



# Electromagnetic Compatibility Test Report

Tests Performed on a Landis +Gyr

Focus Meter with Cellnet DSSS Radio Retrofit, Model 40-1024

Radiometrics Document RP-5378



*Product Detail:*

FCC ID: **ROV-CLTR900M**

Equipment type: 906 to Digitally Modulated Transmitter.

*Test Standards:*

US CFR Title 47, Chapter I, FCC Part 15 Subpart C

FCC Part 15 CFR Title 47: 2004

This report concerns: Original Grant for Certification

FCC Part 15.247

*Tests Performed For:*

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*Test Date(s): (Month-Day-Year)*

September 22 and 23, 2004

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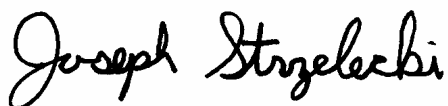
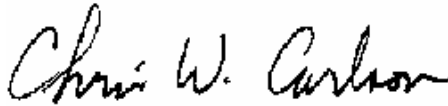
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## 1 ADMINISTRATIVE DATA

|  |  |
|--|--|
| <i>Equipment Under Test:</i><br>A Landis +Gyr, Focus Meter with Cellnet DSSS Radio Retrofit<br>Model: 40-1024 Serial Number: 86 703 807<br>This will be referred to as the EUT in this Report                      |  |
| <i>Date EUT Received at Radiometrics: (Month-Day-Year)</i><br>September 22, 2004   | <i>Test Date(s): (Month-Day-Year)</i><br>September 22 and 23, 2004   |
| <i>Test Report Written By:</i><br>Joseph Strzelecki<br>Senior EMC Engineer   | <i>Test Witnessed By:</i><br>Saieb Alrawi<br>Landis +Gyr   |
| <i>Radiometrics' Personnel Responsible for Test:</i><br><br><hr/> Joseph Strzelecki<br>Senior EMC Engineer<br>NARTE EMC-000877-NE | <i>Test Report Approved By</i><br><br><hr/> Chris W. Carlson<br>Director of Engineering<br>NARTE EMC-000921-NE |

## 2 TEST SUMMARY AND RESULTS

The EUT (Equipment Under Test) is a Focus Meter with Cellnet DSSS Radio Retrofit, Model 40-1024, manufactured by Landis +Gyr. The detailed test results are presented in a separate section. The following is a summary of the test results.

### Emissions Tests Results

| Environmental Phenomena       | Frequency Range | Basic Standard | Test Result |
|-------------------------------|-----------------|----------------|-------------|
| RF Radiated Emissions         | 30-9300 MHz     | FCC Part 15    | Pass        |
| Conducted Emissions, AC Mains | 0.15 - 30 MHz   | FCC Part 15    | Pass        |

### Spread Spectrum Transmitter Requirements

| Environmental Phenomena                        | Frequency Range | FCC Section | Test Result |
|--|-----------------|-------------|-------------|
| 6 dB Bandwidth Test                            | 902-928 MHz     | 15.247 a    | Pass        |
| Peak Output Power                              | 902-928 MHz     | 15.247 b    | Pass        |
| Band-edge Compliance of RF Conducted Emissions | 902-928 MHz     | 15.247 c    | Pass        |
| Spurious RF Conducted Emissions                | 30-9300 MHz     | 15.247 c    | Pass        |
| Spurious Radiated Emissions                    | 30-9300 MHz     | 15.247 c    | Pass        |

### 2.1 RF Exposure Compliance Requirements

Since the power output is 204 mW and the EUT is not mobile, the EUT meets the FCC requirement for RF exposure. There are no power level adjustments and the antenna is permanently attached. The detailed calculations for RF Exposure are presented in a separate document.

### 3 EQUIPMENT UNDER TEST (EUT) DETAILS

#### 3.1 EUT Description

The EUT is a Focus Meter with Cellnet DSSS Radio Retrofit, Model 40-1024, manufactured by Landis +Gyr. The EUT was in good working condition during the tests, with no known defects. The meter tested represents all meters that it will be used in.

This product transmits both mobile and fixed network transmissions. For mobile network transmissions, the RF frequency is 913.98 MHz; the radiated RF power level is approximately -3 dBm and modulation is CCSK. For fixed network transmissions, the RF frequency is 917.58 MHz, SS, the radiated RF power level is approximately +23 dBm and modulation is OOK.

The terms "mobile and fixed network transmissions" refer to the type of devices used to monitor the transmissions from the product. The terms describe the modes only and are not to be confused with the FCC definitions of mobile and fixed with regards to RF exposure.

##### 3.1.1 FCC Section 15.203 Antenna Requirements

The Antenna is integral to the meter as a trace on a PCB. It is permanently installed.

#### 3.2 Related Submittals

Landis +Gyr is not submitting any other products simultaneously for equipment authorization related to the EUT.

### 4 TESTED SYSTEM DETAILS

#### 4.1 Tested System Configuration

The system was configured for testing in a typical fashion. The EUT was placed on an 80-cm high, nonconductive test stand. The testing was performed in conditions as close as possible to installed conditions. Wiring was consistent with manufacturer's recommendations.

Since the EUT is wall mounted, it was placed in an upright configuration during the tests. The EUT was tested as a stand-alone device. Power was supplied at 115 VAC, 60 Hz single-phase.

The identification for all equipment, plus descriptions of all cables used in the tested system, are:

**Tested System Configuration List**

| Item | Description                                  | Type* | Manufacturer | Model Number                   | Serial Number |
|------|--|-------|--------------|--------------------------------|---------------|
| 1    | Focus Meter with Cellnet DSSS Radio Retrofit | E     | Landis +Gyr  | Focus with 40-1024 transmitter | 86 703 807    |
| 2    | Mounting Socket                              | E     | Landis +Gyr  | Form 1S                        | None          |

\* Type: E = EUT, P = Peripheral, S = Support Equipment; H = Host Computer

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#### List of System Cables

| QTY | Length (m) | Cable Description        | Connected to (Item #) | Shielded? |
|-----|------------|--------------------------|-----------------------|-----------|
| 1   | 3.5        | AC input cable; Two wire | #1 Power input        | No        |
| 1   | 3          | AC Load Cable; Two wire  | #1                    | No        |

## 4.2 Special Accessories

No special accessories were used during the tests in order to achieve compliance.

## 4.3 Equipment Modifications

No modifications were made to the EUT at Radiometrics' test facility in order to comply with the standards listed in this report.

## 5 TEST SPECIFICATIONS AND RELATED DOCUMENTS

| Document            | Date | Title  |
|---------------------|------|--|
| FCC<br>CFR Title 47 | 2004 | Code of Federal Regulations Title 47, Chapter 1, Federal Communications Commission, Part 15 - Radio Frequency Devices                |
| ANSI<br>C63.4-2001  | 2001 | Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |

The test procedures used are in accordance with the Industry Canada RSS-212 and ANSI document 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". The specific procedures are described herein. Radiated testing was performed at an antenna to EUT distance of 3 meters. The antenna was raised and lowered from 1 to 4 meters.

## 6 RADIOMETRICS' TEST FACILITIES

The results of these tests were obtained at Radiometrics Midwest Corp. in Romeoville, Illinois, USA. Radiometrics is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025: 1999 "General Requirements for the Competence of Calibration and Testing Laboratories". Radiometrics' Lab Code is 121191 and Certification Number is 1495.01. Radiometrics' scope of accreditation includes all of the test methods listed herein. A copy of the accreditation can be accessed on our web site ([www.radiomet.com](http://www.radiomet.com)). Radiometrics accreditation status can be verified at A2LA's web site ([www.a2la2.net](http://www.a2la2.net)).

The following is a list of anechoic enclosures used during the tests:

Chamber E: Is a custom made anechoic chamber that measures 52' L X 30' W X 18' H. The walls and ceiling are fully lined with RF absorber. Pro-shield of Collinsville, Oklahoma manufactured the chamber.

A separate ten-foot long, brass plated, steel ground rod attached via a 6 inch copper braid grounds each of the above chambers. Each enclosure is also equipped with low-pass power line filters.

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Open Area Test Site (OATS): Is located on 8625 Helmar Road in Newark, Illinois, USA and measures 56' L X 24' W X 17' H. The entire open field test site has a metal ground screen. The FCC has accepted these sites as test site number 31040/SIT 1300F2. The FCC test site Registration Number is 90897. Details of the site characteristics are on file with the Industry Canada as file number IC3124.

A complete list of the test equipment is provided herein. The calibration due dates are indicated on the equipment list. The equipment is calibrated in accordance to ANSI/NCSL Z540-1 with traceability to the National Institute of Standards and Technology (NIST).

## 7 DEVIATIONS AND EXCLUSIONS FROM THE TEST SPECIFICATIONS

There were no deviations or exclusions from the test specifications.

## 8 CERTIFICATION

Radiometrics Midwest Corporation certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specification. The results relate only to the EUT listed herein. Any modifications made to the EUT subsequent to the indicated test date will invalidate the data and void this certification.

## 9 TEST EQUIPMENT TABLE

| RMC ID | Manufacturer       | Description       | Model No.    | Serial No.               | Frequency Range | Cal Period | Cal Date |
|--------|--------------------|-------------------|--------------|--------------------------|-----------------|------------|----------|
| AMP-05 | RMC/Celeritek      | Pre-amplifier     | MW110G       | 1001                     | 1.0-12GHz       | 12 Mo.     | 11/27/03 |
| AMP-12 | MITEQ              | Pre-amplifier     | AM-1431      | 530935                   | 0.01-1000MHz    | 12 Mo.     | 12/31/03 |
| AMP-16 | MITEQ              | Pre-amplifier     | AM-1300      | 608852                   | 0.01-1000MHz    | 12 Mo.     | 1/30/04  |
| AMP-22 | Anritsu            | Pre-amplifier     | MH648A       | M23969                   | 0.1-1200MHz     | 12 Mo.     | 11/25/03 |
| ANT-06 | EMCO               | Log-Periodic Ant. | 3146         | 1248                     | 200-1000MHz     | 24 mo      | 11/17/03 |
| ANT-13 | EMCO               | Horn Antenna      | 3115         | 2502                     | 1.0-18GHz       | 24 Mo.     | 09/30/02 |
| ANT-42 | EMCO               | Bicon Antenna     | 3104C        | 9512-4713                | 25-300MHz       | 12 Mo.     | 12/02/03 |
| ANT-44 | Impossible Machine | Super Log Antenna | SL-20M2G     | 1002                     | 20-2000MHz      | 24 Mo.     | 06/15/04 |
| ATT-02 | KDI                | Attenuator        | A710N        | RMC1                     | DC-10GHz        | 24 Mo.     | 01/12/03 |
| ATT-03 | KDI                | Attenuator        | A710N        | RMC3                     | DC-10GHz        | 24 Mo.     | 01/12/03 |
| HPF-01 | Solar              | High Pass Filter  | 7930-100     | HPF-1                    | 0.15-30MHz      | 24 Mo.     | 12/31/03 |
| HPF-02 | Microwave Cir.     | High Pass Filter  | H2G09G02     | HPF-2                    | 1.5-11 GHz      | 24 Mo.     | 12/31/03 |
| LSN-01 | Electrometrics     | 50 uH LISN        | FCC/VDE 50/2 | 1001                     | 0.01-30MHz      | 24 Mo.     | 1/10/03  |
| LSN-03 | Farnell            | 50 uH LISN        | 1EXLSN30B    | 000314                   | 0.01-30MHz      | 24 Mo.     | 04/08/03 |
| REC-03 | Anritsu            | Spectrum Analyzer | MS2601B      | MT94589                  | 0.01-2200MHz    | 12 Mo.     | 10/21/03 |
| REC-07 | Anritsu            | Spectrum Analyzer | MS2601A      | MT53067                  | 0.01-2200MHz    | 12 Mo.     | 12/29/03 |
| REC-08 | Hewlett Packard    | Spectrum Analyzer | 8566B        | 2648A13481<br>2209A01436 | 30Hz-22GHz      | 12 Mo.     | 05/26/04 |
| THM-01 | Extech Inst.       | Temp/Humid Meter  | 4465CF       | 001106557                | N/A             | 24 Mo.     | 01/28/04 |

Note: All calibrated equipment is subject to periodic checks.

NCR – No Calibration Required. Device monitored by calibrated equipment. N/A: Not Applicable.

## 10 TEST SECTIONS

### 10.1 AC Conducted Emissions; Section 15.207

A computer-controlled analyzer was used to perform the conducted emissions measurements. The frequency range was divided into 500 subranges equally spaced on a logarithmic scale. The computer recorded the peak of each subrange. This data was then plotted on semi-log graph paper generated by the computer and plotter. Adjusting the positions of the cables and orientation of the test system then maximizes the highest emissions.

Mains Conducted emission measurements were performed using a 50 Ohm/50 uH Line Impedance Stabilization Network (LISN) as the pick-up device. Measurements were repeated on both leads within the power cord. If the EUT power cord exceeded 80 cm in length, the excess length of the power cord was made into a 30 to 40 cm bundle near the center of the cord. The LISN was placed on the floor at the base of the test platform and electrically bonded to the ground plane.

Broadband conducted emissions may exceed the following limits by no more than 13 dB. An emission is defined as broadband if the average detector amplitude is 6 dB or more under the quasi-peak detector amplitude.

#### FCC Limits of Conducted Emissions at the AC Mains Ports

| Frequency Range<br>(MHz)  | Class B Limits (dBuV) |         |
|---|-----------------------|---------|
|   | Quasi-Peak            | Average |
| 0.150 - 0.50*   | 66 - 56               | 56 - 46 |
| 0.5 - 5.0   | 56                    | 46      |
| 5.0 - 30  | 60                    | 50      |
| * The limit decreases linearly with the logarithm of the frequency in this range. |                       |         |

The initial step in collecting conducted data is a peak detector scan and the plotting of the measurement range. Significant peaks are then marked as shown on the following table, and these signals are then measured with the quasi-peak detector. The following represents the worst case emissions from the EUT power cord, after testing all modes of operation.

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## Test Results

Test Date : September 22 and 23, 2004

The Amplitude is the final corrected value with cable and LISN Loss factors.

| Tx Frequency | Lead Tested | Frequency MHz | QP Amplitude | QP Limit | Average Amplitude | Average Limit |
|--------------|-------------|---------------|--------------|----------|-------------------|---------------|
| 913.98       | AC Neutral  | 0.15          | 36.6         | 65.9     | 29.6              | 55.9          |
| 913.98       | AC Neutral  | 0.38          | 32.5         | 58.3     | 24.1              | 48.3          |
| 913.98       | AC Hot      | 0.17          | 41.9         | 65.1     | 28.8              | 55.1          |
| 913.98       | AC Hot      | 0.38          | 32.3         | 58.2     | 23.4              | 48.2          |
| 917.58       | AC Neutral  | 0.15          | 36.5         | 66.0     | 29.7              | 56.0          |
| 917.58       | AC Neutral  | 0.37          | 32.0         | 58.4     | 23.5              | 48.4          |
| 917.58       | AC Hot      | 0.17          | 43.0         | 65.1     | 28.5              | 55.1          |
| 917.58       | AC Hot      | 0.39          | 31.9         | 58.0     | 24.0              | 48.0          |

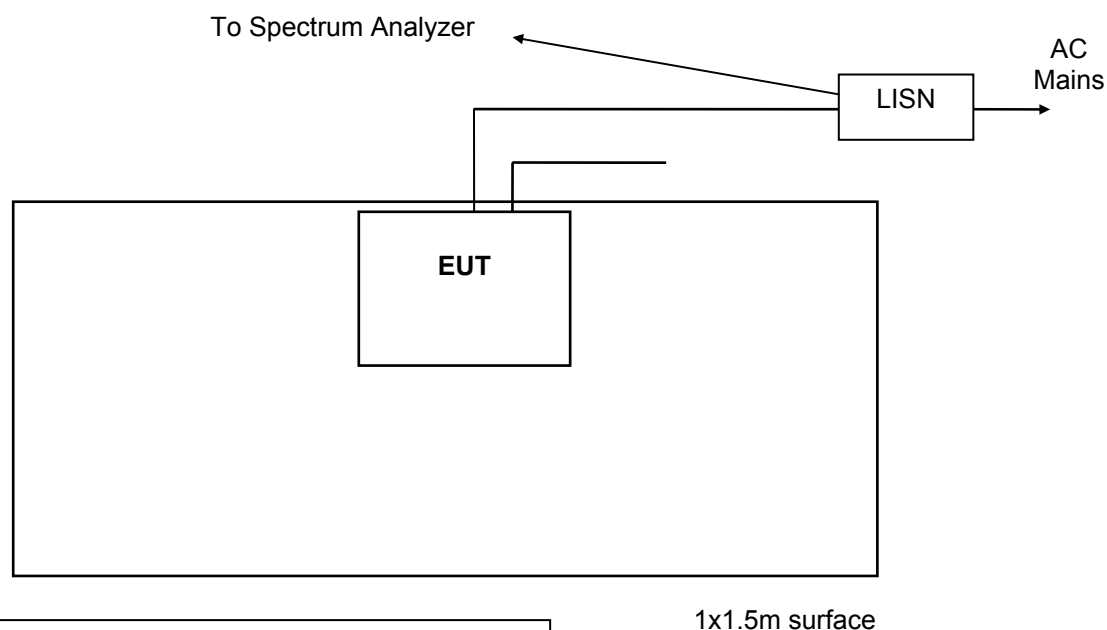
No other emissions were detected from 0.4 to 30 MHz within 15 dB of the limits.

The above are the worst case results .

QP readings are quasi-peak with a 9 kHz bandwidth and no video filter.

Judgment: Passed by 15 dB

**Figure 1. Conducted Emissions Test Setup**



**Notes:**

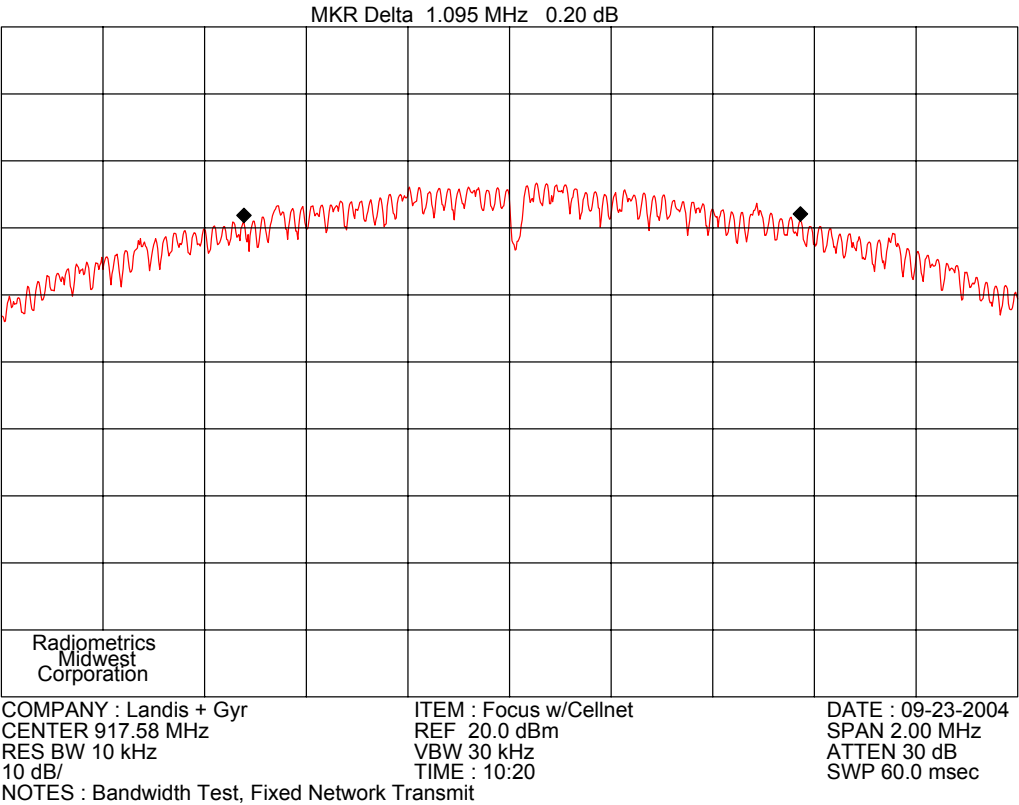
- LISN's at least 80 cm from EUT chassis
- Vertical conductive plane 40 cm from rear of table top
- EUT power cord bundled

## 10.2 Occupied Bandwidth (6 dB)

The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation. The EUT was transmitting at its maximum data rate. The trace was allowed to stabilize.

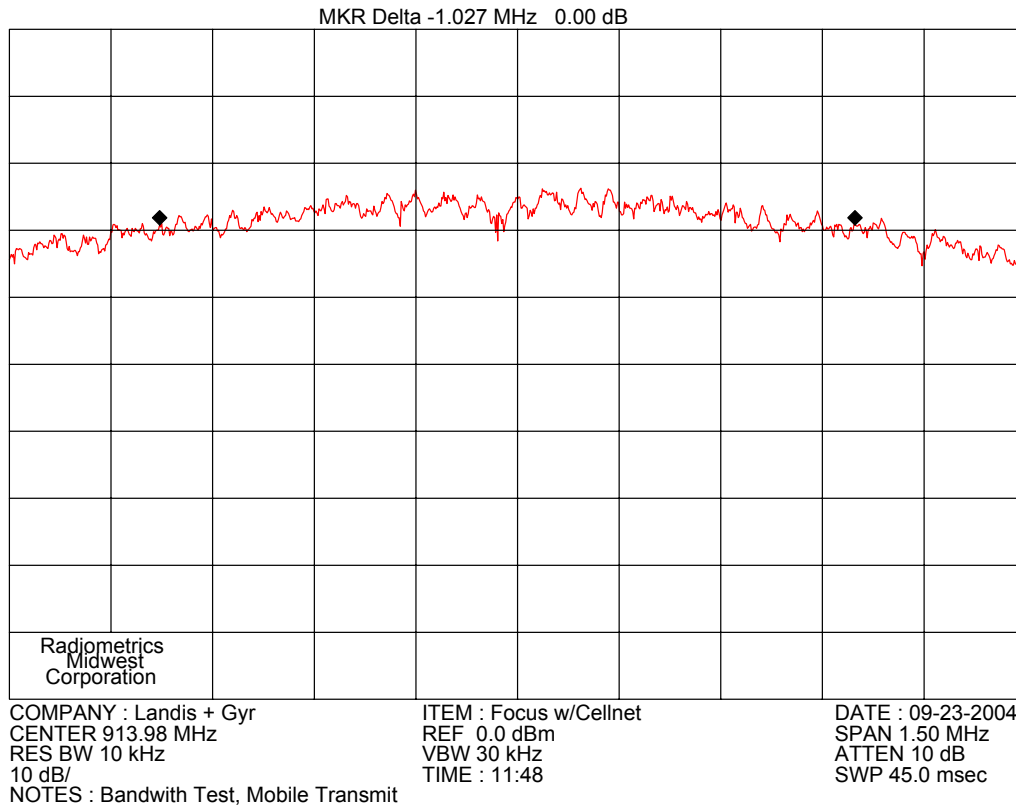


The marker-to-peak function was set to the peak of the emission. Then the marker-delta function was used to measure 6 dB down one side of the emission. The marker-delta function was reset and then moved to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.



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## 10.3 Power Spectral Density

The spectrum analyzer was set to the following settings:

Span = 10 kHz (Stepped Center frequency within channel to obtain Maximum Reading)

RBW = 3 kHz

VBW = 10 kHz

Sweep = auto

| Frequency<br>(MHz) | Reading<br>dBm(1 Hz) | Correction<br>factor to 3 kHz | Attenuator<br>(dB) | Cable Loss<br>(dB) | 3 kHz Spectral<br>Density (dBm) | Limit<br>(dBm) |
|--------------------|----------------------|-------------------------------|--------------------|--------------------|---------------------------------|----------------|
| 913.98             | -60.8                | 30                            | 6.1                | 0.2                | -24.5                           | 8.0            |
| 917.58             | -36.8                | 30                            | 6.1                | 0.2                | -0.5                            | 8.0            |

## 10.4 Peak Output Power

The spectrum analyzer was set to the following settings:

Span = 5 MHz

RBW = 3 MHz

VBW = 3 MHz

Sweep = auto

Detector function = peak

Trace = max hold

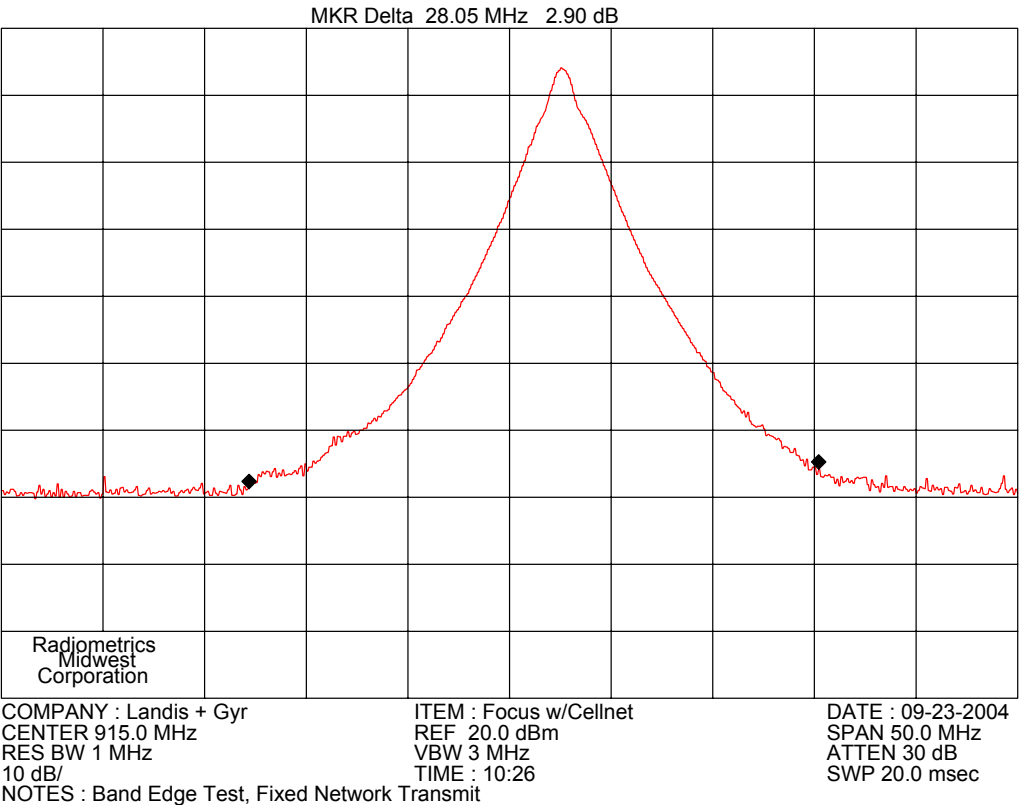
The trace was allowed to stabilize. The marker-to-peak function was used to measure the peak of the emission. The indicated level is the peak output power. Note 30 dBm = 1 watt. Since the gain of the antenna is always less than 6dB, the limit is not reduced.

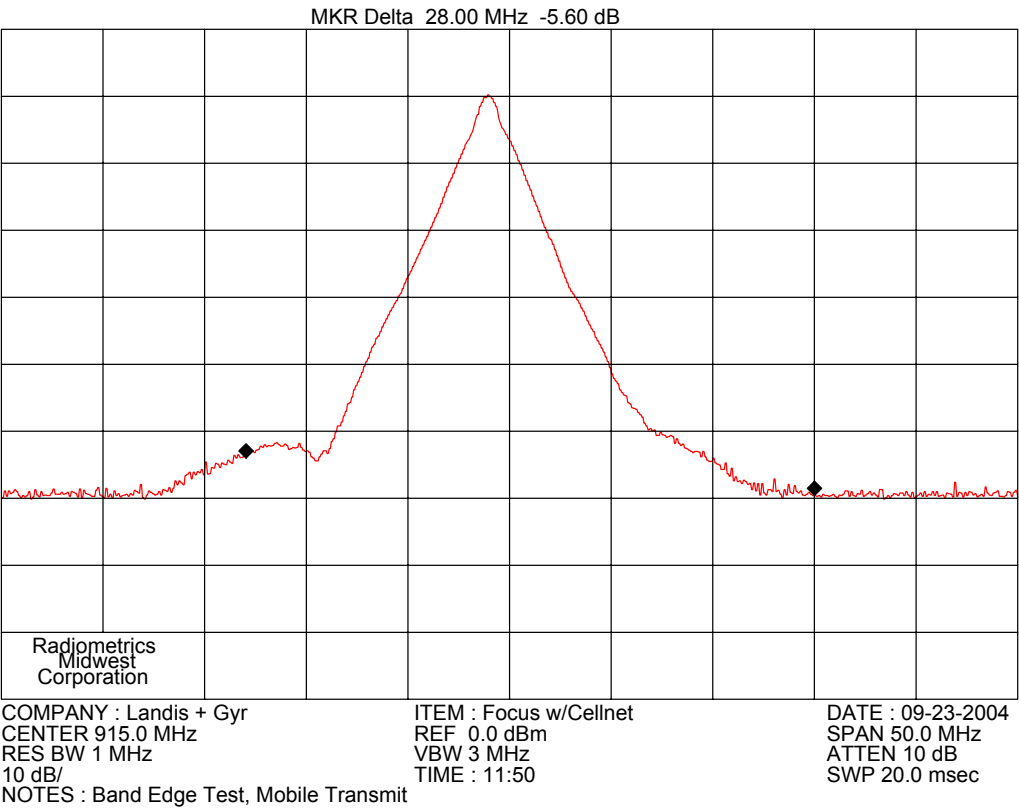
| Frequency<br>(MHz) | Reading<br>(dBm) | Attenuator<br>(dB) | Cable Loss<br>(dB) | Total Power (dBm) |         | Limit (dBm) |
|--------------------|------------------|--------------------|--------------------|-------------------|---------|-------------|
|                    |                  |                    |                    | dBm               | Watts   |             |
| 913.98             | -9.2             | 6.1                | 0.2                | -2.9              | 0.00051 | 30          |
| 917.58             | 16.8             | 6.1                | 0.2                | 23.1              | 0.204   | 30          |

### 10.5 Band-edge Compliance of RF Conducted Emissions

The spectrum analyzer was set to the MAX HOLD mode to record the worst case of the modulation at the band-edge, with the EUT set to the lowest frequency. The trace was allowed to stabilize. Note that the Band edge is the two markers.

The bandedge limits of 15.247 (c) are specified in a 100 kHz Bandwidth. These plots show compliance to the bandedge limits of 15.247 (c) because the band edge emissions are the same or higher with 1 MHz bandwidth vs. 100 kHz bandwidth. The plots show that the band edge emissions are more than 40 dB down from the fundamental. The Peak level using a 100 kHz RBW was 2 dB lower than the level using a 1 MHz RBW.



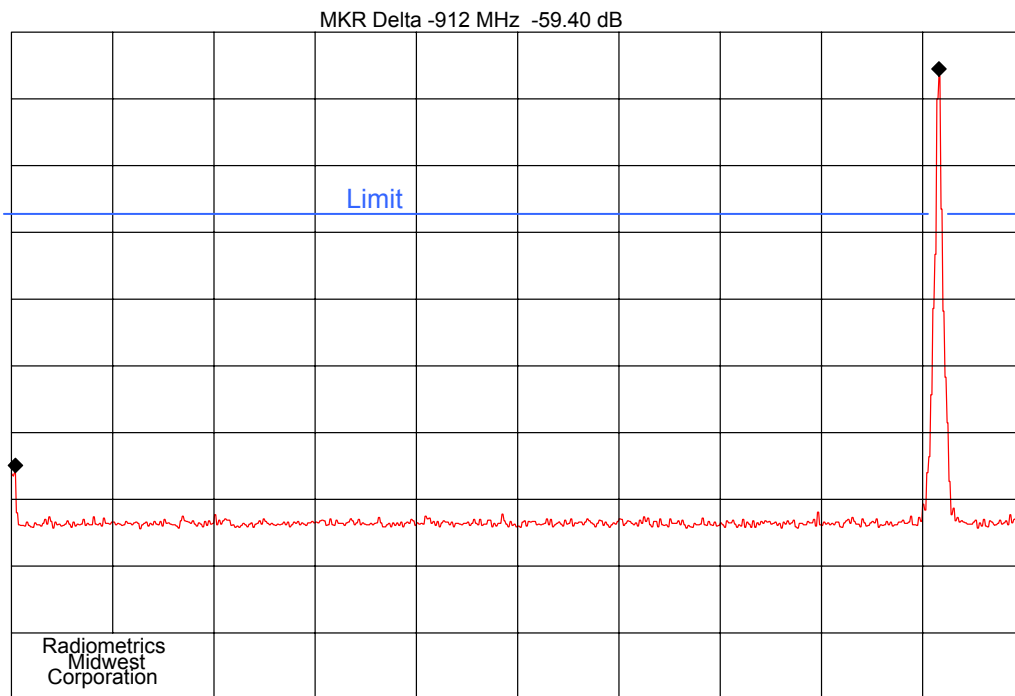


### 10.6 Spurious RF Conducted Emissions

The spectrum analyzer was set to the MAX HOLD mode to record all spurious emissions from the lowest frequency generated in the EUT up through the 10<sup>th</sup> harmonic. The trace was allowed to stabilize. The first five plots were made with the EUT at 913.98 MHz. The last five plots were with the EUT set to 917.58 MHz. Each frequency was on for 30 seconds. Note that the limit does not apply to the fundamental frequency.

# RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

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COMPANY : Landis + Gyr

START 1 MHz

RES BW 300 kHz

10 dB/

NOTES : Spurious Conducted Emissions, Fixed Network Transmit

ITEM : Focus w/Cellnet

REF 20.0 dBm

VBW 1 MHz

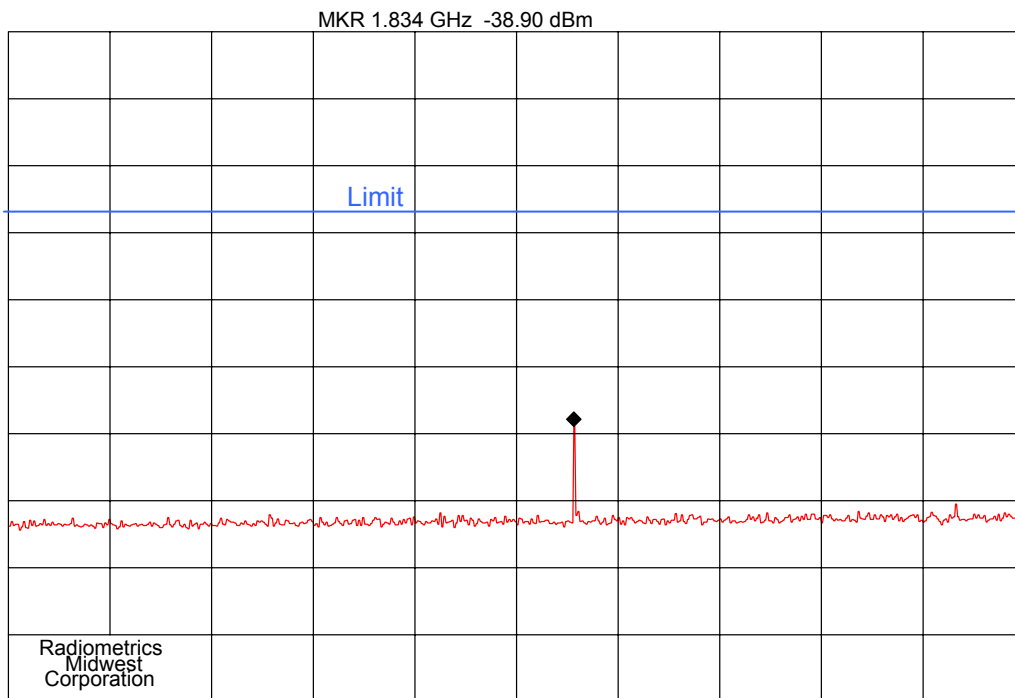
TIME : 10:30

DATE : 09-23-2004

STOP 1.00 GHz

ATTEN 30 dB

SWP 30.0 msec



COMPANY : Landis + Gyr

START 1.00 GHz

RES BW 300 kHz

10 dB/

NOTES : Spurious Conducted Emissions, Fixed Network Transmit

ITEM : Focus w/Cellnet

REF 20.0 dBm

VBW 1 MHz

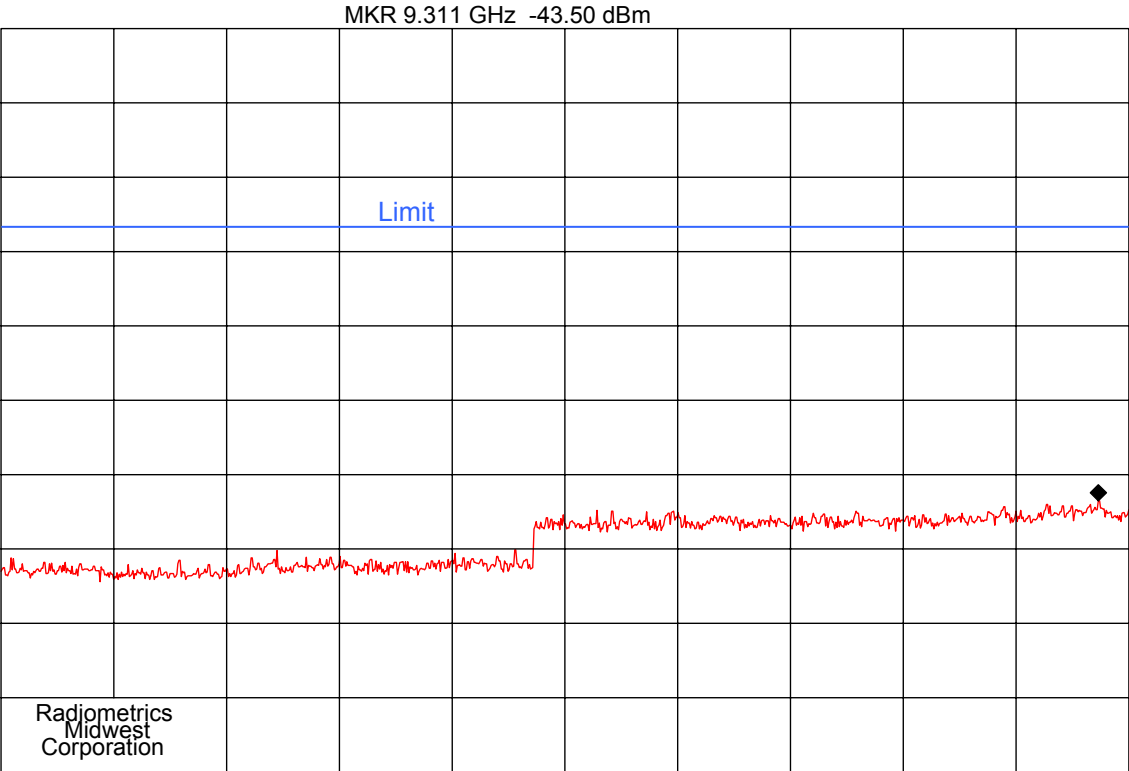
TIME : 10:34

DATE : 09-23-2004

STOP 2.50 GHz

ATTEN 30 dB

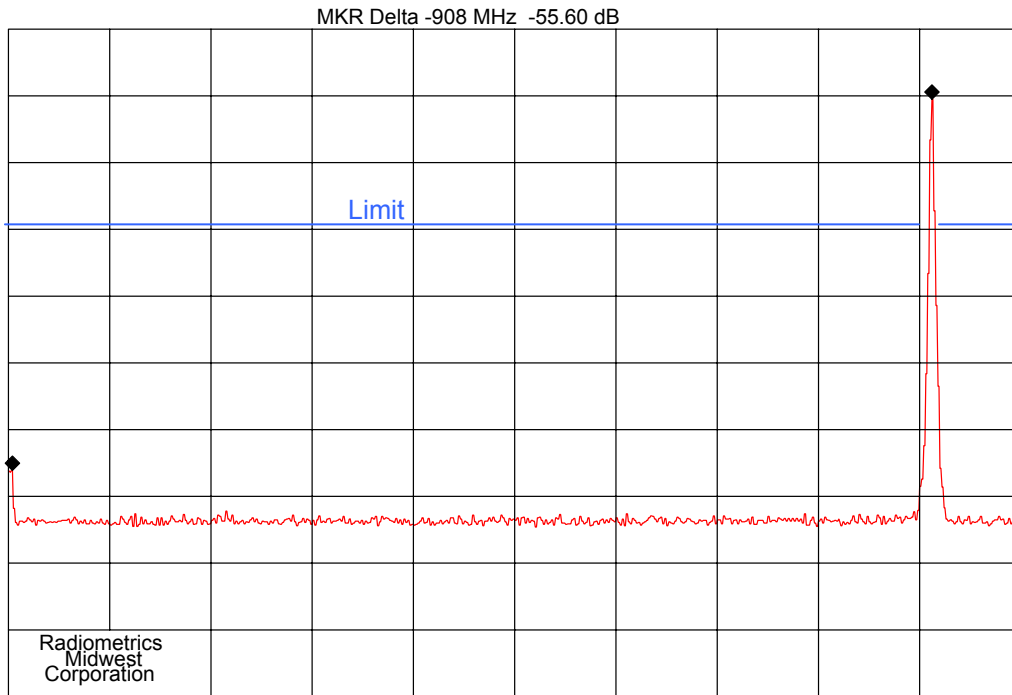
SWP 45.0 msec



|  |                        |                   |
|--|------------------------|-------------------|
| COMPANY : Landis + Gyr                                       | ITEM : Focus w/Cellnet | DATE : 09-23-2004 |
| START 2.50 GHz   | REF 20.0 dBm           | STOP 9.50 GHz     |
| RES BW 300 kHz   | VBW 1 MHz              | ATTEN 30 dB       |
| 10 dB/   | TIME : 10:39           | SWP 210 msec      |
| NOTES : Spurious Conducted Emissions, Fixed Network Transmit |                        |                   |

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Testing of the Landis +Gyr, Focus Meter with Cellnet DSSS Radio Retrofit



COMPANY : Landis + Gyr

START 1 MHz

RES BW 300 kHz

10 dB/

NOTES : Spurious Conducted Emissions, Mobile Transmit

ITEM : Focus w/Cellnet

REF 0.0 dBm

VBW 1 MHz

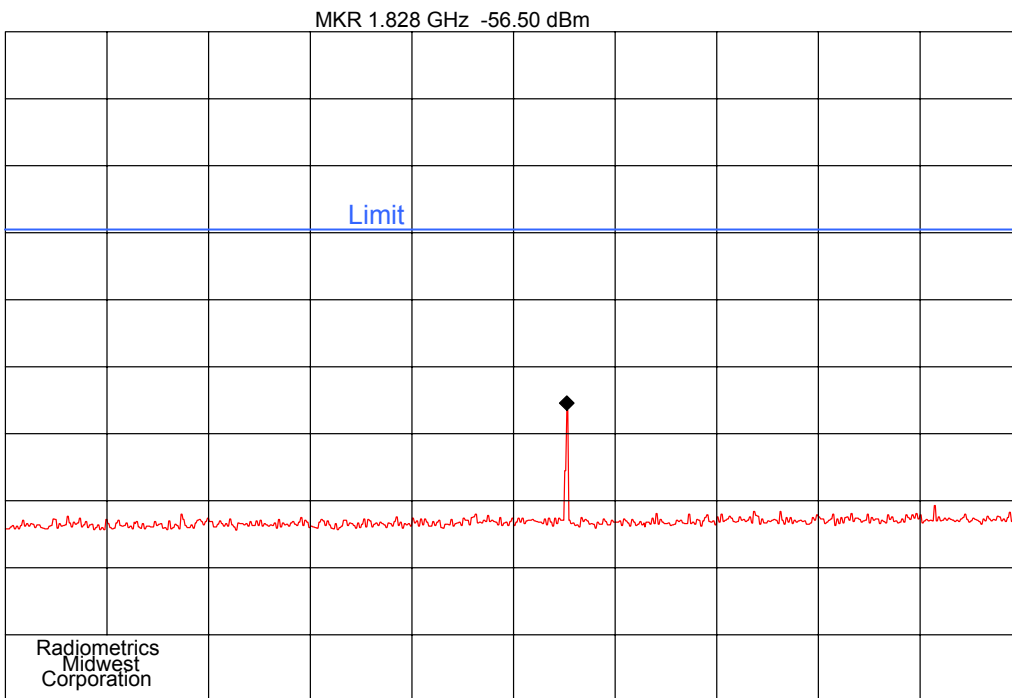
TIME : 11:52

DATE : 09-23-2004

STOP 1.00 GHz

ATTEN 10 dB

SWP 30.0 msec



COMPANY : Landis + Gyr

START 1.00 GHz

RES BW 300 kHz

10 dB/

NOTES : Spurious Conducted Emissions, Mobile Transmit

ITEM : Focus w/Cellnet

REF 0.0 dBm

VBW 1 MHz

TIME : 11:53

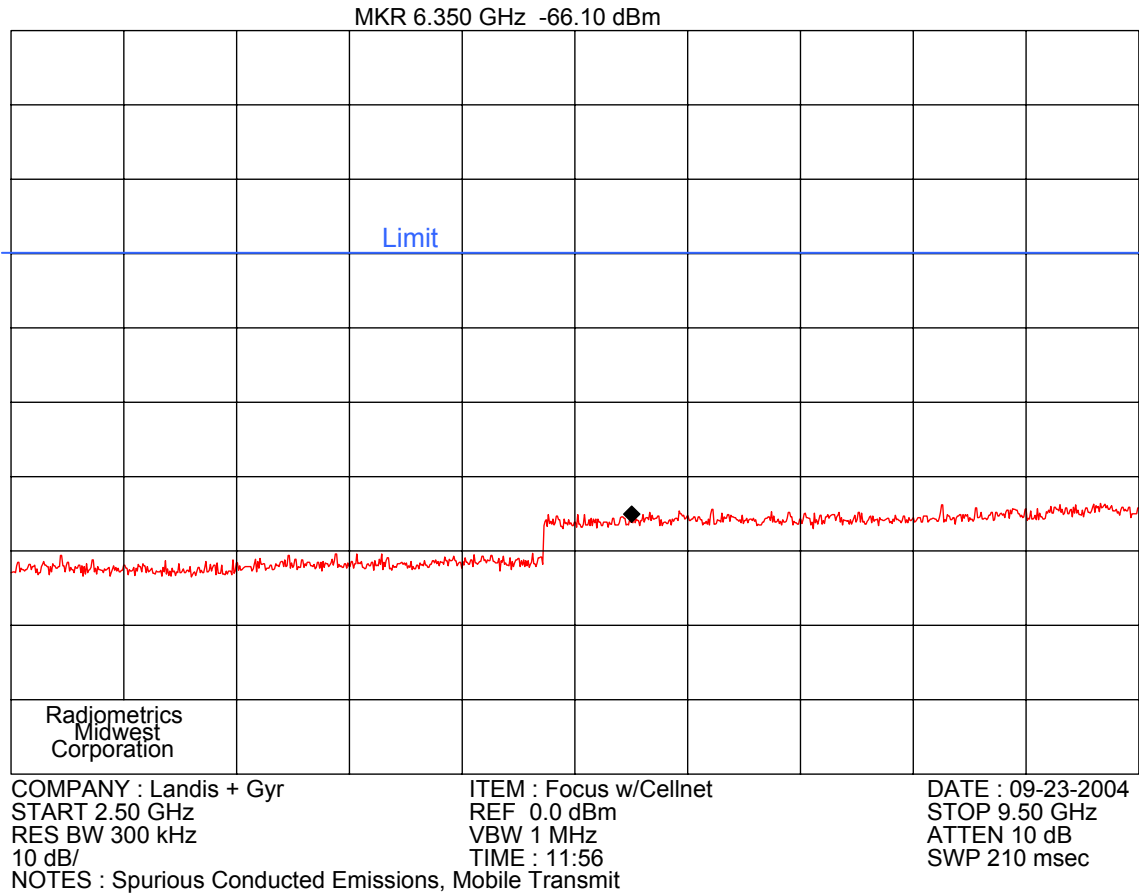
DATE : 09-23-2004

STOP 2.50 GHz

ATTEN 10 dB

SWP 45.0 msec





### 10.7 Spurious Radiated RF Emissions

Radiated emission measurements were performed with linearly polarized broadband antennas. The results obtained with these antennas can be correlated with results obtained with a tuned dipole antenna. Below 1 GHz, when a radiated emission is detected approaching the specification limit, the measurement of the emission is repeated using a tuned dipole antenna with a Roberts Balun.

The radiated emission measurements were performed with a spectrum analyzer. The bandwidth used from 450 kHz to 30 MHz is 9 or 10 kHz and the bandwidth from 30 MHz to 1000 MHz is 100 or 120 kHz. Above 1 GHz, a 1 MHz bandwidth is used. A 10 dB linearity check is performed prior to start of testing in order to determine if an overload condition exists.

From 30 to 1000 MHz an Anritsu Spectrum analyzer and a MITEQ AM-1431 amplifier with a 10 dB attenuator connected to the input. The out of band emissions and the ambient emissions were below the level of input overload (80 dBuV).

For tests from 1 to 9.3 GHz, an HP8566A spectrum analyzer was used with a Celeritek uWave amplifier. The fundamental emission, out of band emissions and the ambient emissions were below the level of input overload (72 dBuV). In addition, a high pass filter was used to reduce the fundamental emission.

Preliminary radiated emission tests were performed inside of an anechoic enclosure. The frequency range from 30 to 9300 MHz was scanned and plotted using the peak detector function. The test antennas were positioned 3 meters from the EUT. The results of the preliminary scans were only used to identify the frequencies being emitted from the EUT and were not used to determine compliance with the test specification. Radiated emission measurements are performed with linearly polarized broadband antennas.

Final radiated emissions measurements were performed in the open area test site at a test distance of 3 meters. Measurements were performed using the peak or quasi-peak detector function. The detected emission levels were maximized by rotating the EUT, adjusting the positions of all cables, and by scanning the measurement antenna from 1 to 4 meters above the ground. The open area test site used to collect the radiated data is located on 8625 Helmar Road in Newark, Illinois. The open field test site has a metal ground screen. All other tests are performed at 12 East Devonwood Ave. Romeoville, Illinois EMI test lab.

The entire frequency range from 30 to 9300 MHz was slowly scanned with particular attention paid to those frequency ranges which appeared high in the preliminary emission scan. Measurements were performed using two antenna polarizations, (vertical and horizontal). The worst case emissions were recorded.

#### 10.7.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and by subtracting the Amplifier Gain from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG + HPF$$

Where: FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

HPF = High pass Filter Loss

#### 10.7.2 Spurious Radiated Emissions Test Results (Restricted Band)

The following spectrum analyzer settings were used.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW  $\geq$  RBW, except for Average measurements above 1 GHz where a VBW = 10 Hz.

Sweep = auto

Detector function = peak

Trace = max hold

# RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

Testing of the Landis +Gyr, Focus Meter with Cellnet DSSS Radio Retrofit

|               |   |               |          |
|---------------|---|---------------|----------|
| Test Date     | 6/23/2004   | Test Distance | 3 Meters |
| Abbreviations | Pol = Antenna Polarization; V = Vertical; H = Horizontal; BC = Biconical (ANT-3);<br>LP = Log-Periodic (ANT-6); HN = Horn (ANT-13) P = peak; Q = QP |               |          |

## Emissions above 1 GHz

| Tx Freq | Ant Pol. | Detector Function | Emission Freq. MHz | dBuV/m | Limit | Margin under limit |
|---------|----------|-------------------|--------------------|--------|-------|--------------------|
| 913.98  | H        | Ave               | 2742               | 43.7   | 54.0  | 10.3               |
| 913.98  | H        | Ave               | 3656               | 43.3   | 54.0  | 10.7               |
| 913.98  | H        | Ave               | 4570               | 46.0   | 54.0  | 8.0                |
| 913.98  | H        | Ave               | 8226               | 43.8   | 54.0  | 10.2               |
| 913.98  | H        | Ave               | 9140               | 47.9   | 54.0  | 6.1                |
| 913.98  | V        | Ave               | 2742               | 47.0   | 54.0  | 7.0                |
| 913.98  | V        | Ave               | 3656               | 47.7   | 54.0  | 6.3                |
| 913.98  | V        | Ave               | 4570               | 45.4   | 54.0  | 8.6                |
| 913.98  | V        | Ave               | 8226               | 43.5   | 54.0  | 10.5               |
| 913.98  | V        | Ave               | 9140               | 47.6   | 54.0  | 6.4                |
| 913.98  | H        | Peak              | 2742               | 53.2   | 74.0  | 20.8               |
| 913.98  | H        | Peak              | 3656               | 51.0   | 74.0  | 23.0               |
| 913.98  | H        | Peak              | 4570               | 57.5   | 74.0  | 16.5               |
| 913.98  | H        | Peak              | 8226               | 54.5   | 74.0  | 19.5               |
| 913.98  | H        | Peak              | 9140               | 58.0   | 74.0  | 16.0               |
| 913.98  | V        | Peak              | 2742               | 54.1   | 74.0  | 19.9               |
| 913.98  | V        | Peak              | 3656               | 56.2   | 74.0  | 17.8               |
| 913.98  | V        | Peak              | 4570               | 56.1   | 74.0  | 17.9               |
| 913.98  | V        | Peak              | 8226               | 53.3   | 74.0  | 20.7               |
| 913.98  | V        | Peak              | 9140               | 59.4   | 74.0  | 14.6               |
| 917.58  | H        | Ave               | 2753               | 49.8   | 54.0  | 4.2                |
| 917.58  | H        | Ave               | 3670               | 50.3   | 54.0  | 3.7                |
| 917.58  | H        | Ave               | 4588               | 46.9   | 54.0  | 7.1                |
| 917.58  | H        | Ave               | 8258               | 43.6   | 54.0  | 10.4               |
| 917.58  | H        | Ave               | 9176               | 48.4   | 54.0  | 5.6                |
| 917.58  | V        | Ave               | 2753               | 51.0   | 54.0  | 3.0                |
| 917.58  | V        | Ave               | 3670               | 51.0   | 54.0  | 3.0                |
| 917.58  | V        | Ave               | 4588               | 47.8   | 54.0  | 6.2                |
| 917.58  | V        | Ave               | 8258               | 43.9   | 54.0  | 10.1               |
| 917.58  | V        | Ave               | 9176               | 48.4   | 54.0  | 5.6                |
| 917.58  | H        | Peak              | 2753               | 65.4   | 74.0  | 8.6                |
| 917.58  | H        | Peak              | 3670               | 64.0   | 74.0  | 10.0               |
| 917.58  | H        | Peak              | 4588               | 60.4   | 74.0  | 13.6               |
| 917.58  | H        | Peak              | 8258               | 56.0   | 74.0  | 18.0               |
| 917.58  | V        | Peak              | 9176               | 58.5   | 74.0  | 15.5               |
| 917.58  | V        | Peak              | 2753               | 68.8   | 74.0  | 5.2                |
| 917.58  | V        | Peak              | 3670               | 65.1   | 74.0  | 8.9                |
| 917.58  | V        | Peak              | 4588               | 62.7   | 74.0  | 11.3               |
| 917.58  | V        | Ave               | 8258               | 54.4   | 74.0  | 19.6               |
| 917.58  | V        | Ave               | 9176               | 59.1   | 74.0  | 14.9               |

# RADIOMETRICS MIDWEST CORPORATION - EMC Test Report

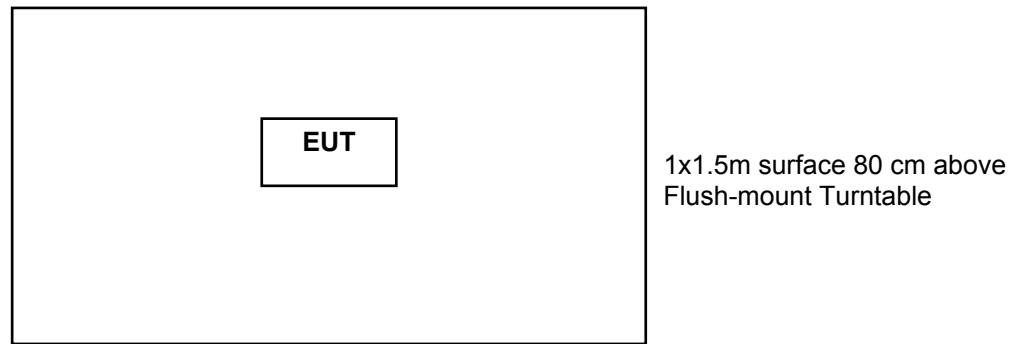
Testing of the Landis +Gyr, Focus Meter with Cellnet DSSS Radio Retrofit

## Emissions Below 1 GHz

| Tx Freq | Ant Pol. | Detector Function | Emission Freq. MHz | dBuV/m | Limit | Margin under limit |
|---------|----------|-------------------|--------------------|--------|-------|--------------------|
| 913.98  | H        | Peak              | 261.7              | 27.7   | 46.0  | 18.3               |
| 913.98  | H        | Peak              | 277.4              | 26.3   | 46.0  | 19.7               |
| 913.98  | H        | Peak              | 275.0              | 20.0   | 46.0  | 26.0               |
| 913.98  | V        | Peak              | 73.1               | 15.2   | 40.0  | 24.8               |
| 913.98  | V        | Peak              | 262.0              | 19.5   | 46.0  | 26.5               |
| 913.98  | V        | Peak              | 275.0              | 22.2   | 46.0  | 23.8               |
| 917.58  | H        | Peak              | 260.9              | 28.7   | 46.0  | 17.3               |
| 917.58  | H        | Peak              | 268.0              | 29.1   | 46.0  | 16.9               |
| 917.58  | H        | Peak              | 272.4              | 30.1   | 46.0  | 15.9               |
| 917.58  | H        | Peak              | 256.2              | 25.0   | 46.0  | 21.0               |
| 917.58  | H        | Peak              | 266.6              | 31.3   | 46.0  | 14.7               |
| 917.58  | V        | Peak              | 72.0               | 16.4   | 40.0  | 23.6               |
| 917.58  | V        | Peak              | 240.2              | 28.4   | 46.0  | 17.6               |
| 917.58  | V        | Peak              | 247.2              | 29.1   | 46.0  | 16.9               |
| 917.58  | V        | Peak              | 266.9              | 29.5   | 46.0  | 16.5               |

Judgment: Passed by 3 dB

No other emissions were detected in the restricted bands.

**Figure 2. Drawing of Radiated Emissions Setup****Notes:**

- AC outlet with low-pass filter at the base of the turntable
- Antenna height varied from 1 to 4 meters
- Distance from antenna to tested system is 3 meters
- Not to Scale

