STATEMENT OF CERTIFICATION

The technical data supplied with this application, having been taken under my supervision is hereby duly certified. The following is a statement of my qualifications:

College Degree: **BSEE, Valparaiso University, Valparaiso, Indiana, USA**
MSEE, Illinois Institute of Technology, Chicago, Illinois, USA

18 years of Design and Development experience in the field of two-way radio communication.

NAME: **Ken Weiss**

SIGNATURE: _____

DATE: **July 21, 2000**

POSITION: **Lead Electrical Engineer**

I hereby certify that the above application was prepared under my direction and that to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct:

NAME: **Ron Wegner**

SIGNATURE: _____

DATE: **July 21, 2000**

POSITION: **Engineering Manager**

SUBMITTED MEASURED DATA -- INDEX

RF POWER OUTPUT DATA

The RF power output was measured with the indicated voltage applied to and current into the final RF amplifying device.

Measured RF output	**100**	Watts
Normal DC Voltage	**28.5**	Volts
Normal DC Current	**14.29**	Amperes
Input power for final RF amplifying device(s)	**407.3**	Watts
Primary Supply Voltage	**48**	Volts DC

Minimum Measured RF output	**5**	Watts
Normal DC Voltage	**28.5**	Volts
Normal DC Current	**3.55**	Amperes
Input power for final RF amplifying device(s)	**101.2**	Watts
Primary Supply Voltage	**48**	Volts DC

OCCUPIED BANDWIDTH

Modulation Type: Widepulse QPSK – 9600 bps Random Data
Emission Designator: 8K70D1W
Channelization: 12.5 kHz

SPECIFICATION REQUIREMENT:

§ 90.210 Emission limits:

For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth (f_0) to 5.625 kHz removed from f_0: *Zero dB.*

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz:
*At least 7.27 *(f_d –2.88 kHz) dB.*

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz:
At least 50 plus 10 log_{10}(P) decibels or 70 decibels, whichever is the lesser attenuation.

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide to capture the true peak emission of the equipment under test.

Necessary Bandwidth Calculation:
The necessary bandwidth of the modulation signal is not calculable per the formulas defined in 47 CFR 2.202 (b). Specifically, although the modulation for this emission is a composite modulation, the equations given in the composite tables in 2.202 are not applicable since none of them adequately approximate the form of digital modulation used. The necessary bandwidth of 8.70 kHz is based upon a 99% power measurement of the transmitter spectrum, per 2.202 (a).

Measurement Setting and Procedure, per TIA/EIA-102.CAAA, Section 2.2.5:

Reference Calibration Analyzer Settings:

Horizontal:	12 kHz per Division	Resolution Bandwidth:	30 kHz
Vertical:	10 dB per Division	Video Bandwidth:	30 kHz
Sweep Time:	75 Seconds (<2000 Hz / Second)	Span:	120 kHz
Detector Mode:	Positive Peak		

Emission Measurement Analyzer Settings:

Horizontal:	12 kHz per Division	Resolution Bandwidth:	100 Hz
Vertical:	10 dB per Division	Video Bandwidth:	1 kHz
Sweep Time:	75 Seconds (<2000 Hz / Second)	Span:	120 kHz
Detector Mode:	Positive Peak		

Test Procedure:
1) Adjust the spectrum analyzer per the values specified in the Reference Calibration Analyzer Settings.
2) Modulate the transmitter with the appropriate signaling pattern, (psuedorandom data) and key the transmitter. Use the analyzer controls to set this signal to the full-scale reference line. Allow the analyzer to sweep.
3) Adjust the analyzer per the Emission Measurement Analyzer Settings.
4) Allow the analyzer to sweep, and record the resultant emission levels.
5) Plot the resulting analyzer trace and the emission mask limit, add text and labeling as appropriate.

APPLICANT: MOTOROLA, INC.

EQUIPMENT TYPE: ABZ89FC5795

OCCUPIED BANDWIDTH -- 12.5 kHz CHANNELS

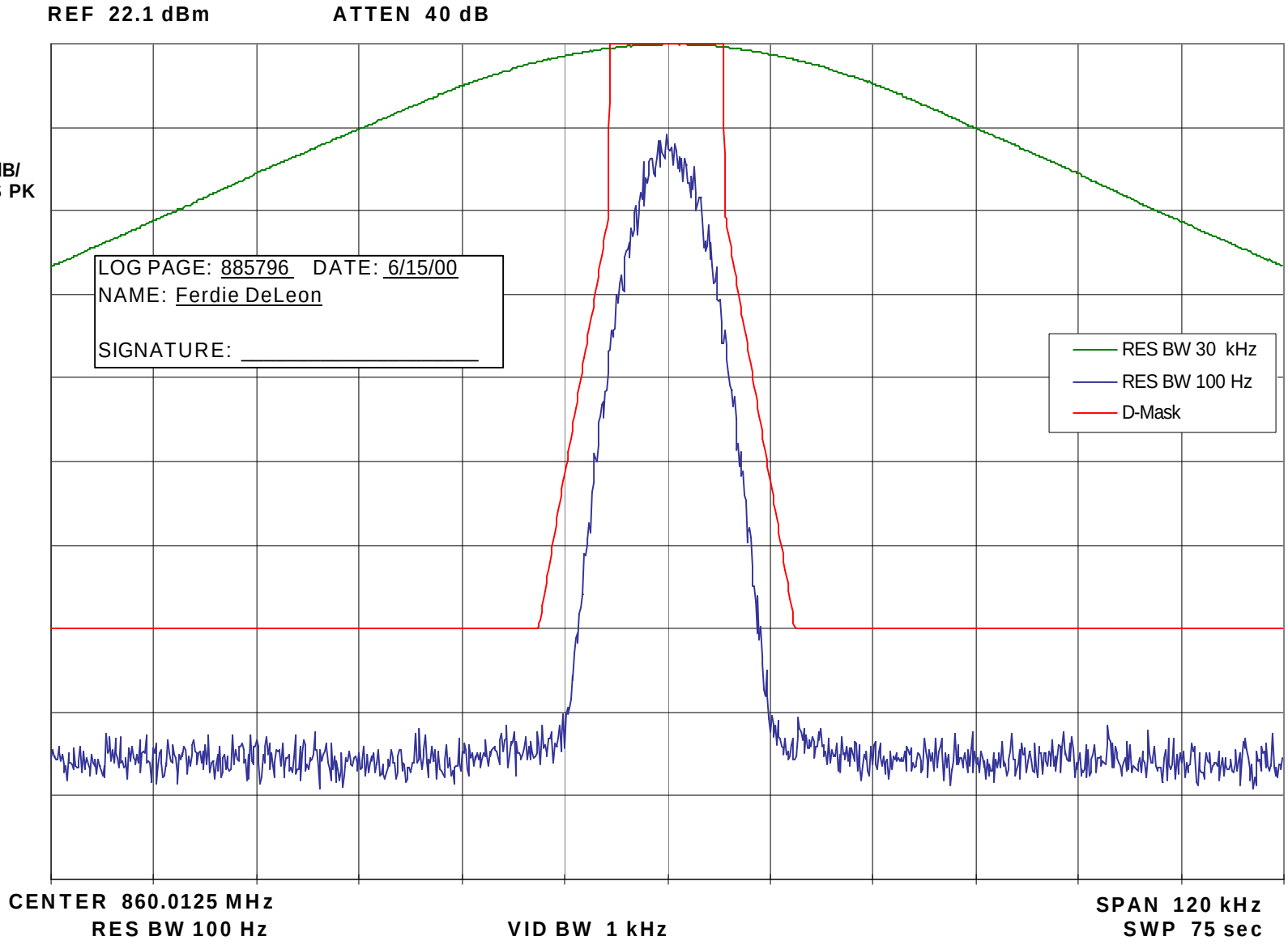


EXHIBIT 11B (Sheet 2 of 2)

CONDUCTED SPURIOUS EMISSIONS

SPECIFICATION REQUIREMENT:

Reference: Part 90.210 (Emission Mask D)

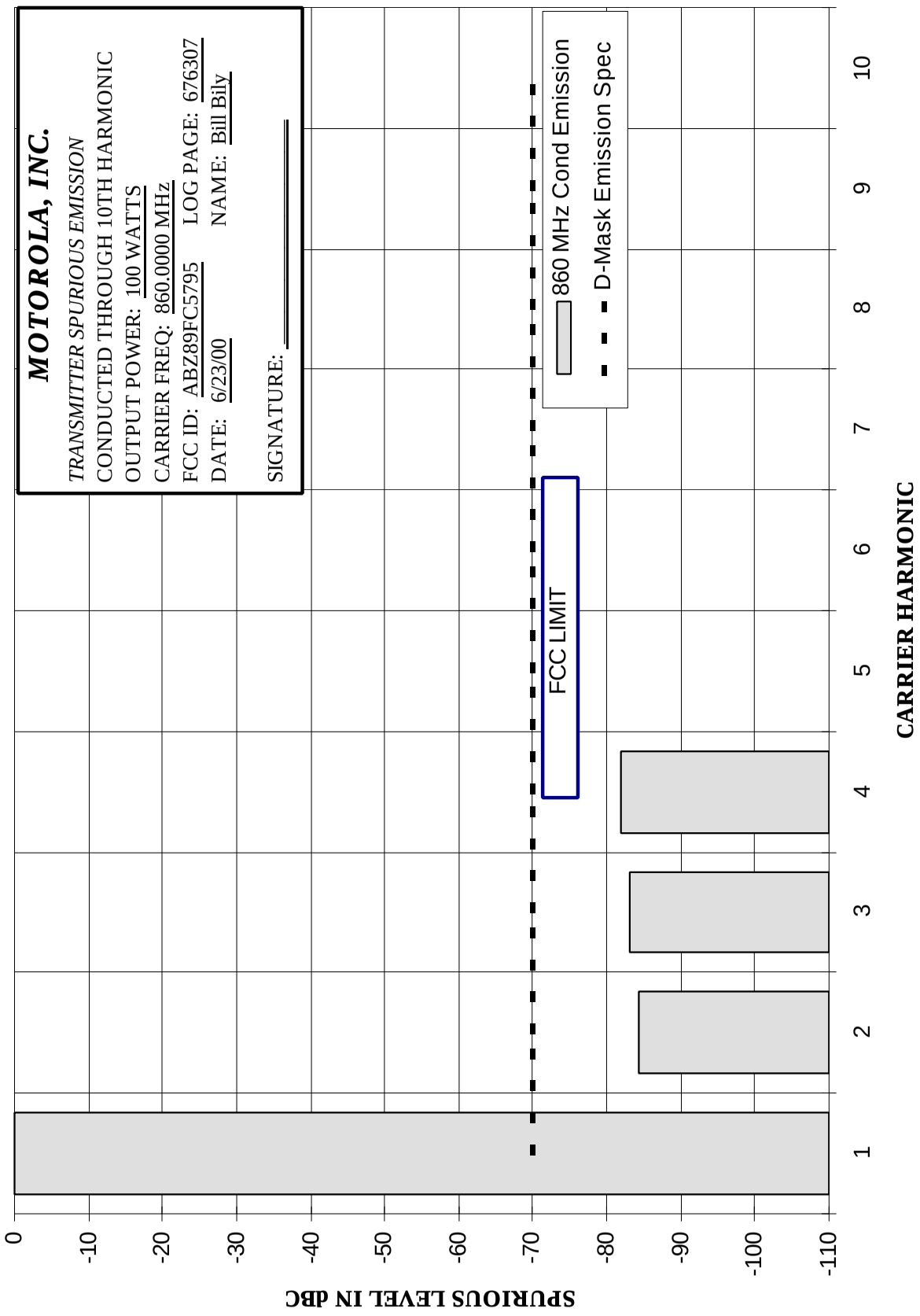
On any frequency displacement of more than 12.5 kHz removed from the center of the authorized bandwidth, the power of any emission shall be attenuated below the transmitter power (P) by at least 50 plus 10 $\log_{10}$(Mean output power in Watts) decibels or 70 decibels, whichever is the lesser attenuation.

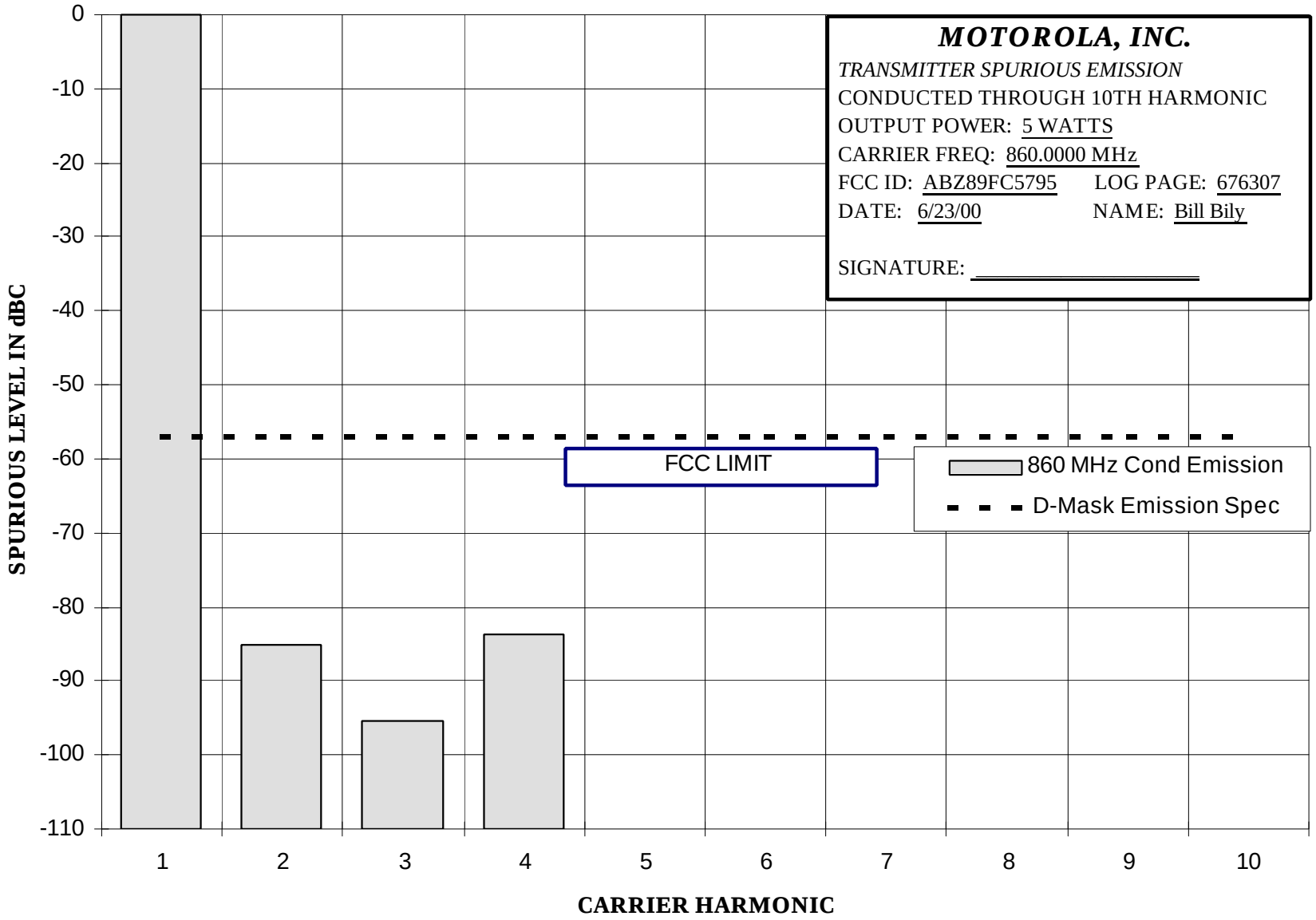
For this transmitter, when operating at the full power setting of 100 Watts, this specification limit is 70.0 dBC.
For this transmitter, when operating at the lowest power setting of 5 Watts, this specification limit is 57.0 dBC.

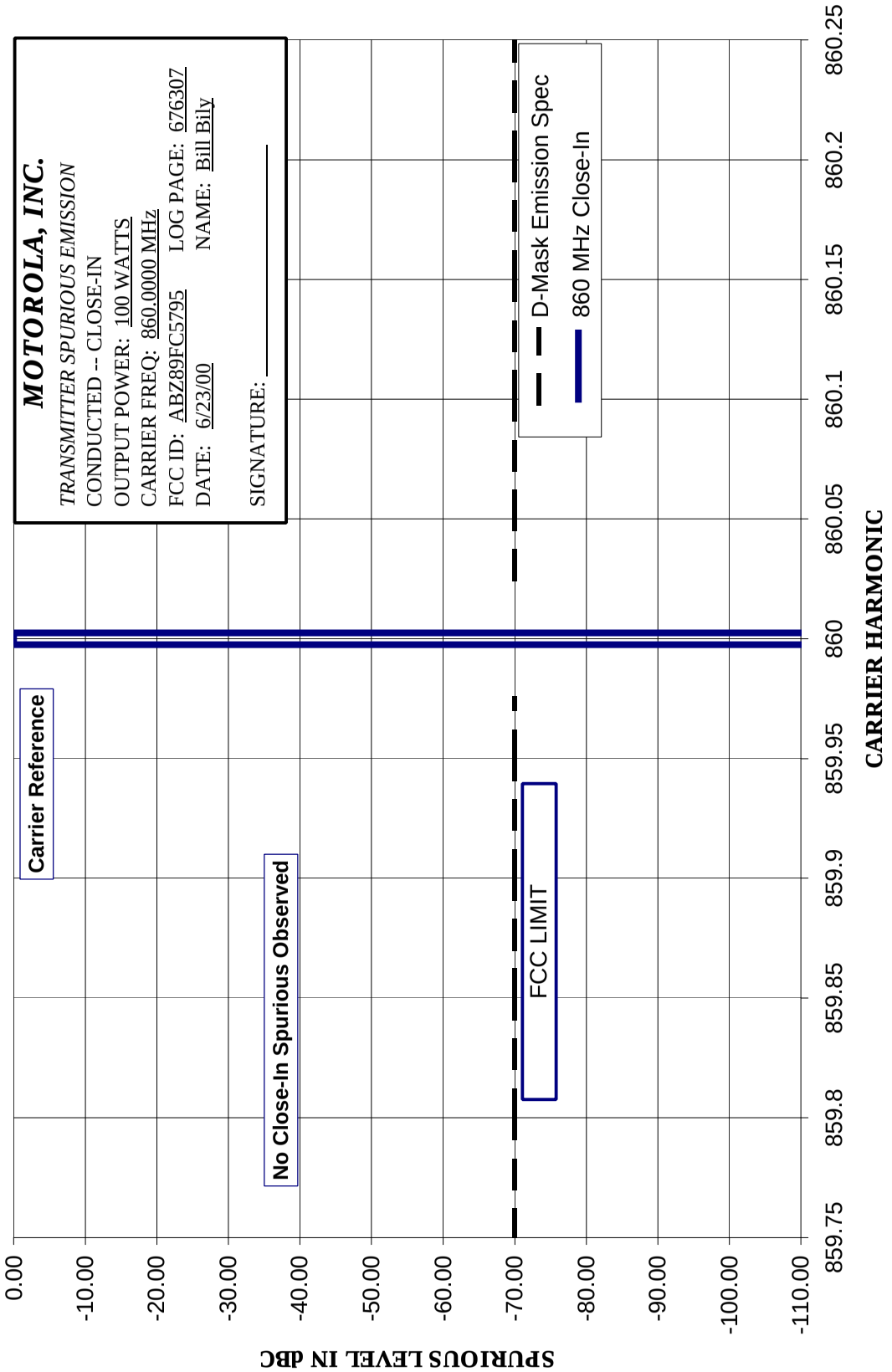
Modulation:	Psuedorandom data
Carrier Frequency:	One carrier frequency, at 860.0000 MHz, was measured. This frequency is near the center of the operating band 851-870 MHz.

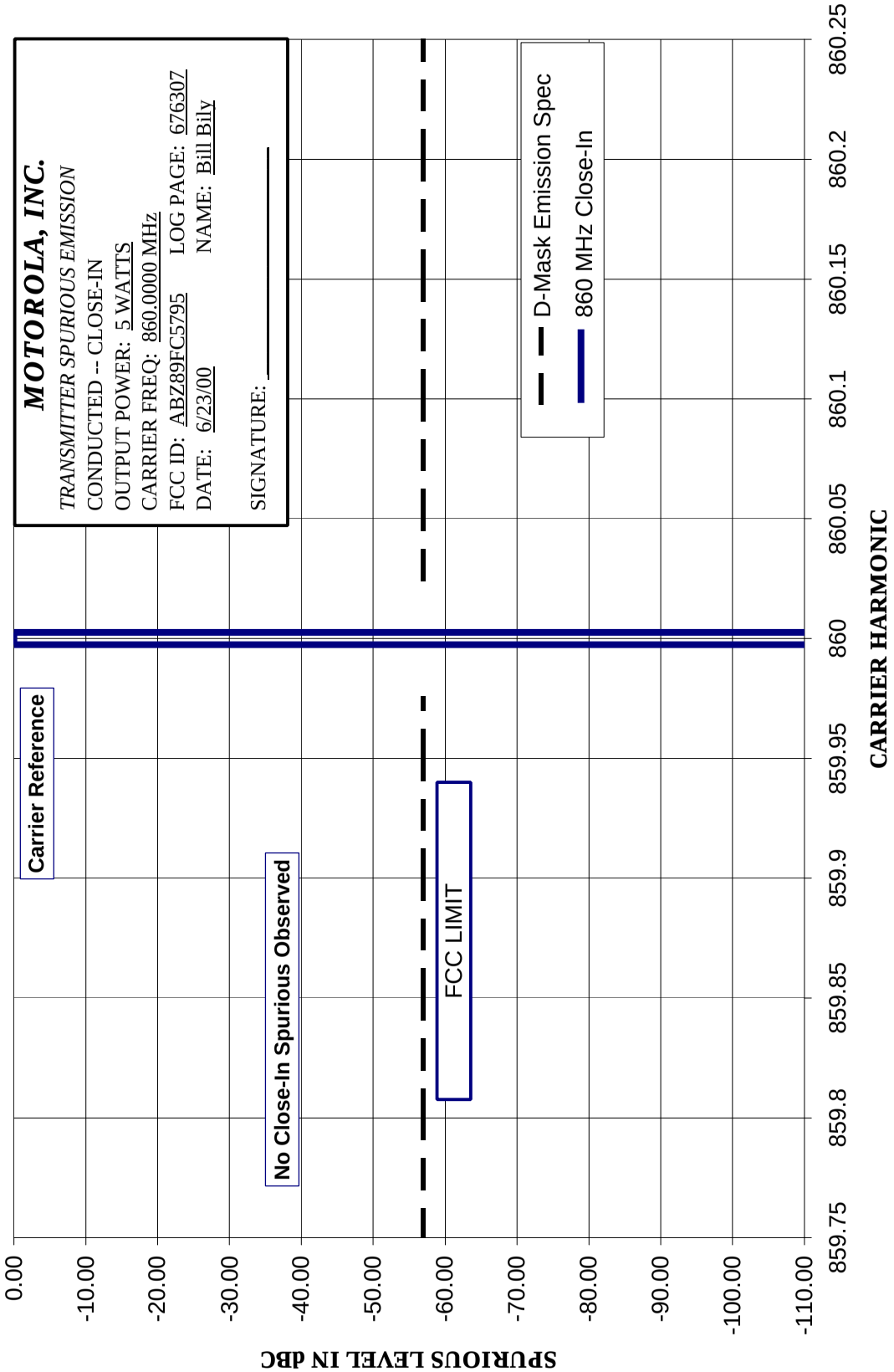
SPURIOUS EMISSION PLOTS:

EXHIBIT	DESCRIPTION
11C-1	Conducted Spurious Harmonic Emissions, Power Output at 100 Watts
11C-2	Conducted Spurious Harmonic Emissions, Power Output at 5 Watts
11C-3	Conducted Spurious Close-In Emissions, Power Output at 100 Watts
11C-4	Conducted Spurious Close-In Emissions, Power Output at 5 Watts


MOTOROLA, INC.
TRANSMITTER SPURIOUS EMISSION
CONDUCTED THROUGH 10TH HARMONIC
OUTPUT POWER: 100 WATTS
CARRIER FREQ: 860.0000 MHz
FCC ID: ABZ89FC5795 LOG PAGE: 676307
DATE: 6/23/00 NAME: Bill Bily
SIGNATURE:
860 MHz Cond Emission
D-Mask Emission Spec
FCC LIMIT
SPURIOUS LEVEL IN dBC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1
2
3
4
5
6
7
8
9
10
CARRIER HARMONIC


MOTOROLA, INC.
TRANSMITTER SPURIOUS EMISSION
CONDUCTED THROUGH 10TH HARMONIC
OUTPUT POWER: 5 WATTS
CARRIER FREQ: 860.0000 MHz
FCC ID: ABZ89FC5795 LOG PAGE: 676307
DATE: 6/23/00 NAME: Bill Bily
SIGNATURE:
FCC LIMIT
860 MHz Cond Emission
D-Mask Emission Spec
SPURIOUS LEVEL IN dBC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1
2
3
4
5
6
7
8
9
10
CARRIER HARMONIC


MOTOROLA, INC.
TRANSMITTER SPURIOUS EMISSION
CONDUCTED -- CLOSE-IN
OUTPUT POWER: 100 WATTS
CARRIER FREQ: 860.0000 MHz
FCC ID: ABZ89FC5795 LOG PAGE: 676307
DATE: 6/23/00 NAME: Bill Bily
SIGNATURE: _____
D-Mask Emission Spec
860 MHz Close-In
Carrier Reference
No Close-In Spurious Observed
FCC LIMIT
SPURIOUS LEVEL IN dBC
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
-80.00
-90.00
-100.00
-110.00
859.75
859.8
859.85
859.9
859.95
860
860.05
860.1
860.15
860.2
860.25
CARRIER HARMONIC


MOTOROLA, INC.
TRANSMITTER SPURIOUS EMISSION
CONDUCTED -- CLOSE-IN
OUTPUT POWER: 5 WATTS
CARRIER FREQ: 860.0000 MHz
FCC ID: ABZ89FC5795 LOG PAGE: 676307
DATE: 6/23/00 NAME: Bill Bily
SIGNATURE:
Carrier Reference
No Close-In Spurious Observed
FCC LIMIT
D-Mask Emission Spec
860 MHz Close-In
SPURIOUS LEVEL IN dBC
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
-80.00
-90.00
-100.00
-110.00
859.75
859.8
859.85
859.9
859.95
860
860.05
860.1
860.15
860.2
860.25
CARRIER HARMONIC

RADIATED SPURIOUS EMISSIONS

SPECIFICATION REQUIREMENT:

Reference: Part 90.210 (Emission Mask D)

On any frequency displacement of more than 12.5 kHz removed from the center of the authorized bandwidth, the power of any emission shall be attenuated below the transmitter power (P) by at least 50 plus 10 $\log_{10}$(Mean output power in Watts) decibels or 70 decibels, whichever is the lesser attenuation.

For this transmitter, when operating at the full power setting of 100 Watts, this specification limit is 70.0 dBC.
For this transmitter, when operating at the lowest power setting of 5 Watts, this specification limit is 57.0 dBC.

Modulation:	Psuedorandom data
Carrier Frequency:	One carrier frequency, at 860.0000 MHz, was measured. This frequency is near the center of the operating band 851-870 MHz.

SPURIOUS EMISSION PLOTS:

EXHIBIT	DESCRIPTION
11D-1	Radiated Spurious Emissions, Power Output at 100 Watts
11D-2	Radiated Spurious Emissions, Power Output at 5 Watts

APPLICANT: MOTOROLA, INC.

EQUIPMENT TYPE: ABZ89FC5795

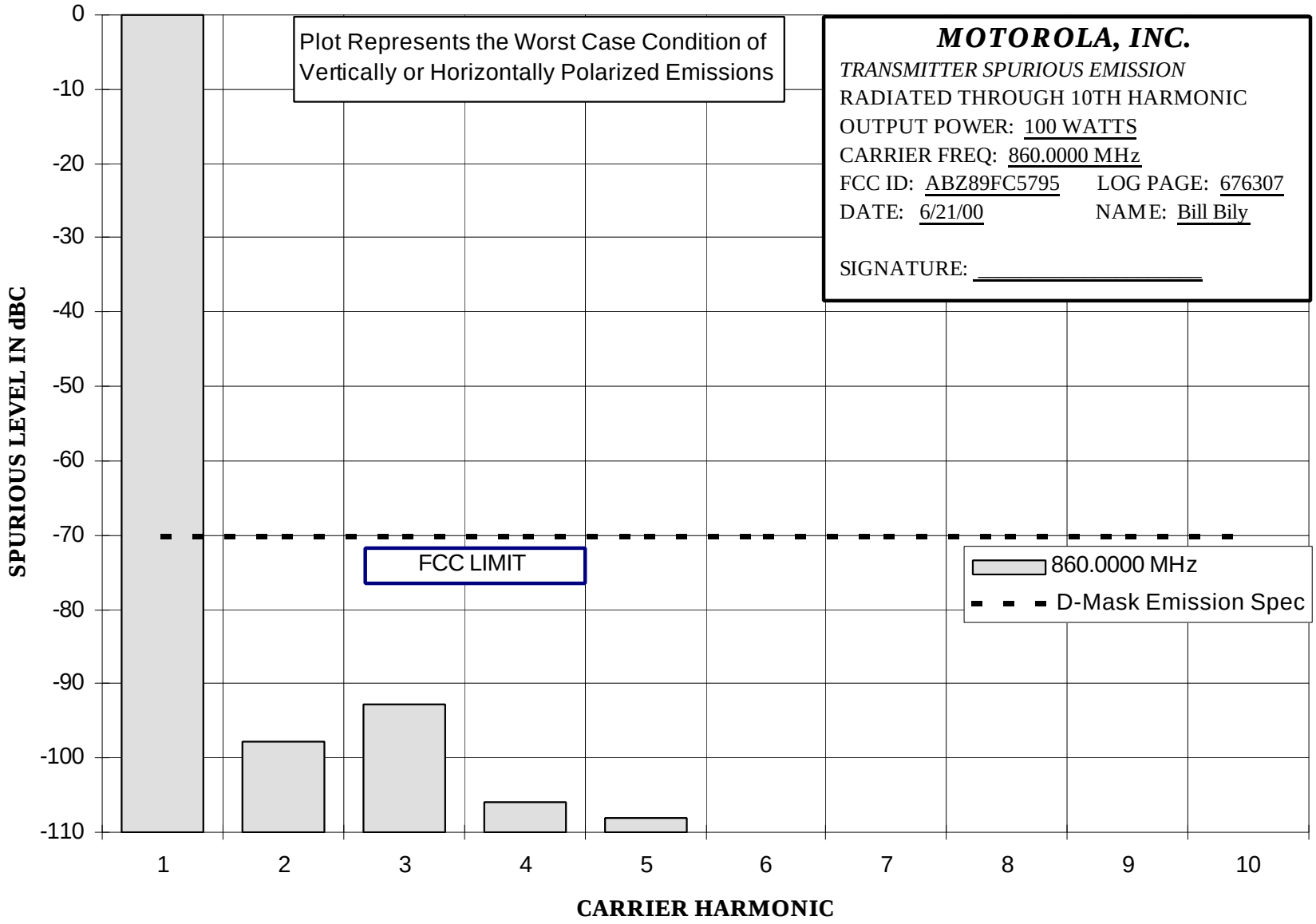
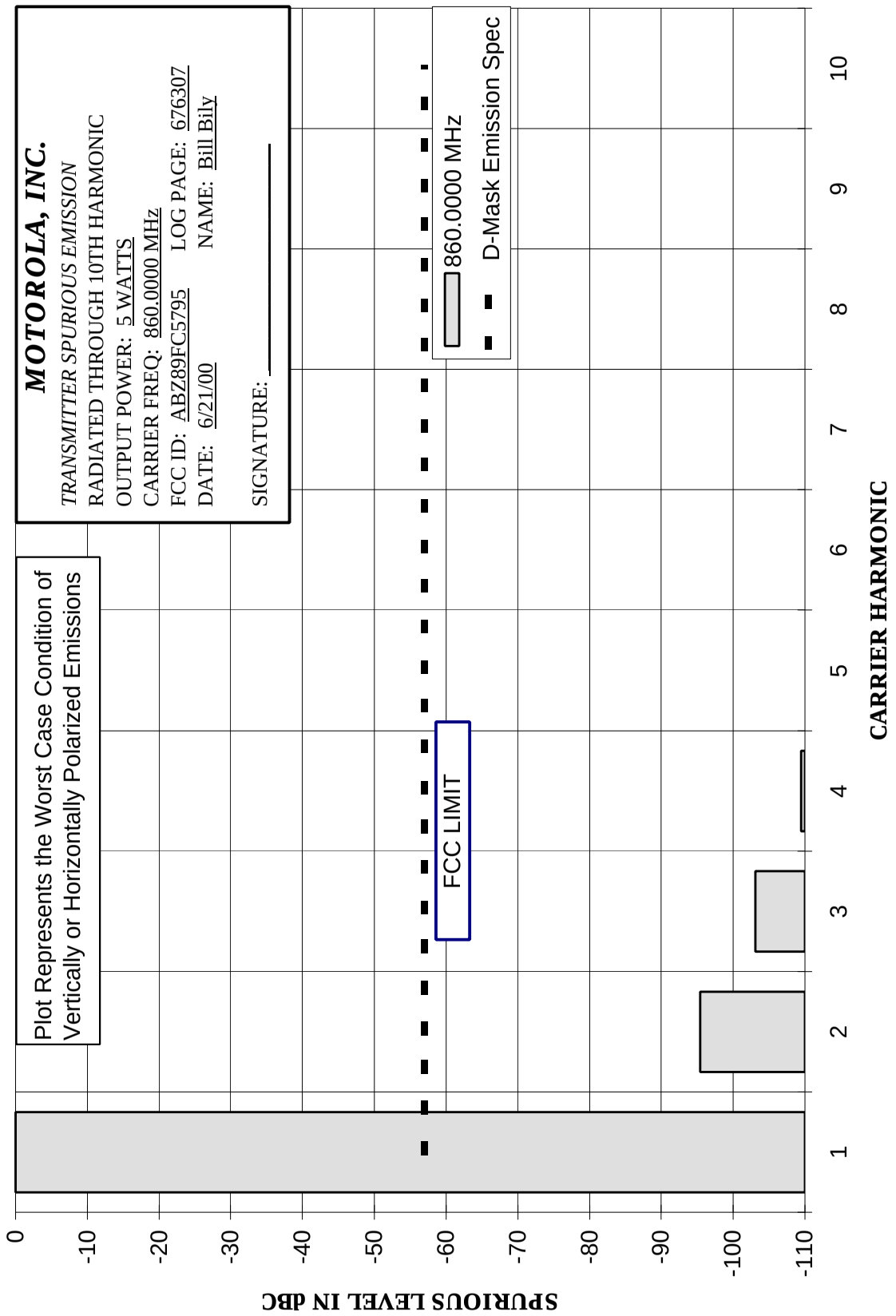


EXHIBIT 11D-1


MOTOROLA, INC.
TRANSMITTER SPURIOUS EMISSION
RADIATED THROUGH 10TH HARMONIC
OUTPUT POWER: 5 WATTS
CARRIER FREQ: 860.0000 MHz
FCC ID: ABZ89FC5795 LOG PAGE: 676307
DATE: 6/21/00 NAME: Bill Bily
SIGNATURE:
Plot Represents the Worst Case Condition of Vertically or Horizontally Polarized Emissions
860.0000 MHz
D-Mask Emission Spec
FCC LIMIT
SPURIOUS LEVEL IN dBC
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1
2
3
4
5
6
7
8
9
10
CARRIER HARMONIC

OSCILLATOR FREQUENCY STABILITY

SPECIFICATION REQUIREMENT:

Reference: Part 90.213

Fixed and Base stations, operating at 851-866 MHz, must have a frequency stability of better than 1.5 PPM.
Fixed and Base stations, operating at 866-869 MHz, must have a frequency stability of better than 1.0 PPM.

Manufacturer data for the system site frequency standard was used in generation of the following frequency stability exhibits.

FREQUENCY STABILITY PLOTS:

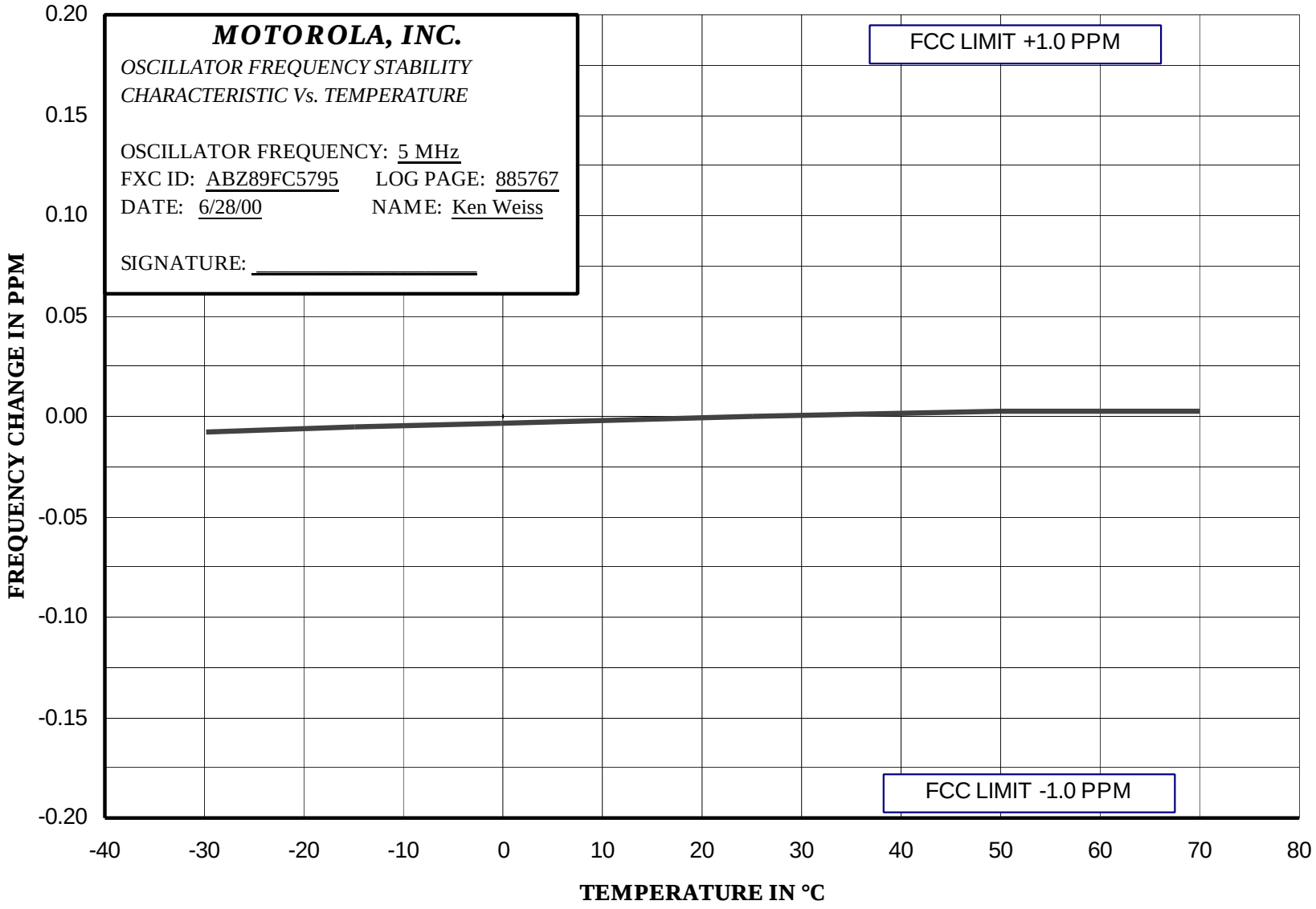
EXHIBIT	DESCRIPTION
11E-1	Frequency Stability Vs Temperature
11E-2	Frequency Stability Vs Voltage

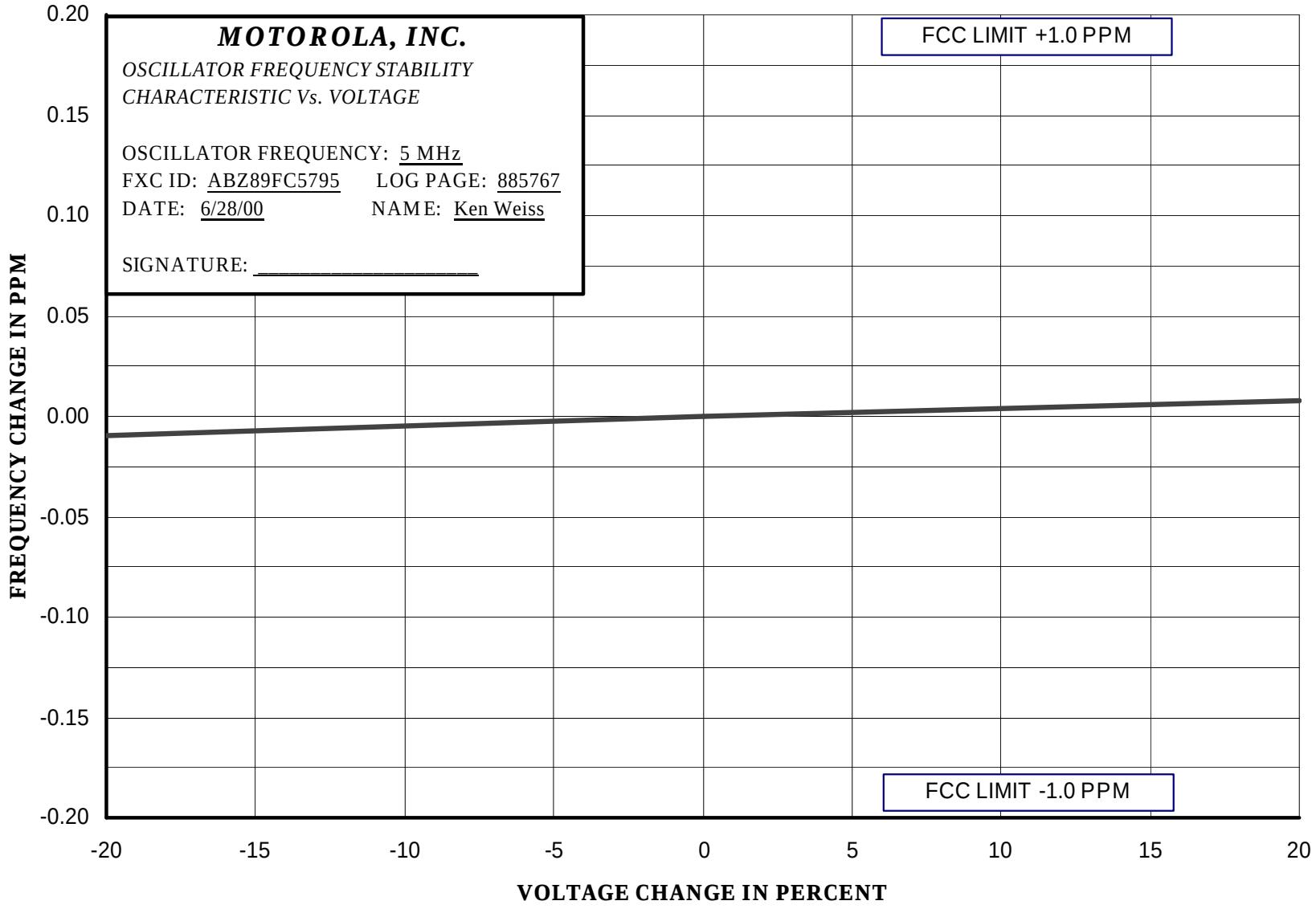
MOTOROLA, INC.

OSCILLATOR FREQUENCY STABILITY CHARACTERISTIC Vs. TEMPERATURE

OSCILLATOR FREQUENCY: 5 MHz
FXC ID: ABZ89FC5795 LOG PAGE: 885767
DATE: 6/28/00 NAME: Ken Weiss

SIGNATURE: _____




MOTOROLA, INC.
OSCILLATOR FREQUENCY STABILITY
CHARACTERISTIC Vs. VOLTAGE
OSCILLATOR FREQUENCY: 5 MHz
FXC ID: ABZ89FC5795 LOG PAGE: 885767
DATE: 6/28/00 NAME: Ken Weiss
SIGNATURE: _____
FCC LIMIT +1.0 PPM
FCC LIMIT -1.0 PPM
FREQUENCY CHANGE IN PPM
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
-20
-15
-10
-5
0
5
10
15
20
VOLTAGE CHANGE IN PERCENT

TEST EQUIPMENT LIST

MODEL	MANUFACTURER	DESCRIPTION	Serial No.	Last Cal	Next Cal
438A	Hewlett Packard	RF Power Meter	3513U06093	11/05/99	11/05/02
8481A	Hewlett Packard	RF Power Sensor	2702A78679	12/02/98	12/02/01
8568B	Hewlett Packard	Spectrum Analyzer	2841A04405	06/18/97	06/18/00
7475A	Hewlett Packard	Plotter	2807F99291	no calibration required	
6071A	Fluke	Signal Generator	3005007	no calibration required	
83712A	Hewlett Packard	Signal Generator	3429A00455	no calibration required	
85460A	Hewlett Packard	EMI Analyzer, Filter	3704A00467	10/12/99	10/12/02
85462A	Hewlett Packard	EMI Analyzer, RF/Display	3906A00500	10/12/99	10/12/02
(Various)	Weinschel, Kathrein, Bird	RF Loads	Various	no calibration required	
3020A, etc.	Narda	Directional Coupler	Various	no calibration required	