CLASS B VERIFICATION MEASUREMENTS

UNDER TITLE 47 CFR, PART 15.109(a)

For

Motorola, Inc.

Enhanced Power Pad (E-Pad)

Two Physically and Electrically Identical Models as defined by Part 2.908

Model: F4421A with the g20, Dual band GPRS & Bluetooth

Model: F4426A with the g20, Dual band GPRS & Bluetooth

And

Conducted Emissions under Part 15.107 (a) for the Universal Office Dock used to charge the Enhanced PowerPad

December 31, 2003

Prepared By

Spectrum Technology, Inc.
209 Dayton Street
Edmonds, WA 98020
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VERIFICATION

TABLE OF CONTENTS

TEST RESULTS AND DATA

SPECTRUM
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209 Dayton Street, Suite 205
Edmonds, WA 98020-3581 425 771-4482 425 771-9283 *Fax*

December 31, 2003

Federal Communications Commission
Authorization and Standards Division
7435 Oakland Mills Rd.
Columbia, M.D. 21046

Re: Model: F4421A and F4426A with the g20, Dual band GPRS & Bluetooth

Gentlemen:

Spectrum Technology Incorporated has tested this digital device in accordance with the requirements contained in the appropriate Commission Regulations. To the best of my knowledge, these tests were performed using measurement procedures consistent with the Industry or Commission standards and demonstrates that the equipment complies with the published standard. We are unable to warrant against unpublished changes in requirements. The applicable rules are listed in the following test report.

The open area test site used for the radiated emissions measurements is located at Fluke Park II in Everett, Washington. The site information required by Part 2.98, measured in accordance with ANSI C63.4-2001, was most recently renew with the FCC and accepted by the FCC Sampling and Measurements Branch in August 2001.

This site is also on file with Industry Canada for the performance of radiated emissions measurements. Test site information required by RSS-212, Issue 1 (provisional) was most recently renewed with IC in January 2002. The site file number is IC 2089.

Sincerely,

Rod Munro
President

MOTOROLA

Motorola Communications Israel Ltd. (MCIL)

3 KREMENETSKI ST. TEL-AVIV 67899 ISRAEL PHONE: 03-5658888 P.O.B. 25016 TEL-AVIV 61250 TELEX: 33569 MOTIL IL. FAX: 03-5624925

December 14, 2003

Rod Munro
Spectrum Technology, Inc.
209 Dayton, Suite 205
Edmonds, WA 98020

Re: Enhanced PowerPad

Gentlemen,

This letter is to confirm that the device verified for Part 15 Class B on November 5, 2003, designated as the Motorola, Inc., Enhanced PowerPad Model 4421A and 4426A is fully representative of the production units.

The Models 4421A and 4426A are physically and electrically identical as defined by Part 2.908.

During testing, no modifications were necessary for compliance; consequently no changes will be made to the products that affect its EMI characteristics.

Sincerely,

Shlomo Assaf

Product manager

TEST: **CONDUCTED SPURIOUS EMISSIONS**

Manufacturer: Motorola, Inc.

Name: Enhanced PowerPad

Model: F4421A and F4426A with the g20, Dual band GPRS & Bluetooth

Setup:

The equipment under test (EUT) was set up in accordance with the provisions of ANSI C63.4-2001, Section 7, on a 1 X 1.5-meter non-conductive test table at our Edmonds, Washington facility. The tabletop is 80 cm above a 2.5 x 2-meter horizontal ground plane and 40 cm forward from a 2.25 X 2.4-meter vertical ground plane. The two ground planes are continuously grounded along the common seam. The two 50 ohm/ 50 uHy Line Impedance Stabilization Networks (LISN) are grounded to the horizontal ground plane. The EUT was placed in a typical operational arrangement following the 10-cm spacing as detailed in Section 6.2 and 11.2, and the power cord of the EUT plugged into the first LISN. The signal output of this LISN was fed to the Agilent E7405 EMC analyzer using a 9 kHz bandwidth, which served as the measuring instrument. The peripheral equipment was powered from a separate LISN.

Discussion:

Measurements of the AC power line conducted spurious emissions were made with the Motorola Universal Office Dock (UOD) set up in a representative maximum system configuration. The UOD is the charging rack for the Enhanced PowerPad (Epad) which can operate during the charging process. The frequency range from 150 kHz to 30 MHz was measured in detail. No modifications were made prior to the final compliance test.

Preliminary measurements were made as described in Section 7.2.3. The EUT was set up as an operational system. The only external port on the UOD, an ethernet port was connected with a 1 meter length of standard Cat 5 cable to a Dell Laptop PC Model: PPO1L Latitude C600, the only peripheral equipment connected to the EUT. Measurements were made for the AC power cord that powered the UOD. Excess I/O cable lengths were draped .5 m straight down behind the units then back up to the device used to terminate the line. The system cables were carefully tuned during the preliminary measurements on all frequencies of significance endeavoring to maximize the emissions observed. The test setup photos that follow detail the exact cable and equipment configuration for this test.

The Universal Office Dock with a maximum configuration of 9 Enhanced PowerPads inserted, turned on and fully operational while the batteries were charging. One of the nine units was set up to transmit with both transmitters active simultaneously during the

measurements. During the preliminary measurements this E-Pad was set to operate with simultaneously transmit on the first the low, then mid and finally the high channels respectively in multiple sets of measurements covering operational range of both transmitters. Note that no measurable change in the conducted emissions activity was observed when the two transmitters were turned on or off or varied over the channel combinations listed below.

All of the following channel combinations were investigated during the preliminary measurements:

g20			Bluetooth	
Channel	Frequency MHz		Channel	Frequency MHz
128	824.2	and	1	2402
190	836.6	and	40	2441
251	848.8	and	79	2480
512	1850.2	and	1	2402
661	1880.0	and	40	2441
810	1909.8	and	79	2480

Final measurements were made as described in Section 7.2.3 while the EUT was fully functional as it would be in normal operation with it's only I/O port terminated in a representative fashion. The equipment had only one basic mode of operation, that being charging up to nine Enhanced PowerPads with the network interface connection active. The final measurements were made with the g20 transmitter set to 824.2 MHz and the Bluetooth intentional radiator set at 2402 MHz.

The following page shows the measured results of the EUT emission profile. The spectrum was observed from .15 to 30 MHz. The Class B average limits are: 56 to 46 dBuV from (0.15 to .5 MHz), 46 dBuV from (.5 to 5 MHz) and 50 dBuV from (5 to 30 MHz).

The conducted emissions were measured with Quasi-peak and Average detectors during the testing. The emissions results are reported for the "hot" and the "neutral" conductors, each with respect to ground at the power terminal. None of the emissions measured with the Quasi-peak detector exceeded the Average or QP limits. Further, none of the emissions measured with the Average emissions detector exceeded the Average limits.

Conclusion

The Motorola Universal Office Dock when charging nine of the Enhanced Power Pad Models: F4421A or F4426A, met the conducted emissions requirements for Class B digital devices under Title 47 CFR, Para. 15.107(a), and for intentional radiators under 15.207(a).

TEST: CONDUCTED SPURIOUS EMISSIONS TEST RESULTS

AC Conducted Emissions for the Motorola Universal Office Dock used to charge the Enhanced PowerPad

Quasi-Peak and Average Limits specified under Part 15.107(a) &15.207(c)

Frequency Range from .15 to 30 MHz was investigated

Location: Edmonds, WA lab facility Date: 12/31/03

Data from "Neutral" conductor line 1

	Freq. MHz	Peak Ampl. dBuV	Qp Ampl. dBuV	Limit QP dBuV	Avg Ampl. dBuV	Limit Avg dBuV
1	16.235512	44.842701	43.663700	60	**43.350700**	**50**
2	15.928397	37.525700	36.682701	60	35.424702	50
3	17.795933	43.359699	42.915699	60	41.546700	50
4	16.270582	44.717701	43.393700	60	43.104698	50
5	16.234846	44.776699	**43.691700**	**60**	43.292702	50
6	26.214976	28.612700	25.611700	60	19.731701	50
7	26.217002	28.719700	25.388700	60	18.723700	50

Data from "Hot" conductor line 2

	Freq. MHz	Peak Ampl. dBuV	Qp Ampl. dBuV	Limit QP dBuV	Avg Ampl. dBuV	Limit Avg dBuV
1	14.220024	34.114700	33.129700	60	**30.639700**	**50**
2	16.249207	37.602699	32.590698	60	29.006701	50
3	18.306804	39.420700	33.658699	60	27.243700	50
4	20.317873	41.081699	**35.864700**	**60**	30.154699	50
5	22.209234	40.196701	35.161701	60	29.185699	50
6	25.944901	37.660702	31.082701	60	19.153700	50

Note: Maximum level in bold

TEST: **FIELD STRENGTH OF RADIATED EMISSIONS**

Manufacturer: Motorola, Inc.

Name: Enhanced PowerPad

Model: F4421A and F4426A with the g20, Dual band GPRS & Bluetooth

Setup:

The equipment under test (EUT) was configured and operated in accordance with the applicable provisions of ANSI C63.4-2001, Section 6 and 8. The EUT was placed on a 80 cm height, 1 X 1.5 m non-metallic turntable that sits above the 15 X 30 meter ground plane at Spectrum's Open Area Test Site. There were no power cords as the device was battery operated. The antennas (dipoles, bi-conical or log-periodic) were mounted on a tower spaced at a 3 meters distance, and arranged for adjustment in height (1-4 meters) and V/H orientation to maximize the emissions levels when combined with turntable rotation of the EUT. An Agilent E7405 EMC analyzer, using 120 kHz bandwidth and a HP 8447F OPT H64 Amplifier were used for the measuring instrumentation.

Discussion:

No modifications were required prior to final radiated emissions measurements as reported herein.

The EUT was the Motorola, Inc., Enhanced Power Pad (E-Pad), a battery operated hand held data terminal designed for field applications where fast data acquisition and wireless communication is required. The E-Pad hosts a Motorola g20 GPRS Dual Band Wireless Data Modem, and a Bluetooth Intentional Radiator. The first transmitter the g20, is a WAN GPRS radio modem that provides packet data connectivity over the two GPRS bands: 850MHz and PCS1900. The channel access technology is GSM. The modulation type is GMSK. The second transmitter is a Bluetooth radio modem. This Frequency Hopping Spread Spectrum radio modem works in the 2.4GHz band and provides connectivity at a short distance (up to 10m). The maximum raw data rate is 1Mbit/s. The modulation type is GFSK. The radio antennas are internally integrated within the terminal.

The Enhanced PowerPad is also equipped with an integrated laser beam Bar Code Reader, IrDA transceiver and a resistive digitizer. The E-Pad is totally self contained and operates stand-alone. The E-Pad has no external I/O ports. The EUT was powered with a fully charged 7.2 V / 2400 mAh Lithium ION battery.

This stand alone unit was tested as a representative configuration of the product series.

Preliminary measurements were made as described in Section 8.3.1.1 while the system was investigated operating in the following modes:

1) E-Pad operating digital device active only, no transmitters turned on.

2) E-Pad operating with the Bluetooth transmitter on low, mid and hi channel.

3) E-Pad operating with the g20 receiver on, high mid and low channels in both cellular and PCS bands to check receiver LO emissions.

During the preliminary measurements the E-Pad was set up at the OATS facility with the receive antenna in close proximity, < .5 meter distance. The E-Pad was operated in the above modes in an attempt to identify measurable emission frequencies. The following g20 receiver LO frequencies and their respective harmonics to 5 GHz were checked for emissions.

Channel	Rec. Freq.	Rec. LO syn	1st LO Rec.
128	869.2	695.36	3476.8
190	881.6	705.28	3526.4
251	893.8	715.04	3575.2
512	1930.2	772.08	3860.4
661	1960.0	784.00	3920.0
810	1989.8	795.92	3979.6

The final OATS configuration is shown in photographs included in this report. Final measurements of the receiver emissions were made from 30 to 5000 MHz at three meters. Final digital device measurements were made from 30 - 1000 MHz as specified in Section 8.3.1.2 and were made at three meters.

Please note that no radiated emissions from the EUT were measurable at 3 meters within 20 dB of the Part 15.109(a) limit. Accordingly no emissions are reported as allowed under Part 15.31(o), which states *"The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated by more than 20 dB below the permissible limit value need not be reported unless specifically required elsewhere in this Part".*

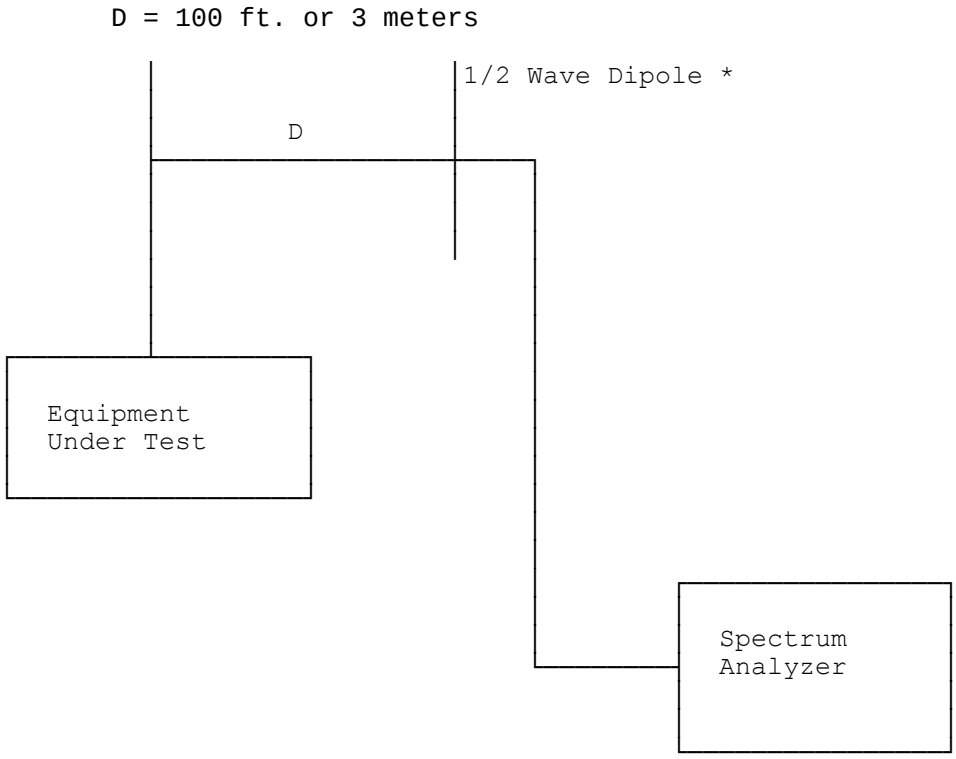
Conclusion:

The Motorola Enhanced Power Pad Model: F4421A and F4426A with the, Dual band GPRS Wireless Modem & Bluetooth capability, when operated as discussed above, meets the radiated emissions requirements for a receivers and Class B digital devices under Title 47 CFR, Para. 15.109(a).

EXHIBIT VII - Test Set-Up Procedures

BLOCK DIAGRAM #1

Radiated Spurious Emissions Test Set Up



See Equipment List for Models

* 1/2 Wave Dipole 30-1000 MHz or BiConilog
Dual Ridged Guide Antenna or Broadband Log Periodic 1-18 GHz
Standard Gain Horn 18 – 26.5 GHz

Test Equipment List A

SPECTRUM TECHNOLOGY, INC.

Equipment	Manufacturer/Model	Serial Number	Cal Date/Due Date	
EMC Analyzer	Agilent Model: E7405A 9kHz – 26.5 GHz	MY42000087	10/23/03	10/23/04
Spectrum Analyzer	Hewlett-Packard 8562A 10kHz - 22 GHz	08562-60062	12/17/02	12/17/03
Amplifier 9 kHz-1300 MHz OPT H64	Hewlett-Packard 8447F	2727A02208	12/17/02	12/17/03
Amplifier .01 –26.5 GHz	Hewlett-Packard 83006A	3104A00167	12/18/02	12/18/03
Service Monitor	IFR FM/AM 500A 4103		---	
Oscilloscope	Kikusui C055060	6132295		---
Power Supply	Astron VS35	8601266		---
Voltmeter	Fluke 8020A	N2420658		---
Multimeter	Fluke 25	3710310		---
Wattmeter	Bird 43	56227		---
High pass filter 2-18 GHz	E/M, Inc.#FH-2/18	SN95-11		---
Notch filter 2-18 GHz	Custom notch 2.4 – 2.485 GHz	S002		---
Band Stop filter 2 – 18 GHz	Custom 1.7 – 2.5 GHz	S003		
RF Termination	Bird 8135	10004		---
Dual Phase LISN	STI per MP-4 50 ohm/50 uH	02	2/11/03	2/11/04
Dual Phase LISN	Compliance Design 50 ohm/50 uH	8012-50R-24-BNC	2/11/03	2/11/04
Audio Generator	Hewlett-Packard 205-AG	8689	---	
Thermometer	Fluke 52	3965185	---	
Test Line	Simulator, Teltone TLS-2	none	---	
Turn Table, RC	EMCO 1060-2M	8912-1415	---	
Antenna Mast, RC	Compliance Design, Inc.	M100	---	

Antennas:

Dipole Set 30 – 1000 MHz	EMCO Model: 3121C	1335	03/26/00	09/26/04
Dipole Set 30 – 1000 MHz	EMCO Model: 3121C	1336	03/26/00	09/26/04
Bi-Conical 20 – 200 MHz	EMCO 3104	3763	reference only	
Bi-Conical 30 – 200 MHz	EMCO 3104C	9401-4635	reference only	
Log-Periodic 200 – 1000 MHz	EMCO 3146	1754	reference only	
Bi-ConiLog 28 – 5000 MHz	EMCO 3141	1125	05/20/02	11/20/03
Active Loop .1 - 30 MHz	EMCO 6502	9107-2645	reference only	
Dual Ridged Guide Ant. 1 – 18 GHz	Electro-metrics RGA-60	6225	1/106/03	1/10/04
Standard Gain Horn 18 – 26.5 GHz	EMCO 3160-09	21138	1/21/03	1/21/04

Rev. 09/03

EUT Radiated Emissions Setup

The EUT was tested in three mutually orthogonal planes during preliminary measurements with the antenna within .5 meter. The digital device emissions levels were very low regardless of the position. The unit was tested laying flat on the table as a representative worst case position.

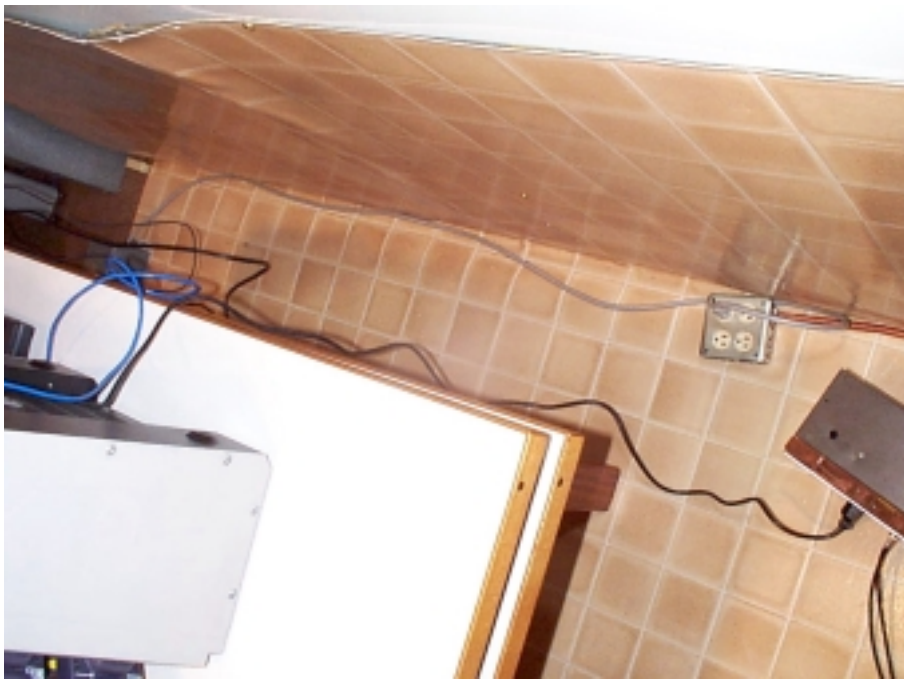
Front View of EPad With Foam Support To Hold The Terminal

View of EPad Terminal On It's Back as it was when measuring the Part 15.109

EUT Conducted Emissions Setup

Universal Office Dock Front View

Right Side



Left Side