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APPLICANT: BERU AG

FCC ID: OYGRDKS-RE-1

TEST REPORT CONTAINING:

EXHIBIT ATTACHMENTS:

APPLICANT: BERU AG
FCC ID: OYGRDKS-RE-1

TEST EQUIPMENT LIST

1. Spectrum Analyzer: HP 8566B-Opt 462, S/N 3138A07786, w/ preselector HP 85685A, S/N 3221A01400, Quasi-Peak Adapter HP 8565OA, S/N 3303A01690 & Preamplifier HP 8449B-OPT H02, S/N 3008A00372 Cal. 10/17/99
2. Biconnical Antenna: Eaton Model 94455-1, S/N 1057
3. Biconnical Antenna: Electro-Metrics Model BIA-25, S/N 1171
4. Log-Periodic Antenna: Electro-Metrics Model EM-6950, S/N 632
5. Log-Periodic Antenna: Electro-Metrics Model LPA-30, S/N 409
6. Double-Ridged Horn Antenna: Electro-Metrics Model RGA-180, 1-18 GHz, S/N 2319
7. 18-26.3GHz Systron Donner Standard Gain Horn #DBE-520-20
8. Horn 40-60GHz: ATM Part #19-443-6R
9. Line Impedance Stabilization Network: Electro-Metrics Model ANS-25/2, S/N 2604 Cal. 2/9/00
10. Temperature Chamber: Tenney Engineering Model TTRC, S/N 11717-7
11. Frequency Counter: HP Model 5385A, S/N 3242A07460 Cal 10/6/99
12. Peak Power Meter: HP Model 8900C, S/N 2131A00545
13. Open Area Test Site #1-3meters Cal. 12/22/99
14. Signal Generator: HP 8640B, S/N 2308A21464 Cal. 9/23/99
15. Signal Generator: HP 8614A, S/N 2015A07428
16. Passive Loop Antenna: EMCO Model 6512, 9KHz to 30MHz, S/N 9706-1211 Cal. 6/10/00
17. Dipole Antenna Kit: Electro-Metrics Model TDA-30/1-4, S/N 153 Cal. 11/24/99
18. AC Voltmeter: HP Model 400FL, S/N 2213A14499 Cal. 9/21/99
19. Digital Multimeter: Fluke Model 8012A, S/N 4810047 Cal 9/21/99
20. Digital Multimeter: Fluke Model 77, S/N 43850817 Cal 9/21/99
21. Oscilloscope: Tektronix Model 2230, S/N 300572 Cal 9/23/99

TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz. The ambient temperature of the UUT was 98.3ºF with a humidity of 40%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz)	METER READING + ACF = FS
33	20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.4-1992 10.1.7 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings were converted to average readings based on the duration of "ON" time.

Measurements were made by TIMCO ENGINEERING INC. at the registered open field test site located at 849 N.W. State Road 45, Newberry, Fl 32669.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

APPLICANT: BERU AG

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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.231 (e)

REQUIREMENTS:

Fundamental Frequency MHz	Field Strength of Fundamental dBuV	Field Strength of Harmonics and Spurious Emissions (dBuV/m @ 3m)
40.66 to 40.70	60.00	40.00
70 to 130	54.00	34.00
130 to 174	54.00 to 63.50	34.00 to 43.50
174 to 260	63.50	43.50
260 to 470	63.50 to 74.00	43.50 to 54.00
470 and above	74.00	54.00

THE LIMIT FOR AVERAGE FIELD STRENGTH dBuV/m FOR THE FUNDAMENTAL FREQUENCY= 72.87 dBuV/m. NO FUNDAMENTAL IS ALLOWED IN THE RESTRICTED BANDS.

THE LIMIT FOR AVERAGE FIELD STRENGTH dBuV/m FOR THE HARMONICS AND SPURIOUS FREQUENCIES = 52.87 dBuV/m. SPURIOUS IN THE RESTRICTED BANDS MUST BE LESS THAN 54dBuV/m OR 15.209.

TEST DATA:

Emission Frequency MHz	Meter Reading dBuv	Ant. Polarity	Coax Loss dB	Correction Factor dB	Duty Cycle Factor dB	Field Strength dBuv/m	Margin dB
433.90	**47.9**	**V**	**3.10**	**17.01**	**20.00**	**48.01**	**24.86**
867.80	**21.0**	**H**	**4.20**	**23.48**	**20.00**	**28.68**	**24.19**
1,301.70R	**29.3**	**V**	**3.70**	**26.49**	**20.00**	**39.49**	**14.51**
1,735.60	**34.8**	**H**	**3.70**	**28.00**	**20.00**	**46.20**	**6.67**
2,169.50	**25.9**	**V**	**3.70**	**29.25**	**20.00**	**38.85**	**14.02**
2,603.40	**26.8**	**V**	**3.70**	**30.50**	**20.00**	**41.00**	**11.87**
3,037.30	**16.7**	**V**	**5.40**	**31.75**	**20.00**	**33.35**	**19.52**
3,471.20	**25.7**	**V**	**5.40**	**31.75**	**20.00**	**42.85**	**10.02**
3,905.10R	**19.3**	**H**	**5.40**	**33.00**	**20.00**	**29.80**	**24.20**
4,339.00R	**11.4**	**V**	**5.70**	**33.56**	**20.00**	**30.66**	**23.34**

SAMPLE CALCULATION OF LIMIT @ 303 MHz:

(470 - 260)Mhz = 210 MHz
(12500 - 3750)uV/m = 8750 uV/m
8750uV/m/210MHz = 41.67 uV/m/MHz
(303-260)MHz = 43 MHz
43 MHz * 41.67 uV/m/MHz = 1791.81 uV/m
(1791.81 + 3750)uV/m = 5541.81 uV/m limit @ 303 MHz

The transmitter ceases transmitting when the button is released.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: JOSEPH SCOGLIO DATE TESTED: MAY 18, 2001

APPLICANT: BERU AG

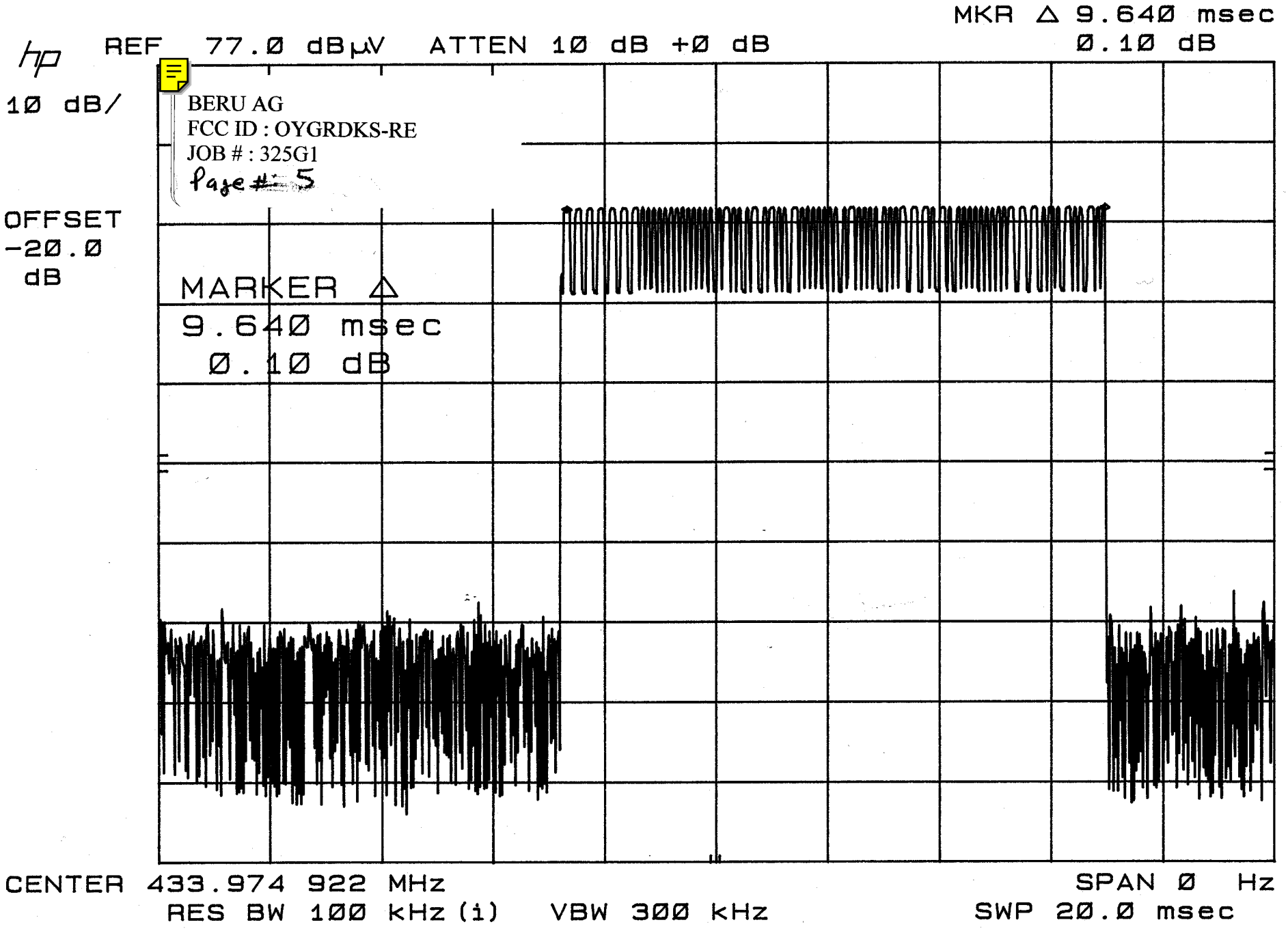
FCC ID: OYGRDKS-RE-1

CALCULATION OF DUTY CYCLE:

The period of the pulse train is determined by observing it on an oscilloscope or a spectrum analyzer with zero(0) frequency span. A plot is then made of the pulse train with a sweep time of 100 milliseconds. This sweep determines the duration of the pulse train, which in this case is 9.64 milliseconds. This sweep allows the determination of the number of pulses if they were of different pulse widths, ie: long & short.

For this EUT, there was a single burst of equally close spaced pulses for a duration of 9.64 milliseconds during the 100 millisecond time period. 9.64 milliseconds out of a 100 millisecond time period coincides to a ten percent duty cycle. The average field strength is determined by multiplying the peak field strength by the percent on time. In this case the percentage ON time was 10%percent. This percentage, (10%) was translated to dB (-20dB) for use in the final Field Strength calculations.

The Duty Cycle Plot is shown on the next page.


MKR Δ 9.640 msec
Ø.1Ø dB
REF 77.Ø dBμV ATTEN 1Ø dB +Ø dB
1Ø dB/
BERU AG
FCC ID : OYGRDKS-RE
JOB # : 325G1
Page #: 5
OFFSET
-2Ø.Ø
dB
MARKER Δ
9.64Ø msec
Ø.1Ø dB
CENTER 433.974 922 MHz
SPAN Ø Hz
RES BW 1ØØ kHz (i)
VBW 3ØØ kHz
SWP 2Ø.Ø msec

APPLICANT: BERU AG

FCC ID: OYGRDKS-RE-1

NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.231(C)

REQUIREMENTS: The bandwidth of the emission shall be no wider than .25% of the center frequency for devices operating between 70 and 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

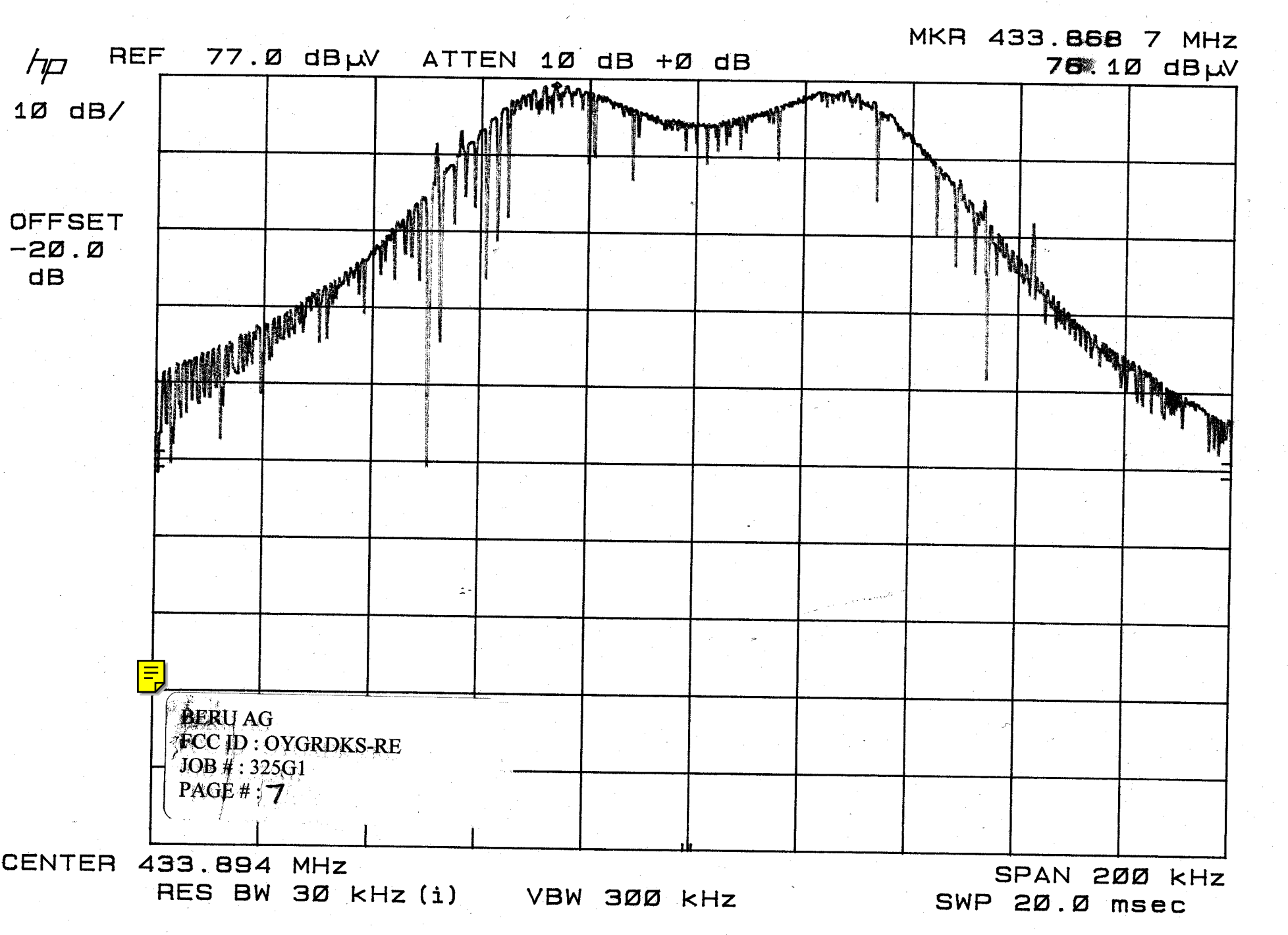
433.90 MHz * .0025 = 1.08475 MHz
1.08475 MHz/2 = +/- 542.375

THE GRAPH ON THE NEXT PAGE REPRESENTS THE EMISSIONS TAKEN FOR THE DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the plot in exhibit 6 was generated. The vertical scale is set to 10 dB per division: the horizontal scale is set to 100 kHz per division.

TEST RESULTS: The unit meets the FCC requirements.

PERFORMED BY: JOE SCOGLIO DATE: MAY 18, 2001


hp
REF 77.0 dBµV
ATTEN 10 dB +0 dB
MKR 433.868 7 MHz
76.10 dBµV
10 dB/
OFFSET
-20.0
dB
BERU AG
FCC ID : OYGRDKS-RE
JOB # : 325G1
PAGE # : 7
CENTER 433.894 MHz
RES BW 30 kHz (i)
VBW 300 kHz
SPAN 200 kHz
SWP 20.0 msec