

**montena**

montena emc sa

Test laboratory accredited by metas, the Swiss Federal Office of Metrology and Accreditation  
 Laboratoire d'essai accrédité par metas, l'Office fédéral de métrologie et d'accréditation  
 Prüflabor akkreditiert durch metas, das Bundesamt für Metrologie und Akkreditierung

Registration number  
 Numéro d'accréditation  
 Akkreditierungsnummer

**STS 024**

Schweizerischer Prüfstellendienst  
 Service suisse d'essai  
 Swiss testing service



|                                                 |                                              |                                             |                                    |                                          |                 |
|-------------------------------------------------|----------------------------------------------|---------------------------------------------|------------------------------------|------------------------------------------|-----------------|
| Date of test:<br>Date de l'essai:<br>Prüfdatum: | <b>January 10 and July 1 to 2, 2003</b>      | Report no:<br>Rapport no:<br>Bericht Nr:    | <b>Draft</b>                       | Mandate no:<br>Mandat no:<br>Auftrag Nr: | <b>20025229</b> |
| Report:<br>Rapport:<br>Bericht:                 | <b>Electromagnetic compatibility</b>         |                                             |                                    |                                          |                 |
| Product name:<br>Nom du produit:<br>Produktname | <b>Mobile Cordless Headset - Dongle HDC5</b> |                                             |                                    |                                          |                 |
| Customer:<br>Client:<br>Kunde:                  | <b>Logitech</b>                              | Serial no:<br>No de série:<br>Seriennummer: | <b>Final pre-production sample</b> |                                          |                 |

|                                                                           |                                |
|---------------------------------------------------------------------------|--------------------------------|
| Standards / Normes / Normen                                               | Result<br>Résultat<br>Ergebnis |
| <b>CFR 47, Part 15, Subpart C, Intentional radiator, Paragraph 15.249</b> | <b>Pass</b>                    |

Test performed by  
 Essai effectué par :  
 Prüfer

Erich Staub

Test report prepared by  
 Rapport d'essai préparé par :  
 Berichtersteller

Erich Staub

Test report controlled and approved by  
 Rapport d'essai contrôlé et approuvé par :  
 Prüfbescheinigung

Bertrand Daout

.....

.....

Rossens, ..... (Issue Date / Date d'édition / Ausstelldatum)

V0309

Main language / Langue principale / Hauptsprache : english / français / deutsch

This report may be reproduced in full. The present document results from tests on a specimen and does not prejudice to the conformity of all the manufactured products. - Ce rapport d'essai peut être reproduit en entier. Le présent document résulte d'essais sur un spécimen. Il ne préjuge pas de la conformité de l'ensemble des produits fabriqués à l'objet essayé. - Dieser Prüfbericht kann als Ganzes vervielfältigt werden. Dieser Bericht beinhaltet die Prüfergebnisse eines Mustergerätes. Es kann daraus nicht auf die Übereinstimmung der Seriegeräte mit dem Mustergerät geschlossen werden.

q:\mandats\mandats\_avant\_2003\20025229\_logitech\_headset\messungen\_fcc\2003-01-10\_hdc5\_dongle\shockfish\_hdc5\_b.doc

## Contents / Table des matières / Inhaltsverzeichnis

### Page/Page/Seite

|     |                                                                                                                            |    |
|-----|----------------------------------------------------------------------------------------------------------------------------|----|
| 1.  | SUMMARY OF TEST RESULTS / RÉSUMÉ DES RÉSULTATS D'ESSAIS / ZUSAMMENFASSUNG DER PRÜFERGEBNISSE .....                         | 3  |
| 2.  | APPLIED STANDARDS / NORMES APPLIQUEES / VERWENDETE NORMEN .....                                                            | 3  |
| 3.  | CLIENT / CLIENT / KUNDE .....                                                                                              | 4  |
| 4.  | EQUIPMENT UNDER TEST / EQUIPEMENT A L'ESSAI / PRÜFLING .....                                                               | 4  |
| 4.1 | Identification / Identification / Identifikation .....                                                                     | 4  |
| 4.2 | Connected cables / Câble connectés / Angeschlossene Kabel .....                                                            | 4  |
| 4.3 | Modifications before the tests / Modifications apportées avant les essais / Vor den Prüfungen angebrachte Änderungen ..... | 5  |
| 4.4 | Pictures of the EUT / Photos de l'EST / Fotos des Prüflings .....                                                          | 5  |
| 4.5 | Classification / Classification / Klassierung .....                                                                        | 6  |
| 5.  | TEST CONDITIONS / CONDITIONS D'ESSAI / TESTBEDINGUNGEN .....                                                               | 6  |
| 5.1 | Climatic conditions / conditions climatiques / klimatologische Bedingungen .....                                           | 6  |
| 5.2 | Location and Date / Lieu et date / Ort und Datum .....                                                                     | 6  |
| 5.3 | Persons present / Personnes présentes / Anwesende Personen .....                                                           | 6  |
| 5.4 | Test configuration / Configuration d'essai / Prüfkonfiguration .....                                                       | 7  |
| 5.5 | Operating conditions / Conditions de fonctionnement / Betriebszustand .....                                                | 7  |
| 5.6 | Auxillary equipment / Matériel auxiliaire / Zusatzgeräte .....                                                             | 7  |
| 6.  | EMISSION TEST TRANSMITTER .....                                                                                            | 8  |
| 6.1 | Carrier measurement .....                                                                                                  | 9  |
| 6.2 | Radiated electromagnetic field 30 - 1000 MHz .....                                                                         | 19 |
| 6.3 | Radiated electromagnetic field 1 – 10 GHz .....                                                                            | 28 |
| 7.  | EMISSION TEST RECEIVER .....                                                                                               | 45 |
| 7.1 | Radiated electromagnetic field 30 - 1000 MHz .....                                                                         | 46 |
| 7.2 | Radiated electromagnetic field 1 - 5 GHz .....                                                                             | 51 |
| 8.  | TEST EQUIPMENT .....                                                                                                       | 60 |

## 1. Summary of test results / Résumé des résultats d'essais / Zusammenfassung der Prüfergebnisse

✓ Pass / Réussi / Bestanden

✗ Fail / Echoué / Nicht bestanden

Ø Not applicable to this product / Pas applicable à ce produit / Nicht anwendbar für dieses Produkt

— Not tested / Pas testé / Nicht geprüft

■ No requirements / Pas d'exigence / Keine Anforderung

| Test Type / Type d'essai / Art der Prüfung                                                                                                 | Standard /Norme /Norm          | Result / Résultat / Ergebnis |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------|
| <b>Emission / Emission / Störaussendung</b>                                                                                                |                                | <b>Transmit mode</b>         |
| Mains terminal interference voltage<br>Tension perturbatrice aux bornes d'alimentation<br>Störspannung auf den Energieversorgungsleitungen | CFR 47 § 15.207                | Ø <sup>1</sup>               |
| Carrier measurement<br>Mesure de la porteuse<br>Trägerfrequenzmessung                                                                      | CFR 47 § 15.249(a)             | ✓                            |
| Radiated electromagnetic field<br>Champ perturbateur<br>Störfeldstärke                                                                     | CFR 47 § 15.249(d)<br>§ 15.209 | ✓                            |
| <b>Emission / Emission / Störaussendung</b>                                                                                                |                                | <b>Receive mode</b>          |
| Mains terminal interference voltage<br>Tension perturbatrice aux bornes d'alimentation<br>Störspannung auf den Energieversorgungsleitungen | CFR 47 § 15.107                | Ø <sup>1</sup>               |
| Radiated electromagnetic field<br>Champ perturbateur<br>Störfeldstärke                                                                     | CFR 47 § 15.109                | ✓                            |

1. Powered with / Alimenté avec / Gespeist mit : Internal battery

## 2. Applied standards / Normes appliquées / Verwendete Normen

|                             |                                                                                                    |
|-----------------------------|----------------------------------------------------------------------------------------------------|
| CFR 47 Part 15<br>Subpart C | Code of Federal Regulations - Telecommunication, FCC Part 15, Subpart C: "Intentional Radiators"   |
| CFR 47 Part 15<br>Subpart B | Code of Federal Regulations - Telecommunication, FCC Part 15, Subpart B: "Unintentional Radiators" |

**3. Client / Client / Kunde**

|                                                                                    |                                                                            |
|------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Client name and address<br>Nom et adresse du client<br>Name und Adresse des Kunden | <i>Logitech<br/>1499 SE Tech Center Place<br/>Vancouver, WA 98683-9575</i> |
| Contact Person / Responsable /<br>Kontaktperson                                    | <i>Mark C. Ohnstad</i>                                                     |
| e-mail / courrier électronique / e-mail                                            | <i>Mark_ohnstad@logitech.com</i>                                           |
| Mandate no / Mandat no / Auftrag Nr.                                               | <i>20025229</i>                                                            |

**4. Equipment under test / Equipement à l'essai / Prüfling****4.1 Identification / Identification / Identifikation**

|                                                                                                  |                                                                            |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Manufacturer name and address<br>Nom et adresse du fabricant<br>Name und Adresse des Herstellers | <i>Logitech<br/>1499 SE Tech Center Place<br/>Vancouver, WA 98683-9575</i> |
| Production country / Pays de<br>fabrication / Ursprungsland                                      | <i>China</i>                                                               |
| Brand name / nom de marque /<br>Verkaufsmarke                                                    | <i>Logitech</i>                                                            |
| Product name / Nom du produit /<br>Produktname                                                   | <i>Mobile Cordless Headset - Dongle HDC5</i>                               |
| Product description / Description du<br>produit / Produktbeschreibung                            | <i>Cordless Headset for mobile phones</i>                                  |
| Model number / Numéro de modèle /<br>Modellnummer                                                | <i>Dongle HDC5</i>                                                         |
| Serial no / No. de série /<br>Seriennummer                                                       | <i>Final pre-production sample</i>                                         |
| Software version / Version du logiciel<br>/ Softwareversion                                      | <i>Revision 1.1</i>                                                        |
| Highest frequency / Fréquence la<br>plus élevée / Höchste Frequenz                               | <i>921.7 MHz</i>                                                           |
| Supply / Alimentation / Speisung                                                                 | <i>Li-Ion battery 4.2V, 100mAh</i>                                         |

**4.2 Connected cables / Câble connectés / Angeschlossene Kabel**

|      |
|------|
| none |
|------|

**4.3 Modifications before the tests / Modifications apportées avant les essais / Vor den Prüfungen angebrachte Änderungen**

|      |
|------|
| none |
|------|

**4.4 Pictures of the EUT / Photos de l'EST / Fotos des Prüflings**Equipment under test / Equipment  
sous test / PrüflingEquipment under test / Equipment  
sous test / Prüfling

Equipment under test / Equipment  
sous test / Prüfling**4.5 Classification / Classification / Klassierung**

- Transmitter part: Intentional radiator
- Receiver part: Unintentional radiator

**5. Test conditions / Conditions d'essai / Testbedingungen****5.1 Climatic conditions / conditions climatiques / klimatologische Bedingungen**

|                                                                    |             |     |
|--------------------------------------------------------------------|-------------|-----|
| Temperature / Température / Temperatur:                            | 20 - 25     | °C  |
| Pressure / Pression / Druck:                                       | 1001 - 1012 | hPa |
| Relative humidity / Humidité relative / Relative Luftfeuchtigkeit: | 36 - 45     | %   |

**5.2 Location and Date / Lieu et date / Ort und Datum**

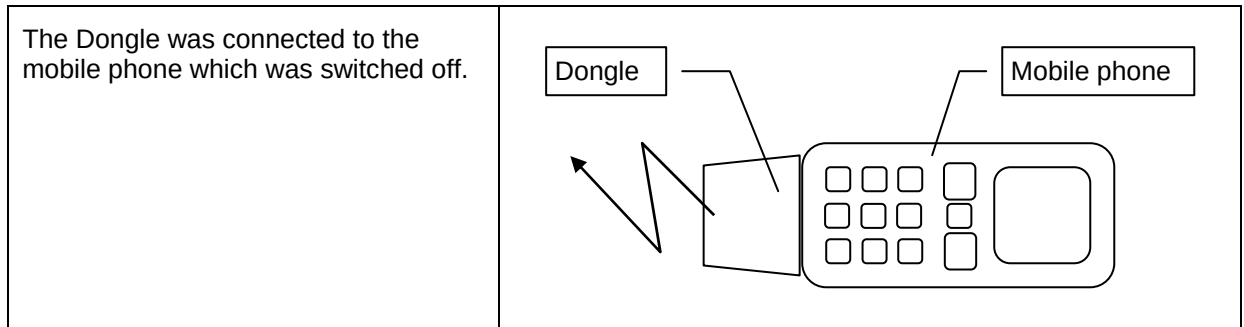
|                                                      |                                  |
|------------------------------------------------------|----------------------------------|
| Test period / Date des essais / Datum der Prüfungen: | January 10 and July 1 to 2, 2003 |
| Location / Lieu / Ort:                               | Rossens                          |

**5.3 Persons present / Personnes présentes / Anwesende Personen****Test Engineer(s) / Ingénieur(s) d'essai / Prüflingenieur(e) :**

Erich Staub

**Other(s) / Autre(s) / Andere :**

|                   |                           |
|-------------------|---------------------------|
| Name / Nom / Name | Company / Société / Firma |
| Roger Meier       | Shockfish SA              |

**5.4 Test configuration / Configuration d'essai / Prüfkonfiguration****5.5 Operating conditions / Conditions de fonctionnement / Betriebszustand**

- Normal mode of operation, modulated transmitter at lowest and highest operating frequencies.
- Receive mode

**5.6 Auxillary equipment / Matériel auxiliaire / Zusatzgeräte**

The following pieces of equipment are used for the monitoring of the EUT or are necessary for the EUT but they are not tested with the EUT / Les équipements suivants servent à la surveillance de l'EST ou sont indispensable au fonctionnement de celui-ci mais ne font pas partie de l'essai / Folgende Geräte werden für die Überwachung des Prüflings gebraucht oder sind notwendig für die korrekte Funktion. Sie gehören jedoch nicht zum Prüfling.

| Product / Produit / Produkt | Brand / Marque / Marke | Model No. | ID    | Remark / Remarque / Bemerkung |
|-----------------------------|------------------------|-----------|-------|-------------------------------|
| Mobile phone                | Nokia                  | 3330      | - - - | Transmit mode                 |
| Mobile phone                | Nokia                  | 3210      | - - - | Receive mode                  |

## **6. Emission Test Transmitter**

**6.1 Carrier measurement**

Test site: ☒ anechoic chamber (foam) ☐ open test site  
☐ anechoic chamber (ferrites) ☐ .....

Distance: ☐ 30 m ☐ 10 m ☒ 3 m ☐ .....

Position of EUT: 0.8 m (height of the equipment under test above floor)

Test precision:  $\pm 6$  dB (30 - 300 MHz) /  $\pm 5.4$  dB (300 - 1000 MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is moved from 1 to 4 m in height successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbance appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding the limits are remeasured manually giving quasi-peak values and average values using a receiver and these measurements are indicated under the graph. The limit must be respected in quasi-peak values (QP).

Test set-up:



Remarks:

- Maximum field strength measured from 1 to 3 m.
- During this measurement the resolution bandwidth was 120 kHz and the video bandwidth 100 kHz. The theoretical error for broad band signals will be smaller than 0.8 dB. For narrow band signals the level does not change.
- EUT measured in position which showed the highest emission on the first HDC9P prototype

Test equipment:

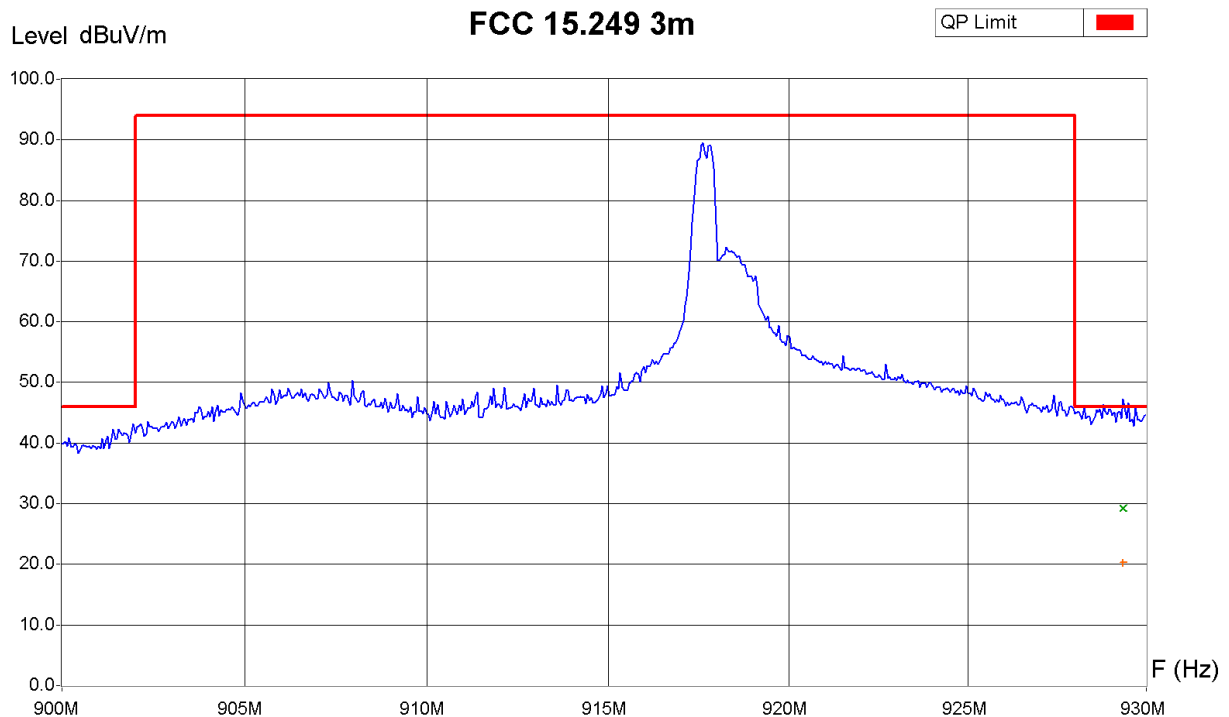
|                                                       |                                           |                                           |                                |                                           |                                |
|-------------------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------|-------------------------------------------|--------------------------------|
| <input checked="" type="checkbox"/> Spectrum analyser | <input checked="" type="checkbox"/> 88-14 | <input type="checkbox"/> 90-26            | <input type="checkbox"/> 94-24 |                                           |                                |
| <input checked="" type="checkbox"/> Receiver          | <input type="checkbox"/> 85-04            | <input checked="" type="checkbox"/> 90-43 | <input type="checkbox"/> 94-35 |                                           |                                |
| <input checked="" type="checkbox"/> Preamplifier      | <input type="checkbox"/> 88-05            | <input type="checkbox"/> 90-01            | <input type="checkbox"/> 90-42 | <input checked="" type="checkbox"/> 95-86 | <input type="checkbox"/> 92-39 |
| <input type="checkbox"/> Antenna (biconical)          | <input type="checkbox"/> 82-02            | <input type="checkbox"/> 87-05            | <input type="checkbox"/> 87-16 | <input type="checkbox"/> 91-05            | <input type="checkbox"/> 94-37 |
| <input checked="" type="checkbox"/> Antenna (log-per) | <input type="checkbox"/> 88-20            | <input type="checkbox"/> 90-30            | <input type="checkbox"/> 91-35 | <input checked="" type="checkbox"/> 94-64 |                                |
| <input checked="" type="checkbox"/> Attenuators       |                                           |                                           |                                |                                           |                                |

|                |                                          |                               |                                         |                                     |
|----------------|------------------------------------------|-------------------------------|-----------------------------------------|-------------------------------------|
| <b>Result:</b> | <input checked="" type="checkbox"/> pass | <input type="checkbox"/> fail | <input type="checkbox"/> not applicable | <input type="checkbox"/> not tested |
|----------------|------------------------------------------|-------------------------------|-----------------------------------------|-------------------------------------|

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1 - 4m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 917.7MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                   |
|-----------------|-------------------|
| Zone            | 900 MHz - 930 MHz |
| Video Bandwidth | 100 KHz           |
| Resol Bandwidth | 120 KHz           |
| Sweep Time      | 0 s               |

## Receiver Measures

| Frequency  | Peak        | QuasiPeak (x) | Average (+) | QP Margin |
|------------|-------------|---------------|-------------|-----------|
| 929.34 MHz | 46.4 dBuV/m | 29.2 dBuV/m   | 20.3 dBuV/m | 16.8 dB   |

Operator: Erich Staub  
Date/Time: 10.01.03 11:01  
Filename:  
20025229\_LCh\_Dongle  
HDC5\_001h.png/.txt

**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

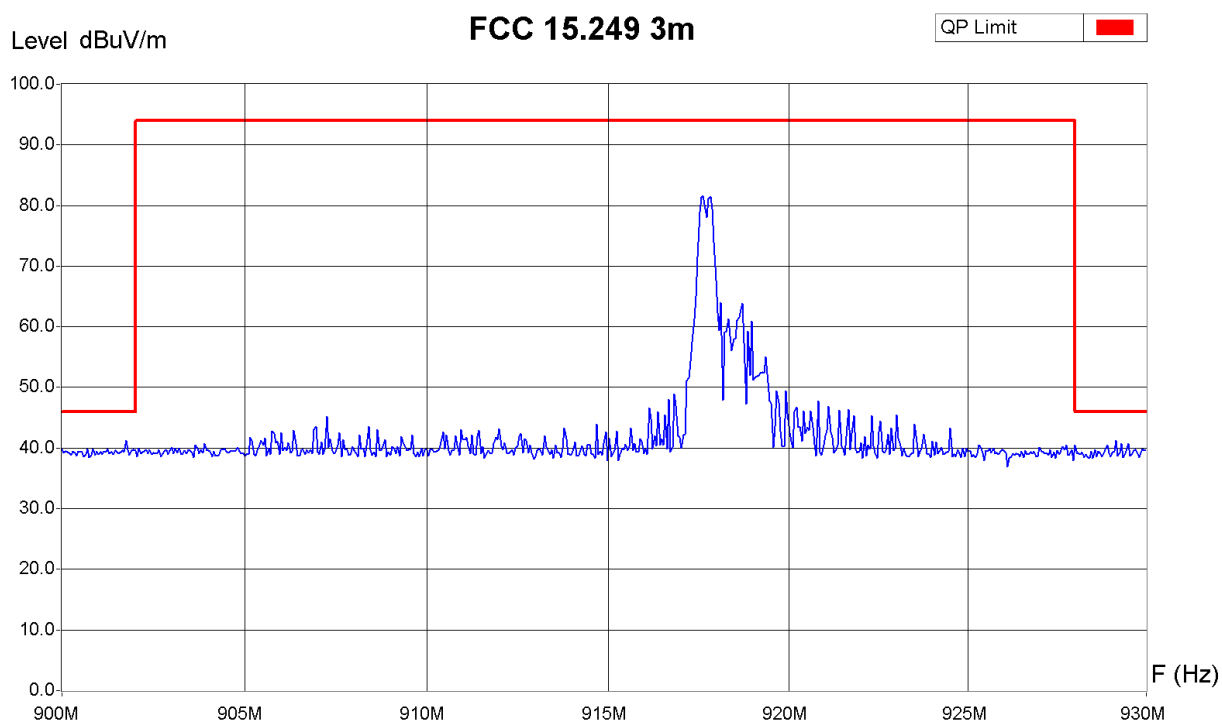
| <b>Frequency<br/>[MHz]</b> | <b>Pk-value<br/>[dBµV/m]</b> | <b>Delta<br/>[dB]</b> |
|----------------------------|------------------------------|-----------------------|
| 901.25                     | 41.1                         | 4.9                   |
| 901.40                     | 42.3                         | 3.7                   |
| 901.55                     | 42.3                         | 3.7                   |
| 901.60                     | 41.6                         | 4.4                   |
| 901.65                     | 41.3                         | 4.7                   |
| 901.70                     | 41.6                         | 4.4                   |
| 901.75                     | 41.5                         | 4.5                   |
| 901.80                     | 41.3                         | 4.7                   |
| 901.90                     | 41.9                         | 4.1                   |
| 901.95                     | 43.1                         | 2.9                   |
| 902.00                     | 41.6                         | 4.4                   |
| 917.57                     | 89.2                         | 4.8                   |
| 917.62                     | 89.5                         | 4.5                   |
| 928.00                     | 44.8                         | 1.2                   |
| 928.05                     | 45.1                         | 0.9                   |
| 928.10                     | 45.3                         | 0.7                   |
| 928.15                     | 44.6                         | 1.4                   |
| 928.20                     | 43.9                         | 2.1                   |
| 928.25                     | 45.9                         | 0.1                   |
| 928.30                     | 44.1                         | 1.9                   |
| 928.35                     | 44.3                         | 1.7                   |
| 928.40                     | 44.3                         | 1.7                   |
| 928.45                     | 43.1                         | 2.9                   |
| 928.50                     | 43.6                         | 2.4                   |
| 928.55                     | 44.3                         | 1.7                   |
| 928.60                     | 45.4                         | 0.6                   |
| 928.65                     | 45.1                         | 0.9                   |
| 928.70                     | 45.6                         | 0.4                   |
| 928.75                     | 44.1                         | 1.9                   |
| 928.80                     | 46.4                         | -0.4                  |
| 928.85                     | 45.3                         | 0.7                   |
| 928.90                     | 44.8                         | 1.2                   |
| 928.95                     | 45.6                         | 0.4                   |
| 929.00                     | 45.4                         | 0.6                   |
| 929.05                     | 44.6                         | 1.4                   |
| 929.10                     | 45.1                         | 0.9                   |
| 929.15                     | 43.4                         | 2.6                   |
| 929.20                     | 44.9                         | 1.1                   |
| 929.25                     | 45.3                         | 0.7                   |
| 929.30                     | 44.1                         | 1.9                   |
| 929.35                     | 47.3                         | -1.3                  |
| 929.40                     | 45.3                         | 0.7                   |
| 929.45                     | 44.1                         | 1.9                   |
| 929.50                     | 46.6                         | -0.6                  |
| 929.55                     | 43.6                         | 2.4                   |
| 929.60                     | 43.9                         | 2.1                   |
| 929.65                     | 42.8                         | 3.2                   |
| 929.70                     | 45.9                         | 0.1                   |
| 929.75                     | 43.8                         | 2.2                   |
| 929.80                     | 43.8                         | 2.2                   |

|        |      |     |
|--------|------|-----|
| 929.85 | 43.6 | 2.4 |
| 929.90 | 43.7 | 2.3 |
| 929.95 | 44.6 | 1.4 |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1 - 4m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 917.7MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                   |
|-----------------|-------------------|
| Zone            | 900 MHz - 930 MHz |
| Video Bandwidth | 100 KHz           |
| Resol Bandwidth | 120 KHz           |
| Sweep Time      | 0 s               |

Operator: Erich Staub  
Date/Time: 10.01.03 10:57  
Filename:  
20025229\_LCh\_Dongle  
HDC5\_001v.png/.txt

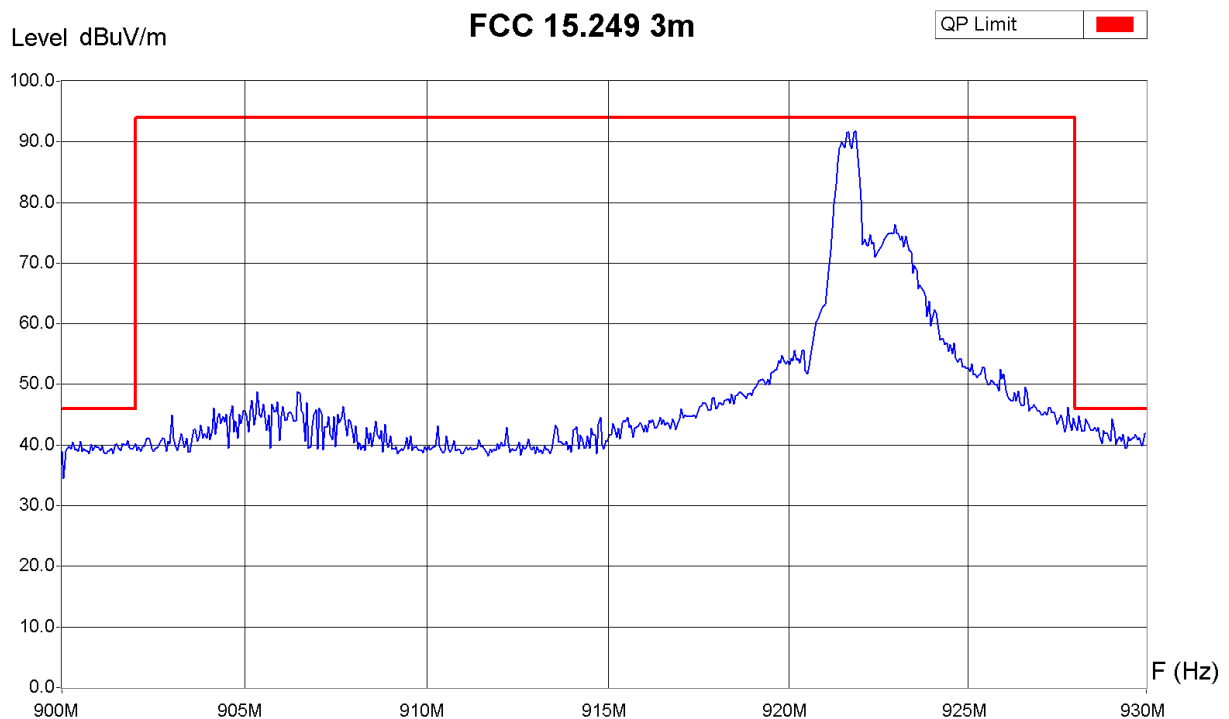
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| <b>Frequency<br/>[MHz]</b> | <b>Pk-value<br/>[dB<math>\mu</math>V/m]</b> | <b>Delta<br/>[dB]</b> |
|----------------------------|---------------------------------------------|-----------------------|
| 901.75                     | 41.3                                        | 4.7                   |
| 929.15                     | 41.3                                        | 4.7                   |

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1 - 4m



Equipment Under Test : Dongle HDC5 US: Highest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 921.7MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                   |
|-----------------|-------------------|
| Zone            | 900 MHz - 930 MHz |
| Video Bandwidth | 100 KHz           |
| Resol Bandwidth | 120 KHz           |
| Sweep Time      | 0 s               |

Operator: Erich Staub  
Date/Time: 10.01.03 10:46  
Filename:  
20025229\_HCh\_Dongle  
HDC5\_001h.png/.txt

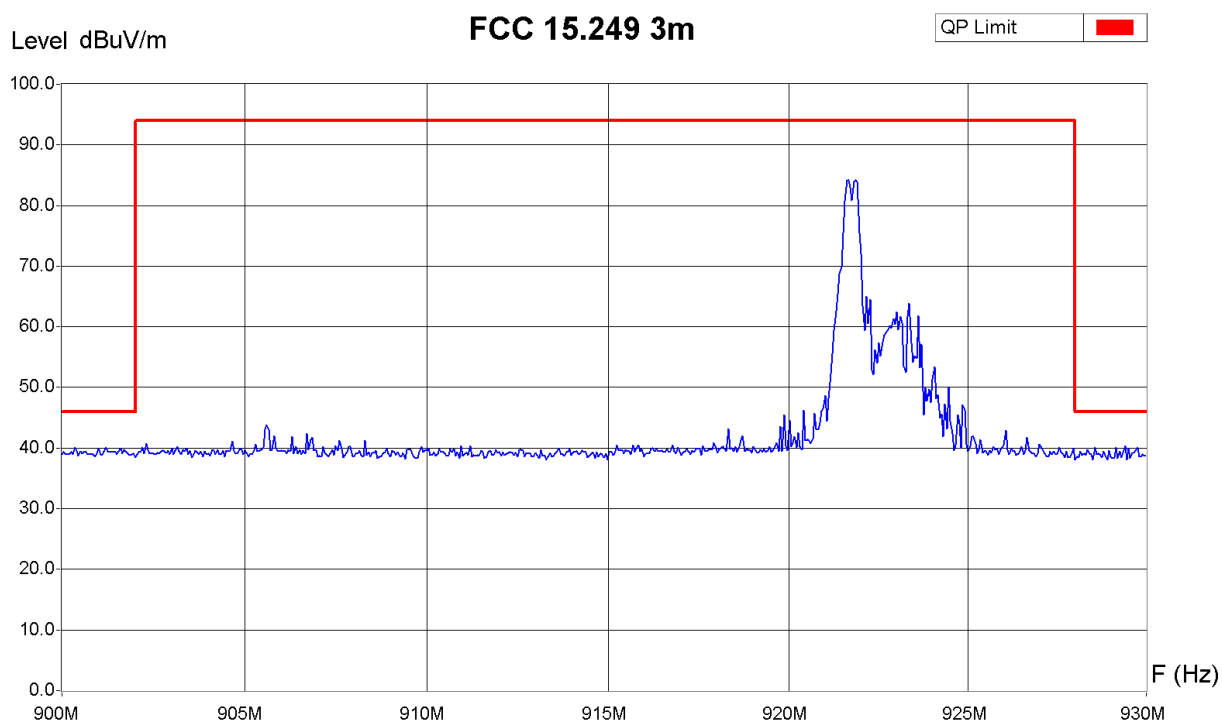
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| <b>Frequency<br/>[MHz]</b> | <b>Pk-value<br/>[dB<math>\mu</math>V/m]</b> | <b>Delta<br/>[dB]</b> |
|----------------------------|---------------------------------------------|-----------------------|
| 921.46                     | 89.9                                        | 4.1                   |
| 921.51                     | 89.5                                        | 4.5                   |
| 921.56                     | 89.0                                        | 5.0                   |
| 921.61                     | 91.5                                        | 2.5                   |
| 921.66                     | 91.5                                        | 2.5                   |
| 921.71                     | 89.5                                        | 4.5                   |
| 921.81                     | 91.5                                        | 2.5                   |
| 921.86                     | 91.8                                        | 2.2                   |
| 928.00                     | 43.3                                        | 2.7                   |
| 928.05                     | 42.4                                        | 3.6                   |
| 928.10                     | 44.8                                        | 1.2                   |
| 928.15                     | 43.4                                        | 2.6                   |
| 928.20                     | 42.3                                        | 3.7                   |
| 928.25                     | 42.3                                        | 3.7                   |
| 928.30                     | 44.3                                        | 1.7                   |
| 928.35                     | 43.8                                        | 2.2                   |
| 928.40                     | 42.9                                        | 3.1                   |
| 928.45                     | 42.4                                        | 3.6                   |
| 928.50                     | 42.4                                        | 3.6                   |
| 928.55                     | 42.9                                        | 3.1                   |
| 928.60                     | 42.3                                        | 3.7                   |
| 928.65                     | 42.9                                        | 3.1                   |
| 928.70                     | 41.4                                        | 4.6                   |
| 928.80                     | 42.4                                        | 3.6                   |
| 928.85                     | 41.9                                        | 4.1                   |
| 928.90                     | 41.9                                        | 4.1                   |
| 928.95                     | 41.1                                        | 4.9                   |
| 929.05                     | 44.3                                        | 1.7                   |
| 929.10                     | 42.4                                        | 3.6                   |
| 929.25                     | 41.4                                        | 4.6                   |
| 929.35                     | 41.8                                        | 4.2                   |
| 929.50                     | 41.4                                        | 4.6                   |
| 929.60                     | 41.1                                        | 4.9                   |
| 929.65                     | 41.1                                        | 4.9                   |
| 929.70                     | 41.8                                        | 4.2                   |
| 929.80                     | 41.3                                        | 4.7                   |
| 929.95                     | 41.9                                        | 4.1                   |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1 - 4m



Equipment Under Test : Dongle HDC5 US: Highest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 921.7MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                   |
|-----------------|-------------------|
| Zone            | 900 MHz - 930 MHz |
| Video Bandwidth | 100 KHz           |
| Resol Bandwidth | 120 KHz           |
| Sweep Time      | 0 s               |

Operator: Erich Staub  
Date/Time: 10.01.03 10:53  
Filename:  
20025229\_HCh\_Dongle  
HDC5\_001v.png/.txt

**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[MHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

**6.2 Radiated electromagnetic field 30 - 1000 MHz**

Test site: ☒ anechoic chamber (foam) ☐ open test site  
☐ anechoic chamber (ferrites) ☐ .....

Distance: ☐ 30 m ☐ 10 m ☒ 3 m ☐ .....

Position of EUT: 0.8 m (height of the equipment under test above floor)

Test precision:  $\pm 6$  dB (30 - 300 MHz) /  $\pm 5.4$  dB (300 - 1000 MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured from 30 to 1000 MHz using a spectrum analyser and a wide band antenna. The antenna is moved from 1 to 4 m in height successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbance appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding the limits are remeasured manually giving quasi-peak values and average values using a receiver and these measurements are indicated under the graph. The limit must be respected in quasi-peak values (QP).

Test set-up:



Remarks:

- Maximum field strength measured from 1 to 3 m.
- EUT measured in position which showed the highest emission on the first HDC9P prototype
- With notch filter at transmitting frequency, for values around carrier see §6.1

Test equipment:

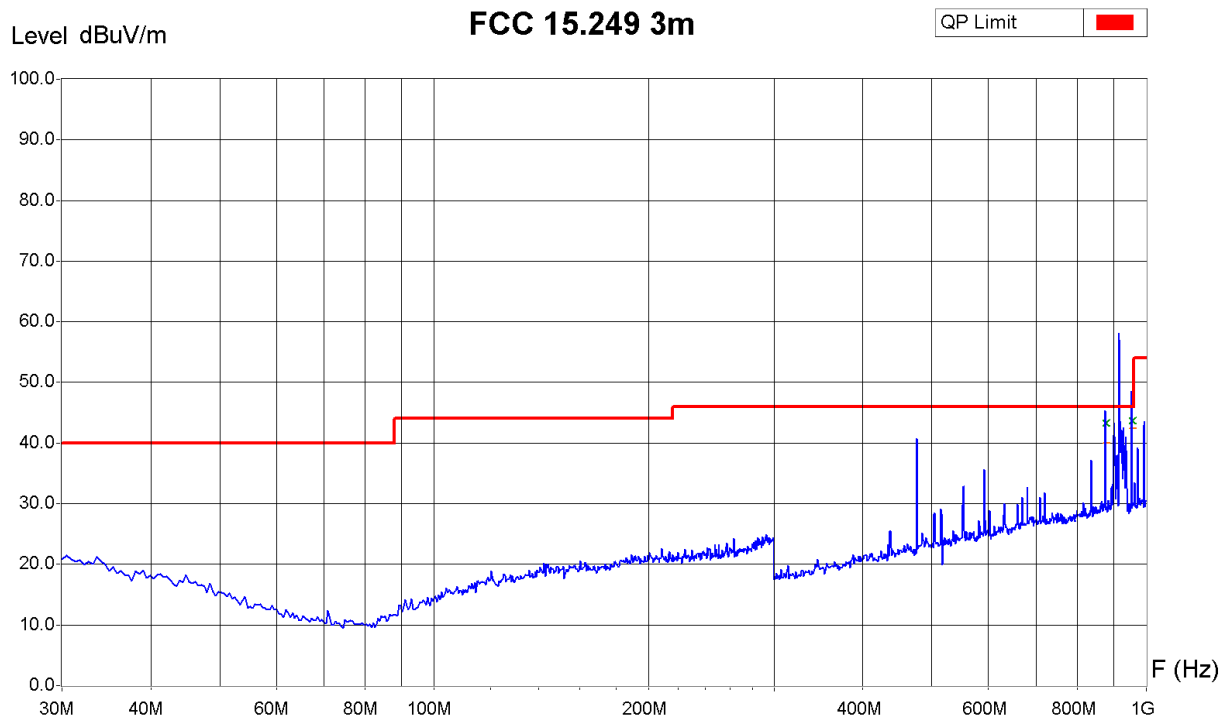
|                                                         |                                           |                                           |                                |                                           |                                           |
|---------------------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------|-------------------------------------------|-------------------------------------------|
| <input checked="" type="checkbox"/> Spectrum analyser   | <input checked="" type="checkbox"/> 88-14 | <input type="checkbox"/> 90-26            | <input type="checkbox"/> 94-24 |                                           |                                           |
| <input checked="" type="checkbox"/> Receiver            | <input type="checkbox"/> 85-04            | <input checked="" type="checkbox"/> 90-43 | <input type="checkbox"/> 94-35 |                                           |                                           |
| <input checked="" type="checkbox"/> Preamplifier        | <input type="checkbox"/> 88-05            | <input type="checkbox"/> 90-01            | <input type="checkbox"/> 90-42 | <input checked="" type="checkbox"/> 95-86 | <input type="checkbox"/> 92-39            |
| <input checked="" type="checkbox"/> Antenna (biconical) | <input type="checkbox"/> 82-02            | <input type="checkbox"/> 87-05            | <input type="checkbox"/> 87-16 | <input type="checkbox"/> 91-05            | <input checked="" type="checkbox"/> 94-37 |
| <input checked="" type="checkbox"/> Antenna (log-per)   | <input type="checkbox"/> 88-20            | <input type="checkbox"/> 90-30            | <input type="checkbox"/> 91-35 | <input checked="" type="checkbox"/> 94-64 |                                           |
| <input type="checkbox"/> Antenna (horn)                 | <input type="checkbox"/> 90-24            | <input type="checkbox"/> 90-29            | <input type="checkbox"/> 98-12 | <input type="checkbox"/> 98-13            | <input type="checkbox"/> .....            |
| <input checked="" type="checkbox"/> Notch filter        | .....                                     |                                           |                                |                                           |                                           |

**Result:** ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1 - 3m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 917.7 MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                  |                 |
|-----------------|------------------|-----------------|
| Zone            | 30 MHz - 300 MHz | 300 MHz - 1 GHz |
| Video Bandwidth | 100 KHz          | 100 KHz         |
| Resol Bandwidth | 120 KHz          | 120 KHz         |
| Sweep Time      | 0 s              | 0 s             |

## Receiver Measures

| Frequency  | Peak        | QuasiPeak (x) | Average (+) | QP Margin |
|------------|-------------|---------------|-------------|-----------|
| 878.65 MHz | 46.5 dBuV/m | 43.3 dBuV/m   | 40.0 dBuV/m | 2.7 dB    |
| 956.65 MHz | 47.6 dBuV/m | 43.7 dBuV/m   | 42.4 dBuV/m | 2.3 dB    |

Operator: Erich Staub  
Date/Time: 10.01.03 09:39  
Filename:  
20025229\_LCh\_Dongle  
HDC5\_000h.png/.txt

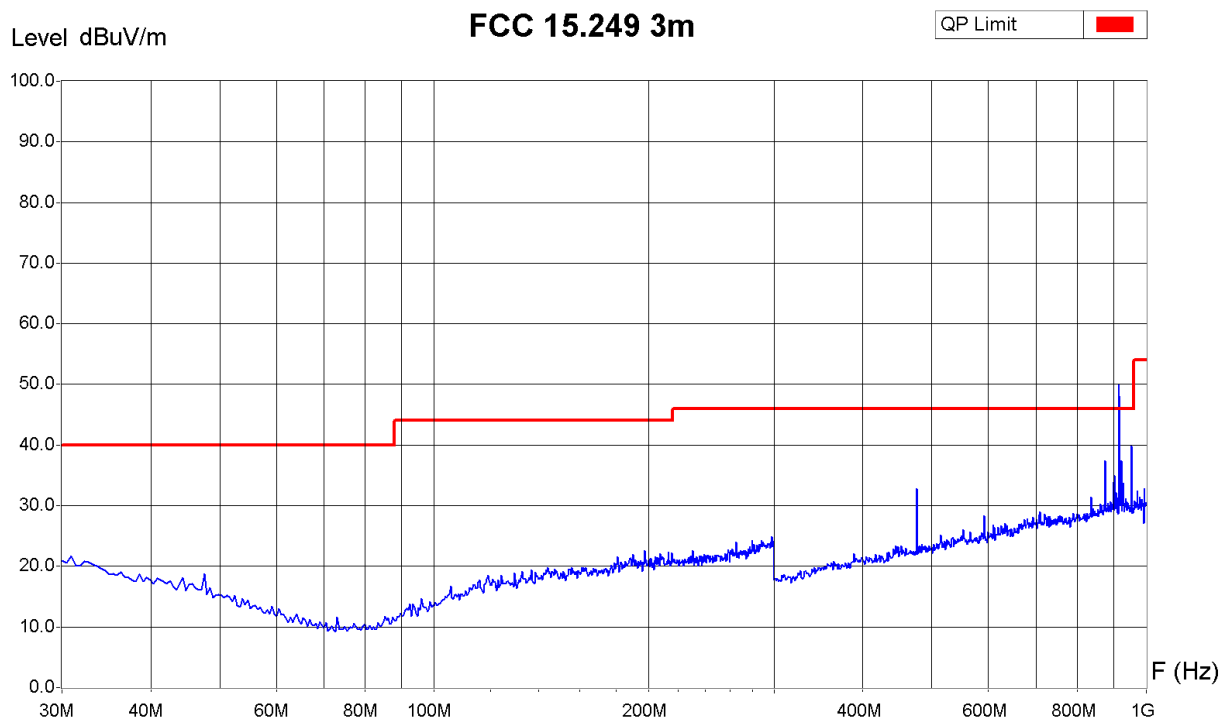
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| <b>Frequency<br/>[MHz]</b> | <b>Pk-value<br/>[dBµV/m]</b> | <b>Delta<br/>[dB]</b> |
|----------------------------|------------------------------|-----------------------|
| 875.37                     | 45.3                         | 0.7                   |
| 876.54                     | 45.3                         | 0.7                   |
| 901.00                     | 41.3                         | 4.7                   |
| 902.16                     | 43.3                         | 2.7                   |
| 903.33                     | 41.1                         | 4.9                   |
| 914.98                     | 58.1                         | -12.1                 |
| 916.14                     | 57.1                         | -11.1                 |
| 917.30                     | 52.1                         | -6.1                  |
| 918.47                     | 42.4                         | 3.6                   |
| 919.63                     | 43.6                         | 2.4                   |
| 923.13                     | 42.1                         | 3.9                   |
| 925.46                     | 41.6                         | 4.4                   |
| 928.95                     | 42.6                         | 3.4                   |
| 935.94                     | 41.0                         | 5.0                   |
| 953.41                     | 48.3                         | -2.3                  |
| 954.58                     | 48.5                         | -2.5                  |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1 - 3m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 917.7 MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                  |                 |
|-----------------|------------------|-----------------|
| Zone            | 30 MHz - 300 MHz | 300 MHz - 1 GHz |
| Video Bandwidth | 100 KHz          | 100 KHz         |
| Resol Bandwidth | 120 KHz          | 120 KHz         |
| Sweep Time      | 0 s              | 0 s             |

Operator: Erich Staub  
Date/Time: 10.01.03 10:04  
Filename:  
20025229\_LCh\_Dongle  
HDC5\_000v.png/.txt

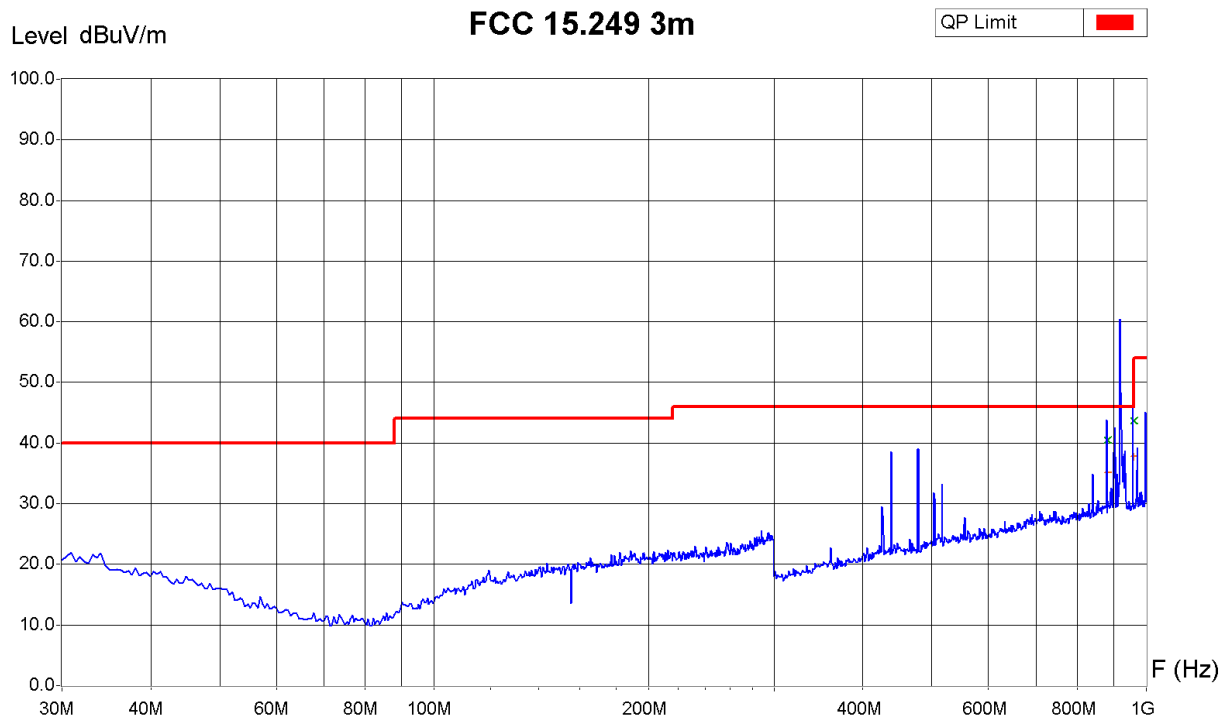
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| <b>Frequency<br/>[MHz]</b> | <b>Pk-value<br/>[dB<math>\mu</math>V/m]</b> | <b>Delta<br/>[dB]</b> |
|----------------------------|---------------------------------------------|-----------------------|
| 914.98                     | 49.9                                        | -3.9                  |
| 916.14                     | 48.1                                        | -2.1                  |

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1 - 3m



Equipment Under Test : Dongle HDC5 US: Highest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 921.7 MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                  |                 |
|-----------------|------------------|-----------------|
| Zone            | 30 MHz - 300 MHz | 300 MHz - 1 GHz |
| Video Bandwidth | 100 KHz          | 100 KHz         |
| Resol Bandwidth | 120 KHz          | 120 KHz         |
| Sweep Time      | 0 s              | 0 s             |

## Receiver Measures

| Frequency  | Peak        | QuasiPeak (x) | Average (+) | QP Margin |
|------------|-------------|---------------|-------------|-----------|
| 882.72 MHz | 44.0 dBuV/m | 40.5 dBuV/m   | 35.1 dBuV/m | 5.5 dB    |
| 960.70 MHz | 47.2 dBuV/m | 43.7 dBuV/m   | 37.8 dBuV/m | 10.3 dB   |

Operator: Erich Staub  
Date/Time: 10.01.03 10:32  
Filename:  
20025229\_HCh\_Dongle  
HDC5\_000h.png/.txt

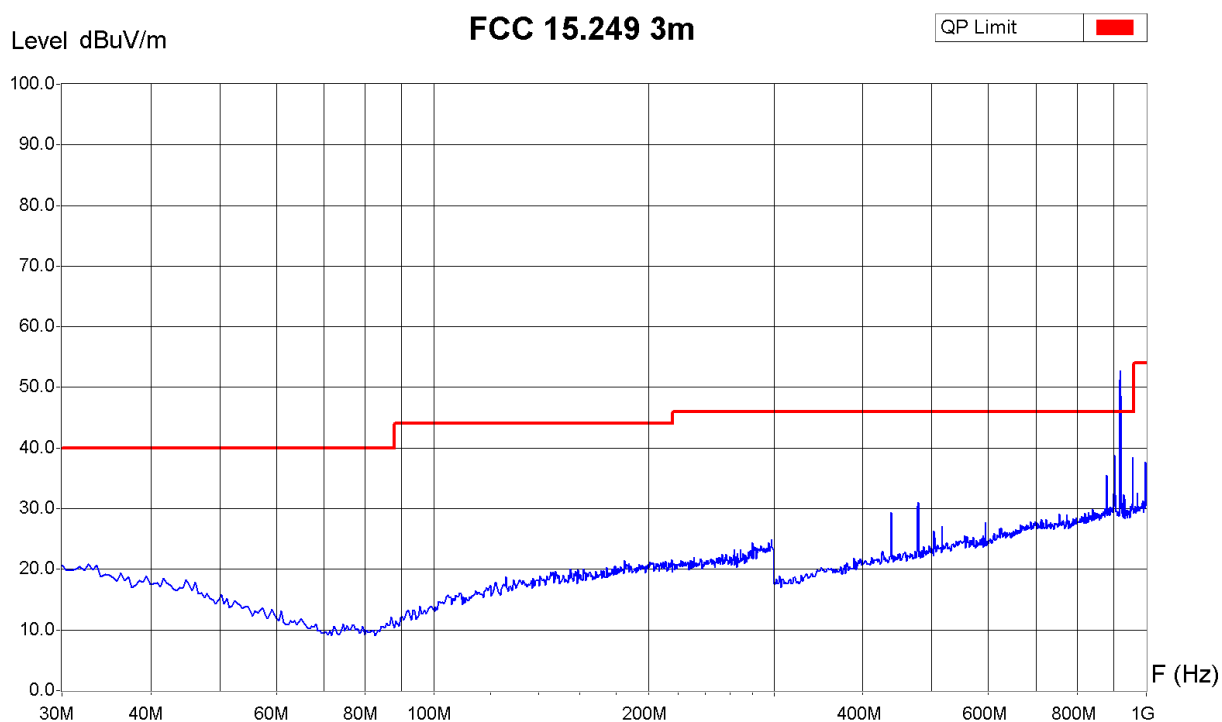
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| <b>Frequency<br/>[MHz]</b> | <b>Pk-value<br/>[dB<math>\mu</math>V/m]</b> | <b>Delta<br/>[dB]</b> |
|----------------------------|---------------------------------------------|-----------------------|
| 880.03                     | 43.8                                        | 2.2                   |
| 904.49                     | 42.6                                        | 3.4                   |
| 918.47                     | 60.4                                        | -14.4                 |
| 919.63                     | 60.2                                        | -14.2                 |
| 920.80                     | 48.4                                        | -2.4                  |
| 921.96                     | 46.7                                        | -0.7                  |
| 923.13                     | 42.3                                        | 3.7                   |
| 958.07                     | 48.1                                        | -2.1                  |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1 - 3m



Equipment Under Test : Dongle HDC5 US: Highest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 921.7 MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                  |                 |
|-----------------|------------------|-----------------|
| Zone            | 30 MHz - 300 MHz | 300 MHz - 1 GHz |
| Video Bandwidth | 100 KHz          | 100 KHz         |
| Resol Bandwidth | 120 KHz          | 120 KHz         |
| Sweep Time      | 0 s              | 0 s             |

Operator: Erich Staub  
Date/Time: 10.01.03 10:11  
Filename:  
20025229\_HCh\_Dongle  
HDC5\_000v.png/.txt

**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| <b>Frequency<br/>[MHz]</b> | <b>Pk-value<br/>[dB<math>\mu</math>V/m]</b> | <b>Delta<br/>[dB]</b> |
|----------------------------|---------------------------------------------|-----------------------|
| 918.47                     | 51.2                                        | -5.2                  |
| 919.63                     | 52.7                                        | -6.7                  |
| 920.80                     | 48.7                                        | -2.7                  |

**6.3 Radiated electromagnetic field 1 – 10 GHz**

Test site: ☒ anechoic chamber (foam) ☐ open test site  
☐ anechoic chamber (ferrites) ☐ .....

Distance: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

Position of EUT: 0.8 m (height of the equipment under test above floor)

Test precision:  $\pm 6$  dB (30 - 300 MHz) /  $\pm 5.4$  dB (300 - 1000 MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbance appearing while the apparatus is under test. The peak values are recorded continuously on the graph.

Test set-up:



Remarks:

- As the noise level of the measuring system was close the the limit, the RBW has been reduced for some frequency ranges. Any emission exceeding the limit would be measured with a receiver with 1 MHz bandwidth
- EUT measured in position which showed the highest emission on the first HDC9P prototype

Test equipment:

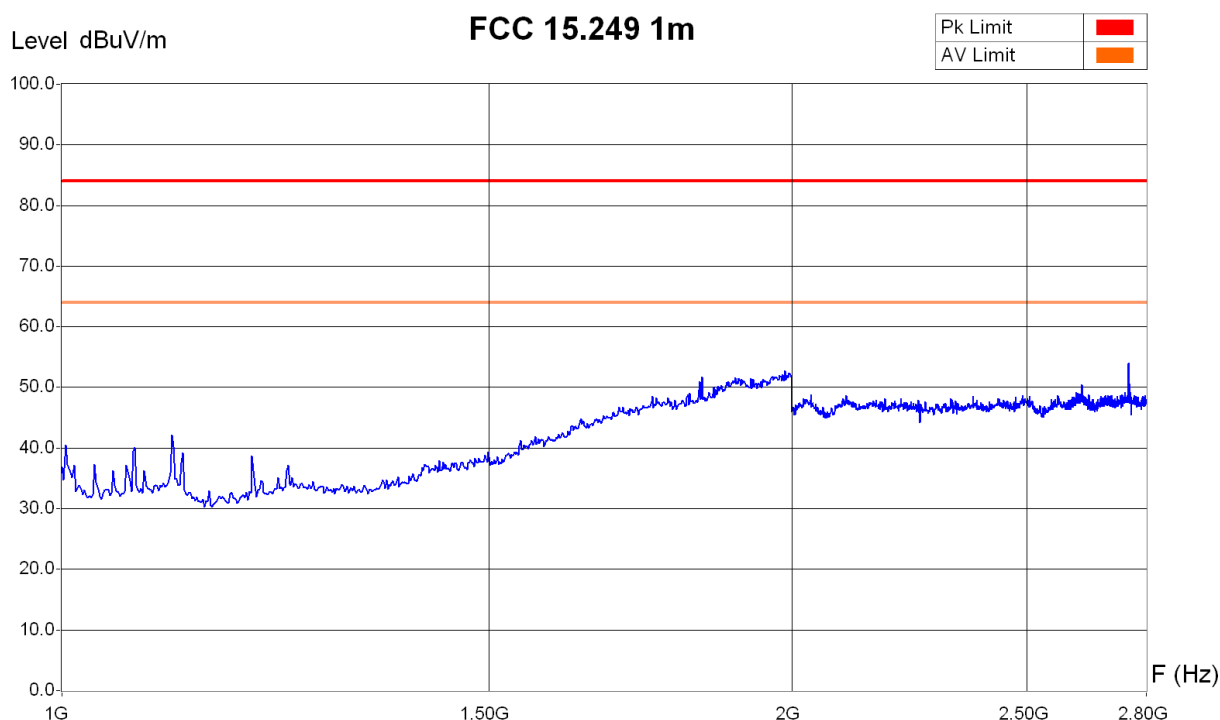
|                                                                |                                           |                                           |                                |                                           |                                           |
|----------------------------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------|-------------------------------------------|-------------------------------------------|
| <input checked="" type="checkbox"/> Spectrum analyser          | <input checked="" type="checkbox"/> 88-14 | <input type="checkbox"/> 90-26            | <input type="checkbox"/> 94-24 |                                           |                                           |
| <input checked="" type="checkbox"/> Receiver                   | <input type="checkbox"/> 85-04            | <input checked="" type="checkbox"/> 90-43 | <input type="checkbox"/> 94-35 |                                           |                                           |
| <input checked="" type="checkbox"/> Preamplifier               | <input type="checkbox"/> 88-05            | <input type="checkbox"/> 90-01            | <input type="checkbox"/> 90-42 | <input checked="" type="checkbox"/> 95-86 | <input checked="" type="checkbox"/> 92-39 |
| <input type="checkbox"/> Antenna (biconical)                   | <input type="checkbox"/> 82-02            | <input type="checkbox"/> 87-05            | <input type="checkbox"/> 87-16 | <input type="checkbox"/> 91-05            | <input type="checkbox"/> 94-37            |
| <input type="checkbox"/> Antenna (log-per)                     | <input type="checkbox"/> 88-20            | <input type="checkbox"/> 90-30            | <input type="checkbox"/> 91-35 | <input type="checkbox"/> 94-64            |                                           |
| <input checked="" type="checkbox"/> Antenna (horn)             | <input checked="" type="checkbox"/> 90-24 | <input type="checkbox"/> 90-29            | <input type="checkbox"/> 98-12 | <input type="checkbox"/> 98-13            | <input type="checkbox"/> .....            |
| <input checked="" type="checkbox"/> Notch and high-pass filter | .....                                     |                                           |                                |                                           |                                           |

|                |                                          |                               |                                         |                                     |
|----------------|------------------------------------------|-------------------------------|-----------------------------------------|-------------------------------------|
| <b>Result:</b> | <input checked="" type="checkbox"/> pass | <input type="checkbox"/> fail | <input type="checkbox"/> not applicable | <input type="checkbox"/> not tested |
|----------------|------------------------------------------|-------------------------------|-----------------------------------------|-------------------------------------|

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 917.7MHz; Dongle attached to Nokia 3330 (switched off)



| Zone            | 1 GHz - 2 GHz | 2 GHz - 2.60 GHz | 2.60 GHz - 2.80 |
|-----------------|---------------|------------------|-----------------|
| Video Bandwidth | 1 MHz         | 1 MHz            | 1 MHz           |
| Resol Bandwidth | 1 MHz         | 1 MHz            | 1 MHz           |
| Sweep Time      | 0 s           | 0 s              | 0 s             |

Operator: E. Staub  
Date/Time: 10.01.2003 11:41  
Filename:  
20025229\_LCh\_Dongle  
HDC5\_002h.png/.txt

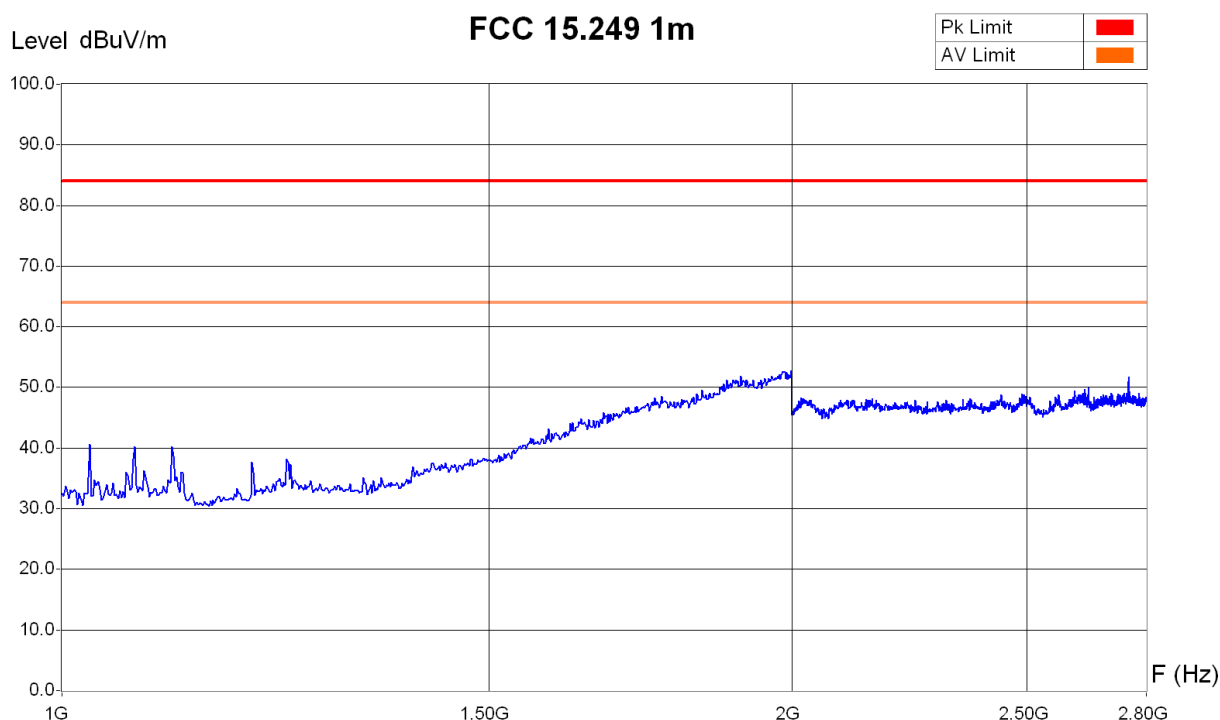
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 917.7MHz; Dongle attached to Nokia 3330 (switched off)



|                 |               |                  |                 |
|-----------------|---------------|------------------|-----------------|
| Zone            | 1 GHz - 2 GHz | 2 GHz - 2.60 GHz | 2.60 GHz - 2.80 |
| Video Bandwidth | 1 MHz         | 1 MHz            | 1 MHz           |
| Resol Bandwidth | 1 MHz         | 1 MHz            | 1 MHz           |
| Sweep Time      | 0 s           | 0 s              | 0 s             |

Operator: E. Staub  
Date/Time: 10.01.2003 11:43  
Filename:  
20025229\_LCh\_Dongle  
HDC5\_002v.png/.txt

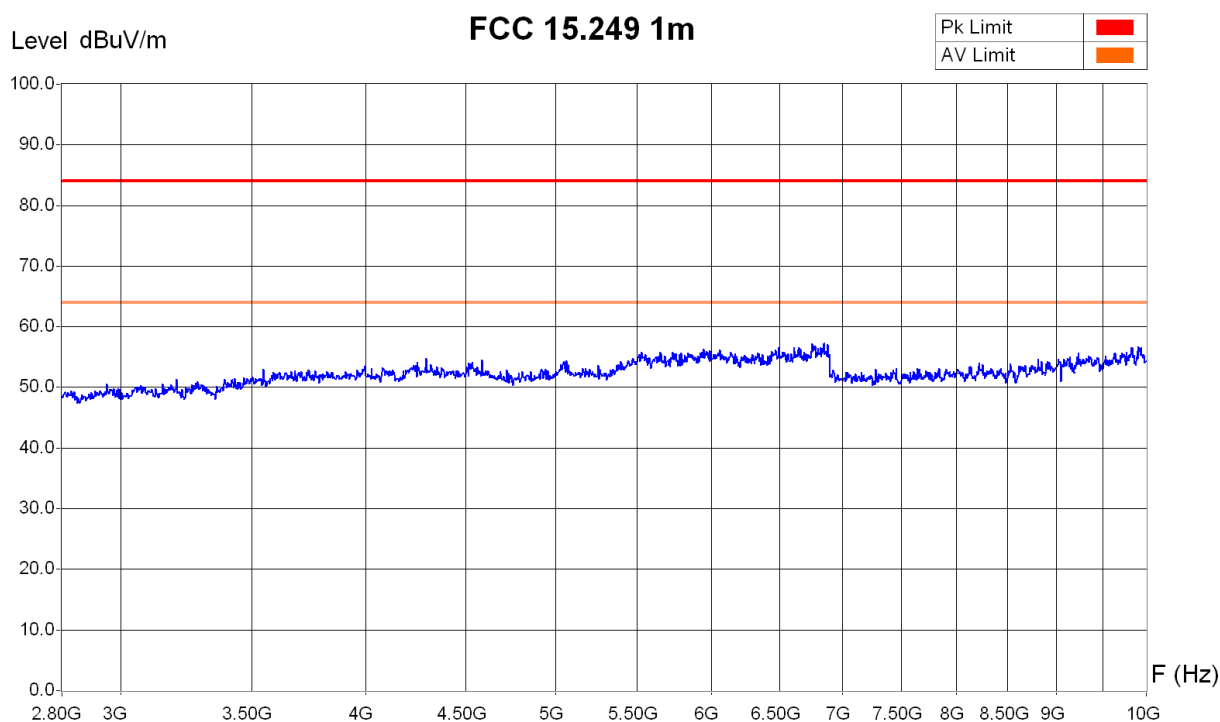
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 917.7MHz; Dongle attached to Nokia 3330 (switched off)



| Zone            | 2.80 GHz - 4.60 | 4.60 GHz - 6.90 | 6.90 GHz - 10 GHz |
|-----------------|-----------------|-----------------|-------------------|
| Video Bandwidth | 1 MHz           | 1 MHz           | 300 KHz           |
| Resol Bandwidth | 1 MHz           | 1 MHz           | 300 KHz           |
| Sweep Time      | 0 s             | 0 s             | 0 s               |

Operator: E. Staub  
Date/Time: 10.01.2003 11:56  
Filename:  
20025229\_LCh\_Dongle  
HDC5\_003hb.png/.txt

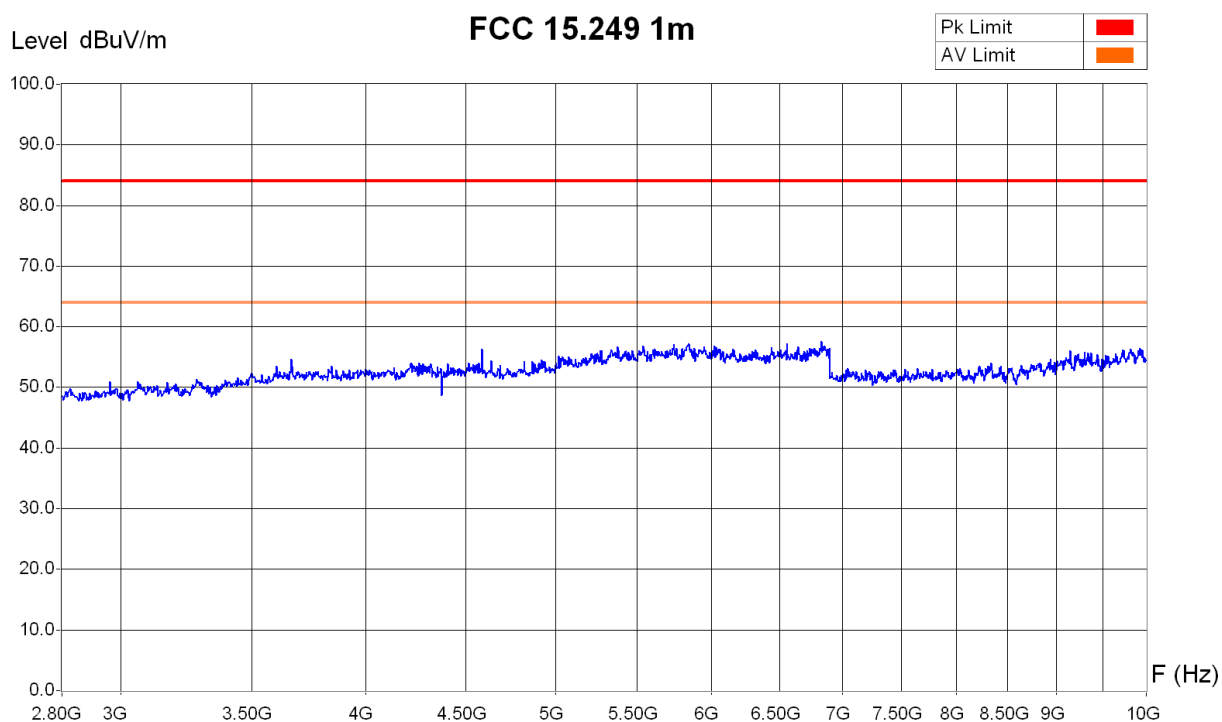
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 917.7MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                 |                 |                   |
|-----------------|-----------------|-----------------|-------------------|
| Zone            | 2.80 GHz - 4.60 | 4.60 GHz - 6.90 | 6.90 GHz - 10 GHz |
| Video Bandwidth | 1 MHz           | 1 MHz           | 300 KHz           |
| Resol Bandwidth | 1 MHz           | 1 MHz           | 300 KHz           |
| Sweep Time      | 0 s             | 0 s             | 0 s               |

Operator: E. Staub  
Date/Time: 10.01.2003 11:50  
Filename:  
20025229\_LCh\_Dongle  
HDC5\_003v.png/.txt

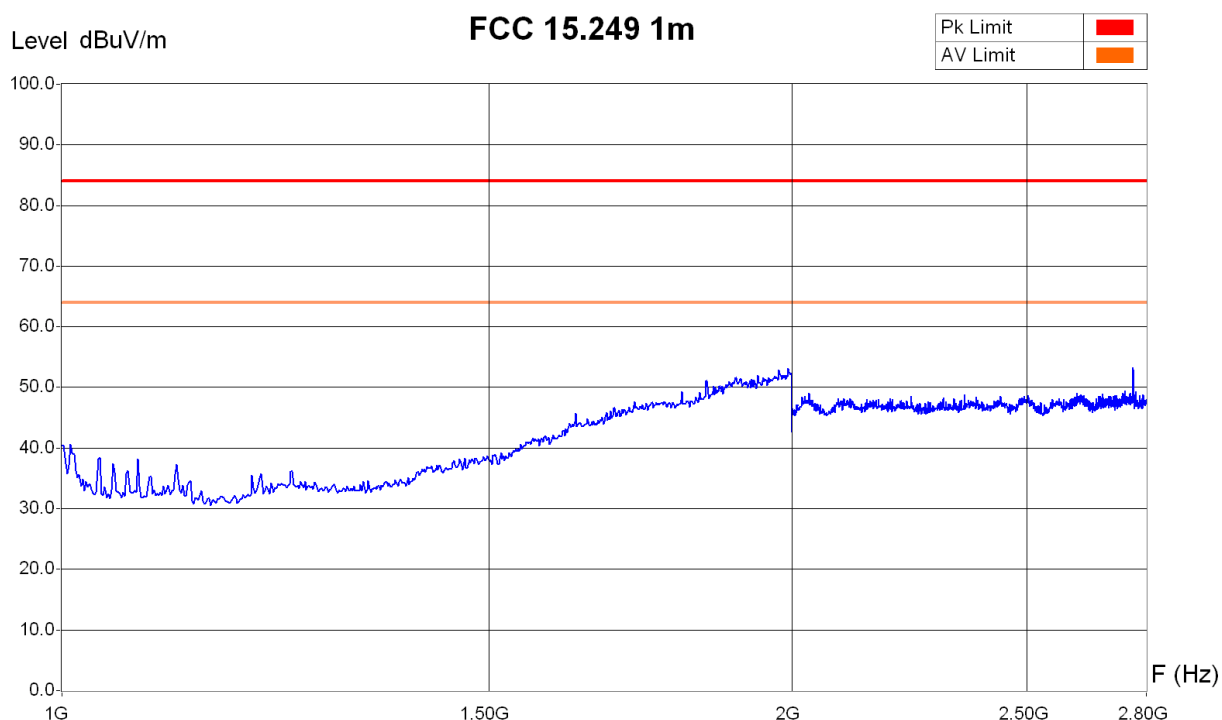
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Highest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 921.7MHz; Dongle attached to Nokia 3330 (switched off)



| Zone            | 1 GHz - 2 GHz | 2 GHz - 2.60 GHz | 2.60 GHz - 2.80 |
|-----------------|---------------|------------------|-----------------|
| Video Bandwidth | 1 MHz         | 1 MHz            | 1 MHz           |
| Resol Bandwidth | 1 MHz         | 1 MHz            | 1 MHz           |
| Sweep Time      | 0 s           | 0 s              | 0 s             |

Operator: Erich Staub  
Date/Time: 10.01.2003 12:22  
Filename:  
20025229\_HCh\_Dongle  
HDC5\_002h.png/.txt

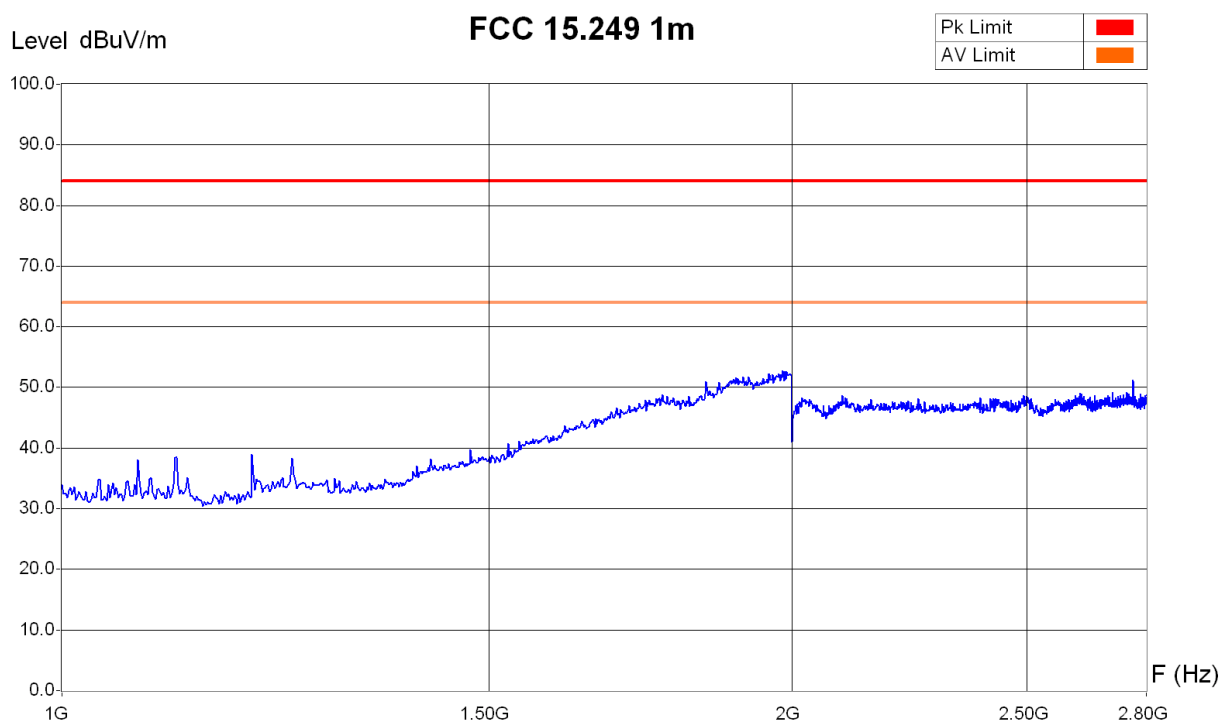
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Highest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 921.7MHz; Dongle attached to Nokia 3330 (switched off)



| Zone            | 1 GHz - 2 GHz | 2 GHz - 2.60 GHz | 2.60 GHz - 2.80 |
|-----------------|---------------|------------------|-----------------|
| Video Bandwidth | 1 MHz         | 1 MHz            | 1 MHz           |
| Resol Bandwidth | 1 MHz         | 1 MHz            | 1 MHz           |
| Sweep Time      | 0 s           | 0 s              | 0 s             |

Operator: Erich Staub  
Date/Time: 10.01.2003 12:25  
Filename:  
20025229\_HCh\_Dongle  
HDC5\_002v.png/.txt

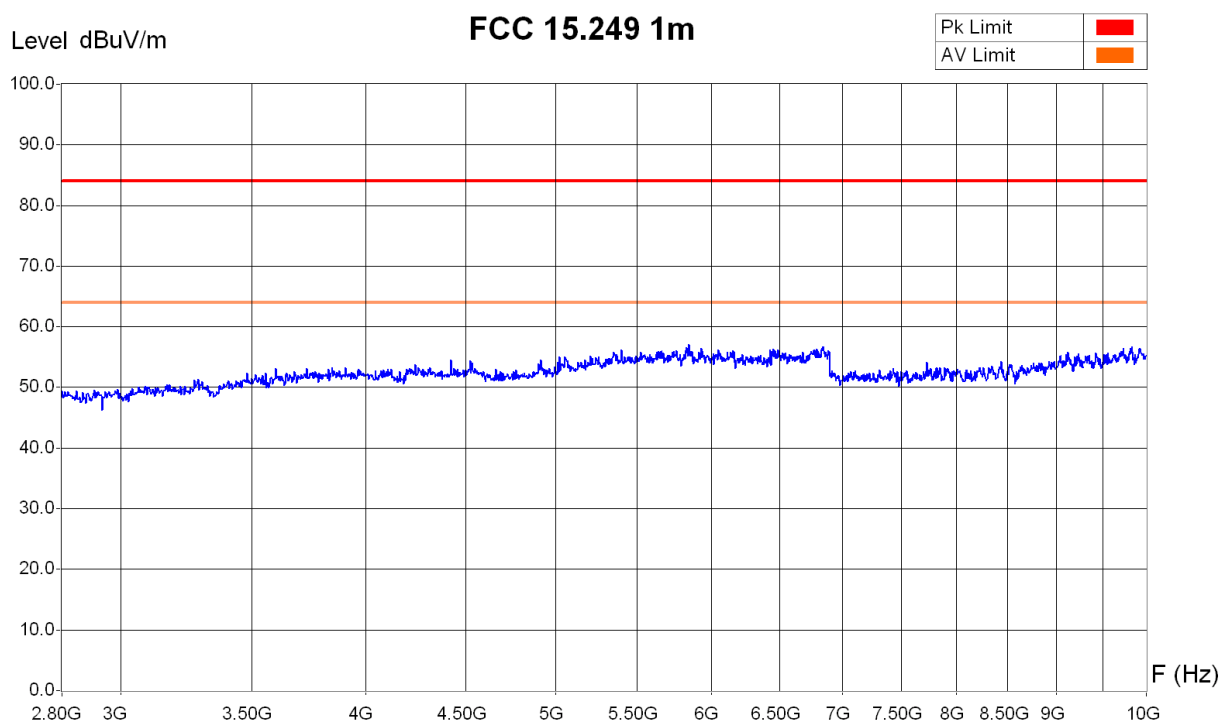
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Highest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 921.7MHz; Dongle attached to Nokia 3330 (switched off)



| Zone            | 2.80 GHz - 4.60 | 4.60 GHz - 6.90 | 6.90 GHz - 10 GHz |
|-----------------|-----------------|-----------------|-------------------|
| Video Bandwidth | 1 MHz           | 1 MHz           | 300 KHz           |
| Resol Bandwidth | 1 MHz           | 1 MHz           | 300 KHz           |
| Sweep Time      | 0 s             | 0 s             | 0 s               |

Operator: E. Staub  
Date/Time: 10.01.2003 12:03  
Filename:  
20025229\_HCh\_Dongle  
HDC5\_003h.png/.txt

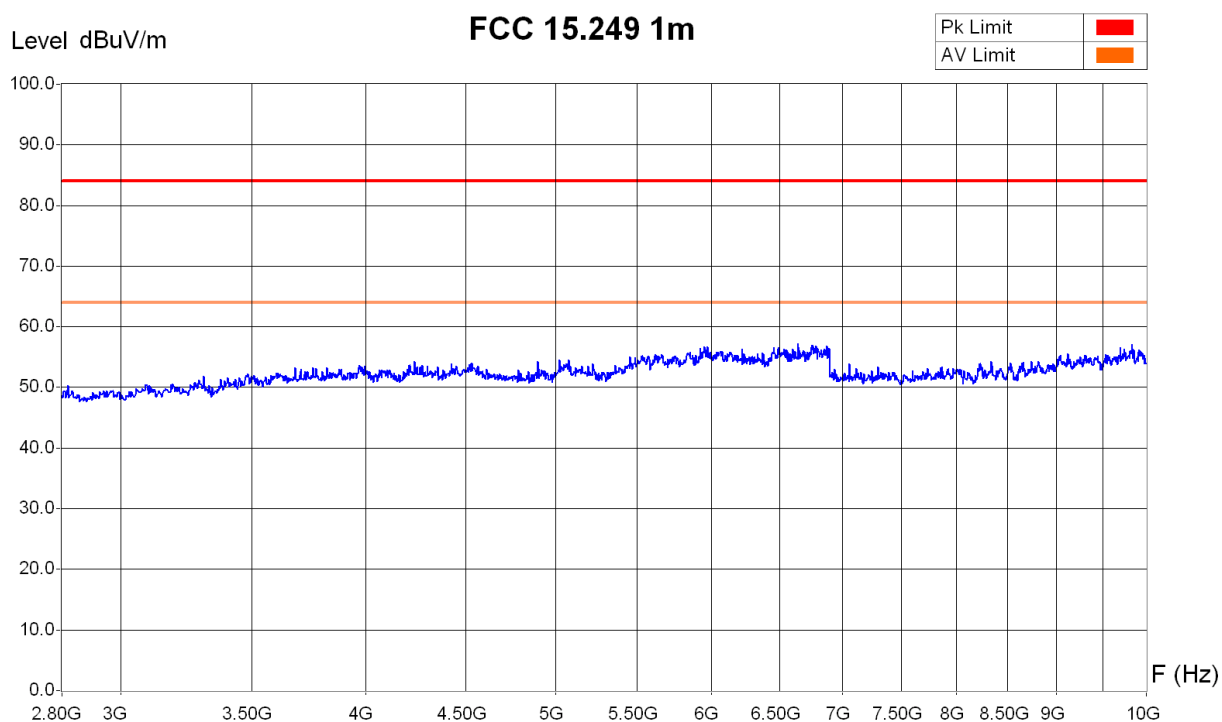
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Highest channel  
Set-Up : without artificial head  
Operating Conditions : modulated  
Remarks : carrier at 921.7MHz; Dongle attached to Nokia 3330 (switched off)



|                 |                 |                 |                   |
|-----------------|-----------------|-----------------|-------------------|
| Zone            | 2.80 GHz - 4.60 | 4.60 GHz - 6.90 | 6.90 GHz - 10 GHz |
| Video Bandwidth | 1 MHz           | 1 MHz           | 300 KHz           |
| Resol Bandwidth | 1 MHz           | 1 MHz           | 300 KHz           |
| Sweep Time      | 0 s             | 0 s             | 0 s               |

Operator: E. Staub  
Date/Time: 10.01.2003 12:08  
Filename:  
20025229\_HCh\_Dongle  
HDC5\_003v.png/.txt

**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

## **7. Emission Test Receiver**

**7.1 Radiated electromagnetic field 30 - 1000 MHz**

Test site: ☐ anechoic chamber (foam) ☐ open test site  
☒ anechoic chamber (ferrites) ☐ .....

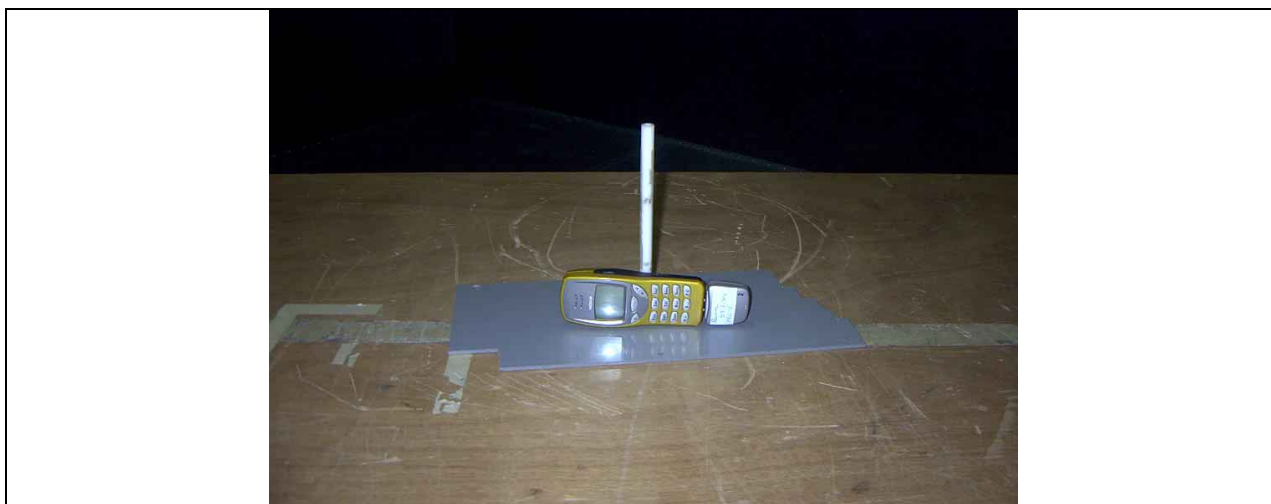
Distance: ☐ 30 m ☐ 10 m ☒ 3 m ☐ .....

Position of EUT: 0.8 m (height of the equipment under test above floor)

Test precision:  $\pm 6$  dB (30 - 300 MHz) /  $\pm 5.4$  dB (300 - 1000 MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured from 30 to 1000 MHz using a spectrum analyser and a wide band antenna. The antenna is moved from 1 to 4 m in height successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbance appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding the limits are remeasured manually giving quasi-peak values and average values using a receiver and these measurements are indicated under the graph. The limit must be respected in quasi-peak values (QP).

Test set-up:



Remarks:

- Maximum field strength measured from 1 to 3 m.
- Radiated emissions measurements were maximized through orientation of EUT in three orthogonal axes

Test equipment:

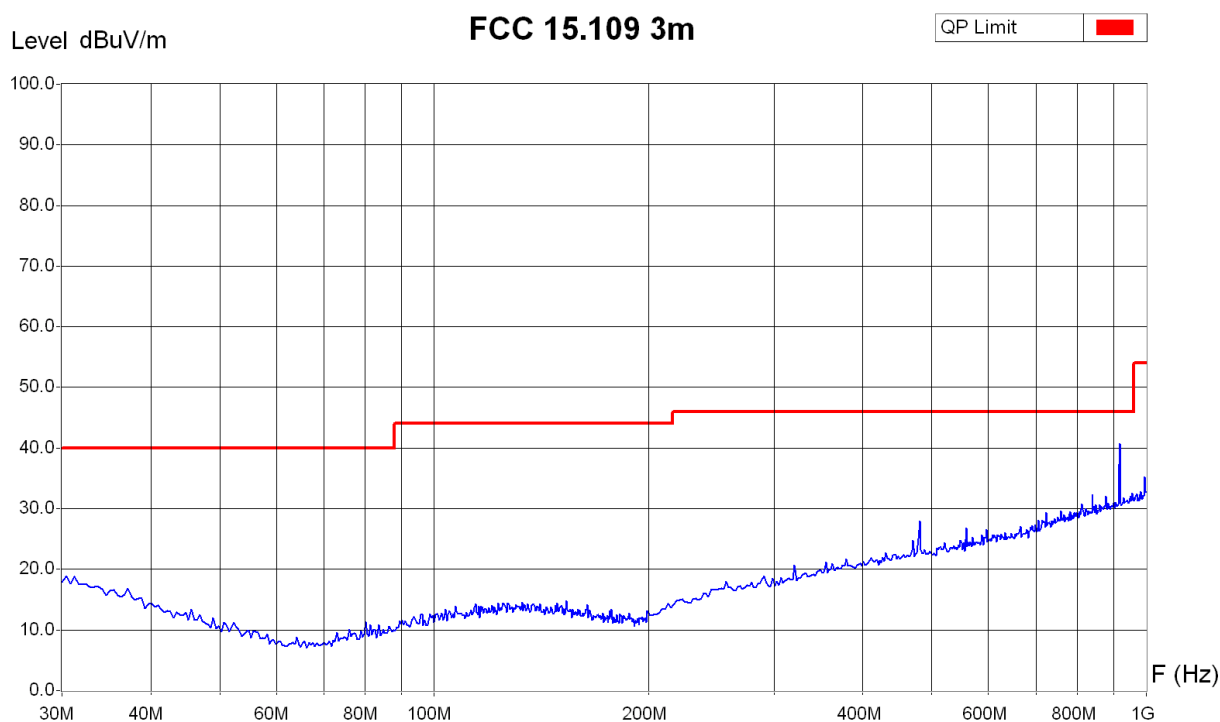
|                                                       |                                           |                                |                                           |                                |                                |
|-------------------------------------------------------|-------------------------------------------|--------------------------------|-------------------------------------------|--------------------------------|--------------------------------|
| <input checked="" type="checkbox"/> Spectrum analyser | <input type="checkbox"/> 88-14            | <input type="checkbox"/> 90-26 | <input checked="" type="checkbox"/> 94-24 |                                |                                |
| <input checked="" type="checkbox"/> Receiver          | <input type="checkbox"/> 85-04            | <input type="checkbox"/> 90-43 | <input checked="" type="checkbox"/> 94-35 |                                |                                |
| <input checked="" type="checkbox"/> Preamplifier      | <input type="checkbox"/> 88-05            | <input type="checkbox"/> 90-01 | <input checked="" type="checkbox"/> 90-42 | <input type="checkbox"/> 95-86 | <input type="checkbox"/> 92-39 |
| <input type="checkbox"/> Antenna (horn)               | <input type="checkbox"/> 90-24            | <input type="checkbox"/> 90-29 | <input type="checkbox"/> 98-12            | <input type="checkbox"/> 98-13 | <input type="checkbox"/> ..... |
| <input checked="" type="checkbox"/> Antenna           | <input checked="" type="checkbox"/> 94-03 |                                |                                           |                                |                                |
| <input type="checkbox"/> Notch filter                 | .....                                     |                                |                                           |                                |                                |

**Result:** ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1 - 3m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : receive mode  
Remarks : 917.7 MHz; Dongle attached to Nokia 3210 (switched off)  
P3 = EUT side



|                 |                  |                 |
|-----------------|------------------|-----------------|
| Zone            | 30 MHz - 199 MHz | 199 MHz - 1 GHz |
| Video Bandwidth | 300 KHz          | 300 KHz         |
| Resol Bandwidth | 120 KHz          | 120 KHz         |
| Sweep Time      | 0 s              | 0 s             |

Operator: E. Staub  
Date/Time: 03.07.03 09:45  
Filename:  
20025229\_RX\_DongleHDC5\_000  
hP3.png/.txt

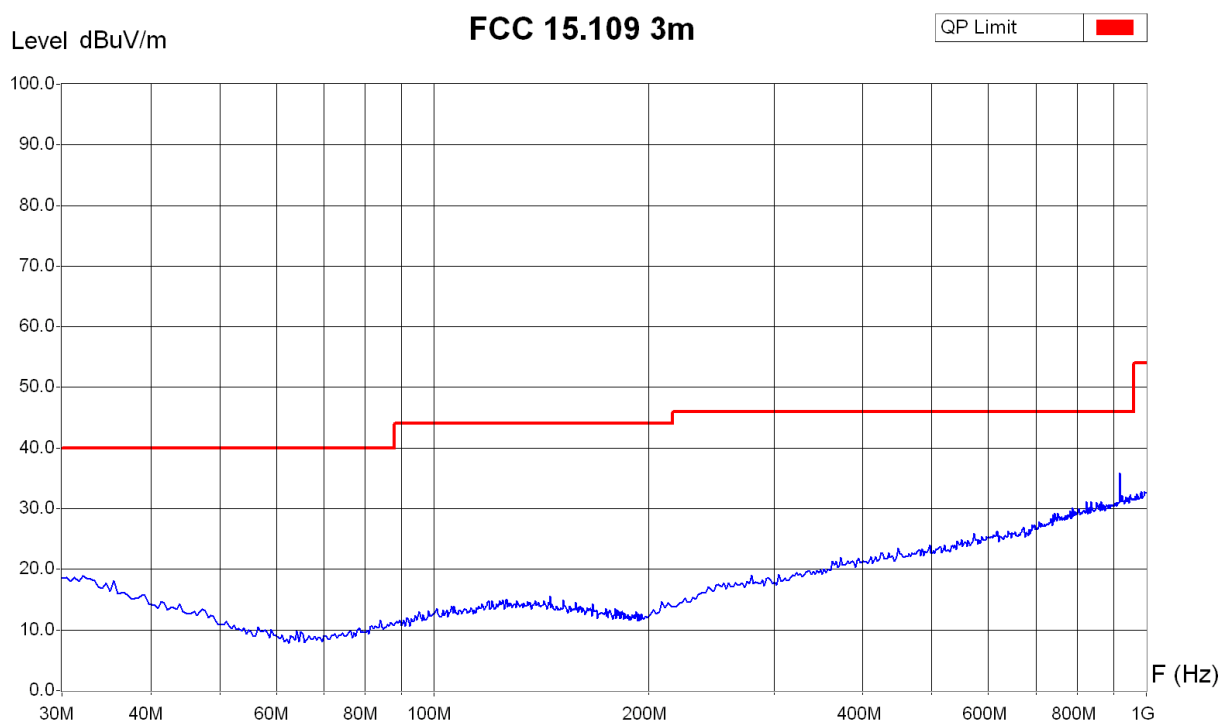
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[MHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1 - 3m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : receive mode  
Remarks : 917.7 MHz; Dongle attached to Nokia 3210 (switched off)  
P3 = EUT side



|                 |                  |                 |
|-----------------|------------------|-----------------|
| Zone            | 30 MHz - 199 MHz | 199 MHz - 1 GHz |
| Video Bandwidth | 300 KHz          | 300 KHz         |
| Resol Bandwidth | 120 KHz          | 120 KHz         |
| Sweep Time      | 0 s              | 0 s             |

Operator: E. Staub  
Date/Time: 03.07.03 09:49  
Filename:  
20025229\_RX\_DongleHDC5\_000v  
P3.png/.txt

**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[MHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

**7.2 Radiated electromagnetic field 1 - 5 GHz**

Test site: ☐ anechoic chamber (foam) ☐ open test site  
☒ anechoic chamber (ferrites) ☐ .....

Distance: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

Position of EUT: 0.8 m (height of the equipment under test above floor)

Test precision:  $\pm 6$  dB (30 - 300 MHz) /  $\pm 5.4$  dB (300 - 1000 MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbance appearing while the apparatus is under test. The peak values are recorded continuously on the graph.

Test set-up:



Remarks: • Radiated emissions measurements were maximized through orientation of EUT in three orthogonal axes

Test equipment:

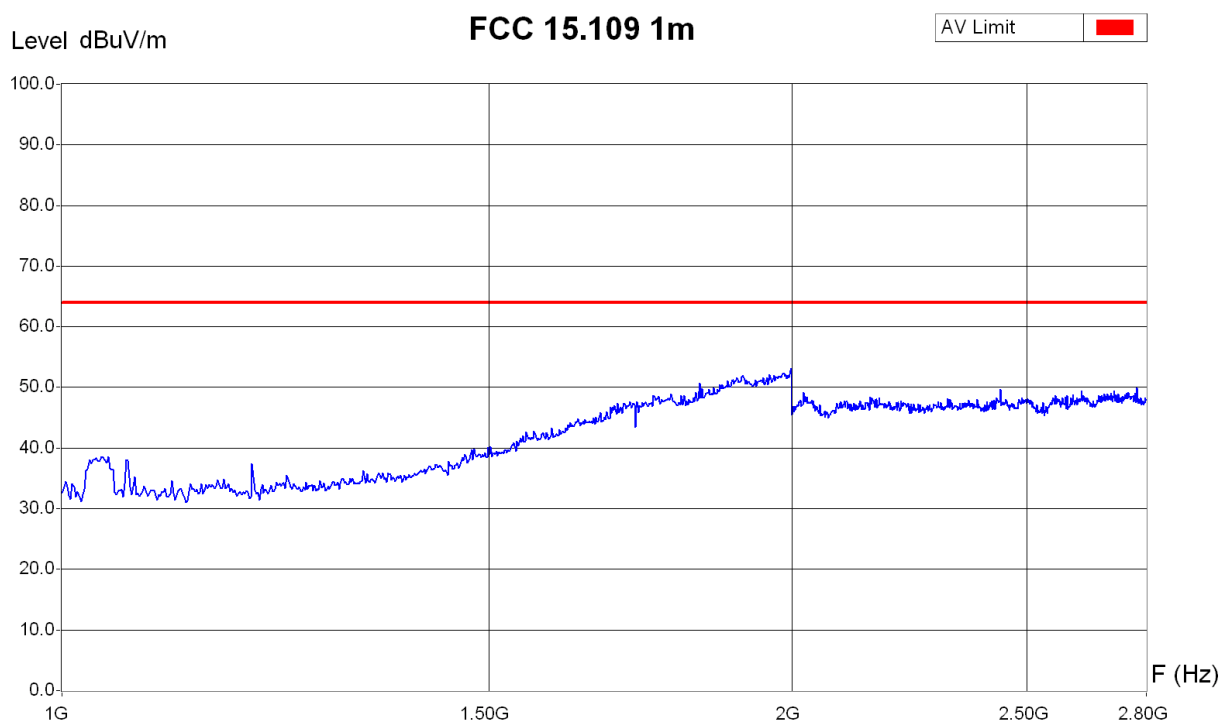
|                                                       |                                           |                                           |                                |                                           |                                           |
|-------------------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------|-------------------------------------------|-------------------------------------------|
| <input checked="" type="checkbox"/> Spectrum analyser | <input checked="" type="checkbox"/> 88-14 | <input type="checkbox"/> 90-26            | <input type="checkbox"/> 94-24 |                                           |                                           |
| <input type="checkbox"/> Receiver                     | <input type="checkbox"/> 85-04            | <input type="checkbox"/> 90-43            | <input type="checkbox"/> 94-35 |                                           |                                           |
| <input checked="" type="checkbox"/> Preamplifier      | <input type="checkbox"/> 88-05            | <input type="checkbox"/> 90-01            | <input type="checkbox"/> 90-42 | <input checked="" type="checkbox"/> 95-86 | <input checked="" type="checkbox"/> 92-39 |
| <input type="checkbox"/> Antenna (biconical)          | <input type="checkbox"/> 82-02            | <input type="checkbox"/> 87-05            | <input type="checkbox"/> 87-16 | <input type="checkbox"/> 91-05            | <input type="checkbox"/> 94-37            |
| <input type="checkbox"/> Antenna (log-per)            | <input type="checkbox"/> 88-20            | <input type="checkbox"/> 90-30            | <input type="checkbox"/> 91-35 | <input type="checkbox"/> 94-64            |                                           |
| <input checked="" type="checkbox"/> Antenna (horn)    | <input type="checkbox"/> 90-24            | <input checked="" type="checkbox"/> 90-29 | <input type="checkbox"/> 98-12 | <input type="checkbox"/> 98-13            | <input type="checkbox"/> .....            |
| <input type="checkbox"/> Notch and high-pass filter   | .....                                     |                                           |                                |                                           |                                           |

**Result:** ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : receive mode  
Remarks : 917.7 MHz; Dongle attached to Nokia 3210 (switched off)  
P3 = EUT lying



|                 |               |                  |
|-----------------|---------------|------------------|
| Zone            | 1 GHz - 2 GHz | 2 GHz - 2.80 GHz |
| Video Bandwidth | 1 MHz         | 1 MHz            |
| Resol Bandwidth | 1 MHz         | 1 MHz            |
| Sweep Time      | 0 s           | 0 s              |

Operator: E. Staub  
Date/Time: 03.07.2003 13:55  
Filename:  
20025229\_RX\_DongleHDC5\_001  
hP3.png/.txt

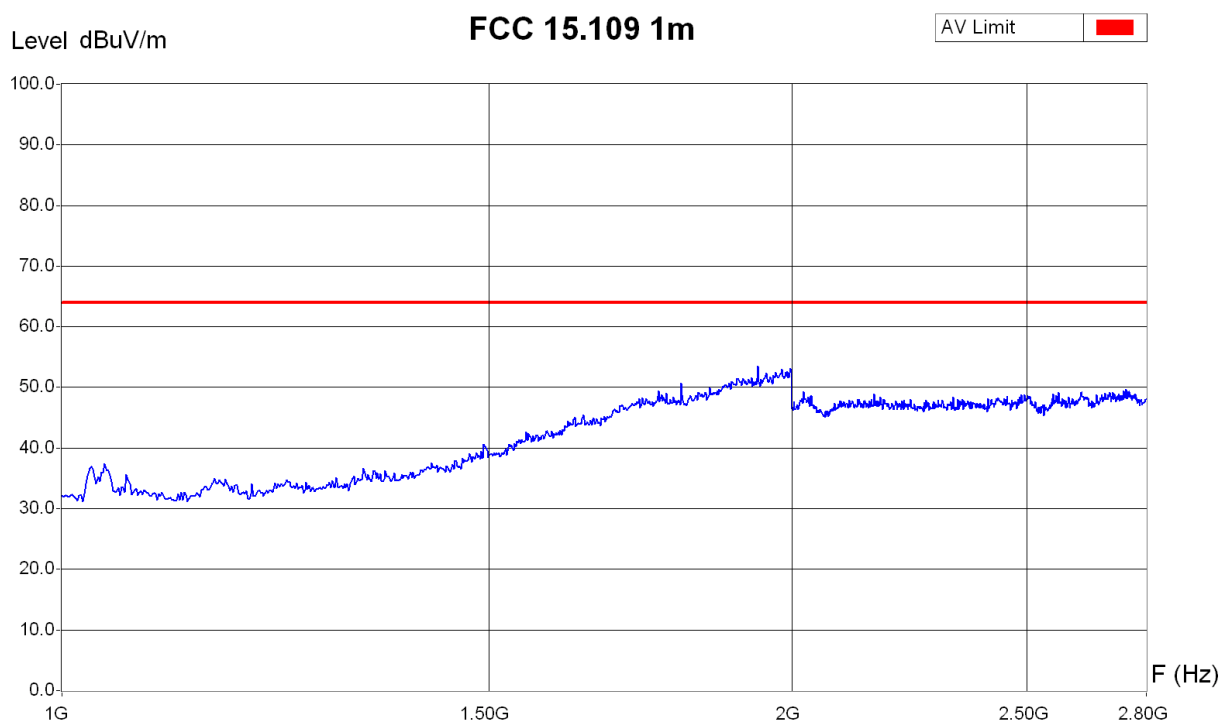
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : receive mode  
Remarks : 917.7 MHz; Dongle attached to Nokia 3210 (switched off)  
P3 = EUT lying



|                 |               |                  |
|-----------------|---------------|------------------|
| Zone            | 1 GHz - 2 GHz | 2 GHz - 2.80 GHz |
| Video Bandwidth | 1 MHz         | 1 MHz            |
| Resol Bandwidth | 1 MHz         | 1 MHz            |
| Sweep Time      | 0 s           | 0 s              |

Operator: E. Staub  
Date/Time 03.07.2003 13:53  
Filename:  
20025229\_RX\_DongleHDC5\_001v  
P3.png/.txt

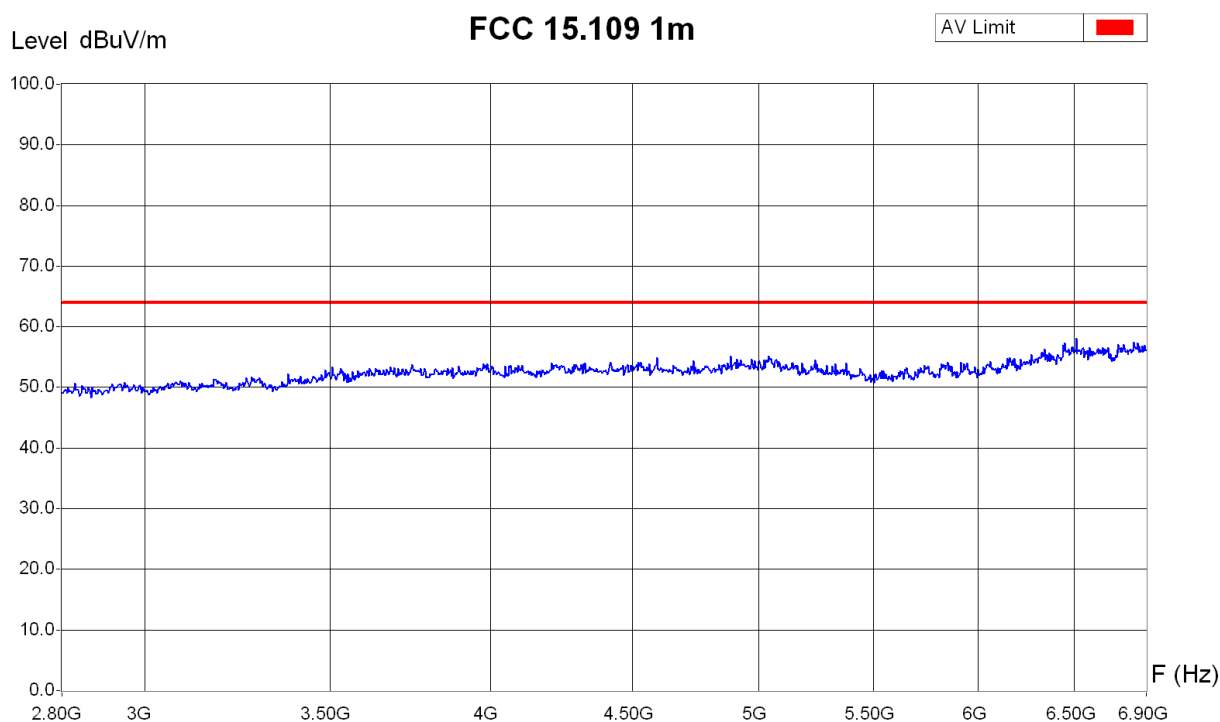
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Horizontal  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : receive mode  
Remarks : 917.7 MHz; Dongle attached to Nokia 3210 (switched off)  
P3 = EUT side



|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Zone            | 2.80 GHz - 4.60 | 4.60 GHz - 6.90 |
| Video Bandwidth | 1 MHz           | 1 MHz           |
| Resol Bandwidth | 1 MHz           | 1 MHz           |
| Sweep Time      | 0 s             | 0 s             |

Operator: E. Staub  
Date/Time 03.07.2003 14:12  
Filename:  
20025229\_RX\_DongleHDC5\_002  
hP3.png/.txt

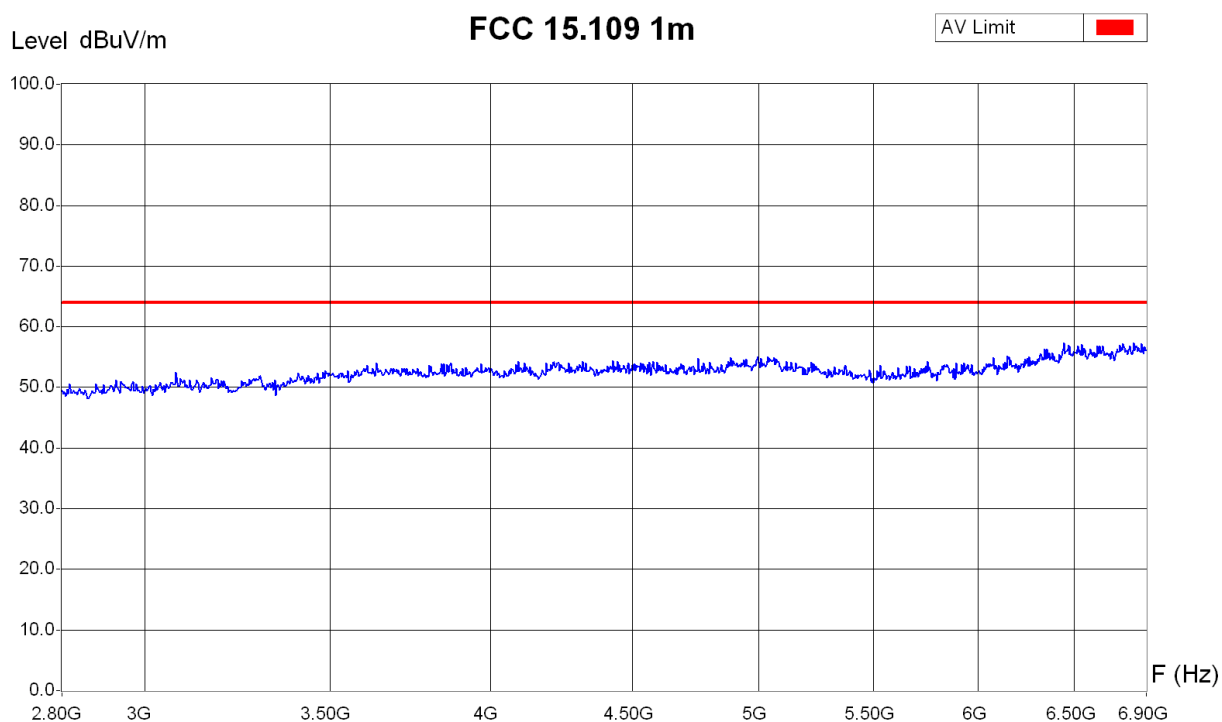
**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| Frequency<br>[GHz] | Pk-value<br>[dB $\mu$ V/m] | Delta<br>[dB] |
|--------------------|----------------------------|---------------|
|                    |                            |               |

Measurement Type : Radiated Field  
Polarisation : Vertical  
Table Angle : 0 - 360°  
Antenna Height : 1m



Equipment Under Test : Dongle HDC5 US: Lowest channel  
Set-Up : without artificial head  
Operating Conditions : receive mode  
Remarks : 917.7 MHz; Dongle attached to Nokia 3210 (switched off)  
P3 = EUT side



|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Zone            | 2.80 GHz - 4.60 | 4.60 GHz - 6.90 |
| Video Bandwidth | 1 MHz           | 1 MHz           |
| Resol Bandwidth | 1 MHz           | 1 MHz           |
| Sweep Time      | 0 s             | 0 s             |

Operator: E. Staub  
Date/Time: 03.07.2003 14:14  
Filename:  
20025229\_RX\_DongleHDC5\_002v  
P3.png/.txt

**Table of measured Pk-values with any points within 5 dB of the limit of previous plot**

| <b>Frequency<br/>[GHz]</b> | <b>Pk-value<br/>[dB<math>\mu</math>V/m]</b> | <b>Delta<br/>[dB]</b> |
|----------------------------|---------------------------------------------|-----------------------|
|                            |                                             |                       |

## **8. Test equipment**

| <b>Inv.</b> | <b>Manufacturer</b> | <b>Model</b> | <b>Last cal.</b> | <b>Cal interval</b> |
|-------------|---------------------|--------------|------------------|---------------------|
| 88-14       | Hewlett Packard     | 8562A        | Feb 2003         | 1 year              |
| 94-24       | Hewlett Packard     | 8591E        | Feb 2003         | 1 year              |
| 94-24       | Hewlett Packard     | E 4407 B     | March 2002       | 2 years             |
| 90-43       | Rohde & Schwarz     | ESVP         | Feb 2003         | 1 year              |
| 94-35       | Rohde & Schwarz     | ESVS10       | Feb 2003         | 1 year              |
| 90-42       | Montena emc         |              | Feb 2003         | 1 year              |
| 95-86       | Montena emc         |              | Feb 2003         | 1 year              |
| 92-39       | Hewlett Packard     | 8349         | Feb 2003         | 1 year              |