

Report No. SC304743-03

MEASUREMENT AND TECHNICAL REPORT

SYMBOL TECHNOLOGIES, INC. - NY
One Symbol Plaza
Holtsville, NY 11742-1300

DATE: 26 November 2003

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:	Marlin 21-64381-01	
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: Defer until:	No: X
Company Name agrees to notify the Commission by:	N/A	
of the intended date of announcement of the product so that the grant can be issued on that date.		
Transition Rules Request per 15.37?	Yes:	*No: X
(*) FCC Part 15, Paragraphs 15.207(a); 15.209(a) 15.247(a)1, (a)1ii, (b)(1), (b)(3); (c)		
Report Prepared by: TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 546 3999 Fax: 858 546 0364		

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1 GENERAL INFORMATION

1.1 Product Description

Marlin, Model 21-64381-xx

Voltage: 3.3 Vdc

Installation: To be incorporated into final products that will be evaluated for the applicable environments.

Interface Ports and Cables: RS232; digital; shielded; connector type - D-Sub DB9; length - 2 m; removable

Software: Revision level - NBRMMx03 Rev 03; Description - Flash bootable firmware

Oscillator Frequencies: 32.768 kHz; 32 MHz

1 GENERAL INFORMATION (continued)

1.2 Related Submittal/Grant

None

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

None

1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the ANSI C63.4 setup.

TEST	FCC CFR 47 #	PASS/FAIL
Conducted	15.207(a)	Pass
Radiated	15.209(a)	Pass
Channel Bandwidth	15.247(a)(1), (a)(1)(ii)	Pass
RF Power Output	15.247(b)(1), (b)(3)	Pass
Spurious Emissions at Terminals	15.247(c); 15.209(b)(1)	Pass
Conducted Spurious Modulation	15.247(c)	Pass

Tests were performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8 -M1983.

1.5 Test Facility

The open area test site and conducted measurement data were tested by:

TÜV AMERICA, INC.
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 858 546 3999
Fax: 858 546 0364

The Test Site Data and performance comply with ANSI 63.4 and are registered with the FCC, 7435 Oakland Mills Rd, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

2. SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was initially tested for FCC emission in the following configuration:

See Test Setup Photos exhibit.

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Modification

None

2.5 Configuration of Tested System

See Test Setup Photos exhibit.

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3. CONDUCTED EMISSION

3.1 EQUIPMENT

Emissions Test Conditions: CONDUCTED EMISSIONS

The *Conducted EMISSIONS* measurements were performed at the following test location :

☐ - Test not applicable

■ - SR 3, Shielded Room, 12' x 20' x 8', Metal Chamber

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
ESHS 30	458	EMI Test Receiver	Rohde & Schwarz	832354/04	05/04
CAT-20	606	20 dB Attenuator	Mini-Circuits	000606	--
9242-50-R-24-BNC	457	LISN	Solar Electronics	941720	NCR
9242-50-R-24-BNC	458	LISN	Solar Electronics	941719	NCR

Remarks: _____

3.2 DATA

TUV America Conducted Emissions

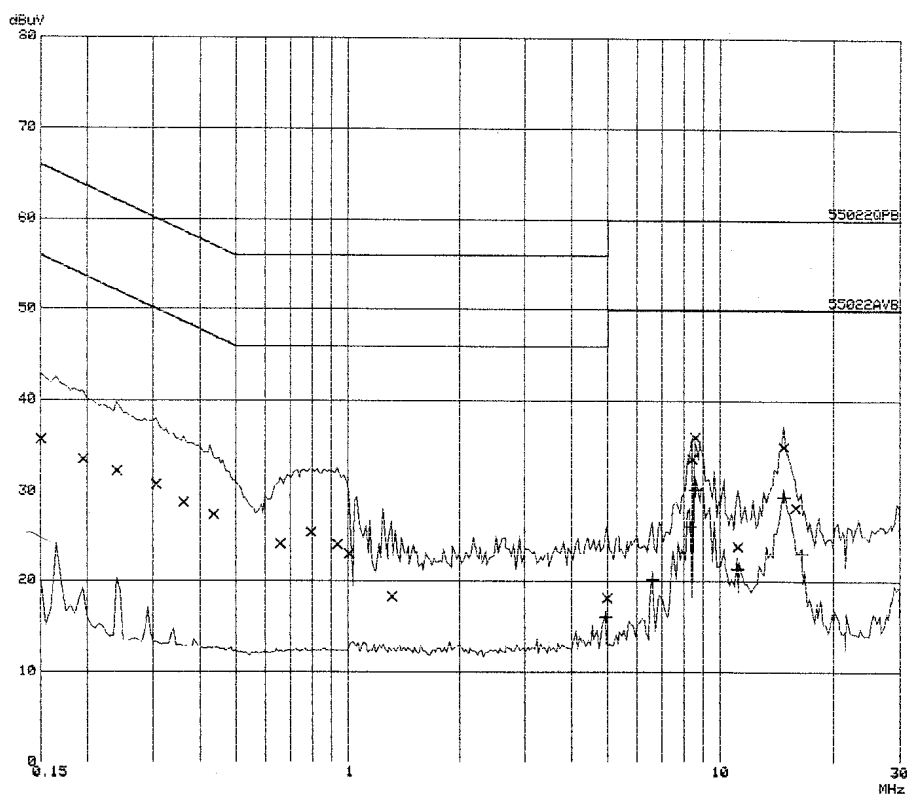
EUT: Marlin BTH Radio
 Manuf: Symbol Technologies
 Op Cond: Full Hopping Mode
 Operator: Mark Lyon
 Test Spec: FCC 15.207(a)
 Comment: 115 VAC 60Hz Line 1.SC304743
 Date: 18. Nov 03 11:43

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	1M	5k	10k	PK+AV	100ms	AUTO	LN OFF	60dB
1M	30M	5k	10k	PK+AV	2ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	20k	30M	20dBLISN

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 30dB



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TUV America **Conducted Emissions**

EUT: Marlin BTH Radio
 Manuf: Symbol Technologies
 Op Cond: Full Hopping Mode
 Operator: Mark Lyon
 Test Spec: FCC 15.207(a)
 Comment: 115 VAC 60Hz Line 1.SC304743
 Date: 18. Nov 03 11:43

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.15000	35.8	66.0
0.19500	33.5	63.9
0.24000	32.2	62.1
0.30500	30.7	60.1
0.36000	28.7	58.7
0.43500	27.4	57.2
0.65500	24.1	56.0
0.79500	25.4	56.0
0.93500	24.1	56.0
1.00500	23.0	56.0
1.31000	18.3	56.0
4.98000	18.2	56.0
8.41000	33.6	60.0
8.56000	36.0	60.0
11.12000	23.8	60.0
14.74500	35.0	60.0
15.90500	28.2	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
4.93000	16.0	46.0
6.57500	20.2	50.0
8.31500	26.1	50.0
8.56000	30.2	50.0
11.07000	21.3	50.0
14.74500	29.3	50.0
16.48500	23.0	50.0

* limit exceeded

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TUV America **Conducted Emissions**

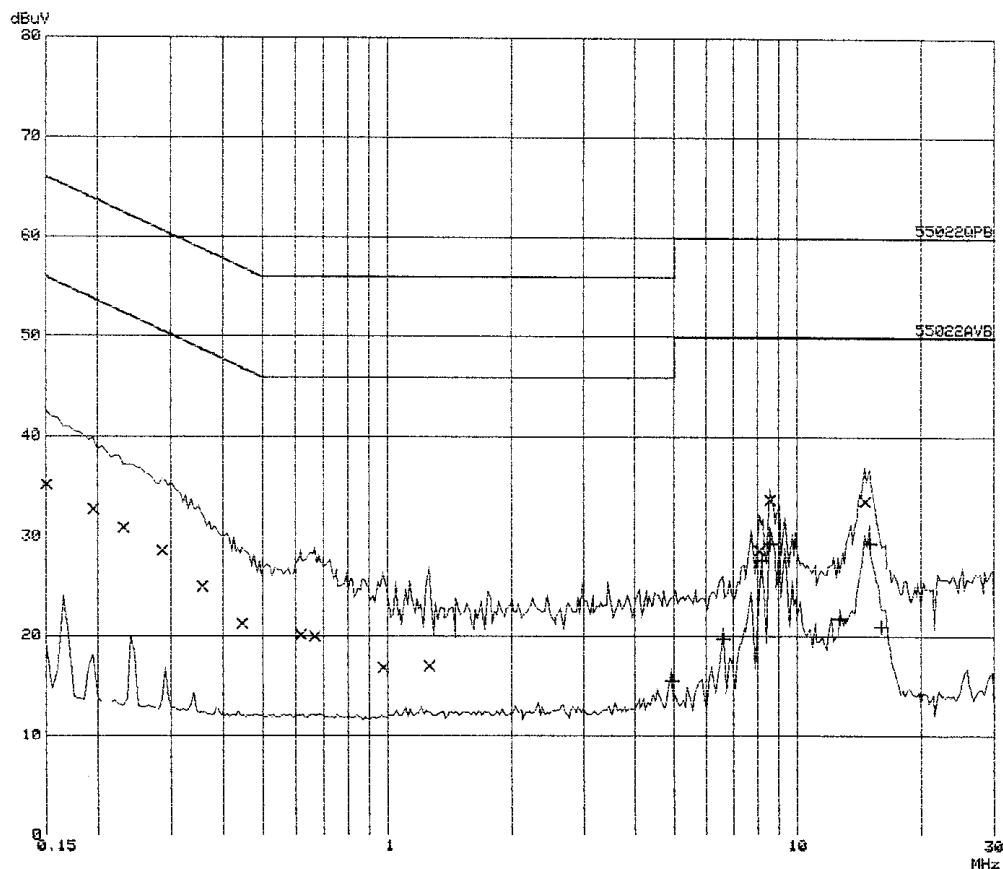
EUT: Marlin BTH Radio
 Manuf: Symbol Technologies
 Op Cond: Full Hopping Mode
 Operator: Mark Lyon *ML*
 Test Spec: FCC 15.207(a)
 Comment: 115 VAC 60Hz Line 2.SC304743
 Date: 18. Nov 03 11:34

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	1M	5k	10k	PK+AV	100ms	AUTO	LN OFF	60dB
1M	30M	5k	10k	PK+AV	2ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	20k	30M	20dBLISN

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 30dB



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**TUV America
Conducted Emissions**

EUT: Marlin BTH Radio
 Manuf: Symbol Technologies
 Op Cond: Full Hopping Mode
 Operator: Mark Lyon
 Test Spec: FCC 15.207(a)
 Comment: 115 VAC 60Hz Line 2.SC304743
 Date: 18. Nov 03 11:34

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.15000	35.2	66.0
0.19500	32.7	63.9
0.23000	30.9	62.4
0.28500	28.6	60.7
0.35500	25.0	58.8
0.44500	21.3	56.9
0.61500	20.1	56.0
0.66500	20.0	56.0
0.97500	16.9	56.0
1.26000	17.1	56.0
8.07500	28.6	60.0
8.56000	33.7 <i>ML</i>	60.0
14.65000	33.5	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
4.93000	15.5	46.0
6.57500	19.7	50.0
8.17000	27.7	50.0
8.56000	29.3 <i>ML</i>	50.0
12.71500	21.8	50.0
15.03500	29.3 <i>ML</i>	50.0
16.00000	21.0	50.0

* limit exceeded

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TUV America **Conducted Emissions**

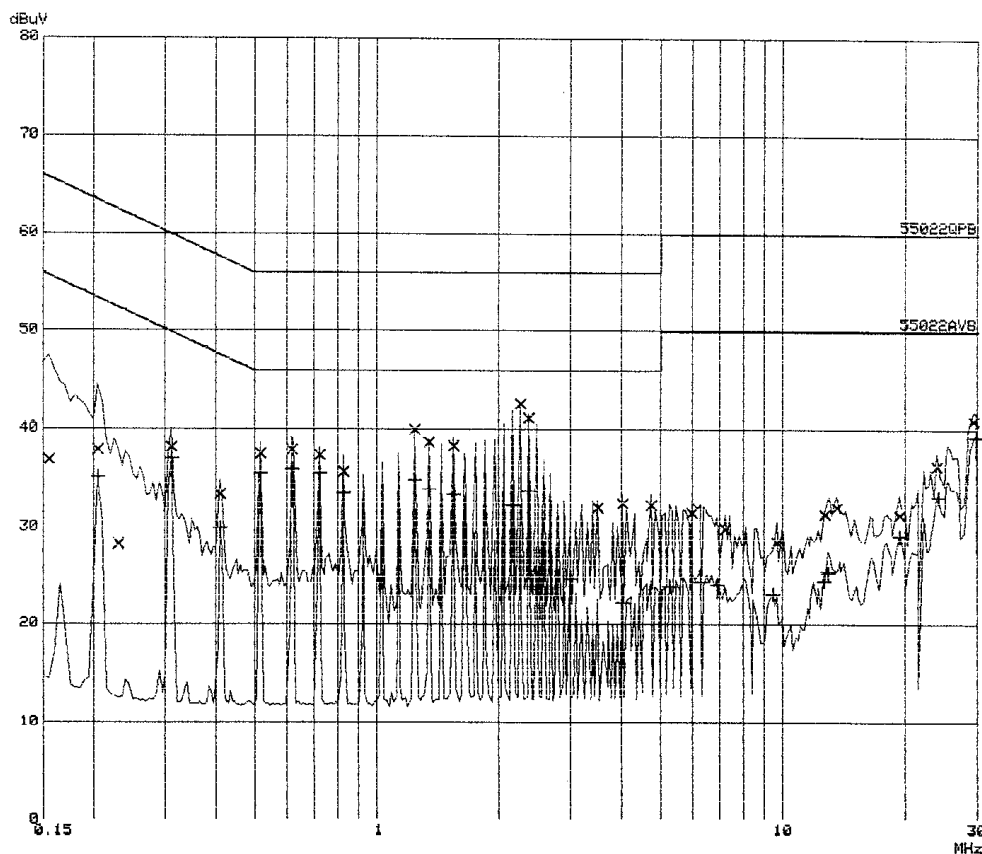
UT: Marlin BTH Radio
 anuf: Symbol Technologies
 p Cond: Full Hopping Mode
 perator: Mark Lyon
 est Spec: FCC 15.207(a)
 omment: 230 VAC 50Hz Line 2.SC304743
 ate: 18. Nov 03 11:14

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	1M	5k	10k	PK+AV	100ms	AUTO	LN OFF	60dB
1M	30M	5k	10k	PK+AV	2ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	20k	30M	20dBLISN

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 30dB



TUV America
Conducted Emissions
 EUT: Marlin BTH Radio
 Manuf: Symbol Technologies
 Op Cond: Full Hopping Mode
 Operator: Mark Lyon
 Test Spec: FCC 15.207(a)
 Comment: 230 VAC 50Hz Line 2.SC304743
 Date: 18. Nov 03 11:14

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.15500	36.9	65.7
0.20500	37.9	63.4
0.23000	28.2	62.4
0.31000	38.1	60.0
0.41000	33.4	57.7
0.51500	37.5	56.0
0.61500	37.9	56.0
0.72000	37.3	56.0
0.82500	35.6	56.0
1.23500	40.0	56.0
1.34000	38.7	56.0
1.54500	38.3	56.0
2.26500	42.6	56.0
2.36500	41.1	56.0
3.50000	32.0	56.0
4.01500	32.4	56.0
4.73500	32.3	56.0
5.97000	31.4	60.0
7.20500	29.7	60.0
9.67500	28.4	60.0
12.71500	31.3	60.0
13.58500	32.0	60.0
19.35500	31.2	60.0
23.88500	36.2	60.0
29.44500	40.9	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
0.20500	35.1	53.4
0.31000	37.0	50.0
0.41000	29.9	47.7
0.51500	35.5	46.0
0.61500	35.9	46.0
0.72000	35.5	46.0
0.82500	33.5	46.0
1.23500	34.8	46.0
1.34000	33.8	46.0
1.54500	33.4	46.0
2.16500	32.2	46.0
2.36500	33.7 <i>mV</i>	46.0
2.98500	24.7	46.0
4.01500	22.2	46.0

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Date: 18. Nov 03 11:14

5.25000	23.9	50.0
6.28000	24.3	50.0
6.89500	24.0	50.0
9.47000	23.1	50.0
12.66500	24.4	50.0
12.95500	25.3	50.0
19.35500	29.1	50.0
24.09000	33.0	50.0
29.96000	39.2	50.0

* limit exceeded

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TUV America **Conducted Emissions**

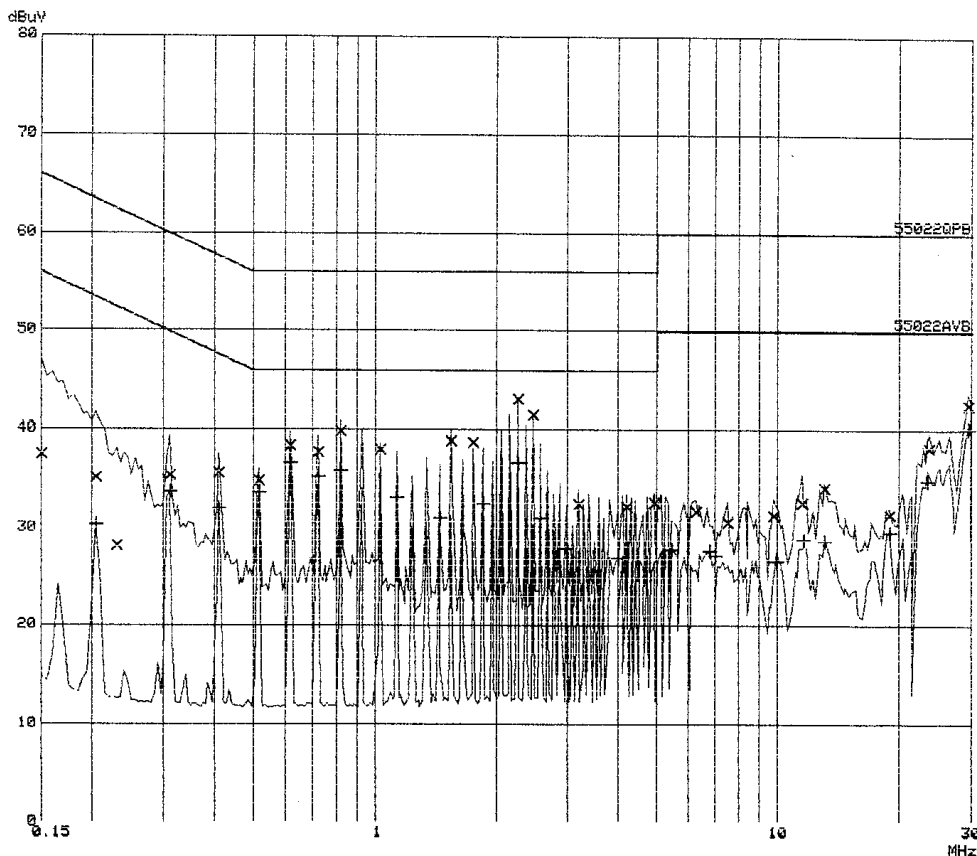
EUT: Marlin BTH Radio
 Manuf: Symbol Technologies
 Op Cond: Full Hopping Mode
 Operator: Mark Lyon
 Test Spec: FCC 15.207(a)
 Comment: 230 VAC 50Hz Line 1.SC304743
 Date: 18. Nov 03 11:01

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	1M	5k	10k	PK+AV	100ms	AUTO	LN OFF	60dB
1M	30M	5k	10k	PK+AV	2ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	20k	30M	20dBLISN

Final Measurement: x QP / + AV
 Meas Time: 1 s
 Subranges: 25
 Acc Margin: 30dB



Report No. SC304743-03

TUV America
Conducted Emissions
 DUT: Marlin BTH Radio
 Manuf: Symbol Technologies
 Mod: Full Hopping Mode
 Operator: Mark Lyon
 Test Spec: FCC 15.207(a)
 Comment: 230 VAC 50Hz Line 1.SC304743
 Date: 18. Nov 03 11:01

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.15000	37.5	66.0
0.20500	35.1	63.4
0.23000	28.2	62.4
0.31000	35.3	60.0
0.41000	35.6	57.7
0.51500	34.8	56.0
0.61500	38.3	56.0
0.72000	37.7	56.0
0.82000	39.8	56.0
1.02500	38.0	56.0
1.54000	38.8	56.0
1.74500	38.6	56.0
2.26000	43.1	56.0
2.46500	41.4	56.0
3.18500	32.4	56.0
4.21000	32.2	56.0
4.93000	32.6	56.0
6.26500	31.7	60.0
7.50000	30.5	60.0
9.76000	31.3	60.0
11.50500	32.6	60.0
13.05000	34.0	60.0
18.91000	31.4	60.0
23.64000	38.1	60.0
29.50500	42.5	60.0

Frequency MHz	AV Level dBuV	AV Limit dBuV
0.20500	30.3	53.4
0.31000	33.7	50.0
0.41000	31.9	47.7
0.51500	33.6	46.0
0.61500	36.6	46.0
0.72000	35.2	46.0
0.82000	35.8	46.0
1.13000	33.1	46.0
1.44000	30.9	46.0
1.85000	32.5	46.0
2.26000	36.6	46.0
2.57000	30.9	46.0
2.98000	27.9	46.0
4.00500	26.9	46.0

Report No. SC304743-03

Date: 18. Nov 03 11:01

5.44500	27.8	50.0
6.78000	27.6	50.0
6.98500	27.1	50.0
9.96500	26.6	50.0
11.61000	28.7	50.0
13.05000	28.6	50.0
18.91000	29.5	50.0
23.43500	34.8	50.0
29.50500	40.1 <i>mm</i>	50.0

* limit exceeded

Report No. SC304743-03

4. RADIATED EMISSION EQUIPMENT/DATA

4.1 EQUIPMENT

Emissions Test Conditions: RADIATED EMISSIONS

The *RADIATED EMISSIONS* measurements were performed at the following test location :

☐ - Test not applicable

■ - Canyon #1 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of:

10 meters

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
ESVS30	6732	Bilog Antenna	Antenna Research	833825/003	05/04
E4440A	7500	Spectrum Analyzer	Hewlett Packard	MY43362168	08/04
CBL6111	6521	Bilog Antenna	Chase Electronics	1291	NCR

Remarks:

4.2 FIELD STRENGTH CALCULATION

If a preamplifier was used during the Radiated Emission Testing, it is required that the amplifier gain must be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna, cable used and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the automatic measurement, these considerations are automatically presented as a part of the print out. In the case of manual measurements and for greater efficiency and convenience, instead of using these correlation factors for each meter reading, the specification limit was modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" or simply the CMRL, which is the actual field strength present at the antenna. The quantity can be derived in the following manner:

$$\text{Corrected Meter Reading Limit (CMRL)} = \text{SAR} + \text{AF} + \text{CL} - \text{AG} - \text{DC}$$

Where, SAR = Spectrum Analyzer Reading

AF = Antenna Factor

CL = Cable Loss

AG = Amplifier Gain (if any)

DC = Distance Correction (if any)

Assume the following situation: A meter reading of 29.4 dBuV was obtained from a Class A computing device measured at 83 MHz. Assume an antenna factor of 9.2 dB, a cable loss of 1.4 dB and amplifier gain of 20.0 dB at 83 MHz. The final field strength would be determined as follows:

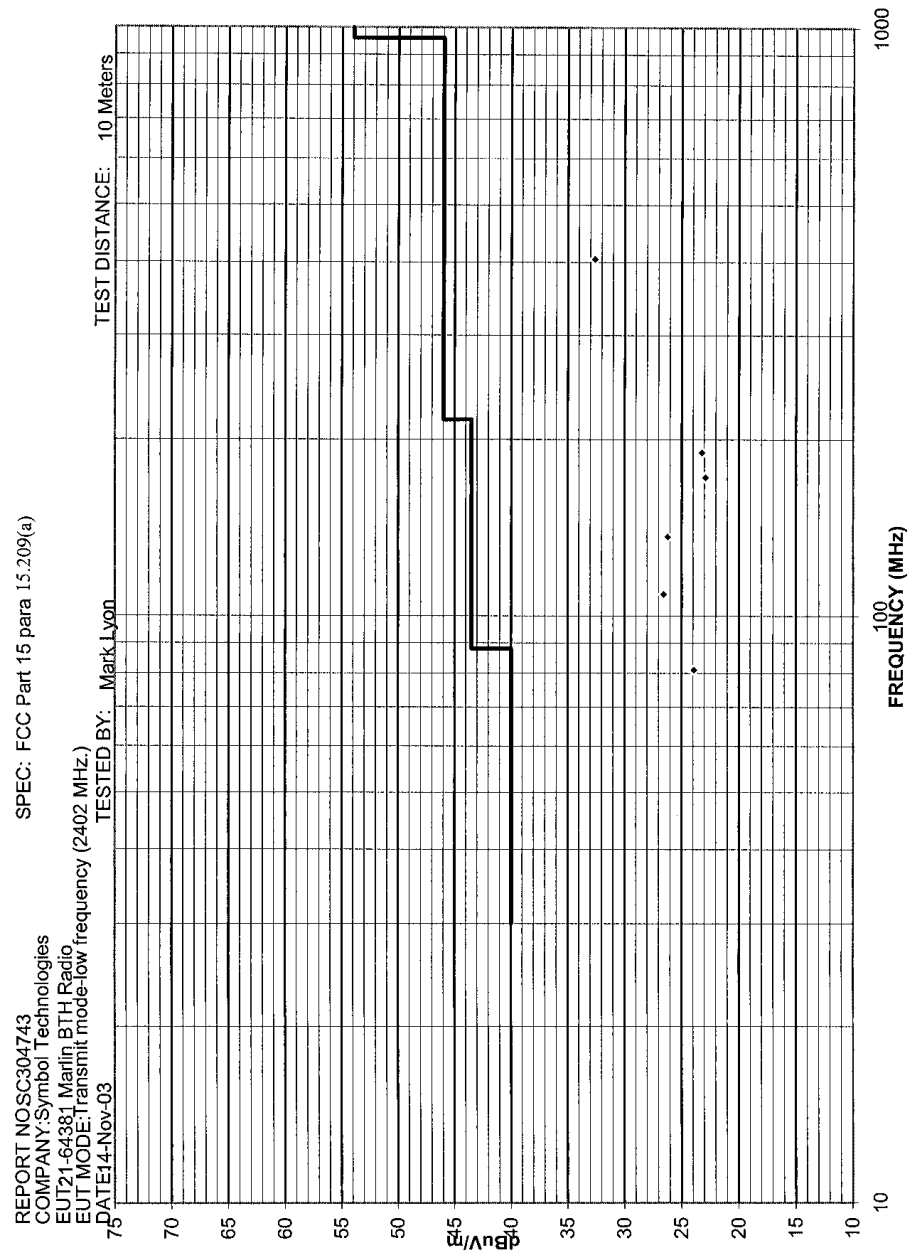
$$\text{CMRL} = 29.4 \text{ dBuV} + 9.2 \text{ dB} - 1.4 \text{ dB} - 20 \text{ dB/M} - 0.0 \text{ dB}$$

$$\text{CMRL} = 20.0 \text{ dBuV/M}$$

This result is well below the FCC and CSA Class A limit of 29.5 dBuV/m at 83 MHz.

For the manual mode of measurement, a table of corrected meter reading limit was used to permit immediate comparison of the meter reading to determine if the measure emission amplitude exceeded the specification limit at that specific frequency.

4.3 DATA



REPORT No: SC304743

SPEC: FCC Part 15 para FCC 15.209(a)

CUSTOMER: Symbol Technologies

TEST DIST: 10 Meters

E U T: 21-64381 Marlin BTH Radio

TEST SITE: 1

EUT MODE: Transmit mode-low frequency (2402 MHz.)

BICONICAL: 739

DATE: 14-Nov-03 TESTED BY: Mark Lyon

LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth.
115 VAC/60 Hz. DC input: 5.2 volts

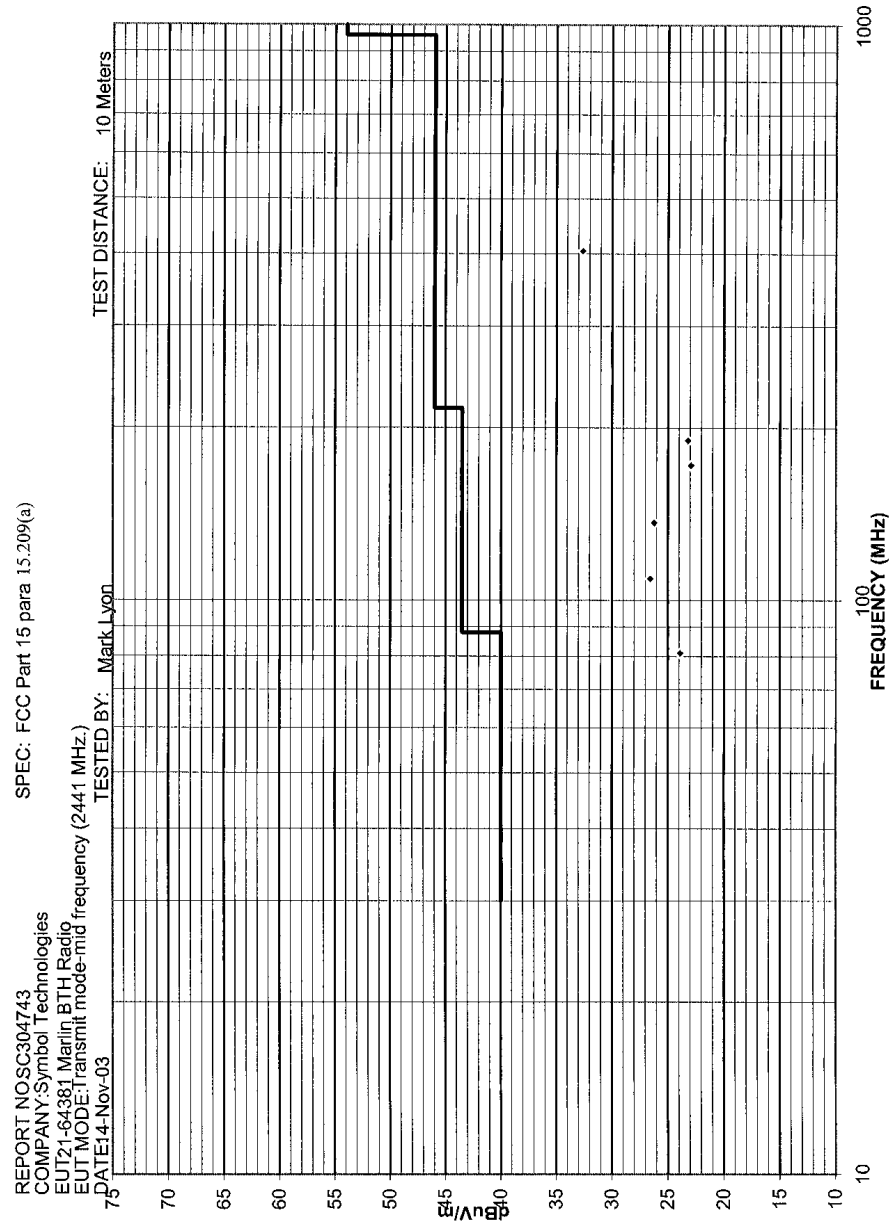
RCVR: 427

Temperature: 20C Relative Humidity: 60%

	Temperature:	200	1
EUT MARGIN	-23.4	dB at 404.8 MHz	

ver 1.9

[illegible]



REPORT No: SC304743

SPEC: FCC Part 15 para 15.209(a)

CUSTOMER: Symbol Technologies

TEST DIST: 10 Meters

E U T: 21-64381 Marlin BTH Radio

TEST SITE: 1

EUT MODE: Transmit mode-mid frequency (2441 MHz.)

BICONICAL: 739

DATE: 14-Nov-03 TESTED BY: Mark Lyon

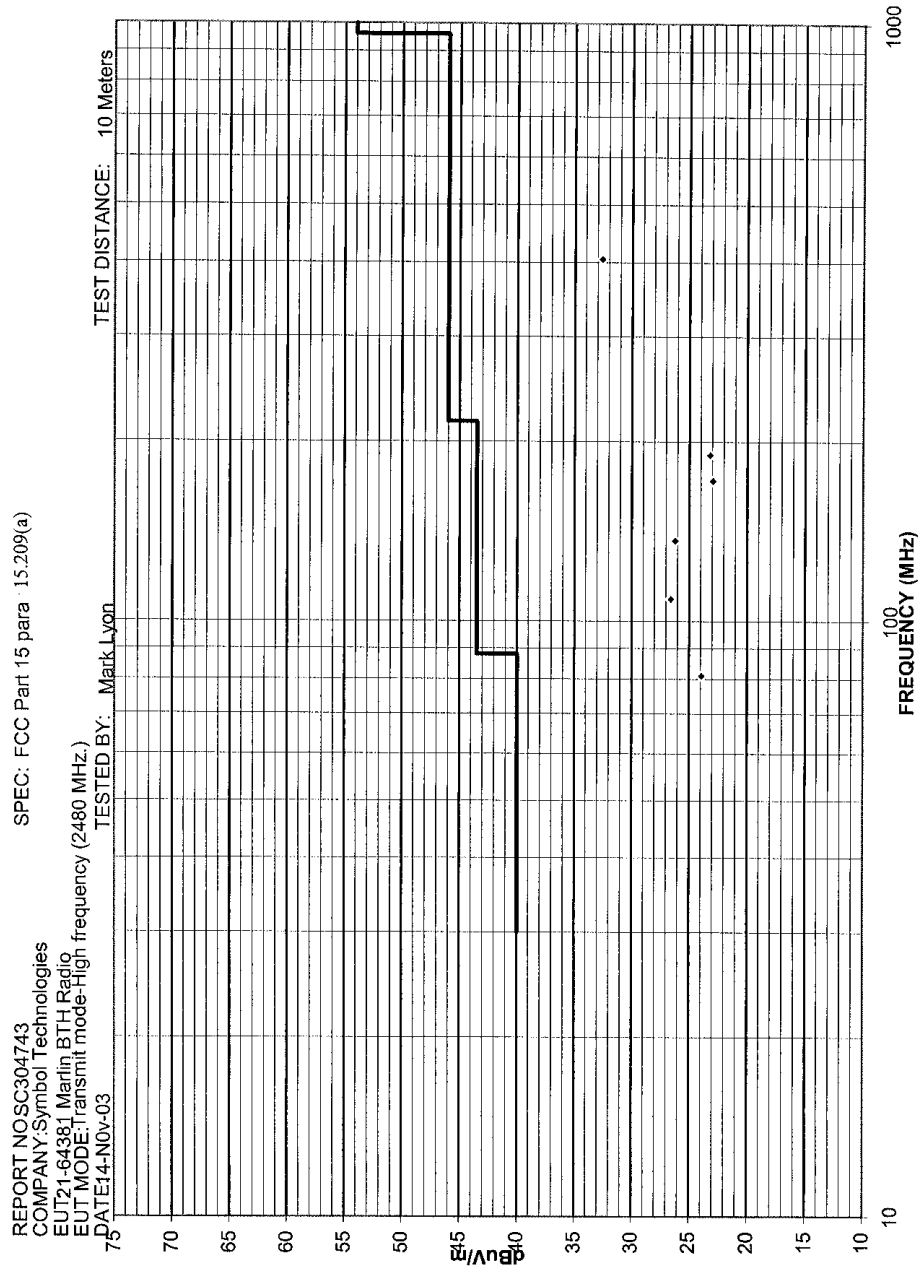
LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth.
115 VAC/60 Hz. DC input: 5.2 volts

RCVR: 427

[illegible]

Report No. SC304743-03



REPORT No: SC304743

SPEC: FCC Part 15 para 15.209(a)

CUSTOMER: Symbol Technologies

TEST DIST: 10 Meters

E U T: 21-64381 Marlin BTH Radio

TEST SITE: 1

EUT MODE: Transmit mode-High frequency (2480 MHz.)

BICONICAL: 739

DATE: 14-Nov-03 TESTED BY: Mark Lyon

LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth.
115 VAC/60 Hz. DC input: 5.2 volts

RCVR: 427

[illegible]

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5. CHANNEL BANDWIDTH

5.1 EQUIPMENT

Emissions Test Conditions: CHANNEL BANDWIDTH; FREQUENCY CHANNEL SEPARATION; TIME OF OCCUPANCY TRIAL

The *Channel Bandwidth* measurements were performed at the following test location :

☐ - Test not applicable

■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

Test Equipment Used :

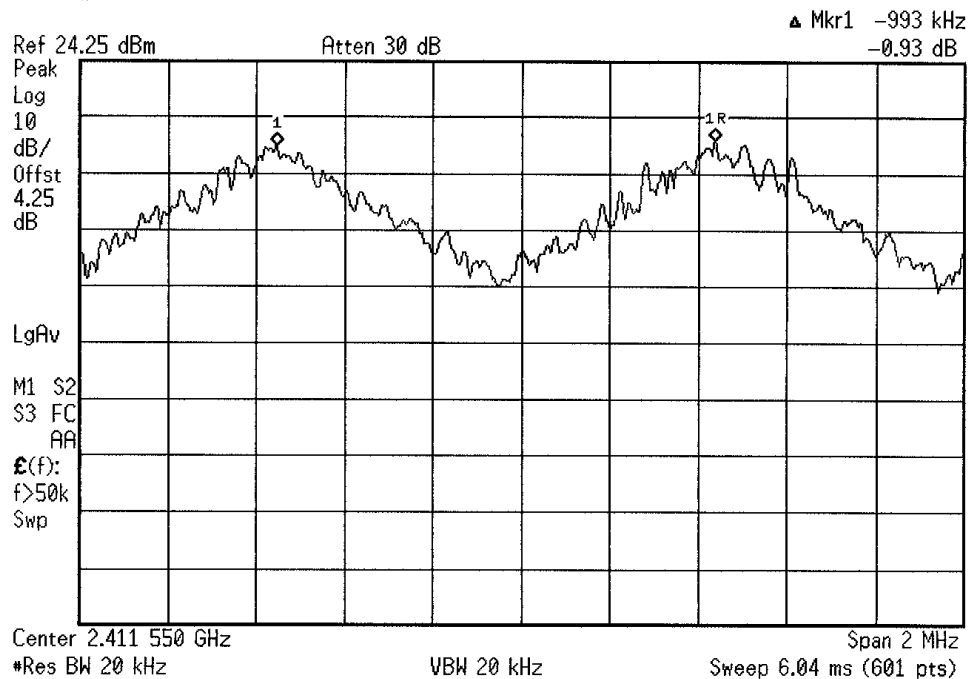
Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
E4440A	7500	Spectrum Analyzer	Hewlett Packard	MY4336216	08/04

Remarks: _____

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5.2 DATA

Agilent 16:03:27 Nov 12, 2003



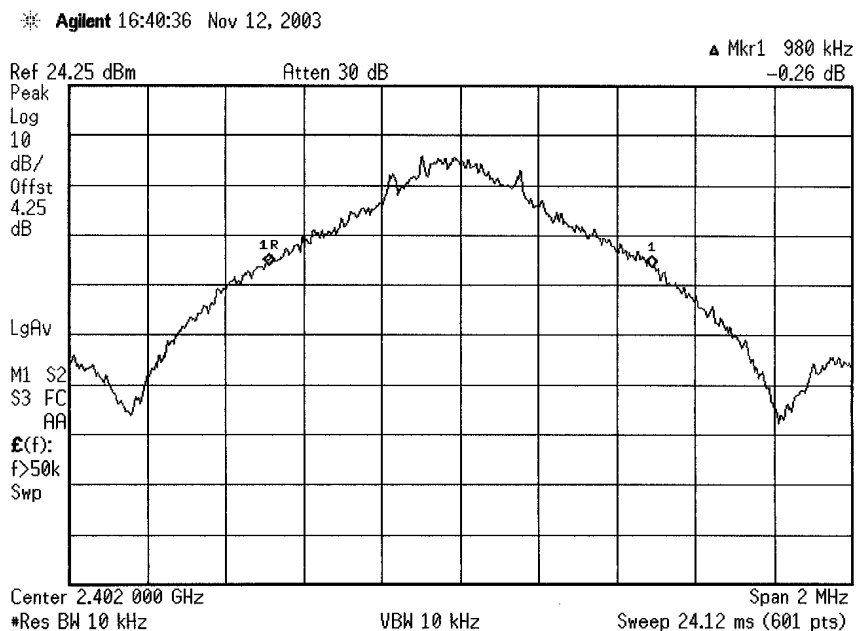
SC304743

SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

FCC 47 Part 15.247 (a)(1) Frequency Channel Separation
Limit = -20 dB Bandwidth (1 MHz) EUT Complies.

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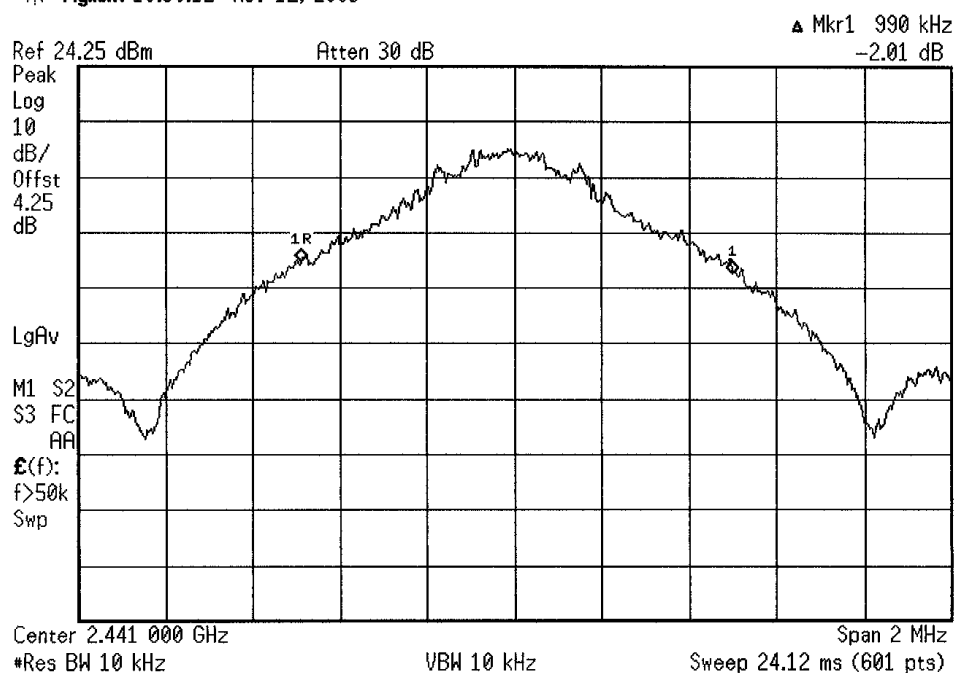
SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

-20 dB Bandwidth
Peak Hold, Modulation On, Low Channel

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* Agilent 16:39:12 Nov 12, 2003

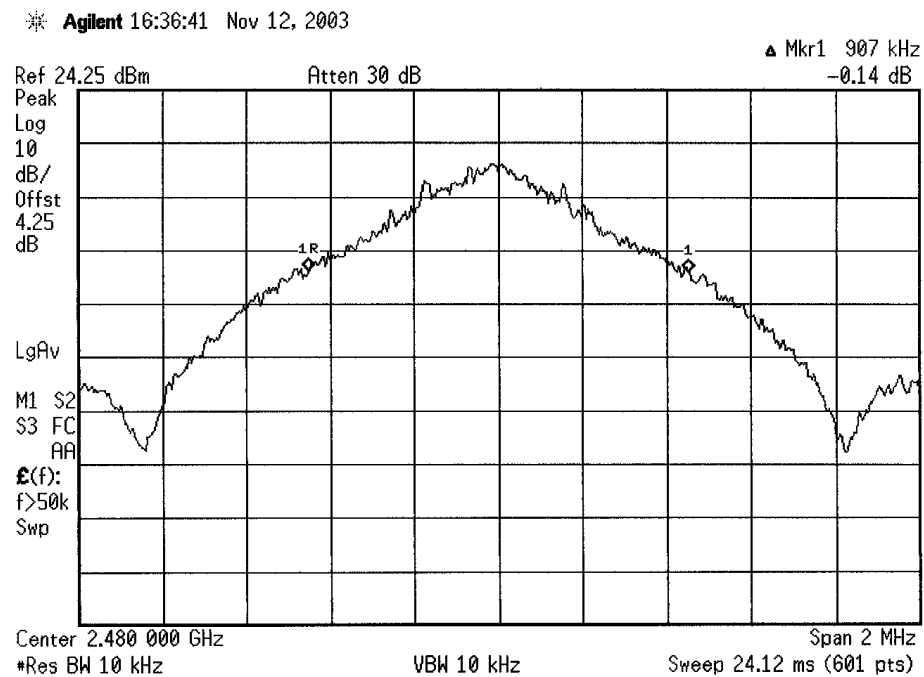


SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

-20 dB Bandwidth
Peak Hold, Modulation On, Mid Channel

Report No. SC304743-03



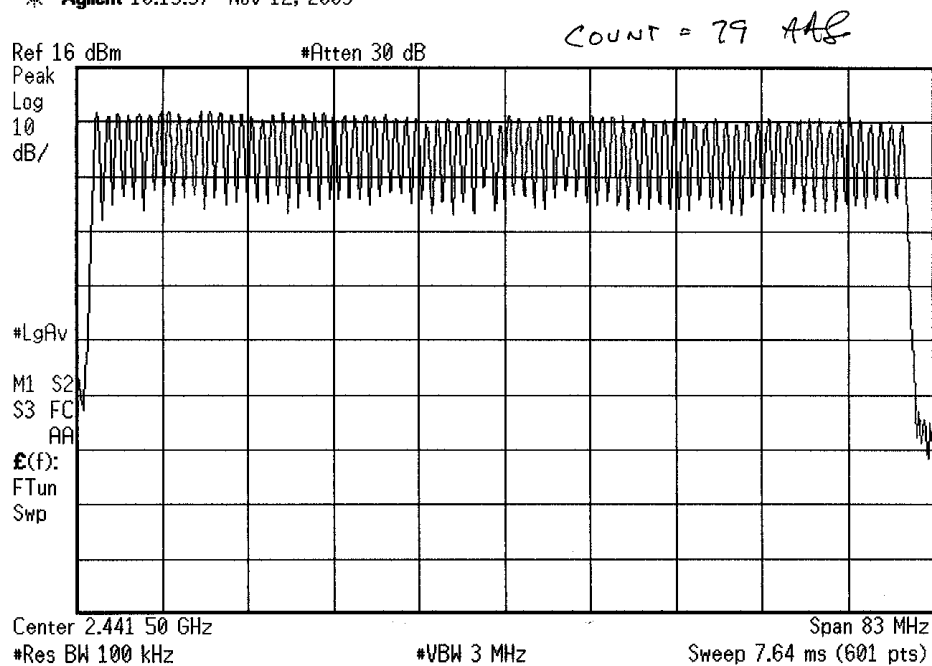
SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

-20 dB Bandwidth
Peak Hold, Modulation On, High Channel

Report No. SC304743-03

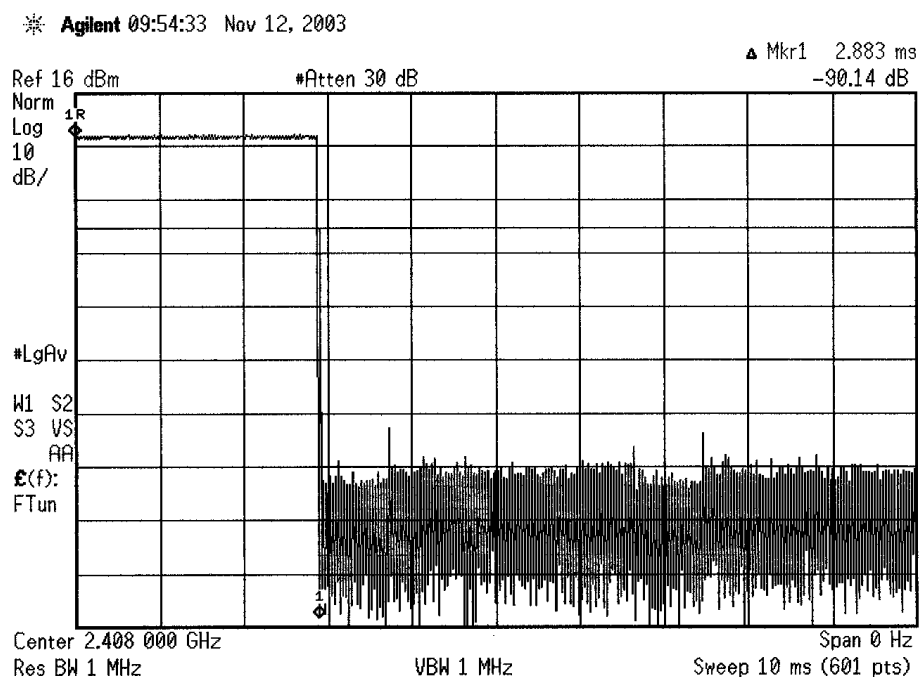
* Agilent 10:13:37 Nov 12, 2003



SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

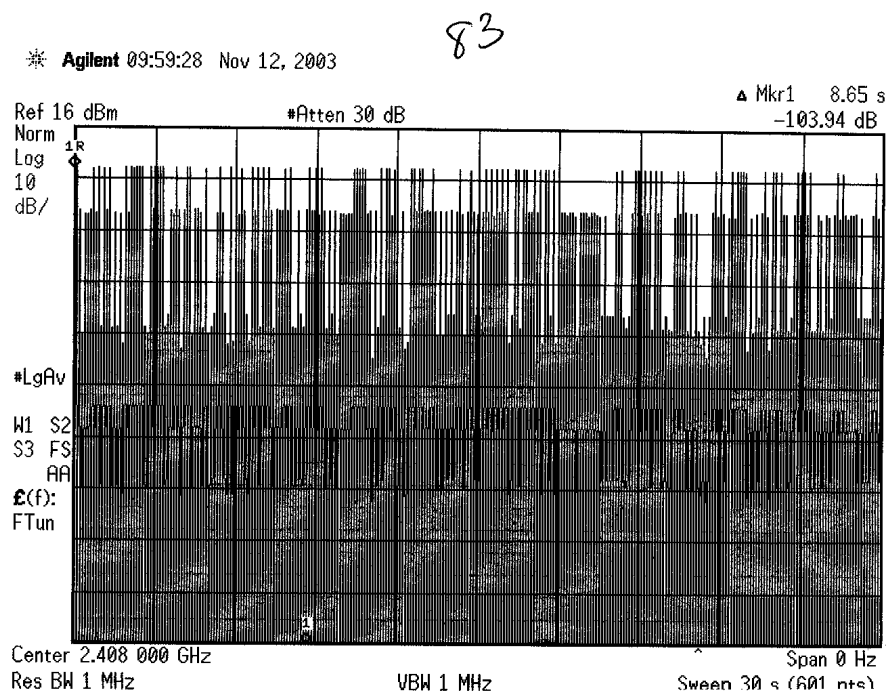
FCC 47 Part 15.247 (a)(1)(iii) Number of Hopping Frequencies **715**



SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

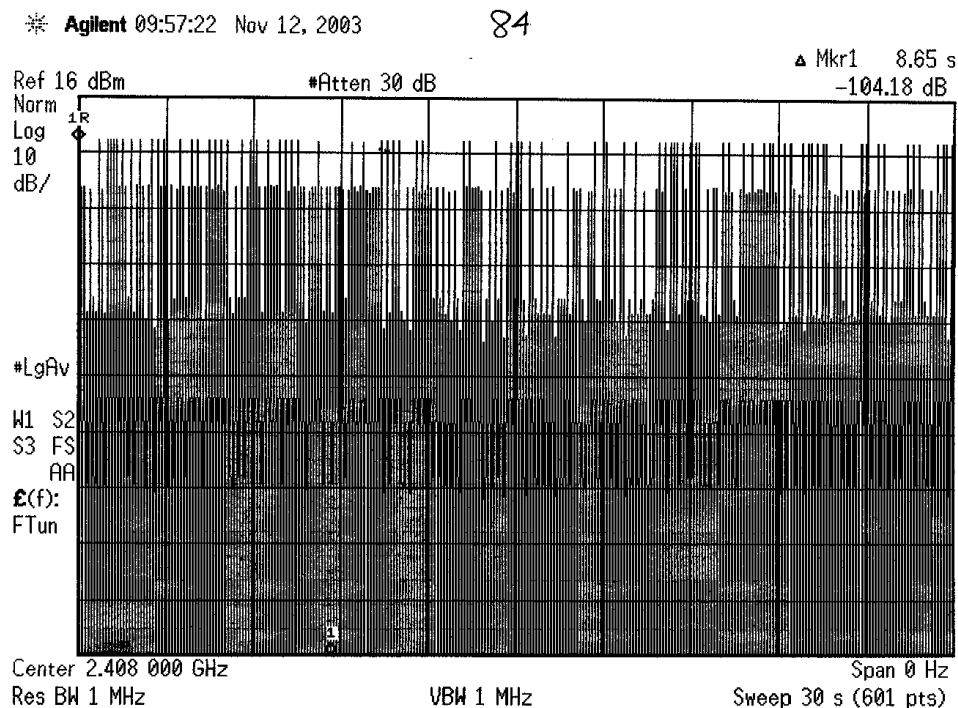
FCC 47 Part 15.247 (a)(1)(iii) Time of Occupancy
Result = $\frac{(83+84+97)}{3} \times 2.883 \text{ ms} = 0.2533 \text{ seconds} < 0.4 \text{ seconds}$ EUT Complies



SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

FCC 47 Part 15.247 (a)(1)(iii) Time of Occupancy
Result = $\frac{(83+84+97)}{3} \times 2.883 \text{ ms} = 0.2533 \text{ seconds} < 0.4 \text{ seconds}$ EUT Complies



SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

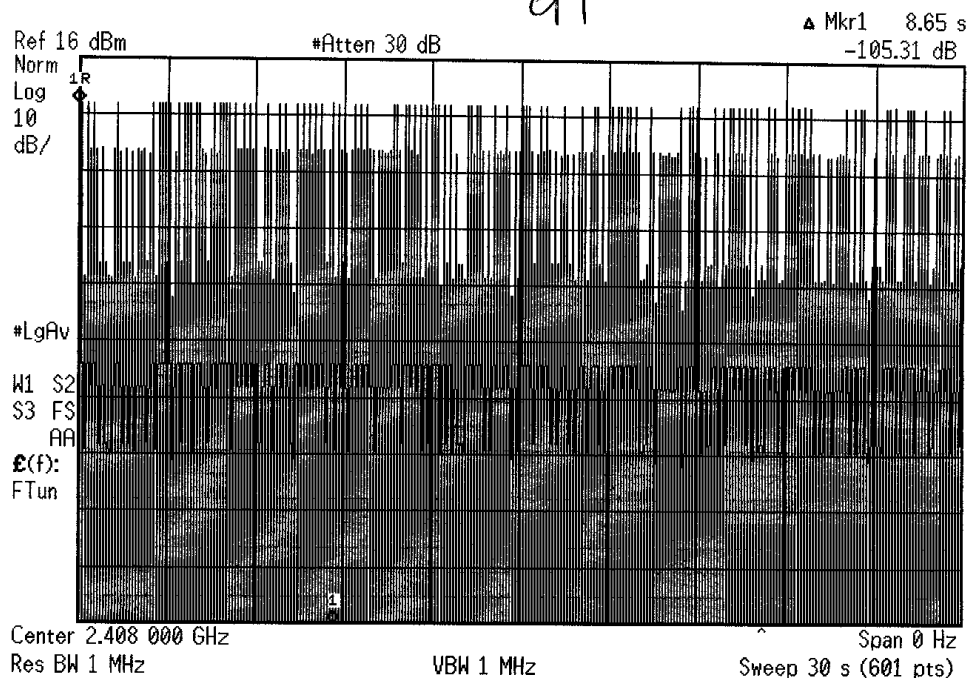
Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

FCC 47 Part 15.247 (a)(1)(iii) Time of Occupancy
Result = $\frac{(83+84+97)}{3} \times 2.883 \text{ ms} = 0.2533 \text{ seconds} < 0.4 \text{ seconds}$ EUT Complies

Report No. SC304743-03

Agilent 09:58:28 Nov 12, 2003

97



SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

FCC 47 Part 15.247 (a)(1)(iii) Time of Occupancy
Result = $\frac{83+84+97}{3} \times 2.883 \text{ ms} = 0.2533 \text{ seconds} < 0.4 \text{ seconds}$ EUT Complies

Report No. SC304743-03

6. RF POWER OUTPUT

6.1 EQUIPMENT

The *RF POWER OUTPUT* measurements were performed at the following test location :

☐ - Test not applicable

■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

Test Equipment Used :

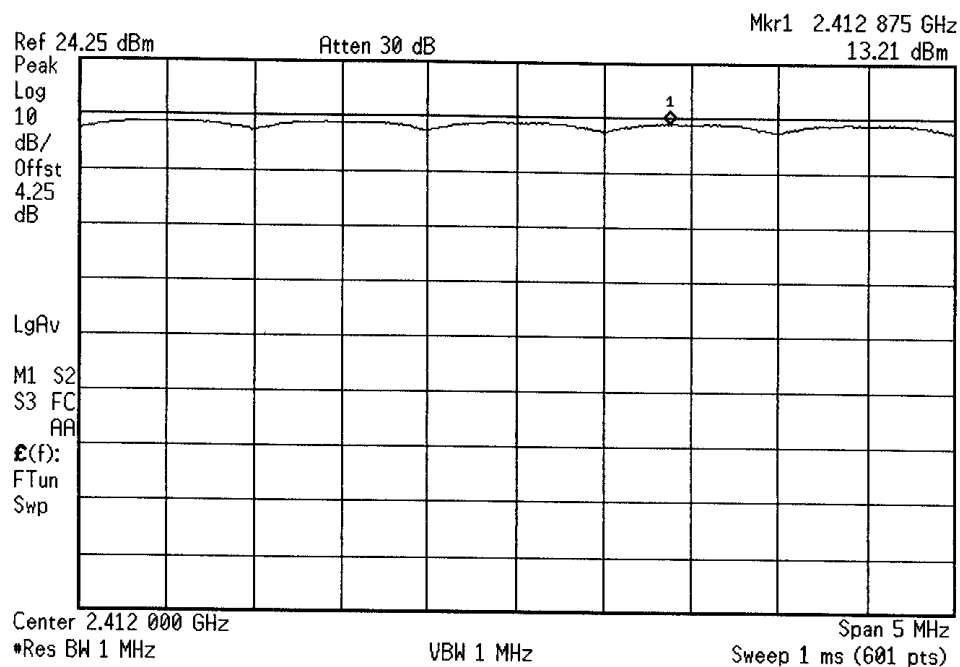
Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
E4440A	7500	Spectrum Analyzer	Hewlett Packard	MY43362168	08/04

Remarks: _____

Report No. SC304743-03

6.2 DATA

✱ Agilent 16:00:44 Nov 12, 2003



SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

FCC 47 Part 15.247 (b)(1) Peak Output Power < 1 Watt (30 dBm)
EUT Complies.

Report No. SC304743-03

SC304743
SYMBOL TECHNOLOGIES
MODEL Marlin BTH Radio

Nov. 12, 2003
TECH/ENGR: AAL
LOCATION: TR2

FCC 47 Part 15.247 (b)(1)

Antenna: Maxrad ISM portable duck antenna MHWR2400MSMA

Non-directional gain antenna used adding 2 dBi to power level
Peak Power Level 13.21 dBm + 2 dBi < 1 Watt (30 dBm)

EUT Complies.

Report No. SC304743-03

7. RADIATED SPURIOUS EMISSIONS

7.1 EQUIPMENT

The *Spurious EMISSIONS* measurements were performed at the following test location :

☐ - Test not applicable

Roof

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
HP8566B	744	Spectrum Analyzer	Hewlett Packard	2618A02913	12/03
AMF-5D-010180-35-10P	719	Preamplifier, 40 dB	Miteq	--	NCR
3115	2495	Horn Antenna	EMCO	--	12/05
11970K	6377	Horn Antenna	Scientific Atlanta	--	12/03
B8M50702	6815	High Pass Filter	Micro Tronics	008	NCR

Remarks: _____

7.1 DATA

REPORT NO: SC304/743	TESTER: Mark Lyon	SPEC: 15.247 (c) / 15.208(a)
CUSTOMER: Symbol Technologies		TEST DIST: 3 Meters
EUT: 21-64381 Martin BTH Radio	TEST SITE: Roof	
EUT MODE: Full Hopping DH-5	BICONICAL: N/A	
DATE: November 13, 2003	LOG: N/A	
NOTES:	Restricted Bands Ref. 15.205(b) above 1GHz: RBW & VBW 100 kHz for Pk; RBW 100 kHz and VBW 10Hz for AVG Range Investigated 1 GHz to 25 GHz Temp: 20 C RH: 65% CF = Antenna Factor + Cable Loss - Preamp/ifier Gain	

[illegible]

REPORT No: SC304743 TESTER: Alan Laudani SPEC: CFR 47 15.247 (b) (1)

CUSTOMER: Symbol Technologies TEST DIST: 3 Meters

E U T: 21-64381 Marlin BTH Radio TEST SITE: Roof

EUT MODE: Full Hopping DH-5 BICONICAL: N/A

DATE: November 13, 2003 LOG: N/A

NOTES: _____ OTHER: 251

above 1GHz: RBW & VBW 1 MHz for Pk

CF = Antenna Factor + Cable Loss

[illegible]

Report No. SC304743-03

8. CONDUCTED SPURIOUS MODULATION

8.1 EQUIPMENT

The *CONDUCTED SPURIOUS* measurements were performed at the following test location :

☐ - Test not applicable

■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

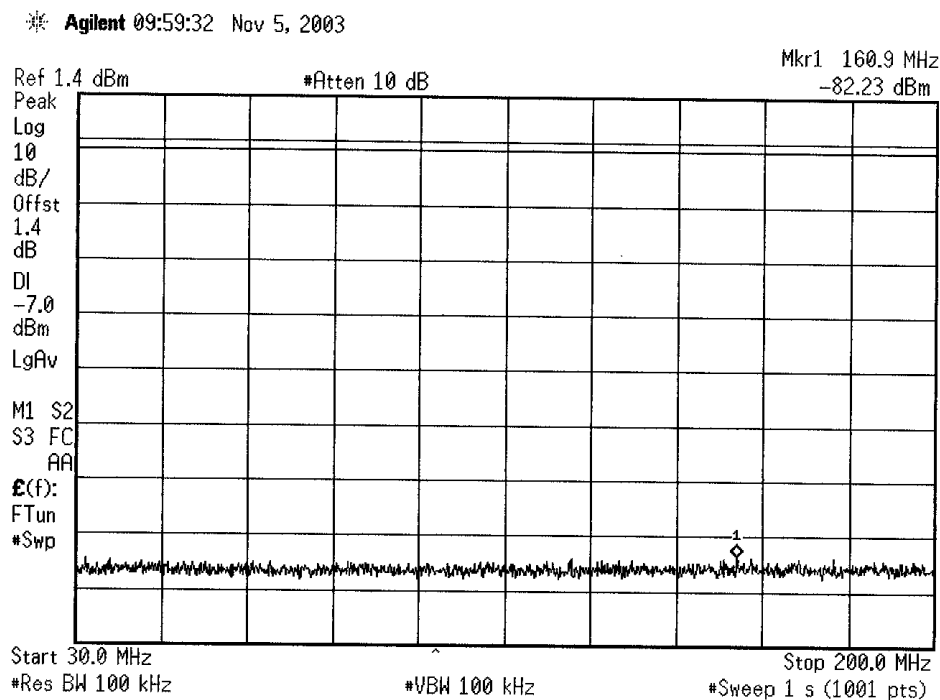
Test Equipment

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
23-40-34	762	40 dB Pad	Weinschel	BF4808	NCR
E4440A	7500	Spectrum Analyzer	Hewlett Packard	MY43362168	08/04
CBL6111	6521	Bilog Antenna	Chase Electronic	1291	NCR
34401A	6709	Multimeter	Hewlett Packard	3146A03945	09/04
23-40-34	762	40 dB Pad	Weinschel	BF4808	NCR

Remarks: _____

Report No. SC304743-03

8.2 DATA



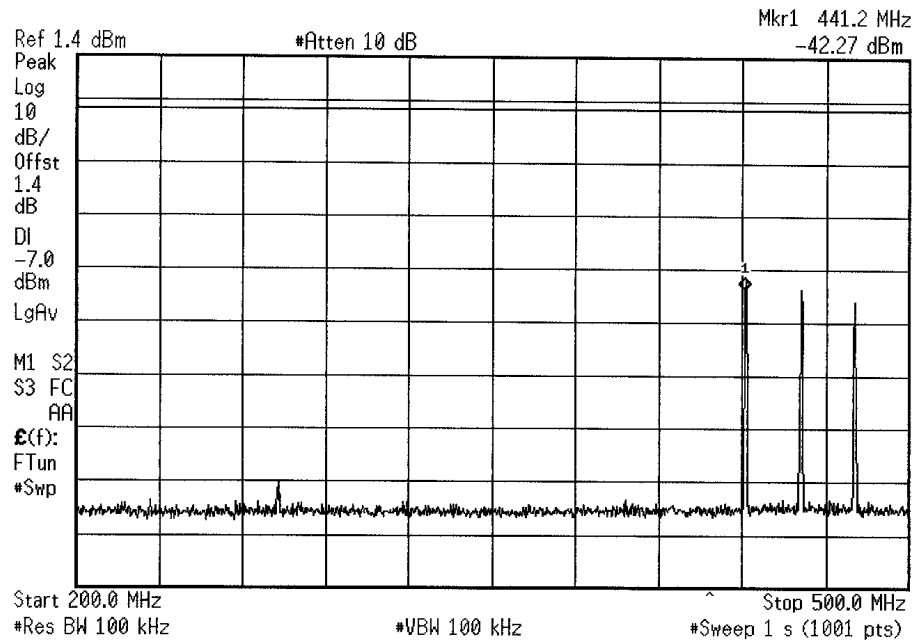
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

* Agilent 10:00:18 Nov 5, 2003



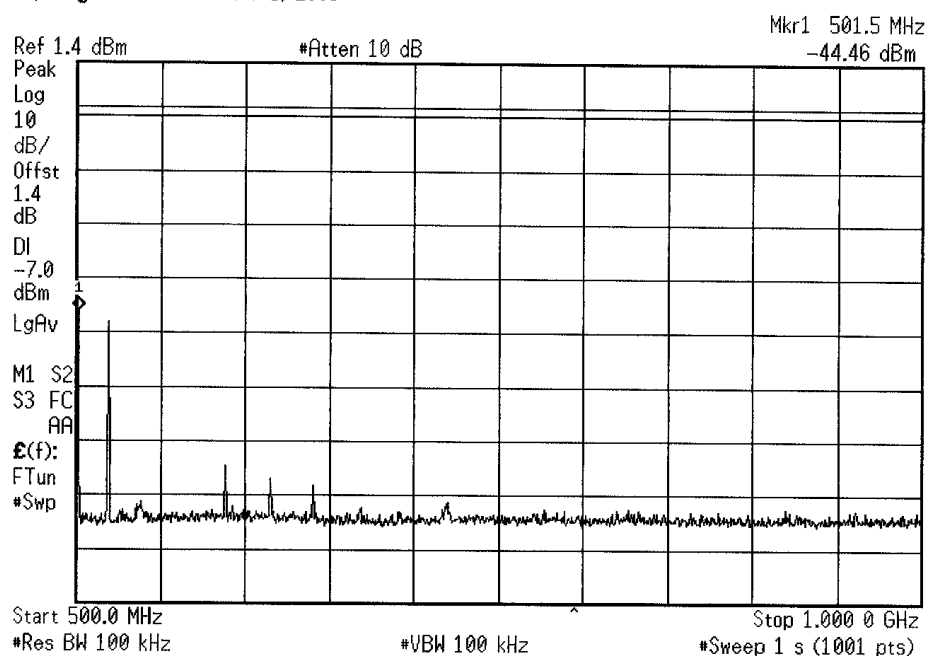
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Agilent 10:02:24 Nov 5, 2003

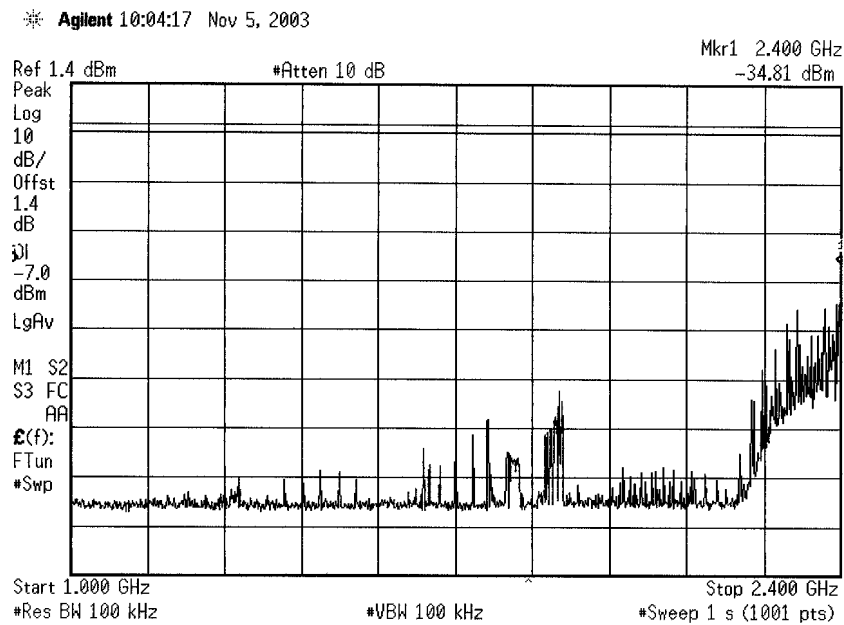


SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies



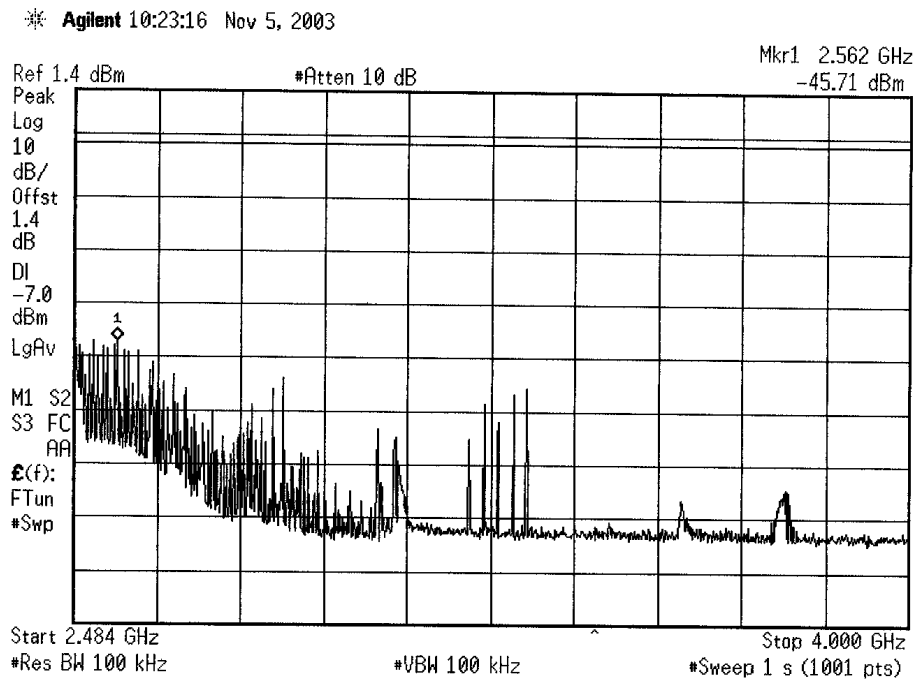
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03



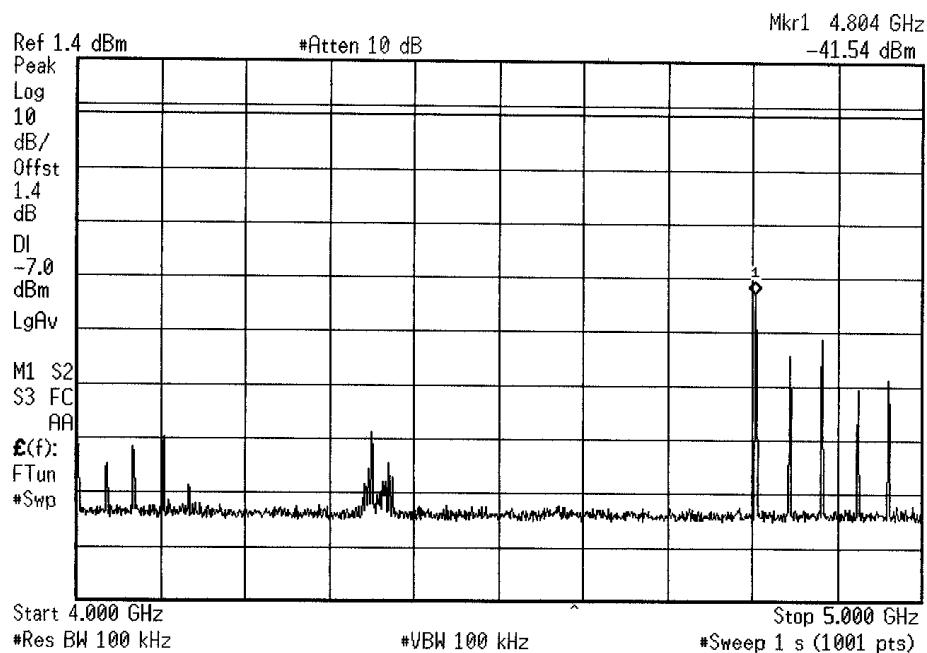
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

* Agilent 10:25:30 Nov 5, 2003



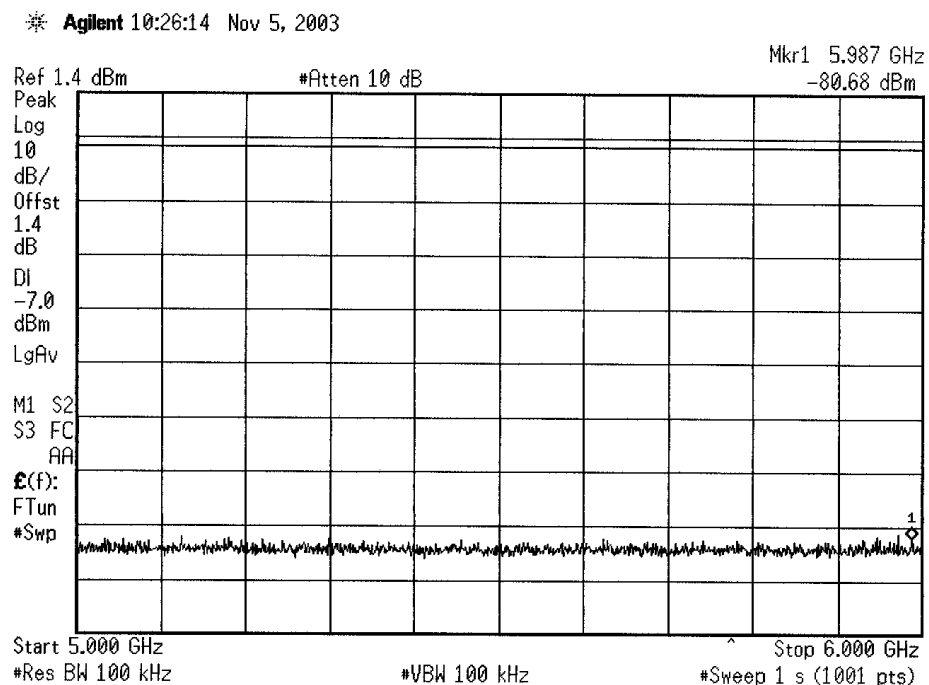
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03



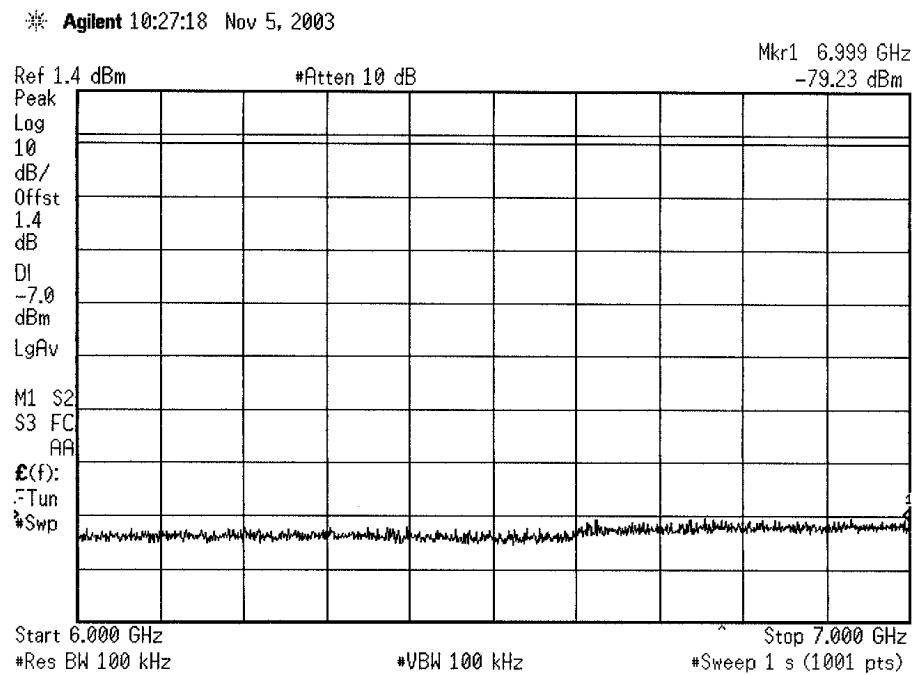
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03



SC304743
Symbol Technologies
MODEL Marlin BTH Radio

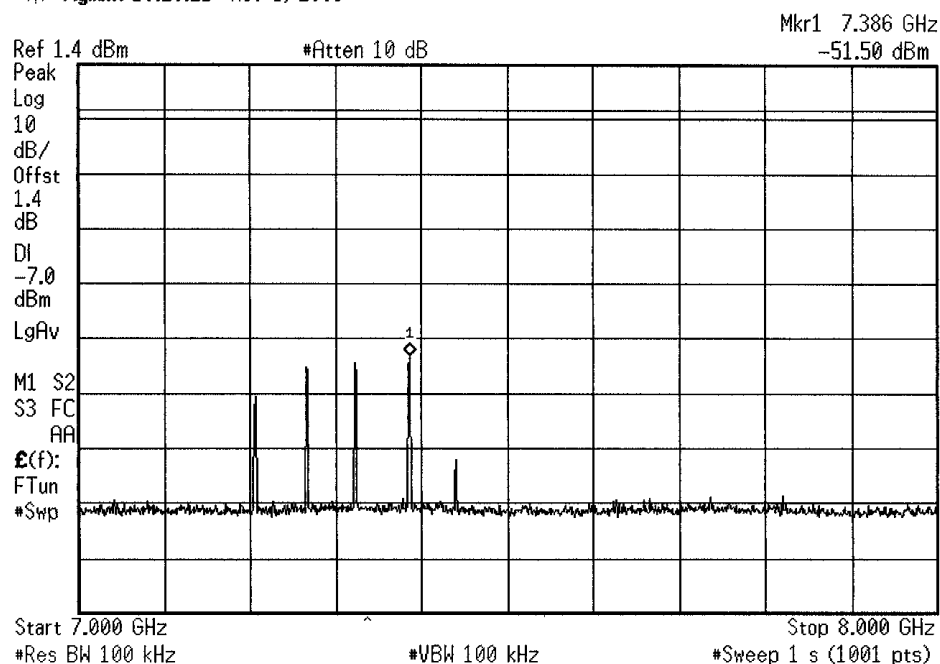
Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03

* Agilent 10:28:21 Nov 5, 2003

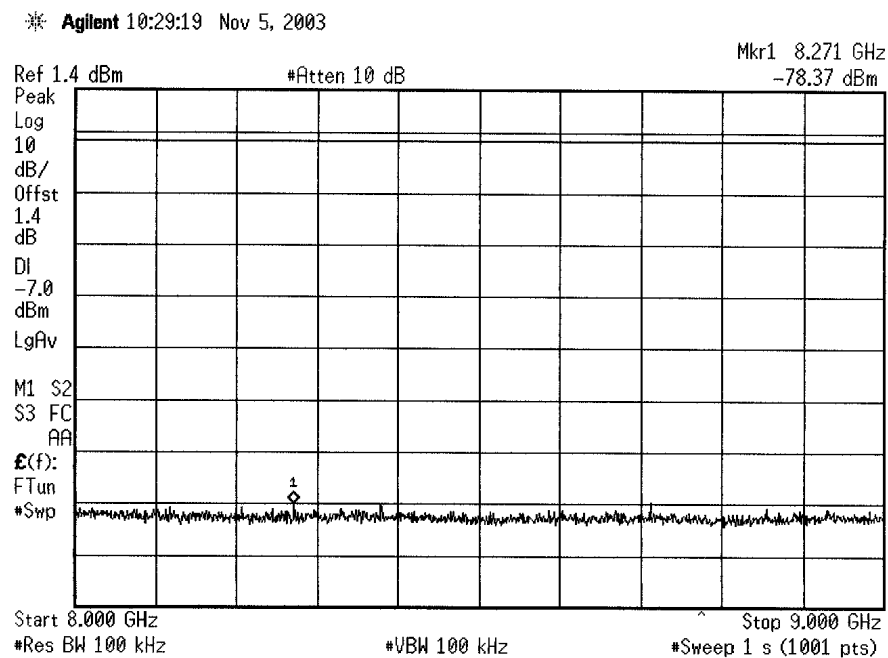


SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies



SC304743
Symbol Technologies
MODEL Marlin BTH Radio

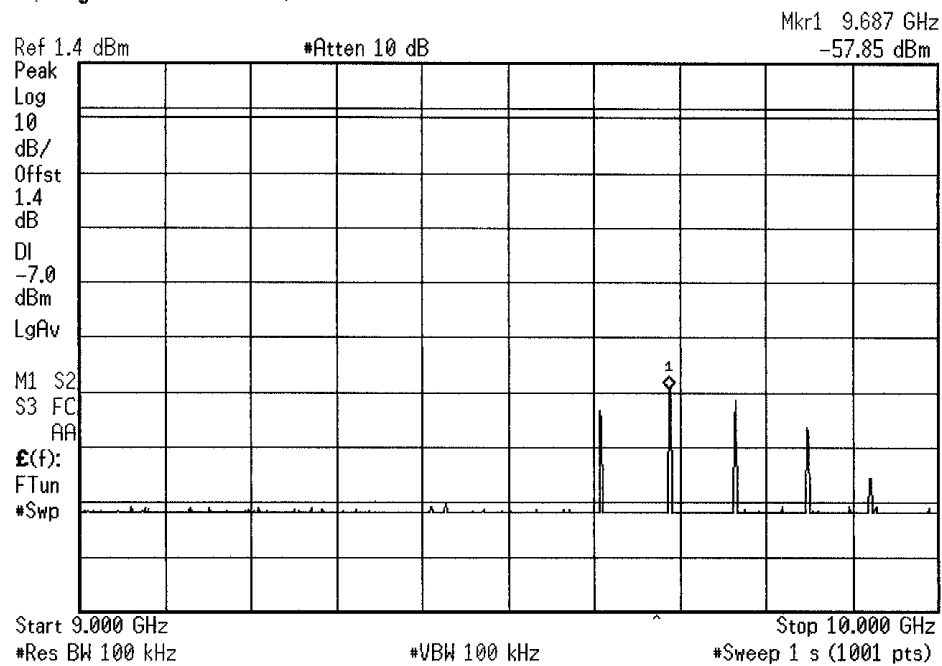
Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03

* Agilent 10:30:08 Nov 5, 2003



SC304743
Symbol Technologies
MODEL Marlin BTH Radio

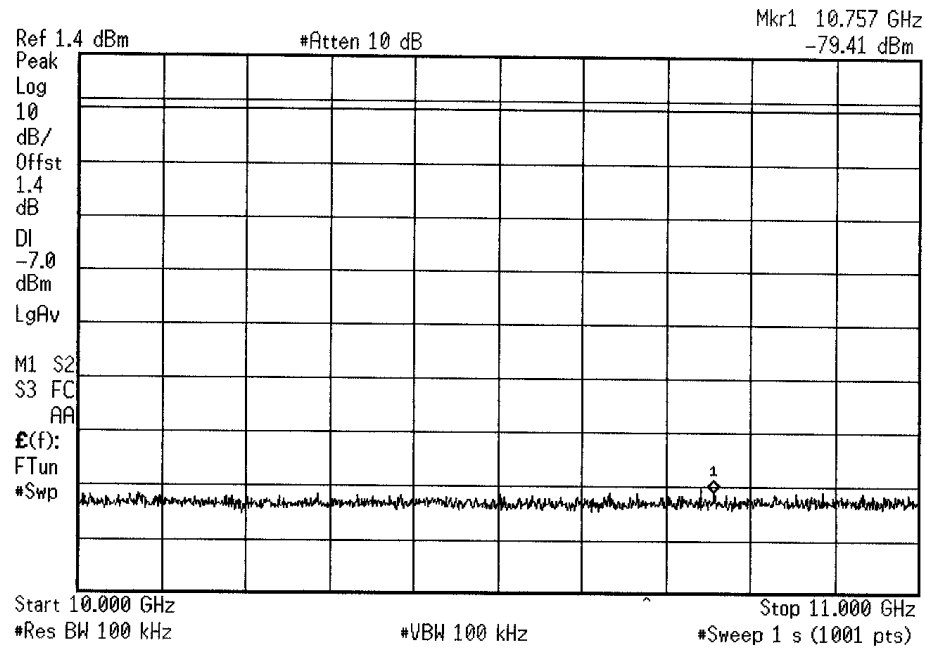
Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03

* Agilent 10:31:04 Nov 5, 2003



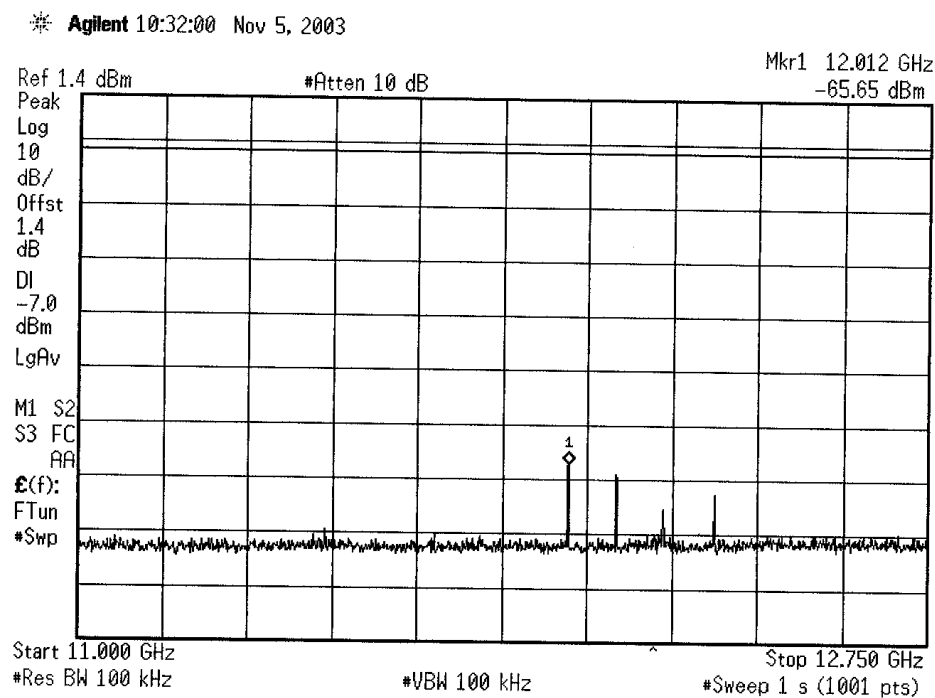
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03



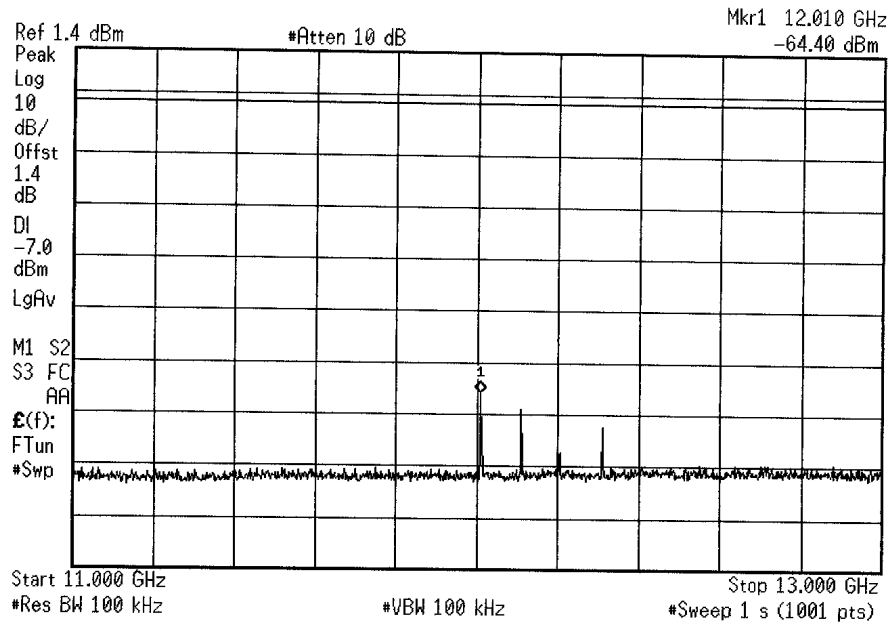
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

* Agilent 10:54:06 Nov 5, 2003



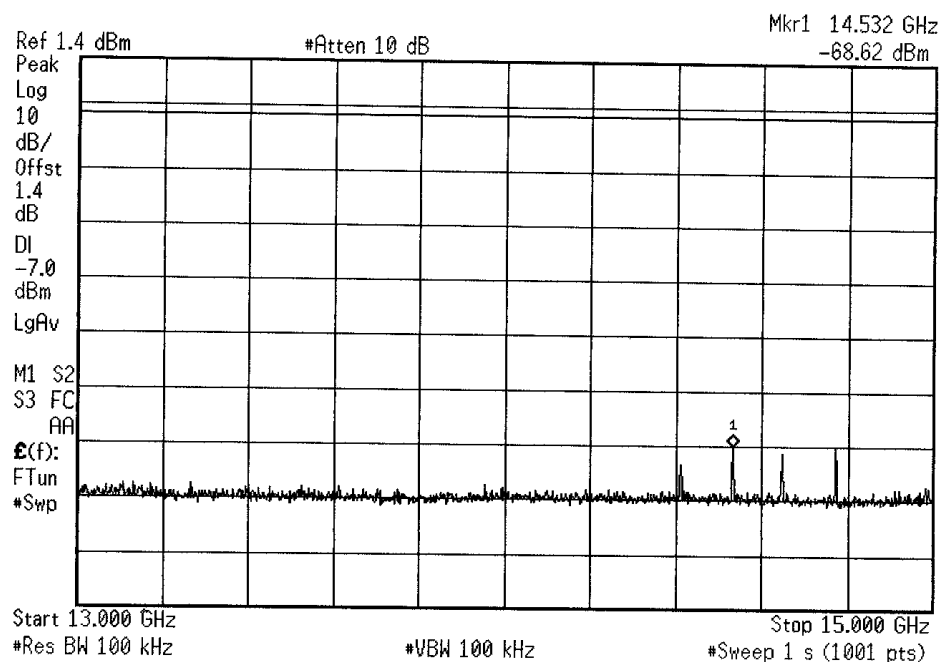
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

* Agilent 10:55:18 Nov 5, 2003



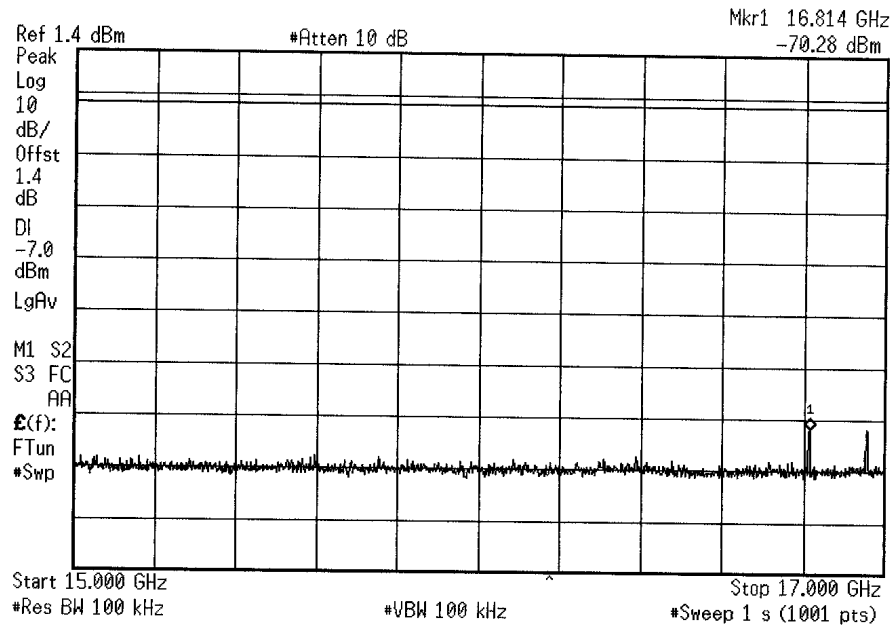
SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

* Agilent 10:56:07 Nov 5, 2003



SC304743
Symbol Technologies
MODEL Marlin BTH Radio

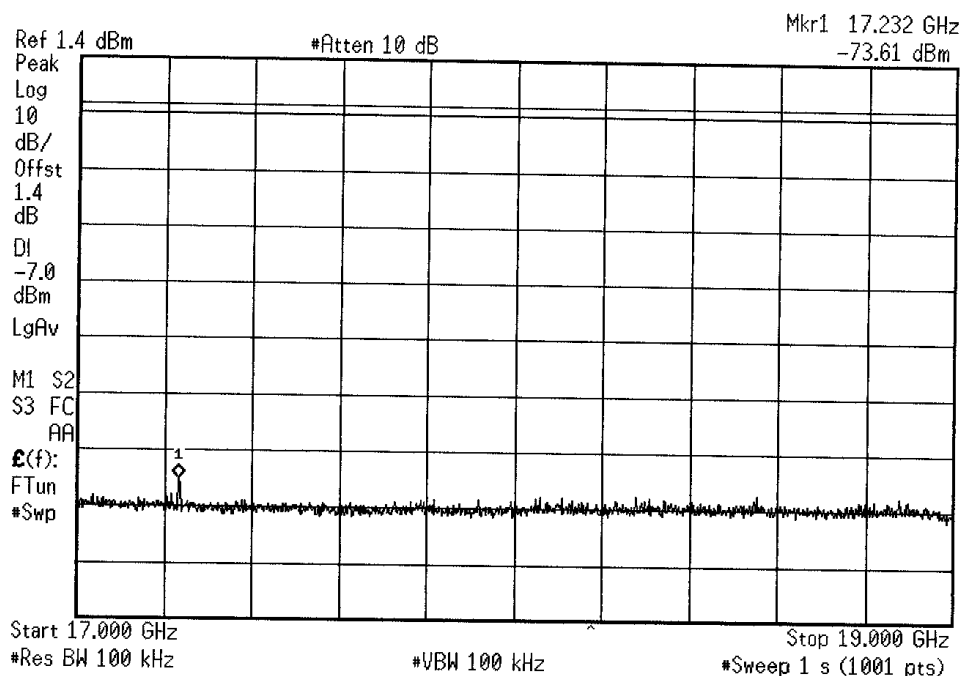
Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03

* Agilent 10:56:49 Nov 5, 2003



SC304743
Symbol Technologies
MODEL Marlin BTH Radio

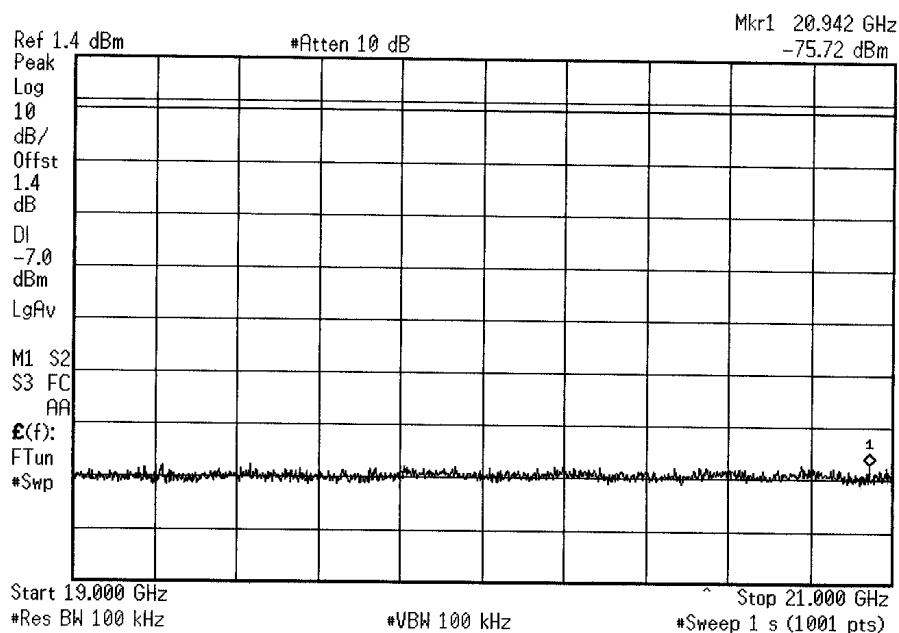
Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03

✱ Agilent 10:57:41 Nov 5, 2003

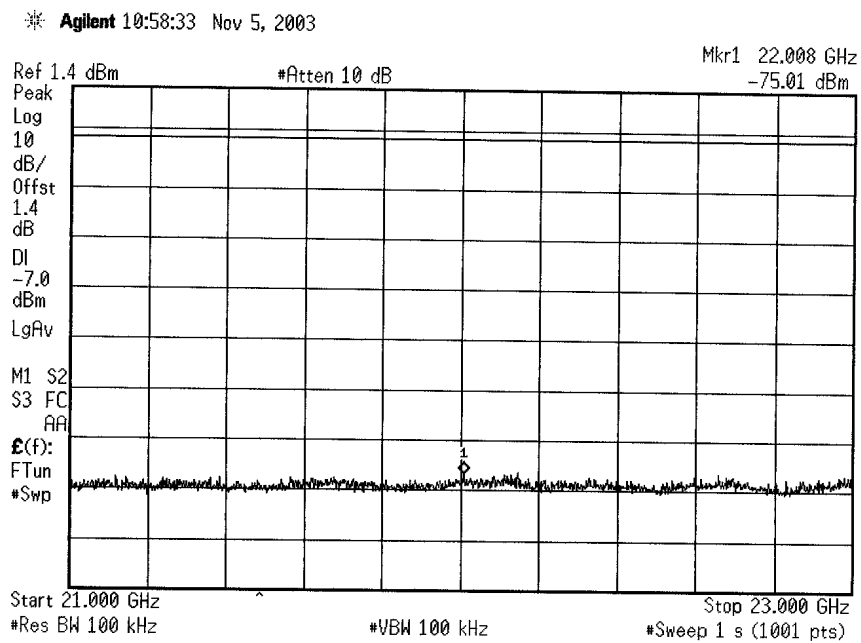


SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies



SC304743
Symbol Technologies
MODEL Marlin BTH Radio

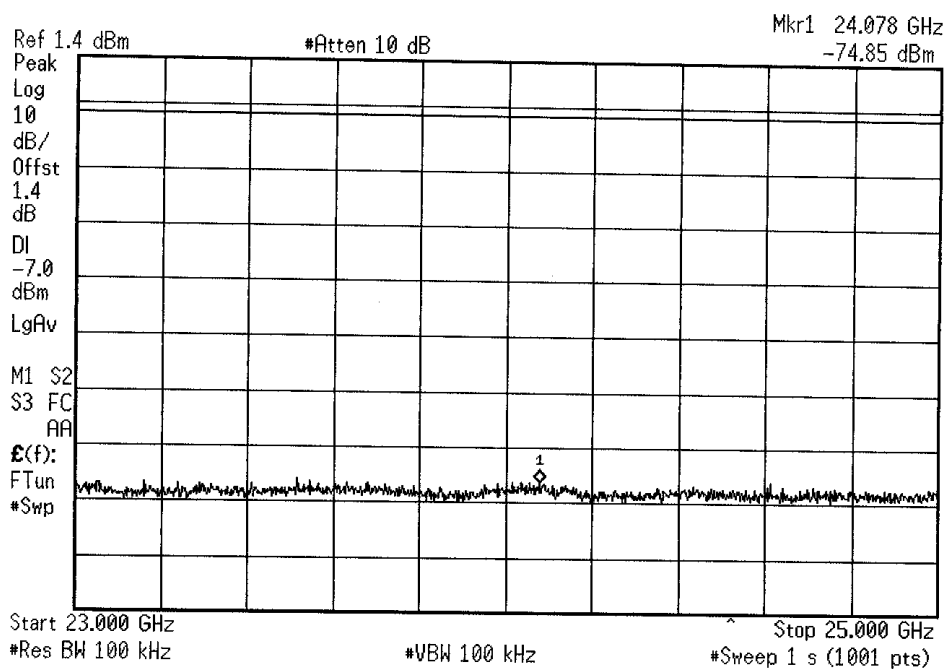
Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03

* Agilent 10:59:16 Nov 5, 2003



SC304743
Symbol Technologies
MODEL Marlin BTH Radio

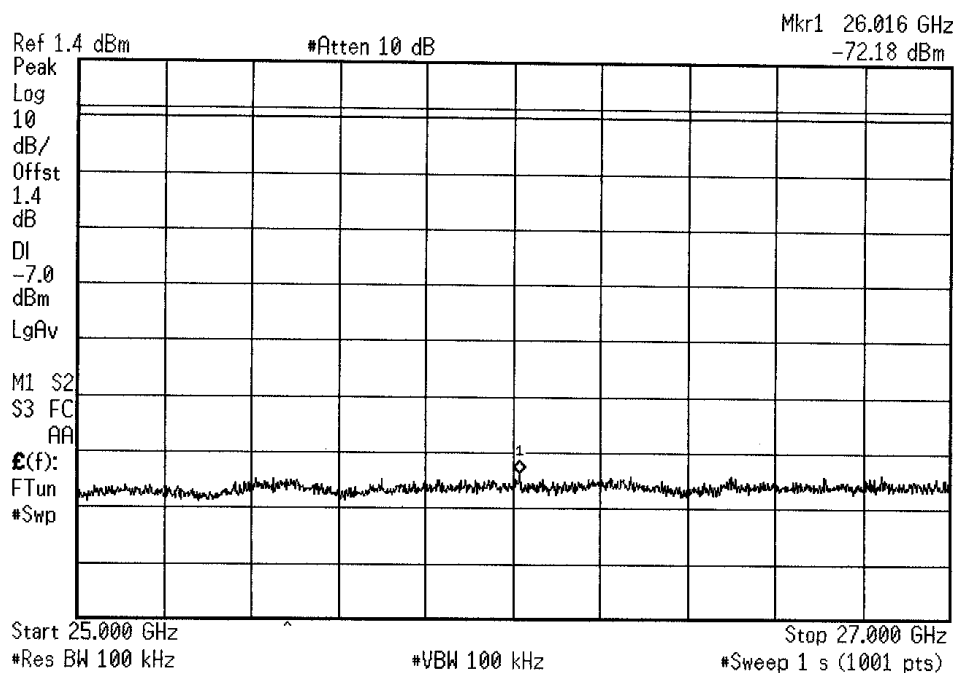
Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm- 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

Report No. SC304743-03

Agilent 11:00:21 Nov 5, 2003



SC304743
Symbol Technologies
MODEL Marlin BTH Radio

Nov. 19, 2003
TECH/ENGR: ML
LOCATION: TR2

FCC 47 Part 15.247 (c) Conductive Spurious
Limit = 20 dB below power of the Carrier.
= 13.2 dBm - 20 dB = -6.8 dBm
Display line set to -7 dBm

EUT Complies

9. ATTESTATION STATEMENT

GENERAL REMARKS:

SUMMARY:

All tests were performed per CFR 47, *Part 15, Paragraphs 15.207(a); 15209(a) 15.247(a)1, (a)1ii, (b)(1), (b)(3); (c).*

■ - Performed

The Equipment Under Test

■ - **Fulfills** the requirements of CFR 47, *Part 15, Paragraphs 15.207(a); 15209(a) 15.247(a)1, (a)1ii, (b)(1), (b)(3); (c).*

- TÜV AMERICA, INC. -

Responsible Engineer:



Jim Owen
EMC Engineer

Responsible Engineer:



Alan Laudani
EMC Engineer