

Figure 51: 40MHz, 6dBi, Low Channel: Power Spectral density Measured at Ch. 1

#### 5.3.4.5.5 40 MHz MODULATION BANDWIDTH, 6 dBi POWER, MID CHANNEL - 5200 MHz



Figure 52: 40MHz, 6dBi, Mid Channel: Power Spectral density Measured at Ch. 0

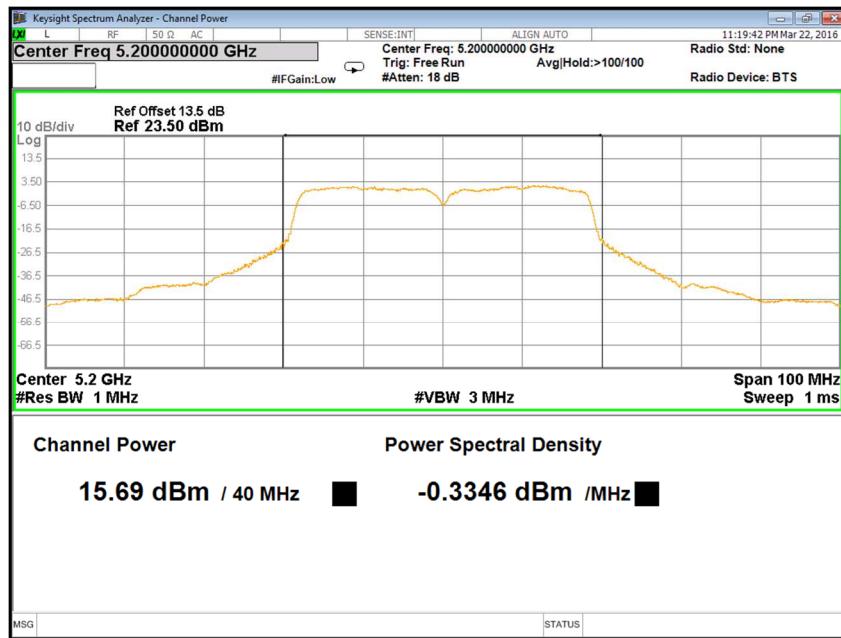


Figure 53: 40MHz, 6dBi, Mid Channel: Power Spectral density Measured at Ch. 1

#### 5.3.4.5.6 40 MHz MODULATION BANDWIDTH, 6 dBi POWER, HIGH CHANNEL - 5220 MHz

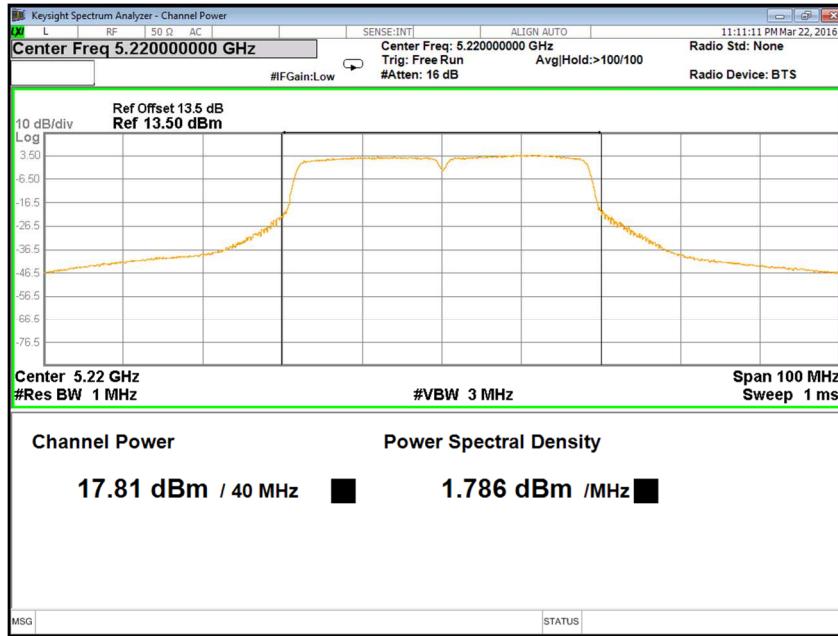


Figure 54: 40MHz, 6dBi, High Channel: Power Spectral density Measured at Ch. 0

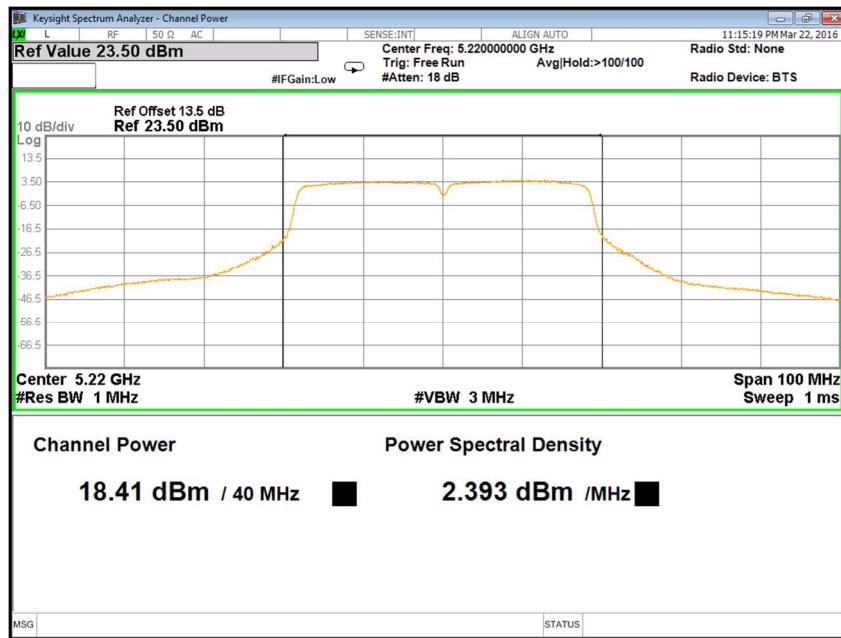


Figure 55: 40MHz, 6dBi, High Channel: Power Spectral density Measured at Ch. 1

#### 5.3.4.5.7 5 MHz MODULATION BANDWIDTH, 17 dBi ANTENNA, LOW CHANNEL - 5115 MHz



Figure 56: 5MHz, 17dBi, Low Channel: Power Spectral density Measured at Ch. 0

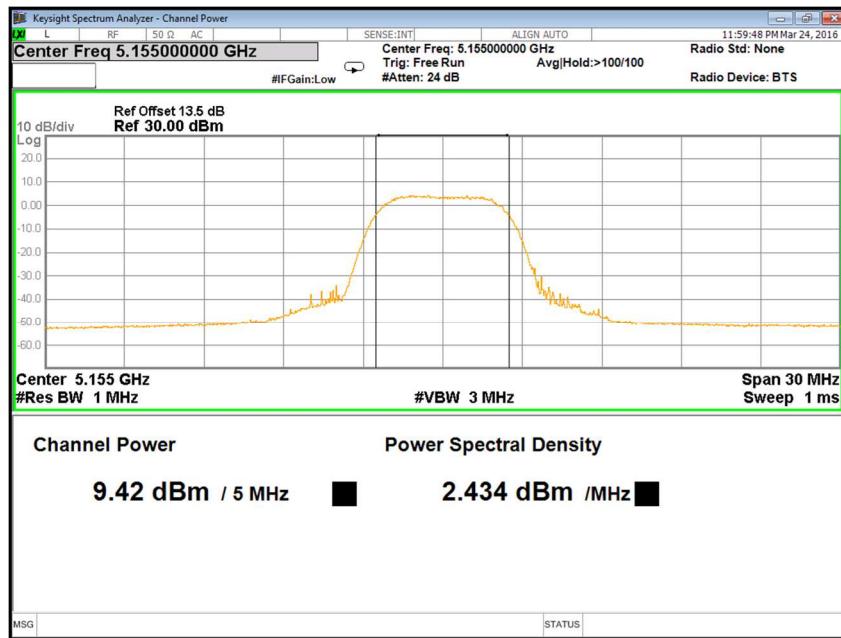


Figure 57: 5MHz, 17dBi, Low Channel: Power Spectral density Measured at Ch. 1

#### 5.3.4.5.8 5 MHz MODULATION BANDWIDTH, 17 dBi ANTENNA, MID CHANNEL - 5200 MHz

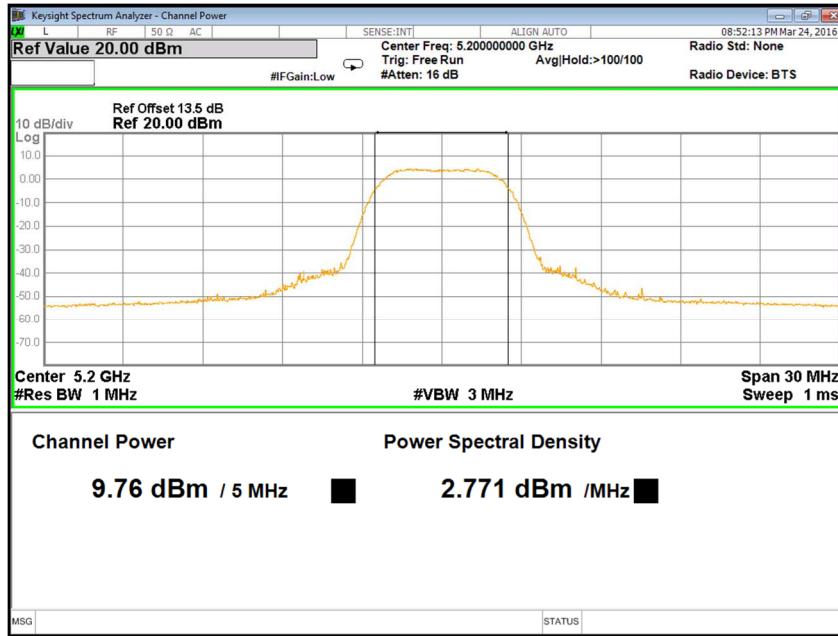


Figure 58: 5MHz, 17dBi, Mid Channel: Power Spectral density Measured at Ch. 0



Figure 59: 5MHz, 17dBi, Mid Channel: Power Spectral density Measured at Ch. 1

### 5.3.4.5.9 5 MHz MODULATION BANDWIDTH, 17 dBi ANTENNA, HIGH CHANNEL - 5245 MHz



Figure 60: 5MHz, 17dBi, High Channel: Power Spectral density Measured at Ch. 0

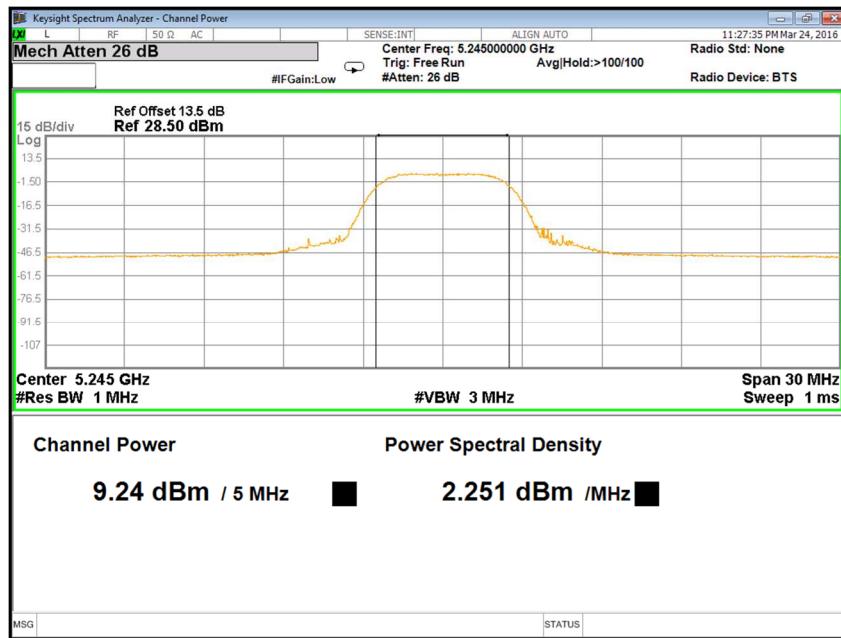


Figure 61: 5MHz, 17dBi, High Channel: Power Spectral density Measured at Ch. 1

#### 5.3.4.5.10 5 MHz MODULATION BANDWIDTH, 6 dBi POWER, LOW CHANNEL - 5115 MHz



Figure 62: 5MHz, 6dBi, Low Channel: Power Spectral density Measured at Ch. 0



Figure 63: 5MHz, 6dBi, Low Channel: Power Spectral density Measured at Ch. 1

#### 5.3.4.5.11 5 MHz MODULATION BANDWIDTH, 6 dBi POWER, MID CHANNEL - 5200 MHz



Figure 64: 5MHz, 6dBi, Mid Channel: Power Spectral density Measured at Ch. 0



Figure 65: 5MHz, 6dBi, Mid Channel: Power Spectral density Measured at Ch. 1

#### 5.3.4.5.12 5 MHz MODULATION BANDWIDTH, 6 dBi POWER, HIGH CHANNEL - 5245 MHz

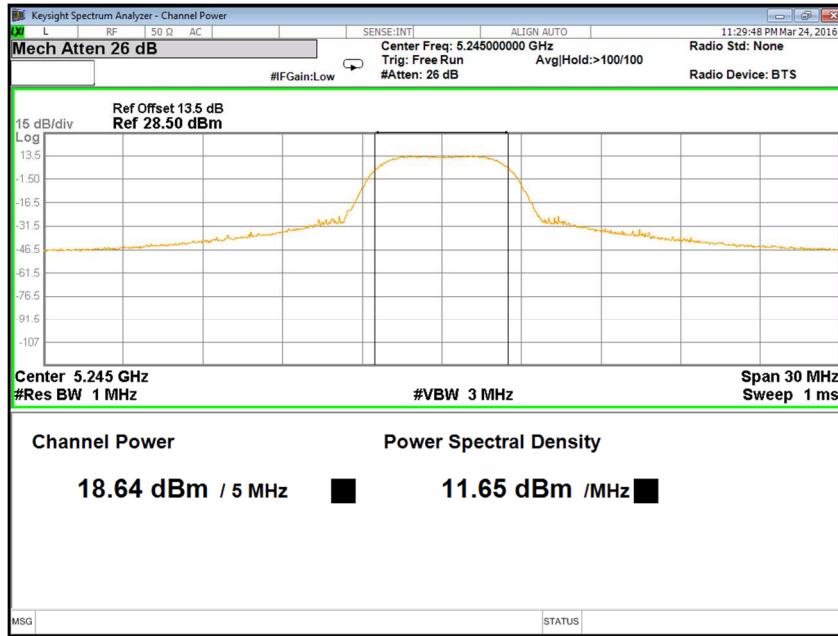
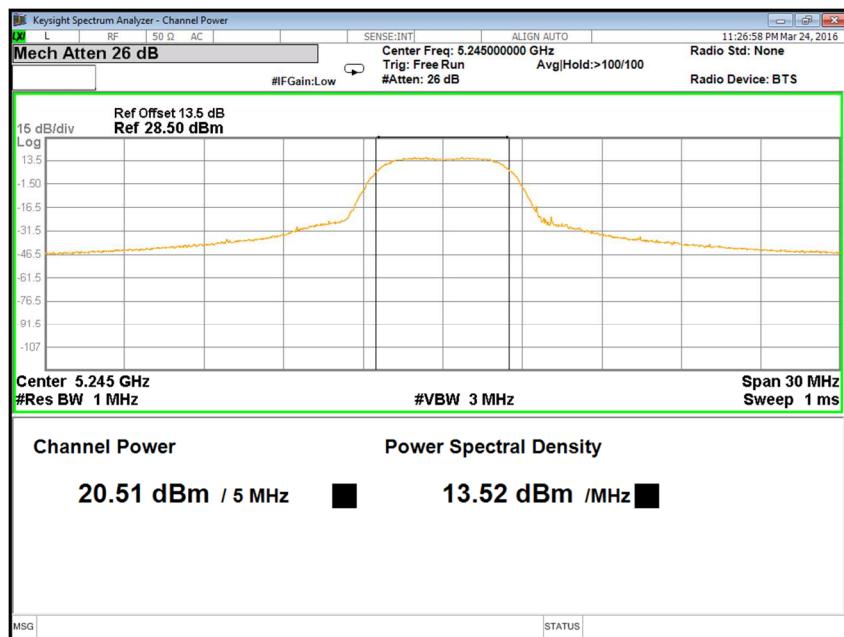


Figure 66: 5MHz, 6dBi, High Channel: Power Spectral density Measured at Ch. 0



**Figure 67: 5MHz, 6dBi, High Channel: Power Spectral density Measured at Ch. 1**

### 5.3.4.6 RESULT

Power Spectral Density for all channels in both 40 MHz & 5 MHz Modulation Bandwidths is within the Specified limit. Refer below table for consolidated result.

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (dBm/MHz)	Limit (dBm/MHz)	Result
40	Ch. 0	5180	-8.88	6	Pass
40	Ch. 0	5180	-6.84	6	Pass
40	Ch. 0	5200	-2.398	6	Pass
40	Ch. 1	5200	-2.234	6	Pass
40	Ch. 1	5220	-7.958	6	Pass
40	Ch. 1	5220	-6.840	6	Pass
5	Ch. 0	5155	0.921	6	Pass
5	Ch. 0	5155	2.434	6	Pass
5	Ch. 0	5200	2.771	6	Pass
5	Ch. 1	5200	2.899	6	Pass
5	Ch. 1	5245	1.342	6	Pass
5	Ch. 1	5245	2.251	6	Pass

Table 9: Result of PSD for 17 dBi configuration for both 40 MHz and 5 MHz modulation bandwidth

Modulation Bandwidth (MHz)	Antenna path	Channel Frequency (MHz)	Recorded value (dBm/MHz)	Limit (dBm/MHz)	Result
40	Ch. 0	5180	1.455	17	Pass
40	Ch. 0	5180	2.586	17	Pass
40	Ch. 0	5200	-1.451	17	Pass
40	Ch. 1	5200	-0.334	17	Pass
40	Ch. 1	5220	1.786	17	Pass
40	Ch. 1	5220	2.393	17	Pass
5	Ch. 0	5155	10.63	17	Pass
5	Ch. 0	5155	12.30	17	Pass
5	Ch. 0	5200	13.21	17	Pass
5	Ch. 1	5200	13.55	17	Pass
5	Ch. 1	5245	11.65	17	Pass
5	Ch. 1	5245	13.52	17	Pass

Table 10: Result of PSD for 6dBi configuration for both 40 MHz and 5 MHz modulation bandwidth

$$dBm/500 kHz = dBm/Hz + 10\log(500kHz)$$

## 5.3.5 TRANSMITTER UNWANTED EMISSIONS (CONDUCTED)

### 5.3.5.1 TEST SPECIFICATION

<b>Test Standard</b>	47 CFR, Part 15 Feb 2016			
<b>Test Procedure</b>	ANSI C63.10-2013			
<b>Frequency Range</b>	9 kHz - 150 kHz	150 kHz -30 MHz	30 MHz-1 GHz	1 GHz – 40 GHz
<b>Resolution Bandwidth</b>	200 Hz	9 kHz	120 kHz	1 MHz
<b>Video Bandwidth</b>	1 kHz	30 kHz	300 kHz	3 MHz
<b>Sweep Time</b>	Auto	Auto	Auto	Auto
<b>Detector</b>	Peak	Peak	Peak	Peak & Average
<b>Attenuation</b>	Auto			
<b>Test Mode</b>	Conducted			
<b>Input Voltage</b>	120 V AC			
<b>Input Frequency</b>	60 Hz			
<b>Temperature</b>	23.0 °C			
<b>Humidity</b>	52.0 %			
<b>Tested By</b>	Raviteja			
<b>Test Date</b>	10 <sup>th</sup> Mar 2016			

### 5.3.5.2 LIMITS

<b>Standard</b>	<b>Reference section</b>	<b>Frequency range</b>	<b>Limit EIRP (dBm/MHz)</b>
47 CFR, Part 15 Feb 2016	§15.407 b (1)	Outside 5150-5350 MHz	-27

Table 11: Unwanted emission Limit

<b>Standard</b>	<b>Reference section</b>	<b>Frequency range</b>	<b>Limit (dB<math>\mu</math>V/m)</b>
47 CFR, Part 15 Feb 2016	§15.209	9 kHz to 490 kHz 490 kHz to 1.705 MHz 1.705 MHz to 30 MHz	128.5194 to 93.8003* 73.8003 to 62.9697* 69.5429

Table 12: General Field strength limit below 30 MHz

Note: \* Decreases with the logarithm of the frequency

<b>Standard</b>	<b>Reference section</b>	<b>Frequency range</b>	<b>Limit (dB<math>\mu</math>V/m) as per Section 5.209</b>
47 CFR, Part 15 Feb 2016	§15.209	30 MHz to 88 MHz 88 MHz to 216 MHz 216 MHz to 960 MHz 960 MHz to 40 GHz	39.54 43.52 46.02 53.98

Table 13: General Field strength limit above 30 MHz

Above table specifies limit with Average detector above 1 GHz. 73.98 dB $\mu$ V/m is considered as the limit when Peak detector is employed for the measurements above 1 GHz.

### 5.3.5.3 TEST SETUP



Figure 68: Typical test setup for Conducted Test

### 5.3.5.4 TEST PROCEDURE

The Conducted test was performed using the Spectrum analyzer/EMI receiver. Measurements were done as per Section II G.0 of KDB “**789033 DO2 General UNII Test Procedure New Rules v01r01**”. The RF output of the EUT was connected to the input port of Spectrum analyzer/EMI receiver using an attenuator. The graph and data captured from spectrum analyzer and performed required calculations to attain the Electric Field value and compared with the limits specified in the standard.

In the frequency range 9 kHz to 1 GHz, the measurement was performed with peak detector. In the frequency range 1 GHz to 40 GHz, measurement was performed employing both peak & average detector as specified in the standard. Detectors were selected based on FCC KDB document.

Peak search option was used to capture the frequency with maximum amplitude in the respective bands and final calculations have been performed on these frequencies to show compliance with the limits specified.

### 5.3.5.5 MEASUREMENT GRAPHS / DATA

#### 5.3.5.5.1 40 MHz MODULATION BANDWIDTH, 17 dBi ANTENNA, LOW CHANNEL - 5180 MHz

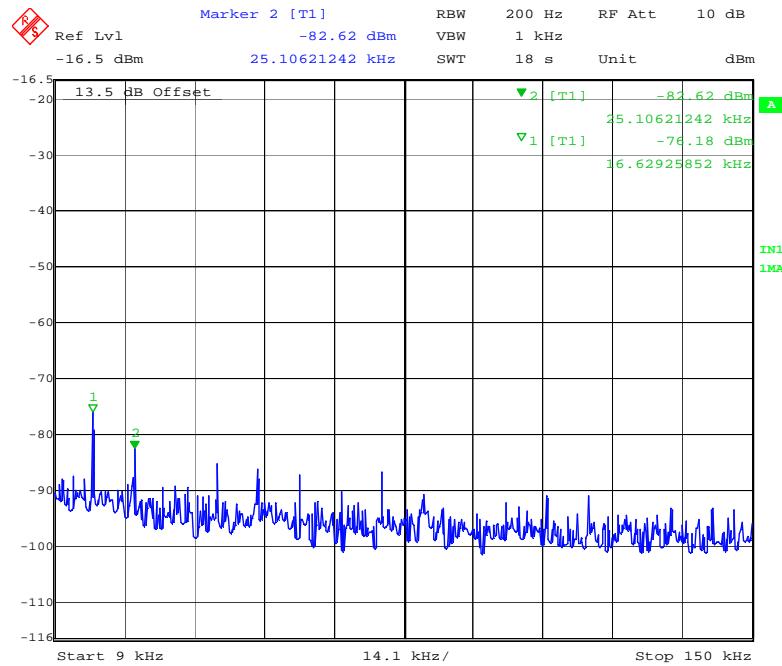


Figure 69: 40MHz, 17dBi, Low Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0

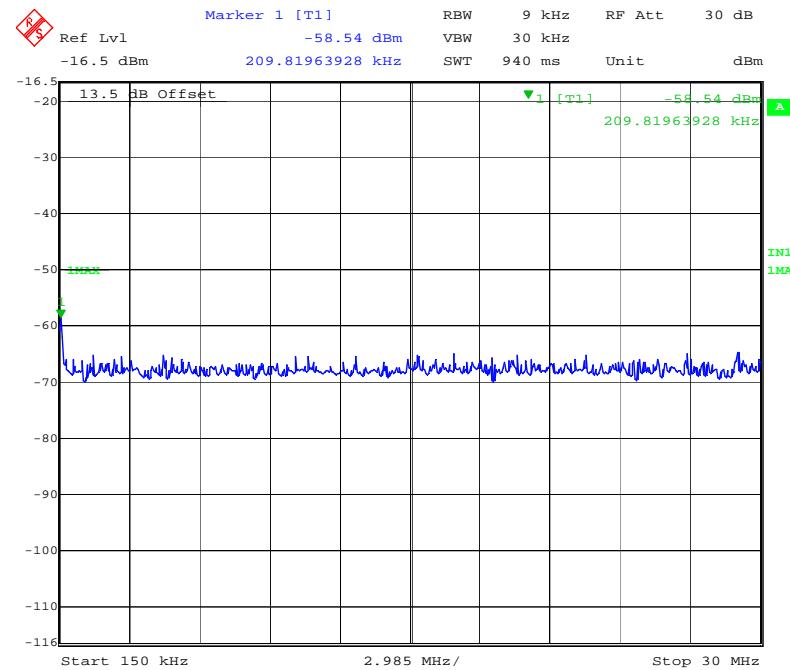


Figure 70: 40MHz, 17dBi, Low Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0

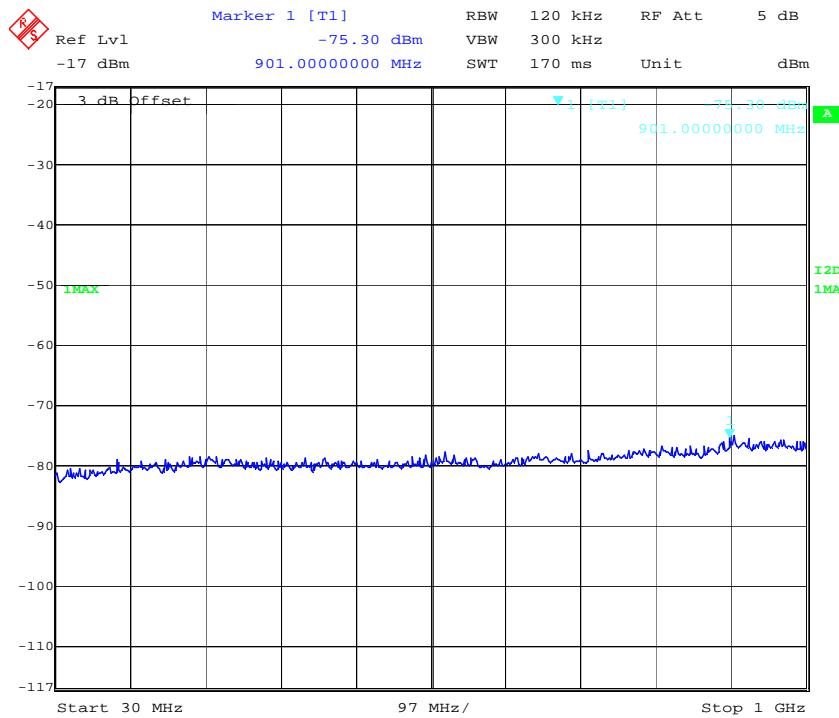


Figure 71: 40MHz, 17dBi, Low Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0

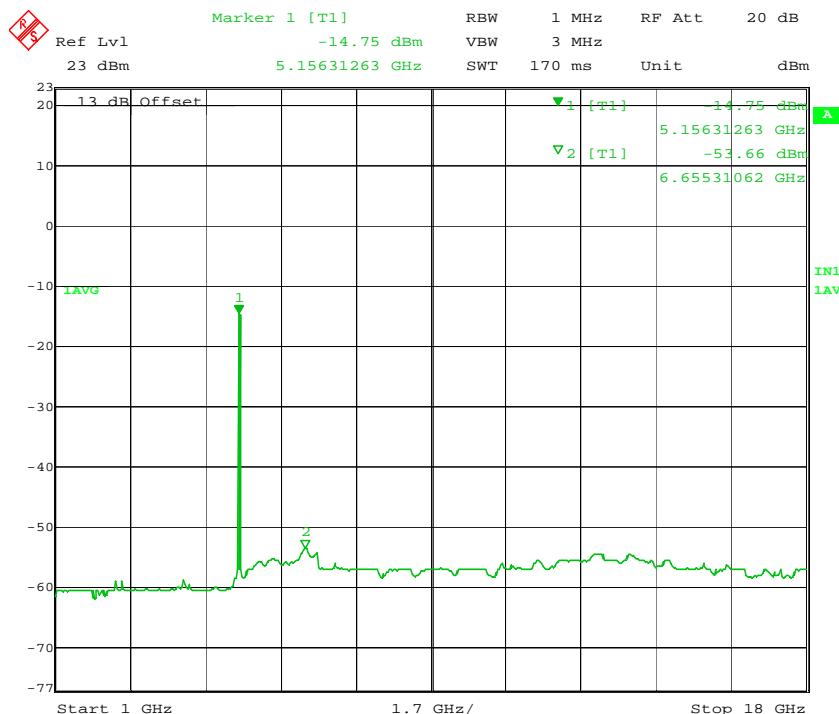


Figure 72: 40MHz, 17dBi, Low Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0

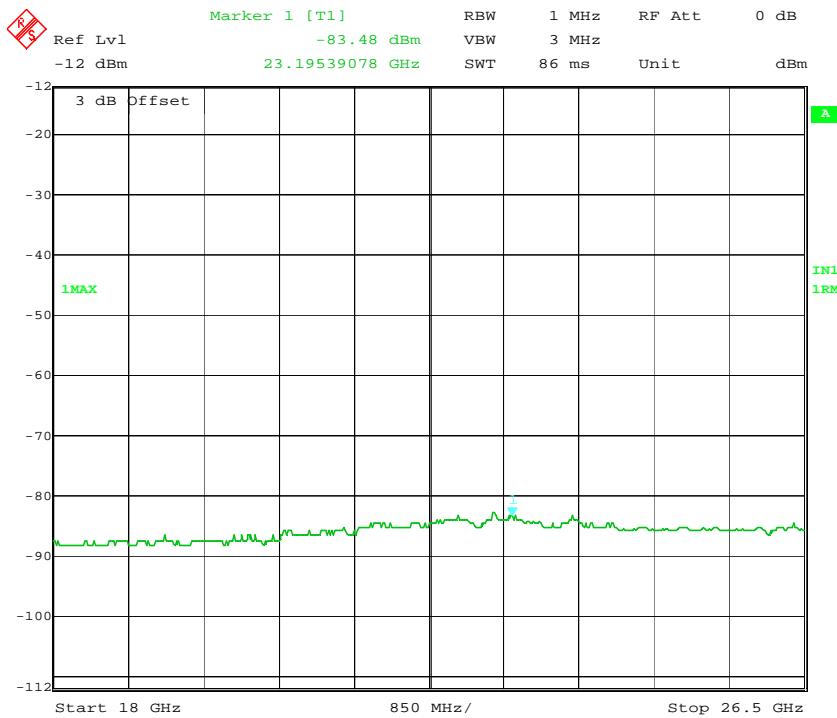


Figure 73: 40MHz, 17dBi, Low Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0

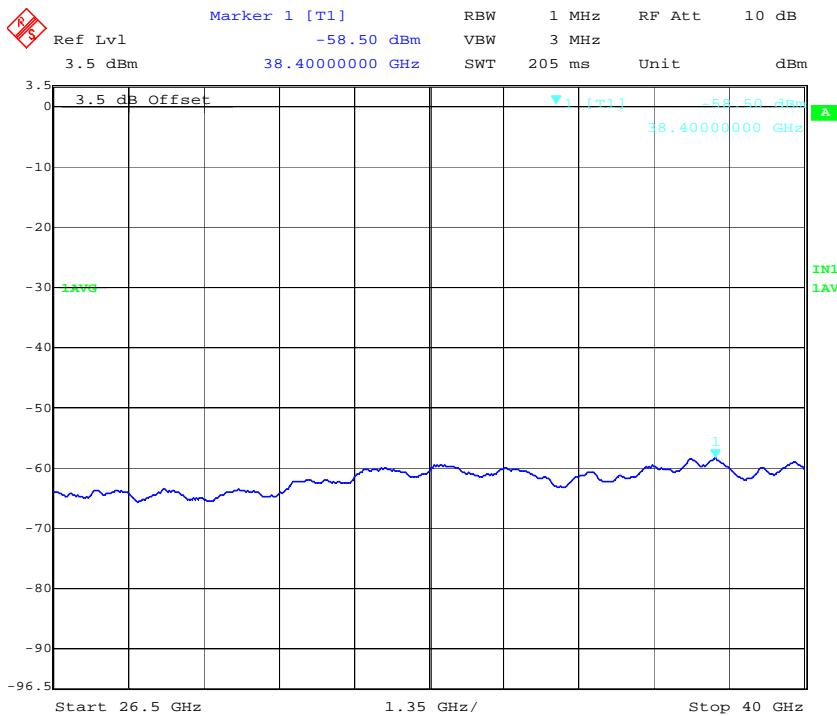


Figure 74: 40MHz, 17dBi, Low Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0

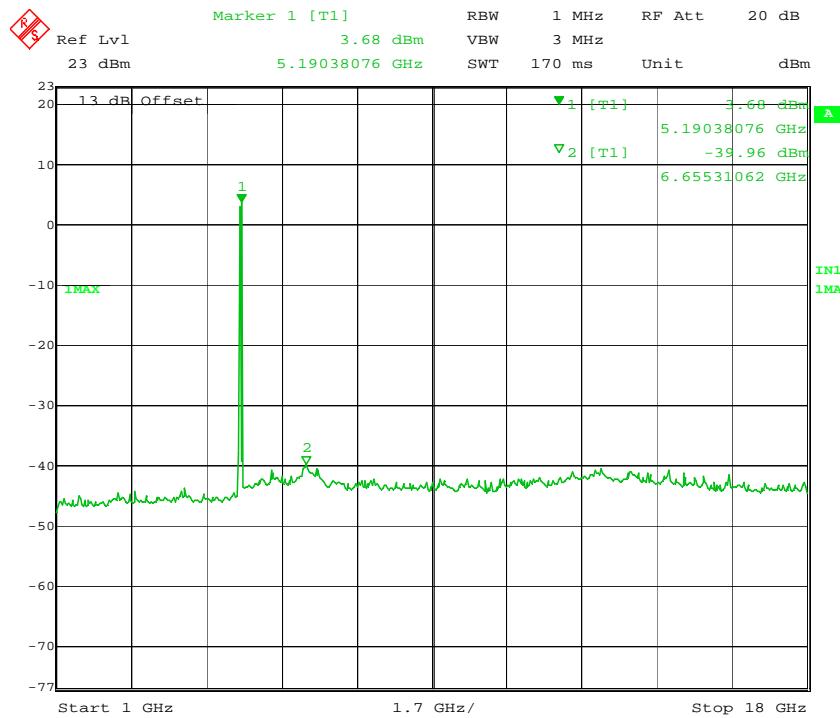


Figure 75: 40MHz, 17dBi, Low Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0

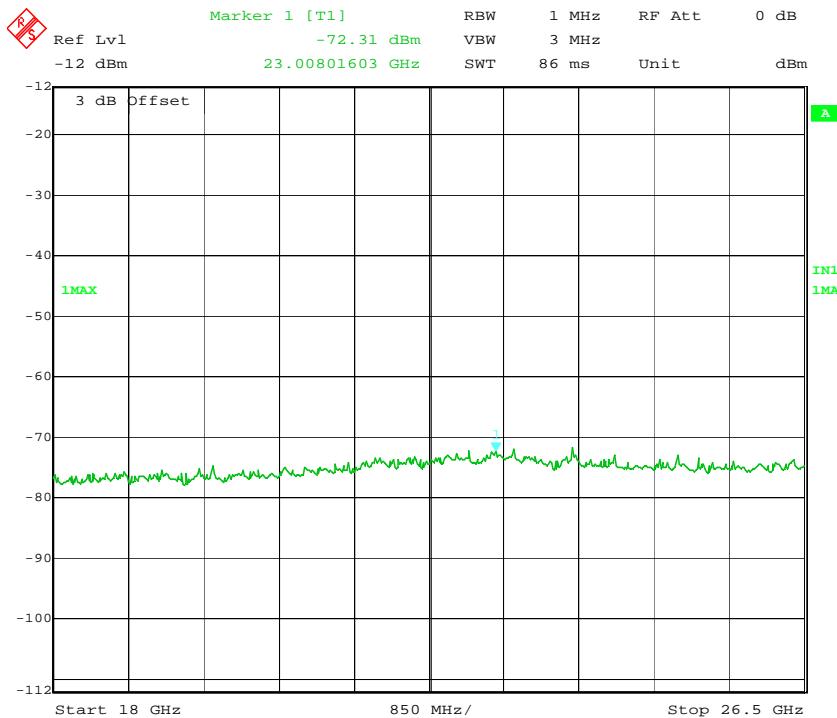


Figure 76: 40MHz, 17dBi, Low Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0

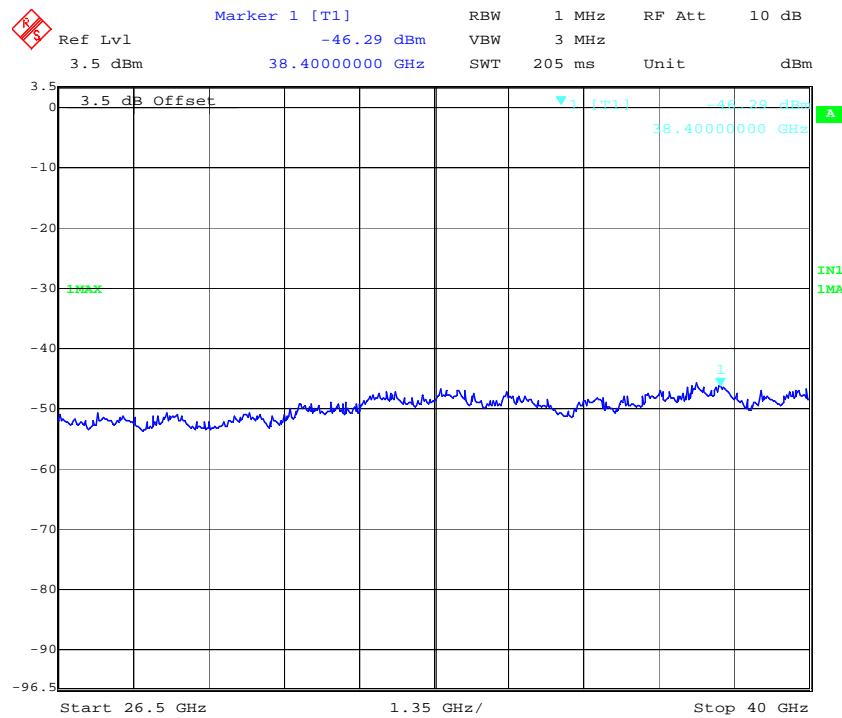


Figure 77: 40MHz, 17dBi, Low Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0

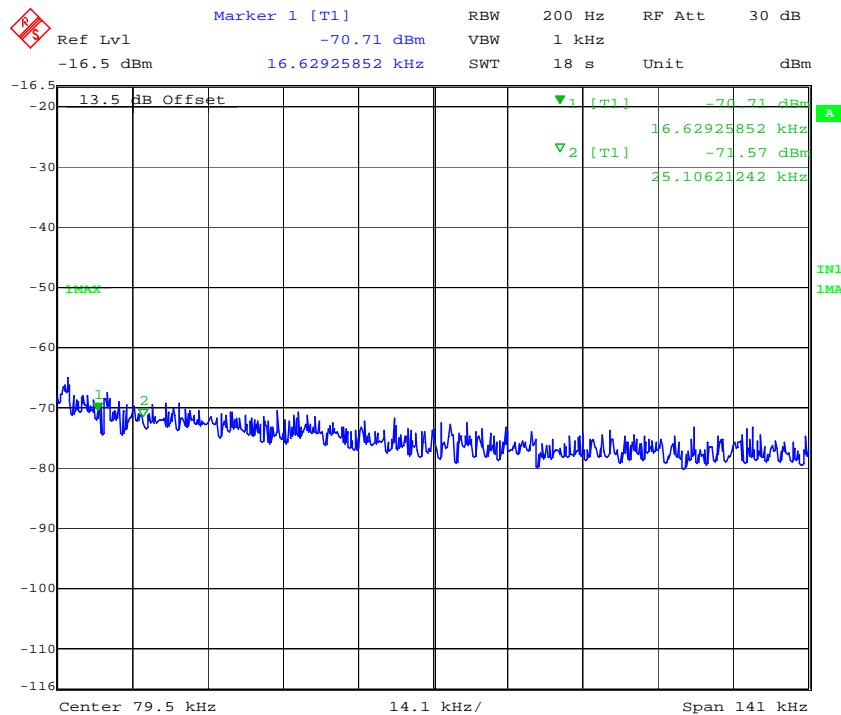


Figure 78: 40MHz, 17dBi, Low Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1

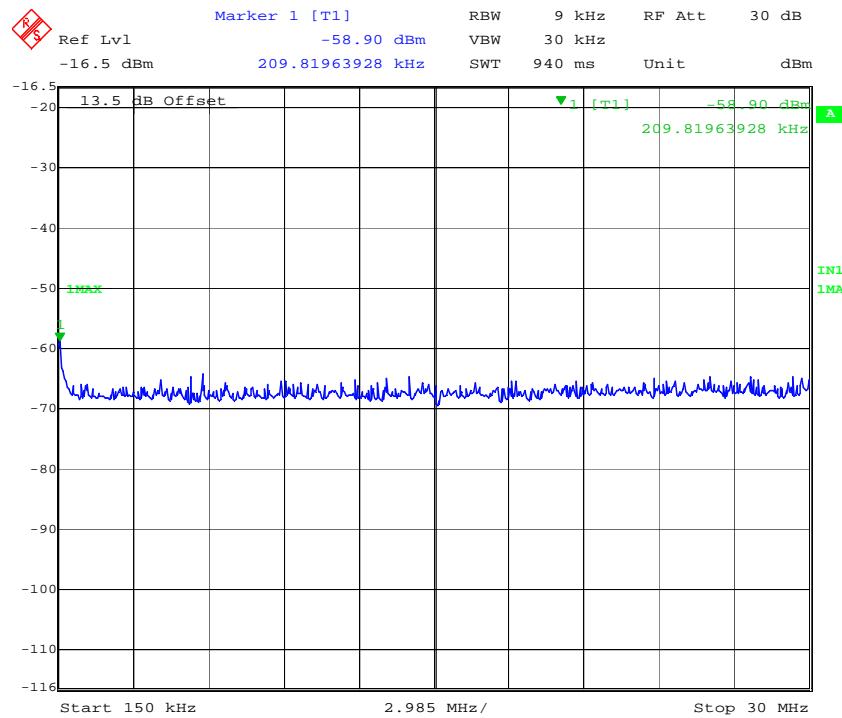


Figure 79: 40MHz, 17dBi, Low Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1

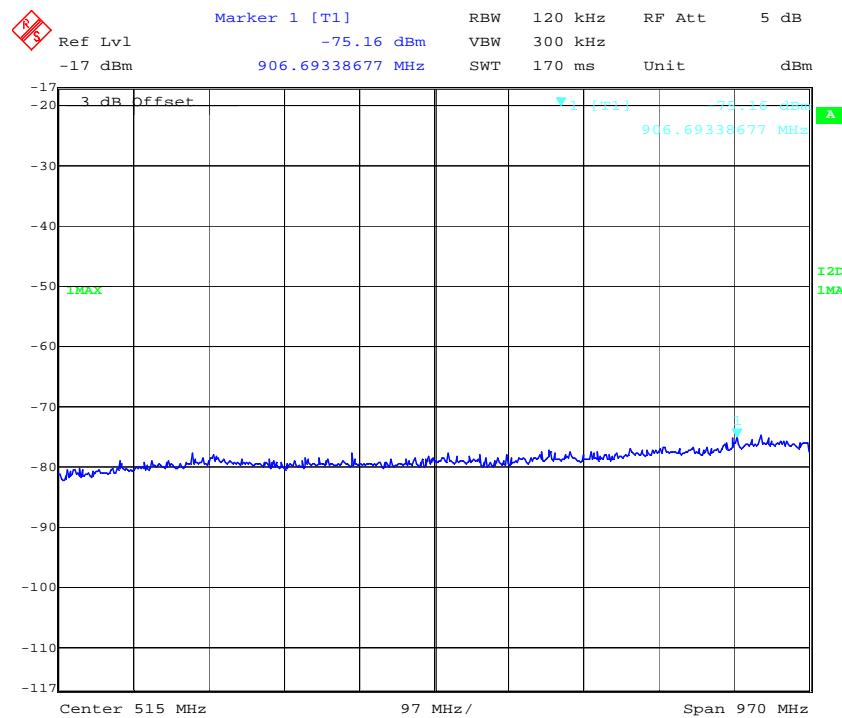


Figure 80: 40MHz, 17dBi, Low Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1

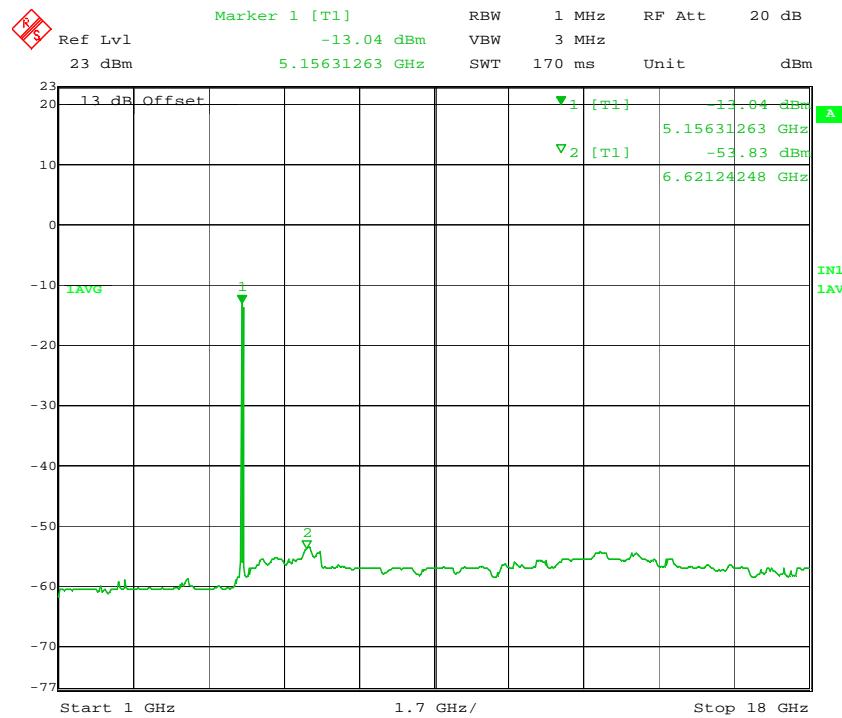


Figure 81: 40MHz, 17dBi, Low Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1

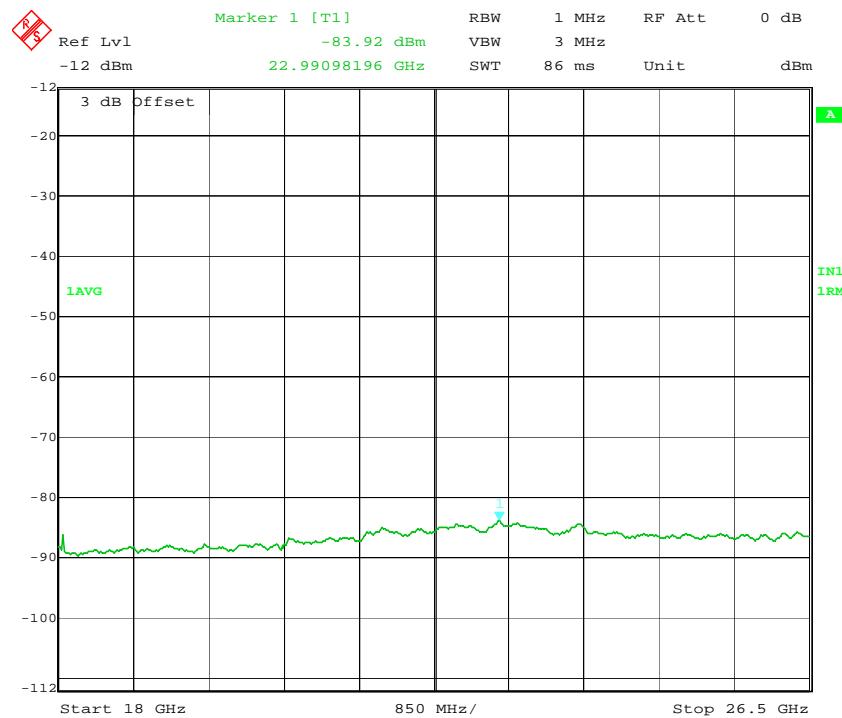


Figure 82: 40MHz, 17dBi, Low Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1

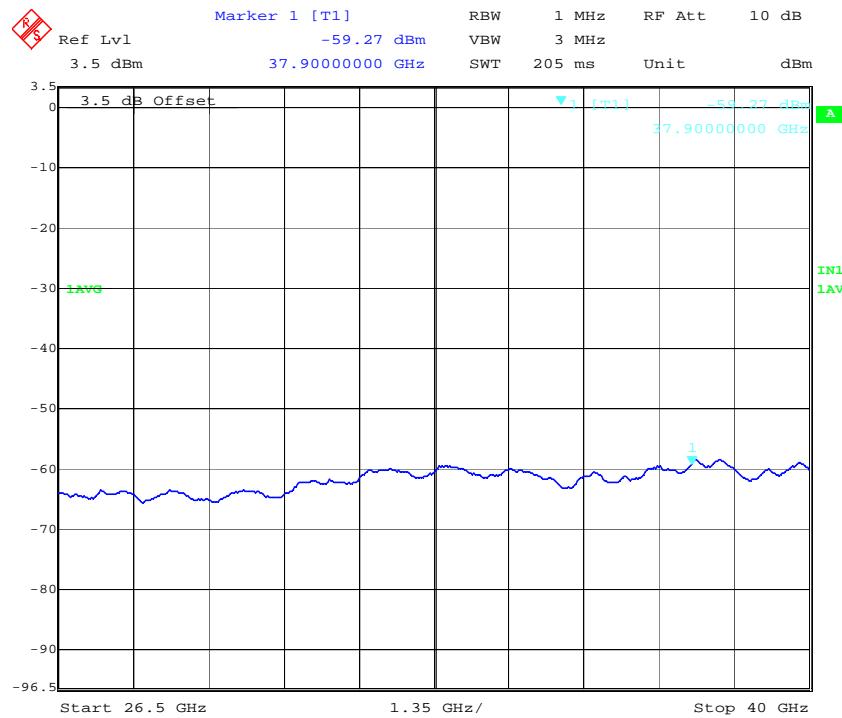


Figure 83: 40MHz, 17dBi, Low Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1

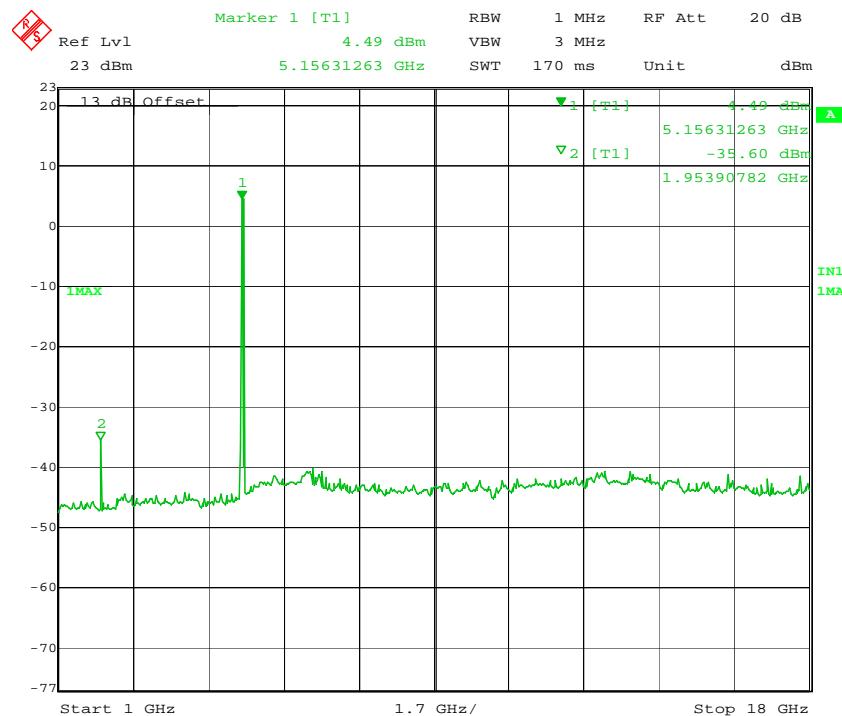


Figure 84: 40MHz, 17dBi, Low Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1

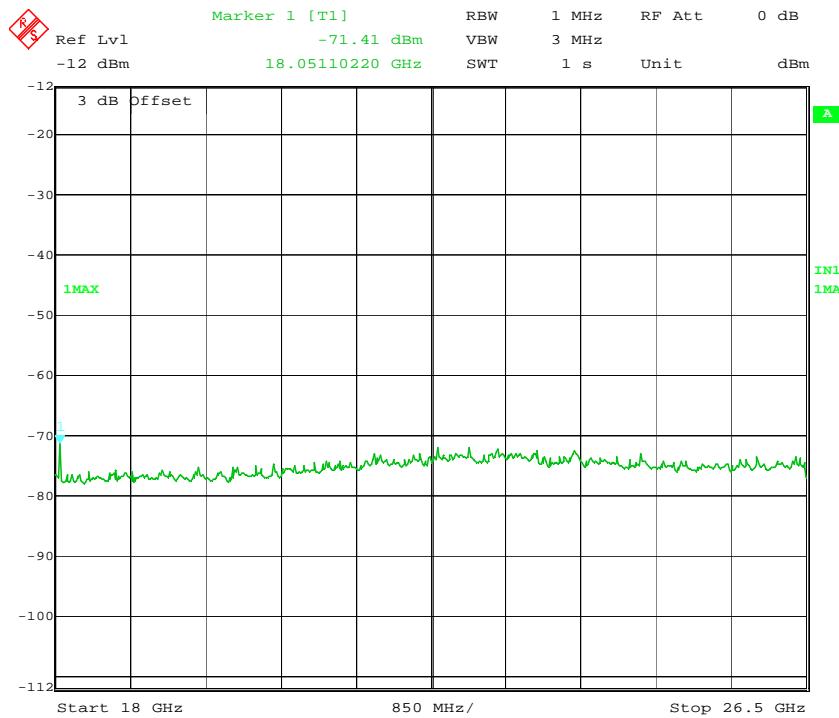


Figure 85: 40MHz, 17dBi, Low Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1

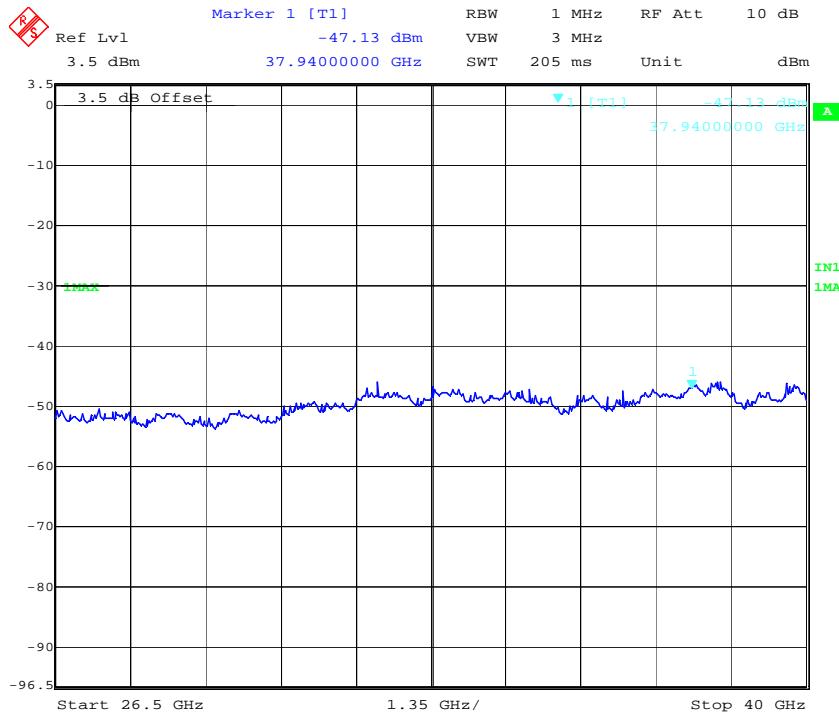


Figure 86: 40MHz, 17dBi, Low Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1

### 5.3.5.5.2 40 MHz MODULATION BANDWIDTH, 17 dBi ANTENNA, MID CHANNEL - 5200 MHz

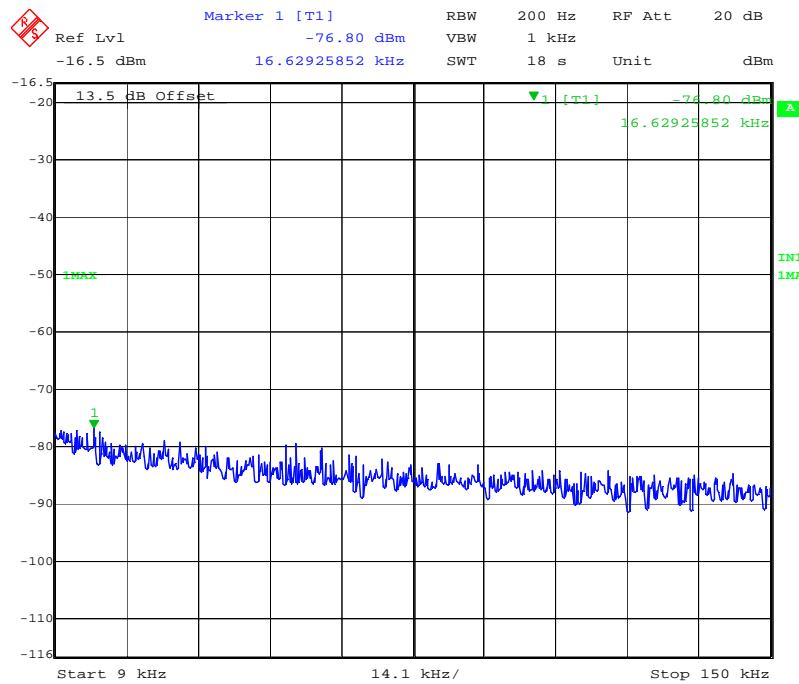


Figure 87: 40MHz, 17dBi, Mid Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0

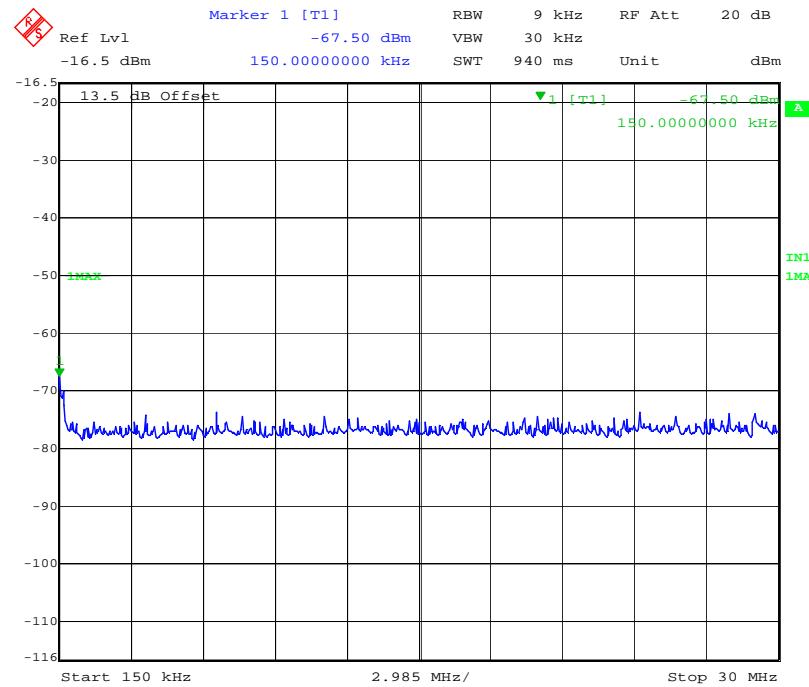


Figure 88: 40MHz, 17dBi, Mid Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0

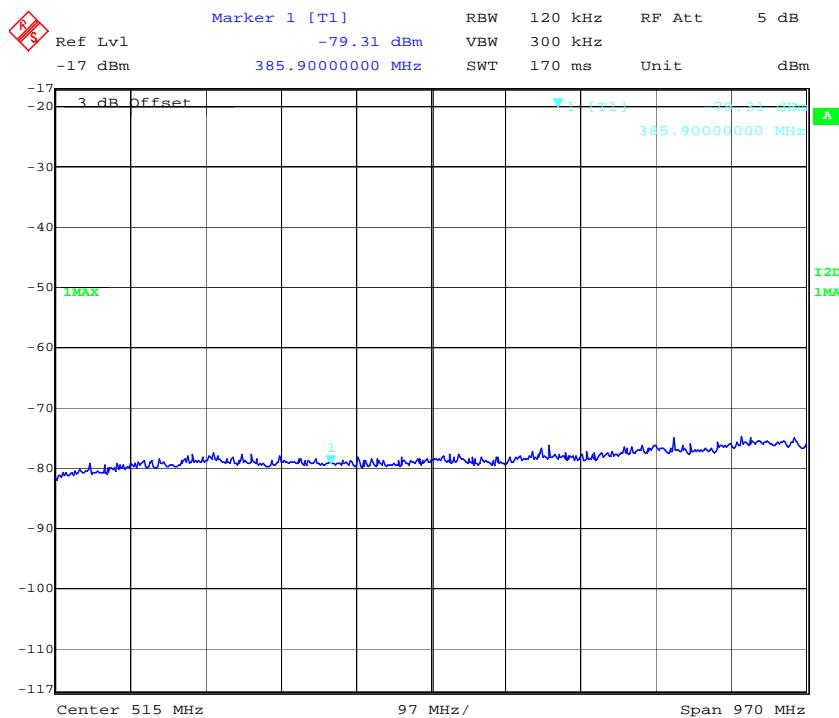


Figure 89: 40MHz, 17dBi, Mid Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0

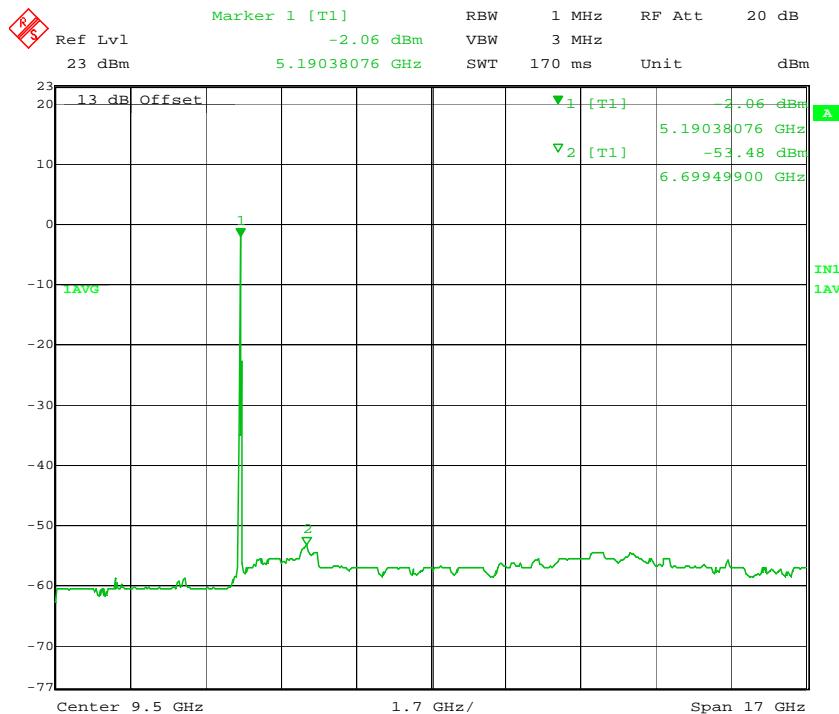


Figure 90: 40MHz, 17dBi, Mid Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0

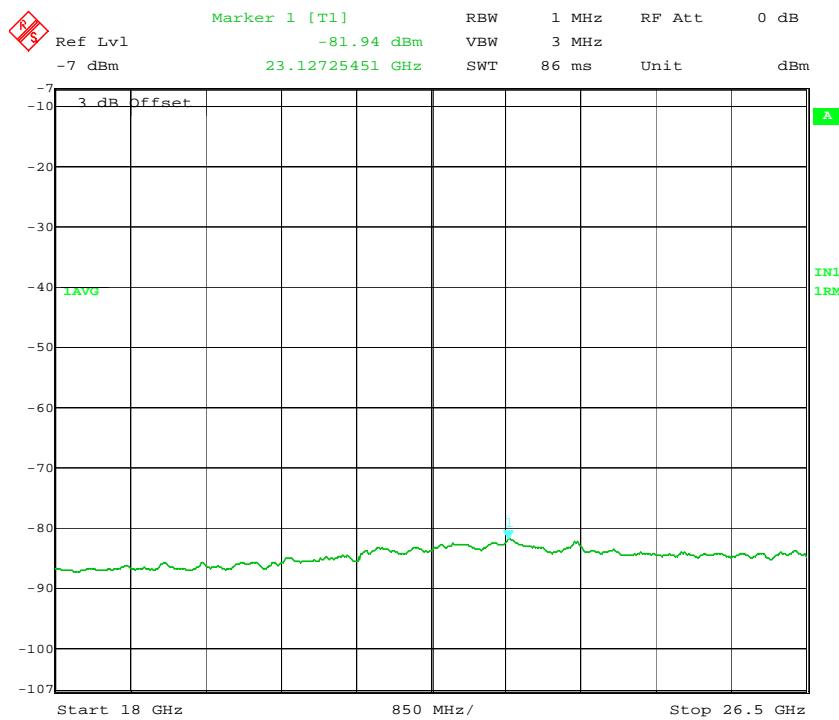


Figure 91: 40MHz, 17dBi, Mid Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0

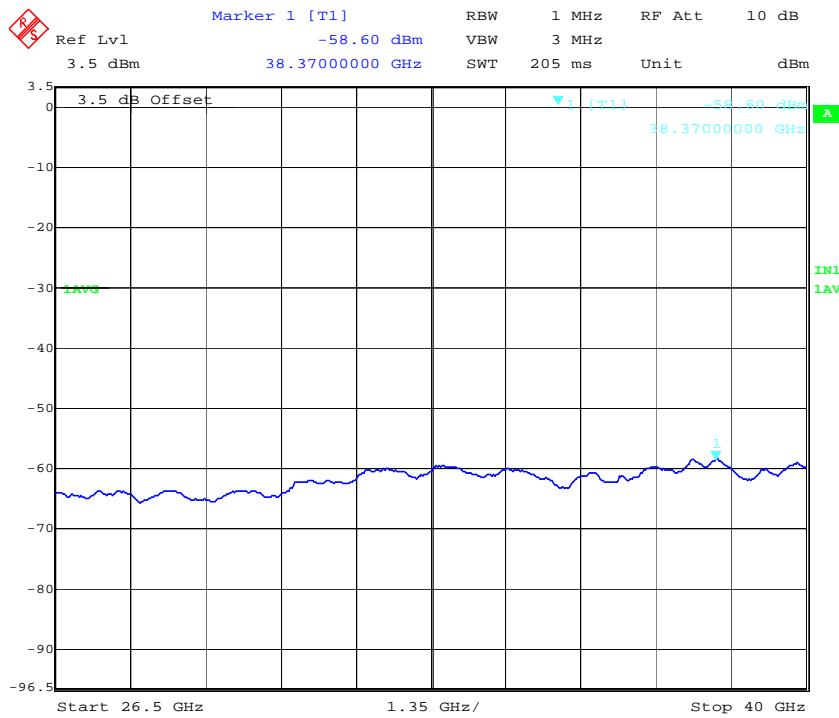


Figure 92: 40MHz, 17dBi, Mid Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0

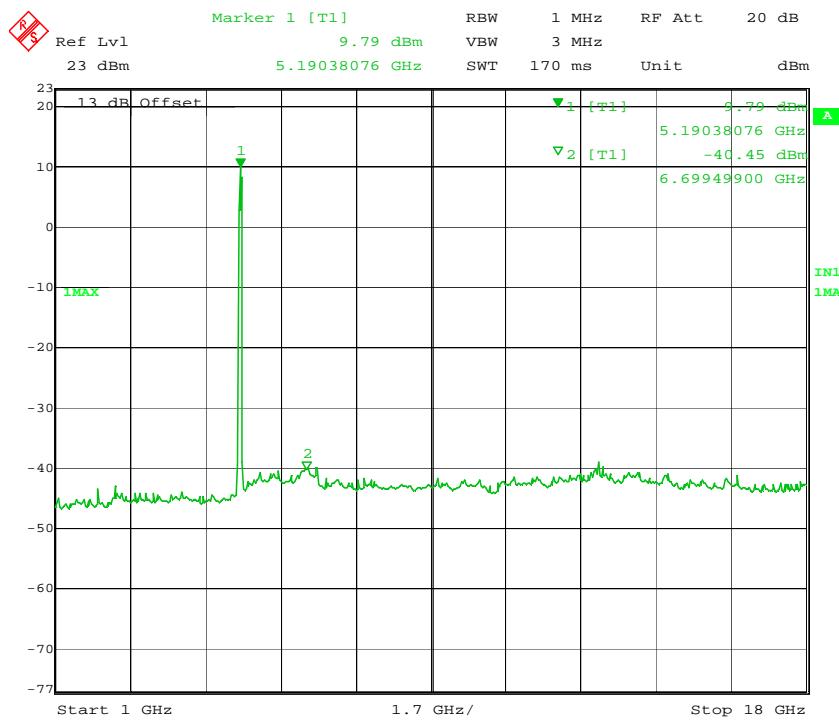


Figure 93: 40MHz, 17dBi, Mid Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0

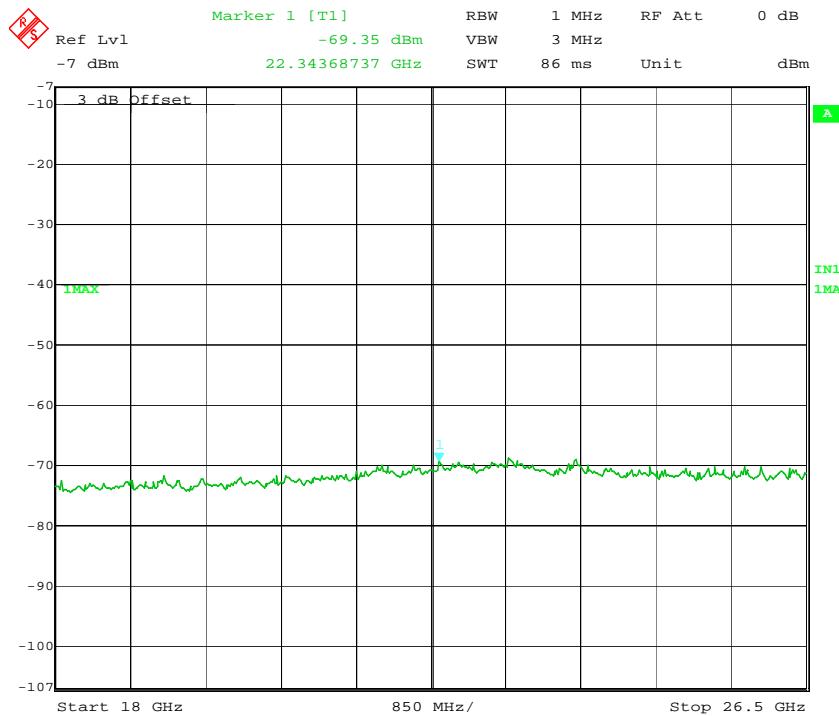


Figure 94: 40MHz, 17dBi, Mid Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0

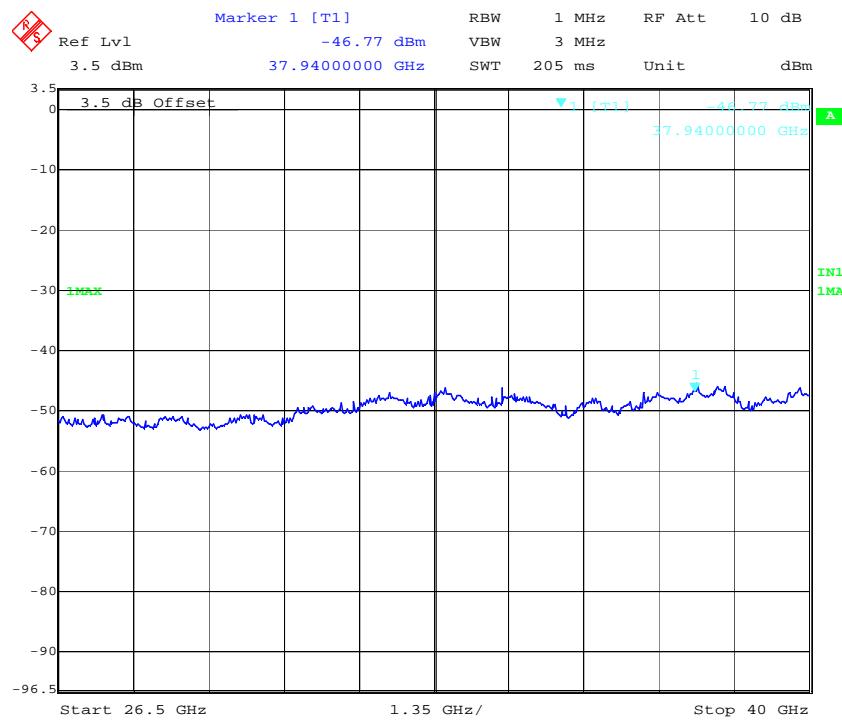


Figure 95: 40MHz, 17dBi, Mid Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0

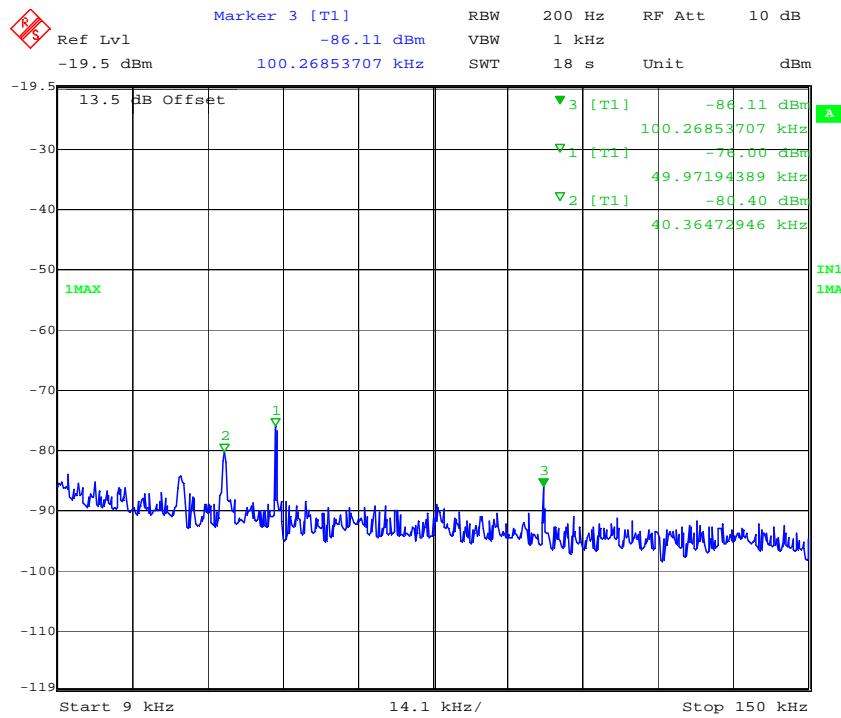
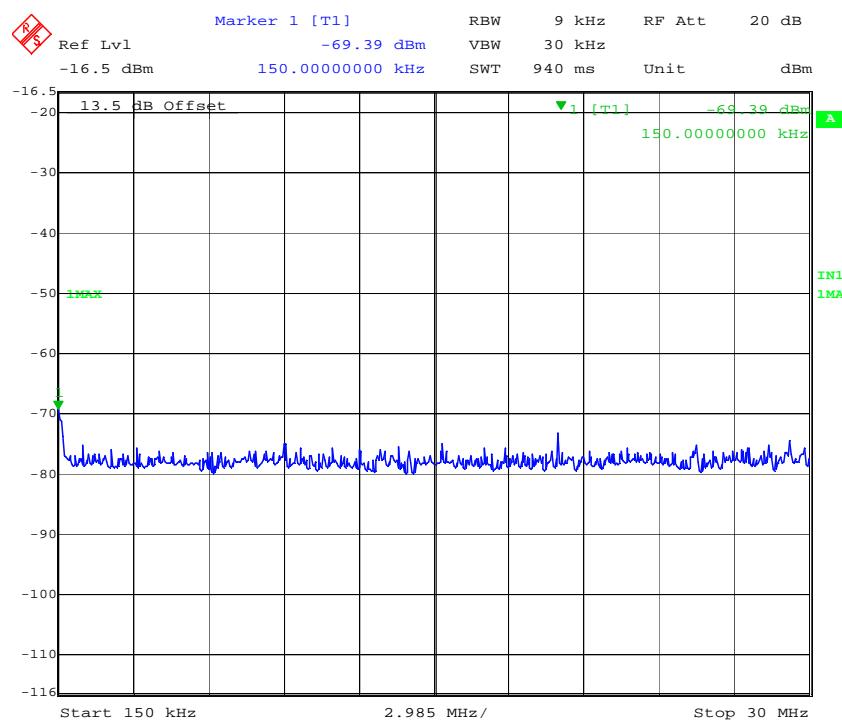
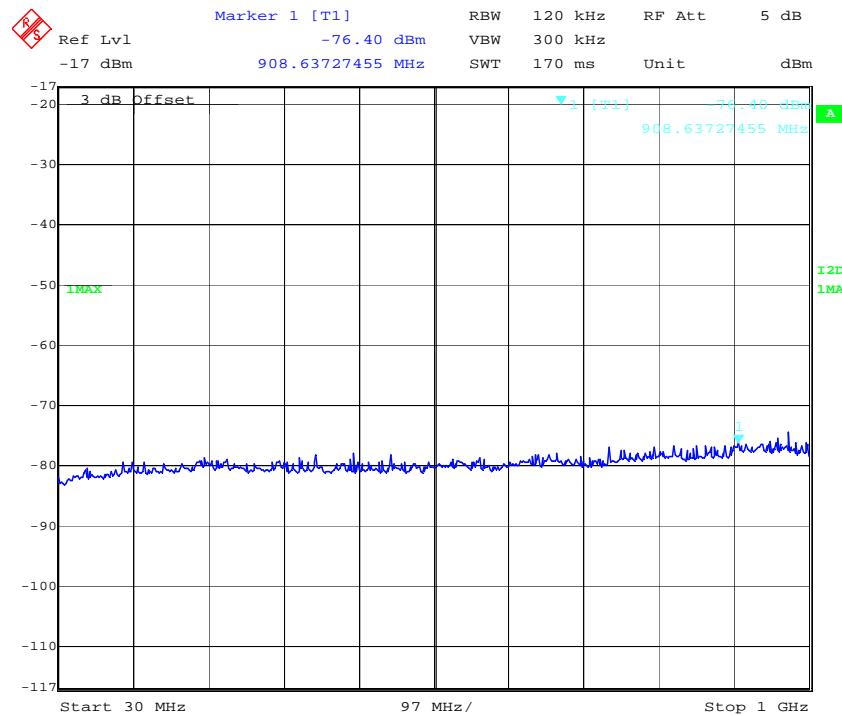


Figure 96: 40MHz, 17dBi, Mid Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1



**Figure 97: 40MHz, 17dBi, Mid Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1**



**Figure 98: 40MHz, 17dBi, Mid Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1**

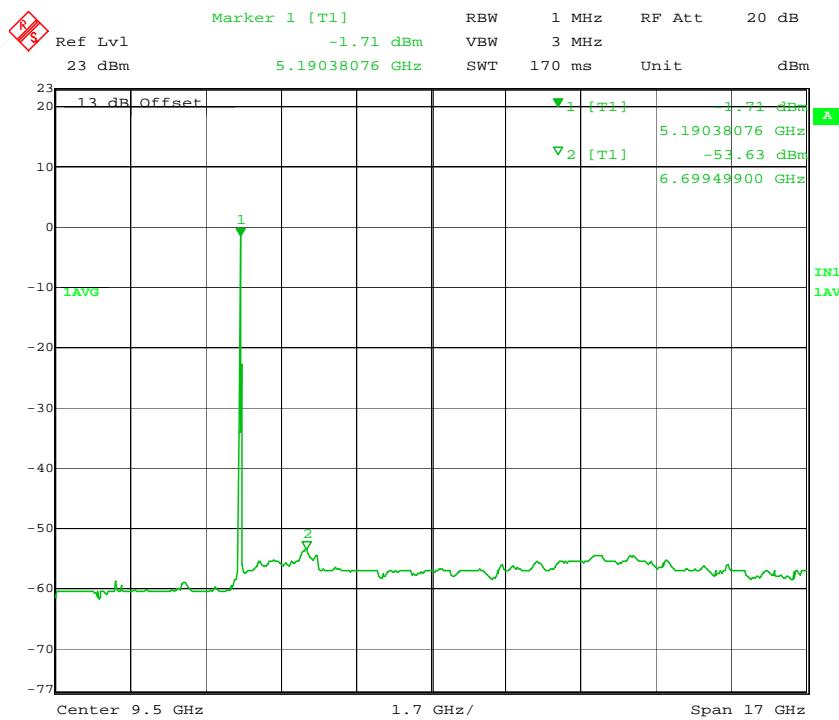


Figure 99: 40MHz, 17dBi, Mid Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1

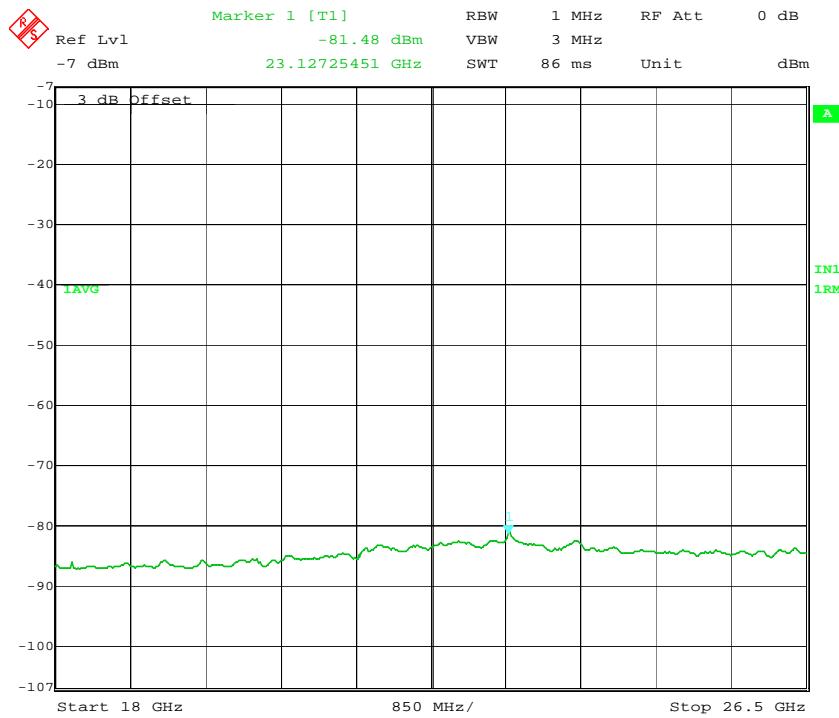


Figure 100: 40MHz, 17dBi, Mid Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1

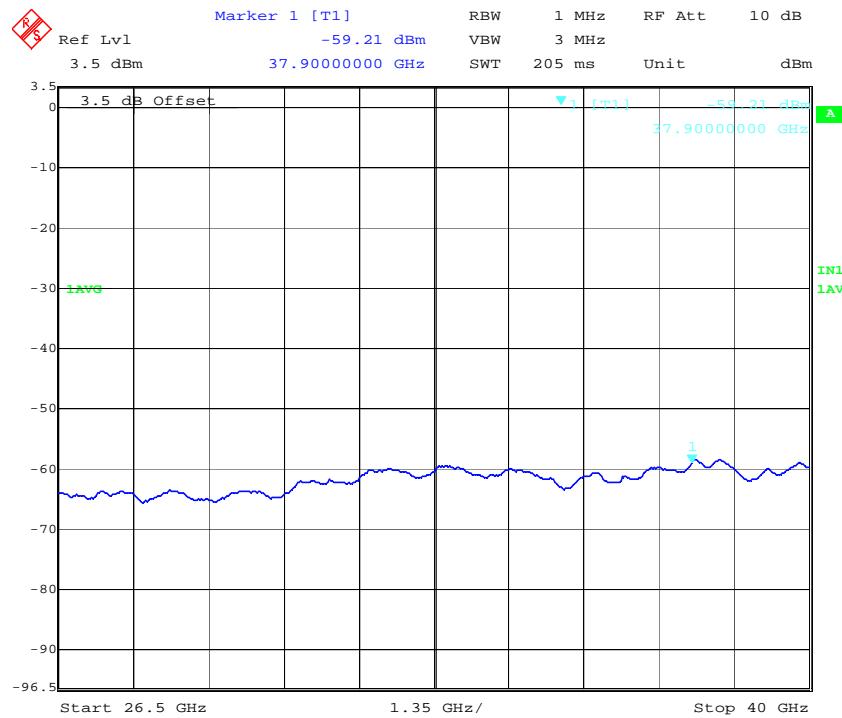


Figure 101: 40MHz, 17dBi, Mid Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1

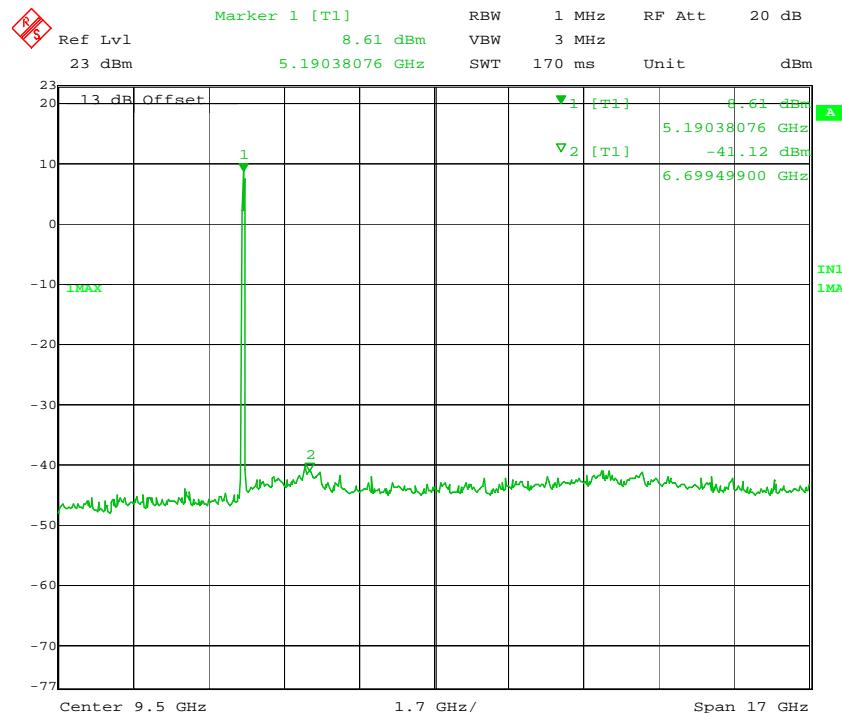


Figure 102: 40MHz, 17dBi, Mid Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1

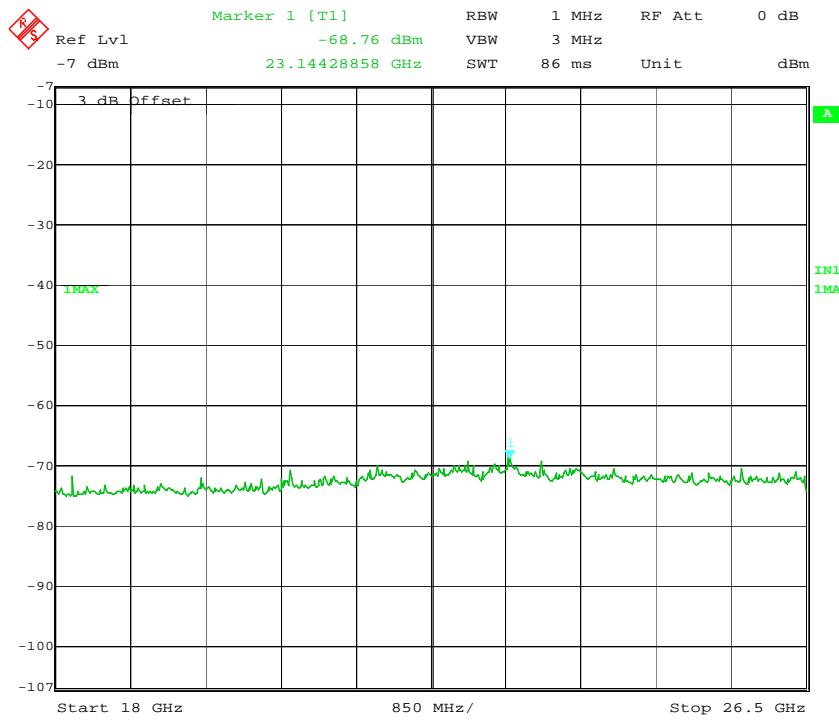


Figure 103: 40MHz, 17dBi, Mid Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1

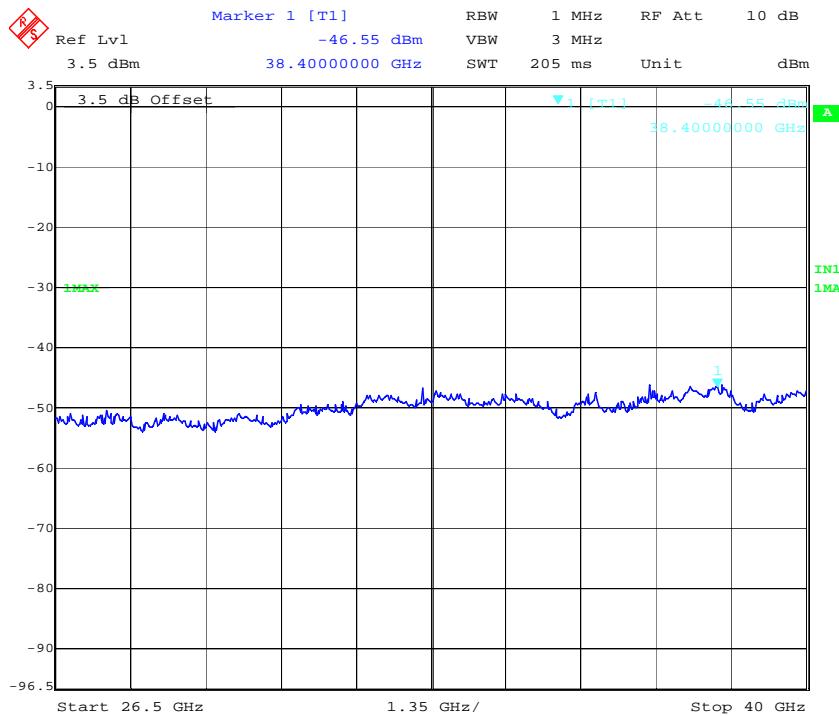


Figure 104: 40MHz, 17dBi, Mid Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1

### 5.3.5.5.3 40 MHz MODULATION BANDWIDTH, 17 dBi ANTENNA, HIGH CHANNEL - 5220 MHz

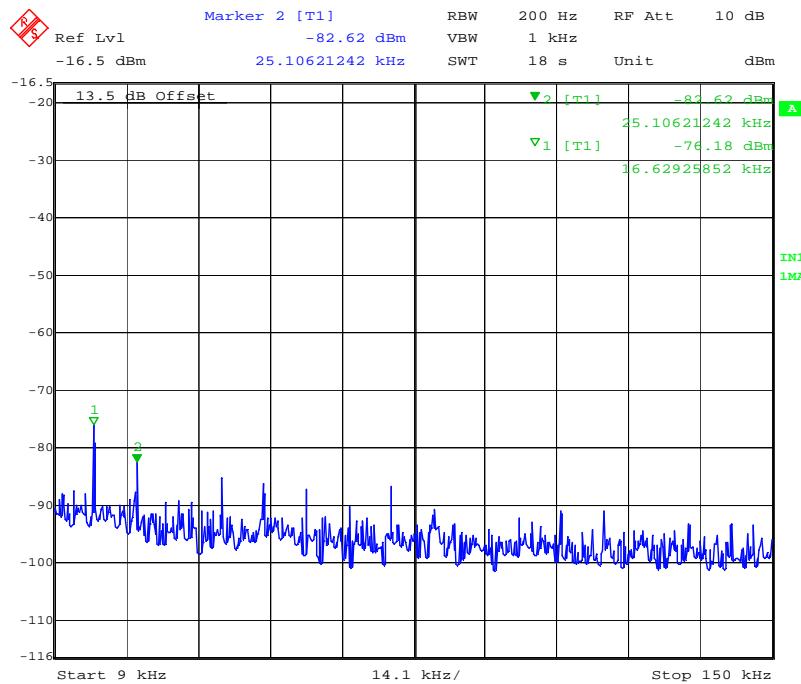


Figure 105: 40MHz, 17dBi, High Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0

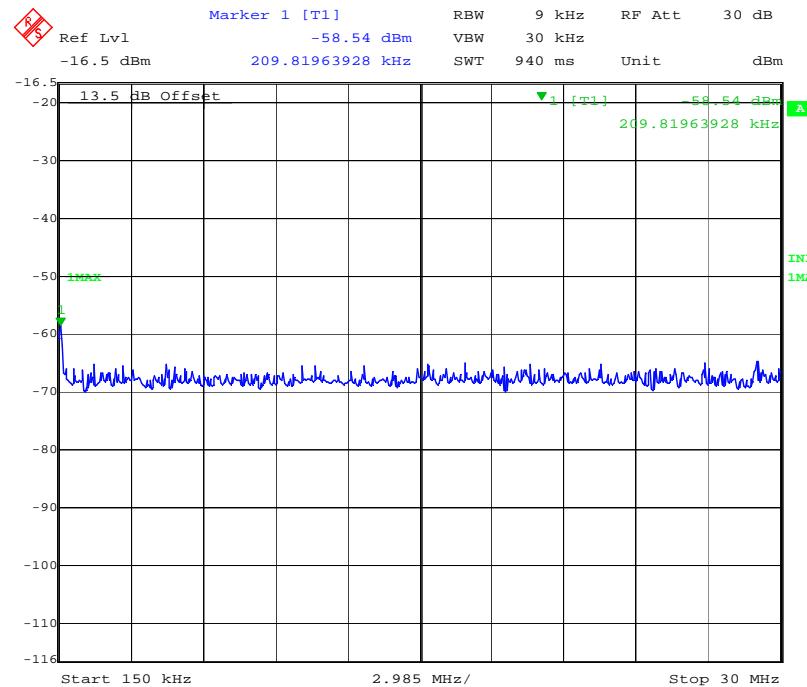


Figure 106: 40MHz, 17dBi, High Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0

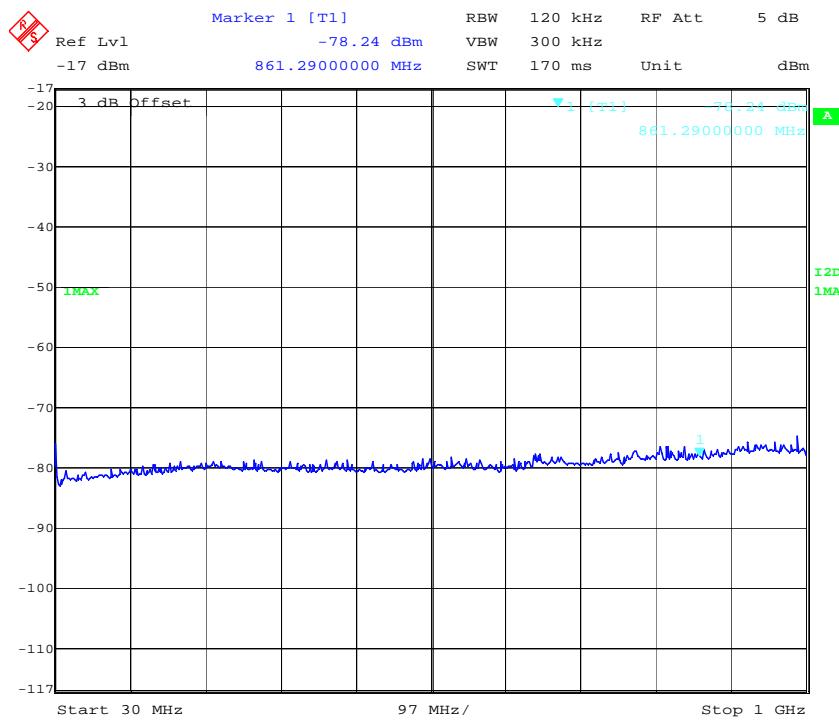


Figure 107: 40MHz, 17dBi, High Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0

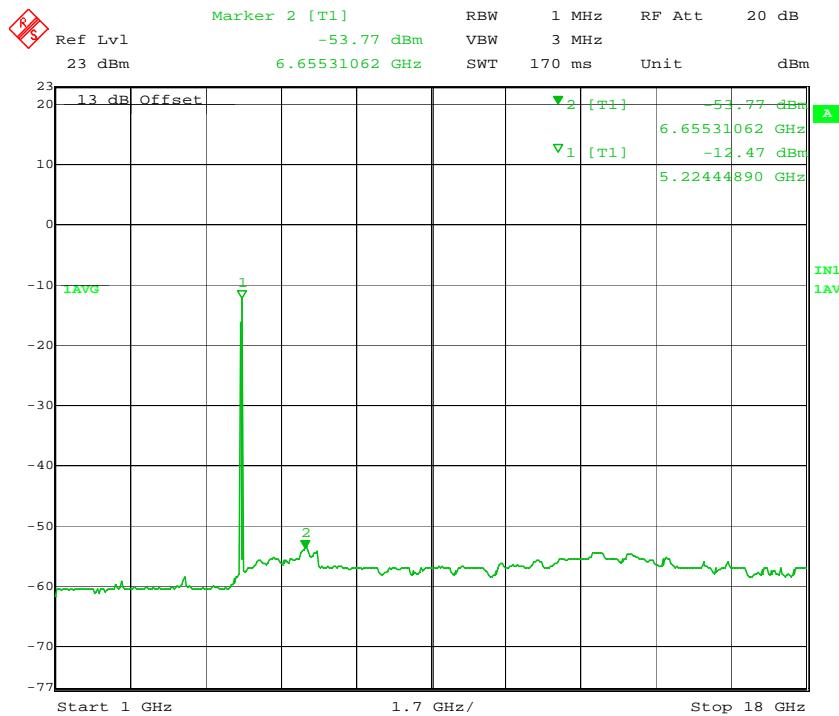


Figure 108: 40MHz, 17dBi, High Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0

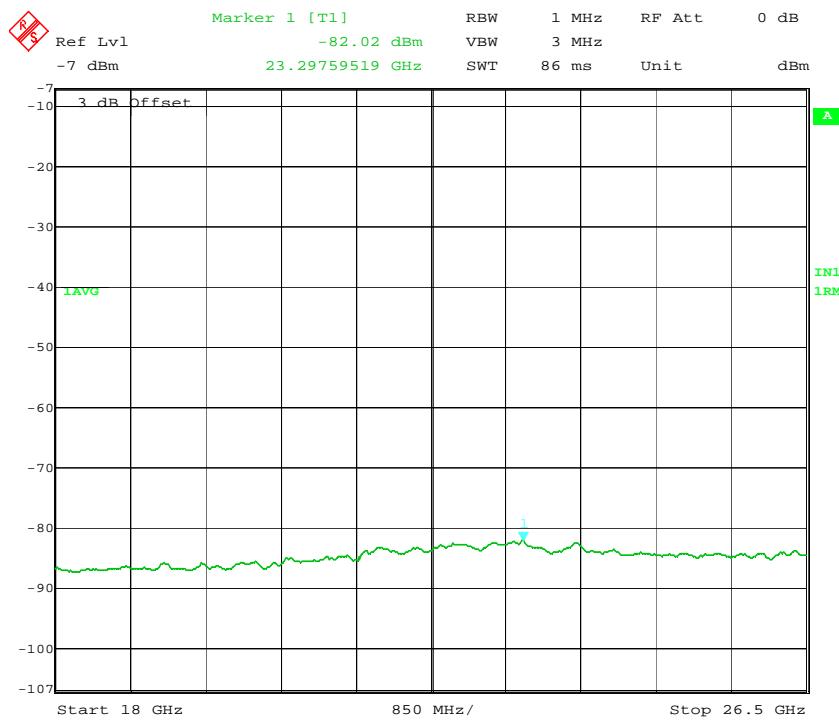


Figure 109: 40MHz, 17dBi, High Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0

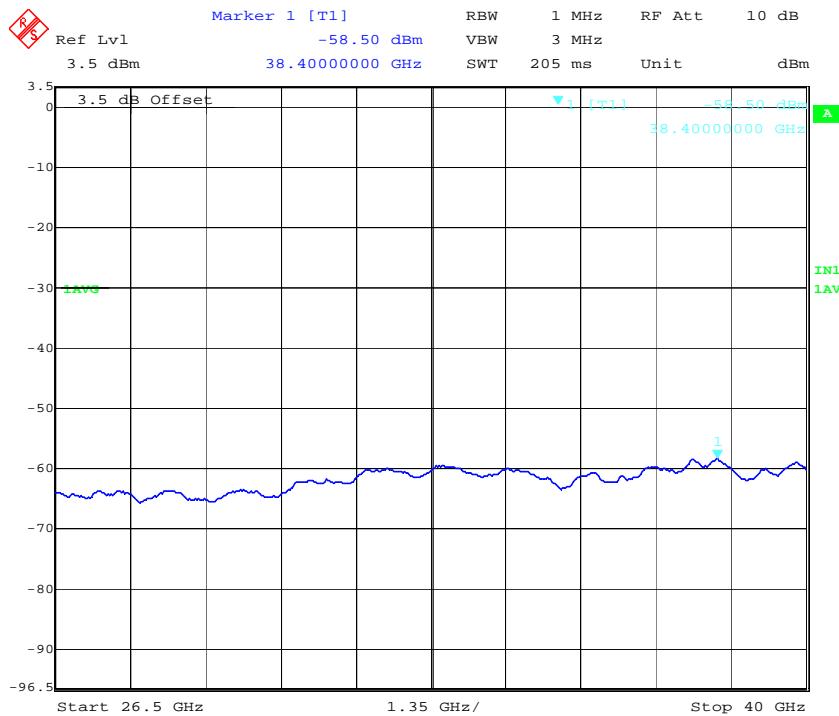


Figure 110: 40MHz, 17dBi, High Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0

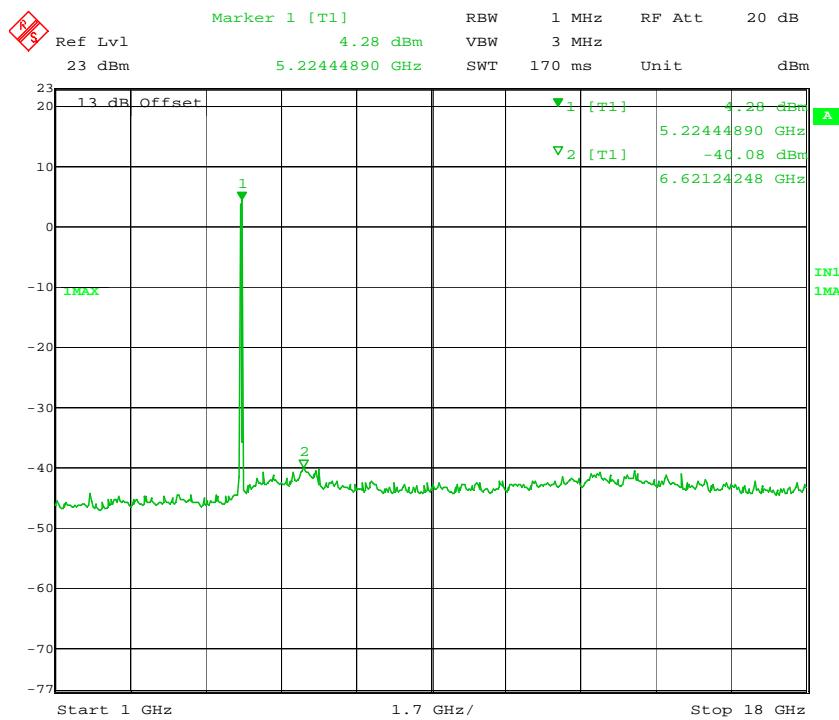


Figure 111: 40MHz, 17dBi, High Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0

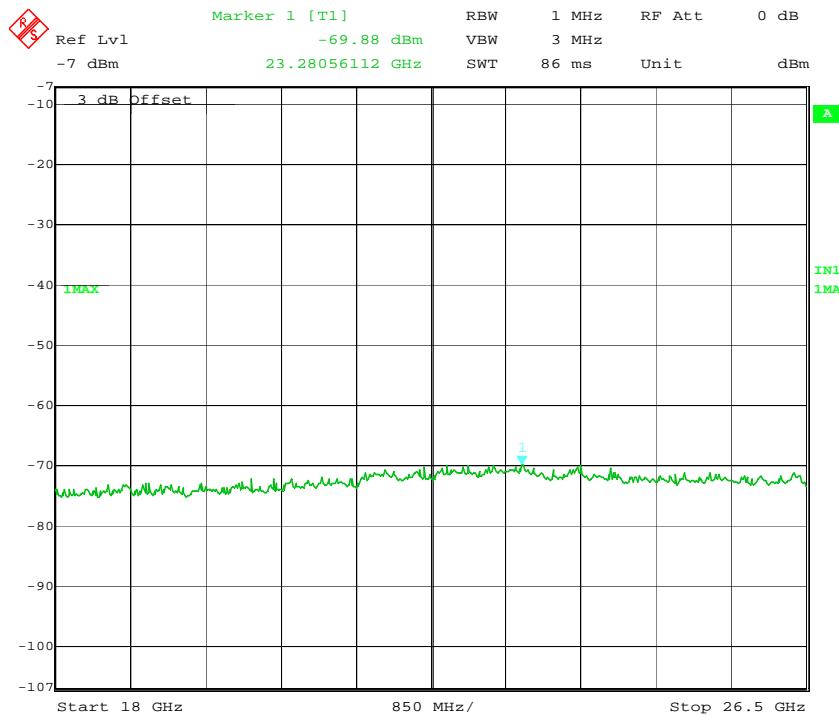


Figure 112: 40MHz, 17dBi, High Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0

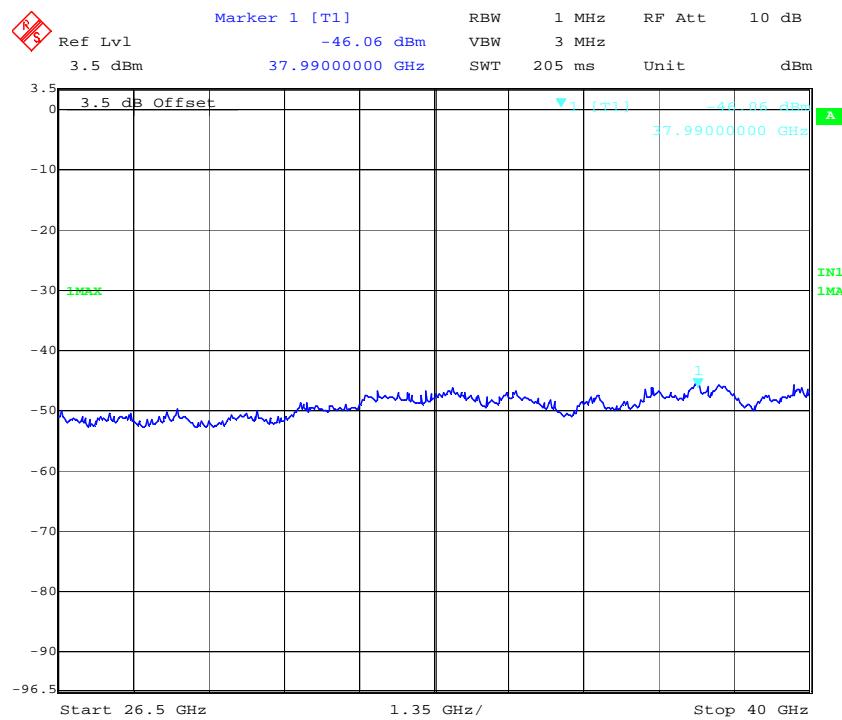


Figure 113: 40MHz, 17dBi, High Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0

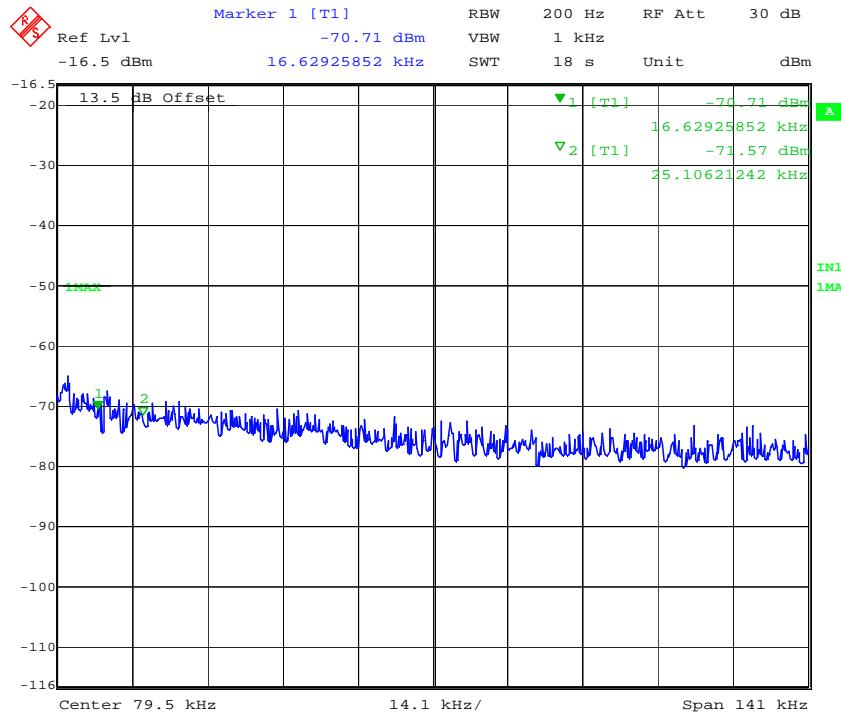


Figure 114: 40MHz, 17dBi, High Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1

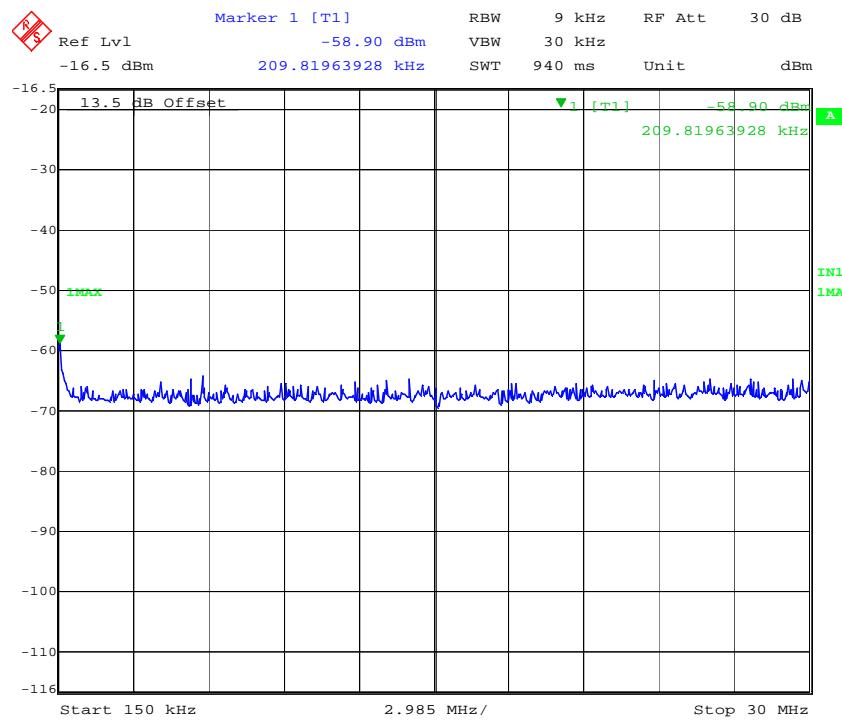


Figure 115: 40MHz, 17dBi, High Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1

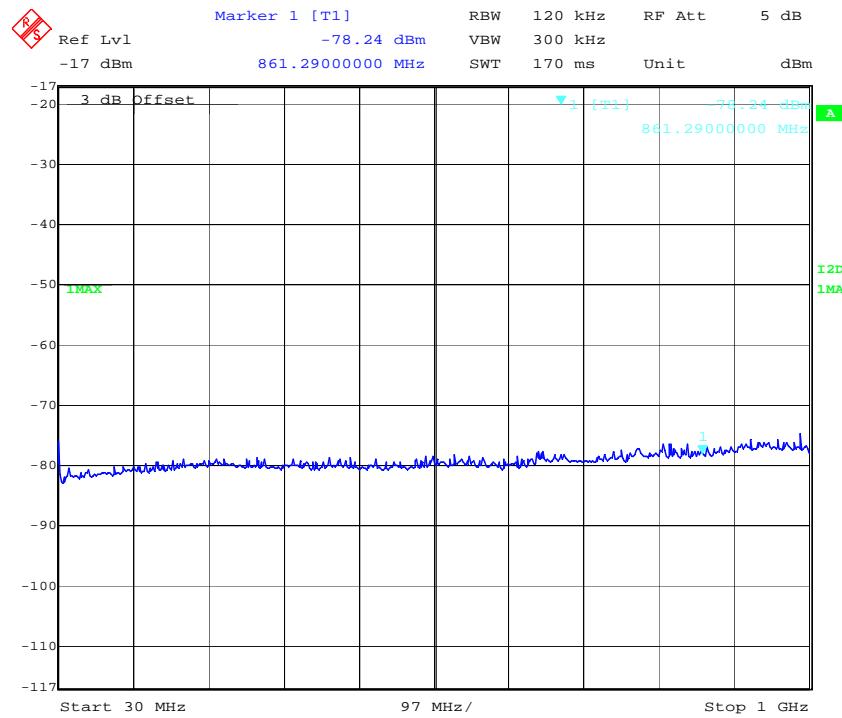


Figure 116: 40MHz, 17dBi, High Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1

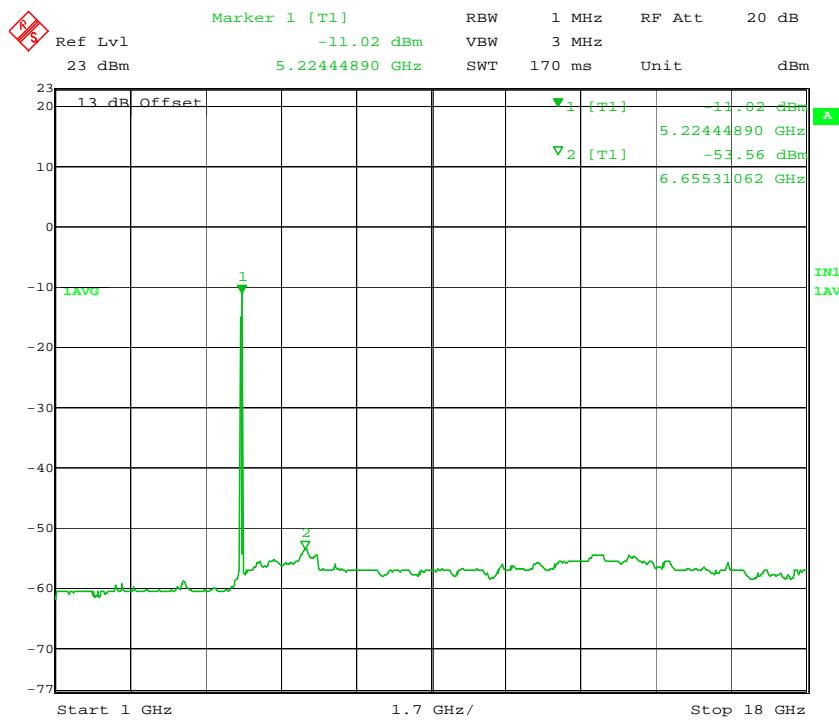


Figure 117: 40MHz, 17dBi, High Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1

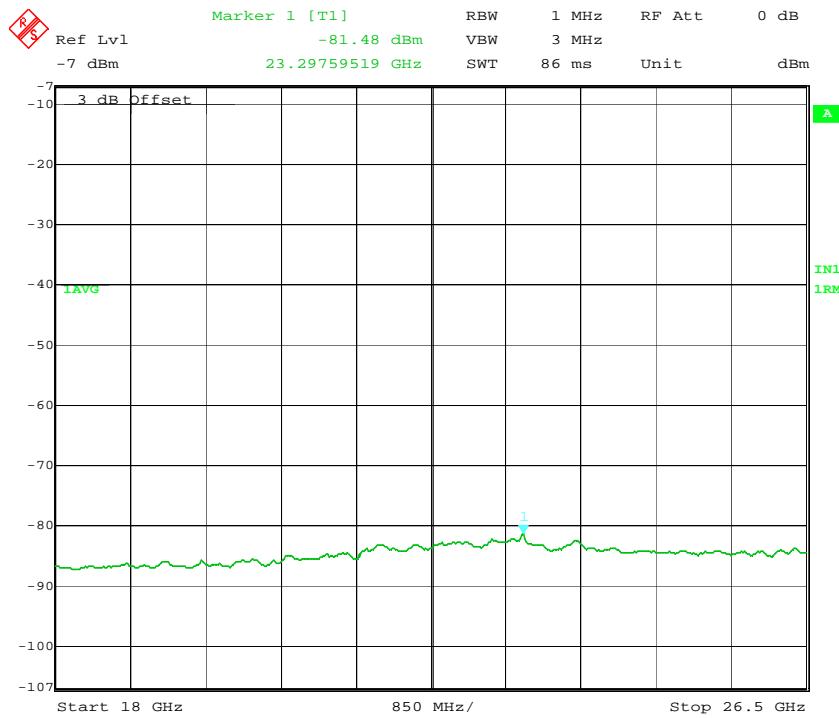


Figure 118: 40MHz, 17dBi, High Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1

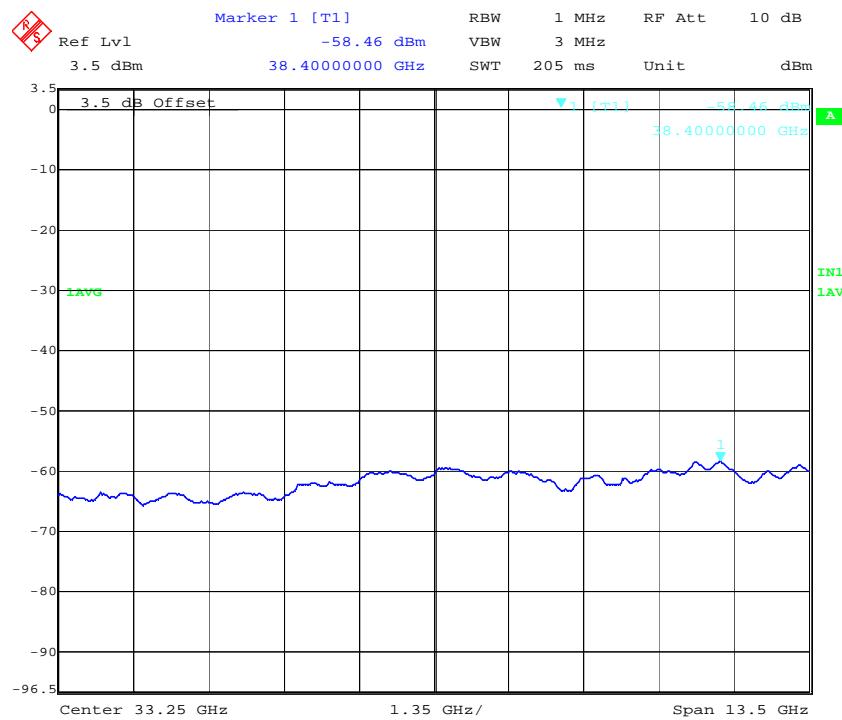


Figure 119: 40MHz, 17dBi, High Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1

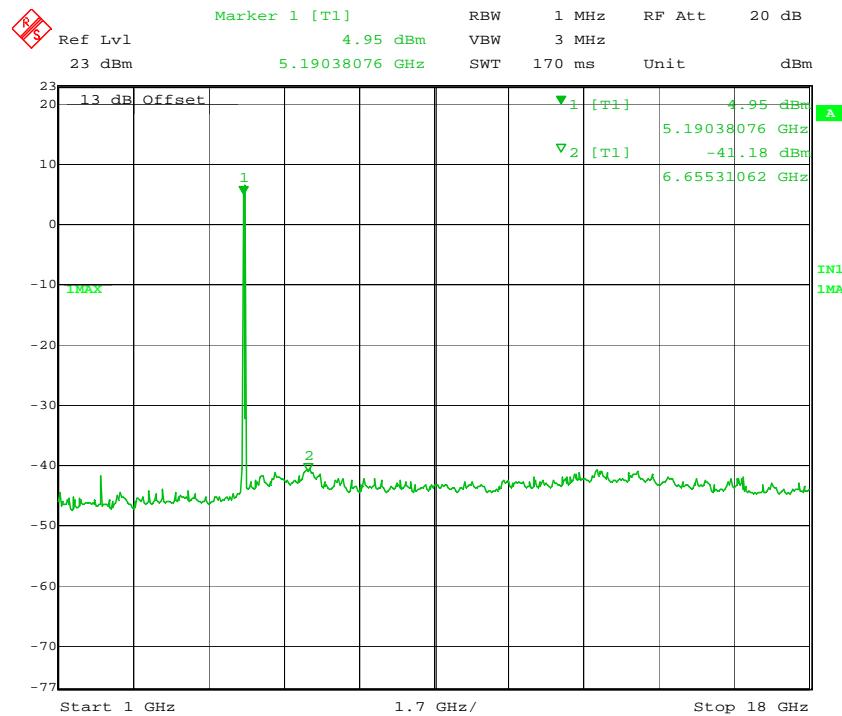


Figure 120: 40MHz, 17dBi, High Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1

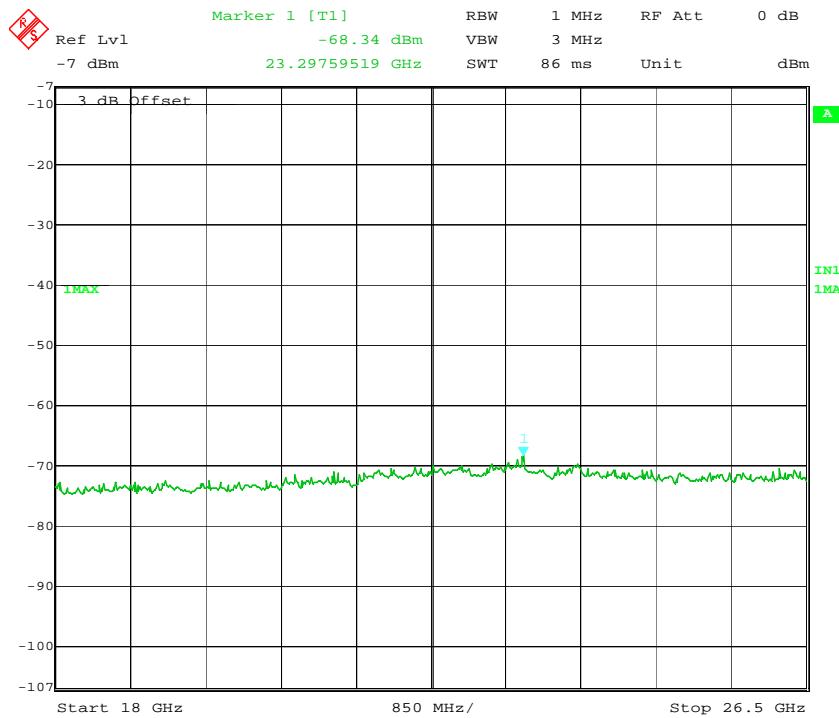


Figure 121: 40MHz, 17dBi, High Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1

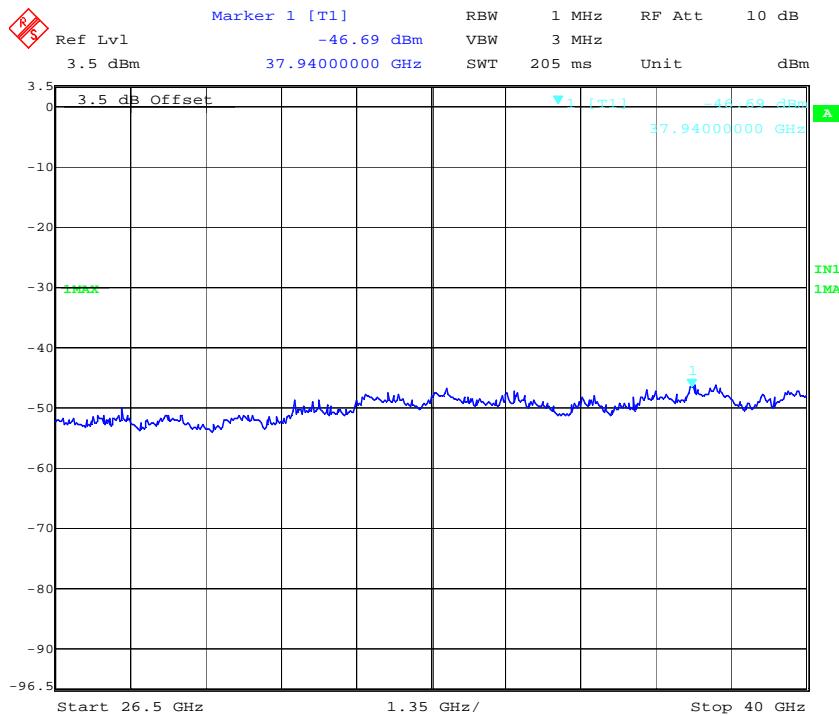


Figure 122: 40MHz, 17dBi, High Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1

#### 5.3.5.5.4 40 MHz MODULATION BANDWIDTH, 6 dBi POWER, LOW CHANNEL - 5180 MHz

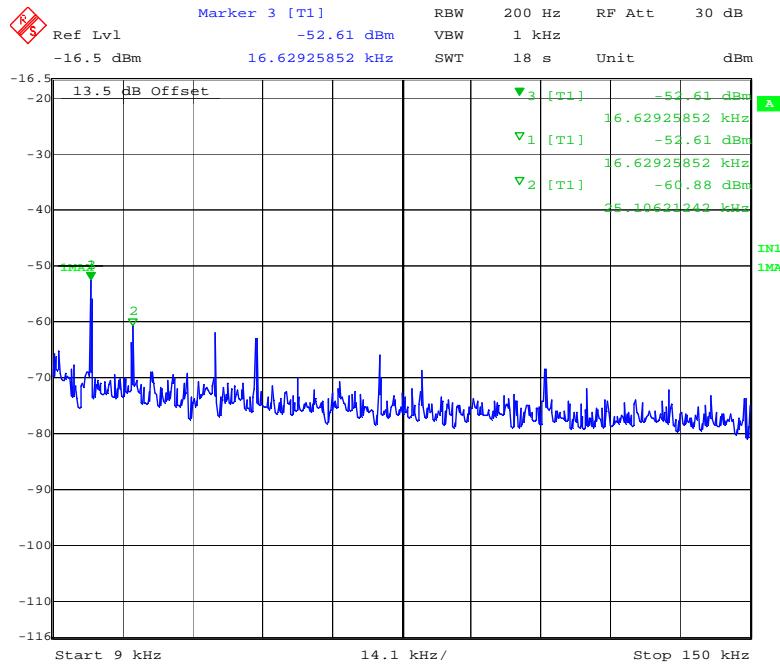


Figure 123: 40MHz, 6dBi, Low Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0

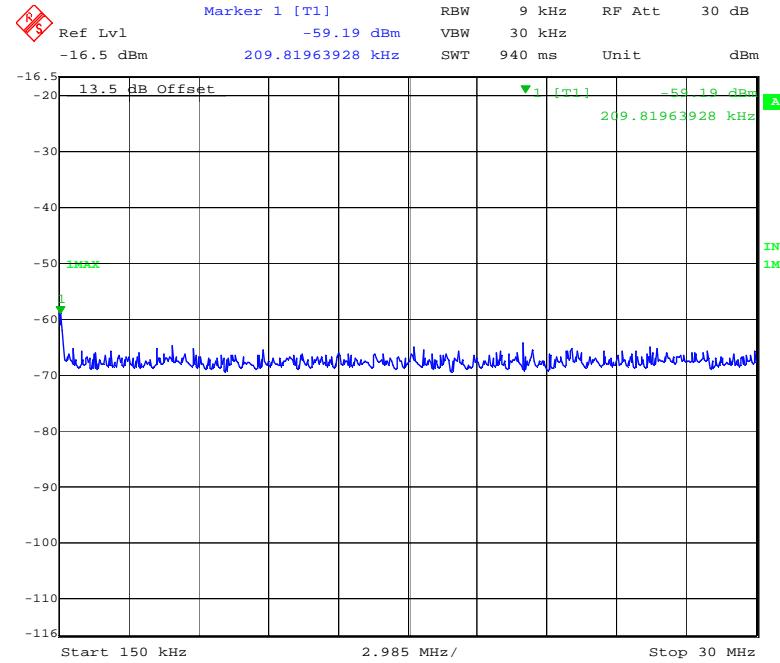


Figure 124: 40MHz, 6dBi, Low Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0

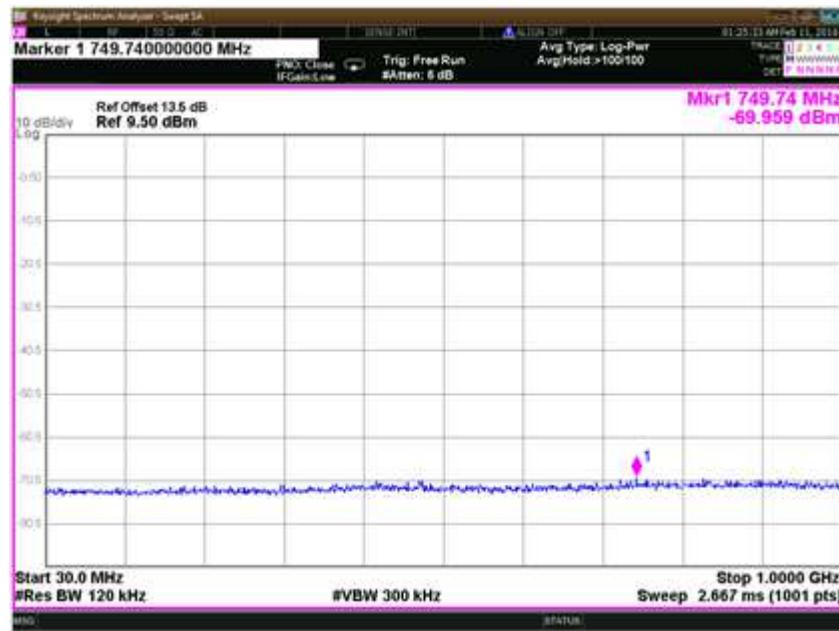


Figure 125: 40MHz, 6dBi, Low Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0

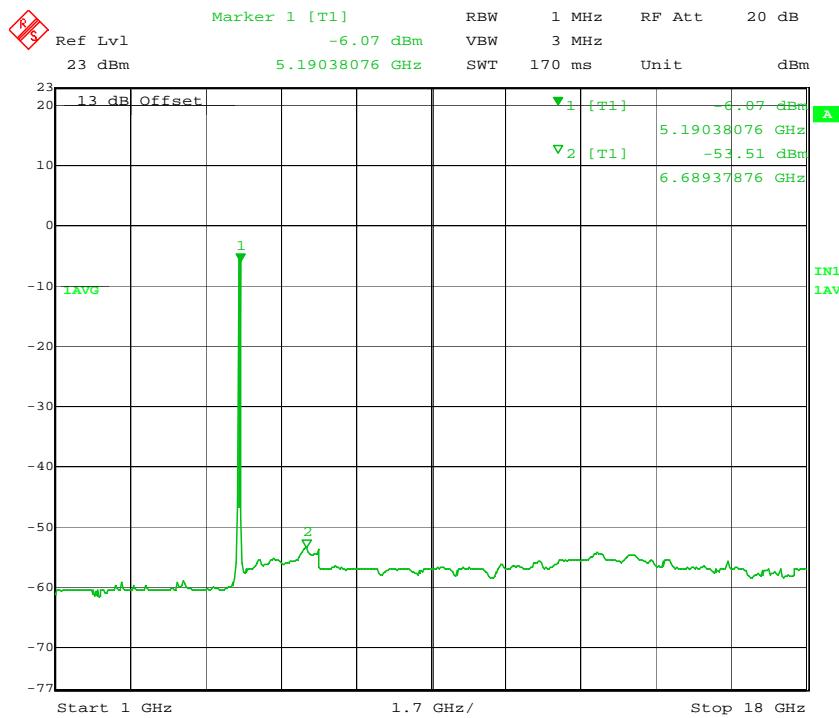


Figure 126: 40MHz, 6dBi, Low Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0

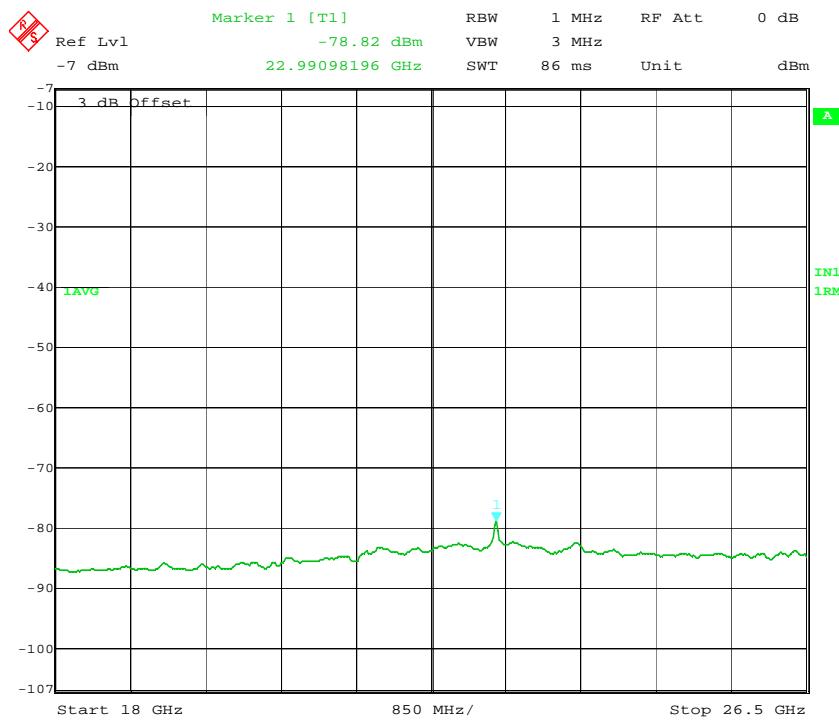


Figure 127: 40MHz, 6dBi, Low Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 0



Figure 128: 40MHz, 6dBi, Low Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 0

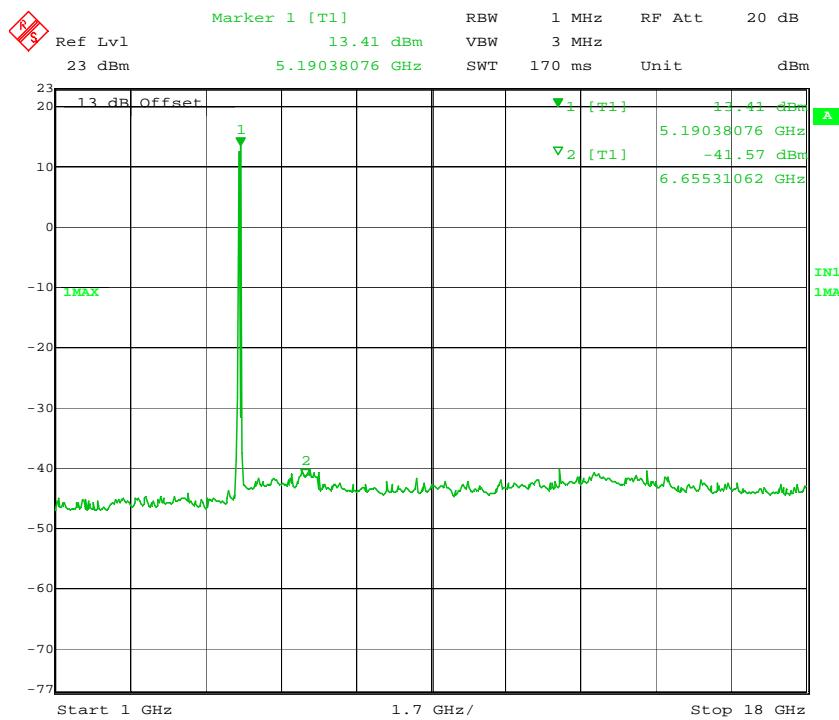


Figure 129: 40MHz, 6dBi, Low Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 0

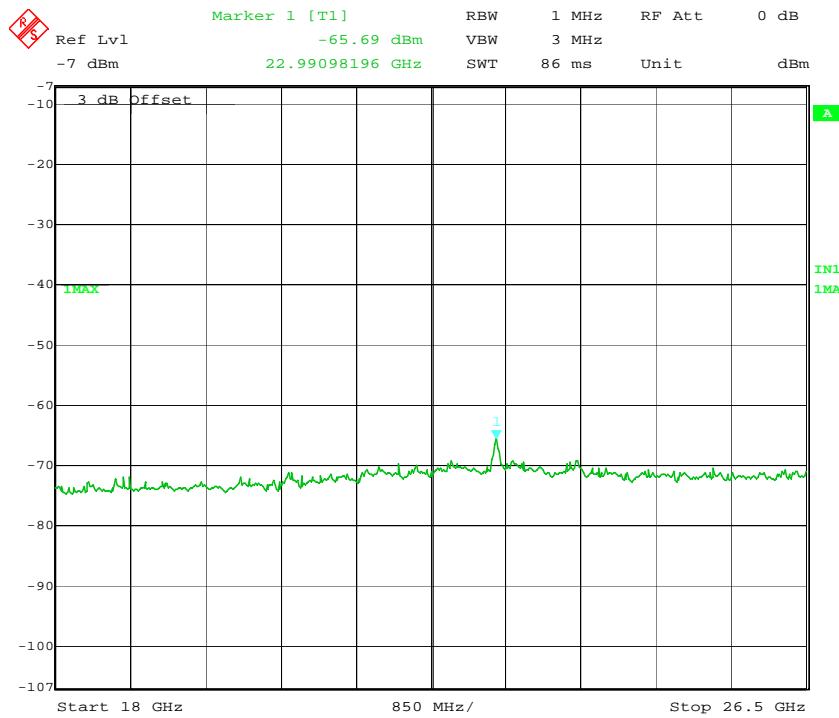


Figure 130: 40MHz, 6dBi, Low Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 0

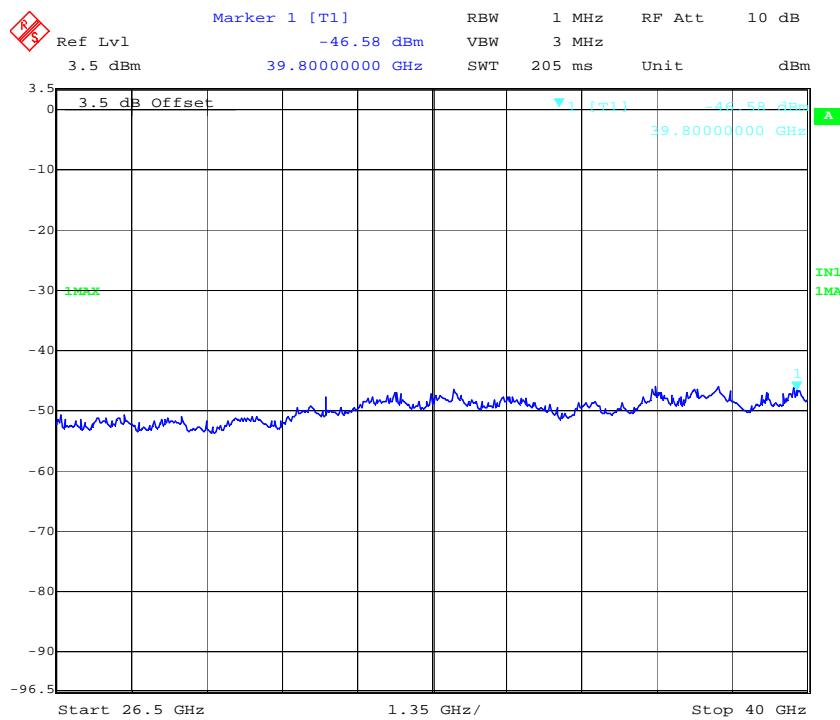


Figure 131: 40MHz, 6dBi, Low Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 0

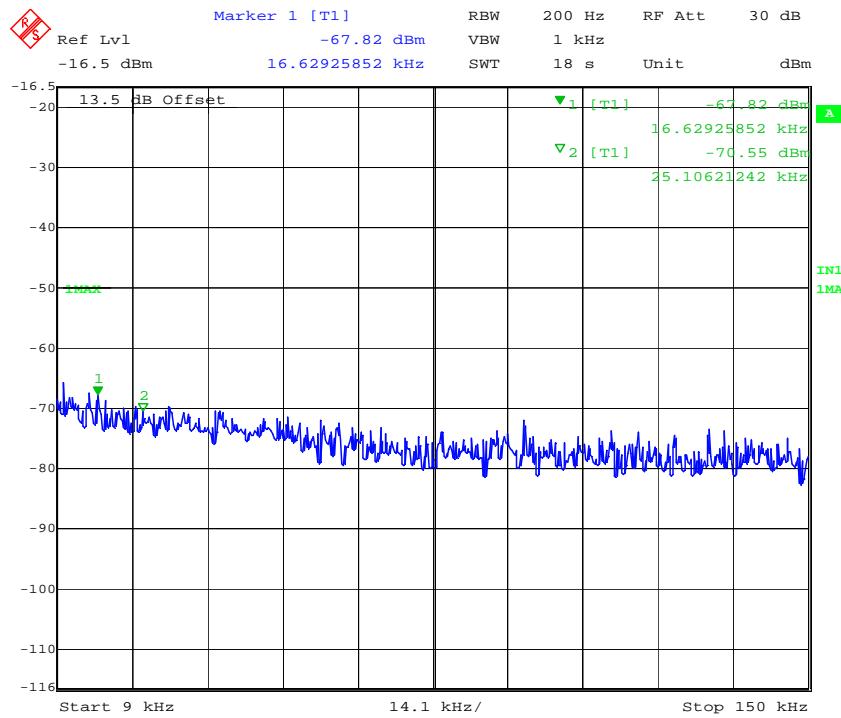


Figure 132: 40MHz, 6dBi, Low Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 1

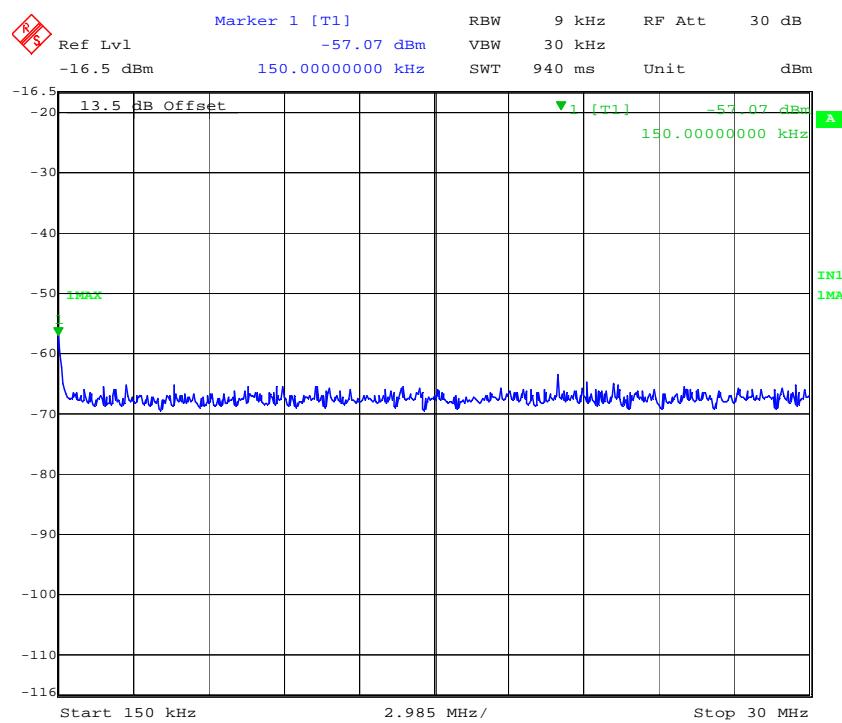


Figure 133: 40MHz, 6dBi, Low Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 1

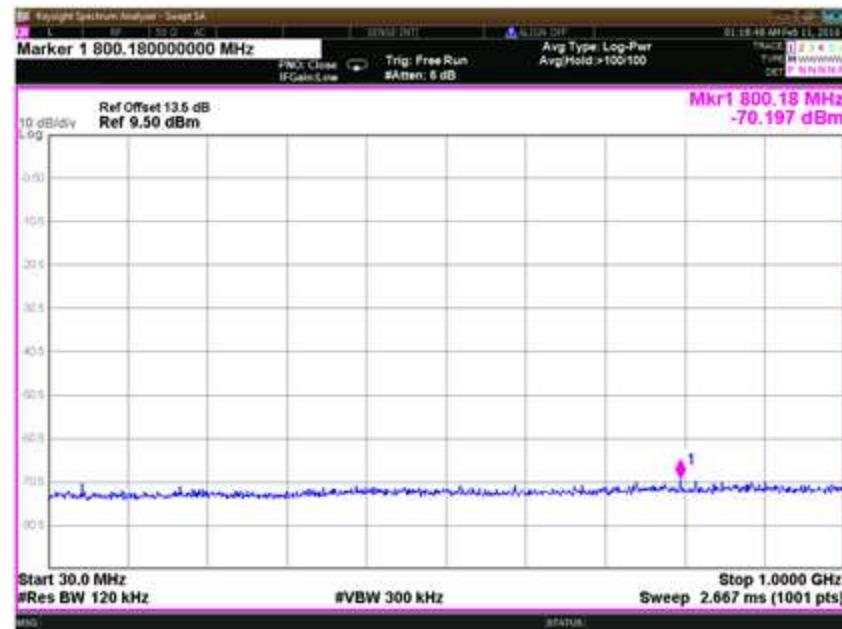


Figure 134: 40MHz, 6dBi, Low Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 1

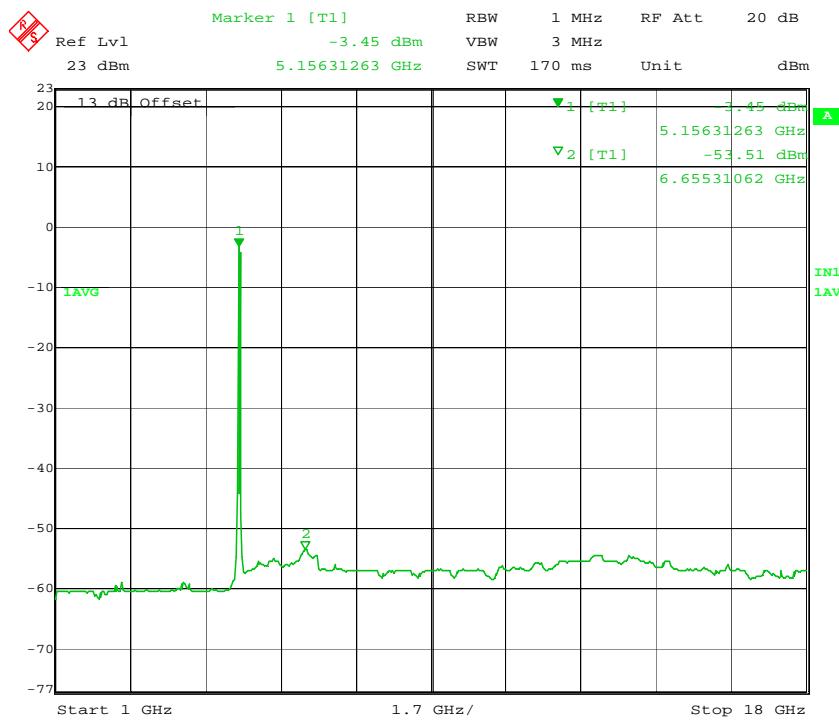


Figure 135: 40MHz, 6dBi, Low Channel: Average Emission from 1 GHz to 18 GHz at Ch. 1

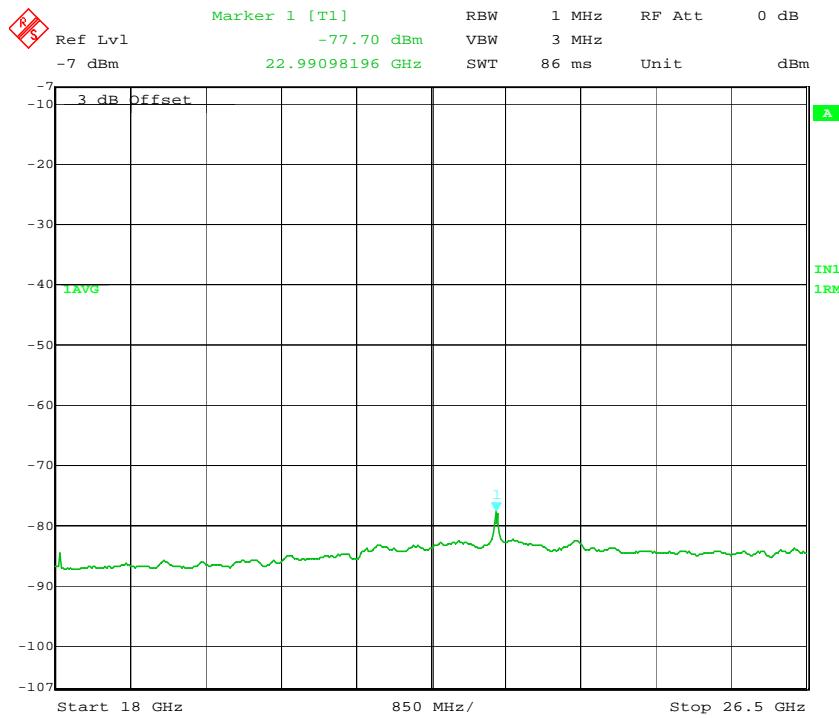


Figure 136: 40MHz, 6dBi, Low Channel: Average Emission from 18 GHz to 26.5 GHz at Ch. 1

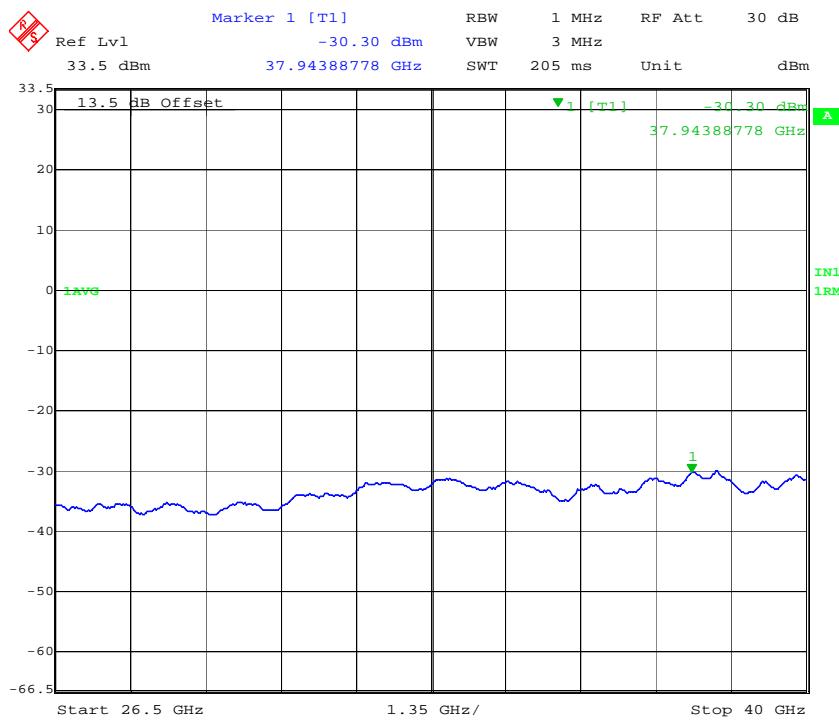


Figure 137: 40MHz, 6dBi, Low Channel: Average Emission from 26.5 GHz to 40 GHz at Ch. 1

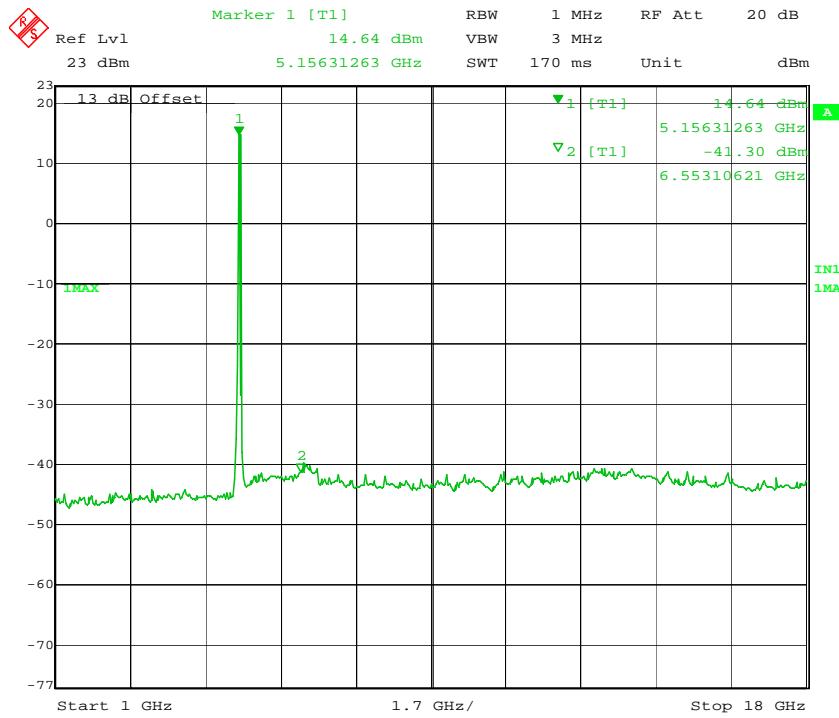


Figure 138: 40MHz, 6dBi, Low Channel: Peak Emission from 1 GHz to 18 GHz at Ch. 1

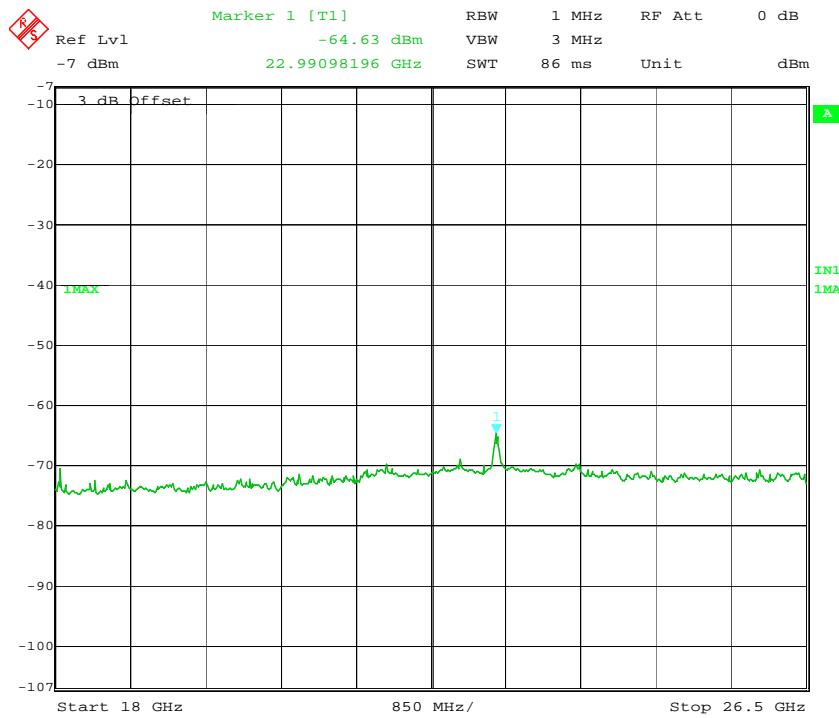


Figure 139: 40MHz, 6dBi, Low Channel: Peak Emission from 18 GHz to 26.5 GHz at Ch. 1

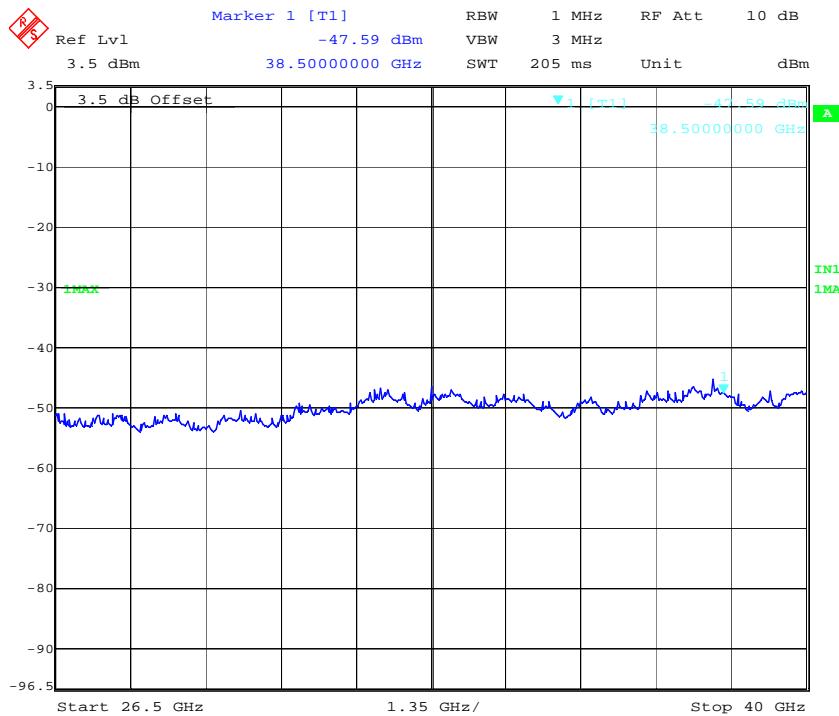


Figure 140: 40MHz, 6dBi, Low Channel: Peak Emission from 26.5 GHz to 40 GHz at Ch. 1

### 5.3.5.5.5 40 MHz MODULATION BANDWIDTH, 6 dBi POWER, MID CHANNEL - 5200 MHz

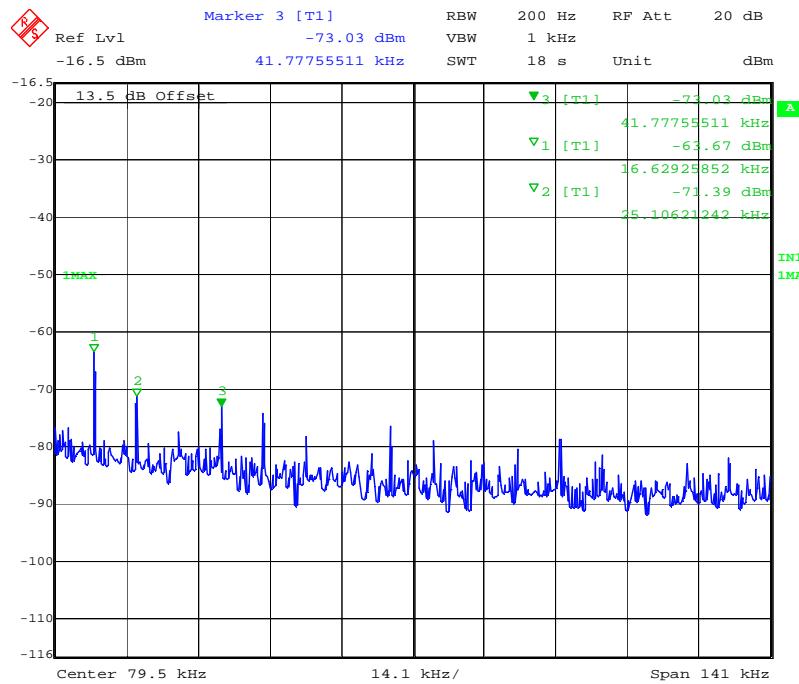


Figure 141: 40MHz, 6dBi, Mid Channel: Peak Emission from 9 kHz to 150 kHz at Ch. 0

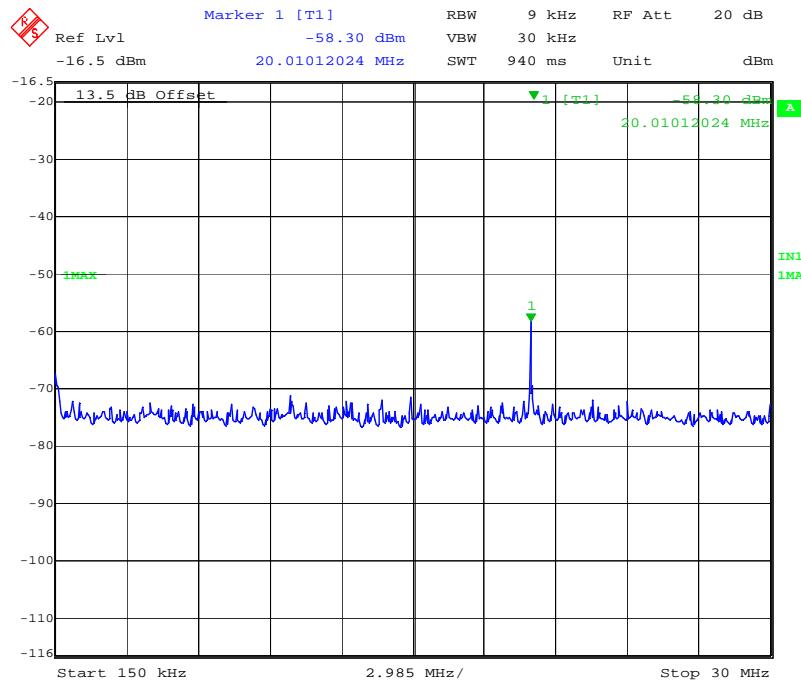


Figure 142: 40MHz, 6dBi, Mid Channel: Peak Emission from 150 kHz to 30 MHz at Ch. 0

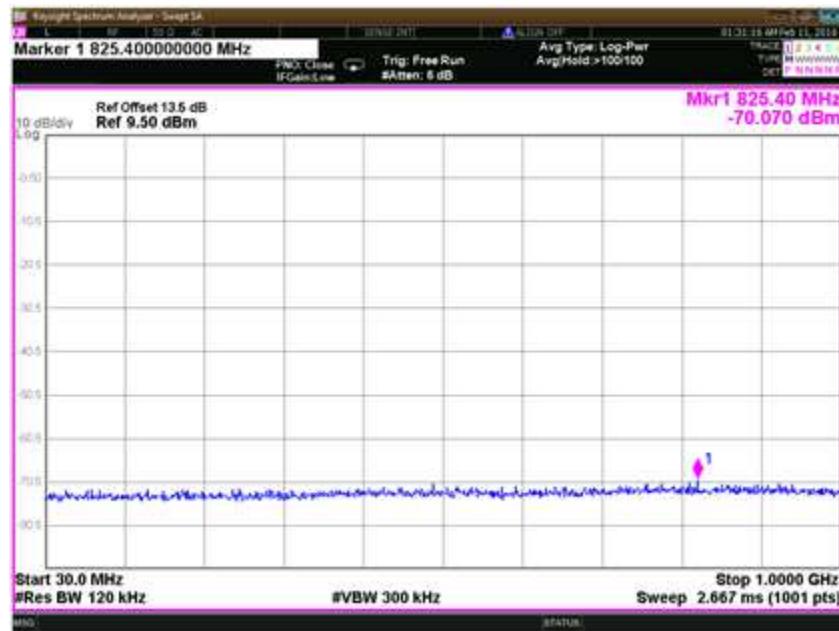


Figure 143: 40MHz, 6dBi, Mid Channel: Peak Emission from 30 MHz to 1 GHz at Ch. 0

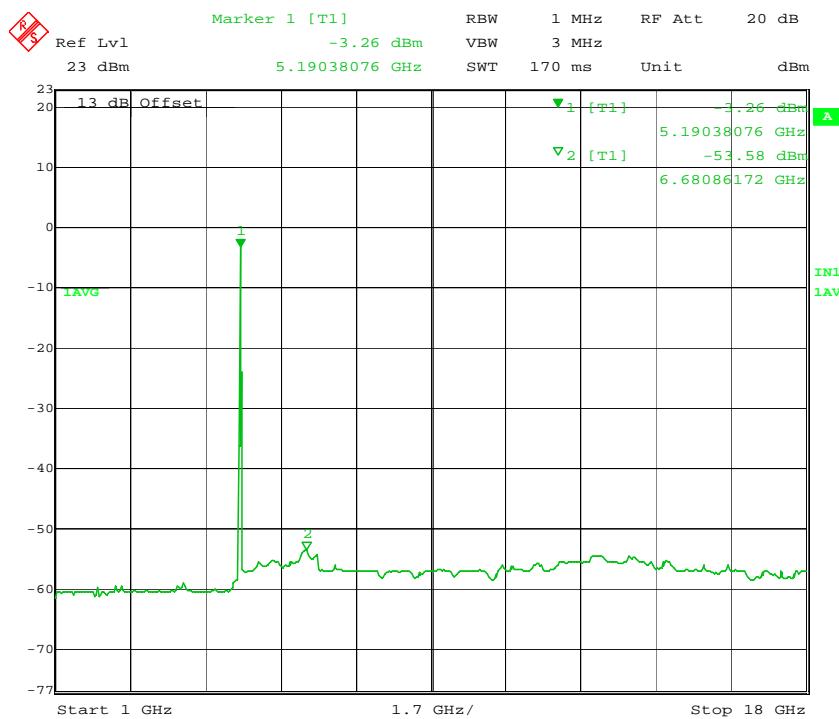


Figure 144: 40MHz, 6dBi, Mid Channel: Average Emission from 1 GHz to 18 GHz at Ch. 0