ENGINEERING TEST REPORT

RTMS K4
MODEL NO.: K4

FCC ID: J7TRTMS-K4

Applicant:

EIS Electronic Integrated System Inc.
150 Bridgeland Ave. Suite 204
Toronto, Ontario
Canada, M6A 1Z5

Tested in Accordance With

FCC Part 15, Subpart C, Section 15.245
Field Disturbance Sensor
Operating in the Frequency Band 24075-24175 MHz

UltraTech's File No.: EIS-032F15C245

This Test report is Issued under the Authority of Tri M. Luu, Professional Engineer, Vice President of Engineering UltraTech Group of Labs Date: August 15, 2007	
Report Prepared by: Dharmajit Solanki, RF Engineer Issued Date: August 15, 2007	Tested by: Mr. Hung Trinh, EMC/RFI Technician Test Dates: August 1-9, 2007

- *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.*

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EXHIBIT 1. SUBMITTAL CHECK LIST

Annex No.	Exhibit Type	Description of Contents	Quality Check (OK)
--	Test Report	Test Report	OK
1	Test Setup Photos	• AC Conducted Emissions Setup Photos • Radiated Emission Setup Photos	OK
2	External Photos of EUT	External EUT Photos	OK
3	Internal Photos of EUT	Internal EUT Photos	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 OK
6	ID Label/Location Info	• ID Label • Location of ID Label	OK
7	Block Diagrams	Block Diagram	OK
8	Schematic Diagrams	Schematic Diagram	OK
9	Parts List/Tune Up Info	-	N/A
10	Operational Description	Operational Description	OK
11	RF Exposure Info	-	N/A
12	Users Manual	K4 User Guide	OK

EXHIBIT 2. INTRODUCTION

2.1. SCOPE

Reference:	FCC Part 15, Subpart C, Section 15.245
Title:	Code of Federal Regulations (CFR), Title 47 – Telecommunication, Part 15
Purpose of Test:	To gain FCC Certification Authorization for Field Disturbance Sensor operating in the Frequency Band 24075-24175 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

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

None.

2.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC CFR Parts 0-19	2006	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 +A1 EN 55022	2003-04-10 2004-10-14 2003	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 3. PERFORMANCE ASSESSMENT

3.1. CLIENT INFORMATION

APPLICANT	
Name:	EIS Electronic Integrated System Inc.
Address:	150 Bridgeland Ave. Suite 204 Toronto, Ontario Canada, M6A 1Z5
Contact Person:	Chris Gosciniak Phone #: (416) 785-9248 Fax #: (416) 785-9332 Email Address: chris.gosciniak@eistraffic.com

MANUFACTURER	
Name:	EIS Electronic Integrated System Inc.
Address:	150 Bridgeland Ave. Suite 204 Toronto, Ontario Canada, M6A 1Z5
Contact Person:	Chris Gosciniak Phone #: (416) 785-9248 Fax #: (416) 785-9332 Email Address: chris.gosciniak@eistraffic.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.

Equipment Identification:	EIS Electronic Integrated System Inc.
Brand or Trade Name:	RTMS K4
Model Name or Number:	K4
Serial Number:	Test Sample
Type of Equipment:	Field Disturbance Sensor
Input Power Supply Type:	12 VDC
Primary User Functions of EUT:	Radar based vehicular traffic detector

3.3. OPERATIONAL DESCRIPTION

1. The RTMS Model K4 consists of a Processor Board and integrated K-band transceiver with patch array antenna.

A. The Microwave module is powered and controlled from the board. The transceiver is VCO based employing PHEMT transistor and receiver circuitry including LNA and two (I and Q) mixers. The transmitted frequency can be changed by applying voltage (0 to 7V) to Varactor diode (input Vtune). In parallel with main VCO there is another circuitry called "stabilizer" which allows precisely (0.5 MHz) control frequency of the main VCO. The circuit contains reference VCO phase locked using PLL circuit with crystal oscillator. Both outputs from main VCO and stabilizer are mixed and producing delta between those two frequencies which is measured by processor board and main VCO frequency is corrected.

B. The Processor board is fed by AC or DC low voltage power through an MS connector. All the output signals from the RTMS are sent through the same connector, including contact pairs and serial port.

2. The Processor Board (see circuit schematic) consists of the following:

A. Power supply (DC/DC converter) based on a bridge rectifier, filter and switching regulator provides 3.3 Volts for logic circuits and 5 Volts for analog circuits.

B. IF Amplifier and filter receives the signal from the mixers (I and Q) and amplifies it with proper filtering to the proper level which can be controlled by software.

C. Frequency Generating Oscillator (FGO), which controls the microwave module Varactor diode. It is a software-generated signal, which is stored in the RAM chip and calculated by the microcontroller (MCU).

D. DSP is a Digital Signal Processor which runs at 60 MHz (generated internally by PLL from 29.4912 MHz). It receives the analog signal from amplifier/filter uses its built-in ADC converter and processes it based on various sophisticated proprietary radar signal-processing algorithms. The DSP produces its reports on a SPI bus to the microcomputer.

E. MCU is a microcontroller, which performs additional processing on the received data from the DSP in real time. The microcontroller performs various tasks, such as communicating with internal devices on the board via SPI and FPGA (a proprietary programmable logic array) and with outside world through its serial port. The microcontroller controls various functions of the RTMS through its resident software (flash memory), including presence of vehicles, calculation of traffic parameters, storage of setup parameters, Self-Test and other auxiliary functions. All software algorithms are proprietary.

F. UART, DRIVER and OPTOs are RS-232/485 a level translation and isolation circuit, which translates the serial port of the microcomputer to the correct voltage levels.

3.4. EUT'S TECHNICAL SPECIFICATIONS

TRANSMITTER	
Equipment Type:	Transceiver
Intended Operating Environment:	Commercial, light industry & heavy industry
Power Supply Requirement:	12 to 24 V DC, 2.7 W
Operating Frequency:	24120 – 24164 MHz
RF Output Impedance:	50 Ohms
20 dB Bandwidth:	46.09 MHz
Modulation Type:	FMCW (Frequency Modulated Continuous Wave)
Duty Cycle:	8.31 %
Antenna Connector Type:	Integral
Antenna Description:	Manufacturer: InnoSent GmbH, Germany Type: Phase array M/N: IVS-195 Frequency Range: 24.000 – 24.250 GHz Gain: 17 dBi

3.5. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	Power	2	MS 32-pins	Shielded
2	Serial port RS232	5	MS 32-pins	Shielded

3.6. GENERAL TEST SETUP

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

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:	55%
Pressure:	102 kPa
Power input source:	12 V DC

4.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	EUT was configured and put into built-in RF test mode to transmit burst with the designated duty cycle for measurements.
Special Test Software:	None
Special Hardware Used:	None
Transmitter Test Antenna:	The EUT is tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

Transmitter Test Signals:	
Frequency Band(s):	24120 – 24164 MHz
Test Frequency(ies):	24140 MHz
Transmitter Wanted Output Test Signals: • Max. Field Strength @ 3 meters : • Normal Test Modulation:	 115.06 dBuV/m Peak FMCW

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.

- AC Powerline 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 File No.: IC2049-1). Last Date of Site Calibration: May 17, 2007.

5.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Section(s)	Test Requirements	Compliance (Yes/No)
15.107(b) & 15.207	Power Line Conducted Emissions	Yes
--	20 dB Bandwidth	Yes
15.245, 15.209, 15.205	Transmitter Radiated Emissions, Harmonic Emissions and Band Edge Radiated Emissions	Yes

5.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.

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 ANSI C63.4 and ULTR-P001-2004.

6.2. 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.

6.3. 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.

6.4. POWER LINE CONDUCTED EMISSIONS [§ 15.107(A) & 15.207]

6.4.1. LIMITS

The equipment shall meet the limits of the following table:

	CLASS B LIMITS		
Test Frequency Range (MHz)	**Quasi-Peak (dBμV)**	**Average* (dBμV)**	**Measuring Bandwidth**
0.15 to 0.5	66 to 56*	56 to 46*	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 1 Hz for Average
0.5 to 5	56	46	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 1 Hz for Average
5 to 30	60	50	RBW = 9 kHz VBW ≥ 9 kHz for QP VBW = 1 Hz for Average

* Decreasing linearly with logarithm of frequency

6.4.2. METHOD OF MEASUREMENTS

Refer to Ultratech Test Procedures ULTR-P001-2004 & ANSI C63.4 for method of measurements.

6.4.3. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
EMI Receiver System/Spectrum Analyzer with built-in Amplifier	Hewlett Packard	HP 8546A	3520A00248	9KHz-5.6GHz, 50 Ohms
Transient Limiter	Hewlett Packard	11947A	..	9 kHz – 200 MHz 10 dB attenuation
L.I.S.N.	EMCO	3825/2	…	9 kHz – 200 MHz 50 Ohms / 50 μH
12'x16'x12' RF Shielded Chamber	RF Shielding	…	..	…

6.4.4. TEST DATA

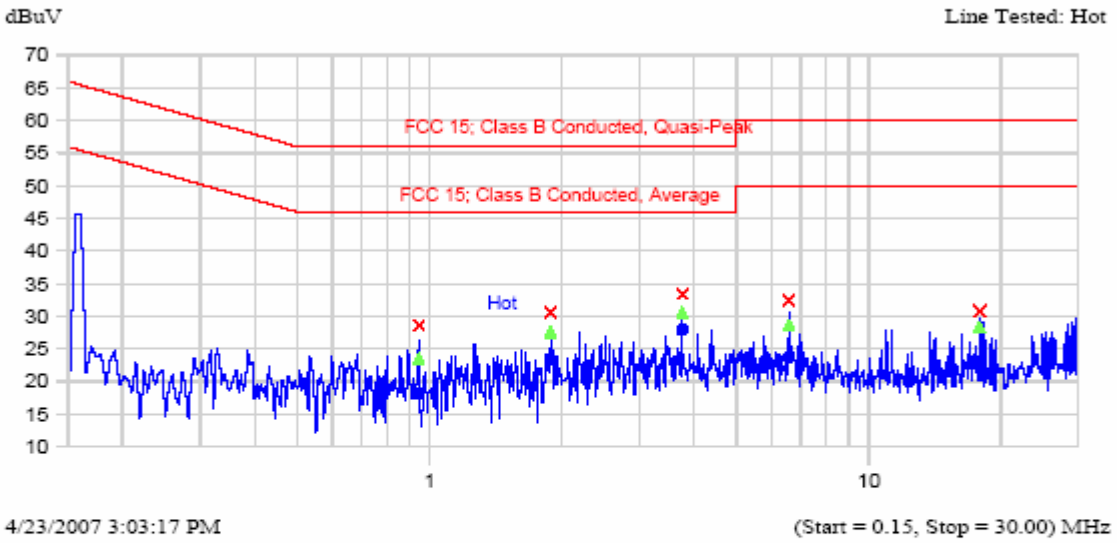
Line Voltage: 12 VDC

Frequency (MHz)	RF Level (dBµV)	Receiver Detector (P/QP/AVG)	QP Limit (dBuV)	AVG Limit (dBuV)	Margin (dB)	Pass/ Fail	Line Tested (L1/L2)
Test Configuration : Transmitter Mode							
0.95	23.5	QP	56	46	-32.5	Pass	L1
0.95	18.2	AVG	56	46	-27.8	Pass	L1
1.88	27.5	QP	56	46	-28.5	Pass	L1
1.88	23.5	AVG	56	46	-22.5	Pass	L1
3.77	30.6	QP	56	46	-25.4	Pass	L1
3.77	27.9	AVG	56	46	-18.1	Pass	L1
6.59	28.7	QP	60	50	-31.3	Pass	L1
6.59	23.8	AVG	60	50	-26.2	Pass	L1
17.89	28.3	QP	60	50	-31.7	Pass	L1
17.89	22.9	AVG	60	50	-27.1	Pass	L1
0.17	40.9	QP	65.6	55.6	-24.7	Pass	L2
0.17	20.7	AVG	65.6	55.6	-34.8	Pass	L2
1.11	22.4	QP	56	46	-33.6	Pass	L2
1.11	16.5	AVG	56	46	-29.5	Pass	L2
3.77	32.4	QP	56	46	-23.6	Pass	L2
3.77	30.6	AVG	56	46	-15.4	Pass	L2
11.31	30.7	QP	60	50	-29.3	Pass	L2
11.31	26.4	AVG	60	50	-23.6	Pass	L2

Note: See the following test data plots for detailed measurements.

Plot 1:
AC Power Line Conducted Emissions
Test Configuration: Transmitter Mode
Line Voltage : 12 VDC
Line Tested: L1

Current Graph

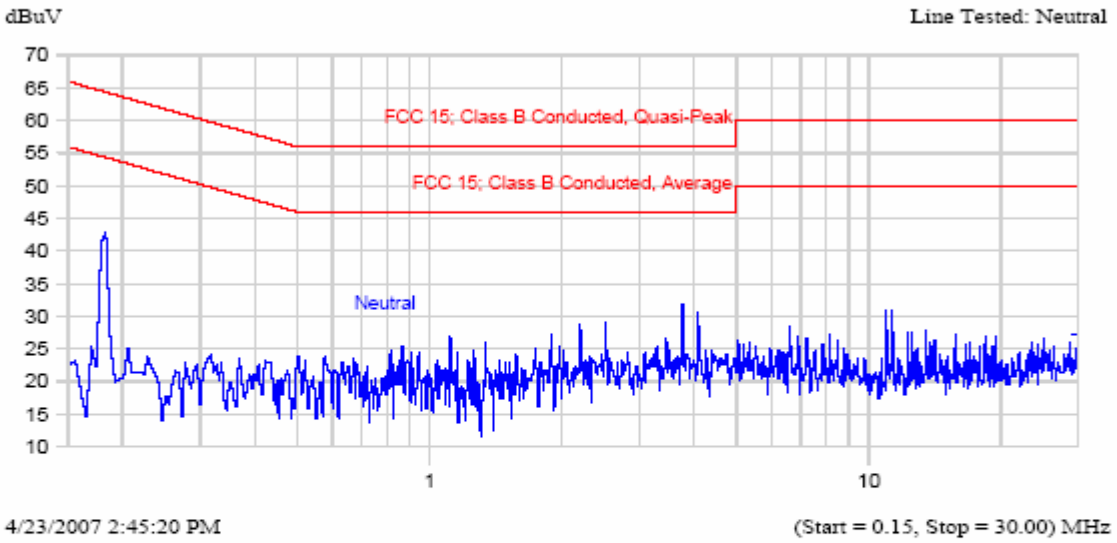


Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP- QP Limit dB	Avg dBuV	Delta Avg- Avg Limit dB	Trace Name
0.946	28.5	23.5	-32.5	18.2	-27.8	Hot
1.883	30.6	27.5	-28.5	23.5	-22.5	Hot
3.766	33.4	30.6	-25.4	27.9	-18.1	Hot
6.590	32.4	28.7	-31.3	23.8	-26.2	Hot
17.889	30.8	28.3	-31.7	22.9	-27.1	Hot
0.149	14.5	9.1		7.3		Hot

Plot 2:
AC Power Line Conducted Emissions
Test Configuration : Transmitter Mode
Line Voltage : 12 VDC
Line Tested: L2

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP- QP Limit dB	Avg dBuV	Delta Avg- Avg Limit dB	Trace Name
0.166	47.1	40.9	-24.7	20.7	-34.8	Neutral
1.107	27.1	22.4	-33.6	16.5	-29.5	Neutral
3.770	35.2	32.4	-23.6	30.6	-15.4	Neutral
11.313	33.0	30.7	-29.3	26.4	-23.6	Neutral

6.5. 20 dB BANDWIDTH

6.5.1. LIMITS

No limit. Test is performed for information only.

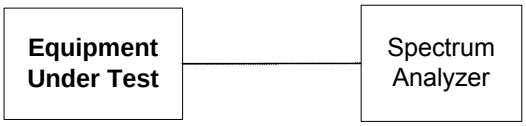
6.5.2. METHOD OF MEASUREMENTS

The transmitter output was loosely coupled to the spectrum analyzer through a receiving antenna and the bandwidth of bandwidth of the fundamental frequency was measured with the spectrum analyzer with the resolution bandwidth of the spectrum analyzer set per ANSI 63.4

6.5.3. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz- 40 GHz
Log Periodic	EMCO	3148	23845	200 MHz – 2 GHz

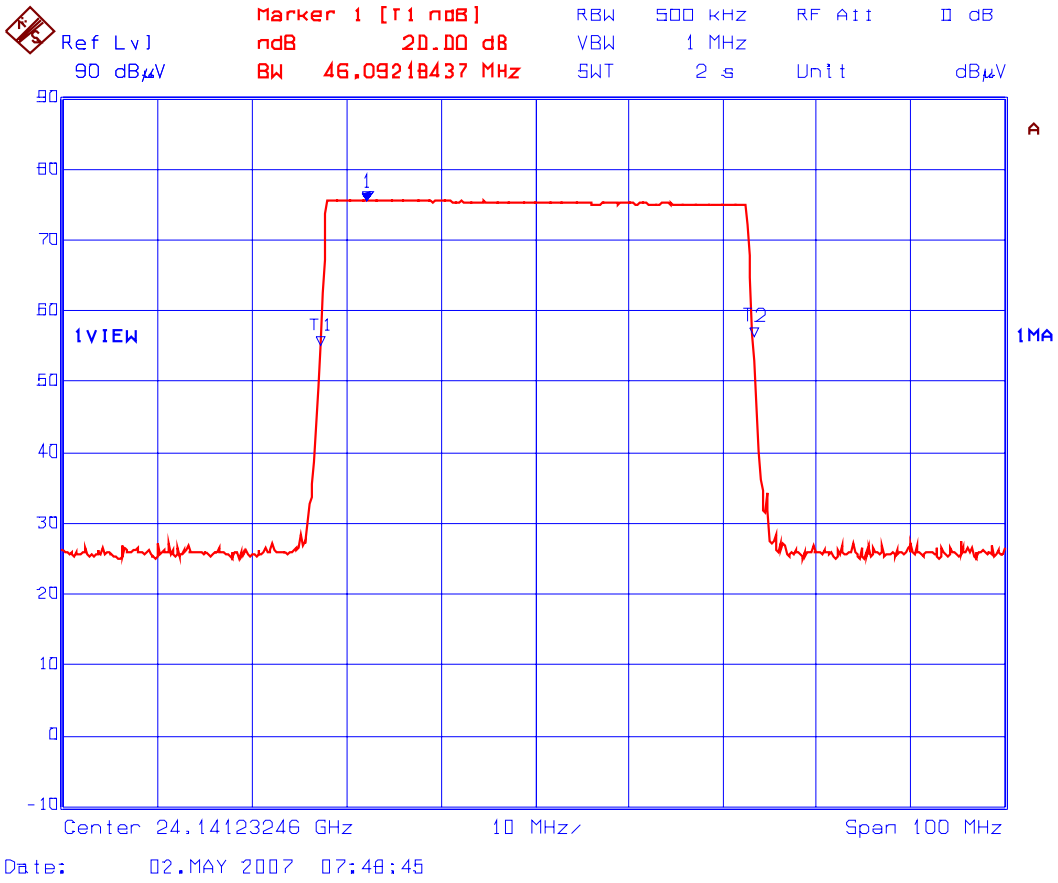
6.5.4. TEST ARRANGEMENT



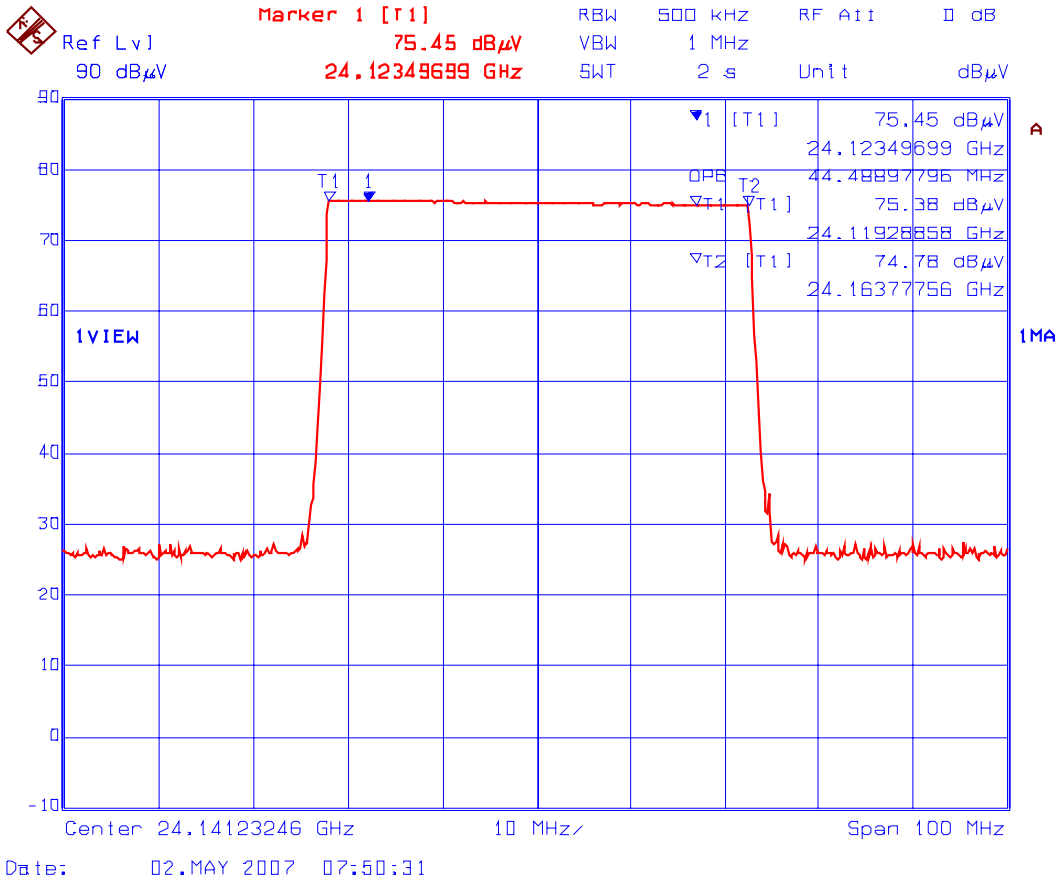
6.5.5. TEST DATA

Bandwidth	Channel Frequency (MHz)	(MHz)
20 dB	24140	46.09
99 %	24140	44.49

Plot 3: 20 dB Bandwidth
Test Frequency: 24140 MHz



Plot 4: 99% Occupied Bandwidth
Test Frequency: 24140 MHz



6.6. FUNDAMETAL FIELD STRENGTH AND HARMONIC EMISSIONS AND BAND-EDGE RADIATED EMISSONS (RADIATED @ 3 METERS) [§ 15.245, 15.209 & 15.205]

6.6.1. LIMITS

- The Field Strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics (μV/m)
24075-24175	2500	25

- Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in 15.205, shall not exceed the field strength limits shown in 15.209. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed the following field strength limits:

  (i) For the second and third harmonics of field disturbance sensors operating in the 24075-24175 MHz band and for other field disturbance sensors designed for use only within a building or to open building doors, 25.0 mV/m.

- Field strength limits are specified at a distance of 3 meters.
- Emissions radiated outside of the specified frequency bands, except for the harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits specified in @ 15.209, whichever is the lesser attenuation.
- The emissions limits shown above are based on the measurement instrumentation employing an average detector. The provisions in Sec. 15.35 for limiting peak emissions apply.

FCC 47 CFR 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 47 CFR 15.209(a)
-- Field Strength Limits within Restricted Frequency Bands --

Frequency (MHz)	Field Strength Limits (μV/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

6.6.2. METHOD OF MEASUREMENTS

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

6.6.3. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range
Spectrum Analyzer/ EMI Receiver	Rohde & Schwarz	FSEK20/B4/B21	834157/005	9 kHz – 40 GHz with external mixer
Microwave Amplifier	Hewlett Packard	HP 83017A		1 GHz to 26.5 GHz
Biconilog Antenna	EMCO	3143	1029	20 MHz to 2 GHz
Horn Antenna	EMCO	3155	9701-5061	1 GHz – 18 GHz
Horn Antenna	EMCO	3160-09	1007	18 GHz – 26.5 GHz
Horn Antenna	EMCO	3160-10	1001	26.5 GHz – 40 GHz
Mixer/Horn Antenna	OML	M19HW/FCC	U30625-1	40 GHz – 60 GHz

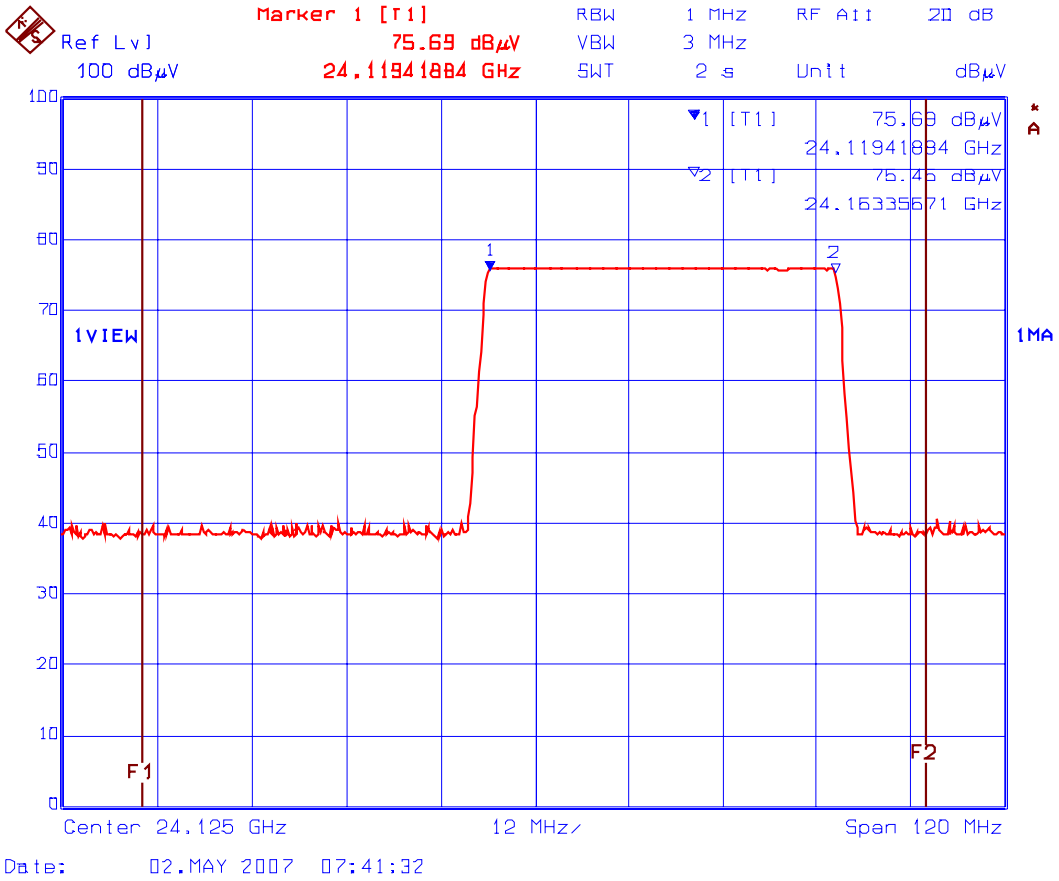
6.6.4. TEST DATA

Duty Cycle Measurements: 8.31 % or Peak-Average Conversion factor = -21.61 dB
Please refer to the Plot # 6 for plots of duty cycle measurements.

Frequency 24140 MHz

Frequency (MHz)	Peak E-Field @3m (dBµV/m)	Average E-Field @3m (dBµV/m)	Antenna Plane (H/V)	Field Strength Limit for Fundamental/Harmonic (dBµV/m)	Field Strength Limit of § 15.209 (dBµV/m)	Margin (dB)
24140	113.77	68.36	V	127.95	--	-14.18
24140	115.06	67.97	H	127.95	--	-12.89
48280	63.57	41.04	V	87.95	--	-24.38
48280	63.27	40.74	H	87.95	--	-24.68
The emissions were scanned from 30 MHz to 52.65 GHz and all emissions within 20 dB below the limits were recorded.						

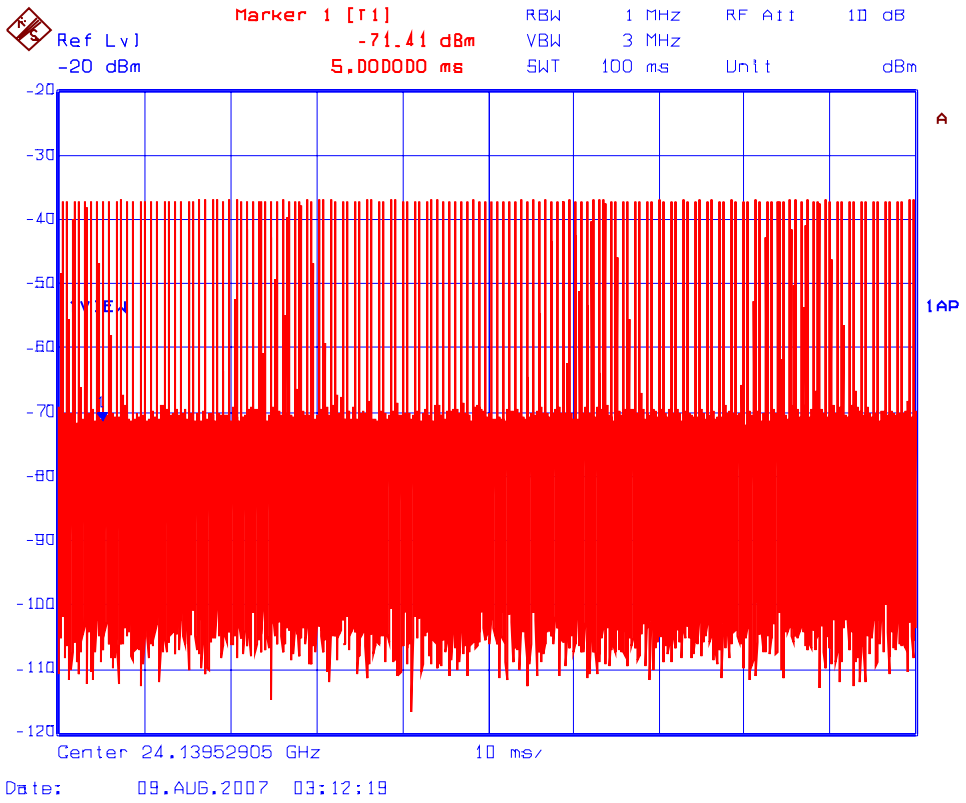
Plot 5: Band-Edge RF Radiated Emissions, Horizontal Polarization
Transmitter Frequency: 24140 MHz



Plot 6: Duty cycle analysis

TX_{ON} = 143 × 58.12 μs = 8.31 ms

TX_{ON} / (TX_{ON} + TX_{OFF}) = 8.31 ms / 100 ms = 0.0831 ≈ 20 log (0.0831) = -21.61 dB



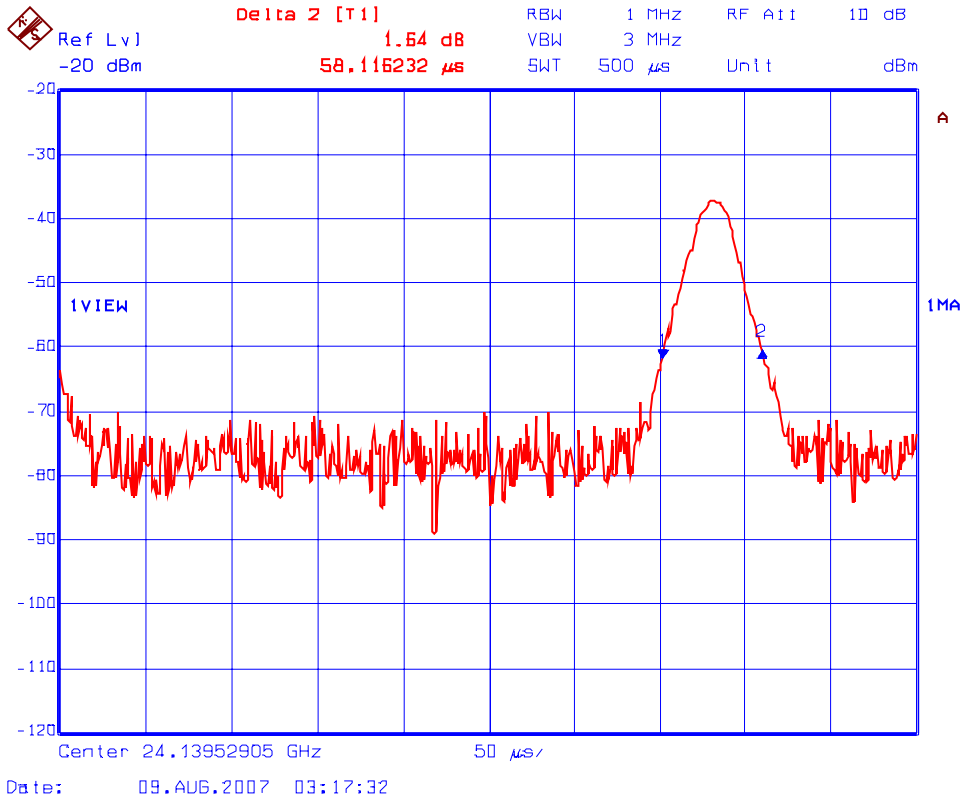

Delta 2 [T1]
1.54 dB
58.116232 µs
RBW 1 MHz
VBW 3 MHz
SWT 500 µs
RF Att 10 dB
Unit dBm
Ref Lvl
-20 dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
1VIEW
1MA
A
Center 24.13952905 GHz
50 µs/
Date: 09.AUG.2007 03:17:32

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 Γ_1 = 0.03 LISN VRC Γ_R = 0.8(9 kHz) 0.2 (30 MHz) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	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:

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

$U = 2u_c(y) = \pm 2.6$ 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 Γ_1 = 0.2 Antenna VRC Γ_R = 0.67(Bi) 0.3 (Lp) Uncertainty limits 20Log(1±$\Gamma_1\Gamma_R$)	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:

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