



PCTEST ENGINEERING LABORATORY, INC.

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CERTIFICATE OF COMPLIANCE FCC Part 24 & 22 Certification Class II Permissive Change

Applicant Name:
Samsung Electronics, Co. Ltd.
18600 Broadwick St.
Rancho Dominguez, CA 90220 USA

Date of Testing:
July 6-7, 2006
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
06062000526-G

FCC ID: A3LSGHZX20
APPLICANT: SAMSUNG ELECTRONICS, CO. LTD.

Application Type: Certification
FCC Classification: Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s): §24(E), §22(H); §2
EUT Type: Dual-Band Dual-Mode GSM/ EDGE/ WCDMA Phone with Bluetooth
Model(s): SGH-ZX20
Tx Frequency Range: 824.20 - 848.80 MHz (Cellular GSM) / 1850.20 - 1909.80 MHz (GSM PCS)
Max. RF Output Power: 1.920 W ERP GSM850 (32.833 dBm) / 1.397 W EIRP GSM1900 (31.451 dBm)
Max. SAR Measurement: 0.675 W/kg GSM850 Head SAR; 1.080 W/kg GSM850 Body SAR
0.763 W/kg GSM1900 Head SAR; 0.284 W/kg GSM1900 Body SAR
Emission Designator(s): 271KGXW (GSM) / 242KG7W (GSM EDGE)
277KGXW (PCS) / 244KG7W (PCS EDGE)
Test Device Serial No.: *identical prototype* [S/N: FD-091-E]
Class II Permissive Change: See Change Document.
Original Grant Date: April 12, 2006

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. SAR compliance for body-worn operating configuration is based on a separation distance of 1.8 cm between the back of the unit and the body of the user. End-users must be informed of the body-worn operating requirements for satisfying RF exposure compliance. Belt clips or holsters may not contain metallic components.

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



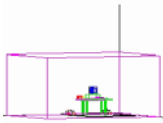
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T A B L E O F C O N T E N T S

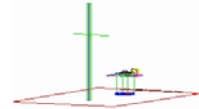
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1.0 SCOPE





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: Samsung Electronics, Co. Ltd.
 Address: 18600 Broadwick St.
 Rancho Dominguez, CA 90220 USA

- FCC ID: A3LSGHZX20
- Quantity: Quantity production is planned
- Emission Designators: 271KGXW (GSM) / 242KG7W (GSM EDGE)
277KGXW (PCS) / 244KG7W (PCS EDGE)
- Tx/ Rx Freq. Range: 824.20 - 848.80 MHz (Cellular GSM)
1850.20 - 1909.80 MHz (GSM PCS)
- Max. Power Rating: 1.920 W ERP GSM850 ((32.833 dBm)) /
1.397 W EIRP GSM1900 ((31.451 dBm))
- FCC Classification(s): PCS Licensed Portable Tx Held to Ear (PCE)
- Equipment (EUT) Type: Dual-Band Dual-Mode GSM/ EDGE/ WCDMA Phone with Bluetooth
- Modulation(s): GSM / EDGE
- Frequency Tolerance: $\pm 0.00025\%$ (2.5 ppm)
- FCC Rule Part(s): § 24(E), §22(H)
- Dates of Tests: July 6-7, 2006
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 06062000526-G
- *Deviation from measurement procedure – None*

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2.0 INTRODUCTION

2.1 Testing Facility

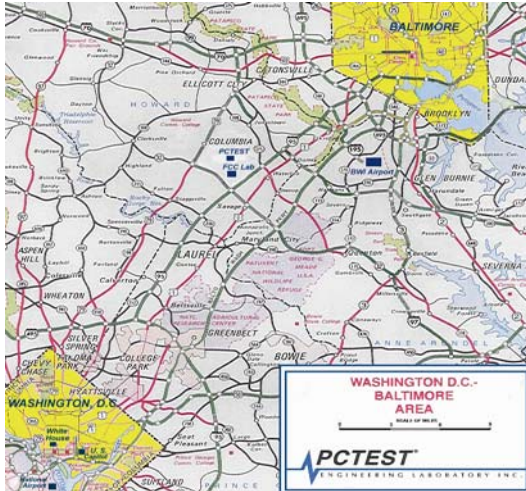


Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

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 $39^{\circ} 11'15''$ N latitude and $76^{\circ} 49'38''$ 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 Figure2). 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.

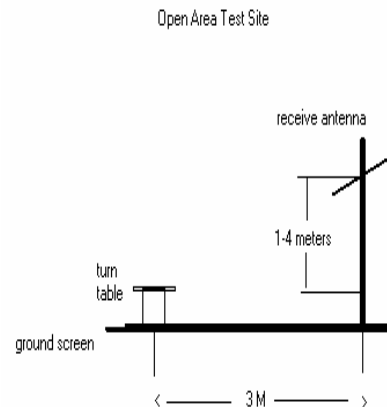




Figure 2. Diagram of 3-meter outdoor test range

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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*

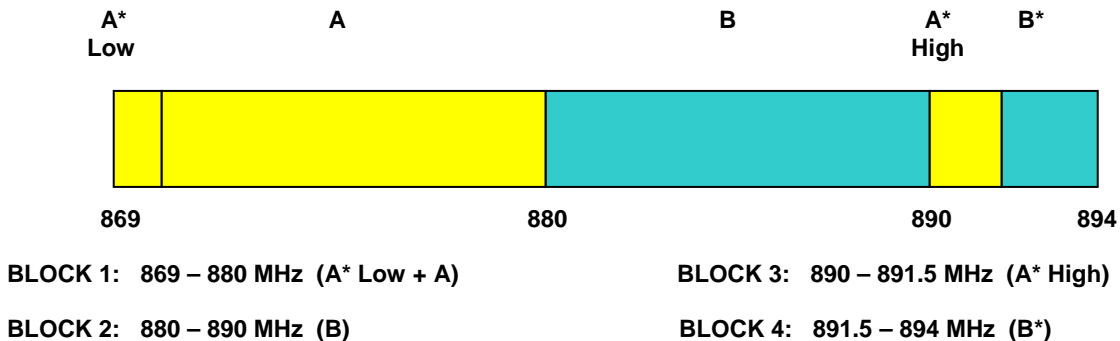
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4.0 DESCRIPTION OF TESTS

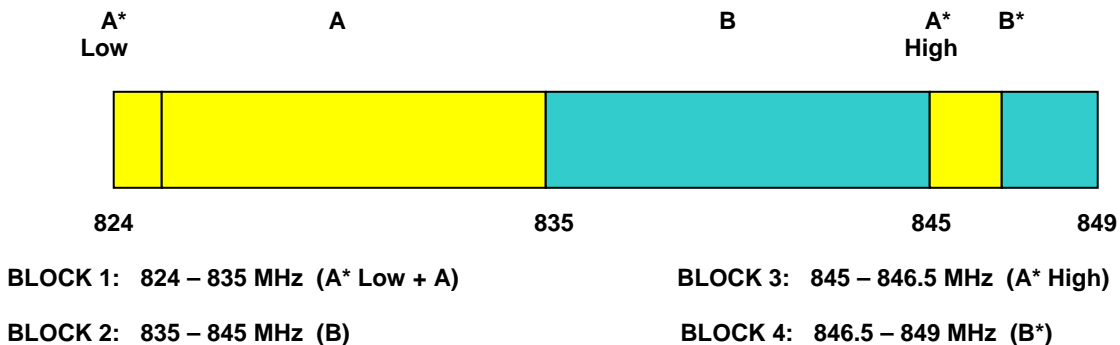
4.1 Occupied Bandwidth Emission Limits



- 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.
- 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.
- 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.
- 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

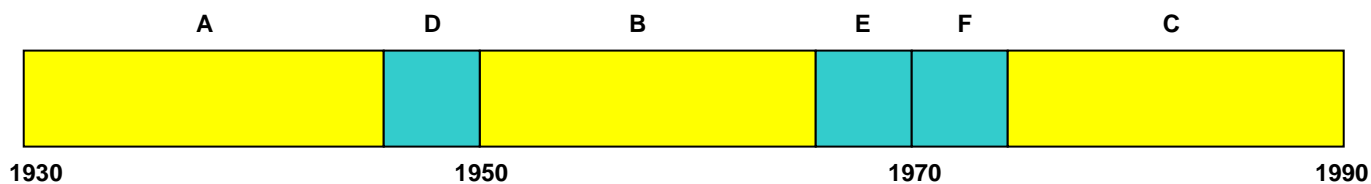


4.3 Cellular - Mobile Frequency Blocks



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4.4 PCS - Base Frequency Blocks



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

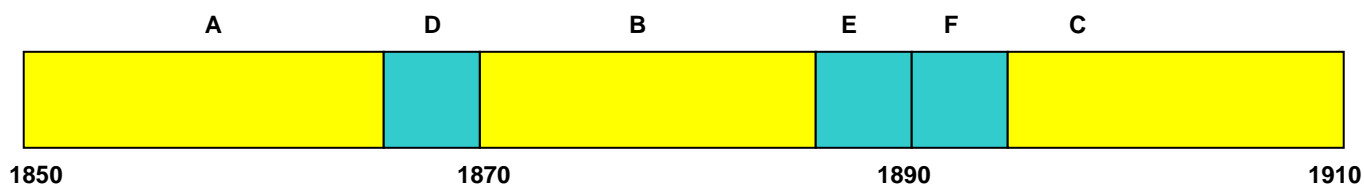
BLOCK 2: 1945 – 1950 MHz (D)

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)

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4.6 Spurious and Harmonic Emissions at Antenna Terminal

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10 GHz. The transmitter is modulated with a 2500 Hz tone at a level of 16 dB greater than that required to provide 50% modulation.



At the input terminals of the spectrum analyzer, an isolator (RF circulator with one port terminated in 50 Ω) and an 870 MHz to 890 MHz band-pass filter is connected between the test transceiver (for conducted tests) or the receive antenna (for radiated tests) and the analyzer. The rejection of the band-pass filter to signals in the 825 – 845 MHz range is adequate to limit the transmit energy from the test transceiver which appears to a level which will allow the analyzer to measure signals less than –90 dBm. Calibration of the test receiver is performed in the 870 – 890 MHz range to insure accuracy to allow variation in the band-pass filter insertion loss to be calibrated.

4.7 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.

4.8 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 R.C.s and S.O.s and the worst case is reported with RC3/SO55, with "All Up" power control bits.

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4.9 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 ± 0.00025 (± 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.
5. Again the transmitter carrier frequency and the individual oscillators is 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.

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5.0 FCC 3G MEASUREMENT PROCEDURES – MAY 2006

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.

Table 1
3GPP TS 34.121 Nominal Maximum Output Power

| 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 |

| | | HSDPA Inactive | | HSDPA Active | |
|------|---------|----------------|---------------|---------------|---------------|
| UMTS | Channel | 12.2 kbps RMC | 12.2 kbps AMR | 12.2 kbps RMC | 12.2 kbps RMC |
| | | 4132 | 23.44 | 23.39 | 23.30 |
| | 4175 | 22.41 | 22.70 | 23.30 | 22.70 |
| | 4233 | 23.30 | 23.30 | 23.21 | 23.20 |
| PCS | 9262 | 23.48 | 23.50 | 23.40 | 23.45 |
| | 9400 | 23.60 | 23.60 | 23.50 | 23.55 |
| | 9538 | 23.37 | 23.56 | 23.33 | 23.50 |

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6.0 EFFECTIVE RADIATED POWER

6.1 Effective Radiated Power Output Data

POWER: High (GSM Mode)



| Freq. Tuned (MHz) | REF. LEVEL (dBm) | POL (H/V) | ERP (W) | ERP (dBm) | BATTERY |
|----------------------|------------------------|--------------|------------|--------------|----------|
| 824.20 | -8.450 | H | 1.915 | 32.823 | Standard |
| 836.60 | -8.600 | H | 1.920 | 32.833 | Standard |
| 848.80 | -8.900 | H | 1.855 | 32.683 | Standard |

Note: Standard batteries are options for this phone.

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 = 5MHz. 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.

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6.0 EFFECTIVE RADIATED POWER

6.2 Effective Radiated Power Output Data

POWER: High (EDGE Mode)



| Freq. Tuned (MHz) | REF. LEVEL (dBm) | POL (H/V) | ERP (W) | ERP (dBm) | BATTERY |
|----------------------|------------------------|--------------|------------|--------------|----------|
| 824.20 | -11.450 | H | 0.960 | 29.823 | Standard |
| 836.60 | -11.600 | H | 0.962 | 29.833 | Standard |
| 848.80 | -11.900 | H | 0.930 | 29.683 | Standard |

Note: Standard batteries are options for this phone.

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 = 5MHz. 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.

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7.0 EQUIVALENT ISOTROPIC RADIATED POWER

7.1 Equivalent Isotropic Radiated Power Output Data

Radiated measurements at 3 meters

Supply Voltage: 3.7 VDC

Modulation: PCS GSM



| FREQ. (MHz) | REF. LEVEL (dBm) | POL (H/V) | Azimuth (o angle) | EIRP (dBm) | EIRP (W) | Battery |
|----------------|------------------------|--------------|----------------------|---------------|-------------|----------|
| 1850.80 | -12.100 | H | 90 | 30.981 | 1.253 | Standard |
| 1880.00 | -11.800 | H | 90 | 31.451 | 1.397 | Standard |
| 1909.80 | -12.300 | H | 90 | 31.121 | 1.295 | Standard |

Note: Standard batteries are options for this phone

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 = 5MHz. 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.

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7.0 EQUIVALENT ISOTROPIC RADIATED POWER

7.2 Equivalent Isotropic Radiated Power Output Data

Radiated measurements at 3 meters

Supply Voltage: 3.7 VDC
Modulation: PCS EDGE



| FREQ. (MHz) | REF. LEVEL (dBm) | POL (H/V) | Azimuth (o angle) | EIRP (dBm) | EIRP (W) | Battery |
|----------------|------------------------|--------------|----------------------|---------------|-------------|----------|
| 1850.80 | -15.100 | H | 90 | 27.981 | 0.628 | Standard |
| 1880.00 | -14.800 | H | 90 | 28.451 | 0.700 | Standard |
| 1909.80 | -15.300 | H | 90 | 28.121 | 0.649 | Standard |

Note: Standard batteries are options for this phone

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 = 5MHz. 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.

| | | | |
|-----------------------------------|--|---|-------------------------------------|
| PCTEST™ PT. 22/24 TEST REPORT |  FCC MEASUREMENT REPORT |  | Reviewed by: Quality Manager |
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8.0 RADIATED MEASUREMENTS

8.1 Cellular GSM Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.20 MHz
 CHANNEL: 128 (Low)
 MEASURED OUTPUT POWER: 32.833 dBm = 1.920 W
 MODULATION SIGNAL: GSM (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 45.83 dBc



| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 1648.40 | -39.48 | 6.10 | -33.38 | H | 66.2 |
| 2472.60 | -33.68 | 6.70 | -26.98 | H | 59.8 |
| 3296.80 | -65.58 | 6.80 | -58.78 | H | 91.6 |
| 4121.00 | -85.68 | 6.50 | -79.18 | H | 112.0 |
| 4945.20 | -84.38 | 7.00 | -77.38 | H | 110.2 |

NOTES:

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 = 5MHz. 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.

| | | | | |
|-----------------------------------|---|--|---|---------------------------------|
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8.1 Cellular GSM Radiated Measurements (Cont'd)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 190 (Mid)
 MEASURED OUTPUT POWER: 32.833 dBm = 1.920 W
 MODULATION SIGNAL: GSM (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 45.83 dBc



| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 1673.20 | -40.08 | 6.10 | -33.98 | H | 66.8 |
| 2509.80 | -32.98 | 6.70 | -26.28 | H | 59.1 |
| 3346.40 | -64.38 | 6.80 | -57.58 | H | 90.4 |
| 4183.00 | -85.78 | 6.50 | -79.28 | H | 112.1 |
| 5019.60 | -83.78 | 7.00 | -76.78 | H | 109.6 |

NOTES:

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 = 5MHz. 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.

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|-----------------------------------|---|--|---|---------------------------------|
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8.1 Cellular GSM Radiated Measurements (Cont'd)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 848.80 MHz
 CHANNEL: 251 (High)
 MEASURED OUTPUT POWER: 32.833 dBm = 1.920 W
 MODULATION SIGNAL: GSM (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 45.83 dBc



| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 1697.60 | -37.98 | 6.10 | -31.88 | H | 64.7 |
| 2546.40 | -33.18 | 6.70 | -26.48 | H | 59.3 |
| 3395.20 | -64.38 | 6.80 | -57.58 | H | 90.4 |
| 4244.00 | -85.68 | 6.50 | -79.18 | H | 112.0 |
| 5092.80 | -83.98 | 7.00 | -76.98 | H | 109.8 |

NOTES:

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 = 5MHz. 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.

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|-----------------------------------|---|--|---|---------------------------------|
| PCTEST™ PT. 22/24 TEST REPORT |  | FCC MEASUREMENT REPORT |  | Reviewed by: Quality Manager |
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8.2 PCS GSM Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1850.20 MHz
 CHANNEL: 512 (Low)
 MEASURED OUTPUT POWER: 31.451 dBm = 1.397 W
 MODULATION SIGNAL: GSM (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 44.45 dBc



| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 3700.40 | -54.83 | 8.70 | -46.13 | H | 77.6 |
| 5550.60 | -58.23 | 9.70 | -48.53 | H | 80.0 |
| 7400.80 | -79.43 | 9.90 | -69.53 | H | 101.0 |
| 9251.00 | -77.43 | 11.40 | -66.03 | H | 97.5 |
| 11101.20 | -77.33 | 12.10 | -65.23 | H | 96.7 |

NOTES:

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 = 5MHz. 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.

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8.2 PCS GSM Radiated Measurements (Cont'd)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 661 (Mid)
 MEASURED OUTPUT POWER: 31.451 dBm = 1.397 W
 MODULATION SIGNAL: GSM (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 44.45 dBc



| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 3760.00 | -54.83 | 8.70 | -46.13 | H | 77.6 |
| 5640.00 | -58.33 | 9.70 | -48.63 | H | 80.1 |
| 7520.00 | -79.13 | 9.90 | -69.23 | H | 100.7 |
| 9400.00 | -77.23 | 11.40 | -65.83 | H | 97.3 |
| 11280.00 | -77.13 | 12.10 | -65.03 | H | 96.5 |

NOTES:

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 = 5MHz. 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.

| | | | | |
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8.2 PCS GSM Radiated Measurements (Cont'd)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1909.80 MHz
 CHANNEL: 810 (High)
 MEASURED OUTPUT POWER: 31.451 dBm = 1.397 W
 MODULATION SIGNAL: GSM (Internal)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 44.45 dBc



| FREQ. (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | POL (H/V) | (dBc) |
|----------------|--|--|--|--------------|-------|
| 3819.60 | -53.23 | 8.70 | -44.53 | H | 76.0 |
| 5729.40 | -59.33 | 9.70 | -49.63 | H | 81.1 |
| 7639.20 | -78.93 | 9.90 | -69.03 | H | 100.5 |
| 9549.00 | -76.93 | 11.40 | -65.53 | H | 97.0 |
| 11458.80 | -76.93 | 12.10 | -64.83 | H | 96.3 |

NOTES:

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 = 5MHz. 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.

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9.0 FREQUENCY STABILITY

9.1 Frequency Stability (Cellular GSM)



OPERATING FREQUENCY: 836,600,005 Hz

CHANNEL: 190

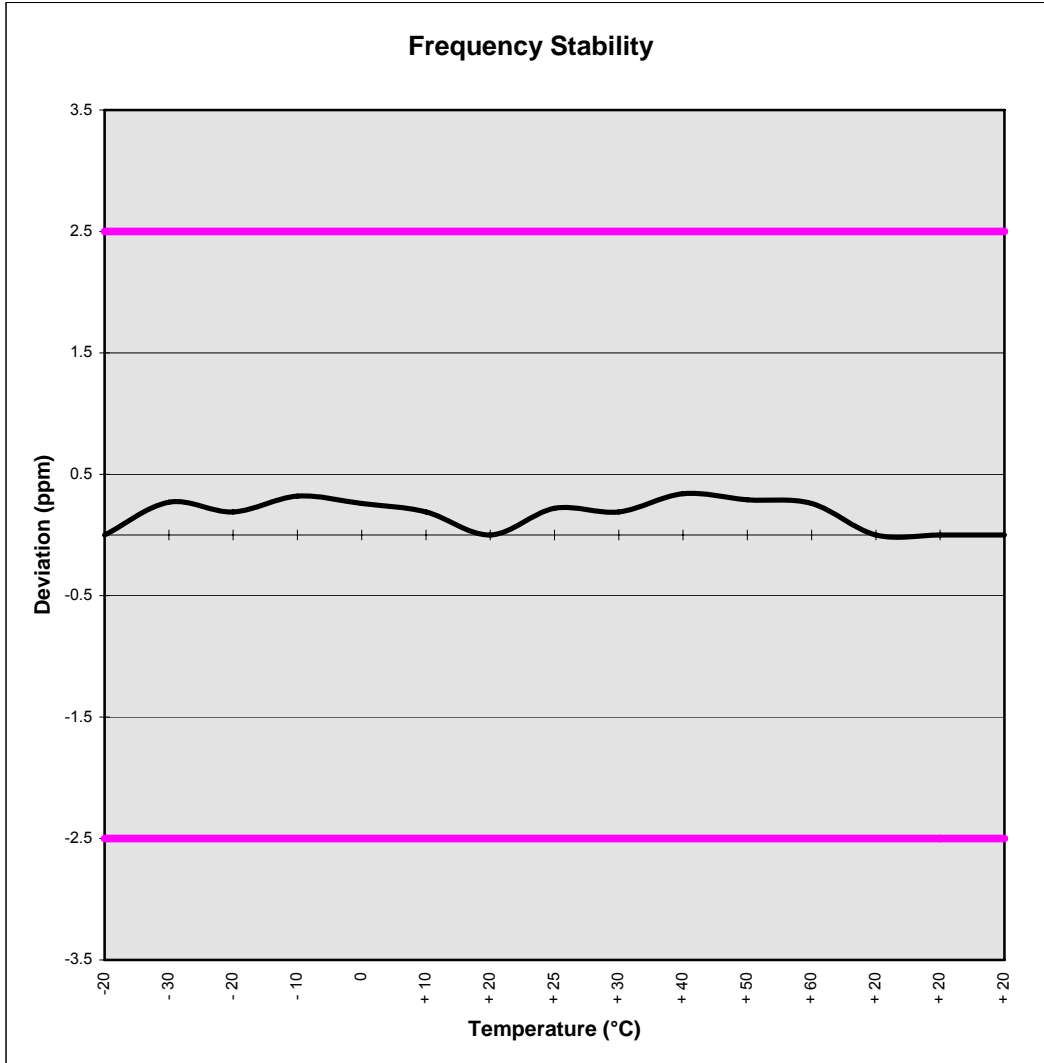
REFERENCE VOLTAGE: 3.7 VDC



DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQ. (Hz) | Deviation (%) |
|----------------|-------------|------------|-------------|---------------|
| 100 % | 3.70 | + 20 (Ref) | 836,600,005 | 0.000000 |
| 100 % | | - 30 | 836,599,779 | 0.000027 |
| 100 % | | - 20 | 836,599,846 | 0.000019 |
| 100 % | | - 10 | 836,599,737 | 0.000032 |
| 100 % | | 0 | 836,599,787 | 0.000026 |
| 100 % | | + 10 | 836,599,846 | 0.000019 |
| 100 % | | + 20 | 836,600,005 | 0.000000 |
| 100 % | | + 25 | 836,599,821 | 0.000022 |
| 100 % | | + 30 | 836,599,846 | 0.000019 |
| 100 % | | + 40 | 836,599,721 | 0.000034 |
| 100 % | | + 50 | 836,599,762 | 0.000029 |
| 100 % | | + 60 | 836,599,787 | 0.000026 |
| 85 % | | 3.15 | + 20 | 836,600,005 |
| 115 % | 4.26 | + 20 | 836,600,005 | 0.000000 |
| BATT. ENDPOINT | 2.99 | + 20 | 836,600,005 | 0.000000 |

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|-----------------------------------|---|--|---|---------------------------------|
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9.1 Frequency Stability (Cellular GSM) (Cont'd)



| | | | | |
|--|---|---|---|--|
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9.2 Frequency Stability (PCS GSM)



OPERATING FREQUENCY: 1,880,000,008 Hz

CHANNEL: 661

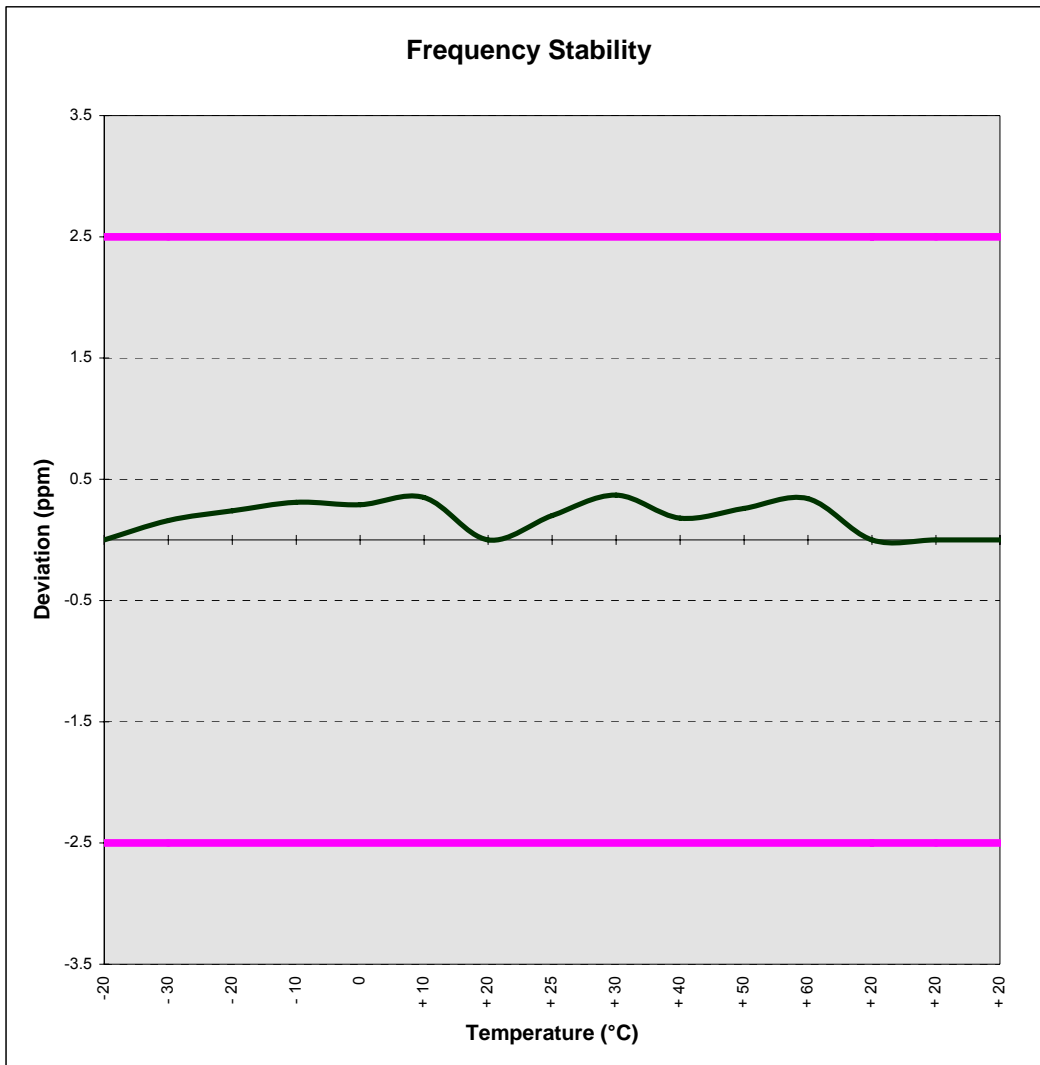
REFERENCE VOLTAGE: 3.7 VAC



DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQ. (Hz) | Deviation (%) |
|----------------|-------------|------------|---------------|---------------|
| 100 % | 3.70 | + 20 (Ref) | 1,880,000,008 | 0.000000 |
| 100 % | | - 30 | 1,879,999,707 | 0.000016 |
| 100 % | | - 20 | 1,879,999,557 | 0.000024 |
| 100 % | | - 10 | 1,879,999,425 | 0.000031 |
| 100 % | | 0 | 1,879,999,463 | 0.000029 |
| 100 % | | + 10 | 1,879,999,350 | 0.000035 |
| 100 % | | + 20 | 1,880,000,008 | 0.000000 |
| 100 % | | + 25 | 1,879,999,632 | 0.000020 |
| 100 % | | + 30 | 1,879,999,312 | 0.000037 |
| 100 % | | + 40 | 1,879,999,670 | 0.000018 |
| 100 % | | + 50 | 1,879,999,519 | 0.000026 |
| 100 % | | + 60 | 1,879,999,369 | 0.000034 |
| 85 % | | 3.15 | + 20 | 1,880,000,008 |
| 115 % | 4.26 | + 20 | 1,880,000,008 | 0.000000 |
| BATT. ENDPOINT | 3.10 | + 20 | 1,880,000,008 | 0.000000 |

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9.2 Frequency Stability (PCS GSM) (Cont'd)



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10.0 PLOT(S) OF EMISSIONS

(SEE ATTACHMENT A)

| | | | | |
|--|---|---|---|--|
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11.0 TEST EQUIPMENT

| TYPE | MODEL | CAL DUE DATE | S/N |
|-----------------------------------|--|--------------|------------------------|
| Signal Generator | Rohde & Schwarz (0.1-1000MHz) | 9/11/2006 | 894215/012 |
| Ailtech/Eaton Receiver | NM 37/57A-SL (30-1000MHz) | 4/12/2007 | 0792-03271 |
| Ailtech/Eaton Receiver | NM 37/57A (30-1000MHz) | 3/11/2007 | 0805-03334 |
| Ailtech/Eaton Receiver | NM 17/27A (0.1-32MHz) | 9/17/2006 | 0608-03241 |
| Ailtech/Eaton Adapter | CCA-7 CISPR/ANSI QP Adapter | 3/11/2007 | 0194-04082 |
| Harmonic/Flicker | Test System HP 6841A (IEC 555-2/3) | 2/11/2007 | 3531A00115/ PCT468 |
| Shielded Screen Room | RF Lindgren Model 26-2/2-0 | 6/19/2006 | 6710 (PCT270) |
| Shielded Semi-Anechoic Chamber | Ray Proof Model S81 | 4/17/2007 | R2437 (PCT278) |
| Quasi-Peak Adapter | HP 85650A | 8/9/2006 | 2043A00301 |
| Microwave Spectrum Analyzer | HP 8566B (100Hz-22GHz) | 8/15/2006 | 3638A08713 |
| Microwave Spectrum Analyzer | HP 8566B (100Hz-22GHz) | 4/17/2007 | 2542A11898 |
| Spectrum Analyzer/Tracking Gen. | HP 8591A (100Hz-1.8GHz) | 9/12/2006 | 3144A02458 |
| Signal Generator | HP 8640B (500Hz-1GHz) | 6/3/2006 | 2232A19558 |
| Signal Generator | HP 8640B (500Hz-1GHz) | 6/3/2006 | 1851A09816 |
| Signal Generator | HP 8648D (9kHz-4GHz) | 5/1/2007 | 3613A00315 |
| Spectrum Analyzer | HP 8594A | 11/2/2006 | 3051A00187 |
| Spectrum Analyzer (2) | HP 8591A | 10/15/2006 | 3034A01395, 3108A02053 |
| Audio Analyzer | HP 8903B | | 3011A09025 |
| Modulation Analyzer | HP 8901A | | 2432A03467 |
| Power Meter | HP 437B | | 3125U24437 |
| Power Sensor | HP 8482H (30mW-3W) | | 2237A02084 |
| Broadband Amplifier (2) | HP 8447D | | 1145A00470, 1937A03348 |
| Broadband Amplifier | HP 8447F | | 2443A03784 |
| Network Analyzer | HP 8753E (30kHz-3GHz) | | JP38020182 |
| Attenuator | HP 8495A (0-70dB) DC-4GHz | | |
| 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, 0355 |
| 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) | | |
| Gigatronics Universal Power Meter | 8657A | | 1835256 |
| Gigatronics Power Sensor | 80701A (0.05-18GHz) | | 1833460 |
| Amplifier Research | 5S1G4 (5W, 800MHz-4.2GHz) | | 22322 |
| Microwave Survey Meter | Holiday Model 1501 (2.450GHz) | | 80931 |
| Digital Thermometer | Extech Instruments 421305 | | 426966 |
| Bi-Directional Coax Coupler | Narda 3020A (50-1000MHz) | | |
| Environmental Chamber | Associated Systems Model 1025 (Temperature/Humidity) | | PCT285 |

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12.0 SAMPLE CALCULATIONS

Emission Designator



Emission Designator = 250KGXW

GSM BW = 250 kHz

G = Phase Modulation



X = Cases not otherwise covered

W = Combination (Audio/Data)

| | | | | |
|--|---|---|---|--|
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13.0 CONCLUSION

The data collected shows that the Samsung Dual-Band Dual-Mode GSM/ EDGE/ WCDMA Phone with Bluetooth FCC ID: A3LSGHZX20 complies with all the requirements of Parts 2, 22, and 24 of the FCC rules.

| | | | | |
|--|---|---|---|--|
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