ELECTRONIC TECHNOLOGY SYSTEMS DR.GENZ GMBH

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IHR ZEICHEN / YOUR REF. IHR SCHREIBEN / YOUR INFORM. UNSER ZEICHEN / OUR REF. DATUM / DATE
8-Apr-02

Subject: Applicant: GN Netcom Inc
FCC ID: BCE-GNELLIPSE24
731 Confirmation number: EA636896
Correspondence Reference Number: 22347

Dear Sir,

Submitted herewith, on behalf of our customer is an amendment to the subject application, provided in response to your request for technical information:

Q1. Please provide MPE estimation analysis for base unit as mobile device.

Answer:
Please find attached the MPE calculation for base unit as mobile device.

Q2. exhibit "users manual 2" states: The user must place the base 2" (5cm) or more from any personnel in order to comply with FCC RF exposure requirements."
EMC test report states base is mobile device requiring 20cm. Please submit revised users manual(s).

Answer:
Please find attached a revised users manual (exhibit users manual 2_rev).

Q3. Please demonstrate how crest factor=27 is derived and is applicable.

Answer:
According to information from the manufacturer the GN ellipse 2.4 is a DECT device operating in the 2400 MHz band. In accordance with the DECT-Standard the crest-factor is 27 (a framewidth of 10 ms and 24 channels results in a slotwidth of 416.6 µs incuding guard time. With 48.6 µs guard time the pulsewidth of each channel is 368 µs).

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Measuring pulsed signals with the DASY3 the crest factor is used to calculate the peak power in the signal and perform the compensation for the diode compression of the peak power.
A short quotation from the DASY User Manual concerning the Crest Factor:
" Pulsed and modulated Signals The probes have low-pass characteristics with a corner frequency of around 20 Hz, due to the high probe impedances and the amplifier filters. The probe output does not follow the fast modulations of the RF signal, but gives an averaged (RMS) reading. For signal levels in the square law region
of the detector diode, this gives the desired RMS value for any modulation scheme. However, for larger signal levels the averaged signal might be below the compression point, while the peak signal is in the compression area. in that case a compensation would be necessary for all levels above the compression range. The DASY system allows the specification of the crest factor of the signal source. ....." . The only limiting factor for SAR measurements is the dynamic range of DASY3 (0.003W/kg up to 100W/kg for an error less than 0.1 dB)

Q4. It is not clear what are Antenna I and II for base unit. Please submit external photos of both antennas. Which one or will both be used with final device?

Answer:
Both, antenna I and II are internal antennas printed directly on the PCB layout. For evidence please see Internal Photo from base unit. The photo is attached again, please see exhibit 'antennas'.
The antennas in normal use are diversity selected in such a way that the antennas do not transmit simultaneously but are controlled separate by selection signals which selecting only one antenna at any time. The diversity functionality is implemented. Please see also circuit diagram (page 2 of exhibit 'antennas'.

Q5. Per Suppl C, dipole validation tests at frequencies within +/- 100 MHz of device center frequency should be done on same date as device tests and plots should be submitted. Dipole construction details and validation target SARs are given in draft IEEE Std 1528. In case 2400 MHz dipoles are not readily available, please use 1800/1900 MHz dipole.

Answer:
The Validation measurement was done using an 1800/1900 MHz dipole at the frequency 1800 MHz, as a 2400 MHz dipole was not readily available. As the results of the validation measurement were close to specification a correct performance at 2.4 GHz is assumed. Please find attached the validation test plot.

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Q6. SAR tests for remote unit should use body liquid permittivity=52.7, conductivity=1.95. If headset does not contain antenna, SAR is not needed for headset. Please submit analysis of expected change in SAR using Kuster/Balzano theory, FDTD, or similar. Alternatively, please submit SAR data using correct liquid parameters.

Answer:
In an application note concerning SAR sensivities the manufacturer of DASY3 states
that an increase of conductivity or a decrease of permittivity will result in higher SAR values and vice versa.
Some numerical examples:
An increase of conductivity of 10 % will result in a 4.3% higher SAR value averaged over 1g.
A decrease of permittivity of 10% will result in a 4.8% higher SAR value
This is consistent with our numerical FDTD simulations on SAR values in a human body. Therefore using a simulating liquid with permittivity of 37.5 and a conductivity of 2.49 will overestimate the SAR-values.

The headset does not contain an antenna, but some time ago a British consumer magazine and some newspapers claimed that there is a significant coupling of RF energy to the head via the connecting cable. To disprove this allegation SAR measurements were done for the headset too.

Q7. Please demonstrate that frequency-hop function was disabled for SAR tests.

Answer:
The SAR-measurements were done using the test-mode of the GNellipse2.4 The parameters of the test-mode could be controlled via an interface and a laptop. One of these parameters was a fixed channel number.

Q8. Please submit probe cal cert showing 1800 and/or 2400 MHz body probe factors. In case extrapolated factors were used, please show calculation details and theory.

Answer:
The conversion factors of the Probe ET3DV4 SN 1108 are specified by the manufacturer

450 MHZ	ConF	5.95	for X,Y,Z	extrapolated
900 MHZ	ConF	5.56 ± 5%	for X,Y,Z	measured
1800 MHZ	ConF	4.77 ± 5%	for X,Y,Z	measured

A linear extrapolation for 2400 MHz results in a conversion factor of 4.3 for X,Y,Z
Using a conversion factor of one results in a worst case estimation of SAR values.

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Q9. Please demonstrate that device holder clamp did not surround, cover, or perturb antenna in SAR test. Please retest SAR as needed.

Answer:
The antenna is placed at the side, near the top of the housing. There is no perturbation of the antenna because the device holder is made totally from plastic with very low losses. Furthermore antennas of mobile devices are designed to operate in the vicinity of bodies with high permitivitty and losses, so plastic with low permitivitty and low losses will not affect them significantly. The SAR values of the GNellipse2.4 are of the same order of magnitude as in the case of other DECT devices we have measured, where the antenna was definitely not covered by the device holder.

We hope this information is sufficient to issue the grant. If you have further questions please do not hesitate to contact us.

Sincerely,

Jürgen Baschin

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