CFR 47 Part 15 Test Report

Test Report Number: 03-EM-0128.001A

Terminal device: FCC ID: OW3RH-47, Model: N-Gage QD, Type: RH-47 HW: 0406, SW: T02.00 (Detailed information is listed in section 4).

Originator:	M.Sundstrom / C.Nguyen
Function:	TCC - Dallas – EMC
Version/Status:	2.0 / Approved
Location:	TCC Directories
Date:	7-Apr-04

Change History:

Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	9-Dec-03	Draft	M.Sundstrom / C.Nguyen	
0.2	5-Jan-04	Proposal	N.Walton	
0.3	14-Jan-04	Reviewed	M.Severson / M.Mobley	
1.0	20-Jan-04	Approved	A.Ewing	
1.1	7-Apr-04	Proposed	N.Walton	Amended to include Appendix A
2.0	7-Apr-04	Approved	A. Ewing	

Testing laboratory:

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Client:

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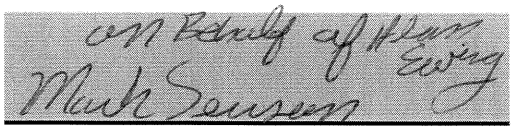
Date and signatures: **7-Apr-04**

For the contents:

Nerina Walton, EMC Engineer
Technical Review



Alan Ewing, General Manager
Manager Review

TABLE OF CONTENTS

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)

dBµV - decibel per microvolt

dBµV/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
47 CFR 15.107 / 15.207 / 15.109	GSM 850/1900	11-Nov-03	Operational	Phone	Type: RH-47 HW: 0406 SW: T02.00 IMEI: 001004/00/127385/4
47 CFR 15.111	GSM 850/1900	11-Nov-03	Operational	Phone	Type: RH-47 HW: 0406 SW: T02.00 IMEI: 001004/00/127431/6
47 CFR 15.107 / 15.207 / 15.109 / 15.111	GSM 850/1900	11-Nov-03	Operational	SIM	Test C-0991
47 CFR 15.107 / 15.207 / 15.109 / 15.111	GSM 850/1900	11-Nov-03	Operational	Battery	Type: BL-6C Other: 3.7 V
47 CFR 15.107 / 15.207 / 15.109	GSM 850/1900	11-Nov-03	Operational	Charger	Type: ACP-12U
47 CFR 15.107 / 15.207 / 15.109	GSM 850/1900	11-Nov-03	Operational	Headset	Type: HS-7
47 CFR 15.107 / 15.207 / 15.109 / 15.111	GSM 850/1900	11-Nov-03	Operational	Memory Card	EMC/DCU 308

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	03008	LISN	EMCO	3816/2	3-Feb-04	12 mo.
6	N/A	10dB Attenuator	Weinschel	Model 2	N/A	N/A
6	00367/00368	EMI Receiver	Hewlett Packard	8546 / 85460A	22-Jul-04	12 mo.
6	02666	Base Station	Rohde & Schwarz	CMU 200	21-Nov-04	12 mo.
7	02664	EMI Receiver	Hewlett Packard	8546 / 85460A	4-Mar-04	12 mo.
7	01472	Biconilog Antenna	EMCO	3142	28-Jan-04	12 mo.
7	02846	Turntable and Tower Controller	Sunol	FM2022 & 2846	N/A	N/A
7	02858	Horn Antenna	EMCO	3115	15-Aug-04	12 mo.
7	02625	Base Station	Rohde & Schwarz	CMU 200	1-Dec-04	12 mo.
7	N/A	EMI Analyzer	Agilent	E7405A	N/A	N/A
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
8	02625	Base Station	Rohde & Schwarz	CMU 200	1-Dec-04	12 mo.

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.

For a photo of the test set-up that was used for AC Conducted Emissions, please refer to Section 1 of Appendix A.

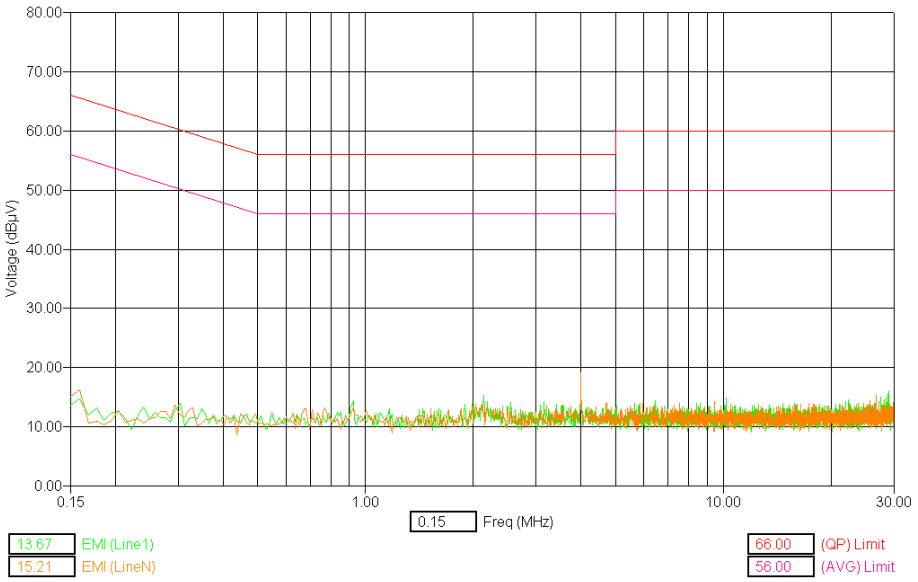
6.2 Pass/Fail Criteria

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

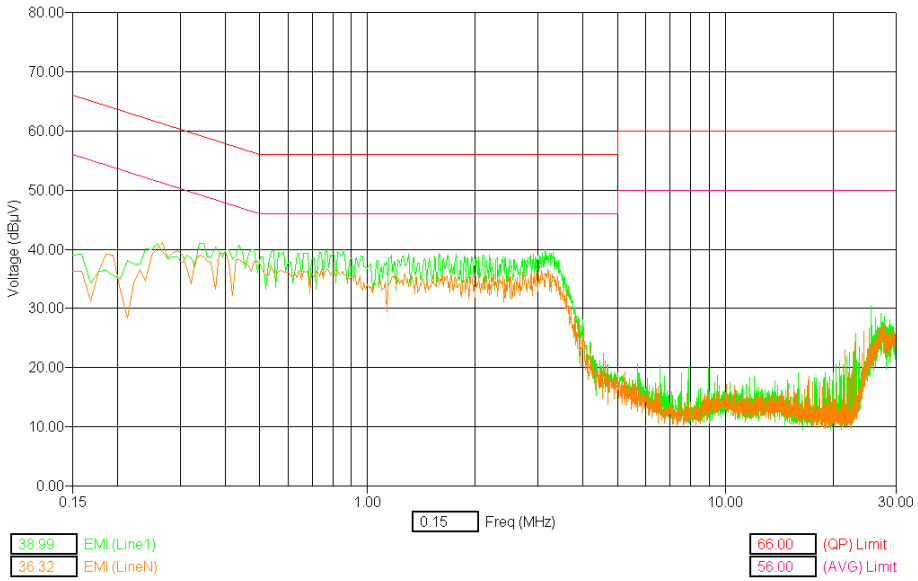
Test Technician / Engineer	M. Sundstrom
Date of Measurement	24-25 Nov-03 & 8-Dec-03
Temperature	22-23 °C
Humidity	25-33 %RH
Test Result	Complies with FCC Part 15.107
Test Result	Complies with FCC Part 15.207

6.3.1 Ambient Scan



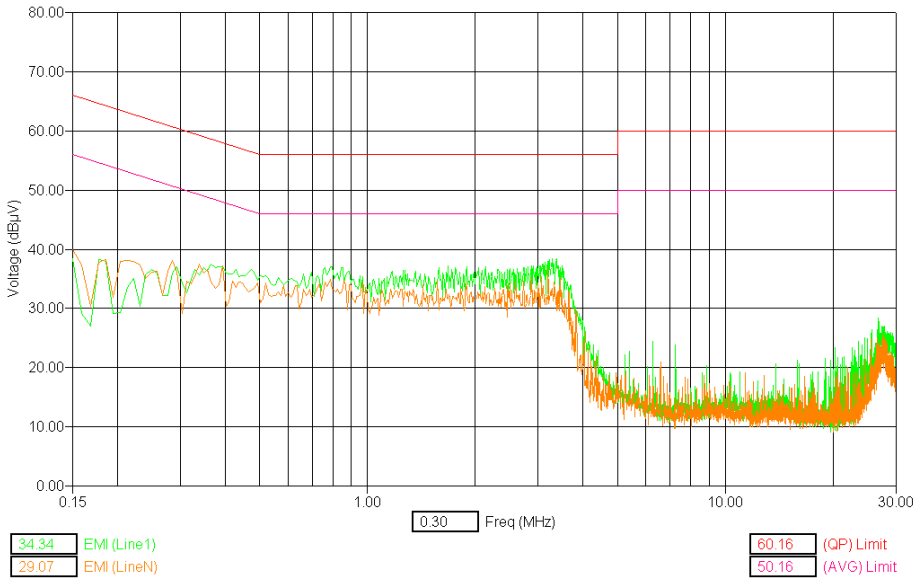
6.3.2 FCC Part 15.107

GSM 850, Channel 190, RH-47 with ACP-12U and HS-7



Freq (Max) (MHz)	(AVG) Trace (dBµV)	(QP) Trace (dBµV)	Transducer (dB)	Cable (dB)	Line	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)
0.152	20.08	24.88	0.03	0.02	L1	20.14	24.94	55.52	65.52
0.199	9.23	13.90	0.03	0.06	N	9.32	13.99	54.21	64.21
0.282	30.94	37.66	0.03	0.07	L1	31.03	37.75	51.50	61.50
0.286	28.34	37.89	0.03	0.07	N	28.43	37.98	50.41	60.41
0.286	28.68	37.92	0.03	0.07	N	28.78	38.02	51.21	61.21
0.336	10.44	24.51	0.03	0.06	L1	10.53	24.60	49.23	59.23

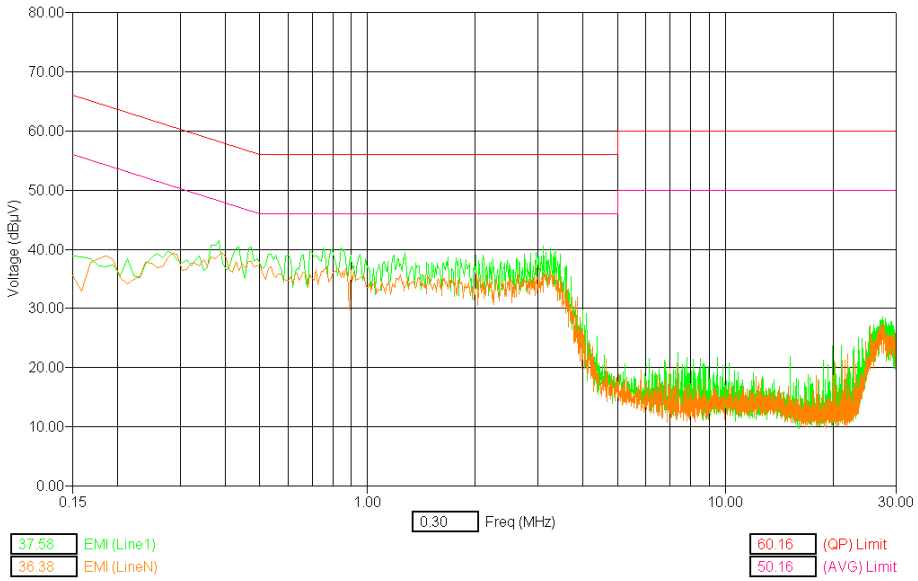
GSM 1900, Channel 661, RH-47 with ACP-12U and HS-7



Freq (Max) (MHz)	(AVG) Trace (dBµV)	(QP) Trace (dBµV)	Transducer (dB)	Cable (dB)	Line	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)
0.288	31.33	36.89	0.03	0.07	N	31.43	36.99	50.67	60.67
0.288	38.13	40.67	0.03	0.07	L1	38.23	40.77	50.67	60.67
0.432	24.15	29.37	0.03	0.10	N	24.28	29.50	47.27	57.27
0.432	30.38	32.62	0.03	0.10	L1	30.51	32.75	47.27	57.27
1.874	22.37	28.74	0.04	0.15	N	22.56	28.93	46.00	56.00
2.901	2.01	7.90	0.05	0.23	L1	2.29	8.18	46.00	56.00

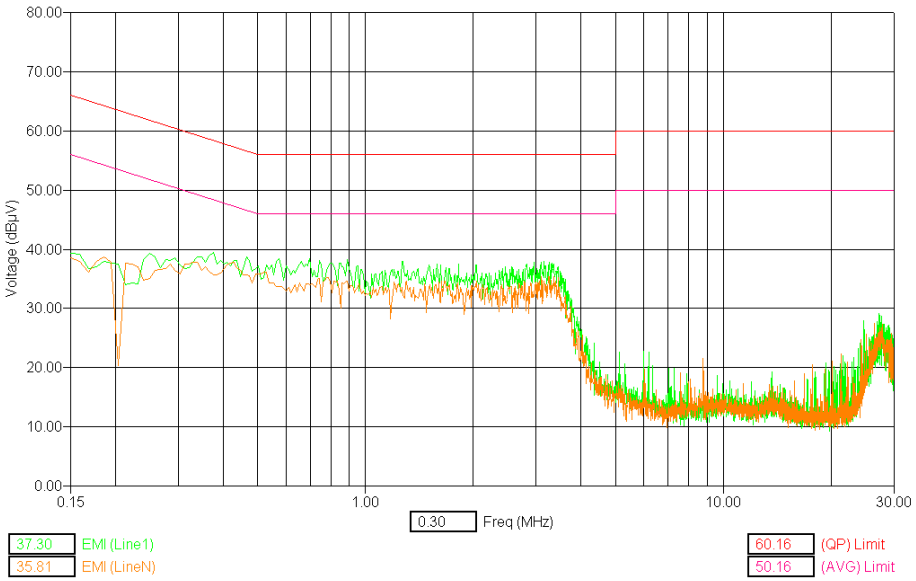
6.3.3 FCC Part 15.207

GSM 850, Channel 190, RH-47 with ACP-12U and HS-7



Freq (Max) (MHz)	(AVG) Trace (dBµV)	(QP) Trace (dBµV)	Transducer (dB)	Cable (dB)	Line	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)
0.198	22.63	37.01	0.03	0.06	N	22.72	37.10	54.21	64.21
0.273	22.72	35.80	0.03	0.07	L1	22.82	35.90	50.67	60.67
0.296	24.43	37.98	0.03	0.07	N	24.53	38.08	50.67	60.67
0.387	21.64	34.79	0.03	0.08	N	21.75	34.90	48.00	58.00
0.389	24.99	35.08	0.03	0.08	L1	25.09	35.18	48.19	58.19
0.470	26.84	36.00	0.03	0.08	L1	26.95	36.11	46.44	56.44

GSM 1900, Channel 661, RH-47 with ACP-12U and HS-7



Freq (Max) (MHz)	(AVG) Trace (dBµV)	(QP) Trace (dBµV)	Transducer (dB)	Cable (dB)	Line	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)
0.162	30.14	36.93	0.03	0.05	L1	30.22	37.01	56.00	66.00
0.198	22.51	37.55	0.03	0.06	N	22.60	37.64	54.21	64.21
0.254	29.51	37.88	0.03	0.06	L1	29.60	37.97	51.79	61.79
0.289	21.61	36.77	0.03	0.07	N	21.71	36.87	50.67	60.67
0.350	19.68	35.22	0.03	0.06	N	19.77	35.31	49.23	59.23
0.379	26.73	38.36	0.03	0.07	L1	26.83	38.46	48.39	58.39

6.4 Measurement Uncertainty

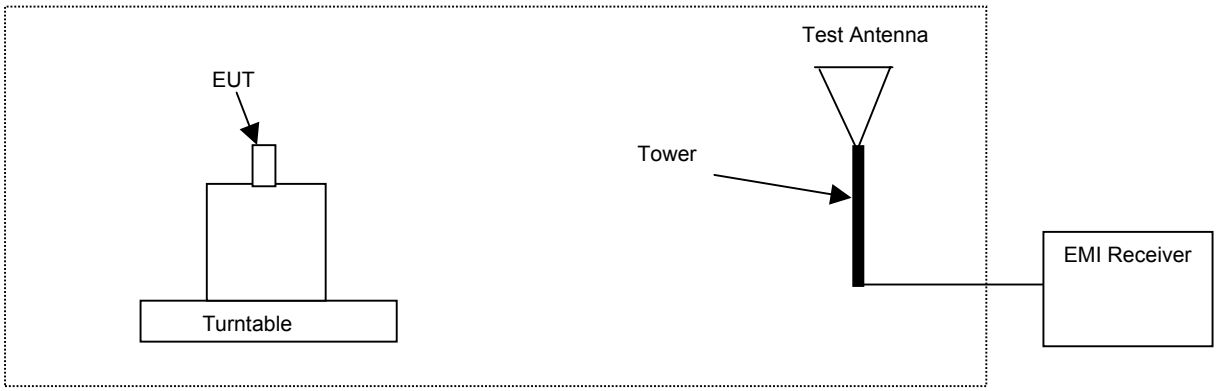
The measurement uncertainty for this test is +/- 2.7dB.

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.



For a photo of the test set-up that was used for Idle Mode Radiated Emissions, please refer to Section 2 of Appendix A.

7.2 Pass/Fail Criteria

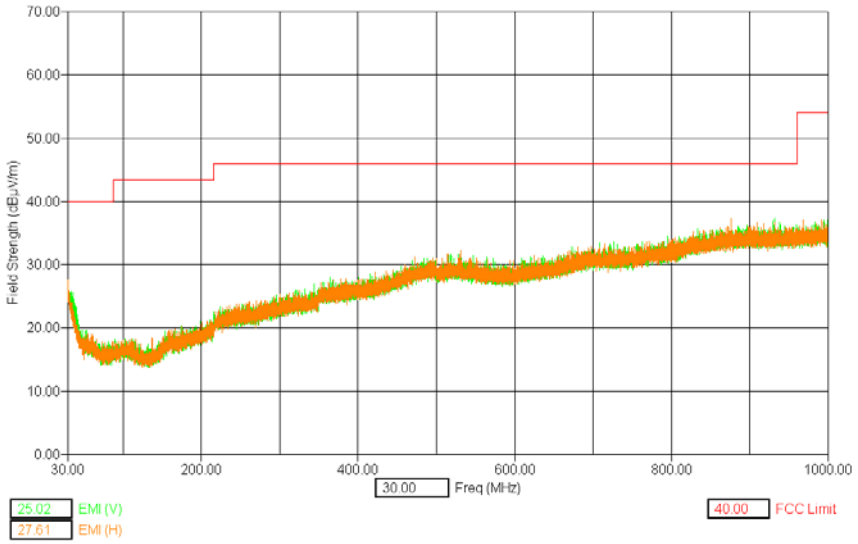
Band	Frequency Range (MHz)	FCC Class B Limit (dBµV/m at 3m)
Cellular	30 – 88	40
Cellular	88 – 216	43.5
Cellular	216 – 960	46
Cellular	> 960 *	54

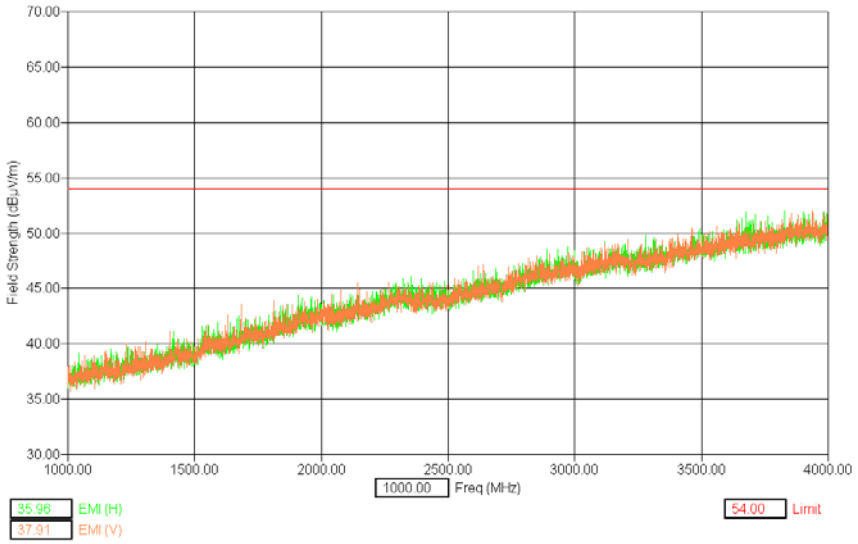
* Frequency to be investigated up to the 5th harmonic of the highest clock or frequency used

7.3 Detailed Test Results

Test Technician / Engineer	C. Nguyen
Date of Measurement	18-Nov-03
Temperature	22 to 23 °C
Humidity	37 to 40 %RH
Test Result	Complies with FCC Part 15.109

GSM 850, Channel 190, RH-47 with ACP-12U and HS-7





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.

For a photo of the test set-up that was used for RF Conducted Idle Mode Emissions, please refer to Section 3 of Appendix A.

8.2 Pass/Fail Criteria

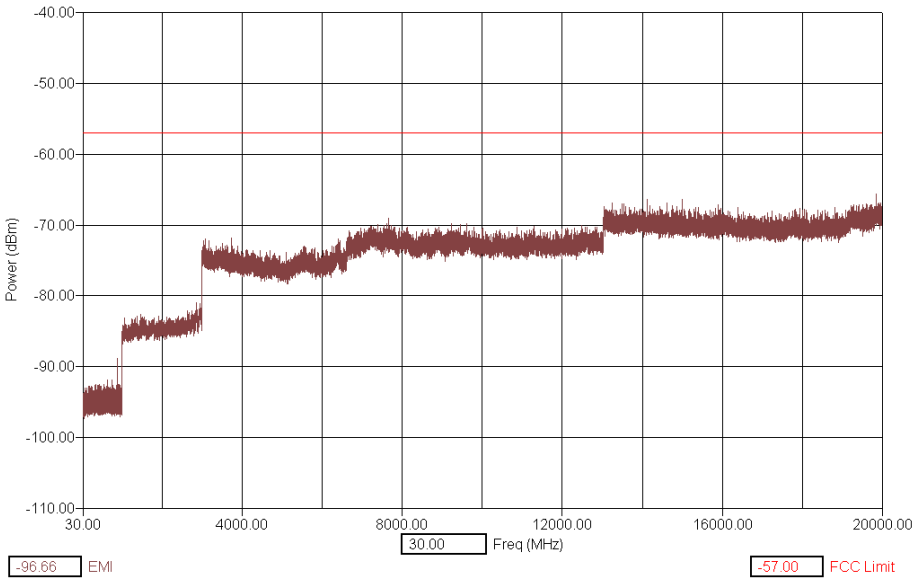
Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular	30 - 5000 *	-57.0

*****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	M. Sundstrom
Date of Measurement	26-Nov-03
Temperature	22-24 °C
Humidity	35-44 %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.