



EXHIBIT 2B

**Test Report Provided by
Sanmina-SCI**

Applicant: Nortel Networks

**For Original Equipment
Certification on:**

AB6NT800SFRM



SANMINA-SCI

Product Integrity Laboratory

5151-47th Street, NE
Calgary, Alberta T3J 3R2
Tel: (403) 295 5134
Fax : (403) 295 4091

FCC 22 Emissions Test Report Project Code 80222

CDMA MCBTS SCPA CR

Revision: 0

Date: October 29, 2002

Prepared for: Nortel Networks.

Author: Carlos Celarie
EMC Technologist

Approved by: Glen Moore
EMC Manager

Confidentially Statement: The information contained in this document is the property of Sanmina-SCI Corporation. Except as specifically authorized in writing by the Director of Sanmina-SCI Corporation, the holder of this document shall keep all information contained herein confidential and shall protect the same, in whole or in part, from disclosure and dissemination to all third parties.

**Summary****Sanmina-SCI Canada**

Product Integrity Laboratory

5151-47th Street, N.E. Calgary Alberta T3J 3R2

Accreditation Numbers: FCC 101386
 IC 46405-3978 File # IC3978-2
 Standards Council of Canada Accredited Laboratory No. 440

Performed For: Nortel Networks.
 5111 – 47th Street NE
 Calgary Alberta, T3J 3R2
 Tel: (403) 769 2425

Customer Representative: Thomas Wong

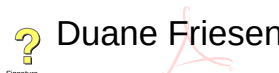
EUT Description: CDMA MCBTS SCPA CR.
 Model: NPGS8660 P8
 Serial Number: NNTM532RPUR9, NNTM532RPUUB, NNTM532RPUTA.

Appendix	Standards		Description & Range	Deviations		Pass / Fail	Criteria
	Base	Test Basis		From Standard	From Test Plan		
B	ANSI C63.4-2001	FCC Part 22	Radiated Emissions Signal Substitution 30MHz-1GHz	No	No	PASS	None
C	ANSI C63.4-2001	FCC Part 22	Radiated Emissions Signal Substitution 1GHz-10GHz	No	No	PASS	None

Note: Test Plan deviations are listed in Appendix A.

Test Result: The product presented for testing complied with test requirements as shown above.

Tested By:  Digitally signed by Carlos A. Celarie
 DN: cn=Carlos A. Celarie, o=Sanmina-SCI, ou=Calgary, c=CA
 Date: 2002.10.31 13:46:43 -0700
 Signature Not Verified
 Carlos Celarie
 EMC Technologist

Checked By:  Digitally signed by Duane Friesen
 DN: cn=Duane Friesen, o=Sanmina-SCI, ou=PI Laboratory, c=CA
 Date: 2002.10.31 15:36:19 -0700
 Reason: I have reviewed this document
 Signature Not Verified
 Duane Friesen C.E.T.
 EMC Technical Advisor

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



Table of Contents

SUMMARY	2
REGISTER OF REVISIONS	3
1.0 INTRODUCTION	4
1.1 Purpose	4
1.2 Abbreviations and Definitions	4
1.3 References	5
2.0 TEST LOG	5
3.0 EUT	6
3.1 Configuration	6
3.1.1 SET UP CONFIGURATION	7
3.1.2 TEST PLAN CONFIGURATION DEVIATIONS	8
3.1.3 EUT POWER	8
3.1.4 TEST PLAN POWER DEVIATIONS	8
3.2 Cables	8
3.2.1 TEST PLAN CABLE LIST DEVIATIONS	8
3.3 Frequencies	9
3.3.1 TEST PLAN FREQUENCY LIST DEVIATIONS	10
3.4 EUT Software	10
3.5 Mode of Operation	11
3.5.1 BTS SET UP & CONFIGURATIONS DETAILS	11
3.5.2 TEST PLAN MODE OF OPERATION DEVIATION	11
3.6 Pass / Fail Criteria	11
4.0 SUPPORT EQUIPMENT	12
APPENDICES	13
APPENDIX A: TEST PLAN DEVIATION LOG	14
APPENDIX B: RADIATED EMISSIONS 30MHZ – 1GHZ PART 22	16
APPENDIX C: RADIATED EMISSIONS 1GHZ – 10GHZ PART 22	21
APPENDIX D: TEST PLAN	26
APPENDIX E: SUPPLEMENTARY INFORMATION	27
END OF DOCUMENT	28

REGISTER OF REVISIONS

Revision	Date	Description of Revisions
0	October 29, 2002	Initial Release

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the tests applied by Sanmina-SCI Canada to demonstrate compliance of Nortel Networks' CDMA MCBTS SCA CR, to the applicable Electromagnetic Compatibility (EMC) standards as outlined in section 1.3.

The Radiated and Conducted Emissions test cases were executed with an indoor CDMA MCBTS Radio Rack system using seven 800 MHz SFRMs as EUT.

The test outlined may not be inclusive of all testing required by the Base Standards or fulfill the applicable regulatory requirements in their entirety.

1.2 ABBREVIATIONS AND DEFINITIONS

The following are the abbreviations and definitions that may be relevant to this document.

<u>Abbreviation</u>	<u>Explanation</u>
dB	Decibel
EMC	Electromagnetic Compatibility
Hz	Hertz
IEC	International Electrotechnical Commission
ITE	Information Technology Equipment
MHz	Megahertz
N/A	Not Applicable
NA	Not Available
PEC	Procurement Engineering Code
μ V	Microvolts
BTS	Base Station
dBm	decibel relative to 1 mW
GHz	Giga Hertz
QA	Quality Assurance
BTS	Base Station Transceiver Subsystem
EFT	Electrically Fast Transient
EMI	Electro-Magnetic Interference
ESD	Electrostatic Discharge
EUT	Equipment Under Test
FER	Frame Error Rate
GPS	Global Positioning System
PI	Product Integrity
RF	Radio Frequency

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



Definitions:

Equipment Under Test (EUT): A representative ITE or functionally interactive group of ITE (that is a system), which includes one or more host units and is used for evaluation purposes.

Electromagnetic compatibility: EMC (abbreviation): The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

1.3 REFERENCES

US Code of Federal Regulations

- 47 CFR Part 22 Federal Communications Commission, Part 22, 10-01-00 edition.

American National Standards Institute

- ANSI C63.4-1992 American National Standards for Methods of Measurements of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipments in the range of 9 KHz to 40 GHz, May 26, 1992

Nortel Networks Documentation

- Document No: None CDMA MCBTS SCPA CR Product Integrity Test Plan. Stream: 00, Issue: 01.Document Status: Draft. Issue Date: October 07, 2002.
Author: Michael Rovers.

Sanmina-SCI Documentation

- Sanmina-SCI EMC Test Method 11.0 Radiated Emissions Signal Substitution Method 30MHz-20GHz
- Sanmina-SCI Radiated Emissions 30MHz – 1GHz Automated Test Method E001R6

2.0 TEST LOG

Appendix	Test Case	Start	End
Date Received: 15OCT02			
B	Radiated Emissions 30MHz-1GHz FCC Part 22	15OCT02	24OCT02
C	Radiated Emissions 1GHz-10GHz FCC Part 22	21OCT02	24OCT02
Date Shipped: 24OCT02			

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



3.0 EUT

3.1 CONFIGURATION

Description of EUT

Name	CDMA MCBTS SCA CR
Model Number	NPGS8660
Revision Number	P8
Serial Number	NNTM532RPUR9, NNTM532RPUUB, NNTM532RPUTA.
Physical Description	 The CDMA MCBTS SCA CR Module (Code Division Multiple Access – Multi Carrier Base station Transceiver Subsystem – Single Channel Power Amplifier – Cost Reduction – Module) is located inside the PAM assembly. The PAM assembly consist of a sealed metal enclosure, dolphin gray in color, provisioned with a ground cable and different connectors for: PEM, Power Data Cable, Fan/Aim Cable, RF port from TRM, RF port to DPM. As part of a typical radio rack installation, the PAM mounts below the TRM (Transmit / Receive Module).
Classification	ITE - Floor standing when installed.
Size (m)	Length: 0.50 x Width: 0.50 x Height: 0.08 (PAM assembly)
Weight	11.36 kg (PAM assembly)
Power	-48Vdc ~ 50A (RF rack with 7 SFRMs).
Functional Description	The Single Channel Amplifier module, amplifies signals received from the TRM.

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



3.1.1 SET UP CONFIGURATION

EUT Description List – The following modules were not verified by Sanmina-SCI.

QTY	Module Description	P/N	Serial Number	Release Number
1	TRM 1	NPGS85AB	NNTM537T50W6	P2
1	TRM 2	NTGS85AB	NNTM5358QDE3	09
1	TRM 3	NPGS85AB	NNTM535T50X7	P2
1	TRM 4	NTGS85BA	NNTM534865RK	06
1	TRM 6	NTGS85AA	NNTM533MJEE9	55
1	TRM 8	NTGS85AA	NNTM533MH2M3	54
1	TRM 9	NTGS85AB	NNTM533TVHJ1	10
1	PAM 1	NPGS8660	NNTM532RPUR9	P8
1	PAM 2	NPGS8660	NNTM532BPMKW	P7
1	PAM 3	NPGS8660	NNTM532RPMJV	P7
1	PAM 4	NPGS8660	NNTM532RPUUB	P8
1	PAM 6	NPGS8660	NNTM532RPUTA	P8
1	PAM 8	NPGS8660	NNTM536HRDPP	43
1	PAM 9	NPGS8660	NNTM5339WG62	24
1	DPM 1	NTGS89DB	CLVWMM1005WC	01
1	DPM 2	NTGS89DB	CLVWPP200BA5	04
1	DPM 3	NTGS89DB	CLVWMM1005Y4	01
1	DPM 4	NTGS89DC	CLWVPP20212P	06
1	DPM 6	NTGS89DB	CLWVPP201RZY	06
1	DPM 8	NTGS89DB	CLWVPP201TKF	06
1	DPM 9	NTGS89DC	CLWVPP20226Z	06
1	FAM 1	NT6460AE	NNTM532VW88E	01
1	FAM 2	NTGS5652	NNTM536GC1CJ	01
1	FAM 3	NTGY5654	NNTM532JPOM	P3
1	FAM 4	NTGS5652	NNTM536EMN57	01
1	FAM 6	NTGS5651	NNTM53586PYC	01
1	FAM 8	NTGS5651	NNTM5375K1MQ	01
1	FAM 9	NTGS5652	NNTM533UCKBB	01
1	Radio Rack	NTGS65AA	NNTM786016N9	09

Note: Special considerations for each test case are noted in the appropriate appendices

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



3.1.2 TEST PLAN CONFIGURATION DEVIATIONS

None.

3.1.3 EUT POWER

DC Voltage	-48V DC
Number of Feeds	1- Hubble A, 1- Hubble B. (2 Total)
Gauge of cable	6/0
Current Draw	50 Amps (Radio Rack with 7 SFRMs)
Special Requirements	N/A

3.1.4 TEST PLAN POWER DEVIATIONS

None

3.2 CABLES

EUT Cable List

The following cables were verified by Sanmina-SCI.

Quantity	PEC Code	Routing	Description	Cable Length
1	NTGS7094	From frame to ground plane.	Ground cables	3.0 m
7	NTGS8082	Hubble to SFRM	System DC power cables	7.0 m
7	LMR400	From Main Antenna through bulkhead to Loads (support room)	RF load cables	NA
1	LMR400	From GPS1 through bulkhead to GPS (support room)	RF load cables	NA
1	NTGS3517	From T1/E1 connector to cable rack	T1/E1	15.0
1	NTGS3518	From Customer Alarm connector to cable rack.	Customer Alarm	30.0
4	NA	From hubble connection to LISN. (2 AWG ESSEX EXCELENE. +105C – 50C, 600W)	Power Cable extension	1.0

3.2.1 TEST PLAN CABLE LIST DEVIATIONS

None

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



3.3 FREQUENCIES

CDMA MCBTS SCPA CR Frequency List

Module	Signal	Frequency (MHz)
NA	NA	NA

Support Equipment - SFRM Frequency List

Module	Signal	Frequency (MHz)
SFRM	Transmit Band	869 – 894
SFRM	Receive Band	824 – 849
SFRM	RF LO Range	750 - 776
SFRM	RF LO Resolution	30
SFRM	Carrier Spacing	1.26
SFRM	Tx IF LO	108.7488
SFRM	Rx IF (Center)	73.5792
SFRM	Tx IF (Center)	118.5792
SFRM	26Fc	31.9488
SFRM	32Fc	39.3216
SFRM	52Fc	63.8976
SFRM	64Fc	78.6432
SFRM	520Fc	638.9760

Fc = CDMA single channel spreading rate = 1.2288 MHz

Support Equipment – Digital Shelf Frequency List

Module	Signal	Frequency (MHz)
CORE	1Fc	1.2288
CORE	8Fc	9.8304
CORE	32Fc	39.3216
CORE	52Fc	63.8976
CORE	Oscillator	20
GPSTM	8Fc	9.8304
GPSTM		10

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



Module	Signal	Frequency (MHz)
GPSTM	Even second (50ns neg pulse 2 sec)	31.9488
GPSTM	GPS L1 Carrier	15.7542 $\pm$ 1.023
CM	IML	3.5
CM	IMC	20
CM	TDM I/F	39.3216
CEM/XCEM	8Fc	9.8304
CEM/XCEM	32Fc	39.3216
CEM/XCEM	52Fc	63.8976
CEM/XCEM	520Fc	638.976
CEM	CPU Clock	40
XCEM	CPU Clock	33, 133 & 200

3.3.1 TEST PLAN FREQUENCY LIST DEVIATIONS

None

3.4 EUT SOFTWARE

The version of software loaded into the MCBTS was release of NBSS 11.1. The firmware in each of the modules, including the TRM, was also 11.1 vintage and is given in the Table below.

MCBTS Metro Cell Load Line Up		
Module	Application Load	Boot Load
Global Positioning Module (GPSTM)	1.88	NA
Control Module (CM)	111L23b	111L23b
Channel Element Module (CEM)	111L21A	111L21A
Configuration Resource Module (CORE)	111L21A	111L21A
Transmit Receive Module (TRM)	111M22A	111L21A

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



3.5 MODE OF OPERATION

As defined by Nortel Networks:

The MCBTS Metro Cell was tested in a configuration that simulates field conditions, as closely as possible, following the installation methods as specified by Nortel Networks Installation Methods To test the CDMA MCBTS SCPA CR. The system under test was configured as follows:

Split Mode

Maximum Output Power = 42.5dBm +/- 0.5dB (800 MHz)

OCNS Channels = 6

TPTL = -6.

3.5.1 BTS SET UP & CONFIGURATIONS DETAILS

Split Mode

800 MHz	Side 0	Channels 90 (Alpha), (Beta), (Gamma) (3 radios) Channels 211 (Alpha), (Beta), (Gamma) (3 radios)
	Side 1	Channel 415 (Alpha) (1 radio) Channel 456 (Alpha) (1 radio) Channel 534 (Alpha) (1 radio)

3.5.2 TEST PLAN MODE OF OPERATION DEVIATION

None

3.6 PASS / FAIL CRITERIA

The pass/fail criteria is defined by:

➤ CFR 47 FCC Part 22

The standard limits are described in each appendices of this report.

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



4.0 SUPPORT EQUIPMENT

Support Modules required for CDMA MCBTS SCA CR Testing

QTY	Module Description	P/N	Serial Number	Release Number
1	GPS Module	NTGS50AA	NNTM74TM22EK	05
1	Control Module	NPBW40AA	CM2-PDCDAC	NA
1	Control Module	NTBW41AA	NNTM74DK57J4	P5
1	CORE	NTGS30AA	NNTM533GQFCH	P1
1	CEM 1	NTGS60BA	NNTM534083CX	77
1	CEM 2	NPGS60BA	NNTM5357H4BF	78
1	CEM 3	NPBW60BA	NNTM5340832L	77
1	CEM 4	NTGS60BA	NNTM533M1365	73
1	CEM 5	NTGS60BA	NNTM5357YCHB	80
1	CEM 6	NTGU70BA	NNTM5340XB4L	04
1	CEM 10	NTGS60BA	NNTM5357H3Y2	78
1	CEM 11	NTGS60BA	NNTM5357H448	78
1	CEM 12	NPBW70BA	NNTM5357GQPDJ	P6
1	Enhanced Control Module	NT7C25BB	ADPL0200T1JC	07
1	Digital Rack	NTGS10AA	NNTM533JMUCL	06
1	Outdoor RE	NTGS30AA	RE-0027	01
1	-48V BIP	NTGU41AA	SNMN53002POJ	03
1	DCG Shelf	NTGS20AA	NNTM533JMUKW	05

Support Test Equipment required for the CDMA MCBTS SCA Testing

QTY	Module Description	P/N	Serial Number	Release Number
1	Digital Multimeter	NA	NA	NA
1	Computer & cable (c/w Vortex 11.1)	NA	NA	NA
1	Power Meter	NA	NA	NA
7	RF Dummy Loads (150 W)	NA	NA	NA

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



APPENDICES

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091

APPENDIX A: TEST PLAN DEVIATION LOG

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



Deviation Number	Time & Date	Reference to Test Plan	Deviation from Standard (Y/N)	Description and Justification of Deviation	Core Standard Affected	Approval
None						

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091

Confidential

Page 15 of 28

October 29, 2002



APPENDIX B: RADIATED EMISSIONS 30MHZ – 1GHZ PART 22

B.1. Base Standard & Test Basis

Base Standard	ANSI C 63.4-2001
Test Basis	47 CFR FCC Part 22
Test Method	Sanmina-SCI RE Signal Substitution Method 30MHz-20GHz Revision 1.0.

B.2. Specifications

47 CFR FCC Part 22, Radiated Emissions		
Frequency	ERP limit	Theoretical Peak Limit @ 10m*
MHz	dBm	dBμV/m
30MHz – 1 GHz	-13	73.90

* Theoretical field strength based on a dipole

B.3. Measurement Uncertainty

Radiated Emissions 30MHz –1GHz	Measurement Uncertainty	Expanded Uncertainty (K=2)
(dB)	+2.15/-2.19	+4.29/-4.37

Radiated Emissions Signal Substitution 30MHz –1GHz	Measurement Uncertainty	Expanded Uncertainty (K=2)
	+/-2.74	+/-5.49

B.4. Deviations

From Standard
None

From Test Plan
None

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



B.5. Radiated Emissions Signal Substitution 30MHz-1GHz – Measurement Equipment

Description	Type/Model	Manufacturer	Serial #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Bilog Antenna	CBL 6111B	Chase	40500566	Mar 12, 03	Mar 12, 02
Mast Controller	2090	EMCO	40500188	N/A	N/A
Multi Device Controller TT1	2090	EMCO	40500197	N/A	N/A
RF Cable East range	Ferrite bead loaded cable	Suhner Succoflex	40500650	Sep 04, 03	Sep 04, 02
RF Cable from Bulkhead to LNA	Succoflex 103	Suhner Succoflex	35200/3	Sep 04, 03	Sep 04, 02
Adjustable Dipole Antenna Set	3121C	EMCO	9611-1233	Mar 04, 03	Mar 04, 02
CONTROL ROOM					
ESMI	1032.5510.23	Rohde & Schwarz	40500153/154	Jan 11, 03	Jan 11, 02
Amplifier	HP-8447F OPT H64	Hewlett Packard	40500228	Sep 04, 03	Sep 04, 02
Switch Matrix Controller	SMC-002	TDL	40500189	N/A	N/A
VERIFICATION EQUIPMENT					
RefRad	4630B	EMCO	40500257	Apr 25, 03	Apr 25, 02
RefRad (Kit)	Balun A	NA	NA	N/A	N/A
RefRad (Kit)	40cm Dipole	NA	NA	N/A	N/A
RefRad Fixture	NA	Sanmina	RefRad Fixture #1	N/A	N/A
Signal Generator 10MHz – 40GHz	SMP04	Rohde & Schwarz	40500125	Mar 27, 03	Mar 27, 02
Cable RX antenna to 3M center bulk head in 10M Chamber	104	Succoflex	116558/4	Apr 18, 03	Apr18, 02
Cable f3M center bulk head to Control room	104	Succoflex	40500627	Apr18, 03	Apr 18, 02
Cable Control room bulk head to Signal Generator	104	Succoflex	40500626	Apr 18, 03	Apr 18, 02

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



B.6. Test Set-up Special Considerations

None

B.7. Test Results

Peak Scan 30MHz – 1GHz



Sanmina
Product Integrity
Laboratory 10.5

Project Name: SCPA CR
Model: CDMA MCBTS SCPA CR
Comments:

Tester: Carlos Celario
Test ID: RE02-10M-2002-046

Standard	FCC Part 22	Measurement Distance	10	Meters
----------	-------------	----------------------	----	--------

Antenna	Frequency	AF	CF	Detector	Peak Measured Value	Corrected Value	Theoretical Limit	Theoretical Margin
	MHz	dB/m	dB		dBuV	dBuV/m	dBuV/m	dB
2261 RX BiCon Hpol	319.4793	13.27	-24.44	Peak	38.73	27.56	73.90	46.34
2261 RX BiCon Hpol	638.9731	19.79	-25.02	Peak	35.13	29.90	73.90	44.00
2261 RX BiCon Hpol	702.8497	20.35	-24.81	Peak	29.67	25.41	73.90	48.49
2261 RX BiCon Vpol	383.3635	15.63	-24.77	Peak	36.39	27.25	73.90	46.65
2261 RX BiCon Vpol	638.9629	20.40	-25.02	Peak	35.28	30.66	73.90	43.24
2261 RX BiCon Vpol	702.6626	21.15	-24.81	Peak	32.00	28.34	73.90	45.56

Corrected Value: Measured Value + AF + CF

AF: Antenna Factors & CF: Correction Factors (LNA Gain + Cable Loss)

Notes:
Positive Margin indicates a pass

Substitution Data 30MHz – 1GHz



Project Name: SCPA
Model: CDMA MCBTS SCPA CR
Comments:

Tester: Carlos Celario
Test ID: RE02-10M-2002-046

Frequency (MHz)	Polarization (V/H)	Uncorrected Peak level dBuV/m	Uncorrected Substitution measured level dBuV/m	Signal Generator level (source) dBm	Cable factor dB	Antenna Gain dB	Effective Radiated Power (E.R.P.) dBm	E.R.P. Limit dBm	Margin dB
319.4793	H	38.73	38.88	-67.40	-2.20	1.73	47.87	-13	54.87
638.9731	H	35.13	35.32	-63.60	-3.14	3.08	43.67	-13	50.67
702.8497	H	29.67	29.74	-73.00	-3.26	4.06	37.21	-13	50.21
383.3635	V	36.39	36.67	-68.60	-2.41	1.32	47.69	-13	54.69
638.9629	V	35.28	35.35	-61.90	-3.14	2.32	42.72	-12	50.72
702.6626	V	32.00	32.00	-68.30	-3.26	2.25	49.33	-13	56.33

Effective Radiate Power (E.R.P.) = Signal Generator + Cable Factor + Antenna Gain

Note: Positive Margin indicates a Pass.

The EUT is in compliance with the limits as specified in the standard 47 CFR FCC Part 22

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



B.8. Observations

None.

B.9. Deviations from Normal Operating Mode During Test

None

B.10. Sample Calculation

Emission Level = Measured Level + Correction Factors
Margin = Limit – Emission Level

ERP Limit = $P_{dBm} - (43 + 10\log(P))$
Example: $P=20w$
ERP Limit = $43dBm - (43 + 10\log(20)) = -13dBm$

Peak Limit = $120 + 20\log(\sqrt{49.2 * P} / D)$
Example: $P = -13dBm = 0.00005w$
D= 10m
Peak Limit = $120 + 20\log(\sqrt{49.2 * 0.00005}) / 10$
= 73.9 dBuV/m

Peak Limit = $120 + 20\log(\sqrt{49.2 * P} / D)$
Example $P = -13dBm = 0.00005w$
D= 3m
Peak Limit = $120 + 20\log((\sqrt{49.2 * 0.00005}) / 3)$
=84.3

B.11. Photographs

The photographs for the Radiated Emissions test appear following this page.

B.12. Signature

This testing was conducted in accordance with the ISO 17025:1999 scope of accreditation, table 1; Quality Manual.

Signature/Date:

Name:

Function:

Digitally signed
by Carlos A.
Celarie
DN: cn=Carlos
A. Celarie,
o=Sanmina-SCI
, ou=Calgary.,
c=CA
Date:
2002.10.31
13:47:03 -07'00'

Signature
Not
Verified



Carlos Celarie
EMC Technologist

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



Photograph 1. Radiated Emissions - 47 CFR FCC Part 22

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091

APPENDIX C: RADIATED EMISSIONS 1GHZ – 10GHZ PART 22**C.1. Base Standard & Test Basis**

Base Standard	ANSI C 63.4-2001
Test Basis	47 CFR FCC Part 22
Test Method	Sanmina-SCI RE Manual Method E006R4. 1GHz-18GHz. Sanmina-SCI RE Signal Substitution Method 30MHz-20GHz Revision 1.0.

C.2. Specifications

47 CFR FCC Part 22, Radiated Emissions		
Frequency	ERP limit	Theoretical Peak Limit @ 10m*
MHz	dBm	dBμV/m
1GHz – 10GHz	-13	84.3

* Theoretical field strength based on a dipole

C.3. Measurement Uncertainty

Radiated Emissions 30MHz –1GHz	Measurement Uncertainty	Expanded Uncertainty (K=2)
(dB)	+3.48/-3.51	+6.96/-7.02

Radiated Emissions Signal Substitution 30MHz –1GHz	Measurement Uncertainty	Expanded Uncertainty (K=2)
	+/-2.74	+/-5.49

C.4. Deviations**From Standard**

None

From Test Plan

None

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



C.5. Radiated Emissions Signal Substitution 1GHz – 10GHz – Measurement Equipment

Description	Type/Model	Manufacturer	Serial #	Cal Due	Cal Date
10m ANECHOIC CHAMBER					
Horn Antenna 1G-10GHz (TX)	3115	EMCO	40500087	Nov 19, 02	Nov 19, 01
Horn Antenna 1G-5.95GHz (Rx)	3115	EMCO	40500090	Jun 21, 03	Jun 21, 02
Std Gain Horn 5.95G-8.2GHz	3160-06	EMCO	40500176	N/A	N/A
Std Gain Horn 8.2G-12.5GHz	3160-07	EMCO	40500177	N/A	N/A
High pass filter	11SH103860	K&L	1/19900010	N/A	N/A
Spectrum Analyzer 9K-40GHz	FSEK	Rohde & Schwarz	40500210	Mar 12, 03	Mar 12, 02
Step Attenuator/Switch	HP11713A	HP	40500014 40500276	N/A	N/A
DC Power Supply	LXO 30-2	Xantrex	40500211	N/A	N/A
LNA	JSD000121	Miteq	830620 in box	Apr 24, 03	Apr 24, 02
HPIB Extender	HP37204	HP	40500195	N/A	N/A
Cable from Antenna to LNA	101PEA	Succoflex	1713/1PEA	Apr 18, 03	Apr 18, 02
CONTROL ROOM					
PC with FSEK Manual ctrl S/W	N/A	N/A	N/A	N/A	N/A
Signal Generator 10M -40GHz	SMP04	Rohde & Schwarz	40500125	Mar 27, 03	Mar 27, 02
HPIB Extender	HP37204	HP	40500193	N/A	N/A
Mast Controller	2090	EMCO	40500184	N/A	N/A
Multi Device Controller TT1	2090	EMCO	40500197	N/A	N/A
VERIFICATION EQUIPMENT					
Horn Antenna (TX) 1GHz-18GHz	3115	EMCO	40500088	N/A	N/A
Signal Generator 10M -40GHz	SMP04	Rohde & Schwarz	40500125	Mar 27, 03	Mar 27, 02
Cable RX antenna to 3M center bulk head	104	Succoflex	116558/4	Apr 18, 03	Apr 18, 02
Cable 3M center bulk head to Control room	104	Succoflex	40500627	Apr 18, 03	Apr 18, 02
Cable Control room bulk head to Signal Generator	104	Succoflex	40500626	Apr 18, 03	Apr 18, 02

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



C.6. Test Set-up Special Considerations

None

C.7. Test Results

Peak Scan 1GHz – 10GHz Horizontal Polarization



Sanmina
Virtual Reality
Innovation - 4.0

Project Name: SCPA CR
Model: CDMA MCBTS SCPA CR
Comments:

Tester: Carlos Celorio
Test ID: RE03-10M-2002-014

Horizontal Polarization

Standard	FCC Part 22		3 meters							
Antenna	Start Frequency	Stop Frequency	Frequency	AF	CL + LNA	Detector	Peak Measured Value	Corrected Value	Theoretical Limit	Theoretical Margin
	MHz	MHz	MHz	dBm	dB		dBuV	dBuV/m	dBuV/m	dB
3115 Hpal	1000	2700	2651.12	30.99	-60.62	Pk	86.94	57.25	84.30	27.95
3115 Vpal	2700	5950	5271.32	36.62	-54.71	Pk	73.62	55.73	84.30	28.57
3160-00	5950	8200	6108.29	29.90	-54.14	Pk	79.72	55.46	84.30	28.82
3160-07	8200	10000	8936.67	33.40	-50.07	Pk	72.34	55.67	84.30	28.63

Corrected Value: Measured Value + AF + CL + LNA.

AF: Antenna Factors & CL: Cable Loss & LNA: Amplifier

Notes:
(1) Positive Margin indicates a pass
(2) Corrected Value was measured by FBEK Virtual Instrument with all factors loaded.

Peak Scan 1GHz – 10GHz Vertical Polarization



Project Name:

SCPA CR

Model:

CDMA MCBTS SCPA CR

Comments:

Tester:

Carlos Celorio

Test ID:

RE03-10M-2002-014

Vertical Polarization

Standard	FCC Part 22			3 meters						
Antenna	Start Frequency	Stop Frequency	Frequency	AF	CL + LNA	Detector	Peak Measured Value	Corrected Value	Theoretical Limit	Theoretical Margin
	MHz	MHz	MHz	dBm	dB		dBuV	dBuV/m	dBuV/m	dB
3115 Vpal	1000	2700	2650.96	30.75	-60.62	Pk	91.69	61.80	84.30	22.50
3115 Hpal	2700	5950	5250.58	36.39	-54.63	Pk	73.98	55.54	84.30	28.76
3160-00	5950	8200	6108.71	29.90	-54.14	Pk	81.83	57.59	84.30	26.71
3160-07	8200	10000	9162.18	33.40	-49.62	Pk	71.49	55.27	84.30	29.03

Corrected Value: Measured Value + AF + CL + LNA.

AF: Antenna Factors & CL: Cable Loss & LNA: Amplifier

Notes:

(1) Positive Margin indicates a pass

(2) Corrected Value was measured by FBEK Virtual Instrument with all factors loaded.

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091



Substitution Data 1GHz – 10GHz



Project Name: SCPA CR
Model:
Comments: CDMA MCBTS SCPA CR

Tester: Carlos Celano
Test ID: RE03-10M-2002-014

Frequency (MHz)	Polarization (V/H)	Emission level	Corrected Substitution measured level	Signal Generator level (source) dBuV	Cable factor	Antenna Gain	Effective Radiated Power (E.R.P.)	E.R.P. Limit	Margin
		dBuV/m	dBuV/m	dBm	dB	dB	dBm	dBm	dB
2651.12	H	57.25	57.86	-54.40	-6.59	7.78	53.21	-13	40.21
5871.32	H	55.73	57.86	-56.70	-10.10	9.12	57.68	-13	44.68
6108.29	H	55.48	55.16	-49.10	-10.31	9.46	49.95	-13	36.95
8836.67	H	55.67	55.86	-50.40	-12.63	9.32	53.71	-13	40.71
2690.98	V	61.80	61.73	-47.90	-6.59	7.92	46.57	-13	33.57
5890.58	V	55.54	55.43	-56.30	-10.06	8.83	57.53	-13	44.53
6108.71	V	57.59	57.60	-46.00	-10.31	9.15	47.16	-13	34.16
9162.18	V	55.27	55.19	-49.90	-12.91	9.35	53.45	-13	40.45

Effective Radiate Power (E.R.P) = Signal Generator + Cable Factor + Antenna Gain

Note: Positive Margin indicates a Pass.

The EUT is in compliance with the limits as specified in the standard 47 CFR FCC Part 22.

C.8. Observations

None.

C.9. Deviations from Normal Operating Mode During Test

None

C.10. Sample Calculation

Emission Level = Measured Level + Correction Factors

Margin = Limit – Emission Level

Effective Radiated Power (ERP) = signal generator + cable factor + Antenna Gain

C.11. Photographs

The photographs for the Radiated Emissions test appear following this page.

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091

C.12. Signature

This testing was conducted in accordance with the ISO 17025:1999 scope of accreditation, table 1; Quality Manual.

Signature/Date:

Name:

Function:


Digitally signed by Carlos A. Celarie
DN: cn=Carlos A. Celarie, o=Sanmina-SCI, ou=Calgary, c=CA
Date: 2002.10.31 13:47:23 -07'00'
Signature Not Verified

Carlos Celarie
EMC Technologist



Photograph 1. Radiated Emissions - 47 CFR FCC Part 22

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091

APPENDIX D: TEST PLAN

Not attached.

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091

APPENDIX E: SUPPLEMENTARY INFORMATION

None

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Canada Product Integrity, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091

END OF DOCUMENT

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in part without permission of the testing body.

Sanmina-SCI Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-295-5134, Fax: 403-295-4091