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# ELECTROMAGNETIC EMISSIONS TEST REPORT
# SECTION 2

**according to 47CFR Part 15, subpart E**
**for**

## Radwin Ltd.

**EQUIPMENT UNDER TEST:**

## Wireless point-to-point multiplexer
## Model: WinLink 582

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# Contents

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# 1 Project information

## Description of equipment under test

| | |
|---|---|
| Test items | : Wireless point-to-point multiplexer, comprising outdoor radio terminal and indoor radio terminal connection box |
| Manufacturer | : Radwin Ltd. |
| Types (Models) | : WinLink 582 |
| Serial number | : outdoor radio terminal – TAT58000032<br>indoor radio terminal connection box – RTCBE100117 |
| Hardware version: | : 01 |

## Applicant information

| | |
|---|---|
| Applicant's responsible person | : Mr. Ron Kapon, CTO |
| Company | : Radwin Ltd. |
| Address | : 34, Habarzel street |
| Postal code | : 69710 |
| City | : Tel Aviv |
| Country | : Israel |
| Telephone number | :+972-3645 5577 |
| Telefax number | :+972-3765 7535 |

## Test performance

| | |
|---|---|
| Project Number: | : 15489 |
| Location | : Hermon Laboratories |
| Receipt date | : April 2, 2003 |
| Test started | : April 2, 2003 |
| Test completed | : May 22, 2003 |
| Purpose of test | : Apparatus compliance verification in accordance with emission requirements |
| Test specification(s) | 47CFR Part 15, subpart E |

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# 2 Summary of tests

The tests listed in the table below were performed. The EUT was found complying with the limits of 47CFR Part 15, subpart E.

| Parameter | Subclause | C | NC | NT | NA | Tested by | Date tested | Remarks |
|---|---|---|---|---|---|---|---|---|
| **Transmitter characteristics, subpart E, §15.407** | | | | | | | | |
| **U-NII devices operating in 5.725 – 5.825 GHz** | | | | | | | | |
| **26 dB bandwidth** | a(3) | **C** | | | | Mr. I. Fershtater, test engineer | May 5, 2003 | |
| **Peak transmit power** | a(3) | **C** | | | | Mr. I. Fershtater, test engineer | May 5, 2003 | |
| **Peak power spectral density** | a(3) | **C** | | | | Mr. I. Fershtater, test engineer | May 5, 2003 | |
| **Ratio of the peak excursion of the modulation envelope to the peak transmit power** | a(6) | **C** | | | | Mr. I. Fershtater, test engineer | May 5, 2003 | |
| **Undesirable emissions (conducted)** | b(3) | **C** | | | | Mr. I. Fershtater, test engineer | April 28, 2003 | |
| **Unwanted emissions below 1 GHz** | b(5) | **C** | | | | Mr. I. Fershtater, test engineer | April 28, 2003 | |
| **Spurious emissions (radiated) in restricted bands** | b(6) | **C** | | | | Mr. I. Fershtater, test engineer | April 28, 2003 | |
| **Automatical discontinuance of transmission in case of absence of information to transmit or operational failure** | c | **C** | | | | | | Manufacturer statement provided |
| **Exposure compliance requirements** | f | **C** | | | | | | Refer to this test report §4.3. |
| **Unintentional radiation** | | | | | | | | |
| **Conducted emissions** | 15.207, 15.107 | **C** | | | | Mr. B. Efros, test engineer | May 22, 2003 | |
| **Radiated emissions** | 15.109 | **C** | | | | Mrs. E. Pitt, test engineer | April 2, 2003 | |

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| **General conditions under Part 15** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Examined frequencies: | | 15.31(m) | **C** | | | | |
| Near the top | 5810 MHz | | | | | | |
| Near the middle | 5780 MHz | | | | | | |
| Near the bottom | 5740 MHz | | | | | | |
| The intentional radiator has permanently attached antenna or antenna that uses a unique coupling to the intentional radiator. | | 15.203 | | | | **NA** | |
| The intentional radiator has a standard connector and must be professionally installed. To demonstrate that professional installation is required, the following three points must be addressed: (a) the application (or intended use) of the EUT; (b) the installation requirements of the EUT, and (c) the method by which the EUT will be marketed. | | 15.203 | **C** | | | | Standard connector is used, professional installation provided |
| No antenna other than that furnished by the responsible party can be used with the device. | | 15.203 | **C** | | | | |
| Antenna technical characteristics, as referred to in "Transmitter description" table in the test report | | 15.204 | | | | | |
| NOTE: C: The parameter is compliant with the requirements.<br>NC: The parameter is not compliant with the requirements.<br>NT: The parameter is not tested.<br>NA: The test of this parameter is not applicable. | | | | | | | |

**Test report prepared by:** Mrs. M. Cherniavsky, MSc, certification engineer

**Test report approved by:** Mr. E. Usoskin, PhD, CEO

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# 3 EUT description

## 3.1 General description

The EUT, WinLink-582, is a point-to-point multiplexer which employs time division duplex (TDD) transmission. It operates in 5.730 – 5.840 GHz* which aggregates E1/T1 and IP traffic over 2.6 Mbps full duplex rate wireless link (5.2 Mbps aggregate rate in both directions), extending data/voice transmission for up to 16 km (10 miles). The device uses direct sequence spread spectrum technology combined with powerful forward error correction to ensure high reliability, supports the UNII 5.740 – 5.810 GHz band. The WinLink-582 consisting of an outdoor radio terminal (RT) and an indoor radio terminal connection box (RTCB) is powered from mains via AC/DC adapter.
* Measurement test results are brought in test report RADEMC_FCC.15489-1 (section 1).

## 3.2 EUT test configuration

The EUT ports and lines description is given in Table 3.2.1, the support/test equipment description - in Table 3.2.2, operating frequencies generated by clocks and oscillators are provided in Table 3.2.3 and test configuration - in Figure 3.2.1.
Throughout the testing a shield of the cable between RTCB and RT was not connected to RTCB chassis.

### 3.2.1 Changes made in the EUT

To withstand the standard requirements the following changes were made in the EUT:
1) local oscillator signal level was reduced by 9 dB;
2) a ferrite-bead P/N 0443164151, manufactured by Fair-Rite, with 3 turns, was installed at the RTCB power input.

**Table 3.2.1 EUT ports and lines**

| Port type | Port description | Connector type | Quantity | Cable type description | Cable length, m | Connected |
|---|---|---|---|---|---|---|
| Power | 48 V DC | Terminal block | 1 | unshielded | 0.2 | From indoor unit to adapter |
| Power | AC | Non-detachable | 1 | unshielded | 1 | From adapter to mains |
| Signal (RTCB) | signal | D-type, 25 pin | 1 | shielded | 15 | From indoor unit to outdoor unit |
| Signal (RT) | signal | KRONE | 1 | Same as above | Same as above | Same as above |
| Signal | E1/T1 trunk | RJ-45 | 1 | shielded | 15 | From indoor unit to BER meter |
| Signal | ethernet | RJ-45 | 1 | UTP | 15 | From indoor unit to laptop |

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**Table 3.2.2 EUT support/test equipment**

| Description | Manufacturer | Model number | Serial number |
|---|---|---|---|
| Laptop | IBM | Think Pad | 55692A4 |
| BER meter | TTC | Interceptor 132A | 1034141 |
| Indoor radio terminal connection box | Radwin | RTCB | E100113 |
| Outdoor radio terminal | Radwin | RT5800 | TAT58000024 |

**Table 3.2.3 EUT operating frequencies**

| Frequency, MHz | Description |
|---|---|
| 10.00 | Clock in digital card |
| 15.357 | Clock in digital card |
| 25.00 | Clock in digital card |
| 61.44 | Clock in digital card |
| 125.00 | Clock in digital card |
| 5730 | CH1 output frequency |
| 5740 | CH2 output frequency |
| 5750 | CH3 output frequency |
| 5760 | CH4 output frequency |
| 5770 | CH5 output frequency |
| 5780 | CH6 output frequency |
| 5790 | CH7 output frequency |
| 5800 | CH8 output frequency |
| 5810 | CH9 output frequency |
| 5820 | CH10 output frequency |
| 5830 | CH11 output frequency |
| 5840 | CH12 output frequency |

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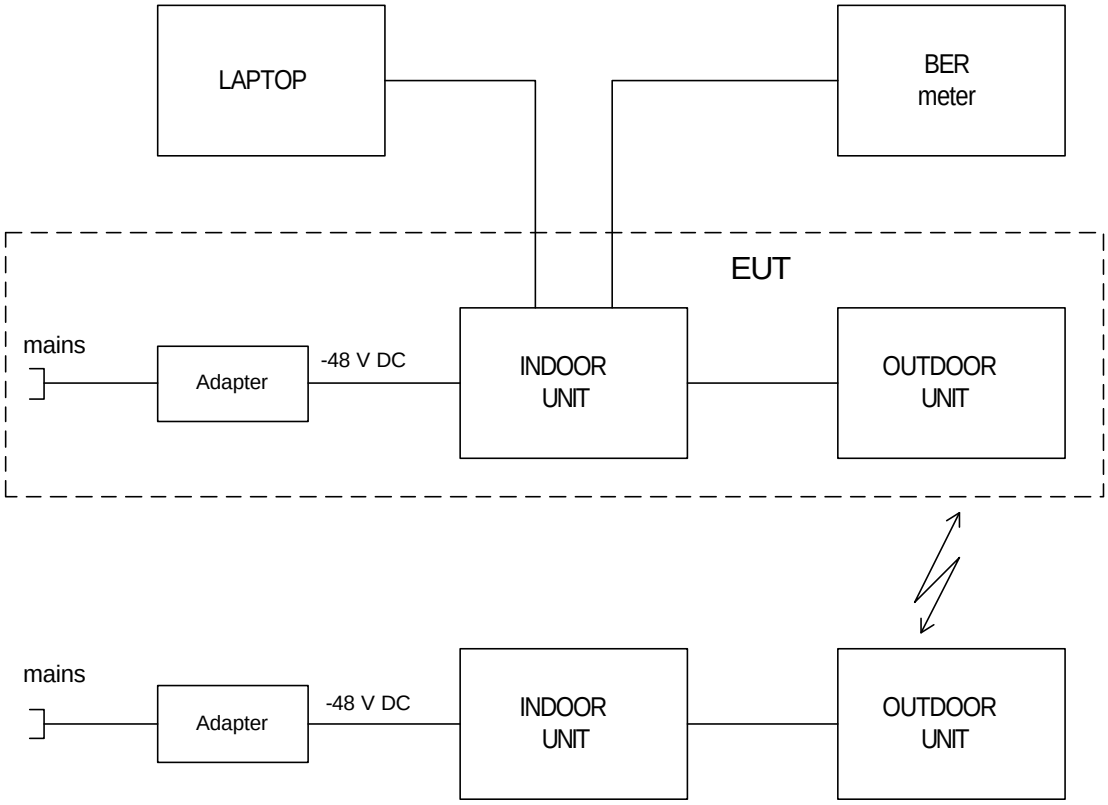
**Figure 3.2.1 EUT test configuration**



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# 4 Test results

## 4.1 Occupied 26-dB bandwidth according to § 15.407(a) (3)

| | |
|---|---|
| METHOD OF MEASUREMENTS | FCC Public Notice DA 02-2138, Appendix A |
| DATE: | May 5, 2003 |
| RELATIVE HUMIDITY: | 36 % |
| AMBIENT TEMPERATURE: | 24°C |
| AIR PRESSURE: | 1012 hPa |
| OPERATING FREQUENCY RANGE: | 5740 – 5810 GHz |
| MODULATION TECHNIQUE: | digital |
| BIT RATE: | 5.2 Mbps |
| MEASUREMENT UNCERTAINTY: | ±1085 Hz |

| Carrier frequency, MHz | Measured 26 dB bandwidth, MHz | Reference to Plot in Appendix A |
|---|---|---|
| 5740 | 10.4 | A1 |
| 5780 | 9.93 | A2 |
| 5810 | 8.83 | A3 |

**TEST PROCEDURE**

The EUT RF output was connected to the spectrum analyzer through 40 dB attenuator (plus 1.4 dB cable loss), the settings are shown in the plots. Spectrum analyzer readings were corrected for external attenuation and cable loss. The measurements were performed in continuous transmission mode of operation for carrier (channel) frequency at low and high edges and at the middle of the 5.740 – 5.810 GHz frequency range.

**TEST EQUIPMENT USED:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 1424 | HL 1650 | HL 1651 | HL 2254 | | | |

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## 4.2 Maximum peak transmit power test according to §15.407 (a)(3)

METHOD OF MEASUREMENTS: FCC Public Notice DA 02-2138, Appendix A
DATE: May 5, 2003
RELATIVE HUMIDITY: 36 %
AMBIENT TEMPERATURE: 24°C
AIR PRESSURE: 1012 hPa
OPERATING FREQUENCY RANGE: 5740 – 5810 GHz
MODULATION TECHNIQUE: digital
BIT RATE: 5.2 Mbps
MEASUREMENT UNCERTAINTY: ±3.5 dB

| Carrier frequency, MHz | Peak transmit power, dBm | Limit, dBm | Margin, dB | Verdict | Reference to Plots in Appendix A |
|---|---|---|---|---|---|
| 5740 | 16.7 | 27.2 | 10.5 | Pass | A5 |
| 5780 | 16.6 | 26.9 | 10.3 | Pass | A6 |
| 5810 | 16.0 | 26.5 | 10.5 | Pass | A7 |

**LIMIT**

| Operating frequency range, MHz | Maximum peak transmit power* |
|---|---|
| 5725 - 5825 | The lesser of 1 W or 17 dBm +10 log B<br>(B is the 26-dB emission bandwidth in MHz) |

The maximum 26-dB emission bandwidth is 10.4 MHz at 5740 MHz channel frequency, the limit is equal to:

17 dBm + 10 log 10.4 = 27.2 dBm < 30 dBm (1 W), hence [17 dBm +10 log B] limit was used.

* Notes to table:
Fixed point-to-point U-NII devices operating in the 5725 - 5825 MHz band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in transmitter peak output power or peak power spectral density.

**TEST PROCEDURE**

The EUT RF output was connected to the spectrum analyzer through 40 dB attenuator (plus 1.4 dB cable loss), the settings are shown in the plots. Spectrum analyzer readings were corrected for external attenuation and cable loss. The measurements were performed in continuous transmission mode of operation for carrier (channel) frequency at low and high edges and at the middle of the 5.740 – 5.810 GHz frequency range according to method #3 of Public Notice DA 02-2138, Appendix A for peak conducted transmit output power.
Video bandwidth (VBW) was calculated from maximum usable transmission pulse duration T, shown in plots A4 a), b): VBW ≥ 1/T ≥ 1/1.64 ms; VBW = 1 kHz.

**TEST EQUIPMENT USED:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 1424 | HL 1650 | HL 1651 | HL 2254 | | | |

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## 4.3 Exposure limit according to §15.407(f) and §1.1310

Limit for power density for general population/uncontrolled exposure is 1 mW/cm$^2$ (for 1500 –100,000 MHz frequency range).

The power density **$P\ (mW/cm^2) = P_T / 4\pi r^2$**

$P_{T1}$ is the transmitted power, which is equal to the full transmitter output power 16.7 dBm plus maximum antenna gain 20 dBi, the maximum equivalent isotropically radiated power EIRP is

$$P_{T1} = 16.7\ dBm + 20\ dBi = 36.7\ dBm = 4677.4\ mW.$$

The minimum safe distance “r”, where RF exposure does not exceed FCC permissible limit, is 19.3 cm.

$$r1 = \sqrt{(P_{T1} / (P \times 4\pi))} = \sqrt{(4677.4 / 12.56)} = 19.3\ cm$$

Conclusion: The public cannot be exposed to dangerous RF level.

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## 4.4 Peak power spectral density according to § 15.407(a)(3)

| | |
|---|---|
| METHOD OF MEASUREMENTS: | FCC Public Notice DA 02-2138, Appendix A |
| DATE: | May 5, 2003 |
| RELATIVE HUMIDITY: | 36 % |
| AMBIENT TEMPERATURE: | 24°C |
| AIR PRESSURE: | 1012 hPa |
| OPERATING FREQUENCY RANGE: | 5740 – 5810 GHz |
| MODULATION TECHNIQUE: | digital |
| BIT RATE: | 5.2 Mbps |
| LIMIT FOR PEAK POWER SPECTRAL DENSITY | 17 dBm in any 1-MHz band |
| MEASUREMENT UNCERTAINTY: | ±3.5 dB |

| Carrier frequency, MHz | Measured peak power spectral density, dBm/MHz | Margin, dB | Verdict | Reference to Plots in Appendix A |
|---|---|---|---|---|
| 5740 | 15.5 | 1.5 | Pass | A8 |
| 5780 | 15.5 | 1.5 | Pass | A9 |
| 5810 | 15.67 | 1.33 | Pass | A10 |

**TEST PROCEDURE**

The EUT RF output was connected to the spectrum analyzer through 40 dB attenuator (plus 1.4 dB cable loss), the settings are shown in the plots. Spectrum analyzer readings were corrected for external attenuation and cable loss. The measurements were performed in continuous transmission mode of operation for carrier (channel) frequency at low and high edges and at the middle of the 5.740 – 5.810 GHz frequency range according to method #1 of Public Notice DA 02-2138, Appendix A for peak power spectral density.

**TEST EQUIPMENT USED:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 1424 | HL 1650 | HL 1651 | HL 2254 | | | |

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## 4.5 Ratio of the peak excursion of the modulation envelope to the peak transmit power according to § 15.407(a)(6)

| | |
|---|---|
| METHOD OF MEASUREMENTS: | FCC Public Notice DA 02-2138, Appendix A |
| DATE: | May 5, 2003 |
| RELATIVE HUMIDITY: | 36 % |
| AMBIENT TEMPERATURE: | 24°C |
| AIR PRESSURE: | 1012 hPa |
| OPERATING FREQUENCY RANGE: | 5740 – 5810 GHz |
| MODULATION TECHNIQUE: | digital |
| BIT RATE: | 5.2 Mbps |
| LIMIT: | ≤13 dB across any 1 MHz bandwidth |
| MEASUREMENT UNCERTAINTY: | ±1.3 dB |

| Carrier frequency, MHz | Measured maximum peak excursion, dB | Margin, dB | Verdict | Reference to Plots in Appendix A |
|---|---|---|---|---|
| 5740 | 12.7 | 0.3 | Pass | A11 |
| 5780 | 12.7 | 0.3 | Pass | A12 |
| 5810 | 12.8 | 0.2 | Pass | A13 |

**TEST PROCEDURE**

The EUT RF output was connected to the spectrum analyzer through 40 dB attenuator (plus 1.4 dB cable loss), the settings are shown in the plots. Spectrum analyzer readings were corrected for external attenuation and cable loss. The measurements were performed in continuous transmission mode of operation for carrier (channel) frequency at low and high edges and at the middle of the 5.740 – 5.810 GHz frequency range. The maximum peak excursion of modulation envelope was measured as a difference between 2 traces:
trace 1: RBW = 1 MHz, VBW = 3 MHz
trace 2: RBW = 1 MHz, VBW = 1 kHz, where
RBW – resolution bandwidth
VBW - video bandwidth.

**TEST EQUIPMENT USED:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 1424 | HL 1650 | HL 1651 | HL 2254 | | | |

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## 4.6 Unwanted emissions out of restricted band test according to §15.407(b)(3), (5)

| | |
|---|---|
| METHOD OF MEASUREMENTS | FCC part 15, §15.407(b)(4) |
| DATE: | May 1 to 6, 2003 |
| RELATIVE HUMIDITY: | 52 % |
| AMBIENT TEMPERATURE: | 25°C |
| AIR PRESSURE: | 1012 hPa |
| OPERATING FREQUENCY RANGE: | 5740 – 5810 GHz |
| MODULATION TECHNIQUE: | digital |
| BIT RATE: | 5.2 Mbps |
| FREQUENCY RANGE* | 9 kHz - 40 GHz |
| MEASUREMENT UNCERTAINTY: | ± 4.5 dB |
| RESOLUTION BANDWIDTH: | 1 MHz |
| VIDEOBANDWIDTH: | 1 kHz |

* The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to 40 GHz.
All emissions were found below the specified limit. The emission levels of the EUT in peak mode more than 20 dB lower than the specified limit were not recorded in the table below. For test results refer to Plots A14 – A93.

| Frequency, MHz | Antenna polarization | Carrier frequency, MHz | Spurious emission level, dB(mV/m) | Spurious limit, dB(mV/m) | Margin, dB | Reference to Plots in Appendix A |
|---|---|---|---|---|---|---|
| 5608.6 | V | 5810 | 53.12 | 68.2 | 15.08 | A75 |
| 5620.1 | V | 5810 | 52.56 | 68.2 | 15.64 | A76 |
| 5713.8 | H | 5780 | 56.10 | 68.2 | 12.10 | A50 |
| 5715.0 | V | 5740 | 51.68 | 68.2 | 16.52 | A24 |
| 5719.0 | V | 5810 | 65.33 | 78.2 | 12.87 | A77 |
| 5724.8 | V | 5740 | 66.83 | 78.2 | 11.37 | A25 |
| 5825.0 | V | 5810 | 66.17 | 78.2 | 12.03 | A78 |
| 5826.1 | V | 5740 | 50.32 | 78.2 | 27.88 | A26 |
| 5855.0 | V | 5780 | 54.17 | 68.2 | 14.03 | A53 |
| 5876.4 | V | 5740 | 53.28 | 68.2 | 14.92 | A28 |
| 5885.0 | V | 5810 | 53.48 | 68.2 | 14.72 | A80 |
| 13498.0 | V | 5780 | 52.00 | 68.2 | 16.2 | A60 |

The recorded test results were obtained throughout measurements with double ridged guide antenna at 1 m height and 180° turntable position.

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**LIMIT**

For transmitters operating in the 5.725 – 5.825 GHz band all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of –17 dBm/MHz [equivalent field strength at 3 m is 78.2 dB(μV/m)]; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of –27 dBm/MHz [equivalent field strength at 3 m is 68.2 dB(μV/m)].

Unwanted emissions below 1 GHz must comply with the general field strength limits of FCC CFR47 section 15.209. For test results refer to this test report section 4.8.

**TEST PROCEDURE**

The test was performed with transmitter operating at 3 carrier frequencies $F_{min}$ = 5740 MHz, $F_{cent}$ = 5780 MHz, $F_{max}$ = 5810 MHz. The measurements were performed at 3 m test distance from 9 kHz to 40 GHz. The EUT was placed on a wooden 80 cm height turntable.

**9 kHz – 30 MHz frequency range.** The loop antenna was positioned with its plane vertical. The loop center was 1 meter above the ground plane. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated about its vertical axis.

**30 MHz – 40 GHz frequency range.** To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

**TEST EQUIPMENT USED AT OATS:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 0025 | HL 0038 | HL 0091 | HL 0275 | HL 0287 | HL 0763 | HL 0769 |
| HL 1200 | HL 1295 | HL 1424 | HL 1651 | HL 1940 | HL 1942 | HL 1989 |
| HL 2259 | HL 2260 | HL 2261 | HL 2274 | | | |

**TEST EQUIPMENT USED IN SEMI-ANECHOIC CHAMBER:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 0041 | HL 0446 | HL 0465 | HL 0521 | HL 0589 | HL 0592 | HL 0593 |
| HL 0594 | HL 0604 | HL 1004 | HL 1424 | HL 1651 | HL 1942 | HL 1947 |
| HL 2009 | HL 2259 | HL 2260 | HL 2274 | | | |

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## 4.7 Radiated emissions which fall in restricted bands test according to §15. 407(b) and § 15.205, §15.209(a)

| | |
|---|---|
| METHOD OF MEASUREMENTS | ANSI 63.4 §13.1.4 |
| DATE: | April 10, May 1, 6, 2003 |
| RELATIVE HUMIDITY: | 42 % |
| AMBIENT TEMPERATURE: | 25°C |
| AIR PRESSURE: | 1016 hPa |
| OPERATING FREQUENCY RANGE: | 5730 – 5840 GHz |
| MODULATION TECHNIQUE | DSSS |
| BIT RATE: | 5.2 Mbps |
| FREQUENCY RANGE* | 9 kHz - 40 GHz |
| MEASUREMENT UNCERTAINTY: | ± 4.5 dB |

* The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to 40 GHz. All emissions were found below the specified limit.
For test results refer to Plots A14 – A93.

**LIMIT**

Radiated emissions, which fall in the restricted bands, must comply with §15.209(a) limits.

**Quasi-peak detector**

| Frequency, MHz | Antenna type | Antenna height, m | Turntable position, ° | Radiated emissions, dB (μV/m) | Limit, dB (μV/m) | Margin, dB | Reference to Plots in Appendix A |
|---|---|---|---|---|---|---|---|
| 37.82 | Biconilog | 1.0 | 278 | 31.9 | 40.00 | 8.10 | A67 |
| 38.11 | Biconilog | 1.0 | 278 | 32.5 | 40.00 | 7.50 | A67 |
| 73.25 | Biconilog | 1.0 | 86 | 35.1 | 40.00 | 4.90 | A68 |
| 73.33 | Biconilog | 1.0 | 0 | 35.85 | 40.00 | 4.15 | A17 |
| 73.74 | Biconilog | 1.0 | 0 | 35.77 | 40.00 | 4.23 | A41 |
| 124.40 | Biconical | 1.0 | 189 | 29.74 | 43.50 | 13.76 | A20 |
| 127.89 | Biconical | 1.0 | 0 | 34.60 | 43.50 | 8.90 | A69 |
| 131.05 | Biconical | 1.0 | 0 | 31.72 | 43.50 | 11.78 | A69 |
| 137.75 | Biconical | 1.0 | 0 | 37.78 | 43.50 | 5.72 | A69 |
| 249.00 | Log-periodic | 1.2 | 254 | 23.68 | 46.00 | 22.32 | A20 |
| 400.0 | Log-periodic | 1.0 | 218 | 34.63 | 46.00 | 11.37 | A20 |
| 1000.00 | Log-periodic | 1.5 | 272 | 44.57 | 54.00 | 9.43 | A20 |

The recorded test results were obtained through measurements with antennas in vertical polarization**.**
Turntable position: $0^{o}$ = EUT front panel faces the receiving antenna

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**Peak detector, carrier frequency 5740 MHz**

| Frequency, MHz | Antenna polarization and height, cm | Turntable position, (°) | Radiated emissions, dB (mV/m) | Limit, dB (mV/m) | Margin, dB | Reference to Plots in Appendix A |
|---|---|---|---|---|---|---|
| 2370.0 | H, 326 | 122 | 54.32 | 74 | 19.68 | A22 |
| 4740.0 | V, 126 | 356 | 55.73 | 74 | 18.27 | A23 |
| 11885.0 | V, 100 | 180 | 55.83 | 74 | 18.17 | A31 |
| 12550.0 | V, 100 | 180 | 65.67 | 74 | 8.33 | A33 |
| 15290.0 | V, 100 | 180 | 59.33 | 74 | 14.67 | A34 |
| 17840.0 | V, 100 | 180 | 59.50 | 74 | 14.50 | A35 |

**Average detector, carrier frequency 5740 MHz**

| Frequency, MHz | Antenna polarization and height, cm | Turntable position, (°) | Radiated emissions, dB (mV/m) | Limit, dB (mV/m) | Margin, dB | Reference to Plots in Appendix A |
|---|---|---|---|---|---|---|
| 2370.0 | H, 326 | 122 | 52.13 | 54 | 1.87 | A22 |
| 4740.0 | V, 126 | 356 | 50.58 | 54 | 3.42 | A23 |
| 11885.0 | V, 100 | 180 | 42.67 | 54 | 11.33 | A31 |
| 12550.0 | V, 100 | 180 | 52.33 | 54 | 1.67 | A33 |
| 15290.0 | V, 100 | 180 | 44.50 | 54 | 9.5 | A34 |
| 17840.0 | V, 100 | 180 | 47.17 | 54 | 6.83 | A35 |

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**Peak detector, carrier frequency 5780 MHz**

| Frequency, MHz | Antenna polarization and height, cm | Turntable position, (°) | Radiated emissions, dB (µV/m) | Limit, dB (µV/m) | Margin, dB | Reference to Plots in Appendix A |
|---|---|---|---|---|---|---|
| 2390.0 | H, 105 | 127 | 55.51 | 74 | 18.49 | A46 |
| 7400.0 | V, 100 | 180 | 57.17 | 74 | 16.83 | A54 |
| 11867.0 | V, 100 | 180 | 62.50 | 74 | 11.5 | A58 |
| 12557.0 | V, 100 | 180 | 64.33 | 74 | 9.67 | A59 |
| 17873.0 | V, 100 | 180 | 61.00 | 74 | 13.00 | A62 |

**Average detector, carrier frequency 5780 MHz**

| Frequency, MHz | Antenna polarization and height, cm | Turntable position, (°) | Radiated emissions, dB (µV/m) | Limit, dB (µV/m) | Margin, dB | Reference to Plots in Appendix A |
|---|---|---|---|---|---|---|
| 2390.0 | H, 105 | 127 | 53.43 | 54 | 0.57 | A46 |
| 7400.0 | V, 100 | 180 | 44.33 | 54 | 9.67 | A54 |
| 11867.0 | V, 100 | 180 | 42.83 | 54 | 11.17 | A58 |
| 12557.0 | V, 100 | 180 | 51.00 | 54 | 3.00 | A59 |
| 17873.0 | V, 100 | 180 | 47.50 | 54 | 6.50 | A62 |

**Peak detector, carrier frequency 5810 MHz**

| Frequency, MHz | Radiated emissions, dB (µV/m) | Limit, dB (µV/m) | Margin, dB | Reference to Plots in Appendix A |
|---|---|---|---|---|
| 4810.0 | 63.25 | 74 | 10.75 | A73 |
| 11820.0 | 56.00 | 74 | 18.00 | A83 |
| 12550.0 | 61.83 | 74 | 12.17 | A86 |
| 16000.0 | 56.67 | 74 | 17.33 | A89 |
| 17905.0 | 57.67 | 74 | 16.33 | A90 |

The recorded test results were obtained throughout measurements with double ridged guide antenna in vertical polarization at 1 m height and 180° turntable position**.**

**Average detector, carrier frequency 5810 MHz**

| Frequency, MHz | Radiated emissions, dB (µV/m) | Limit, dB (µV/m) | Margin, dB | Reference to Plots in Appendix A |
|---|---|---|---|---|
| 4810.0 | 53.01 | 54 | 0.99 | A73 |
| 11820.0 | 41.17 | 54 | 12.83 | A85 |
| 12550.0 | 48.33 | 54 | 5.67 | A86 |
| 16000.0 | 41.33 | 54 | 12.67 | A89 |
| 17905.0 | 46.83 | 54 | 7.17 | A90 |

The recorded test results were obtained throughout measurements with double ridged guide antenna in vertical polarization at 1 m height and 180° turntable position**.**

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**Table abbreviations:**
Margin = dB below (negative if above) specification limit.
Turntable position: $0^o$ = EUT front panel faces the receiving antenna
Antenna polarization: H - horizontal, V - vertical

**TEST PROCEDURE**

The test was performed with transmitter operating at 3 carrier frequencies $F_{min}$ = 5740 MHz, $F_{cent}$ = 5780 MHz, $F_{max}$ = 5810 MHz. The measurements were performed at 3 m test distance from 9 kHz to 40 GHz. The EUT was placed on a wooden 80 cm height turntable.

**9 kHz – 30 MHz frequency range.** The loop antenna was positioned with its plane vertical. The loop center was 1 meter above the ground plane. To find maximum radiation the turntable was rotated 360 and the measuring antenna was rotated about its vertical axis.

**30 MHz – 40 GHz frequency range.** To find maximum radiation the turntable was rotated $360^o$, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

If the emission level of the EUT in peak mode was more than 20 dB lower than the specified limit, the testing was stopped and the peak values were reported. The emissions that did not have 20 dB margin were retested using average method as shown in the tables above.

**TEST EQUIPMENT USED AT OATS:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 0025 | HL 0038 | HL 0091 | HL 0275 | HL 0287 | HL 0763 | HL 0769 |
| HL 1200 | HL 1295 | HL 1424 | HL 1651 | HL 1940 | HL 1942 | HL 1989 |
| HL 2259 | HL 2260 | HL 2261 | HL 2274 | | | |

**TEST EQUIPMENT USED IN SEMI-ANECHOIC CHAMBER:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 0041 | HL 0446 | HL 0465 | HL 0521 | HL 0589 | HL 0592 | HL 0593 |
| HL 0594 | HL 0604 | HL 1004 | HL 1424 | HL 1651 | HL 1942 | HL 1947 |
| HL 2009 | HL 2259 | HL 2260 | HL 2274 | | | |

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## 4.8 Unintentional radiated emissions test according to §15.109

| | |
|---|---|
| METHOD OF MEASUREMENT: | ANSI 63.4 §11.6 / ANSI 63.4 §12.1.4 |
| DATE | April 2, 2003 |
| TEST PERFROMED AT: | OATS |
| AMBIENT TEMPERATURE: | 22°C |
| RELATIVE HUMIDITY | 50% |
| AIR PRESSURE: | 1015 hPa |
| DISTANCE BETWEEN ANTENNA AND EUT: | 10 m |
| THE EUT WAS TESTED AS: | Table-top |
| FREQUECNY RANGE: | 30 MHz – 2 GHz |
| DETECTOR TYPE: | Quasi-peak |
| RESOLUTION BANDWIDTH: | 120 kHz |
| MEASUREMENT UNCERTAINTY: | ± 6 dB max |

| Frequency, MHz | Antenna polarization | Antenna height, m | Turntable position, ($^o$) | Radiated emissions, dB (μV/m) | Limit, dB (μV/m) | Margin, dB | Pass/ Fail |
|---|---|---|---|---|---|---|---|
| 42.35 | Vertical | 1.1 | 272 | 33.8 | 39 | 5.2 | Pass |
| 50.10 | Vertical | 1.2 | 137 | 35.8 | 39 | 3.2 | Pass |
| 51.20 | Vertical | 1.2 | 137 | 37.8 | 39 | 1.2 | Pass |
| 400.00 | Horizontal | 1.8 | 351 | 31.9 | 46.5 | 14.6 | Pass |
| 500.00 | Horizontal | 1.6 | 354 | 33.1 | 46.5 | 13.4 | Pass |
| 1000.00 | Horizontal | 1.0 | 218 | 42.9 | 49.5 | 6.6 | Pass |

The test results recorded in the table were obtained throughout measurements with a biconilog antenna.

**Table abbreviations:**
Turntable position: $0^o$ = EUT front panel faces the receiving antenna

**LIMIT (§ 15.109)**

| Frequency, MHz | Class A equipment @ 10 m dB(μV/m) |
|---|---|
| 30 - 88 | 39 |
| 88 - 216 | 43.5 |
| 216 - 960 | 46.5 |
| 960 - 5000 | 49.5 |

**TEST EQUIPMENT USED:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 0038 | HL 0041 | HL 0091 | HL 0287 | HL 0784 | HL 0813 | HL 1430 |
| HL 1552 | HL 1827 | HL 1848 | HL 1947 | | | |

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## 4.9 Conducted emissions test according to §15.207, 15.107

| | |
|---|---|
| METHOD OF MEASUREMENTS | ANSI 63.4 §13.1.3 |
| DATE: | May 22, 2003 |
| RELATIVE HUMIDITY: | 46 % |
| AMBIENT TEMPERATURE: | 25 °C |
| AIR PRESSURE: | 1018 hPa |
| THE EUT WAS TESTED AS: | TABLE-TOP |
| DETECTOR USED: | QUASI-PEAK |
| FREQUECNY RANGE: | 150 kHz – 30 MHz |
| RESOLUTION BANDWIDTH: | 9 kHz |
| MEASUREMENT UNCERTAINTY, dB | ± 3.9 dB in 9 – 150 kHz<br>± 3.8 dB in 150 kHz – 30 MHz |

**Quasi-peak detector**

| Frequency, MHz | Line identification | Measured emissions, dB (mV) | Specification QP limit, dB (mV) | Margin, dB | Pass/ Fail | Reference to Plots in Appendix A |
|---|---|---|---|---|---|---|
| 0.150107 | Ph | 47.14 | 65.99 | 18.85 | Pass | A96 |
| 0.451870 | Ph | 41.30 | 56.90 | 15.60 | Pass | A96 |
| 0.904025 | Ph | 41.66 | 56.00 | 14.34 | Pass | A96 |
| 1.052197 | N | 42.94 | 56.00 | 13.06 | Pass | A97 |
| 1.054831 | Ph | 43.04 | 56.00 | 12.96 | Pass | A96 |
| 1.202191 | N | 42.23 | 56.00 | 13.77 | Pass | A97 |
| 1.205074 | Ph | 42.81 | 56.00 | 13.19 | Pass | A96 |
| 1.878332 | N | 43.23 | 56.00 | 12.77 | Pass | A97 |
| 2.029057 | N | 43.04 | 56.00 | 12.96 | Pass | A97 |
| 2.105036 | N | 43.80 | 56.00 | 12.20 | Pass | A97 |
| 2.257958 | Ph | 43.81 | 56.00 | 12.19 | Pass | A96 |
| 3.008317 | N | 43.43 | 56.00 | 12.57 | Pass | A97 |

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**Average detector**

| Frequency, MHz | Line identification | Measured emissions, dB (mV) | Specification AVRG limit, dB (mV) | Margin, dB | Pass/ Fail | Reference to Plots in Appendix A |
|---|---|---|---|---|---|---|
| 0.150107 | Ph | 40.37 | 55.99 | 15.62 | Pass | A109 |
| 0.451870 | Ph | 39.11 | 46.90 | 7.79 | Pass | A109 |
| 0.904025 | Ph | 38.30 | 46.00 | 7.70 | Pass | A109 |
| 1.052197 | N | 41.46 | 46.00 | 4.54 | Pass | A110 |
| 1.054831 | Ph | 40.06 | 46.00 | 5.94 | Pass | A109 |
| 1.202191 | N | 38.76 | 46.00 | 7.24 | Pass | A110 |
| 1.205074 | Ph | 40.12 | 46.00 | 5.88 | Pass | A109 |
| 1.878332 | N | 39.86 | 46.00 | 6.14 | Pass | A110 |
| 2.029057 | N | 39.05 | 46.00 | 6.95 | Pass | A110 |
| 2.105036 | N | 40.39 | 46.00 | 5.61 | Pass | A110 |
| 2.257958 | Ph | 40.23 | 46.00 | 5.77 | Pass | A109 |
| 3.008317 | N | 40.09 | 46.00 | 5.91 | Pass | A110 |

**LIMIT**

| Frequency, MHz | Class B equipment, dB(mV) | |
|---|---|---|
| | QP | AVRG |
| 0.15 - 0.5 | 66 - 56* | 56 - 46* |
| 0.5 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

*The limit decreases linearly with the logarithm of frequency.

**TEST PROCEDURE**

The measurements were performed at mains terminals by means of LISN, connected to spectrum analyzer in the frequency range as referred to in the table above. The unused coaxial connector of the LISN was terminated with 50 Ω.
The measurements were made with quasi-peak and average detectors as referred to in the tables.
The position of the EUT cables was varied to determine maximum emission level.

**TEST EQUIPMENT USED:**

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 0163 | HL 0787 | HL 1430 | HL 1502 | HL 1510 | | |

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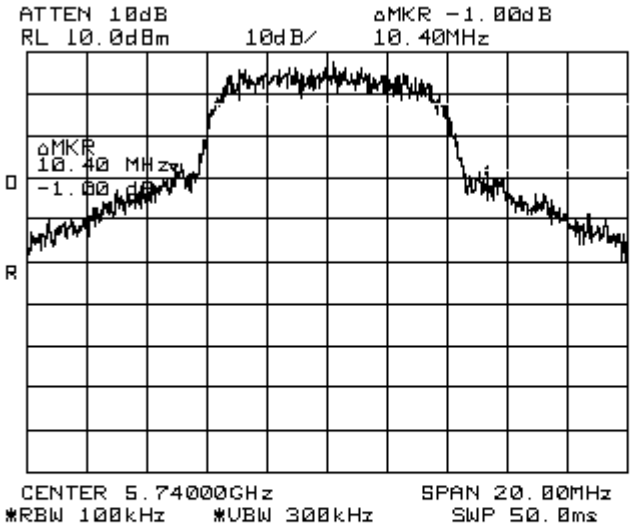
# Appendix A Plots

**Plot A 1**

**26 dB bandwidth @ 5.740 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 100 kHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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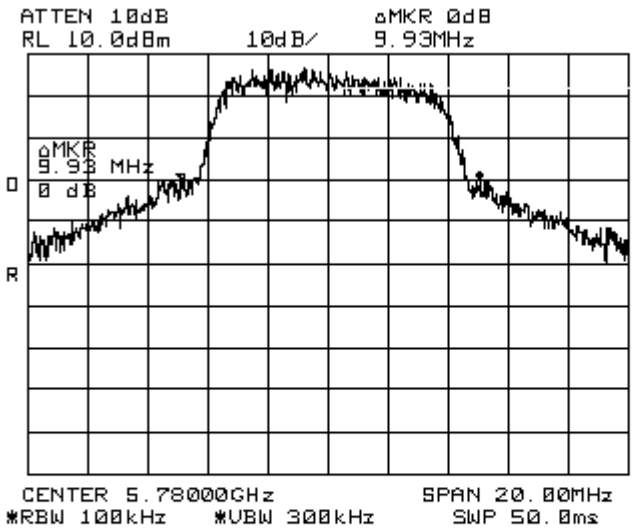
**Plot A 2**

**26 dB bandwidth @ 5.780 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 100 kHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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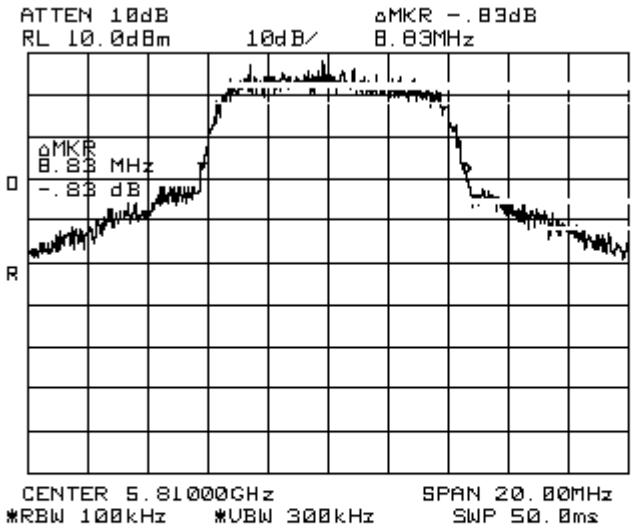
**Plot A 3**

**26 dB bandwidth @ 5.810 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 100 kHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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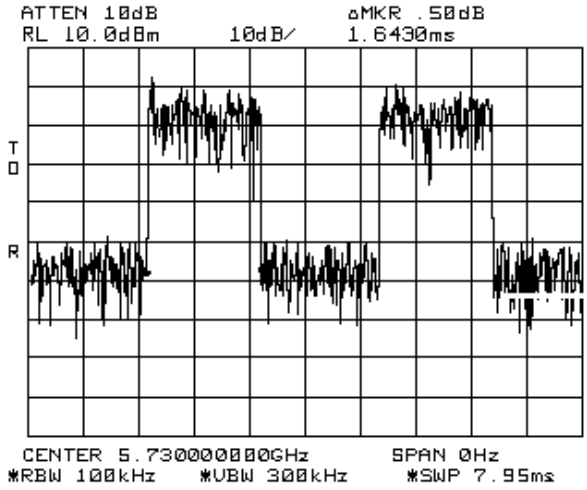
**Plot A 4**

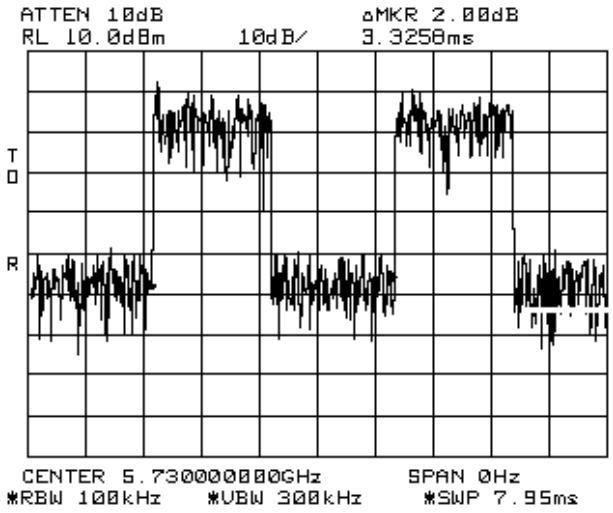
**Transmission pulse duration measurements**

**a)**




Transmission duration= 1.6430 msec

**b**)




Transmission period= 3.3258 msec

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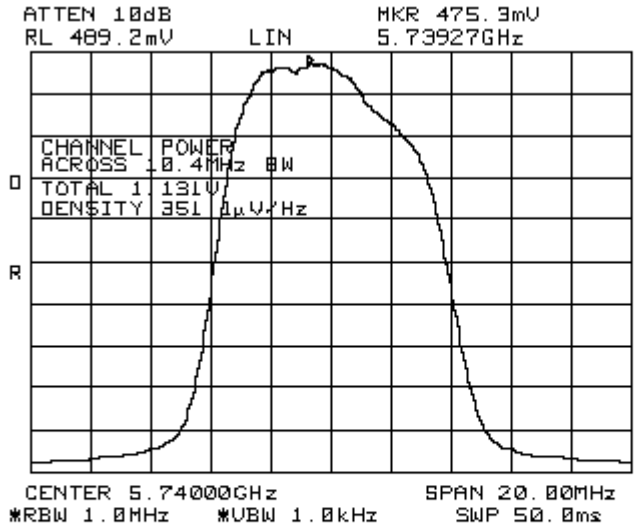
**Plot A 5**

**Peak transmit power measurements@ 5.740 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |




Maximum transmit power calculated using alternative method:
$Pmax=10\log((0.4753)^2/50)+30+10\log(10.4MHz/1MHz)=6.5+10.2=16.7$ dBm

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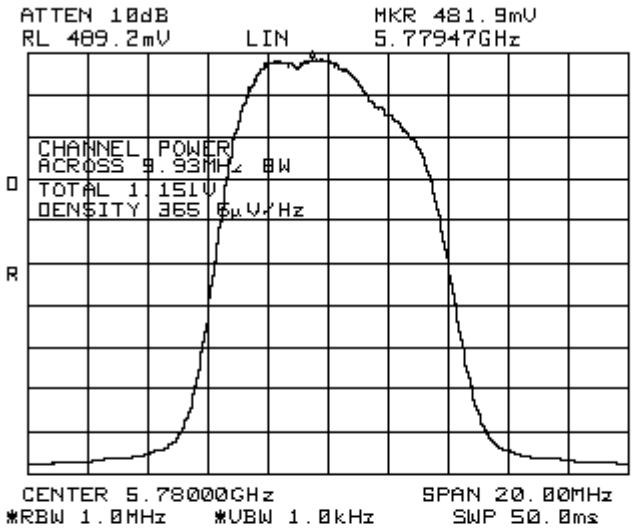
**Plot A 6**

**Peak transmit power measurements@ 5.780 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |




Maximum transmit power calculated using alternative method:
$Pmax=10\log((0.4819)^2/50)+30+10\log(9.93MHz/1MHz)=6.7+9.9=16.6$ dBm

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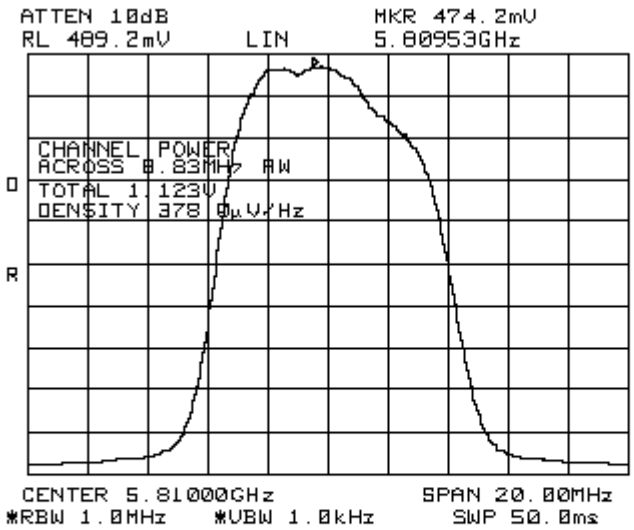
**Plot A 7**

**Peak transmit power measurements@ 5.810 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |




Maximum transmit power calculated using alternative method:
$Pmax=10\log((0.4742)^2/50)+30+10\log(8.83MHz/1MHz)=6.5+9.5=16.0$ dBm

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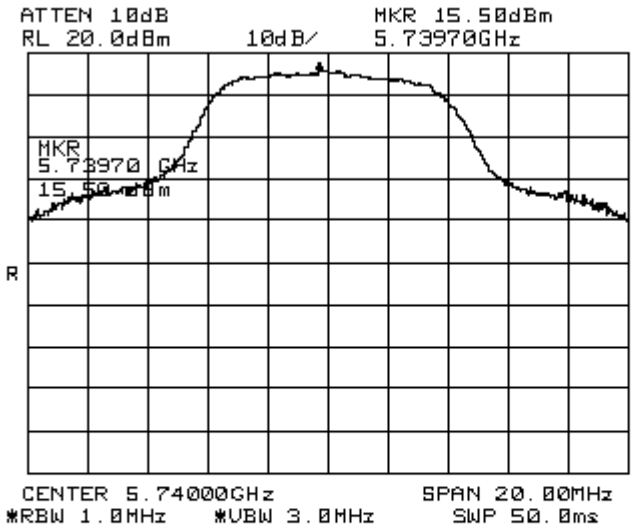
**Plot A 8**

**Peak power spectral density measurements @ 5.740 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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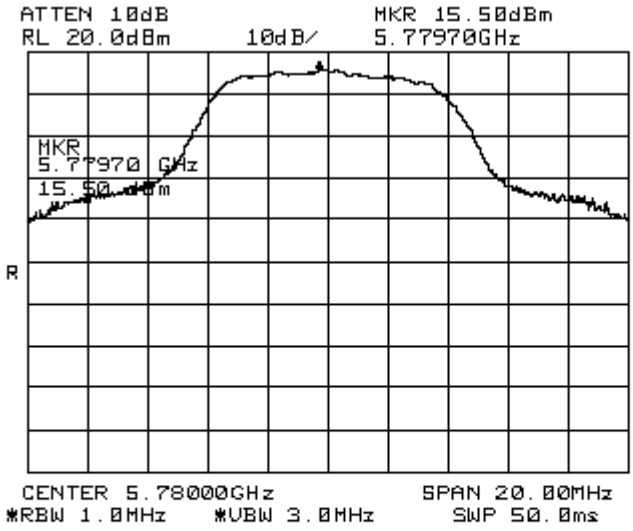
**Plot A 9**

**Peak power spectral density measurements @ 5.780 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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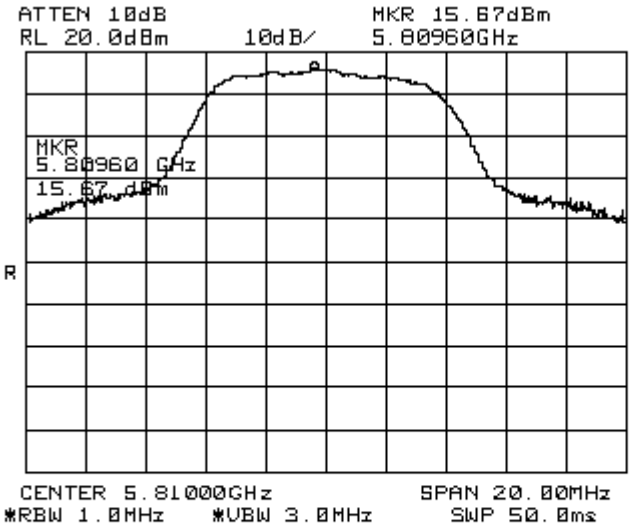
**Plot A 10**

**Peak power spectral density measurements @ 5.810 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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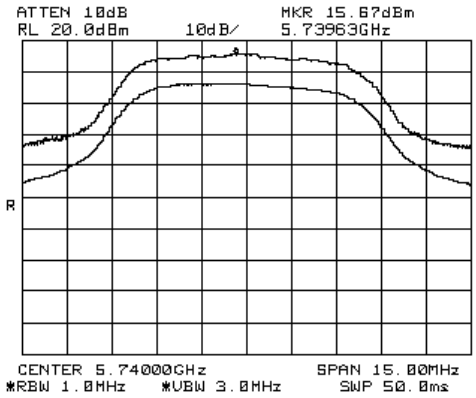
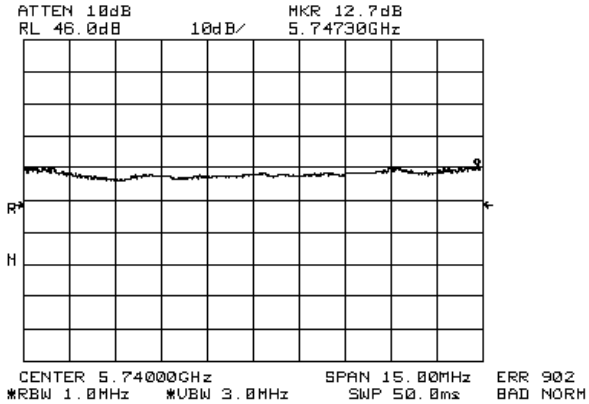
**Plot A 11**

**Peak excursion measurements @ 5.740 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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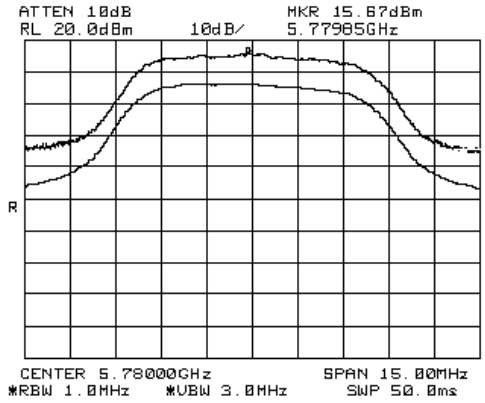
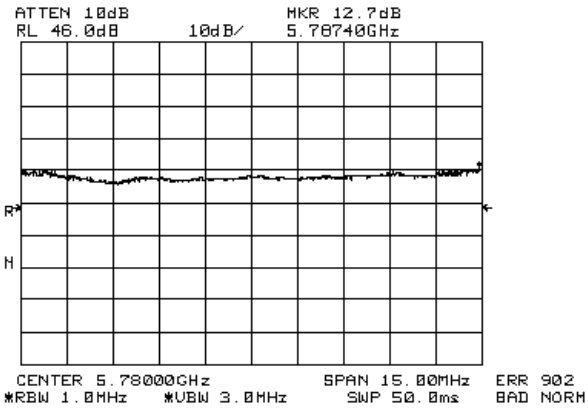
**Plot A 12**

**Peak excursion measurements @ 5.780 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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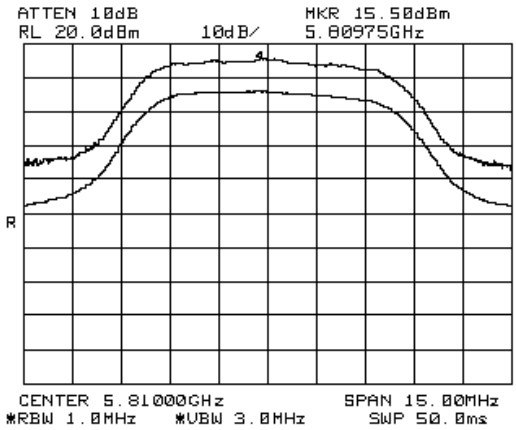
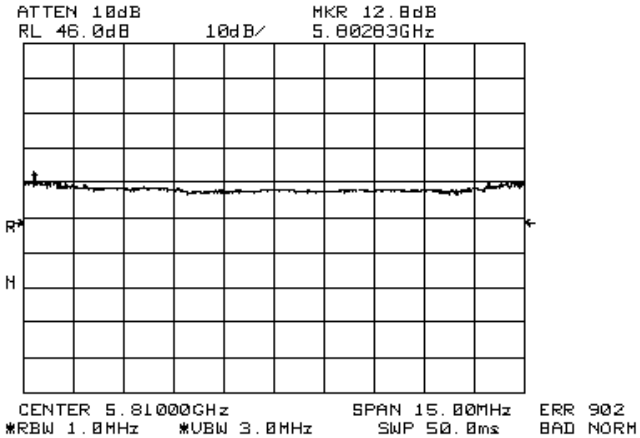
**Plot A 13**

**Peak excursion measurements @ 5.810 GHz**

| | |
|---|---|
| EUT: | WinLink 582 |
| Detector: | Peak |
| RBW | 1 MHz |
| Test Method: | measurement at antenna connector |
| Note: | Bit rate 5.2 Mbps |



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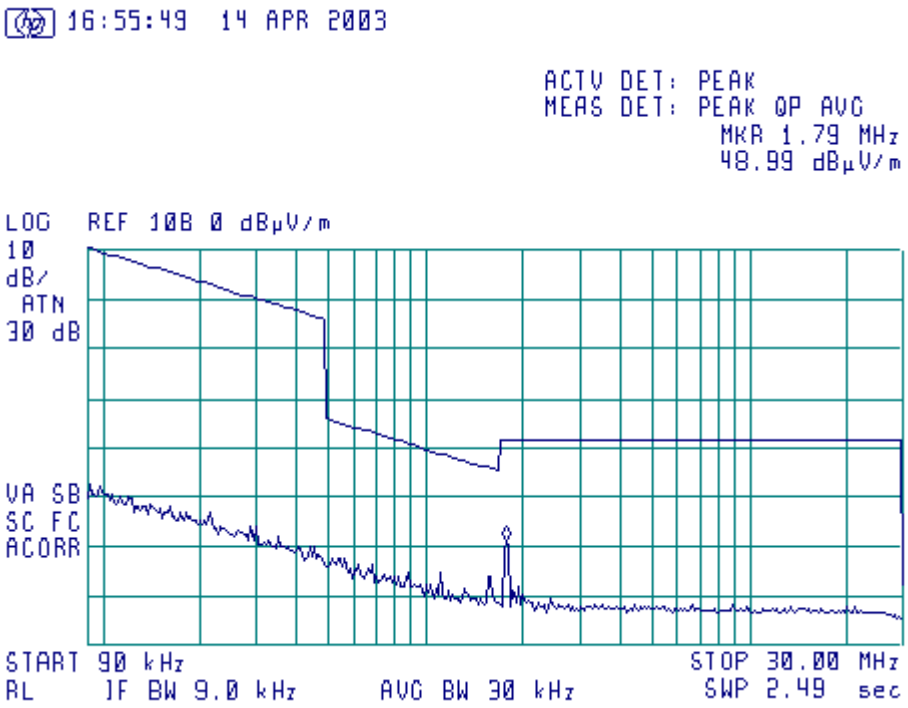
**Plot A 14**

**Radiated spurious emission measurements in the anechoic chamber from 9 kHz to 30 MHz, carrier frequency 5740 MHz**



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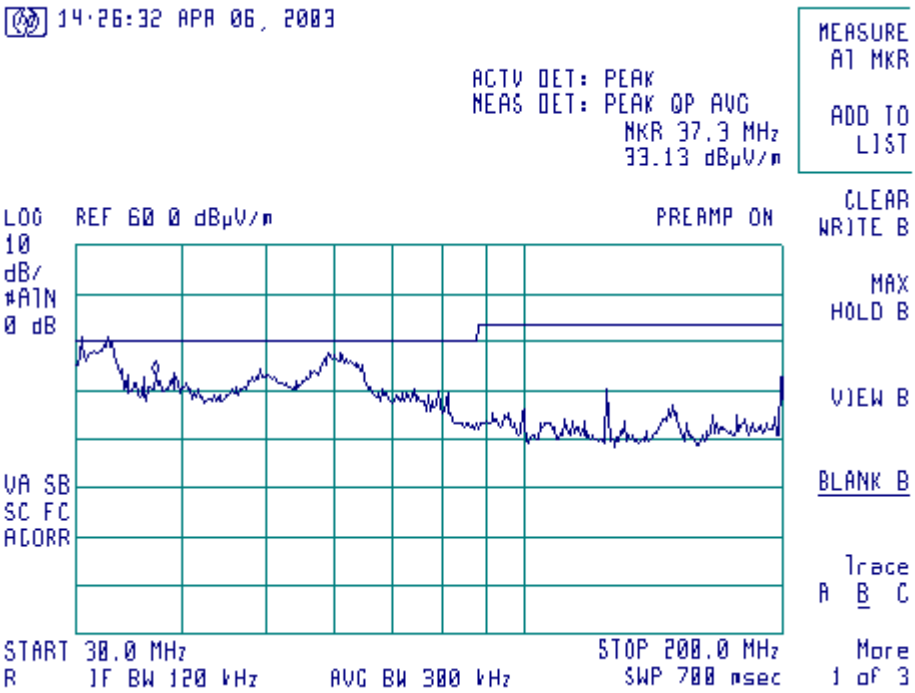
**Plot A 15**

**Radiated spurious emission measurements in the anechoic chamber from 30 kHz to 200 MHz, carrier frequency 5740 MHz**



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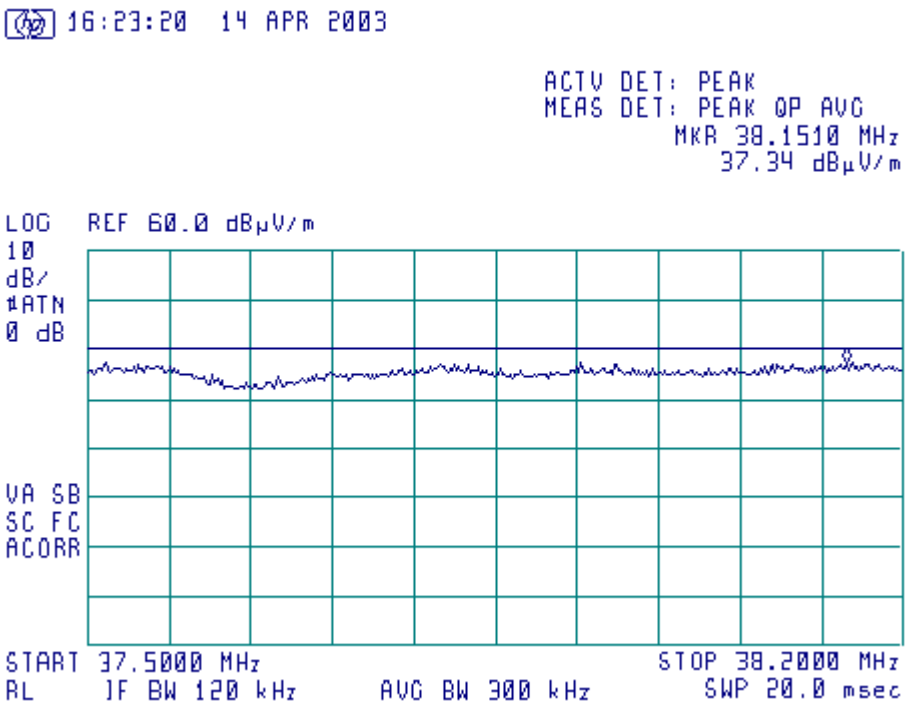
**Plot A 16**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5740 MHz**



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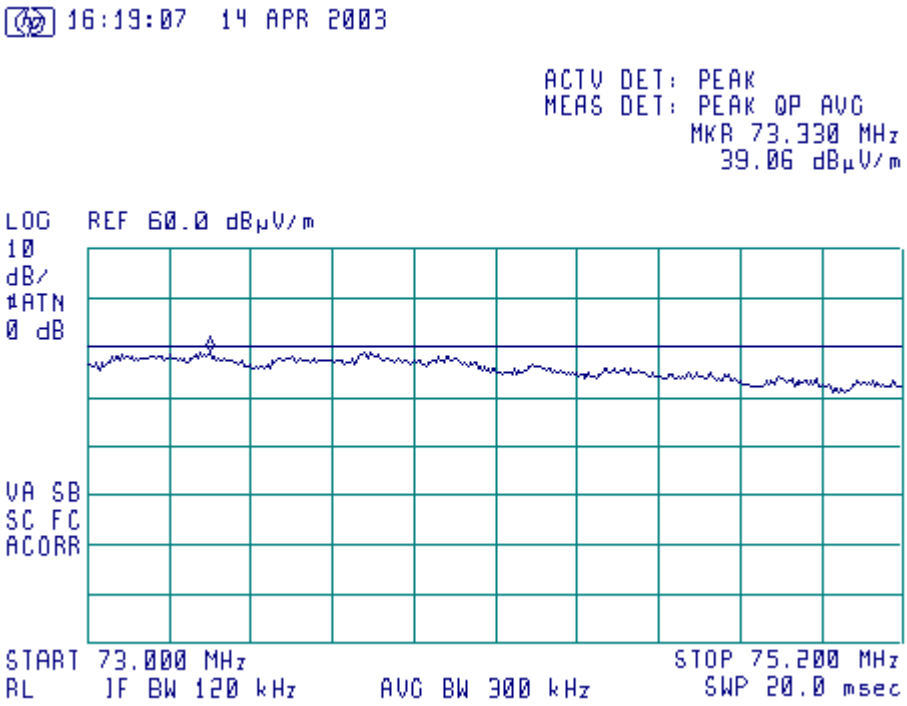
**Plot A 17**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5740 MHz**




| Frequency, MHz | Peak measurement, dB(uV/m) | QP measurement, dB(uV/m) | Limit, dB(uV/m) | Margin, dB |
|---|---|---|---|---|
| 73.331825 | 39.47 | 35.85 | 40.00 | 4.15 |

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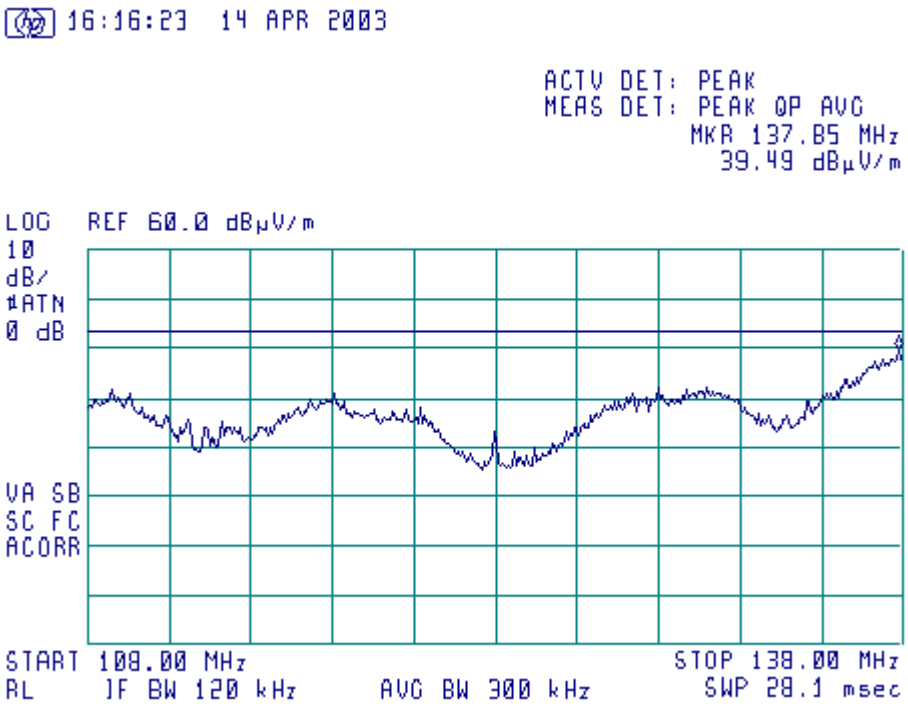
**Plot A 18**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5740 MHz**



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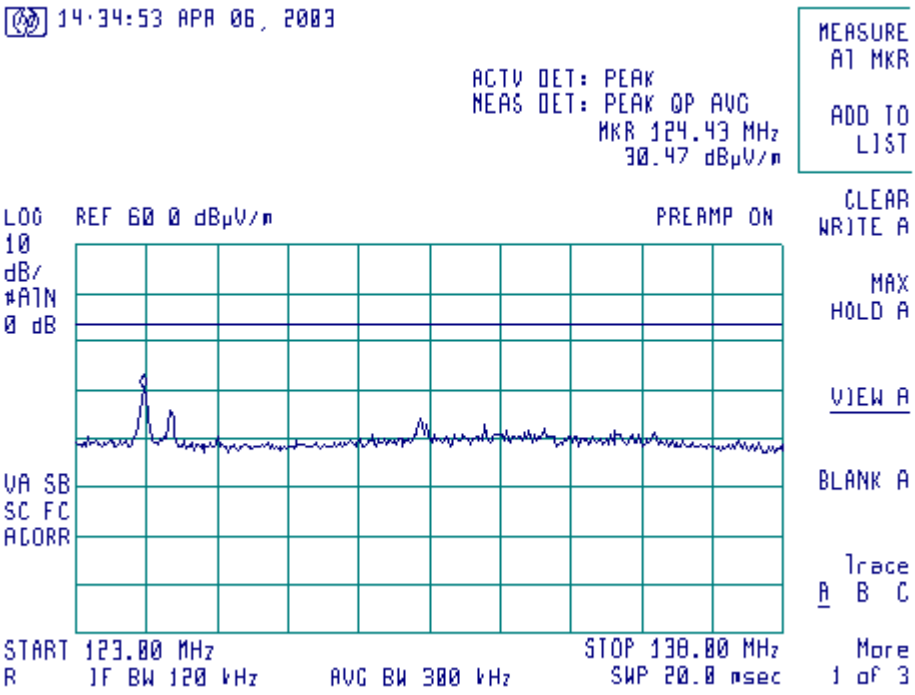
**Plot A 19**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5740 MHz**



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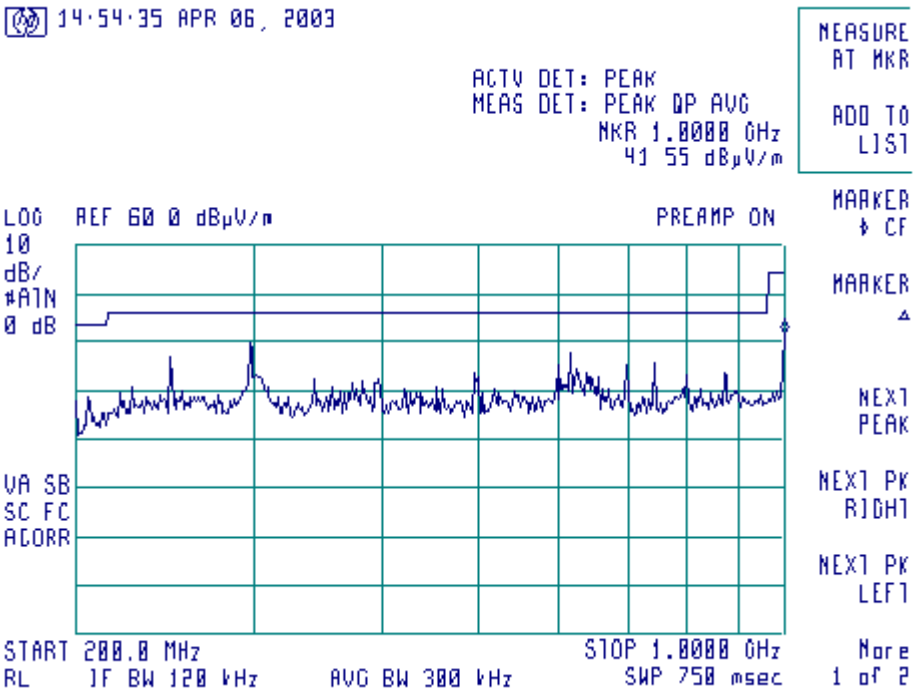
**Plot A 20**

**Radiated spurious emission measurements in the anechoic chamber from 200 to 1000 MHz, carrier frequency 5740 MHz**




| Frequency, MHz | Peak measurement, dB(uV/m) | QP measurement, dB(uV/m) | Limit, dB(uV/m) | Margin, dB |
|---|---|---|---|---|
| 124.4 | 30.47 | 29.74 | 43.50 | 13.76 |
| 249.0 | 32.79 | 23.68 | 46.00 | 22.32 |
| 400.0 | 36.51 | 34.63 | 46.00 | 11.37 |
| 1000.0 | 47.34 | 44.57 | 54.00 | 9.43 |

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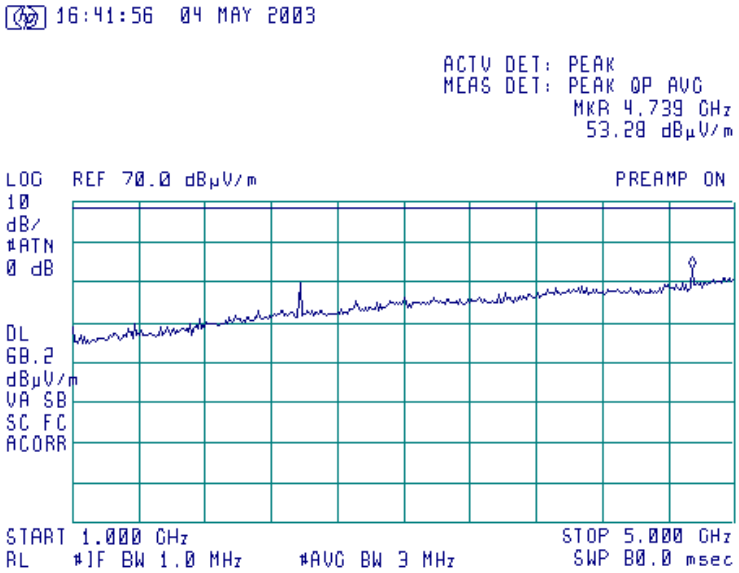
**Plot A 21**

**Radiated spurious emission measurements in the anechoic chamber from 1000 to 5000 MHz, carrier frequency 5740 MHz**



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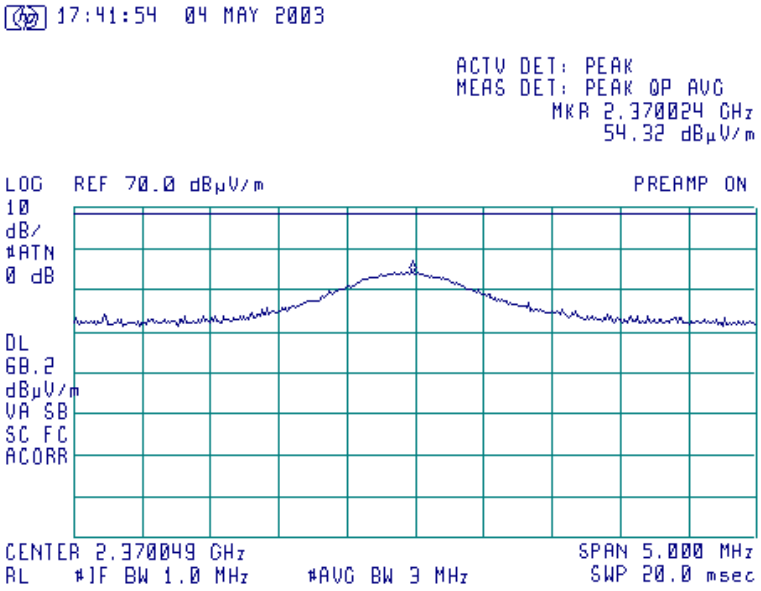
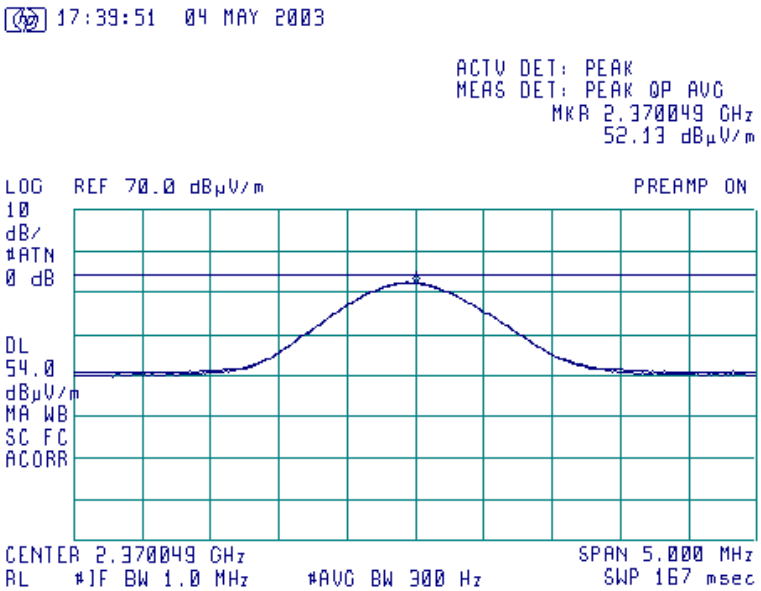
**Plot A 22**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5740 MHz**



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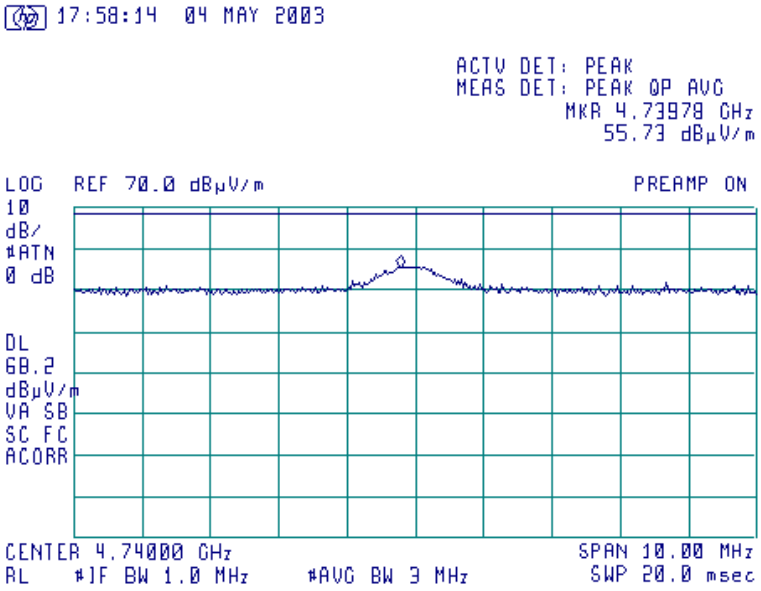
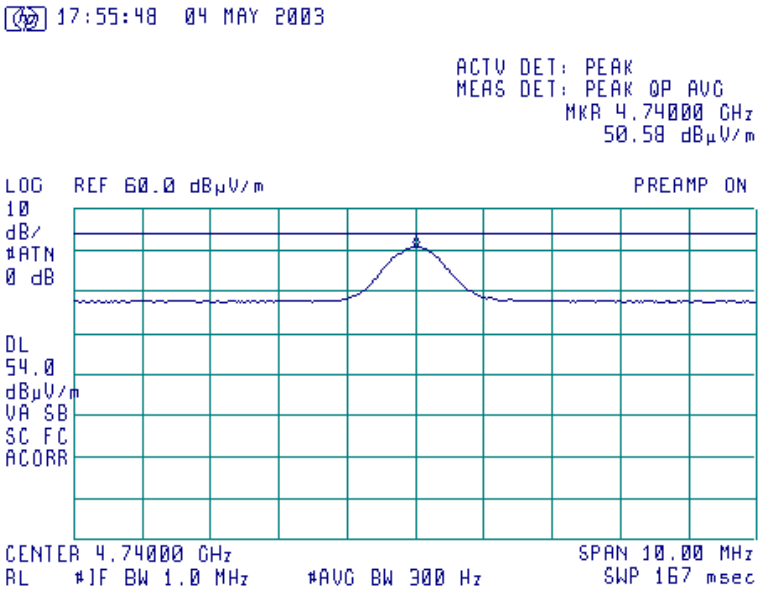
**Plot A 23**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5740 MHz**



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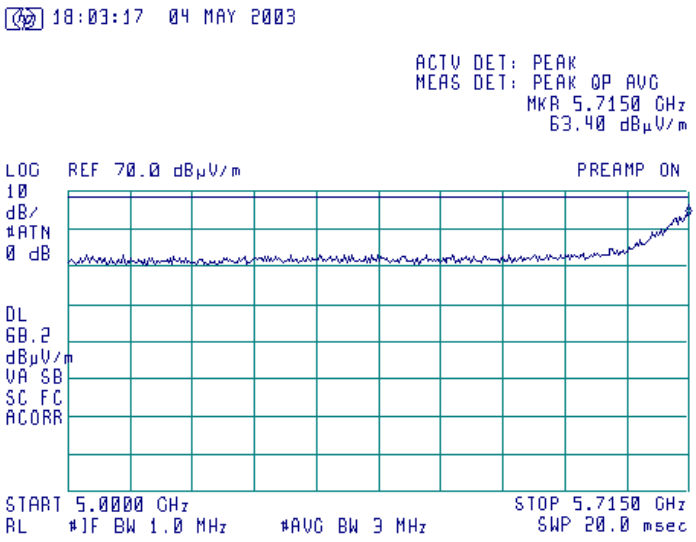
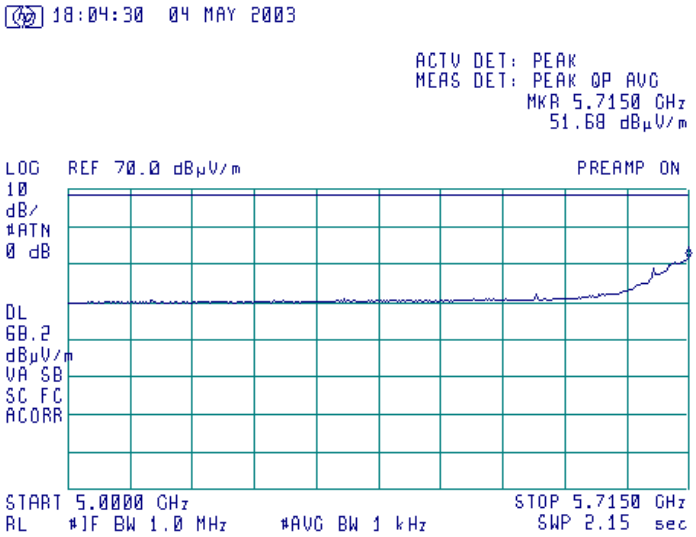
**Plot A 24**

**Radiated spurious emission measurements in the anechoic chamber from 5 GHz to 5.715 GHz, carrier frequency 5740 MHz**



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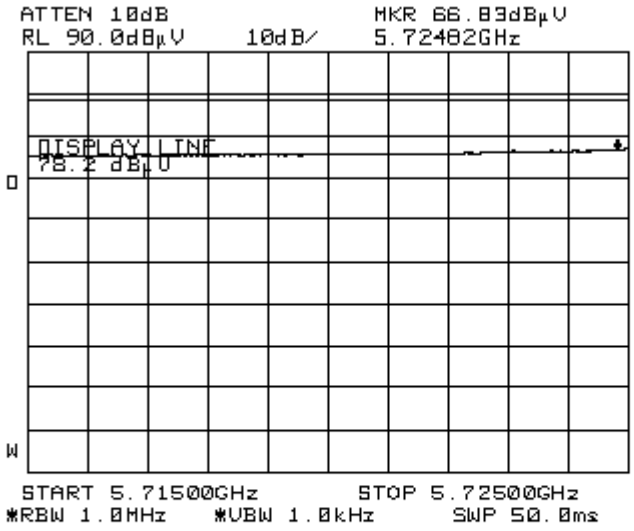
**Plot A 25**

**Radiated spurious emission measurements at the OATS from 5.715 to 5.725 GHz, carrier frequency 5740 MHz**



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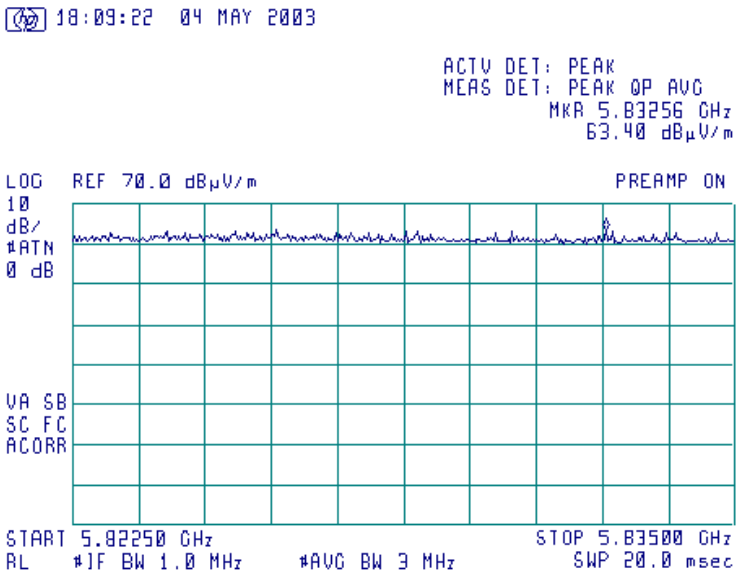
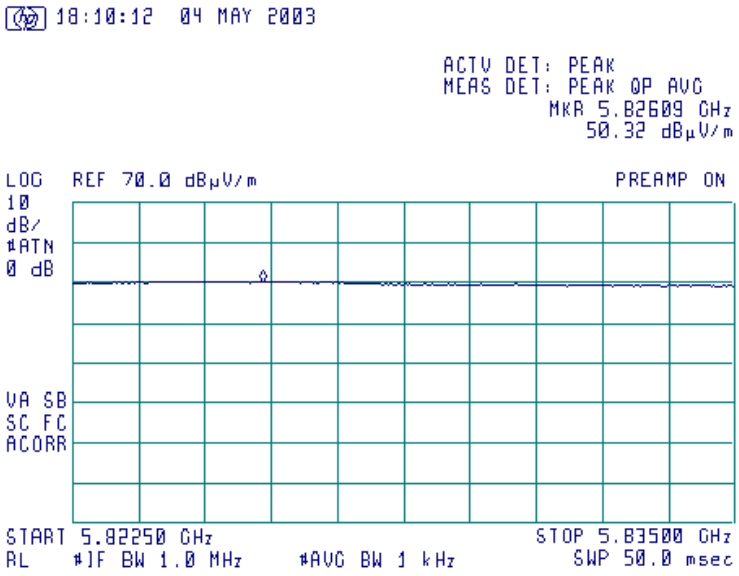
**Plot A 26**

**Radiated spurious emission measurements in the anechoic chamber from 5.825 to 5.835 GHz, carrier frequency 5740 MHz**



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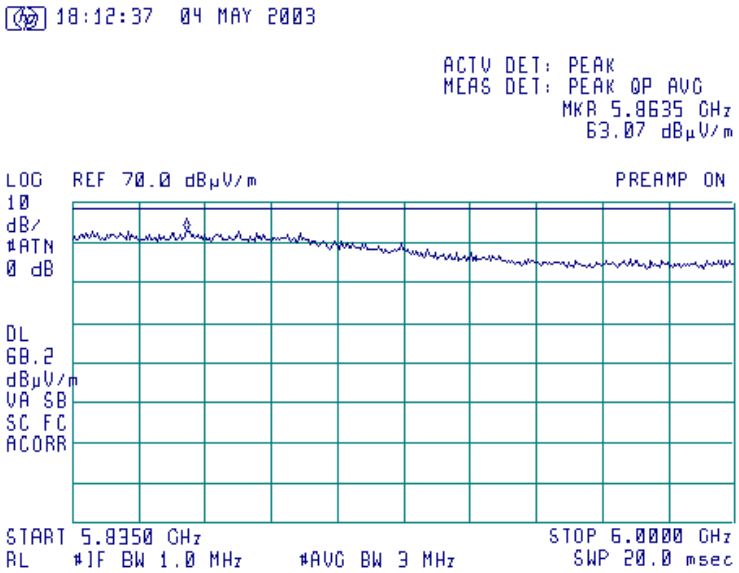
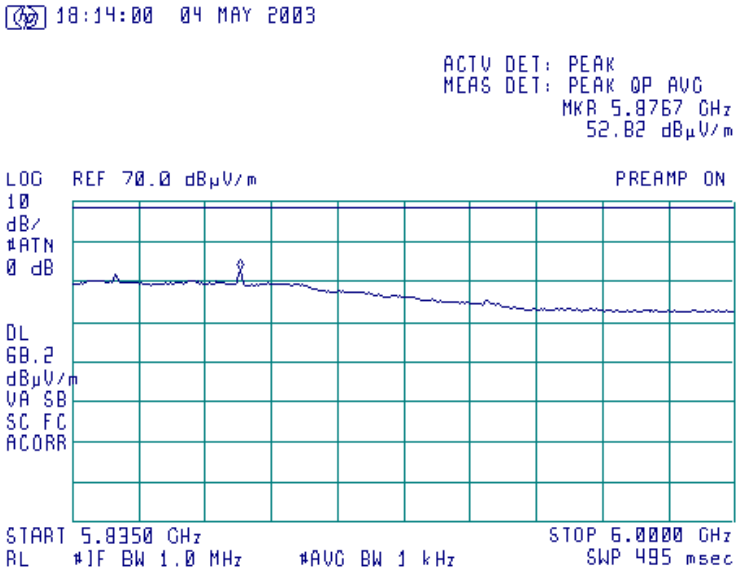
**Plot A 27**

**Radiated spurious emission measurements in the anechoic chamber from 5.835 to 6 GHz, carrier frequency 5740 MHz**



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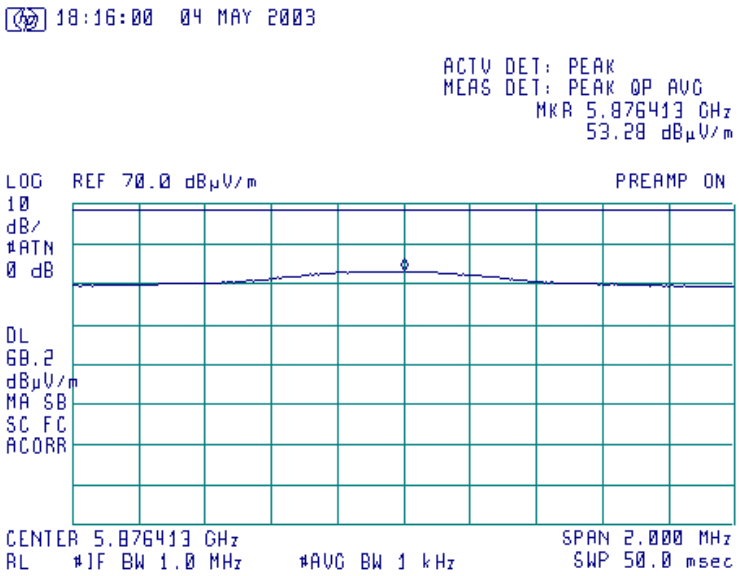
**Plot A 28**

**Radiated spurious emission measurements in the anechoic chamber, carrier frequency 5740 MHz**



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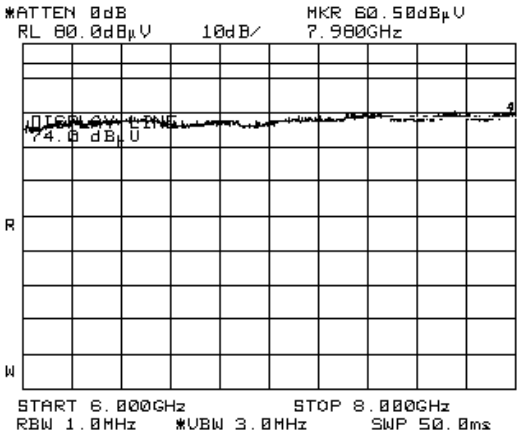
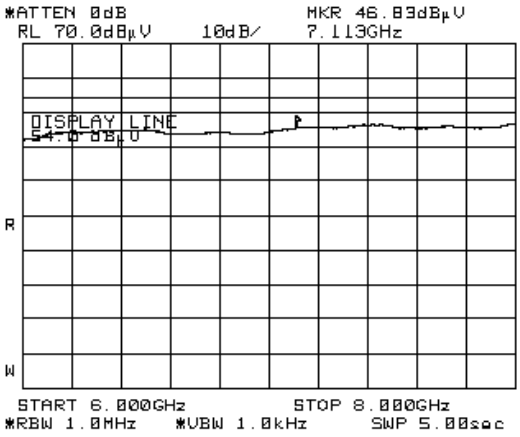
**Plot A 29**

**Radiated spurious emission measurements in the anechoic chamber from 6 GHz to 8 GHz, carrier frequency 5740 MHz**



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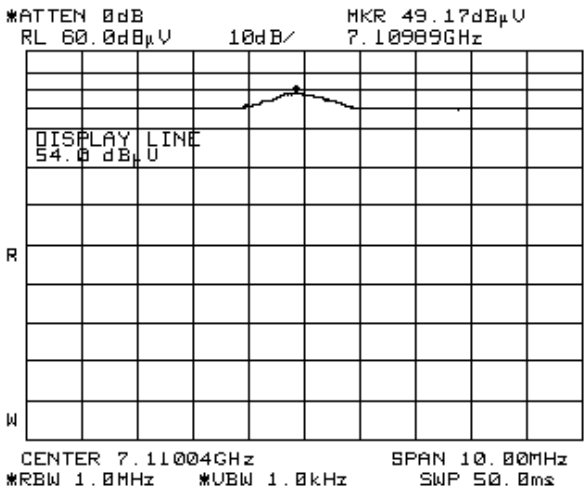
**Plot A 30**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5740 MHz**



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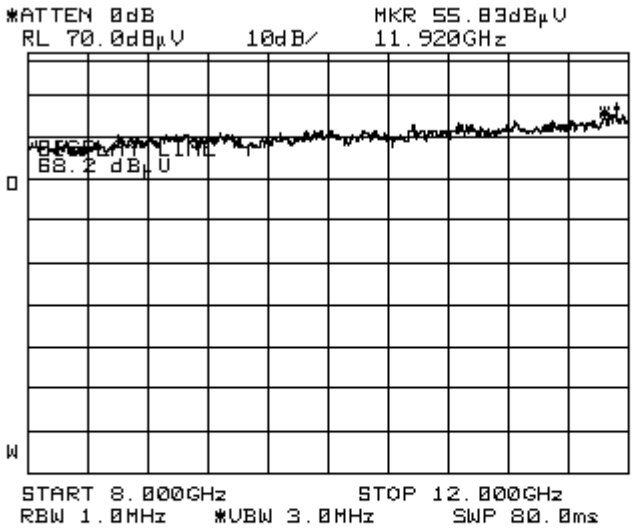
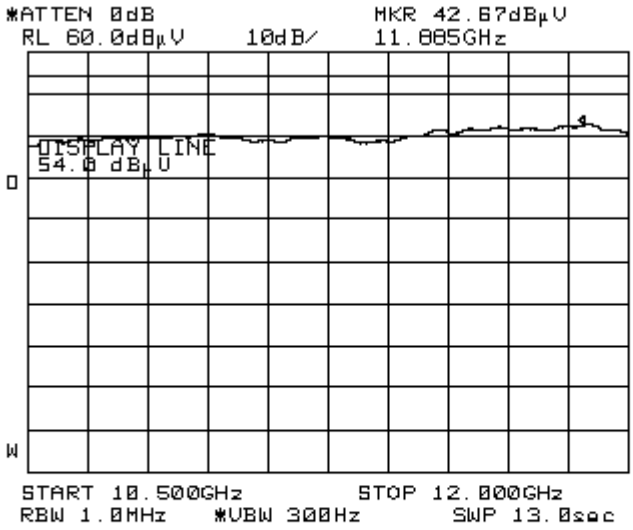
**Plot A 31**

**Radiated spurious emission measurements at the OATS,
carrier frequency 5740 MHz**



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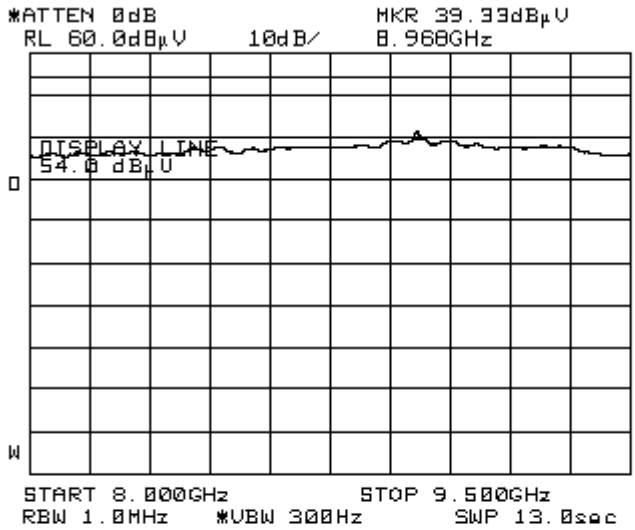
**Plot A 32**

**Radiated spurious emission measurements in restricted bands at the OATS, carrier frequency 5740 MHz**



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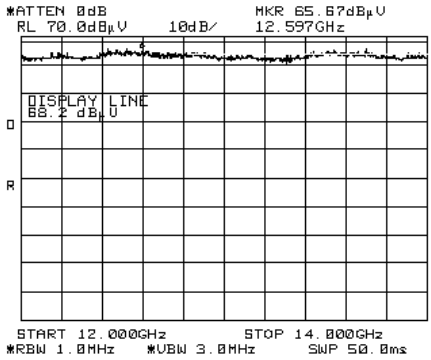
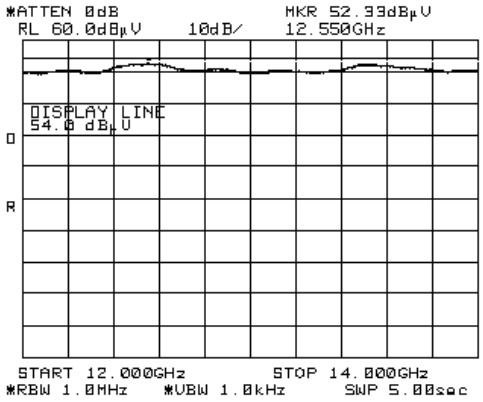
**Plot A 33**

**Radiated spurious emission measurements in the anechoic chamber from 12 to 14 GHz, carrier frequency 5740 MHz**



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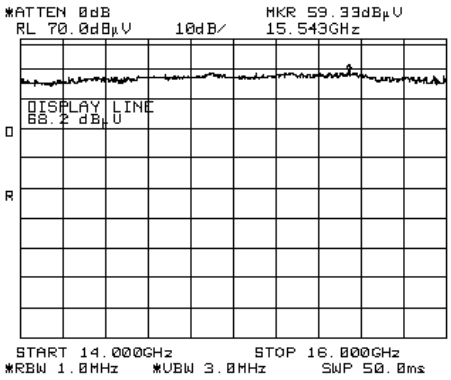
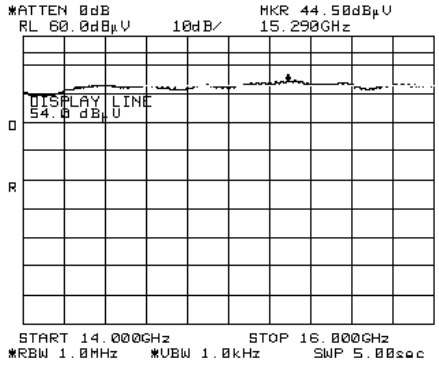
**Plot A 34**

**Radiated spurious emission measurements in the anechoic chamber from 14 to 16 GHz, carrier frequency 5740 MHz**



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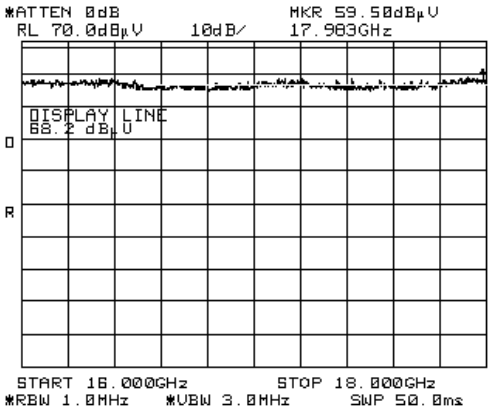
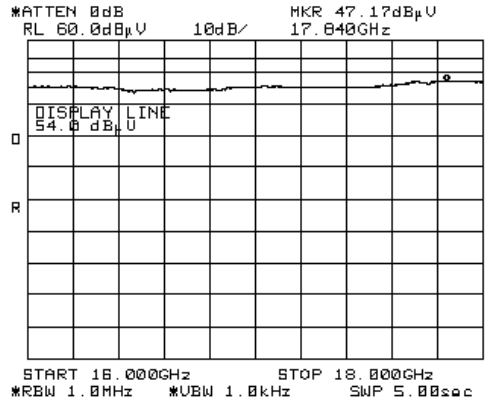
**Plot A 35**

**Radiated spurious emission measurements in the anechoic chamber from 16 to 18 GHz, carrier frequency 5740 MHz**



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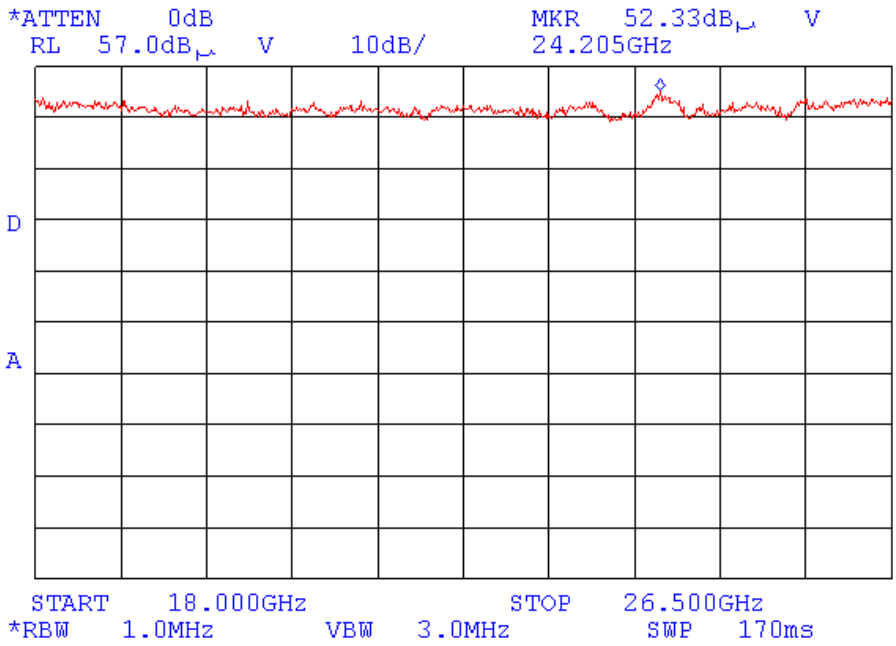
**Plot A 36**

**Radiated spurious emission measurements at the OATS from 18 to 26.5 GHz, carrier frequency 5740 MHz**




No spurious emissions were found.
Limit: 54 dB(µV/m)
Noise floor peak value: 52.33 dBµV + 32 dB(1/m) + 3.6 dB – 42.4 dB = 45.53 dB(µV/m), where
Antenna factor = 32 dB(1/m)
Max cable loss = 3.6 dB
Min LNA (low noise amplifier) gain = 42.4 dB

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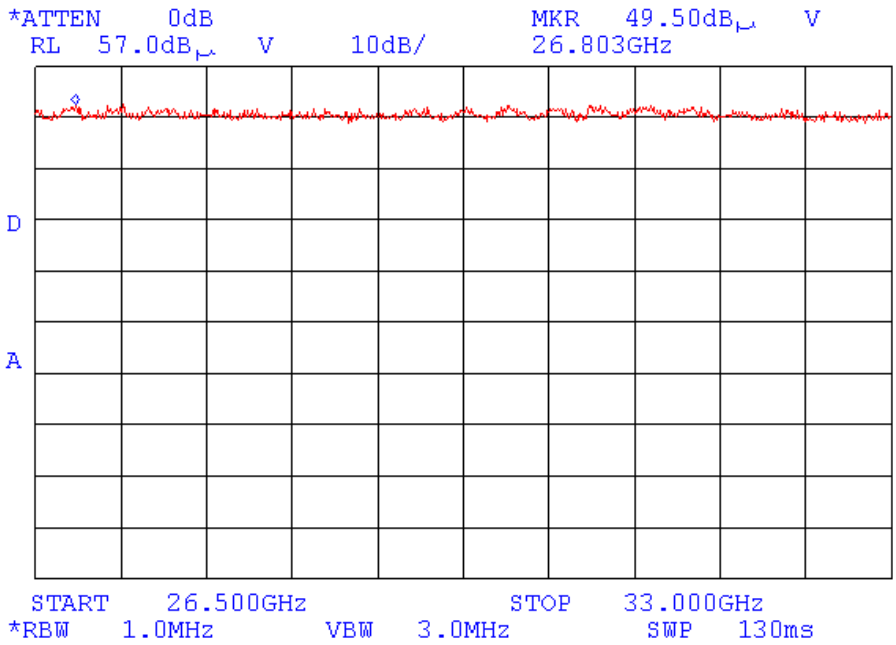
**Plot A 37**

**Radiated spurious emission measurements at the OATS from 26.5 to 33 GHz, carrier frequency 5740 MHz**




No spurious emissions were found
Limit: 54 dB(µV/m)
Noise floor peak value: 49.5 dBµV + 35.5 dB(1/m) + 3.7 dB – 40.7 dB = 48.0 dB(µV/m), where

Antenna factor = 35.5 dB(1/m)
Max cable loss = 3.7 dB
Min LNA (low noise amplifier) gain = 40.7 dB

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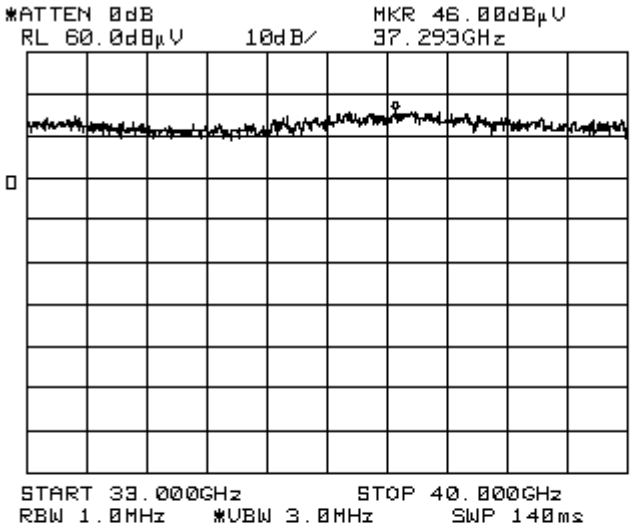
**Plot A 38**

**Radiated spurious emission measurements at the OATS from 33 to 40 GHz, carrier frequency 5740 MHz**




No spurious emissions were found
Limit for spurious in restricted bands: 54 dB(µV/m)
Noise floor peak value: 46.0 dBµV + 35.5 dB(1/m) + 5.2 dB – 35.6 dB = 51.1 dB(µV/m), where

Antenna factor = 35.5 dB(1/m)
Max cable loss = 5.2 dB
Min LNA (low noise amplifier) gain = 35.6 dB

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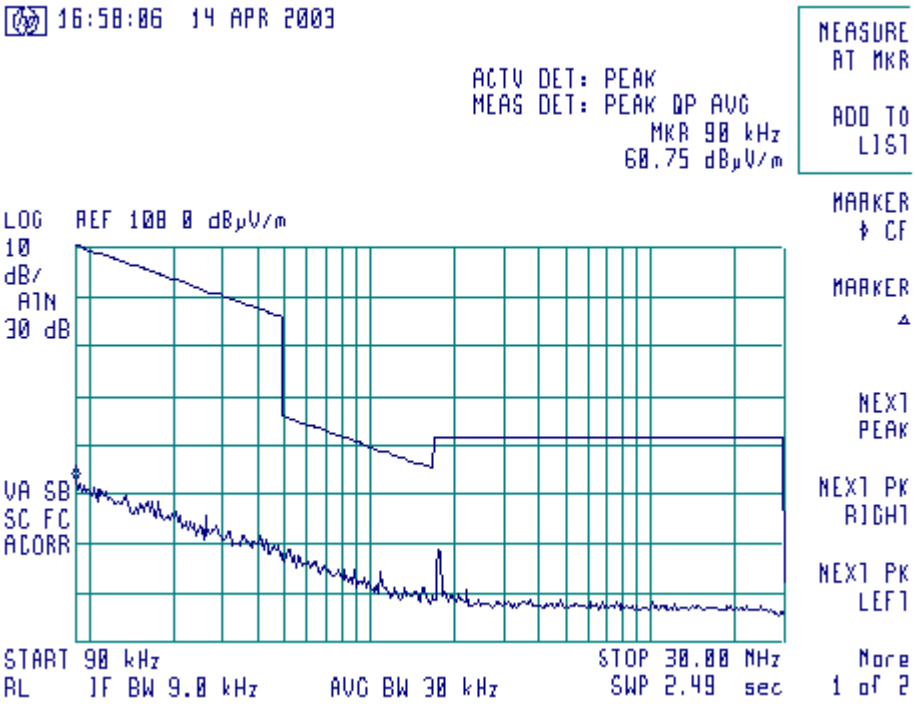
**Plot A 39**

**Radiated spurious emission measurements in the anechoic chamber from 9 kHz to 30 MHz, carrier frequency 5780 MHz**



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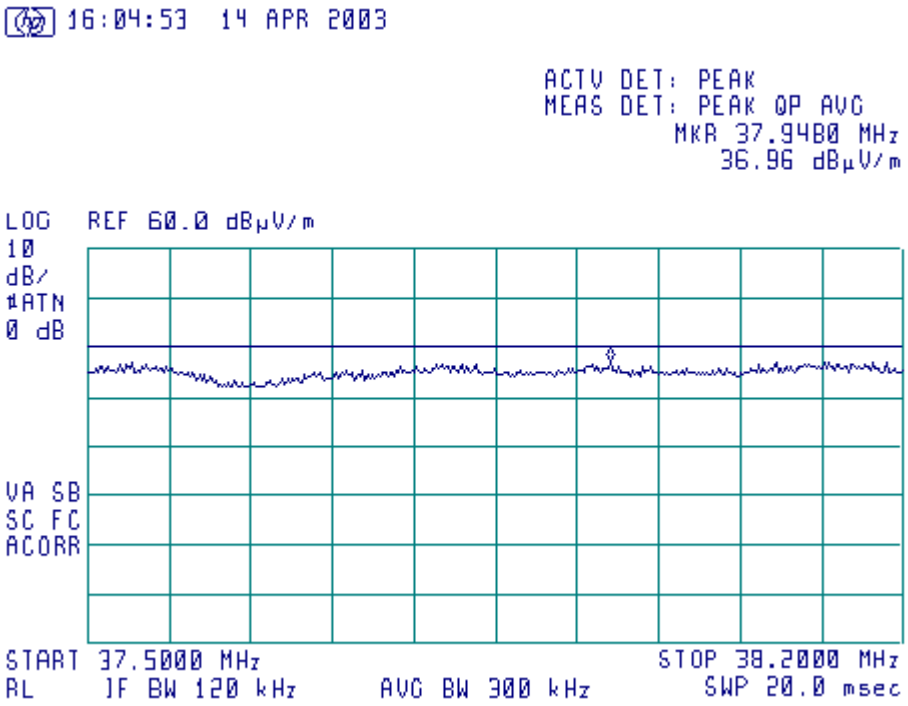
**Plot A 40**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5780 MHz**



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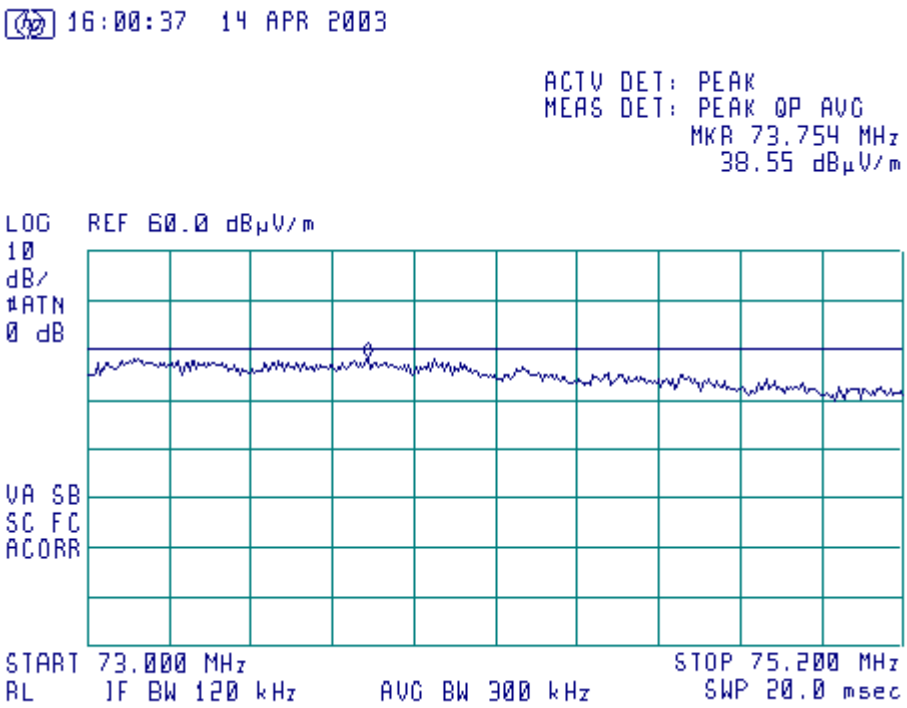
**Plot A 41**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5780 MHz**




| Frequency, MHz | Peak measurement, dB(uV/m) | QP measurement, dB(uV/m) | Limit, dB(uV/m) | Margin, dB |
|---|---|---|---|---|
| 73.737750 | 39.77 | 35.77 | 40.00 | 4.23 |

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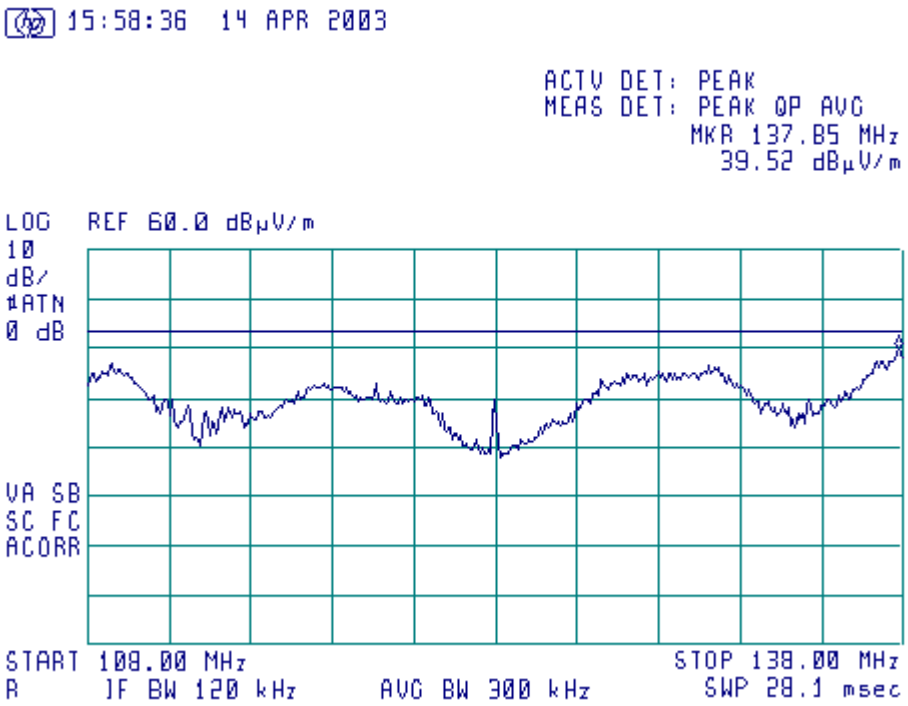
**Plot A 42**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5780 MHz**



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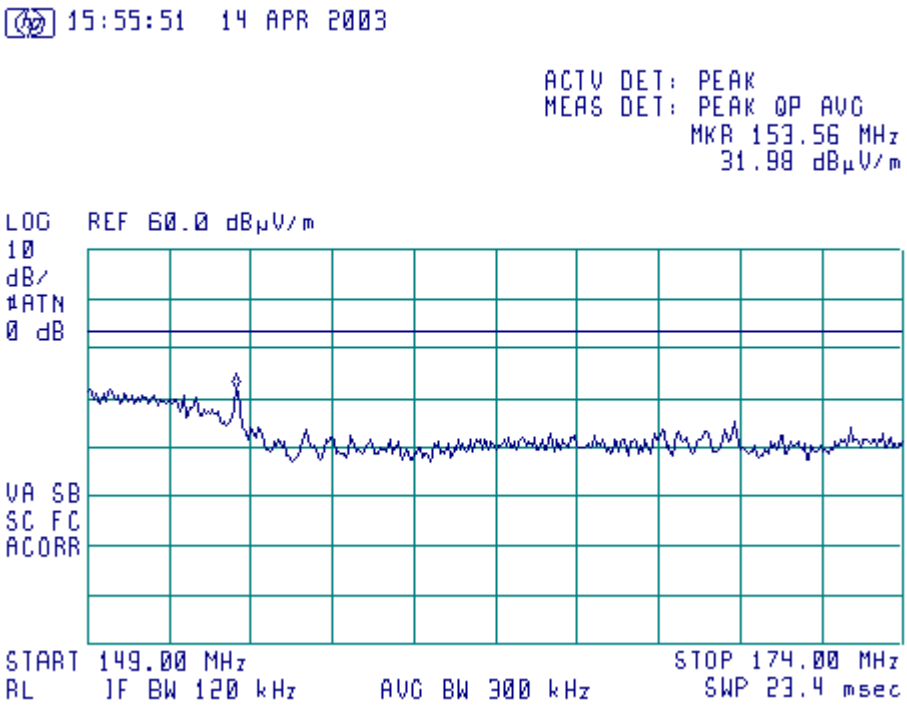
**Plot A 43**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5780 MHz**



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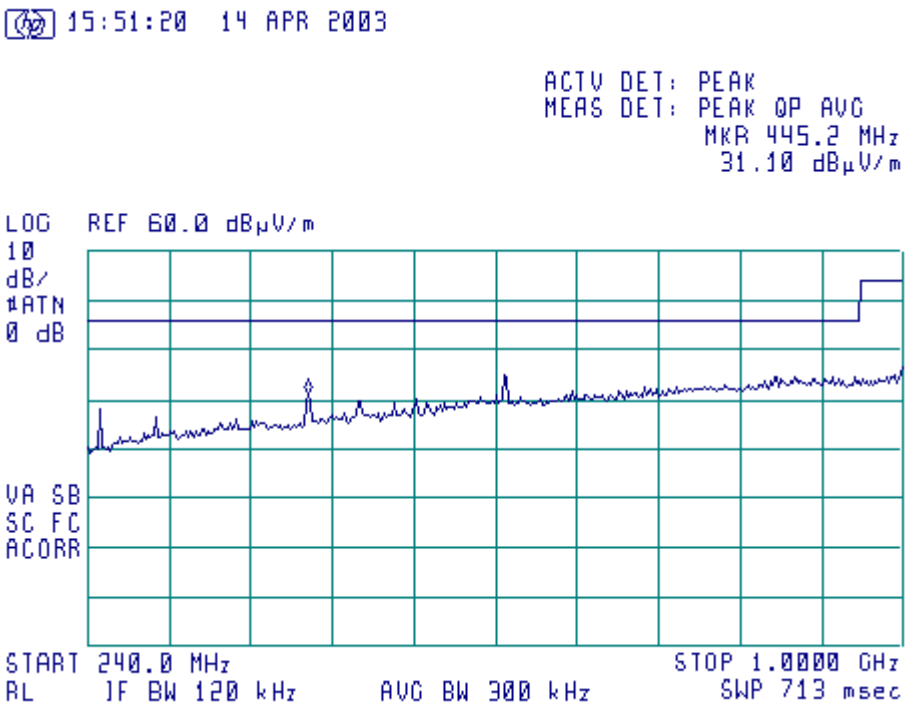
**Plot A 44**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5780 MHz**



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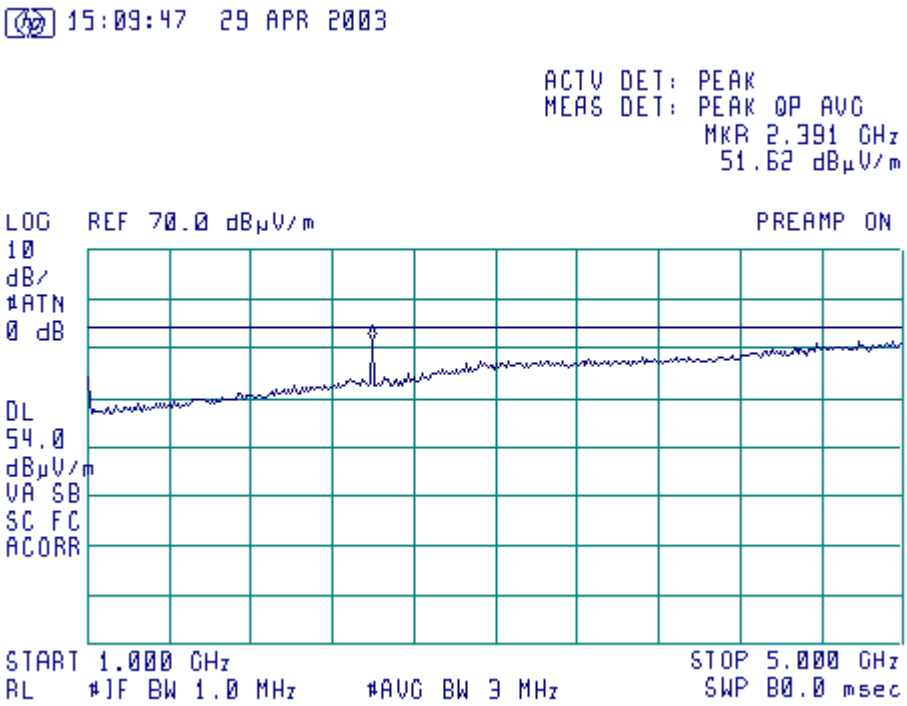
**Plot A 45**

**Radiated spurious emission measurements in the anechoic chamber from 1000 to 5000 MHz, carrier frequency 5780 MHz**



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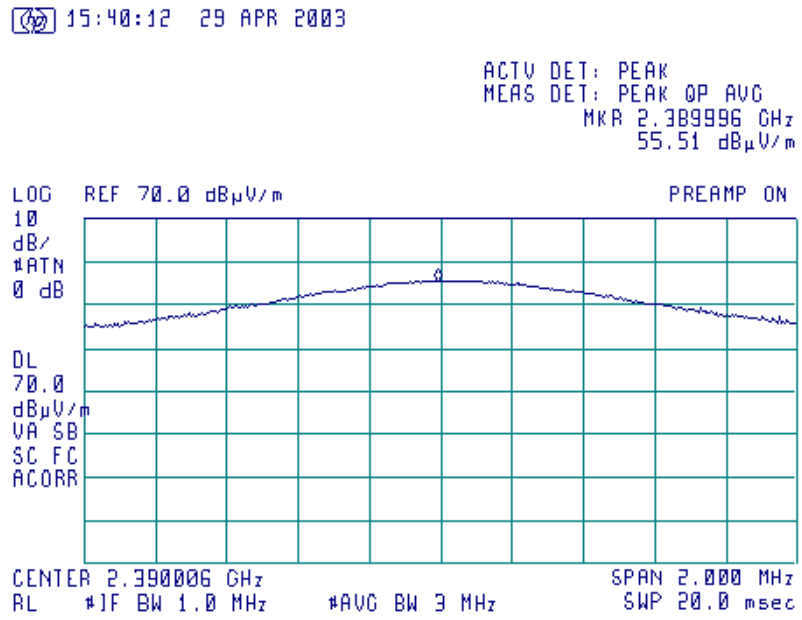
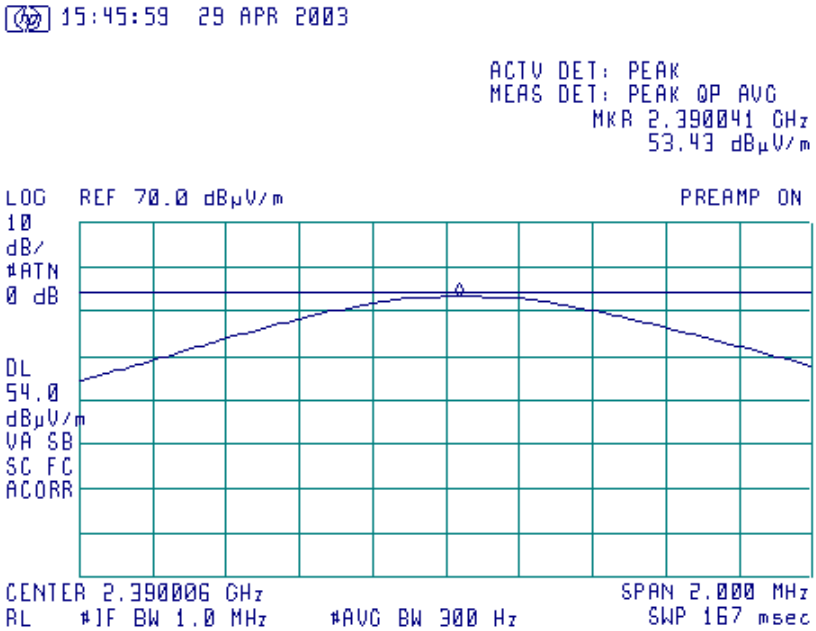
**Plot A 46**

**Radiated spurious emission measurements in the anechoic chamber, carrier frequency 5780 MHz**



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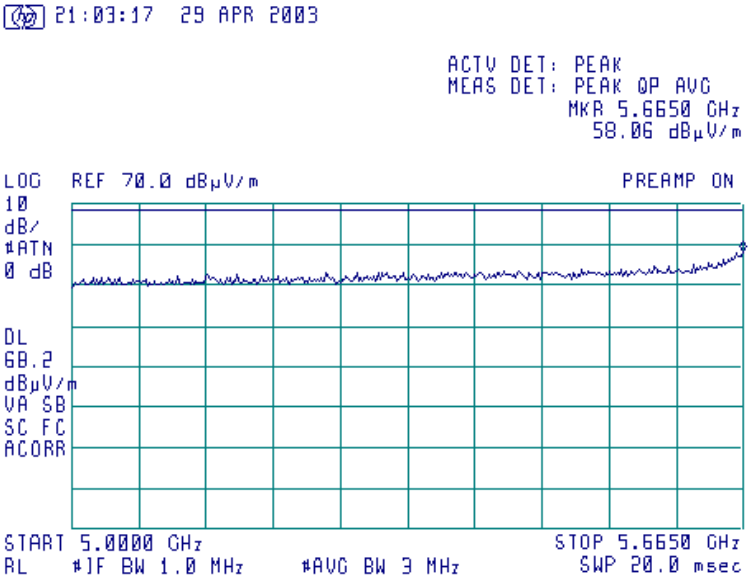
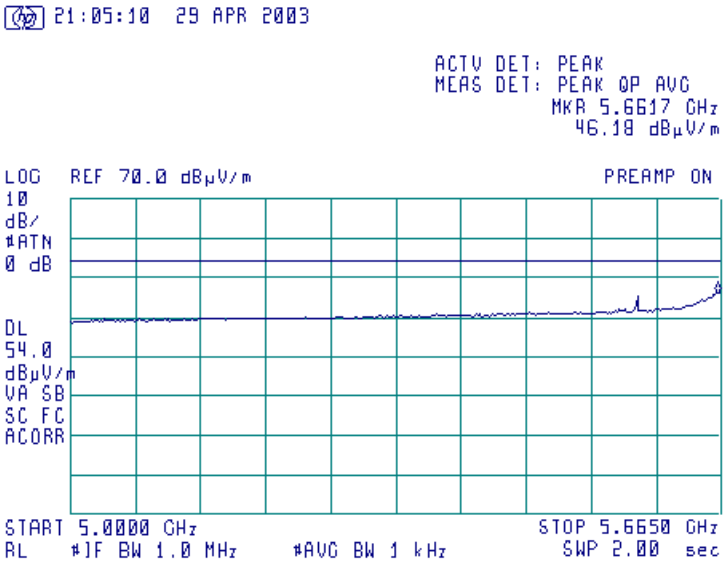
**Plot A 47**

**Radiated spurious emission measurements in the anechoic chamber from 5 to 5.665 GHz, carrier frequency 5780 MHz**



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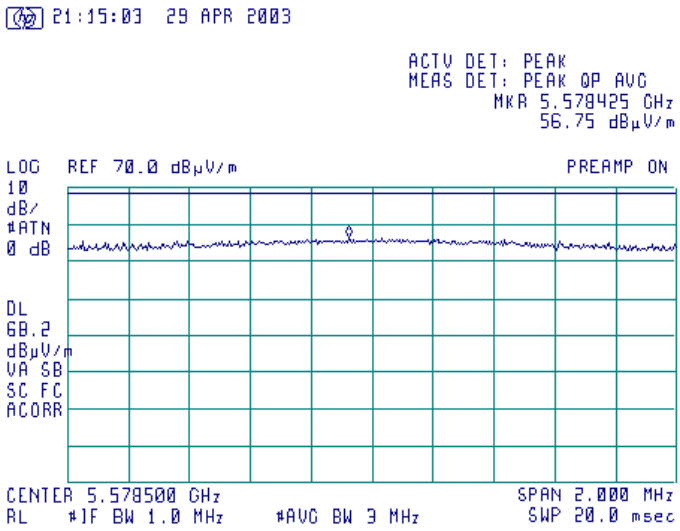
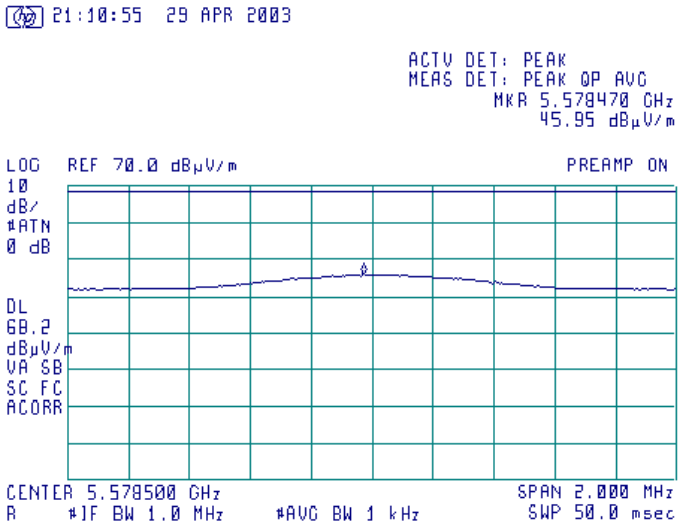
**Plot A 48**

**Radiated spurious emission measurements in the anechoic chamber, carrier frequency 5780 MHz**



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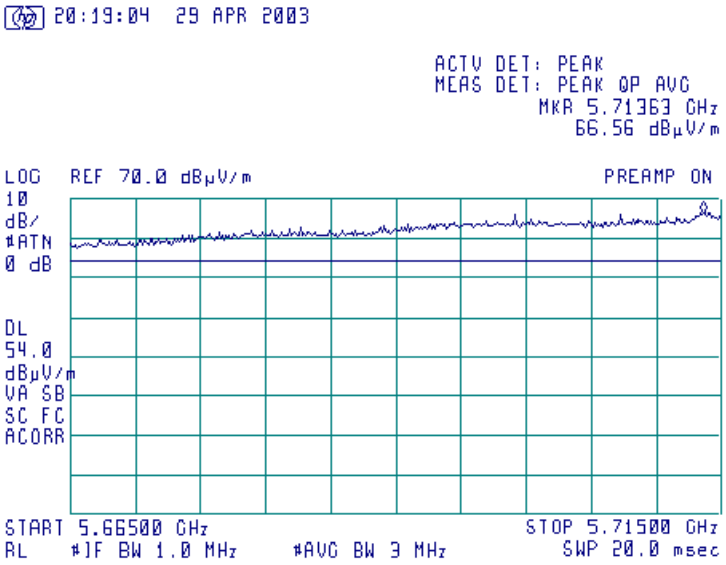
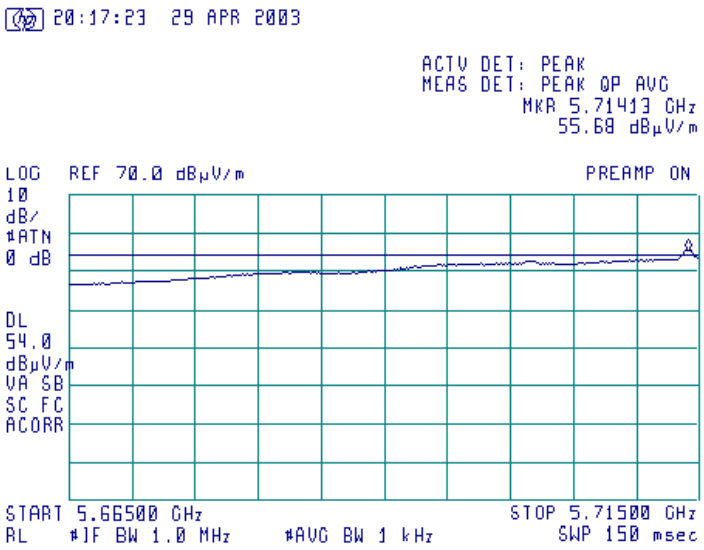
**Plot A 49**

**Radiated spurious emission measurements in the anechoic chamber from 5.665 to 5.715GHz, carrier frequency 5780 MHz**



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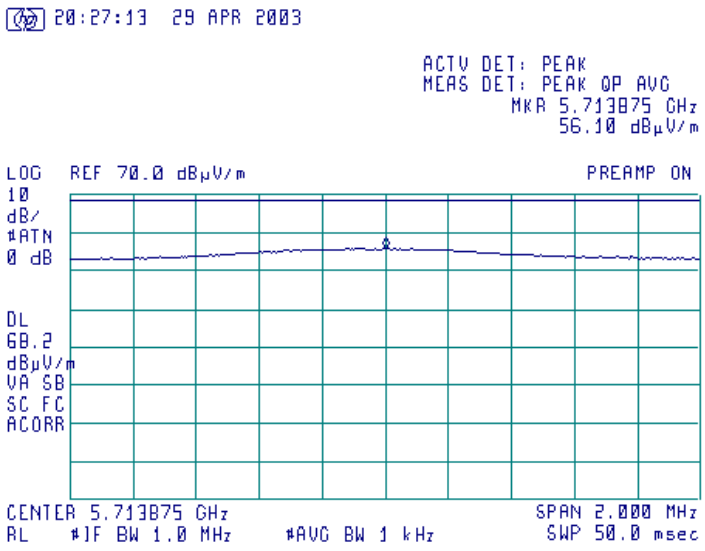
**Plot A 50**

**Radiated spurious emission measurements in the anechoic chamber, carrier frequency 5780 MHz**



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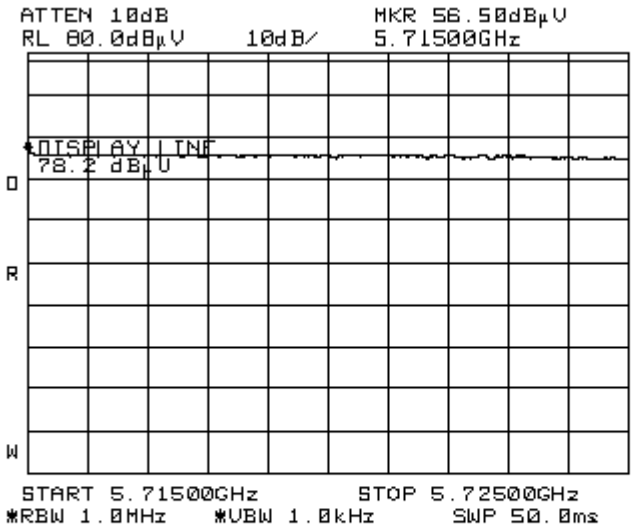
**Plot A 51**

**Radiated spurious emission measurements at the OATS,
carrier frequency 5780 MHz**




No spurious emissions were found.

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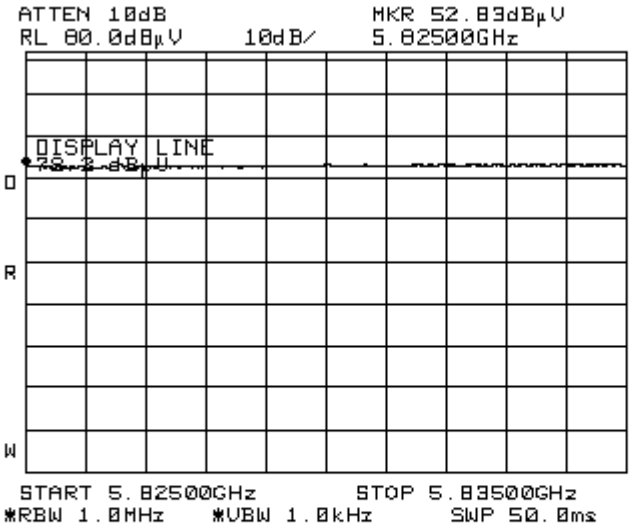
**Plot A 52**

**Radiated spurious emission measurements at the OATS,
carrier frequency 5780 MHz**




No spurious emissions were found.

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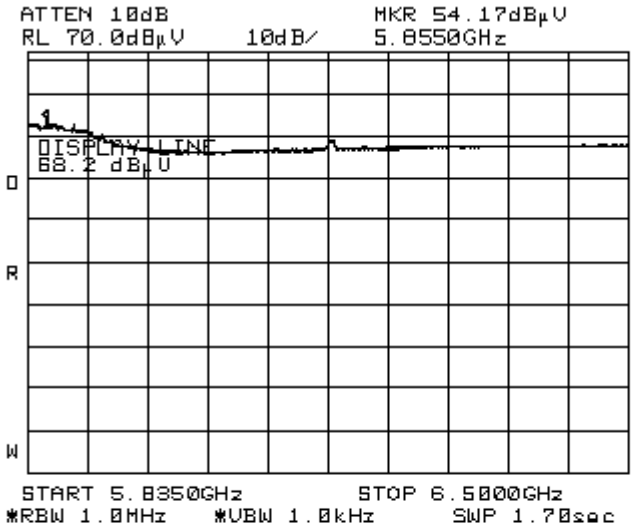
**Plot A 53**

**Radiated spurious emission measurements at the OATS from 5.835 to 6.500 GHz, carrier frequency 5780 MHz**



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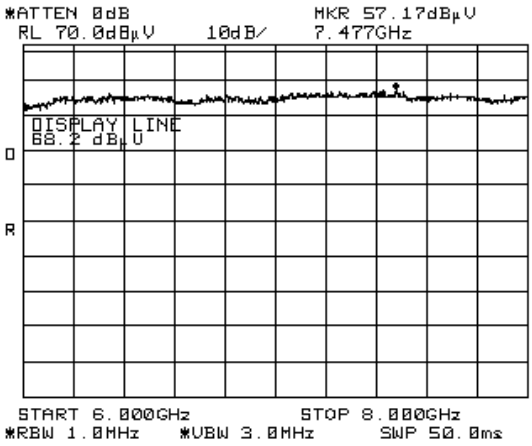
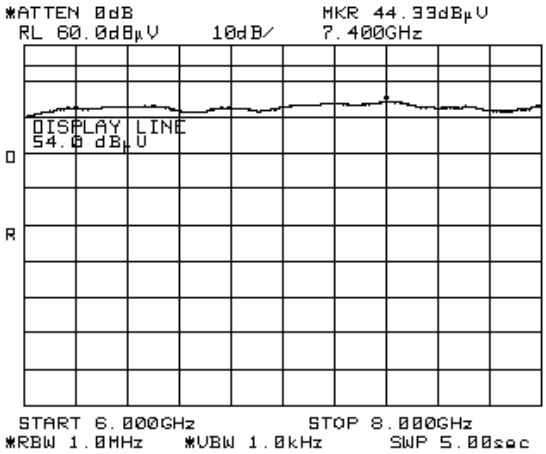
**Plot A 54**

**Radiated spurious emission measurements in the anechoic chamber from 6 to 8 GHz, carrier frequency 5780 MHz**



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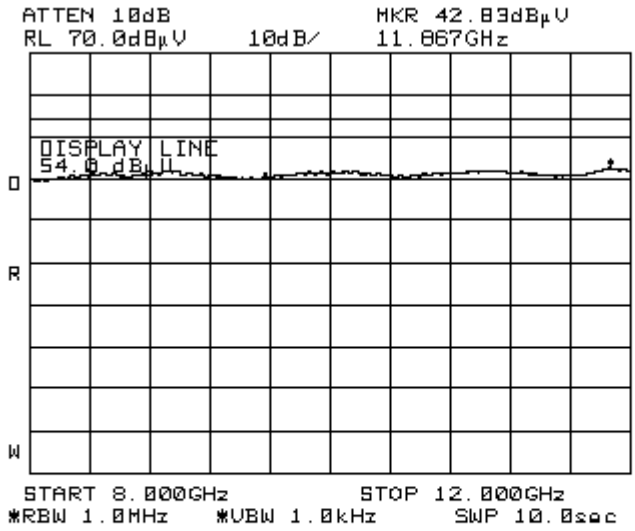
**Plot A 55**

**Radiated spurious emission measurements at the OATS from 8 to 12 GHz, carrier frequency 5780 MHz**



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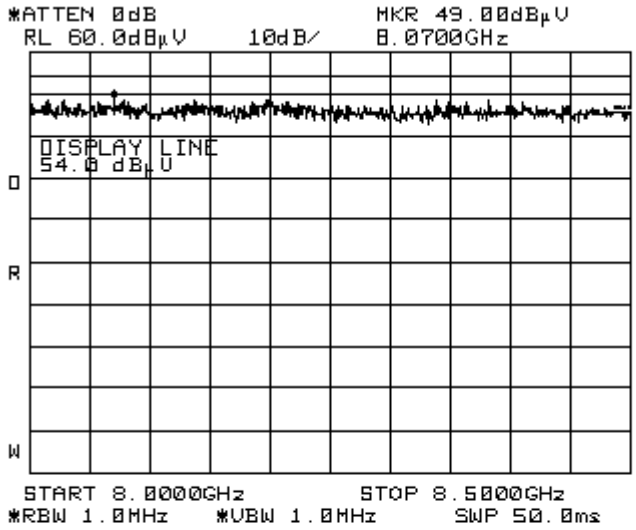
**Plot A 56**

**Radiated spurious emission measurements at the OATS from 8 to 8.500 GHz, carrier frequency 5780 MHz**



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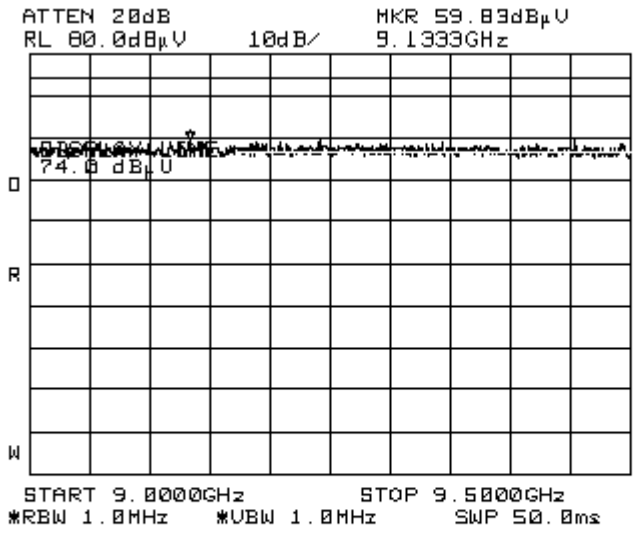
**Plot A 57**

**Radiated spurious emission measurements at the OATS from 9 to 9.500 GHz, carrier frequency 5780 MHz**



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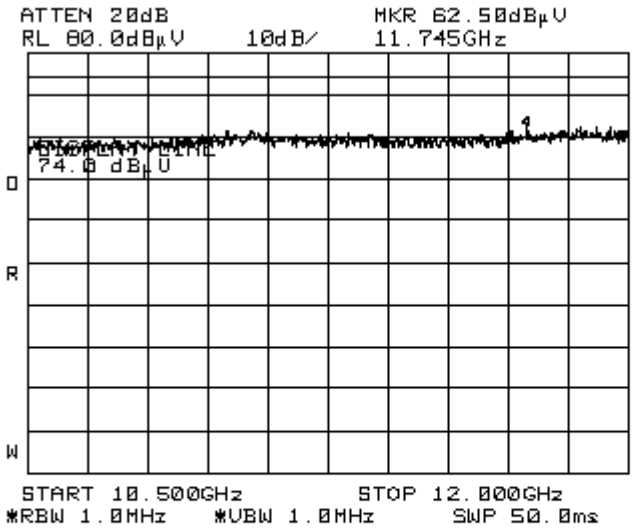
**Plot A 58**

**Radiated spurious emission measurements at the OATS from 10.5 to 12 GHz, carrier frequency 5780 MHz**



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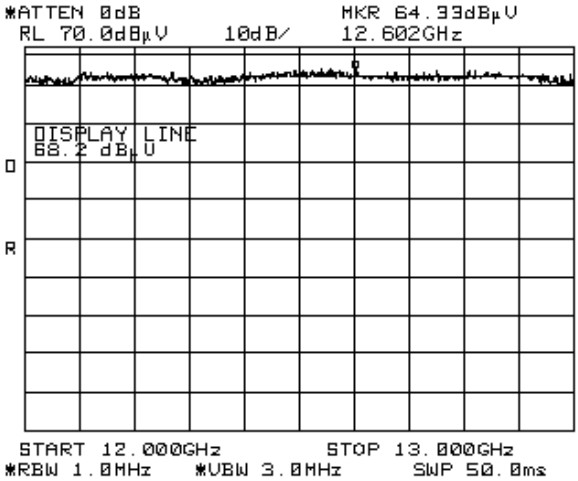
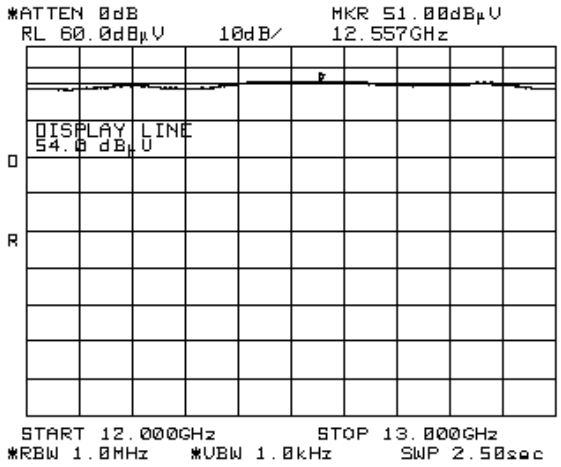
**Plot A 59**

**Radiated spurious emission measurements in the anechoic chamber from 12 to 13 GHz, carrier frequency 5780 MHz**



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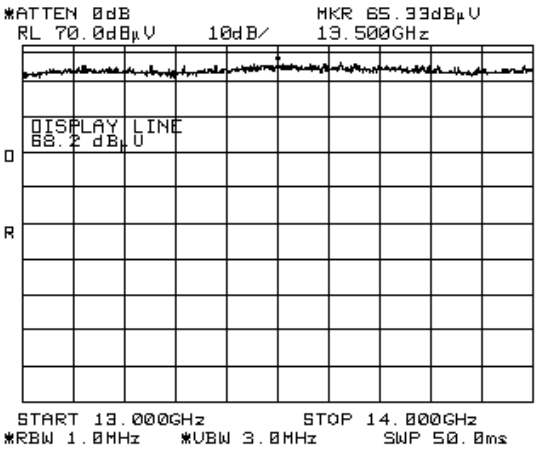
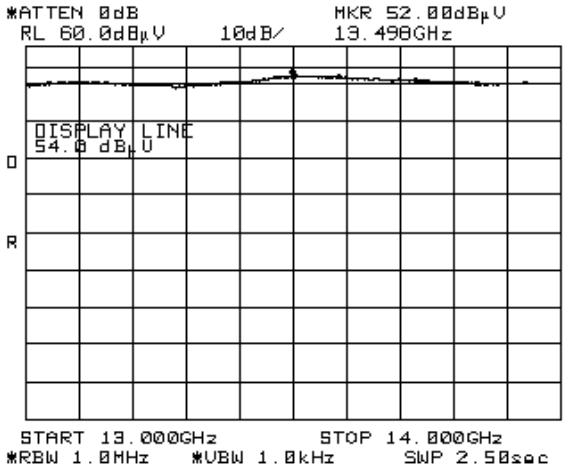
**Plot A 60**

**Radiated spurious emission measurements in the anechoic chamber from 13 to 14 GHz, carrier frequency 5780 MHz**



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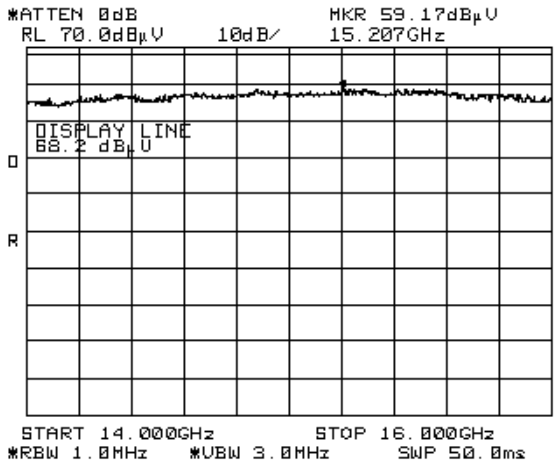
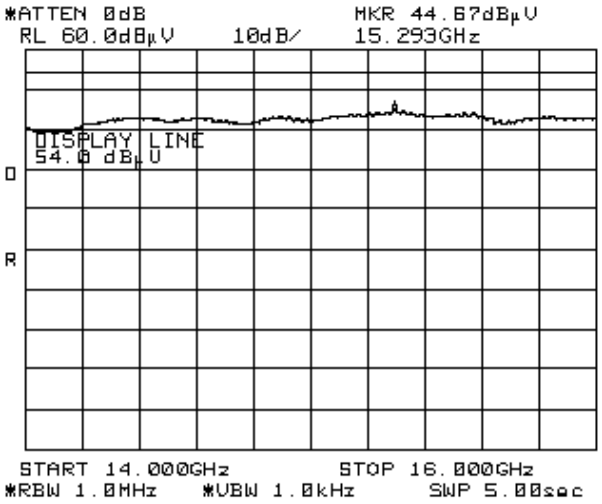
**Plot A 61**

**Radiated spurious emission measurements in the anechoic chamber from 14 to 16 GHz, carrier frequency 5780 MHz**



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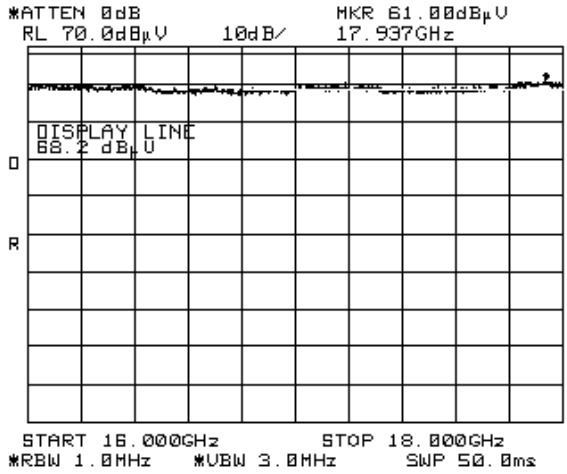
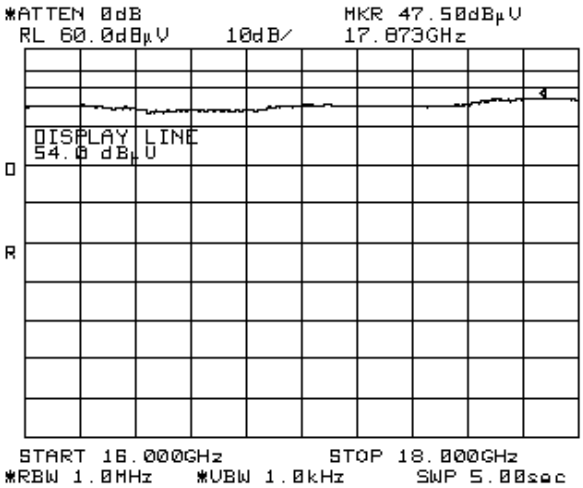
**Plot A 62**

**Radiated spurious emission measurements in the anechoic chamber from 16 to 18 GHz, carrier frequency 5780 MHz**



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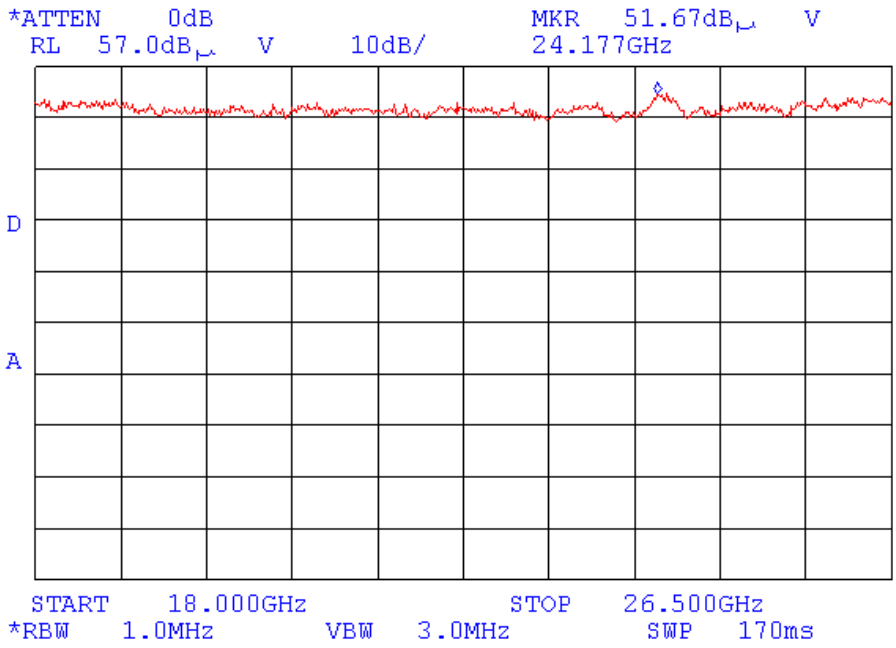
**Plot A 63**

**Radiated spurious emission measurements at the OATS from 18 to 26.5 GHz, carrier frequency 5780 MHz**




No spurious emissions were found
Limit: 54 dB(µV/m)
Noise floor peak value: 51.67 dBµV + 32 dB(1/m) + 3.6 dB – 42.4 dB = 44.87 dB(µV/m), where

Antenna factor = 32 dB(1/m)
Max cable loss = 3.6 dB
Min LNA (low noise amplifier) gain = 42.4 dB

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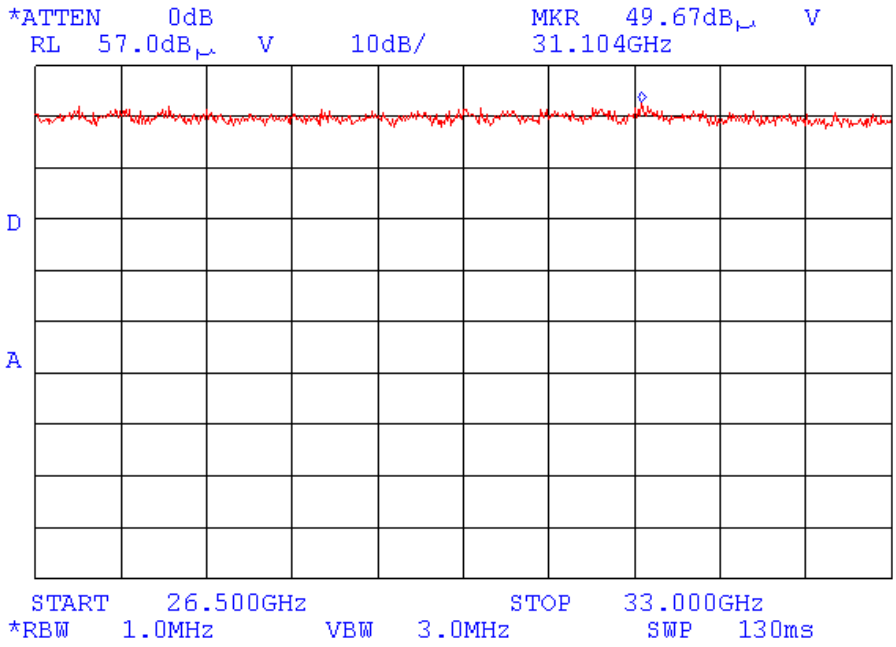
**Plot A 64**

**Radiated spurious emission measurements at the OATS from 26.5 to 33 GHz, carrier frequency 5780 MHz**




No spurious emissions were found
Limit: 54 dB(µV/m)
Noise floor peak value: 49.67 dBµV + 35.5 dB(1/m) + 3.7 dB – 40.7 dB = 48.17 dB(µV/m), where

Antenna factor = 35.5 dB(1/m)
Max cable loss = 3.7 dB
Min LNA (low noise amplifier) gain = 40.7 dB

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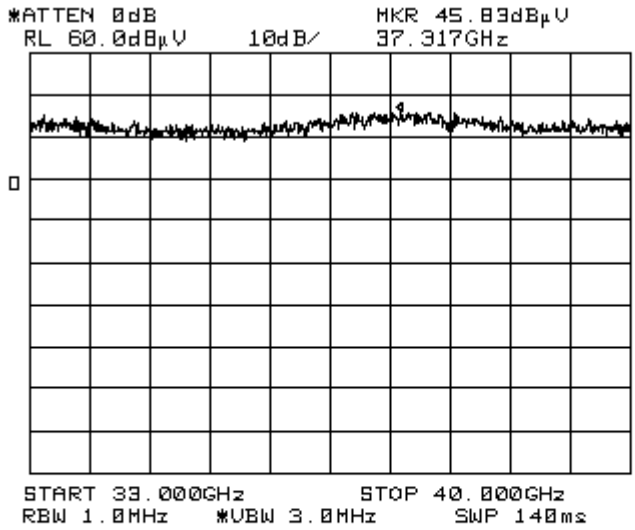
**Plot A 65**

**Radiated spurious emission measurements at the OATS from 33 to 40 GHz, carrier frequency 5780 MHz**




No spurious emissions were found
Limit for spurious in restricted bands: 54 dB(µV/m)
Noise floor peak value: 45.83 dBµV + 35.5 dB(1/m) + 5.2 dB – 35.6dB = 50.9 dB(µV/m), where

Antenna factor = 35.5 dB(1/m)
Max cable loss = 5.2 dB
Min LNA (low noise amplifier) gain = 35.6 dB

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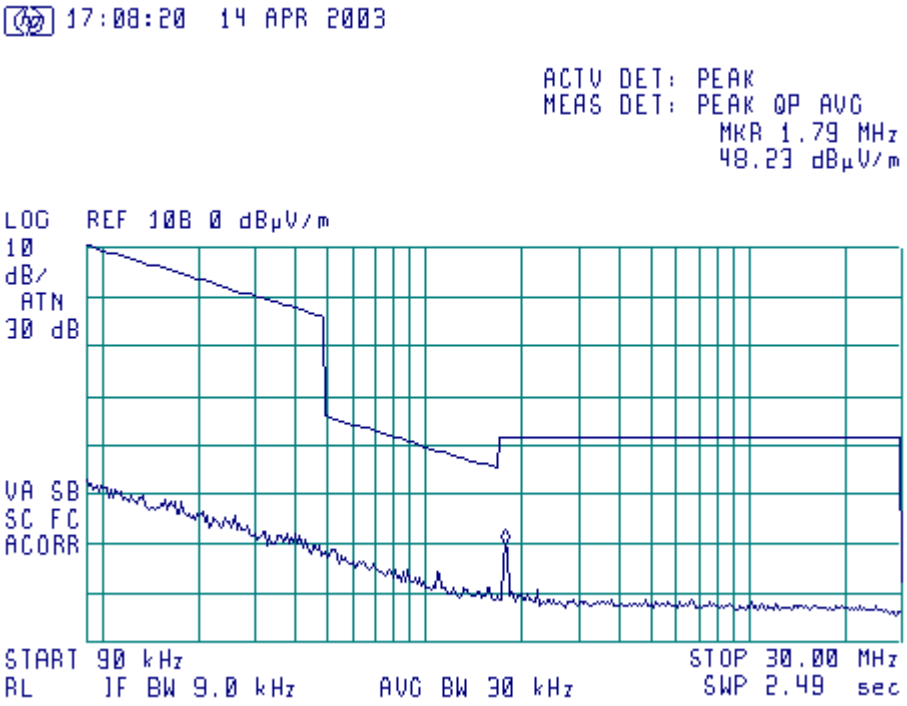
**Plot A 66**

**Radiated spurious emission measurements in the anechoic chamber from 9 kHz to 30 MHz, carrier frequency 5810 MHz**



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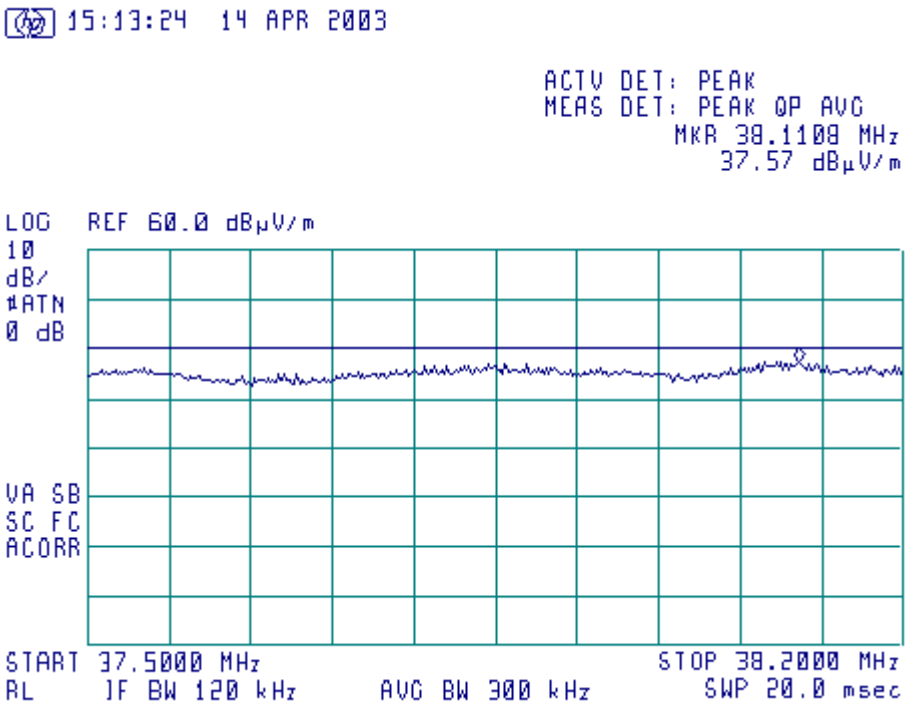
**Plot A 67**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5810 MHz**




| Frequency, MHz | Peak measurement, dB(uV/m) | QP measurement, dB(uV/m) | Limit, dB(uV/m) | Margin, dB |
|---|---|---|---|---|
| 37.82 | 36.3 | 31.9 | 40.00 | 8.1 |
| 38.11 | 37.6 | 32.5 | 40.00 | 7.5 |

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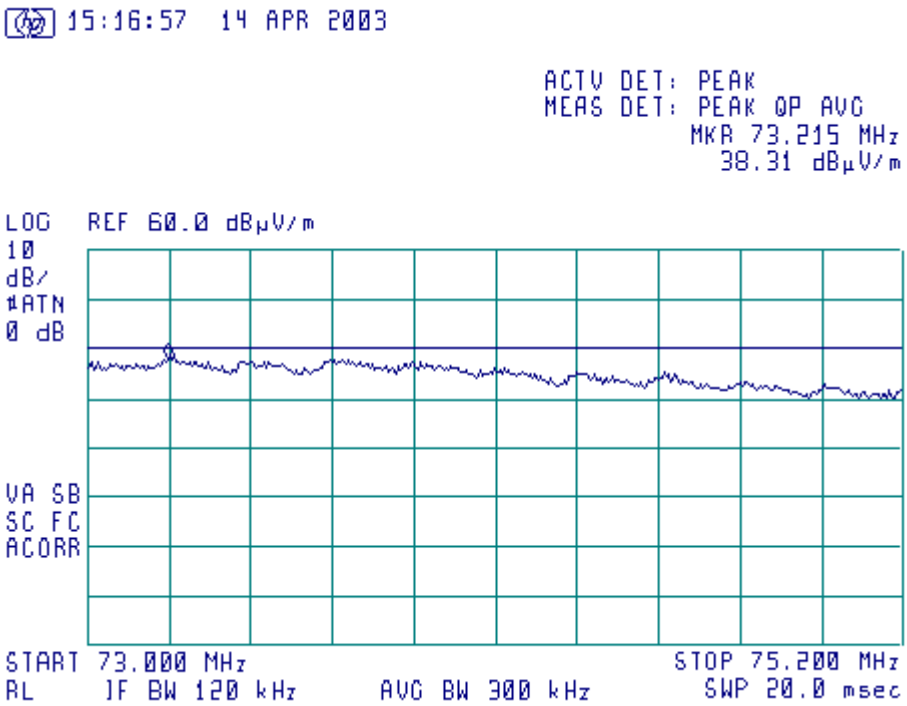
**Plot A 68**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5810 MHz**




| Frequency, MHz | Peak measurement, dB(uV/m) | QP measurement, dB(uV/m) | Limit, dB(uV/m) | Margin, dB |
|---|---|---|---|---|
| 73.25 | 39.0 | 35.1 | 40.00 | 4.9 |

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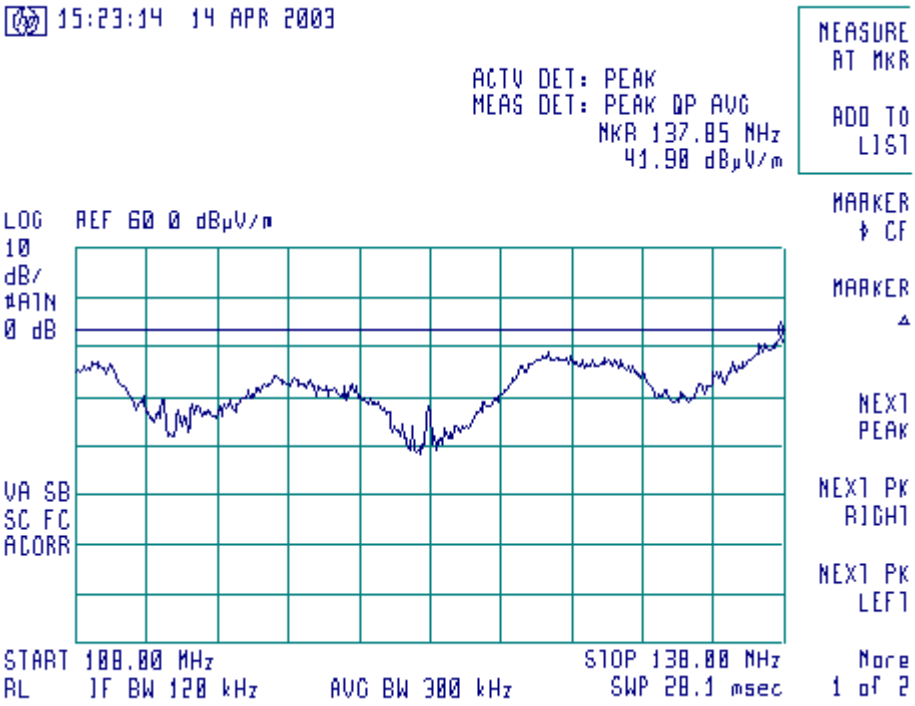
**Plot A 69**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5810 MHz**




| Frequency, MHz | Peak measurement, dB(uV/m) | QP measurement, dB(uV/m) | Limit, dB(uV/m) | Margin, dB |
|---|---|---|---|---|
| 127.89 | 38.12 | 34.60 | 43.50 | 8.90 |
| 131.05 | 34.69 | 31.72 | 43.50 | 11.78 |
| 137.75 | 41.07 | 37.78 | 43.50 | 5.72 |

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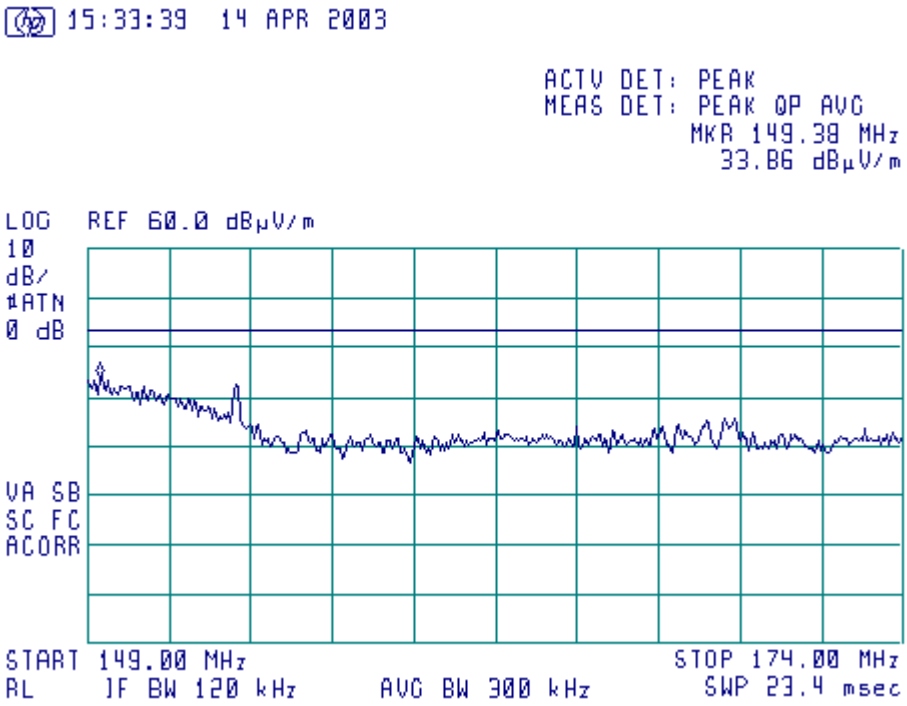
**Plot A 70**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5810 MHz**



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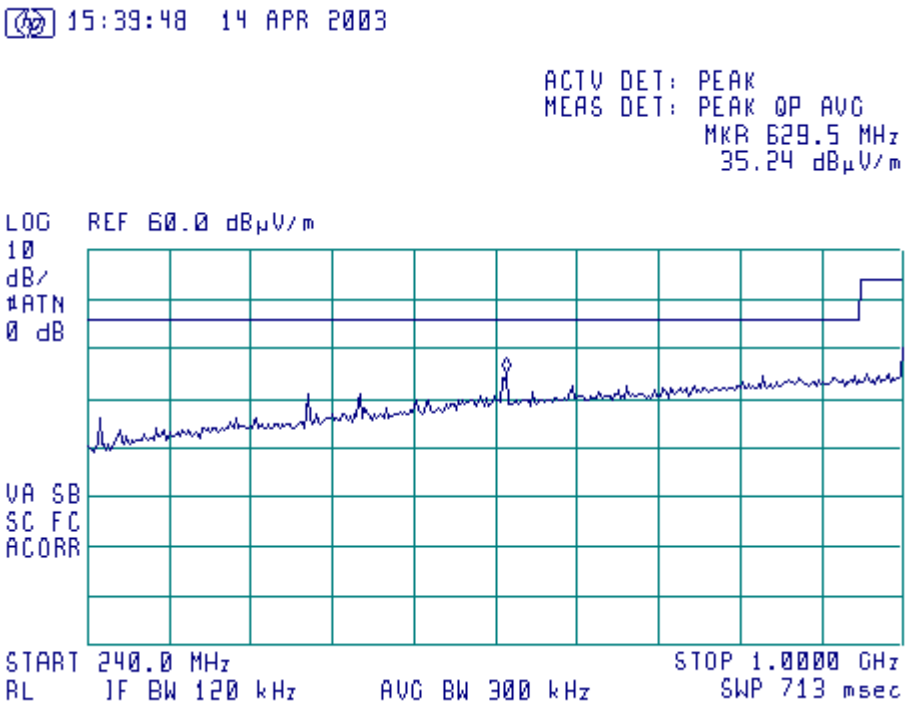
**Plot A 71**

**Radiated spurious emission measurements in the anechoic chamber from 240 to 1000 MHz, carrier frequency 5810 MHz**



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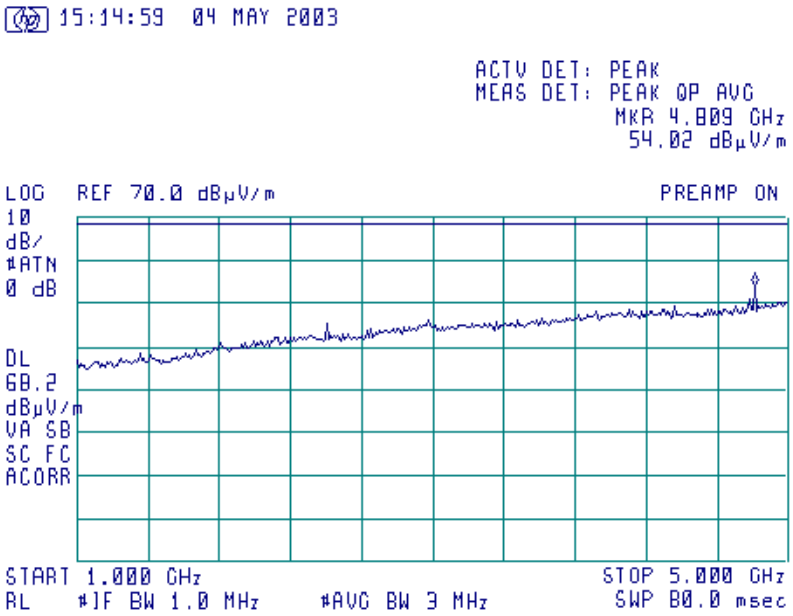
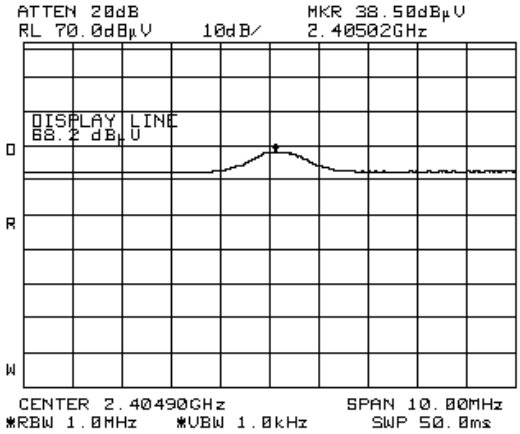
**Plot A 72**

**a)**
**Radiated spurious emission measurements in the anechoic chamber from 1000 to 5000 MHz, carrier frequency 5810 MHz**




**b)**
**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5810 MHz**



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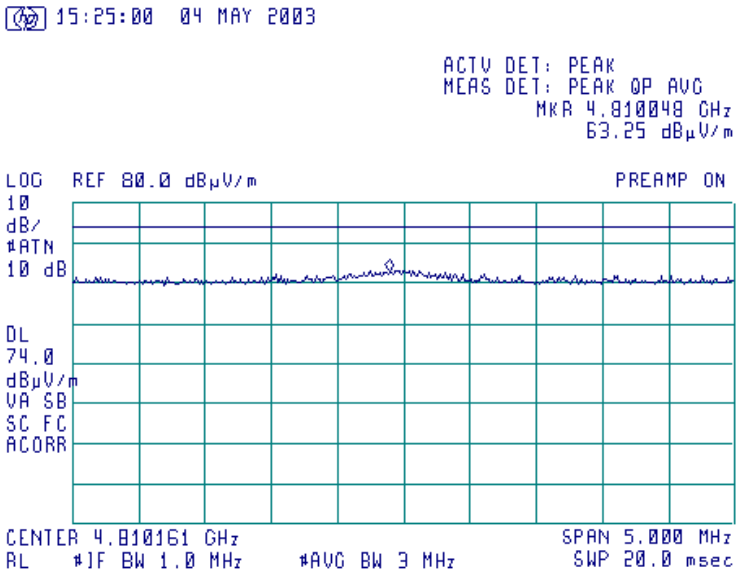
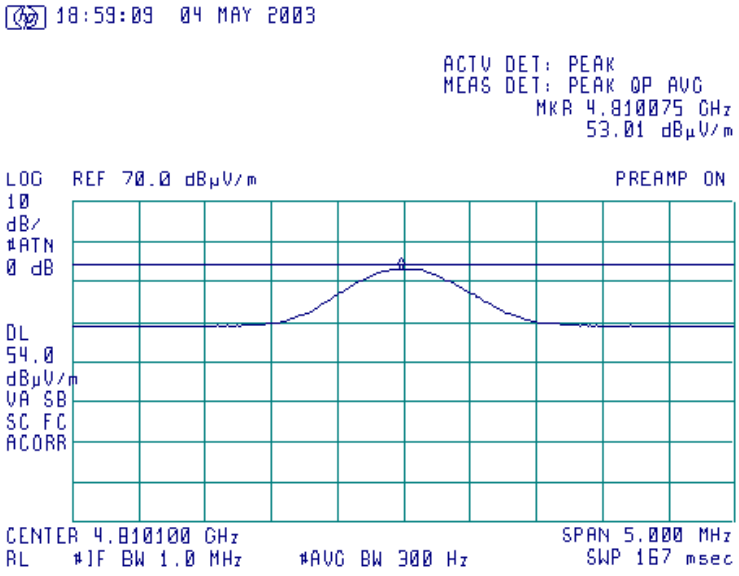
**Plot A 73**

**Radiated spurious emission measurements in restricted bands in the anechoic chamber, carrier frequency 5810 MHz**



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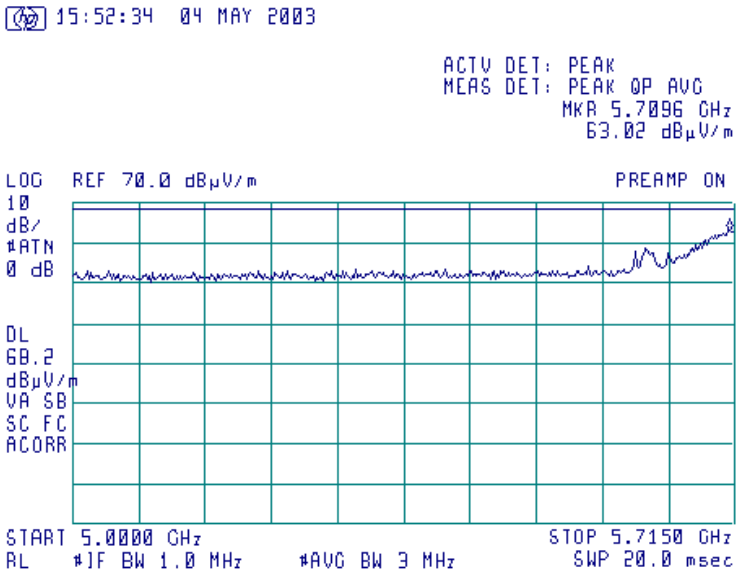
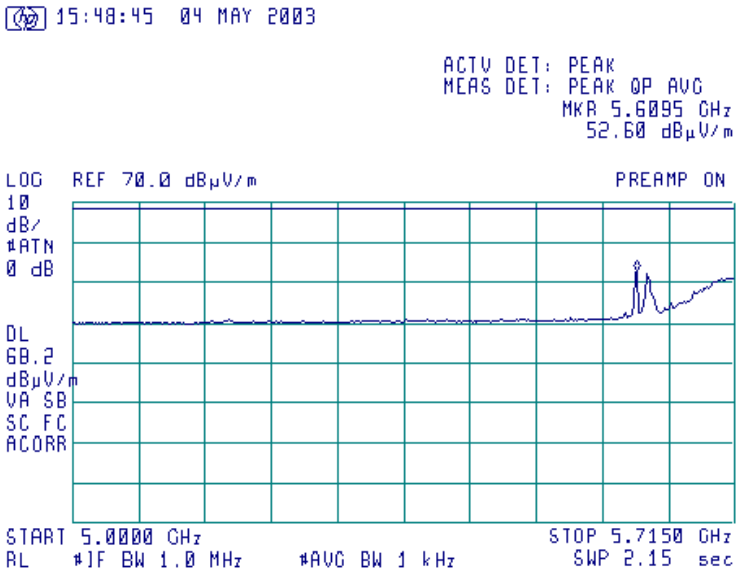
**Plot A 74**

**Radiated spurious emission measurements in the anechoic chamber from 5 to 5.715 GHz, carrier frequency 5810 MHz**



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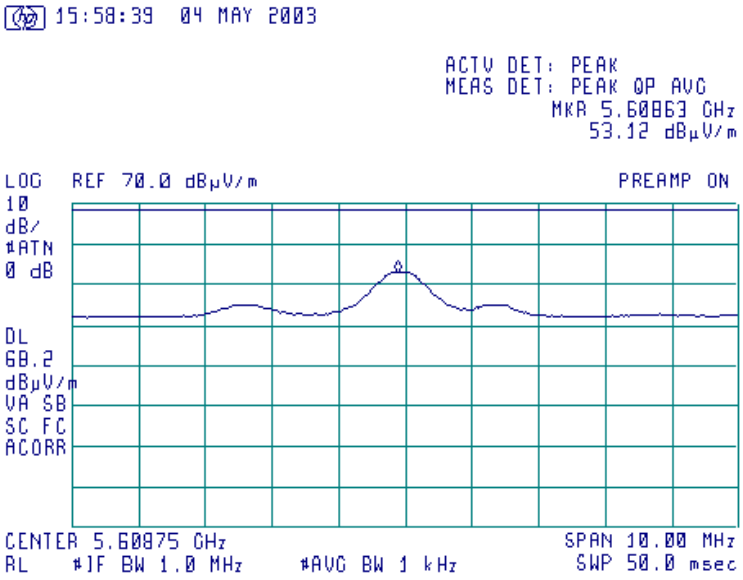
**Plot A 75**

**Radiated spurious emission measurements in the anechoic chamber, carrier frequency 5810 MHz**



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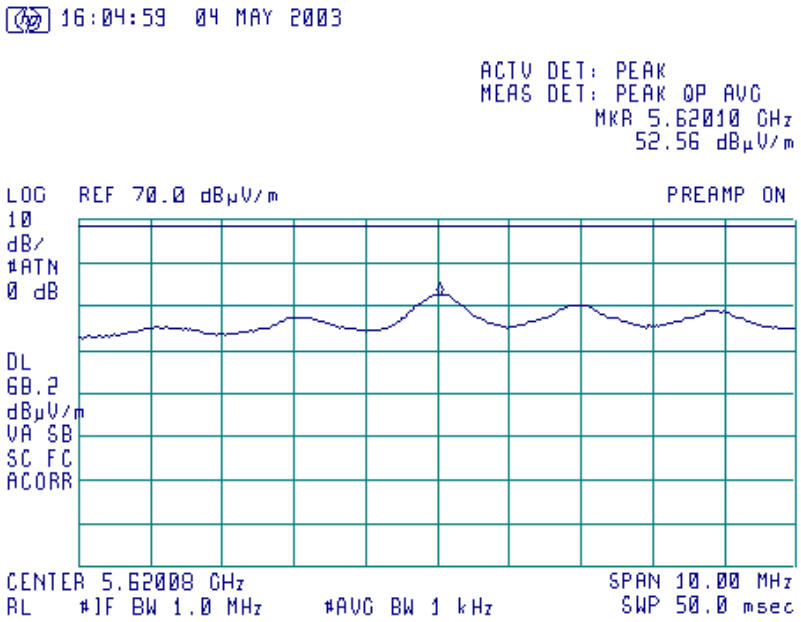
**Plot A 76**

**Radiated spurious emission measurements in the anechoic chamber, carrier frequency 5810 MHz**



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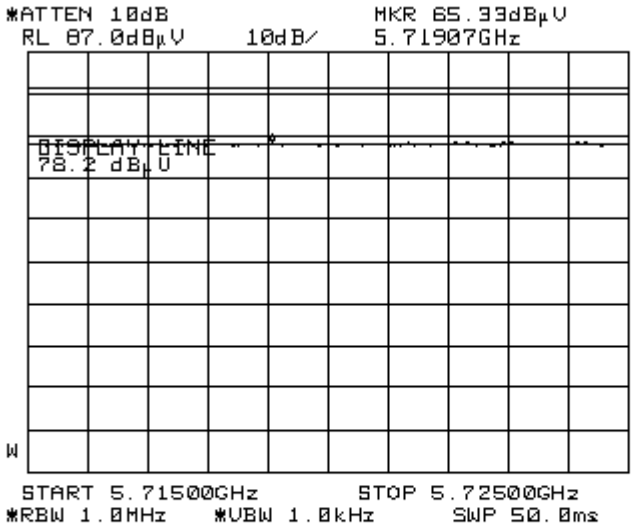
**Plot A 77**

**Radiated spurious emission measurements at the OATS from 5.715 to 5.725 GHz, carrier frequency 5810 MHz**



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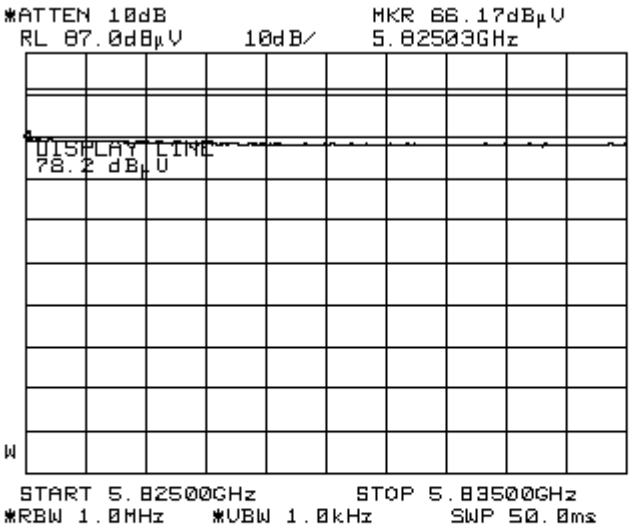
**Plot A 78**

**Radiated spurious emission measurements at the OATS from 5.825 to 5.835 GHz, carrier frequency 5810 MHz**



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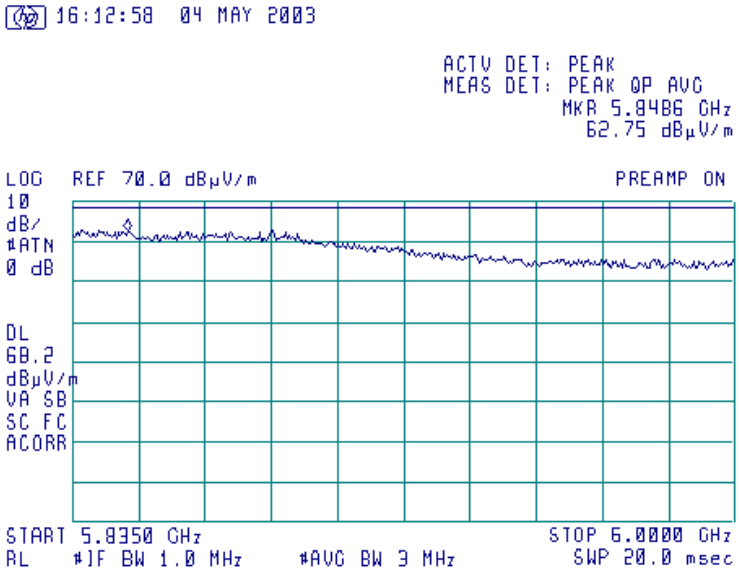
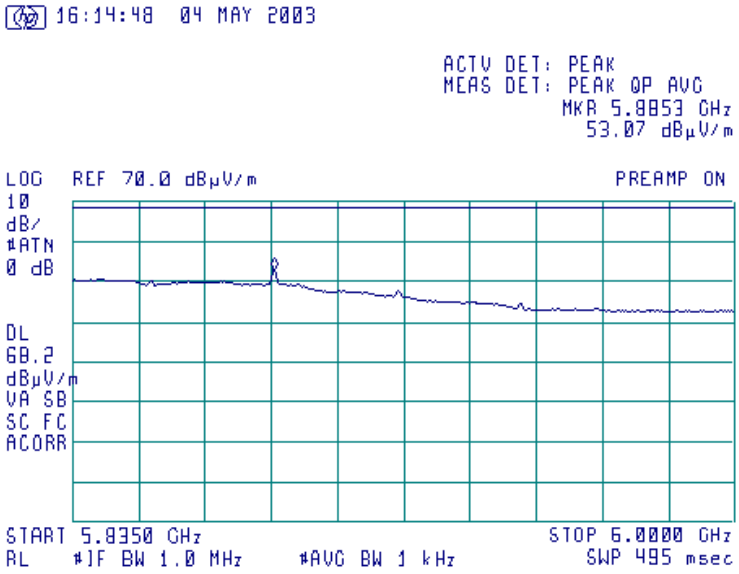
**Plot A 79**

**Radiated spurious emission measurements in the anechoic chamber 5.835 to 6 GHz, carrier frequency 5810 MHz**



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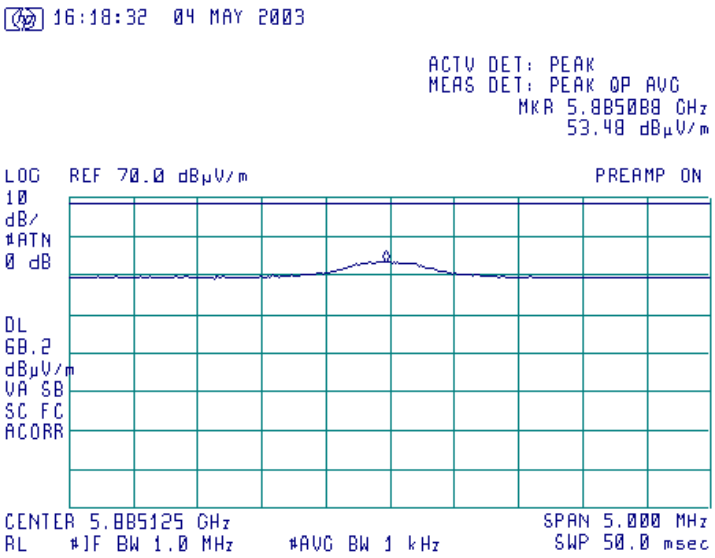
**Plot A 80**

**Radiated spurious emission measurements in the anechoic chamber, carrier frequency 5810 MHz**



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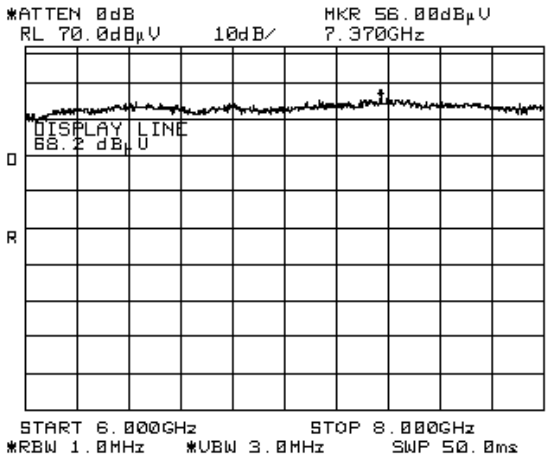
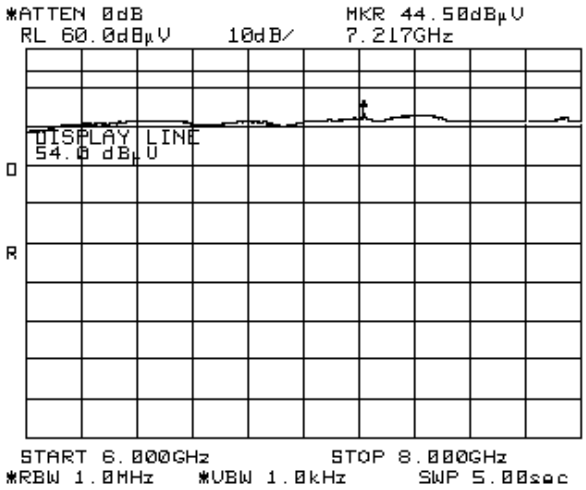
**Plot A 81**

**Radiated spurious emission measurements in the anechoic chamber from 6 to 8 GHz, carrier frequency 5810 MHz**



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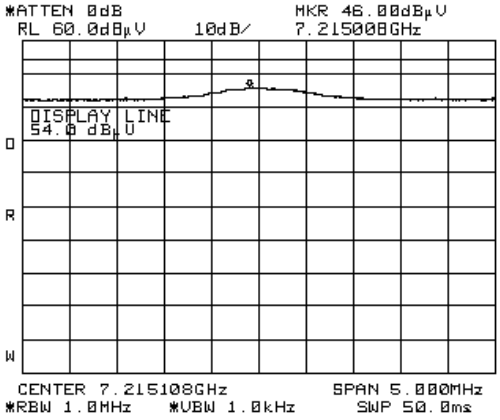
**Plot A 82**

**Radiated spurious emission measurements in the anechoic chamber, carrier frequency 5810 MHz**



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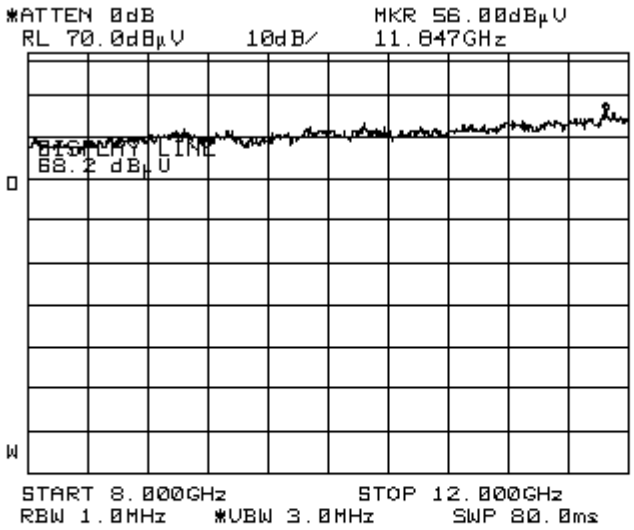
**Plot A 83**

**Radiated spurious emission measurements at the OATS from 8 to 12 GHz, carrier frequency 5810 MHz**



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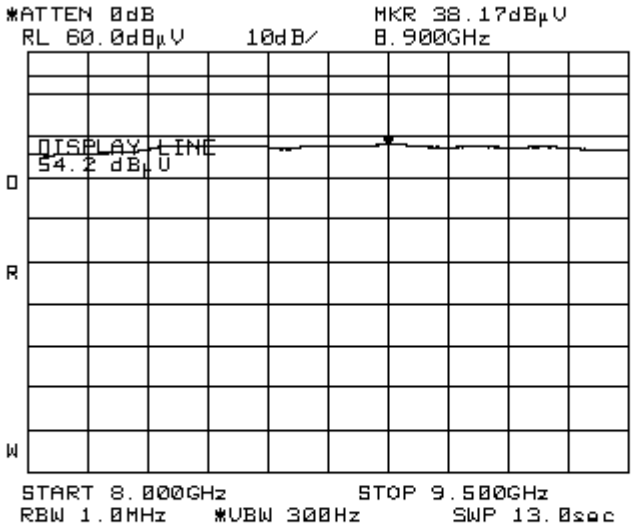
**Plot A 84**

**Radiated spurious emission measurements at the OATS from 8 to 9.5 GHz, carrier frequency 5810 MHz**



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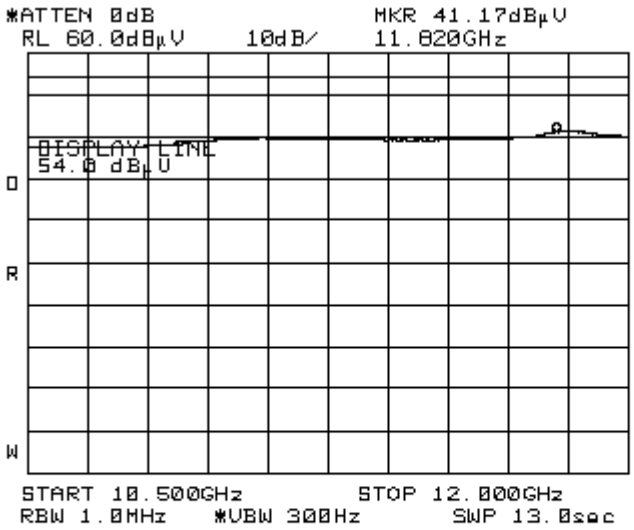
**Plot A 85**

**Radiated spurious emission measurements at the OATS from 10.5 to 12 GHz, carrier frequency 5810 MHz**



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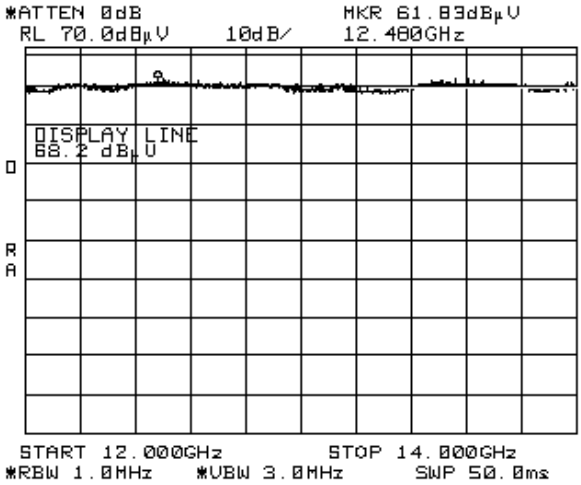
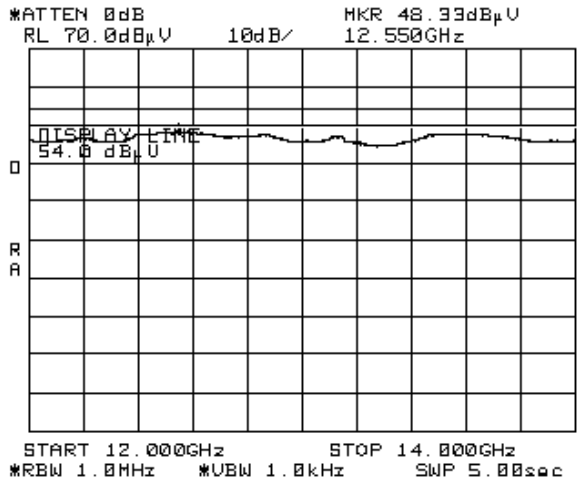
**Plot A 86**

**Radiated spurious emission measurements in the anechoic chamber from 12 to 14 GHz, carrier frequency 5810 MHz**



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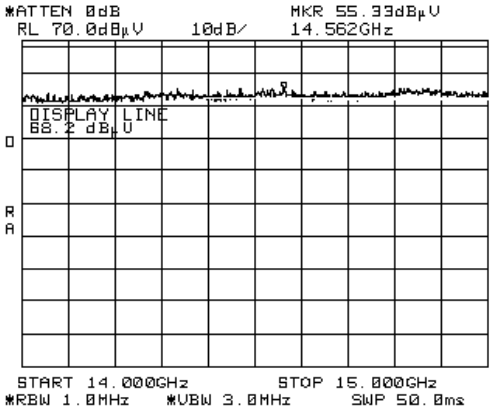
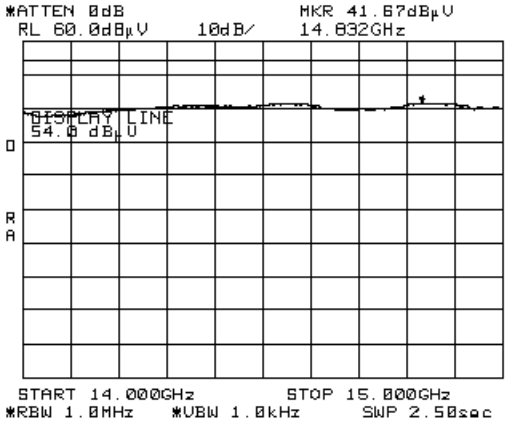
**Plot A 87**

**Radiated spurious emission measurements in the anechoic chamber from 14 to 15 GHz, carrier frequency 5810 MHz**



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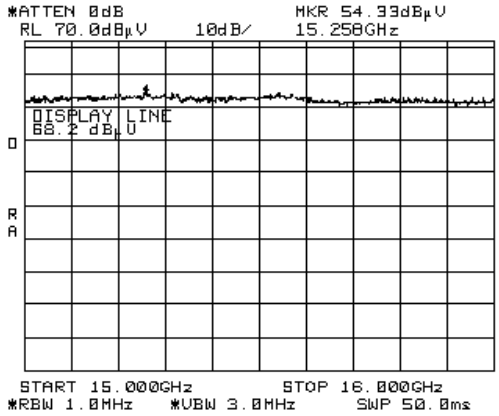
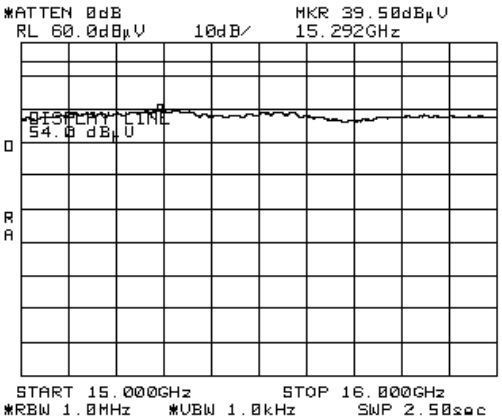
**Plot A 88**

**Radiated spurious emission measurements in the anechoic chamber from 15 to 16 GHz, carrier frequency 5810 MHz**



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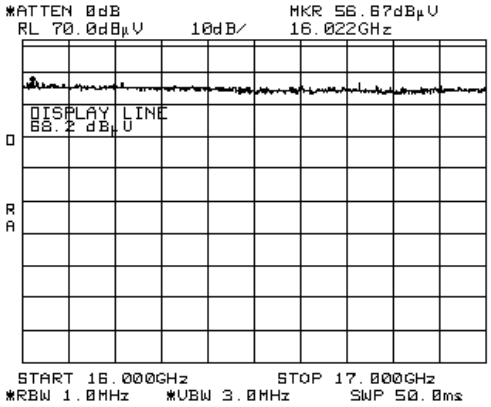
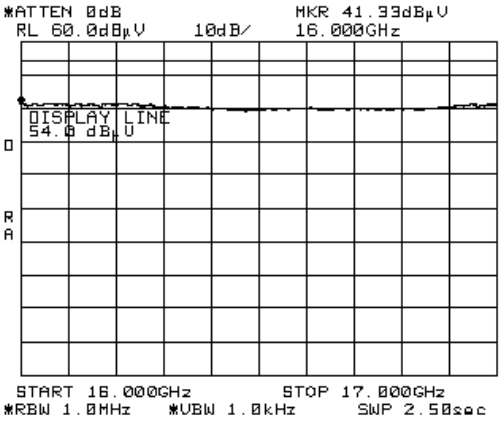
**Plot A 89**

**Radiated spurious emission measurements in the anechoic chamber from 16 to 17 GHz, carrier frequency 5810 MHz**



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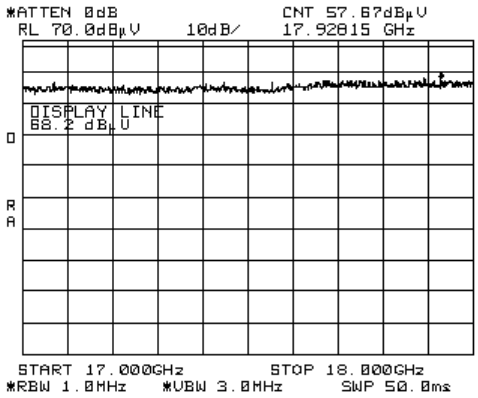
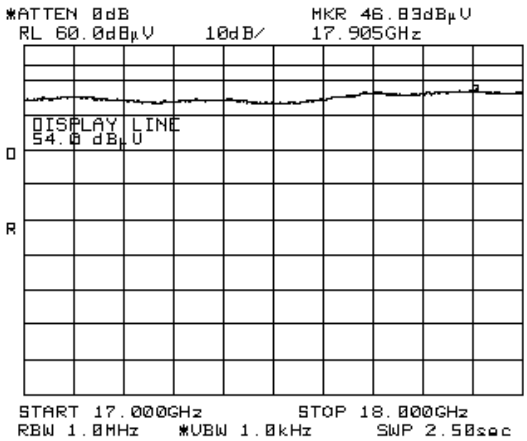
**Plot A 90**

**Radiated spurious emission measurements in the anechoic chamber from 17 to 18 GHz, carrier frequency 5810 MHz**



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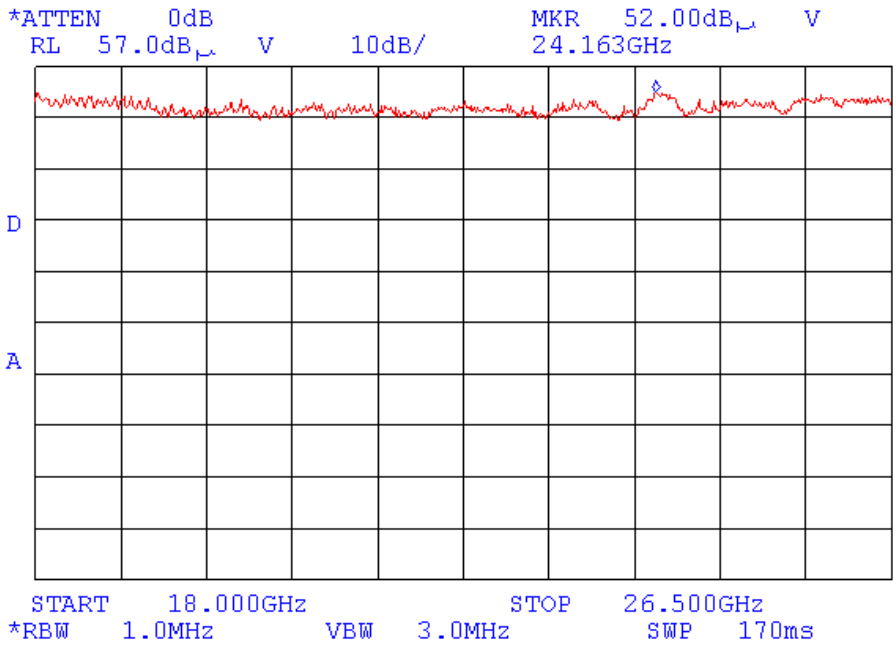
**Plot A 91**

**Radiated spurious emission measurements at the OATS from 18 to 26.5 GHz, carrier frequency 5810 MHz**




No spurious emissions were found.
Limit: 54 dB(µV/m)
Noise floor peak value: 52 dBµV + 32 dB(1/m) + 3.6 dB – 42.4 dB = 45.2 dB(µV/m), where
Antenna factor = 32 dB(1/m)
Max cable loss = 3.6 dB
Min LNA (low noise amplifier) gain = 42.4 dB

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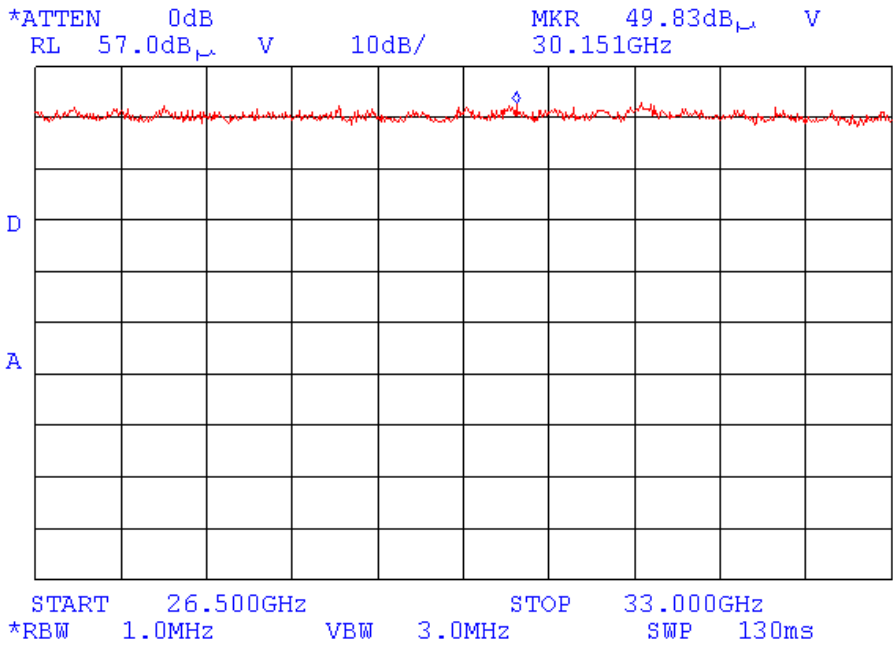
**Plot A 92**

**Radiated spurious emission measurements at the OATS from 26.5 to 33 GHz, carrier frequency 5810 MHz**




No spurious emissions were found.
Limit: 54 dB(µV/m)
Noise floor peak value: 49.83 dBµV + 35.5 dB(1/m) + 3.7 dB – 40.7 dB = 48.33 dB(µV/m), where
Antenna factor = 35.5 dB(1/m)
Max cable loss = 3.7 dB
Min LNA (low noise amplifier) gain = 40.7 dB

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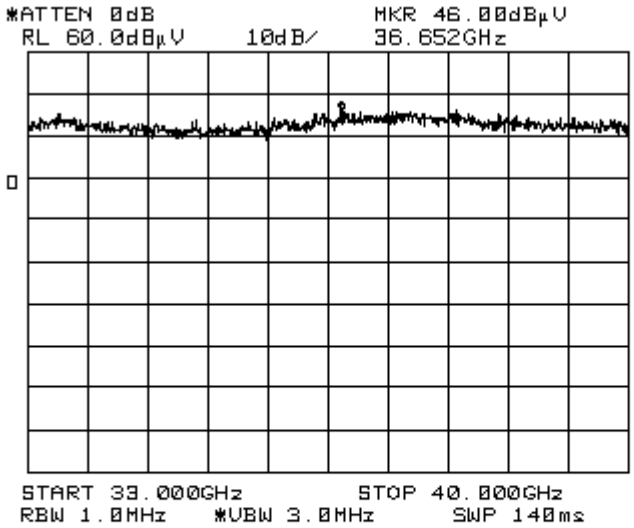
**Plot A 93**

**Radiated spurious emission measurements at the OATS from 33 to 40 GHz, carrier frequency 5810 MHz**




No spurious emissions were found.
Limit for spurious in restricted bands: 54 dB(µV/m)
Noise floor peak value: 46.0 dBµV + 35.5 dB(1/m) + 5.2 dB – 35.6 dB = 51.1 dB(µV/m), where
Antenna factor = 35.5 dB(1/m)
Max cable loss = 5.2 dB
Min LNA (low noise amplifier) gain = 35.6 dB

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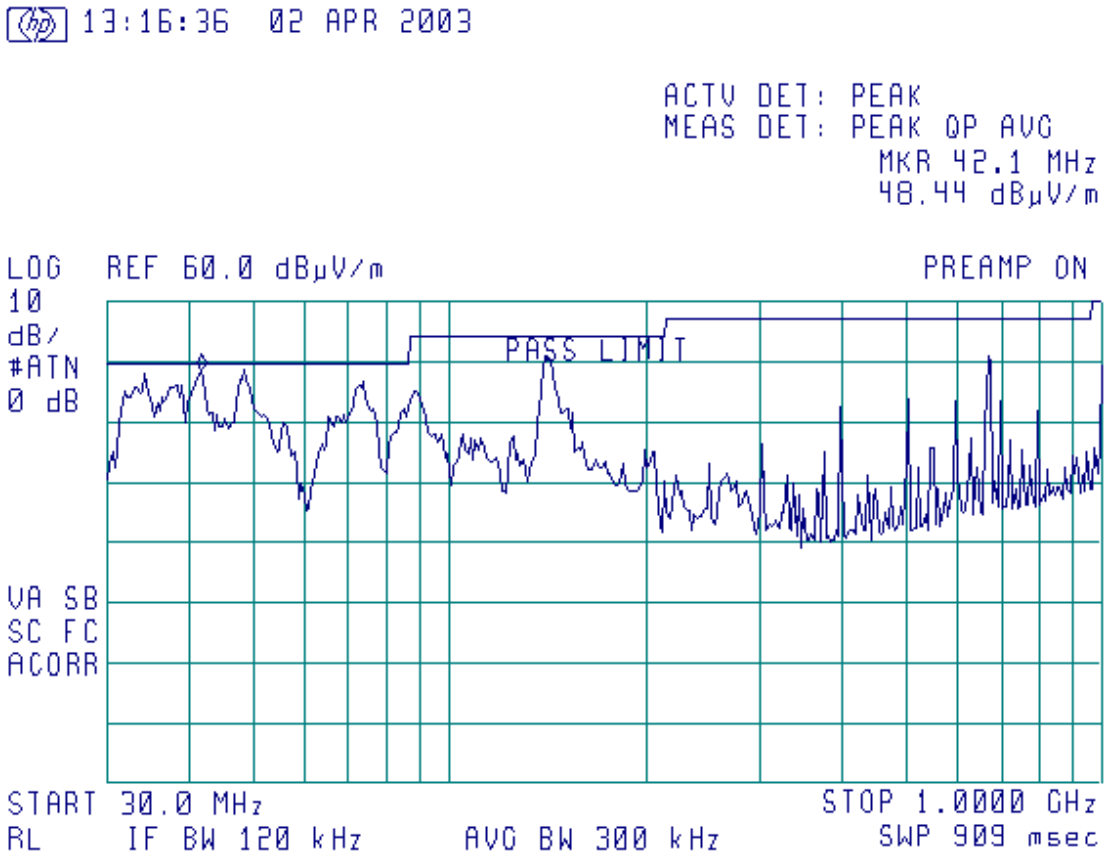
s

**Plot A 94**

**Radiated emission measurements in the anechoic chamber from 30 MHz to 1 GHz, test distance 10 m, vertical & horizontal antenna polarization**



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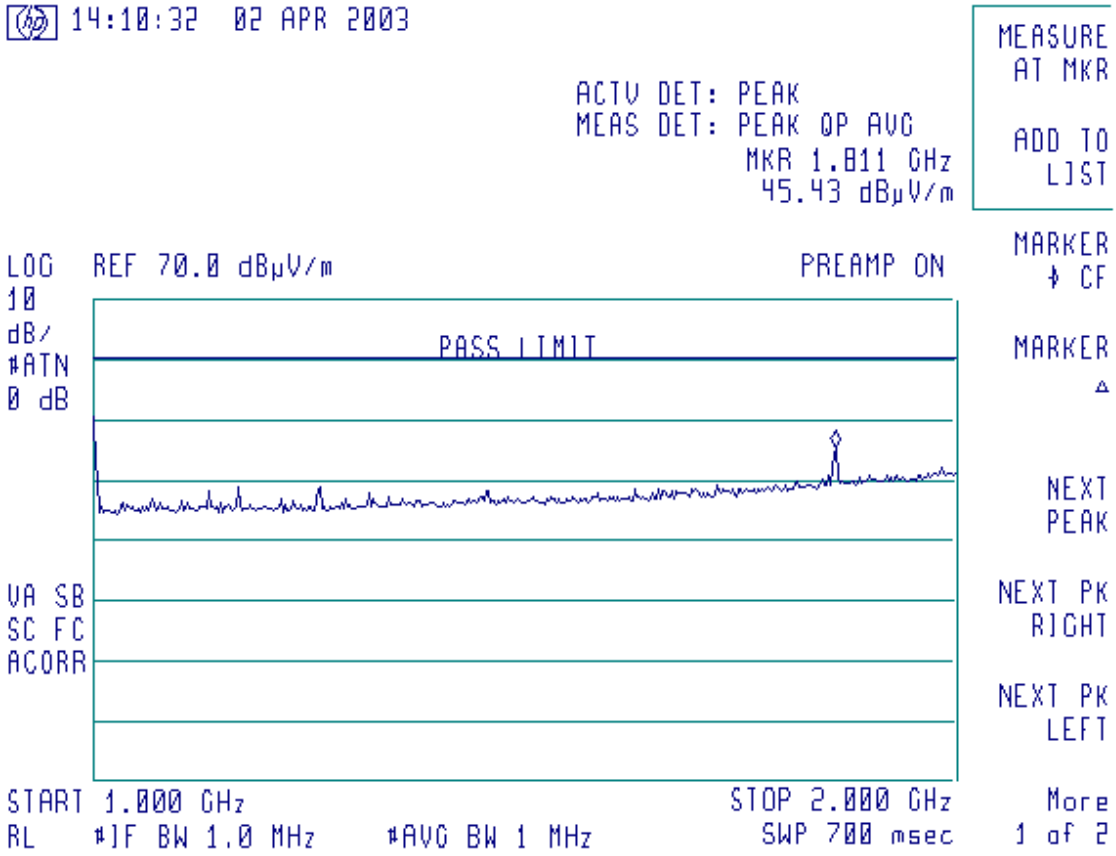
**Plot A 95**

**Radiated emission measurements in the anechoic chamber from 1 to 2 GHz, test distance 10 m, vertical & horizontal antenna polarization**



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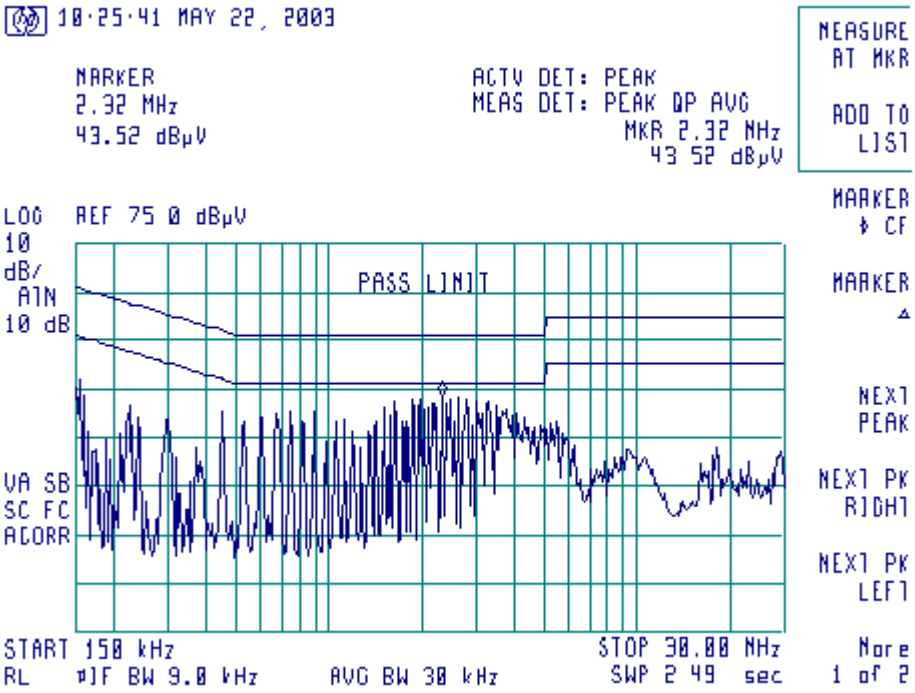
**Plot A 96**

**Conducted emission measurements test results at the phase line**



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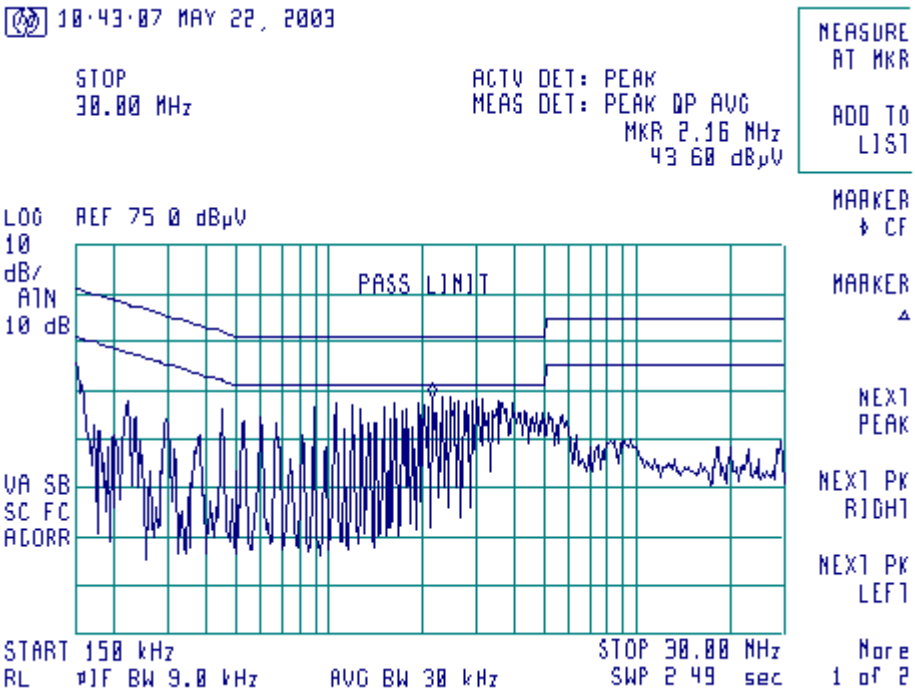
**Plot A 97**

**Conducted emission measurements test results at the neutral line**



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# Appendix B Test equipment used for tests

| HL Serial No. | Description | Manufacturer information | | | Due Calibr. Month/ year |
|---|---|---|---|---|---|
| | | Name | Model No. | Serial No. | |
| 0025 | Spectrum analyzer, 10 kHz-23 GHz | Anritsu | MS-710C | 5837 | 10/03 |
| 0038 | Antenna Mast, 1-4 m | Hermon Labs | AM-1 | 028 | 2/04 Check |
| 0041 | Double ridged guide antenna, 1-18 GHz | Electro-Metrics | RGA 50/60 | 2811 | 3/04 |
| 0091 | Position controller for antenna mast + turntable, OFTS | Hermon Labs | CRL-2 | 091 | 4/04 Check |
| 0163 | LISN FCC/VDE/MIL -STD | Electro-Metrics | ANS-25/2 | 1314 | 10/03 |
| 0275 | Table non-metallic, 1.5 x 1.0 x 0.8 m | Hermon Labs | TNM | 040 | 3/04 Check |
| 0287 | Turntable, motorized diameter, 2 m | Hermon Labs | TMD-2 | 042 | 11/03 Check |
| 0295 | Amplifier for clamp-on probe RCA-11 | Electro-Metrics | RCA-11 | 543 | 1/04 |
| 0446 | Active Loop Antenna, 10 kHz-30 MHz | Electro-Mechanics | 6502 | 2857 | 10/03 |
| 0465 | Anechoic chamber 9 (L) x 6.5 (W) x 5.5 (H) m | Hermon Labs | AC-1 | 023 | 10/05 check |
| 0521 | Spectrum analyzer with RF filter section (EMI receiver 9 kHz - 6.5 GHz) | Hewlett Packard | 8546A | 0319 | 9/03 |
| 0589 | Cable coaxial, GORE A2POL118.2, 3 m | Hermon Labs | GORE-3 | 589 | 11/03 |
| 0592 | Position controller | Hermon Labs | L2-SR3000 | 100 | 5/04 check |
| 0593 | Antenna Mast, 1-4 m/ 1-6 m Pneumatic | Hermon Labs | AM-F1 | 101 | 2/04check |
| 0594 | Turntable for Anechoic Chamber, flush mounted, d=1.2 m, pneumatic | Hermon Labs | WDC1 | 102 | 1/04 check |
| 0604 | Antenna biconilog log-periodic/T Bow-Tie, 26 - 2000 MHz | EMCO | 3141 | 9611-1011 | 1/04 |
| 0763 | Antenna Linear Horn (Optium Gain) 18 - 26.5 GHz | Continental Mictowave & Tool Co. | LHA042 | 980976-002 | 6/04 check |
| 0769 | Antenna standard gain horn, 26.5 – 40 GHz, WR-42, K-band, gain – 25 dB | Quinstar Technology | QWH-2800-BA | 112 | 7/04 check |
| 0784 | Antenna X-WING BILOG 20 MHz – 2 GHz | Schaffner- Chase EMC | CBL6140A | 1120 | 1/04 |
| 0787 | Transient limiter | Hewlett Packard | 11947A-8ZE | 3107A01877 | 11/03 |
| 0813 | Cable, coax, RG-214, 12 m, N-type connectors | Hermon Labs | C214-12 | 149 | 12/03 |
| 1004 | Cable, coaxial ANDREW PSWJ4, 6 m | Hermon Labs | ANDREW-6 | 163 | 12/03 |
| 1200 | Quadruplexer, 1-12 GHz | Elettronica S.p.A.-Roma | UE 84 | 0240 | 4/04 check |
| 1295 | Adapter, 26.5-40 GHz | Wiltron | 35WR28KF | 1295 | 8/03 |
| 1424 | Spectrum analyzer, 30 Hz - 40 GHz | Agilent Technologies | 8564EC | 3946A00219 | 8/03 |

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| HL Serial No. | Description | Manufacturer information | | | Due Calibr. Month/ year |
|---|---|---|---|---|---|
| | | Name | Model No. | Serial No. | |
| 1430 | EMI Receiver System, 9 kHz - 2.9 GHz | Agilent Technologies | 8542E | 3807A00262 | 9/03 |
| 1502 | Cable RF, 6 m | Belden | M17/167 MIL-C-17 | 1502 | 12/03 check |
| 1510 | Cable RF, 8 m | Belden | M17/167 MIL-C-17 | 1510 | 12/03 |
| 1552 | Cable RF, 8 m | Alpha wire | RG-214 | 1552 | 5/04 |
| 1650 | Attenuators set (2, 3, 5, 20 dB), DC – 18 GHz | M/A –COM | 2082 | 1650 | 3/04 |
| 1651 | Attenuators set (2, 3, 5, 20 dB), DC – 18 GHz | M/A –COM | 2082 | 1651 | 3/04 |
| 1827 | Antenna mast position controller (OATS) | Sh. I. Machines | CRL-5 | 1 | 5/04 check |
| 1848 | Antenna mast 4m/6m with polarity control | Sh.I.Mashines | AM-5 | 1 | 4/04 check |
| 1940 | Cable 40 GHz, 1.5 m, blue | Rhophase Microwave Ltd. | KPS-1503A-1500-KPS | T4663 | 10/03 |
| 1942 | Cable 18 GHz, 4 m, blue | Rhophase Microwave Ltd | SPS-1803A-4000-NPS | T4658 | 10/03 |
| 1947 | Cable 18 GHz, 6.5 m, blue | Rhophase Microwave Ltd | NPS-1803A-6500-NPS | T4974 | 10/03 |
| 1989 | Adapter, 18 - 26.5 GHz, WR-42/SMA | Continental Microwave & Tool Co. | WR-42/SMA | 1989 | 8/04 |
| 2009 | Cable RF, 8 m | Alpha Wire | RG-214 | C-56 | 12/03 |
| 2254 | Cable 40 GHz, 0.8 m, blue | Rhophase Microwave | KPS-1503A-800-KPS | W4907 | 11/03 |
| 2259 | Amplifier Low Noise 2-20 GHz | Sophia Wireless | LNA0220-C | 0223 | 11/03 |
| 2260 | Amplifier Low Noise 14-33 GHz | Sophia Wireless | LNA28-B | 0233 | 11/03 |
| 2261 | Amplifier Low Noise 33-40 GHz | Sophia Wireless | LNA38-B | 0234 | 11/03 |
| 2274 | Power supply 11 V for HL2258, HL2259, HL2260, HL2261 | Hermon Labs | S-11 | 2274 | 12/03 |

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# Appendix C Antenna factors and cable loss

**Antenna factor**
**Double ridged guide antenna**
**Model RGA-50/60**
**S/N 2811**

| Frequency, MHz | Antenna factor, dB |
|---|---|
| 1000 | 24.3 |
| 1500 | 25.4 |
| 2000 | 28.4 |
| 2500 | 29.2 |
| 3000 | 30.5 |
| 3500 | 31.6 |
| 4000 | 33.7 |
| 4500 | 32.2 |
| 5000 | 34.5 |
| 5500 | 34.5 |
| 6000 | 34.6 |
| 6500 | 35.3 |
| 7000 | 35.5 |
| 7500 | 35.9 |
| 8000 | 36.6 |
| 8500 | 37.3 |
| 9000 | 37.7 |
| 9500 | 37.7 |
| 10000 | 38.2 |
| 10500 | 38.5 |
| 11000 | 39.0 |
| 11500 | 40.1 |
| 12000 | 40.2 |
| 12500 | 39.3 |
| 13000 | 39.9 |
| 13500 | 40.6 |
| 14000 | 41.1 |
| 14500 | 40.5 |
| 15000 | 39.9 |
| 15500 | 37.8 |
| 16000 | 39.1 |
| 16500 | 41.1 |
| 17000 | 41.7 |
| 17500 | 45.1 |
| 18000 | 44.3 |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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**Antenna Factor**
**Biconilog Antenna EMCO Model 3141**
**Ser.No.1011**

| Frequency, MHz | Antenna Factor, dB(1/m) | Frequency, MHz | Antenna Factor, dB(1/m) |
|---|---|---|---|
| 26 | 7.8 | 940 | 24.0 |
| 28 | 7.8 | 960 | 24.1 |
| 30 | 7.8 | 980 | 24.5 |
| 40 | 7.2 | 1000 | 24.9 |
| 60 | 7.1 | 1020 | 25.0 |
| 70 | 8.5 | 1040 | 25.2 |
| 80 | 9.4 | 1060 | 25.4 |
| 90 | 9.8 | 1080 | 25.6 |
| 100 | 9.7 | 1100 | 25.7 |
| 110 | 9.3 | 1120 | 26.0 |
| 120 | 8.8 | 1140 | 26.4 |
| 130 | 8.7 | 1160 | 27.0 |
| 140 | 9.2 | 1180 | 27.0 |
| 150 | 9.8 | 1200 | 26.7 |
| 160 | 10.2 | 1220 | 26.5 |
| 170 | 10.4 | 1240 | 26.5 |
| 180 | 10.4 | 1260 | 26.5 |
| 190 | 10.3 | 1280 | 26.6 |
| 200 | 10.6 | 1300 | 27.0 |
| 220 | 11.6 | 1320 | 27.8 |
| 240 | 12.4 | 1340 | 28.3 |
| 260 | 12.8 | 1360 | 28.2 |
| 280 | 13.7 | 1380 | 27.9 |
| 300 | 14.7 | 1400 | 27.9 |
| 320 | 15.2 | 1420 | 27.9 |
| 340 | 15.4 | 1440 | 27.8 |
| 360 | 16.1 | 1460 | 27.8 |
| 380 | 16.4 | 1480 | 28.0 |
| 400 | 16.6 | 1500 | 28.5 |
| 420 | 16.7 | 1520 | 28.9 |
| 440 | 17.0 | 1540 | 29.6 |
| 460 | 17.7 | 1560 | 29.8 |
| 480 | 18.1 | 1580 | 29.6 |
| 500 | 18.5 | 1600 | 29.5 |
| 520 | 19.1 | 1620 | 29.3 |
| 540 | 19.5 | 1640 | 29.2 |
| 560 | 19.8 | 1660 | 29.4 |
| 580 | 20.6 | 1680 | 29.6 |
| 600 | 21.3 | 1700 | 29.8 |
| 620 | 21.5 | 1720 | 30.3 |
| 640 | 21.2 | 1740 | 30.8 |
| 660 | 21.4 | 1760 | 31.1 |
| 680 | 21.9 | 1780 | 31.0 |
| 700 | 22.2 | 1800 | 30.9 |
| 720 | 22.2 | 1820 | 30.7 |
| 740 | 22.1 | 1840 | 30.6 |
| 760 | 22.3 | 1860 | 30.6 |
| 780 | 22.6 | 1880 | 30.6 |
| 800 | 22.7 | 1900 | 30.6 |
| 820 | 22.9 | 1920 | 30.7 |
| 840 | 23.1 | 1940 | 30.9 |
| 860 | 23.4 | 1960 | 31.2 |
| 880 | 23.8 | 1980 | 31.6 |
| 900 | 24.1 | 2000 | 32.0 |
| 920 | 24.1 | | |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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**Antenna factor**
**Active Loop Antenna**
**Model 6502**
**S/N 2857**

| Frequency, MHz | Magnetic antenna factor, dB | Electric antenna factor, dB |
|---|---|---|
| 0.009 | -32.8 | 18.7 |
| 0.010 | -33.8 | 17.7 |
| 0.020 | -38.3 | 13.2 |
| 0.050 | -41.1 | 10.4 |
| 0.075 | -41.3 | 10.2 |
| 0.100 | -41.6 | 9.9 |
| 0.150 | -41.7 | 9.8 |
| 0.250 | -41.6 | 9.9 |
| 0.500 | -41.8 | 9.8 |
| 0.750 | -41.9 | 9.7 |
| 1.000 | -41.4 | 10.1 |
| 2.000 | -41.5 | 10.0 |
| 3.000 | -41.4 | 10.2 |
| 4.000 | -41.4 | 10.1 |
| 5.000 | -41.5 | 10.1 |
| 10.000 | -41.9 | 9.6 |
| 15.000 | -41.9 | 9.6 |
| 20.000 | -42.2 | 9.3 |
| 25.000 | -42.8 | 8.7 |
| 30.000 | -44.0 | 7.5 |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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**Antenna Gain**
**Waveguide standard gain horn antenna**
**Continental Microwave & Tool Co., Inc.**
**P/N LHA 042**
**Ser.No.980976-002**

| Frequency, GHz | H-3dB BW degrees | E-3dB BW degrees | Gain, dBi |
|---|---|---|---|
| 18.000 | 10 | 9 | 23.3 |
| 18.850 | 10 | 9 | 23.6 |
| 19.700 | 10 | 9 | 23.7 |
| 20.550 | 9 | 8 | 24.1 |
| 21.400 | 9 | 8 | 24.3 |
| 22.250 | 9 | 8 | 24.3 |
| 23.100 | 8 | 7 | 24.5 |
| 23.950 | 8 | 7 | 24.5 |
| 24.800 | 8 | 7 | 24.8 |
| 25.650 | 7 | 6 | 24.9 |
| 26.500 | 7 | 6 | 24.9 |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

**Antenna factor**
**Standard gain horn antenna**
**Quinstar Technology**
**Model QWH**
**Ser.No.112, HL 0768, 0769, 0770**

| Frequency min, GHz | Frequency max, GHz | Antenna factor, dB(1/m) |
|---|---|---|
| 18.000 | 26.500 | 32.01 |
| 26.500 | 40.000 | 35.48 |
| 40.000 | 60.000 | 39.03 |
| 60.000 | 90.000 | 42.55 |
| 90.000 | 140.000 | 46.23 |
| 140.000 | 220.000 | 50.11 |

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**Antenna factor**
**Biconilog antenna**
**CHASE Model CBL6140A**
**Serial no: 1120, HL 0784**

| Frequency, MHz | Antenna factor, dB |
|---|---|
| 30.0 | 4.3 |
| 35.0 | 7.3 |
| 40.0 | 8.8 |
| 45.0 | 9.3 |
| 50.0 | 9.6 |
| 60.0 | 9.9 |
| 70.0 | 9.2 |
| 80.0 | 7.6 |
| 90.0 | 7.6 |
| 100.0 | 8.8 |
| 120.0 | 7.2 |
| 125.0 | 7.5 |
| 140.0 | 7.7 |
| 150.0 | 7.9 |
| 160.0 | 11.4 |
| 175.0 | 8.6 |
| 180.0 | 8.8 |
| 200.0 | 9.8 |
| 250.0 | 12.5 |
| 300.0 | 12.2 |
| 350.0 | 14.8 |
| 400.0 | 16.1 |
| 450.0 | 16.5 |
| 500.0 | 17.6 |
| 550.0 | 18.3 |
| 600.0 | 18.5 |
| 650.0 | 19.8 |
| 700.0 | 20.1 |
| 750.0 | 20.8 |
| 800.0 | 21.2 |
| 850.0 | 22.0 |
| 900.0 | 22.2 |
| 950.0 | 23.2 |
| 1000.0 | 23.8 |

Antenna factor in dB(1/m) is to be added to receiver meter reading in dB(μV) to convert it into field intensity in dB(μV/m).

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**Cable loss**
**Cable RG-214, HL 0813**

| No. | Frequency, MHz | Cable loss, dB |
|---|---|---|
| 1 | 10 | 0.15 |
| 2 | 20 | 0.40 |
| 3 | 30 | 0.51 |
| 4 | 40 | 0.61 |
| 5 | 50 | 0.68 |
| 6 | 60 | 0.76 |
| 7 | 70 | 0.80 |
| 8 | 80 | 0.92 |
| 9 | 90 | 0.96 |
| 10 | 100 | 0.99 |
| 11 | 200 | 1.60 |
| 12 | 300 | 1.85 |
| 13 | 400 | 2.25 |
| 14 | 500 | 2.43 |
| 15 | 600 | 2.80 |
| 16 | 700 | 3.14 |
| 17 | 800 | 3.34 |
| 18 | 900 | 3.75 |
| 19 | 1000 | 4.05 |
| 20 | 1200 | 4.41 |
| 21 | 1400 | 4.81 |
| 22 | 1600 | 5.18 |
| 23 | 1800 | 5.58 |
| 24 | 2000 | 6.09 |
| 25 | 2500 | 7.27 |
| 26 | 2900 | 8.01 |

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**Cable loss**
**RF cable 8 m, model RG-214-8m, HL 1552**

| No. | Frequency, MHz | Cable loss, dB | Measurement uncertainty, dB | Notes |
|---|---|---|---|---|
| 1 | 0.010 | 0.01 | ±0.05 | |
| 2 | 0.1 | 0.01 | | |
| 3 | 1 | 0.03 | | |
| 4 | 10 | 0.12 | | |
| 5 | 20 | 0.23 | | |
| 6 | 30 | 0.30 | | |
| 7 | 40 | 0.32 | | |
| 8 | 50 | 0.34 | | |
| 9 | 60 | 0.39 | | |
| 10 | 70 | 0.43 | | |
| 11 | 80 | 0.48 | | |
| 12 | 90 | 0.50 | | |
| 13 | 100 | 0.55 | | |
| 14 | 200 | 0.78 | | |
| 15 | 300 | 1.04 | | |
| 16 | 400 | 1.16 | | |
| 17 | 500 | 1.33 | | |
| 18 | 600 | 1.51 | | |
| 19 | 700 | 1.65 | | |
| 20 | 800 | 1.77 | | |
| 21 | 900 | 1.92 | | |
| 22 | 1000 | 2.04 | | |
| 23 | 1200 | 2.26 | | |
| 24 | 1400 | 2.49 | | |
| 25 | 1600 | 2.74 | | |
| 26 | 1800 | 2.94 | | |
| 27 | 2000 | 3.18 | | |
| 28 | 2500 | 3.65 | | |
| 29 | 2900 | 4.08 | | |

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**Cable loss**
**Cable 40 GHz, 1.5 m, blue, model: KPS-1503A-1500-KPS, S/N T4663, HL 1940**

| Frequency, GHz | Cable loss, dB | Frequency, GHz | Cable loss, dB | Frequency, GHz | Cable loss, dB |
|---|---|---|---|---|---|
| 0.03 | 0.13 | 5.10 | 1.33 | 15.00 | 2.27 |
| 0.05 | 0.14 | 5.30 | 1.33 | 15.50 | 2.32 |
| 0.10 | 0.19 | 5.50 | 1.38 | 16.00 | 2.39 |
| 0.20 | 0.25 | 5.70 | 1.41 | 16.50 | 2.41 |
| 0.30 | 0.31 | 5.90 | 1.43 | 17.00 | 2.36 |
| 0.40 | 0.37 | 6.10 | 1.50 | 17.50 | 2.42 |
| 0.50 | 0.41 | 6.30 | 1.47 | 18.00 | 2.50 |
| 0.60 | 0.46 | 6.50 | 1.56 | 18.50 | 2.89 |
| 0.70 | 0.49 | 6.70 | 1.50 | 19.00 | 2.86 |
| 0.80 | 0.53 | 6.90 | 1.53 | 19.50 | 2.84 |
| 0.90 | 0.56 | 7.10 | 1.53 | 20.00 | 2.77 |
| 1.00 | 0.59 | 7.30 | 1.56 | 20.50 | 2.73 |
| 1.10 | 0.62 | 7.50 | 1.59 | 21.00 | 3.05 |
| 1.20 | 0.65 | 7.70 | 1.62 | 21.50 | 3.07 |
| 1.30 | 0.68 | 7.90 | 1.68 | 22.00 | 2.97 |
| 1.40 | 0.70 | 8.10 | 1.67 | 22.50 | 2.91 |
| 1.50 | 0.73 | 8.30 | 1.70 | 23.00 | 3.02 |
| 1.60 | 0.76 | 8.50 | 1.69 | 23.50 | 3.29 |
| 1.70 | 0.77 | 8.70 | 1.70 | 24.00 | 3.31 |
| 1.80 | 0.80 | 8.90 | 1.68 | 24.50 | 3.49 |
| 1.90 | 0.82 | 9.10 | 1.70 | 25.00 | 3.37 |
| 2.00 | 0.84 | 9.30 | 1.70 | 25.50 | 3.56 |
| 2.10 | 0.85 | 9.50 | 1.77 | 26.00 | 3.56 |
| 2.20 | 0.87 | 9.70 | 1.80 | 26.50 | 3.33 |
| 2.30 | 0.88 | 9.90 | 1.88 | 27.00 | 3.52 |
| 2.40 | 0.90 | 10.10 | 1.93 | 28.00 | 3.38 |
| 2.50 | 0.91 | 10.30 | 1.94 | 29.00 | 3.34 |
| 2.60 | 0.93 | 10.50 | 1.99 | 30.00 | 3.33 |
| 2.70 | 0.95 | 10.70 | 1.91 | 31.00 | 3.48 |
| 2.80 | 0.97 | 10.90 | 2.00 | 32.00 | 3.63 |
| 2.90 | 0.98 | 11.10 | 1.92 | 33.00 | 3.69 |
| 3.10 | 1.02 | 11.30 | 1.97 | 34.00 | 3.79 |
| 3.30 | 1.05 | 11.50 | 1.98 | 35.00 | 3.77 |
| 3.50 | 1.09 | 11.70 | 1.99 | 36.00 | 3.92 |
| 3.70 | 1.12 | 11.90 | 2.06 | 37.00 | 3.94 |
| 3.90 | 1.15 | 12.10 | 2.01 | 38.00 | 3.80 |
| 4.10 | 1.18 | 12.40 | 2.08 | 39.00 | 4.15 |
| 4.30 | 1.21 | 13.00 | 2.05 | 40.00 | 4.03 |
| 4.50 | 1.24 | 13.50 | 2.15 | | |
| 4.70 | 1.29 | 14.00 | 2.25 | | |
| 4.90 | 1.27 | 14.50 | 2.26 | | |

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**Cable loss**
**Cable 18 GHz, 4 m, blue, model: SPS-1803A-4000-NPS, S/N T4658, HL 1942**

| Frequency, GHz | Cable loss, dB |
|---|---|
| 0.03 | 0.21 |
| 0.05 | 0.26 |
| 0.10 | 0.36 |
| 0.20 | 0.50 |
| 0.30 | 0.61 |
| 0.40 | 0.70 |
| 0.50 | 0.78 |
| 0.60 | 0.85 |
| 0.70 | 0.93 |
| 0.80 | 0.99 |
| 0.90 | 1.04 |
| 1.00 | 1.10 |
| 1.10 | 1.16 |
| 1.20 | 1.22 |
| 1.30 | 1.26 |
| 1.40 | 1.31 |
| 1.50 | 1.35 |
| 1.60 | 1.41 |
| 1.70 | 1.45 |
| 1.80 | 1.49 |
| 1.90 | 1.53 |
| 2.00 | 1.57 |
| 2.10 | 1.61 |
| 2.20 | 1.65 |
| 2.30 | 1.69 |
| 2.40 | 1.72 |
| 2.50 | 1.76 |
| 2.60 | 1.79 |
| 2.70 | 1.83 |
| 2.80 | 1.87 |
| 2.90 | 1.90 |
| 3.10 | 1.97 |
| 3.30 | 2.04 |
| 3.50 | 2.11 |
| 3.70 | 2.18 |
| 3.90 | 2.24 |
| 4.10 | 2.31 |
| 4.30 | 2.38 |
| 4.50 | 2.43 |
| 4.70 | 2.53 |
| 4.90 | 2.53 |
| 5.10 | 2.63 |
| 5.30 | 2.65 |
| 5.50 | 2.72 |
| 5.70 | 2.76 |
| 5.90 | 2.79 |

| Frequency, GHz | Cable loss, dB |
|---|---|
| 6.10 | 2.88 |
| 6.30 | 2.90 |
| 6.50 | 2.97 |
| 6.70 | 3.02 |
| 6.90 | 3.04 |
| 7.10 | 3.07 |
| 7.30 | 3.12 |
| 7.50 | 3.13 |
| 7.70 | 3.19 |
| 7.90 | 3.24 |
| 8.10 | 3.30 |
| 8.30 | 3.36 |
| 8.50 | 3.45 |
| 8.70 | 3.41 |
| 8.90 | 3.45 |
| 9.10 | 3.42 |
| 9.30 | 3.55 |
| 9.50 | 3.48 |
| 9.70 | 3.58 |
| 9.90 | 3.61 |
| 10.10 | 3.66 |
| 10.30 | 3.68 |
| 10.50 | 3.70 |
| 10.70 | 3.70 |
| 10.90 | 3.75 |
| 11.10 | 3.78 |
| 11.30 | 3.86 |
| 11.50 | 3.98 |
| 11.70 | 4.10 |
| 11.90 | 4.12 |
| 12.10 | 4.09 |
| 12.40 | 4.13 |
| 13.00 | 4.23 |
| 13.50 | 4.35 |
| 14.00 | 4.40 |
| 14.50 | 4.44 |
| 15.00 | 4.57 |
| 15.50 | 4.66 |
| 16.00 | 4.64 |
| 16.50 | 4.66 |
| 17.00 | 4.75 |
| 17.50 | 4.85 |
| 18.00 | 4.93 |

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**Cable loss**
**Cable 18 GHz, 6.5 m, blue, model: NPS-1803A-6500-NPS, S/N T4974, HL 1947**

| Frequency, GHz | Cable loss, dB |
|---|---|
| 0.03 | 0.30 |
| 0.05 | 0.38 |
| 0.10 | 0.53 |
| 0.20 | 0.74 |
| 0.30 | 0.91 |
| 0.40 | 1.05 |
| 0.50 | 1.18 |
| 0.60 | 1.29 |
| 0.70 | 1.40 |
| 0.80 | 1.50 |
| 0.90 | 1.59 |
| 1.00 | 1.68 |
| 1.10 | 1.77 |
| 1.20 | 1.86 |
| 1.30 | 1.94 |
| 1.40 | 2.01 |
| 1.50 | 2.08 |
| 1.60 | 2.16 |
| 1.70 | 2.22 |
| 1.80 | 2.29 |
| 1.90 | 2.36 |
| 2.00 | 2.42 |
| 2.10 | 2.48 |
| 2.20 | 2.54 |
| 2.30 | 2.60 |
| 2.40 | 2.66 |
| 2.50 | 2.71 |
| 2.60 | 2.77 |
| 2.70 | 2.83 |
| 2.80 | 2.89 |
| 2.90 | 2.95 |
| 3.10 | 3.06 |
| 3.30 | 3.17 |
| 3.50 | 3.28 |
| 3.70 | 3.39 |
| 3.90 | 3.51 |
| 4.10 | 3.62 |
| 4.30 | 3.76 |
| 4.50 | 3.87 |
| 4.70 | 4.01 |
| 4.90 | 4.10 |
| 5.10 | 4.21 |
| 5.30 | 4.31 |
| 5.50 | 4.43 |
| 5.70 | 4.56 |
| 5.90 | 4.71 |

| Frequency, GHz | Cable loss, dB |
|---|---|
| 6.10 | 4.87 |
| 6.30 | 4.95 |
| 6.50 | 4.94 |
| 6.70 | 4.88 |
| 6.90 | 4.87 |
| 7.10 | 4.83 |
| 7.30 | 4.85 |
| 7.50 | 4.86 |
| 7.70 | 4.91 |
| 7.90 | 4.96 |
| 8.10 | 5.03 |
| 8.30 | 5.08 |
| 8.50 | 5.13 |
| 8.70 | 5.21 |
| 8.90 | 5.22 |
| 9.10 | 5.34 |
| 9.30 | 5.35 |
| 9.50 | 5.52 |
| 9.70 | 5.51 |
| 9.90 | 5.66 |
| 10.10 | 5.70 |
| 10.30 | 5.78 |
| 10.50 | 5.79 |
| 10.70 | 5.82 |
| 10.90 | 5.86 |
| 11.10 | 5.94 |
| 11.30 | 6.06 |
| 11.50 | 6.21 |
| 11.70 | 6.44 |
| 11.90 | 6.61 |
| 12.10 | 6.76 |
| 12.40 | 6.68 |
| 13.00 | 6.66 |
| 13.50 | 6.81 |
| 14.00 | 6.90 |
| 14.50 | 6.90 |
| 15.00 | 6.97 |
| 15.50 | 7.17 |
| 16.00 | 7.28 |
| 16.50 | 7.27 |
| 17.00 | 7.38 |
| 17.50 | 7.68 |
| 18.00 | 7.92 |

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**Cable loss**
**Cable Coaxial, GORE A2P01POL118, 2.3 m, model:GORE-3, HL 0589**
**+ Cable Coaxial, ANDREW PSWJ4, 6m, model: ANDREW-6, HL 1004**

| No. | Frequency, MHz | Cable loss, dB | Tolerance (Specification), dB | Measurement uncertainty, dB |
|---|---|---|---|---|
| 1 | 30 | 0.33 | 6.5 | ±0.12 |
| 2 | 50 | 0.40 | | |
| 3 | 100 | 0.57 | | |
| 4 | 300 | 0.97 | | |
| 5 | 500 | 1.25 | | |
| 6 | 800 | 1.59 | | |
| 7 | 1000 | 1.81 | | |
| 8 | 1200 | 1.97 | | |
| 9 | 1400 | 2.15 | | |
| 10 | 1600 | 2.28 | | |
| 11 | 1800 | 2.43 | | |
| 12 | 2000 | 2.61 | | |
| 13 | 2200 | 2.75 | | |
| 14 | 2400 | 2.89 | | |
| 15 | 2600 | 2.97 | | |
| 16 | 2800 | 3.21 | 6.5 | ±0.12 |
| 17 | 3000 | 3.32 | | |
| 18 | 3300 | 3.47 | | |
| 19 | 3600 | 3.62 | | |
| 20 | 3900 | 3.84 | | |
| 21 | 4200 | 3.92 | | ±0.17 |
| 22 | 4500 | 4.07 | | |
| 23 | 4800 | 4.36 | | |
| 24 | 5100 | 4.62 | | |
| 25 | 5400 | 4.78 | | |
| 26 | 5700 | 5.16 | | |
| 27 | 6000 | 5.67 | | |
| 28 | 6500 | 5.99 | | |

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**Cable loss**
**RF cable 8 m, model RG-214, HL 2009**

| No. | Frequency, MHz | Cable loss, dB | Tolerance (Specification), dB | Measurement uncertainty, dB |
|---|---|---|---|---|
| 1 | 1 | 0.10 | NA | ±0.12 |
| 2 | 10 | 0.14 | | |
| 3 | 30 | 0.25 | | |
| 4 | 50 | 0.34 | | |
| 5 | 100 | 0.53 | | |
| 6 | 300 | 0.99 | | |
| 7 | 500 | 1.31 | | |
| 8 | 800 | 1.73 | | |
| 9 | 1000 | 1.98 | | |
| 10 | 1100 | 2.11 | | |
| 11 | 1200 | 2.21 | | |
| 12 | 1300 | 2.35 | | |
| 13 | 1400 | 2.46 | | |
| 14 | 1500 | 2.55 | | |
| 15 | 1600 | 2.68 | | |
| 16 | 1700 | 2.78 | | |
| 17 | 1800 | 2.88 | | |
| 18 | 1900 | 2.98 | | |
| 19 | 2000 | 3.09 | | |

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**Cable loss**
**Cable 40 GHz, 0.8 m, blue, model: KPS-1503A-800-KPS, S/N W4907, HL 2254**

| Frequency, GHz | Cable loss, dB | Frequency, GHz | Cable loss, dB | Frequency, GHz | Cable loss, dB |
|---|---|---|---|---|---|
| 0.03 | 0.04 | 5.10 | 0.80 | 15.00 | 1.49 |
| 0.05 | 0.07 | 5.30 | 0.83 | 15.50 | 1.49 |
| 0.10 | 0.09 | 5.50 | 0.83 | 16.00 | 1.46 |
| 0.20 | 0.15 | 5.70 | 0.84 | 16.50 | 1.47 |
| 0.30 | 0.19 | 5.90 | 0.87 | 17.00 | 1.50 |
| 0.40 | 0.25 | 6.10 | 0.86 | 17.50 | 1.57 |
| 0.50 | 0.29 | 6.30 | 0.89 | 18.00 | 1.63 |
| 0.60 | 0.33 | 6.50 | 0.90 | 18.50 | 1.57 |
| 0.70 | 0.37 | 6.70 | 0.89 | 19.00 | 1.63 |
| 0.80 | 0.41 | 6.90 | 0.93 | 19.50 | 1.65 |
| 0.90 | 0.44 | 7.10 | 0.92 | 20.00 | 1.64 |
| 1.00 | 0.45 | 7.30 | 0.95 | 20.50 | 1.75 |
| 1.10 | 0.48 | 7.50 | 0.96 | 21.00 | 1.72 |
| 1.20 | 0.51 | 7.70 | 0.97 | 21.50 | 1.78 |
| 1.30 | 0.53 | 7.90 | 1.01 | 22.00 | 1.76 |
| 1.40 | 0.54 | 8.10 | 1.00 | 22.50 | 1.72 |
| 1.50 | 0.57 | 8.30 | 1.05 | 23.00 | 1.83 |
| 1.60 | 0.59 | 8.50 | 1.04 | 23.50 | 1.80 |
| 1.70 | 0.04 | 8.70 | 1.07 | 24.00 | 1.90 |
| 1.80 | 0.07 | 8.90 | 1.11 | 24.50 | 1.81 |
| 1.90 | 0.09 | 9.10 | 1.09 | 25.00 | 1.98 |
| 2.00 | 0.15 | 9.30 | 1.14 | 25.50 | 1.91 |
| 2.10 | 0.19 | 9.50 | 1.12 | 26.00 | 2.02 |
| 2.20 | 0.25 | 9.70 | 1.15 | 26.50 | 1.92 |
| 2.30 | 0.29 | 9.90 | 1.16 | 27.00 | 1.97 |
| 2.40 | 0.33 | 10.10 | 1.16 | 28.00 | 2.02 |
| 2.50 | 0.37 | 10.30 | 1.19 | 29.00 | 1.95 |
| 2.60 | 0.41 | 10.50 | 1.14 | 30.00 | 1.94 |
| 2.70 | 0.44 | 10.70 | 1.19 | 31.00 | 2.11 |
| 2.80 | 0.45 | 10.90 | 1.17 | 32.00 | 2.17 |
| 2.90 | 0.48 | 11.10 | 1.13 | 33.00 | 2.27 |
| 3.10 | 0.61 | 11.30 | 1.20 | 34.00 | 2.27 |
| 3.30 | 0.64 | 11.50 | 1.13 | 35.00 | 2.29 |
| 3.50 | 0.65 | 11.70 | 1.20 | 36.00 | 2.35 |
| 3.70 | 0.68 | 11.90 | 1.18 | 37.00 | 2.37 |
| 3.90 | 0.69 | 12.10 | 1.14 | 38.00 | 2.40 |
| 4.10 | 0.71 | 12.40 | 1.19 | 39.00 | 2.57 |
| 4.30 | 0.73 | 13.00 | 1.34 | 40.00 | 2.36 |
| 4.50 | 0.75 | 13.50 | 1.33 | | |
| 4.70 | 0.77 | 14.00 | 1.48 | | |
| 4.90 | 0.79 | 14.50 | 1.45 | | |

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**Cable loss**
**Cable coaxial, 6 m, model: M17/167 MIL-C-17, HL 1502**

| Frequency, MHz | Cable loss, dB |
|---|---|
| 0.1 | 0.02 |
| 1 | 0.07 |
| 3 | 0.15 |
| 5 | 0.17 |
| 10 | 0.26 |
| 30 | 0.43 |
| 50 | 0.57 |
| 80 | 0.72 |
| 100 | 0.81 |
| 300 | 1.48 |
| 500 | 2.00 |
| 800 | 2.70 |
| 1000 | 3.09 |

**Cable loss**
**Cable M17/167 MIL-C-17, HL 1510**

| No. | Frequency, MHz | Cable loss, dB |
|---|---|---|
| 1 | 0.1 | 0.05 |
| 2 | 1 | 0.09 |
| 3 | 3 | 0.16 |
| 4 | 5 | 0.18 |
| 5 | 10 | 0.27 |
| 6 | 30 | 0.44 |
| 7 | 50 | 0.58 |
| 8 | 80 | 0.69 |
| 9 | 100 | 0.82 |
| 10 | 300 | 1.48 |
| 11 | 500 | 2.01 |
| 12 | 800 | 2.65 |
| 13 | 1000 | 3.12 |

**Correction factor**
**Line impedance stabilization network, Electro-Metrics**
**Model ANS-25/2**

| Frequency, kHz | Correction factor, dB |
|---|---|
| 10 | 4.9 |
| 15 | 2.86 |
| 20 | 1.83 |
| 25 | 1.25 |
| 30 | 0.91 |
| 35 | 0.69 |
| 40 | 0.53 |
| 50 | 0.35 |
| 60 | 0.25 |
| 70 | 0.18 |
| 80 | 0.14 |
| 90 | 0.11 |
| 100 | 0.09 |
| 125 | 0.06 |
| 150 | 0.04 |

The correction factor in dB is to be added to meter readings of an interference analyzer or a spectrum analyzer.

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# Appendix D General information

## Test facility description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private EMC, safety, environmental and telecommunication testing facility. Hermon Laboratories is listed by the Federal Communications Commission (USA) for all parts of Code of Federal Regulations 47 (CFR 47) and by Industry Canada for electromagnetic emissions (file numbers IC 2186-1 for OATS and IC 2186-2 for anechoic chamber), certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, C-845 for conducted emissions site), assessed by TNO Certification EP&S (Netherlands) for a number of EMC, telecommunications, environmental, safety standards, and by AMTAC (UK) for safety of medical devices. The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing and environmental simulation (for exact scope please refer to Certificate No. 839.01) and approved by Israel Ministry of environmental protection, radiation hazards department (Permit number 1158).

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## Abbreviations and acronyms

The following abbreviations and acronyms are applicable to this test report:

| | |
|---|---|
| AC | alternating current |
| cm | centimeter |
| dB | decibel |
| dBm | decibel referred to one milliwatt |
| dB(μV) | decibel referred to one microvolt |
| dB(μV/m) | decibel referred to one microvolt per meter |
| EMC | electromagnetic compatibility |
| EUT | equipment under test |
| GHz | gigahertz |
| H | height |
| Hz | hertz |
| kHz | kilohertz |
| kV | kilovolt |
| L | length |
| LNA | low noise amplifier |
| m | meter |
| MHz | megahertz |
| NA | not applicable |
| QP | quasi-peak |
| RF | radio frequency |
| rms | root mean square |
| s | second |
| UNII | Unlicensed National Information Infrastructure |
| V | volt |
| W | width |

## Specification references

| | |
|---|---|
| 47CFR part 15: 2002 | Radio Frequency Devices |
| ANSI C63.2:96 | American National Standard for Instrumentation-Electromagnetic Noise and Field Strength, 10 kHz to 40 GHz-Specifications. |
| ANSI C63.4:92 | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. |
| FCC Public Notice DA 02-2138 August 30, 2002 | Measurement procedure updated for peak transmit power in U-NII bands |