

EXHIBIT E: REPORT OF MEASUREMENTS [2.1033(B6)]**Test Report for FCC ID: RN8TIPS001**
FCC Part 2.1031, Part 15 Subpart C(15.209)**Report #0400719F**
Issued 11/01/04**MODEL TIPS PRO**

Prepared for:

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data recorded by

Ted Chaffee, NCE

witnessed by

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Statements Concerning this Report

NVLAP Accreditation: NVLAP Lab Code 200129-0

The scope of AHD accreditation is the test methods of:

IEC/CISPR 22: Limits and methods measurement of radio disturbance characteristics of information technology equipment.

FCC Method – 47 CFT Part 15: Digital Devices.

AS/NZS 3548: Electromagnetic Interference – Limits and Methods of Measurement of Information Technology Equipment.

IEC61000-4-2 and Amend.1: ElectroStatic Discharge Immunity

IEC61000-4-5: Surge Immunity

Test Data:

This test report contains data included in the scope of NVLAP accreditation.

Subcontracted Testing:

This report does not contain data produced under subcontract.

Test Traceability:

The calibration of all measuring and test equipment and the measured data using this equipment are traceable to the National Institute for Standards and Technology (NIST).

Limitations on results:

The test results contained in this report relate only to the Item(s) tested. Any electrical or mechanical modification made to the test item subsequent to the test date shall invalidate the data presented in this report. Any electrical or mechanical modification made to the test item subsequent to this test date shall require an evaluation to verify continued compliance.

Limitations on copying:

This report shall not be reproduced, except in full, without the written approval of AHD.

Limitations of the report:

This report shall not be used to claim product endorsement by NVLAP, FCC, or any agency of the US Government.

Statement of Test Results Uncertainty:

Following the guidelines of NAMAS publication NIS81 and NIST Technical Note 1297, the Measurement Uncertainty at a 95% confidence level is determined to be: ± 1.4 dB

Manufacturer/Applicant [2.1033(b1)]

The manufacturer and applicant:

G5 Electronics, LLC
2727 Apache Trail.
Wixom, MI 48393

Measurement/Test Site Facility & Equipment**Test Site [2.948, 2.1033(b6)]**

The AHD test facility is centered on 9 acres of rural property near Sister Lakes, Michigan. The mailing address is 92723 M-152, Dowagiac, Michigan 49047. This test facility is NVLAP accredited (LabCode 200129-0). It has been fully described in a report filed with the FCC (No.90413) and Industry Canada (file:IC3161).

Measurement Equipment Used [2.947(d), 15.31(b)]

Equipment Calibration	Model	S/N	Last Cal Date	Interval
HP EMI Receiver system	HP 8546A			
RF Filter Section	HP-85460A	3448A00283	26-Aug-04	12 months
RF Receiver Section	HP-85462A	3625A00342	26-Aug-04	12 months
EMCO BiconiLog Antenna	3142	1077	24-Aug-04	12 months
(3-M) Type 129FF Ultra Flex LowLoss	RG58/U	9910-12	04-Feb-04	6 months
(3-M) LMR-400 Ultra Flex	LMR400	9812-11	04-Feb-04	6 months
50ohm Coax	RG223/U	9802302	04-Feb-04	12 months
EMCO Loop Antenna	6502	2184	25-Aug-03	36 months

Measurement Environment

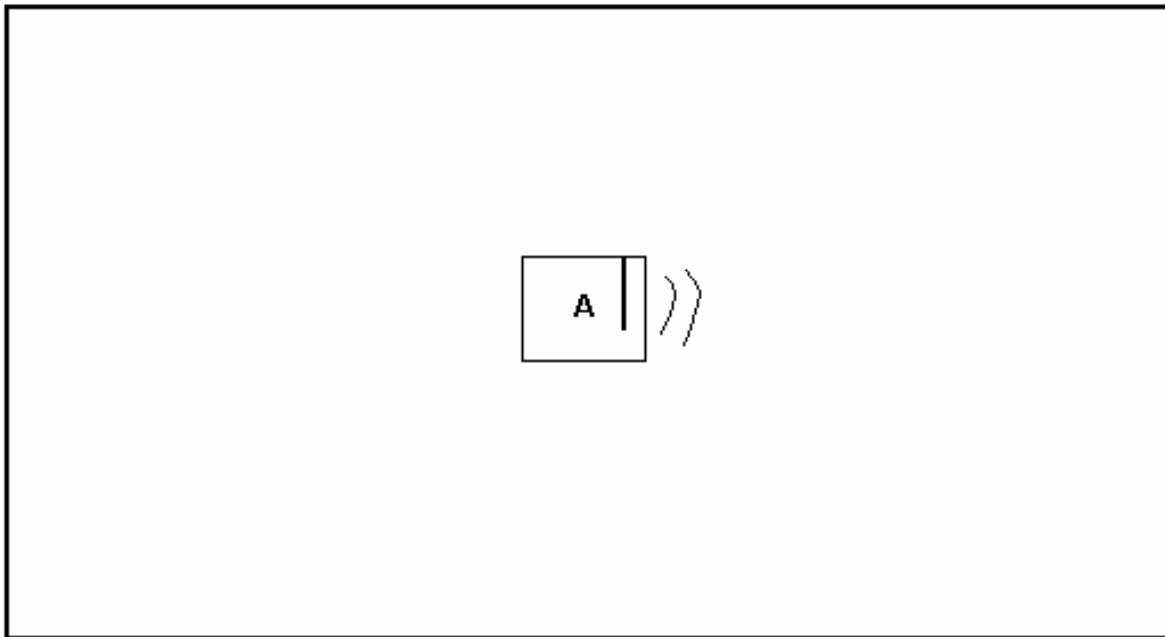
The tests were performed with the equipment under test, and measurement equipment inside the all-weather enclosure. Ambient temperature was 24deg.C., the relative humidity 35%.

Tested Configuration /Setup: [2.1033(b8)]**Support Equipment & Cabling**

Setup Diagram Legend	Description	Model	Serial No. / Part No.	EMC Consideration
A	[EUT] 125KHz transmitter	[G5] TIPS PRO	preproduction	RN8TIPS001

Setup Diagram

Note: Setup photographs are located in Attached Electronic File, Exhibit E.



setup_la1b

Summary of Results:

1. This test series evaluated the Equipment Under Test to FCC Part 15, SubPart C.
2. The product tested is the TIPS unit, model number TIPS PRO. This unit is compliant to the requirement of CFR 47, FCC Part 15, SubPart C for operation at 125KHz, (Part 15.209).
3. The equipment under test was received on September 7, 2004 and this test series commenced on September 7, 2004.
4. The line conducted emission testing does not apply to this product. The device is powered from six 1.5volt AA batteries only.
5. The fundamental was measured using a loop antenna at 10meter distance. The field strength level of the fundamental, 125KHz, was determined to be 18.1dBuV/m. This measurement is 7.5dB below the limit prescribed in Part 15.209.
6. The harmonic of the fundamental was measured using a loop antenna at 3meter distance. The measureable harmonic nearest the limit occurred at 875KHz. The level was determined to be 19.2dB below the limit prescribed in Part 15.209.
7. The measureable spurious emission, of digital and receiver oscillator frequencies, nearest the limit occurred at 254.4Hz in a horizontal polarity. This emission was measured to be 20.0dB below the limit of 46.0dBuV/m(200uV/m). From the prescan suspect list, the suspect at 30.8MHz was below the background floor noise. The floor noise in this frequency area measured 30.5dBuV/m which is 9.5dB below the limit of 40dBuV/m.

Changes made to achieve compliance

1. None

Standards Applied to Test: [2.1033(b6)]

ANSI C63.4 - 2001

CFR47 FCC Part 2, Part 15, SubPart C, 15.209 Intentional Radiator; SubPart B, Digital Device
AHD test procedures TP0101-01, TP0102-01

Test Methodology: [2.1033(b6)]

The setup pictures in this report indicate the maximum configurations of testing for this product.

Line Conducted testing was not performed on this product. The device is powered from six 1.5volt AA batteries only.

Radiated testing, performed at the applicable distance of the 10 meter and 3 meter open field test sites, was completed according to the procedures in FCC Part 15 with supporting instructions from ANSI C63.4 (2001).

The ITE system under test was placed per ANSI C63.4

The transmitted power output is established in the design and is not adjustable. The batteries were replaced periodically throughout the evaluation to ensure maximum power output.

The transmit antenna is a multi-turn H-field coil located in the 'nose' of the device.

The EUT was setup up, via a firmware adjustment, to allow for continuous transmission. Normally the device will turn off after approximately 6seconds.

The measurements of the fundamental, harmonics, and other spurious emissions were compared to the limits defined in section 15.209.

Spurious measurements from the unit were also evaluated. These spurious emissions were compared to the limits defined in section FCC 15.109.

Variance from Test Procedure

None.

Radiated

The system was placed upon a 1 x 1.5 meter non-metallic table 80cm above the open field site ground plane in the prescribed setup per ANSI C63.4.

The table sits upon a remote controlled turntable. The receiving antenna, located at the appropriate standards distance of 3 or 10 meters from the table center, is also remote controlled.

The principle settings of the EMI Receiver for radiated testing include:

IF Bandwidth: 200Hz for frequencies less than 150KHz
9KHz for frequencies less than 30MHz
120KHz for frequencies less than 1GHz.
1 MHz for frequencies greater than 1GHz.

Detector Function: Quasi-Peak
Average for frequencies 110-490KHz and above 1GHz.

At frequencies below 30MHz a broadband Loop antenna was used for measurements.

At frequencies up to 1000MHz a BiconiLog broadband antenna was used for measurements.

At frequencies above 1000MHz a double-ridge Horn broadband antenna was used for measurements.

During the transmitter evaluation the EUT was transmitting continuously.

The loop antenna was positioned 10meters from the turntable and 1 meter above the Open Area Test Site ground plane. The turntable was rotated 360 degrees and the loop receiving antenna rotated about its vertical axis to search out the highest emissions.

Above 30MHz, the turntable was rotated 360 degrees and the biconical receiving antenna height varied from 1 to 4 meters to search out the highest emissions. The procedure was repeated for both vertical and horizontal receive antenna polarizations.

FORMULAS AND SAMPLE CALCULATIONS:

THE HP8546A EMI Receiver has stored in memory the antenna and coax correction factors used in this test. The resultant Field Strength (FS) in dBuV/m presented by the HP8546A is the summation in decibels (dB) of the Received Level (RF), the Antenna Correction Factor (AF), and the Cable Loss Factor (CF).

Formula 1: $FS(\text{dBuV/m}) = RF(\text{dBuV}) + AF(\text{dB/m}) + CF(\text{dB})$

Where it was necessary to move the EUT to a distance other than prescribed to take measurements a 'dB' factor which adjusts for this distance variance is used before comparing the emission level to the FCC limits. This factor is determined by the following formula.

Formula 2: $\text{Distance factor(dB)} = 20 * \text{Log}(\text{actual test distance} / \text{prescribed test distance})$.

Formula 2a: At frequencies less than 5MHz –

$\text{Distance factor(dB)} = 40 * \text{Log}(\text{actual test distance} / \text{prescribed test distance})$.

Test Data [2.1033(b6)]**Radiated Field Strength Measurements: [15.209]**

Unless noted, the measurement distance is 10Meters with the loop antenna.

Tabulated Measurements.

FUNDAMENTAL

Frequency MHz	Measured dBuV/m	Included Cable+Ant. Factors dB+dB/m	Det	Antenna Oriented	Extrap factor from 300 to 10 meters dB	Resultant Measurement to compare to limit dBuV/m	FCC 15.209 Limit dBuV/m	Margin dB
0.125	77.2	10.30	AVG	perp	-59.10	18.1	25.64	-7.54

HARMONICS of fundamental

Because of low level emissions, the LOOP antenna was moved into 3 meters from EUT for the following measurements. The emission levels measured at 3 meters are compared to the limits set for a 10 meter test range.

Frequency MHz	Measured dBuV/m	Included Cable+Ant. Factors dB+dB/m	Det	Antenna Oriented	Extrap factor from 300 to 3 meters dB	Resultant Measurement to compare to limit dBuV/m	FCC 15.209 Limit dBuV/m	Margin dB
0.250	53.4	9.97	AVG	perp	-80.0	-26.6	19.67	46.27
0.375	61.5	10.10	AVG	perp	-80.0	-18.5	16.09	34.59

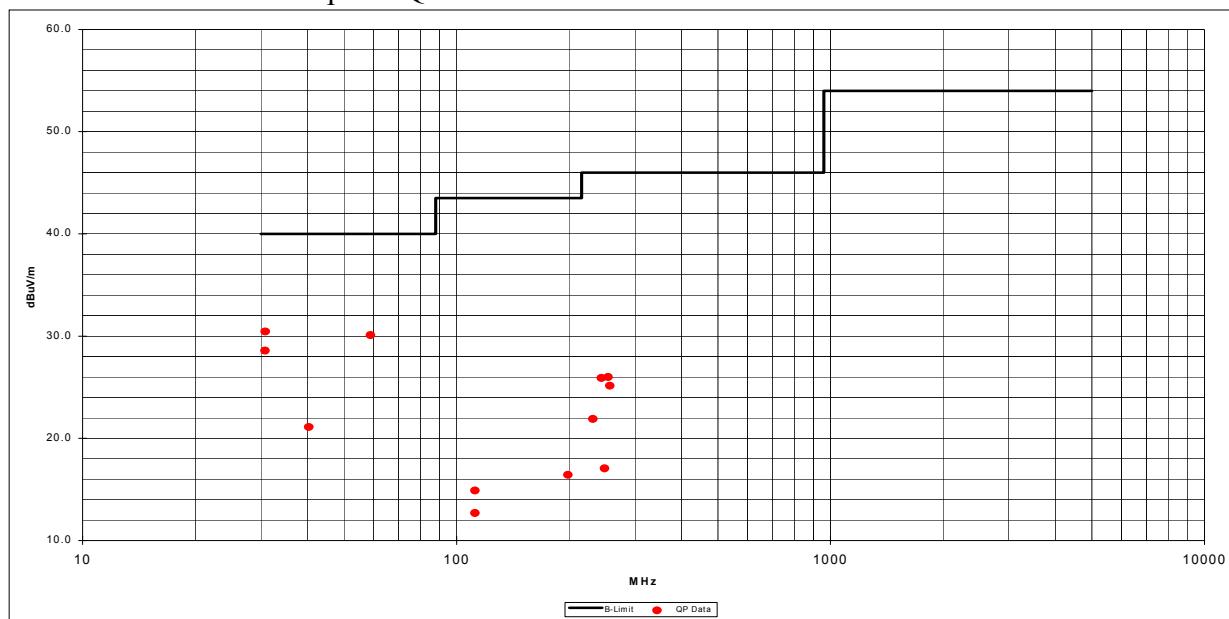
Frequency MHz	Measured dBuV/m	Included Cable+Ant. Factors dB+dB/m	Det	Antenna Oriented	Extrap factor from 30 to 3 meters dB	Resultant Measurement to compare to limit dBuV/m	FCC 15.209 Limit dBuV/m	Margin dB
0.500	52.4	10.19	QP	perp	-40.0	12.4	33.67	21.27
0.625	56.3**	10.23	QP	perp	-40.0	16.3	31.67	15.37
0.750	44.9**	10.25	QP	perp	-40.0	4.9	30.10	25.2
0.875	49.5	10.28	QP	perp	-40.0	9.5	28.73	19.23
0.999	46.9**	10.29	QP	perp	-40.0	6.9	27.62	20.72
1.125	45.2	10.24	QP	perp	-40.0	5.2	26.55	21.35
1.250	38.8**	10.19	QP	perp	-40.0	-1.2	25.59	26.79
1.375	37.5**	10.16	QP	perp	-40.0	-2.5	24.82	27.32

**Measurements show the levels of the background noise floor. The emission levels of the equipment under test is lower.

Test scan was performed through 30MHz.

Spurious Emissions above 30MHz: [15.209]

Graph of Quasi-Peak Measurements 3 meter distance



Tabulated Quasi-Peak Measurements.

Frequency MHz	Corrected Quasi Peak Measurement dBuV/m	Included Cable+Antenna Factors dB+dB/m	Polarity	Turntable Azimuth deg	Antenn a Height Mtr	FCC Class B Limit dBuV/m	Margin dB
30.81	30.46**	18.58	V	-	1.0	40.00	9.54
58.90	30.11**	8.65	V	-	1.0	40.00	9.89
112.00	14.90	9.20	V	10	1.0	43.50	28.60
248.89	17.06	13.56	V	180	1.0	46.00	28.94
30.78	28.59**	18.60	H	-	4.0	40.00	11.41
40.27	21.10**	13.56	H	-	4.0	40.00	18.90
112.00	12.70	9.20	H	200	2.5	43.50	30.80
113.44	6.84**	9.11	H	-	2.0	43.50	36.66
198.51	16.43	11.97	H	280	2.1	43.50	27.07
231.40	21.90	13.07	H	270	1.4	46.00	24.10
244.13	25.91	13.43	H	270	1.5	46.00	20.09
254.37	26.00	13.69	H	270	1.2	46.00	20.00
257.14	25.15	13.77	H	270	1.4	46.00	20.85

Measurement scan to 1000MHz

The frequencies for measurements were determined by the suspect list generated from the shielded room prescan.

**Measurements show the levels of the background noise floor. The emissions of the equipment under test is less.

All other spurious emission are greater than 25dB below limits.

20dB Occupied Bandwidth (ANSI C63.4, Annex I.6)

The occupied bandwidth is measured using 1KHz resolution bandwidth of measurement equipment.

Fundamental	Measured 20dB Bandwidth
125 KHz	4.0KHz

Spectrum of measured bandwidth of signal.