

**EXHIBIT 11**  
**RF OUTPUT POWER MEASUREMENTS (UPDATED)**

This exhibit describes the procedures employed and presents results of measurements of the RM output power, as required by and performed in accordance with § 2.1046.

This version of Exhibit 11 (file name: EX11\_OIIRM1900\_990910.DOC) has been updated following revision of device tune-up procedure to ensure that peak RF output power does not exceed 30 dBm. In mobile applications, where antenna system gain is specified to be no greater than 3 dBi, this modification of the tune-up procedure ensures that the unit will comply with the 2 W e.i.r.p. peak output power limit given in § 24.232(b).

### **Requirements**

Section 24.232 of the FCC Rules and Regulations governing operation of PCS equipment provides power limitations for base and mobile/portable stations. Per § 24.232(a), base (fixed) stations are limited to 1640 W peak equivalent isotropically radiated power (e.i.r.p.) with an antenna height up to 300 meters HAAT (height above average terrain). In no case may peak output power exceed 100 W. In § 24.232(b), mobile/portable stations are limited to 2 W e.i.r.p. peak output power.

Measurements of transmitter RF output power are described in § 2.1046 and are necessary to obtain a certification grant of equipment authorization. For all measurements of output power, the RF output port of the RM was loaded with a matched  $50 \Omega$  impedance.

### **Measurement Procedure**

Measurements of the RM output power were performed using an HP8563E Spectrum Analyzer, with a resolution bandwidth set large enough to integrate the power in the entire transmitted burst. Prior to the measurement, signal path loss of the diagnostic system (cables and attenuator) was characterized at all frequencies at which output power was measured; this loss was then used to correct the raw readings to obtain precise measurements of RM RF output power. Measurements were made at the lowest (channel 512, 1850.2 MHz), middle (channel 661, 1880.0), and highest (channel 810, 1909.8 MHz) PCS-1900 defined channels in the licensed PCS spectrum.

Specific procedures followed during measurements of RF output power were as follows:

1. Configure the RM:

• Input Voltage	5.0 VDC
• Mode	Transmit, random data pattern selected using PC controller
• RF Output Power	Maximum level (step 0, 30 dBm nominal) and minimum level (step 15, 0 dBm nominal) selected using the PC controller

- Frequencies Channel 512 (1850.2 MHz), Channel 661 (1880.0 MHz), and Channel 810 (1909.8 MHz) selected using the PC controller

2. Configure the HP8563E Spectrum Analyzer:
  - Center Frequency Center of selected channel
  - Span 1 kHz
  - RBW 1 MHz
  - Sweep Time 5 sec
  - Display Max Hold
3. Record peak RF output power, correcting for diagnostic system losses
4. Perform measurement at all three channels
5. Perform measurement at minimum power level (Step 15, 0 dBm nominal)

## Measurement Results

RM output power measurement results are given in Table E11.1. All results have been corrected to account for diagnostic system losses.

Table E11.1. RF output power measurement results.

PCS-1900 Channel	Measurement Frequency (MHz)	Maximum Output Power (dBm)	Minimum Output Power (dBm)
512	1850.2	29.67	0.5
661	1880.0	29.83	1.00
810	1909.8	29.33	0.84

As the results in Table E11.1 indicate, the measured maximum RF peak output power of the RM is approximately 29.83 dBm, or 0.96 W. The nominal maximum RF output power of the RM is 30 dBm (1.0 W).

The peak RF output power of the RM complies with the 100 W maximum for fixed applications given in § 24.232(a); peak e.i.r.p. will not exceed 1640 W (i.e., antenna gain will not exceed 32 dBi). Maximum antenna gain for fixed applications will be limited to 7 dBi gain in all cases, maintaining output levels well below the maximum allowable. For mobile/portable applications, compliance with the 2 W e.i.r.p. limit given in § 24.232(b) will be ensured by limiting antenna system gain (antenna gain minus RF interconnect cable loss) to 3 dB nominally. Note that in all applications, RM output power is controlled by the GSM network to minimize transmit power while maintaining the quality of the link.