

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

E1-1	RF Output-Data
E1-2	Occupied Bandwidth: Setup, Specifications, and Index (Mixed QAM)
E1-2.1	800 MHz – One Transmit Carrier
E1-2.2	800 MHz – Two Transmit Carriers
E1-2.3	800 MHz – Three Transmit Carriers
E1-2.4	800 MHz – Four Transmit Carriers
E1-2.5	800 MHz – Five Transmit Carriers
E1-2.6	800 MHz – Six Transmit Carriers
E1-2.7	900 MHz – One Transmit Carrier
E1-2.8	900 MHz – Two Transmit Carriers
E1-2.9	900 MHz – Three Transmit Carriers
E1-2.10	900 MHz – Four Transmit Carriers
E1-2.11	900 MHz – Five Transmit Carriers
E1-2.12	900 MHz – Six Transmit Carriers
E1-3	Conducted Spurious Emissions: Setup, Specifications, and Index
E1-3.1	800 MHz – One Carrier Conducted Spurious Emissions, Harmonics, Power Output at 70 Watts
E1-3.2	800 MHz – One Carrier Conducted Spurious Emissions, Harmonics, Power Output at 5 Watts
E1-3.3	800 MHz – Six Carrier Conducted Spurious Emissions, Harmonics, Power Output at 42 Watts
E1-3.4	800 MHz – Six Carrier Conducted Spurious Emissions, Harmonics, Power Output at 5 Watts
E1-3.5	800 MHz – One Carrier – Conducted Close-In, 20 MHz Span, Power Output at 70 Watts
E1-3.6	800 MHz – One Carrier – Conducted Close-In, 200 MHz Span, Power Output at 70 Watts
E1-3.7	800 MHz – Six Carrier – Conducted Close-In, 20 MHz Span, Power Output at 42 Watts
E1-3.8	800 MHz – Six Carrier – Conducted Close-In, 200 MHz Span, Power Output at 42 Watts

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Report on Test Measurements

Measurements Report

SUBMITTED MEASURED DATA – INDEX (Continued)

EXHIBIT DESCRIPTION

E1-3.9	900 MHz – One Carrier Conducted Spurious Emissions, Harmonics, Power Output at 52 Watts
E1-3.10	900 MHz – One Carrier Conducted Spurious Emissions, Harmonics, Power Output at 5 Watts
E1-3.11	900 MHz – Six Carrier Conducted Spurious Emissions, Harmonics, Power Output at 42 Watts
E1-3.12	900 MHz – Six Carrier Conducted Spurious Emissions, Harmonics, Power Output at 5 Watts
E1-3.13	900 MHz – One Carrier – Conducted Close-In, 20 MHz Span, Power Output at 52 Watts
E1-3.14	900 MHz – One Carrier – Conducted Close-In, 200 MHz Span, Power Output at 52 Watts
E1-3.15	900 MHz – Six Carrier – Conducted Close-In, 20 MHz Span, Power Output at 42 Watts
E1-3.16	900 MHz – Six Carrier – Conducted Close-In, 200 MHz Span, Power Output at 42 Watts
E1-4	Radiated Spurious Emissions: Setup, Specifications, and Index
E1-4.1	800 MHz – One Carrier Radiated Spurious Emissions, Harmonics, Power Output at 70 Watts
E1-4.2	800 MHz – One Carrier Radiated Spurious Emissions, Harmonics, Power Output at 5 Watts
E1-4.3	800 MHz – Six Carrier Radiated Spurious Emissions, Harmonics, Power Output at 42 Watts
E1-4.4	800 MHz – Six Carrier Radiated Spurious Emissions, Harmonics, Power Output at 5 Watts
E1-4.5	900 MHz – One Carrier Radiated Spurious Emissions, Harmonics, Power Output at 52 Watts
E1-4.6	900 MHz – One Carrier Radiated Spurious Emissions, Harmonics, Power Output at 5 Watts
E1-4.7	900 MHz – Six Carrier Radiated Spurious Emissions, Harmonics, Power Output at 42 Watts
E1-4.8	900 MHz – Six Carrier Radiated Spurious Emissions, Harmonics, Power Output at 5 Watts
E1-5	Frequency Stability: Setup, Specifications, and Index
E1-5.1	Frequency Stability Vs Temperature
E1-5.2	Frequency Stability Vs Voltage
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 eight parallel power transistors.

800 MHz Single Carrier Mode:

Measured RF output	<u>70</u>	Watts, Average
Normal DC Voltage	<u>28.3</u>	Volts
Normal DC Current	<u>16.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>455</u>	Watts
Primary Supply Voltage	<u>48</u>	Volts DC
Minimum Measured RF output	<u>5</u>	Watts, Average
Normal DC Voltage	<u>28.3</u>	Volts
Normal DC Current	<u>8.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>227</u>	Watts
Primary Supply Voltage	<u>48</u>	Volts DC

800 MHz Six Carrier Mode:

Measured RF output	<u>42</u>	Watts, Average
DC Voltage	<u>28.3</u>	Volts
DC Current	<u>12.9</u>	Amperes
Input power for final RF amplifying device(s)	<u>365</u>	Watts
Primary Supply Voltage	<u>48</u>	Volts DC
Minimum Measured RF output	<u>5</u>	Watts, Average
Normal DC Voltage	<u>28.3</u>	Volts
Normal DC Current	<u>8.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>227</u>	Watts
Primary Supply Voltage	<u>48</u>	Volts DC

900 MHz Single Carrier Mode:

Measured RF output	<u>52</u>	Watts, Average
Normal DC Voltage	<u>28.3</u>	Volts
Normal DC Current	<u>13.9</u>	Amperes
Input power for final RF amplifying device(s)	<u>394</u>	Watts
Primary Supply Voltage	<u>48</u>	Volts DC
Minimum Measured RF output	<u>5</u>	Watts, Average
Normal DC Voltage	<u>28.3</u>	Volts
Normal DC Current	<u>8.2</u>	Amperes
Input power for final RF amplifying device(s)	<u>232</u>	Watts
Primary Supply Voltage	<u>48</u>	Volts DC

900 MHz Six Carrier Mode:

Measured RF output	<u>42</u>	Watts, Average
DC Voltage	<u>28.3</u>	Volts
DC Current	<u>12.8</u>	Amperes
Input power for final RF amplifying device(s)	<u>362</u>	Watts
Primary Supply Voltage	<u>48</u>	Volts DC
Minimum Measured RF output	<u>5</u>	Watts, Average
Normal DC Voltage	<u>28.3</u>	Volts
Normal DC Current	<u>8.2</u>	Amperes
Input power for final RF amplifying device(s)	<u>232</u>	Watts
Primary Supply Voltage	<u>48</u>	Volts DC

Report on Test Measurements*Occupied Bandwidth – Multi-Carrier Base Radio, 25 kHz Channel Spacing – 800 MHz Operation*

There are six exhibits shown for 800 MHz operation. All can be used in a system configuration based upon channel usage as described in Exhibit B. All of the following charts reference the following setup and specification requirements.

Modulation Type: Quad-QAM, 64 kbps Random Data Per Channel
 Emission Designator: (See Exhibit Table Below)
 Channelization: 25 kHz per channel
 Power Setting: (See Exhibit Table Below)

§ 90.691 Emission Mask Requirements for EA-Based Systems:

(a) Out of band emission requirements apply only to the 'outer' channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P), in Watts, by at least $116 \log_{10}(F/6.1)$ dB or $50 \text{ plus } 10 \log_{10}(P)$ dB or 80 dB, whichever is the lesser attenuation, where F is the frequency removed from the center of the outer channel in the block, in kiloHertz, and where F is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block by greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P), in Watts, by at least $43 \text{ plus } 10 \log_{10}(P)$ dB or 80 dB, whichever is the lesser attenuation, where F is the frequency removed from the center of the outer channel in the block, in kiloHertz, and where F is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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 17.7 kHz per carrier is based upon a 99% power measurement of the transmitter spectrum, per 2.202 (a). For the composite two carrier signal (1 additional channel), the resulting necessary bandwidth is $17.7 \text{ kHz} + 1 \times 25 \text{ kHz} = 42.7 \text{ kHz}$. For the composite signal of n additional carriers, the resulting necessary bandwidth is $17.7 \text{ kHz} + n \times 25 \text{ kHz}$.

Measurement Procedure and Instrument SettingsReference Calibration Analyzer Settings:

Horizontal:	12.5 kHz per Division	Resolution Bandwidth:	300 kHz
Vertical:	10 dB per Division	Video Bandwidth:	500 kHz
Sweep Time:	as needed (<2000 Hz / Second)	Span:	as needed per # carriers
Detector Mode:	Peak		

Emission Measurement Analyzer Settings:

Horizontal:	12.5 kHz per Division	Resolution Bandwidth:	300 Hz
Vertical:	10 dB per Division	Video Bandwidth:	3 kHz
Sweep Time:	as needed (<2000 Hz / Second)	Span:	as needed per # carriers
Detector Mode:	Peak		

Report on Test Measurements

Occupied Bandwidth – Multi-Carrier Base Radio, 25 kHz Channel Spacing – 800 MHz Operation (continued)

Test Procedure:

- 1) Adjust the spectrum analyzer per the values specified in the Reference Calibration Analyzer Settings section above.
- 2) Modulate the transmitter with the appropriate signaling pattern, (mixed QAM, psuedorandom data) and key the transmitter at the full power rating for the number of carriers to be measured. Use the analyzer controls to set this signal to the full-scale reference line. Allow the analyzer to sweep fully, store the sweep, and record the peak value.
- 3) Adjust the analyzer per the values specified in the Emission Measurement Analyzer Settings section above.
- 4) Allow the analyzer to sweep, and record the resultant emission levels.
- 5) Plot the resulting analyzer trace and the emission mask limit, add annotation text and labeling as appropriate.

EXHIBIT	DESCRIPTION	Power (Watts, Avg)	Emission Designator
E1-2.1	800 MHz – One Carrier	70 Watts	17K7D7W
E1-2.2	800 MHz – Two Carriers	52 Watts	42K7D7W
E1-2.3	800 MHz – Three Carriers	48 Watts	67K7D7W
E1-2.4	800 MHz – Four Carriers	42 Watts	92K7D7W
E1-2.5	800 MHz – Five Carriers	42 Watts	118KD7W
E1-2.6	800 MHz – Six Carriers	42 Watts	143KD7W

Report on Test Measurements*Occupied Bandwidth – Multi-Carrier Base Radio, 25 kHz Channel Spacing – 900 MHz Operation*

There are six exhibits shown for 900 MHz operation. All can be used in a system configuration based upon channel usage as described in Exhibit B. All of the following charts reference the following setup and specification requirements.

Modulation Type: Quad-QAM, 64 kbps Random Data Per Channel
 Emission Designator: (See Exhibit Table Below)
 Channelization: 25 kHz per channel
 Power Setting: (See Exhibit Table Below)

§ 90.669 Emission Limits:

- (a) On any frequency in an MTA licensee's spectrum block that is adjacent to a non-MTA frequency, the power of any emission shall be attenuated below the transmitter power (P) by at least *43 plus 10 log₁₀(P) dB or 80 dB, whichever is the lesser attenuation.*

Note: The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

- (b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

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 17.7 kHz per carrier is based upon a 99% power measurement of the transmitter spectrum, per 2.202 (a). For the composite two carrier signal (1 additional channel), the resulting necessary bandwidth is 17.7 kHz + 1*25 kHz = 42.7 kHz. For the composite signal of n additional carriers, the resulting necessary bandwidth is 17.7 kHz + n*25 kHz.

Measurement Procedure and Instrument SettingsReference Calibration Analyzer Settings:

Horizontal:	12.5 kHz per Division	Resolution Bandwidth:	300 kHz
Vertical:	10 dB per Division	Video Bandwidth:	500 kHz
Sweep Time:	as needed (<2000 Hz / Second)	Span:	as needed per # carriers
Detector Mode:	Peak		

Emission Measurement Analyzer Settings:

Horizontal:	12.5 kHz per Division	Resolution Bandwidth:	300 Hz
Vertical:	10 dB per Division	Video Bandwidth:	3 kHz
Sweep Time:	as needed (<2000 Hz / Second)	Span:	as needed per # carriers
Detector Mode:	Peak		

Report on Test Measurements

Occupied Bandwidth – Multi-Carrier Base Radio, 25 kHz Channel Spacing – 900 MHz Operation (continued)

Test Procedure:

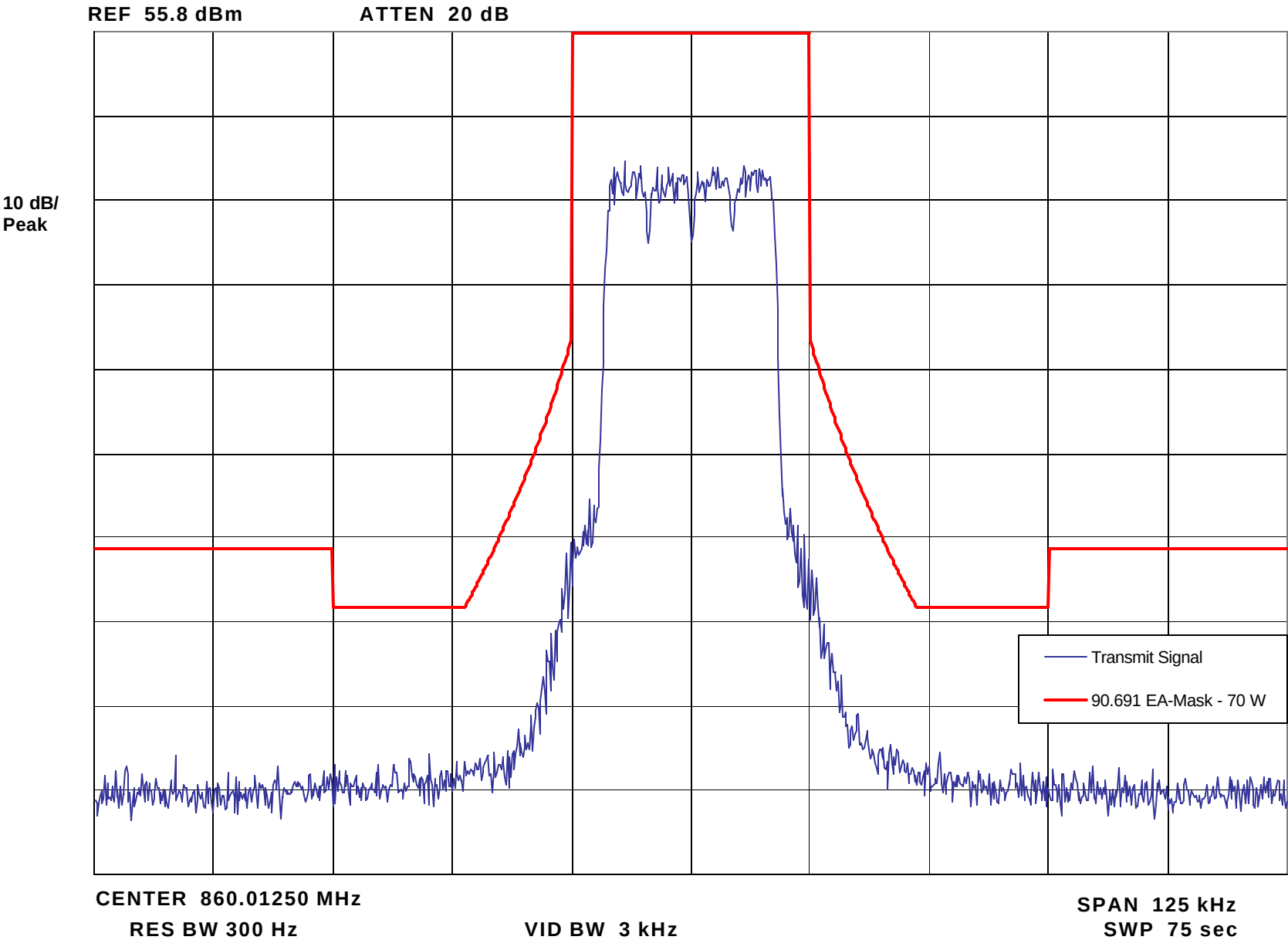
- 1) Adjust the spectrum analyzer per the values specified in the Reference Calibration Analyzer Settings section above.
- 2) Modulate the transmitter with the appropriate signaling pattern, (mixed QAM, psuedorandom data) and key the transmitter at the full power rating for the number of carriers to be measured. Use the analyzer controls to set this signal to the full-scale reference line. Allow the analyzer to sweep fully, store the sweep, and record the peak value.
- 3) Adjust the analyzer per the values specified in the Emission Measurement Analyzer Settings section above.
- 4) Allow the analyzer to sweep, and record the resultant emission levels.
- 5) Plot the resulting analyzer trace and the emission mask limit, add annotation text and labeling as appropriate.

EXHIBIT	DESCRIPTION	Power (Watts, Avg)	Emission Designator
E1-2.7	900 MHz – One Carrier	52 Watts	17K7D7W
E1-2.8	900 MHz – Two Carriers	52 Watts	42K7D7W
E1-2.9	900 MHz – Three Carriers	48 Watts	67K7D7W
E1-2.10	900 MHz – Four Carriers	42 Watts	92K7D7W
E1-2.11	900 MHz – Five Carriers	42 Watts	118KD7W
E1-2.12	900 MHz – Six Carriers	42 Watts	143KD7W

Report on Test Measurements

Occupied Bandwidth – 800 MHz – One Carrier

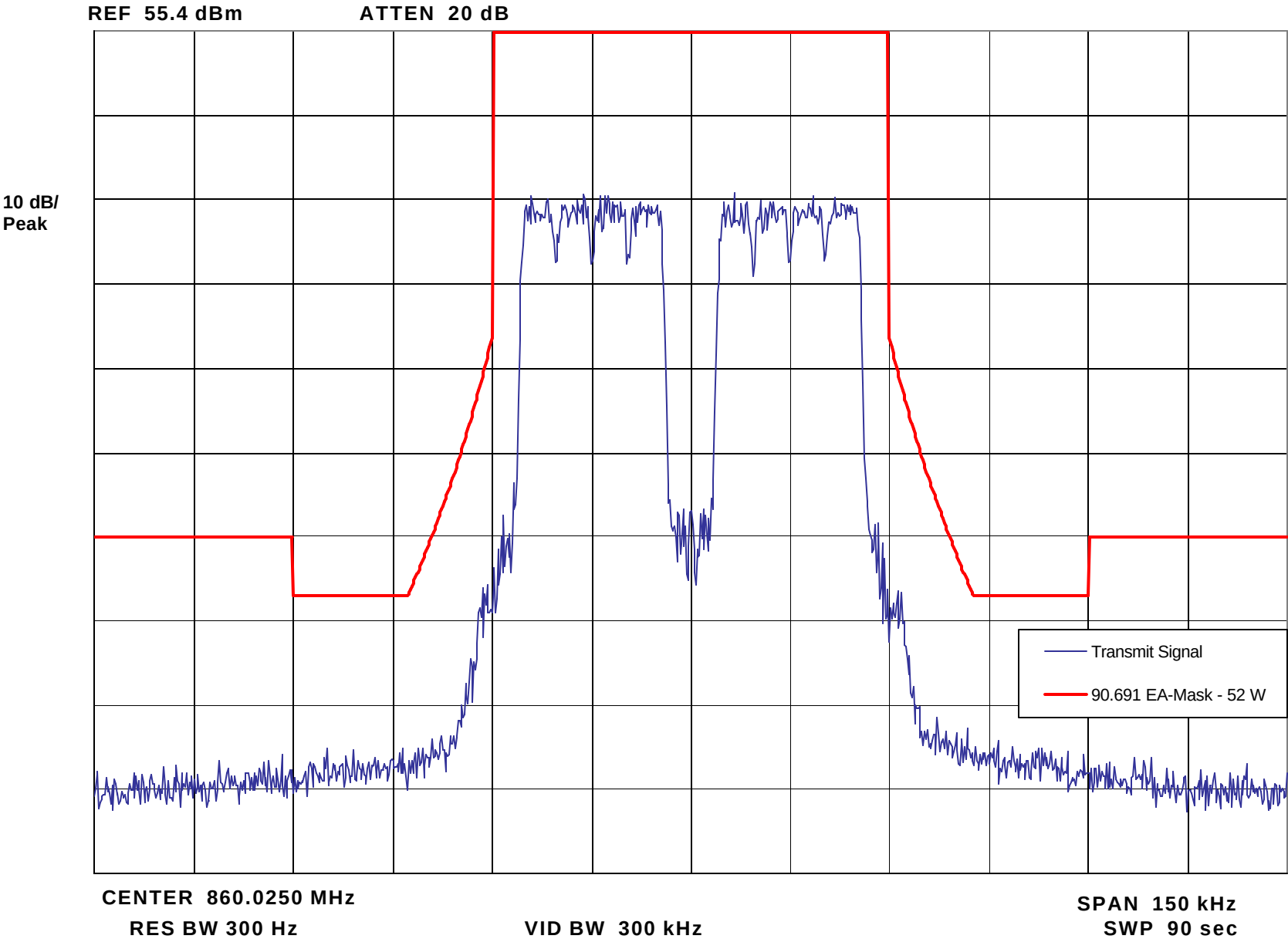
Occupied Bandwidth -- One Carrier - Mixed QAM - 17K7D7D - 70 Watts



Report on Test Measurements

Occupied Bandwidth – 800 MHz – Two Carriers

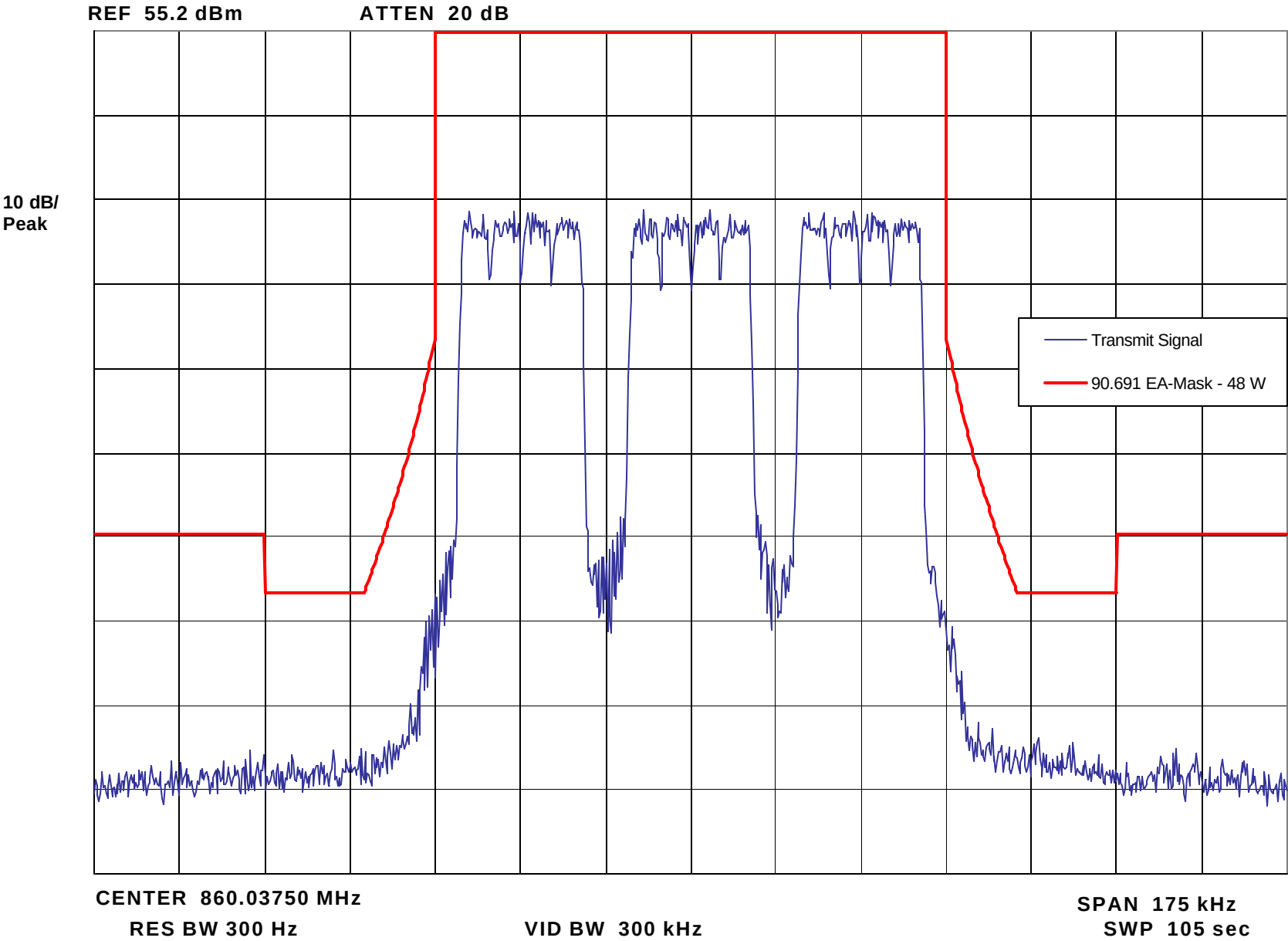
Occupied Bandwidth -- Two Carriers - Mixed QAM - 42K7D7D - 52 Watts



Report on Test Measurements

Occupied Bandwidth – 800 MHz – Three Carriers

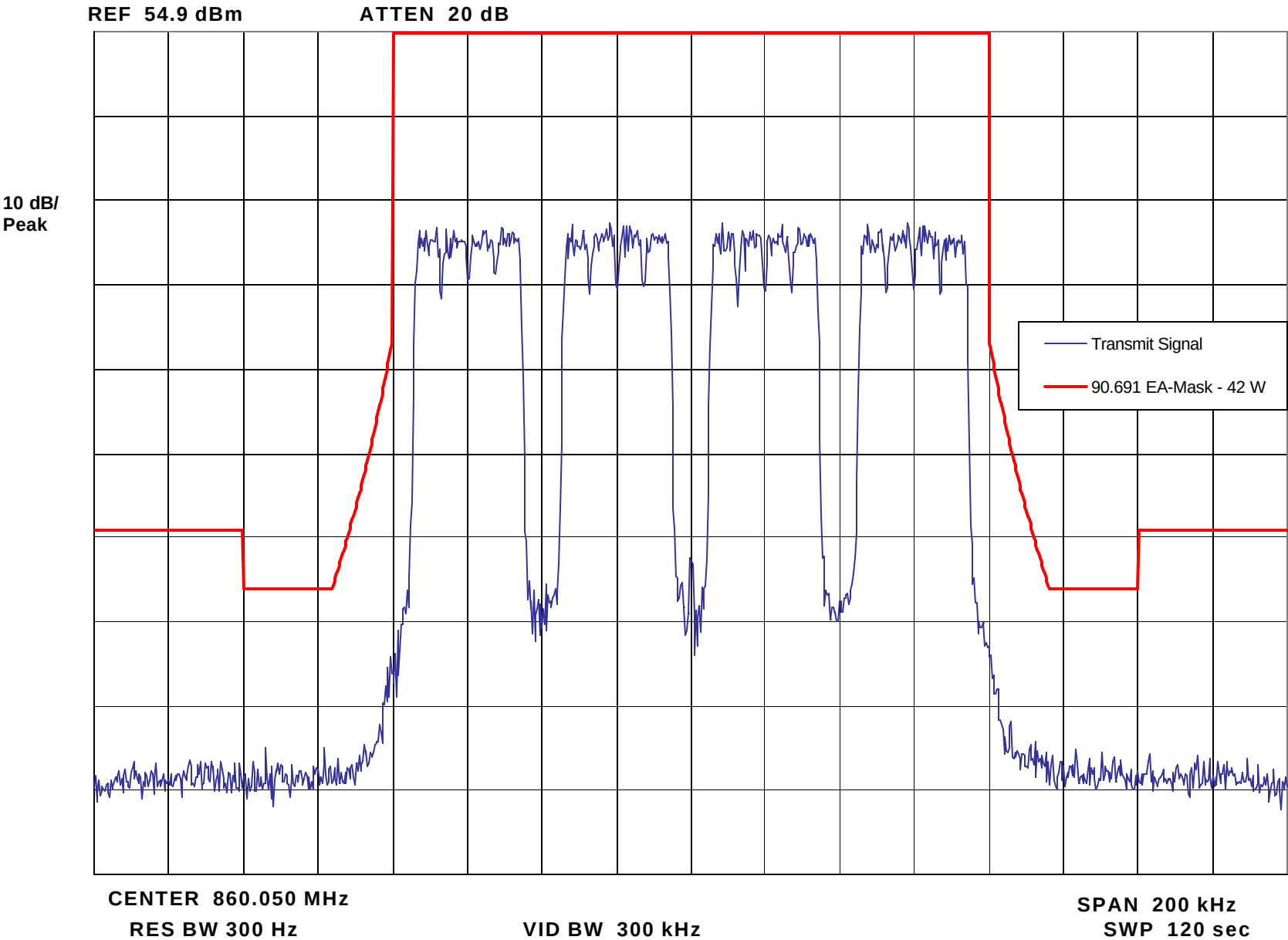
Occupied Bandwidth -- Three Carriers - Mixed QAM - 67K7D7D - 48 Watts



Report on Test Measurements

Occupied Bandwidth – 800 MHz – Four Carriers

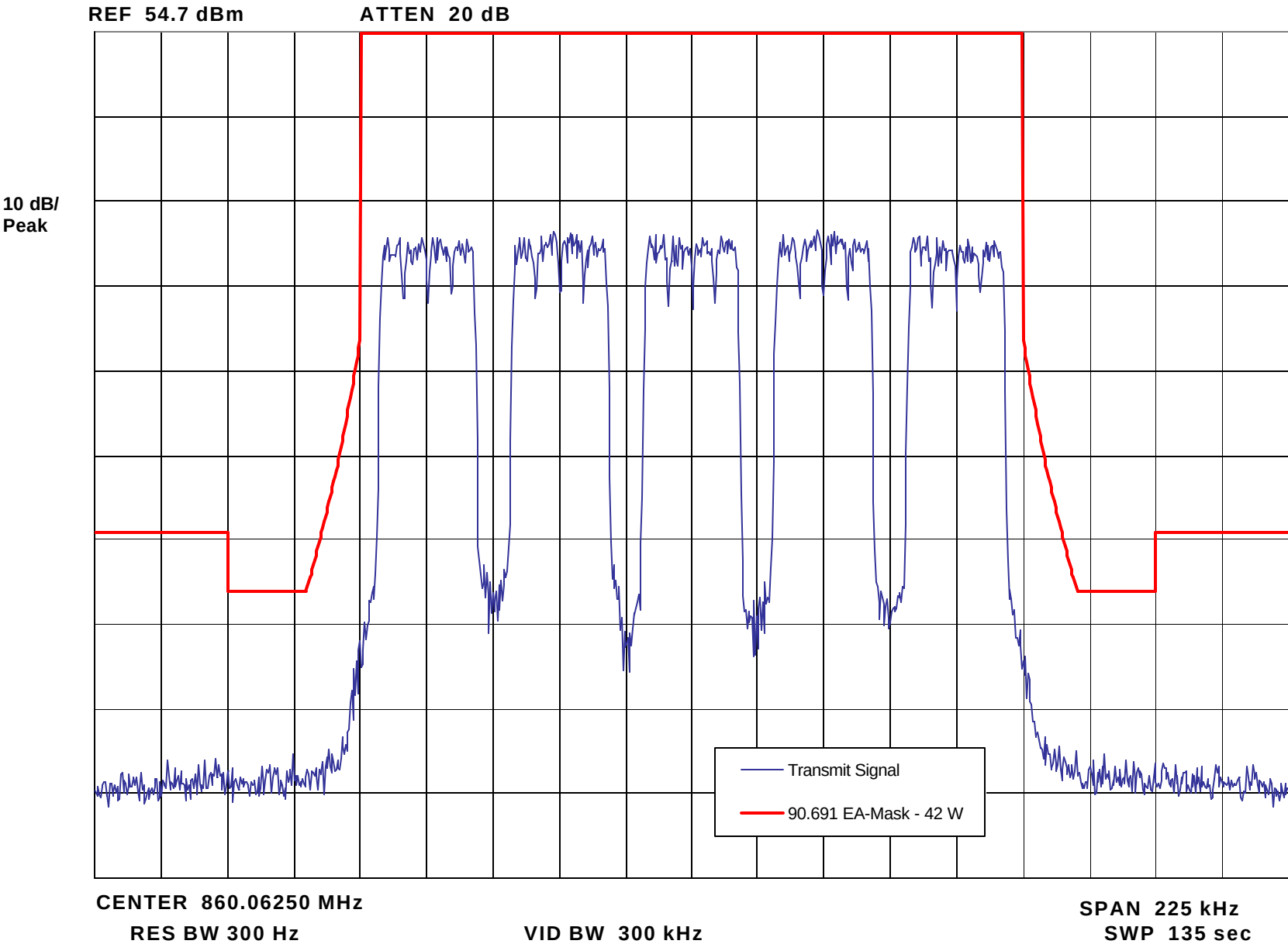
Occupied Bandwidth -- Four Carriers - Mixed QAM - 92K7D7D - 42 Watts



Report on Test Measurements

Occupied Bandwidth – 800 MHz – Five Carriers

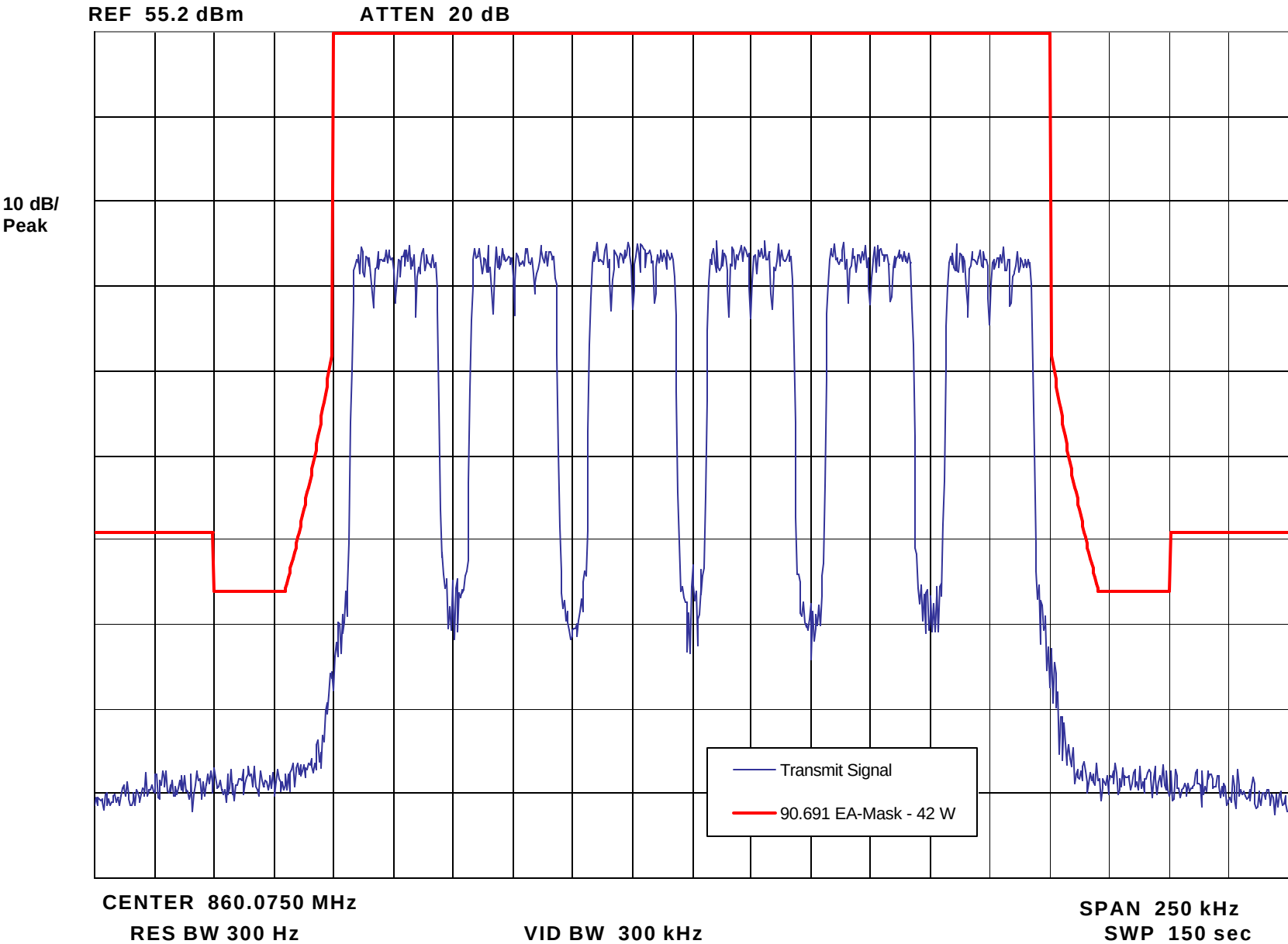
Occupied Bandwidth -- Five Carriers - Mixed QAM - 118KD7D - 42 Watts



Report on Test Measurements

Occupied Bandwidth – 800 MHz – Six Carriers

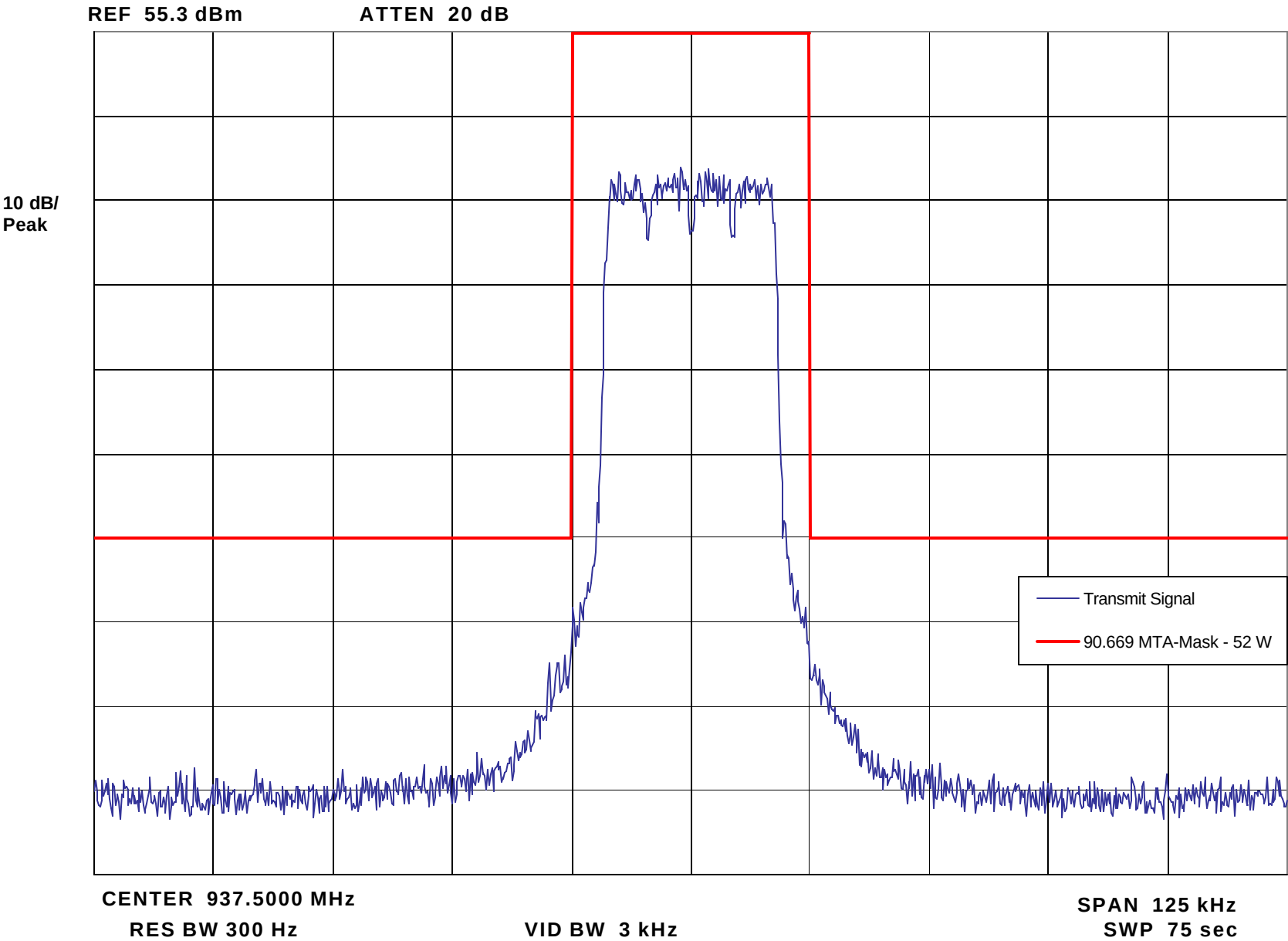
Occupied Bandwidth -- Six Carriers - Mixed QAM - 143KD7D - 42 Watts



Report on Test Measurements

Occupied Bandwidth – 900 MHz – One Carrier

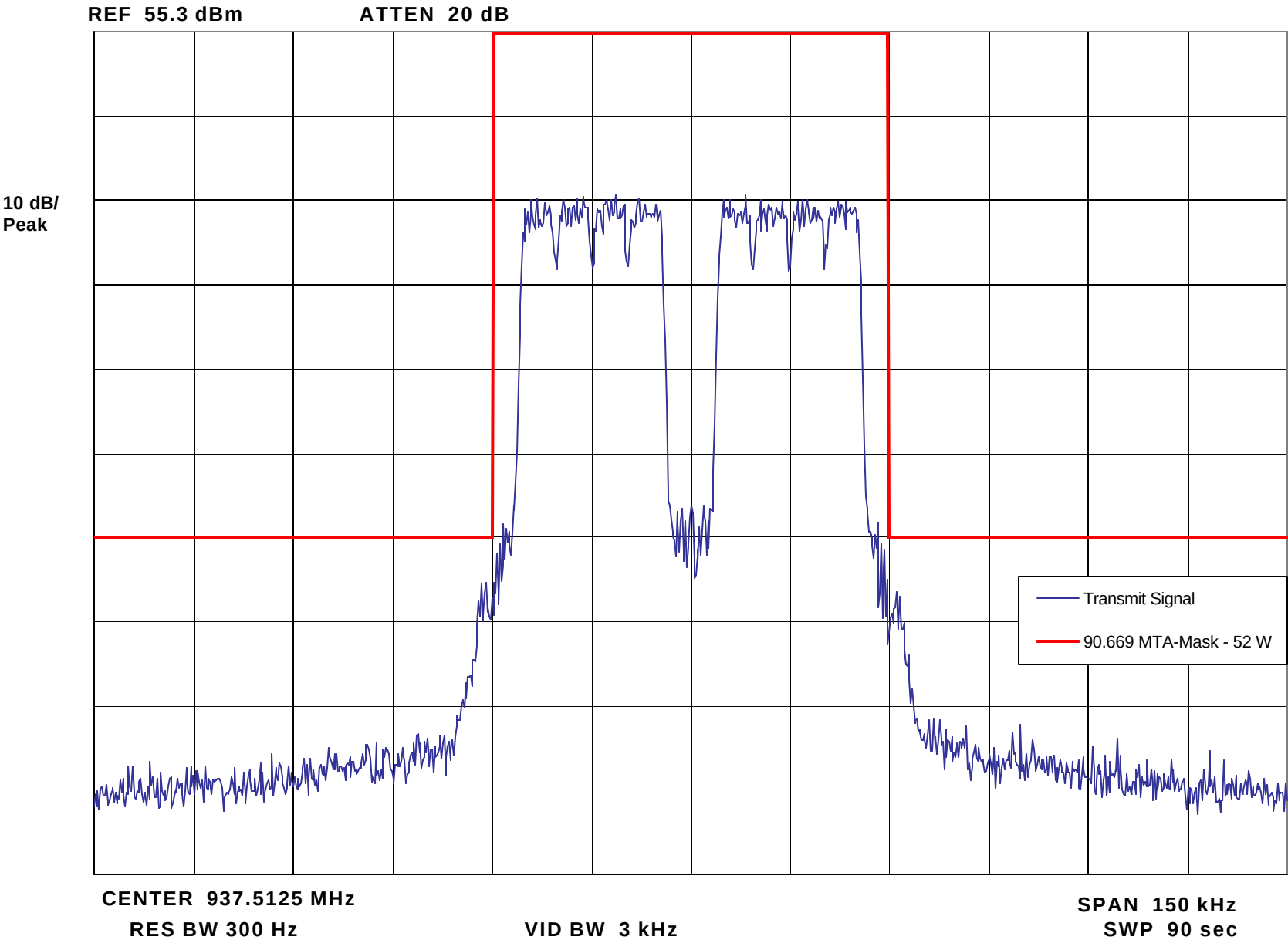
Occupied Bandwidth -- One Carrier - Mixed QAM - 17K7D7D - 52 Watts



Report on Test Measurements

Occupied Bandwidth – 900 MHz – Two Carriers

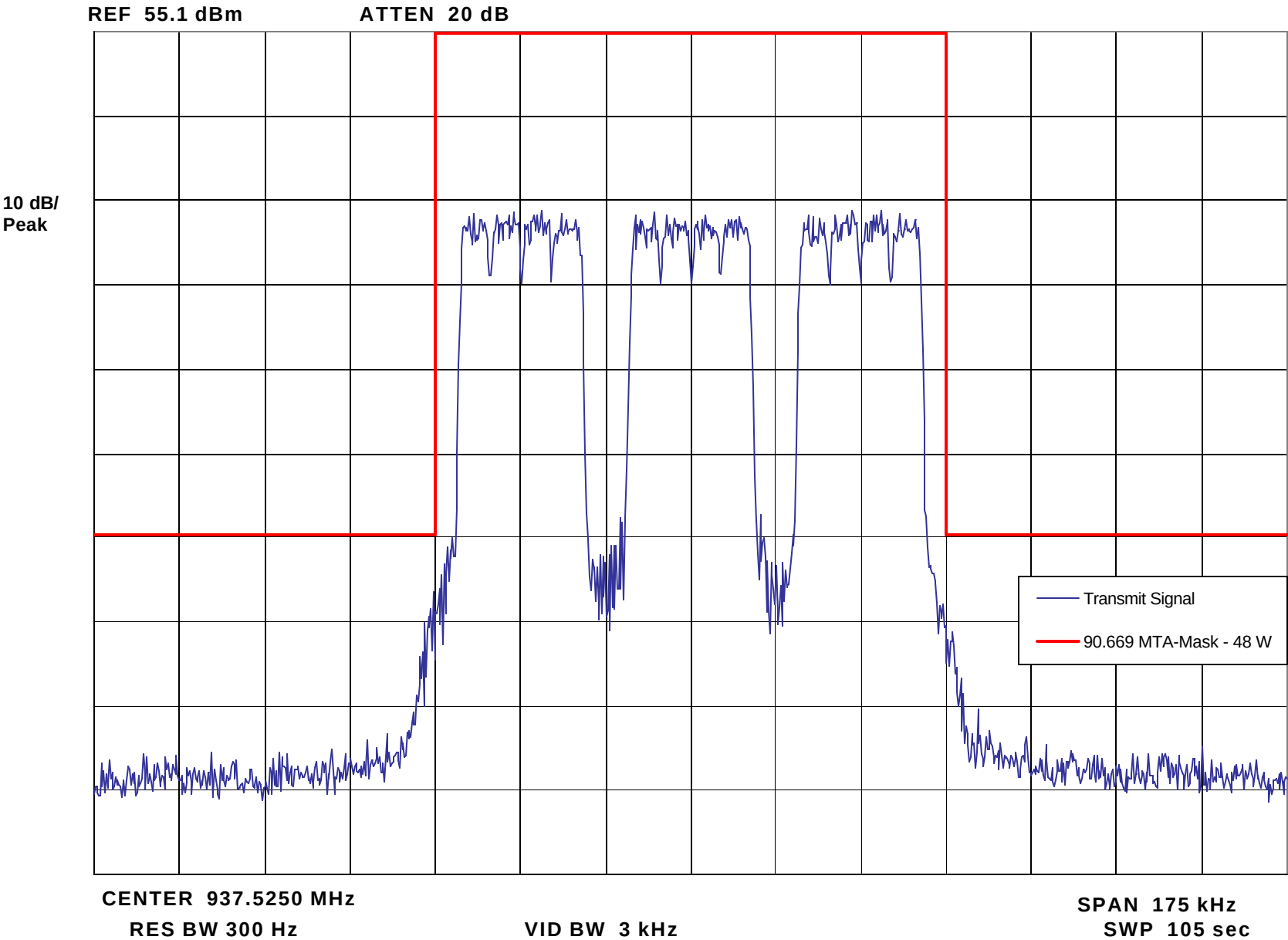
Occupied Bandwidth -- Two Carriers - Mixed QAM - 42K7D7D - 52 Watts



Report on Test Measurements

Occupied Bandwidth – 900 MHz – Three Carriers

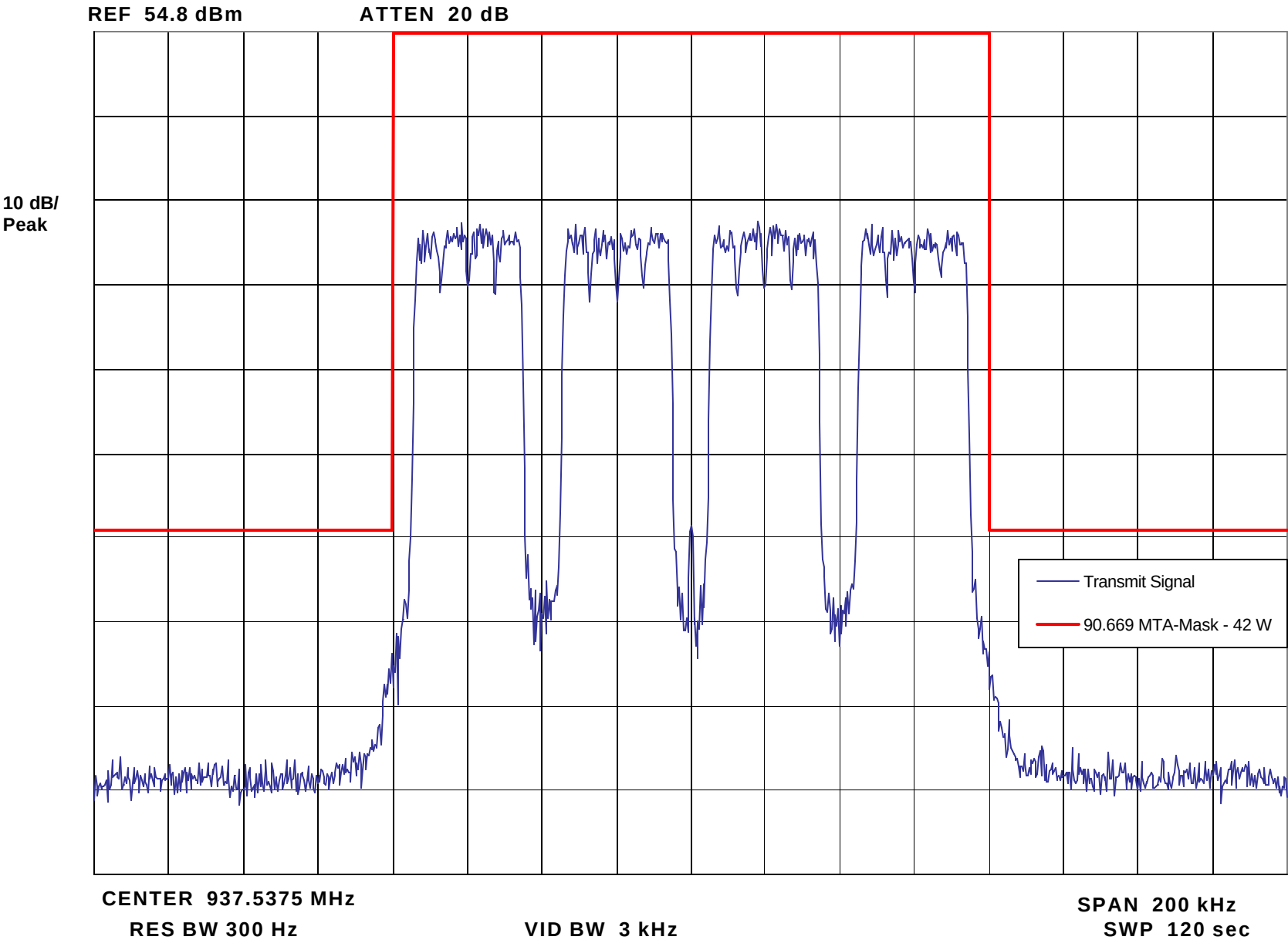
Occupied Bandwidth -- Three Carriers - Mixed QAM - 67K7D7D - 48 Watts



Report on Test Measurements

Occupied Bandwidth – 900 MHz – Four Carriers

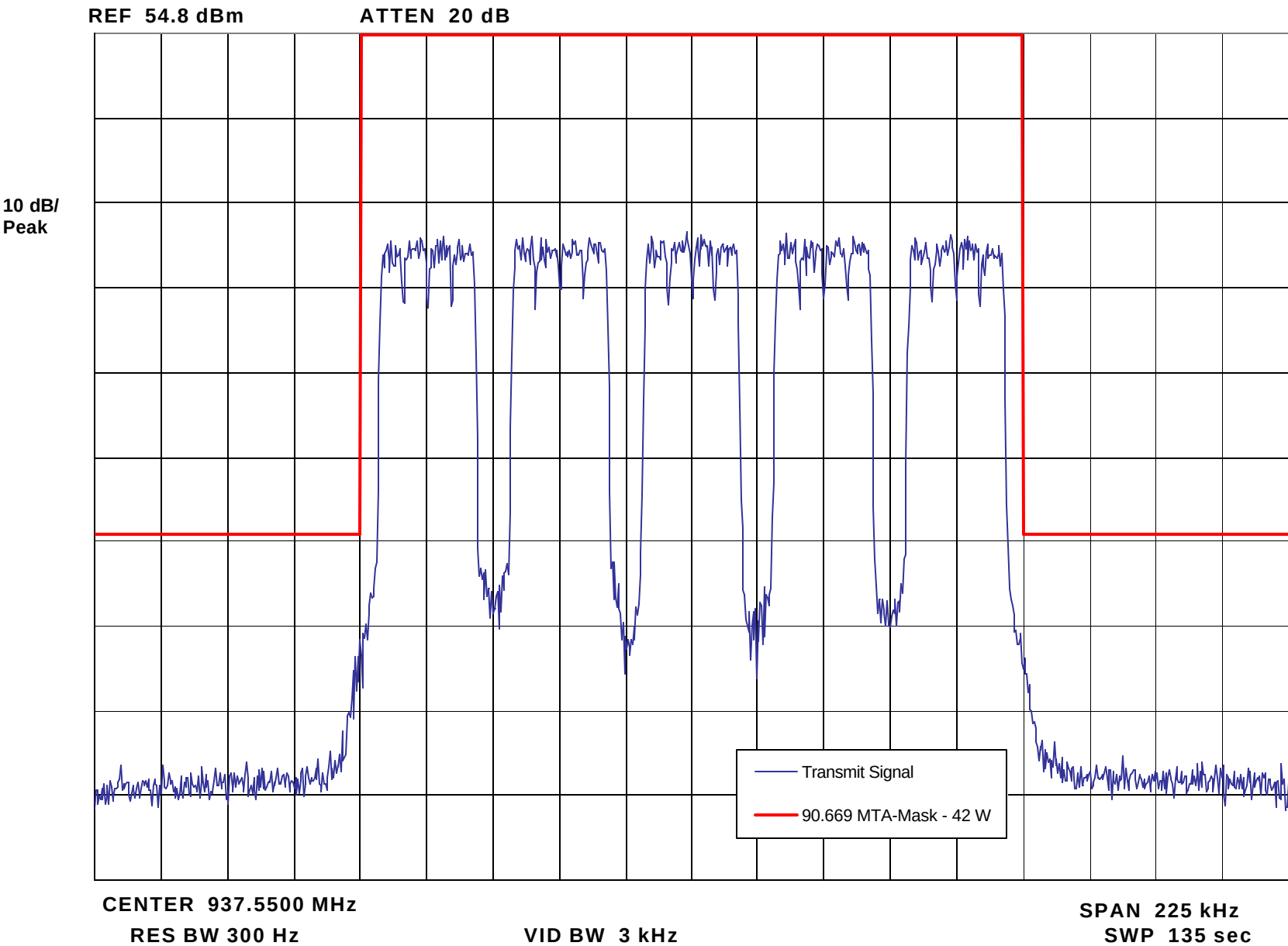
Occupied Bandwidth -- Four Carriers - Mixed QAM - 92K7D7D - 42 Watts



Report on Test Measurements

Occupied Bandwidth – 900 MHz – Five Carriers

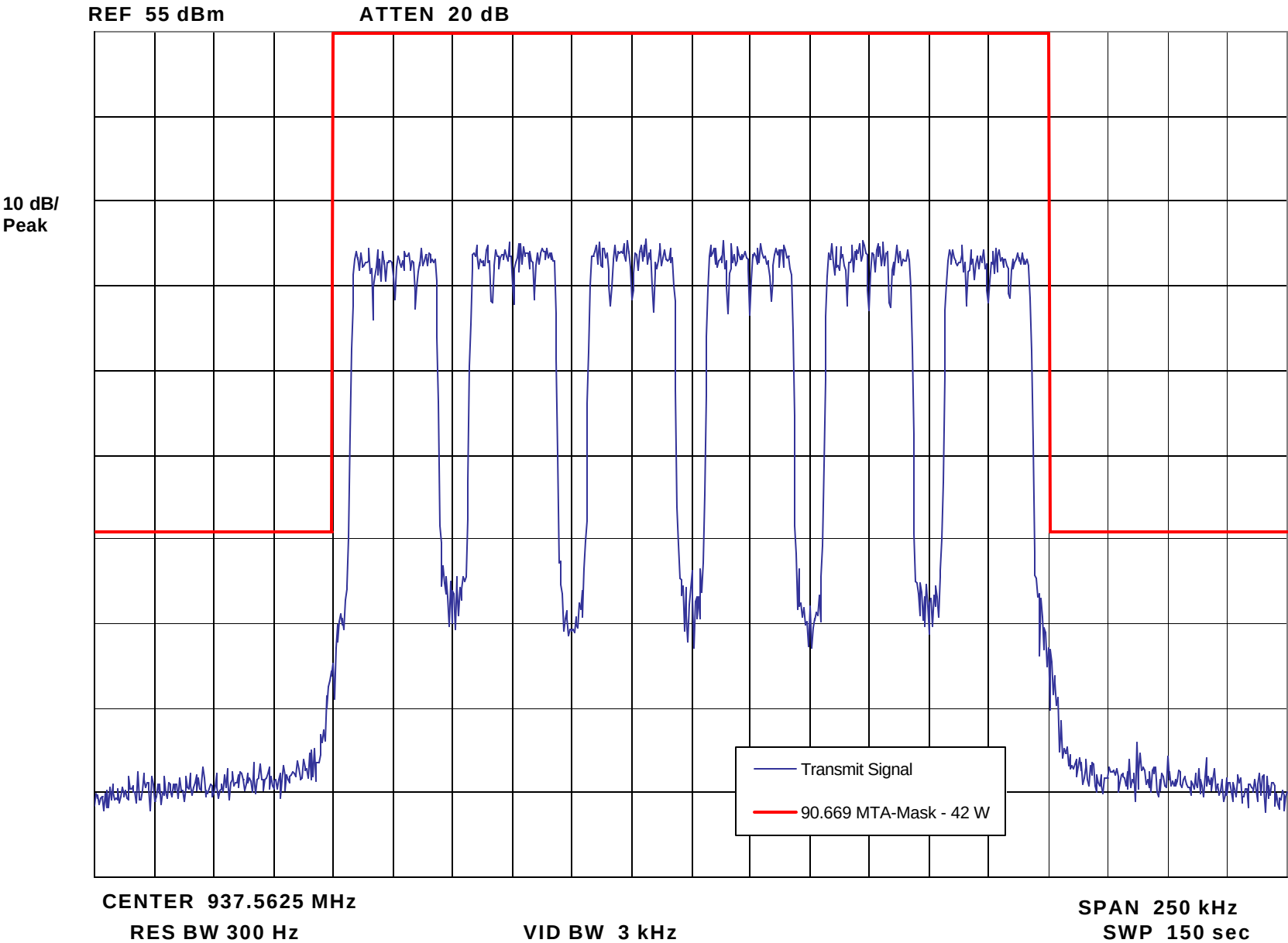
Occupied Bandwidth -- Five Carriers - Mixed QAM - 118KD7D - 42 Watts



Report on Test Measurements

Occupied Bandwidth – 900 MHz – Six Carriers

Occupied Bandwidth -- Six Carriers - Mixed QAM - 118KD7D - 42 Watts



Report on Test Measurements

Conducted Spurious Emissions, Harmonics and Close-In, 800 MHz Operation

§ 90.691 Emission Mask Requirements for EA-Based Systems:

(a) Out of band emission requirements apply only to the 'outer' channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(2) For any frequency removed from the EA licensee's frequency block by greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P), in Watts, by at least *43 plus $10 \log_{10}(P)$ dB or 80 dB, whichever is the lesser attenuation*, where F is the frequency removed from the center of the outer channel in the block, in kiloHertz, and where F is greater than 37.5 kHz.

Modulation: Quad-QAM, 64 kbps Random Data Per Channel

Carrier Frequency: A carrier frequency of 860.0125 MHz was measured. This frequency is near the center of the operating band 851-870 MHz

EXHIBIT	DESCRIPTION
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E1-3.1	800 MHz – One Carrier Conducted Spurious Emissions, Harmonics, Power Output at 70 Watts The specification limit is -61.5 dBc
E1-3.2	800 MHz – One Carrier Conducted Spurious Emissions, Harmonics, Power Output at 5 Watts The specification limit is -50.0 dBc
E1-3.3	800 MHz – Six Carrier Conducted Spurious Emissions, Harmonics, Power Output at 42 Watts The specification limit is -59.2 dBc
E1-3.4	800 MHz – Six Carrier Conducted Spurious Emissions, Harmonics, Power Output at 5 Watts The specification limit is -50.0 dBc
E1-3.5	800 MHz – One Carrier – Conducted Close-In, 5 MHz Span, Power Output at 70 Watts The specification limit is -61.5 dBc
E1-3.6	800 MHz – One Carrier – Conducted Close-In, 100 MHz Span, Power Output at 70 Watts The specification limit is -61.5 dBc
E1-3.7	800 MHz – Six Carrier – Conducted Close-In, 5 MHz Span, Power Output at 42 Watts The specification limit is -59.2 dBc
E1-3.8	800 MHz – Six Carrier – Conducted Close-In, 100 MHz Span, Power Output at 42 Watts The specification limit is -59.2 dBc

Report on Test Measurements

Conducted Spurious Emissions, Harmonics and Close-In, 900 MHz Operation

§ 90.669 Emission Limits:

- (c) On any frequency in an MTA licensee's spectrum block that is adjacent to a non-MTA frequency, the power of any emission shall be attenuated below the transmitter power (P) by at least *43 plus 10 log₁₀(P) dB or 80 dB, whichever is the lesser attenuation.*

Note: The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

- (d) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

Modulation: Quad-QAM, 64 kbps Random Data Per Channel

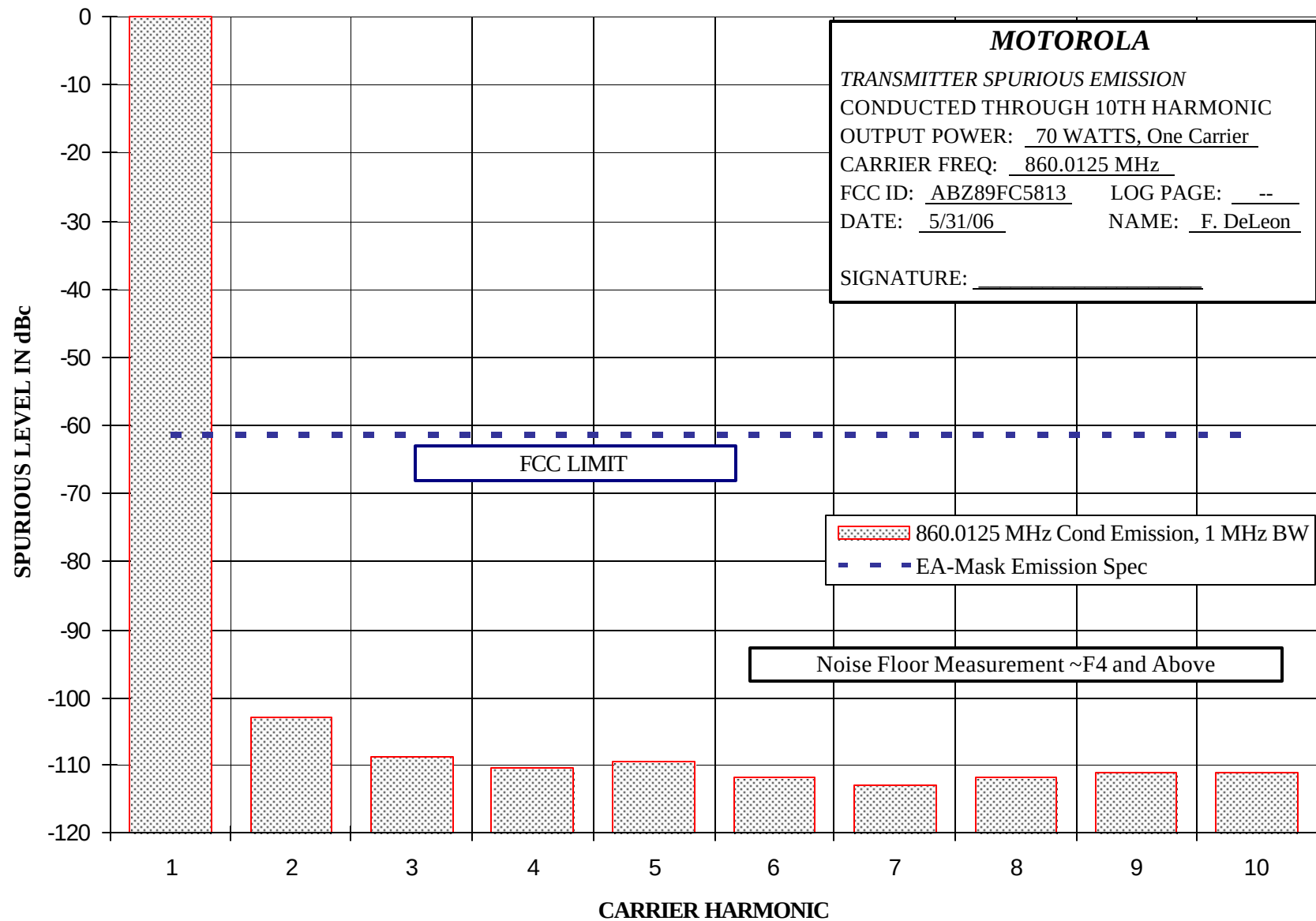
Carrier Frequency: A carrier frequency of 937.5000 MHz was measured. This frequency is near the center of the operating band 935-941 MHz

EXHIBIT DESCRIPTION

E1-3.9	900 MHz – One Carrier Conducted Spurious Emissions, Harmonics, Power Output at 52 Watts The specification limit is -60.2 dBc
E1-3.10	900 MHz – One Carrier Conducted Spurious Emissions, Harmonics, Power Output at 5 Watts The specification limit is -50.0 dBc
E1-3.11	900 MHz – Six Carrier Conducted Spurious Emissions, Harmonics, Power Output at 42 Watts The specification limit is -59.2 dBc
E1-3.12	900 MHz – Six Carrier Conducted Spurious Emissions, Harmonics, Power Output at 5 Watts The specification limit is -50.0 dBc
E1-3.13	900 MHz – One Carrier – Conducted Close-In, 5 MHz Span, Power Output at 52 Watts The specification limit is -60.2 dBc
E1-3.14	900 MHz – One Carrier – Conducted Close-In, 100 MHz Span, Power Output at 52 Watts The specification limit is -60.2 dBc
E1-3.15	900 MHz – Six Carrier – Conducted Close-In, 5 MHz Span, Power Output at 42 Watts The specification limit is -59.2 dBc
E1-3.16	900 MHz – Six Carrier – Conducted Close-In, 100 MHz Span, Power Output at 42 Watts The specification limit is -59.2 dBc

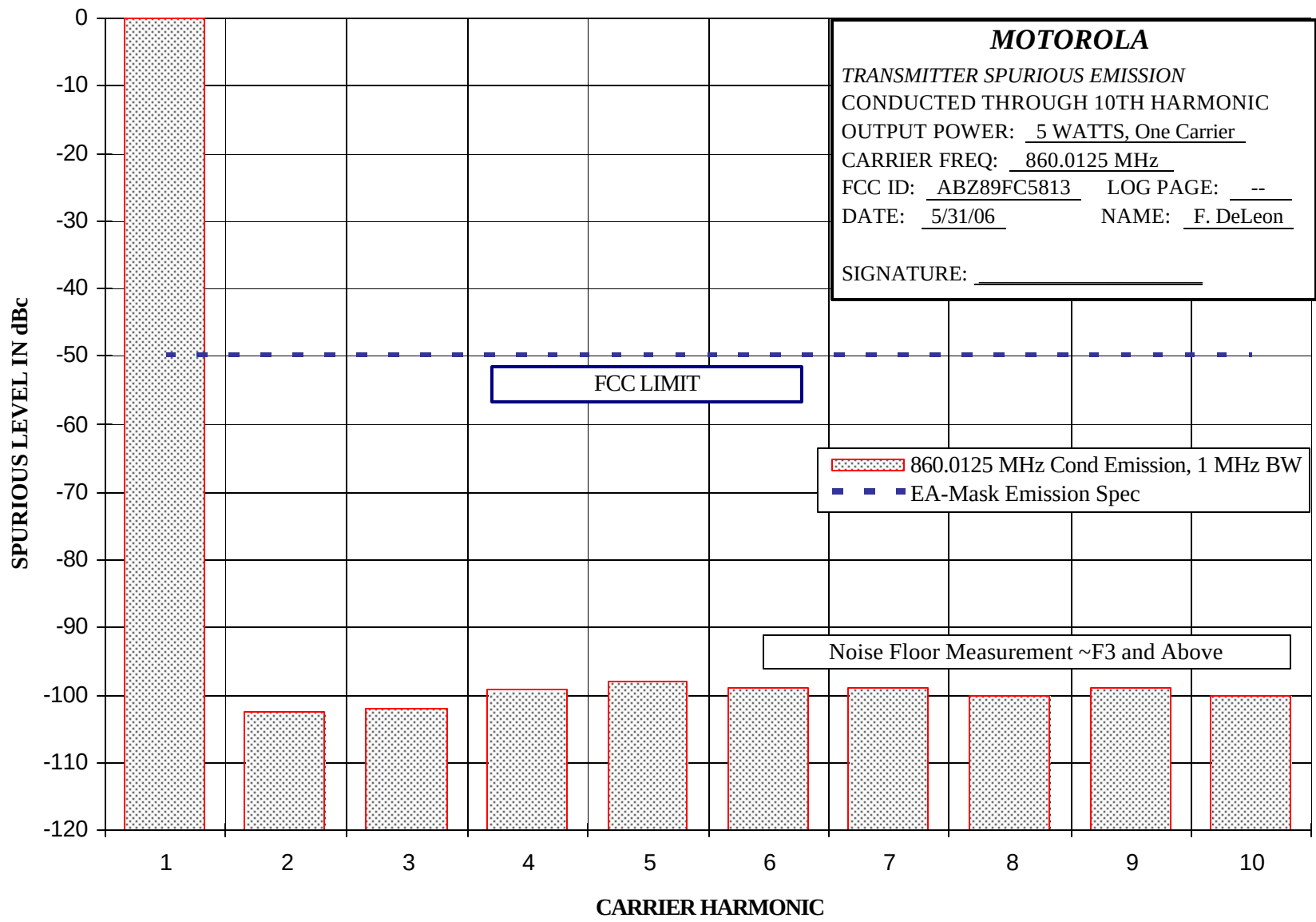
Report on Test Measurements

Conducted Emission – Harmonics – One Carrier - 70 Watts – 800 MHz



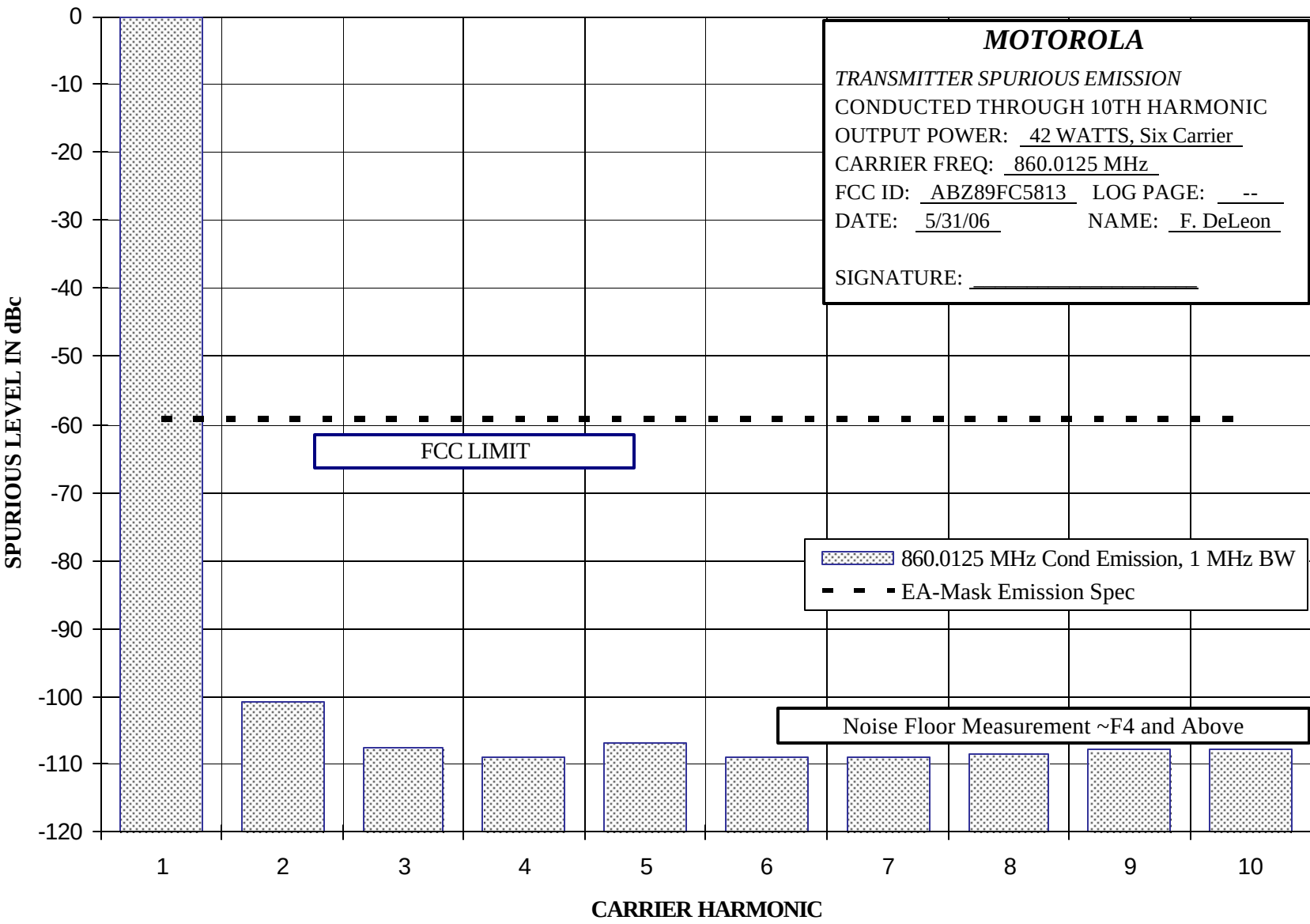
Report on Test Measurements

Conducted Emission – Harmonics – One Carrier - 5 Watts – 800 MHz



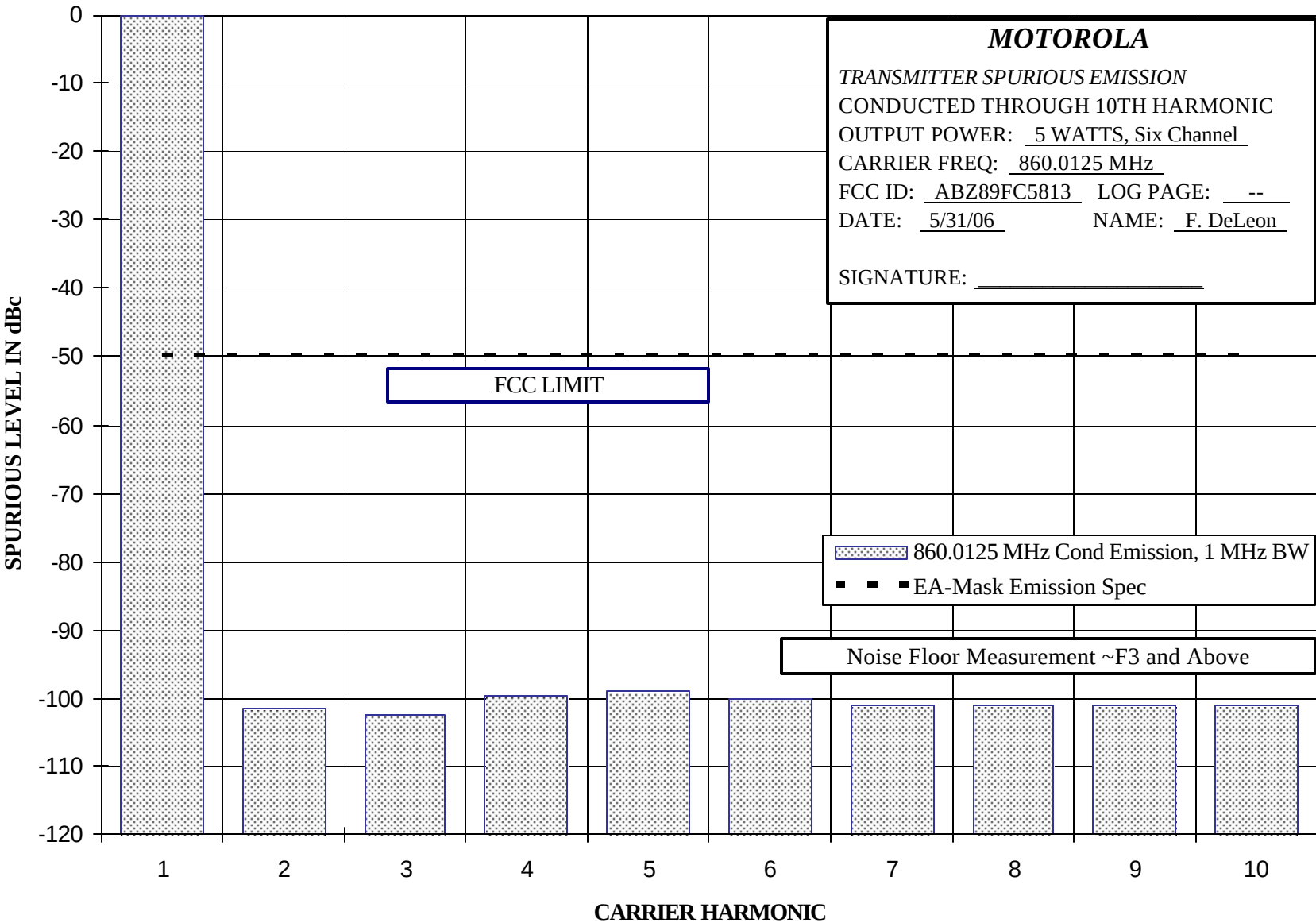
Report on Test Measurements

Conducted Emission – Harmonics – Six Carrier - 42 Watts – 800 MHz



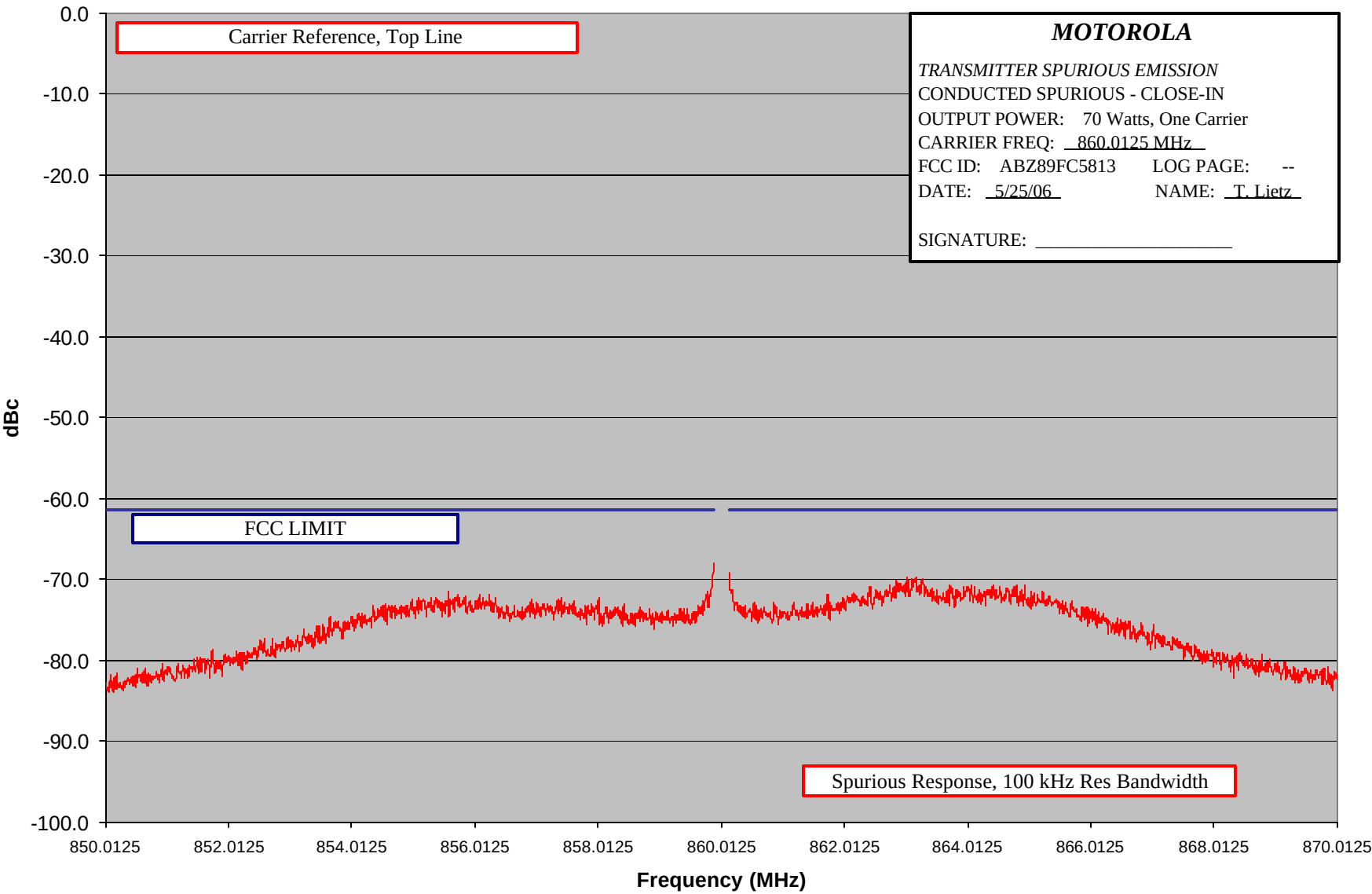
Report on Test Measurements

Conducted Emission – Harmonics – Six Carrier - 5 Watts – 800 MHz



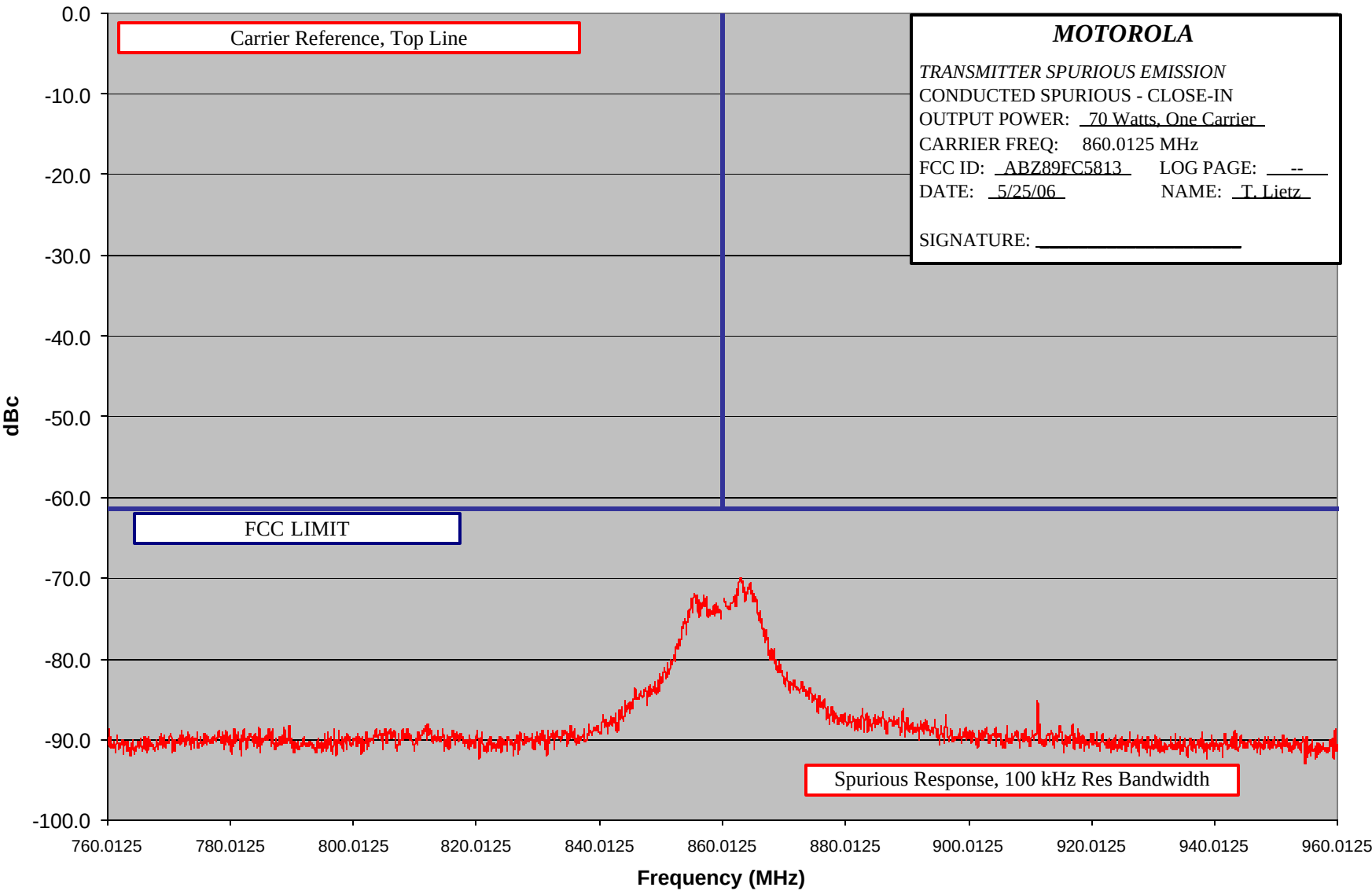
Report on Test Measurements

Conducted Emission – Close-In – One Carrier – 70 Watts – 800 MHz – 20 MHz Span



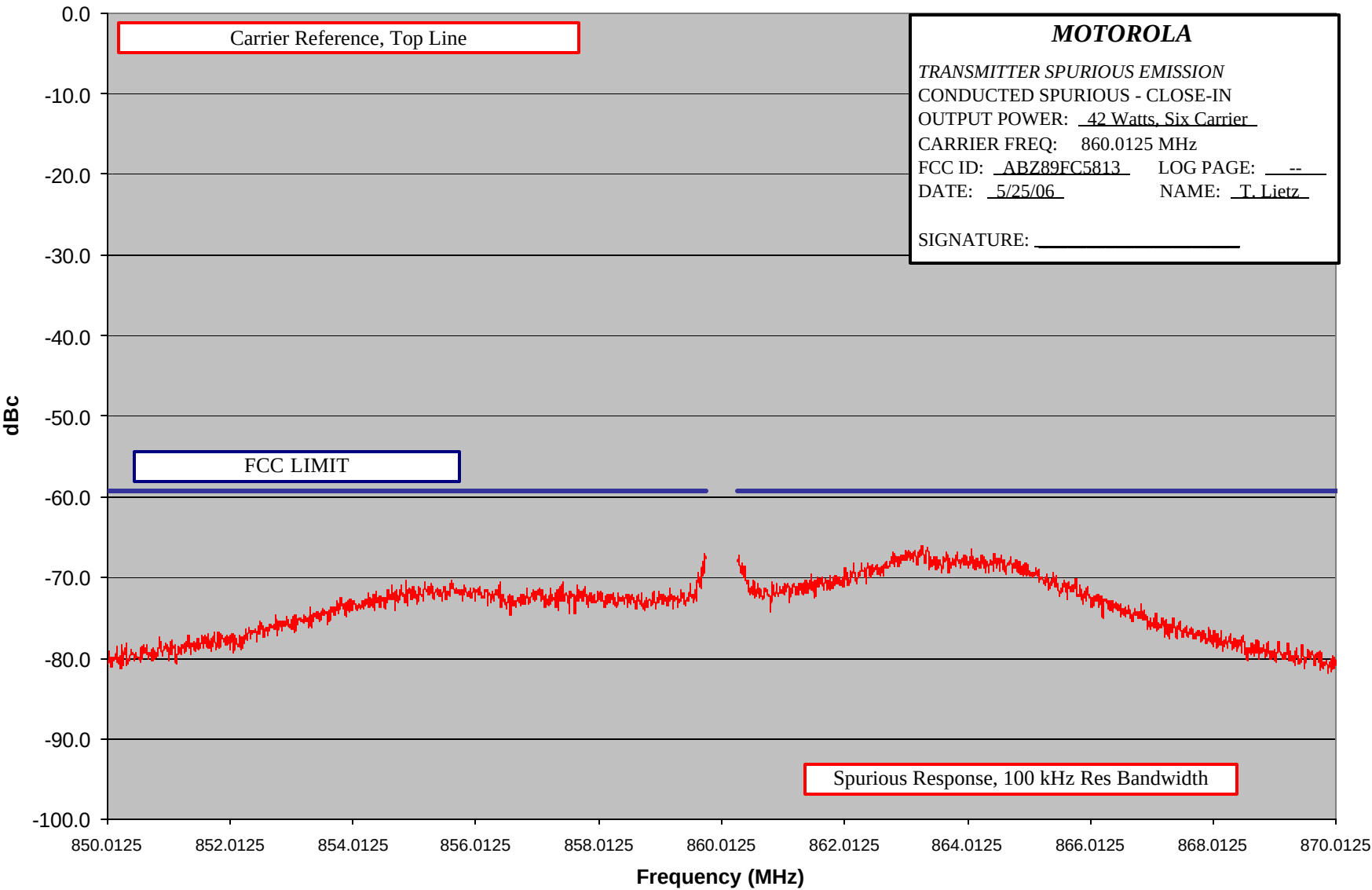
Report on Test Measurements

Conducted Emission – Close-In – One Carrier – 70 Watts – 800 MHz – 200 MHz Span



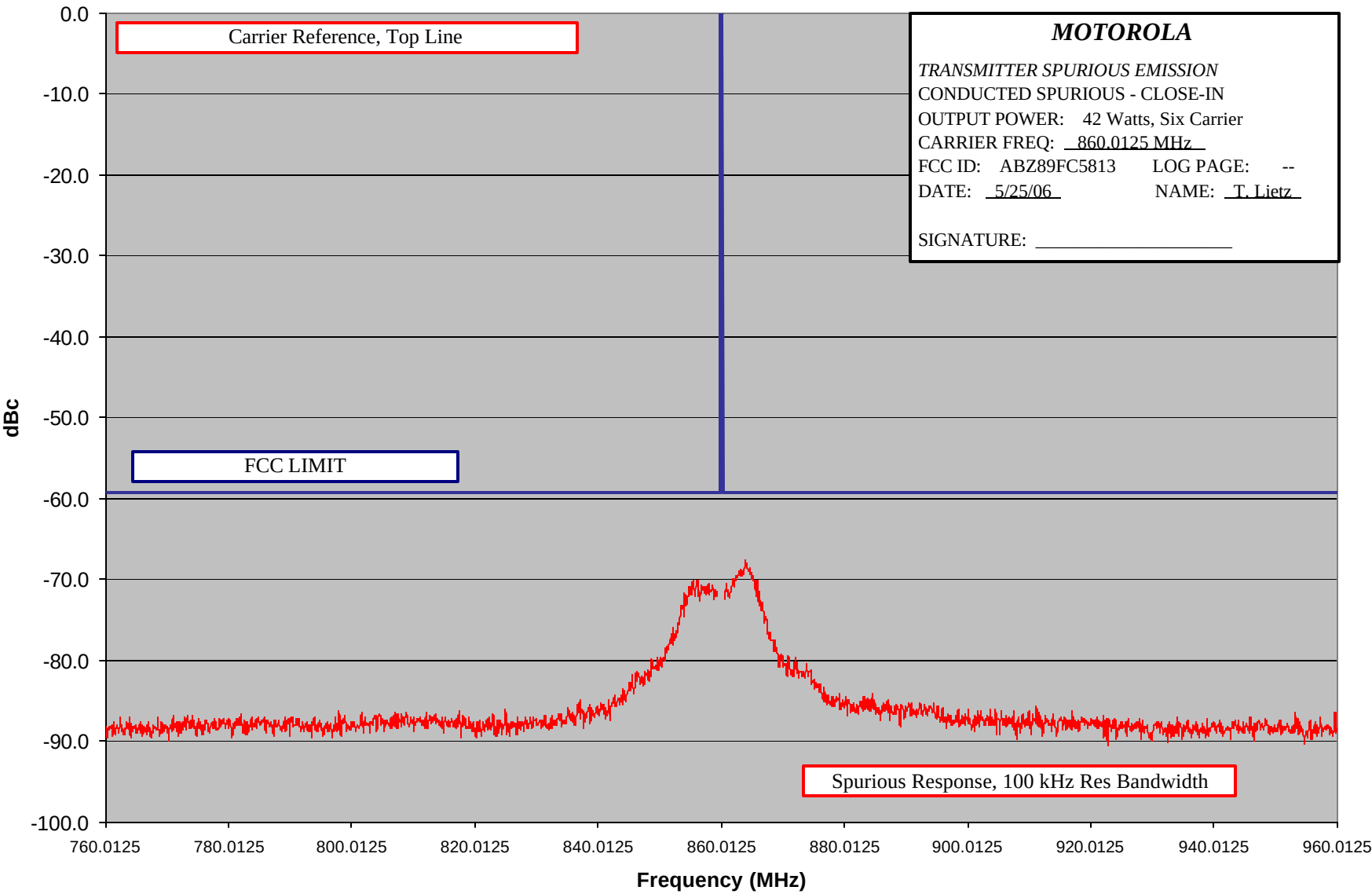
Report on Test Measurements

Conducted Emission – Close-In – Six Carrier – 42 Watts – 800 MHz – 20 MHz Span



Report on Test Measurements

Conducted Emission – Close-In – Six Carrier – 42 Watts – 800 MHz – 200 MHz Span

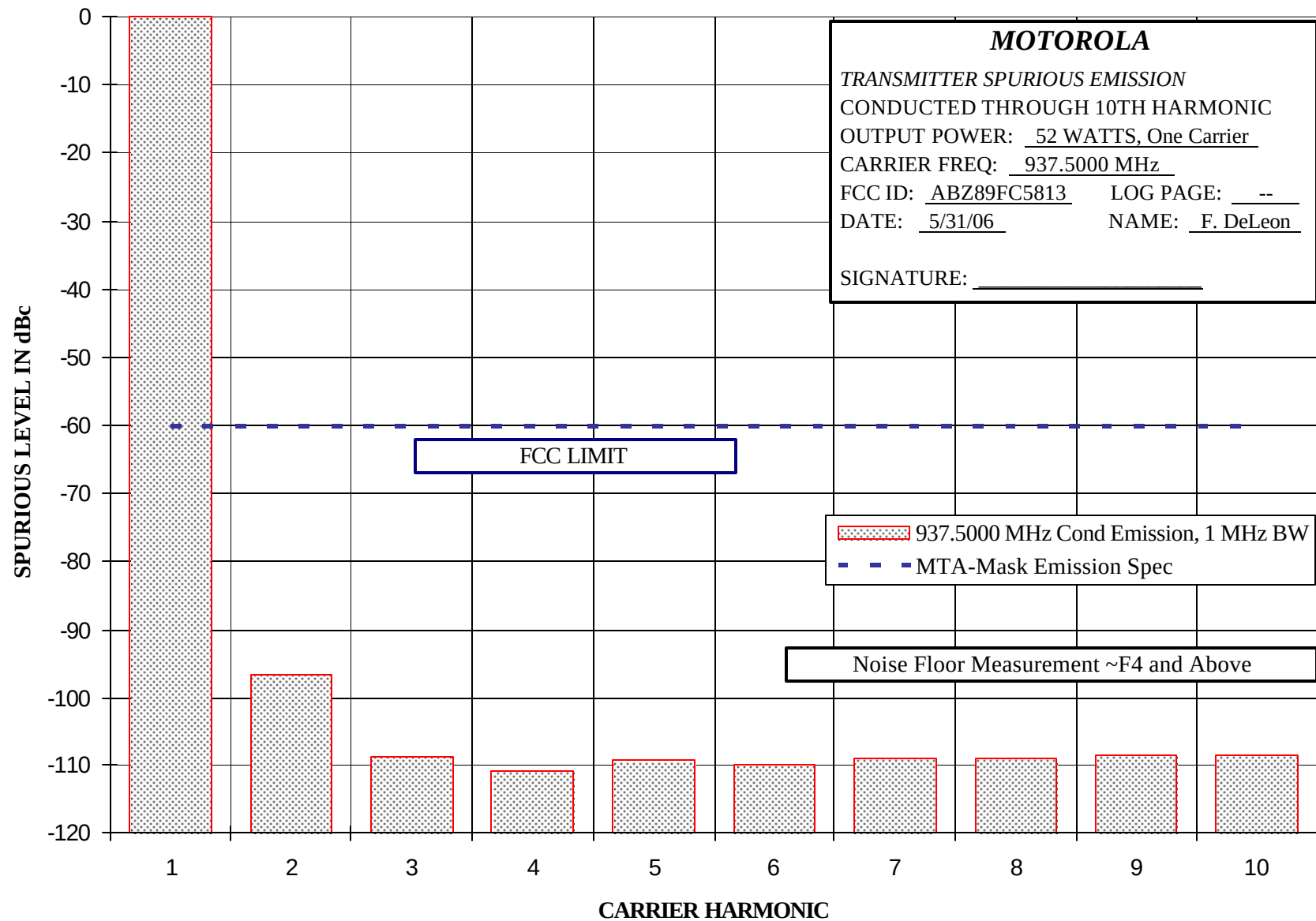


APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC5813

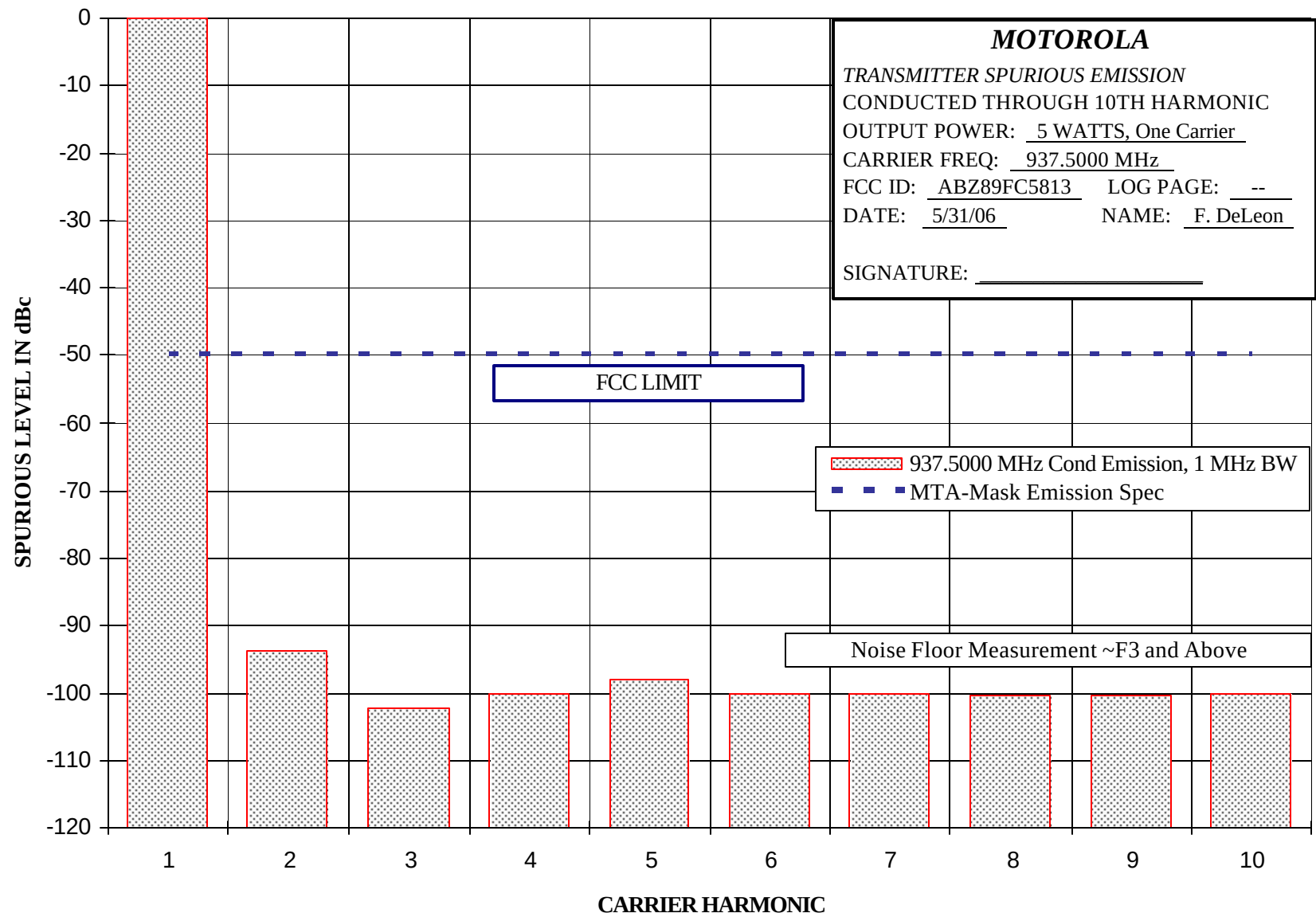
Conducted Emission – Harmonics – One Carrier - 52 Watts – 900 MHz

Report on Test Measurements



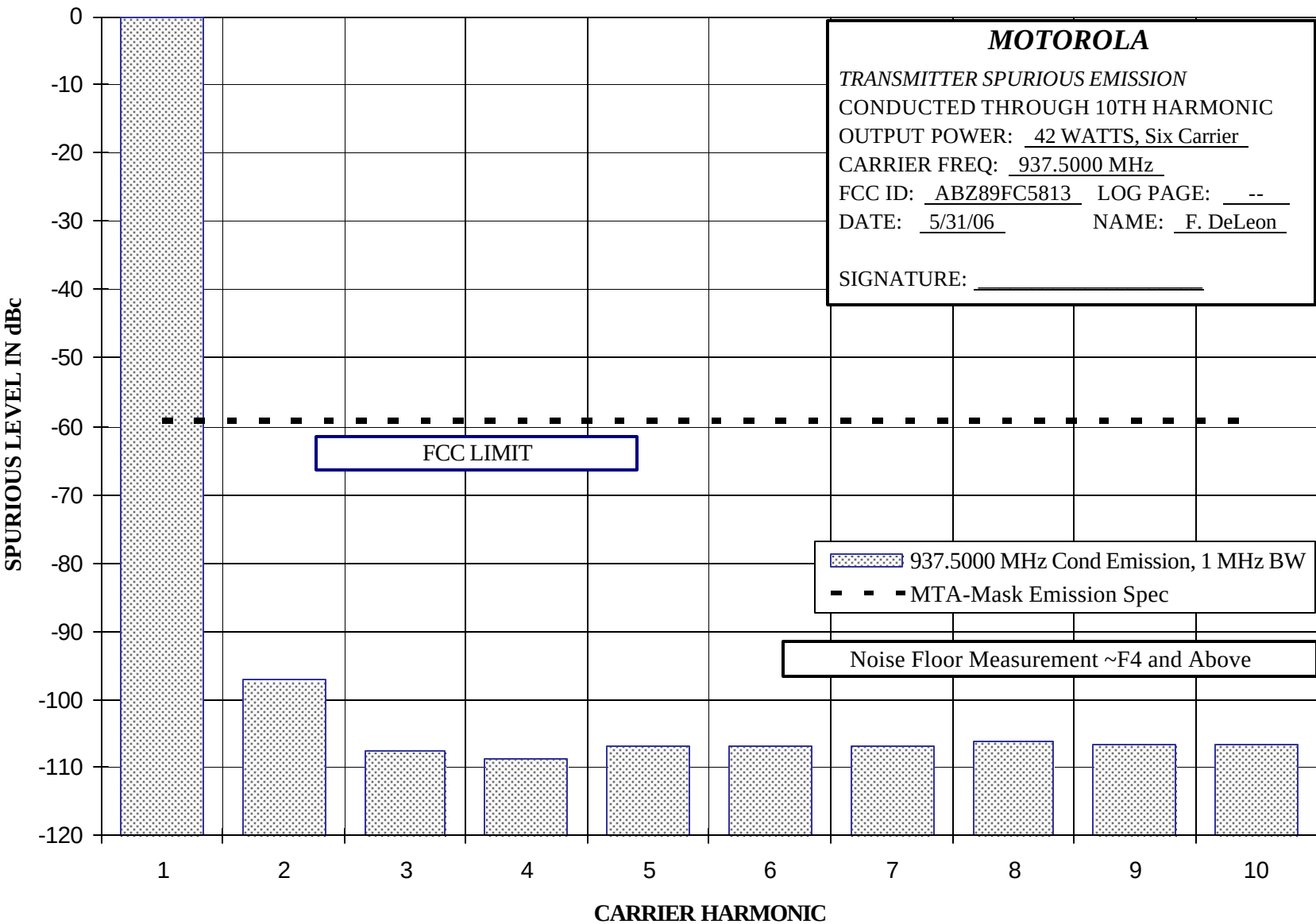
Report on Test Measurements

Conducted Emission – Harmonics – One Carrier - 5 Watts – 900 MHz



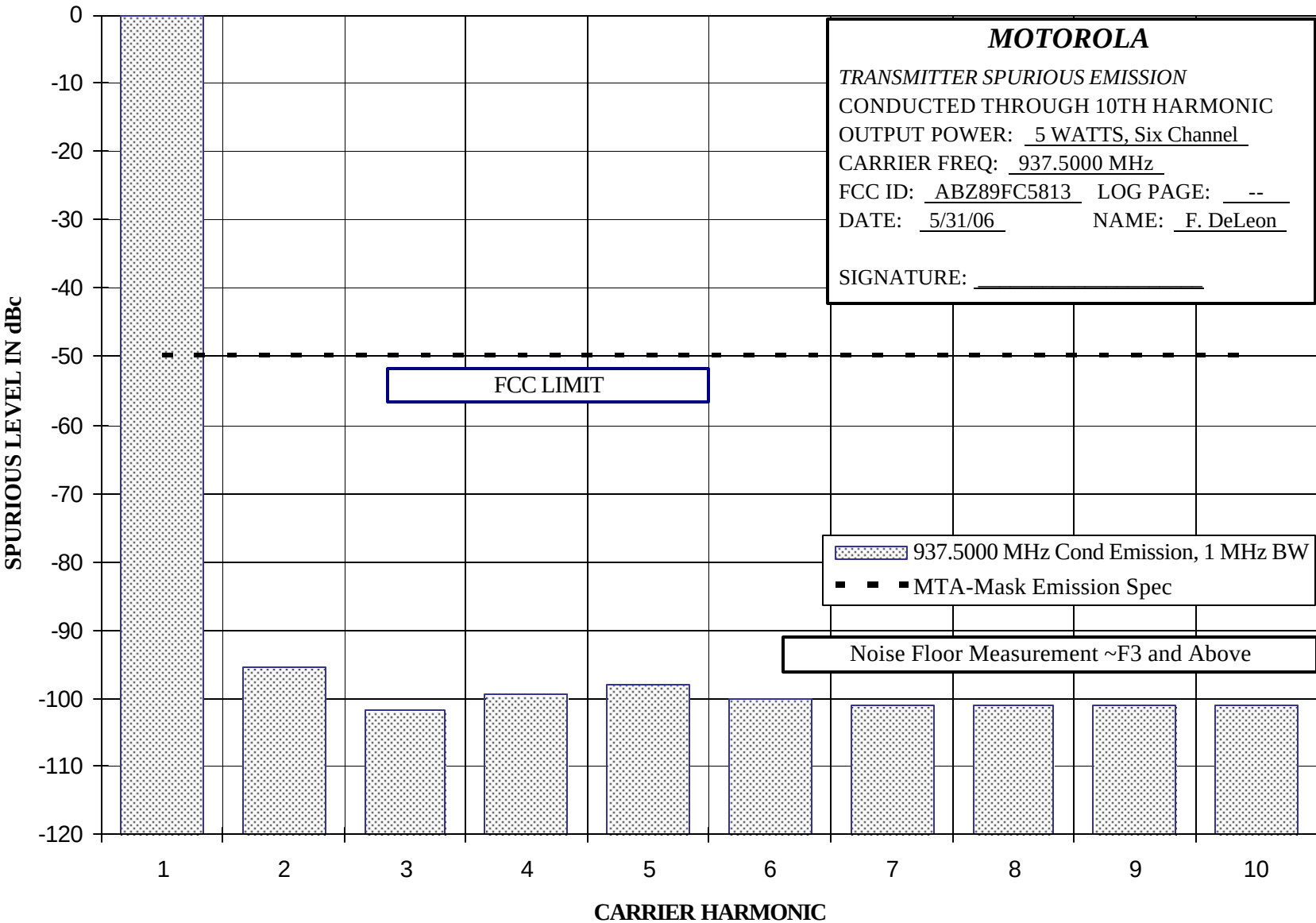
Report on Test Measurements

Conducted Emission – Harmonics – Six Carrier - 42 Watts – 900 MHz



Report on Test Measurements

Conducted Emission – Harmonics – Six Carrier - 5 Watts – 900 MHz

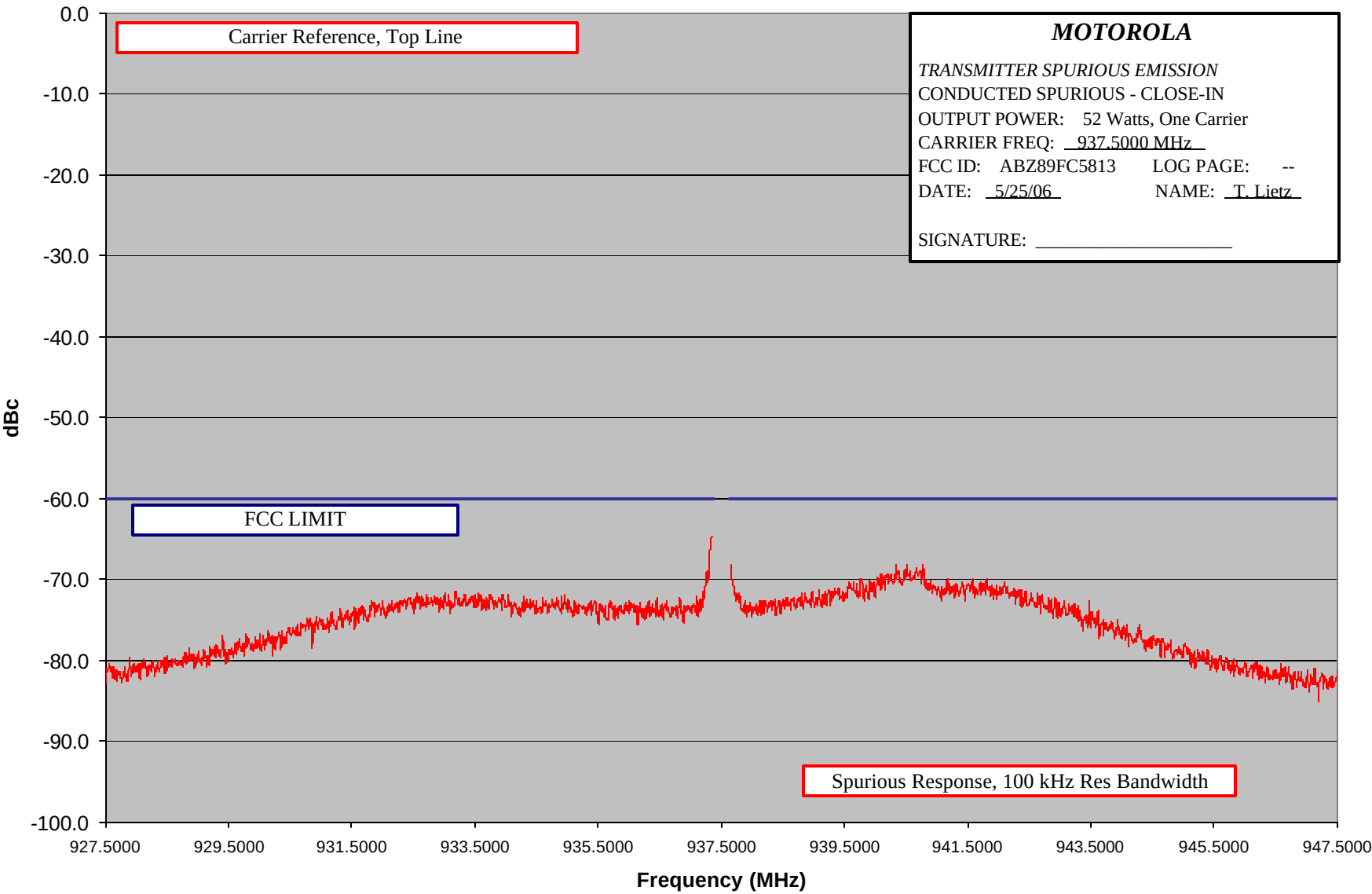


APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC5813

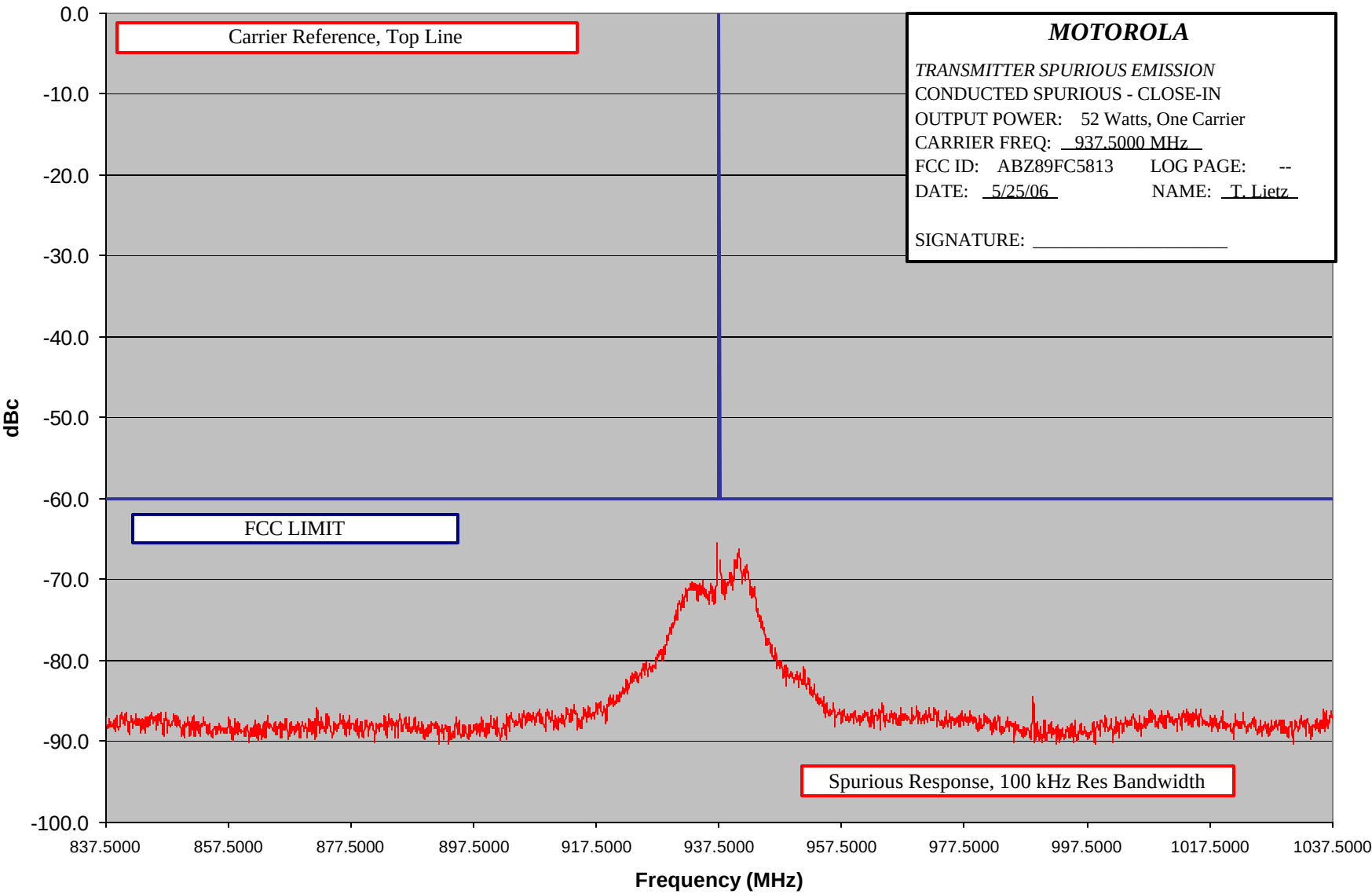
Report on Test Measurements

Conducted Emission – Close-In – One Carrier – 52 Watts – 900 MHz – 20 MHz Span



Report on Test Measurements

Conducted Emission – Close-In – One Carrier – 52 Watts – 900 MHz – 200 MHz Span

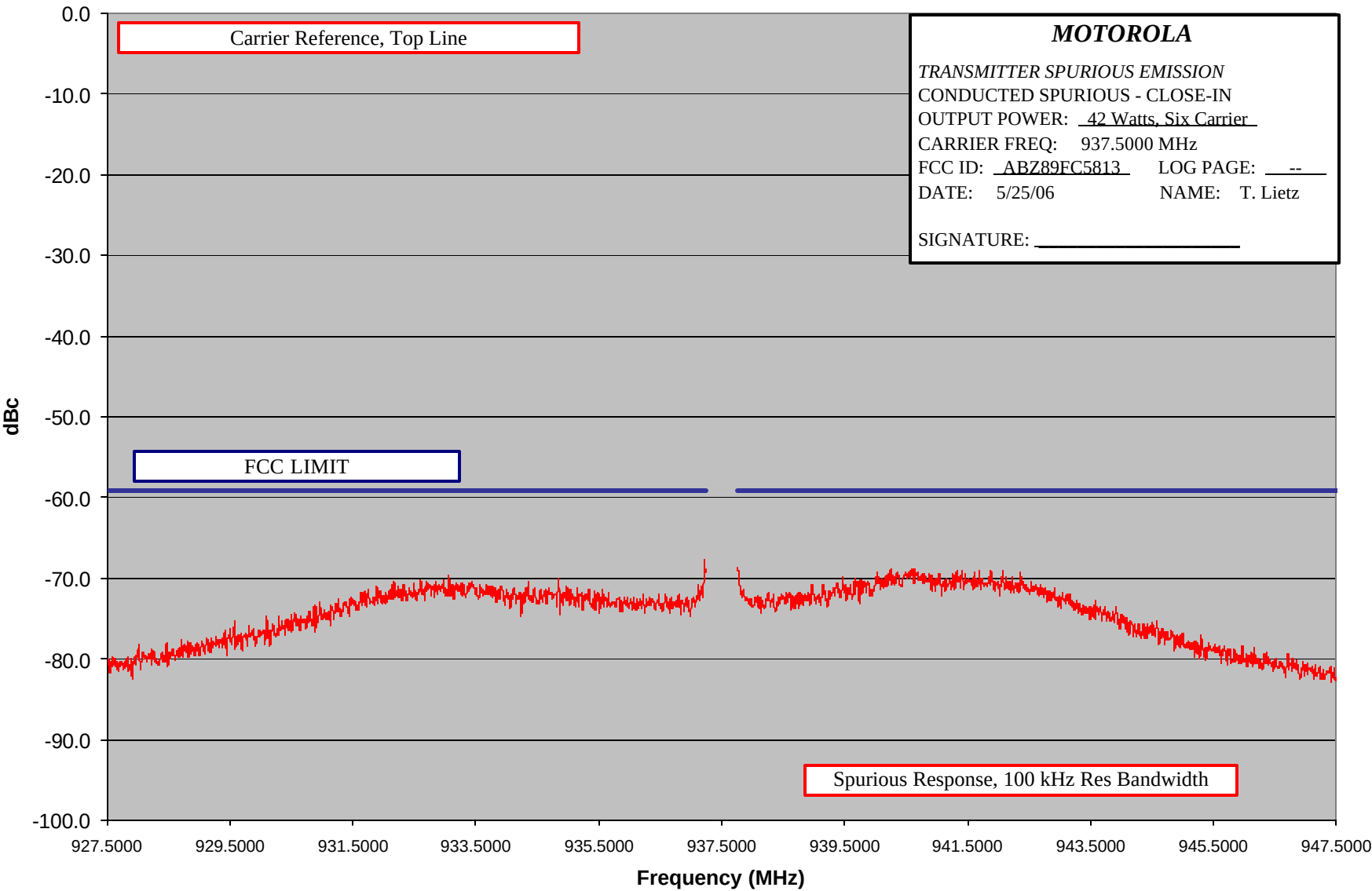


APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC5813

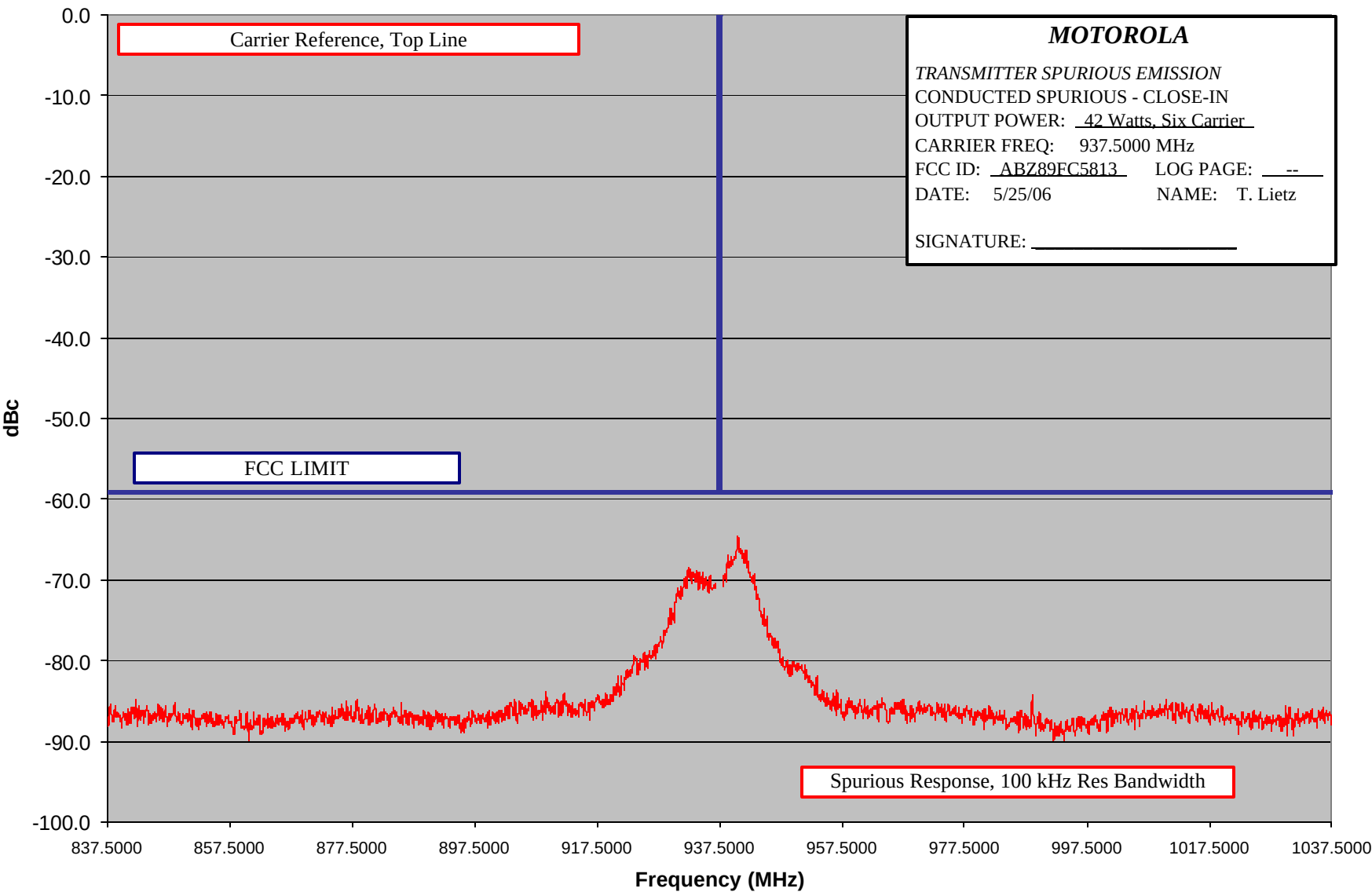
Report on Test Measurements

Conducted Emission – Close-In – Six Carrier – 42 Watts – 900 MHz – 20 MHz Span



Report on Test Measurements

Conducted Emission – Close-In – Six Carrier – 42 Watts – 900 MHz – 200 MHz Span



Report on Test Measurements*Radiated Spurious Emissions, Harmonics*§ 90.691 Emission Mask Requirements for EA-Based Systems:

(a) Out of band emission requirements apply only to the 'outer' channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(2) For any frequency removed from the EA licensee's frequency block by greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P), in Watts, by at least *43 plus 10 log₁₀(P) dB or 80 dB, whichever is the lesser attenuation*, where F is the frequency removed from the center of the outer channel in the block, in kiloHertz, and where F is greater than 37.5 kHz.

Modulation: Quad-QAM, 64 kbps Random Data per Channel

Carrier Frequency: A carrier frequency of 860.0125 MHz was measured. This frequency is near the center of the operating band 851-870 MHz

EXHIBIT DESCRIPTION

E1-4.1	800 MHz – One Carrier Radiated Spurious Emissions, Harmonics, Power Output at 70 Watts The specification limit is -61.5 dBc
E1-4.2	800 MHz – One Carrier Radiated Spurious Emissions, Harmonics, Power Output at 5 Watts The specification limit is -50.0 dBc
E1-4.3	800 MHz – Six Carrier Radiated Spurious Emissions, Harmonics, Power Output at 42 Watts The specification limit is -59.2 dBc
E1-4.4	800 MHz – Six Carrier Radiated Spurious Emissions, Harmonics, Power Output at 5 Watts The specification limit is -50.0 dBc

§ 90.669 Emission Limits:

(e) On any frequency in an MTA licensee's spectrum block that is adjacent to a non-MTA frequency, the power of any emission shall be attenuated below the transmitter power (P) by at least *43 plus 10 log₁₀(P) dB or 80 dB, whichever is the lesser attenuation*.

Modulation: Quad-QAM, 64 kbps Random Data Per Channel

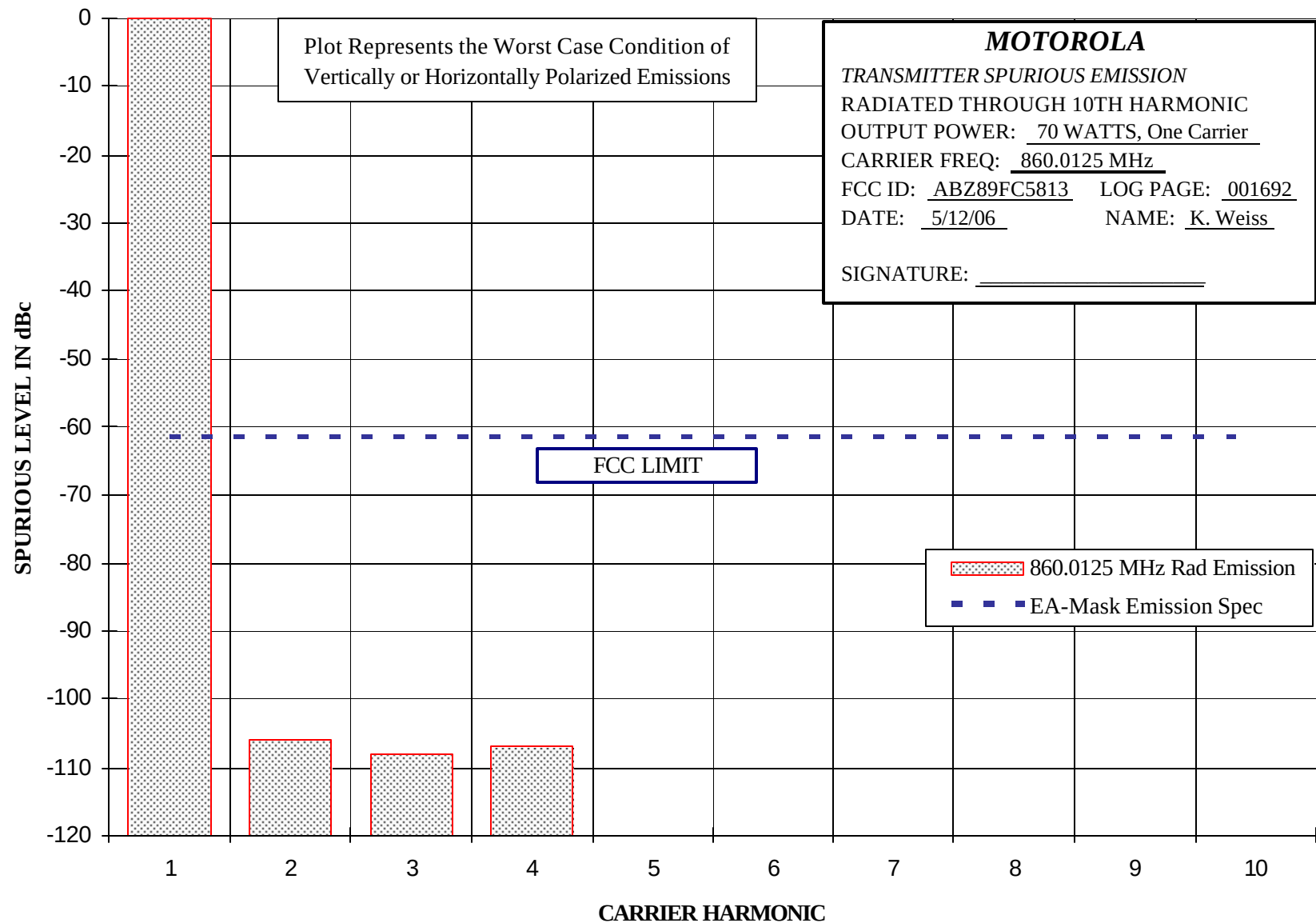
Carrier Frequency: A carrier frequency of 937.5000 MHz was measured. This frequency is near the center of the operating band 935-941 MHz

EXHIBIT DESCRIPTION

E1-4.5	900 MHz – One Carrier Radiated Spurious Emissions, Harmonics, Power Output at 52 Watts The specification limit is -60.2 dBc
E1-4.6	900 MHz – One Carrier Radiated Spurious Emissions, Harmonics, Power Output at 5 Watts The specification limit is -50.0 dBc
E1-4.7	900 MHz – Six Carrier Radiated Spurious Emissions, Harmonics, Power Output at 42 Watts The specification limit is -59.2 dBc
E1-4.8	900 MHz – Six Carrier Radiated Spurious Emissions, Harmonics, Power Output at 5 Watts The specification limit is -50.0 dBc

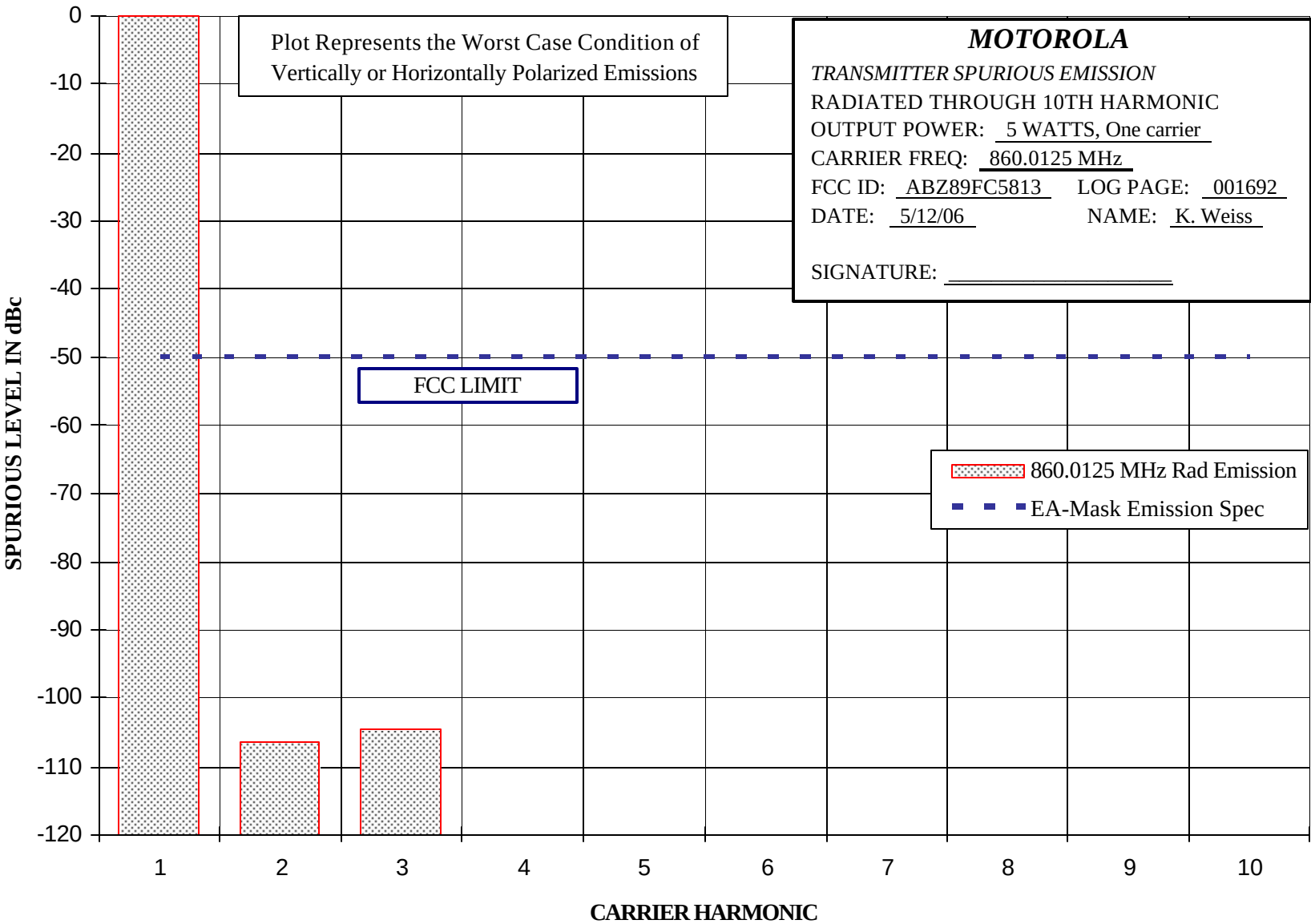
Report on Test Measurements

Radiated Emission – Harmonics – One Carrier - 70 Watts – 800 MHz



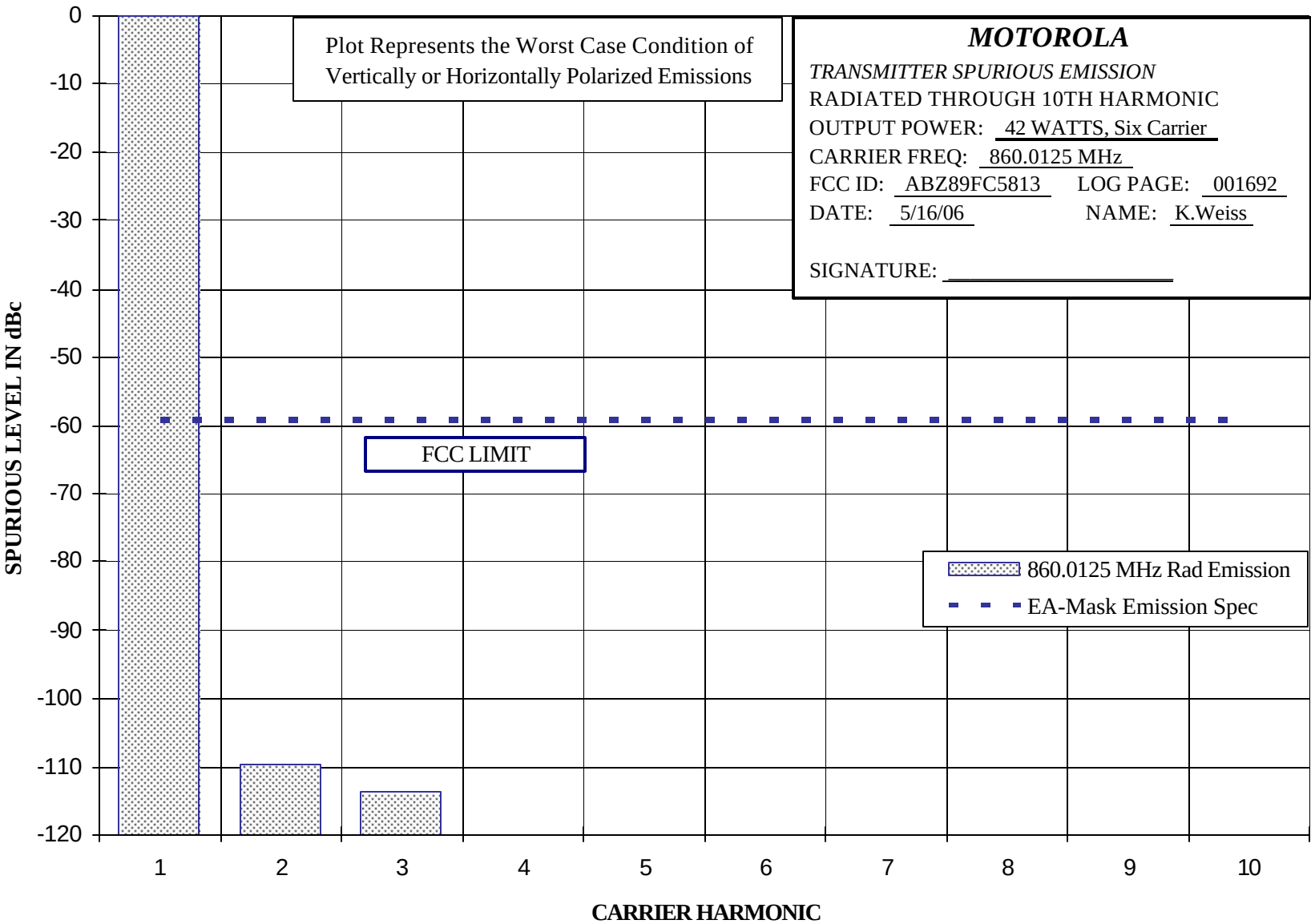
Report on Test Measurements

Radiated Emission – Harmonics – One Carrier - 5 Watts – 800 MHz



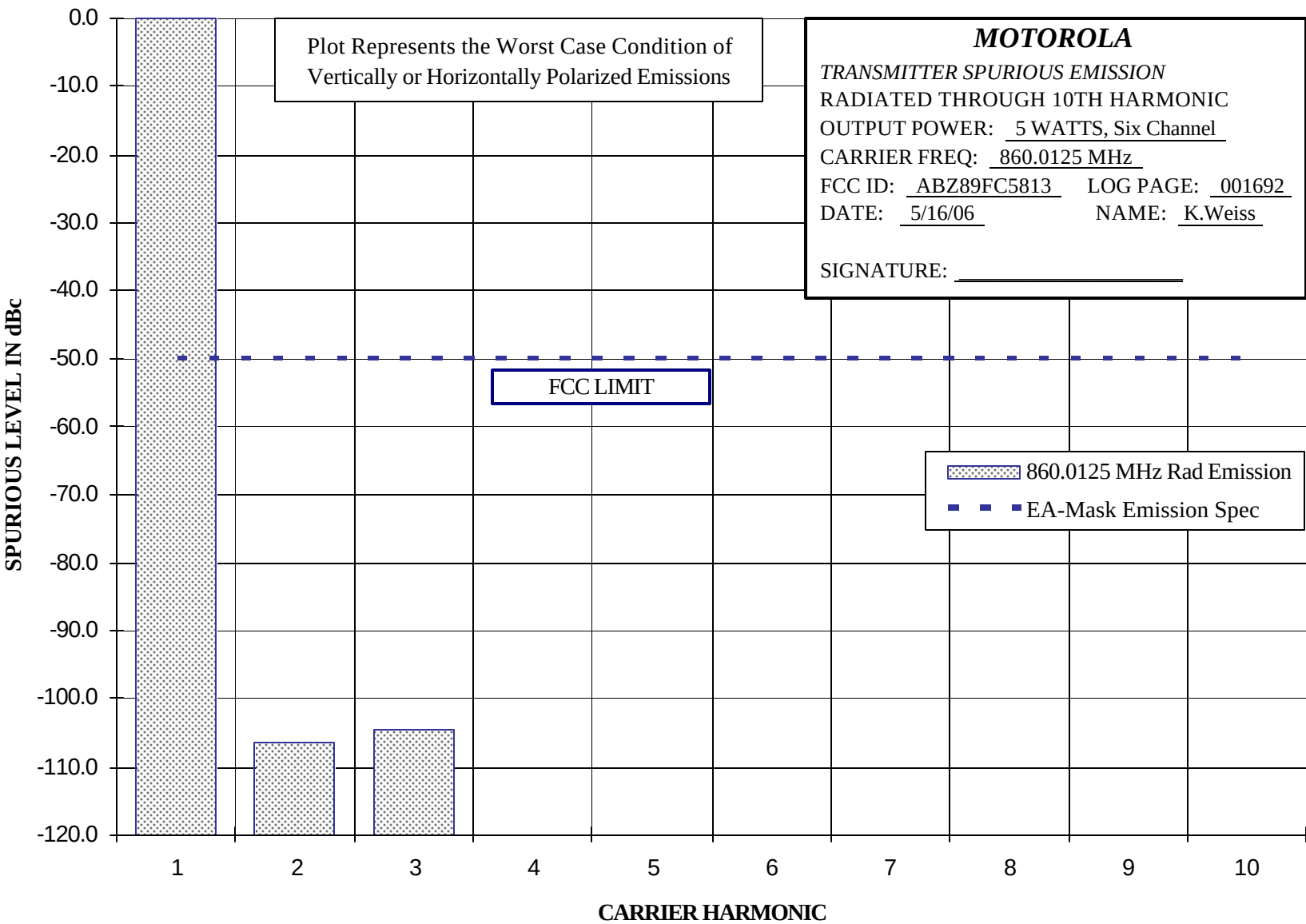
Report on Test Measurements

Radiated Emission – Harmonics – Six Carrier - 42 Watts – 800 MHz



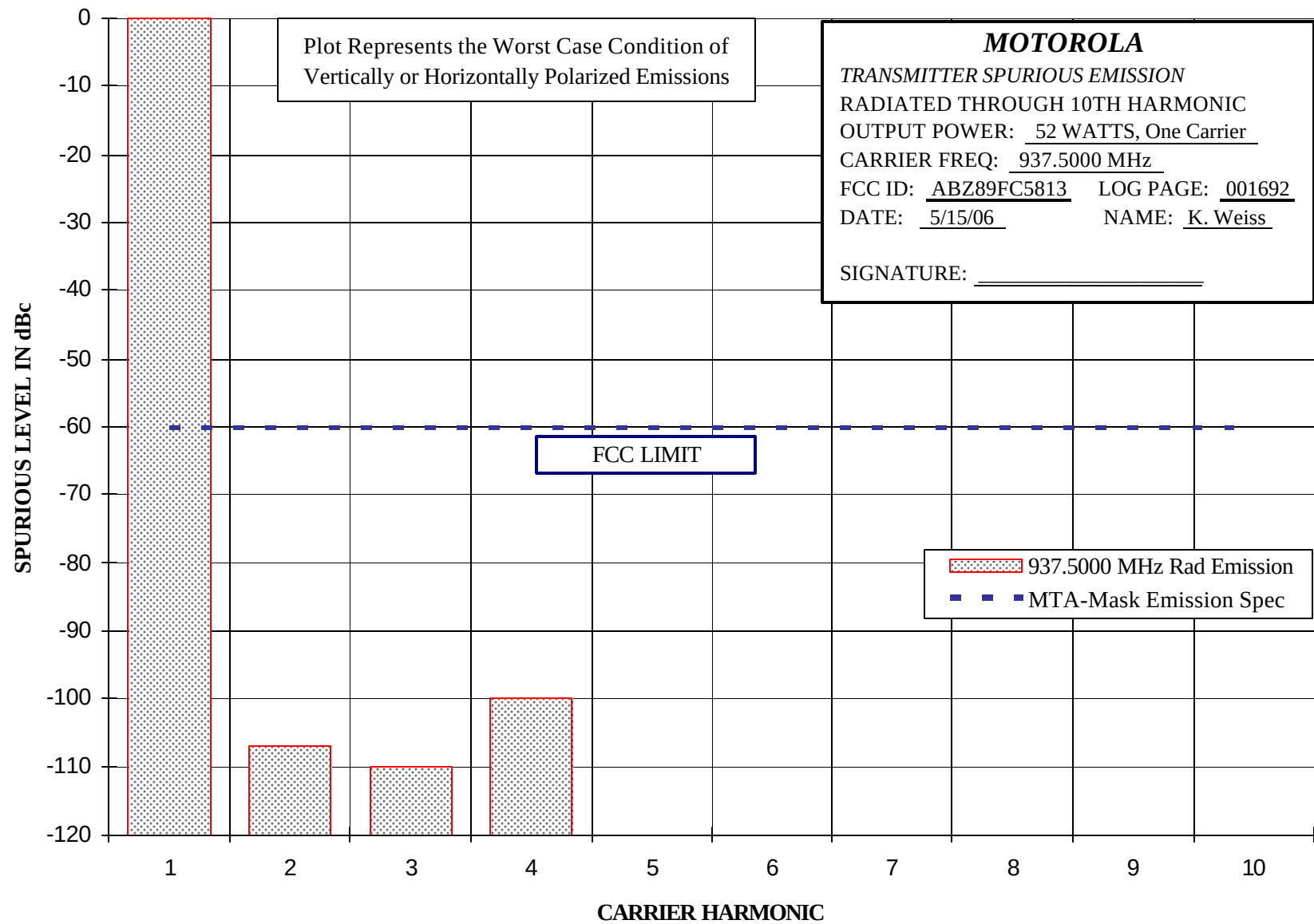
Report on Test Measurements

Radiated Emission – Harmonics – Six Carrier - 5 Watts – 800 MHz



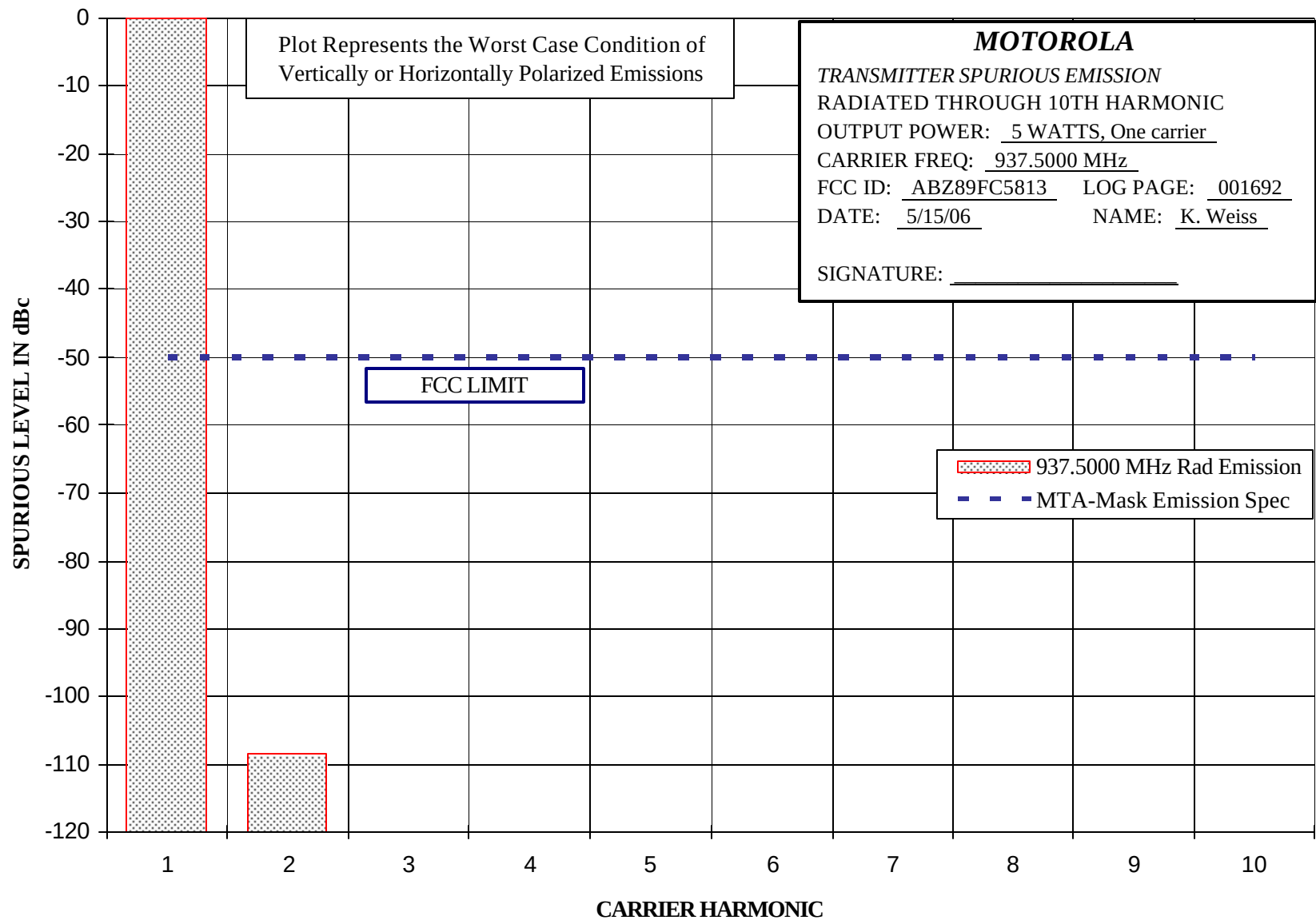
Report on Test Measurements

Radiated Emission – Harmonics – One Carrier - 52 Watts – 900 MHz



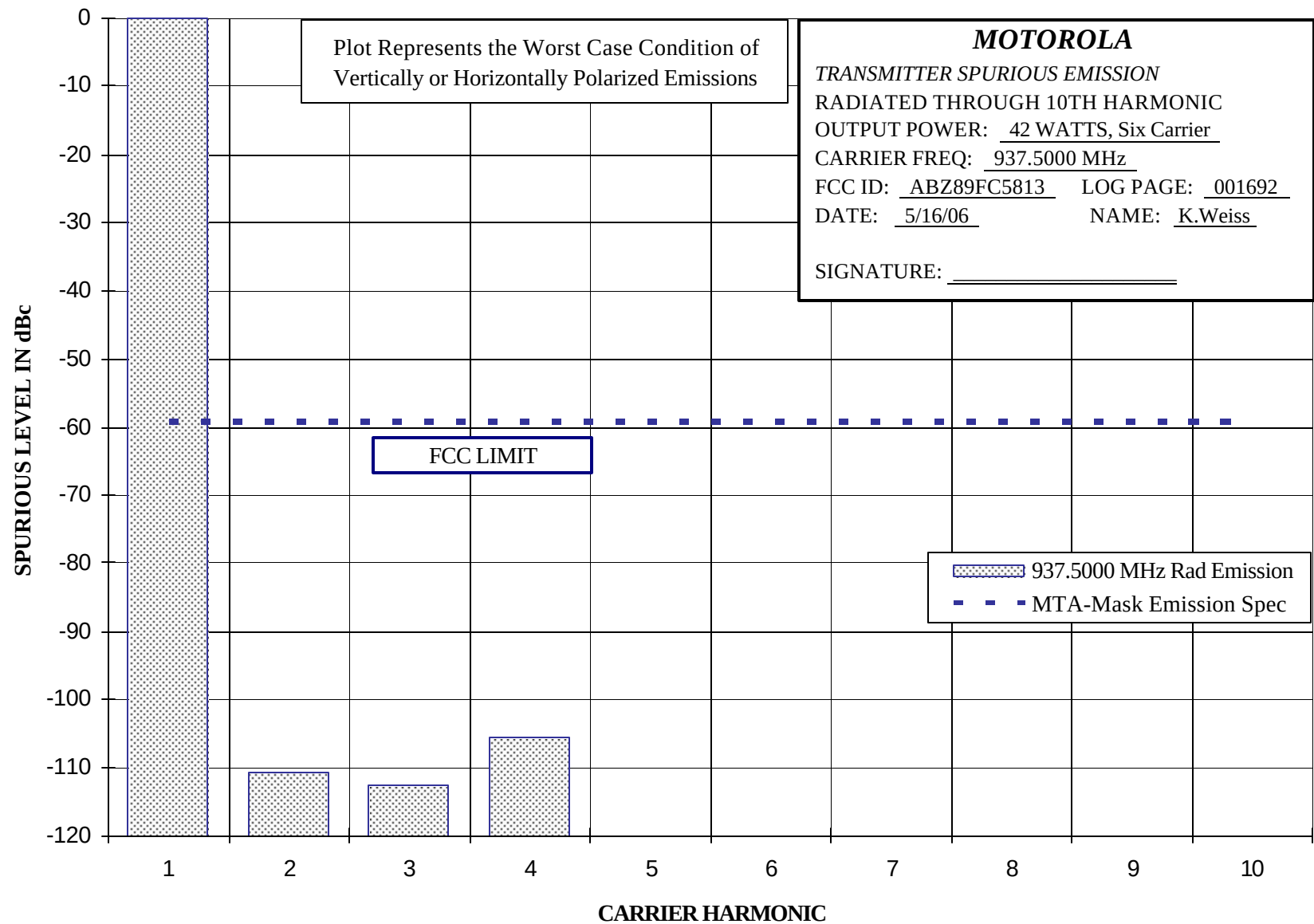
Report on Test Measurements

Radiated Emission – Harmonics – One Carrier - 5 Watts – 900 MHz



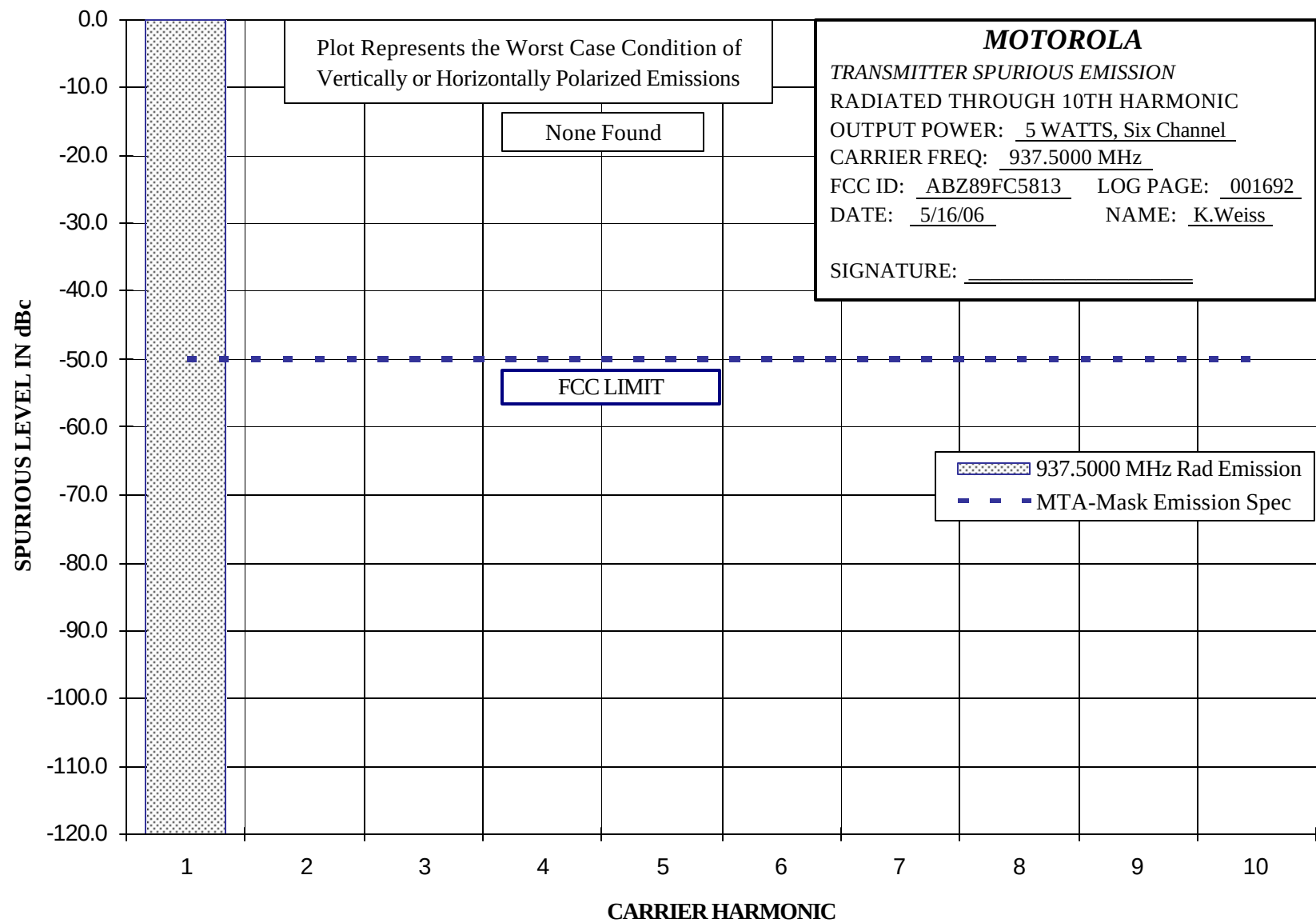
Report on Test Measurements

Radiated Emission – Harmonics – Six Carrier - 42 Watts – 900 MHz



Report on Test Measurements

Radiated Emission – Harmonics – Six Carrier - 5 Watts – 900 MHz



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.

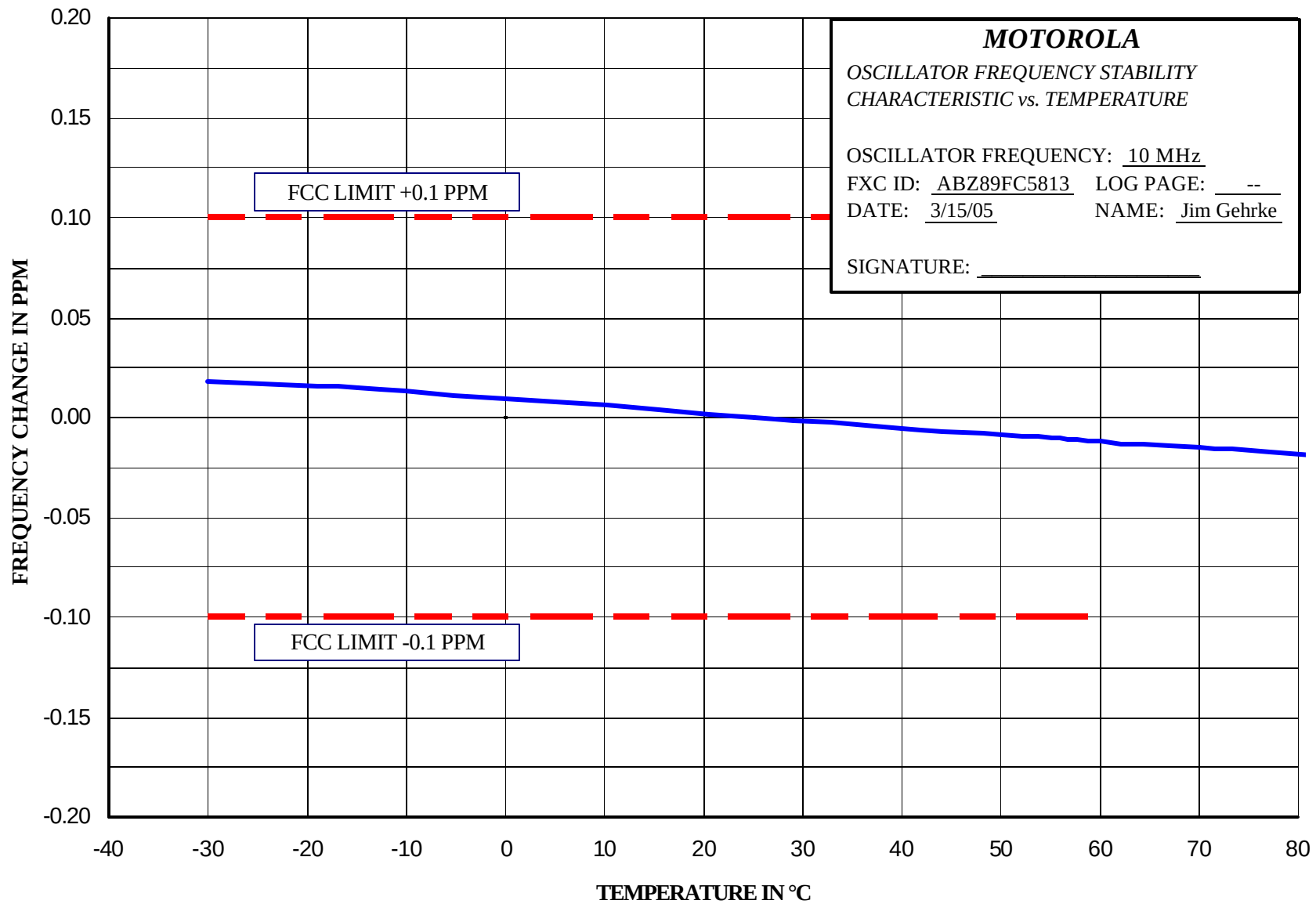
Specification Requirement:**Reference: Part 90.213**

Fixed and Base stations, operating at 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.

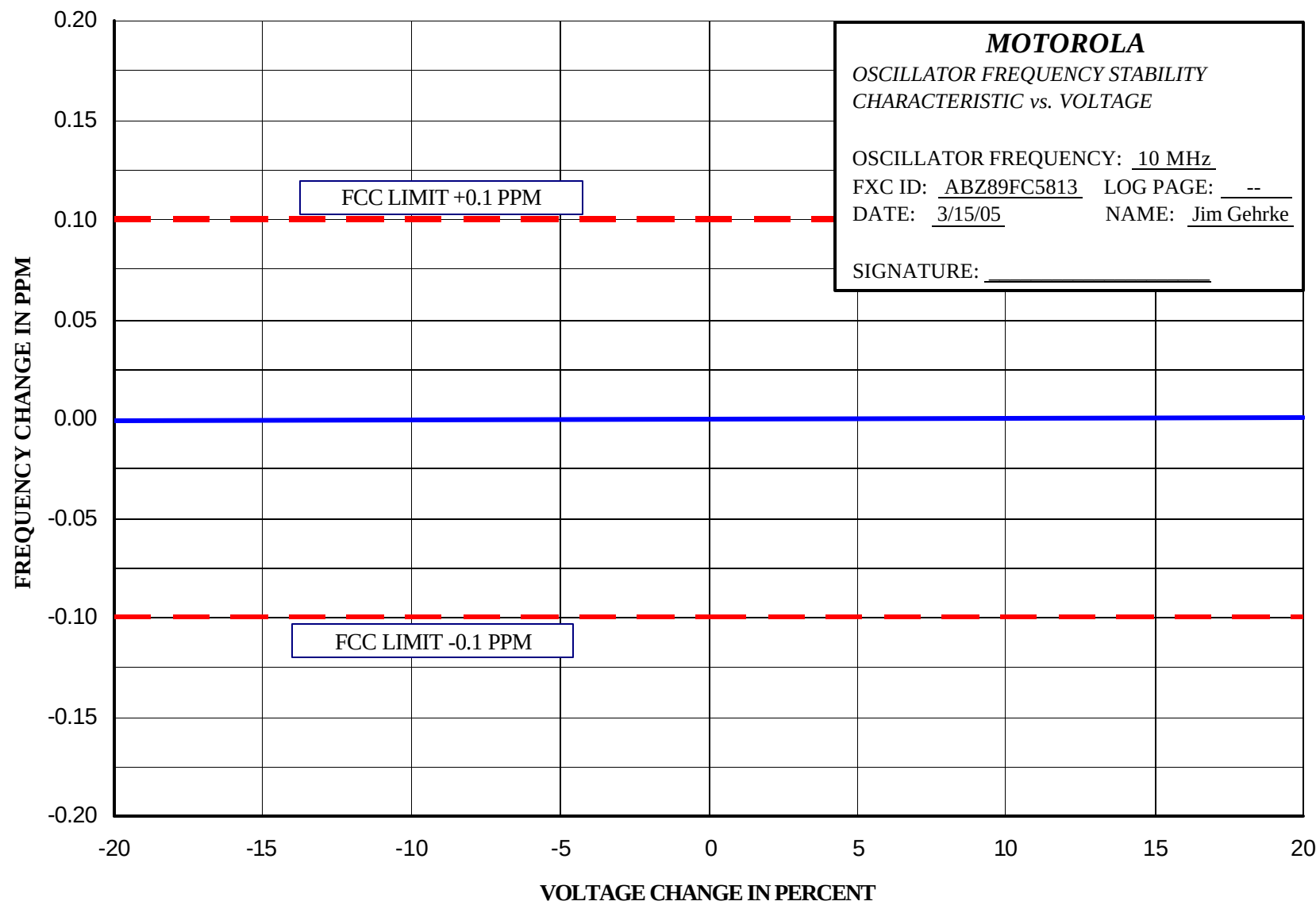
Fixed and Base stations, operating at 935-940 MHz, must have a frequency stability of better than +/- 0.1 PPM.

<u>EXHIBIT</u>	<u>DESCRIPTION</u>
E1-5.1	Frequency Stability Vs Temperature
E1-5.2	Frequency Stability Vs Voltage



Report on Test Measurements

Frequency Stability Vs Voltage



Report on Test Measurements

Test Equipment List

MODEL	MANUFACTURER	DESCRIPTION	Serial No.	Last Cal	Next Cal
438A	Hewlett Packard	RF Power Meter	3008A07428	11/05/04	11/05/07
8481A	Hewlett Packard	RF Power Sensor	2702A76706	11/17/04	11/17/07
E4443A	Agilent	Spectrum Analyzer	MY43360090	12/27/03	12/27/06
ESG-D2000A	Agilent	RF Signal Generator	US307040105	06/04/03	06/04/06
83712A	Hewlett Packard	Signal Generator	3429A00455	no calibration required	
8671B	Hewlett Packard	Signal Generator	2611A00159	11/08/04	11/08/07
85460A	Hewlett Packard	EMI Analyzer, Filter	3704A00467	11/17/03	11/17/06
85462A	Hewlett Packard	EMI Analyzer, RF/Display	3906A00500	11/17/03	11/17/06
8593E	Hewlett Packard	EMI Analyzer	3513A01649	05/19/04	05/19/07
(Various)	Weinschel, Kathrein, Bird	RF Loads	Various	no calibration required	
3020A, etc.	Narda	Directional Coupler	Various	no calibration required	

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

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

NAME: Ken Weiss

SIGNATURE: _____

DATE: June 1, 2006

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: Steve Noskowicz

SIGNATURE: _____

DATE: June 1, 2006

POSITION: Engineering Manager