

**Report on Test Measurements***Measurements Report*

The measurement report shows compliance information against the pertinent technical standards. Each section of the report contains either verbiage or graphs which show compliance to applicable standards as required. Each section also explains testing method and indicates what the applicable specification is.

A list of test equipment for all sections, and certification signoff page are included at the end of the measurement report.

**SUBMITTED MEASURED DATA – INDEX****EXHIBIT    DESCRIPTION**

|         |                                                                                      |
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| E1-2.2  | Audio Frequency Response – Modulation Characteristics, 12.5 kHz Channels             |
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**Report on Test Measurements***Measurements Report*

## SUBMITTED MEASURED DATA – INDEX (Continued)

**EXHIBIT    DESCRIPTION**

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| E1-5.2 | Conducted Spurious Emissions, Harmonics, Power 5 Watts, Low / Mid / High Frequencies   |
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| E1-6.1 | Radiated Spurious Emissions, Harmonics, Power 100 Watts, Middle of Band                |
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| E1-8.2 | Frequency Transient Behavior, 25 kHz Channel De-key                                    |
| E1-8.3 | Frequency Transient Behavior, 12.5 kHz Channel Key-Up                                  |
| E1-8.4 | Frequency Transient Behavior, 12.5 kHz Channel De-key                                  |
| E1-11  | Test Equipment Used                                                                    |
| E1-12  | Statement of Certification                                                             |

## Report on Test Measurements

*RF Power Output Data*

The RF power output was measured with the indicated voltage applied to and current into the final RF amplifying device. The DC current indicated is the total for the final RF amplifier stage, consisting of four parallel power transistors.

## Analog Voice Frequency Modulation Mode:

|                                               |             |                |
|-----------------------------------------------|-------------|----------------|
| Measured RF output                            | <u>100</u>  | Watts          |
| DC Voltage                                    | <u>28.2</u> | Volts          |
| DC Current                                    | <u>9.2</u>  | Amperes        |
| Input power for final RF amplifying device(s) | <u>260</u>  | Watts          |
| Primary Radio Input Supply Voltage            | <u>120</u>  | Volts AC       |
| Minimum Measured RF output                    | <u>8</u>    | Watts, Average |
| Normal DC Voltage                             | <u>28.5</u> | Volts          |
| Normal DC Current                             | <u>2.7</u>  | Amperes        |
| Input power for final RF amplifying device(s) | <u>77</u>   | Watts          |
| Primary Radio Input Supply Voltage            | <u>120</u>  | Volts AC       |

## Digital 4-Level Frequency Shift Key Modulation Mode:

|                                               |             |                |
|-----------------------------------------------|-------------|----------------|
| Measured RF output                            | <u>100</u>  | Watts          |
| DC Voltage                                    | <u>28.2</u> | Volts          |
| DC Current                                    | <u>9.2</u>  | Amperes        |
| Input power for final RF amplifying device(s) | <u>260</u>  | Watts          |
| Primary Radio Input Supply Voltage            | <u>120</u>  | Volts AC       |
| Minimum Measured RF output                    | <u>8</u>    | Watts, Average |
| Normal DC Voltage                             | <u>28.5</u> | Volts          |
| Normal DC Current                             | <u>2.7</u>  | Amperes        |
| Input power for final RF amplifying device(s) | <u>77</u>   | Watts          |
| Primary Radio Input Supply Voltage            | <u>120</u>  | Volts AC       |

## Report on Test Measurements

*Audio Frequency Response*Specification Requirement per TIA 603:

Audio Frequency Response, 25 kHz Channels: The audio frequency response from 300 Hz to 3000 Hz shall not vary more than +1 dB or -3 dB from a true 6 dB per octave pre-emphasis characteristic as referenced to the 1000 Hz level, with an additional 6 dB per octave attenuation allowed from 500 Hz to 300 Hz, and an additional 6 dB per octave attenuation is allowed from 2500 Hz to 3000 Hz in equipment operating in the 25 MHz to 869 MHz range.

Audio Frequency Response, 12.5 kHz Channels: The audio frequency response from 300 Hz to 3000 Hz shall not vary more than +1 dB or -3 dB from a true 6 dB per octave pre-emphasis characteristic as referenced to the 1000 Hz level, with an additional 6 dB per octave attenuation allowed from 500 Hz to 300 Hz. An additional 6 dB per octave rolloff is allowed from 2300 Hz to 2700 Hz, and an additional 12 dB per octave is allowed from 2700 Hz to 3000 Hz in equipment operating in the 896 MHz to 940 MHz range or for 12.5 kHz channel operation.

Modulation: Audio Test Tone

Carrier Frequency: A carrier at 436.0125 MHz was measured. This frequency is near the center of the operating band 403-470 MHz

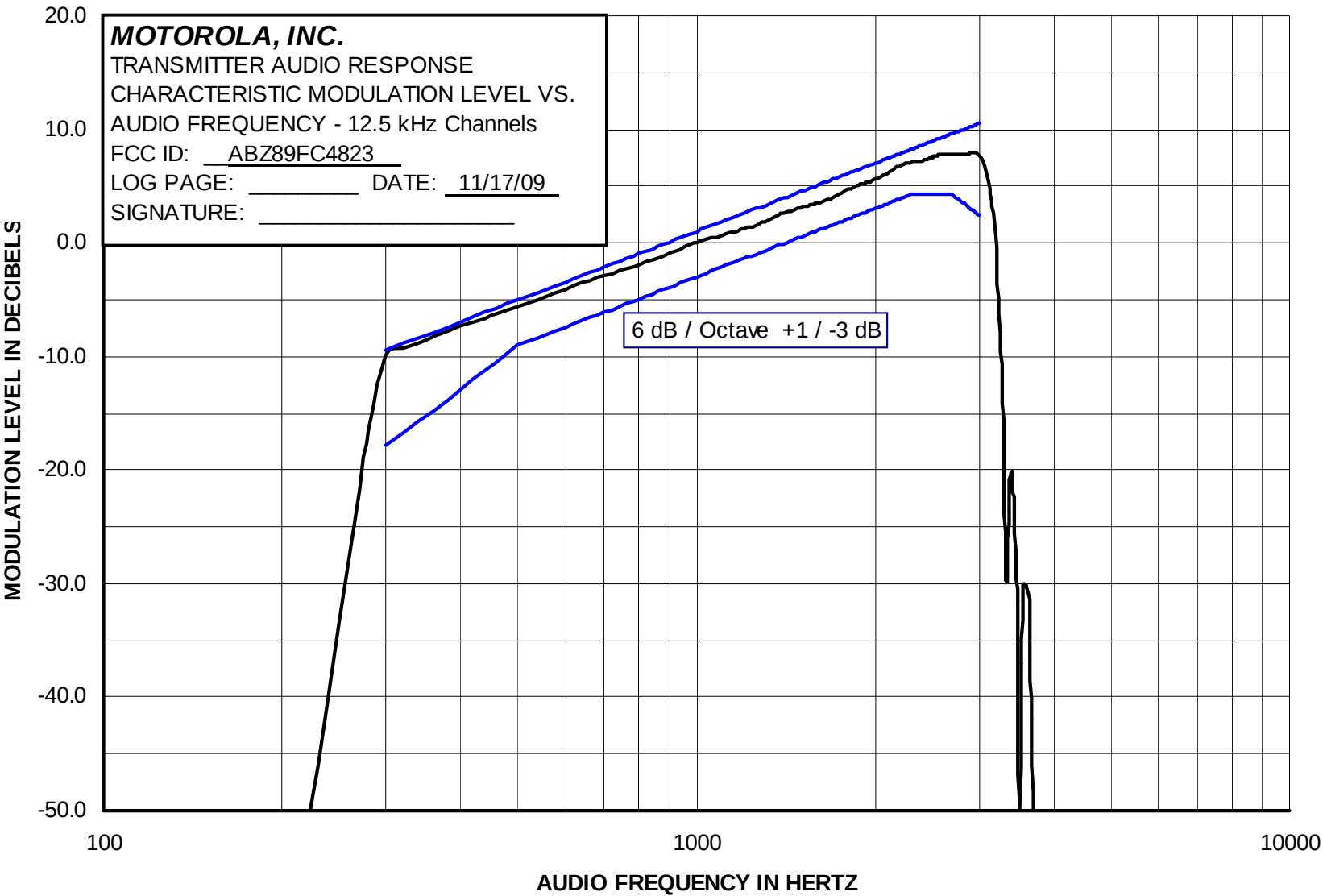
| EXHIBIT | DESCRIPTION                                                              |
|---------|--------------------------------------------------------------------------|
| E1-2.1  | Audio Frequency Response – Modulation Characteristics, 25 kHz Channels   |
| E1-2.2  | Audio Frequency Response – Modulation Characteristics, 12.5 kHz Channels |
|         | The specification limit is shown on the response plots                   |

### Audio Frequency Response – 25 kHz Channels



Report on Test Measurements

Audio Frequency Response – 12.5 kHz Channels



**Report on Test Measurements***Modulation Limiting*Specification Requirement per TIA 603:

Modulation Limiting, 25 kHz Channels: The maximum instantaneous peak and steady state deviations shall not exceed the rated system deviation of +/- 5 kHz at any audio frequency or change in level as specified in the method of measurement.

The minimum value of modulation limiting shall be at least 60% of the rated system deviation, or 3 kHz.

Modulation Limiting, 12.5 kHz Channels: The maximum instantaneous peak and steady state deviations shall not exceed the rated system deviation of +/- 2.5 kHz at any audio frequency or change in level as specified in the method of measurement.

The minimum value of modulation limiting shall be at least 60% of the rated system deviation, or 1.5 kHz.

Modulation: Audio Test Tone, Varying Frequency between 300 Hz and 3000 Hz

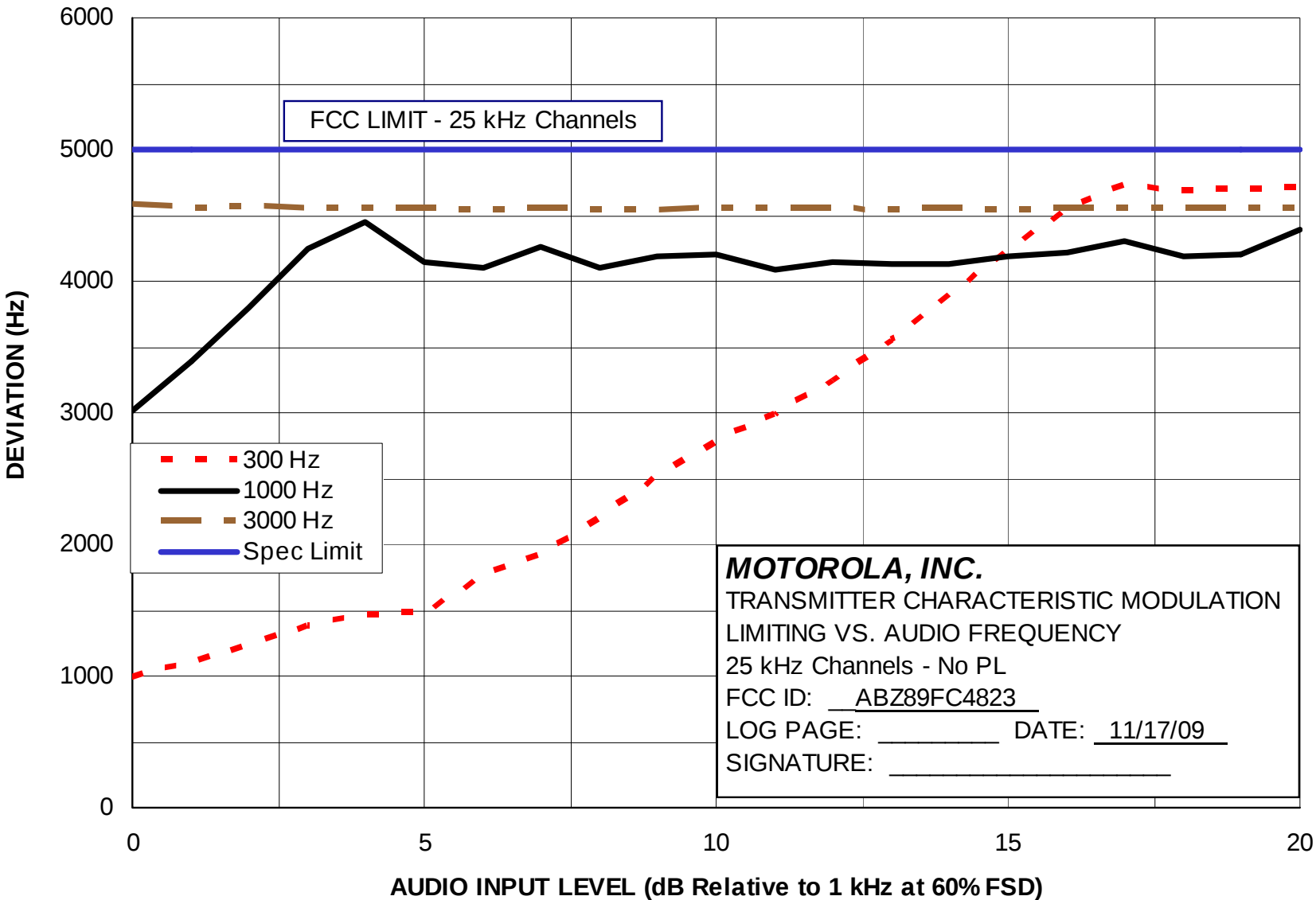
Carrier Frequency: A carrier at 436.0125 MHz was measured. This frequency is near the center of the operating band 403-470 MHz

**Modulation Limiting Response Plots:****EXHIBIT      DESCRIPTION**

- |        |                                                                              |
|--------|------------------------------------------------------------------------------|
| E1-3.1 | Modulation Limiting Response – Modulation Characteristics, 25 kHz Channels   |
| E1-3.2 | Modulation Limiting Response – Modulation Characteristics, 12.5 kHz Channels |

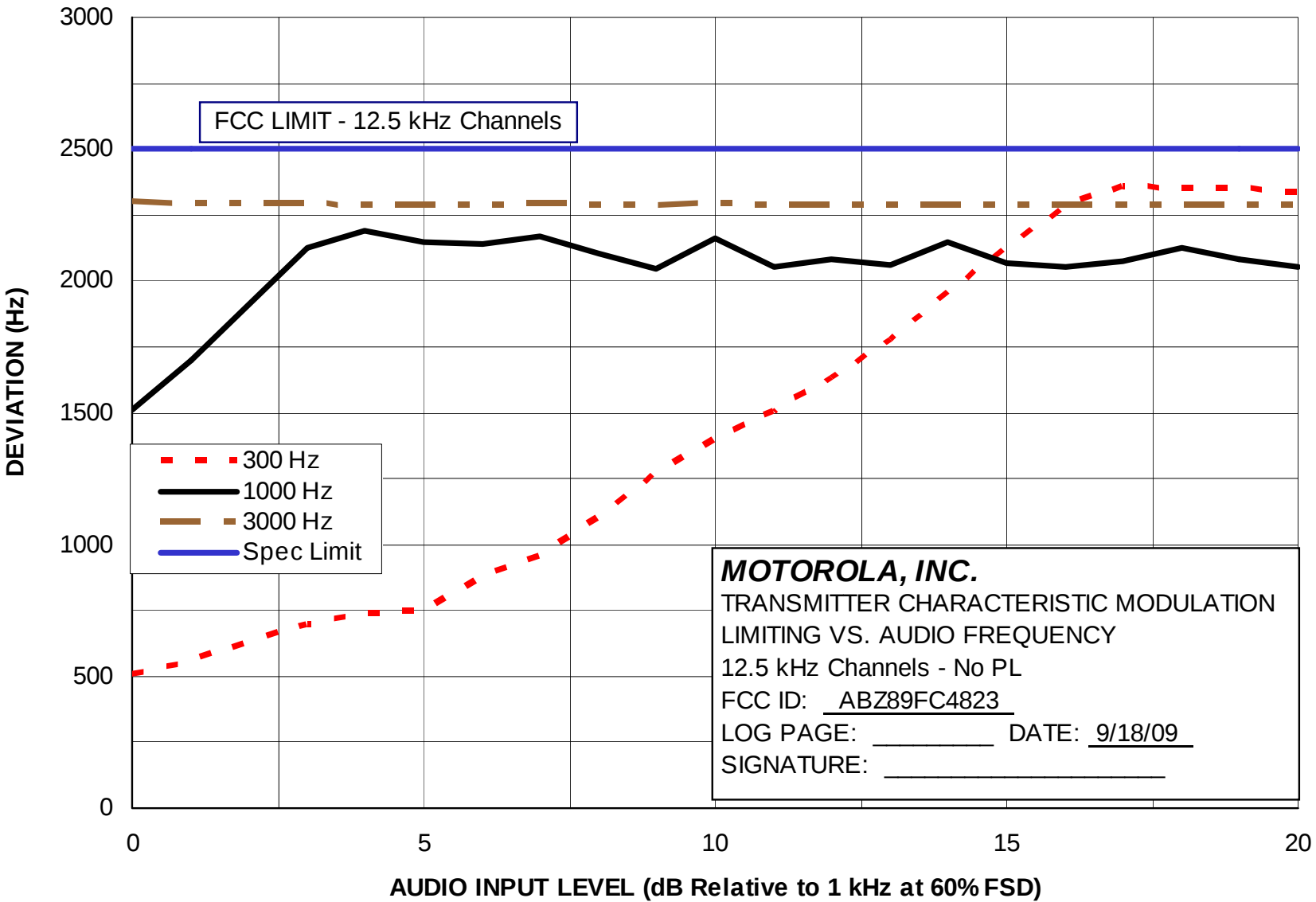
Report on Test Measurements

Modulation Limiting – 25 kHz Channels



Report on Test Measurements

Modulation Limiting – 12.5 kHz Channels



**Report on Test Measurements**Occupied Bandwidth – Analog Voice Frequency Modulation, 25 kHz Channel Spacing

The exhibits in this section show occupied bandwidth plots for analog voice modulation. Data is shown with the modulating audio tone itself, the tone plus Private Line (PL) sub-audible tone signaling, and tone plus Digital Private Line (DPL) sub-audible signaling.

The occupied bandwidth charts reference the following setup and specification requirements.

Modulation Type: Analog Voice  
 Emission Designator: 16K0F3E  
 Channelization: 25 kHz  
 Deviation Limit:  $\pm 5.0$  kHz Max  
 Power Setting: 100 Watts

Specification Requirement § 90.210(b) Emission Limits:

For transmitters equipped with an audio low pass filter and designed to operate with a 25 kHz channel spacing (authorized bandwidth 20 kHz), the power of any emission must be below the unmodulated carrier power (P) as follows:

On any frequency removed from the assigned frequency by a displacement frequency ( $F_d$  in kHz) of:

- |                                       |                                                |
|---------------------------------------|------------------------------------------------|
| a) >10 kHz up to and including 20 kHz | At least 25 dB;                                |
| b) >20 kHz up to and including 50 kHz | At least 35 dB;                                |
| c) >50 kHz                            | at least $43 + 10 * \log_{10}(P)$ dB or 80 dB; |
|                                       | (whichever is the lesser attenuation).         |

Necessary Bandwidth Calculation:

The necessary bandwidth of the modulation signal per the formulas defined in 47 CFR 2.202 (b) is as follows:

|                        |                         |                             |               |
|------------------------|-------------------------|-----------------------------|---------------|
| <u>Max Mod Freq, M</u> | <u>Max Deviation, D</u> | <u><math>2*(M+D)</math></u> | <u>Nec BW</u> |
| 3 kHz                  | 5 kHz                   | 16 kHz                      | 16K0          |

Emission Measurement Analyzer Settings:

|                |                                |                       |         |
|----------------|--------------------------------|-----------------------|---------|
| Horizontal:    | 12.5 kHz per Division          | Resolution Bandwidth: | 300 Hz  |
| Vertical:      | 10 dB per Division             | Video Bandwidth:      | 30 kHz  |
| Sweep Time:    | 72 Seconds (<2000 Hz / Second) | Span:                 | 125 kHz |
| Detector Mode: | Peak                           |                       |         |

Test Procedure:

- 1) Key the station with no modulation to obtain the unmodulated carrier reference level on the analyzer. Use the analyzer controls to set this reference to a full-scale reference line. Store this analyzer trace in trace A.
- 2) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation.
- 3) Allow the analyzer to sweep, and record the resultant emission levels in trace B.
- 4) Plot the resulting analyzer trace. The occupied bandwidth mask is then added along with additional labeling as appropriate.

**EXHIBIT DESCRIPTION**

|        |                                                                                           |
|--------|-------------------------------------------------------------------------------------------|
| E1-4.1 | Carrier with 2500 Hz Audio Tone, 25 kHz Channels                                          |
| E1-4.2 | Carrier with 2500 Hz Audio Tone and Private Line (PL) Signaling, 25 kHz Channels          |
| E1-4.3 | Carrier with 2500 Hz Audio Tone and Digital Private Line (DPL) Signaling, 25 kHz Channels |

## Report on Test Measurements

*Occupied Bandwidth – Analog Voice, Digitized Voice and Data Frequency Modulation, 12.5 kHz Channel Spacing*  
The exhibits in this section show occupied bandwidth plots for analog voice modulation. Data is shown with the modulating audio tone itself, the tone plus Private Line (PL) sub-audible tone signaling, and tone plus Digital Private Line (DPL) sub-audible signaling.

There is also an exhibit showing the occupied bandwidth plot for digitized voice or data modulation. The signaling utilized is 4-level frequency shift keying of the carrier frequency.

The occupied bandwidth charts reference the following setup and specification requirements.

|                      |              |                       |
|----------------------|--------------|-----------------------|
| Modulation Type:     | Analog Voice | Digitized Voice, Data |
| Emission Designator: | 11K0F3E      | 7K60FXE, 7K60FXD      |
| Channelization:      | 12.5 kHz     | 12.5 kHz              |
| Deviation Limit:     | ±5.0 kHz Max |                       |
| Power Setting:       | 100 Watts    | 100 Watts             |

Specification Requirement § 90.210(d) Emission Limits:

*Emission Mask D.* 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  $7.27 * (f_d - 2.88 \text{ kHz})$  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  $10 \log_{10}(P)$  dB or 70 dB, 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. In order to show compliance with the emissions mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to ensure that the emission profile is developed.

Necessary Bandwidth Calculation (Analog Emission):

The necessary bandwidth of the modulation signal per the formulas defined in 47 CFR 2.202 (b) is as follows:

|                        |                         |                             |               |
|------------------------|-------------------------|-----------------------------|---------------|
| <i>Max Mod Freq, M</i> | <i>Max Deviation, D</i> | <i><math>2*(M+D)</math></i> | <i>Nec BW</i> |
| 3 kHz                  | 2.5 kHz                 | 11 kHz                      | 11K0          |

Necessary Bandwidth Calculation (Digital Emission): An occupied bandwidth of 7.60 kHz was measured for this emission, per 2.202 paragraph (a) of the Rules and Regulations, as that bandwidth which contains 99% of the power in the transmitted signal. For this system, the necessary bandwidth has been chosen to be the same as the occupied bandwidth, thereby per paragraph (b) (2), the necessary bandwidth is 7K60.

Measurement Procedure and Instrument Settings:

Emission Measurement Analyzer Settings:

|                |                                |                       |         |
|----------------|--------------------------------|-----------------------|---------|
| Horizontal:    | 12.5 kHz per Division          | Resolution Bandwidth: | 100 Hz  |
| Vertical:      | 10 dB per Division             | Video Bandwidth:      | 10 kHz  |
| Sweep Time:    | 72 Seconds (<2000 Hz / Second) | Span:                 | 125 kHz |
| Detector Mode: | Peak                           |                       |         |

**Report on Test Measurements***Occupied Bandwidth –12.5 kHz Channel Spacing (continued)*Test Procedure (Analog Voice):

- 1) Key the station with no modulation to obtain the unmodulated carrier reference level on the analyzer. Use the analyzer controls to set this reference to a full-scale reference line. Store this analyzer trace in trace A.
- 2) Modulate the transmitter with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of rated system deviation.
- 3) Allow the analyzer to sweep, and record the resultant emission levels in trace B.
- 4) Plot the resulting analyzer trace. The occupied bandwidth mask is then added along with additional labeling as appropriate.

Test Procedure (Digitized Voice or Data):

- 1) Adjust the spectrum analyzer per the values specified in the Emission Measurement Analyzer Settings.
- 2) Modulate the transmitter with the appropriate signaling pattern, (pseudorandom data) and key the transmitter at the full power rating. Use the analyzer controls to set this signal to the full-scale reference line. Allow the analyzer to sweep fully and store the sweep.
- 3) Use the band power marker function of the spectrum analyzer to measure the power of the carrier in a 12.5 kHz bandwidth.
- 4) Use the carrier power value from the previous step to generate the emission mask limit.
- 5) Plot the resulting analyzer trace and the emission mask limit, add text and labeling as appropriate.

| <b>EXHIBIT</b> | <b>DESCRIPTION</b>                                                                          |
|----------------|---------------------------------------------------------------------------------------------|
| E1-4.11        | Carrier with 2500 Hz Audio Tone, 12.5 kHz Channels                                          |
| E1-4.12        | Carrier with 2500 Hz Audio Tone and Private Line (PL) Signaling, 12.5 kHz Channels          |
| E1-4.13        | Carrier with 2500 Hz Audio Tone and Digital Private Line (DPL) Signaling, 12.5 kHz Channels |
| E1-4.14        | Carrier with Digitized Voice / Data, 12.5 kHz Channels                                      |

APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC4823

Report on Test Measurements

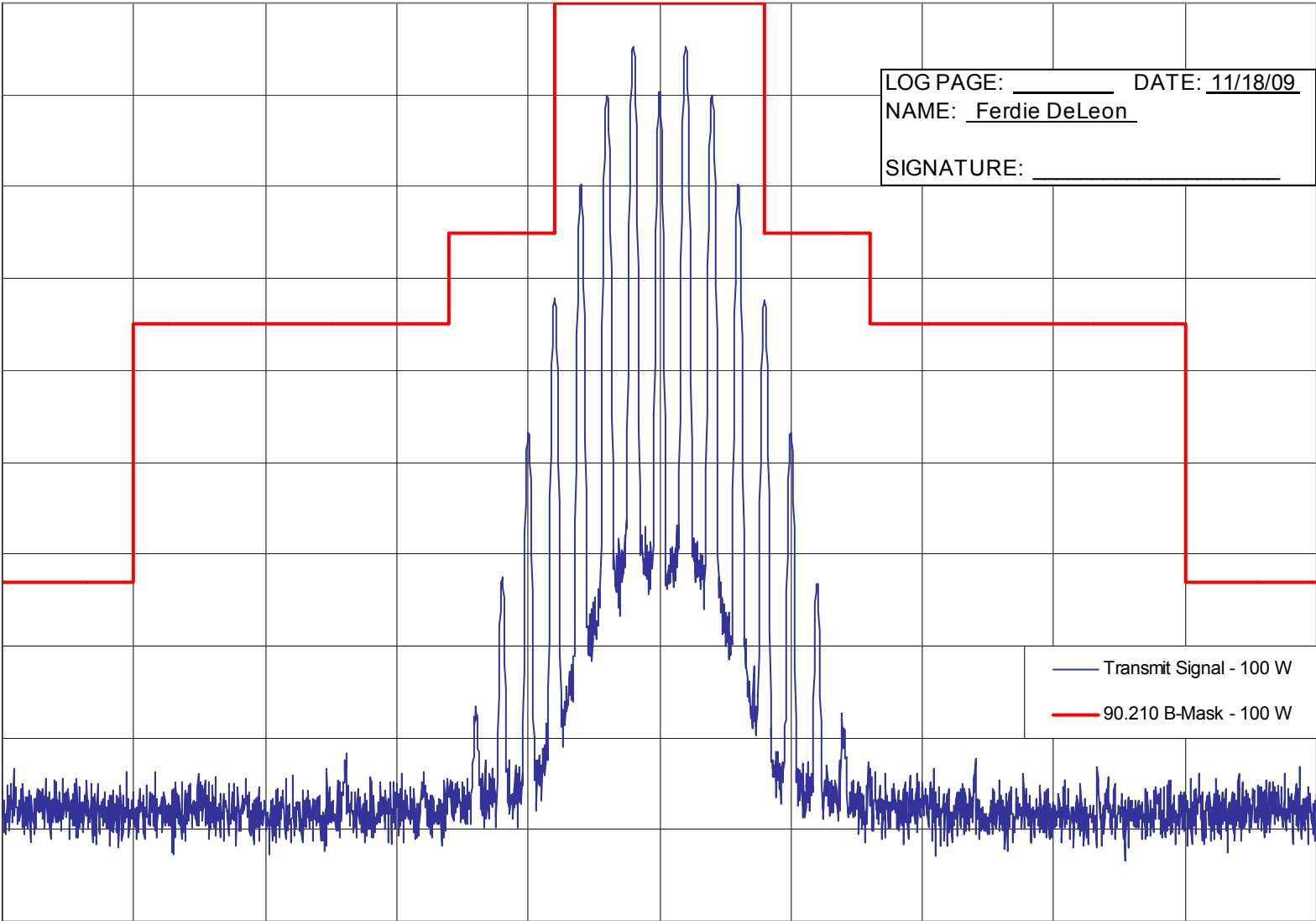
Occupied Bandwidth – Carrier with 2500 Hz Audio Tone, 25 kHz Channels

Occupied Bandwidth - 25 kHz Channels - Carrier with 2500 Hz Audio Tone - 16K0F3E

REF 50 dBm

ATTEN 20 dB

10 dB/  
Peak



CENTER 436.50 MHz

RES BW 100 Hz

VID BW 10 kHz

SPAN 125 kHz

SWP 72 sec

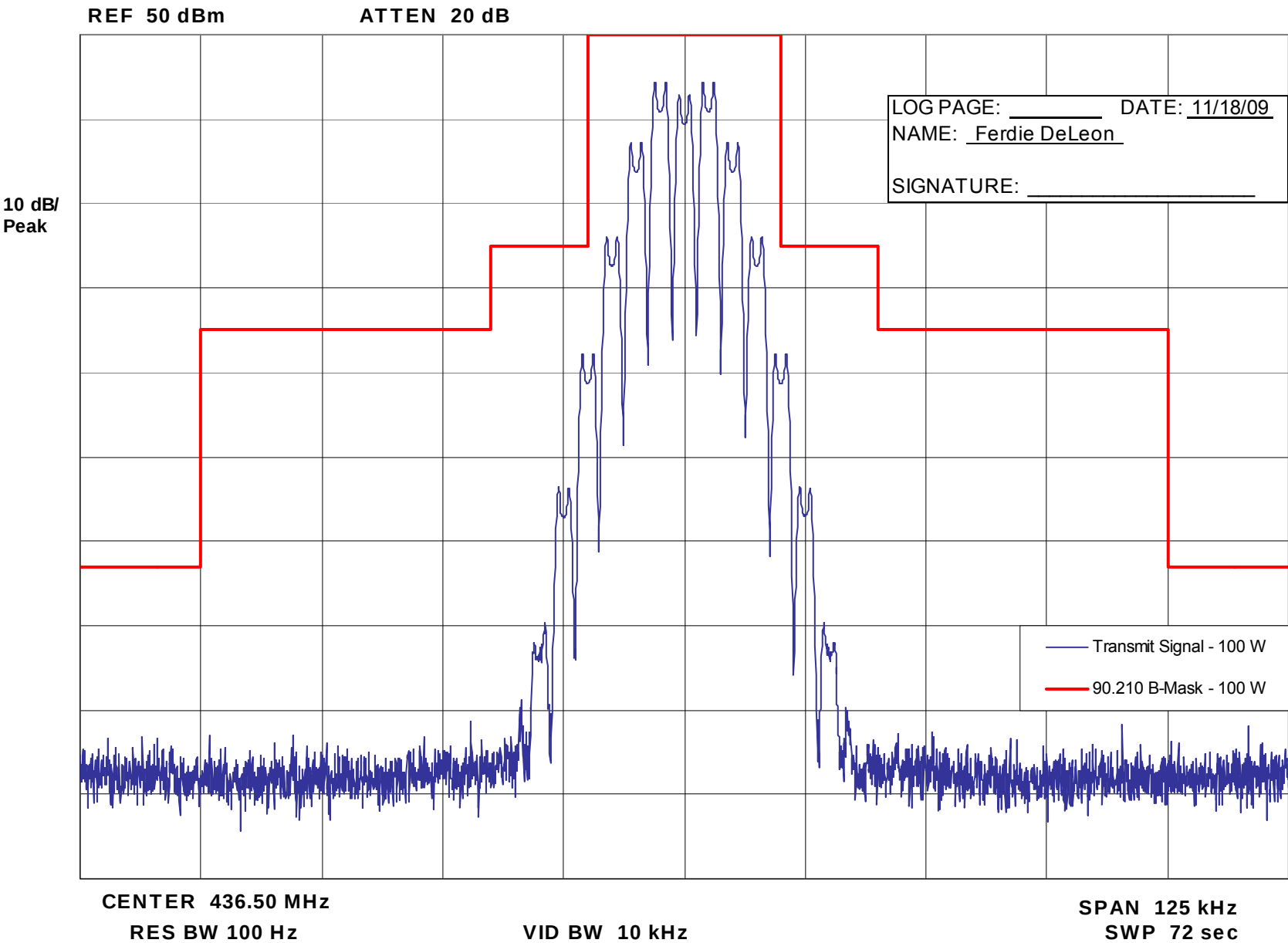
APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC4823

Report on Test Measurements

Occupied Bandwidth – Carrier with 2500 Hz Audio Tone and Private Line (PL) Signaling, 25 kHz Channels

Occupied Bandwidth - 25 kHz Channels - Carrier with 2500 Hz Audio and 123 Hz PL - 16K0F3E



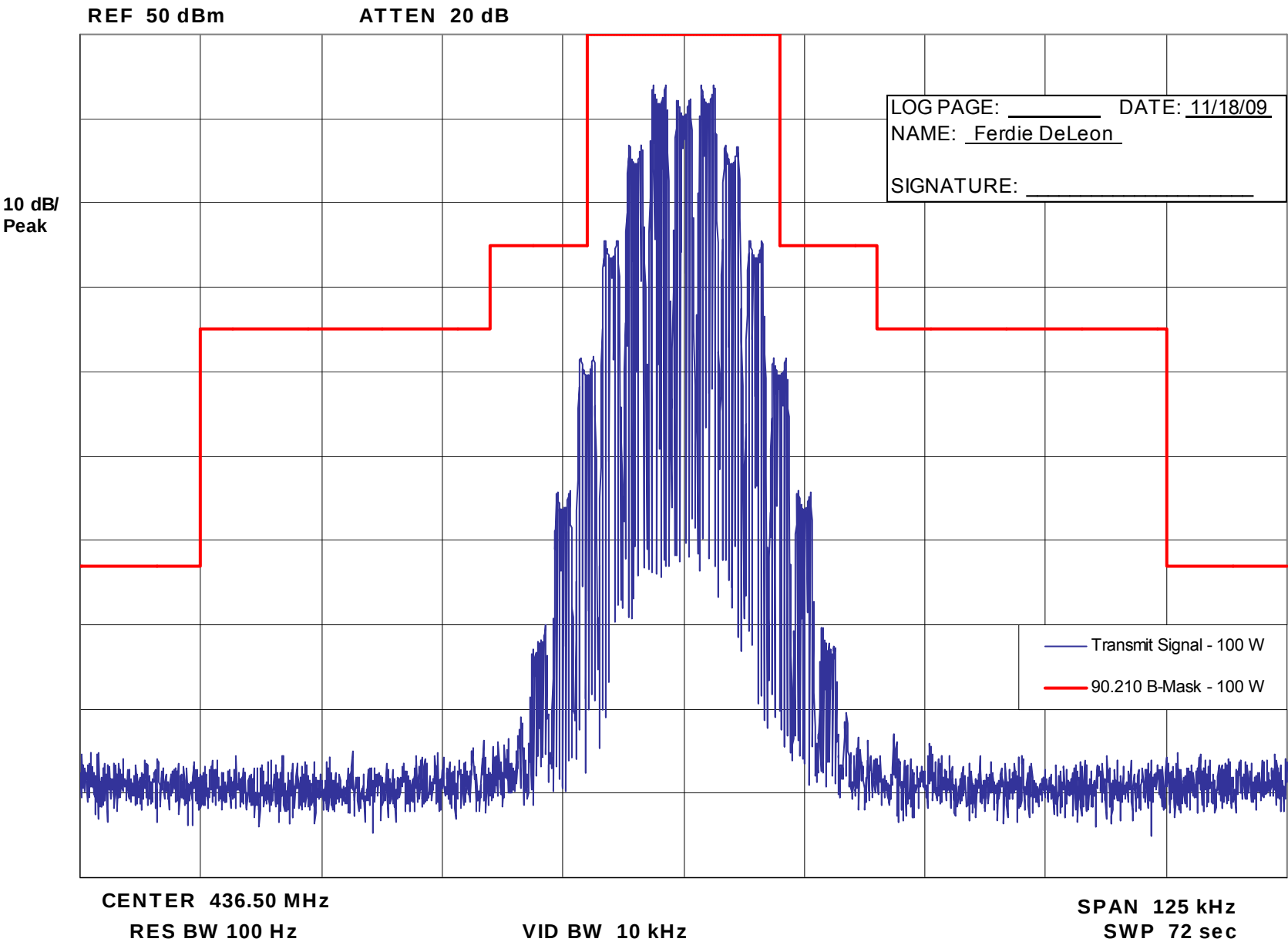
APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC4823

Report on Test Measurements

Occupied Bandwidth – Carrier with 2500 Hz Audio Tone and Digital Private Line (DPL) Signaling, 25 kHz Channels

Occupied Bandwidth - 25 kHz Channels - Carrier with 2500 Hz Audio and 627 DPL - 16K0F3E



Report on Test Measurements

Occupied Bandwidth – Carrier with 2500 Hz Audio Tone, 12.5 kHz Channels

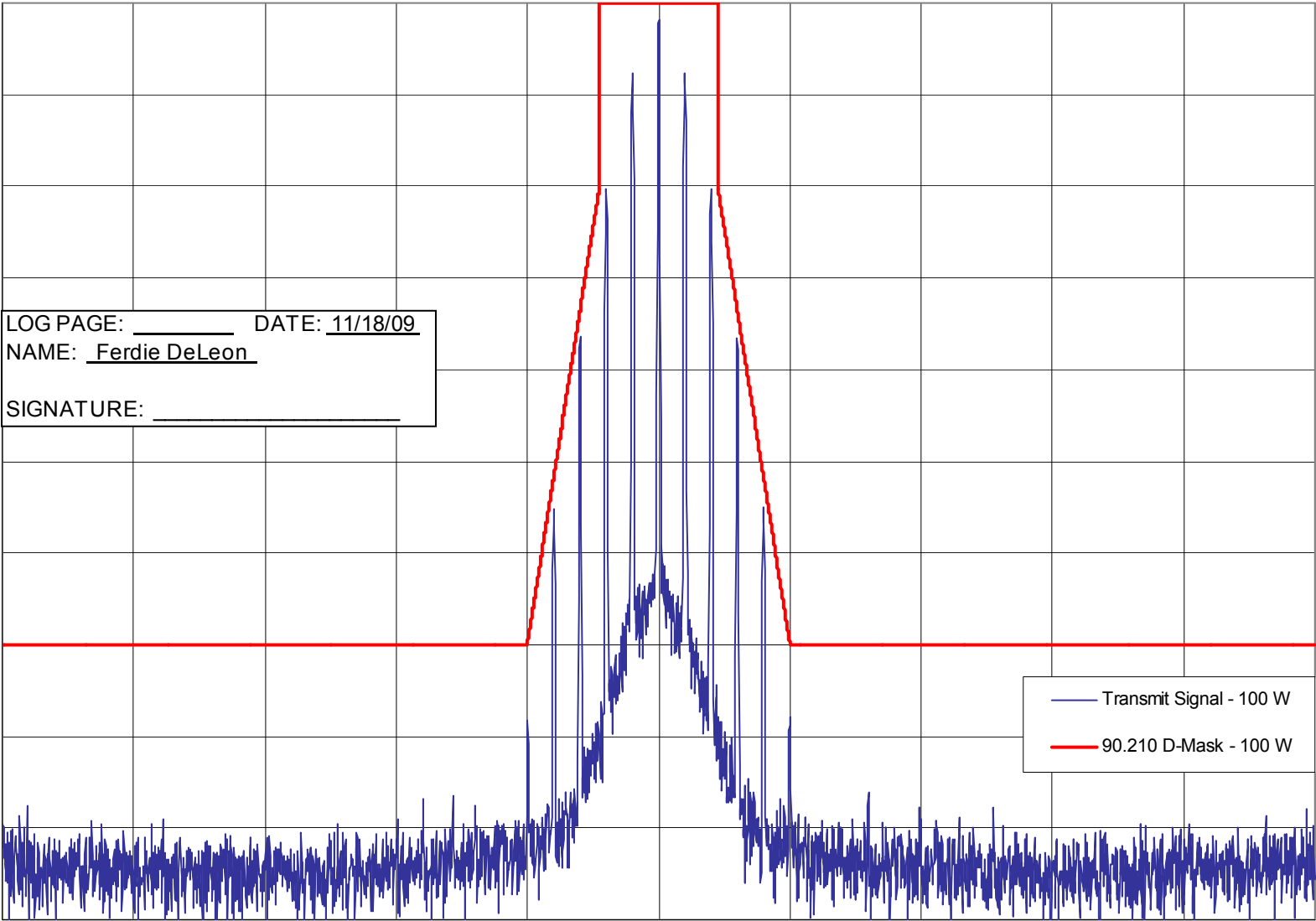
Occupied Bandwidth - 12.5 kHz Channels - Carrier with 2500 Hz Audio Tone - 11K0F3E

REF 50 dBm

ATTEN 20 dB

10 dB/  
Peak

LOG PAGE: \_\_\_\_\_ DATE: 11/18/09  
NAME: Ferdie DeLeon  
SIGNATURE: \_\_\_\_\_



CENTER 436.50 MHz  
RES BW 100 Hz

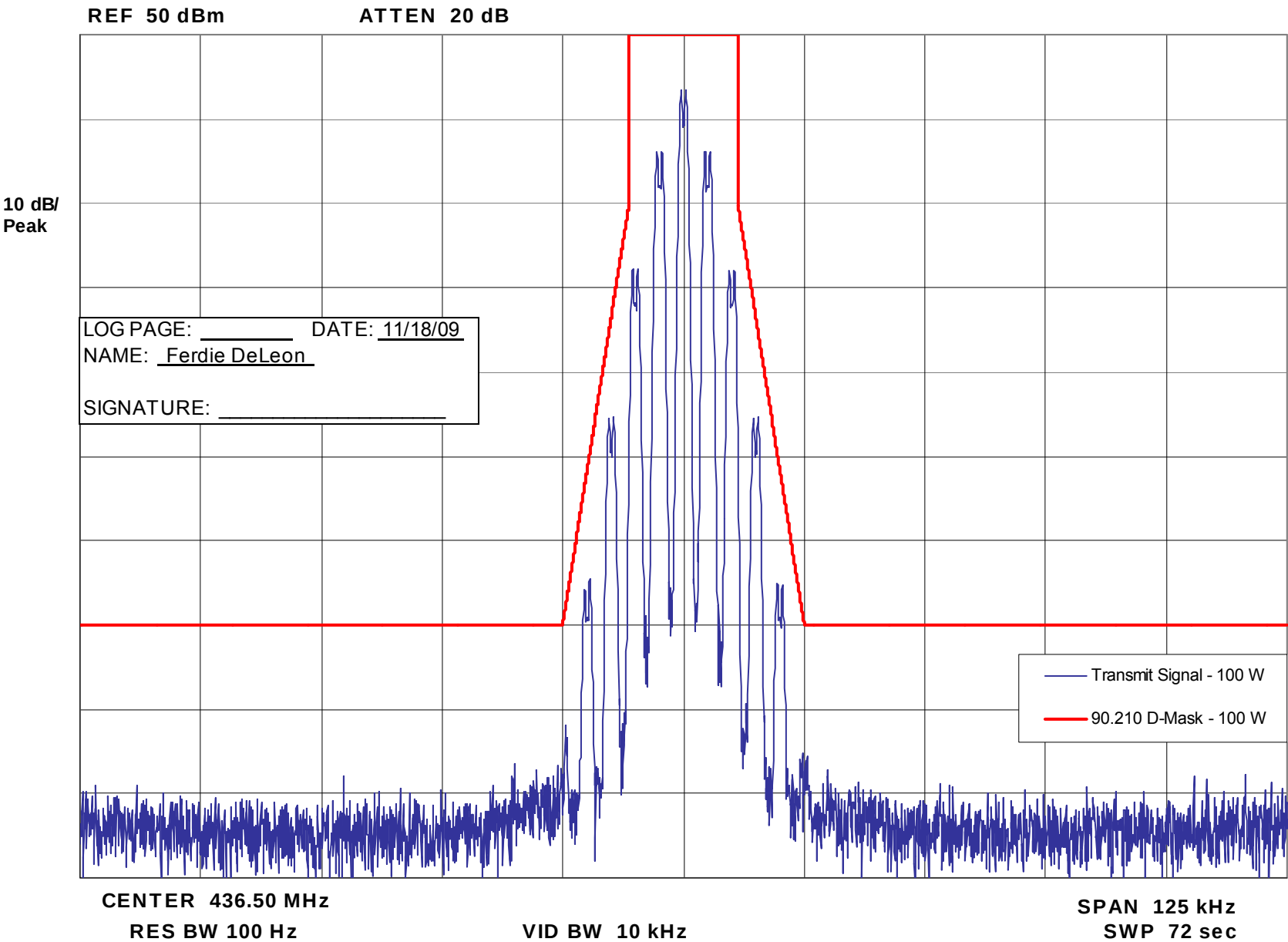
VID BW 10 kHz

SPAN 125 kHz  
SWP 72 sec

Report on Test Measurements

Occupied Bandwidth – Carrier with 2500 Hz Audio Tone and Private Line (PL) Signaling, 12.5 kHz Channels

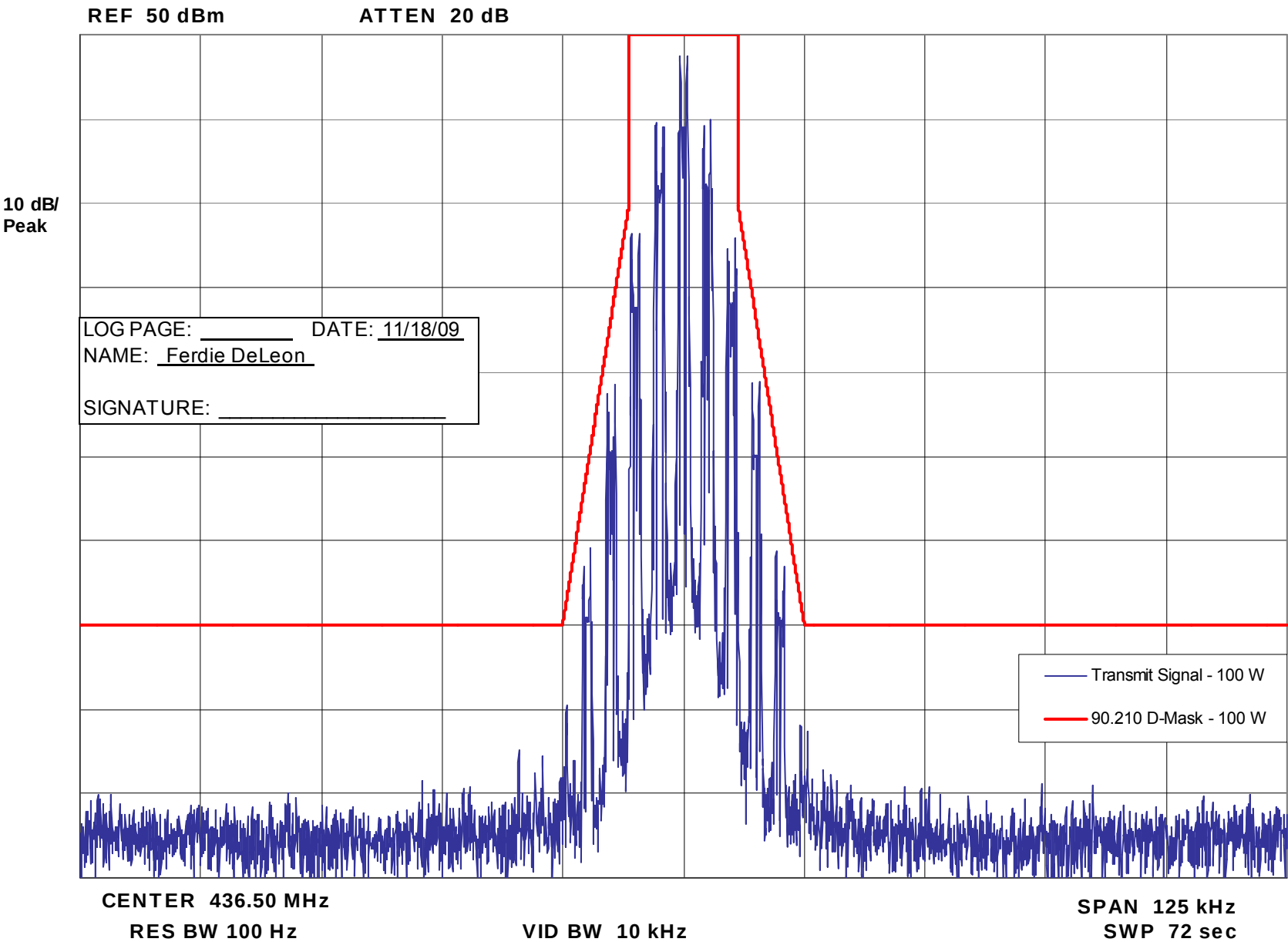
Occupied Bandwidth - 12.5 kHz Channels - Carrier with 2500 Hz Audio and 123 Hz PL - 11K0F3E



Report on Test Measurements

Occupied Bandwidth – Carrier with 2500 Hz Audio Tone and Digital Private Line (DPL) Signaling, 12.5 kHz Channels

Occupied Bandwidth - 12.5 kHz Channels - Carrier with 2500 Hz Audio and 627 DPL - 11K0F3E



APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC4823

Report on Test Measurements

Occupied Bandwidth – Carrier with Digitized Voice /Data, 12.5 kHz Channels

Occupied Bandwidth - 4-Level Frequency Shift Keying Modulation - 7K60FXD, 7K60FXE - 100 Watts

REF 50 dBm

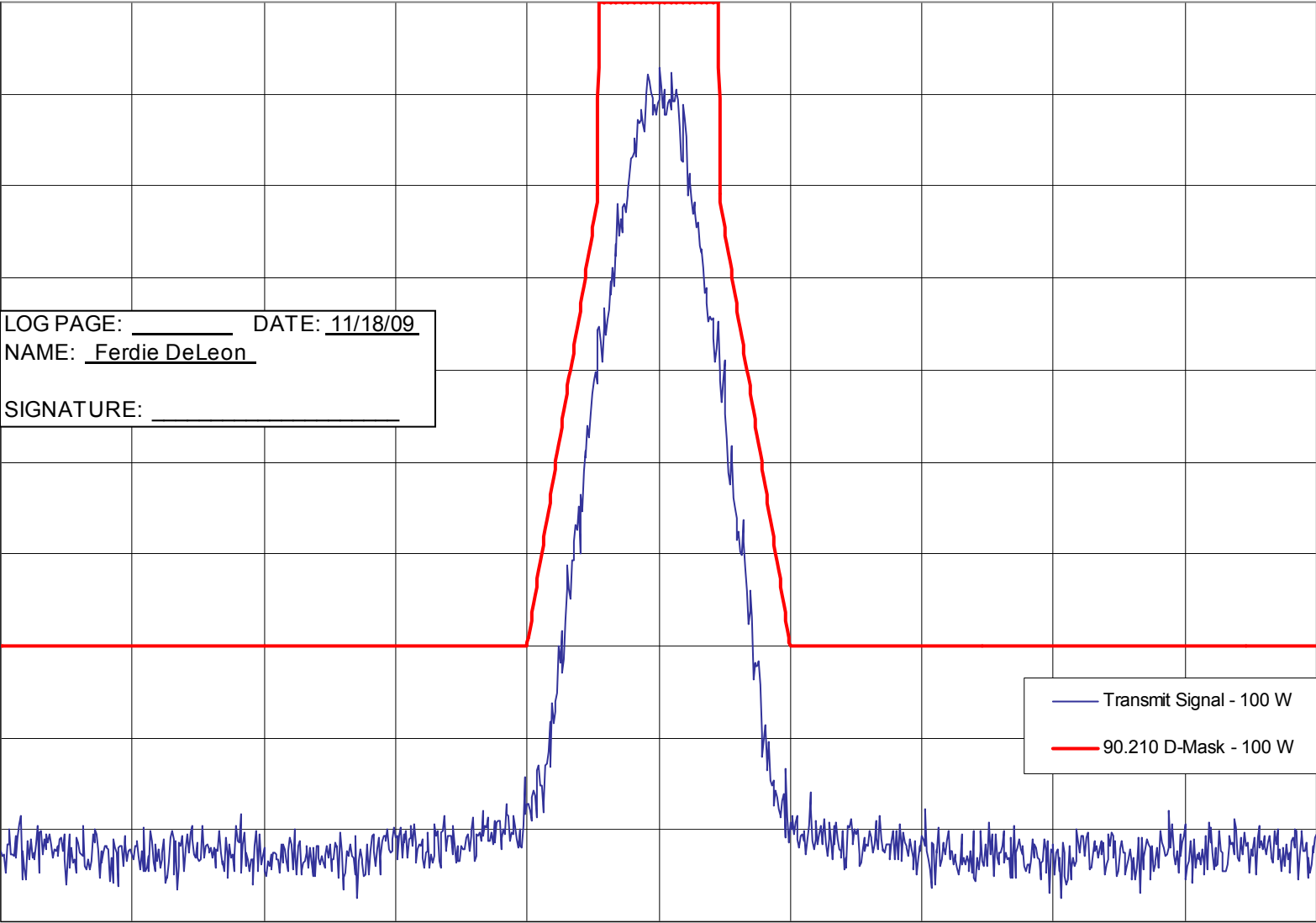
ATTEN 20 dB

10 dB/  
Peak

LOG PAGE: \_\_\_\_\_ DATE: 11/18/09

NAME: Ferdie DeLeon

SIGNATURE: \_\_\_\_\_



CENTER 436.50 MHz

RES BW 100 Hz

VID BW 10 kHz

SPAN 125 kHz

SWP 72 sec

EXHIBIT E1-4.7

## Report on Test Measurements

*Conducted Spurious Emissions, Harmonics and Close-In*Specification Requirement § 90.210(b) Emission Limits:

*Emission Mask B:* For transmitters equipped with an audio low pass filter and designed to operate with a 25 kHz channel spacing (authorized bandwidth 20 kHz), the power of any emission must be below the unmodulated carrier power (P) as follows:

On any frequency removed from the assigned frequency by a displacement frequency ( $F_d$  in kHz) of:

- |                                       |                                                                                                                 |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| a) >10 kHz up to and including 20 kHz | <i>At least 25 dB;</i>                                                                                          |
| b) >20 kHz up to and including 50 kHz | <i>At least 35 dB;</i>                                                                                          |
| c) >50 kHz                            | <i>least 50 plus <math>10 \log_{10}(P)</math> dB or 80 dB;</i><br><i>(whichever is the lesser attenuation).</i> |

Specification Requirement § 90.210(d) Emission Limits:

*Emission Mask D:* 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:

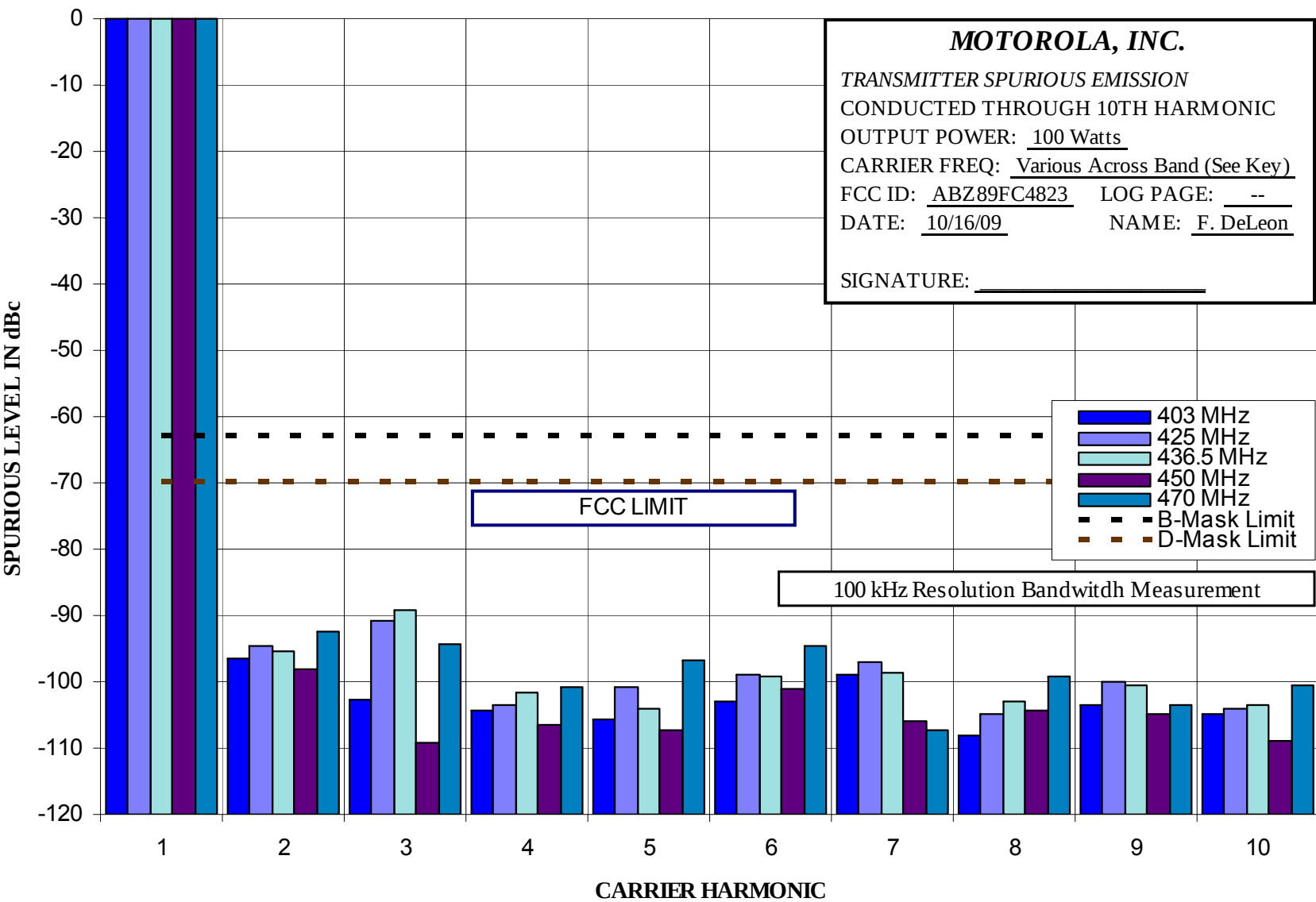
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz:
- At least 50 plus  $10 \log_{10}(P)$  dB or 70 dB,*  
*whichever is the lesser attenuation.*

Carrier Frequencies: For harmonics, carrier frequencies of 403, 425, 436.5, 450, and 470 MHz were measured. These frequencies represent the low end, center, and high end of the operating band. For Close-In, a carrier frequency in the middle of the operating band, of 436.5000 MHz, was used

| EXHIBIT | DESCRIPTION                                                                                                                                                              |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E1-5.1  | Conducted Spurious Emissions, Harmonics, Power Output 100 Watts<br>The specification limit is -70.0 dBc (12.5 kHz channels) or -63 dBc (25 kHz channels)                 |
| E1-5.2  | Conducted Spurious Emissions, Harmonics, Power Output 8 Watts<br>The specification limit is -59.0 dBc (12.5 kHz channels) or -52 dBc (25 kHz channels)                   |
| E1-5.3  | Conducted Spurious Emissions, Close-In, 200 MHz Span, Power Output at 100 Watts<br>The specification limit is -70.0 dBc (12.5 kHz channels) or -63 dBc (25 kHz channels) |
| E1-5.4  | Conducted Spurious Emissions, Close-In, 20 MHz Span, Power Output at 100 Watts<br>The specification limit is -70.0 dBc (12.5 kHz channels) or -63 dBc (25 kHz channels)  |

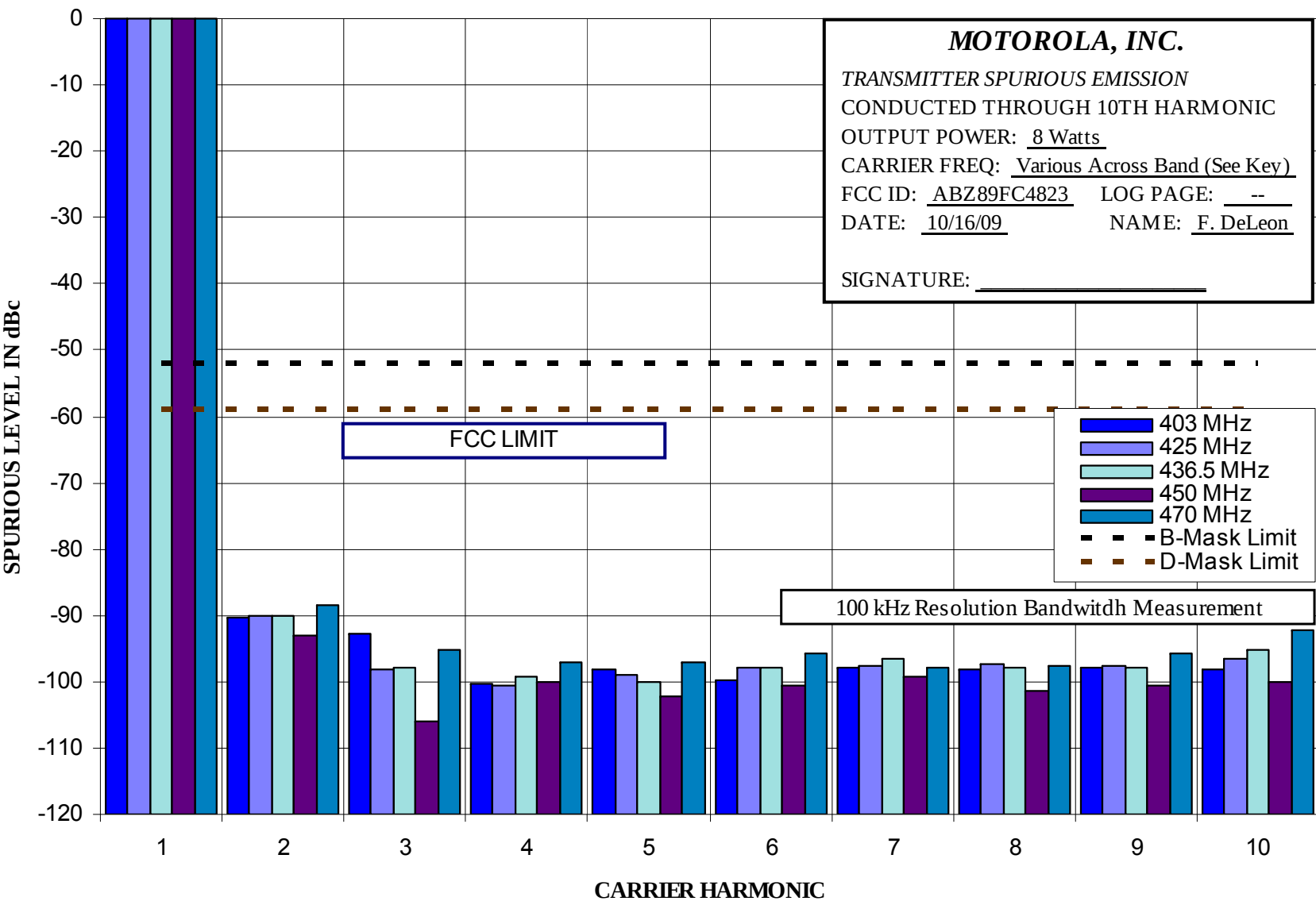
Report on Test Measurements

Conducted Emission – Harmonics – 100 Watts



Report on Test Measurements

Conducted Emission – Harmonics – 8 Watts

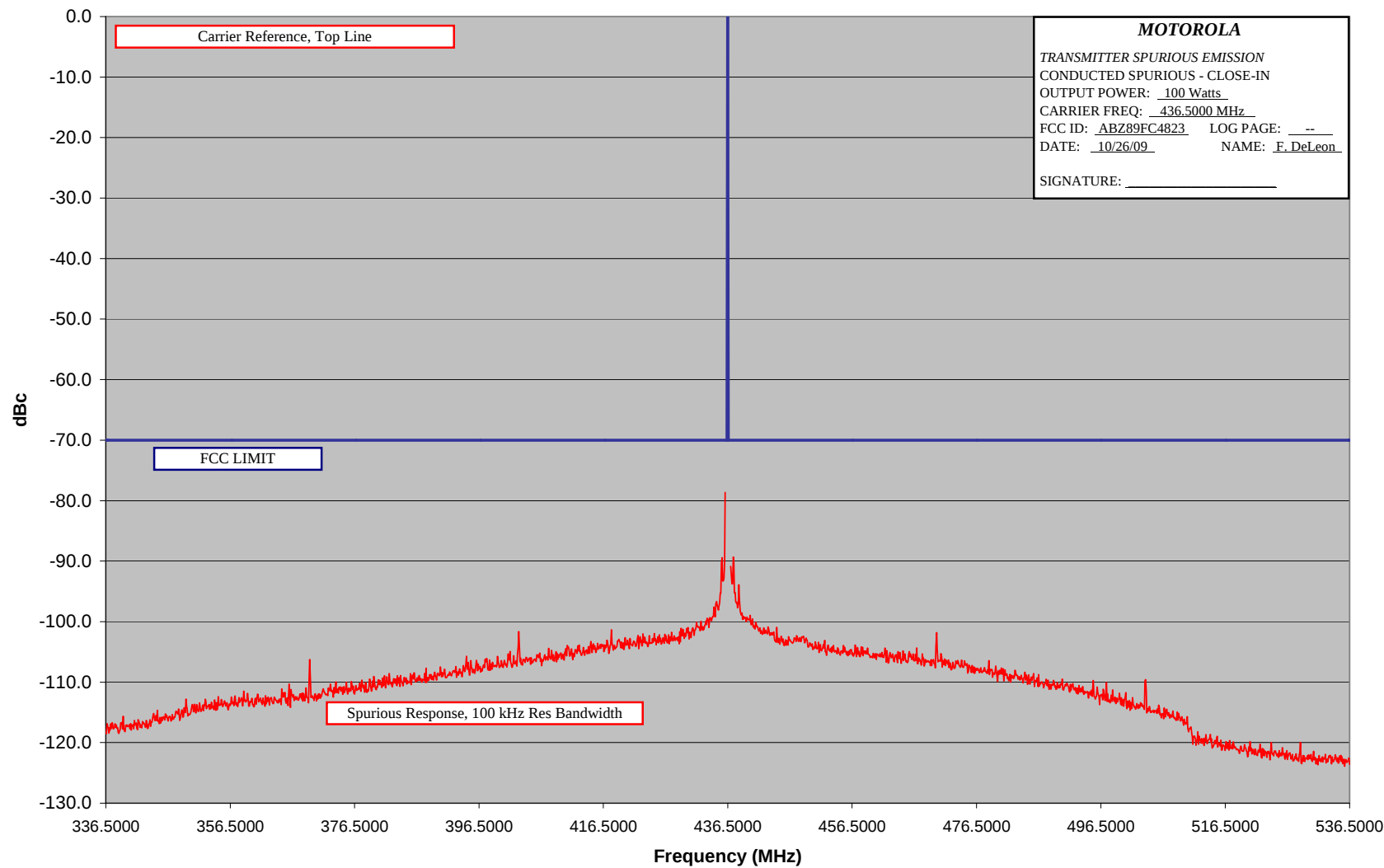


APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC4823

Report on Test Measurements

Conducted Emission – Close-In – 100 Watts – 200 MHz Span

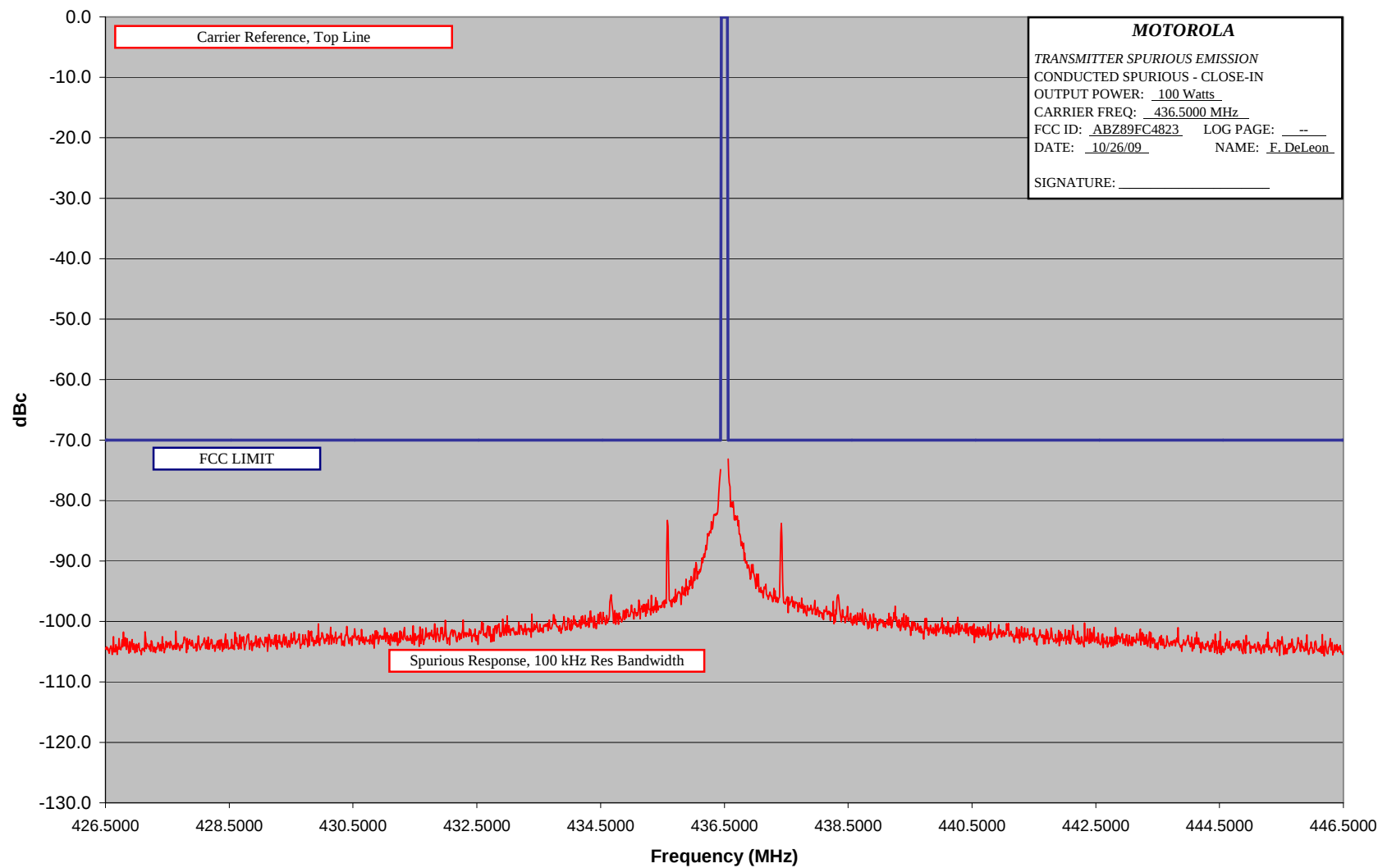


APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC4823

Report on Test Measurements

Conducted Emission – Close-In – 100 Watts – 20 MHz Span



## Report on Test Measurements

*Radiated Spurious Emissions, Harmonics*Specification Requirement § 90.210(b) Emission Limits:

*Emission Mask B:* For transmitters equipped with an audio low pass filter and designed to operate with a 25 kHz channel spacing (authorized bandwidth 20 kHz), the power of any emission must be below the unmodulated carrier power (P) as follows:

On any frequency removed from the assigned frequency by a displacement frequency ( $F_d$  in kHz) of:

- |                                       |                                                                                                                 |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| a) >10 kHz up to and including 20 kHz | <i>At least 25 dB;</i>                                                                                          |
| b) >20 kHz up to and including 50 kHz | <i>At least 35 dB;</i>                                                                                          |
| c) >50 kHz                            | <i>least 50 plus <math>10 \log_{10}(P)</math> dB or 80 dB;</i><br><i>(whichever is the lesser attenuation).</i> |

Specification Requirement § 90.210(d) Emission Limits:

*Emission Mask D:* 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:

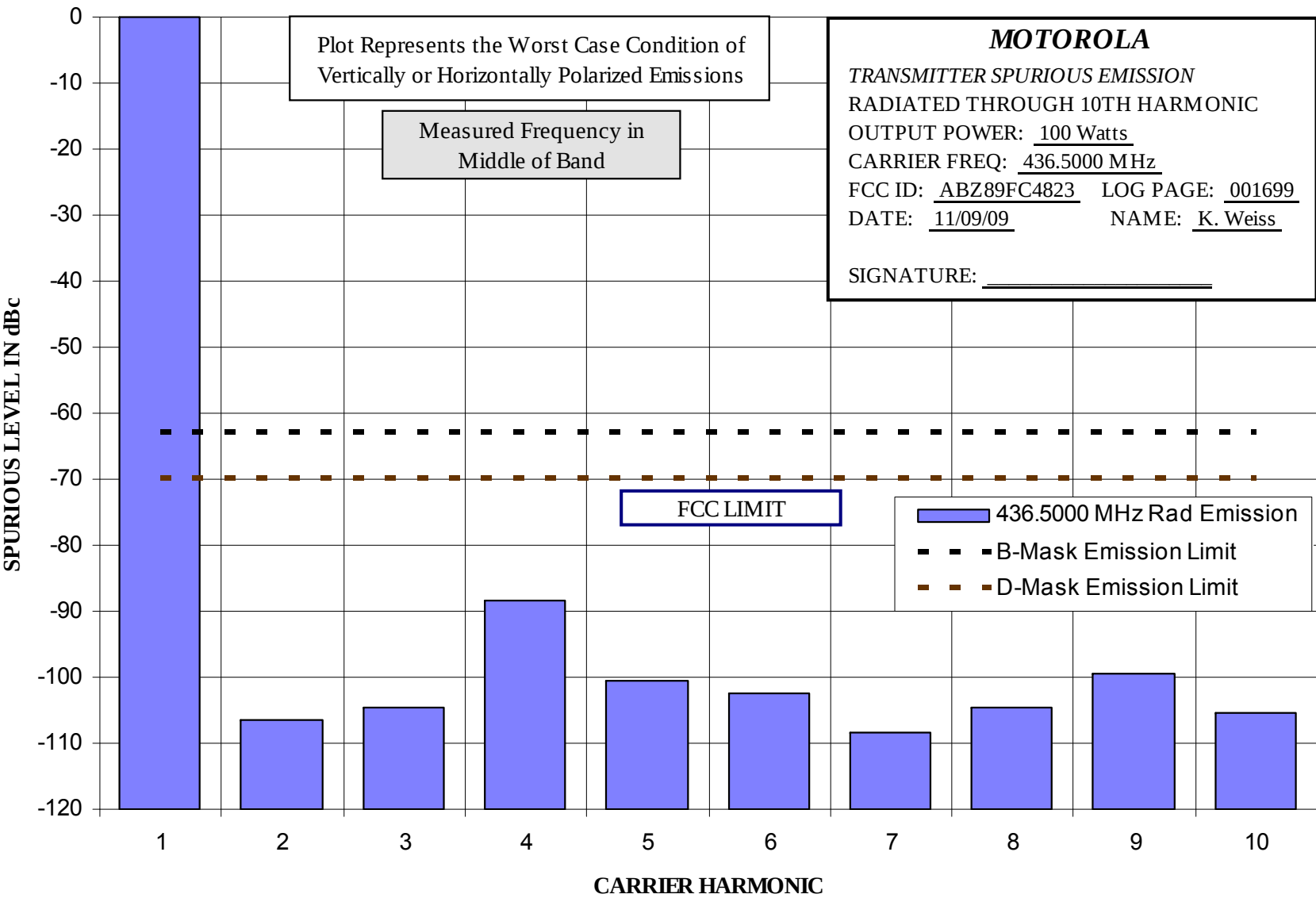
- (3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz:
- At least 50 plus  $10 \log_{10}(P)$  dB or 70 dB,*  
*whichever is the lesser attenuation.*

Carrier Frequencies: A carrier frequency of 436.5000 MHz was measured. This frequency represents the center of the operating band

| EXHIBIT | DESCRIPTION                                                                                                                                             |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| E1-6.1  | Radiated Spurious Emissions, Harmonics, Power Output 100 Watts<br>The specification limit is -70.0 dBc (12.5 kHz channels) or -63 dBc (25 kHz channels) |
| E1-6.2  | Radiated Spurious Emissions, Harmonics, Power Output 8 Watts<br>The specification limit is -59.0 dBc (12.5 kHz channels) or -52 dBc (25 kHz channels)   |

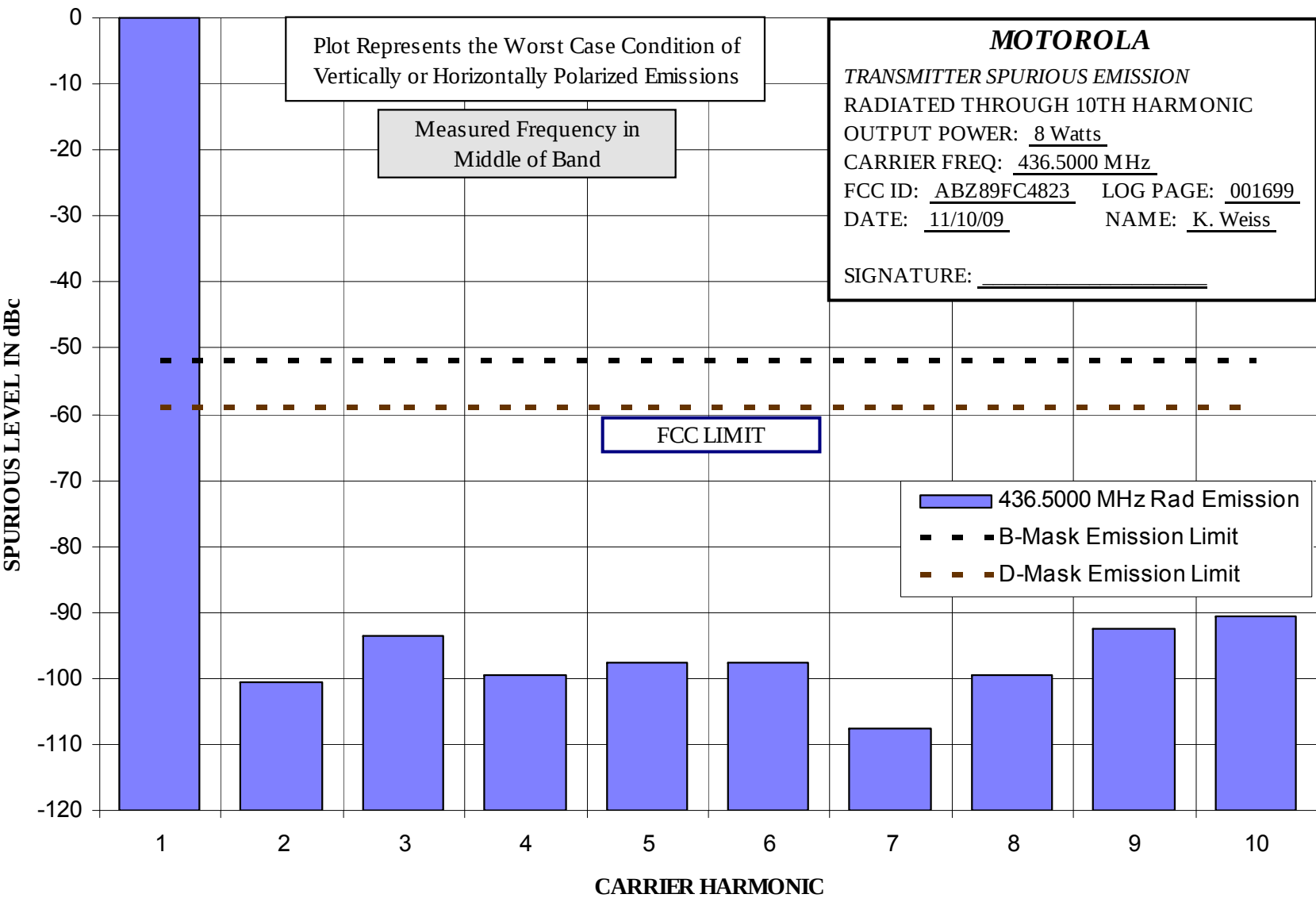
Report on Test Measurements

Radiated Emission – Harmonics – 100 Watts



Report on Test Measurements

Radiated Emission – Harmonics – 8 Watts



**Report on Test Measurements***Oscillator Frequency Stability*

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

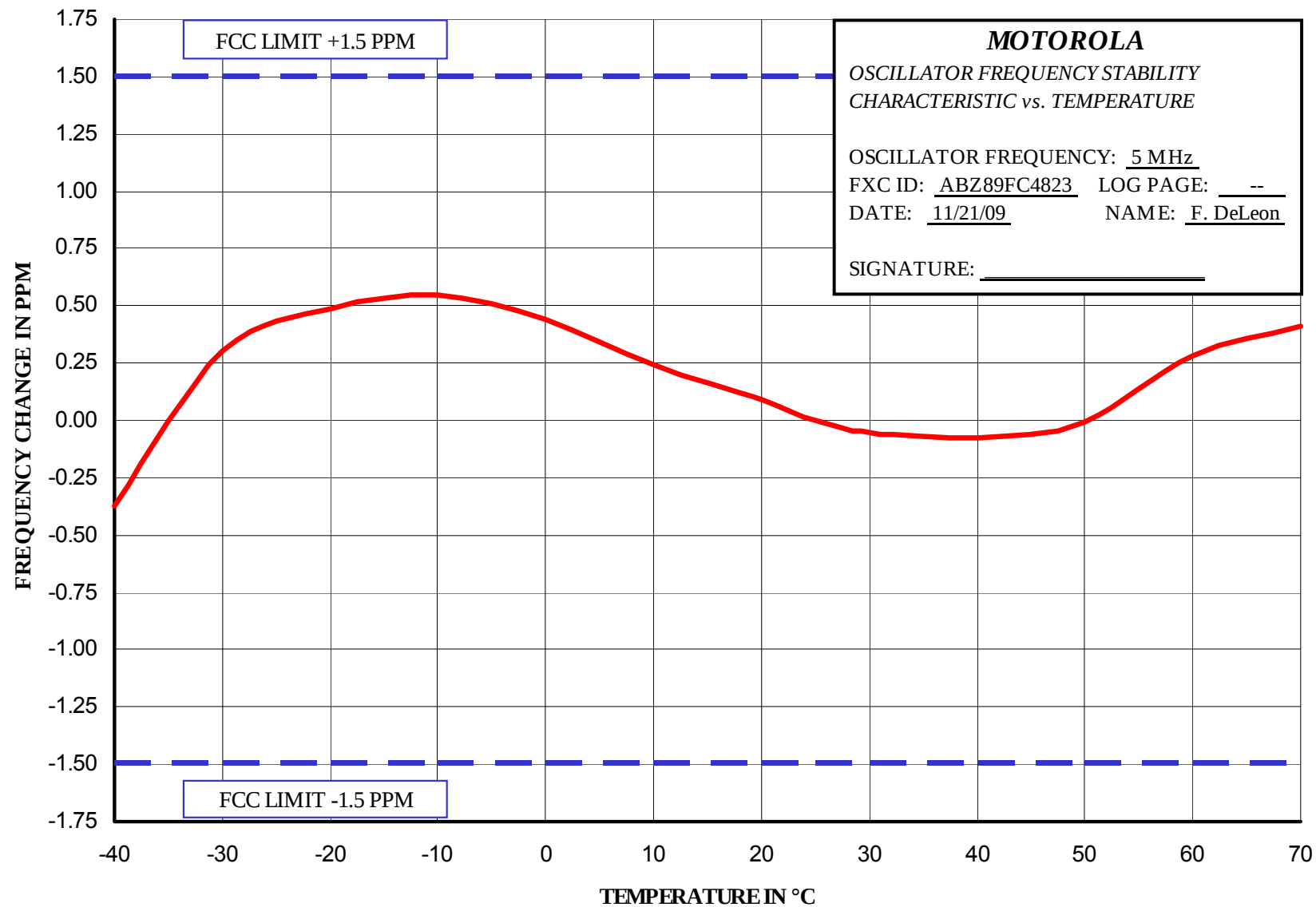
Specification Requirement: Reference Part 90.213

Fixed and Base stations operating at 421-512 MHz and 25 kHz channel bandwidth must have a frequency stability of better than +/- 2.5 PPM. Fixed and Base stations operating at 421-512 MHz and 12.5 kHz channel bandwidth must have a frequency stability of better than +/- 1.5 PPM.

| <b>EXHIBIT</b> | <b>DESCRIPTION</b>                 |
|----------------|------------------------------------|
| E1-7.1         | Frequency Stability Vs Temperature |
| E1-7.2         | Frequency Stability Vs Voltage     |

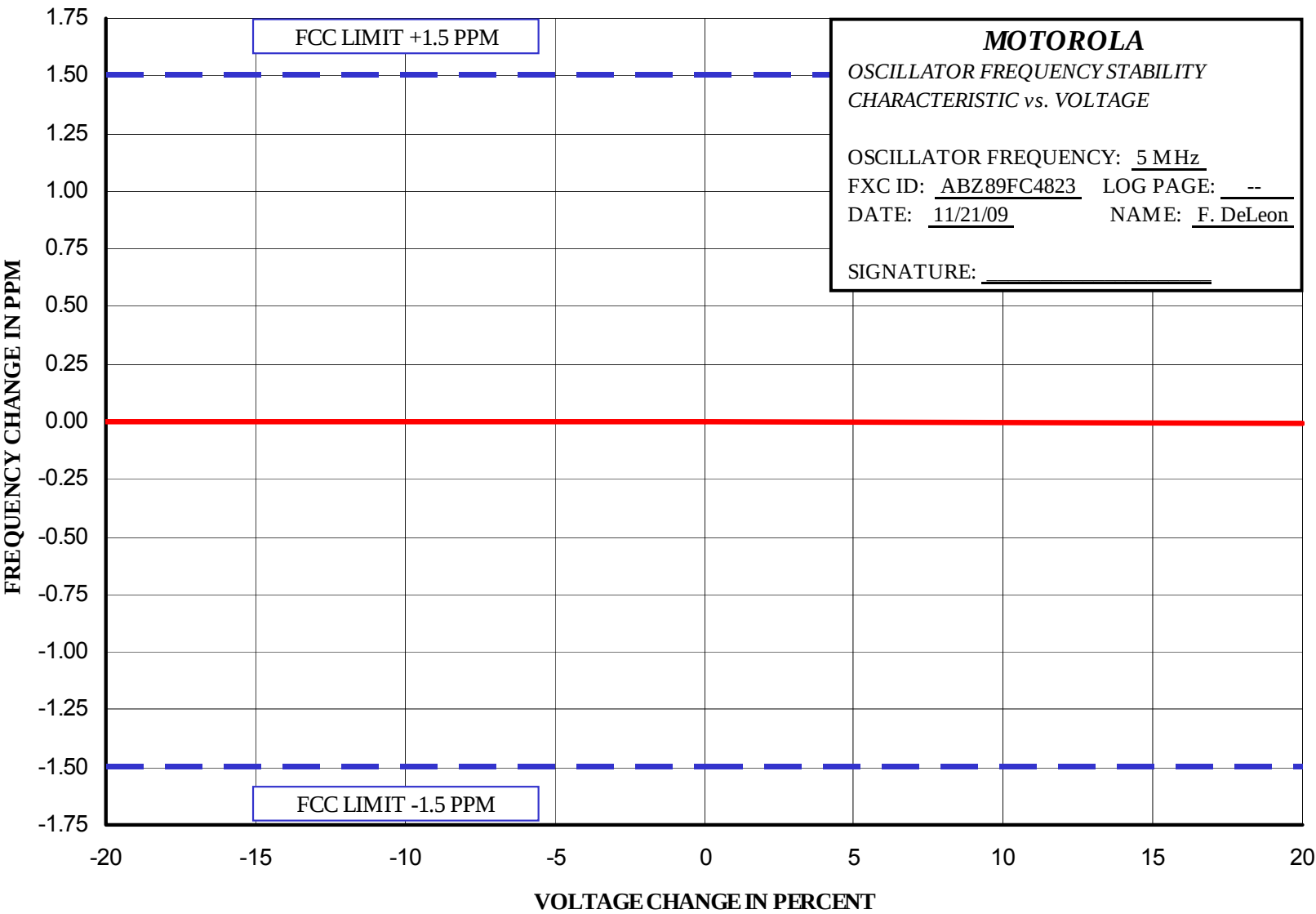
Report on Test Measurements

Frequency Stability Vs Temperature



Report on Test Measurements

Frequency Stability Vs Voltage



**Report on Test Measurements***Frequency Transient Behavior*Specification Requirement: Reference Part 90.214

Transmitters designed to operate in the 421-512 MHz frequency band must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated below:

Transient Frequency Behavior 25 kHz Channels

For time intervals:

- a.  $t_1 = 10$  ms      Maximum Frequency Difference  $\pm 25$  kHz
- b.  $t_2 = 25$  ms      Maximum Frequency Difference  $\pm 12.5$  kHz
- c.  $t_3 = 10$  ms      Maximum Frequency Difference  $\pm 25$  kHz

Transient Frequency Behavior 12.5 kHz Channels

For time intervals:

- a.  $t_1 = 10$  ms      Maximum Frequency Difference  $\pm 12.5$  kHz
- b.  $t_2 = 25$  ms      Maximum Frequency Difference  $\pm 6.25$  kHz
- c.  $t_3 = 10$  ms      Maximum Frequency Difference  $\pm 12.5$  kHz

Where  $t_1$  and  $t_2$  are times immediately following when the transmitter is turned on, and  $t_3$  is the time from when the transmitter is turned off.

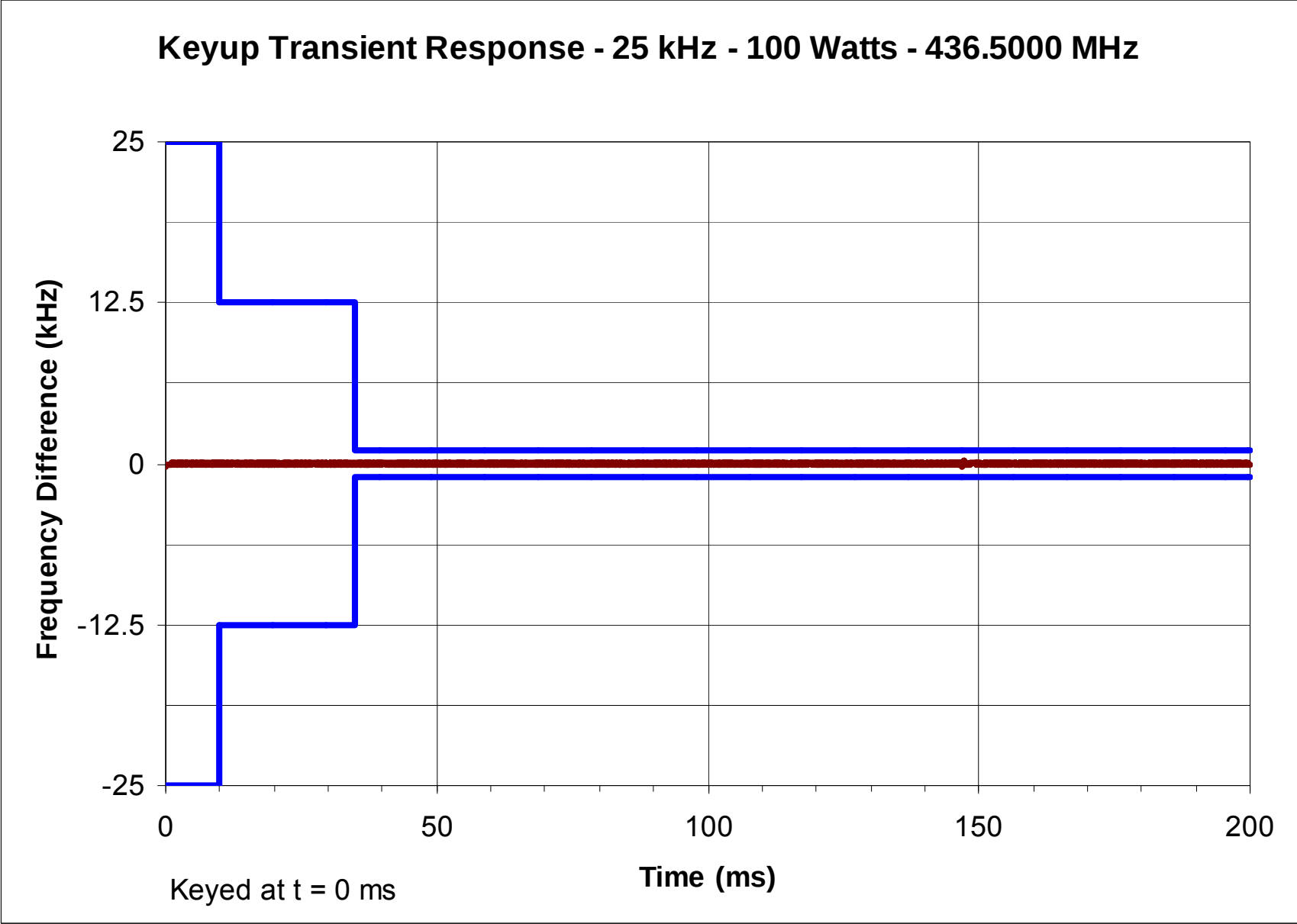
During the time from the end of  $t_2$  to the beginning of  $t_3$ , the frequency difference must not exceed the limits specified in §90.213.

Carrier Frequencies: A carrier frequency of 436.5000 was measured. This frequency represents the center of the operating band

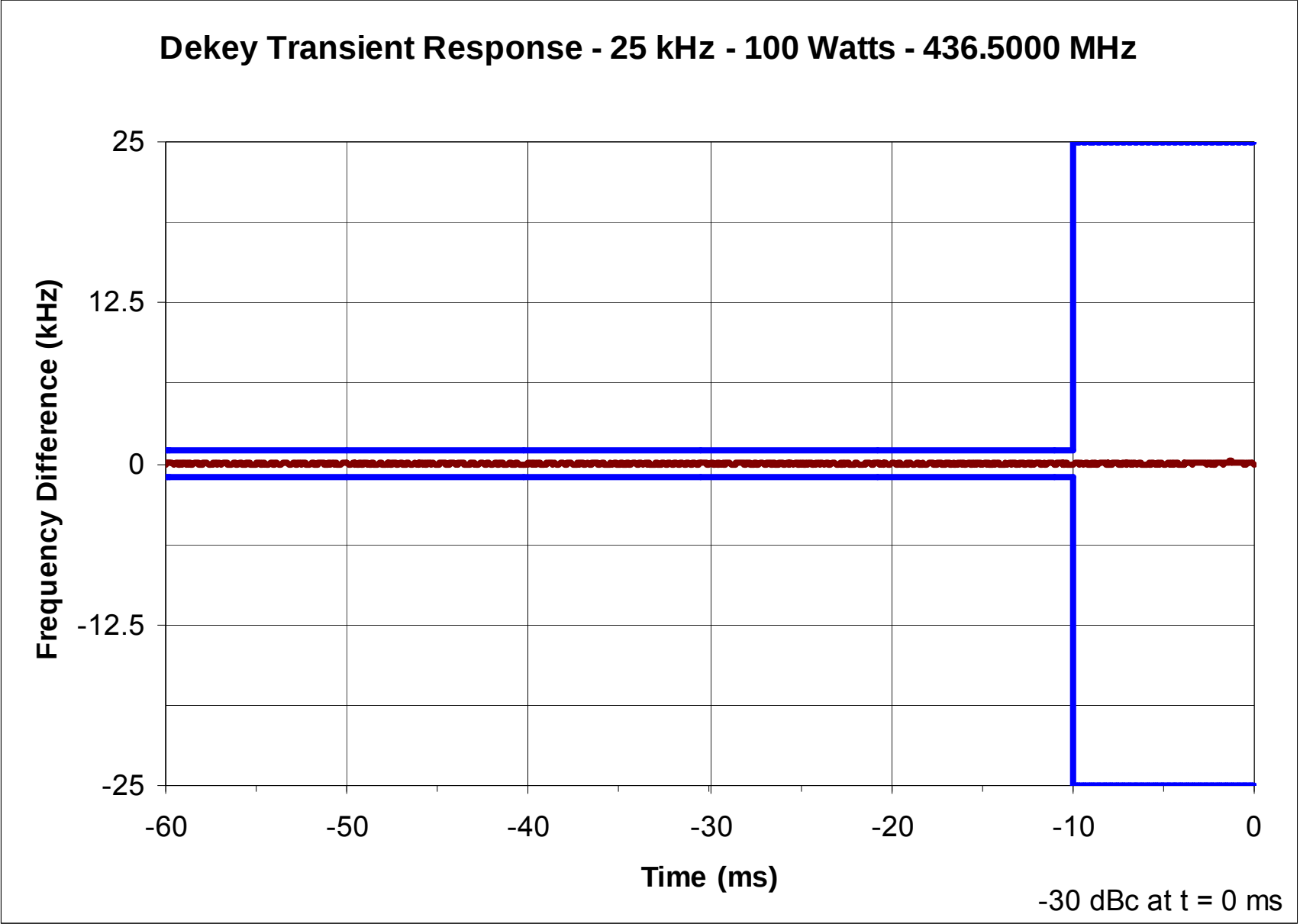
| <b>EXHIBIT</b> | <b>DESCRIPTION</b>                                                    |
|----------------|-----------------------------------------------------------------------|
| E1-8.1         | Frequency Transient Behavior, 25 kHz Channel Key-Up, Middle of Band   |
| E1-8.2         | Frequency Transient Behavior, 25 kHz Channel De-key, Middle of Band   |
| E1-8.3         | Frequency Transient Behavior, 12.5 kHz Channel Key-Up, Middle of Band |
| E1-8.4         | Frequency Transient Behavior, 12.5 kHz Channel De-key, Middle of Band |

The unit was tested at various frequencies and power levels across the operating range. Neither was found to have and impact in terms of performance according to this standard.

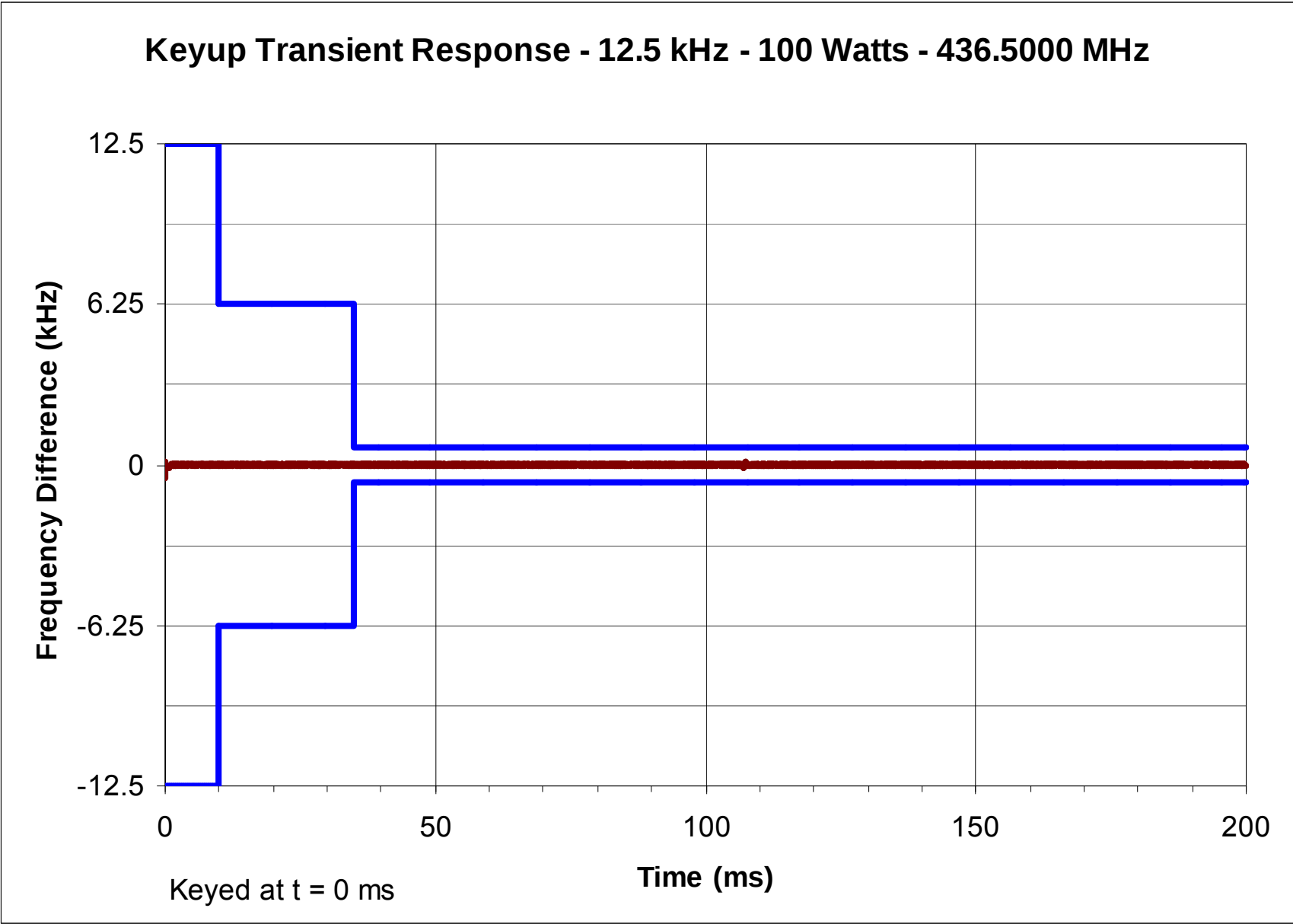
Frequency Transient – Key-up – 25 kHz Channels



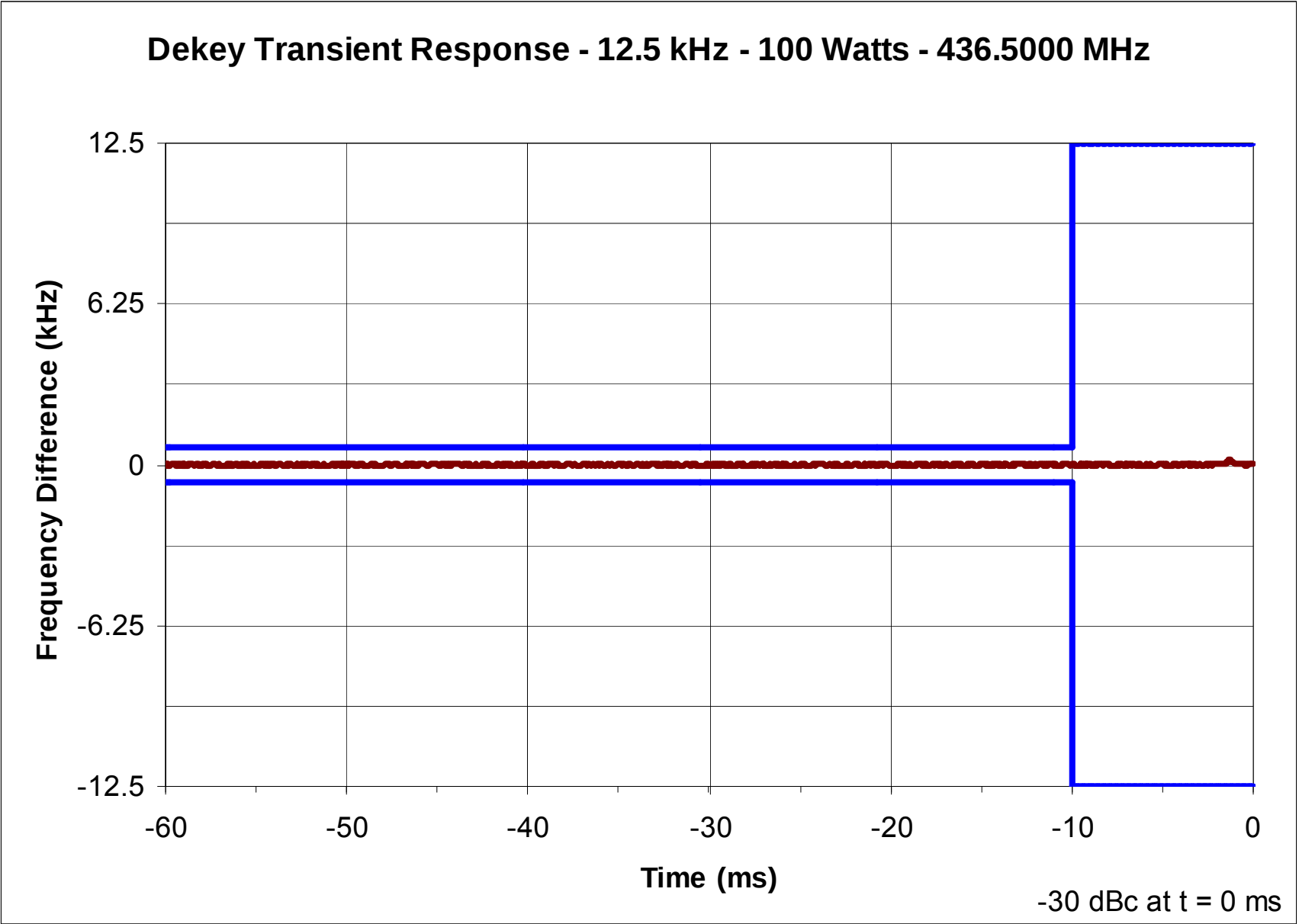
Frequency Transient – De-key – 25 kHz Channels



Frequency Transient – Key-up – 12.5 kHz Channels



Frequency Transient – De-key – 12.5 kHz Channels



## Report on Test Measurements

*Test Equipment List*

| <b>MODEL</b> | <b>MANUFACTURER</b>       | <b>DESCRIPTION</b>       | <b>Serial No.</b> | <b>Last Cal</b>         | <b>Next Cal</b> |
|--------------|---------------------------|--------------------------|-------------------|-------------------------|-----------------|
| 437B         | Hewlett Packard           | RF Power Meter           | 2912A01517        | 05/13/08                | 05/13/11        |
| 8481A        | Hewlett Packard           | RF Power Sensor          | 2702A76706        | 07/25/08                | 07/25/11        |
| E4443A       | Agilent                   | Spectrum Analyzer        | MY43360090        | 09/18/09                | 09/18/12        |
| 83712A       | Hewlett Packard           | Signal Generator         | 3429A00455        | 10/27/08                | 10/27/11        |
| 8671B        | Hewlett Packard           | Signal Generator         | 2611A00159        | 10/24/07                | 10/24/10        |
| 85460A       | Hewlett Packard           | EMI Analyzer, Filter     | 3704A00467        | 07/21/07                | 07/21/10        |
| 85462A       | Hewlett Packard           | EMI Analyzer, RF/Display | 3906A00500        | 07/21/07                | 07/21/10        |
| 8593E        | Hewlett Packard           | EMI Analyzer             | 3513A01649        | 06/08/07                | 06/08/10        |
| 89441A       | Hewlett Packard           | Vector Signal Analyzer   | 3416A00835        | 05/27/09                | 05/27/10        |
| (Various)    | Weinschel, Kathrein, Bird | RF Loads                 | Various           | no calibration required |                 |
| TWPC-4510-1  | Telewave                  | Cavity                   | 5244              | no calibration required |                 |
| 3020A, etc.  | Narda                     | Directional Coupler      | Various           | no calibration required |                 |

APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC4823

Report on Test Measurements

*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

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

NAME: Ken Weiss

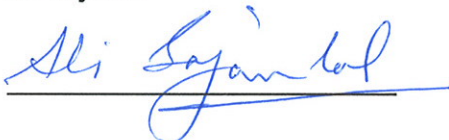
SIGNATURE: 

DATE: November 25, 2009

POSITION: Senior Staff 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: Ali Sajanalal

SIGNATURE: 

DATE: November 25, 2009

POSITION: Engineering Section Manager