

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 and a certification signoff page are included at the end of the measurement report.

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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.

High Performance Data Mode:

Measured RF output	<u>50</u>	Watts, Average
DC Voltage	<u>28.5</u>	Volts
DC Current	<u>8.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>228</u>	Watts
Primary Radio Input Supply Voltage	<u>120</u>	Volts AC
Minimum Measured RF output	<u>2</u>	Watts, Average
Normal DC Voltage	<u>21.0</u>	Volts
Normal DC Current	<u>3.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>63</u>	Watts
Primary Radio Input Supply Voltage	<u>120</u>	Volts AC

Linear Simulcast Modulation Mode:

Measured RF output	<u>100</u>	Watts, Average
DC Voltage	<u>27.5</u>	Volts
DC Current	<u>12.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>330</u>	Watts
Primary Radio Input Supply Voltage	<u>120</u>	Volts AC
Minimum Measured RF output	<u>2</u>	Watts, Average
Normal DC Voltage	<u>21.0</u>	Volts
Normal DC Current	<u>3.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>63</u>	Watts
Primary Radio Input Supply Voltage	<u>120</u>	Volts AC

Compatible 4-Level Frequency Modulation Mode:

Measured RF output	<u>100</u>	Watts
DC Voltage	<u>21.0</u>	Volts
DC Current	<u>13.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>273</u>	Watts
Primary Radio Input Supply Voltage	<u>120</u>	Volts AC
Minimum Measured RF output	<u>2</u>	Watts
Normal DC Voltage	<u>21.0</u>	Volts
Normal DC Current	<u>3.0</u>	Amperes
Input power for final RF amplifying device(s)	<u>63</u>	Watts
Primary Radio Input Supply Voltage	<u>120</u>	Volts AC

Report on Test Measurements*Adjacent Channel Coupled Power (ACCP) Requirements*

The transmitter can utilize various modulation modes as determined by customer requirements, channel usage, and system configuration as described in Exhibit B. These modulations are High Performance Data (HPD), Linear Simulcast Modulation (LSM), Compatible 4-Level Frequency Modulation (C4FM). All of the following charts reference the following setup and specification requirements for the modes summarized as follows:

Modulation Type:	HPD	LSM	C4FM
Emission Designator:	17K7D7D	8K70D1W	8K10F1E
Channelization:	25 kHz	12.5 kHz	12.5 kHz
Power Setting:	50 Watts, Average	100 Watts, Average	100 Watts

Specification Requirement § 90.543, § 27.53 Emission Limits:

§ 90.543 Emission limits: For operation in the 764-776 MHz Band

§ 27.53 Emission limits: For operation in the 762-764 MHz Band

ACCP Tables per 90.543(a), 27.53(d)(1): For base transmitters designed to operate with a 12.5 kHz channel bandwidth, the ACCP shall be in accordance to the following table.

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP (dBc)
9.375	6.25	-40
15.625	6.25	-60
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
350	100	-65
>= 400 kHz to 12 MHz	30(s)	-80
12 MHz to paired receive band	30(s)	-80
In the paired receive band	30(s)	-100

For base transmitters designed to operate with a 25 kHz channel bandwidth, the ACCP shall be in accordance to the following table.

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP (dBc)
15.625	6.25	-40
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
350	100	-65
>= 400 kHz to 12 MHz	30 (swept)	-80
12 MHz to paired receive band	30 (swept)	-80
In the paired receive band	30 (swept)	-100

Report on Test Measurements

Adjacent Channel Coupled Power (ACCP) Requirements

ACP measurement procedure: For all measurements modulate the transmitter as it would be modulated in normal operating conditions. The ACP measurements may be made with a spectrum analyzer capable of making direct ACP measurements. "Measurement bandwidth", as used for non-swept measurements, implies an instrument that measures the power in many narrow bandwidths equal to the nominal resolution bandwidth and integrates these powers to determine the total power in the specified measurement bandwidth.

(1) *Setting reference level.* Set transmitter to maximum output power. Using a spectrum analyzer capable of ACP measurements, set the measurement bandwidth to the channel size. Set the frequency offset of the measurement bandwidth to zero and adjust the center frequency of the instrument to the assigned center frequency to measure the average power level of the transmitter. Record this power level in dBm as the "reference power level".

(2) *Non-swept power measurement.* Using a spectrum analyzer capable of ACP measurements, set the measurement bandwidth and frequency offset from the assigned center frequency as shown in the tables above. Any value of resolution bandwidth may be used as long as it does not exceed 2 percent of the specified measurement bandwidth. Measure the power level in dBm. These measurements should be made at maximum power. Calculate ACP by subtracting the reference power level measured in (b)(1) from the measurements made in this step. The absolute value of the calculated ACP must be greater than or equal to the absolute value of the ACP given in the table for each condition above.

(3) *Swept power measurement.* Set a spectrum analyzer to 30 kHz resolution bandwidth, 1 MHz video bandwidth and average, sample, or RMS detection. Set the reference level of the spectrum analyzer to the RMS value of the transmitter power. Sweep above and below the carrier frequency to the limits defined in the tables. Calculate ACP by subtracting the reference power level measured in (b)(1) from the measurements made in this step. The absolute value of the calculated ACP must be greater than or equal to the absolute value of the ACP given in the table for each condition above.

Measurement results:

For measurements less than or equal to 400 kHz offset from the center frequency, the ACCP results are shown in Tabular format. For measurements great than 400 kHz offset from the center frequency, the ACCP results are shown in Graphical format. The results shown are from testing performed using the worst case of the two transmit filtering alternatives.

All results show sufficient margin to the specified requirements.

EXHIBIT DESCRIPTION

- | | |
|--------|---|
| E1-2.1 | ACCP Results – Offsets ≤ 400 kHz for HPD, LSM, and C4FM Modes – Tabular Results |
| E1-2.2 | ACCP Results– Offsets > 400 kHz for HPD, LSM, C4FM at 764 MHz – Graphical Results (3 pages) |
| E1-2.3 | ACCP Results– Offsets > 400 kHz for HPD, LSM, C4FM at 770 MHz – Graphical Results (3 pages) |
| E1-2.4 | ACCP Results– Offsets > 400 kHz for HPD, LSM, C4FM at 776 MHz – Graphical Results (3 pages) |

Report on Test Measurements

Adjacent Channel Coupled Power (ACCP) Requirements

ACCP Test Results for offset frequencies ≤ 400 kHz

ACCP Test Results: HPD Modulation, Pout = 50 Watts (avg), Channel Spacing = 25 kHz, Transmit Filter								
FCC Requirements			Measurement Results					
Offset from Center Freq (kHz)	Measurement BW (kHz)	Maximum ACP (dBc)	764 MHz*		770 MHz		776 MHz	
			Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)	Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)	Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)
+/- 15.625	6.25	-40	-50.0	-50.7	-51.4	-51.5	-49.3	-49.9
+/- 21.875	6.25	-60	-69.9	-69.9	-69.6	-69.6	-69.1	-69.1
+/- 37.5	25	-60	-69.8	-70.4	-70.0	-70.1	-69.8	-69.8
+/- 62.5	25	-65	-70.5	-70.5	-70.2	-70.2	-68.8	-68.8
+/- 87.5	25	-65	-76.6	-76.7	-76.0	-76.4	-75.9	-75.9
+/- 150	100	-65	-73.0	-73.4	-72.7	-73.1	-72.6	-72.8
+/- 250	100	-65	-74.4	-75.5	-74.0	-74.9	-73.6	-74.6
+/- 350	100	-65	-77.5	-77.7	-77.2	-77.3	-76.9	-77.1
+/- 400	30 (swept)	-80	-83.9	-84.2	-83.6	-83.7	-82.9	-83.1

ACCP Test Results: LSM Modulation, Pout = 100 Watts (avg), Channel Spacing = 12.5 kHz, Transmit Filter								
FCC Requirements			Measurement Results					
Offset from Center Freq (kHz)	Measurement BW (kHz)	Maximum ACP (dBc)	764 MHz*		770 MHz		776 MHz	
			Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)	Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)	Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)
+/- 9.375	6.25	-40	-42.8	-42.2	-42.8	-42.7	-42.5	-42.8
+/- 15.625	6.25	-60	-80.9	-80.0	-81.2	-80.7	-80.0	-80.1
+/- 21.875	6.25	-60	-84.7	-84.8	-84.3	-84.3	-84.1	-83.1
+/- 37.5	25	-60	-79.4	-79.1	-79.3	-78.8	-80.1	-78.7
+/- 62.5	25	-65	-82.9	-82.9	-83.1	-82.3	-83.5	-83.1
+/- 87.5	25	-65	-84.6	-84.2	-84.7	-84.3	-85.2	-84.8
+/- 150	100	-65	-86.8	-85.3	-86.9	-85.6	-87.7	-85.6
+/- 250	100	-65	-86.7	-83.6	-87.1	-83.8	-87.1	-84.9
+/- 350	100	-65	-91.9	-90.5	-92.3	-90.8	-93.0	-90.3
+/- 400	30 (swept)	-80	-98.0	-96.6	-98.9	-96.4	-98.7	-97.3

ACCP Test Results: C4FM Modulation, Pout = 100 Watts, Channel Spacing = 12.5 kHz, Transmit Filter								
FCC Requirements			Measurement Results					
Offset from Center Freq (kHz)	Measurement BW (kHz)	Maximum ACP (dBc)	764 MHz*		770 MHz		776 MHz	
			Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)	Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)	Max ACP at low side offset freq (dBc)	Max ACP at high side offset freq (dBc)
+/- 9.375	6.25	-40	-41.9	-41.4	-41.8	-42.2	-42.5	-42.1
+/- 15.625	6.25	-60	-82.6	-83.1	-82.7	-82.4	-82.6	-81.9
+/- 21.875	6.25	-60	-85.2	-83.5	-84.2	-84.8	-83.7	-84.3
+/- 37.5	25	-60	-79.3	-78.6	-79.4	-78.9	-79.1	-79.0
+/- 62.5	25	-65	-83.4	-82.6	-82.7	-82.6	-83.7	-82.6
+/- 87.5	25	-65	-85.1	-83.7	-85.7	-84.1	-85.2	-84.0
+/- 150	100	-65	-87.6	-85.5	-87.5	-85.6	-87.2	-85.0
+/- 250	100	-65	-86.6	-83.5	-87.4	-83.4	-88.1	-83.5
+/- 350	100	-65	-92.9	-90.6	-92.4	-90.3	-92.8	-90.0
+/- 400	30 (swept)	-80	-98.8	-96.4	-98.8	-96.3	-98.7	-96.3

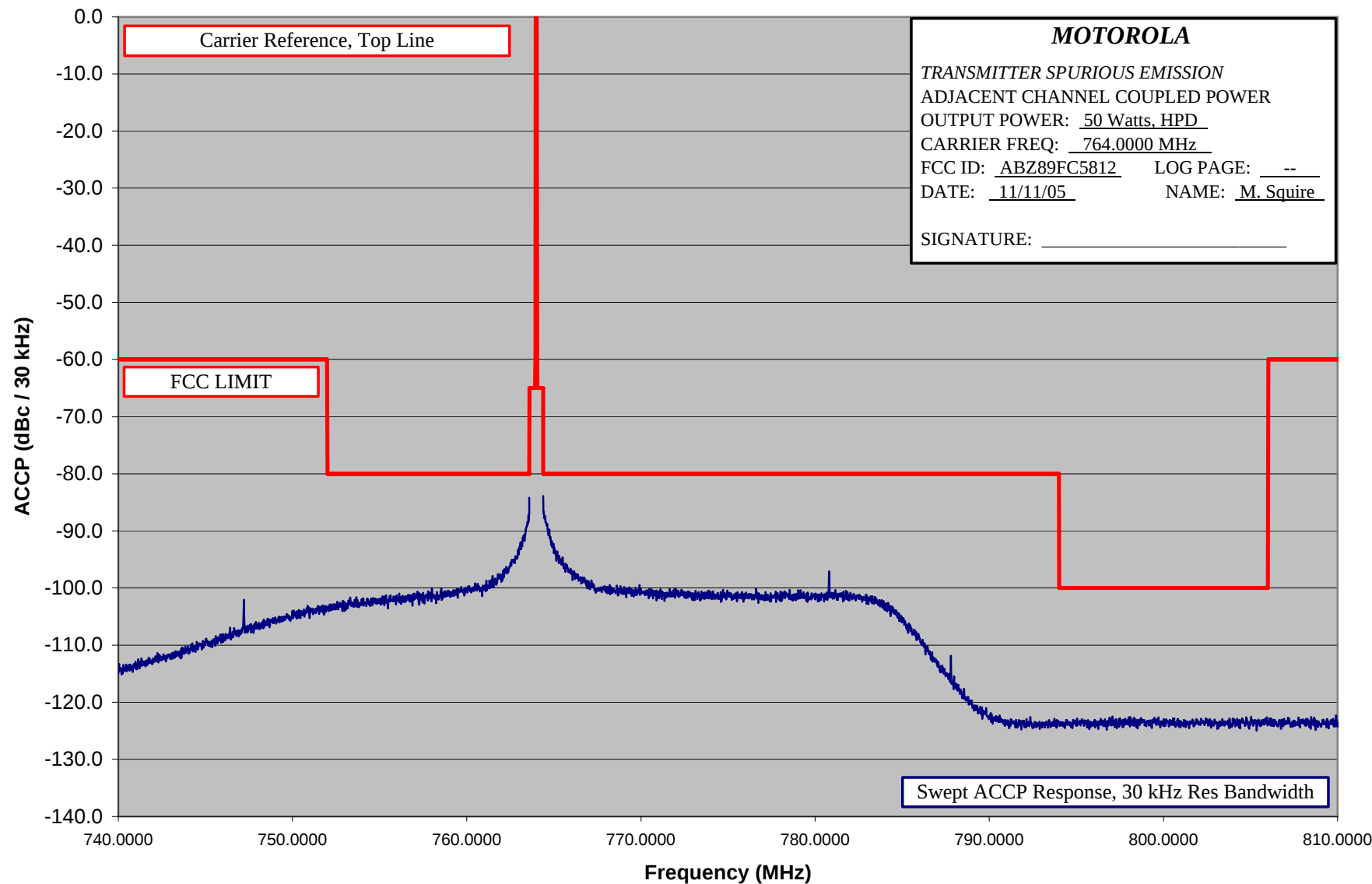
* 764 MHz specification is covered by 27.53(d) and 90.543(b)

APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC5812

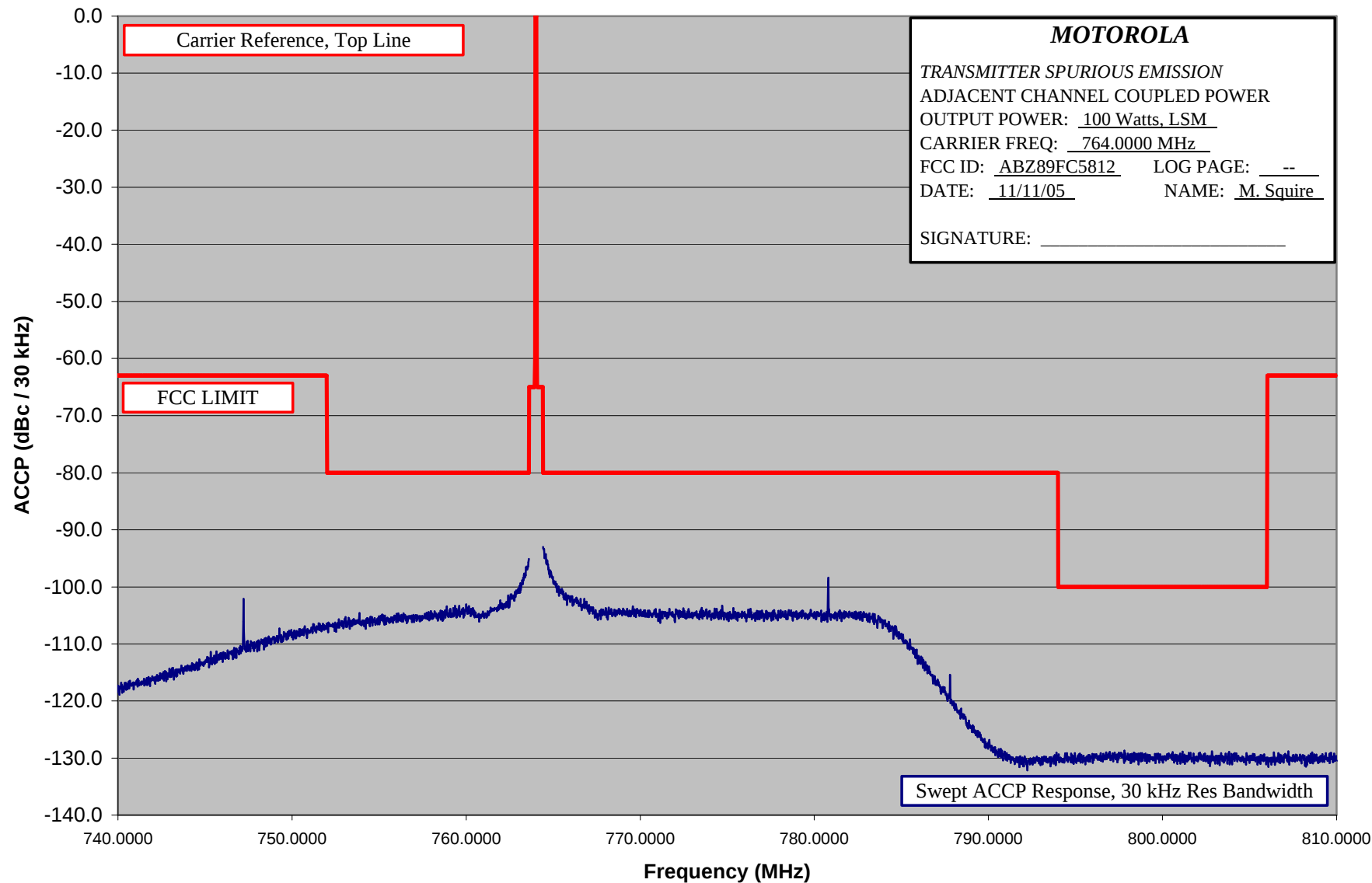
Report on Test Measurements

ACCP – High Performance Data, offset > 400 kHz, Tx = 764 MHz



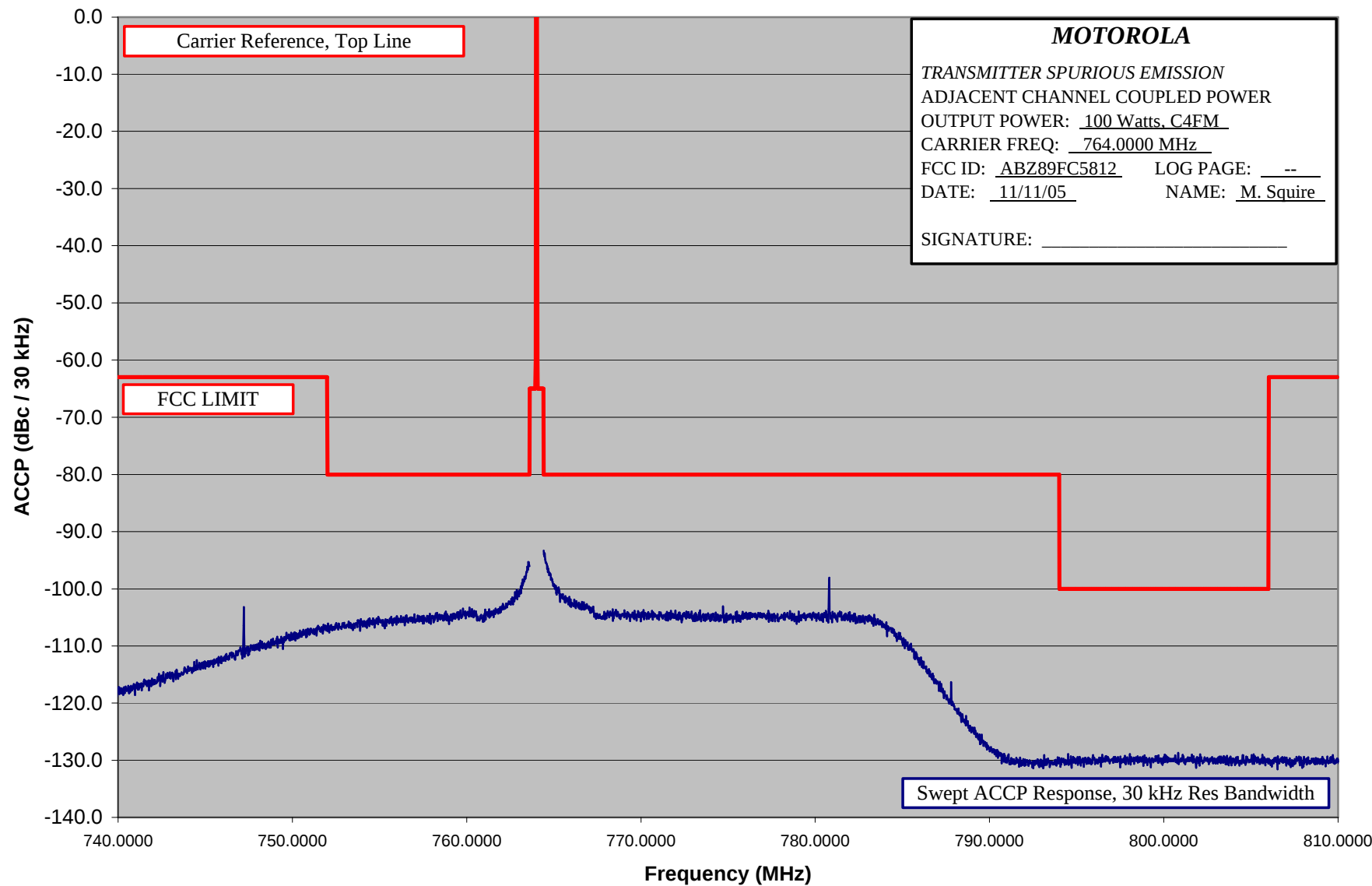
Report on Test Measurements

ACCP –Linear Simulcast Modulation, offset > 400 kHz, Tx = 764 MHz



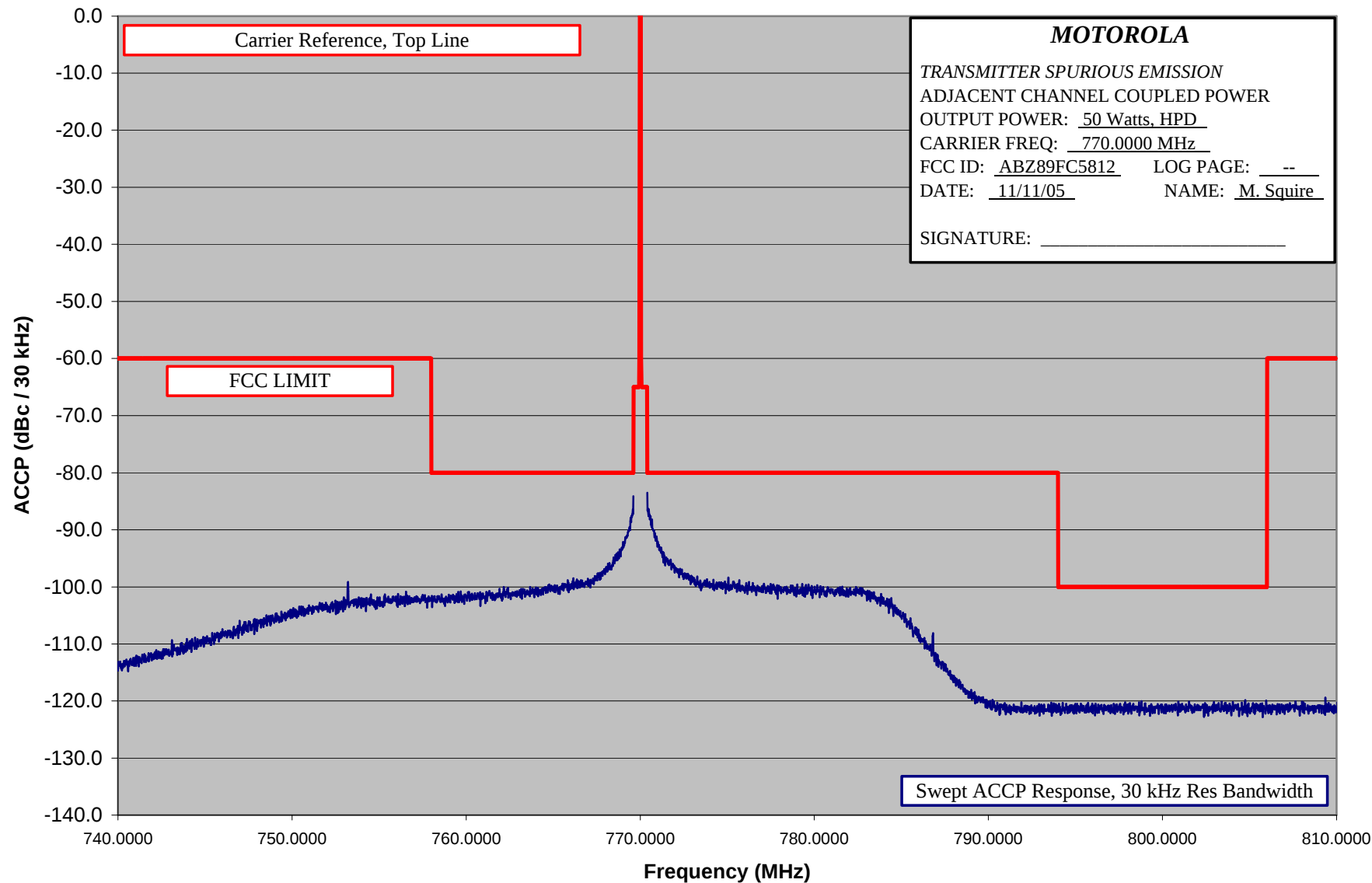
Report on Test Measurements

ACCP –Compatible 4-Level Frequency Modulation), offset > 400 kHz, Tx = 764 MHz



Report on Test Measurements

ACCP – High Performance Data, offset > 400 kHz, Tx = 770 MHz

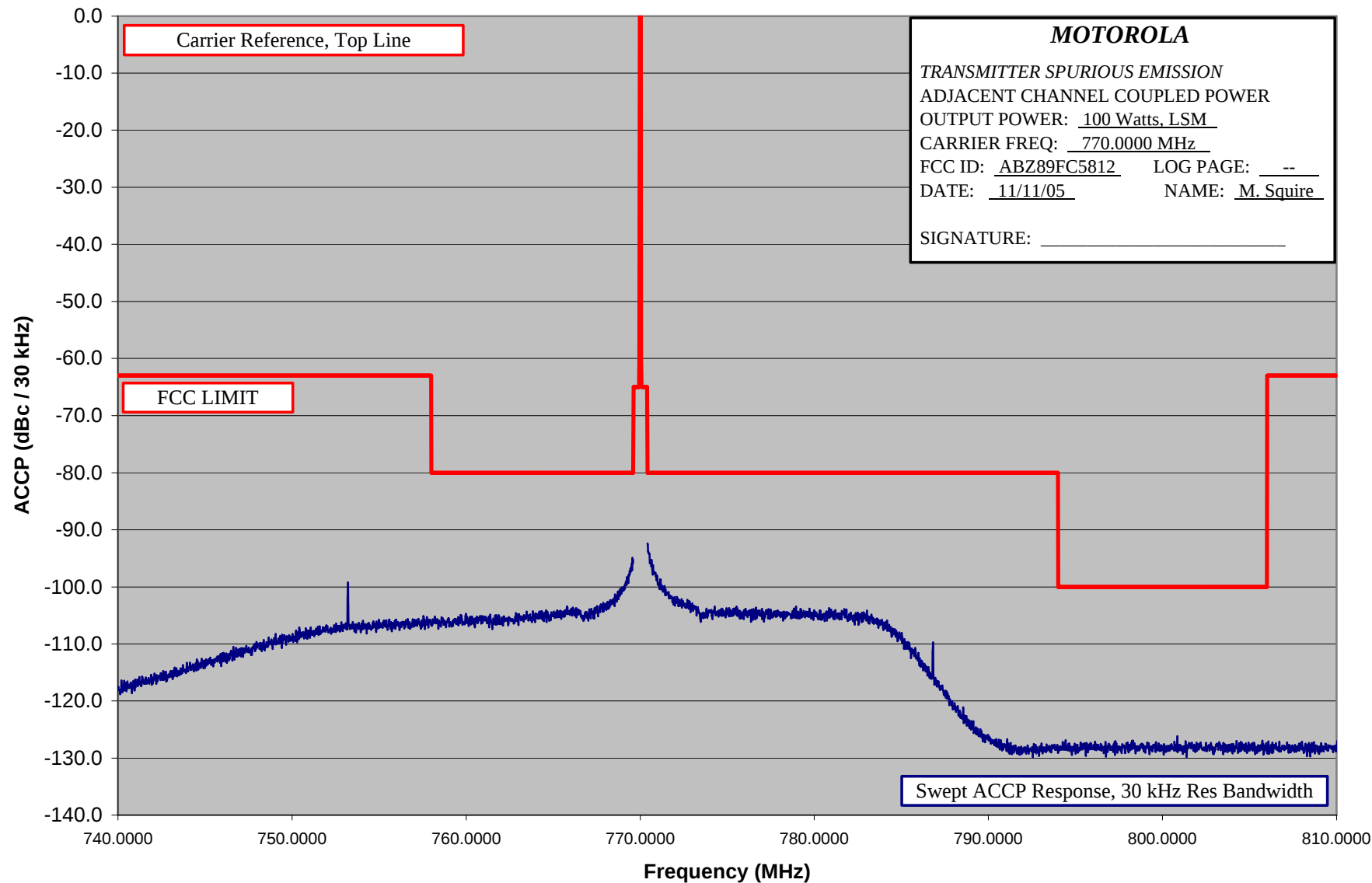


APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC5812

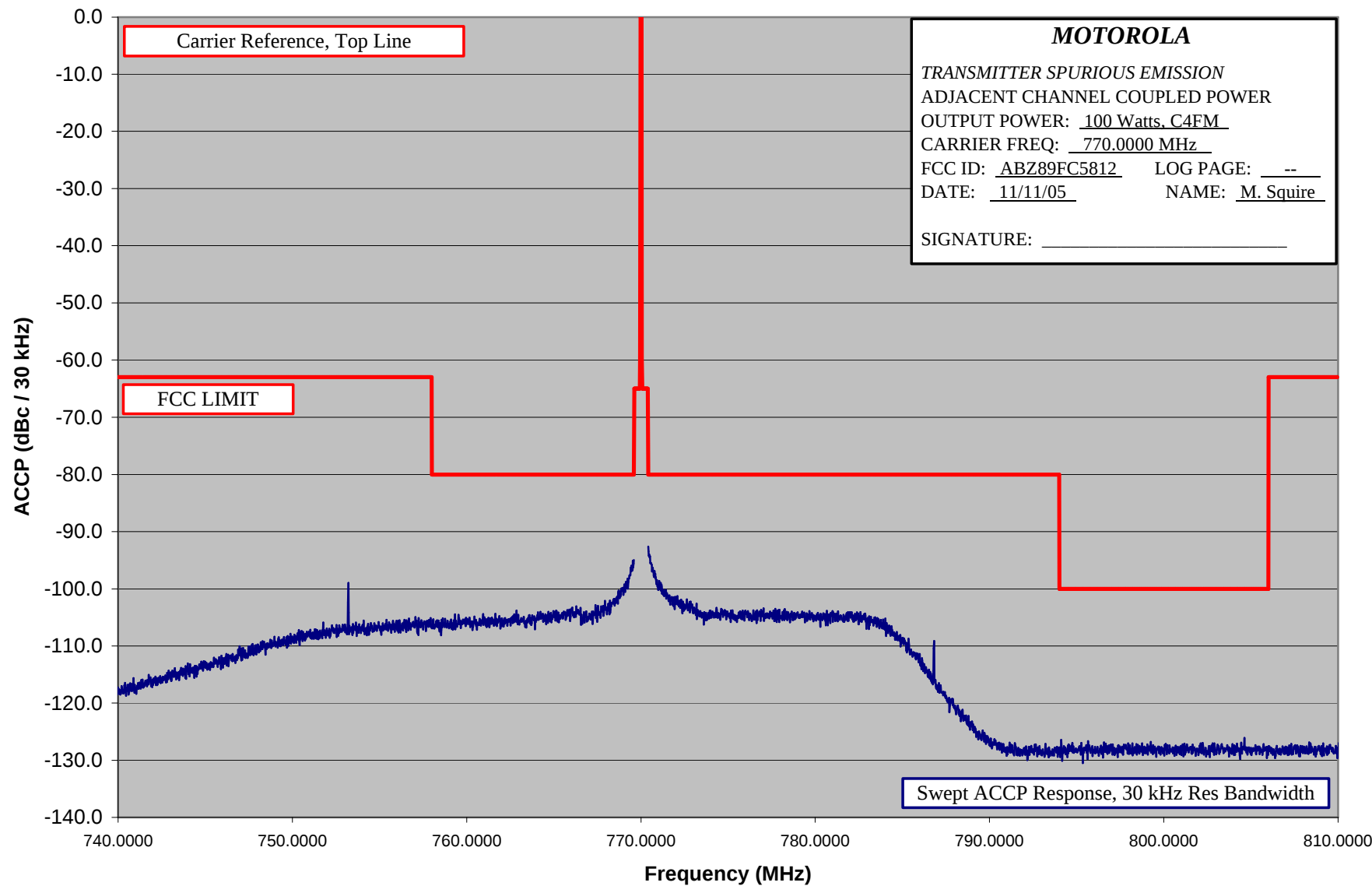
Report on Test Measurements

ACCP –Linear Simulcast Modulation, offset > 400 kHz, Tx = 770 MHz



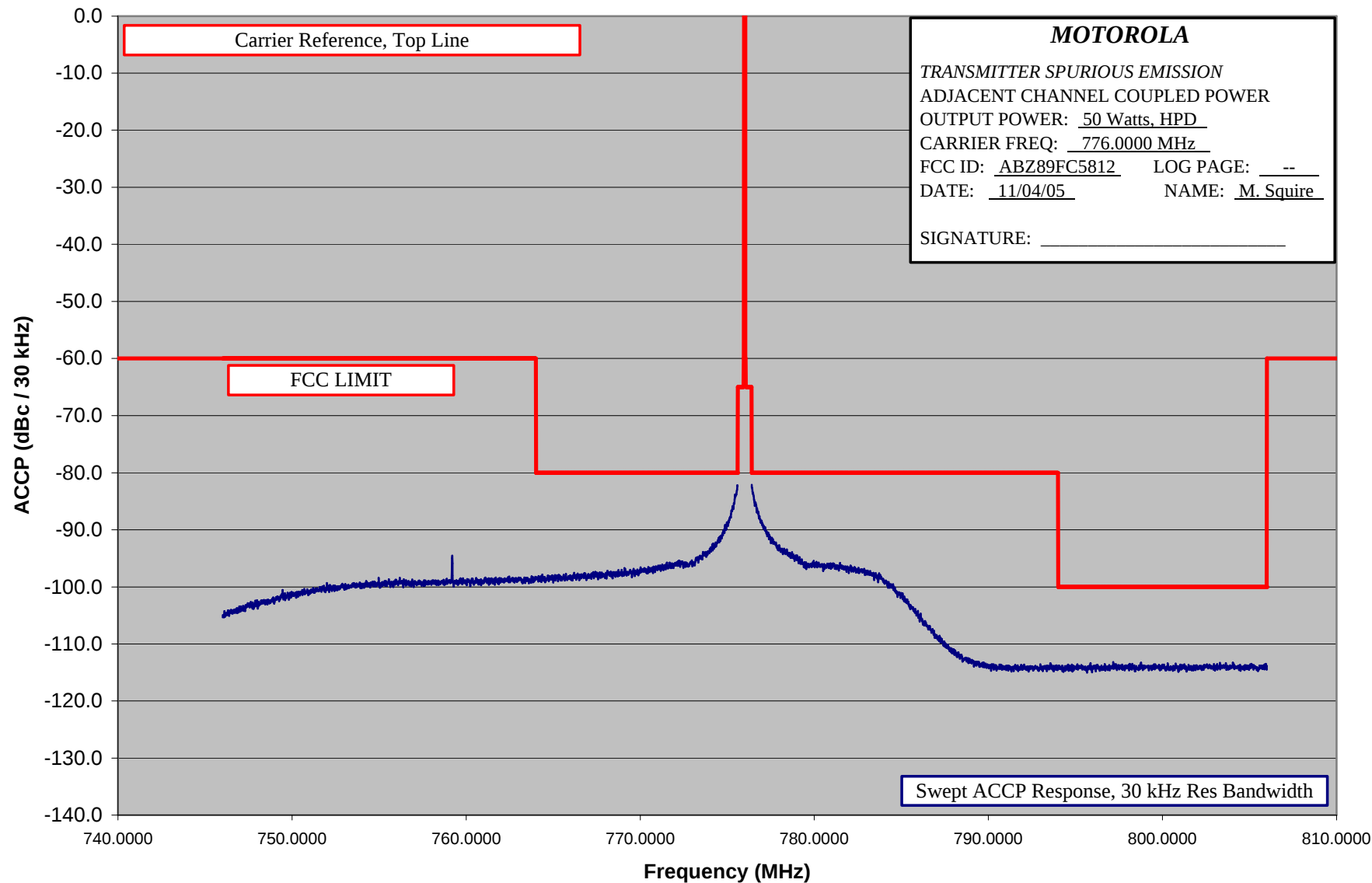
Report on Test Measurements

ACCP –Compatible 4-Level Frequency Modulation), offset > 400 kHz, Tx = 770 MHz



Report on Test Measurements

ACCP – High Performance Data, offset > 400 kHz, Tx = 776 MHz

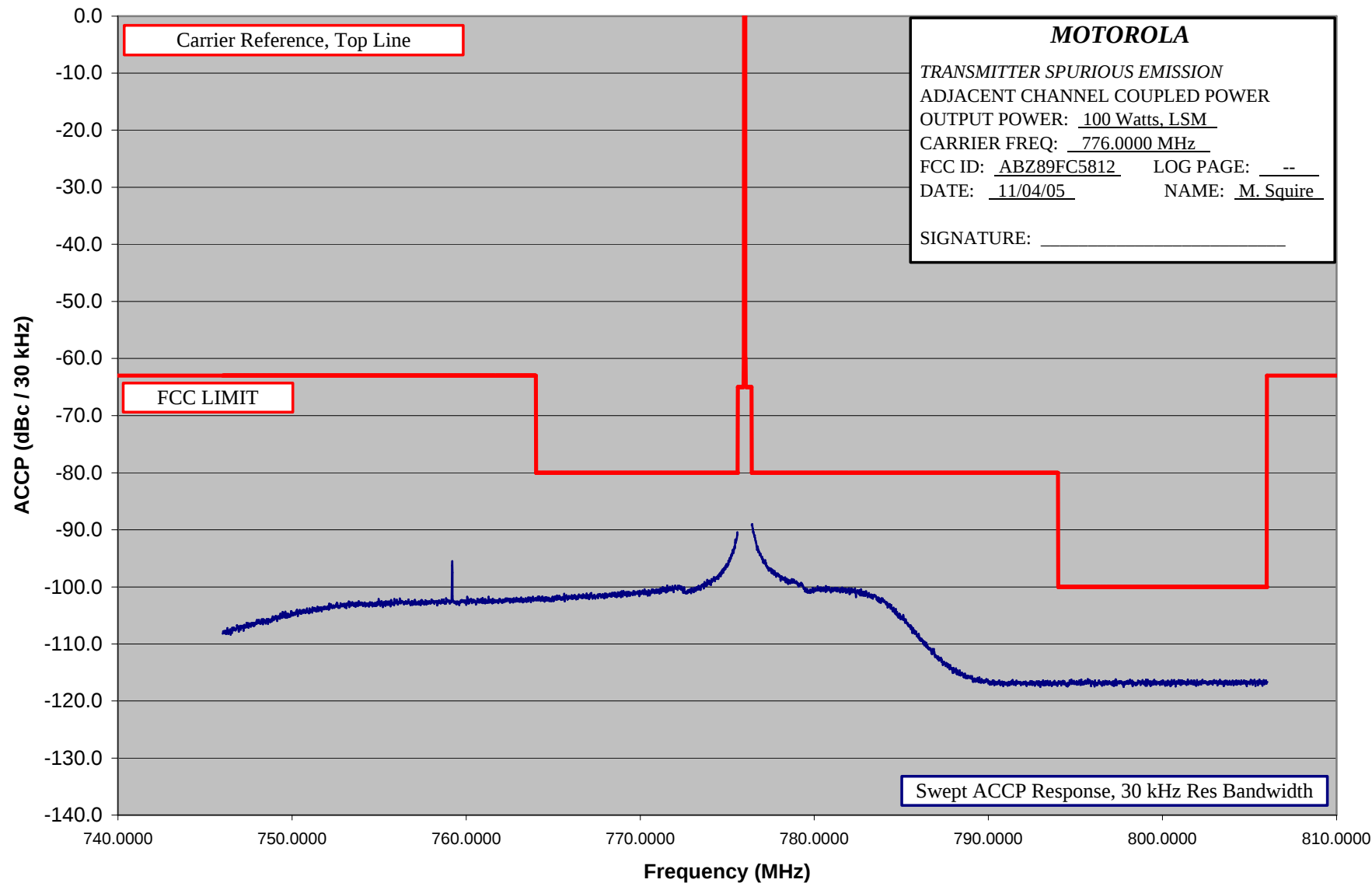


APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC5812

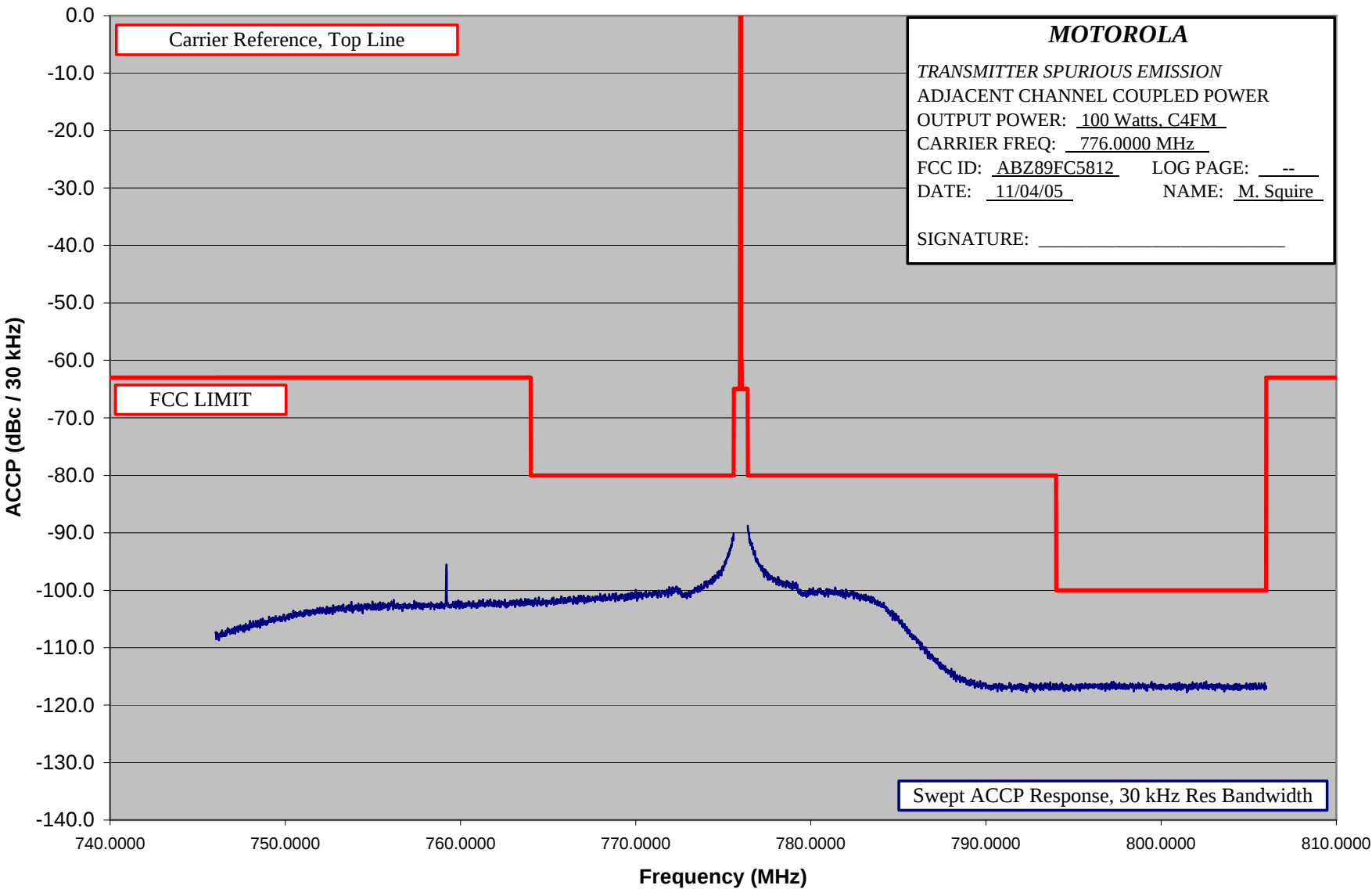
Report on Test Measurements

ACCP –Linear Simulcast Modulation, offset > 400 kHz, Tx = 776 MHz



Report on Test Measurements

ACCP –Compatible 4-Level Frequency Modulation), offset > 400 kHz, Tx = 776 MHz



Report on Test Measurements

Conducted Spurious Emissions, Harmonics

Specification Requirement § 90.543(c) and 27.53(d)(3) Emission Limits:

(c) Out-of-band emission limit: On any frequency outside of the frequency ranges covered by the ACP tables in this section, the power of any emission must be reduced below the mean output power (P):

$$\text{At least } 43 + 10 \log (P) \text{ dB}$$

measured in a 100 kHz bandwidth for frequencies less than 1 GHz, and in a 1 MHz bandwidth for frequencies greater than 1 GHz.

Modulation: High Performance Data – 64 QAM; or
Linear Simulcast Modulation (LSM); or
Compatible 4-Level Frequency Modulation (C4FM)
(Pseudorandom data, as indicated)

Carrier Frequency: A carrier frequency of 770.0000 MHz was measured. This frequency is near the center of the operating band 762-776 MHz

EXHIBIT DESCRIPTION

- | | |
|--------|---|
| E1-3.1 | Conducted Spurious Emissions, Harmonics, Power Output 50 Watts, High Performance Data (HPD)
The specification limit is -60.0 dBc |
| E1-3.2 | Conducted Spurious Emissions, Harmonics, Power Output 2 Watts, High Performance Data (HPD)
The specification limit is -46.0 dBc |
| E1-3.3 | Conducted Spurious Emissions, Harmonics, Power Output 100 Watts, LSM
The specification limit is -63.0 dBc |
| E1-3.4 | Conducted Spurious Emissions, Harmonics, Power Output 100 Watts, C4FM
The specification limit is -63.0 dBc |

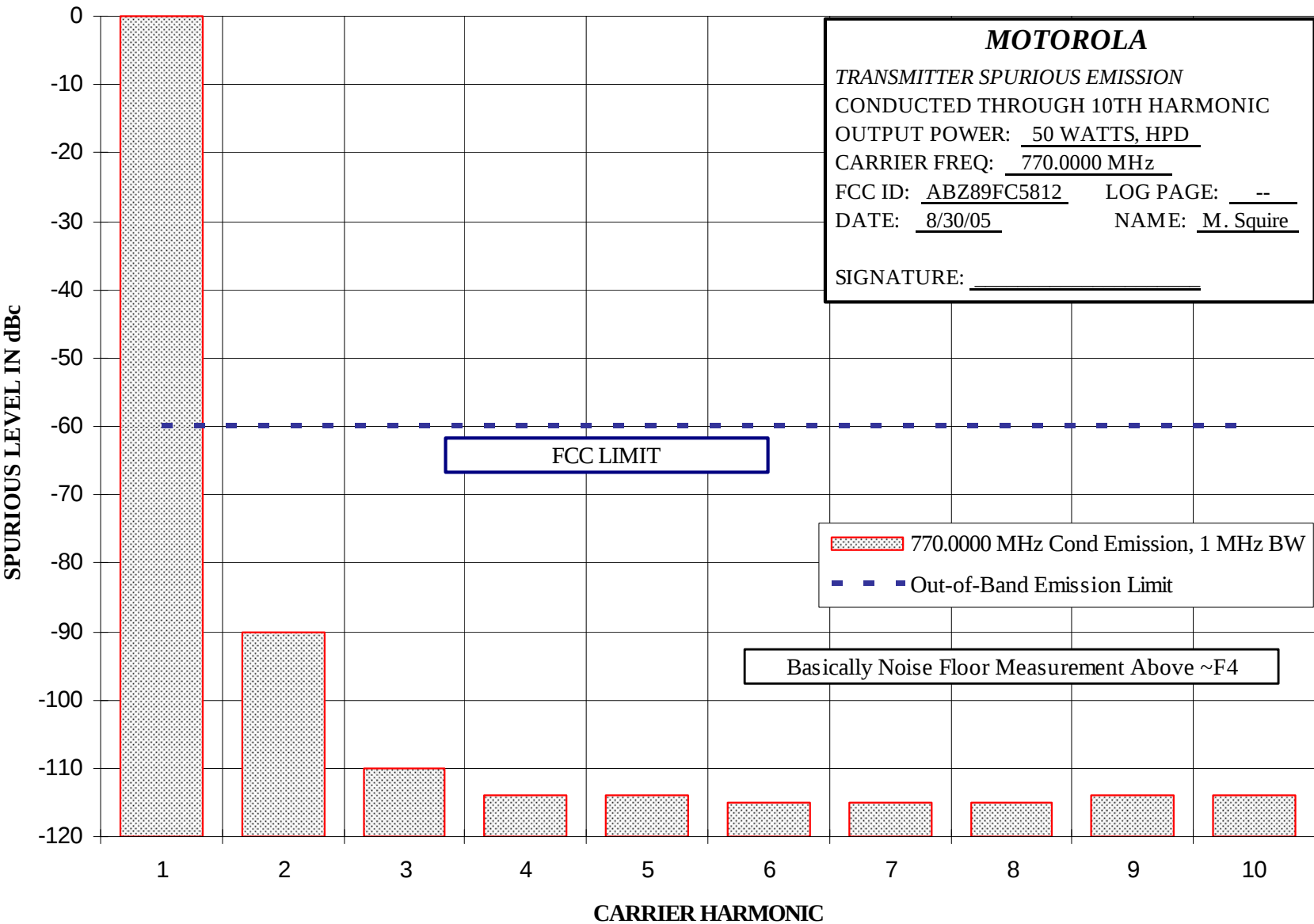
Note 1: Conducted emissions at 2 Watts for LSM and C4FM modes are virtually identical to that shown in E1-3.2 for HPD at 2 Watts. Thus, separate exhibits for LSM and C4FM conducted emissions at 2 Watts and are not included in this package and are covered by Exhibit E1-3.2.

APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC5812

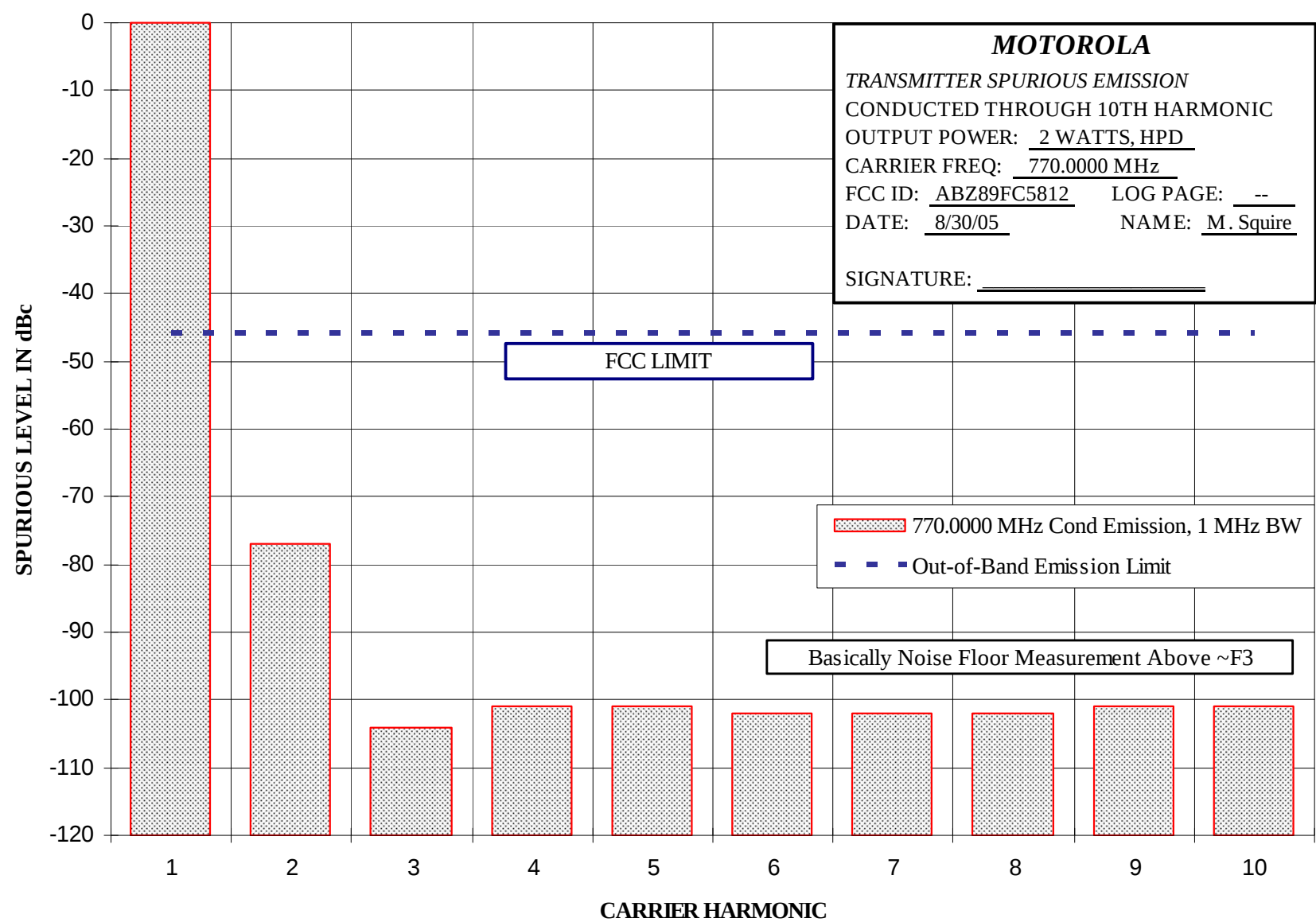
Report on Test Measurements

Conducted Emission – Harmonics – 50 Watts HPD



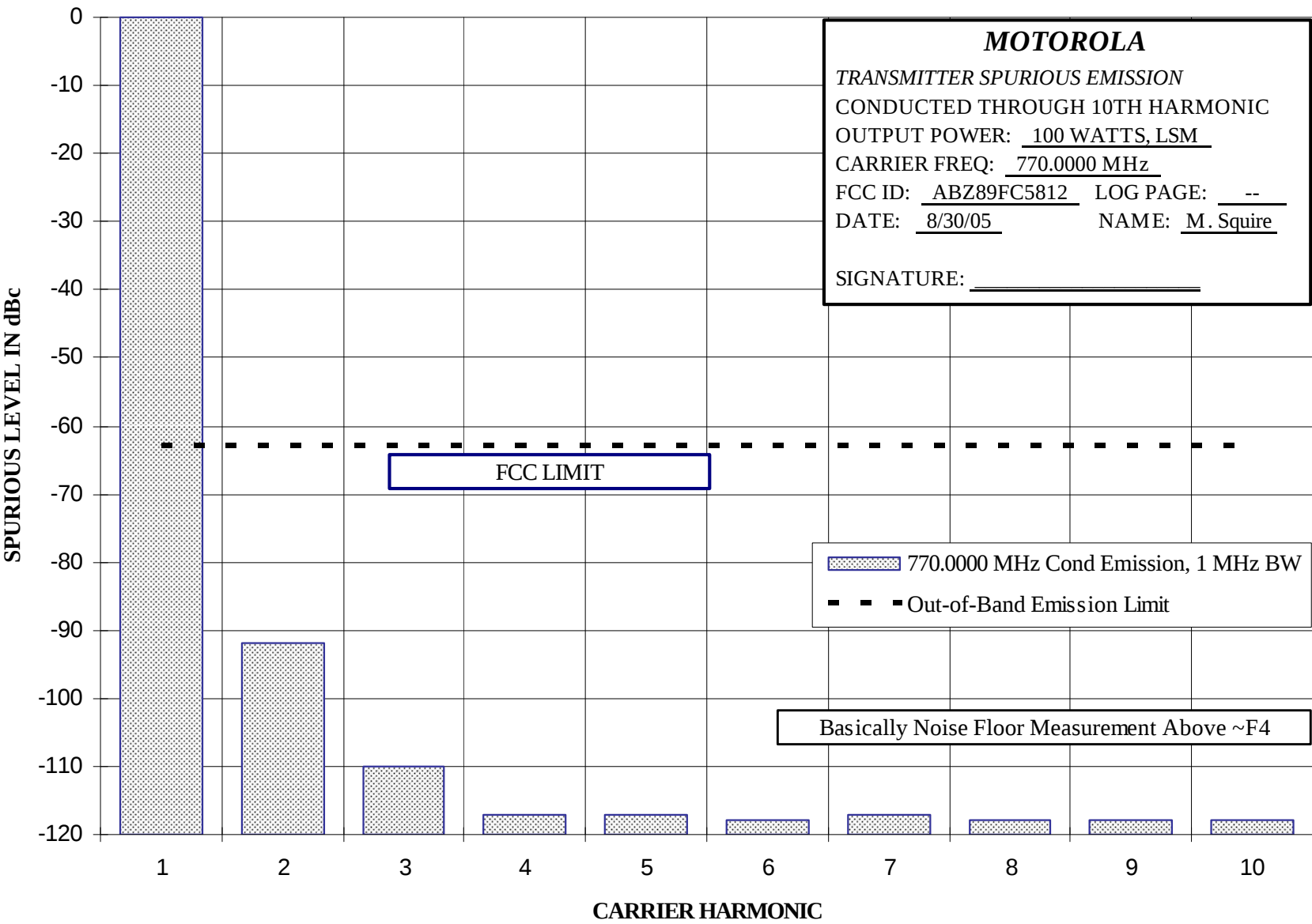
Report on Test Measurements

Conducted Emission – Harmonics – 2 Watts HPD



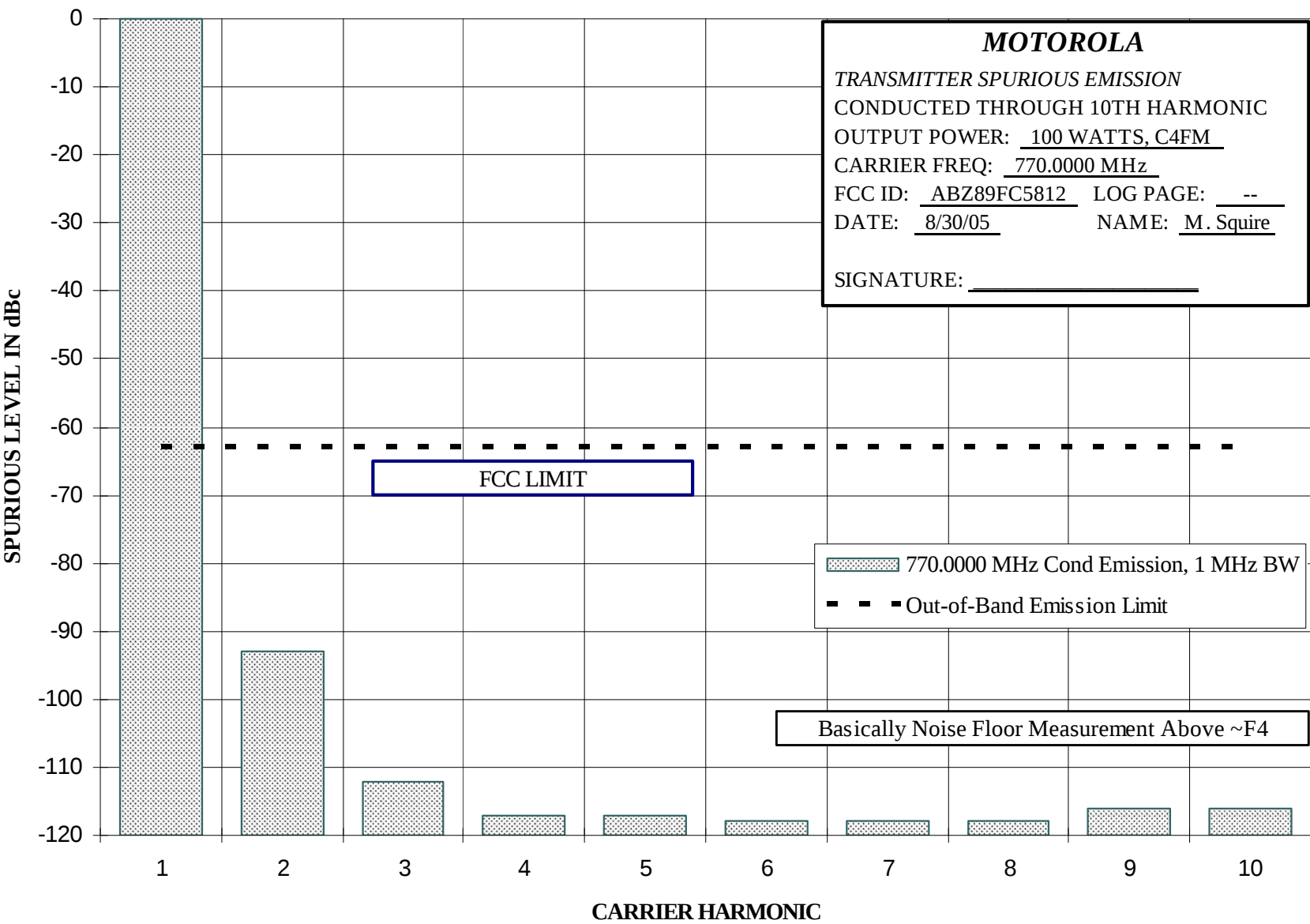
Report on Test Measurements

Conducted Emission – Harmonics – 100 Watts LSM



Report on Test Measurements

Conducted Emission – Harmonics – 100 Watts C4FM



Report on Test Measurements

*Radiated Spurious Emissions, Harmonics*Specification Requirement § 90.543(c) and 27.53(d)(3) Emission Limits:

(c) Out-of-band emission limit: On any frequency outside of the frequency ranges covered by the ACP tables in this section, the power of any emission must be reduced below the mean output power (P):

At least $43 + 10 \log (P)$ dB

measured in a 100 kHz bandwidth for frequencies less than 1 GHz, and in a 1 MHz bandwidth for frequencies greater than 1 GHz.

Modulation: High Performance Data – 64 QAM; or
Linear Simulcast Modulation (LSM); or
Compatible 4-Level Frequency Modulation (C4FM)
(Pseudorandom data, as indicated)

Carrier Frequency: A carrier frequency of 770.0000 MHz was measured. This frequency is near the center of the operating band 762-776 MHz

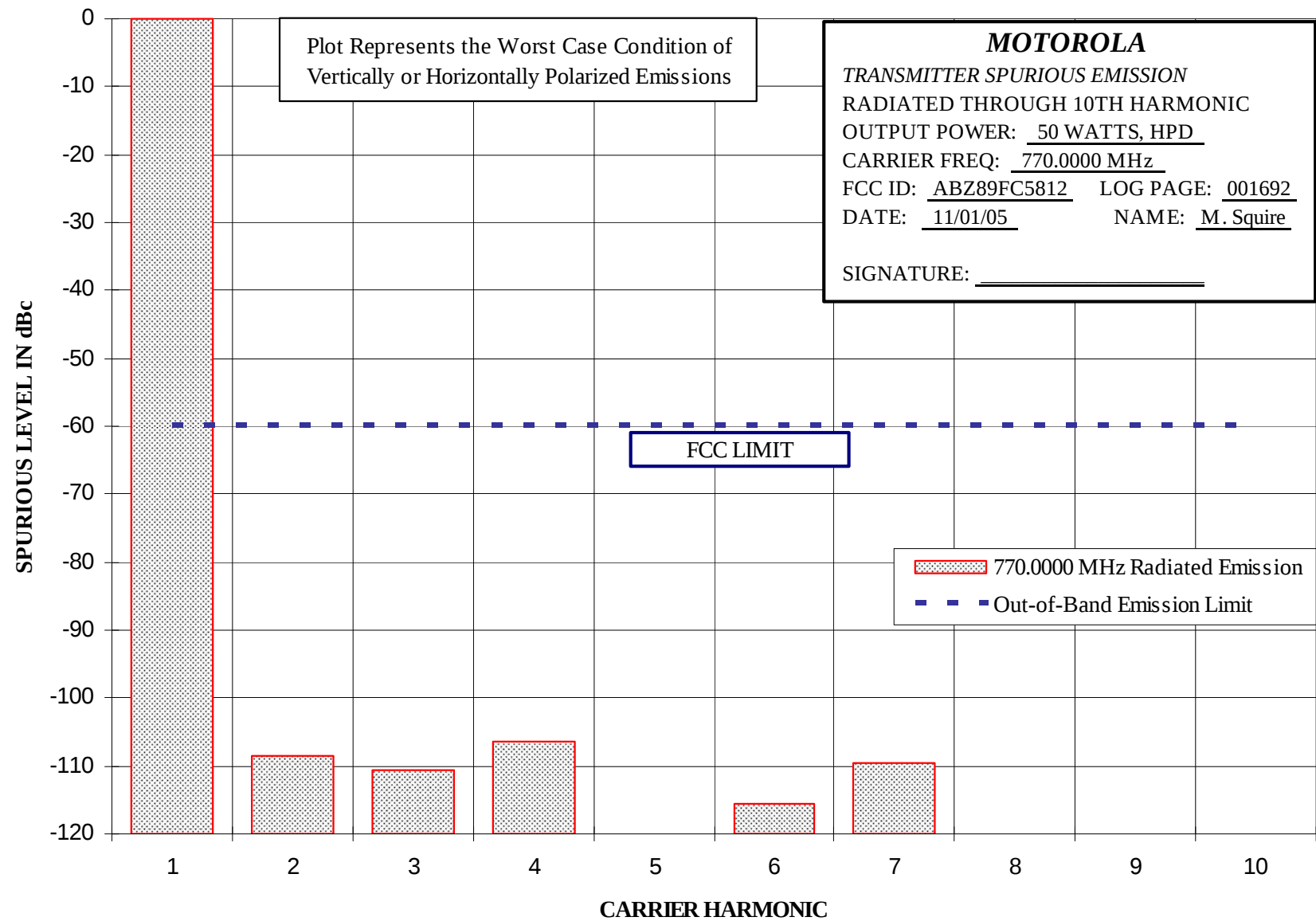
EXHIBIT DESCRIPTION

- | | |
|--------|--|
| E1-4.1 | Radiated Spurious Emissions, Harmonics, Power Output 50 Watts, High Performance Data (HPD)
The specification limit is -60.0 dBc |
| E1-4.2 | Radiated Spurious Emissions, Harmonics, Power Output 2 Watts, High Performance Data (HPD)
The specification limit is -46.0 dBc |
| E1-4.3 | Radiated Spurious Emissions, Harmonics, Power Output 100 Watts, LSM
The specification limit is -63.0 dBc |
| E1-4.4 | Radiated Spurious Emissions, Harmonics, Power Output 2 Watts, LSM
The specification limit is -46.0 dBc |
| E1-4.5 | Radiated Spurious Emissions, Harmonics, Power Output 100 Watts, C4FM
The specification limit is -63.0 dBc |
| E1-4.6 | Radiated Spurious Emissions, Harmonics, Power Output 2 Watts, C4FM
The specification limit is -46.0 dBc |

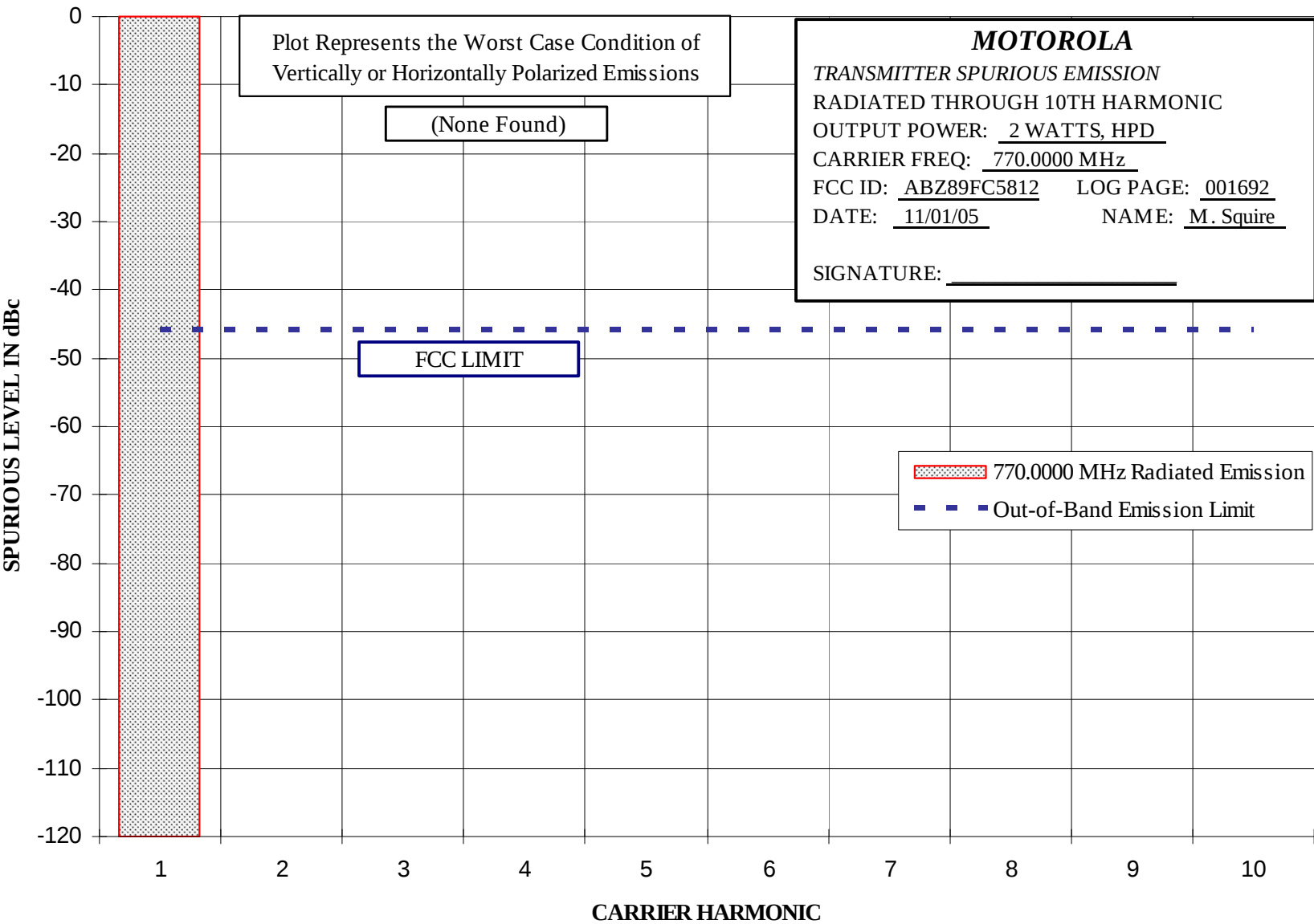
APPLICANT: MOTOROLA

EQUIPMENT TYPE: ABZ89FC5812

Report on Test Measurements
Radiated Emission – Harmonics – 50 Watts – High Performance Data (HPD)

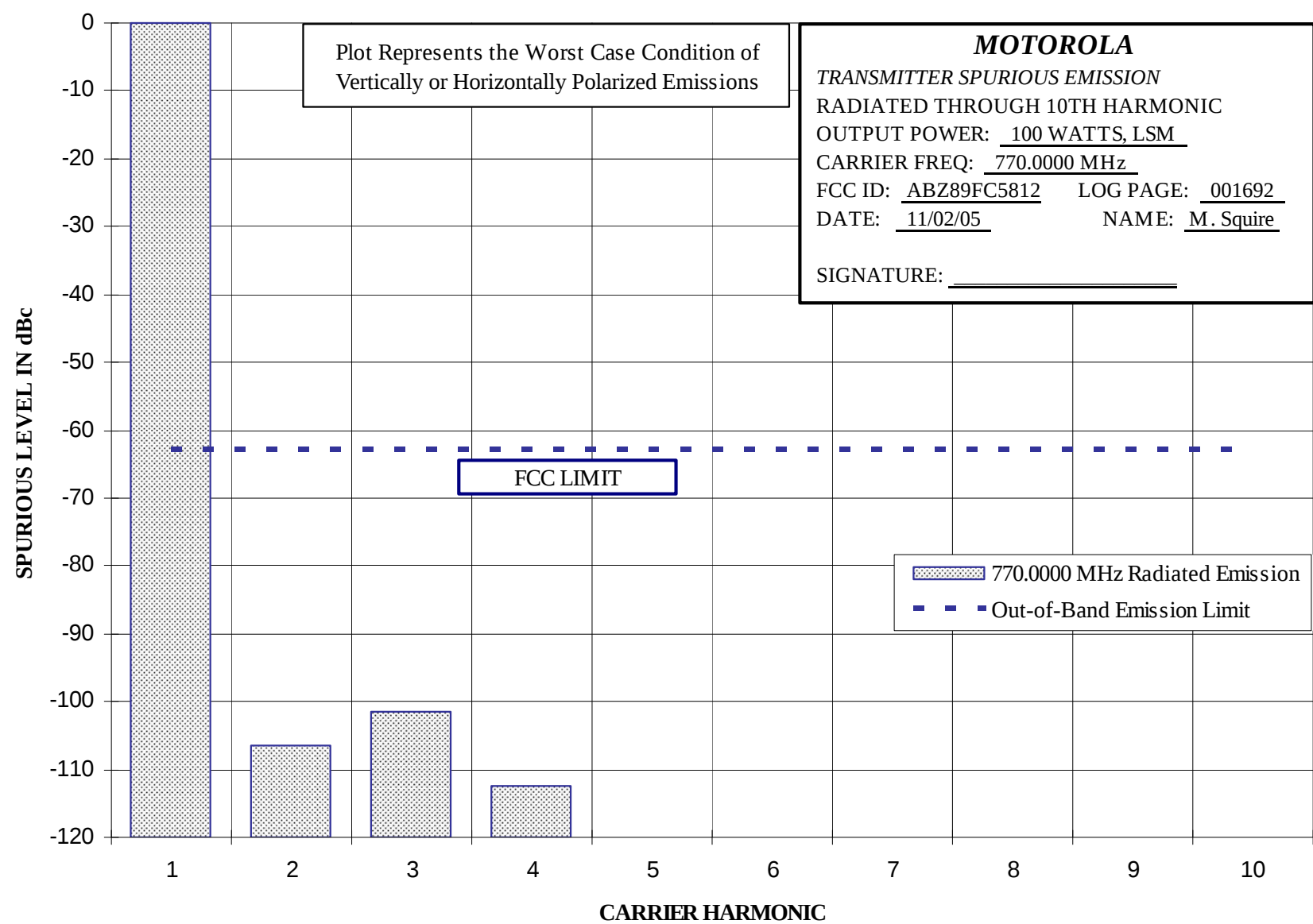


Report on Test Measurements
 Radiated Emission – Harmonics – 2 Watts – High Performance Data (HPD)

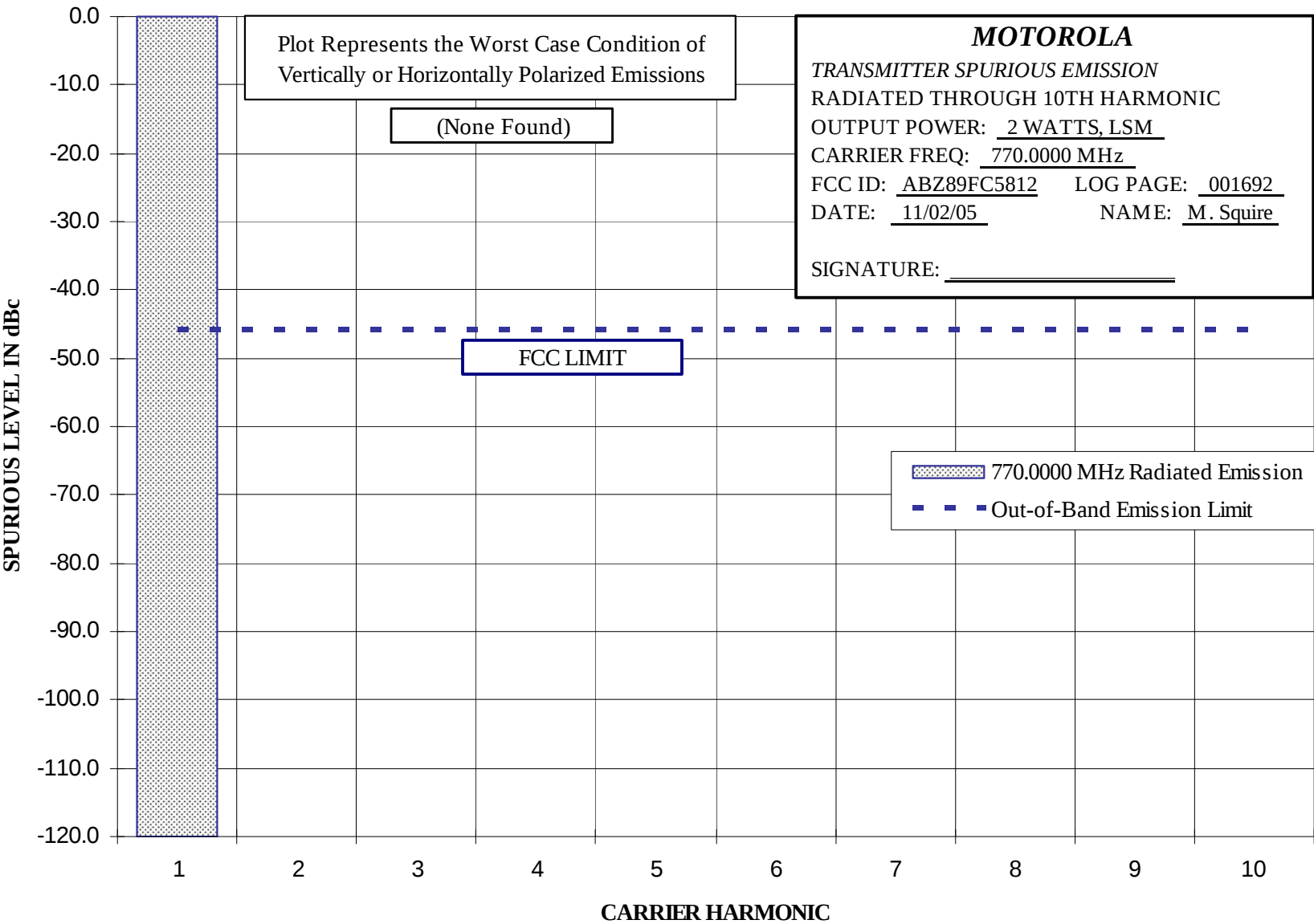


Report on Test Measurements

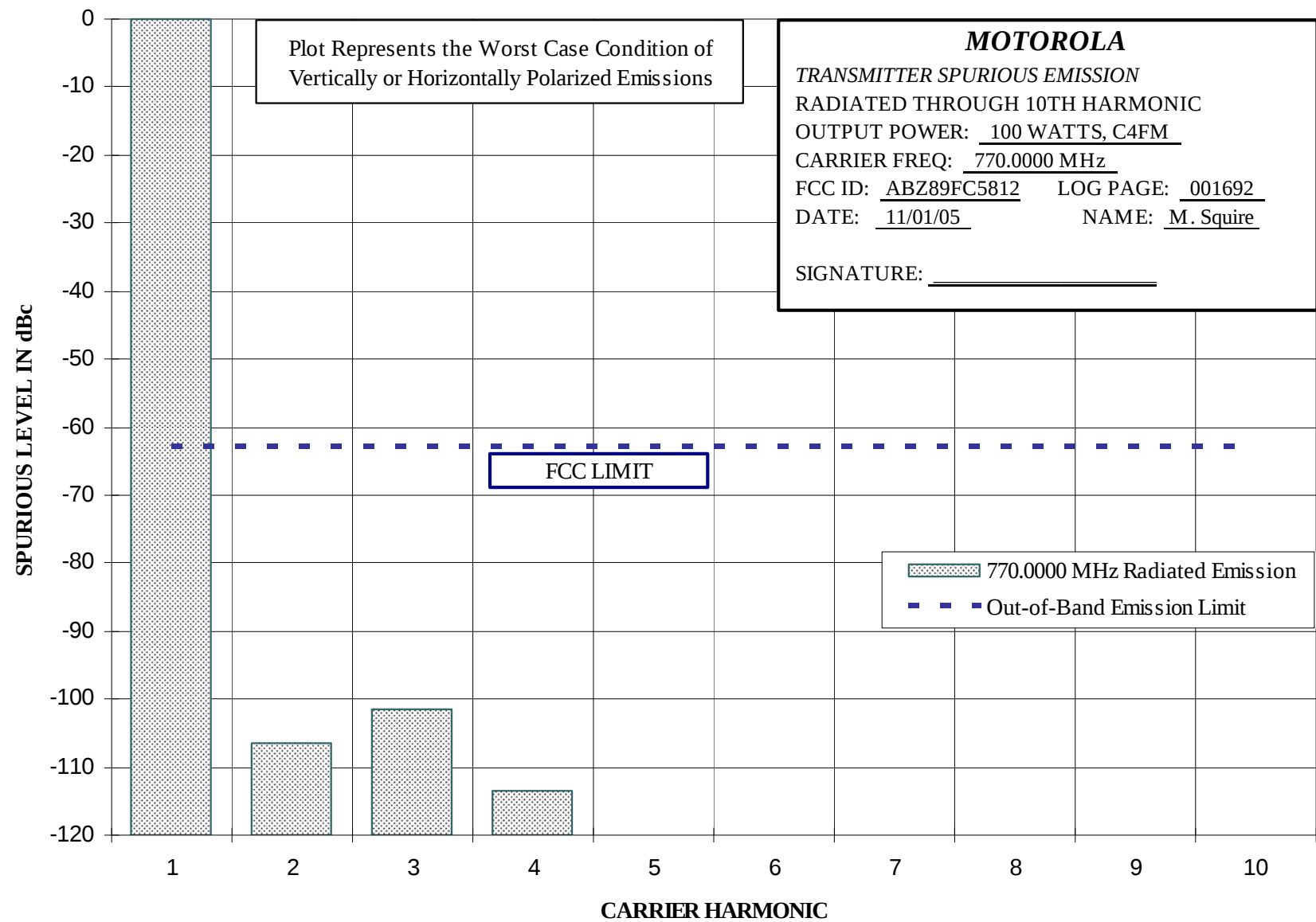
Radiated Emission – Harmonics – 100 Watts – Linear Simulcast Modulation (LSM)



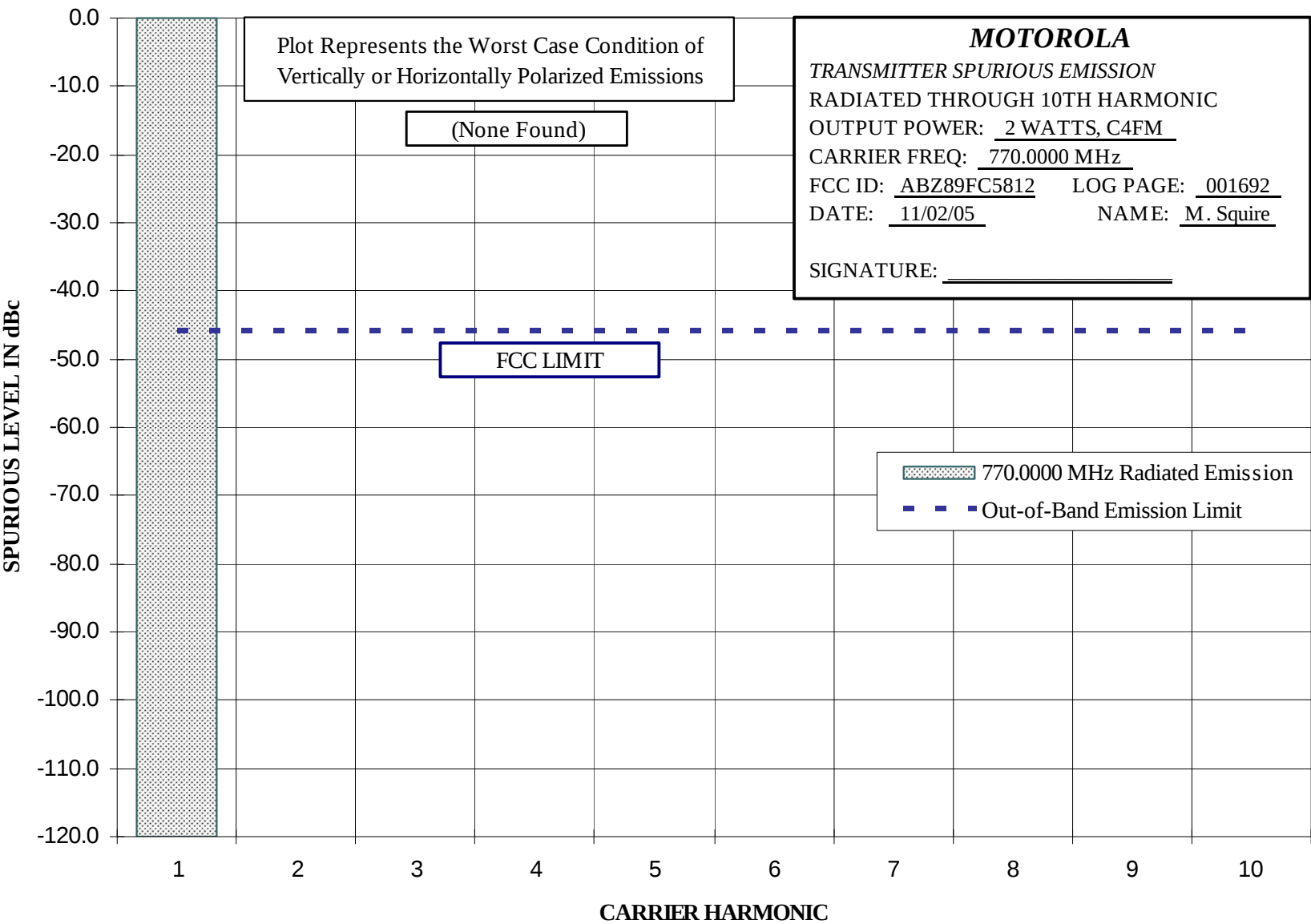
Report on Test Measurements
 Radiated Emission – Harmonics – 2 Watts – Linear Simulcast Modulation (LSM)



Report on Test Measurements
 Radiated Emission – Harmonics – 100 Watts – Compatible 4-Level Frequency Modulation (C4FM)



Report on Test Measurements
 Radiated Emission – Harmonics – 2 Watts – Compatible 4-Level Frequency Modulation (C4FM)



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.

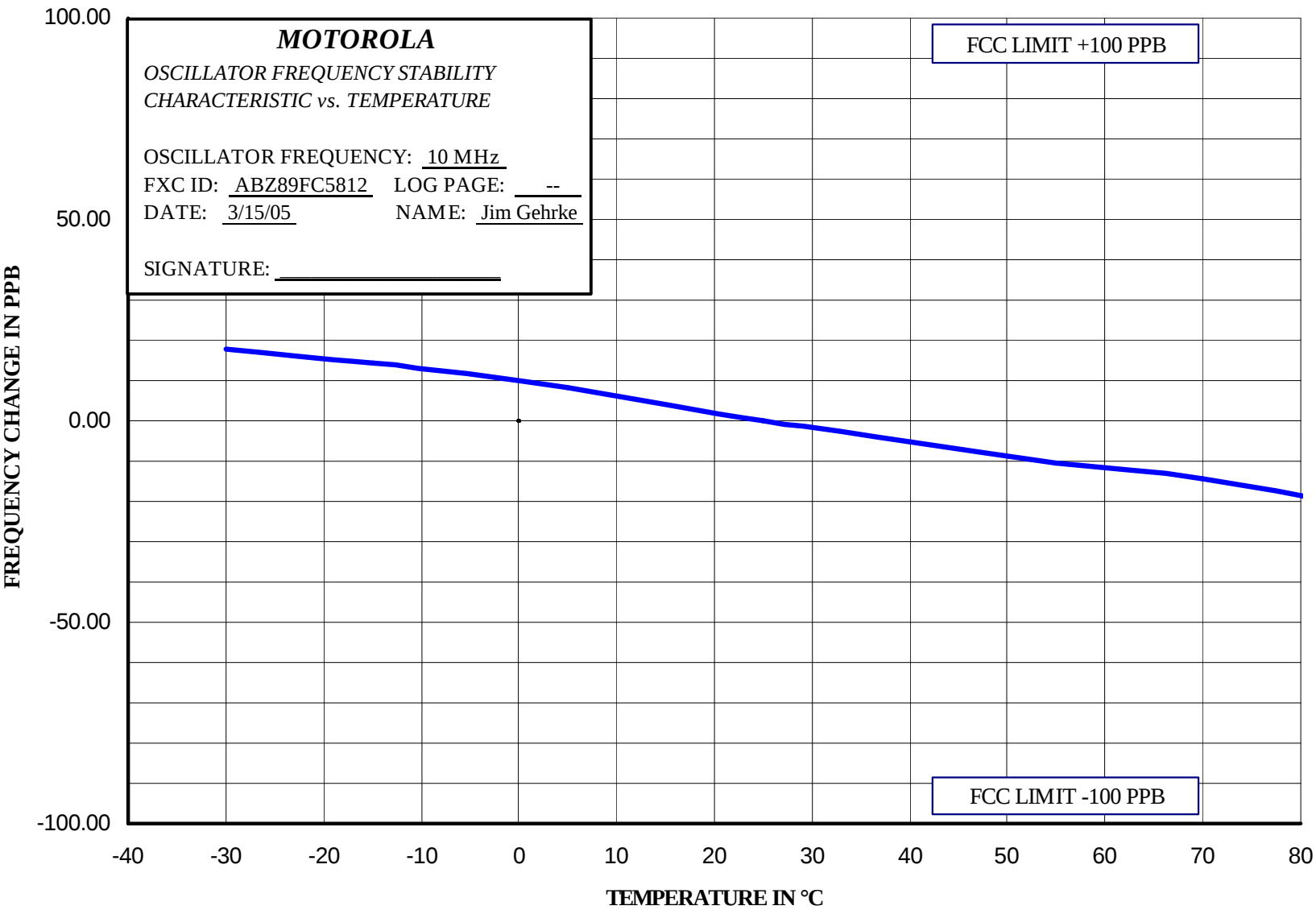
Specification Requirement:**Reference: Part 90.539(b)**

(b) The frequency stability of base transmitters operating in the narrowband segment must be 100 parts per billion or better.

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

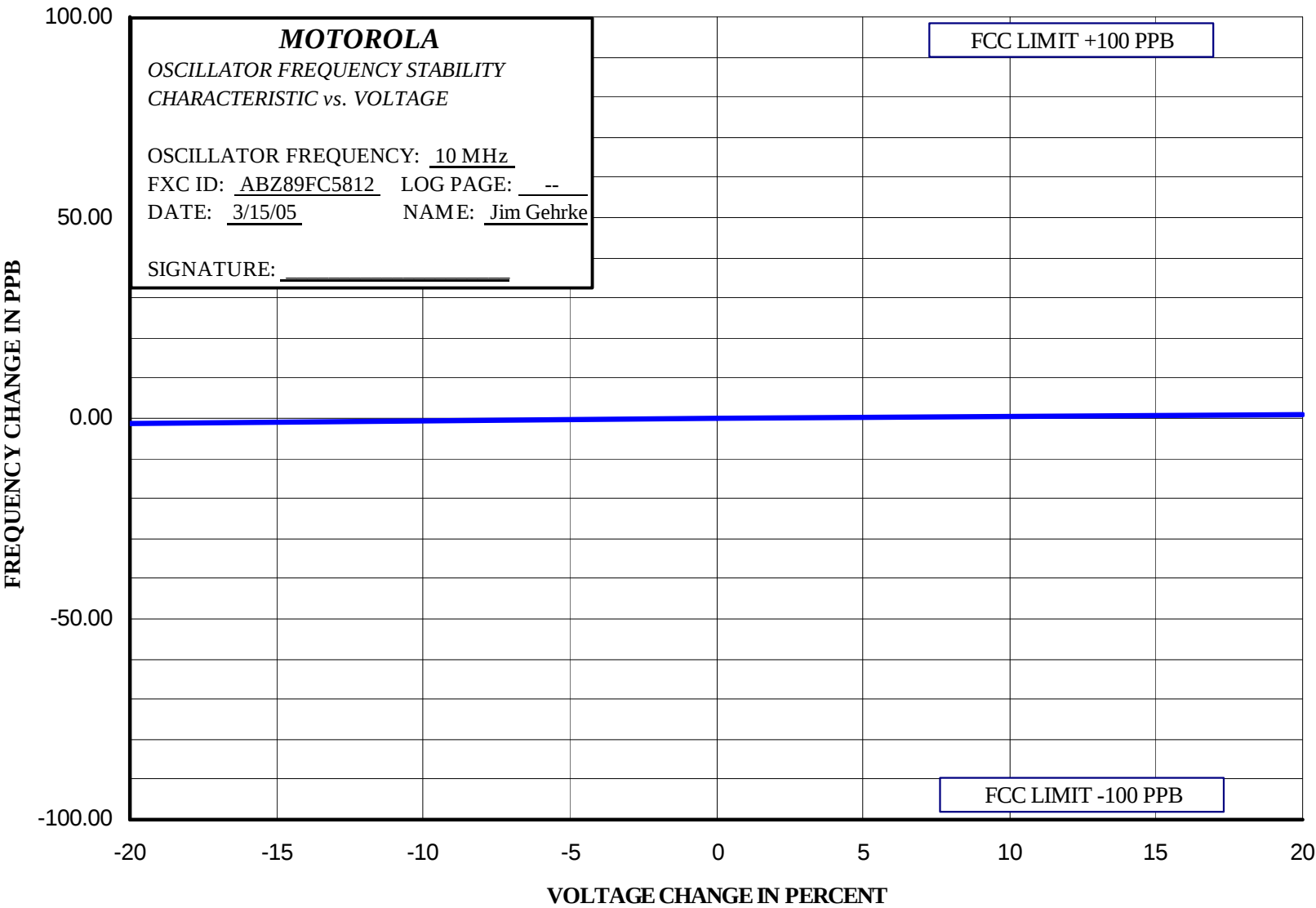
Report on Test Measurements

Frequency Stability Vs Temperature



Report on Test Measurements

Frequency Stability Vs Voltage



Report on Test Measurements

Protection of the 1559 – 1610 MHz Band

Specification Requirement:

Reference: Part 90.543(e) and Part 27.53(e)

<u>EXHIBIT</u>	<u>DESCRIPTION</u>
E1-6.1	Part 90 Operation, Setup, Specification, and Results
E1-6.2	Part 27 Operation, Setup, Specification, and Results

Report on Test Measurements*Protection of the 1559 – 1610 MHz Band***Specification Requirement:****Reference: Part 90.543(e)**

For operation in the 764 – 776 MHz and 794 – 806 MHz bands, all emissions including harmonics in the band 1559 – 1610 MHz shall be limited to –70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and –80 dBW/MHz EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Setup: The data was measured using the base radio to drive a representative antenna, with the maximum power rating of 50 Watts average power for HPD and 100 Watts average power for LSM modulation modes. The radiated emissions in the 1559 – 1610 MHz band were recorded.

Modulation / Power Setting: Pseudorandom data, type / power as indicated in the charts, either: High Performance Data (HPD) at 50 Watts (average); or Linear Simulcast Modulation (LSM) at 100 Watts (average).

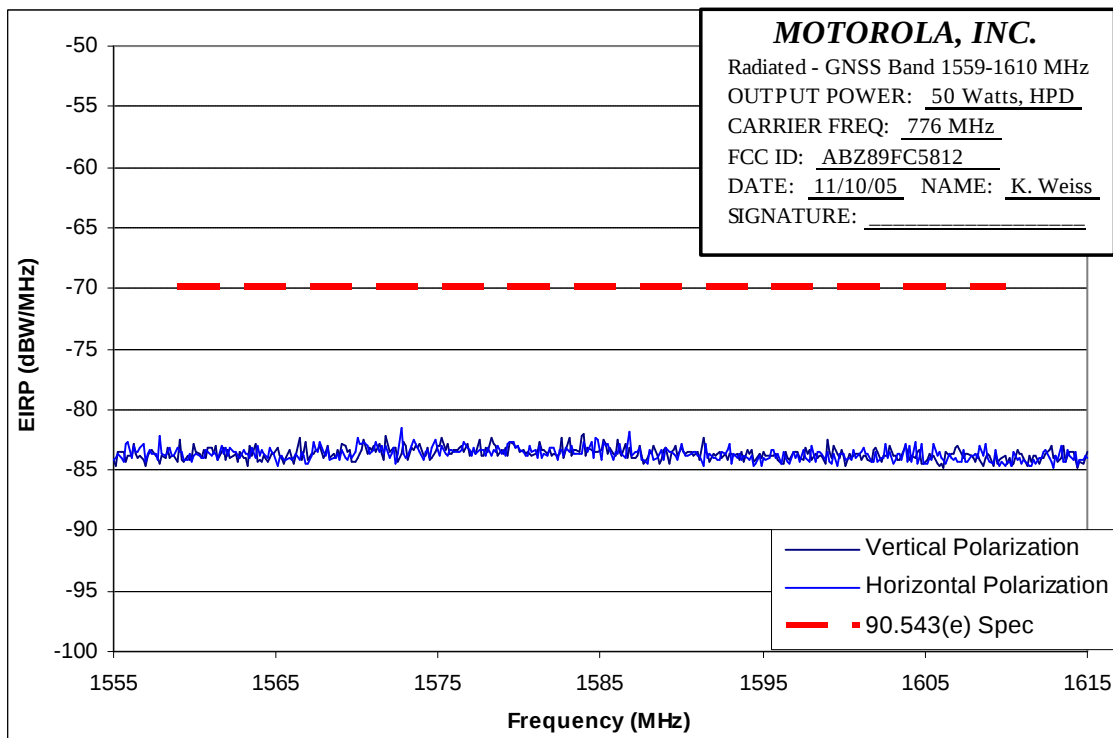
Carrier Frequencies: A transmitter carrier frequency of 776 MHz was measured. This frequency represents the band edge of the 764-776 MHz transmitter band, the second harmonic for which is closest to the 1559 – 1610 MHz band. The corresponding receiver channel was set to 806 MHz.

Antenna Model: Andrew Corporation, model DB806-A, 740-801 MHz, single polarized, 8.1 dBi gain antenna with zero degrees of electrical down tilt.

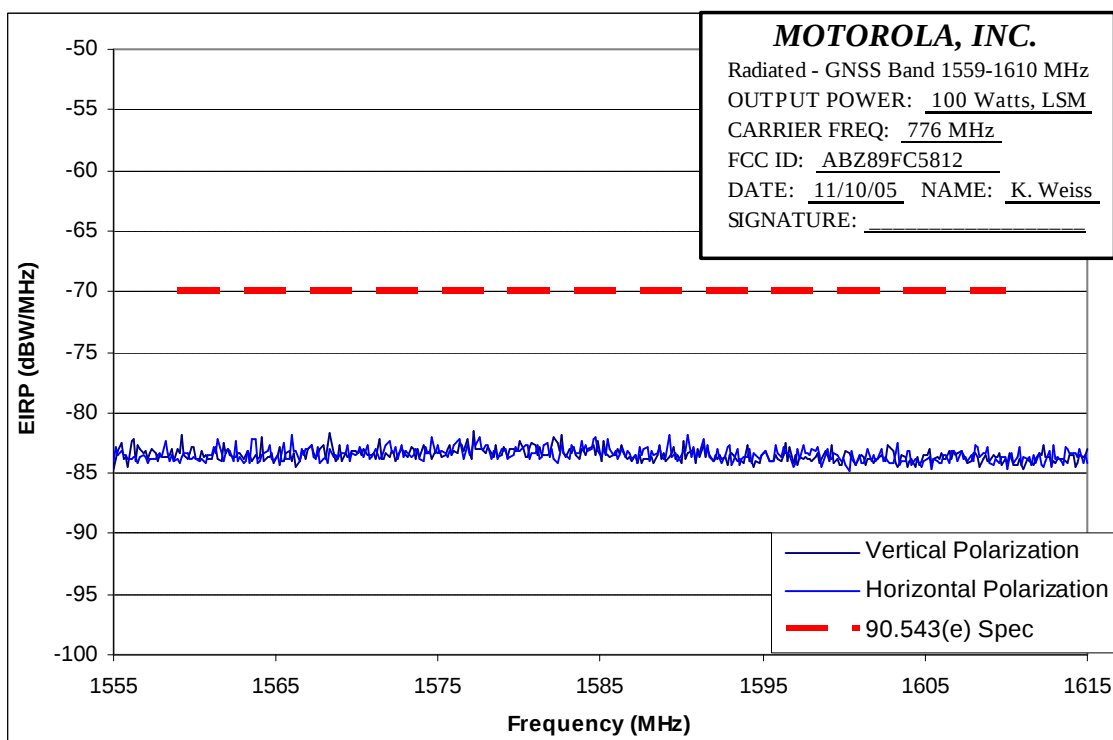
Results: Test results are shown of the following page for both HPD and LSM at the highest rated power setting. The worst case noted was –81.5 dBW/MHz at 1572.70 MHz for HPD, and –81.6 dBW/MHz at 1568.35 MHz for LSM. The wideband radiated emissions were significantly below the specification limit of -70 dBW/MHz and no narrowband emissions were observed.

Report on Test Measurements

Protection of the 1559 – 1610 MHz Band – Part 90.543(e)



High Performance Data (HPD) modulation at 50 Watts (average)



Linear Simulcast Modulation (LSM) at 100 Watts (average)

Report on Test Measurements*Protection of the 1559 – 1610 MHz Band***Specification Requirement:****Reference: Part 27.53(e)**

For operation in the 746 – 764 MHz and 776 – 794 MHz bands, emissions in the band 1559 – 1610 MHz shall be limited to –70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and –80 dBW/MHz EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Setup: The data was measured using the base radio to drive a representative antenna, with the maximum power rating of 50 Watts average power for HPD and 100 Watts average power for LSM modulation modes. The radiated emissions in the 1559 – 1610 MHz band were recorded.

Modulation / Power Setting: Pseudorandom data, type / power as indicated in the charts, either: High Performance Data (HPD) at 50 Watts (average); or Linear Simulcast Modulation (LSM) at 100 Watts (average).

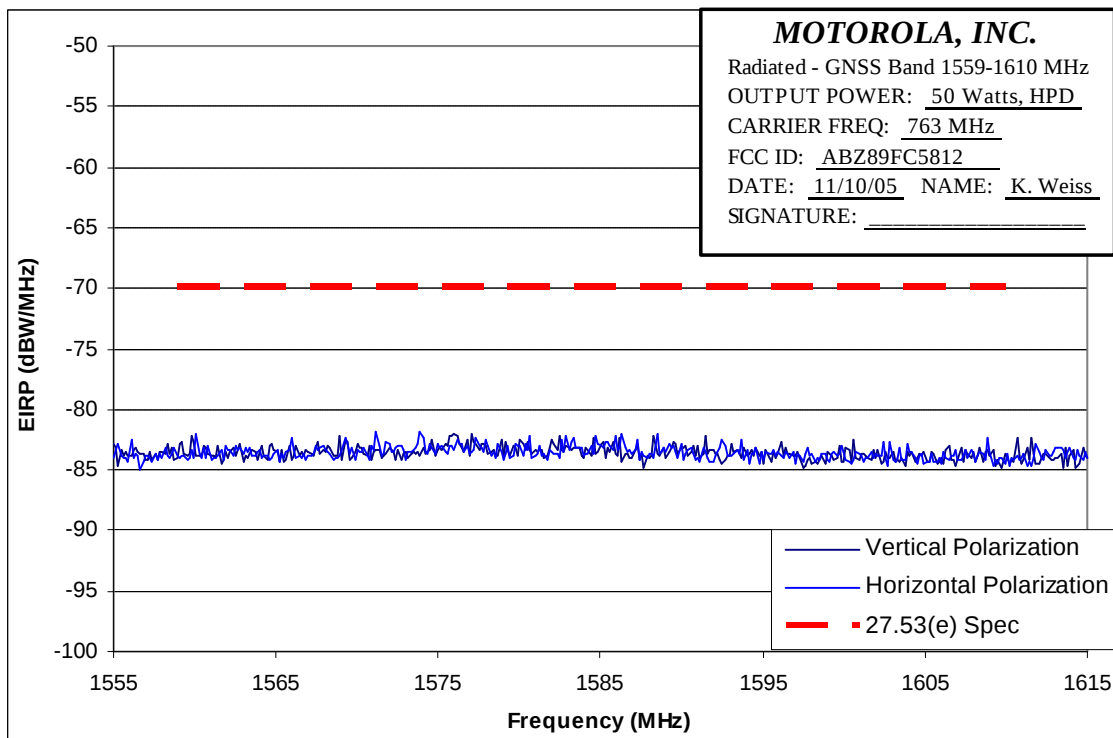
Carrier Frequencies: A transmitter carrier frequency of 763 MHz was measured. This frequency represents the middle of the requested 762-764 MHz guard band manager frequency band. The corresponding receiver channel was set to 793 MHz.

Antenna Model: Andrew Corporation, model DB806-A, 740-801 MHz, single polarized, 8.1 dBi gain antenna with zero degrees of electrical down tilt.

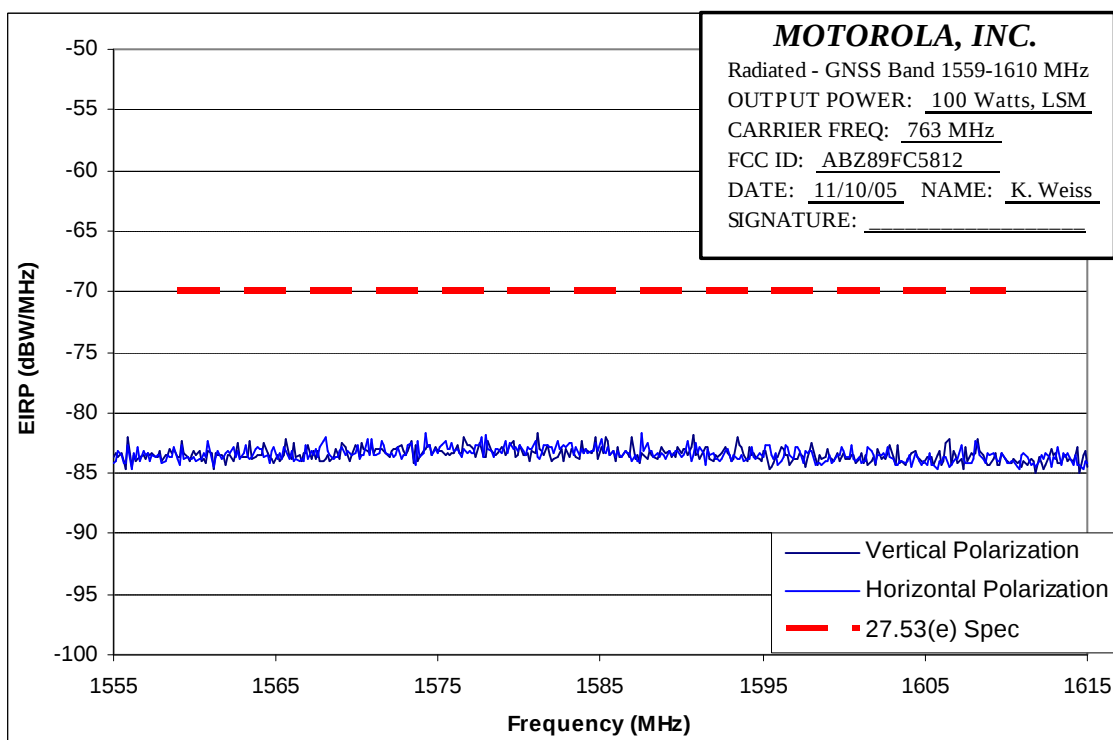
Results: Test results are shown of the following page for both HPD and LSM at the highest rated power setting. The worst case noted was –81.8 dBW/MHz at 1571.20 MHz for HPD, and –81.6 dBW/MHz at 1587.55 MHz for LSM. The wideband radiated emissions were significantly below the specification limit of -70 dBW/MHz and no narrowband emissions were observed.

Report on Test Measurements

Protection of the 1559 – 1610 MHz Band – Part 27.53(e)



High Performance Data (HPD) modulation at 50 Watts (average)



Linear Simulcast Modulation (LSM) at 100 Watts (average)

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
89441A	Hewlett Packard	Vector Signal Analyzer	33416A00835	05/17/05	05/17/08
(Various)	Weinschel, Kathrein, Bird	RF Loads	Various	no calibration required	
3020A, etc.	Narda	Directional Coupler	Various	no calibration required	

Report on Test Measurements

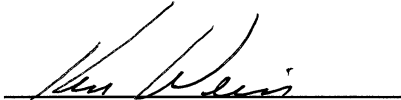
Statement of Certification

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

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

NAME: Ken Weiss

SIGNATURE: 

DATE: November 21, 2005

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: November 21, 2005

POSITION: Engineering Manager