Emissions Testing
Performed
on the
Transcept, Inc.
Opencell RAN (Base and Expansion Unit)
Part Number: 1000801G001
To
FCC Part 15, Subpart B, Class A

Date of Test: April 16, 2002

Project 3021924

Contact: Mr. Mike Prussel

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This report is designed to show compliance with the FCC Part 15, Subpart B Rules for an unintentional radiator. The test procedures, as described in American National Standards Institute C63.4-1992, were employed. A description of the product and operating configuration, the various provisions of the rules, the methods for determining compliance, and a detailed summary of the results are included within this test report.

1.0 Introduction and Conclusions

On April 16, 2002, we tested the Opencell RAN (Base and Expansion Unit), Part Number: 1000801G001, to determine if it was in compliance with the FCC Part 15, Subpart 15, Class B emissions limits. We found that the unit met the FCC Part 15 Subpart 15, Class B requirements when tested as received.

This report is designed to show compliance with the following standards:

FCC Part 15, Subpart B Rules for an Unintentional Radiator

The test procedures described in American National Standards Institute C63.4: 1992, A description of the product and operating configurations, the various provisions of the rules, the methods for determining compliance and a detailed summary of the results are included within this test report.

Configuration:

In summary, this report verifies that the Opencell RAN (Base and Expansion Unit), Part Number: 1000801G001, is compliant with the FCC Part 15 Subpart 15, Class B requirements when production units conform to the initial sample. Please address all questions and comments concerning this report to Scott Lambert, Engineering Team Leader.

2.0 Description of the Product

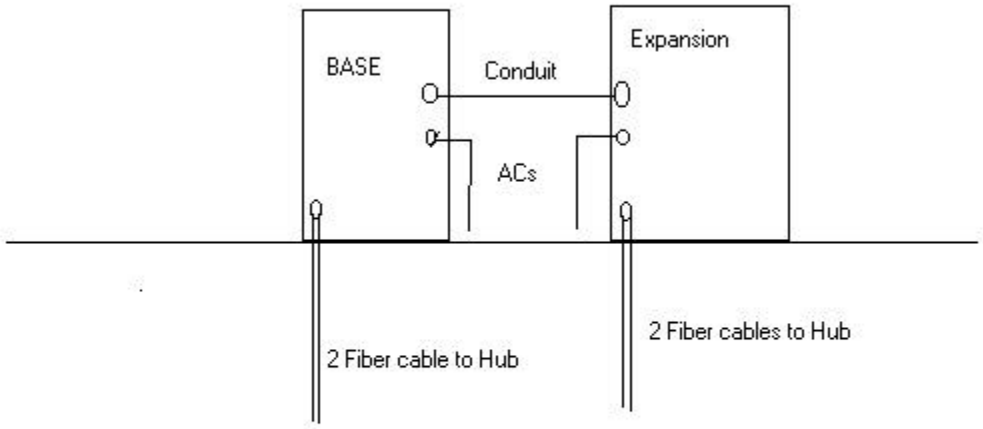
2.1 Brief Description and Received Condition

The OpenCell System consists of the RAN and the HUB. The RAN (Radio Access Node) is an RF transceiver operating in the PCS, Cellular, and SMR bands (FCC Part 22, 24 and 90). The RAN is designed to be installed opn utility poles along with a customer antenna.

A production version of the sample was received on Tuesday, April 16, 2002 in good condition.

2.2 System Block Diagram

The diagram shown below details the placement of the equipment under test on the turntable. Please note that the equipment on the rear of the table was centered along the back edge. Equipment on the front of the turntable was centered along the front edge. All peripherals were separated by 10cm.



2.3 System Test Configuration

Equipment Under Test: Opencell RAN (Base and Expansion Unit)

Part Number: 1000801G001

Serial Number: 8010008 (Base Unit) and 8010010 (Expansion Unit)

Support Equipment:

Keyboard		
	Manufacturer:	KeyTronic
	Model:	E03601QLPS2-C
	Serial Number:	J972605143
	FCC ID:	CIGE03600W
Color Monitor		
	Manufacturer:	CTX
	Model:	VL-400
	Serial Number:	19293200817
	FCC ID:	DBL1454EL
Mouse		
	Manufacturer:	Logitech
	Model:	M-CQ38
	Serial Number:	LZA63418564
	FCC ID:	DZLM04
Signal Generator		
	Manufacturer:	HP
	Model:	8648C
	Serial Number:	3537A02215
	FCC ID:	Not Applicable
Hub		
	Manufacturer:	Opencell
	Model:	ENGINEERING
	Serial Number:	Not Labelled
	FCC ID:	Not Applicable

Power Supply

Manufacturer:	LAMBDA
Model:	FE150048-RA
Serial Number:	0120 08815892
FCC ID:	Not Applicable

Computer

Manufacturer:	PC Warehouse
Model:	IIS Baseline
Serial Number:	04269834873-02
FCC ID:	Not Labelled

Cables:

QTY	Description	Shield Description	Hood Description	Length (m)
4	Single Mode Fiber Cable	None	Metal with Drain Wire	8
1	Conduit Cable	Shield	Metal with Drain Wire	0.5

2.4 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in C63.4 (1992).

For maximizing emissions, the system was rotated through 360^{o}, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data received.

All support equipment was remotely located. The EUT was on the center of the turntable.

Radiated emissions were tested in the range of 30 MHz to 2.0 GHz.

2.5 Description of how EUT was exercised during test

Two RAN enclosure (Base RAN and Expansion RAN) were interconnected along with a battery enclosure on the turntable.

The HUB was setup below the ground plane, and connected to the RAN with fiber optic cables. An IF signal was injected into the HUB (at 32 MHz.).

The HUB was configured using the latest operating system software.

Eight RF carriers were transmitted by the RANs (6 PCS, 1 Cellular, and 1 SMR) and RAN RF outputs connected to RF loads.

2.6 Modifications Required for Compliance

No modifications were implemented by Intertek Testing Services.

3.0 Radiated Emission

3.1 Radiated Emissions Limits

The following table shows the radiated emission limits for FCC Part 15 Subpart B Section 15.109:

Class A

Frequency (MHz)	Field Strength Limit		
	mV/m at 10m	dBmV/m at 10m	dBmV/m at 3m
30 to 88	90	39.1	49.6
88 to 216	150	43.5	54.0
216 to 960	210	46.4	56.9
Above 960	300	49.5	60.0

(1) Determined using a 20 dB/decade extrapolation. The specified test distance is 10 meters, however measurements at another distance is allowed provided measurements are not made in the near-field and it can be determined the emissions can be measured at that distance (See Section 15.31 (f)(1) of the FCC's rules).

(2) The tighter limit applies at the band-edge.

3.2 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB/m
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBµV/m

Level in µV/m = $[10^{(32\ dB\mu V/m)/20)}]$ = 39.8 µV/m

3.3 Configuration Photographs - Worst-Case Radiated Emission

3.4 Test Data

The following results were obtained when the device was tested as described in this report.

Radiated Emissions / Interference

Table: 1

Company: Transcept, Inc. | Tested by: Michael Ogunleye
Model: 1000801G001 | Location: Site 3C
Project No.: 3021924 | Detector: HP 8542E
Serial No.: 8010008 (Base) & 8010010 (Expansion) | Temps/Humidity: 75C/22%
Date: 04/16/02 | Antenna: LOG3
Standard: FCC15 | PreAmp: None
Class: A | Group: None | Cable(s): 3C
Notes: | Distance: 10 meters

Abbreviations: nb - narrow band, bb - broadband, pk - peak measurement

	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	M
BB	V	31.700	9.8	17.1	0.9	0.0	0.0	27.8	39.1	-
BB	V	37.990	13.0	13.5	1.0	0.0	0.0	27.5	39.1	-
BB	V	41.480	11.4	11.9	1.0	0.0	0.0	24.3	39.1	-
BB	V	45.190	17.1	10.5	1.0	0.0	0.0	28.6	39.1	-
BB	V	51.370	20.5	8.5	1.1	0.0	0.0	30.0	39.1	
BB	V	52.190	22.1	8.3	1.1	0.0	0.0	31.5	39.1	
BB	V	61.820	19.3	6.9	1.2	0.0	0.0	27.4	39.1	-
BB	V	86.300	22.8	6.8	1.4	0.0	0.0	31.0	39.1	
BB	V	120.200	9.3	6.8	1.8	0.0	0.0	17.9	43.5	-
BB	V	122.400	15.1	6.8	1.8	0.0	0.0	23.7	43.5	-
NB	V	143.400	13.9	7.9	1.9	0.0	0.0	23.8	43.5	-
NB	V	200.700	10.4	9.9	2.3	0.0	0.0	22.7	43.5	-

4.0 AC Mains Line-Conducted Emissions

4.1 Line-Conducted Emission Limits

The following table shows the line-conducted emission limits for FCC Part 15 Subpart B Section 15.107:

Class A

Frequency (MHz)	Conducted Limit	
	mV	dBmV
0.45 to 1.705	1000	60
1.705 to 30	3000	69.5

(1) The tighter limit applies at the band-edge.

4.2 Configuration Photographs - Worst-Case Line-Conducted Emission

4.3 Test Data

The following results were obtained when the device was tested as described in this report.

Conducted Emissions / Interference

Table: 2

Company:	Transcept, Inc.	Tested by:	Michael Ogunleye
Model:	1000801G001	Location:	Site 3C
Serial No.:	8010008 (Base)	Temp./Humidity:	80C/24%
Project No.:	3021924	Detector:	HP 8542E
Date:	4/16/02	Cable:	CBL10MS3
Standard:	FCC15	Limiter:	yes
Class:	A	Group: None	
Notes:	BASE Unit		

Abbreviations: nb - narrow band, bb - broadband, pk - peak measurement

Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	LISN Side 1 Loss dB	Lisn Side 2 Loss dB	Cable Loss dB	Attenuator Factor dB	Quasi-Peak Net dB(uV)	Quasi-Peak Limit dB(uV)	Quasi-Peak Margin dB
No emissions detected above the measuring equipment noise floor.									

Conducted Emissions / Interference

Table: 3

Company: Transcept, Inc.
Model: 1000801G001
Serial No.: 8010010 (Expansion)
Project No.: 3021924
Date: 4/16/02
Standard: FCC15
Class: A Group: None
Notes: Expansion Unit.

Tested by: Michael Ogunleye
Location: Site 3C
Temp./Humidity: 80C/24%
Detector: HP 8542E
Cable: CBL10MS3
Limiter: yes

Abbreviations: nb - narrow band, bb - broadband, pk - peak measurement

Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	LISN Side 1 Loss dB	Lisn Side 2 Loss dB	Cable Loss dB	Attenuator Factor dB	Quasi-Peak Net dB(uV)	Quasi-Peak Limit dB(uV)	Quasi-Peak Margin dB
No emissions detected above the measuring equipment noise floor.									

5.0 Miscellaneous Information

5.1 Site Description

SITE 3C - At this time, three weather-sheltered open field test sites are in use. Site 3 is surrounded by a wire mesh groundplane extension of 25m x 37m to permit 30m operation, and a turntable capacity is increased to 12,000 lbs.

Each site is comprised of a 33' x 57' continuous metal sheet groundplane, sheltered by an arched, flexible plastic cover supported by semicircular fiberglass ribs. Maximum interior height is 16'. The groundplane is earthed at 3' intervals around its periphery by grounding straps outside of the foundation. Access to the site is provided by both a personnel door and a 10' x 10' operable flap in the plastic cover.

Each site has a 12' diameter flush-mounted motorized turntable and remote-controlled mast for antenna height and polarization. A half-basement provides access below the turntable for support equipment and mains power selection.

The operation and test equipment are located below the groundplane at a mezzanine level, permitting observation of the EUT without affecting the measurement of radiated emissions.

For 30m antenna distances in Site 3, the antenna mast is located outside of the plastic shelter, on the wire mesh extension of the groundplane.

All unnecessary equipment is removed from the site following the shipping and storing procedures of the Standard Operating Procedures. Any packaging material is moved to a corner of the site. Packing material is generally non-conductive. Any metal shipping contains are removed entirely from the site, and, if necessary due to inclement weather, either sheltered in plastic or removed to another location.

5.2 Test Procedure Reference

For radiated emissions testing:

ANSI C63.4:1992

For line-conducted emissions testing

ANSI C63.4:1992

5.3 Labeling - USA

Class A Labelling
and
Instruction Manual Requirements

Devices subject to Class A verification must be labelled with the following statement:

> **This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

In addition, for a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

> **Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**
>
> **NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.**

If shielded cables or other specialized accessories are necessary for the unit to achieve compliance, a statement similar to the following should be added:

> **Shielded cables must be used with this unit to ensure compliance with the Class A FCC limits.**

5.4 Labelling - Canada

Canadian Emissions Requirements

The intent of the amendment is to establish Canadian Regulations which are harmonized with the existing FCC Regulations. As such, no retesting is required and devices which have been tested and comply with the FCC Specifications (Class A or B) also comply with the Canadian Specification (Class A or B).

A record of the measurements and results shall be retained by the manufacturer or importer for a period of at least five years and made available for examination on the request of the Canadian Government.

A written notice indicating compliance must accompany each unit of digital apparatus to the end user. The notice shall be in the form of a label that is affixed to the apparatus. Where because of insufficient space or other restrictions, it is not feasible to affix a label to the apparatus, the notice may be in the form of a statement included in the user's manual.

This Class [*] digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe [*] est conforme à la norme NMB-003 du Canada.

[*] Insert either "A" or "B" but not both as appropriate for the equipment requirements.

5.5 Test Report Certification

Company Name: Transcept, Inc.
955 Perimeter Road
Manchester, NH 03103

Attention: Mr. Mike Prussel

Part No.: 1000801G001

Serial Nos.: 8010008 (Base Unit) and 8010010 (Expansion Unit)

Report Date: April 23, 2002

Test Site Location: Site 3C

INTERTEK TESTING SERVICES NA INC.
70 Codman Hill Road
Boxborough, Massachusetts 01719

We attest to the accuracy of this report:

Michael S. Ogunleye
Signature

Michael S. Ogunleye
Testing Performed By

Senior Project Engineer
Title

5.6 Equipment List

The following equipment was used to make measurements for emissions testing:

Description	Manufacturer	Model	Serial #	Cal Due
ANTENNA	EMCO	3142	9711-1224	11/14/02
Spectrum Analyzer	Agilent	E7405A	US40240205	11/2/02
Cable, SMA - SMA, < 18GHz	Sucoflex (Huber Suhner)	104PE	CBLSHF103	4/1/03
HORN ANTENNA	EMCO	3115	9602-4675	5/29/02
Cable, BNC - BNC, 10m long	Alpha	RG-58C/U	CBL10MS3	8/24/02
Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS22A	8/24/02
RF FILTER	Hewlett Packard	85420E	3427A00177	1/23/03
EMI Receiver W/RF Filter	Hewlett Packard	8542E	3625A00188	1/24/03
LISN, 50uH, .01 - 50MHz	SOLAR ELECTRONICS	9252-50-R-24-BNC	955107	3/20/03
LISN, 50uH, .01 - 50MHz	SOLAR ELECTRONICS	9252-50-R-24-BNC	941713	5/21/02