RETLIF TESTING LABORATORIES
TEST REPORT R-4600N-3
May 28, 2006

FCC COMPLIANCE TEST REPORT
ON

MICROHEAT, INC.
WINDSHIELD WASHER FLUID HEATER SYSTEM
ENGINE COMPARTMENT WIRELESS CONTROL UNIT
FCC ID: T7SMHRF72406

APPLICANT	MANUFACTURER
Microheat, Inc. 27611 Halsted Road Farmington Hills, MI 48331	Same

TEST SPECIFICATION: FCC Rules and Regulations Part 15, Subpart C, Para. 15.249

TEST PROCEDURE: ANSI C63.4:2003

TEST SAMPLE DESCRIPTION:

BRANDNAME: HOTSHOT

Part #: 00986-01

Model #: MH35

TYPE: Windshield Washer Fluid Heater System - Engine Compartment Wireless Control Unit

POWER REQUIREMENTS: 12VDC Battery

FREQUENCY BAND OF OPERATION: 902 - 928MHz

MODULATION: FSK

APPLICATION: Control of the Hotshot Washer Fluid Heating System

FCC ID: T7SMHRF72406

TESTS PERFORMED:

15.249 (a) Fundamental & Harmonic Emissions

15.249 (d) Out of Band/Band Edge Emissions (30MHz to 930MHz)

TEST SAMPLE OPERATION:

The Microheat Windshield Washer Fluid Heater System Engine Compartment Control Unit contains a wireless transceiver used for control of the Hotshot Washer Fluid Heating System. It receives wireless transmissions from the associated Remote Control FOB and transmits an acknowledgment signal back. The Unit operates in the 902MHz to 928MHz band. During testing the EUT was continuously transmitting with new batteries installed.

TEST SAMPLE / TEST PROGRAM

- 15.203 Antenna Requirements - The device uses a permanently attached internal antenna. The antenna is totally enclosed inside the case.

- 15.205 Restricted Bands - No emissions were observed from the EUT in any restricted bands.

- 15.207 Conducted Emissions - Not applicable (dc powered device with no connection to AC mains)

- Radiated Emissions from the EUT were measured in all three axis. The attached Radiated Emissions test data shows the maximized fundamental emission for the worst case orientation.

- The test sample can operate at multiple channels within the 902 to 928MHz band with the lowest available channel being 905.70MHz and the highest available channel being 924.75MHz. Testing was performed at three frequencies (low, mid and high).

FIELD STRENGTH LIMITS

The 3 meter field strength limits shown below were as specified in Section 15.249 (a)

Fundamental Frequency	**Fundamental**	**Harmonics**
902 - 928MHz	50mV/M (94dBuV)	500uV/M (54dBuV)

The out of band emissions limits except for harmonics must be attenuated by at least 50dB below the level of the fundamental or to the general radiated emissions limits of 15.209 whichever is the lesser attenuation.

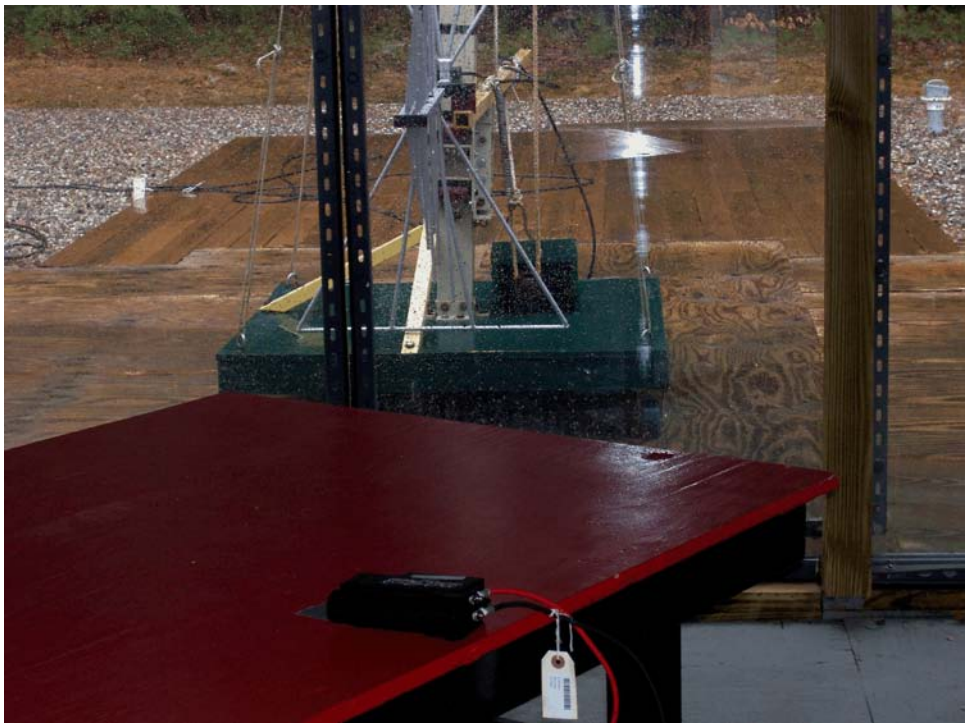
Test Method

15.249/15.209 Fundamental, Harmonic & Out of Band/Band Edge Radiated Emissions

The test sample was placed on a 80cm high wooden test stand which was located 3 meters from the test antenna on an FCC listed open area test site. Emissions from the EUT were maximized by rotating the test sample and adjusting the test sample orientation and antenna polarization. The maximized peak field strength of each emission was measured and recorded and compared to the specified limits. Testing was performed at 3 frequencies (low mid and high within the operational band. Band Edge emissions were measured with the EUT transmitting at the lowest and highest channels within the band. When necessary the marker/delta method was used to verify compliance of band edge emissions.

Test Results: The maximized peak field strength at 905.66MHz was 72.05dBuV. The maximized peak field strength at 916.80MHz was 68.83dBuV. The maximized peak field strength at 924.41MHz was 78.9dBuV. No harmonic or out of band spurious emissions were observed at 1 or 3 meter test distances. Band edge emissions were more than 50dB below the level of the fundamental.

RADIATED EMISSIONS SETUP PHOTOGRAPHS



RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method: Fundamental Field Strength

Customer: Microheat, Inc. **Job No:** R-4600N-3

Test Sample: Engine Compartment Transceiver

Part No. 00986-01 **Serial No:** N/A

Test Specification: FCC Part 15.249
Paragraph: n/a

Operating Mode: Continuously Transmitting

Technician: T. Hannemann **Date:** 4/3/2006

Notes:

Transmit Frequency	Test Frequency	Antenna/EUT Position	Meter Reading	Correction Factor	Duty Cycle Correction	Corrected Reading			Converted Reading	Limit at 3 Meters
MHz	MHz	Polarization/Axis	dBuV	dB	dB	dBuV/m			uV/m	uVm
905.66	905.66	V/X	33.48	38.57	0.00	72.05			4004.41	50000.00

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Part No. 00986-01 **Serial No:** N/A

Test Specification: FCC Part 15.249

Paragraph: n/a

Operating Mode: Continuously Transmitting

Technician: T. Hannemann **Date:** 4/3/2006

Notes:

Transmit Frequency	Test Frequency	Antenna/EUT Position	Meter Reading	Correction Factor	Duty Cycle Correction	Corrected Reading			Converted Reading	Limit at 3 Meters
MHz	MHz	Polarization/Axis	dBuV	dB	dB	dBuV/m			uV/m	uVm
916.80	916.80	V/Y	31.52	38.18	0.00	69.70			3054.42	50000.00

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Customer: Microheat, Inc. **Job No:** R-4600N-3

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Part No. 00986-01 **Serial No:** N/A

Test Specification: FCC Part 15.249
Paragraph: n/a

Operating Mode: Continuously Transmitting

Technician: T. Hannemann **Date:** 4/3/2006

Notes:

Transmit Frequency	Test Frequency	Antenna/EUT Position	Meter Reading	Correction Factor	Duty Cycle Correction	Corrected Reading			Converted Reading	Limit at 3 Meters
MHz	MHz	Polarization/Axis	dBuV	dB	dB	dBuV/m			uV/m	uVm
924.81	924.81	V/Y	30.93	37.90	0.00	68.83			2762.67	50000.00

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method: Harmonic Emissions

Customer: Microheat, Inc. **Job No:** R-4600N-3

Test Sample: Engine Compartment Transceiver

Part No. 00986-01 **Serial No:** N/A

Test Specification: FCC Part 15.249
Paragraph: n/a

Operating Mode: Continuously Transmitting

Technician: T. Hannemann **Date:** 4/4/2006

Notes:

Transmit Frequency	Test Frequency	Antenna/EUT Position	Meter Reading	Correction Factor	Duty Cycle Correction	Corrected Reading			Converted Reading	Limit at 3 Meters
MHz	MHz	Polarization/Axis	dBuV	dB	dB	dBuV/m			uV/m	uVm
905.66										
	1811.3	*	-	-	-	-			-	500.00
	2717.0	*	-	-	-	-			-	|
	3622.6	*	-	-	-	-			-	|
	4528.3	*	-	-	-	-			-	|
	5434.0	*	-	-	-	-			-	|
	6339.6	*	-	-	-	-			-	|
	7245.3	*	-	-	-	-			-	|
	8150.9	*	-	-	-	-			-	|
	9056.6	*	-	-	-	-			-	500.00

* No harmonic emissions observed above the noisefloor of the test equipment which was a minimum of 10dB below the specified limit.

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method:	Harmonic Emissions		
Customer:	Microheat, Inc.	**Job No:**	R-4600N-3
Test Sample:	Engine Compartment Transceiver		
Part No.	00986-01	**Serial No:**	N/A
Test Specification:	FCC Part 15.249 Paragraph: n/a		
Operating Mode:	Continuously Transmitting		
Technician:	T. Hannemann W	**Date:**	4/4/2006
Notes:			

Transmit Frequency	Test Frequency	Antenna/EUT Position	Meter Reading	Correction Factor	Duty Cycle Correction	Corrected Reading			Converted Reading	Limit at 3 Meters
MHz	MHz	Polarization/Axis	dBuV	dB	dB	dBuV/m			uV/m	uVm
924.81										
	1849.6	*	-	-	-	-			-	500.00
	2774.4	*	-	-	-	-			-	|
	3699.3	*	-	-	-	-			-	|
	4624.1	*	-	-	-	-			-	|
	5548.9	*	-	-	-	-			-	|
	6473.7	*	-	-	-	-			-	|
	7398.5	*	-	-	-	-			-	|
	8323.3	*	-	-	-	-			-	|
	9248.1	*	-	-	-	-			-	500.00

* No harmonic emissions observed above the noisefloor of the test equipment which was a minimum of 10dB below the specified limit.

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method: Harmonic Emissions

Customer: Microheat, Inc. **Job No:** R-4600N-3

Test Sample: Engine Compartment Transceiver

Part No. 00986-01 **Serial No:** N/A

Test Specification: FCC Part 15.249
Paragraph: n/a

Operating Mode: Continuously Transmitting

Technician: T. Hannemann **Date:** 4/4/2006

Notes:

Transmit Frequency	Test Frequency	Antenna/EUT Position	Meter Reading	Correction Factor	Duty Cycle Correction	Corrected Reading			Converted Reading	Limit at 3 Meters
MHz	MHz	Polarization/Axis	dBuV	dB	dB	dBuV/m			uV/m	uVm
916.80										
	1833.6	*	-	-	-	-			-	500.00
	2750.4	*	-	-	-	-			-	|
	3667.2	*	-	-	-	-			-	|
	4584.0	*	-	-	-	-			-	|
	5500.8	*	-	-	-	-			-	|
	6417.6	*	-	-	-	-			-	|
	7334.4	*	-	-	-	-			-	|
	8251.2	*	-	-	-	-			-	|
	9168.0	*	-	-	-	-			-	500.00

* No harmonic emissions observed above the noisefloor of the test equipment which was a minimum of 10dB below the specified limit.

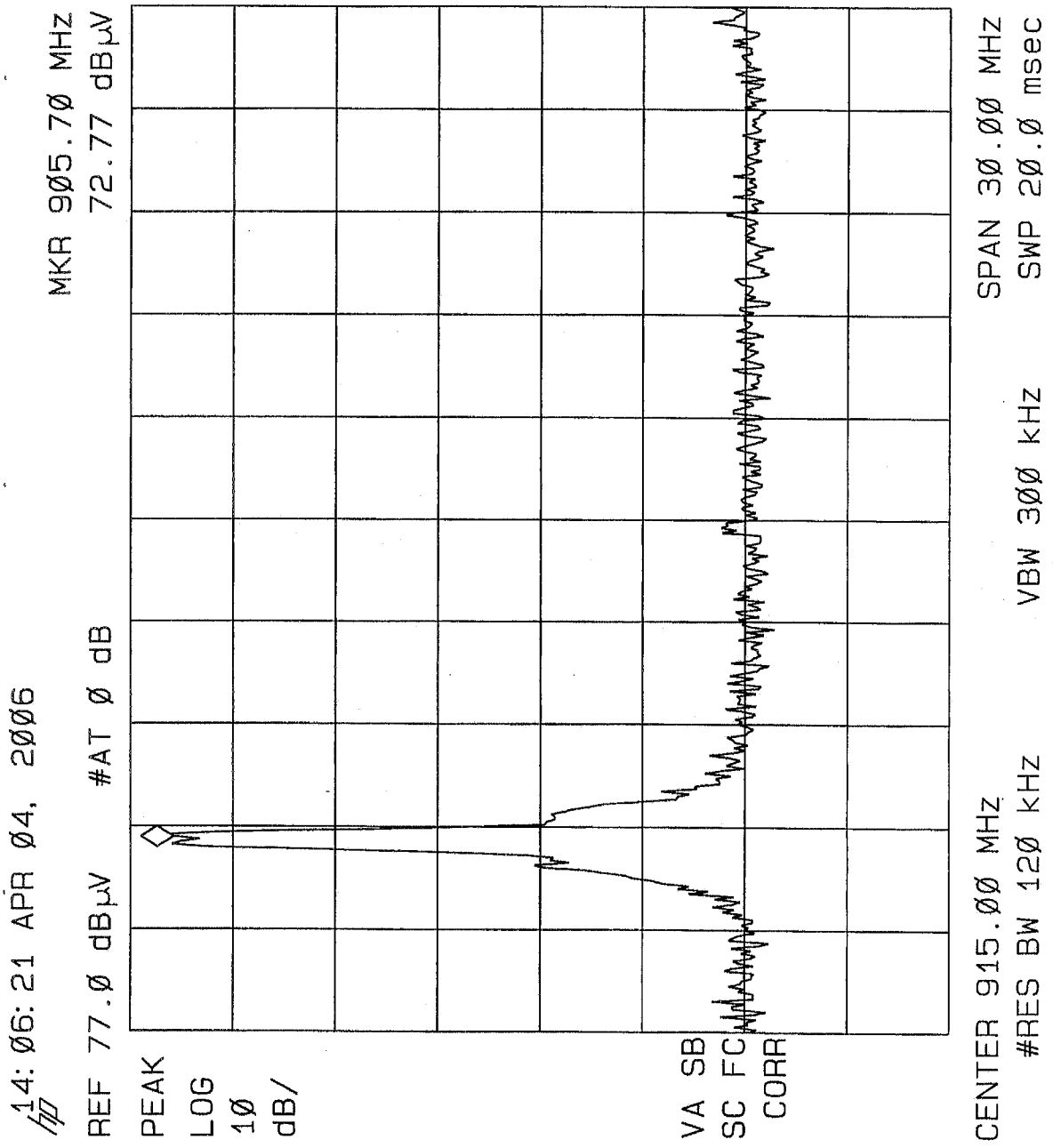
RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Out of Band Emissions 30MHz to 9.3GHz		
Customer	Microheat, Inc.	**Job No.**	R-4600N-3
Test Sample	Engine Compartment Transceiver		
Part No.	00986-01	**Serial No.**	N/A
Test Specification:	FCC Part 15.249		
Operating Mode:	Continuously Transmitting		
Technician:	T. Hannemann	**Date:**	April 4, 2006
Notes:	Test Distance: 3 Meters Detector: Quasi-peak and Average Testing was performed at transmit frequencies of 905.66MHz, 916.80MHz and 924.81MHz		

Test Frequency	Antenna Position	Turntable Position	Uncorrected Reading	Correction Factor	Corrected Reading					Limit at 3 Meters
MHz	(H/V) - Height	Degrees	dBuV	dB	dBuV/m					dBuV/m
30.00	-	-	-	-	-					40.0
|	-	-	-	-	-					|
88.00	-	-	-	-	-					40.0
88.00	-	-	-	-	-					43.5
|	-	-	-	-	-					|
216.00	-	-	-	-	-					43.5
216.00	-	-	-	-	-					46.0
|	-	-	-	-	-					|
960.00	-	-	-	-	-					46.0
960.00	-	-	-	-	-					54.0
|	-	-	-	-	-					|
9300.00	-	-	-	-	-					54.0

EUT out of band emissions were observed above the noisefloor of the test equipment which was a minimum of 10dB below the specified limits.



Customer	Microheat, Inc.
Test Sample	Engine Compartment Transceiver
Part No.	00986-01
Test Spec	FCC Part 15.249
Notes:	Bandedge Data

DV

Date: 4/4/2006 Tech: T. Hannemann Sheet 1 of 4

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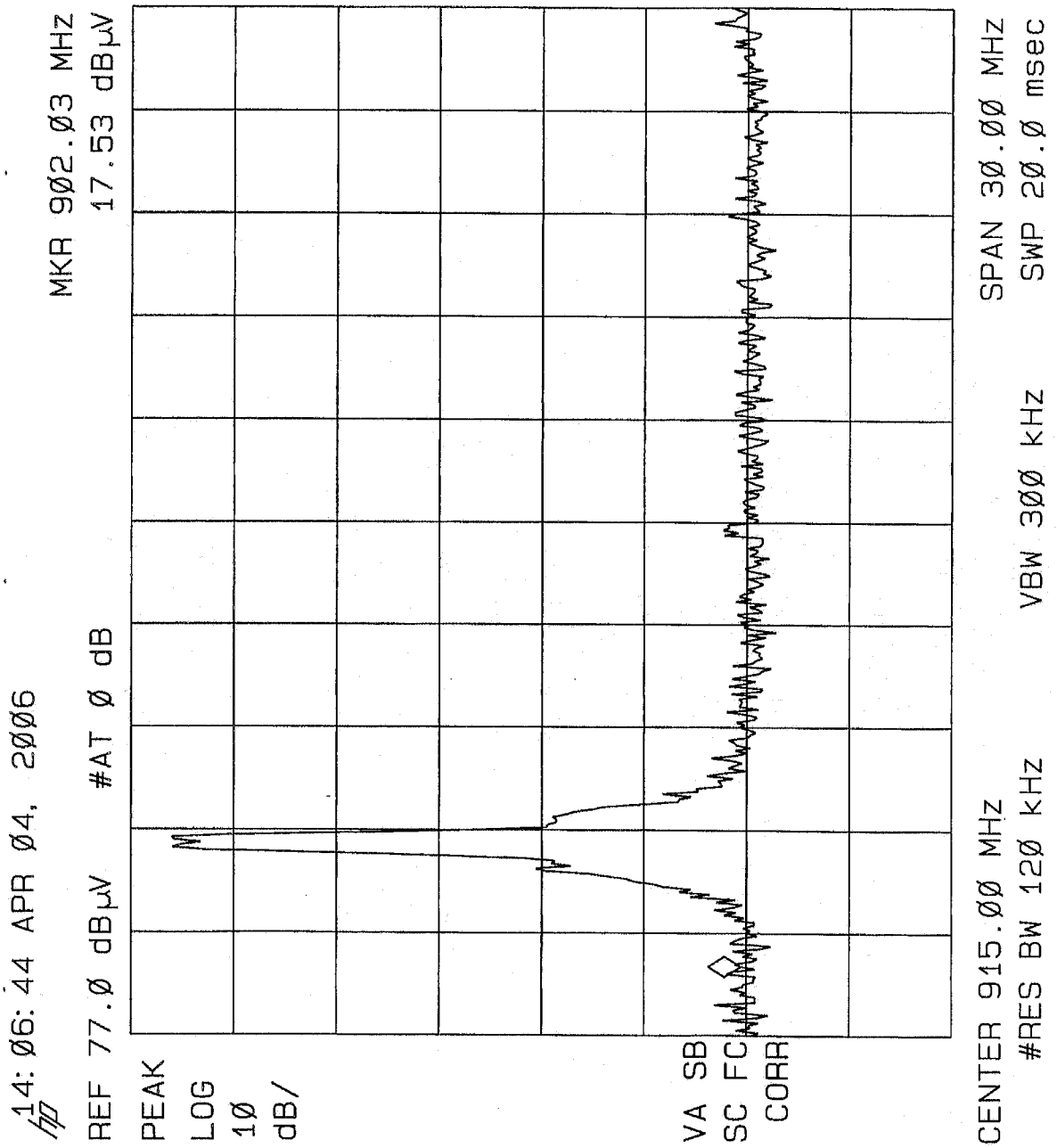

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Test Sample	Engine Compartment Transceiver
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Test Spec	FCC Part 15.249
Notes:	Bandedge Data

Date: 4/4/2006 Tech: T. Hannemann Sheet 2 of 4

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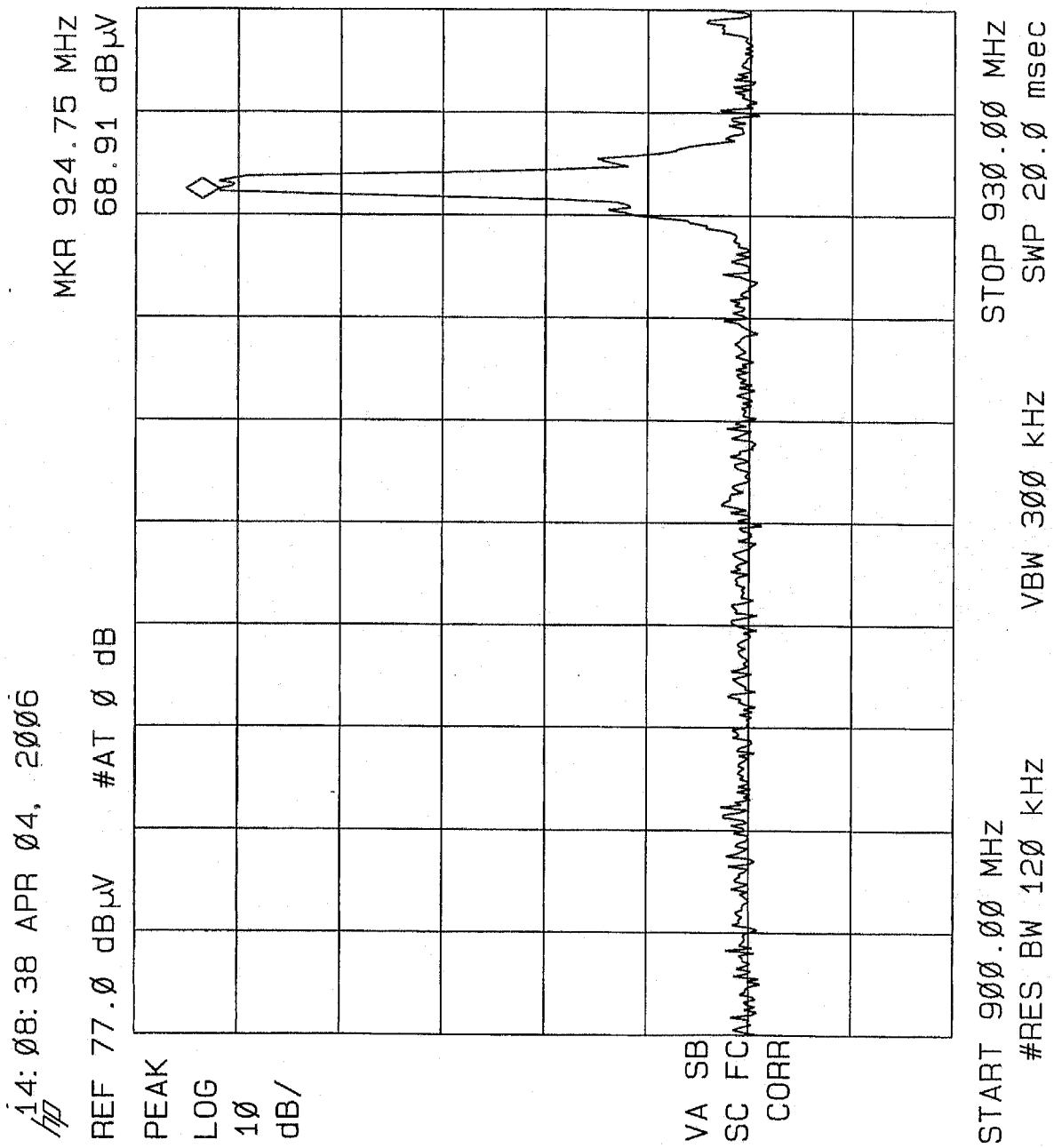

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Test Sample	Engine Compartment Transceiver
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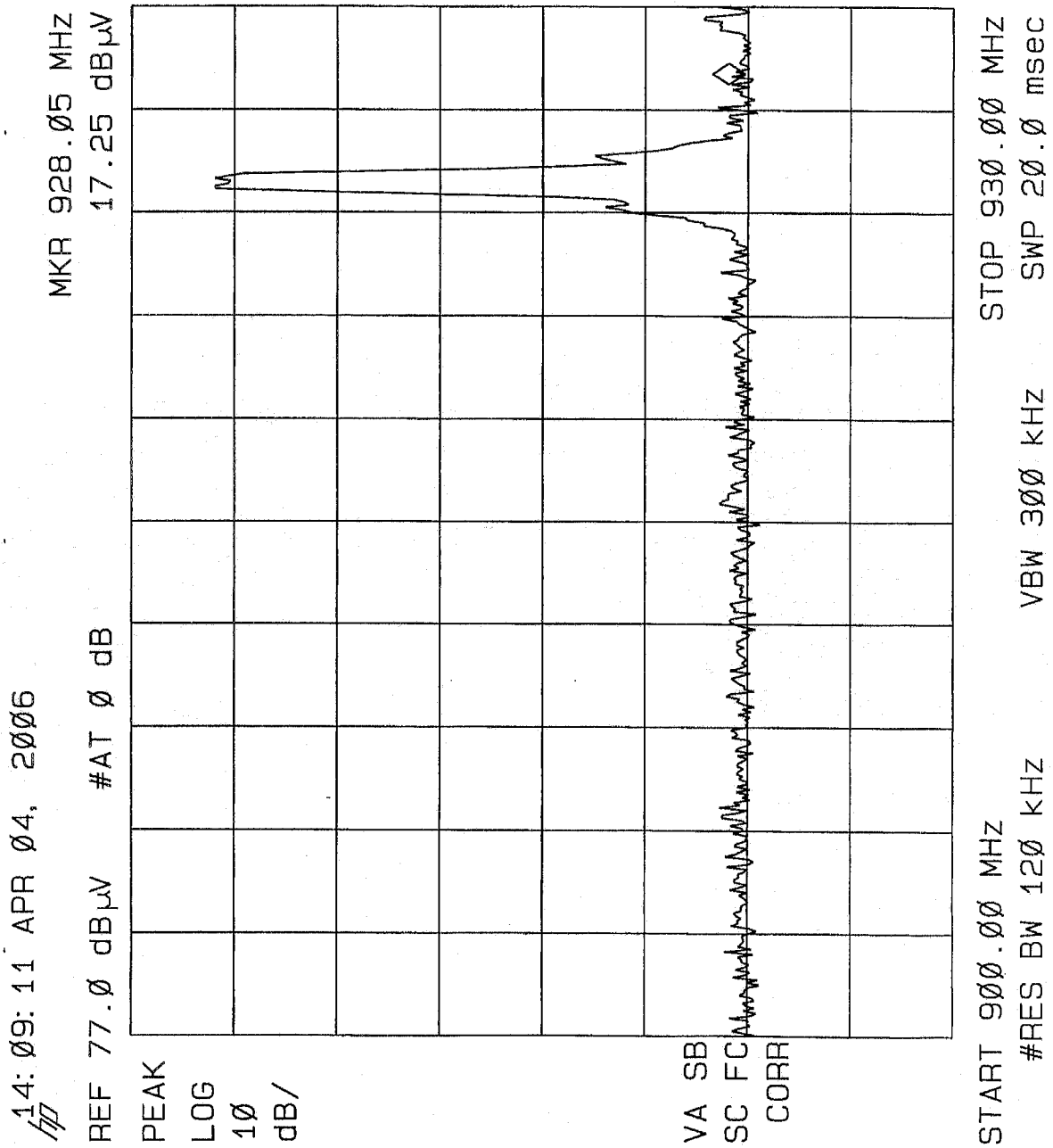

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Test Sample	Engine Compartment Transceiver
Part No.	00986-01
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Notes:	Bandedge Data

Date: 4/4/2006 Tech: T. Hannemann Sheet 4 of 4

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RADIATED EMISSIONS EQUIPMENT LIST

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due
3119A	Pre-Amplifier	Retlif	10 kHz - 1 GHz	RET-PA-SW	08/21/2005	08/21/2006
3258	Double Ridge Guide	EMCO	1 - 18 GHz	3115	08/21/2005	08/21/2006
4029B	Test Site Attenuation	Retlif	3 / 10 Meters	RNH	12/03/2004	05/03/2006
4202	Biconilog	EMCO	26 MHz - 2 GHz	3142	12/14/2005	12/14/2006
4895	Spectrum Analyzer	Hewlett Packard	9kHz - 22GHz	8593EM	09/20/2005	09/20/2006