RF Exposure Test Report

Test Report No. :	**T31348-00-01AA**	January 22, 2007
		Date of issue

Type / Model Name : LIB PX, EMERALD / WIFI / WISIPLUS

Product Description : Electronic Article Surveillance Detection System

Applicant : Checkpoint Systems, Inc.

Address : 101 Wolf Drive, Thorofare

New Jersey, USA 08086

Manufacturer : Checkpoint Systems Dominican Republic

Address : Checkpoint Caribbean, Zona Franca Los Alcarrizos

Manzana A. Edif No 1, Apartado Postal No. 182-0

Los Alcarrizos, Santo Domingo, Republica Dominicana

Licence holder : Checkpoint Systems, Inc.

Address : 101 Wolf Drive, Thorofare

New Jersey, USA 08086

Test Result according to the standards listed in clause 1 test standards:	**POSITIVE**

Deutscher Akkreditierungs Rat

DAT-P-207/05-00

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

Contents

1 T E S T S T A N D A R D S

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart C - Intentional Radiators (October 01, 2005)

Part 15, Subpart C, Section 15.209(a)	Radiated emissions, general requirements
Part 15, Subpart C, Section 15.247(b)(1)	Maximum Peak output Power of intentional radiator
Part 15, Subpart C, Section 15.215(c)	Additional Provisions to the general radiated emission limitations

FCC Rules and Regulations Part 15 Subpart E – Unlicensed National Information Infrastructure Devices (October 01, 2005)

Part 15, Subpart E, Section 15.407	General technical requirements

FCC Rules and Regulations Part 1 Subpart I - Procedures Implementing the National Environmental Policy Act of 1969

Part 1, Subpart I, Section 1.1310	Radiofrequency radiation exposure limits.

OET Bulletin 65, 65A, 65B, 65C Edition 97-01, August 1997 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

2 S U M M A R Y

GENERAL REMARKS:

The EAS don't contribute any emissions for evaluating compliance for Human Exposure RF.
The built in CB3000 operates in both the 2.4 GHz and 5 GHz bands and is kompatible with 802.11a/802.11b and 802.11g technology.

DECLARATION:

The EuT consists of 2 certified components:

1. EAS with FCC ID: DO4EMRLDUP
2. WLAN bridge CB3000 with FCC ID: H9PCB3000

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample   : acc. to storage records

Testing commenced on   : 04. December 2006

Testing concluded on   : 15. January 2007

Checked by: Tested by:

Thomas Weise
Dipl.-Ing.(FH)
Laboratory Manager

Anton Altmann
Dipl.-Ing.(FH)

3 EQUIPMENT UNDER TEST

3.1   Photo documentation of the EuT

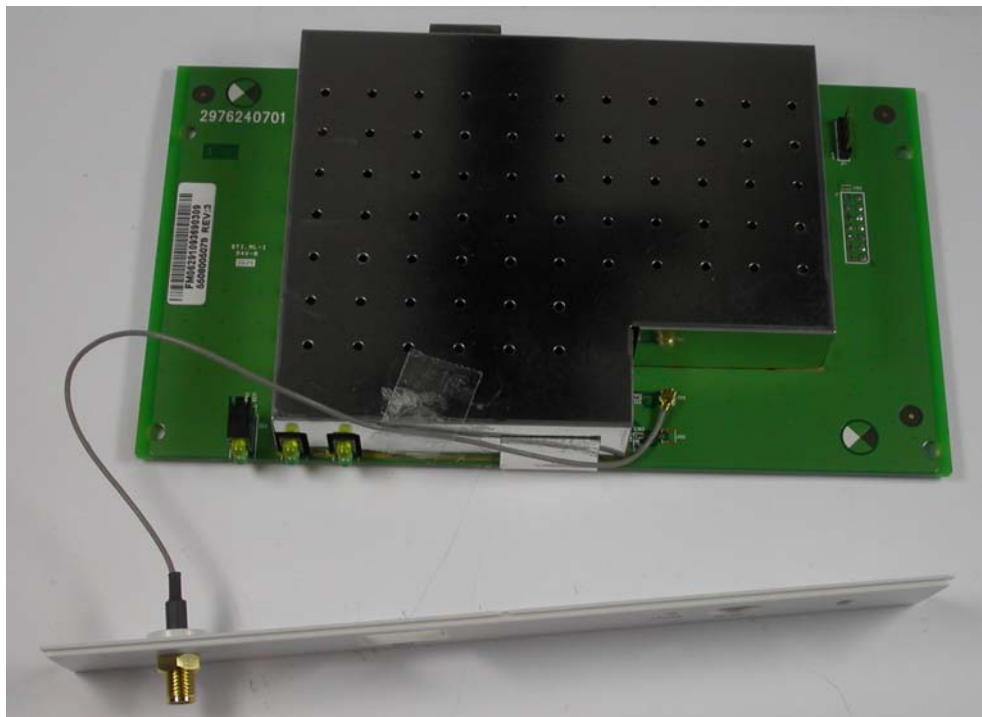LIB PX with EMERALD electronics and CB3000

Wifi Bridge CB3000
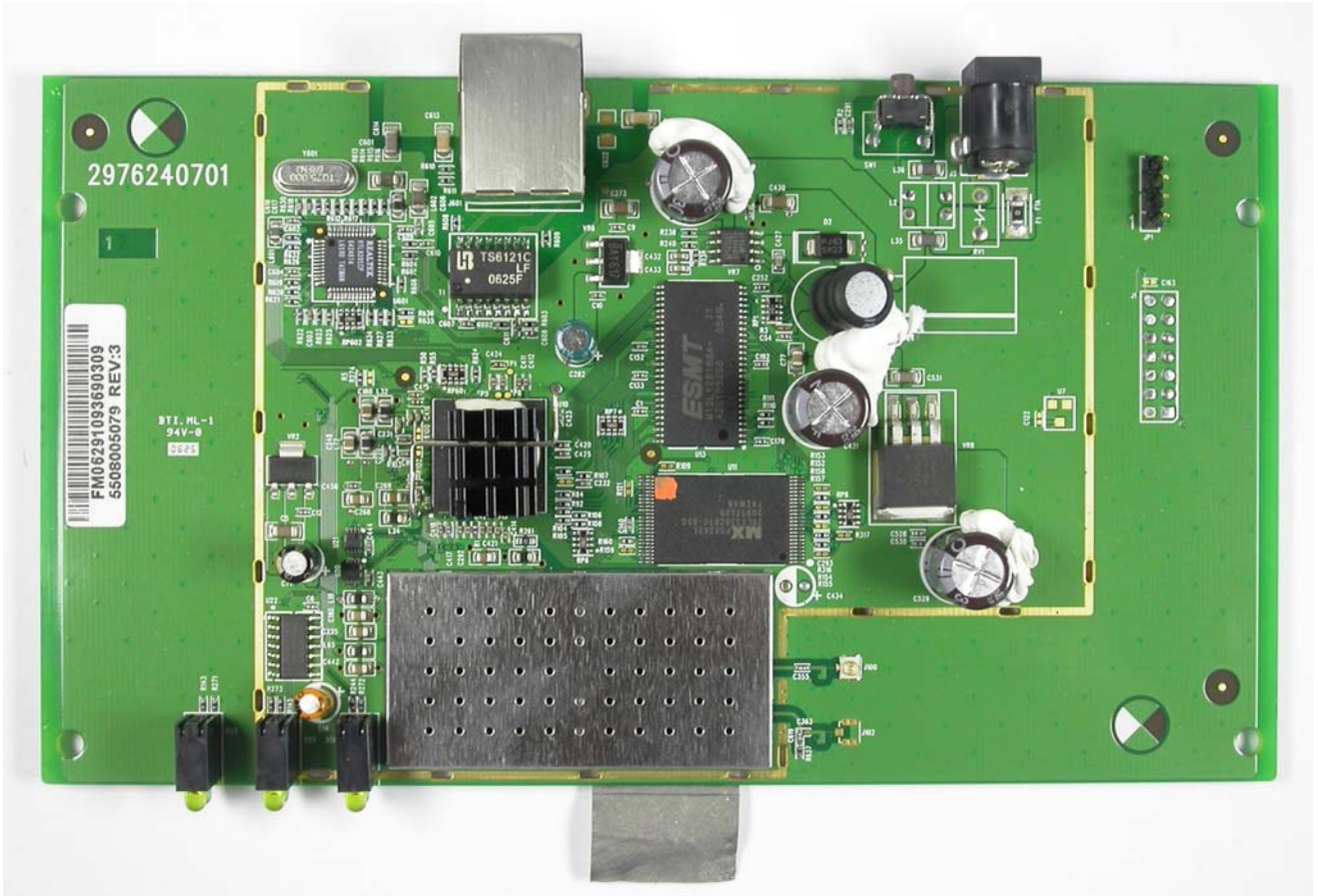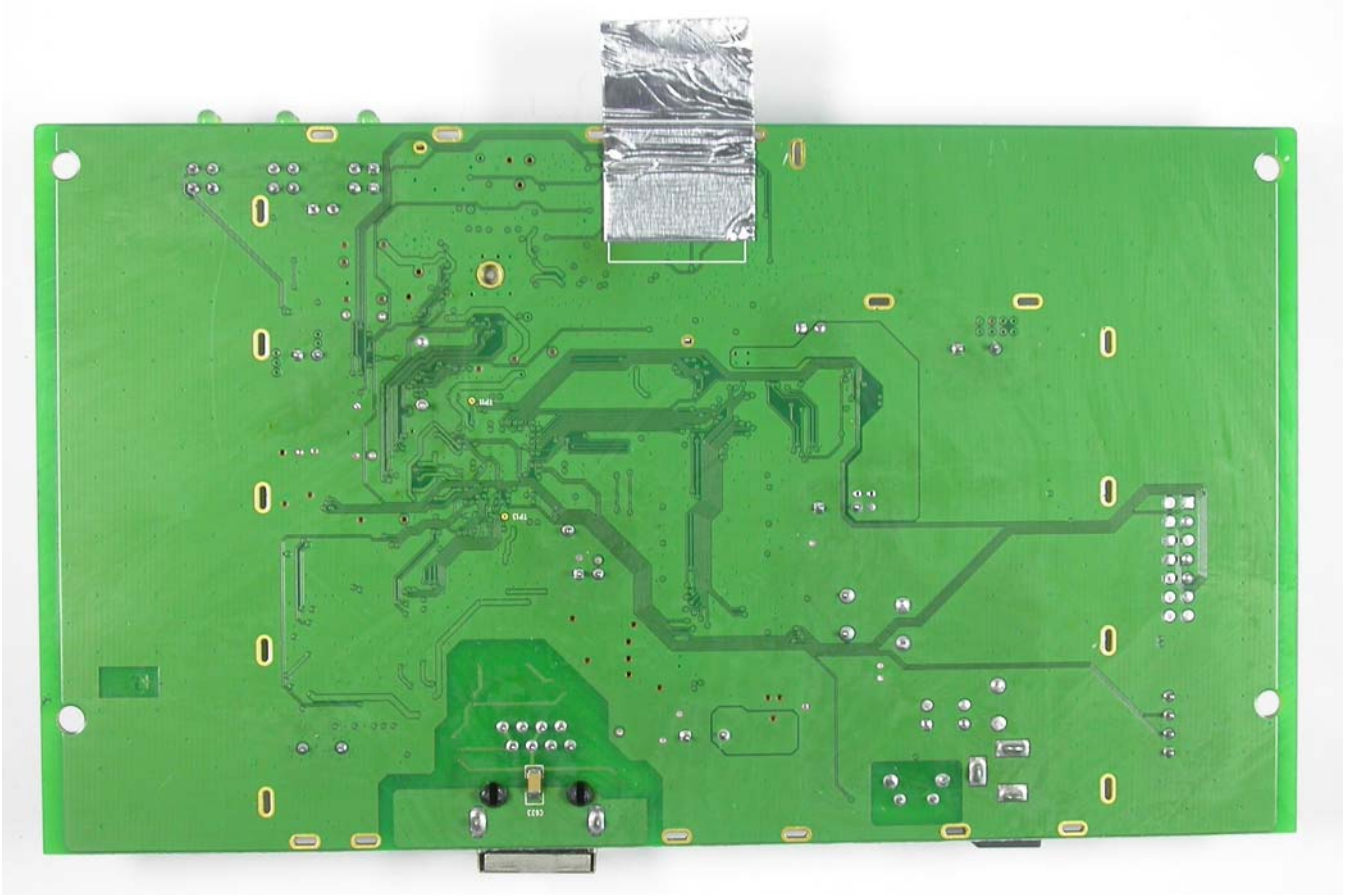
External Photo

Assembly PCB / Antenna

Internal Photo

Antenna

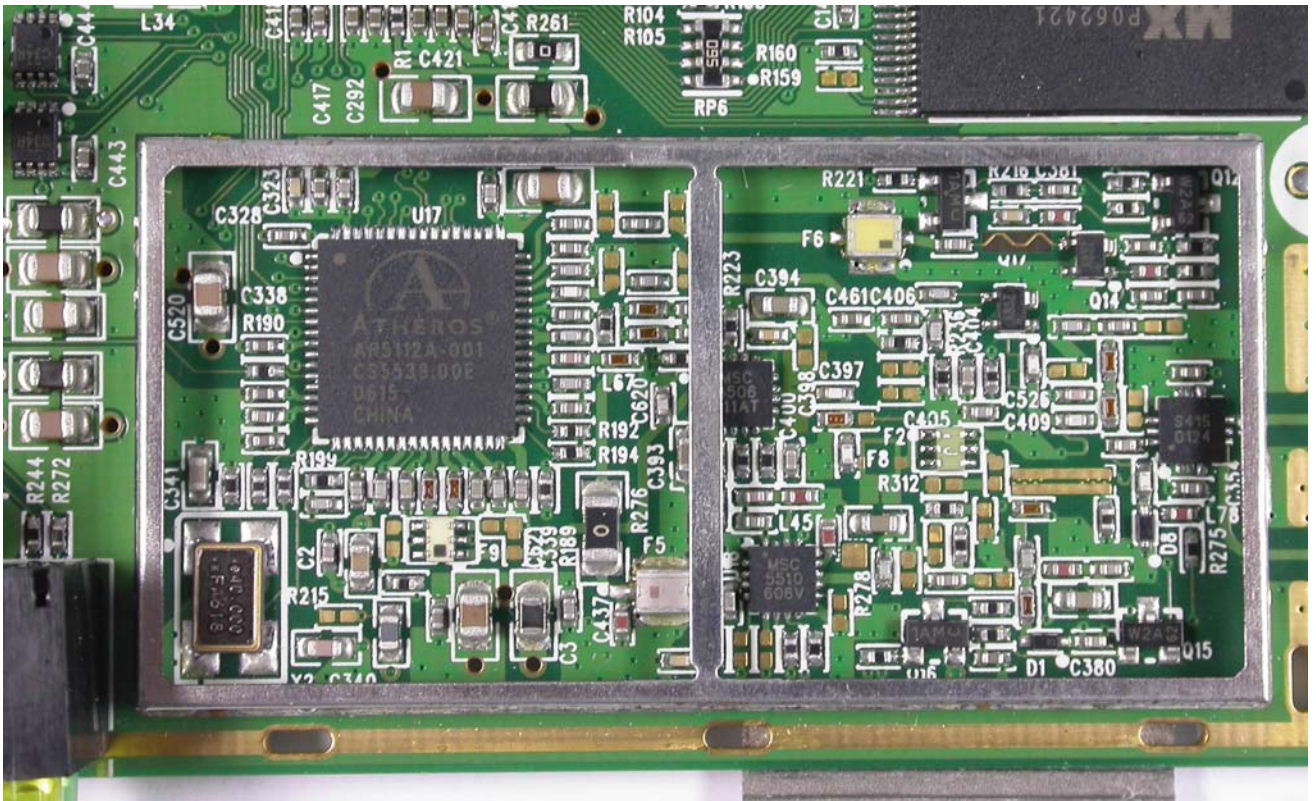## 3.2 Power supply system utilised

Power supply voltage   :   Emerald electronic 115 V / 60 Hz / 1φ - 24 V / DC
                                                  Wifi Bridge CB3000 24 VDC/12 VDC

3.3 Short description of the Equipment under Test (EuT)

The Liberty PX Antenna with Emerald Electronic is an Electronic Article Surveillance System (EAS). The system detects target tags attached to merchandise. The targets resonate in the region of 8.2 MHz or 9.5 MHz. When an article of merchandise is purchased, the target is deactivated which causes it to no longer resonate. The Liberty PX Antenna with Emerald Electronic monitors an area 3-feet on either side of the antenna in the 7.4 to 10.0 MHz range and triggers an alarm when a non-deactivated target is detected.

The CB3000 provides a reliable interface between the Ethernet port of EMERALD electronic and WLAN switches or access points.

Number of tested samples: 1
Serial number CB3000:   6202529900114

EuT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- Continuous transmit mode

The software provided by Manufacturer enabled the CB3000 to transmit data at lowest, middle and highest

channel individually.

EuT configuration:
(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- PSU (Power Supply Unit) GlobTek   Model : GT-2S5024D-R, S/N RoHS00984803/06

- DC Power supply 24VDC/12VDC   Model : P/N 7273140 (used for CB3000)

-   Model :

-   Model :

-   Model :

-   Model :

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 Strasskirchen
Germany

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 /11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements" and is documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.4 Measurement Protocol for FCC

4.4.1 GENERAL INFORMATION

4.4.1.1 Test Methodology

The maximum total power input to the antenna has been measured conducted. Through the Friis transmission formula and the known maximum gain of the antenna, the distance can be calculated, away from the product, where the limit of MPE is reached.
Also the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. This has been used as the worst case to specify the safety range.

Friis Formula

Friis transmission formula: $P_d = \dfrac{P_{out} * G}{4 * \Pi * r^2}$

where

P_d = power density in mW/cm^2
P_{out} = output power to antenna in mW
G = gain of antenna (linear scale)
r = distance between antenna and observation point [cm]

4.4.1.2 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions.

4.4.2 DETAILS OF TEST PROCEDURES

The test methods used comply with ANSI/IEEE C95.1-1992, "IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".
This test report shows the compliance with the limits for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 and the criteria to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in FCC 1.1307(b).

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
(A) Limits for Occupational / Controlled Exposure				
300-1500	---	---	f/300	6
1500-100000	---	---	5.0	6
(B) Limits for General Population / Uncontrolled Exposure				
300-1500	---	---	f/1500	30
1500-100000	---	---	1.0	30

f = Frequency in MHz

5 TEST CONDITIONS AND RESULTS

5.1 Maximum Permissible Exposure (MPE)

For test instruments and accessories used see section 6 Part **MPE**.

5.1.1 Description of the test location

Test location: AREA4

5.1.2 Description of Measurement

Conducted maximum peak output power:

A spectrum analyzer / EMI test receiver is connected to the ouput of the transmitter via a suitable attenuator while EuT was operating in transmit mode using the assigned frequency.
Analyzer Settings:
- Detector: Max hold
- RBW: greater than 20 dB Bandwidth
- VBW: ≥ RBW
- Sweep Time: Coupled

5.1.3 Test result

5.1.3.1 Results of power density in relation to the limit at a distance of 20 cm.

802.11b
DSSS Modulation
Antenna gain 3 dBi

Frequency band: 2400 -2483.5 MHz

Channel	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
1	22.5	2412	51.404	0.020	1.0
6	22.5	2437	45.186	0.018	1.0
11	22.5	2462	52.119	0.021	1.0

802.11g
OFDM Modulation
Antenna gain 3 dBi

Frequency band: 2400 -2483.5 MHz

Channel	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
1	17.0	2412	20.941	0.008	1.0
6	22.5	2437	68.077	0.027	1.0
11	17.0	2462	21.478	0.009	1.0

802.11a
OFDM Modulation
Antenna gain 4 dBi

Frequency band: 5150 -5250 MHz

Channel	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
36	13.0	5180	13.397	0.007	1.0
48	17.5	5240	42.462	0.021	1.0

Frequency band: 5250 – 5350 MHz

Channel	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
52	17.5	5260	36.308	0.018	1.0
64	16.5	5320	22.542	0.011	1.0

Frequency band: 5470 – 5725 MHz

Channel	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
100	22.0	5500	81.658	0.041	1.0
120	22.0	5600	73.114	0.037	1.0
140	22.0	5700	76.736	0.038	1.0

Frequency band: 5725 – 5825 MHz

Channel	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
149	19.5	5745	40.644	0.020	1.0
157	19.5	5785	51.286	0.026	1.0
165	19.5	5825	59.979	0.030	1.0

The requirements are **FULFILLED.**

Remarks:

5.1.3.2 Results of distances calculated in relation of power density of 1 mW/cm^2

802.11b
DSSS Modulation
Antenna gain 3 dBi

Frequency band: 2400 -2483.5 MHz

Channel no	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Distance (cm)
1	22.5	2412	51.404	1.0	2.86
6	22.5	2437	45.186	1.0	2.68
11	22.5	2462	52.119	1.0	2.88

802.11g
OFDM Modulation
Antenna gain 3 dBi

Frequency band: 2400 -2483.5 MHz

Channel no	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Distance (cm)
1	17.0	2412	20.941	1.0	1.82
6	22.5	2437	68.077	1.0	3.29
11	17.0	2462	21.478	1.0	1.85

802.11a
OFDM Modulation
Antenna gain 4 dBi

Frequency band: 5150 -5250 MHz

Channel no	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Distance (cm)
36	13.0	5180	13.397	1.0	1.64
48	17.5	5240	42.462	1.0	2.91

Frequency band: 5250 – 5350 MHz

Channel no	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Distance (cm)
52	17.5	5260	36.308	1.0	2.69
64	16.5	5320	22.542	1.0	2.12

Frequency band: 5470 – 5725 MHz

Channel no	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Distance (cm)
100	22.0	5500	81.658	1.0	4.04
120	22.0	5600	73.114	1.0	3.82
140	22.0	5700	76.736	1.0	3.92

Frequency band: 5725 – 5825 MHz

Channel no	Software Setting	Frequency [MHz]	Peak Power Output to Antenna (mW)	Power Density (mW/cm^2)	Distance (cm)
149	19.5	5745	40.644	1.0	2.85
157	19.5	5785	51.286	1.0	3.20
165	19.5	5825	59.979	1.0	3.46

The requirements are **FULFILLED.**

Remarks: 1. On request of the customer the Friis Formula for far field has been used to calculate the

maximum distance for RF exposure for the limit of 1 mW/cm^2.

2. The distance between the antenna of CB3000 and the area of Human Exposure of RF

measures at least 2 cm.

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

The calibration intervals and the calibration history will be given out on request.

Test ID	Model / Type	Kind of Equipment	Manufacturer	Equipment No.
MPE	FSP 30	Spectrum Analyzer	Rohde&Schwarz	02-02/11-05-001