

31040/SIT



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3000 Bristol Circle,
Oakville, Ontario,
Canada L6H 6G4

Tel.: (905) 829-1570
Fax: (905) 829-8050

Website: www.ultratech-labs.com
Email: vic@ultratech-labs.com

Nov. 29, 2002

CANSEC INC.

3105 Unity Drive, Suite # 9
Mississauga, Ontario
CANADA L5L 4L2

Attn.: Mr. Ed Malconian

**Subject: FCC Certification Application Testing under FCC PART 15,
Subpart C - Unlicensed Low Power Transmitter operating in the
frequency band 13.553-13.567 MHz.**

Product: ZODIAC FINGERPRINT READER
Model No.: ZODRCS
FCC ID: OD5-ZODRCS

Dear Mr. Malconian,

The product sample, as provided by you, has been tested and found to comply with
**FCC PART 15, Subpart C - Unlicensed Low Power Transmitter operating in the
frequency band 13.553-13.567 MHz.**

Enclosed you will find copies of the engineering report. If you have any queries, please
do not hesitate to contact us.

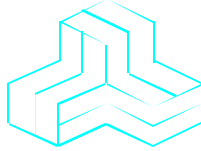
Yours truly,



Tri Minh Luu, P. Eng.,
V.P., Engineering

Encl

ENGINEERING TEST REPORT



ZODIAC FINGERPRINT READER Model No.: ZODRCS

FCC ID: OD5-ZODRCS

Applicant: **CANSEC SYSTEMS LIMITED**
3105 Unity Drive, Suite # 9
Mississauga, Ontario
CANADA L5L 4L2

In Accordance With

**FEDERAL COMMUNICATIONS COMMISSION (FCC)
PART 15, SUBPART C
Unlicensed Low Power Transmitter
operating in the band 13.553-13.567 MHz**

UltraTech's File No.: CSC-019F15.225

This Test report is Issued under the Authority of
Tri M. Luu, Professional Engineer,
Vice President of Engineering
UltraTech Group of Labs



Date: Nov. 29, 2002

Report Prepared by: Tri Luu

Tested by: Hung Trinh, RFI Technician

Issued Date: Nov. 29, 2002

Test Dates: Nov. 25, 2002

- The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.
- This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.

UltraTech

3000 Bristol Circle, Oakville, Ontario, Canada, L6H 6G4

Tel.: (905) 829-1570 Fax.: (905) 829-8050

Website: www.ultratech-labs.com Email: vic@ultratech-labs.com, Email: tri.luu@sympatico.ca



31040/SIT

C-1376

46390-2049

200093-0

00-034

TABLE OF CONTENTS

EXHIBIT 1.	SUBMITTAL CHECK LIST.....	4
EXHIBIT 2.	INTRODUCTION	5
2.1.	SCOPE.....	5
2.2.	RELATED SUBMITAL(S)/GRANT(S).....	5
2.3.	NORMATIVE REFERENCES	5
EXHIBIT 3.	PERFORMANCE ASSESSMENT	6
3.1.	CLIENT INFORMATION.....	6
3.2.	EQUIPMENT UNDER TEST (EUT) INFORMATION	6
3.3.	THEORY OF OPERATION	7
3.4.	EUT'S TECHNICAL SPECIFICATIONS	8
3.5.	LIST OF EUT'S PORTS	8
3.6.	ANCILLARY EQUIPMENT	8
3.7.	BLOCK DIAGRAM OF TEST SETUP	9
EXHIBIT 4.	EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS	10
4.1.	CLIMATE TEST CONDITIONS.....	10
4.2.	OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TEST S.....	10
EXHIBIT 5.	SUMMARY OF TEST RESULTS.....	11
5.1.	LOCATION OF TESTS	11
5.2.	MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES.....	11
5.3.	APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS.....	11
EXHIBIT 6.	MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS	12
6.1.	TEST PROCEDURES.....	12
6.2.	MEASUREMENT UNCERTAINTIES.....	12
6.3.	MEASUREMENT EQUIPMENT USED:.....	12
6.4.	ESSENTIAL/PRIMARY FUNCTIONS AS DECLARED BY THE MANUFACTURER:.....	12
6.5.	COMPLIANCE WITH FCC PART 15 – GENERAL TECHNICAL REQUIREMENTS.....	13
6.6.	26 DB BANDWIDTH @ FCC 15.407(A)	14
6.6.1.	Limits.....	14
6.6.2.	Method of Measurements.....	14
6.6.3.	Test Equipment List	14
6.6.4.	Test Data.....	14
6.6.5.	Plots of Measurements	15
6.7.	FIELD STRENGTH OF EMISSIONS INSIDE & OUTSIDE THE PERMITTED BAND 13.553-13.567 MHz @ 10 METERS, FCC 15.225(A) & (B)	16
6.7.1.	Limits.....	16
6.7.2.	Method of Measurements.....	17
6.7.3.	Test Equipment List	17
6.7.4.	Photographs of Test Setup	17
6.7.5.	Test Data.....	18

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File #: CSC-019F15.225

Nov. 29, 2002

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)



31040/SIT

C-1376

46390-2049

200093-0

00-034

6.8.	FREQUENCY STABILITY @ FCC §15.225(c)	21
6.8.1.	Limits	21
6.8.2.	Method of Measurements	21
6.8.3.	Test Equipment List	21
6.8.4.	Test Arrangement	21
6.8.5.	Test Data	22
6.9.	AC POWERLINE CONDUCTED EMISSIONS @ FCC PART 15, SUBPART B, PARA.15.207	23
6.9.1.	Limits	23
6.9.2.	Method of Measurements	23
6.9.3.	Test Equipment List	23
6.9.4.	Test Data	24
EXHIBIT 7.	MEASUREMENT UNCERTAINTY	31
7.1.	LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY	31
7.2.	RADIATED EMISSION MEASUREMENT UNCERTAINTY	32
EXHIBIT 8.	MEASUREMENT METHODS	33
8.1.	GENERAL TEST CONDITIONS	33
8.1.1.	Normal temperature and humidity	33
8.1.2.	Normal power source	33
8.1.3.	Operating Condition of Equipment under Test	33
8.2.	METHOD OF MEASUREMENTS - AC MAINS CONDUCTED EMISSIONS	34
8.3.	SPURIOUS EMISSIONS	38
8.4.	26 DB BANDWIDTH MEASUREMENTS	40
8.5.	FREQUENCY STABILITY	40

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Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: CSC-019F15.225

Nov. 29, 2002

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)



31040/SIT

C-1376

46390-2049

200093-0

00-034

EXHIBIT 1. SUBMITTAL CHECK LIST

Annex No.	Exhibit Type	Description of Contents	Quality Check (OK)
	Test Report	- Exhibit 1: Submittal check lists - Exhibit 2: Introduction - Exhibit 3: Performance Assessment - Exhibit 4: EUT Operation and Configuration during Tests - Exhibit 5: Summary of test Results - Exhibit 6: Measurement Data - Exhibit 7: Measurement Uncertainty - Exhibit 8: Measurement Methods	OK
1	Test Setup Photos	Photos # 1 to 2	OK
2	External Photos of EUT	Photos # 1 to 3	OK
3	Internal Photos of EUT	Photos of 1 to 9	OK
4	Cover Letters	Letter from Ultratech for Certification Request	OK
5	Attestation Statements	- Letter from the Applicant to appoint Ultratech to act as an agent - Letter from the Applicant to request for Confidentiality Filing	OK Submitted by supplier
6	ID Label/Location Info	- ID Label - Location of ID Label	OK OK
7	Block Diagrams	Block Diagrams	Submitted by supplier
8	Schematic Diagrams	Schematic Diagrams	Submitted by supplier
9	Parts List/Tune Up Info	Parts List/Tune Up Info	N/A
10	Operational Description	Operational Description	OK
11	RF Exposure Info	N/A	N/A
12	Users Manual	Users Manual	OK

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File #: CSC-019F15.225

Nov. 29, 2002

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31040/SIT

C-1376

46390-2049

200093-0

00-034

EXHIBIT 2. INTRODUCTION

2.1. SCOPE

Reference:	FCC Part 15, Subpart C - Unlicensed Low Power Transmitter
Title	Telecommunication - Code of Federal Regulations, CFR 47, Part 15, Subpart C
Purpose of Test:	This report is covered test results for Certification compliance with FCC regulations for Unlicensed Low Power Transmitter operating in the 13.553-13.567 MHz band.
Test Procedures	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute 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 9 kHz to 40 GHz.
Environmental Classification:	• Light-industry, Commercial • Industry

2.2. RELATED SUBMITAL(S)/GRANT(S)

None

2.3. NORMATIVE REFERENCES

Publication	YEAR	Title
FCC CFR Parts 0-19	2001	Code of Federal Regulations – Telecommunication
ANSI C63.4	1992	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CISPR 22 & EN 55022	1997	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
CISPR 16-1	1998	Specification for Radio Disturbance and Immunity measuring apparatus and methods

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File #: CSC-019F15.225

Nov. 29, 2002

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)



31040/SIT

C-1376

46390-2049

200093-0

00-034

EXHIBIT 3. PERFORMANCE ASSESSMENT

3.1. CLIENT INFORMATION

APPLICANT:	
Name:	CANSEC SYSTEMS LIMITED
Address:	3105 Unity Drive, Suite # 9 Mississauga, Ontario CANADA L5L 4L2
Contact Person:	Mr. Ed Malconian Phone #: 905-820-2404 Fax #: 905-820-0301 Email Address: malconiane@Cansec.com

MANUFACTURER:	
Name:	CANSEC SYSTEMS LIMITED
Address:	3105 Unity Drive, Suite # 9 Mississauga, Ontario CANADA L5L 4L2
Contact Person:	Mr. Ed Malconian Phone #: 905-820-2404 Fax #: 905-820-0301 Email Address: malconiane@Cansec.com

3.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name	CANSEC SYSTEMS LIMITED
Product Name	ZODIAC FINGERPRINT READER
Model Name or Number	ZODRCS
Serial Number	01756
Type of Equipment	Unlicensed Low Power Transmitter
Input Power Supply Type	AC-DC External Power Supply, by Elpac Power Systems, Model W1512, Input 100-240V, 1A, Output: 12 Vdc

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File #: CSC-019F15.225
Nov. 29, 2002

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3.3. THEORY OF OPERATION

The Cansec Model ZODRCS employs a 13.56 MHz Radio Module which is manufactured by Inside Technologies.

After the power (12VDC) is applied to the unit, the right LED on the unit turns on. The left LED stays off and the unit goes through self test mode which usually takes about 15 - 20 seconds.. The self test sequence is as follows.

The main interface board will try to communicate with the contactless reader module through RS232 . If the communication is successful, the unit will beep three times . But if the communication fails the left LED will flash red then green for five times then goes off . This sequence will be repeated every 15 seconds until the communication between the main interface board and the contact less reader is successful or the problem is corrected.

After establishing successful communication with the contactless reader module, the main interface board will try to establish communication with the finger print reader module through RS232. If the communication is successful the left LED turns on and stays on indicating that the self test is completed otherwise the unit will beep three times and repeat the previous step until is successful or the problem is fixed.

After the self test is completed the unit will enter the idle state, where it scans contentiously for contactless smart cards that are within range of 3 inches or less and contain Cansec data .

If a User presents a card at the unit, the unit will try to read the card implementing ASK modulation, Manchester coding protocol. During the reading the left LED flashes rapidly indicating that an active communication between the unit and the contactless card is in process, which usually takes about a second .

Once the data transfer is completed successfully the unit beeps once indicating to the user that the reading is complete at the same time the finger print reader scanner turns on, prompting the user to place a finger . The scanner captures the image of the finger and compares it with the data that was read from the card . If the matching is successful the unit beeps once and the left LED turns green for 3 seconds then turns red again while an ID number associated with user=s card is sent to the host controller through pins one and two of the eight pin connector . If the matching is unsuccessful the unit will beep three times and the left LED flashes red three times simultaneously, indicating to the user that the verification failed . No data is sent to the host controller.

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File #: CSC-019F15.225

Nov. 29, 2002

All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)



31040/SIT

C-1376

46390-2049

200093-0

00-034

3.4. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	▪ Base station (fixed use) - Wall mounted
Intended Operating Environment:	▪ Commercial, light industry & heavy industry
Power Supply Requirement:	12 Vdc using an external AC-DC power supply
RF Output Power Rating:	342.77 uV/m at 10 meters
Operating Frequency Range:	13.553-13.567 MHz
RF Output Impedance:	50 Ohms
Channel Spacing:	1
Duty Cycle:	100%
26 dB Bandwidth:	4.14 kHz
Modulation Type:	ASK ISO 15693 Manchester coding 26 KBit Baud
Emission Designation:	4K1D1D
Oscillator Frequencies:	4.9152 MHz , 36.864 MHz, 13.56 MHz
Antenna Connector Type:	Internal, integral PCB Loop Antenna located inside the plastic enclosure

3.5. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type/Cable Length	Cable Type (Shielded/Non-shielded)
1	RS-232	1	Wiring Harness	Non-shielded
1	DC Supply Input Port	1	Wiring Harness	Non-shielded

3.6. ANCILLARY EQUIPMENT

No ancillary equipment necessary to exercise the ports during tests:

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Nov. 29, 2002

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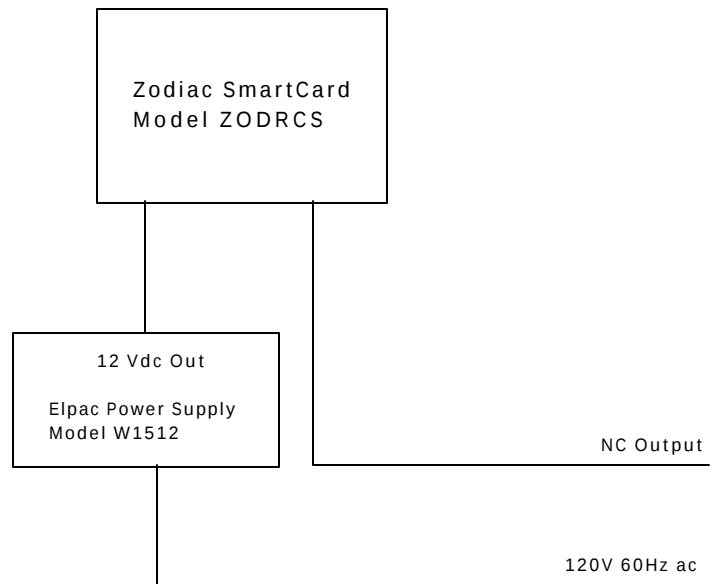
C-1376

46390-2049

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3.7. BLOCK DIAGRAM OF TEST SETUP



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File #: CSC-019F15.225

Nov. 29, 2002

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31040/SIT

C-1376

46390-2049

200093-0

00-034

EXHIBIT 4. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

4.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	12 Vdc using an external AC-DC power supply

4.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The transmitter radiate 13.56 MHz continuously during testing
Special Test Software:	None
Special Hardware Used:	None
Transmitter Test Antenna:	Internal, integral PCB Loop Antenna

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File #: CSC-019F15.225

Nov. 29, 2002

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31040/SIT

C-1376

46390-2049

200093-0

00-034

EXHIBIT 5. SUMMARY OF TEST RESULTS

5.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- Radiated Emissions were performed at the Ultratech's 10 meter Open Field Test Site (OFTS) situated in the Town of Oakville, province of Ontario.

The above sites have been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville Open Field Test Site has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada File No.: IC2049). Last Date of Site Calibration: Aug. 20, 2002.

5.2. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None

5.3. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC PARAGRAPH.	TEST REQUIREMENTS	COMPLIANCE (YES/NO)
15.203 & 15.204	The transmitter shall use a transmitting antenna that is an integral part of the device	Yes
	Power Limits & 26 dB Bandwidth	Yes
15.225(a) & (b)	Field Strength of Emissions inside and outside the permitted band 13.553-13.567 MHz	Yes
15.225(c)	Frequency Stability	Yes
15.107 & 15.207	Class B - AC Power Conducted Emissions on Tx, Rx and standby modes	Yes
15.109(b)	Class B - Radiated Emissions from Unintentional Radiators	Yes. A separate test report will be provided upon request.

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Nov. 29, 2002

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31040/SIT

C-1376

46390-2049

200093-0

00-034

EXHIBIT 6. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

6.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in Exhibit 8 of this report and ANSI C63-4:1992

6.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document NIS 81 with a confidence level of 95%. Please refer to Exhibit 7 for Measurement Uncertainties.

6.3. MEASUREMENT EQUIPMENT USED:

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C64-3:1992, FCC 15.407 and CISPR 16-1.

6.4. ESSENTIAL/PRIMARY FUNCTIONS AS DECLARED BY THE MANUFACTURER:

The essential function of the EUT is to correctly communicate data to and from radios over RF link.

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C-1376



46390-2049



200093-0



00-034



6.5. COMPLIANCE WITH FCC PART 15 – GENERAL TECHNICAL REQUIREMENTS

FCC Section	FCC Rules	
15.203	Described how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT. The exception is in those cases where EUT must be professionally installed. In order to demonstrate that professional installation is required, the following 3 points must be addressed: • The application (or intended use) of the EUT • The installation requirements of the EUT • The method by which the EUT will be marketed	Conforms. Integral, permanently attached and located inside the enclosure
15.204	Provided the information for every antenna proposed for use with the EUT: (a) type (e.g. Yagi, patch, grid, dish, etc...), (b) manufacturer and model number (c) gain with reference to an isotropic radiator	N/A

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200093-0

00-034

6.6. 26 DB BANDWIDTH @ FCC 15.407(A)

6.6.1. Limits

N/A. The 26 dB bandwidth shall be less than 14 kHz.

6.6.2. Method of Measurements

Refer to Exhibit 8, Sec. 8.3 of this test report.

6.6.3. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Hewlett Packard	HP 8546A	...	9 kHz to 5.6 GHz with built-in 30 dB Gain Pre-selector, QP, Average & Peak Detectors.
Biconilog Antenna	EMCO	3142	10005	30 MHz to 2 GHz

6.6.4. Test Data

CHANNEL FREQUENCY (MHz)	26 dB BANDWIDTH (kHz)
13.56	4.14

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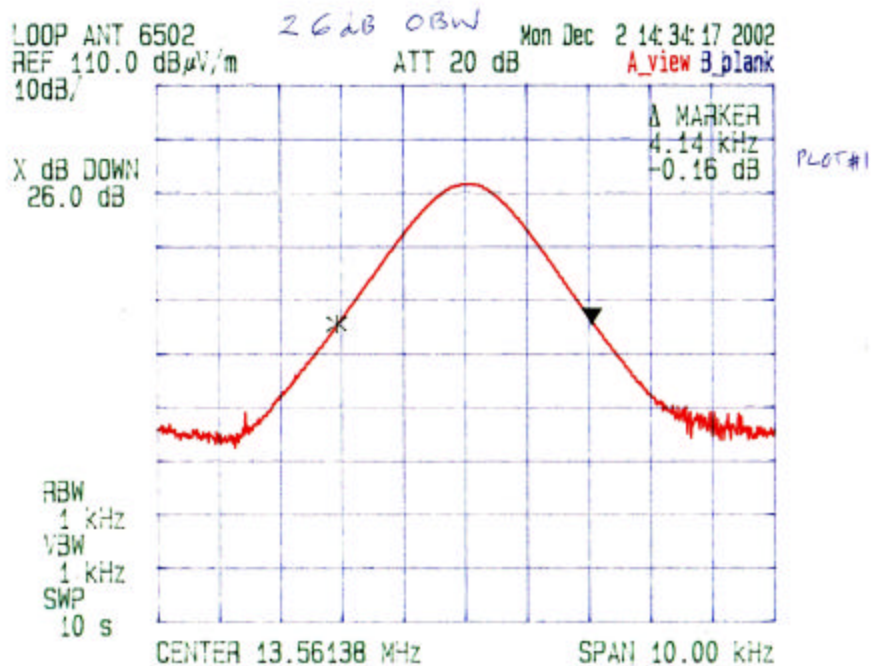
C-1376

46390-2049

200093-0

00-034

6.6.5. Plots of Measurements



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31040/SIT

C-1376

46390-2049

200093-0

00-034

6.7. FIELD STRENGTH OF EMISSIONS INSIDE & OUTSIDE THE PERMITTED BAND 13.553-13.567 MHZ @ 10 METERS, FCC 15.225(A) & (B)

6.7.1. Limits

- (a) The field strength of any emissions within this band shall not exceed 10,000 microvolts/meter (80 dBuV/m) at 30 meters or 89.5 dBuV/m at 10 meters
- (b) The field strength of any emissions appearing outside of this band shall not exceed the general radiated emission limits shown in Sec. 15.209.

Remarks:

FCC CFR 47, Part 15, Subpart C, Para. 15.205(a) - Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	162.0125 - 167.17	2310 - 2390	9.3 - 9.5
0.49 - 0.51	167.72 - 173.2	2483.5 - 2500	10.6 - 12.7
2.1735 - 2.1905	240 - 285	2655 - 2900	13.25 - 13.4
8.362 - 8.366	322 - 335.4	3260 - 3267	14.47 - 14.5
13.36 - 13.41	399.9 - 410	3332 - 3339	14.35 - 16.2
25.5 - 25.67	608 - 614	3345.8 - 3358	17.7 - 21.4
37.5 - 38.25	960 - 1240	3600 - 4400	22.01 - 23.12
73 - 75.4	1300 - 1427	4500 - 5250	23.6 - 24.0
108 - 121.94	1435 - 1626.5	5350 - 5460	31.2 - 31.8
123 - 138	1660 - 1710	7250 - 7750	36.43 - 36.5
149.9 - 150.05	1718.8 - 1722.2	8025 - 8500	Above 38.6
156.7 - 156.9	2200 - 2300	9000 - 9200	

FCC CFR 47, Part 15, Subpart C, Para. 15.209(a)
-- Field Strength Limits within Restricted Frequency Bands --

FREQUENCY (MHz)	FIELD STRENGTH LIMITS (microvolts/m)	DISTANCE (Meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / F (KHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

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File #: CSC-019F15.225

Nov. 29, 2002

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6.7.2. Method of Measurements

Refer to Exhibit 8, Sec. 8.3 of this test report and ANSI 63.4-1992, Para. 8 for detailed radiated emissions measurement procedures.

Applies to harmonics/spurious that fall in the restricted bands listed in Section 15.205. the maximum permitted average field strength is listed in Section 15.209. A Pre-Amp and highpass filter are used for this measurement.

- For measurements from 9 KHz to 150 KHz, set RBW = 200 Hz, VBW $\geq$ RBW, SWEEP=AUTO.
- For measurements from 150 KHz to 30 MHz, set RBW = 10 KHz, VBW $\geq$ RBW, SWEEP=AUTO.
- For measurements from 30 MHz to 1 GHz, set RBW = 100 KHz, VBW $\geq$ RBW, SWEEP=AUTO.
- For measurement above 1 GHz, set RBW = 1 MHz, VBW = 1 MHz, SWEEP=AUTO.

If the emission is pulsed, modified the unit for continuous operation, then use the settings above for measurements, then correct the reading by subtracting the peak-average correction factor derived from the appropriate duty cycle calculation. See Section 15.35(b) and (c).

6.7.3. Test Equipment List

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Hewlett Packard	HP 8593EM	3412A00103	9 kHz – 26.5 GHz
Peak Power Meter & Peak Power Sensor	Hewlett Packard	8900 8481A	2131A00124 2551A01965	0.1-18 GHz 50 Ohms Input
Microwave Amplifier	Hewlett Packard	HP 83017A		1 GHz to 26.5 GHz
Active Loop Antenna	EMCO	6507	8906-1167	1 kHz – 30 MHz
Log Periodic/Bow-Tie Antenna	EMCO	3143	1029	20 - 1000 MHz

6.7.4. Photographs of Test Setup

Refer to photos # 1 and 3 in Annex 1 for photos of test setup

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File #: CSC-019F15.225

Nov. 29, 2002

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C-1376

46390-2049

200093-0

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6.7.5. Test Data

The radiated emissions were scanned from 10 kHz to 1 GHz and all emission less than 20 dB below the FCC Limits were recorded

FREQUENCY (MHz)	RF LEVEL @10m (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA		MARGIN (dB)	PASS/ FAIL
			PLANE (H/V)	LIMIT 10m (dBuV/m)		
13.560	50.7	PEAK	0 degree	89.5	-38.8	PASS
13.560	46.3	PEAK	90 degrees	89.5	-43.2	PASS
40.69	22.0	PEAK	V	29.5	-7.5	PASS
40.69	19.4	PEAK	H	29.5	-10.1	PASS
43.30	22.8	PEAK	V	29.5	-6.7	PASS
43.30	19.6	PEAK	H	29.5	-9.9	PASS
49.30	24.0	PEAK	V	29.5	-5.5	PASS
49.30	20.3	PEAK	H	29.5	-9.2	PASS
54.25	26.1	QP	V	29.5	-3.4	PASS
54.25	19.9	PEAK	H	29.5	-9.6	PASS
57.30	21.9	PEAK	V	29.5	-7.6	PASS
57.30	17.8	PEAK	H	29.5	-11.7	PASS
67.80	19.7	PEAK	V	29.5	-9.8	PASS
67.80	13.9	PEAK	H	29.5	-15.6	PASS
81.38	27.0	PEAK	V	29.5	-2.5	PASS
81.38	16.2	PEAK	H	29.5	-13.3	PASS
93.00	19.5	PEAK	V	33.0	-13.5	PASS
93.00	13.8	PEAK	H	33.0	-19.2	PASS
95.30	24.2	PEAK	V	33.0	-8.8	PASS
95.30	18.5	PEAK	H	33.0	-14.5	PASS
103.00	25.8	PEAK	V	33.0	-7.2	PASS
103.00	16.9	PEAK	H	33.0	-16.1	PASS
108.80	24.2	PEAK	V	33.0	-8.8	PASS
108.80	19.9	PEAK	H	33.0	-13.1	PASS
122.06	25.0	PEAK	V	33.0	-8.0	PASS
122.06	25.0	PEAK	H	33.0	-8.0	PASS
124.08	24.8	PEAK	V	33.0	-8.2	PASS
124.08	22.4	PEAK	H	33.0	-10.6	PASS
135.80	25.0	PEAK	V	33.0	-8.0	PASS
135.80	21.5	PEAK	H	33.0	-11.5	PASS
141.98	19.1	PEAK	V	33.0	-13.9	PASS
141.98	19.2	PEAK	H	33.0	-13.8	PASS

Continued ...

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File #: CSC-019F15.225

Nov. 29, 2002

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FREQUENCY (MHz)	RF LEVEL @10m (dBuV/m)	DETECTOR USED (PEAK/QP)	ANTENNA		MARGIN (dB)	PASS/ FAIL
			PLANE (H/V)	LIMIT 10m (dBuV/m)		
149.17	21.2	PEAK	V	33.0	-11.8	PASS
149.17	17.6	PEAK	H	33.0	-15.4	PASS
162.74	19.2	PEAK	V	33.0	-13.8	PASS
162.74	18.3	PEAK	H	33.0	-14.7	PASS
190.60	21.7	PEAK	V	33.0	-11.3	PASS
190.60	18.0	PEAK	H	33.0	-15.0	PASS
204.20	24.3	PEAK	V	33.0	-8.7	PASS
204.20	18.6	PEAK	H	33.0	-14.4	PASS
217.60	23.8	PEAK	V	35.5	-11.7	PASS
217.60	18.9	PEAK	H	35.5	-16.6	PASS
230.56	31.9	PEAK	V	35.5	-3.6	PASS
230.56	26.8	PEAK	H	35.5	-8.7	PASS
245.20	26.3	PEAK	V	35.5	-9.2	PASS
245.20	24.6	PEAK	H	35.5	-10.9	PASS
258.50	23.6	PEAK	V	35.5	-11.9	PASS
258.50	24.3	PEAK	H	35.5	-11.2	PASS

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File #: CSC-019F15.225

Nov. 29, 2002

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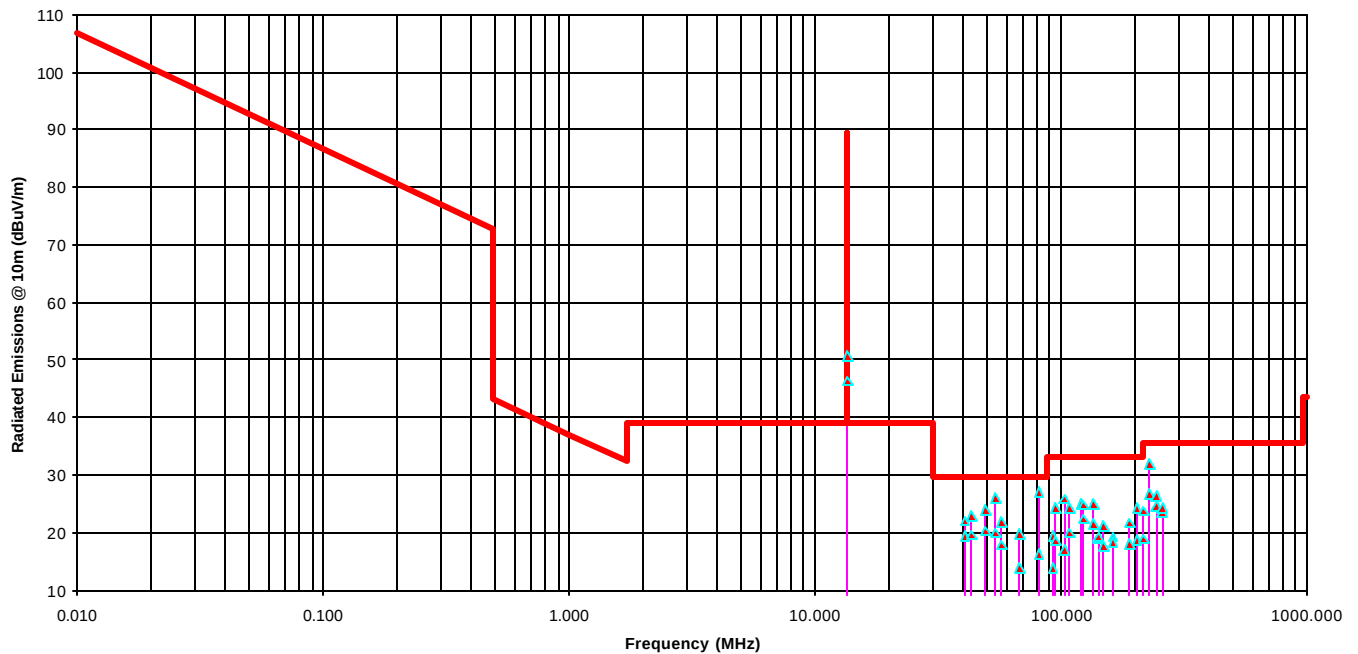
C-1376

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CANSEC SYSTEMS LTD.
ZODIAC FINGERPRINT READER, Model No.: ZODRCS
Transmitter Freq.: 13.56 MHz
Radiated Emissions Measurements @ 10m OFTS



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31040/SIT

C-1376

46390-2049

200093-0

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