To: Errol Chang/Kwok Chan 2-1-00
FCC OET

From: Jim Sponsler

Subject: FCC submittal EA96211; Correspondence 11591

Errol,

Comments are denoted in blue within the original request for additional information/comments. Last week, Ken Nichols anticipated approval of this submittal within 5 weeks. Does it look like we will be able to make the February 25 date?

If you have any questions, feel free to contact me.

Have a good day.

Jim Sponsler
jim.sponsler@ericsson.com

To: Jim Sponsler, Ericsson Inc
From: Errol Chang
echang@fcc.gov
FCC Application Processing Branch

Re: FCC ID AXATR-378-A2
Applicant: Ericsson Inc
Correspondence Reference Number: 11591
731 Confirmation Number: EA96211
Date of Original E-Mail: 01/20/2000

1. The voltage vs output power plots in exhibit 6 have around 26 dBm for Part 22 and 25 dBm for Part 24 as conducted output. These are similar to output power levels used in the SAR measurements. The alignment procedures for PCS band is indicating 26 dBm +/- 0.25dB for production units, please clarify.

The alignment procedure takes in account all the variants including power over temperature and voltage ranges (refer to exhibit 6M for both plots). The units tested represent pre-production. The SAR unit had its power set to the high side for the 800 MHz band, as this is the worst case scenario for SAR. Power for the 1900 MHz band was to be set to 26 dB at the factory and we measured in RTP at 25.5 dB. The difference between the two is well within the tolerance of measurement error between two different sites and power meters.

2. Please clarify how the extrapolation of SAR to maximum output power (last column) in Table 1 of the SAR report was performed. Other parts of the filing (exhibit 6, tune-up procedures, and section 2.2 of SAR report) are indicating maximum output of 26.25 dBm and possibly 25.25 dBm for the PCS band. We cannot associate the extrapolated maximum SAR with these output levels. Note: not sure why the extrapolated maximum SAR for AMPS mode is lower than the measured SAR.

The specified nominal output power (26 dBm) for the highest power level is set at the middle of the transmit band. For example, for the AMPS band, the device is set in the factory to transmit at 26 dBm ± 0.25 dB at 837 MHz. At other frequencies (e.g. at 824 and 849 MHz) the output power may be different from this. For example, the output power at 824 MHz is 0.3 dB lower than at 837 MHz for this device. This roll-off is due to physical characteristics of the device that do not vary between units.

For SAR testing, we specifically asked to receive units from the factory that have the output power set to 26.25 dBm ± 0.25 dB instead of 26 dBm ± 0.25 dB. That is why the output power of the device in the test report is 26.4 dBm in AMPS mode, 0.15 dB higher than the highest allowable power (26.25 dBm). We felt that it was

better to measure the SAR of a device that has the output power set higher than to scale the numbers up from a lower power.

Correcting the SAR for maximum allowable output power then means subtracting 0.15 dB from the measured SAR values (in other words, multiplying by 0.966). The same scaling factor applies across the AMPS band, regardless of what the output power is at the other frequencies. This is the most realistic way of doing it.

Footnote 1 on page 3 of the SAR Test Report mentions that the nominal output power applies at the middle of the transmit band only. However, I will change the test report to provide better explanation.

3. FYI - SAR plots should occupy at least 3/4 of the page, descriptions of test parameters and conditions on existing plots are hardly readable. Plots that are too small or not readable will not be accepted for future filings.

These figures have been enlarged. I apologize for the inconvenience.

4. FYI - SCC-34 has been proposing +/- 5% for tissue dielectric constant and conductivity. The current SAR report has 10% for dielectric constant in the PCS band. It is not a problem for this particular filing because of the lower SAR. It could cause problems for other filings.

Once the recipes have been defined for the higher frequency bands, we will use them as soon as possible. Currently, we are using a water and sugar solution for the PCS band, which results in a higher conductivity than desired. This results in SAR overestimation.

5. Section 3.1 of the SAR report indicates a +15% offset which does not seem to be consistent with the measurement uncertainty procedure referenced. The referenced procedures were submitted with another Ericsson filing where similar issues have not been addressed. Please refer to measurement uncertainty issues indicated in EA 96065 (repeated below) and address expanded uncertainty for the current filing. SAR compliance may be affected by issues and responses for the referenced procedure (reference #1 and #2 in the current SAR report). We may not be able to complete the SAR review until issues for the referenced procedures have been addressed.

SAR and measurement uncertainty issues to be addressed by EA 96065 that concern the current filing -

a) The measurement uncertainty information of sub-chapter 7 -

(i) the total phantom uncertainty does not compute to 10% as indicated, the 3% above it appears to be in error

You are correct. This error has been corrected in the attachment.

(ii) the offset indicated for phantom uncertainty and extrapolation+boundary effect sections are indicated as +/- offsets; offset errors are generally not bidirectional, please clarify

This was an oversight. The offsets have been corrected to be positive.

(iv) the "combined" and "expanded" uncertainty need to be re-computed

We have re-computed them (the final numbers are still the same, however, because the errors you found were typographical, not mathematical).

(v) for a typical DASY3 system, the offsets are positive which typically results in an expanded uncertainty of about -12% to +52% for a K factor of 2 (for 900 MHZ band)

At the July, 1998 IEEE SCC34 SC-2 meeting, Thomas Schmid and Niels Kuster provided an uncertainty estimate for the DASY3 system that gave a total expanded uncertainty of –12% to +52%, as you have indicated. This is what our table is based on.

However, since the July 1998 meeting, there have been some minor adjustments to this evaluation. In an e-mail from SPEAG dated November 5, 1999:

> "the uncertainty budget is practically the same as before. the only correction is that the total measurement uncertainty should be +/-10.2 (not 10.1) and we took away the +5% offset; that means that combined uncertainty will be +/- 16 (+15% offset - from phantom) resulting in +/- 32 (+15%) for k=2."

In further communication with SPEAG, they indicated that the +5% offset was taken away from the extrapolation and boundary effect. This is reflected in the attached revision. SPEAG has not made any further changes to this evaluation since then. That is how we arrived at a total expanded uncertainty (K = 2) of –17% to +47%.

It is worth mentioning that included in the uncertainty is "Uncertainty of covering the exposure of 80% of the entire user group" which, strictly speaking, is not measurement uncertainty. However, we decided to keep it in for completeness. If we neglect the "phantom uncertainty," the DASY3 measurement uncertainty becomes ±12.2% for K = 1, or ±24.4% for K = 2 (with no offset). This agrees with Niels Kuster's statements at the last IEEE SCC34 meeting that the DASY measurement uncertainty is approximately 25%.

(vi) a number of the indicated standard uncertainty values are typically dependent on specific conditions and assumptions which have not been described or indicated, please address accordingly so that the provided uncertainty numbers are meaningful.

In the new text, we have added a reference to the IEEE SCC34 SC-2 contribution of Thomas Schmid and Niels Kuster in July, 1998 meeting. I hope this is sufficient.

(vii) please also explain how the re-calculated uncertainty analysis would affect compliance for the worst case SAR results of 1.49 W/kg determined for this device.

Given that the measurement uncertainty (not including phantom uncertainty) is within ±30%, the SAR numbers should be compared directly with the limit, as per a motion at the last IEEE SCC34 SC-2 meeting. Uncertainty is not added to the measured value in this case.

(b) FYI - the total amount (assuming it is weight) indicated in sub-chapter 2 section 3 for the tissue recipes appear to be incorrect.

The total amount is actually a volume, in liters (6.7 liters). If this is confusing, we can change it for future filings.

(c) FYI - sub-chapter 3 section 4, 10% is indicated; please note currently SCC-34 is proposing 5% which may affect your evaluation procedures.

We have updated the document to reflect SCC34 proposals.

(d) FYI - sub-chapter 5 section 4.1, 5 cm separation for testing push-to-talk device may not always be appropriate, it is dependent on the design and operating configuration of an individual device. Same page, first line in section 3.3, typo, "ne" should be "be"

For push-to-talk devices, this distance is specified in the user's manuals. That is where that number came from. If the number is not appropriate in a future product, we will certainly change it in the Measurement Specification.

The typo has been corrected in the new version.