



TEST REPORT

FCC Class II Change

RF 3D Mouse

Model Name **RF50201-02**

Tested at October 9, 2000

According **47CFR Part, 15C (15.249)**

Issued for

RF-LINK SYSTEMS INC.

1F, No. 9, Chan Yen Road 1, Science –Based Industrial Park,
Hsinchu, Taiwan, R.O.C.

PREPARED BY: **ADVANCE DATA TECHNOLOGY CORPORATION**



Accredited Laboratory

11F, NO.1, SEC.4, NAN-KING EAST RD.,
TAIPEI, TAIWAN, R.O.C.

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REPORT NO : RF89082906
PRODUCT : RF 3D Mouse
MODEL NO : RF50201-02
BRAND NAME : RF-LINK
SERIAL NO : N/A
CLIENT : RF-LINK SYSTEMS INC.
ADDRESS : 1F, No.9, Chan Yen Road 1, Science-Based Industrial Park, Hsinchu, Taiwan, R.O.C.
ISSUED BY : Advance Data Technology Corporation (Adt Corp.)
OFFICE ADDRESS : 11F, No. 1, Sec. 4, Nan-King East Rd., Taipei, Taiwan, R.O.C.
LABORATORY ADDRESS : No. 13-1, Lane 19, Wen Shan 3rd St., Kweishan, Taoyuan, Taiwan, R.O.C.
TEST STANDARD : 47CFR Part 15, Subpart C (15.249)
TEST DATE : October 6, 2000
TEST RESULT : Pass

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1 CERTIFICATION

Issue Date: October 19, 2000

PRODUCT : RF 3D Mouse

MODEL NO : RF50201-02

FCC ID : MIBRF50201

SPEC. : Operating at 902 ~ 928 MHz, 8 Channels,
FSK modulation

CLIENT : RF-LINK SYSTEMS INC.

TEST STANDARD : FCC 47CFR Part 15, Subpart C (Section 15.249)
ANSI C63.4-1992

We, **ADVANCE DATA TECHNOLOGY CORPORATION**, hereby certify that one sample of the designated sample has been tested in our facility. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate representation of the measurements of the sample's EMI characteristics and the energy emitted under the conditions herein specified.

TESTED BY:

Steven Lu
Steven Lu

DATE: Oct. 19, 2000

PREPARED BY:

Demi Chen
Demi Chen

DATE: Oct. 19, 2000

APPROVED BY:

Alan Lane
Dr. Alan Lane, Manager

DATE: Oct. 19, 2000



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

47 CFR Part 15, Subpart C (15.249)			
PARAGRAPH.	TEST REQUIREMENTS	COMPLIANCE (YES/NO)	TEST RESULT
15.107	AC Power Conducted Emissions Spec.: 48 dBuV	Yes	N/A
15.249(c)	Transmitter Radiated Emissions Spec.: Table 15.209	Yes	Minimum passing margin is -4.9 dBuV At 901.60 MHz
15.249(d)	Band Edge Measurement	Yes	N/A



3 GENERAL INFORMATION

3.1 General Description of EUT

Product	:	RF 3D Mouse
Model No	:	RF50201-02
Power Supply	:	3VDC (Battery 1.5V x 2)
Modulation Type	:	FSK
Operating Frequency	:	902 ~ 928 MHz
Operating Range	:	5 meters
Number of Channel	:	8
Radio Data Rate	:	9600 bps
Others	:	N/A

Note: The AeroMouse comes with a multi-function “Wheel” feature that allows fast and easy scrolling. A Mouse Control Panel adds flexibility by providing a series of easy-to-use functions.

Through the use of radio multi-channel technology, the AeroMouse broadcasts at 900 MHz and allows up to eight AeroMouse mice operate simultaneously within the same location. It also turns off automatically when idled for five minutes to save energy.

This class II change certification is different from original submission with minor component change on the RF module.



3.2 Description of Test mode

Eight channels are provided in this EUT.

Channel	Frequency
1	915.2 MHz
2	917.6 MHz
3	920.0 MHz
4	922.4 MHz
5	905.6 MHz
6	908.0 MHz
7	910.4 MHz
8	912.8 MHz

Three channels as following are chosen for final evaluation.

Mode	Channel Frequency
Mode 1	Channel 5 (905.6 MHz)
Mode 2	Channel 8 (912.8 MHz)
Mode 3	Channel 4 (922.4 MHz)

3.3 Test Methodology

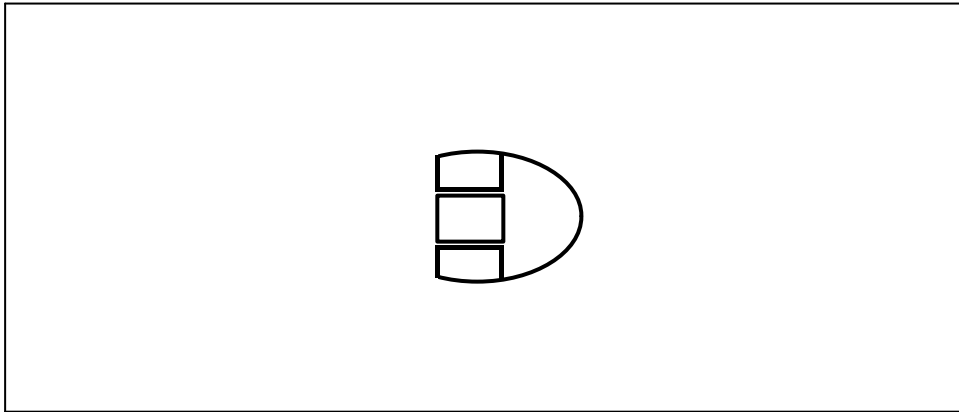
These tests were conducted on a sample of EUT for the evaluation in compliance with FCC CFR47 Part 15, Subpart C (15.249).

Both conducted and radiated emissions measurements were conducted in accordance with ANSI C63.4:1992.

3.4 Support Units List

N/A

3.5 Configuration of System Under Test





4 GENERAL INFORMATION OF TEST FACILITY

4.1 Test Lab.

Advance Data Technology Corporation (NVLAP Certified)
R & TTE Certification Division

No. 13-1, Lane 19, Wen Shan 3rd St., Kweishan, Taoyuan, Taiwan, R.O.C.

4.2 Calibration Interval

All calibration interval of the test sites and test instruments is 12 months. The calibrations are traceable to NML/ROC and NIST/USA.



5 TEST PROCEDURES AND TEST RESULTS

5.1 Conducted Emission Measurement

This EUT is excused from investigation of conducted emission, for it is powered by battery only. According to paragraph 15.207(a), measurements to demonstrate compliance with the conducted limited are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.



5.2 Radiated Emission Measurement

5.2.1 Test instruments

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8590L	3544A01176	Apr 18, 2001
HP Preamplifier	8447D	2944A08485	Oct. 23, 2000
HP Preamplifier	8347A	3307A01088	Sep. 04, 2001
HP Preamplifier	8449B	3008A01201	Dec. 15, 2000
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Aug. 3, 2001
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 2000
CHASE BILOG Antenna	CBL6112A	2221	Aug. 4, 2001
SCHWARZBECK Horn Antenna	BBHA9120-D	D130	Jul. 09, 2001
SCHWARZBECK Horn Antenna	BBHA9170	123	Jan. 31, 2001
EMCO Turn Table	1060	1115	N/A
SHOSHIN Tower	AP-4701	A6Y005	N/A
SCHWARZBECK BICONICAL Antenna	VHBA9123	449	Aug.16, 2001
Open Field Test Site	Site 5	ADT-R05	Aug. 08, 2001

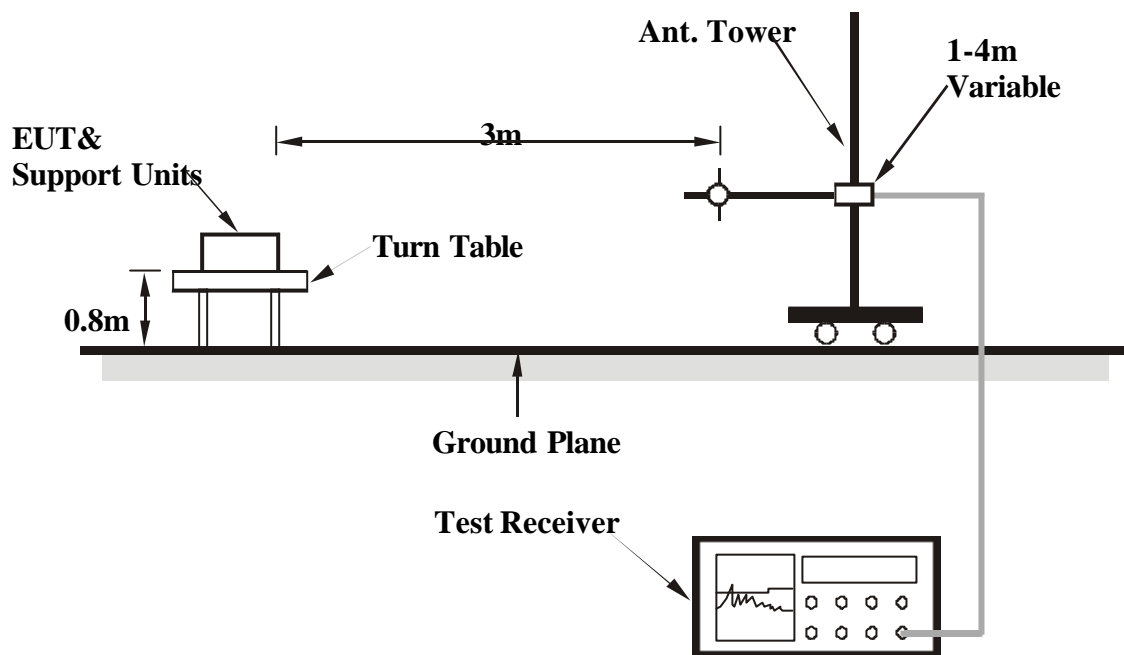
The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMAS document NIS81.



5.2.2 Test Procedures

- a. The EUT was placed on the turn table 0.8 meter above ground in 3 meter open area test site.
- b. Set the resolution bandwidth to 120KHz in the test receiver and select Peak function to scan the frequency below 1 GHz.
- c. Shift the interference-receiving antenna located in antenna tower upwards and downwards between 1 and 4 meters above ground and find out the local peak emission on frequency domain.
- d. Locate the interference-receiving antenna at the position where the local peak reach the maximum emission.
- e. Rotate the turn table and stop at the angle where the measurement device has maximum reading
- f. Shift the interference-receiving antenna again to detect the maximum emission of the local peak
- g. If the reading of the local peak under Peak function is lower than limit by 6dB, then Quasi Peak detection is not needed and this reading should be recorded. And if it is higher than Peak limit, then the test is fail. Others, switch the receiver to Quasi Peak function, set the resolution bandwidth to 100kHz and repeat the procedures C ~ F. If the reading is lower than limit, this reading should be recorded, otherwise, the test is fail.
- h. Set the resolution and video bandwidth of the spectrum analyzer to 1MHz and repeat procedures C ~ F for frequency band from 1 GHz to 10 times carrier frequency.
- i. If the reading for the local peak is lower than the Average limit, no further testing is needed in this local peak and this reading should be recorded. If it is higher than Average limit but lower than Peak limit, then set the resolution bandwidth to 1MHz and video bandwidth to 300Hz. Repeat procedures C ~ F. If the maximum reading is lower than Average limit, then this reading should be recorded. If it is higher, then the test is fail.

5.2.3 Test Setup



5.2.4 Photograph of Test Setup





5.2.5 EUT Operating Condition

1. Place the EUT on the test table
2. Power on
3. Select the channel which is chosen for testing
4. Proceed measurement

5.2.6 Climate Condition

The temperature and related humidity: 26 and 75%



5.2.7 Test Results

5.2.7.1. Fundamental Frequency

MODE 1 ANTENNA POLARITY: Vertical		Detector Function : Peak Average				6dB Bandwidth : 120 kHz.				Distance : 3 M Frequency Range : 30 – 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
905.06	24.5	50.3	50.1	74.8	74.6	114	94	-39.2	-19.4	139	151

MODE 1 ANTENNA POLARITY: Horizontal		Detector Function : Peak Average				6dB Bandwidth : 120 kHz.				Distance : 3 M Frequency Range : 30 – 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
905.06	24.5	52.0	51.9	76.5	76.4	114	94	-37.5	-17.6	120	110

- Remarks:**
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



MODE 2 ANTENNA POLARITY: Vertical		Detector Function : Peak Average				6dB Bandwidth : 120 kHz.				Distance : 3 M Frequency Range : 30 – 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
912.81	24.7	50.7	50.6	75.4	75.3	114	94	-38.6	-18.7	100	181

MODE 2 ANTENNA POLARITY: Horizontal		Detector Function : Peak Average				6dB Bandwidth : 120 kHz.				Distance : 3 M Frequency Range : 30 – 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
912.81	24.7	52.0	51.9	76.7	76.6	114	94	-37.3	-17.4	128	284

- Remarks:**
1. "*": Undetectable
 2. Q.P. and A.V. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



MODE 3 ANTENNA POLARITY: Vertical		Detector Function : Peak Average				6dB Bandwidth : 120 kHz.				Distance : 3 M Frequency Range : 30 – 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
922.38	24.9	51.4	51.3	76.3	76.2	114	94	-37.7	-17.8	101	173

MODE 3 ANTENNA POLARITY: Horizontal		Detector Function : Peak Average				6dB Bandwidth : 120 kHz.				Distance : 3 M Frequency Range : 30 – 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
922.39	24.9	53.6	53.4	78.5	78.3	114	94	-35.5	-15.7	103	83

- Remarks:**
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



5.2.7.2. Harmonics and Spurious

MODE 1 ANTENNA POLARITY: Vertical		Detector Function: Peak Average				6dB Bandwidth : 1MHz				Distance : 3 M Frequency Range : Above 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
1810.20	33.4	12.3	-	45.7	-	74.0	54.0	-28.3	-	118	76
2716.90	37.3	16.0	-	53.3	-	74.0	54.0	-20.7	-	118	233
3622.40	-	-	-	-	-	-	-	-	-	-	-

MODE 1 ANTENNA POLARITY: Horizontal		Detector Function: Peak Average				6dB Bandwidth : 1MHz				Distance : 3 M Frequency Range : Above 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
1810.20	33.4	12.4	-	45.8	-	74.0	54.0	-28.2	-	112	150
2716.80	37.3	14.8	-	52.1	-	74.0	54.0	-21.9	-	118	189
3622.40	-	-	-	-	-	-	-	-	-	-	-

- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



MODE 2 ANTENNA POLARITY: Vertical		Detector Function: Peak Average				6dB Bandwidth : 1MHz				Distance : 3 M Frequency Range : Above 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
1825.60	33.6	14.3	-	47.9	-	74.0	54.0	-26.1	-	104	279
2738.40	37.3	16.1	-	53.4	-	74.0	54.0	-20.6	-	108	33
3651.20	-	-	-	-	-	-	-	-	-	-	-

MODE 2 ANTENNA POLARITY: Horizontal		Detector Function: Peak Average				6dB Bandwidth : 1MHz				Distance : 3 M Frequency Range : Above 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
1825.60	33.6	14.5	-	48.1	-	74.0	54.0	-25.9	-	107	224
2738.45	37.3	17.8	8.0	55.1	45.3	74.0	54.0	-18.9	-8.7	107	126
3651.20	-	-	-	-	-	-	-	-	-	-	-

- Remarks:**
1. "*": Undetectable
 2. Q.P. and A.V. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.



MODE 3 ANTENNA POLARITY: Vertical		Detector Function: Peak Average				6dB Bandwidth : 1MHz				Distance : 3 M Frequency Range : Above 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
1844.80	33.8	15.4	-	49.2	-	74.0	54.0	-24.8	-	138	280
2767.20	37.3	16.8	9.6	54.1	46.9	74.0	54.0	-19.9	-7.1	109	325
3689.60	-	-	-	-	-	-	-	-	-	-	-

MODE 3 ANTENNA POLARITY: Horizontal		Detector Function: Peak Average				6dB Bandwidth : 1MHz				Distance : 3 M Frequency Range : Above 1000 MHz.	
Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Antenna Height (cm)	Table Angle (Degree)
		P.K.	A.V.	P.K.	A.V.	P.K.	A.V.	P.K.	A.V.		
1844.80	33.8	15.6	-	49.4	-	74.0	54.0	-24.6	-	100	277
2767.20	37.3	16.3	-	53.6	-	74.0	54.0	-20.4	-	116	235
3689.60	-	-	-	-	-	-	-	-	-	-	-

- Remarks:**
1. "*": Undetectable
 2. Q.P. and A.V. are abbreviations of quasi-peak and average individually.
 3. "-": NA
 4. The emission levels of other frequencies were very low against the limit.
 5. Margin value = Emission level - Limit value
 6. Emission Level = Correction Factor + Reading Value.

5.3 BAND EDGES MEASUREMENT

5.3.1 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ TEST RECEIVER	ESMI	848926/005 846839/018	Dec 03, 2000
HP PLOTTER	7475A	2641V27755	N/A

The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMAS document NIS81.

5.3.2 Test Procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 kHz bandwidth from band edge. The band edges was measured and recorded.

5.3.3 Test Setup





5.3.4 EUT Operating condition

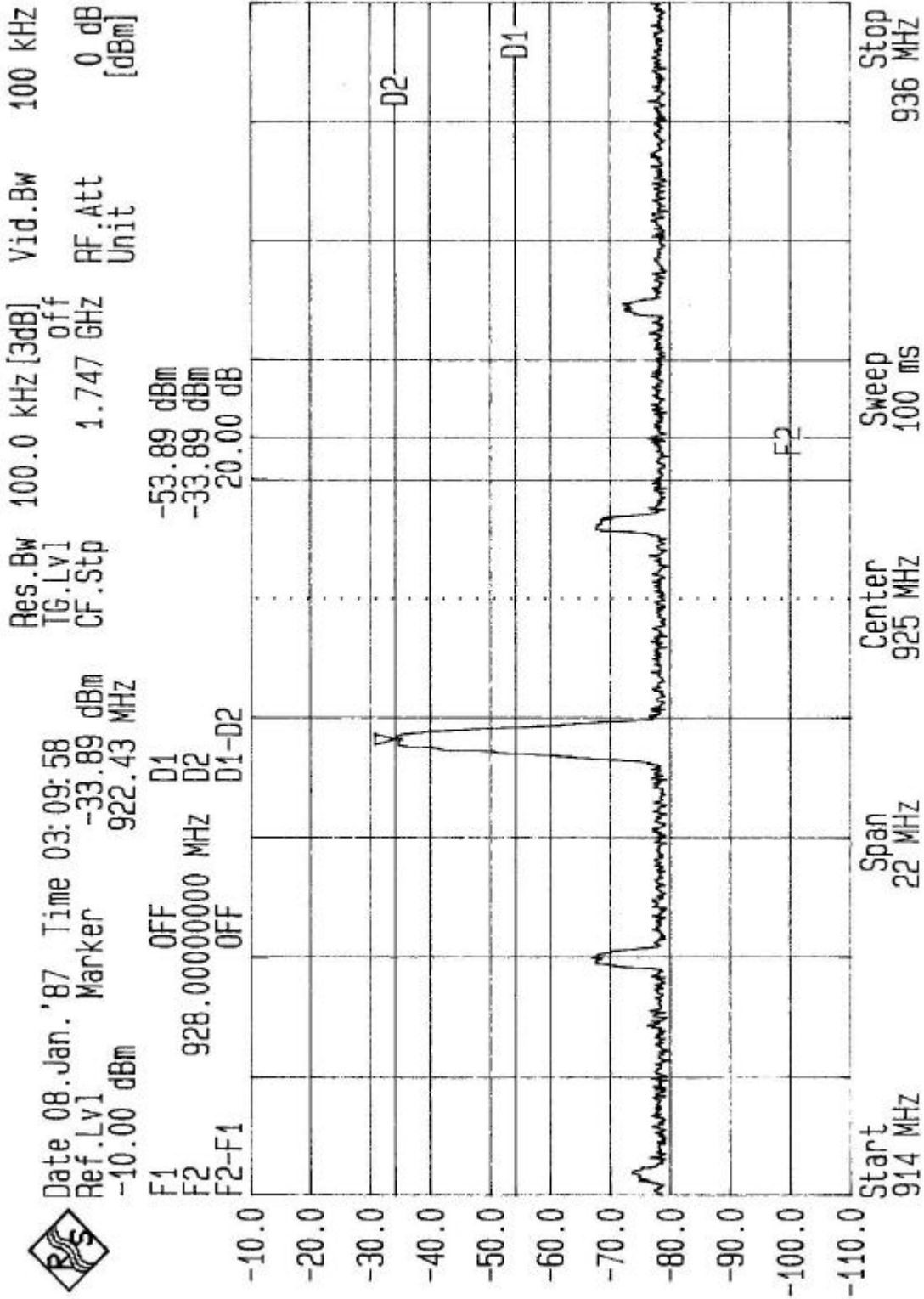
1. Place the EUT on the test table
2. Power on
3. Select the channel which is chosen for testing
4. Proceed measurement

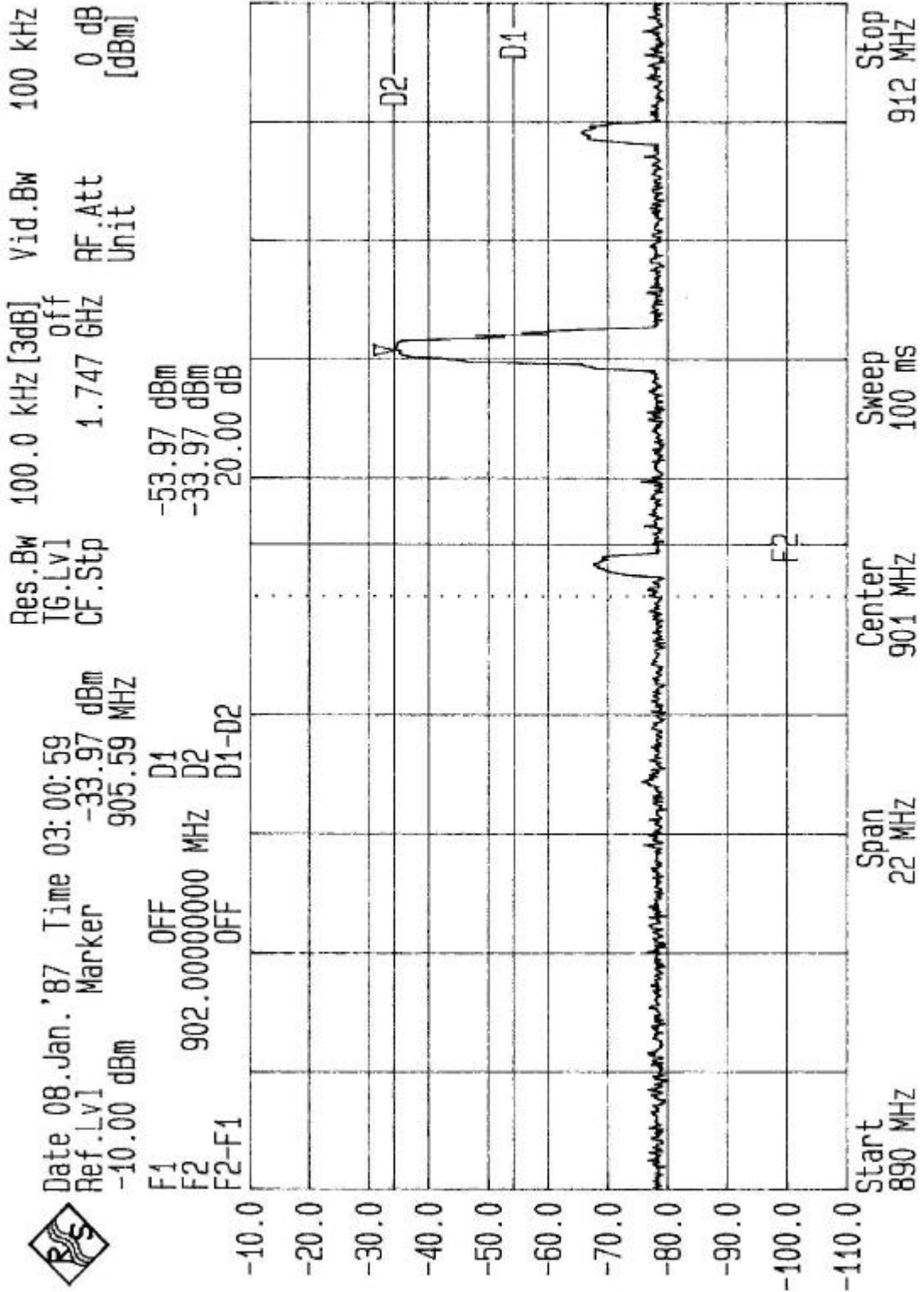
5.3.5 Climate Condition

The temperature and related humidity: 26 Degree C and 75%RH

5.3.6 Test Results

The spectrum plots are attached below.





6 PHOTOGRAPHS OF THE EUT



