

# PCTEST Engineering Laboratory, Inc.

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# CERTIFICATE OF COMPLIANCE FCC Parts 24/22 Certification

**PANASONIC** 

Matsushita Mobile Communications Development Corporation of U.S.A. 1225 Northbrook Parkway, Suite 2-400

Suwanee, GA 30024

Attn: Pieter C. Seidel, Sr. System Test Engineer

Dates of Tests: April 06, 2001

Test Report S/N: 24/22.2100404194.NWJ Test Site: PCTEST Lab, Columbia MD

FCC ID

**NWJ10A006A** 

**APPLICANT** 

PANASONIC

Classification: Licensed Portable Transmitter Held to Ear (PCE)

FCC Rule Part(s): §24(E), §22(H), §2

EUT Type: Tri-Mode Dual-Band Phone (AMPS/TDMA)

Trade Name/Model: PANASONIC Atlas CE

Tx Frequency Range: 824.04 - 848.97 MHz (AMPS) / 824.04 - 848.97 MHz (TDMA)

1850.01 - 1909.99 MHz (PCS TDMA)

Rx Frequency Range: 869.04 - 893.97 MHz (AMPS) / 869.64 - 893.97 MHz (TDMA)

1930.05 - 1989.95 MHz (PCS TDMA)

Max. RF Output Power: 0.285W ERP AMPS (24.555dBm) / 0.917W ERP TDMA (29.622dBm)

0.664W EIRP PCS TDMA (28.211dBm)

Max. SAR Measurement: 1.470mW/g AMPS Head SAR; 0.321 mW/g AMPS Body SAR

1.510mW/g Cell. TDMA Head SAR; 0.441mW/g Cell. TDMA Body SAR 1.510mW/g PCS TDMA Head SAR; 1.160mW/g PCS TDMA Body SAR

Emission Designator(s): 40K0F8W, 40K0F1D, 30K0DXW

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. (See Test Report)

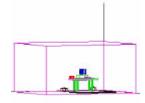
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking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

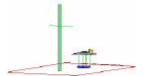
PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Randy Ortanez President & Chief Engineer LAB CODE 100431-0

2 1 0 3 2 8 1 8 4 . N WJ

# **MEASUREMENT REPORT**





### **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.

### **General Information**

Applicant Name: PANASONIC

Matsushita Mobile Communications
Development Corporation of U.S.A.

1225 Northbrook Parkway Suits 2,400

Address: 1225 Northbrook Parkway, Suite 2-400

Suwanee, GA 30024

Attention: Pieter C. Seidel, Sr. System Test Engineer

FCC ID: NWJ10A006A

Quantity: Quantity production is planned
 Emission Designator: 30K0DXW, 40K0F8W, 40K0F1D

• Tx Freq. Range: 824.04 – 848.97 MHz (AMPS) / 824.04 – 848.97 MHz (TDMA)

1850.01 –1909.99 MHz (PCS TDMA)

• Rx Freq. Range: 869.04 – 893.97 MHz (AMPS) / 869.64 – 893.97 MHz (TDMA)

1930.05 - 1989.95 MHz (PCS TDMA)

• Max. RF Power Rating: 0.285W ERP AMPS (24.555dBm) / 0.917W ERP TDMA (29.622dBm)

0.664W EIRP PCS TDMA (28.211dBm)

• FCC Classification(s): Licensed Portable Tx Held to Ear (PCE)

Equipment (EUT) Type: Tri-Mode Dual-Band Analog/TDMA Phone

• Frequency Tolerance:  $\pm 0.00025\%$  (2.5 ppm)

FCC Rule Part(s): § 24(E), §22(H), §2

Dates of Tests: April 06, 2001

Place of Tests:
 PCTEST Lab, Columbia, MD U.S.A.

Test Report S/N: 24/22.2100404194.NWJ



### INTRODUCTION

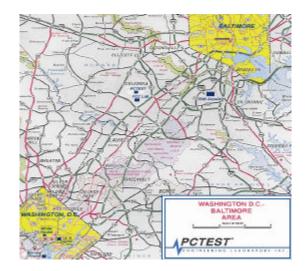


Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

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.

#### **Measurement Procedure**

The radiated and spurious measurements are made outdoors at the 3-meter test site range (see Figure2). The equipment under test is placed on a wooden turntable 3-meters from the receive antenna. The receive antenna height and turntable rotations are adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole is substituted in place of the EUT. This dipole antenna is driven by a signal generator and the level of the signal generator is 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.

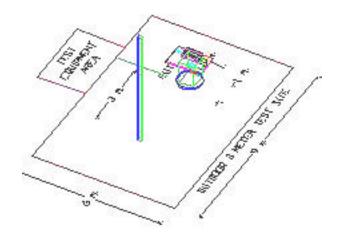


Figure 2. 3-meter Outdoor Test Site

# **Test Data**

# § 22.913 Effective Radiated Power Output

A. POWER: Low (Analog Mode)

Freq. Tuned			ERP (W)	ERP (dBm)
824.04	-34.561	V	0.00470	6.71
836.49	-34.458	V	0.00499	6.97
848.97	-34.763	V	0.00482	6.82

A. POWER: High (Analog Mode)

Freq. Tuned (MHz)	LEVEL (dBm)	POL (H/V)	ERP (W)	ERP (dBm)	BATTERY
824.04	-17.044	V	0.26481	24.229	Standard
836.49	-16.874	V	0.28542	24.555	Standard
848.97	-17.100	V	0.28086	24.485	Standard

#### **NOTES:**

**ERP Measurements by Substitution Method:** 

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. 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 ERP 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.

# **Test Data**

# § 22.913 Effective Radiated Power Output

### A. POWER: High (TDMA Mode)

Freq. Tuned	LEVEL	POL	ERP	ERP	BATTERY
(MHz)	(dBm)	(H/V)	(W)	(dBm)	
824.04	-11.989	V	0.84806	29.284	Standard
835.49	-11.794	V	0.91673	29.622	Standard
848.97	-12.105	V	0.88714	29.480	Standard

#### NOTES:

#### **ERP Measurements by Substitution Method:**

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. 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 ERP 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.

# **Test Data**

### **Equivalent Isotropic Radiated Power (E.I.R.P.)**

#### Radiated measurements at 3 meters

Supply Voltage: 4.2 VDC

Modulation: PCS TDMA

FREQ. (MHz)	LEVEL (dBm)	POL (H/V)	Azimuth (o angle)	EIRP (dBm)	EIRP (W)	Battery
1850.10	-18.870	Н	65.0	28.211	0.664	Standard
1880.00	-19.347	Н	65.0	27.904	0.617	Standard
1909.56	-19.391	Н	65.0	28.030	0.635	Standard

#### NOTES:

### **ERP Measurements by Substitution Method:**

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. 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 ERP 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.

### **Test Data**

#### **Radiated Measurements**

Field Strength of SPURIOUS Radiation (TDMA)

OPERATING FREQUENCY: 824.04 MHz CHANNEL: 991 (Low) 29.622 dBm = MEASURED OUTPUT POWER: 0.917 MODULATION SIGNAL: TDMA (Internal) DISTANCE: meters LIMIT:  $43 + 10 \log_{10} (W) =$ 

FREQ.	LEVEL	AFCL	POL	F/S	ERP	
(MHz)	(dBm)	(dB)	(H/V)	(μV/m)	(dBm)	(dBc)
1648.08	-83.95	34.5	V	754.2	-39.83	69.4
2472.12	-94.66	38.8	V	360.6	-46.24	75.9
3296.16	-99.10	42.5	V	331.1	-46.98	76.6
4120.20	-101.42	46.1	V	383.7	-45.70	75.3
4944.24	< -130					

42.62

#### NOTES:

- The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz). 1.
- 2. The spectrum was checked from 25 MHz up to the 10th harmonic.
- 3. All emissions not listed were found to be more than 20dB below the limit.
- < -130dBm is below the floor of the spectrum analyzer. 4.
- 5. The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
- The EUT is placed 3m. away from the receiving antenna and the ERP 6. is calculated using the formula:

=  $10 \text{ Log}_{10} (((r(mV/m)/1 \times 10^6)^2 / 49.2/1 \times 10^{-3}))$ ERP (dBm) ERP (dBm) =  $10 \text{ Log}_{10} [(3 \text{ x FS/1 x } 10^6)^2 / (49.2) \text{ x } 1000]$ 

ERP (Watts)  $= {(3 \times FS)/1 \times 10^6}^2 / 49.2$ 

# **Test Data**

#### **Radiated Measurements**

Field Strength of SPURIOUS Radiation (TDMA)

OPERATING FREQUENCY: 836.49 MHz

CHANNEL: 383 (Middle)

MEASURED OUTPUT POWER: 29.622 dBm = 0.919 W

MODULATION SIGNAL: TDMA (Internal)

DISTANCE: 3 meters

LIMIT: 43 + 10 log<sub>10</sub> (W) = 42.63 dB

FREQ.	LEVEL (dBm)	AFCL (dB)	POL (H/V)	F/S (μV/m)	ERP (dBm)	(dBc)
(2)	(45)	(42)	(117.17	(μ*//	(45)	(423)
1672.98	-84.19	34.5	V	733.7	-40.07	69.7
2509.47	-93.22	39.0	V	435.5	-44.60	74.2
3345.96	-100.48	42.7	V	289.1	-48.16	77.8
4182.45	-101.70	46.2	V	375.8	-45.88	75.5
5018.94	< -130					

#### NOTES:

- 1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
- 2. The spectrum was checked from 25 MHz up to the 10th harmonic.
- 3. All emissions not listed were found to be more than 20dB below the limit.
- 4. < -130dBm is below the floor of the spectrum analyzer.
- 5. The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
- 6. The EUT is placed 3m. away from the receiving antenna and the ERP is calculated using the formula:

ERP (dBm) =  $10 \text{ Log}_{10} (((r(mV/m)/1 \times 10^6)^2 / 49.2/1 \times 10^{-3}))$ ERP (dBm) =  $10 \text{ Log}_{10} [(3 \times FS/1 \times 10^6)^2 / (49.2) \times 1000]$ 

### **Test Data**

### **Radiated Measurements**

Field Strength of SPURIOUS Radiation (TDMA)

 OPERATING FREQUENCY:
 848.97
 MHz

 CHANNEL:
 799 (High)
 WHZ

 MEASURED OUTPUT POWER:
 29.622 dBm = 0.919 W
 W

 MODULATION SIGNAL:
 TDMA (Internal)
 meters

 LIMIT:
 43 + 10 log<sub>10</sub> (W) = 42.63 dB
 42.63 dB

FREQ.	LEVEL	AFCL	POL	F/S	ERP	
(MHz)	(dBm)	(dB)	(H/V)	(μV/m)	(dBm)	(dBc)
1697.94	-85.82	34.9	V	636.8	-41.30	70.9
2546.91	-93.75	39.2	V	419.3	-44.93	74.5
3395.88	-96.21	42.9	V	483.6	-43.69	73.3
4244.85	-103.49	46.3	V	309.4	-47.57	77.2
5093.82	< -130					

#### NOTES:

- 1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
- The spectrum was checked from 25 MHz up to the 10th harmonic.
- 3. All emissions not listed were found to be more than 20dB below the limit.
- 4. < -130dBm is below the floor of the spectrum analyzer.
- The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
- 6. The EUT is placed 3m. away from the receiving antenna and the ERP is calculated using the formula:

ERP (dBm) =  $10 \text{ Log}_{10} (((r(mV/m)/1 \times 10^6)^2 / 49.2/1 \times 10^{-3}))$ ERP (dBm) =  $10 \text{ Log}_{10} [(3 \times FS/1 \times 10^6)^2 / (49.2) \times 1000]$ 

ERP (Watts) =  ${(3 \times FS)/1 \times 10^6}^2 / 49.2$ 

# **Test Data**

#### **Radiated Measurements**

Field Strength of SPURIOUS Radiation (AMPS)

 OPERATING FREQUENCY:
 824.04
 MHz

 CHANNEL:
 991 (Low)

 MEASURED OUTPUT POWER:
 24.555 dBm = 0.286 W

 MODULATION SIGNAL:
 ST (Signalling Tone)

 DISTANCE:
 3 meters

 LIMIT:
 43 + 10 log<sub>10</sub> (W) = 37.57 dB

FREQ.	LEVEL	AFCL	POL	F/S	ERP	
(MHz)	(dBm)	(dB)	(H/V)	(μV/m)	(dBm)	(dBc)
1648.08	-87.92	34.5	V	477.5	-43.80	68.4
2472.12	-98.46	38.8	V	232.8	-50.04	74.6
3296.16	-105.10	42.5	V	166.0	-52.98	77.5
4120.20	-106.26	46.1	V	219.8	-50.54	75.1
4944.24	< -130					

### NOTES:

- 1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
- 2. The spectrum was checked from 25 MHz up to the 10th harmonic.
- 3. All emissions not listed were found to be more than 20dB below the limit.
- 4. < -130dBm is below the floor of the spectrum analyzer.
- The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
- 6. The EUT is placed 3m. away from the receiving antenna and the ERP is calculated using the formula:

ERP (dBm) =  $10 \text{ Log}_{10} (((r(mV/m)/1 \times 10^6)^2 / 49.2/1 \times 10^{-3}))$ ERP (dBm) =  $10 \text{ Log}_{10} [(3 \times FS/1 \times 10^6)^2 / (49.2) \times 1000]$ 

ERP (Watts) =  $\{(3 \times FS)/1 \times 10^6\}^2 / 49.2$ 

# **Test Data**

#### **Radiated Measurements**

Field Strength of SPURIOUS Radiation (AMPS)

OPERATING FREQUENCY: 836.49 MHz

CHANNEL: 383 (Middle)

MEASURED OUTPUT POWER: 24.555 dBm = 0.286 W

MODULATION SIGNAL: ST (Signalling Tone)

DISTANCE: 3 meters

LIMIT: 43 + 10 log<sub>10</sub> (W) = 37.57 dB

FREQ.	LEVEL	AFCL	POL	F/S	ERP	
(MHz)	(dBm)	(dB)	(H/V)	(μV/m)	(dBm)	(dBc)
1672.98	-87.52	34.5	V	500.0	-43.40	68.0
2509.47	-97.34	39.0	V	271.0	-48.72	73.3
3345.96	-103.09	42.7	V	214.0	-50.77	75.3
4182.45	-105.11	46.2	V	253.8	-49.29	73.8
5018.94	< -130					

#### NOTES:

- 1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
- 2. The spectrum was checked from 25 MHz up to the 10th harmonic.
- 3. All emissions not listed were found to be more than 20dB below the limit.
- 4. < -130dBm is below the floor of the spectrum analyzer.
- 5. The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
- 6. The EUT is placed 3m. away from the receiving antenna and the ERP is calculated using the formula:

ERP (dBm) =  $10 \text{ Log}_{10} (((r(mV/m)/1 \times 10^6)^2 / 49.2/1 \times 10^{-3}))$ ERP (dBm) =  $10 \text{ Log}_{10} [(3 \times FS/1 \times 10^6)^2 / (49.2) \times 1000]$ 

ERP (Watts) =  ${((3 \times FS)/1 \times 10^6)^2}/{49.2}$ 

# **Test Data**

### **Radiated Measurements**

Field Strength of SPURIOUS Radiation (AMPS)

OPERATING FREQUENCY: 848.97 MHz

CHANNEL: 799 (High)

MEASURED OUTPUT POWER: 24.555 dBm = 0.286 W

MODULATION SIGNAL: ST (Signalling Tone)

DISTANCE: 3 meters

LIMIT: 43 + 10 log<sub>10</sub> (W) = 37.57 dBd

FREQ.	LEVEL	AFCL	POL	F/S	ERP	
(MHz)	(dBm)	(dB)	(H/V)	(μV/m)	(dBm)	(dBc)
1697.94	-87.35	34.9	V	533.9	-42.83	67.4
2546.91	-98.71	39.2	V	236.9	-49.89	74.4
3395.88	-103.63	42.9	V	205.8	-51.11	75.7
4244.85	-104.17	46.1	V	279.6	-48.45	73.0
5093.82	< -130					

#### NOTES:

- 1. The bandwidth is set per §22.917 (RBW = 1MHz, VBW = 1MHz).
- 2. The spectrum was checked from 25 MHz up to the 10th harmonic.
- 3. All emissions not listed were found to be more than 20dB below the limit.
- 4. < -130dBm is below the floor of the spectrum analyzer.
- The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
- 6. The EUT is placed 3m. away from the receiving antenna and the ERP is calculated using the formula:

ERP (dBm) =  $10 \text{ Log}_{10} (((r(mV/m)/1 \times 10^6)^2 / 49.2/1 \times 10^{-3}))$ ERP (dBm) =  $10 \text{ Log}_{10} [(3 \times FS/1 \times 10^6)^2 / (49.2) \times 1000]$ 

ERP (Watts) =  ${(3 \times FS)/1 \times 10^6}^2 / 49.2$ 

### **Test Data**

### **Radiated Measurements**

Field Strength of SPURIOUS Radiation (PCS TDMA)

 OPERATING FREQUENCY:
 1850.01
 MHz

 CHANNEL:
 0002 (Low)

 MEASURED OUTPUT POWER:
 28.211 dBm = 0.662 W

 MODULATION SIGNAL:
 TDMA (Internal)

 DISTANCE:
 3 meters

 LIMIT:
 43 + 10 log<sub>10</sub> (W) = 41.21 dBc

FREQ.	LEVEL	AFCL	POL	F/S	EIRP	
(MHz)	(dBm)	(dB)	(H/V)	(μV/m)	(dBm)	(dBc)
3700.02	-97.53	44.4	Н	493.7	-41.36	69.6
5550.03	-115.83	49.7	Н	110.5	-54.36	82.6
7400.04	-116.19	53.7	Н	168.1	-50.72	78.9
9250.05	< - 1 3 0					
11100.06	< -130					

#### NOTES:

- 1. The bandwidth is set per §24.238 (RBW = 1MHz, VBW = 1MHz).
- 2. The spectrum was checked from 25 MHz up to the 10th harmonic.
- 3. All emissions not listed were found to be more than 20dB below the limit.
- 4. < -130dBm is below the floor of the spectrum analyzer.
- 5. The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
- 6. The EUT is placed 3m. away from the receiving antenna and the EIRP is calculated using the formula:

EIRP (dBm) = 10 Log 10 ((( $r(mV/m)/1 \times 10^6)^2 / 30.0/1 \times 10^{-3}$ ) EIRP (dBm) = 10 Log 10 [ (3 x FS/1 x 10<sup>6</sup>)<sup>2</sup> / (30.0) x 1000]

EIRP (Watts) =  ${(3 \times FS)/1 \times 10^6}^2 / 30.0$ 

### **Test Data**

### **Radiated Measurements**

Field Strength of SPURIOUS Radiation (PCS TDMA)

OPERATING FREQUENCY: 1880.00 MHz

CHANNEL: 1000 (Middle)

MEASURED OUTPUT POWER: 28.211 dBm = 0.662 W

MODULATION SIGNAL: TDMA (Internal)

DISTANCE: 3 meters

LIMIT:  $43 + 10 \log_{10} (W) = 41.21$  dBc

FREQ.	LEVEL	AFCL	POL	F/S	EIRP	
(MHz)	(dBm)	(dB)	(H/V)	(μV/m)	(dBm)	(dBc)
3760.00	-97.38	44.7	Н	520.0	-40.91	69.1
5640.00	-117.24	49.9	Н	96.2	-55.57	83.8
7520.00	-117.59	54.0	Н	148.1	-51.82	80.0
9400.00	<-130					
11280.00	< -130					

#### NOTES:

- 1. The bandwidth is set per §24.238 (RBW = 1MHz, VBW = 1MHz).
- 2. The spectrum was checked from 25 MHz up to the 10th harmonic.
- 3. All emissions not listed were found to be more than 20dB below the limit.
- 4. < -130dBm is below the floor of the spectrum analyzer.
- The EUT is manipulated through 3 orthogonal axis and the worst-case are reported.
- 6. The EUT is placed 3m. away from the receiving antenna and the EIRP is calculated using the formula:

EIRP (dBm) = 10 Log 10 (((r(mV/m)/1 x  $10^6$ )<sup>2</sup> / 30.0/1 x  $10^{-3}$ ) EIRP (dBm) = 10 Log 10 [ (3 x FS/1 x  $10^6$ )<sup>2</sup> / (30.0) x 1000]

EIRP (Watts) =  ${(3 \times FS)/1 \times 10^6}^2 / 30.0$ 

### **Test Data**

### **Radiated Measurements**

### Field Strength of SPURIOUS Radiation (PCS TDMA)

MHz OPERATING FREQUENCY: 1909.56

CHANNEL: 1998 (High)

MEASURED OUTPUT POWER: 28.211 dBm =0.662

MODULATION SIGNAL: TDMA (Internal)

DISTANCE: meters

LIMIT:  $43 + 10 \log_{10} (W) =$ 41.21

FREQ.	LEVEL	AFCL	POL	F/S	EIRP	
(MHz)	(dBm)	(dB)	(H/V)	(μV/m)	(dBm)	(dBc)
3819.12	-98.72	45.0	Н	461.3	-41.95	70.2
5728.68	-116.42	50.1	Н	108.1	-54.55	82.8
7638.24	-117.06	54.2	Н	161.1	-51.09	79.3
9547.80	<-130					
11457.36	< -130					

#### NOTES:

- 1. The bandwidth is set per §24.238 (RBW = 1MHz, VBW = 1MHz).
- The spectrum was checked from 25 MHz up to the 10th harmonic. 2.
- All emissions not listed were found to be more than 20dB below the limit. 3.
- < -130dBm is below the floor of the spectrum analyzer. 4.
- The EUT is manipulated through 3 orthogonal axis and the worst-case 5. are reported.
- The EUT is placed 3m. away from the receiving antenna and the EIRP 6. is calculated using the formula:

= 10 Log 10 ((( $r(mV/m)/1 \times 10^6$ )<sup>2</sup> / 30.0/1 x 10<sup>-3</sup>) EIRP (dBm)

= 10 Log 10 [  $(3 \times FS/1 \times 10^6)^2 / (30.0) \times 1000$ ] EIRP (dBm)

 $= {(3 \times FS)/1 \times 10^6}^2 / 30.0$ EIRP (Watts)

# **TEST EQUIPMENT**

Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         3123A00181           Ailtech/Eaton Receiver         NM37/57A-SL         0792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A02           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966	Type	Model	Cal. Due D	ate S/N
Microwave Spectrum Analyzer         HP 8566B (100Hz-22GHz)         04/17/02         2542A11898           Spectrum Analyzer/Tracking Gen.         HP 8591A (100Hz-18GHz)         08/10/01         3144A02458           Signal Generator         HP 8640B (500Hz-1GHz)         06/03/01         232A19558           Signal Generator         HP 8640B (500Hz-1GHz)         06/03/01         1851A09816           Signal Generator         Rohde & Schwarz (0.1-1000MHz)         09/11/01         894215/012           Alltech/Eaton Receiver         NM 37/57A-SL (30-1000MHz)         09/11/01         894215/012           Alltech/Eaton Receiver         NM 17/27A (0.1-32MHz)         09/11/01         0608-033241           Alltech/Eaton Adapter         HP 85650A         08/15/01         2043A00301           Alltech/Eaton Adapter         HP 8565DA         08/15/01         2043A00301           Alltech/Eaton Adapter         CCA-7 CISPR/ANSI QP Adapter         03/11/02         0194-04082           Gigatronics Universal Power Meter         80701A (0.05-18GHz)         1833460         1835256           Gigatronics Power Sensor         80701A (0.05-18GHz)         1833460         1833460           Signal Generator         HP 8648B (9kHz-4GHz)         3613A00315         315400315           Network Analyzer         HP 8753E (30kHz-3GHz)	Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	08/15/01	3638A08713
Signal Generator         HP 8640B (500Hz-1GHz)         06/03/01         2232A19558           Signal Generator         HP 8640B (500Hz-1GHz)         06/03/01         1851A09816           Signal Generator         Rohde & Schwarz (0.1-1000MHz)         09/11/01         1894125012           Alitech/Eaton Receiver         NM 37/57A-SL (30-1000MHz)         04/12/02         0792-03271           Alitech/Eaton Receiver         NM 37/57A (30-1000MHz)         03/11/02         0805-03334           Alitech/Eaton Receiver         NM 71/27A (0.1-32MHz)         09/17/01         0608-03241           Alitech/Eaton Receiver         NM 71/27A (0.1-32MHz)         09/17/01         0608-03241           Alitech/Eaton Adapter         CCA-7 CISPR/ANSI OP Adapter         03/11/02         0194-04082           Gigatronics Universal Power Meter         8657A         1835256         1833460           Gigatronics Universal Power Meter         B867A         1835256         1833460           Signal Generator         HP 8648D (9ktz-4GHz)         3613A00315         1833460           Amplifier Research         5SIG4 (5W, 800MHz-4.2GHz)         2322         22322           Network Analyzer         HP 8753E (30kHz-3GHz)         1938020182         2322           Network Analyzer         HP 8973E (30kHz-3GHz)         2323A03467	Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	04/17/02	2542A11898
Signal Generator         HP 8640B (500Hz-IGHz)         06/03/01         1851A09816           Signal Generator         Rohde & Schwarz (01-1000MHz)         09/1/01         894215/012           Alltech/Eaton Receiver         NM 37/57A-SL (30-1000MHz)         04/12/02         0792-03271           Alltech/Eaton Receiver         NM 37/57A (30-1000MHz)         03/11/02         0805-03334           Alltech/Eaton Receiver         NM 17/27A (01-32MHz)         09/17/01         0608-03241           Quasi-Peak Adapter         HP 85650A         08/15/01         2043A00301           Alltech/Eaton Adapter         CCA-7 CISPR/ANSI QP Adapter         03/11/02         0194-04082           Gigatronics Universal Power Meter         8657A         1835256         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315         23222         22322         22322         22322         2232         22322         2232         2232         2232         2232         2232         2232         2234         2432A03467         1980020182         1980020182         1980020182         1980020182         1980020182         1980020182         1980020182         1980020182         1980020182         1980020182 <td>Spectrum Analyzer/Tracking Gen.</td> <td>HP 8591A (100Hz-1.8GHz)</td> <td>08/10/01</td> <td>3144A02458</td>	Spectrum Analyzer/Tracking Gen.	HP 8591A (100Hz-1.8GHz)	08/10/01	3144A02458
Signal Generator         Rohde & Schwarz (0.1-1000MHz)         09/11/01         894215/012           Alitech/Eaton Receiver         NM 37/57A-SL (30-1000MHz)         04/12/02         0792-03271           Alitech/Eaton Receiver         NM 37/57A (30-1000MHz)         03/11/02         0805-03334           Alitech/Eaton Receiver         NM 17/27A (01-32MHz)         09/17/01         0608-03241           Quasi-Peak Adapter         HP 85650A         08/15/01         2043A00301           Alitech/Eaton Adapter         CCA-7 CISPR/ANSI QP Adapter         03/11/02         0194-04082           Gigatronics Universal Power Meter         8657A         1835256         1833460           Gigatronics Power Sensor         80701A (0.05-18GHz)         1833460         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315         1833460           Amplifier Research         5SIG4 (5W, 800MHz-4.2GHz)         23222         22322           Audio Analyzer         HP 8753E (30kHz-3GHz)         JP38020182         2432A03467           Howthork Analyzer         HP 8901A         2432A03467         2432A03467           Power Sensor         HP 847B         3125U24437         3011A09025           Modulation Analyzer         HP 8481B (EC 555-2/3)         3531A00115         3531A00115     <	Signal Generator*	HP 8640B (500Hz-1GHz)	06/03/01	2232A19558
Alltech/Eaton Receiver         NM 37/57A-SL (3O-1000MHz)         04/12/02         0792-03271           Alltech/Eaton Receiver         NM 37/57A (3O-1000MHz)         03/11/02         0805-03334           Alltech/Eaton Receiver         NM 17/27A (0.1-32MHz)         09/17/01         0608-03241           Quasi-Peak Adapter         HP 85650A         08/15/01         2043A00301           Alltech/Eaton Adapter         CCA-7 CISPR/ANSI QP Adapter         03/11/02         0194-04082           Gigatronics Universal Power Meter         8657A         1835256         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         1833460         513A00315           Amplifier Research         5S1G4 (5W, 800MHz-4.2GHz)         22322         Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182           Audio Analyzer         HP 8903B         3011A09025         JP38020182           Audio Analyzer         HP 8901A         2432A03467         2432A03467           Power Meter         HP 8901A         2432A03467         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115         3531A00115           Broadband Amplifier         HP 8447F         2443A03784         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)	Signal Generator*	HP 8640B (500Hz-1GHz)	06/03/01	1851A09816
Ailtech/Eaton Receiver NM 37/57A (30-1000MHz) 03/11/02 0805-03334 Ailtech/Eaton Receiver NM 17/27A (0.1-32MHz) 09/17/01 0608-03241 Quasi-Peak Adapter HP 85650A 08/15/01 2043A00301 Ailtech/Eaton Adapter CCA-7 CISPR/ANSI QP Adapter Gigatronics Universal Power Meter Gigatronics Power Sensor Signal Generator HP 8648D (9kHz-4GHz) 1833460 Signal Generator HP 8648D (9kHz-4GHz) 3613A00315 Amplifier Research HP 8753E (30kHz-3GHz) 22322 Network Analyzer HP 8753E (30kHz-3GHz) JP38020182 Audio Analyzer HP 8903B 301IA09025 Modulation Analyzer HP 8901A 2432A03467 Power Meter HP 437B 3125U24437 Power Sensor HP 8448ZH (30µW-3W) 2237A02084 Harmonic/Flicker Test System HP 6841A (EC 555-2/3) 3531A00115 Broadband Amplifier HP 8447F 2443A03784 Horn Antenna EMCO Model 3115 (1-18GHz) 9704-5182 Horn Antenna EMCO Model 3116 (18-HGHz) 9205-3874 Horn Antenna EMCO Model 3116 (18-HGHz) 9203-2178 Biconical Antenna (3) Ailtech/Eaton 93490-1 Compliance Design (1 set) Ailtech Dipoles DM-105A (1 set) 33448-111 EMCO Wasie Peramplifier 40dB Gain Microwave Cables MicroCoax (1.0-26.5GHz) Microwave Cables Ailtech/Eaton Receiver NM37/57A-SL Digital Thermometer Extech Instruments 421305 Microwave Survey Meter Holaday Model 1501 (2.450GHz) 80931 Digital Thermometer Extech Instruments 421305 Ale66	Signal Generator*	Rohde & Schwarz (0.1-1000MHz)	09/11/01	894215/012
Ailtech/Eaton Receiver         NM 17/27A (0.1-32MHz)         09/17/01         0608-03241           Quasi-Peak Adapter         HP 85650A         08/15/01         2043A00301           Ailtech/Eaton Adapter         CCA-7 CISPR/ANSI QP Adapter         03/11/02         0194-04082           Gigatronics Universal Power Meter         8657A         1835256           Gigatronics Power Sensor         80701A (0.05-18GHz)         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315           Amplifier Research         55IG4 (5W, 800MHz-4.2GHz)         22322           Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182           Audio Analyzer         HP 8903B         3011A09025           Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 8437B         3125U24437           Power Meter         HP 8437B         3125U24437           Power Sensor         HP 8482H (30µW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier         HP 8447F         145A00470, 1937A033           Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182<	Ailtech/Eaton Receiver	NM 37/57A-SL (30-1000MHz)	04/12/02	0792-03271
Quasi-Peak Adapter         HP 85650A         08/15/01         2043A00301           Alitech/Eaton Adapter         CCA-7 CISPR/ANSI QP Adapter         03/11/02         0194-04082           Gigatronics Universal Power Meter Gigatronics Power Sensor         8657A         18335256         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315         3613A00315           Amplifier Research         5SIG4 (5W, 800MHz-4.2GHz)         22322         22322           Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182         3011A09025           Modulation Analyzer         HP 8903B         3011A09025         3011A09025           Modulation Analyzer         HP 8901A         2432A03467         2432A03467           Power Meter         HP 437B         3125U24437         3125U24437           Power Sensor         HP 8482H (30µ.W-3W)         2237A02084         3531A00115           Broadband Amplifier         HP 8447F         145A00470, 1937A033         3531A00115           Broadband Amplifier         HP 8447F         145A003784         400470, 1937A033         400470, 1937A0333         400470, 1937A0333         400470, 1937A0333	Ailtech/Eaton Receiver	NM 37/57A (30-1000MHz)	03/11/02	0805-03334
Ailtech/Eaton Adapter         CCA-7 CISPR/ANSI QP Adapter         03/11/02         0194-04082           Gigatronics Universal Power Meter         8657A         1835256           Gigatronics Power Sensor         80701A (0.05-18GHz)         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315           Amplifier Research         5S1G4 (5W, 800MHz-4.2GHz)         22322           Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182           Audio Analyzer         HP 8903B         3011A09025           Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 8437B         3125U24437           Power Sensor         HP 8482H (30µ.W-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Roberts Dipoles         DM-105A (1 set) <td>Ailtech/Eaton Receiver</td> <td>NM 17/27A (O.1-32MHz)</td> <td>09/17/01</td> <td>0608-03241</td>	Ailtech/Eaton Receiver	NM 17/27A (O.1-32MHz)	09/17/01	0608-03241
Gigatronics Universal Power Meter         8657A         1835256           Gigatronics Power Sensor         80701A (0.05-18GHz)         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315           Amplifier Research         5SIG4 (5W, 800MHz-4.2GHz)         22322           Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182           Audio Analyzer         HP 8903B         3011A09025           Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 437B         3125U24437           Power Sensor         HP 8482H (30µW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6441A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447P         1145A00470, 1937A03:           Broadband Amplifier (2)         HP 8447F         2443A03784           Horn Antenna         EMC0 Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMC0 Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMC0 Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (3)         Ailtech/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104 <tr< td=""><td>Quasi-Peak Adapter</td><td>HP 85650A</td><td>08/15/01</td><td>2043A00301</td></tr<>	Quasi-Peak Adapter	HP 85650A	08/15/01	2043A00301
Gigatronics Power Sensor         80701A (0.05-18GHz)         1833460           Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315           Amplifier Research         5SIG4 (5W, 800MHz-4.2GHz)         22322           Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182           Audio Analyzer         HP 8903B         3011A09025           Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 437B         3125U24437           Power Sensor         HP 8482H (30µW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447D         1145A00470, 1937A033           Broadband Amplifier (4)         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111	Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	03/11/02	0194-04082
Signal Generator         HP 8648D (9kHz-4GHz)         3613A00315           Amplifier Research         5STG4 (5W, 800MHz-4.2GHz)         22322           Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182           Audio Analyzer         HP 8903B         3011A09025           Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 8437B         3125U24437           Power Sensor         HP 8482H (30µW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447D         1145A00470, 1937A033           Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-2874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (3)         Ailtech/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         DM-105A (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier	Gigatronics Universal Power Meter	8657A		1835256
Amplifier Research         5SIG4 (5W, 800MHz-4.2GHz)         22322           Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182           Audio Analyzer         HP 8903B         3011A09025           Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 437B         3125U24437           Power Sensor         HP 8482H (30μW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447D         1145A00470, 1937A033           Broadband Amplifier (2)         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 4OdB Gain         HP 83017A (0.5-26.5GHz)         312A00181 <tr< td=""><td>Gigatronics Power Sensor</td><td>80701A (0.05-18GHz)</td><td></td><td>1833460</td></tr<>	Gigatronics Power Sensor	80701A (0.05-18GHz)		1833460
Network Analyzer         HP 8753E (30kHz-3GHz)         JP38020182           Audio Analyzer         HP 8903B         3011A09025           Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 437B         3125U24437           Power Sensor         HP 8482H (30μW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447D         1145A00470, 1937A033           Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         0792-03271	Signal Generator	HP 8648D (9kHz-4GHz)		3613A00315
Audio Analyzer HP 8903B 3011A09025 Modulation Analyzer HP 8901A 2432A03467 Power Meter HP 437B 3125U24437 Power Sensor HP 8482H (30µW-3W) 2237A02084 Harmonic/Flicker Test System HP 6841A (IEC 555-2/3) 3531A00115 Broadband Amplifier (2) HP 8447D 1145A00470, 1937A033 Broadband Amplifier HP 8447F 2443A03784 Horn Antenna EMCO Model 3115 (1-18GHz) 9704-5182 Horn Antenna EMCO Model 3115 (1-18GHz) 9205-3874 Horn Antenna EMCO Model 3115 (1-18GHz) 9203-2178 Biconical Antenna (4) Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035 Log-Spiral Antenna (3) Ailtech/Eaton 93490-1 0608, 1103, 1104 Roberts Dipoles Compliance Design (1 set) Ailtech Dipoles DM-105A (1 set) 33448-111 EMCO LISN (6) 3816/2 1079 Microwave Preamplifier 40dB Gain HP 83017A (0.5-26.5GHz) 3123A00181 Microwave Cables MicroCoax (1.0-26.5GHz) Ailtech/Eaton Receiver NM37/57A-SL 0792-03271 Spectrum Analyzer HP 8594A 3051A00187 Spectrum Analyzer (2) HP 8591A Microwave Survey Meter Holaday Model 1501 (2.450GHz) 80931 Digital Thermometer Extech Instruments 421305 426966	Amplifier Research	5S1G4 (5W, 800MHz-4.2GHz)		22322
Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 437B         3125U24437           Power Sensor         HP 8482H (30μW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447D         1145A00470, 1937A033           Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3116 (18-40GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)           Ailtech Dipoles         DM-105A (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         0792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (	Network Analyzer	HP 8753E (30kHz-3GHz)		JP38020182
Modulation Analyzer         HP 8901A         2432A03467           Power Meter         HP 437B         3125U24437           Power Sensor         HP 8482H (30μW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447D         1145A00470, 1937A033           Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMC0 Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMC0 Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMC0 Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           Ailtech Dipoles         DM-105A (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         792-03271           Ajtech/Eaton Receiver         NM37/57A-SL         0792-03271 <tr< td=""><td>Audio Analyzer</td><td>HP 8903B</td><td></td><td>3011A09025</td></tr<>	Audio Analyzer	HP 8903B		3011A09025
Power Meter         HP 437B         3125U24437           Power Sensor         HP 8482H (30μW-3W)         2237A02084           Harmonic/Flicker Test System         HP 6841A (IEC 555-2/3)         3531A00115           Broadband Amplifier (2)         HP 8447D         1145A00470, 1937A033           Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMC0 Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMC0 Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMC0 Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         30792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A0           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931 </td <td></td> <td>HP 8901A</td> <td></td> <td>2432A03467</td>		HP 8901A		2432A03467
Harmonic/Flicker Test System       HP 6841A (IEC 555-2/3)       3531A00115         Broadband Amplifier (2)       HP 8447D       1145A00470, 1937A033         Broadband Amplifier       HP 8447F       2443A03784         Horn Antenna       EMC0 Model 3115 (1-18GHz)       9704-5182         Horn Antenna       EMC0 Model 3115 (1-18GHz)       9205-3874         Horn Antenna       EMC0 Model 3116 (18-40GHz)       9203-2178         Biconical Antenna (4)       Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035         Log-Spiral Antenna (3)       Ailtech/Eaton 93490-1       0608, 1103, 1104         Roberts Dipoles       Compliance Design (1 set)         Ailtech Dipoles       DM-105A (1 set)       33448-111         EMCO LISN (6)       3816/2       1079         Microwave Preamplifier 40dB Gain       HP 83017A (0.5-26.5GHz)       3123A00181         Microwave Cables       MicroCoax (1.0-26.5GHz)       3123A00181         Ailtech/Eaton Receiver       NM37/57A-SL       0792-03271         Spectrum Analyzer       HP 8594A       3051A00187         Spectrum Analyzer (2)       HP 8591A       3034A01395, 3108A02         Microwave Survey Meter       Holaday Model 1501 (2.450GHz)       80931         Digital Thermometer       Extech Instruments 421305		HP 437B		3125U24437
Harmonic/Flicker Test System       HP 6841A (IEC 555-2/3)       3531A00115         Broadband Amplifier (2)       HP 8447D       1145A00470, 1937A033         Broadband Amplifier       HP 8447F       2443A03784         Horn Antenna       EMC0 Model 3115 (1-18GHz)       9704-5182         Horn Antenna       EMC0 Model 3115 (1-18GHz)       9205-3874         Horn Antenna       EMC0 Model 3116 (18-40GHz)       9203-2178         Biconical Antenna (4)       Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035         Log-Spiral Antenna (3)       Ailtech/Eaton 93490-1       0608, 1103, 1104         Roberts Dipoles       Compliance Design (1 set)         Ailtech Dipoles       DM-105A (1 set)       33448-111         EMCO LISN (6)       3816/2       1079         Microwave Preamplifier 40dB Gain       HP 83017A (0.5-26.5GHz)       3123A00181         Microwave Cables       MicroCoax (1.0-26.5GHz)       3123A00181         Ailtech/Eaton Receiver       NM37/57A-SL       0792-03271         Spectrum Analyzer       HP 8594A       3051A00187         Spectrum Analyzer (2)       HP 8591A       3034A01395, 3108A02         Microwave Survey Meter       Holaday Model 1501 (2.450GHz)       80931         Digital Thermometer       Extech Instruments 421305	Power Sensor	HP 8482H (30uW-3W)		2237A02084
Broadband Amplifier (2)         HP 8447D         1145A00470,1937A033           Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 944555/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A02           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966	Harmonic/Flicker Test System	· · · · · · · · · · · · · · · · · · ·		
Broadband Amplifier         HP 8447F         2443A03784           Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 4OdB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         3051A00187           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A02           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966	•			1145A00470, 1937A03348
Horn Antenna         EMCO Model 3115 (1-18GHz)         9704-5182           Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         3051A00187           Ailtech/Eaton Receiver         NM37/57A-SL         0792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A02           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966	• • •	HP 8447F		
Horn Antenna         EMCO Model 3115 (1-18GHz)         9205-3874           Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           Ailtech Dipoles         DM-105A (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         0792-03271           Ailtech/Eaton Receiver         NM37/57A-SL         0792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A02           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966		EMCO Model 3115 (1-18GHz)		9704-5182
Horn Antenna         EMCO Model 3116 (18-40GHz)         9203-2178           Biconical Antenna (4)         Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035           Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           Ailtech Dipoles         DM-105A (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         792-03271           Ailtech/Eaton Receiver         NM37/57A-SL         0792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A02           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966	Horn Antenna			9205-3874
Biconical Antenna (4) Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 035 Log-Spiral Antenna (3) Ailtech/Eaton 93490-1 0608, 1103, 1104 Roberts Dipoles Compliance Design (1 set) Ailtech Dipoles DM-105A (1 set) 33448-111 EMCO LISN (6) 3816/2 1079 Microwave Preamplifier 40dB Gain HP 83017A (0.5-26.5GHz) 3123A00181 Microwave Cables MicroCoax (1.0-26.5GHz) Ailtech/Eaton Receiver NM37/57A-SL 0792-03271 Spectrum Analyzer HP 8594A 3051A00187 Spectrum Analyzer (2) HP 8591A 3034A01395, 3108A02 Microwave Survey Meter Holaday Model 1501 (2.450GHz) 80931 Digital Thermometer Extech Instruments 421305	Horn Antenna	-		9203-2178
Log-Spiral Antenna (3)         Ailtech/Eaton 93490-1         0608, 1103, 1104           Roberts Dipoles         Compliance Design (1 set)         33448-111           Ailtech Dipoles         DM-105A (1 set)         33448-111           EMCO LISN (6)         3816/2         1079           Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         0792-03271           Ailtech/Eaton Receiver         NM37/57A-SL         0792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A03           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966	Biconical Antenna (4)	*	er 94455-1/Complian	ce Design 1295, 1332, 0355
Roberts Dipoles Compliance Design (1 set)  Ailtech Dipoles DM-105A (1 set) 33448-111  EMCO LISN (6) 3816/2 1079  Microwave Preamplifier 4OdB Gain HP 83017A (0.5-26.5GHz) 3123A00181  Microwave Cables MicroCoax (1.0-26.5GHz)  Ailtech/Eaton Receiver NM37/57A-SL 0792-03271  Spectrum Analyzer HP 8594A 3051A00187  Spectrum Analyzer (2) HP 8591A 3034A01395, 3108A02  Microwave Survey Meter Holaday Model 1501 (2.450GHz) 80931  Digital Thermometer Extech Instruments 421305	* *		•	•
Ailtech Dipoles       DM-105A (1 set)       33448-111         EMCO LISN (6)       3816/2       1079         Microwave Preamplifier 40dB Gain       HP 83017A (0.5-26.5GHz)       3123A00181         Microwave Cables       MicroCoax (1.0-26.5GHz)       0792-03271         Ailtech/Eaton Receiver       NM37/57A-SL       0792-03271         Spectrum Analyzer       HP 8594A       3051A00187         Spectrum Analyzer (2)       HP 8591A       3034A01395, 3108A02         Microwave Survey Meter       Holaday Model 1501 (2.450GHz)       80931         Digital Thermometer       Extech Instruments 421305       426966		Compliance Design (1 set)		, ,
EMCO LISN (6)       3816/2       1079         Microwave Preamplifier 40dB Gain       HP 83017A (0.5-26.5GHz)       3123A00181         Microwave Cables       MicroCoax (1.0-26.5GHz)         Ailtech/Eaton Receiver       NM37/57A-SL       0792-03271         Spectrum Analyzer       HP 8594A       3051A00187         Spectrum Analyzer (2)       HP 8591A       3034A01395, 3108A02         Microwave Survey Meter       Holaday Model 1501 (2.450GHz)       80931         Digital Thermometer       Extech Instruments 421305       426966	•	• • • •		33448-111
Microwave Preamplifier 40dB Gain         HP 83017A (0.5-26.5GHz)         3123A00181           Microwave Cables         MicroCoax (1.0-26.5GHz)         0792-03271           Ailtech/Eaton Receiver         NM37/57A-SL         0792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A03           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966				
Microwave Cables         MicroCoax (1.0-26.5GHz)           Ailtech/Eaton Receiver         NM37/57A-SL         0792-03271           Spectrum Analyzer         HP 8594A         3051A00187           Spectrum Analyzer (2)         HP 8591A         3034A01395, 3108A03           Microwave Survey Meter         Holaday Model 1501 (2.450GHz)         80931           Digital Thermometer         Extech Instruments 421305         426966	* *	HP 83017A (0.5-26.5GHz)		3123A00181
Ailtech/Eaton Receiver NM37/57A-SL 0792-03271 Spectrum Analyzer HP 8594A 3051A00187 Spectrum Analyzer (2) HP 8591A 3034A01395, 3108A02 Microwave Survey Meter Holaday Model 1501 (2.450GHz) 80931 Digital Thermometer Extech Instruments 421305 426966	•	•		
Spectrum AnalyzerHP 8594A3051A00187Spectrum Analyzer (2)HP 8591A3034A01395, 3108A02Microwave Survey MeterHoladay Model 1501 (2.450GHz)80931Digital ThermometerExtech Instruments 421305426966		· ·		0792-03271
Spectrum Analyzer (2) HP 8591A 3034A01395, 3108A02 Microwave Survey Meter Holaday Model 1501 (2.450GHz) 80931 Digital Thermometer Extech Instruments 421305 426966				
Microwave Survey Meter Holaday Model 1501 (2.450GHz) 80931 Digital Thermometer Extech Instruments 421305 426966				3034A01395, 3108A02053
Digital Thermometer Extech Instruments 421305 426966	•			
		•		
Attenuator HP 8495A (0-70dB) DC-4GHz		HP 8495A (0-70dB) DC-4GHz		
Bi-Directional Coax Coupler Narda 3020A (50-1000MHz)		•		
Shielded Screen Room RF Lindgren Model 26-2/2-0 6710 (PCT270)	•	•		6710 (PCT270)
Shielded Semi-Anechoic Chamber Ray Proof Model S81 R2437 (PCT278)				
Environmental Chamber Associated Systems Model 1025 (Temperature/Humidity) PCT285		•	mperature/Humidity)	· · · · · · · · · · · · · · · · · · ·

<sup>\*</sup> Calibration traceable to the National Institute of Standards and Technology (NIST).

### **SAMPLE CALCULATIONS**

### **A. ERP Sample Calculation**

Level 
$$\mu$$
/Vm @ 3 meters = Log 10<sup>-1</sup> (dBm + 107 + AFCL)  
20

$$Log 10^{-1} \frac{(-14 + 107 + 31.7)}{20}$$

1717908.4  $\mu$ /Vm @ 3 meters

Sample Calculation (relative to a dipole)

ERP (dBm) =  $10 \text{ Log}_{10} (((r(\mu V/m)1x10^6)^2/49.2/1x10^{-3})$ 

ERP (dBm) =  $10 \text{ Log}_{10}(((3(1717908.4)1x10^6)^2/49.2/1x10^{-3}))$ 

ERP (dBm) = 27.32

### **B. Emission Designator per §2.201**

#### **TDMA Sample**

2M + 2DK

TDMA BW = 30.0 kHz

D = AM or Angle-Modulated

X = Other

W = Combination (Audio/Data)

Emission Designator = 30K0 DXW

### 12.1 CONCLUSION

The data collected shows that the **PANASONIC Tri-Mode Analog/PCS (AMPS/TDMA) Phone FCC ID: NWJ10A006A** complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.