EMC Testing Laboratories, Inc.

RF Emissions Test Report
To Determine Compliance With:
FCC, Part 15.249 and RSS210
Rules and Regulations

Model number: BPC001

Date: May 20, 2010

Manufacturer: Titan Pet Products, Inc.
6521 Creedmoor Road
Suite 101
Raleigh, NC 27613

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Section 1

GENERAL INFORMATION

Manufacturer:	Titan Pet Products, Inc. 6521 Creedmoor Road Suite 101 Raleigh, NC 27613
Manufacturer representative:	**Mr. Jason A. Hardi**
Equipment covered by this report:	Model no. BPC001
Options covered by this report:	None
Equipment serial no.	Prototype
Transmitting Frequency:	915 MHz
Test specifications:	To determine compliance with: FCC, Part 15.249, Subpart B and C, Rules and Regulations, Class A.
Test report number:	10-165A
Test commenced:	April 8, 2010
Test completed:	May 20, 2010
Test engineer:	**Gene Bailey**

Test Facility: The test facility used to perform these tests is on file with the FCC under registration number 637500 and located at:

EMC Testing Laboratories, Inc.
2100 Brandon Trail
Suite 101
Alpharetta, GA 30004

Section 2

PRODUCT DESCRIPTION AND TEST SUMMARY

Product description:
The product covered by this report, model no. BPC001 is a dog collar. The collar is equipped with IR receiver sensors, accelerometer, and an RF transceiver to communicate with other elements of the solution. The collar has an electronic shock circuit, a Peizo speaker element, (optional cell phone vibrator) to generate sound, vibration, and a static shock. The collar is also equipped with super bright LEDs that are used to generate visual feedback to the dog owner when commands are received by the collar, and super-bright flashes when necessary for the safety of the dog should it venture unattended away from the residence. The accelerometer is used in the system to preserve battery life and send most active functions to sleep while the pet is not moving. The product is battery powered.

The integral antenna is an Inverted F antenna, printed on the FR-4 circuit board. The transmitter is built on a CC1101 chip, with maximum power +10dBm.

The test results apply only to the products identified on the test report.

Test configuration:
The equipment under test (EUT) was set-up and configured as specified by the manufacturer as follows:

1- The product was connected to the following support peripherals:

A. A Power supply manufactured by Click, model no. CP50058050100U.

2- The EUT utilized the following cables and were connected as indicated below:

A- An Ethernet cable.

B- Power cable

Worst case transmit duty Cycle:
The duty cycle factor used in the calculation of average radiated limits (15.209 (d)) is described below.

Maximum transmit time On equals 1.6 mS over a 5,000 mS period.

The worst case Duty Cycle is calculated as follows:

(1.6/100) 100% = 0.016%

In terms of voltage dB: 20 log (2/100) = -35.91 dB

Modifications:
The following modifications were required to comply with the radiated emission limits:

1- None

Engineering Statement:
All measurement data of this test report was taken in accordance with the FCC, Part 15.249, Class B Rules and Regulations and ANSI C63.4-(09) and RSS-210 (07) by EMC Testing Laboratories, Inc. located in Alpharetta, Georgia. Although this data is taken under stringent laboratory conditions and to the best of our knowledge, represents accurate data, it must be recognized that emissions from or immunity to this type equipment may be greatly affected by the final installation of the equipment. Therefore, EMC Testing Laboratories, Inc., while supporting the accuracy of the data in this report, takes no responsibility for use of equipment based on these tests. The manufacturer of this equipment must take full responsibility for any field problems which may arise, and agrees that EMC Testing Laboratories, Inc., in performing its functions in accordance with its objectives and purposes, does not assume or undertake to discharge any responsibility of the manufacturer to any other party or parties.

Conclusion:
With the above-indicated modifications, the product covered by this report has been tested and found to comply with the above-indicated standards.

Tested by: **Gene Bailey, RF Engineer**

Approved by: _____
Glenn Barnes, RF Engineer,
EMC Tests, Inc.

Section 3

STANDARD REFERENCE

The following primary standards were used for this test:

1- **ANSI C63.4-09:** Method of Measurements of Radio-Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the 9 KHz to 40 GHz.

2- **US Code of Federal Regulations (CFR):** Title 47, Part 15, Radio Frequency Devices, Subpart B, Intentional Radiators.

3- **RSS-210 Issue 7 (07):** Low-Power Licence-Exempt Radiocommunication Devices

Note: Applicable amendments were applied to all standards.

Section 4

TEST METHOD

INTRODUCTION:

The product(s) covered by this report were subjected to electromagnetic interference emissions measurements to determine compliance with the FCC, Part 15 requirements.

Radiated and conducted emissions were measured in accordance with the Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz, ANSI C63.4.

MEASUREMENT CALCULATIONS:

Radiated Emissions:

For radiated emissions measurements, the signal attenuation due to impedance losses in the antenna and signal cable were significant and was added to the spectrum analyzer reading to give corrected signal strength reading. If a preamplifier was used, the signal gain was subtracted from the signal strength reading. Radiated emissions data was specified as decibels above 1 microvolt per meter (dBμV/m) of radiated field strength.

Radiated emissions (dBμV) = Analyzer reading (dBμV) plus
antenna factor (dB) plus cable factor (dB) minus Amplifier gain (dB)

Conducted Emissions:

For conducted emissions, the signal attenuation due to impedance losses in the LISN and signal cables was negligible and assumed to be 0dB. The conducted emissions were directly equal to the spectrum analyzer reading. Conducted emissions data was specified as decibels above 1 microvolt (dBμV) of conducted line voltage.

Conducted emissions (dBμV) = Analyzer reading (dBμV)

Test Method cont…

RADIATED EMISSIONS MEASUREMENT:

Radiated emissions measurements were performed at an open field test site. The receiving antenna was positioned 3 meters from the equipment under test along the center axis of the test site. Measurements were made with broadband antennas and if necessary, detected emissions were verified with dipole antennas. The dipole antenna was manually tuned to the signal frequency by adjusting the length of the antenna elements. The radiated emissions were measured for both the horizontal and vertical signal planes by rotating the antennas. Additionally, the EUT was rotated by the turntable and the antenna height was raised and lowered 1 to 4 meters to locate the maximum emission strength at each frequency.

The radiated emissions were measured over the frequency span of 30 MHz to 9.200 GHz. The following antennas were used to measure the radiated emissions within the specified frequency spans.

CONDUCTED EMISSIONS MEASUREMENT:

Conducted emissions measurements were performed on a ground plane that was electrically bonded to earth ground. The equipment under test was positioned 0.8 meter above the ground plane and 0.8 meter minimum from the LISN that was positioned on the ground plane. The LISN housings were electrically bonded to the ground plane. The conducted emissions for both the ungrounded supply conductor (L1) and the grounded conductor (L2) of the power supply cord were measured. The conducted emissions were measured over the frequency span of 0.15 to 30 MHz. The measurements were conducted in the quasi-peak and average detector modes.

INSTRUMENTATION:

Radiated and conducted signal strength measurements were taken with a spectrum analyzer. Radiated emissions were measured with broadband and tuned dipole antennas. Conducted emissions were measured with a 50 UH line impedance stabilization network (LISN).

Test Method cont…

DETECTOR FUNCTION:

Unless otherwise indicated in this report, all measurements were taken using a peak hold signal detector function. In this mode, the spectrum analyzer makes continuous scans across the frequency band and stores the highest emission value detected at each frequency for all scans. The peak hold integration will detect transient or low duty cycle emissions peak, which might be missed on single scan measurement. The emission value at each frequency was a true value.

SPECTRUM ANALYZER SETTING:

For all measurements, the spectrum analyzer was set for 10 dB input attenuation, 10 dB/Division vertical scale and 90 or 100 dBμV reference level. The resolution bandwidth was set at 9 KHz for the 0.15 - 30 MHz span and at 120 KHz for 30 – 9.200 GHz span. The video bandwidth and sweep rate were automatically coupled by the analyzer.

Section 5

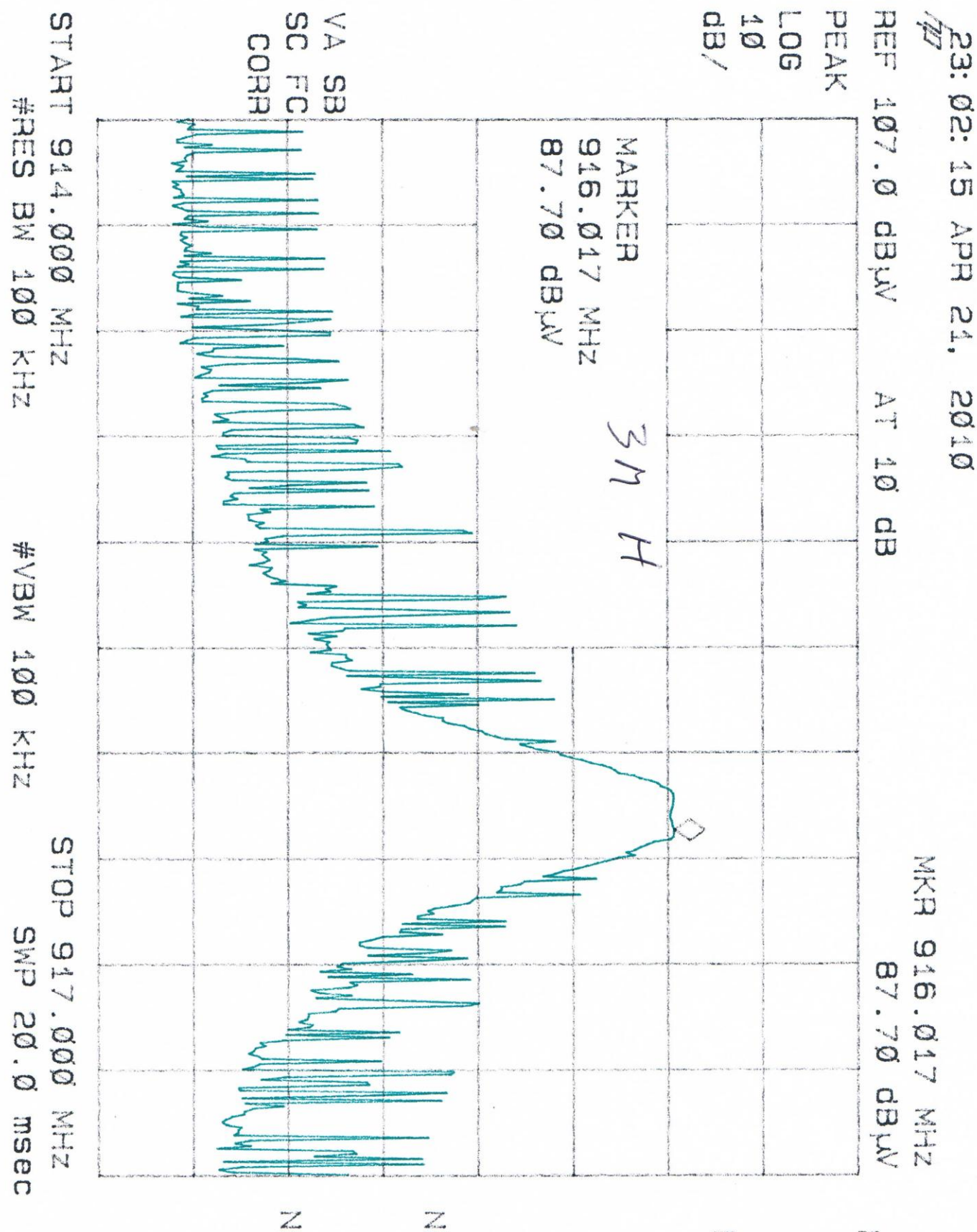
OUTPUT POWER

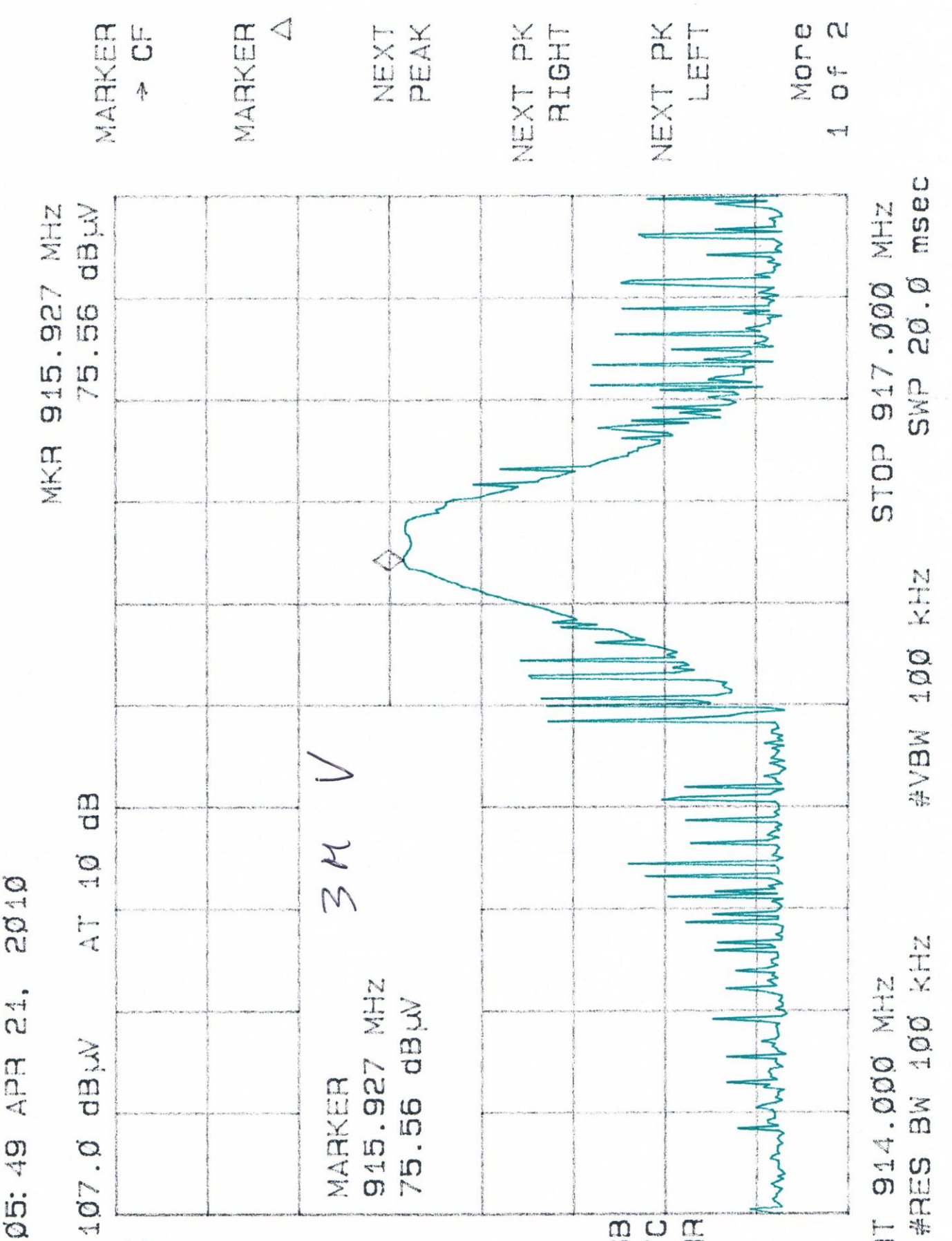
Model number: BPC001 **Test Date:** April 12, 2010

Test distance: 3 meters

Test Results

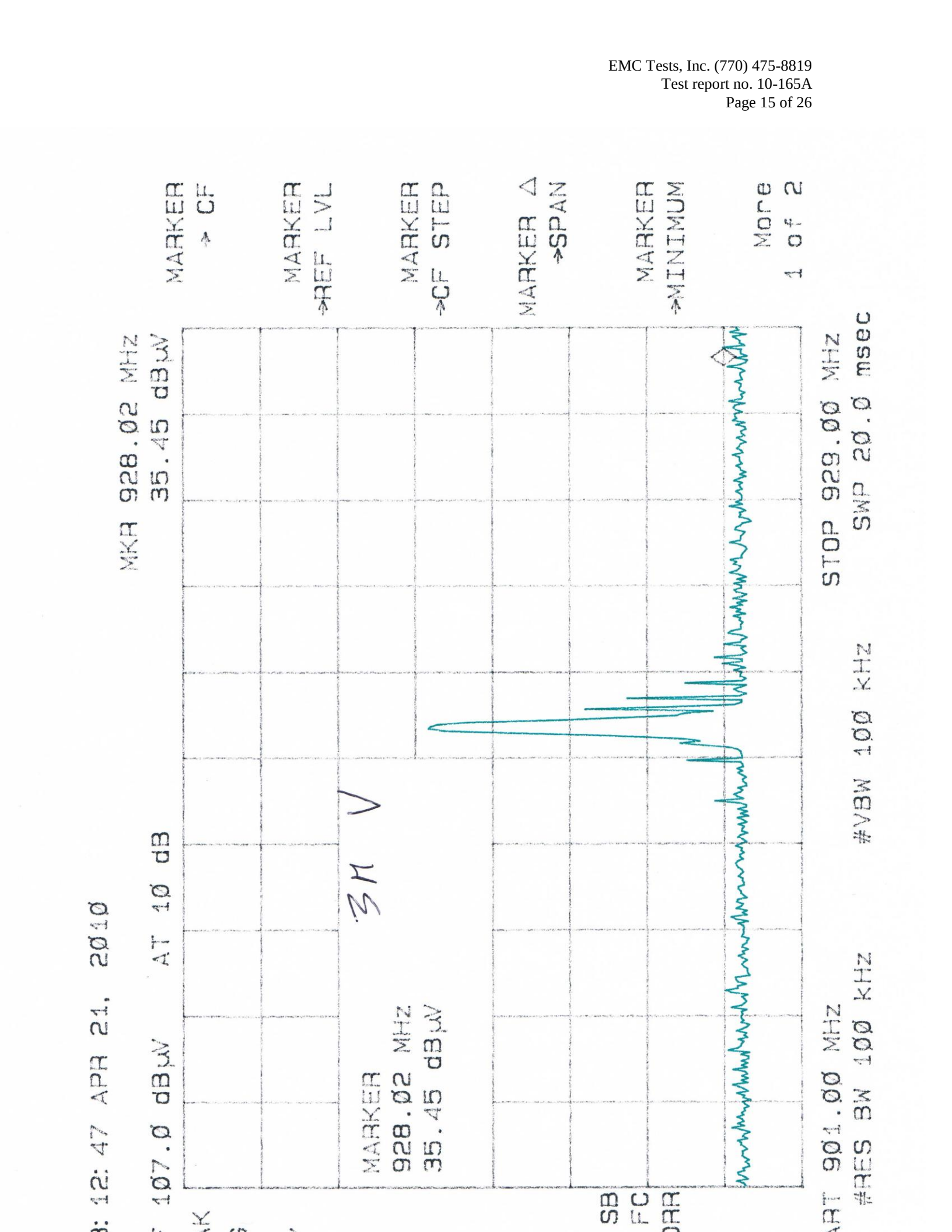
Frequency (MHz)	Antenna Polarization	Output in dBμV/m	Corrected reading	FCC Limits dBμV/m	Margin dBμV/m
916.017	H	87.70	93.0	94.0	-1.0
915.927	V	75.56	80.86	94.0	-13.14

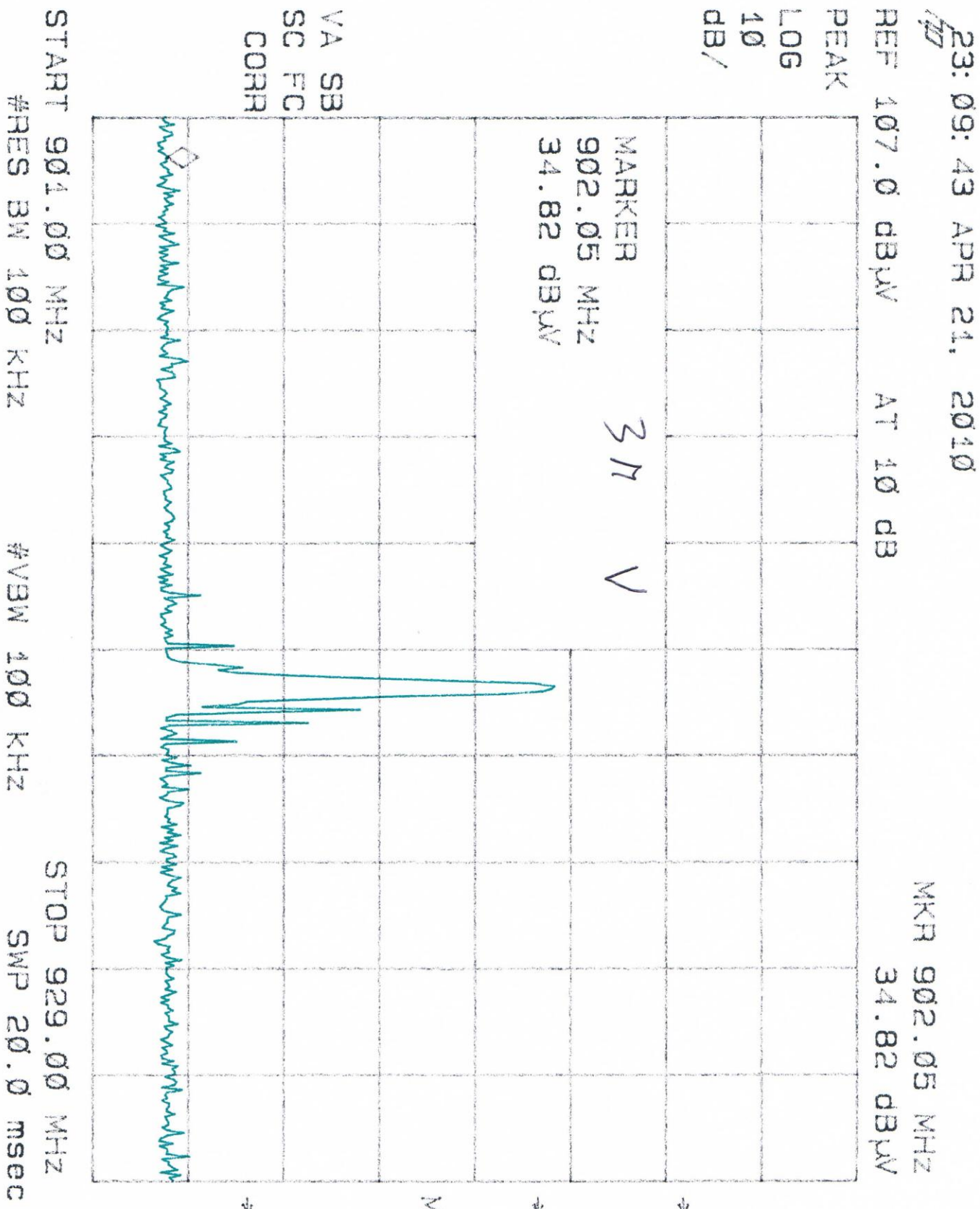

23: 02: 15 APR 21, 2010
REF 107.0 dBµV
AT 10 dB
PEAK
LOG
10
dB/
MARKER
916.017 MHz
87.70 dBµV
3m H
MKR 916.017 MHz
87.70 dBµV
VA SB
SC FC
CORR
START 914.000 MHz
#RES BW 100 KHz
#VBW 100 KHz
STOP 917.000 MHz
SWP 20.0 msec

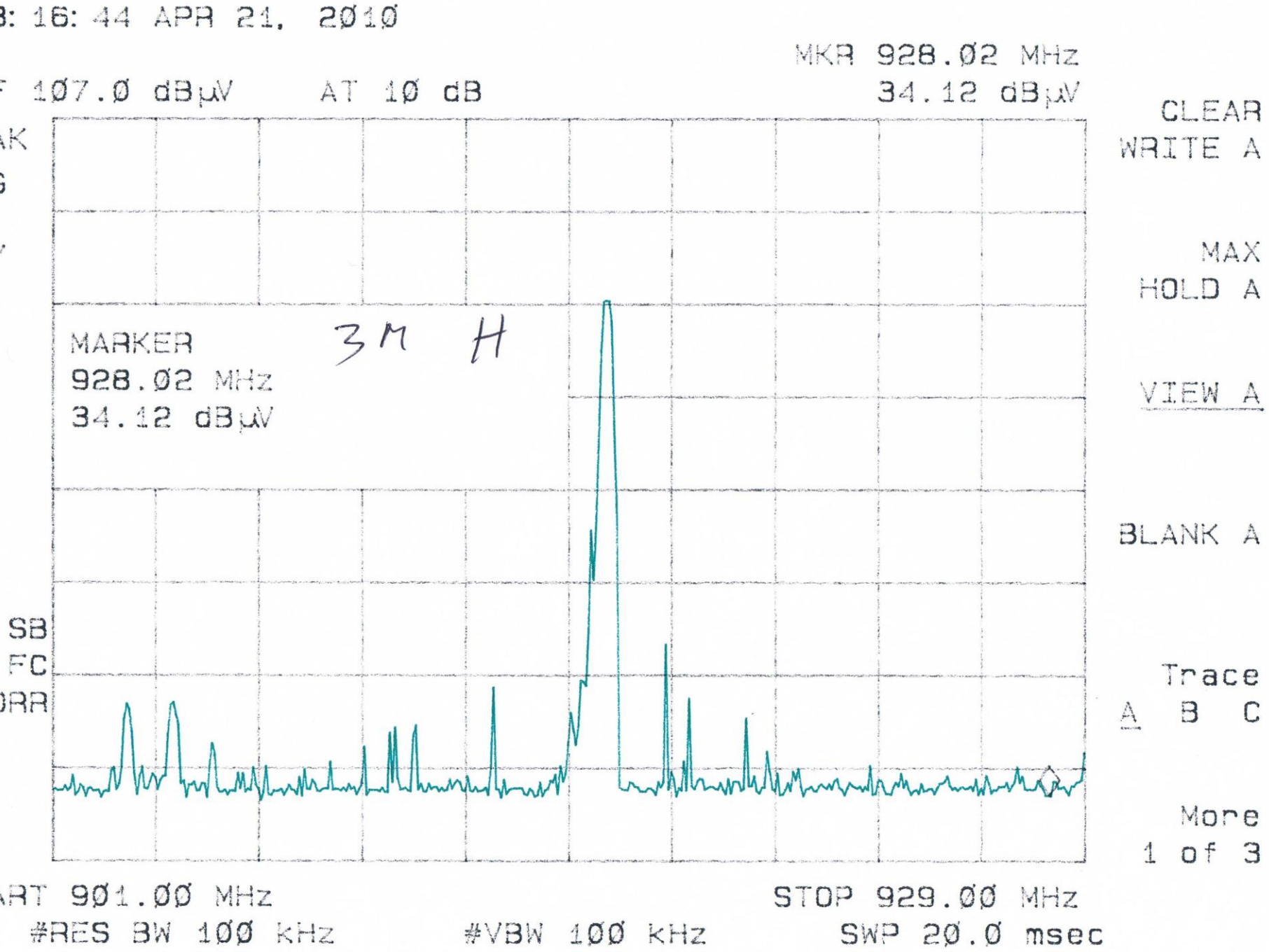

08: 05: 49 APR 21, 2010
MKR 915.927 MHz
75.56 dBµV
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
F 107.0 dBµV
AT 10 dB
3m V
MARKER
915.927 MHz
75.56 dBµV
STOP 917.000 MHz
#VBW 100 kHz
SWP 20.0 msec
START 914.000 MHz
#RES BW 100 kHz

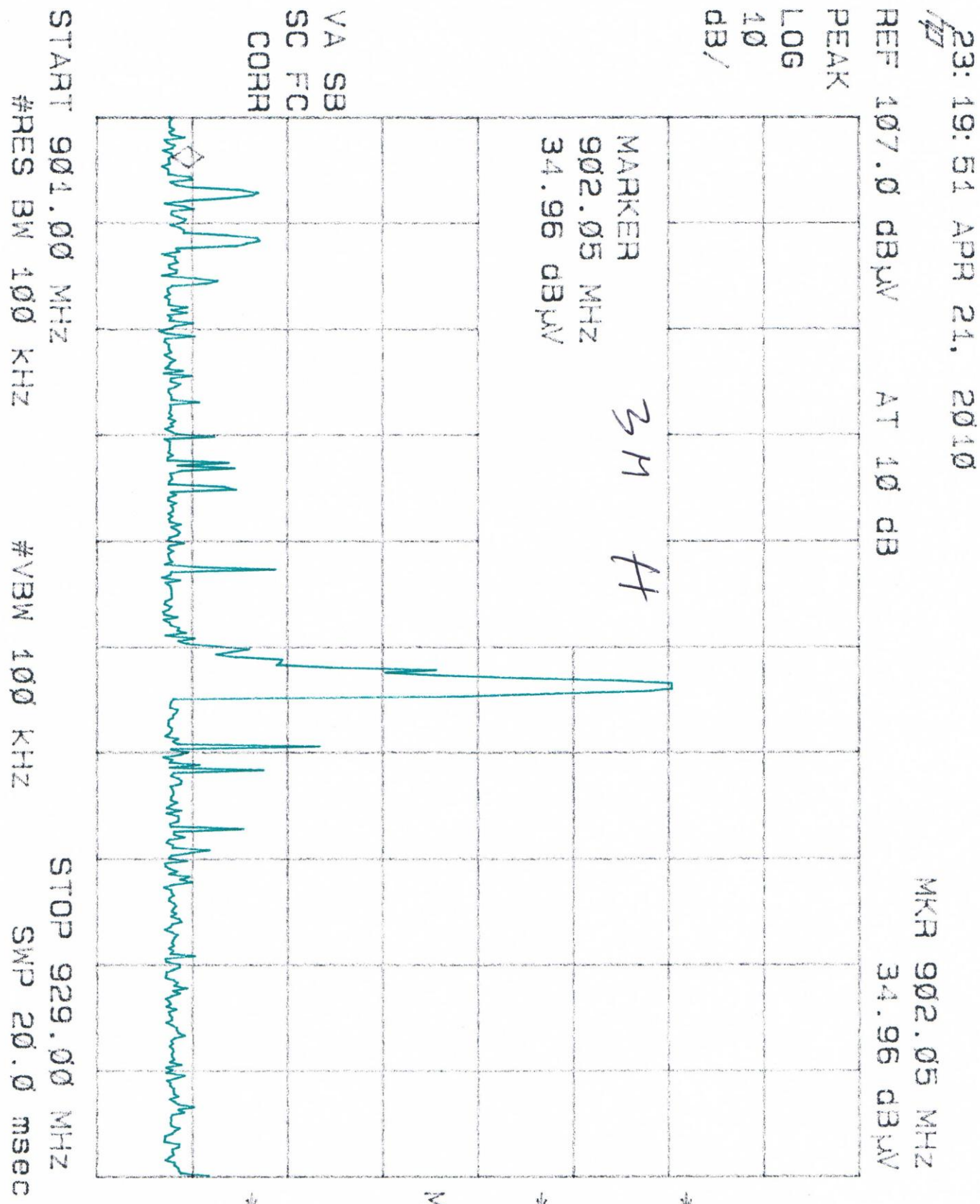
Section 6

BANDWIDTH


MKR 928.02 MHz
35.45 dBµV
MARKER
→ CF
MARKER
→REF LVL
MARKER
→CF STEP
MARKER Δ
→SPAN
MARKER
→MINIMUM
More
1 of 2
3m V
MARKER
928.02 MHz
35.45 dBµV
107.0 dBµV
AT 10 dB
STOP 929.00 MHz
#VBW 100 kHz
SWP 20.0 msec
901.00 MHz
#RES BW 100 kHz
12: 47 APR 21, 2010


23: 09: 43 APR 21, 2010
REF 107.0 dBµV
AT 10 dB
PEAK
LOG
10
dB/
MARKER
902.05 MHz
34.82 dBµV
3M V
VA SB
SC FC
CORR
MKR 902.05 MHz
34.82 dBµV
START 904.00 MHz
#RES BW 100 KHz
#VBW 100 KHz
STOP 929.00 MHz
SWP 20.0 msec


8: 16: 44 APR 21, 2010
MKR 928.02 MHz
F 107.0 dBµV AT 10 dB 34.12 dBµV
CLEAR
WRITE A
MAX
HOLD A
MARKER
928.02 MHz
34.12 dBµV
3M H
VIEW A
BLANK A
Trace
A B C
More
1 of 3
START 901.00 MHz
STOP 929.00 MHz
#RES BW 100 kHz
#VBW 100 kHz
SWP 20.0 msec


23: 19: 51 APR 21, 2010
REF 107.0 dBµV
AT 10 dB
PEAK
LOG
10
dB/
MARKER
902.05 MHz
34.96 dBµV
3M 4
VA SB
SC FC
CORR
MKR 902.05 MHz
34.96 dBµV
START 904.00 MHz
#RES BW 100 kHz
#VBW 100 kHz
STOP 929.00 MHz
SWP 20.0 msec

Section 7

RADIATED EMISSIONS MEASUREMENTS

Radiated Emissions Measurements cont…

RADIATED EMISSIONS MEASUREMENTS

General: The following represents the highest measured radiated emissions.

Model number: BPC001 **Test Date:** April 16, 2010

Test distance: 3 meters

Frequency, MHz	**Measurement Reading, dBμV/m**	**Corrected Reading, dBμV/m**	**FCC Limit, dBμV/m**	**Minimum Margin, dBμV/m**
		Horizontal		
1832	45.2	38.7	54.0	-15.3
2748	45.7	43.2	54.0	-10.8
3664	40.6	42.1	54.0	-11.9
4581	40.7	45.2	54.0	-8.8
5497	39.4	47.2	54.0	-6.8
6413	40.0	43.5	54.0	-10.5
7329	46.0*	56.8	64.0	-7.2
8245	47.0*	59.2	64.0	-4.8
9162	45.0*	58.6	64.0	-5.4

* - Due to the high ambient noise floor, these measurements were taken at 1 meter.

Note: The measured levels are the ambient noise floor. No harmonics emissions were observed.

Radiated Emissions Measurements cont…

RADIATED EMISSIONS MEASUREMENTS

Model number: BPC001 **Test Date:** April 16, 2010

Test distance: 3 meters

Frequency, MHz	**Measurement Reading, dBμV/m**	**Corrected Reading, dBμV/m**	**FCC Limit, dBμV/m**	**Minimum Margin, dBμV/m**
		Vertical		
1832	44.5	36.9	54.0	-17.1
2748	45.7	42.7	54.0	-11.3
3664	41.7	42.7	54.0	-11.3
4581	40.3	44.0	54.0	-10.0
5497	40.0	46.9	54.0	-7.1
6413	40.1	47.9	54.0	-6.1
7329	45.3*	54.6	64.0	-9.4
8245	47.1*	58.1	64.0	-5.9
9162	45.3*	57.4	64.0	-6.6

* - Due to the high ambient noise floor, these measurements were taken at 1 meter.

Note: The measured levels are the ambient noise floor. No harmonics emissions were observed.

Section 8

CONFIGURATION

EUT

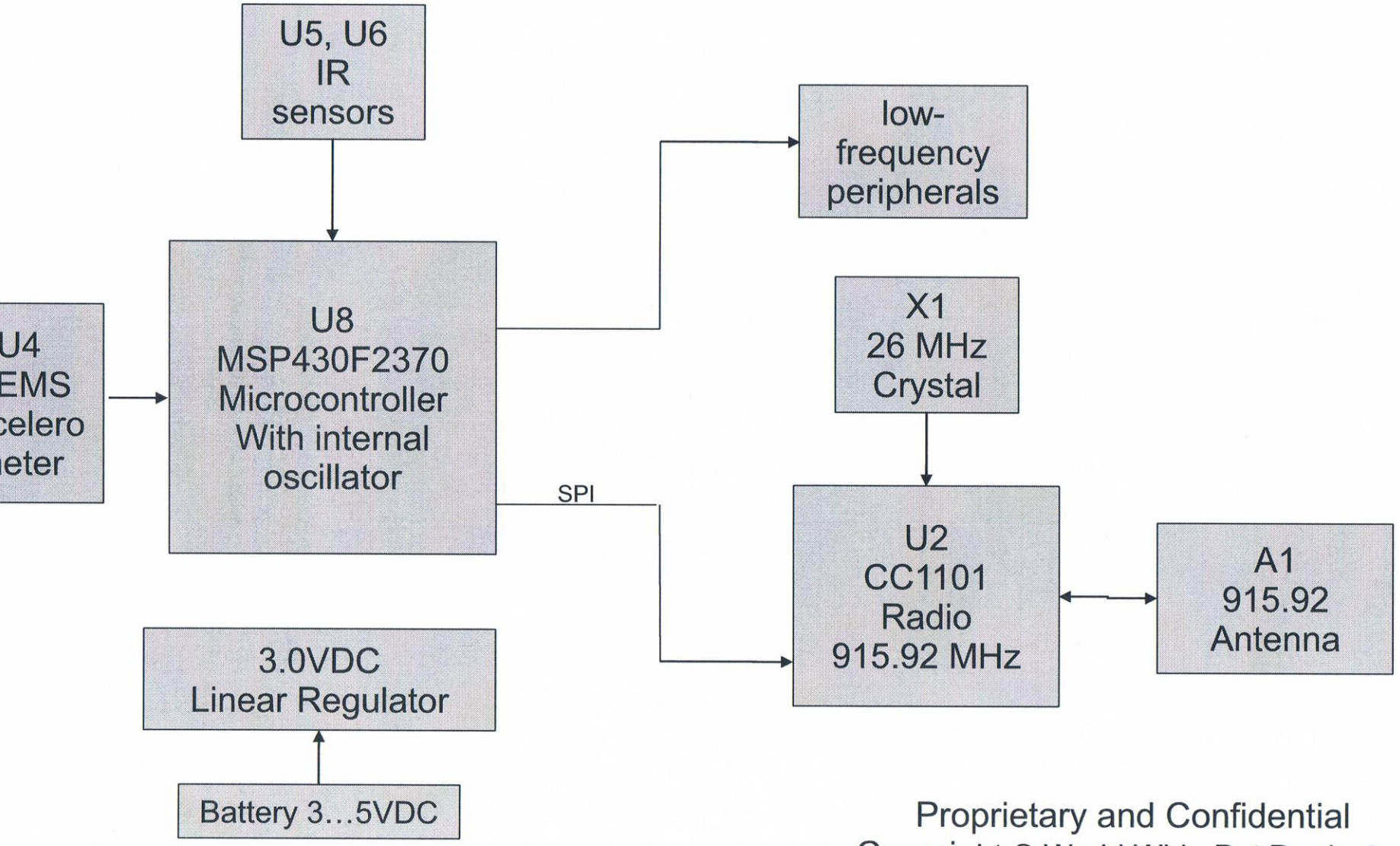
Section 9

BLOCK DIAGRAM

World Wide Pet Products

Collar

Block Diagram



Section 10

TEST EQUIPMENT

Test Equipment	**Model No.**	**Cal. Due**
Spectrum Analyzer	8592L	Jan 2011
LISN	LI-210	Jul 2010
Preamplifier	8449B	Jan 2011

Antennas	**Frequency Span**	**Cal. Due**
Biconical	20 - 200 MHz	Feb. 2011
Log Periodic	200 - 1000 MHz	Feb. 2011
Horn	1-18 GHz	Feb. 2011

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