

TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.249

IC RSS-210 Issue 6

IC RSS-Gen Issue 1

MANUFACTURER Data Sciences International

NAME OF EQUIPMENT Primate Repeaters

MODEL NUMBERS **RPT-910-3**
RPT-980-3

MANUFACTURER'S ADDRESS 4358 West Round Lake Rd.
Arden Hills, MN 55112

TEST REPORT NUMBER WC602546 Rev A

TEST DATES 8 & 15 March, 5 May 2006

According to testing performed at TÜV America Inc, the above-mentioned unit is in compliance with the applicable electromagnetic compatibility (EMC) portions of the requirements defined in FCC Part 15 Subpart C Section 15.249 and Industry Canada RSS-210 Issue 6 Sections A2.9 and 2.6, RSS Gen Issue 1 Section 4.4.1

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

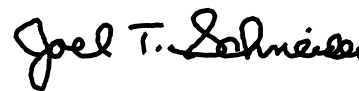
TÜV America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC requirements of FCC Part 15 Subpart C Section 15.249 and Industry Canada RSS-210 Issue 6 Sections A2.9 and 2.6, RSS Gen Issue 1 Section 4.4.1

Date: 24 May 2006

Location: Taylors Falls MN
USA



JC Sausen
EMC Technician



JT Schneider
Senior EMC Engineer

Not Transferable

EMC Emission - T E S T R E P O R T

Test Report File No. : **WC602546 Rev A** Date of issue: 24 May 2006

Model / Serial nos. : **RPT-910-3 / 00029**
RPT-980-3 / 00032

Product Name : Primate Repeater

Product Type : Primate Repeater

Applicant : Data Sciences International

Manufacturer : Data Sciences International

License Holder : Data Sciences International

Address : 4358 West Round Lake Rd.
Arden Hills, MN 55112

Test Result : ☒ **Positive** ☐ **Negative**

Test Project Number :
Reference(s) : **WC602546 Rev A**

Total pages including Appendices **35**

TÜV America Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV America Inc issued reports.

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TÜV America Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI

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Test Results

FCC

IC

Transmitter fundamentals	15.249 (a)	RSS-210 A2.9 (1)	<u>4</u>
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Sign Explanations:

- ☐ - not applicable
☒ - applicable

R E V I S I O N R E C O R D

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	48	16 May 2006	Initial Release
A	35	24 May 2006	Revisions include: ▪ Remove all references to separate receivers

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

- | | | |
|---|---|---|
| ☐ - EN 50081-1 / 1991 | ☐ - Group 1 | ☐ - Group 2 |
| ☐ - EN 55011 / 1991 | ☐ - Class A | ☐ - Class B |
| ☐ - EN 55013 / 1990 | | |
| ☐ - EN 55014 / 1987 | ☐ - Household appliances and similar | |
| | ☐ - Portable tools | |
| | ☐ - Semiconductor devices | |
| ☐ - EN 55014 / A2:1990 | ☐ - Household appliances and similar | |
| ☐ - EN 55014 / 1993 | ☐ - Portable tools | |
| | ☐ - Semiconductor devices | |
| ☐ - EN 55015 / 1987 | | |
| ☐ - EN 55015 / A1:1990 | | |
| ☐ - EN 55015 / 1993 | | |
| ☐ - EN 55022 / 1987 | ☐ - Class A | ☐ - Class B |
| ☐ - EN 55022 / 1991 | ☐ - Class A | ☐ - Class B |
| ☐ - BS | | |
| ☐ - VCCI | ☐ - Class A | ☐ - Class B |
| ☐ - FCC Part 15 Subpart B | ☐ - Class A | ☒ - Class B |
| ☒ - FCC Part 15 Subpart C | | |
| ☐ - CISPR 11 (1990) | ☐ - Group 1 | ☐ - Group 2 |
| | ☐ - Class A | ☐ - Class B |
| ☐ - CISPR 22 (1993) | ☐ - Class A | ☐ - Class B |
| ☒ - IC RSS-210 Issue 6 | | |
| ☒ - IC RSS-Gen Issue 1 | | |

RF Exposure Statement

The repeaters comply with the RF exposure limits for humans as called out in FCC 2.1091 and IC RSS-102 2.5.2 (mobile >20 cm) or FCC 2.1093 and IC RSS-102 2.5.1 (portable <20 cm). Based on the highest field strength measured from the different samples, they are exempt from RF Evaluation because of their operating frequency range of 911.1 - 918.1 MHz, and ERP of $\leq 96 \mu\text{W}$ based on;

$$\text{ERP} = E \text{ (dBuV/m)} - 106.92 + 20 \log D \text{ (km)} = 86.61 - 106.92 + 20 \log .003 = -70.18 \text{ dBk} = 95.94 \mu\text{W}.$$

This is less than the 1.5 W requirement for a mobile device, or the 200 mW requirement for a portable device.

Transmitter fundamental, FCC 15.249, IC RSS-210 A2.9

Test summary

The requirements are: ■ - MET □ - NOT MET

Transmitters were tested on an open field test site

Transmitters were tested at both lowest and highest frequencies (i.e. 911.1 & 918.1 MHz)

Minimum margin of compliance is 4.3 dB at 911.1 MHz

Test location

■ - Wild River Lab Large Test Site (Open Area Test Site)

□ - Wild River Lab Small Test Site (Open Area Test Site)

Test Distance

■ - 3 meters

□ - 10 meters

Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	19-Oct-06
3961	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-1	Code B
2680	85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00343	01-Jun-06
3196	8566B	Hewlett Packard	Spectrum Analyzer	2240A01856	07 Oct-06
3195	85662A	Hewlett Packard	Analyzer Display	2648A13518	07 Oct-06
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	02-Sep-06

Cal Code B = Calibration verification performed internally.

Test limit

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

94dB μ V/m at 911.1 MHz

Test Data

Pages A2, A7

Transmitter harmonics, FCC 15.249, IC RSS-210 A2.9

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Transmitters were tested at both lowest and highest frequencies (i.e. 911.1 & 918.1 MHz)

Minimum margin of compliance is 5.6 dB at 1836 MHz

Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

☐ - Wild River Lab Small Test Site (Open Area Test Site)

Test Distance

☒ - 3 meters

☐ - 10 meters

Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	07-Dec-06
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B
3961	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-1	Code B
2680	85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00343	01-Jun-06
3196	8566B	Hewlett Packard	Spectrum Analyzer	2240A01856	07 Oct-06
3195	85662A	Hewlett Packard	Analyzer Display	2648A13518	07 Oct-06
2003	F550B1	Acronetics	4 – 8 GHz Bandpass Filter	010	Code B
3933	F551B-1	Acronetics	8 – 12 GHz Bandpass Filter	010	Code B
3934	F549B-1	Acronetics	2 – 4 GHz Bandpass Filter	010	Code B
3935	F548B-1	Acronetics	1 – 2 GHz Bandpass Filter	010	Code B

Cal Code B = Calibration verification performed internally.

Test limit

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

74dB μ V/m at 1836 MHz

Test Data

Pages A2 - A4, A7 - A8

Transmitter spurious emissions, FCC 15.249 (d), IC RSS-210 A2.9 (2)

Test summary

The requirements are: ■ - MET □ - NOT MET

No spurious emissions detected

Minimum margin of compliance is >10dB from 30 MHz to 9.2 GHz

Test location

■ - Wild River Lab Large Test Site (Open Area Test Site)

□ - Wild River Lab Small Test Site (Open Area Test Site)

Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	07-Dec-06
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	19-Oct-06
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B
3961	ZHL-1042J	Mini-Circuits	Preamplifier 30 - 5000 MHz	D120403-1	Code B
2680	85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00343	01-Jun-06
3196	8566B	Hewlett Packard	Spectrum Analyzer	2240A01856	07 Oct-06
3195	85662A	Hewlett Packard	Analyzer Display	2648A13518	07 Oct-06
2003	F550B1	Acronetics	4 – 8 GHz Bandpass Filter	010	Code B
3933	F551B-1	Acronetics	8 – 12 GHz Bandpass Filter	010	Code B
3934	F549B-1	Acronetics	2 – 4 GHz Bandpass Filter	010	Code B
3935	F548B-1	Acronetics	1 – 2 GHz Bandpass Filter	010	Code B
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	02-Sep-06

Cal Code B = Calibration verification performed internally.

Test limit

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/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

Test Data

Pages A2, A7

Occupied Bandwidth, IC RSS-Gen 4.4.1

Test summary

The requirements are: ☒ - MET ☐ - NOT MET
Occupied bandwidth recorded

Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)

Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	19-Oct-06
3961	ZHL-1042J	Mini-Circuits	Preamplifier 30 - 5000 MHz	D120403-1	Code B
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	02-Sep-06

Test Data

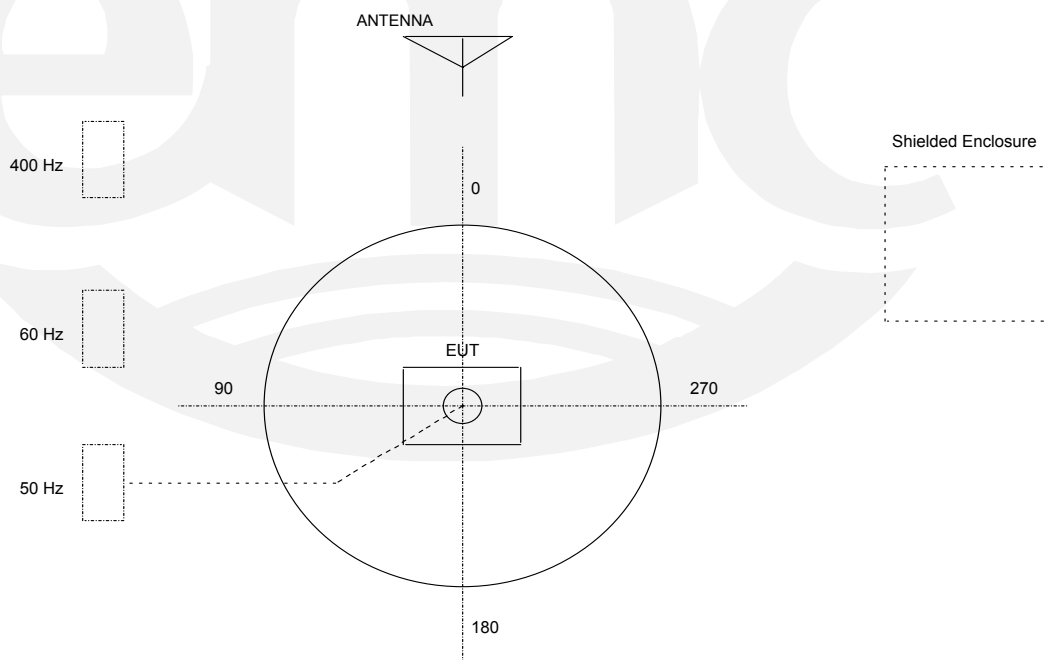
Pages A6, A10

TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB Large Test Site

Notes:

1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.
2. 50 Hz, 60 Hz, and 400 Hz are power panels for alternating current.
3. The antenna may be positioned horizontally 3, 10 or 30 meters from the center of the turntable.
4. The circle is a 6.7 meter diameter turntable.
5. A ground plane is in the plane of this sheet.
6. The test sample is shown in the azimuthal position representing zero degrees.



Test Operation Mode:

The device under test was operated under the following conditions during emissions testing:

Manufacturer's statement;

The repeater enclosure, battery compartment and antenna are mounted on a collar that is fastened around the neck of the implanted subject from which data is collected for transfer to the data collection system. This is the only method of operation since close coupling of the implant antenna coil and the receiver input coil is required. However, the unit was tested in a stand alone arrangement without use of a mounting simulator on an OATS site for compliance purposes.



DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

Repeater plots done under test report number WC601130, 8 March 2006

Modifications required to pass:

- ☒ None
- ☐ As indicated on the data sheet(s)

Test Specification Deviations: Additions to or Exclusions from:

- ☒ None
- ☐ As indicated in the Test Plan

SUMMARY:

The requirements according to the technical regulations are

- ☒ - met
- ☐ - **not** met.

The device under test does

- ☒ - fulfill the general approval requirements mentioned on page 3.
- ☐ - **not** fulfill the general approval requirements mentioned on page 3.

EUT Received Date: 6 March 2006

Condition of EUT: Normal

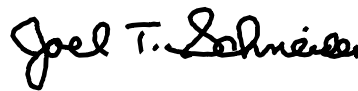
Testing Start Date: 8 March, 2006

Testing End Date: 5 May, 2006

- TÜV AMERICA INC -



JC Sausen
EMC Technician



JT Schneider
Senior EMC Engineer

Appendix A

Test Data Sheets



RADIATED EMISSIONS



Test Report #: WC602546 Run 1 Test Area: LTS

EUT Model #: RPT-910-3 Date: 5/5/2006

EUT Serial #: 00029 EUT Power: Internal Battery Temperature: 22.0 °C

Test Method: FCC - 15.249 Air Pressure: 99.0 kPa

Customer: DSI Rel. Humidity: 30.0 %

EUT Description: 911.1 MHz RF repeater. Primate Collar

Notes: Stand alone at maximum power output.

Data File Name: 2546.dat

Page: 1 of 5

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	15.249 LIMIT (dBμV/m)	DELTA
Highest levels detected with EUT in horizontal position.						
All measurements maximized.						
911.1 MHz	57.09 Qp	2.51 / 22.34 / 0.0 / 0.0	81.94	V / 1.45 / 0	94	-12.06
911.1 MHz	64.83 Qp	2.51 / 22.34 / 0.0 / 0.0	89.68	H / 1.30 / 46	94	-4.32
harmonics maxed, but azimuth and ht not recorded.						
1.822 GHz	45.43 Av	4.04 / 26.93 / 49.71 / 0.0	26.69	V / 1.00 / 0	54	-27.31
1.822 GHz	68.85 Pk	4.04 / 26.93 / 49.71 / 0.0	50.11	V / 1.00 / 0	74	-23.89
1.822 GHz	45.43 Av	4.04 / 26.93 / 49.71 / 0.0	26.69	H / 1.00 / 0	54	-27.31
1.822 GHz	78.15 Pk	4.04 / 26.93 / 49.71 / 0.0	59.41	H / 1.00 / 0	74	-14.59
2.733 GHz	43.09 Av	4.58 / 29.39 / 48.26 / 0.0	28.8	V / 1.00 / 0	54	-25.2
2.733 GHz	64.1 Pk	4.58 / 29.39 / 48.26 / 0.0	49.81	V / 1.00 / 0	74	-24.19
2.733 GHz	42.99 Av	4.58 / 29.39 / 48.26 / 0.0	28.7	H / 1.00 / 0	54	-25.3
2.733 GHz	56.35 Pk	4.58 / 29.39 / 48.26 / 0.0	42.06	H / 1.00 / 0	74	-31.94
3.644 GHz	39.14 Av	5.39 / 31.45 / 46.98 / 0.0	29.0	V / 1.00 / 0	54	-25
3.644 GHz	52.95 Pk	5.39 / 31.45 / 46.98 / 0.0	42.81	V / 1.00 / 0	74	-31.19
3.644 GHz	39.3 Av	5.39 / 31.45 / 46.98 / 0.0	29.16	H / 1.00 / 0	54	-24.84
3.644 GHz	53.7 Pk	5.39 / 31.45 / 46.98 / 0.0	43.56	H / 1.00 / 0	74	-30.44
No further EUT emissions detected. Noise floor measurements:						
4.556 GHz	37.97 Av	5.99 / 32.17 / 45.28 / 0.0	30.85	V / 1.00 / 0	54	-23.15
4.556 GHz	45.1 Pk	5.99 / 32.17 / 45.28 / 0.0	37.98	V / 1.00 / 0	74	-36.02
5.467 GHz	35.36 Av	6.81 / 33.37 / 44.66 / 0.0	30.88	V / 1.00 / 0	54	-23.12
5.467 GHz	42.65 Pk	6.81 / 33.37 / 44.66 / 0.0	38.17	V / 1.00 / 0	74	-35.83
6.378 GHz	34.77 Av	7.56 / 34.57 / 45.77 / 0.0	31.14	V / 1.00 / 0	54	-22.86
6.378 GHz	45.25 Pk	7.56 / 34.57 / 45.77 / 0.0	41.62	V / 1.00 / 0	74	-32.38
7.289 GHz	35.11 Av	8.05 / 35.77 / 45.98 / 0.0	32.94	V / 1.00 / 0	54	-21.06
7.289 GHz	43.15 Pk	8.05 / 35.77 / 45.98 / 0.0	40.98	V / 1.00 / 0	74	-33.02

Tested by: J. C. Sausen

Printed

J C Sausen

Signature

Reviewed by: Greg Jakubowski

by:

Printed

G Jakubowski

Signature

RADIATED EMISSIONS



Test Report #: WC602546 Run 1 Test Area: LTS
EUT Model #: RPT-910-3 Date: 5/5/2006
EUT Serial #: 00029 EUT Power: Internal Battery Temperature: 22.0 °C
Test Method: FCC - 15.249 Air Pressure: 99.0 kPa
Customer: DSI Rel. Humidity: 30.0 %

EUT Description: 911.1 MHz RF repeater. Primate Collar

Notes: Stand alone at maximum power output.

Data File Name: 2546.dat

Page: 2 of 5

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	15.249 LIMIT (dBμV/m)	DELTA
8.2 GHz	36.55 Av	8.8 / 36.82 / 45.73 / 0.0	36.43	V / 1.00 / 0	54	-17.57
8.2 GHz	44.25 Pk	8.8 / 36.82 / 45.73 / 0.0	44.13	V / 1.00 / 0	74	-29.87
9.111 GHz	35.55 Av	9.68 / 37.37 / 44.83 / 0.0	37.77	V / 1.00 / 0	54	-16.23
9.111 GHz	44.9 Pk	9.68 / 37.37 / 44.83 / 0.0	47.12	V / 1.00 / 0	74	-26.88

Tested by: J. C. Sausen

Printed

Signature

Reviewed by: Greg Jakubowski

by:

Printed

Signature

RADIATED EMISSIONS



Test Report #: WC602546 Run 1 Test Area: LTS

EUT Model #: RPT-910-3 Date: 5/5/2006

EUT Serial #: 00029 EUT Power: Internal Battery Temperature: 22.0 °C

Test Method: FCC - 15.249 Air Pressure: 99.0 kPa

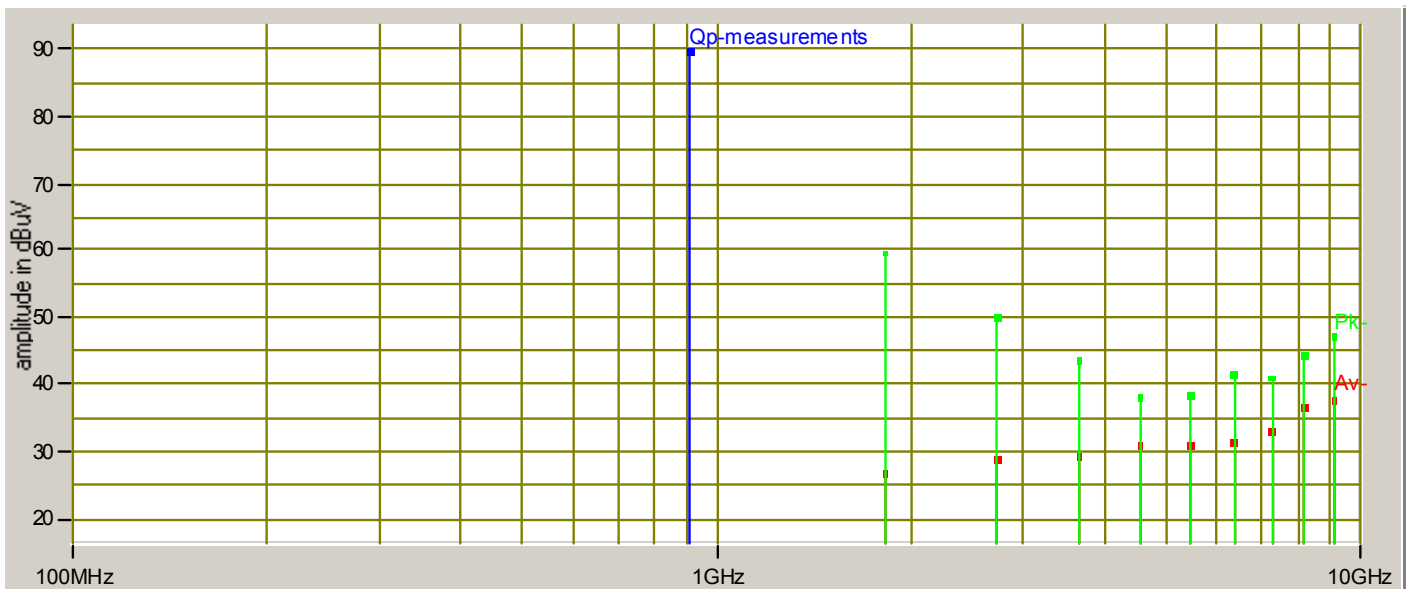
Customer: DSI Rel. Humidity: 30.0 %

EUT Description: 911.1 MHz RF repeater. Primate Collar

Notes: Stand alone at maximum power output.

Data File Name: 2546.dat Page: 3 of 5

Graph:



RADIATED EMISSIONS



Test Report #: WC602546 Run 1 Test Area: LTS

EUT Model #: RPT-910-3 Date: 5/5/2006

EUT Serial #: 00029 EUT Power: Internal Battery Temperature: 22.0 °C

Test Method: FCC - 15.249 Air Pressure: 99.0 kPa

Customer: DSI Rel. Humidity: 30.0 %

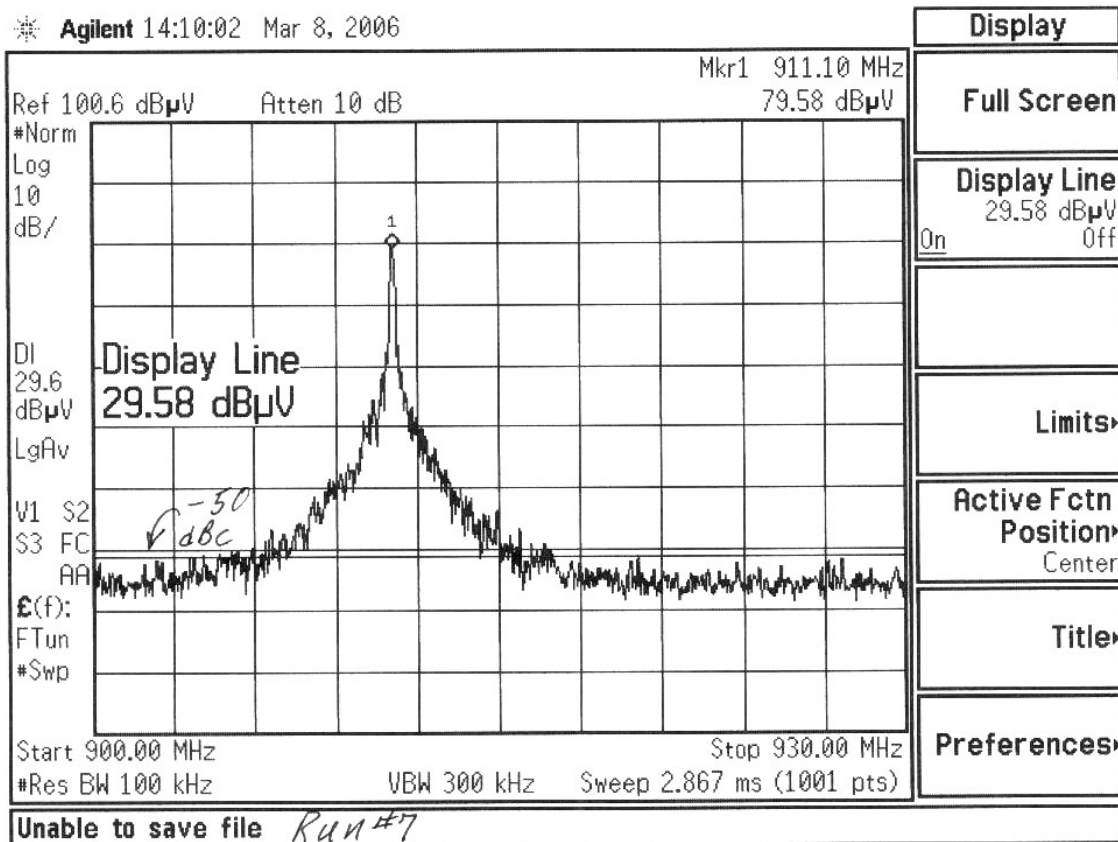
EUT Description: 911.1 MHz RF repeater. Primate Collar

Notes: Stand alone at maximum power output.

Data File Name: 2546.dat

Page: 4 of 5

Band edge



Tested by: J. C. Sausen

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J C Sausen

Signature

Reviewed by: Greg Jakubowski

by:

Printed

G Jakubowski

Signature