

FCC PART 15, SUBPART C
TEST REPORT

for

RF-232

MODEL: EP0104

Prepared for

YIS, INC.

1049 NORTH HARTLEY STREET
YORK, PENNSYLVANIA 17402

Prepared by: Kyle Fujimoto

KYLE FUJIMOTO

Approved by: Michael P. Christensen

MICHAEL CHRISTENSEN

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: APRIL 8, 2002

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	16	2	2	12	15	2	49

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



TABLE OF CONTENTS

Section / Title	PAGE
GENERAL REPORT SUMMARY	4
SUMMARY OF TEST RESULTS	4
1. PURPOSE	5
2. ADMINISTRATIVE DATA	6
2.1 Location of Testing	6
2.2 Traceability Statement	6
2.3 Cognizant Personnel	6
2.4 Date Test Sample was Received	6
2.5 Disposition of the Test Sample	6
2.6 Abbreviations and Acronyms	6
3. APPLICABLE DOCUMENTS	7
4. Description of Test Configuration	8
4.1 Description of Test Configuration - EMI	8
4.1.1 Cable Construction and Termination	9
5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT	10
5.1 EUT and Accessory List	10
5.2 EMI Test Equipment	11
6. TEST SITE DESCRIPTION	12
6.1 Test Facility Description	12
6.2 EUT Mounting, Bonding and Grounding	12
7. Test Procedures	13
7.1 Radiated Emissions (Spurious and Harmonics) Test	13
7.2 Band Edge Plots of the Low and High Channels	15
8. CONCLUSIONS	16



LIST OF APPENDICES

APPENDIX	TITLE
A	Modifications to the EUT
B	Additional Models Covered Under This Report
C	Diagrams, Charts and Photos • Test Setup Diagrams • Radiated Emissions Photos • Antenna and Effective Gain Factors
D	Data Sheets
E	Laboratory Recognitions

LIST OF FIGURES

FIGURE	TITLE
1	Plot Map And Layout of Test Site



GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Device Tested: RF-232
Model: EP0104
S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was not modified during the testing.

Manufacturer: YIS, Inc.
1049 North Hartley Street
York, Pennsylvania 17402

Test Dates: April 3 and 4, 2002

Test Specifications: EMI requirements
CFR Title 47, Part 15 Subpart C, Sections 15.205 and 15.249

Test Procedure: ANSI C63.4: 1992

Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 450 kHz - 30 MHz	The EUT operates on twelve volts DC only and cannot be plugged into the AC public mains.
2	Radiated RF Emissions, 10 kHz - 9300 MHz	Complies with the limits of CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209, and 15.249



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the RF-232 Model: EP0104. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined by CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209, and 15.249.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

YIS, Inc.

Robert A. Keough President

Compatible Electronics, Inc.

Kyle Fujimoto Test Engineer

Michael Christensen Test Engineer

2.4 Date Test Sample was Received

The test sample was received on April 2, 2002.

2.5 Disposition of the Test Sample

The test sample has not been returned to YIS, Inc. as of April 8, 2002.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network



3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
CFR Title 47, Subpart C.	FCC Rules – Radio frequency devices – Intentional Radiators
ANSI C63.4 1992	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.



4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

For the Transmit Mode: The RF-232 Model: EP0104 (EUT) was connected to a data sender via its I/O port. The data sender was also connected to the triple output power supply via its power port. The EUT was transmitting the data sent from the data sender on a continuous basis. The antenna connector is a reverse polarity SMA located on the top portion of the PCB inside the EUT.

For the Receive Mode: The RF-232 Model: EP0104 (EUT) was connected to a display head via its I/O port. The display head was also connected to the DC power supply via its power port. A 1 foot cable was also connected to the display head. The EUT was continuously receiving. The antenna connector is a reverse polarity SMA located on the top portion of the PCB inside the EUT.

The final radiated data was taken in the modes above. Please see Appendix D for the data sheets.



4.1.1 Cable Construction and Termination

Transmit Mode

Cable 1 This is a 1 meter braid and foil shielded cable connecting the data sender to the EUT. It has a D-9 pin metallic connector the data sender end and is hard wired into the EUT. The shield of the cable is grounded to the chassis via the connector at the data sender end only.

Cable 2 This is a 2 meter unshielded cable connecting the data sender to cable #3. It is hard wired at the data sender end and has a cigarette lighter adapter at the other end. This cable, along with cable #3, was bundled to a length of 1 meter.

Cable 3 This is a 1 meter unshielded cable connecting the triple output power supply to cable #2. It has 2 banana plug connectors at the triple output power supply end and has alligator clips at the other end. This cable, along with cable #2, was bundled to a length of 1 meter.

Receive Mode

Cable 1 This is a 1 meter braid and foil shielded cable connecting the display head to the EUT. It has a D-9 pin metallic connector the display head end and is hard wired into the EUT. The shield of the cable is grounded to the chassis via the connector at the data sender end only.

Cable 2 This is a 1 meter unshielded cable connecting the display head to the DC power supply. It has a cigarette lighter adapter at the DC power supply end and is hard wired into the display head.

Cable 3 This is a 1 foot unshielded, unterminated cable connected to the display head. It is hard wired into the display head.



5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
RF-232 (EUT)	YIS, INC.	EP0104	N/A	QAU-EP0104
DATA SENDER (used for transmit mode only)	YIS, INC.	N/A	N/A	N/A
TRIPLE OUTPUT POWER SUPPLY (used for transmit mode only)	HEWLETT PAKCARD	6326B	2735A-24498	N/A
DC POWER SUPPLY (used for receive mode only)	HEWLETT PAKCARD	6012B	2524A-00848	N/A
DISPLAY HEAD (used for receive mode only)	YIS, INC.	9605C	152	N/A



5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Radiated Emissions Manual Test – Radiated	Compatible Electronics	N/A	N/A	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08768	June 15, 2001	June 15, 2002
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22262	June 15, 2001	June 15, 2002
Spectrum Analyzer – Quasi-Peak Adapter	Hewlett Packard	85662A	2811A01363	June 15, 2001	June 15, 2002
Preamplifier	Com Power	PA-102	1017	Dec. 31, 2001	Dec. 31, 2002
Biconical Antenna	Com Power	AB-100	1548	Oct. 11, 2001	Oct. 11, 2002
Log Periodic Antenna	Com Power	AL-100	16089	Oct. 11, 2001	Oct. 11, 2002
Computer	Hewlett Packard	D5251A 888	US74458128	N/A	N/A
Printer	Hewlett Packard	C5886A	SG7CM1P090	N/A	N/A
Monitor	Hewlett Packard	D5258A	DK74889705	N/A	N/A
Loop Antenna	Com-Power	AL-130	17070	May 21, 2001	May 21, 2002
Horn Antenna	Antenna Research	DRG-118/A	1053	Jan. 13, 2002	Jan. 13, 2003
Microwave Preamplifier	Com-Power	PA-122	25195	Jan. 7, 2002	Jan. 7, 2003



6. TEST SITE DESCRIPTION

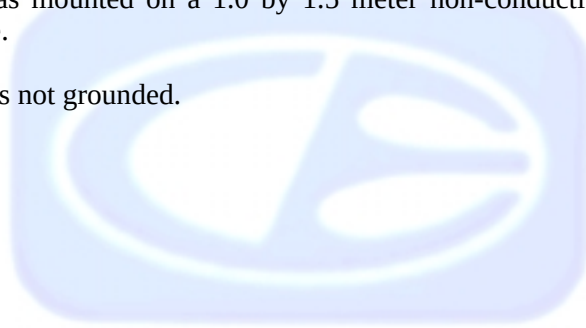
6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.



7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps.

For the peak readings below 1000 MHz that were within 3 dB of the spec limit or higher, the quasi-peak adapter was used.

For the peak readings above 1000 MHz that were within 3dB of the spec limit or higher, the readings were averaged manually by narrowing the video filter down to 10 Hz and slowing the sweep time to keep the amplitude reading calibrated.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 9.3 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 1992. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.



Radiated Emissions (Spurious and Harmonics) Test (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data. The final qualification data sheets are located in Appendix D.



7.2 Band Edge Plots of the Low and High Channels

Spectral plots of both the low and high channels were taken of the EUT to show that the emissions at the band edges (902 and 928 MHz) were attenuated by at least 50 dB below the level of the fundamental or to the general radiated emissions limits in FCC Title 47, Subpart C, section 15.209, whichever is the lesser attenuation. Please see Appendix D for the spectral plots and data sheets.

The spectral plots were taken at a distance of 3 meters, using the PA-102 Preamplifier to boost the signal level of any potential emissions outside the band edges.



8. CONCLUSIONS

The RF-232 Model: EP0104 meets all of the specification limits defined in CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209, and 15.249.



APPENDIX A

MODIFICATIONS TO THE EUT



MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.249 specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.



APPENDIX B

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***



ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

RF-232
Model: EP0104
S/N: N/A

There were no additional models covered under this report.



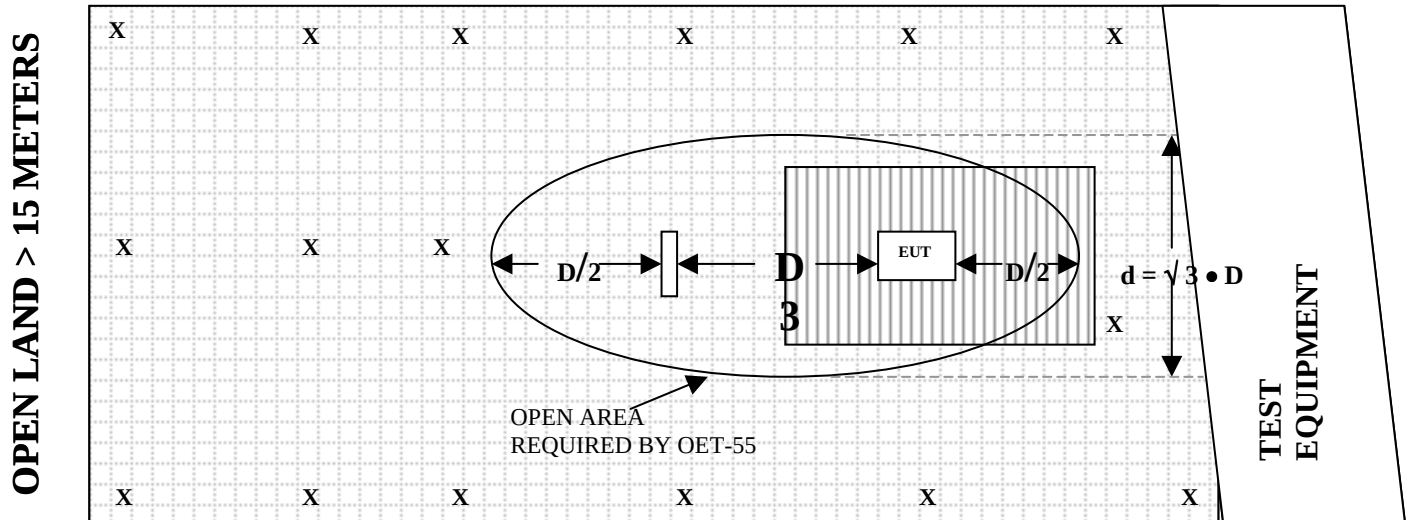
APPENDIX C

DIAGRAMS, CHARTS AND PHOTOS

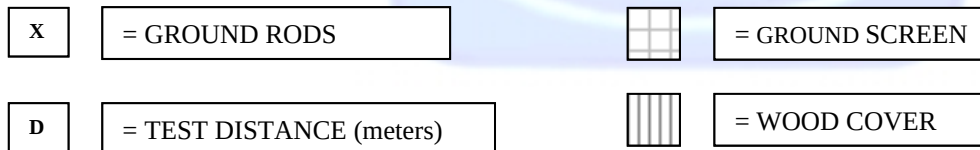


FIGURE 1 PLOT MAP AND LAYOUT OF RADIATED SITE

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS





FRONT VIEW

YIS, INC.

RF-232

MODEL: EP0104

FCC SUBPART C - RADIATED EMISSIONS – TRANSMIT MODE – 04-03-02

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





REAR VIEW

YIS, INC.

RF-232

MODEL: EP0104

FCC SUBPART C - RADIATED EMISSIONS – 04-03-02

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





FRONT VIEW

YIS, INC.

RF-232

MODEL: EP0104

FCC SUBPART C - RADIATED EMISSIONS – 04-04-02

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





REAR VIEW

YIS, INC.

RF-232

MODEL: EP0104

FCC SUBPART C - RADIATED EMISSIONS – 04-04-02

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



COM-POWER AB-100
BICONICAL ANTENNA

S/N: 01548

CALIBRATION DATE: OCTOBER 11, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	13.70	120	11.00
35	13.70	125	11.20
40	11.80	140	12.50
45	12.30	150	13.20
50	11.00	160	13.50
60	10.40	175	14.60
70	8.60	180	14.40
80	8.30	200	15.90
90	8.30	250	17.60
100	8.80	300	19.90



COM-POWER AL-100
LOG PERIODIC ANTENNA

S/N: 16089

CALIBRATION DATE: OCTOBER 11, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	14.10	700	20.60
400	15.10	800	22.40
500	16.60	900	22.70
600	19.90	1000	26.50



COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: DECEMBER 31, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.5	300	38.5
40	38.5	350	38.4
50	38.5	400	38.2
60	38.5	450	37.8
70	38.5	500	38.0
80	38.5	550	38.2
90	38.3	600	38.2
100	38.3	650	38.0
125	38.6	700	38.1
150	38.5	750	37.7
175	38.4	800	37.4
200	38.5	850	37.9
225	38.5	900	37.2
250	38.4	950	36.8
275	38.4	1000	37.3



COM-POWER PA-122

MICROWAVE PREAMPLIFIER

S/N: 25195

CALIBRATION DATE: JANUARY 7, 2002

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	33.7	9.5	31.8
1.1	33.4	10.0	32.2
1.2	33.1	11.0	31.4
1.3	33.1	12.0	30.2
1.4	33.2	13.0	32.9
1.5	32.5	14.0	33.9
1.6	32.7	15.0	32.4
1.7	32.3	16.0	32.2
1.8	32.3	17.0	31.5
1.9	31.4	18.0	32.2
2.0	32.8	19.0	31.2
2.5	33.3	20.0	31.3
3.0	31.7	21.0	31.7
3.5	31.6	22.0	29.7
4.0	31.2		
4.5	31.2		
5.0	31.0		
5.5	31.3		
6.0	32.1		
6.5	32.1		
7.0	31.8		
7.5	32.0		
8.0	33.1		
8.5	32.0		
9.0	30.8		



ANTENNA RESEARCH DRG-118/A

HORN ANTENNA

S/N: 1053

CALIBRATION DATE: JANUARY 13, 2002

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	25.5	9.5	39.1
1.5	26.6	10.0	39.7
2.0	29.4	10.5	40.9
2.5	30.4	11.0	40.7
3.0	31.2	11.5	42.4
3.5	32.3	12.0	42.6
4.0	32.9	12.5	42.4
4.5	33.0	13.0	41.5
5.0	34.8	13.5	41.0
5.5	35.2	14.0	40.5
6.0	36.4	14.5	43.6
6.5	36.6	15.0	43.7
7.0	38.8	15.5	43.3
7.5	38.8	16.0	42.8
8.0	38.0	16.5	43.0
8.5	38.1	17.0	42.7
9.0	39.9	17.5	44.0
		18.0	41.8



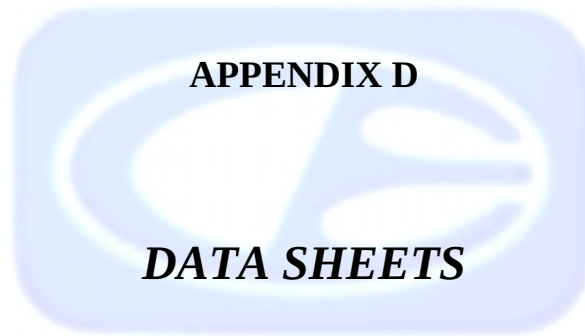
Com-Power Corporation

(949) 587-9800

Antenna Calibration

Antenna Type		Active Loop Antenna
Model		AL-130
Serial Number		17930
Calibration Date		05/21/01
Certificate Number		071016
Frequency MHz	Magnetic (dB/m)	Electric (dB/m)
0.009	-40.5	11.0
0.01	-40.4	11.1
0.02	-41.4	10.1
0.03	-40.0	11.5
0.04	-40.4	11.1
0.05	-41.7	9.8
0.06	-41.2	10.3
0.07	-41.5	10.0
0.08	-41.8	9.7
0.09	-41.8	9.7
0.1	-41.8	9.7
0.2	-44.0	7.5
0.3	-41.6	9.9
0.4	-41.6	9.9
0.5	-41.6	9.9
0.6	-41.5	10.0
0.7	-41.4	10.1
0.8	-41.3	10.2
0.9	-41.3	10.2
1	-40.9	10.6
2	-40.3	11.2
3	-40.5	11.0
4	-40.8	10.7
5	-40.2	11.3
6	-40.0	11.5
7	-40.4	11.1
8	-40.5	11.0
9	-40.0	11.5
10	-40.7	10.8
12	-41.2	10.3
14	-41.3	10.2
15	-41.3	10.2
16	-41.4	10.1
18	-41.4	10.1
20	-41.4	10.1
25	-41.7	9.8
30	-43.1	8.4

Separation Distance: _____ meter



RADIATED EMISSIONS
DATA SHEETS



RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	YIS, INC.	DATE	4/3/02
EUT	RF-232	DUTY CYCLE	N/A
MODEL	EP0104	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
916.5000	98.6	98.5 A	H	1.0	90	X	LOW	23.3	5.1	37.5	89.4	-4.6	94.0	
916.5000	102.9	102.8 A	V	1.0	180	X	LOW	23.3	5.1	37.5	93.7	-0.3	94.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

PAGE 1

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	YIS, INC.	DATE	4/3/02
EUT	RF-232	DUTY CYCLE	N/A
MODEL	EP0104	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
1833.0000	50.7	A	H	1.0	180	X	LOW	28.6	3.4	31.9	50.8	-3.2	54.0	
1833.0000	50.2	A	V	1.0	180	X	LOW	28.6	3.4	31.9	50.3	-3.7	54.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

PAGE 2

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	YIS, INC.	DATE	4/3/02
EUT	RF-232	DUTY CYCLE	N/A
MODEL	EP0104	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2749.5000	45.7	A	H	1.0	180	X	LOW	30.9	4.3	31.8	49.1	-4.9	54.0	
2749.5000	47.1	A	V	1.0	90	X	LOW	30.9	4.3	31.8	50.5	-3.5	54.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
 ** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	YIS, INC.	DATE	4/3/02
EUT	RF-232	DUTY CYCLE	N/A
MODEL	EP0104	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
3666.0000	38.8	A	H	1.0	180	X	LOW	32.6	5.1	31.9	44.6	-9.4	54.0	
3666.0000	38.8	A	V	1.0	180	X	LOW	32.6	5.1	31.9	44.6	-9.4	54.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
 ** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	YIS, INC.	DATE	4/3/02
EUT	RF-232	DUTY CYCLE	N/A
MODEL	EP0104	PEAK TO AVG	N/A
S/N	N/A	TEST DIST.	3 METERS
TEST ENGINEER	KYLE FUJIMOTO	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi- Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4582.5000	34.8	A	H	1.0	180	X	LOW	33.5	6.0	31.6	42.6	-11.4	54.0	
4582.5000	36.1	A	V	1.0	180	X	LOW	33.5	6.0	31.6	43.9	-10.1	54.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

No Emissions nor Harmonics found after the
5th Harmonic for the EUT

Test location: Compatible Electronics

Customer : YIS INC.

Date : 4/ 3/2002

Manufacturer : YIS INC.

Time : 10.38

EUT name : RF-232

Model: EP0104

Specification: FCC_B Test distance: 3.0 mtrs Lab: D

Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00

Test Mode : SPURIOUS EMISSIONS FROM THE EUT - TRANSMIT MODE

VERTICAL AND HORIZONTAL POLARIZATION

30 MHz TO 300 MHz

TESTED BY: KYLE FUJIMOTO

Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
			dB	dB	dB	dBuV	dBuV/m	dB
VERTICAL POLARIZATION								
1V	73.84	59.50	1.38	8.48	38.50	30.86	40.00	-9.14
2V	118.09	59.90	1.74	10.79	38.52	33.92	43.50	-9.58
3V	125.44	57.70	1.80	11.24	38.60	32.14	43.50	-11.36
4V	140.19	63.10	1.92	12.51	38.54	39.00	43.50	-4.50
5V	154.93	61.30	2.06	13.35	38.48	38.23	43.50	-5.27
6V	169.69	50.10	2.24	14.21	38.42	28.13	43.50	-15.37
7V	272.88	36.20	2.98	18.65	38.40	19.44	46.00	-26.56
8V	287.58	36.70	3.10	19.33	38.45	20.68	46.00	-25.32
9V	295.01	39.10	3.16	19.67	38.48	23.45	46.00	-22.55
HORIZONTAL POLARIZATION								
10H	57.39	41.10	1.17	10.56	38.50	14.33	40.00	-25.67
11H	73.81	60.60	1.38	8.49	38.50	31.96	40.00	-8.04
12H	88.56	57.70	1.50	8.30	38.33	29.17	43.50	-14.33
13H	98.37	52.50	1.58	8.72	38.30	24.50	43.50	-19.00
14H	118.08	62.50	1.74	10.79	38.52	36.52	43.50	-6.98
15H	125.44	59.30	1.80	11.24	38.60	33.74	43.50	-9.76
16H	140.18	54.10	1.92	12.51	38.54	29.99	43.50	-13.51
17H	154.90	56.70	2.06	13.35	38.48	33.63	43.50	-9.87
18H	169.70	52.40	2.24	14.21	38.42	30.43	43.50	-13.07
19H	272.94	34.90	2.98	18.66	38.40	18.14	46.00	-27.86
20H	287.34	34.50	3.10	19.32	38.45	18.47	46.00	-27.53
21H	295.04	41.80	3.16	19.67	38.48	26.15	46.00	-19.85

Test location: Compatible Electronics
 Customer : YIS INC. Date : 4/ 3/2002
 Manufacturer : YIS INC. Time : 14.59
 EUT name : RF-232 Model: EP0104
 Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
 Test Mode : SPURIOUS EMISSIONS FROM THE EUT - TRANSMIT MODE
 VERTICAL AND HORIZONTAL POLARIZATION
 300 MHz TO 1000 MHz
 TESTED BY: KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
HORIZONTAL POLARIZATION								
1H	334.17	44.90	3.34	14.44	38.43	24.25	46.00	-21.75
2H	483.65	41.40	4.03	16.35	37.93	23.85	46.00	-22.15
VERTICAL POLARIZATION								
3V	334.20	41.80	3.34	14.44	38.43	21.15	46.00	-24.85
14.3 MHz SIDEBANDS OF THE 916.5 MHz TRANSMITTER								
*4H	902.23	52.70	5.04	22.78	37.18	43.35		
*5H	902.23	52.60	5.04	22.78	37.18	43.25Qp		
*6V	902.23	59.90	5.04	22.78	37.18	50.55		
*7V	902.23	59.27	5.04	22.78	37.18	49.92Qp		
8V	930.91	47.10	5.62	23.87	36.95	39.64	46.00	-6.36
9H	930.91	44.30	5.62	23.87	36.95	36.84	46.00	-9.16

*THESE READINGS ARE FROM THE TRANSMITTER ITSELF AND ARE STILL WITHIN THE
 902-928 MHz BAND — THUS THEY ARE NOT OUTSIDE THE SPECIFIED FREQUENCY
 BAND AND ARE NOT SUBJECT TO 15.249 (c)

Test location: Compatible Electronics
Customer : YIS INC. Date : 4/ 3/2002
Manufacturer : YIS INC. Time : 15.46
EUT name : RF-232 Model: EP0104
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
Test Mode : SPURIOUS EMISSIONS FROM THE EUT - TRANSMIT MODE
VERTICAL AND HORIZONTAL POLARIZATION
10 kHz to 30 MHz
TESTED BY: KYLE FUJIMOTO

NO EMISSIONS FOUND FROM 10 kHz TO 30 MHz
IN EITHER POLARIZATION FOR THE EUT

Test location: Compatible Electronics

Customer : YIS INC.

Date : 4/ 4/2002

Manufacturer : YIS INC.

Time : 8.25

EUT name : RF-232

Model: EP0104

Specification: Fcc_B Test distance: 3.0 mtrs Lab: D

Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00

Test Mode : SPURIOUS EMISSIONS IN RECEIVE MODE

30 MHz TO 300 MHz VERTICAL AND HORIZONTAL

TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 79%

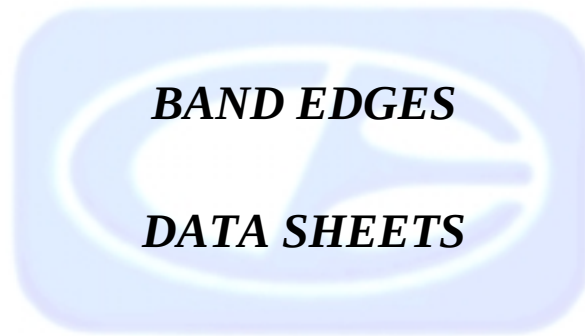
TESTED BY: KYLE FUJIMOTO

Pol	Freq	Rdng	Cable	Ant	Amp	Cor'd	limit	Delta
	MHz	dBuV	loss	factor	gain	rdg = R	= L	R-L
			dB	dB	dB	dBuV	dBuV/m	dB
VERTICAL POLARIZATION								
1V	39.46	46.60	0.89	12.01	38.50	21.00	40.00	-19.00
2V	59.08	51.60	1.19	10.46	38.50	24.75	40.00	-15.25
3V	73.79	52.00	1.38	8.49	38.50	23.36	40.00	-16.64
4V	78.71	52.50	1.47	8.34	38.50	23.81	40.00	-16.19
5V	177.05	40.80	2.31	14.52	38.41	19.22	43.50	-24.28
HORIZONTAL POLARIZATION								
6H	44.89	54.50	1.00	12.29	38.50	29.29	40.00	-10.71
7H	98.38	56.60	1.58	8.72	38.30	28.60	43.50	-14.90
8H	120.11	51.80	1.76	11.00	38.54	26.02	43.50	-17.48
9H	177.04	46.20	2.31	14.52	38.41	24.62	43.50	-18.88
10H	221.28	43.70	2.49	16.62	38.50	24.31	46.00	-21.69

Test location: Compatible Electronics
 Customer : YIS INC. Date : 4/ 4/2002
 Manufacturer : YIS INC. Time : 8.57
 EUT name : RF-232 Model: EP0104
 Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
 Distance correction factor($20 \cdot \log(\text{test}/\text{spec})$) : 0.00
 Test Mode : SPURIOUS EMISSIONS 300 MHz TO 5000 MHz - RECEIVE MODE
 VERTICAL AND HORIZONTAL POLARIZATION
 TEMPERATURE 68 DEGREES F., RELATIVE HUMIDITY 79%
 TESTED BY: KYLE FUJIMOTO

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	limit = L dBuV/m	Delta R-L dB
VERTICAL POLARIZATION								
1V	485.76	36.90	4.04	16.39	37.94	19.39	46.00	-26.61
2V	871.92	37.80	5.22	22.62	37.59	28.05	46.00	-17.95
3V	905.84	45.10	5.12	22.92	37.15	35.99	46.00	-10.01
HORIZONTAL POLARIZATION								
4H	328.19	44.70	3.31	14.38	38.44	23.95	46.00	-22.05
5H	383.91	42.80	3.60	14.94	38.26	23.08	46.00	-22.92
6H	447.85	38.50	3.89	15.82	37.82	20.39	46.00	-25.61
7H	905.84	47.10	5.12	22.92	37.15	37.99	46.00	-8.01

NO EMISSIONS FOUND IN EITHER POLARIZATION ABOVE 905.84 MHz
 FOR THE RECEIVER PORTION



AT 902 MHz

BAND EDGE XXXXXXXXXX
REF 110.0 dB μ V ATTEN 20 dB

MKR 902.00 MHz
42.10 dB μ V

hp

10 dB/

DL
102.9
dB μ V

MARKER

902.00 MHz
42.10 dB μ V

902.23 MHz

902 MHz

CORR'D

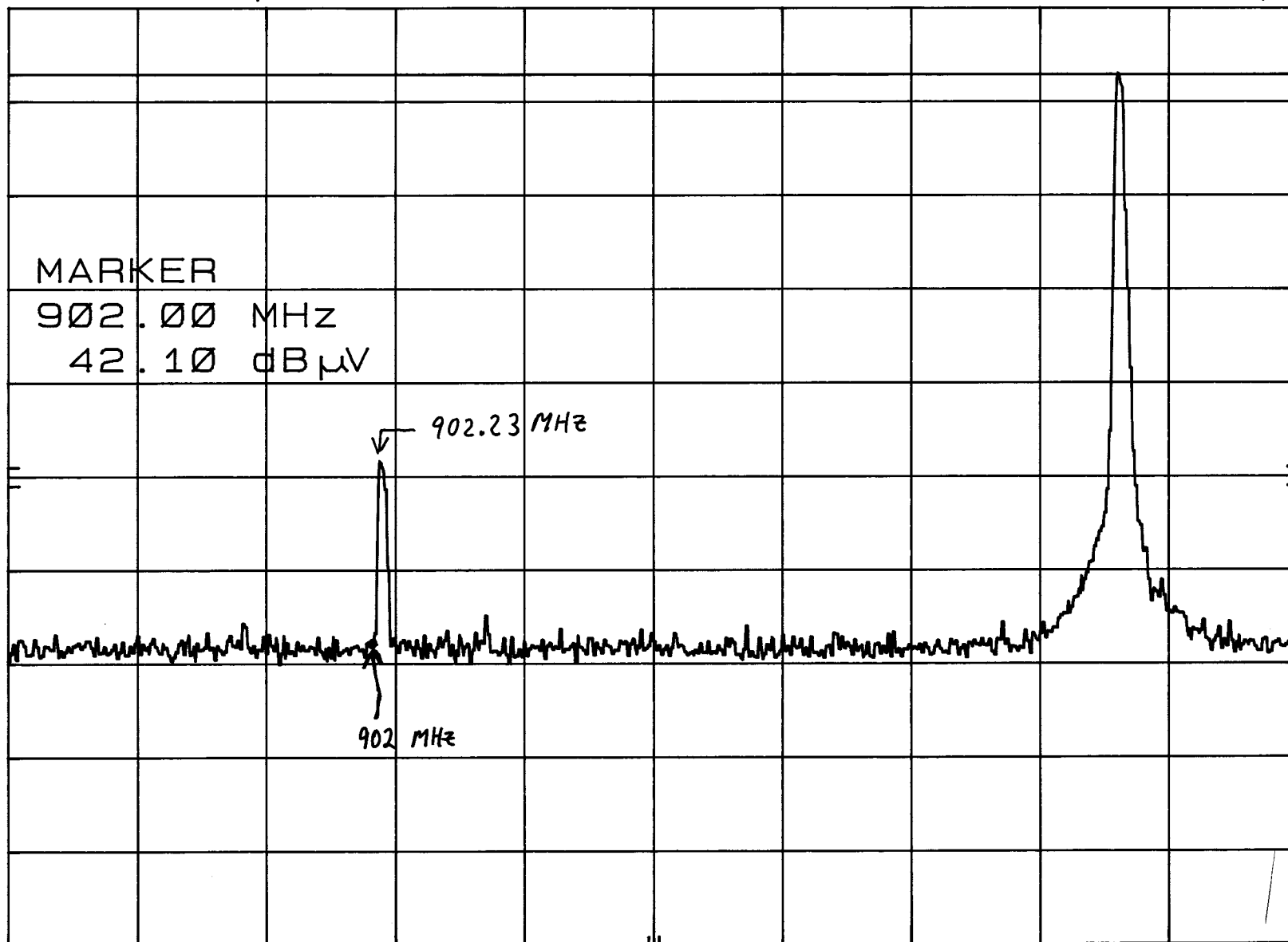
START 895.0 MHz

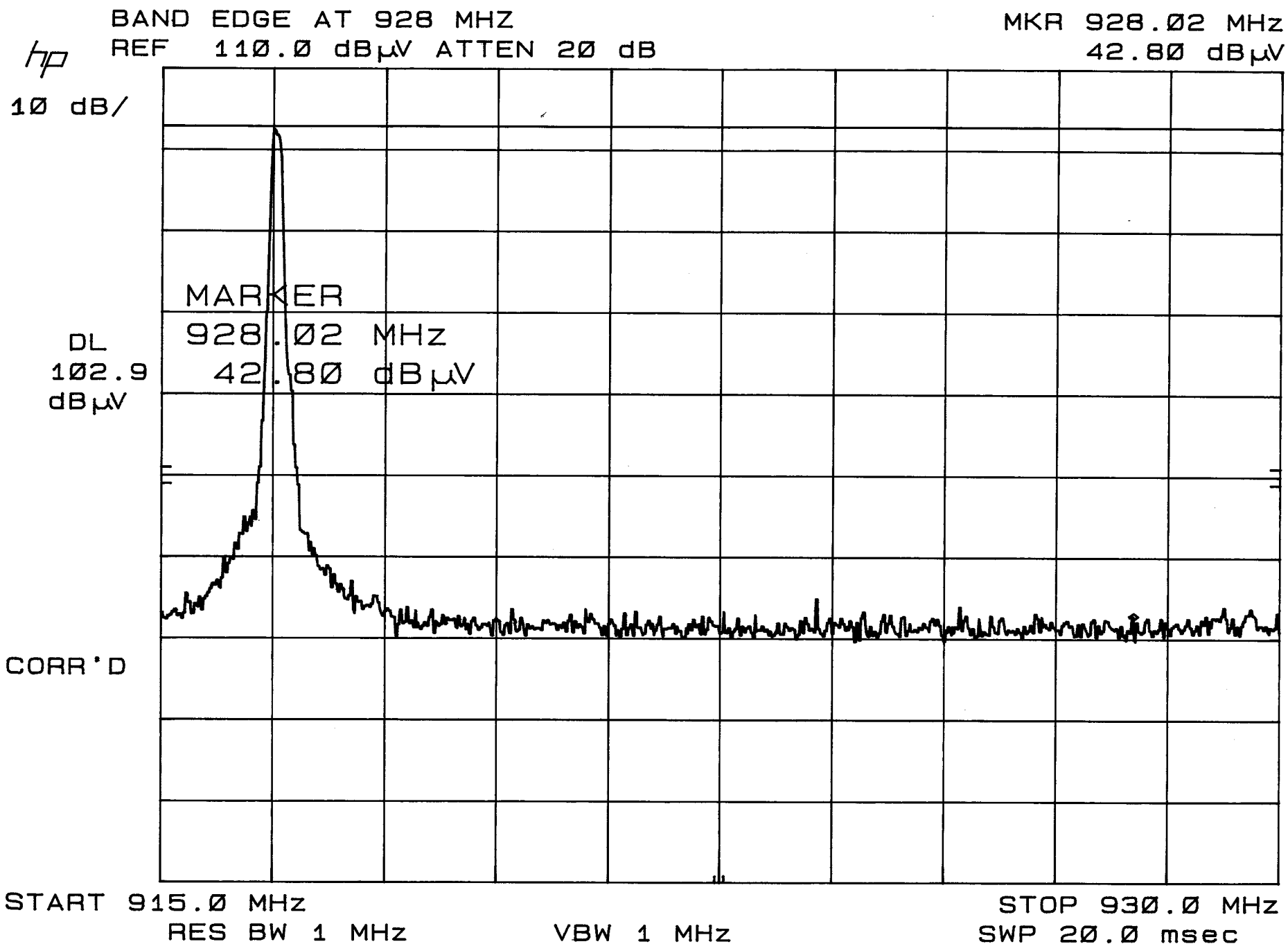
RES BW 1 MHz

VBW 1 MHz

STOP 920.0 MHz

SWP 20.0 msec





APPENDIX E

LABORATORY RECOGNITIONS



LABORATORY RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200063-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

