Test & Certification Center (TCC) - Dallas

ACCREDITED
Accredited Laboratory
Certificate Number: 1819-01

February 19, 2002

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Nokia Mobile Phones, Inc.
Equipment: 3590
FCC ID: GMLNPM-8
FCC Rules: 22H, 24E, Confidentiality

To whom it may concern:

Enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, for approval of the referenced equipment as shown.

Filing fees are attached. Should you require any further information, please get in touch with the appropriate contact listed.

Regards,

Alan C. Ewing
Senior Engineering Manager, TCC-Dallas
Nokia Mobile Phones

CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: 02-RF-0020.001

Terminal device: FCC ID: GMLNPM-8, Model 3590, HW: 4.0, SW: 4.0
(Detailed information is listed in section 4).

Originator:	Randy Leenerts
Function:	TCC - Dallas - EMC
Version/Status:	1.0 Approved
Location:	TCC Directories
Date:	February 20, 2002

Change History:

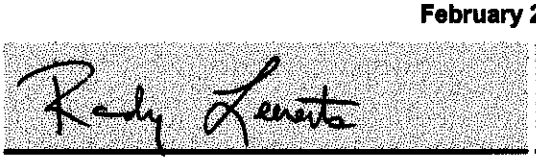
Version	*Date*	*Status*	*Handled By*	*Comments*
0.1	February 11, 2002	Draft	Randy Leenert	In Process
0.2	February 13, 2002	Draft	Elizabeth Parish	Updated
0.3	February 18, 2002	Proposal	Elizabeth Parish	Submit for Review
1.0	February 20, 2002	Approved	Alan Ewing	Approved

Testing laboratory:
Test & Certification Center (TCC) Dallas
Nokia Mobile Phones, Inc
6021 Connection Drive
Irving, Texas 75039
U.S.A.
Tel. 972-894-5000
Fax. 972-894-4988

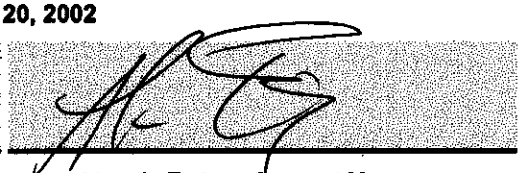
Client:
Nokia Mobile Phones, Inc.
Model 3590, FCC ID: GMLNPM-8
6021 Connection Drive
Irving, Texas 75039
U.S.A.
Tel. 972-894-5000
Fax. 972-894-4988

Date and signatures: **February 20, 2002**

For the contents:



Randy Leenerts, EMC Engineer
Technical Review



Alan C. Ewing, 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). The appendix of this report contains the scope of accreditation for A2LA. 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 List of General Information Required for Certification

This list is in accordance with FCC Rules and Regulations, CFR 47, Part 2, and to 22H, 24E, Confidentiality.

1.2.1 Sub-part 2.1033(c)(1)

Name and Address of Applicant: Nokia Mobile Phones
6021 Connection Drive
Irving, Texas 75039 USA

Manufacturer: Nokia Mexico, S.A. DE C.V.
Ave. Industrial Rio Bravo s/n
Parque Ind. Del Nte. C.P. 88730

OR

Nokia Do Brasil Tecnologia Ltda.
Rod. Torquato Tapajos, 7200 KM 12 Taruma
69048-660 Manaus - AM

1.2.2 Sub-part 2.1033(c)(2)

FCC ID: GMLNPM-8

Model No: 3590

1.2.3 Sub-part 2.1033(c)(3)

Instruction Manual(s):
Refer to attached EXHIBITS

1.2.4 Sub-part 2.1033(c)(4)

Type of Emission: 200KGXW

1.2.5 Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.2 to 848.8
1850.2 to 1909.8

1.2.6 Sub-part 2.1033(c)(6)

Power Rating, Watts: 2.14w EDRP Cellular GSM
1.32w EIRP PCS GSM

☐ Switchable ☒ Variable ☐ N/A

FCC Grant Note: BC- The output power is continuously variable from the value listed in this entry to 5%-10% of the value listed.

1.2.7 Sub-part 2.1033(c)(7)

Maximum Power Rating, Watts: 2.14

1.2.8 Sub-part 2.1033(c)(8)

Voltages & Currents in all elements in final R.F. Stage, including final transistor or solid-state device:
Collector Current, A = per manual
Collector Voltage, Vdc = per manual
Supply Voltage, Vdc = 3.6

1.2.9 Sub-part 2.1033(c)(9)

Tune-up Procedure:
Refer to attached EXHIBITS

1.2.10 Sub-part 2.1033(c)(10)

Circuit Diagram/Circuit Description:
Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.
Refer to attached EXHIBITS

1.2.11 Sub-part 2.1033(c)(11)

Label Information:
Refer to attached EXHIBITS

1.2.12 Sub-part 2.1033(c)(12)

Photographs:
Refer to attached EXHIBITS

1.2.13 Sub-part 2.1033(c)(13)

Digital Modulation Description:
N/A

1.2.14 Sub-part 2.1033(c)(14)

Test and Measurement Data:
FOLLOWS

1.3 Objective

All tests and measurement data shown was performed to determine whether the selected handset was in compliance as specified in FCC: CFR47 Parts 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, Part 22, and Part 24.

1.4 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
RF Power Output (Radiated)	FCC Part 22.913(a) / 24.232(b)	6	Complies
Occupied Bandwidth: Transmitter Conducted Measurements	FCC Part 2.1049(c)(1), 24.238(a)(b)	7	Complies
Emissions in Receiver Critical Band	FCC Part 22.917(f)	8	Complies
Spurious Emissions at Antenna Terminals	FCC Part 2.1051	9	Complies
Field Strength of Spurious Radiation	FCC Part 2.1053	10	Complies
Frequency Stability (Temperature Variation)	FCC Part 2.1055(a)(1)(b), 24.235	11	Complies
Frequency Stability (Voltage Variation)	FCC Part 2.1055(d)(1)(2), 24.235	12	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 2	Code of Federal Regulations (CFR) Title 47, Part 2 – Frequency Allocations and Radio Treaty Matters; General Rules and Regulations: Subpart J – Equipment Authorization Procedures
3	FCC: CFR 47 Part 22	Code of Federal Regulations (CFR) Title 47, Part 22 – Public Mobile Services: Subpart H – Cellular Radiotelephone Service
4	FCC: CFR 47 Part 24	Code of Federal Regulations (CFR) Title 47, Part 24 – Personal Communications Services: Subpart E – Broadband PCS
5	RSS-133	2 GHz Personal Communications Services, Industry Canada
6	RSS-212	Test Facilities and Test Methods for Radio Equipment, Industry Canada (Provisional)
7	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)

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

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
22.913(a), 24.232(b)(c), 2.1053	GSM 800/1900	25Jan.2002	Good	Phone	FCC ID: GMLNPM-8 IMEI: 001004/50/048146/1 Model 3590 Build: 4.0
22.917(f), 2.1049(c)(1), 24.238(a)(b), 2.1051, 2.1053, 2.1055(d)(1)(2), 2.1055(a)(1)(b), 24.235	GSM 800/1900	25Jan.2002	Good	Phone	FCC ID: GMLNPM-8 IMEI: 001004/50/048165/1 Model 3590 Build: 4.0
22.917(f), 2.1049(c)(1), 24.238(a)(b), 2.1051, 2.1053, 2.1055(d)(1)(2), 2.1055(a)(1)(b), 24.235, 22.913(a), 24.232(b)(c), 2.1053	GSM 800/1900	25Jan.2002	Good	Battery	Type: BLC-1 Other: 3.6vdc

4.2 Photograph of Tested Device(s):

Refer to attached EXHIBITS

5. TEST EQUIPMENT LIST

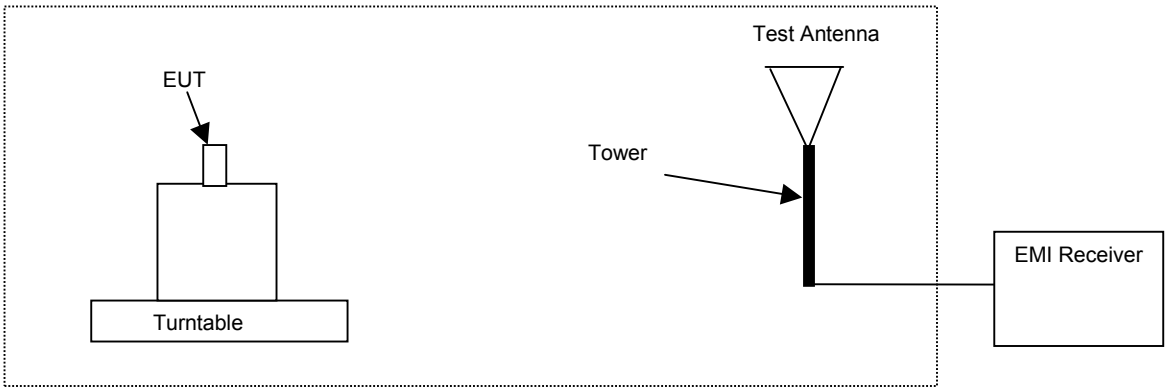
The listing below indicates the test equipment utilized for the test (s). Calibration interval on all items listed can be obtained from the Engineering Services Group within NMP, Product Creation - Dallas. Where relevant, measuring equipment is subjected to in-service checks between testing. TCC - Dallas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

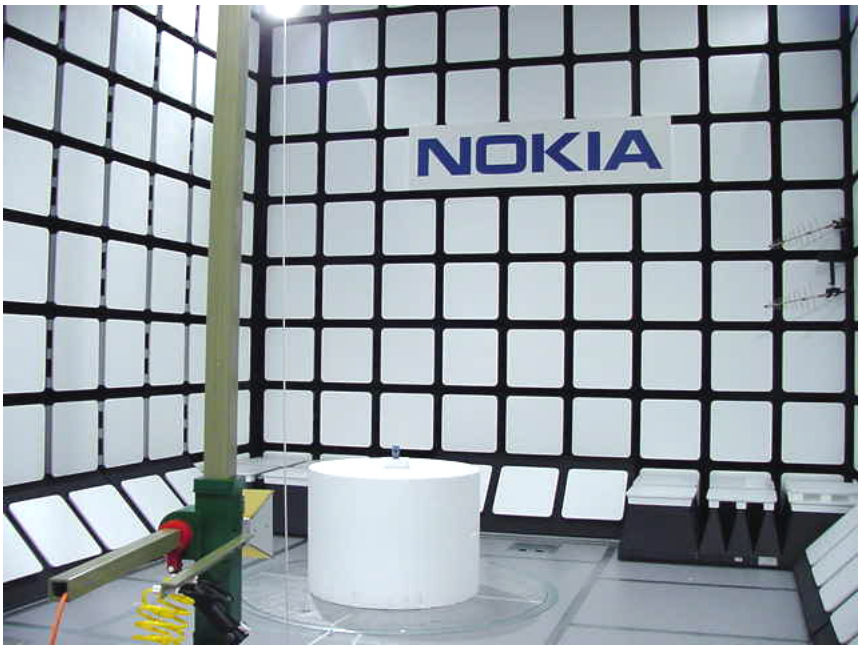
Test/ Section of Report	NMP#	Test Equipment	Mfr. #	Model #
10	02996	Power Meter	Boonton	4232A
6, 10	02874	Biconilog Antenna	EMCO	3142
6, 10	02846	Turntable and Tower Controller	Sunol	Turntable FM2022, Controller 2846
6, 10	00065	Horn Antenna	EMCO	3115
6, 10	00064	Horn Antenna	EMCO	3115
10	02671	Signal Generator	Agilent	83630B
6, 10	02661/ 02663	EMI Receiver	Agilent	8546A, 85460A
7, 8, 9	02664/ 00367	EMI Receiver	Agilent	8546A, 85460A
6, 10	02680	Spectrum Analyzer	Agilent	E7405A
7, 8, 9	02679	Spectrum Analyzer	Agilent	E7405A
6, 7, 8, 9, 10, 11, 12	02601	Base Station Simulator	R & S	CMU 200
6, 10	00532/00 283	Base Station Simulator	HP	8922M / 83220A
7, 8, 9	03155	Power Splitter (must have 6 dB insertion loss)	HP	33120A
7, 8, 9	N/A	6dB Attenuator	Weinshcel	Model 2
8	N/A	Tunable Notch Filter	K&L	5TNF-500/1000-N/N
6, 7, 8, 9, 10, 11, 12	N/A	3GHz High Pass Filter	Trilithic Inc.	4HC2900/18000-1.1-KK
6, 7, 8, 9, 10, 11, 12	N/A	2GHz High Pass Filter	Trilithic Inc.	3HC1900/18000-1-KK
6, 7, 8, 9, 10, 11, 12	N/A	1GHz High Pass Filter	Wainwright.	WHK949-9SS
10	00001	RF preamplifier	Agilent	HP8449B
11, 12	02602	Base Station Simulator	R & S	CMU 200
11	00767	Temperature Chamber	Thermotron	2800

6. RF POWER OUTPUT (RADIATED)

Specification: FCC Part 22.913(a), 24.232(b)(c)

6.1 Setup





6.2 Pass/Fail Criteria

Band	FCC Limit (dBm)
Cellular	38.5 (EDRP)
PCS	33.0 (EIRP)

6.3 Detailed Test Results

Test Technician / Engineer	Michael Sundstrom	
Date of Measurement	30 January 2002	
Temperature / Humidity	24°C	47%RH
Test Result	3590 IMEI 001004/50/0481461 FCC ID: GMLNPM-8 at max power setting, complies with FCC Part 22.913(a) and FCC Part 24.232(b).	

Cellular Band, GSM 800 MHz, Channel 128

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
824.3	31.5	V

Cellular Band, GSM 800 MHz, Channel 190

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
836.6	32.6	V

Cellular Band, GSM 800 MHz, Channel 251

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
848.8	33.3	V

PCS Band, GSM 1900 MHz, Channel 512

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1850.2	31.2	V

PCS Band, GSM 1900 MHz, Channel 661

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1880.0	31.0	V

PCS Band, GSM 1900 MHz, Channel 810

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1909.8	30.0	V

6.4 Measurement Uncertainty

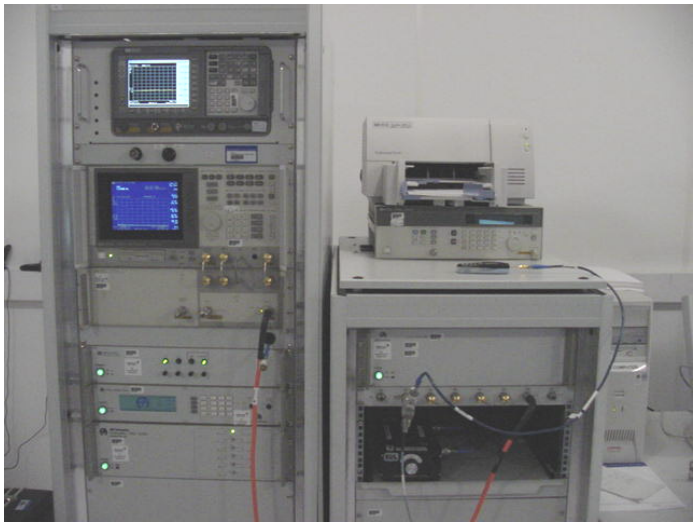
The measurement uncertainty for this test is +/- 2.4dB for 800 to 2000 MHz.

7. OCCUPIED BANDWIDTH (TRANSMITTER CONDUCTED MEASUREMENTS)

Specification: FCC Part 2.1049(c)(1), 24.238(a)(b)

7.1 Setup

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



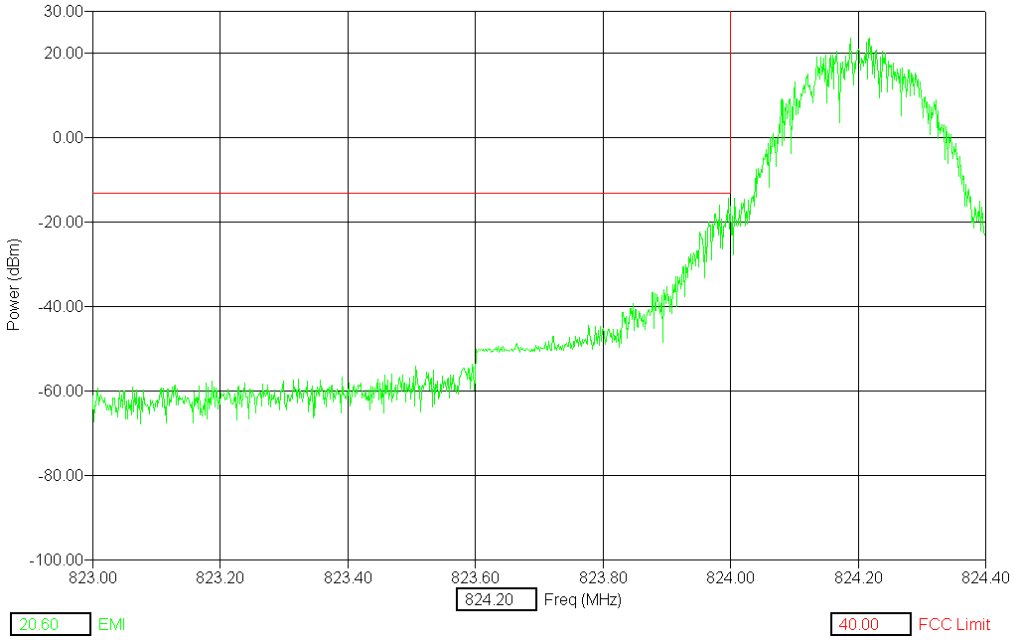
7.2 Pass/Fail Criteria

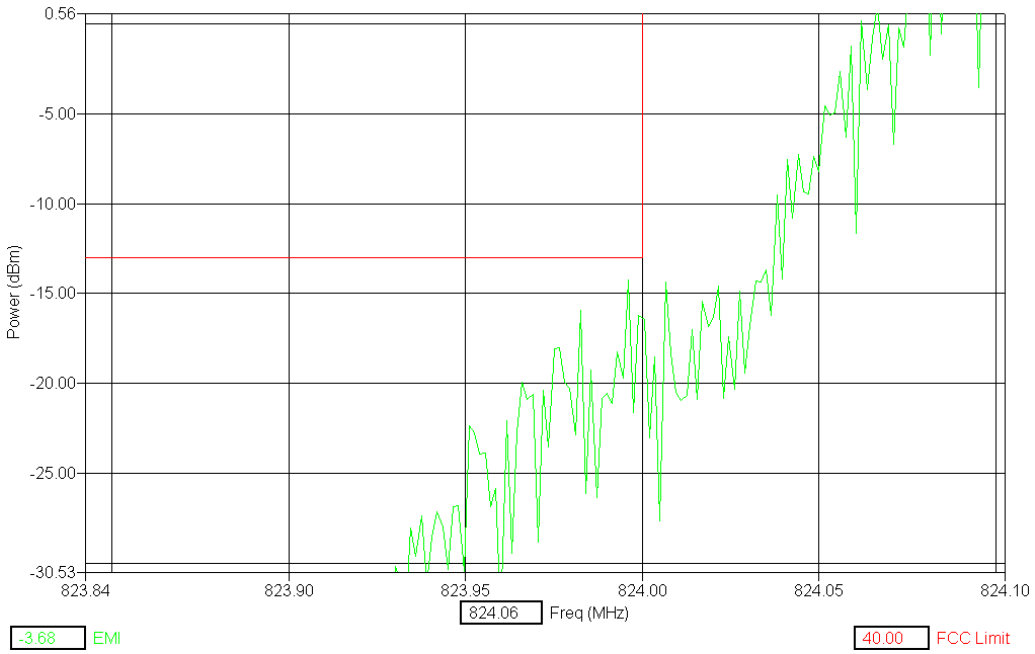
Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular 800 Low Channel	< 824	-13
Cellular 800 High Channel	> 849	-13
PCS 1900 Low Channel	< 1850	-13
PCS 1900 High Channel	> 1910	-13

7.3 Detailed Test Results

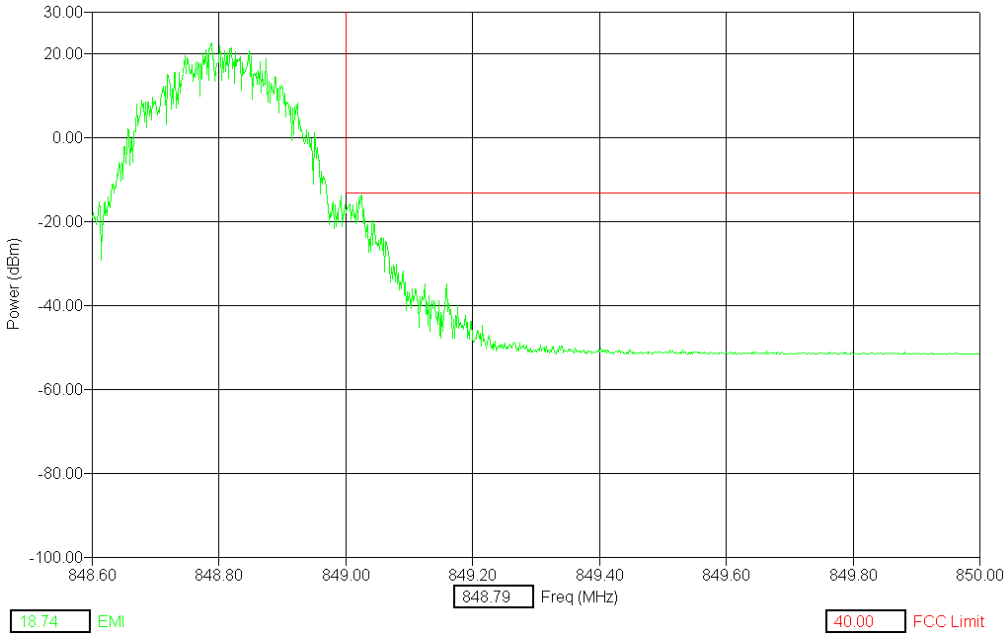
Test Technician / Engineer	Mark Severson	
Date of Measurement	Jan 29, 2002	
Temperature / Humidity	22°C	52%RH
Test Result	3590 IMEI 001004/50/048149/5 FCC ID: GMLNPM-8 at max power setting, complies with FCC Part 2.1049(c)(1), 24.238(a)(b)	

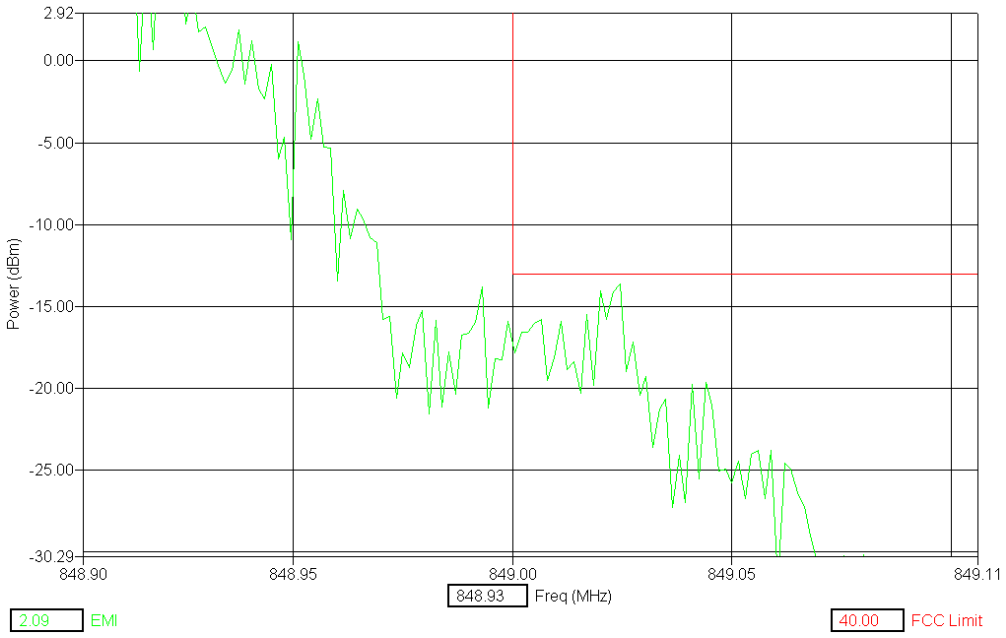
Cellular Band, GSM 800, Channel 128



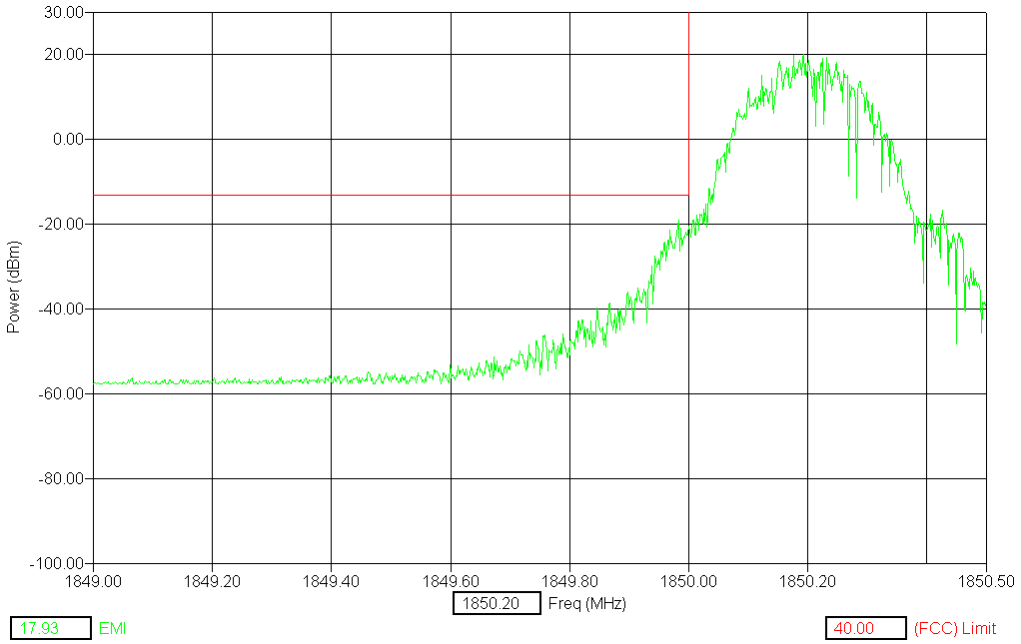


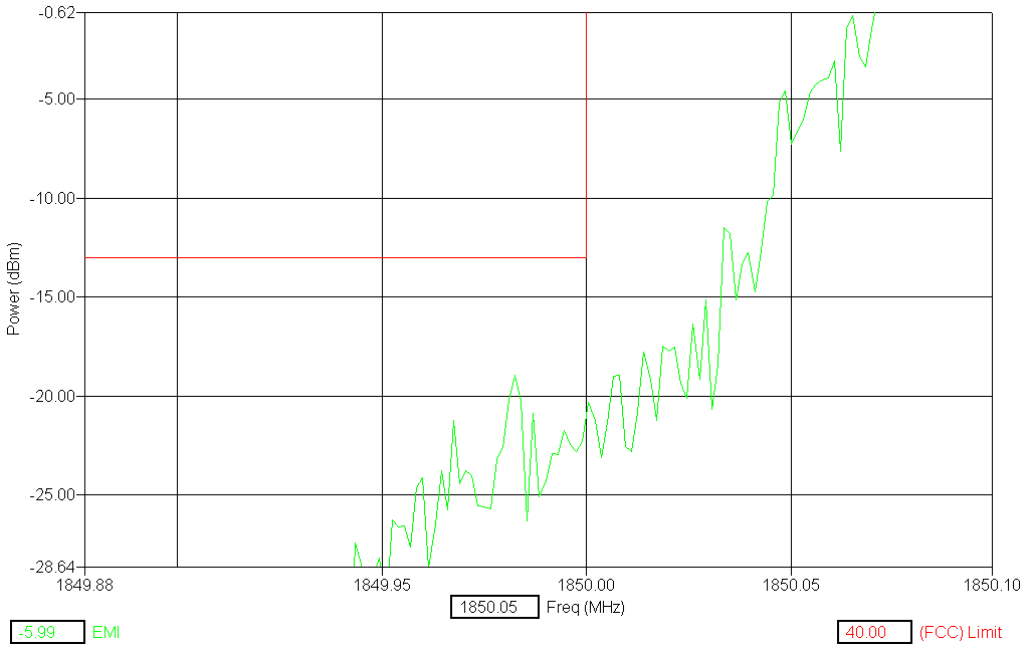
Cellular Band, GSM 800, Channel 251



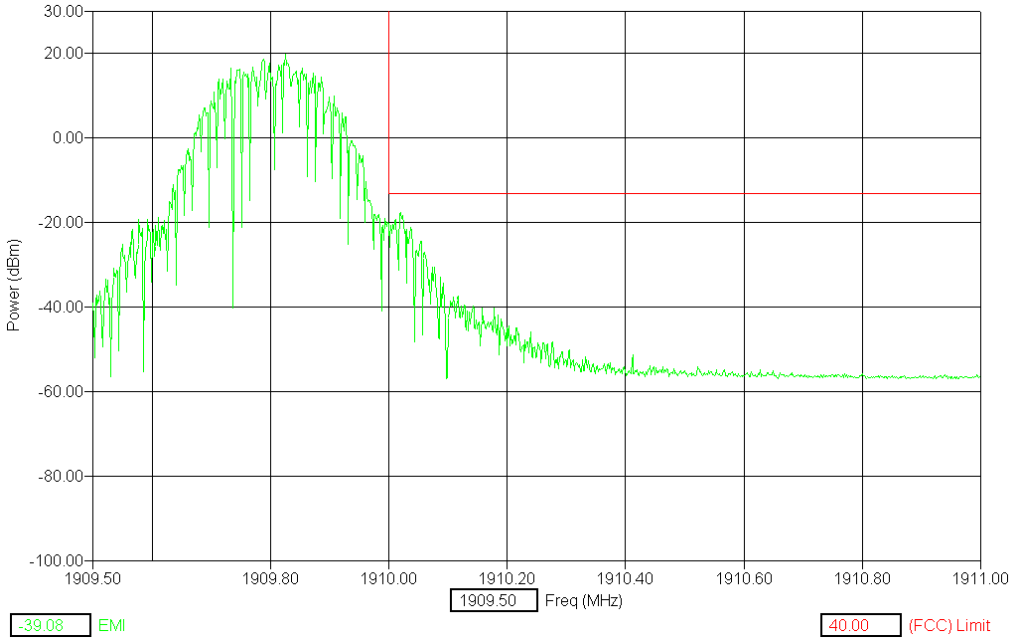


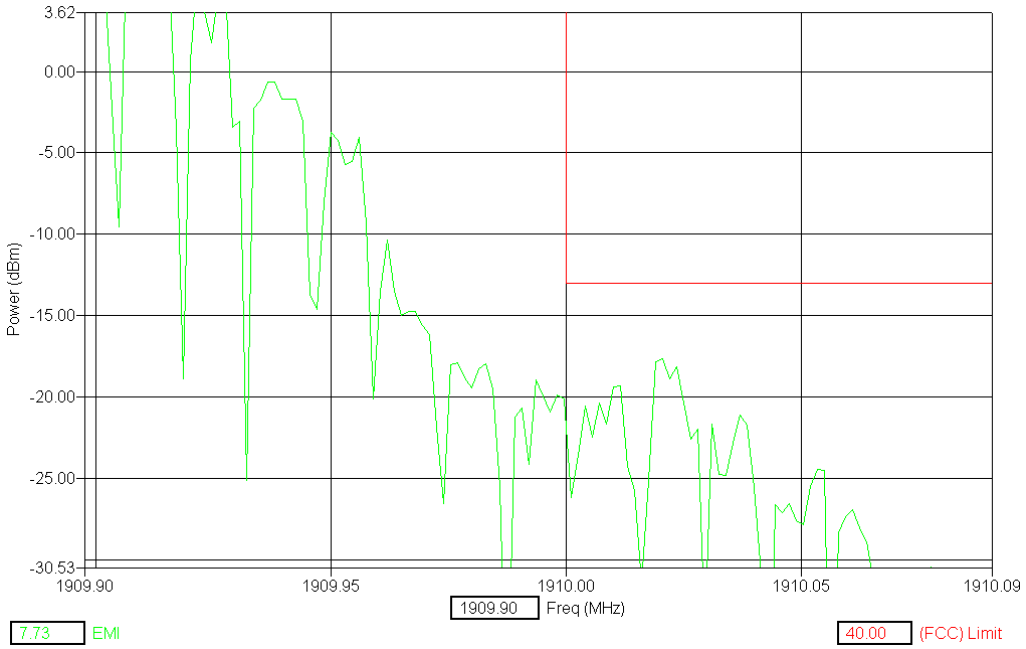
PCS Band, GSM 1900, Channel 512





PCS Band. GSM 1900, Channel 810





7.4 Measurement Uncertainty

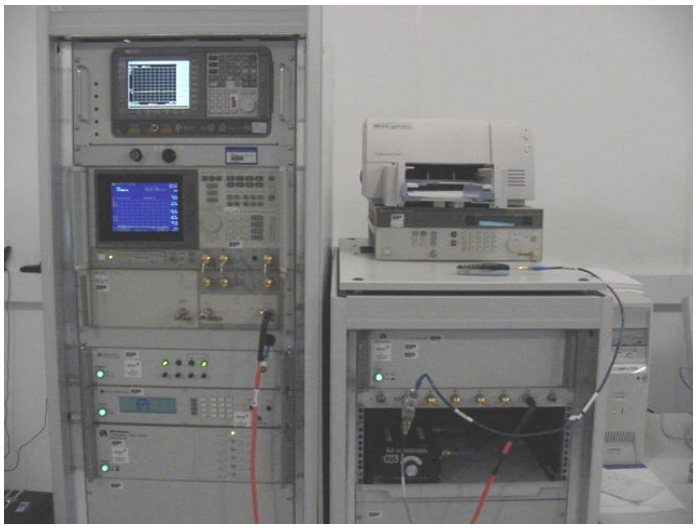
The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.

8. EMISSIONS IN RECEIVER CRITICAL BAND

Specification: FCC Part 22.917(f)

8.1 Setup

Testing was performed with the EUT connected to a 6dB attenuator, 6dB splitter, filter bank and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a call. Filters were introduced to reduce or eliminate spurious emission, which could be generated internally in the EMI receiver.



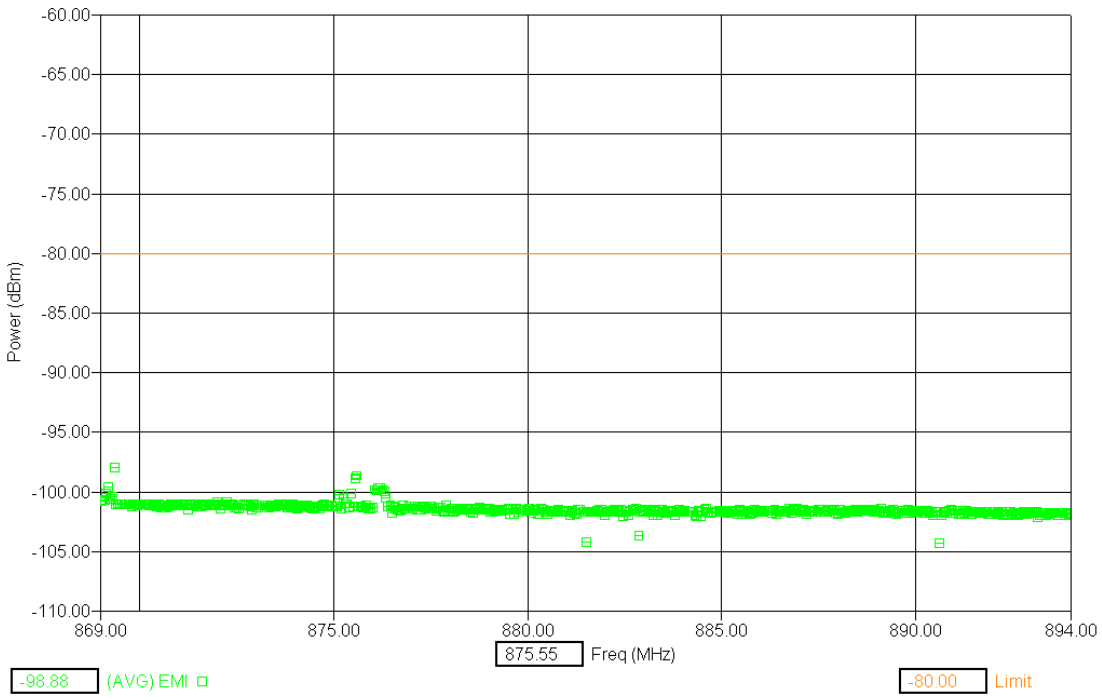
8.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular	869 - 894	-80

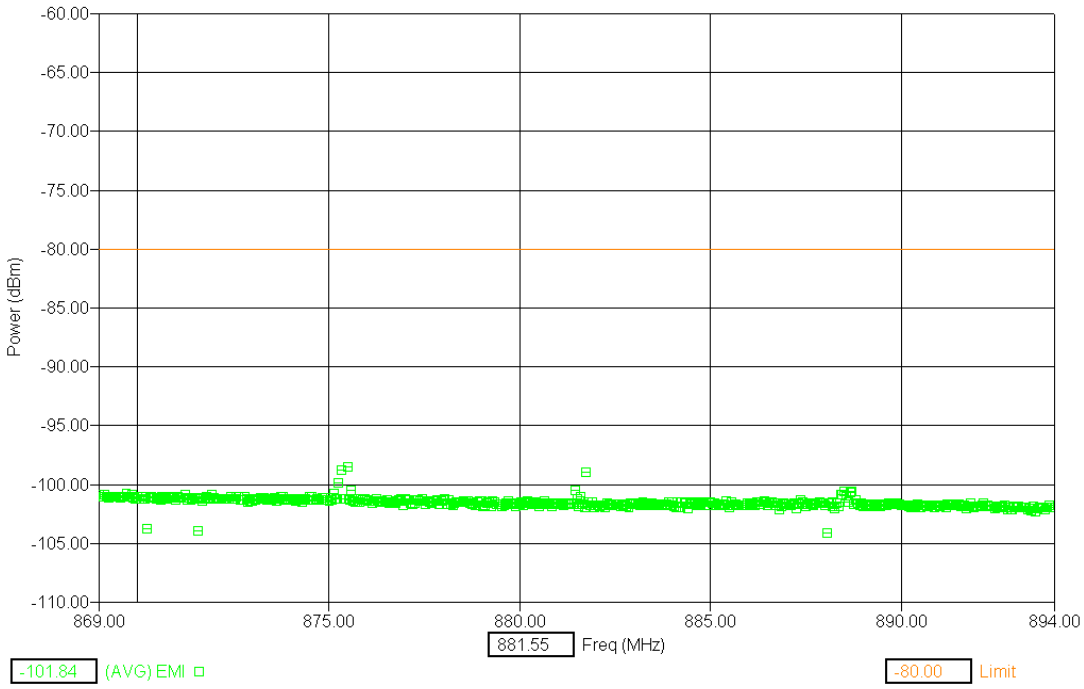
8.3 Detailed Test Results

Test Technician / Engineer	Mark Severson	
Date of Measurement	Jan 29, 2002	
Temperature / Humidity	22 °C	52%RH
Test Result	3590 IMEI 001004/50/048149/5 FCC ID: GMLNPM-8 at max power setting, complies with FCC Part 22.917(f)	

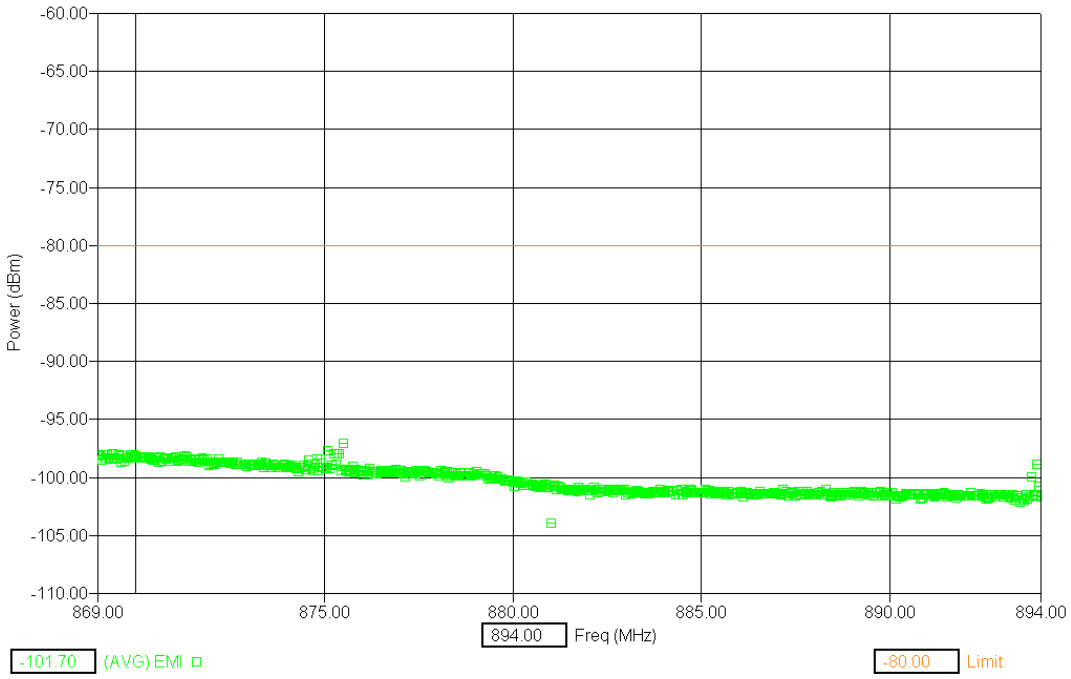
Cellular Band, GSM 800, Channel 128



Cellular Band, GSM 800, Channel 190



Cellular Band, GSM 800, Channel 251



8.4 Measurement Uncertainty

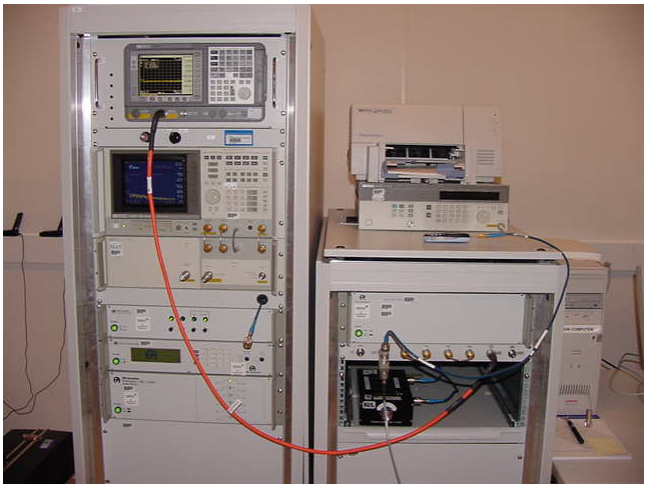
The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz.

9. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Specification: FCC Part 2.1051

9.1 Setup

Testing was performed with the EUT connected to a 6dB attenuator, 6dB splitter, filter bank and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a call. Filters were introduced to reduce or eliminate spurious emission, which could be generated internally in the EMI receiver.



9.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular / PCS	30 – 20000 *	-13

* Frequency to be investigated up to the 10th harmonic of the highest clock or frequency used.

9.3 Detailed Test Results

Test Technician / Engineer	Mark Severson	
Date of Measurement	Jan 30, 2002	
Temperature / Humidity	22°C	51%RH
Test Result	3590 IMEI 001004/50/048149/5 FCC ID: GMLNPM-8 at max power setting, complies with FCC part 2.1051	

EMI (dBm) = trace (dBuV) + cable loss (dB) + filter loss (dB).

Cellular Band, GSM 800 MHz, Channel 128

Freq (Max) (MHz)	(PK) Trace (dBm)	Cable (dB)	Filter (dB)	(PK) EMI (dBm)	(FCC) Limit (dBm)
1648.04	-32.09	0.78	2.24	-29.08	-13.00
2472.71	-48.79	1.03	3.00	-44.76	-13.00
3296.88	-52.89	1.24	3.26	-48.39	-13.00
4120.09	-53.40	1.57	3.39	-48.44	-13.00
4945.01	-53.60	1.78	3.49	-48.32	-13.00
5769.80	-52.40	1.96	3.74	-46.70	-13.00
6594.57	-54.45	2.03	3.97	-48.44	-13.00
7417.55	-50.28	2.07	4.17	-44.04	-13.00
8242.42	-50.35	2.23	4.37	-43.75	-13.00

Cellular Band, GSM 800 MHz, Channel 190

Freq (Max) (MHz)	(PK) Trace (dBm)	Cable (dB)	Filter (dB)	(PK) EMI (dBm)	(FCC) Limit (dBm)
1673.34	-31.04	0.79	2.29	-27.97	-13.00
2509.69	-53.71	1.06	3.00	-49.66	-13.00
3346.24	-52.03	1.27	3.26	-47.50	-13.00
4182.48	-54.02	1.59	3.40	-49.04	-13.00
5020.09	-54.61	1.80	3.51	-49.31	-13.00
5856.77	-53.77	1.97	3.77	-48.02	-13.00
6691.82	-53.81	2.04	4.00	-47.78	-13.00
7529.99	-50.64	2.08	4.20	-44.37	-13.00
8366.05	-52.36	2.30	4.40	-45.66	-13.00

Cellular Band, GSM 800 MHz, Channel 251

Freq (Max) (MHz)	(PK) Trace (dBm)	Cable (dB)	Filter (dB)	(PK) EMI (dBm)	(FCC) Limit (dBm)
1697.05	-31.70	0.76	2.24	-28.69	-13.00
2546.53	-51.51	1.03	3.01	-47.47	-13.00
3396.09	-51.19	1.38	3.27	-46.54	-13.00
4244.03	-53.70	1.61	3.40	-48.69	-13.00
5092.62	-54.66	1.81	3.53	-49.31	-13.00
5941.22	-54.42	1.99	3.79	-48.64	-13.00
6791.02	-50.03	2.04	4.02	-43.96	-13.00
7638.65	-50.21	2.08	4.22	-43.90	-13.00
8487.63	-50.35	2.37	4.43	-43.55	-13.00

PCS Band, GSM 1900 MHz, Channel 512

Freq (Max) (MHz)	(PK) Trace (dBm)	Cable (dB)	Filter (dB)	(PK) EMI (dBm)	(FCC) Limit (dBm)
3700.53	-46.50	1.50	3.32	-41.68	-13.00
5550.86	-45.80	1.91	3.68	-40.21	-13.00
7401.19	-48.92	2.07	4.17	-42.68	-13.00
9251.19	-49.57	2.75	4.63	-42.19	-13.00
11100.26	-51.86	3.19	5.24	-43.43	-13.00
12950.46	-51.66	3.25	5.88	-42.52	-13.00
14800.84	-49.11	3.25	6.44	-39.41	-13.00
16651.04	-47.38	3.42	7.36	-36.60	-13.00
18501.81	-48.41	4.01	8.25	-36.15	-13.00

PCS Band, GSM 1900 MHz, Channel 661

Freq (Max) (MHz)	(PK) Trace (dBm)	Cable (dB)	Filter (dB)	(PK) EMI (dBm)	(FCC) Limit (dBm)
3759.95	-46.92	1.57	3.33	-42.01	-13.00
5639.93	-52.64	1.93	3.71	-47.01	-13.00
7519.43	-50.33	2.08	4.19	-44.06	-13.00
9398.77	-50.72	2.82	4.66	-43.23	-13.00
11280.57	-49.90	3.20	5.30	-41.40	-13.00
13160.22	-51.26	3.25	5.95	-42.05	-13.00
15040.43	-47.38	3.25	6.52	-37.61	-13.00
16920.58	-50.22	3.49	7.49	-39.24	-13.00
18800.61	-48.56	4.16	8.40	-35.99	-13.00

PCS Band, GSM 1900 MHz, Channel 810

Freq (Max) (MHz)	(PK) Trace (dBm)	Cable (dB)	Filter (dB)	(PK) EMI (dBm)	(FCC) Limit (dBm)
3819.40	-51.73	1.39	3.34	-47.00	-13.00
5729.61	-48.82	1.95	3.73	-43.14	-13.00
7638.36	-49.29	2.08	4.22	-42.99	-13.00
9548.09	-50.22	2.89	4.70	-42.63	-13.00
11458.27	-48.73	3.21	5.37	-40.15	-13.00
13368.92	-47.95	3.25	6.02	-38.68	-13.00
15279.23	-49.04	3.25	6.65	-39.14	-13.00
17187.92	-48.96	3.55	7.62	-37.79	-13.00
19098.62	-49.87	4.31	8.55	-37.01	-13.00

9.4 Measurement Uncertainty

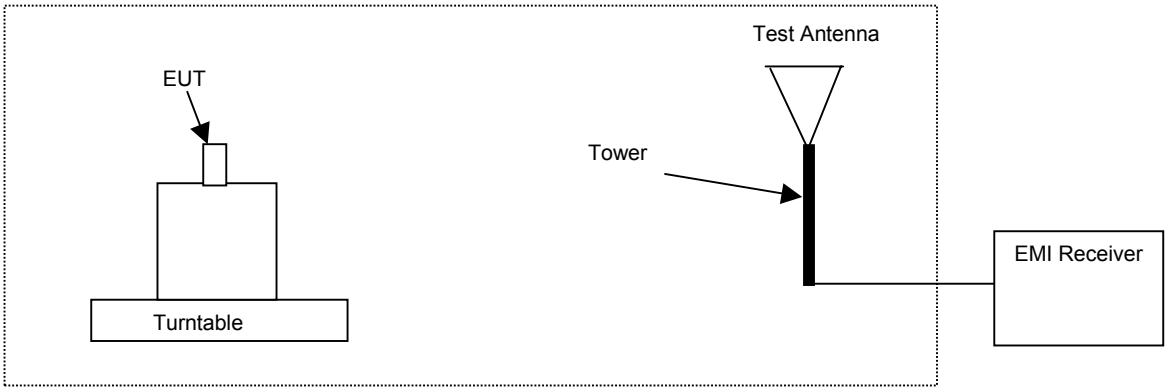
The measurement uncertainty for this test is +/- 3.7dB for 100kHz - 1000MHz and +/- 5.3dB for 1 - 20GHz.

10. FIELD STRENGTH OF SPURIOUS RADIATION

Specification: FCC Part 2.1053

10.1 Setup

Test equipment set-up.



10.2 Pass/Fail Criteria

Band	Frequency Range (MHz)	FCC Limit (dBm)
Cellular / PCS	30 – 20000*	-13

- Frequency to be investigated up to the 10th harmonic of the highest clock or frequency used.

Subsitution method according to ANSI/TIA/EIA 603-1 was used for final measurements.

10.3 Detailed Test Results

Test Technician / Engineer	Michael Sundstrom	
Date of Measurement	31 January 2002	
Temperature / Humidity	24°C	41%RH
Test Result	3590 IMEI 001004/50/0481461 FCC ID: GMLNPM-8 at max power setting, complies with FCC Part 2.1053.	

Cellular Band, GSM 800 MHz, Channel 128

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	FCC Limit (dBm)	Pol.
824.2	1648.5	-43.6	-13	H
824.2	1648.4	-41.7	-13	V
824.2	2472.6	-40.4	-13	H
824.2	2472.6	-41.3	-13	V
824.2	3296.8	-35.7	-13	H
824.2	3296.6	-36.9	-13	V
824.2	4121.0	-34.8	-13	H
824.2	4120.9	-35.3	-13	V
824.2	4945.4	-31.1	-13	H
824.2	4945.1	-31.1	-13	V
824.2	5769.3	-27.9	-13	H
824.2	5769.4	-28.3	-13	V
824.2	6592.8	-44.6	-13	H
824.2	6594.0	-45.5	-13	V
824.2	7418.3	-42.0	-13	H
824.2	7417.1	-43.0	-13	V
824.2	8241.9	-39.7	-13	H
824.2	8242.9	-40.8	-13	V

Cellular Band, GSM 800 MHz, Channel 190

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	FCC Limit (dBm)	Pol.
836.6	1673.2	-43.1	-13	V
836.6	1673.3	-44.3	-13	H
836.6	2509.7	-40.3	-13	H
836.6	2509.7	-41.2	-13	V
836.6	3346.4	-37.1	-13	H
836.6	3346.3	-37.0	-13	V
836.6	4182.9	-33.7	-13	H
836.6	4183.0	-34.8	-13	V
836.6	5019.5	-30.1	-13	H
836.6	5019.5	-30.4	-13	V
836.6	5856.1	-27.4	-13	H
836.6	5856.3	-28.7	-13	V
836.6	6693.0	-44.9	-13	H
836.6	6692.0	-44.5	-13	V
836.6	7528.8	-41.4	-13	H
836.6	7529.1	-42.5	-13	V
836.6	8366.9	-40.6	-13	H
836.6	8366.3	-38.8	-13	V

Cellular Band, GSM 800 MHz, Channel 251

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	FCC Limit (dBm)	Pol.
848.8	1697.6	-41.9	-13	H
848.8	1697.7	-44.4	-13	V
848.8	2546.3	-39.5	-13	H
848.8	2546.4	-40.1	-13	V
848.8	3395.3	-35.8	-13	H
848.8	3395.1	-36.6	-13	V
848.8	4243.8	-33.8	-13	H
848.8	4244.0	-33.9	-13	V
848.8	5092.7	-30.6	-13	H
848.8	5092.9	-30.8	-13	V
848.8	5941.6	-29.0	-13	H
848.8	5941.6	-28.4	-13	V
848.8	6789.6	-43.1	-13	H
848.8	6790.5	-44.8	-13	V
848.8	7639.7	-41.3	-13	H
848.8	7638.6	-41.4	-13	V
848.8	8487.8	-40.0	-13	H
848.8	8488.4	-39.9	-13	V

PCS Band, GSM 1900 MHz, Channel 512

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	FCC Limit (dBm)	Pol.
1850.2	3700.4	-21.64	-13	H
1850.2	3700.5	-27.23	-13	V
1850.2	5550.5	-28.7	-13	V
1850.2	5550.6	-25.6	-13	H
1850.2	7401.7	-42.0	-13	H
1850.2	7400.7	-40.6	-13	V
1850.2	9251.1	-38.4	-13	H
1850.2	9250.4	-39.3	-13	V
1850.2	11100.8	-36.65	-13	H
1850.2	11101.6	-37.01	-13	V
1850.2	12952.1	-34.08	-13	H
1850.2	12951.1	-33.16	-13	V
1850.2	14802.4	-31.47	-13	H
1850.2	14802.2	-29.82	-13	V
1850.2	16651.1	-31.75	-13	H
1850.2	16652.6	-30.57	-13	V

PCS Band, GSM 1900 MHz, Channel 661

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	FCC Limit (dBm)	Pol.
1880.0	3756.0	-22.4	-13	H
1880.0	3760.2	-30.3	-13	V
1880.0	5640.1	-26.2	-13	V
1880.0	5640.2	-24.7	-13	H
1880.0	7519.9	-41.2	-13	H
1880.0	7520.8	-40.2	-13	V
1880.0	9399.5	-39.9	-13	H
1880.0	9400.4	-39.8	-13	V
1880.0	11280.7	-36.1	-13	H
1880.0	11280.8	-37.9	-13	V
1880.0	13160.8	-33.2	-13	H
1880.0	13160.2	-33.5	-13	V
1880.0	15040.6	-30.4	-13	H
1880.0	15039.7	-31.6	-13	V
1880.0	16920.2	-28.1	-13	H
1880.0	16919.6	-29.6	-13	V

PCS Band, GSM 1900 MHz, Channel 810

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	FCC Limit (dBm)	Pol.
1909.8	3819.6	-21.5	-13	H
1909.8	3819.7	-31.0	-13	V
1909.8	5729.4	-25.4	-13	V
1909.8	5729.5	-23.4	-13	H
1909.8	7639.7	-42.0	-13	H
1909.8	7640.0	-43.2	-13	V
1909.8	9548.4	-39.4	-13	H
1909.8	9548.6	-39.3	-13	V
1909.8	11459.1	-37.8	-13	H
1909.8	11459.7	-37.2	-13	V
1909.8	13368.8	-31.9	-13	H
1909.8	13368.5	-32.3	-13	V
1909.8	15277.7	-33.5	-13	H
1909.8	15278.6	-32.2	-13	V
1909.8	17187.5	-26.8	-13	H
1909.8	17188.1	-27.3	-13	V

10.4 Measurement Uncertainty

The measurement uncertainty for this test is +/- 5.2dB for 30-300MHz; +/- 5.2dB for 300-1000MHz, +/- 5.6dB for 1-6GHz and +/-6.8 for 6-18GHz.

11. FREQUENCY STABILITY (TEMPERATURE VARIATION)

Specification: FCC Part 2.1055(a)(1)(b), 24.235

11.1 Setup

The EUT was connected to the base station simulator to measure the RF power output.

11.2 Pass/Fail Criteria

Not Applicable

11.3 Detailed Test Results

Test Technician / Engineer	Clayton Bennett	
Date of Measurement	February 11, 2002	
Temperature / Humidity	21° to 23°C	26 to 42%RH
Test Result	3590 IMEI 001004/50/048149/5 FCC ID: GMLNPM-8 at max power setting, was tested in accordance with 2.1055(a)(1)(b), 24.235	

GSM 800 MHz, Call mode, Channel 190, Frequency 836.60 MHz

Temp. (ºC)	Change (Hz)
-30	-0.45
-20	3.16
-10	1.55
0	4.20
10	3.68
20	16.14
30	0.13
40	9.81
50	6.39

GSM 1900 MHz, Call mode, Channel 660, Frequency 1879.8 MHz

Temp. (ºC)	Change (Hz)
-30	23.37
-20	16.34
-10	27.38
0	6.30
10	4.00
20	53.72
30	14.46
40	70.96
50	54.37

** (ppm/10^6) = (Change in Hz/Frequency in MHz)*

12. FREQUENCY STABILITY (VOLTAGE VARIATION)

Specification: FCC Part 2.1055(d)(1)(2), 24.235

12.1 Setup

The EUT was connected to the base station simulator to measure the RF power output.

12.2 Pass/Fail Criteria

Not Applicable

12.3 Detailed Test Results

Test Technician / Engineer	Clayton Bennett	
Date of Measurement	February 11, 2002	
Temperature / Humidity	21° to 23°C	26 to 42%RH
Test Result	3590 IMEI 001004/50/048149/5 FCC ID: GMLNPM-8 at max power setting, was tested in accordance with 2.1055(d)(1)(2), 24.235	

GSM 800 MHz, Call mode, High Power. Channel 190

Battery End Point (Voltage) = 3.1

% of STV	Voltage	Change (Hz)
85	3.2	5.81
100	3.8	15.43
115	4.4	6.59
B.E.P.	3.1	8.46

GSM 1900 MHz, Call mode, Channel 660, Frequency 1879.8 MHz

Battery End Point (Voltage) = 3.1

% of STV	Voltage	Change (Hz)
85	3.2	43.72
100	3.8	20.02
115	4.4	50.17
B.E.P.	3.1	14.40

APPENDIX

TCC-Dallas is accredited by the American Association for Laboratory Accreditation (A2LA) as shown in the scope below:

THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

NOKIA MOBILE PHONES
Test & Certification Center - Dallas
Irving, TX

for technical competence in the field of

Electrical Testing

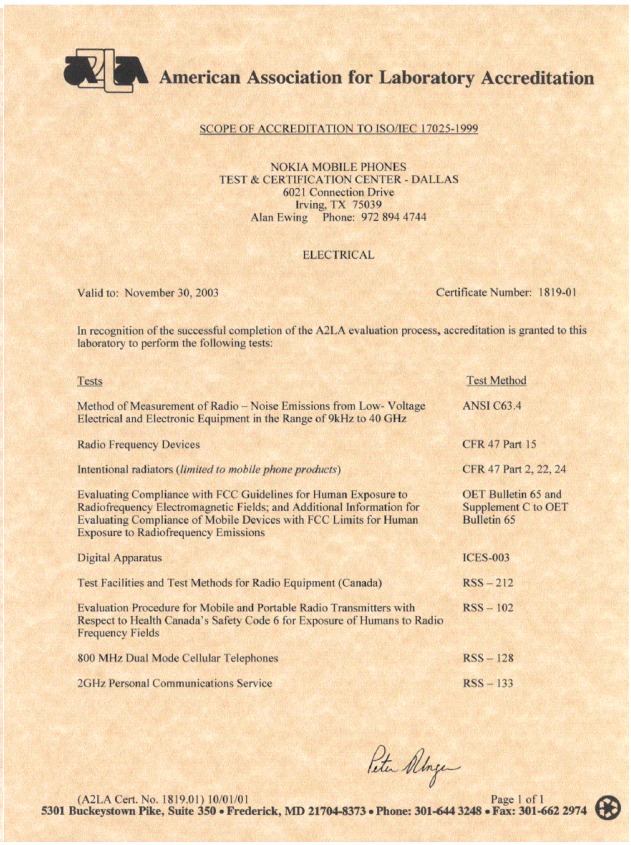
The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002.

Presented this 1st day of October, 2001.

SEAL

President
For the Accreditation Council
Certificate Number 1819.01
Valid to November 30, 2003

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

NOKIA MOBILE PHONES
TEST & CERTIFICATION CENTER - DALLAS
6021 Connection Drive
Irving, TX 75039
Alan Ewing Phone: 972 894 4744

ELECTRICAL

Valid to: November 30, 2003 Certificate Number: 1819-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

Tests	Test Method
Method of Measurement of Radio – Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz	ANSI C63.4
Radio Frequency Devices	CFR 47 Part 15
Intentional radiators (*limited to mobile phone products*)	CFR 47 Part 2, 22, 24
Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and Additional Information for Evaluating Compliance of Mobile Devices with FCC Limits for Human Exposure to Radiofrequency Emissions	OET Bulletin 65 and Supplement C to OET Bulletin 65
Digital Apparatus	ICES-003
Test Facilities and Test Methods for Radio Equipment (Canada)	RSS – 212
Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields	RSS – 102
800 MHz Dual Mode Cellular Telephones	RSS – 128
2GHz Personal Communications Service	RSS – 133

(A2LA Cert. No. 1819.01) 10/01/01 Page 1 of 1
5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined to be in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, such data would not be covered by this laboratory's A2LA accreditation.