TEST RESULT SUMMARY

FCC PART 15 SUBPART C
Section 15.245

MANUFACTURER'S NAME	Bureau d'Electronique Appliquee (B.E.A) Inc.
NAME OF EQUIPMENT	K-Band Transceiver with Antennas
MODEL NUMBER	**10.0599** **10.0600** **10.0603** **10.0604** **10.0605**
MANUFACTURER'S ADDRESS	100 Enterprise Drive RIDC Park West Pittsburgh PA 15275
TEST REPORT NUMBER	WC403462.2 Rev2
TEST DATE	12, 17, 20 August & 23 October 2004

According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 15

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 15.

Date: 23 October 2004

Location: Taylors Falls MN USA	G. S. Jakubowski Tested By	T. K. Swanson Reviewed By

Not Transferable

REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
1	36	04 October 2004	Initial Release
2	43	23 October 2004	Revisions include: ▪ Changed “no emissions detected” statements on pages 10, A11, and A12. ▪ Added October 23 test date. ▪ Added data summary table on page A3. ▪ Added Appendix A page directory on page A2. ▪ Replaced band edge plots and added 4 more band edge plots. ▪ Changed ANSI C63.4 date to 2001.

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

EMC EMISSION - T E S T R E P O R T

Test Report File No.	:	**WC403462.2 Rev2**	Date of issue:	23 October 2004

Model No.	:	**10.0599** **10.0600** **10.0603** **10.0604** **10.0605**
Product Name	:	K-Band Transceiver with Antennas
Applicant	:	Bureau d'Electronique Appliquee (B.E.A) Inc.
Manufacturer	:	Bureau d'Electronique Appliquee (B.E.A) Inc.
License holder	:	Bureau d'Electronique Appliquee (B.E.A) Inc.
Address	:	100 Enterprise Drive RIDC Park West
	:	Pittsburgh PA 15275
Test Result	:	■ **Positive** ☐ **Negative**
Test Project Number Reference(s)	:	**WC403462.2 Rev2**
Total pages including Appendices		**43**

TÜV Product Service Inc is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV Product Service Inc reports apply only 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. TÜV Product Service Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service Inc issued reports.

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. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

TÜV Product Service Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI

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D I R E C T O R Y - EMISSIONS

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

☐ - EN 50081-1 / 1991

☐ - EN 55011 / 1998 w/Amendment A1:1999 ☐ - Group 1 ☐ - Group 2 ☐ - Class A ☐ - Class B

☐ - EN 55013 / 1990

☐ - EN 55014 / 1987 ☐ - Household appliances and similar ☐ - Portable tools ☐ - Semiconductor devices

☐ - EN 55014 / A2:1990

☐ - EN 55014 / 1993 ☐ - Household appliances and similar ☐ - Portable tools ☐ - Semiconductor devices

☐ - EN 55015 / 1987

☐ - EN 55015 / A1: 1990

☐ - EN 55015 / 1993

☐ - EN 55022 / 1987 ☐ - Class A ☐ - Class B

■ - FCC Part 15 Subpart C Section 15.245

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Environmental conditions in the lab:

	Actual
Temperature	: 23 °C
Relative Humidity	: 41 %
Atmospheric pressure	: 99.0 kPa
Power supply system	: 5 VDC

Sign Explanations:

☐ - not applicable
■ - applicable

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Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE*) measurements were performed at the following test location:

■ - Test not applicable

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room
☐ - New Brighton Lab Shielded Room

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD*) measurements were performed at the following test location:

■ - Test not applicable

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

☐ - 3 meters
☐ - 30 meters

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Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location:

☐ - Test not applicable

■ - Wild River Lab Large Test Site (Open Area Test Site) – NSA measurements made 2-03, due 2-05.
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

■ - 3 meters
☐ - 10 meters
☐ - 30 meters

Test equipment used:

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	24-Oct-04
■-	8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115a00853	14-Aug-05
■ -	8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	14-Aug-05
■	2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	14-Aug-05
■ -	2668	8447D	Electro-Mechanics (EMCO)	Preamplifier	1937A02209	Code B

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

Emissions Test Conditions: INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

■ - Test not applicable

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room
☐ - New Brighton Lab Shielded Room

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Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz - 110 GHz were performed in a horizontal and vertical polarization at the following test location:

☐ **- Test not applicable**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

at a test distance of:

■ - 1 meter
■ - 3 meters
☐ - 10 meters

Test equipment used:

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■-	8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115a00853	14-Aug-05
■ -	8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	14-Aug-05
■	2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	14-Aug-05
■-	3957	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B
■ -	2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	19-Nov-04
■ -	2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B
■ -	2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	7-11-06
■ -	2661	11970A	Hewlett-Packard	Harm Mixer – 26.5-40 GHz	2332A01861	7-11-06
■ -	2919	11970U	Hewlett-Packard	Harm Mixer – 40-60 GHz	3003A01395	7-11-06
■ -	2920	11970V	Hewlett-Packard	Harm Mixer – 50-75 GHz	2521A01172	10-23-04
■ -	2922	11970W	Hewlett-Packard	Harm Mixer – 75-110 GHz	2521A01336	10-23-04
■ -	2788	3116	Electro-Mechanics (EMCO)	Ridge Guide Ant 18-40 GHz	2005	7-11-05
■ -	2916	10-7025		Horn Antenna - 75-110 GHz		N/A
■ -	2917	15-7025		Horn Antenna – 50-75 GHz		N/A
■ -	2918	19-7025		Horn Antenna – 40-60 GHz		N/A

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

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Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

■ - Normal Operating Mode

☐ - _____

Configuration of the device under test:

■ - See Constructional Data Form in Appendix B - Page B2

☐ - See Product Information Form in Appendix B - beginning on Page B3

The following peripheral devices and interface cables were connected during the measurement:

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

■ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables MPS.No.: _____

☐ - customer specific cables

☐ - _____

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Emission Test Results:

Fundamental Field Strength [15.245 (b)]

The requirements are ■ - MET ☐ - NOT MET

Minimum margin of compliance 14 dB at 24.12 GHz [15.245(b)]

Remarks: The fundamental was measured to be 114.2 dBuV/m (512.86 mV/m) in peak mode compared to a limit of 127.95 dBuV/m (2500mV/m). See data summary table on page A3.

Harmonic Emissions [15.245 (b)(1)]

The requirements are ■ - MET ☐ - NOT MET

Minimum margin of compliance for Harmonics >10 dB at GHz [15.245(b)(1)]

Remarks: No harmonic emissions were detected above the noise level of the measuring system. The noise level

of the measuring system is a minimum of 10 dB below the limit.

Radiated Emissions outside of the specified frequency bands [15.245 (b)(3)]

The requirements are ■ - MET ☐ - NOT MET

Minimum margin of compliance for spurious emissions >10 dB at MHz [15.245(b)(3)]

Remarks: No emissions were detected above the noise level of the measuring system. The noise level.

of the measuring system is a minimum of 10 dB below the limit.

Band Edge Compliance [15.245 (b)(3)]

The requirements are ■ - MET ☐ - NOT MET

Remarks: Allowed band is 24.075 GHz to 24.175 GHz. (See pages A15 to A22 for band edge plots).

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DEVIATIONS FROM STANDARD:

None

GENERAL REMARKS:

SUMMARY:

The requirements according to the technical regulations are

■ - met

☐ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

☐ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date: 12 August 2004

Testing End Date: 23 October 2004

- TÜV PRODUCT SERVICE INC -

Thomas K. Swanson

T. K. Swanson
Reviewed By

Tested By:
G. S. Jakubowski

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Test-setup photo(s):
Conducted emission 10/150 kHz - 30 MHz

Not Applicable

Test-setup photo(s):
Radiated emission 30 MHz - 110000 MHz

Refer to the Test Setup Submittal Exhibit

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Appendix A

Test Data Sheets

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Appendix A Page Directory

Assembly P/N	Transceiver	Antenna	Fundamental Frequency & Power Page number(s)	Band Edge Compliance Plot Page number
10.0599	M/A COM Microwave Transceiver	41.4285 (1x3)	4	15
10.0599	BEA Microwave Transceiver	41.4284 (2x3)	5	16
10.0600	M/A COM Microwave Transceiver	41.4285 (1x3)	6	17
10.0600	BEA Microwave Transceiver	41.4284 (2x3)	7	18
10.0603	M/A COM Microwave Transceiver	41.4771 (3x3)	8	19
10.0604	M/A COM Microwave Transceiver	41.4285 (1x3)	9	20
10.0604	BEA Microwave Transceiver	41.4771 (3x3)	10	21
10.0605	BEA Microwave Transceiver	41.4771 (3x3)	11	22

Data summary table
Fundamental Frequency and Power results

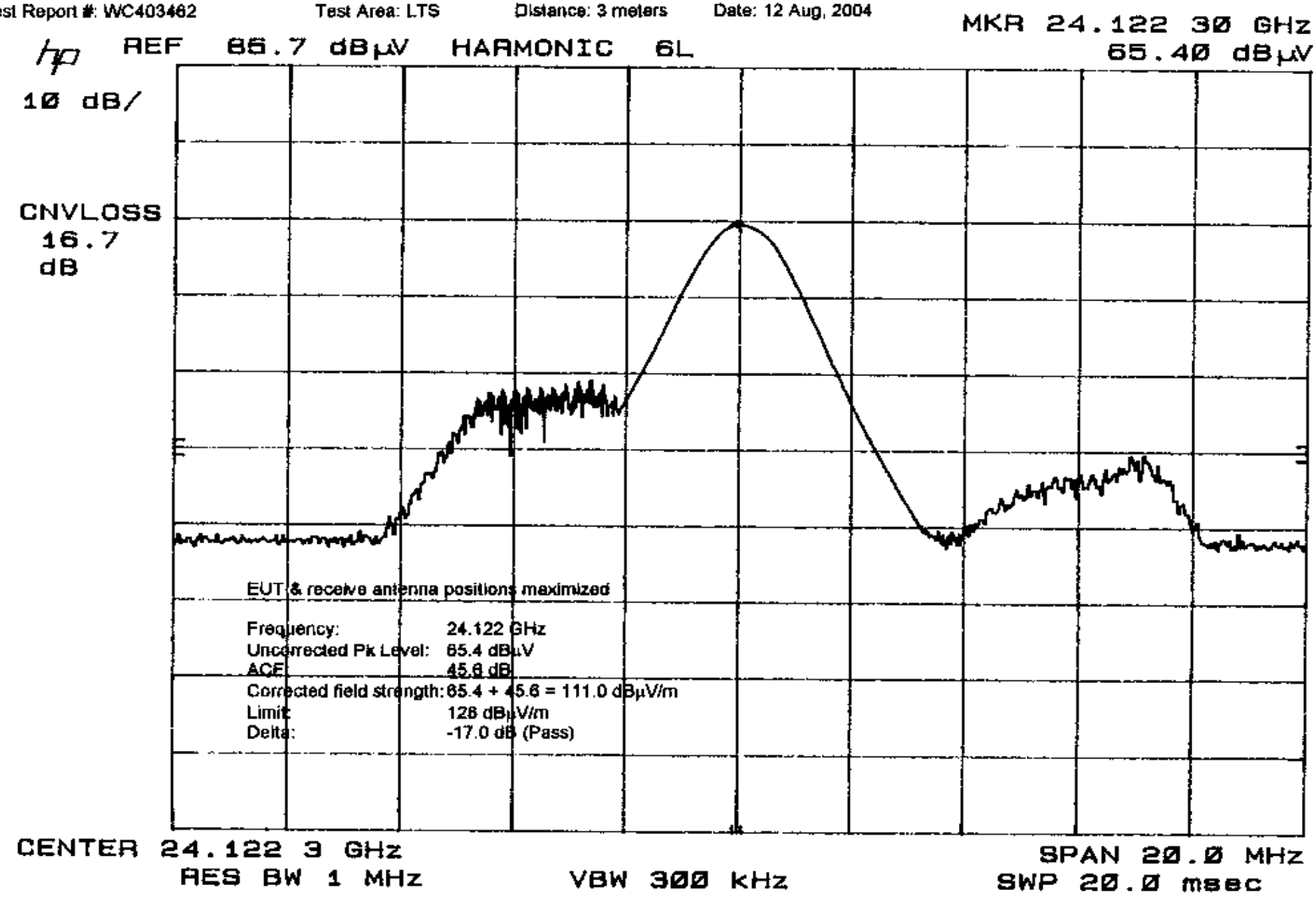
Assembly P/N	Transceiver	Antenna	Fundamental Frequency	Power	Power Limit	Margin of compliance
10.0599	M/A COM Microwave Transceiver	41.4285 (1x3)	24.122 GHz	111 dBuV/m	128 dBuV/m	17 dB
10.0599	BEA Microwave Transceiver	41.4284 (2x3)	24.124 GHz	112.4 dBuV/m	128 dBuV/m	15.6 dB
10.0600	M/A COM Microwave Transceiver	41.4285 (1x3)	24.125 GHz	110.6 dBuV/m	128 dBuV/m	17.4 dB
10.0600	BEA Microwave Transceiver	41.4284 (2x3)	24.122 GHz	112.0 dBuV/m	128 dBuV/m	16 dB
10.0603	M/A COM Microwave Transceiver	41.4771 (3x3)	24.121 GHz	**114.2 dBuV/m**	128 dBuV/m	**13.8 dB**
10.0604	M/A COM Microwave Transceiver	41.4285 (1x3)	24.123 GHz	110.4 dBuV/m	128 dBuV/m	17.6 dB
10.0604	BEA Microwave Transceiver	41.4771 (3x3)	24.127 GHz	112.7 dBuV/m	128 dBuV/m	15.3 dB
10.0605	BEA Microwave Transceiver	41.4771 (3x3)	24.122 GHz	113.5 dBuV/m	128 dBuV/m	14.5 dB

Fundamental Frequency & Power per FCC Part 15 Subpart C Sec. 15.245

Customer: BEA EUT Description: 24GHz Transceiver Notes: M/A com xcvr, Eagle 3x1 antenna, Single mixer, Sample 3

EUT Model #: 10.0599 with M/A com Xcvr EUT Serial #: n/a EUT Power: 5VDC

Test Report #: WC403462 Test Area: LTS Distance: 3 meters Date: 12 Aug, 2004

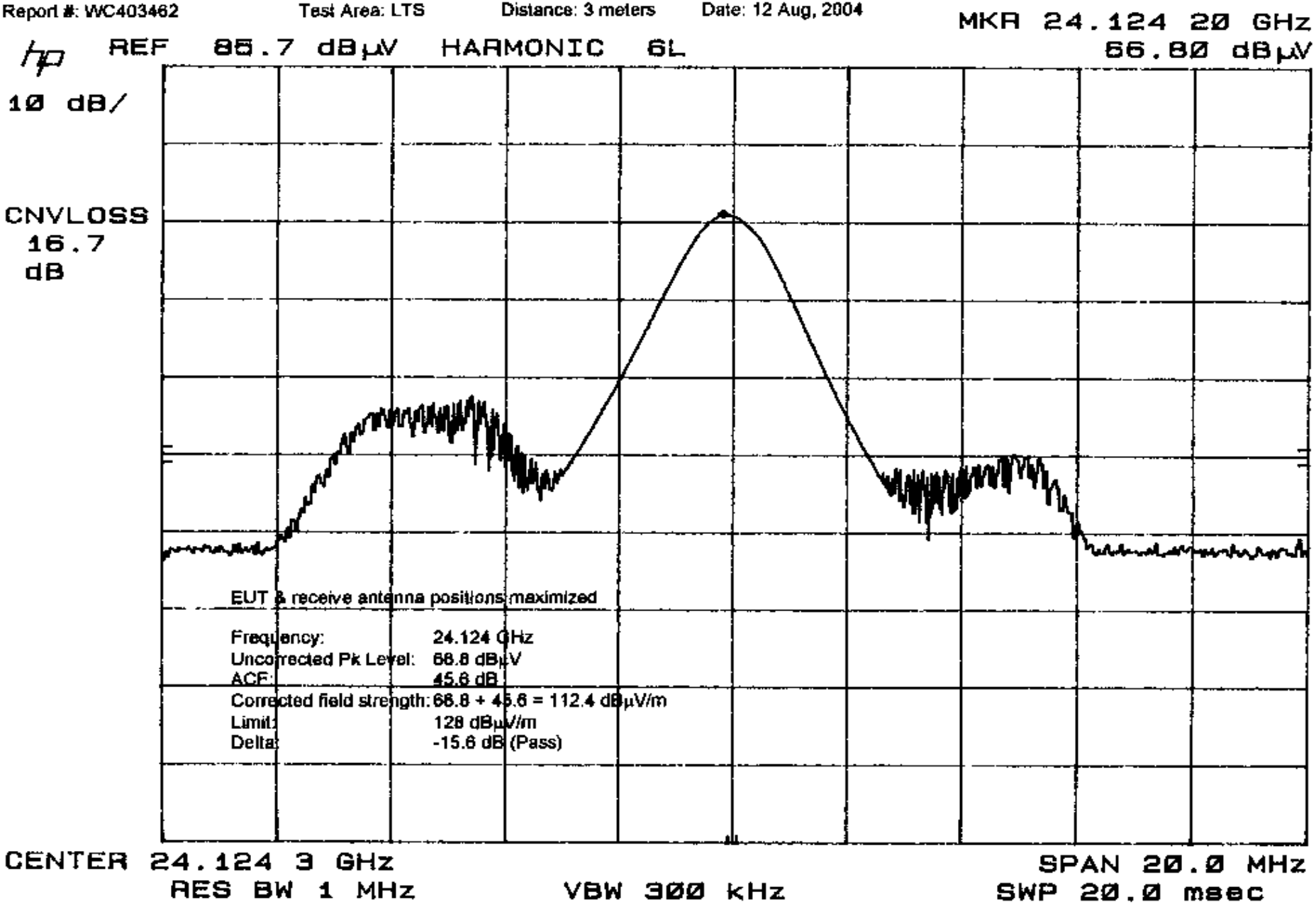


Fundamental Frequency & Power per FCC Part 15 Subpart C Sec. 15.245

Customer: BEA | EUT Description: 24GHz Transceiver | Notes: BEA xcvr, Eagle 3x2 antenna, Single mixer, Sample 12

EUT Model #: 10.0599 w/BEA Xcvr | EUT Serial #: n/a | EUT Power: 5VDC

Test Report #: WC403462 | Test Area: LTS | Distance: 3 meters | Date: 12 Aug, 2004

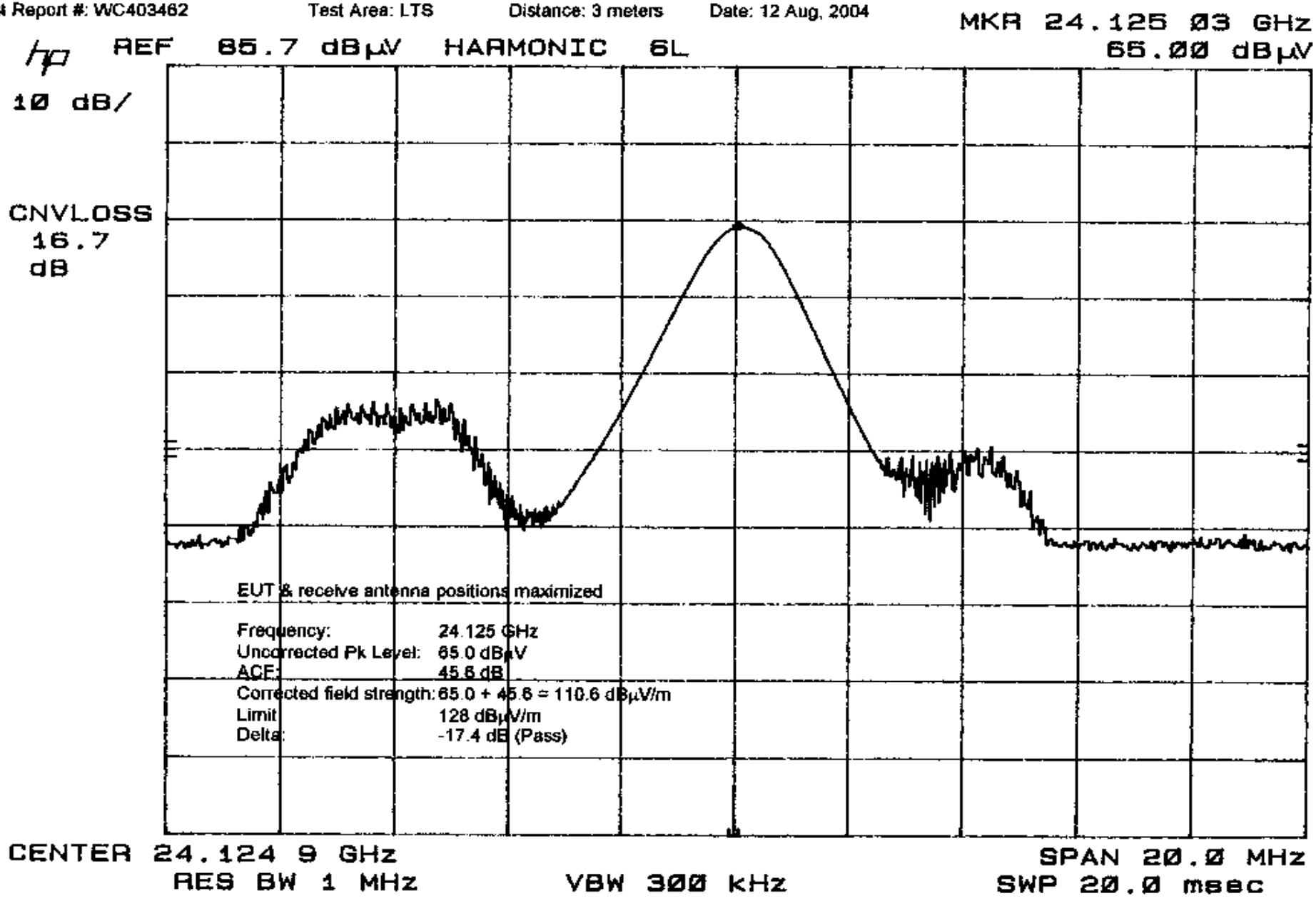


Fundamental Frequency & Power per FCC Part 15 Subpart C Sec. 15.245

Customer: BEA EUT Description: 24GHz Transceiver Notes: M/A com xcvr, Eagle 3x1 antenna, Dual mixer, Sample 1

EUT Model #: 10.0600 with M/A com Xcvr EUT Serial #: n/a EUT Power: 5VDC

Test Report #: WC403462 Test Area: LTS Distance: 3 meters Date: 12 Aug, 2004

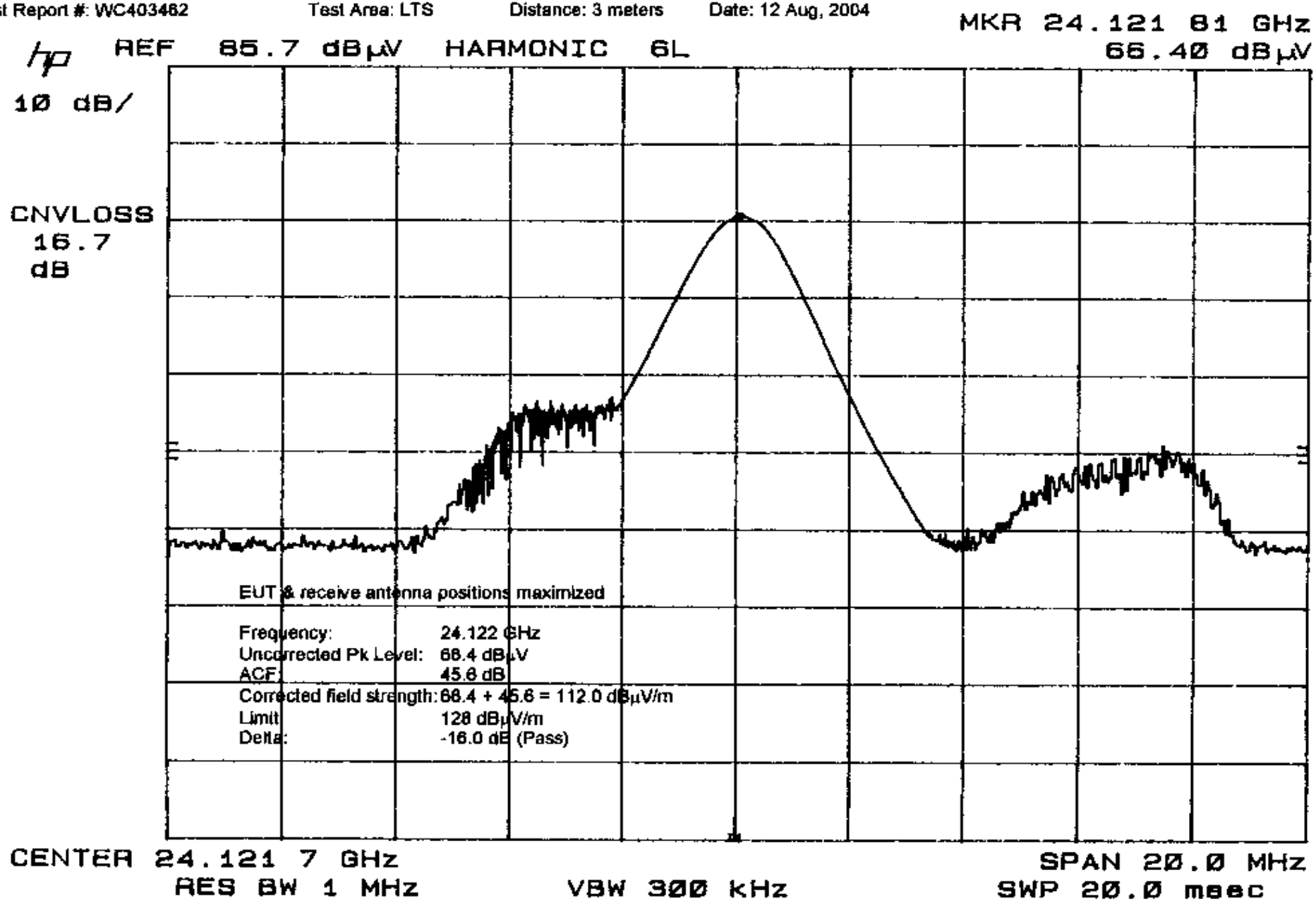


Fundamental Frequency & Power per FCC Part 15 Subpart C Sec. 15.245

Customer: BEA | EUT Description: 24GHz Transceiver | Notes: BEA xcvr, Eagle 3x2 antenna, Dual mixer, Sample 9

EUT Model #: 10.0600 w/BEA Xcvr | EUT Serial #: n/a | EUT Power: 5VDC

Test Report #: WC403462 | Test Area: LTS | Distance: 3 meters | Date: 12 Aug, 2004

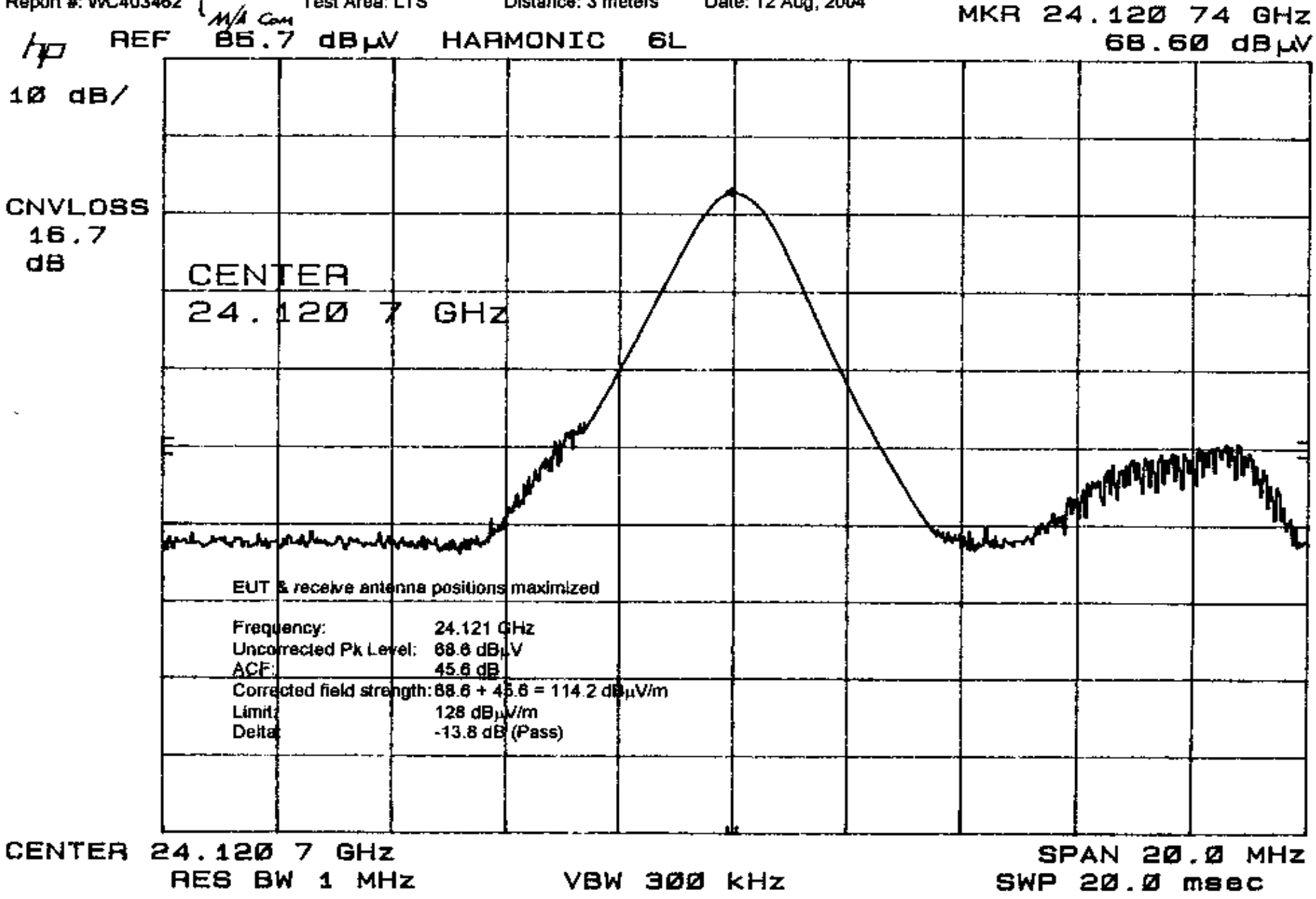


Fundamental Frequency & Power per FCC Part 15 Subpart C Sec. 15.245

Customer: BEA | EUT Description: 24GHz Transceiver | Notes: M/A com xcvr, Eagle 3x3 antenna, Single mixer, Sample 5

EUT Model #: 10.0603 w/M/A Xcvr | EUT Serial #: n/a | EUT Power: 5VDC

Test Report #: WC403462 | Test Area: LTS | Distance: 3 meters | Date: 12 Aug, 2004

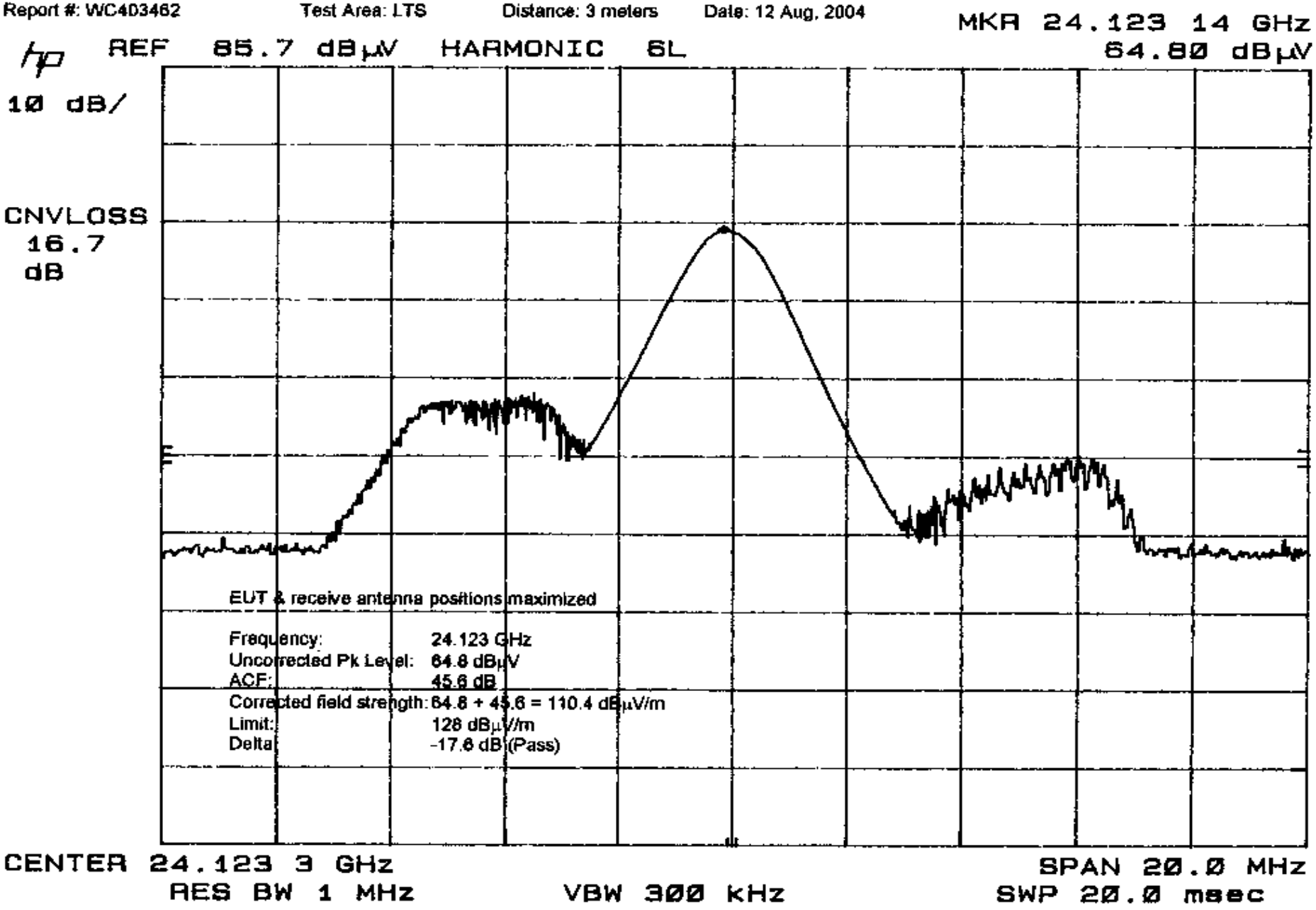


Fundamental Frequency & Power per FCC Part 15 Subpart C Sec. 15.245

Customer: BEA EUT Description: 24GHz Transceiver Notes: M/A com xcvr, Falcon 3x1 antenna, Dual mixer, Sample 6

EUT Model #: 10.0604 with M/A com Xcvr EUT Serial #: n/a EUT Power: 5VDC

Test Report #: WC403462 Test Area: LTS Distance: 3 meters Date: 12 Aug, 2004

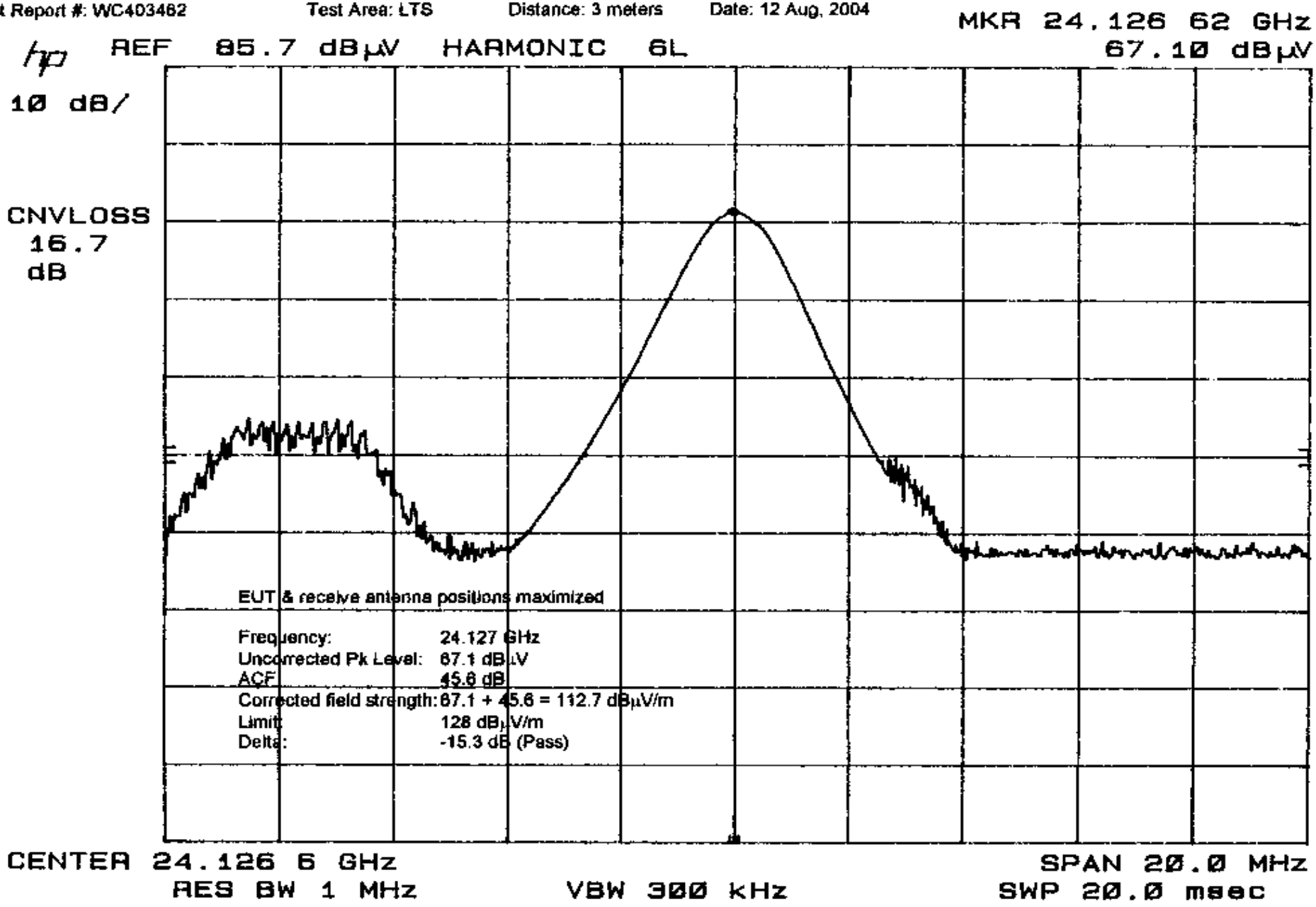


Fundamental Frequency & Power per FCC Part 15 Subpart C Sec. 15.245

Customer: BEA | EUT Description: 24GHz Transceiver | Notes: BEA xcvr, Falcon 3x3 antenna, Dual mixer, Sample 14

EUT Model #: 10.0604 with BEA Xcvr | EUT Serial #: n/a | EUT Power: 5VDC

Test Report #: WC403462 | Test Area: LTS | Distance: 3 meters | Date: 12 Aug, 2004

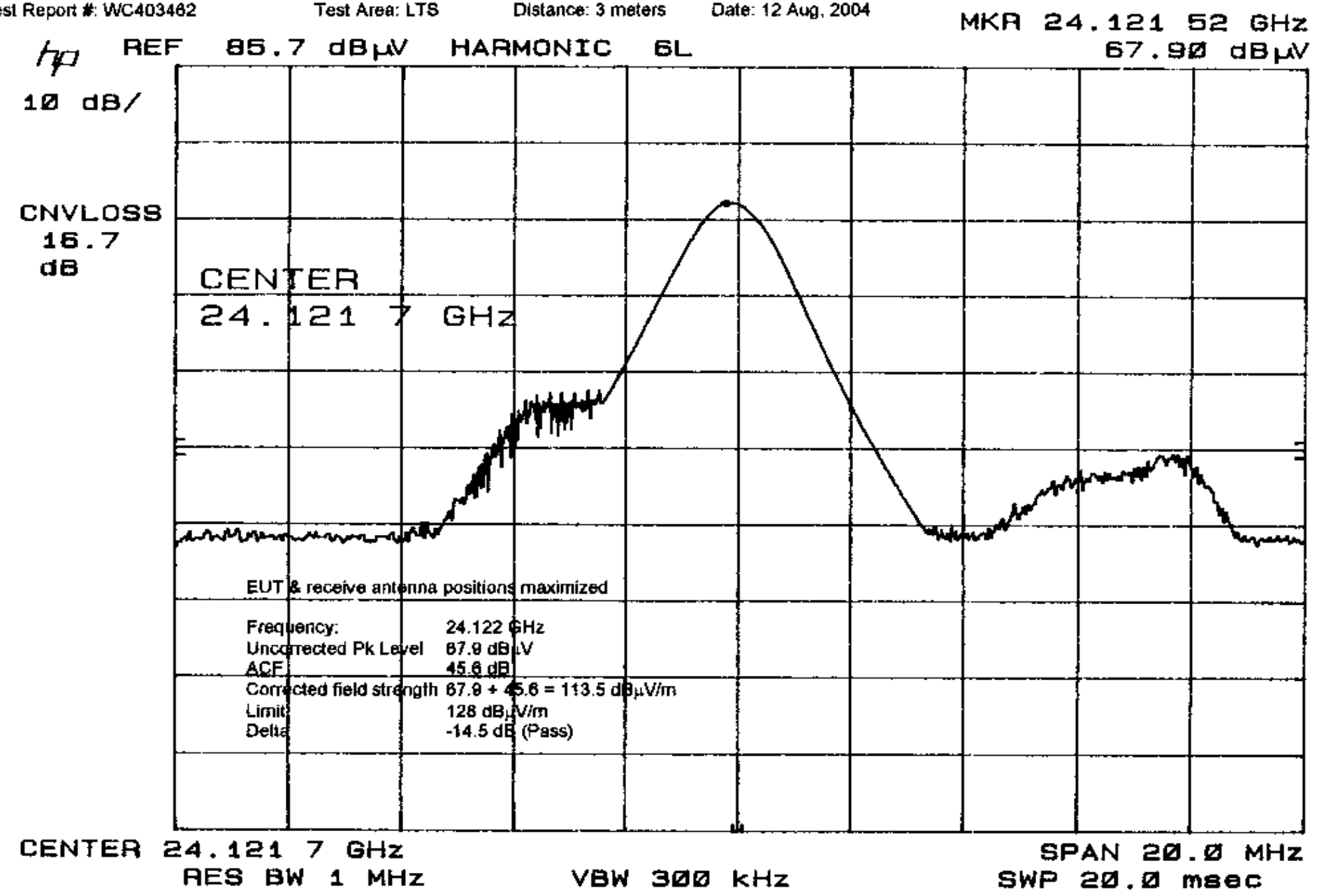


Fundamental Frequency & Power per FCC Part 15 Subpart C Sec. 15.245

Customer: BEA | EUT Description: 24GHz Transceiver | Notes: BEA xcvr, Eagle 3x3 antenna, Dual mixer, SAMPLE #1

EUT Model #: 10.0605 w/BEA Xcvr | EUT Serial #: n/a | EUT Power: 5VDC

Test Report #: WC403462 | Test Area: LTS | Distance: 3 meters | Date: 12 Aug, 2004



RADIATED EMISSIONS

Test Report #:	WC403432	Test Area:	STS - 3 meters		
EUT Model #:	10.0605 w/BEA xcvr	Date:	8/6/04		
EUT Serial #:	n/a	EUT Power:	5VDC	Temperature:	23.0 °C
Test Method:	FCC Part 15 Subpart C Sec. 15.245			Air Pressure:	99.0 kPa
Customer:	B.E.A			Rel. Humidity:	38.0 %
EUT Description:	24GHz Xcvr				
Notes:	BEA Xcvr, Eagle 3x3 Antenna, Dual Mixer				
Data File Name:				Page:	1

Fundamental:

Measurement Distance:	3 meters
Fundamental Signal:	24.118GHz
Uncorrected Peak Level:	67.9dBuV (Maximized EUT / Antenna orientation)
ACF:	45.6dB/m
Corrected Field Strength:	67.9dBuV + 45.6dB ACF = 113.5dBuV/m Pk
Limit:	128dBuV/m
Delta From Limit:	-14.5dB (Pass)

Tested by: G Jakubowski

Printed

Signature

RADIATED EMISSIONS

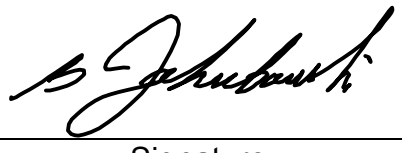
Test Report #:	WC403462 Run 1	Test Area:	STS		
EUT Model #:	[8 different models, see notes]	Date:	8/20/04		
EUT Serial #:	n/a	EUT Power:	5 VDC	Temperature:	23.0 °C
Test Method:	FCC Part 15 subpart C sec. 15.245			Air Pressure:	99.0 kPa
Customer:	BEA			Rel. Humidity:	35.0 %
EUT Description:	24GHz Radar				
Notes:					
Data File Name:	3462 30-1000 re.dat			Page:	1 of 1

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2
All 8 samples tested						
Notes: Model nos. - 10.0600 w/BEA, 10.0599 w/BEA, 10.0605 w/BEA, 10.0604 w/BEA, 10.0600 w/ M/A com						
10.0599 w/ M/a com, 10.0603 w/ M/A com, 10.0604 w/ M/A com						
No emissions detected above the noise level from 30MHz to 1000 MHz. The system noise level is a minimum of 10 dB below the						
Limit from 30 MHz to 1000 MHz.						
EUT rotated 360 degrees, receive antenna both horizontal & vertical, 1 to 4 meters high						

Tested by: G Jakubowski

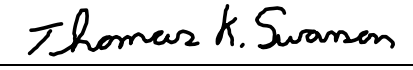
Printed



Signature

Reviewed by: TKS

Printed



Signature

RADIATED EMISSIONS

Test Report #:	WC403462 Run 1	Test Area:	LTS		
EUT Model #:	[8 models, see notes]	Date:	8/20/04		
EUT Serial #:	n/a	EUT Power:	5 VDC	Temperature:	23.0 °C
Test Method:	FCC Part 15 subpart C sec. 15.245			Air Pressure:	99.0 kPa
Customer:	BEA			Rel. Humidity:	41.0 %
EUT Description:	24GHz Radar				
Notes:					
Data File Name:	3462 01 RE 18-110GHz.dat			Page:	1 of 1

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC B >1GHz 3m	DELTA2
All 8 samples tested						
Notes: Model nos. - 10.0600 w/BEA, 10.0599 w/BEA, 10.0605 w/BEA, 10.0604 w/BEA, 10.0600 w/ M/A com						
10.0599 w/ M/a com, 10.0603 w/ M/A com, 10.0604 w/ M/A com						
No emissions detected 1GHz to 18GHz above the noise level. The noise level is a minimum of 10 dB below the limit.						
EUT rotated 360 degrees, receive antenna both horizontal & vertical, 1 to 4 meters high						
Using harmonic mixer & horn combinations,						
Other than the Fundamental, No emissions detected 18 GHz to 110 GHz above the noise level. The noise level is a minimum of 10 dB below the limit.						
See plots for fundamental power levels, frequency, & BW						

Tested by: G Jakubowski

Printed

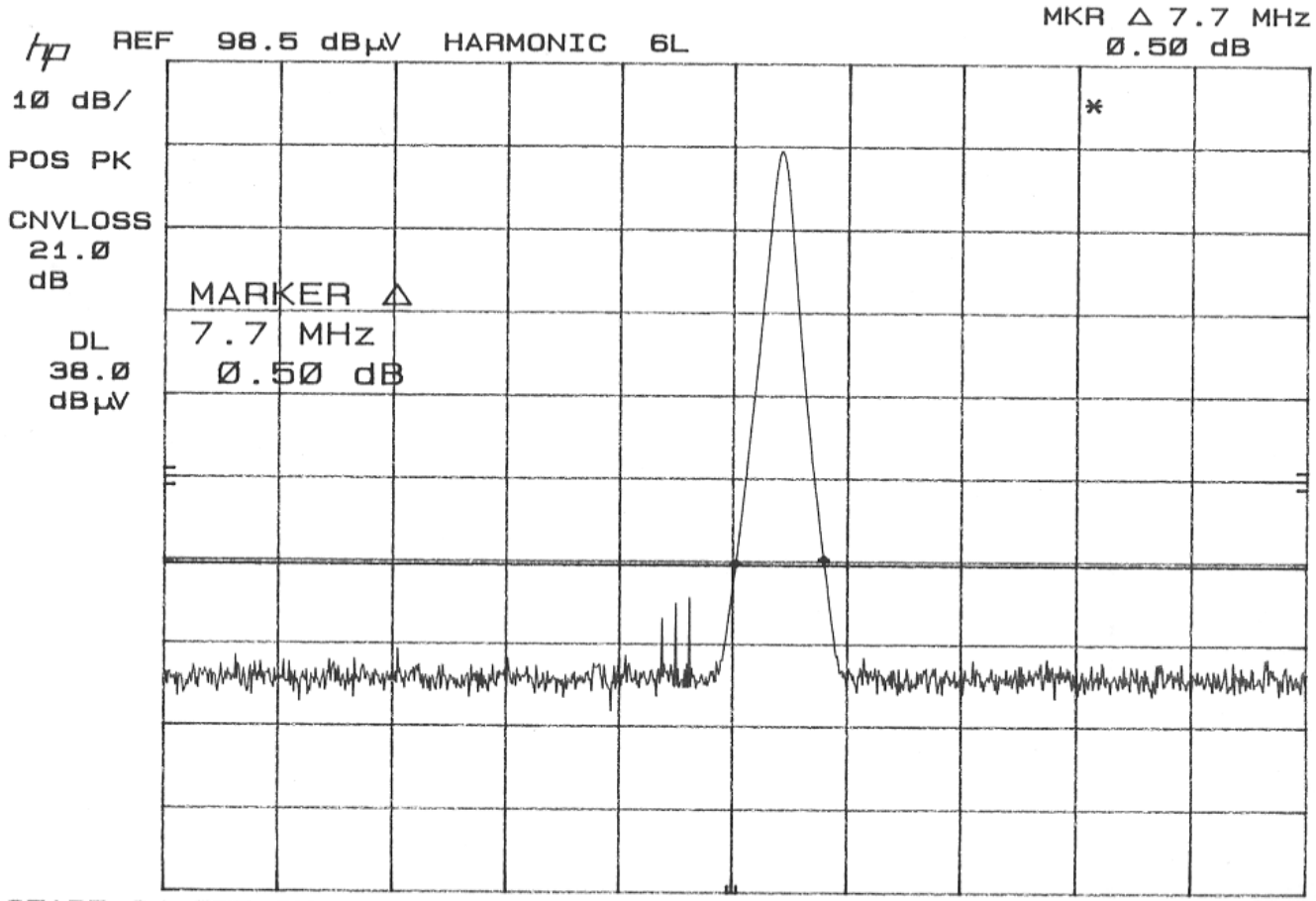
Signature

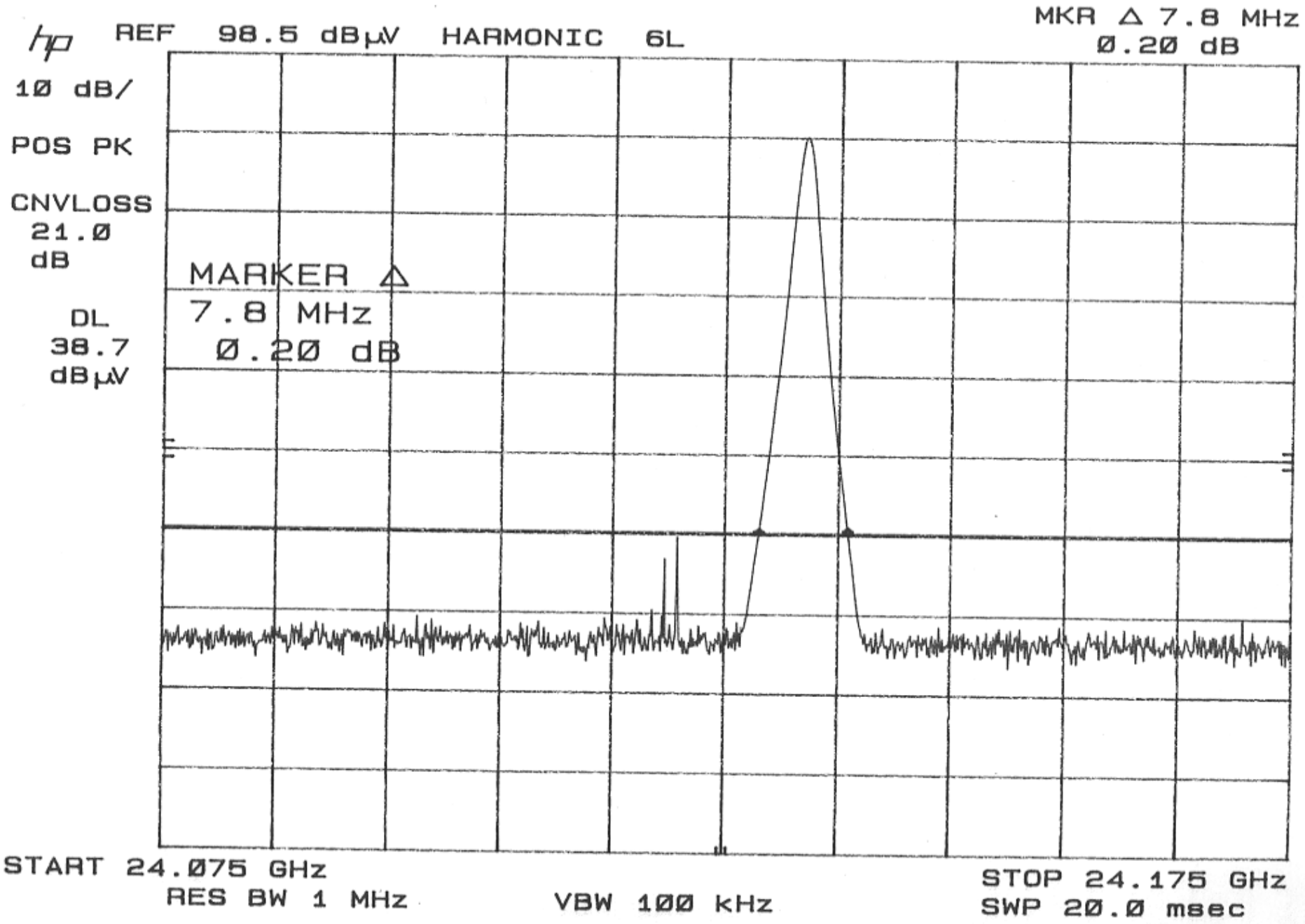
Reviewed by: TKS

Printed

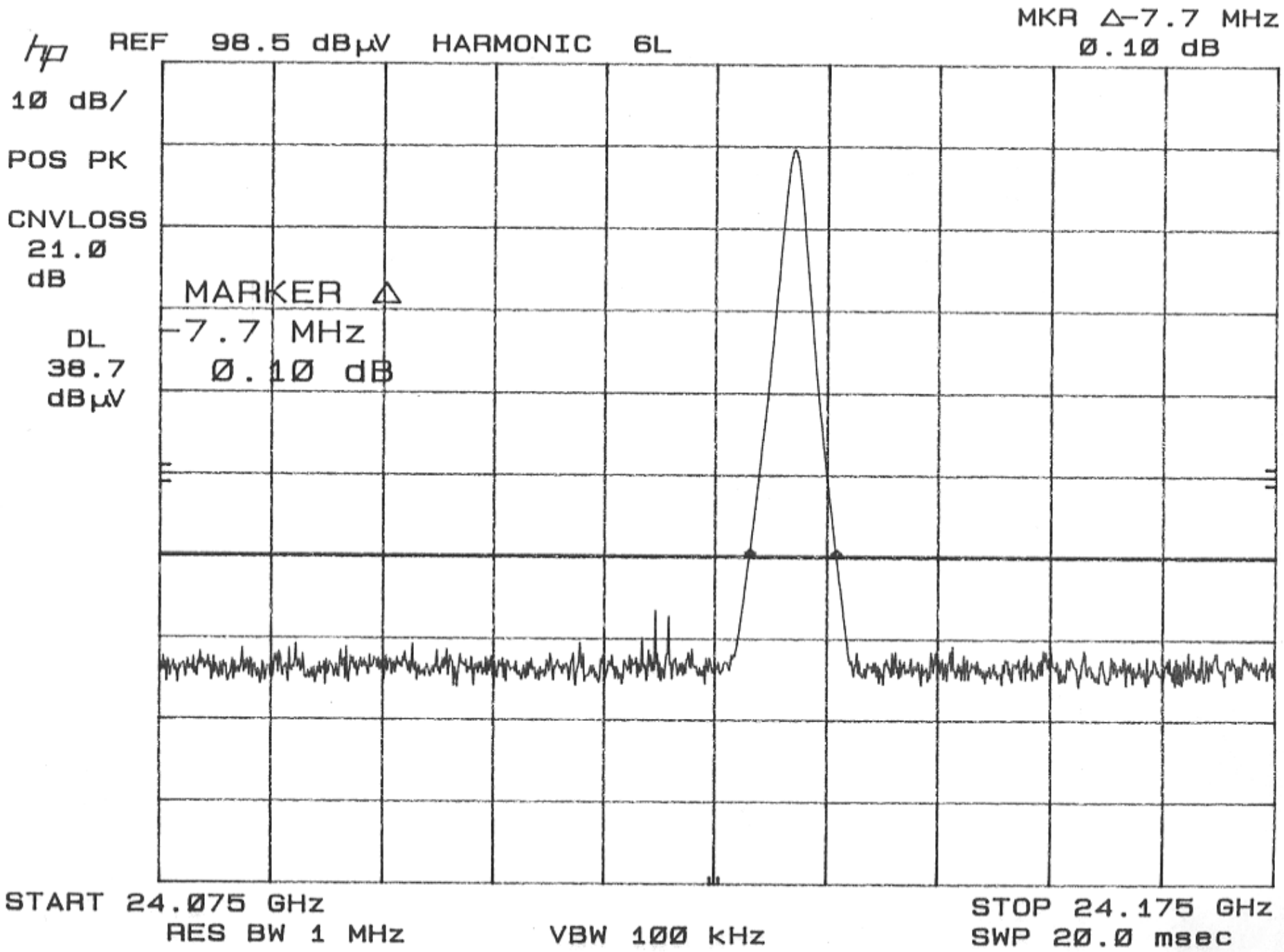
Signature

-50 dBc Band Edge - Model 10.0599 with M/A Xcvr - Test Distance <1 M - 23 October 2004

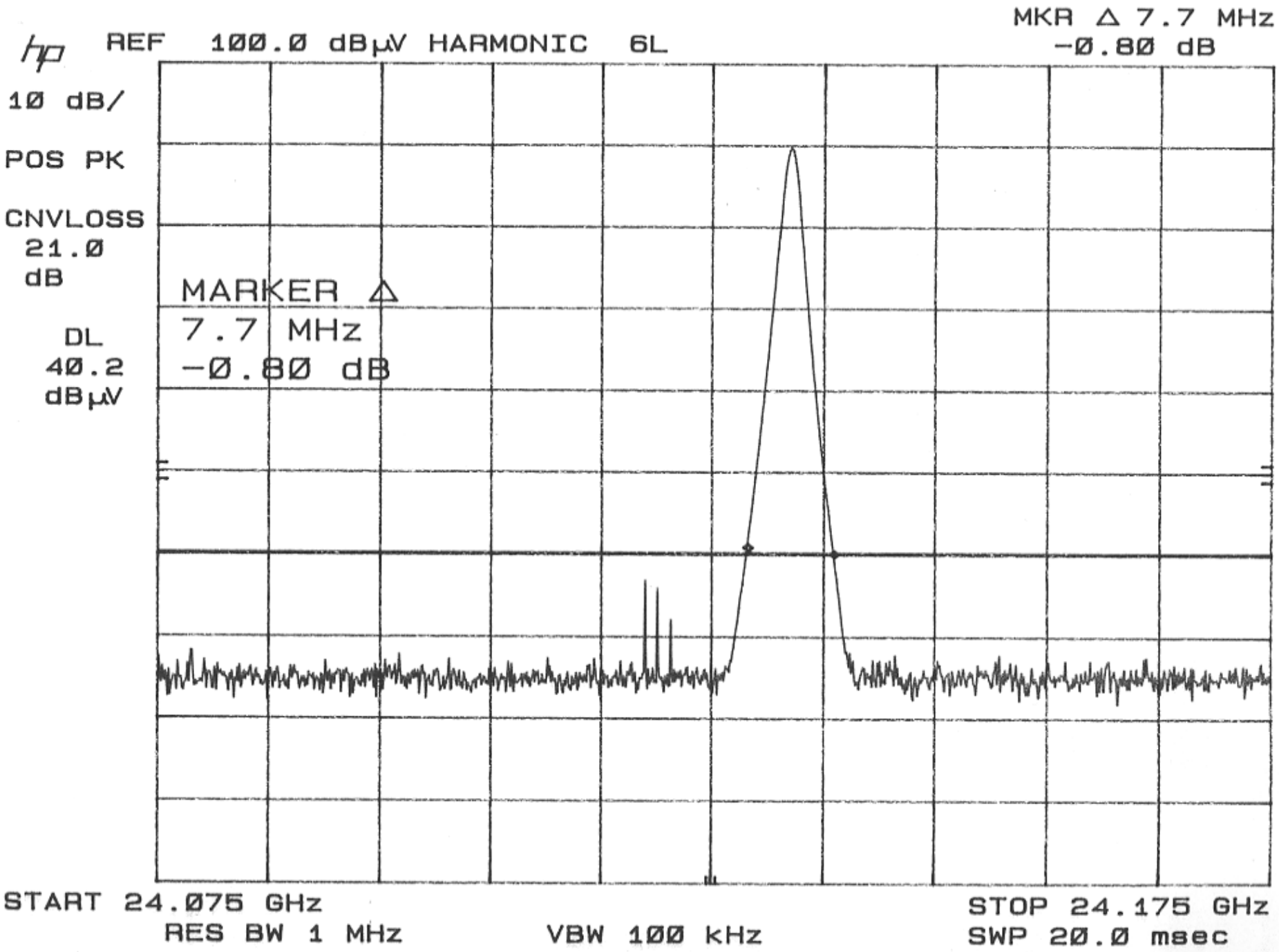



REF 98.5 dBµV
HARMONIC 6L
MKR Δ 7.8 MHz
0.20 dB
10 dB/
POS PK
CNVLOSS
21.0
dB
DL
38.7
dBµV
MARKER Δ
7.8 MHz
0.20 dB
START 24.075 GHz
RES BW 1 MHz
VBW 100 kHz
STOP 24.175 GHz
SWP 20.0 msec

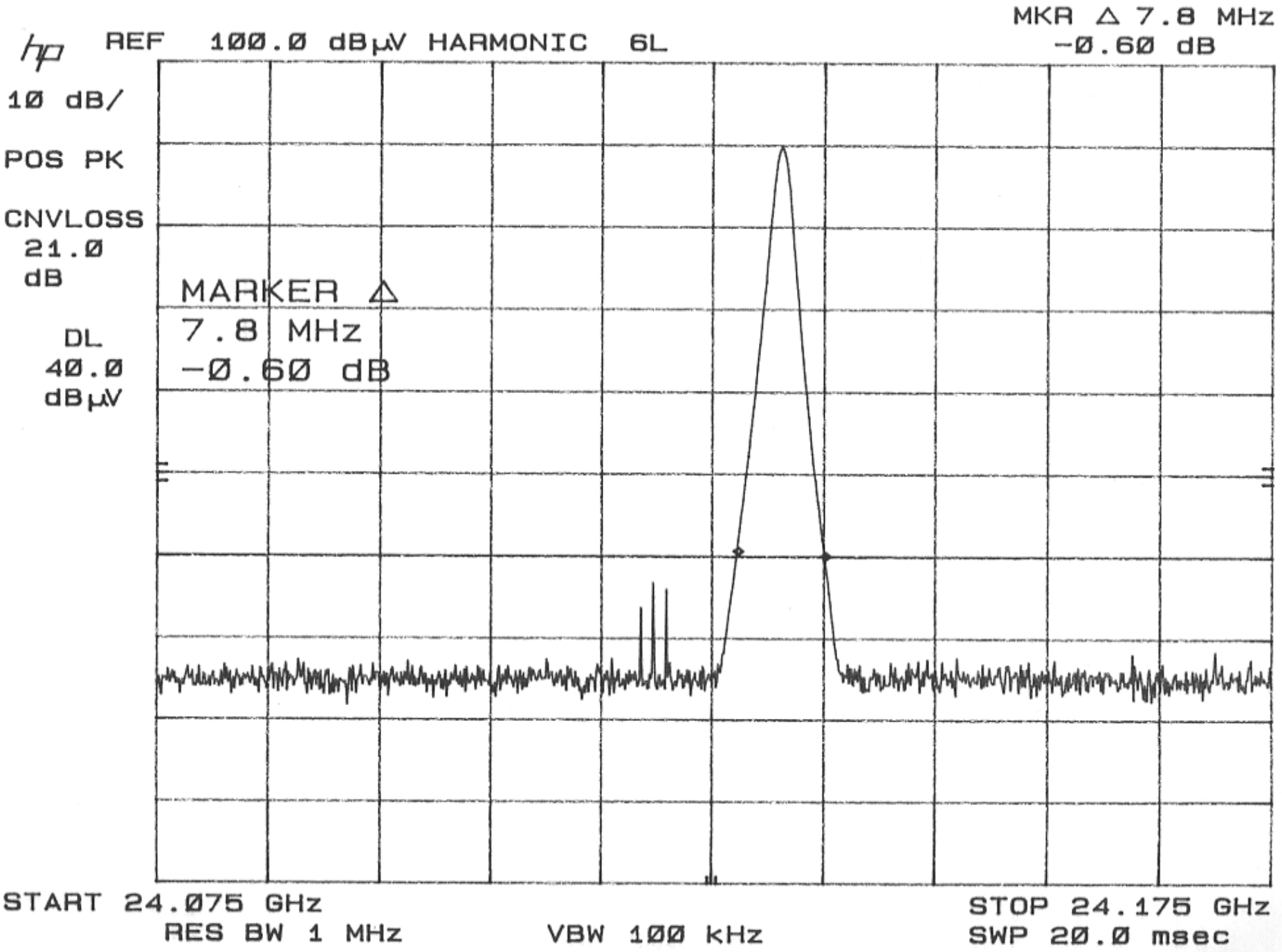
-50 dBc Band Edge - Model 10.0600 with M/A Xcvr - Test Distance < 1 M - 21 October 2004



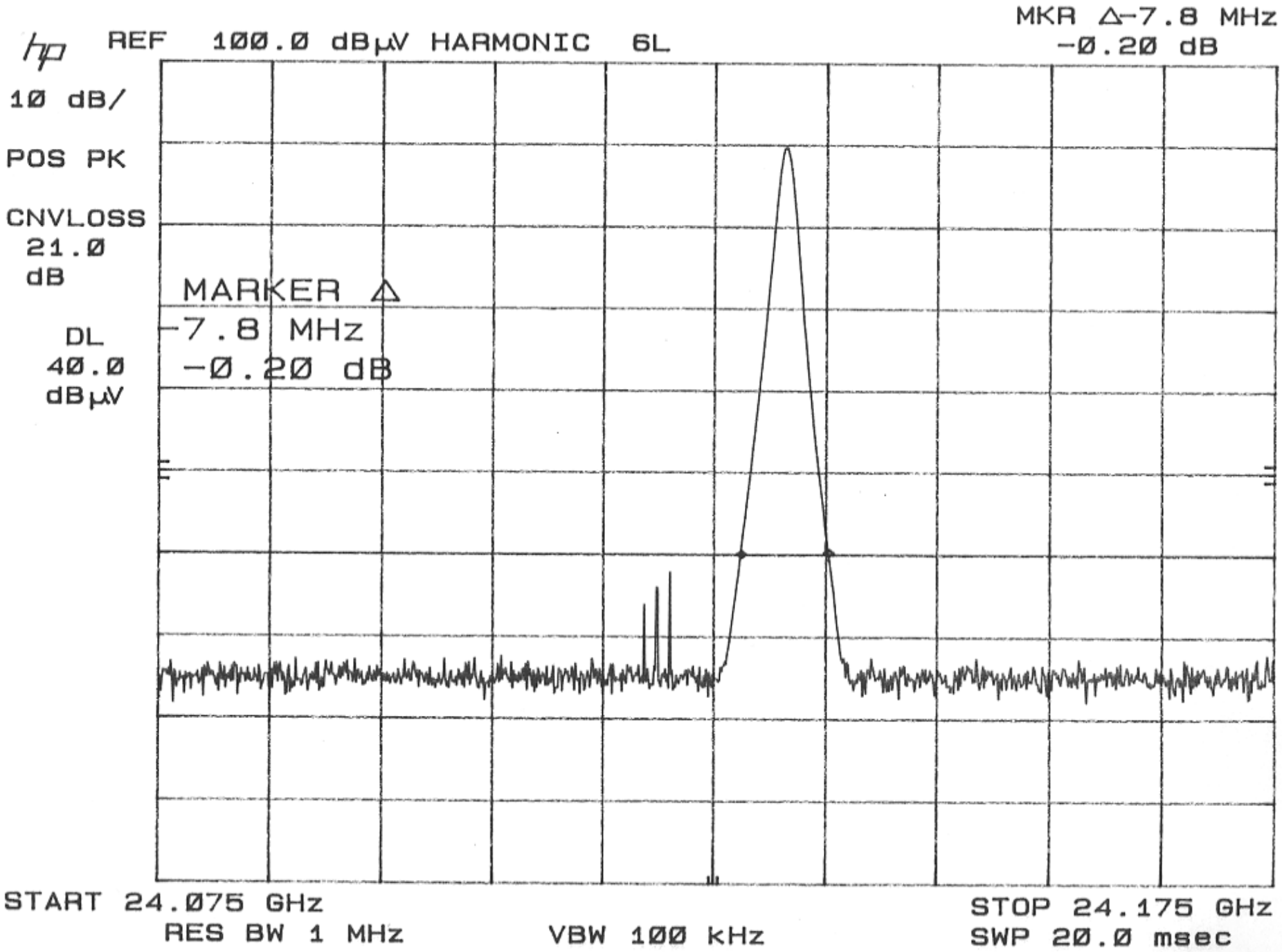
-50 dBc Band Edge - Model 10.0600 with BEA Xcvr - Test Distance < 1M - 23 October 2004



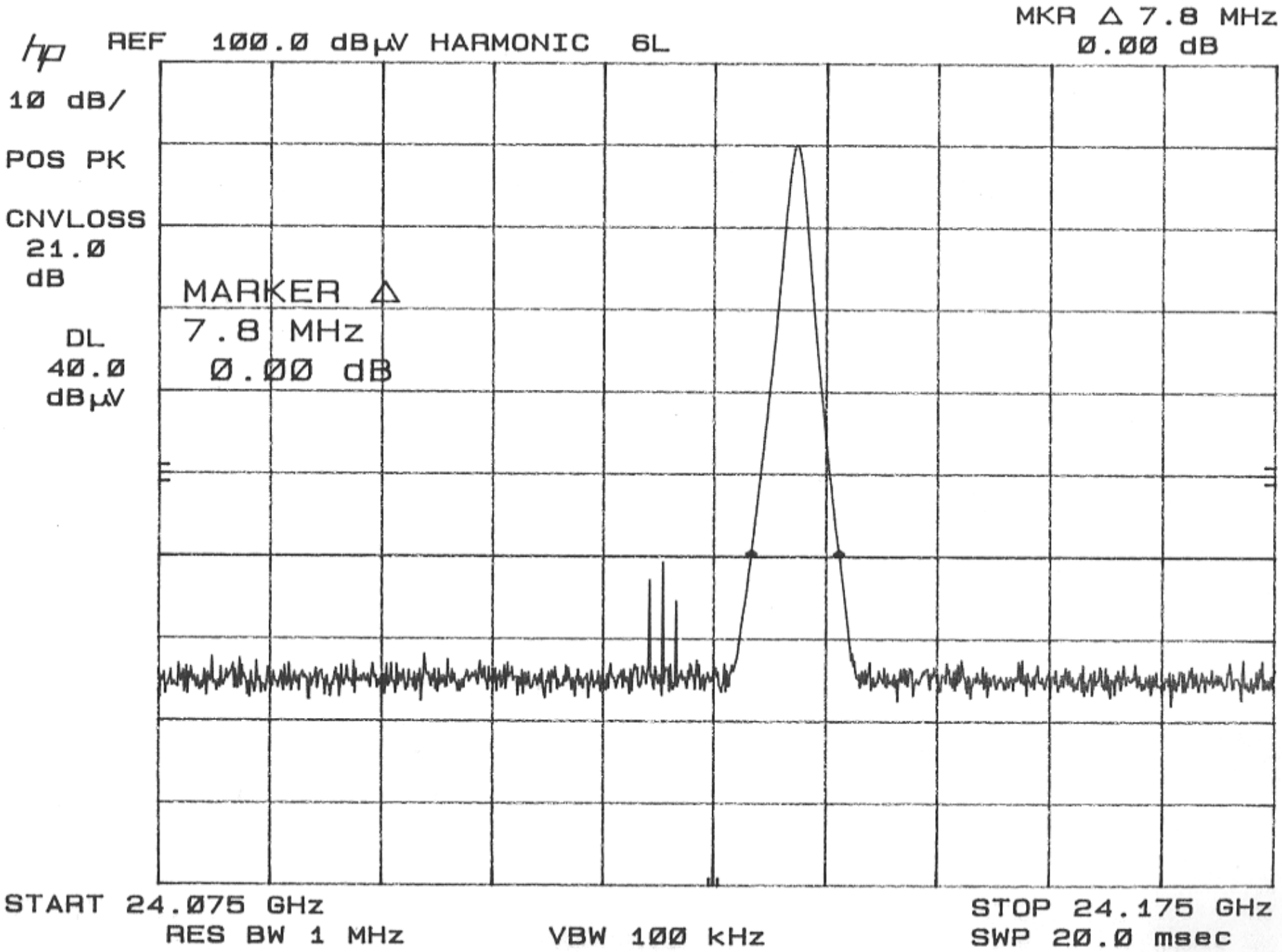
-50 dBc Band Edge - Model 10.0603 with M/A Xcvr - Test Distance < 1 M - 23 October 2004



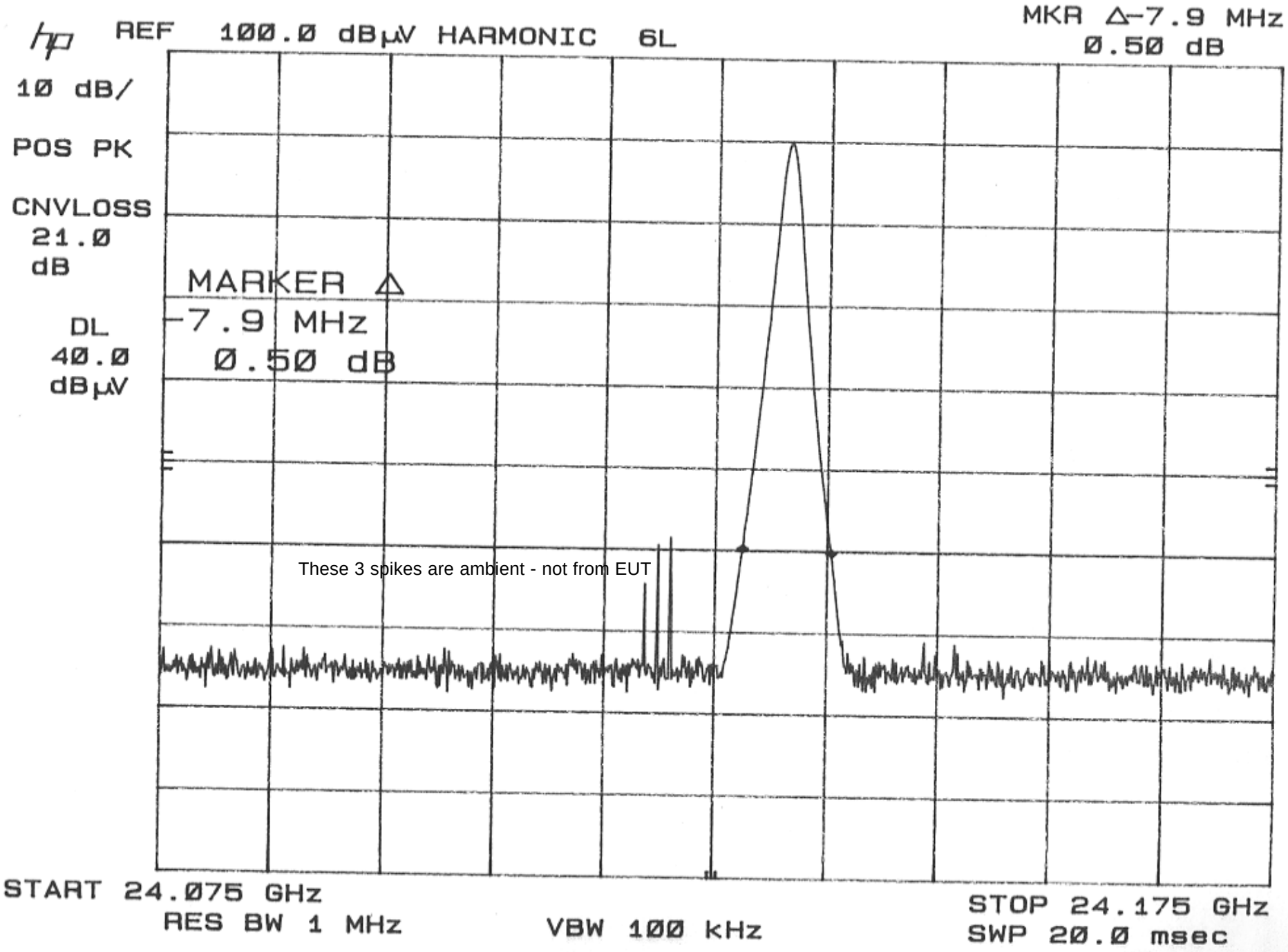
-50 dBc Band Edge - Model 10.0604 with M/A Xcvr - Test Distance < 1 M - 23 October 2004



-50 dBc Band Edge - Model 10.0604 with BEA Xcvr - Test Distance < 1 M - 23 October 2004



-50 dBc Band Edge - Model 10.0605 with BEA Xcvr - Test Distance <1 M - 23 October 2004



Appendix B

Constructional Data Form(s)

and/or

Product Information Form(s)

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Form

EMC Test Plan and Constructional Data Form

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PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- ***NOTE: This information will be input into your test report as shown below. Press the F1 key at any time to get HELP for the current field selected.***

Company:	Bureau d'Electronique Appliquee (B.E.A.) Inc.		
Address:	100 Enterprise Drive		
	RIDC Park West		
	Pittsburgh, PA 15275		
Contact:	Thomas Schluep	Position:	Vice President of Engineering
Phone:	412 249 4100	Fax:	412 249 4101
E-mail Address:	tpschluep@beainc.com		

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description	K-Band Transceiver with Antennas		
EUT Name	K-Band Transceiver		
Model No.:	10.0599 10.0600 10.0603 10.0604 10.0605	Serial No.:	N/A
Product Options:	N/A		
Configurations to be tested:	2 - 10.0599 2 - 10.0600 1 - 10.0603 2 - 10.0604 1 - 10.0605		

Test Objective

- ☐ EMC Directive 89/336/EEC (EMC) Std:
- ☐ Machinery Directive 89/392/EEC (EMC Std:
- ☐ Medical Device Directive 93/42/EEC (EMC) Std:
- ☐ Vehicle Directive 72/245/EEC (EMC) Std:
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☐ FCC: Class ☐ A ☒ B Part 15
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B
- ☐ Canada: Class ☐ A ☒ B
- ☐ Australia: Class ☐ A ☐ B
- ☐ Other:

TÜV Product Service Certification Requested

- ☐ Attestation of Conformity (AoC)
- ☐ Certificate of Conformity (CoC)
- ☐ EMC Certification (used with Octagon Mark)
- ☐ Compliance Document

Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III

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EMC Test Plan and Constructional Data Form

(Press **F1** when field is selected to show additional information on Protection Class.)

Attendance

Test will be: ☐ Attended by the customer ☒ Unattended by the customer

Failure - *Complete this section if testing will not be attended by the customer.*

If a failure occurs, TUV Product Service should:

☐ Call contact listed above, if not available then stop testing. (After hrs phone): _____

☒ Continue testing to complete test series.

☒ Continue testing to define corrective action.

☐ Stop testing.

EUT Specifications and Requirements

Length:	Width:	Height:	Weight:
27mm 67mm	37mm 68mm	28mm 33mm	60g 120g

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 5VDC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: _____

Current (Amps/phase(max)): _____ Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
In sensor systems for low energy-, swing-, sliding-, bifolding-, or revolving automatic doors.
Commericial or residential applications.

EUT Power Cable

☐ Permanent OR ☐ Removable Length (in meters): _____

☐ Shielded OR ☐ Unshielded

☒ Not Applicable

EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables

Type	Analog	Digital	During Test: Active	During Test: Passive	Qty	Shielding: Yes	Shielding: No	Shielding: Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
EXAMPLE: *RS232*	☐	☒	☒	☐	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
5VDC	☒	☐	☒	☐		☐	☒		N/A	4-pin JST with leads for PWR supply	N/A	0	☐	☒
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐

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EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level:

Description:

Equipment Under Test (EUT) Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. As stand a modular Device

2.

3.

Equipment Under Test (EUT) System Components -- List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #
Transceiver (mono, ss, 1x3, 2x3)	10.0599		G9B-10.0599
Transceiver (stereo, ss, 1x3, 2x3)	10.0600		G9B-10.0600
Transceiver (mono, hm, 3x3)	10.0603		G9B-10.0603
Transceiver (stereo, ls, 1x3, 2x3, 3x3)	10.0604		G9B-10.0604
Transceiver (stereo, hm, 3x3)	10.0605		G9B-10.0605

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EMC Test Plan and Constructional Data Form

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc) This information is required for FCC & Taiwan testing.

Description	*Model #*	*Serial #*	*FCC ID #*

Oscillator Frequencies

Frequency	*Derived Frequency*	*Component # / Location*	*Description of Use*

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*

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EMC Test Plan and Constructional Data Form

Critical EMI Components (Capacitors, ferrites, etc.)

Description	*Manufacturer*	*Part # or Value*	*Qty*	*Component # / Location*

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

(PLEASE INSERT "**ELECTRONIC SIGNATURE**" BELOW IF POSSIBLE)

Authorization Signatures

Thomas P. Schluep — 07/15/2004

Customer authorization to perform tests according to this test plan. — Date

Test Plan/CDF Prepared By (please print) — Date

APPROVED

JUL 15 2004

BEA INC.
ENGINEERING

Appendix C

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

The test methods used comply with ANSI C63.4-2001 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ±4.8 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dBμV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the CISPR limit.

To convert between dBμV and μV, the following conversions apply:

dBμV = 20(log μV)

μV = Inverse log(dBμV/20)

RADIATED EMISSIONS

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

Example:

FREQ (MHz)	LEVEL (dBuV)		CABLE/ANT/PREAMP (dB)			FINAL (dBuV/m)		POL/HGT/AZ (m)	(deg)	DELTA1 EN 55022 A
60.80	42.5Qp	+	1.2	+ 10.9	- 25.5 =	29.1	V	1.0	0.0	-10.9

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DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-2001 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 110000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. The transmitter is rotated through 3 orthogonal axes in order to determine the maximum emission levels.

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