

FCC APPLICATION INQUIRY RESPONSE
M78-C12A: SIEMENS C12 CELLULAR TELEPHONE

Correspondence Number: 3542

September 30, 1998

1.0 Overview

This package was compiled to reply to inquiries made by Mr. Greg Czumak of the FCC regarding the Type Acceptance Application for the Siemens C12 Cellular Telephone. Each Inquiry item is listed below followed by the response.

2.0 Inquiry Responses

- (1) **The equation used to calculate EIRP (though mistakenly listed as ERP) is incorrect. The simplified equation is: $P \text{ (watts)} = (E \times d)^2 / 30G$ (that is, E (E field in volts per meter) times d (in meters) quantity squared, divided by $30G$). Based on the measured E field at 1 meter, this yields an EIRP of 171 mW. This is the value which will be listed on the grant. Please confirm your understanding of this.**

Answer:

We understand your correction and therefore are submitting the following changes, as amendments to our filing:

- A. In section 4.0 ERP should be changed to EIRP wherever it occurs.
B. In section 4.0 the equation for EIRP (formerly ERP) should be changed to

$$EIRP = \{(E*d)^2\}/30$$

- C. Because of the change in formula certain changes must be made in Appendix B, containing the Test Data for this test. The highest reading, corrected, was 127.10 dB(uV/m) at 1m. With the corrected formula is results in a EIRP of 171mW.

Today the conducted output power of the device was remeasured at the external antenna port at 29.5 dBm (peak measured in a 3 MHz/3 MHz analyzer setting at Channel 661), which is equivalent to 0.891 watts. We request that the Commission change the power rating of this device to to 0.891 watts as this is the highest peak power output for the device (as compared to the radiated output of 171 mW).

- (2) **The first portion of the emission designator is defined as either the Necessary bandwidth or the measured occupied bandwidth. Please remeasure the occupied bandwidth using a RBW= 3 kHz (not 30 kHz), as this is approx. 1% of the emission bandwidth, and VBW >= RBW. You may then use the 99% power measurement function available on most spectrum analyzers. Report this new value, and use it to correct the emission designator.**

Answer:

We have remeasured the occupied bandwidth using $RBW = 3\text{kHz}$, $VBW = 10\text{kHz}$ based on a 26 dB down criteria. The Frequency Span was set to 1 MHz.

A. The new readings were:

Channel 512 - Center Freq. - 1850.2

The 26 dB points were found at -130.0 kHz and +177.7 kHz, resulting in an occupied bandwidth of 307.7 kHz.

Channel 810 - Center Freq. - 1909.8

The 26 dB points were found at -173.3 kHz and +133.3 kHz, resulting in an occupied bandwidth of 306.6 kHz.

B. The modulation type for this device is GXW This results in emission designator of:

308KGXW

We request that the Commission modify the emission designator of this application based on this value.

(3) Please indicate the actual tuning range of the EUT. For PCS 1900 (GSM) equipment, this is typically beginning and ending 200 kHz from the frequency block edges.

Answer:

This device is a PCS 1900 (GSM) device, accordingly the tuning range is:

A. For the lowest channel, Channel 512 the center frequency is 1850.2 with a lower frequency at 1850.0 and an upper frequency at 1850.3.

B. For highest channel, Channel 810 the center frequency is 1909.8 with a lower frequency at 1909.6 and an upper frequency at 1909.9.

The complete tuning range of this device (including band edges) is:

1850 to 1909.9 MHz

We request that the Commission modify the frequency range portion of this application to these values.

- (4) **Based on $43 + 10\log P$, the limit for radiated spurs is 82.2 dBuV/m @ 3m. At what distance were radiated spurious emission measured? Page 30 of 33 lists the 4th harmonic as having a field strength above this limit. Please address. What is "DSN" listed on the bottom of this page?**

Answer:

The 4th harmonic reading for the horizontal polarization is incorrect in that the pre-amplifier gain was not taken into account. The true corrected level is 62.0 dB(uV/m), which is below the limit of 82.2 dB(uV/m).

"DSN" is Detection System Noise.

- (5) **SAR report indicates 1 W output (probably peak output, equivalent to about 125 mW average for GSM?), SAR Lab should clarify the type of output.**

Answer:

The C12 is a PCS 1900 (GSM) product. Accordingly the nominal output power value is 1W peak (see Item 1) which is equivalent to a 125 mW average power.

- (6) **The headings on the SAR plots are mostly not readable because of poor scan resolution. This should be avoided in the future. For the present application, there is no data for the latest SAR tests without the DC power adaptor and cable. Please submit plots for the worst case data set with battery only. This will also resolve issues from some of the existing plots that are not readable.**

Answer:

We apologize for the poor scan resolution. Lucent Technology is sending by separate cover the new plots with the phone operating on battery power, without attached cables. These plots should both substantiate the peak SAR value, previously transmitted and provide clear print resolution.

In a conversation with Mr. John O'Brien of Professional Testing (Sept 30, 1998: 12:35 p.m. CDT), Mr. Steve Gordon of Lucent indicated that he had been in contact with Mr. Kwok Chan of the FCC as recent as the morning of Sept 30, 1998 regarding this issue and the SAR probe calibration issue. Lucent and Mr. Chan have been exchanging e-mail to identify specifically what is needed (including format) for this issue. Mr. Gordon indicated that the required information will be forwarded to Mr. Chan directly from Lucent within the next few days.

- (7) **The dipole validation data is inconsistent with the original validation reference provide by the equipment manufacturer. The provided 1-g results are much lower than those indicated in the reference data. This cannot be used to support the fact that the system is in good calibration for doing SAR. Please comment.**

FYI: The SAR limit indicated on page 9 of Exhibit 6(a) should be 1.6 W/kg instead of 4.0 W/kg. Need to inform test lab to avoid problem in the future.

Answer:

There were two sets of SAR measurements taken as part of this submission. The first set was taken in the worst case configuration, with the phone attached to a option adapter cable and operating off of external power. Some weeks later a second set of measurements was taken to compare the worst case from the first set to the result with the phone configured for standalone operation, operating off battery power and without any cables attached. Between these two sets of measurements the SAR equipment was calibrated. Accordingly there are two calibrations, one which is appropriate for the first set of readings and a second for the later readings.

See Item (6) for additional information regarding the response to this issue.

In addition, in section 3.2 and Exhibit 6(a) the SAR limit should be changed to 1.6 W/kg. This figure was obtained from the original SAR report, which (erroneously) indicated the higher SAR limit.