Report on Test Measurements

Measurements Report
The measurement report shows compliance information against the pertinent technical standards. Each parameter is measured generally at the low end, middle, and at the high end of the applicable frequency band. Each section of the report contains either verbiage or graphs which show compliance to applicable standards as required, explains testing method used, 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

Report on Test Measurements

RF Power Output Data

The RF power output was measured with the indicated voltage applied to the RF Site. The DC current indicated is the total for the site with 1 channel transmitting at the noted power at the top of rack. Max Power requested is 44W, Lower Power is 2W.

C4FM Modulation

Temperature	25˚C				
Voltage (V)	48V				
Frequency (MHz)	Low Power (W)	Current (A)	Max Power (W)	Current (A)	Remarks
851	2.03	36.38	45.20	41.47	
860	2.02	37.36	44.53	42.14	
870	2.06	37.51	44.31	42.49	

LSM Modulation

Temperature	25˚C				
Voltage (V)	48V				
Frequency (MHz)	Low Power (W)	Current (A)	Max Power (W)	Current (A)	Remarks
851	2.08	37.43	45.71	41.63	
860	2.05	37.43	44.55	42.06	
870	2.07	37.50	46.34	42.57	

H-DQPSK Modulation

Temperature	25˚C				
Voltage (V)	48V				
Frequency (MHz)	Low Power (W)	Current (A)	Max Power (W)	Current (A)	Remarks
851	2.09	37.40	46.08	42.92	
860	2.05	37.46	44.60	42.32	
870	2.07	37.53	45.20	42.93	

Report on Test Measurements

Occupied Bandwidth – Linear Simulcast Modulation (LSM), 12.5 kHz Channel Spacing
Linear Simulcast Modulation can be used in a system configuration based upon channel usage as described in Exhibit B. The 'D1E' emission designator provides usage for telephony, the 'D1D' provides usage for data / telecommand, and the 'D1W' provides for usage as a combination. All are spectrally identical. The occupied bandwidth charts reference the following setup and specification requirements.

Modulation Type:	Linear Simulcast Modulation, LSM
Emission Designator:	8K70D1E, 8K70D1D, 8K70D1W
Channelization:	12.5 kHz
Power Setting:	44 Watts, Average

Specification Requirement 47 CFR §90.210(d) and IC RSS-119 section 5.8.3 - Emission Limits – "D-Mask":
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 (f0) to 5.625 kHz removed from f0: *Zero dB*

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

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: *At least 50 plus 10 log_{10}(P) 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: The necessary bandwidth of the modulation signal is not directly calculable per the composite modulation formulas defined in 47 CFR §2.202(g) / TRC-43 section 8. Quadrature Phase Shift Keying is used to modulate a carrier with a digital bit stream: Data Rate: R = 9600 bps; Bits per Symbol: S=4; B_n = 2BK; B = R/log_2(s) = 9600/log_2(4) = 4800; K= 0.9; B_n = 2*4800*0.9; B_n = 8700 Hz. The necessary bandwidth of 8.70 kHz is based upon a 99% power measurement of the transmitter spectrum, per §2.202(a) / TRC-43 section 7(c).

Measurement Procedure and Instrument Settings:

Emission Measurement Analyzer Settings			
Horizontal:	12.5 kHz per Division	Resolution BW:	100 Hz
Vertical:	10 dB per Division	Video BW:	10 kHz
Sweep Time:	72 Seconds (<2 kHz/Sec)	Span:	125 kHz
Detector:	Peak		

Measured Occupied Bandwidth	
Resolution BW:	150 Hz
Span:	15 kHz
Number of Points:	1601
Integration Time:	14.8 ms

Test Procedure:
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. 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.
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.
6) Adjust the signal analyzer resolution BW and span as indicated above, use the Occupied Bandwidth function to record the value.

EXHIBIT	DESCRIPTION	Meas Occ BW
E1-2.1	Occupied Bandwidth - Linear Simulcast Modulation (LSM), Low End of Band	8.92 kHz
E1-2.2	Occupied Bandwidth - Linear Simulcast Modulation (LSM), Middle of Band	8.85 kHz
E1-2.3	Occupied Bandwidth - Linear Simulcast Modulation (LSM), High End of Band	8.88 kHz

Report on Test Measurements

Occupied Bandwidth – Compatible 4-Level Frequency Modulation (C4FM), 12.5 kHz Channel Spacing
C4FM can be used in a system configuration based upon channel usage as described in Exhibit B. The 'F1E' emission designator provides usage for telephony, the 'F1D' provides usage for data / telecommand, and the 'F1W' provides for usage as a combination. All are spectrally identical. The occupied bandwidth charts reference the following setup and specification requirements.

Modulation Type:	Compatible 4-Level Frequency Modulation, C4FM
Emission Designator:	8K10F1E, 8K10F1D, 8K10F1W
Channelization:	12.5 kHz
Power Setting:	44 Watts

Specification Requirement 47 CFR §90.210(d) and IC RSS-119 section 5.8.3 - Emission Limits – "D-Mask":
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 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:
The necessary bandwidth of the modulation per the formulas defined in 47 CFR §2.202(g) / TRC-43 section 8 is as follows:

Max Mod Freq, M= ½B	*Max Deviation, D*	*2M+2DK (K=1)*	*Nec BW*
1.2 kHz	2.85 kHz	8.10 kHz	8K10

Measurement Procedure and Instrument Settings:

Emission Measurement Analyzer Settings

Horizontal:	12.5 kHz per Division	Resolution BW:	100 Hz
Vertical:	10 dB per Division	Video BW:	10 kHz
Sweep Time:	72 Seconds (<2 kHz/Sec)	Span:	125 kHz
Detector:	Peak		

Measured Occupied Bandwidth

Resolution BW:	150 Hz
Span:	15 kHz
Number of Points:	1601
Integration Time:	14.8 ms

Test Procedure:
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. 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.
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.
6) Adjust the signal analyzer resolution BW and span as indicated above, use the Occupied Bandwidth function to record the value.

EXHIBIT	**DESCRIPTION**	**Meas Occ BW**
E1-2.4	Occupied Bandwidth - Compatible 4-Level Frequency Mod (C4FM), Low End of Band	7.84 kHz
E1-2.5	Occupied Bandwidth - Compatible 4-Level Frequency Mod (C4FM), Middle of Band	7.85 kHz
E1-2.6	Occupied Bandwidth - Compatible 4-Level Frequency Mod (C4FM), High End of Band	7.92 kHz

Report on Test Measurements

Occupied Bandwidth –H-DQPSK, P25 Two Slot TDMA Digital Modulation, 12.5 kHz Channel Spacing
H-DQPSK modulation can be used in a system configuration based upon channel usage as described in Exhibit B. The 'D7E' emission designator provides usage for telephony, the 'D7D' provides usage for data / telecommand, and the 'D7W' provides for usage as a combination. All are spectrally identical. The occupied bandwidth charts reference the following setup and specification requirements.

Modulation Type:	H-DQPSK, P25 Two Slot TDMA Digital Modulation
Emission Designator:	9K80D7E, 9K80D7D, 9K80D7W
Channelization:	12.5 kHz
Power Setting:	44 Watts, Average

Specification Requirement 47 CFR §90.210(d) and IC RSS-119 section 5.8.3 - Emission Limits – "D-Mask":
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 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: The necessary bandwidth of the modulation signal is not directly calculable per the composite modulation formulas defined in 47 CFR §2.202(g) / TRC-43 section 8. Quadrature Phase Shift Keying is used to modulate a carrier with a digital bit stream: Data Rate: R = 12000 bps; Bits per Symbol: S=4; B_n = 2BK; B = R/log_2(s) = 12000/log_2(4) = 6000; K= 0.81; B_n = 2*6000*0.81; B_n = 9800 Hz. The necessary bandwidth of 9.80 kHz is based on a 99% power measurement of the transmitter spectrum, per §2.202(a) / TRC-43 section 7(c).

Measurement Procedure and Instrument Settings:

Emission Measurement Analyzer Settings			
Horizontal:	12.5 kHz per Division	Resolution BW:	100 Hz
Vertical:	10 dB per Division	Video BW:	10 kHz
Sweep Time:	72 Seconds (<2 kHz/Sec)	Span:	125 kHz
Detector:	Peak		

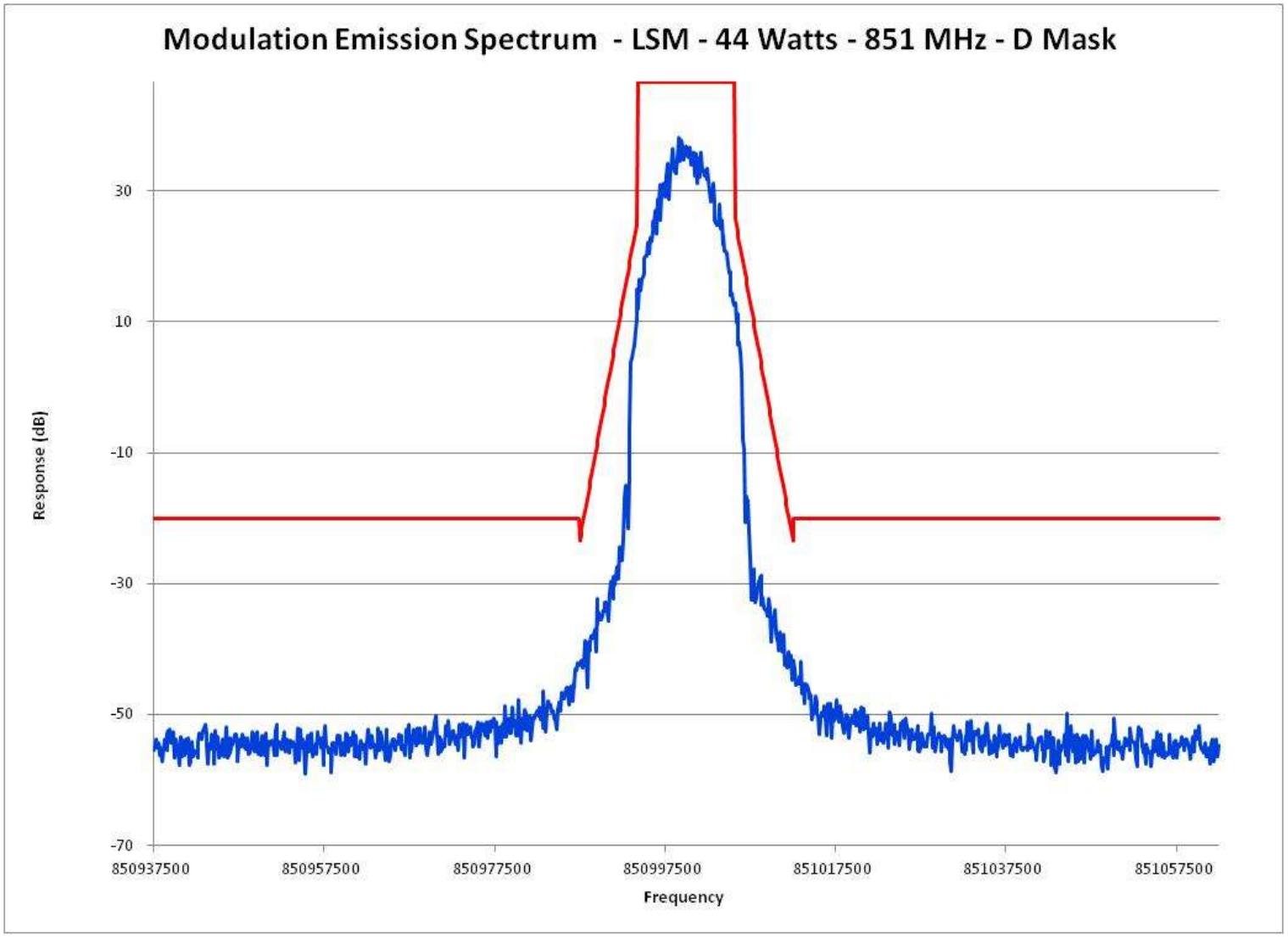
Measured Occupied Bandwidth	
Resolution BW:	150 Hz
Span:	15 kHz
Number of Points:	1601
Integration Time:	14.8 ms

Test Procedure:
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. 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.
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.
6) Adjust the signal analyzer resolution BW and span as indicated above, use the Occupied Bandwidth function to record the value.

EXHIBIT	DESCRIPTION	Meas Occ BW
E1-2.7	Occupied Bandwidth - H-DQPSK P25 Two Slot TDMA Digital Mod, Low End of Band	9.80 kHz
E1-2.8	Occupied Bandwidth - H-DQPSK P25 Two Slot TDMA Digital Mod, Middle of Band	9.81 kHz
E1-2.9	Occupied Bandwidth - H-DQPSK P25 Two Slot TDMA Digital Mod, High End of Band	9.79 kHz

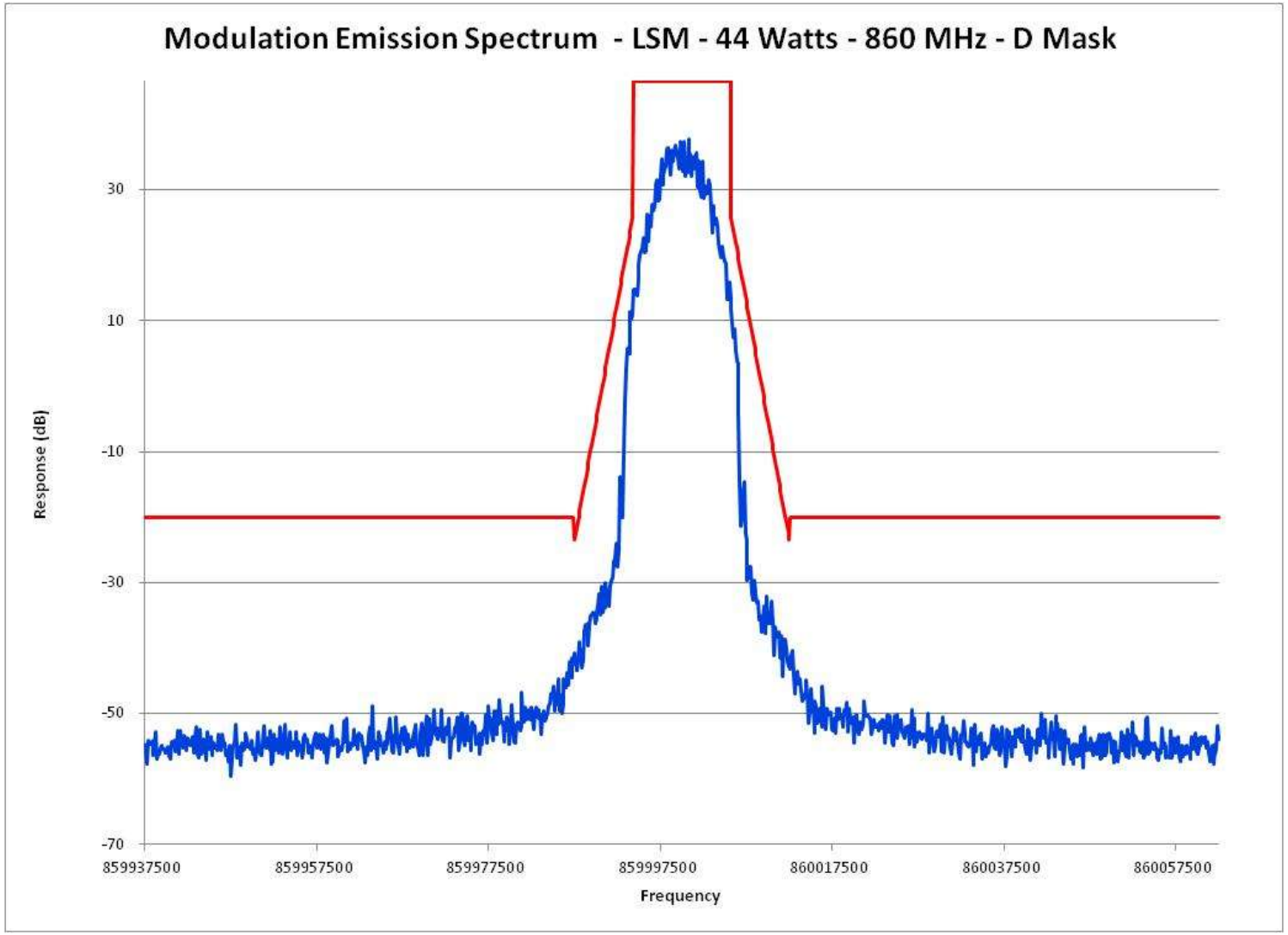
Report on Test Measurements

Occupied Bandwidth – Linear Simulcast Modulation (LSM) – Emission Designator: 8K70D1E, 8K70D1D, 8K70D1W – Low End of Band



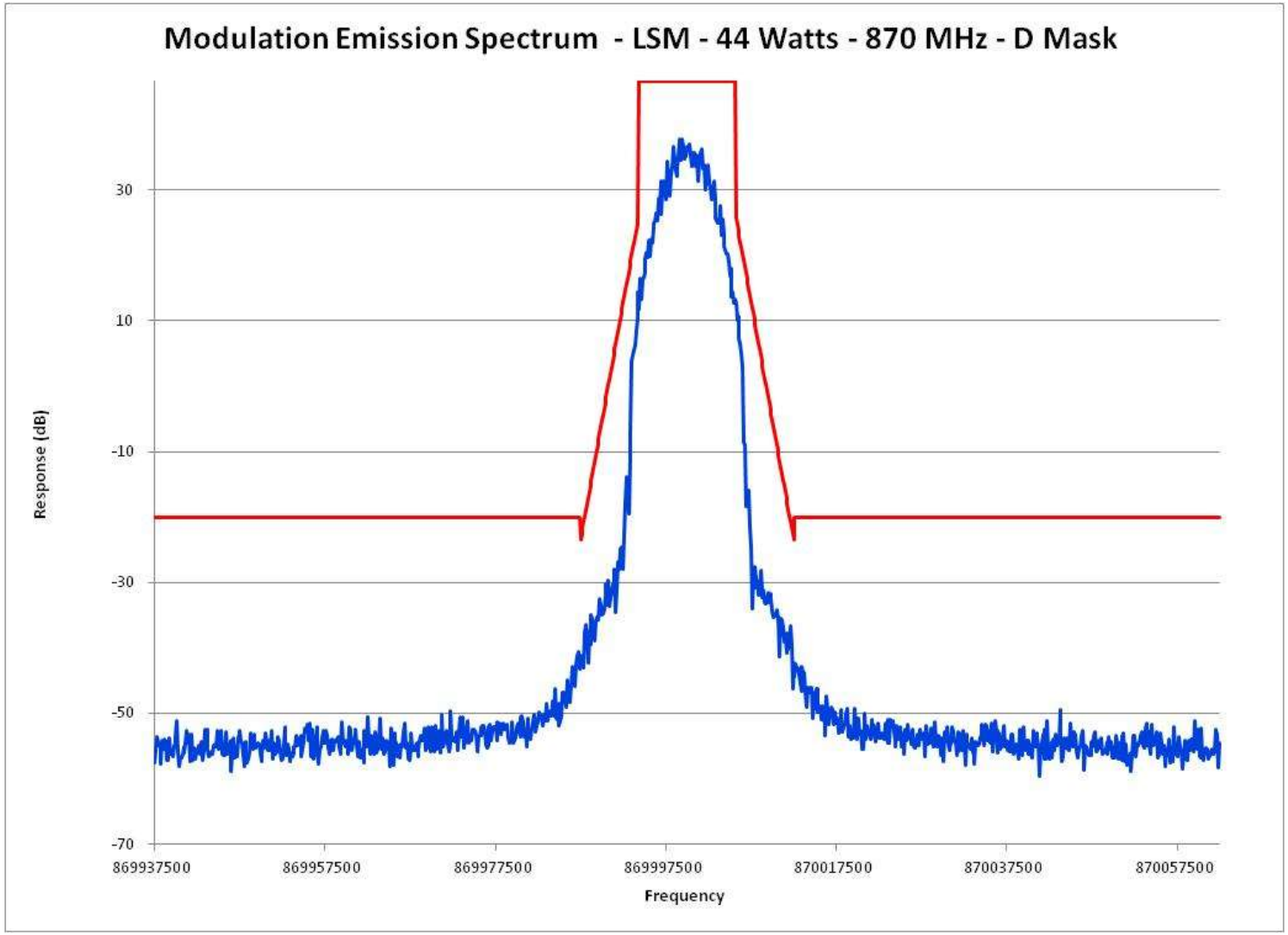
Report on Test Measurements

Occupied Bandwidth – Linear Simulcast Modulation (LSM) – Emission Designator: 8K70D1E, 8K70D1D, 8K70D1W – Middle of Band



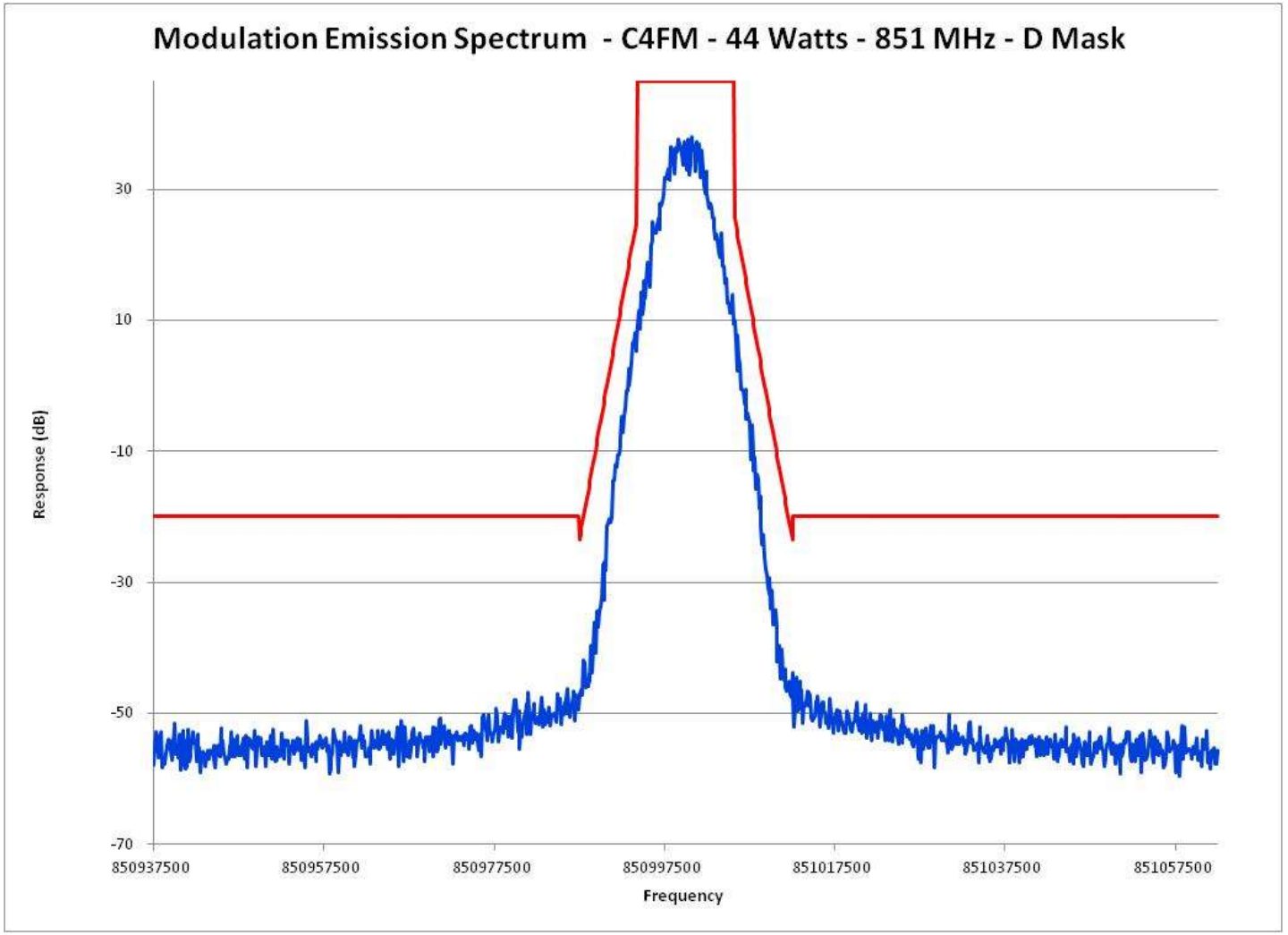
Report on Test Measurements

Occupied Bandwidth – Linear Simulcast Modulation (LSM) – Emission Designator: 8K70D1E, 8K70D1D, 8K70D1W – High End of Band



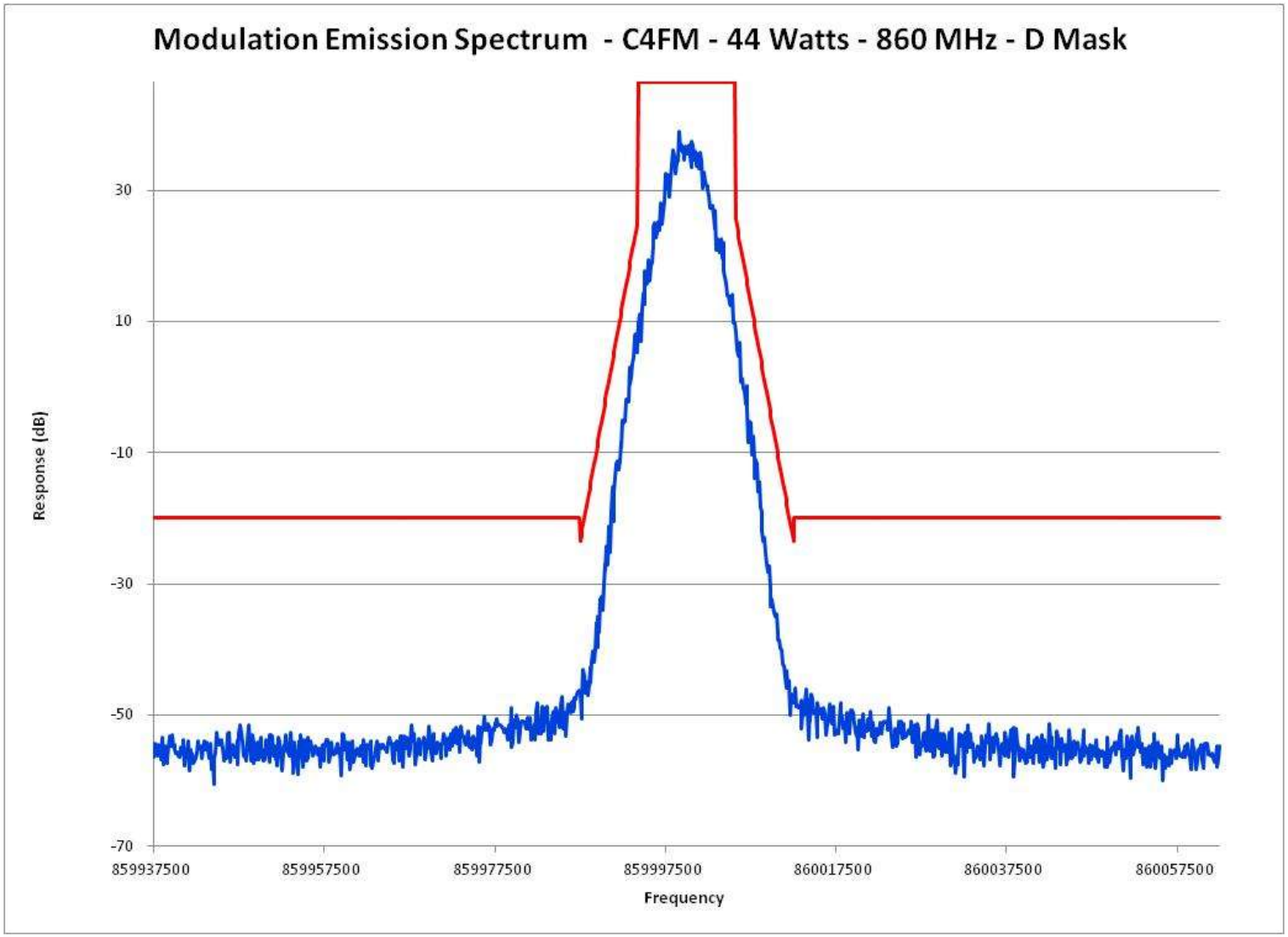
Report on Test Measurements

Occupied Bandwidth – Compatible 4-Level Frequency Modulation (C4FM) – Emission Designator: 8K10D1E, 8K10D1D, 8K10D1W, Low End of Band



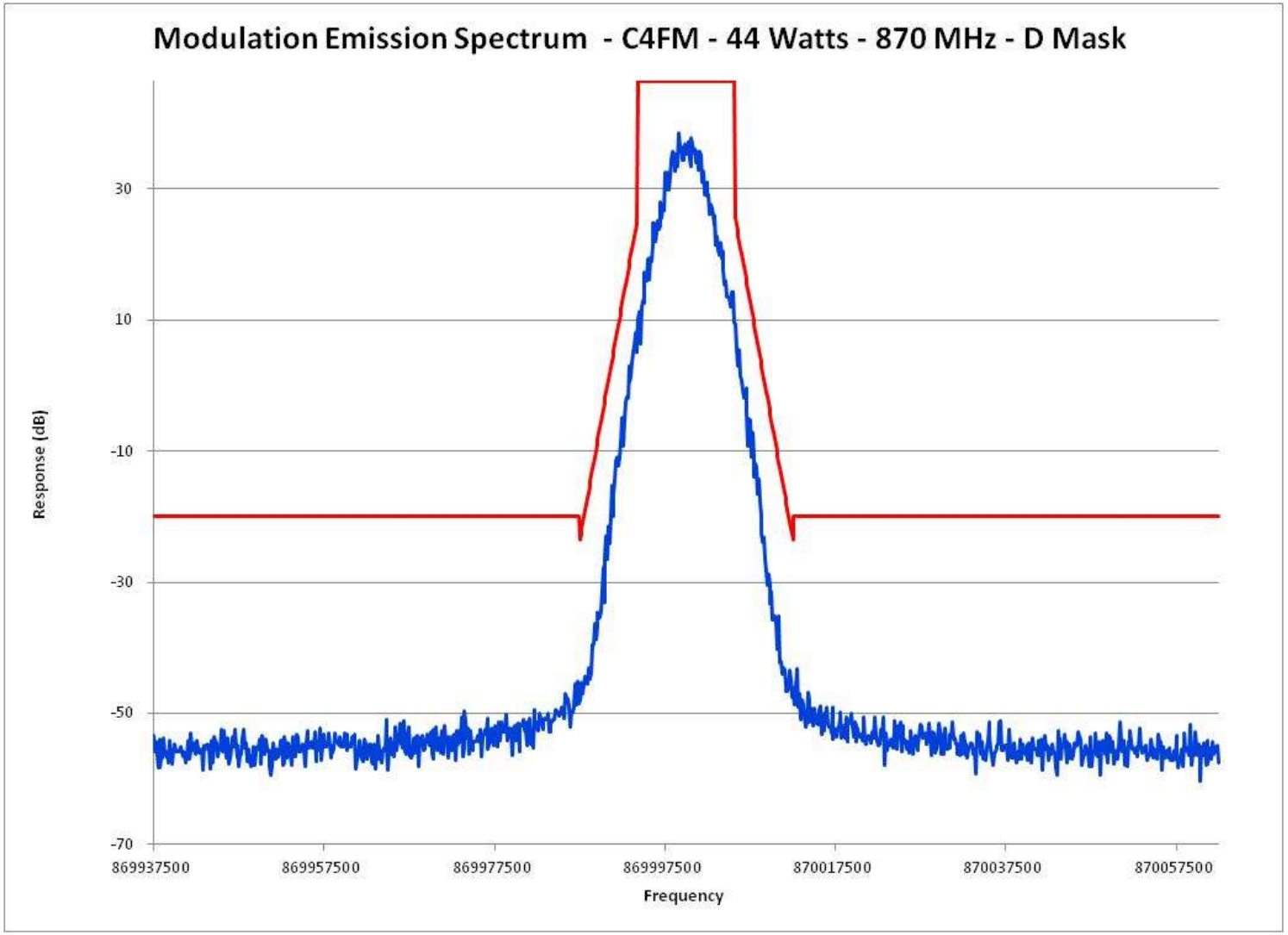
Report on Test Measurements

Occupied Bandwidth – Compatible 4-Level Frequency Modulation (C4FM) – Emission Designator: 8K10D1E, 8K10D1D, 8K10D1W, Middle of Band



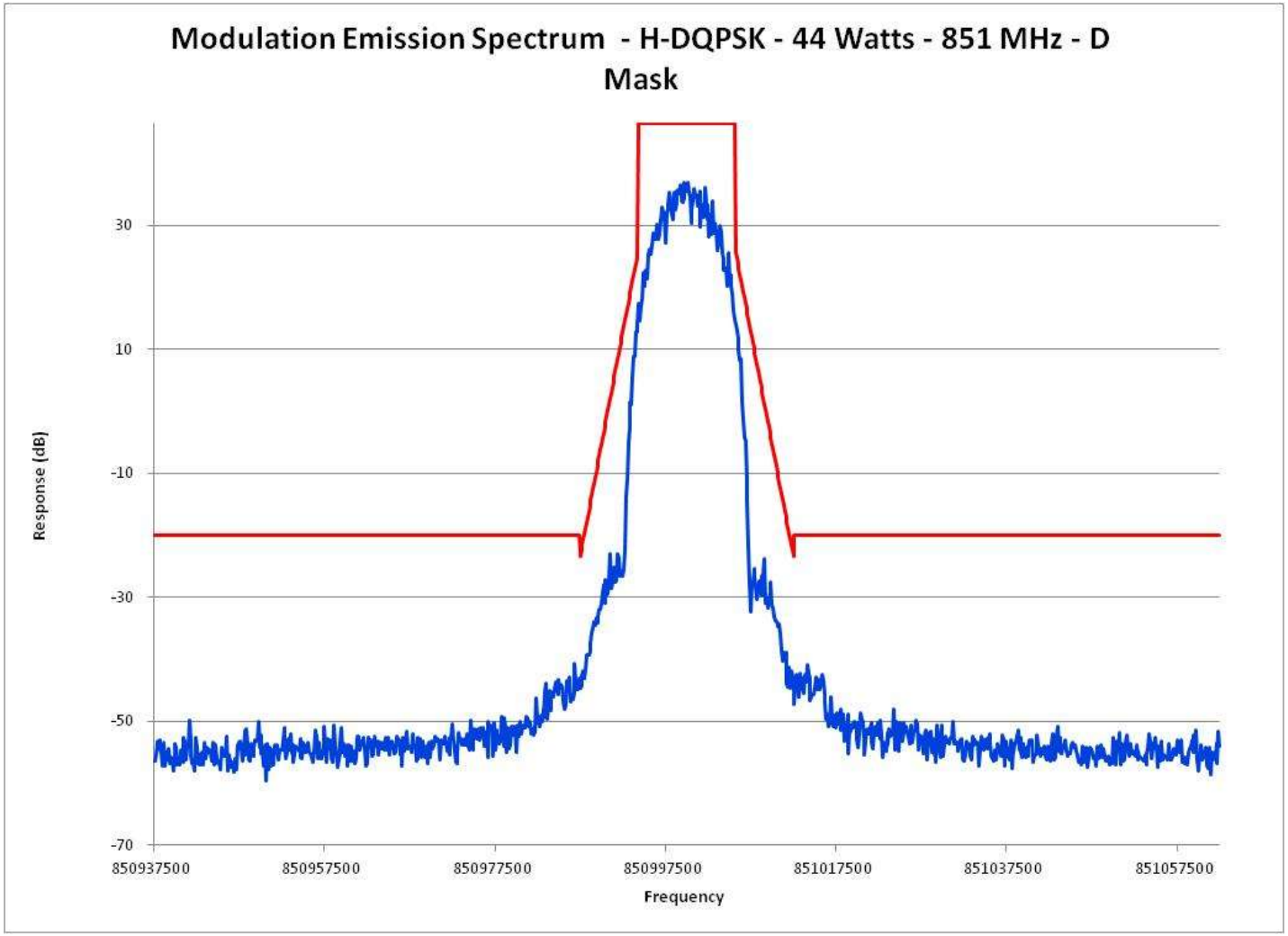
Report on Test Measurements

Occupied Bandwidth – Compatible 4-Level Frequency Modulation (C4FM) – Emission Designator: 8K10D1E, 8K10D1D, 8K10D1W, High End of Band



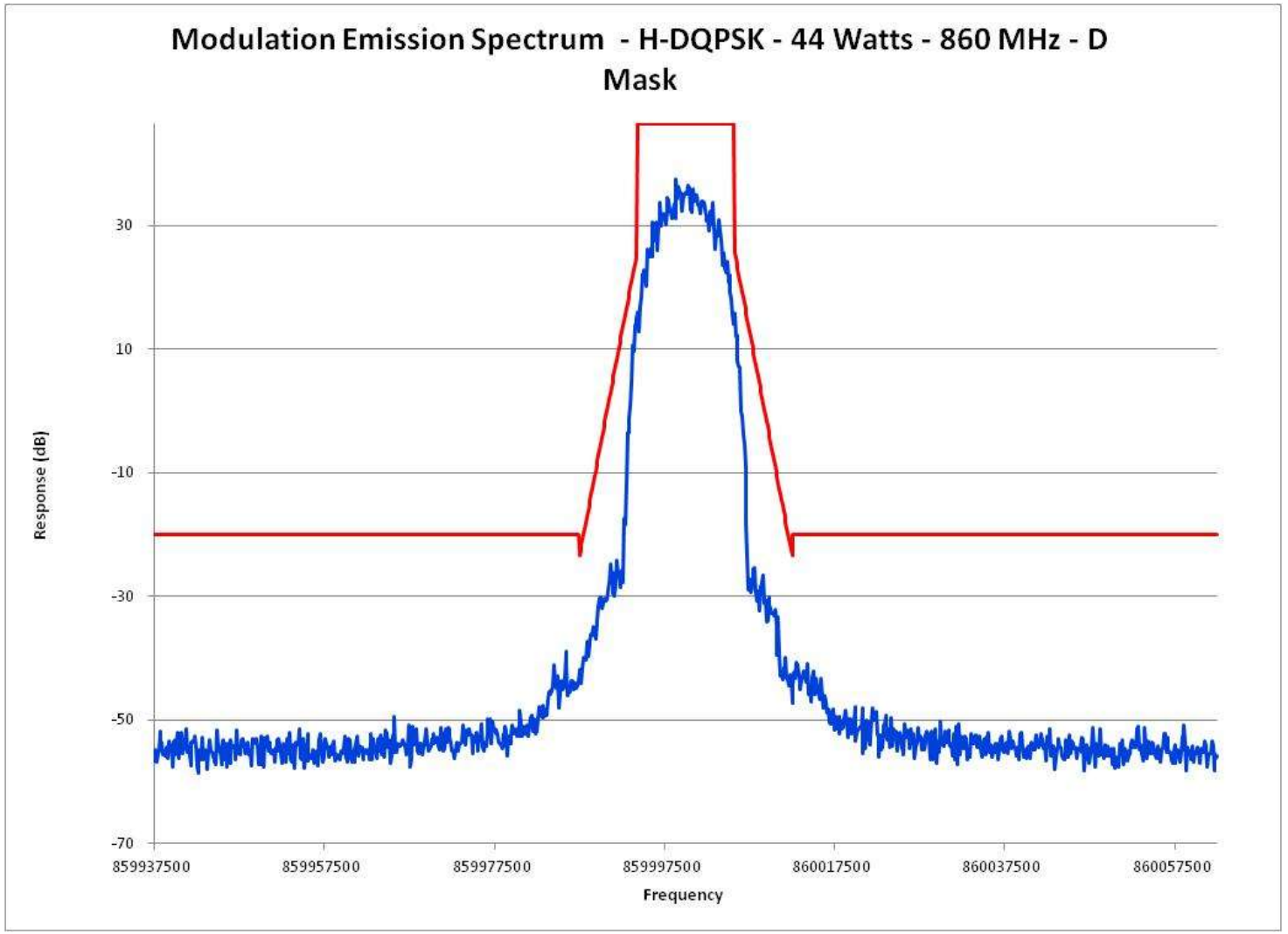
Report on Test Measurements

Occupied Bandwidth – H-DQPSK, P25 Two Slot TDMA Digital Modulation – Emission Designator: 9K80D7E, 9K80D7D, 9K80D7W, Low End of Band



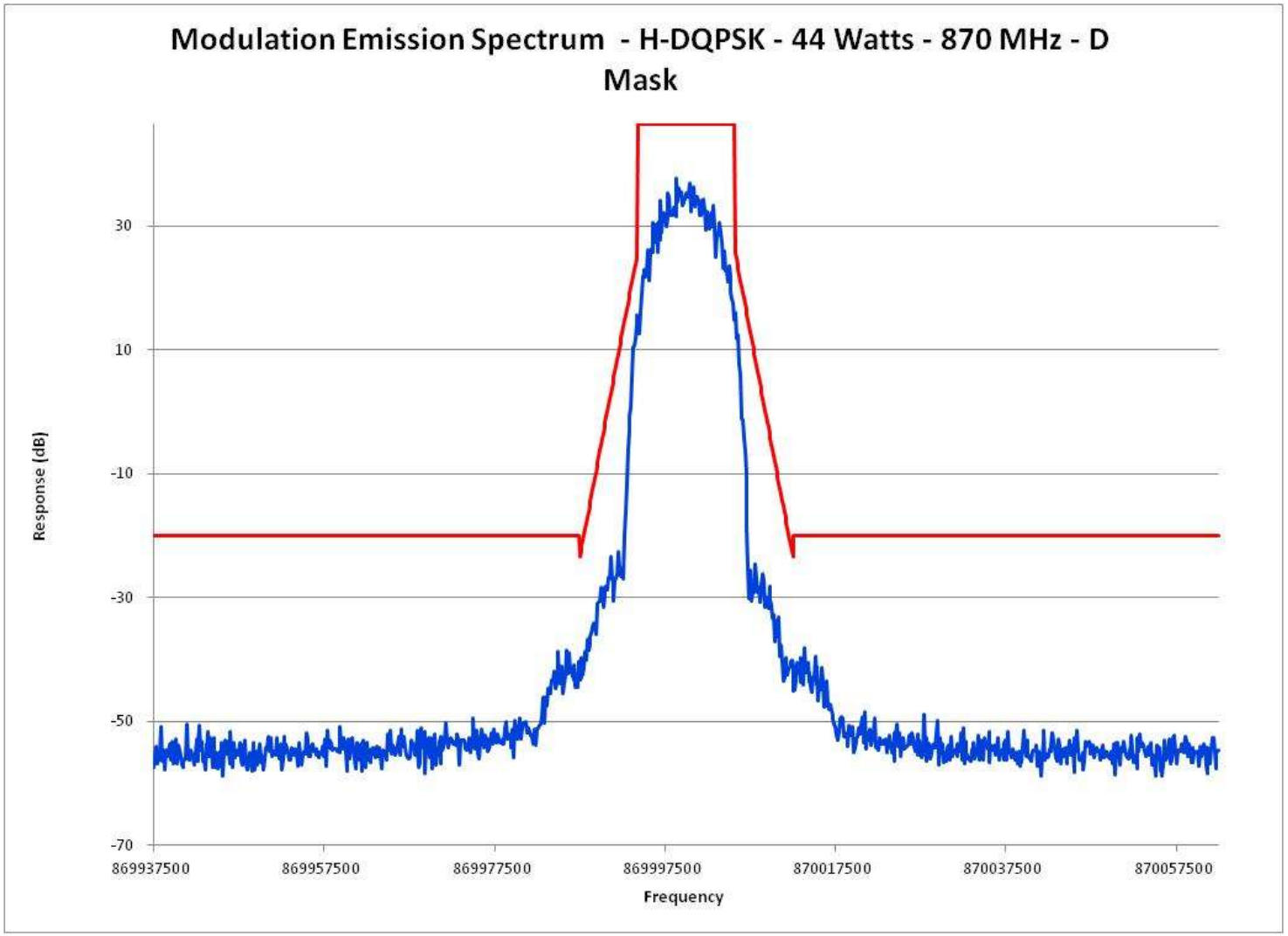
Report on Test Measurements

Occupied Bandwidth – H-DQPSK, P25 Two Slot TDMA Digital Modulation – Emission Designator: 9K80D7E, 9K80D7D, 9K80D7W, Middle of Band



Report on Test Measurements

Occupied Bandwidth – H-DQPSK, P25 Two Slot TDMA Digital Modulation – Emission Designator: 9K80D7E, 9K80D7D, 9K80D7W, High End of Band



Report on Test Measurements

Conducted Spurious Emissions – Harmonics and Emission Spectrum

Specification Requirement 47 CFR §90.210(d) and IC RSS-119 section 5.8.3 - Emission Limits – "D-Mask":
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 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.*

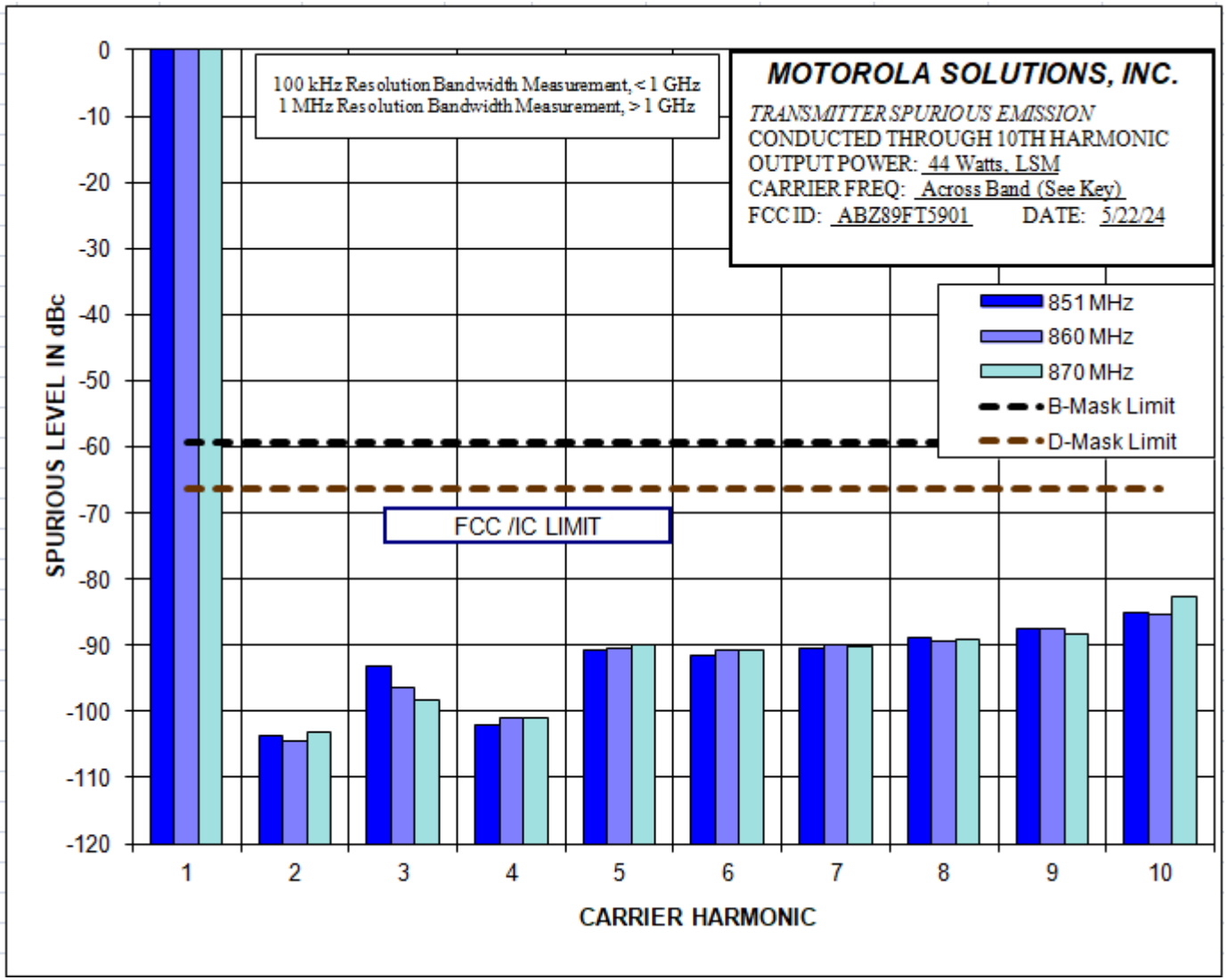
Modulation: Linear Simulcast Modulation (LSM), Compatible 4-Level Frequency Modulation (C4FM) or P25 Two Slot TDMA Digital Modulation (H-DQPSK) as indicated

Carrier Frequencies: Carrier frequencies of 851, 860, and 870 MHz were measured for conducted carrier harmonics and conducted emission. These frequencies represent the low end, center, and high end of the 851-870 MHz band, and are representative of the full operating band.

EXHIBIT	DESCRIPTION
E1-3.1	Conducted Spurious Harmonic Emissions, Power Output 44 Watts (Average), LSM The specification limit is -66.4 dBc (-20dBm)
E1-3.2	Conducted Spurious Harmonic Emissions, Power Output 2 Watts (Average), LSM The specification limit is -53.0 dBc (-20dBm)
E1-3.3	Conducted Spurious Harmonic Emissions, Power Output 44 Watts, C4FM The specification limit is -66.4 dBc (-20dBm)
E1-3.4	Conducted Spurious Harmonic Emissions, Power Output 2 Watts, C4FM The specification limit is -53.0 dBc (-20dBm)
E1-3.5	Conducted Spurious Harmonic Emissions, Power Output 44 Watts, H-DQPSK The specification limit is -66.4 dBc (-20dBm)
E1-3.6	Conducted Spurious Harmonic Emissions, Power Output 2 Watts, H-DQPSK The specification limit is -53.0 dBc (-20dBm)
E1-3.7, 8, 9	Conducted Spurious Emission Spectrum, 200 MHz Span, Power Output at 44 Watts, LSM The specification limit is -66.4 dBc (-20dBm)
E1-3.10, 11, 12	Conducted Spurious Emission Spectrum, 200 MHz Span, Power Output at 44 Watts, C4FM The specification limit is -66.4 dBc (-20dBm)
E1-3.13,14, 15	Conducted Spurious Emission Spectrum, 200 MHz Span, Power Output at 44 Watts, H-DQPSK The specification limit is -66.4 dBc (-20dBm)

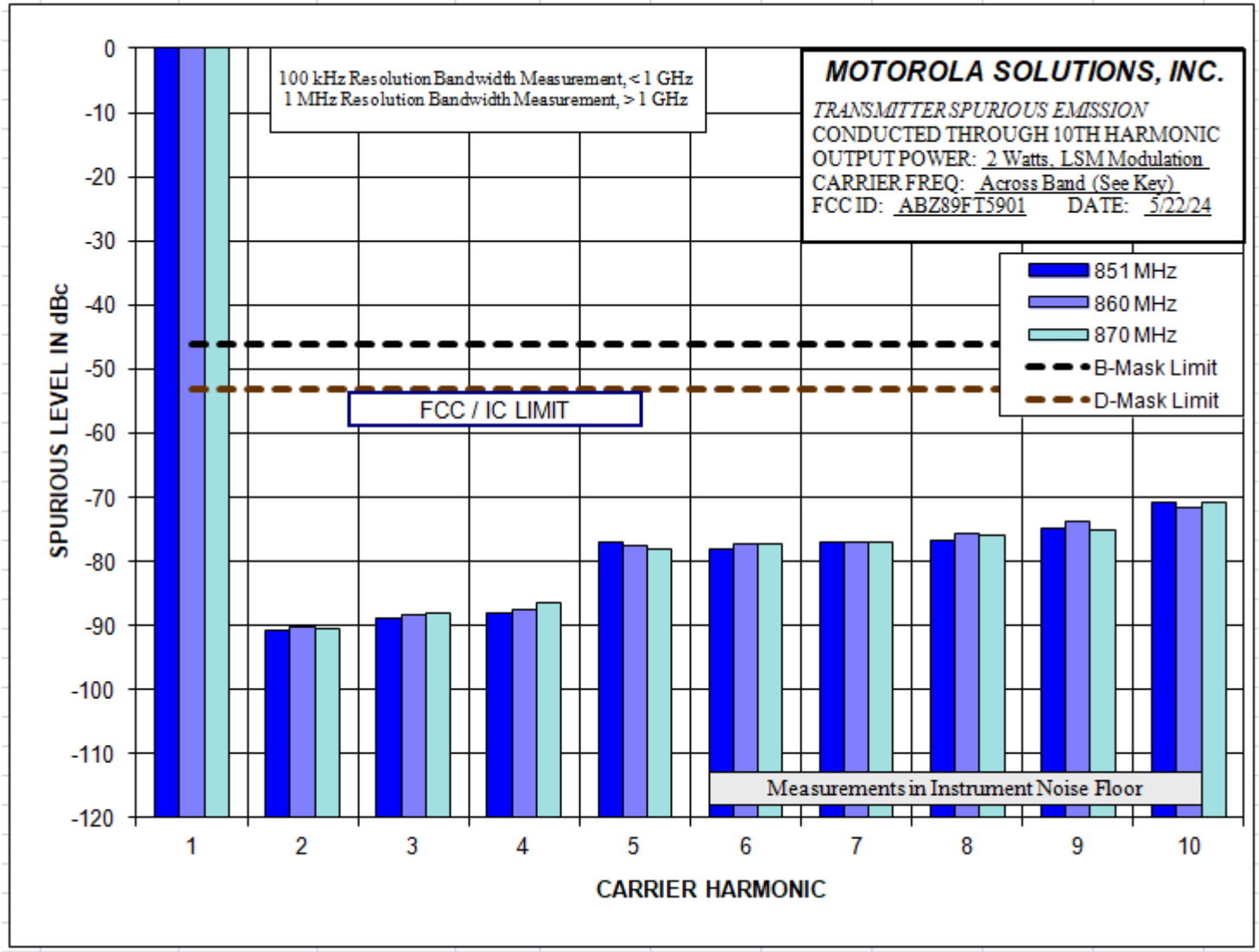
Report on Test Measurements

Conducted Spurious Harmonic Emissions – 44 Watts (Average) LSM



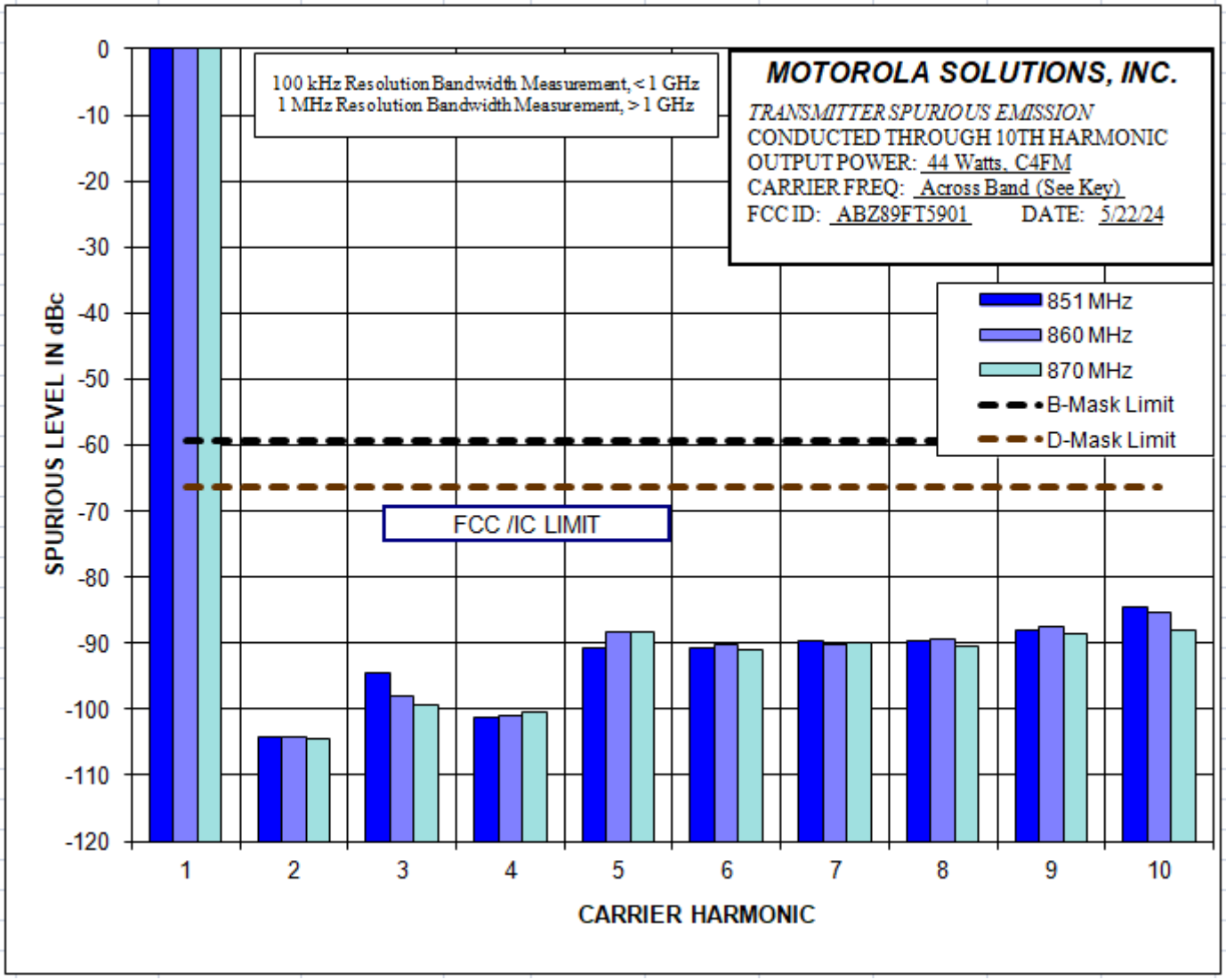
Report on Test Measurements

Conducted Spurious Harmonic Emissions – 2 Watts (Average) LSM



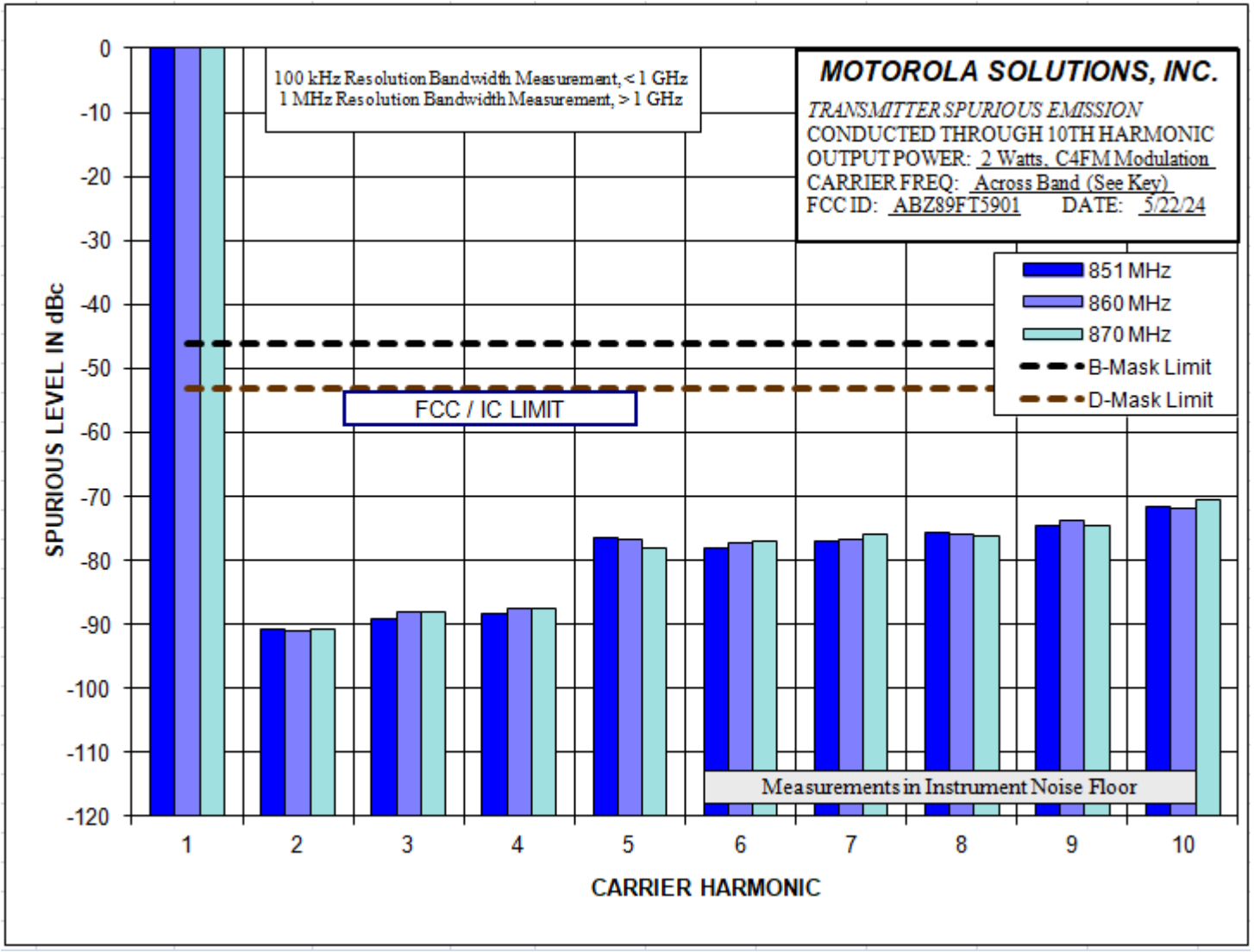
Report on Test Measurements

Conducted Spurious Harmonic Emissions – 44 Watts C4FM



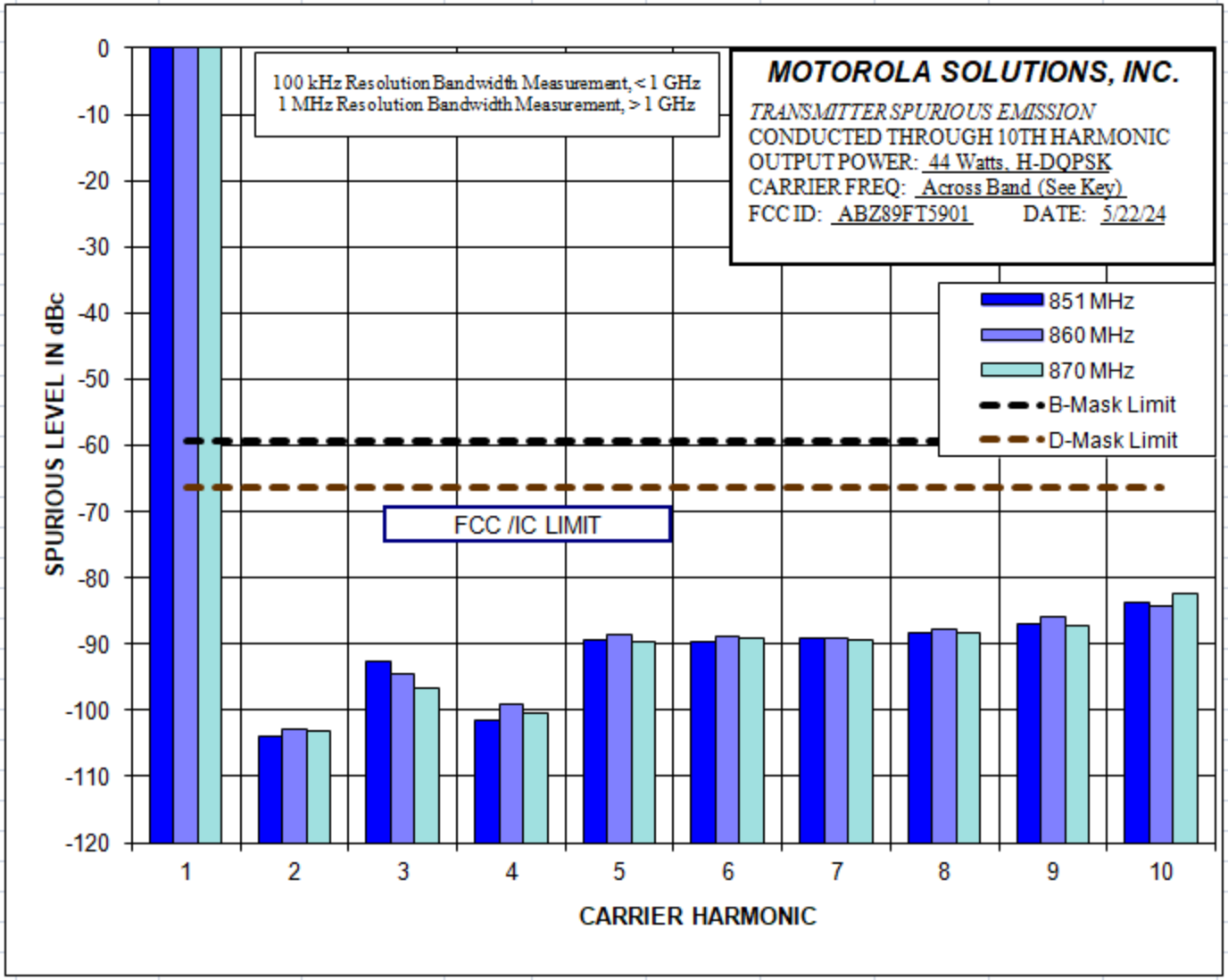
Report on Test Measurements

Conducted Spurious Harmonic Emissions – 2 Watts C4FM



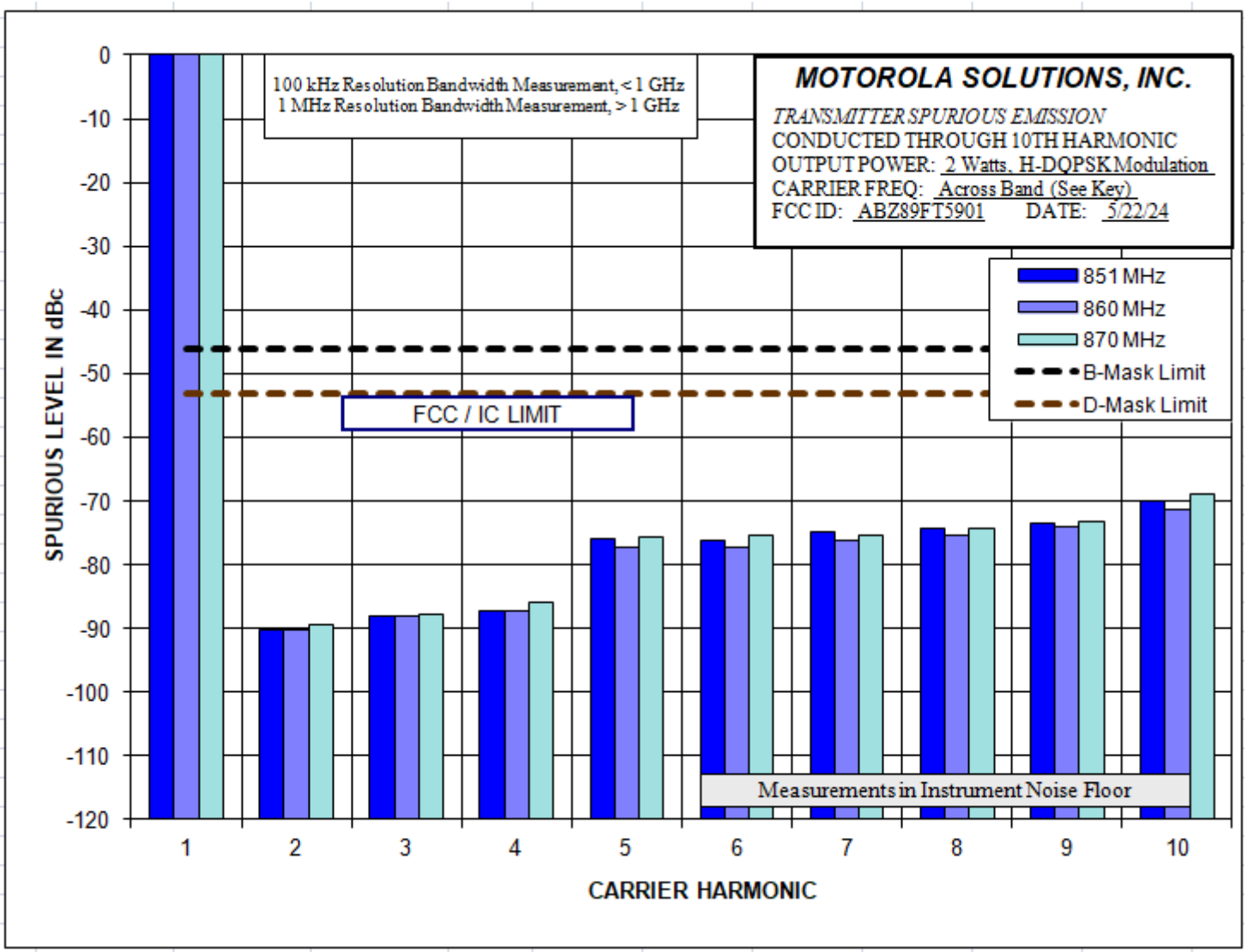
Report on Test Measurements

Conducted Spurious Harmonic Emissions – 44 Watts H-DQPSK



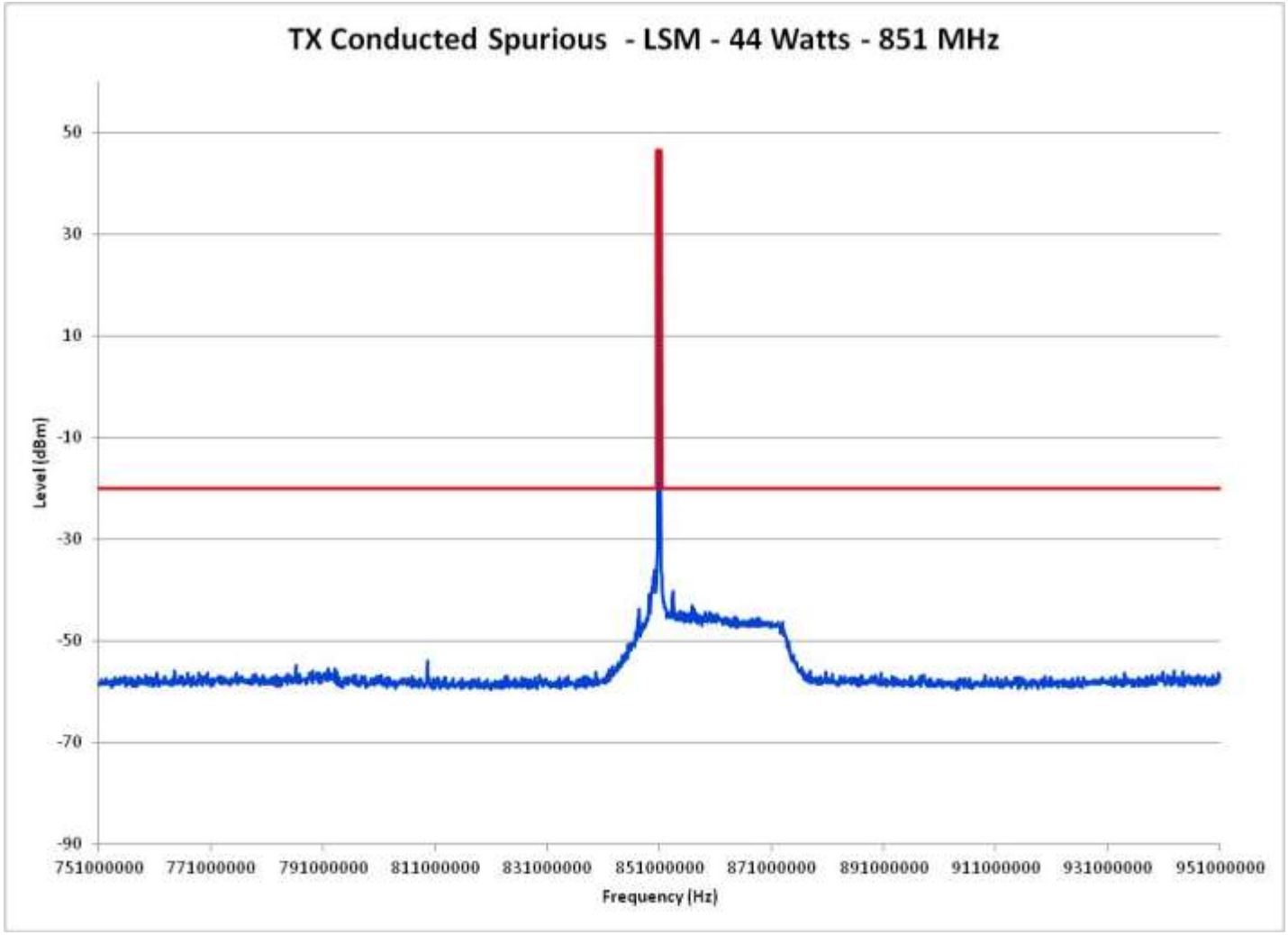
Report on Test Measurements

Conducted Spurious Harmonic Emissions – 2 Watts H-DQPSK



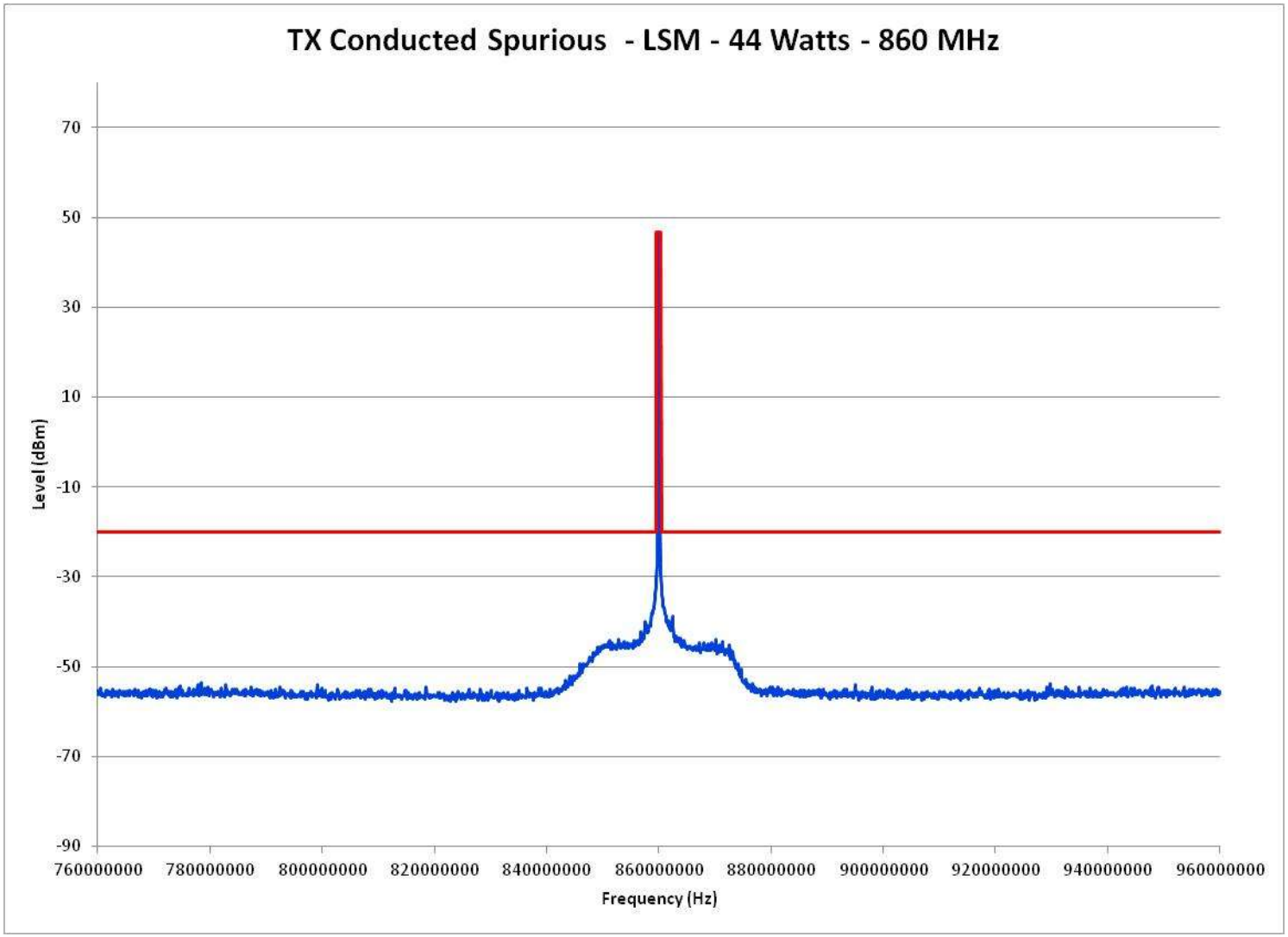
Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts (Average) LSM – 200 MHz Span – Low End of Band



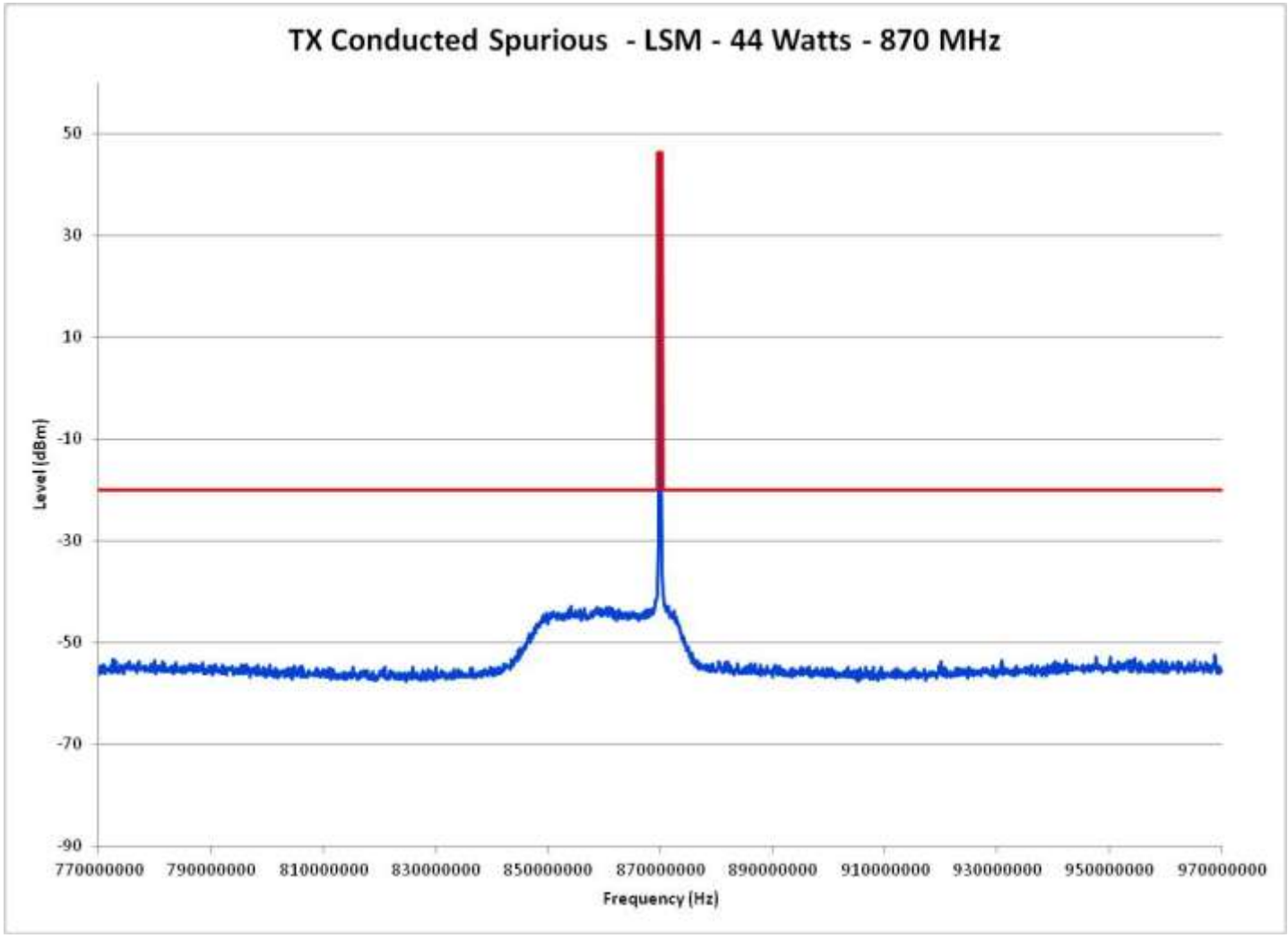
Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts (Average) LSM – 200 MHz Span – Middle of Band



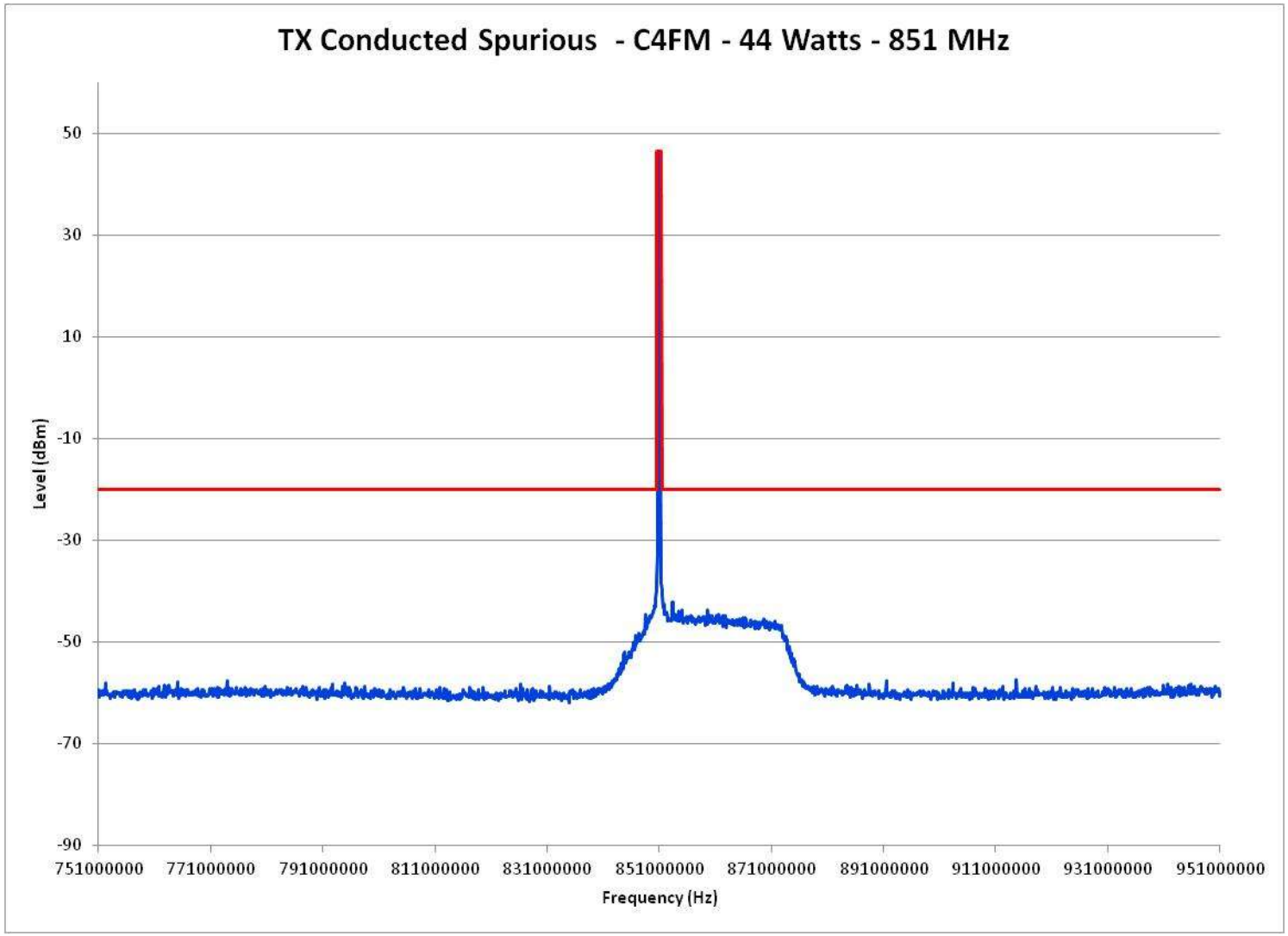
Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts (Average) LSM – 200 MHz Span – High End of Band



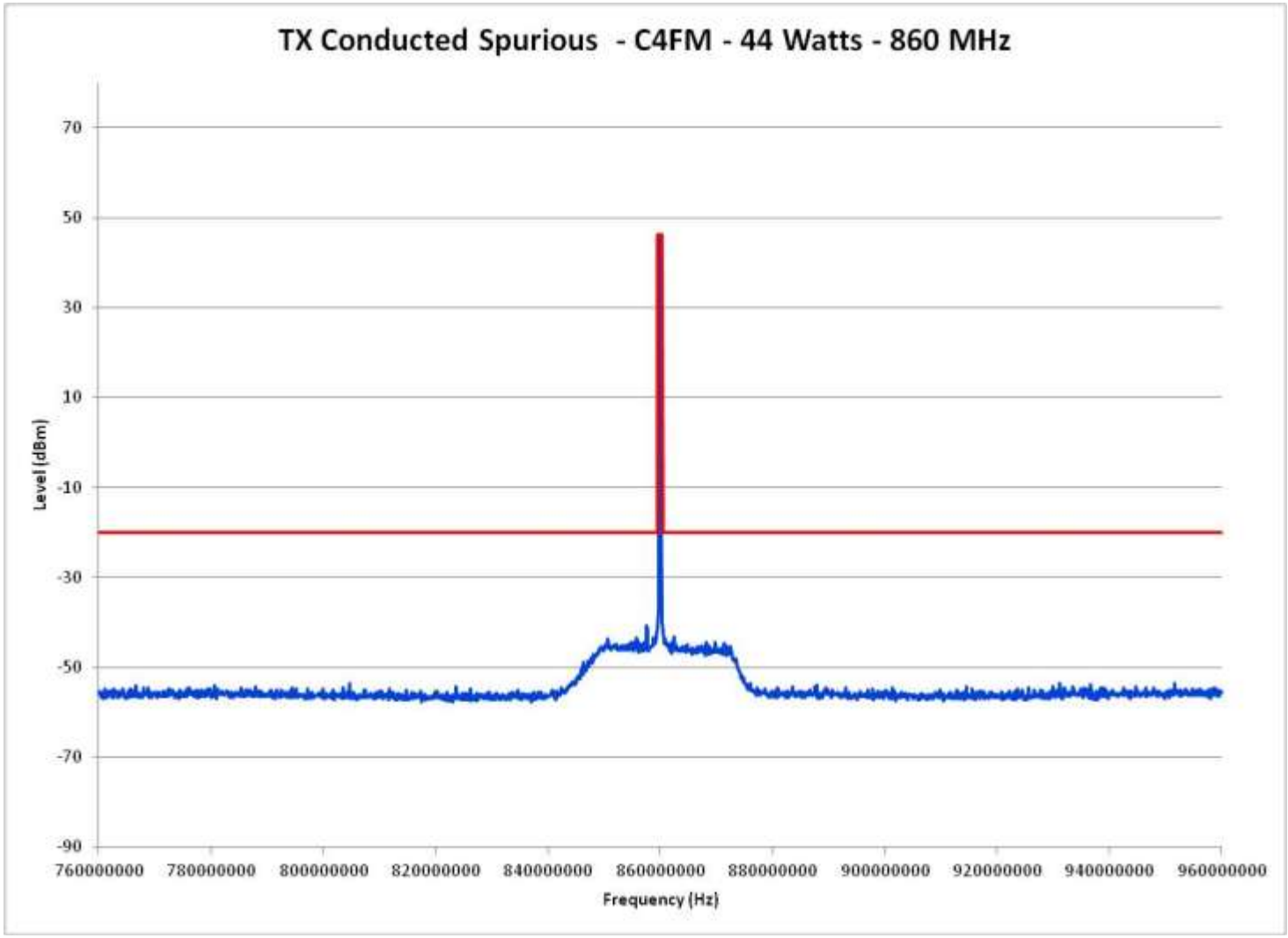
Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts C4FM – 200 MHz Span – Low End of Band



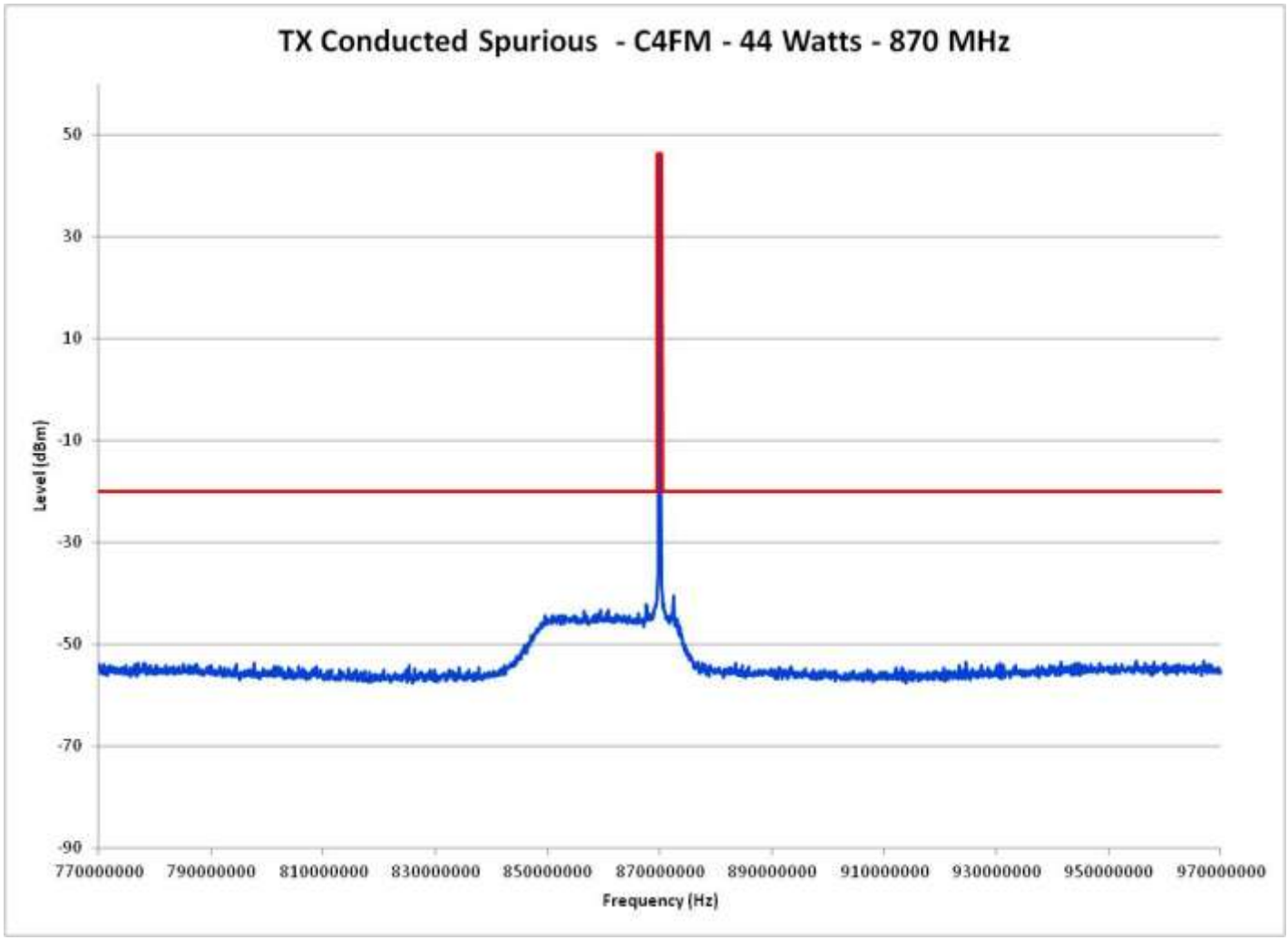
Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts C4FM – 200 MHz Span – Middle of Band



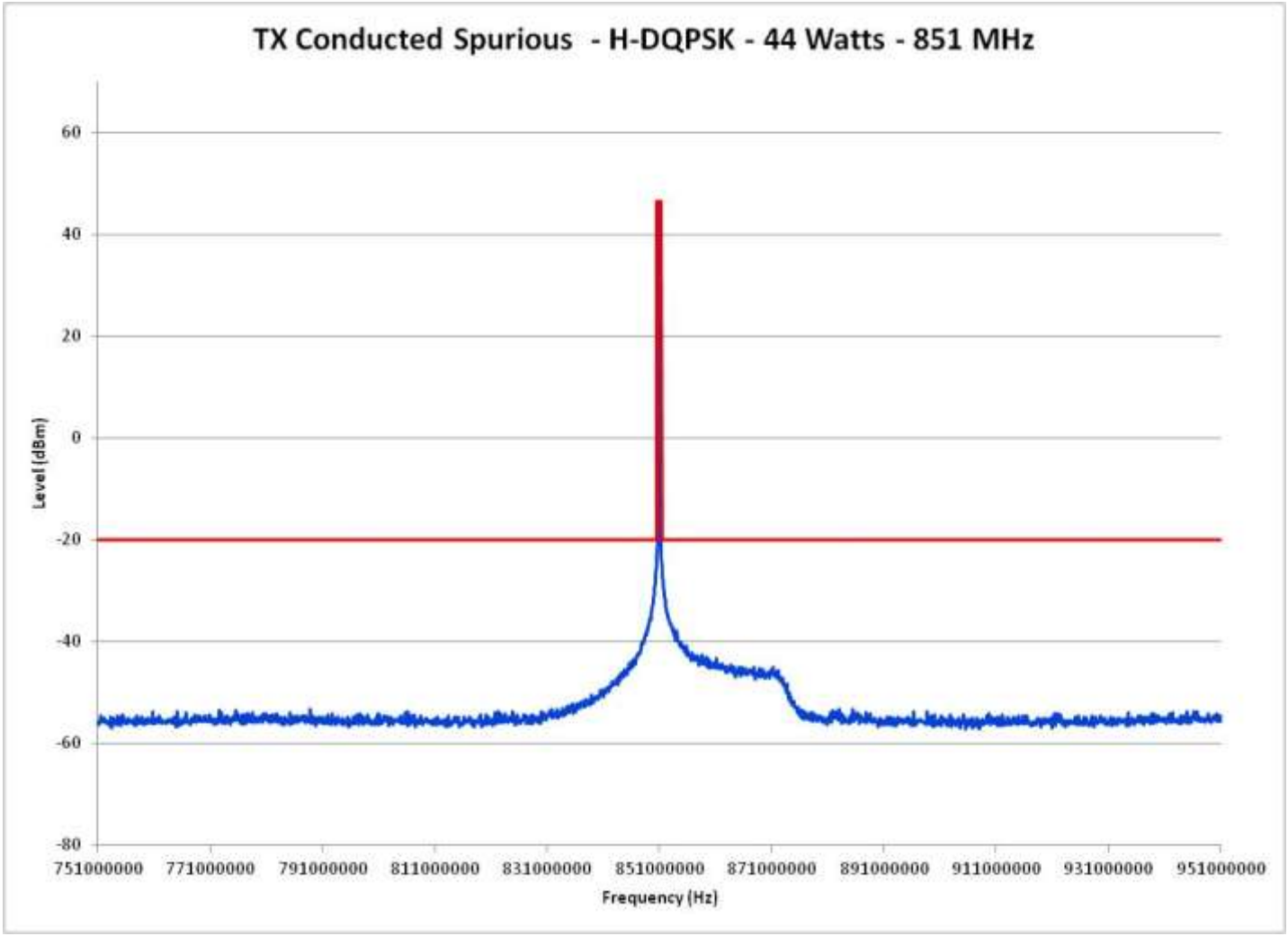
Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts C4FM – 200 MHz Span – High End of Band



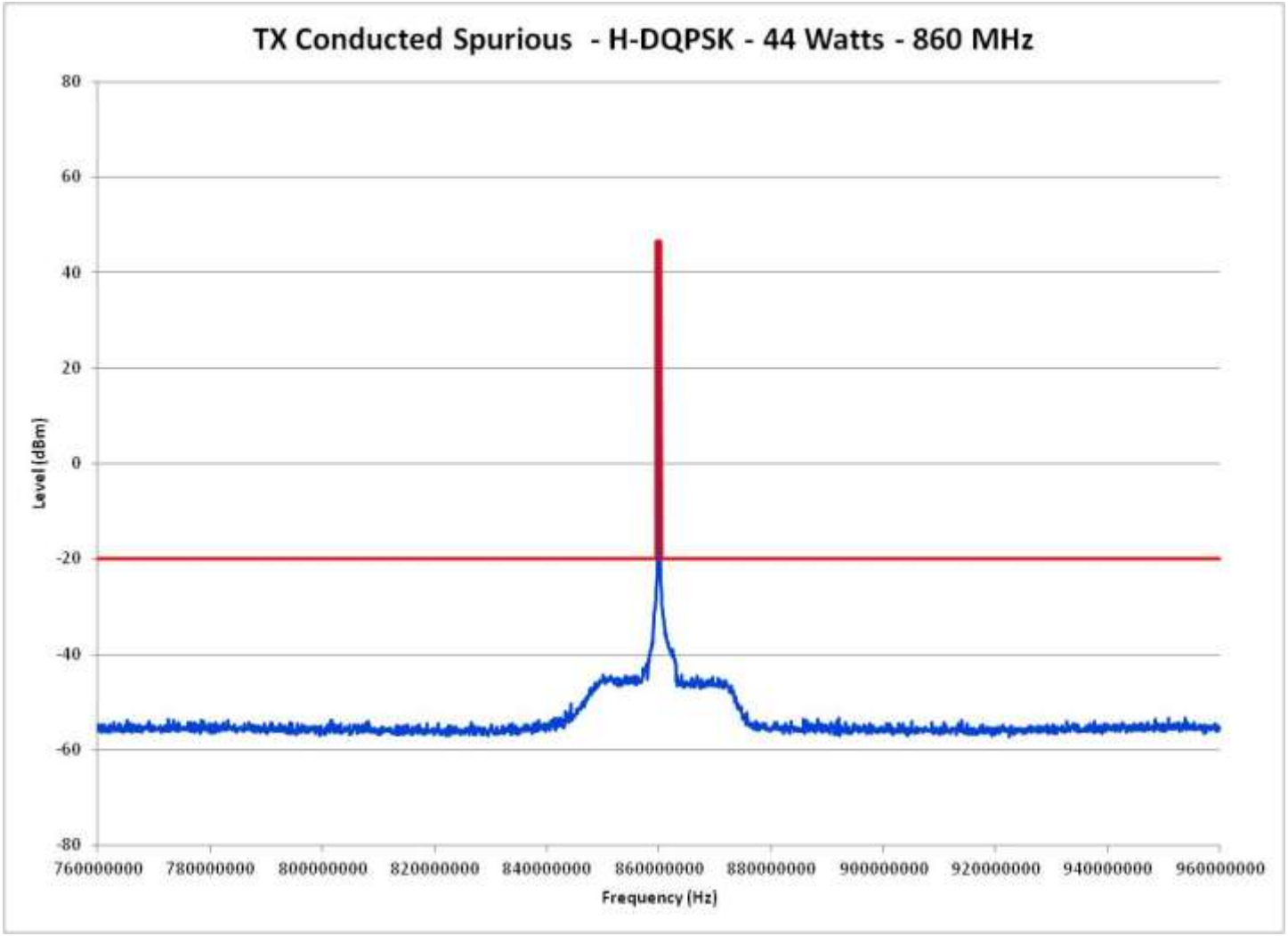
Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts H-DQPSK P25 Two Slot TDMA – 200 MHz Span – Low End of Band



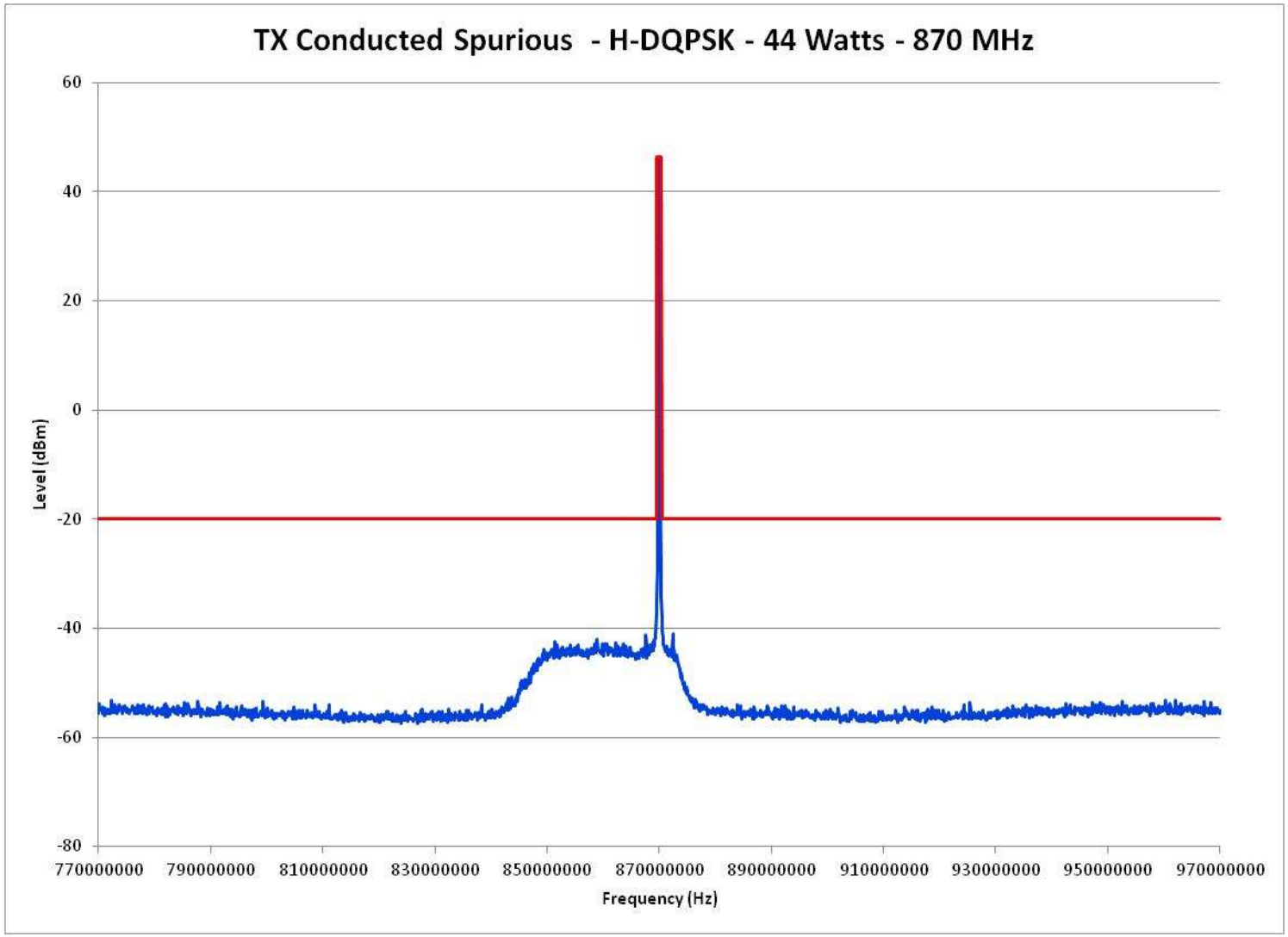
Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts H-DQPSK P25 Two Slot TDMA – 200 MHz Span – Middle of Band



Report on Test Measurements

Conducted Spurious Emission Spectrum – 44 Watts H-DQPSK P25 Two Slot TDMA – 200 MHz Span – High End of Band



Report on Test Measurements

Radiated Spurious Emissions, Harmonics

Specification Requirement 47 CFR §90.210(d) and IC RSS-119 section 5.8.3 - Emission Limits – "D-Mask":
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:
(2) 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.*

Modulation: Linear Simulcast Modulation (LSM), Compatible 4-Level Frequency Modulation (C4FM) or P25 Two Slot TDMA Digital Modulation (H-DQPSK) as indicated

Carrier Frequencies: Radiated Spurious Emissions was run with 9 carriers transmitting at 44W and 2W per carrier. Frequencies tested were 851 (C4FM), 852 (LSM), 853 (H-DQPSK), 860 (C4FM), 861 (LSM), 862 (H-DQPSK), 868 (C4FM), 869 (LSM), 870 (H-DQPSK). These frequencies represent the low end, center, and high end of the 851-870 MHz band, and are representative of the full operating band.

EXHIBIT	DESCRIPTION
E1-4.1	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 851MHz, C4FM
E1-4.2	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 851 MHz, C4FM
E1-4.3	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 852 MHz, LSM
E1-4.4	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 852 MHz, LSM
E1-4.5	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 853 MHz, H-DQPSK
E1-4.6	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 853 MHz, H-DQPSK
E1-4.7	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 860MHz, C4FM
E1-4.8	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 860 MHz, C4FM
E1-4.9	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 861 MHz, LSM
E1-4.10	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 861 MHz, LSM
E1-4.11	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 862 MHz, H-DQPSK
E1-4.12	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 862 MHz, H-DQPSK
E1-4.13	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 868MHz, C4FM
E1-4.14	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 868 MHz, C4FM
E1-4.15	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 869 MHz, LSM
E1-4.16	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 869 MHz, LSM
E1-4.17	Radiated Spurious Harmonic Emissions, Power Output 44 Watts (Average), 870 MHz, H-DQPSK
E1-4.18	Radiated Spurious Harmonic Emissions, Power Output 2 Watts (Average), 870 MHz, H-DQPSK

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 851MHz, C4FM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	851MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1702.00	H	13.09		-53.13	4.28	2.28	-51.14	97.57	66.43
1702.00	V	13.95		-50.88	4.28	2.28	-48.89	95.32	66.43
2553.00	H	21.40	Ambient	-40.29	3.08	2.85	-40.06	86.49	66.43
2553.00	V	22.00	Ambient	-39.55	3.08	2.85	-39.31	85.74	66.43
3404.00	H	20.16	Ambient	-41.14	5.66	3.31	-38.80	85.23	66.43
3404.00	V	20.07	Ambient	-41.51	5.66	3.31	-39.17	85.60	66.43
4255.00	H	23.12	Ambient	-36.92	6.99	3.67	-33.61	80.04	66.43
4255.00	V	23.48	Ambient	-36.51	6.99	3.67	-33.20	79.63	66.43
5106.00	H	25.90	Ambient	-32.51	7.80	3.98	-28.70	75.13	66.43
5106.00	V	25.26	Ambient	-32.98	7.80	3.98	-29.17	75.60	66.43
5957.00	H	24.69	Ambient	-33.49	8.23	4.33	-29.60	76.03	66.43
5957.00	V	24.92	Ambient	-33.11	8.23	4.33	-29.22	75.65	66.43
6808.00	H	26.38	Ambient	-30.83	8.82	4.72	-26.73	73.16	66.43
6808.00	V	25.51	Ambient	-32.18	8.82	4.72	-28.07	74.51	66.43
7659.00	H	24.94	Ambient	-32.88	10.06	5.07	-27.89	74.33	66.43
7659.00	V	25.18	Ambient	-33.08	10.06	5.07	-28.10	74.53	66.43
8510.00	H	25.59	Ambient	-31.91	10.93	5.20	-26.18	72.61	66.43
8510.00	V	25.08	Ambient	-32.69	10.93	5.20	-26.96	73.39	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 2 Watts (Average), 851MHz, C4FM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	851MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1702.00	H	12.52	Ambient	-53.70	4.28	2.28	-51.71	84.72	53.01
1702.00	V	12.12	Ambient	-52.71	4.28	2.28	-50.72	83.73	53.01
2553.00	H	22.08	Ambient	-39.61	3.08	2.85	-39.38	72.39	53.01
2553.00	V	23.71	Ambient	-37.84	3.08	2.85	-37.60	70.61	53.01
3404.00	H	21.63	Ambient	-39.67	5.66	3.31	-37.33	70.34	53.01
3404.00	V	22.07	Ambient	-39.51	5.66	3.31	-37.17	70.18	53.01
4255.00	H	23.38	Ambient	-36.66	6.99	3.67	-33.35	66.36	53.01
4255.00	V	23.08	Ambient	-36.91	6.99	3.67	-33.60	66.61	53.01
5106.00	H	25.64	Ambient	-32.77	7.80	3.98	-28.96	61.97	53.01
5106.00	V	25.51	Ambient	-32.73	7.80	3.98	-28.92	61.93	53.01
5957.00	H	23.93	Ambient	-34.25	8.23	4.33	-30.36	63.37	53.01
5957.00	V	25.35	Ambient	-32.68	8.23	4.33	-28.79	61.80	53.01
6808.00	H	25.05	Ambient	-32.16	8.82	4.72	-28.06	61.07	53.01
6808.00	V	25.57	Ambient	-32.12	8.82	4.72	-28.01	61.02	53.01
7659.00	H	24.55	Ambient	-33.27	10.06	5.07	-28.28	61.29	53.01
7659.00	V	24.81	Ambient	-33.45	10.06	5.07	-28.47	61.48	53.01
8510.00	H	25.43	Ambient	-32.07	10.93	5.20	-26.34	59.35	53.01
8510.00	V	26.26	Ambient	-31.51	10.93	5.20	-25.78	58.79	53.01

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 852MHz, LSM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	852MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1704.00	H	17.14		-49.05	4.27	2.28	-47.06	93.50	66.43
1704.00	V	17.13		-47.66	4.27	2.28	-45.67	92.11	66.43
2556.00	H	18.14	Ambient	-43.55	3.09	2.85	-43.31	89.74	66.43
2556.00	V	18.26	Ambient	-43.28	3.09	2.85	-43.04	89.48	66.43
3408.00	H	18.99	Ambient	-42.31	5.66	3.32	-39.97	86.40	66.43
3408.00	V	18.86	Ambient	-42.69	5.66	3.32	-40.35	86.78	66.43
4260.00	H	21.40	Ambient	-38.63	7.00	3.68	-35.31	81.75	66.43
4260.00	V	20.36	Ambient	-39.63	7.00	3.68	-36.31	82.74	66.43
5112.00	H	23.99	Ambient	-34.42	7.80	3.99	-30.61	77.04	66.43
5112.00	V	22.39	Ambient	-35.86	7.80	3.99	-32.04	78.48	66.43
5964.00	H	22.87	Ambient	-35.32	8.23	4.33	-31.42	77.85	66.43
5964.00	V	22.85	Ambient	-35.18	8.23	4.33	-31.28	77.71	66.43
6816.00	H	23.67	Ambient	-33.57	8.84	4.72	-29.46	75.89	66.43
6816.00	V	23.13	Ambient	-34.58	8.84	4.72	-30.47	76.90	66.43
7668.00	H	22.10	Ambient	-35.74	10.07	5.07	-30.74	77.18	66.43
7668.00	V	22.78	Ambient	-35.49	10.07	5.07	-30.49	76.93	66.43
8520.00	H	23.03	Ambient	-34.46	10.93	5.20	-28.73	75.16	66.43
8520.00	V	22.40	Ambient	-35.34	10.93	5.20	-29.60	76.04	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 2 Watts (Average), 852MHz, LSM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	852MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1704.00	H	12.01	Ambient	-54.18	4.27	2.28	-52.19	85.20	53.01
1704.00	V	12.00	Ambient	-52.79	4.27	2.28	-50.80	83.81	53.01
2556.00	H	20.99	Ambient	-40.70	3.09	2.85	-40.46	73.47	53.01
2556.00	V	21.68	Ambient	-39.86	3.09	2.85	-39.62	72.63	53.01
3408.00	H	21.45	Ambient	-39.85	5.66	3.32	-37.51	70.52	53.01
3408.00	V	21.47	Ambient	-40.08	5.66	3.32	-37.74	70.75	53.01
4260.00	H	22.56	Ambient	-37.47	7.00	3.68	-34.15	67.16	53.01
4260.00	V	22.53	Ambient	-37.46	7.00	3.68	-34.14	67.15	53.01
5112.00	H	25.22	Ambient	-33.19	7.80	3.99	-29.38	62.39	53.01
5112.00	V	25.61	Ambient	-32.64	7.80	3.99	-28.82	61.83	53.01
5964.00	H	24.84	Ambient	-33.35	8.23	4.33	-29.45	62.46	53.01
5964.00	V	24.16	Ambient	-33.87	8.23	4.33	-29.97	62.98	53.01
6816.00	H	25.02	Ambient	-32.22	8.84	4.72	-28.11	61.12	53.01
6816.00	V	24.65	Ambient	-33.06	8.84	4.72	-28.95	61.96	53.01
7668.00	H	24.88	Ambient	-32.96	10.07	5.07	-27.96	60.97	53.01
7668.00	V	24.52	Ambient	-33.75	10.07	5.07	-28.75	61.76	53.01
8520.00	H	25.07	Ambient	-32.42	10.93	5.20	-26.69	59.70	53.01
8520.00	V	25.60	Ambient	-32.14	10.93	5.20	-26.40	59.41	53.01

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 853MHz, H-DQPSK

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	853MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1706.00	H	15.65		-50.51	4.26	2.28	-48.53	94.96	66.43
1706.00	V	16.16		-48.58	4.26	2.28	-46.60	93.04	66.43
2559.00	H	23.76	Ambient	-37.92	3.09	2.85	-37.68	84.11	66.43
2559.00	V	23.94	Ambient	-37.60	3.09	2.85	-37.36	83.79	66.43
3412.00	H	21.98	Ambient	-39.33	5.67	3.32	-36.98	83.41	66.43
3412.00	V	21.37	Ambient	-40.16	5.67	3.32	-37.81	84.25	66.43
4265.00	H	23.83	Ambient	-36.20	7.00	3.68	-32.87	79.30	66.43
4265.00	V	22.87	Ambient	-37.11	7.00	3.68	-33.79	80.22	66.43
5118.00	H	24.87	Ambient	-33.53	7.80	3.99	-29.73	76.16	66.43
5118.00	V	25.18	Ambient	-33.07	7.80	3.99	-29.26	75.70	66.43
5971.00	H	24.18	Ambient	-34.01	8.24	4.34	-30.11	76.54	66.43
5971.00	V	24.15	Ambient	-33.87	8.24	4.34	-29.97	76.41	66.43
6824.00	H	25.51	Ambient	-31.76	8.85	4.73	-27.64	74.07	66.43
6824.00	V	24.93	Ambient	-32.81	8.85	4.73	-28.69	75.12	66.43
7677.00	H	25.66	Ambient	-32.20	10.08	5.08	-27.20	73.63	66.43
7677.00	V	24.41	Ambient	-33.86	10.08	5.08	-28.86	75.30	66.43
8530.00	H	25.28	Ambient	-32.21	10.94	5.20	-26.47	72.90	66.43
8530.00	V	25.33	Ambient	-32.37	10.94	5.20	-26.63	73.07	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 2 Watts (Average), 853MHz, H-DQPSK

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	853MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1706.00	H	12.02	Ambient	-54.14	4.26	2.28	-52.16	85.17	53.01
1706.00	V	12.01	Ambient	-52.73	4.26	2.28	-50.75	83.76	53.01
2559.00	H	22.89	Ambient	-38.79	3.09	2.85	-38.55	71.56	53.01
2559.00	V	23.59	Ambient	-37.95	3.09	2.85	-37.71	70.72	53.01
3412.00	H	21.79	Ambient	-39.52	5.67	3.32	-37.17	70.18	53.01
3412.00	V	21.75	Ambient	-39.78	5.67	3.32	-37.43	70.44	53.01
4265.00	H	23.39	Ambient	-36.64	7.00	3.68	-33.31	66.32	53.01
4265.00	V	23.07	Ambient	-36.91	7.00	3.68	-33.59	66.60	53.01
5118.00	H	25.12	Ambient	-33.28	7.80	3.99	-29.48	62.49	53.01
5118.00	V	24.96	Ambient	-33.29	7.80	3.99	-29.48	62.49	53.01
5971.00	H	24.34	Ambient	-33.85	8.24	4.34	-29.95	62.96	53.01
5971.00	V	24.09	Ambient	-33.93	8.24	4.34	-30.03	63.04	53.01
6824.00	H	24.97	Ambient	-32.30	8.85	4.73	-28.18	61.19	53.01
6824.00	V	25.19	Ambient	-32.55	8.85	4.73	-28.43	61.44	53.01
7677.00	H	25.12	Ambient	-32.74	10.08	5.08	-27.74	60.75	53.01
7677.00	V	24.80	Ambient	-33.47	10.08	5.08	-28.47	61.48	53.01
8530.00	H	25.96	Ambient	-31.53	10.94	5.20	-25.79	58.80	53.01
8530.00	V	25.23	Ambient	-32.47	10.94	5.20	-26.73	59.74	53.01

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 860MHz, C4FM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	860MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1720.00	H	19.50		-46.44	4.20	2.29	-44.52	90.96	66.43
1720.00	V	20.50		-43.91	4.20	2.29	-42.00	88.44	66.43
2580.00	H	22.79	Ambient	-38.85	3.13	2.86	-38.59	85.02	66.43
2580.00	V	23.18	Ambient	-38.34	3.13	2.86	-38.08	84.51	66.43
3440.00	H	21.79	Ambient	-39.53	5.70	3.33	-37.16	83.59	66.43
3440.00	V	21.49	Ambient	-39.88	5.70	3.33	-37.51	83.95	66.43
4300.00	H	22.77	Ambient	-37.19	7.04	3.69	-33.84	80.27	66.43
4300.00	V	23.04	Ambient	-36.90	7.04	3.69	-33.55	79.98	66.43
5160.00	H	25.22	Ambient	-33.15	7.78	4.01	-29.37	75.81	66.43
5160.00	V	24.89	Ambient	-33.37	7.78	4.01	-29.60	76.03	66.43
6020.00	H	24.33	Ambient	-33.77	8.28	4.36	-29.85	76.28	66.43
6020.00	V	24.60	Ambient	-33.40	8.28	4.36	-29.48	75.91	66.43
6880.00	H	24.67	Ambient	-32.80	8.94	4.75	-28.61	75.05	66.43
6880.00	V	24.73	Ambient	-33.19	8.94	4.75	-29.00	75.44	66.43
7740.00	H	24.92	Ambient	-33.06	10.14	5.10	-28.03	74.46	66.43
7740.00	V	25.02	Ambient	-33.28	10.14	5.10	-28.24	74.68	66.43
8600.00	H	25.60	Ambient	-31.86	10.98	5.20	-26.08	72.51	66.43
8600.00	V	25.32	Ambient	-32.16	10.98	5.20	-26.38	72.81	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 2 Watts (Average), 860MHz, C4FM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	860MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1720.00	H	12.05	Ambient	-53.89	4.20	2.29	-51.97	84.98	53.01
1720.00	V	12.29	Ambient	-52.12	4.20	2.29	-50.21	83.22	53.01
2580.00	H	23.48	Ambient	-38.16	3.13	2.86	-37.90	70.91	53.01
2580.00	V	22.76	Ambient	-38.76	3.13	2.86	-38.50	71.51	53.01
3440.00	H	21.58	Ambient	-39.74	5.70	3.33	-37.37	70.38	53.01
3440.00	V	21.23	Ambient	-40.14	5.70	3.33	-37.77	70.78	53.01
4300.00	H	23.01	Ambient	-36.95	7.04	3.69	-33.60	66.61	53.01
4300.00	V	22.75	Ambient	-37.19	7.04	3.69	-33.84	66.85	53.01
5160.00	H	24.71	Ambient	-33.66	7.78	4.01	-29.88	62.89	53.01
5160.00	V	24.89	Ambient	-33.37	7.78	4.01	-29.60	62.61	53.01
6020.00	H	24.40	Ambient	-33.70	8.28	4.36	-29.78	62.79	53.01
6020.00	V	24.13	Ambient	-33.87	8.28	4.36	-29.95	62.96	53.01
6880.00	H	25.29	Ambient	-32.18	8.94	4.75	-27.99	61.00	53.01
6880.00	V	24.85	Ambient	-33.07	8.94	4.75	-28.88	61.89	53.01
7740.00	H	24.74	Ambient	-33.24	10.14	5.10	-28.21	61.22	53.01
7740.00	V	24.66	Ambient	-33.64	10.14	5.10	-28.60	61.61	53.01
8600.00	H	25.27	Ambient	-32.19	10.98	5.20	-26.41	59.42	53.01
8600.00	V	25.23	Ambient	-32.25	10.98	5.20	-26.47	59.48	53.01

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 861MHz, LSM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	861MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1722.00	H	20.94		-44.96	4.19	2.29	-43.06	89.50	66.43
1722.00	V	23.57		-40.80	4.19	2.29	-38.90	85.33	66.43
2583.00	H	10.92	Ambient	-50.71	3.13	2.87	-50.45	96.88	66.43
2583.00	V	13.17		-48.35	3.13	2.87	-48.08	94.52	66.43
3444.00	H	19.28	Ambient	-42.04	5.71	3.33	-39.67	86.10	66.43
3444.00	V	19.32	Ambient	-42.03	5.71	3.33	-39.66	86.09	66.43
4305.00	H	21.23	Ambient	-38.72	7.04	3.69	-35.37	81.81	66.43
4305.00	V	21.29	Ambient	-38.64	7.04	3.69	-35.29	81.73	66.43
5166.00	H	23.24	Ambient	-35.13	7.78	4.01	-31.35	77.79	66.43
5166.00	V	24.06	Ambient	-34.21	7.78	4.01	-30.43	76.87	66.43
6027.00	H	22.41	Ambient	-35.66	8.29	4.36	-31.73	78.17	66.43
6027.00	V	22.39	Ambient	-35.61	8.29	4.36	-31.68	78.12	66.43
6888.00	H	22.75	Ambient	-34.75	8.95	4.75	-30.55	76.99	66.43
6888.00	V	22.92	Ambient	-35.03	8.95	4.75	-30.83	77.26	66.43
7749.00	H	22.45	Ambient	-35.55	10.14	5.10	-30.51	76.94	66.43
7749.00	V	23.04	Ambient	-35.26	10.14	5.10	-30.22	76.66	66.43
8610.00	H	23.23	Ambient	-34.23	10.98	5.20	-28.45	74.88	66.43
8610.00	V	23.61	Ambient	-33.84	10.98	5.20	-28.06	74.49	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 2 Watts (Average), 861MHz, LSM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	861MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1722.00	H	12.15	Ambient	-53.75	4.19	2.29	-51.85	84.86	53.01
1722.00	V	12.01	Ambient	-52.36	4.19	2.29	-50.46	83.47	53.01
2583.00	H	23.02	Ambient	-38.61	3.13	2.87	-38.35	71.36	53.01
2583.00	V	23.59	Ambient	-37.93	3.13	2.87	-37.66	70.67	53.01
3444.00	H	21.49	Ambient	-39.83	5.71	3.33	-37.46	70.47	53.01
3444.00	V	21.40	Ambient	-39.95	5.71	3.33	-37.58	70.59	53.01
4305.00	H	23.38	Ambient	-36.57	7.04	3.69	-33.22	66.23	53.01
4305.00	V	23.24	Ambient	-36.69	7.04	3.69	-33.34	66.35	53.01
5166.00	H	24.49	Ambient	-33.88	7.78	4.01	-30.10	63.11	53.01
5166.00	V	24.36	Ambient	-33.91	7.78	4.01	-30.13	63.14	53.01
6027.00	H	24.87	Ambient	-33.20	8.29	4.36	-29.27	62.28	53.01
6027.00	V	24.21	Ambient	-33.79	8.29	4.36	-29.86	62.87	53.01
6888.00	H	24.70	Ambient	-32.80	8.95	4.75	-28.60	61.61	53.01
6888.00	V	24.71	Ambient	-33.24	8.95	4.75	-29.04	62.05	53.01
7749.00	H	24.52	Ambient	-33.48	10.14	5.10	-28.44	61.45	53.01
7749.00	V	24.98	Ambient	-33.32	10.14	5.10	-28.28	61.29	53.01
8610.00	H	25.05	Ambient	-32.41	10.98	5.20	-26.63	59.64	53.01
8610.00	V	25.31	Ambient	-32.14	10.98	5.20	-26.36	59.37	53.01

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 862MHz, H-DQPSK

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	862MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1724.00	H	13.48		-52.39	4.19	2.29	-50.50	96.93	66.43
1724.00	V	20.05		-44.27	4.19	2.29	-42.38	88.81	66.43
2586.00	H	23.41	Ambient	-38.22	3.14	2.87	-37.95	84.38	66.43
2586.00	V	23.13	Ambient	-38.38	3.14	2.87	-38.11	84.55	66.43
3448.00	H	21.46	Ambient	-39.86	5.71	3.33	-37.49	83.92	66.43
3448.00	V	21.61	Ambient	-39.72	5.71	3.33	-37.34	83.78	66.43
4310.00	H	23.71	Ambient	-36.23	7.04	3.70	-32.88	79.32	66.43
4310.00	V	23.20	Ambient	-36.73	7.04	3.70	-33.38	79.81	66.43
5172.00	H	24.80	Ambient	-33.56	7.78	4.01	-29.79	76.23	66.43
5172.00	V	24.94	Ambient	-33.33	7.78	4.01	-29.56	76.00	66.43
6034.00	H	24.18	Ambient	-33.85	8.29	4.36	-29.92	76.36	66.43
6034.00	V	24.70	Ambient	-33.30	8.29	4.36	-29.37	75.80	66.43
6896.00	H	24.83	Ambient	-32.70	8.96	4.76	-28.49	74.93	66.43
6896.00	V	25.01	Ambient	-32.96	8.96	4.76	-28.75	75.19	66.43
7758.00	H	25.05	Ambient	-32.95	10.15	5.11	-27.91	74.34	66.43
7758.00	V	25.16	Ambient	-33.13	10.15	5.11	-28.09	74.53	66.43
8620.00	H	24.92	Ambient	-32.53	10.98	5.20	-26.75	73.19	66.43
8620.00	V	25.52	Ambient	-31.89	10.98	5.20	-26.11	72.55	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 2 Watts (Average), 862MHz, H-DQPSK

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	862MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1724.00	H	12.30	Ambient	-53.57	4.19	2.29	-51.68	84.69	53.01
1724.00	V	12.27	Ambient	-52.05	4.19	2.29	-50.16	83.17	53.01
2586.00	H	22.68	Ambient	-38.95	3.14	2.87	-38.68	71.69	53.01
2586.00	V	23.38	Ambient	-38.13	3.14	2.87	-37.86	70.88	53.01
3448.00	H	21.12	Ambient	-40.20	5.71	3.33	-37.83	70.84	53.01
3448.00	V	21.32	Ambient	-40.01	5.71	3.33	-37.63	70.64	53.01
4310.00	H	23.35	Ambient	-36.59	7.04	3.70	-33.24	66.25	53.01
4310.00	V	23.34	Ambient	-36.59	7.04	3.70	-33.24	66.25	53.01
5172.00	H	25.53	Ambient	-32.83	7.78	4.01	-29.06	62.07	53.01
5172.00	V	24.60	Ambient	-33.67	7.78	4.01	-29.90	62.91	53.01
6034.00	H	24.09	Ambient	-33.94	8.29	4.36	-30.01	63.02	53.01
6034.00	V	24.05	Ambient	-33.95	8.29	4.36	-30.02	63.03	53.01
6896.00	H	25.28	Ambient	-32.25	8.96	4.76	-28.04	61.05	53.01
6896.00	V	24.85	Ambient	-33.12	8.96	4.76	-28.91	61.93	53.01
7758.00	H	24.79	Ambient	-33.21	10.15	5.11	-28.17	61.18	53.01
7758.00	V	25.19	Ambient	-33.10	10.15	5.11	-28.06	61.07	53.01
8620.00	H	26.06	Ambient	-31.39	10.98	5.20	-25.61	58.62	53.01
8620.00	V	25.12	Ambient	-32.29	10.98	5.20	-26.51	59.52	53.01

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 868MHz, C4FM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	868MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1736.00	H	15.86		-49.82	4.14	2.30	-47.99	94.42	66.43
1736.00	V	15.07		-48.97	4.14	2.30	-47.14	93.57	66.43
2604.00	H	22.82	Ambient	-38.77	3.18	2.88	-38.48	84.91	66.43
2604.00	V	23.37	Ambient	-38.12	3.18	2.88	-37.82	84.26	66.43
3472.00	H	21.10	Ambient	-40.24	5.74	3.35	-37.84	84.27	66.43
3472.00	V	21.74	Ambient	-39.46	5.74	3.35	-37.06	83.49	66.43
4340.00	H	23.54	Ambient	-36.35	7.04	3.71	-33.01	79.44	66.43
4340.00	V	23.43	Ambient	-36.46	7.04	3.71	-33.12	79.56	66.43
5208.00	H	25.21	Ambient	-33.12	7.78	4.03	-29.38	75.81	66.43
5208.00	V	24.32	Ambient	-33.96	7.78	4.03	-30.22	76.65	66.43
6076.00	H	24.70	Ambient	-33.13	8.33	4.38	-29.18	75.62	66.43
6076.00	V	24.49	Ambient	-33.51	8.33	4.38	-29.56	76.00	66.43
6944.00	H	25.09	Ambient	-32.61	9.04	4.78	-28.35	74.78	66.43
6944.00	V	24.82	Ambient	-33.30	9.04	4.78	-29.04	75.47	66.43
7812.00	H	25.04	Ambient	-32.96	10.20	5.13	-27.89	74.33	66.43
7812.00	V	25.10	Ambient	-33.15	10.20	5.13	-28.08	74.52	66.43
8680.00	H	26.13	Ambient	-31.30	10.99	5.20	-25.51	71.95	66.43
8680.00	V	26.09	Ambient	-31.13	10.99	5.20	-25.35	71.78	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 2 Watts (Average), 868MHz, C4FM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	868MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1736.00	H	12.56	Ambient	-53.12	4.14	2.30	-51.29	84.30	53.01
1736.00	V	12.59	Ambient	-51.45	4.14	2.30	-49.62	82.63	53.01
2604.00	H	22.55	Ambient	-39.04	3.18	2.88	-38.75	71.76	53.01
2604.00	V	22.68	Ambient	-38.81	3.18	2.88	-38.51	71.52	53.01
3472.00	H	21.17	Ambient	-40.17	5.74	3.35	-37.77	70.78	53.01
3472.00	V	21.01	Ambient	-40.19	5.74	3.35	-37.79	70.80	53.01
4340.00	H	23.42	Ambient	-36.47	7.04	3.71	-33.13	66.14	53.01
4340.00	V	23.62	Ambient	-36.27	7.04	3.71	-32.93	65.94	53.01
5208.00	H	24.58	Ambient	-33.75	7.78	4.03	-30.01	63.02	53.01
5208.00	V	24.76	Ambient	-33.52	7.78	4.03	-29.78	62.79	53.01
6076.00	H	24.61	Ambient	-33.22	8.33	4.38	-29.27	62.28	53.01
6076.00	V	24.05	Ambient	-33.95	8.33	4.38	-30.00	63.01	53.01
6944.00	H	25.38	Ambient	-32.32	9.04	4.78	-28.06	61.07	53.01
6944.00	V	24.60	Ambient	-33.52	9.04	4.78	-29.26	62.27	53.01
7812.00	H	25.22	Ambient	-32.78	10.20	5.13	-27.71	60.72	53.01
7812.00	V	25.18	Ambient	-33.07	10.20	5.13	-28.00	61.01	53.01
8680.00	H	25.61	Ambient	-31.82	10.99	5.20	-26.03	59.04	53.01
8680.00	V	25.94	Ambient	-31.28	10.99	5.20	-25.50	58.51	53.01

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 869MHz, LSM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	869MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1738.00	H	19.85		-45.80	4.13	2.30	-43.98	90.41	66.43
1738.00	V	20.02		-43.98	4.13	2.30	-42.15	88.59	66.43
2607.00	H	11.78	Ambient	-49.81	3.19	2.88	-49.50	95.94	66.43
2607.00	V	11.65	Ambient	-49.83	3.19	2.88	-49.52	95.96	66.43
3476.00	H	19.15	Ambient	-42.19	5.75	3.35	-39.79	86.22	66.43
3476.00	V	18.80	Ambient	-42.37	5.75	3.35	-39.97	86.41	66.43
4345.00	H	22.27	Ambient	-37.61	7.04	3.71	-34.27	80.71	66.43
4345.00	V	22.27	Ambient	-37.61	7.04	3.71	-34.28	80.71	66.43
5214.00	H	22.66	Ambient	-35.67	7.78	4.03	-31.92	78.36	66.43
5214.00	V	22.08	Ambient	-36.21	7.78	4.03	-32.46	78.89	66.43
6083.00	H	22.56	Ambient	-35.24	8.34	4.39	-31.29	77.72	66.43
6083.00	V	22.83	Ambient	-35.17	8.34	4.39	-31.22	77.65	66.43
6952.00	H	23.41	Ambient	-34.32	9.05	4.78	-30.05	76.48	66.43
6952.00	V	23.18	Ambient	-34.97	9.05	4.78	-30.69	77.13	66.43
7821.00	H	24.02	Ambient	-33.98	10.20	5.13	-28.91	75.34	66.43
7821.00	V	23.58	Ambient	-34.66	10.20	5.13	-29.59	76.02	66.43
8690.00	H	25.02	Ambient	-32.40	10.99	5.20	-26.62	73.05	66.43
8690.00	V	22.54	Ambient	-34.65	10.99	5.20	-28.86	75.30	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 2 Watts (Average), 869MHz, LSM

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	869MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1738.00	H	12.27	Ambient	-53.38	4.13	2.30	-51.56	84.57	53.01
1738.00	V	12.02	Ambient	-51.98	4.13	2.30	-50.15	83.16	53.01
2607.00	H	21.32	Ambient	-40.27	3.19	2.88	-39.96	72.97	53.01
2607.00	V	20.68	Ambient	-40.80	3.19	2.88	-40.49	73.50	53.01
3476.00	H	19.61	Ambient	-41.73	5.75	3.35	-39.33	72.34	53.01
3476.00	V	19.53	Ambient	-41.64	5.75	3.35	-39.24	72.25	53.01
4345.00	H	21.27	Ambient	-38.61	7.04	3.71	-35.27	68.28	53.01
4345.00	V	21.33	Ambient	-38.55	7.04	3.71	-35.22	68.23	53.01
5214.00	H	22.49	Ambient	-35.84	7.78	4.03	-32.09	65.10	53.01
5214.00	V	22.50	Ambient	-35.79	7.78	4.03	-32.04	65.05	53.01
6083.00	H	22.88	Ambient	-34.92	8.34	4.39	-30.97	63.98	53.01
6083.00	V	22.14	Ambient	-35.86	8.34	4.39	-31.91	64.92	53.01
6952.00	H	23.68	Ambient	-34.05	9.05	4.78	-29.78	62.79	53.01
6952.00	V	23.07	Ambient	-35.08	9.05	4.78	-30.80	63.82	53.01
7821.00	H	23.54	Ambient	-34.46	10.20	5.13	-29.39	62.40	53.01
7821.00	V	23.78	Ambient	-34.46	10.20	5.13	-29.39	62.40	53.01
8690.00	H	26.84	Ambient	-30.58	10.99	5.20	-24.80	57.81	53.01
8690.00	V	23.90	Ambient	-33.29	10.99	5.20	-27.50	60.51	53.01

Report on Test Measurements

Radiated Spurious Harmonic Emissions — Power Output 44 Watts (Average), 870MHz, H-DQPSK

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	870MHz
Notes	44W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1740.00	H	19.49		-46.13	4.12	2.30	-44.31	90.75	66.43
1740.00	V	18.33		-45.62	4.12	2.30	-43.80	90.24	66.43
2610.00	H	22.63	Ambient	-38.95	3.20	2.88	-38.63	85.07	66.43
2610.00	V	22.90	Ambient	-38.57	3.20	2.88	-38.25	84.69	66.43
3480.00	H	21.63	Ambient	-39.71	5.75	3.35	-37.31	83.74	66.43
3480.00	V	21.24	Ambient	-39.91	5.75	3.35	-37.51	83.94	66.43
4350.00	H	23.81	Ambient	-36.06	7.05	3.71	-32.72	79.16	66.43
4350.00	V	23.86	Ambient	-36.02	7.05	3.71	-32.68	79.12	66.43
5220.00	H	24.44	Ambient	-33.88	7.78	4.03	-30.14	76.57	66.43
5220.00	V	24.70	Ambient	-33.59	7.78	4.03	-29.84	76.28	66.43
6090.00	H	23.90	Ambient	-33.86	8.35	4.39	-29.91	76.34	66.43
6090.00	V	24.37	Ambient	-33.63	8.35	4.39	-29.68	76.11	66.43
6960.00	H	25.49	Ambient	-32.27	9.07	4.78	-27.98	74.42	66.43
6960.00	V	25.79	Ambient	-32.38	9.07	4.78	-28.10	74.53	66.43
7830.00	H	24.95	Ambient	-33.05	10.21	5.14	-27.97	74.41	66.43
7830.00	V	25.33	Ambient	-32.91	10.21	5.14	-27.83	74.26	66.43
8700.00	H	26.19	Ambient	-31.23	10.99	5.20	-25.44	71.88	66.43
8700.00	V	26.02	Ambient	-31.14	10.99	5.20	-25.35	71.79	66.43

Report on Test Measurements

Radiated Spurious Harmonic Emissions –– Power Output 2 Watts (Average), 870MHz, H-DQPSK

Test Details	
Manufacturer	Motorola Solutions
EUT	DBR M12 800 MHz RF Site
Model No.	DBR M12
Serial No.	EMC Rack P6
Mode	Tx
Frequency Tested	870MHz
Notes	2W

Freq. (MHz)	Ant Pol	Meter Reading (dBµV)	Ambient	Calculated Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	ERP (dBm)	Attenuation Below Output Power (dB)	Minimum Attenuation (dB)
1740.00	H	12.30	Ambient	-53.32	4.12	2.30	-51.50	84.51	53.01
1740.00	V	12.48	Ambient	-51.47	4.12	2.30	-49.65	82.67	53.01
2610.00	H	20.99	Ambient	-40.59	3.20	2.88	-40.27	73.29	53.01
2610.00	V	21.49	Ambient	-39.98	3.20	2.88	-39.66	72.67	53.01
3480.00	H	18.99	Ambient	-42.35	5.75	3.35	-39.95	72.96	53.01
3480.00	V	21.08	Ambient	-40.07	5.75	3.35	-37.67	70.68	53.01
4350.00	H	22.74	Ambient	-37.13	7.05	3.71	-33.79	66.80	53.01
4350.00	V	22.65	Ambient	-37.23	7.05	3.71	-33.89	66.90	53.01
5220.00	H	23.14	Ambient	-35.18	7.78	4.03	-31.44	64.45	53.01
5220.00	V	23.55	Ambient	-34.74	7.78	4.03	-30.99	64.00	53.01
6090.00	H	22.09	Ambient	-35.67	8.35	4.39	-31.72	64.73	53.01
6090.00	V	22.56	Ambient	-35.44	8.35	4.39	-31.49	64.50	53.01
6960.00	H	23.16	Ambient	-34.60	9.07	4.78	-30.31	63.32	53.01
6960.00	V	24.07	Ambient	-34.10	9.07	4.78	-29.82	62.83	53.01
7830.00	H	23.69	Ambient	-34.31	10.21	5.14	-29.23	62.24	53.01
7830.00	V	23.88	Ambient	-34.36	10.21	5.14	-29.28	62.29	53.01
8700.00	H	23.68	Ambient	-33.74	10.99	5.20	-27.95	60.96	53.01
8700.00	V	24.58	Ambient	-32.58	10.99	5.20	-26.79	59.80	53.01

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 RSS-119 Section 5.3

Fixed and Base stations operating at 851-866 MHz and 866-869 MHz must have a frequency stability of better than +/- 1.0 PPM for 12.5 kHz channel spacing and +/- 1.5 PPM for 25 kHz channel spacing.

Specification Requirement: Reference Part 90.213

Fixed and Base stations operating at 851-854 must have a frequency stability of better than +/- 1.0 PPM.
Fixed and Base stations operating at 854-869 must have a frequency stability of better than +/- 1.5 PPM.

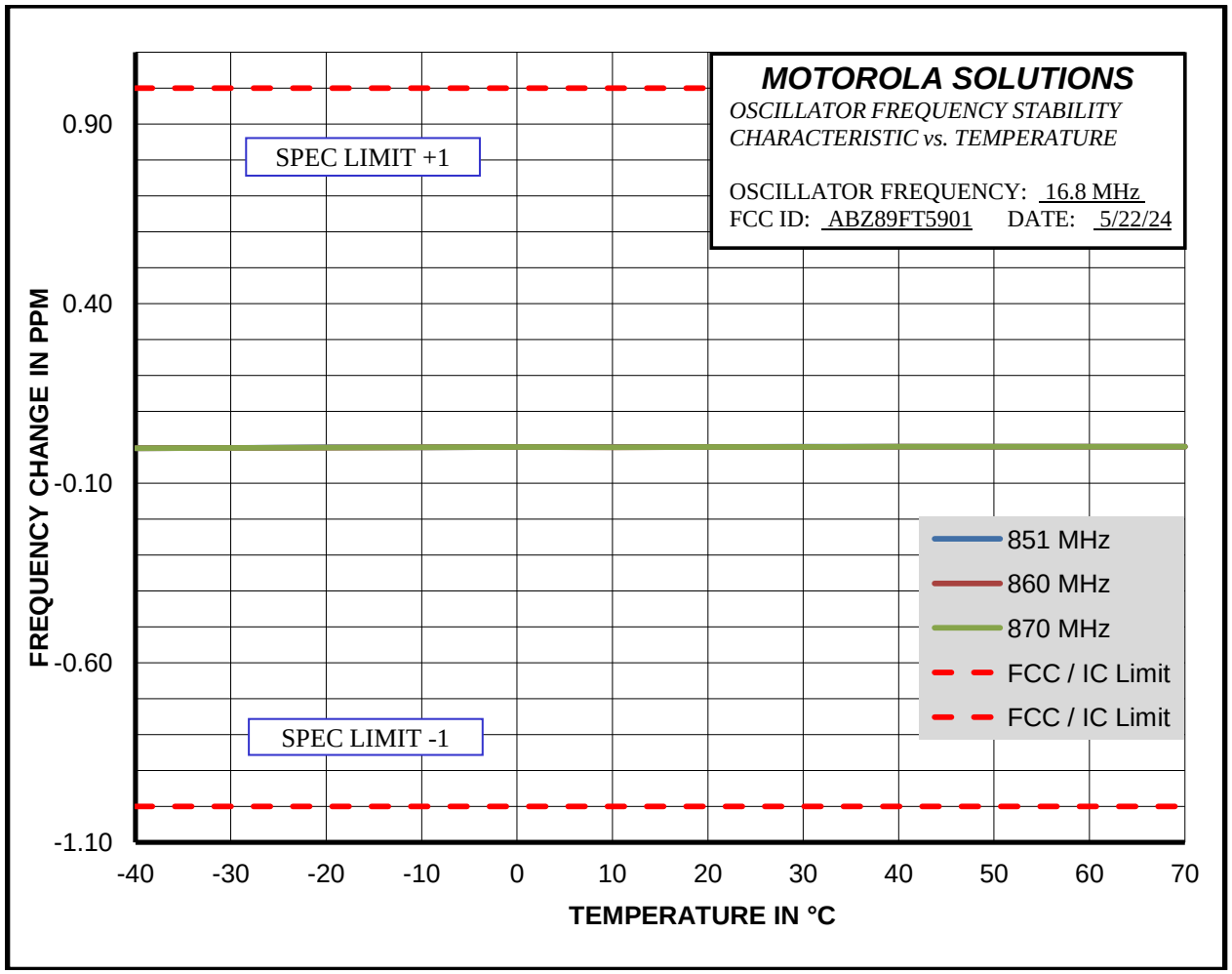
Only the more stringent specification limit is shown on the frequency stability exhibits.

Performance was measured at carrier frequencies at the low end, middle, and high end of the operating band.

EXHIBIT	DESCRIPTION
E1-5.1	Frequency Stability Vs Temperature
E1-5.2	Frequency Stability Vs Voltage

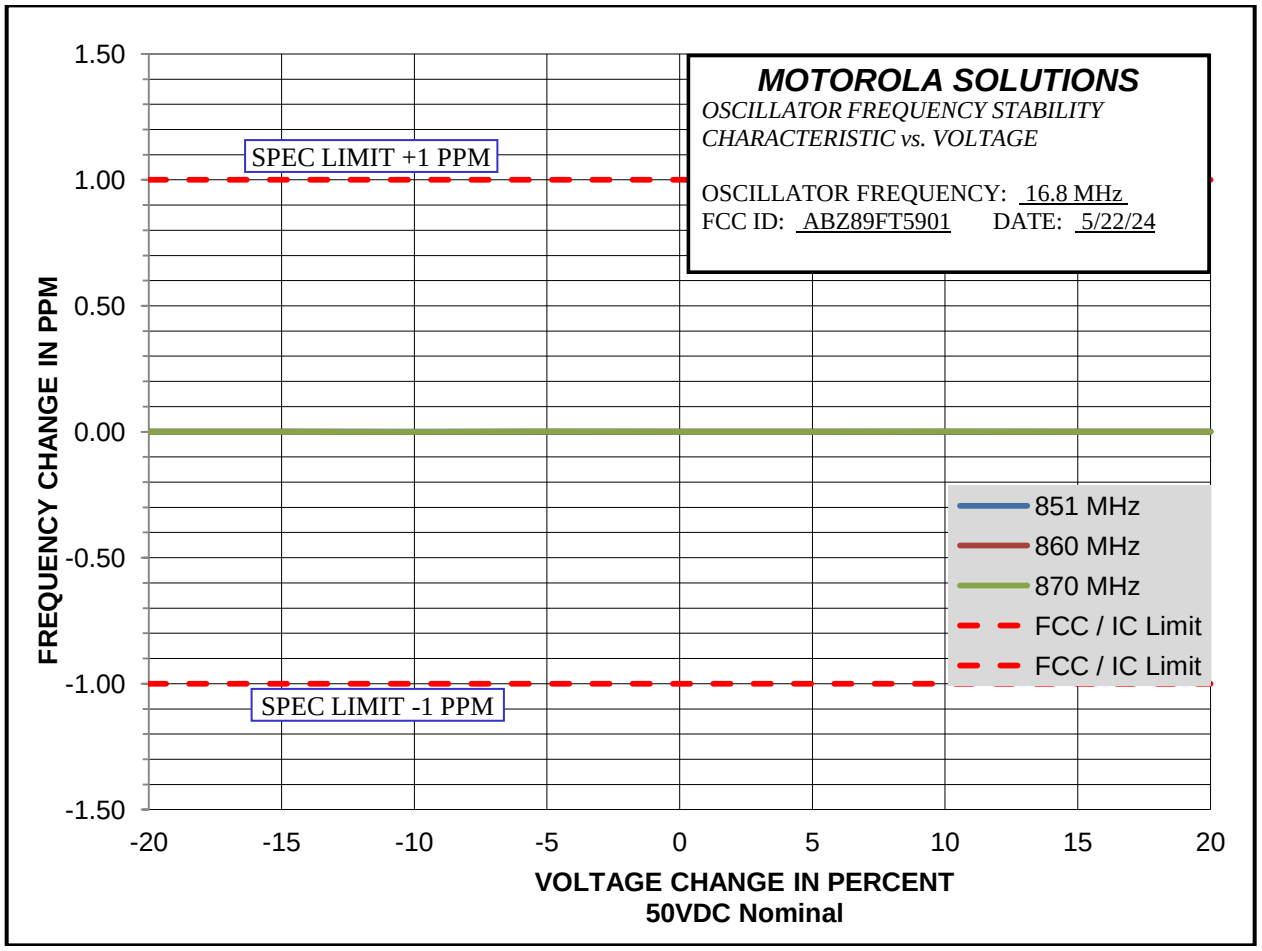
Report on Test Measurements

Frequency Stability Vs Temperature



Report on Test Measurements

Frequency Stability Vs Voltage



Test Setup Details

Test Locations:
(for all tests except radiated emissions)
Motorola Solutions, Inc., Schaumburg Lab
2000 Progress Parkway, Schaumburg, IL 60196
FCC Registration Number 786245
IC CAB Identifier US0220
Test Engineer Ted Lietz

(for radiated emissions)
Elite Electronic Engineering Inc.
1516 Centre Circle Dr., Downers Grove, IL 60515
FCC Registration Number 269750
IC Registration Number 2987A
IC CAB Identifier US0107
Test Engineer Tylar Jozefczyk

Test Equipment List (Motorola)

Model	Manufacturer	Description	Serial Number	Last Cal	Interval
N9030A	Keysight/Agilent/HP	PXA Signal Analyzer, 3 Hz to 50 GHz	MY53310751	9/7/2022	9/7/2024
NRP-Z11	Rohde & Schwarz	Power Sensor	101590	8/31/2022	8/31/2024
SMU200A	Rohde & Schwarz	Signal Generator / Power Meter	101350	12/30/2021	12/29/2024
34401A	Keysight/Agilent/HP	Digital Multimeter	3146A59752	8/29/2022	8/29/2026
E5071C	Keysight/Agilent/HP	ENA Series Network analyzer	MY46316134	8/23/2023	8/23/2024

Test Equipment List (Elite)

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	3/20/2024	3/20/2025
CDZ4	LAB WORKSTATION	ELITE	LWS-10		WINDOWS 10	CNR	
GRB0	1MHZ, LISN SIGNAL CHECKER	ELITE	LISNCHKR1M	1	1MHZ	12/6/2022	12/6/2024
NSDS1	UNIVERSAL SPHERICAL DIPOLE SOURCE	AET	USDS-H	AET-1116		NOTE 1	
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	5/19/2022	5/19/2024
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	5/26/2022	5/26/2024
PLF1	CISPR16 50UH LISN	ELITE	CISPR16/70A	001	.15-30MHz	3/27/2024	3/27/2025
PLF3	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	3/27/2024	3/27/2025
R21F	3M ANECHOIC CHAMBER NSA	EMC TEST SYSTEMS	3M ANECHOIC		30MHZ-18GHZ	3/1/2024	3/1/2025
RBG3	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101592	2HZ-44GHZ	3/7/2024	3/7/2025
SAA1	AC POWER SOURCE/ANALYZER	HEWLETT PACKARD	6813A	3524A-00446	0-300VRMS, 1750VA	NOTE 1	
SCB0	PROGRAMABLE POWER SUPPLY	CALIFORNIA INSTRUMENTS	CSW5550-208/156-321-ELF	1513A01939		NOTE 1	
SCB3	PROGRAMABLE POWER SUPPLY	CALIFORNIA INSTRUMENTS	CSW5550-208/156-321-ELF	1513A02091		NOTE 1	
SHC2	Power Supplies	HENGFU	HF60W-SL-24	A11372702	24V	NOTE 1	
T1EJ	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	CD6790	DC-18GHZ	1/3/2024	1/3/2026
VBR8	COMMERCIAL CONDUCTED EMISSIONS.EXE	ELITE				N/A	
VBV2	COMMERCIAL RADIATED EMISSIONS.EXE	ELITE		---	---	N/A	
XLT5	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	12/20/2023	12/20/2025

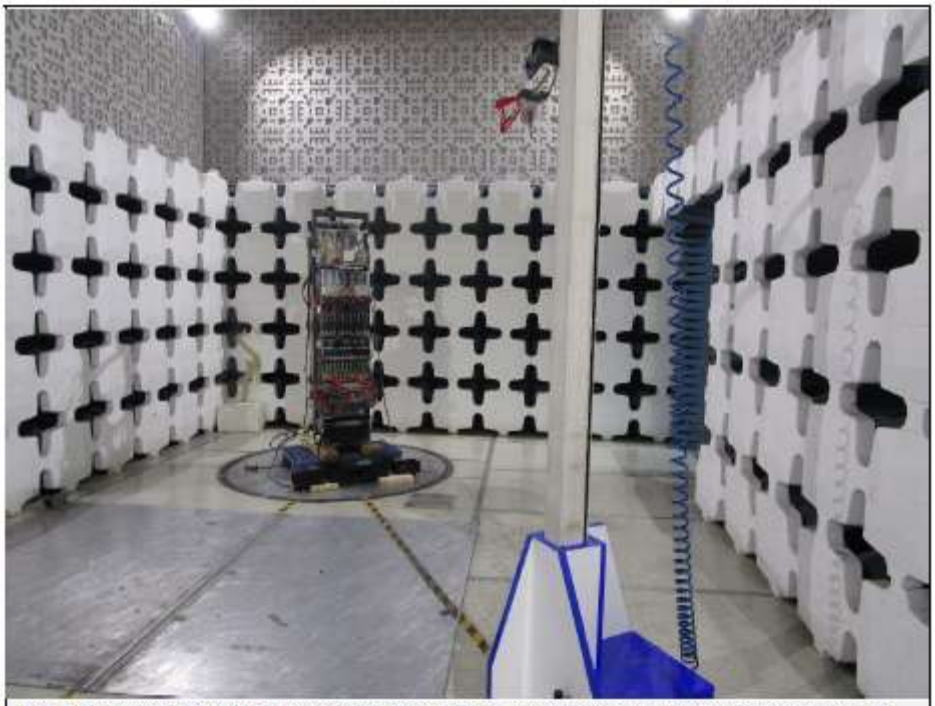
N/A: Not Applicable I/O: Initial Only CNR: Calibration Not Required
NOTE 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

Test Setup (Elite)

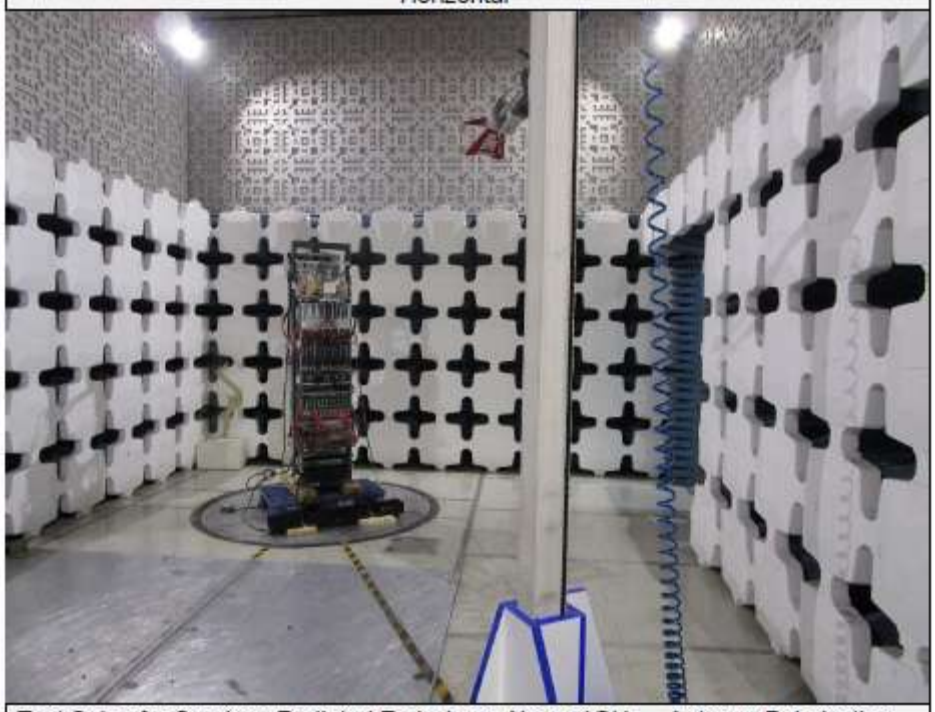
Test Setup for Radiated Emissions: 30MHz to 1GHz, Horizontal Polarization

Test Setup for Radiated Emissions: 30MHz to 1GHz, Vertical Polarization

Test Setup (Elite)



Test Setup for Spurious Radiated Emissions, Above 1GHz– Antenna Polarization Horizontal



Test Setup for Spurious Radiated Emissions, Above 1GHz – Antenna Polarization Vertical

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: BS Mathematics, Illinois State University, Normal, IL, USA

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

NAME: Ted Lietz

SIGNATURE: 

DATE: May 22, 2024

POSITION: Principal 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: Matt Nawrocki

SIGNATURE: 

DATE: May 22, 2024

POSITION: Engineering Manager