



CERT NO: 208601

TEST REPORT #110209

STANDARD: FCC PART 15

SUBPART C--INTENTIONAL RADIATORS

**SECTION 15. 247 OPERATION WITHIN THE BANDS 902-928 MHZ,
2400-2483.5 MHZ, AND 5725-5850 MHZ**

EQUIPMENT TESTED:

RNK PRODUCTS

FCC ID: W7G RNKBT

PRE CORDIAL AMPLIFIER BT

MODEL: PA-BT

TEST DATE: 11 FEBRUARY, 2009

1100 Falcon Avenue
Glencoe, MN 55336



Tele: 320-864-4444
Fax: 320-864-6611

Prepared for: RNK Products, Inc.
12700 Diamond Drive
Burnsville, MN 55337

Test agent: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Test location: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Prepared by: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336

International Certification Services represents to the client that testing is done in accordance with standard procedures applicable and that reported test results are accurate within generally accepted commercial ranges of accuracy.

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

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

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1.0 TEST SUMMARY

TEST REPORT: #110209	
COMPANY:	RNK Products, Inc.
AGENT:	International Certification Services, Inc.
PHONE:	320-864-4444
TEST DATE:	11 February, 2009
EQUIPMENT UNDER TEST:	Amplifier precordial stethoscope with a Bluetooth wireless connection. Pre Cordial Amplifier BT Model: PA-BT
GENERAL TEST SUMMARY:	The testing was performed at International Certification Services, Inc. at 1100 Falcon Ave, Glencoe, MN 55336
VERIFICATION / CERTIFICATION STATUS:	The 2.4 Ghz Transmitter Pre Cordial Amplifier BT Model: PA-BT was found to be in compliance with the FCC Part 15 Subpart C, Section 15.247 requirements.
MODIFICATIONS NECESSARY:	None

TESTED BY

Steve Wendlandt



WRITTEN BY

Duane R. Bagdons



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Applicable Standards

47 CFR Ch.1 (10-1-98 Edition)
FCC Part 15 Radio Frequency Devices
Subpart C Intentional Radiators
Section 15.247 Operation within the bands 902-928 Mhz, 2400-2483.5 Mhz and 5725-5850 Mhz.

2.1 Referenced Standards

ANSI C63.4-2003 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 Khz to 40 Ghz.
FCC DA 00-705 Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

2.2 Equipment Units Tested

The equipment tested was a battery powered 2.4 Ghz transmitter Pre Cordial Amplifier BT model: PA-BT. This device uses a CSR BlueCore 3 Multimedia chip coupled to an Antenova P/N: A5645 SMD antenna. The battery power source is 2 AA batteries in series regulated down to 1.8 VDC. The transmit burst duration is controlled by the CSR BlueCore 3 Multimedia processor to a length of around 325 mS. This time is controlled by the internal firmware of the chip.

2.3 Equipment and Cable Configuration

See photo of the EUT test configuration setup in Attachment A

2.4 List of Test Equipment

<u>Test Equipment</u>	<u>Model</u>	<u>S/N</u>	<u>Calibration Date</u>
Spectrum Analyzer	Hewlett-Packard 8566B	2421A00458	01/25/08
Preamp	Nextec NB0031	378	06/09/08
Horn Antenna (1-18 Ghz)	EMCO 3115	5697	08/30/07

Measurement cable losses, and antenna correction factors are included in the data sheets. The Resolution BW was set at 1 Mhz and the Video BW was set at 1 Hz with a Span of 0 Hz to perform the correct average detected measurements over 1000 Mhz.

2.5 Units of Measurement.

All measurements were taken in dBuV/m with the antenna located at 1 meter distance from the EUT. Frequency measurements are recorded in Mhz

2.6 Location of Test Site

The open area test site (OATS) measurement facility used to collect the data was International Certification Services, Inc. at 1100 Falcon Ave in Glencoe, MN 55336. This site has been certified to be in spec of the normalized site attenuation per ANSI C63.4-2003.

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2.7 Measurement Procedures

The antenna was placed at a distance of 1 meter from the EUT. The EUT was set on an insulating table in the OATS site and rotated through 360 degrees to determine the worst case EUT orientation. The antenna was then positioned vertical and horizontal to determine which antenna polarity orientation was worst case. Then certification data was recorded at all the transmitter frequencies from the fundamental to the 10th harmonic at an antenna height variation of from 1-4 meters.

2.8 Reporting Measurement Data

See data sheets and plots in Attachment B.

2.9 Radiated Emissions Data

The frequency and amplitude of the tuned frequency of the EUT along with the frequencies and amplitudes of the harmonics up to the 10th harmonic are reported in the data sheets in Attachment B. This information is plotted against the limit of section 15.247 of FCC Part 15 subpart C. Both Horizontal and Vertical antenna polarities as well as antenna heights of 1 to 4 meters were observed but all maximum signal strengths occurred in the Horizontal antenna polarity and at 1 meter antenna height.

The Final Level, expressed in dBuV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBuV) and adding the antenna correction factor and cable loss factor (Factor dB) and subtracting the preamp gain. This result then has the FCC limit subtracted from it to provide the margin which gives the tabular data as shown in the data sheets in Attachment B.

Example:

<u>Frequency</u>		<u>Level</u>	+	<u>Factor</u>	=	<u>Corr Data</u>	-	<u>FCC Limit</u>	=	<u>Margin</u>
<u>(MHz)</u>		<u>(dBuV)</u>	+	<u>(dB)</u>	=	<u>(dBuV/m)</u>	-	<u>(dBuV/m)</u>	=	<u>(dB)</u>
100.0		20.6	+	11.0	=	31.6	-	43.5	=	-11.9

2.10 Operating Frequency Data for Intentional Radiators

All operating frequencies and harmonic frequencies and ambient temperature at which all data was taken at, is recorded in the data sheets in Attachment B.

2.11 Occupied Bandwidth Data for Intentional Radiators

The occupied BW data for the EUT is listed in the data sheets in Attachment B.

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2.12 Summary of Results

The EUT passed the requirements of FCC Part 15 Subpart C, Section 15.247 with a maximum output power of 0.00309 Watts. This power was measured using the signal substitution method at three frequencies in the band (low channel, Middle channel, and high channel) against an allowable limit of 1.0 Watt since the device uses 79 hopping channels (more than 75 channels). No modifications were necessary to accomplish this compliance.

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ATTACHMENT A

RADIATED MEASUREMENT

TEST SET UP

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**RNK Products, Inc.
Pre Cordial Amplifier BT
Model: PA-BT
Radiated Emissions**



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ATTACHMENT B

DETAILED TEST DATA SHEETS

Each radiated emissions plot indicates the receiving antenna measurement distance in meters and the emission amplitudes with respect to their applicable limits. The associated tabulation for each radiated plot lists the emission frequency, the final emission level, and the margin from the limit.

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RNK Products, Inc.
 Pre Cordial Amplifier BT
 Model: PA-BT
 Temperature: 14.2 Deg C.
 Humidity: 44 % R.H.

Test Technician: Duane R. Bagdons

Center Frequency: 2402 Ghz (low channel)
 2441 Ghz (mid channel)
 2480 Ghz (high channel)

Preliminary testing was done to determine what antenna polarity and antenna height generated the highest signal levels. Tests were performed at this test configuration and then each frequency was maximized to 0-360 degrees orientation and antenna height of 1-4 meters.

15.247 (a) (1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 Mhz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mS. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo-randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

The Microprocessor chip (CSR BlueCore-3) built in firmware controls the output protocol such as frequency usage and receiver bandwidths.

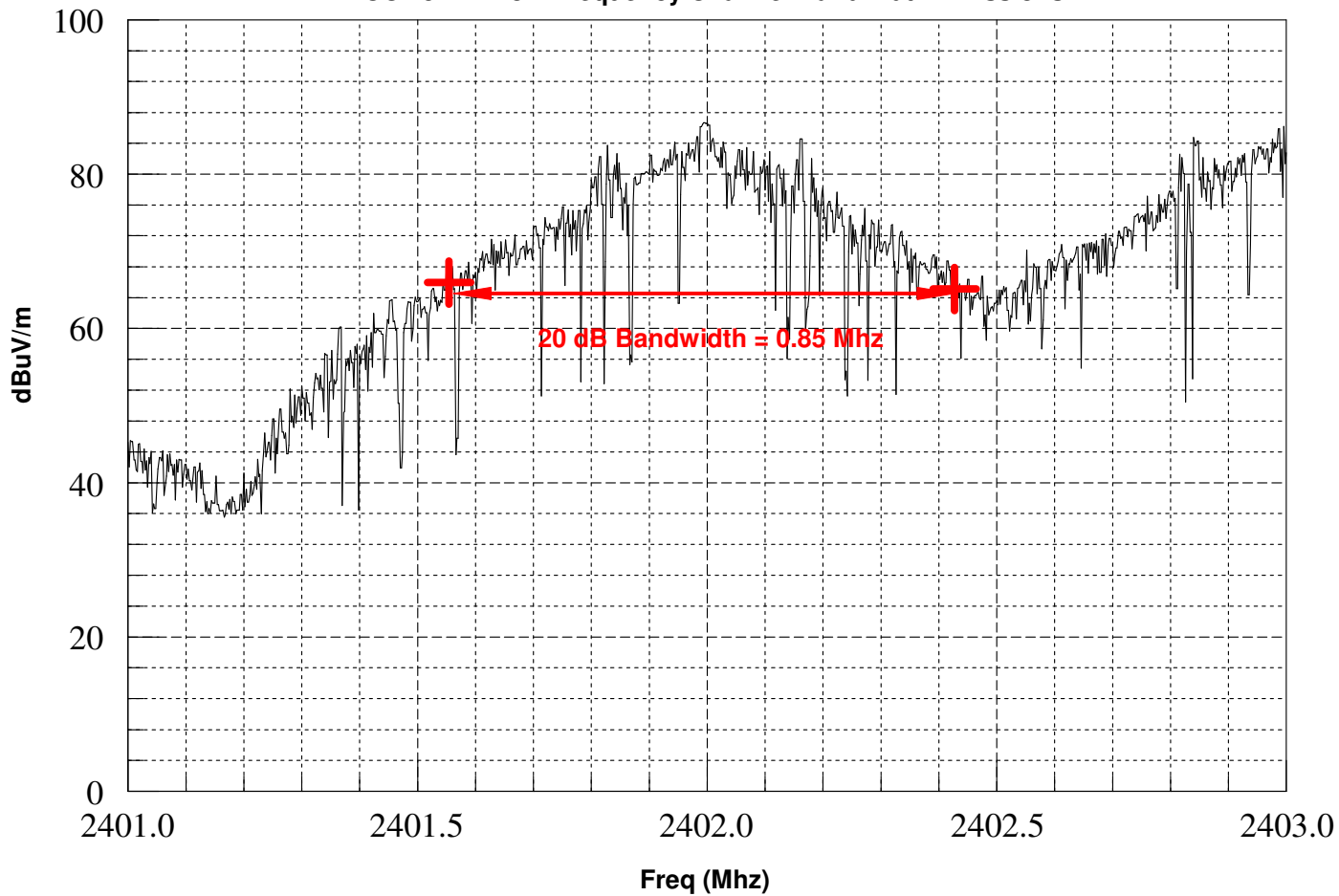
Channel	Frequency (Ghz)	Amplitude (dBuV/m)	20 dB BW (Mhz)
<i>Low Channel</i>	2401.6	66.5608	
	2402	86.6616	0.85
	2402.45	66.3625	
<i>Mid Channel</i>	2440.59	69.3608	
	2441	88.9616	0.84
	2441.43	69.2624	
<i>High Channel</i>	2478.35	69.4603	
	2479	89.4616	1.0
	2479.35	69.2623	

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RNK Products, Inc.
Model: PABT
FCC 15.247 Low Frequency Channel Bandwidth Emissions



International Certification Services, Inc.

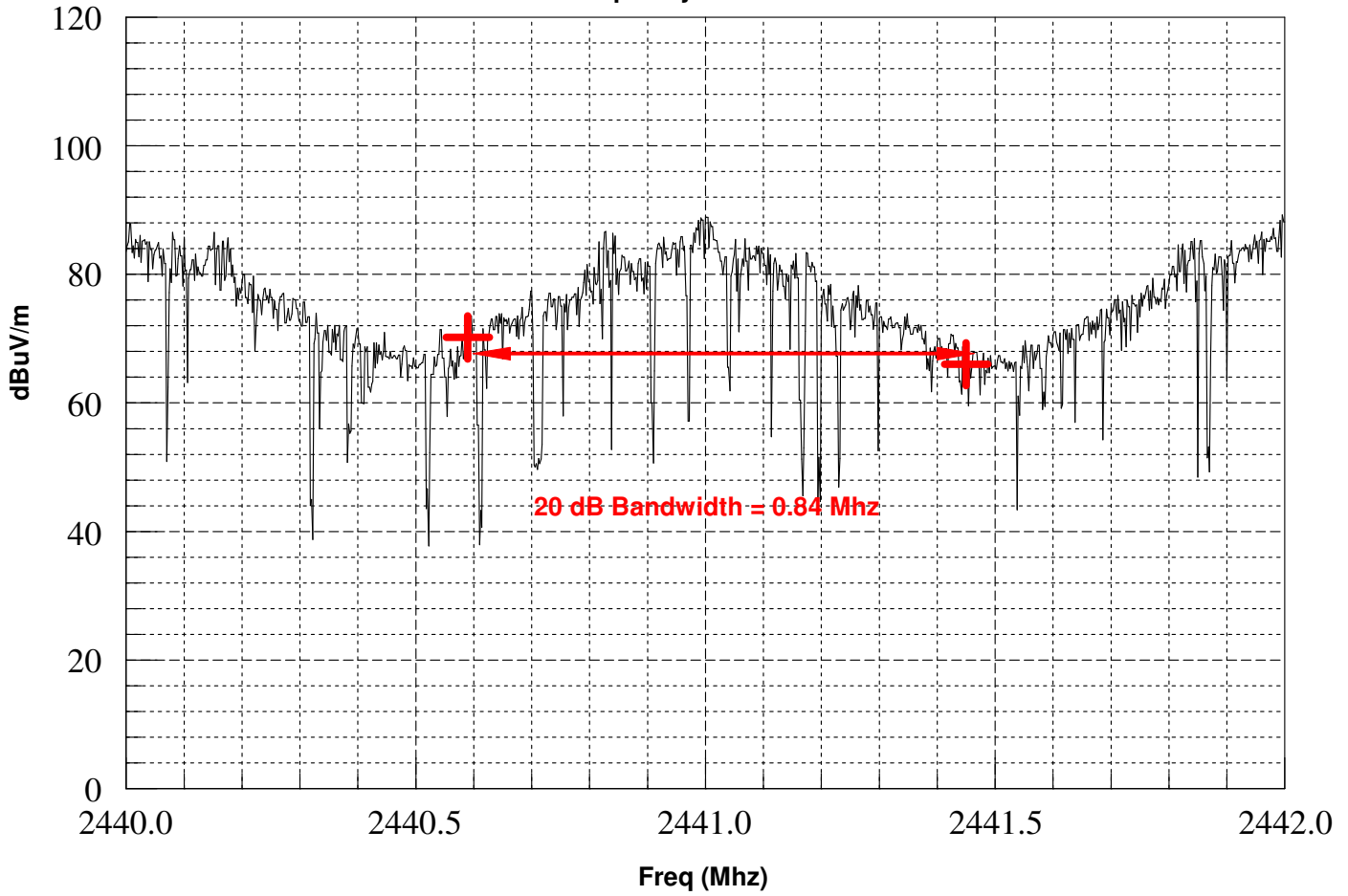
March 27, 2009

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CERTIFICATION SERVICES, INC.

RNK Products, Inc.
Model: PABT
FCC 15.247 Middle Frequency Channel Bandwidth Emissions



International Certification Services, Inc.

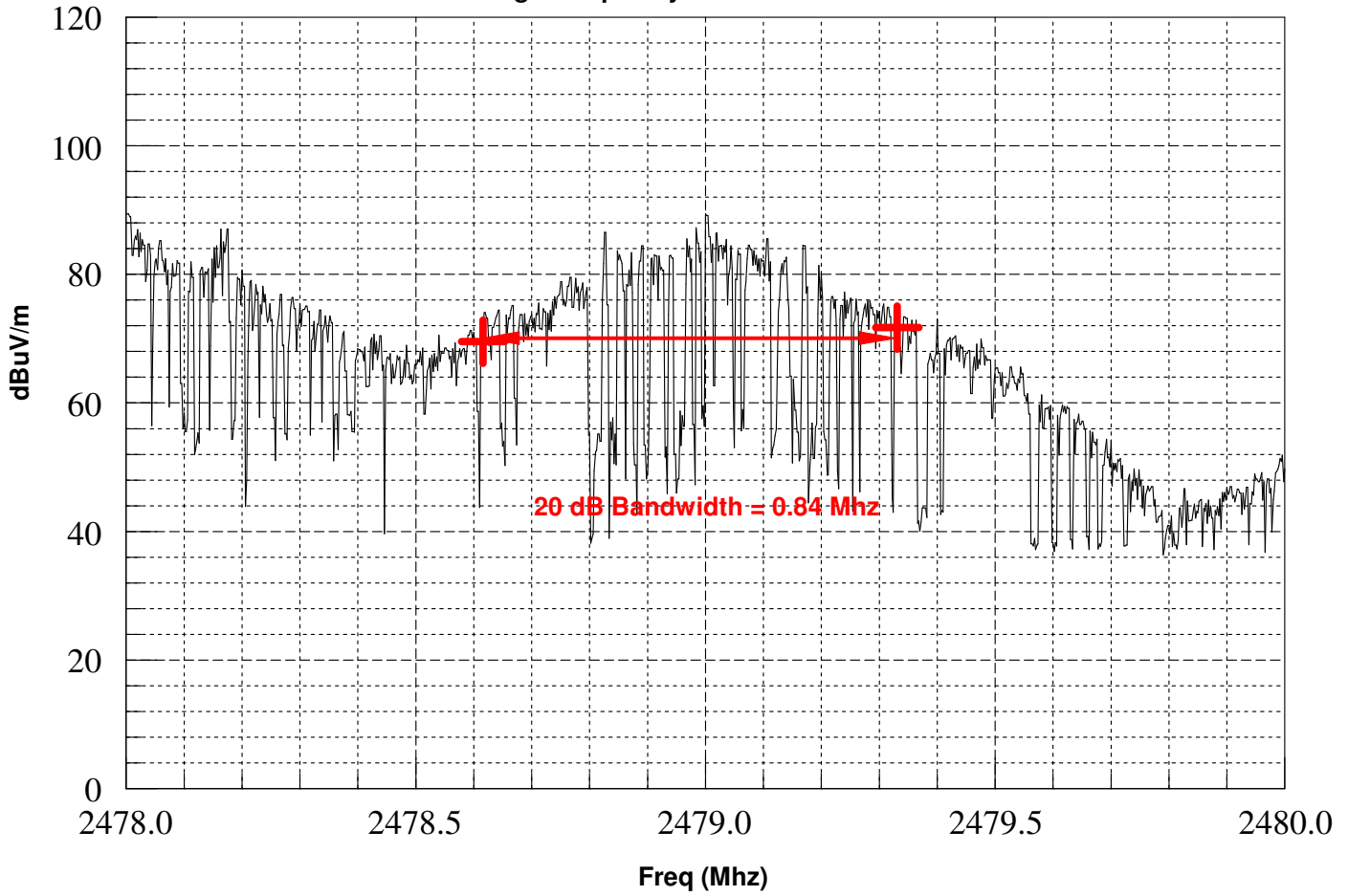
March 27, 2009

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CERTIFICATION SERVICES, INC.

RNK Products, Inc.
Model: PABT
FCC 15.247 High Frequency Channel Bandwidth Emissions



International Certification Services, Inc.

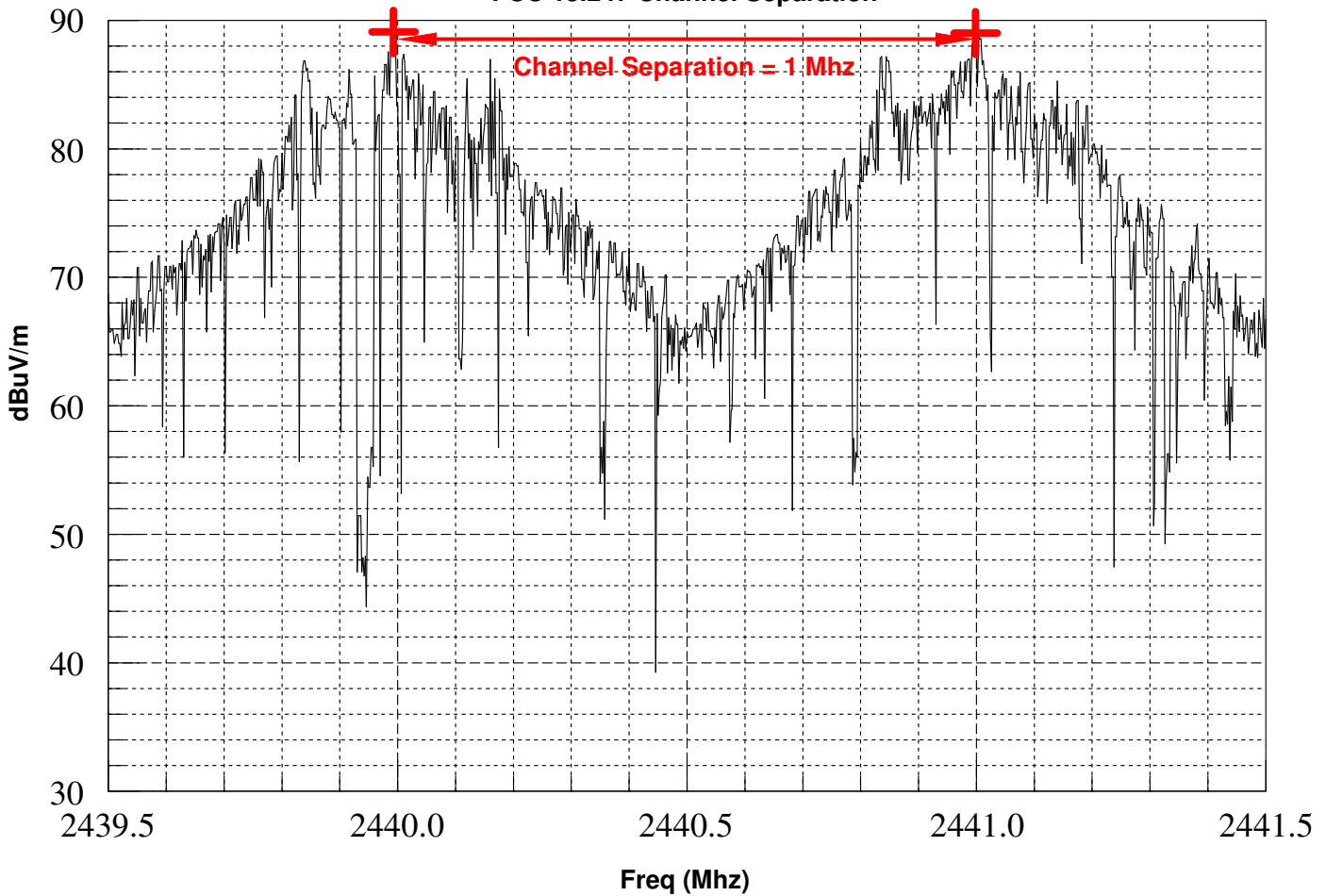
March 27, 2009

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RNK Products, Inc.
Model: PABT
FCC 15.247 Channel Separation



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March 27, 2009

15.247 (a) (1) (i) N/A

15.247 (a) (1) (ii) N/A

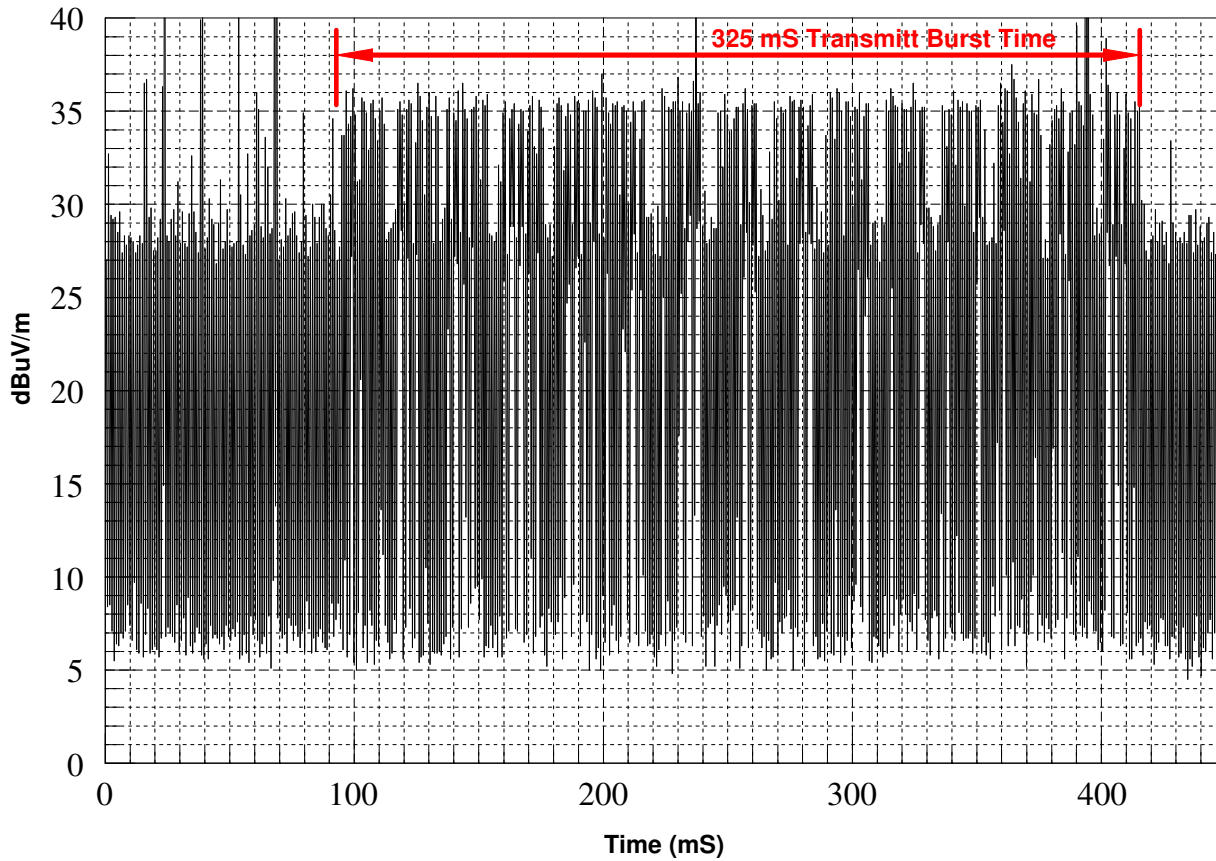
15.247 (a) (1) (iii) Frequency hopping systems in the 2400 – 2483.5 Mhz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

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Model: PA-BT
FCC 15.247 Transmitt Burst time



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15.247 (a) (2)

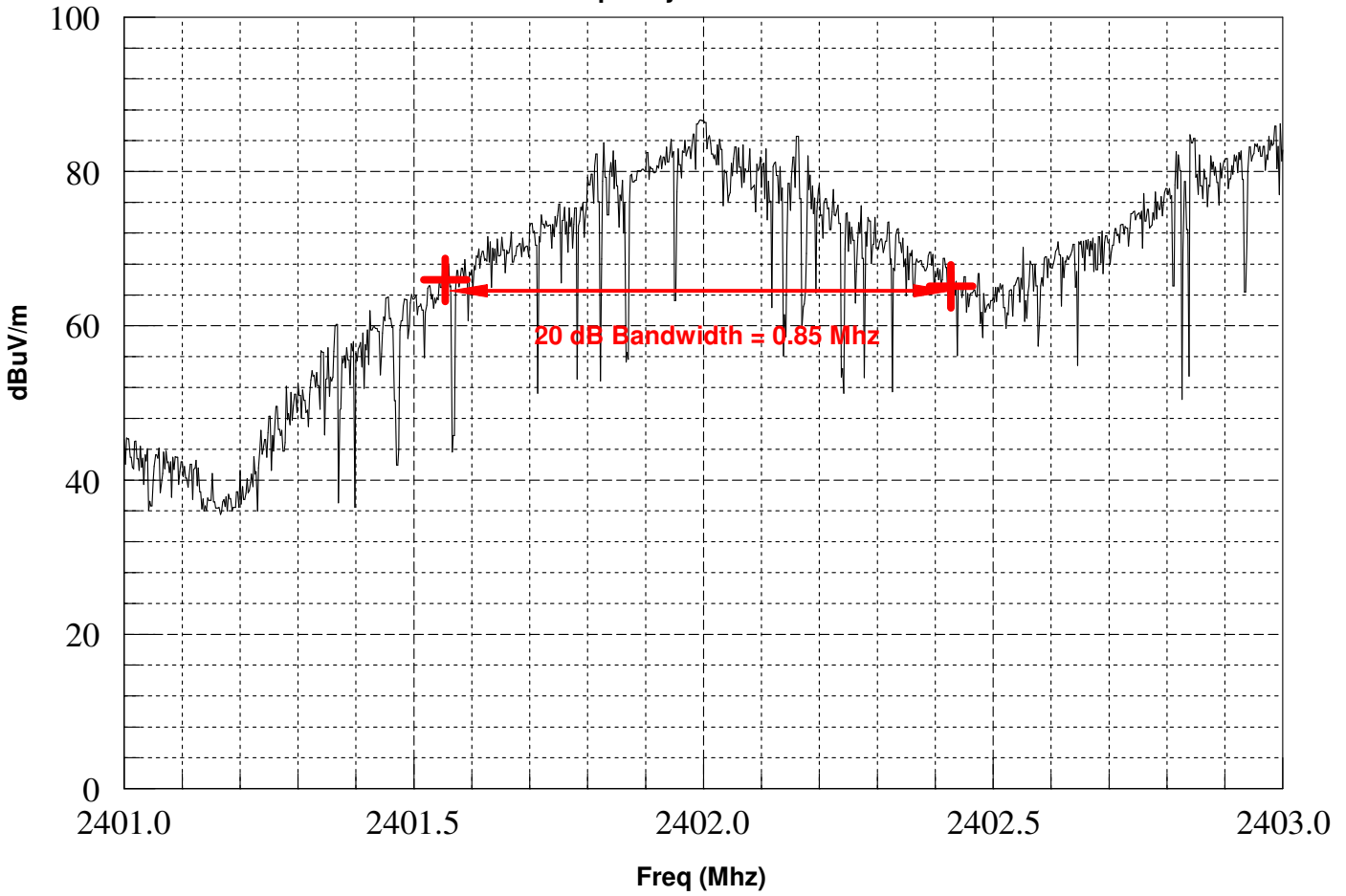
Systems using digital modulation techniques may operate in the 902-928 Mhz, 2400-2483.5 Mhz and 5725-5850 Mhz bands. The minimum 6 dB bandwidth shall be at least 500 Khz.

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RNK Products, Inc.
Model: PABT
FCC 15.247 Low Frequency Channel Bandwidth Emissions



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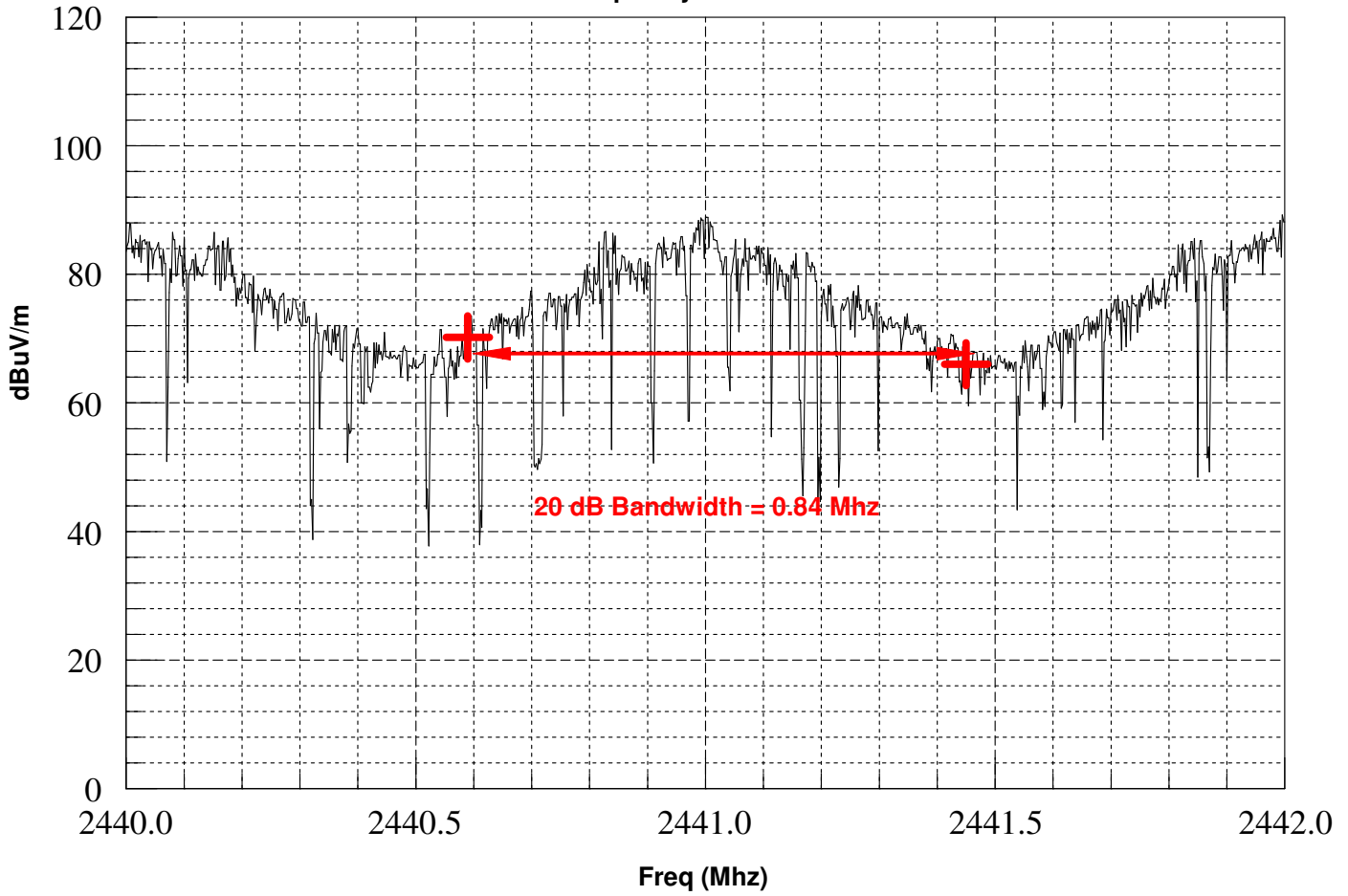
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RNK Products, Inc.
Model: PABT
FCC 15.247 Middle Frequency Channel Bandwidth Emissions



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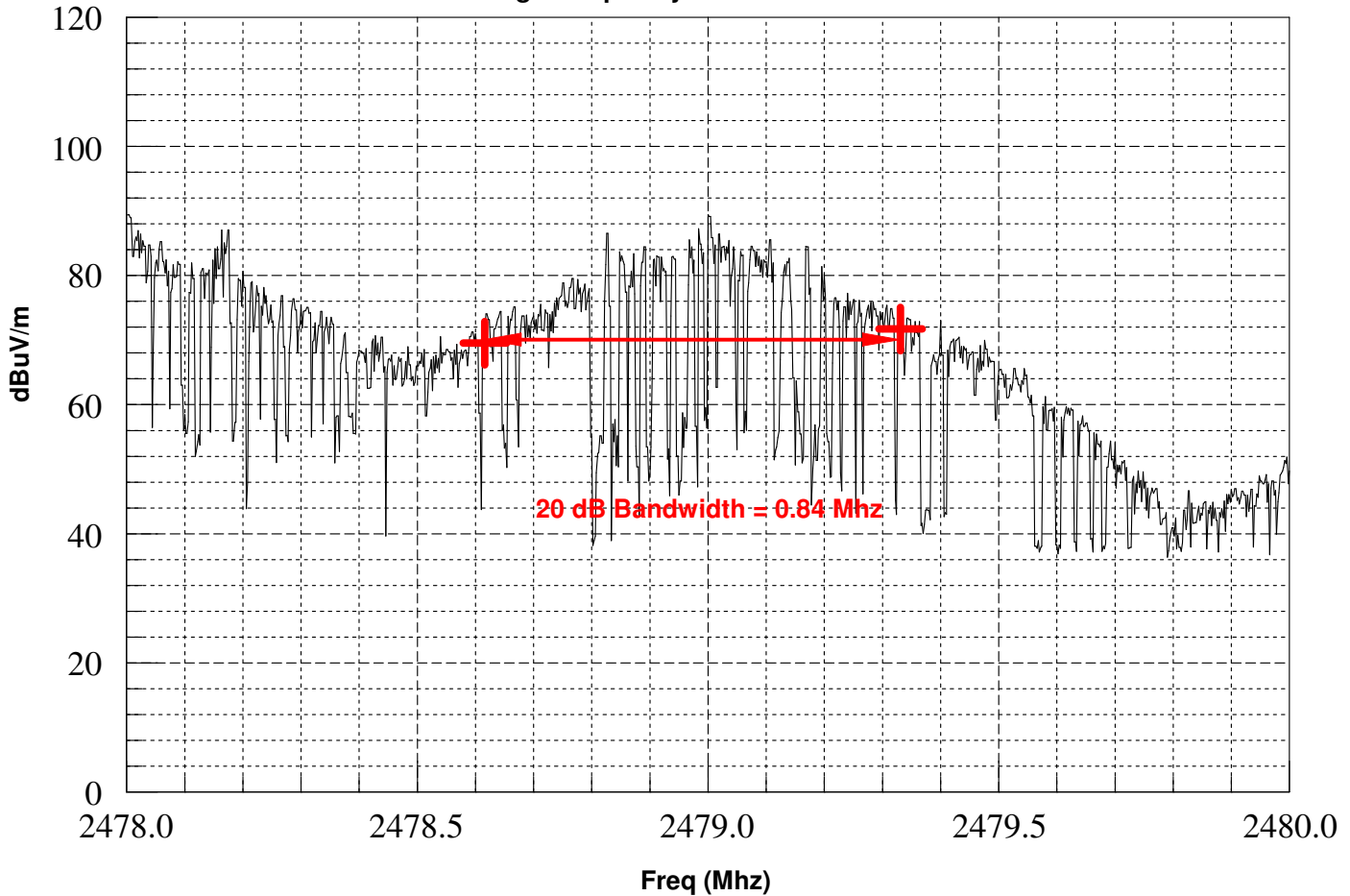
March 27, 2009

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RNK Products, Inc.
Model: PABT
FCC 15.247 High Frequency Channel Bandwidth Emissions



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March 27, 2009

15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

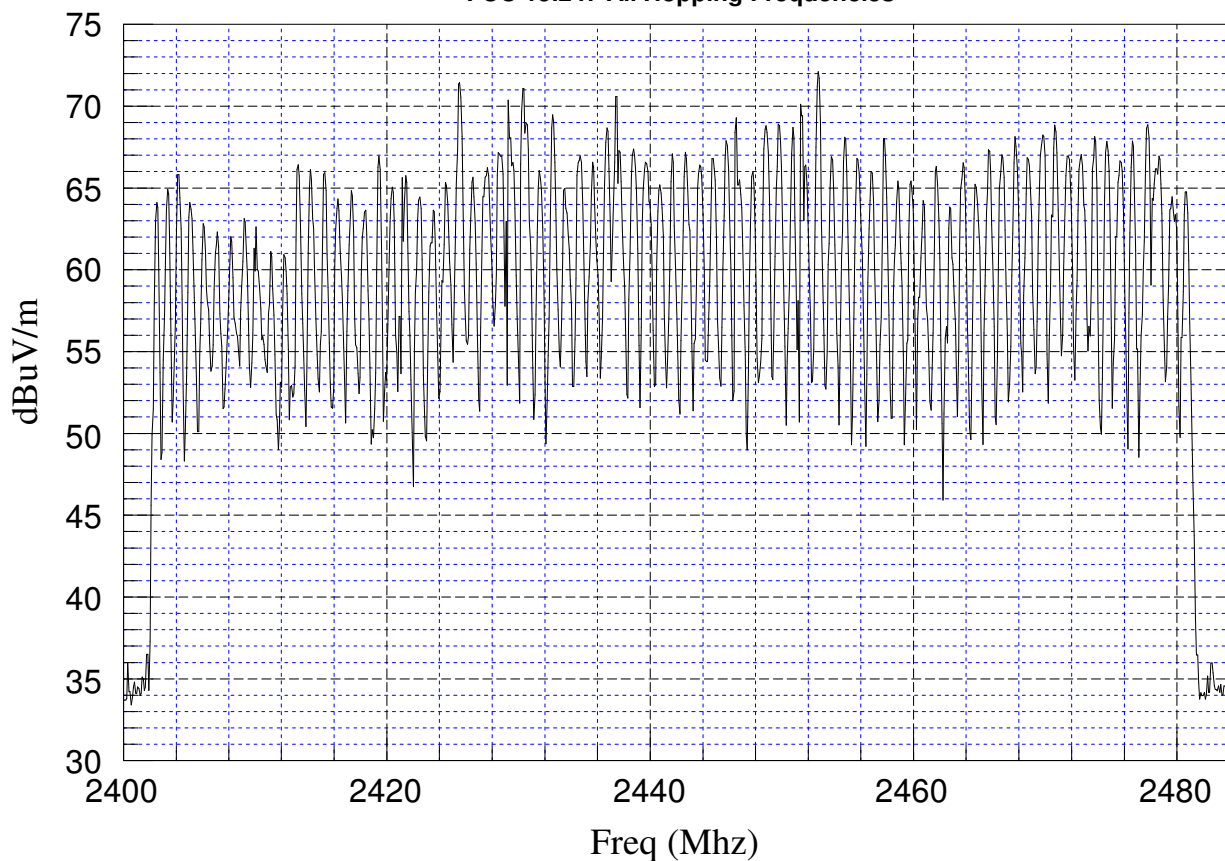
15.247 (b) (1) For frequency hopping systems operating in the 2400-2483.5 Mhz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 Mhz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 Mhz band: 0.125 watts.

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RNK Products, Inc.
Model: PA-BT
FCC 15.247 All Hopping Frequencies



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February 05, 2009

This device has 79 hopping frequencies and operates in the 2400-2483.5 Mhz band, hence the allowable output power is 1 watt.

The output power was determined using the signal substitution method. The results are listed in the table below:

Freq (Mhz)	Field Strength (dBuV/m)	Sig Gen output (dBm)	Antenna Gain (dB)	Cable loss (dB)	EUT Power Out (dBm)	EUT Power Out (W)	FCC 15.247 (b)(1) Limit (Watts)
2402.35	95.1	-6.1	9.7	1.3	4.9	0.00309	1.0
2441.05	97.08	-6.1	9.7	1.3	4.9	0.00309	1.0
2479.94	98.8	-6.1	9.7	1.3	4.9	0.00309	1.0

15.247 (b) (2) N/A, this device operates in the 2400-2483.5 Band.

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15.247 (b) (3) For systems using digital modulation in the 902-928 Mhz, 2400-2483.5 Mhz and 5725-5850 Mhz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g. alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

15.247 (b) (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The internal antenna of this device does not exceed 6 dBi hence the power limit listed in the above table is acceptable.

15.247 (c) N/A The antenna in this device does not have a gain of greater than 6 dBi.

15.247 (d) In any 100 Khz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional Radiator shall be at least 20 dB below that in the 100 Khz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209 (a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in section 15.205 (a), must also comply with the radiated emissions limits specified in Section 15.209 (a) (see Section 15.205 (c)).

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Harmonic Frequencies observed:

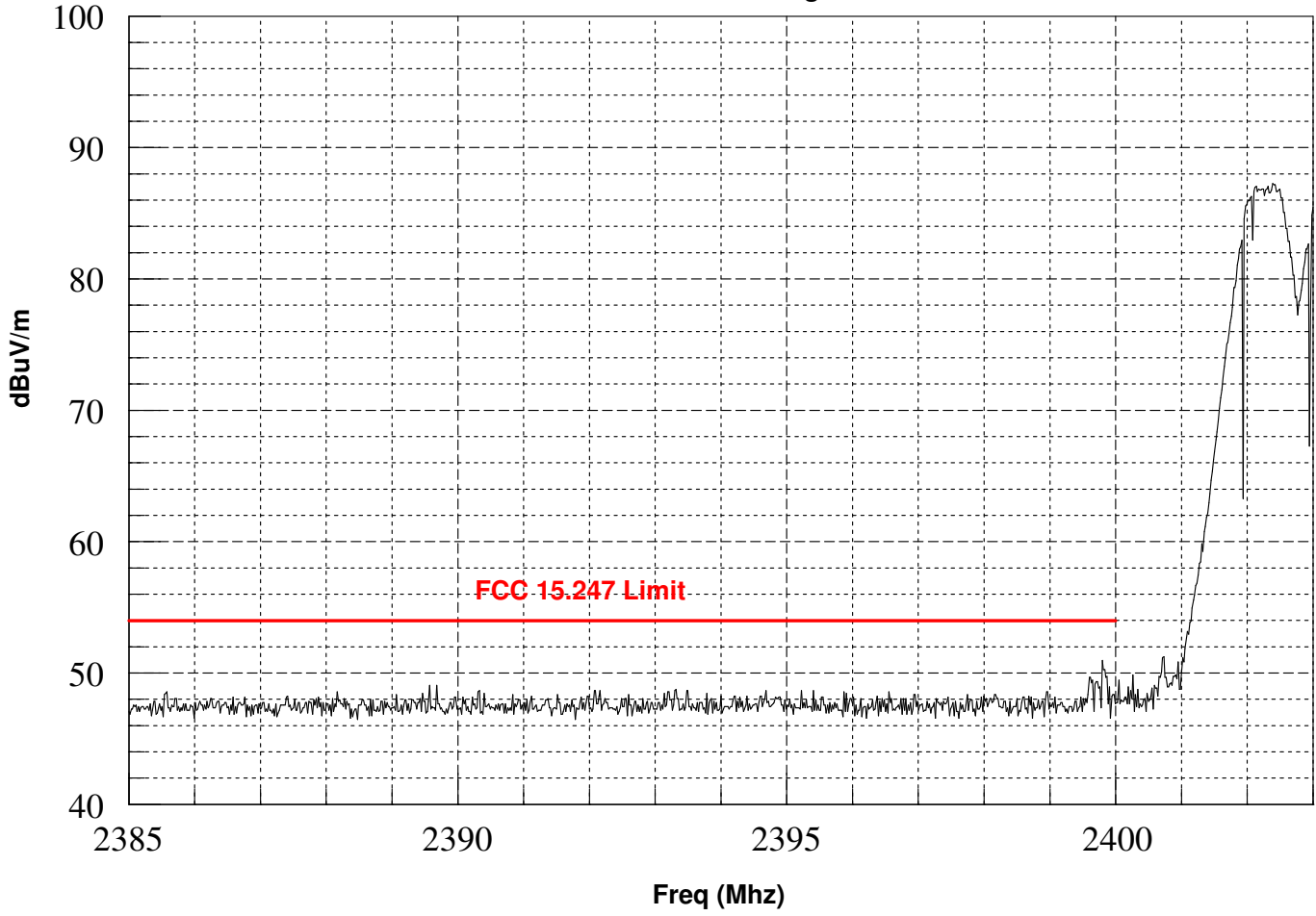
Freq (Mhz)	EUT Corr Data (dBuV/m)	
2441	97.08	Fundamental
4882	39.8	1 st harmonic
7323	No signal observed	2nd harmonic
9764	No signal observed	3 rd harmonic
12205	No signal observed	4 th harmonic
14646	No signal observed	5 th harmonic
17087	No signal observed	6 th harmonic
19528	No signal observed	7 th harmonic
21969	No signal observed	8 th harmonic
24410	No signal observed	9th harmonic
26851	No signal observed	10th harmonic

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Model: PABT
FCC 15.247 Lower Band Edge Emissions



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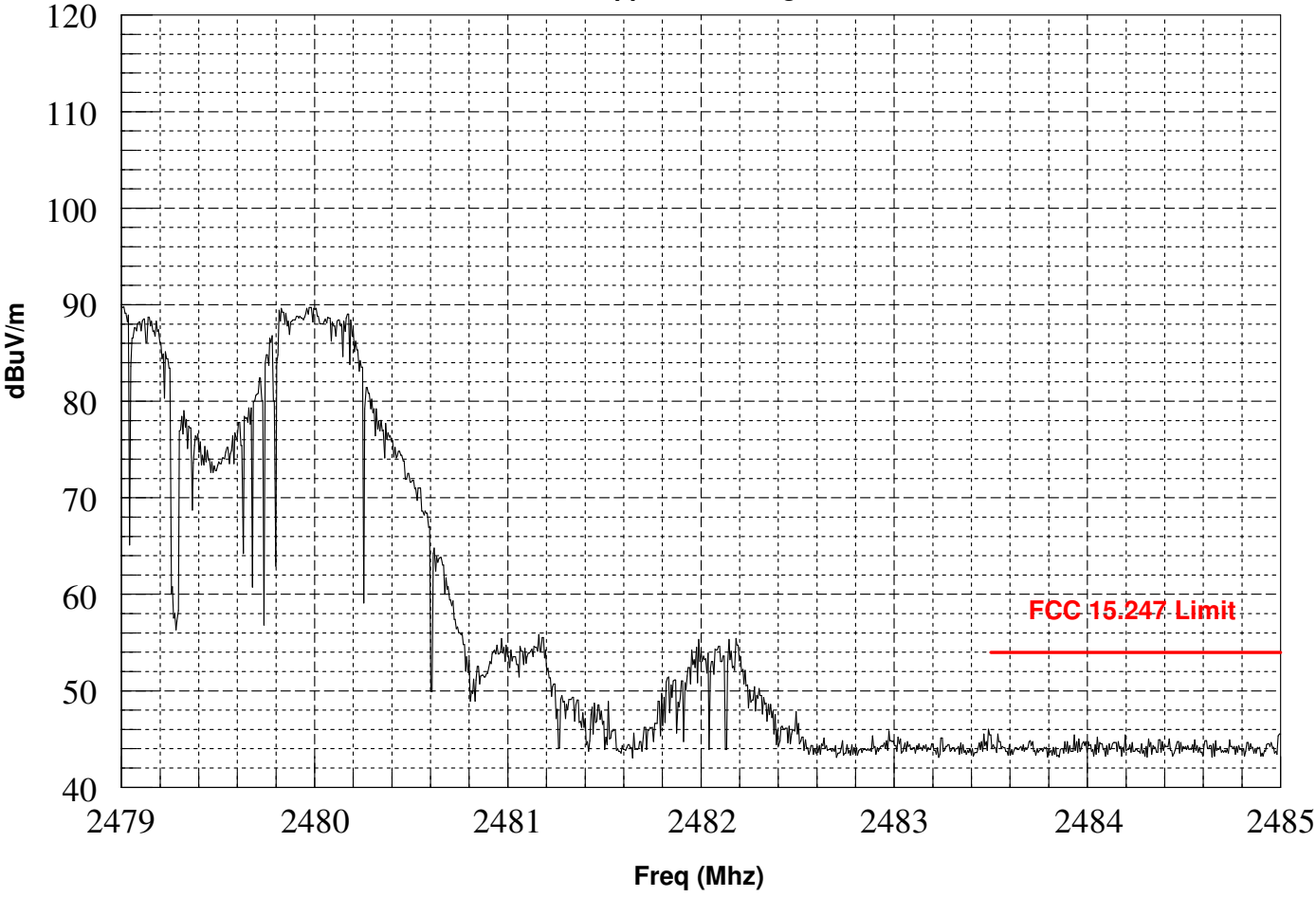
March 27, 2009

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RNK Products, Inc.
Model: PABT
FCC 15.247 Upper Band Edge Emissions



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March 27, 2009

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ATTACHMENT C

**PRODUCT DATA SHEET OR PRODUCT INFORMATION FORM AS SUPPLIED
BY THE CUSTOMER**

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CERTIFICATION SERVICES, INC.

COMPANY NAME: RNK Products, Inc.

CUSTOMER REPRESENTATIVE: International Certification Services, Inc.

EQUIPMENT DESCRIPTION: Pre Cordial Amplifier BT

MODEL NUMBER: Pre Cordial Amplifier BT

SERIAL NUMBER: N/A

TYPE OF TEST: Development
 Initial Design Verification
 Design Change (Please describe exact changes below)
 Production Sample (Audit Test)
Changes made: NONE

OSCILLATOR FREQUENCIES:

26 Mhz

POWER INTERFACE:

Frequency: DC
Voltage: 3.0 VDC

POWER SUPPLY:

Battery: 2 AA cells

POWER CABLE: None

POWER LINE FILTER: None

PRODUCT SHIELDING PROVISION:

Plastic enclosure

SOFTWARE AND / OR OPERATING MODES:

Uses Bluetooth connection SW on embedded Bluetooth IC

I/O CABLES: NONE

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