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APPLICANT: HC TELECOM CO., LTD.
FCC ID: ON7AU27018

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APPLICANT: HC TELECOM CO., LTD.
FCC ID: ON7AU27018

15.214(d) THIS DEVICE COMPLIES WITH THE SECURITY CODE REQUIREMENTS OF 15.214(d)(1)(2) AND (3) BY MEANS OF THE FOLLOWING:

THE EPROM IS CAPABLE OF 16 MILLION DIGIT CODING AND THE FACTORY WRITES THE SERIES IN PRODUCTION. THIS MEANS THAT EACH OF 16 MILLION INDIVIDUAL SECURITY CODES ARE REPEATED ONLY ONCE IN ANY CONSECUTIVELY PRODUCED UNIT.

## 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
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
10. Temperature Chamber: Tenney Engineering Model TTRC, S/N 11717-7
11. Frequency Counter: HP Model 5385A, S/N 3242A07460
12. Peak Power Meter: HP Model 8900C, S/N 2131A00545
13. Open Area Test Site #1-3meters
14. Signal Generator: HP 8640B, S/N 2308A21464
15. Signal Generator: HP 8614A, S/N 2015A07428
16. Passive Loop Antenna: EMCO Model 6512, 9KHz to 30MHz, S/N 9706-1211
17. Dipole Antenna Kit: Electro-Metrics Model TDA-30/1-4, S/N 153
18. AC Voltmeter: HP Model 400FL, S/N 2213A14499
19. Digital Multimeter: Fluke Model 8012A, S/N 4810047
20. Digital Multimeter: Fluke Model 77, S/N 43850817
21. Oscilloscope: Tektronix Model 2230, S/N 300572

## TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC. Shielded interface cables were used in all cases except for cables connecting to the telephone line and the power cords. A test program was run which simulated a normal data transmission on a network.

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-1992 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 74°F with a humidity of 44%.

BANDWIDTH 6.0dB: The measurements were made with the spectrum analyzer's resolution bandwidth(RBW)=100kHz and the video bandwidth(VBW) =300KHz and the span set as shown on plot.

TEST PROCEDURES CONTINUED

POWER OUTPUT: The RF power output was measured at the antenna feed point by removing the permanent antenna and connecting the UUT to a peak power meter, HP Model No. 8900C.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a prese-lector. The bandwidth(RBW) of the spectrum analyzer was 100kHz up to 1GHz and 1.0MHz above 1GHz with an appropriate sweep speed. The VBW above 1.0GHz was = 1.0MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 82°F with a humidity of 37%.

15.247(d) POWER SPECTRAL DENSITY. The peak within the pass band was located with a RBW set to 30Khz and a span of 5MHz, slightly greater than the 6dB bandwidth, then the emission was centered on the display and the span and RBW reduced. A 1.5MHz span, 3kHz RBW, and a sweep time to sweep time set to 500 seconds. Since spectral line spacing could not be resolved, the noise power density method was used. The reponse was then plotted, a correction factor of 35dB and any attenuation used was added.

15.247(e): PROCESSING GAIN, This gain is supplied by the manufacturer of the UUT.

2.1033(b)(4)

ANTENNA AND GROUND SYSTEM:
This unit uses a short, antenna element for the base unit and the handset. The antenna is permanently attached to the unit and no provision is made for connection to an external antenna.

No ground connection is provided. The only ground in use is the ground plane on the printed circuit board.

APPLICANT: HC TELECOM CO., LTD.

FCC ID: ON7AU27018

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

RULES PART NUMBER: 15.207

MINIMUM REQUIREMENTS:

| FREQUENCY MHz | LEVEL dBuV |
|---|---|
| 0.450-30 | 48 dBuV or 250 uV |

TEST PROCEDURE: ANSI STANDARD C63.4-1992

**ON HOOK**

THE HIGHEST EMISSION READ FOR LINE 1 WAS 48.358 uV @ 19.30 MHz.

THE HIGHEST EMISSION READ FOR LINE 2 WAS 47.258 uV @ 9.61 MHz.

**OFF HOOK**

THE HIGHEST EMISSION READ FOR LINE 1 WAS 54.887 uV @ 19.30 MHz.

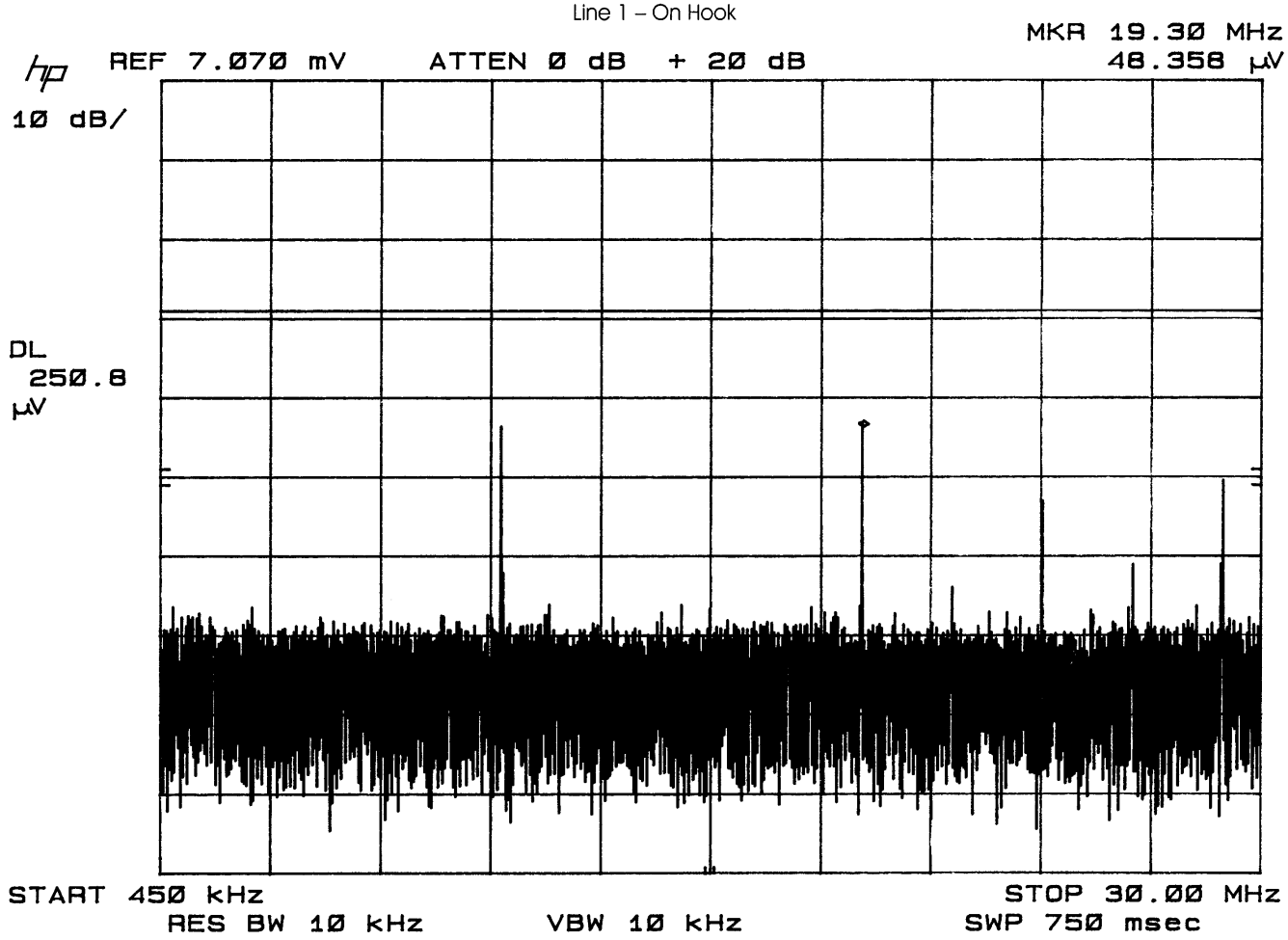
THE HIGHEST EMISSION READ FOR LINE 2 WAS 61.584 uV @ 19.30 MHz.

THE GRAPHS ON THE FOLLOWING PAGES REPRESENT THE EMISSIONS READ FOR POWERLINE CONDUCTED FOR THIS DEVICE.

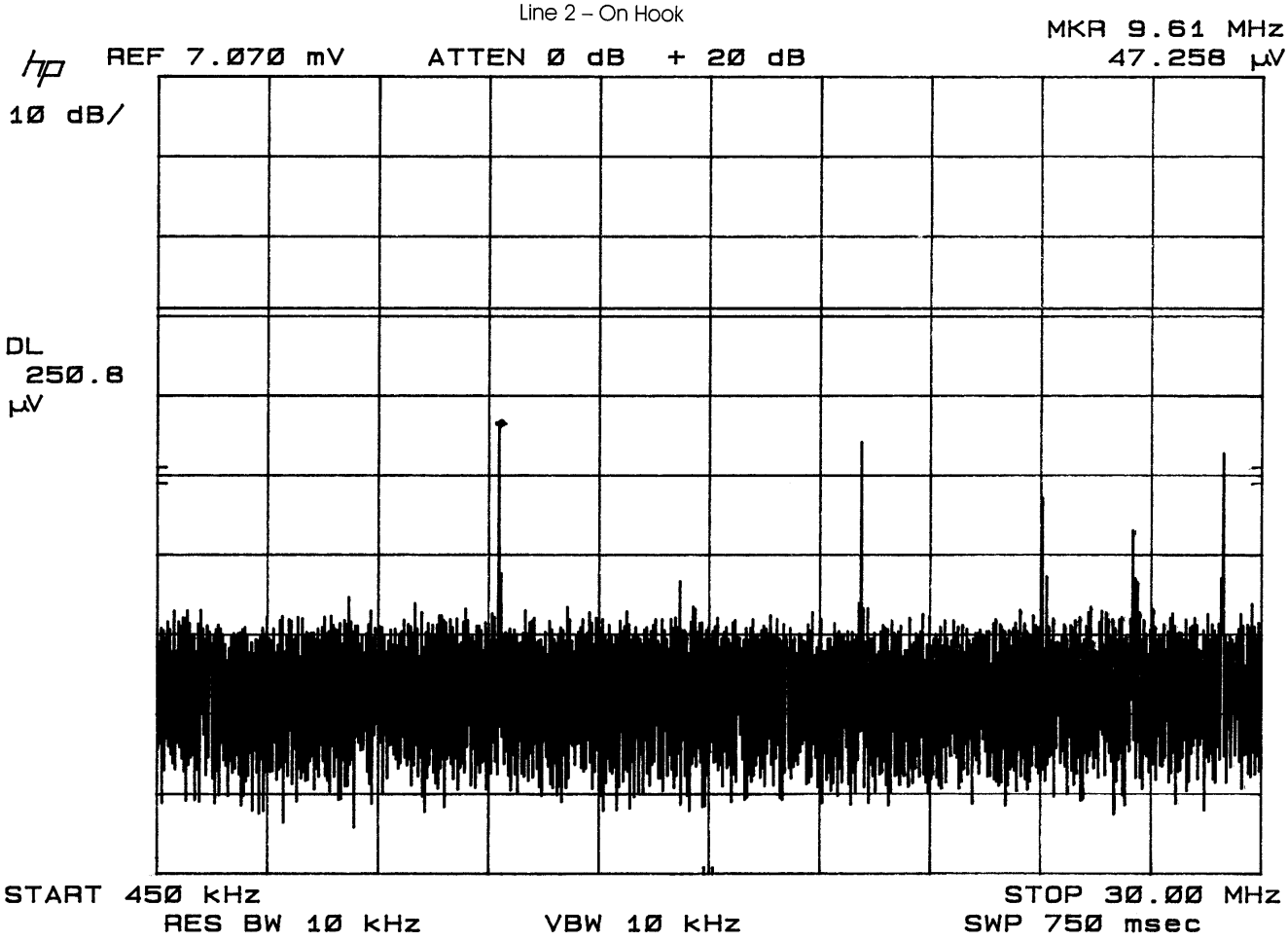
TEST RESULTS: Both lines were observed with the UUT transmitting. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

PERFORMED BY: JOE SCOGLIO DATE: 10/8/01

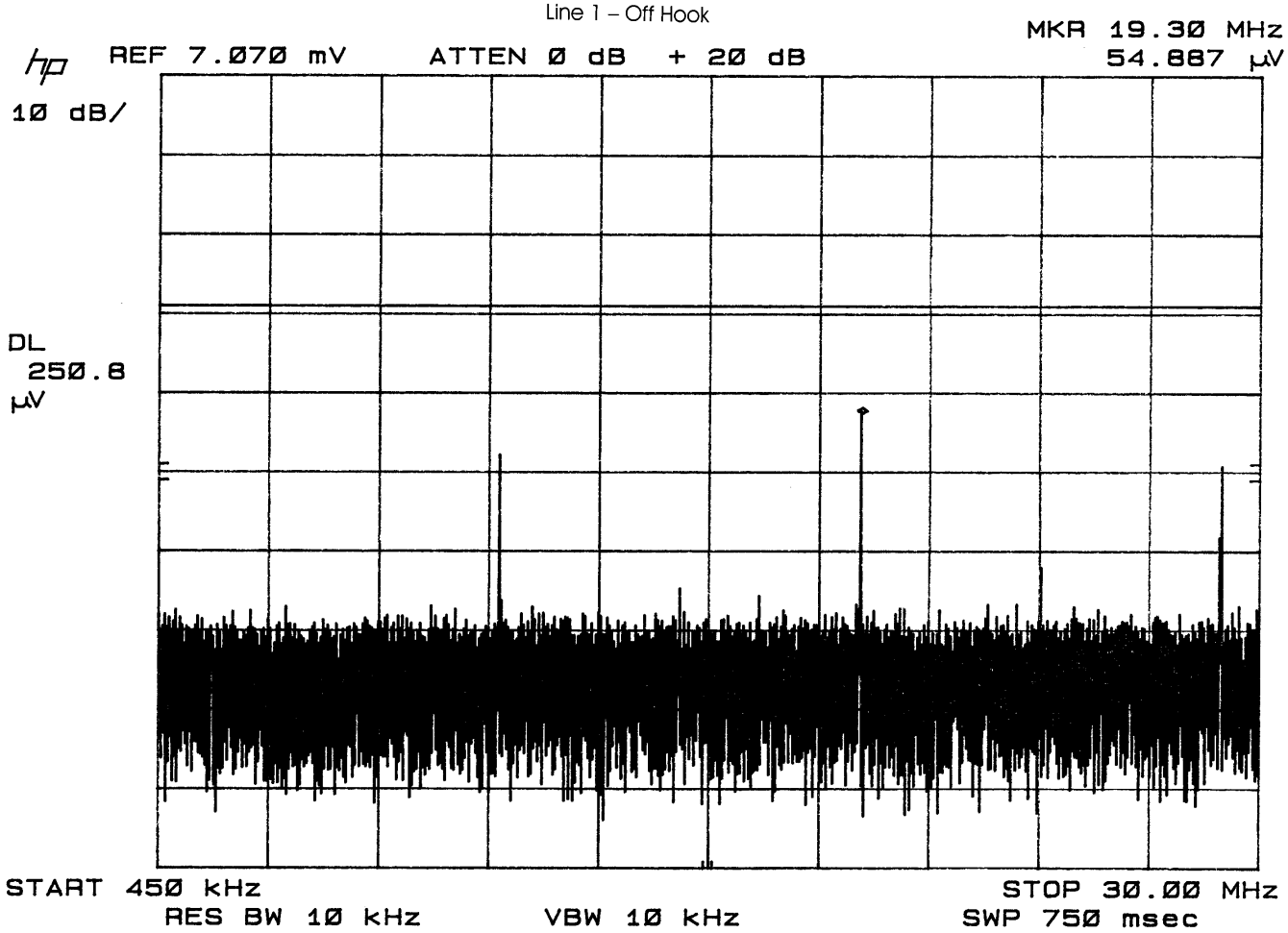
Line 1 – On Hook



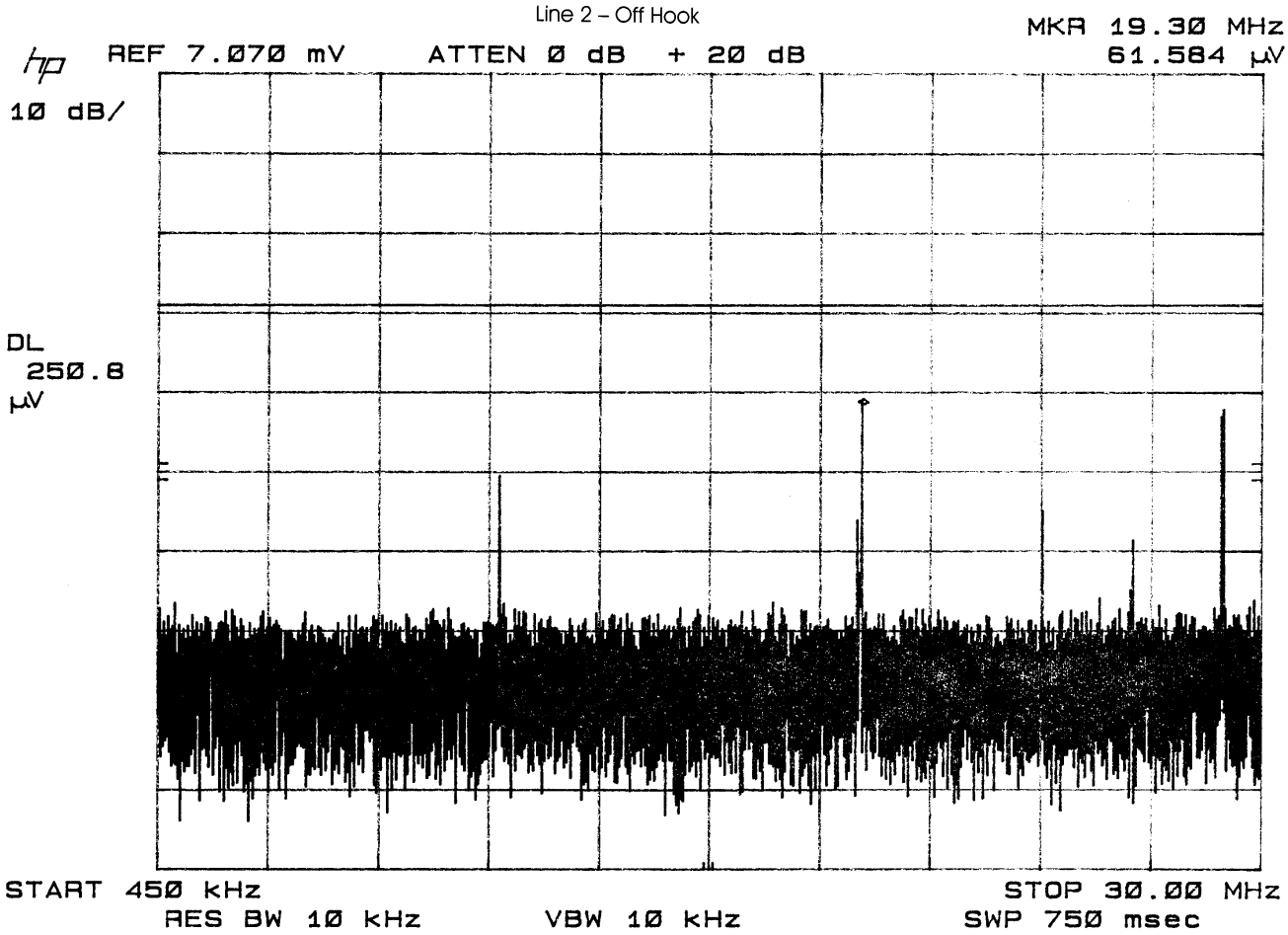
Line 2 – On Hook



Line 1 – Off Hook



Line 2 – Off Hook



APPLICANT: HC TELECOM CO., LTD.

FCC ID: ON7AU27018

NAME OF TEST: OCCUPIED BANDWIDTH

RULES PART NUMBER: 15.247

15.247(a)(2)

6dB bandwidth shall be at least 500 kHz. As shown in the accompanying plots. The bandwidth was measured at three places in the band and the narrowest is reported below.

Base 6dB Bandwidth = 1.540 MHz

Handset 6 dB Bandwidth = 1.575 MHz

15.247(B) PEAK POWER OUTPUT

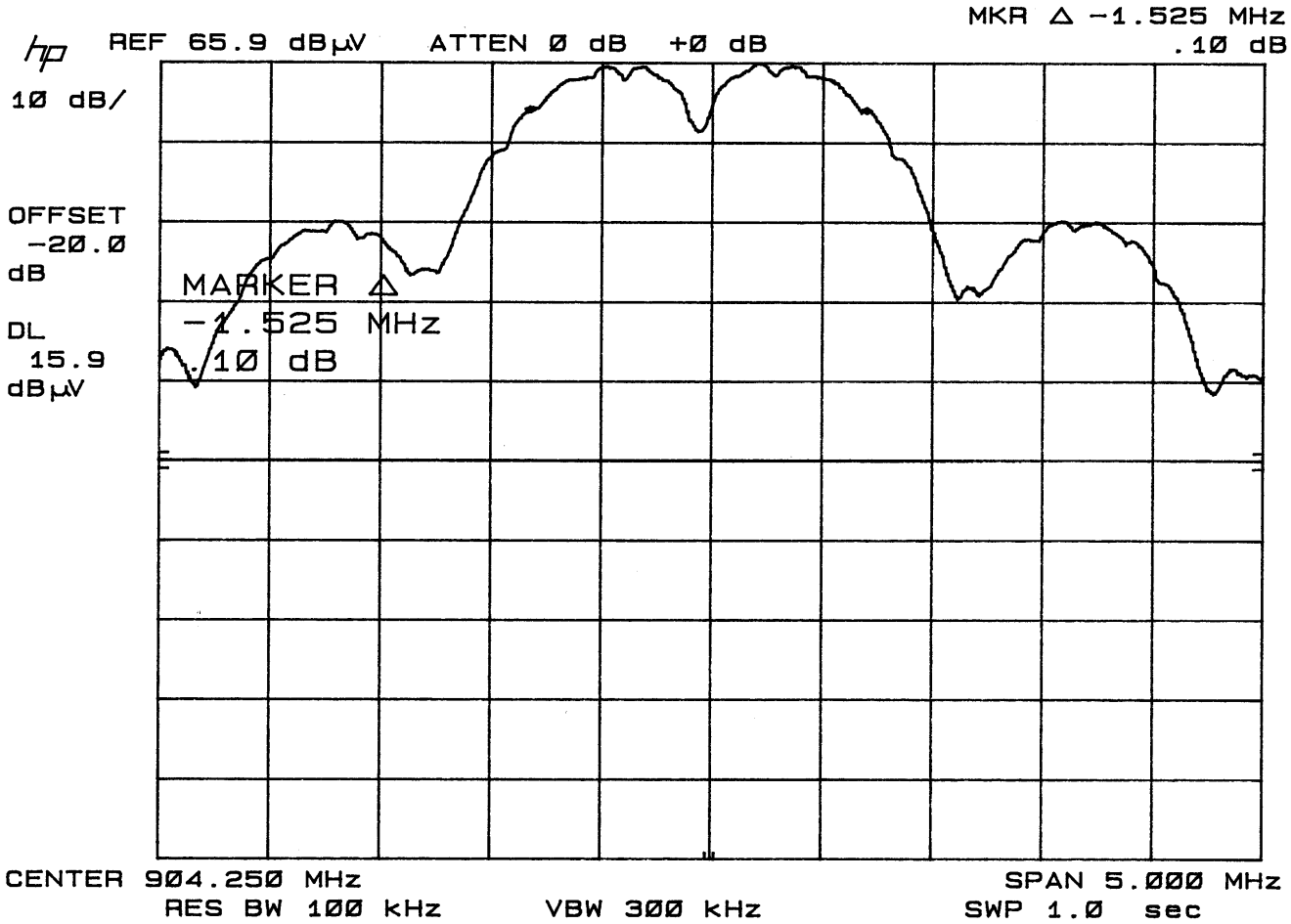
The maximum peak output power shall not exceed 1 watt (30 dBm). If directional transmitting antennas with a gain of more than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Both the base and handset have a maximum power output of less than +30 dBm. Power was measured by disconnecting the antennas and measuring across a 50 ohm load as recommended by the manufacturer using a HP peak power meter Model 8900C. The antennas are non directional and do not exceed 6 dBi gain. The power output was measured at three places in the band highest is reported below.

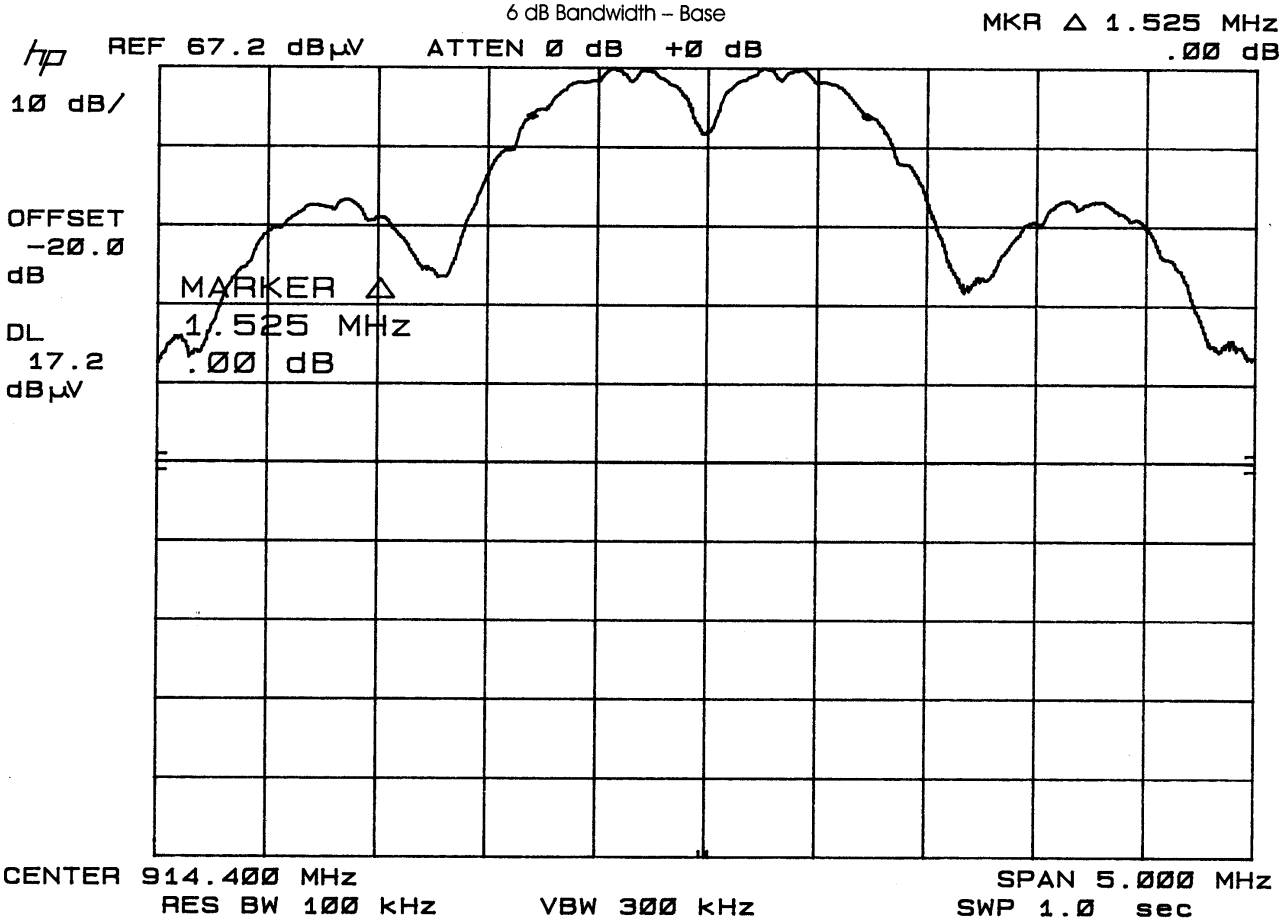
POWER OUTPUT - LIMIT +30 dBm

BASE PEAK POWER OUTPUT = .28 mWatts
HANDSET PEAK POWER OUTPUT = .078 mWatts

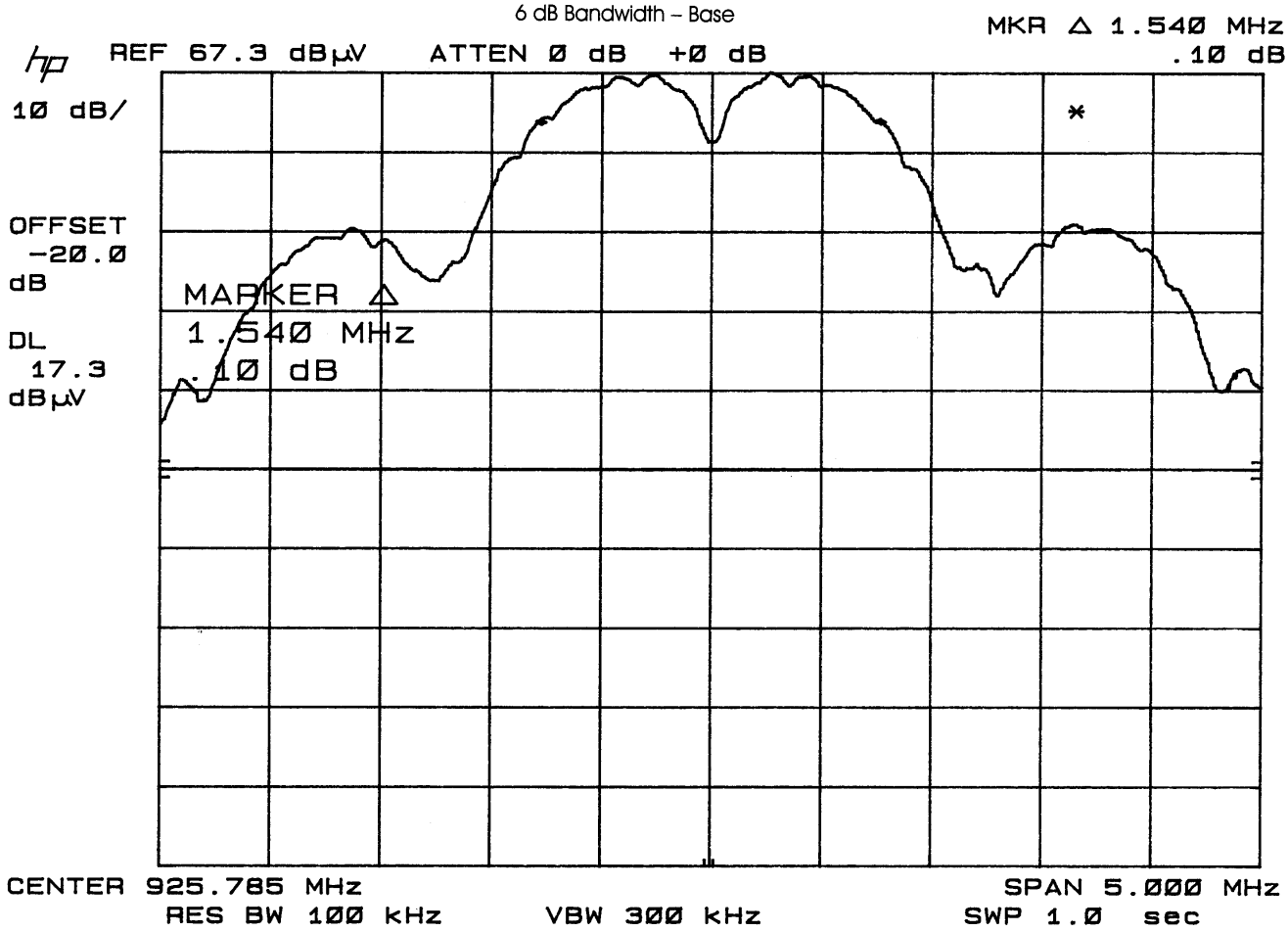
6 dB Bandwidth – Base



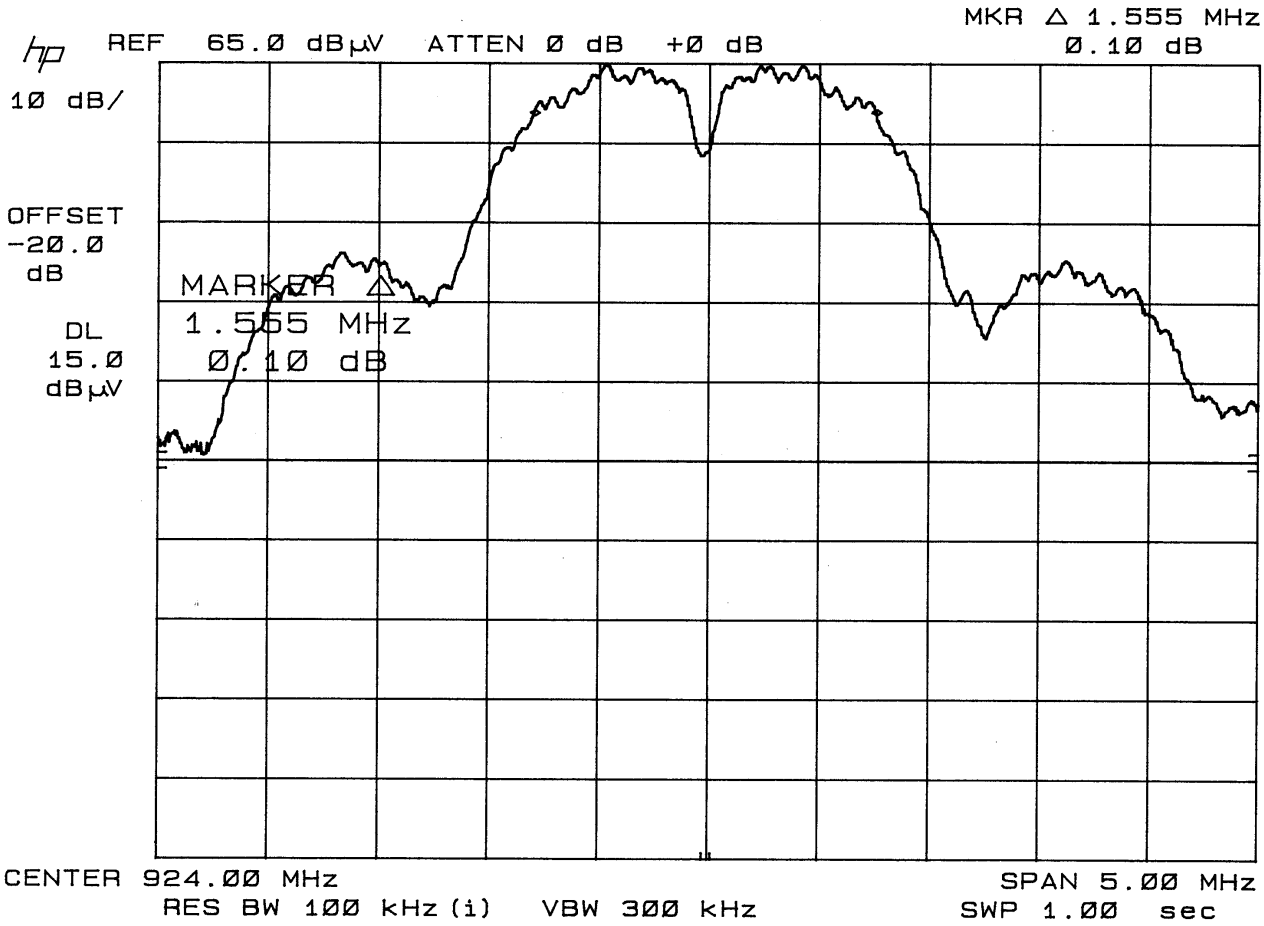
6 dB Bandwidth – Base



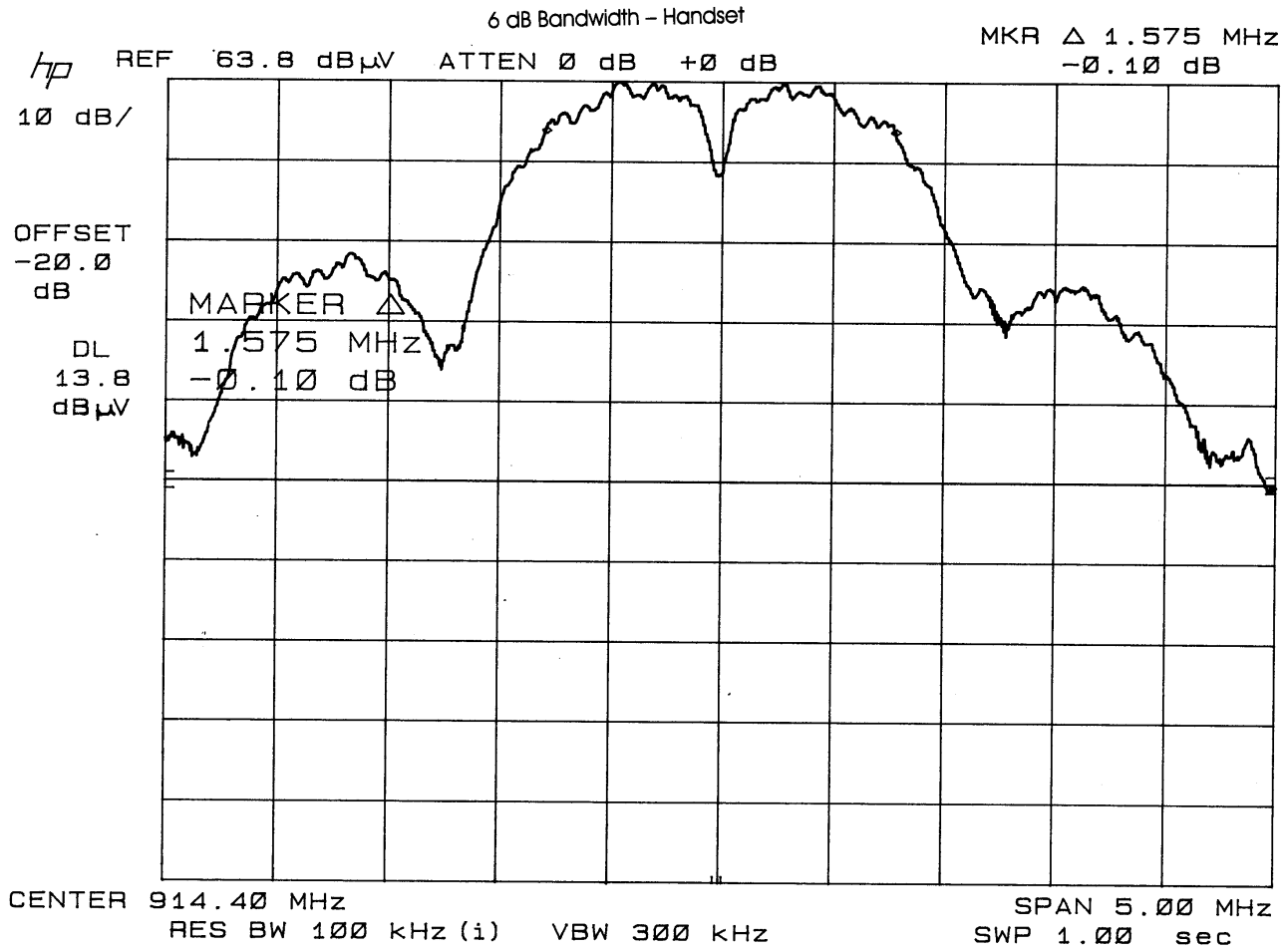
6 dB Bandwidth – Base



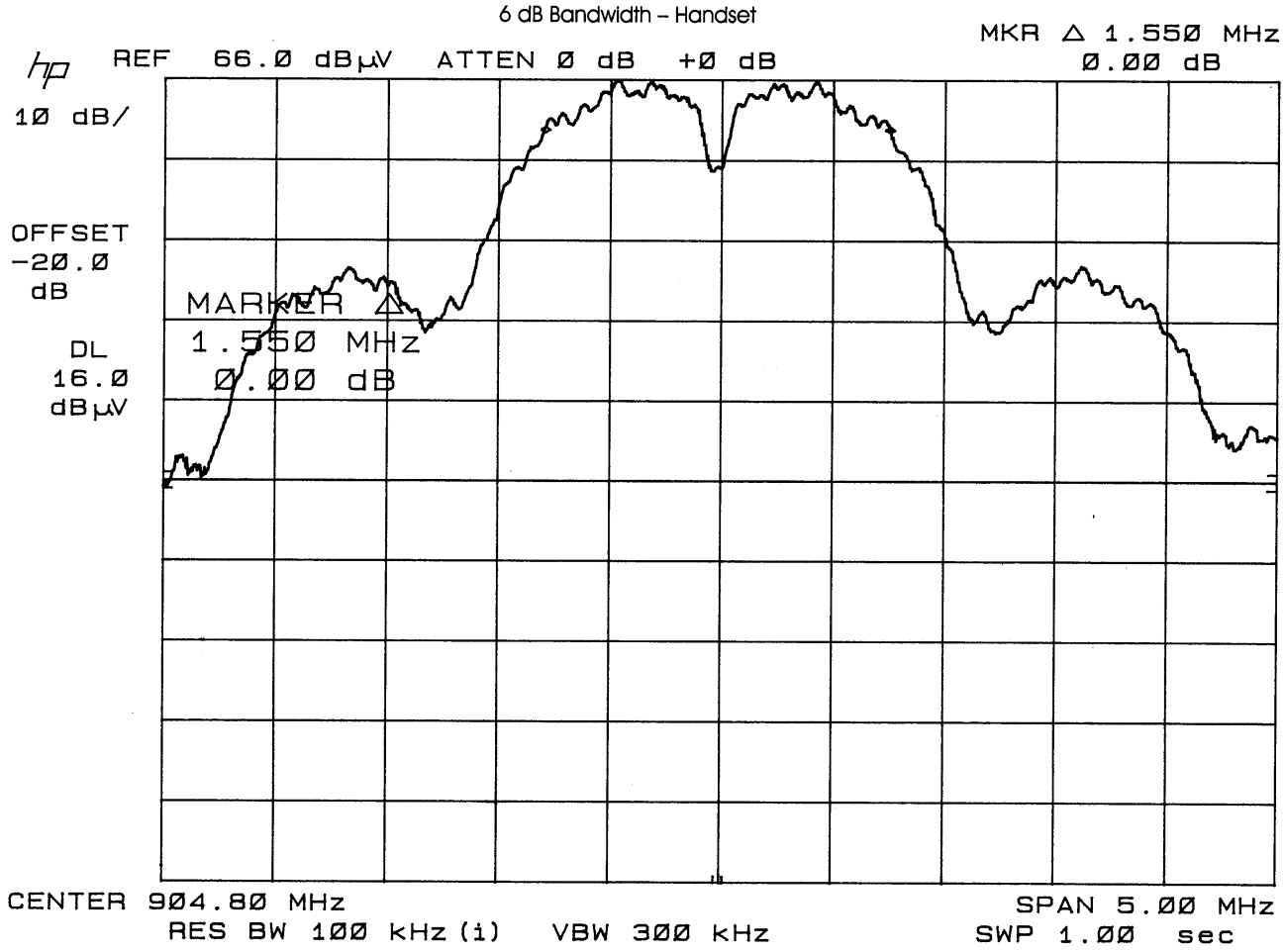
6 dB Bandwidth – Handset



6 dB Bandwidth – Handset



6 dB Bandwidth – Handset



APPLICANT: HC TELECOM CO., LTD.

FCC ID: ON7AU27018

NAME OF TEST: RADIATED SPURIOUS EMISSIONS - BASE

RULES PART NUMBER: 15.247(c)

REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54 dBuV/m). Spurious not in a restricted band must be 20dBc.

TEST DATA:

| Tuned Frequency MHz | Emission Frequency MHz | Meter Reading dBuv | Ant. Polarity | Coax Loss dB | Correction Factor dB | Field Strength dBuv/m | Margin dB |
|---|---|---|---|---|---|---|---|
| BASE | | | | | | | |
| 904.2 | 904.20 | 64.1 | H | 4.11 | 23.45 | 91.66 | 35.72 |
| 904.2 | 1,808.40 | 21.8 | V | 2.80 | 28.42 | 53.02 | 18.64 |
| 904.2 | 2,712.60R | 14.9 | H | 3.57 | 29.75 | 48.22 | 5.78 |
| 904.2 | 3,616.80R | 6.7 | V | 4.42 | 31.53 | 42.65 | 11.35 |
| 904.2 | 5,425.30R | 4.7 | V | 6.35 | 34.28 | 45.33 | 8.67 |
| 904.2 | 7,233.70 | 2.5 | V | 7.04 | 36.04 | 45.58 | 26.08 |
| 904.2 | 9,042.20R | 1.4 | V | 8.28 | 37.34 | 47.02 | 6.98 |
| 914.4 | 914.40 | 64.6 | H | 3.88 | 23.37 | 91.85 | 35.53 |
| 914.4 | 1,828.80 | 22.8 | V | 2.82 | 28.43 | 54.05 | 17.80 |
| 914.4 | 2,743.20R | 9.6 | H | 3.59 | 29.86 | 43.05 | 10.95 |
| 914.4 | 3,657.60R | 3.5 | H | 4.46 | 31.71 | 39.67 | 14.33 |
| 914.4 | 5,486.40 | 1.1 | V | 6.37 | 34.32 | 41.79 | 30.06 |
| 925.8 | 925.80 | 59.8 | V | 3.62 | 23.28 | 86.70 | 40.68 |
| 925.8 | 1,851.60 | 21.4 | V | 2.84 | 28.45 | 52.69 | 14.01 |
| 925.8 | 2,777.40R | 7.1 | H | 3.62 | 29.98 | 40.70 | 13.30 |
| 925.8 | 3,703.20R | 2.9 | V | 4.50 | 31.92 | 39.32 | 14.68 |
| 925.8 | 5,554.80R | 0.9 | V | 6.39 | 34.37 | 41.66 | 12.34 |

APPLICANT: HC TELECOM CO., LTD.

FCC ID: ON7AU27018

NAME OF TEST: RADIATED SPURIOUS EMISSIONS - HANDSET

RULES PART NUMBER: 15.247(c)

REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54 dBuV/m). Spurious not in a restricted band must be 20dBc.

TEST DATA CONTINUED:

| Tuned Frequency MHz | Emission Frequency MHz | Meter Reading dBuv | Ant. Polarity | Coax Loss dB | Correction Factor dB | Field Strength dBuv/m | Margin dB |
|---|---|---|---|---|---|---|---|
| **HANDSET** | | | | | | | |
| **905.9** | **905.90** | **57.4** | **V** | **4.07** | **24.83** | **86.30** | **41.08** |
| **905.9** | **1,811.90** | **25.1** | **H** | **2.80** | **28.42** | **56.32** | **9.98** |
| **905.9** | **2,717.90R** | **11.5** | **V** | **3.57** | **29.76** | **44.83** | **9.17** |
| **905.9** | **5,435.90R** | **8.2** | **V** | **6.35** | **34.29** | **48.84** | **5.16** |
| **905.9** | **6,341.90** | **15.7** | **V** | **6.62** | **35.31** | **57.63** | **8.67** |
| **914.4** | **914.40** | **57.6** | **V** | **3.88** | **24.73** | **86.21** | **41.17** |
| **914.4** | **1,828.80** | **25.6** | **H** | **2.82** | **28.43** | **56.85** | **9.36** |
| **914.4** | **2,743.20R** | **3.1** | **V** | **3.59** | **29.86** | **36.55** | **17.45** |
| **914.4** | **5,486.40** | **17.3** | **V** | **6.37** | **34.32** | **57.99** | **8.22** |
| **914.4** | **6,400.80** | **16.1** | **V** | **6.63** | **35.42** | **58.15** | **8.06** |
| **924.0** | **924.00** | **57.3** | **V** | **3.66** | **24.61** | **85.57** | **41.81** |
| **924.0** | **1,848.00** | **23.6** | **H** | **2.84** | **28.44** | **54.88** | **10.69** |
| **924.0** | **2,772.00R** | **1.2** | **V** | **3.62** | **29.96** | **34.78** | **19.22** |
| **924.0** | **5,544.00** | **17.0** | **H** | **6.39** | **34.36** | **57.75** | **7.82** |
| **924.0** | **6,468.00** | **15.0** | **V** | **6.64** | **35.54** | **57.18** | **8.39** |

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

METHOD OF MEASUREMENT: The procedure used was ANSI STANDARD C63.4-1992. 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 spectrum was scanned from 30 MHz to 10 GHz using a Hewlett Packard Model 8566B Spectrum Analyzer, Hewlett Packard Model 85685A Preselector, Hewlett Packard Model 85650A Quasi-Peak Adaptor, and an appropriate antenna. Low loss coax was used above 1 GHz. Measurements were made at Timco Engineering, Inc. 849 NW State Road 45 Newberry, Fl.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: Joseph Scoglio DATE: 10/8/01

APPLICANT: HC TELECOM CO., LTD.

FCC ID: ON7AU27018

NAME OF TEST: POWER SPECTRAL DENSITY

RULES PART NUMBER: 15.247(d)

REQUIREMENTS: The power spectral density averaged over any 1 second interval shall not be greater than 8 dBm in any 3 kHz bandwidth within these bands.

TEST DATA:

The spectrum line spacing could not be resolved so the noise power density was measured;

Measurement Method:

Starting from the settings that were used for the 6 dB bandwidth the peak signal was located and the span was reduced and the sweep time increased in a manner to maintain calibration and to keep the peak emission in the display, then the sweep time was increased to 500seconds at 1.5MHz span and a RBW changed to 3 kHz.The spectrum analyzer was put into the noise power mode and the plots made.

**BASE**

| @ 904.509 MHz | @ 915.109 MHz | @ 923.254 MHz |
|---|---|---|
| .90 dBuV | -.90 dBuV | -1.40 dBuV |
| 40.00 dB ATTN | 40.00 dB ATTN | 40.00 dB ATTN |
| 35.00 dB CF | 35.00 dB CF | 35.00 dB CF |
| 75.90 dBuV | 74.10 dBuV | 73.60 dBuV |
| -107.00 dBuV to dBm | -107.00 dBuV to dBm | -107.00 dBuV to dBm |
| TOTAL -31.10 dBm | TOTAL -32.90 dBm | TOTAL -33.40 dBm |

**HANDSET**

| @ 905.866 MHz | @ 917.573 MHz | @ 924.879 MHz |
|---|---|---|
| -3.40 dBuV | -3.40 dBuV | -4.10 dBuV |
| 40.00 dB ATTN | 40.00 dB ATTN | 40.00 dB ATTN |
| 35.00 dB CF | 35.00 dB CF | 35.00 dB CF |
| 71.60 dBuV | 71.60 dBuV | 70.90 dBuV |
| -107.00 dBuV to dBm | -107.00 dBuV to dBm | -107.00 dBuV to dBm |
| TOTAL -35.40 dBm | TOTAL -35.40 dBm | TOTAL -36.10 dBm |

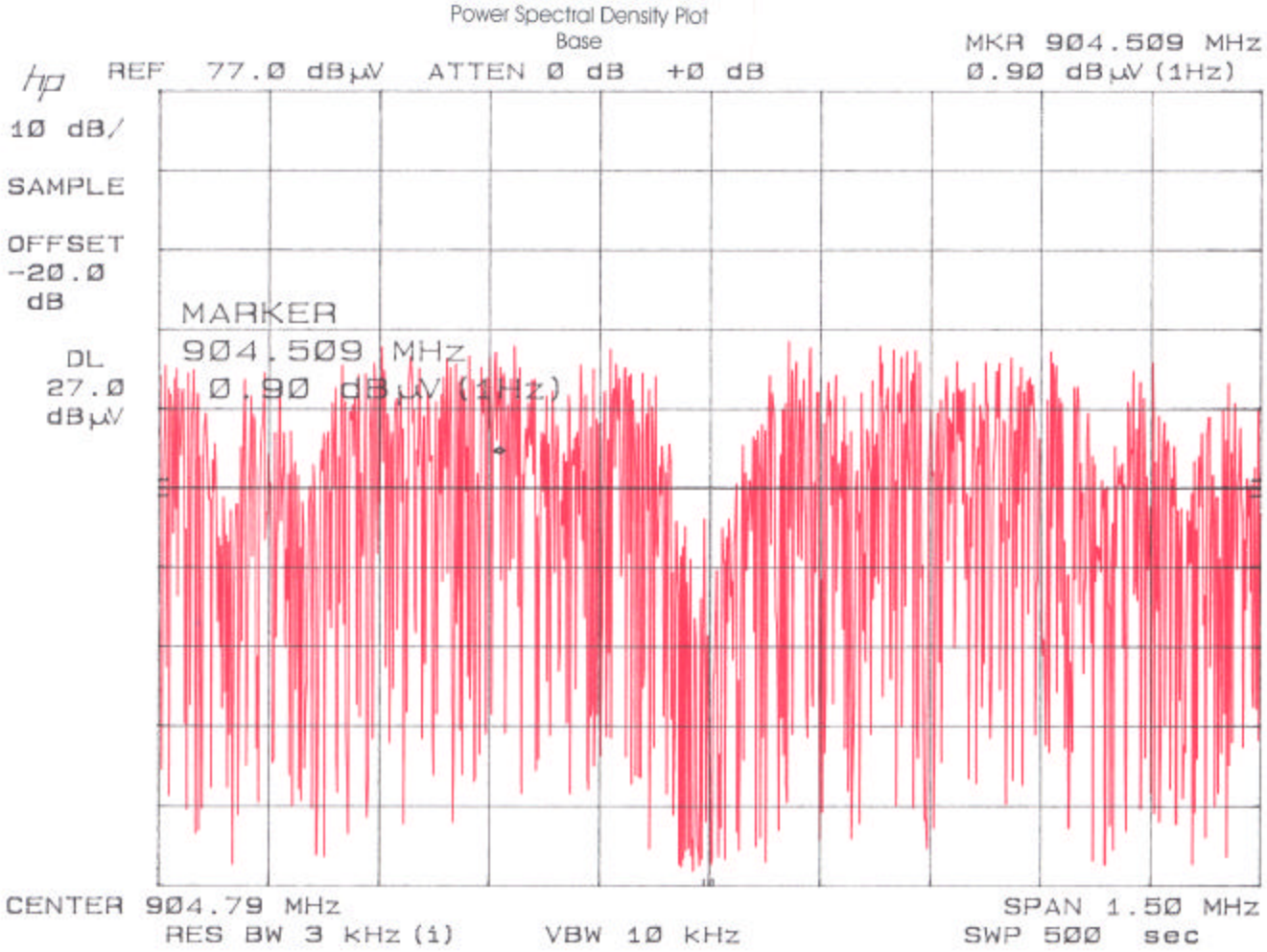
NAME OF TEST: PROCESSING GAIN

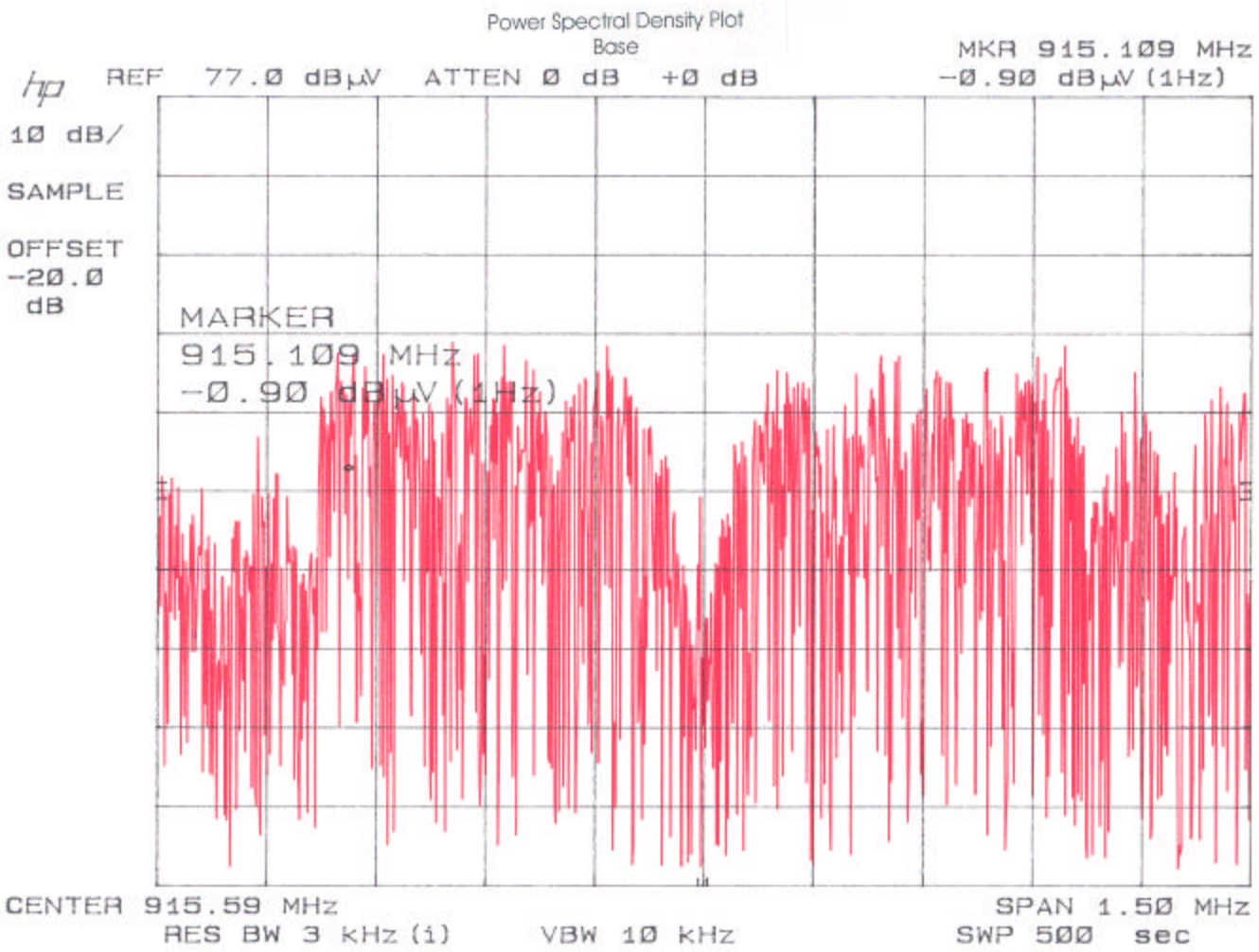
RULES PART NUMBER: 15.247(e)

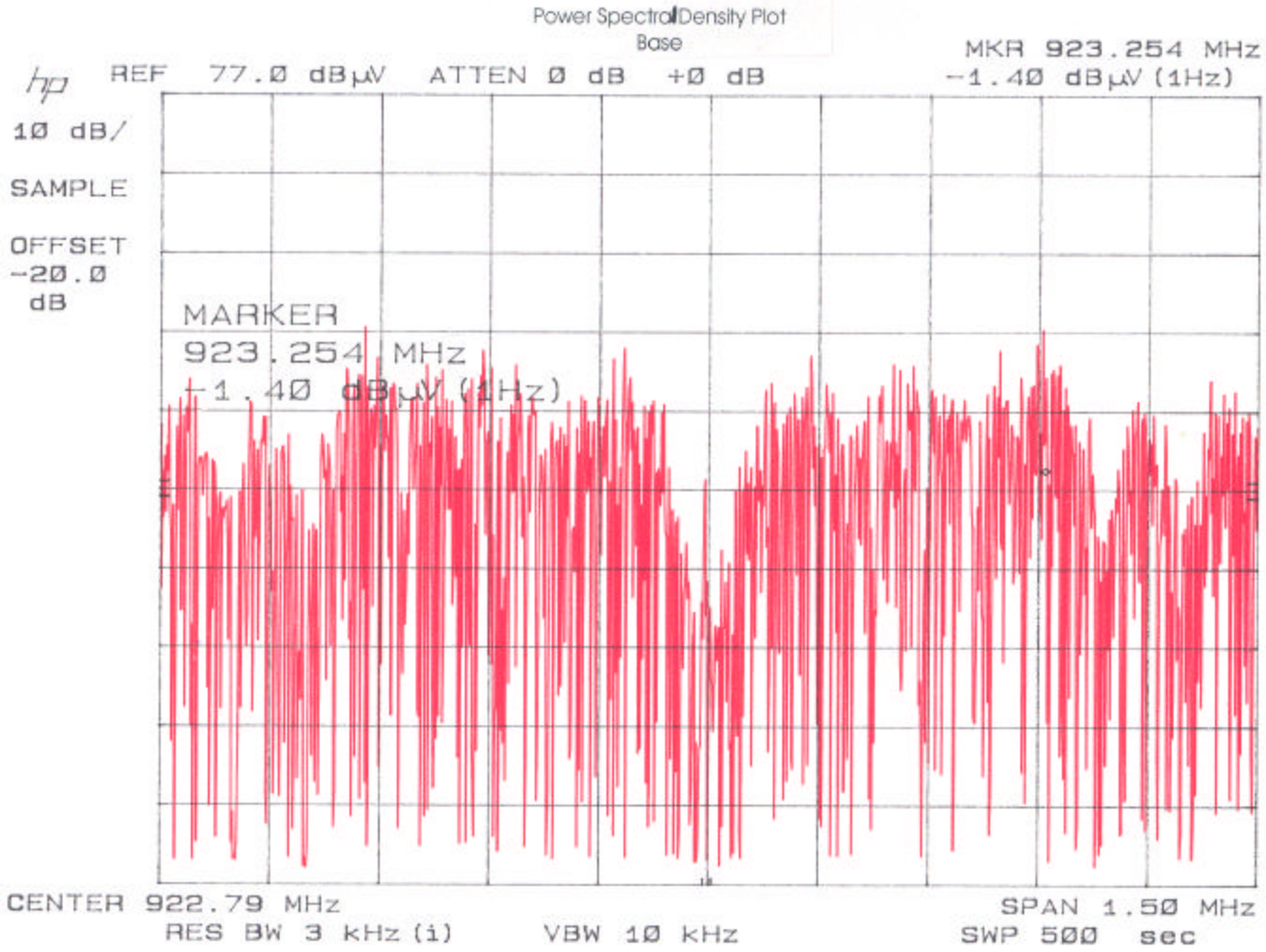
REQUIREMENTS: The processing gain shall be at least 10 dB.

TEST DATA:

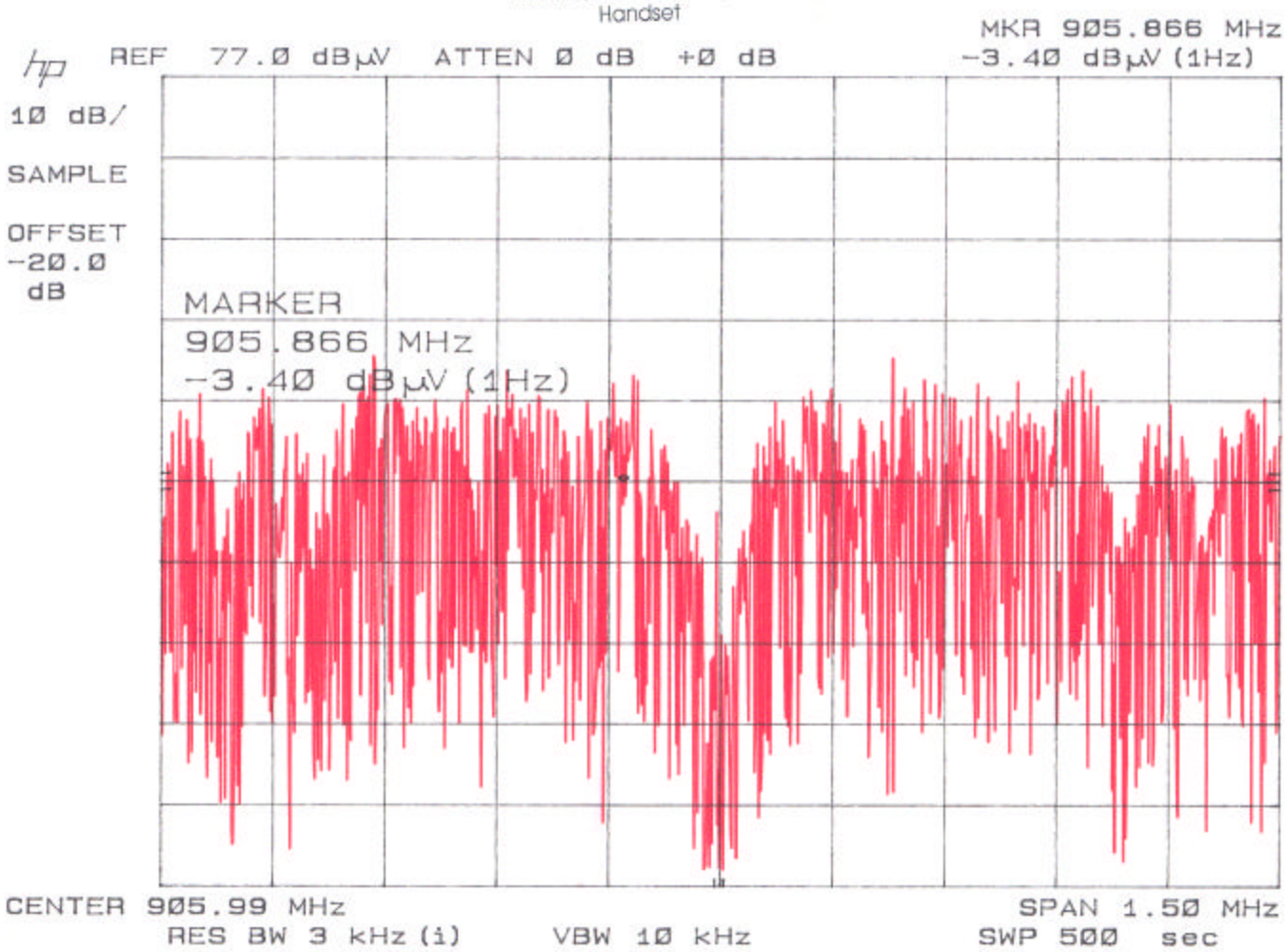
The processing gain of this unit is at least 11dB . This information was provided by the manufacturer, and data included as in exhibits 10A-10B.


Power Spectral Density Plot
Base
MKR 904.509 MHz
0.90 dBμV (1Hz)
REF 77.0 dBμV ATTEN 0 dB +0 dB
10 dB/
SAMPLE
OFFSET
-20.0
dB
MARKER
904.509 MHz
0.90 dBμV (1Hz)
DL
27.0
dBμV
CENTER 904.79 MHz
SPAN 1.50 MHz
RES BW 3 kHz (i)
VBW 10 kHz
SWP 500 sec

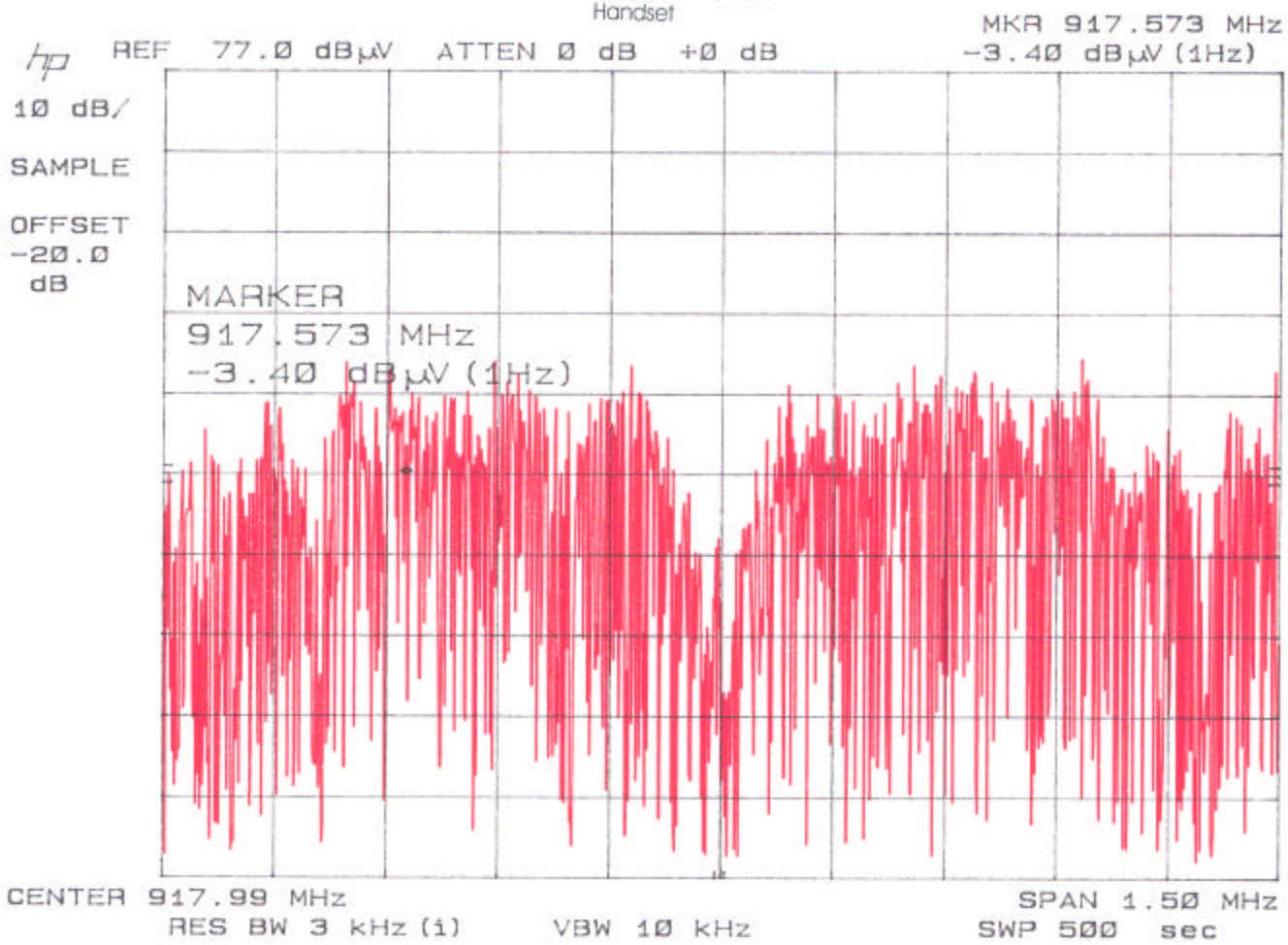
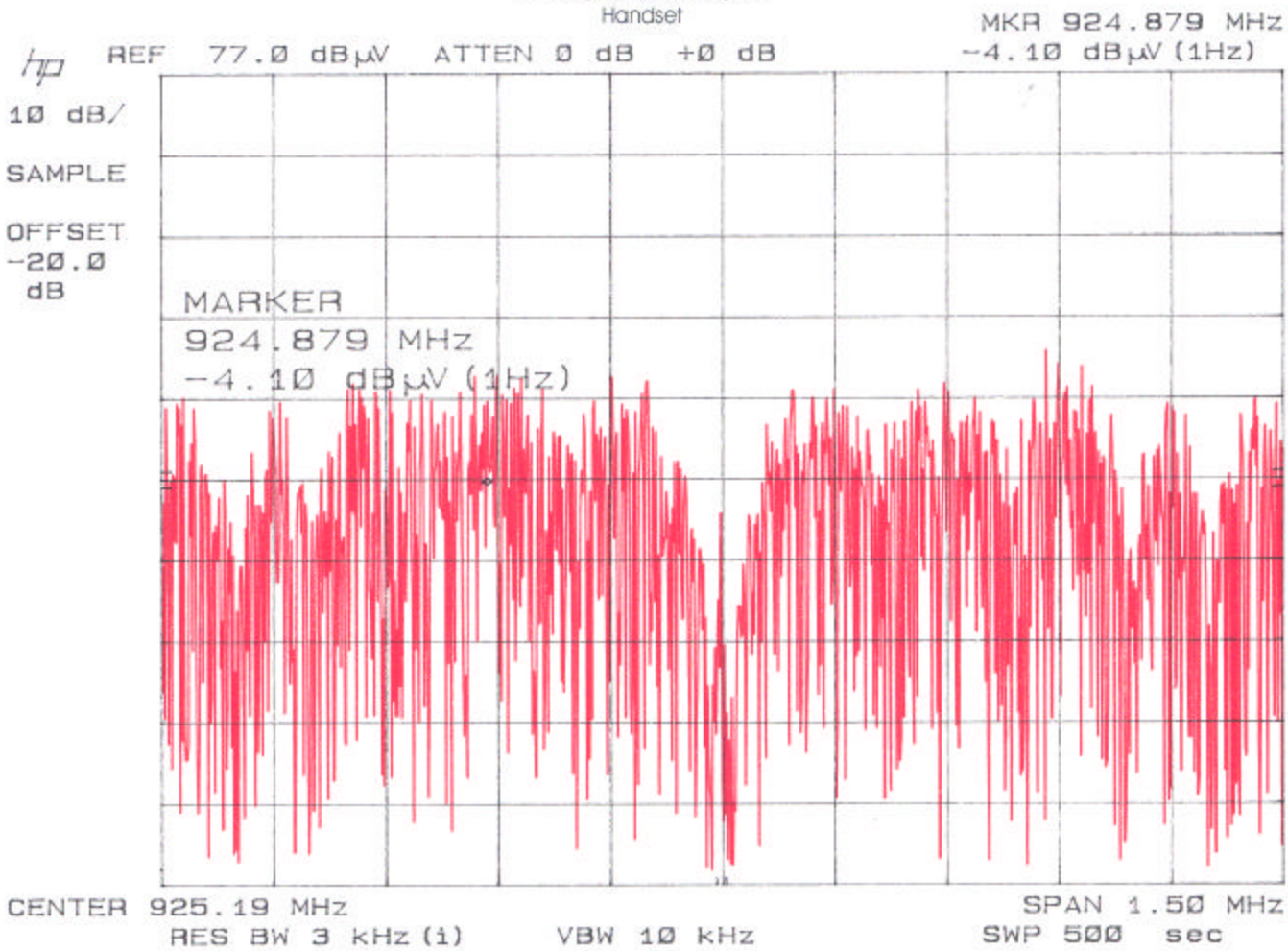

Power Spectral Density Plot
Base
hp
REF 77.0 dBμV ATTEN 0 dB +0 dB
MKR 915.109 MHz
-0.90 dBμV (1Hz)
10 dB/
SAMPLE
OFFSET
-20.0
dB
MARKER
915.109 MHz
-0.90 dBμV (1Hz)
CENTER 915.59 MHz
SPAN 1.50 MHz
RES BW 3 kHz (i)
VBW 10 kHz
SWP 500 sec


Power Spectral Density Plot
Base
hp
REF 77.0 dBμV
ATTEN 0 dB +0 dB
MKR 923.254 MHz
-1.40 dBμV (1Hz)
10 dB/
SAMPLE
OFFSET
-20.0
dB
MARKER
923.254 MHz
-1.40 dBμV (1Hz)
CENTER 922.79 MHz
RES BW 3 kHz (i)
VBW 10 kHz
SPAN 1.50 MHz
SWP 500 sec

Power Spectral Density Plot
Handset



Power Spectral Density Plot
Handset



Power Spectral Density Plot
Handset