



Test &amp; Certification Center (TCC) - Dallas

FCC ID: LJPNSB-9  
Test Report #: 02-RF-0158.001  
Amendment A  
22 November 2002

Accredited Laboratory  
Certificate Number: 1819-01

Ver 1.0

## CFR 47 Part 2, 22, and 24 Test Report

Test Report Number: 02-RF-0158.001 Amendment A

**Terminal device:**

FCC ID: LJPNSB-9, Model 6800, HW: 3.0, SW: 3.44:  
(Detailed information is listed in section 4).

Originator: M. Severson  
Function: TCC - Dallas - EMC  
Version/Status: 1.0 Approved  
Location: TCC Directories  
Date: 22 November 2002

**Change History:**

Version	Date	Status	Handled By	Comments
0.1	14 Nov. 2002	Draft	M. Severson	In Process
0.2	22 Nov. 2002	Reviewed	R. Leenerts	
1.0	22 Nov. 2002	Approved	A. Ewing	

**Testing laboratory:**

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Irving, Texas 75039  
U.S.A.  
Tel. 972-894-5000  
Fax. 972-894-4988

**Client:**

Nokia Mobile Phones, Inc.  
Model 6800, FCC ID: LJPNSB-9  
6021 Connection Drive  
Irving, Texas 75039  
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Tel. 972-894-5000  
Fax. 972-894-4988

**Date and signatures:**

22 November 2002

For the contents:

Randy Leenerts, EMC Engineer  
Technical Review

Alan C. Ewing, General Manager  
Manager Review

Quality  
Mgr.

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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 Corporation  
Elektroniikkatie 10  
90571 Oulu, FINLAND

Manufacturer:

Nokia Finland  
Joensuunkatu 7  
24100 Salo, FINLAND

#### 1.2.2 Sub-part 2.1033(c)(2)

FCC ID: LJPNSB-9

Model No: 6800

#### 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: 256KGXW

#### 1.2.5 Sub-part 2.1033(c)(5)

Frequency Range, MHz: 824.2 to 848.8  
1850.2 to 1909.8

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## 1.2.6 Sub-part 2.1033(c)(6)

Power Rating, Watts: 1.3w EDRP Cellular GSM  
1.6w 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: 1.6w

## 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

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## 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

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## 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
6	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.



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### 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.

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## 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 850/1900	5 Nov. 2002	Good		FCC ID: LJPNSB-9 IMEI: 001004100931477 Model: 6800 Build:
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 850/1900	5 Nov. 2002	Good		FCC ID: LJPNSB-9 IMEI: 001004100923177 Model: 6800 Build:
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 850/1900	5 Nov. 2002	Good		Type: BLC-2 Other: 3.6vdc

### 4.2 Photograph of Tested Device(s):

Refer to attached EXHIBITS

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## 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

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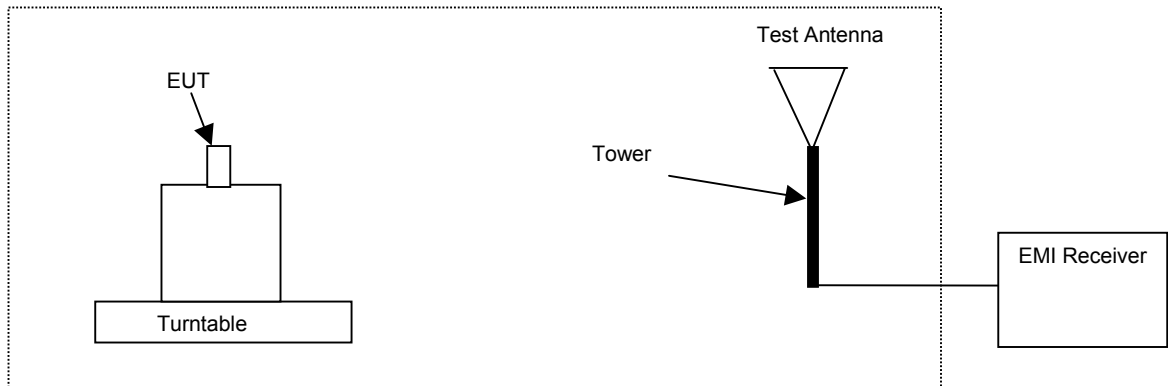
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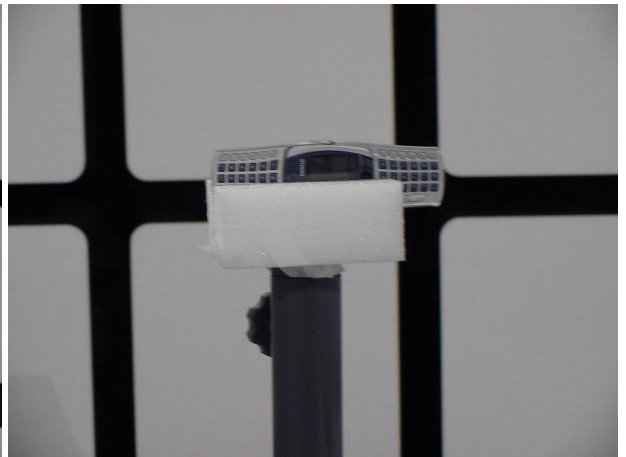
## 6. RF POWER OUTPUT (RADIATED)

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

### 6.1 Setup



**Phone Vertical (Flip Closed)**



**Phone Horizontal (Flip Open)**

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## 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	Mark Severson	
Date of Measurement	November 11-12, 2002	
Temperature / Humidity	23°C	42-39%RH
Test Result	NSB-9 IMEI 001004/10/093147/7, complies with FCC Part 22.913(a) and FCC Part 24.232(b).	

### Cellular Band, GSM 850 MHz, Channel 128

Phone Vertical, Flip Closed, Antenna Vertical

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
824.3	31.7	V

### Cellular Band, GSM 850 MHz, Channel 190

Phone Vertical, Flip Closed, Antenna Vertical

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
836.6	31.8	V

### Cellular Band, GSM 850 MHz, Channel 251

Phone Vertical, Flip Closed, Antenna Vertical

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
848.8	32.0	V

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**Cellular Band, GSM 850 MHz, Channel 128****Phone Horizontal, Flip Open, Antenna Vertical**

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
824.3	20.7	V

**Cellular Band, GSM 850 MHz, Channel 190****Phone Horizontal, Flip Open, Antenna Vertical**

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
836.6	22.8	V

**Cellular Band, GSM 850 MHz, Channel 251****Phone Horizontal, Flip Open, Antenna Vertical**

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
848.8	22.1	V

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**Cellular Band, GSM 850 MHz, Channel 128****Phone Horizontal, Flip Open, Antenna Horizontal**

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
824.3	27.8	H

**Cellular Band, GSM 850 MHz, Channel 190****Phone Horizontal, Flip Open, Antenna Horizontal**

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
836.6	29.0	H

**Cellular Band, GSM 850 MHz, Channel 251****Phone Horizontal, Flip Open, Antenna Horizontal**

Freq Max (MHz)	EDRP EMI (dBm)	Pol.
848.8	28.8	H

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**PCS Band, GSM 1900 MHz, Channel 512****Phone Vertical, Flip Closed, Antenna Vertical**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1850.2	23.8	V

**PCS Band, GSM 1900 MHz, Channel 661****Phone Vertical, Flip Closed, Antenna Vertical**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1880.0	25.0	V

**PCS Band, GSM 1900 MHz, Channel 810****Phone Vertical, Flip Closed, Antenna Vertical**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1909.8	25.7	V



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**PCS Band, GSM 1900 MHz, Channel 512****Phone Horizontal, Flip Open, Antenna Vertical**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1850.2	23.5	V

**PCS Band, GSM 1900 MHz, Channel 661****Phone Horizontal, Flip Open, Antenna Vertical**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1880.0	25.6	V

**PCS Band, GSM 1900 MHz, Channel 810****Phone Horizontal, Flip Open, Antenna Vertical**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1909.8	26.1	V

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**PCS Band, GSM 1900 MHz, Channel 512****Phone Horizontal, Flip Open, Antenna Horizontal**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1850.2	30.1	H

**PCS Band, GSM 1900 MHz, Channel 661****Phone Horizontal, Flip Open, Antenna Horizontal**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1880.0	31.1	H

**PCS Band, GSM 1900 MHz, Channel 810****Phone Horizontal, Flip Open, Antenna Horizontal**

Freq Max (MHz)	EIRP EMI (dBm)	Pol.
1909.8	30.4	H

**6.4 Measurement Uncertainty**

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

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**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	November 05-06, 2002	
Temperature / Humidity	23°C	39-38%RH
Test Result	NSB -9 IMEI 001004100923177 at max power setting, complies with FCC Part 2.1049(c)(1), 24.238(a)(b)	



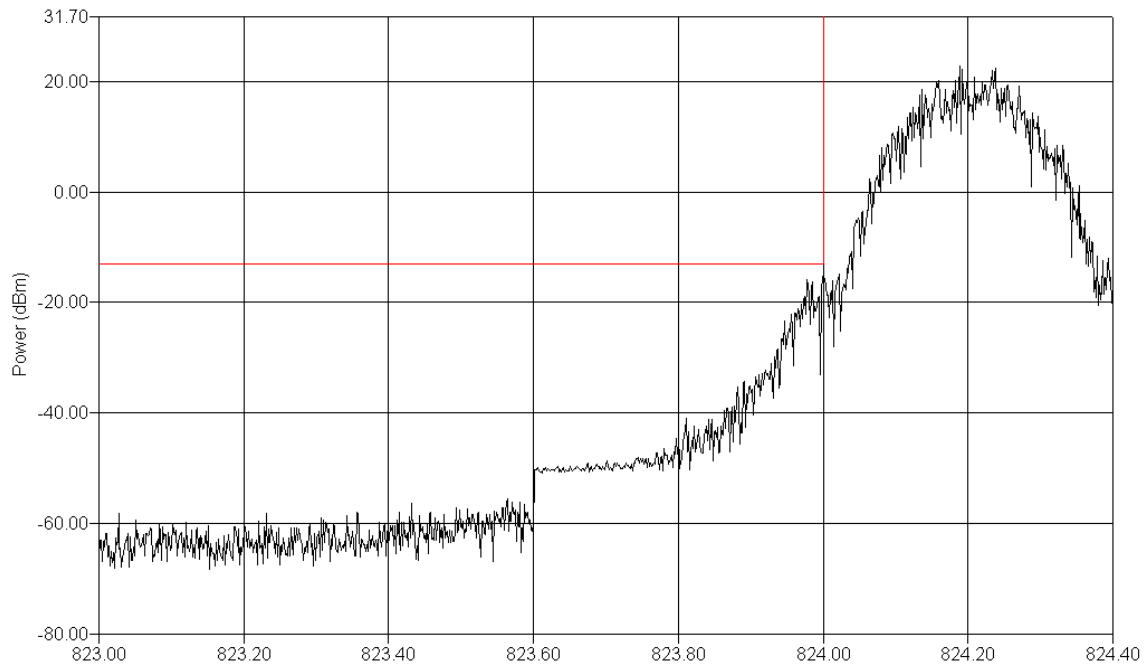
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## Cellular Band, GSM 850, Channel 128

**3 KHz RBW/VBW, 100ms Sweep Time, ref to power level**



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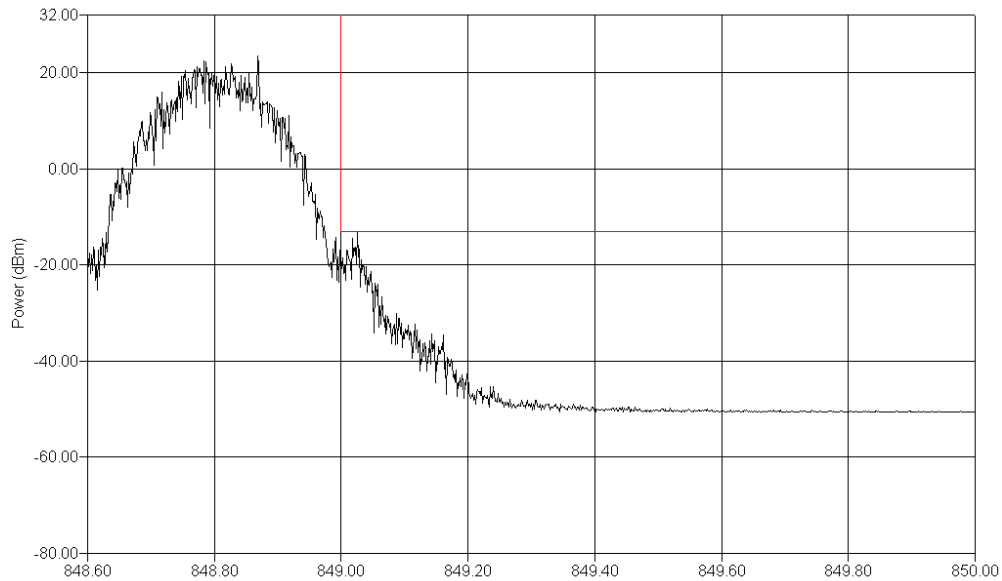
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**Cellular Band, GSM 850, Channel 251****3 KHz RBW/VBW, 100ms Sweep Time, ref to power level**

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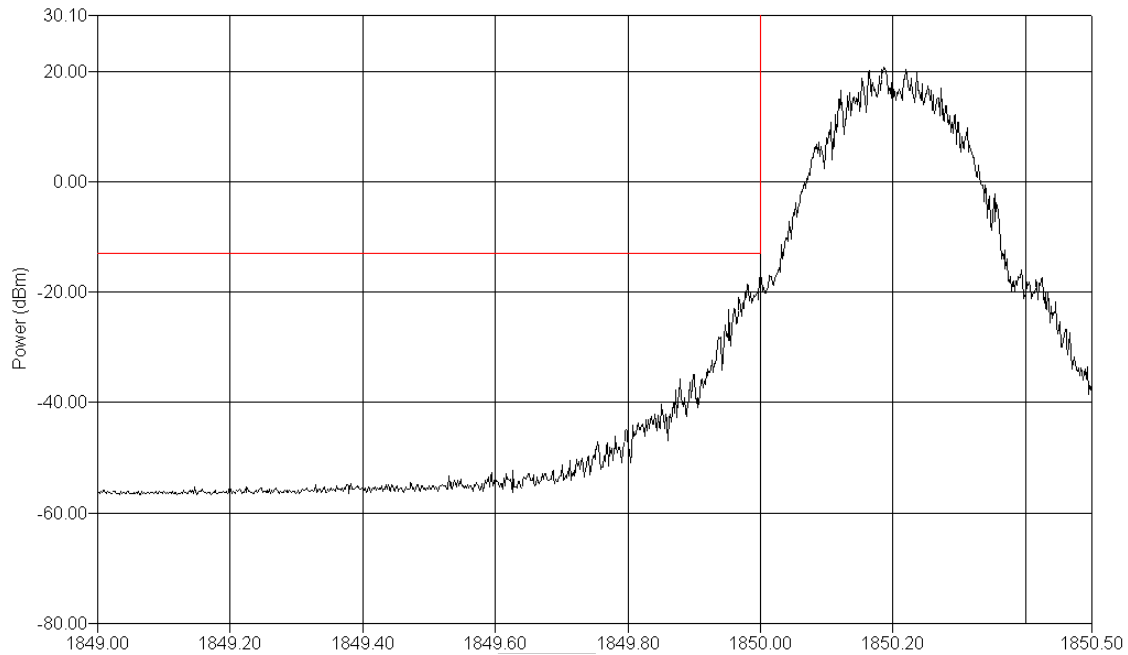
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**PCS Band, GSM 1900, Channel 512****3 KHz RBW/VBW, 100ms Sweep Time, ref to power level**

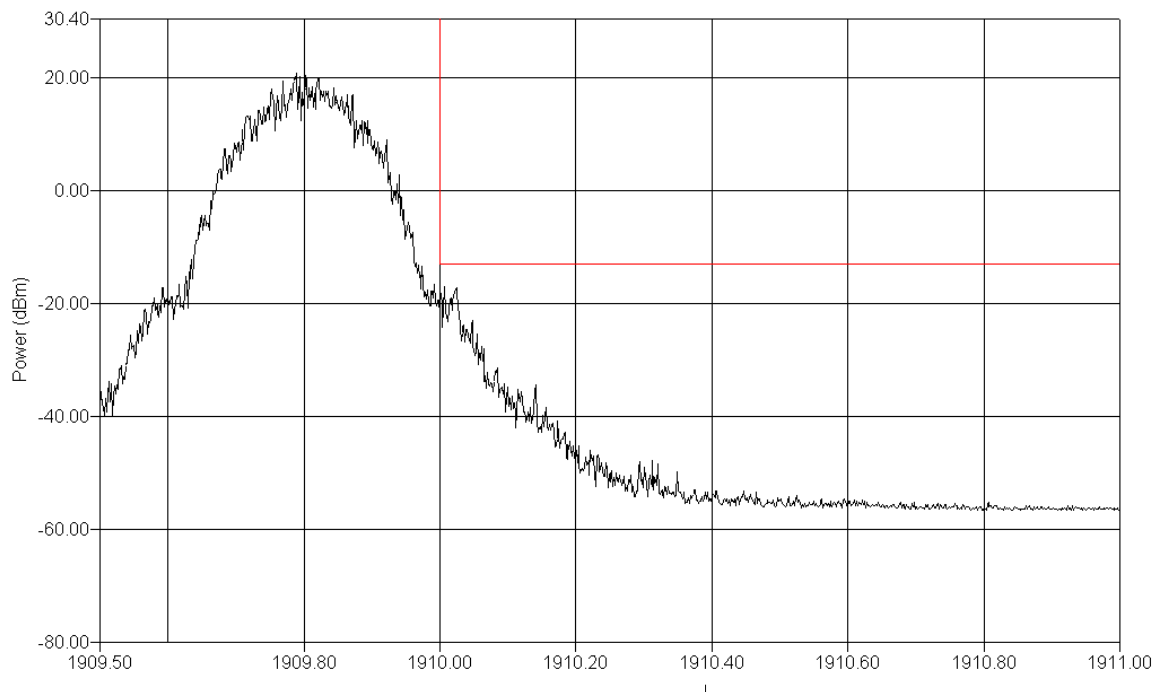
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## PCS Band. GSM 1900, Channel 810

**3 KHz RBW/VBW, 100ms Sweep Time, ref to power level**



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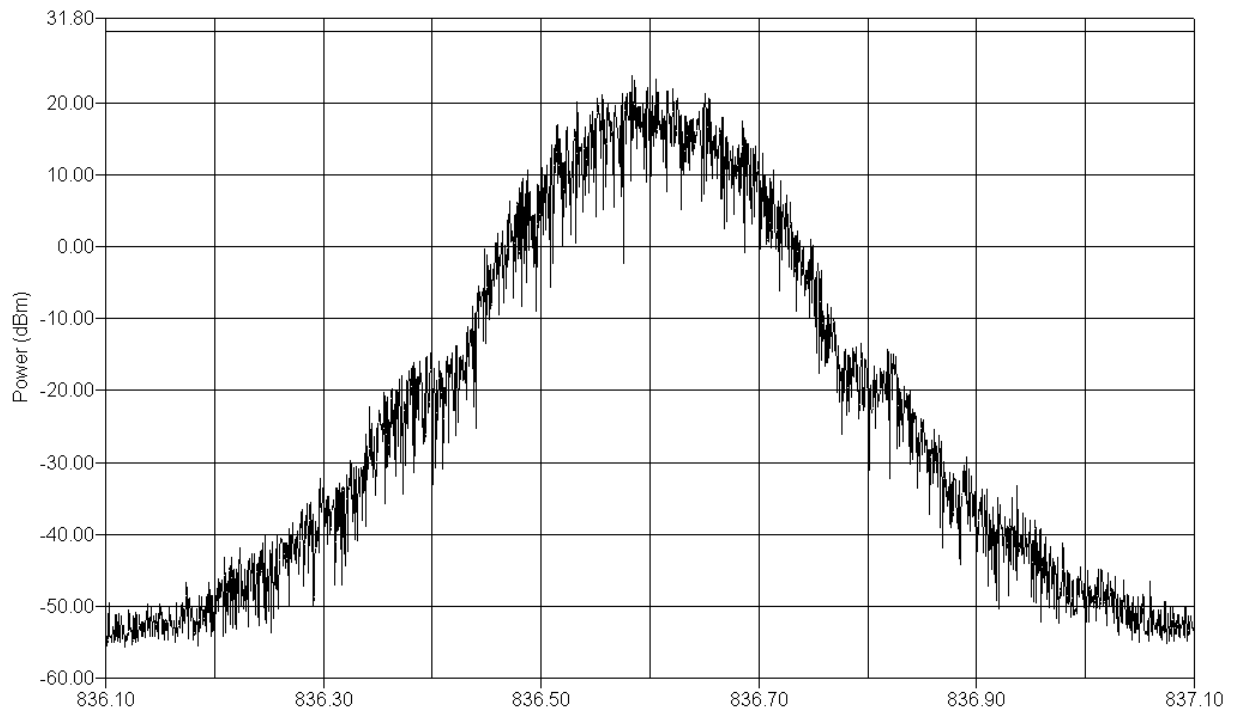
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## Occupied Bandwidth, In Band

### Cellular Band, GSM 850, Channel 190

3 KHz RBW/VBW, 100ms Sweep Time, ref to power level





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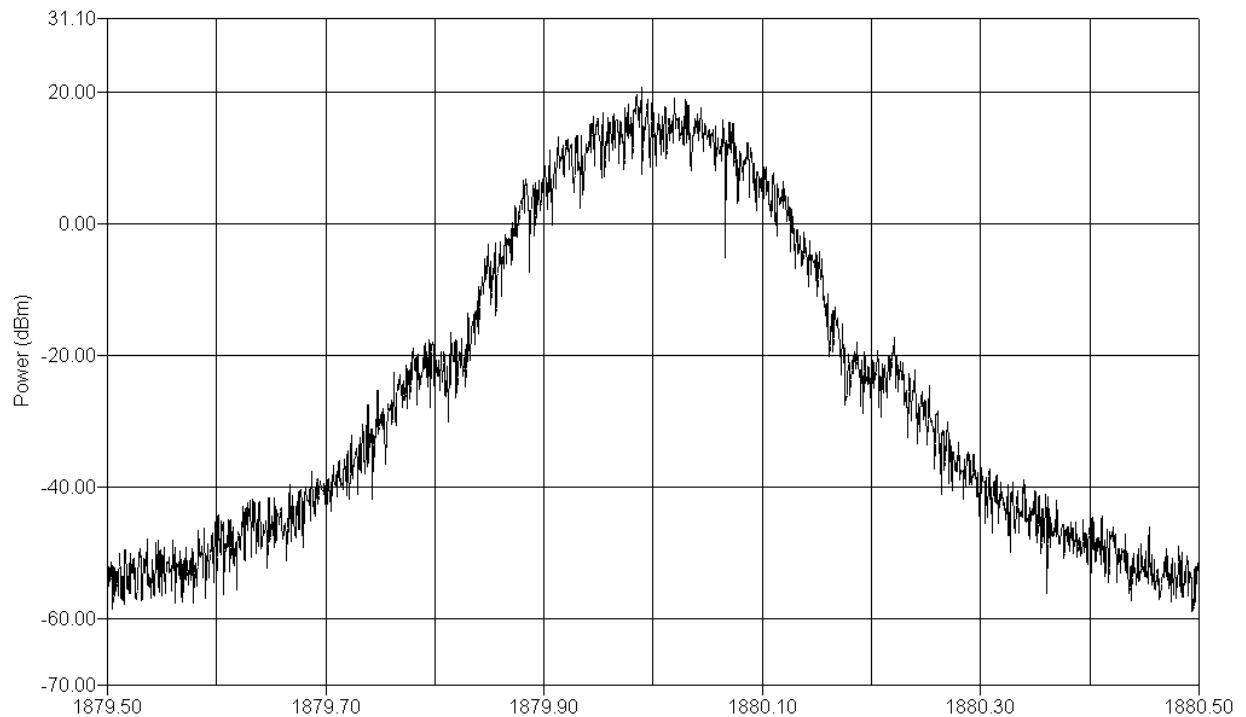
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## Occupied Bandwidth, In Band

### PCS Band, GSM 1900, Channel 661

**3 KHz RBW/VBW, 100ms Sweep Time, ref to power level**

## 7.4 Measurement Uncertainty

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

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## 8. EMISSIONS IN RECEIVER CRITICAL BAND

**Specification: FCC Part 22.917(f)**

### 8.1 Setup

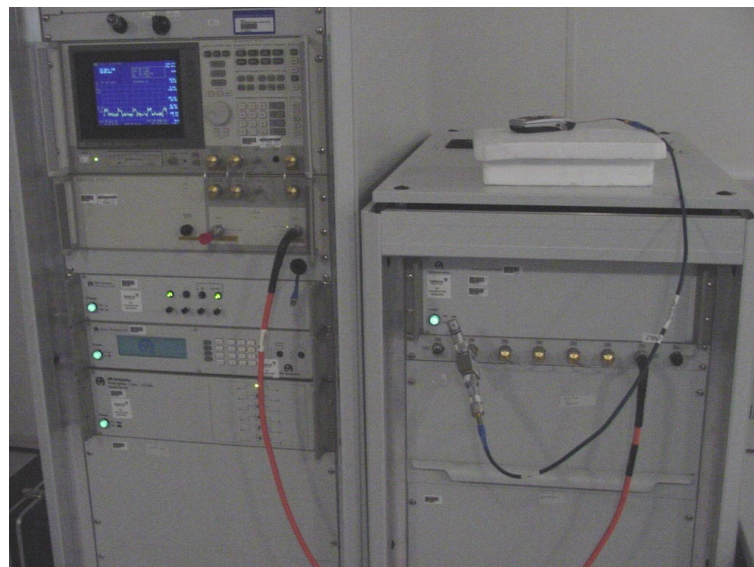
Testing was performed with the EUT connected to a 6dB attenuator, 6dB splitter, filter bank and then to the EMI receiver. The base station simulator was connected to the other port of the splitter to establish a call. Filters were introduced to reduce or eliminate spurious emission, which could be generated 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	November 05, 2002	
Temperature / Humidity	23°C	39-38%RH
Test Result	NSB -9, IMEI 001004100923177 at max power setting, complies with FCC Part 22.917(f)	



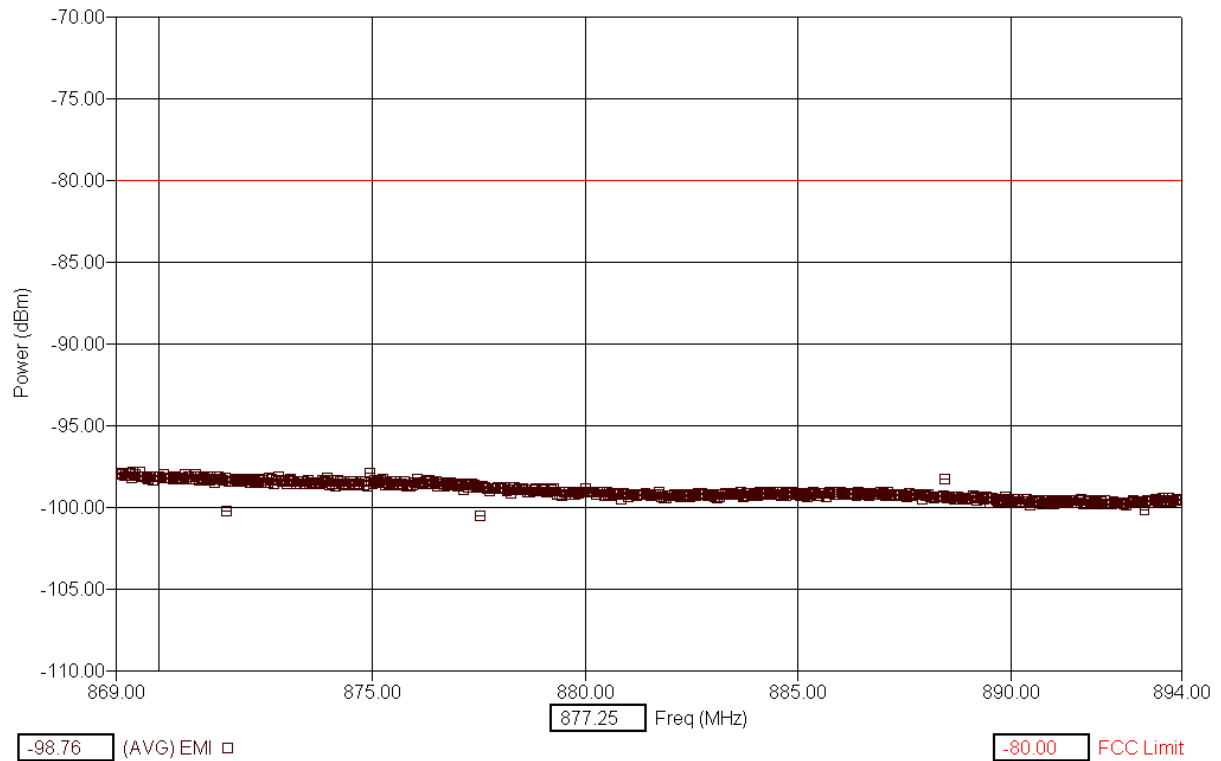
Test & Certification Center (TCC) - Dallas

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## Cellular Band, GSM 850, Channel 128

**30 kHz RBW/VBW, 100ms Sweep Time**



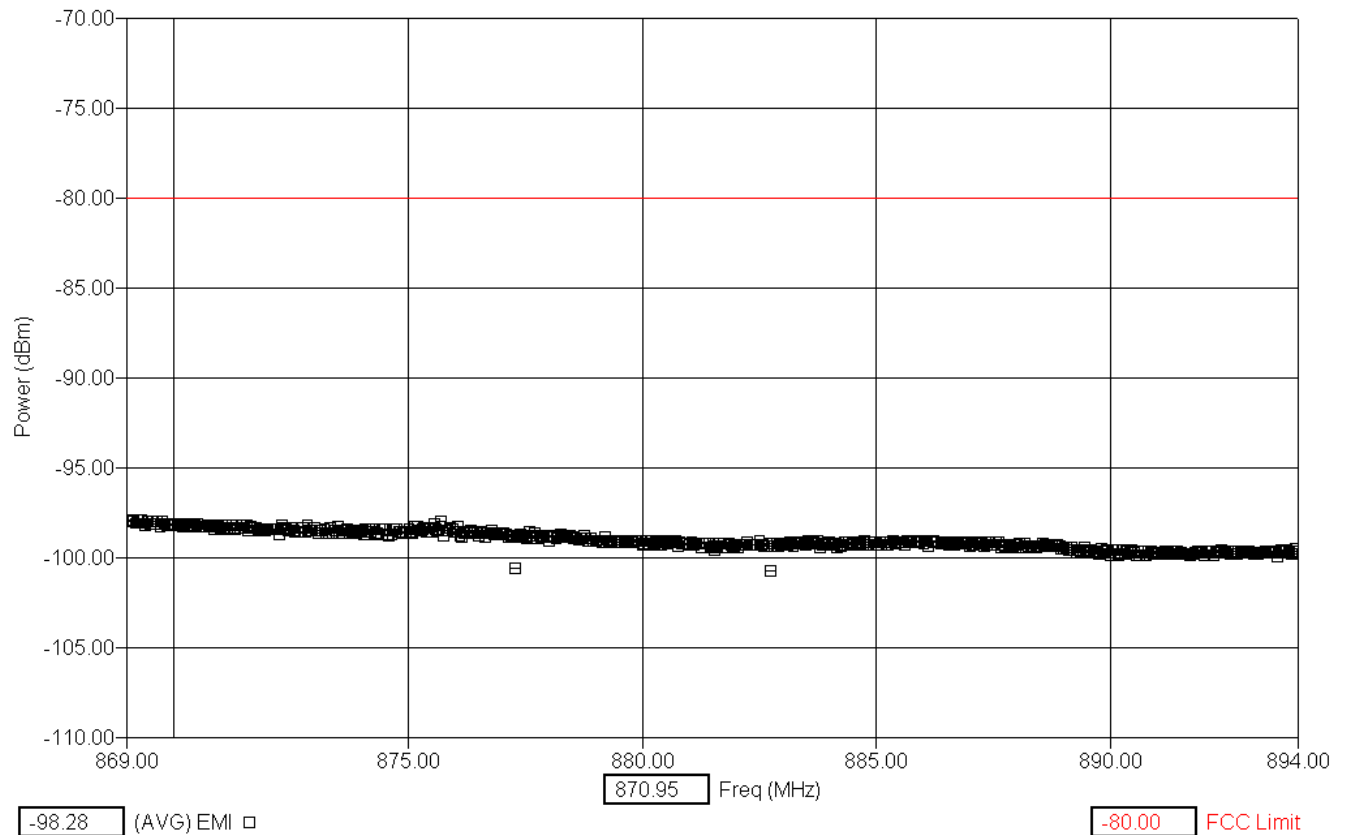
Test & Certification Center (TCC) - Dallas

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## Cellular Band, GSM 850, Channel 190

30 kHz RBW/VBW, 100ms Sweep Time



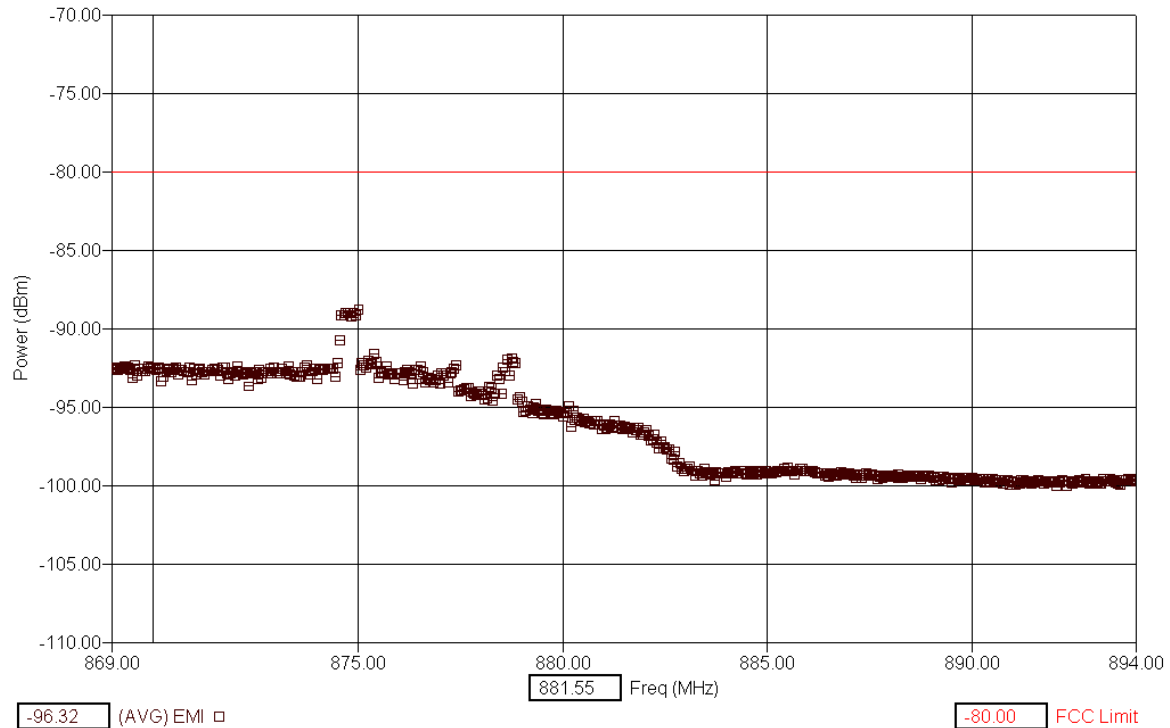
Test & Certification Center (TCC) - Dallas

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## Cellular Band, GSM 850, Channel 251

30 kHz RBW/VBW, 100ms Sweep Time



## 8.4 Measurement Uncertainty

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

Test & Certification Center (TCC) - Dallas

FCC ID: LJPNSB-9

Test Report #: 02-RF-0158.001

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## 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

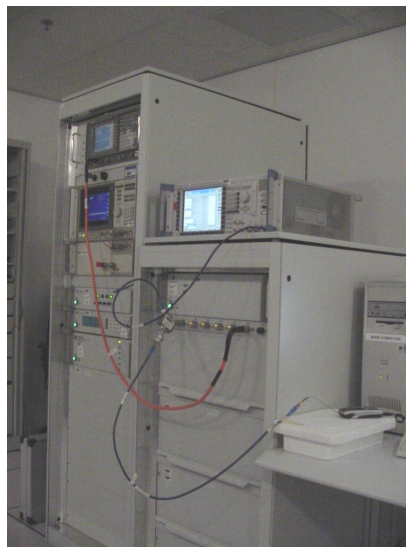
Band	Frequency Range (MHz)	FCC Limits (dBm)
Cellular / PCS	30 – 20000 *	-13

\* Frequency to be investigated up to the 10<sup>th</sup> harmonic of the highest clock or frequency used.

### 9.3 Detailed Test Results

<b>Test Technician / Engineer</b>	Mark Severson	
<b>Date of Measurement</b>	November 05, 2002	
<b>Temperature / Humidity</b>	20-23°C	38-54%RH
<b>Test Result</b>	NSB-9, IMEI 001004100923177, complies with FCC part 2.1051	

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



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## Cellular Band, GSM 850 MHz, Channel 128

Freq [Max] [MHz]	[PK] Trace [dBm]	Cable [dB]	Filter [dB]	[PK] EMI [dBm]	FCC Limit [dBm]
1649.11	-41.54	0.78	2.24	-38.53	-13.00
2475.03	-45.80	1.03	3.00	-41.77	-13.00
3296.63	-48.34	1.24	3.26	-43.84	-13.00
4122.39	-49.14	1.57	3.39	-44.18	-13.00
4944.89	-49.32	1.78	3.49	-44.05	-13.00
5769.20	-49.93	1.96	3.74	-44.23	-13.00
6591.32	-48.89	2.03	3.97	-42.89	-13.00
7416.24	-45.74	2.07	4.17	-39.49	-13.00
8243.08	-47.20	2.23	4.37	-40.60	-13.00

## Cellular Band, GSM 850 MHz, Channel 190

Freq [Max] [MHz]	[PK] Trace [dBm]	Cable [dB]	Filter [dB]	[PK] EMI [dBm]	FCC Limit [dBm]
1674.37	-45.34	0.79	2.29	-42.26	-13.00
2507.05	-47.39	1.06	3.00	-43.33	-13.00
3344.27	-48.22	1.27	3.26	-43.69	-13.00
4182.25	-49.00	1.59	3.40	-44.01	-13.00
5017.83	-48.86	1.80	3.51	-43.56	-13.00
5853.29	-48.69	1.97	3.77	-42.95	-13.00
6693.05	-50.50	2.04	4.00	-44.46	-13.00
7529.19	-44.33	2.08	4.20	-38.06	-13.00
8364.18	-47.64	2.30	4.40	-40.94	-13.00

## Cellular Band, GSM 850 MHz, Channel 251

Freq [Max] [MHz]	[PK] Trace [dBm]	Cable [dB]	Filter [dB]	[PK] EMI [dBm]	FCC Limit [dBm]
1700.35	-44.69	0.76	2.24	-41.68	-13.00
2544.24	-47.53	1.03	3.01	-43.49	-13.00
3396.43	-48.44	1.38	3.27	-43.79	-13.00
4241.92	-50.62	1.61	3.40	-45.61	-13.00
5092.74	-49.01	1.81	3.53	-43.66	-13.00
5944.38	-50.66	1.99	3.79	-44.87	-13.00
6788.18	-46.63	2.04	4.02	-40.56	-13.00
7637.94	-44.83	2.08	4.22	-38.53	-13.00
8486.51	-47.13	2.37	4.43	-40.33	-13.00

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## PCS Band, GSM 1900 MHz, Channel 512

Freq [Max] [MHz]	(PK) Trace [dBm]	Cable [dB]	Filter [dB]	(PK) EMI [dBm]	FCC Limit [dBm]
3702.61	-48.24	1.50	3.32	-43.42	-13.00
5550.97	-44.80	1.91	3.68	-39.21	-13.00
7400.67	-45.63	2.07	4.17	-39.38	-13.00
9253.79	-47.15	2.75	4.63	-39.77	-13.00
11101.18	-46.07	3.19	5.24	-37.65	-13.00
12949.21	-45.73	3.25	5.88	-36.60	-13.00
14799.88	-43.52	3.25	6.44	-33.82	-13.00
16649.17	-44.08	3.42	7.36	-33.30	-13.00
18501.16	-44.83	4.01	8.25	-32.56	-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]
3757.84	-49.14	1.57	3.33	-44.24	-13.00
5641.34	-45.53	1.93	3.71	-39.89	-13.00
7522.05	-45.60	2.08	4.19	-39.32	-13.00
9398.13	-45.51	2.82	4.66	-38.02	-13.00
11280.49	-46.07	3.20	5.30	-37.56	-13.00
13160.14	-46.08	3.25	5.95	-36.88	-13.00
15040.24	-44.84	3.25	6.52	-35.07	-13.00
16917.96	-44.27	3.49	7.49	-33.30	-13.00
18802.02	-43.85	4.16	8.40	-31.28	-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]
3817.63	-46.71	1.39	3.34	-41.98	-13.00
5730.03	-46.10	1.95	3.73	-40.42	-13.00
7636.53	-44.52	2.08	4.22	-38.21	-13.00
9550.80	-46.86	2.89	4.70	-39.27	-13.00
11456.72	-46.99	3.21	5.37	-38.41	-13.00
13368.67	-43.47	3.25	6.02	-34.20	-13.00
15280.00	-43.43	3.25	6.65	-33.53	-13.00
17189.11	-45.51	3.55	7.62	-34.33	-13.00
19095.56	-44.56	4.31	8.55	-31.70	-13.00

## 9.4 Measurement Uncertainty

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

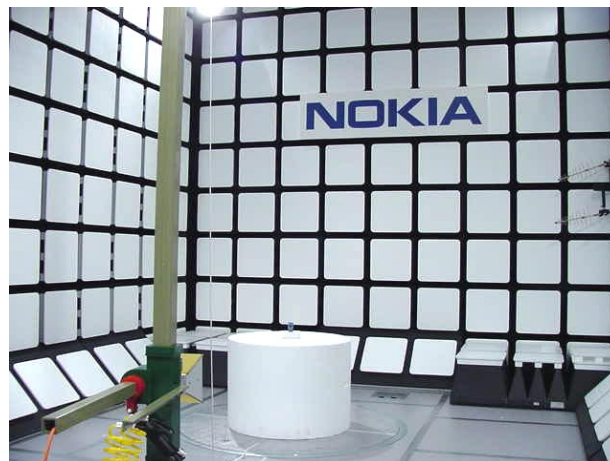
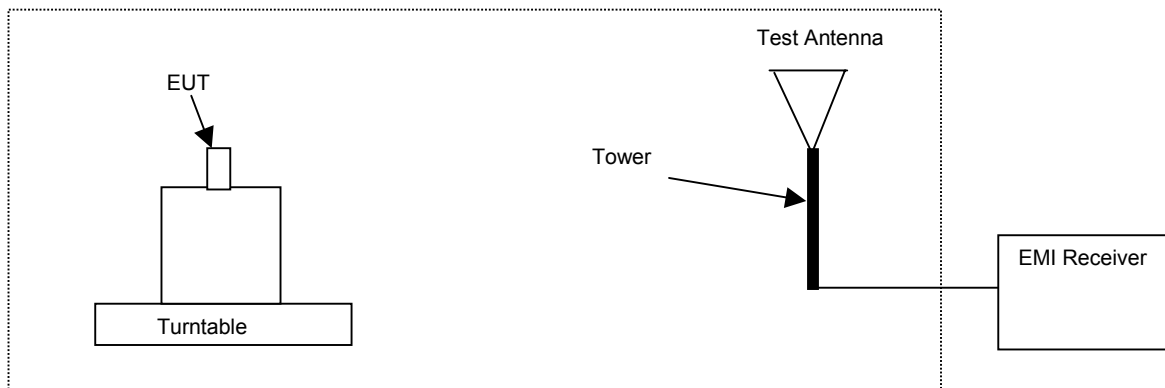


## 10. FIELD STRENGTH OF SPURIOUS RADIATION

*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 10<sup>th</sup> harmonic of the highest clock or frequency used.

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

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## 10.3 Detailed Test Results

<b>Test Technician / Engineer</b>	Mark Severson	
<b>Date of Measurement</b>	November 08, 2002	
<b>Temperature / Humidity</b>	22°C	46%RH
<b>Test Result</b>	NSB-9, IMEI 001004/10/093147/7 at max power setting, complies with FCC Part 2.1053.	

### Cellular Band, GSM 850 MHz, Channel 190, Flip Open

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
836.6	1673.2	-34.2	-66.0	-13	H
836.6	1673.3	-33.8	-65.6	-13	V
836.6	2509.7	-34.7	-66.5	-13	H
836.6	2509.7	-34.7	-66.5	-13	V
836.6	3346.4	-31.9	-63.7	-13	H
836.6	3346.3	-31.3	-63.1	-13	V
836.6	4182.9	-28.7	-60.5	-13	H
836.6	4183.0	-28.0	-59.8	-13	V
836.6	5019.5	-24.8	-56.6	-13	H
836.6	5019.5	-23.6	-55.4	-13	V
836.6	5856.1	-23.1	-54.9	-13	H
836.6	5856.3	-22.9	-54.7	-13	V
836.6	6693.0	-42.2	-74.0	-13	H
836.6	6692.0	-42.6	-74.4	-13	V
836.6	7528.8	-39.7	-71.5	-13	H
836.6	7529.1	-39.9	-71.7	-13	V
836.6	8366.9	-38.8	-70.6	-13	H
836.6	8366.3	-37.8	-69.6	-13	V

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## **Cellular Band, GSM 850 MHz, Channel 190, Flip Closed**

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
836.6	1673.2	-33.2	-65.0	-13	H
836.6	1673.3	-38.4	-70.2	-13	V
836.6	2509.7	-34.0	-65.8	-13	H
836.6	2509.7	-35.7	-67.5	-13	V
836.6	3346.4	-32.3	-64.1	-13	H
836.6	3346.3	-31.3	-63.1	-13	V
836.6	4182.9	-27.7	-59.5	-13	H
836.6	4183.0	-27.8	-59.6	-13	V
836.6	5019.5	-24.1	-55.9	-13	H
836.6	5019.5	-25.4	-57.2	-13	V
836.6	5856.1	-22.8	-54.6	-13	H
836.6	5856.3	-22.7	-54.5	-13	V
836.6	6693.0	-43.3	-75.1	-13	H
836.6	6692.0	-43.4	-75.2	-13	V
836.6	7528.8	-40.4	-72.2	-13	H
836.6	7529.1	-39.6	-71.4	-13	V
836.6	8366.9	-38.8	-70.6	-13	H
836.6	8366.3	-38.4	-70.2	-13	V

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## **PCS Band, GSM 1900 MHz, Channel 661, Flip Open**

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
1880.0	3756.0	-30.0	-61.1	-13	H
1880.0	3760.2	-28.1	-59.2	-13	V
1880.0	5640.1	-24.4	-55.5	-13	V
1880.0	5640.2	-22.9	-54.0	-13	H
1880.0	7519.9	-40.8	-71.9	-13	H
1880.0	7520.8	-40.4	-71.5	-13	V
1880.0	9399.5	-36.9	-68.0	-13	H
1880.0	9400.4	-36.6	-67.7	-13	V
1880.0	11280.7	-33.8	-64.9	-13	H
1880.0	11280.8	-33.9	-65.0	-13	V
1880.0	13160.8	-30.0	-61.1	-13	H
1880.0	13160.2	-30.0	-61.1	-13	V
1880.0	15040.6	-28.6	-59.7	-13	H
1880.0	15039.7	-28.5	-59.6	-13	V
1880.0	16920.2	-26.5	-57.6	-13	H
1880.0	16919.6	-27.7	-58.8	-13	V

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## **PCS Band, GSM 1900 MHz, Channel 661, Flip Closed**

Tuned Freq (MHz)	Freq Max (MHz)	(PK) EMI (dBm)	dBc	FCC Limit (dBm)	Pol.
1880.0	3756.0	-29.1	-60.2	-13	H
1880.0	3760.2	-29.4	-60.5	-13	V
1880.0	5640.1	-23.1	-54.2	-13	H
1880.0	5640.2	-23.9	-55.0	-13	V
1880.0	7519.9	-38.9	-70.0	-13	H
1880.0	7520.8	-35.4	-66.5	-13	V
1880.0	9399.5	-36.2	-67.3	-13	H
1880.0	9400.4	-35.8	-66.9	-13	V
1880.0	11280.7	-34.1	-65.2	-13	H
1880.0	11280.8	-34.4	-65.5	-13	V
1880.0	13160.8	-30.0	-61.1	-13	H
1880.0	13160.2	-30.0	-61.1	-13	V
1880.0	15040.6	-28.7	-59.8	-13	H
1880.0	15039.7	-27.6	-58.7	-13	V
1880.0	16920.2	-27.1	-58.2	-13	H
1880.0	16919.6	-26.8	-57.9	-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.

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## 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

<b>Test Technician / Engineer</b>	Anu B	
<b>Date of Measurement</b>	11/11/02 - 11/14/02	
<b>Temperature / Humidity</b>	22-28°C	26-38%RH
<b>Test Result</b>	at max power setting, was tested in accordance with 2.1055(a)(1)(b), 24.235	

#### **GSM 850 MHz, Call mode, Channel 190, Frequency 836.60 MHz**

<b>Temp. (°C)</b>	<b>Change (Hz)</b>
-30	17.0
-20	-19.0
-10	16.0
0	24.0
10	-20.0
20	-18.0
30	17.0
40	-21.0
50	-16.0

#### **GSM 1900 MHz, Call mode, Channel 661, Frequency 1880.00 MHz**

<b>Temp. (°C)</b>	<b>Change (Hz)</b>
-30	-37.9
-20	-52.9
-10	-32.1
0	-34.7
10	-17.6
20	16.6
30	-16.5
40	-36.6
50	-44.6

\* (ppm/10<sup>6</sup>) = (Change in Hz/Frequency in MHz)

Test & Certification Center (TCC) - Dallas

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## 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	Anu B	
Date of Measurement	11/12/02 & 11/14/02	
Temperature / Humidity	22-28°C	26-38%RH
Test Result	at max power setting, was tested in accordance with 2.1055(d)(1)(2), 24.235	

#### **GSM 850 MHz, Call mode, Channel 190, Frequency 836.60 MHz**

**Battery End Point (Voltage) = 3.55V**

% of STV	Voltage	Change (Hz)
85	3.315	N/A
100	3.9	-19.0
115	4.485	21.0
B.E.P.	3.55	24.0

85% of Nominal Voltage was less than the Battery End point, so it was not measured.

#### **GSM 1900 MHz, Call mode, Channel 660, Frequency 1880.00 MHz**

**Battery End Point (Voltage) = 3.55 V**

% of STV	Voltage	Change (Hz)
85	3.315	N/A
100	3.9	-29.0
115	4.485	-17.4
B.E.P.	3.55	-20.8

85% of Nominal Voltage was less than the Battery End point, so it was not measured.

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## APPENDIX

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







**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 Electromagnetic Compatibility (EMC), Specific Absorption Rate (SAR), and tests on wireless communications devices:

Tests	Test Method
<b>Emissions</b>	
Conducted and Radiated	CFR 47 Part 2, 15, 22, 24 CISPR 22; EN 55022 ICES-003; RSS-128, 132 and 133 3GPP TS 51.010-1 Section 12.2 ETSI EN 301 489-1; EN 301 489-7 (using ANSI C63.4 and RSS-212)
Specific Absorption Rate	IEEE 1528 EN 50360; EN 50361 CFR 47 Parts 2 and 24 OET Bulletin 65 and Supplement C RSS-102
<b>Immunity</b>	
Vehicular Immunity	ISO 7637-1; ETSI EN 301 489-1; EN 301 489-7
Electrostatic Discharge (ESD)	EN 61000-4-2; ETSI EN 301 489-1; EN 301 489-7
RF Radiated	EN 61000-4-3; ETSI EN 301 489-1; EN 301 489-7
Electrical Fast Transient/Burst	EN 61000-4-4; ETSI EN 301 489-1; EN 301 489-7
Surge	EN 61000-4-5; ETSI EN 301 489-1; EN 301 489-7
Conducted	EN 61000-4-6; ETSI EN 301 489-1; EN 301 489-7
Voltage Dips, Short Interruptions and Voltage Variations	EN 61000-4-11; ETSI EN 301 489-1; EN 301 489-7

Tests	Test Method
<b>Wireless</b>	
GSM (850/900/1800/1900 MHz)	3GPP TS 51.010-1, -2, -3 3GPP TS 11.10.4 PTCRB NAPRD.03
TDMA	CTIA TDMA/AMPS Test Plan (excluding Sections 7.3.3 & 7.3.4) TTA/EIA-136-270

(A2LA Cert. No. 1819.01) Revised 09/18/02  
 5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

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“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.