



# PCTEST ENGINEERING LABORATORY, INC.

6660-B Dobbin Road, Columbia, MD 21045 USA  
Tel. 410.290.6652 / Fax 410.290.6554  
<http://www.pctestlab.com>



## CERTIFICATE OF COMPLIANCE FCC Part 24 & 22 Certification

**Applicant Name:**  
Panasonic Corporation of North America  
One Panasonic Way, 4B-8  
Secaucus, NJ 07094  
United States

**Date of Testing:**  
July 7 - July 10, 2006  
**Test Site/Location:**  
PCTEST Lab, Columbia, MD, USA  
**Test Report Serial No.:**  
0606160519-W

**FCC ID:** ACJ9TGCF-742

**APPLICANT:** PANASONIC CORPORATION OF NORTH AMERICA

**Application Type:** Certification  
**FCC Classification:** PCS Licensed Transmitter (PCB)  
**FCC Rule Part(s):** §24(E), §22(H); §2  
**EUT Type:** Panasonic Toughbook Model: CF-74  
**Model(s):** CF-74  
**Tx Frequency Range:** 826.40 - 846.60 MHz (Cellular WCDMA-HSDPA) /  
1852.4 - 1907.6 MHz (PCS WCDMA-HSDPA)  
**Rx Frequency Range:** 871.4 - 891.8 MHz (Cellular WCDMA-HSDPA) /  
1932.4 - 1995.6 MHz (PCS WCDMA-HSDPA)  
**Max. RF Output Power:** 0.205 W ERP Cellular WCDMA-HSDPA (23.120 dBm) /  
0.228 W EIRP PCS WCDMA-HSDPA (23.570 dBm)  
**Emission Designator(s):** 4M17F9W (Cellular WCDMA-HSDPA) / 4M18F9W (PCS WCDMA-HSDPA)  
**Test Device Serial No.:** *identical prototype* [S/N: 6BKSA00246R]

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947.



I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

**Grant Conditions:** Power output listed is ERP for Part 22 and EIRP for Part 24.

*PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.*



  
Randy Ortanez  
President



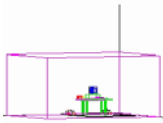
PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 1 of 26

## T A B L E O F C O N T E N T S

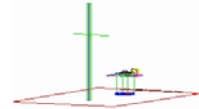
1.0	SCOPE .....	3
2.0	INTRODUCTION .....	4
	2.1 TESTING FACILITY .....	4
	2.2 MEASUREMENT PROCEDURE .....	4
3.0	INSERTS .....	5
4.0	DESCRIPTION OF TESTS.....	6
	4.1 OCCUPIED BANDWIDTH EMISSION LIMITS .....	6
	4.2 CELLULAR - BASE FREQUENCY BLOCKS.....	6
	4.3 CELLULAR - MOBILE FREQUENCY BLOCKS.....	6
	4.4 PCS - BASE FREQUENCY BLOCKS .....	7
	4.5 PCS - MOBILE FREQUENCY BLOCKS.....	7
	4.6 FREQUENCIES .....	8
	4.7 RADIATED SPURIOUS AND HARMONIC EMISSIONS .....	8
	4.8 FREQUENCY STABILITY / TEMPERATURE VARIATION .....	8
5.0	CONDUCTED OUTPUT POWER.....	10
	5.1 SAR MEASUREMENT CONDITIONS FOR WCDMA.....	10
	5.2 OUTPUT POWER VERIFICATION.....	10
6.0	EFFECTIVE RADIATED POWER .....	11
	6.1 EFFECTIVE RADIATED POWER OUTPUT DATA .....	11
7.0	EQUIVALENT ISOTROPIC RADIATED POWER.....	12
	7.1 EQUIVALENT ISOTROPIC RADIATED POWER OUTPUT DATA.....	12
8.0	RADIATED MEASUREMENTS .....	13
	8.1 CELLULAR WCDMA RADIATED MEASUREMENTS .....	13
	8.2 PCS WCDMA RADIATED MEASUREMENTS .....	16
9.0	FREQUENCY STABILITY .....	19
	9.1 FREQUENCY STABILITY (CELLULAR WCDMA).....	19
	9.2 FREQUENCY STABILITY (PCS WCDMA).....	21
10.0	PLOT(S) OF EMISSIONS.....	23
11.0	TEST EQUIPMENT .....	24
12.0	SAMPLE CALCULATIONS.....	25
13.0	CONCLUSION.....	26
ATTACHMENT A:	TEST PLOTS	
ATTACHMENT B:	TEST SETUP PHOTOGRAPHS	
ATTACHMENT C:	EXTERNAL PHOTOGRAPHS	
ATTACHMENT D:	INTERNAL PHOTOGRAPHS	

<b>PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT</b>		<b>FCC MEASUREMENT REPORT (WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 2 of 26

## 1.0 SCOPE



Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.





### §2.1033 General Information

Applicant Name: Panasonic Corporation of North America  
 Address: One Panasonic Way, 4B-8  
 Secaucus, NJ 07094  
 United States

- FCC ID: ACJ9TGCF-742
- Quantity: Quantity production is planned
- Emission Designators: 4M17F9W (Cellular WCDMA-HSDPA) /  
4M18F9W (PCS WCDMA-HSDPA)
- Tx Freq. Range: 826.40 - 846.60 MHz (Cellular WCDMA-HSDPA) /  
1852.4 - 1907.6 MHz (PCS WCDMA-HSDPA)
- Rx Freq. Range: 871.4 - 891.8 MHz (Cellular WCDMA-HSDPA) /  
1932.4 - 1995.6 MHz (PCS WCDMA-HSDPA)
- Max. Power Rating: 0.205 W ERP Cellular WCDMA-HSDPA (23.120 dBm) /  
0.228 W EIRP PCS WCDMA-HSDPA (23.570 dBm)
- FCC Classification(s): PCS Licensed Transmitter (PCB)
- Equipment (EUT) Type: Panasonic Toughbook Model: CF-74
- Modulation(s): QPSK
- Frequency Tolerance:  $\pm 0.00025\%$  (2.5 ppm)
- FCC Rule Part(s): § 24(E), §22(H)
- Dates of Tests: July 7 - July 10, 2006
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 0606160519-W

**Note: Deviation from measurement procedure - None**

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 3 of 26

## 2.0 INTRODUCTION

### 2.1 Testing Facility

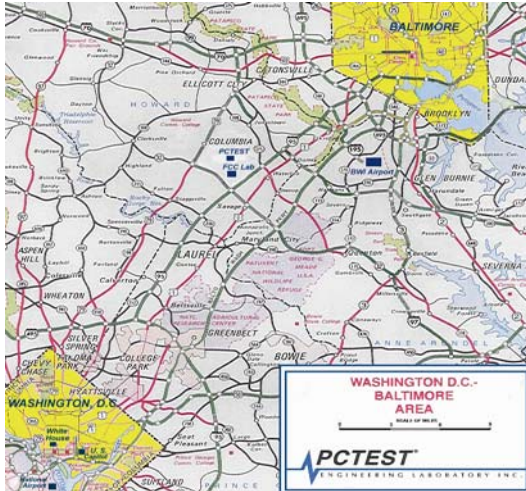


Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

These measurement tests were conducted at PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 1992.

### 2.2 Measurement Procedure

The radiated spurious measurements were made outdoors at a 3-meter test range (see Figure 2). The equipment under test is placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

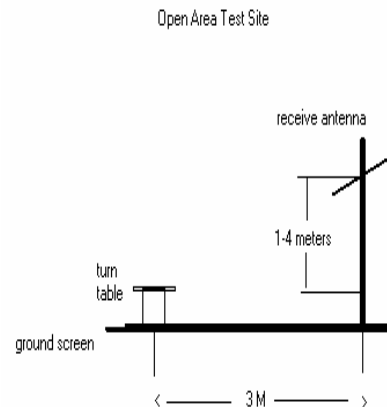




Figure 2. Diagram of 3-meter outdoor test range

<b>PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT</b>		<b>FCC MEASUREMENT REPORT (WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 4 of 26

### 3.0 INSERTS

Function of Active Devices (Confidential)

Block & Schematic Diagrams (Confidential)



Operating Instructions

Parts List & Tune-Up Procedure (Confidential)

Description of Freq. Stabilization Circuit (Confidential)

Description for Suppression of Spurious Radiation, for Limiting Modulation, and Harmonic Suppression Circuits (Confidential)

*\* These exhibits are not included within this report.*

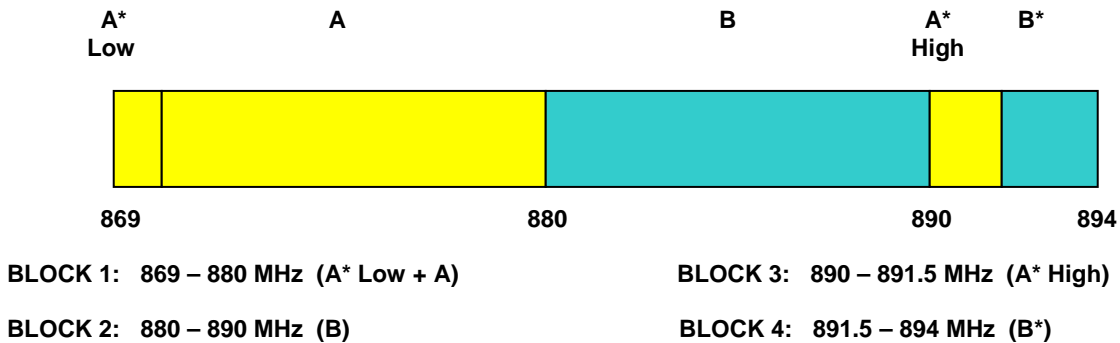
PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 5 of 26

## 4.0 DESCRIPTION OF TESTS

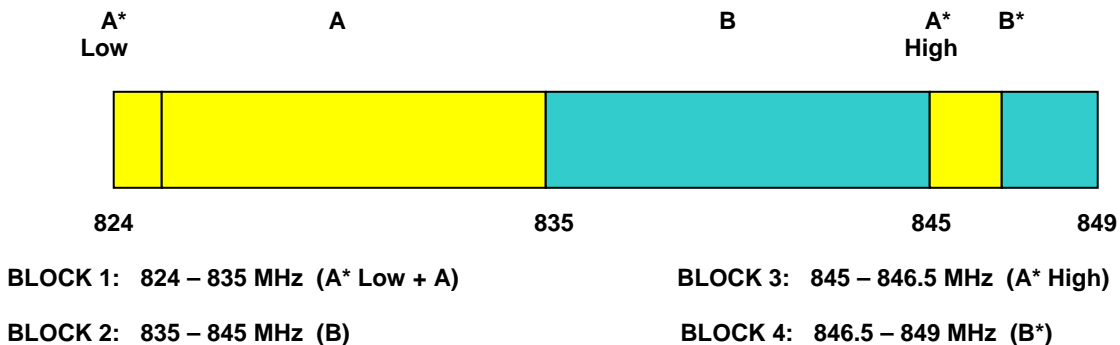
### 4.1 Occupied Bandwidth Emission Limits



- a. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB.
- b. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
- c. When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.
- d. The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

### 4.2 Cellular - Base Frequency Blocks

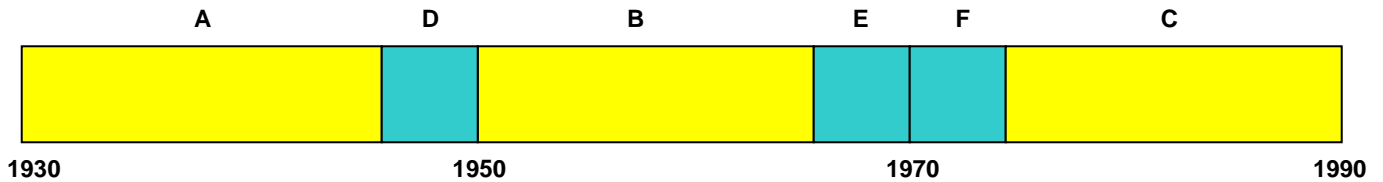


### 4.3 Cellular - Mobile Frequency Blocks



PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 6 of 26

#### 4.4 PCS - Base Frequency Blocks



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

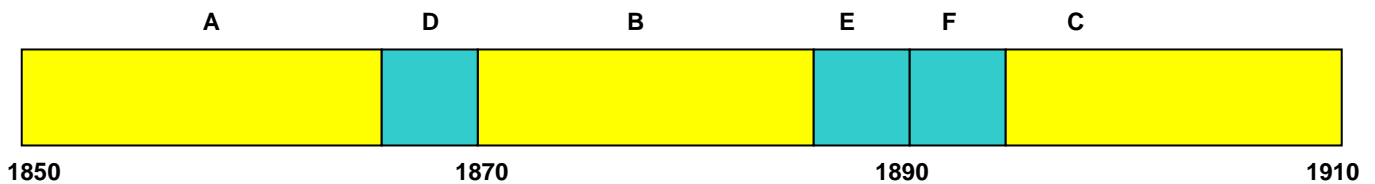
BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

#### 4.5 PCS - Mobile Frequency Blocks



BLOCK 1: 1850 – 1865 MHz (A)



BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 2: 1865 – 1870 MHz (D)

BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 6: 1895 – 1910 MHz (C)

<b>PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT</b>		<b>FCC MEASUREMENT REPORT (WCDMA-HSDPA)</b>		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 7 of 26

## 4.6 Frequencies

At the input terminals of the spectrum analyzer, an isolator (RF pad) and a high-pass filter are connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The high-pass filter (signals below 1.6 GHz) is to limit the fundamental frequency from interfering with the measurement of low-level spurious and harmonic emissions and to ensure that the preamplifier is not saturated.

## 4.7 Radiated Spurious and Harmonic Emissions

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration. This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

## 4.8 Frequency Stability / Temperature Variation



The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +60°C using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

*Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025$  ( $\pm 2.5$  ppm) of the center frequency.*

### **Time Period and Procedure:**

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (22°C to 25°C to provide a reference).
2. The equipment is subjected to an overnight “soak” at -30°C without any power applied.
3. After the overnight “soak” at -30°C (usually 14-16 hours), the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are made at 10°C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.



<b>PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT</b>		<b>FCC MEASUREMENT REPORT (WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 8 of 26



#### 4.8 Frequency Stability / Temperature Variation (Cont'd)

5. Again the transmitter carrier frequency and the individual oscillators are measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency measurements are at 10 intervals starting at -30°C up to +50°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

**NOTE: The EUT is tested down to the battery endpoint.**

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 9 of 26

## 5.0 CONDUCTED OUTPUT POWER

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

### 5.1 SAR Measurement Conditions for WCDMA

The following procedures were followed according to FCC "SAR Measurement Procedures for 3G Devices", June 2006.

### 5.2 Output Power Verification

The maximum output power is a measure of the maximum power the UE can transmit (i.e. the actual power as would be measured assuming no measurement error) in a bandwidth of at least  $(1 + \alpha)$  times the chip rate of the radio access mode.

The default test configuration is to configure an established radio link between the UE and a communication test set using a 12.2 kbps RMC (reference measurement channel) configured in Test Loop Mode 1. Maximum output power is verified according to 3GPP TS 34.121 Section 5.2.



1. Configure TPC (Transmit Power Control) set to "All 1"s.
2. RMC and AMR connections at 12.2 kbps are measured under 3.4 kbps SRB (signaling radio bearer)
3. Measure the mean power of the UE in a bandwidth of at least  $(1 + \alpha)$  times the chip rate of the radio access mode. The mean power shall be averaged over at least one timeslot.

Operating Band	Power Class 3		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
Band II	+24	+1/-3	+21	+2/-2
Band V	+24	+1/-3	+21	+2/-2

Table 5-1. 3GPP TS 34.121 Nominal Maximum Output Power

	Channel	HSDPA Inactive		HSDPA Active	
		12.2 kbps RMC	12.2 kbps AMR	12.2 kbps RMC	12.2 kbps AMR
UMTS	4132	20.48	20.43	20.45	20.41
	4175	20.39	20.45	20.53	20.51
	4233	20.47	20.52	20.38	20.44
PCS	9262	21.47	21.52	21.45	21.47
	9400	21.51	21.50	21.54	21.46
	9538	21.53	21.51	21.42	21.50

Table 5-2. Maximum Power Output Table for CF-74

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 10 of 26

## 6.0 EFFECTIVE RADIATED POWER

### 6.1 Effective Radiated Power Output Data

POWER: High (WCDMA Mode)

Freq. Tuned (MHz)	REF. LEVEL (dBm)	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
826.40	-18.153	V	0.205	23.120	Standard
835.00	-18.473	V	0.198	22.960	Standard
846.60	-18.493	V	0.204	23.090	Standard



Note: This unit was tested with its standard battery.

#### **NOTES:**

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

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## 7.0 EQUIVALENT ISOTROPIC RADIATED POWER

### 7.1 Equivalent Isotropic Radiated Power Output Data

#### Radiated measurements at 3 meters

<b>Supply Voltage:</b>	11.1 VDC
<b>Modulation:</b>	PCS WCDMA

FREQ. (MHz)	REF. LEVEL (dBm)	POL (H/V)	Azimuth (o angle)	EIRP (dBm)	EIRP (W)	Battery
1852.40	-19.921	V	60	23.160	0.207	Standard
1880.00	-19.681	V	60	23.570	0.228	Standard
1907.60	-20.011	V	60	23.410	0.219	Standard



Note: This unit was tested with its standard battery.

#### **NOTES:**

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

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Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 12 of 26

## 8.0 RADIATED MEASUREMENTS

### 8.1 Cellular WCDMA Radiated Measurements

#### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 826.40 MHz  
 CHANNEL: 4132 (Low)  
 MEASURED OUTPUT POWER: 23.120 dBm = 0.205 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.12 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1652.80	-84.13	6.10	-78.03	V	101.1
2479.20	-89.35	6.70	-82.65	V	105.8
3305.60	-89.58	6.80	-82.78	V	105.9

#### **NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT			FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
	Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 13 of 26

## 8.1 Cellular WCDMA Radiated Measurements (Cont'd)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 835.00 MHz  
 CHANNEL: 4175 (Mid)  
 MEASURED OUTPUT POWER: 23.120 dBm = 0.205 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.12 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1670.00	-84.83	6.10	-78.73	V	101.8
2505.00	-88.46	6.70	-81.76	H	104.9
3340.00	-89.48	6.80	-82.68	V	105.8

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 14 of 26

## 8.1 Cellular WCDMA Radiated Measurements (Cont'd)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 846.60 MHz  
 CHANNEL: 4233 (High)  
 MEASURED OUTPUT POWER: 23.120 dBm = 0.205 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.12 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1693.20	-84.94	6.10	-78.84	V	102.0
2539.80	-88.06	6.70	-81.36	H	104.5
3386.40	-89.08	6.80	-82.28	V	105.4

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 15 of 26

## 8.2 PCS WCDMA Radiated Measurements

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1852.40 MHz  
 CHANNEL: 9262 (Low)  
 MEASURED OUTPUT POWER: 23.570 dBm = 0.228 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.57 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3704.80	-74.95	8.70	-66.25	H	89.8
5557.20	-65.00	9.70	-55.30	H	78.9
7409.60	-79.43	9.90	-69.53	V	93.1

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 16 of 26

## 8.2 PCS WCDMA Radiated Measurements (Cont'd)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 9400 (Mid)  
 MEASURED OUTPUT POWER: 23.570 dBm = 0.228 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.57 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-75.10	8.70	-66.40	H	90.0
5640.00	-65.18	9.70	-55.48	V	79.0
7520.00	-79.13	9.90	-69.23	V	92.8

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 17 of 26

## 8.2 PCS WCDMA Radiated Measurements (Cont'd)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1907.60 MHz  
 CHANNEL: 9538 (High)  
 MEASURED OUTPUT POWER: 23.570 dBm = 0.228 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.57 dBc



FREQ. (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
3815.20	-74.24	8.70	-65.54	V	89.1
5722.80	-58.42	9.70	-48.72	H	72.3
7630.40	-78.93	9.90	-69.03	H	92.6

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-A-2001, Aug. 15, 2001:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3 MHz. For WCDMA signals, a peak detector is used with RBW = VBW = 5 MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1 MHz. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".



PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 18 of 26

## 9.0 FREQUENCY STABILITY

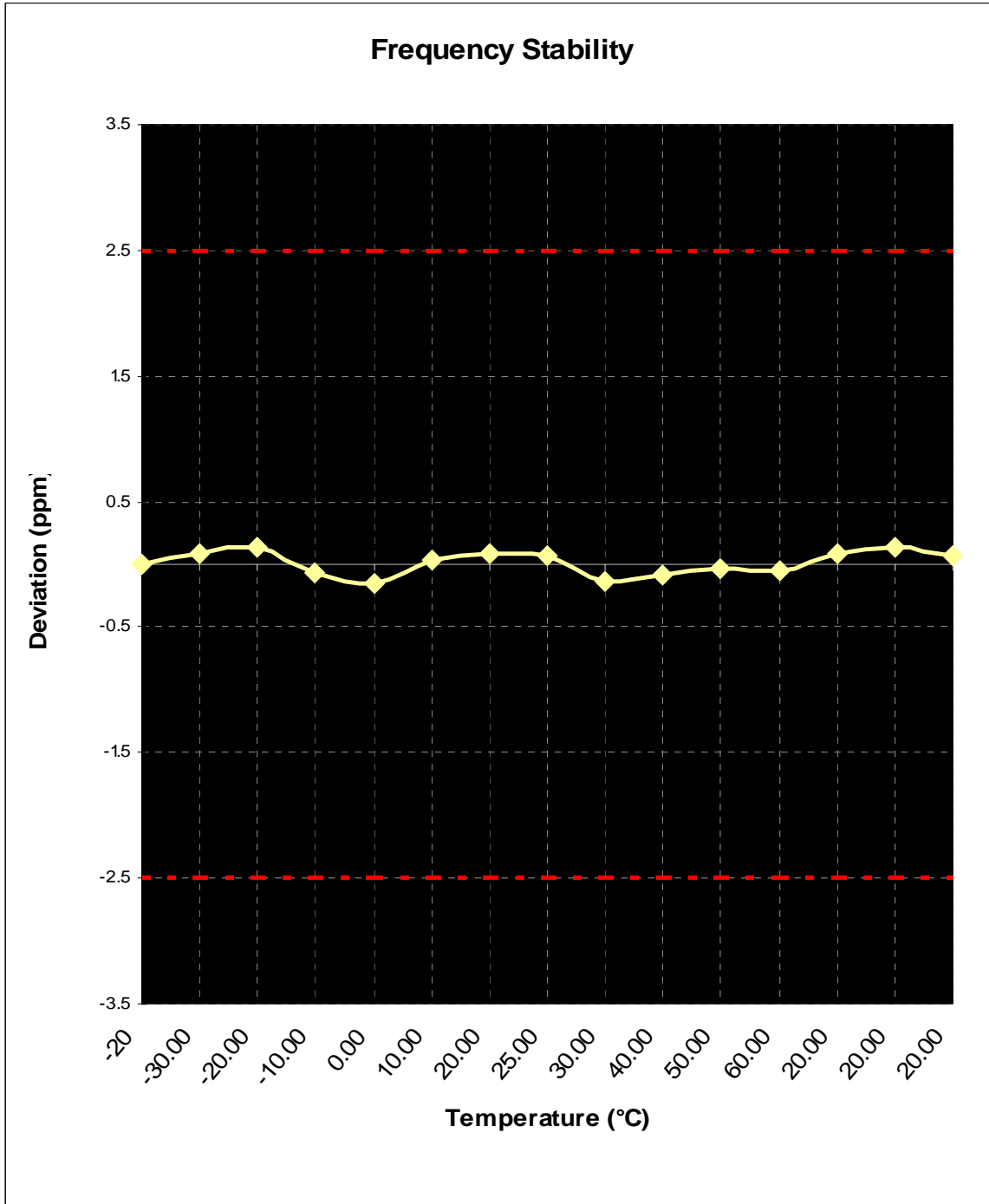
### 9.1 Frequency Stability (Cellular WCDMA)



OPERATING FREQUENCY: 835,000,009 Hz  
 CHANNEL: 4175  
 REFERENCE VOLTAGE: 11.1 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ. (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	11.10	+ 20 (Ref)	835,000,009	0.00	0.000000
100 %		-30	834,999,934	75.15	0.000009
100 %		-20	834,999,900	108.55	0.000013
100 %		-10	835,000,067	-58.45	-0.000007
100 %		0	835,000,134	-125.25	-0.000015
100 %		10	834,999,984	25.05	0.000003
100 %		20	834,999,934	75.15	0.000009
100 %		25	834,999,951	58.45	0.000007
100 %		30	835,000,126	-116.90	-0.000014
100 %		40	835,000,076	-66.80	-0.000008
100 %		50	835,000,042	-33.40	-0.000004
100 %		60	835,000,051	-41.75	-0.000005
85 %		9.44	20	834,999,934	75.15
115 %	12.77	20	834,999,900	108.55	0.000013
BATT. ENDPOINT	9.12	20	834,999,951	58.45	0.000007

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 19 of 26

## 9.1 Frequency Stability (Cellular WCDMA) (Cont'd)



<b>PCTEST™ PT. 22/24</b> <b>WCDMA-HSDPA</b> <b>TEST REPORT</b>		<b>FCC MEASUREMENT REPORT</b> <b>(WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 20 of 26

## 9.2 Frequency Stability (PCS WCDMA)



OPERATING FREQUENCY: 1,880,000,003 Hz

CHANNEL: 9400

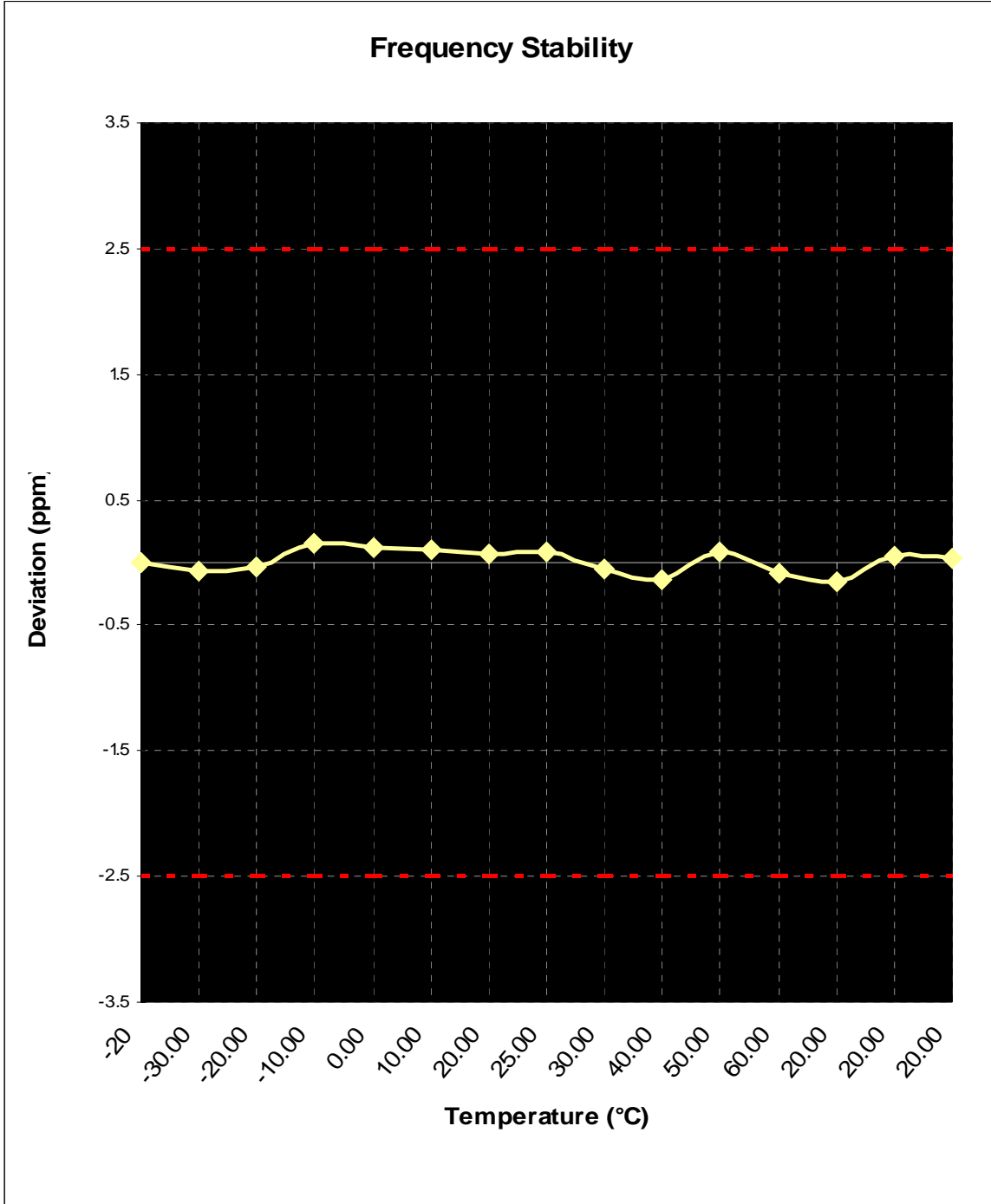
REFERENCE VOLTAGE: 11.1 VDC



DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQ. (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	11.10	+ 20 (Ref)	1,880,000,003	0.00	0.000000
100 %		-30	1,880,000,135	-131.60	-0.000007
100 %		-20	1,880,000,059	-56.40	-0.000003
100 %		-10	1,879,999,721	282.00	0.000015
100 %		0	1,879,999,777	225.60	0.000012
100 %		10	1,879,999,815	188.00	0.000010
100 %		20	1,879,999,871	131.60	0.000007
100 %		25	1,879,999,834	169.20	0.000009
100 %		30	1,880,000,097	-94.00	-0.000005
100 %		40	1,880,000,247	-244.40	-0.000013
100 %		50	1,879,999,853	150.40	0.000008
100 %		60	1,880,000,172	-169.20	-0.000009
85 %		9.44	20	1,880,000,304	-300.80
115 %	12.77	20	1,879,999,909	94.00	0.000005
BATT. ENDPOINT	9.15	20	1,879,999,928	75.20	0.000004

PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT		FCC MEASUREMENT REPORT (WCDMA-HSDPA)		Reviewed by: Quality Manager
Test Report S/N: 0606160519-W	Test Dates: July 7 - July 10, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 21 of 26



## 9.2 Frequency Stability (PCS WCDMA) (Cont'd)



<b>PCTEST™ PT. 22/24</b> <b>WCDMA-HSDPA</b> <b>TEST REPORT</b>		<b>FCC MEASUREMENT REPORT</b> <b>(WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 22 of 26

## 10.0 PLOT(S) OF EMISSIONS



(SEE ATTACHMENT A)

<b>PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT</b>		<b>FCC MEASUREMENT REPORT (WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 23 of 26

## 11.0 TEST EQUIPMENT

TYPE	MODEL	CAL. DUE DATE	CAL. INTERVAL	SERIAL No.
Microwave Spectrum Analyzer	Agilent E4448A (3Hz-50GHz)	09/19/06	Annual	US42510244
Spectrum Analyzer/Tracking Generator	HP 8591A (9kHz-1.8GHz)	09/12/06	Annual	3144A02458
Spectrum Analyzer	HP 8566B (100Hz-2.5GHz/2-22GHz)	12/22/06	Annual	3638A08713
Signal Generator	HP 8640D (500Hz-1GHz)	12/07/07	Annual	3613A00315
PSG Analog Signal Generator	Agilent E8257D (250kHz-20GHz)	03/08/07	Annual	MY45470194
5 Watt Amplifier	5S1G4 (800MHz-4.2GHz)	N/A	N/A	22332
Universal Radio Communication Tester	CMU200	04/20/07	Annual	836370/079
Universal Power Meter	Gigatronics 8651A (50MHz-18GHz)	07/28/07	Annual	1834052
Power Sensor	Gigatronics 80701A	04/11/07	Annual	1833460
Quasi-Peak Adapter	HP 85650A	08/09/06	Annual	2043A00301
Preamplifier	HP 8449B (1-26.5GHz)	12/22/06	Annual	3008A00985
Attenuation/Switch Driver	HP 11713A	12/22/06	Annual	N/A
Preselector	HP 85685A (20Hz-2GHz)	12/22/06	Annual	N/A
6dB Res BW Spec. Analyzer Display	OPT 462	12/22/06	Annual	3701A22204
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	12/19/06	Annual	0194-04082
Ailtech/Eaton Receiver	NM 37/57A (30MHz – 1GHz)	06/07/07	Annual	0805-03334
Broadband Amplifier (2)	HP 8447D (0.1 – 1300MHz)	N/A	N/A	2443A01900, 1937A03348
Horn Antenna	EMCO Model 3115 (1-18GHz)	08/25/07	Annual	9704-5182
Horn Antenna	EMCO Model 3116 (18-40GHz)	08/25/07	Annual	9203-2178
Roberts Dipoles	Compliance Design (1 set) A100	08/31/06	Annual	5118
EMCO Dipoles (2)	N/A	05/08/08	Annual	00023951
EMCO LISN (3)	3816/2, 3816/2, 3725/2	10/26/06	Annual	1077, 1079, 2099
10dB Attenuator	HP 8493B	N/A	N/A	N/A
Microwave Cables	MicroCoax (1.0-26.5GHz)	02/26/07	Annual	N/A
Shielded Screen Room	RF Lindgren Model 26-2/2-0	N/A	N/A	6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81	N/A	N/A	R2437 (PCT278)
Environmental Chamber	Associated Systems 1025	08/08/06	Annual	PCT285
OATS	N/A	12/31/2006	Tri-annual	N/A

**Table 11-1. Test Equipment**

<b>PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT</b>			<b>FCC MEASUREMENT REPORT (WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
	<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 24 of 26

## 12.0 SAMPLE CALCULATIONS

### Emission Designator

**Emission Designator = 4M26F9W**

WCDMA BW = 4.26 MHz

F = Frequency Modulation



9 = Composite Digital Info

W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

### Spurious Radiated Emission - PCS Band



**Example: Channel 9262 PCS Mode 2<sup>nd</sup> Harmonic (3704.80 MHz)**

The receive analyzer reading at 3 meters with the EUT on the turntable was  $-81.0$  dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of  $-81.0$  dBm on the receive analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3704.80 MHz. So 6.1 dB is added to the signal generator reading of  $-30.9$  dBm yielding  $-24.80$  dBm. The fundamental EIRP was 25.501 dBm so this harmonic was  $25.501$  dBm  $- (-24.80) = 50.3$  dBc.

<b>PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT</b>		<b>FCC MEASUREMENT REPORT (WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 25 of 26

## 13.0 CONCLUSION

The data collected shows that the Panasonic Toughbook Model: CF-74 FCC ID: ACJ9TGCF-742 complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.

<b>PCTEST™ PT. 22/24 WCDMA-HSDPA TEST REPORT</b>		<b>FCC MEASUREMENT REPORT (WCDMA-HSDPA)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0606160519-W	<b>Test Dates:</b> July 7 - July 10, 2006	<b>EUT Type:</b> Panasonic Toughbook Model: CF-74	<b>FCC ID:</b> ACJ9TGCF-742	Page 26 of 26