

DATE: 08 February 2011

I.T.L. (PRODUCT TESTING) LTD.
FCC Radio Test Report
for
Orpak Systems Ltd.

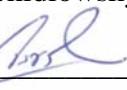
Equipment under test:

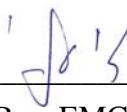
Orpak Tag Reader With Keyboard (OrTR KB)*

800910933 *

* See customer's declaration on pages 5 to 7.

Written by: 
D. Shidlowsky, Documentation

Approved by: 
A. Sharabi, Test Engineer

Approved by: 
I. Raz, EMC Laboratory Manager

This report must not be reproduced, except in full, without the written permission of I.T.L. (Product Testing) Ltd.

This report relates only to items tested.



Measurement/Technical Report for Orpak Systems Ltd.

Orpak Tag Reader With Keyboard (OrTR KB)

800910933

FCC ID: W8F800910933

This report concerns:

Original Grant:

Class I change:

Class II change:

Equipment type:

Part 15 Low Power Communication Device Transmitter

47CFR15 Section 15.225

Measurement procedure used is ANSI C63.4-2003.

Application for Certification
prepared by:

Ishaishou Raz
ITL (Product Testing) Ltd.
Kfar Bin Nun
D.N. Shimshon 99780
Israel
e-mail Sraz@itl.co.il

Applicant for this device:
(different from "prepared by")

Gideon Segal
Orpak Systems Ltd.
31 Lechi St.
P.O.B. 1461
Bnei-Brak 5114
Israel
Tel: +972- 3 - 577 - 6868
Fax: +972- 6 - 579 - 6310
e-mail: gidi@orpak .com

TABLE OF CONTENTS

1. GENERAL INFORMATION -----	4
1.1 Administrative Information.....	4
2. LIST OF ACCREDITATIONS -----	7
2.1 Product Description	8
2.2 Test Methodology	9
2.3 Test Facility	9
2.4 Measurement Uncertainty	9
3. SYSTEM TEST CONFIGURATION-----	10
3.1 Justification.....	10
3.2 EUT Exercise Software	10
3.3 Special Accessories	10
3.4 Equipment Modifications	10
3.5 Configuration of Tested System.....	10
4. TEST SET-UP PHOTOS-----	11
5. FIELD STRENGTH OF FUNDAMENTAL-----	13
5.1 Test Specification	13
5.2 Test Procedure.....	13
5.3 Measured Data.....	13
5.4 Test Instrumentation Used, Field Strength of Fundamental	16
6. SPURIOUS RADIATED EMISSION, 9 KHZ – 30 MHZ -----	17
6.1 Test Specification	17
6.2 Test Procedure.....	17
6.3 Measured Data.....	17
6.4 Test Instrumentation Used, Radiated Measurements	19
6.5 Field Strength Calculation	19
7. SPURIOUS RADIATED EMISSION 30 – 136 MHZ -----	20
7.1 Test Specification	20
7.2 Test Procedure.....	20
7.3 Test Data.....	20
7.4 Test Instrumentation Used, Radiated Measurements	22
7.5 Field Strength Calculation	22
8. FREQUENCY TOLERANCE -----	23
8.1 Test Specification	23
8.2 Test Procedure.....	23
8.3 Test Results	23
8.1 Test Instrumentation Used, Radiated Measurements	27
9. APPENDIX A - CORRECTION FACTORS -----	28
9.1 Correction factors for CABLE	28
9.2 Correction factors for CABLE	29
9.3 Correction factors for LOG PERIODIC ANTENNA	30
9.4 Correction factors for BICONICAL ANTENNA.....	31
9.5 Correction factors for ACTIVE LOOP ANTENNA	32

1. General Information

1.1 Administrative Information

Manufacturer: Orpak Systems Ltd.

Manufacturer's Address: 31 Lechi St.
Bnei-Brak 51114
Israel
Tel: +972-3-577-6868
Fax: +972-3-579-6310

Manufacturer's Representative: Carlos Wolman

Equipment Under Test (E.U.T): Orpak Tag Reader With Keyboard
(OrTR KB) (See customer's
declaration on following pages)

Equipment Model/Serial No.: 800910933 (See customer's
declaration on following pages)

Equipment Serial No.: Not Designated

Date of Receipt of E.U.T: 24.01.11

Start of Test: 24.01.11

End of Test: 25.01.11

Test Laboratory Location: I.T.L (Product Testing) Ltd.
Kfar Bin Nun,
ISRAEL 99780

Test Specifications: FCC Part 15 Subpart C

Date: 23/1/2011

DECLARATION

I HEREBY DECLARE THAT

OrTR KB

P/N 800910933



**IS A FULL CONFIGURATION MODEL including:
ORPAK'S Logo, MiFare Reader, RS485, LAN, RS232, SWIPE (MAGNRTIC CARD
READER), ENGLISH KEYPAD.**

OTHER MODELS WHICH INCLUDE

P/N	Description
OrTR KB	OrTR KB
800910925	ORTR-KB (GB, MF, SW, ENG)
800910926	ORTR-KB (OR, MF, ENG)
800910927	ORTR-KB (OR, MF, SW, ENG)
800910928	ORTR-KB (OR, MF, LAN, ENG)
800910929	ORTR-KB (OR, MF, LAN, SW, ENG)

And



P/N	Description
OrTR	OrTR
800910910	ORTR (OR, MF, LAN)
800910920	ORTR (OR, MF)
800910925	ORTR (OR, MF, LAN, SW)
800910930	ORTR (GB, MF, SW)
800910931	ORTR (OR, MF, SW)
800910934	ORTR (GB, MF)
800910935	ORTR (GB, MF, LAN, SW)

And



P/N	Description
FHO MIFARE POD	FHO MIFARE POD
800910980	FHO MIFARE POD UNIT

DIFFER FROM THE OrTR KB ONLY BY SOFTWARE AND/OR EXTRACTED COMPONENTS/ASSEMBLIES.

The enclosures of OrTR KB, OrTR & FHO MIFARE POD UNIT are constructed from the same plastic material.

Please relate to them all (from an EMC point of view) as the same product.

Thank you,
Signature:

Printed Name: Gidi Segal



Quality Assurance Director
Orpak Systems Ltd.

2. List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

2.1 **Product Description**

The Orpak Tag Reader (OrTR) is a standalone unit for reading contactless MiFare cards and tags (13.56 MHz) intended for vehicle or driver tag identification in gas stations (see Figure 1). It can also be equipped with an optional magnetic card reader, at the right-hand side of the unit. The OrTR includes a Security Application Module (SAM) used to handle encrypted contactless cards and tags. The OrTR is within easy reach of the customer wishing to refuel and transmits the information to the station automation system (OrCU) over an RS-485 shielded cable. The OrTR is designed to be installed in



a non hazardous location in the station.

Figure 1. OrTR, General view

The OrTR has a stylish-look, with a clean panel, which includes two indicators (green and red) and a large LCD. Its operation is very simple: to start a fuel purchase, all the customer has to do is to wave the tag or card in front of the unit. After the tag is recognized and validated, clear messages shown on the display guide the customer and help him to complete the transaction. In addition to the LCD, an internal buzzer beeps to provide audio feedback and the status of the current operation is indicated by the green and red indicators. One or several OrTRs can be installed in a single station for improved service. In this case, all OrTRs in the station should be connected to the same single OrCU (e.g. Fuel



Truck Controller or others) via RS-485.connection.

Figure 2. OrTR KB, General view

The OrTRs with keyboard (see Figure 2) is similar to the one with no keyboard except for its dedicated keyboard; The full keyboard enables the user to operate the unit and insert the vehicle required data to be sent to the Station Controller.

The FHO MIFARE POD UNIT (see Figure 3) is constructed from the basic OrTR attached to a plastic box.



Figure 3. FHO MIFARE POD UNIT, General view

2.2 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

2.3 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing September 3, 2009).

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

2.4 Measurement Uncertainty

Radiated Emission

The Open Site complies with the ± 4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

3. System Test Configuration

3.1 **Justification**

The E.U.T. was tested on a table in vertical position simulating normal operation.

3.2 **EUT Exercise Software**

The E.U.T. was operated using the following software:

819810925 F/W, ORTR TERMINAL 8.0027

Hyper Terminal (on the auxiliary laptop)

3.3 **Special Accessories**

No special accessories were needed in order to achieve compliance.

3.4 **Equipment Modifications**

No modifications were needed in order to achieve compliance

3.5 **Configuration of Tested System**

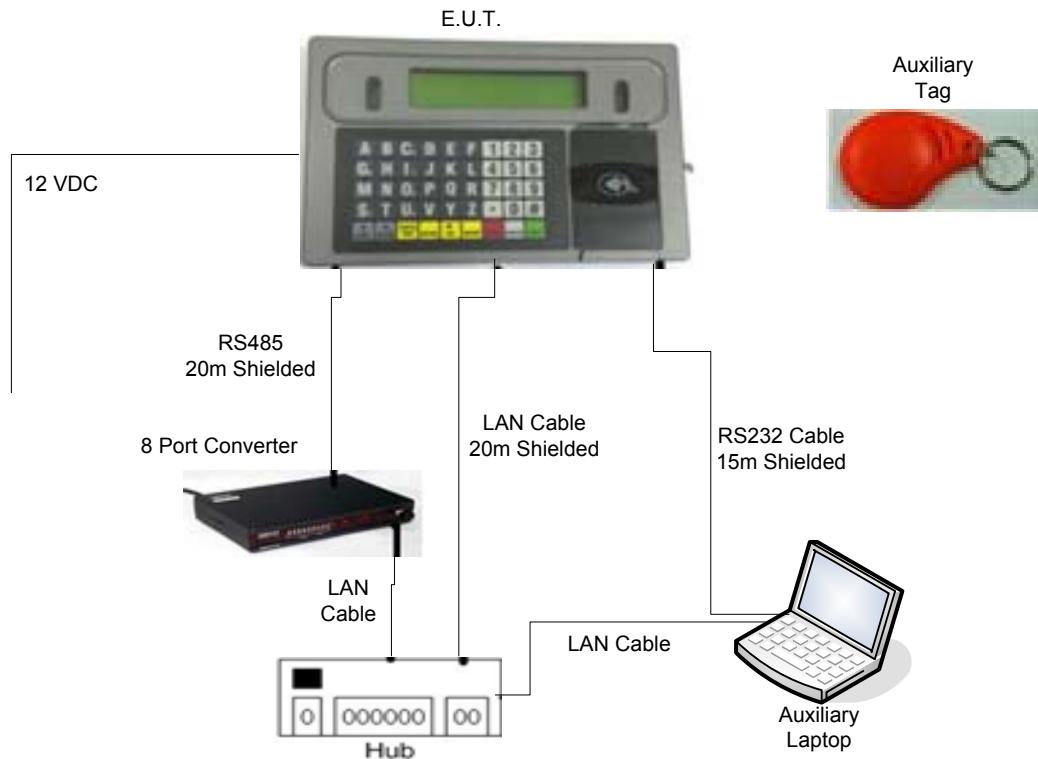


Figure 4. Configuration of Tested System

4. Test Set-up Photos



Figure 5. Radiated Emission Test 9 kHz – 30 MHz



Figure 6. Radiated Emission Test 30 MHz – 1000 MHz



Figure 7. Frequency Stability Test

5. Field Strength of Fundamental

5.1 **Test Specification**

F.C.C., Part 15, Subpart C, Section 15.225(a) (b) (c)

5.2 **Test Procedure**

The E.U.T. operation mode and test set-up are as described in Section 3.

The E.U.T. was placed on a non-conductive table, 0.8 meters above the O.A.T.S. ground plane.

The EMI receiver was set to the E.U.T. Fundamental Frequency (13.56 MHz) and Peak Detection.

The distance between the E.U.T. and test antenna was 3 meters.

The turntable and antenna were adjusted for maximum level reading on the EMI receiver. The loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter.

The average result is:

Peak Level(dB μ V/m) + E.U.T. Duty Cycle Factor, in 100msec time window (dB)

5.3 **Measured Data**

JUDGEMENT: Passed by 51.03 dB (Section 15.225(a))

Passed by 16.43 dB (Section 15.225(b))

Passed by 6.43 dB (Section 15.225(c))

The EUT met the FCC Part 15, Subpart C, Sections 15.225(a); (b); (c) specifications requirements.

The details of the highest emissions are given in Figure 8 to Figure 9.

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

Field Strength of Fundamental

E.U.T Description Orpak Tag Reader With Keyboard (OrTR KB)
 Model/Part Number 800910933
 Serial Number: Not Designated

 15:05:25 JAN 24, 2011

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 13.5629 MHz
 74.07 dB μ V/m

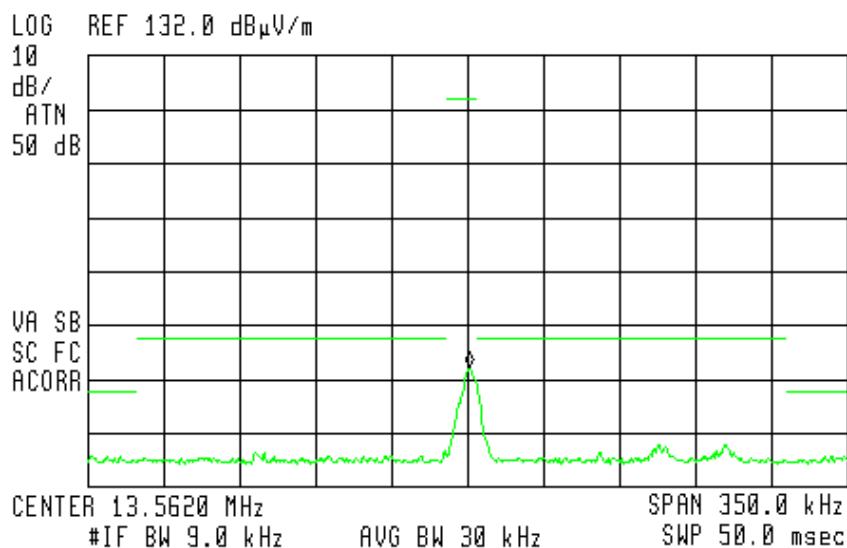


Figure 8. Field Strength of Fundamental Mask Detector: Peak

Section 15.225 (b): $L_{im30m} = 334.00 \mu\text{V/m} = 50.50 \text{ dB}\mu\text{V/m}$

Section 15.225 (b): $L_{im3m} = 40 + 50.50 \text{ dB}\mu\text{V/m} = 90.50 \text{ dB}\mu\text{V/m}$

Section 15.225 (c): $L_{im30m} = 106.00 \mu\text{V/m} = 40.50 \text{ dB}\mu\text{V/m}$

Section 15.225 (c) $L_{im3m} = 40 + 40.50 \text{ dB}\mu\text{V/m} = 80.50 \text{ dB}\mu\text{V/m}$

Field Strength of Fundamental

E.U.T Description Orpak Tag Reader With Keyboard (OrTR KB)
 Model/Part Number 800910933
 Serial Number: Not Designated

 15:06:53 JAN 24, 2011

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 13.56260 MHz
 72.97 dB μ V/m

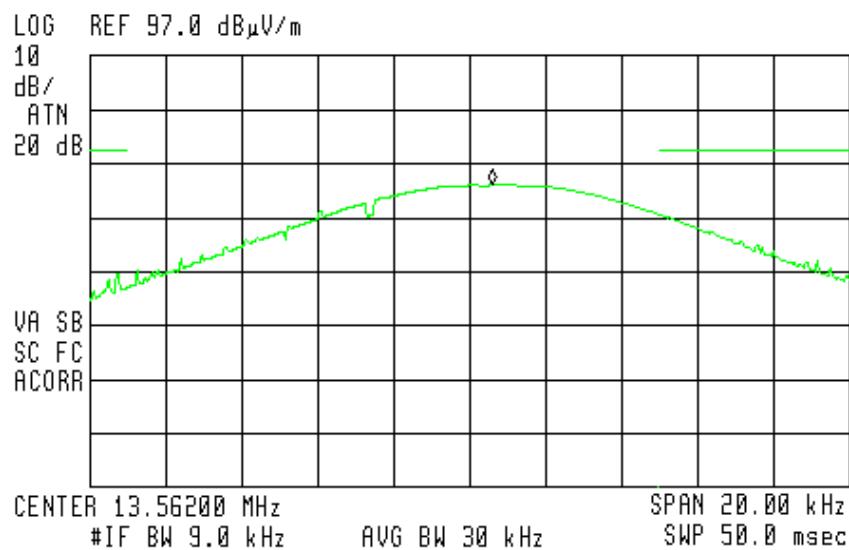


Figure 9. Field Strength of Fundamental Detector: Peak

Section 15.225 (a): $L_{im30m} = 15848.00 \mu\text{V/m} = 84.0 \text{ dB}\mu\text{V/m}$

Section 15.225(a): $L_{im3m} = 40 + 84.0 \text{ dB}\mu\text{V/m} = 124.0 \text{ dB}\mu\text{V/m}$

5.4 **Test Instrumentation Used, Field Strength of Fundamental**

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 25, 2010	1 year
EMI Receiver Filter Section	HP	85420E	3427A00103	November 25, 2010	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 19, 2010	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A

6. Spurious Radiated Emission, 9 kHz – 30 MHz

6.1 **Test Specification**

9 kHz-30 MHz, FCC, Part 15, Subpart C, Section 209

6.2 **Test Procedure**

The E.U.T. operation mode and test set-up are as described in Section 2.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 4.

The frequency range 9 kHz-30 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

The E.U.T. was operated at the frequency of 13.56 MHz. This frequency was measured using a peak detector.

6.3 **Measured Data**

JUDGEMENT: Passed by 37.8 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 209 specification.

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

Radiated Emission 30 – 136 MHz

E.U.T Description Orpak Tag Reader With
 Keyboard (OrTR KB)
 Model/Part Number 800910933
 Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Vertical	Frequency range: 9 kHz - 30 MHz
Test Distance: 3 meters	Detector: Peak
Operation Frequency: 13.56 MHz	

Frequency (MHz)	Peak Reading (dB μ V/m)	Specification (dB μ V/m)	Margin (dB)
27.125	31.7	69.5	-37.8

Figure 10. Radiated Emission

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Peak Reading” includes correction factor.

“Correction Factor” = Antenna Factor + Cable Loss

6.4 **Test Instrumentation Used, Radiated Measurements**

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 25, 2010	1 year
RF Section	HP	85420E	3705A00248	November 25, 2010	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 25, 2010	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

6.5 **Field Strength Calculation**

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS: Field Strength [dB μ V/m]
 RA: Receiver Amplitude [dB μ V]
 AF: Receiving Antenna Correction Factor [dB/m]
 CF: Cable Attenuation Factor [dB]

Example: $FS = 30.7 \text{ dB}\mu\text{V (RA)} + 14.0 \text{ dB (AF)} + 0.9 \text{ dB (CF)} = 45.6 \text{ dB}\mu\text{V}$

No external pre-amplifiers are used.

7. Spurious Radiated Emission 30 – 136 MHz

7.1 ***Test Specification***

30 MHz-1000 MHz, F.C.C., Part 15, Subpart C

7.2 ***Test Procedure***

The E.U.T. operation mode and test set-up are as described in Section 2. See Section 2.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The configuration tested is shown in Figure 4. The frequency range 30 MHz-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 30-1000 MHz, the readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods:

Turning the E.U.T on and off.

Using a frequency span less than 10 MHz.

Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

7.3 ***Test Data***

JUDGEMENT: Passed by 2.7 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

Radiated Emission 30 – 136 MHz

E.U.T Description: Orpak Tag Reader With
 Keyboard (OrTR KB)
 Model/Part Number: 800910933
 Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Vertical

Frequency range: 30 - 1000 MHz

Test Distance: 3 meters

Detector: Peak

Operation Frequency: 13.56 MHz

Frequency (MHz)	Peak Reading (dB μ V/m)	Specification (dB μ V/m)	Margin (dB)
27.125	31.7	69.5	-37.8
54.68	37.3	40.0	-2.7
67.81	35.1	40.0	-4.9
81.47	31.4	40.0	-8.6

Figure 11. Radiated Emission

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Peak Reading” includes correction factor.

“Correction Factor” = Antenna Factor + Cable Loss

7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 25, 2010	1 year
RF Section	HP	85420E	3705A00248	November 25, 2010	1 year
Antenna Bi-conical	ARA	BCD 235/B	1041	August 1, 2010	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 24, 2010	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200	JPKGC19982	N/A	N/A

7.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[\text{dB}\mu\text{v}/\text{m}] \text{ FS} = \text{RA} + \text{AF} + \text{CF}$$

FS: Field Strength [dB μ v/m]
 RA: Receiver Amplitude [dB μ v]
 AF: Receiving Antenna Correction Factor [dB/m]
 CF: Cable Attenuation Factor [dB]

Example: FS = 30.7 dB μ V (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dB μ V

No external pre-amplifiers are used.

8. Frequency Tolerance

8.1 Test Specification

Part 15 Subpart C Section 15.225(e)

8.2 Test Procedure

The E.U.T operation mode and test setup are as described in Section 2.

The E.U.T. was placed in a test fixture enabling coupling from the E.U.T. to the spectrum analyzer.

The E.U.T. and test fixture were placed inside a temperature chamber. The E.U.T. was operated from 12 VDC at normal temperature (25°C).

The chamber temperature was set to +25°C.

The spectrum analyzer was set to 1.0 kHz span and 1.0 kHz resolution B.W.

The carrier frequency was measured and recorded.

The carrier frequency measurement was repeated for:

- (a). 13.8 + 10.2 VDC +55°C
- (b). 13.8 + 10.2 VDC -20°C

The carrier frequency was measured and recorded after at least 10 minutes of exposing the E.U.T. to the temperature.

The configuration tested is shown in photograph Figure 7.

8.3 Test Results

The E.U.T met the requirements of Part 15 Subpart C, Section 225(e) specification.

The frequency offset between the frequency measured under extreme conditions and the nominal carrier frequency measured under normal test conditions, is in the worst case, 0.02 kHz at -20 °C (spec: +/-1.356 kHz).

The details of the highest emissions are given in Figure 12 to Figure 17.

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

Frequency Tolerance

E.U.T Description Orpak Tag Reader With Keyboard (OrTR KB)

Model/Part Number 800910933

Serial Number: Not Designated

Specification: FCC Part 15 Subpart C Section 15.225(e)

Temperature	Voltage	Measured Carrier Frequency	Nominal Carrier Frequency	Δ	Specification	Pass/Fail
(°C)	(VDC)	(MHz)	(MHz)	(kHz)	(kHz)	
+25	12	13.56248	13.56248	-	-	-
+55	13.8	13.56240	13.56248	-0.08	+/-1.356	Pass
+55	10.2	13.56248	13.56248	0.00	+/-1.356	Pass
-20	13.8	13.56250	13.56248	+0.02	+/-1.356	Pass
-20	10.2	13.56250	13.56248	+0.02	+/-1.356	Pass

Figure 12. Frequency Error

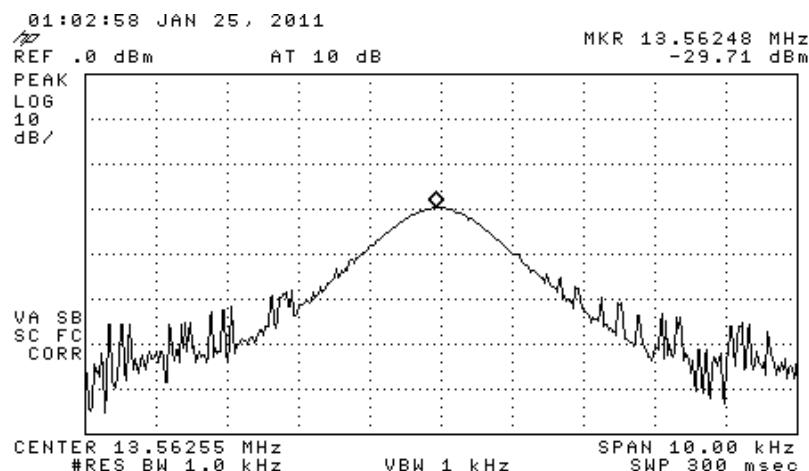


Figure 13. 12 VDC, 25°C

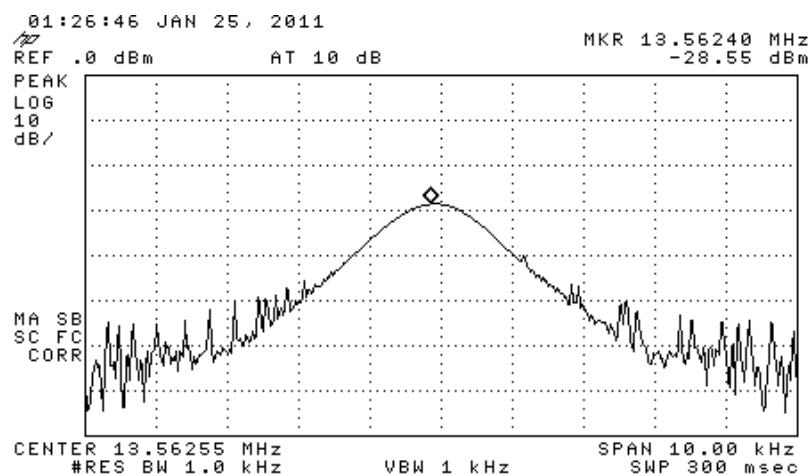


Figure 14. 13.8 VDC, 55°C

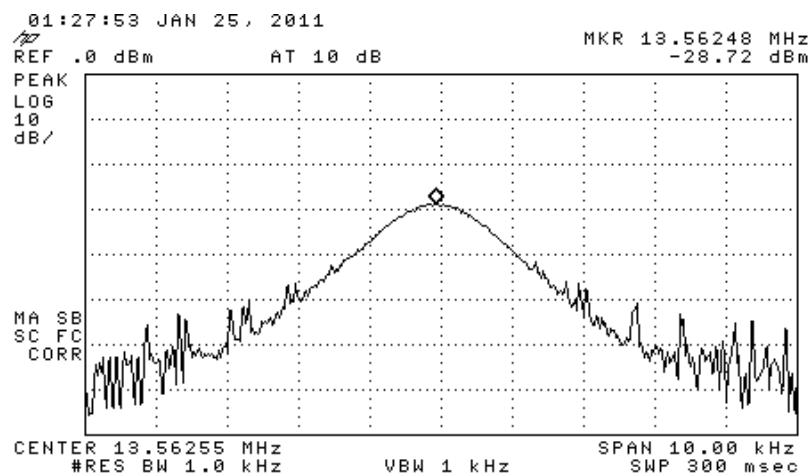


Figure 15. 10.2 VDC, 55°C

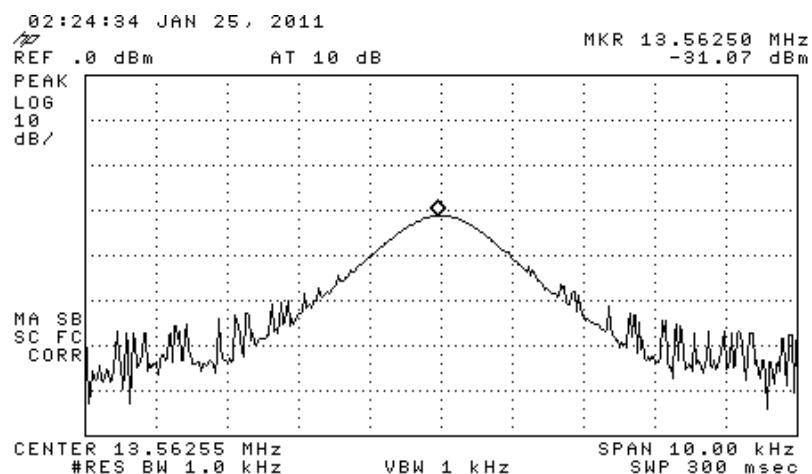


Figure 16. 13.8 VDC, - 20°C

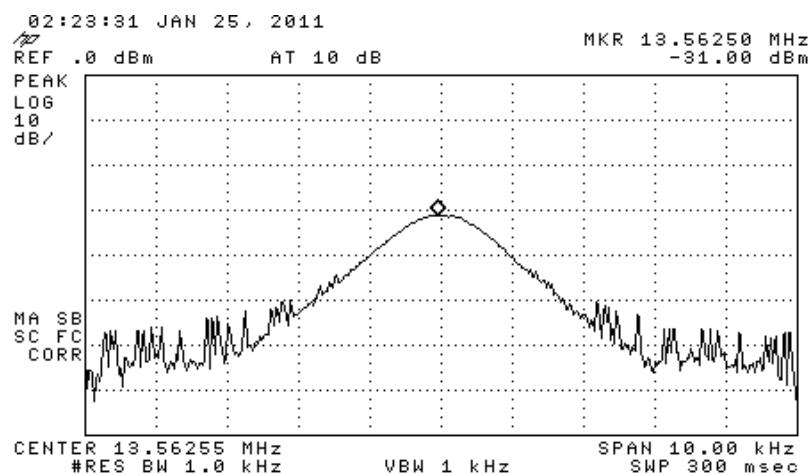


Figure 17. 10.2 VDC, - 20°C

8.1 *Test Instrumentation Used, Radiated Measurements*

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Environmental Chamber	THERMOTRON CORP	SM 32C Mini Max	25-1030	December 12, 2010	1 Year
Digital Voltage Meter	Escort	EDM1111A	10313121	December 7, 2010	2 Years
Variable Voltage Transformer	Variac Voltage Co.	-	-	N/A	N/A
Spectrum Analyzer	HP	8594E	3809U03785	March 8, 2010	2 Year

9. APPENDIX A - CORRECTION FACTORS

9.1 *Correction factors for CABLE* **from EMI receiver to test antenna at 3 meter range.**

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3	1200.0	7.3
20.0	0.6	1400.0	7.8
30.0	0.8	1600.0	8.4
40.0	0.9	1800.0	9.1
50.0	1.1	2000.0	9.9
60.0	1.2	2300.0	11.2
70.0	1.3	2600.0	12.2
80.0	1.4	2900.0	13.0
90.0	1.6		
100.0	1.7		
150.0	2.0		
200.0	2.3		
250.0	2.7		
300.0	3.1		
350.0	3.4		
400.0	3.7		
450.0	4.0		
500.0	4.3		
600.0	4.7		
700.0	5.3		
800.0	5.9		
900.0	6.3		
1000.0	6.7		

NOTES:

1. The cable type is RG-214.
2. The overall length of the cable is 27 meters.
3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

9.2 *Correction factors for* *CABLE*
from EMI receiver
to test antenna
at 3 meter range.

FREQUENCY	CORRECTION
	FACTOR
(GHz)	(dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. *The cable type is RG-8.*
2. *The overall length of the cable is 10 meters.*

9.3 Correction factors for LOG PERIODIC ANTENNA

Type LPD 2010/A
at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

NOTES:

1. Antenna serial number is 1038.
2. The above lists are located in file number 38M30.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.
3. The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".

9.4 Correction factors for

**BICONICAL ANTENNA
Type BCD-235/B,
at 3 meter range**

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.
2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

9.5 Correction factors for ACTIVE LOOP ANTENNA

**Model 6502
S/N 9506-2950**

FREQUENCY (MHz)	Magnetic Antenna Factor (dB)	Electric Antenna Factor (dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2