



**NEBRASKA CENTER FOR EXCELLENCE IN ELECTRONICS**  
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## Test Report

Company: Telex Communications  
8601 East Cornhusker Highway  
Lincoln, NE 68505  
Contact: Roger Cox  
Product: 2480AA  
FCC ID: B5D-AP200MW

Test Report No: R030904-05a

APPROVED BY: Steve Cass  
General Manager

A handwritten signature in black ink, appearing to read "Steve Cass", is written over a horizontal line.

Doug Kramer  
Test Engineer

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DATE: 23 April 2004  
Total Pages: 82

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**1.0 Summary of test results****1.1 Test Results**

| Test                    | Test Specification      | Results  |
|-------------------------|-------------------------|----------|
| CFR 47, FCC Part 15.203 | Part 15.203             | Complies |
| CFR 47, FCC Part 15.207 | Part 15.207, Class B    | Complies |
| CFR 47, FCC Part 15.209 | Part 15.109, Class B    | Complies |
| CFR 47, FCC Part 15.247 | Parts 15.209 and 15.247 | Complies |

**1.2 Test Methods****1.2.1 Conducted Emissions**

Measurements of conducted emissions to the limits set in CFR 47 Part 15.207 were conducted using the methods shown in ANSI/IEEE C63.4, 2001. Several configurations were examined the results presented represent a worst-case scenario. The EUT was placed on a wooden table approximately 80 centimeters high, positioned 40 centimeters from the vertical ground plane and 80 centimeters or more away from any other conductive surface.

**1.2.2 Radiated Emissions**

Compliance to CFR 47 Parts 15.109/209 and 15.247 was tested in accordance with the methods of ANSI/IEEE C63.4, 2001. Several configurations were examined the results presented represent a worst-case scenario. The EUT was mounted on a wooden table 80 centimeters high and centered on a 4 meter diameter turntable. The table was rotated to maximize emissions. All measurements below 18GHz were taken at a distance of 3 meters from the EUT. Measurements above 18GHz were made at a distance of 1 meter.

## 2.0 Description

### 2.1 Equipment under test

The DSSS transmitter and receiver of the EUT is powered via a PCMCIA interface to the LAN interface PCB. The transmitter and receiver of the EUT are connected to a 14.5 dBi sector antenna (Telex model 2444AA) through a 15 foot length of Times Microwave LMR-400 cable. The transmitter and receiver may use separate similar antennas in a diversity mode. The LAN interface PCB is connected to an outdoor-rated Ethernet cable (CAT-5) from which it receives both data and DC power. The DSSS transmitter and receiver consists of a PCMCIA radio card, Senao model NL-2511CD PLUS EXT2 (FCC ID: NI3-2511CD-PLUS3). A 9.5dBi omni antenna (Telex model 2439AA-1) with 3 feet of Times Microwave LMR-400 cable was also tested. The EUT is powered by an 18V DC Globtek power supply through a Power over Ethernet (PoE) adapter box.

2.1.1 Identification: 2480AA

2.1.2 EUT received date: 10 March 2004

2.1.3 EUT tested dates: 11<sup>th</sup> – 28<sup>th</sup> March 2004

2.1.4 Manufacturer: Telex Communications

2.1.5 Serial number: MAC 00026F01F90F

### 2.2 Laboratory description

All testing was performed at the NCEE Lincoln facility, which is a FCC registered lab. This site has been fully described in a report submitted to the FCC office, and accepted in a letter dated May 4, 2001.

### 2.3 Special equipment or setup

The transmit mode was a continuous RF on setting at 11Mbps and power F0. The EUT is a diversity receiver. One 14.5dBi antenna was connected to the dual purpose TX/RX port and the other 14.5dBi antenna was connected to the RX only port. The 9.5dBi antenna was only tested when connected to the dual purpose TX/RX port.

### 3.0 Test equipment used

| <i>Serial #</i> | <i>Manufacturer</i> | <i>Model</i> | <i>Description</i> | <i>Last cal.</i> |
|-----------------|---------------------|--------------|--------------------|------------------|
| 1654            | EMCO                | 3142B        | Biconilog antenna  | 03-May-03        |
| 6415            | EMCO                | 3115         | DRG Horn           | 29-Apr-03        |
| 2576            | EMCO                | 3116         | DRG Horn           | 29-Apr-03        |
| 100037          | Rohde & Schwarz     | ESIB26       | EMI Test Receiver  | 02-Jul-03        |
| 100007          | Rohde & Schwarz     | ESIB7        | EMI Test Receiver  | 26-May-03        |
| 082001/003      | Rohde & Schwarz     | TS-PR18      | Preamplifier       | N/A              |
| 2575            | Rohde & Schwarz     | ES-K1        | Software v1.60     | N/A              |
| 836679/010      | Rohde & Schwarz     | ESH3-Z5      | Artificial Mains   | 29-Apr-03        |
| 200332488       | Trilithic           | 23042        | High pass filter   | N/A              |

### 4.0 Detailed Results

Radiated emissions measurements were made by first using a spectrum analyzer getting a rough signal spectrum, any points were then measured using a CISPR 16 compliant receiver with the following bandwidth setting:

30MHz - 1GHz: 120kHz IF bandwidth, 60kHz steps

Above 1GHz: 1MHz IF bandwidth, 500kHz steps

Conducted measurements were made using a CISPR 16 compliant receiver with the IF bandwidth set to 9kHz taking 5kHz steps through the range 150kHz to 30MHz.

All results shown are corrected to incorporate cables losses, antenna factors, and any amplification.

#### 4.1 FCC Part 15.203 Antenna Requirement

The antenna is attached to the 2480AA via an N-type connector. The 2480AA and antennas must be professionally installed. Other antennas and their specifications to be used with the 2480AA are in Appendix G.

#### 4.2 FCC Part 15.207 Conducted Emissions

The EUT was tested with the transmitter operating with a continuous RF signal. The RF output was into a 50ohm RF load. The setup can be seen in Figures 3 and 4. The results can be seen in Figure 27. The worst case emission was at 390kHz on the Line conductor. The quasi-peak value at 390kHz was 48.9dBuV which is 9.1dB under the limit. The plot shown in Figure 27 is a composite worst-case of the Line and Neutral conductors.

#### 4.3 FCC Part 15.109 Radiated Emissions, Receive only

The EUT was found to not produce any emissions in excess of the Class 'B' limits. The test setup can be seen in Figure 1 for the 14.5dBi antennas and Figure 2 for the 10dBi antenna. More information on the radiated emissions can be found in Section 4.4. The transmitter was not active for these measurements. Appendix C shows the measured values denoted by a red '+' or blue '+' in Figures 25 and 26. The red '+' is the quasi-peak or average measurement while

the blue ‘+’ in Figures 25 and 26 show the peak values. No values were found to be in excess of the limits. A table of the values can be seen in Appendix C. All measurements were made at a distance of 3 meters.

#### 4.4 FCC Parts 15.209 and 15.247 Radiated Emissions, Transmit only

The EUT was tested with the transmitter operating with a continuous RF signal at three frequencies in the lower, middle and upper portions of the band. The frequencies chosen were Channel 1 (2.412GHz), Channel 5 (2.432GHz), and Channel 11 (2.462GHz). No spurious emissions were noted above 18GHz. Appendix B shows the worst-case emissions for each channel in the ranges of 30MHz – 1GHz, 1GHz – 3GHz, and 3GHz – 18GHz while the EUT was transmitting. Figures 5 through 15 show the emissions plots for the 14.5dBi antennas. Figures 6-16 show the emissions plots for the 9.5dBi antenna. The peak and quasi-peak measurements below 1GHz were found not to exceed the limits. The peak and average measurements between 1GHz and 3GHz did not exceed limits outside of the transmitters operating band. The peak and average measurement between 3GHz and 18GHz did not exceed the limits. The test setup can be seen in Figure 1 for the 14.5dBi antennas and Figure 2 for the 9.5dBi antenna. The EUT was mounted on a table 80 centimeters above a ground plane. Appendix D contains the results of testing the 3 transmitter frequencies. Appendix B shows the measured values denoted by a red ‘+’ or a blue ‘+’ in Figures 5 through 26. The red ‘+’ is the quasi-peak or average measurement while the blue ‘+’ in Figures 5 through 26 show the peak values.

#### 4.5 Bandedge and Conducted Power Measurements

The EUT was tested at Channel 1 and Channel 11 for the bandedge measurements. The EUT was tested on Channels 1, 5 and 11 for the conducted power measurements. Appendix F shows the results and the plots of bandedge and conducted power measurements. The radiated peak and average values were tested with the antenna centered on the turntable. The maximum calculated emission with the 14.5dBi antenna in the 2.31GHz – 2.39GHz restricted band is 63.14dBuV/m for peak and 55.70dBuV/m for average. The bandedge average measurement for channel 1 is in excess of the 54dBuV/m limit. The figures in Appendix F show that the product does comply with the bandedge requirements. The maximum calculated emission with the 14.5dBi antenna in the 2.4835GHz – 2.5GHz restricted band is 56.46dBuV/m for peak and 45.08dBuV/m for average. The maximum emission in the upper restricted band fell within 2MHz of 2.4835GHz as shown in Figures 43 and 44.

|               | Channel   |           |           |
|---------------|-----------|-----------|-----------|
|               | 1         | 5         | 11        |
| 6dB Bandwidth | 9.9 MHz   | 9.9 MHz   | 9.9 MHz   |
| Maximum Power | 19.9 dBm  | 20.4 dBm  | 20.1 dBm  |
| Maximum PSD   | -5.72 dBm | -5.10 dBm | -5.26 dBm |

## **Appendix A: Photos**



**Figure 1 Radiated Emissions Test Setup - 14.5dBi Panels**



**Figure 2 Radiated Emissions Test Setup - 9.5dBi Omni**



**Figure 3 Conducted Emissions Test Setup**



**Figure 4 Conducted Emissions Test Setup**

## **Appendix B: Emissions Plots**

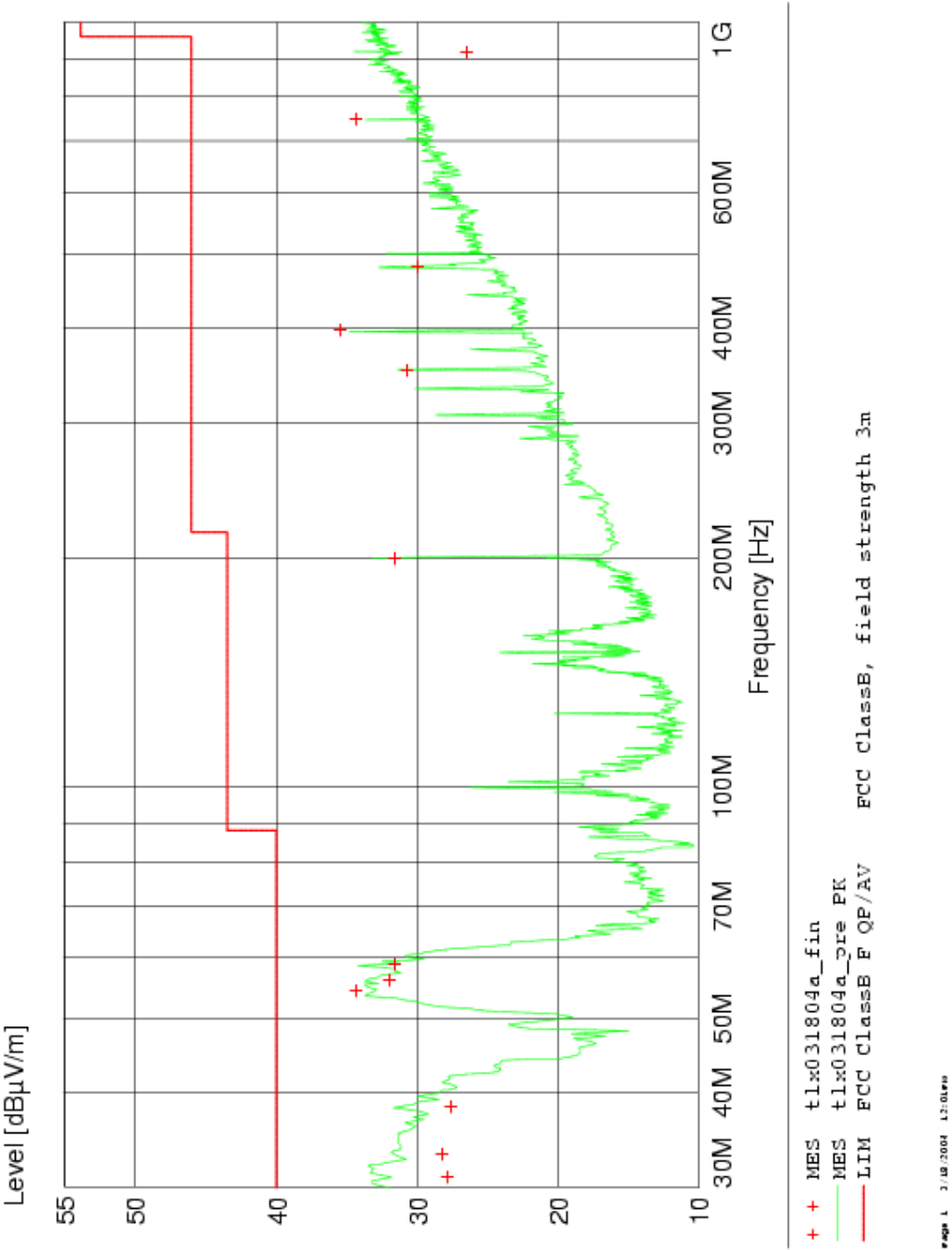


Figure 5 Radiated Emissions Plot 14.5dBi Panel, Channel 1, 30MHz - 1GHz

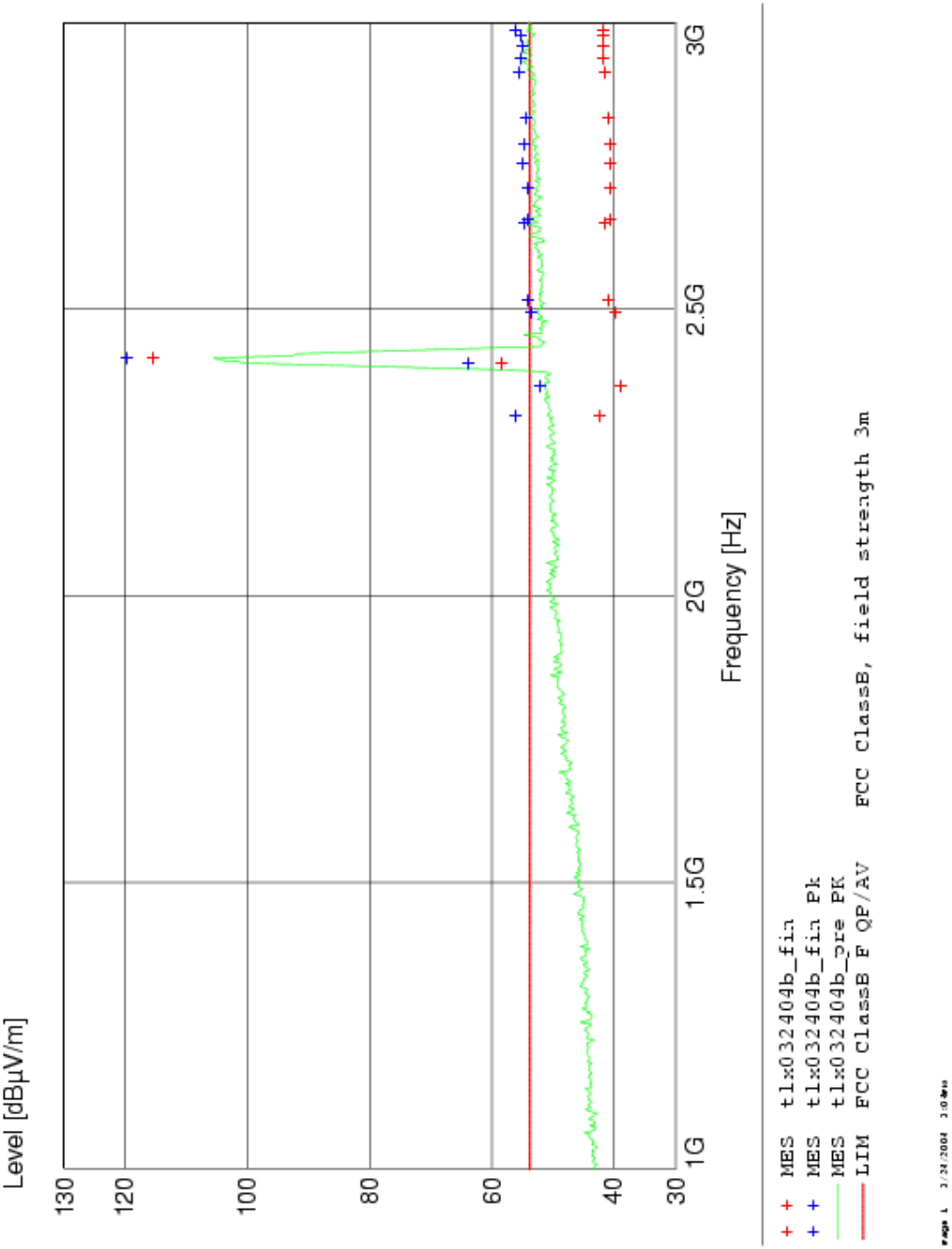


Figure 6 Radiated Emissions Plot 14.5dBi Panel, Channel 1, 1GHz - 3GHz

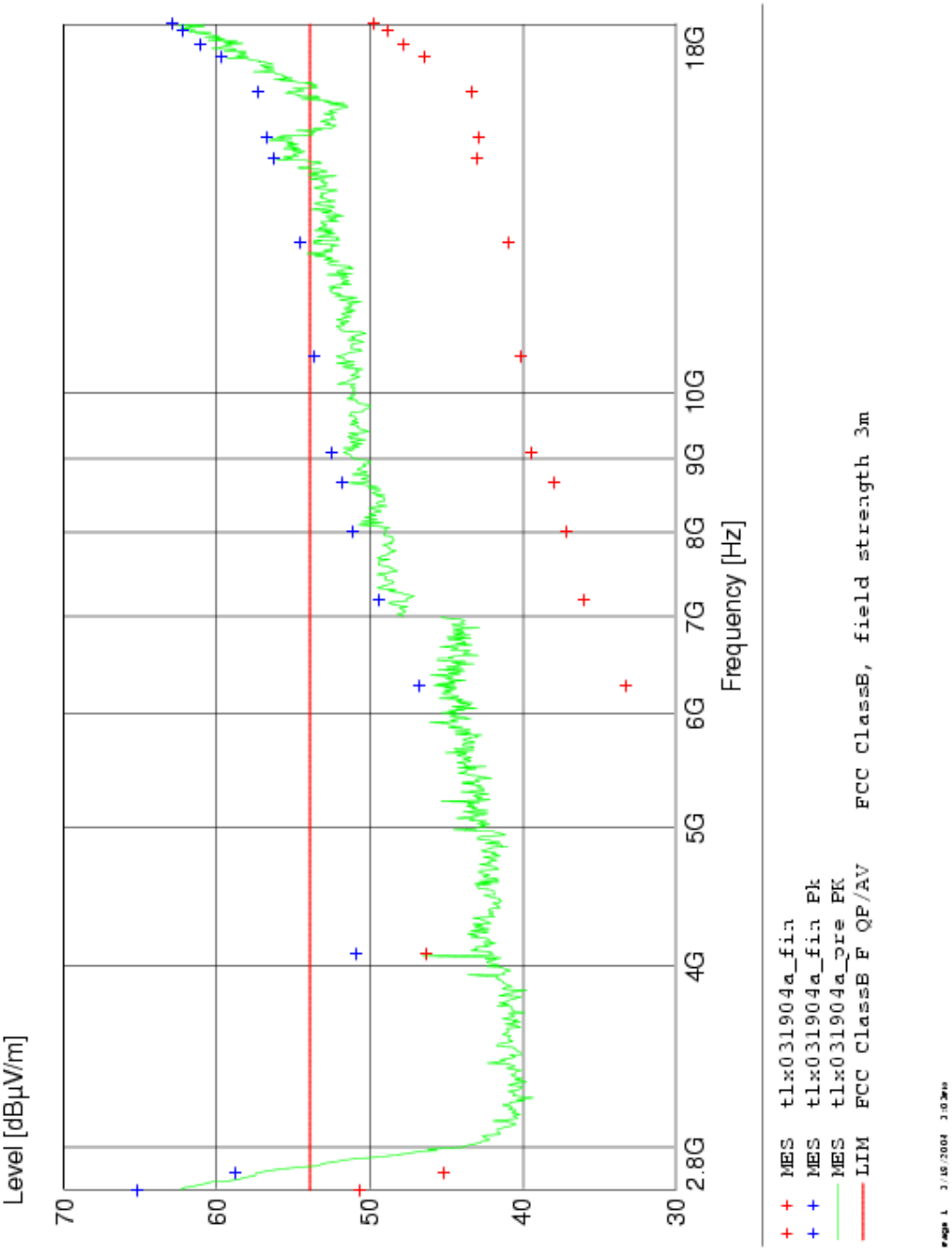


Figure 7 Radiated Emissions Plot 14.5dBi Panel, Channel 1, 2.8GHz - 18GHz

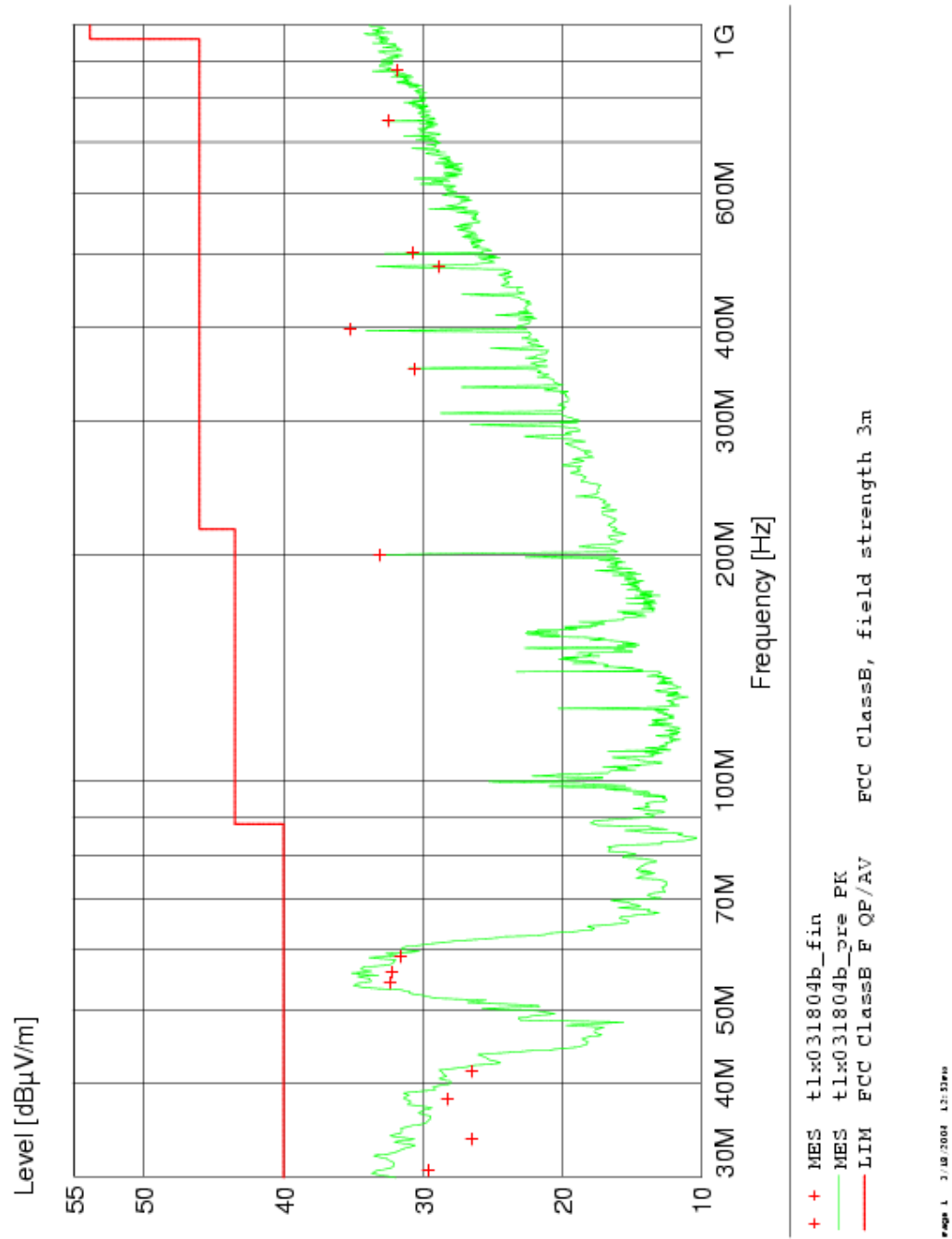


Figure 8 Radiated Emissions Plot 14.5dBi Panel, Channel 5, 30MHz - 1GHz

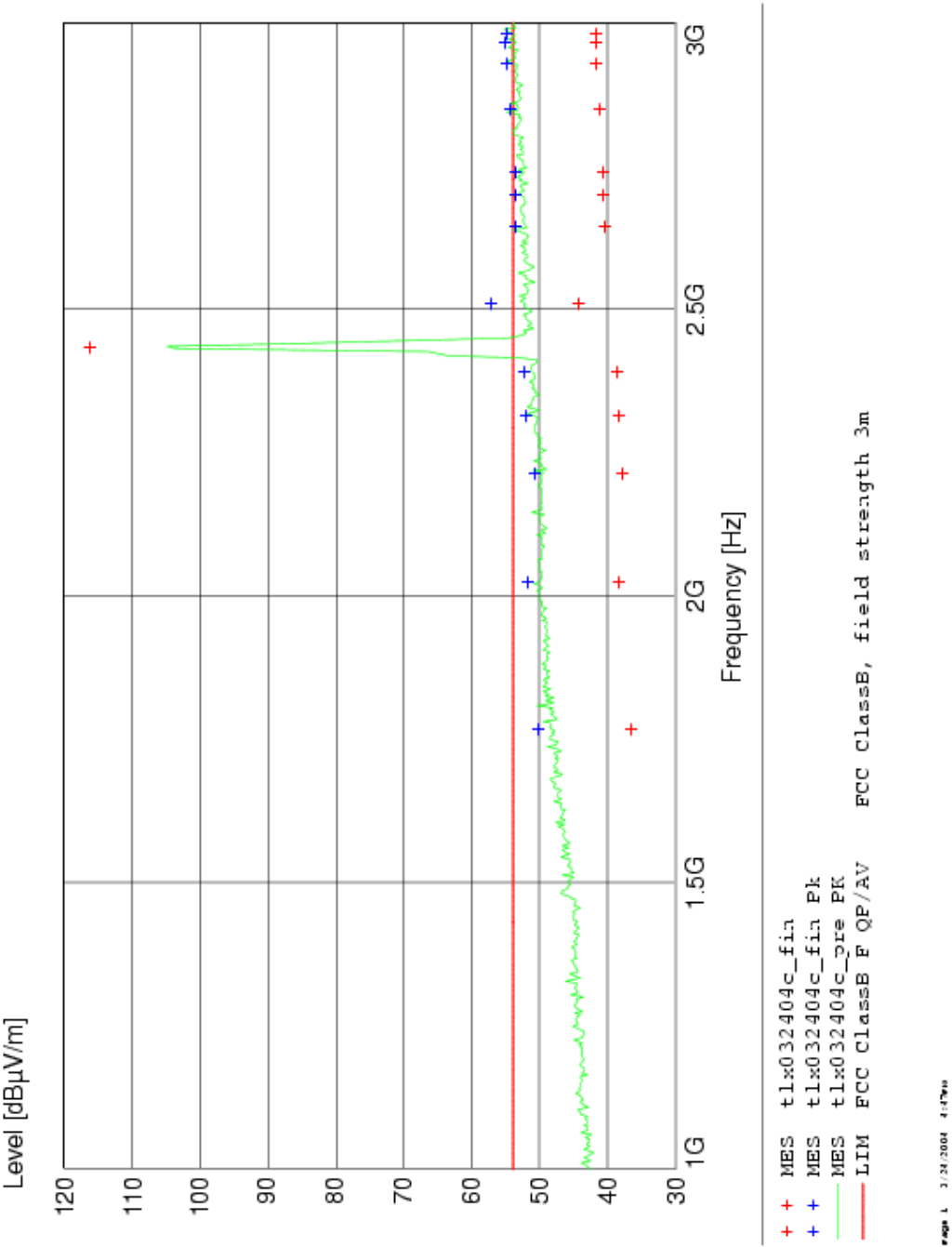


Figure 9 Radiated Emissions Plot 14.5dBi Panel, Channel 5, 1GHz - 3GHz

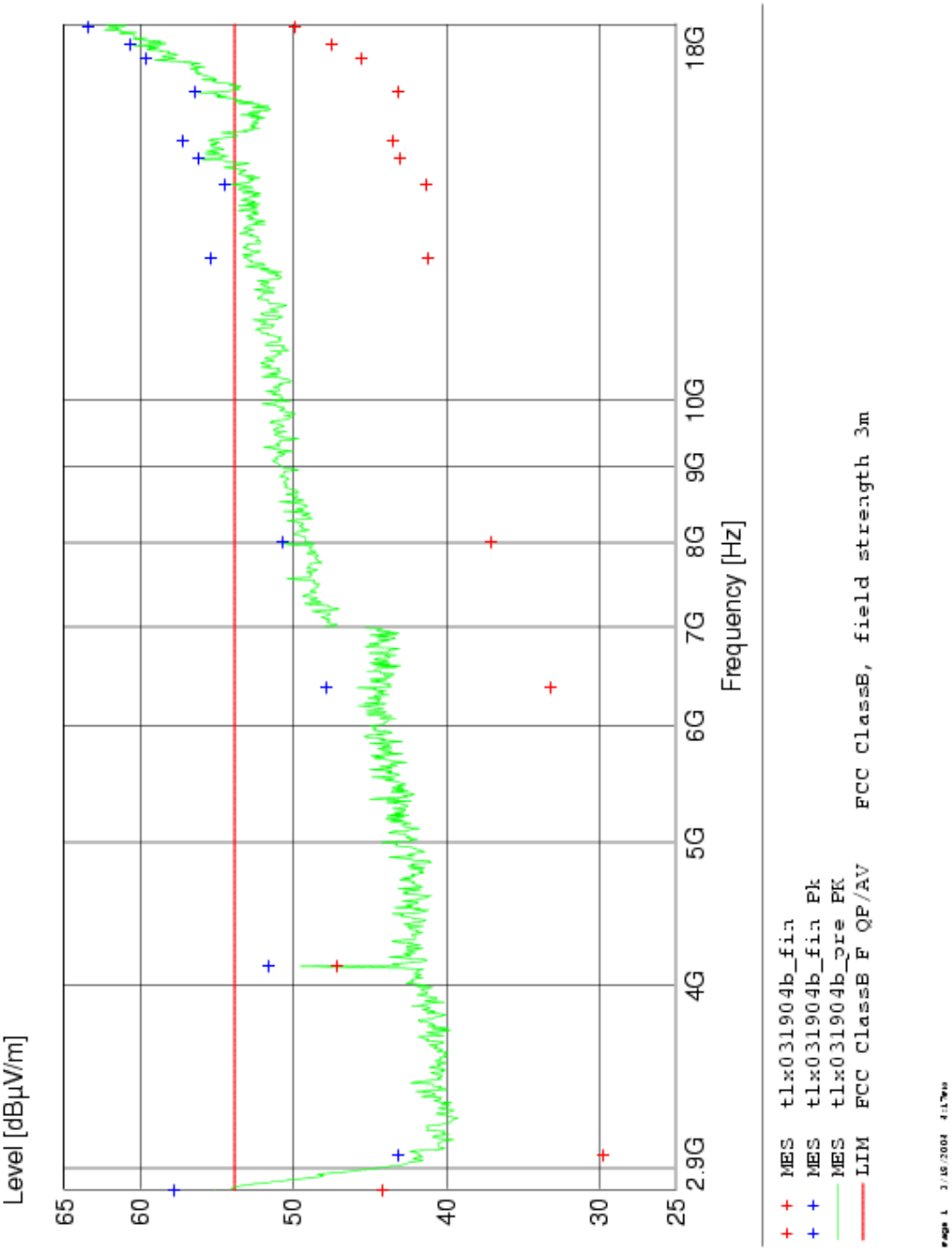


Figure 10 Radiated Emissions Plot 14.5dBi Panel, Channel 5, 2.9GHz - 18GHz

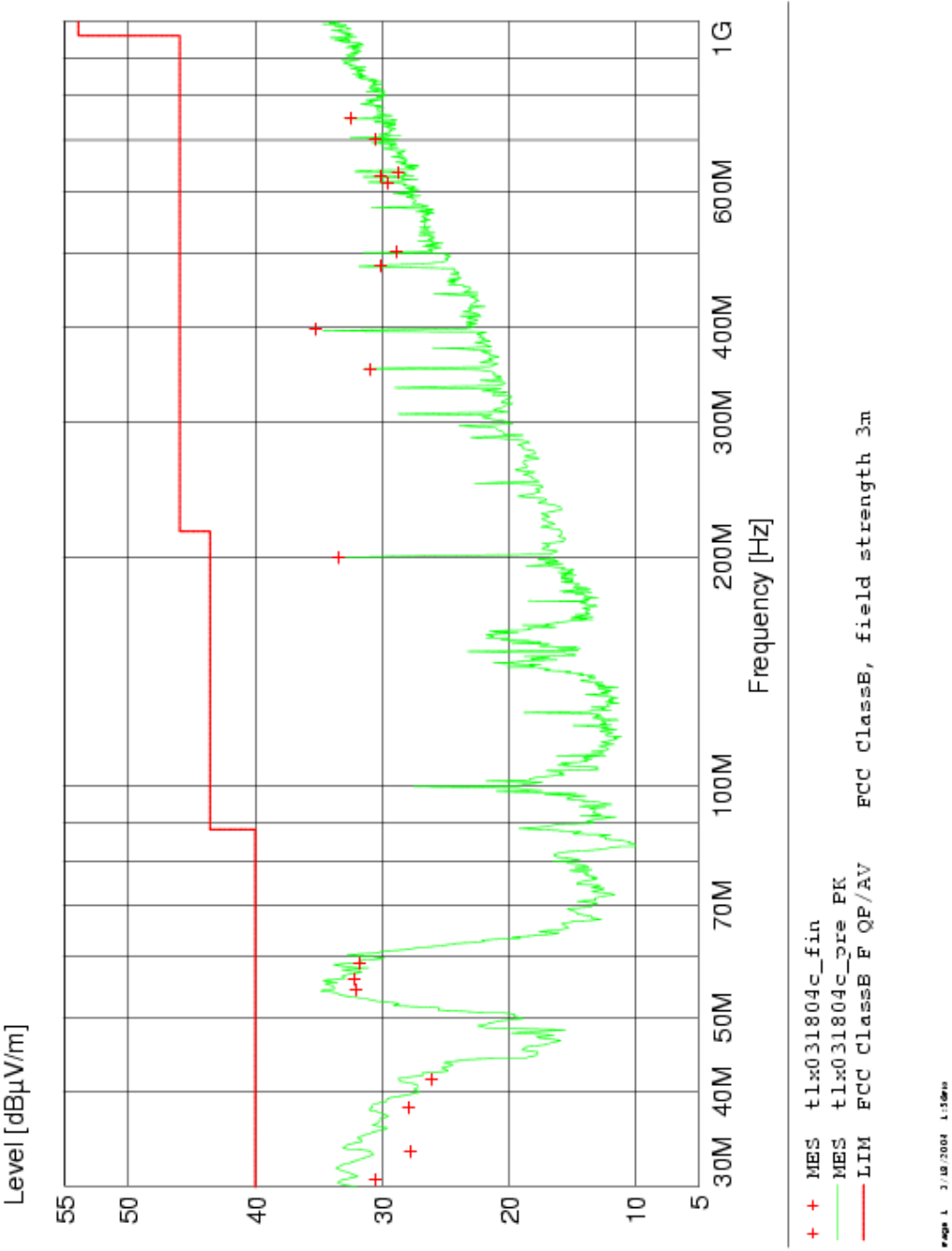


Figure 11 Radiated Emissions Plot 14.5dBi Panel, Channel 11, 30MHz - 1GHz

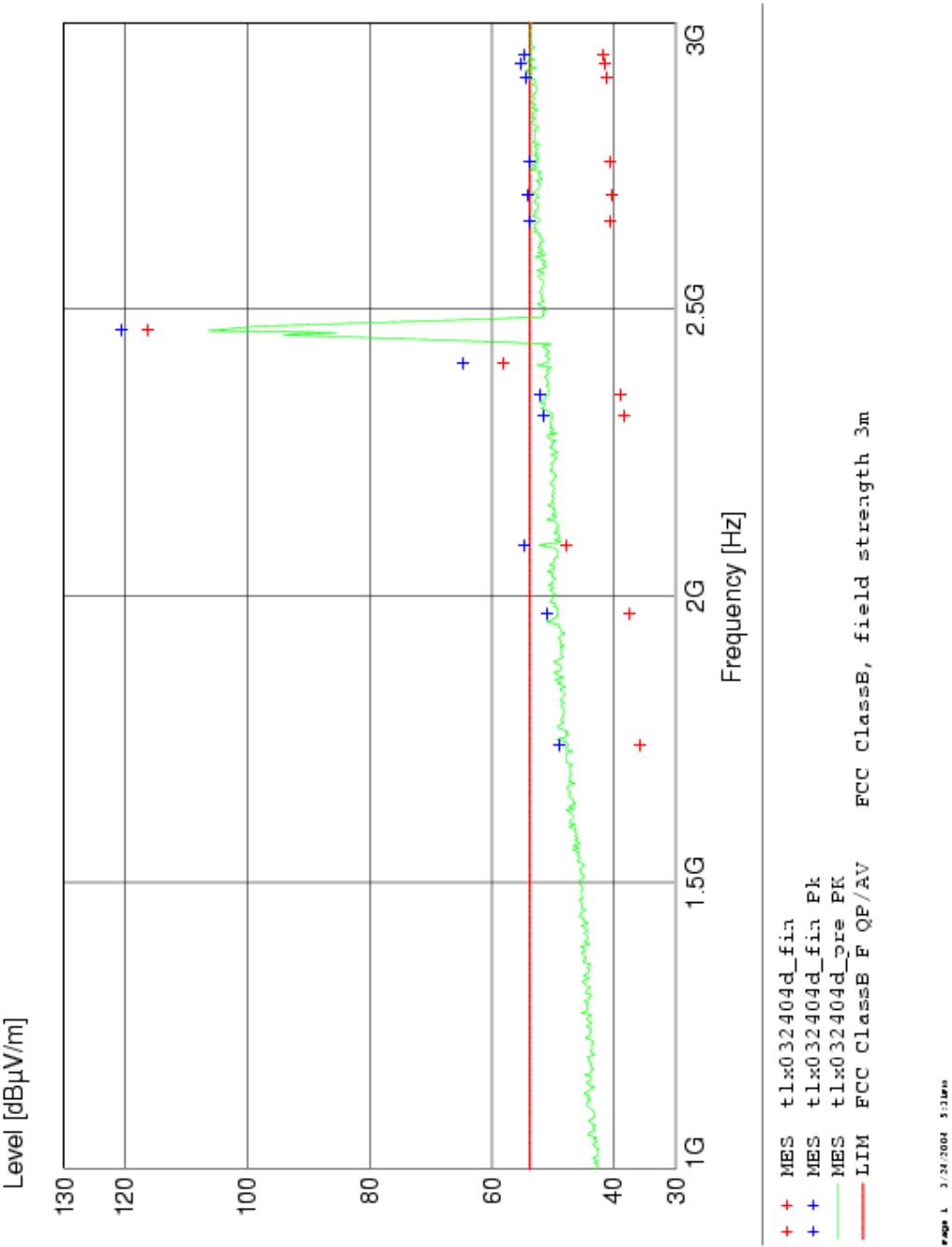


Figure 12 Radiated Emissions Plot 14.5dBi Panel, Channel 11, 1GHz - 3GHz

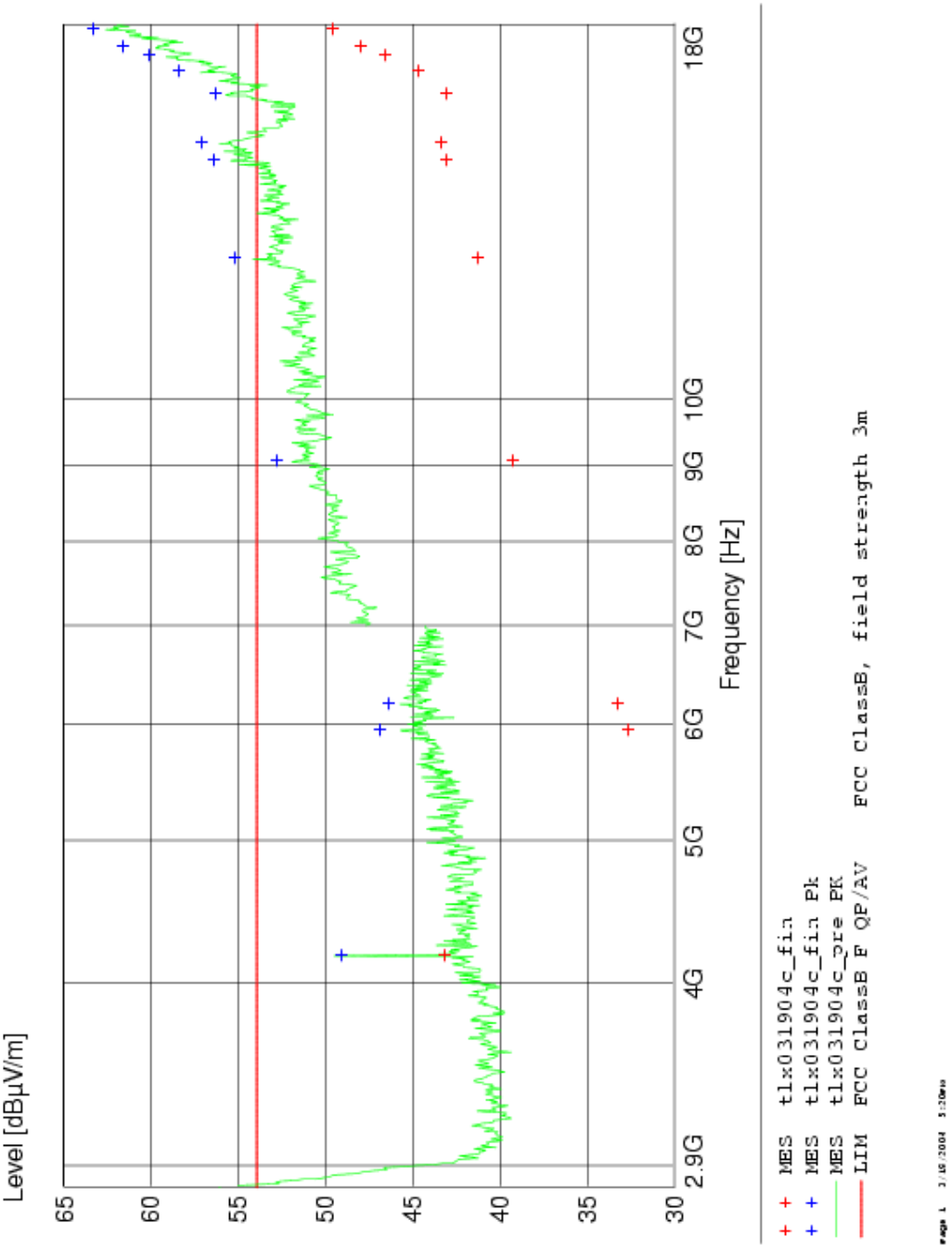


Figure 13 Radiated Emissions Plot 14.5dBi Panel, Channel 11, 2.9GHz - 18GHz

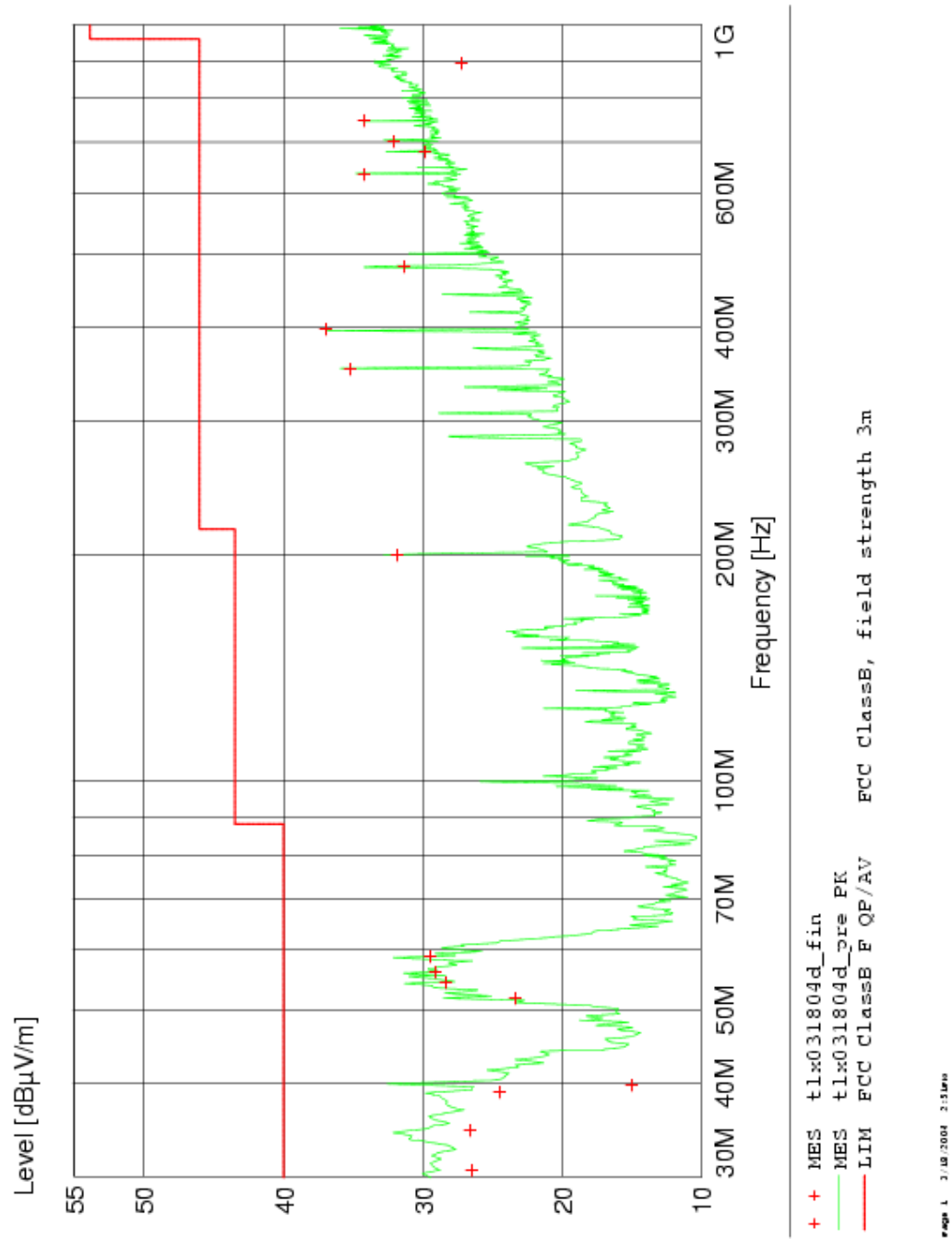


Figure 14 Radiated Emissions Plot 14.5dBi Panel, Receive Only, 30MHz - 1GHz

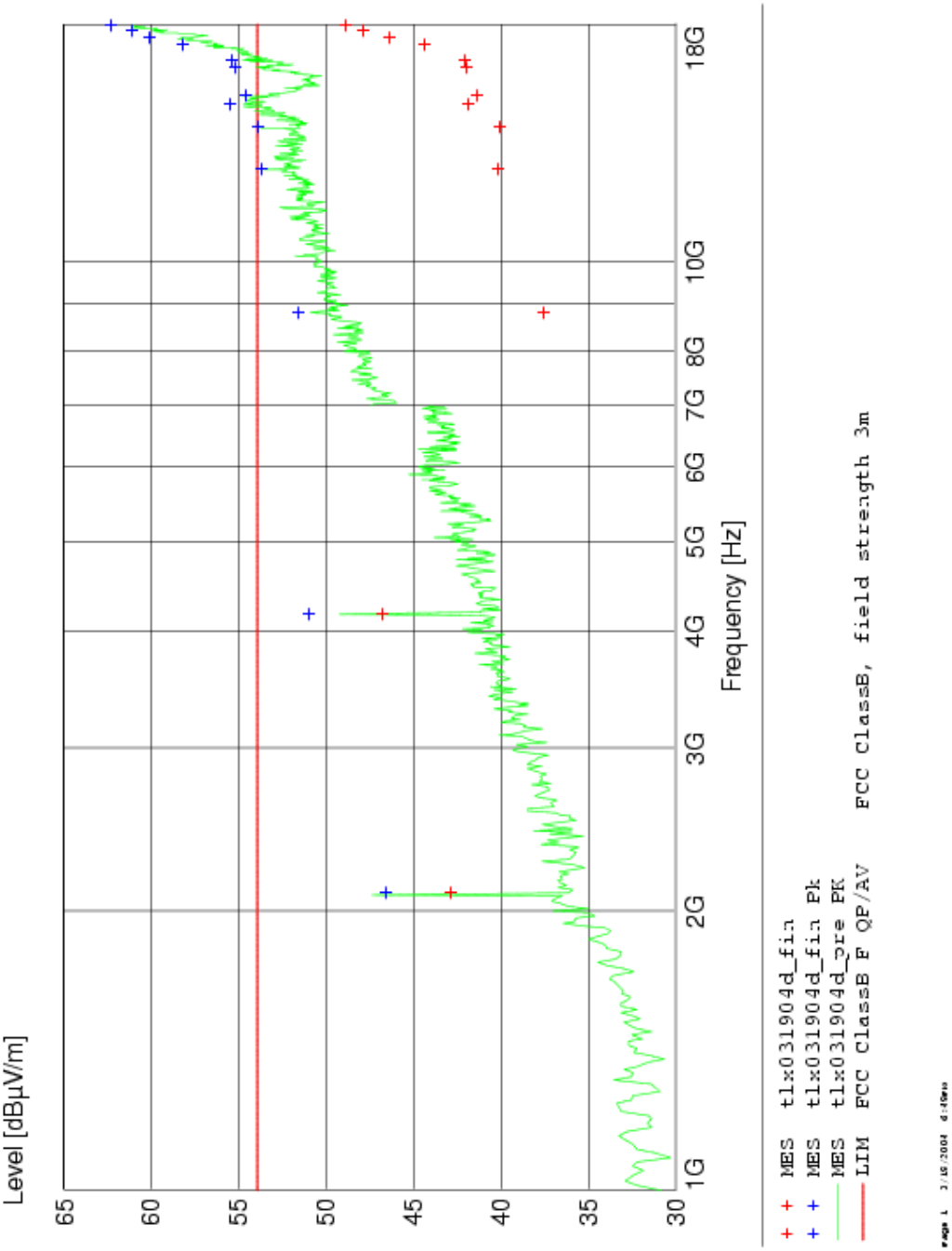


Figure 15 Radiated Emissions Plot 14.5dBi Panel, Receive Only, 1GHz - 18GHz

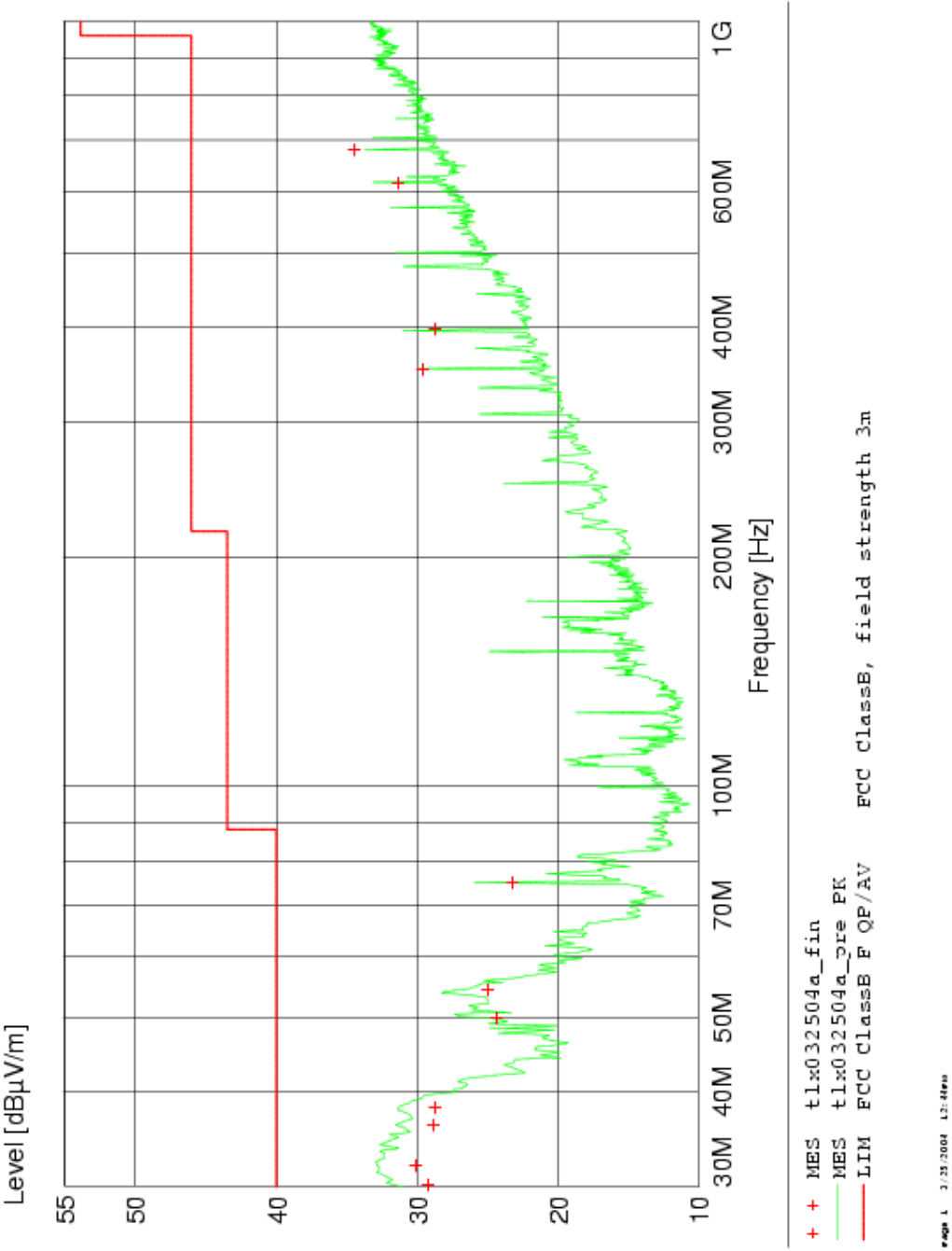


Figure 16 Radiated Emissions Plot 9.5dBi Omni, Channel 1, 30MHz - 1GHz

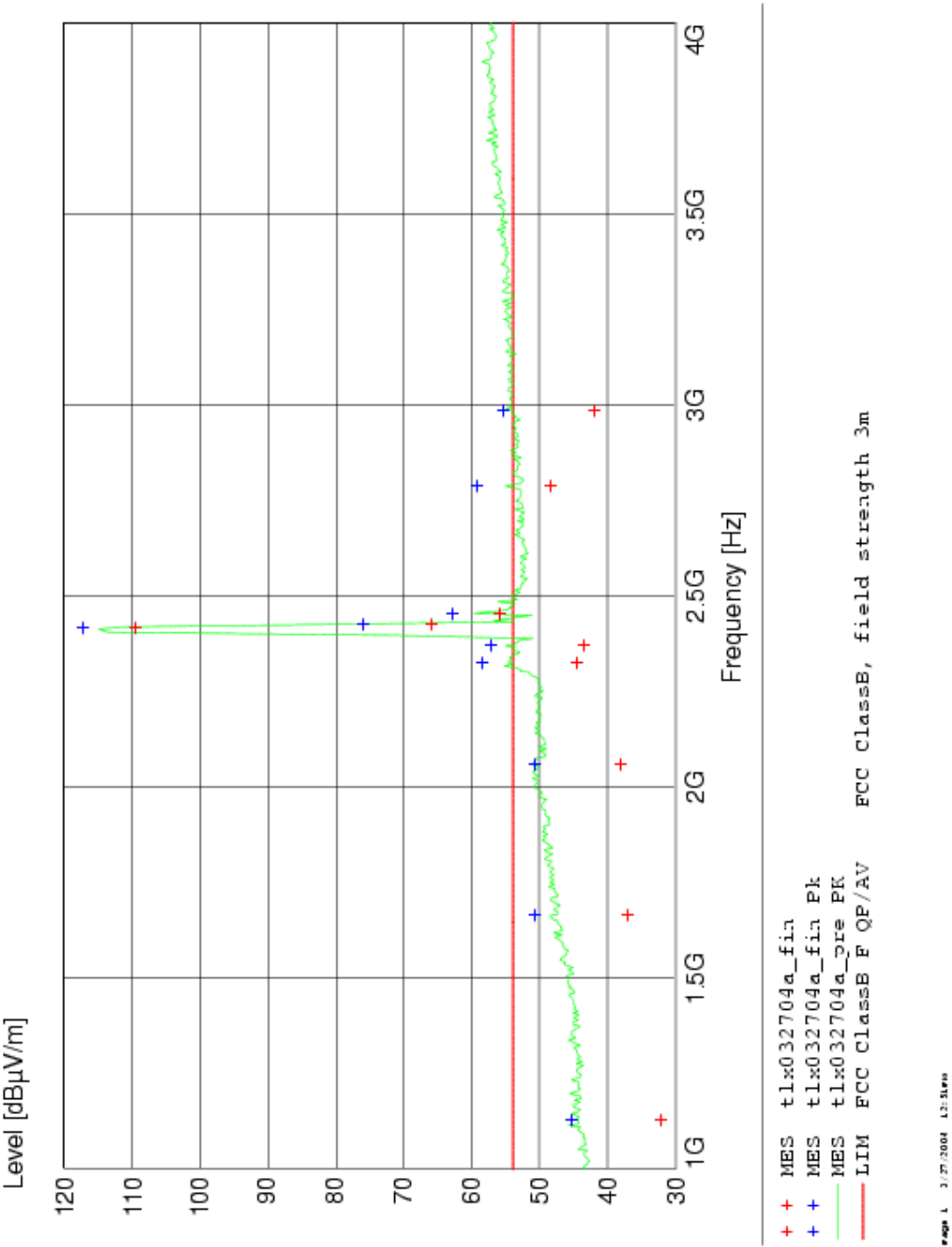


Figure 17 Radiated Emissions Plot 9.5dBi Omni, Channel 1, 1GHz - 4GHz

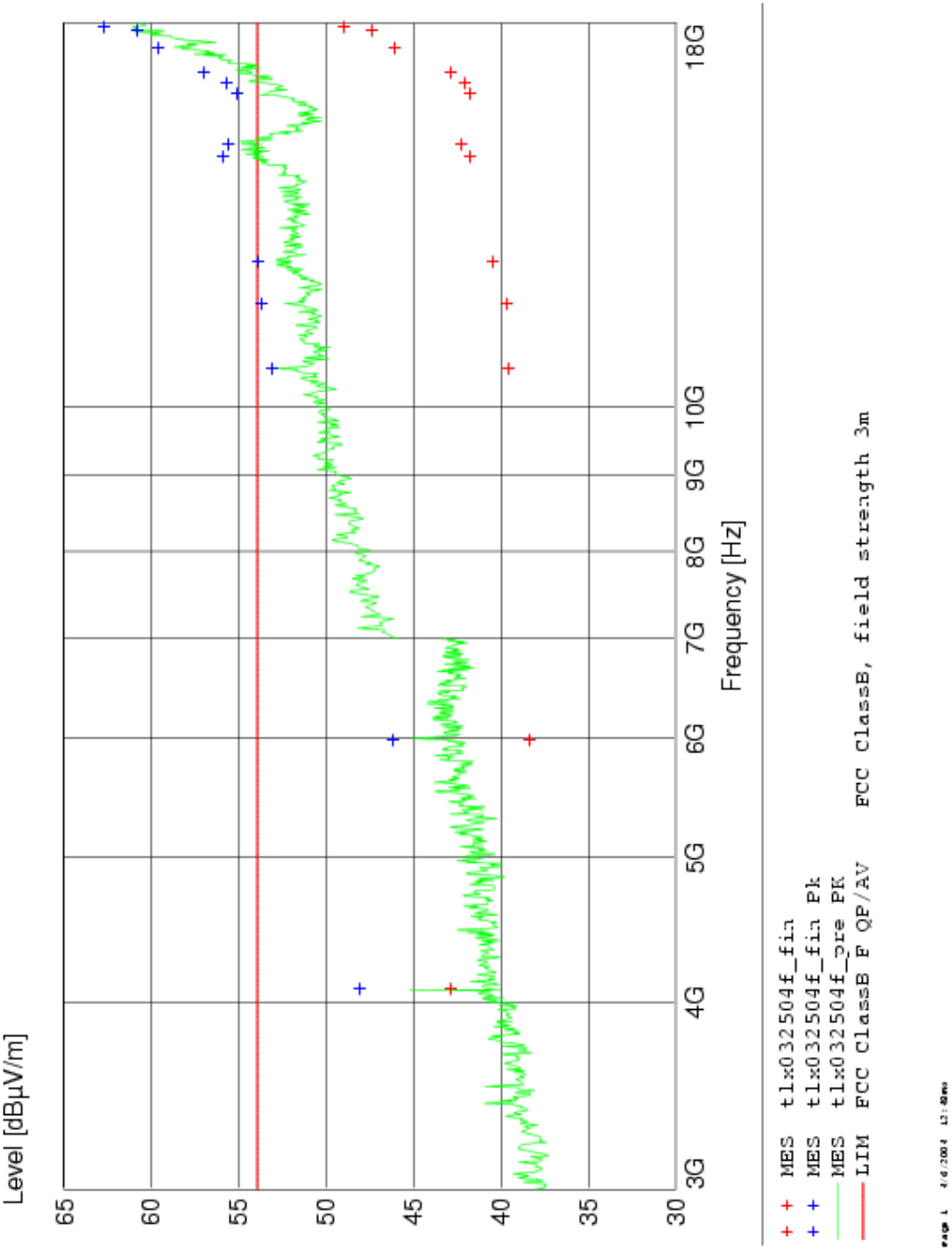


Figure 18 Radiated Emissions Plot 9.5dBi Omni, Channel 1, 3GHz - 18GHz

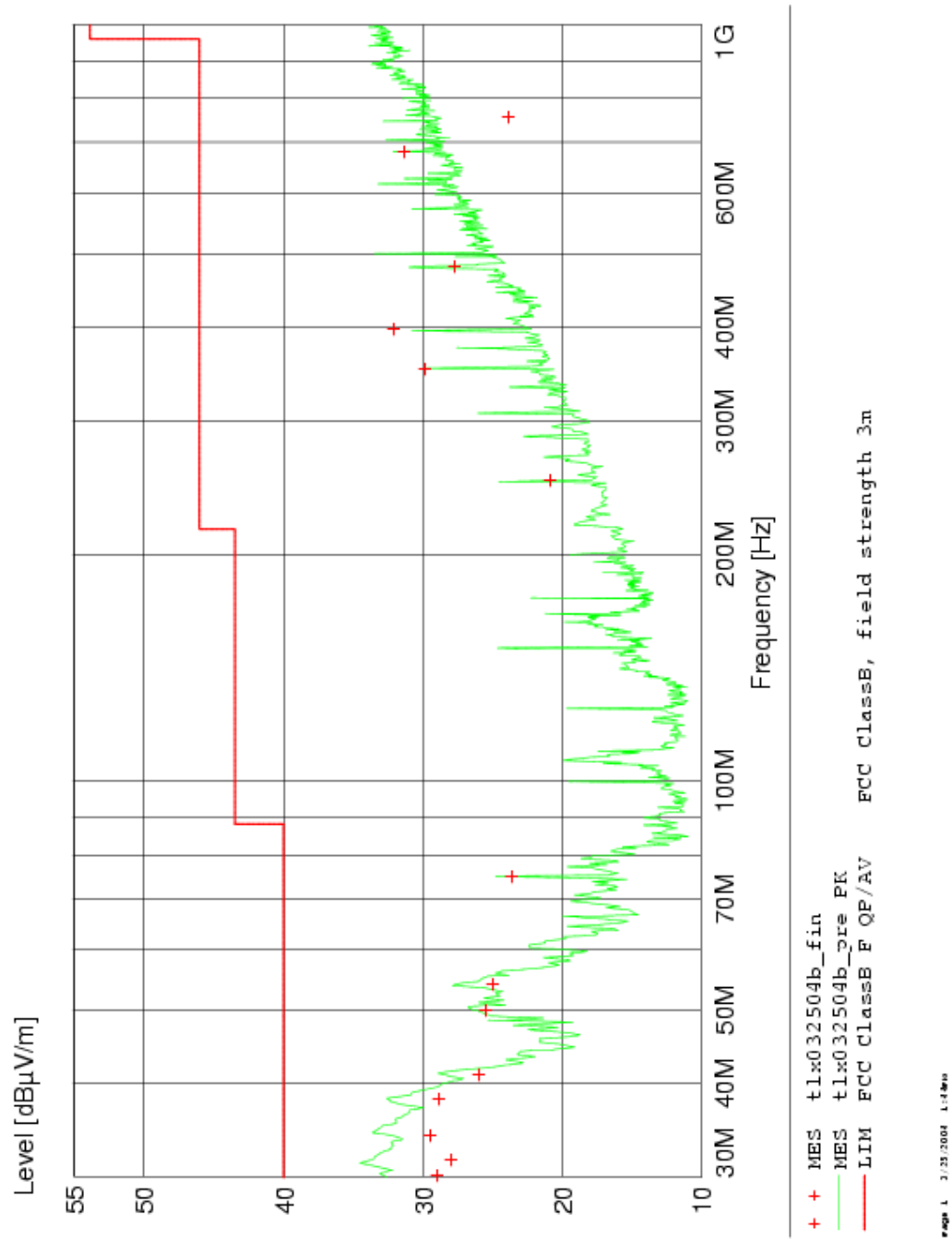


Figure 19 Radiated Emissions Plot 9.5dBi Omni, Channel 5, 30MHz - 1GHz

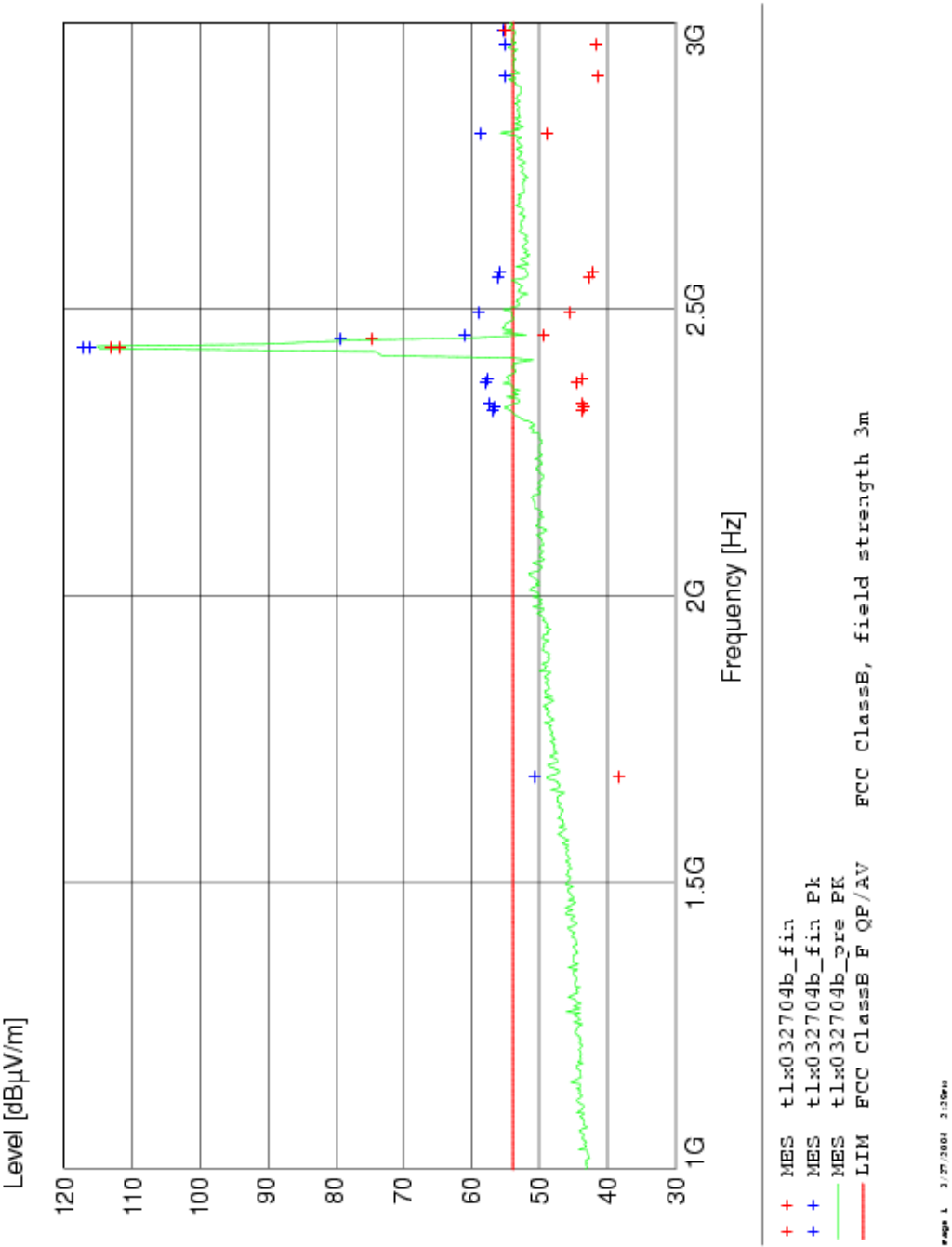


Figure 20 Radiated Emissions Plot 9.5dBi Omni, Channel 5, 1GHz - 3GHz

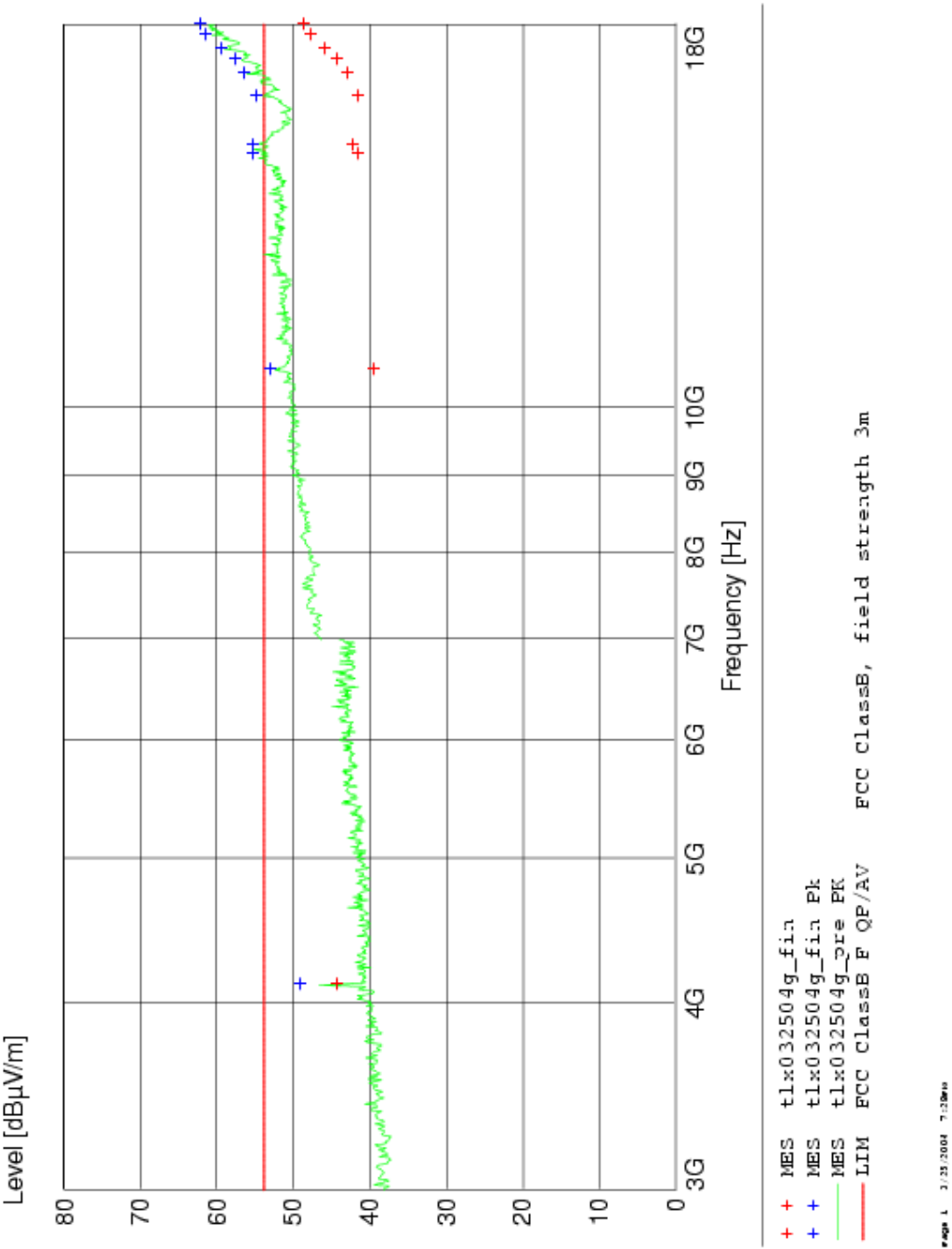


Figure 21 Radiated Emissions Plot 9.5dBi Omni, Channel 5, 3GHz - 18GHz

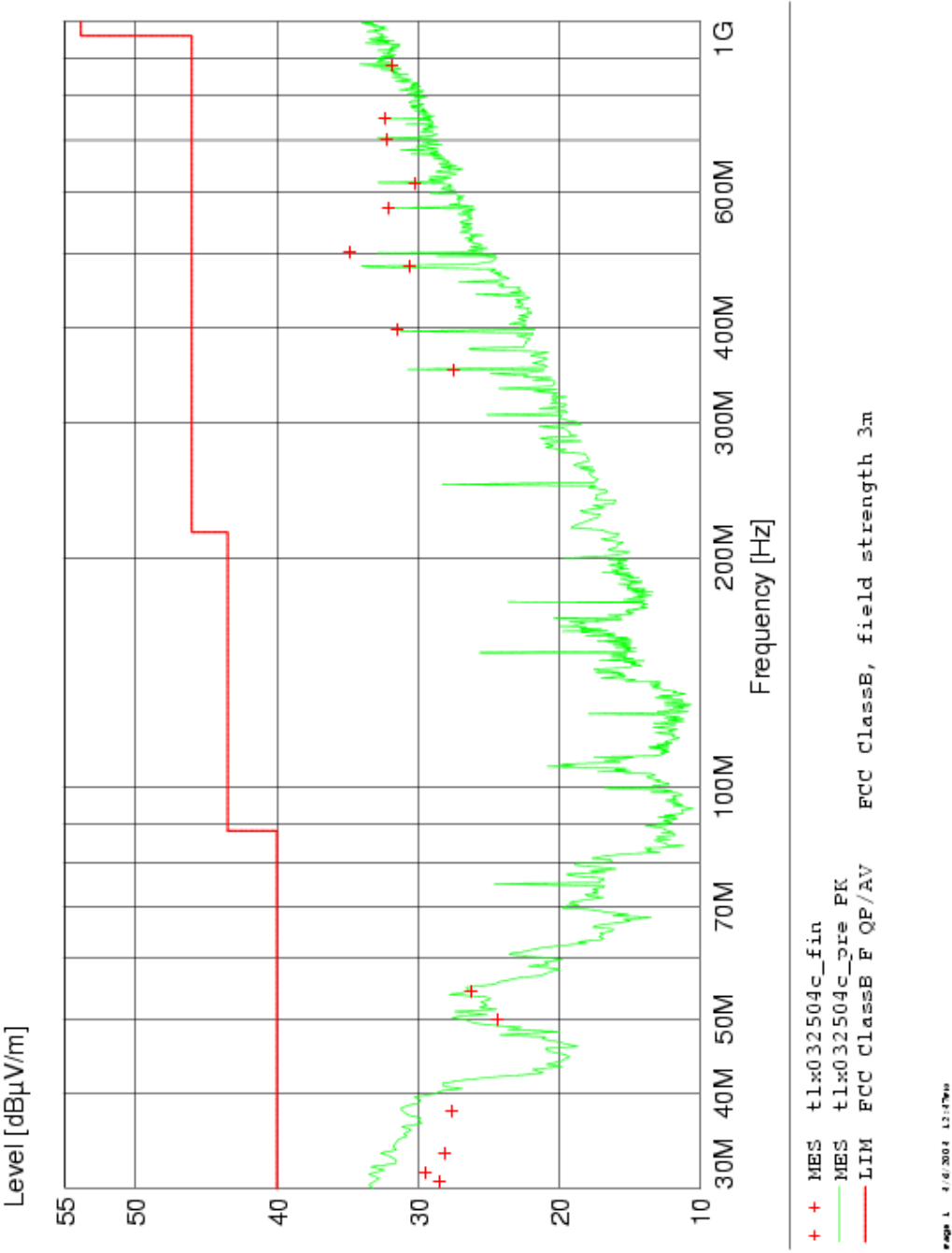


Figure 22 Radiated Emissions Plot 9.5dBi Omni, Channel 11, 30MHz - 1GHz

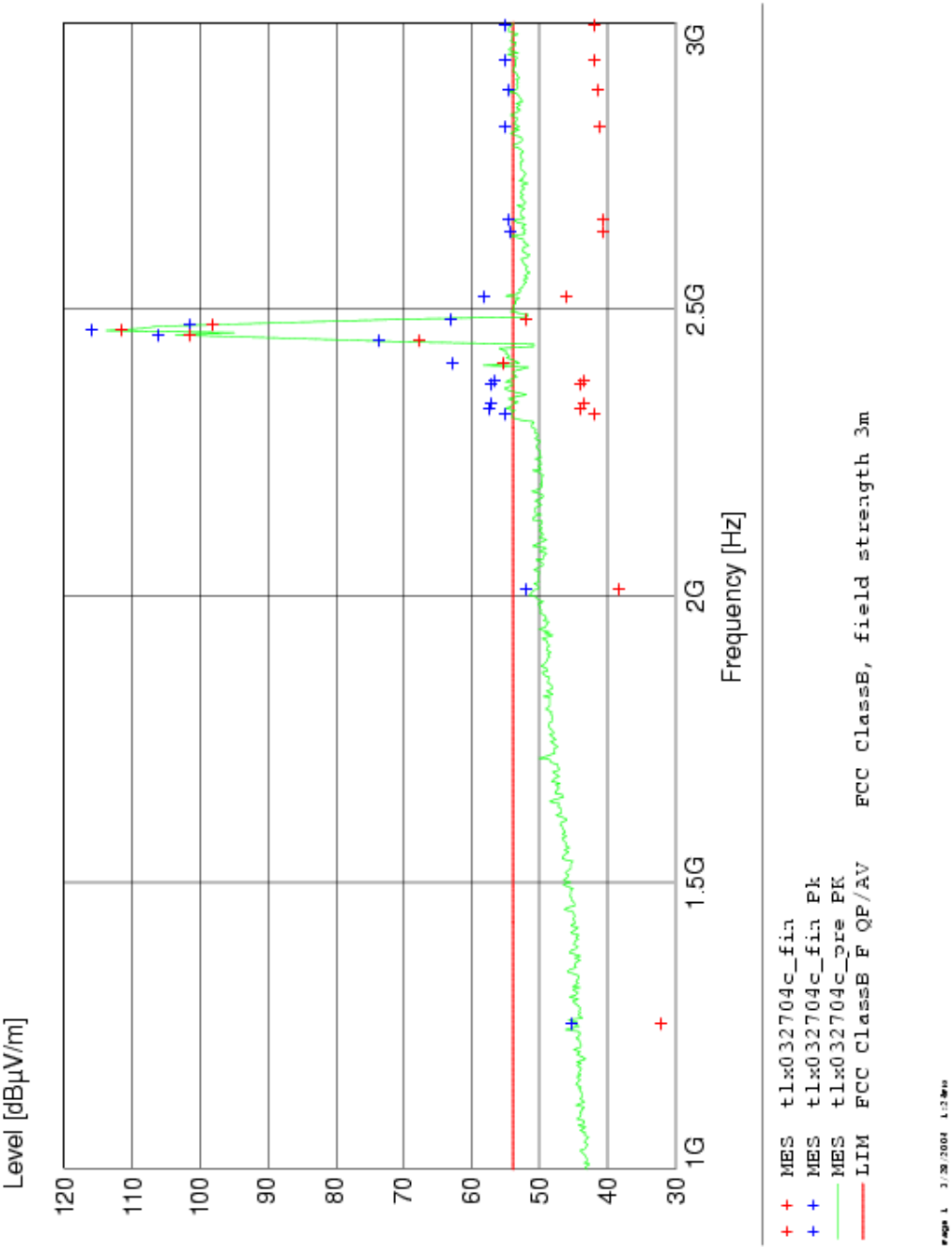


Figure 23 Radiated Emissions Plot 9.5dBi Omni, Channel 11, 1GHz - 3GHz

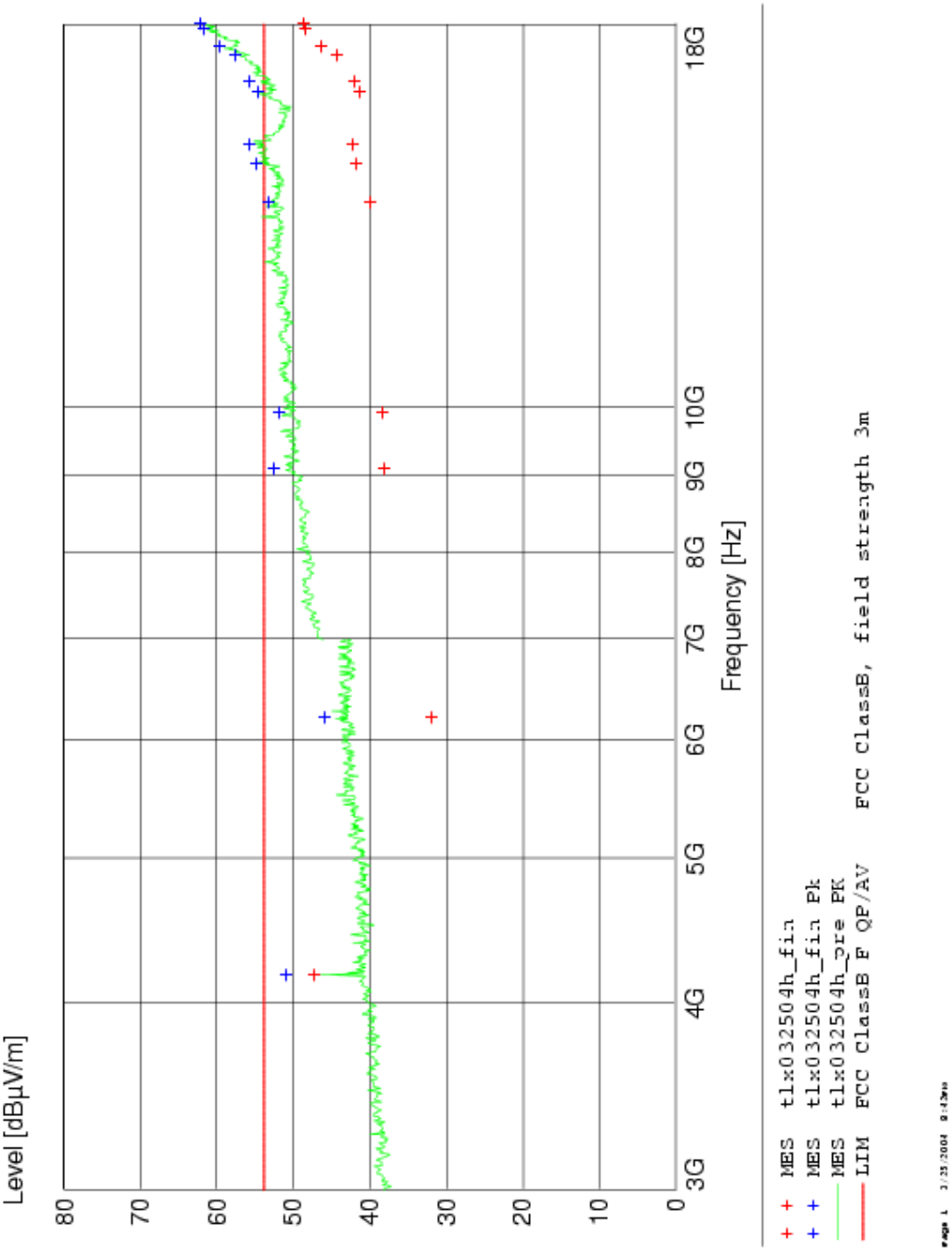


Figure 24 Radiated Emissions Plot 9.5dBi Omni, Channel 11, 3GHz - 18GHz

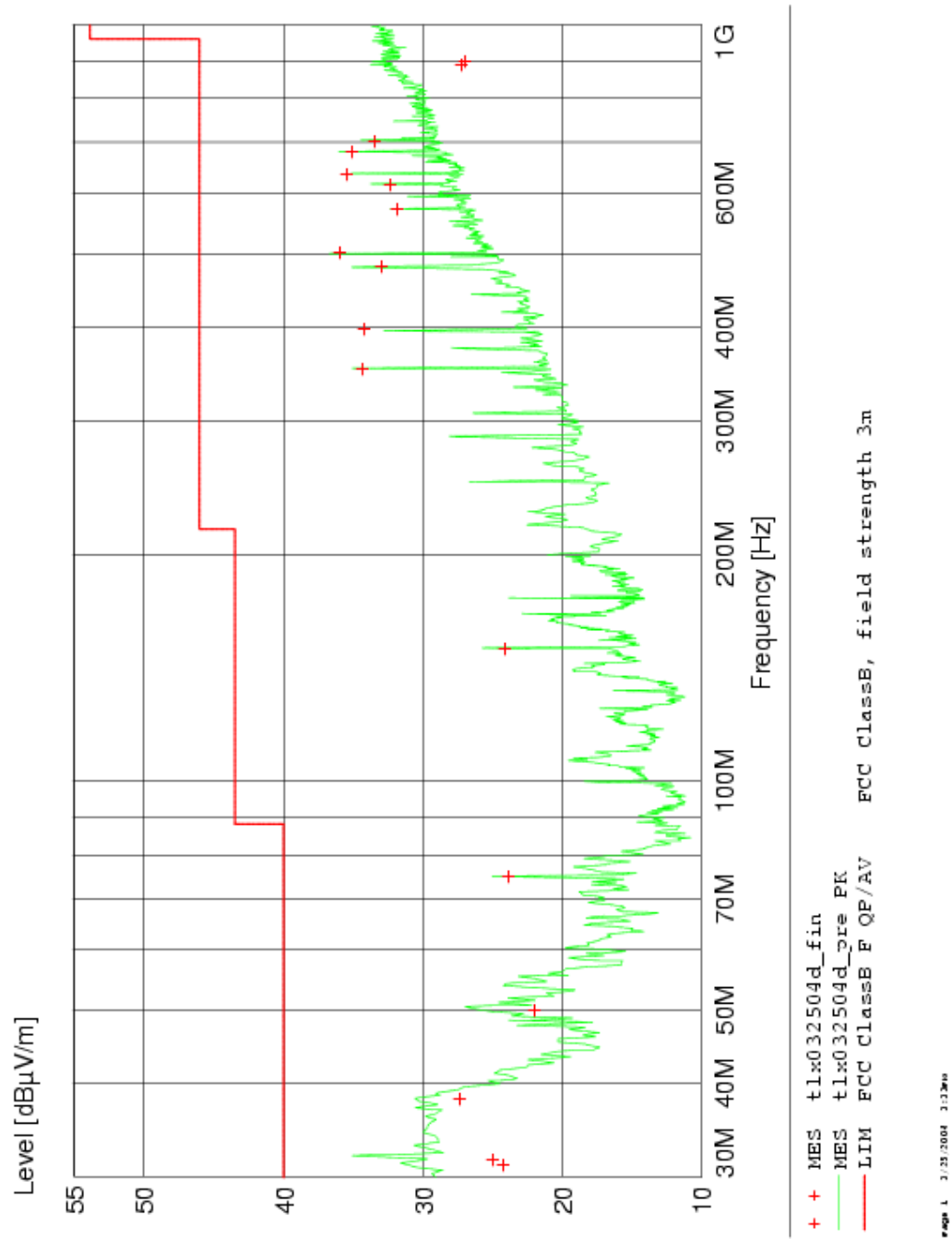


Figure 25 Radiated Emissions Plot 9.5dBi Omni, Receive Only, 30MHz - 1GHz

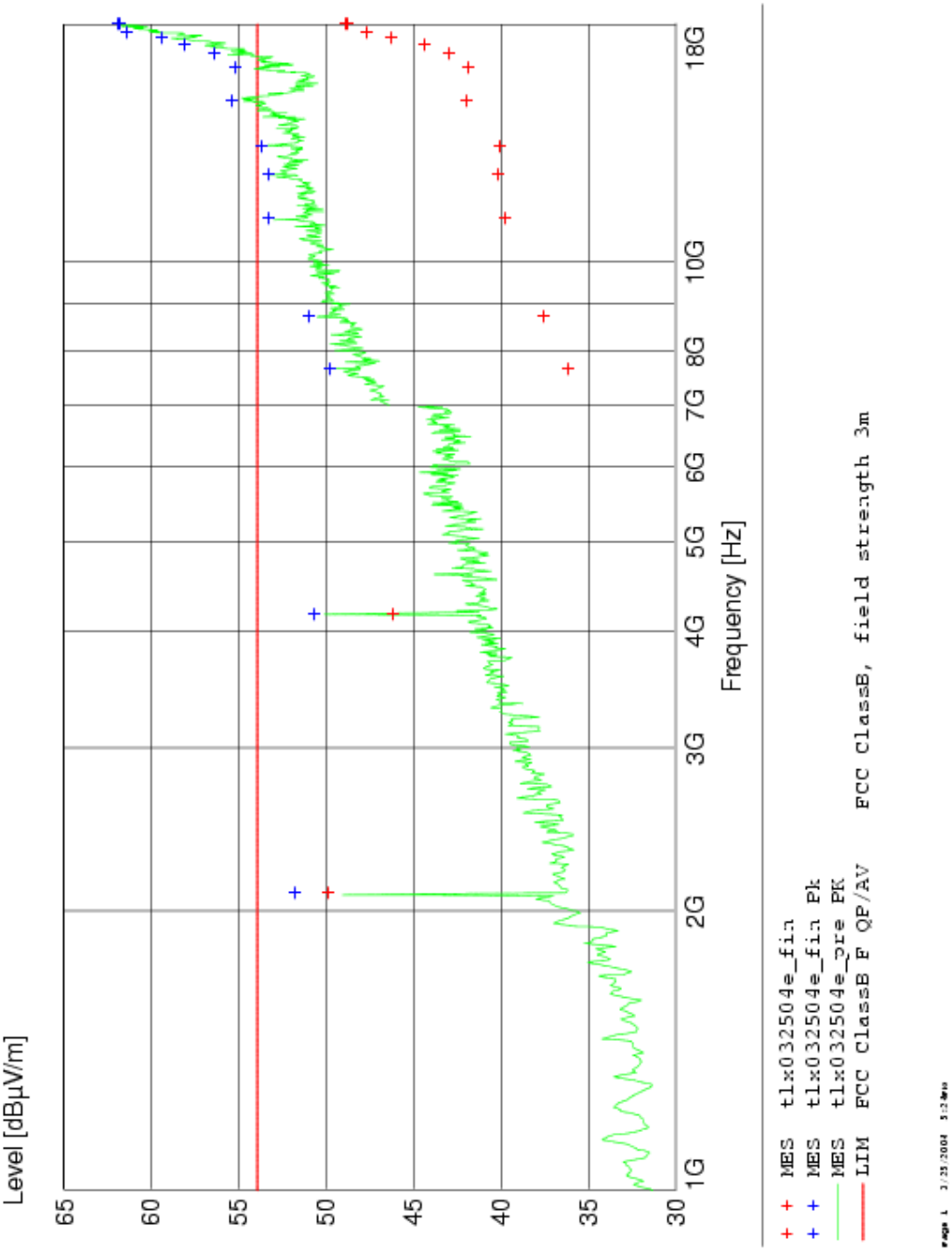


Figure 26 Radiated Emissions Plot 9.5dBi Omni, Receive Only, 1GHz - 18GHz

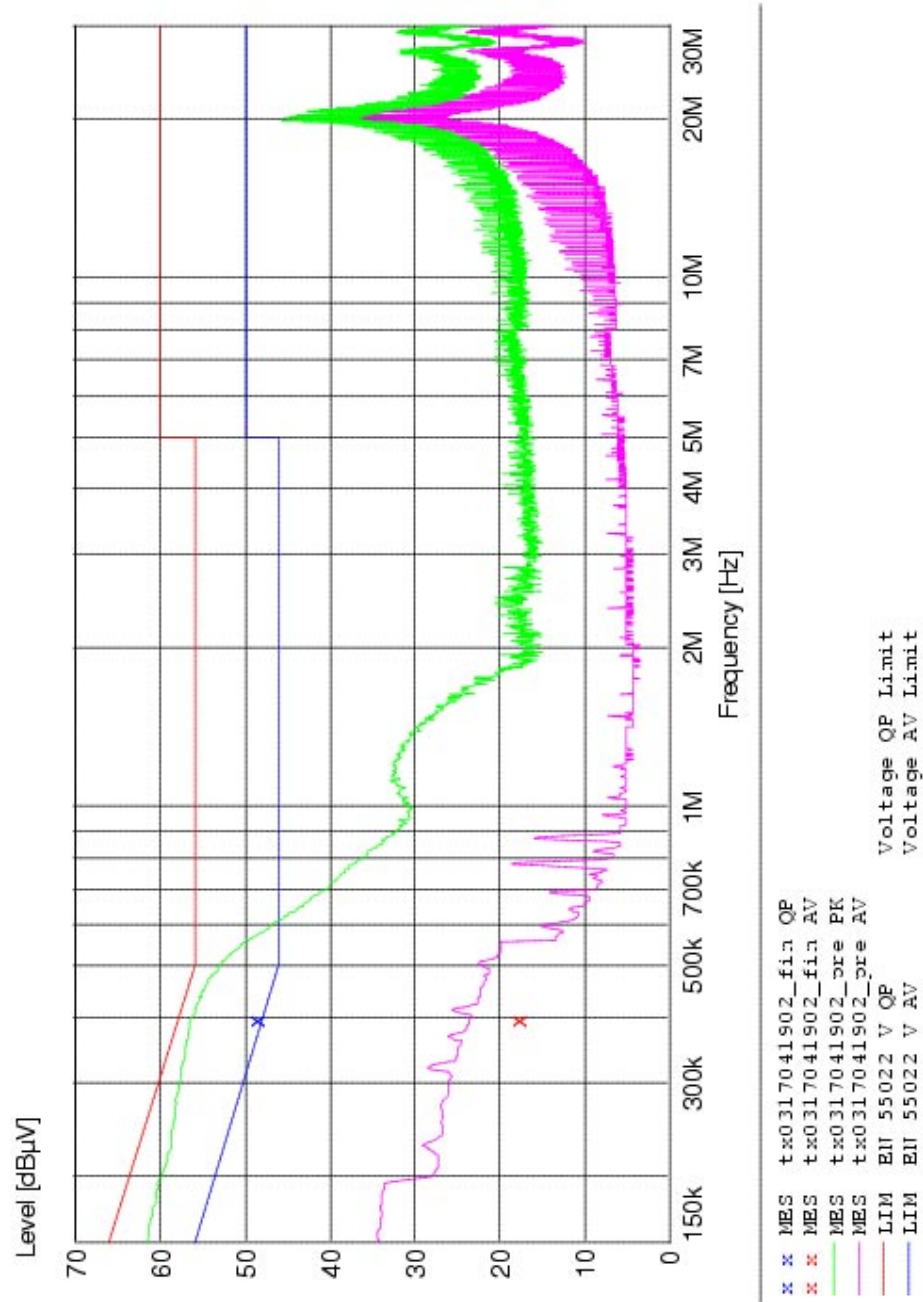


Figure 27 Conducted Emissions Plot

## **Appendix C: Emissions Results, Receive, 3-Meter Measurement Distance**

## 14.5dBi Antenna Receive Only QuasiPeak Results 30M-1GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 30.66     | 26.76  | 8.36     | 17.8   | -0.6   | 40     | 13.2   | 101    | 359   | VERT |
| 34.68     | 26.91  | 10.79    | 15.5   | -0.7   | 40     | 13.1   | 99     | 93    | VERT |
| 38.94     | 24.75  | 10.84    | 13.2   | -0.7   | 40     | 15.2   | 104    | 50    | VERT |
| 39.84     | 15.18  | 1.71     | 12.8   | -0.7   | 40     | 24.8   | 350    | 197   | VERT |
| 51.72     | 23.61  | 13.37    | 9.3    | -0.9   | 40     | 16.4   | 100    | 359   | VERT |
| 54.18     | 28.5   | 18.22    | 9.4    | -0.9   | 40     | 11.5   | 99     | 0     | VERT |
| 55.98     | 29.3   | 19.42    | 9      | -0.9   | 40     | 10.7   | 101    | 29    | VERT |
| 58.74     | 29.63  | 20.92    | 7.8    | -0.9   | 40     | 10.4   | 150    | 27    | VERT |
| 199.98    | 32.1   | 19.7     | 10.6   | -1.8   | 43.5   | 11.4   | 99     | 145   | VERT |
| 351.96    | 35.5   | 17.52    | 15.6   | -2.4   | 46     | 10.5   | 122    | 87    | VERT |
| 396       | 37.1   | 17.76    | 16.8   | -2.6   | 46     | 8.9    | 115    | 216   | VERT |
| 479.58    | 31.49  | 10.3     | 18.4   | -2.8   | 46     | 14.5   | 99     | 123   | VERT |
| 637.98    | 34.43  | 11.05    | 20.2   | -3.2   | 46     | 11.6   | 101    | 208   | VERT |
| 682.02    | 30.05  | 4.91     | 21.8   | -3.3   | 46     | 15.9   | 204    | 104   | VERT |
| 703.98    | 32.4   | 7.06     | 21.9   | -3.4   | 46     | 13.6   | 100    | 32    | VERT |
| 748.5     | 34.43  | 9.11     | 21.8   | -3.5   | 46     | 11.6   | 100    | 38    | VERT |
| 891.6     | 27.45  | -0.91    | 24.4   | -3.9   | 46     | 18.6   | 377    | 29    | HORI |

## 14.5dBi Antenna Receive Only Average Results 1GHz - 18GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 2087.5    | 42.98        | 37.69      | 29.6   | 24.3   | 53.9         | 10.9   | 100    | 167   | VERT |
| 4175.5    | 46.98        | 34.48      | 34.4   | 21.9   | 53.9         | 6.9    | 106    | 221   | HORI |
| 8790.5    | 37.72        | 15.92      | 40     | 18.2   | 53.9         | 16.2   | 227    | 112   | HORI |
| 12559     | 40.33        | 16.03      | 41.4   | 17.1   | 53.9         | 13.6   | 120    | 191   | HORI |
| 13915     | 40.15        | 15.15      | 42.1   | 17.1   | 53.9         | 10.8   | 149    | 286   | VERT |
| 14717.5   | 41.95        | 16.3       | 42.9   | 17.3   | 53.9         | 11.9   | 349    | 214   | HORI |
| 15089     | 41.5         | 16.47      | 42.5   | 17.5   | 53.9         | 12.4   | 357    | 356   | VERT |
| 16146     | 42.05        | 18.35      | 40.4   | 16.7   | 53.9         | 11.8   | 399    | 171   | VERT |
| 16463     | 42.2         | 17.49      | 41.3   | 16.6   | 53.9         | 11.7   | 400    | 120   | VERT |
| 17107.5   | 44.57        | 15.64      | 43.8   | 14.9   | 53.9         | 9.3    | 349    | 71    | VERT |
| 17373     | 46.51        | 16         | 44.9   | 14.4   | 53.9         | 7.4    | 99     | 73    | HORI |
| 17715     | 48.04        | 16.01      | 46.4   | 14.3   | 53.9         | 5.9    | 106    | 33    | HORI |
| 17933     | 49.08        | 15.76      | 47.3   | 14     | 53.9         | 4.8    | 100    | 172   | VERT |

## 14.5dBi Antenna Receive Only Peak Results 1GHz - 18GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 2087.5    | 46.69        | 41.4       | 29.6   | 24.3   | 74           | 27.3   | 100    | 167   | VERT |
| 4175.5    | 51.13        | 38.64      | 34.4   | 21.9   | 74           | 22.9   | 106    | 221   | HORI |
| 8790.5    | 51.76        | 29.96      | 40     | 18.2   | 74           | 22.2   | 227    | 112   | HORI |
| 12559     | 53.88        | 29.59      | 41.4   | 17.1   | 74           | 20.1   | 120    | 191   | HORI |
| 13915     | 53.99        | 28.96      | 42.1   | 17.1   | 74           | 20.0   | 149    | 286   | VERT |
| 14717.5   | 55.61        | 29.96      | 42.9   | 17.3   | 74           | 18.4   | 349    | 214   | HORI |
| 15089     | 54.74        | 29.71      | 42.5   | 17.5   | 74           | 19.3   | 357    | 356   | VERT |
| 16146     | 55.37        | 31.67      | 40.4   | 16.7   | 74           | 18.6   | 399    | 171   | VERT |
| 16463     | 55.46        | 30.75      | 41.3   | 16.6   | 74           | 18.5   | 400    | 120   | VERT |
| 17107.5   | 58.39        | 29.46      | 43.8   | 14.9   | 74           | 15.6   | 349    | 71    | VERT |
| 17373     | 60.23        | 29.71      | 44.9   | 14.4   | 74           | 13.8   | 99     | 73    | HORI |
| 17715     | 61.24        | 29.21      | 46.4   | 14.3   | 74           | 12.8   | 106    | 33    | HORI |
| 17933     | 62.41        | 29.08      | 47.3   | 14     | 74           | 11.6   | 100    | 172   | VERT |

## 9.5dBi Antenna Receive only QuasiPeak Results 30MHz - 1GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 31.14     | 24.46        | 6.34       | 17.5   | -0.6   | 40           | 15.5   | 122    | 26    | VERT |
| 31.68     | 25.27        | 7.48       | 17.2   | -0.6   | 40           | 14.7   | 149    | 213   | VERT |
| 38.1      | 27.6         | 13.26      | 13.6   | -0.7   | 40           | 12.4   | 99     | 99    | VERT |
| 49.98     | 22.29        | 12.09      | 9.3    | -0.9   | 40           | 17.7   | 149    | 125   | VERT |
| 75        | 24.02        | 16.17      | 6.8    | -1.1   | 40           | 16     | 100    | 250   | VERT |
| 150       | 24.34        | 13.94      | 8.8    | -1.6   | 43.5         | 19.2   | 201    | 125   | HORI |
| 351.96    | 34.55        | 16.57      | 15.6   | -2.4   | 46           | 11.4   | 129    | 70    | VERT |
| 396       | 34.43        | 15.09      | 16.8   | -2.6   | 46           | 11.6   | 135    | 199   | VERT |
| 479.58    | 33.22        | 12.03      | 18.4   | -2.8   | 46           | 12.8   | 99     | 47    | VERT |
| 499.98    | 36.23        | 14.83      | 18.5   | -2.9   | 46           | 9.8    | 99     | 122   | VERT |
| 571.98    | 32.08        | 9.52       | 19.5   | -3.1   | 46           | 13.9   | 105    | 264   | VERT |
| 615.96    | 32.56        | 8.2        | 21.2   | -3.2   | 46           | 13.4   | 220    | 0     | VERT |
| 637.98    | 35.7         | 12.32      | 20.2   | -3.2   | 46           | 10.3   | 217    | 29    | VERT |
| 681.96    | 35.25        | 10.11      | 21.8   | -3.3   | 46           | 10.7   | 236    | 329   | VERT |
| 703.98    | 33.67        | 8.33       | 21.9   | -3.4   | 46           | 12.3   | 100    | 349   | VERT |

## 9.5dBi Antenna Receive only Average Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 2087.5    | 50     | 44.71    | 29.6   | 24.3   | 53.9   | 3.9    | 106    | 155   | VERT |
| 4175.5    | 46.31  | 33.81    | 34.4   | 21.9   | 53.9   | 7.6    | 106    | 225   | HORI |
| 7646.5    | 36.29  | 16.51    | 38.9   | 19.1   | 53.9   | 17.6   | 156    | 130   | HORI |
| 8727      | 37.72  | 16.19    | 39.9   | 18.4   | 53.9   | 16.2   | 178    | 243   | HORI |
| 11117.5   | 39.82  | 16.47    | 40.8   | 17.4   | 53.9   | 14.1   | 350    | 28    | VERT |
| 12422     | 40.3   | 16.44    | 41.2   | 17.3   | 53.9   | 13.6   | 149    | 311   | VERT |
| 13302.5   | 40.17  | 15.54    | 42.1   | 17.5   | 53.9   | 13.7   | 371    | 6     | VERT |
| 14883.5   | 42.13  | 16.04    | 43     | 16.9   | 53.9   | 11.8   | 381    | 169   | HORI |
| 16150     | 42.04  | 18.33    | 40.4   | 16.7   | 53.9   | 11.9   | 249    | 301   | HORI |
| 16706.5   | 43.13  | 16.7     | 42.2   | 15.8   | 53.9   | 10.8   | 256    | 93    | HORI |
| 17091.5   | 44.56  | 15.79    | 43.8   | 15     | 53.9   | 9.3    | 399    | 359   | HORI |
| 17381     | 46.4   | 15.87    | 44.9   | 14.4   | 53.9   | 7.5    | 191    | 30    | HORI |
| 17668     | 47.74  | 16.18    | 46.1   | 14.6   | 53.9   | 6.2    | 100    | 130   | HORI |
| 17935     | 49.04  | 15.7     | 47.3   | 14     | 53.9   | 4.9    | 149    | 69    | VERT |
| 17985     | 48.93  | 15.23    | 47.5   | 13.8   | 53.9   | 5      | 149    | 0     | VERT |

## 9.5dBi Antenna Receive only Peak Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 2087.5    | 51.9   | 46.61    | 29.6   | 24.3   | 74     | 22.1   | 106    | 155   | VERT |
| 4175.5    | 50.88  | 38.39    | 34.4   | 21.9   | 74     | 23.1   | 106    | 225   | HORI |
| 7646.5    | 49.86  | 30.09    | 38.9   | 19.1   | 74     | 24.1   | 156    | 130   | HORI |
| 8727      | 51.11  | 29.59    | 39.9   | 18.4   | 74     | 22.9   | 178    | 243   | HORI |
| 11117.5   | 53.44  | 30.09    | 40.8   | 17.4   | 74     | 20.6   | 350    | 28    | VERT |
| 12422     | 53.35  | 29.46    | 41.2   | 17.3   | 74     | 20.7   | 149    | 311   | VERT |
| 13302.5   | 53.85  | 29.21    | 42.1   | 17.5   | 74     | 20.2   | 371    | 6     | VERT |
| 14883.5   | 55.55  | 29.46    | 43     | 16.9   | 74     | 18.5   | 381    | 169   | HORI |
| 16150     | 55.25  | 31.54    | 40.4   | 16.7   | 74     | 18.8   | 249    | 301   | HORI |
| 16706.5   | 56.52  | 30.09    | 42.2   | 15.8   | 74     | 17.5   | 256    | 93    | HORI |
| 17091.5   | 58.23  | 29.46    | 43.8   | 15     | 74     | 15.8   | 399    | 359   | HORI |
| 17381     | 59.49  | 28.96    | 44.9   | 14.4   | 74     | 14.5   | 191    | 30    | HORI |
| 17668     | 61.52  | 29.96    | 46.1   | 14.6   | 74     | 12.5   | 100    | 130   | HORI |
| 17935     | 62.03  | 28.69    | 47.3   | 14     | 74     | 12.0   | 149    | 69    | VERT |
| 17985     | 61.99  | 28.3     | 47.5   | 13.8   | 74     | 12.0   | 149    | 0     | VERT |

## **Appendix D: Emissions Results, Transmit, 3-Meter Measurement Distance**

## 14.5dBi Antenna Channel 1 QuasiPeak Results 30M-1GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 31.02     | 28.08  | 9.9      | 17.6   | -0.6   | 40     | 11.9   | 101    | 9     | VERT |
| 33.18     | 28.47  | 11.53    | 16.3   | -0.6   | 40     | 11.5   | 98     | 86    | VERT |
| 38.28     | 27.78  | 13.54    | 13.6   | -0.7   | 40     | 12.2   | 101    | 99    | VERT |
| 54.18     | 34.63  | 24.34    | 9.4    | -0.9   | 40     | 5.4    | 100    | 17    | VERT |
| 55.98     | 32.2   | 22.32    | 9      | -0.9   | 40     | 7.8    | 99     | 36    | VERT |
| 58.68     | 31.77  | 23.03    | 7.8    | -0.9   | 40     | 8.2    | 149    | 37    | VERT |
| 199.98    | 31.85  | 19.45    | 10.6   | -1.8   | 43.5   | 11.7   | 120    | 145   | VERT |
| 352.02    | 30.9   | 12.92    | 15.6   | -2.4   | 46     | 15.1   | 126    | 103   | VERT |
| 396       | 35.69  | 16.35    | 16.8   | -2.6   | 46     | 10.3   | 119    | 221   | VERT |
| 479.52    | 30.27  | 9.08     | 18.4   | -2.8   | 46     | 15.7   | 99     | 28    | VERT |
| 748.5     | 34.54  | 9.23     | 21.8   | -3.5   | 46     | 11.5   | 100    | 33    | VERT |
| 917.04    | 26.77  | -0.91    | 23.7   | -4     | 46     | 19.2   | 100    | 156   | HORI |

## 14.5dBi Antenna Channel 1 Average Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 2313.5    | 42.85  | 6.35     | 30.1   | -6.4   | 53.9   | 11.1   | 150    | 162   | VERT |
| 2363      | 39.27  | 2.65     | 30.2   | -6.4   | 53.9   | 14.6   | 278    | 148   | HORI |
| 2403.5    | 58.81  | 22.09    | 30.3   | -6.4   | 95.92  | 37.11  | 371    | 28    | HORI |
| 2413      | 115.92 | 79.14    | 30.3   | -6.5   | 115.92 | 0      | 150    | 144   | VERT |
| 2492.5    | 40.25  | 3.25     | 30.5   | -6.5   | 53.9   | 13.6   | 291    | 176   | HORI |
| 2512      | 41.21  | 4.12     | 30.5   | -6.5   | 53.9   | 12.7   | 150    | 244   | VERT |
| 2647.5    | 41.75  | 3.95     | 31     | -6.8   | 53.9   | 12.2   | 156    | 134   | VERT |
| 2654.5    | 41.03  | 3.2      | 31     | -6.8   | 53.9   | 12.9   | 314    | 339   | VERT |
| 2709      | 40.91  | 2.76     | 31.2   | -6.9   | 53.9   | 13     | 249    | 66    | HORI |
| 2752      | 41.06  | 2.63     | 31.3   | -7.1   | 53.9   | 12.8   | 141    | 212   | HORI |
| 2786      | 41.2   | 2.7      | 31.5   | -7     | 53.9   | 12.7   | 150    | 111   | VERT |
| 2832.5    | 41.5   | 2.84     | 31.6   | -7.1   | 53.9   | 12.4   | 398    | 183   | HORI |
| 2911.5    | 41.88  | 2.98     | 31.8   | -7.1   | 53.9   | 12     | 249    | 250   | VERT |
| 2936.5    | 42.09  | 2.94     | 31.9   | -7.2   | 53.9   | 11.8   | 350    | 242   | VERT |
| 2957      | 42.1   | 2.81     | 32     | -7.3   | 53.9   | 11.8   | 400    | 237   | VERT |
| 2957.5    | 42.16  | 2.87     | 32     | -7.3   | 53.9   | 11.7   | 119    | 275   | VERT |
| 2975      | 42.21  | 2.84     | 32     | -7.4   | 53.9   | 11.7   | 399    | 3     | HORI |
| 2984.5    | 42.19  | 2.77     | 32.1   | -7.4   | 53.9   | 11.7   | 350    | 223   | HORI |
| 4075.5    | 46.51  | 33.27    | 34.2   | 21     | 53.9   | 7.4    | 106    | 249   | VERT |
| 6263.5    | 33.4   | 14.99    | 36.8   | 18.4   | 53.9   | 20.5   | 165    | 57    | HORI |
| 7168.5    | 36.14  | 16.92    | 38.2   | 19     | 53.9   | 17.8   | 399    | 298   | VERT |
| 8012      | 37.25  | 15.77    | 39.1   | 17.6   | 53.9   | 16.7   | 100    | 332   | HORI |
| 8655      | 38.11  | 15.92    | 39.8   | 17.6   | 53.9   | 15.8   | 249    | 36    | HORI |
| 9093      | 39.58  | 15.98    | 40.4   | 16.8   | 53.9   | 14.3   | 370    | 143   | VERT |
| 10591.5   | 40.29  | 16.06    | 40.6   | 16.4   | 53.9   | 13.6   | 278    | 358   | VERT |
| 12689     | 41.12  | 15.95    | 41.6   | 16.4   | 53.9   | 12.8   | 149    | 35    | HORI |
| 14522     | 43.23  | 16.29    | 42.9   | 16     | 53.9   | 10.7   | 399    | 69    | VERT |
| 14985     | 42.97  | 15.57    | 43     | 15.6   | 53.9   | 10.9   | 249    | 75    | HORI |
| 16158.5   | 43.45  | 18.26    | 40.4   | 15.3   | 53.9   | 10.4   | 191    | 53    | HORI |
| 17072.5   | 46.59  | 15.97    | 43.7   | 13.1   | 53.9   | 7.3    | 166    | 7     | HORI |
| 17391     | 47.97  | 15.79    | 45     | 12.8   | 53.9   | 5.9    | 349    | 165   | HORI |
| 17795     | 48.96  | 15.22    | 46.7   | 13     | 53.9   | 4.9    | 191    | 120   | VERT |
| 17999.5   | 49.8   | 15.22    | 47.6   | 13     | 53.9   | 4.1    | 399    | 124   | VERT |

## 14.5dBi Antenna Channel 1 Peak Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 2313.5    | 56.5   | 19.98    | 30.1   | -6.4   | 74     | 17.5   | 150    | 162   | VERT |
| 2363      | 52.67  | 16.05    | 30.2   | -6.4   | 74     | 21.3   | 278    | 148   | HORI |
| 2403.5    | 64.18  | 27.46    | 30.3   | -6.4   | 100.16 | 35.98  | 371    | 28    | HORI |
| 2413      | 120.16 | 83.38    | 30.3   | -6.5   | 120.16 | 0.0    | 150    | 144   | VERT |
| 2492.5    | 53.93  | 16.93    | 30.5   | -6.5   | 74     | 20.1   | 291    | 176   | HORI |
| 2512      | 54.57  | 17.48    | 30.5   | -6.5   | 74     | 19.4   | 150    | 244   | VERT |
| 2647.5    | 55.14  | 17.34    | 31     | -6.8   | 74     | 18.9   | 156    | 134   | VERT |
| 2654.5    | 54.51  | 16.68    | 31     | -6.8   | 74     | 19.5   | 314    | 339   | VERT |
| 2709      | 54.57  | 16.42    | 31.2   | -6.9   | 74     | 19.4   | 249    | 66    | HORI |
| 2752      | 55.37  | 16.93    | 31.3   | -7.1   | 74     | 18.6   | 141    | 212   | HORI |
| 2786      | 55.02  | 16.52    | 31.5   | -7     | 74     | 19.0   | 150    | 111   | VERT |
| 2832.5    | 54.83  | 16.17    | 31.6   | -7.1   | 74     | 19.2   | 398    | 183   | HORI |
| 2911.5    | 56.05  | 17.06    | 31.8   | -7.1   | 74     | 18.0   | 249    | 250   | VERT |
| 2936.5    | 55.46  | 16.3     | 31.9   | -7.2   | 74     | 18.5   | 350    | 242   | VERT |
| 2957      | 55.33  | 16.05    | 32     | -7.3   | 74     | 18.7   | 400    | 237   | VERT |
| 2957.5    | 55.34  | 16.05    | 32     | -7.3   | 74     | 18.7   | 119    | 275   | VERT |
| 2975      | 55.8   | 16.42    | 32     | -7.4   | 74     | 18.2   | 399    | 3     | HORI |
| 2984.5    | 56.62  | 17.2     | 32.1   | -7.4   | 74     | 17.4   | 350    | 223   | HORI |
| 4075.5    | 51.02  | 37.77    | 34.2   | 21     | 74     | 23.0   | 106    | 249   | VERT |
| 6263.5    | 46.89  | 28.48    | 36.8   | 18.4   | 74     | 27.1   | 165    | 57    | HORI |
| 7168.5    | 49.58  | 30.36    | 38.2   | 19     | 74     | 24.4   | 399    | 298   | VERT |
| 8012      | 51.19  | 29.71    | 39.1   | 17.6   | 74     | 22.8   | 100    | 332   | HORI |
| 8655      | 51.9   | 29.71    | 39.8   | 17.6   | 74     | 22.1   | 249    | 36    | HORI |
| 9093      | 52.68  | 29.08    | 40.4   | 16.8   | 74     | 21.3   | 370    | 143   | VERT |
| 10591.5   | 53.82  | 29.59    | 40.6   | 16.4   | 74     | 20.2   | 278    | 358   | VERT |
| 12689     | 54.76  | 29.59    | 41.6   | 16.4   | 74     | 19.2   | 149    | 35    | HORI |
| 14522     | 56.4   | 29.46    | 42.9   | 16     | 74     | 17.6   | 399    | 69    | VERT |
| 14985     | 56.83  | 29.46    | 43     | 15.6   | 74     | 17.2   | 249    | 75    | HORI |
| 16158.5   | 57.49  | 32.3     | 40.4   | 15.3   | 74     | 16.5   | 191    | 53    | HORI |
| 17072.5   | 59.83  | 29.21    | 43.7   | 13.1   | 74     | 14.2   | 166    | 7     | HORI |
| 17391     | 61.26  | 29.08    | 45     | 12.8   | 74     | 12.7   | 349    | 165   | HORI |
| 17795     | 62.31  | 28.56    | 46.7   | 13     | 74     | 11.7   | 191    | 120   | VERT |
| 17999.5   | 63.15  | 28.56    | 47.6   | 13     | 74     | 10.9   | 399    | 124   | VERT |

## 14.5dBi Antenna Channel 5 QuasiPeak Results 30M-1GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 30.66     | 29.8   | 11.4     | 17.8   | -0.6   | 40     | 10.2   | 101    | 267   | VERT |
| 33.72     | 26.74  | 10.1     | 16     | -0.6   | 40     | 13.3   | 100    | 83    | VERT |
| 38.1      | 28.45  | 14.12    | 13.6   | -0.7   | 40     | 11.6   | 99     | 99    | VERT |
| 41.4      | 26.77  | 13.92    | 12.1   | -0.7   | 40     | 13.2   | 101    | 116   | VERT |
| 54.18     | 32.53  | 22.25    | 9.4    | -0.9   | 40     | 7.5    | 100    | 14    | VERT |
| 55.98     | 32.48  | 22.61    | 9      | -0.9   | 40     | 7.5    | 100    | 53    | VERT |
| 58.68     | 31.78  | 23.04    | 7.8    | -0.9   | 40     | 8.2    | 185    | 38    | VERT |
| 199.98    | 33.32  | 20.92    | 10.6   | -1.8   | 43.5   | 10.2   | 99     | 161   | VERT |
| 352.02    | 30.82  | 12.84    | 15.6   | -2.4   | 46     | 15.2   | 123    | 90    | VERT |
| 396       | 35.45  | 16.1     | 16.8   | -2.6   | 46     | 10.6   | 117    | 217   | VERT |
| 479.82    | 29.04  | 7.84     | 18.4   | -2.8   | 46     | 17     | 102    | 36    | VERT |
| 500.04    | 31.01  | 9.61     | 18.5   | -2.9   | 46     | 15     | 98     | 67    | VERT |
| 748.5     | 32.62  | 7.3      | 21.8   | -3.5   | 46     | 13.4   | 100    | 224   | VERT |
| 870.66    | 32.14  | 4.59     | 23.7   | -3.8   | 46     | 13.9   | 149    | 285   | HORI |

## 14.5dBi Antenna Channel 5 Average Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 1766      | 36.74  | 2.86     | 28.4   | -5.4   | 53.9   | 17.2   | 249    | 329   | HORI |
| 2023      | 38.54  | 3.14     | 29.5   | -5.9   | 53.9   | 15.4   | 249    | 310   | HORI |
| 2212.5    | 38.06  | 1.96     | 29.9   | -6.2   | 53.9   | 15.8   | 249    | 278   | VERT |
| 2313.5    | 38.71  | 2.19     | 30.1   | -6.4   | 53.9   | 15.2   | 249    | 222   | HORI |
| 2388.5    | 39     | 2.32     | 30.3   | -6.4   | 53.9   | 14.9   | 201    | 359   | HORI |
| 2433      | 116.45 | 79.55    | 30.4   | -6.5   | 116.45 | 0      | 150    | 125   | VERT |
| 2508      | 44.51  | 7.45     | 30.5   | -6.5   | 53.9   | 9.4    | 149    | 77    | VERT |
| 2641.5    | 40.8   | 3.03     | 31     | -6.8   | 53.9   | 13.1   | 150    | 318   | HORI |
| 2697      | 40.85  | 2.79     | 31.2   | -6.9   | 53.9   | 13     | 381    | 345   | HORI |
| 2738      | 40.86  | 2.46     | 31.3   | -7.1   | 53.9   | 13     | 249    | 286   | HORI |
| 2848.5    | 41.44  | 2.69     | 31.6   | -7.1   | 53.9   | 12.5   | 191    | 45    | HORI |
| 2925.5    | 41.98  | 2.9      | 31.9   | -7.2   | 53.9   | 11.9   | 371    | 231   | HORI |
| 2962.5    | 41.92  | 2.62     | 32     | -7.3   | 53.9   | 12     | 156    | 138   | HORI |
| 2980      | 42.01  | 2.61     | 32     | -7.4   | 53.9   | 11.9   | 150    | 11    | VERT |
| 2893.5    | 44.29  | 19.02    | 31.8   | 6.5    | 53.9   | 9.6    | 400    | 134   | VERT |
| 3060      | 29.84  | 18.25    | 32.3   | 20.7   | 53.9   | 24.1   | 100    | 32    | VERT |
| 4115.5    | 47.35  | 34.03    | 34.3   | 21     | 53.9   | 6.5    | 99     | 233   | VERT |
| 6362.5    | 33.39  | 15.28    | 36.8   | 18.7   | 53.9   | 20.5   | 201    | 359   | VERT |
| 7987      | 37.19  | 15.81    | 39.1   | 17.7   | 53.9   | 16.7   | 169    | 19    | VERT |
| 12477     | 41.34  | 16.03    | 41.3   | 16     | 53.9   | 12.6   | 381    | 238   | HORI |
| 13993     | 41.35  | 15.24    | 42.1   | 16     | 53.9   | 12.5   | 100    | 241   | HORI |
| 14579     | 43.16  | 16.11    | 42.9   | 15.9   | 53.9   | 10.7   | 399    | 272   | HORI |
| 14983     | 43.56  | 16.19    | 43     | 15.6   | 53.9   | 10.3   | 100    | 235   | VERT |
| 16191     | 43.24  | 17.97    | 40.5   | 15.3   | 53.9   | 10.7   | 178    | 254   | VERT |
| 17036.5   | 45.65  | 15.65    | 43.5   | 13.5   | 53.9   | 7.3    | 250    | 28    | VERT |
| 17413.5   | 47.68  | 15.56    | 45.1   | 12.9   | 53.9   | 6.2    | 150    | 228   | HORI |
| 17889.5   | 50     | 16.03    | 47.1   | 13.1   | 53.9   | 3.9    | 169    | 252   | HORI |

## 14.5dBi Antenna Channel 5 Peak Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 1766      | 50.56  | 16.68    | 28.4   | -5.4   | 74     | 23.4   | 249    | 329   | HORI |
| 2023      | 52.08  | 16.68    | 29.5   | -5.9   | 74     | 21.9   | 249    | 310   | HORI |
| 2212.5    | 51.2   | 15.07    | 29.9   | -6.2   | 74     | 22.8   | 249    | 278   | VERT |
| 2313.5    | 52.29  | 15.77    | 30.1   | -6.4   | 74     | 21.7   | 249    | 222   | HORI |
| 2388.5    | 52.45  | 15.77    | 30.3   | -6.4   | 74     | 21.6   | 201    | 359   | HORI |
| 2433      | 120.83 | 83.93    | 30.4   | -6.5   | 120.83 | 0.0    | 150    | 125   | VERT |
| 2508      | 57.56  | 20.5     | 30.5   | -6.5   | 74     | 16.4   | 149    | 77    | VERT |
| 2641.5    | 53.81  | 16.05    | 31     | -6.8   | 74     | 20.2   | 150    | 318   | HORI |
| 2697      | 53.83  | 15.77    | 31.2   | -6.9   | 74     | 20.2   | 381    | 345   | HORI |
| 2738      | 53.84  | 15.49    | 31.3   | -7.1   | 74     | 20.2   | 249    | 286   | HORI |
| 2848.5    | 54.51  | 15.77    | 31.6   | -7.1   | 74     | 19.5   | 191    | 45    | HORI |
| 2925.5    | 55.13  | 16.05    | 31.9   | -7.2   | 74     | 18.9   | 371    | 231   | HORI |
| 2962.5    | 55.49  | 16.17    | 32     | -7.3   | 74     | 18.5   | 156    | 138   | HORI |
| 2980      | 55.17  | 15.77    | 32     | -7.4   | 74     | 18.8   | 150    | 11    | VERT |
| 2893.5    | 57.96  | 32.68    | 31.8   | 6.5    | 74     | 16.0   | 400    | 134   | VERT |
| 3060      | 43.33  | 31.74    | 32.3   | 20.7   | 74     | 30.7   | 100    | 32    | VERT |
| 4115.5    | 51.71  | 38.39    | 34.3   | 21     | 74     | 22.3   | 99     | 233   | VERT |
| 6362.5    | 47.92  | 29.82    | 36.8   | 18.7   | 74     | 26.1   | 201    | 359   | VERT |
| 7987      | 50.84  | 29.46    | 39.1   | 17.7   | 74     | 23.2   | 169    | 19    | VERT |
| 12477     | 55.53  | 30.22    | 41.3   | 16     | 74     | 18.5   | 381    | 238   | HORI |
| 13993     | 54.68  | 28.56    | 42.1   | 16     | 74     | 19.3   | 100    | 241   | HORI |
| 14579     | 56.38  | 29.34    | 42.9   | 15.9   | 74     | 17.6   | 399    | 272   | HORI |
| 14983     | 57.34  | 29.96    | 43     | 15.6   | 74     | 16.7   | 100    | 235   | VERT |
| 16191     | 56.55  | 31.28    | 40.5   | 15.3   | 74     | 17.5   | 178    | 254   | VERT |
| 17036.5   | 59.73  | 29.71    | 43.5   | 13.5   | 74     | 14.3   | 250    | 28    | VERT |
| 17413.5   | 60.81  | 28.69    | 45.1   | 12.9   | 74     | 13.2   | 150    | 228   | HORI |
| 17889.5   | 63.56  | 29.59    | 47.1   | 13.1   | 74     | 10.4   | 169    | 252   | HORI |

## 14.5dBi Antenna Channel 11 QuasiPeak Results 30M-1GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 30.66     | 30.83        | 12.43      | 17.8   | -0.6   | 40           | 9.2    | 99     | 72    | VERT |
| 33.42     | 27.99        | 11.19      | 16.2   | -0.6   | 40           | 12     | 101    | 78    | VERT |
| 38.1      | 28.05        | 13.72      | 13.6   | -0.7   | 40           | 11.9   | 101    | 75    | VERT |
| 41.52     | 26.37        | 13.57      | 12.1   | -0.7   | 40           | 13.6   | 98     | 73    | VERT |
| 54.18     | 32.25        | 21.97      | 9.4    | -0.9   | 40           | 7.7    | 100    | 0     | VERT |
| 55.98     | 32.47        | 22.6       | 9      | -0.9   | 40           | 7.5    | 100    | 29    | VERT |
| 58.68     | 32.06        | 23.32      | 7.8    | -0.9   | 40           | 7.9    | 262    | 50    | VERT |
| 199.98    | 33.68        | 21.28      | 10.6   | -1.8   | 43.5         | 9.8    | 98     | 172   | VERT |
| 352.02    | 31.24        | 13.25      | 15.6   | -2.4   | 46           | 14.8   | 117    | 92    | VERT |
| 396       | 35.46        | 16.12      | 16.8   | -2.6   | 46           | 10.5   | 123    | 223   | VERT |
| 479.52    | 30.32        | 9.13       | 18.4   | -2.8   | 46           | 15.7   | 99     | 130   | VERT |
| 499.98    | 29.13        | 7.73       | 18.5   | -2.9   | 46           | 16.9   | 99     | 64    | VERT |
| 615.96    | 29.75        | 5.39       | 21.2   | -3.2   | 46           | 16.3   | 98     | 211   | VERT |
| 627       | 30.38        | 6.34       | 20.8   | -3.2   | 46           | 15.6   | 109    | 11    | VERT |
| 637.98    | 28.94        | 5.56       | 20.2   | -3.2   | 46           | 17.1   | 178    | 113   | VERT |
| 703.98    | 30.75        | 5.41       | 21.9   | -3.4   | 46           | 15.2   | 201    | 72    | HORI |
| 748.5     | 32.74        | 7.42       | 21.8   | -3.5   | 46           | 13.3   | 102    | 225   | VERT |

## 14.5dBi Antenna Channel 11 Average Results 1GHz - 18GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 1740      | 36.34        | 2.63       | 28.3   | -5.4   | 53.9         | 17.6   | 399    | 224   | HORI |
| 1966      | 37.89        | 2.86       | 29.3   | -5.8   | 53.9         | 16     | 201    | 242   | HORI |
| 2088      | 48.15        | 12.54      | 29.6   | -6     | 53.9         | 5.8    | 150    | 189   | VERT |
| 2312      | 38.73        | 2.21       | 30.1   | -6.4   | 53.9         | 15.2   | 99     | 0     | HORI |
| 2350      | 39.25        | 2.66       | 30.2   | -6.4   | 53.9         | 14.6   | 269    | 27    | HORI |
| 2403      | 58.48        | 21.77      | 30.3   | -6.4   | 96.73        | 38.25  | 150    | 92    | VERT |
| 2463      | 116.73       | 79.73      | 30.4   | -6.6   | 116.73       | 0      | 150    | 117   | VERT |
| 2650.5    | 40.94        | 3.13       | 31     | -6.8   | 53.9         | 13     | 99     | 298   | HORI |
| 2699.5    | 40.8         | 2.73       | 31.2   | -6.9   | 53.9         | 13.1   | 214    | 201   | HORI |
| 2755      | 40.91        | 2.47       | 31.4   | -7.1   | 53.9         | 13     | 107    | 201   | HORI |
| 2901.5    | 41.73        | 2.82       | 31.8   | -7.1   | 53.9         | 12.2   | 291    | 157   | HORI |
| 2928      | 41.99        | 2.89       | 31.9   | -7.2   | 53.9         | 11.9   | 400    | 65    | HORI |
| 2942      | 42.06        | 2.86       | 31.9   | -7.3   | 53.9         | 11.8   | 301    | 135   | HORI |
| 4175.5    | 43.24        | 29.8       | 34.4   | 21     | 53.9         | 10.7   | 141    | 267   | VERT |
| 5934.5    | 32.73        | 12.3       | 36.7   | 16.2   | 53.9         | 21.2   | 350    | 263   | HORI |
| 6191.5    | 33.37        | 14.85      | 36.8   | 18.3   | 53.9         | 20.5   | 128    | 309   | VERT |
| 9070.5    | 39.44        | 15.93      | 40.4   | 16.9   | 53.9         | 14.5   | 371    | 117   | HORI |
| 12465     | 41.36        | 16.19      | 41.2   | 16.1   | 53.9         | 12.5   | 371    | 345   | VERT |
| 14511     | 43.17        | 16.25      | 42.9   | 16     | 53.9         | 10.7   | 301    | 280   | HORI |
| 14937     | 43.55        | 16.17      | 43     | 15.6   | 53.9         | 10.4   | 150    | 202   | VERT |
| 16119.5   | 43.19        | 18.11      | 40.3   | 15.3   | 53.9         | 10.7   | 256    | 0     | VERT |
| 16709.5   | 44.81        | 16.67      | 42.2   | 14.1   | 53.9         | 9.1    | 381    | 309   | HORI |
| 17118.5   | 46.71        | 15.6       | 43.9   | 12.8   | 53.9         | 7.2    | 169    | 70    | VERT |
| 17365     | 48.09        | 15.96      | 44.9   | 12.7   | 53.9         | 5.8    | 100    | 34    | VERT |
| 17861.5   | 49.71        | 15.8       | 47     | 13.1   | 53.9         | 4.2    | 350    | 37    | VERT |

## 14.5dBi Antenna Channel 11 Peak Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 1740      | 49.35  | 15.63    | 28.3   | -5.4   | 74     | 24.7   | 399    | 224   | HORI |
| 1966      | 51.33  | 16.3     | 29.3   | -5.8   | 74     | 22.7   | 201    | 242   | HORI |
| 2088      | 55.2   | 19.58    | 29.6   | -6     | 74     | 18.8   | 150    | 189   | VERT |
| 2312      | 51.87  | 15.35    | 30.1   | -6.4   | 74     | 22.1   | 99     | 0     | HORI |
| 2350      | 52.51  | 15.91    | 30.2   | -6.4   | 74     | 21.5   | 269    | 27    | HORI |
| 2403      | 65.07  | 28.35    | 30.3   | -6.4   | 101.07 | 36.0   | 150    | 92    | VERT |
| 2463      | 121.07 | 84.07    | 30.4   | -6.6   | 121.07 | 0.0    | 150    | 117   | VERT |
| 2650.5    | 54.11  | 16.3     | 31     | -6.8   | 74     | 19.9   | 99     | 298   | HORI |
| 2699.5    | 54.5   | 16.42    | 31.2   | -6.9   | 74     | 19.5   | 214    | 201   | HORI |
| 2755      | 54.49  | 16.05    | 31.4   | -7.1   | 74     | 19.5   | 107    | 201   | HORI |
| 2901.5    | 54.82  | 15.91    | 31.8   | -7.1   | 74     | 19.2   | 291    | 157   | HORI |
| 2928      | 55.52  | 16.42    | 31.9   | -7.2   | 74     | 18.5   | 400    | 65    | HORI |
| 2942      | 54.97  | 15.77    | 31.9   | -7.3   | 74     | 19.0   | 301    | 135   | HORI |
| 4175.5    | 49.2   | 35.75    | 34.4   | 21     | 74     | 24.8   | 141    | 267   | VERT |
| 5934.5    | 47     | 26.56    | 36.7   | 16.2   | 74     | 27.0   | 350    | 263   | HORI |
| 6191.5    | 46.48  | 27.97    | 36.8   | 18.3   | 74     | 27.5   | 128    | 309   | VERT |
| 9070.5    | 52.97  | 29.46    | 40.4   | 16.9   | 74     | 21.0   | 371    | 117   | HORI |
| 12465     | 55.26  | 30.09    | 41.2   | 16.1   | 74     | 18.7   | 371    | 345   | VERT |
| 14511     | 56.51  | 29.59    | 42.9   | 16     | 74     | 17.5   | 301    | 280   | HORI |
| 14937     | 57.21  | 29.84    | 43     | 15.6   | 74     | 16.8   | 150    | 202   | VERT |
| 16119.5   | 56.36  | 31.28    | 40.3   | 15.3   | 74     | 17.6   | 256    | 0     | VERT |
| 16709.5   | 58.49  | 30.36    | 42.2   | 14.1   | 74     | 15.5   | 381    | 309   | HORI |
| 17118.5   | 60.19  | 29.08    | 43.9   | 12.8   | 74     | 13.8   | 169    | 70    | VERT |
| 17365     | 61.71  | 29.59    | 44.9   | 12.7   | 74     | 12.3   | 100    | 34    | VERT |
| 17861.5   | 63.5   | 29.59    | 47     | 13.1   | 74     | 10.5   | 350    | 37    | VERT |

## 9.5dBi Antenna Channel 1 QuasiPeak Results 30MHz - 1GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 30.24     | 29.41        | 10.76      | 18.1   | -0.6   | 40           | 10.6   | 101    | 97    | VERT |
| 32.04     | 30.33        | 12.74      | 17     | -0.6   | 40           | 9.7    | 100    | 356   | VERT |
| 36.12     | 29.12        | 13.77      | 14.7   | -0.7   | 40           | 10.9   | 98     | 143   | VERT |
| 38.1      | 28.91        | 14.58      | 13.6   | -0.7   | 40           | 11.1   | 101    | 359   | VERT |
| 49.98     | 24.58        | 14.37      | 9.3    | -0.9   | 40           | 15.4   | 99     | 59    | VERT |
| 54.12     | 25.26        | 14.98      | 9.4    | -0.9   | 40           | 14.7   | 101    | 61    | VERT |
| 75        | 23.5         | 15.65      | 6.8    | -1.1   | 40           | 16.5   | 98     | 250   | VERT |
| 351.96    | 29.82        | 11.84      | 15.6   | -2.4   | 46           | 16.2   | 132    | 74    | VERT |
| 396       | 28.88        | 9.54       | 16.8   | -2.6   | 46           | 17.1   | 149    | 205   | VERT |
| 615.96    | 31.62        | 7.26       | 21.2   | -3.2   | 46           | 14.4   | 217    | 0     | VERT |
| 681.96    | 34.66        | 9.52       | 21.8   | -3.3   | 46           | 11.3   | 259    | 28    | VERT |

## 9.5dBi Antenna Channel 1 Average Results 1GHz - 18GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 1125      | 32.57        | 1.83       | 26.5   | -4.3   | 53.9         | 21.3   | 201    | 359   | VERT |
| 1665      | 37.42        | 4.12       | 28     | -5.3   | 53.9         | 16.5   | 150    | 205   | VERT |
| 2055.5    | 38.28        | 2.75       | 29.5   | -6     | 53.9         | 15.6   | 358    | 99    | VERT |
| 2324.5    | 44.82        | 8.28       | 30.1   | -6.4   | 53.9         | 9.1    | 100    | 98    | VERT |
| 2369      | 43.79        | 7.16       | 30.2   | -6.4   | 53.9         | 10.1   | 106    | 162   | VERT |
| 2413      | 109.81       | 73.03      | 30.3   | -6.5   | 109.81       | 0      | 129    | 123   | VERT |
| 2427      | 66.37        | 29.51      | 30.4   | -6.5   | 89.81        | 23.44  | 128    | 171   | VERT |
| 2453      | 56.08        | 19.08      | 30.4   | -6.6   | 89.81        | 33.73  | 128    | 239   | VERT |
| 2786      | 48.83        | 10.35      | 31.5   | -7     | 53.9         | 5.1    | 150    | 122   | VERT |
| 2983      | 42.3         | 2.88       | 32.1   | -7.4   | 53.9         | 11.6   | 337    | 56    | VERT |
| 4075.5    | 43.01        | 30.72      | 34.2   | 22     | 53.9         | 10.9   | 128    | 254   | VERT |
| 5992      | 38.5         | 12.59      | 36.7   | 17.2   | 53.9         | 15.4   | 371    | 155   | VERT |
| 10582     | 39.68        | 16.07      | 40.6   | 17     | 53.9         | 14.2   | 150    | 178   | VERT |
| 11711     | 39.78        | 16.47      | 40.6   | 17.2   | 53.9         | 14.1   | 350    | 330   | VERT |
| 12466     | 40.58        | 16.13      | 41.2   | 16.8   | 53.9         | 13.3   | 106    | 173   | VERT |
| 14665     | 41.91        | 16.24      | 42.9   | 17.3   | 53.9         | 12     | 370    | 358   | HORI |
| 14948.5   | 42.41        | 16.23      | 43     | 16.8   | 53.9         | 11.5   | 141    | 87    | HORI |
| 16133     | 41.87        | 18.22      | 40.4   | 16.7   | 53.9         | 12     | 169    | 322   | VERT |
| 16445.5   | 42.19        | 17.64      | 41.2   | 16.7   | 53.9         | 11.7   | 227    | 226   | HORI |
| 16694     | 43.06        | 16.66      | 42.2   | 15.8   | 53.9         | 10.8   | 141    | 345   | VERT |
| 17322.5   | 46.17        | 15.8       | 44.7   | 14.3   | 53.9         | 7.7    | 371    | 7     | VERT |
| 17775     | 47.58        | 15.01      | 46.6   | 14.1   | 53.9         | 6.3    | 399    | 88    | HORI |
| 17901.5   | 49.13        | 16.03      | 47.2   | 14.1   | 53.9         | 4.8    | 278    | 209   | VERT |

## 9.5dBi Antenna Channel 1 Peak Results 1GHz - 18GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 1125      | 45.54        | 14.8       | 26.5   | -4.3   | 74           | 28.5   | 201    | 359   | VERT |
| 1665      | 51.05        | 17.76      | 28     | -5.3   | 74           | 23.0   | 150    | 205   | VERT |
| 2055.5    | 51.03        | 15.49      | 29.5   | -6     | 74           | 23.0   | 358    | 99    | VERT |
| 2324.5    | 58.69        | 22.15      | 30.1   | -6.4   | 74           | 15.3   | 100    | 98    | VERT |
| 2369      | 57.4         | 20.76      | 30.2   | -6.4   | 74           | 16.6   | 106    | 162   | VERT |
| 2413      | 117.54       | 80.76      | 30.3   | -6.5   | 117.54       | 0.0    | 129    | 123   | VERT |
| 2427      | 76.24        | 39.38      | 30.4   | -6.5   | 97.54        | 21.3   | 128    | 171   | VERT |
| 2453      | 63.17        | 26.17      | 30.4   | -6.6   | 97.54        | 34.4   | 128    | 239   | VERT |
| 2786      | 59.63        | 21.15      | 31.5   | -7     | 74           | 14.4   | 150    | 122   | VERT |
| 2983      | 55.72        | 16.3       | 32.1   | -7.4   | 74           | 18.3   | 337    | 56    | VERT |
| 4075.5    | 48.18        | 35.88      | 34.2   | 22     | 74           | 25.8   | 128    | 254   | VERT |
| 5992      | 46.3         | 26.82      | 36.7   | 17.2   | 74           | 27.7   | 371    | 155   | VERT |
| 10582     | 53.19        | 29.59      | 40.6   | 17     | 74           | 20.8   | 150    | 178   | VERT |
| 11711     | 53.8         | 30.49      | 40.6   | 17.2   | 74           | 20.2   | 350    | 330   | VERT |
| 12466     | 54.03        | 29.59      | 41.2   | 16.8   | 74           | 20.0   | 106    | 173   | VERT |
| 14665     | 56.02        | 30.36      | 42.9   | 17.3   | 74           | 18.0   | 370    | 358   | HORI |
| 14948.5   | 55.76        | 29.59      | 43     | 16.8   | 74           | 18.2   | 141    | 87    | HORI |
| 16133     | 55.19        | 31.54      | 40.4   | 16.7   | 74           | 18.8   | 169    | 322   | VERT |
| 16445.5   | 55.83        | 31.28      | 41.2   | 16.7   | 74           | 18.2   | 227    | 226   | HORI |
| 16694     | 57.15        | 30.75      | 42.2   | 15.8   | 74           | 16.9   | 141    | 345   | VERT |
| 17322.5   | 59.7         | 29.34      | 44.7   | 14.3   | 74           | 14.3   | 371    | 7     | VERT |
| 17775     | 60.87        | 28.3       | 46.6   | 14.1   | 74           | 13.1   | 399    | 88    | HORI |
| 17901.5   | 62.82        | 29.71      | 47.2   | 14.1   | 74           | 11.2   | 278    | 209   | VERT |

## 9.5dBi Antenna Channel 5 QuasiPeak Results 30MHz - 1GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 30.24     | 29.25        | 10.6       | 18.1   | -0.6   | 40           | 10.7   | 115    | 101   | VERT |
| 31.62     | 28.2         | 10.37      | 17.2   | -0.6   | 40           | 11.8   | 139    | 66    | VERT |
| 34.08     | 29.62        | 13.17      | 15.8   | -0.6   | 40           | 10.4   | 98     | 113   | VERT |
| 38.1      | 29.04        | 14.71      | 13.6   | -0.7   | 40           | 11     | 100    | 108   | VERT |
| 41.1      | 26.21        | 13.24      | 12.2   | -0.7   | 40           | 13.8   | 104    | 109   | VERT |
| 49.98     | 25.73        | 15.53      | 9.3    | -0.9   | 40           | 14.3   | 101    | 88    | VERT |
| 53.94     | 25.15        | 14.87      | 9.4    | -0.9   | 40           | 14.9   | 102    | 89    | VERT |
| 75        | 23.86        | 16.01      | 6.8    | -1.1   | 40           | 16.1   | 99     | 281   | VERT |
| 249.96    | 21.02        | 6.32       | 12.7   | -2     | 46           | 25     | 99     | 351   | VERT |
| 351.96    | 30.12        | 12.14      | 15.6   | -2.4   | 46           | 15.9   | 135    | 74    | VERT |
| 396       | 32.28        | 12.94      | 16.8   | -2.6   | 46           | 13.7   | 138    | 195   | VERT |
| 478.8     | 27.97        | 6.8        | 18.4   | -2.8   | 46           | 18     | 100    | 55    | VERT |
| 681.96    | 31.5         | 6.37       | 21.8   | -3.3   | 46           | 14.5   | 240    | 29    | VERT |
| 754.92    | 24.14        | -1.16      | 21.8   | -3.5   | 46           | 21.9   | 249    | 21    | HORI |

## 9.5dBi Antenna Channel 5 Average Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 1682.5    | 38.85  | 5.48     | 28.1   | -5.3   | 53.9   | 15     | 149    | 197   | VERT |
| 2320      | 44.13  | 7.6      | 30.1   | -6.4   | 53.9   | 9.8    | 106    | 83    | VERT |
| 2329      | 43.65  | 7.1      | 30.2   | -6.4   | 53.9   | 10.3   | 100    | 6     | VERT |
| 2334.5    | 44.23  | 7.67     | 30.2   | -6.4   | 53.9   | 9.7    | 106    | 74    | VERT |
| 2372.5    | 44.76  | 8.12     | 30.2   | -6.4   | 53.9   | 9.1    | 115    | 105   | VERT |
| 2375      | 44.08  | 7.44     | 30.2   | -6.4   | 53.9   | 9.8    | 115    | 296   | VERT |
| 2430.5    | 112.29 | 75.41    | 30.4   | -6.5   | 113.19 | 0.9    | 128    | 108   | VERT |
| 2433      | 113.19 | 76.29    | 30.4   | -6.5   | 113.19 | 0      | 128    | 111   | VERT |
| 2446.5    | 75.1   | 38.12    | 30.4   | -6.6   | 93.19  | 18.09  | 119    | 107   | VERT |
| 2454      | 49.77  | 12.77    | 30.4   | -6.6   | 53.9   | 4.1    | 128    | 127   | VERT |
| 2493      | 45.82  | 8.82     | 30.5   | -6.5   | 53.9   | 8.1    | 128    | 115   | VERT |
| 2554.5    | 43.2   | 5.81     | 30.7   | -6.7   | 53.9   | 10.7   | 128    | 143   | VERT |
| 2563      | 42.55  | 5.13     | 30.7   | -6.7   | 53.9   | 11.3   | 141    | 181   | VERT |
| 2806      | 49.09  | 10.56    | 31.5   | -7     | 53.9   | 4.8    | 128    | 127   | VERT |
| 2905      | 41.85  | 2.92     | 31.8   | -7.1   | 53.9   | 12     | 141    | 175   | HORI |
| 2961.5    | 42.05  | 2.74     | 32     | -7.3   | 53.9   | 11.8   | 400    | 101   | VERT |
| 2986.5    | 55.48  | 16.05    | 32.1   | -7.4   | 53.9   | -1.6   | 250    | 322   | VERT |
| 4115.5    | 44.7   | 32.34    | 34.3   | 22     | 53.9   | 9.2    | 119    | 318   | VERT |
| 10585     | 39.75  | 16.11    | 40.6   | 17     | 53.9   | 14.1   | 357    | 350   | HORI |
| 14729.5   | 41.92  | 16.27    | 42.9   | 17.3   | 53.9   | 12     | 119    | 73    | HORI |
| 14963.5   | 42.39  | 16.22    | 43     | 16.8   | 53.9   | 11.5   | 349    | 135   | HORI |
| 16115.5   | 41.75  | 18.16    | 40.3   | 16.7   | 53.9   | 12.1   | 399    | 214   | VERT |
| 16689.5   | 43.01  | 16.63    | 42.2   | 15.8   | 53.9   | 10.9   | 350    | 359   | HORI |
| 17074     | 44.45  | 15.92    | 43.7   | 15.2   | 53.9   | 9.5    | 314    | 141   | VERT |
| 17336     | 46.23  | 15.83    | 44.8   | 14.3   | 53.9   | 7.7    | 265    | 343   | VERT |
| 17721     | 48.02  | 15.94    | 46.4   | 14.3   | 53.9   | 5.9    | 399    | 291   | HORI |
| 17993     | 48.98  | 15.24    | 47.6   | 13.8   | 53.9   | 4.9    | 349    | 6     | HORI |

## 9.5dBi Antenna Channel 5 Peak Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 1682.5    | 51.13  | 17.76    | 28.1   | -5.3   | 74     | 22.9   | 149    | 197   | VERT |
| 2320      | 57.29  | 20.76    | 30.1   | -6.4   | 74     | 16.7   | 106    | 83    | VERT |
| 2329      | 56.92  | 20.37    | 30.2   | -6.4   | 74     | 17.1   | 100    | 6     | VERT |
| 2334.5    | 57.71  | 21.15    | 30.2   | -6.4   | 74     | 16.3   | 106    | 74    | VERT |
| 2372.5    | 58.29  | 21.65    | 30.2   | -6.4   | 74     | 15.7   | 115    | 105   | VERT |
| 2375      | 58.05  | 21.4     | 30.2   | -6.4   | 74     | 16.0   | 115    | 296   | VERT |
| 2430.5    | 116.64 | 79.75    | 30.4   | -6.5   | 117.47 | 0.8    | 128    | 108   | VERT |
| 2433      | 117.47 | 80.57    | 30.4   | -6.5   | 117.47 | 0.0    | 128    | 111   | VERT |
| 2446.5    | 79.64  | 42.66    | 30.4   | -6.6   | 97.47  | 17.8   | 119    | 107   | VERT |
| 2454      | 61.38  | 24.38    | 30.4   | -6.6   | 74     | 12.6   | 128    | 127   | VERT |
| 2493      | 59.15  | 22.15    | 30.5   | -6.5   | 74     | 14.9   | 128    | 115   | VERT |
| 2554.5    | 56.58  | 19.19    | 30.7   | -6.7   | 74     | 17.4   | 128    | 143   | VERT |
| 2563      | 56.04  | 18.62    | 30.7   | -6.7   | 74     | 18.0   | 141    | 181   | VERT |
| 2806      | 59.03  | 20.5     | 31.5   | -7     | 74     | 15.0   | 128    | 127   | VERT |
| 2905      | 55.24  | 16.3     | 31.8   | -7.1   | 74     | 18.8   | 141    | 175   | HORI |
| 2961.5    | 55.22  | 15.91    | 32     | -7.3   | 74     | 18.8   | 400    | 101   | VERT |
| 2986.5    | 55.86  | 16.42    | 32.1   | -7.4   | 74     | 18.1   | 250    | 322   | VERT |
| 4115.5    | 49.53  | 37.18    | 34.3   | 22     | 74     | 24.5   | 119    | 318   | VERT |
| 10585     | 53.23  | 29.59    | 40.6   | 17     | 74     | 20.8   | 357    | 350   | HORI |
| 14729.5   | 55.61  | 29.96    | 42.9   | 17.3   | 74     | 18.4   | 119    | 73    | HORI |
| 14963.5   | 55.64  | 29.46    | 43     | 16.8   | 74     | 18.4   | 349    | 135   | HORI |
| 16115.5   | 55.13  | 31.54    | 40.3   | 16.7   | 74     | 18.9   | 399    | 214   | VERT |
| 16689.5   | 56.73  | 30.36    | 42.2   | 15.8   | 74     | 17.3   | 350    | 359   | HORI |
| 17074     | 57.86  | 29.34    | 43.7   | 15.2   | 74     | 16.1   | 314    | 141   | VERT |
| 17336     | 59.61  | 29.21    | 44.8   | 14.3   | 74     | 14.4   | 265    | 343   | VERT |
| 17721     | 61.67  | 29.59    | 46.4   | 14.3   | 74     | 12.3   | 399    | 291   | HORI |
| 17993     | 62.43  | 28.69    | 47.6   | 13.8   | 74     | 11.6   | 349    | 6     | HORI |

## 9.5dBi Antenna Channel 11 QuasiPeak Results 30MHz - 1GHz

| Frequency | Level        | Measured   | Transd | Cables | Limit        | Margin | Height | Angle | Pol. |
|-----------|--------------|------------|--------|--------|--------------|--------|--------|-------|------|
| MHz       | dB $\mu$ V/m | dB $\mu$ V | dB     | dB     | dB $\mu$ V/m | dB     | cm     | deg   |      |
| 30.66     | 28.72        | 10.32      | 17.8   | -0.6   | 40           | 11.3   | 145    | 40    | VERT |
| 31.5      | 29.66        | 11.76      | 17.3   | -0.6   | 40           | 10.3   | 101    | 0     | VERT |
| 33.48     | 28.39        | 11.62      | 16.1   | -0.6   | 40           | 11.6   | 113    | 67    | VERT |
| 37.92     | 27.83        | 13.41      | 13.7   | -0.7   | 40           | 12.2   | 99     | 132   | VERT |
| 50.04     | 24.68        | 14.48      | 9.3    | -0.9   | 40           | 15.3   | 105    | 99    | VERT |
| 54.18     | 26.42        | 16.13      | 9.4    | -0.9   | 40           | 13.6   | 102    | 75    | VERT |
| 351.96    | 27.73        | 9.75       | 15.6   | -2.4   | 46           | 18.3   | 159    | 291   | VERT |
| 396       | 31.75        | 12.41      | 16.8   | -2.6   | 46           | 14.3   | 134    | 253   | VERT |
| 479.64    | 30.79        | 9.6        | 18.4   | -2.8   | 46           | 15.2   | 100    | 51    | VERT |
| 499.98    | 34.99        | 13.59      | 18.5   | -2.9   | 46           | 11     | 100    | 220   | VERT |
| 571.98    | 32.32        | 9.76       | 19.5   | -3.1   | 46           | 13.7   | 99     | 267   | VERT |
| 616.02    | 30.51        | 6.14       | 21.2   | -3.2   | 46           | 15.5   | 250    | 0     | VERT |
| 703.98    | 32.42        | 7.08       | 21.9   | -3.4   | 46           | 13.6   | 101    | 209   | HORI |
| 748.5     | 32.54        | 7.22       | 21.8   | -3.5   | 46           | 13.5   | 249    | 173   | VERT |
| 878.04    | 32.12        | 4.06       | 24.2   | -3.9   | 46           | 13.9   | 249    | 297   | VERT |

## 9.5dBi Antenna Channel 11 Average Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 1254.5    | 32.52  | 1.26     | 26.8   | -4.5   | 53.9   | 21.4   | 394    | 215   | HORI |
| 2010.5    | 38.75  | 3.4      | 29.4   | -5.9   | 53.9   | 15.1   | 99     | 347   | HORI |
| 2316.5    | 42.32  | 5.79     | 30.1   | -6.4   | 53.9   | 11.6   | 99     | 169   | VERT |
| 2326.5    | 44.43  | 7.89     | 30.1   | -6.4   | 53.9   | 9.5    | 106    | 54    | VERT |
| 2335      | 43.93  | 7.37     | 30.2   | -6.4   | 53.9   | 10     | 100    | 72    | VERT |
| 2368.5    | 44.4   | 7.77     | 30.2   | -6.4   | 53.9   | 9.5    | 106    | 105   | VERT |
| 2374      | 43.91  | 7.27     | 30.2   | -6.4   | 53.9   | 10     | 100    | 164   | VERT |
| 2403      | 55.88  | 19.16    | 30.3   | -6.4   | 91.9   | 36.02  | 119    | 108   | VERT |
| 2444      | 68.01  | 31.05    | 30.4   | -6.6   | 91.9   | 23.89  | 128    | 111   | VERT |
| 2456      | 101.68 | 64.68    | 30.4   | -6.6   | 111.9  | 10.22  | 120    | 152   | VERT |
| 2463      | 111.9  | 74.9     | 30.4   | -6.6   | 111.9  | 0      | 129    | 39    | VERT |
| 2470      | 98.51  | 61.51    | 30.4   | -6.6   | 111.9  | 13.39  | 129    | 120   | VERT |
| 2482      | 52.18  | 15.18    | 30.5   | -6.5   | 91.9   | 39.72  | 119    | 141   | VERT |
| 2520.5    | 46.28  | 9.12     | 30.6   | -6.6   | 53.9   | 7.6    | 141    | 197   | VERT |
| 2635      | 40.91  | 3.17     | 31     | -6.8   | 53.9   | 13     | 130    | 50    | HORI |
| 2654.5    | 41.1   | 3.26     | 31     | -6.8   | 53.9   | 12.8   | 301    | 67    | HORI |
| 2815.5    | 41.61  | 3.04     | 31.5   | -7     | 53.9   | 12.3   | 149    | 0     | VERT |
| 2881.5    | 41.67  | 2.82     | 31.7   | -7.1   | 53.9   | 12.2   | 119    | 319   | VERT |
| 2933      | 42.2   | 3.06     | 31.9   | -7.2   | 53.9   | 11.7   | 278    | 130   | VERT |
| 2994      | 42.2   | 2.73     | 32.1   | -7.4   | 53.9   | 11.7   | 269    | 229   | HORI |
| 4175.5    | 47.43  | 34.94    | 34.4   | 21.9   | 53.9   | 6.5    | 119    | 193   | VERT |
| 6195      | 32.08  | 14.36    | 36.8   | 19.1   | 53.9   | 21.8   | 399    | 9     | HORI |
| 9086.5    | 38.4   | 16.03    | 40.4   | 18.1   | 53.9   | 15.5   | 115    | 204   | HORI |
| 9886      | 38.62  | 16.02    | 40.7   | 18.1   | 53.9   | 15.3   | 150    | 192   | HORI |
| 13680     | 40.3   | 15.8     | 42.2   | 17.7   | 53.9   | 13.6   | 400    | 7     | VERT |
| 14537.5   | 42     | 16.43    | 42.9   | 17.3   | 53.9   | 11.9   | 400    | 350   | HORI |
| 14950.5   | 42.52  | 16.34    | 43     | 16.8   | 53.9   | 11.4   | 191    | 134   | VERT |
| 16215     | 41.67  | 17.83    | 40.6   | 16.8   | 53.9   | 12.2   | 214    | 252   | HORI |
| 16469.5   | 42.29  | 17.51    | 41.3   | 16.5   | 53.9   | 11.6   | 100    | 122   | VERT |
| 17146     | 44.68  | 15.55    | 44     | 14.9   | 53.9   | 9.2    | 350    | 179   | VERT |
| 17375.5   | 46.55  | 16.03    | 44.9   | 14.4   | 53.9   | 7.3    | 327    | 172   | HORI |
| 17846     | 48.59  | 15.66    | 46.9   | 14     | 53.9   | 5.3    | 399    | 209   | HORI |
| 17989     | 49.03  | 15.32    | 47.6   | 13.8   | 53.9   | 4.9    | 269    | 226   | VERT |

## 9.5dBi Antenna Channel 11 Peak Results 1GHz - 18GHz

| Frequency | Level  | Measured | Transd | Cables | Limit  | Margin | Height | Angle | Pol. |
|-----------|--------|----------|--------|--------|--------|--------|--------|-------|------|
| MHz       | dBμV/m | dBμV     | dB     | dB     | dBμV/m | dB     | cm     | deg   |      |
| 1254.5    | 45.67  | 14.4     | 26.8   | -4.5   | 74     | 28.3   | 394    | 215   | HORI |
| 2010.5    | 52.28  | 16.93    | 29.4   | -5.9   | 74     | 21.7   | 99     | 347   | HORI |
| 2316.5    | 55.44  | 18.91    | 30.1   | -6.4   | 74     | 18.6   | 99     | 169   | VERT |
| 2326.5    | 57.82  | 21.27    | 30.1   | -6.4   | 74     | 16.2   | 106    | 54    | VERT |
| 2335      | 57.59  | 21.02    | 30.2   | -6.4   | 74     | 16.4   | 100    | 72    | VERT |
| 2368.5    | 57.53  | 20.89    | 30.2   | -6.4   | 74     | 16.5   | 106    | 105   | VERT |
| 2374      | 57.02  | 20.37    | 30.2   | -6.4   | 74     | 17.0   | 100    | 164   | VERT |
| 2403      | 63.02  | 26.3     | 30.3   | -6.4   | 96.26  | 33.2   | 119    | 83    | VERT |
| 2444      | 74.14  | 37.18    | 30.4   | -6.6   | 96.26  | 22.1   | 128    | 111   | VERT |
| 2456      | 106.51 | 69.51    | 30.4   | -6.6   | 116.26 | 9.8    | 120    | 152   | VERT |
| 2463      | 116.26 | 79.26    | 30.4   | -6.6   | 116.26 | 0.0    | 129    | 39    | VERT |
| 2470      | 101.61 | 64.61    | 30.4   | -6.6   | 116.26 | 14.7   | 129    | 120   | VERT |
| 2482      | 63.3   | 26.3     | 30.5   | -6.5   | 116.26 | 53.0   | 119    | 141   | VERT |
| 2520.5    | 58.43  | 21.27    | 30.6   | -6.6   | 74     | 15.6   | 141    | 197   | VERT |
| 2635      | 54.54  | 16.81    | 31     | -6.8   | 74     | 19.5   | 130    | 50    | HORI |
| 2654.5    | 54.9   | 17.06    | 31     | -6.8   | 74     | 19.1   | 301    | 67    | HORI |
| 2815.5    | 55.25  | 16.68    | 31.5   | -7     | 74     | 18.8   | 149    | 0     | VERT |
| 2881.5    | 54.89  | 16.05    | 31.7   | -7.1   | 74     | 19.1   | 119    | 319   | VERT |
| 2933      | 55.43  | 16.3     | 31.9   | -7.2   | 74     | 18.6   | 278    | 130   | VERT |
| 2994      | 55.52  | 16.05    | 32.1   | -7.4   | 74     | 18.5   | 269    | 229   | HORI |
| 4175.5    | 51.26  | 38.76    | 34.4   | 21.9   | 74     | 22.7   | 119    | 193   | VERT |
| 6195      | 46.33  | 28.61    | 36.8   | 19.1   | 74     | 27.7   | 399    | 9     | HORI |
| 9086.5    | 52.72  | 30.36    | 40.4   | 18.1   | 74     | 21.3   | 115    | 204   | HORI |
| 9886      | 52.07  | 29.46    | 40.7   | 18.1   | 74     | 21.9   | 150    | 192   | HORI |
| 13680     | 53.58  | 29.08    | 42.2   | 17.7   | 74     | 20.4   | 400    | 7     | VERT |
| 14537.5   | 55.15  | 29.59    | 42.9   | 17.3   | 74     | 18.9   | 400    | 350   | HORI |
| 14950.5   | 56.01  | 29.84    | 43     | 16.8   | 74     | 18.0   | 191    | 134   | VERT |
| 16215     | 54.99  | 31.15    | 40.6   | 16.8   | 74     | 19.0   | 214    | 252   | HORI |
| 16469.5   | 56.05  | 31.28    | 41.3   | 16.5   | 74     | 18.0   | 100    | 122   | VERT |
| 17146     | 57.83  | 28.69    | 44     | 14.9   | 74     | 16.2   | 350    | 179   | VERT |
| 17375.5   | 59.98  | 29.46    | 44.9   | 14.4   | 74     | 14.0   | 327    | 172   | HORI |
| 17846     | 62.01  | 29.08    | 46.9   | 14     | 74     | 12.0   | 399    | 209   | HORI |
| 17989     | 62.41  | 28.69    | 47.6   | 13.8   | 74     | 11.6   | 269    | 226   | VERT |

## **Appendix E: Sample Calculation**

## Field Strength Calculation

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

$$FS = RA + AF - (-CF + AG) + AV$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

AV = Averaging Factor (if applicable)

Assume a receiver reading of 55 dB $\mu$ V is obtained. The Antenna Factor of 12 and a Cable Factor of 1.1 is added. The Amplifier Gain of 20 dB is subtracted, giving a field strength of 48.1 dB $\mu$ V/m.

$$FS = 55 + 12 - (-1.1 + 20) + 0 = 48.1 \text{ dB}\mu\text{V/m}$$

The 48.1 dB $\mu$ V/m value can be mathematically converted to its corresponding level in  $\mu$ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(48.1 \text{ dB}\mu\text{V/m})/20] = 254.1 \mu\text{V/m}$$

## **Appendix F: Bandedge and Conducted Power Measurements**

This appendix contains information about the signal of interest in relation to the restricted bands of 2.31GHz to 2.39GHz and 2.4835GHz to 2.5GHz. The following tables show the calculated restricted band values based on the measured values from the antennas that were tested with the Times Microwave LMR-400 coax cable.

14.5dBi panel w/15ft LMR-400 cable

| Restricted Band Calculated Values (dBuV/m) |       |         |
|--------------------------------------------|-------|---------|
| Channel                                    | Peak  | Average |
| 1                                          | 63.14 | 55.70   |
| 11                                         | 56.46 | 45.08   |

9.5dBi omni w/3ft LMR-400 cable

| Restricted Band Calculated Values (dBuV/m) |       |         |
|--------------------------------------------|-------|---------|
| Channel                                    | Peak  | Average |
| 1                                          | 57.72 | 51.01   |
| 11                                         | 51.83 | 41.04   |

It is shown in the calculation above that the bandedge average measurement for channel 1 with the 14.5dBi antenna is in excess of the 54dB $\mu$ V/m limit. The figures in this appendix show that the product does comply with the bandedge requirements. As can be seen in Figure 30, the spurious emission at 2.37GHz is not detectable with 100kHz RBW and is more than 40dB below the fundamental signal. Figure 31 shows that a 10kHz RBW is required to clearly see the 2.37GHz signal above the noise floor. Figure 32 is measured with a 1kHz RBW at 45.49dBuV/m, which is more than 8dB below the limit.

The following tables show the calculated restricted band measurements of the antenna and coax cable combinations listed in Appendix G. The 15 foot length of LMR-400 has a loss of 1.2dB from 2.3GHz – 2.5GHz. The 3 foot length of LMR-400 has a loss of 0.4dB from 2.3GHz – 2.5GHz. These values are calculated by taking the corresponding value from the tested antenna then subtracting the differences in the gain and adding in the difference between the coax cable used.

For example:

14.5dBi panel Channel 1 Peak value = 63.14dBuV/m

Difference in gain to 12dBi panel = 2.5dB

Difference in coax cable losses = 0.8dB

12dBi panel Channel 1 Peak value is  $63.14\text{dBuV/m} - 2.5\text{dB} + 0.8\text{dB} = 61.44\text{dBuV/m}$

14dBi panel w/15ft LMR-400 cable

| Restricted Band Calculated Values (dBuV/m) |       |         |
|--------------------------------------------|-------|---------|
| Channel                                    | Peak  | Average |
| 1                                          | 62.64 | 55.20   |
| 11                                         | 55.96 | 44.58   |

12dBi panel w/3ft LMR-400 cable

| Restricted Band Calculated Values (dBuV/m) |       |         |
|--------------------------------------------|-------|---------|
| Channel                                    | Peak  | Average |
| 1                                          | 61.44 | 54.00   |
| 11                                         | 54.76 | 43.38   |

7.5dBi omni w/3ft LMR-400 cable

| Restricted Band Calculated Values (dBuV/m) |       |         |
|--------------------------------------------|-------|---------|
| Channel                                    | Peak  | Average |
| 1                                          | 55.72 | 49.01   |
| 11                                         | 49.83 | 39.04   |

The following tables show where the above numbers were generated from based on the measured radiated and conducted values from the EUT. Calculated values are denoted by an '\*'. The figures referenced in the table below denote the plot from which the measured value is taken.

The tables below show the detailed restricted band calculations for the 14.5dBi panel and 9.5dBi omni antennas.

#### 14.5dBi Panel

|         | Radiated                                    |      |                  | Radiated |  |
|---------|---------------------------------------------|------|------------------|----------|--|
| Channel | Peak (dBuV/m)                               | Fig. | Average (dBuV/m) | Fig.     |  |
| 1       | 120.61                                      | 28   | 115.64           | 29       |  |
| 11      | 122.11                                      | 35   | 116.76           | 36       |  |
|         |                                             |      |                  |          |  |
|         | Conducted Peak                              |      |                  |          |  |
| Channel | 100kHz RBW (dBm)                            | Fig. | RestBand (dBm)   | Fig.     |  |
| 1       | 6.19                                        | 41   | -51.28           | 41       |  |
| 11      | 6.61                                        | 43   | -53.63           | 43       |  |
|         |                                             |      |                  |          |  |
|         | Conducted Average                           |      |                  |          |  |
| Channel | 100kHz RBW (dBm)                            | Fig. | RestBand (dBm)   | Fig.     |  |
| 1       | -2.98                                       | 42   | -62.92           | 42       |  |
| 11      | -2.08                                       | 44   | -64.4            | 44       |  |
|         |                                             |      |                  |          |  |
|         | Delta dB*                                   |      |                  |          |  |
| Channel | Peak (dB)                                   |      | Average (dB)     |          |  |
| 1       | 57.47                                       |      | 59.94            |          |  |
| 11      | 60.24                                       |      | 62.32            |          |  |
|         |                                             |      |                  |          |  |
|         | Mhz from BandEdge                           |      |                  |          |  |
| Channel | Peak (Mhz)                                  |      | Average (Mhz)    |          |  |
| 1       | 19.40                                       |      | 19.40            |          |  |
| 11      | 0.20                                        |      | 0.20             |          |  |
|         |                                             |      |                  |          |  |
|         | BW Delta dB (1MHz vs 100kHz)*               |      |                  |          |  |
| Channel | Peak (dB)                                   |      | Average (dB)     |          |  |
| 1       | 0.00                                        |      | 0.00             |          |  |
| 11      | 5.41                                        |      | 9.36             |          |  |
|         |                                             |      |                  |          |  |
|         | Restricted Band Calculated Values (dBuV/m)* |      |                  |          |  |
| Channel | Peak                                        |      | Average          |          |  |
| 1       | 63.14                                       |      | 55.70            |          |  |
| 11      | 56.46                                       |      | 45.08            |          |  |

| Restricted Bands |            |         |
|------------------|------------|---------|
|                  | Freq (Ghz) |         |
|                  | Minimum    | Maximum |
| Lower            | 2.3100     | 2.3900  |
| Upper            | 2.4835     | 2.5000  |

| Limits (dBuV/m) |    |
|-----------------|----|
| Average         | 54 |
| Peak            | 74 |

## 9.5dBi Omni

|         | Radiated                                    |      |                  | Radiated |  |
|---------|---------------------------------------------|------|------------------|----------|--|
| Channel | Peak (dBuV/m)                               | Fig. | Average (dBuV/m) | Fig.     |  |
| 1       | 115.19                                      | 37   | 110.95           | 38       |  |
| 11      | 117.48                                      | 39   | 112.72           | 40       |  |
|         |                                             |      |                  |          |  |
|         | Conducted Peak                              |      |                  |          |  |
| Channel | 100kHz RBW (dBm)                            | Fig. | RestBand (dBm)   | Fig.     |  |
| 1       | 6.19                                        | 41   | -51.28           | 41       |  |
| 11      | 6.61                                        | 43   | -53.63           | 43       |  |
|         |                                             |      |                  |          |  |
|         | Conducted Average                           |      |                  |          |  |
| Channel | 100kHz RBW (dBm)                            | Fig. | RestBand (dBm)   | Fig.     |  |
| 1       | -2.98                                       | 42   | -62.92           | 42       |  |
| 11      | -2.08                                       | 44   | -64.4            | 44       |  |
|         |                                             |      |                  |          |  |
|         | Delta dB*                                   |      |                  |          |  |
| Channel | Peak (dB)                                   |      | Average (dB)     |          |  |
| 1       | 57.47                                       |      | 59.94            |          |  |
| 11      | 60.24                                       |      | 62.32            |          |  |
|         |                                             |      |                  |          |  |
|         | Mhz from BandEdge                           |      |                  |          |  |
| Channel | Peak (Mhz)                                  |      | Average (Mhz)    |          |  |
| 1       | 19.40                                       |      | 19.40            |          |  |
| 11      | 0.20                                        |      | 0.20             |          |  |
|         |                                             |      |                  |          |  |
|         | BW Delta dB (1MHz vs 100kHz)*               |      |                  |          |  |
| Channel | Peak (dB)                                   |      | Average (dB)     |          |  |
| 1       | 0.00                                        |      | 0.00             |          |  |
| 11      | 5.41                                        |      | 9.36             |          |  |
|         |                                             |      |                  |          |  |
|         | Restricted Band Calculated Values (dBuV/m)* |      |                  |          |  |
| Channel | Peak                                        |      | Average          |          |  |
| 1       | 57.72                                       |      | 51.01            |          |  |
| 11      | 51.83                                       |      | 41.04            |          |  |

| Restricted Bands |            |         |
|------------------|------------|---------|
|                  | Freq (Ghz) |         |
|                  | Minimum    | Maximum |
| Lower            | 2.3100     | 2.3900  |
| Upper            | 2.4835     | 2.5000  |

| Limits (dBuV/m) |    |
|-----------------|----|
| Average         | 54 |
| Peak            | 74 |

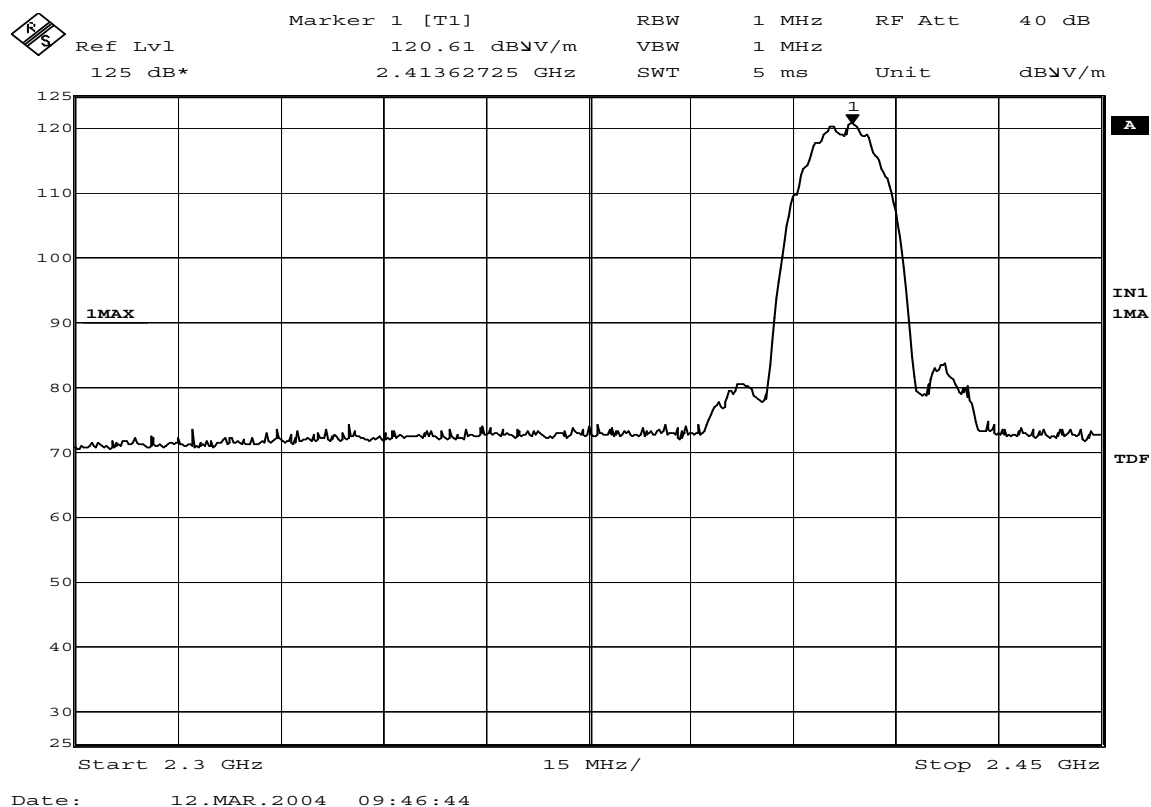


Figure 28 14.5dBi Panel Radiated Peak Plot Channel 1

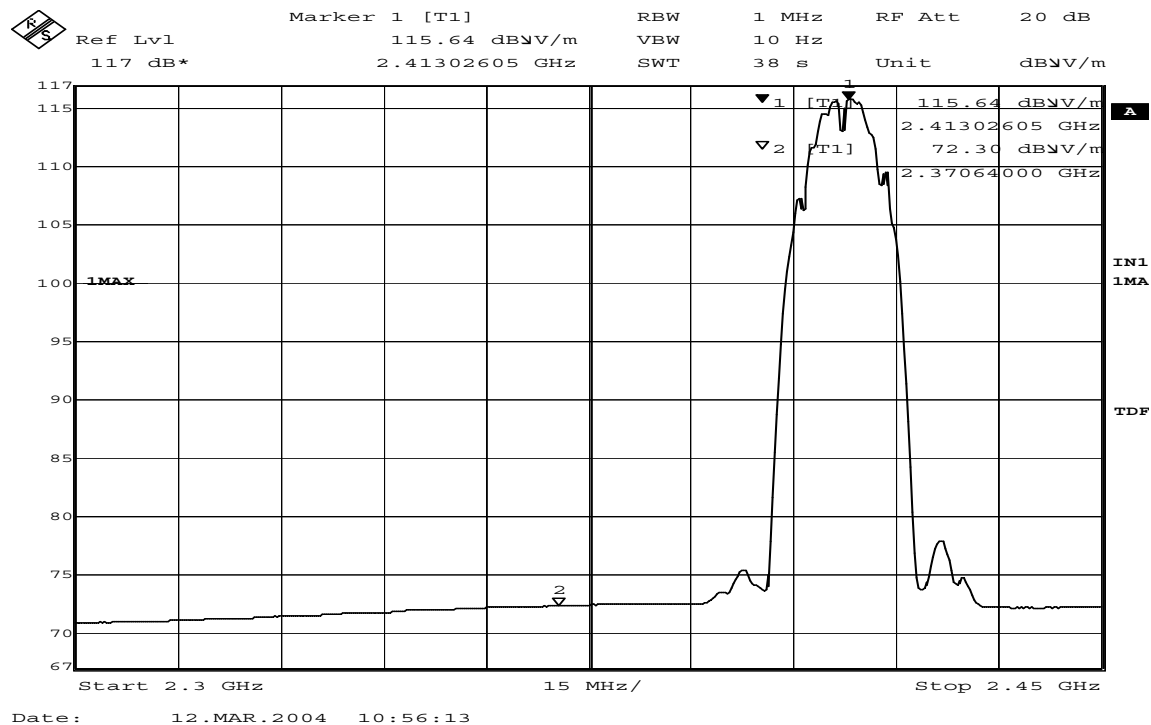


Figure 29 14.5dBi Radiated Average Plot Channel 1

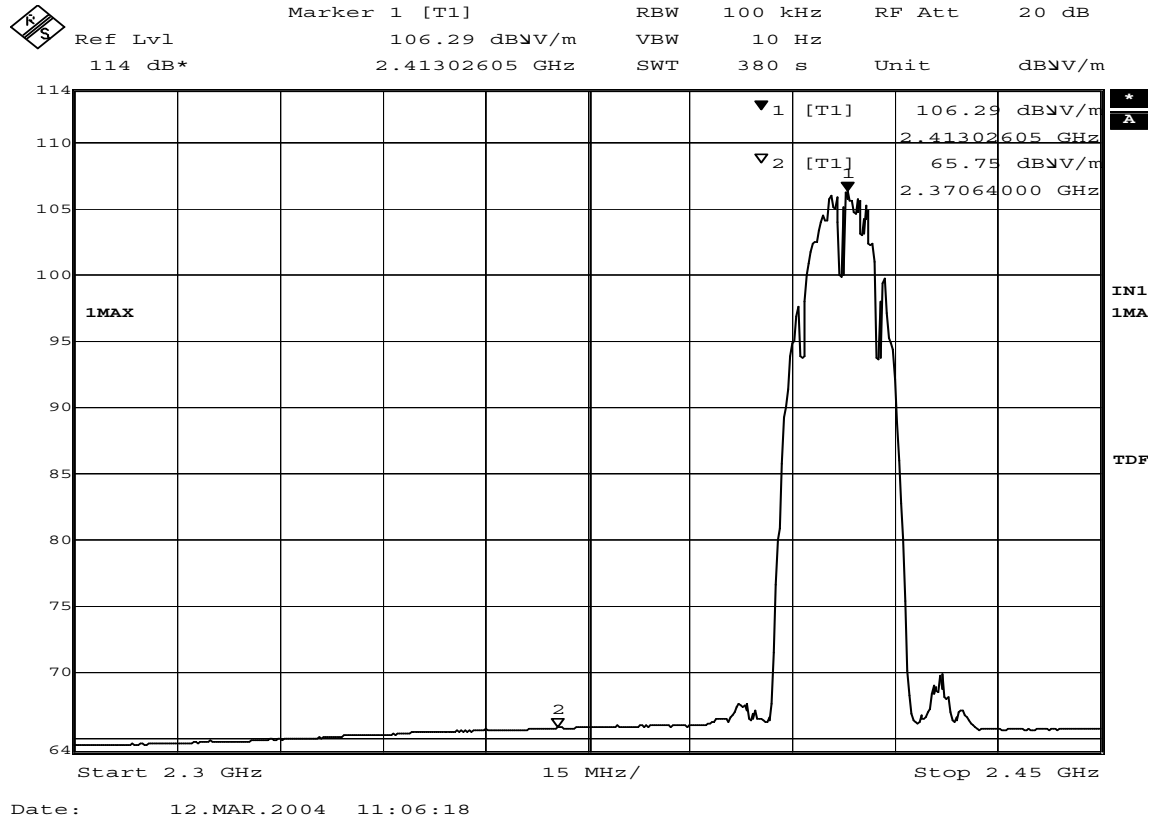


Figure 30 14.5dBi Panel Radiated Average Plot Channel 1 RBW=100kHz

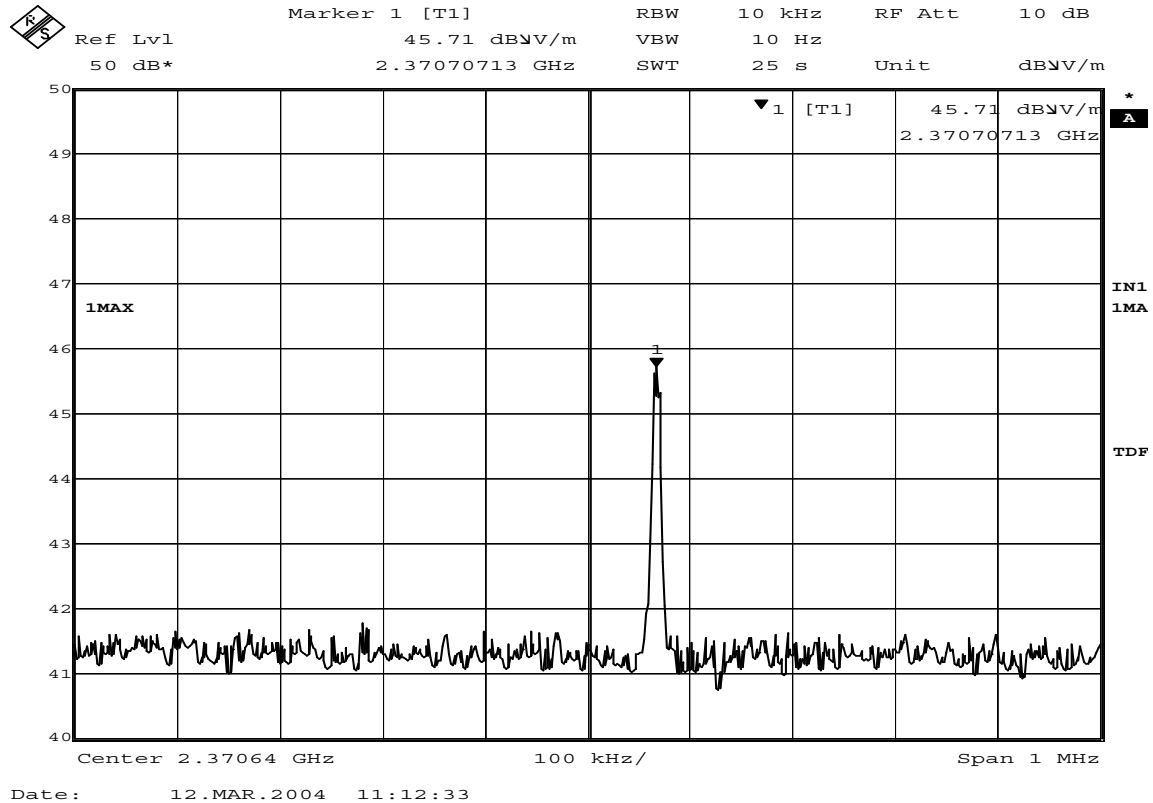
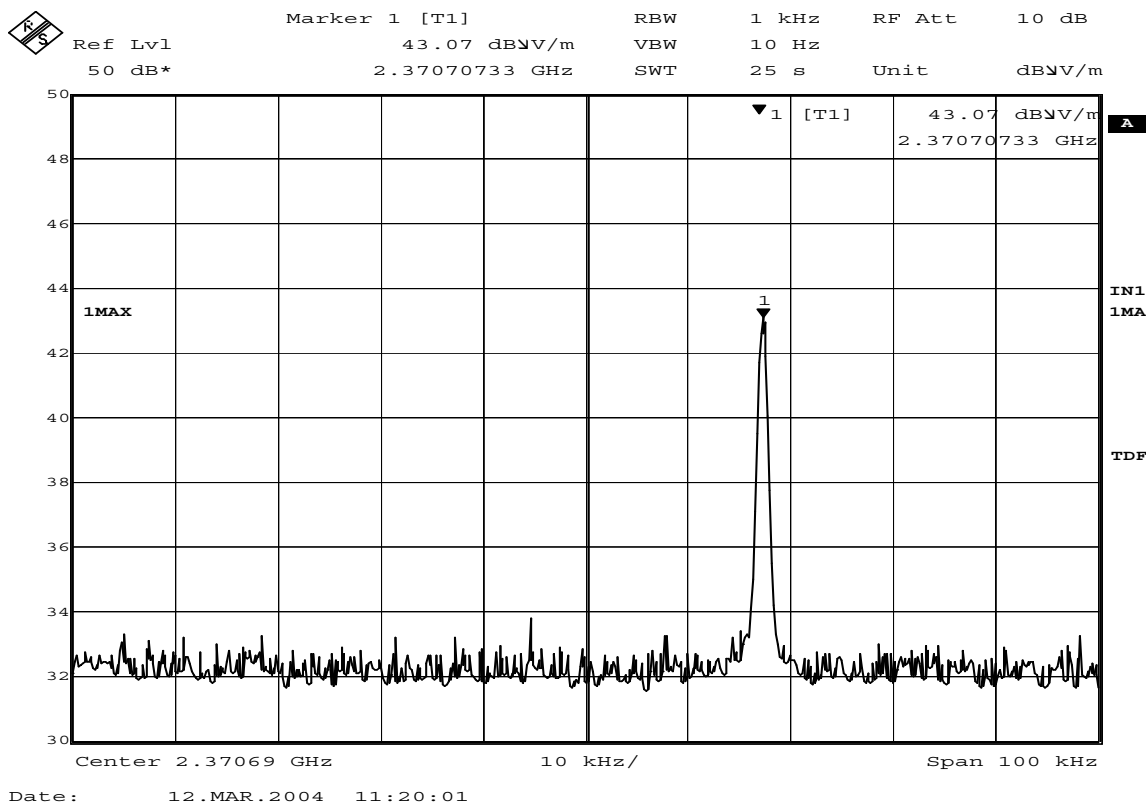
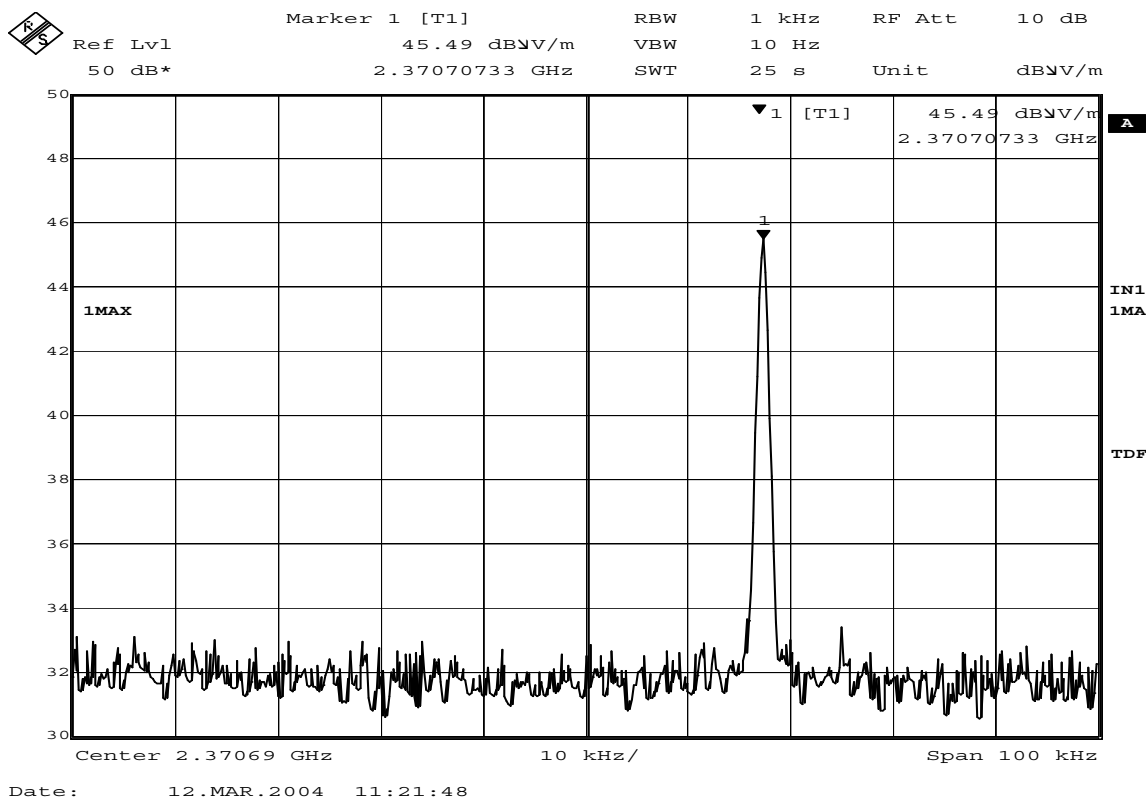
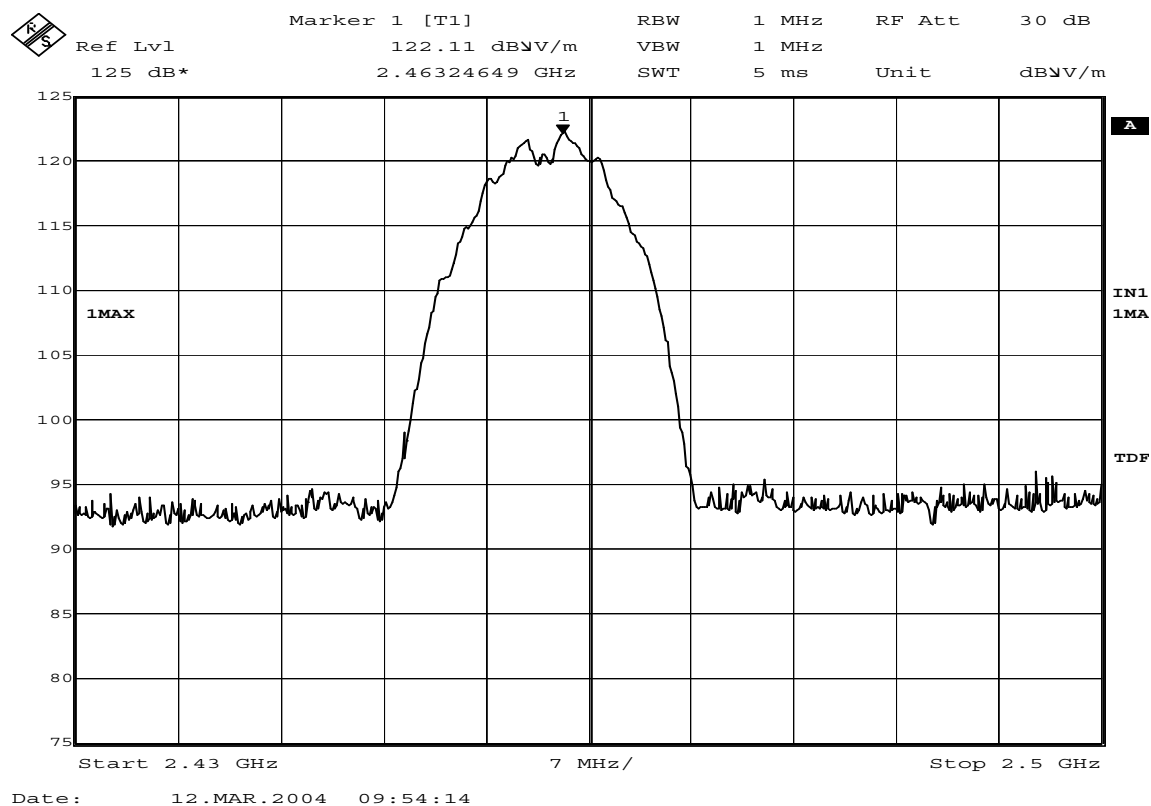
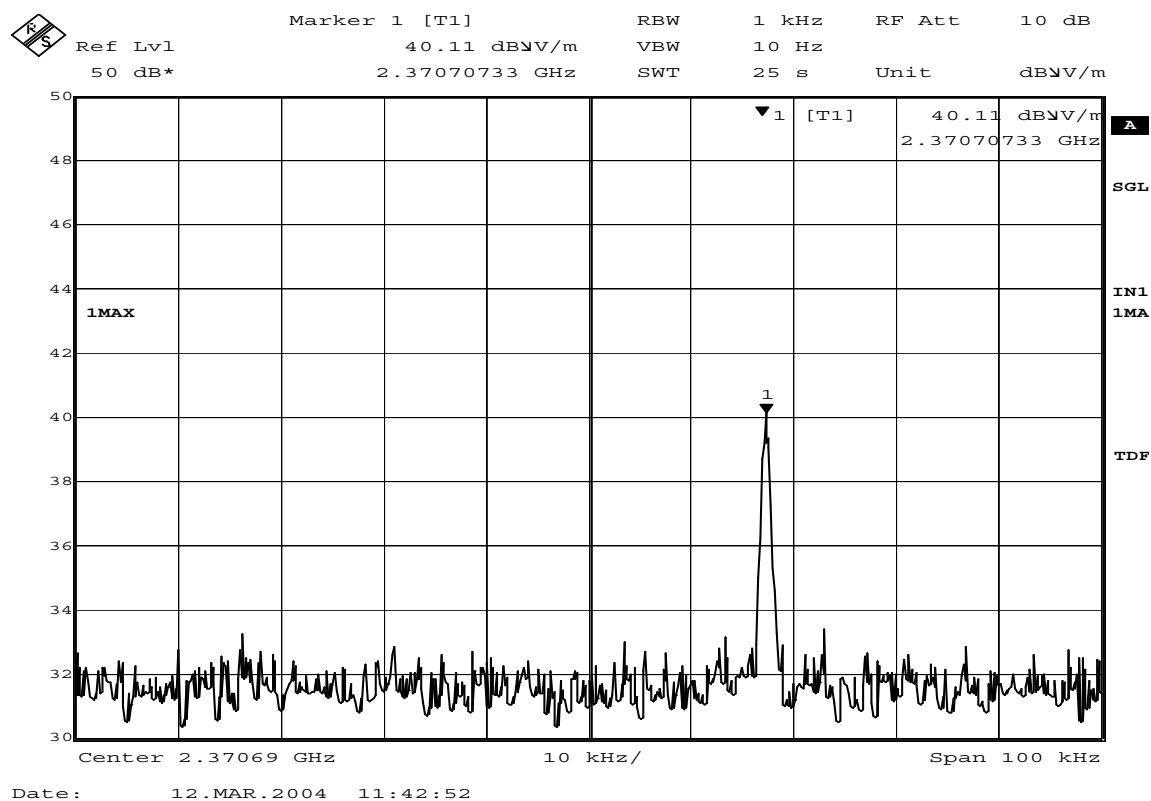


Figure 31 14.5dBi Panel Radiated Average Plot Channel 1 RBW=10kHz





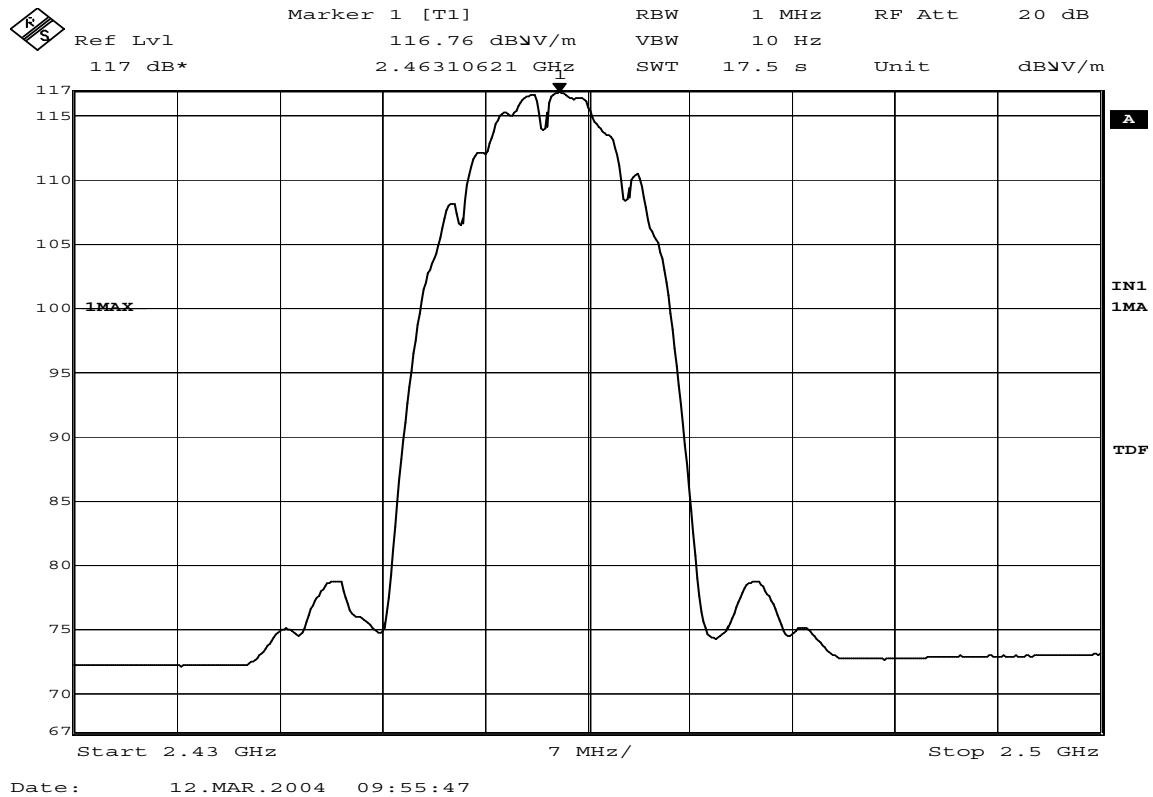


Figure 36 14.5dBi Radiated Average Plot Channel 11

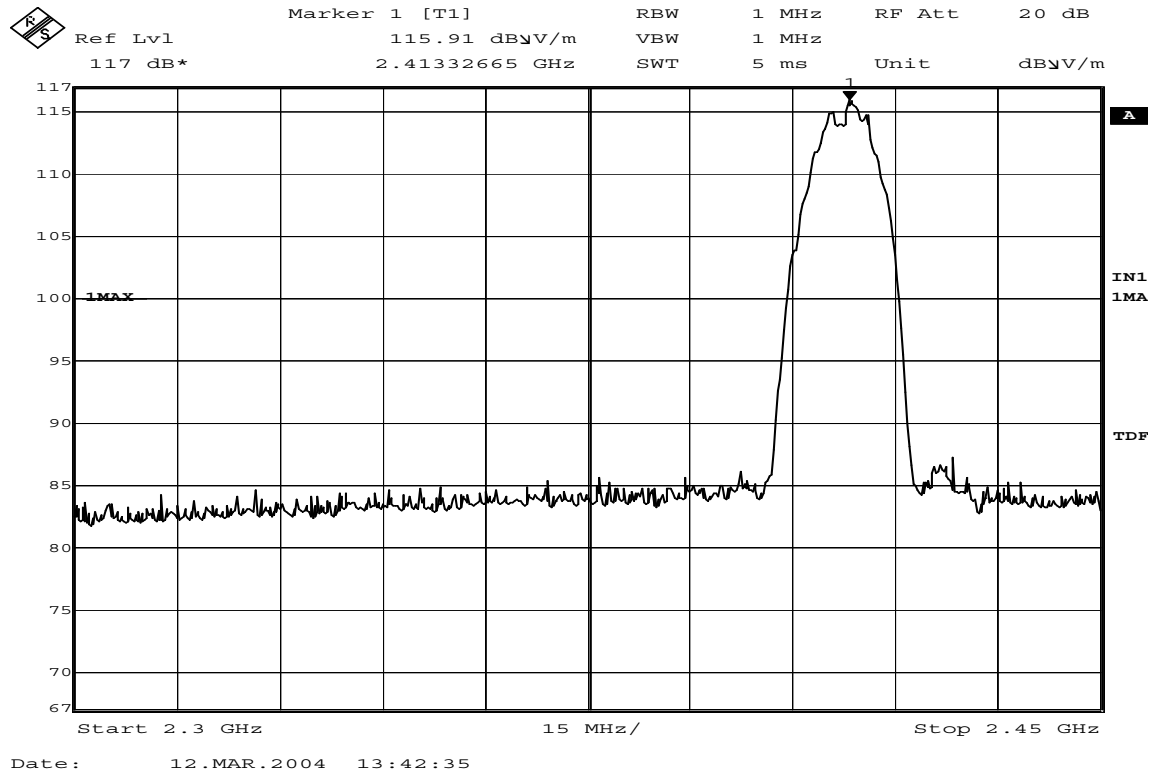


Figure 37 9.5dBi Omni Radiated Peak Plot Channel 1

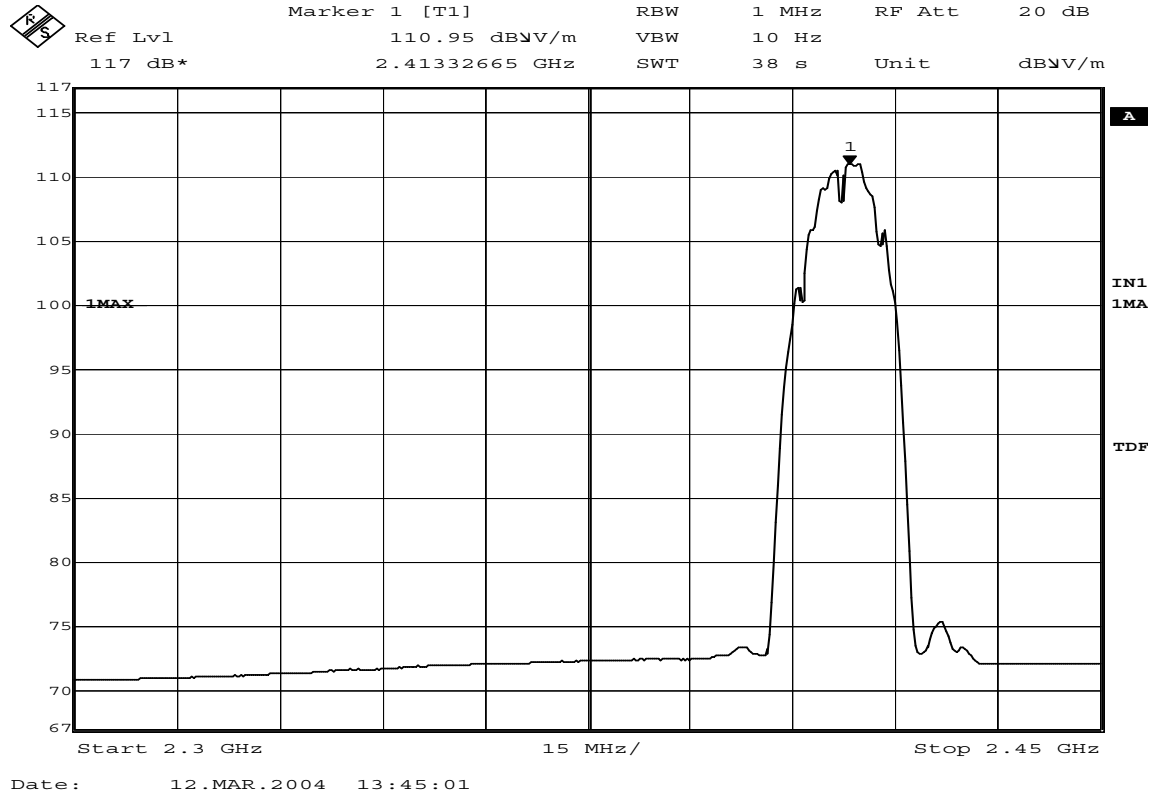


Figure 38 9.5dBi Omni Radiated Average Plot Channel 1

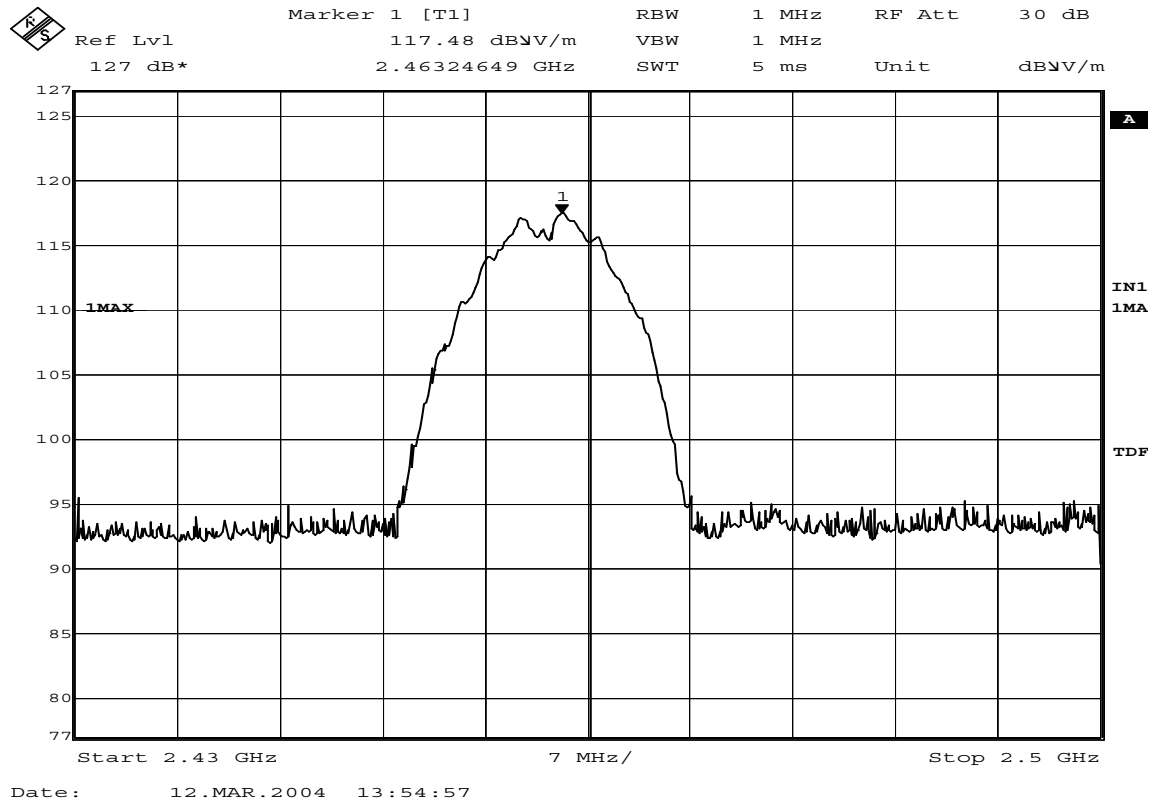


Figure 39 9.5dBi Omni Radiated Peak Plot Channel 11

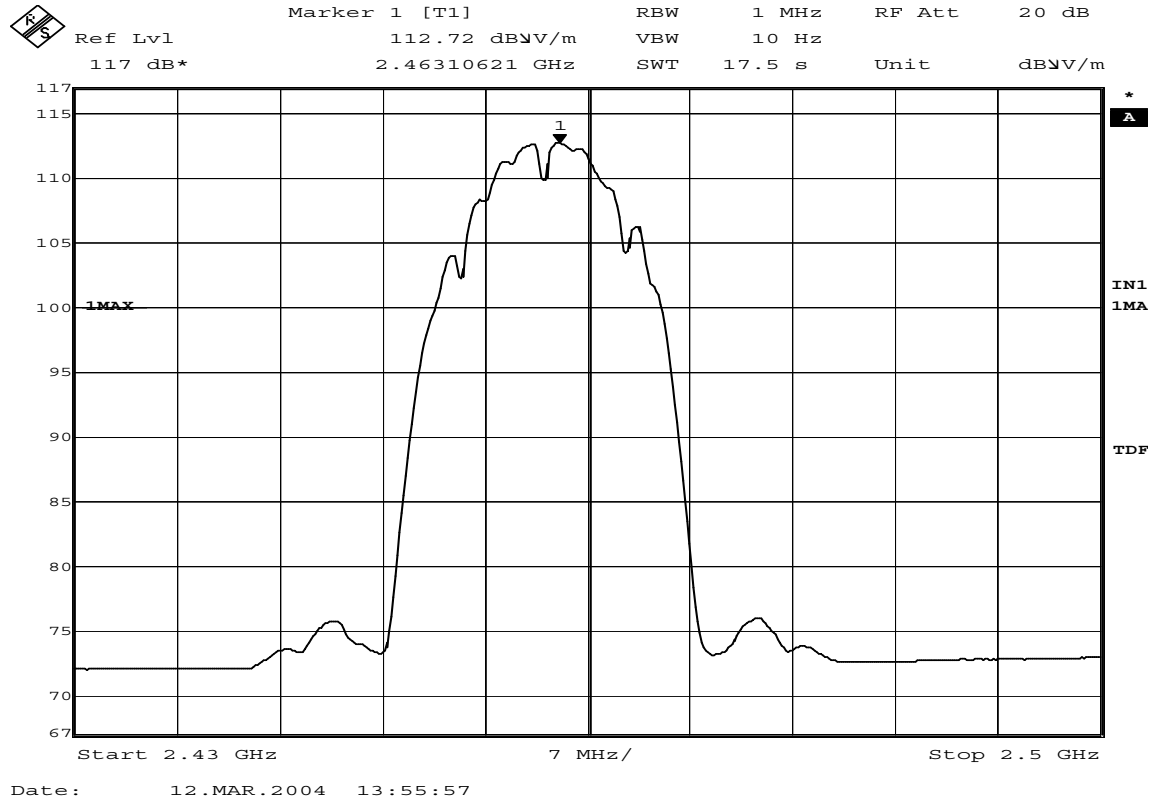


Figure 40 9.5dBi Omni Radiated Average Plot Channel 11

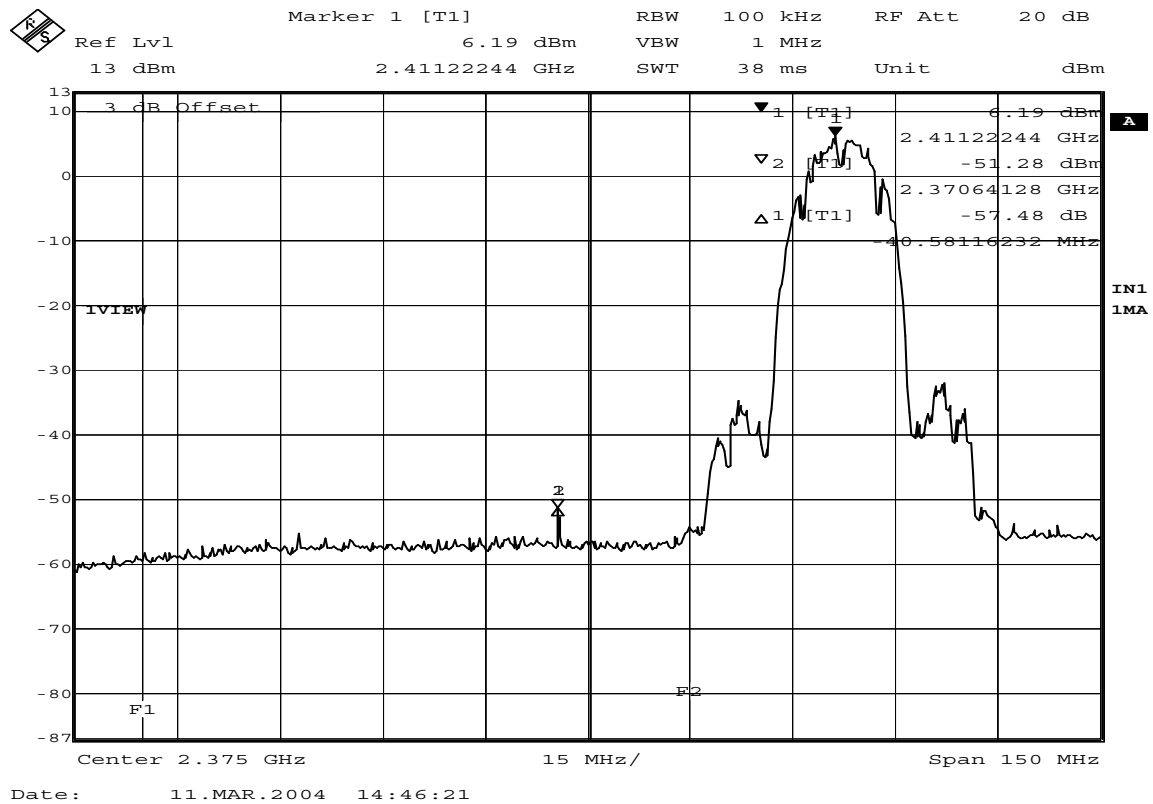


Figure 41 Conducted Peak Plot Channel 1 RBW=100kHz

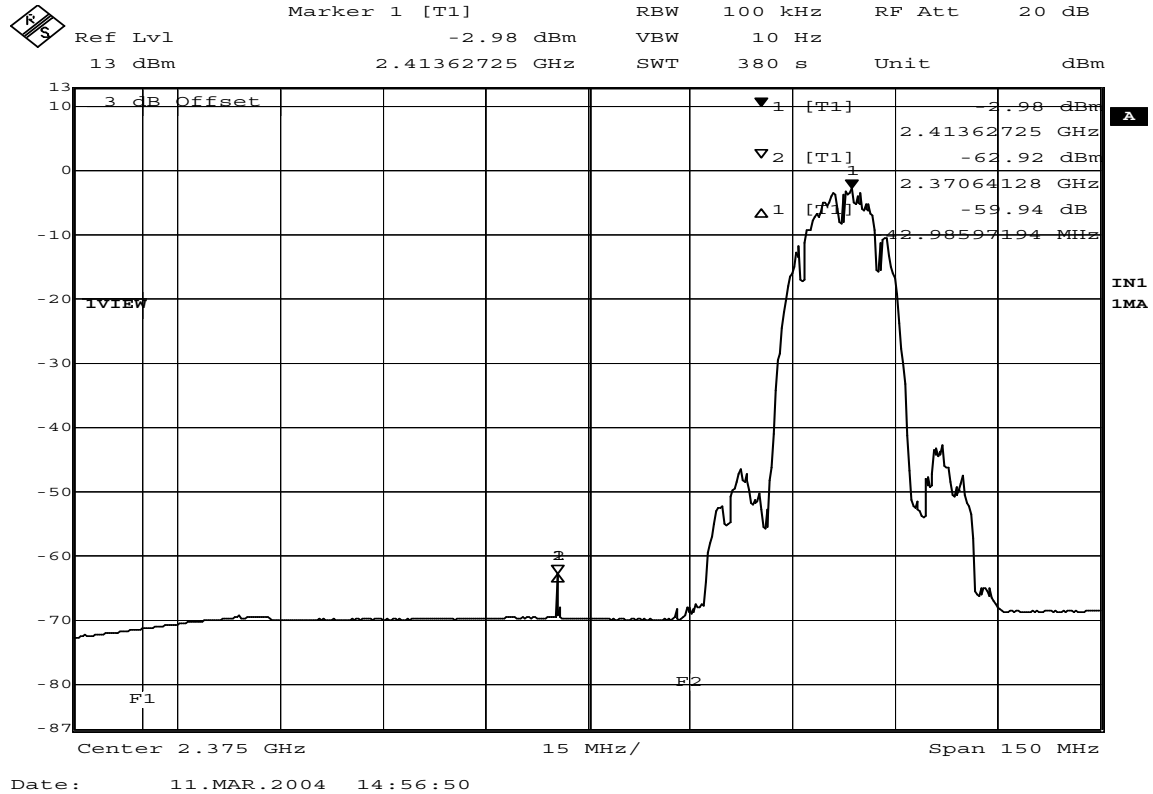


Figure 42 Conducted Average Plot Channel 1 RBW=100kHz

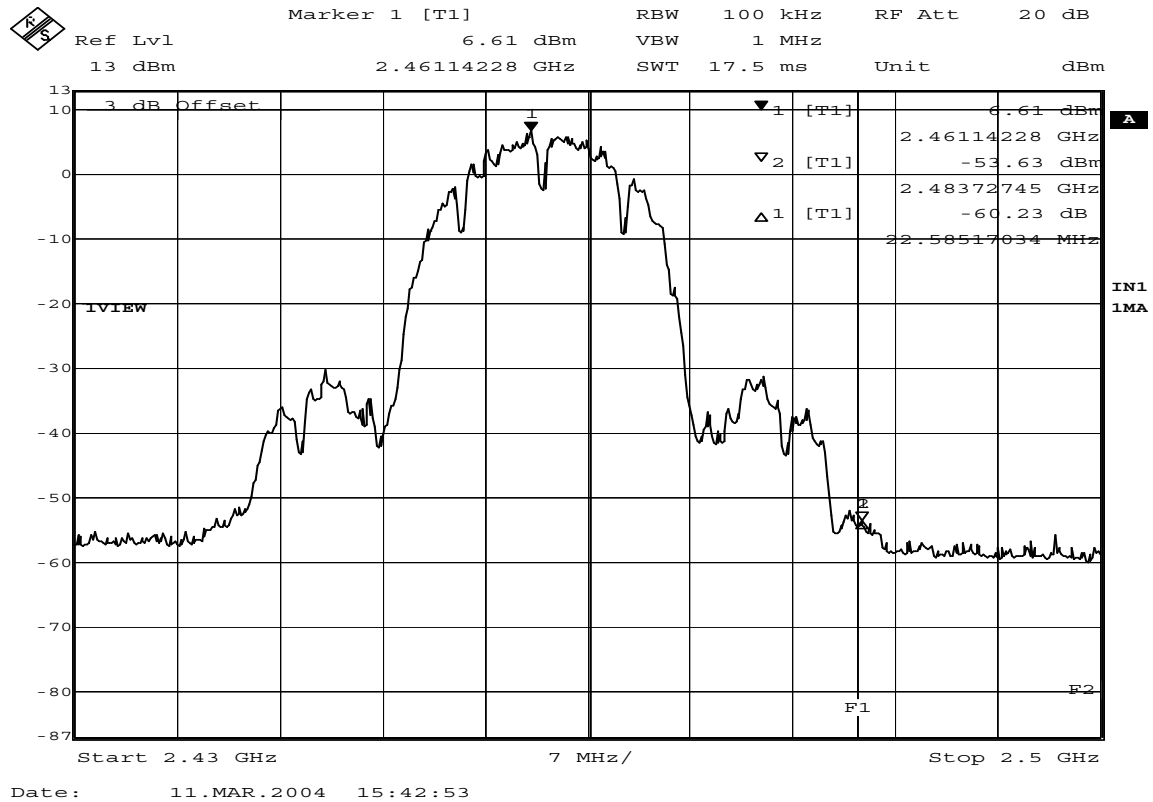


Figure 43 Conducted Peak Plot Channel 11 RBW=100kHz

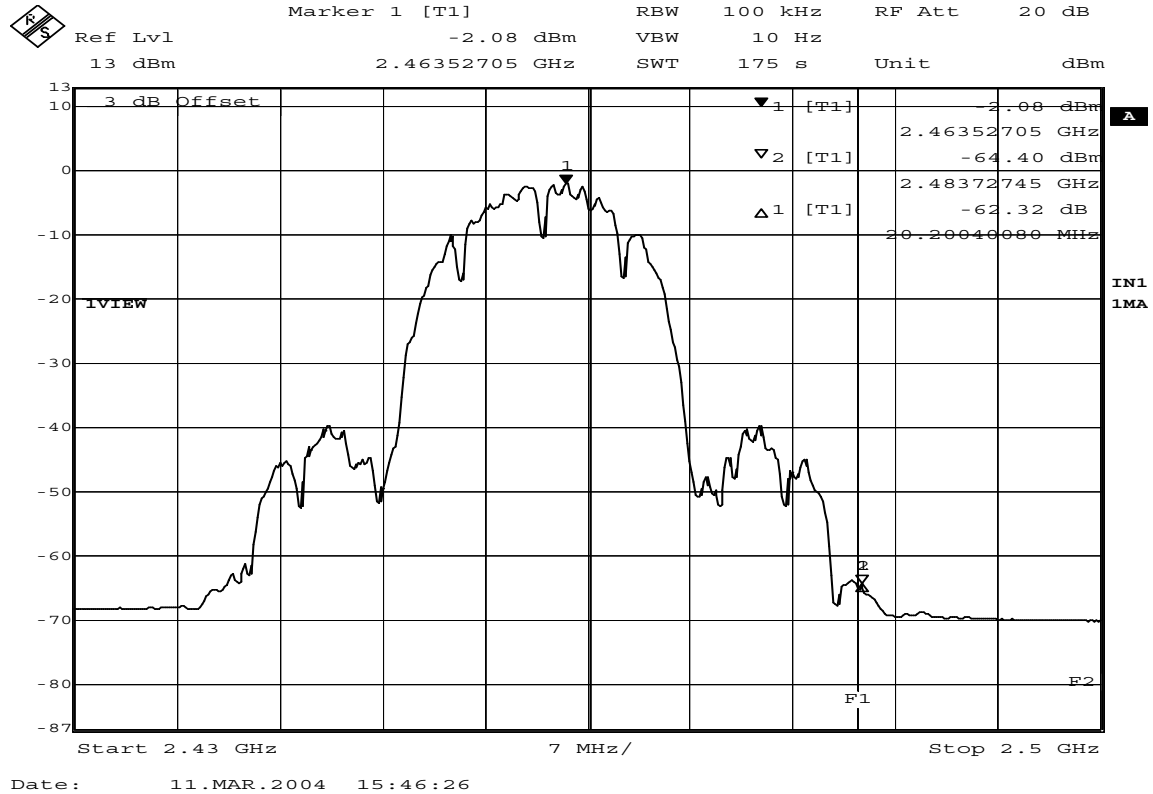


Figure 44 Conducted Average Plot Channel 11 RBW=100kHz

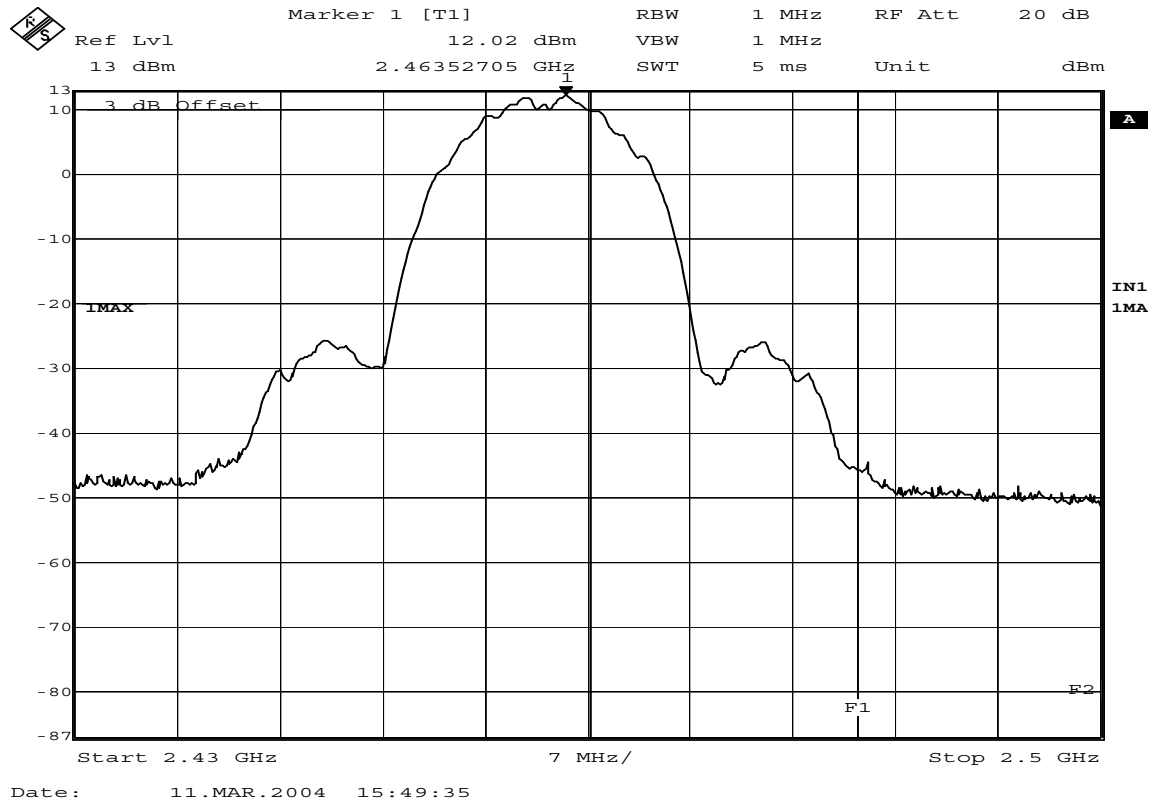


Figure 45 Conducted Peak Plot Channel 11 RBW=1MHz

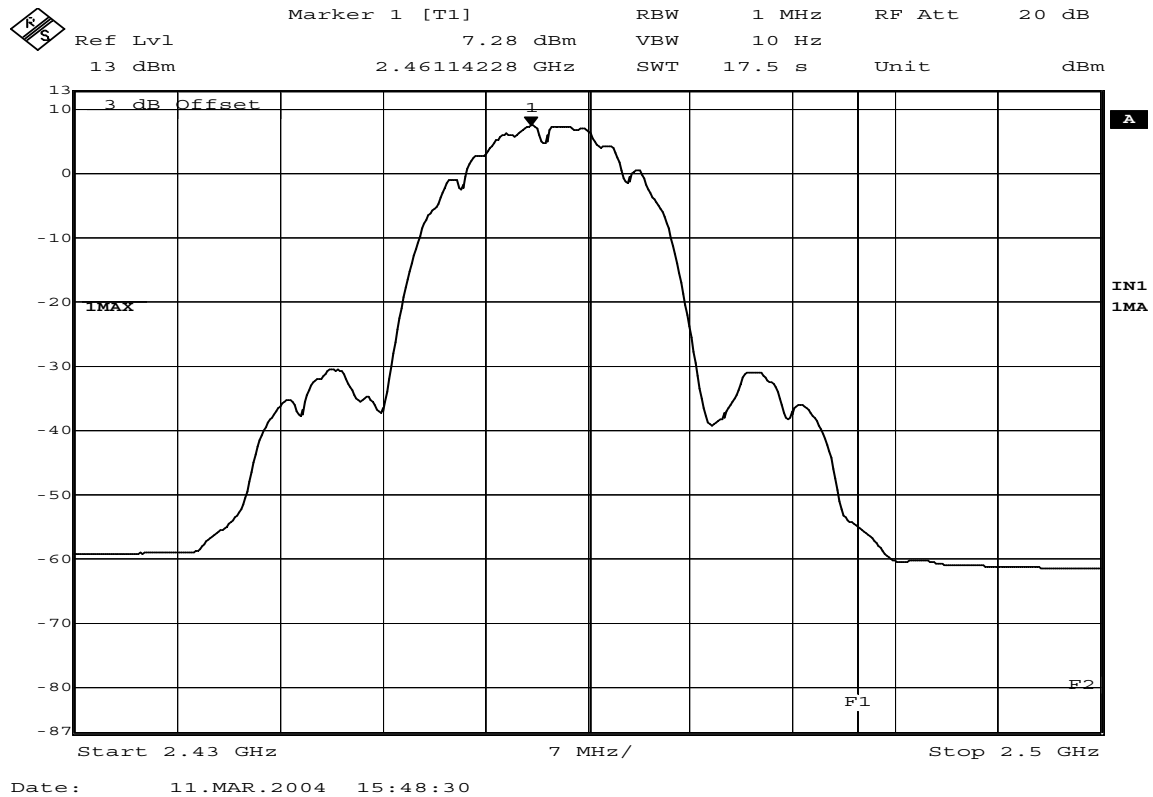


Figure 46 Conducted Average Plot Channel 11 RBW=1MHz

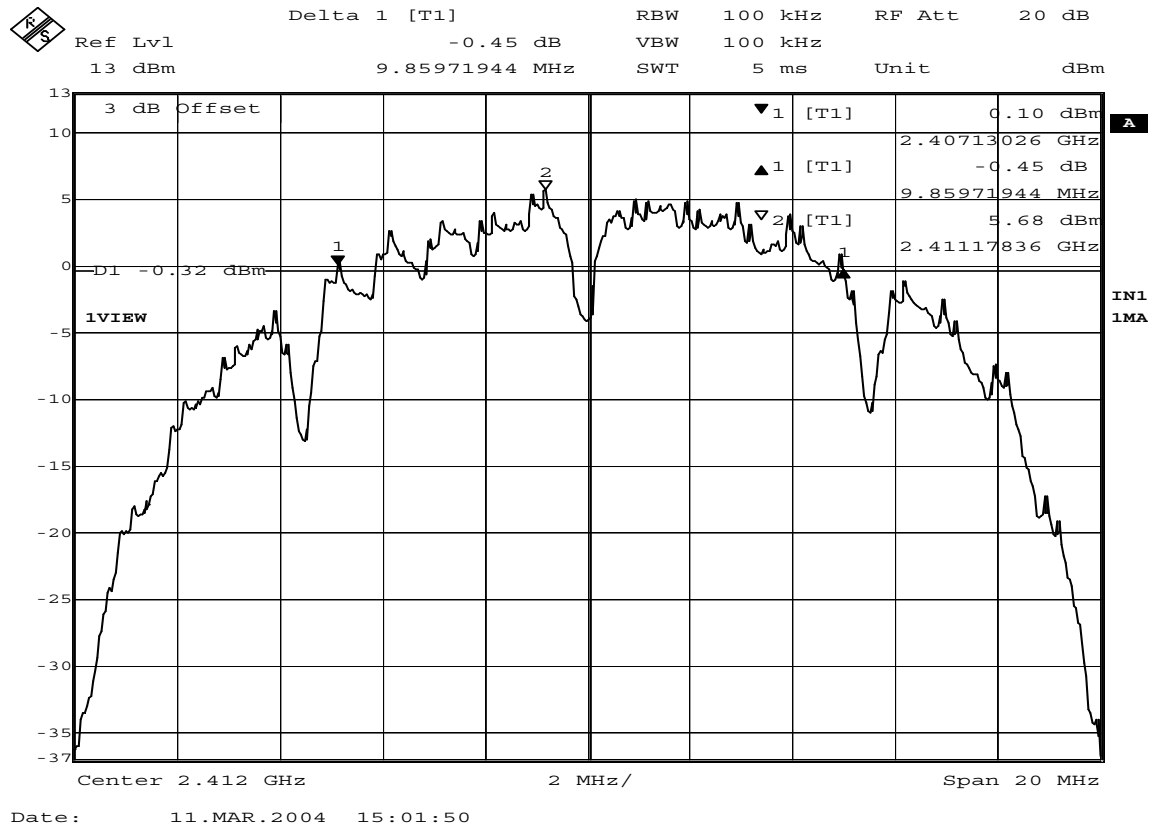


Figure 47 Conducted 6dB Bandwidth Channel 1

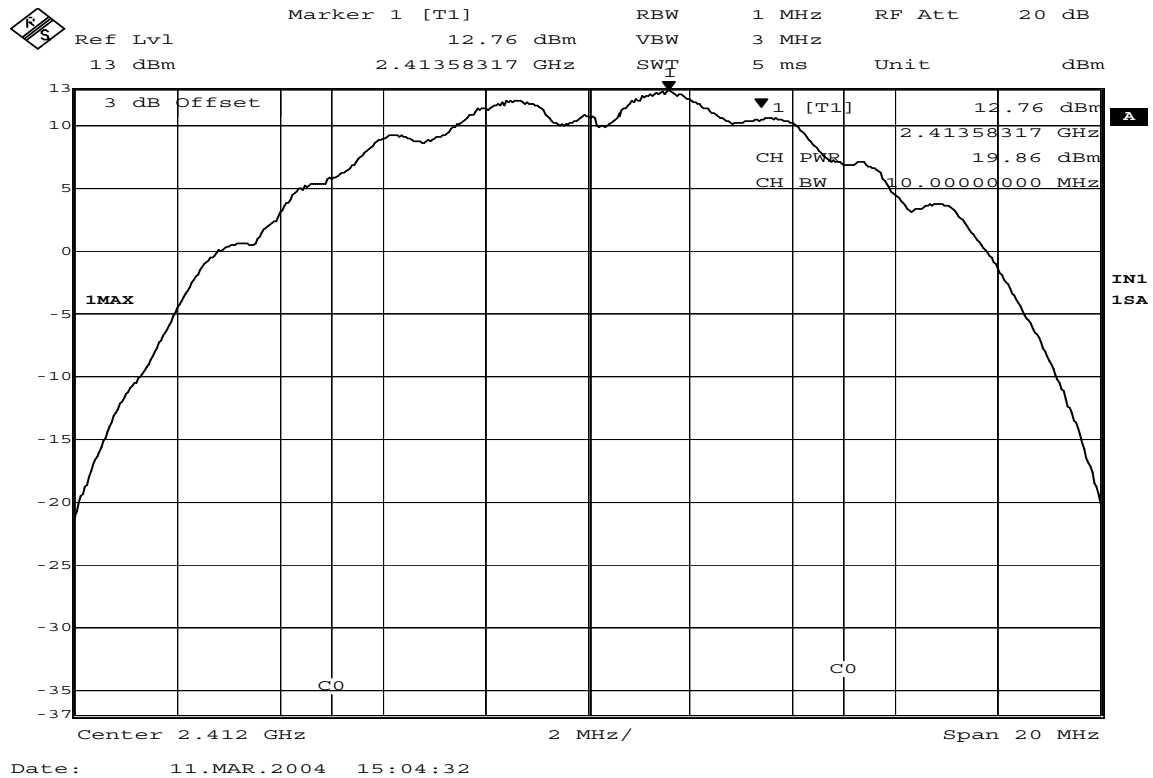


Figure 48 Conducted Channel Power Channel 1

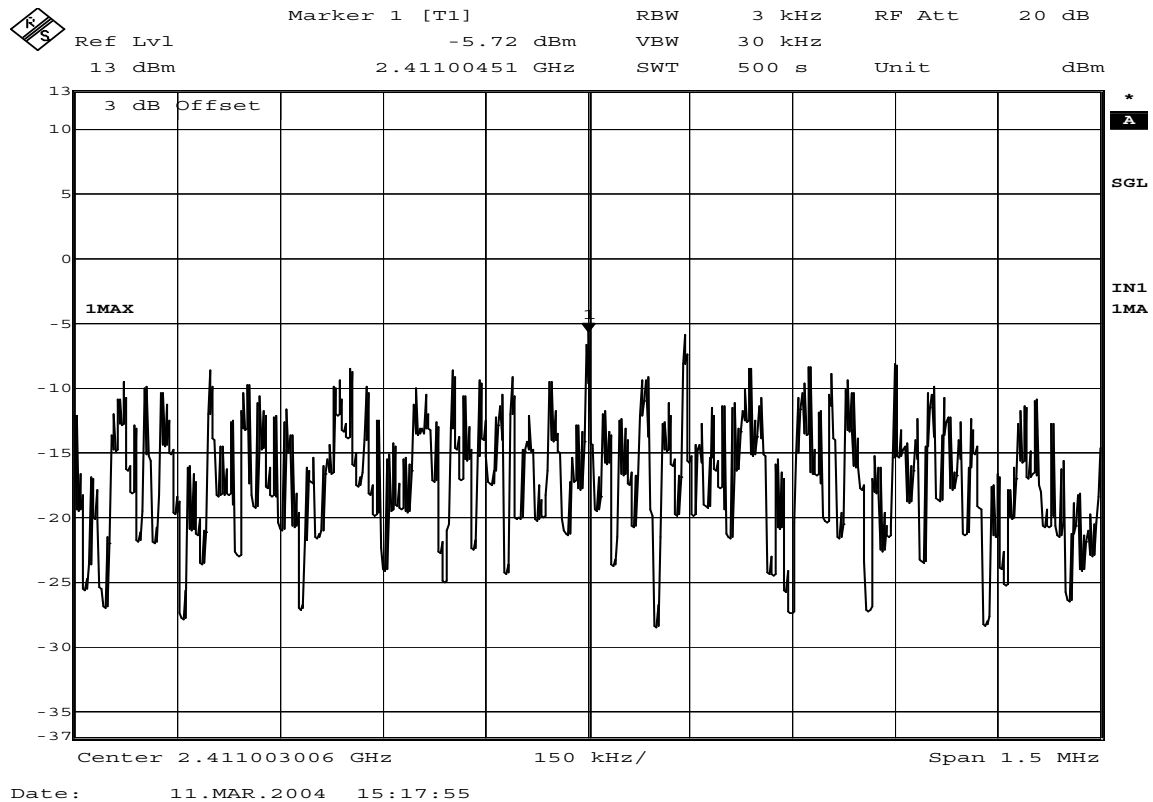


Figure 49 Conducted Power Spectral Density Channel 1

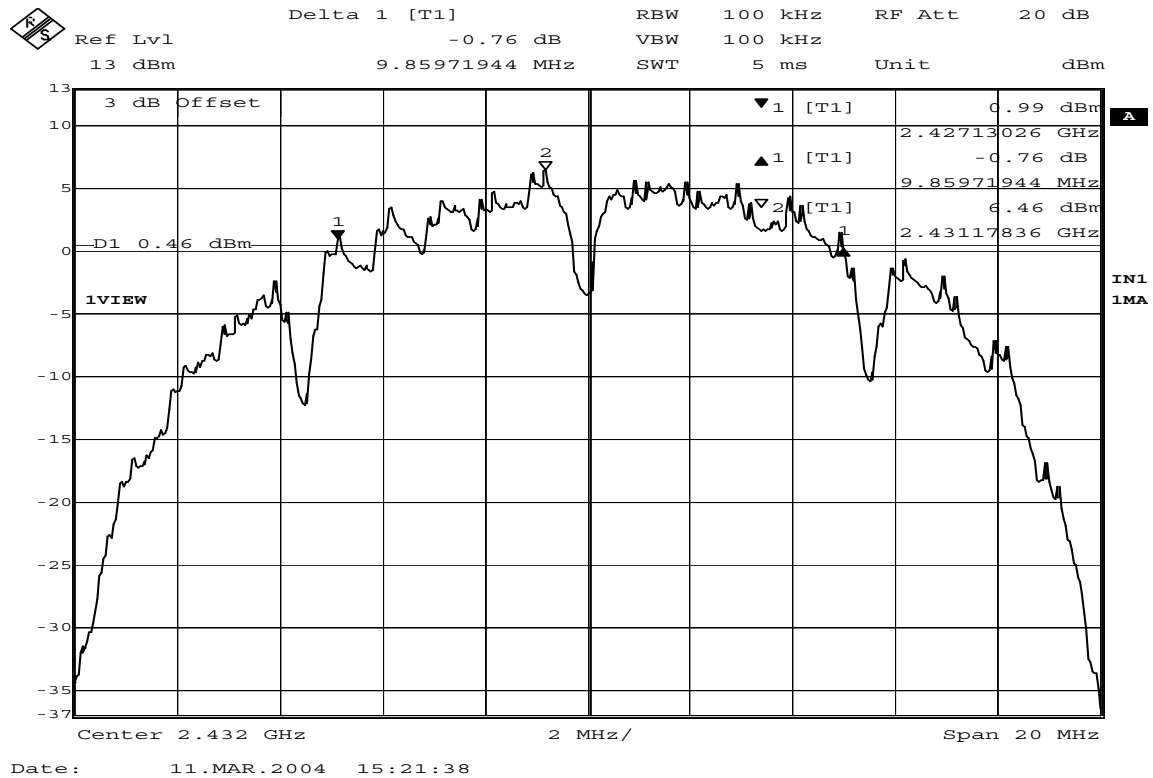


Figure 50 Conducted 6dB Bandwidth Channel 5

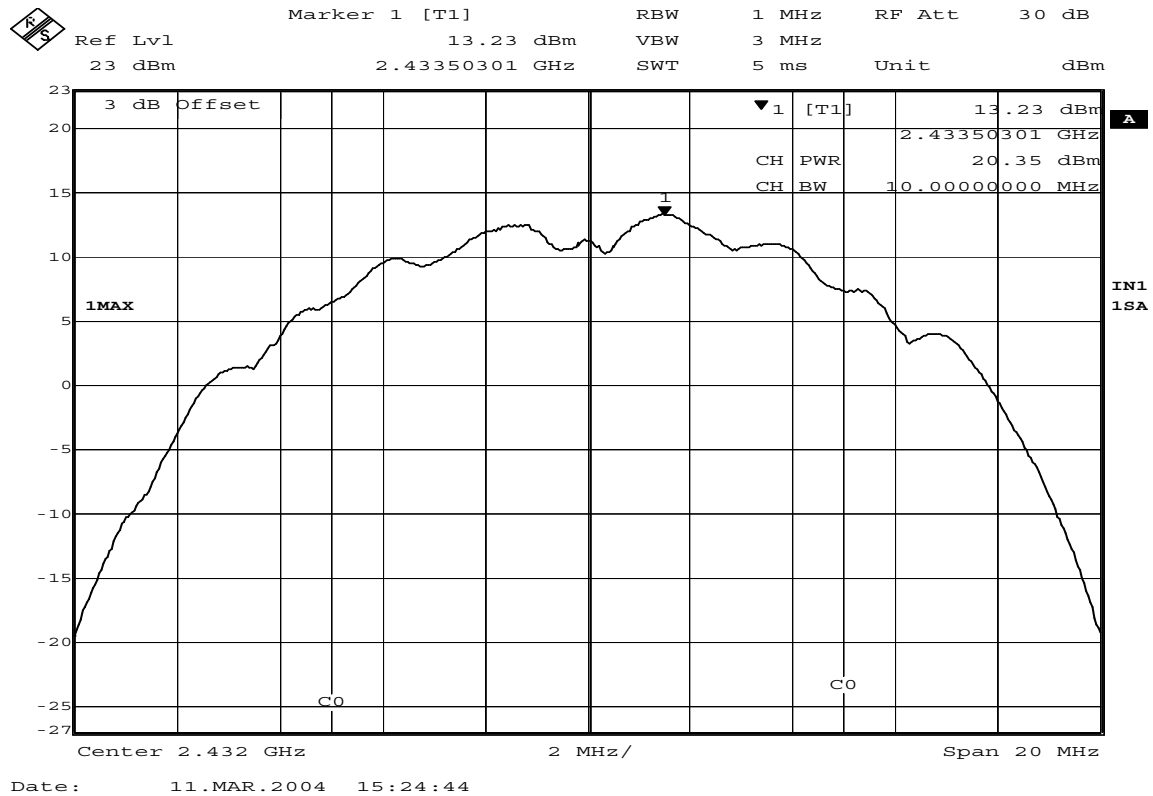


Figure 51 Conducted Channel Power Channel 5

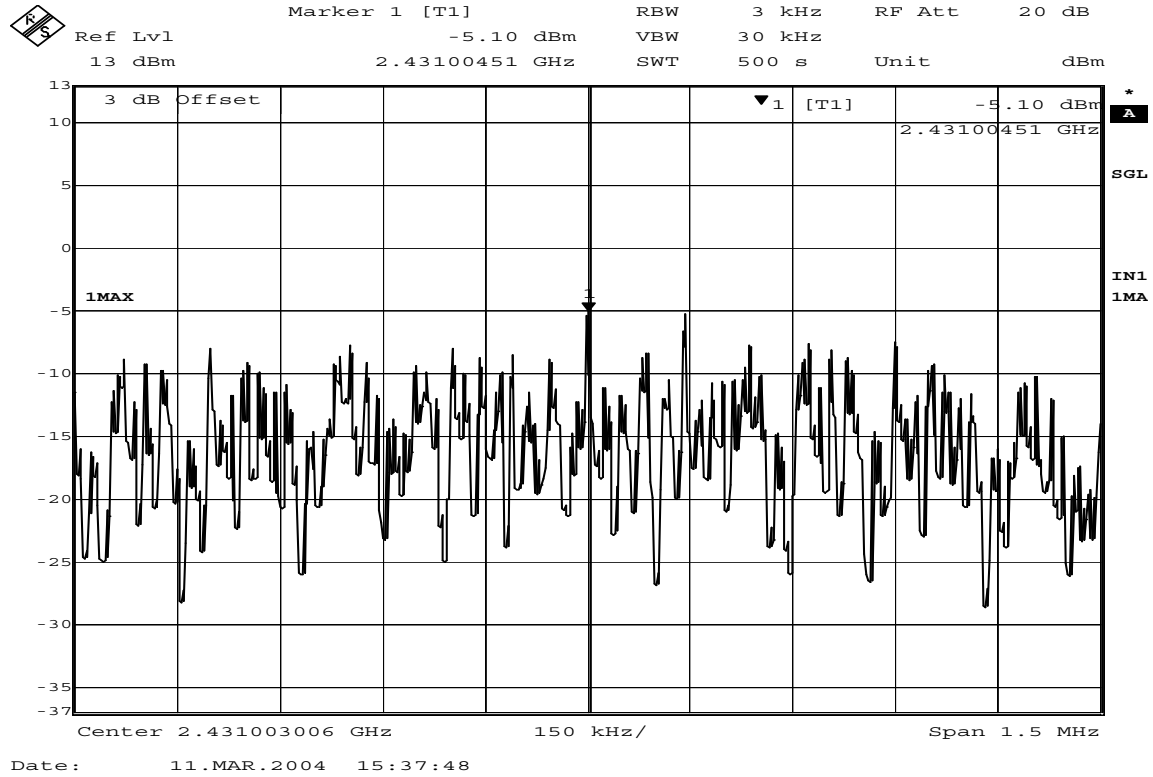


Figure 52 Conducted Power Spectral Density Channel 5

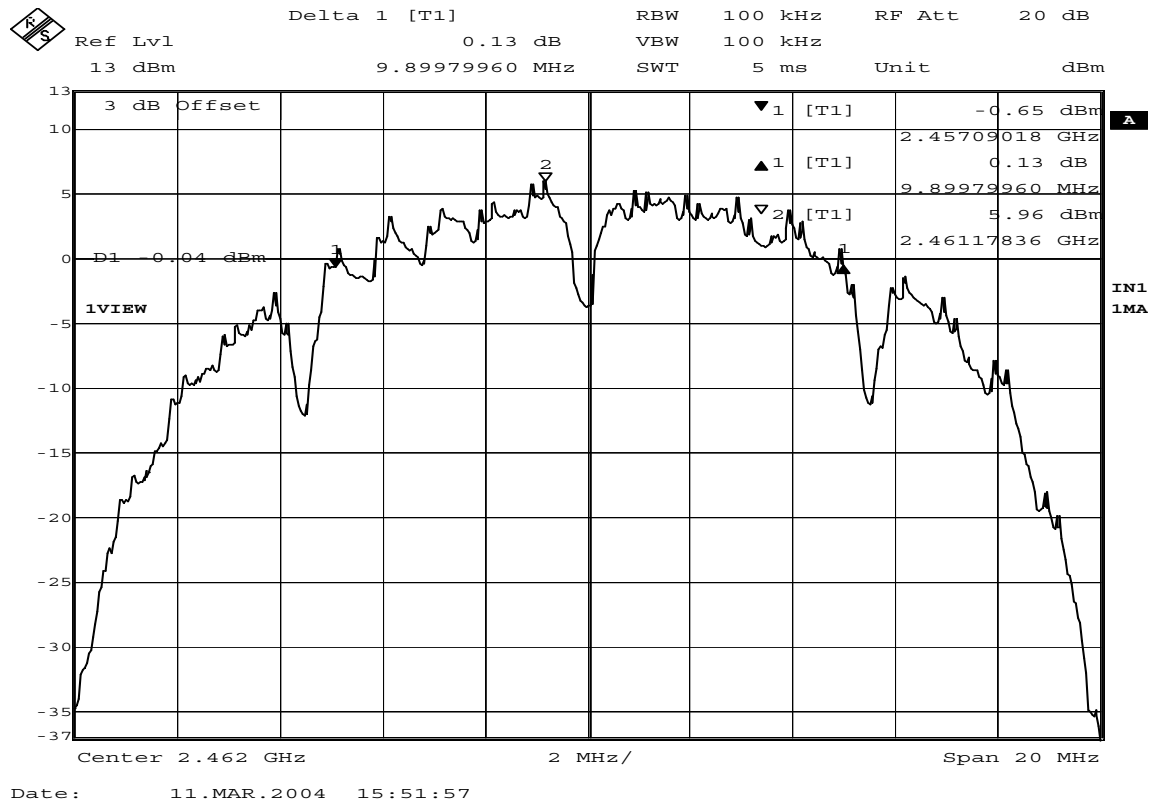


Figure 53 Conducted 6dB Bandwidth Channel 11

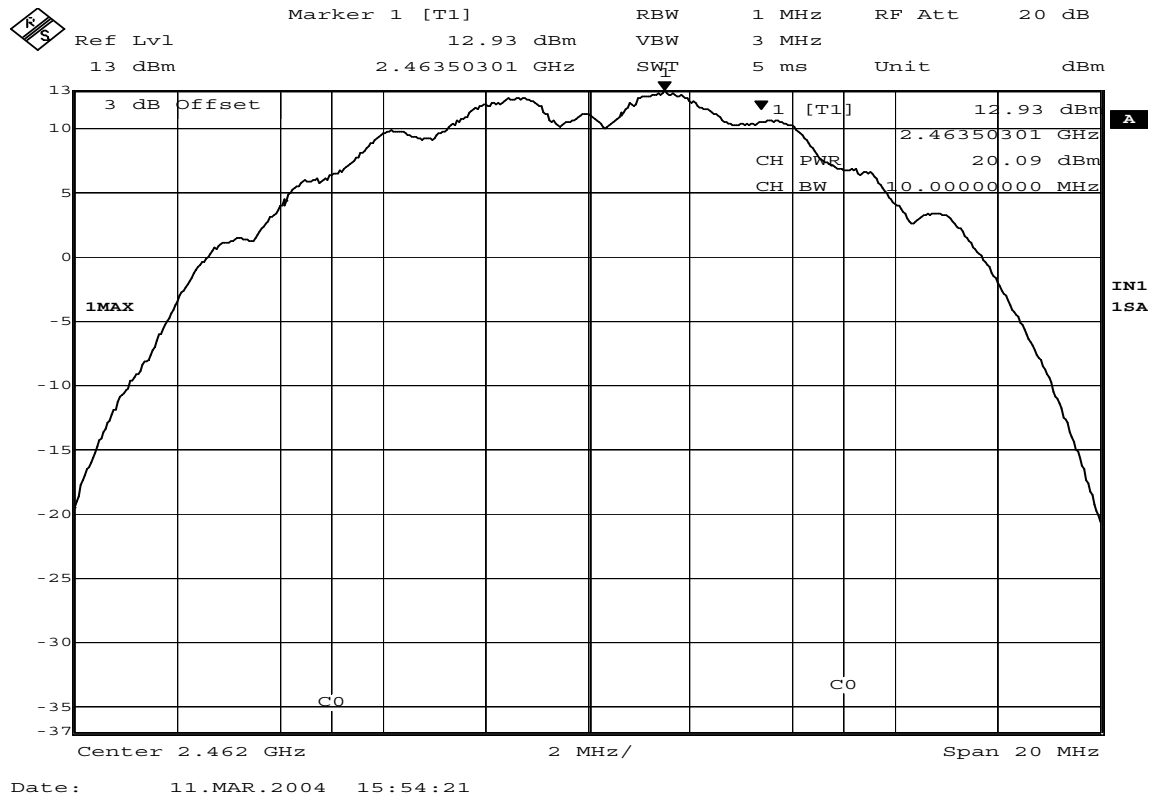


Figure 54 Conducted Channel Power Channel 11

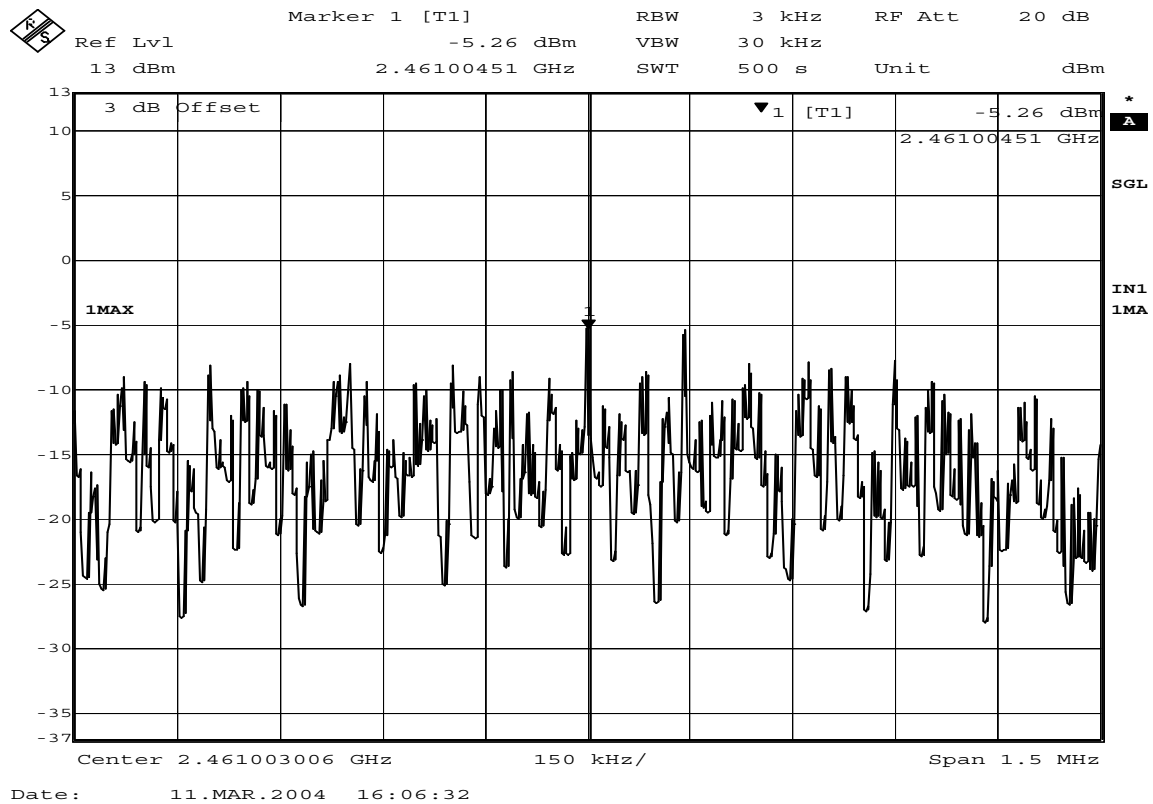


Figure 55 Conducted Power Spectral Density Channel 11

## **Appendix G: Specifications of Antennas**

| <b>Telex Model</b> | <b>Gain (dBi)</b> | <b>Antenna Type</b> | <b>Polarization</b> | <b>Cable</b> | <b>Cable Length (ft.)</b> | <b>Azimuth Beamwidth (degrees)</b> |
|--------------------|-------------------|---------------------|---------------------|--------------|---------------------------|------------------------------------|
| 2444AA             | 14.5              | Sector              | Vertical            | LMR400       | 15                        | 96 degrees                         |
| 2442AA             | 14                | Sector              | Vertical            | LMR400       | 15                        | 60 degrees                         |
| 2443AA             | 12                | Sector              | Vertical            | LMR400       | 3                         | 125 degrees                        |
| 2445AA             | 12                | Sector              | Horizontal          | LMR400       | 3                         | 90 degrees                         |
| 2439AA-1           | 9.5               | Omni                | Vertical            | LMR400       | 3                         | Not Applicable                     |
| 2437AA             | 7.5               | Omni                | Vertical            | LMR400       | 3                         | Not Applicable                     |

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