



Electromagnetic Compatibility Tests on a Handheld Transmitter, Model No. ULXD2

For : Shure Incorporated
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Niles, IL 60714

P.O. No. : 4500207310
Date Received : September 5, 2011
Dates Tested : September 6, 2011 through October 24, 2011
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Specification : FCC "Code of Federal Regulations" Title 47 Part 74
Industry Canada RSS-123
Industry Canada RSS-Gen

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REPORT REVISION HISTORY

Revision	Date	Description
--	November 9, 2011	Initial release
A	December 7, 2011	Corrected power output measurement data

Electromagnetic Compatibility Tests on Handheld Transmitter, Model No. ULXD2**1. INTRODUCTION****1.1 Scope of Tests**

This document presents the results of a series of electromagnetic compatibility (EMC) tests performed on a Handheld Transmitter, Model No. ULXD2, (hereinafter referred to as the EUT). The EUT contained a transmitter that was designed to transmit in the following UHF frequency bands using an internal, non-removable helical antenna:

Group	Frequency (MHz)	Band	Output Power (mW)
A	470 – 534	G50	1, 10, 20
C	572 – 636	J50	1, 10, 20
E	632 – 696	L50	1, 10, 20

For testing purposes only, the helical antenna was disconnected from the EUT and replaced with a coaxial connector. The EUT with the coaxial connector was used to perform RF power output test, frequency stability test, and occupied bandwidth test.

The EUT was manufactured and submitted for testing by Shure Incorporated located in Niles, IL.

1.2 Purpose

The test series was performed to determine if the EUT would meet selected requirements of the Code of Federal Regulations, Title 47, Part 74 for low power auxiliary station bands and Industry Canada RSS-123 Licensed Low-Power Radio Apparatus.

1.3 Deviations, Additions, and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4 EMC Laboratory Identification

The electromagnetic compatibility tests were performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois.

1.5 Laboratory Conditions

The temperature at the time of the test was 22°C and the relative humidity was 29%.

2. APPLICABLE DOCUMENTS

The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 74, dated 1 October 2010
- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 2, dated 1 October 2010
- RSS-123, "Spectrum Management and Telecommunications Radio Standards Specification Licensed Low Power Radio Apparatus" Issue 2, February 2011



- RSS-Gen, "Spectrum Management and Telecommunications Radio Standards Specification General Requirements and Information for the Certification of Radiocommunication Equipment", Issue 3, December 2010
- TIA-603-C-2004, "Land Mobile FM or PM Communications Equipment Measurement and Performance Standard"

3. EUT SETUP AND OPERATION

3.1 General Description

The EUT is a Handheld Transmitter, Model No. ULXD2. A block diagram of the EUT setup is shown as Figure 1.

3.1.1 Power Input

The EUT was powered with 3VDC from 2 each internal "AA" batteries.

3.1.2 Peripheral Equipment

The microphone port of the EUT was terminated with a Shure SM58 vocal microphone for all radiated emissions tests.

3.1.3 Signal Input/Output Leads

The EUT was submitted for testing with no signal leads.

3.1.4 Grounding

The EUT was not grounded during testing.

3.1.5 Frequency of EUT

Per CFR Title 47, Section 2, part 1057, for spurious radiated emissions measurements, the frequency spectrum shall be investigated up to at least the tenth harmonic of the highest fundamental frequency.

3.2 Operational Mode

All emissions tests were performed separately in the following modes:

Group A, Band G50

Tx @ 470.125MHz, 1mW; Tx @ 470.125MHz, 20mW

Tx @ 500MHz, 1mW; Tx @ 500MHz, 20mW

Tx @ 534MHz, 1mW; Tx @ 534MHz, 20mW

Group C, Band J50

Tx @ 572MHz, 1mW; Tx @ 572MHz, 20mW

Tx @ 604MHz, 1mW; Tx @ 604MHz, 20mW

Tx @ 636MHz, 1mW; Tx @ 636MHz, 20mW

Group E, Band L50

Tx @ 632.125MHz, 1mW; Tx @ 632.125MHz, 20mW

Tx @ 664MHz, 1mW; Tx @ 664MHz, 20mW

Tx @ 695.875MHz, 1mW; Tx @ 695.875MHz, 20mW



3.3 EUT Modifications

No modifications were required for compliance.

4. TEST FACILITY AND TEST INSTRUMENTATION

4.1 Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2003 for site attenuation.

4.2 Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in **Table 10-1**.

4.3 Calibration Traceability

Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

4.4 Measurement Uncertainty

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty for these tests is presented below:

Radiated Emission Measurements		
Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

5. TEST PROCEDURES

5.1 RF POWER OUTPUT MEASUREMENTS

5.1.1 Requirements

In accordance with paragraph 74.861(e)(1)(ii), for low power auxiliary stations operating in the bands allocated for TV broadcasting, the power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed 250 milliwatts in the 470-608 and 614-806MHz bands. In accordance with paragraph 74.861(d)(1), for low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the maximum transmitter power which will be authorized is 1 watt.

For certification to section 4.2 of the Industry Canada's RSS-123 requirement, the RF power output must not exceed 250mW average power as listed in Table 1.

5.1.2 Procedures

The output from the antenna port of the EUT was connected to a spectrum analyzer through 40dB of attenuation. The output power of the EUT was then measured.

5.1.3 Results

The output power measurements are presented on pages 18 through 20. As can be seen from the data, the power output of each transmitter is within the requirements of Part 74.861 and RSS-123. A photograph of the test setup is shown in Figure 2.

5.2 MODULATION CHARACTERISTICS

5.2.1 Requirements

In accordance with paragraph 74.861(e)(3) and paragraph 5.2 of RSS-123, for low power auxiliary stations operating in the bands allocated for TV broadcasting, any form of modulation may be used. A maximum deviation of $\pm 75\text{kHz}$ is permitted when frequency modulation is employed.

5.2.2 Procedures

Since the EUT employs digital modulation, no modulation characteristics tests were performed.

5.3 FREQUENCY STABILITY

5.3.1 Requirements

In accordance with paragraph 74.861(e)(4) and paragraph 7 of RSS-123 Table 1, for low power auxiliary stations operating in the bands allocated for TV broadcasting, the frequency tolerance of the transmitter shall be 0.005 percent.

5.3.2 Procedures

The antenna port of the EUT was connected to a frequency counter. The EUT was then placed in a temperature chamber. The EUT was operated in the Transmit at 470.125MHz, 1mW output power mode.

- a) The nominal frequency of the transmitter was measured and recorded.
- b) The temperature chamber was then set to -30°C .
- c) Once the temperature had reached -30°C the EUT was allowed to soak for 30 minutes.
- d) After soaking at -30°C for thirty minutes the EUT was turned on and the transmit frequency was measured and recorded.
- e) Steps (b) through (d) were repeated for each temperature in 10°C steps from -20°C to $+50^{\circ}\text{C}$.
- f) Steps (a) through (e) were repeated with the EUT transmitting in the remaining modes listed in section 3.2 (1mW power only).

5.3.3 Results

The frequency stability measurements are presented on pages 21 through 23. As can be seen from the data the test frequency deviation was within the 0.005 percent limit. A photograph of the test setup is shown in Figure 3.

5.4 OCCUPIED BANDWIDTH MEASUREMENTS

5.4.1 Requirements

In accordance with paragraph 74.861(e)(5) and (6), for low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:



- a) The operating bandwidth shall not exceed 200 kHz.
- b) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:
 - i. On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
 - ii. On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
 - iii. On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43 + 10 \log_{10}(\text{mean output power in watts})$ dB.

For certification to the RSS-123 paragraph 5.3 and 5.5.1, the following technical requirements apply:

- a) The authorized bandwidth shall not exceed 200kHz.
- b) the power of unwanted emissions shall be attenuated below the mean transmitter power in accordance with the following schedule:
 - i. On any frequency removed from the carrier frequency by more than 50% up to and including 100% of the authorized bandwidth: at least 25 dB.
 - ii. On any frequency removed from the carrier frequency by more than 100% up to and including 250% of the authorized bandwidth: at least 35 dB.
 - iii. On any frequency removed from the carrier frequency by more than 250% of the authorized bandwidth: at least $55 + 10 \log(P)$ dB.

5.4.2 Procedures

- a) The EUT was connected to a spectrum analyzer through 40 dB of attenuation. The unmodulated carrier signal level was measured and recorded.
- b) The EUT was modulated with a typical digital modulation.
- c) Steps (a) through (b) were repeated separately for each of the remaining transmitters. The bandwidth of the spectrum analyzer was set to 2kHz (1% of Authorized BW).

5.4.3 Results

The plots of the occupied bandwidth measured are presented on pages 24 through 32. The limits, shown on the plots, are referenced to the power measured from the un-modulated carrier. The plots show the power when modulated with a typical digital modulation.

The maximum Industry Canada 99% bandwidth measurement was 196kHz.

As can be seen from the data, the EUTs met all occupied bandwidth requirements.

5.5 FIELD STRENGTH OF SPURIOUS EMISSIONS

5.5.1 Requirements

In accordance with paragraph 74.861 of CFR 47, the power of any emission on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated by at least $43 + 10 \log(P)$ dB.



In accordance with RSS-123 paragraph 6.3.1, the power of any emission on any frequency removed from the carrier frequency by more than 250% of the authorized bandwidth shall be attenuated by at least $55 + 10 \log (P)$ dB.

5.5.2 Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4 2003 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

1. Preliminary radiated measurements were performed to determine the frequencies where the significant emissions might be found. With the EUT at one set position and the measurement antenna at a set height (i.e. without maximizing), the radiated emissions were measured using a peak detector and automatically plotted. The broadband measuring antenna was positioned at a 3 meter distance from the EUT. This data was then automatically plotted. All preliminary tests were performed separately with the EUT operating in the modes listed in Para. 3.2.
2. All significant broadband and narrowband signals found in the preliminary sweeps were then measured using a peak detector at a test distance of 3 meters. The measurements were made with a bilog antenna over the frequency range of 30MHz to 1GHz, and a double ridged waveguide antenna was used for frequencies above 1GHz.
3. To ensure that maximum emission levels were measured, the following steps were taken:
 - a. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - b. Since the measuring antennas are linearly polarized, both horizontal and vertical field components were measured.
 - c. The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, another antenna was set in place of the EUT and connected to a calibrated signal generator. (A tuned dipole was used for all measurements below 1GHz and a double ridged waveguide antenna was used for all measurements above 1GHz.) The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was corrected to compensate for cable loss, as required, and for frequencies above 1GHz, increased by the gain of the waveguide.

5.5.3 Results

The preliminary plots peak levels are presented on pages 33 through 104. Factors for the antennas and cables were added to the data before it was plotted. This data is only presented for a reference, and is not used as official data. All significant radiated emissions were subsequently measured using the substitution method.

The final radiated levels are presented on pages 105 through 128. The radiated emissions were measured through the 10th harmonic. All emissions measured from the EUT were within the specification limits. Photographs of the test setup are shown in Figure 4 and Figure 5.



6. OTHER TEST CONDITIONS

6.1 Test Personnel and Witnesses

All EMC tests were performed by qualified personnel from Elite Electronic Engineering Incorporated. The test series was partially witnessed by Shure Incorporated personnel.

6.2 Disposition of the EUT

The EUT and all associated equipment were returned to Shure Incorporated upon completion of the tests.

7. CONCLUSION

It was found that the Shure Incorporated, Model ULXD2 Handheld Transmitter, did comply with the RF power output, the occupied bandwidth, the frequency stability, the spurious emissions at antenna terminal, and the field strength of spurious emissions requirements of FCC Part 74 for low power auxiliary station bands and Industry Canada RSS-123 Low Power Licensed Radio communication Devices.

8. CERTIFICATION

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specification. The data presented in this test report pertains only to the EUT at the test date. Any electrical or mechanical modification made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

9. ENDORSEMENT DISCLAIMER

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.

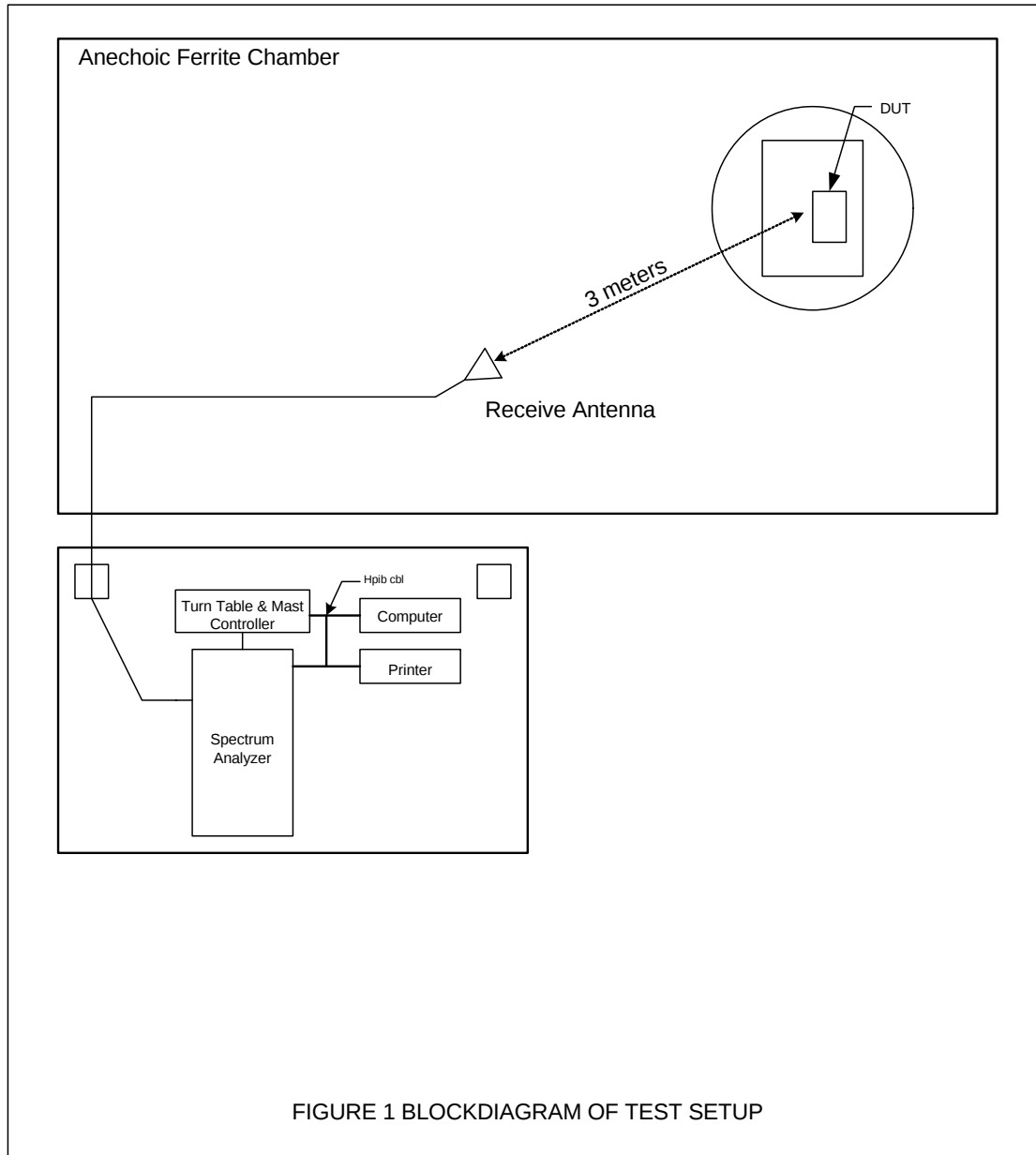
**10. EQUIPMENT LIST****Table 10-1**

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
CMA1	Controllars	EMCO	2090	9701-1213	---	N/A	
ETD0	ENV Chambers For Auto Dept Use Only	Thermotron	S-8	15461	-70 to 150 degrees C	Note 1	
ETDA	HONEYWELL CHART RECORDER	HONEYWELL	DR45AT-1100	0825Y878133300009	PROGRAMMABLE	1/7/2011	1/7/2012
ETDC	Temperature Controller	Thermotron	2800	753726	Programmable	Note 1	
GXA1	MXG MW ANALOG SIGNAL GENERATOR	AGILENT TECHNOLOGIES	N5183A	MY47420353	250KHz-40GHz	3/11/2011	3/11/2012
MFC0	MICROWAVE FREQ. COUNTER	HEWLETT PACKARD	5343A	2133A00591	10HZ-26GHZ	8/30/2011	8/30/2012
NDQ1	TUNED DIPOLE ANTENNA	EMCO	3121C-DB4	313	400-1000MHZ	4/20/2011	4/20/2012
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHZ	6/29/2011	6/29/2012
NWF0	RIDGED WAVE GUIDE	EMCO	3105	2035	1-12.4GHZ	1/29/2011	1/29/2012
NWH0	RIDGED WAVE GUIDE	TENSOR	4105	2081	1-12.4GHZ	8/31/2010	10/31/2011
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/24/2011	3/24/2012
RBC1	ESCI EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCI	100341	9KHZ-3GHZ	7/5/2011	9/5/2012
RBE1	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU26	100096	20Hz-26GHz	3/23/2011	3/23/2012
T2D7	20DB, 25W ATTENUATOR	WEINSCHL	46-20-43	AY9246	DC-18GHZ	8/4/2011	8/4/2012
T2D8	20DB, 25W ATTENUATOR	WEINSCHL	46-20-43	AY9247	DC-18GHZ	1/3/2011	1/3/2012

I/O: Initial Only

N/A: Not Applicable

Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.





MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 and RSS-123 RF Power Output – Antenna Conducted
DATE : October 4, 2011
MODE : See Below
UNIT : Group A
BAND : G50
EQUIPMENT USED : RBC1, T2D7, T2D8

Frequency MHz	Nominal Power mW	Measured Power mW	FCC-74 Limit mW	RSS-123 Limit mW
470.125	1.0	0.92	250	1000
470.125	20.0	19.2	250	1000
502.000	1.0	0.99	250	1000
502.000	20.0	19.4	250	1000
534.000	1.0	1.0	250	1000
534.000	20.0	18.5	250	1000

Checked By:

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MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 and RSS-123 RF Power Output – Antenna Conducted
DATE : September 22, 2011
MODE : See Below
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBC1, T2D7, T2D8

Frequency MHz	Nominal Power mW	Measured Power mW	FCC-74 Limit mW	RSS-123 Limit mW
572.000	1.0	1.0	250	1000
572.000	20.0	21.7	250	1000
604.000	1.0	1.0	250	1000
604.000	20.0	20.6	250	1000
636.000	1.6	.90	250	1000
636.000	21.3	18.2	250	1000

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MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 and RSS-123 RF Power Output – Antenna Conducted
DATE : September 22, 2011
MODE : See Below
UNIT : Group E
BAND : L50
EQUIPMENT USED : RBC1, T2D7, T2D8

Frequency MHz	Nominal Power mW	Measured Power mW	FCC-74 Limit mW	RSS-123 Limit mW
632.000	1.0	1.0	250	1000
632.000	20.0	19.9	250	1000
664.000	1.0	1.0	250	1000
664.000	20.0	20.1	250	1000
696.000	1.0	0.9	250	1000
696.000	20.0	18.4	250	1000

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MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SPECIFICATION : FCC-74 and RSS-123 RF Frequency Stability over temp range
DATE : October 19 and 20, 2011
MODE : Transmit, 1mW
UNIT : Group A
BAND : Band G50
EQUIPMENT USED : MFC0, ETDC, ETD0, ETDA

Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	470.125000	470.124061	-0.0001997	0.005	-939.00	23506.25	PASS
-20	470.125000	470.124861	-0.0000296	0.005	-139.00	23506.25	PASS
-10	470.125000	470.125181	0.0000385	0.005	181.00	23506.25	PASS
0	470.125000	470.125480	0.0001021	0.005	480.00	23506.25	PASS
10	470.125000	470.125552	0.0001174	0.005	552.00	23506.25	PASS
20	470.125000	470.125446	0.0000949	0.005	446.00	23506.25	PASS
30	470.125000	470.125299	0.0000636	0.005	299.00	23506.25	PASS
40	470.125000	470.125070	0.0000149	0.005	70.00	23506.25	PASS
50	470.125000	470.125032	0.0000068	0.005	32.00	23506.25	PASS

Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	502.000000	502.000015	0.0000030	0.005	15.00	25100	PASS
-20	502.000000	501.999790	-0.0000418	0.005	-210.00	25100	PASS
-10	502.000000	502.000206	0.0000410	0.005	206.00	25100	PASS
0	502.000000	502.000498	0.0000992	0.005	498.00	25100	PASS
10	502.000000	502.000592	0.0001179	0.005	592.00	25100	PASS
20	502.000000	502.000477	0.0000950	0.005	477.00	25100	PASS
30	502.000000	502.000320	0.0000637	0.005	320.00	25100	PASS
40	502.000000	502.000041	0.0000082	0.005	41.00	25100	PASS
50	502.000000	502.000013	0.0000026	0.005	13.00	25100	PASS

Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	534.000000	534.000045	0.0000084	0.005	45.00	26700	PASS
-20	534.000000	533.999750	-0.0000468	0.005	-250.00	26700	PASS
-10	534.000000	534.000248	0.0000464	0.005	248.00	26700	PASS
0	534.000000	534.000522	0.0000978	0.005	522.00	26700	PASS
10	534.000000	534.000630	0.0001180	0.005	630.00	26700	PASS
20	534.000000	534.000509	0.0000953	0.005	509.00	26700	PASS
30	534.000000	534.000341	0.0000639	0.005	341.00	26700	PASS
40	534.000000	534.000071	0.0000133	0.005	71.00	26700	PASS
50	534.000000	534.000013	0.0000024	0.005	13.00	26700	PASS

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MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SPECIFICATION : FCC-74 and RSS-123 RF Frequency Stability over temp range
DATE : October 19 and 20, 2011
MODE : Transmit, 1mW
UNIT : Group C
BAND : Band J50
EQUIPMENT USED : MFC0, ETDC, ETD0, ETDA

Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	572.000000	571.998975	-0.0001792	0.005	-1025.00	28600	PASS
-20	572.000000	571.998427	-0.0002750	0.005	-1573.00	28600	PASS
-10	572.000000	571.998676	-0.0002315	0.005	-1324.00	28600	PASS
0	572.000000	571.999164	-0.0001462	0.005	-836.00	28600	PASS
10	572.000000	571.999901	-0.0000173	0.005	-99.00	28600	PASS
20	572.000000	572.000544	0.0000951	0.005	544.00	28600	PASS
30	572.000000	572.001022	0.0001787	0.005	1022.00	28600	PASS
40	572.000000	572.001517	0.0002652	0.005	1517.00	28600	PASS
50	572.000000	572.001955	0.0003418	0.005	1955.00	28600	PASS

Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	604.000000	603.998422	-0.0002613	0.005	-1578.00	30200	PASS
-20	604.000000	603.998315	-0.0002790	0.005	-1685.00	30200	PASS
-10	604.000000	603.998520	-0.0002450	0.005	-1480.00	30200	PASS
0	604.000000	603.999144	-0.0001417	0.005	-856.00	30200	PASS
10	604.000000	603.999866	-0.0000222	0.005	-134.00	30200	PASS
20	604.000000	604.000577	0.0000955	0.005	577.00	30200	PASS
30	604.000000	604.001088	0.0001801	0.005	1088.00	30200	PASS
40	604.000000	604.001420	0.0002351	0.005	1420.00	30200	PASS
50	604.000000	604.002051	0.0003396	0.005	2051.00	30200	PASS

Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	636.000000	635.998339	-0.0002612	0.005	-1661.00	31800	PASS
-20	636.000000	635.998219	-0.0002800	0.005	-1781.00	31800	PASS
-10	636.000000	635.998256	-0.0002742	0.005	-1744.00	31800	PASS
0	636.000000	635.999110	-0.0001399	0.005	-890.00	31800	PASS
10	636.000000	635.999833	-0.0000263	0.005	-167.00	31800	PASS
20	636.000000	636.000611	0.0000961	0.005	611.00	31800	PASS
30	636.000000	636.001187	0.0001866	0.005	1187.00	31800	PASS
40	636.000000	636.001510	0.0002374	0.005	1510.00	31800	PASS
50	636.000000	636.002162	0.0003399	0.005	2162.00	31800	PASS

Checked By:

MARK E. LONGINOTTI

Mark E. Longinotti



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SPECIFICATION : FCC-74 and RSS-123 RF Frequency Stability over temp range
DATE : October 19 and 20, 2011
MODE : Transmit, 1mW
UNIT : Group E
BAND : L51
EQUIPMENT USED : MFC0, ETDC, ETD0, ETDA

Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	632.000000	631.998772	-0.0001943	0.005	-1228.00	31600	PASS
-20	632.000000	631.999923	-0.0000122	0.005	-77.00	31600	PASS
-10	632.000000	631.999989	-0.0000017	0.005	-11.00	31600	PASS
0	632.000000	632.000324	0.0000513	0.005	324.00	31600	PASS
10	632.000000	632.000267	0.0000422	0.005	267.00	31600	PASS
20	632.000000	631.999996	-0.0000006	0.005	-4.00	31600	PASS
30	632.000000	631.999674	-0.0000516	0.005	-326.00	31600	PASS
40	632.000000	632.003679	0.0005821	0.005	3679.00	31600	PASS
50	632.000000	632.002927	0.0004631	0.005	2927.00	31600	PASS

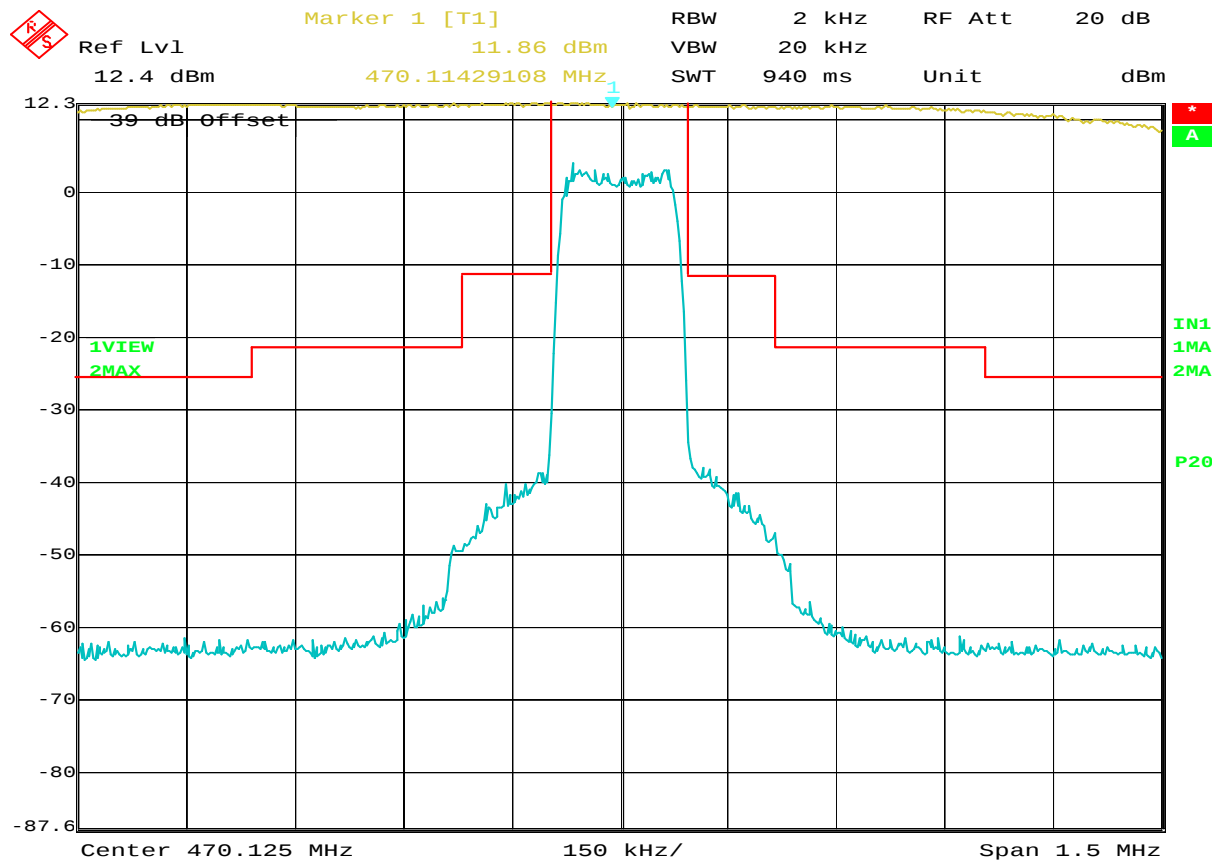
Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	664.000000	663.999825	-0.0000264	0.005	-175.00	33200	PASS
-20	664.000000	663.999794	-0.0000310	0.005	-206.00	33200	PASS
-10	664.000000	664.000063	0.0000095	0.005	63.00	33200	PASS
0	664.000000	664.000328	0.0000494	0.005	328.00	33200	PASS
10	664.000000	664.000282	0.0000425	0.005	282.00	33200	PASS
20	664.000000	663.999997	-0.0000005	0.005	-3.00	33200	PASS
30	664.000000	663.999661	-0.0000511	0.005	-339.00	33200	PASS
40	664.000000	663.996715	-0.0004947	0.005	-3285.00	33200	PASS
50	664.000000	663.995676	-0.0006512	0.005	-4324.00	33200	PASS

Temp °C	Nominal Frequency	Measured Frequency	Deviation (%)	Frequency Stability (%)	Deviation (Hz)	Frequency Stability (Hz)	Pass Or Fail
-30	696.000000	695.999866	-0.0000193	0.005	-134.00	34800	PASS
-20	696.000000	695.999498	-0.0000721	0.005	-502.00	34800	PASS
-10	696.000000	696.000107	0.0000154	0.005	107.00	34800	PASS
0	696.000000	696.000340	0.0000489	0.005	340.00	34800	PASS
10	696.000000	696.000294	0.0000422	0.005	294.00	34800	PASS
20	696.000000	695.999998	-0.0000003	0.005	-2.00	34800	PASS
30	696.000000	695.999648	-0.0000506	0.005	-352.00	34800	PASS
40	696.000000	695.999116	-0.0001270	0.005	-884.00	34800	PASS
50	696.000000	695.998928	-0.0001540	0.005	-1072.00	34800	PASS

Checked By:

MARK E. LONGINOTTI

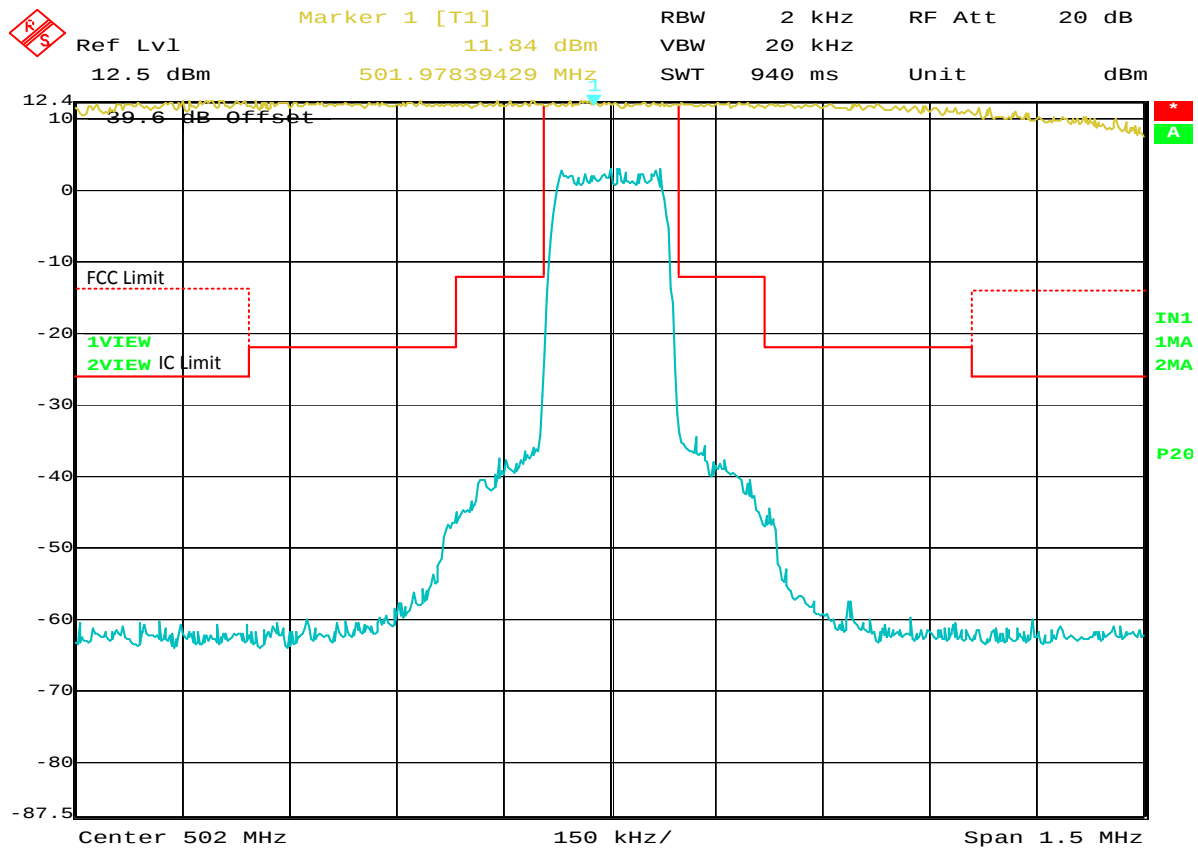
Mark E. Longinotti



Date: 4.OCT.2011 08:00:51

FCC/Industry Canada Occupied Bandwidth

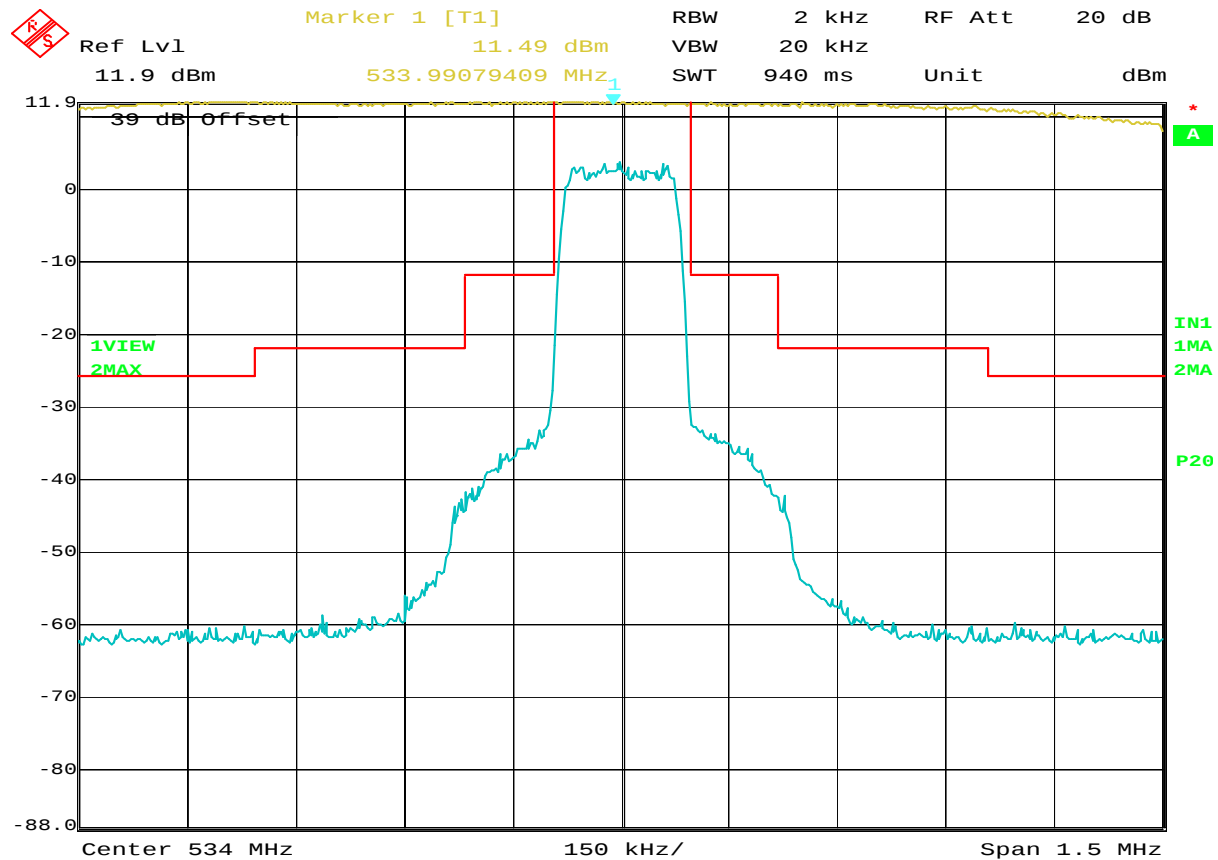
MANUFACTURER : Shure, Inc.
MODEL NUMBER : ULXD2
SERIAL NUMBER : None Assigned
TEST MODE : Tx @ 470.125MHz, 20mW
NOTES : Group A, Band G50
TEST DATE : October 4, 2011
TEST PARAMETERS : Occupied Bandwidth
NOTES :
EQUIPMENT USED : RBB0, T2D7, T2D8



Date: 4.OCT.2011 07:52:04

FCC/Industry Canada Occupied Bandwidth

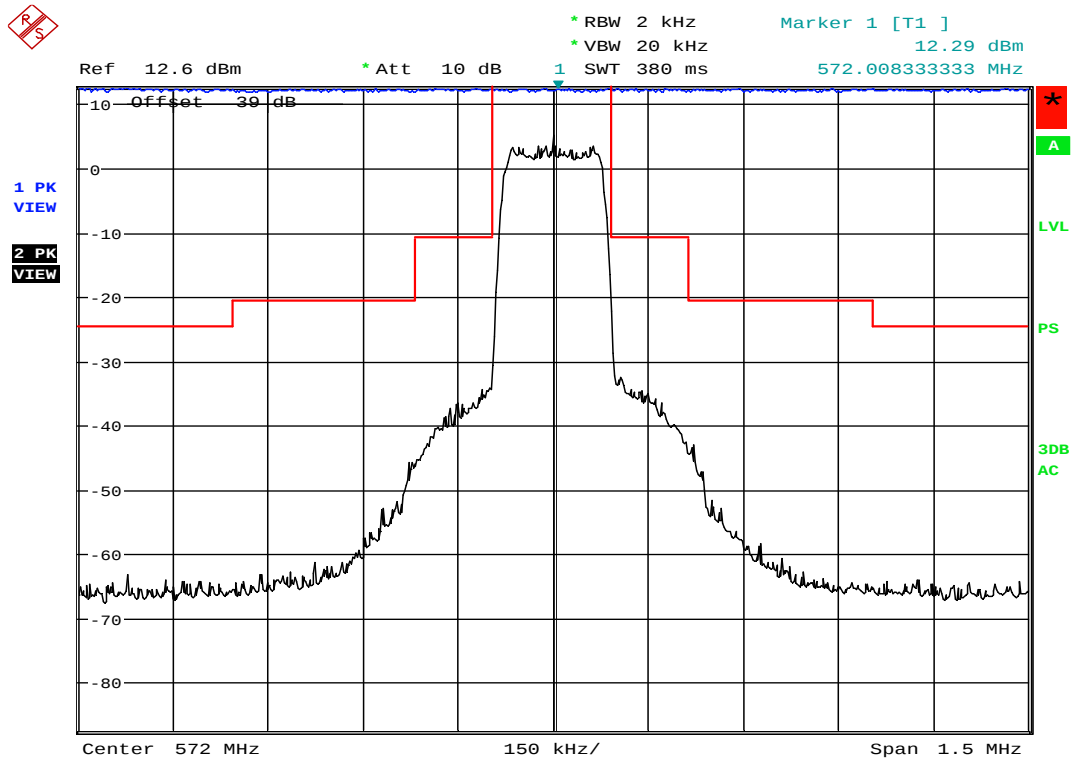
MANUFACTURER : Shure, Inc.
MODEL NUMBER : ULXD2
SERIAL NUMBER : None Assigned
TEST MODE : Tx @ 502MHz, 20mW
NOTES : Group A, Band G50
TEST DATE : October 4, 2011
TEST PARAMETERS : Occupied Bandwidth
NOTES :
EQUIPMENT USED : RBB0, T2D7, T2D8



Date: 4.OCT.2011 07:45:16

FCC/Industry Canada Occupied Bandwidth

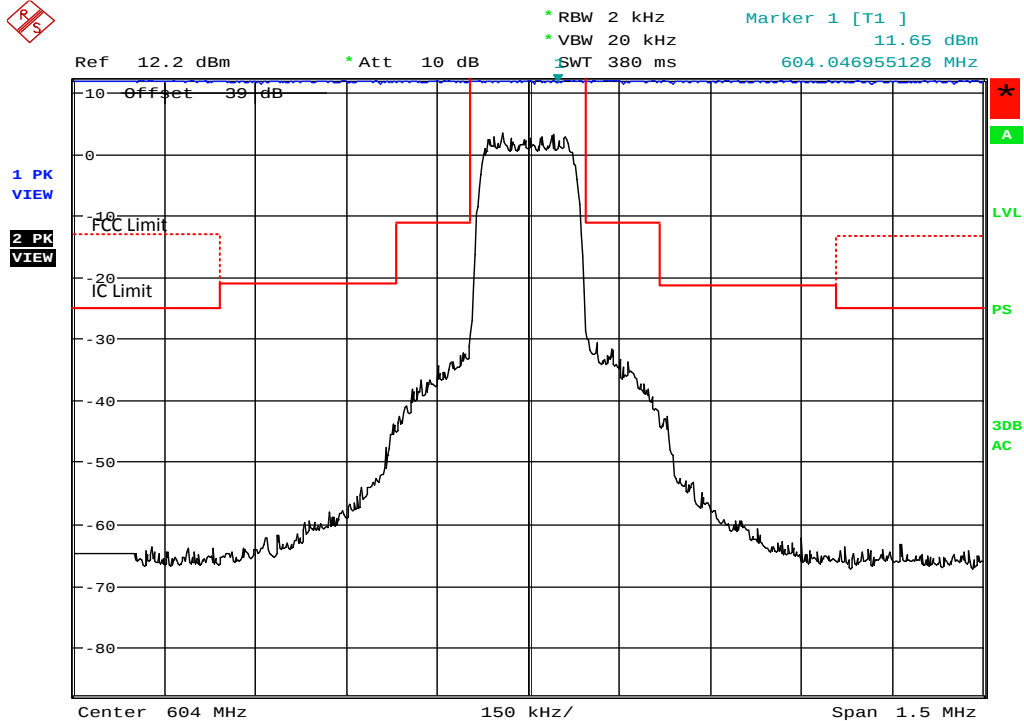
MANUFACTURER : Shure, Inc.
MODEL NUMBER : ULXD2
SERIAL NUMBER : None Assigned
TEST MODE : Tx @ 534MHz, 20mW
NOTES : Group A, Band G50
TEST DATE : October 4, 2011
TEST PARAMETERS : Occupied Bandwidth
NOTES :
EQUIPMENT USED : RBB0, T2D7, T2D8



Date: 23.SEP.2011 10:21:45

FCC/Industry Canada Occupied Bandwidth

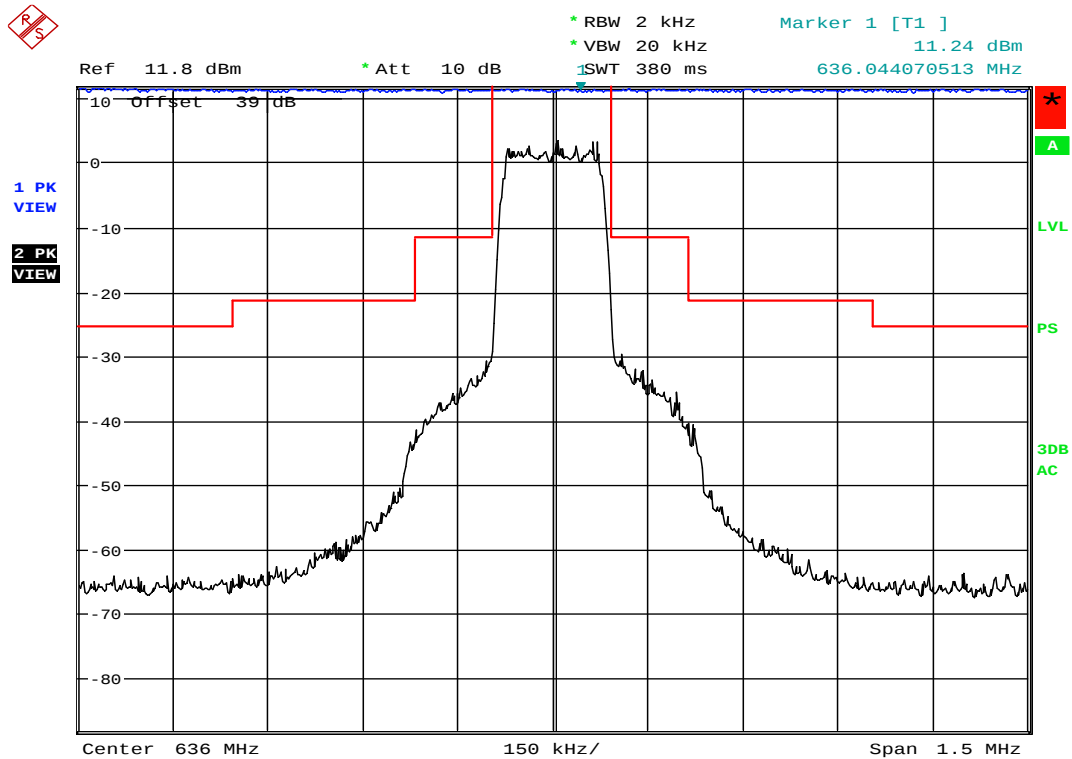
MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	ULXD2
SERIAL NUMBER	:	None Assigned
TEST MODE	:	Tx @ 572MHz at 20mW
NOTES	:	Group C, Band J50
TEST DATE	:	September 23, 2011
TEST PARAMETERS	:	Occupied Bandwidth
NOTES	:	
EQUIPMENT USED	:	RBE1, T2D7, T2D8



Date: 23.SEP.2011 10:14:36

FCC/Industry Canada Occupied Bandwidth

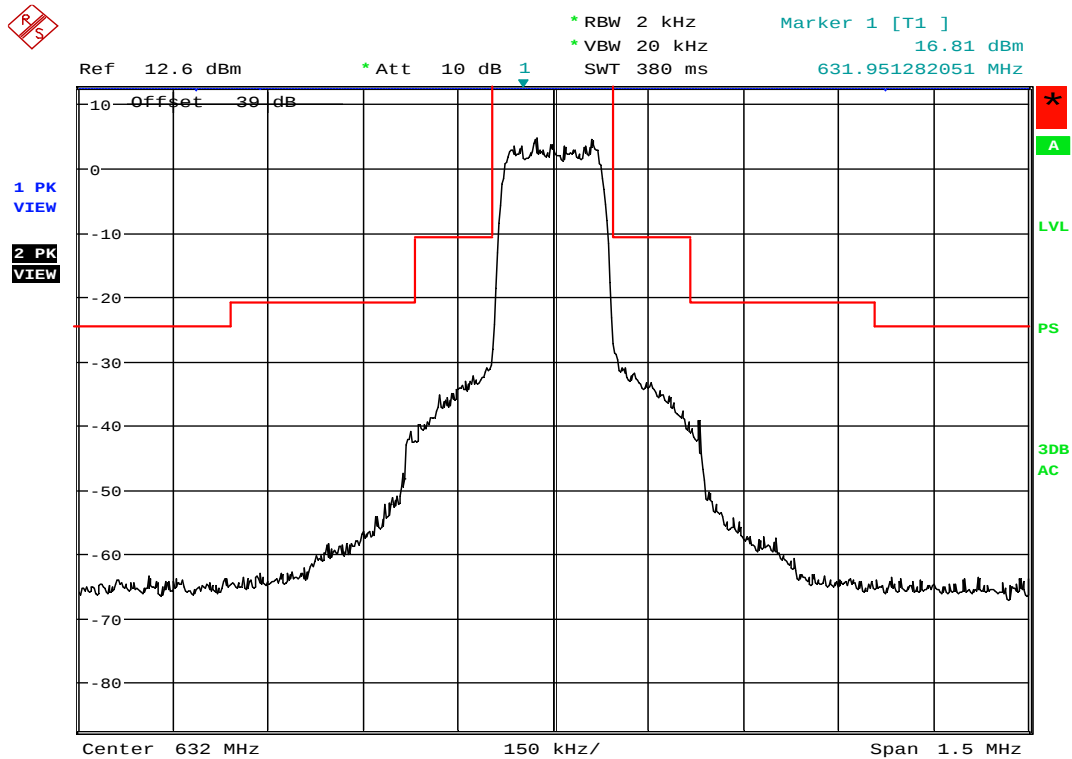
MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	ULXD2
SERIAL NUMBER	:	None Assigned
TEST MODE	:	Tx @ 604MHz at 20mW
NOTES	:	Group C, Band J50
TEST DATE	:	September 23, 2011
TEST PARAMETERS	:	Occupied Bandwidth
NOTES	:	
EQUIPMENT USED	:	RBE1, T2D7, T2D8



Date: 23.SEP.2011 10:06:05

FCC/Industry Canada Occupied Bandwidth

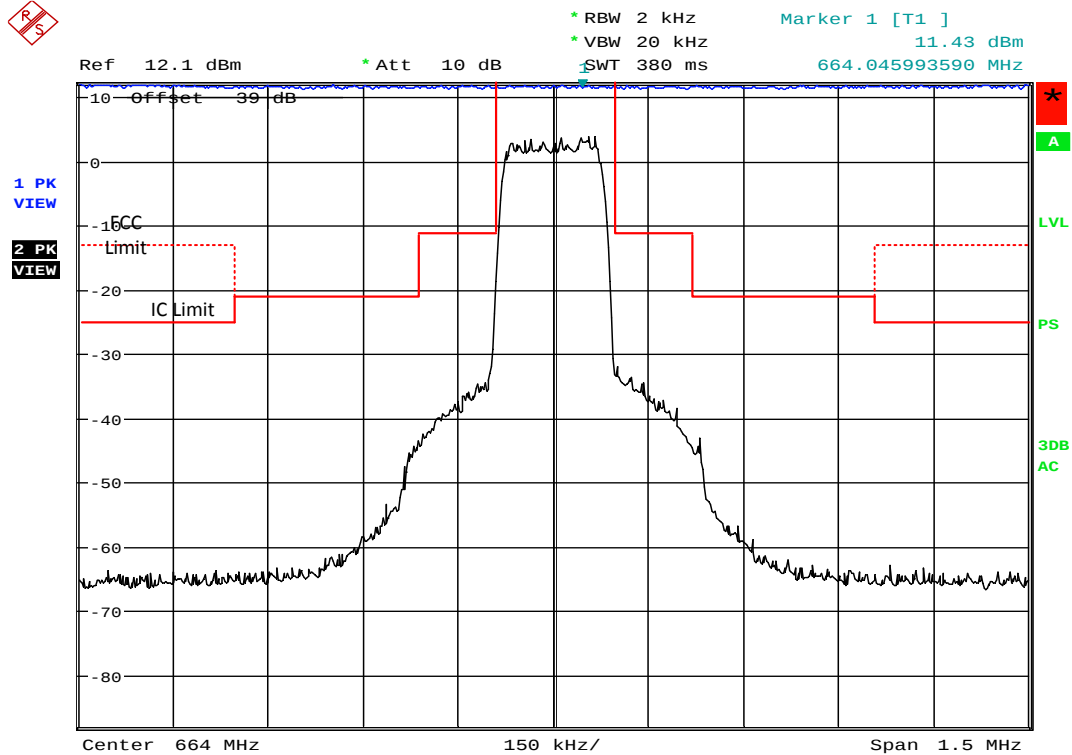
MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	ULXD2
SERIAL NUMBER	:	None Assigned
TEST MODE	:	Tx @ 636MHz at 20mW
NOTES	:	Group C, Band J50
TEST DATE	:	September 23, 2011
TEST PARAMETERS	:	Occupied Bandwidth
NOTES	:	
EQUIPMENT USED	:	RBE1, T2D7, T2D8



Date: 23.SEP.2011 09:42:13

FCC/Industry Canada Occupied Bandwidth

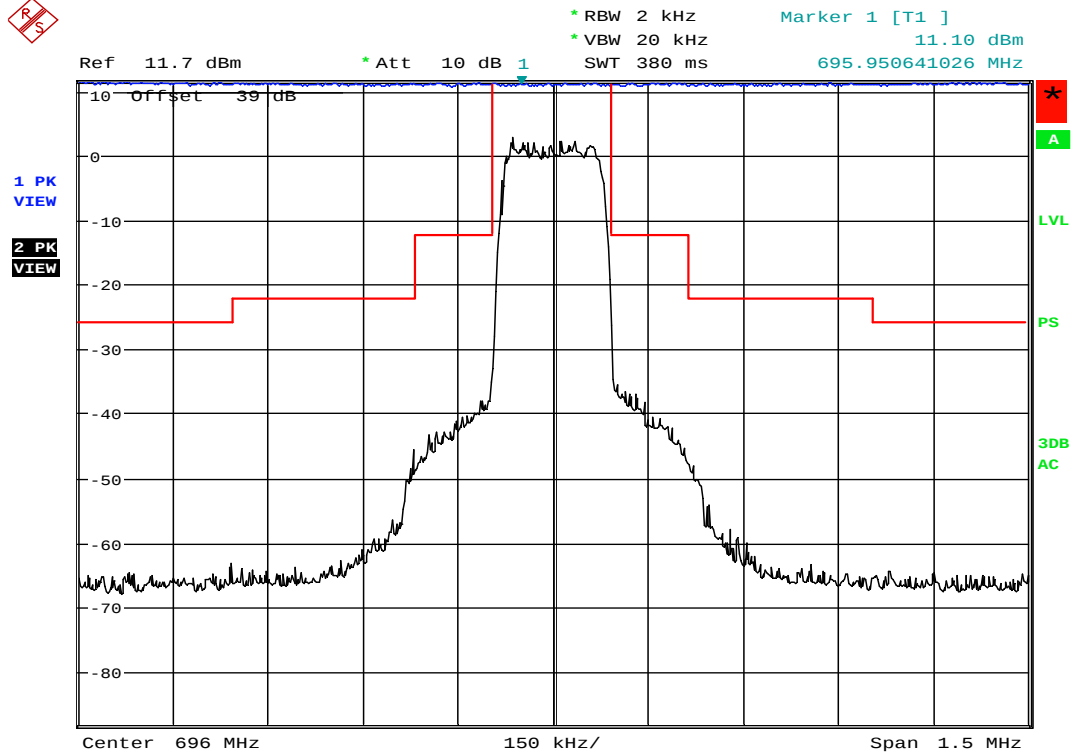
MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	ULXD2
SERIAL NUMBER	:	None Assigned
TEST MODE	:	Tx @ 632MHz at 20mW
NOTES	:	Group E, Band L50
TEST DATE	:	September 23, 2011
TEST PARAMETERS	:	Occupied Bandwidth
NOTES	:	
EQUIPMENT USED	:	RBE1, T2D7, T2D8



Date: 23.SEP.2011 09:35:11

FCC/Industry Canada Occupied Bandwidth

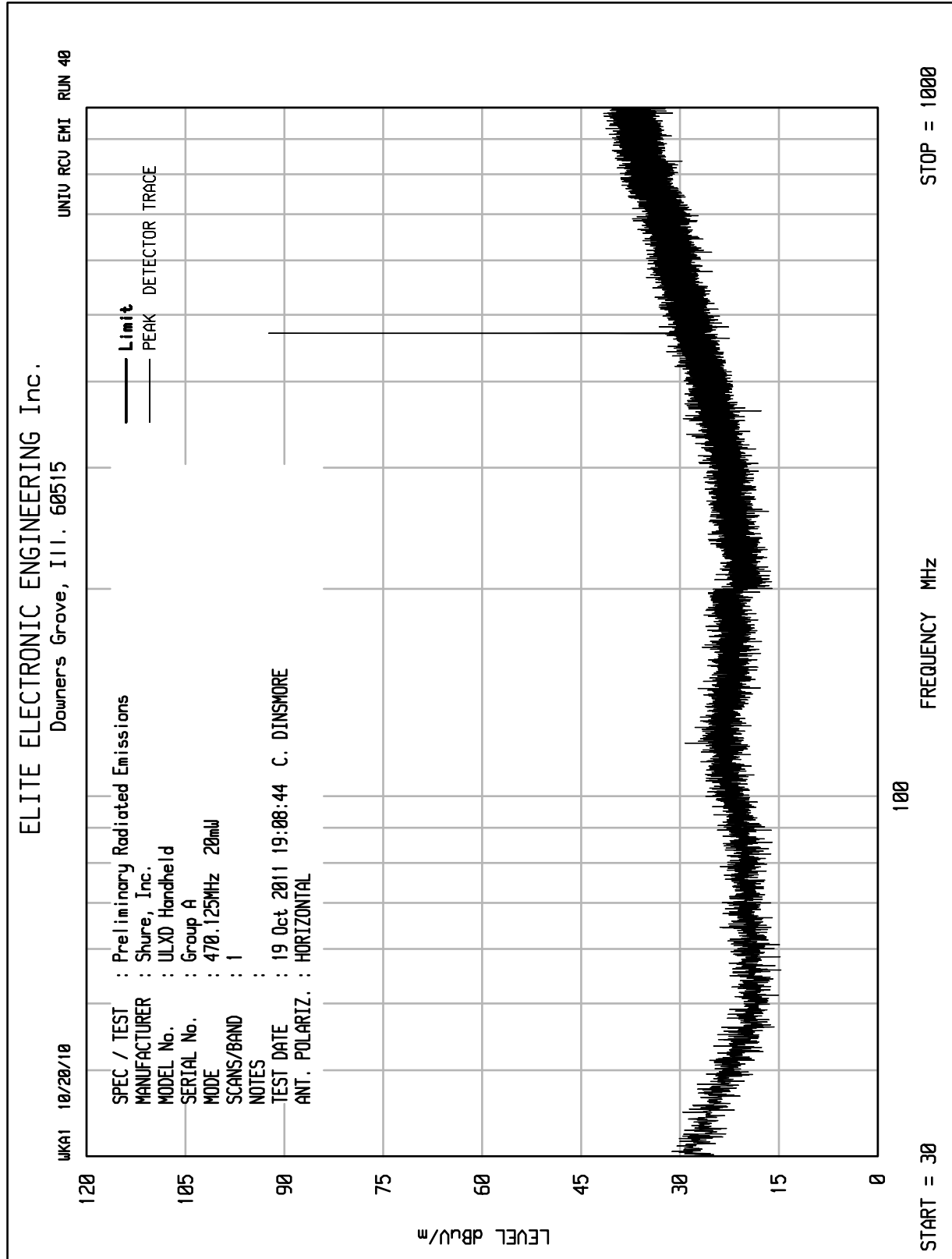
MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	ULXD2
SERIAL NUMBER	:	None Assigned
TEST MODE	:	Tx @ 696MHz at 20mW
NOTES	:	Group E, Band L50
TEST DATE	:	September 23, 2011
TEST PARAMETERS	:	Occupied Bandwidth
NOTES	:	
EQUIPMENT USED	:	RBE1, T2D7, T2D8

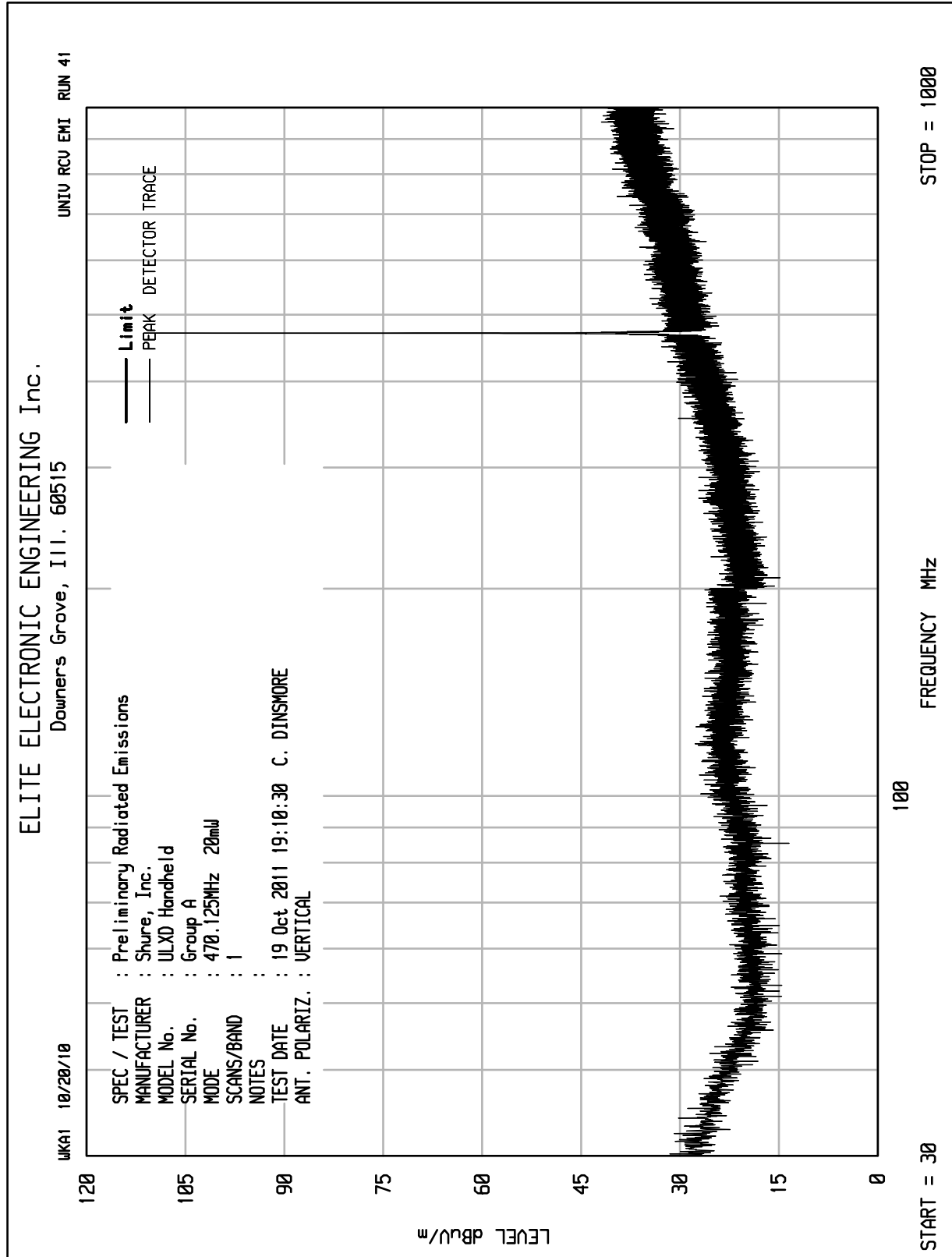


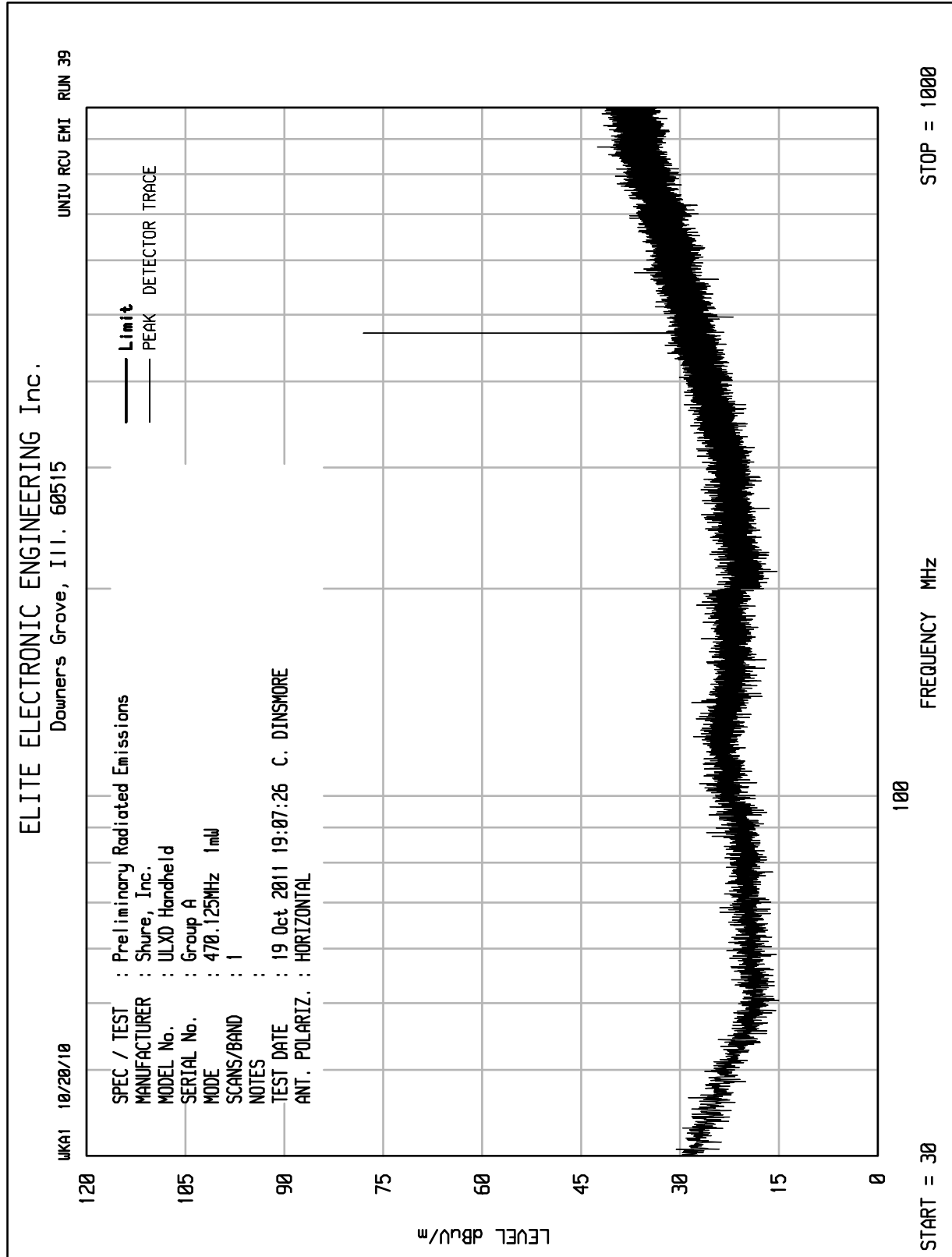
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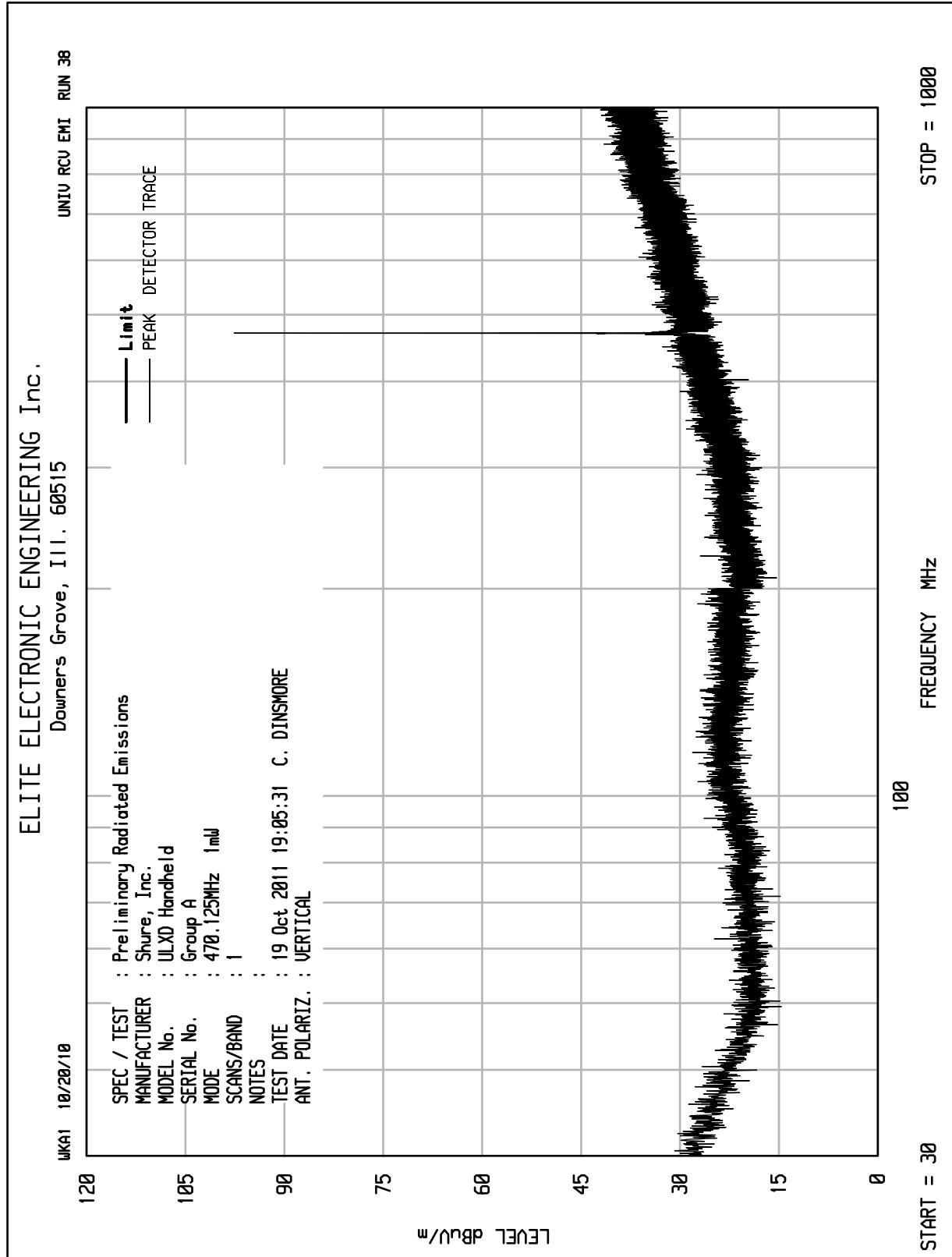
FCC/Industry Canada Occupied Bandwidth

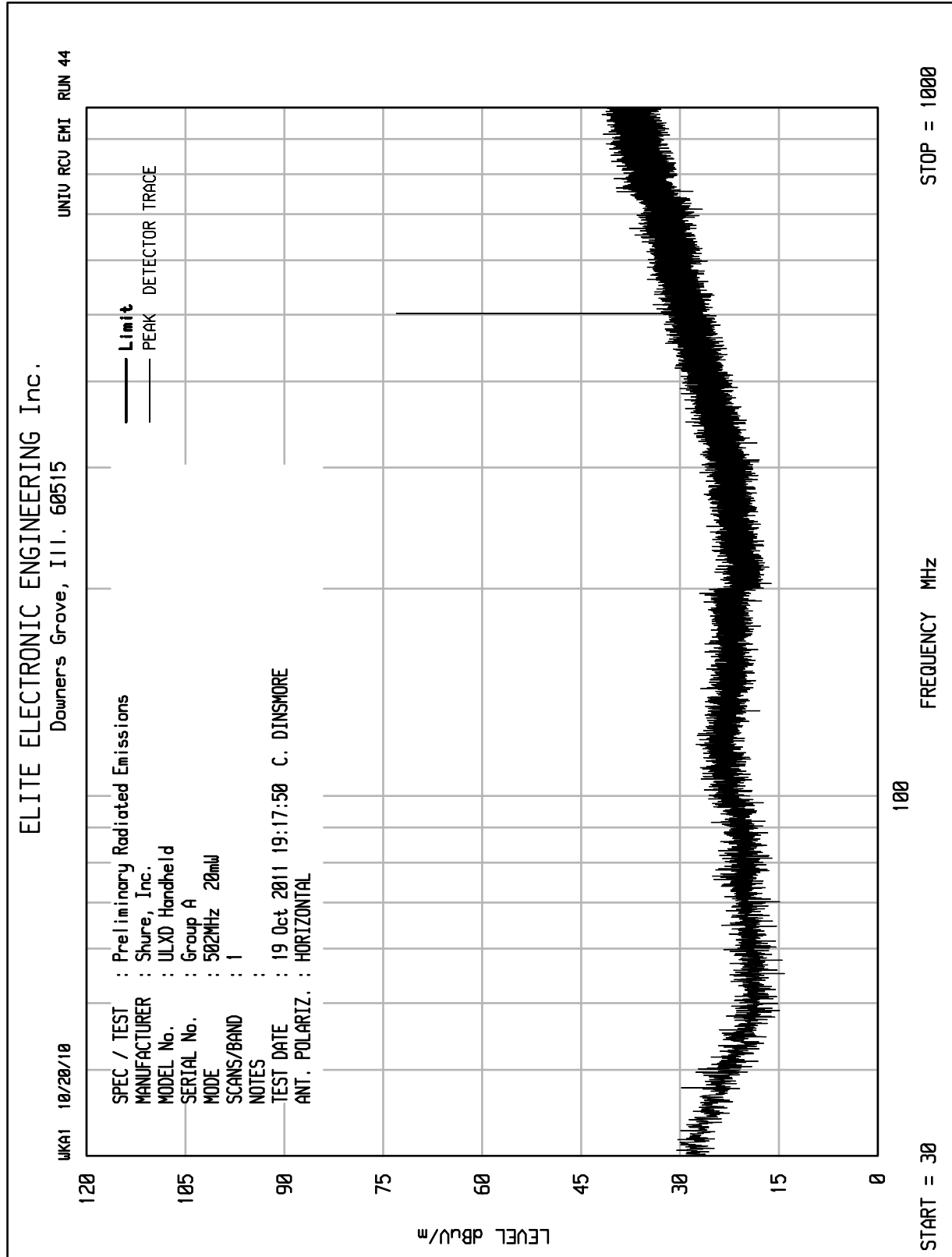
MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	ULXD2
SERIAL NUMBER	:	None Assigned
TEST MODE	:	Tx @ 696MHz at 20mW
NOTES	:	Group E, Band L50
TEST DATE	:	September 23, 2011
TEST PARAMETERS	:	Occupied Bandwidth
NOTES	:	
EQUIPMENT USED	:	RBE1, T2D7, T2D8

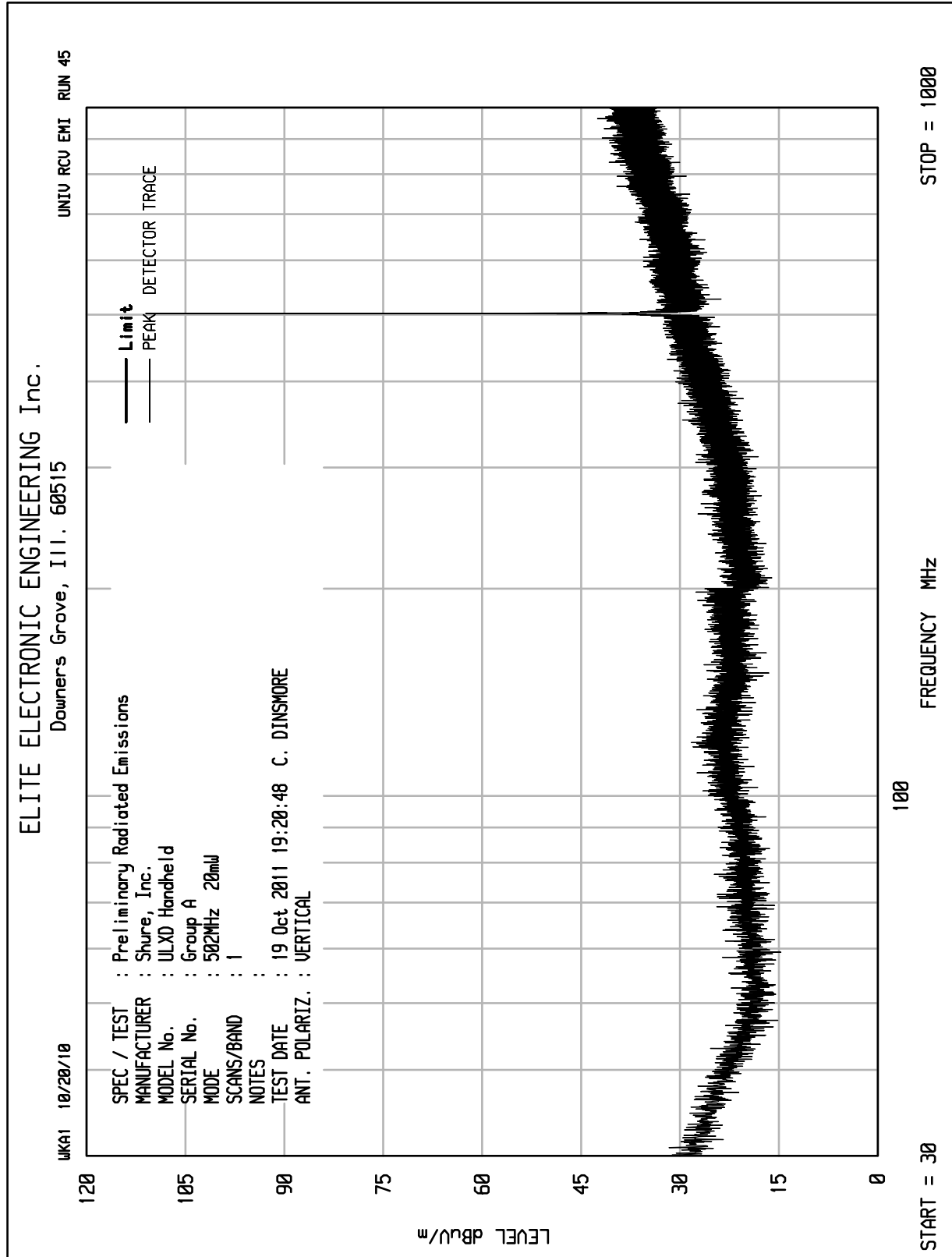


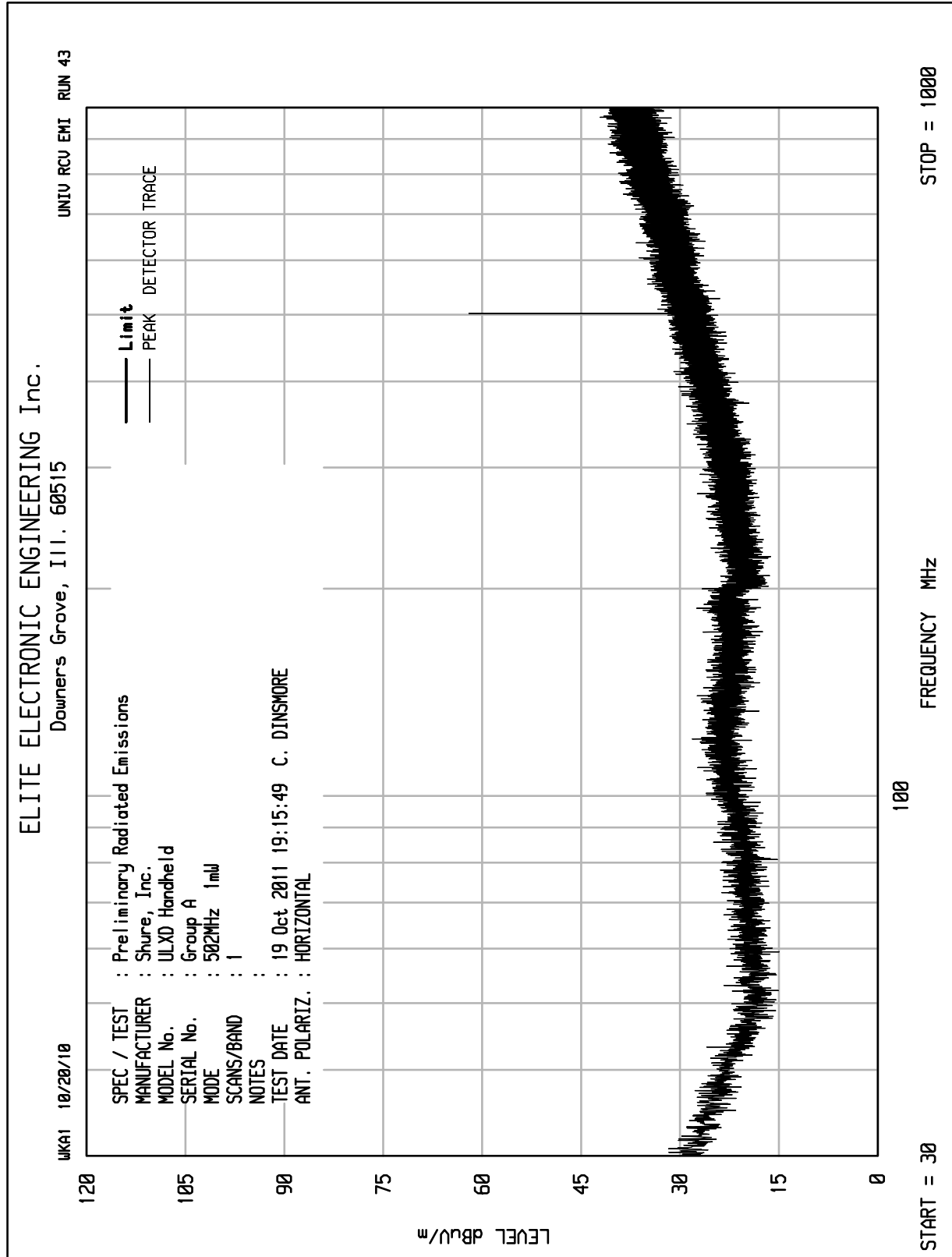


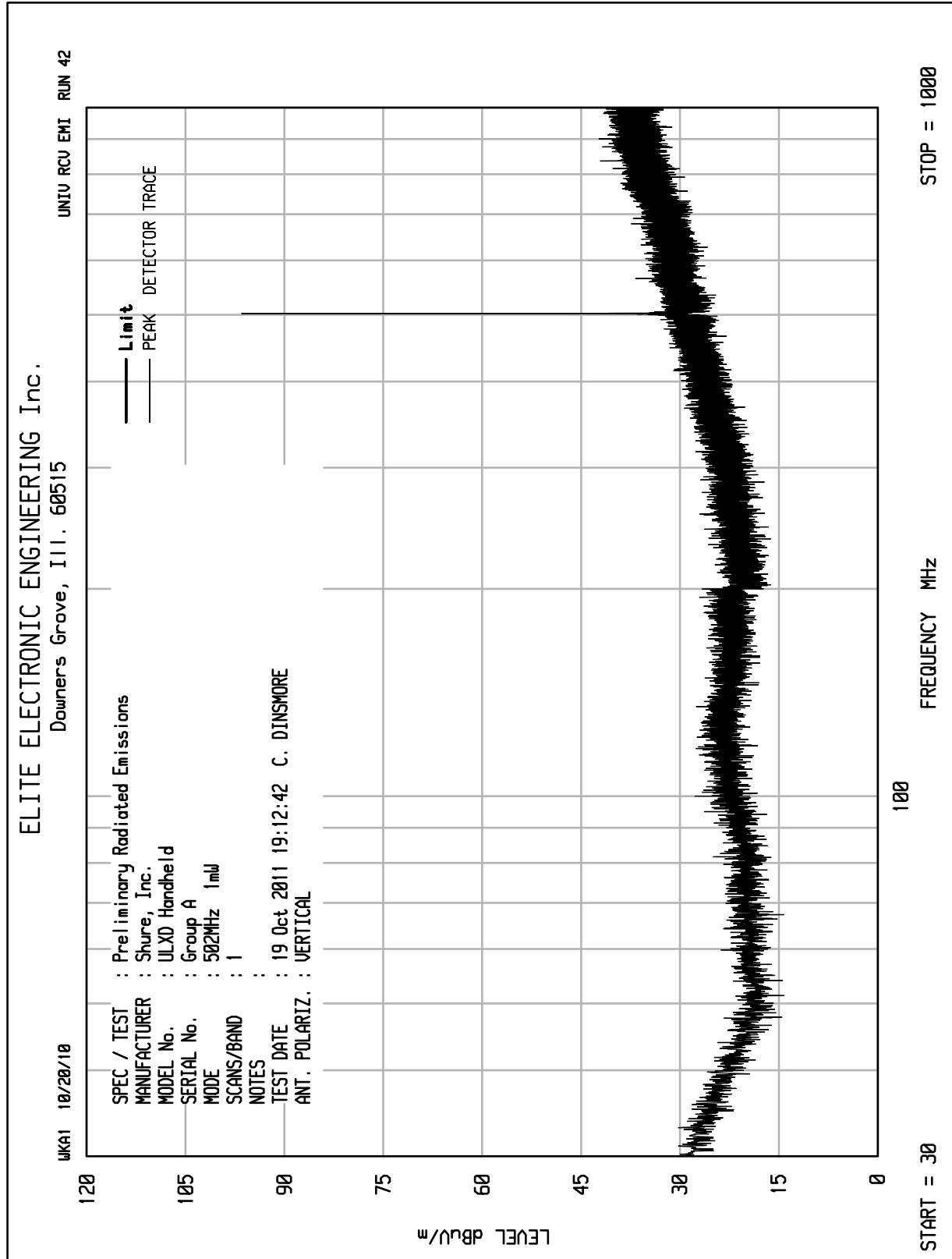


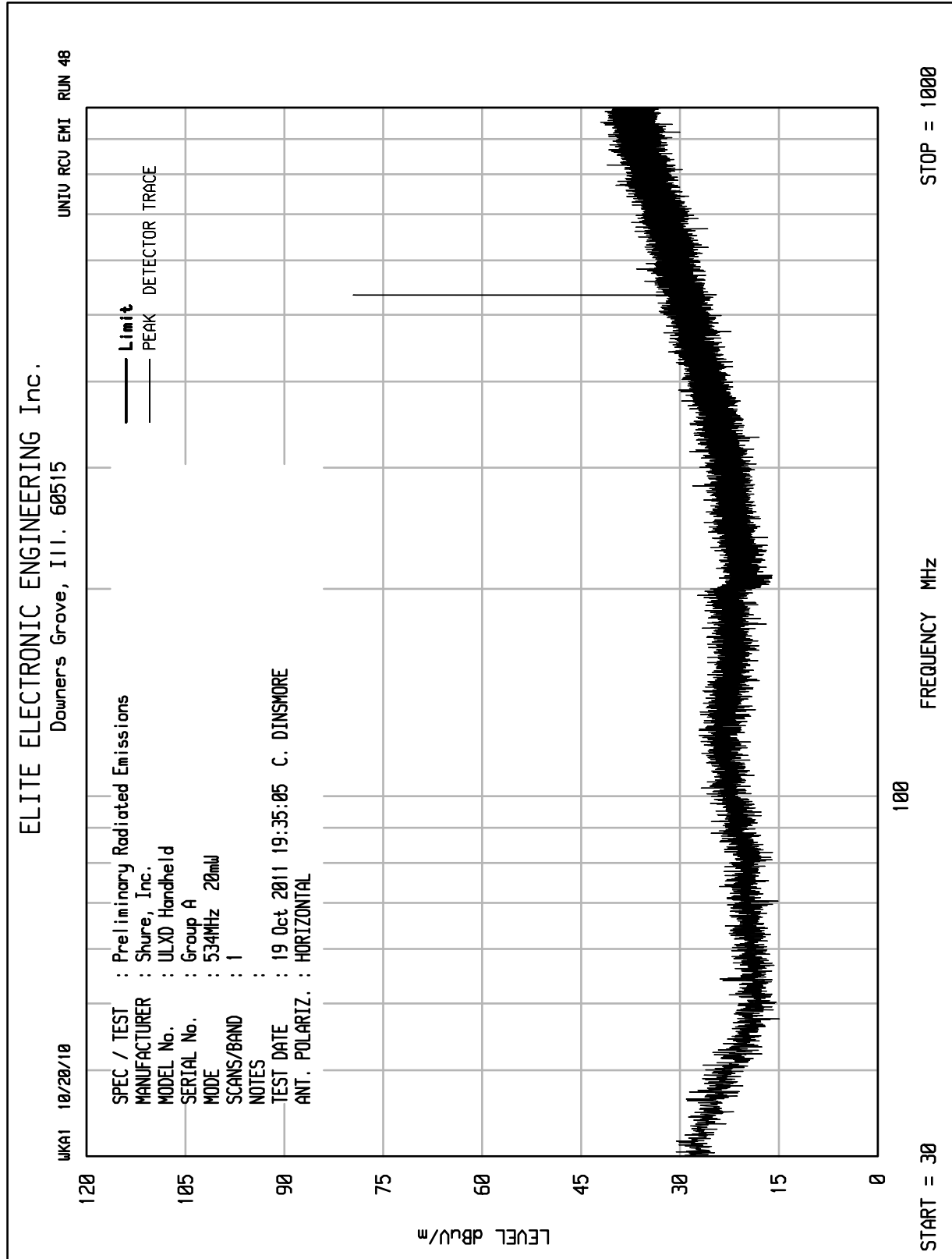


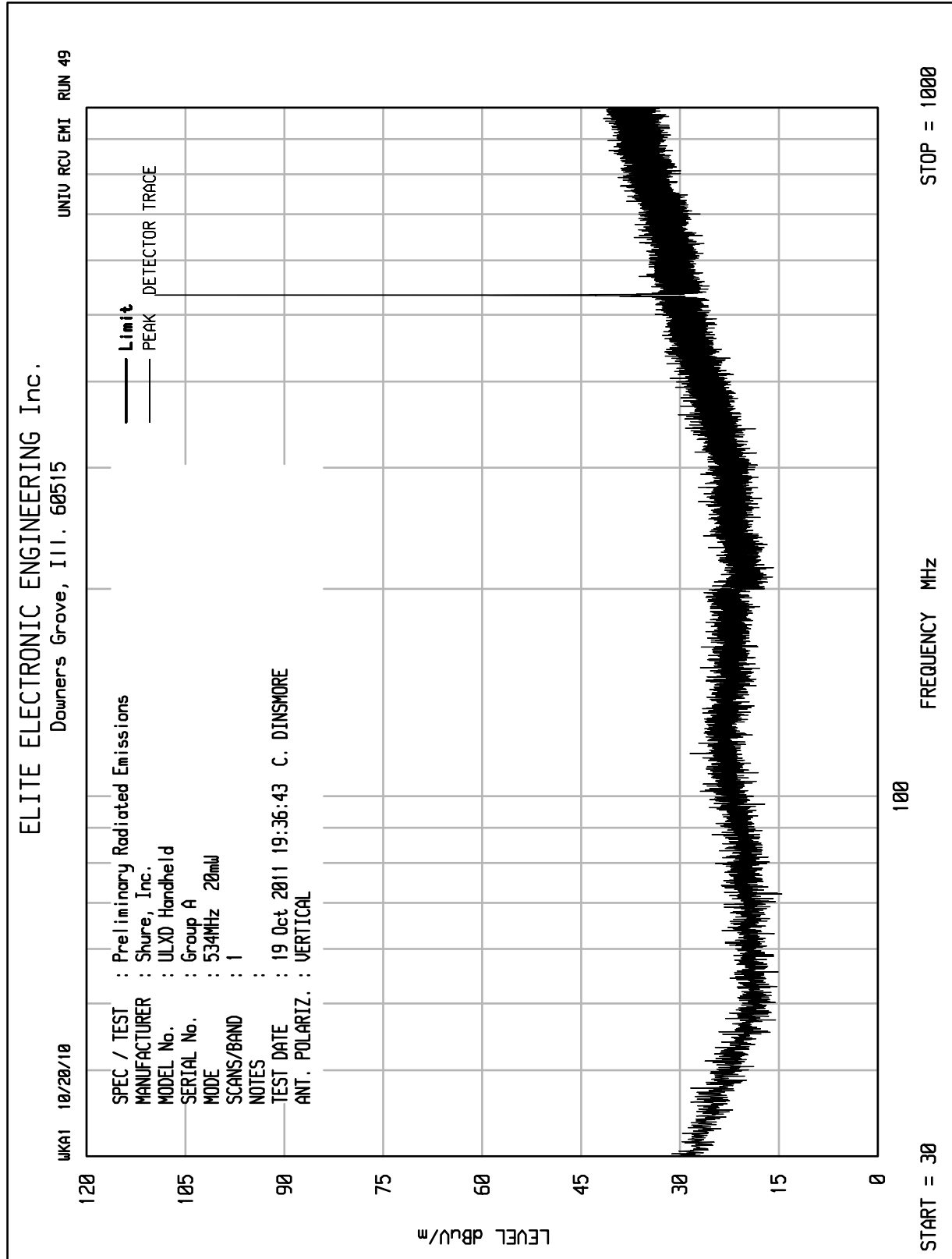


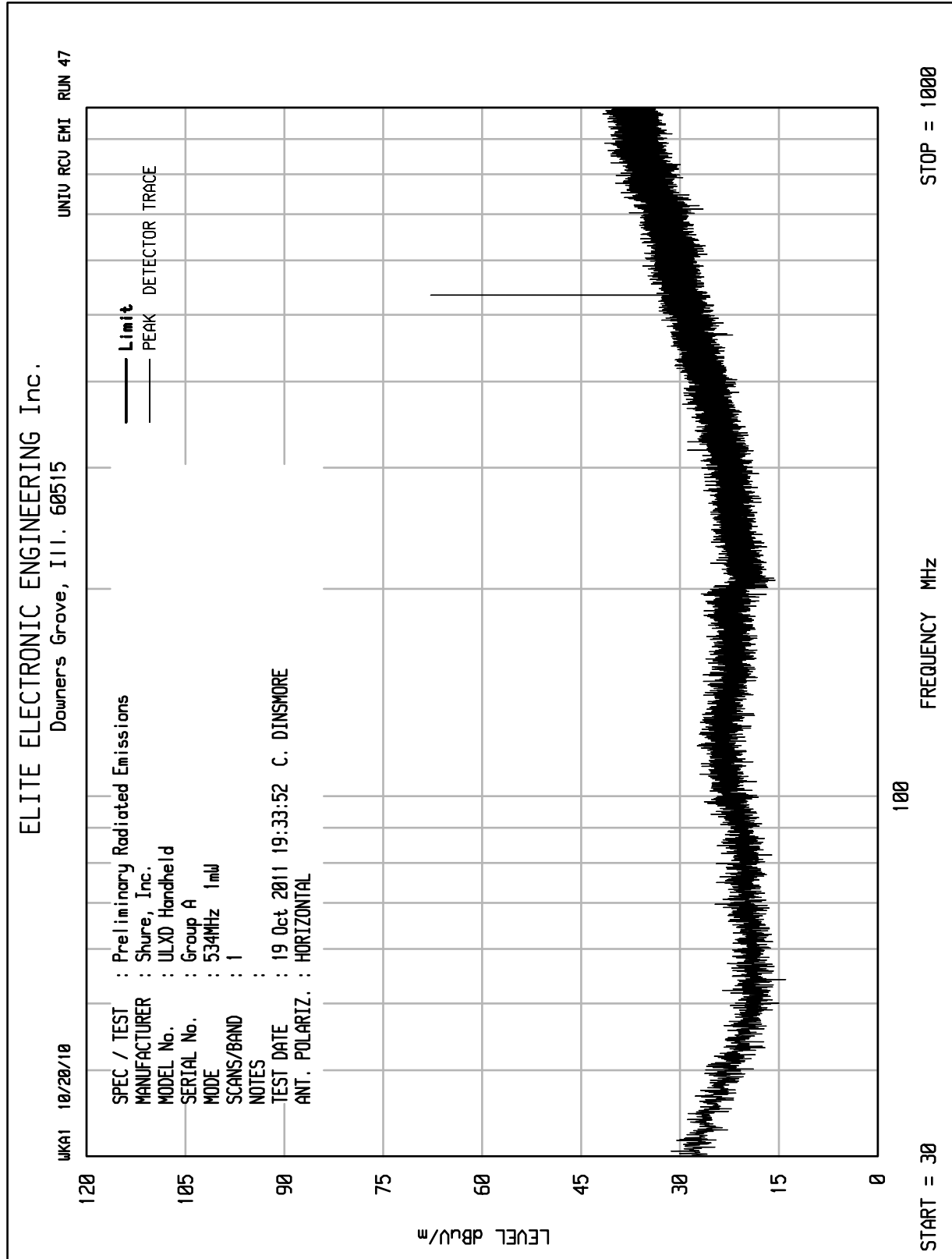


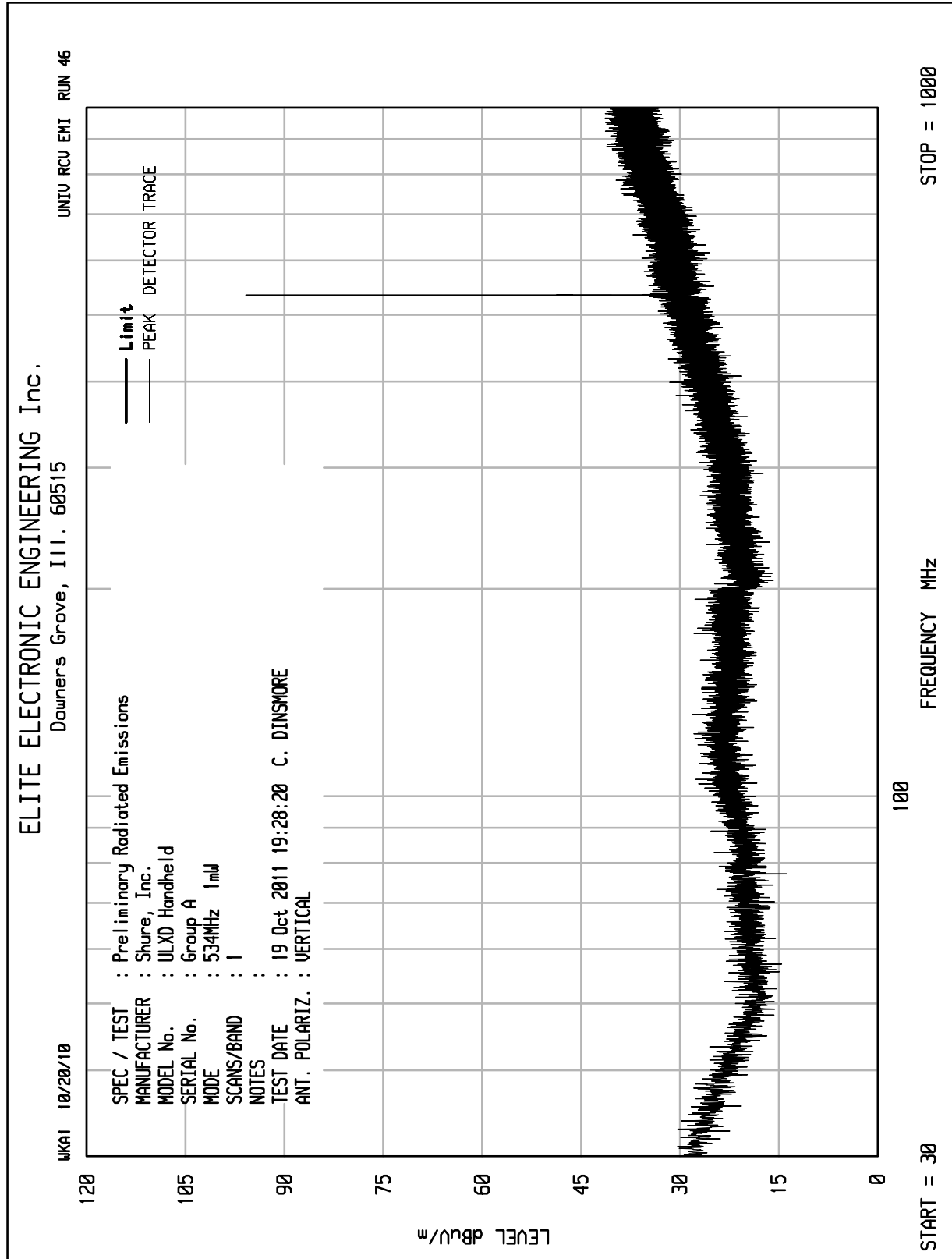


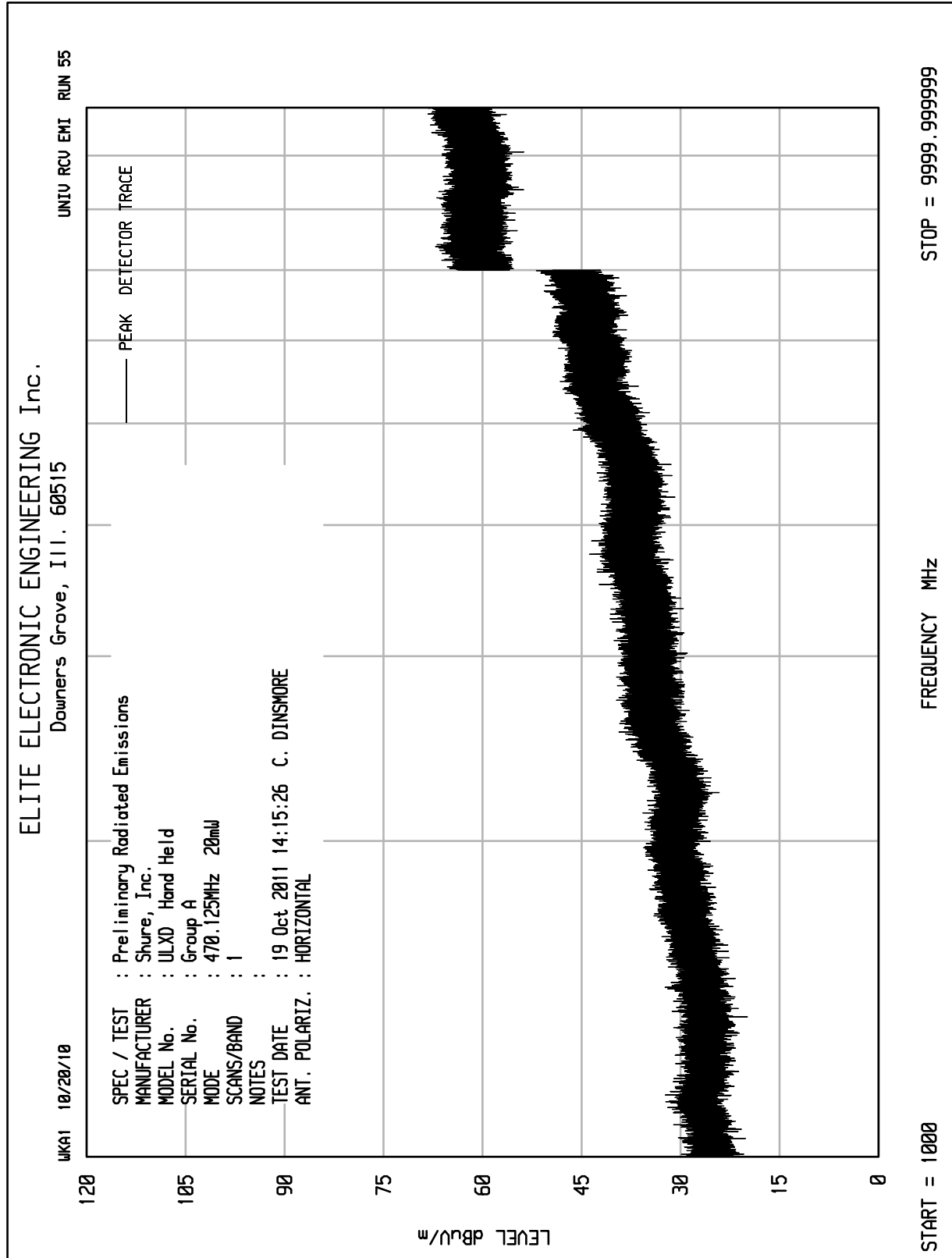


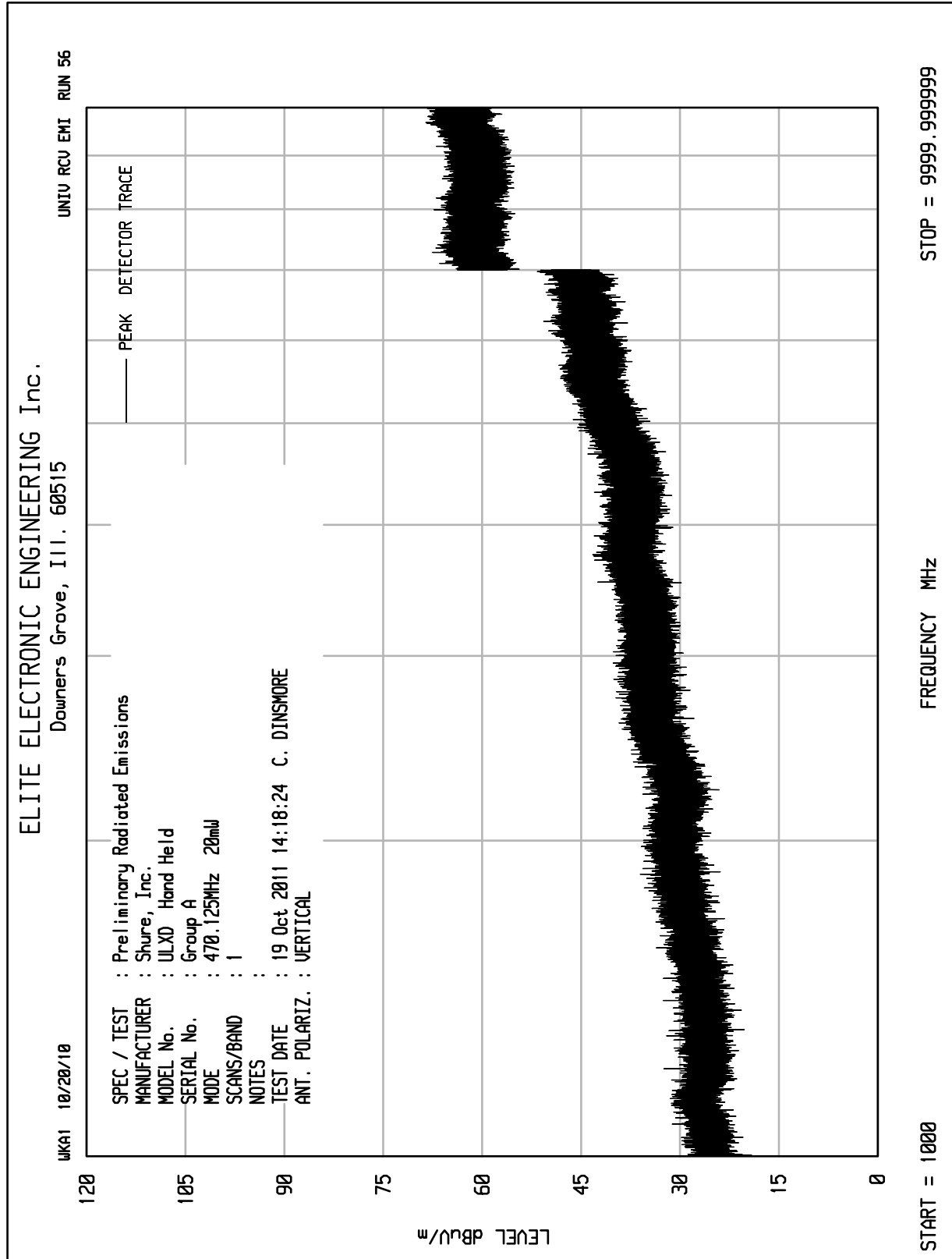


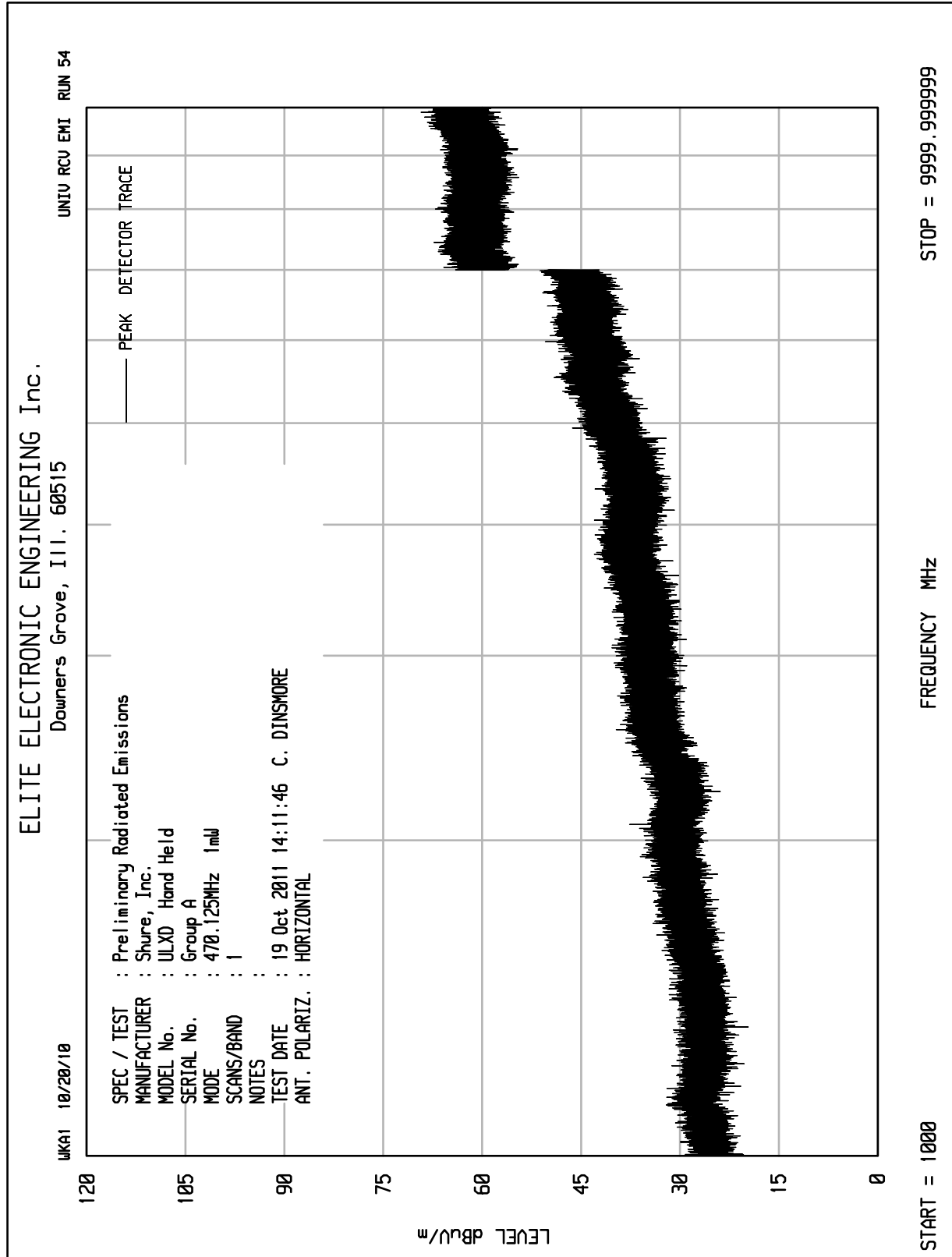


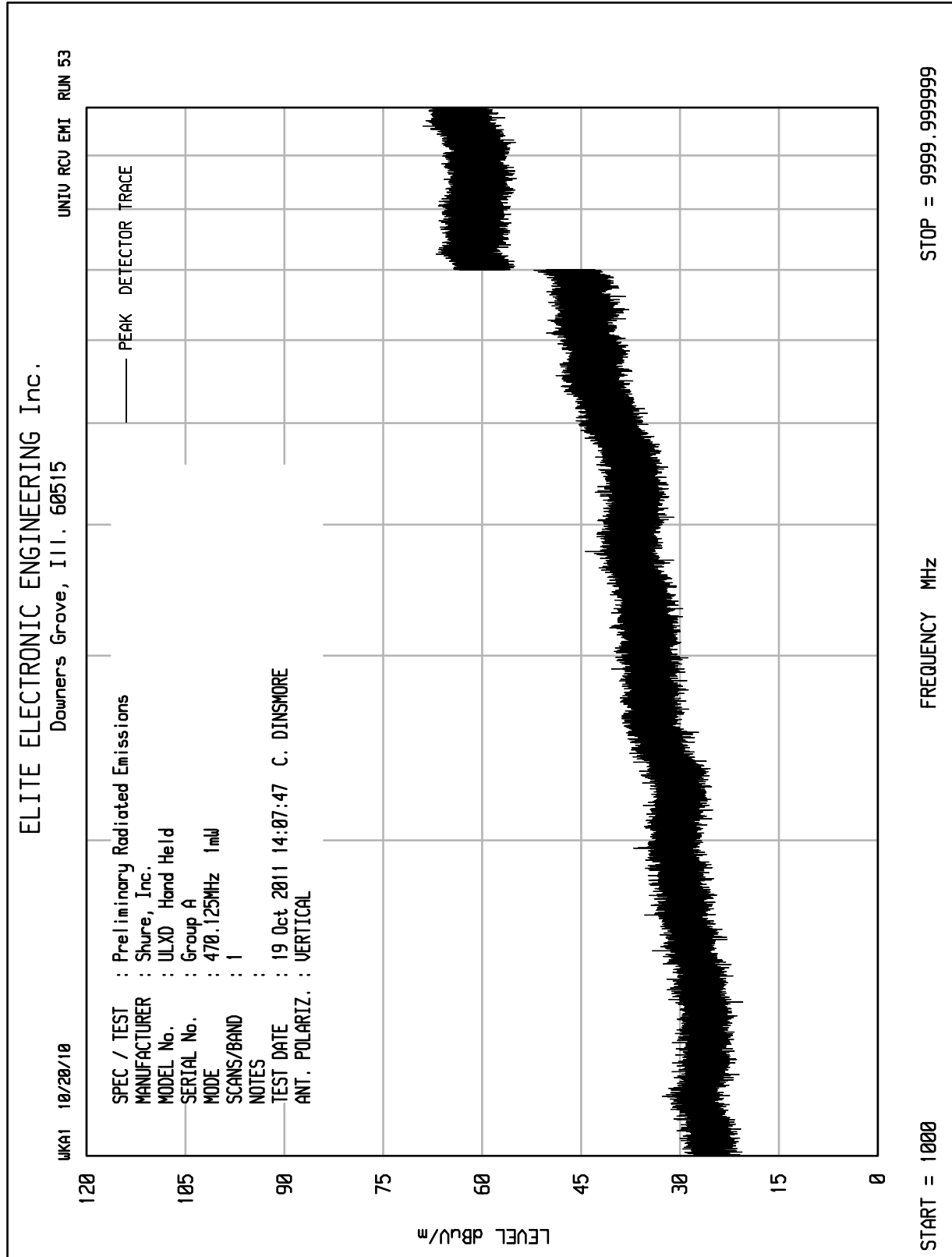


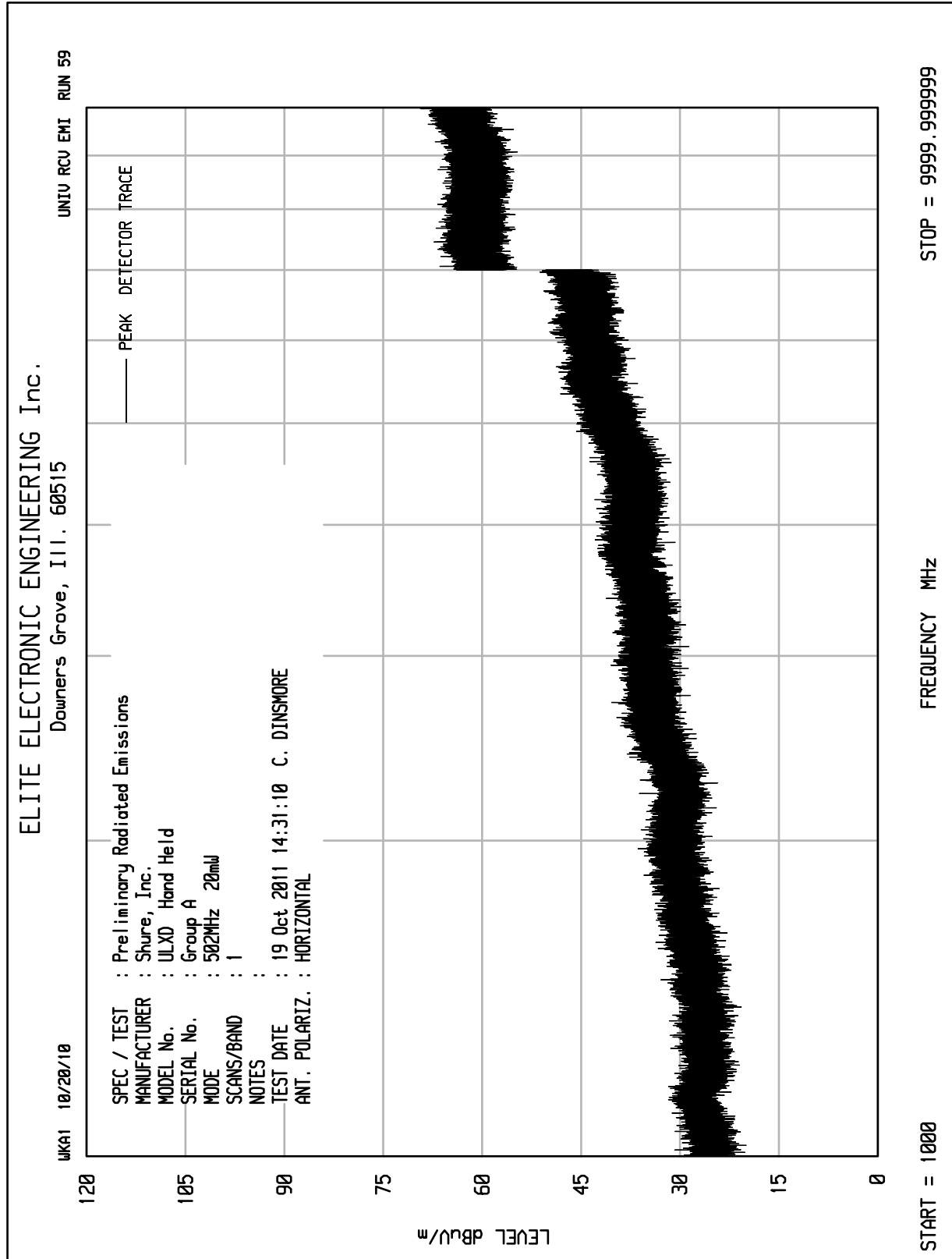


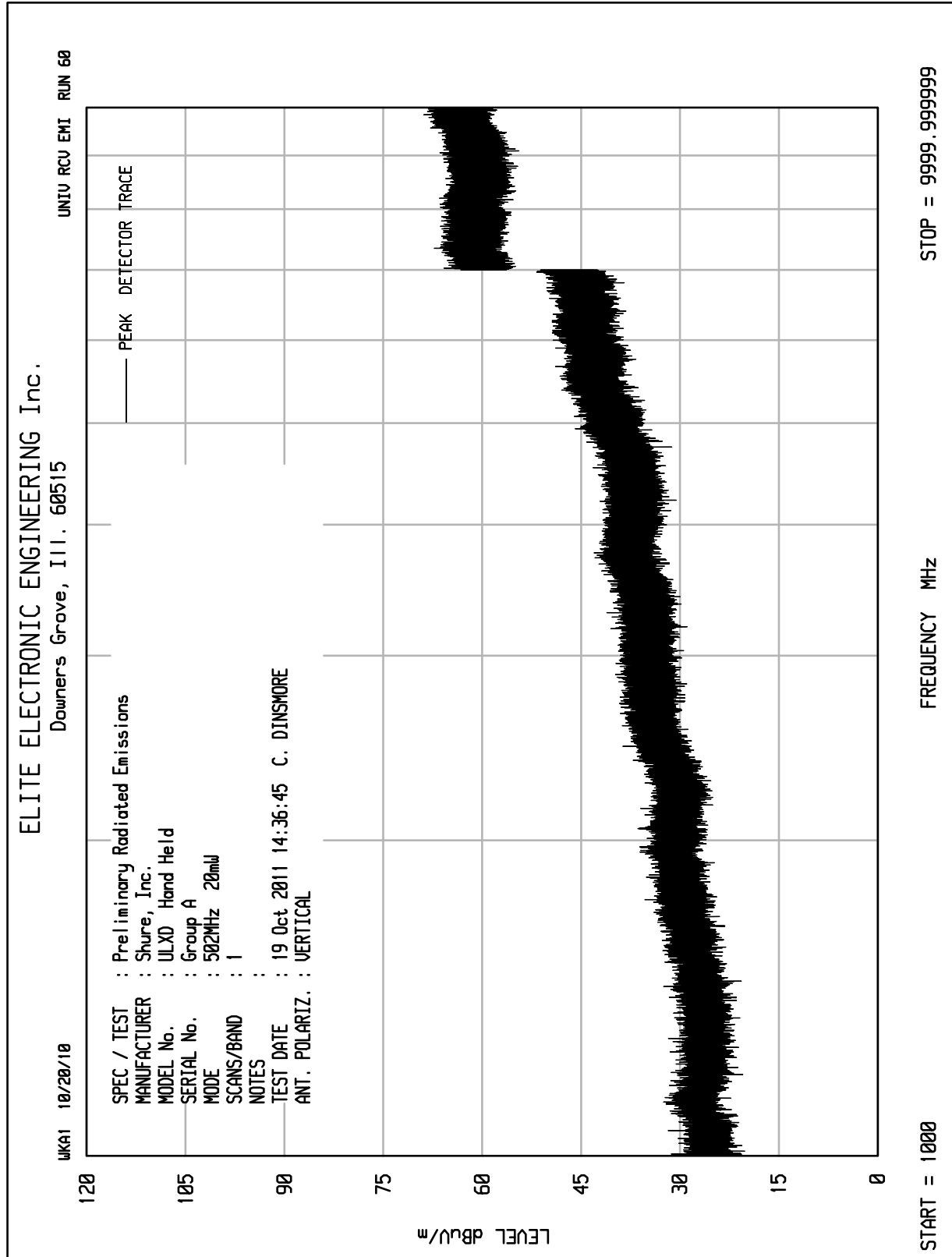


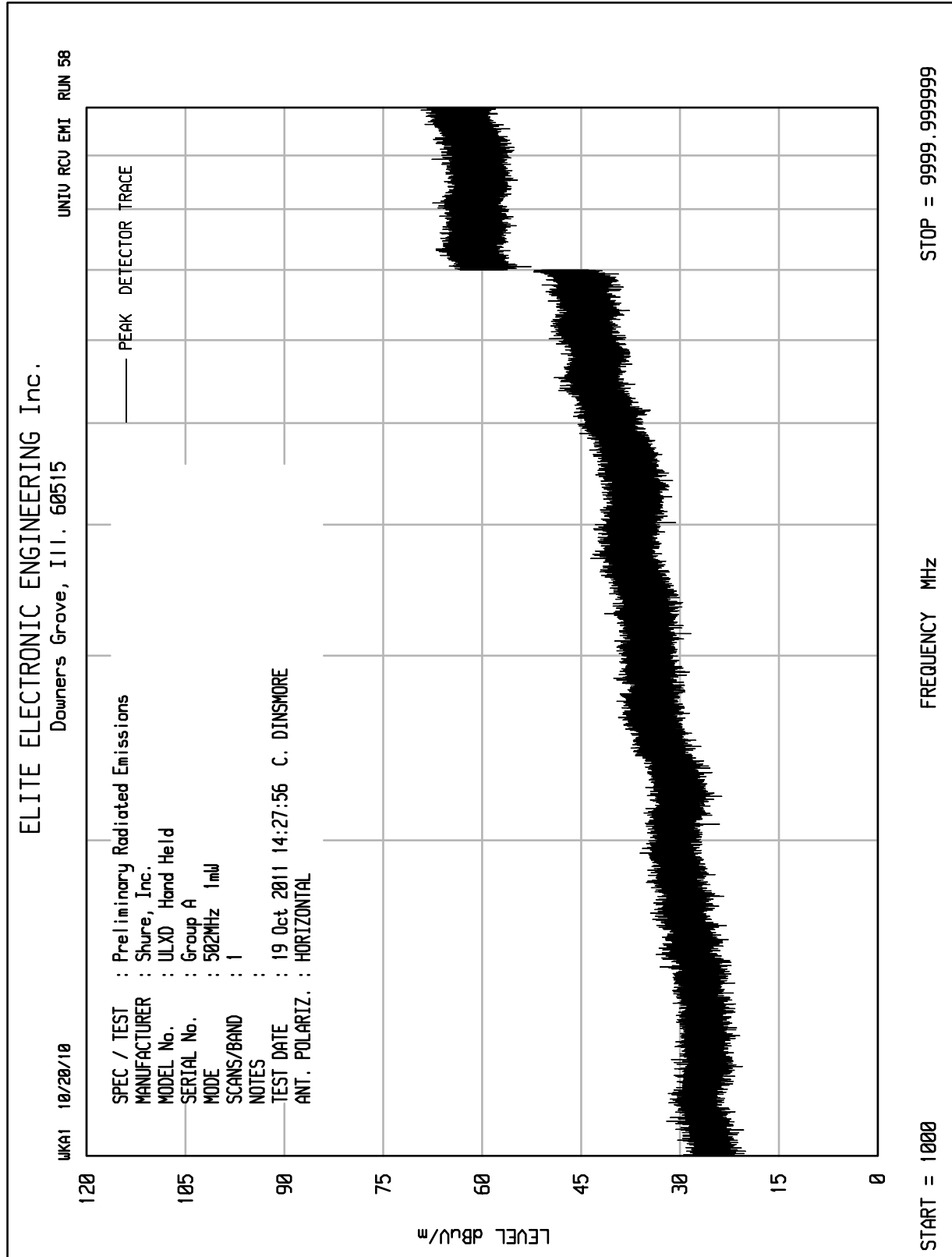


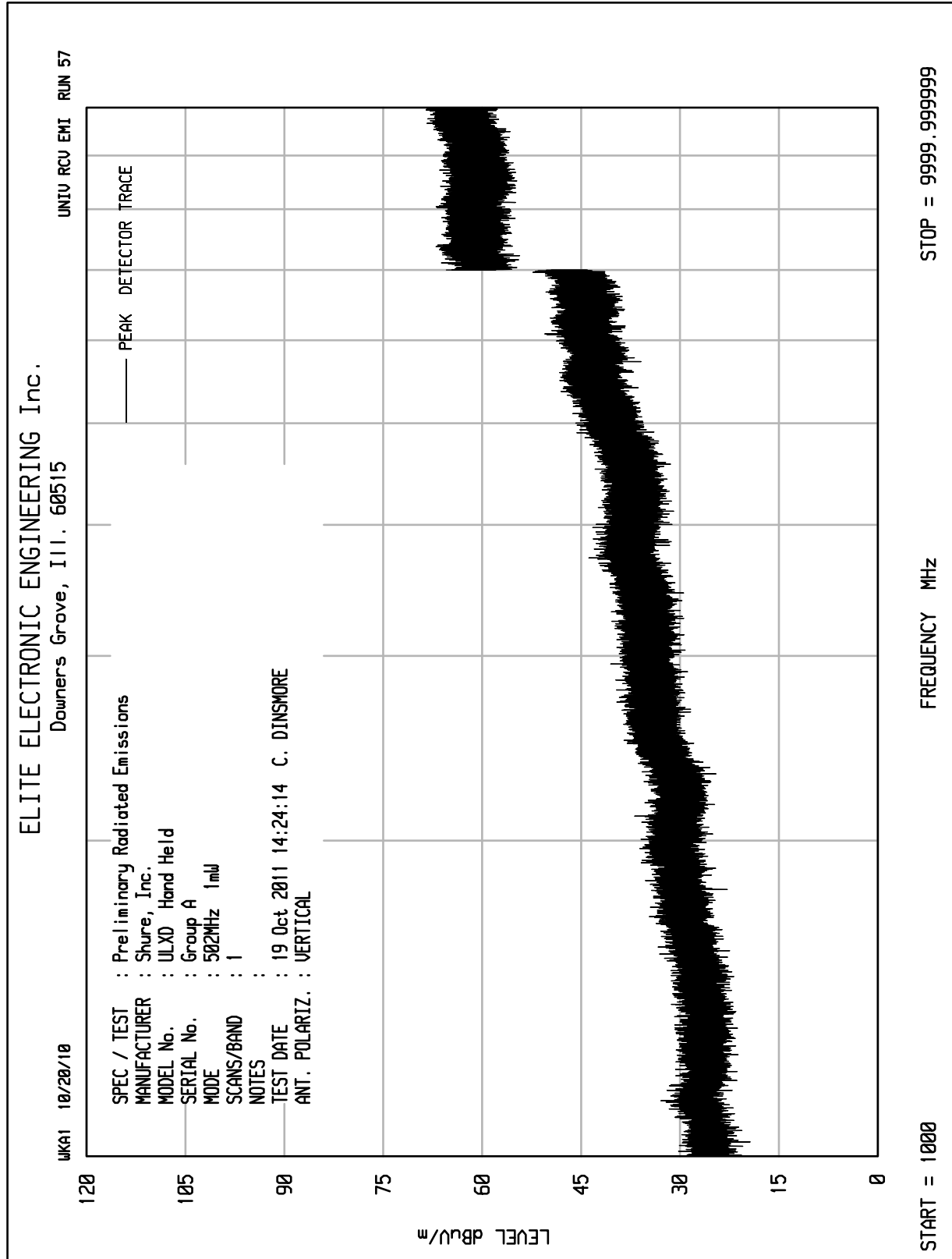


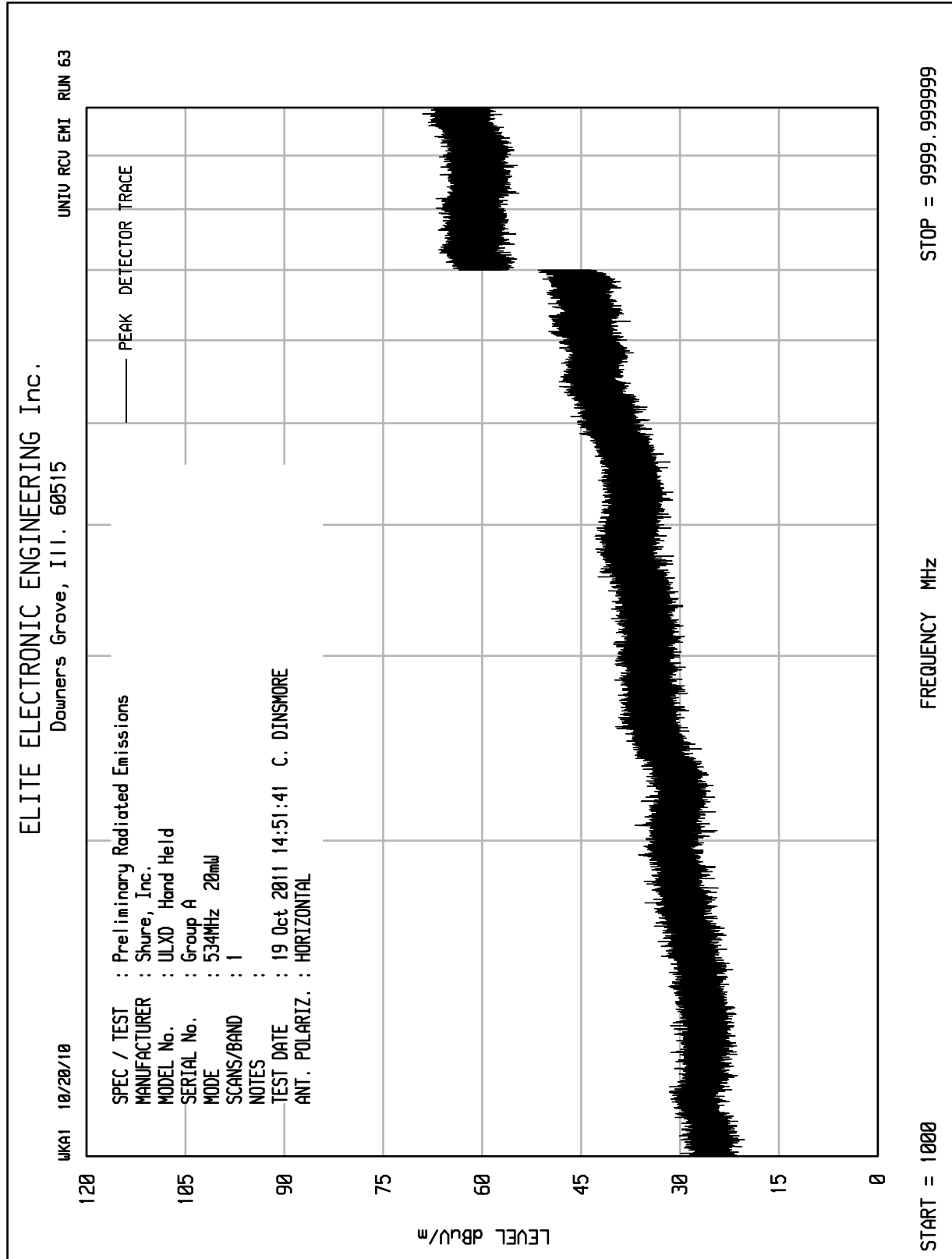


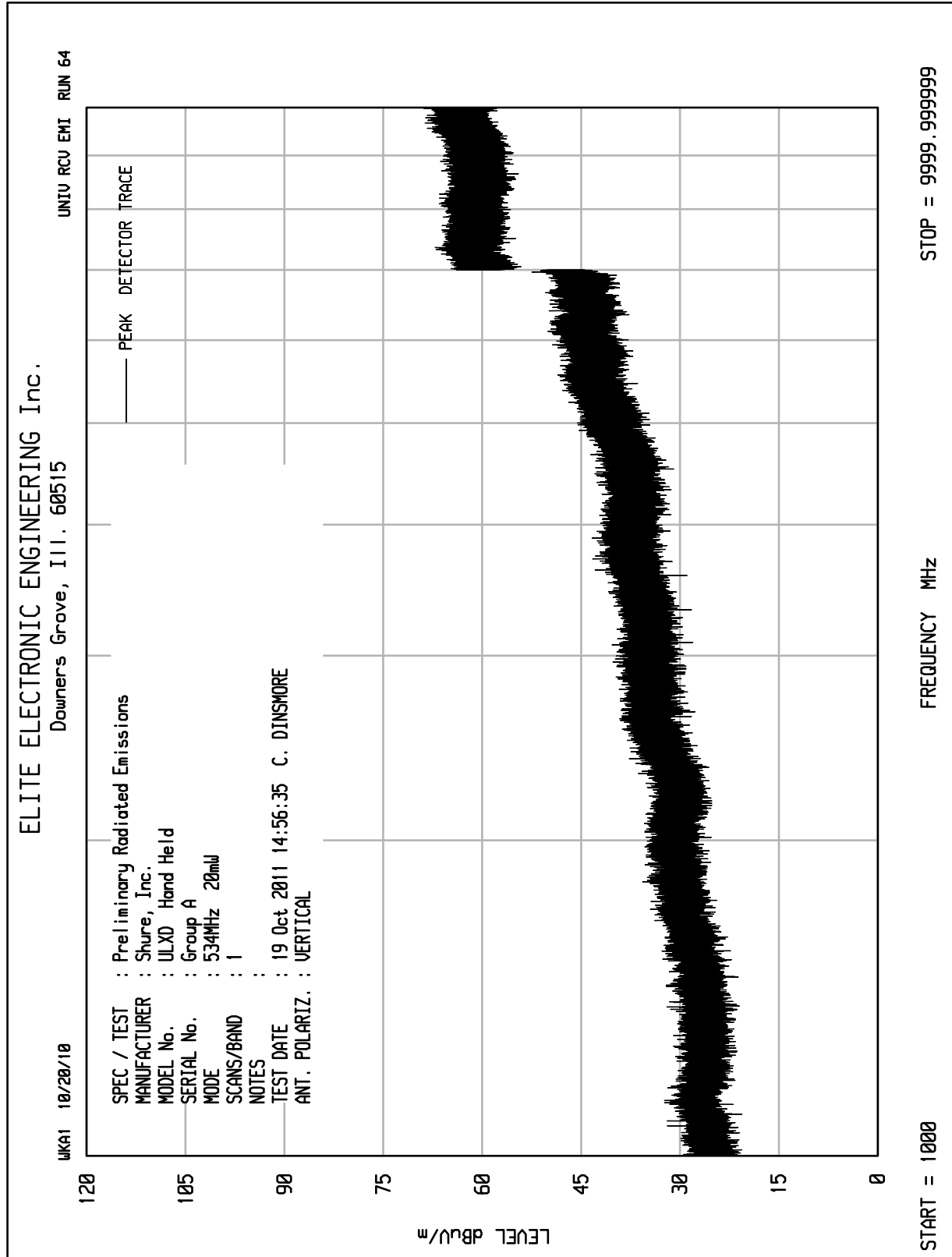


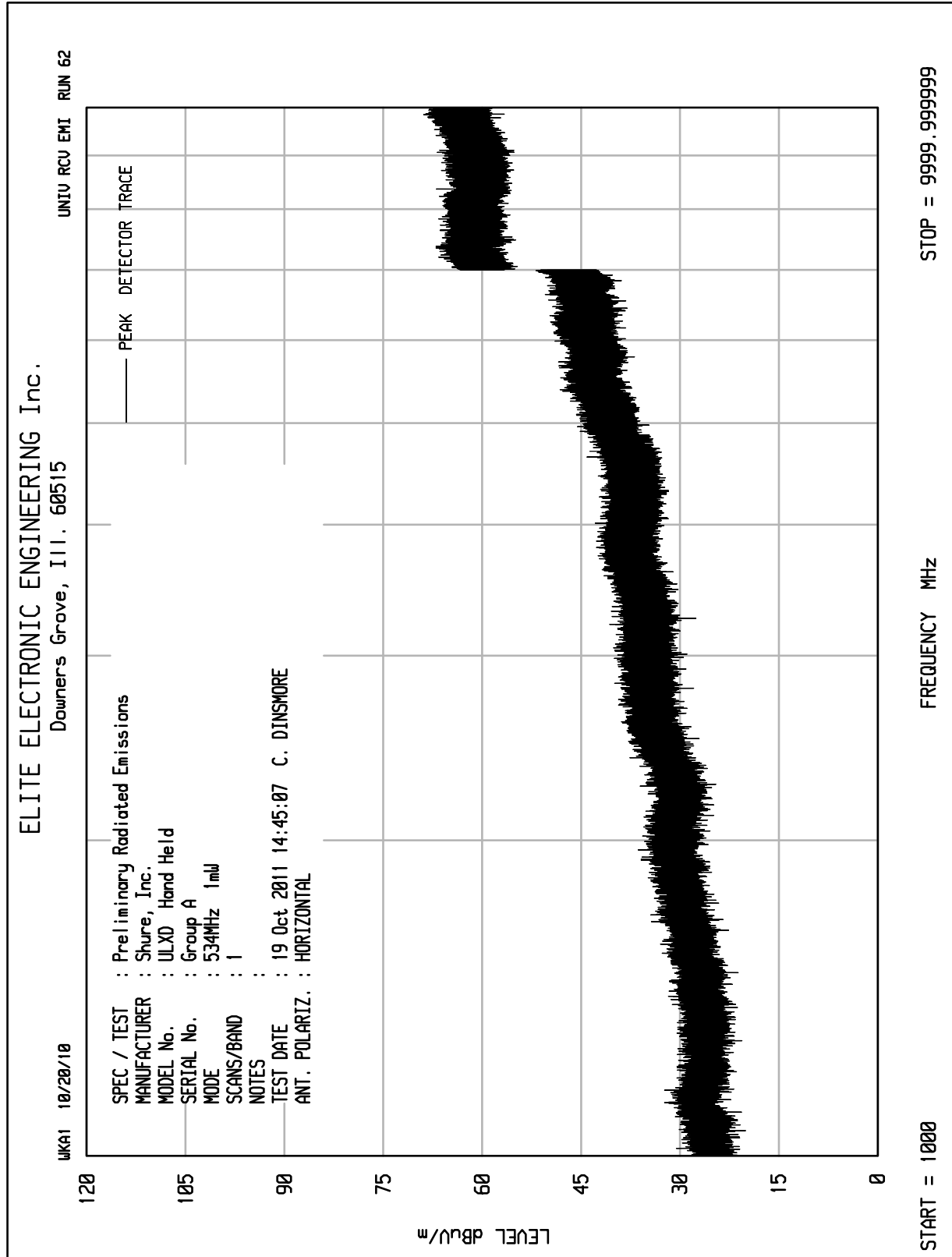


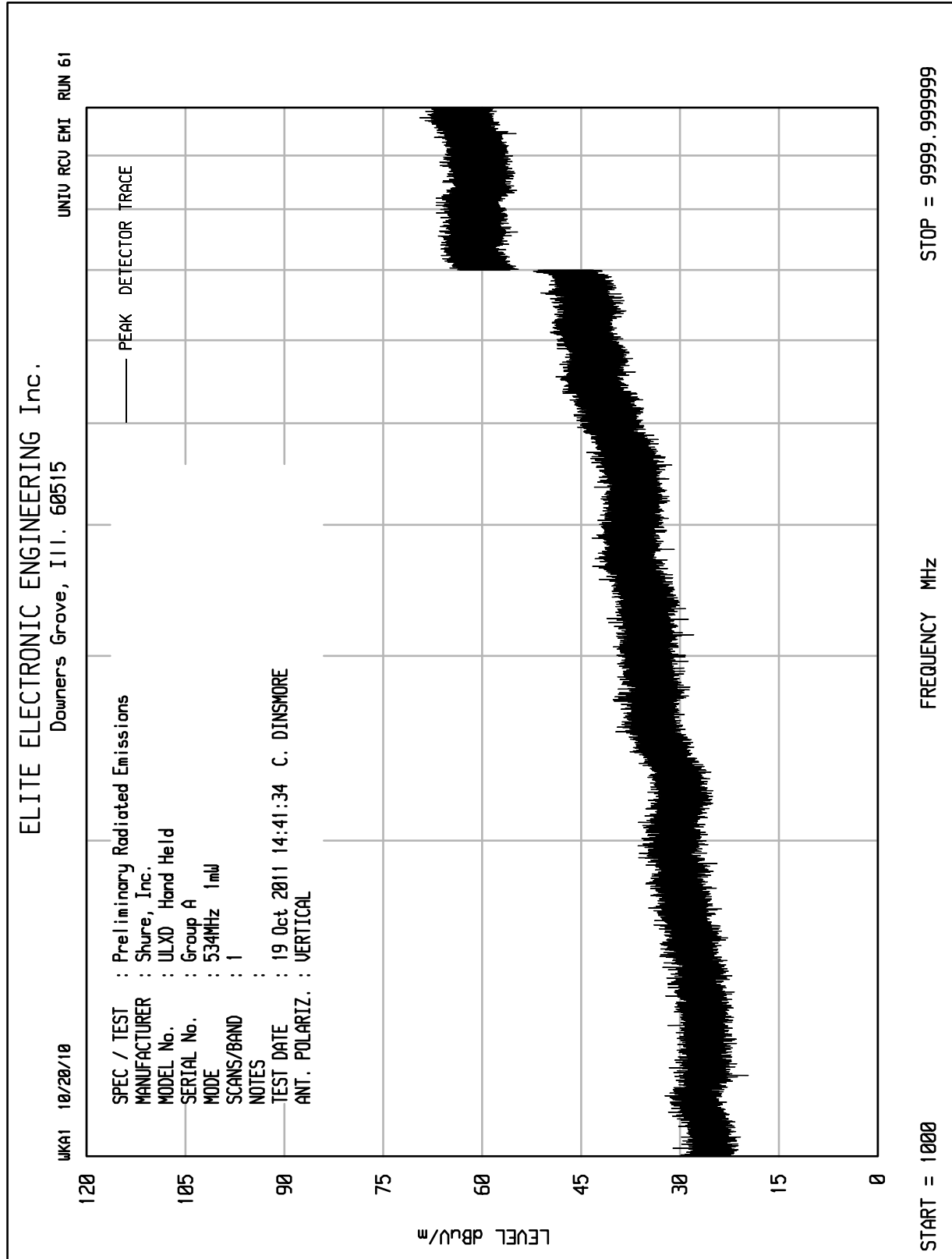


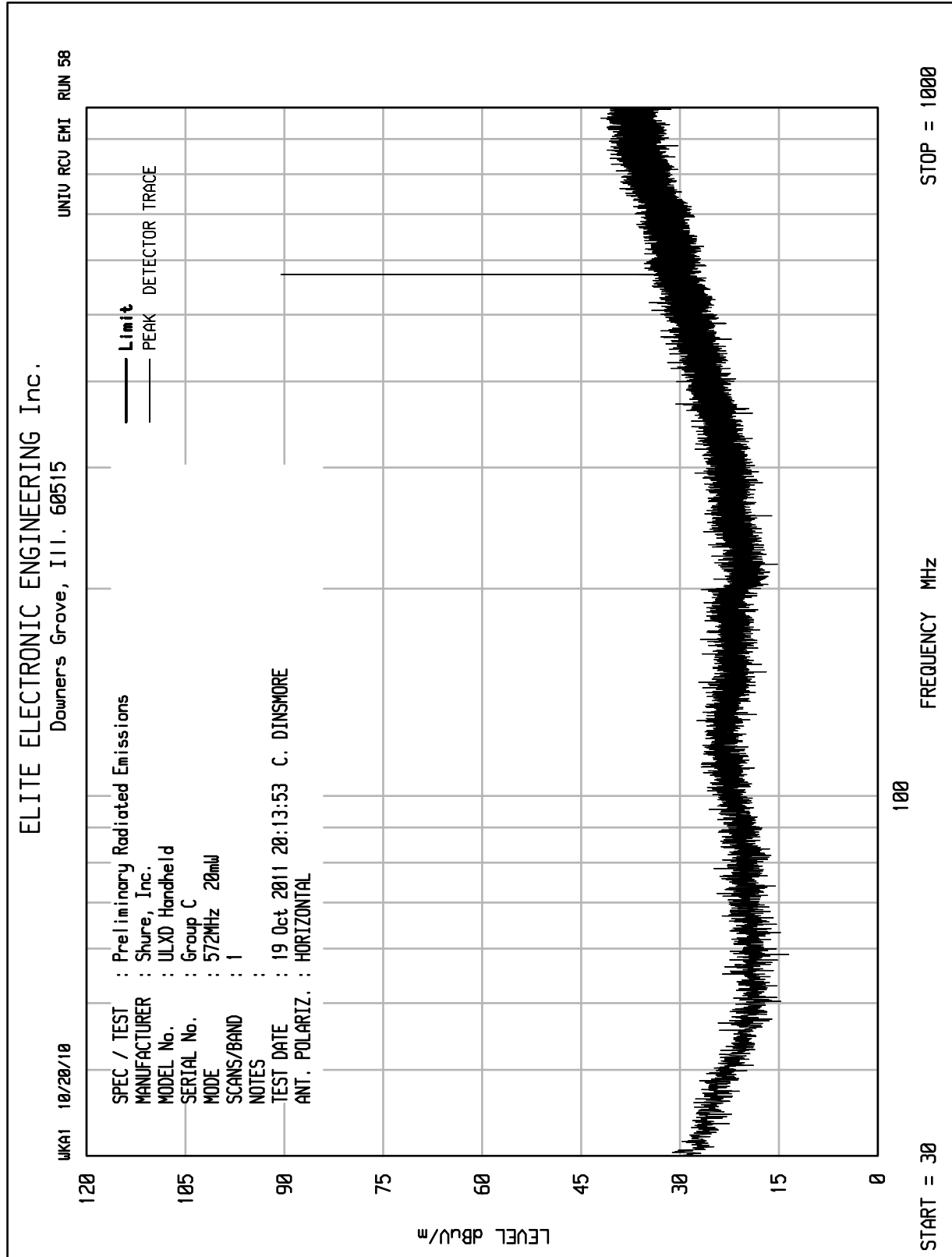


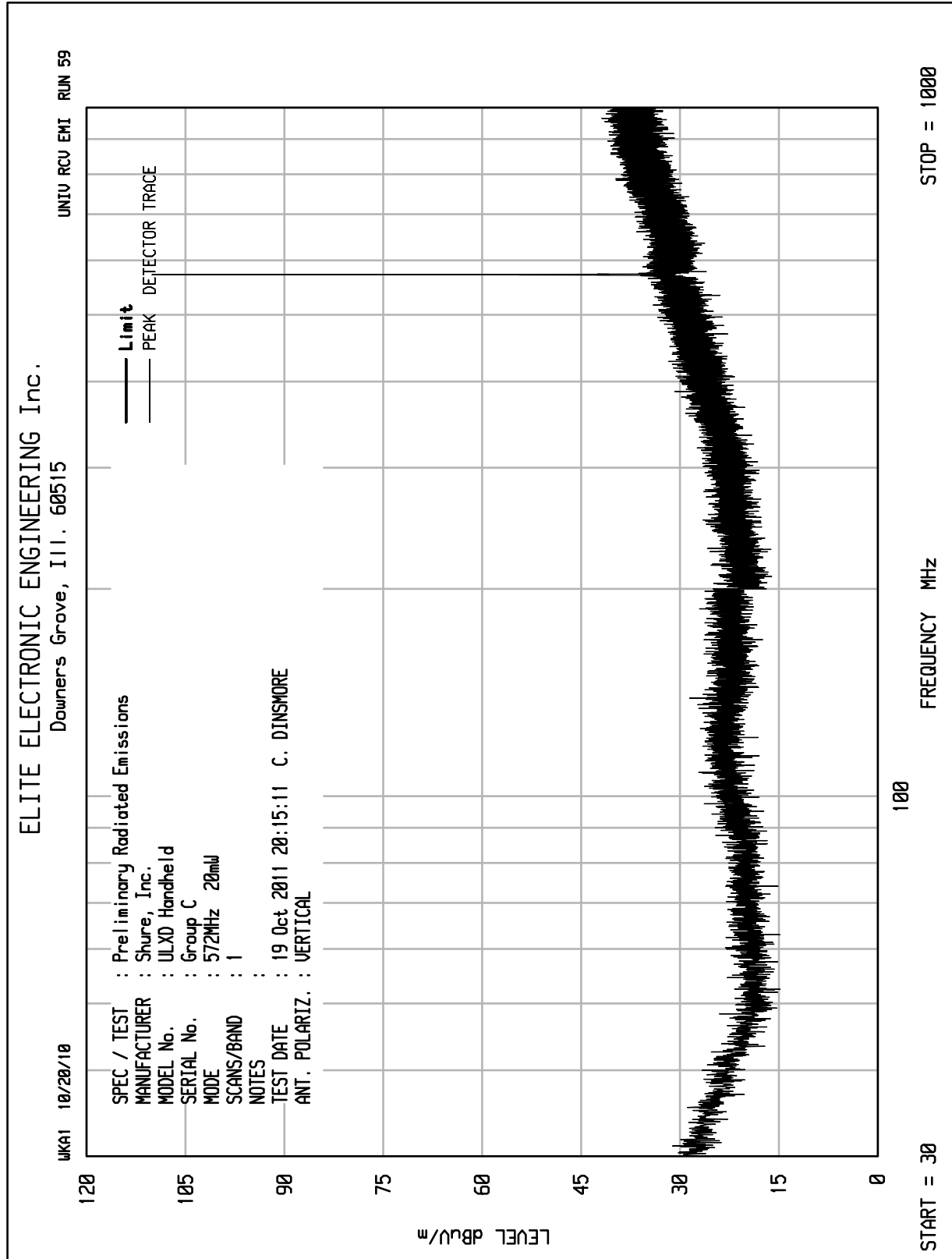


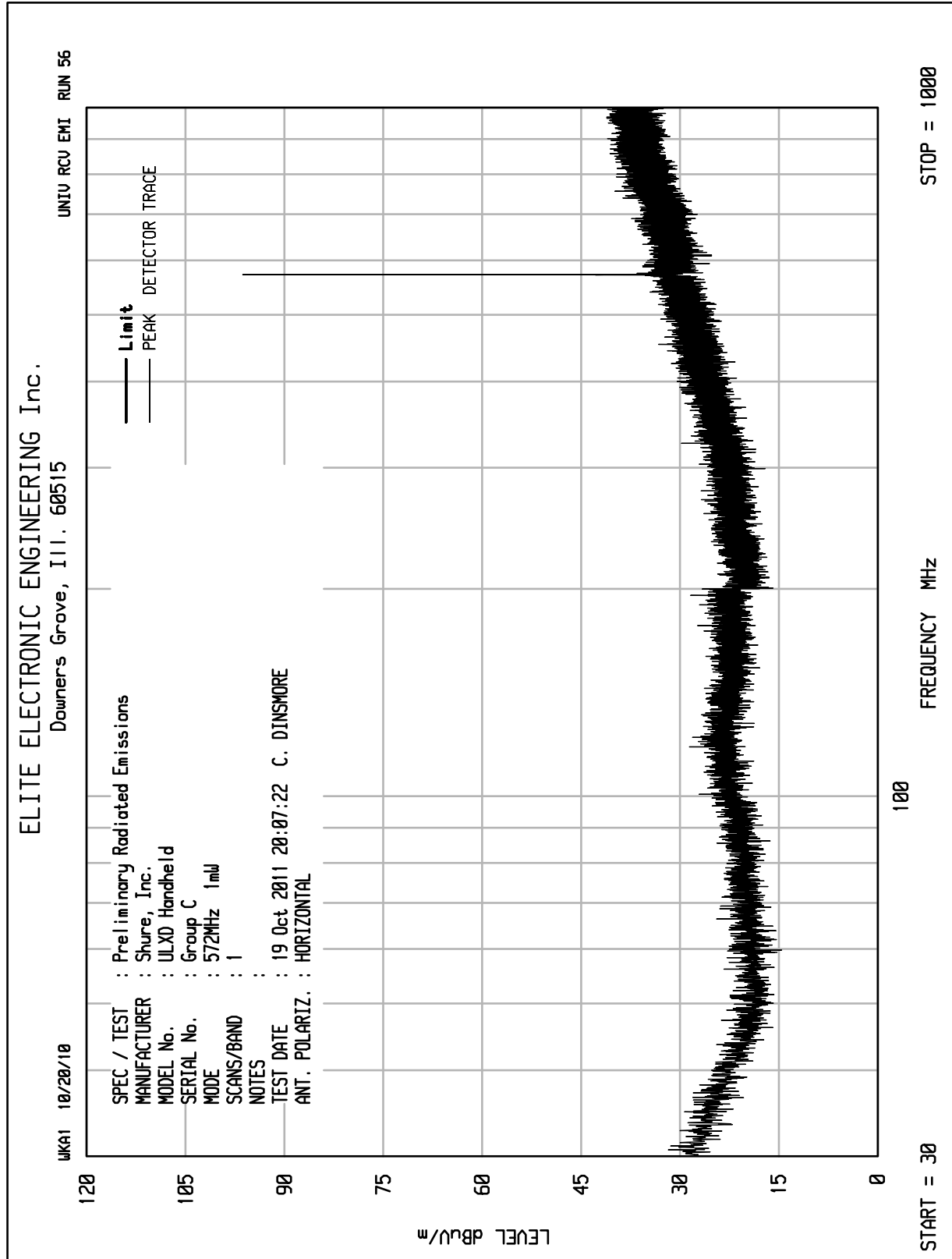


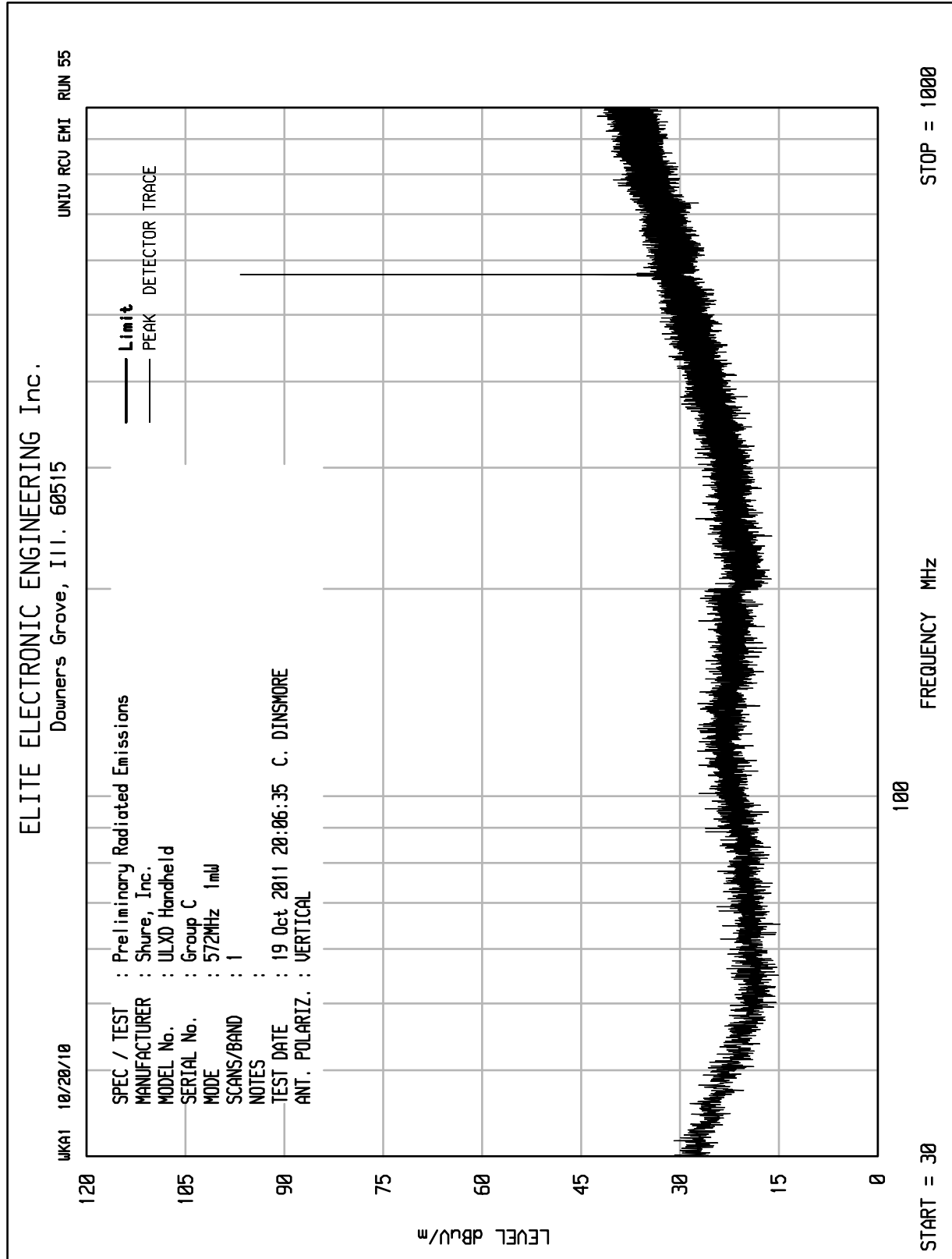


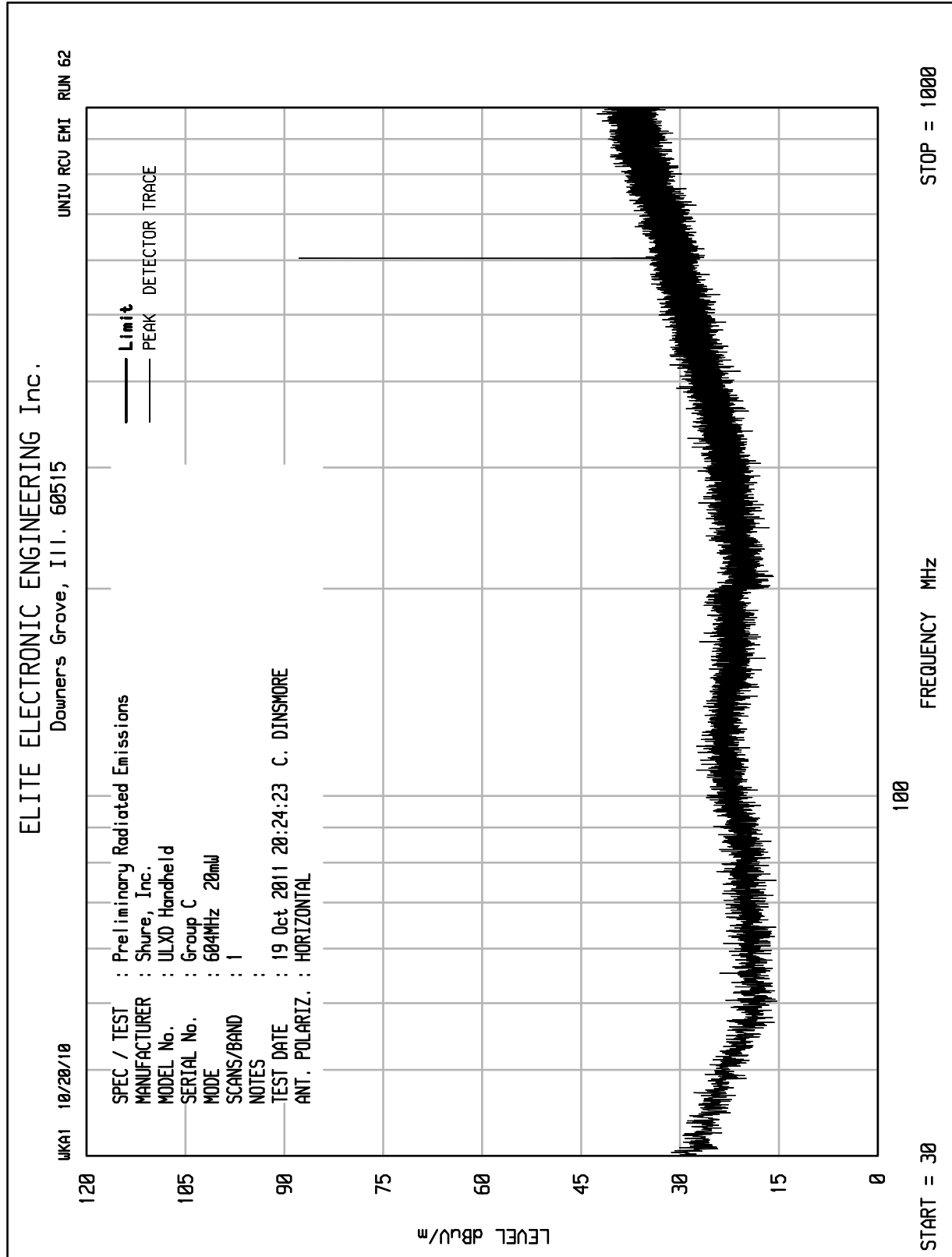


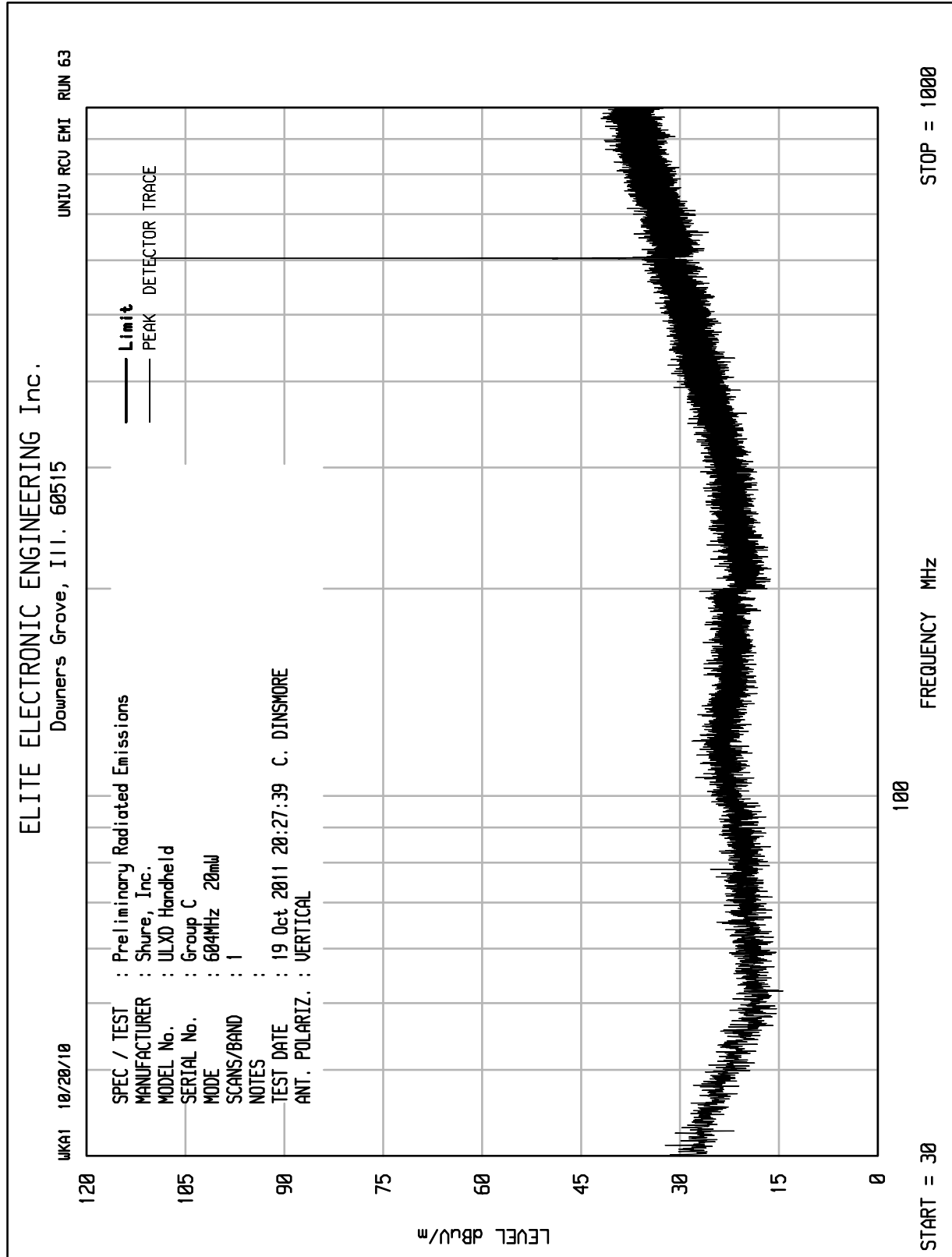


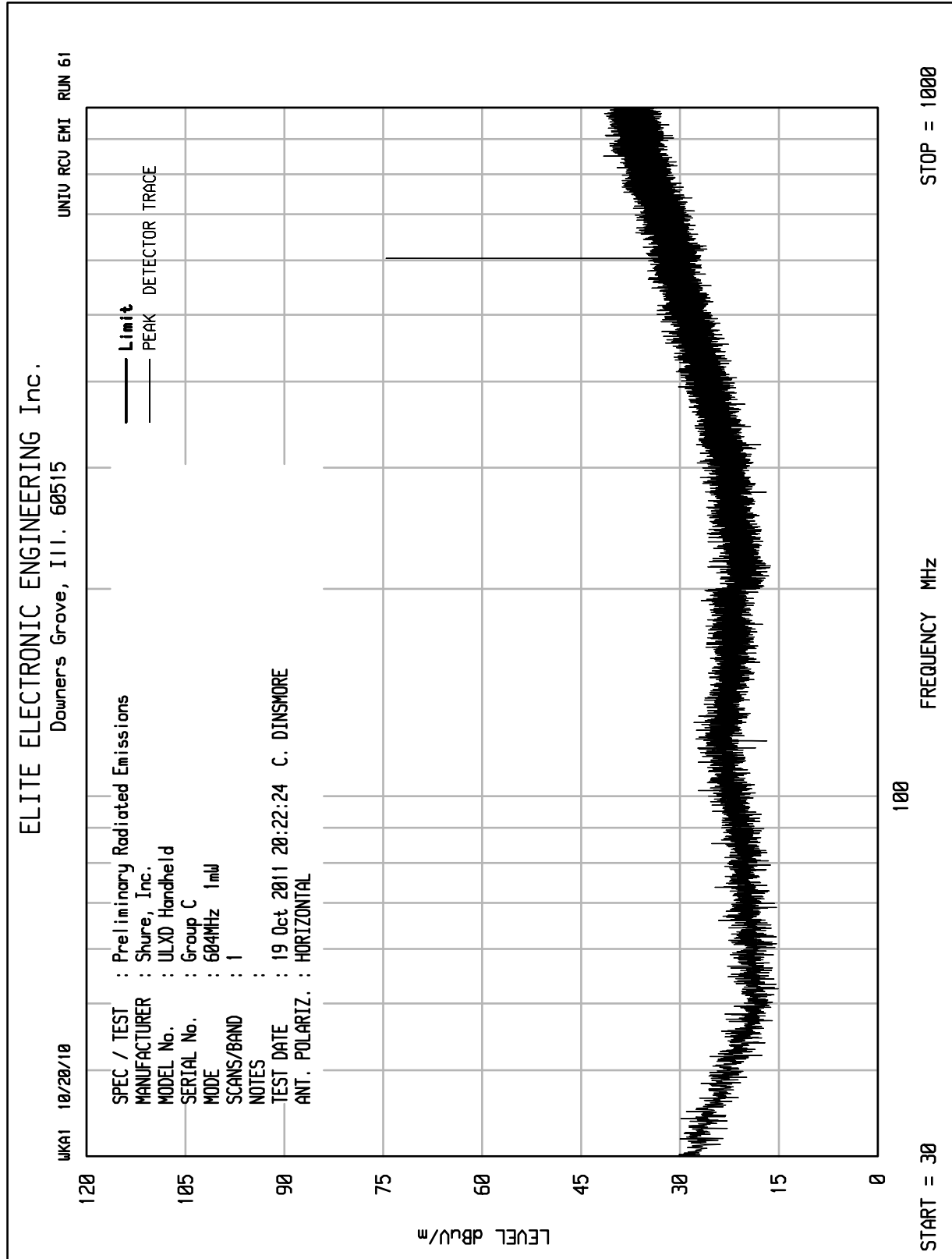


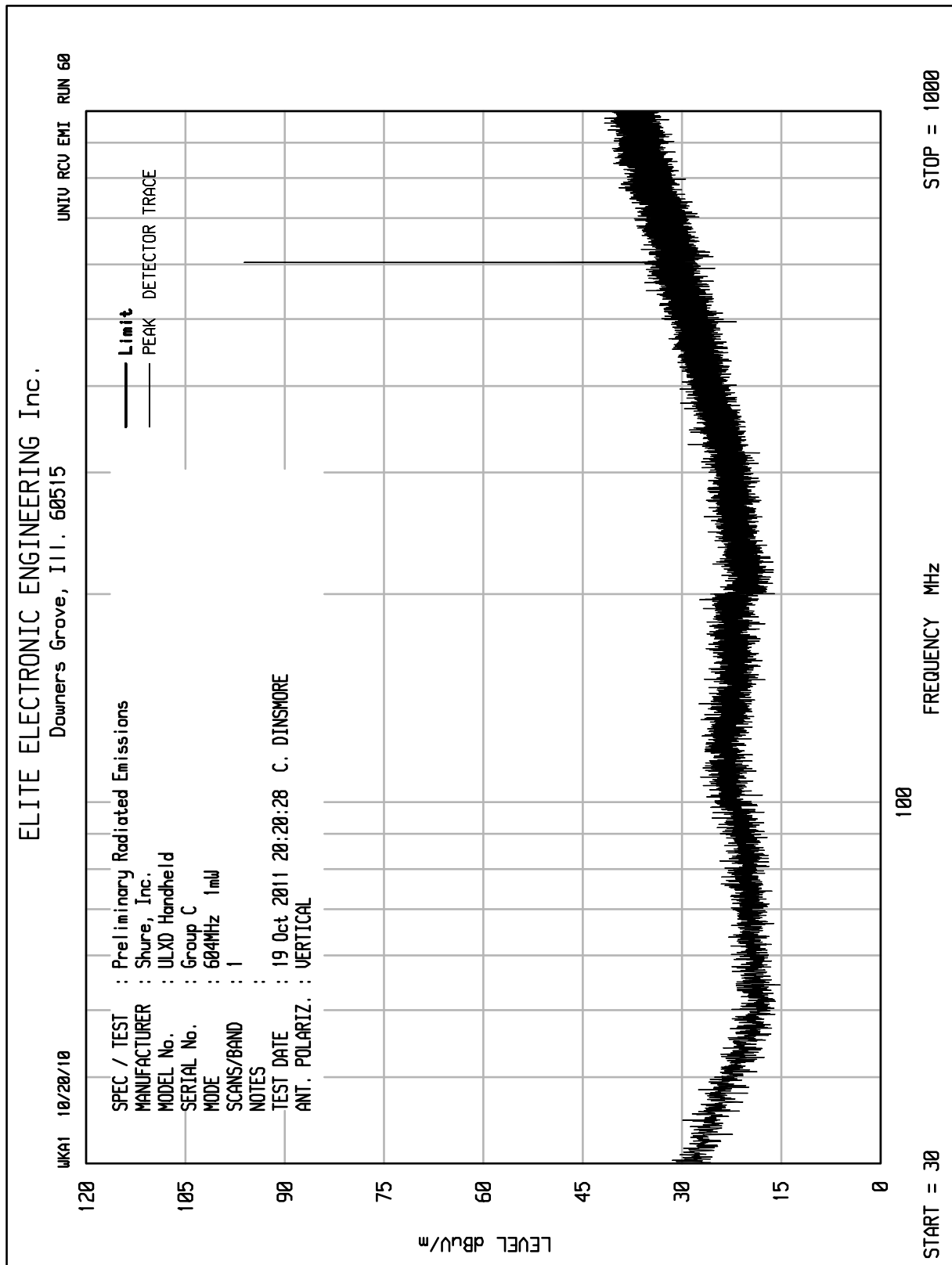


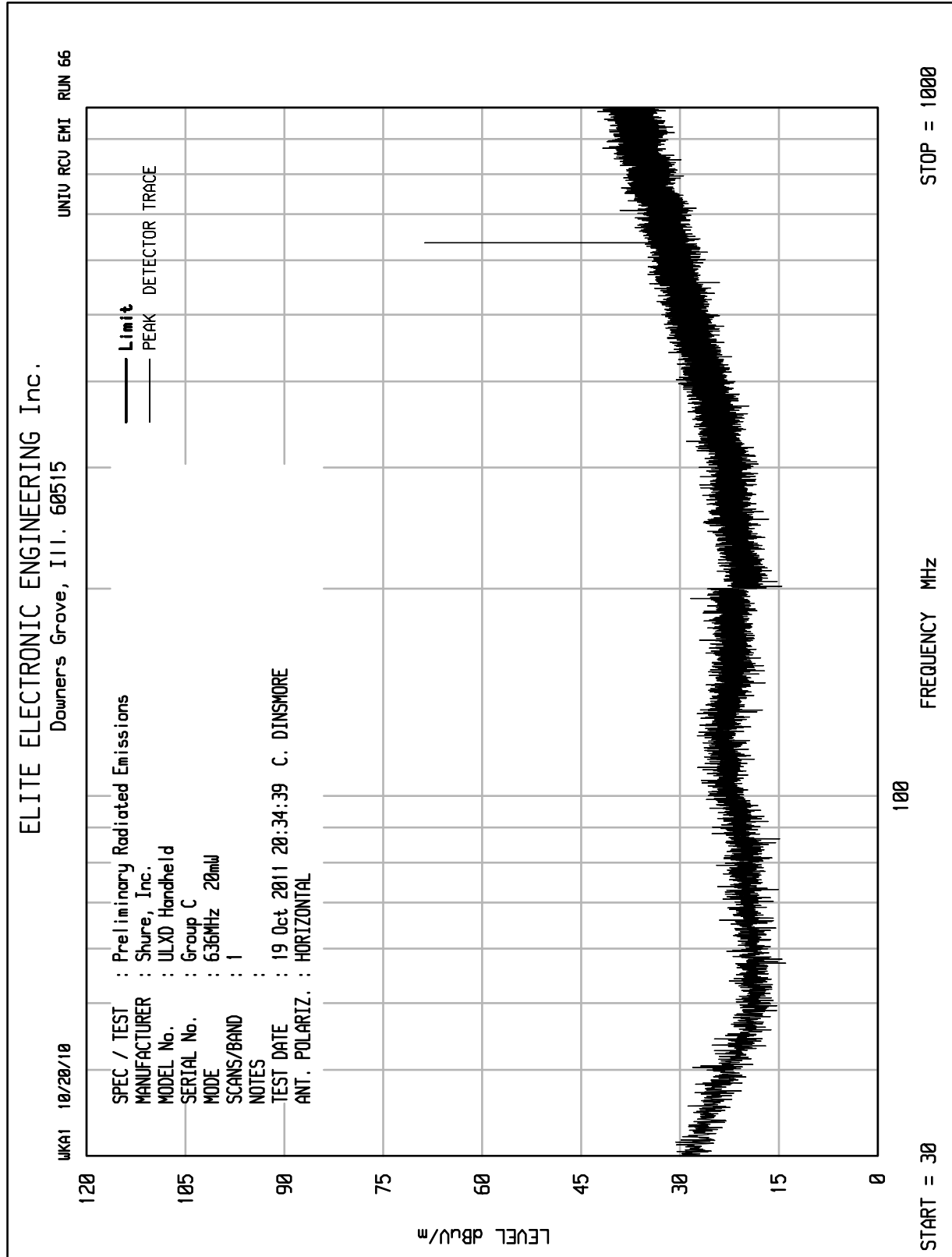


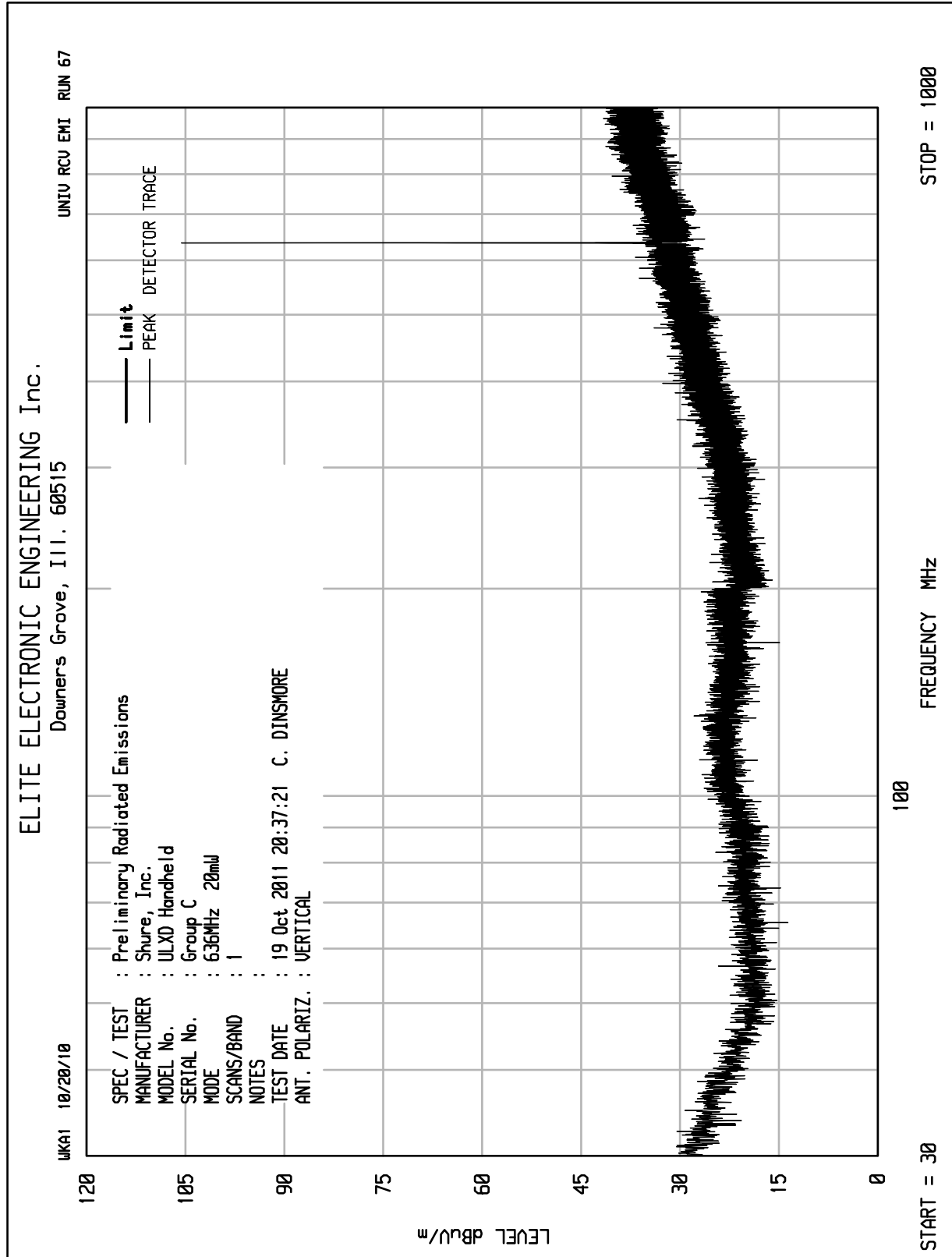


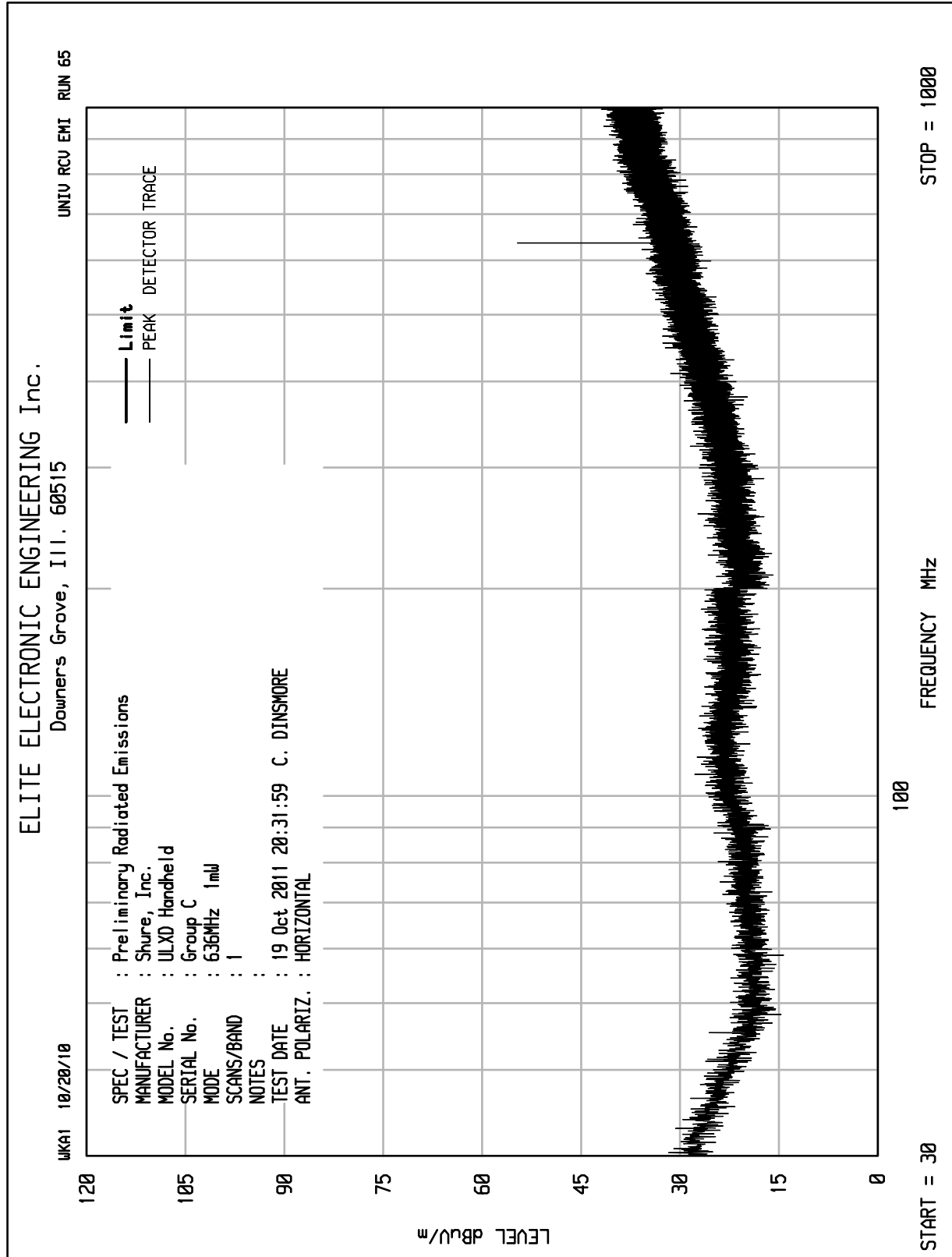


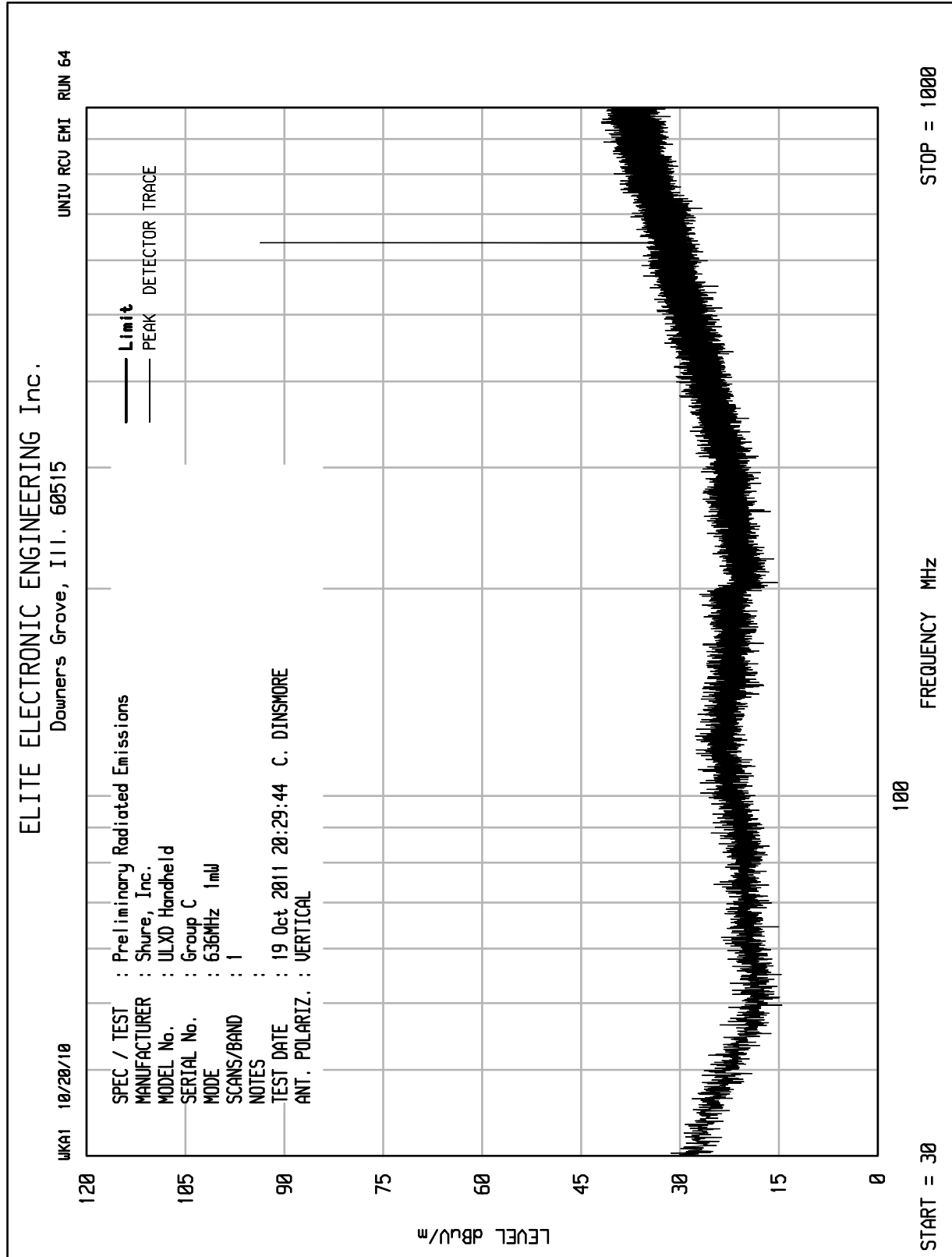


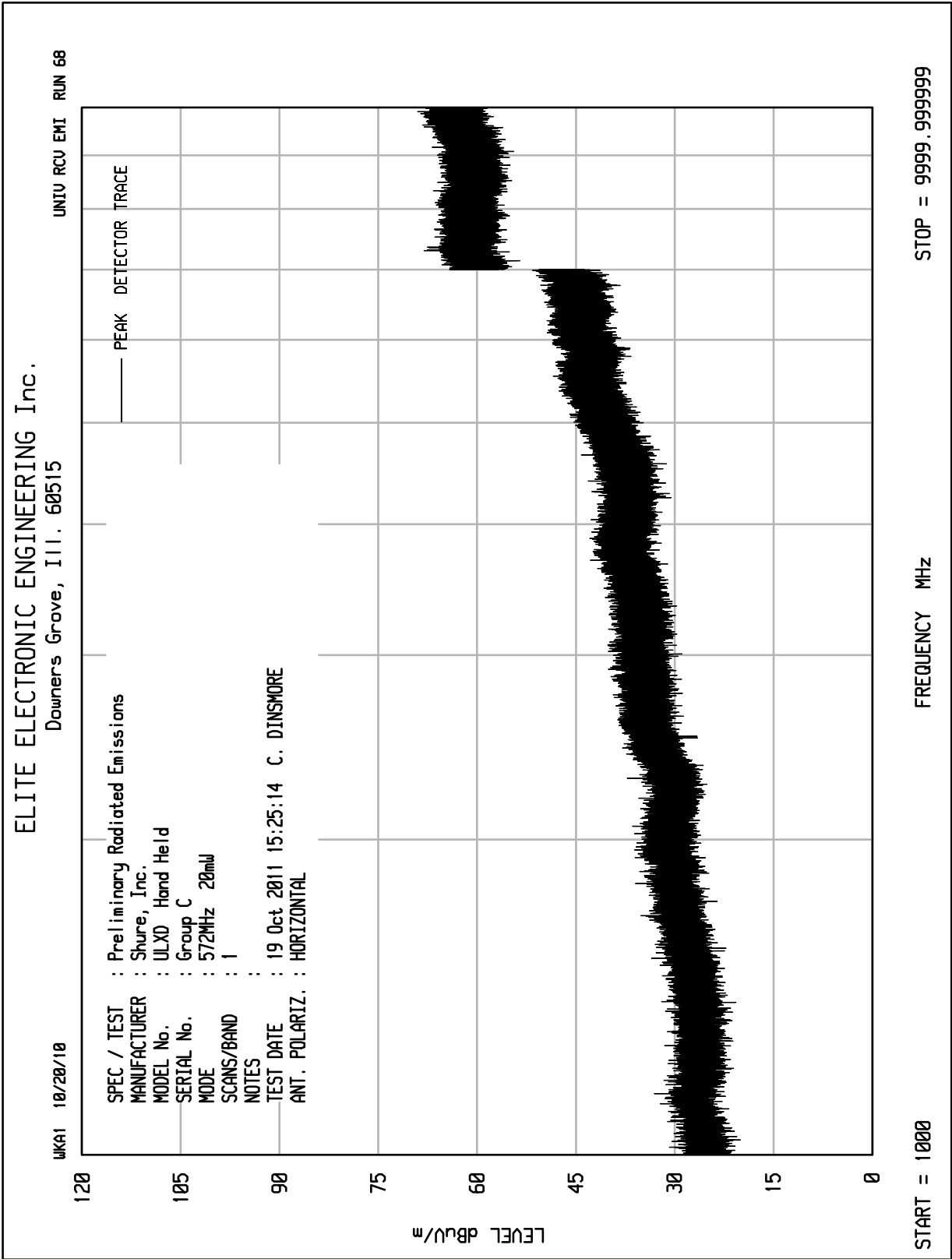


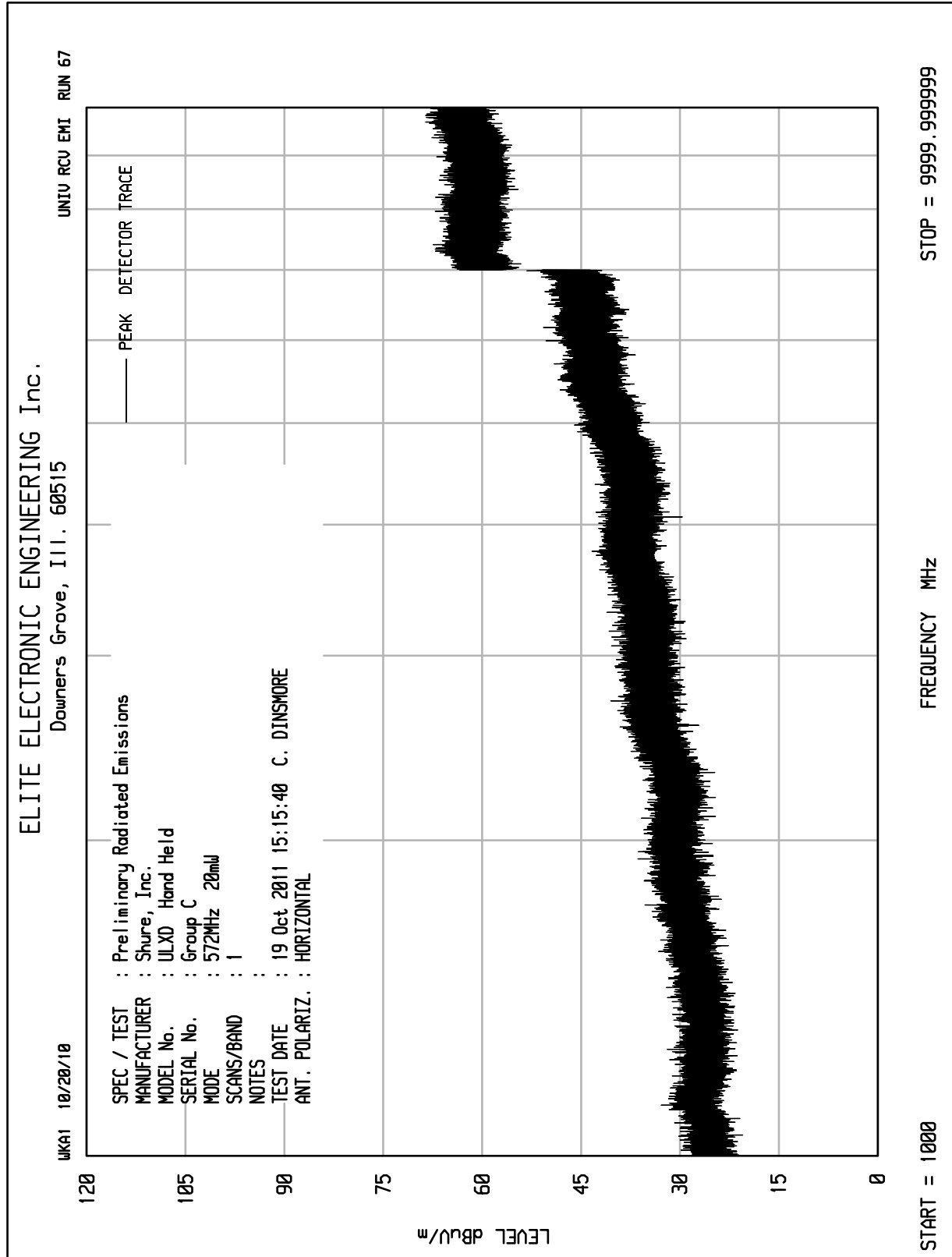


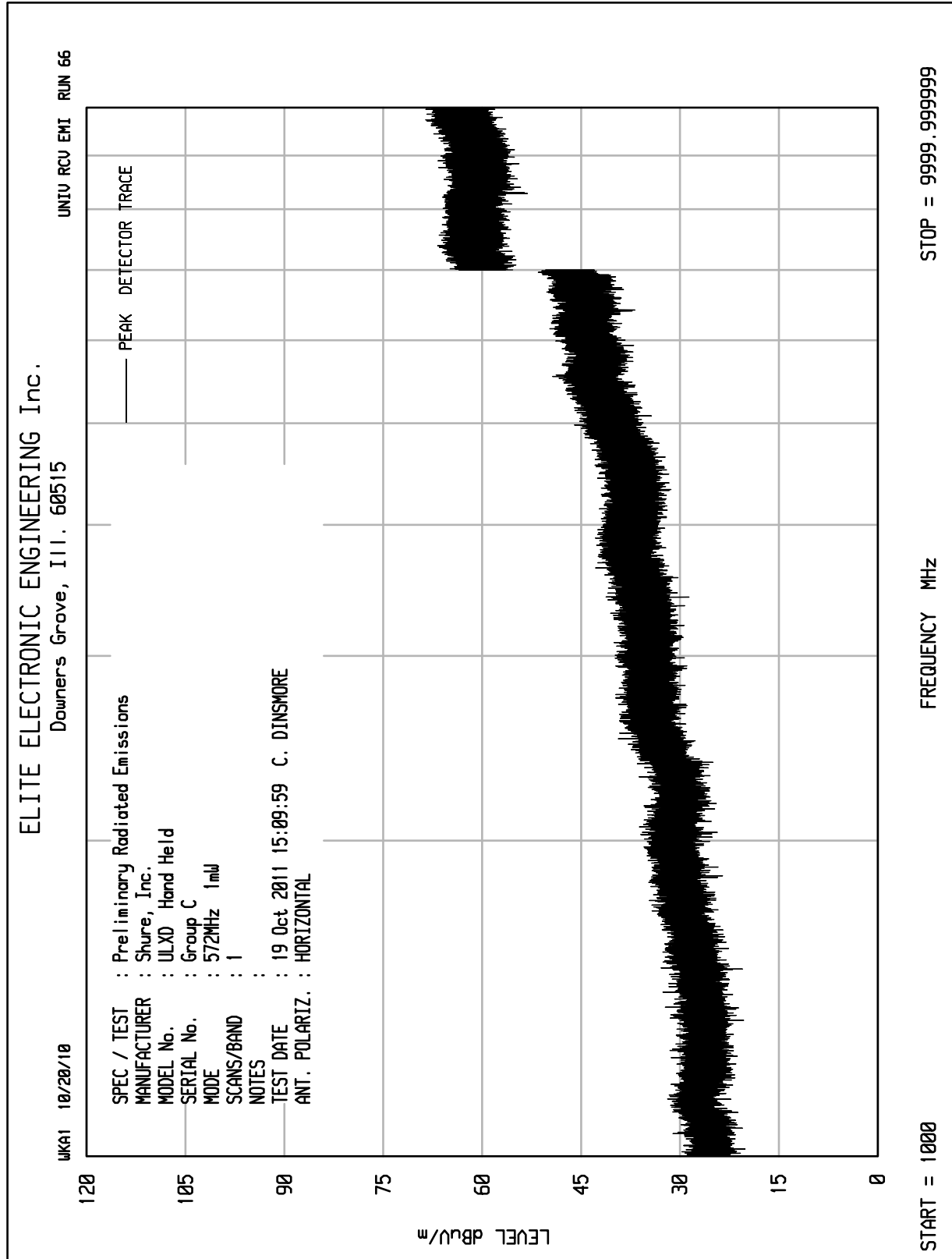


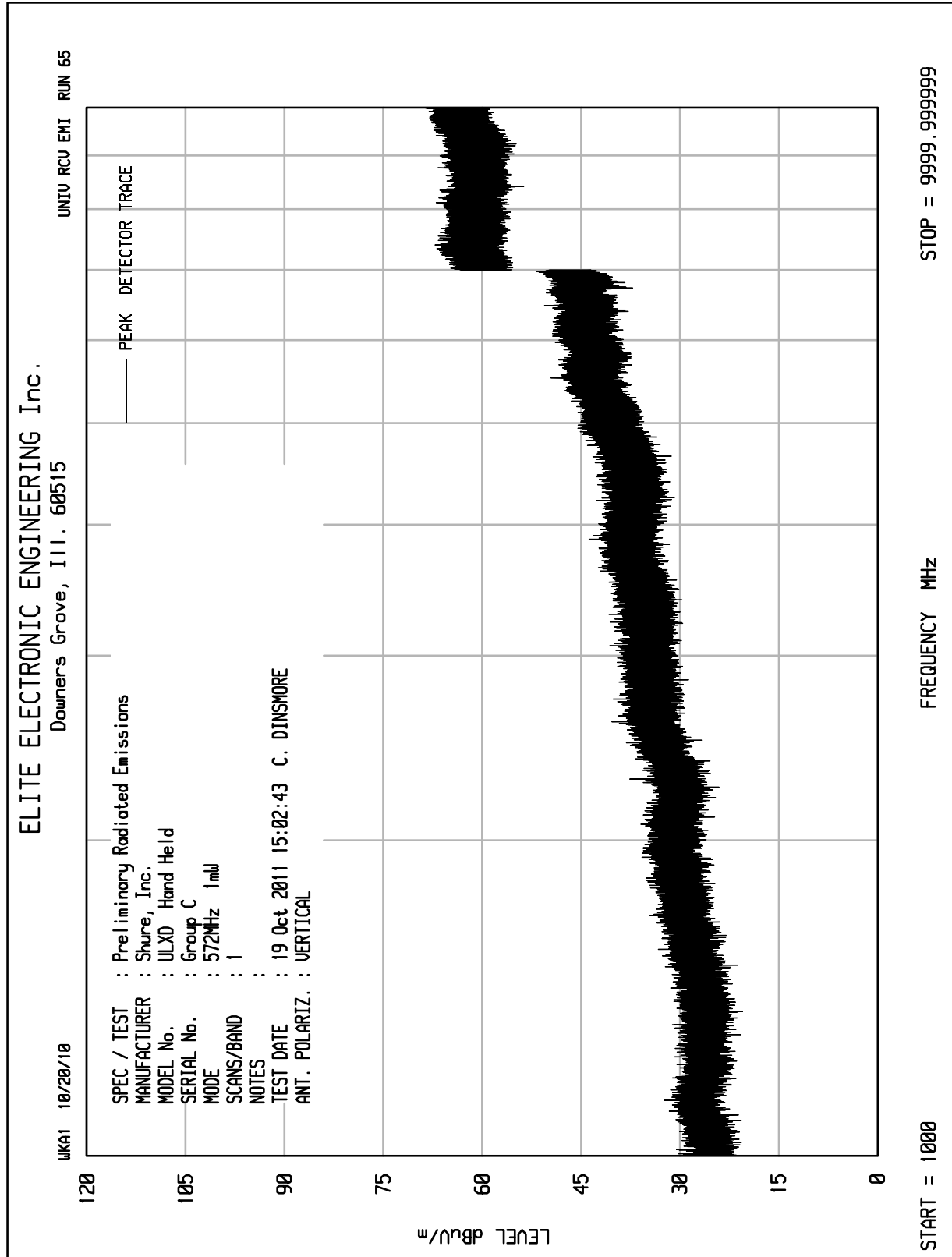


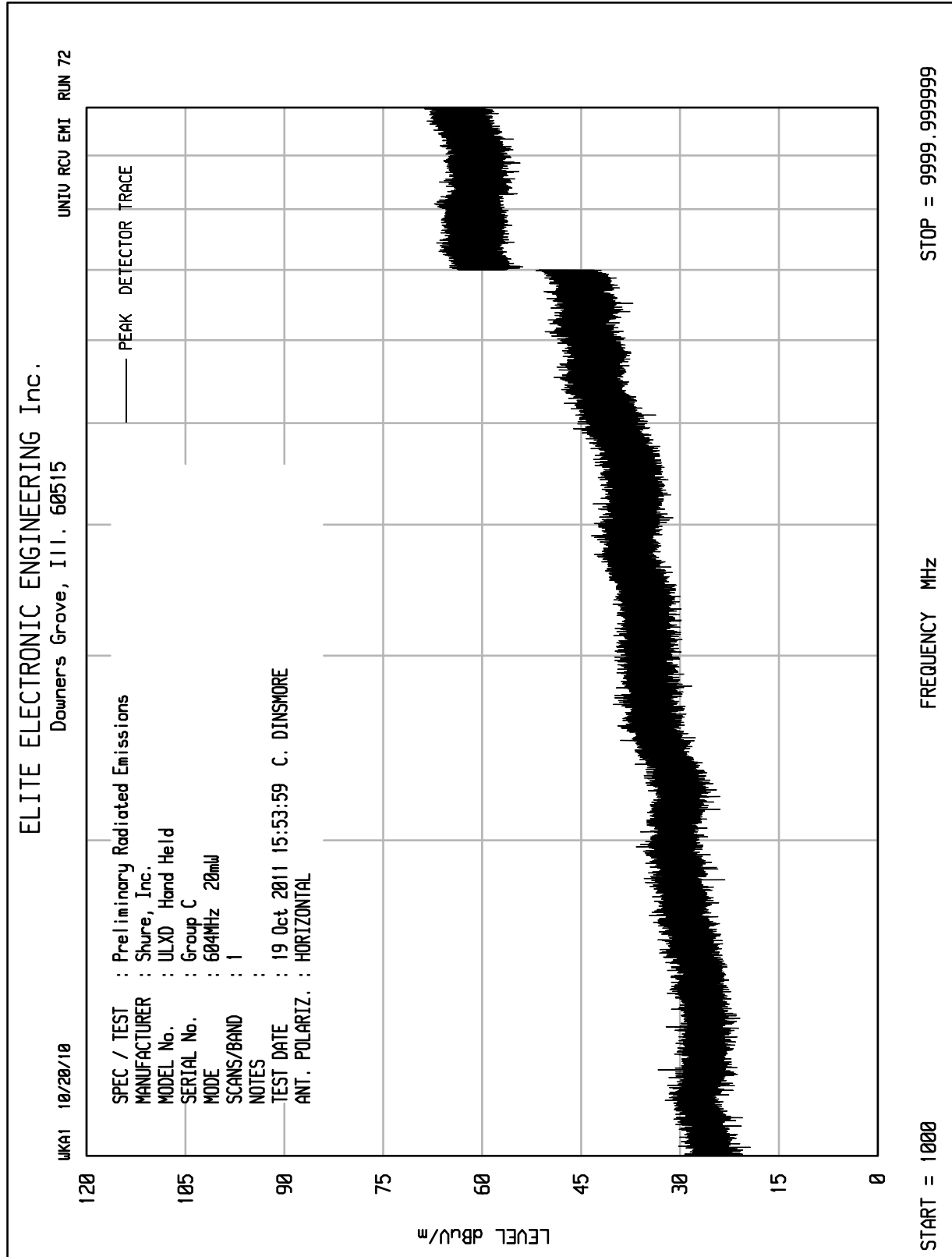


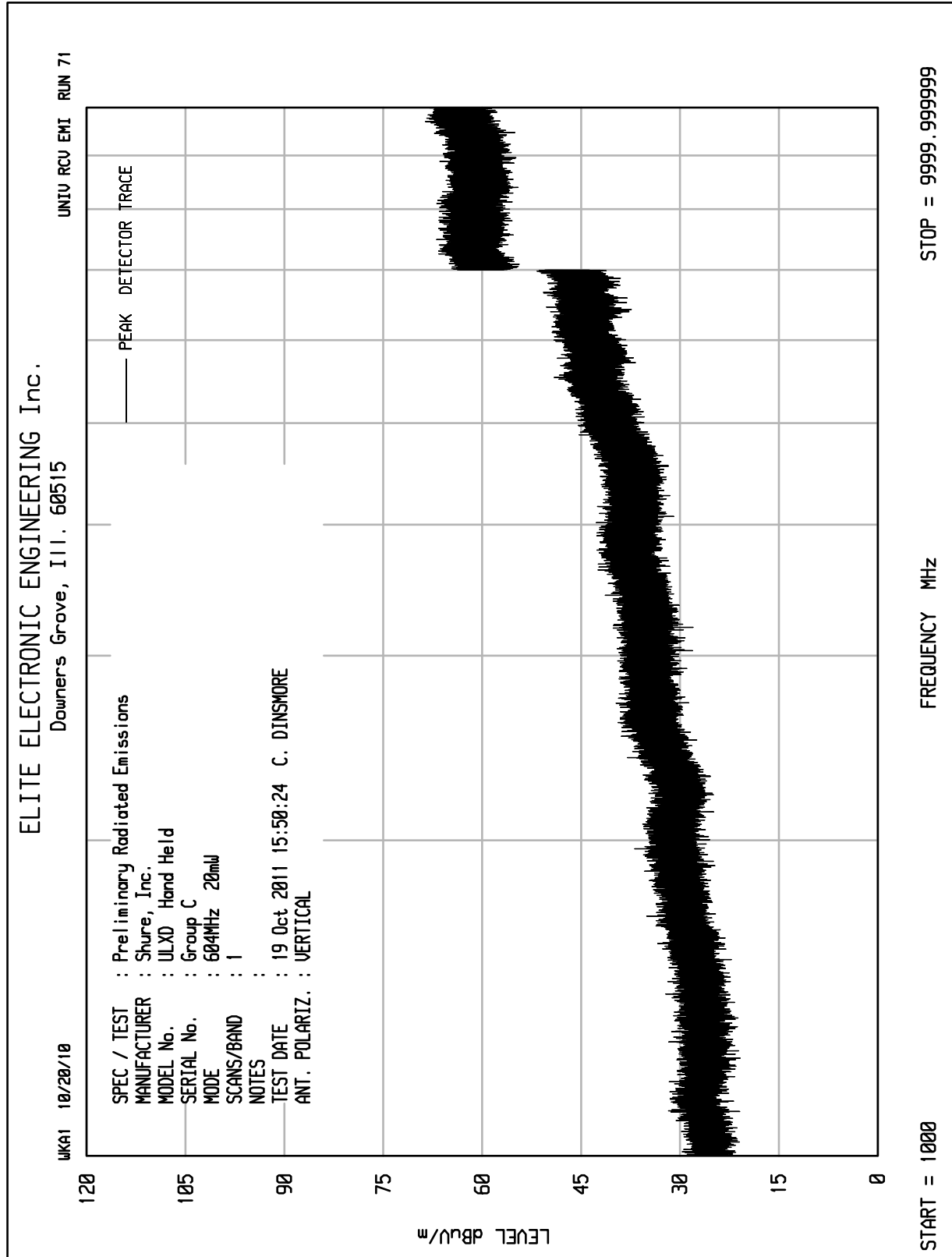


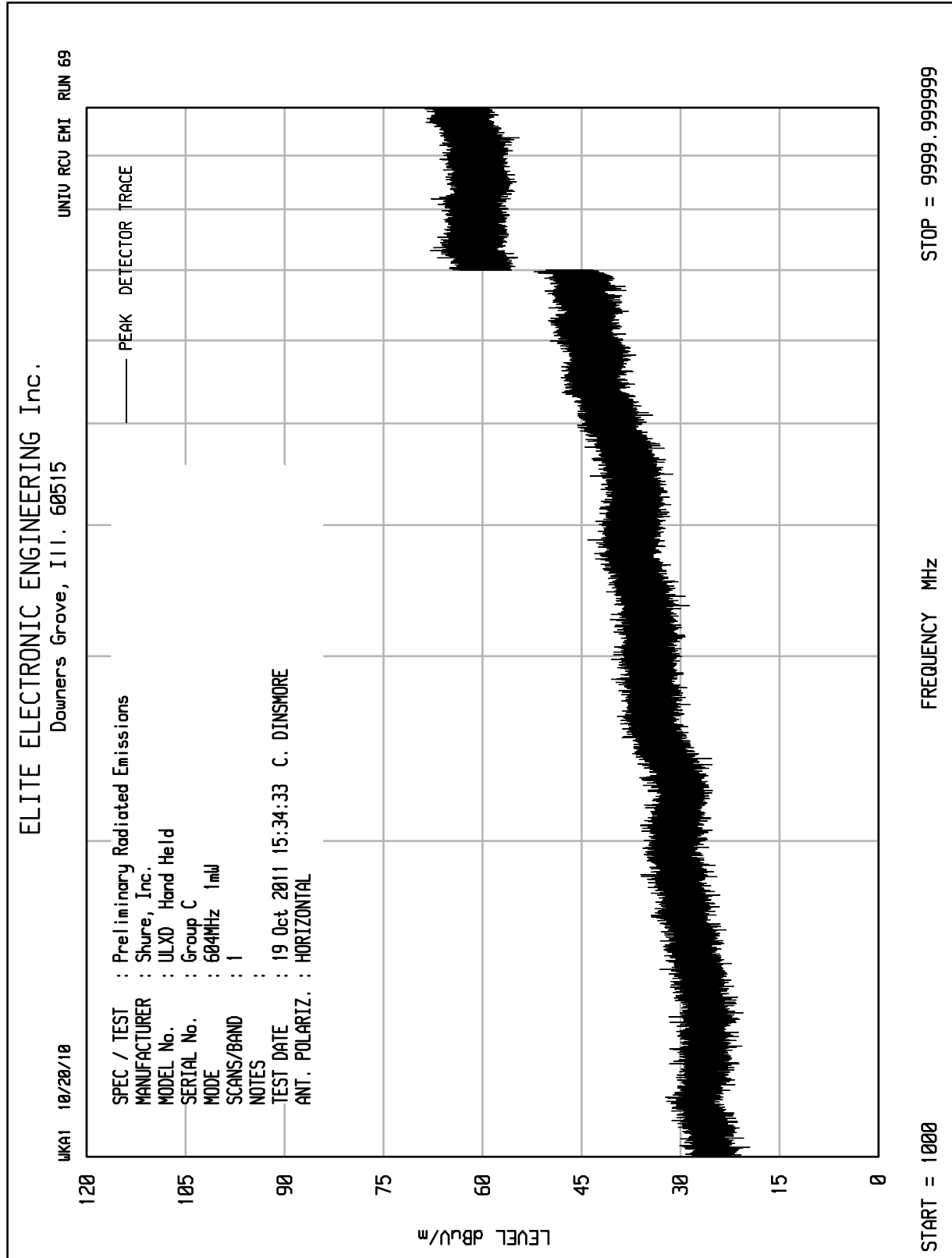


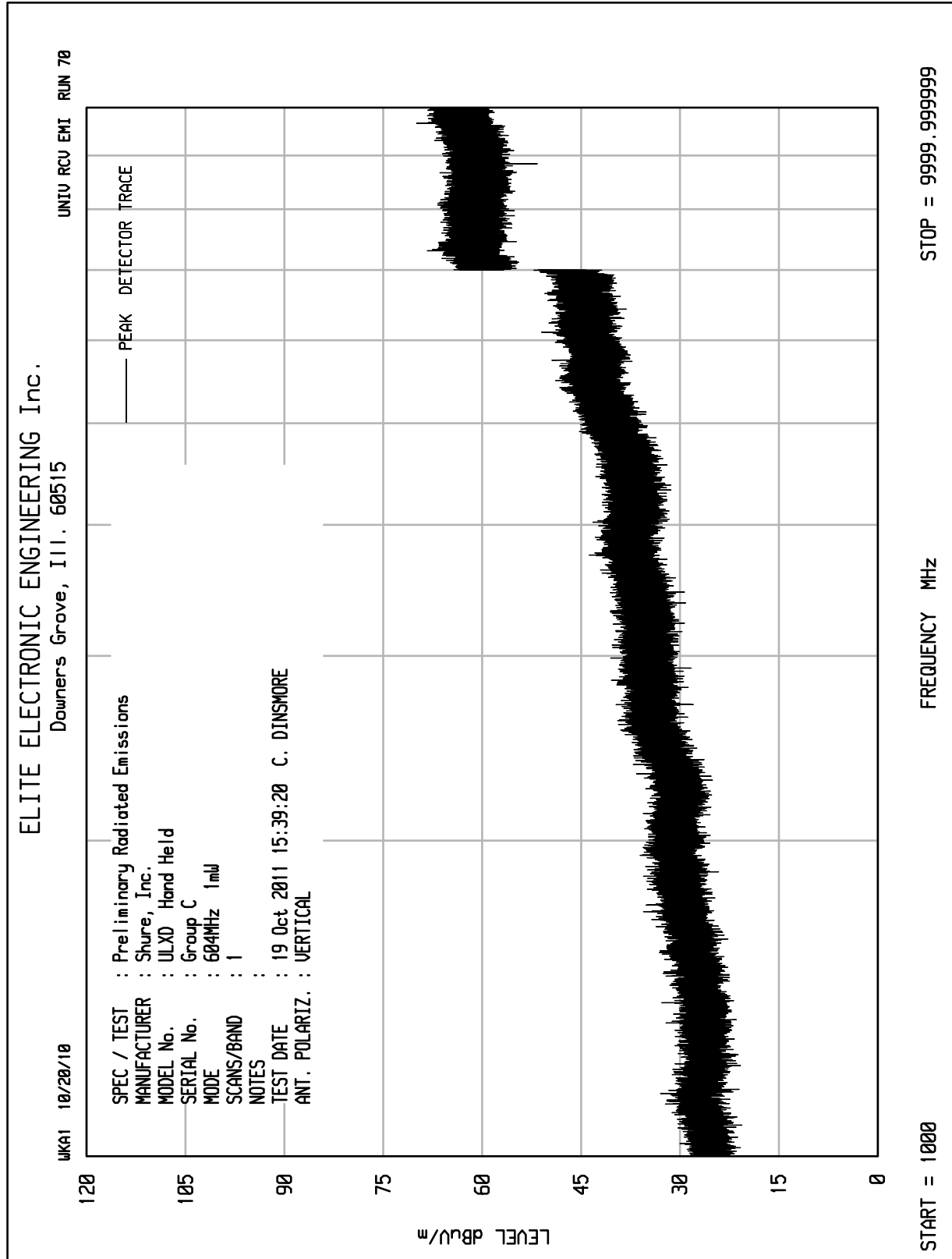


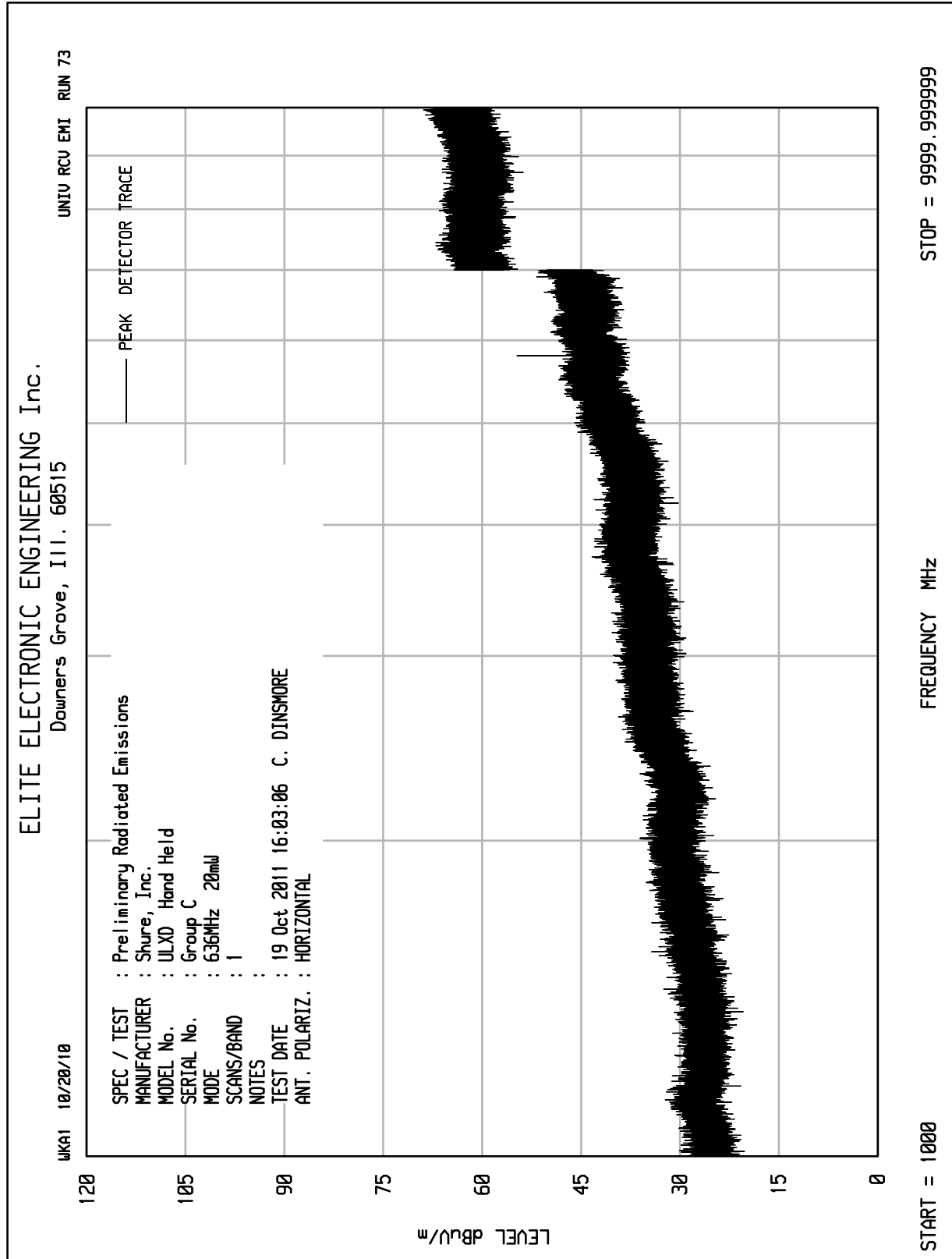


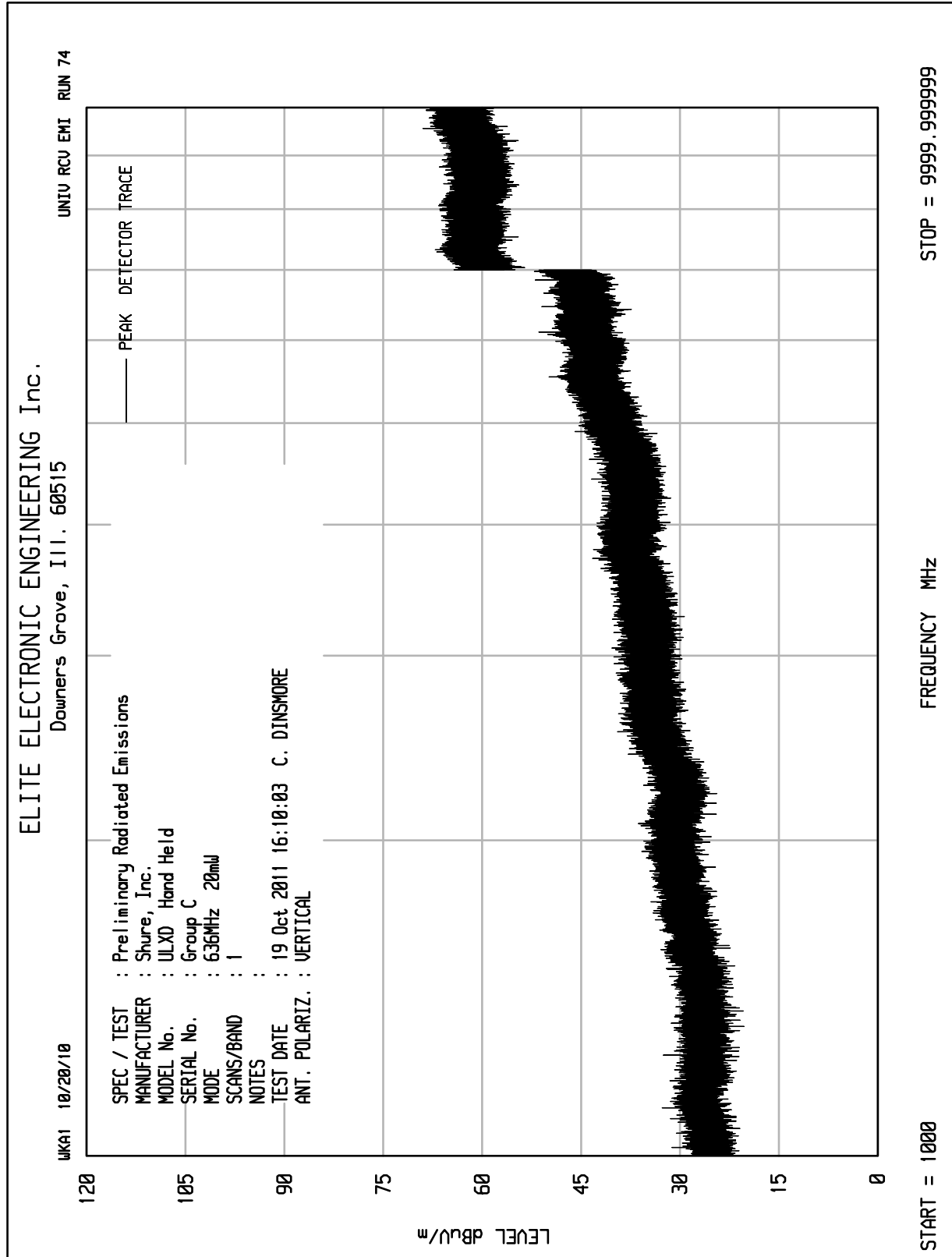


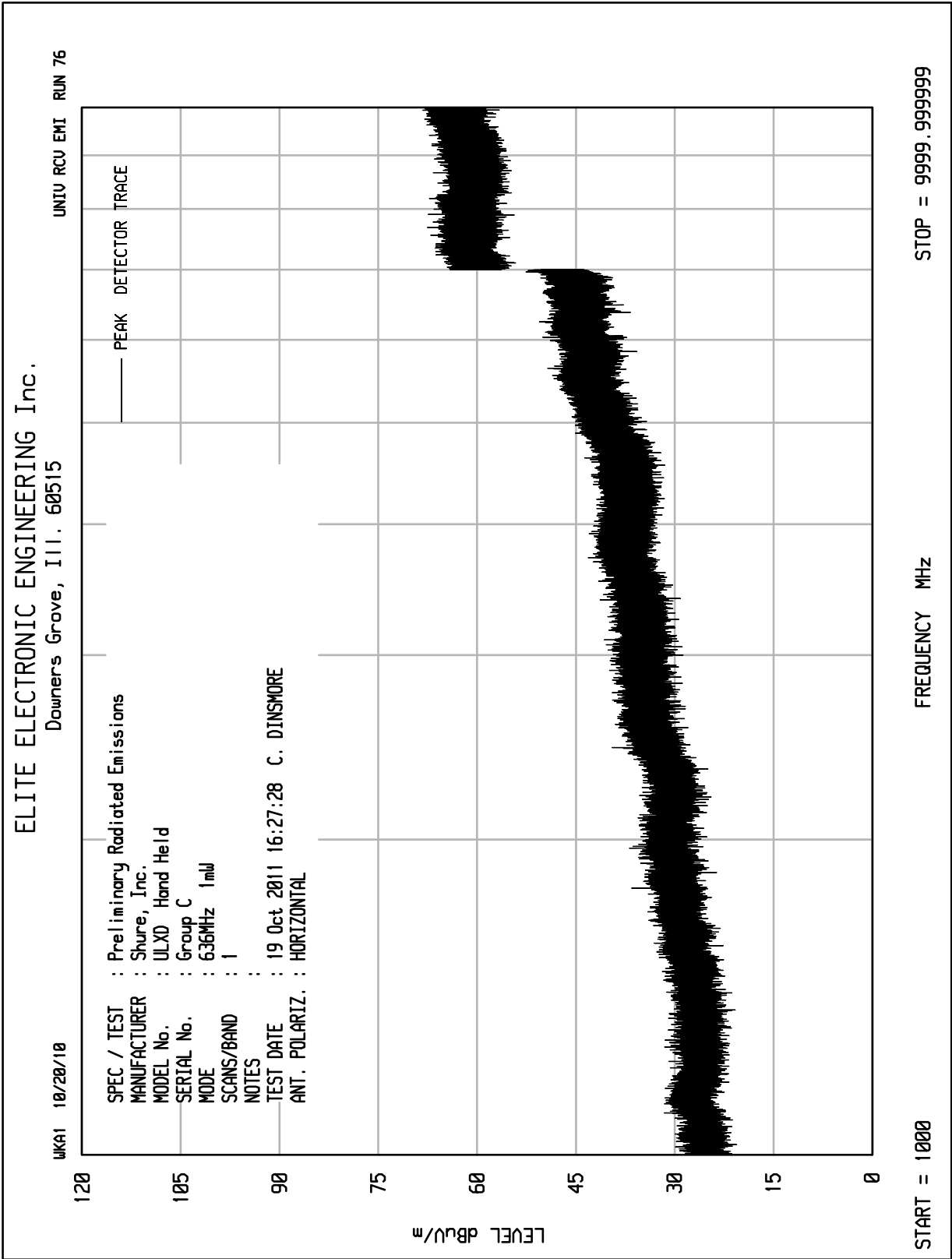


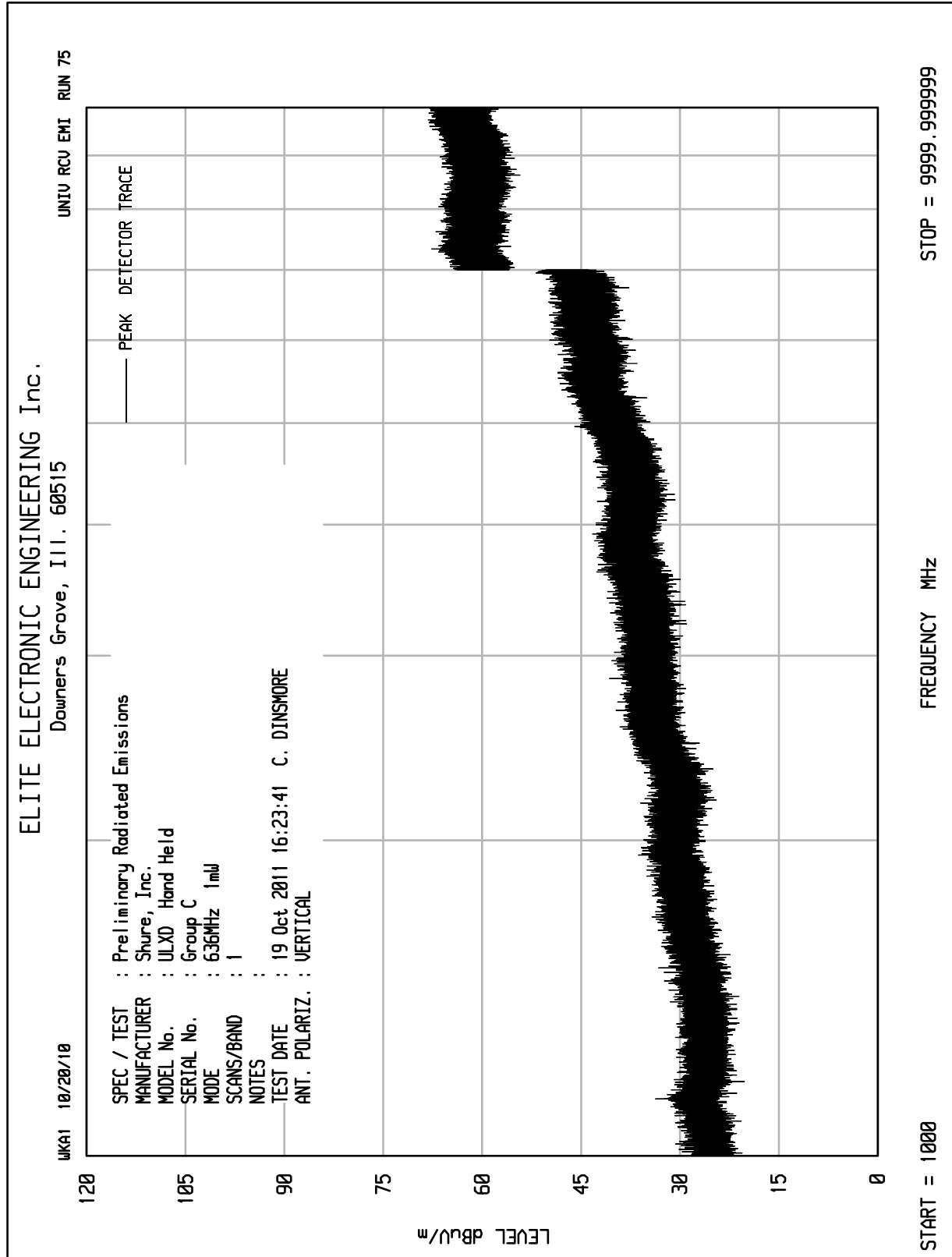


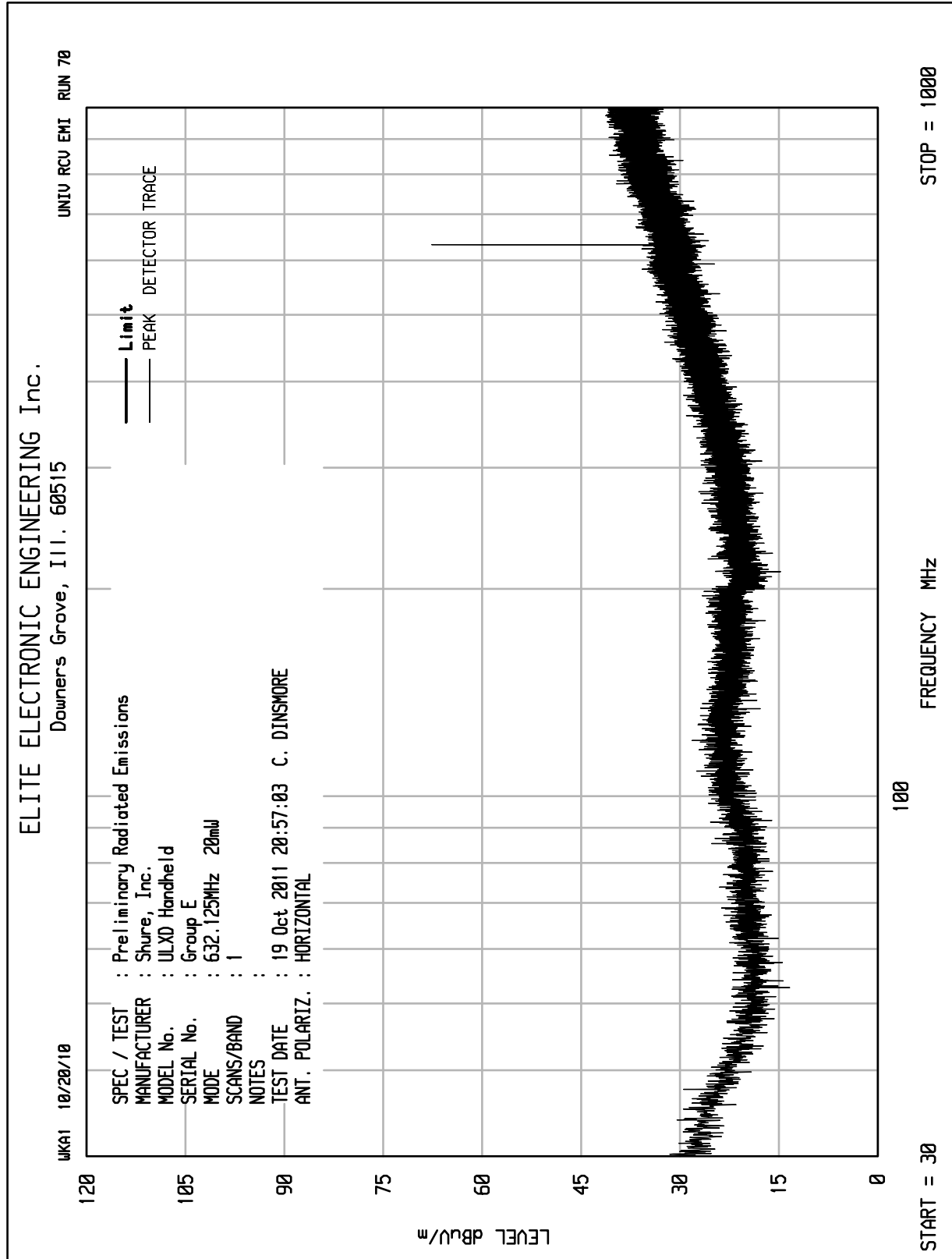


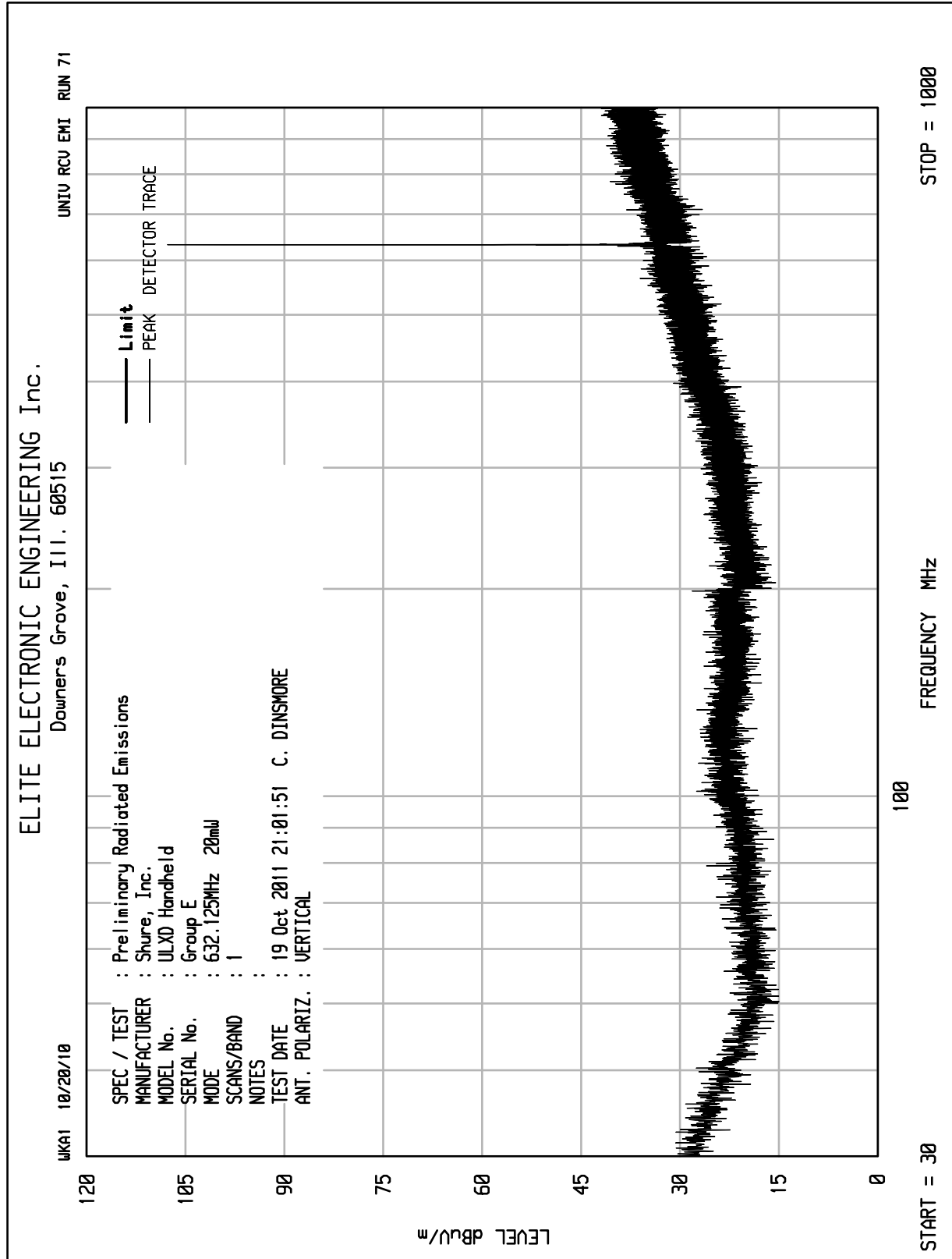


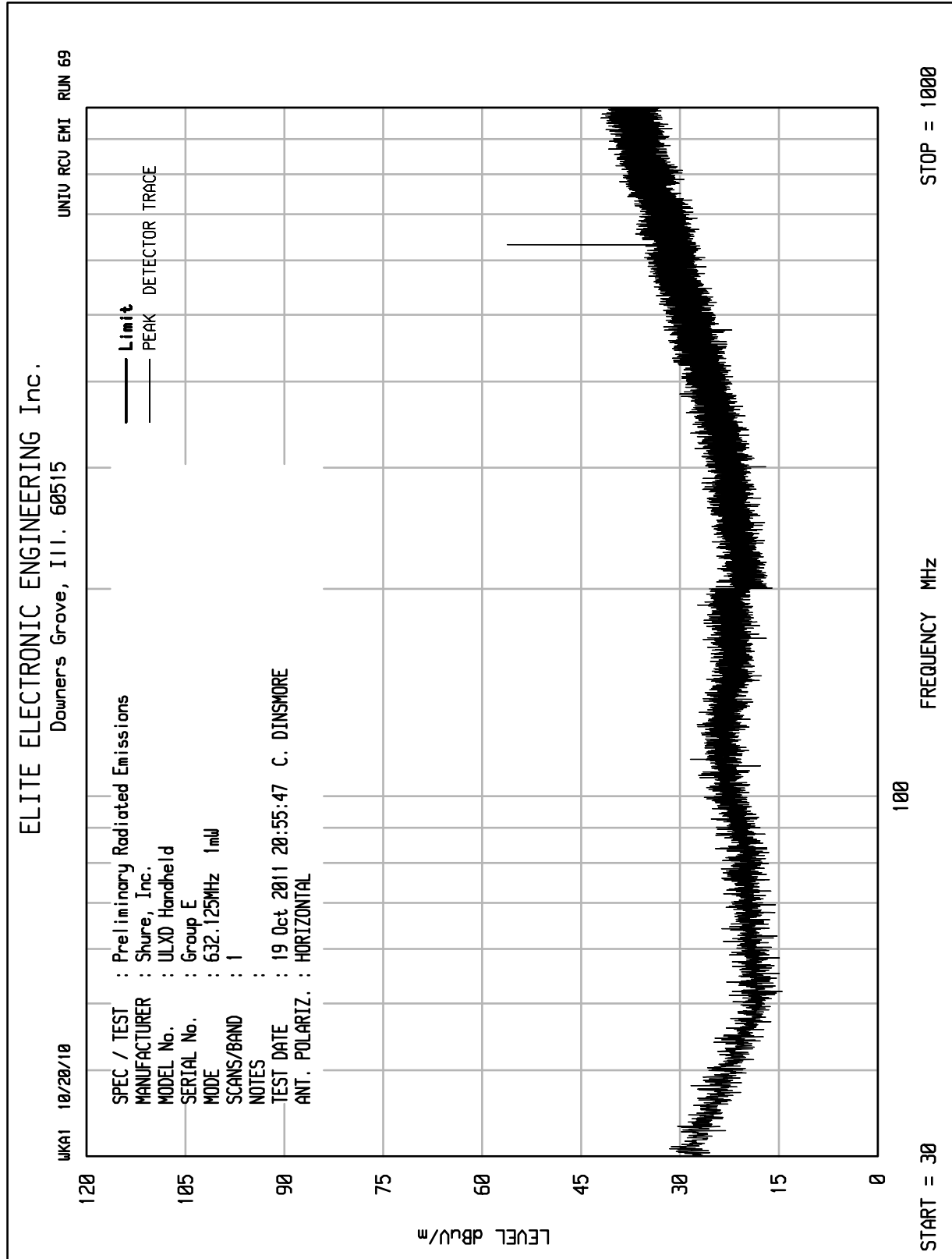


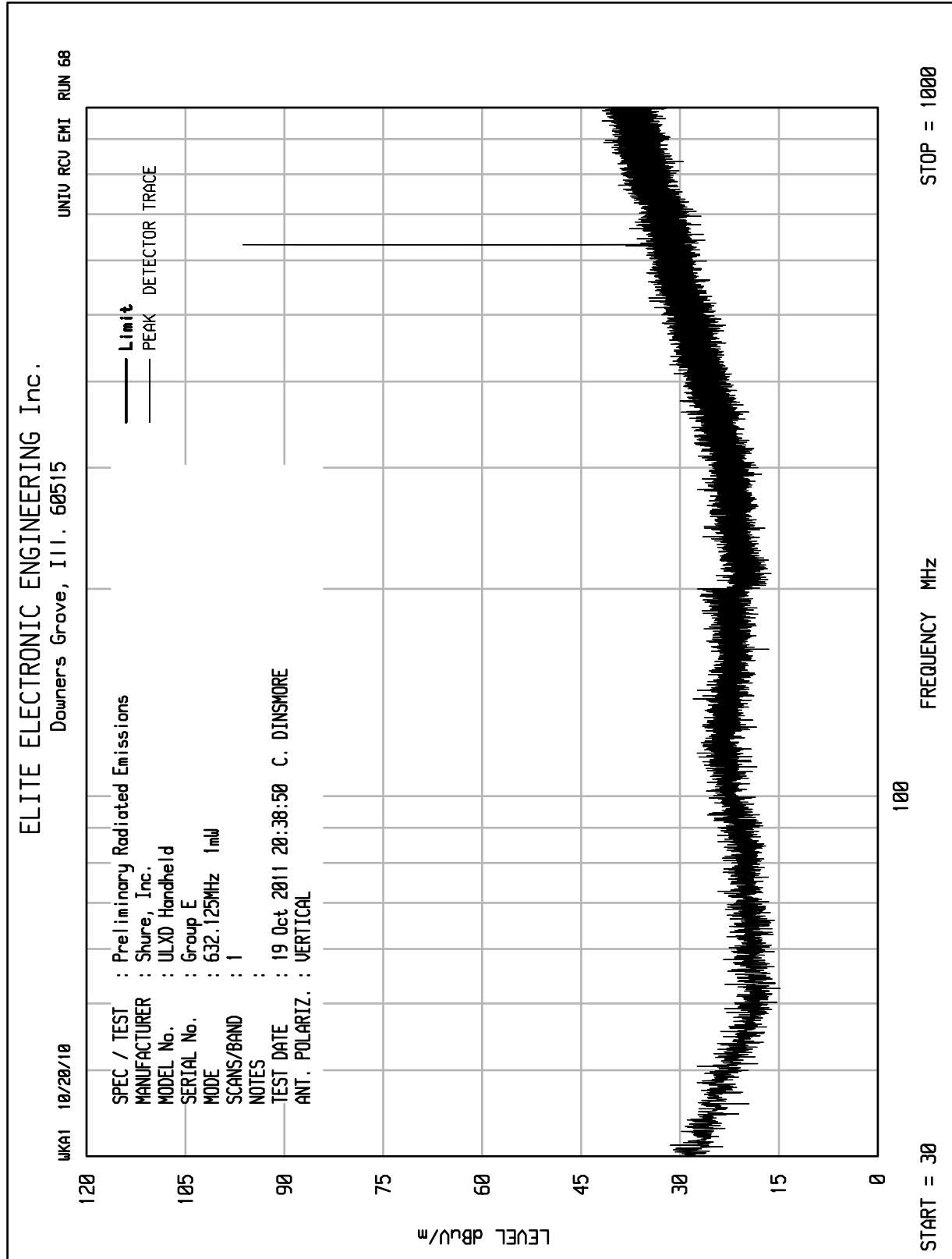


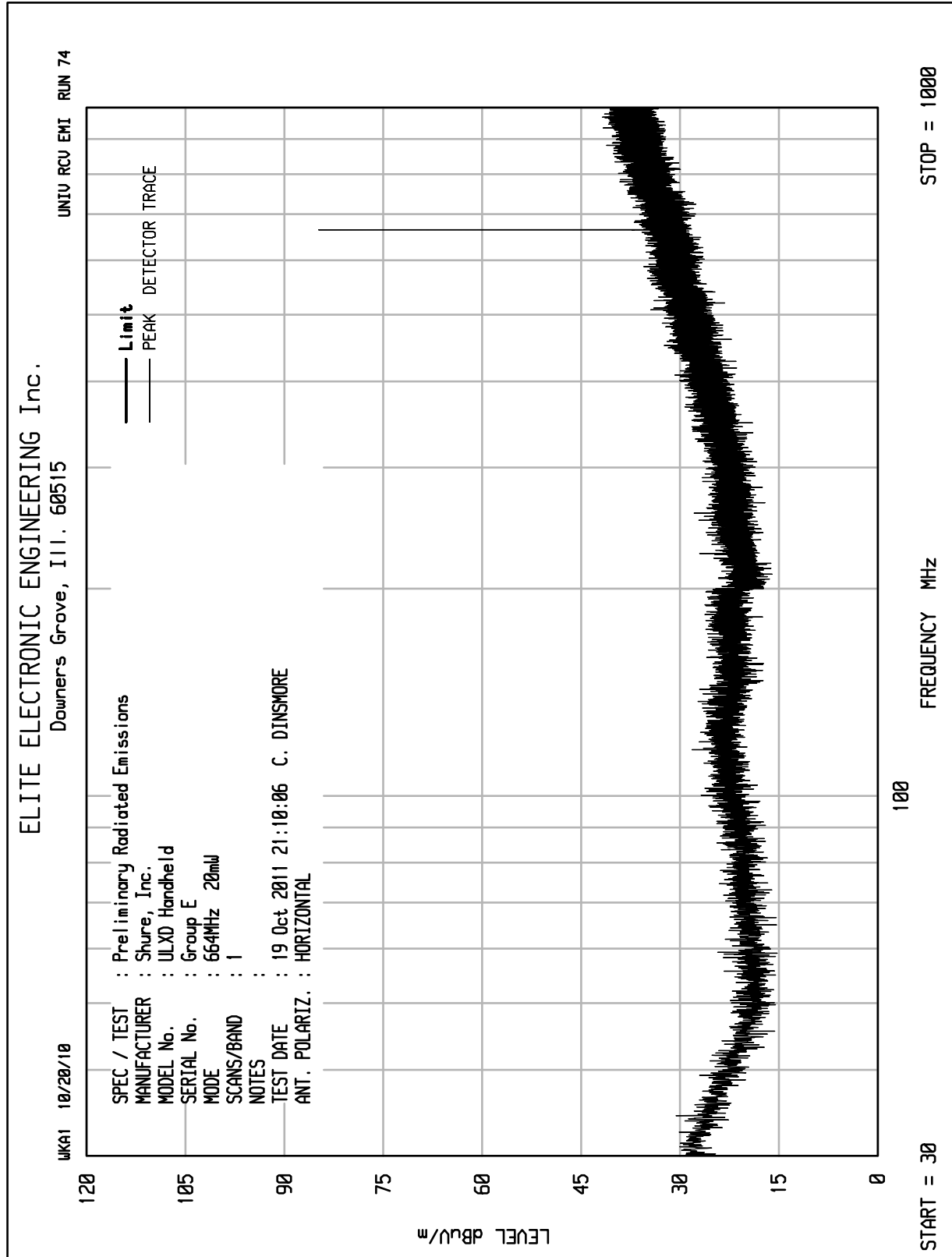


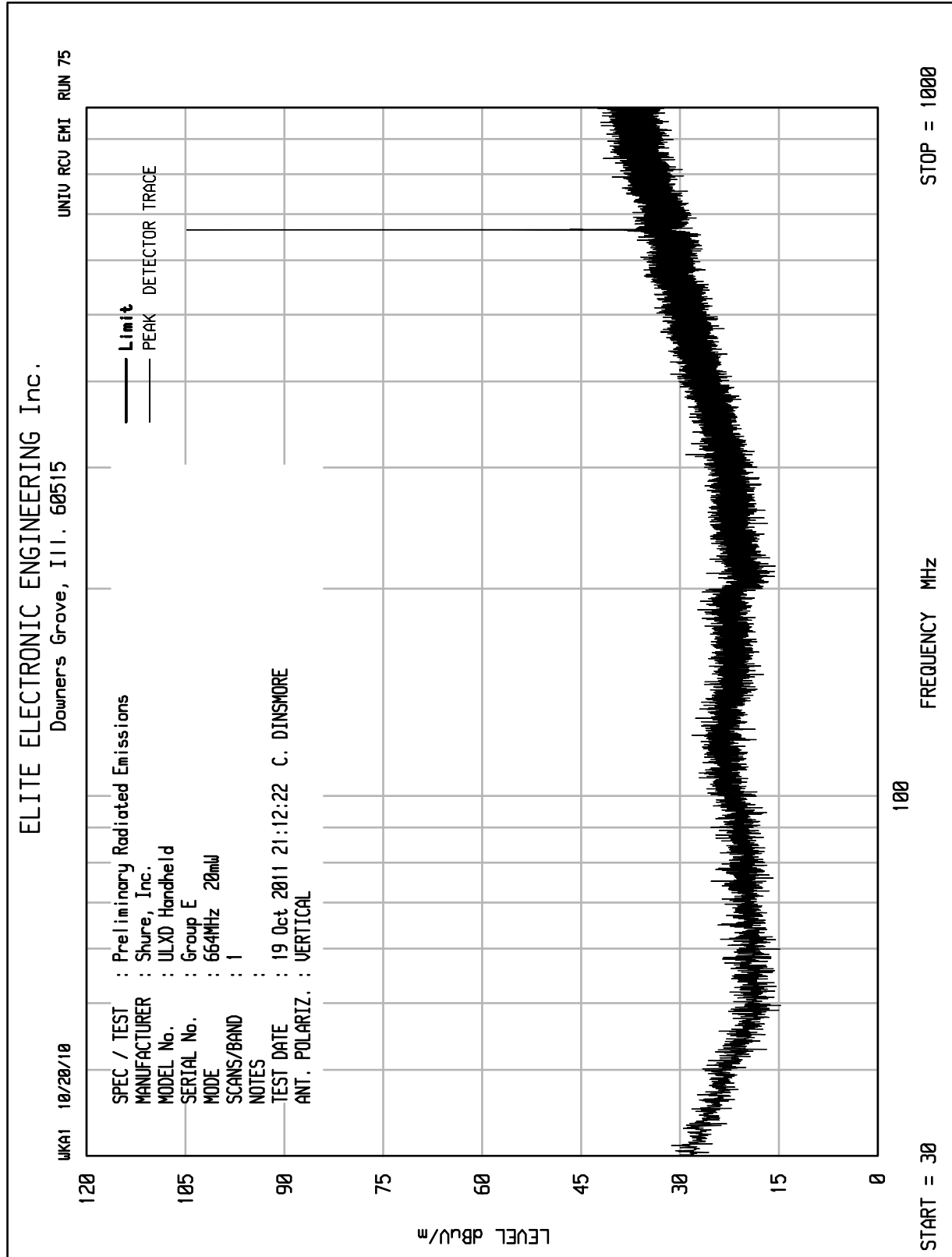


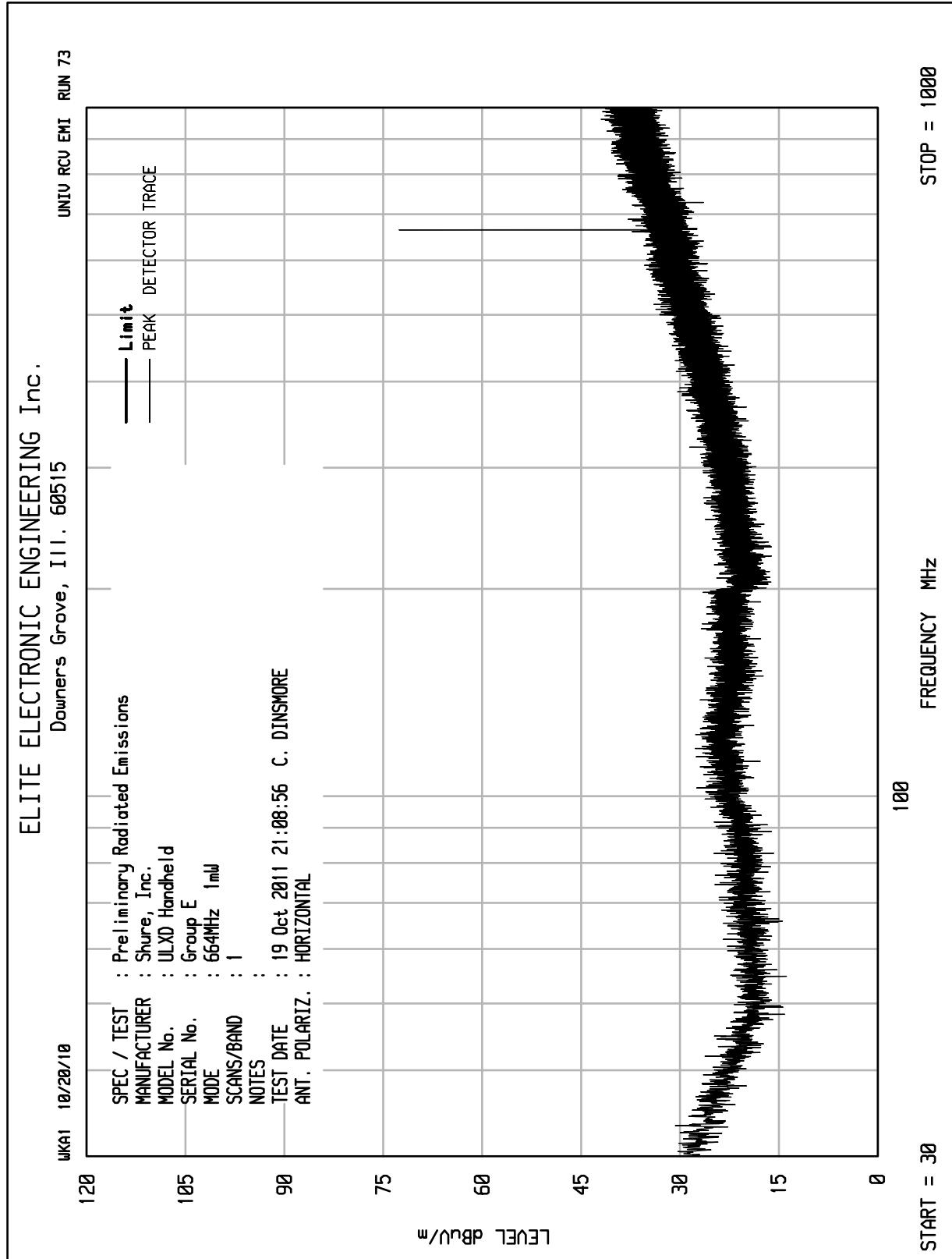


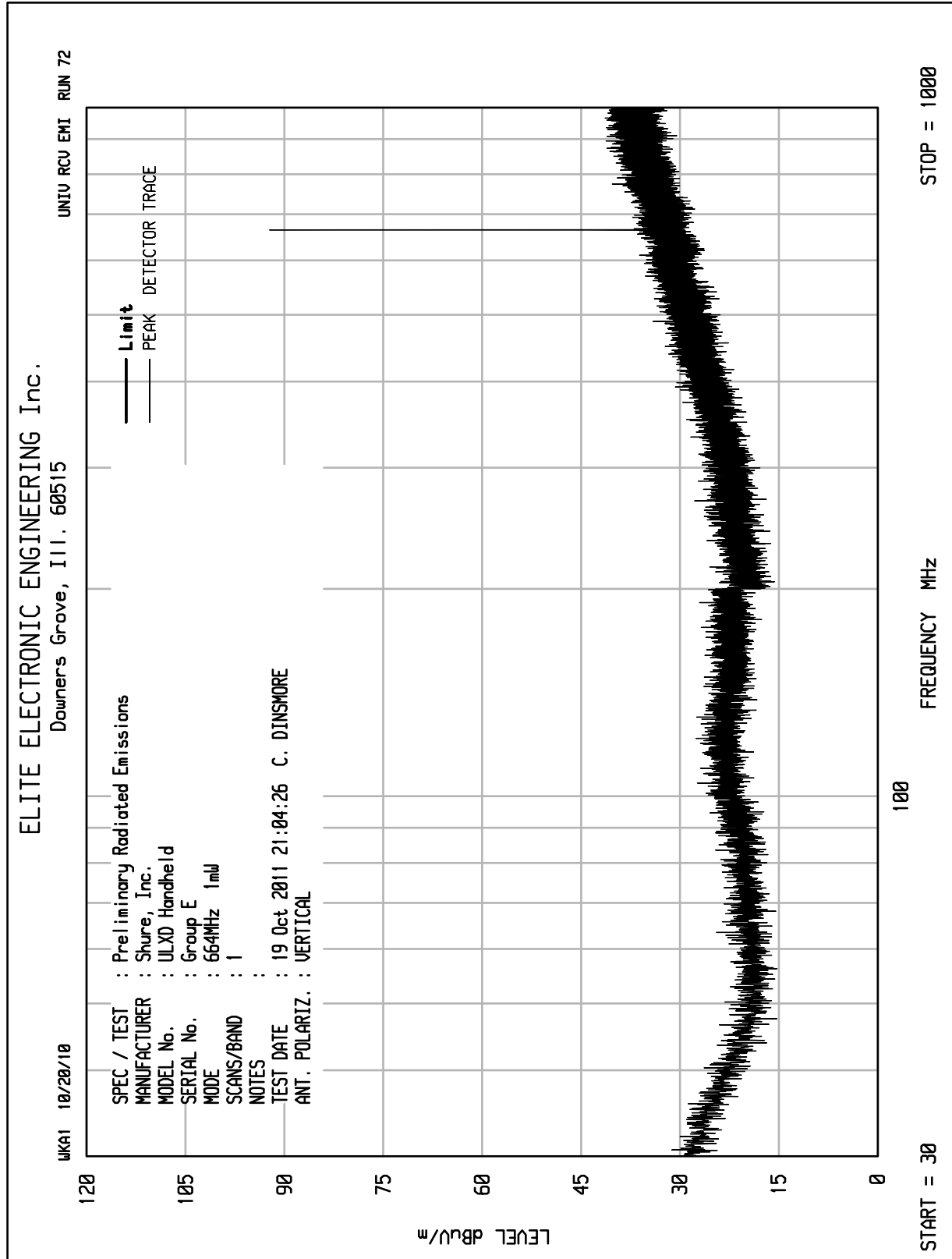


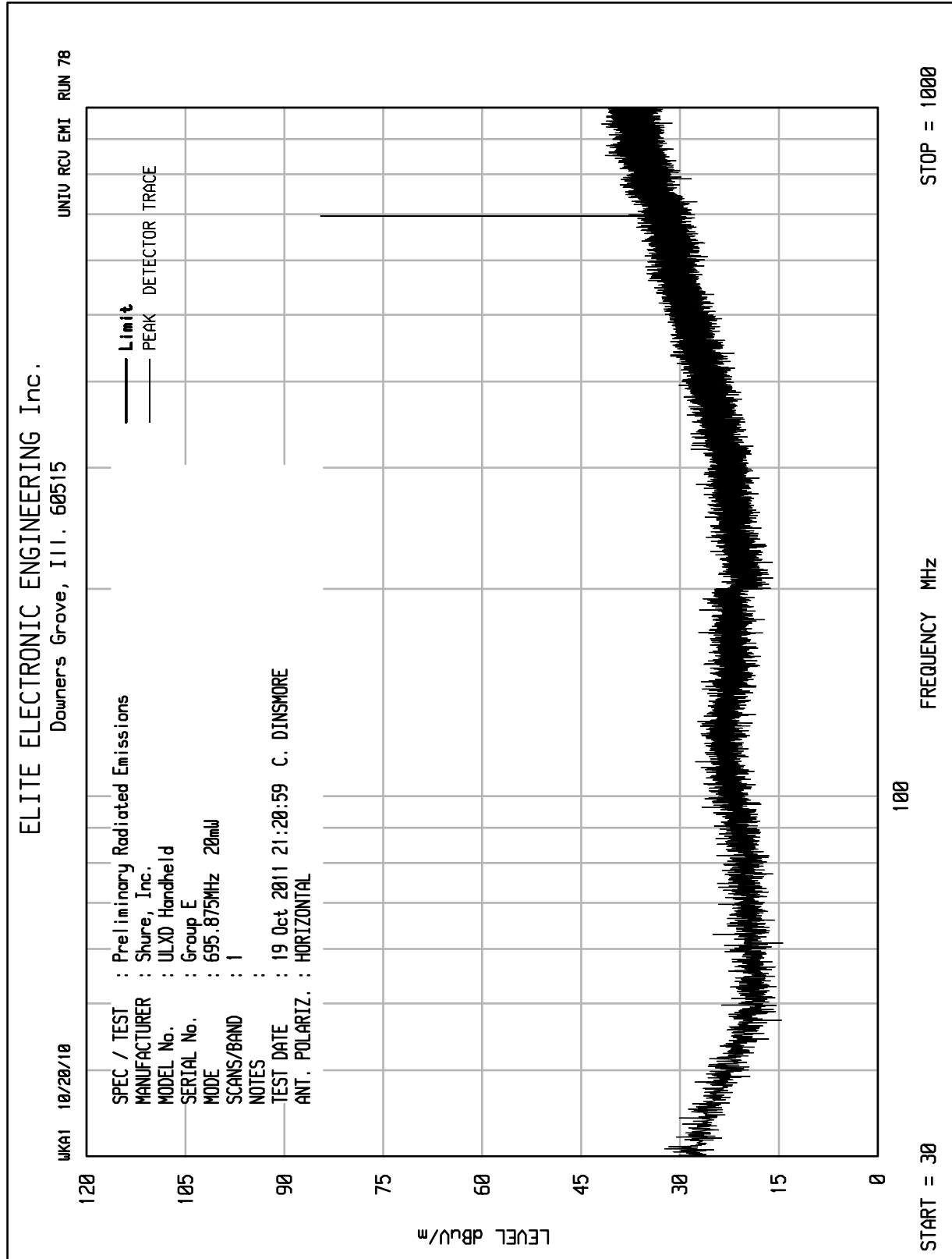


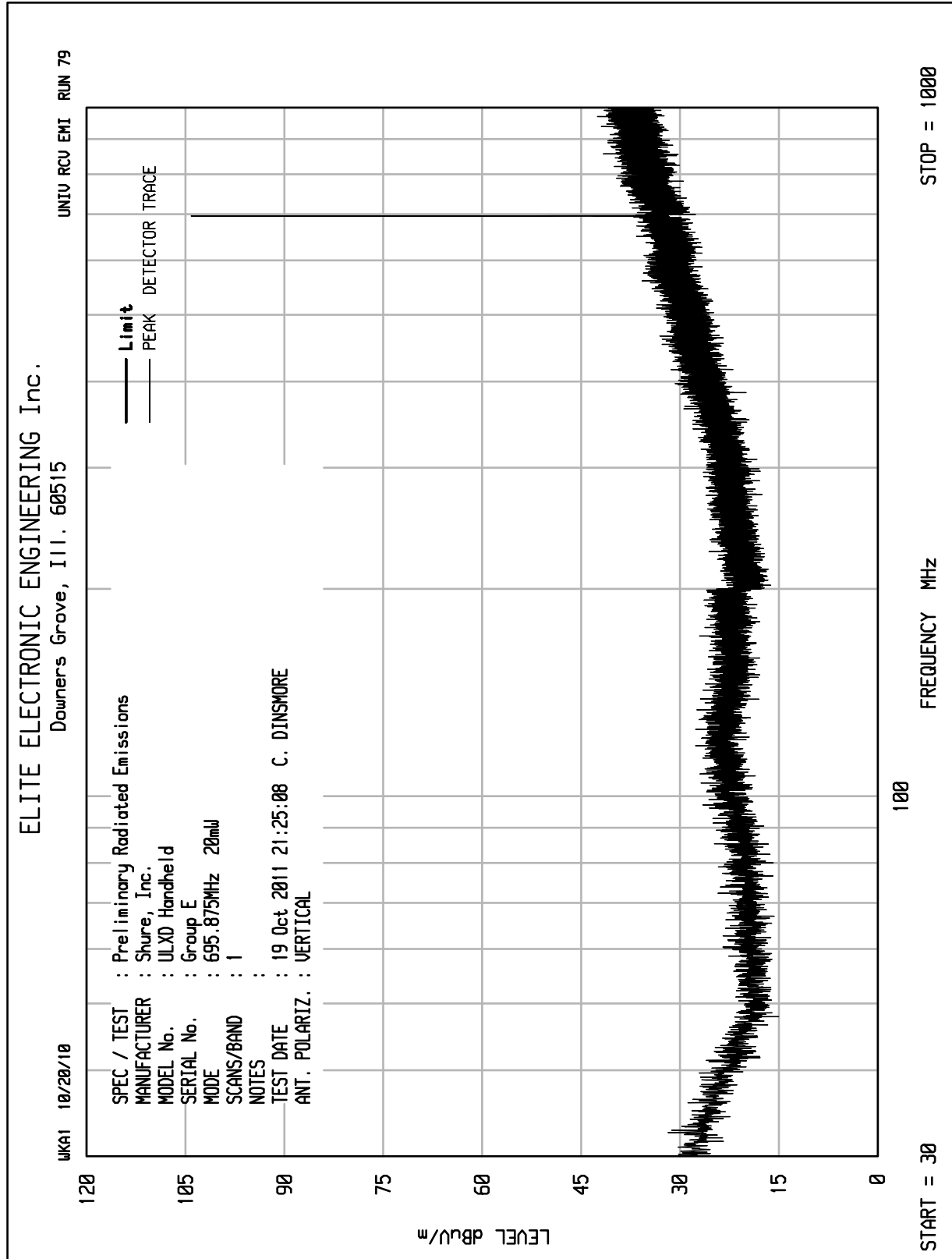


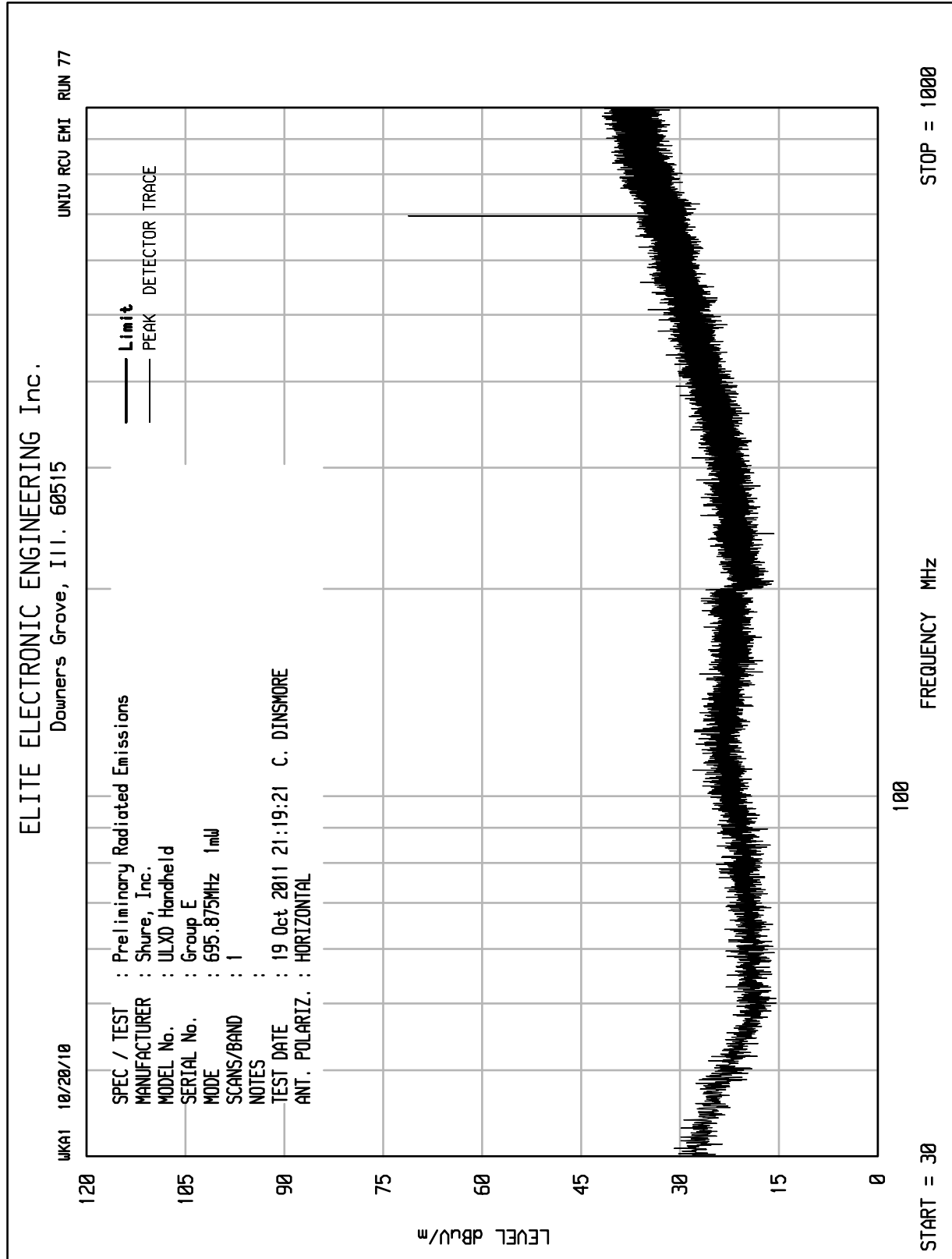


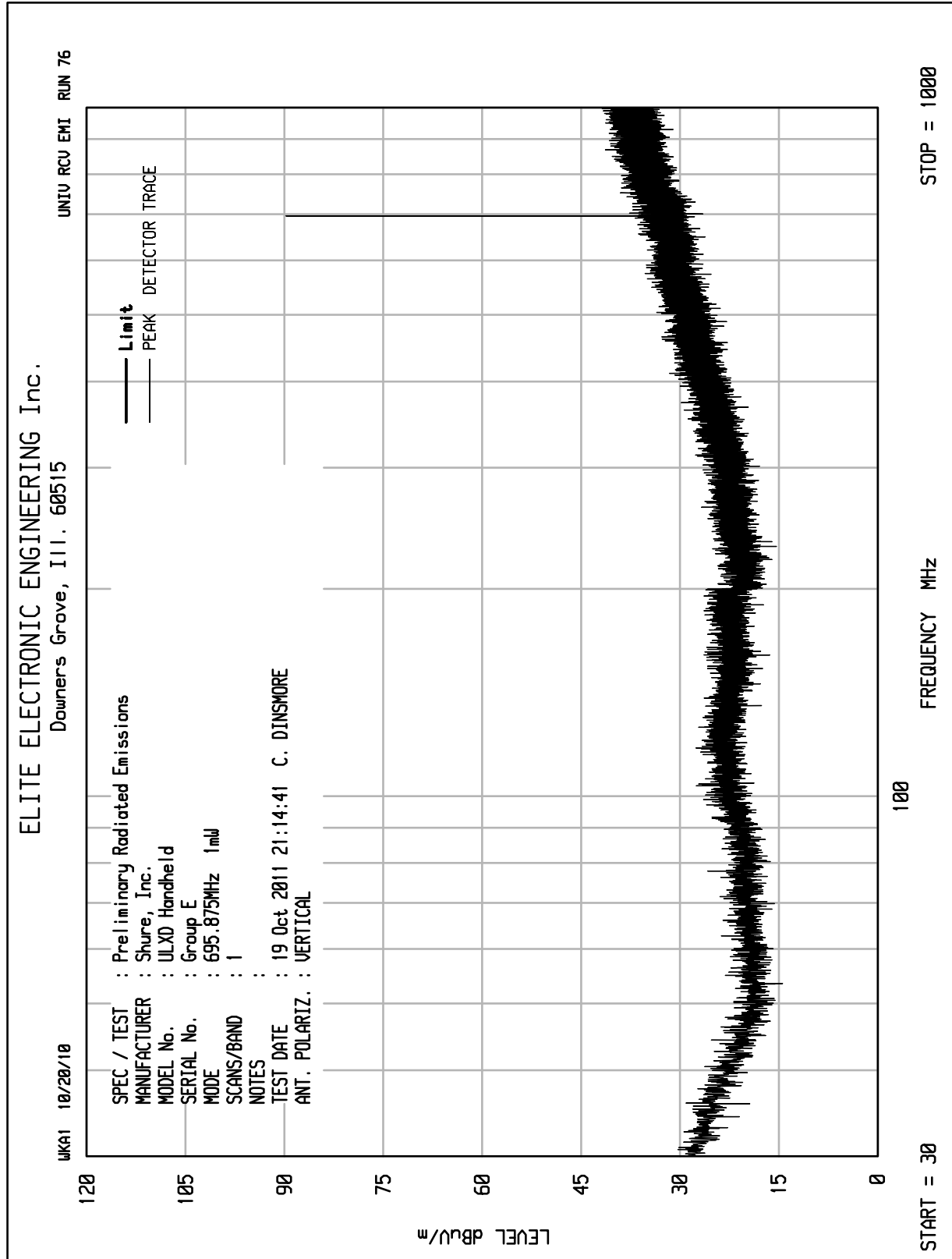


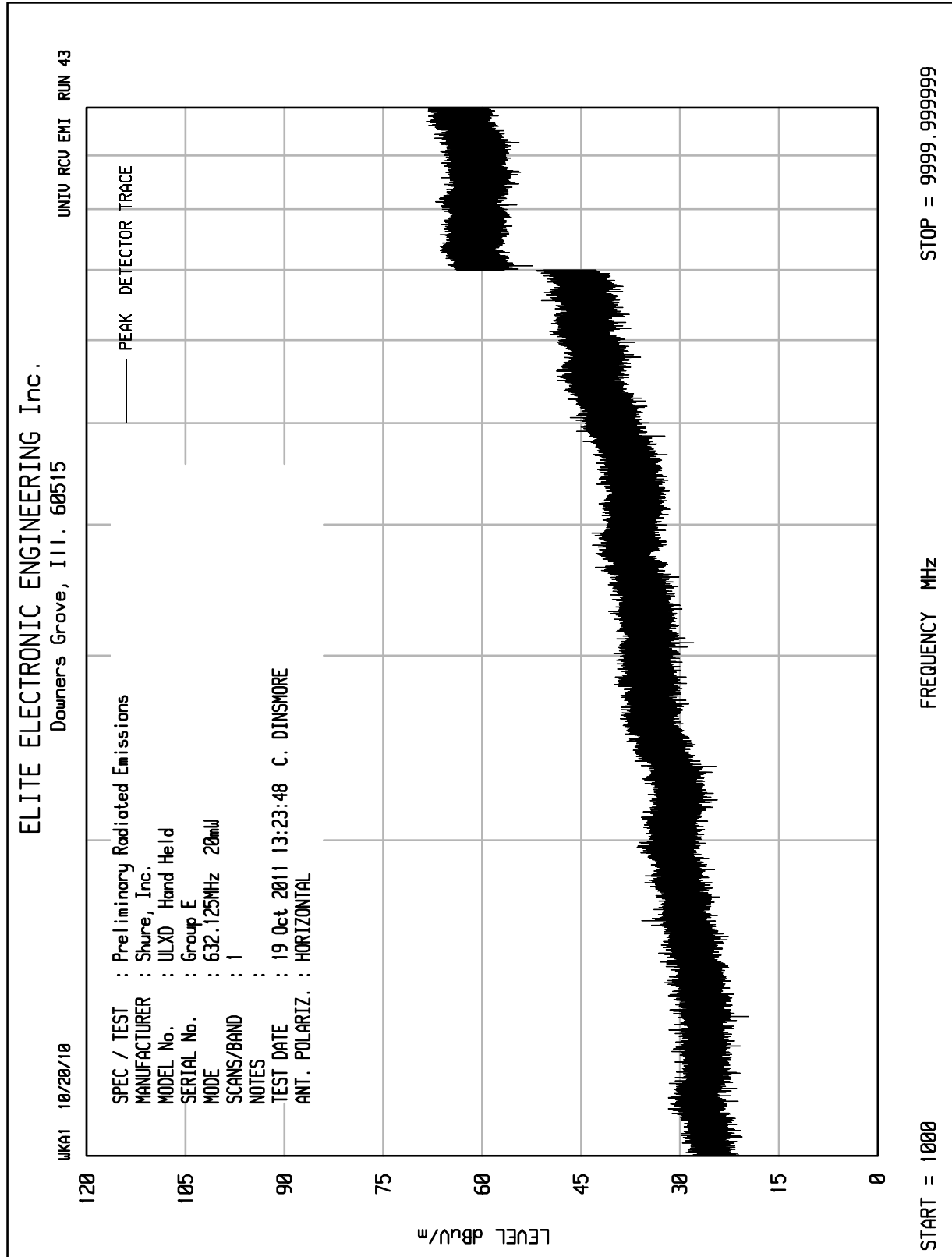


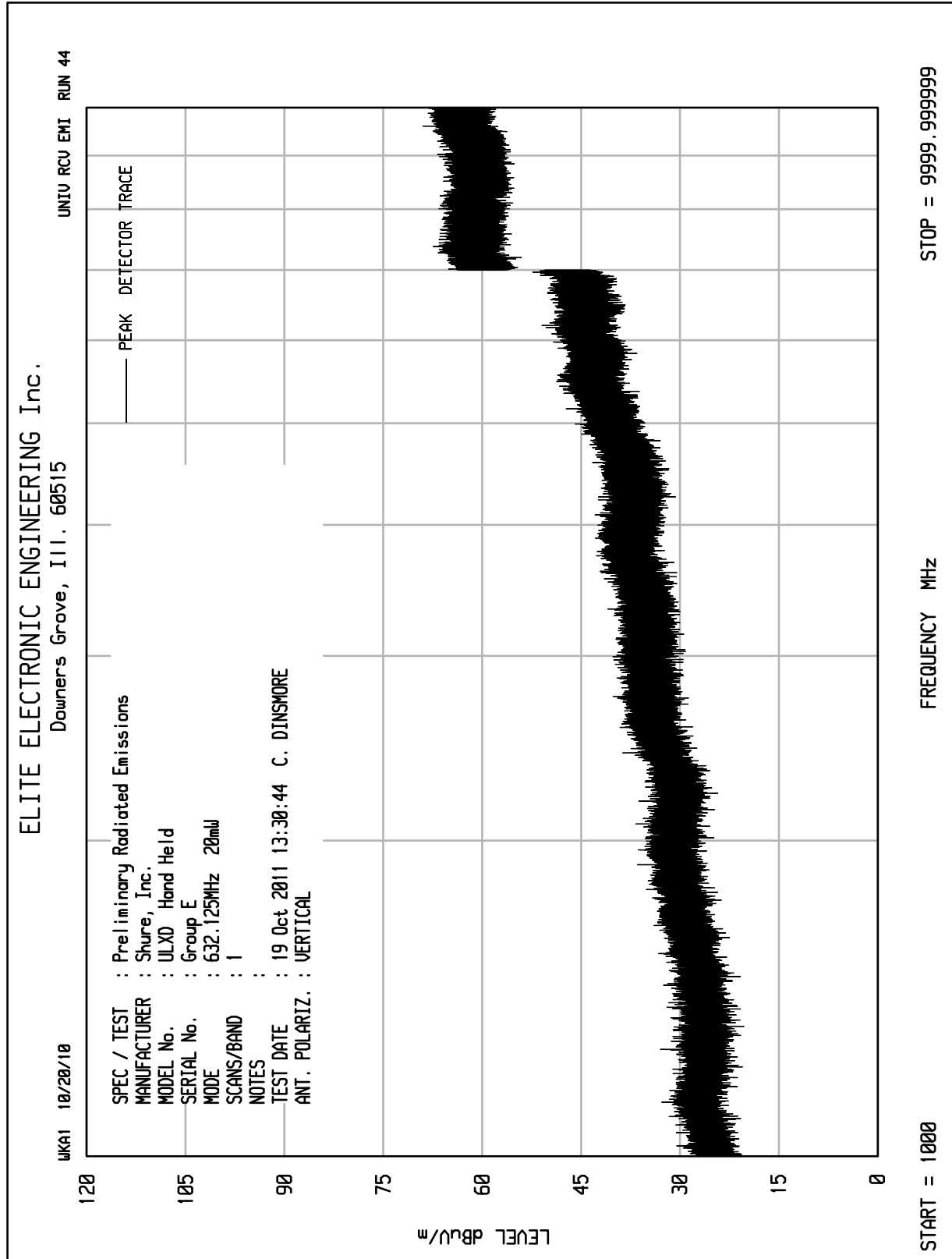


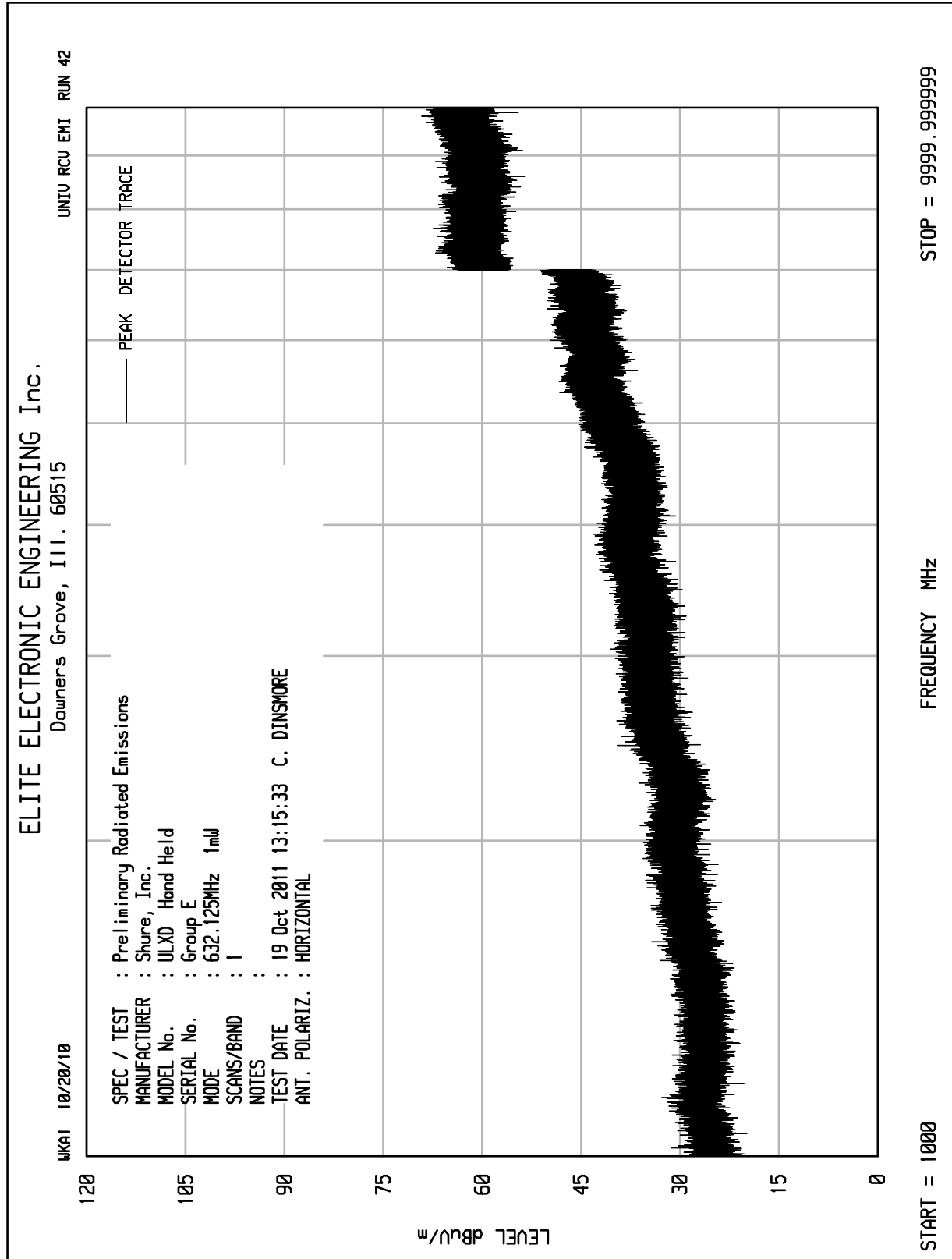


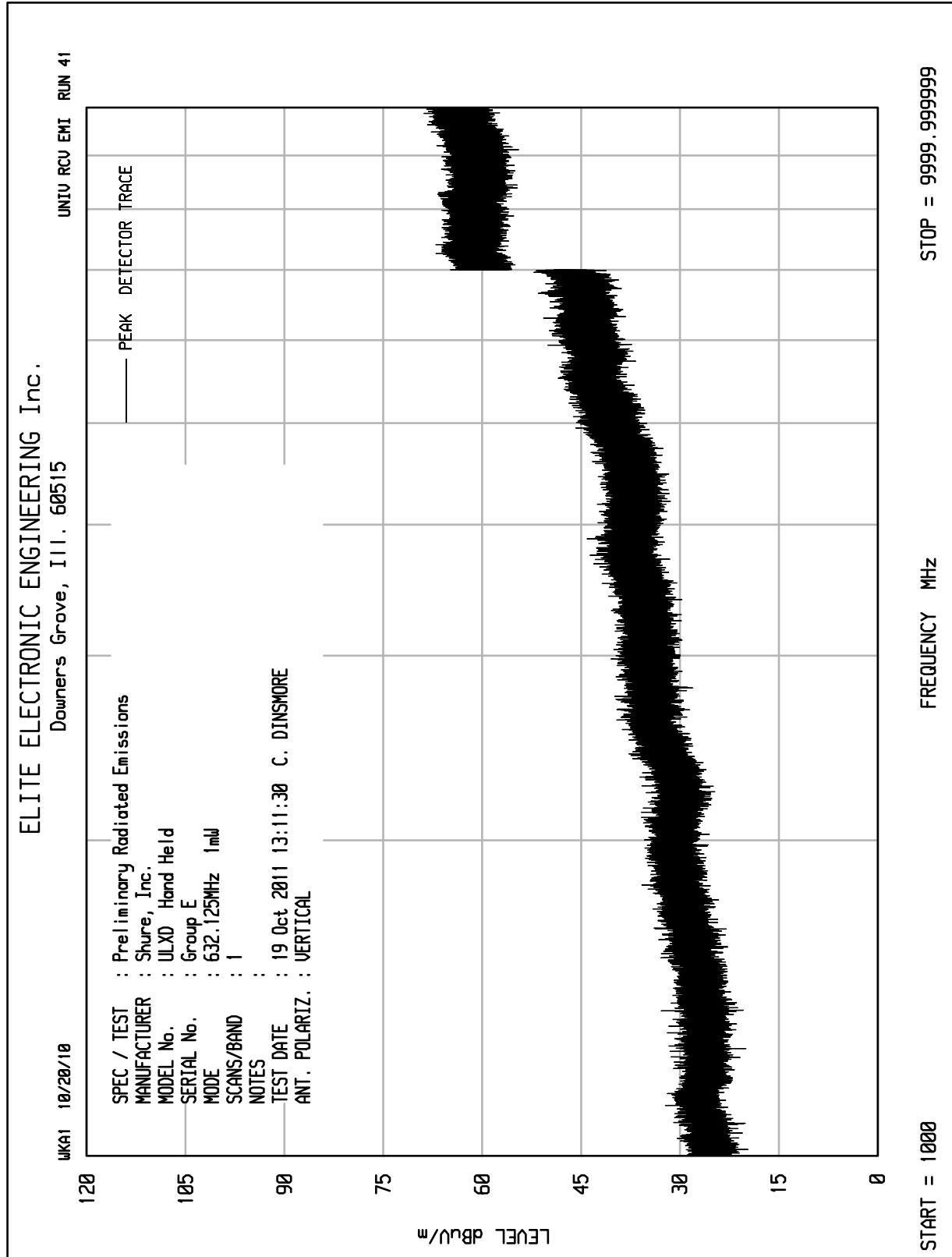


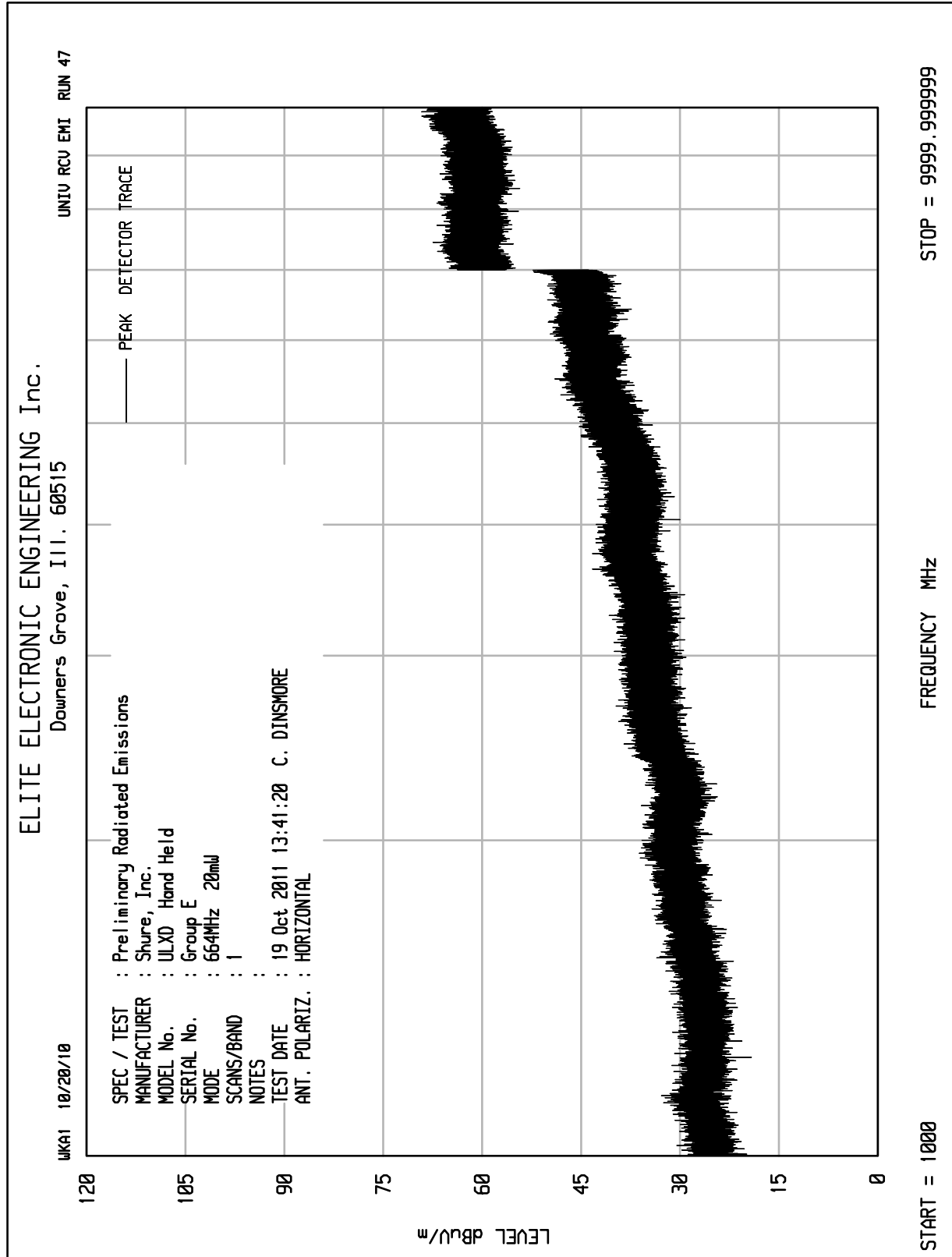


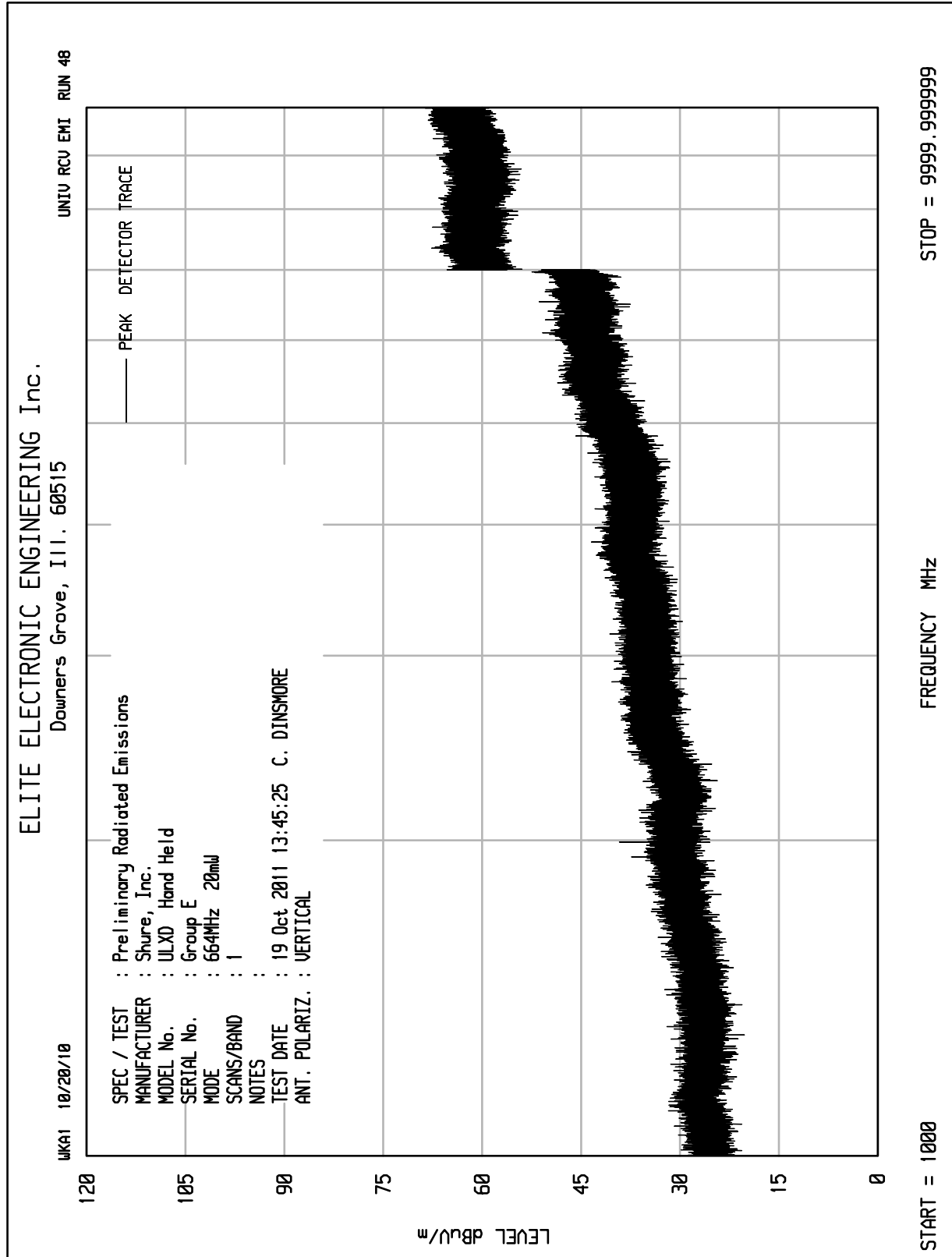


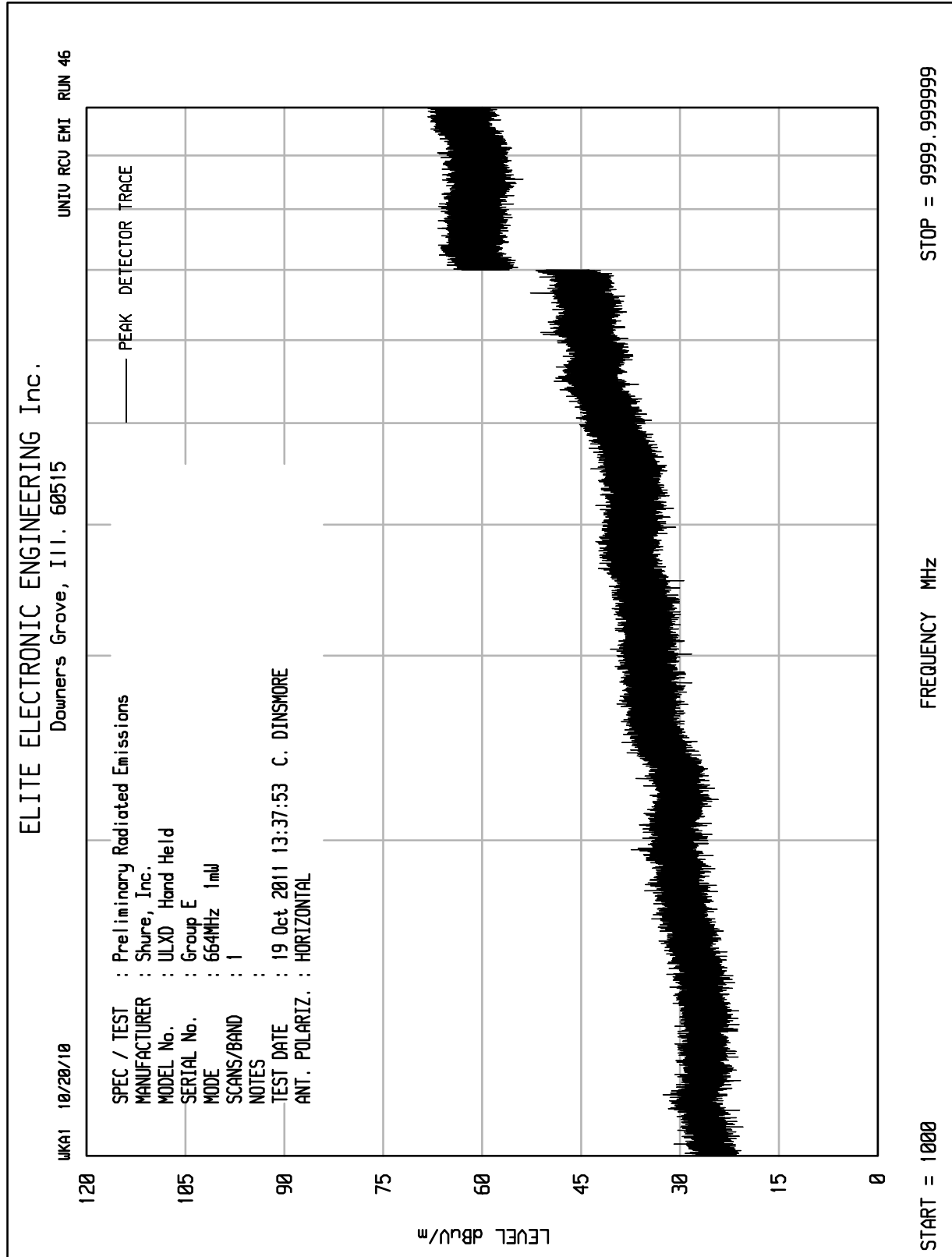


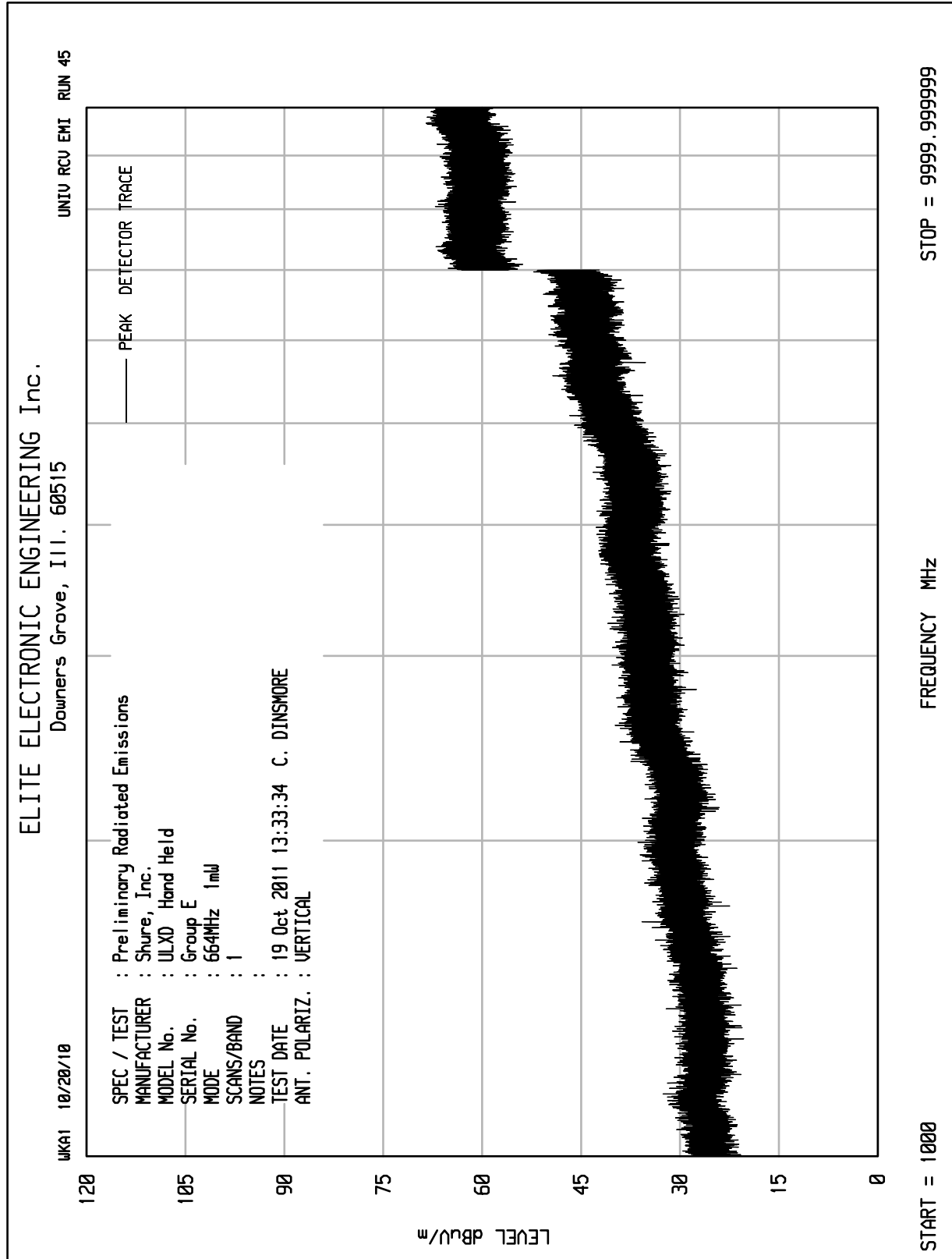


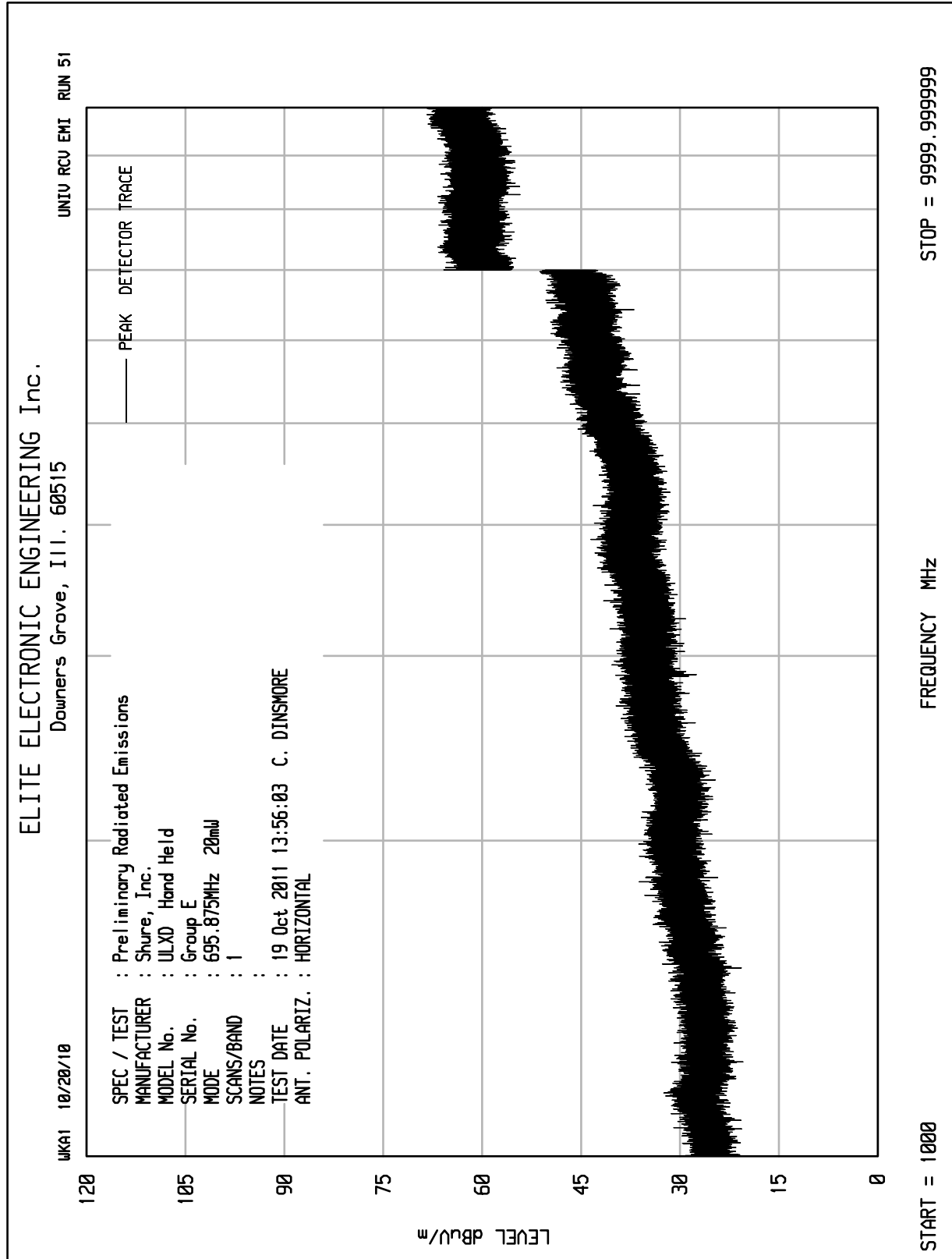


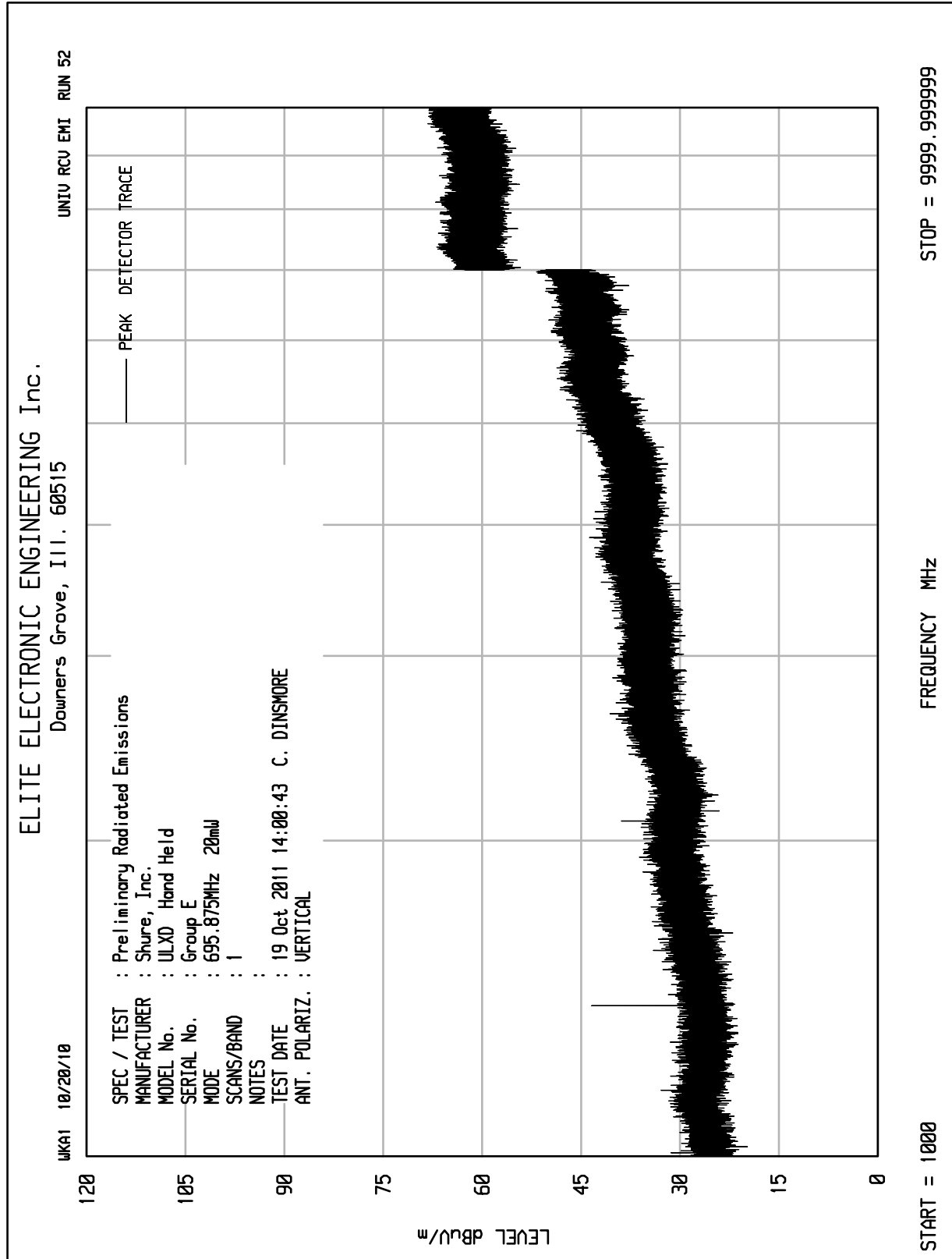


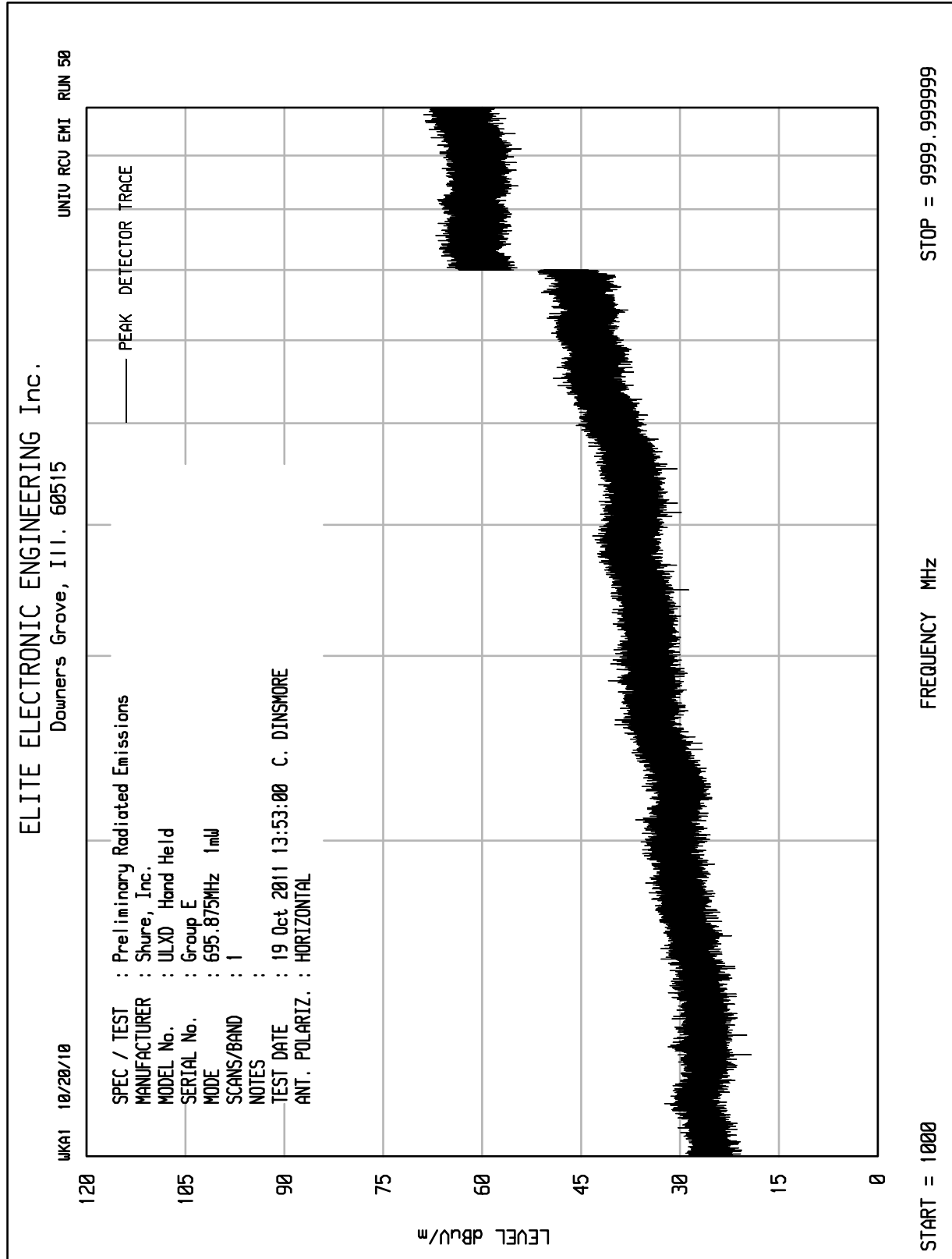


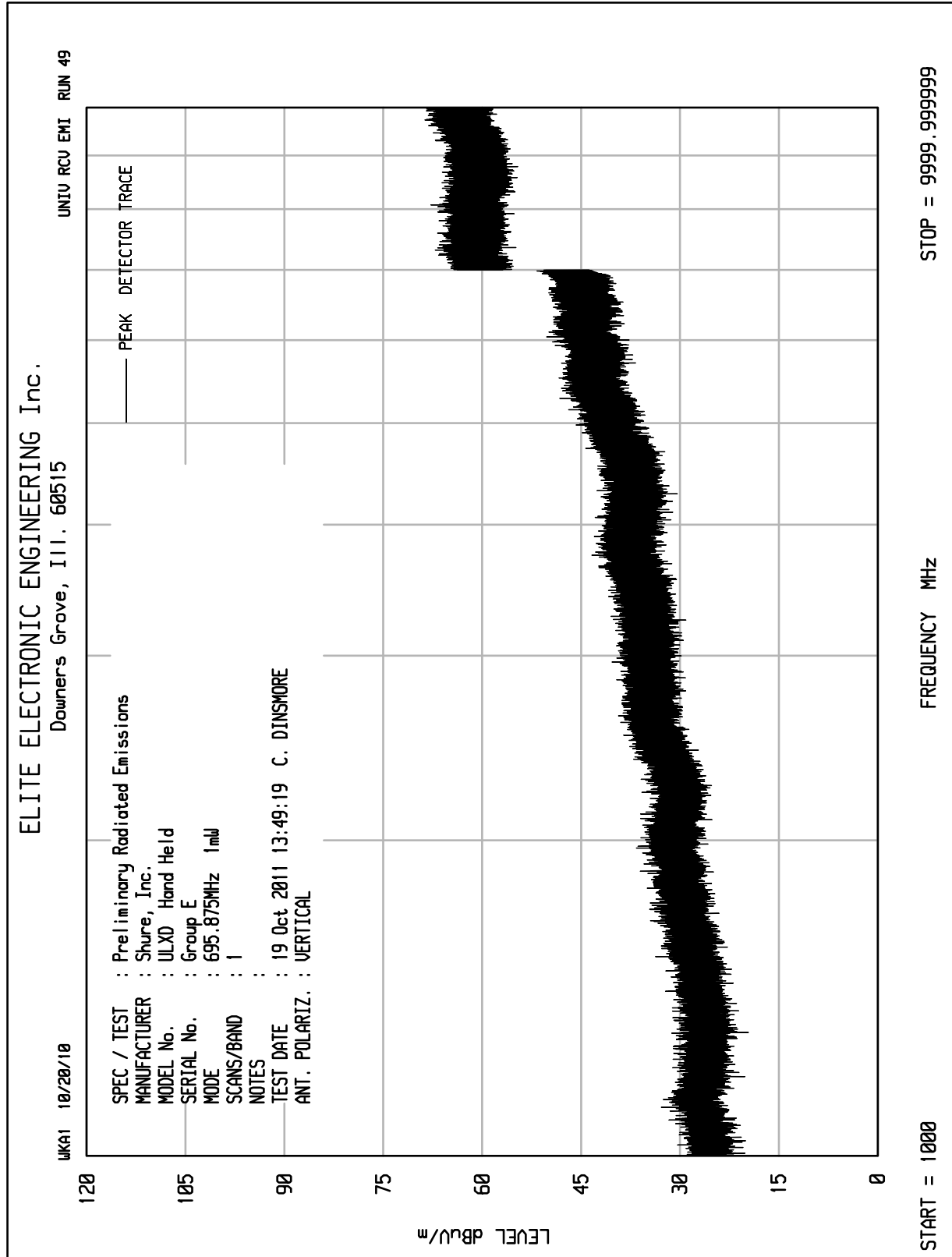














MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 470.125MHz, 1mW (0dBm)
UNIT : Group A
BAND : G50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
940.25	H	-2.2	*	-76.0	0.0	2.0	-78.0	78.0	25
940.25	V	0.4	*	-71.3	0.0	2.0	-73.3	73.3	25
1410.38	H	-1.5	*	-78.2	4.5	2.4	-76.0	76.0	25
1410.38	V	-1.4	*	-77.9	4.5	2.4	-75.7	75.7	25
1880.50	H	-2.1	*	-76.5	5.0	2.7	-74.2	74.2	25
1880.50	V	-1.3	*	-74.9	5.0	2.7	-72.6	72.6	25
2350.63	H	-1.4	*	-74.2	5.7	3.2	-71.7	71.7	25
2350.63	V	-1.5	*	-72.3	5.7	3.2	-69.8	69.8	25
2820.75	H	-1.6	*	-72.8	6.0	3.6	-70.4	70.4	25
2820.75	V	-1.9	*	-70.7	6.0	3.6	-68.3	68.3	25
3290.88	H	-1.7	*	-71.5	6.5	3.9	-68.8	68.8	25
3290.88	V	-1.6	*	-69.5	6.5	3.9	-66.9	66.9	25
3761.00	H	-1.8	*	-69.1	6.9	4.2	-66.4	66.4	25
3761.00	V	-0.5	*	-66.8	6.9	4.2	-64.1	64.1	25
4231.13	H	-0.3	*	-65.9	7.6	4.4	-62.7	62.7	25
4231.13	V	0.5	*	-65.0	7.6	4.4	-61.8	61.8	25
4701.25	H	0.1	*	-64.1	8.2	4.7	-60.6	60.6	25
4701.25	V	0.6	*	-63.9	8.2	4.7	-60.4	60.4	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 470.125MHz, 20mW (13dBm)
UNIT : Group A
BAND : G50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
940.25	H	0.1	*	-73.7	0.0	2.0	-75.7	88.8	38
940.25	V	11.4		-60.3	0.0	2.0	-62.3	75.3	38
1410.38	H	-2.1	*	-78.8	4.5	2.4	-76.6	89.7	38
1410.38	V	-1.2	*	-77.7	4.5	2.4	-75.5	88.6	38
1880.50	H	-1.8	*	-76.2	5.0	2.7	-73.9	86.9	38
1880.50	V	-1.2	*	-74.8	5.0	2.7	-72.5	85.5	38
2350.63	H	-1.6	*	-74.4	5.7	3.2	-71.9	84.9	38
2350.63	V	-1.6	*	-72.4	5.7	3.2	-69.9	82.9	38
2820.75	H	-1.1	*	-72.3	6.0	3.6	-69.9	82.9	38
2820.75	V	-1.4	*	-70.2	6.0	3.6	-67.8	80.8	38
3290.88	H	-1.6	*	-71.4	6.5	3.9	-68.7	81.8	38
3290.88	V	-0.2	*	-68.1	6.5	3.9	-65.5	78.5	38
3761.00	H	-0.1	*	-67.4	6.9	4.2	-64.7	77.7	38
3761.00	V	-0.1	*	-66.4	6.9	4.2	-63.7	76.7	38
4231.13	H	-0.5	*	-66.1	7.6	4.4	-62.9	75.9	38
4231.13	V	-0.6	*	-66.1	7.6	4.4	-62.9	75.9	38
4701.25	H	-0.4	*	-64.6	8.2	4.7	-61.1	74.1	38
4701.25	V	-0.7	*	-65.2	8.2	4.7	-61.7	74.7	38

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 500MHz, 1mW (0dBm)
UNIT : A
BAND : G50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1000.00	H	-4.4	*	-79.7	0.0	2.0	-81.7	81.7	25
1000.00	V	1.4		-74.9	0.0	2.0	-76.9	76.9	25
1500.00	H	-2.1	*	-78.8	4.9	2.5	-76.4	76.4	25
1500.00	V	-1.9	*	-78.6	4.9	2.5	-76.2	76.2	25
2000.00	H	-1.2	*	-75.1	5.1	2.8	-72.8	72.8	25
2000.00	V	-2.0	*	-75.0	5.1	2.8	-72.7	72.7	25
2500.00	H	0.5	*	-71.9	5.9	3.3	-69.3	69.3	25
2500.00	V	1.5	*	-68.5	5.9	3.3	-65.9	65.9	25
3000.00	H	-1.2	*	-71.8	6.0	3.7	-69.5	69.5	25
3000.00	V	-1.3	*	-69.5	6.0	3.7	-67.2	67.2	25
3500.00	H	-1.4	*	-70.6	6.8	4.0	-67.8	67.8	25
3500.00	V	-1.6	*	-69.3	6.8	4.0	-66.5	66.5	25
4000.00	H	-0.9	*	-66.6	6.9	4.3	-64.0	64.0	25
4000.00	V	-1.8	*	-66.9	6.9	4.3	-64.3	64.3	25
4500.00	H	-0.8	*	-66.2	8.3	4.6	-62.4	62.4	25
4500.00	V	0.0	*	-65.9	8.3	4.6	-62.1	62.1	25
5000.00	H	0.1	*	-62.5	7.9	4.8	-59.3	59.3	25
5000.00	V	-0.1	*	-62.7	7.9	4.8	-59.6	59.6	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 500MHz, 20mW (13dBm)
UNIT : Group A
BAND : G50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1000.00	H	-3.2	*	-78.5	0.0	2.0	-80.5	93.5	38
1000.00	V	5.9		-70.4	0.0	2.0	-72.4	85.4	38
1500.00	H	-1.8	*	-78.5	4.9	2.5	-76.1	89.1	38
1500.00	V	1.1	*	-75.6	4.9	2.5	-73.2	86.2	38
2000.00	H	-1.2	*	-75.1	5.1	2.8	-72.8	85.8	38
2000.00	V	-0.5	*	-73.5	5.1	2.8	-71.2	84.2	38
2500.00	H	-2.1	*	-74.5	5.9	3.3	-71.9	84.9	38
2500.00	V	2.5	*	-67.5	5.9	3.3	-64.9	77.9	38
3000.00	H	-0.8	*	-71.4	6.0	3.7	-69.1	82.1	38
3000.00	V	0.5	*	-67.7	6.0	3.7	-65.4	78.4	38
3500.00	H	-0.5	*	-69.7	6.8	4.0	-66.9	79.9	38
3500.00	V	-0.3	*	-68.0	6.8	4.0	-65.2	78.2	38
4000.00	H	-0.2	*	-65.9	6.9	4.3	-63.3	76.3	38
4000.00	V	0.1	*	-65.0	6.9	4.3	-62.4	75.4	38
4500.00	H	-0.5	*	-65.9	8.3	4.6	-62.1	75.2	38
4500.00	V	0.1	*	-65.8	8.3	4.6	-62.0	75.1	38
5000.00	H	-0.5	*	-63.0	7.9	4.8	-59.9	72.9	38
5000.00	V	-0.4	*	-63.0	7.9	4.8	-59.9	72.9	38

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 534MHz, 1mW (0dBm)
UNIT : Group A
BAND : G50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1068.00	H	-1.4	*	-77.2	2.9	2.1	-76.3	76.3	25
1068.00	V	-1.0	*	-77.2	2.9	2.1	-76.3	76.3	25
1602.00	H	-1.4	*	-77.4	4.9	2.5	-75.0	75.0	25
1602.00	V	-0.4	*	-76.1	4.9	2.5	-73.7	73.7	25
2136.00	H	-0.7	*	-74.2	5.3	2.9	-71.8	71.8	25
2136.00	V	-0.5	*	-72.6	5.3	2.9	-70.2	70.2	25
2670.00	H	-1.2	*	-73.0	5.9	3.4	-70.4	70.4	25
2670.00	V	-1.4	*	-70.8	5.9	3.4	-68.2	68.2	25
3204.00	H	-0.7	*	-70.7	6.4	3.8	-68.2	68.2	25
3204.00	V	-1.4	*	-69.4	6.4	3.8	-66.9	66.9	25
3738.00	H	-0.7	*	-68.2	6.9	4.2	-65.5	65.5	25
3738.00	V	-1.1	*	-67.5	6.9	4.2	-64.8	64.8	25
4272.00	H	-1.2	*	-66.7	7.7	4.5	-63.5	63.5	25
4272.00	V	-1.2	*	-66.7	7.7	4.5	-63.5	63.5	25
4806.00	H	-0.3	*	-63.9	8.1	4.7	-60.5	60.5	25
4806.00	V	-0.5	*	-64.3	8.1	4.7	-61.0	61.0	25
5340.00	H	0.1	*	-62.0	7.3	4.9	-59.6	59.6	25
5340.00	V	-0.1	*	-62.4	7.3	4.9	-60.0	60.0	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 534MHz, 20mW (13dBm)
UNIT : Group A
BAND : G50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1068.00	H	-1.3	*	-77.1	2.9	2.1	-76.2	89.2	1068.00
1068.00	V	5.1		-71.1	2.9	2.1	-70.2	83.2	1068.00
1602.00	H	-1.1	*	-77.1	4.9	2.5	-74.7	87.7	1602.00
1602.00	V	7.7	*	-68.0	4.9	2.5	-65.6	78.7	1602.00
2136.00	H	-0.7	*	-74.2	5.3	2.9	-71.8	84.8	2136.00
2136.00	V	1.1	*	-71.0	5.3	2.9	-68.6	81.6	2136.00
2670.00	H	-1.1	*	-72.9	5.9	3.4	-70.3	83.3	2670.00
2670.00	V	-1.4	*	-70.8	5.9	3.4	-68.2	81.2	2670.00
3204.00	H	-0.7	*	-70.7	6.4	3.8	-68.2	81.2	3204.00
3204.00	V	-1.4	*	-69.4	6.4	3.8	-66.9	79.9	3204.00
3738.00	H	-0.4	*	-67.9	6.9	4.2	-65.2	78.2	3738.00
3738.00	V	0.1	*	-66.3	6.9	4.2	-63.6	76.6	3738.00
4272.00	H	-0.8	*	-66.3	7.7	4.5	-63.1	76.1	4272.00
4272.00	V	-1.2	*	-66.7	7.7	4.5	-63.5	76.5	4272.00
4806.00	H	-0.2	*	-63.8	8.1	4.7	-60.4	73.4	4806.00
4806.00	V	0.3	*	-63.5	8.1	4.7	-60.2	73.2	4806.00
5340.00	H	0.1	*	-62.0	7.3	4.9	-59.6	72.6	5340.00
5340.00	V	-0.1	*	-62.4	7.3	4.9	-60.0	73.0	5340.00

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 500MHz, 1mW (0dBm)
UNIT : Group A
BAND : G50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBUV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	Part 74 Min. Attn. dB
1000.00	H	13.2	*	-61.4	0.0	2.0	-63.4	63.4	13
1000.00	V	14.8		-59.8	0.0	2.0	-61.8	61.8	13
1500.00	H	14.9	*	-59.2	4.9	2.5	-56.8	56.8	13
1500.00	V	15.1	*	-59.4	4.9	2.5	-57.0	57.0	13
2000.00	H	15.1	*	-53.4	5.1	2.8	-51.1	51.1	13
2000.00	V	15.2	*	-55.6	5.1	2.8	-53.3	53.3	13
2500.00	H	14.0	*	-55.9	5.9	3.3	-53.3	53.3	13
2500.00	V	14.3	*	-53.6	5.9	3.3	-51.0	51.0	13
3000.00	H	13.9	*	-49.0	6.0	3.7	-46.7	46.7	13
3000.00	V	14.1	*	-51.8	6.0	3.7	-49.5	49.5	13
3500.00	H	15.0	*	-51.8	6.8	4.0	-49.0	49.0	13
3500.00	V	14.8	*	-49.8	6.8	4.0	-47.0	47.0	13
4000.00	H	14.2	*	-51.2	6.9	4.3	-48.6	48.6	13
4000.00	V	13.9	*	-50.0	6.9	4.3	-47.4	47.4	13
4500.00	H	14.2	*	-50.0	8.3	4.6	-46.2	46.2	13
4500.00	V	14.6	*	-50.6	8.3	4.6	-46.8	46.8	13
5000.00	H	13.9	*	-47.8	7.9	4.8	-44.7	44.7	13
5000.00	V	14.7	*	-47.0	7.9	4.8	-43.9	43.9	13

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 500MHz, 20mW (13dBm)
UNIT : Group A
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	Part 74 Min. Attn. dB
1000.00	H	3.8	*	-71.2	0.0	2.0	-73.2	86.2	26
1000.00	V	19.0		-55.7	0.0	2.0	-57.7	70.7	26
1500.00	H	13.1	*	-61.6	4.9	2.5	-59.2	72.2	26
1500.00	V	14.2	*	-60.4	4.9	2.5	-58.0	71.0	26
2000.00	H	14.5	*	-54.0	5.1	2.8	-51.7	64.7	26
2000.00	V	14.3	*	-56.8	5.1	2.8	-54.5	67.5	26
2500.00	H	13.9	*	-56.0	5.9	3.3	-53.4	66.4	26
2500.00	V	14.5	*	-53.4	5.9	3.3	-50.8	63.8	26
3000.00	H	14.8	*	-48.0	6.0	3.7	-45.7	58.7	26
3000.00	V	14.7	*	-51.0	6.0	3.7	-48.7	61.7	26
3500.00	H	13.8	*	-53.4	6.8	4.0	-50.6	63.6	26
3500.00	V	14.2	*	-50.6	6.8	4.0	-47.8	60.8	26
4000.00	H	14.1	*	-51.3	6.9	4.3	-48.7	61.7	26
4000.00	V	15.0	*	-49.0	6.9	4.3	-46.4	59.4	26
4500.00	H	14.6	*	-50.4	8.3	4.6	-46.6	59.7	26
4500.00	V	14.1	*	-51.1	8.3	4.6	-47.3	60.4	26
5000.00	H	13.7	*	-48.0	7.9	4.8	-44.9	57.9	26
5000.00	V	14.2	*	-48.2	7.9	4.8	-45.1	58.1	26

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 572MHz, 1mW (0dBm)
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1144.00	H	-1.9	*	-78.2	3.3	2.2	-77.0	77.0	25
1144.00	V	-2.0	*	-78.0	3.3	2.2	-76.8	76.8	25
1716.00	H	-1.5	*	-76.7	5.0	2.6	-74.4	74.4	25
1716.00	V	-2.6	*	-77.3	5.0	2.6	-75.0	75.0	25
2288.00	H	3.1	*	-69.9	5.6	3.1	-67.4	67.4	25
2288.00	V	10.0		-61.2	5.6	3.1	-58.7	58.7	25
2860.00	H	2.4	*	-68.7	6.0	3.6	-66.3	66.3	25
2860.00	V	3.9	*	-64.8	6.0	3.6	-62.4	62.4	25
3432.00	H	-0.5	*	-69.9	6.7	4.0	-67.1	67.1	25
3432.00	V	-1.2	*	-69.0	6.7	4.0	-66.2	66.2	25
4004.00	H	-0.8	*	-66.5	6.9	4.3	-63.9	63.9	25
4004.00	V	-1.3	*	-66.4	6.9	4.3	-63.8	63.8	25
4576.00	H	0.2	*	-64.7	8.3	4.6	-61.1	61.1	25
4576.00	V	0.3	*	-65.1	8.3	4.6	-61.4	61.4	25
5148.00	H	0.2	*	-62.1	7.7	4.9	-59.3	59.3	25
5148.00	V	0.5	*	-62.0	7.7	4.9	-59.2	59.2	25
5720.00	H	0.8	*	-61.0	7.5	5.1	-58.6	58.6	25
5720.00	V	0.4	*	-61.7	7.5	5.1	-59.3	59.3	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 572MHz, 20mW (13dBm)
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBUV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1144.00	H	-0.8	*	-77.1	3.3	2.2	-75.9	88.9	38
1144.00	V	14.1		-61.9	3.3	2.2	-60.7	73.7	38
1716.00	H	-0.8	*	-76.0	5.0	2.6	-73.7	86.7	38
1716.00	V	0.1	*	-74.6	5.0	2.6	-72.3	85.3	38
2288.00	H	1.7	*	-71.3	5.6	3.1	-68.8	81.8	38
2288.00	V	9.7		-61.5	5.6	3.1	-59.0	72.0	38
2860.00	H	2.4	*	-68.7	6.0	3.6	-66.3	79.3	38
2860.00	V	1.7	*	-67.0	6.0	3.6	-64.6	77.6	38
3432.00	H	0.8	*	-68.6	6.7	4.0	-65.8	78.8	38
3432.00	V	1.4	*	-66.4	6.7	4.0	-63.6	76.6	38
4004.00	H	-0.8	*	-66.5	6.9	4.3	-63.9	76.9	38
4004.00	V	-0.5	*	-65.6	6.9	4.3	-63.0	76.0	38
4576.00	H	0.2	*	-64.7	8.3	4.6	-61.1	74.1	38
4576.00	V	0.8	*	-64.6	8.3	4.6	-60.9	73.9	38
5148.00	H	1.2	*	-61.1	7.7	4.9	-58.3	71.3	38
5148.00	V	1.0	*	-61.5	7.7	4.9	-58.7	71.7	38
5720.00	H	0.8	*	-61.0	7.5	5.1	-58.6	71.6	38
5720.00	V	1.1	*	-61.0	7.5	5.1	-58.6	71.6	38

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 604MHz, 1mW (0dBm)
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1208.00	H	-1.2	*	-77.8	3.6	2.2	-76.4	76.4	25
1208.00	V	-1.0	*	-76.9	3.6	2.2	-75.5	75.5	25
1812.00	H	-2.0	*	-76.6	5.0	2.7	-74.3	74.3	25
1812.00	V	-1.5	*	-75.4	5.0	2.7	-73.1	73.1	25
2416.00	H	-1.4	*	-74.0	5.8	3.2	-71.5	71.5	25
2416.00	V	6.6		-63.9	5.8	3.2	-61.3	61.3	25
3020.00	H	-1.0	*	-71.5	6.0	3.7	-69.2	69.2	25
3020.00	V	-1.5	*	-69.7	6.0	3.7	-67.3	67.3	25
3624.00	H	-2.1	*	-70.4	6.9	4.1	-67.6	67.6	25
3624.00	V	1.5	*	-65.5	6.9	4.1	-62.8	62.8	25
4228.00	H	-1.3	*	-66.9	7.6	4.4	-63.7	63.7	25
4228.00	V	-1.4	*	-66.9	7.6	4.4	-63.7	63.7	25
4832.00	H	-2.0	*	-65.4	8.1	4.7	-62.1	62.1	25
4832.00	V	-1.8	*	-65.5	8.1	4.7	-62.1	62.1	25
5436.00	H	-1.6	*	-63.6	7.2	5.0	-61.4	61.4	25
5436.00	V	-2.1	*	-64.3	7.2	5.0	-62.2	62.2	25
6040.00	H	-2.3	*	-63.9	8.3	5.3	-60.9	60.9	25
6040.00	V	-2.0	*	-64.0	8.3	5.3	-61.0	61.0	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 604MHz, 20mW (13dBm)
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1208.00	H	-2.4	*	-79.0	3.6	2.2	-77.6	90.6	38
1208.00	V	11.7		-64.2	3.6	2.2	-62.8	75.8	38
1812.00	H	1.2	*	-73.4	5.0	2.7	-71.1	84.1	38
1812.00	V	1.5	*	-72.4	5.0	2.7	-70.1	83.1	38
2416.00	H	1.1	*	-71.5	5.8	3.2	-69.0	82.0	38
2416.00	V	5.6		-64.9	5.8	3.2	-62.3	75.3	38
3020.00	H	0.9	*	-69.6	6.0	3.7	-67.3	80.3	38
3020.00	V	1.6	*	-66.6	6.0	3.7	-64.2	77.2	38
3624.00	H	1.5	*	-66.8	6.9	4.1	-64.0	77.0	38
3624.00	V	1.0	*	-66.0	6.9	4.1	-63.3	76.3	38
4228.00	H	0.8	*	-64.8	7.6	4.4	-61.6	74.6	38
4228.00	V	1.4	*	-64.1	7.6	4.4	-60.9	73.9	38
4832.00	H	1.2	*	-62.2	8.1	4.7	-58.9	71.9	38
4832.00	V	0.8	*	-62.9	8.1	4.7	-59.5	72.5	38
5436.00	H	1.2	*	-60.8	7.2	5.0	-58.6	71.6	38
5436.00	V	0.5	*	-61.7	7.2	5.0	-59.6	72.6	38
6040.00	H	1.1	*	-60.5	8.3	5.3	-57.5	70.5	38
6040.00	V	1.0	*	-61.0	8.3	5.3	-58.0	71.0	38

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 636MHz, 1mW (0dBm)
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1272.00	H	-0.2	*	-76.8	3.9	2.3	-75.2	75.2	25
1272.00	V	-0.1	*	-76.2	3.9	2.3	-74.5	74.5	25
1908.00	H	-0.5	*	-74.8	5.0	2.7	-72.5	72.5	25
1908.00	V	1.1	*	-72.3	5.0	2.7	-70.0	70.0	25
2544.00	H	0.2	*	-72.0	5.9	3.3	-69.4	69.4	25
2544.00	V	-0.5	*	-70.3	5.9	3.3	-67.7	67.7	25
3180.00	H	-0.1	*	-70.2	6.3	3.8	-67.7	67.7	25
3180.00	V	0.2	*	-67.8	6.3	3.8	-65.3	65.3	25
3816.00	H	0.3	*	-66.6	6.9	4.2	-64.0	64.0	25
3816.00	V	-0.2	*	-66.2	6.9	4.2	-63.5	63.5	25
4452.00	H	-0.4	*	-65.8	8.2	4.5	-62.2	62.2	25
4452.00	V	-0.7	*	-66.5	8.2	4.5	-62.9	62.9	25
5088.00	H	0.5	*	-61.9	7.8	4.8	-58.9	58.9	25
5088.00	V	-1.1	*	-63.6	7.8	4.8	-60.7	60.7	25
5724.00	H	-1.3	*	-63.1	7.6	5.1	-60.7	60.7	25
5724.00	V	-0.8	*	-62.9	7.6	5.1	-60.5	60.5	25
6360.00	H	-0.7	*	-61.8	9.3	5.7	-58.2	58.2	25
6360.00	V	-0.4	*	-62.3	9.3	5.7	-58.7	58.7	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 636MHz, 20mW (13dBm)
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBUV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1272.00	H	-2.0	*	-78.6	3.9	2.3	-77.0	90.0	38
1272.00	V	20.9		-55.2	3.9	2.3	-53.5	66.6	38
1908.00	H	-3.2	*	-77.5	5.0	2.7	-75.2	88.2	38
1908.00	V	21.9		-51.5	5.0	2.7	-49.2	62.3	38
2544.00	H	-2.5	*	-74.7	5.9	3.3	-72.1	85.1	38
2544.00	V	-0.5	*	-70.3	5.9	3.3	-67.7	80.7	38
3180.00	H	-0.8	*	-70.9	6.3	3.8	-68.4	81.4	38
3180.00	V	-0.2	*	-68.2	6.3	3.8	-65.7	78.7	38
3816.00	H	-0.1	*	-67.0	6.9	4.2	-64.4	77.4	38
3816.00	V	0.1	*	-65.9	6.9	4.2	-63.2	76.3	38
4452.00	H	0.4	*	-65.0	8.2	4.5	-61.4	74.4	38
4452.00	V	0.5	*	-65.3	8.2	4.5	-61.7	74.7	38
5088.00	H	1.1	*	-61.3	7.8	4.8	-58.3	71.4	38
5088.00	V	1.2	*	-61.3	7.8	4.8	-58.4	71.4	38
5724.00	H	1.2	*	-60.6	7.6	5.1	-58.2	71.2	38
5724.00	V	1.1	*	-61.0	7.6	5.1	-58.6	71.6	38
6360.00	H	1.0	*	-60.1	9.3	5.7	-56.5	69.5	38
6360.00	V	1.1	*	-60.8	9.3	5.7	-57.2	70.2	38

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 604MHz, 1mW (0dBm)
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	Part 74 Min. Attn. dB
1208.00	H	12.8	*	-61.2	3.6	2.2	-59.8	59.8	13
1208.00	V	12.6	*	-62.6	3.6	2.2	-61.2	61.2	13
1812.00	H	14.0	*	-57.6	5.0	2.7	-55.3	55.3	13
1812.00	V	13.8	*	-58.0	5.0	2.7	-55.7	55.7	13
2416.00	H	12.9	*	-57.0	5.8	3.2	-54.4	54.4	13
2416.00	V	14.5	*	-53.4	5.8	3.2	-50.8	50.8	13
3020.00	H	13.8	*	-53.8	6.0	3.7	-51.5	51.5	13
3020.00	V	13.4	*	-52.4	6.0	3.7	-50.1	50.1	13
3624.00	H	14.0	*	-52.7	6.9	4.1	-49.9	49.9	13
3624.00	V	13.1	*	-51.4	6.9	4.1	-48.6	48.6	13
4228.00	H	12.8	*	-53.4	7.6	4.4	-50.3	50.3	13
4228.00	V	13.1	*	-51.3	7.6	4.4	-48.2	48.2	13
4832.00	H	13.4	*	-49.6	8.1	4.7	-46.3	46.3	13
4832.00	V	12.7	*	-50.6	8.1	4.7	-47.3	47.3	13
5436.00	H	13.0	*	-47.4	7.2	5.0	-45.2	45.2	13
5436.00	V	13.6	*	-47.4	7.2	5.0	-45.2	45.2	13
6040.00	H	13.8	*	-46.0	8.3	5.3	-43.0	43.0	13
6040.00	V	13.0	*	-46.6	8.3	5.3	-43.6	43.6	13

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 604MHz, 20mW (13dBm)
UNIT : Group C
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	Part 74 Min. Attn. dB
1208.00	H	14.1	*	-59.9	3.6	2.2	-58.5	71.5	26
1208.00	V	22.9		-52.0	3.6	2.2	-50.6	63.6	26
1812.00	H	14.2	*	-57.4	5.0	2.7	-55.1	68.1	26
1812.00	V	16.1	*	-55.6	5.0	2.7	-53.3	66.3	26
2416.00	H	13.8	*	-56.1	5.8	3.2	-53.5	66.5	26
2416.00	V	15.0	*	-52.9	5.8	3.2	-50.3	63.3	26
3020.00	H	15.1	*	-52.4	6.0	3.7	-50.1	63.1	26
3020.00	V	14.7	*	-51.0	6.0	3.7	-48.7	61.7	26
3624.00	H	13.9	*	-52.8	6.9	4.1	-50.0	63.1	26
3624.00	V	14.2	*	-50.3	6.9	4.1	-47.5	60.6	26
4228.00	H	13.8	*	-52.4	7.6	4.4	-49.3	62.3	26
4228.00	V	13.5	*	-51.8	7.6	4.4	-48.7	61.7	26
4832.00	H	14.1	*	-49.0	8.1	4.7	-45.7	58.7	26
4832.00	V	15.3	*	-48.0	8.1	4.7	-44.7	57.7	26
5436.00	H	15.6	*	-44.8	7.2	5.0	-42.6	55.6	26
5436.00	V	15.1	*	-45.6	7.2	5.0	-43.4	56.4	26
6040.00	H	16.0	*	-43.4	8.3	5.3	-40.4	53.4	26
6040.00	V	15.8	*	-44.8	8.3	5.3	-41.8	54.8	26

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 632.125MHz, 1mW (0dBm)
UNIT : Group E
BAND : L50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBUV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1264.25	H	-0.8	*	-77.4	3.9	2.3	-75.8	75.8	25
1264.25	V	-1.1	*	-77.2	3.9	2.3	-75.6	75.6	25
1896.38	H	0.1	*	-74.2	5.0	2.7	-71.9	71.9	25
1896.38	V	0.5	*	-73.0	5.0	2.7	-70.7	70.7	25
2528.50	H	0.9	*	-71.4	5.9	3.3	-68.8	68.8	25
2528.50	V	2.5	*	-67.4	5.9	3.3	-64.8	64.8	25
3160.63	H	0.3	*	-69.8	6.3	3.8	-67.3	67.3	25
3160.63	V	-0.4	*	-68.4	6.3	3.8	-65.9	65.9	25
3792.75	H	-0.5	*	-67.6	6.9	4.2	-64.9	64.9	25
3792.75	V	-0.9	*	-67.0	6.9	4.2	-64.4	64.4	25
4424.88	H	0.8	*	-64.6	8.1	4.5	-61.1	61.1	25
4424.88	V	0.5	*	-65.3	8.1	4.5	-61.7	61.7	25
5057.00	H	1.2	*	-61.2	7.8	4.8	-58.2	58.2	25
5057.00	V	1.2	*	-61.4	7.8	4.8	-58.3	58.3	25
5689.13	H	1.3	*	-60.5	7.5	5.1	-58.1	58.1	25
5689.13	V	1.4	*	-60.7	7.5	5.1	-58.3	58.3	25
6321.25	H	2.0	*	-59.2	9.2	5.6	-55.7	55.7	25
6321.25	V	2.1	*	-59.8	9.2	5.6	-56.3	56.3	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 632MHz, 20mW (13dBm)
UNIT : Group E
BAND : J50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1264.25	H	-2.1	*	-78.7	3.9	2.3	-77.1	90.1	38
1264.25	V	9.2		-66.9	3.9	2.3	-65.3	78.3	38
1896.38	H	-2.1	*	-76.4	5.0	2.7	-74.1	87.1	38
1896.38	V	3.6	*	-69.9	5.0	2.7	-67.6	80.6	38
2528.50	H	-1.5	*	-73.8	5.9	3.3	-71.2	84.2	38
2528.50	V	4.2	*	-65.7	5.9	3.3	-63.1	76.1	38
3160.63	H	-0.9	*	-71.0	6.3	3.8	-68.5	81.5	38
3160.63	V	0.1	*	-67.9	6.3	3.8	-65.4	78.5	38
3792.75	H	-0.5	*	-67.6	6.9	4.2	-64.9	77.9	38
3792.75	V	-0.1	*	-66.2	6.9	4.2	-63.6	76.6	38
4424.88	H	-0.3	*	-65.7	8.1	4.5	-62.2	75.2	38
4424.88	V	-0.1	*	-65.9	8.1	4.5	-62.3	75.3	38
5057.00	H	-0.2	*	-62.6	7.8	4.8	-59.6	72.6	38
5057.00	V	0.8	*	-61.8	7.8	4.8	-58.7	71.8	38
5689.13	H	1.1	*	-60.7	7.5	5.1	-58.3	71.3	38
5689.13	V	1.3	*	-60.8	7.5	5.1	-58.4	71.4	38
6321.25	H	0.9	*	-60.3	9.2	5.6	-56.8	69.8	38
6321.25	V	0.5	*	-61.4	9.2	5.6	-57.9	70.9	38

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 664MHz, 1mW (0dBm)
UNIT : Group E
BAND : L50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBUV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1328.00	H	-1.4	*	-78.0	4.2	2.3	-76.2	76.2	25
1328.00	V	-1.5	*	-77.8	4.2	2.3	-75.9	75.9	25
1992.00	H	-1.2	*	-75.1	5.1	2.8	-72.8	72.8	25
1992.00	V	1.9	*	-71.1	5.1	2.8	-68.9	68.9	25
2656.00	H	-1.2	*	-73.0	5.9	3.4	-70.5	70.5	25
2656.00	V	1.6	*	-67.8	5.9	3.4	-65.3	65.3	25
3320.00	H	-0.7	*	-70.4	6.6	3.9	-67.7	67.7	25
3320.00	V	-0.9	*	-68.8	6.6	3.9	-66.1	66.1	25
3984.00	H	-1.1	*	-66.9	6.9	4.3	-64.3	64.3	25
3984.00	V	-0.8	*	-66.0	6.9	4.3	-63.4	63.4	25
4648.00	H	-0.3	*	-64.8	8.2	4.6	-61.2	61.2	25
4648.00	V	0.4	*	-64.5	8.2	4.6	-60.9	60.9	25
5312.00	H	-0.5	*	-62.6	7.4	4.9	-60.2	60.2	25
5312.00	V	0.1	*	-62.2	7.4	4.9	-59.8	59.8	25
5976.00	H	1.1	*	-60.6	8.1	5.2	-57.7	57.7	25
5976.00	V	0.8	*	-61.2	8.1	5.2	-58.3	58.3	25
6640.00	H	1.5	*	-59.2	9.3	6.0	-55.9	55.9	25
6640.00	V	2.0	*	-59.8	9.3	6.0	-56.5	56.5	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 664MHz, 20mW (13dBm)
UNIT : Group E
BAND : L50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1328.00	H	-12.0	*	-88.6	4.2	2.3	-86.8	99.8	38
1328.00	V	4.9		-71.4	4.2	2.3	-69.5	82.5	38
1992.00	H	-1.3	*	-75.2	5.1	2.8	-72.9	86.0	38
1992.00	V	7.3	*	-65.7	5.1	2.8	-63.5	76.5	38
2656.00	H	-1.2	*	-73.0	5.9	3.4	-70.5	83.5	38
2656.00	V	-0.9	*	-70.3	5.9	3.4	-67.8	80.8	38
3320.00	H	-1.3	*	-71.0	6.6	3.9	-68.3	81.3	38
3320.00	V	-0.9	*	-68.8	6.6	3.9	-66.1	79.1	38
3984.00	H	-0.5	*	-66.3	6.9	4.3	-63.7	76.7	38
3984.00	V	-0.6	*	-65.8	6.9	4.3	-63.2	76.2	38
4648.00	H	0.6	*	-63.9	8.2	4.6	-60.3	73.4	38
4648.00	V	0.4	*	-64.5	8.2	4.6	-60.9	73.9	38
5312.00	H	-0.2	*	-62.3	7.4	4.9	-59.9	72.9	38
5312.00	V	-0.1	*	-62.4	7.4	4.9	-60.0	73.0	38
5976.00	H	0.6	*	-61.1	8.1	5.2	-58.2	71.2	38
5976.00	V	0.8	*	-61.2	8.1	5.2	-58.3	71.3	38
6640.00	H	1.1	*	-59.6	9.3	6.0	-56.3	69.3	38
6640.00	V	0.8	*	-61.0	9.3	6.0	-57.7	70.7	38

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 695.875MHz, 1mW (0dBm)
UNIT : Group E
BAND : Band L50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1391.75	H	-2.5	*	-79.2	4.5	2.4	-77.1	77.1	25
1391.75	V	-2.3	*	-78.7	4.5	2.4	-76.7	76.7	25
2087.63	H	-2.1	*	-75.7	5.2	2.9	-73.4	73.4	25
2087.63	V	6.4		-66.0	5.2	2.9	-63.7	63.7	25
2783.50	H	-0.9	*	-72.2	6.0	3.5	-69.8	69.8	25
2783.50	V	3.6		-65.3	6.0	3.5	-62.9	62.9	25
3479.38	H	-1.4	*	-70.7	6.8	4.0	-67.9	67.9	25
3479.38	V	-1.5	*	-69.2	6.8	4.0	-66.4	66.4	25
4175.25	H	-1.2	*	-66.8	7.4	4.4	-63.8	63.8	25
4175.25	V	-1.4	*	-66.8	7.4	4.4	-63.8	63.8	25
4871.13	H	-0.7	*	-63.9	8.0	4.7	-60.6	60.6	25
4871.13	V	-0.3	*	-63.7	8.0	4.7	-60.4	60.4	25
5567.00	H	0.5	*	-61.4	7.2	5.0	-59.2	59.2	25
5567.00	V	0.4	*	-61.8	7.2	5.0	-59.6	59.6	25
6262.88	H	0.9	*	-60.4	9.0	5.6	-57.0	57.0	25
6262.88	V	0.7	*	-61.2	9.0	5.6	-57.8	57.8	25
6958.75	H	1.2	*	-59.1	8.4	6.0	-56.7	56.7	25
6958.75	V	1.1	*	-60.6	8.4	6.0	-58.2	58.2	25

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : RSS-123 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 696MHz, 20mW (13dBm)
UNIT : Group E
BAND : L50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten dB	RSS-123 Min. Attn. dB
1391.75	H	-2.1	*	-78.8	4.5	2.4	-76.7	89.7	38
1391.75	V	17.2		-59.2	4.5	2.4	-57.2	70.2	38
2087.63	H	-1.1	*	-74.7	5.2	2.9	-72.4	85.4	38
2087.63	V	10.5		-61.9	5.2	2.9	-59.6	72.6	38
2783.50	H	-1.3	*	-72.6	6.0	3.5	-70.2	83.2	38
2783.50	V	5.1	*	-63.8	6.0	3.5	-61.4	74.4	38
3479.38	H	-1.2	*	-70.5	6.8	4.0	-67.7	80.7	38
3479.38	V	-1.4	*	-69.1	6.8	4.0	-66.3	79.3	38
4175.25	H	-2.1	*	-67.7	7.4	4.4	-64.7	77.7	38
4175.25	V	-1.4	*	-66.8	7.4	4.4	-63.8	76.8	38
4871.13	H	-0.4	*	-63.6	8.0	4.7	-60.3	73.3	38
4871.13	V	-0.1	*	-63.5	8.0	4.7	-60.2	73.2	38
5567.00	H	0.8	*	-61.1	7.2	5.0	-58.9	71.9	38
5567.00	V	1.0	*	-61.2	7.2	5.0	-59.0	72.0	38
6262.88	H	1.2	*	-60.1	9.0	5.6	-56.7	69.7	38
6262.88	V	1.4	*	-60.5	9.0	5.6	-57.1	70.1	38
6958.75	H	1.5	*	-58.8	8.4	6.0	-56.4	69.4	38
6958.75	V	1.6	*	-60.1	8.4	6.0	-57.7	70.7	38

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By:

Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 664MHz, 1mW (0dBm)
UNIT : Group E
BAND : L50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1328.00	H	15.1	*	-58.6	4.2	2.3	-56.7	56.7	13
1328.00	V	14.8	*	-59.4	4.2	2.3	-57.5	57.5	13
1992.00	H	15.5	*	-55.4	5.1	2.8	-53.1	53.1	13
1992.00	V	15.2	*	-55.2	5.1	2.8	-52.9	52.9	13
2656.00	H	14.2	*	-55.4	5.9	3.4	-52.9	52.9	13
2656.00	V	14.4	*	-52.8	5.9	3.4	-50.3	50.3	13
3320.00	H	14.8	*	-52.2	6.6	3.9	-49.6	49.6	13
3320.00	V	14.2	*	-51.0	6.6	3.9	-48.4	48.4	13
3984.00	H	15.1	*	-49.2	6.9	4.3	-46.6	46.6	13
3984.00	V	14.8	*	-49.0	6.9	4.3	-46.4	46.4	13
4648.00	H	15.1	*	-49.0	8.2	4.6	-45.4	45.4	13
4648.00	V	15.3	*	-49.0	8.2	4.6	-45.4	45.4	13
5312.00	H	14.9	*	-45.4	7.4	4.9	-42.9	42.9	13
5312.00	V	14.7	*	-46.4	7.4	4.9	-43.9	43.9	13
5976.00	H	15.8	*	-43.8	8.1	5.2	-40.9	40.9	13
5976.00	V	15.3	*	-44.2	8.1	5.2	-41.3	41.3	13
6640.00	H	15.9	*	-37.6	9.3	6.0	-34.3	34.3	13
6640.00	V	16.4	*	-37.8	9.3	6.0	-34.5	34.5	13

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By: 
Craig M. Dinsmore



MANUFACTURER : Shure Incorporated
MODEL : ULXD2 Handheld Transmitter
SERIAL NO. : None Assigned
SPECIFICATION : FCC-74 Spurious Radiated Emissions
DATE : September 6, 2011 through October 14, 2011
MODE : Transmit at 664MHz, 20mW (13dBm)
UNIT : Group E
BAND : L50
EQUIPMENT USED : RBB0, CMA1, NTA2, NWH0, NWF0, NDQ1, GXA1

Freq. MHz	Ant Pol	Meter Reading dBuV	Amb	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1328.00	H	15.6	*	-57.8	4.2	2.3	-55.9	69.0	26
1328.00	V	18.6	*	-55.6	4.2	2.3	-53.7	66.8	26
1992.00	H	13.7	*	-57.2	5.1	2.8	-54.9	67.9	26
1992.00	V	14.9	*	-54.9	5.1	2.8	-52.6	65.6	26
2656.00	H	16.1	*	-53.4	5.9	3.4	-50.9	63.9	26
2656.00	V	13.8	*	-53.8	5.9	3.4	-51.3	64.3	26
3320.00	H	14.2	*	-53.0	6.6	3.9	-50.4	63.4	26
3320.00	V	15.0	*	-50.1	6.6	3.9	-47.5	60.5	26
3984.00	H	14.7	*	-49.6	6.9	4.3	-47.0	60.0	26
3984.00	V	13.9	*	-49.8	6.9	4.3	-47.2	60.2	26
4648.00	H	14.1	*	-50.0	8.2	4.6	-46.4	59.4	26
4648.00	V	13.5	*	-50.8	8.2	4.6	-47.2	60.2	26
5312.00	H	14.0	*	-47.0	7.4	4.9	-44.5	57.6	26
5312.00	V	13.8	*	-47.6	7.4	4.9	-45.1	58.2	26
5976.00	H	13.4	*	-46.4	8.1	5.2	-43.5	56.5	26
5976.00	V	12.9	*	-47.6	8.1	5.2	-44.7	57.7	26
6640.00	H	13.4	*	-40.8	9.3	6.0	-37.5	50.5	26
6640.00	V	13.6	*	-40.8	9.3	6.0	-37.5	50.5	26

* - Ambient

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked By: 
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