

Certification Test Report

FCC ID: IHDT56MR1
IC: 1090-T56MR1

FCC Rule Part: CFR Part 90 / CFR Part 24
IC Radio Standards Specification: RSS 119 / RSS 134

ACS Report Number: 11-2007.W06.22.B
This report contains data that are not covered by the NVLAP accreditation

Applicant: Motorola
Model: H80XAH6QR2AN

Test Begin Date: February 1, 2011
Test End Date: February 15, 2011

Report Issue Date: February 17, 2011



FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200897-0

This report is not be used to claim certification, approval, or endorsement by NVLAP, NIST or any government agency.

Project Manager:

A handwritten signature in blue ink, appearing to read "Thierry Jean-Charles".

Thierry Jean-Charles
EMC Engineer
Advanced Compliance Solutions, Inc.

Reviewed by:

A handwritten signature in blue ink, appearing to read "Kirby Munroe".

Kirby Munroe
Director, Wireless Certifications
Advanced Compliance Solutions, Inc.

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This report contains 17 pages

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1.0 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 2 Subpart J, Part 24 and Part 90 of the FCC's Code of Federal Regulations; as well as RSS 119 and RSS 134 of Industry Canada's Radio Standard Specifications.

1.2 Manufacturer Information:

Motorola, Inc.
8000 W. Sunrise Blvd.
Plantation, FL 33322

1.3 Product Description

The EUT is a cell phone - iDEN (800/900MHz), GPS, and BT 2.0 EDR.

Model Variants:

Variants/Configurations	Description	Test
i420	Carrier Model with silver back cover and flip	Yes
i412	Boost Model with blue back cover and flip	---

The customer declares the two model variants identical in terms of hardware and compliant base on similarities.

Test Sample Serial Numbers: 364VMA2R5Q

Test Sample Condition: The test sample was provided in good physical condition with no noticeable functional defects.

1.4 Test Configurations and Justification

This document reports the results for the equipment under test (EUT) operating in the iDEN mode. The EUT was evaluated for radiated spurious emissions up to the 10th harmonic of the fundamental frequency.

The unit was pre-scanned in three orthogonal orientations and final measurements were performed in the orientation leading to the maximum emissions.

The document also reports the power line conducted emissions test results for the EUT in the iDEN TX mode for both 800 MHz and 900 MHz bands.

2.0 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions, Inc.
3998 FAU Blvd, Suite 310
Boca Raton, Florida 33431
Phone: (561) 961-5585
Fax: (561) 961-5587
www.acstestlab.com

FCC Test Firm Registration #: 581606
Industry Canada Lab Code: 4175C

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 200897-0. Unless otherwise specified, all tests methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

2.3 Radiated & Conducted Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl floor.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flushed with the chamber floor which it is connected to, around its circumference, with metallic loaded springs. An EMC Model 1051 Multi-device Controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMC Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

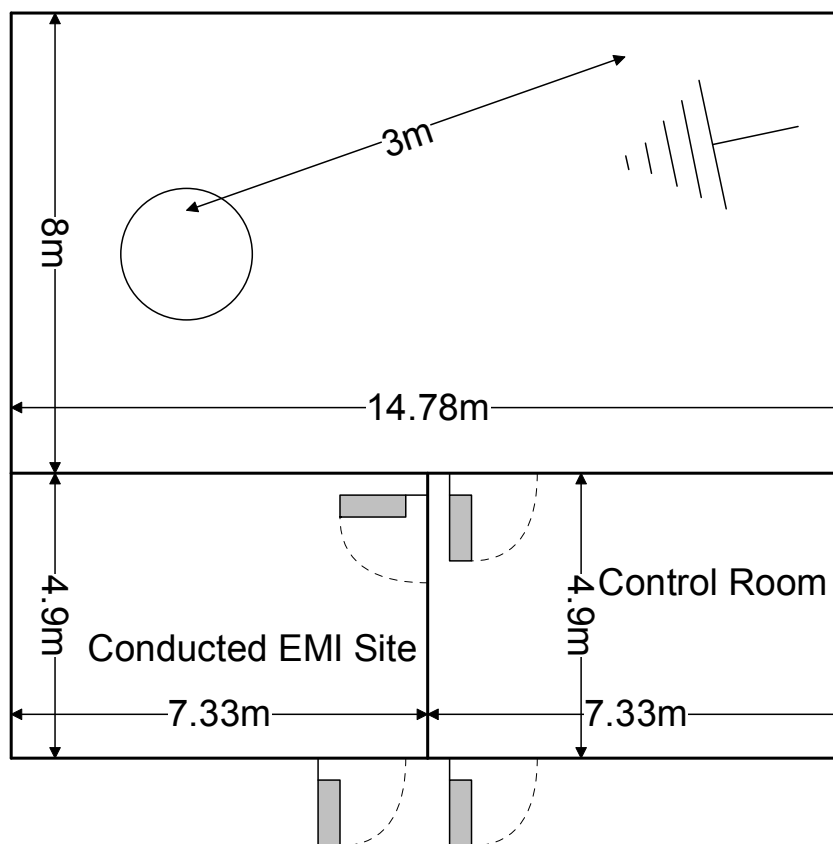


Figure 2.3.1-1: Semi-Anechoic Chamber Test Site

2.3.2 Conducted Emissions Test Site Description

The dimensions of the shielded conducted room are 7.3 x 4.9 x 3 m³. As per ANSI C63.4 2003 requirements, the data were taken using two LISNs; a Solar Model 8028-50 50 Ω /50 μ H and an EMCO Model 3825, which are installed as shown in Photograph 3. For 220 V, 50 Hz, a Polarad LISN (S/N 879341/048) is used in conjunction with a 1 kVA, 50 Hz/220 V EDGAR variable frequency generator, Model 1001B, to filter conducted noise from the generator.

A diagram of the room is shown below in figure 2.3.2-1:

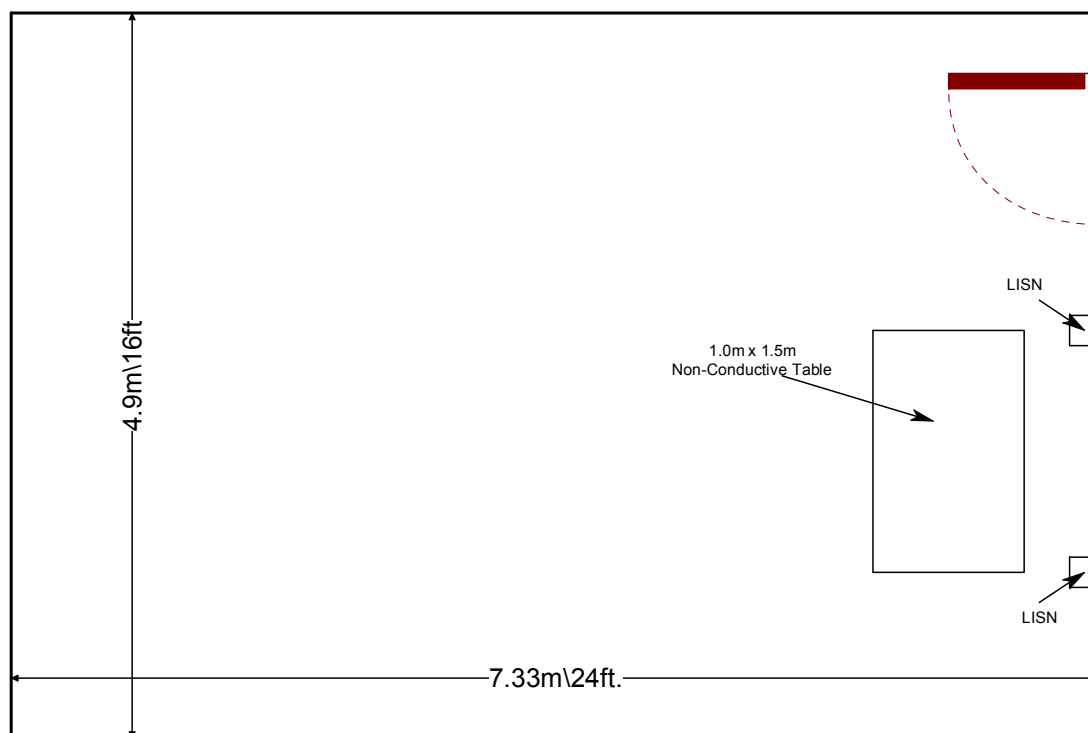


Figure 2.3.2-1: AC Mains Conducted EMI Site

3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

- 1 - ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 kHz to 40GHz - 2003
- 2 - US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures - 2010
- 3 - US Code of Federal Regulations (CFR): Title 47, Part 90, Subpart I: Private Land Mobile Radio Services – 2010
- 4 - US Code of Federal Regulations (CFR): Title 47, Part 24: Personal Communications Services - 2010¹
- 5 – TIA-603-C: Land Mobile FM or PM - Communications Equipment - Measurement and Performance Standards – 2004
- 6 - Industry Canada Radio Standards Specification: RSS-119 - Land Mobile and Fixed Radio Transmitters and Receivers Operating in the Frequency Range 27.41- 960 MHz, Issue 10, April 2010
- 7 - Industry Canada Radio Standards Specification: RSS-134 - 900 MHz Narrowband Personal Communication Service - Issue 1, March 2000
- 8 - Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 8, December 2010.

¹ FCC Part 24 is not encompassed under our current NVLAP scope of accreditation

4.0 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
2002	EMCO	3108	Antennas	2147	9/10/2009	9/10/2011
2004	EMCO	3146	Antennas	1385	9/10/2009	9/10/2011
2006	EMCO	3115	Antennas	2573	2/21/2009	2/21/2011
2011	Hewlett-Packard	HP 8447D	Amplifiers	2443A03952	1/3/2011	1/3/2012
re581	Hewlett Packard	8449B	Amplifier	3008A00198	1/20/2011	1/20/2012
2013	Hewlett Packard	HP8566B	Spectrum Analyzers	2407A03233	8/5/2010	8/5/2012
2014	Hewlett Packard	HP 85650A	Quasi Peak Adapter	2430A00559	8/5/2010	8/5/2012
523	Agilent	E7405	Spectrum Analyzers	MY45103293	1/5/2011	1/5/2013
2037	ACS Boca	Chamber EMI Cable Set	Cable Set	2037	1/7/2011	1/7/2012
2078	ACS Boca	Substitution Cable Set	Cable Set	2078	2/2/2011	2/2/2012
2007	EMCO	3115	Antennas	2419	1/12/2010	1/12/2012
2022	EMCO	LISN3825/2R	LISN	1095	8/10/2009	8/10/2011
2045	ACS Boca	Conducted Cable Set	Cable Set	2045	1/6/2011	1/6/2012
2064	CIR Q-TEL	FHT/22-10K-13/50-3A/3A	Filter	9	1/15/2011	1/15/2012
2061	Weinschel Engineering	1506A	Power Splitter	FW183	2/3/2011	2/3/2012

NCR=No Calibration Required

5.0 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Diagram #	Manufacturer	Equipment Type	Model Number	Serial Number
1	AC adapter	Motorola	FMP5358A	09135-12-0838738-B-B

6.0 EQUIPMENT UNDER TEST SETUP AND BLOCK DIAGRAM

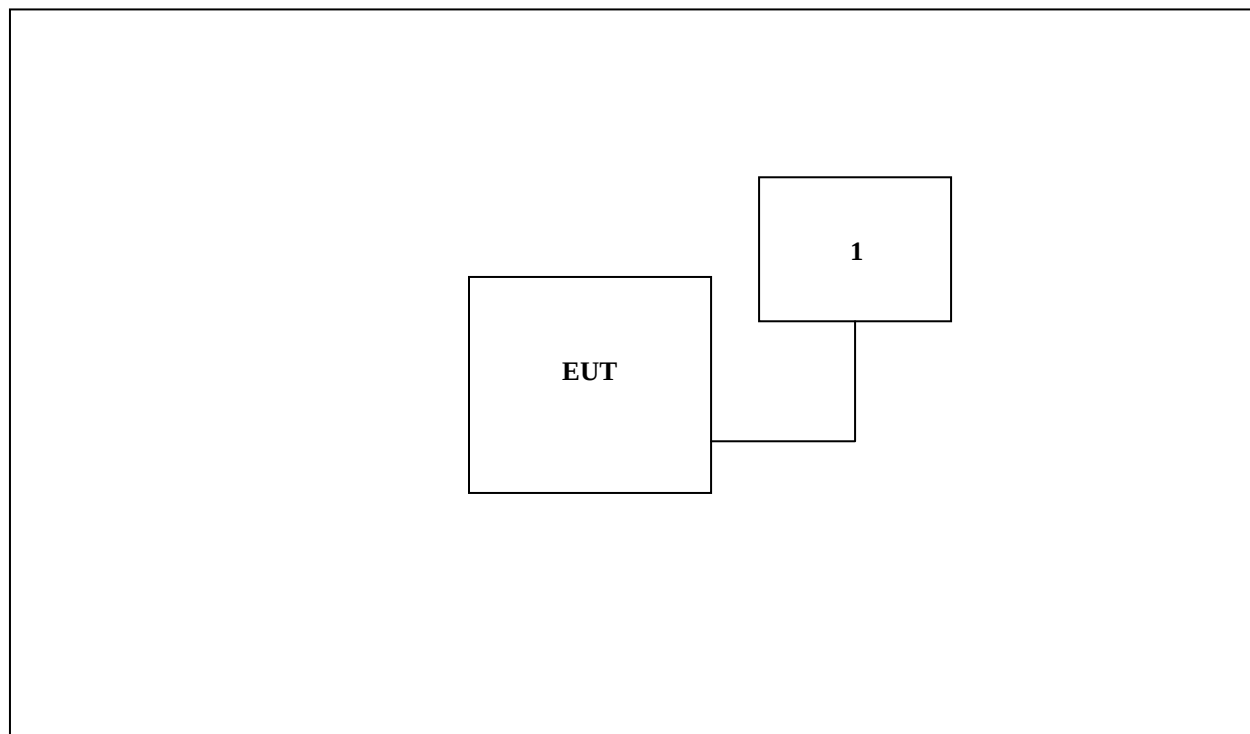


Figure 6-1: EUT Test Setup

NOTE: The EUT was tested standalone for the radiated TX emissions. The power supply was only used for the conducted emissions evaluation.

7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Field Strength of Spurious Emissions – FCC Part 2.1053, Part 90.210, Part 24.133²; RSS-119 RSS-134

7.1.1 Measurement Procedure

The equipment under test is placed in the Semi-Anechoic Chamber (described in section 2.3.1) on a wooden table at the turntable center. For each spurious emission, the antenna mast is raised and lowered from one (1) to four (4) meters and the turntable is rotated 360° and the maximum reading on the spectrum analyzer is recorded. This was repeated for both horizontal and vertical polarizations of the receive antenna.

The equipment under test is then replaced with a substitution antenna fed by a signal generator. The signal generator's frequency is set to that of the spurious emission recorded from the equipment under test. The antenna mast is raised and lowered from one (1) to four (4) meters to obtain a maximum reading on the spectrum analyzer. The output of the signal generator is then adjusted until the reading on the spectrum analyzer matches that obtained from the equipment under test. The signal generator level is recorded. The power in dBm of each spurious emission is calculated by correcting the signal generator level for the cable loss and gain of the substitution antenna referenced to a dipole. The spectrum was investigated in accordance to CFR 47 Part 2.1057.

The magnitude of all spurious emissions not reported were attenuated below the noise floor of the measurement system and therefore not specified in this report. Results are shown below in Tables 7.1.2-1 through 7.1.2-5.

7.1.2 Measurement Results

Table 7.1.2-1: Field Strength of Spurious Emissions – 806.0625 MHz – iDEN TX Mode

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	ERP (dBm)	Limit (dBm)	Margin (dB)
1612.125	-56.45	H	-51.26	-13.00	38.26
2418.188	-39.10	H	-29.72	-13.00	16.72
3224.25	-55.65	H	-45.29	-13.00	32.29
4030.313	-48.75	H	-32.74	-13.00	19.74
8060.625	-66.65	H	-54.61	-13.00	41.61
1612.125	-46.95	V	-41.46	-13.00	28.46
2418.188	-46.60	V	-35.88	-13.00	22.88
3224.25	-53.95	V	-41.09	-13.00	28.09
4030.313	-54.80	V	-39.19	-13.00	26.19
8060.625	-66.20	V	-54.26	-13.00	41.26

NOTE: All frequencies not listed were below the noise floor of the spectrum analyzer.

² FCC part 24 is not encompassed within our current NVLAP scope of accreditation.

Table 7.1.2-2: Field Strength of Spurious Emissions – 813.5625 MHz – iDEN TX Mode

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1627.125	-57.45	H	-53.31	-13.00	40.31
2440.688	-39.85	H	-30.13	-13.00	17.13
3254.25	-55.75	H	-46.59	-13.00	33.59
4067.813	-49.65	H	-35.04	-13.00	22.04
8135.625	-65.60	H	-54.22	-13.00	41.22
1627.125	-47.90	V	-42.96	-13.00	29.96
2440.688	-46.35	V	-34.88	-13.00	21.88
3254.25	-53.70	V	-41.69	-13.00	28.69
4067.813	-56.15	V	-41.19	-13.00	28.19
8135.625	-66.65	V	-55.52	-13.00	42.52

NOTE: All frequencies not listed were below the noise floor if the spectrum analyzer.

Table 7.1.2-3: Field Strength of Spurious Emissions – 824.9875 MHz – iDEN TX Mode

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1649.975	-49.80	H	-43.36	-13.00	30.36
2474.963	-49.75	H	-40.33	-13.00	27.33
3299.95	-50.20	H	-39.44	-13.00	26.44
4124.938	-52.95	H	-37.08	-13.00	24.08
8249.875	-66.80	H	-54.47	-13.00	41.47
1649.975	-45.55	V	-39.36	-13.00	26.36
2474.963	-50.50	V	-38.58	-13.00	25.58
3299.95	-52.45	V	-39.89	-13.00	26.89
4124.938	-51.85	V	-35.13	-13.00	22.13
4949.925	-64.05	V	-41.80	-13.00	28.80
8249.875	-66.55	V	-54.22	-13.00	41.22

NOTE: All frequencies not listed were below the noise floor if the spectrum analyzer.

Table 7.1.2-4: Field Strength of Spurious Emissions – 896.01875 MHz – iDEN TX Mode³

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1792.038	-50.05	H	-42.06	-13.00	29.06
2688.056	-49.30	H	-35.55	-13.00	22.55
3584.075	-55.25	H	-43.31	-13.00	30.31
5376.113	-65.60	H	-51.90	-13.00	38.90
8960.188	-67.20	H	-50.24	-13.00	37.24
1792.038	-45.25	V	-36.72	-13.00	23.72
2688.056	-49.25	V	-34.16	-13.00	21.16
3584.075	-48.95	V	-34.60	-13.00	21.60
4480.094	-60.40	V	-45.79	-13.00	32.79
5376.113	-66.35	V	-53.20	-13.00	40.20
8960.188	-66.30	V	-49.63	-13.00	36.63

NOTE: All frequencies not listed were below the noise floor if the spectrum analyzer.

Table 7.1.2-5: Field Strength of Spurious Emissions – 901.98125 MHz – iDEN TX Mode³

Frequency (MHz)	Spectrum Analyzer Level (dBm)	Antenna Polarity (H/V)	Spurious ERP (dBm)	Limit (dBm)	Margin (dB)
1803.963	-54.65	H	-48.38	-13.00	35.38
2705.944	-47.30	H	-36.44	-13.00	23.44
3607.925	-54.20	H	-41.89	-13.00	28.89
4509.906	-63.90	H	-51.81	-13.00	38.81
5411.888	-62.90	H	-46.43	-13.00	33.43
9019.813	-65.70	H	-48.11	-13.00	35.11
1803.963	-44.60	V	-36.51	-13.00	23.51
2705.944	-43.20	V	-31.25	-13.00	18.25
3607.925	-60.60	V	-48.19	-13.00	35.19
5411.888	-65.70	V	-52.36	-13.00	39.36
9019.813	-65.65	V	-49.15	-13.00	36.15

NOTE: All frequencies not listed were below the noise floor if the spectrum analyzer.

³ FCC Part 24 is not encompassed within our current NVLAP scope of accreditation.

7.2 Power Line Conducted Emissions – FCC: Section 15.207 IC: RSS-Gen 7.2.4

7.2.1 Measurement Procedure

ANSI C63.4 sections 6 and 7 were the guiding documents for this evaluation. Conducted emissions were performed from 150 kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9 kHz and the video bandwidth set to 30 kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss

Margin = Applicable Limit - Corrected Reading

7.2.2 Measurement Results

Results are shown in Tables 7.2.2-1 to 7.2.2-2 and Figures 7.2.2-1 to 7.2.2-4.

Table 7.2.2-1: Power Line Conducted EMI Results

Frequency (MHz)	Uncorrected Reading (dBµV)		Total Correction Factor (dB)	Corrected Level (dBµV)		Limit (dBµV)		Margin (dB)	
	Quasi- Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
Line 1									
0.192	41.347	32.851	0.45	41.80	33.30	63.93	53.93	22.1	20.6
0.231	37.445	29.629	0.36	37.81	29.99	62.42	52.42	24.6	22.4
0.495	37.57	32.255	0.35	37.92	32.60	56.08	46.08	18.2	13.5
2.184	38.556	32.64	0.39	38.95	33.03	56.00	46.00	17.1	13.0
2.706	39.697	33.821	0.39	40.09	34.21	56.00	46.00	15.9	11.8
5.001	37.984	31.346	0.48	38.47	31.83	60.00	50.00	21.5	18.2
5.003	37.952	31.32	0.48	38.44	31.80	60.00	50.00	21.6	18.2
5.337	37.847	32.073	0.55	38.39	32.62	60.00	50.00	21.6	17.4
5.515	36.04	29.878	0.58	36.62	30.46	60.00	50.00	23.4	19.5
5.876	36.173	30.253	0.64	36.82	30.90	60.00	50.00	23.2	19.1
Line 2									
0.456	-----	34.3	0.41	-----	34.71	56.77	46.77	-----	12.1
0.500	-----	32.45	0.40	-----	32.85	56.00	46.00	-----	13.1
0.546	-----	29.44	0.41	-----	29.85	56.00	46.00	-----	16.2
2.142	-----	33.905	0.50	-----	34.40	56.00	46.00	-----	11.6
2.717	-----	33.248	0.50	-----	33.74	56.00	46.00	-----	12.3
5.292	-----	34.908	0.64	-----	35.55	60.00	50.00	-----	14.5

NOTES:

The EUT was charging while the IDEN TX was turned on at 813 MHz.

The values reported for Line 2 on the Average column are peak values, which are sufficient to show compliance since they are below both Quasi-Peak and Average Limits.

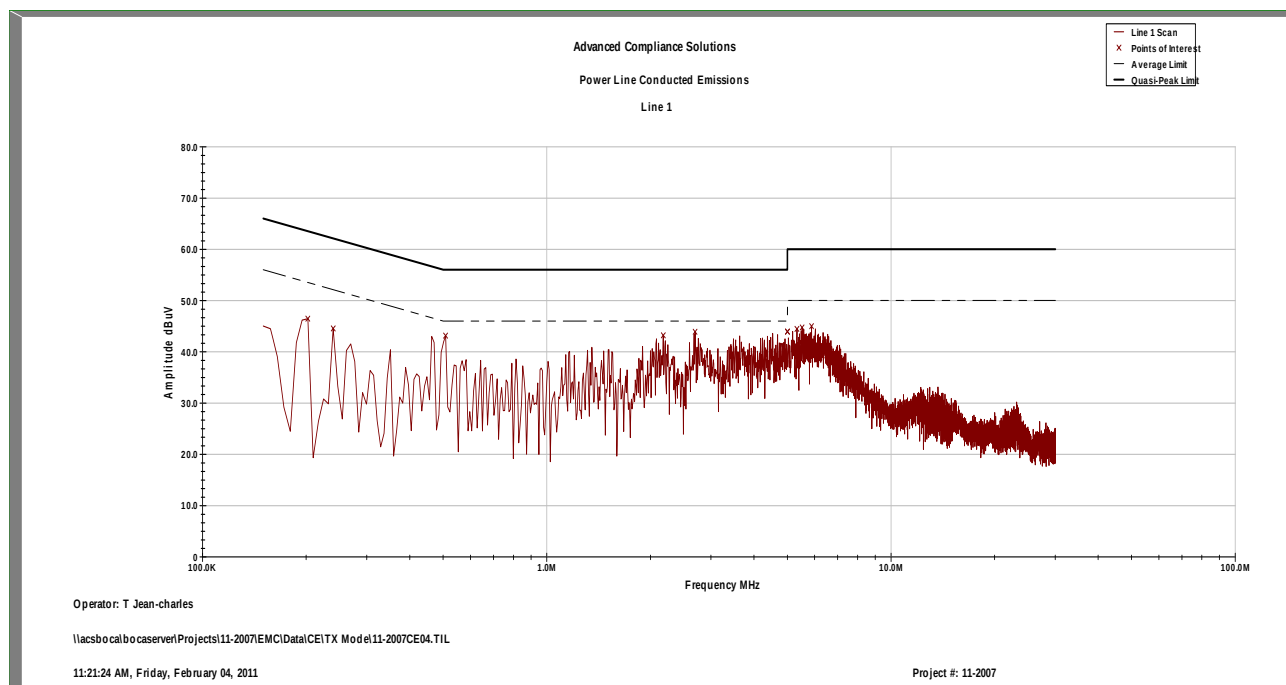


Figure 7.2.2-1: Conducted Emission Line 1

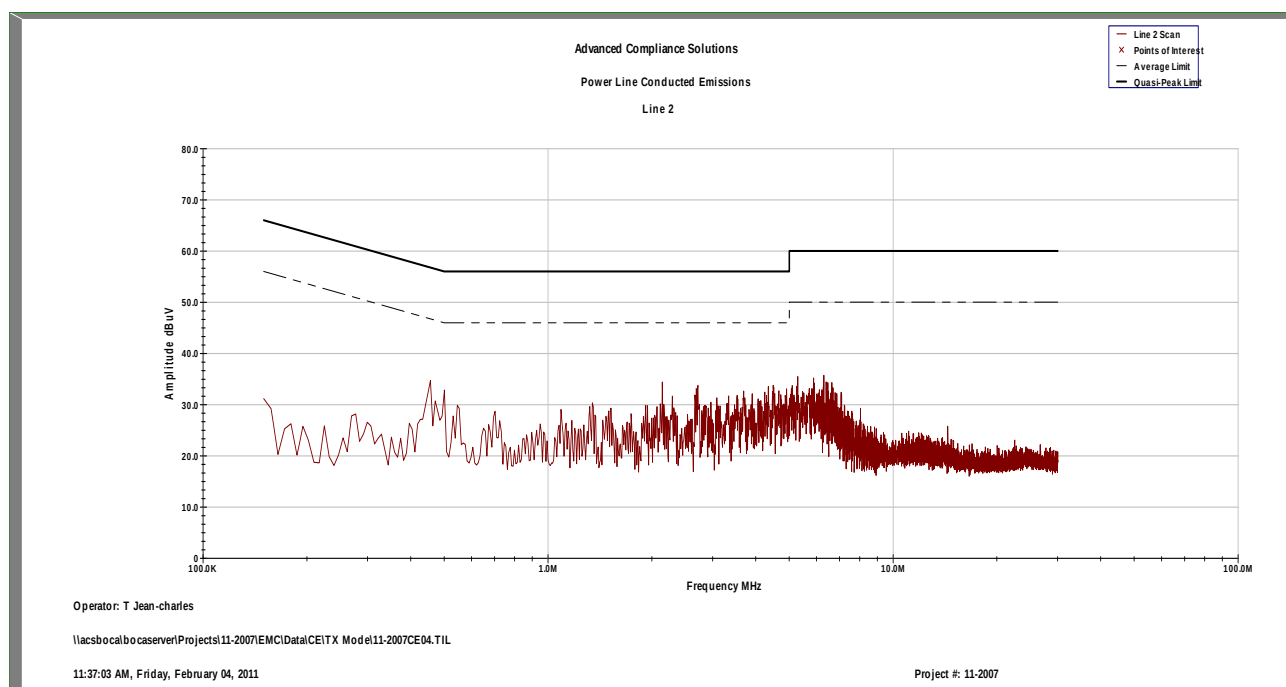


Figure 7.2.2-2: Conducted Emission Line 2

Table 7.2.2-2: Power Line Conducted EMI Results

Frequency (MHz)	Uncorrected Reading (dBμV)		Total Correction Factor (dB)	Corrected Level (dBμV)		Limit (dBμV)		Margin (dB)	
	Quasi- Peak	Average		Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
Line 1									
0.486	30.889	21.84	0.35	31.24	22.19	56.23	46.23	25.0	24.0
0.507	42.776	37.803	0.33	43.11	38.14	55.88	45.88	12.8	7.7
2.347	38.579	30.094	0.39	38.97	30.49	56.00	46.00	17.0	15.5
2.933	39.5	29.855	0.39	39.89	30.25	56.00	46.00	16.1	15.8
4.659	38.305	30.832	0.48	38.78	31.31	56.00	46.00	17.2	14.7
4.763	36.543	29.734	0.48	37.02	30.21	56.00	46.00	19.0	15.8
4.804	36.954	13.519	0.48	37.43	14.00	56.00	46.00	18.6	32.0
4.962	37.517	30.272	0.48	38.00	30.75	56.00	46.00	18.0	15.3
5.004	37.975	30.637	0.48	38.46	31.12	60.00	50.00	21.5	18.9
5.866	38.694	31.711	0.64	39.34	32.35	60.00	50.00	20.7	17.6
Line 2									
0.159	45.334	34.166	0.56	45.90	34.73	65.53	55.53	19.6	20.8
0.197	40.153	30.449	0.55	40.70	31.00	63.72	53.72	23.0	22.7
0.472	41.895	36.892	0.41	42.31	37.30	56.49	46.49	14.2	9.2
3.582	37.952	31.209	0.54	38.49	31.75	56.00	46.00	17.5	14.3
5.475	36.764	30.568	0.67	37.44	31.24	60.00	50.00	22.6	18.8
5.910	38.308	31.745	0.75	39.06	32.50	60.00	50.00	20.9	17.5
5.99091	38.614	30.279	0.77	39.38	31.05	60.00	50.00	20.6	19.0
6.26069	33.038	27.01	0.65	33.69	27.66	60.00	50.00	26.3	22.3
6.32085	38.437	31.117	0.66	39.10	31.78	60.00	50.00	20.9	18.2
6.45005	38.147	30.453	0.69	38.83	31.14	60.00	50.00	21.2	18.9

NOTES:

The EUT was charging while the IDEN TX was turned on at 896 MHz.

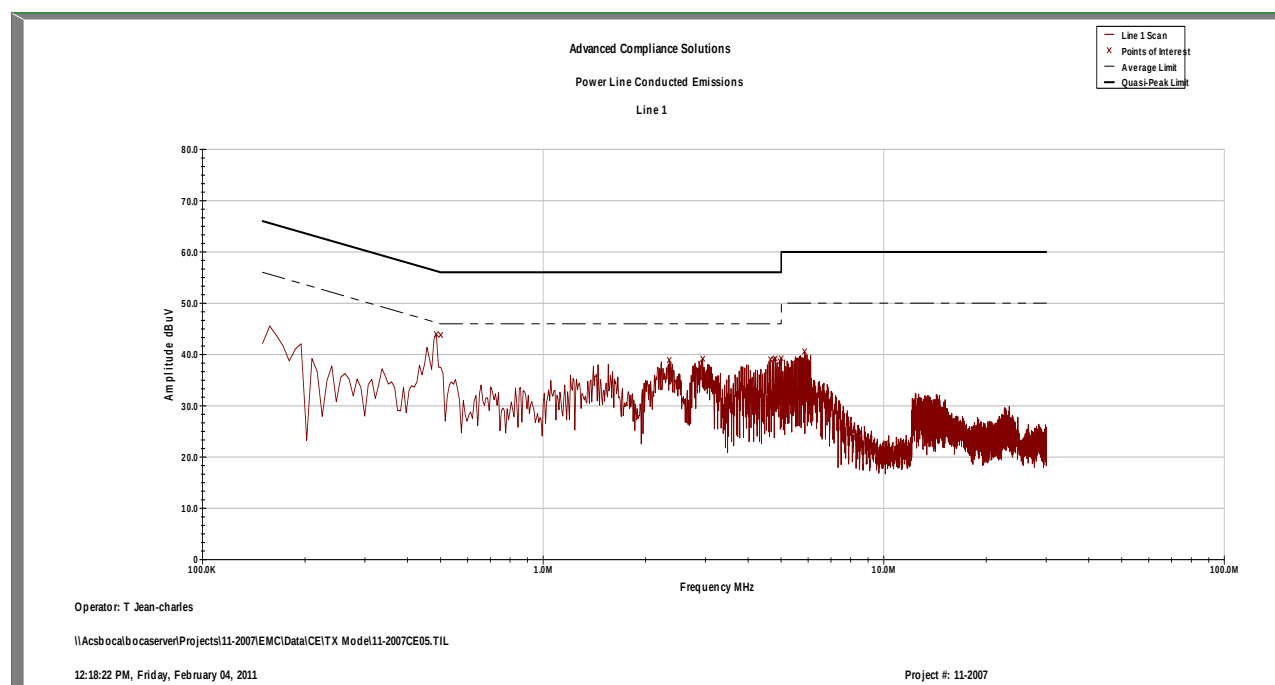
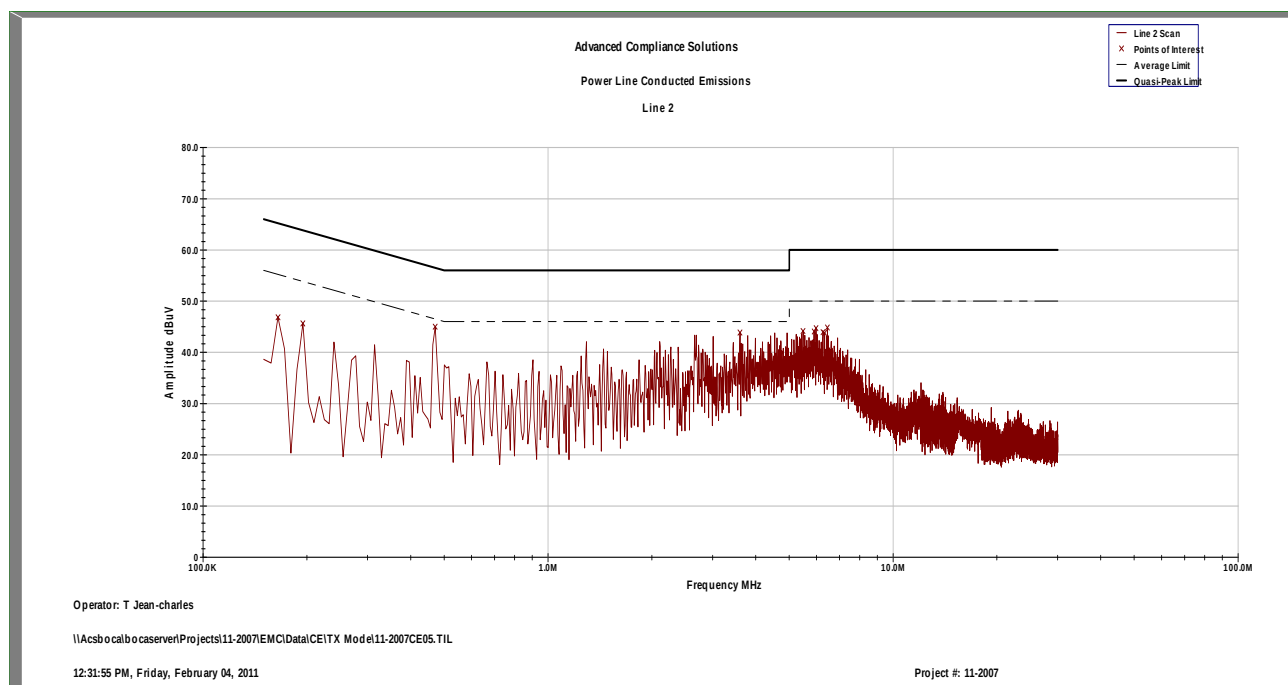


Figure 7.2.2-3: Conducted Emission Line 1

**Figure 7.2.2-4: Conducted Emission Line 2**

8.0 CONCLUSION

In the opinion of ACS, Inc. the model H80XAH6QR2AN, manufactured by Motorola, Inc., meets all the requirements of FCC Part 90 and Part 24 as well as IC RSS-119 and RSS 134 as applicable.

End Report