Testing Tomorrow's Technology

April 24, 2008

Mr. John Gauss
BALOGH T.A.G. Corporation
7699 Kensington Court
Brighton, MI 48116

Dear Mr. Gauss:

Enclosed please find BALOGH T.A.G. Corporation's file copy of the FCC Subpart C, Section 15.209 Certification Report and Application for the ERC-100 RFID Transceiver.

BALOGH T.A.G. Corporation should expect to receive a grant of certification for this product within the next 8-12 weeks.

If you have any questions, please don't hesitate to call. Thank you for your business.

Sincerely,

Steve Sawyer
Chief Compliance Engineer

3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com

Certification Application

For the

BALOGH T.A.G. Corporation

Model ERC-100

Per the Requirements of

US Code Title 47, Part 15, Subpart C, Section 15.209

DATE: May 7, 2008

Number of Pages in this report: 38

3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com

MEASUREMENT TECHNICAL REPORT

COMPANY NAME: **BALOGH T. A. G. Corporation**

MODEL: **ERC-100**

FCC ID: **G8630100X**

DATE: **May 7, 2008**

This report concerns (check one): Original grant X
Class II change_____

Equipment type: **RFID Transceiver**

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No X

If yes, defer until:_____
date

N.A. agrees to notify the Commission by N.A.
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

US Tech
3505 Francis Circle
Alpharetta, GA 30004

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

Table of Contents

List of Figures

List of Tables

1. General Information

The information contained in this report is presented for the FCC Equipment Authorization of Certification for the EUT.

1.1 Product Description

The Equipment under Test (EUT) is the BALOGH T.A.G. Corporation, Model ERC-100. The EUT is a Low Power RFID Transceiver operating at 1.5 MHz.

1.2 Related Submittal(s)/Grant(s)

The EUT will be used with part of a system to send/receive data. The transmitter presented in this report will be used with another transceiver which has been submitted under FCC ID: G8630100X

1.3 Subject Authorizations

The EUT is subject to the following authorizations:

a) Certification as a transceiver
b) Verification as a Digital Device.

2 Tests and Measurements

2.1 Configuration of Tested System

The Test sample was tested per ANSI C63.4, Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2003). Conducted and radiated emissions data were taken with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. Interconnecting cables were manipulated as necessary in an attempt to maximize emissions. A block diagram of the tested system is shown in Figure 1. Test configuration photographs for fundamental and harmonic emissions are shown in Figure 2.

The sample used for testing was received by US Tech on March 20, 2008 in good condition.

2.2 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA 30004. This site has been fully described and registered with the FCC, under designation number US5117. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1.

2.3 Test Instruments

Table 3 describes test equipment used to evaluate this product.

2.4 Modifications to Hardware

No modifications were necessary to be made by US Tech in order to bring the EUT into compliance with FCC Part 15 limits for the transmitter portion of the EUT or the Class A Digital Device Requirements (Part 15, Subpart B).

2.5 Antenna Description (FCC Sec. 15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The BALOGH T.A.G. Corporation Model ERC-100 incorporates an integral antenna only.

Manufacturer: Balogh T.A.G. Corporation
7699 Kensington Court

Brighton, Michigan 48116-8561

Type: Internal Single Ferrite Antenna

Model Number: --

Gain: 2 dBi

Connector: Integral

BALOGH T.A.G. Corporation will sell the ERC-100 with one of the following antennas.

Table 1. Antenna description for Model ERC-100 Transceiver

MANUFACTURER	MODEL	GAIN dBi
Balogh T.A.G. Corporation	--	2

2.6 Test Procedure

The EUT was configured as shown in the following block diagram(s) and photograph(s). The sample was tested per ANSI C63.4, Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (1992) following paragraph 7 for conducted emissions and paragraph 8 for radiated emissions. Conducted and radiated emissions data were taken with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter on the spectrum analyzer was OFF throughout the evaluation process. Interconnecting cables were manipulated as necessary in an attempt to maximize emissions. See Table 2 for a list of EUT and peripherals. A list of Test Instruments is found in Table 3.

Figure 1. Test Configuration

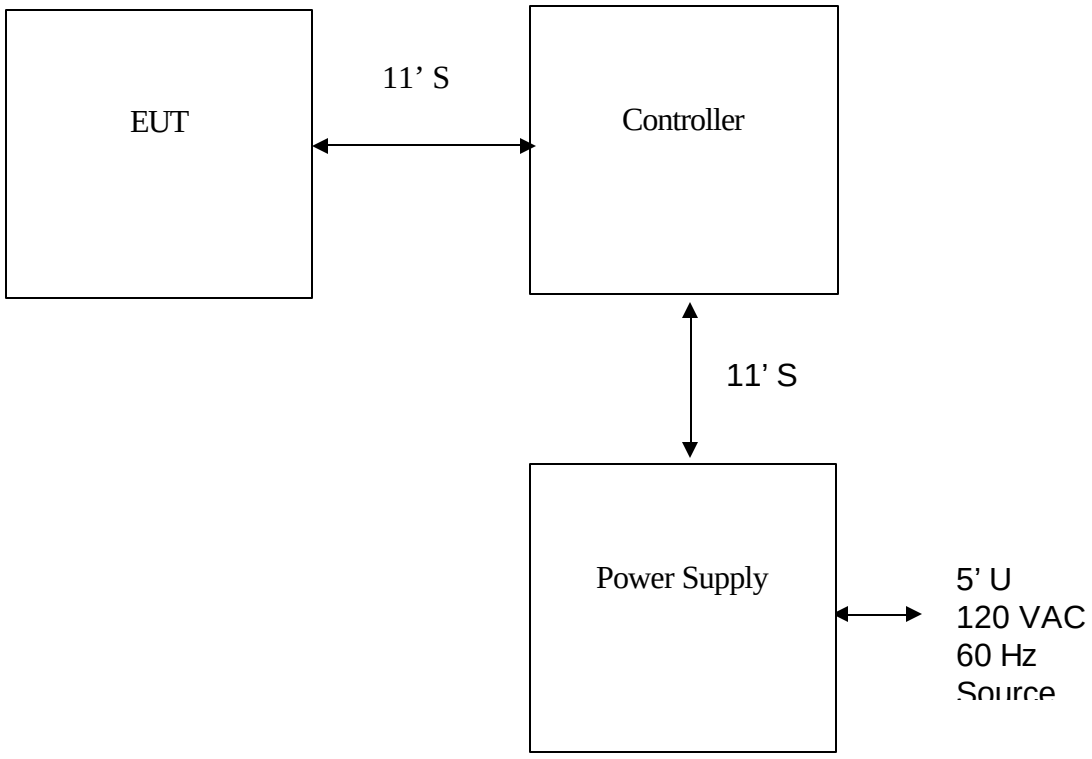


Figure 2.

Photograph of Test Setup for Spurious and Fundamental Emissions Measurement, (Rear View)

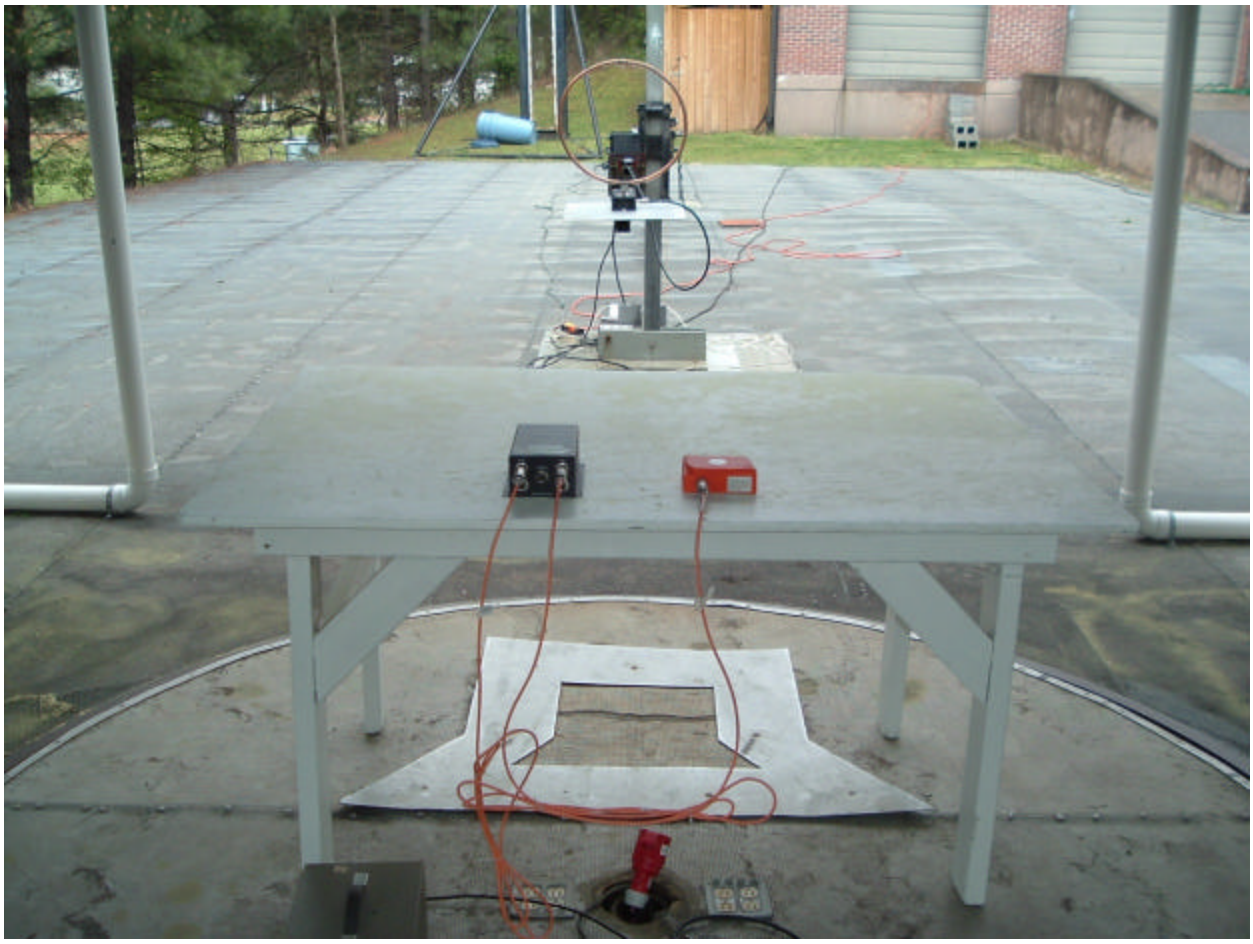


Figure 3.

Photograph of Test Setup for Spurious and Fundamental Emissions Measurement, (Front View)

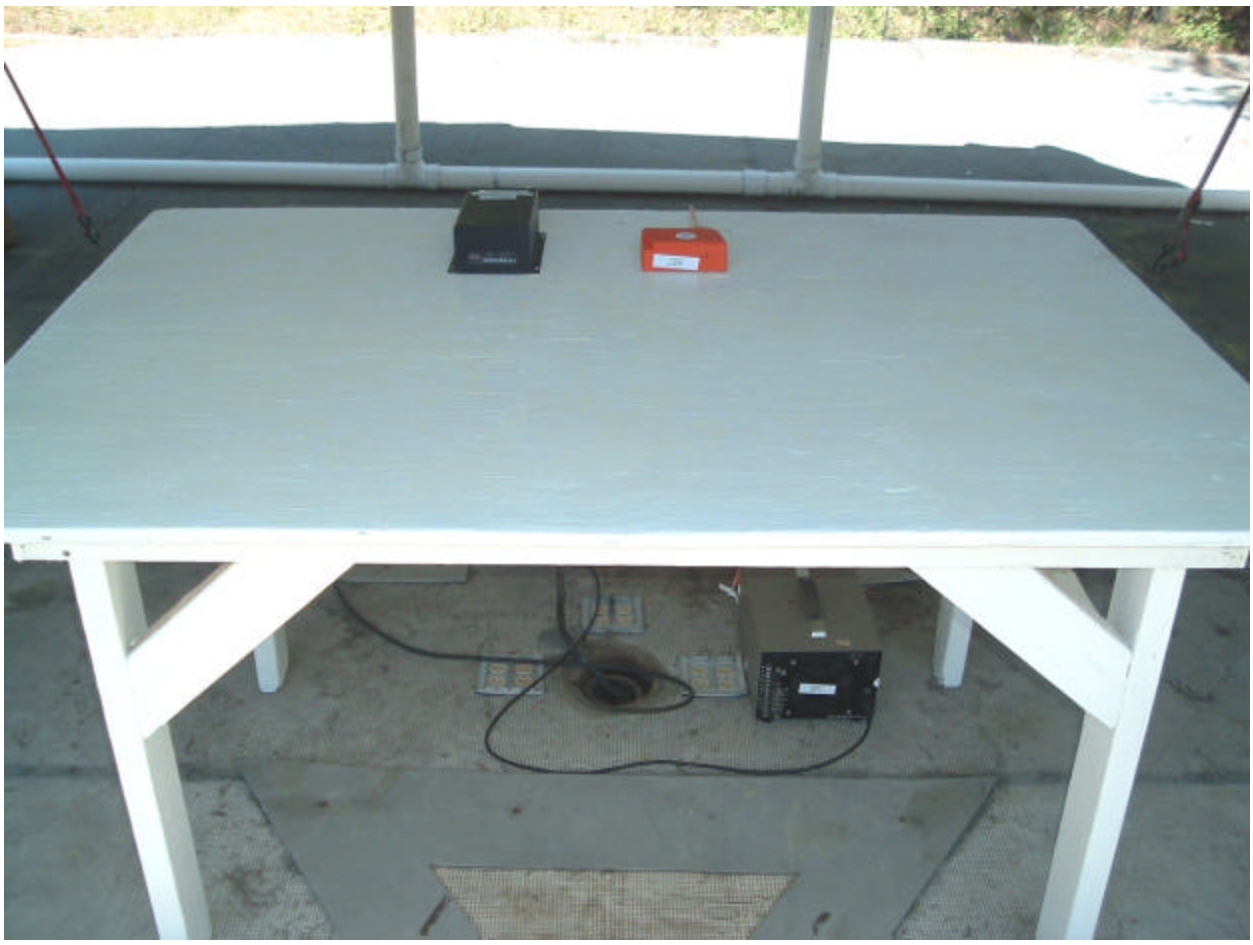


Figure 4.

Photograph of Conducted Emissions, Transceiver and Digital Device

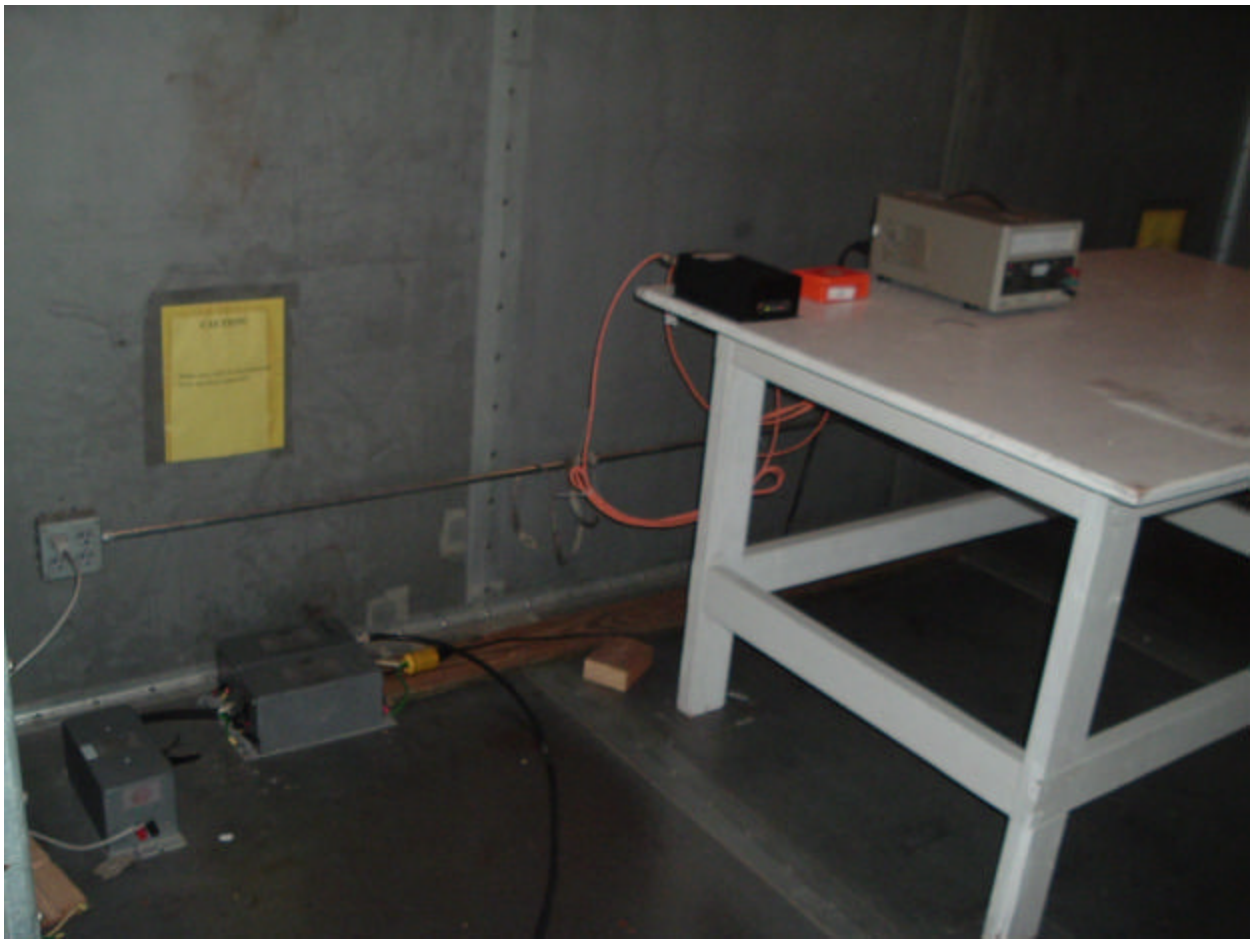


Table 2.

EUT and Peripherals

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Transceiver BALOGH T.A.G. Corporation (EUT)	ERC-100	None	G8630100X (Pending)	11' S
Controller BALOGH T.A.G. Corporation	BIET / XX	3090033	None	11' S
Power Supply Kenwood	PD56-6	None	None	5' U

P = Power D = data S = Shielded U = Unshielded

Table 3.

Test Instruments

TYPE	MANUFACTURER	MODEL	SN.	Cal Date.
SPECTRUM ANALYZER	HEWLETT-PACKARD	8593E	3205A00124	1/15/08
RF PREAMP 10 to 1000 MHz	HEWLETT-PACKARD	8447D	1937A03355	6/14/07
Loop Antenna 10 kHz to 30 MHz	A. H. Systems	SAS-200/562	142	Due 10/16/08
BICONICAL ANTENNA 25 to 200 MHz	EMCO	3110	9307-1431	11/15/07
LOG PERIODIC ANTENNA 100 MHz to 1 GHz	EMCO	3146	9110-3600	8/24/07
LISN	SOLAR ELECTRONICS.	8028	910495 & 910494	5/10/07

2.7 Field Strength of Fundamental

The results of the measurements for peak fundamental emissions are given in Table 3 and Figure 6. The EUT emissions were measured by setting up the loop antenna in the vertical orientation at a distance of 3 meters from the EUT and at a height of 1.0 meters above the ground. The EUT major axis was set to face the measuring antenna so that it intercepted the plane formed by the loop at right angles. When a signal was detected, the loop was slowly rotated about its axis in an attempt to maximize the emission. The antenna was left in the orientation where the emission was at a maximum and the signal was measured and recorded.

Table 4.
Field Strength of Fundamental and Harmonic Emissions, Peak

Test By: DA	**Test:** FCC Part 15.209							
	Project: 08-0015		**Class: N/A**					
Frequency	**Spectrum Analyzer Reading**	**Transducer Factor for Loop Antenna**	**Other Correction Factors CL- DIST**	**Corrected Test Data @ 30 m**	**FCC Limits @ 30 m**	**Actual Test Distance**	**Margin**	**DETECTOR PK/QP/ AVG**
MHz	***dBuV**	**dB/m**	**dB**	**uV/m**	**uV/m**	**m**	**dB**	
1.50	25.4	35.4	+1.6 -40	13.18	16.00	3	1.6	PK
1.50	22.63	35.4	+1.6 -40	9.59	16.00	3	4.37	QP
3.0	23.95	28.7	+.3 -40	4.44	29.54	3	17.05	PK
4.5	14.05	24.9	+.3 -40	0.92	29.54	3	30.3	PK

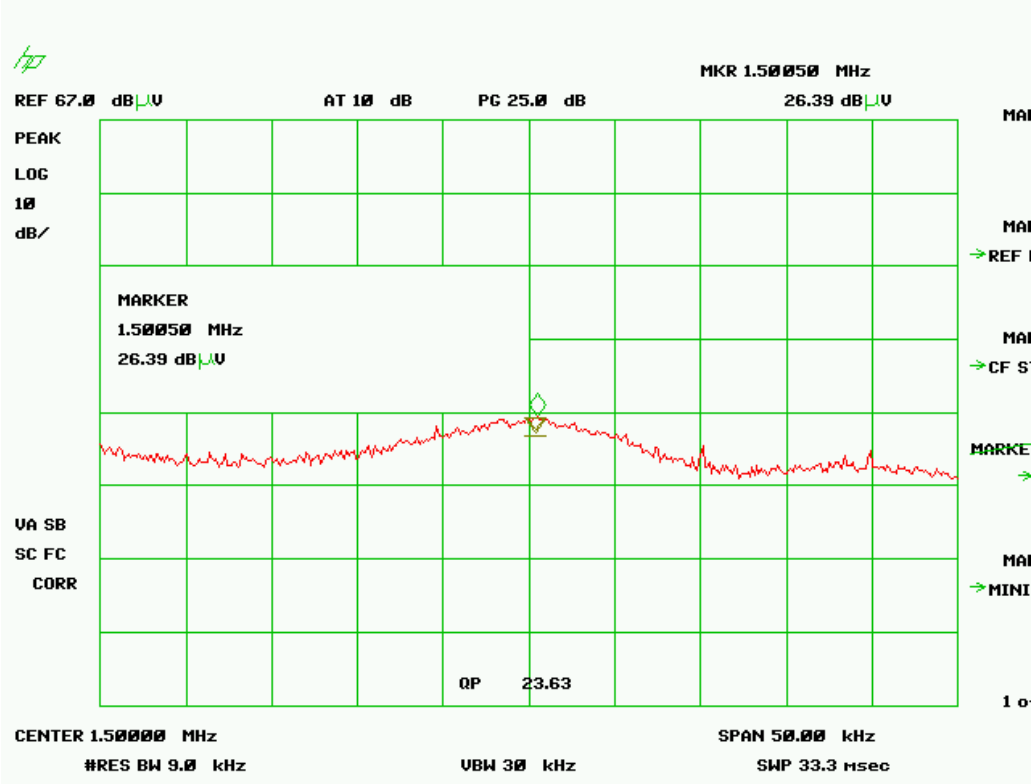
Tested over (0.15 to 15) MHz. No other signals found within 20 dB of limit.
*** - Includes subtraction of Preamp gain value (-26 dB)**
SAMPLE CALCULATIONS:

RESULTS @ 1.5 MHz with Peak Detector, = Antilog (25.4 + 35.4+1.6-40)/20 = 13.18 uV/m @ 30 m

Test Results Reviewed By: Daniel Aparaschivei **Name: Daniel Aparaschivei**

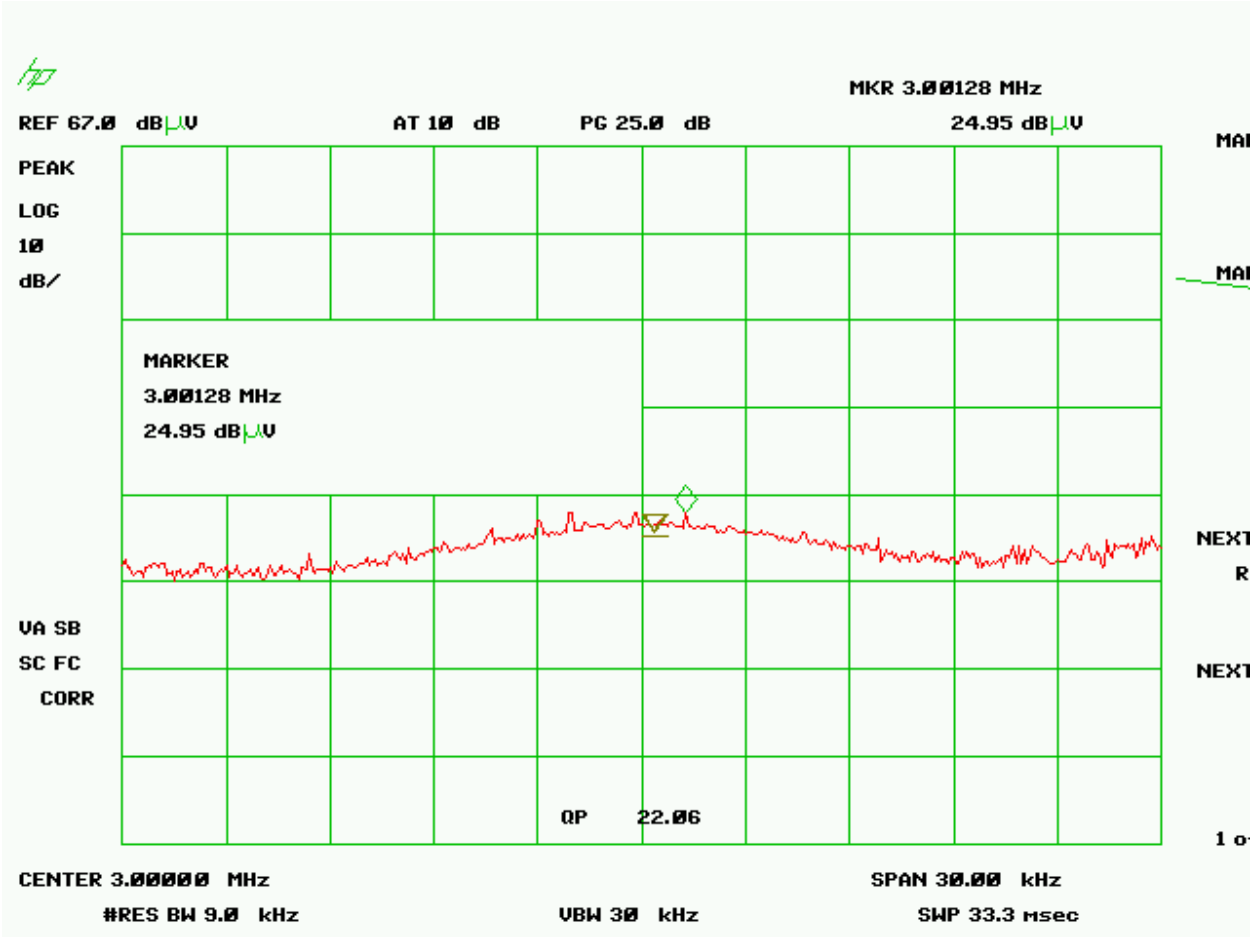
Figure 5.

Field Strength of Fundamental Emissions 15.209



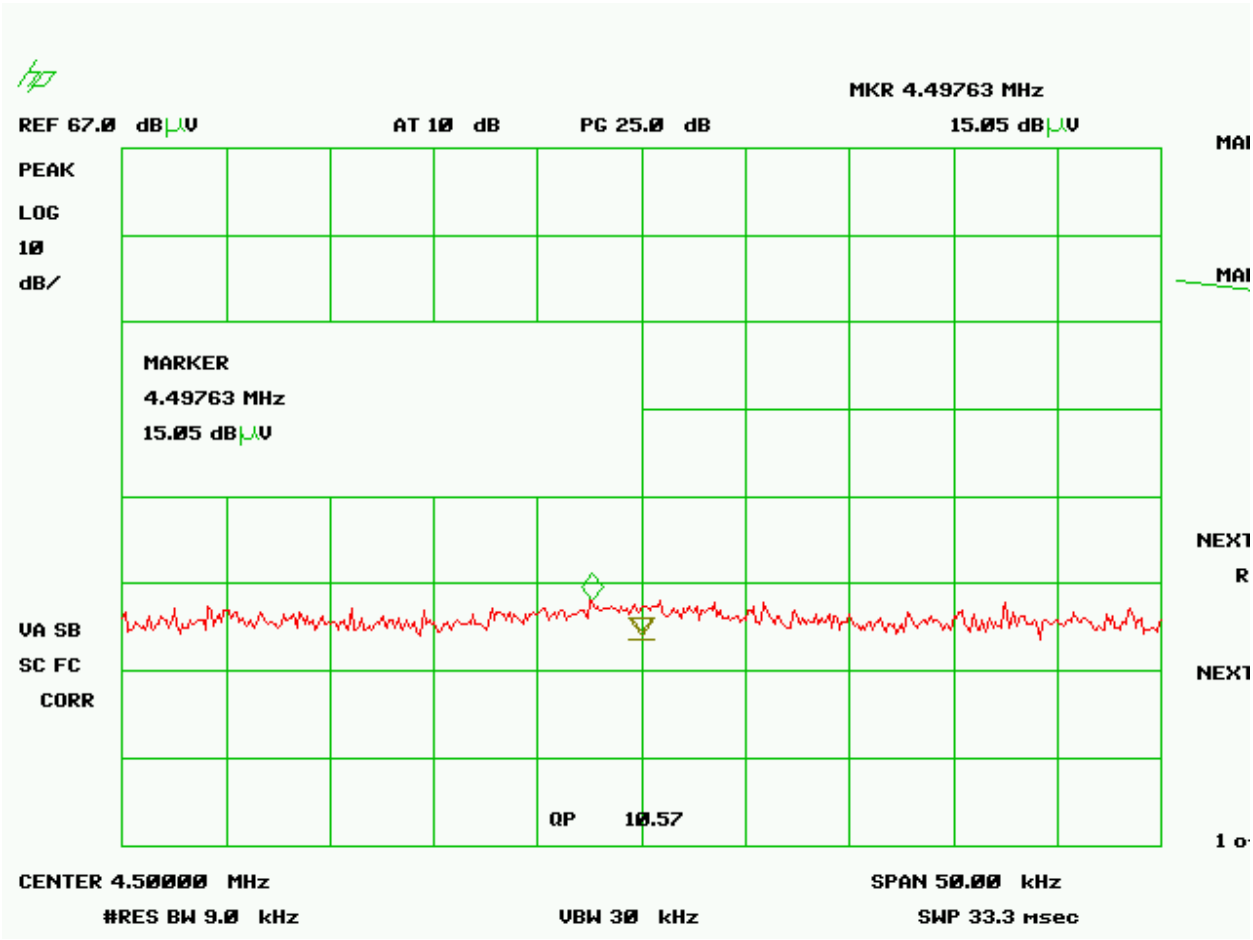
Note: Subtract 1 additional dB for pre-amp gain.

Figure 6. Second Harmonic of ERC-100.



Note: Subtract 1 additional dB for pre-amp gain.

Figure 7. Third Harmonic of ERC-100.



Note: Subtract 1 additional dB for pre-amp gain.

2.8 Peak Radiated Spurious Emissions in the Frequency Range 30 MHz -1,000 MHz (FCC Section 15.205 & 15.209)

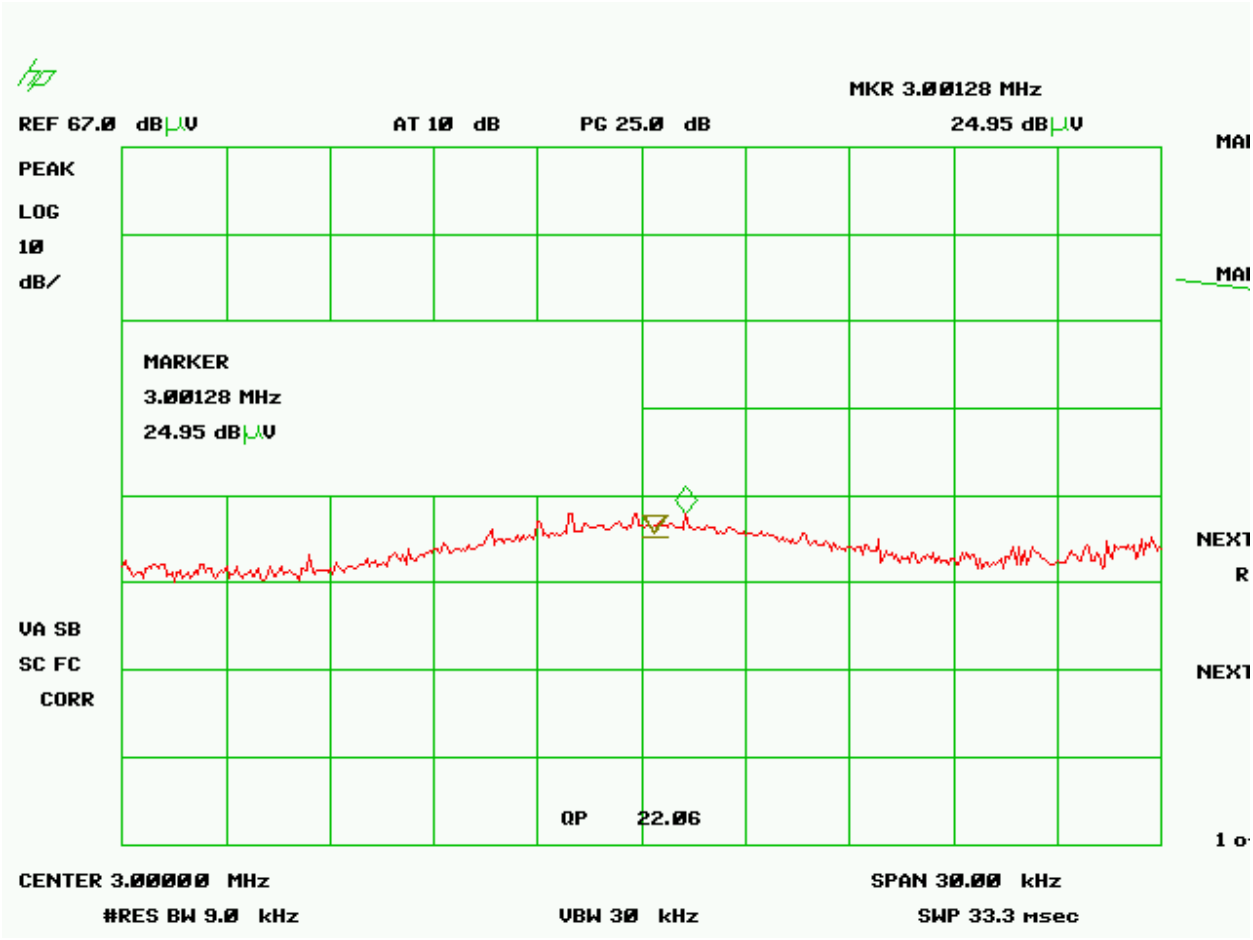
A preliminary scan was performed on the EUT to determine spurious frequencies that were caused by the transmitter portion of the product. Significant emissions that fell within restricted bands were then measured on an OAT's site. Radiated measurements below 1 GHz were tested with a RBW = 120 kHz. The results of all peak radiated spurious emissions including those falling in the restricted bands are given in Table 4 and 5 and Figure 8.

Table 5. Peak Radiated spurious Emissions 30 MHz to 1000 MHz.

Test By: DA	**Client:** BALOGH T.A.G. Corporation							
	FCC Part 15.209	**Model:** ERC-100						
		Project Number: 08-0015						
Frequency	**Test Data**	**Test Data**	**Transducer ANT+CL**	**Corrected Results**	**Limits @ 3m**	**Actual Test Distance/**	**Margin**	**PK / QP**
(MHz)	**(dBm)**	**(dBuV)**	**(dB)**	**(uV/m)**	**(uV/m)**	**Polarity**	**(dB)**	
30.0	-84.65	22.35	13.2+.95	66.83	100	3m/Vert	**3.5**	**PK**
109.5	-89.69	17.31	10.7+1.9	31.29	100	3m/Horiz	**10.09**	**PK**
212.33	-93.89	13.11	11.4+2.7	29.5	100	3m/Vert	**10.6**	**PK**
221.33	-88.83	18.17	11.1+2.7	22.94	150	3m/Horiz	**12.81**	**PK**
468.9	-92.68	14.16	17.2+4.2	59.98	150	3m/Vert	**4.44**	**PK**
477.74	-92.84	14.16	17.4+4.2	59.98	200	3m/Vert	**17.2**	**PK**
641.36	-90.94	16.06	19.8+4.8	107.89	200	3m/Vert	**11.27**	**PK**
973.2	-101.53	5.47	23.0+6.3	54.76	500	3m/Vert	**19.23**	**PK**

Figure 8.

Peak Radiated Spurious Emission 15.209 Representative Plot



2.9 Frequency Stability

The EUT temperature stability was measured over the temperature range of -20º C to 50º C as well as supply voltage variations of 85% to 115% at the temperature of 20º C. The results of this measurement are recorded in Table 6 below.

Table 6. Frequency Variation with Temperature and Supply Voltage.

Voltage - Volts	**Temperature ºC**		
	-20	**20**	**50**
Frequency @ 20.4	NR	1.5000 MHz	NR
Frequency @ 24.0	1.50000 MHz	1.50025 MHz	1.50031 MHz
Frequency @ 27.6	NR	1.50000 MHz	NR
85 % of 24 VDC = 20.4 VDC			
115 % of 24 VDC= 27.6 VDC			

NR = Not Required

All of the measured values lie between the upper and lower 0.01% bounds.

Test Date: April 17, 2008

Tested by Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

Figure 9. Data Plot 24.0 VDC, +20ºC.

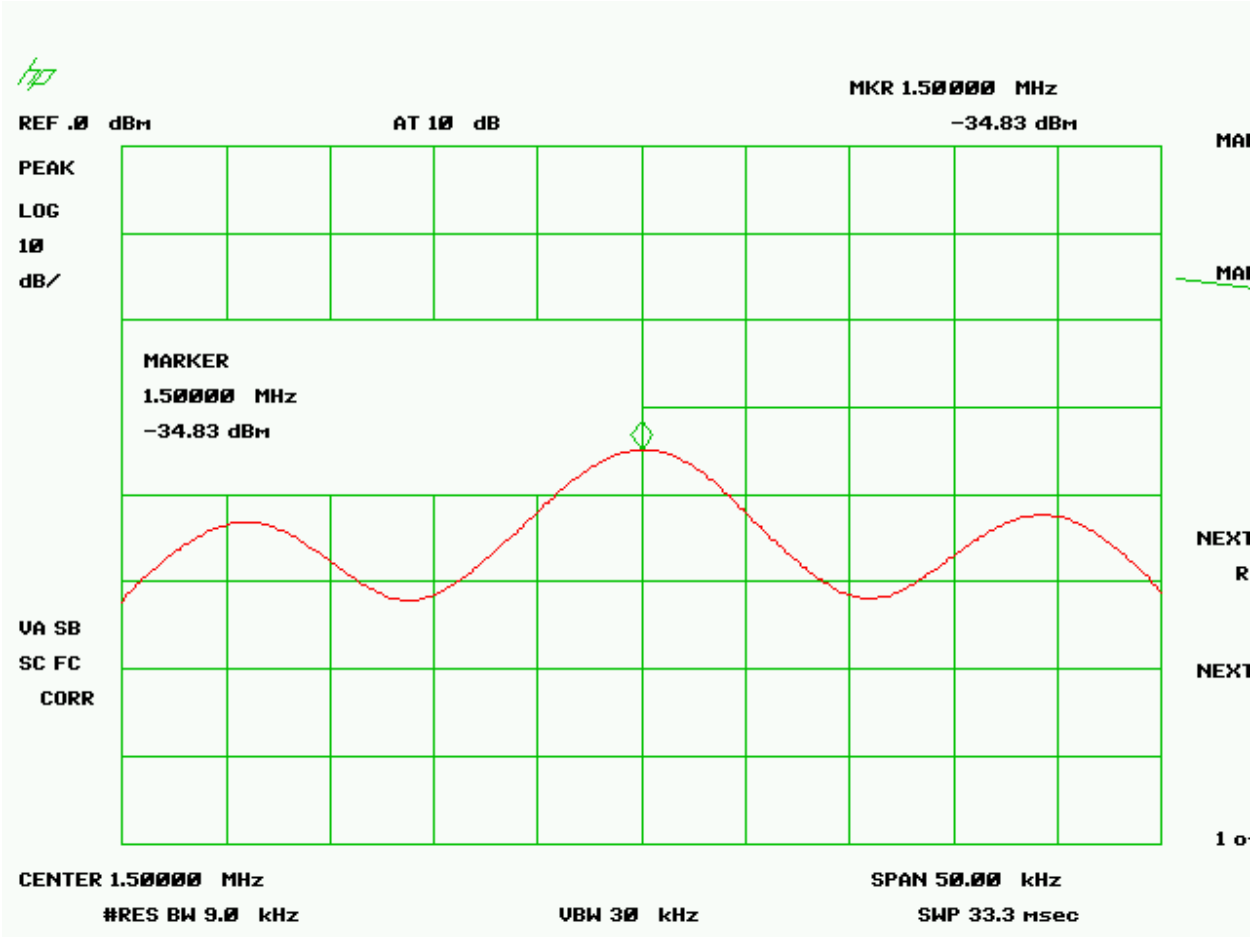


Figure 10. Data Plot, 24.0 VDC, -20 ºC.

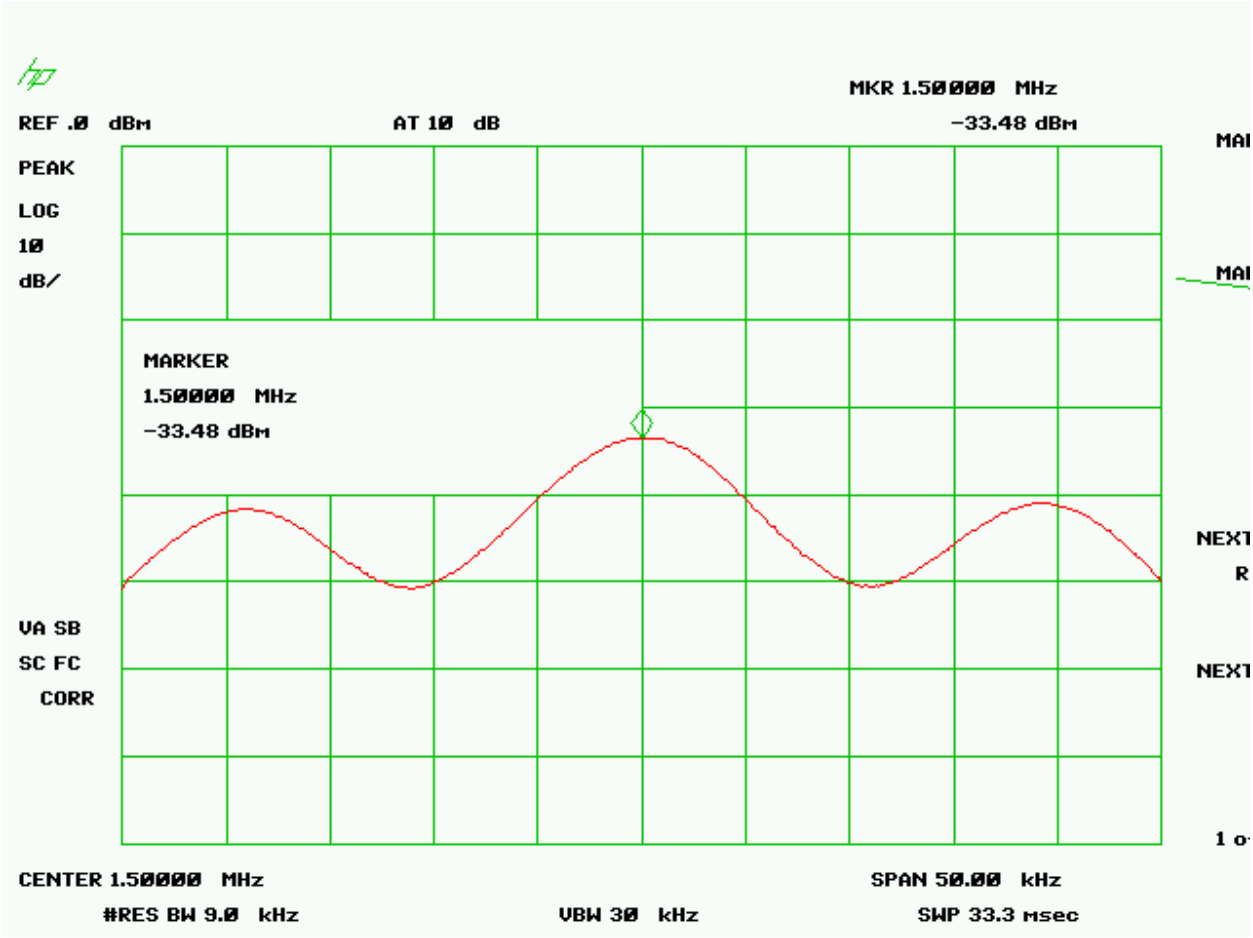
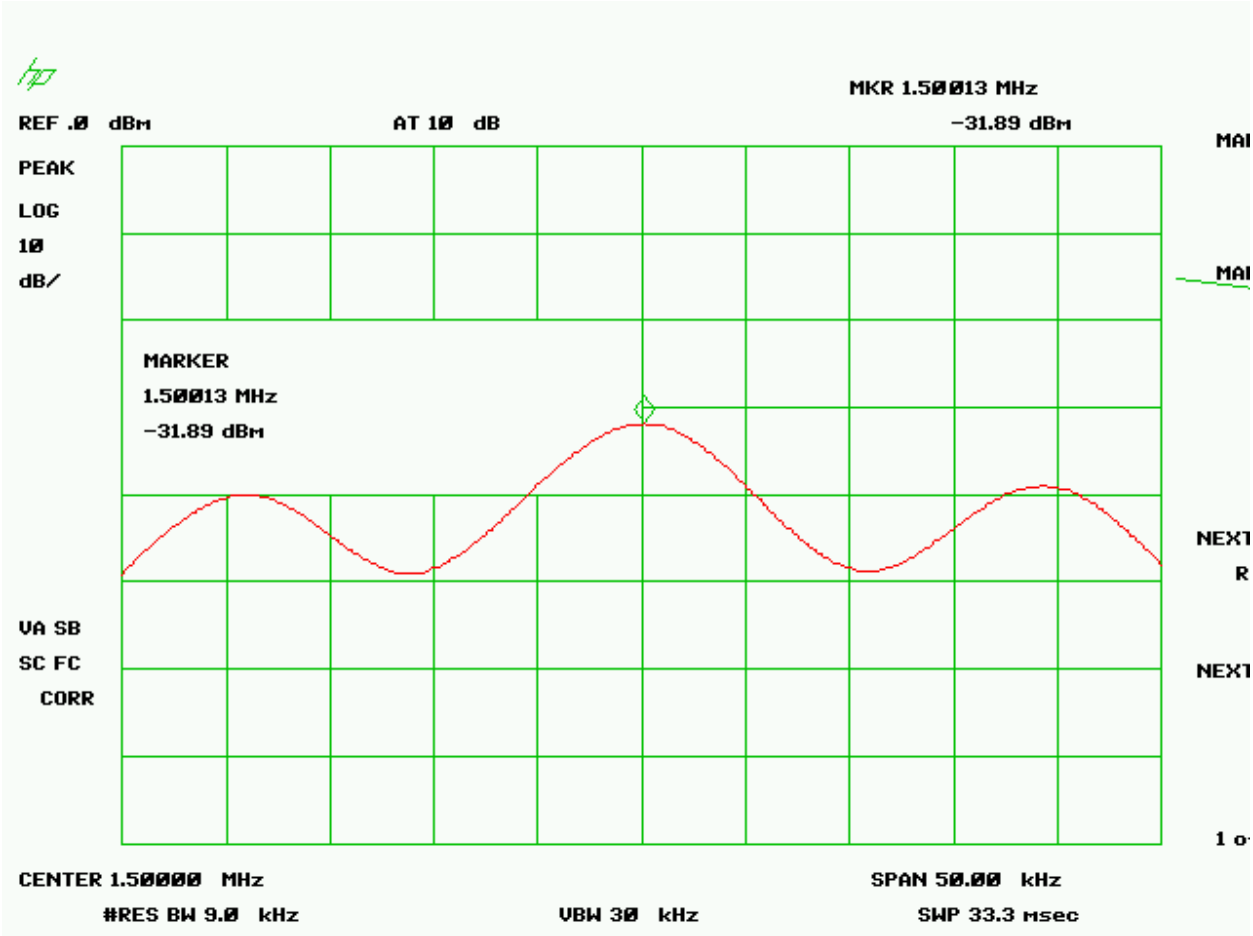


Figure 11. Data Plot 24.0 VDC, +50 ºC.



2.10 Powerline Conducted Emissions (Transmitter and Receiver plus Digital Devices.) (FCC Section 15.107 & 15.207)

The conducted voltage measurements have been carried out in accordance with FCC Section 15.207, with a spectrum analyzer connected to an LISN and the EUT placed into a continuous mode of transmit. The results are given in Table 7.

Table 7. Conducted Emissions Test Data for Transmitter and Receiver/Digital Devices, Class A.

Tested over the frequency range of 150 kHz to 30 MHz.

Conducted Emissions									
Test By: KM	**Test:** FCC Part 15.107 & 15.207					**Client:** BALOGH T.A.G. Corporation			
	Project: 08-0015					**Model:** ERC-100			
Frequency (MHz)	**Test Data (dBm)**	**Test Data (dBuV)**	**Transducer**	**LISN +CL (dB)**	**Results (dBuV)**	**Limits (dBuV)**	**Distance / Polarity**	**Margin (dB)**	**PK = n / QP**
3.0	-82.3	24.7	LISNP	0.2	24.9	46.0	PHASE	**21.1**	**PK**
18.0	-73.8	33.2	LISNP	0.7	33.9	50.0	PHASE	**16.1**	**PK**
19.5	-68.5	38.5	LISNP	0.6	39.1	50.0	PHASE	**10.9**	**PK**
24.0	-73.7	33.3	LISNP	0.6	33.9	50.0	PHASE	**16.1**	**PK**
25.5	-70.0	37.0	LISNP	0.6	37.6	50.0	PHASE	**12.4**	**PK**
27.0	-76.2	30.8	LISNP	0.6	31.4	50.0	PHASE	**18.6**	**PK**
28.5	-74.3	32.7	LISNP	0.7	33.4	50.0	PHASE	**16.6**	**PK**
3.0	-86.8	20.2	LISNN	0.2	20.4	46.0	NEUTRAL	**25.6**	**PK**
18.0	-75.8	31.2	LISNN	0.7	31.9	50.0	NEUTRAL	**18.1**	**PK**
19.5	-69.7	37.3	LISNN	0.6	37.9	50.0	NEUTRAL	**12.1**	**PK**
24.0	-75.2	31.8	LISNN	0.7	32.5	50.0	NEUTRAL	**17.5**	**PK**
25.5	-71.0	36.0	LISNN	0.7	36.7	50.0	NEUTRAL	**13.3**	**PK**
27.0	-77.0	30.0	LISNN	0.7	30.7	50.0	NEUTRAL	**19.3**	**PK**
28.5	-75.0	32.0	LISNN	0.8	32.8	50.0	NEUTRAL	**17.2**	**PK**

SAMPLE CALCULATIONS: At 3.00 MHz, level = 24.7 + 0.2 = 24.9 dBuV.

Test Results Reviewed By: Keyvan Muvahhid **Name: Keyvan Muvahhid**

2.11 Radiated Emissions (Receiver and Digital Devices) (FCC Section 15.109)

Radiated emissions for the receiver and digital aparatus were evaluated from 30 MHz to 5000 MHz. Measurements were made with the analyzer's bandwidth set to 120 kHz for measurements made at less than 1 GHz and 1 MHz for measurements made for 1 GHz and higher. Results are shown in Table 8.

Table 8. Radiated Emissions Data for Receiver and Digital Device, Class B

30 MHz – 12 GHz

Radiated Emissions for Digital Device

Test By: DA	**Test:** FCC Part 15		**Client:** BALOGH T.A.G. Corporation
	Project: 08-0015	**Class: B**	**Model:** ERC-100

Frequency MHz	Spectrum Analyzer dBm	Transducer Table	Test Data dBuV	AF+CA-AMP dB/m	Results uV/m	Limits uV/m	Distance / Polarity	Margin dB	QP/PK
30.00	-84.7	1BI3mV	22.4	13.9	65.3	100.0	3m./VERT	**3.7**	**PK**
63.00	-88.2	1BI3mH	18.8	11.0	31.1	100.0	3m./HORZ	**10.1**	**PK**
109.50	-89.7	1BI3mH	17.3	12.6	31.3	150.0	3m./HORZ	**13.6**	**PK**
144.00	-88.5	1BI3mV	18.5	15.0	47.4	150.0	3m./VERT	**10.0**	**PK**
221.33	-88.8	1LP3mH	18.2	14.2	41.5	150.0	3m./HORZ	**11.2**	**PK**
468.90	-92.7	1LP3mV	14.3	21.0	58.5	200.0	3m./VERT	**10.7**	**PK**
477.70	-94.5	1LP3mH	12.5	21.7	51.2	200.0	3m./HORZ	**11.8**	**PK**
477.74	-92.8	1LP3mV	14.2	21.2	58.6	200.0	3m./VERT	**10.7**	**PK**
641.36	-90.9	1LP3mV	16.1	24.3	104.7	200.0	3m./VERT	**5.6**	**PK**
973.20	-101.5	1LP3mV	5.5	29.4	55.4	500.0	3m./VERT	**11.2**	**PK**

SAMPLE CALCULATIONS:

RESULTS @ 30 MHz: E = Antilog ((-84.7 + 13.9 + 107)/20) = 65.3 uV/m @ 3m
CONVERSION FROM dBm TO dBuV = 107 dB

April 16, 2008

Test Results Reviewed By: Daniel Aparaschivei **Name: Daniel Aparaschivei**

5 Photographs

Photos of The Tested EUT

5.1 EUT, Front View
5.2 EUT, Side View
5.3 EUT, Bottom View Cover Removed Transceiver board Solder Side
5.4 EUT, Transceiver board Component Side

6 User's Manual

Provided in a separate PDF document