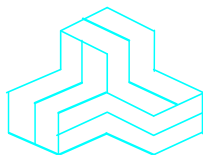


ENGINEERING TEST REPORT



NBS7250

**Model No.: NBS7250P001, NBS7250P101,
NBS7250P901 & NBS7250P902**

FCC ID: O3JNBS7250

Applicant:

NBS Payment Solutions – Division of NBS Technologies Inc.

703 Evans Avenue, Suite 400

Toronto, Ontario

Canada M9C 5E9

In Accordance With

FEDERAL COMMUNICATIONS COMMISSION (FCC)

Part 15, Subpart C

Unlicensed Low Power Transmitter Operating in the band 13.110-14.010 MHz

UltraTech's File No.: MIS-084F15C225

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



Date: September 17, 2008

Report Prepared by: Dan Huynh

Tested by: Mr. Steven Lu, EMC Technician
Ms. Phuong Ngo, EMC Technician

Issued Date: September 17, 2008

Test Dates: August 18-19 & September 3, 2008

- *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@ultratech-labs.com



0685



31040/SIT



C-1376



46390-2049



200093-0



SL2-IN-E-1119R



2005-82 & 83

TABLE OF CONTENTS

EXHIBIT 1.	INTRODUCTION.....	1
1.1.	SCOPE	1
1.2.	RELATED SUBMITTAL(S)/GRANT(S).....	1
1.3.	NORMATIVE REFERENCES	1
EXHIBIT 2.	PERFORMANCE ASSESSMENT	2
2.1.	CLIENT INFORMATION.....	2
2.2.	EQUIPMENT UNDER TEST (EUT) INFORMATION.....	2
2.3.	EUT’S TECHNICAL SPECIFICATIONS.....	3
2.4.	LIST OF EUT’S PORTS.....	3
2.5.	ANCILLARY EQUIPMENT	3
2.6.	GENERAL TEST SETUP.....	4
EXHIBIT 3.	EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS.....	5
3.1.	CLIMATE TEST CONDITIONS	5
3.2.	OPEPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS	5
EXHIBIT 4.	SUMMARY OF TEST RESULTS.....	6
4.1.	LOCATION OF TESTS.....	6
4.2.	APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS	6
4.3.	MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES.....	6
EXHIBIT 5.	MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS	7
5.1.	TEST PROCEDURES	7
5.2.	MEASUREMENT UNCERTAINTIES	7
5.3.	MEASUREMENT EQUIPMENT USED	7
5.4.	COMPLIANCE WITH FCC PART 15 – GENERAL TECHNICAL REQUIREMENTS	7
5.5.	OCCUPIED BANDWIDTH.....	8
5.6.	FIELD STRENGTH OF EMISSIONS INSIDE & OUTSIDE THE PERMITTED BAND 13.110-14.010 MHz [47 CFR 15.225 (a) to (d)]	11
5.7.	FREQUECNY STABILITY [47 CFR 15.225 (e)]	16
5.8.	POWERLINE CONDUCTED EMISSIONS [47 CFR 15.107(a) & 15.207]	23
EXHIBIT 6.	TEST EQUIPMENTS LIST.....	26
EXHIBIT 7.	MEASUREMENT UNCERTAINTY.....	27
7.1.	LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY.....	27
7.2.	RADIATED EMISSION MEASUREMENT UNCERTAINTY	28

EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C, Sec. 15.225 - Operation within the band 13.110 – 14.010 MHz.
Title:	Telecommunication - Code of Federal Regulations, CFR 47, Part 15, Subpart C
Purpose of Test:	To gain FCC Certification Authorization for Low Power Licensed-Exempt Transmitters operating in the Frequency Band 13.110 – 14.010 MHz.
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:	Commercial, industrial or business environment

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Parts 0-19	2007	Code of Federal Regulations – Telecommunication
ANSI C63.4	2003	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	2006 2006	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
CISPR 16-1-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-2-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-1: Conducted disturbance measurement
CISPR 16-2-3	2003	Specification for radio disturbance and immunity measuring apparatus and methods. Part 2-3: Radiated disturbance measurement

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	NBS Payment Solutions – Division of NBS Technologies Inc.
Address:	703 Evans Avneue, Suite 400 Toronto, Ontario Canada M9C 5E9
Contact Person:	Mr. Dragoslav Jovanovic Phone #: 416-621-7410 x359 Fax #: 416-621-8875 Email Address: djovanovic@nbsps.com

MANUFACTURER	
Name:	SAGEM Monotel
Address:	1, Rue Claude Chappe – BP346 07503 Guilherand-Granges - France
Contact Person:	Mr. Clement Lormeau Phone #: +33 4 75 81 40 47 Fax #: +33 4 75 81 41 57 Email Address: Clement.lormeau@sagem.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

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

Brand Name:	NBS Payment Solutions
Product Name:	NBS7250
Model Name or Number:	NBS7250P001, NBS7250P101, NBS7250P901 & NBS7250P902
Serial Number:	Test sample
Type of Equipment:	Low Power Transmitters
Input Power Supply Type:	5V/350mA (USB), 8-12V/280mA
Operating Voltage:	5 VDC
Primary User Functions of EUT:	PIN Pad/ RFID Reader

2.3. EUT’S TECHNICAL SPECIFICATIONS

Transmitter	
Equipment Type:	Mobile
Intended Operating Environment:	Commercial, light industry & heavy industry
Power Supply Requirement:	5 VDC
Field Strength:	56.56 dBµV/m at 10 m
Operating Frequency Range:	13.56 MHz
RF Output Impedance:	50 Ω
26 dB Bandwidth:	431 kHz
Modulation Type:	Amplitude Shift Keying (ASK)
Antenna Connector Type:	Integral 2 turn coils antenna

2.4. LIST OF EUT’S PORTS

Port Number	EUT’s Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	USB	1	USB	Shielded

2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

Ancillary Equipment # 1	
Description:	Point of Sale
Brand name:	NBS Technologies Inc.
Model Name or Number:	ZF-45 01
FCC Certification:	n/a
Serial Number:	TB045605
Connected to EUT’s Port:	USB port

Ancillary Equipment # 2	
Description:	Switching Adapter
Brand name:	Sunny Computer Technologies Co., Ltd.
Model Name or Number:	SYS1097-2709
FCC Certification:	n/a
Serial Number:	G071107085719
Connected to EUT's Port:	n/a

2.6. GENERAL TEST SETUP

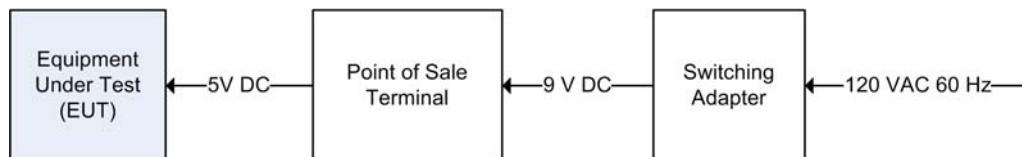


EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	120 VAC 60 Hz

3.2. OPEPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	Transmit in continuous mode for purpose of testing
Special Test Software:	None
Special Hardware Used:	None
Transmitter Test Antenna:	Integral

Transmitter Test Signals:	
Frequency:	13.56 MHz
Transmitter Wanted Output Test Signals:	
▪ RF Power Output (measured maximum output power):	56.56 dB μ V/m at 10 m
▪ Normal Test Modulation:	ASK
▪ Modulating signal source:	Internal

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. 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.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).
- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site 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 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 31040/SIT 1300B3) and Industry Canada office (Industry Canada Site No.: 2049A-3, Expiry Date: May 17, 2009).

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Regulations	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
	26 dB & 99% Bandwidth	Yes
15.225(a) – (d)	Field Strength of Emissions Inside and Outside the Permitted Band 13.110 - 14.010 MHz	Yes
15.225(e)	Frequency Stability	Yes
15.107 & 15.207	Class B - Power Line Conducted Emissions	Yes
15.109(b)	Class B - Radiated Emissions from Unintentional Radiators	Yes

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in ANSI C63.4 and ULTR-P001-2004.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with requirements of UKAS Document LAB 34 with a confidence level of 95%. Please refer to Exhibit 6 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CISPR 16-1-1.

5.4. COMPLIANCE WITH FCC PART 15 – GENERAL TECHNICAL REQUIREMENTS

FCC Section	FCC Rules	
15.203	<p>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.</p> <p>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:</p> <ul style="list-style-type: none">• The application (or intended use) of the EUT• The installation requirements of the EUT• The method by which the EUT will be marketed	Integral 2 turn coils antenna
15.204	<p>Provided the information for every antenna proposed for use with the EUT:</p> <p>(a) type (e.g. Yagi, patch, grid, dish, etc...), (b) manufacturer and model number (c) gain with reference to an isotropic radiator</p>	N/A

5.5. OCCUPIED BANDWIDTH

5.5.1. Limits

The bandwidth shall show bandedge compliance.

5.5.2. Method of Measurements

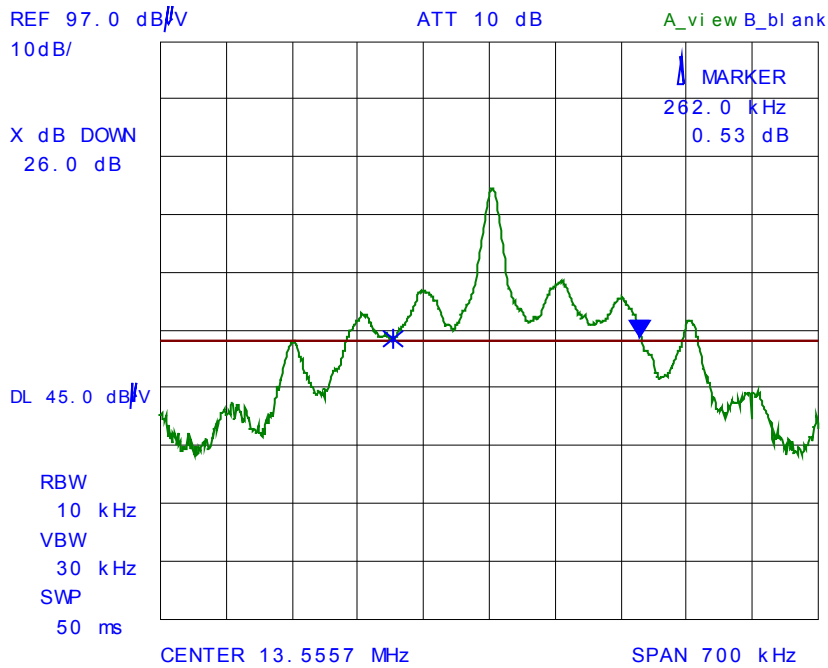
Refer to Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods

5.5.3. Test Data

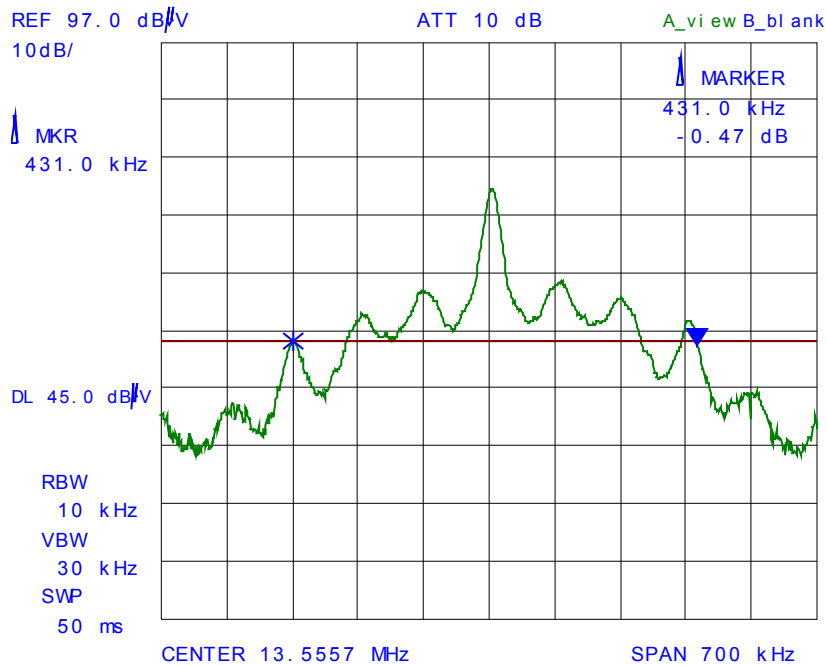
Test Frequency (MHz)	Occupied Bandwidth (kHz)	
	26 dB BW	99 % BW
13.56	431	372

See the following plots for detailed measurement.

Plot 5.5.3.1(i) 26dB Bandwidth
Test Frequency: 13.56 MHz



Plot 5.5.3.1(ii) 26dB Bandwidth
Test Frequency: 13.56 MHz



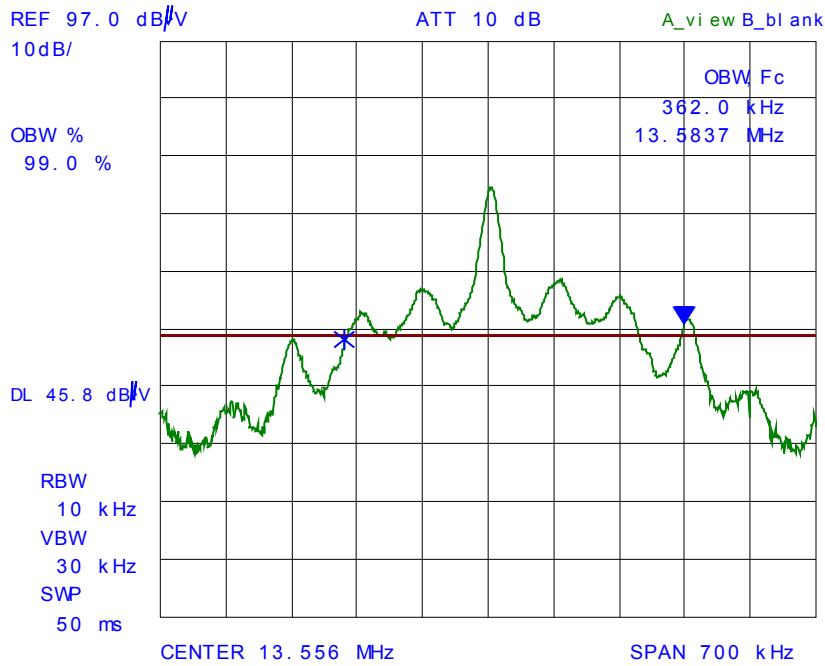
ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

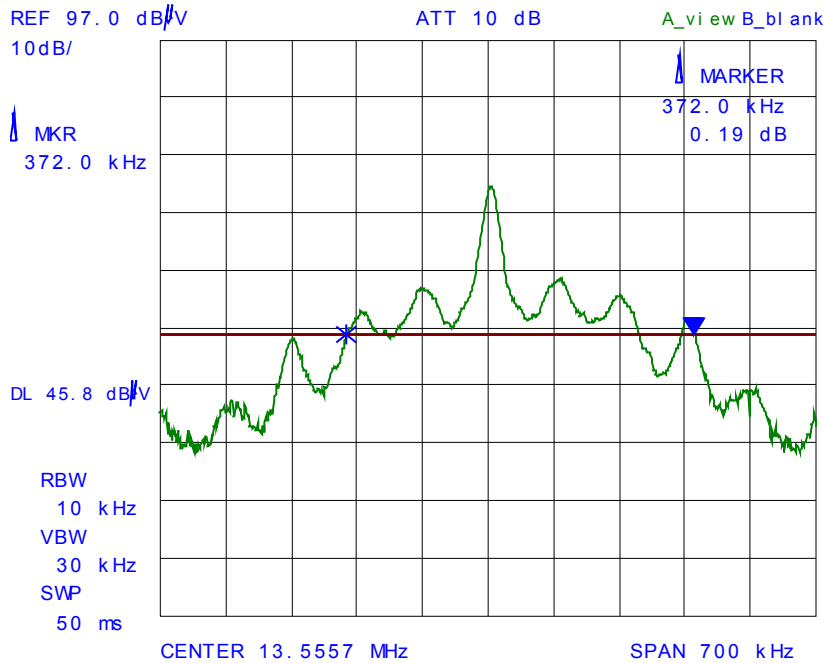
File #: MIS-084F15C225
September 17, 2008

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

Plot 5.5.3.2 (i) 99% Occupied Bandwidth
 Test Frequency: 13.56 MHz



Plot 5.5.3.2 (ii) 99% Occupied Bandwidth
 Test Frequency: 13.56 MHz



ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
 Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: MIS-084F15C225
 September 17, 2008

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

5.6. FIELD STRENGTH OF EMISSIONS INSIDE & OUTSIDE THE PERMITTED BAND 13.110-14.010 MHz [47 CFR 15.225 (a) to (d)]

5.6.1. Limits

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110 – 14.010 MHz band shall not exceed the general radiated emission limits in § 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

5.6.2. Method of Measurements

Refer to Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods

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 high-pass filter are used for this measurement.

- For measurements from 9 KHz to 150 KHz, set RBW = 200 Hz, VBW ≥ RBW, SWEEP=AUTO.
- For measurements from 150 KHz to 30 MHz, set RBW = 10 KHz, VBW ≥ RBW, SWEEP=AUTO.
- For measurements from 30 MHz to 1 GHz, set RBW = 100 KHz, VBW ≥ 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).

5.6.3. Test Data

Remarks:

- Radiated spurious emissions measurements were performed at 10 m distance, from 10 kHz – 30 MHz with loop antenna and all spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- For frequencies below 30 MHz, the results measured at 10 m distance shall be extrapolated to 30 m distance using an extrapolation factor of 40 dB/decade (40*log(10/30)).
- For frequencies at or above 30 MHz, the results are measured at 3 m distance and all spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.

5.6.3.1. Field Strength of Emissions Inside the Permitted Band

Frequency (MHz)	Measured Field Strength @ 10m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Field Strength Extrapolated Value (dBµV/m)	§ 15.225 Field Strength Limits	Margin (dB)
13.56	50.30	QP	V	31.2	84.0	-52.8
13.56	56.56	QP	H	37.5	84.0	-46.5

5.6.3.2. Field Strength of Emissions Outside the Permitted Band

Frequency (MHz)	Measured Field Strength @ 3m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	§ 15.209 Field Strength Limits	Margin (dB)
30.50	26.93	Peak	V	40.0	-13.1
50.00	23.83	Peak	V	40.0	-16.2
57.30	25.26	Peak	V	40.0	-14.7
80.00	26.11	Peak	V	40.0	-13.9
82.00	27.53	Peak	V	40.0	-12.5

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
 Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: MIS-084F15C225
 September 17, 2008

Frequency (MHz)	Measured Field Strength @ 3m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	§ 15.209 Field Strength Limits	Margin (dB)
98.30	28.46	Peak	V	43.5	-15.0
114.30	35.25	Peak	V	43.5	-8.3
114.30	28.36	Peak	H	43.5	-15.1
125.80	30.51	Peak	V	43.5	-13.0
125.80	24.49	Peak	H	43.5	-19.0
130.00	28.10	Peak	V	43.5	-15.4
135.00	29.74	Peak	V	43.5	-13.8
135.00	26.75	Peak	H	43.5	-16.8
137.30	29.39	Peak	V	43.5	-14.1
150.30	36.00	Peak	V	43.5	-7.5
150.30	28.22	Peak	H	43.5	-15.3
159.70	29.17	Peak	V	43.5	-14.3
159.70	25.17	Peak	H	43.5	-18.3
164.90	35.16	Peak	V	43.5	-8.3
164.90	29.79	Peak	H	43.5	-13.7
171.70	34.17	QP	V	43.5	-9.3
171.70	30.04	Peak	H	43.5	-13.5
180.40	30.55	Peak	V	43.5	-13.0
180.40	24.26	Peak	H	43.5	-19.2
198.80	29.75	Peak	V	43.5	-13.8
198.80	34.37	Peak	H	43.5	-9.1
200.30	29.81	Peak	V	43.5	-13.7
207.20	37.52	Peak	V	43.5	-6.0
207.20	39.10	QP	H	46.0	-6.9
210.30	32.05	Peak	V	43.5	-11.5
229.00	38.40	Peak	V	46.0	-7.6
229.00	39.10	QP	H	46.0	-6.9
250.30	31.95	Peak	V	46.0	-14.1
250.30	40.03	Peak	H	46.0	-6.0
285.90	33.95	Peak	V	46.0	-12.1
343.10	39.02	Peak	V	46.0	-7.0
343.10	39.35	Peak	H	46.0	-6.7
350.40	38.91	Peak	V	46.0	-7.1
350.40	38.34	Peak	H	46.0	-7.7
390.70	35.51	Peak	V	46.0	-10.5
390.70	33.83	Peak	H	46.0	-12.2
400.40	36.35	Peak	V	46.0	-9.7
400.40	39.26	Peak	H	46.0	-6.7

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
 Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: MIS-084F15C225
 September 17, 2008

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

Frequency (MHz)	Measured Field Strength @ 3m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	§ 15.209 Field Strength Limits	Margin (dB)
410.50	34.96	Peak	V	46.0	-11.0
410.50	35.68	Peak	H	46.0	-10.3
412.00	33.54	Peak	V	46.0	-12.5
420.20	34.58	Peak	V	46.0	-11.4
430.60	35.27	Peak	V	46.0	-10.7
430.60	39.59	Peak	H	46.0	-6.4
436.80	34.27	Peak	V	46.0	-11.7
440.70	33.22	Peak	V	46.0	-12.8
445.00	33.75	Peak	V	46.0	-12.3
450.40	40.38	Peak	V	46.0	-5.6
450.40	41.55	Peak	H	46.0	-4.5
453.10	33.78	Peak	V	46.0	-12.2
457.80	33.19	Peak	V	46.0	-12.8
460.50	34.68	Peak	V	46.0	-11.3
460.50	36.86	Peak	H	46.0	-9.1
469.40	34.02	Peak	V	46.0	-12.0
469.40	40.51	Peak	H	46.0	-5.5
470.60	37.79	Peak	V	46.0	-8.2
480.20	35.85	Peak	V	46.0	-10.2
480.20	38.16	Peak	H	46.0	-7.8
490.30	36.65	Peak	V	46.0	-9.4
490.30	37.64	Peak	H	46.0	-8.4
500.70	39.41	Peak	V	46.0	-6.6
500.70	36.88	Peak	H	46.0	-9.1
510.30	37.20	Peak	V	46.0	-8.8
510.30	35.59	Peak	H	46.0	-10.4
550.50	40.42	Peak	V	46.0	-5.6
550.50	44.29	QP	H	46.0	-1.7
560.70	38.13	Peak	V	46.0	-7.9
560.70	40.85	Peak	H	46.0	-5.2
572.10	39.84	Peak	V	46.0	-6.2
572.10	39.22	Peak	H	46.0	-6.8
580.40	35.03	Peak	V	46.0	-11.0
583.60	34.00	Peak	V	46.0	-12.0
583.60	35.53	Peak	H	46.0	-10.5
595.10	35.79	Peak	V	46.0	-10.2
595.10	38.79	Peak	H	46.0	-7.2
600.80	39.47	Peak	V	46.0	-6.5

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
 Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: MIS-084F15C225
 September 17, 2008

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

Frequency (MHz)	Measured Field Strength @ 3m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	§ 15.209 Field Strength Limits	Margin (dB)
600.80	40.76	Peak	H	46.0	-5.2
606.60	34.34	Peak	V	46.0	-11.7
606.60	35.72	Peak	H	46.0	-10.3
609.10	34.16	Peak	V	46.0	-11.8
618.00	36.20	Peak	V	46.0	-9.8
618.00	35.89	Peak	H	46.0	-10.1
640.40	34.26	Peak	V	46.0	-11.7
640.40	33.89	Peak	H	46.0	-12.1
651.20	39.96	Peak	V	46.0	-6.0
651.20	37.99	Peak	H	46.0	-8.0
686.30	33.29	Peak	V	46.0	-12.7
686.30	32.08	Peak	H	46.0	-13.9
700.90	33.61	Peak	V	46.0	-12.4
700.90	31.84	Peak	H	46.0	-14.2
950.90	32.51	Peak	V	46.0	-13.5

ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
 Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: MIS-084F15C225
 September 17, 2008

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

5.7. FREQUENCY STABILITY [47 CFR 15.225 (e)]

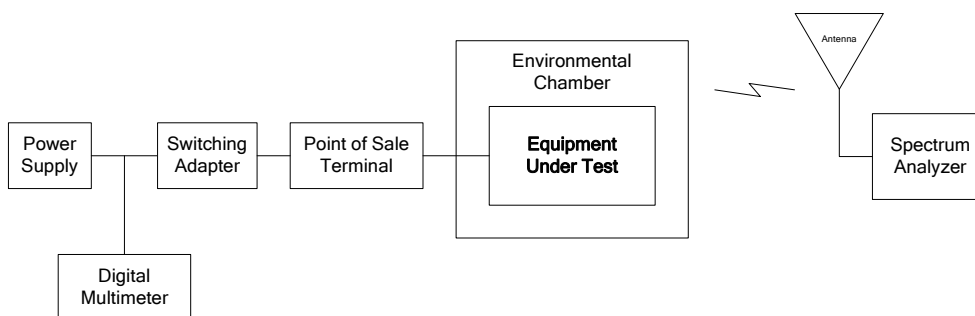
5.7.1. Limits

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

5.7.2. Method of Measurements

Refer to Ultratech Test Procedures, File # ULTR P001-2004 for measurement methods.

5.7.3. Test Arrangement

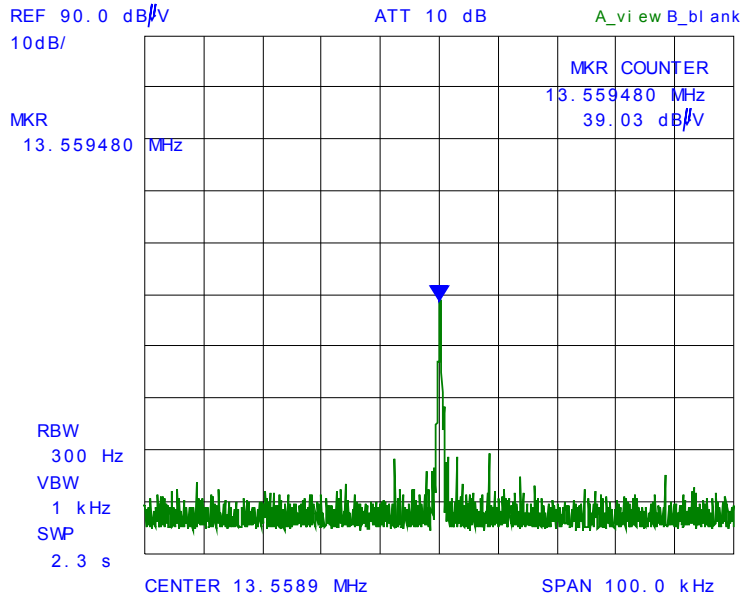


5.7.4. Test Data

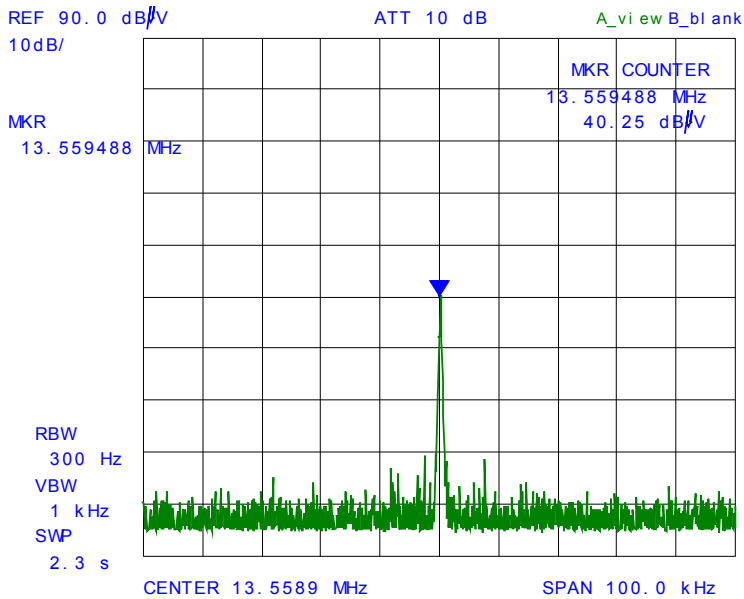
Center Frequency:	13.56 MHz
Full Power Level:	56.56 dB μ V/m at 10 m distance
Frequency Tolerance Limit:	$\pm 0.01\%$ or ± 1356 Hz
Max. Frequency Tolerance Measured:	+28 Hz
Input Voltage Rating:	5 VDC derived from host device via 120 VAC 60 Hz

See the following plots for detailed measurement.

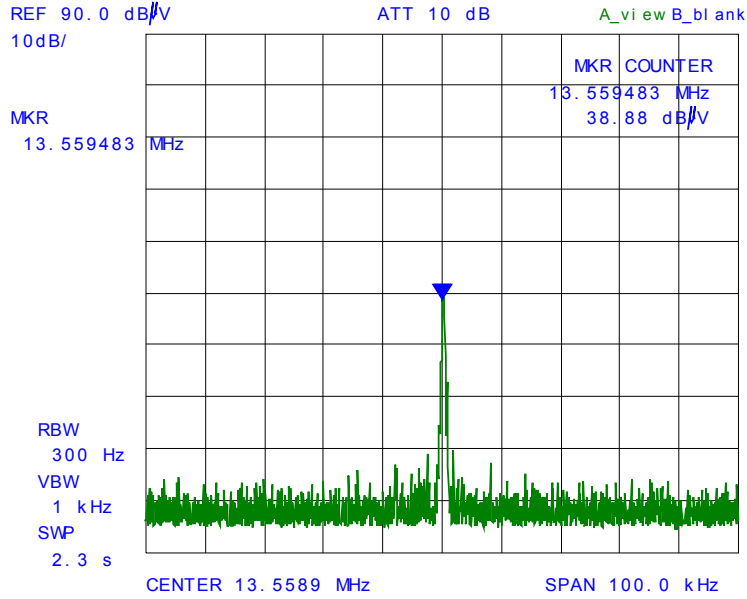
Plot 5.7.4.1(i) Temperature Variation
Test Condition: Nominal Voltage at -20 °C



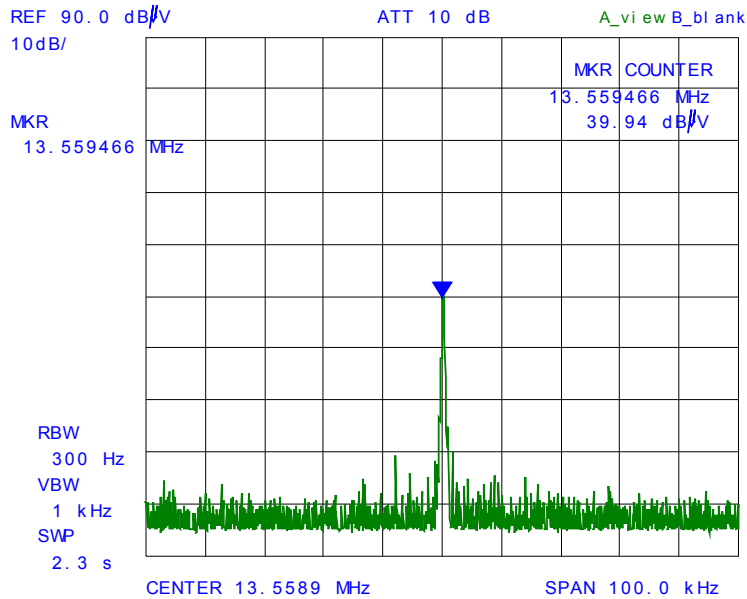
Plot 5.7.4.1(ii) Temperature Variation
Test Condition: Nominal Voltage at -10 °C



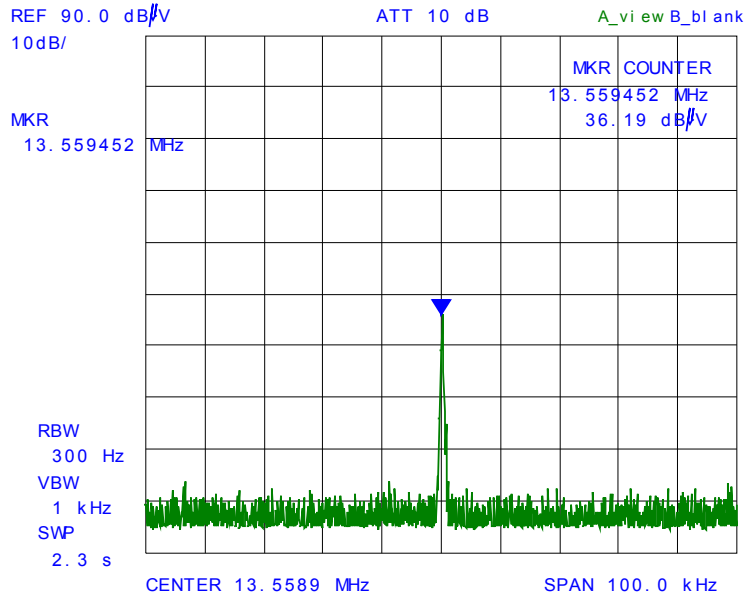
Plot 5.7.4.1(iii) Temperature Variation
Test Condition: Nominal Voltage at 0 °C



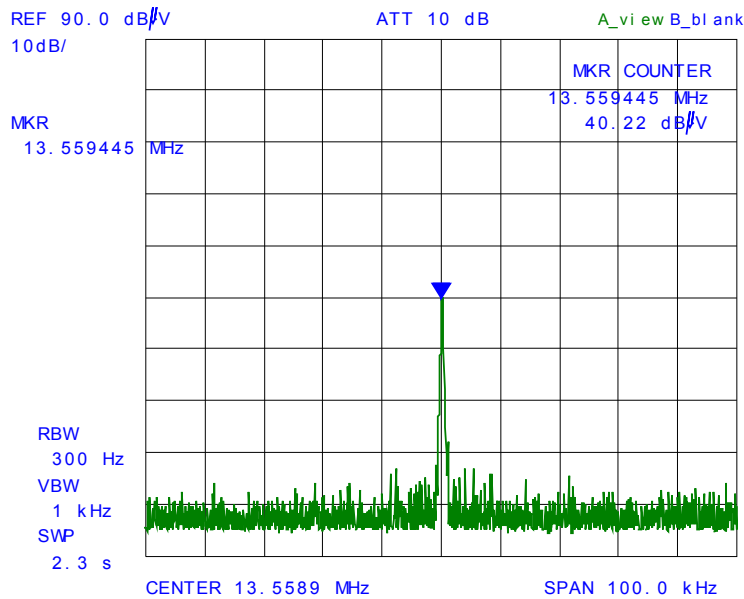
Plot 5.7.4.1(iv) Temperature Variation
Test Condition: Nominal Voltage at 10 °C



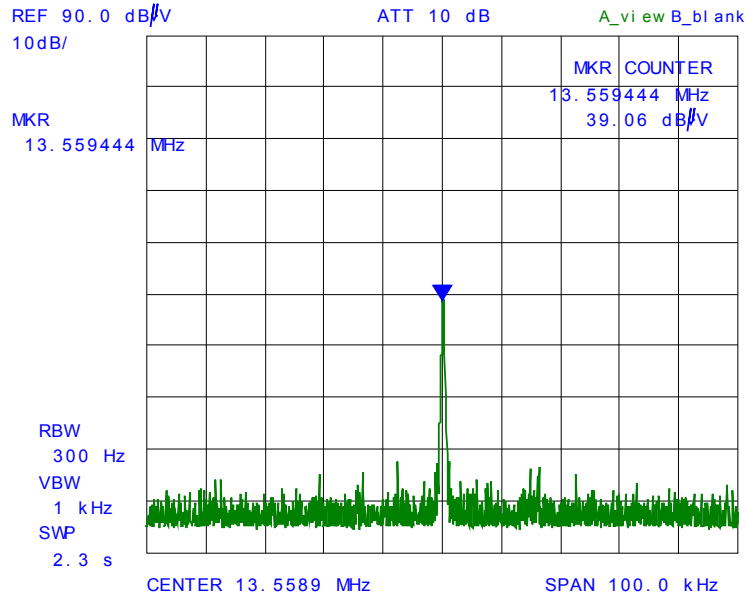
Plot 5.7.4.1(v) Temperature Variation
Test Condition: Nominal Voltage at 20 °C



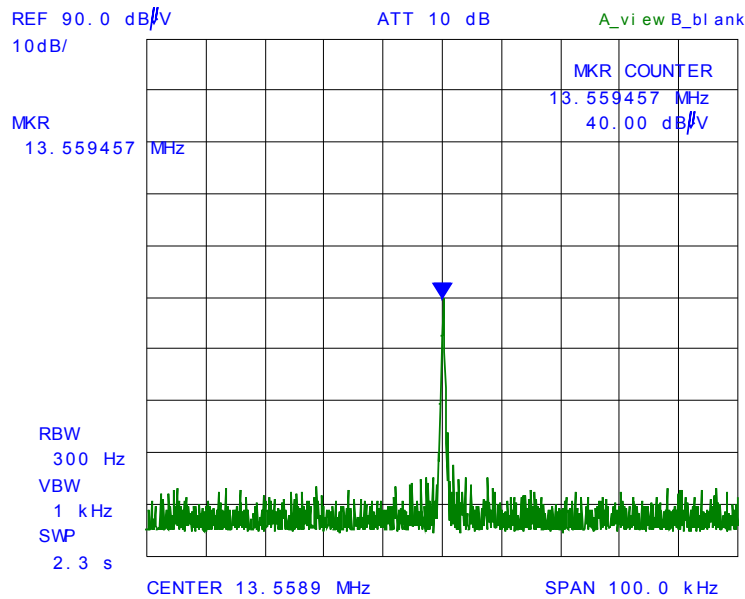
Plot 5.7.4.1(vi) Temperature Variation
Test Condition: Nominal Voltage at 30 °C



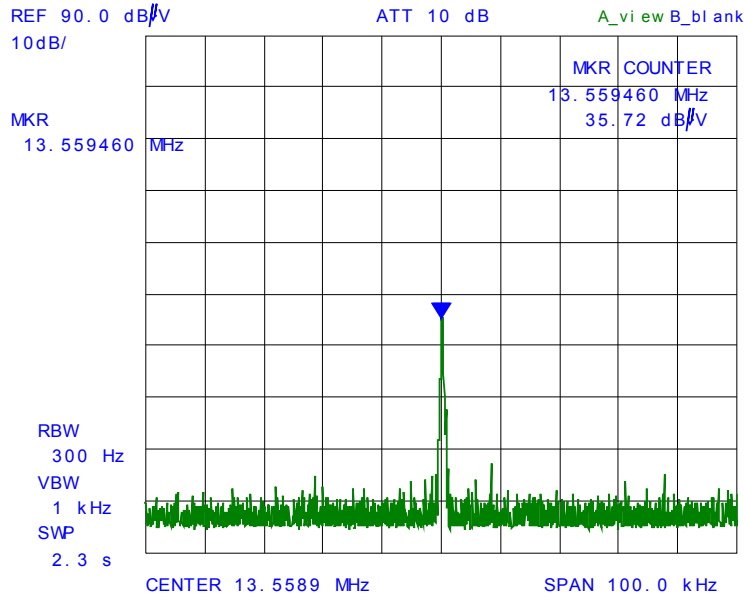
Plot 5.7.4.1(vii) Temperature Variation
Test Condition: Nominal Voltage at 40 °C



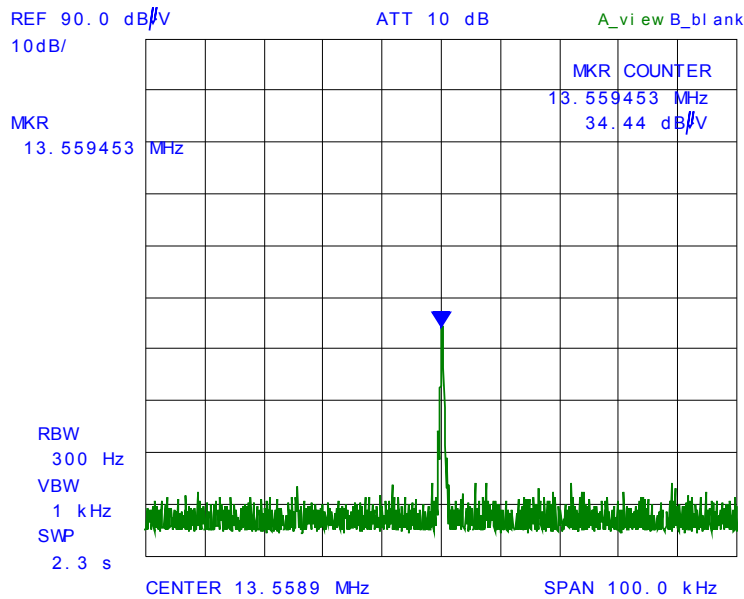
Plot 5.7.4.1(viii) Temperature Variation
Test Condition: Nominal Voltage at 50 °C



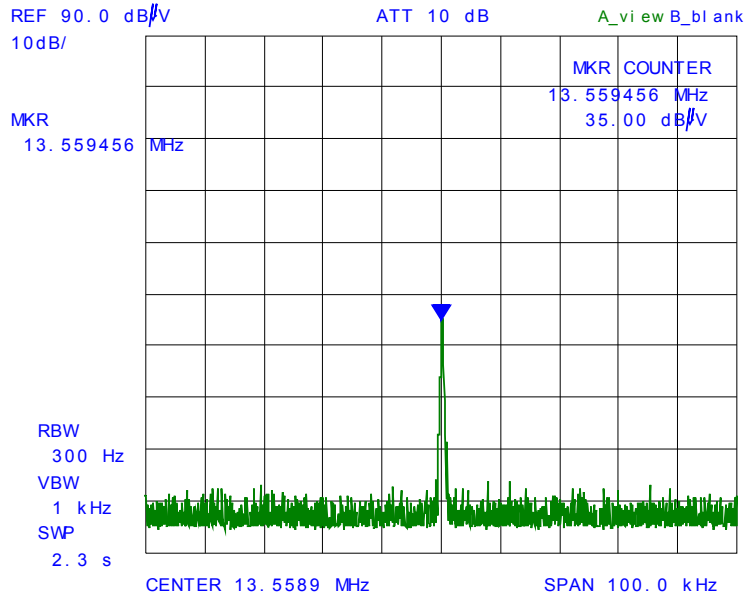
Plot 5.7.4.2(i) Primary Supply Voltage Variation
Test Condition: 120VAC at 20 °C



Plot 5.7.4.2(ii) Primary Supply Voltage Variation
Test Condition: 102VAC at 20 °C



Plot 5.7.4.2(iii) Primary Supply Voltage Variation
Test Condition: 138VAC at 20 °C



ULTRATECH GROUP OF LABS

3000 Bristol Circle, Oakville, Ontario, Canada L6H 6G4
Tel. #: 905-829-1570, Fax. #: 905-829-8050, Email: vic@ultratech-labs.com, Website: <http://www.ultratech-labs.com>

File #: MIS-084F15C225
September 17, 2008

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

5.8. POWERLINE CONDUCTED EMISSIONS [47 CFR 15.107(a) & 15.207]

5.8.1. Limits

The equipment shall meet the limits of the following table:

Test Frequency Range (MHz)	Class B Limits (dB μ V)		Measuring Bandwidth
	Quasi-Peak	Average	
0.15 to 0.5	66 to 56*	56 to 46*	RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average
0.5 to 5	56	46	RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average
5 to 30	60	50	RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average

* Decreasing linearly with logarithm of frequency

5.8.2. Method of Measurements

Refer to Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods

5.8.3. Test Data

Plot 5.8.3.1 Power Line Conducted Emission
 Line Tested: Hot
 Line Voltage 120 VAC 60 Hz

Current Graph

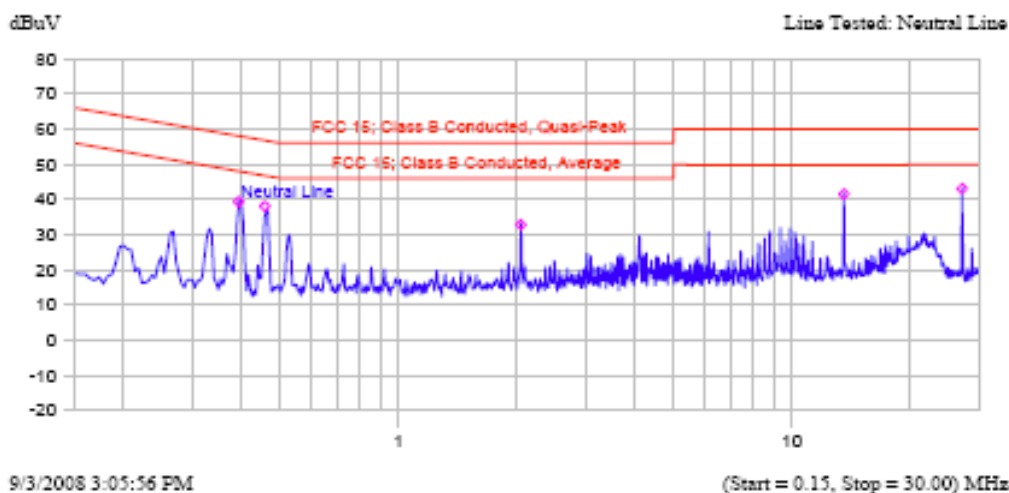


Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta dB	QP-QP Limit dB	Avg dBuV	Delta dB	Avg-Avg Limit dB	Trace Name
0.392	41.2	40.1	-18.9		32.2	-16.8		Hot Line
2.049	32.5	31.7	-24.3		31.5	-14.5		Hot Line
13.561	39.8	39.4	-20.6		39.3	-10.7		Hot Line
27.119	45.3	45.1	-14.9		45.0	-5.0		Hot Line

Plot 5.8.3.2 Power Line Conducted Emission
 Line Tested: Neutral
 Line Voltage 120 VAC 60 Hz

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta dB	QP-QP Limit	Avg dBuV	Delta dB	Avg-Avg Limit	Trace Name
0.392	39.3	38.3	-20.7		30.6	-18.4		Neutral Line
0.458	38.1	37.2	-20.0		30.2	-17.0		Neutral Line
2.049	32.8	32.2	-23.8		31.9	-14.1		Neutral Line
13.560	41.6	41.3	-18.7		41.1	-8.9		Neutral Line
27.119	43.0	42.8	-17.2		42.7	-7.3		Neutral Line

EXHIBIT 6. TEST EQUIPMENTS LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Operating Range
Spectrum Analyzer	Advantest	R3271	15050203	100 Hz – 26.5 GHz
Power Supply	Staco Energy Product Co.	3PN501B	0036	Output Volts 0 -140
Loop Antenna	EMCO	6502	2611	10 kHz - 30 MHz
Temperature & Humidity Chamber	Envirotronics	SSH32C	11994847-S-11059	-60o to +177 o C range
Digital Multimeter	Tenma	72-6202	2080027	DC-100 KHz
Spectrum Analyzer/EMI Receiver	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz with external mixer
EMI Receiver System/ Spectrum Analyzer with built-in Amplifier	Hewlett Packard	HP 8546A	3520A00248	9 kHz - 5.6GHz, 50 Ohms
Microwave Amplifier	Hewlett Packard	HP 83017A	311600661	1 GHz - 26.5 GHz
Biconilog Antenna	EMCO	3143	1029	20 MHz - 2 GHz
Horn Antenna	EMCO	3155	9701-5061	1 GHz - 18 GHz
Active Loop Antenna	EMCO	6507	8906-1167	1 kHz – 30 MHz
Spectrum Analyzer/EMI Receiver	Hewlett Packard	HP 8593EM	3412A00103	9 kHz – 26.5 GHz
Transient Limiter	Hewlett Packard	11947A	310701998	9 kHz – 200 MHz 10 dB attenuation
L.I.S.N.	EMCO	3825/2	89071531	9 kHz – 200 MHz 50 Ohms / 50 μH
RF Shielded Chamber	RF Shielding	--	--	--

EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and LAB 34.

7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Line Conducted)	PROBABILITY DISTRIBUTION	UNCERTAINTY (dB)	
		9-150 kHz	0.15-30 MHz
EMI Receiver specification	Rectangular	± 1.5	± 1.5
LISN coupling specification	Rectangular	± 1.5	± 1.5
Cable and Input Transient Limiter calibration	Normal (k=2)	± 0.3	± 0.5
Mismatch: Receiver VRC $\Gamma_1 = 0.03$ LISN VRC $\Gamma_R = 0.8(9 \text{ kHz}) 0.2 (30 \text{ MHz})$ Uncertainty limits $20\text{Log}(1 \pm \Gamma_1 \Gamma_R)$	U-Shaped	± 0.2	± 0.3
System repeatability	Std. deviation	± 0.2	± 0.05
Repeatability of EUT	--	--	--
Combined standard uncertainty	Normal	± 1.25	± 1.30
Expanded uncertainty U	Normal (k=2)	± 2.50	± 2.60

Sample Calculation for Measurement Accuracy in 450 kHz to 30 MHz Band:

$$u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)} = \pm \sqrt{(1.5^2 + 1.5^2)/3 + (0.5/2)^2 + (0.05/2)^2 + 0.35^2} = \pm 1.30 \text{ dB}$$

$$U = 2u_c(y) = \pm 2.6 \text{ dB}$$

7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

CONTRIBUTION (Radiated Emissions)	PROBABILITY DISTRIBUTION	UNCERTAINTY (+ dB)	
		3 m	10 m
Antenna Factor Calibration	Normal (k=2)	± 1.0	± 1.0
Cable Loss Calibration	Normal (k=2)	± 0.3	± 0.5
EMI Receiver specification	Rectangular	± 1.5	± 1.5
Antenna Directivity	Rectangular	+0.5	+0.5
Antenna factor variation with height	Rectangular	± 2.0	± 0.5
Antenna phase center variation	Rectangular	0.0	± 0.2
Antenna factor frequency interpolation	Rectangular	± 0.25	± 0.25
Measurement distance variation	Rectangular	± 0.6	± 0.4
Site imperfections	Rectangular	± 2.0	± 2.0
Mismatch: Receiver VRC $\Gamma_1 = 0.2$ Antenna VRC $\Gamma_R = 0.67(Bi) 0.3 (Lp)$ Uncertainty limits $20\text{Log}(1 \pm \Gamma_1 \Gamma_R)$	U-Shaped	+1.1 -1.25	± 0.5
System repeatability	Std. Deviation	± 0.5	± 0.5
Repeatability of EUT		-	-
Combined standard uncertainty	Normal	+2.19 / -2.21	+1.74 / -1.72
Expanded uncertainty U	Normal (k=2)	+4.38 / -4.42	+3.48 / -3.44

Calculation for maximum uncertainty when 3m biconical antenna including a factor of k = 2 is used:

$U = 2u_c(y) = 2x(+2.19) = +4.38 \text{ dB}$ And $U = 2u_c(y) = 2x(-2.21) = -4.42 \text{ dB}$