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TEL 81-2-2109-5059 FAX 81-2-2109-5056 email:thrukang@kornet.net

Test Report

Product Name: **FM Tranceiver**

FCC ID: ON7HCF-3000

Applicant:

HC Telecom Co., Ltd
5F.,Chookhyup Blgd,
#577 Songnae-Dong,Sosa
Puchon,Kyunggi,Korea

Date Receipt: 18/Feb/2004

Date Tested: 20/Feb/2004

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APPLICANT: HC Telecom Co., Ltd

FCC ID: ON7HCF-3000

TEST REPORT CONTAINING:

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APPLICANT: HC Telecom Co., Ltd

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Test Equipment List

DEVICE	MODEL	MFGR	SERNO	DUE.CAL
EMI Test Receiver	ESVS 10	Rohde & Schwarz	830489/001	2004.04.25.
Spectrum Analyzer	8566B	Hewlett Packard	2311A02394	2004.03.17
Spectrum Display	85662A	Hewlett Packard	2542A12429	2004.03.17
Quasi-Peak Adapter	85650A	Hewlett Packard	2521A00887	2004.03.17
RF Preselector	85685A	Hewlett Packard	2648A00504	2004.03.17
Pre-Amplifier	8449B	Hewlett Packard	3008A00375	2004.03.17
Pre-Amplifier	8447F	Hewlett Packard	3113A05367	2004.03.17
Spectrum Monitor	EZM	Rohde & Schwarz	862304/007	2004.03.17
Bico-Antenna	94455-1	Eaton	977	2004.03.17
Log-Periodic Antenna	3146	EMCO	2051	2004.03.17
Dipole Antenna	TDA25/1/2	Electro Metrics	176/200/200	2004.03.17
Horn Antenna	SAS-571	A.H Systems	414	2004.03.17
Spectrum Analyzer	R3261C	Advantest	71720189	2004.04.26
LISN	KNW-242	Kyoritsu	8-923-2	2004.07.12
LISN	8012-50-R-24	Solar	8379121	2004.07.12
Loop Ant	6507	EMCO	1435	2004.10.06

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TEST PROCEDURE

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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 300 kHz. The ambient temperature of the UUT was 63 degrees with a humidity of 49%.

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 unit under test was placed on a table 80 cm high and with dimensions of 1 m by 1.5 m. The table used for radiated measurements is capable of continuous rotation.

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 1 m to 4 m. The antenna was placed in both the horizontal and vertical planes.

The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSIC63.4-1992 with the EUT 40 cm from the vertical ground wall.

Not Applicable battery operated.

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APPLICANT: HC Telecom Co., Ltd

FCC ID: ON7HCF-3000

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.239(b)

REQUIREMENTS: CARRIER FREQUENCY WILL NOT EXCEEDS 48.0 dBuV/m AT 3M.

TEST DATA:

Frequency (MHz)	Value dBuv/m PK	Value dBuv/m AV	Polar	Ant Height m	Antenna Factor dB	Cable Loss dB	Result dBuv/m PK	Result dBuv/m AV	Limit dBuv/m PK	Limit dBuv/m AV	Margin dBuv/m PK	Margin dBuv/m AV
88.1	33.5	31.8	H	2.8	10.0	1.5	**45.0**	**43.3**	68	48	-23	-4.7
88.1	24.8	20.0	V	2.60	10.0	1.5	**36.3**	**31.5**	68	48	-31.7	-16.5

Frequency (MHz)	Value dBuv/m PK	Value dBuv/m AV	Polar	Ant Height m	Antenna Factor dB	Cable Loss dB	Result dBuv/m PK	Result dBuv/m AV	Limit dBuv/m PK	Limit dBuv/m AV	Margin dBuv/m PK	Margin dBuv/m AV
97.7	35.5	34.0	H	2.8	11.0	1.6	**48.1**	**46.6**	68	48	-19.9	-1.4
97.7	26.4	22.7	V	2.60	11.0	1.6	**39**	**35.3**	68	48	-29	-12.7

Frequency (MHz)	Value dBuv/m PK	Value dBuv/m AV	Polar	Ant Height m	Antenna Factor dB	Cable Loss dB	Result dBuv/m PK	Result dBuv/m AV	Limit dBuv/m PK	Limit dBuv/m AV	Margin dBuv/m PK	Margin dBuv/m AV
107.2	34.3	31.2	H	2.8	11.1	1.7	**47.1**	**44.0**	68	48	-20.9	-4.0
107.2	24.1	19.6	V	2.60	11.1	1.7	**36.9**	**32.4**	68	48	-31.1	-15.6

SAMPLE CALCULATION: FSdBuV/m = MR (dBuV) + ACFdB.

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-1992. The spectrum was scanned from 30 MHz to 1000 MHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The UUT was tested in 3 orthogonal planes.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: Kyoung.M Choi **DATE**: 20/Feb/04

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APPLICANT: HC Telecom Co., Ltd

FCC ID: ON7HCF-3000

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.239(c)

REQUIREMENTS: OUT-OF-BAND EMISSIONS SHALL NOT EXCEED:

30 - 88 MHz	40.0 dBuV/M MEASURED AT 3 METERS
88 - 216 MHz	43.5 dBuV/M
216 - 960 MHz	46.0 dBuV/M
ABOVE 960 MHz	54.0 dBuV/M

TEST DATA:

88.1 Mhz

Frequency (MHz)	Result (dBuv/m)	Polar	Ant Height m	Antenna Factor dB	Cable Loss dB	Limit (dBuv/m)	Value (dBuv/m)	Margin (dBuv/m)
176.20	22.7	H	2.0	15.2	2.3	43.5	5.2	-20.8
264.30	18.0	H	2.4	13.5	3.2	46.0	1.3	-28.0
352.40	13.1	H	3.2	14.8	3.8	46.0	-5.6	-32.9
440.50	19.3	H	2.0	16.2	4.5	46.0	-1.4	-26.7
528.60	21.7	H	2.5	17.8	5.1	46.0	-1.2	-24.3
616.70	25.1	H	2.9	20.2	5.7	46.0	-0.7	-20.9
704.80	26.4	H	1.5	21.4	6.2	46.0	-1.2	-19.6
792.90	26.7	H	1.6	21.4	6.7	46.0	-1.4	-19.3
881.00	28.5	H	1.4	23.6	7.2	46.0	-2.3	-17.5

SAMPLE CALCULATION: FSdBuV/m = MR (dBuV) + ACFdB.

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-1992. The spectrum was scanned from 30 MHz to 1000 MHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The UUT was tested in 3 orthogonal planes.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: Kyoung.M Choi **DATE**: 20/Feb/04

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APPLICANT: HC Telecom Co., Ltd

FCC ID: ON7HCF-3000

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.239(c)

REQUIREMENTS: OUT-OF-BAND EMISSIONS SHALL NOT EXCEED:

30 - 88 MHz	40.0 dBuV/M	MEASURED AT 3 METERS
88 - 216 MHz	43.5 dBuV/M	
216 - 960 MHz	46.0 dBuV/M	
ABOVE 960 MHz	54.0 dBuV/M	

TEST DATA:

97.7 Mhz

Frequency (MHz)	Result (dBuv/m)	Polar	Ant Height m	Antenna Factor dB	Cable Loss dB	Limit (dBuv/m)	Value (dBuv/m)	Margin (dBuv/m)
197.40	19.9	H	2.3	15.5	2.5	43.5	1.9	-23.6
293.10	16.4	H	2.4	17.3	3.4	46.0	-4.2	-29.6
390.80	15.7	H	1.2	15.3	4.1	46.0	-3.7	-30.3
448.50	20.0	H	1.9	16.4	4.5	46.0	-0.9	-26.0
586.20	23.6	H	2.0	18.7	5.5	46.0	-0.6	-22.4
683.90	25.2	H	2.4	21.2	6.1	46.0	-2.1	-20.8
781.60	24.3	H	1.6	21.1	6.7	46.0	-3.5	-21.7
879.30	27.9	H	1.8	23.6	7.2	46.0	-2.9	-18.1
977.00	28.4	H	2.5	24.0	7.4	54.0	-3.0	-25.6

SAMPLE CALCULATION: FSdBuV/m = MR (dBuV) + ACFdB.

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-1992. The spectrum was scanned from 30 MHz to 1000 MHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The UUT was tested in 3 orthogonal planes.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: Kyoung.M Choi **DATE**: 20/Feb/04

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APPLICANT: HC Telecom Co., Ltd

FCC ID: ON7HCF-3000

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.239(c)

REQUIREMENTS: OUT-OF-BAND EMISSIONS SHALL NOT EXCEED:

30 - 88 MHz	40.0 dBuV/M MEASURED AT 3 METERS
88 - 216 MHz	43.5 dBuV/M
216 - 960 MHz	46.0 dBuV/M
ABOVE 960 MHz	54.0 dBuV/M

TEST DATA:

107.2 Mhz

Frequency (MHz)	Result (dBuv/m)	Polar	Ant Height m	Antenna Factor dB	Cable Loss dB	Limit (dBuv/m)	Value (dBuv/m)	Margin (dBuv/m)
214.30	17.1	H	2.0	10.7	2.7	43.5	3.7	-26.4
321.50	17.2	H	1.2	15.9	3.6	46.0	-2.3	-28.8
428.70	17.6	H	1.6	15.9	4.4	46.0	-2.7	-28.4
535.90	22.6	H	2.4	17.9	5.1	46.0	-0.5	-23.4
643.19	25.3	H	2.3	20.3	5.8	46.0	-0.9	-20.7
750.39	25.8	H	1.8	21.0	6.5	46.0	-1.6	-20.2
857.50	27.1	H	2.1	23.2	7.1	46.0	-3.2	-18.9
964.70	28.7	H	2.0	23.6	7.4	54.0	-2.3	-25.3
1071.90	29.0	H	1.8	25.9!	7.4	54.0	-4.3	-25.0

SAMPLE CALCULATION: FSdBuV/m = MR (dBuV) + ACFdB.

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-1992. The spectrum was scanned from 30 MHz to 1000 MHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The UUT was tested in 3 orthogonal planes.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: Kyoung.M Choi **DATE**: 20/Feb/04

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APPLICANT: HC Telecom Co., Ltd

FCC ID: ON7HCF-3000

NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.239(a)

REQUIREMENTS: Emissions from the device shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

TEST DATA:

THE GRAPH ON THE FOLLOWING PAGE REPRESENTS THE EMISSIONS TAKEN FOR THIS DEVICE.

METHOD OF MEASUREMENT: The zero level was set without modulation. A small sample of the transmitter output was fed into the spectrum analyzer and the above photo was taken. The vertical scale is set to 10 dB per division; the horizontal scale is set to 20 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: Kyoung.M Choi **DATE**: 20/Feb/04

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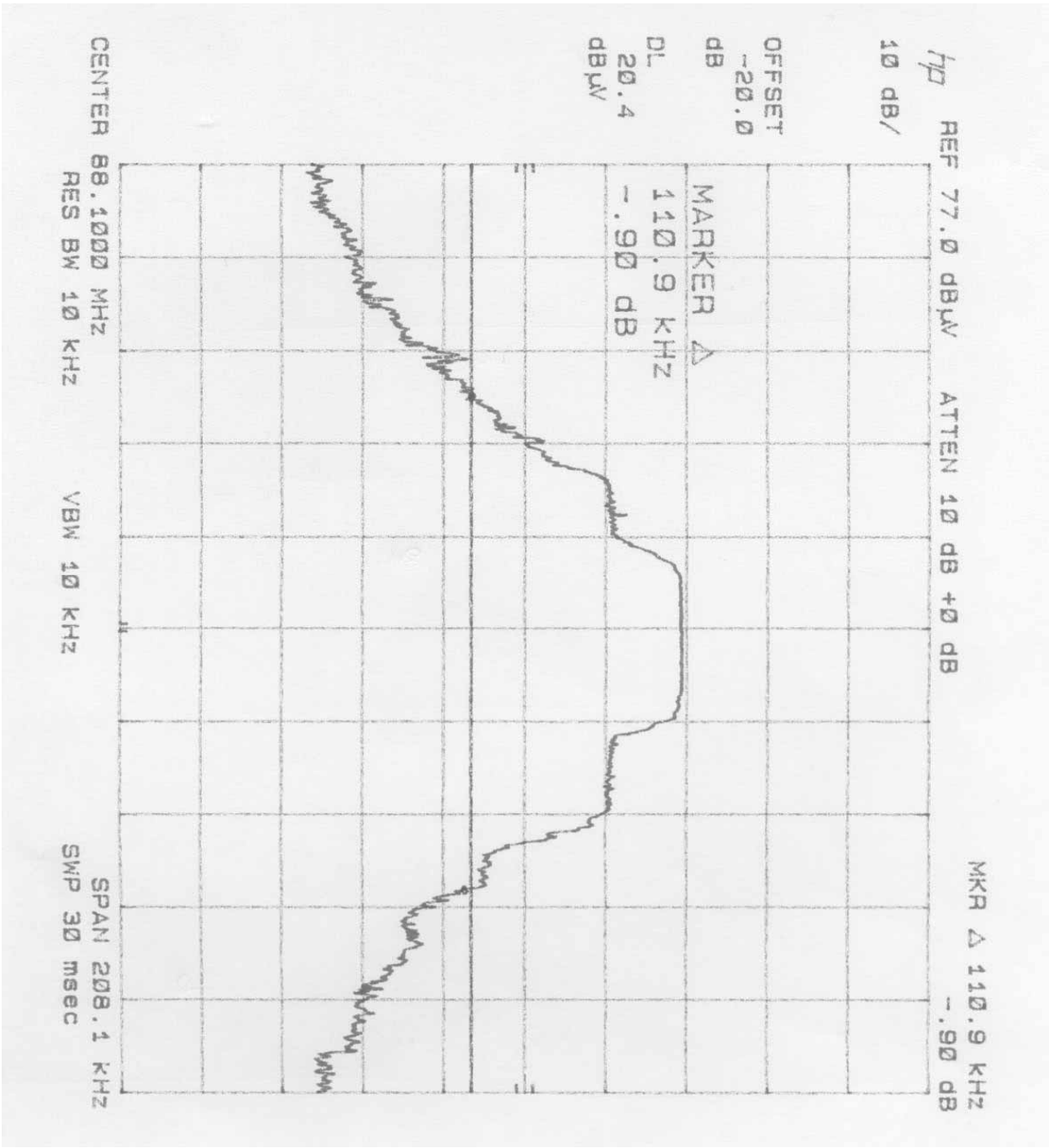
OCCUPIED BANDWIDTH PLOT GOES HERE
88.1 Mhz



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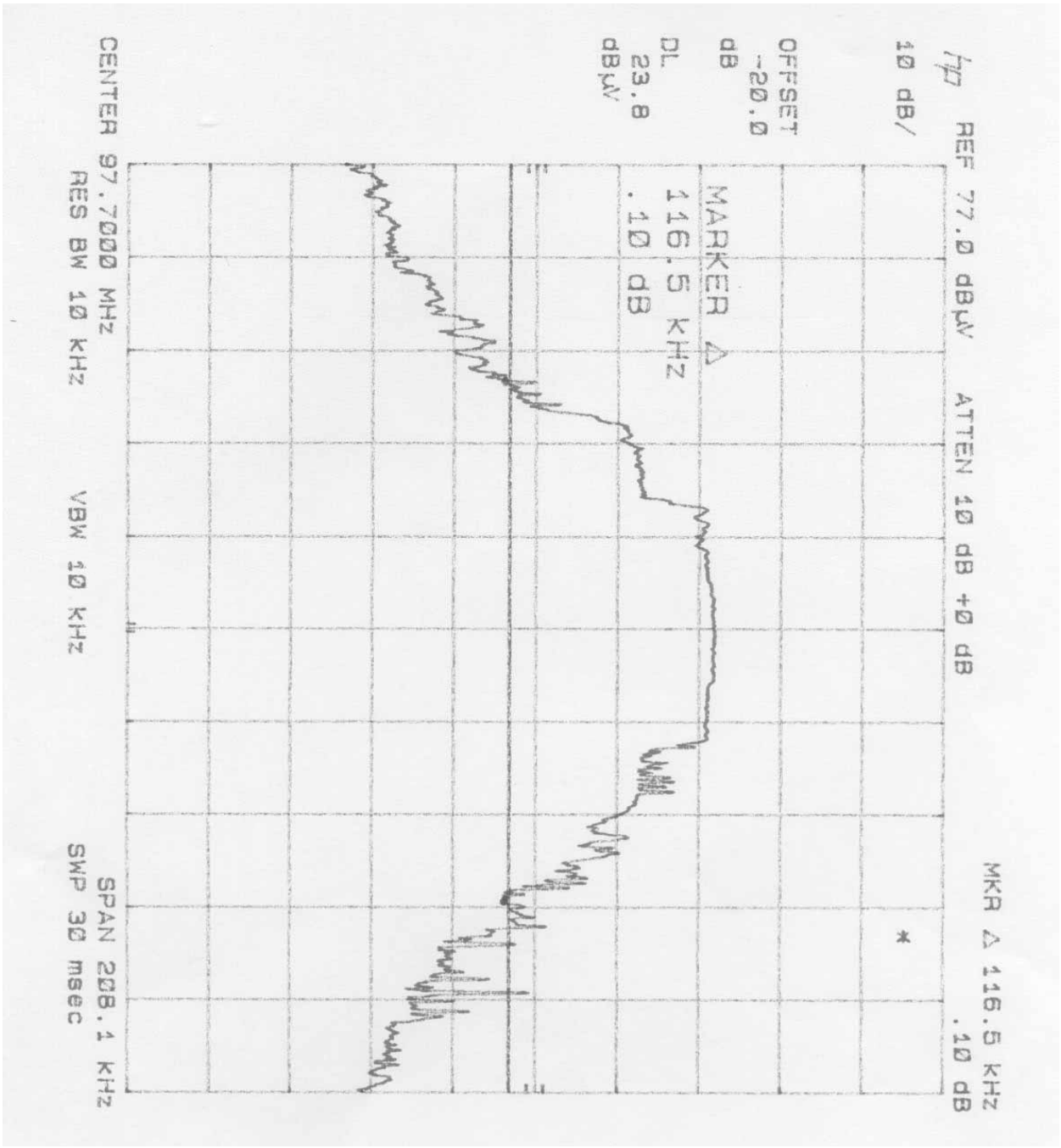
OCCUPIED BANDWIDTH PLOT GOES HERE
97.7 Mhz



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OCCUPIED BANDWIDTH PLOT GOES HERE
107.2 Mhz