

Recognized by the  
Federal Communications Commission  
**FCC-Identification Number: 90462**  
**TCB ID: DE 0001**



**Anechoic chamber registration no.: 3463 (IC)**

Accredited by the  
German Accreditation Council  
**DAR-Registration Number**  
**TTI-P-G 081/94-D0**



Independent ETSI  
compliance test house



**Accredited Bluetooth™ Test Facility (BQTF)**

**Test report no.: 2-3613-01-01/04**

**FCC Part 15.225**

**CC-197D**

CETECOM – ICT Services GmbH

Untertürkheimerstr. 6-10

66117 Saarbrücken, Germany

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Fax: + 49 (0) 681 / 598-9075

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## 1 General information

### 1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5.

The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

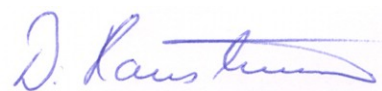
#### Test laboratory manager:

|            |            |         |
|------------|------------|---------|
| 2004-06-08 | RSC - 8411 | Berg M. |
| Date       | Section    | Name    |

  
Signature

#### Technical responsibility for area of testing:

|            |            |               |
|------------|------------|---------------|
| 2004-06-08 | RSC - 8412 | Hausknecht D. |
| Date       | Section    | Name          |

  
Signature

## 1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Telephone : + 49 681 598 - 0

Telefax : + 49 681 598 - 9075

E-mail : Michael.Berg@ict.cetecom.de

Internet : www.cetecom-ict.de

### Accredited testing laboratory

Accredited by : Regulierungsbehörde für Telekommunikation und Post (RegTP)

Listed by : Federal Communications Commission (FCC)

| Authority | Identification/Registration No. |
|-----------|---------------------------------|
| RegTP     | TTI-P-G 081/94-D0               |
| FCC       | 90462                           |

## 1.3 Details of applicant

**Name** : NOKIA Corporation

**Street** : P.O. Box 300

**City** : FIN-90401 OULU

**Country** : Finland

**Telephone** : +358 7180 08000

**Telefax** : +358 7180 44911

**Contact** : Kare Oksanen

**Telephone** : +358 7180 58667

### Contact person:

Name : Kare Oksanen

Telephone : +358 7180 58667

Telex : +358 7180 44911

E-mail : Kare.oksanen@nokia.com

## 1.4 Application details

Date of receipt of test item : 2004-04-26

Date of test : 2004-04-30

Person(s) who have been : Raimo Ikonen

present during the test :

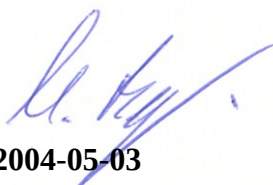
## 1.5 Test item

### Test Report Cover Sheet

|                                                   |                                  |
|---------------------------------------------------|----------------------------------|
| Company Number:                                   | 661E                             |
| Model Number:                                     | CC-197D                          |
| Product Name:                                     |                                  |
| Manufacturer:                                     | Nokia Corporation                |
| Tested to Radio Standards Specification(RSS) No.: | 210 Issue 5                      |
| Open Area Test Site Industry Canada Number:       | 3463                             |
| Frequency Range (or fixed frequency):             | 13.56 MHz                        |
| R:F: Power in Watts:                              |                                  |
| Field Strength (at what distance):                | 50 dBµV/m in 3m                  |
| Occupied Bandwidth (99% BW):                      | 5.48 kHz                         |
| Type of Modulation:                               | Amplitude                        |
| Emission Designator (TRC-43):                     | 2K12A1DBN                        |
| Transmitter Spurious (worst case):                | 39.2dBµV/m in 3m                 |
| Receiver Spurious (worst case):                   | -.-                              |
| IC no.                                            | 661E-R1                          |
| FCC ID no.                                        | LJPR1                            |
| Temperature range                                 | -20°C to +50°C                   |
| Power supply                                      | 3.7 V DC via Battery from Mobile |

**ATTESTATION:** I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all the applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Date: 2004-05-03

NAME AND TITLE (Please print or type):

**Berg Michael, Project Engineer**

Note: This form must be completed and provided with the submission.

## 1.6 Test specifications: FCC Part 15 §15.225 CANADA RSS-210 Issue 5

## **2 Technical test**

### **2.1 Summary of test results**

#### **FCC Part 15 Subpart B**

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas are conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2001 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2001 clause 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.225 and 15.207

The product fulfils also the requirements for CANADA RSS-210 Issue 5

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

**FINAL VERDICT : PASS**

## **2.2 Test report**

### **TEST REPORT**

**Test report no: 2-3613-01-01/04**

**LIST OF MEASUREMENTS.**

The list of measured parameters is given below.

**FCC**

|                                                      |                            |           |
|------------------------------------------------------|----------------------------|-----------|
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**CANADA**

|                                                               |           |
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Equipment under test : CC-197D

Ambient temperature : 23°C

Relative humidity : 48%

**SPURIOUS RADIATION**

§ 15.209 / § 15.225

| SPURIOUS EMISSIONS LEVEL (µV/m) |          |       |  |  |                 |                 |                |         |
|---------------------------------|----------|-------|--|--|-----------------|-----------------|----------------|---------|
| 13.56 MHz                       |          |       |  |  |                 |                 |                |         |
| f<br>(MHz)                      | Detector |       |  |  | Level<br>(µV/m) | Limit<br>(µV/m) | Margin<br>(dB) | Results |
| 0.0787                          | QP       |       |  |  | 0.009           | 30.48           | 70.08          | pass    |
| 36.3                            | PK       |       |  |  | 14.1            | 100             | 17.0           | pass    |
| 39.06                           | PK       |       |  |  | 17.8            | 100             | 15.0           | pass    |
| 41.02                           | PK       |       |  |  | 44.7            | 100             | 7.0            | pass    |
| 45.23                           | PK       |       |  |  | 35.5            | 100             | 9.0            | pass    |
| 51.61                           | PK       |       |  |  | 13.5            | 100             | 17.4           | pass    |
| 55.27                           | PK       |       |  |  | 18.2            | 100             | 14.8           | pass    |
| 62.76                           | PK       |       |  |  | 13.2            | 100             | 17.6           | pass    |
| 3321.9                          | PK       |       |  |  | 81.3            | 500             | 11.8           | pass    |
| 3717.2                          | PK       |       |  |  | 91.2            | 500             | 10.8           | pass    |
| Measurement uncertainty         |          | ±3 dB |  |  |                 |                 |                |         |

f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

H = Horizontal ; V= Vertical

( to convert the measuring distance from 3m to 30m and 3 to 300m a correction factor from 40 dB/decade was used.)

Sample for 0.0787 MHz : 39 dBµV/m in 3m related to -41 dBµV/m in 300m (39 dBµV/m – 80 dB)  
-41 dBµV/m = 0.009µV/m

**Limits**

SUBCLAUSE § 15.209

| Frequency (MHz) | Field strength (µV/m) | Measurement distance (m) |
|-----------------|-----------------------|--------------------------|
| 0.009 – 0.490   | 2400/F(kHz)           | 300                      |
| 0.490 – 1.705   | 24000/F(kHz)          | 30                       |
| 1.705 – 30.0    | 30                    | 30                       |
| 30 - 88         | 100                   | 3                        |
| 88 - 216        | 150                   | 3                        |
| 216 - 960       | 200                   | 3                        |
| above 960       | 500                   | 3                        |

**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**

(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

Equipment under test : CC-197D

Ambient temperature : 23°C

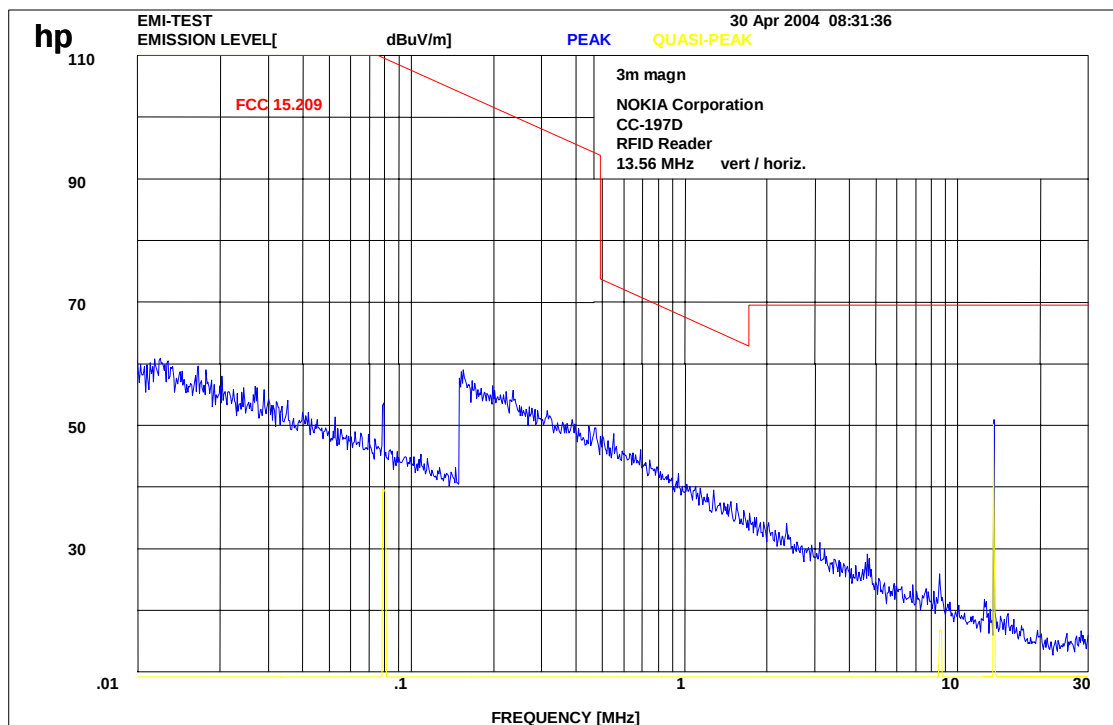
Relative humidity : 48%

## Plots of the measurements

### SCANTABELLE: "FCC 15 magn"

Kurzbeschreibung: Voltage Mains 1.60

| Start-Frequenz | Stop-Frequenz | Schrittweite | Detektor | Meßzeit  | ZF-Bandbr. | Transducer       |
|----------------|---------------|--------------|----------|----------|------------|------------------|
| 9.0 kHz        | 150.0 kHz     | 100.0 Hz     | MaxPeak  | 100.0 ms | 0.2 kHz    | HFH2-Z2 (dBµV/m) |
|                |               | 10.0 kHz     | MaxPeak  | 100.0 ms | 10 kHz     | HFH2-Z2 (dBµV/m) |



Measurement distance 3m

This measurement was done in 3 polarisation's, the plot shows the worst case (Coil antenna and controller PCB horizontal)

**Field strength of the Fundamental : 50 dBµV/m in 3m or 10 dBµV/m in 30m**

( to convert the measuring distance from 3m to 30m and 3 to 300m a correction factor from 40 dB/decade was used.)

### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

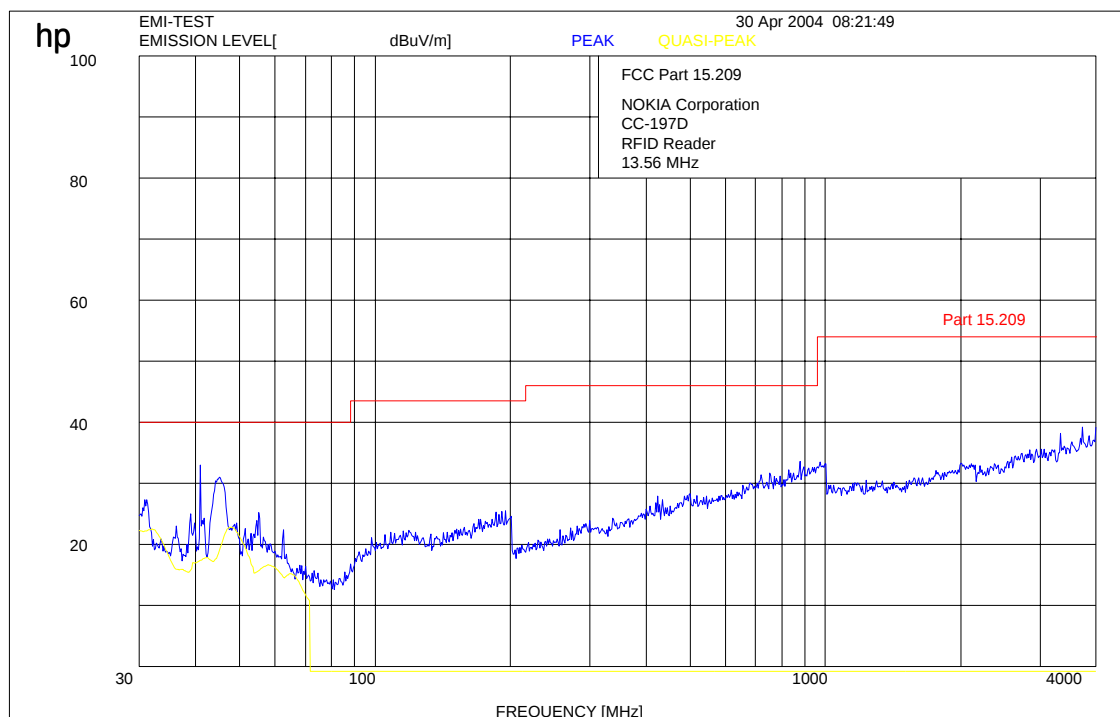
Equipment under test : CC-197D

Ambient temperature : 23°C

Relative humidity : 48%

## Plots of the measurements

Spurious 30 MHz – 4 GHz (Quasi Peak below 1 GHz)



$f < 1 \text{ GHz}$  : RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$  : RBW/VBW: 1 MHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
(for reference numbers see test equipment listing)

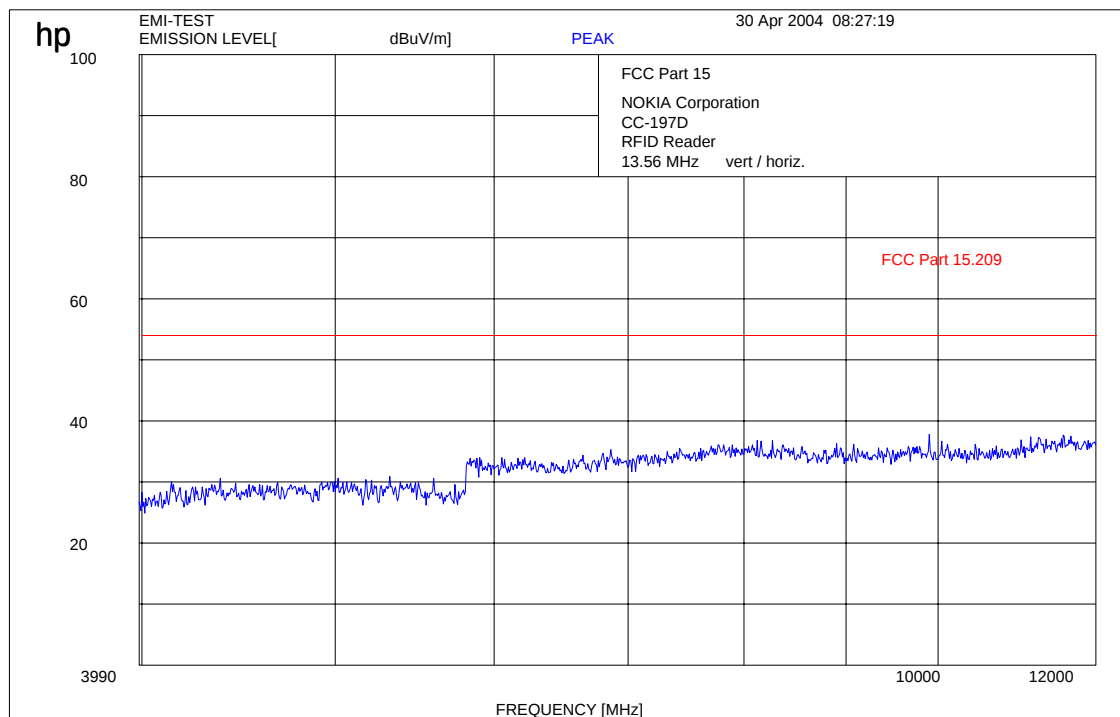
17 – 24: 53 , 54 , 62

Equipment under test : CC-197D

Ambient temperature : 23°C

Relative humidity : 48%

Spurious 4 GHz – 12 GHz



**above 12 GHz no traceable peak found**

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

17 – 24: 53 , 54 , 62

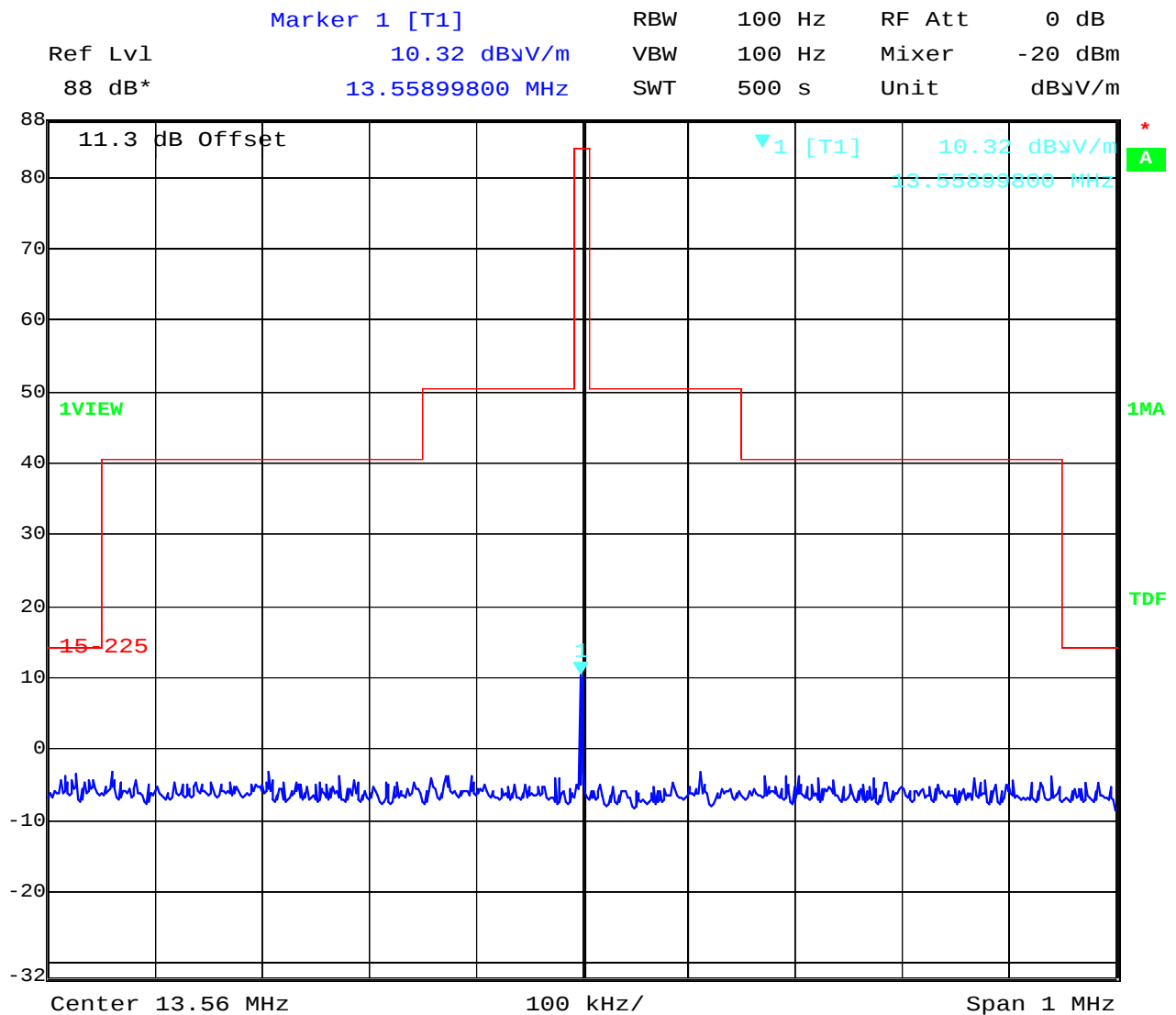
Equipment under test : CC-197D

Ambient temperature : 23°C

Relative humidity : 48%

## EMISSION MASK

§ 15.225



Date: 30.APR.2004 10:14:09

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
 (for reference numbers see test equipment listing)

**Equipment under test : CC-197D****Ambient temperature : 23°C****Relative humidity : 48%****Frequency Tolerance****§ 15.225 (e)****Method of Measurement:**

1. Measure the carrier frequency at room temperature.
2. Subject the mobile station to overnight soak at -20 C.
3. With the mobile station, powered with 3.7 Volts, measure the carrier frequency. These measurements should be made within 2 minutes of powering up the mobile station, to prevent significant self warming.
4. Repeat the above measurements at 10 C increments from -20 C to +50 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal 3.7 Volts. Vary supply voltage from minimum 3.2 Volts to maximum 4.2 Volts, in 11 steps re-measuring carrier frequency at each voltage. Pause at 3.7 V dc Volts for 1 1/2 hours un-powered, to allow any self heating to stabilize, before continuing.
6. At all temperature levels hold the temperature to +/- 0.5 C during the measurement procedure.

**Measurement Limit:**

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

**Equipment under test : CC-197D**
**Ambient temperature : 23°C**
**Relative humidity : 48%**
**AFC FREQ ERROR vs. VOLTAGE**

| <b>Voltage<br/>(V)</b> | <b>Frequency Error<br/>(Hz)</b> | <b>Frequency Error<br/>(%)</b> | <b>Frequency Error<br/>(ppm)</b> |
|------------------------|---------------------------------|--------------------------------|----------------------------------|
| 3.2                    | -99                             | -0,00073009                    | -7,3009                          |
| 3.3                    | -99                             | -0,00073009                    | -7,3009                          |
| 3.4                    | -99                             | -0,00073009                    | -7,3009                          |
| 3.5                    | -99                             | -0,00073009                    | -7,3009                          |
| 3.6                    | -99                             | -0,00073009                    | -7,3009                          |
| 3.7                    | -99                             | -0,00073009                    | -7,3009                          |
| 3.8                    | -99                             | -0,00073009                    | -7,3009                          |
| 3.9                    | -99                             | -0,00073009                    | -7,3009                          |
| 4.0                    | -99                             | -0,00073009                    | -7,3009                          |
| 4.1                    | -101                            | -0,00074484                    | -7,4484                          |
| 4.2                    | -101                            | -0,00074484                    | -7,4484                          |
|                        |                                 |                                |                                  |

**AFC FREQ ERROR vs. TEMPERATURE**

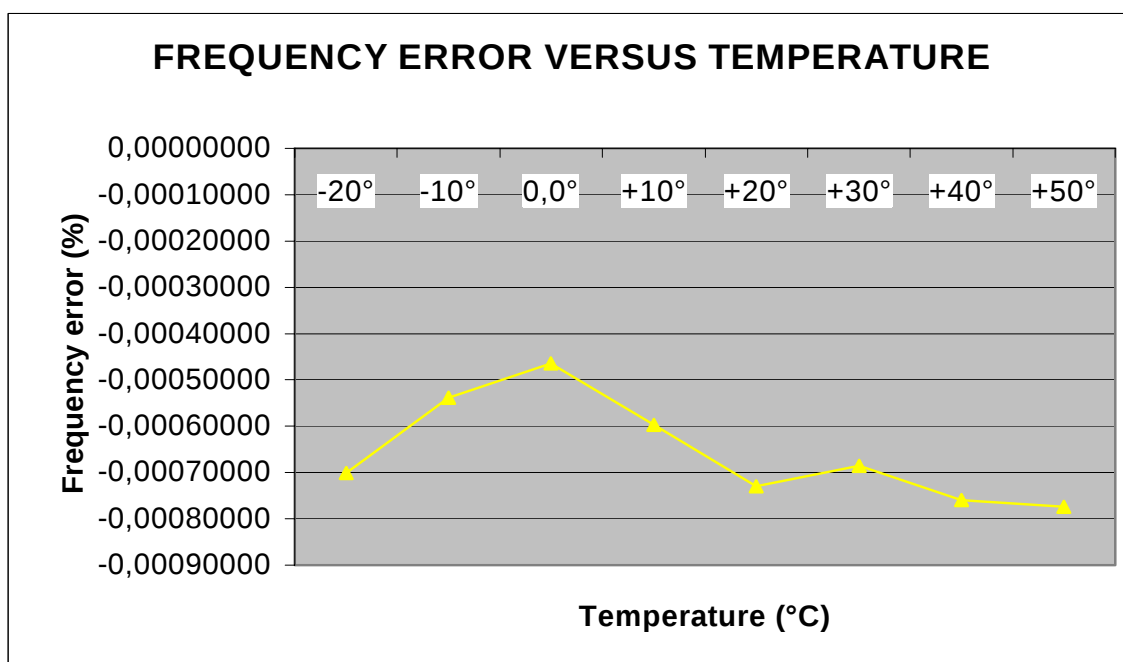
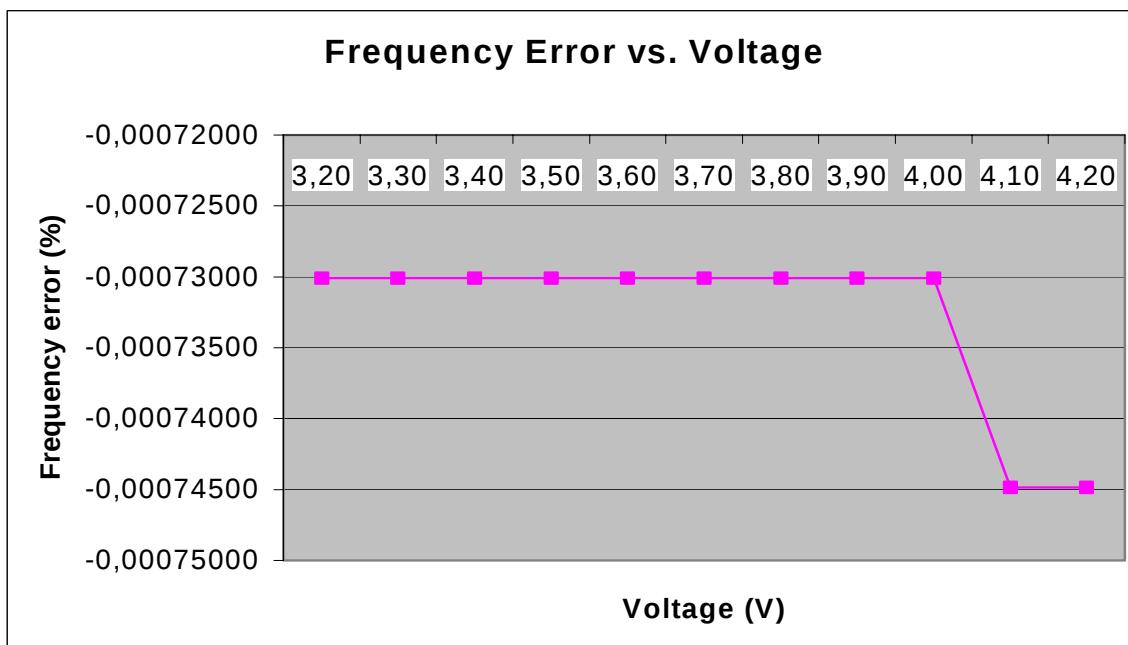
| <b>TEMPERATURE<br/>(°C)</b> | <b>Frequency Error<br/>(Hz)</b> | <b>Frequency Error<br/>(%)</b> | <b>Frequency Error<br/>(ppm)</b> |
|-----------------------------|---------------------------------|--------------------------------|----------------------------------|
|                             |                                 |                                |                                  |
| -20                         | -95                             | -0,00070059                    | -7,0059                          |
| -10                         | -73                             | -0,00053835                    | -5,3835                          |
| ±0.0                        | -63                             | -0,00046460                    | -4,6460                          |
| +10                         | -81                             | -0,00059735                    | -5,9735                          |
| +20                         | -99                             | -0,00073009                    | -7,3009                          |
| +30                         | -93                             | -0,00068584                    | -6,8584                          |
| +40                         | -103                            | -0,00075959                    | -7,5959                          |
| +50                         | -105                            | -0,00077434                    | -7,7434                          |
|                             |                                 |                                |                                  |

**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
 (for reference numbers see test equipment listing)

Equipment under test : CC-197D

Ambient temperature : 23°C

Relative humidity : 48%



Equipment under test : CC-197D

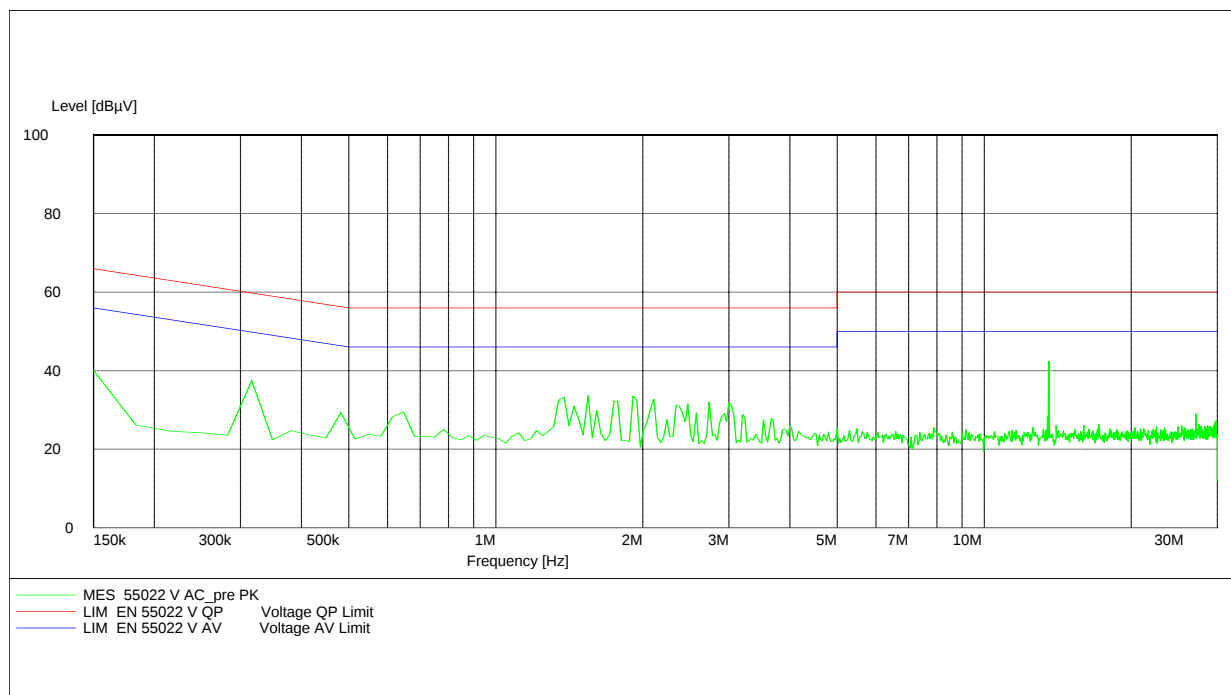
Ambient temperature : 23°C

Relative humidity : 48%

## Conducted emissions

§ 15.107/207

EUT: CC197D  
 Manufacturer: NOKIA Corporation  
 Operating Condition: normal reading mode  
 Test Site: Room 006 (Shielded chamber)  
 Operator: Berg M.  
 Test Specification: CISPR 22  
 Comment: 115V / 60 Hz  
 Start of Test: 30.04.04 / 09:29:09



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
 (for reference numbers see test equipment listing)

Test report no.:2-3613-01-01/04

Issue date: 2004-05-06

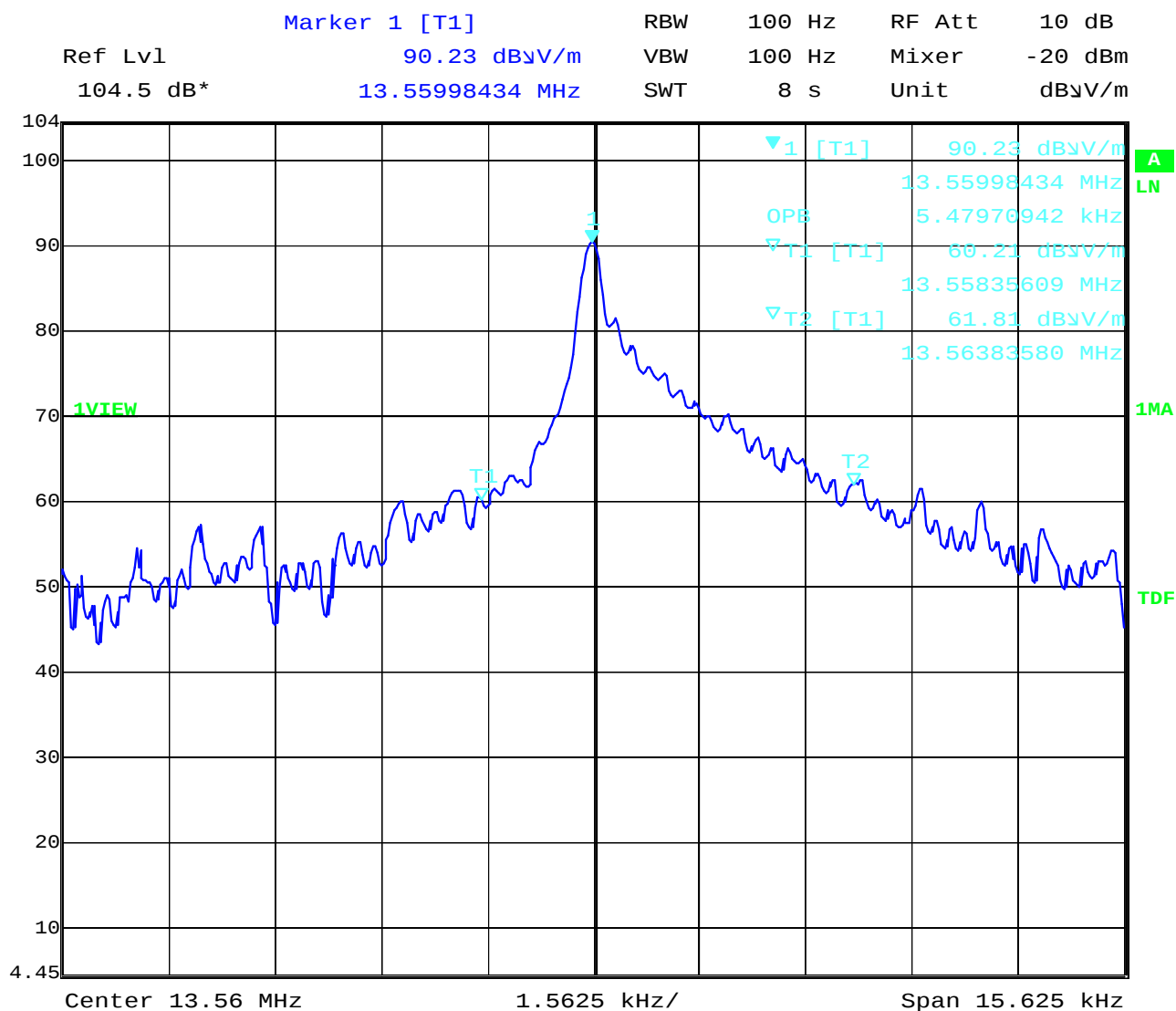
Page 18 (20)

Equipment under test : CC-197D

Ambient temperature : 23°C

Relative humidity : 48%

## 20 dB Bandwidth



Date: 30.APR.2004 09:56:03

20 dB Bandwidth : 5.4797 kHz

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED  
 (for reference numbers see test equipment listing)

**TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

| No | Instrument/Ancillary         | Type      | Manufacturer    | Serial No.  | Calibrated |
|----|------------------------------|-----------|-----------------|-------------|------------|
| 01 | Spectrum Analyzer            | 8566 A    | Hewlett-Packard | 1925A00257  | Yes        |
| 02 | Analyzer Display             | 8566 A    | Hewlett-Packard | 1925A00860  | Yes        |
| 03 | Oscilloscope                 | 7633      | Tektronix       | 230054      | Yes        |
| 04 | Radio Communication Analyzer | CMTA 54   | Rohde & Schwarz | 894 043/010 | Yes        |
| 05 | System Power Supply          | 6038 A    | Hewlett-Packard | 2848A07027  | Yes        |
| 06 | Signal Generator             | 8111 A    | Hewlett-Packard | 2215G00867  | Yes        |
| 07 | Signal Generator             | 8662 A    | Hewlett-Packard | 2224A01012  | Yes        |
| 08 | Function Generator           | AFGU      | Rohde & Schwarz | 862 480/032 | Yes        |
| 09 | Regulating Transformer       | MPL       | Erfi            | 91350       | n.a.       |
| 10 | LISN                         | NNLA 8120 | Schwarzbeck     | 8120331     | Yes        |
| 11 | Relay-Matrix                 | PSU       | Rohde & Schwarz | 893 285/020 | Yes        |
| 12 | Power-Meter                  | 436 A     | Hewlett-Packard | 2101A12378  | Yes        |
| 13 | Power-Sensor                 | 8484 A    | Hewlett-Packard | 2237A10156  | Yes        |
| 14 | Power-Sensor                 | 8482 A    | Hewlett-Packard | 2237A00616  | Yes        |
| 15 | Modulation Meter             | 9008      | Racal-Dana      | 2647        | Yes        |
| 16 | Frequency Counter            | 5340 A    | Hewlett-Packard | 1532A03899  | Yes        |
| 17 | Anechoic Chamber             | ---       | MWB             | 87400/002   | Yes        |
| 18 | Spectrum Analyzer            | 85660 B   | Hewlett-Packard | 2747A05306  | Yes        |
| 19 | Analyzer Display             | 85662 A   | Hewlett-Packard | 2816A16541  | Yes        |
| 20 | Quasi Peak Adapter           | 85650 A   | Hewlett-Packard | 2811A01131  | Yes        |
| 21 | RF-Preselector               | 85685 A   | Hewlett-Packard | 2833A00768  | Yes        |
| 22 | Biconical Antenna            | 3104      | Emco            | 3758        | Yes        |
| 23 | Log. Per. Antenna            | 3146      | Emco            | 2130        | Yes        |
| 24 | Double Ridged Horn           | 3115      | Emco            | 3088        | Yes        |
| 25 | EMI-Testreceiver             | ESAI      | Rohde & Schwarz | 863 180/013 | Yes        |
| 26 | EMI-Analyzer-Display         | ESAI-D    | Rohde & Schwarz | 862 771/008 | Yes        |
| 27 | Biconical Antenna            | HK 116    | Rohde & Schwarz | 888 945/013 | Yes        |
| 28 | Log. Per. Antenna            | HL 223    | Rohde & Schwarz | 825 584/002 | Yes        |
| 29 | Relay-Switch-Unit            | RSU       | Rohde & Schwarz | 375 339/002 | Yes        |
| 30 | Highpass                     | HM985955  | FSY Microwave   | 001         | n.a.       |
| 31 | Amplifier                    | P42-GA29  | Tron-Tech       | B 23602     | Yes        |
| 32 | Anechoic Chamber             |           | Frankonia       |             | Yes        |
| 33 | Control Computer             | PSM 7     | Rohde & Schwarz | 834 621/004 | Yes        |
| 34 | EMI Test Receiver            | ESMI      | Rohde & Schwarz | 827 063/010 | Yes        |
| 35 | EMI Test Receiver            | Display   | Rohde & Schwarz | 829 808/010 | Yes        |

**TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

| No | Instrument/Ancillary                  | Type      | Manufacturer    | Serial No.   | Calibrated |
|----|---------------------------------------|-----------|-----------------|--------------|------------|
| 36 | Control Computer                      | HD 100    | Deisel          | 100/322/93   | n.a.       |
| 37 | Relay Matrix                          | PSN       | Rohde & Schwarz | 829 065/003  | Yes        |
| 38 | Control Unit                          | GB 016 A2 | Rohde & Schwarz | 344 122/008  | Yes        |
| 39 | Relay Switch Unit                     | RSU       | Rohde & Schwarz | 316 790/001  | Yes        |
| 40 | Power Supply                          | 6032A     | Hewlett Packard | 2846A04063   | Yes        |
| 41 | Spectrum Monitor                      | EZM       | Rohde & Schwarz | 883 720/006  | n.a.       |
| 42 | Measuring Receiver                    | ESH 3     | Rohde & Schwarz | 890 174/002  | Yes        |
| 43 | Measuring Receiver                    | ESVP      | Rohde & Schwarz | 891 752/005  | Yes        |
| 44 | Bicon Ant. 20-300MHz                  | HK 116    | Rohde & Schwarz | 833 162/011  | Yes        |
| 45 | Logper Ant. 0.3-1 GHz                 | HL 223    | Rohde & Schwarz | 832 914/010  | Yes        |
| 46 | Amplifier 0.1-4 GHz                   | AFS4      | Miteq Inc.      | 206461       | Yes        |
| 47 | Logper Ant. 1-18 GHz                  | HL 024 A2 | Rohde & Schwarz | 342 662/002  | Yes        |
| 48 | Polarisation Network                  | HL 024 Z1 | Rohde & Schwarz | 341 570/002  | Yes        |
| 49 | Double Ridged Horn Antenna 1-26.5 GHz | 3115      | EMCO            | 9107-3696    | Yes        |
| 50 | Microw. Sys. Amplifier 0.5- 26.5 GHz  | 8317A     | Hewlett Packard | 3123A00105   | Yes        |
| 51 | Audio Analyzer                        | UPD       | Rohde & Schwarz | 1030.7500.04 | Yes        |
| 52 | Controler                             | PSM 7     | Rohde & Schwarz | 883 086/026  | Yes        |
| 53 | DC V-Network                          | ESH3-Z6   | Rohde & Schwarz | 861 406/005  | Yes        |
| 54 | DC V-Network                          | ESH3-Z6   | Rohde & Schwarz | 893 689/012  | Yes        |
| 55 | AC 2 Phase V-Network                  | ESH3-Z5   | Rohde & Schwarz | 861 189/014  | Yes        |
| 56 | AC 2 Phase V-Network                  | ESH3-Z5   | Rohde & Schwarz | 894 981/019  | Yes        |
| 57 | AC-3 Phase V-Network                  | ESH2-Z5   | Rohde & Schwarz | 882 394/007  | Yes        |
| 58 | Power Supply                          | 6032A     | Rohde & Schwarz | 2933A05441   | Yes        |
| 59 | RF-Test Receiver                      | ESVP.52   | Rohde & Schwarz | 881 487/021  | Yes        |
| 60 | Spectrum Monitor                      | EZM       | Rohde & Schwarz | 883 086/026  | n.a.       |
| 61 | RF-Test Receiver                      | ESH3      | Rohde & Schwarz | 881 515/002  | Yes        |
| 62 | Relay Matrix                          | PSU       | Rohde & Schwarz | 882 943/029  | Yes        |
| 63 | Relay Matrix                          | PSU       | Rohde & Schwarz | 828 628/007  | Yes        |
| 64 | Spectrum Analyzer                     | FSIQ 26   | Rohde & Schwarz | 119.6001.27  | Yes        |
| 65 | Spectrum Analyzer                     | HP 8565E  | Hewlett Packard | 3473A00773   | Yes        |
| 68 |                                       |           |                 |              |            |