EMC Testing Laboratories, Inc.

RF Emissions Test Report To Determine Compliance With: FCC, Part 15, Subpart B and C Rules and Regulations

Model number: NIV04

Date: July 11, 2008

Manufacturer: Nivis, LLC
1000 Circle 75 Pkwy.
Third Floor
Atlanta, GA 30339

Contents Section

Section 1

GENERAL INFORMATION

Manufacturer:	Nivis, LLC 1000 Circle 75 Pkwy. Third Floor Atlanta, GA 30339
Manufacturer representative:	**Mr. Ed Castro**
Equipment covered by this report:	Model no. NIV04
Options covered by this report:	None
Equipment serial no.	Prototype
Test specifications:	To determine compliance with: FCC, Part 15, Subpart B and C, Rules and Regulations, Class A.
Test report number:	08-252A
Test commenced:	July 1, 2008
Test completed:	July 11, 2008
Test engineer:	**Edward Barnes**

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 radio, model no. NIV04 is a 2.4 GHz spread spectrum transceiver. The radio is intended to be used within Nevis's product, model no. Acuity Edge Router ER-550.

The integral antenna is manufactured by Nearson, model no. S151AH-2450 with a 5 dBi gain. The connector is a reverse threaded SMA.

The product, model no. Acuity Edge Router ER-550 encloses the following component judged as critical:

1- An Access Node USB, printed wiring board manufacturer by Nivin, part no. 51000078-001, rev. no. C. See circuit schematics, Section 17.

2- A Com Board, printed wiring, manufacturer by Nivin, part no. 51000086-001, rev B. See circuit schematics, Section 18.

3- A power supply, manufactured by Bear Power Supplies, model no. BP41015120.

4- A radio manufactured by L S Research, LLC. model no. NIV04, rev. no. B. with a radio printed wiring board, no. 51000082, rev. no. B. See trace layout drawing, Section.

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 laptop.

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

A- An Ethernet cable between the product and laptop.

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 10mS over a 125 mS period.

The Duty Cycle is calculated as follows:

(10/125) 100% = 8%

In terms of voltage dB: 20 log (10/125) = -21.9 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, Subpart C, Part 15.247, Class A Rules and Regulations and ANSI C63.4-(03) 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: **Edward Barnes, RF Engineer**

Approved by: _____
Gene Bailey, Engineering Manager,
EMC Testing Laboratories, Inc.

Section 3

STANDARD REFERENCE

The following primary standards were used for this test:

1- **ANSI C63.4-2003:** 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) (03):** Title 47, Part 15, Radio Frequency Devices, Subpart C, Intentional Radiators.

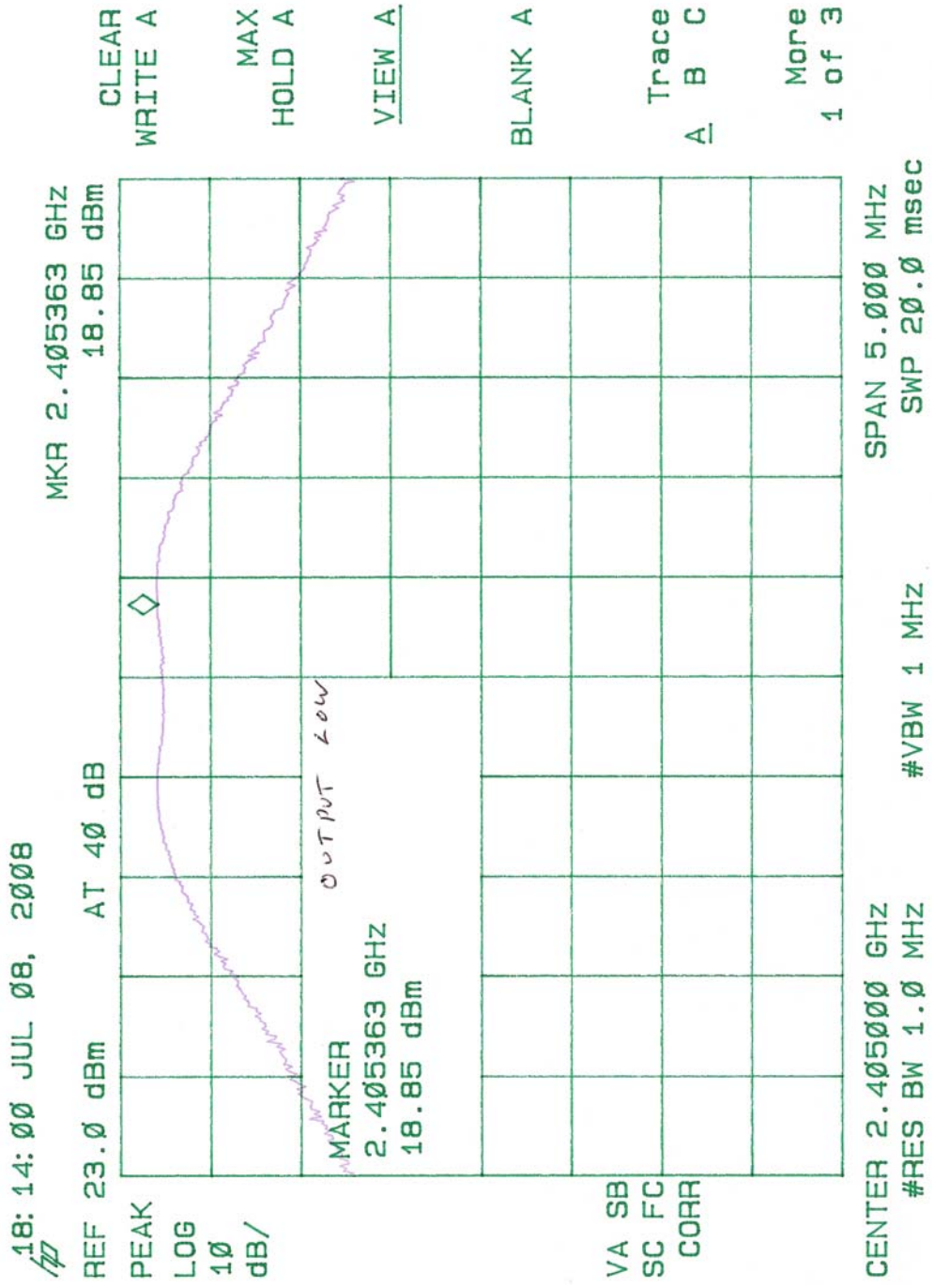
Note: Applicable amendments were applied to all standards.

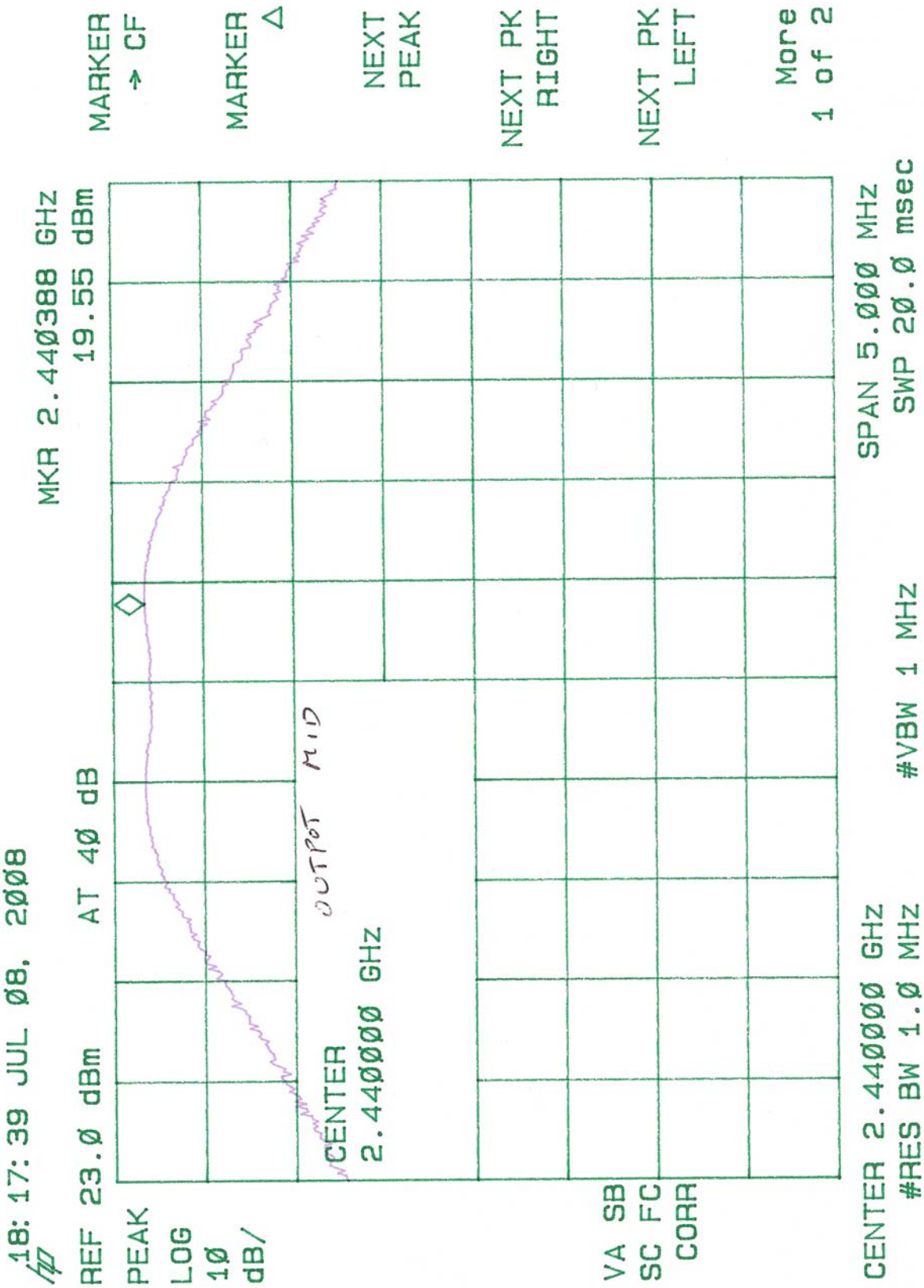
Section 4

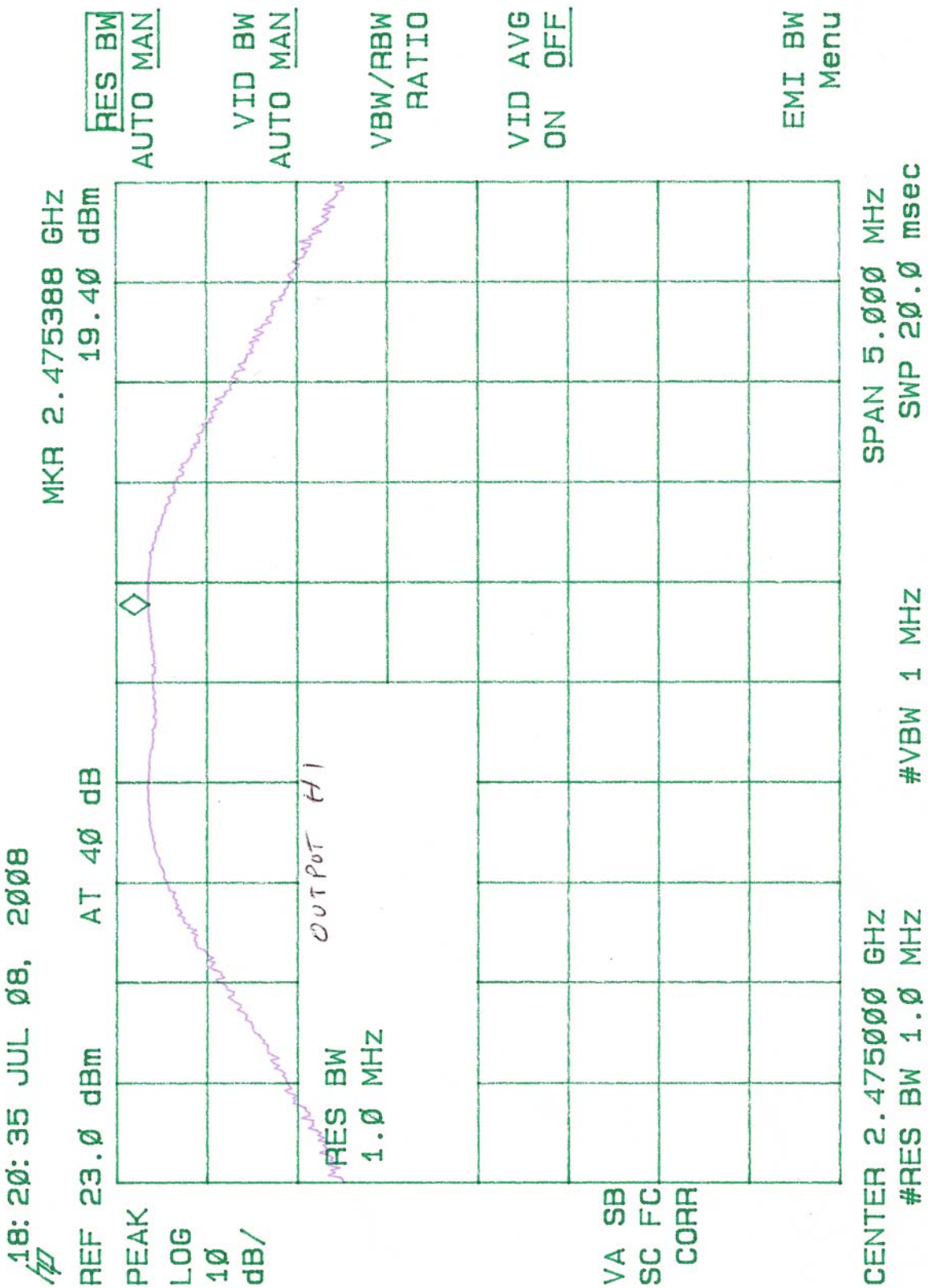
CONDUCTED OUTPUT POWER AT ANTENNA TERMINALS

Test Results

Frequency (MHz)	Output in dBm	FCC Limits
2405	18.85 dBm	30 dBm
2440	19.55 dBm	30 dBm
2475	19.40 dBm	30 dBm

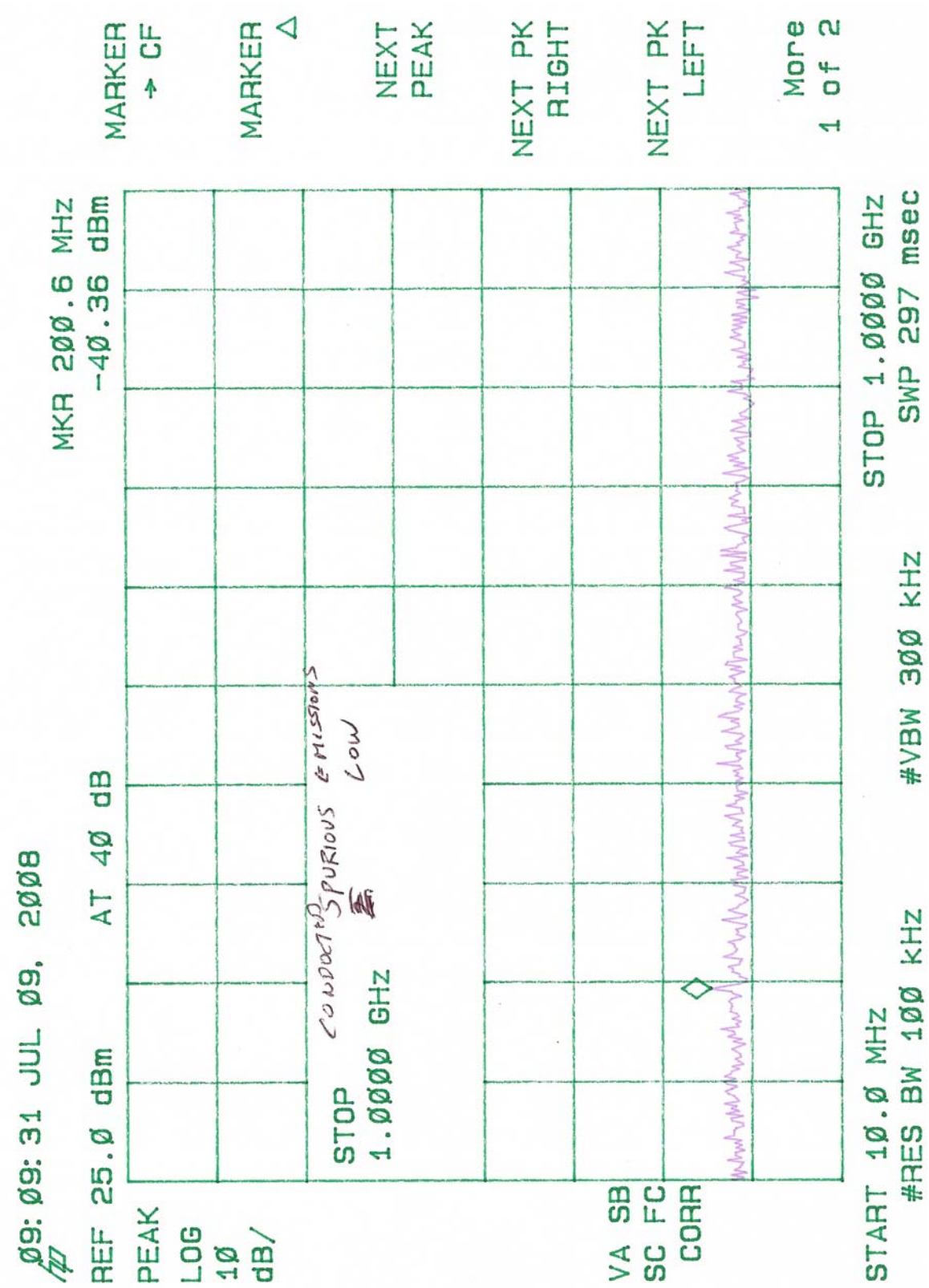

18: 14: ØØ JUL Ø8, 2ØØ8
MKR 2.4Ø5363 GHz
18.85 dBm
REF 23.Ø dBm
AT 4Ø dB
PEAK
LOG
1Ø
dB/
MARKER
2.4Ø5363 GHz
18.85 dBm
output low
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
CORR
CENTER 2.4Ø5ØØØ GHz
#RES BW 1.Ø MHz
#VBW 1 MHz
SPAN 5.ØØØ MHz
SWP 2Ø.Ø msec

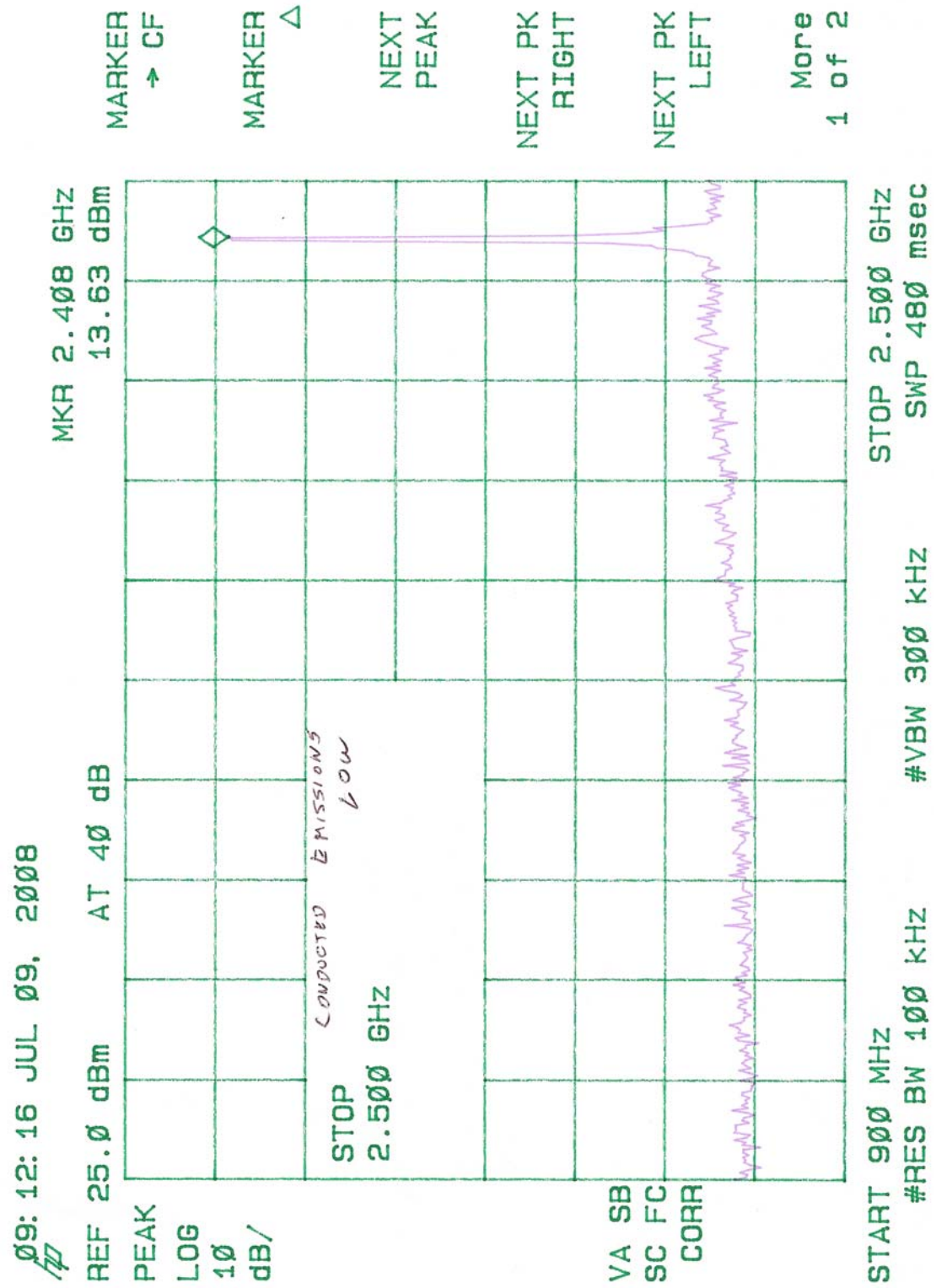

18: 17: 39 JUL 08, 2008
MKR 2.440388 GHz
19.55 dBm
REF 23.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
CENTER
2.440000 GHz
output mid
VA SB
SC FC
CORR
CENTER 2.440000 GHz
#RES BW 1.0 MHz
#VBW 1 MHz
SPAN 5.000 MHz
SWP 20.0 msec
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

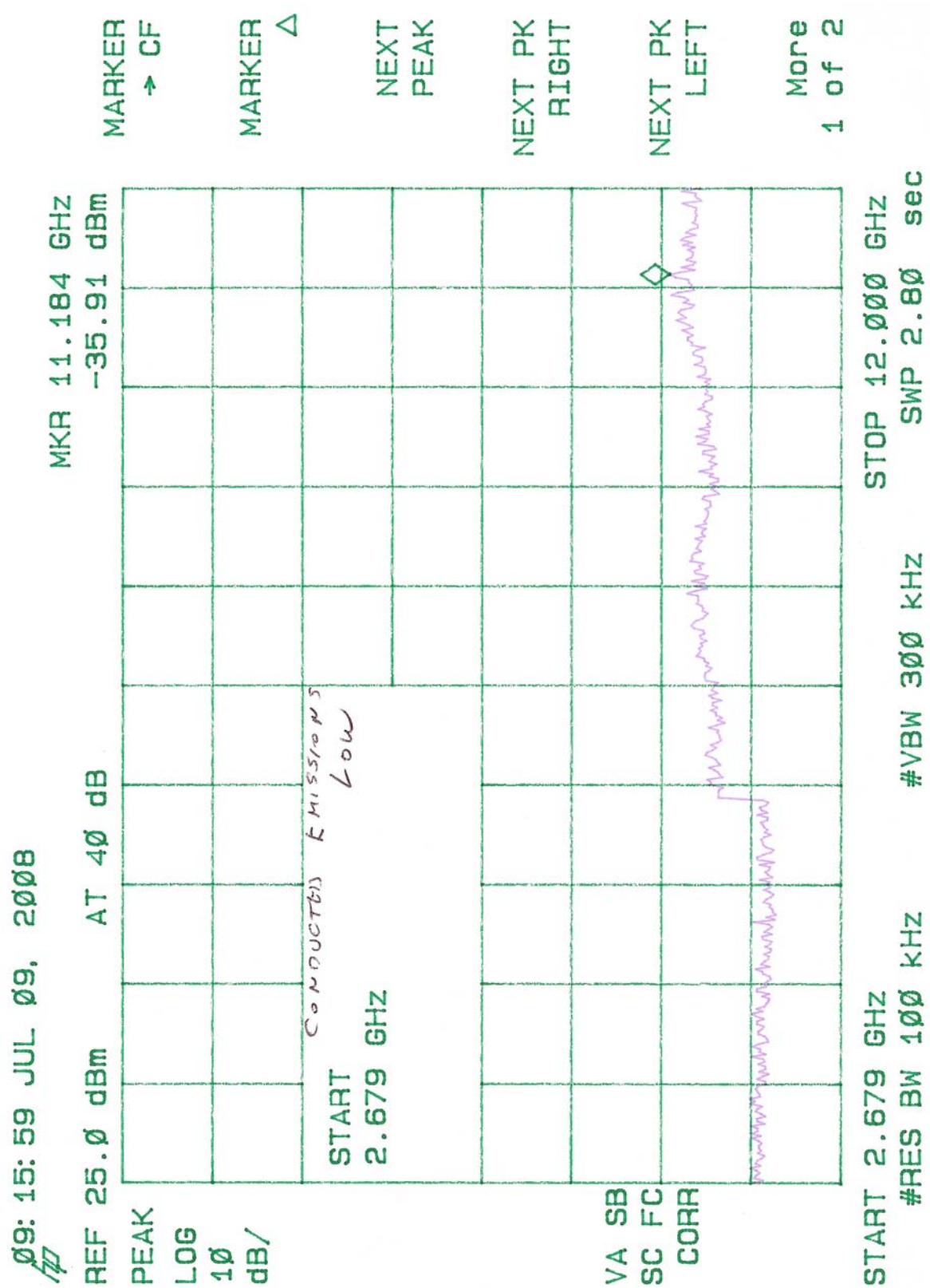

18: 20: 35 JUL 08, 2008
MKR 2.475388 GHz
19.40 dBm
RES BW
AUTO MAN
VID BW
AUTO MAN
VBW/RBW
RATIO
VID AVG
ON OFF
EMI BW
Menu
REF 23.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
RES BW
1.0 MHz
OUTPUT HI
VA SB
SC FC
CORR
CENTER 2.475000 GHz
#RES BW 1.0 MHz
#VBW 1 MHz
SPAN 5.000 MHz
SWP 20.0 msec

Section 5

Antenna Conducted Spurious Emissions
15.247(c) Low

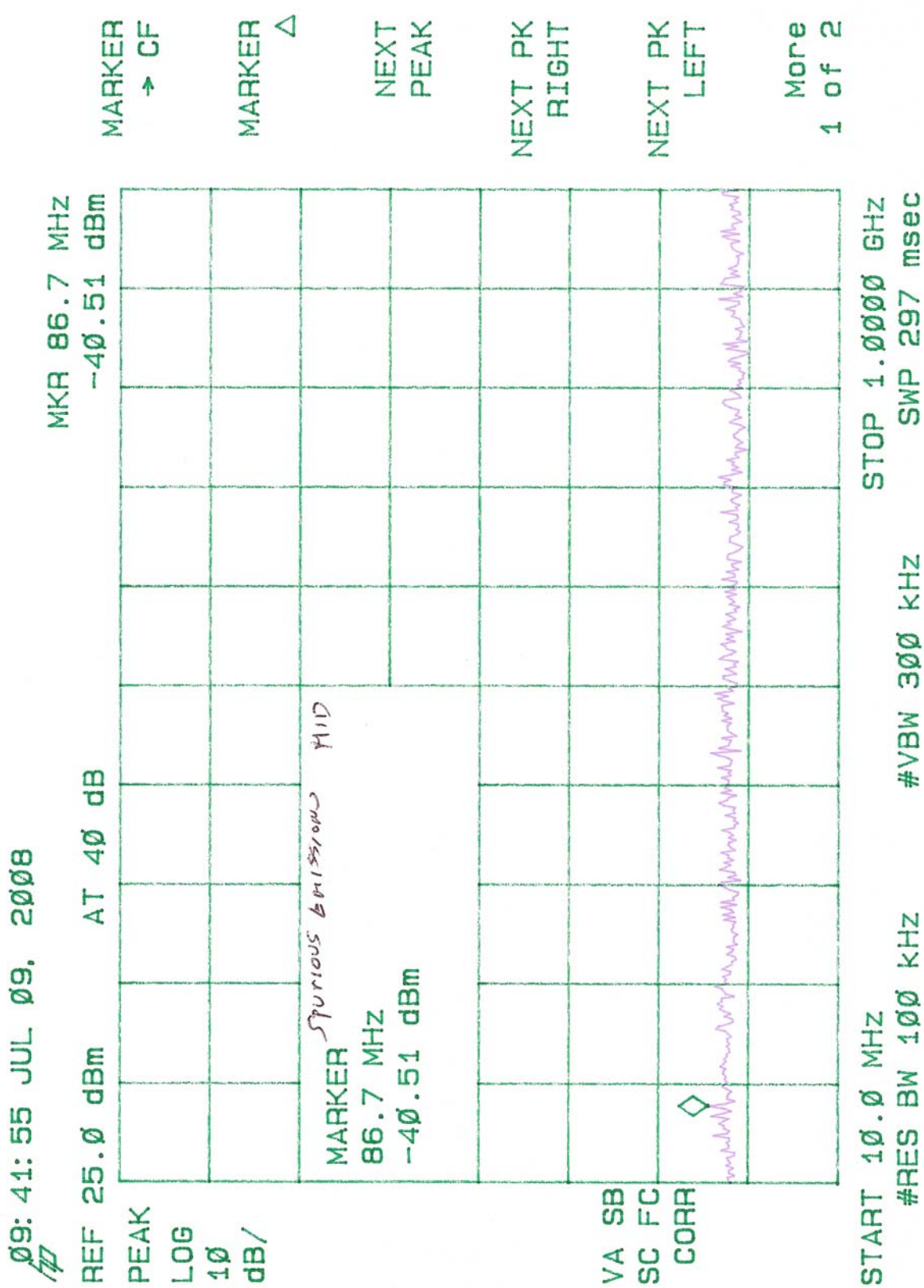

09: 09: 31 JUL 09, 2008
MKR 200.6 MHz
-40.36 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
1.0000 GHz
CONDUCTED SPURIOUS EMISSIONS
LOW
VA SB
SC FC
CORR
START 10.0 MHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 1.0000 GHz
SWP 297 msec
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

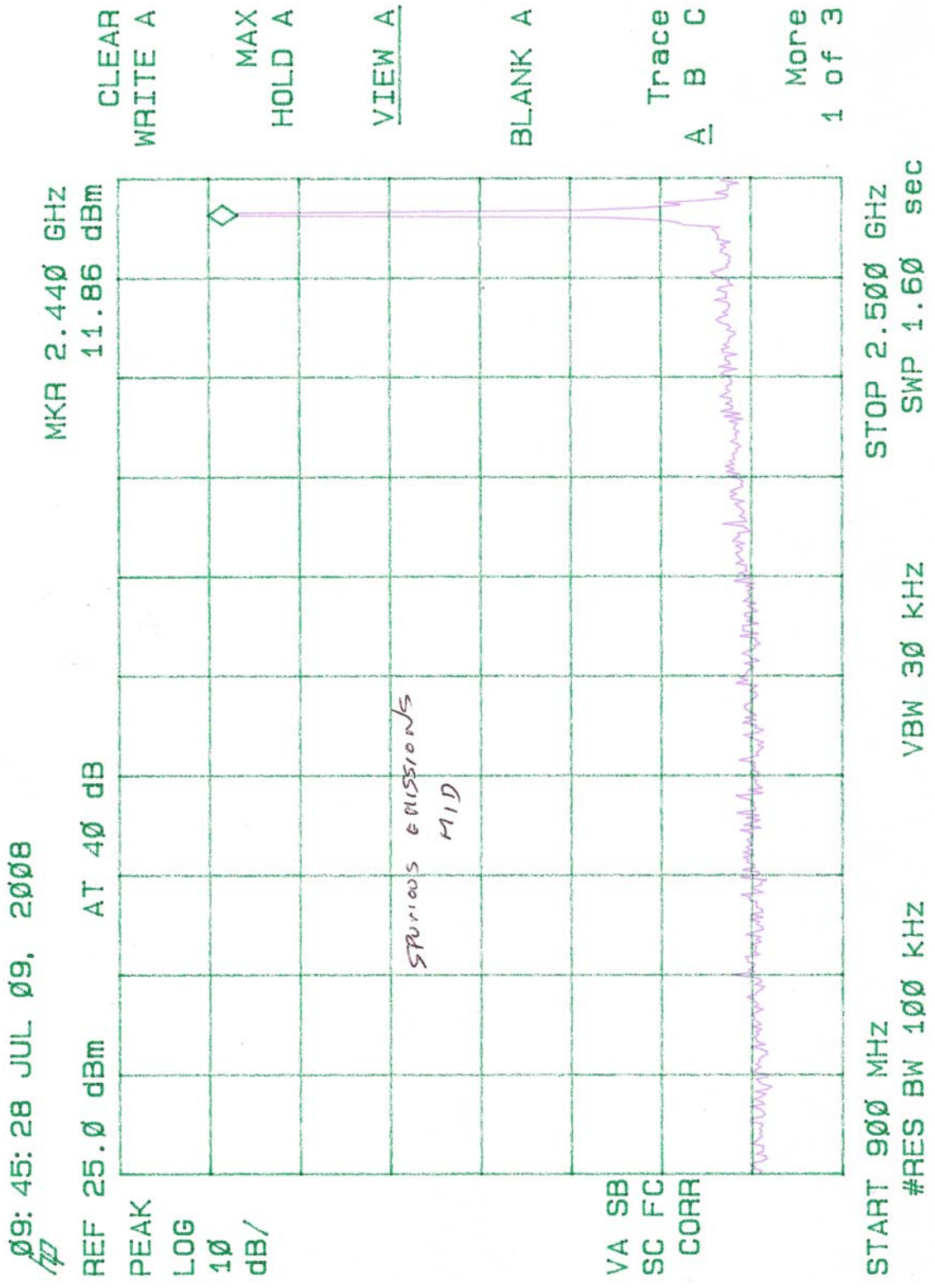

09: 12: 16 JUL 09, 2008
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
MKR 2.408 GHz
13.63 dBm
CONDUCTED EMISSIONS
LOW
STOP
2.500 GHz
VA SB
SC FC
CORR
START 900 MHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 2.500 GHz
SWP 480 msec
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

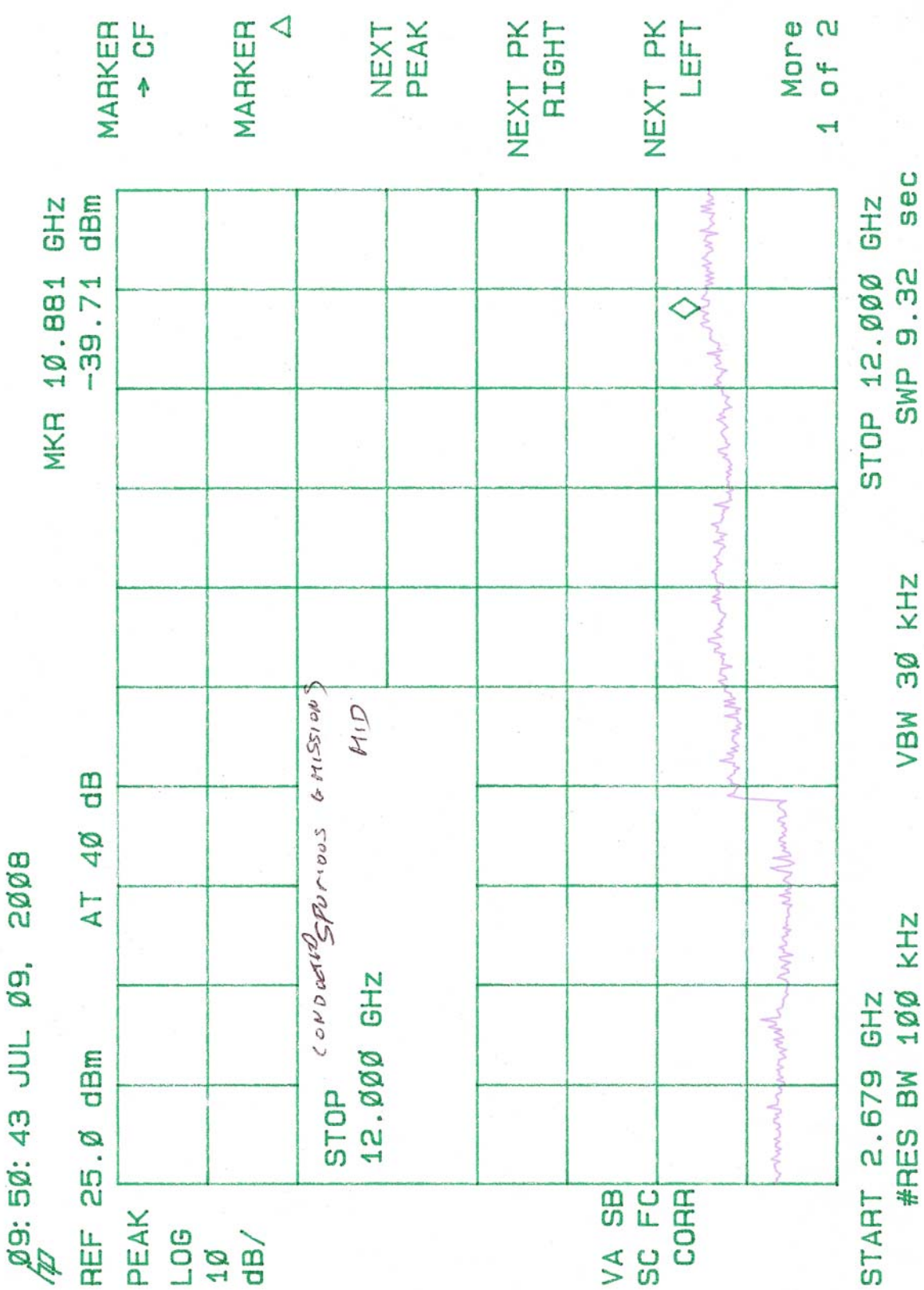

09: 15: 59 JUL 09, 2008
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
MKR 11.184 GHz
-35.91 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
Conducted Emissions Low
START 2.679 GHz
VA SB
SC FC
CORR
START 2.679 GHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 12.000 GHz
SWP 2.80 sec

Section 6

Antenna Conducted Spurious Emissions
15.247(c) Mid

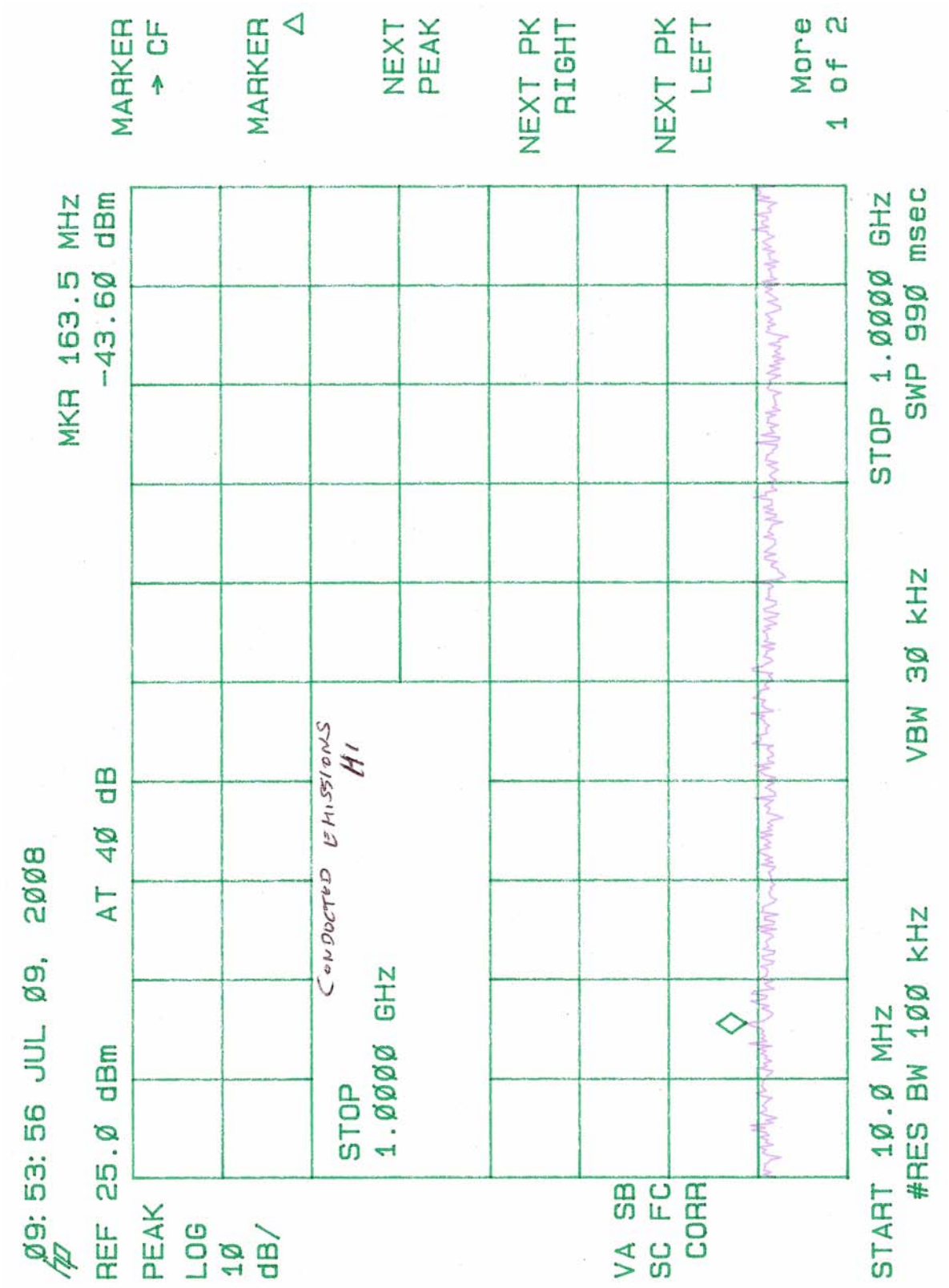

09: 41: 55 JUL 09, 2008
MKR 86.7 MHz
-40.51 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
MARKER
86.7 MHz
-40.51 dBm
Spurious Emissions Mid
VA SB
SC FC
CORR
START 10.0 MHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 1.0000 GHz
SWP 297 msec
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2

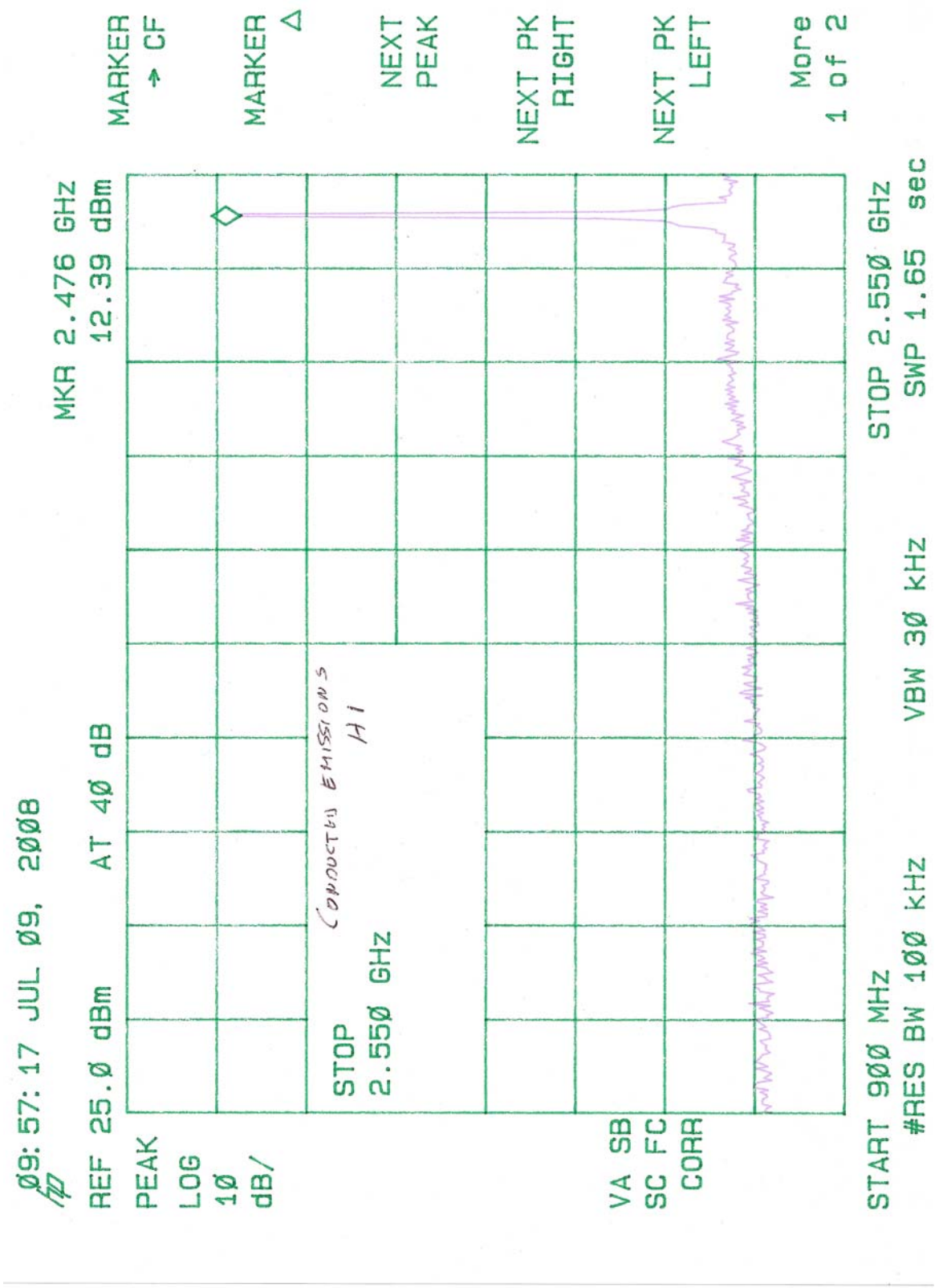

09: 45: 28 JUL 09, 2008
MKR 2.440 GHz
11.86 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
VA SB
SC FC
CORR
START 900 MHz
#RES BW 100 kHz
VBW 30 kHz
STOP 2.500 GHz
SWP 1.60 sec
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
SPURIOUS EMISSIONS
MID

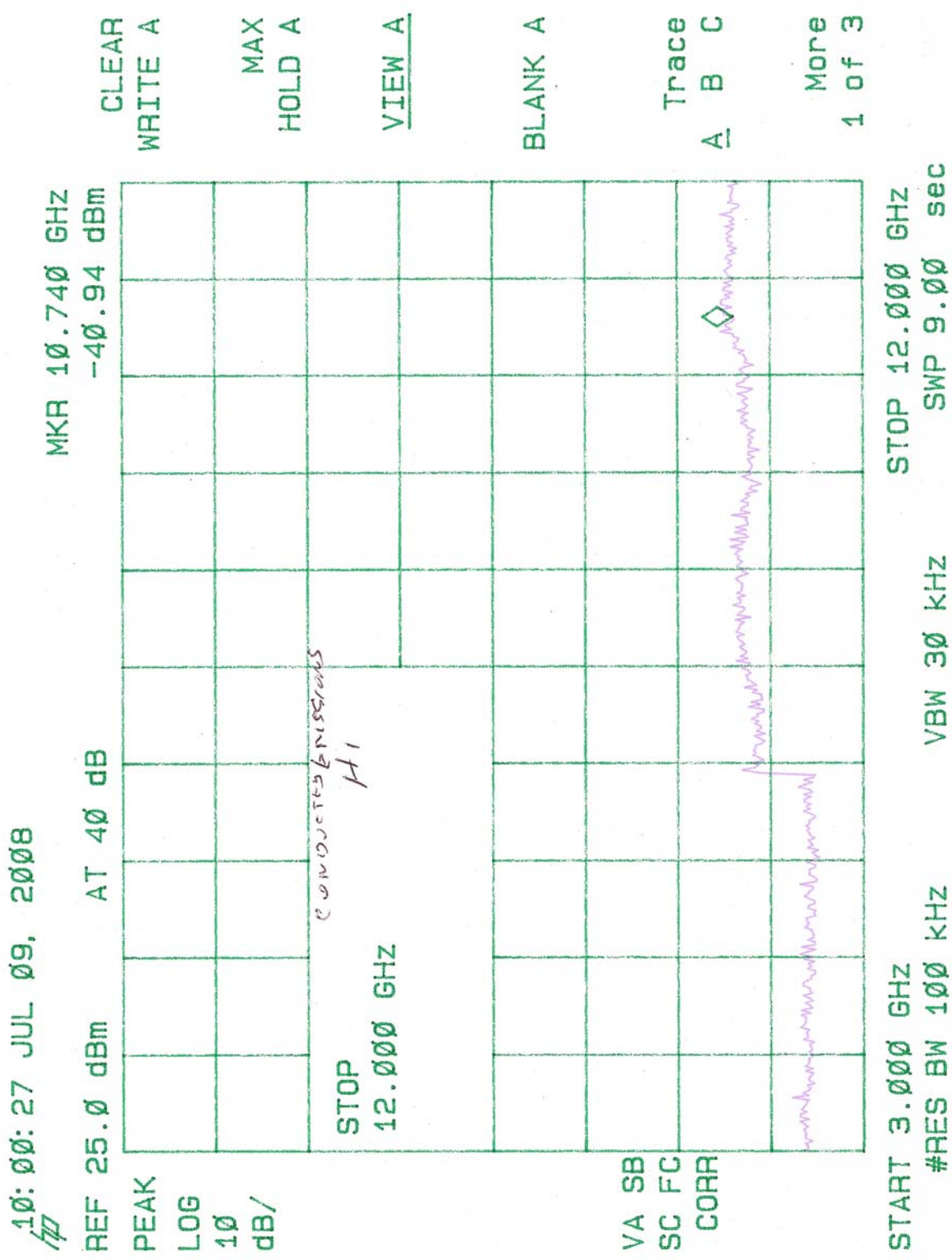

09: 50: 43 JUL 09, 2008
MKR 10.881 GHz
-39.71 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
12.000 GHz
CONDUCTED SPURIOUS EMISSIONS
MID
VA SB
SC FC
CORR
START 2.679 GHz
#RES BW 100 kHz
VBW 30 kHz
STOP 12.000 GHz
SWP 9.32 sec
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

Section 7

Antenna Conducted Spurious Emissions
15.247(c) Hi


09: 53: 56 JUL 09, 2008
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
MKR 163.5 MHz
-43.60 dBm
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
Conducted Emissions
H1
STOP 1.0000 GHz
VA SB
SC FC
CORR
START 10.0 MHz
#RES BW 100 kHz
VBW 30 kHz
STOP 1.0000 GHz
SWP 990 msec


09:57:17 JUL 09, 2008
REF 25.0 dBm
AT 40 dB
MKR 2.476 GHz
12.39 dBm
PEAK
LOG
10
dB/
STOP
2.550 GHz
Conducted Emissions
H1
VA SB
SC FC
CORR
START 900 MHz
#RES BW 100 kHz
VBW 30 kHz
STOP 2.550 GHz
SWP 1.65 sec
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

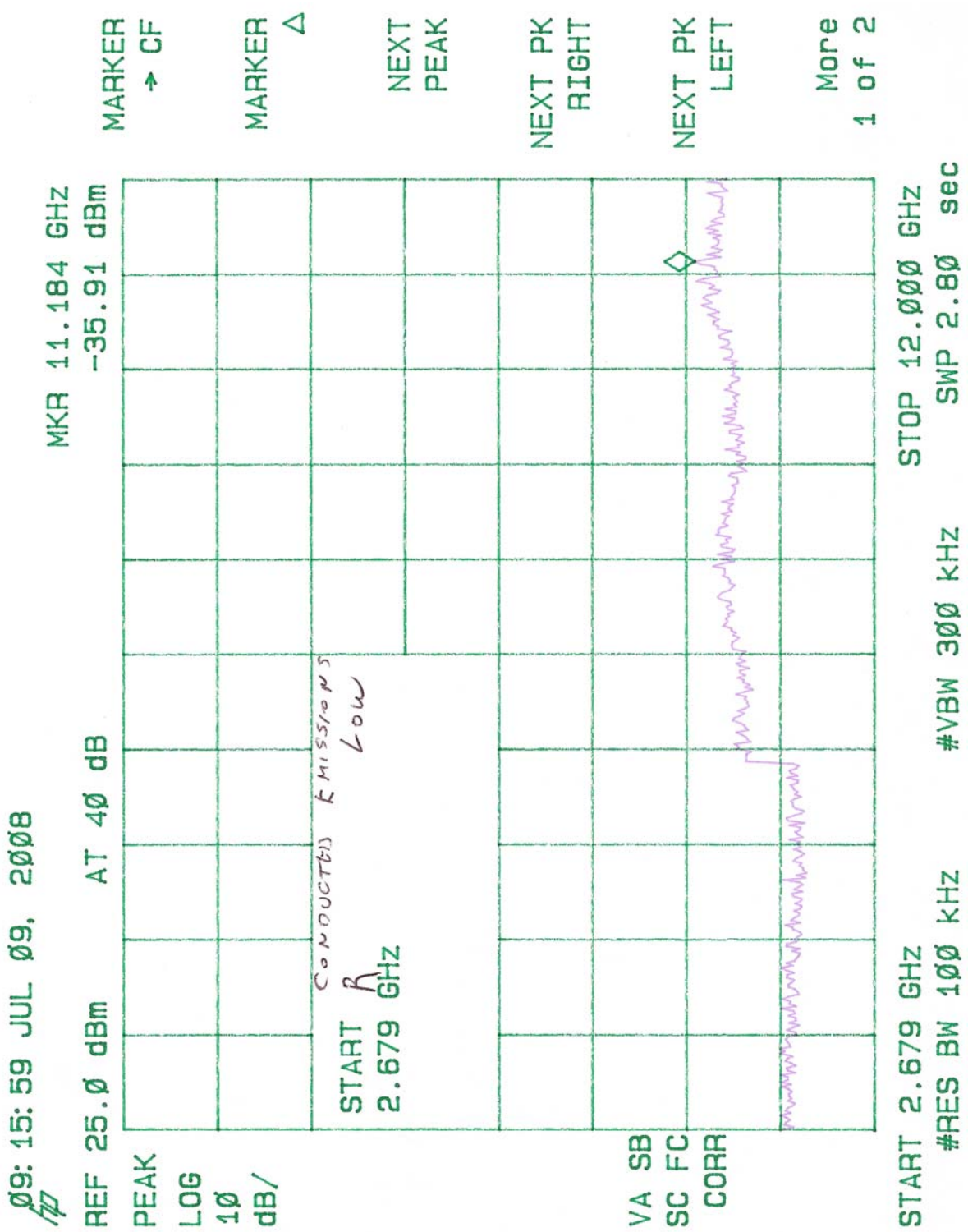

10: 00: 27 JUL 09, 2008
MKR 10.740 GHz
-40.94 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
12.000 GHz
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
CORR
START 3.000 GHz
#RES BW 100 kHz
VBW 30 kHz
STOP 12.000 GHz
SWP 9.00 sec

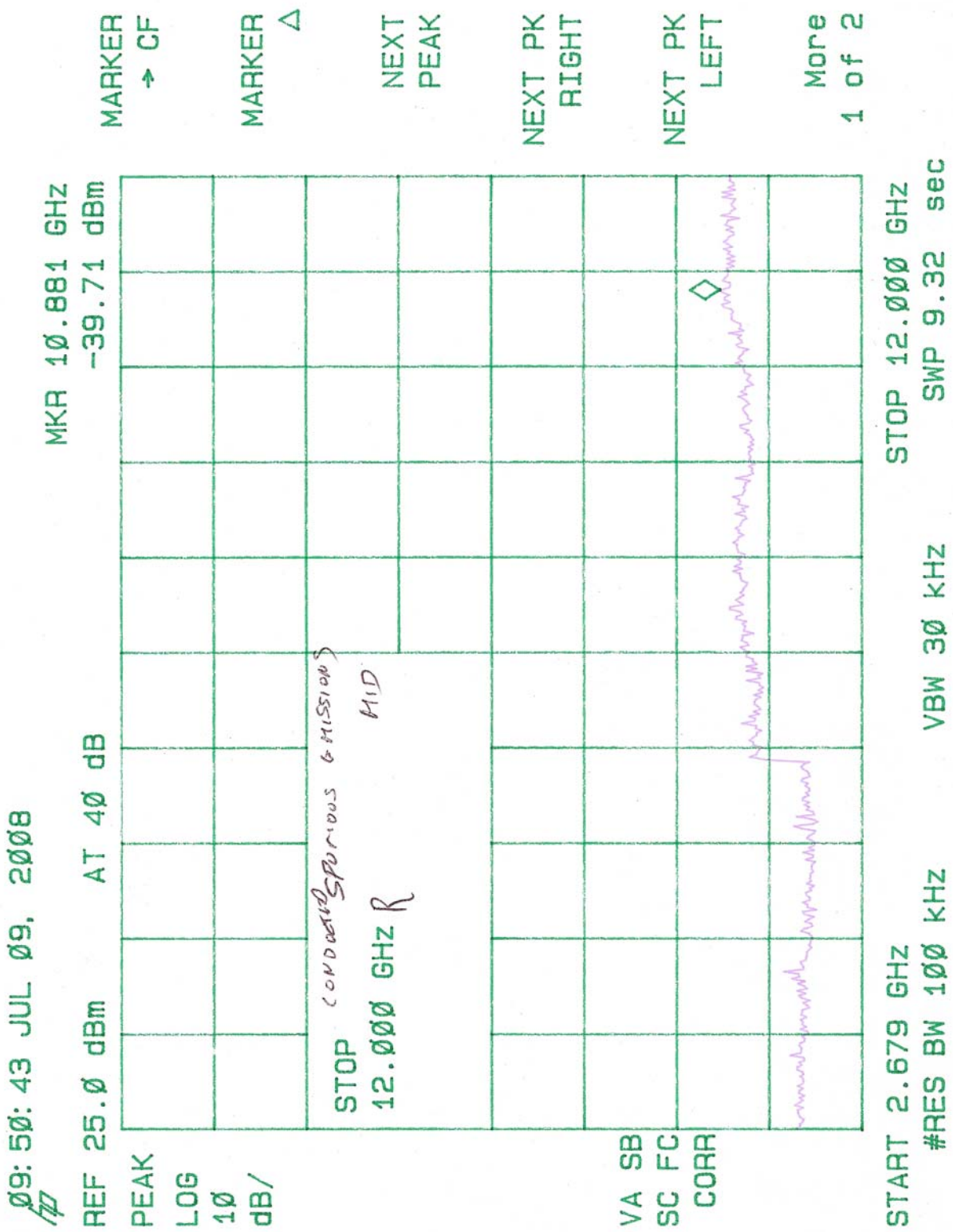
Section 8

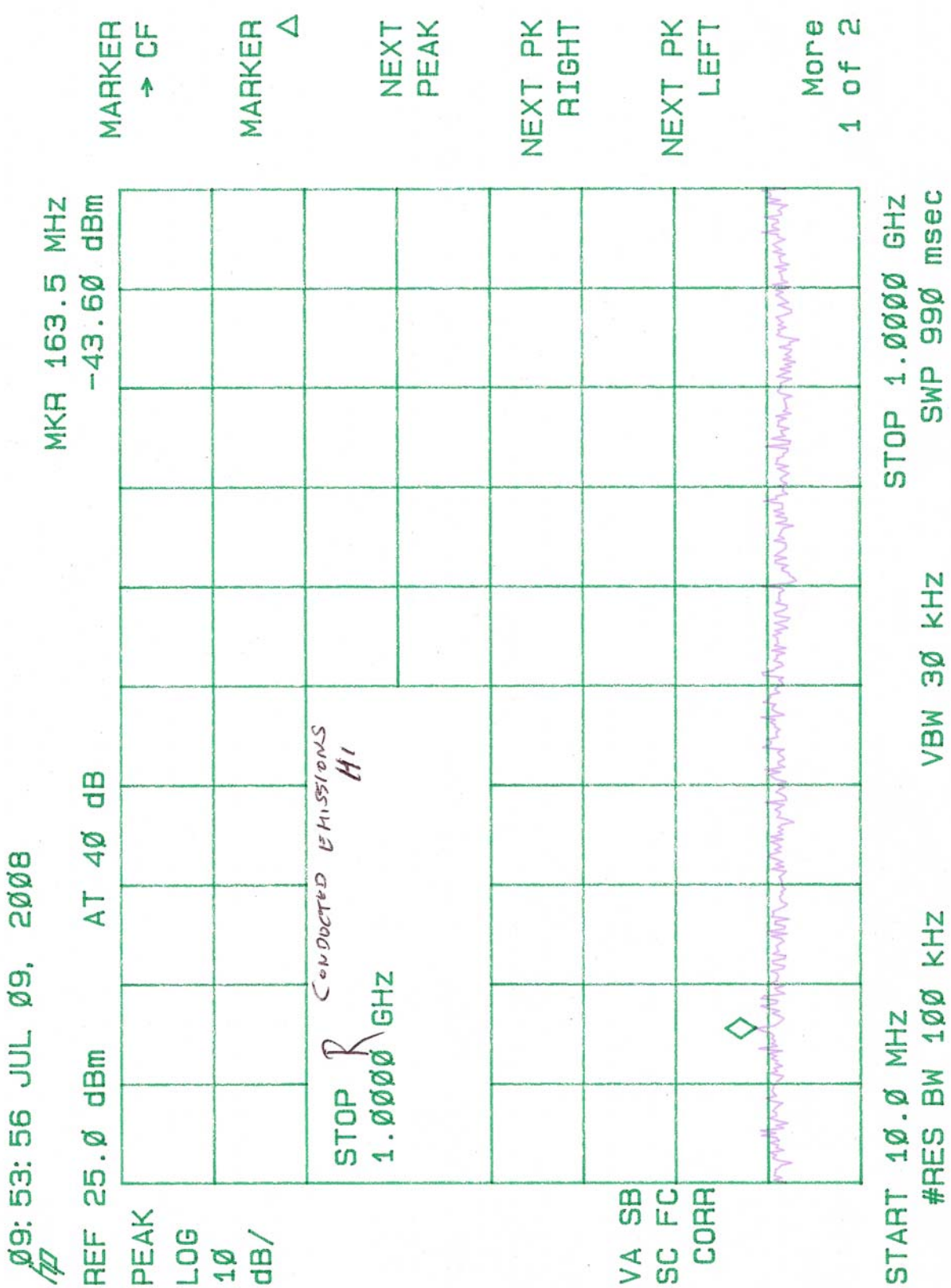
OUT OF BAND CONDUCTED EMISSIONS

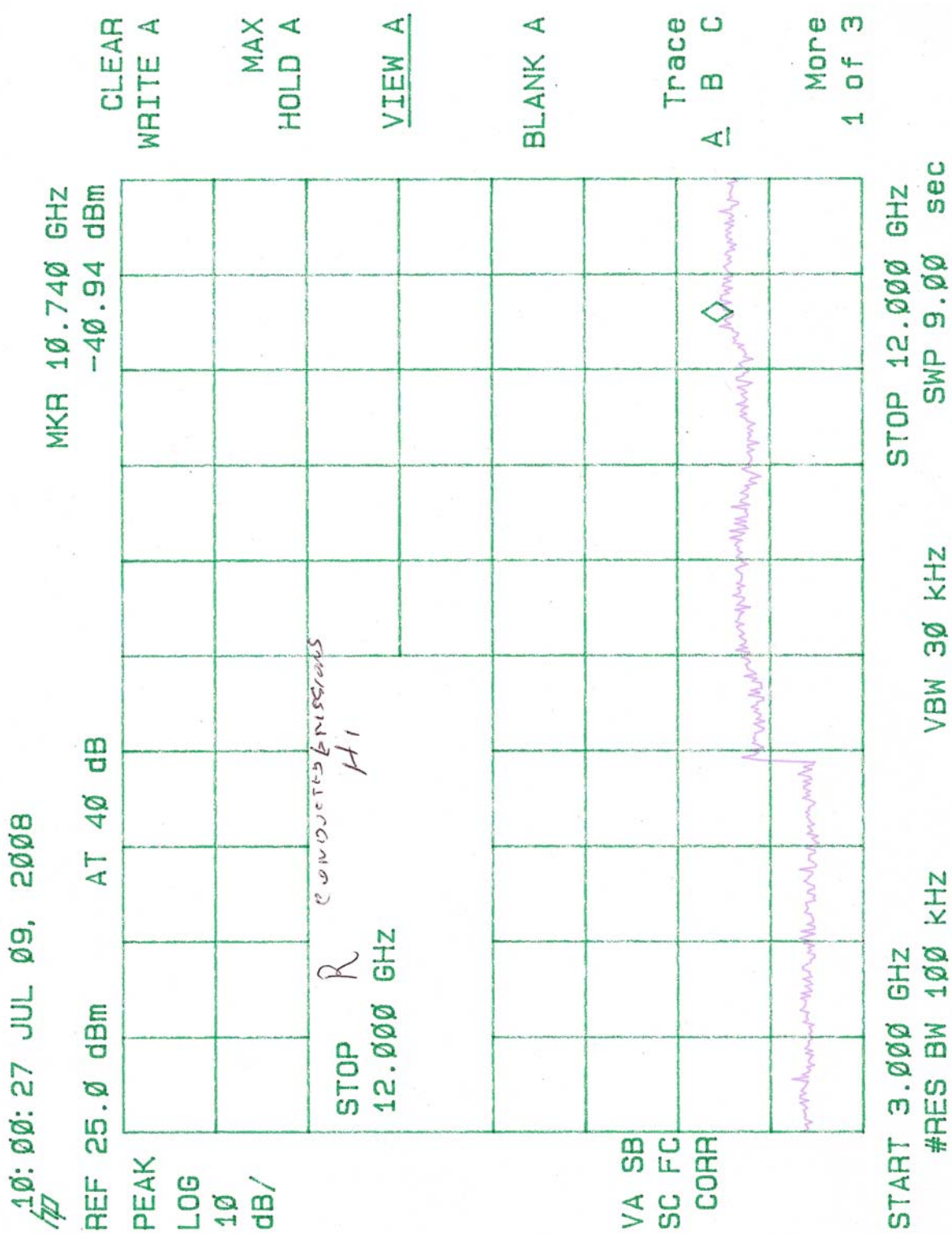
Frequency (MHz)	Level below Carrier (dBc)
11.184	-35.91
10.81	-39.71
163.5	-43.60
10.74	-40.94

NOTE: No other out of band conducted emissions within 50 dBc of the fundamental transmit frequency.


09: 15: 59 JUL 09, 2008
MKR 11.184 GHz
-35.91 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
CONDUCTED EMISSIONS
LOW
START 2.679 GHz
VA SB
SC FC
CORR
START 2.679 GHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 12.000 GHz
SWP 2.80 sec
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2

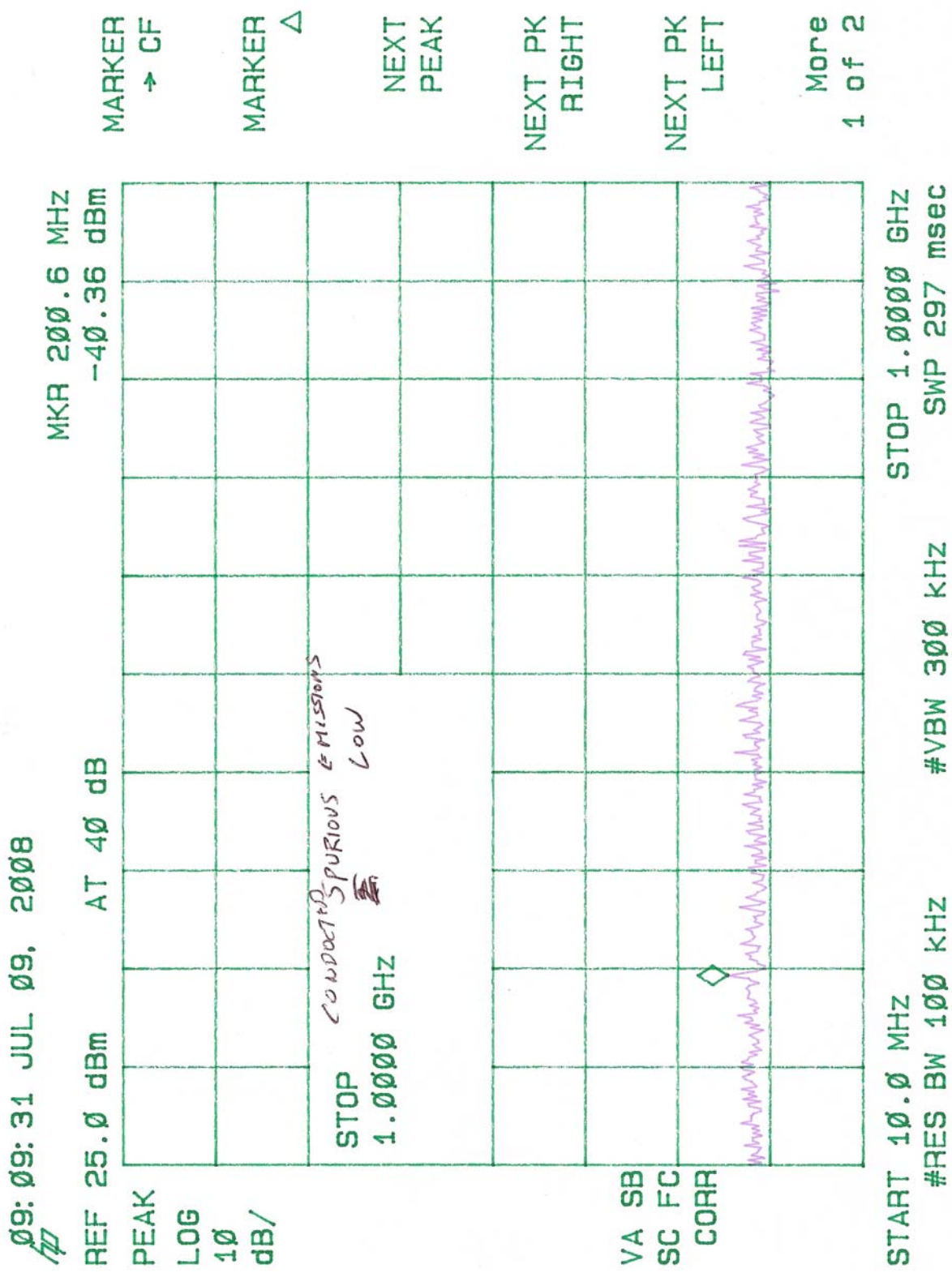

09: 50: 43 JUL 09, 2008
MKR 10.881 GHz
-39.71 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
12.000 GHz
R
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
VA SB
SC FC
CORR
START 2.679 GHz
#RES BW 100 kHz
VBW 30 kHz
STOP 12.000 GHz
SWP 9.32 sec

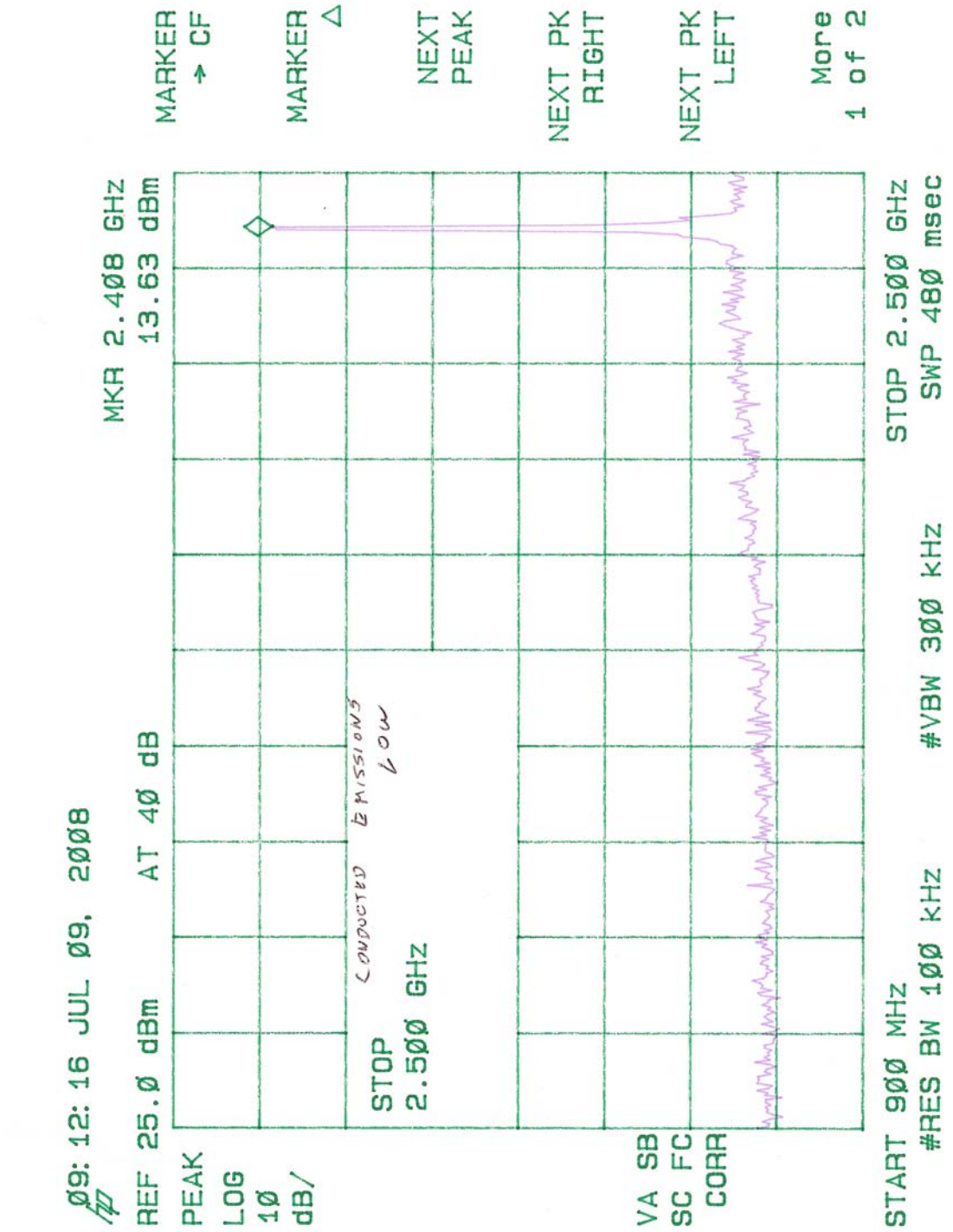

09:53:56 JUL 09, 2008
MKR 163.5 MHz
-43.60 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
1.0000 GHz
Conducted Emissions
Hi
VA SB
SC FC
CORR
START 10.0 MHz
#RES BW 100 kHz
VBW 30 kHz
STOP 1.0000 GHz
SWP 990 msec
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2


10: 00: 27 JUL 09, 2008
MKR 10.740 GHz
-40.94 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
12.000 GHz
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
CORR
START 3.000 GHz
#RES BW 100 kHz
VBW 30 kHz
STOP 12.000 GHz
SWP 9.00 sec

Section 9

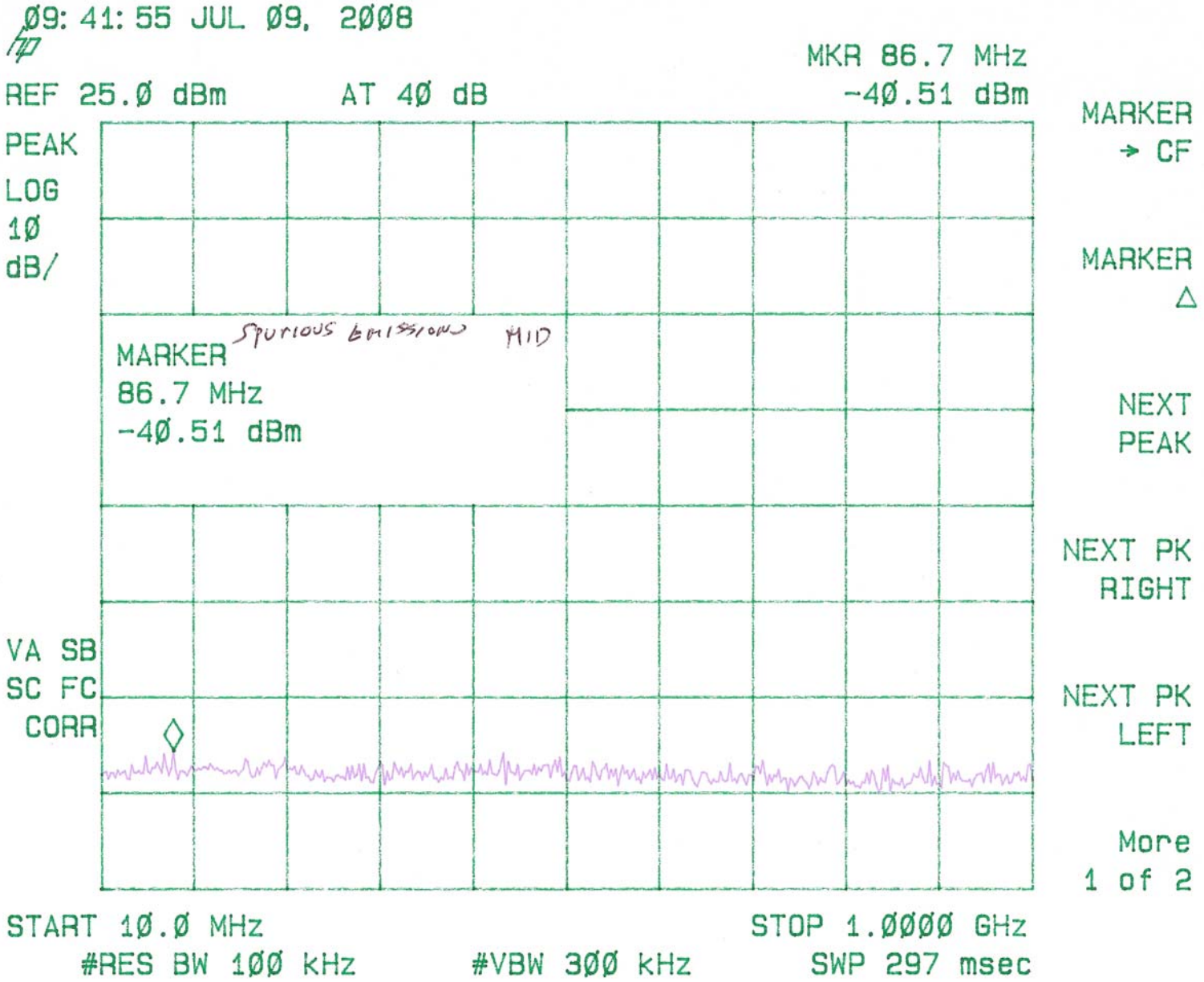
CONDUCTED EMISSIONS
Low

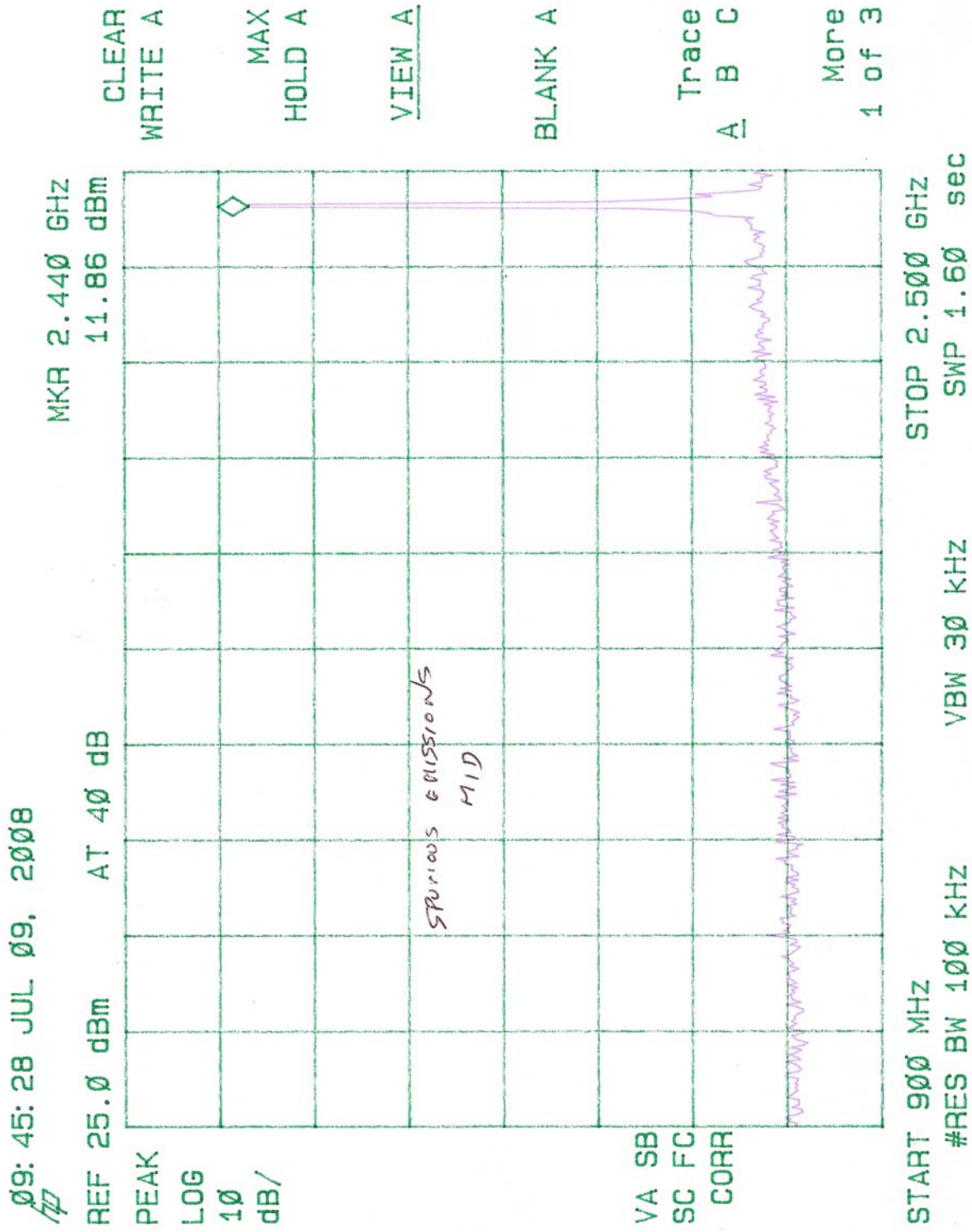

09:09:31 JUL 09, 2008
MKR 200.6 MHz
-40.36 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
1.0000 GHz
Conducted SPURIOUS Emissions
Low
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2
VA SB
SC FC
CORR
START 10.0 MHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 1.0000 GHz
SWP 297 msec


09: 12: 16 JUL 09, 2008
MKR 2.408 GHz
13.63 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
2.500 GHz
CONDUCTED EMISSIONS
LOW
VA SB
SC FC
CORR
START 900 MHz
#RES BW 100 kHz
#VBW 300 kHz
STOP 2.500 GHz
SWP 480 msec
MARKER
→ CF
MARKER
△
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

Section 10

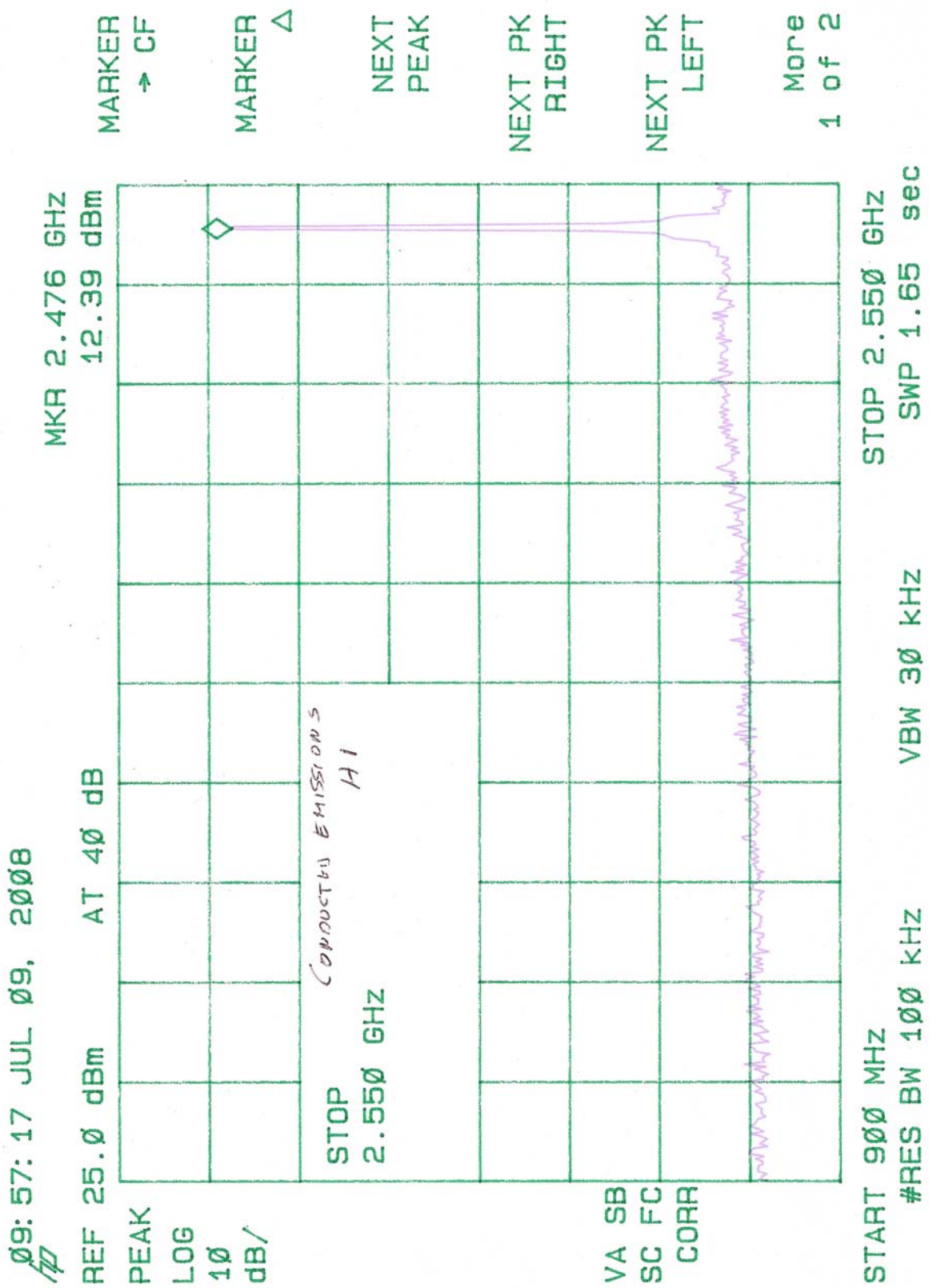
CONDUCTED EMISSIONS
Mid


09: 41: 55 JUL 09, 2008
MKR 86.7 MHz
REF 25.0 dBm
AT 40 dB
-40.51 dBm
MARKER
→ CF
PEAK
LOG
10
dB/
MARKER
△
Spurious Emissions Mid
MARKER
86.7 MHz
-40.51 dBm
NEXT
PEAK
NEXT PK
RIGHT
VA SB
SC FC
CORR
NEXT PK
LEFT
More
1 of 2
START 10.0 MHz
STOP 1.0000 GHz
#RES BW 100 kHz
#VBW 300 kHz
SWP 297 msec


09: 45: 28 JUL 09, 2008
MKR 2.440 GHz
11.86 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
SPURIOUS EMISSIONS
MID
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
CORR
START 900 MHz
#RES BW 100 kHz
VBW 30 kHz
STOP 2.500 GHz
SWP 1.60 sec

Section 11

ANTENNA CONDUCTED EMISSIONS
Hi


09:57:17 JUL 09, 2008
MKR 2.476 GHz
12.39 dBm
REF 25.0 dBm
AT 40 dB
PEAK
LOG
10
dB/
STOP
2.550 GHz
Conducted Emissions
H1
VA SB
SC FC
CORR
START 900 MHz
#RES BW 100 kHz
VBW 30 kHz
STOP 2.550 GHz
SWP 1.65 sec
MARKER
→ CF
MARKER
Δ
NEXT
PEAK
NEXT PK
RIGHT
NEXT PK
LEFT
More
1 of 2

Section 12

TRANSMITTER RADIATED EMISSIONS IN RESTRICTED BANDS

Radiated emissions were performed from 30 MHz to 24000 MHz.

For radiated emissions tests, the analyzer setting was as follows:

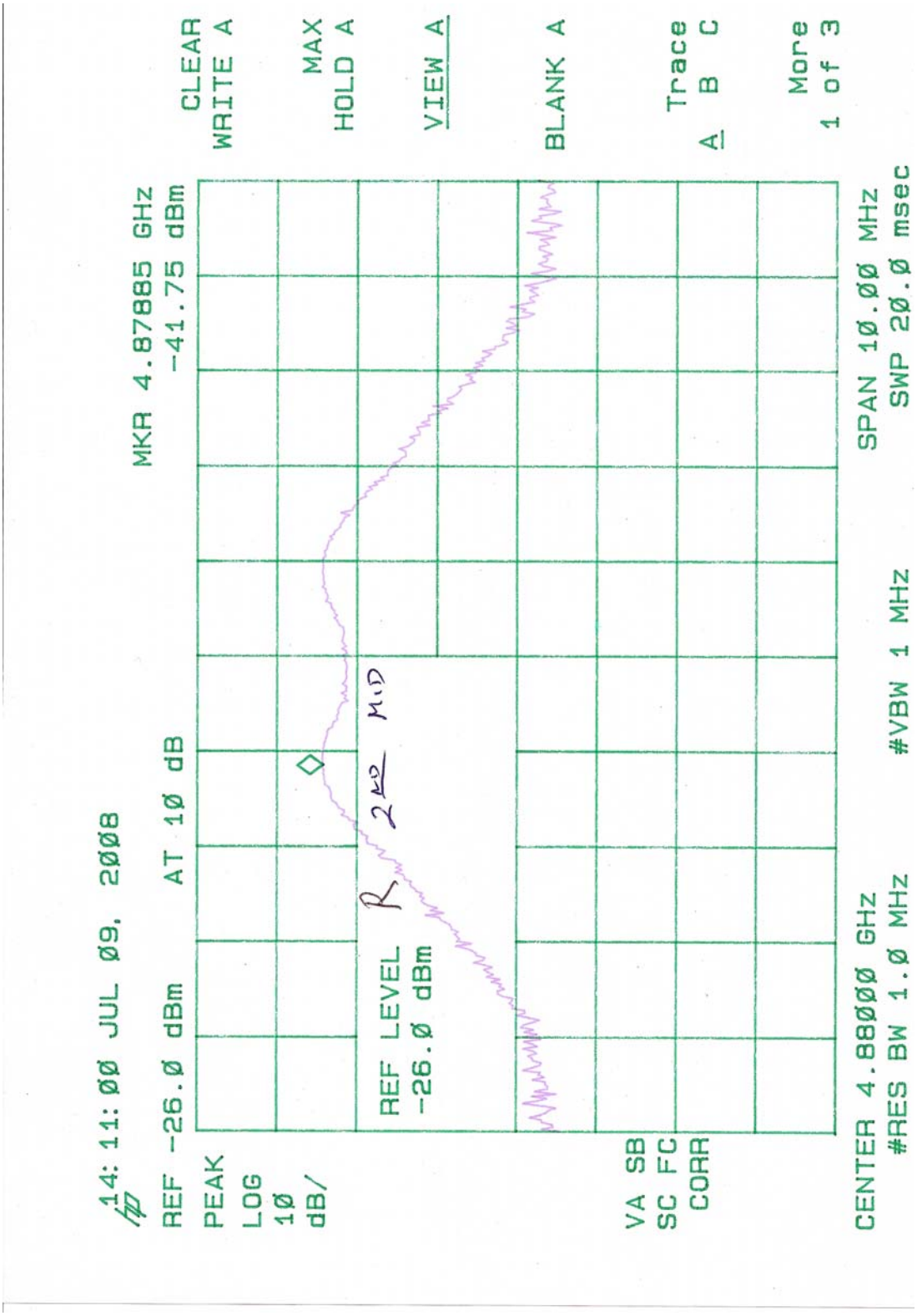
	RES BW	**VID BW**	
Frequency < 1 GHz	100 kHz	100 kHz	
Frequency > 1GHz	1 MHz	1 MHz	(Peak Measurements)
	1 MHz	10 Hz	(Average Measurements)

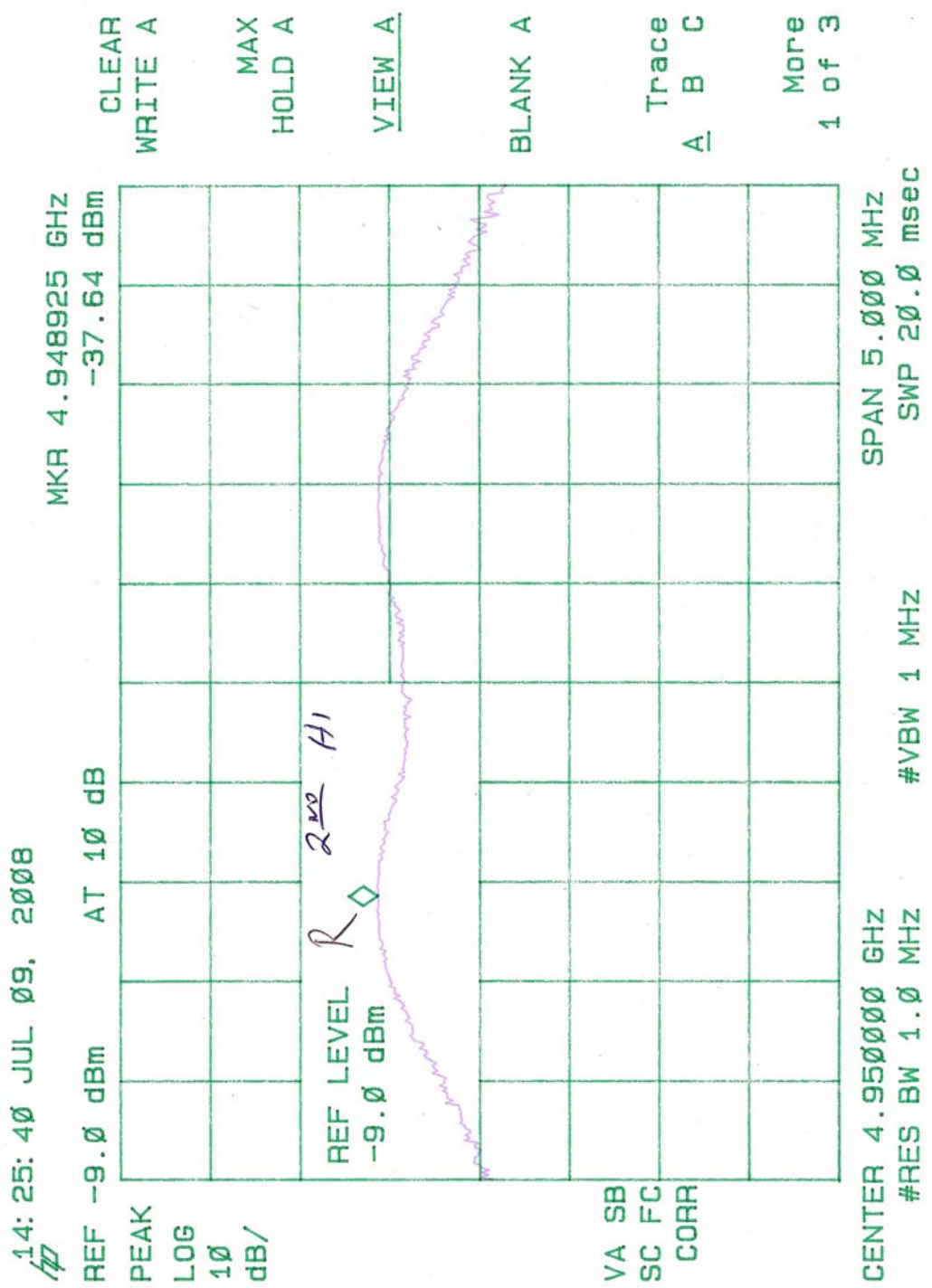
Transmitter was tested and scanned for emissions using the lowest frequency 2405 MHz, the middle frequency 2440 MHz, and the highest frequency 2475 MHz.

Method

In any 100 kHz bandwidth outside the EUT passband, the RF power shall be at least 20 dB below that of the maximum in-band 100 kHz emission.

Frequency (MHz)	**Polarity**	**Level below carrier (dBc)**
4880 MHz	Horizontal	-41.75 dBc
4880 MHz	Vertical	-40.89 dBc
4950 MHz	Horizontal	-37.64 dBc
4950 MHz	Vertical	-36.42 dBc


14: 11: ØØ JUL Ø9, 2ØØ8
MKR 4.87885 GHz
-41.75 dBm
REF -26.Ø dBm
AT 1Ø dB
PEAK
LOG
1Ø
dB/
REF LEVEL
-26.Ø dBm
2nd MD
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
CORR
CENTER 4.88ØØØ GHz
#RES BW 1.Ø MHz
#VBW 1 MHz
SPAN 1Ø.ØØ MHz
SWP 2Ø.Ø msec

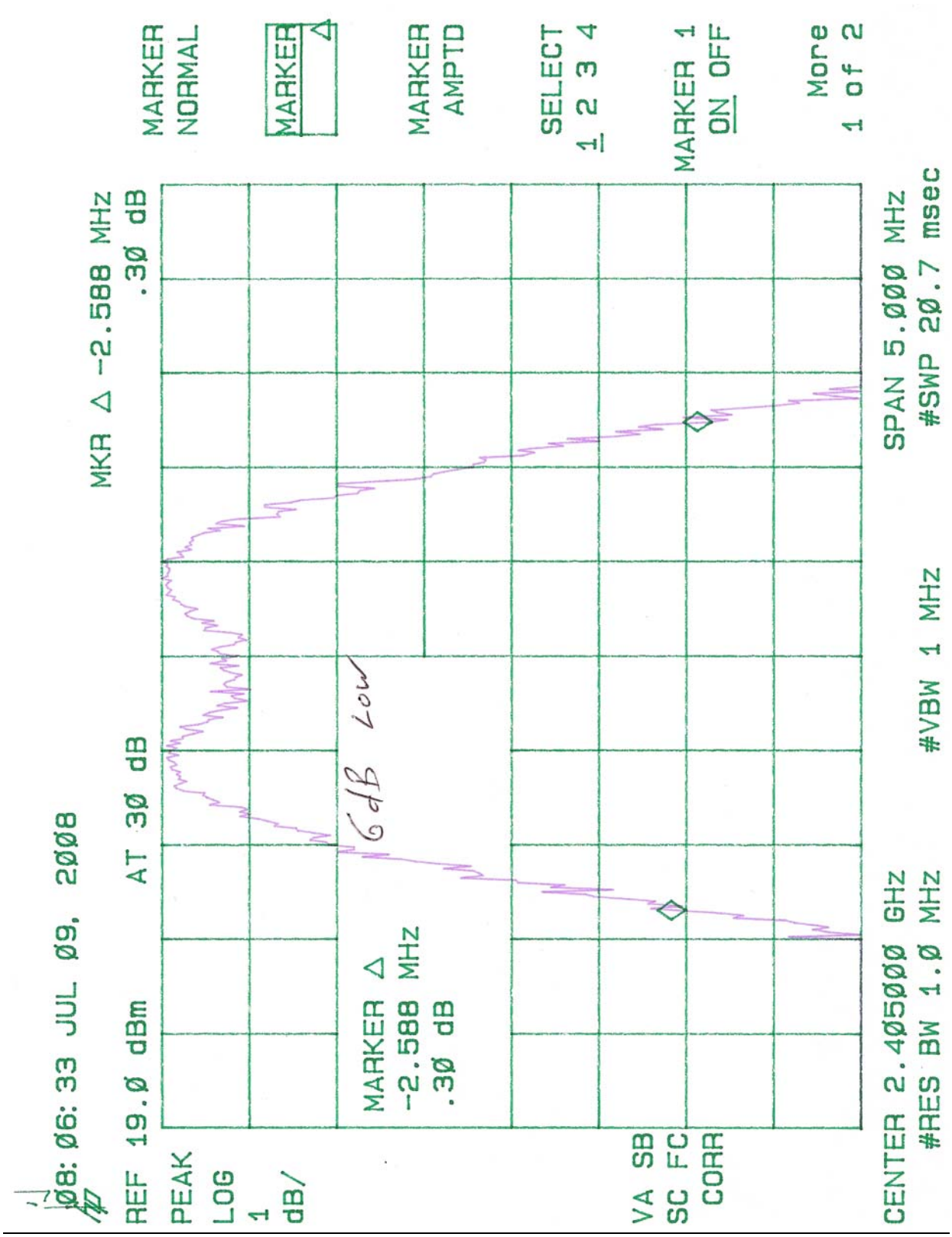

14: 25: 40 JUL 09, 2008
MKR 4.948925 GHz
-37.64 dBm
REF -9.0 dBm
AT 10 dB
PEAK
LOG
10
dB/
REF LEVEL
-9.0 dBm
2nd H1
CLEAR
WRITE A
MAX
HOLD A
VIEW A
BLANK A
Trace
A B C
More
1 of 3
VA SB
SC FC
CORR
CENTER 4.950000 GHz
#RES BW 1.0 MHz
#VBW 1 MHz
SPAN 5.000 MHz
SWP 20.0 msec

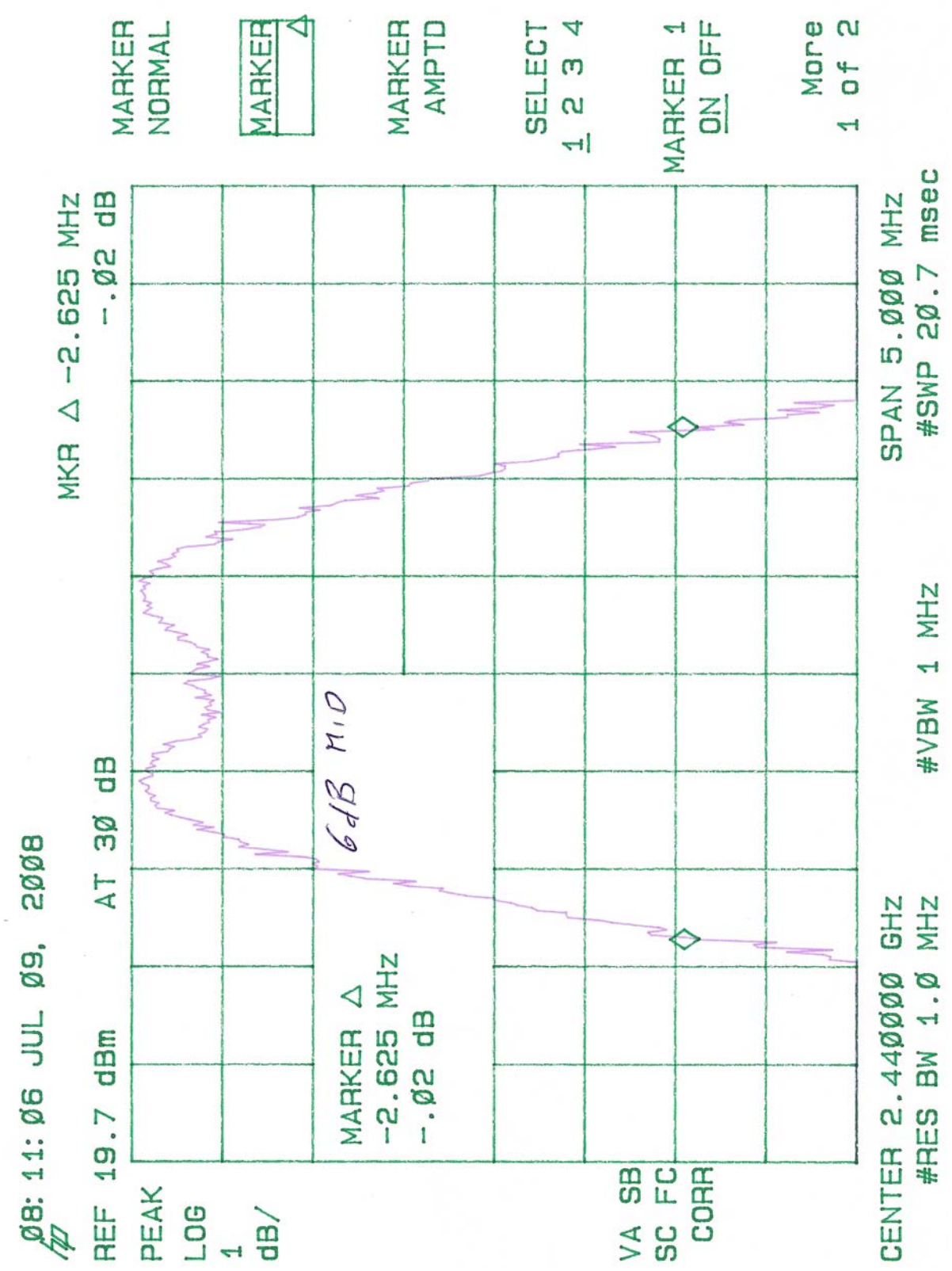
Section 13

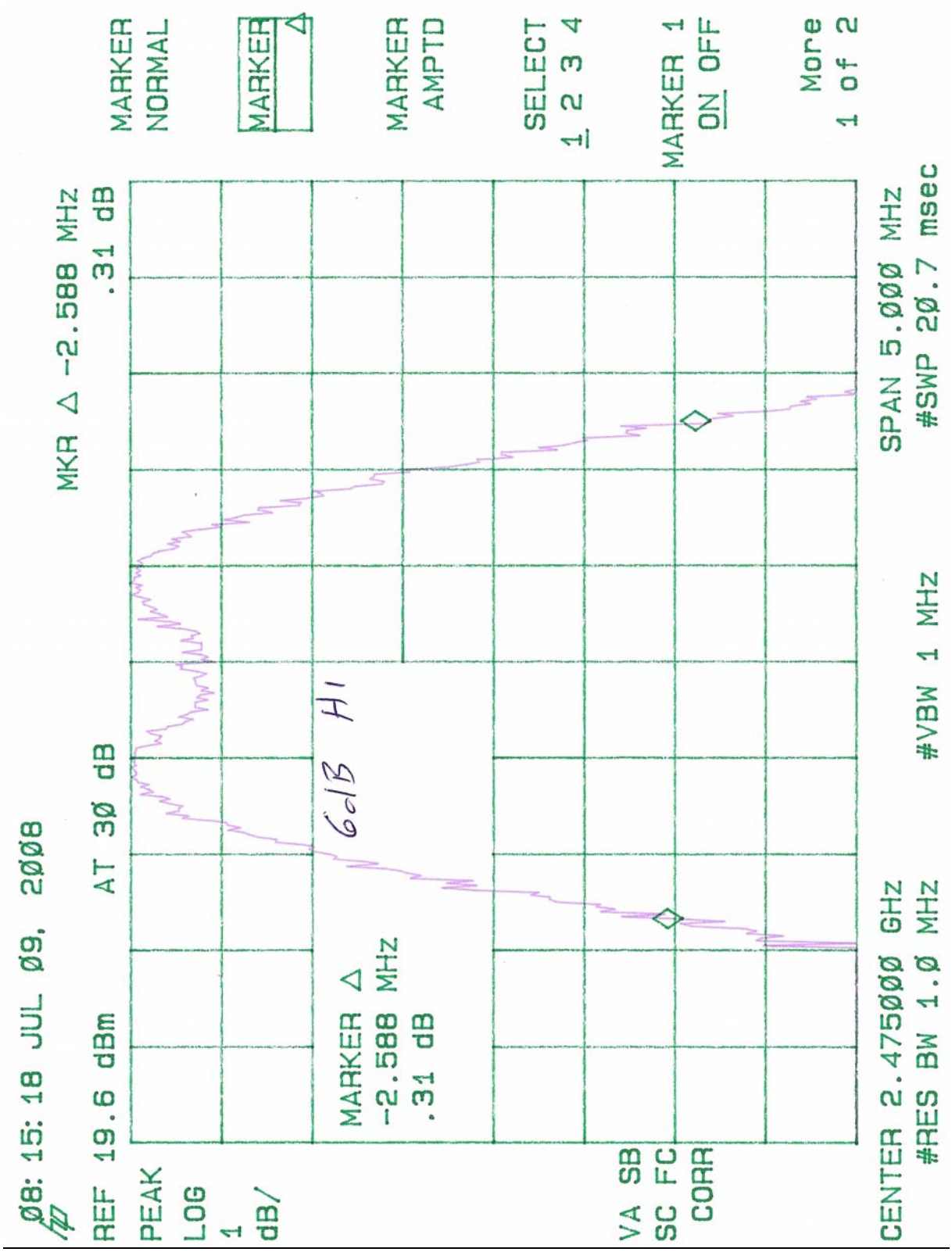
6 dB Bandwidth

Test Result

Frequency (MHz)	6 dB Bandwidth
2405	2.588 MHz
2440	2.625 MHz
2475	2.588 MHz


08: 06: 33 JUL 09, 2008
MKR Δ -2.588 MHz
.30 dB
REF 19.0 dBm
AT 30 dB
PEAK
LOG
1
dB/
6dB Low
MARKER Δ
-2.588 MHz
.30 dB
VA SB
SC FC
CORR
CENTER 2.405000 GHz
#RES BW 1.0 MHz
#VBW 1 MHz
SPAN 5.000 MHz
#SWP 20.7 msec
MARKER
NORMAL
MARKER Δ
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2


08: 11: 06 JUL 09, 2008
REF 19.7 dBm
AT 30 dB
PEAK
LOG
1
dB/
MKR Δ -2.625 MHz
-.02 dB
MARKER Δ
-2.625 MHz
-.02 dB
6dB m.o
VA SB
SC FC
CORR
MARKER
NORMAL
MARKER Δ
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.440000 GHz
#RES BW 1.0 MHz
#VBW 1 MHz
SPAN 5.000 MHz
#SWP 20.7 msec


08: 15: 18 JUL 09, 2008
REF 19.6 dBm
AT 30 dB
MKR Δ -2.588 MHz
.31 dB
PEAK
LOG
1
dB/
MARKER Δ
-2.588 MHz
.31 dB
6dB Hi
VA SB
SC FC
CORR
MARKER
NORMAL
MARKER Δ
MARKER
AMPTD
SELECT
1 2 3 4
MARKER 1
ON OFF
More
1 of 2
CENTER 2.475000 GHz
#RES BW 1.0 MHz
#VBW 1 MHz
SPAN 5.000 MHz
#SWP 20.7 msec

Section 14

RADIATED EMISSIONS MEASUREMENTS

Paragraphs: 15.209 (a)

Model number: Acuity Edge Router ER-550 **Test date:** July 2, 2008

Frequency, MHz	**Measurement Reading, dBμV/m**	**Corrected Reading, dBμV/m**	**FCC Limit, dBμV/m**	**Minimum Margin, dBμV/m**
Horizontal - Horizontal				
There were no measurable radiated emissions within 12 dBμV/m from the limits in either the Vertical or Horizontal Antenna Polarization				

Section 15

AC LINE CONDUCTED EMISSIONS

Model number: Acuity Edge Router ER-550

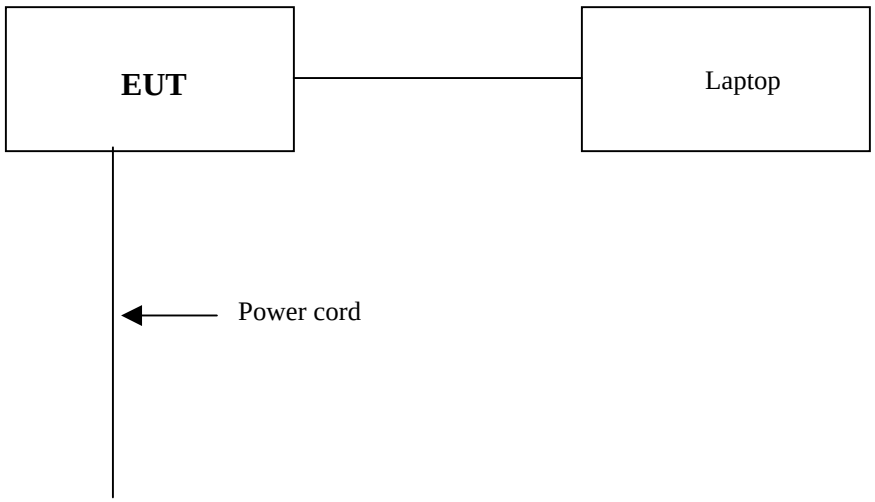
Test voltage: 120V 60Hz **Test date:** July 7, 2008

Frequency MHz	Reading dBuV, L1	Frequency MHz	Reading dBuV, L2	FCC Limit, dBuV	Margin dB
There were no measurable emissions within 15 dBμV/m from the FCC limits					

Conducted Emissions Measurements cont…

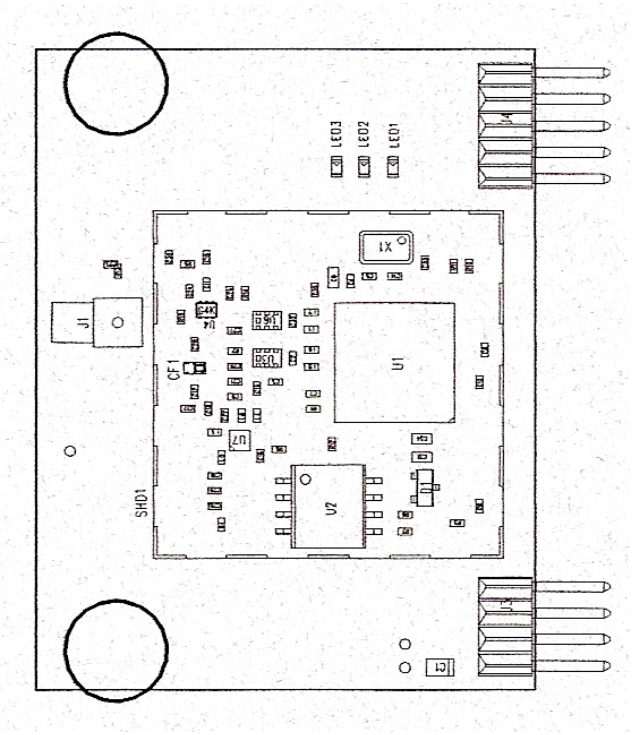
Section 8

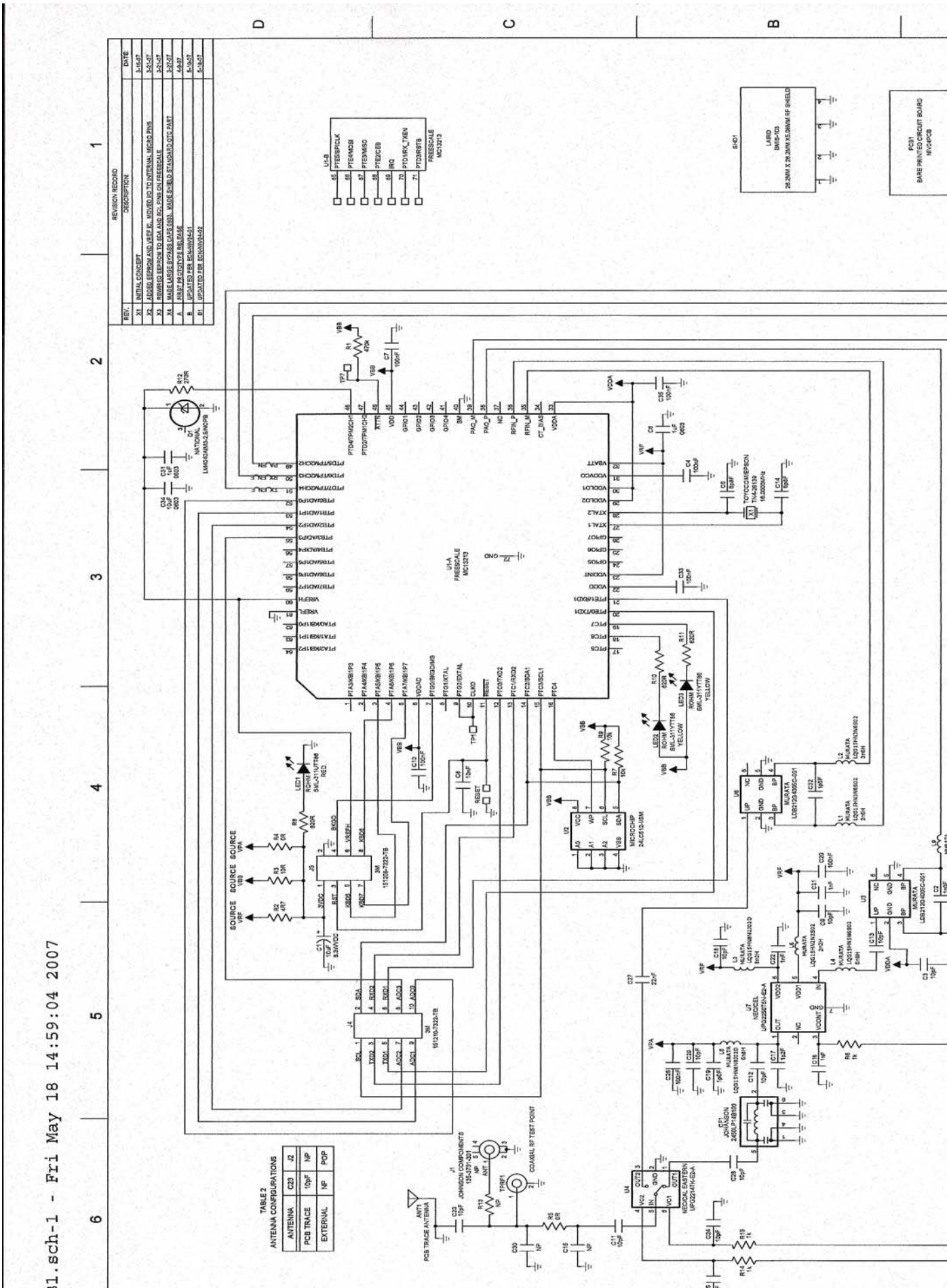
CONFIGURATION



Section 16

TRACE LAYOUT and CIRCUIT SCHEMATICS
Radio, Model no. NIVO


LED3
LED2
LED1
X1
J1
U1
CF1
U2
SHD1


REVISION RECORD
REV. DESCRIPTION DATE
X1 INITIAL CONCEPT 3-16-07
X2 ADDED EEPROM AND VREF IN. MOVED I/O TO INTERNAL HCS08 PINS 3-21-07
X3 REVISED EEPROM TO 8SK AND SCL PINS ON FREESCALE 3-21-07
X4 MADE LARGE BYPASS CAPS 330U. MADE SHIELD ETANDARD OTC PART 3-27-07
A FIRST PROTOTYPE RELEASE 4-9-07
B UPDATED PER ECN-N/04-01 5-10-07
B1 UPDATED PER ECN-N/04-02 5-30-07
TABLE 2
ANTENNA CONFIGURATIONS
ANTENNA C23 J2
PCB TRACE 10pF NP
EXTERNAL NP POP
SOURCE SOURCE SOURCE
COAXIAL RF TEST POINT
PCB TRACE ANTENNA
LAIRD BMS-103
PCB1 BARE PRINTED CIRCUIT BOARD NKV04PCB
U1-A FREESCALE MC13213
U1-B FREESCALE MC13213
MICROCHIP 24LC512-I/SM
ROHM SML-311YT86 YELLOW
ROHM SML-311UT86 RED
MURATA LQG15HN2N2S02
MURATA LQG15HN3N9S02
MURATA LQG15HN6N8S02
MURATA LQG15HN10NJ02
MURATA LQG15HN18NJ02
MURATA LQG15HN33NJ02
MURATA LQG15HN56NJ02
MURATA LQG15HN82NJ02
MURATA LQG15HNR10J02
MURATA LQG15HNR12J02
MURATA LQG15HNR15J02
MURATA LQG15HNR18J02
MURATA LQG15HNR22J02
MURATA LQG15HNR27J02
MURATA LQG15HNR33J02
MURATA LQG15HNR39J02
MURATA LQG15HNR47J02
MURATA LQG15HNR56J02
MURATA LQG15HNR68J02
MURATA LQG15HNR82J02
MURATA LQG15HN1N0S02
MURATA LQG15HN1N2S02
MURATA LQG15HN1N5S02
JOHANSON 2450LP14B100
JOHNSON COMPONENTS 135-3701-201
MEDICAL EASTERN HSDL-9100
NEOCEL UPG2256TB-E2-A
NATIONAL LLM04NNS-2.5/NOPB
TOYOCOM/EPSON TX4-26139 16.000MHz
3M 151206-7222-TB
3M 151210-7222-TB
D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20 D21 D22 D23 D24 D25 D26 D27 D28 D29 D30 D31 D32 D33 D34 D35 D36 D37 D38 D39 D40 D41 D42 D43 D44 D45 D46 D47 D48 D49 D50 D51 D52 D53 D54 D55 D56 D57 D58 D59 D60 D61 D62 D63 D64 D65 D66 D67 D68 D69 D70 D71 D72 D73 D74 D75 D76 D77 D78 D79 D80 D81 D82 D83 D84 D85 D86 D87 D88 D89 D90 D91 D92 D93 D94 D95 D96 D97 D98 D99 D100 D101 D102 D103 D104 D105 D106 D107 D108 D109 D110 D111 D112 D113 D114 D115 D116 D117 D118 D119 D120 D121 D122 D123 D124 D125 D126 D127 D128 D129 D130 D131 D132 D133 D134 D135 D136 D137 D138 D139 D140 D141 D142 D143 D144 D145 D146 D147 D148 D149 D150 D151 D152 D153 D154 D155 D156 D157 D158 D159 D160 D161 D162 D163 D164 D165 D166 D167 D168 D169 D170 D171 D172 D173 D174 D175 D176 D177 D178 D179 D180 D181 D182 D183 D184 D185 D186 D187 D188 D189 D190 D191 D192 D193 D194 D195 D196 D197 D198 D199 D200 D201 D202 D203 D204 D205 D206 D207 D208 D209 D210 D211 D212 D213 D214 D215 D216 D217 D218 D219 D220 D221 D222 D223 D224 D225 D226 D227 D228 D229 D230 D231 D232 D233 D234 D235 D236 D237 D238 D239 D240 D241 D242 D243 D244 D245 D246 D247 D248 D249 D250 D251 D252 D253 D254 D255 D256 D257 D258 D259 D260 D261 D262 D263 D264 D265 D266 D267 D268 D269 D270 D271 D272 D273 D274 D275 D276 D277 D278 D279 D280 D281 D282 D283 D284 D285 D286 D287 D288 D289 D290 D291 D292 D293 D294 D295 D296 D297 D298 D299 D300 D301 D302 D303 D304 D305 D306 D307 D308 D309 D310 D311 D312 D313 D314 D315 D316 D317 D318 D319 D320 D321 D322 D323 D324 D325 D326 D327 D328 D329 D330 D331 D332 D333 D334 D335 D336 D337 D338 D339 D340 D341 D342 D343 D344 D345 D346 D347 D348 D349 D350 D351 D352 D353 D354 D355 D356 D357 D358 D359 D360 D361 D362 D363 D364 D365 D366 D367 D368 D369 D370 D371 D372 D373 D374 D375 D376 D377 D378 D379 D380 D381 D382 D383 D384 D385 D386 D387 D388 D389 D390 D391 D392 D393 D394 D395 D396 D397 D398 D399 D400 D401 D402 D403 D404 D405 D406 D407 D408 D409 D410 D411 D412 D413 D414 D415 D416 D417 D418 D419 D420 D421 D422 D423 D424 D425 D426 D427 D428 D429 D430 D431 D432 D433 D434 D435 D436 D437 D438 D439 D440 D441 D442 D443 D444 D445 D446 D447 D448 D449 D450 D451 D452 D453 D454 D455 D456 D457 D458 D459 D460 D461 D462 D463 D464 D465 D466 D467 D468 D469 D470 D471 D472 D473 D474 D475 D476 D477 D478 D479 D480 D481 D482 D483 D484 D485 D486 D487 D488 D489 D490 D491 D492 D493 D494 D495 D496 D497 D498 D499 D500 D501 D502 D503 D504 D505 D506 D507 D508 D509 D510 D511 D512 D513 D514 D515 D516 D517 D518 D519 D520 D521 D522 D523 D524 D525 D526 D527 D528 D529 D530 D531 D532 D533 D534 D535 D536 D537 D538 D539 D540 D541 D542 D543 D544 D545 D546 D547 D548 D549 D550 D551 D552 D553 D554 D555 D556 D557 D558 D559 D560 D561 D562 D563 D564 D565 D566 D567 D568 D569 D570 D571 D572 D573 D574 D575 D576 D577 D578 D579 D580 D581 D582 D583 D584 D585 D586 D587 D588 D589 D590 D591 D592 D593 D594 D595 D596 D597 D598 D599 D600 D601 D602 D603 D604 D605 D606 D607 D608 D609 D610 D611 D612 D613 D614 D615 D616 D617 D618 D619 D620 D621 D622 D623 D624 D625 D626 D627 D628 D629 D630 D631 D632 D633 D634 D635 D636 D637 D638 D639 D640 D641 D642 D643 D644 D645 D646 D647 D648 D649 D650 D651 D652 D653 D654 D655 D656 D657 D658 D659 D660 D661 D662 D663 D664 D665 D666 D667 D668 D669 D670 D671 D672 D673 D674 D675 D676 D677 D678 D679 D680 D681 D682 D683 D684 D685 D686 D687 D688 D689 D690 D691 D692 D693 D694 D695 D696 D697 D698 D699 D700 D701 D702 D703 D704 D705 D706 D707 D708 D709 D710 D711 D712 D713 D714 D715 D716 D717 D718 D719 D720 D721 D722 D723 D724 D725 D726 D727 D728 D729 D730 D731 D732 D733 D734 D735 D736 D737 D738 D739 D740 D741 D742 D743 D744 D745 D746 D747 D748 D749 D750 D751 D752 D753 D754 D755 D756 D757 D758 D759 D760 D761 D762 D763 D764 D765 D766 D767 D768 D769 D770 D771 D772 D773 D774 D775 D776 D777 D778 D779 D780 D781 D782 D783 D784 D785 D786 D787 D788 D789 D790 D791 D792 D793 D794 D795 D796 D797 D798 D799 D800 D801 D802 D803 D804 D805 D806 D807 D808 D809 D810 D811 D812 D813 D814 D815 D816 D817 D818 D819 D820 D821 D822 D823 D824 D825 D826 D827 D828 D829 D830 D831 D832 D833 D834 D835 D836 D837 D838 D839 D840 D841 D842 D843 D844 D845 D846 D847 D848 D849 D850 D851 D852 D853 D854 D855 D856 D857 D858 D859 D860 D861 D862 D863 D864 D865 D866 D867 D868 D869 D870 D871 D872 D873 D874 D875 D876 D877 D878 D879 D880 D881 D882 D883 D884 D885 D886 D887 D888 D889 D890 D891 D892 D893 D894 D895 D896 D897 D898 D899 D900 D901 D902 D903 D904 D905 D906 D907 D908 D909 D910 D911 D912 D913 D914 D915 D916 D917 D918 D919 D920 D921 D922 D923 D924 D925 D926 D927 D928 D929 D930 D931 D932 D933 D934 D935 D936 D937 D938 D939 D940 D941 D942 D943 D944 D945 D946 D947 D948 D949 D950 D951 D952 D953 D954 D955 D956 D957 D958 D959 D960 D961 D962 D963 D964 D965 D966 D967 D968 D969 D970 D971 D972 D973 D974 D975 D976 D977 D978 D979 D980 D981 D982 D983 D984 D985 D986 D987 D988 D989 D990 D991 D992 D993 D994 D995 D996 D997 D998 D999 D1000
Fri May 18 14:59:04 2007

Section 17

CIRCUIT SCHEMATICS
Access Node

Section 18

CIRCUIT SCHEMATICS
Communication Board

Section 19

PHOTOGRAPHS

Photographs cont...

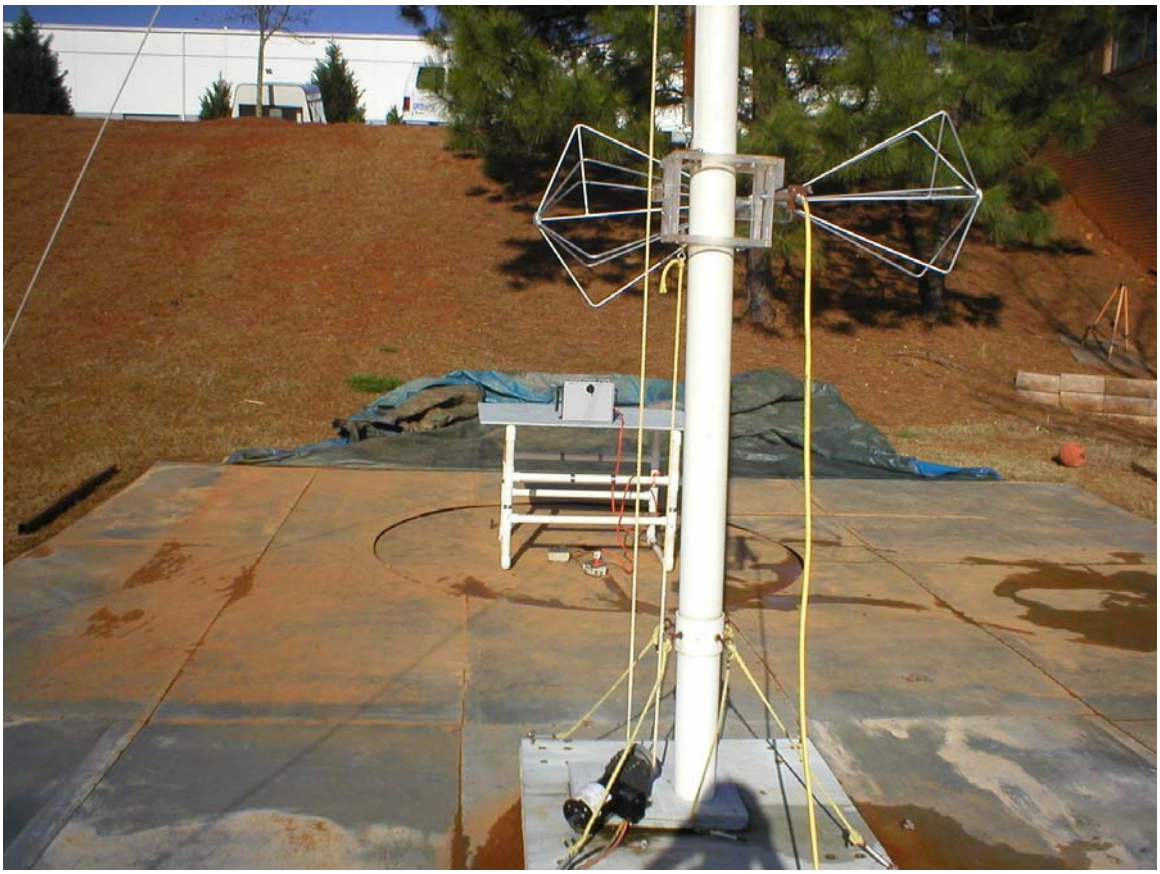
Illustrates Complete Product

Photographs cont...

Radiated Emissions Measurements
Product

Photographs cont...

Radiated Emissions Measurements
Product

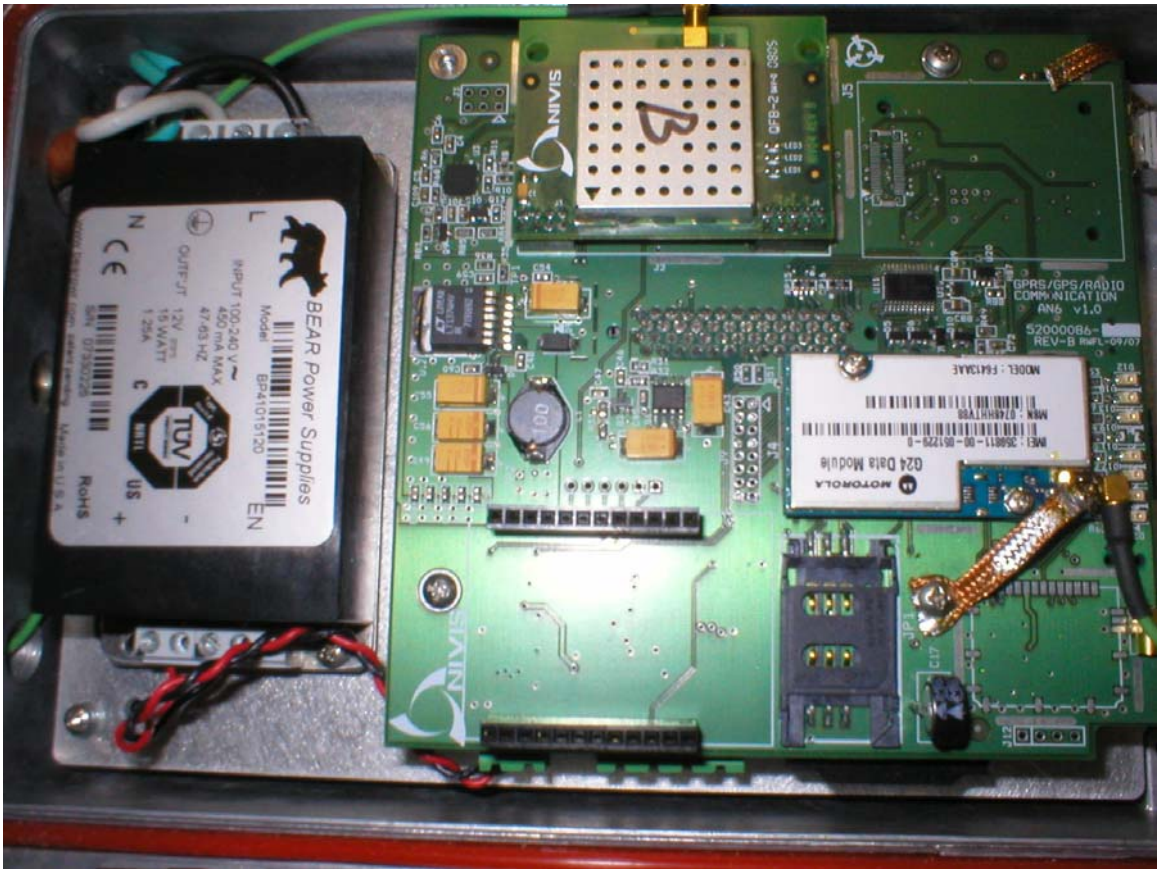


Photographs cont...

Conducted Emissions Measurements
Product

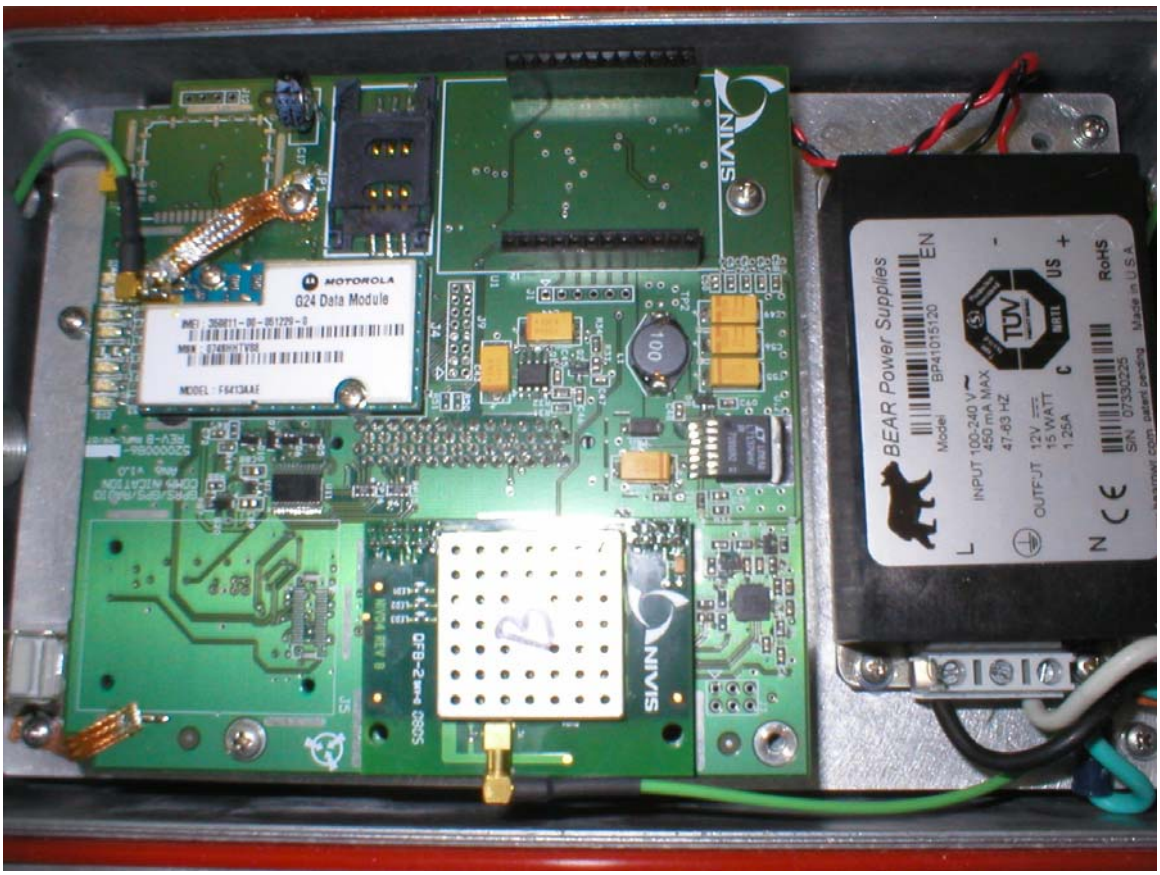
Photographs cont...

Main Board with Radio Board, Utilizing Cover
Showing Grounding Straps



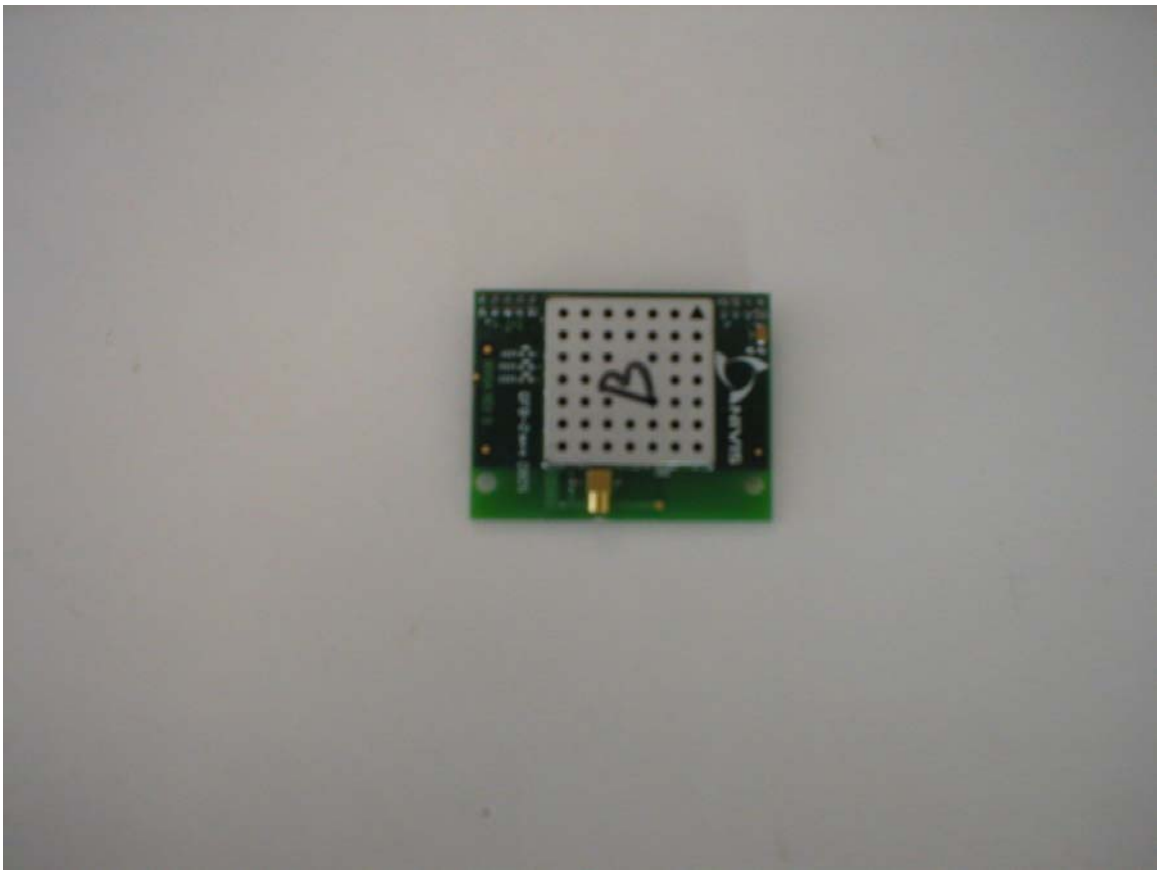
Photographs cont...

Other View of Main Board with Radio
Showing Grounding Straps



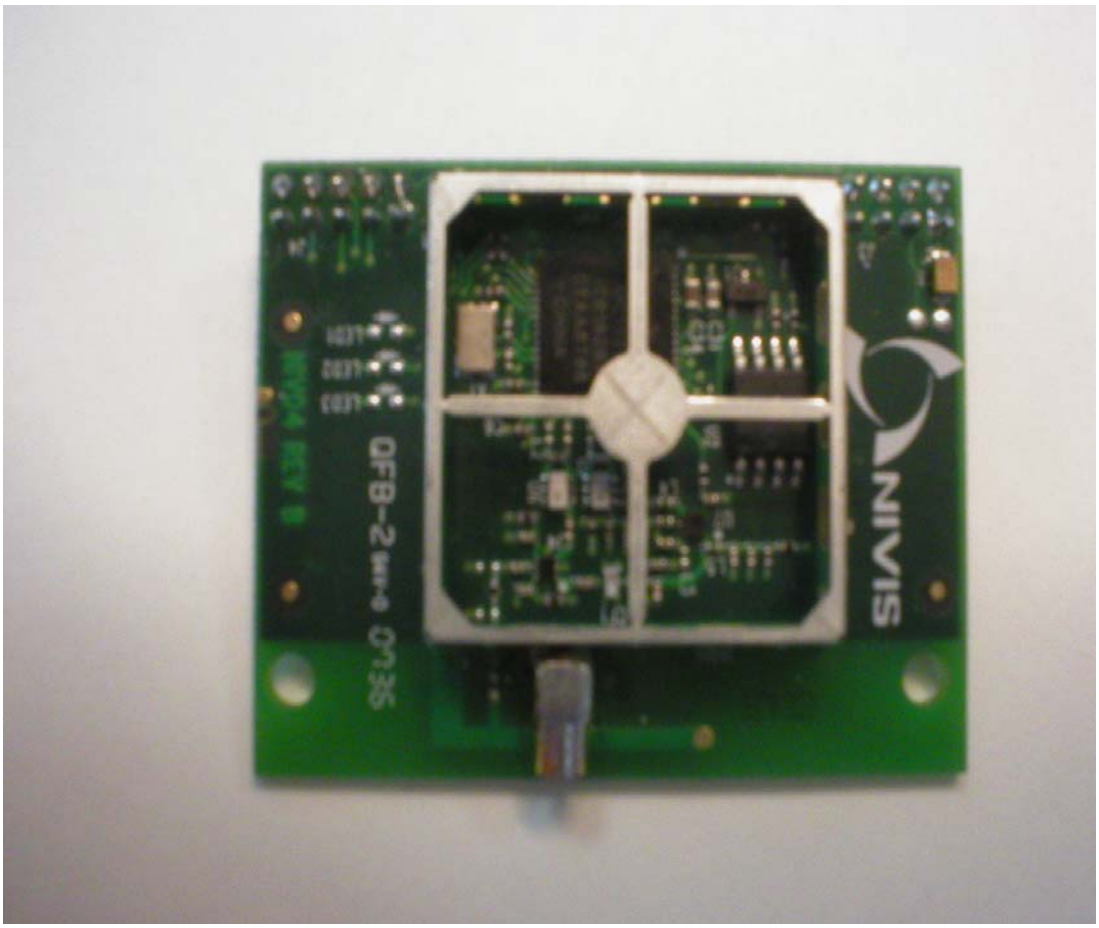
Photographs cont...

Radio Board



Photographs cont...

Radio Board with Cover Removed



Section 19

FCC LABEL
Product

REVISIONS			
REVSION	DESCRIPTION	DATE	APPROVED
1	RELEASED	02/19/08	CENE

SPECIFICATION CONTROL

1. MATERIAL: .002" THICK POLYESTER WITH 3M #400 OR #7921 ACRYLIC ADHESIVE
   a. BACKING: SILICONE RELEASE LINER
   b. FACE COLOR: WHITE WITH BLACK INK
2. ENVIRONMENTAL:
   a. TEMPERATURE RANGE: -40°C TO +85°C
   b. ADHESIVE, MATERIAL AND INK SHALL BE RESISTANCE TO UV DEGRADATION
   c. LIGHT AND HUMIDITY AS SPECIFIED IN UL 969 – OUTDOOR EXPOSURE TEST
3. FONT: MODEL ID AND FCC ID ARIAL 9 BOLD AND TEXT ARIAL 8
4. LABEL SIZE: 1.50" WIDE X 1.10" HIGH

FC

FCC ID: SQB-NIVISAN0100
IC: 6546A-NIVISAN0100

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS.
(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

EXAMPLE

DRAWN BY: C.ENE	DATE: 02/19/08	**NIVIS LLC.** ATLANTA , GEORGIA			
APPROVALS					
DOC CONTROL:	DATE:	TITLE: **Product Label, FCC** **EDGE ROUTER**			
PURCH'G:	DATE:				
DEV ENG:	DATE:				
QUAL ASSR:	DATE:				
MFG ENG:	DATE:	SIZE A	FCSM NO.	DWG. NO. 90000545	REV. 1
PRODUCT MGR:	DATE:	SCALE: NONE		SHEET: 1	

FCC LABEL
Radio

REVISIONS			
REVSION	DESCRIPTION	DATE	APPROVED
1	RELEASED	2/19/08	CENE

SPECIFICATION CONTROL

1. MATERIAL: .002" THICK POLYESTER WITH 3M #400 OR #7921 ACRYLIC ADHESIVE
   a. BACKING: SILICONE RELEASE LINER
   b. FACE COLOR: WHITE WITH BLACK INK
2. ENVIRONMENTAL:
   a. TEMPERATURE RANGE: -40°C TO +85°C
   b. ADHESIVE, MATERIAL AND INK SHALL BE RESISTANCE TO UV DEGRADATION
   c. LIGHT AND HUMIDITY AS SPECIFIED IN UL 969 – OUTDOOR EXPOSURE TEST
3. FONT: ARIAL APPROXIMATELY AS SHOWN
   a. HEIGHT: .050" BOLD, .035 REGULAR
4. LABEL SIZE: 0.75" WIDE X .40" HIGH

FCC ID: SQB-NIVISAN0100
IC: 6546A-NIVISAN0100

EXAMPLE

DRAWN BY: C.ENE	DATE: 02/19/08	**NIVIS LLC.** ATLANTA , GEORGIA			
APPROVALS					
DOC CONTROL:	DATE:	TITLE: **Shield LABEL, FCC** **Edge Router**			
PURCH'G:	DATE:				
DEV ENG:	DATE:				
QUAL ASSR:	DATE:				
MFG ENG:	DATE:	SIZE A	FCSM NO.	DWG. NO. 90000546	REV. 1
PRODUCT MGR:	DATE:	SCALE: NONE		SHEET: 1	

Section 20

FCC INFORMATION
Manual

8. RF and Compliance

8.1 RF Exposure Limits WARNING

To comply with FCC's RF exposure limits for general population / uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

8.2 Compliance Statement (Part 15.19)

This Device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

8.3 Information to the user (Part 15.105)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

8.4 WARNING (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Section 20

TEST EQUIPMENT

Test Equipment	**Model No.**	**Cal. Due**
Spectrum Analyzer	HP 8565E	Oct.08
Spectrum Analyzer	HP 8591A	Jan 09
Spectrum Analyzer	8592L	Jan 09
Signal Generator	83640L	Oct 08
Signal Generator	8644A	---
Signal Generator	8648A	Jan 09
LISN	94641-1	Jun 09
LISN	3825/2	Aug 09
LISN	LI-210	Jul 09
Preamplifier	QB-820	Jan 09
Preamplifier	8449B	Jan 09
Preamplifier	PA-840	Oct 08

Antennas	**Frequency Span**
Biconical	20 - 200 MHz
Log Periodic	200 - 1000 MHz
Dipoles	20 - 1000 MHz
Horn	1-18 GHz
Horn (2)	18 – 40 GHz

All antennas are calibrated annually

LAST PAGE ...