

Test & Certification Center (TCC) - Dallas

FCC ID: QVVRH-52

WR165 .001

April 13, 2004

Accredited Laboratory
Certificate Number: 1819-01

Ver 1.0

CFR 47 Part 15 Test Report

Test Report Number: WR 165.001

Terminal device: FCC ID: QVVRH-52 Model: 7610 b Type: RH-52 HW: 3006 SW: 3.0405.1
(Detailed information is listed in section 4).

Originator: Michael Sundstrom/Chi Nguyen
Function: TCC - Dallas – EMC
Version/Status: 1.0 Approved
Location: TCC Directories
Date: April 13, 2004

Change History:

Version	Date	Status	Handled By	Comments
0.1	11-Mar-04	Draft	Michael Sundstrom / Chi Nguyen	
0.2	24-Mar-04	Proposal	Michael Sundstrom	
0.3	12 Apr 04	Reviewed	Mark Severson / Michael Mobley	
1.0	13 Apr 04	Approved	Nerina Walton	

Testing laboratory:

Test & Certification Center (TCC) Dallas
Nokia Mobile Phones
6021 Connection Drive
Irving, Texas 75039
U.S.A.

Tel. 972-894-5000

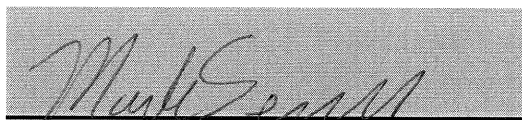
Client:

Nokia Corporation
P.O. Box 100
FIN 00045 Nokia Group
Finland

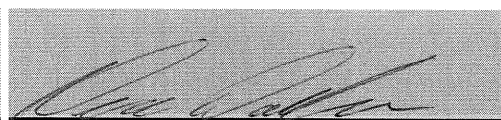
Date and signatures:

April 13, 2004

For the contents:



Mark Severson, EMC Engineer
Technical Review



Nerina Walton, General Manager
Manager Review

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1. GENERAL

1.1 Quality System

The quality system in place for TCC-Dallas conforms to ISO/IEC 17025 and has been audited to the standard by A2LA (American Association of Laboratory Accreditation). TCC - Dallas has also been audited using the ISO 9000 Quality System, as part of Nokia Mobile Phones, Inc., by ABS (American Bureau of Shipping) Quality Evaluations Inc.

TCC-Dallas is a recognized laboratory with the Federal Communications Commission in filing applications for Certification under Parts 15 and 18, Registration Number 100060, and Industry Canada, Registration Number IC 661.

1.2 Objective

All tests and measurement data shown was performed to determine whether the selected handset was in compliance as specified in FCC: CFR47 Parts 15.107, 15.109, 15.111 and 15.207.

1.3 Test Summary

Test Results: *The test result relates only to those tested devices mentioned in Section 4 of this test report.*

Test Performed	Reference	Section of Report	Complies / Does not comply / Not Tested
AC Conducted Emissions	FCC Part 15.107	6	Complies
AC Conducted Emissions	FCC Part 15.207	6	Complies
Idle Mode Radiated Emissions	FCC Part 15.109	7	Complies
RF Conducted Idle Mode Emissions	FCC Part 15.111	8	Complies



2. STANDARDS BASIS

Testing has been carried out in accordance with:

REF.	Code of the standard	Name of the standard
1	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.
2	FCC: CFR 47 Part 15	Code of Federal Regulations (CFR) Title 47, Part 15 – Radio Frequency Devices: Subpart B – Unintentional Radiators and Subpart C – Intentional Radiators
3	CISPR 22 / EN55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.
4	ICES-003	Digital Apparatus, Industry Canada
5	RSS-132	800 MHz Cellular Telephones Employing New Technologies
6	RSS-133	2 GHz Personal Communications Services, Industry Canada
7	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
8	RSP-100	Radio Equipment Certification Procedure

Note: Unless otherwise stated, (by reference to a version number and a publication date), the latest version of the above documents applies.

Deviations:

Not Applicable.

3. LIST OF ABBREVIATIONS, ACRONYMS AND TERMS

3.1 Abbreviations

dB - decibel

dBm - decibels per milliwatt (absolute measurement)

dB μ V - decibel per microvolt

dB μ V/m - decibel of microvolt per meter

GHz - gigahertz or 1000000000 hertz

kHz - kilohertz or 1000 hertz

MHz - megahertz or 1000000 hertz

3.2 Acronyms

AMPS - Advanced Mobile Phone System

BSS - Base Station Simulator

CDMA - Code Division Multiple Access

EMC - Electromagnetic Compatibility

EMI - Electromagnetic Interference

EUT - Equipment under Test

GSM - Global System for Mobile communications

PCS - Personal Communications Services

RF - Radio Frequency

TDMA - Time Division Multiple Access

3.3 Terms

Base Station Simulator (BSS) - simulates all the necessary signals that a phone would experience while on a live network. There are many types of base station simulators catering for all current protocols, i.e., GSM, AMPS, TDMA, and CDMA.

Cellular - refers to a frequency in the 800MHz band.

PCS - refers to a frequency in the 1900MHz band.

4. EQUIPMENT-UNDER-TEST (EUT)

The results in this report relate only to the items listed below:

4.1 Description of Tested Device(s):

Test Performed	Mode of Operation	Date of Receipt	Condition of Sample	Item	Identifying Information
FCC Part, 15.107, 15.109, 15.207	GSM 850/1900	09 Mar 2004	Operational	Phone	FCC ID: QVVRH-52 Type: RH-52 HW: 3006 SW: C3.0405.1.BT IMEI: 004400361607946
FCC Part, 15.111	GSM 850/1900	09 Mar 2004	Operational	Phone	FCC ID: QVVRH-52 Type: RH-52 HW: 3006 SW: C3.0405.1.BT IMEI: 0044003616079
FCC Part, 15.107, 15.109, 15.207, 15.111	GSM 850/1900	09 Mar 2004	Operational	Battery	Type: BL-5C Other: 3.7 V
FCC Part, 15.107, 15.109, 15.207, 15.111	GSM 850/1900	09 Mar 2004	Operational	Charger	Type: ACP-12U
FCC Part, 15.107, 15.109, 15.207	GSM 850/1900	09 Mar 2004	Operational	Headset	Type: HS-10

5. TEST EQUIPMENT LIST

The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas shall notify clients promptly, in writing, of identification of defective measuring equipment that casts doubt on the validity of results given in this report.

Section of Report	NMP#	Test Equipment	Mfr. #	Model #	Calibration Due Date	Calibration Interval
6	03007	LISN	EMCO	3816/2	20 May 2005	12 Mo.
6	N/A	10dB Attenuator	Weinschel	Model 2	N/A	N/A
6	00368 00367	EMI Receiver	Hewlett Packard	8546 / 85460A	22 July 2004	12 Mo.
6	03857	Base Station	Rohde & Schwarz	CMU 200	17 July 2004	12 Mo.
7	02664	EMI Receiver	Hewlett Packard	8546 / 85460A	23-Feb-2005	12 Mo.
7	02858	Biconilog Antenna	EMCO	3142	15-Aug-04	12 Mo.
7	02846	Turntable and Tower Controller	Sunol	FM2022 & 2846	N/A	N/A
7	02666	Base Station	R&S	CMU200	21-Nov-04	12 Mo.
8	02680	EMI Analyzer	Agilent	E7405A	24 Nov 04	12 Mo.
8	03155	Power Splitter (must have 6 dB insertion loss)	Agilent	33120A	N/A	N/A
8	N/A	6dB Attenuator	Weinschel	Model 2	N/A	N/A

6. AC CONDUCTED EMISSIONS

Specification: FCC Part 15.107 and 15.207

6.1 Setup

Testing was performed in accordance with ANSI C63.4, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.



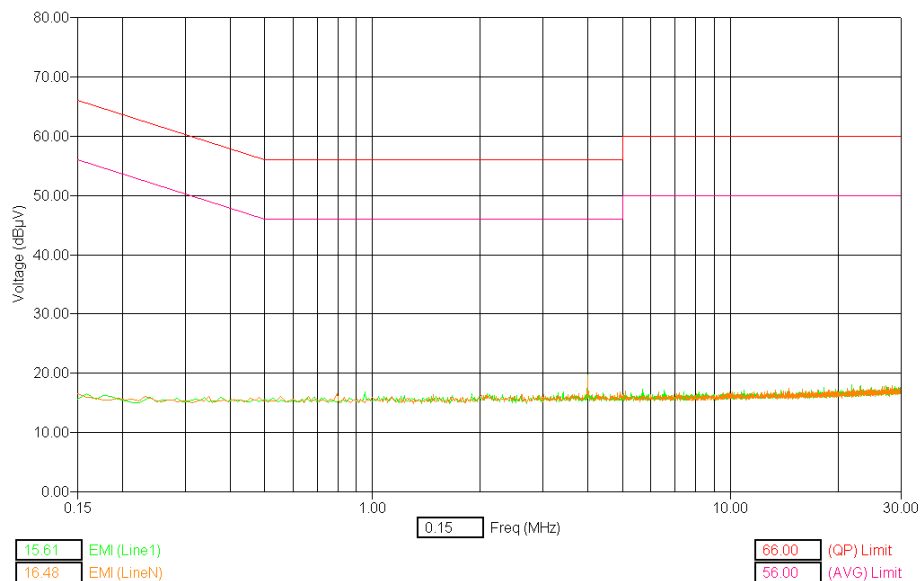
6.2 Pass/Fail Criteria

Frequency Range	AC Conducted Emission Limits (CISPR 22)	
	Quasi-peak (dBμV)	Average (dBμV)
0.15MHz - 0.5MHz	66 - 56	56 - 46
0.5MHz - 5MHz -	56	46
5MHz - 30MHz	60	50

6.3 Detailed Test Results

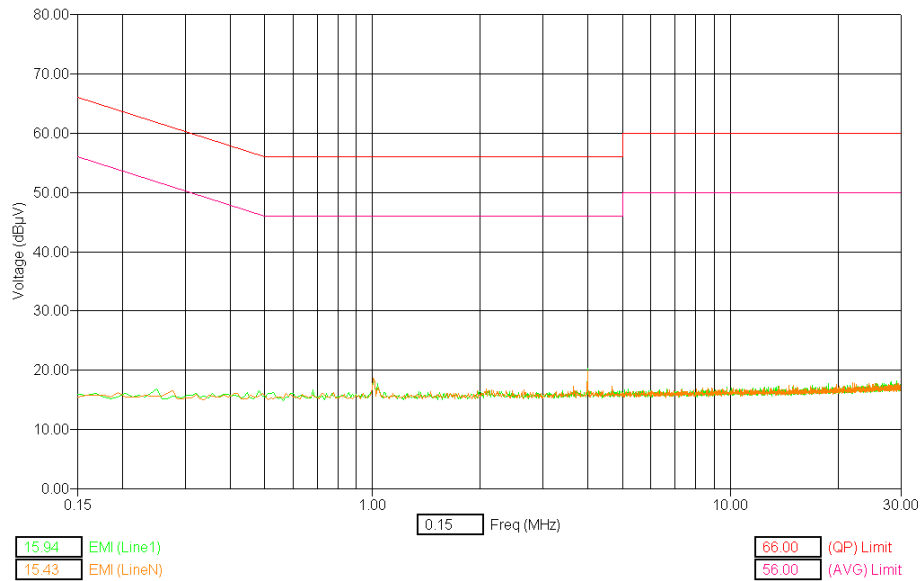
Test Technician / Engineer	Michael Sundstrom
Date of Measurement	10, 11, March 2004
Temperature	22 / 23 °C
Humidity	31 / 54 %RH
Test Result	Complies with FCC Part 15.107
Test Result	Complies with FCC Part 15.207

6.3.1 Ambient Scan

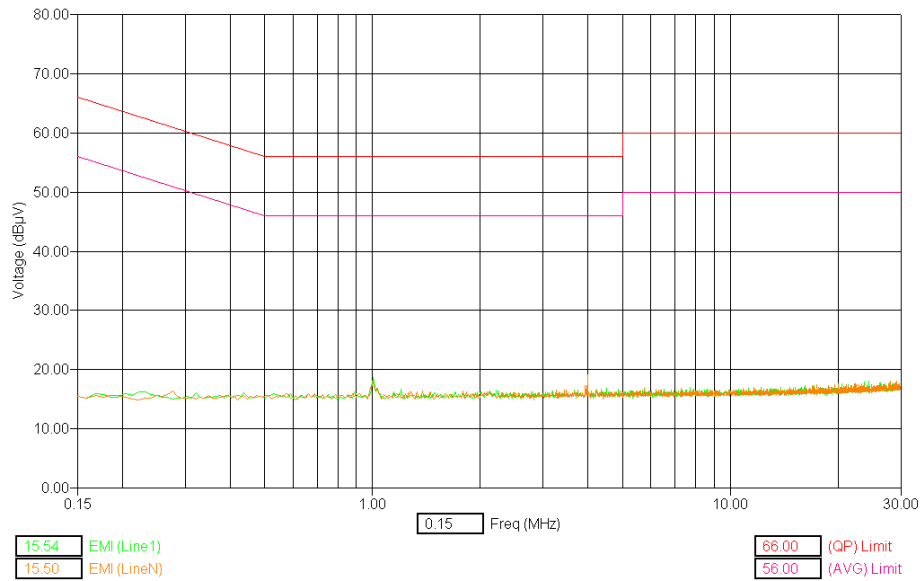


6.3.2 FCC Part 15.107

GSM 850, Channel 190, RH 52 with ACP 12U and HS 10:

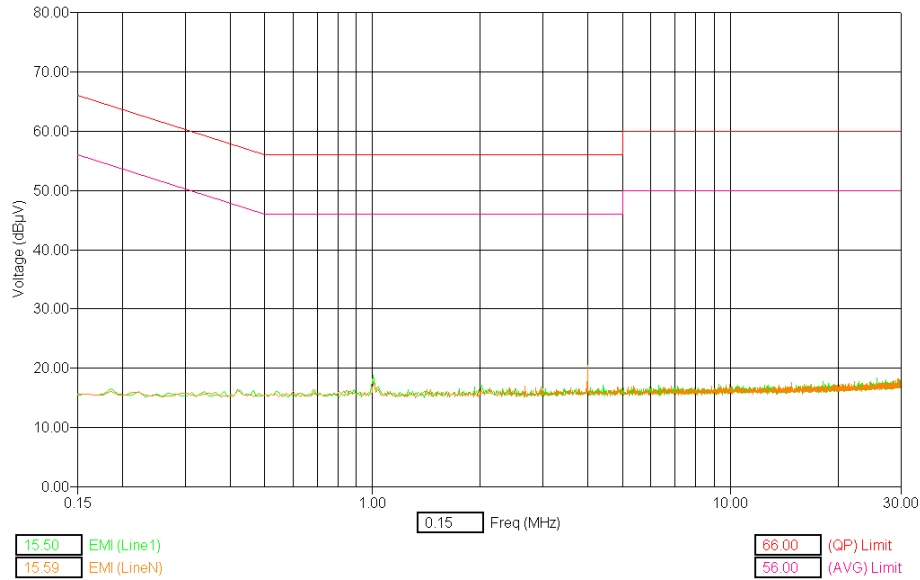


GSM 1900, Channel 661, RH 52 with ACP 12U and HS 10:

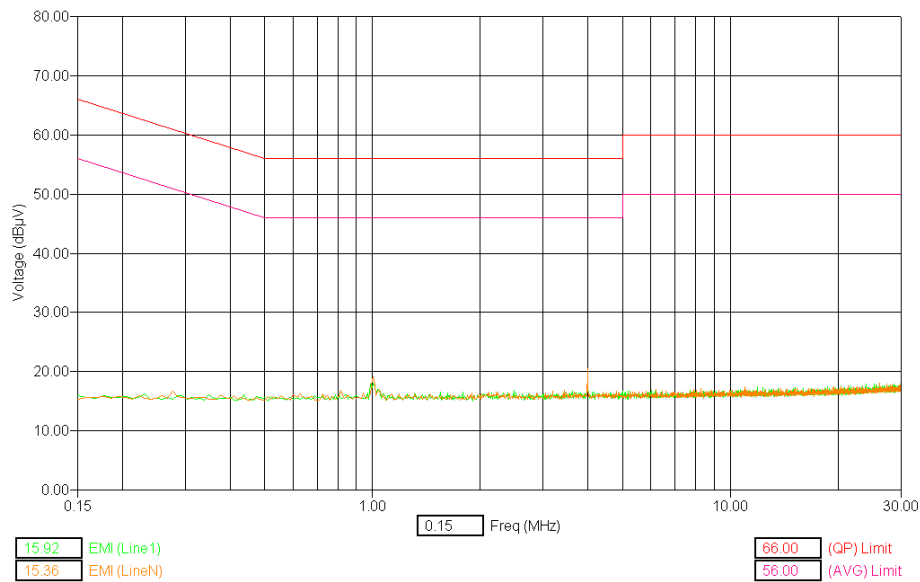


6.3.3 FCC Part 15.207

GSM 850, Channel 190, RH 52 with ACP 12U and HS 10:



GSM 1900, Channel 661, RH 52 with ACP 12U and HS 10:



6.4 Measurement Uncertainty

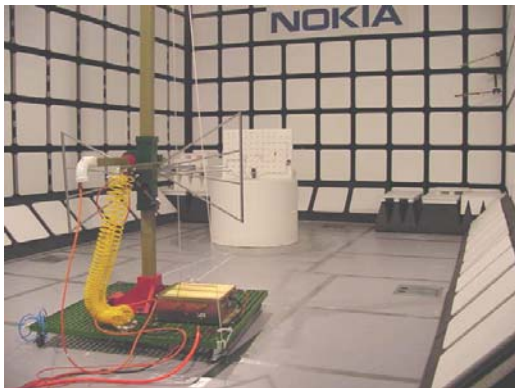
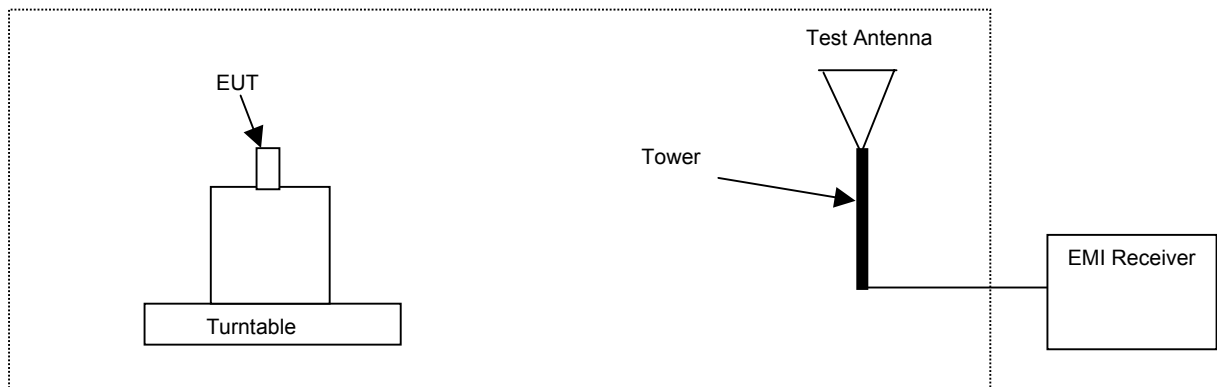
The measurement uncertainty for this test is +/- 2.7dB.

7. IDLE MODE RADIATED EMISSIONS

Specification: FCC Part 15.109

7.1 Setup

Testing was performed in accordance with ANSI C63.4, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.



7.2 Pass/Fail Criteria

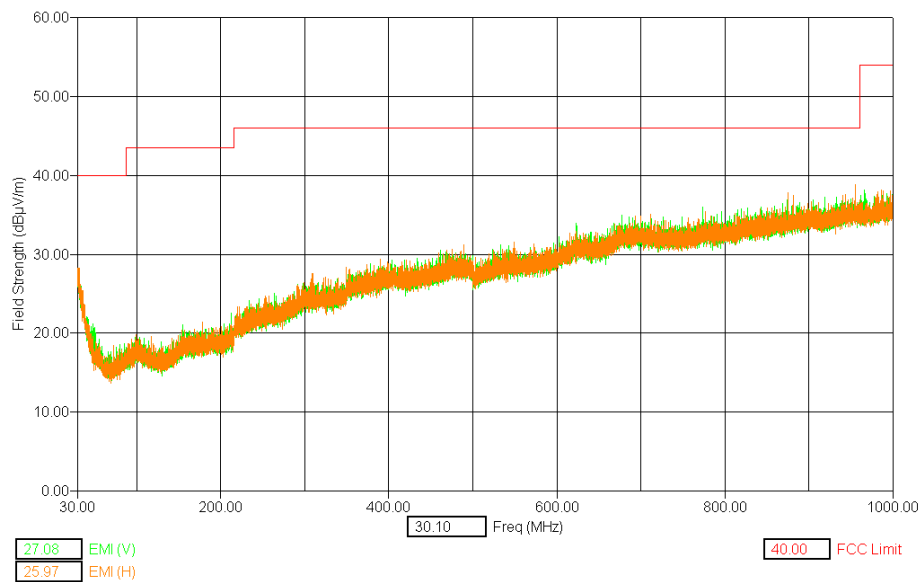
Band	Frequency Range (MHz)	FCC Class B Limit (dBμV/m at 3m)
Cellular	30 – 88	40
Cellular	88 – 216	43.5
Cellular	216 – 960	46
Cellular	> 960 *	54

* Frequency to be investigated up to the 5th harmonic of the highest clock or frequency used

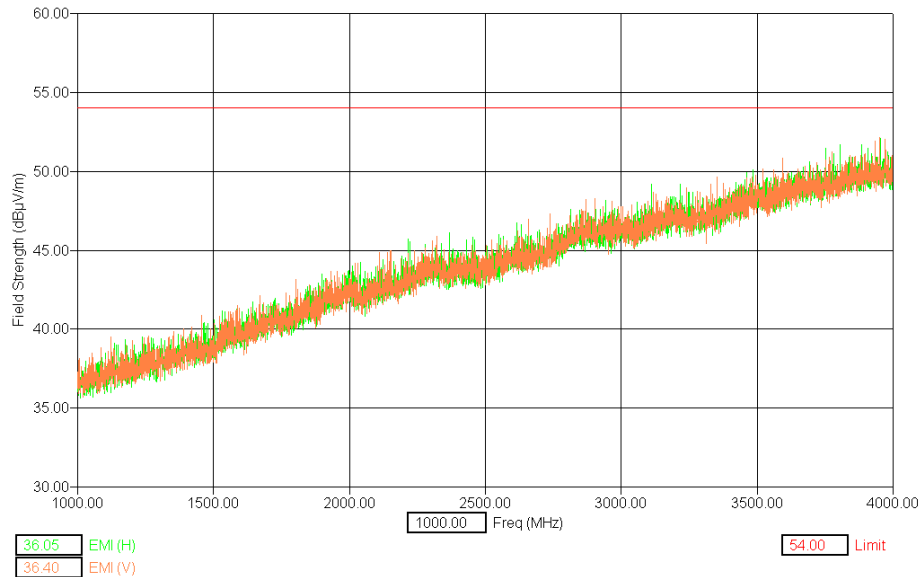
7.3 Detailed Test Results

Test Technician / Engineer	Chi Nguyen
Date of Measurement	11-Mar-04
Temperature	23 to 24 °C
Humidity	33 to 35 %RH
Test Result	Complies with FCC Part 15.109

GSM 850, Channel 190, RH-52 with ACP-12U and HS-10



GSM 850, Channel 190, RH-52 with ACP-12U and HS-10



Final Measurement from 1GHz to 4GHz

Freq (Max) [MHz]	(PK) EMI [dBµV/m]	(AVG) EMI [dBµV/m]	FCC Limit [dBµV/m]	(PK) Trace [dBµV]	Cable [dB]	Transducer [dB]	Pol.	Twr Ht [cm]	Ttbl Agl [deg]
2322.54	44.10	32.77	54.00	8.28	5.72	30.10	V	393.00	103.00
2366.93	43.83	32.45	54.00	7.94	5.71	30.18	H	138.00	165.00
3111.55	47.64	35.04	54.00	8.77	6.51	32.36	H	354.00	182.00
3352.01	47.65	36.34	54.00	7.89	6.68	33.08	V	219.00	221.00
3804.89	49.95	38.53	54.00	8.42	7.35	34.19	H	252.00	161.00
3951.60	50.41	38.91	54.00	8.47	7.44	34.50	V	248.00	88.00

7.4 Measurement Uncertainty

The measurement uncertainty for this test is +/- 5.2dB for 30-300MHz; +/- 5.2dB for 300-1000MHz and +/- 5.6dB for 1-4GHz.

8. RF CONDUCTED IDLE MODE EMISSIONS

Specification: FCC Part 15.111

8.1 Setup

Testing was performed with the EUT connected to a 6dB splitter, 6dB attenuator and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a connection.



8.2 Pass/Fail Criteria

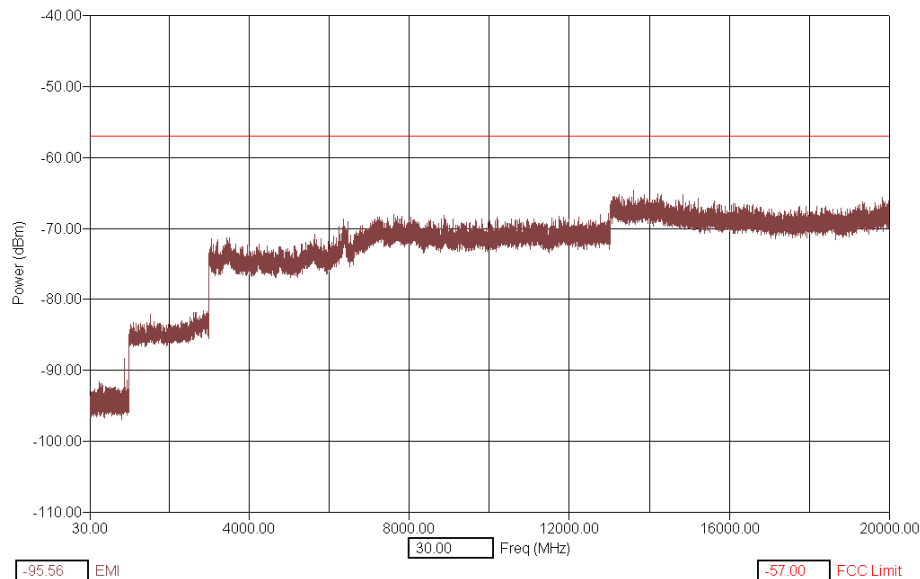
Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular	30 - 5000 *	-57.0

*Frequency to be investigated up to the 5th harmonic of the highest frequency generated if over 1000MHz.

8.3 Detailed Test Results

Test Technician / Engineer	Michael Sundstrom
Date of Measurement	11 March 2004
Temperature	22-24 °C
Humidity	34-38 %RH
Test Result	Complies with FCC Part 15.111

GSM 850, Channel 190



8.4 Measurement Uncertainty

The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.