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Bell Labs Innovations

August 08, 1999

EIRP Measurement

Test Method

The EIRP level was calculated mathematically, based on the OATS Radiated field strength measurement taken at Lucent Technologies Global Compliance Laboratory in Holmdel NJ (see next page). Using the next formula.

EIRP(mW)=10^(E(dBμV/m)/10 –9.75)

The power of Three Channels(1,30,60), in base and handset, were measured,using a peak detector and a RBW of 1Mhz , the Highest reading was of **121.4 dBμV/m,** and was taken from the Handset.

Applying the formula above we get:
E= 121.4 dBμV/m
EIRP=10^(121.4/10 –9.75)= **245.47mW**

Also, we may say that the readings were the worst case readings of each channel. The units were rotated 360° and the antenna were moved from 1mts to 4mts.

We found that using the highest peak, the EIRP is not higher than 300mW, and we don't need to perform SAR test.

Radiated Emissions OATS

Name of EUT:	9520 900 MHz DSS/FH		
Serial Number:		Date of Test:	August 7, 1999
Temperature:	23° C	Relative Humidity:	49%
Product Class:	B	Test Facility:	Open Area Test Site
Test Specification:	47 CFR Part 15	Measurement Distance:	3 meters
File Number:	99520 (Data file:99520E)	Test Engineer:	W. Anderson

9520 Base Set

Freq. (MHz)	EUT Azimuth (Degrees)	Antenna Height (cm)	Antenna Polarity (H/V)	Meter Reading (dBuV) Ave Det/ 1 MHz RSB	Meter Reading (dBuV) Peak Det/ 1 MHz RSB	Cable Loss (dB)	Antenna Factor (dB/m)	Field Intensity (dBuV/m) 1 MHz RSB	
								Ave Det	Peak Det
90259	82	172	V	82.2	83.6	6.6	27.7	116.4	117.8
916.38	67.2	176	V	83.0	84.4	6.6	28.1	117.7	119.1
927.45	182	100	V	82.4	83.8	6.7	28.4	117.4	118.8

9520 Hand Set

Freq. (MHz)	EUT Azimuth (Degrees)	Antenna Height (cm)	Antenna Polarity (H/V)	Meter Reading (dBuV) Ave Det/ 1 MHz RSB	Meter Reading (dBuV) Peak Det/ 1 MHz RSB	Cable Loss (dB)	Antenna Factor (dB/m)	Field Intensity (dBuV/m) 1 MHz RSB	
								Ave Det	Peak Det
90259	157	111	V	85.5	86.6	6.6	27.7	119.7	120.8
916.38	169	103	V	85.6	86.7	6.6	28.1	120.3	**121.4**
927.45	124	111	V	84.1	85.4	6.7	28.4	119.1	120.4

FORMULA DEDUCTION:

L=Distance
E=Field strength
V=voltage
W=watts
Impedance=Z

$P(W)= V^2/Z$
$E=V/L$
$V=E*L$
$P(W)=(E*L)^2/Z$
$E= \sqrt{(P(W)*Z)}/L$

For a Z=50 Ω

$E= 7*\sqrt{P(w)}/L$

$E(\mu V/m)=7x10^6\sqrt{P(w)}/L$

$E(dB\mu V/m)=20 \log[7x10^6*\sqrt{P(W)}/L]$

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$E(dB\mu V/m)=20\log(7x10^{6)} + 20\log\sqrt{}(P(W) – 20 \log L$
$E(dB\mu V/m)=137 + 10\log P(W) – 20 \log L$

$P(W)= antilog[(E(dB\mu V/m) + 20\log L – 137)/10]$

$P(W)= antilog[E(dB\mu V/m)/10 + 2\log L – 13.7]$

$P(mW)= antilog[E(dB\mu V/m)/10 + 2\log L – 13.7 + 3]$

$P(mW)= antilog[E(dB\mu V/m)/10 + \log L^2 – 10.7]$

For a distance L=3 mts

$P(mW)= 10^\wedge[E(dB\mu V/m)/10 – 9.75]$