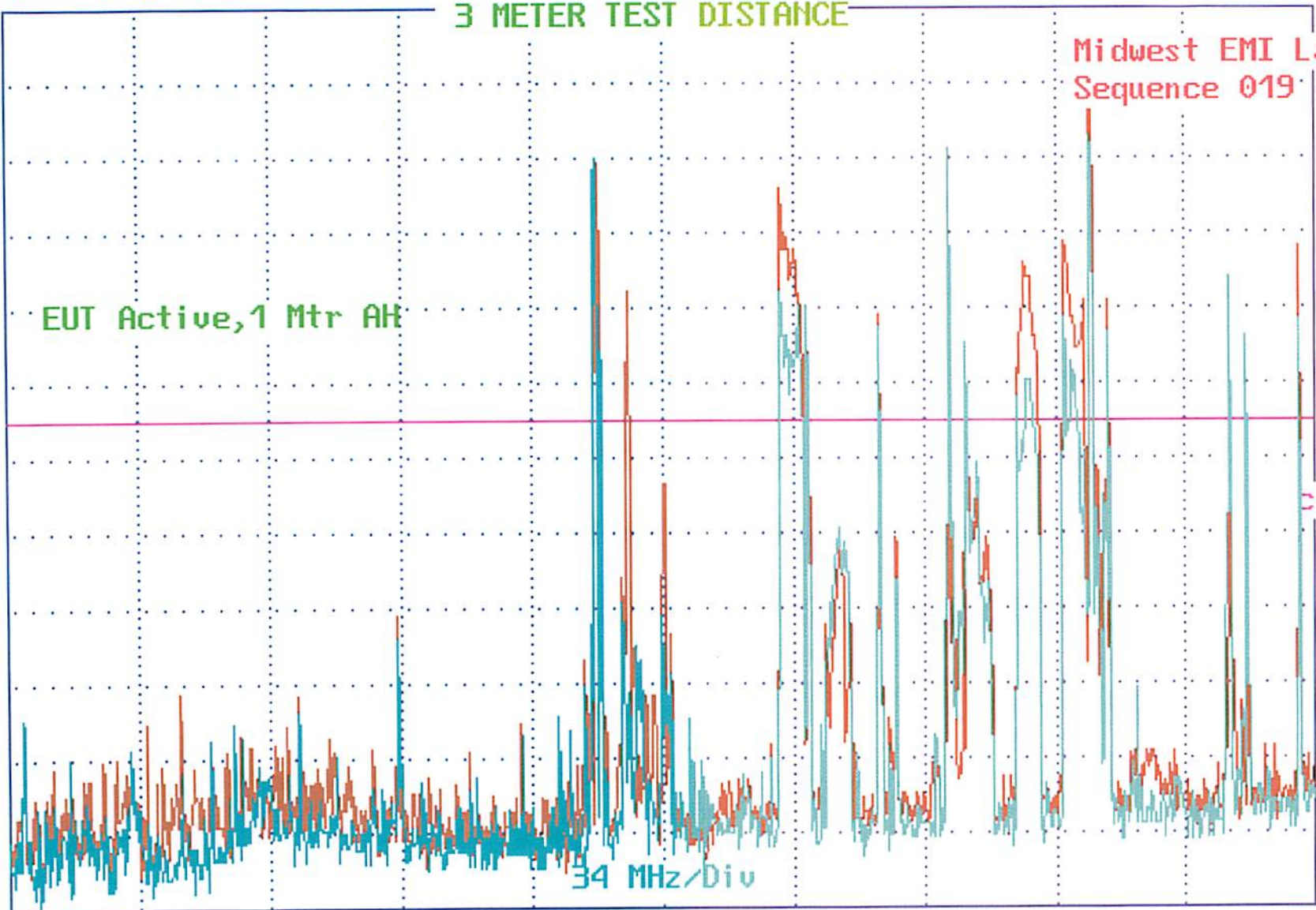
Y5700

12:32:41

10-31-2006

Sitting on Wood Table at 80cm., Battery Powered

George Bowman



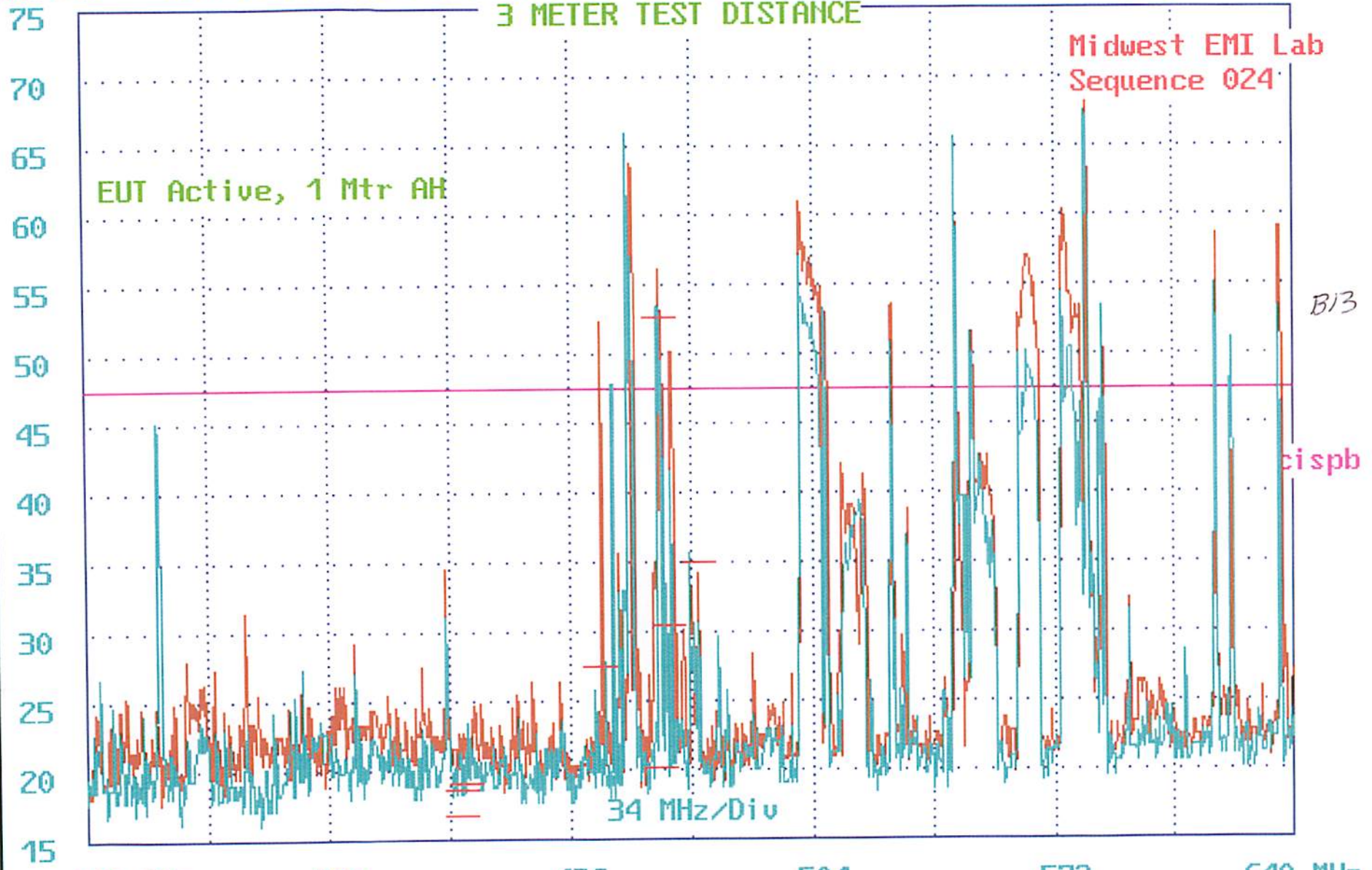
RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

dBuV/m

Midwest EMI Lab
Sequence 024

EUT Active, 1 Mtr AH



B13

cispb

34 MHz/Div

300 MHz

368

436

504

572

640 MHz

TFT Remote

Y5700

12:32:41

10-31-2006

Sitting on Wood Table at 80cm., Battery Powered

George Bowman

B14

SHEET 1 **cispb RADIATED QUASI-PEAK REPORT**
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

TIME: 12:32:41 **Midwest EMI**
DATE: 10-31-2006 **Associates**

TEST ITEM: TFT Remote
SERIAL NUMBER: Y5700 **Sequence Number: 024**
COMMENTS: Sitting on Wood Table at 80cm., Battery Powered
TEST PERFORMED BY: George Bowman

Peak Frequency (MHz)	Peak Interfer. (dBuV/m)	Quasi-peak Freq. (MHz)	Quasi-peak Interfer. (dBuV/m)	Spec. Level (dBuV/m)	Antenna Polarization (H/V)
-----------------------------	--------------------------------	-------------------------------	--------------------------------------	-----------------------------	-----------------------------------

406.5745	46.18	406.6793	19.06	47.50	Horizontal
406.2669	47.19	406.0685	18.74	47.50	Horizontal
405.9468	42.00	406.1036	16.74	47.50	Horizontal
444.9508	50.84	444.8684	27.56	47.50	Horizontal
461.4501	55.84	461.4965	52.76	47.50 *	Horizontal
462.1991	53.56	462.0143	20.17	47.50	Horizontal
464.0727	51.13	464.2719	30.62	47.50	Horizontal
472.2478	47.85	472.3734	35.12	47.50	Horizontal

RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

dBuV/m

75

70

65

60

55

50

45

40

35

30

25

20

15

Ambient

Midwest EMI Lab
Sequence 015

BIS

cispr

38 MHz/Div

620 MHz

696

772

848

924

1 GHz

TFT Remote

Y5700

12:32:41

10-31-2006

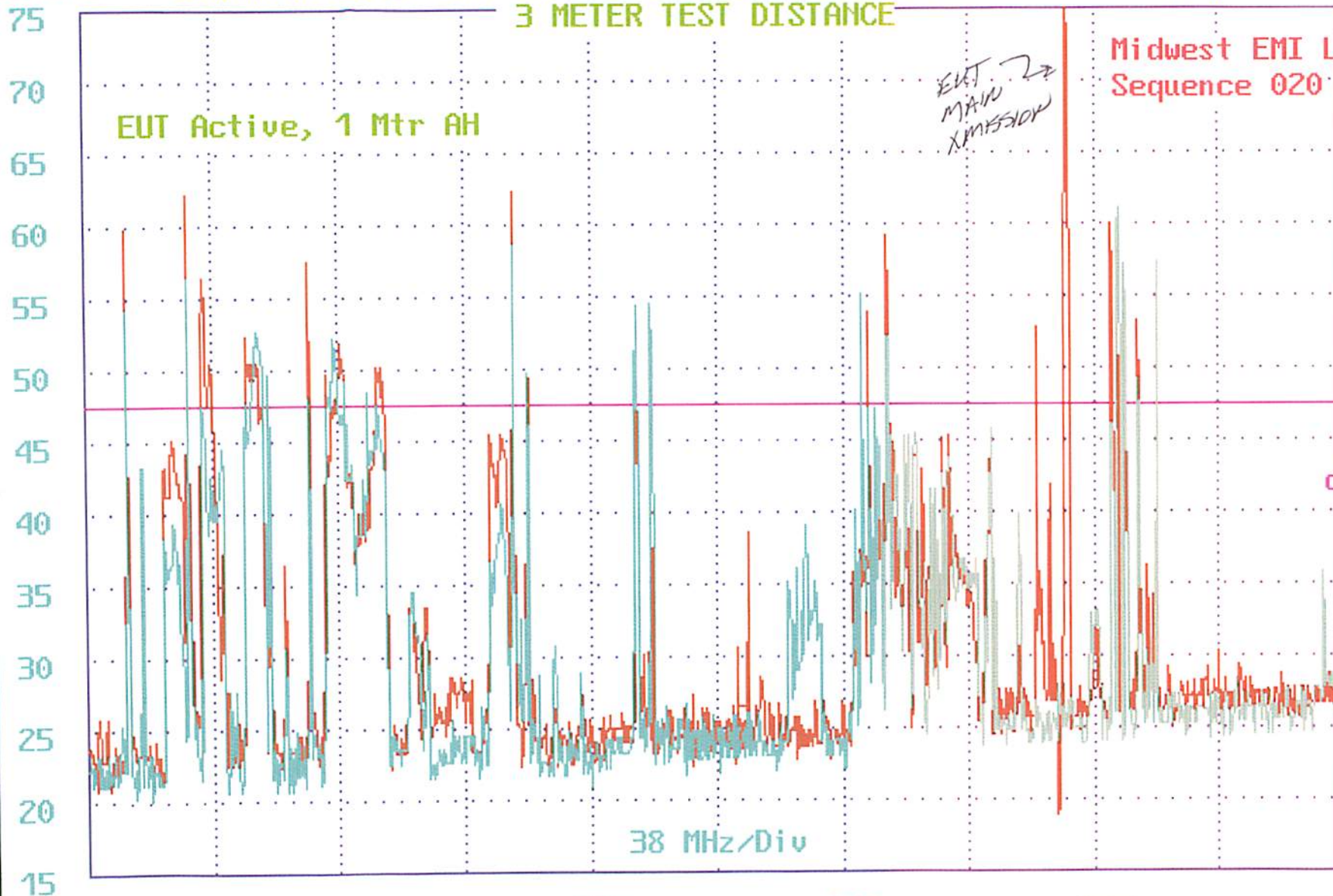
Sitting on Wood Table at 80cm., Battery Powered

George Bowman

RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

dBuV/m



Midwest EMI Lab
Sequence 020

EUT Active, 1 Mtr AH

EUT MAIN EMISSION

B16

cispb

38 MHz/Div

620 MHz 696 772 848 924 1 GHz

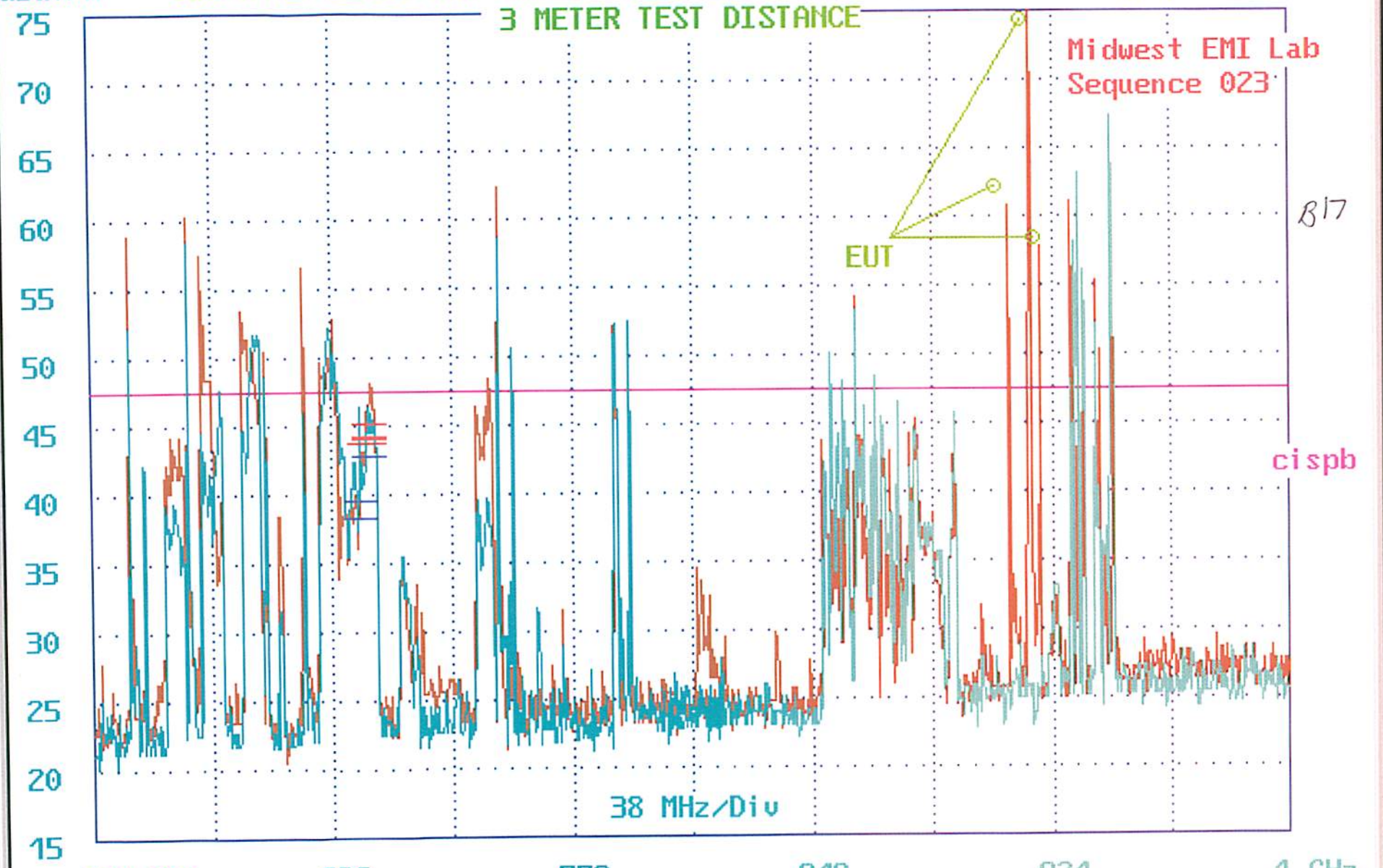
TFT Remote Y5700
Sitting on Wood Table at 80cm., Battery Powered

12:32:41 10-31-2006
George Bowman

RADIATED EMISSIONS

CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

dBuV/m



TFT Remote
Sitting on Wood Table at 80cm., Battery Powered

Y5700
12:32:41 10-31-2006
George Bowman

B18

SHEET 1 **cispb RADIATED QUASI-PEAK REPORT**
CISPR11B Level for Industrial, Scientific and Medical Equipment
3 METER TEST DISTANCE

TIME: 12:32:41 **Midwest EMI**
DATE: 10-31-2006 **Associates**

TEST ITEM: TFT Remote
SERIAL NUMBER: Y5700 **Sequence Number: 023**

COMMENTS: Sitting on Wood Table at 80cm., Battery Powered
TEST PERFORMED BY: George Bowman

Peak Frequency (MHz)	Peak Interfer. (dBuV/m)	Quasi-peak Freq. (MHz)	Quasi-peak Interfer. (dBuV/m)	Spec. Level (dBuV/m)	Antenna Polarization (H/V)
-----------------------------	--------------------------------	-------------------------------	--------------------------------------	-----------------------------	-----------------------------------

707.514	46.14	707.6396	43.77	47.50	Horizontal
707.683	47.25	707.8278	44.17	47.50	Horizontal
707.28	48.27	707.1608	43.86	47.50	Horizontal
707.9822	48.68	707.8206	44.27	47.50	Horizontal
708.0019	48.70	707.9979	45.28	47.50	Horizontal
705.276	47.51	705.0839	38.31	47.50	Vertical
705.1963	48.81	705.0379	39.61	47.50	Vertical
707.7762	48.57	707.7098	42.87	47.50	Vertical