This document was generated in response to a request for additional technical information by Joe Dichoso in regards to the type approval of the KWC-2325. The information included in related to the 5 specific topics discussed in the following email received by Lin Lu on June 17, 2002:

From: oetech@fccsun34w.fcc.gov
Date: Mon, 17 Jun 2002 13:59:28 -0400 (EDT)
To: LLu@qcpi.com
X-BigFish: cs0v

To: Lin Lu, Kyocera Wireless Corp
From: Joe Dichoso
jdichoso@fcc.gov
FCC Application Processing Branch
Re: FCC ID OVFKWC-2325
Applicant: Kyocera Wireless Corp
Correspondence Reference Number: 23139
731 Confirmation Number: EA645242

Please address the following RF safety and EMC issues.

RF safety...

1) Op Desc exhibit missing.

2) Probe cal. cert. shows head factors only. Please describe how body factors were obtained, or submit body cal. cert.

3) pg 3 of users manual: FCC ID is wrong - hyphen missing

EMC QUESTIONS.

1) The output powers listed on page 6 of the test report does not agree with those on Pages 25 and Pages 26. Pages 25 and 25 was used for the requested radiated output powers. Please explain. The output power in the test report must also agree with the SAR report.

2) What is the second test report for? Please explain.

**RF Safety –**

**1) Operational Description under FCC Rules Part 2 Section 2.1033 (c)**

The operational description specified in FCC rules section 2.1033 (c) was included in the first test report, named “KWC-2345_part22&24 test report”, Exhibit 2, pp. 5 ~ 23. The circuit description specified in Section 2.1033 (c) (10) was contained in Exhibit 2, page 6 ~ 23. The schematic diagram was uploaded to FCC OET web site on May 21, 2002. In case, some of files were missing during the uploading. The Exhibit 2 (operational description) has been re-sent to FCC via OET electronic filing web sit, as a separate Exhibit. Please let us know if any further information is needed.

**2) Probe Factor for Muscle Tissues**

Based on DASY3-user manual Page 49 and the email from Schmid & Partner Engineering AG, the probe conversion factor in muscle tissue was set to 3% lower than for brain tissue in 835MHz frequency, and 10% lower than for brain tissue in 1800MHz. The related pages of DASY3-user manual, SPEAG email are attached in the proceeding pages.

### 4.5.3 Connection between device, liquid, and probe parameters

The electric parameters of the simulation liquid are frequency dependent. Unluckily, this frequency dependency in the homogeneous simulation liquid is different than in the complex cellstructure of the simulated tissue. Since each solution can simulate the tissue only within a limited frequency range, several mixtures are necessary to cover the total MTE frequency range. Within a frequency bandwidth of at least 20%, the same solution can be used with small errors in the SAR. However, the measured parameters at the actual frequency should be used in the software (see RG: 2.3 Medium).

The DASY3 software checks the selected solution against the device frequency to prevent incorrect combinations which could lead to undetected measurement errors. To that purpose, each dataset for the media includes frequency range settings. If the frequency of the selected device is not within the range of the selected media, the system will issue an error message. It is highly recommended to use different media datasets for different frequencies, even for the same liquid. If one liquid is used for 835MHz and 900MHz two datasets with the corresponding parameters should be used (e.g., with frequency ranges 800 - 850 MHz and 870 - 920 MHz). The liquid parameters should be remeasured and adjusted in the software regularly (see RG: 2.3 Medium).

The probe conversion factor (and boundary effect) depends on the frequency and the liquid parameters. For each dosimetric probe, many different sets of conversion factors and boundary correction data can be defined (RG: 2.6.1 E-Field Probe). Each set includes range settings for permittivity, conductivity and frequency. The probe conversion factors can be selected manually or automatically (RG: 2.6.1 E-Field Probe). In the (recommended) automatic selection mode, the software searches for the first conversion factor in the list, whose permittivity and conductivity and frequency range covers the selected device frequency and liquid parameters. If no valid conversion factor can be found, the system will issue an error message when trying to measure SAR. The same error message appears if the manually selected conversion factors do not correspond with the device or the media.

**Note:** The system automatically selects the first valid conversion factor. If you define conversion factors with a reduced frequency and parameter range, make sure that this range is not already covered by an other set further up in the list.

The conversion factors are determined during probe calibration. SPEAG probes are by default calibrated at 900MHz and 1800MHz in brain simulating tissue. The range settings in the probe configuration file are selected to guarantee the specified probe uncertainties. If you want to perform SAR measurements in other liquids (e.g., 835MHz muscle tissue), the DASY3 system will complain. There are several ways to overcome the problem:

- Increase the range settings in the probe document, leaving the conversion factors as they are. This will permit the measurement, although with increased uncertainty. For small changes in the parameters or frequency the error is small (see box below).
- Add a new conversion factor set for the new liquid or frequency. The conversion factor can be estimated from the existing conversion factors (see box below).
- Order special calibrations for the probe.

The following sensitivities of the conversion factor can be used to estimate the conversion factor for other frequencies or media. They are assessed from special calibrations with the ET3DVx probe series. (They cannot be applied for other probe types!)

For frequency changes within the same media (not the same media parameters, they change also with the frequency and must be adjusted in the media settings!):

- In brain and muscle tissue between 750MHz and 1GHz, the conversion factor decreases approximately 1.3% per 100MHz frequency increase.
- In brain and muscle tissue between 1.6GHz and 2GHz, the conversion factor decreases approximately 1% per 100MHz frequency increase.

For muscle tissue around 900MHz (permittivity about 30% higher and conductivity about 15% higher than brain tissue):

- The conversion factor in muscle tissue is approximately 3% lower than for brain tissue for the same frequency.

**For example:**

An ET3DVx probe with a conversion factor 6.0 for 900MHz brain gives a conversion factor of 5.87 for 835MHz muscle tissue.

**SPEAG's email**

X-Sender: pokovic.speagcom@mail.speag.com
Message-Id: <v04210106b5530a3b8cba@[192.168.0.106]>
Date: Thu, 25 May 2000 18:53:22 +0200
To: llu@qualcomm.com
From: Katja Pokovic <pokovic@speag.com>
Subject: probe 1348 - estimate for muscle tissue
Cc: egger@speag.com
Content-Type: text/plain; charset="us-ascii" ; format="flowed"
X-UIDL: f094fb92ae0ff3f05efa23d23d38e279

hi,

i hope this time it will work out!

so the very quick estimate is that the conversion factor will be
about 10% lower for muscle tissue at 1800 MHz (eps=54.3, sig=1.45)
compared to the brain tissue at the same frequency (i.e.,at 1800 MHz
with eps=40.5, sig=1.69).
the document will be fax to you soon.
best, katja

Katja Pokovic
Schmid & Partner
Engineering AG
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Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9707, Fax +41 1 245 9779
WWW http://www.speag.com
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**3) Page 3 of User's Guide: FCC ID is wrong - hyphen missing**

The correction on page 3 of User's Guide has been made. Please see next page.

## FCC/IC Notice

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

To comply with FCC radiation exposure requirements, use of this device for body-worn operational configurations is limited to accessories tested and approved by Kyocera Wireless Corp. (KWC). Other accessories used with this device for body-worn operations must not contain any metallic components and must provide at least 22.5 mm separation distance including the antenna and the user's body.

**This model phone meets the government's requirements for exposure to radio waves.**

Your wireless phone is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for wireless mobile phones employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6 W/kg.* Tests for SAR are conducted using standard operating positions specified by the FCC with the phone transmitting at its highest certified power level in all tested frequency bands.

Although the SAR is determined at the highest certified power level, the actual SAR level of the phone while operating can be well below the maximum value. This is because the phone is designed to operate at multiple power levels so as to use only the power required to reach the network. In general, the closer you are to a wireless base station antenna, the lower the power output.

Before a phone model is available for sale to the public, it must be tested and certified to the FCC that it does not exceed the limit established by the government-adopted requirement for safe exposure. The tests are performed in positions and locations (e.g., at the ear and worn on the body) as required by the FCC for each model. The highest SAR value for this model phone are:

AMPS mode—Head: 1.23 mW/g; Body-worn: 0.360 mW/g with KWC body-worn accessory.

PCS mode—Head: 1.03 mW/g; Body-worn: 0.199 mW/g with KWC body-worn accessory.

(Body-worn measurements differ among phone models, depending upon available accessories and FCC requirements). While there may be differences between the SAR levels of various phones and at various positions, they all meet the government requirement for safe exposure.

The FCC has granted an Equipment Authorization for this model phone with all reported SAR levels evaluated as in compliance with the FCC RF emission guidelines. SAR information on this model phone is on file with the FCC and can be found under the Display Grant section http://www.fcc.gov/oet/fccid after searching on FCC ID OVFKWC2325. Additional information on SAR

**EMC Questions –**

**1) Clarification of Power Numbers Listed on Page 6, Page 25 and Page 26 of the Test Report**

Powers listed on Page 6 (section 8) are the power consumption levels of high power amplifiers (PA) in cell and PCS band. The conducted output power listed on page 25 and 26 were actually measured at RF test port, which were truly powers fed into antenna and used for radiated power measurements. Per 2325 Tx block diagram, the relation between power consumption of PA and conducted output power measured at RF test port is,

Conducted output P(dBm) = PA power consumption x PA efficiency – loss of isolator – loss of duplexer – loss of switcher

The conducted output power listed on page 25 and 26 of the test report agree with what was used for SAR testing (See page 17 and 18 of SAR report).

**2) Explanation of Exhibit 24 – Second Test Report**

KWC 2325 is a tri-mode handset, it supports AMPS, Cell CDMA and PCS CDMA. For CDMA modes, KWC 2325 is designed as a CDMA2000 1x phone. It is fully backward compatible. That means it supports reverse channels, as specified in the legacy IS-95/8-A/B system / standard, as well as support additional reverse channel as per IS-98D standard. The first test report shows the compliance, per the legacy IS-95/8-A/B requirements and FCC requirements. Since KWC 2325 also supports addition reverse channel as per IS-98D, we generated the second test report as Exhibit 24 to show the compliance while the phone operated in more advanced network environment (i.e., P-Rev 6 and above network (CDMA2000)). For the application that 2325 supports, the frequency assignment are identical and the RF waveform are similar. However the channel configuration in baseband is different between the legacy IS-95/8-A/B and IS-98D. Based on measurement results reported in both reports (the first one and second), KWC 2325 is in compliance with FCC requirements, IS-95/8-A/B and IS-98D.