



# FCC Test report

Test report no.: EMC\_469FCC-24\_2003\_M55

FCC Part 24 / RSS 133

FCC ID: PWX-M55



*TTI-P-G 081/94-A0*

Accredited according to **ISO/IEC 17025**



FCC listed # 101450

IC recognized # 3925

## **CETECOM Inc.**

411 Dixon Landing Road ♦ Milpitas, CA 95035 ♦ U.S.A.

Phone: + 1 (408) 586 6200 ♦ Fax: + 1 (408) 586 6299 ♦ E-mail: [info@ceteconomusa.com](mailto:info@ceteconomusa.com) ♦ <http://www.ceteconom.com>

CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686  
Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

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<b>1</b>	<b>General information</b>
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The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM Inc. does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc.

**TEST REPORT PREPARED BY:****EMC Engineer: Harpreet Sidhu****1.2 Testing laboratory****CETECOM Inc.**

411 Dixon Landing Road, Milpitas, CA-95035, USA

Phone: +1 408 586 6200 Fax: +1 408 586 6299

E-mail: [lothar.schmidt@ceteconomusa.com](mailto:lothar.schmidt@ceteconomusa.com)Internet: [www.ceteconom.com](http://www.ceteconom.com)

**1.3 Details of applicant**

**Name** : SIEMENS ICM  
**Street** : 16745 West Bernardo Drive  
**City / Zip Code** : San Diego CA 92127  
**Country** : U.S.A  
**Contact** : David McPherson  
**Telephone** : +1 858-521-3387  
**Tele-fax** : +1 858-521-3106  
**e-mail** : [david.mcpherson@icm.siemens.com](mailto:david.mcpherson@icm.siemens.com)

**1.4 Application details**

Date of receipt of application : 2003-04-3  
Date of receipt test item : 2003-04-11  
Date of test : 2003-04-25/26

**1.5 Test item**

Manufacturer : SIEMENS  
Street Address : Suedstr. 9  
City / Zip Code : 47475 Kamp-Lintfort  
Country : Germany  
Marketing Name : M55  
Model No. : Barracuda 55  
Description : GSM Triband 900/1800/1900 Mobile Phone  
FCC-ID : PWX-M55

**Additional information**

Frequency : 1850.2MHz – 1909.8MHz for PCS 1900  
Type of modulation : GMSK  
Number of channels : 299 for PCS 1900  
Antenna : Embedded Triband  
Power supply : Battery or Charger (AC Adaptor)  
Output power : 29.03dBm (799.83mW) maximum EIRP measured for PCS 1900  
Extreme vol. Limits : 3.8VDC to 4.5VDC  
Extreme temp. Tolerance : -30°C to +50°C

**1.6 Test standards**

FCC Part 24 / RSS133 r1

**2 Technical test****2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests Performed	
Final Verdict: (only "passed" if all single measurements are "passed")	<b>Passed</b>

**Technical responsibility for area of testing:****2003-05-28    EMC & Radio    Lothar Schmidt (EMC Manager)****Date****Section****Name****Signature****Responsible for test report and project leader:****2003-05-28    EMC & Radio    Harpreet Sidhu (EMC Engineer)****Date****Section****Name****Signature**

## **2.2 Test report**

### **TEST REPORT**

**Test report no.: EMC\_469FCC-24\_2003\_M55  
(FCC ID: PWX-M55)**

**TEST REPORT REFERENCE**

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**POWER OUTPUT****§ 24.232(b)****Summary:**

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMD-55) to ensure max. Power transmission and proper modulation.

This paragraph contains Burst Average conducted output power and EIRP measurements for the EUT.  
In all cases, output power is within the specified limits.

**Method of Measurements:**

The EUT was set up for the max. Output power with pseudo random data modulation.

The power was measured with R&S Spectrum Analyzer ESIB 40 (peak)

These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0 MHz and 1909.8 MHz (bottom, middle and top of operational frequency range)

**Conducted:****Limits:**

Power Step	Nominal Peak Output Power (dBm)	Tolerance (dB)
0	$\leq 30\text{dBm (1W)}^*$	$\pm 2$

\*GSM Specification – ETSI EN 300 910 V8.5.0 (2000-07) Section 4.1 {GSM05.05 Version 8.5.0 Release 1999}

**Power Measurements:**

**Conducted Average power measurements are provided by SIEMENS**

Please refer to attached document: “EMC\_M55\_1”

(Page 4, section 2.3, Siemens M55, “FCC Sample 1”, IMEI: 004999.51.206583.9)

Frequency (MHz)	Burst Average Power (dBm)
1850.2	29.4
1880.0	29.2
1909.8	29.1



**Radiated:****EIRP Measurements**

Description: This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Method of Measurement:

1. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power (Pin) is applied to the input of the dipole, and the power received (Pr) at the chamber's probe antenna is recorded.
2. A "reference path loss" is established as  $P_{in} + 2.1 - P_r$ .
3. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
4. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
5. The EUT is then put into pulse mode at its maximum power level (Power Step 0).
6. "Gated mode" power measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in FCC Rule 24.232 (b) and (c). The "reference path loss" from Step 1 is added to this result.
7. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.1 dBi) and known input power (Pin).
8. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.1 \text{ dBi}$ .

**Limits:**

Power Step	Burst Average EIRP (dBm)
0	≤33dBm (1W)

**Power Measurements:**

Plots are shown on next pages

**Radiated:**

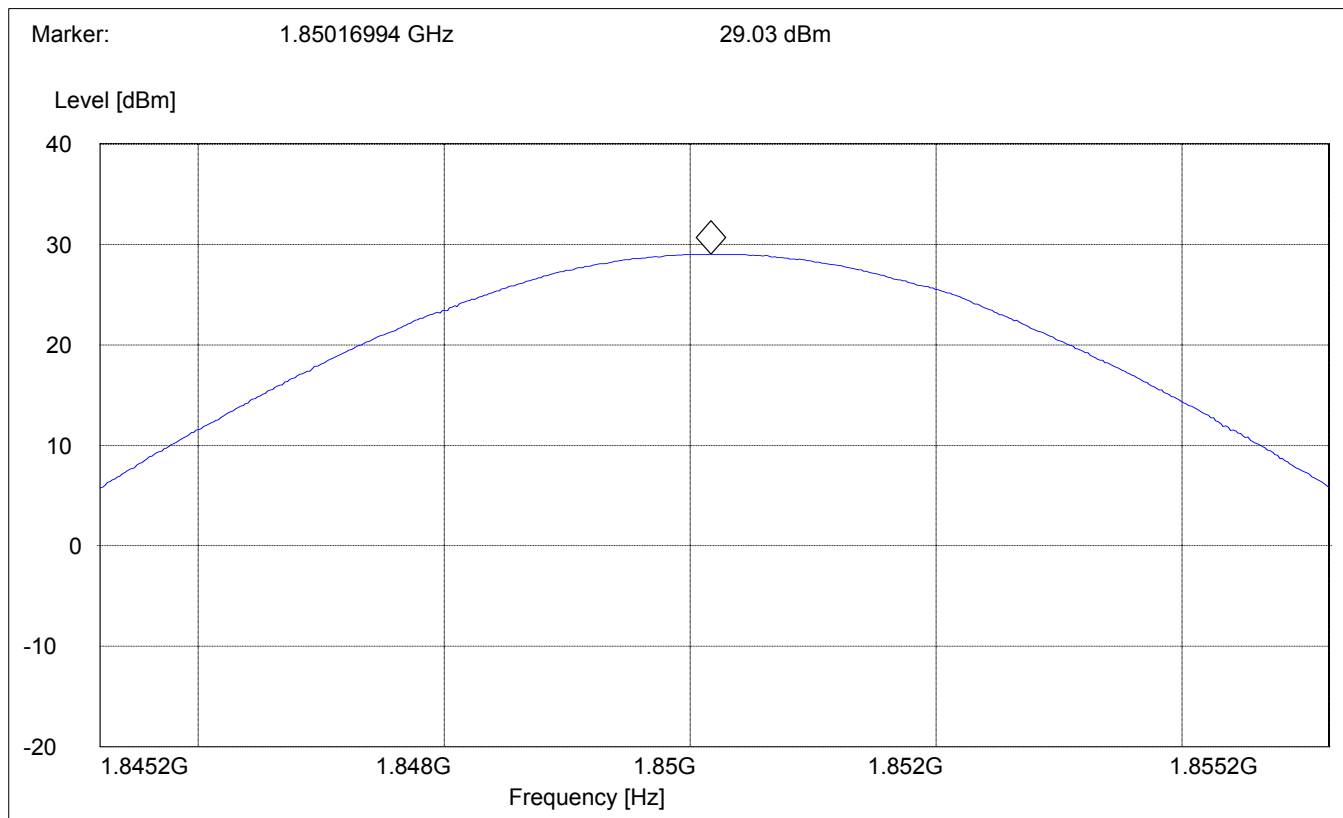
Frequency (MHz)	Power Step	BURST AVERAGE EIRP (dBm)
1850.2	0	29.03
1880.0	0	28.59
1909.8	0	28.41
Measurement uncertainty	±0.5 dB	

ANALYZER SETTINGS: RBW = VBW = 3MHz

## EIRP CHANNEL 512

SWEEP TABLE: "EIRP 1900 CH512"

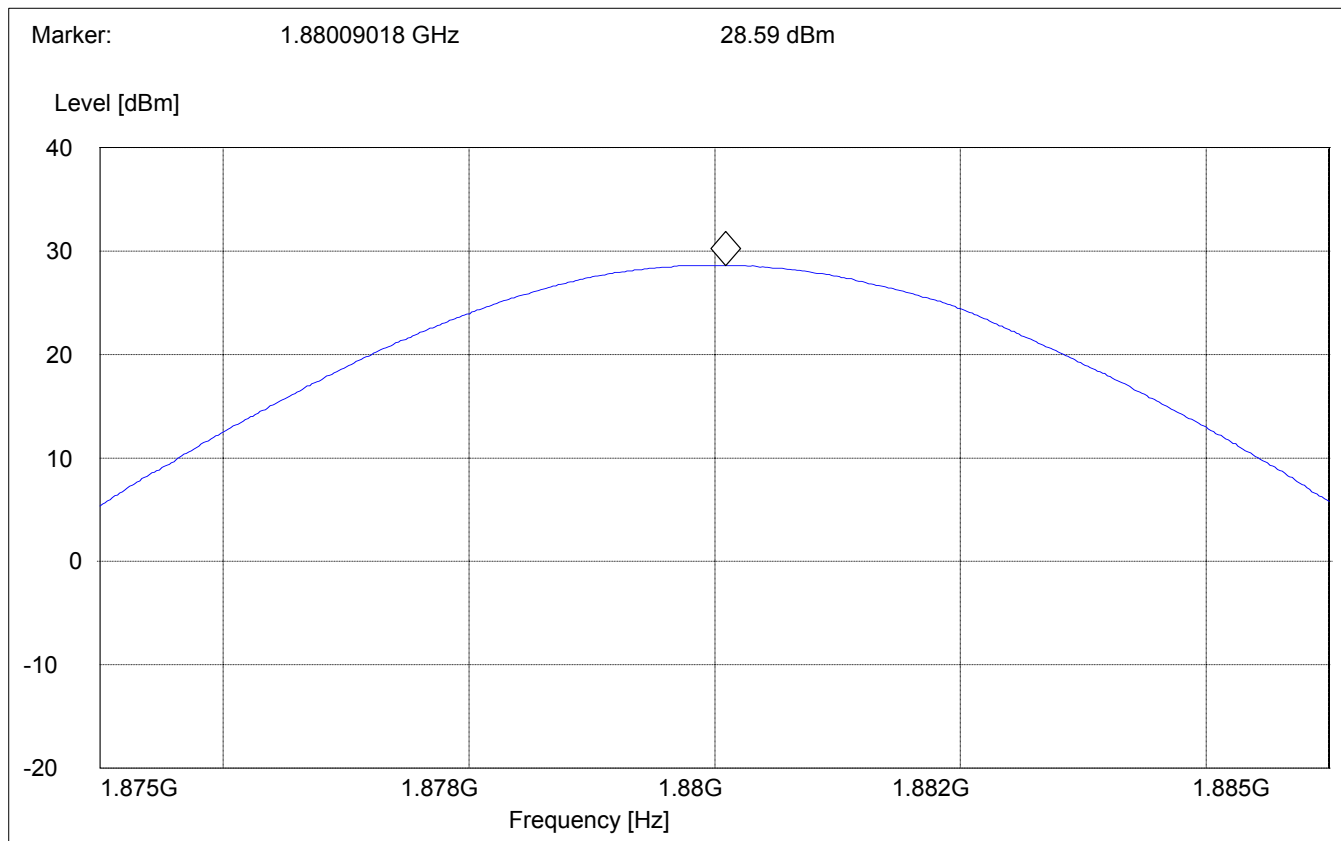
Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
1.8452 GHz	1.8552 GHz	Max Peak	Coupled	3 MHz



## EIRP CHANNEL 661:

SWEEP TABLE: "EIRP 1900 CH661"

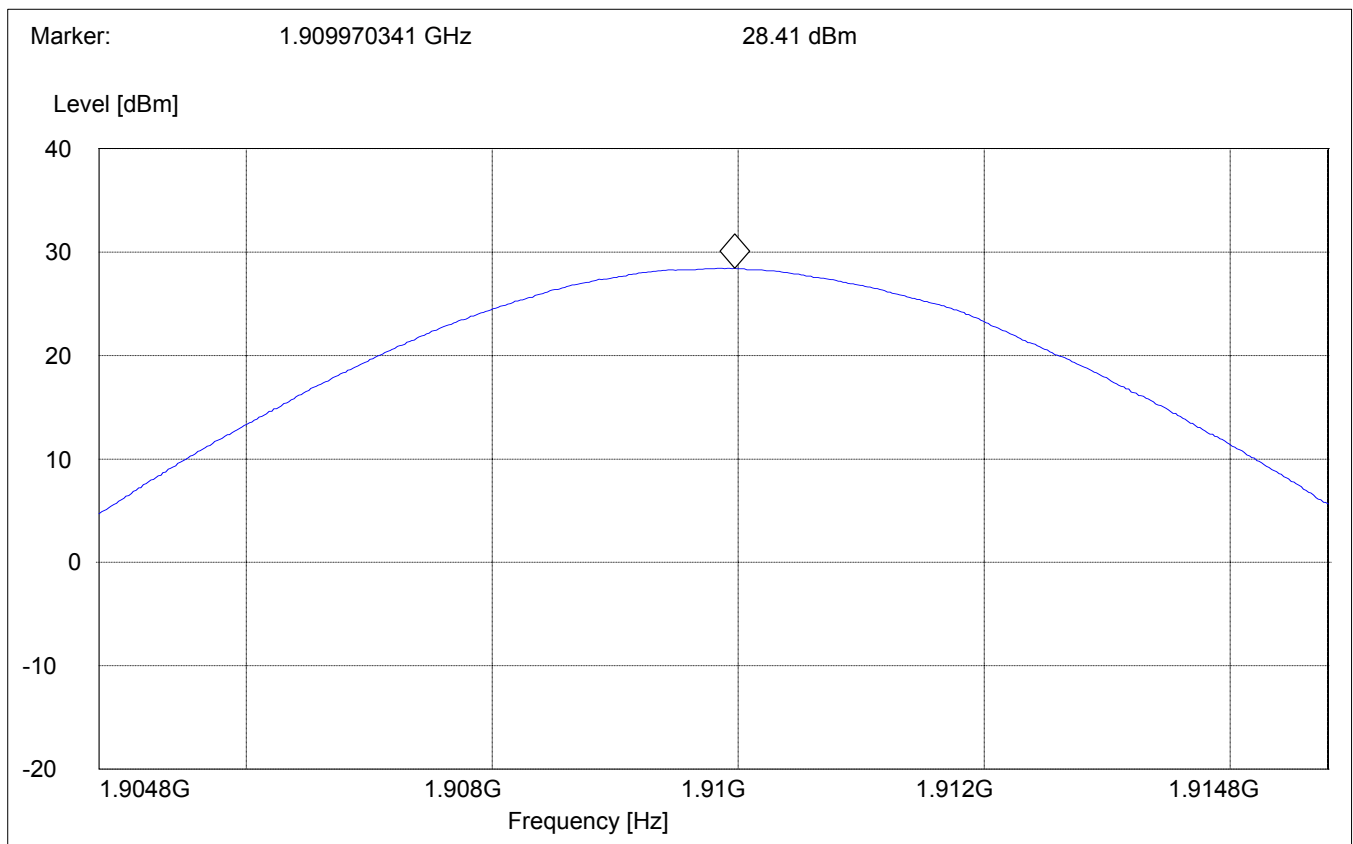
Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
1.875 GHz	1.885 GHz	Max Peak	Coupled	3 MHz



## EIRP CHANNEL 810:

SWEEP TABLE: "EIRP 1900 CH810"

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
1.9048 GHz	1.9148 GHz	Max Peak	Coupled	3 MHz



**FREQUENCY STABILITY****§ 2.1055 / § 24.235****Method of Measurement:**

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMD 55 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30 C.
3. With the EUT, powered via nominal voltage, connected to the CMD 55 and in a simulated call on channel 661 (centre channel), measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10 C increments from -30 C to +50 C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1 Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50 C.
7. With the EUT, powered via nominal voltage, connected to the CMD 55 and in a simulated call on channel 661 (centre channel), measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50 C to -30 C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5 C during the measurement procedure.

**Measurement Limit:****For Hand carried battery powered equipment:**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.8VDC and 4.5VDC, with a nominal voltage of 4.0VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -5 % and +12.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

**For equipment powered by primary supply voltage:**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

**AFC FREQ ERROR vs. VOLTAGE**

<b>Voltage (VDC)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>
3.8	-23	-0.0122
3.9	-14	-0.00745
4.0	-20	-0.0106
4.1	-24	-0.0128
4.2	-26	-0.0138
4.3	-28	-0.0149
4.4	-25	-0.0133
4.5	-22	-0.0117

**AFC FREQ ERROR vs. TEMPERATURE**

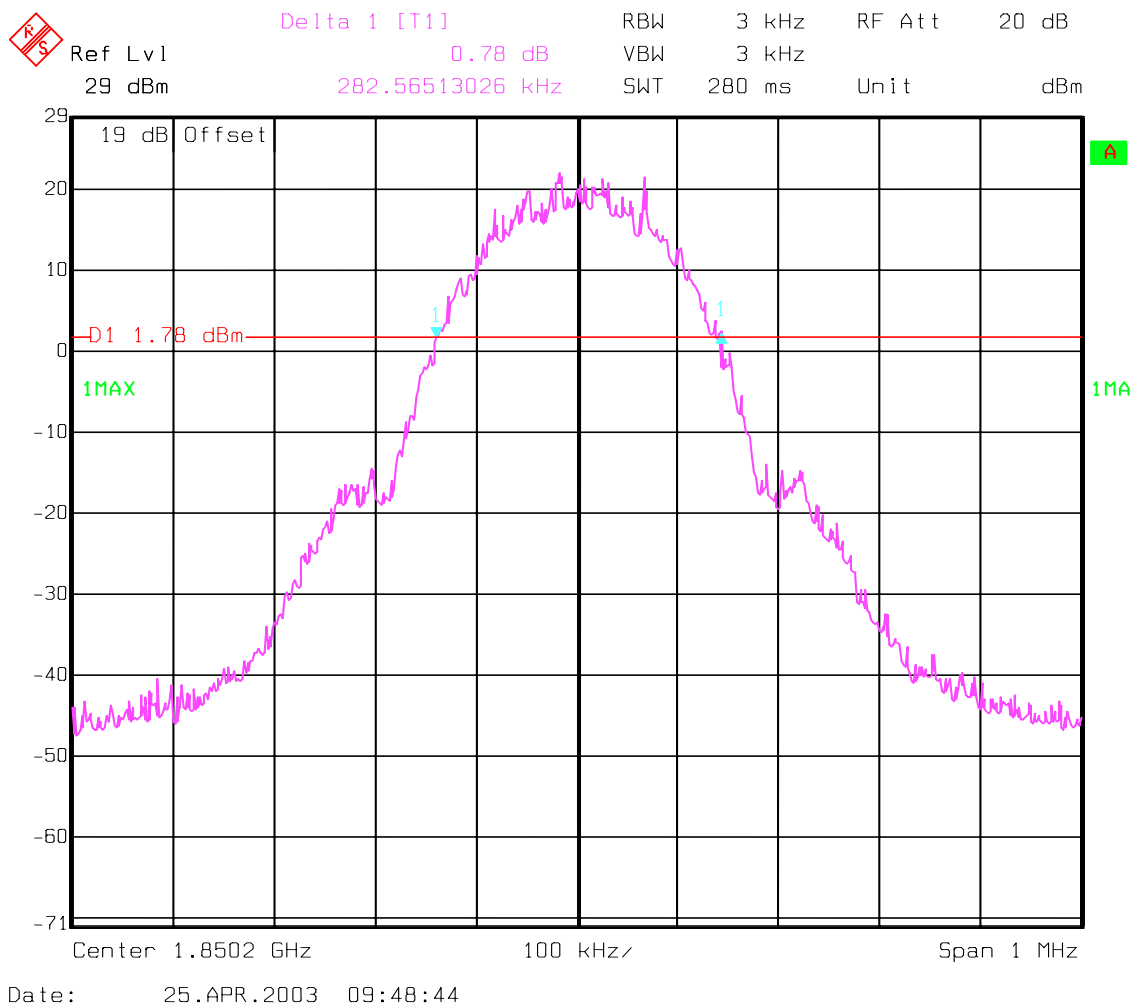
<b>TEMPERATURE (°C)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>
-30	27	0.0144
-20	22	0.0117
-10	19	0.0101
0	11	0.00585
+10	-13	-0.00691
+20	-19	-0.0101
+30	-32	-0.01702
+40	-36	-0.0191
+50	-30	-0.0160

**OCCUPIED BANDWIDTH****§2.1049(h)(i)****Occupied Bandwidth Results**

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. Table below lists the measured 99% power (-20dBc BW). Spectrum analyzer plots are included on the following pages.

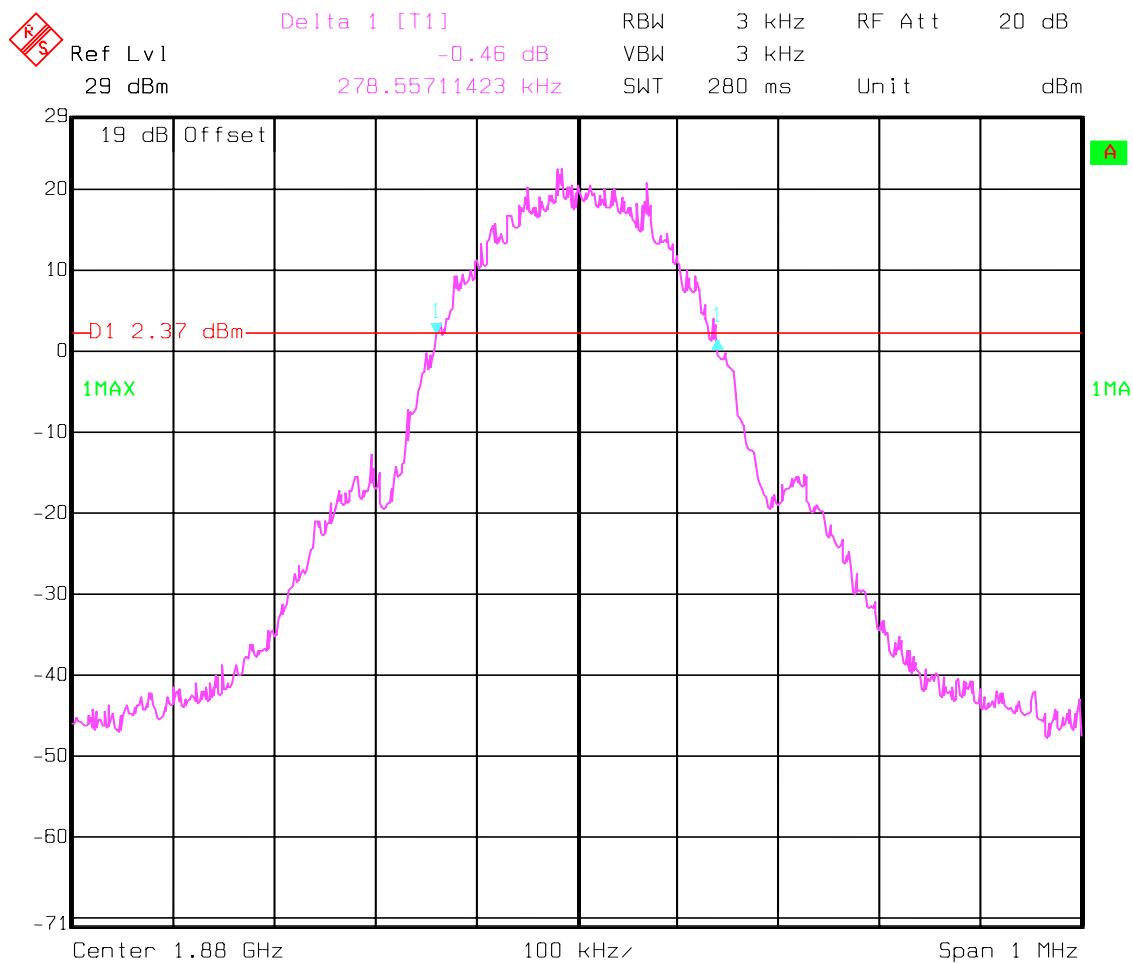
Frequency	Occupied Bandwidth (99% power or -20dBc BW)
1850.2 MHz	282.56
1880.0 MHz	278.55
1909.8 MHz	276.55

## Channel 512 Occupied Bandwidth (-20dBc BW)



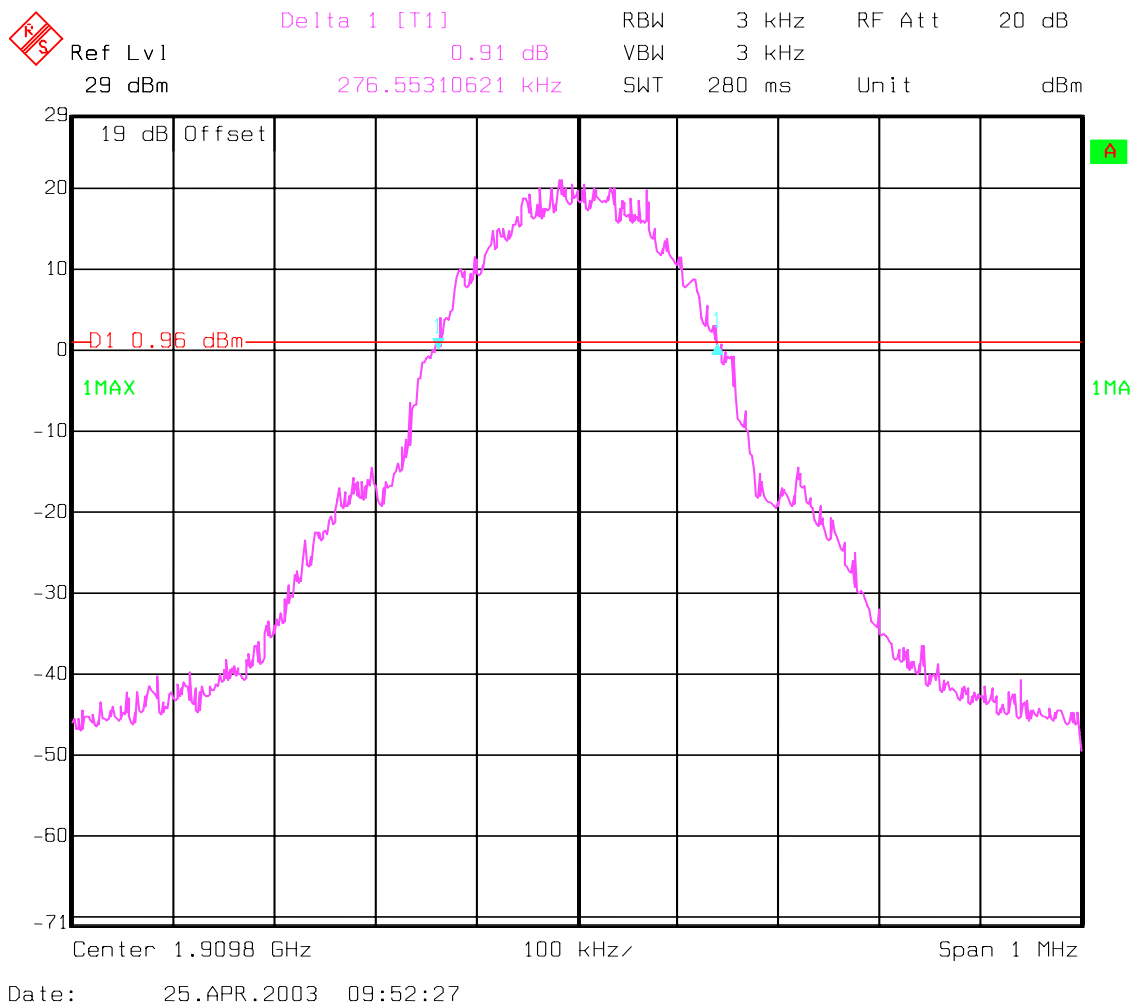


## Channel 661 Occupied Bandwidth (-20dBc BW)



Date: 25.APR.2003 09:50:40

Channel 810  
Occupied Bandwidth (-20dBc BW)



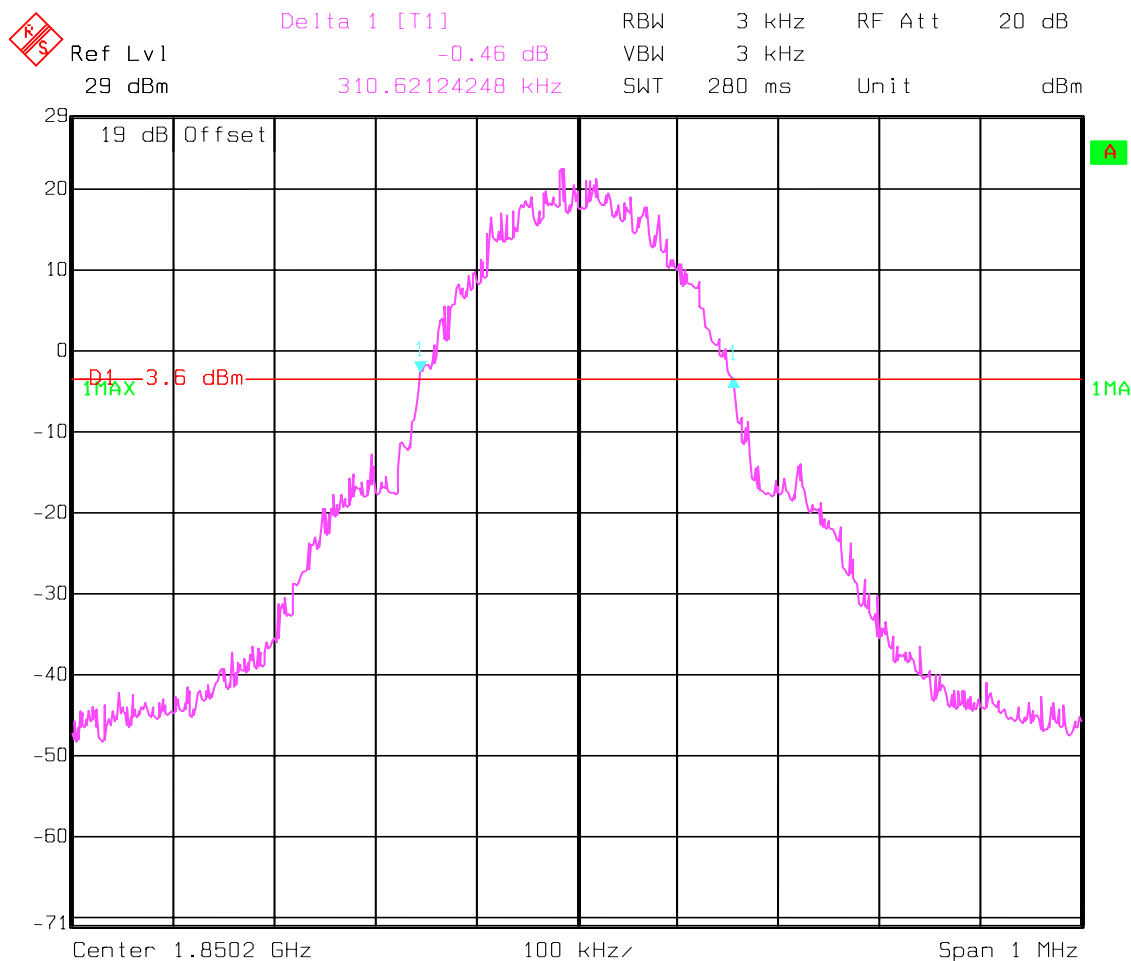
**EMISSION BANDWIDTH****§24.238(b)****Emission Bandwidth Results**

Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

Frequency	Emission Bandwidth (-26dBc BW)
1850.2 MHz	310.62
1880.0 MHz	312.62
1909.8 MHz	318.63

## Channel 512

## Emission Bandwidth (-26dBc BW)

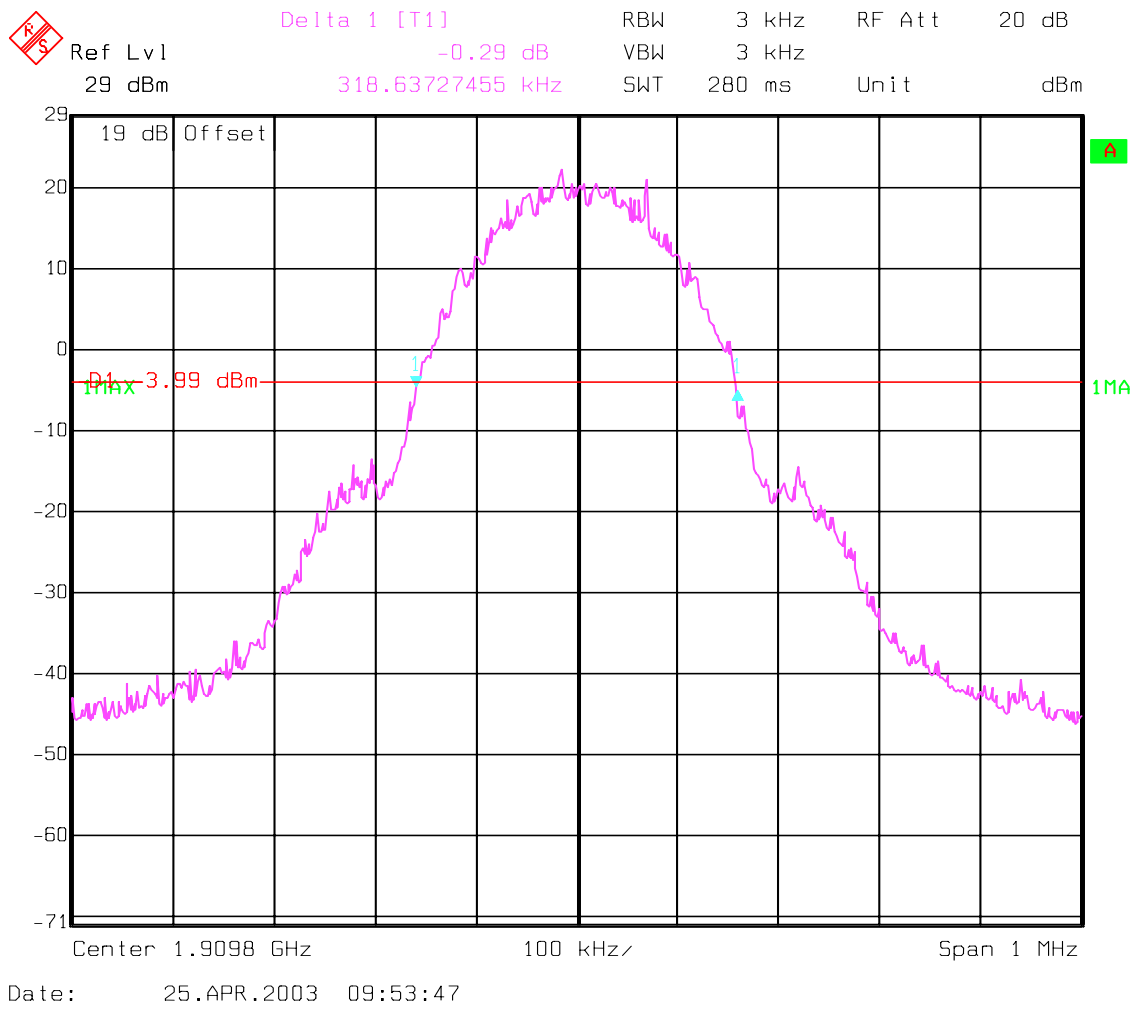


Date: 25.APR.2003 09:57:05

### Emission Bandwidth (-26dBc BW)



Channel 810  
Emission Bandwidth (-26dBc BW)



**EMISSIONS LIMITS****§24.238****Measurement Procedure:**

The following steps outline the procedure used to measure the radiated emissions from the EUT. The site is constructed in accordance with ANSI C63.4 – 1992 requirements and is recognised by the FCC. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the USPCS band.

**The final Radiated emission test procedure is as follows:**

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) A double-ridged wave-guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- c) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was determined by the substitution method described for EIRP measurements.

**Measurement Limit:**

Sec. 24.238 Emission Limits.

- (a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43 + 10 \log(P)$  dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**Measurement Results:**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the USPCS band (1850.2 MHz, 1880 MHz and 1909.8 MHz). It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the USPCS band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**NOTE:** The spurious emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3GHz and 19.1 GHz very short cable connections to the antenna was used to minimize the noise level.

**RESULTS OF RADIATED TESTS FOR FCC-24:**

Harmonic	Tx ch. 512 Freq. (MHz)	Level (dBm)	Tx ch. 661 Freq. (MHz)	Level (dBm)	Tx ch. 810 Freq. (MHz)	Level (dBm)
2	3700.4	-43.26	3760	-44.89	3819.6	-38.90
3	5550.6	-26.30	5640	-23.24	5729.4	-26.98
4	7400.8	-36.96	7520	-40.30	7639.2	-37.35
5	9251	-36.68	9400	-37.01	9549	-37.93
6	11101.2	-36.32	11280	-36.47	11458.8	-37.95
7	12951.4	-38.09	13160	-37.21	13368.6	-37.80
8	14801.6	-38.72	15040	-37.10	15278.4	-39.10
9	16651.8	-34.02	16920	-33.11	17188.2	-31.29
10	18502	-34.11	18800	-34.20	19098	-34.22



## RADIATED SPURIOUS EMISSIONS

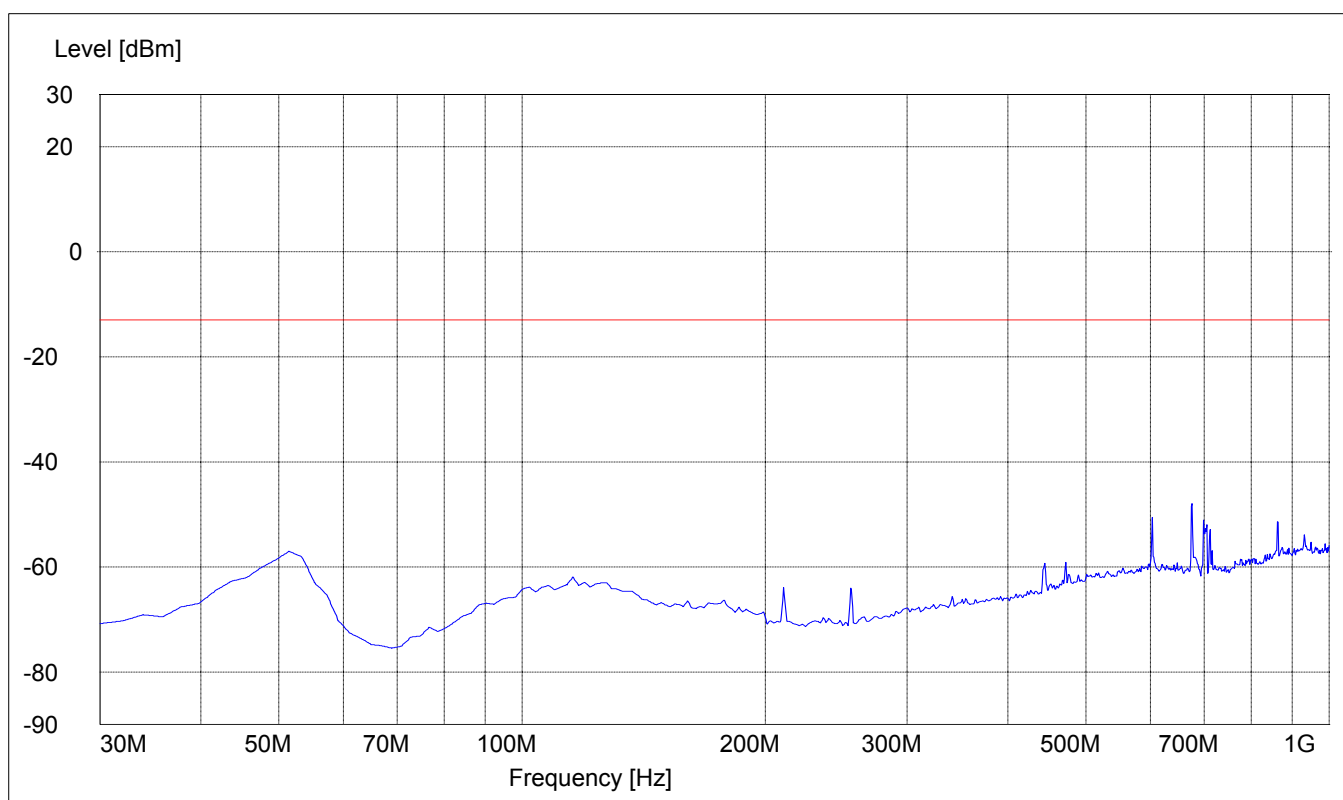
### Channel 512: 30MHz - 1GHz

Spurious emission limit -13dBm

**Note: This plot is valid for low, mid & high channels (worst-case plot)**

**SWEEP TABLE: "FCC 24 Spur 30M-1G"**

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
30MHz	1GHz	Max Peak	Coupled	1 MHz



## RADIATED SPURIOUS EMISSIONS

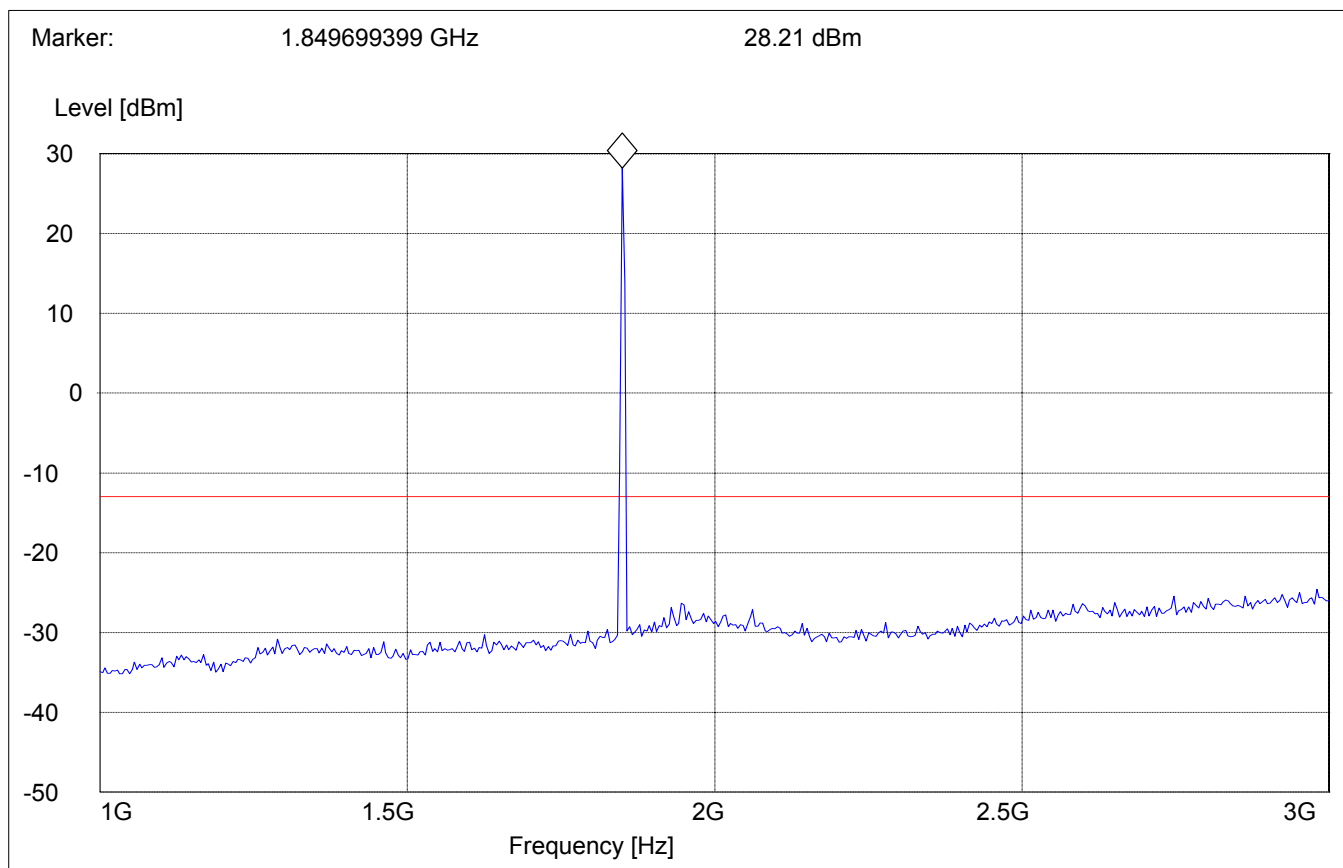
### Channel 512: 1GHz – 3GHz

Spurious emission limit –13dBm

**NOTE:** peak above the limit line is the Carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

#### SWEEP TABLE: "FCC Spuri 1-3G"

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
1GHz	3GHz	Max Peak	Coupled	1 MHz

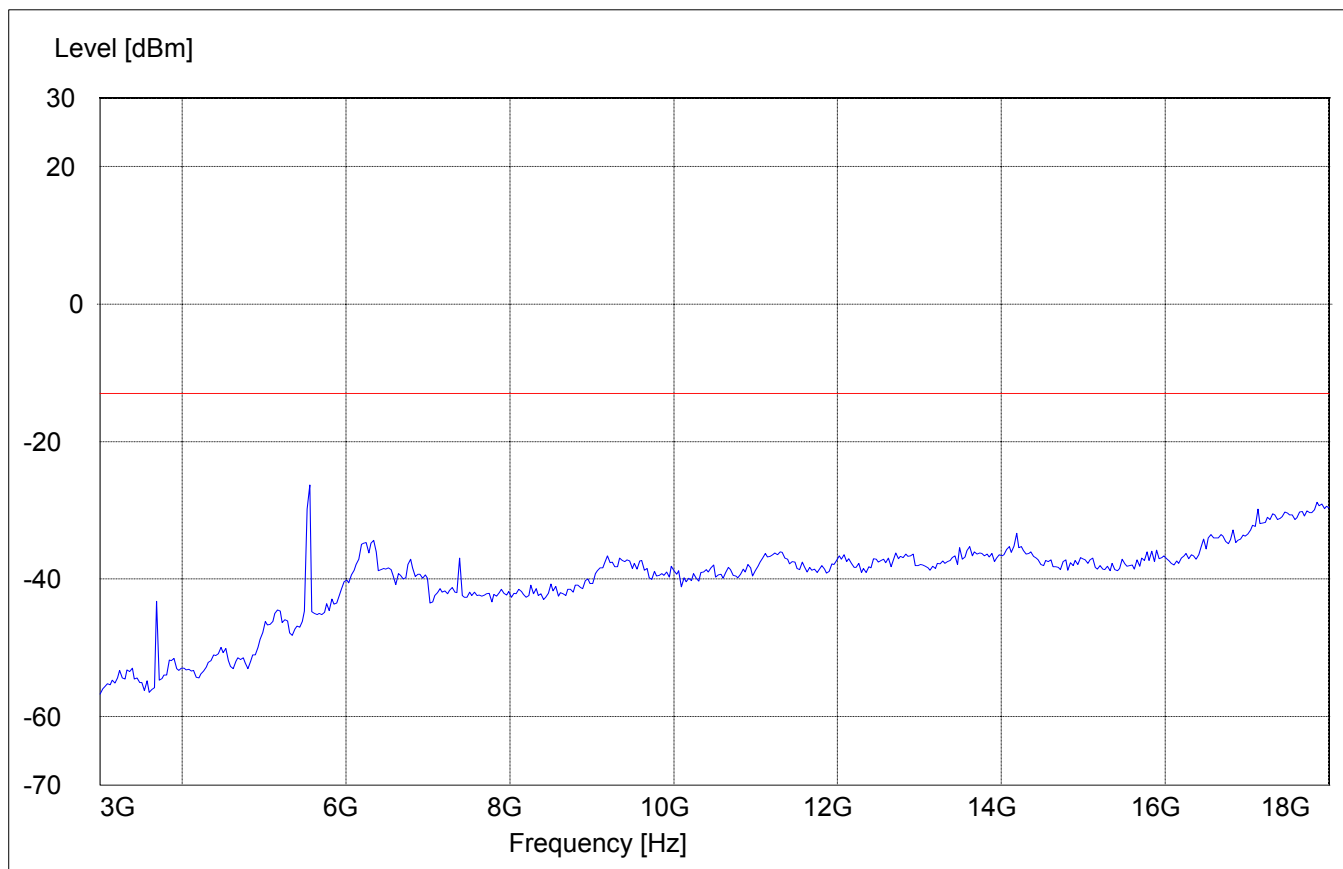


**RADIATED SPURIOUS EMISSIONS****Channel 512: 3GHz – 18GHz**

Spurious emission limit -13dBm

***SWEEP TABLE: "FCC Spuri 3-18G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
3GHz	18GHz	Max Peak	Coupled	1 MHz



## RADIATED SPURIOUS EMISSIONS

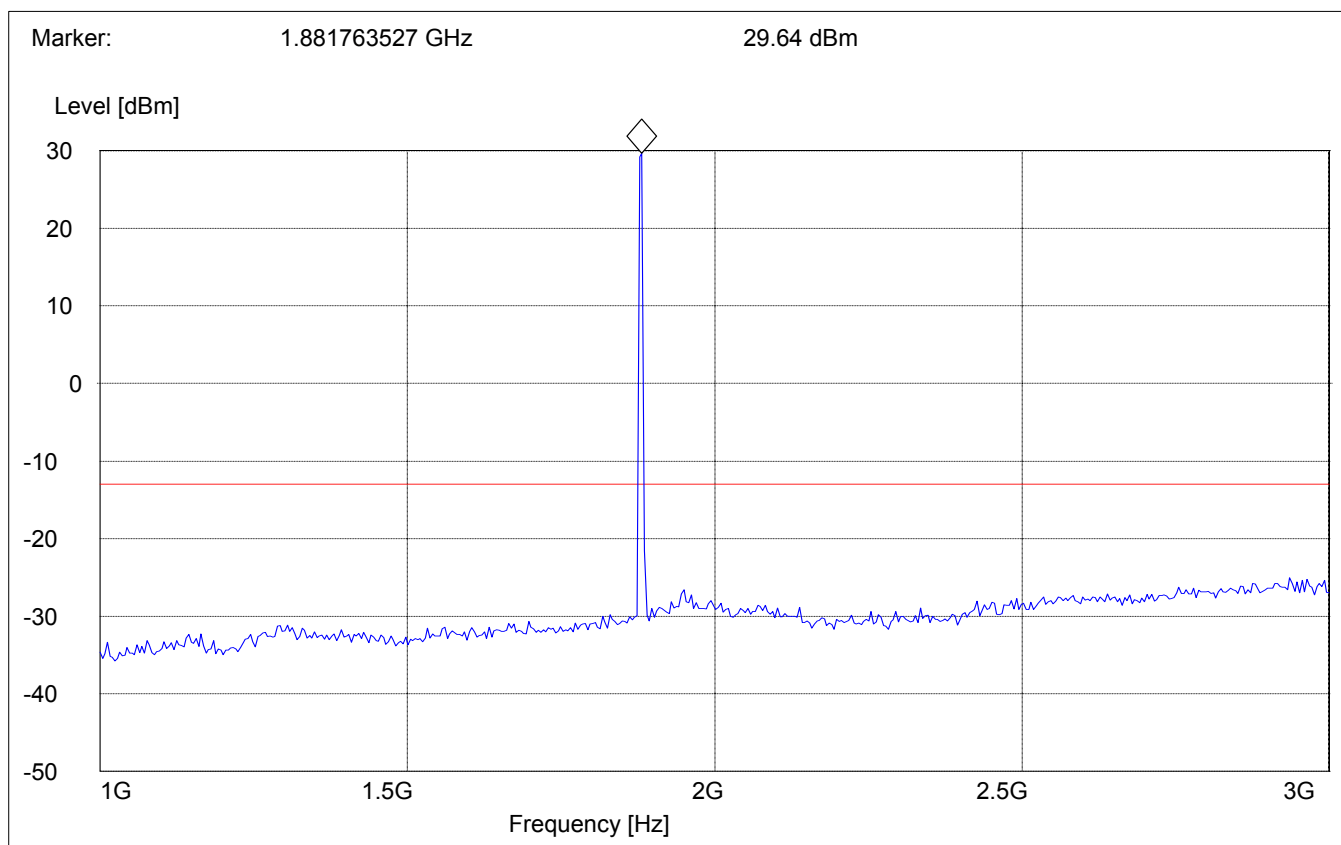
### Channel 661: 1GHz – 3GHz

Spurious emission limit –13dBm

**NOTE:** peak above the limit line is the Carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

#### ***SWEEP TABLE: "FCC Spuri 1-3G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
1GHz	3GHz	Max Peak	Coupled	1 MHz



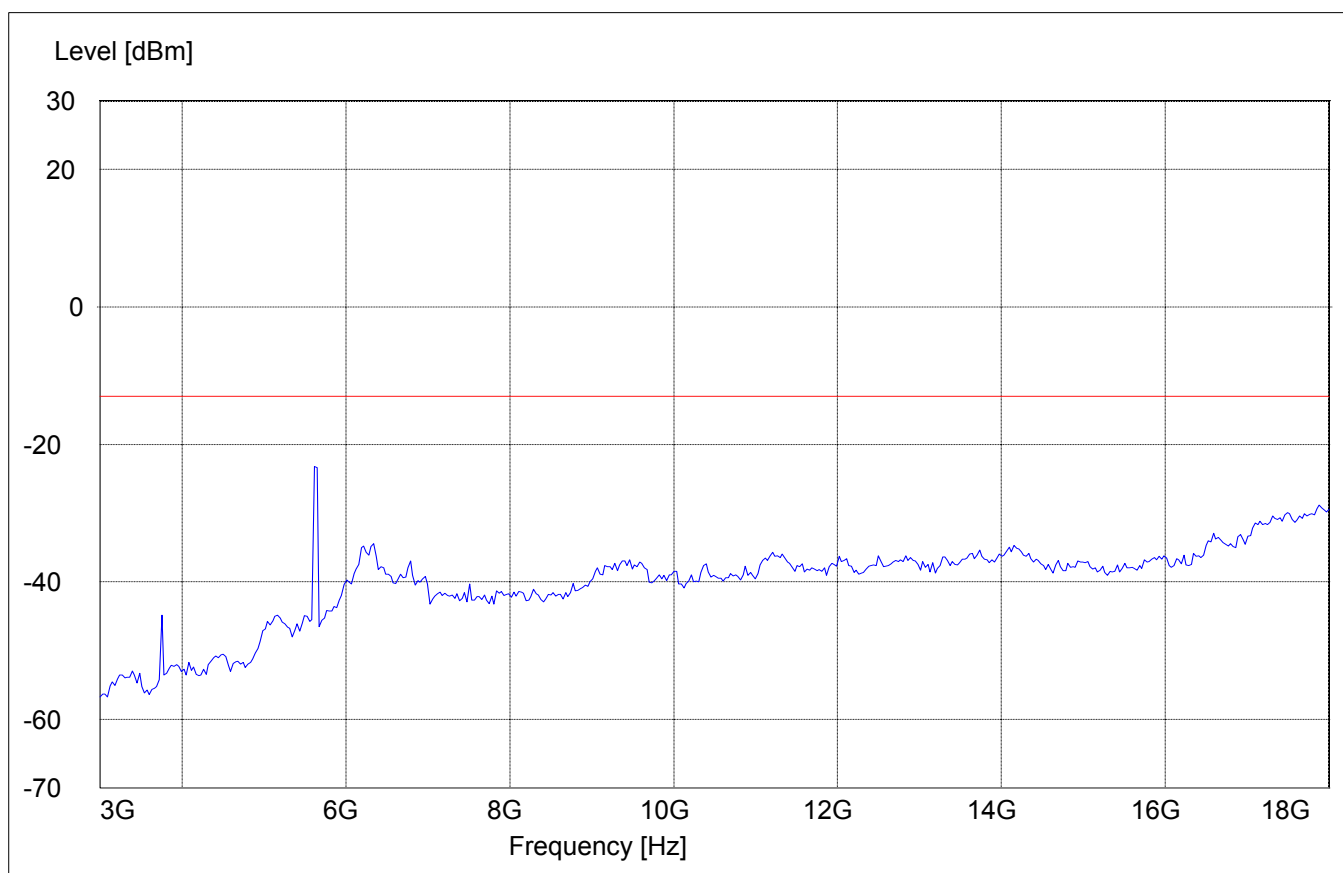
## RADIATED SPURIOUS EMISSIONS

### Channel 661: 3GHz – 18GHz

Spurious emission limit –13dBm

#### ***SWEEP TABLE: "FCC Spuri 3-18G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
3GHz	18GHz	Max Peak	Coupled	1 MHz



## RADIATED SPURIOUS EMISSIONS

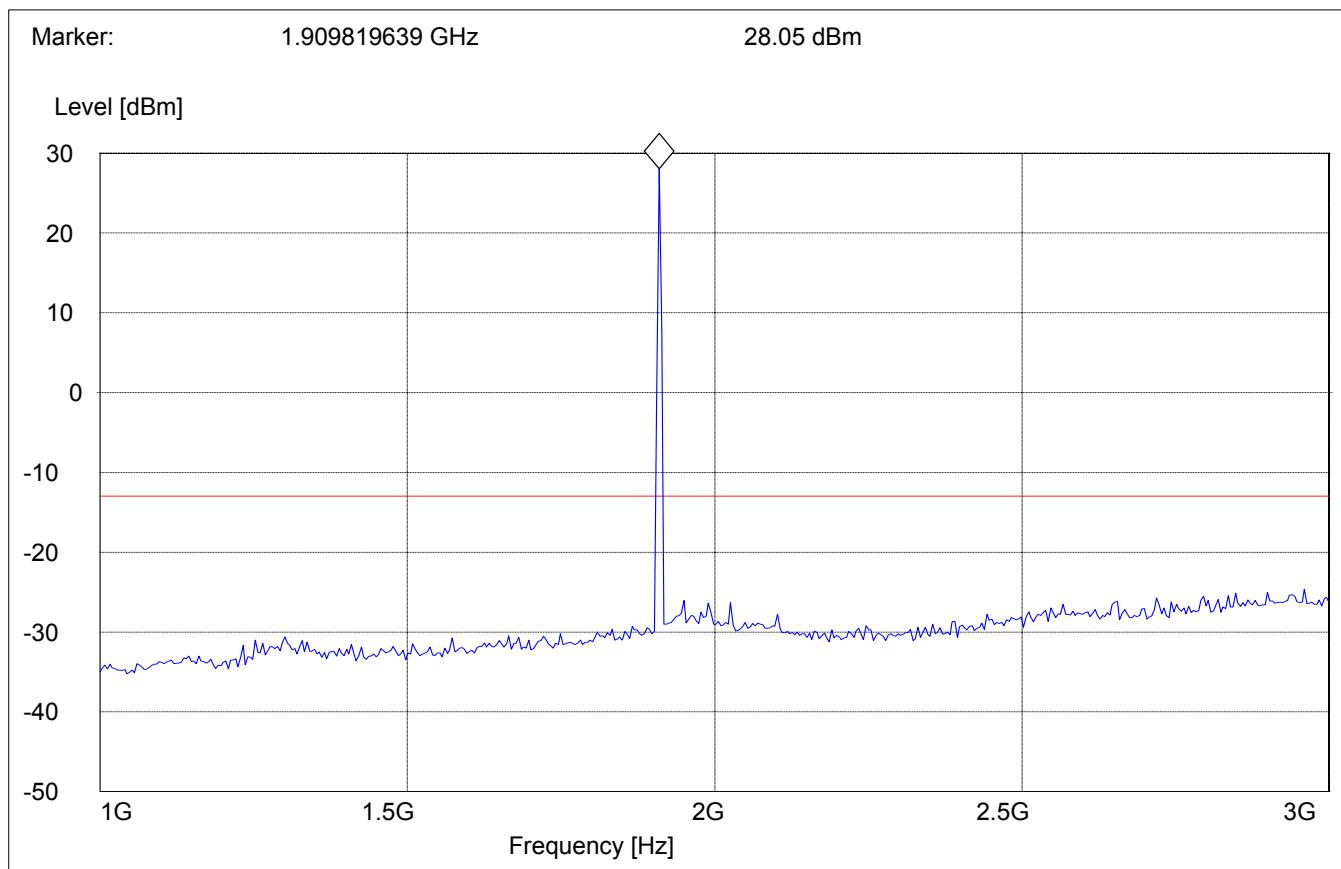
### Channel 810: 1GHz – 3GHz

Spurious emission limit –13dBm

**NOTE:** peak above the limit line is the Carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

#### ***SWEEP TABLE: "FCC Spuri 1-3G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
1GHz	3GHz	Max Peak	Coupled	1 MHz



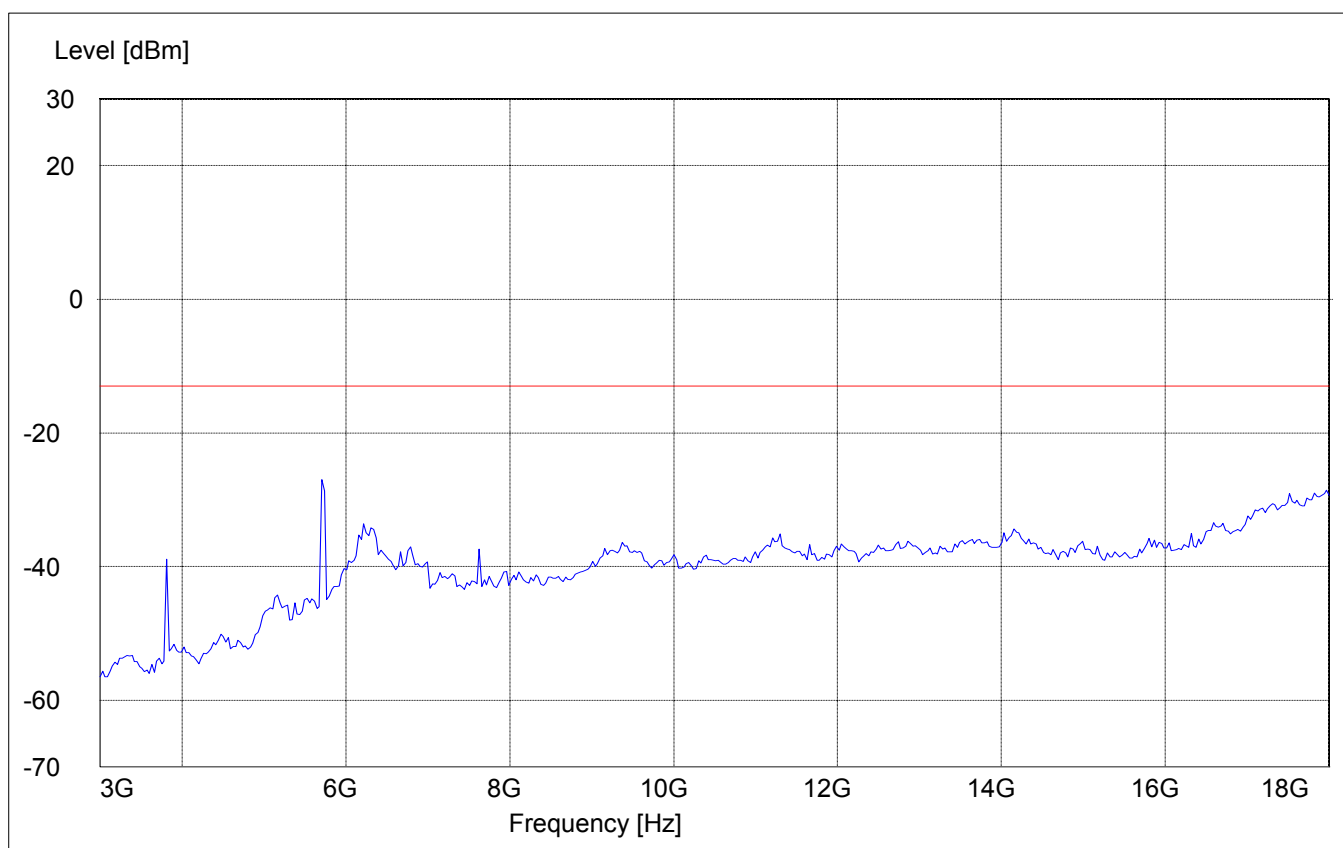
## RADIATED SPURIOUS EMISSIONS

### Channel 810: 3GHz – 18GHz

Spurious emission limit –13dBm

#### ***SWEEP TABLE: "FCC Spuri 3-18G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
3GHz	18GHz	Max Peak	Coupled	1 MHz

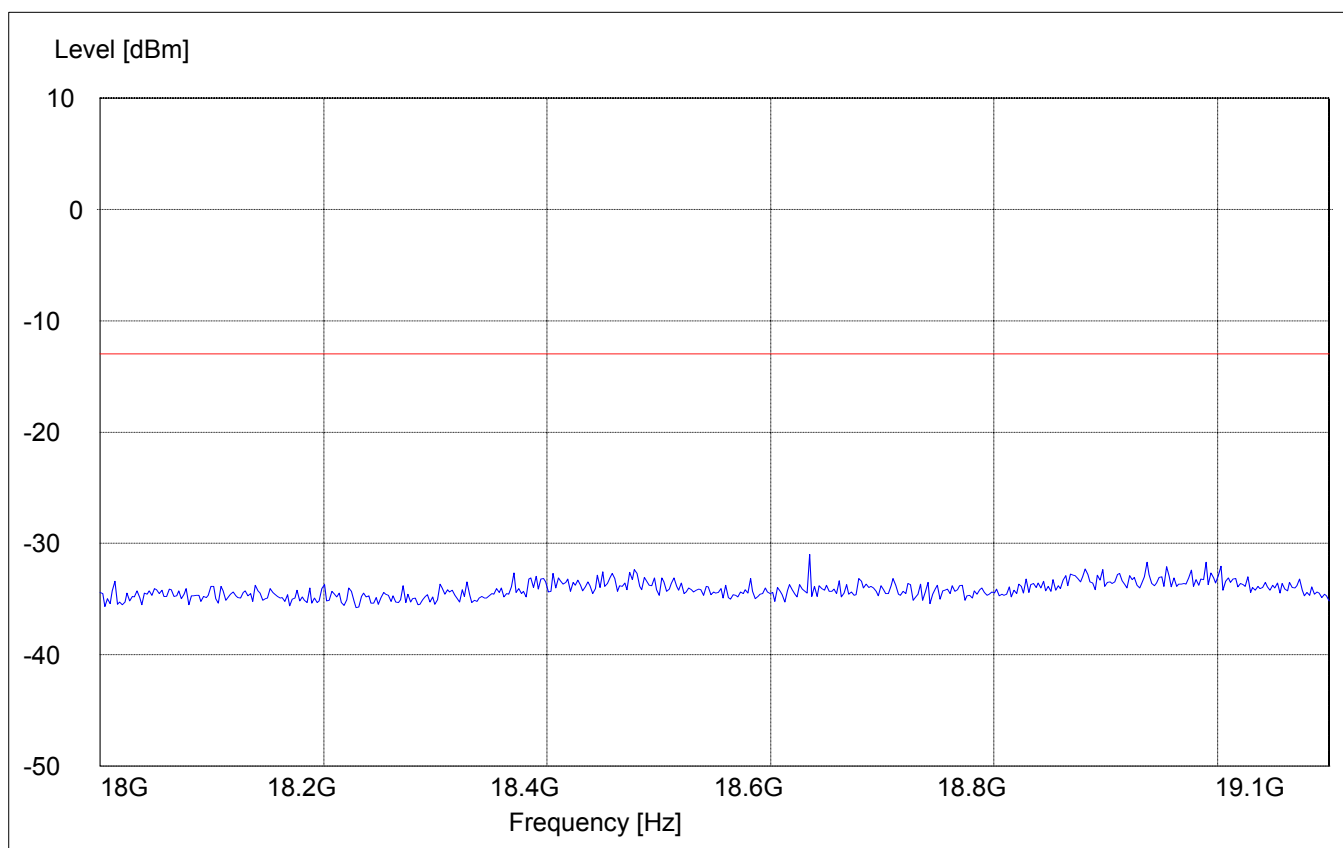


**RADIATED SPURIOUS EMISSIONS****18GHz – 19.1GHz**

Spurious emission limit –13dBm

**Note: This plot is valid for low, mid & high channels (worst-case plot)*****SWEEP TABLE: "FCC 24 spuri 18-19.1G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
18GHz	19.1GHz	Max Peak	Coupled	1 MHz



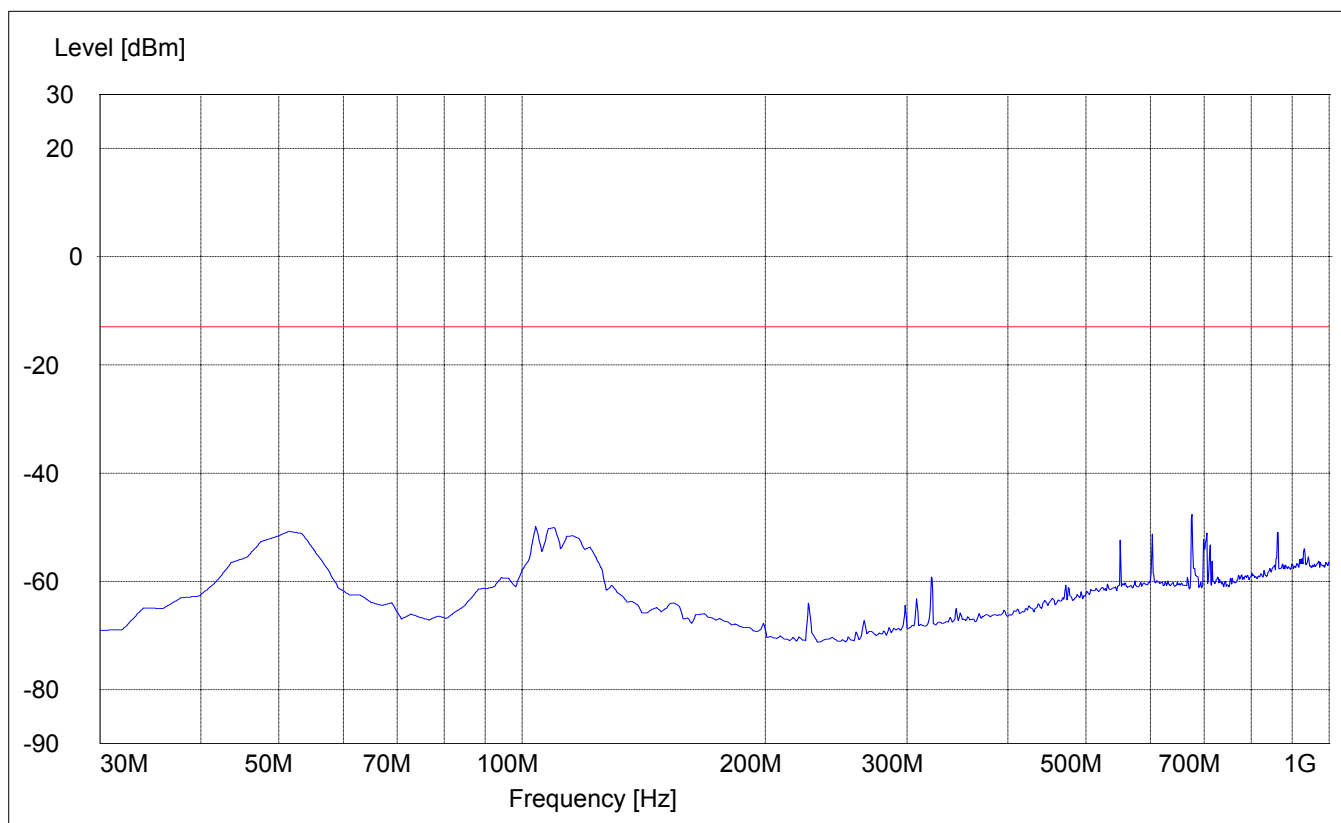


**RADIATED SPURIOUS EMISSIONS****EUT in Idle Mode: 30MHz – 1GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 24 Spur 30M-1G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
30MHz	1GHz	Max Peak	Coupled	1 MHz



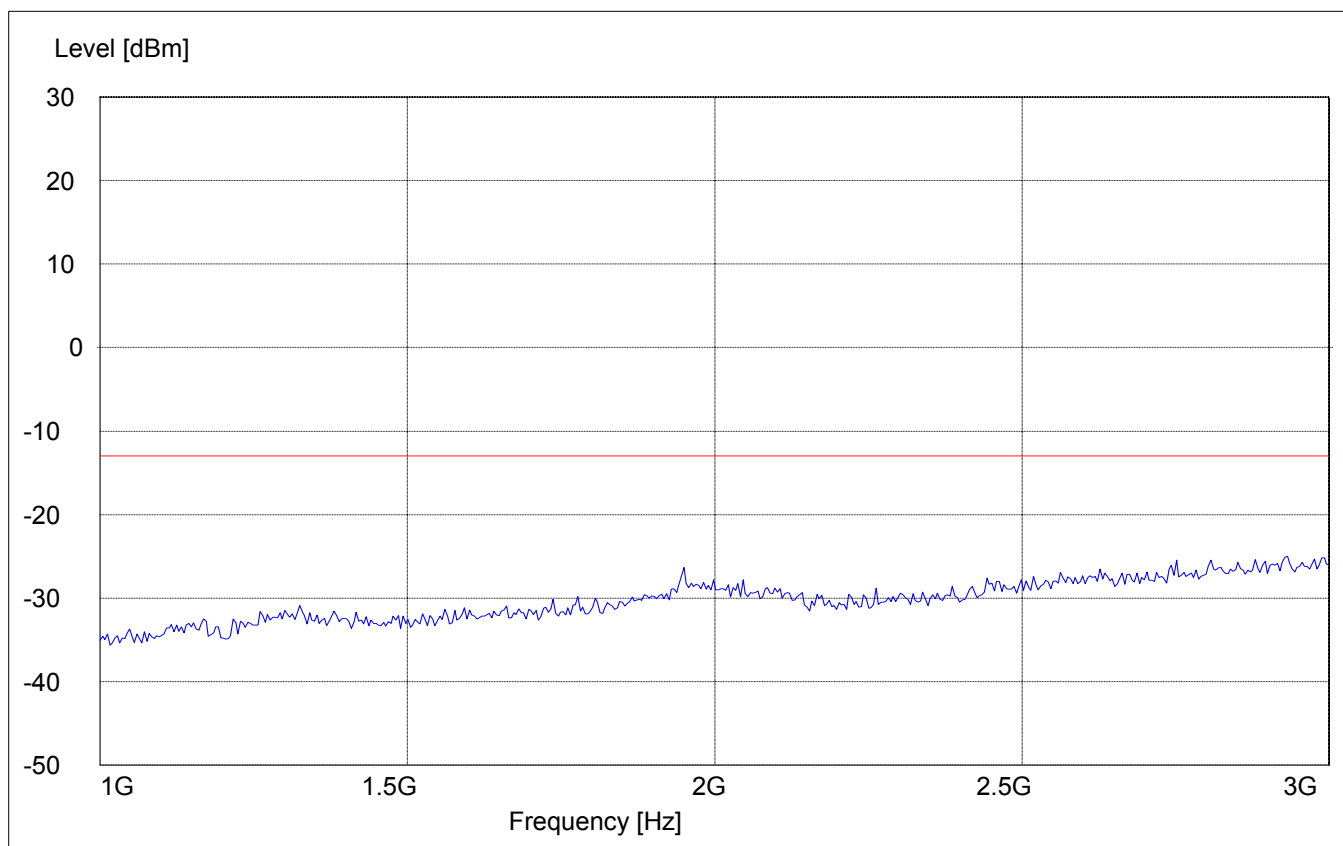
## RADIATED SPURIOUS EMISSIONS

### EUT in Idle Mode: 1GHz – 3GHz

Spurious emission limit –13dBm

#### SWEEP TABLE: "FCC Spuri 1-3G"

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
1GHz	3GHz	Max Peak	Coupled	1 MHz



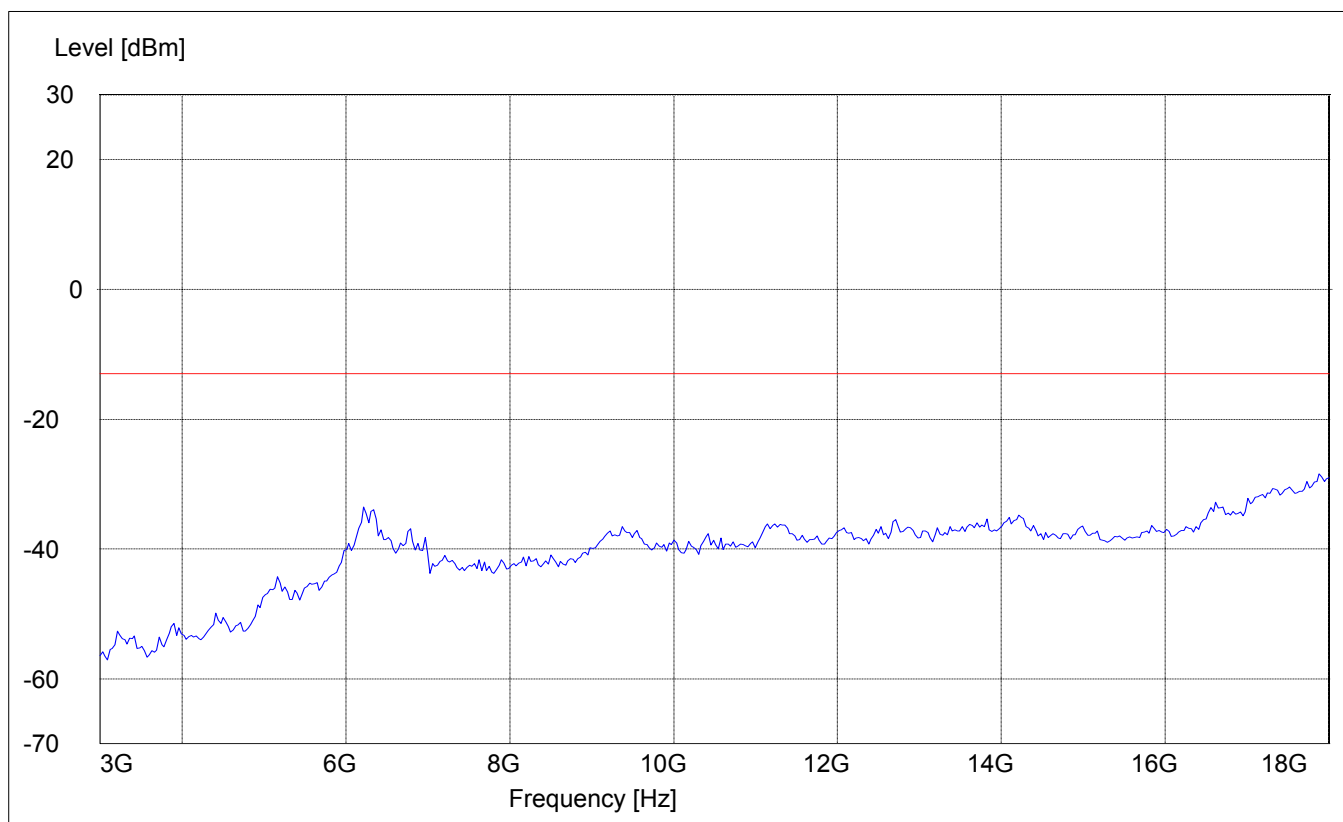
## RADIATED SPURIOUS EMISSIONS

### EUT in Idle Mode: 3GHz – 18GHz

Spurious emission limit –13dBm

#### ***SWEEP TABLE: "FCC 24 spuri 3-18G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
3GHz	18GHz	Max Peak	Coupled	1 MHz

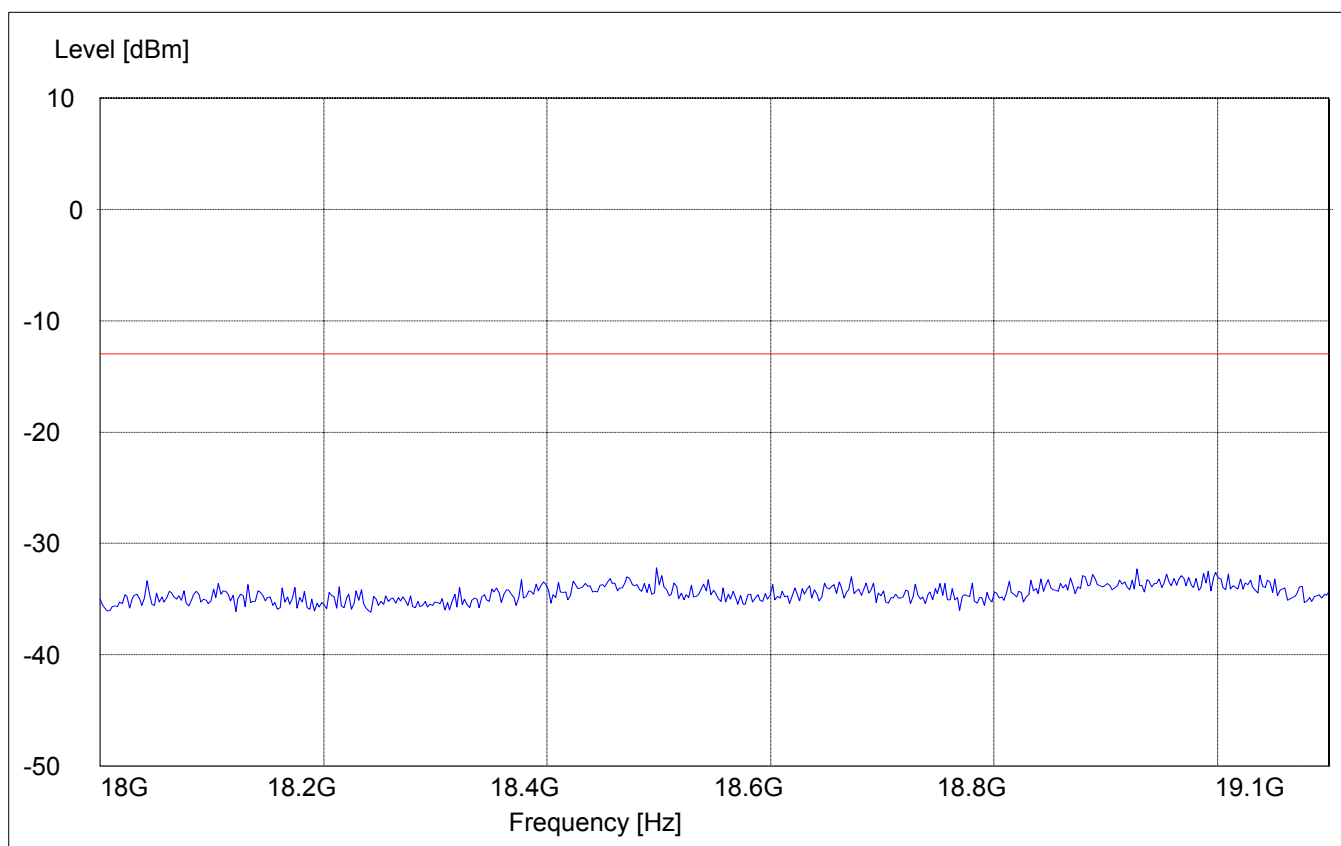


**RADIATED SPURIOUS EMISSIONS****EUT in Idle Mode: 18GHz – 19.1GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 24 spuri 18-19.1G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
18GHz	19.1GHz	Max Peak	Coupled	1 MHz

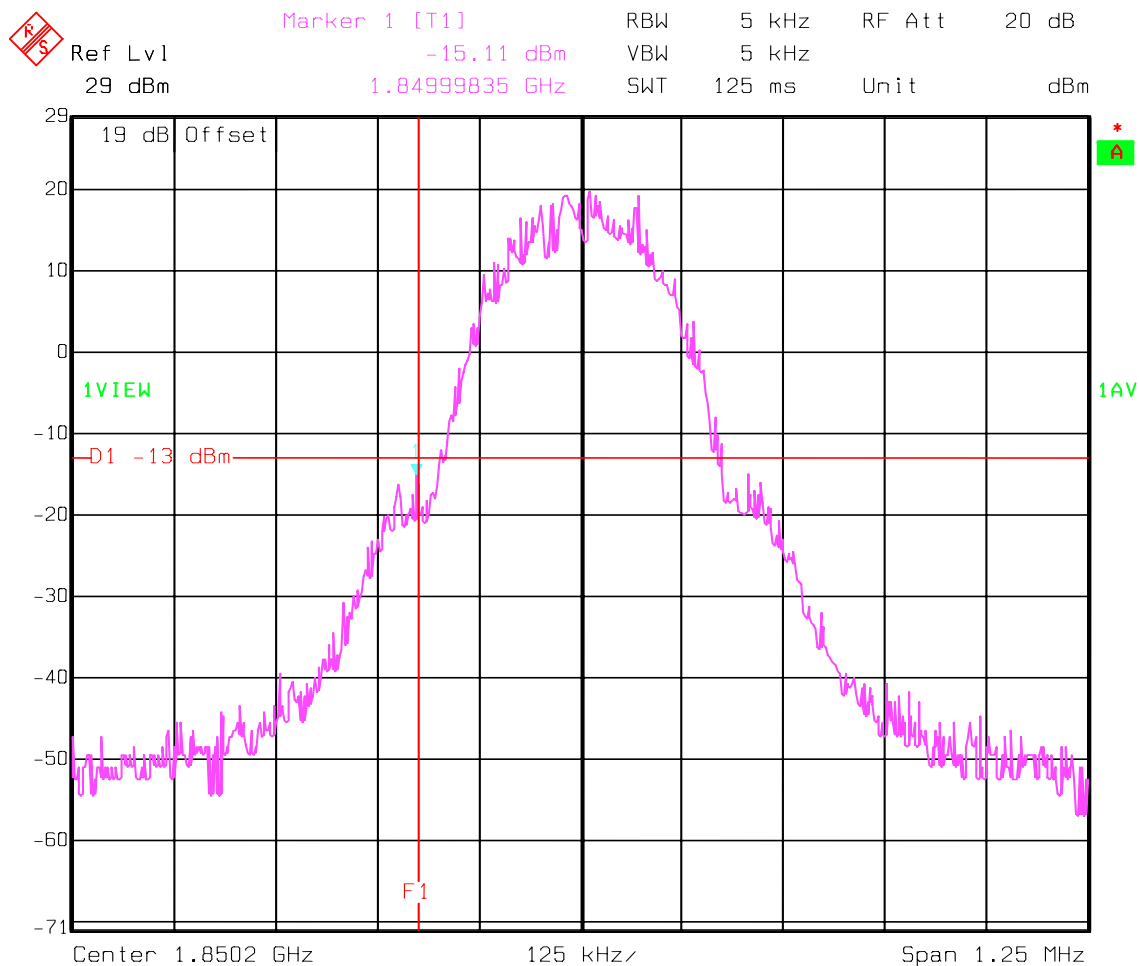


## BAND EDGE COMPLIANCE (Conducted)

§24.238(b)

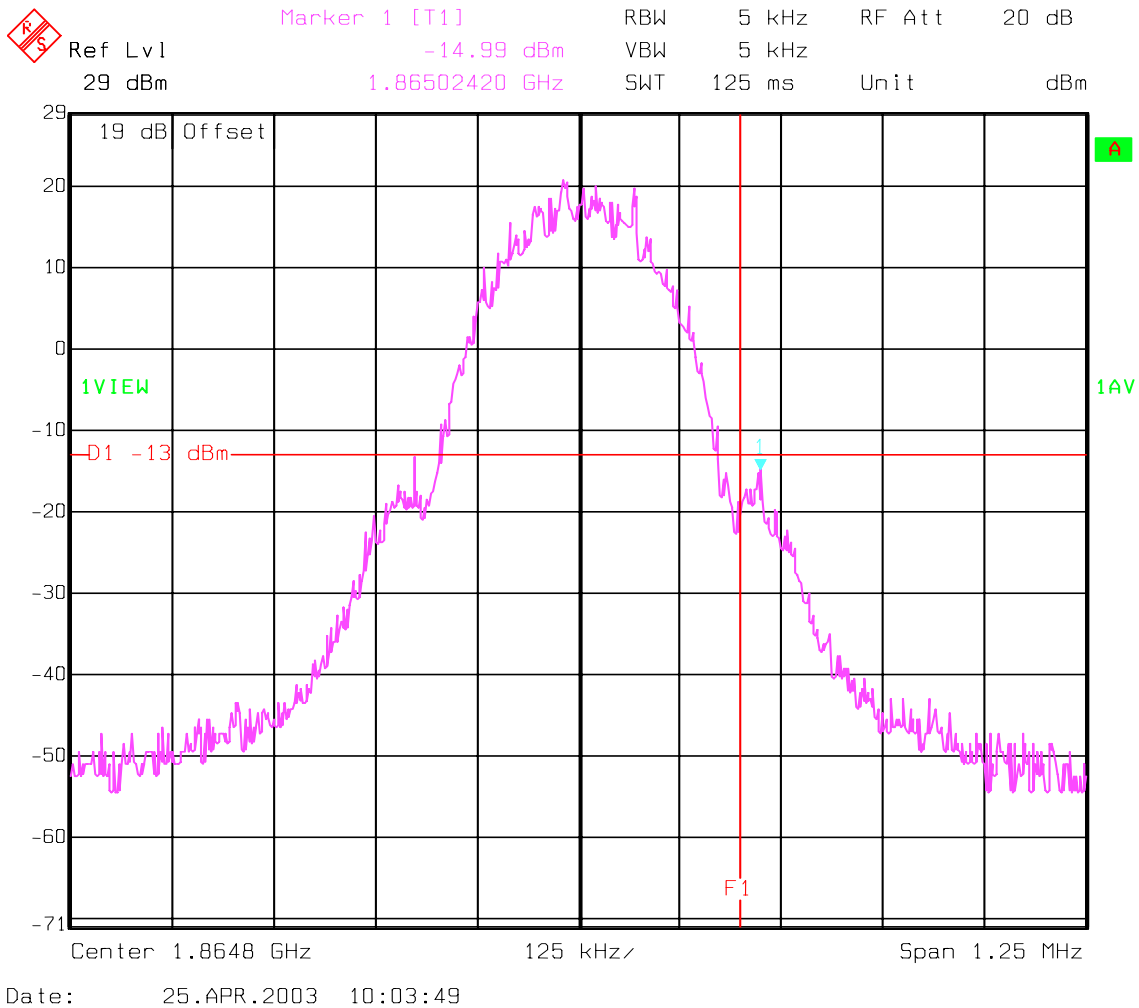
As per part 24.238(b), "1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed"  
For emission bandwidth of 314.62kHz, this equates to a resolution bandwidth of at least 3.5 kHz. For this testing, a resolution bandwidth 5.0 kHz was used.

## Lower Band Edge Block-A: (Conducted)

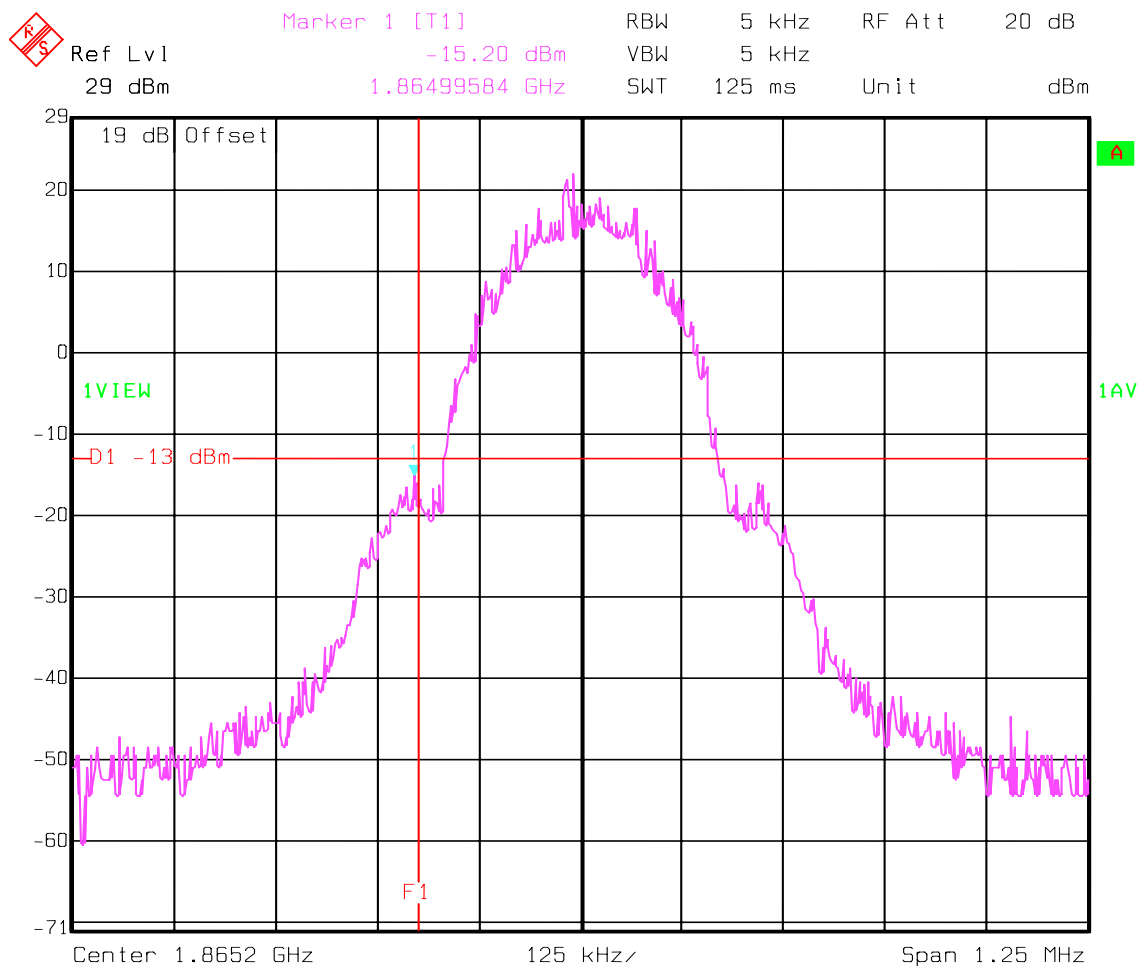


Date: 25.APR.2003 10:01:57

## Higher Band Edge Block-A: (Conducted)

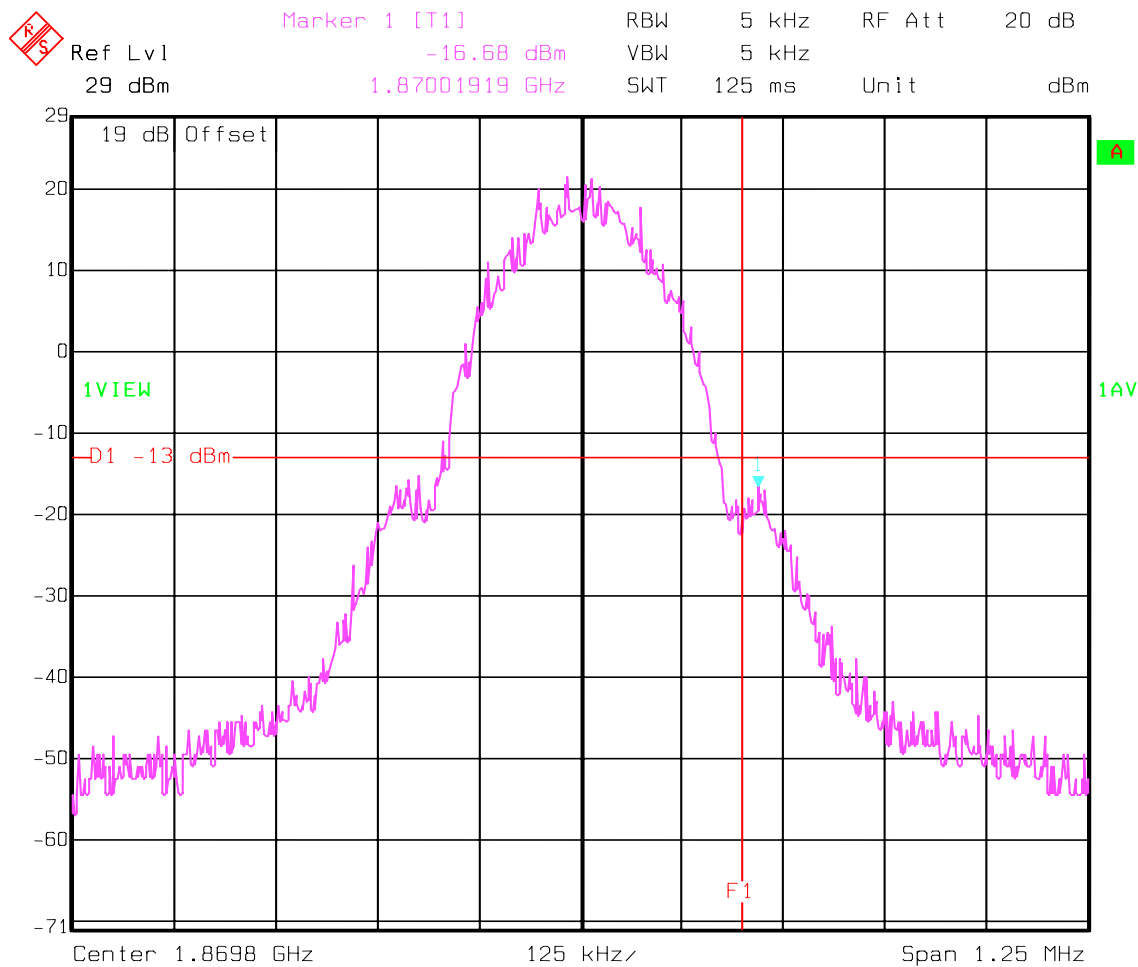


## Lower Band Edge Block-D: (Conducted)



Date: 25.APR.2003 10:05:36

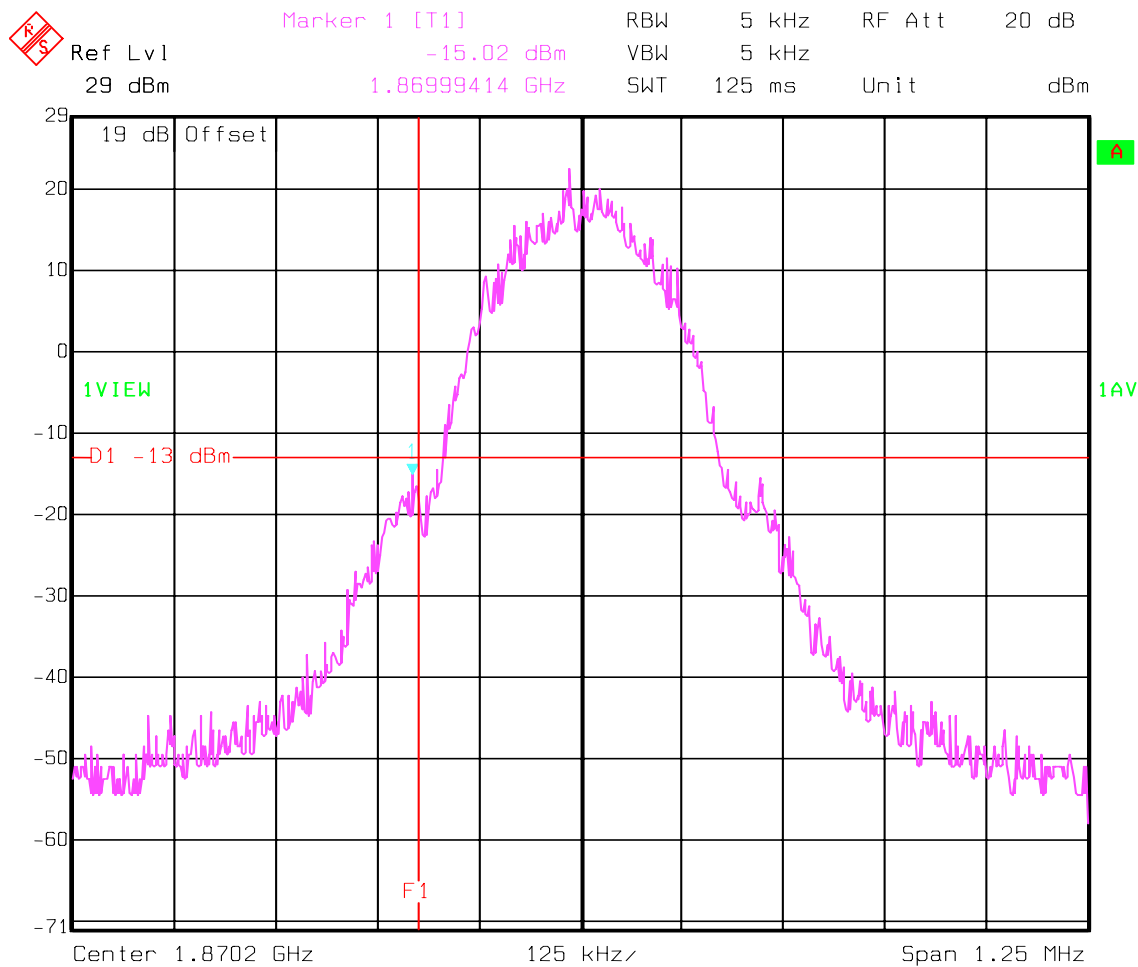
## Higher Band Edge Block-D: (Conducted)



Date: 25.APR.2003 10:07:04

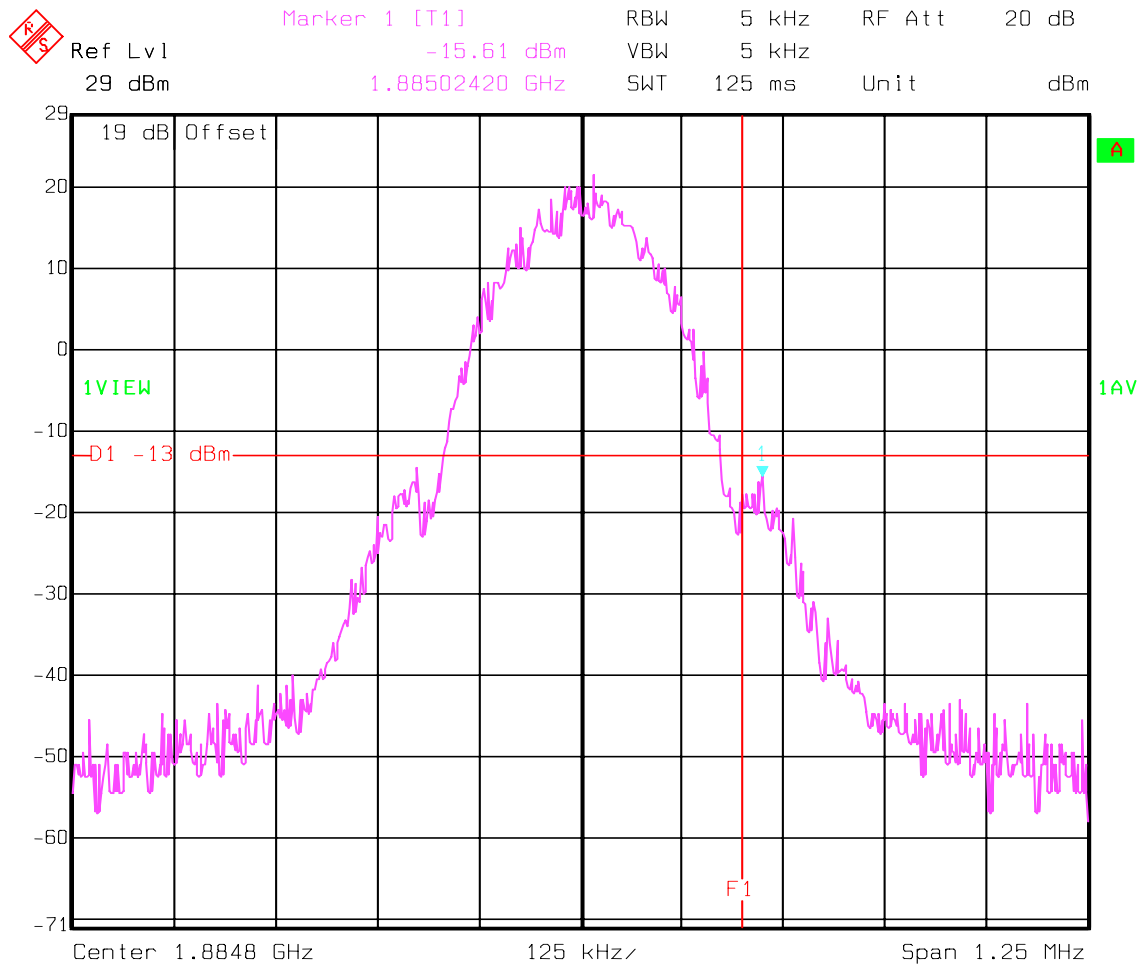


## Lower Band Edge Block-B: (Conducted)



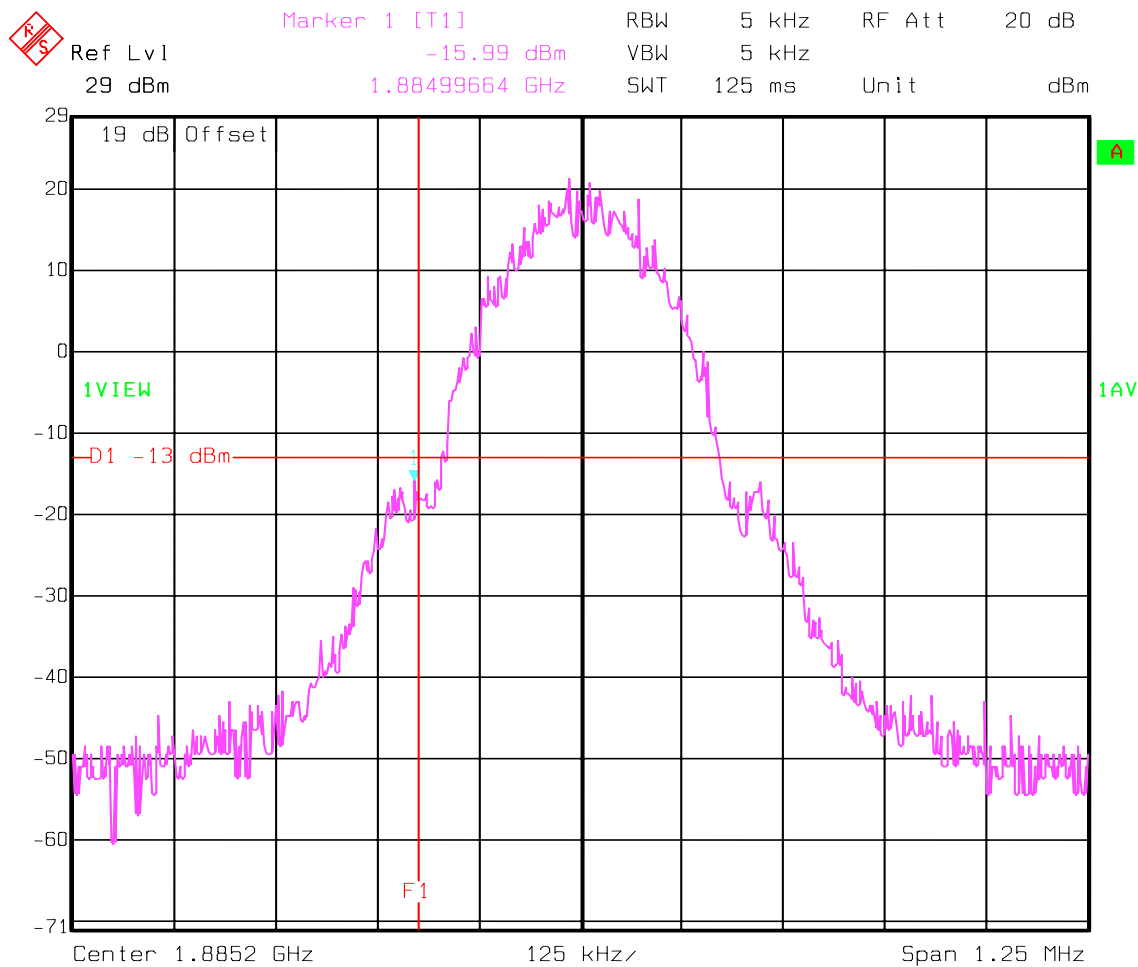
Date: 25.APR.2003 10:08:29

Higher Band Edge Block-B:  
(Conducted)



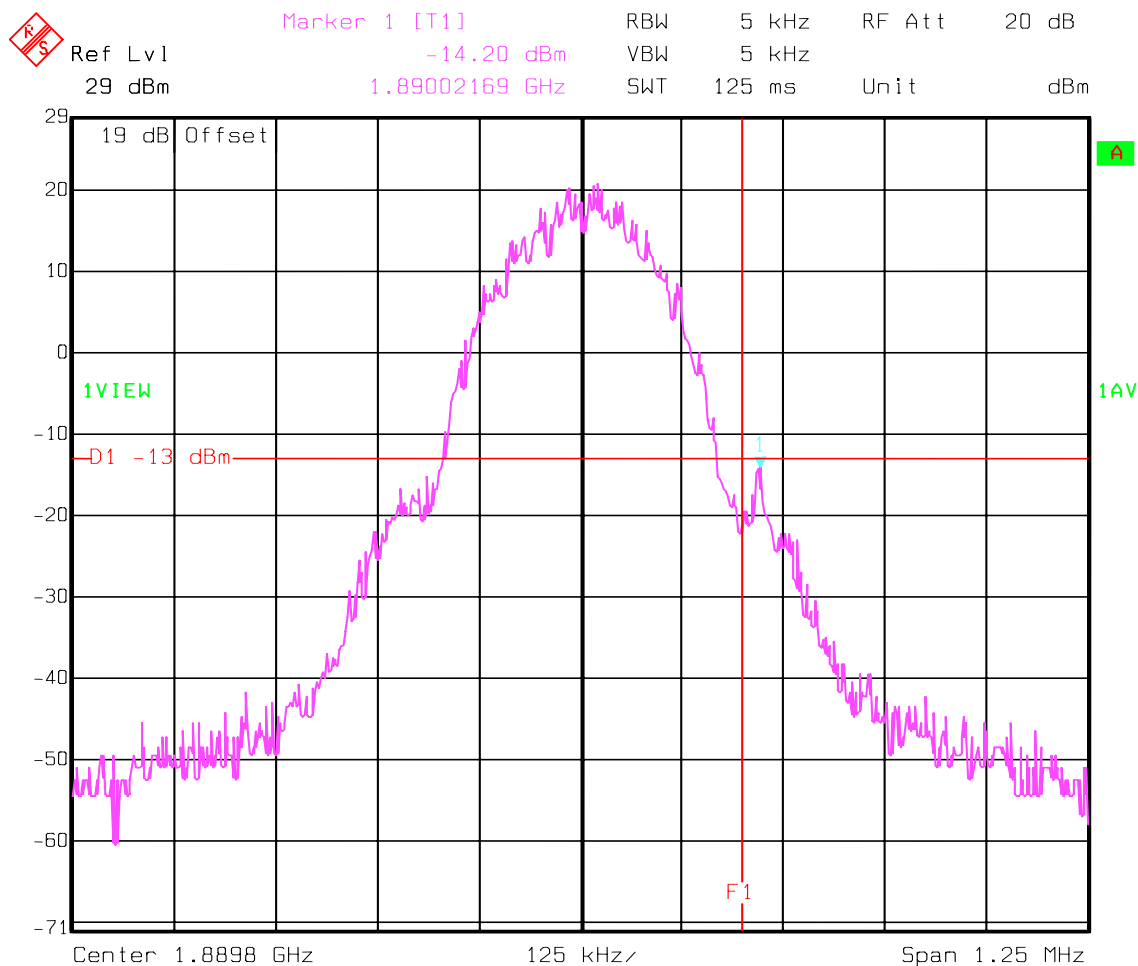
Date:      25.APR.2003    10:10:07

Lower Band Edge Block-E:  
(Conducted)



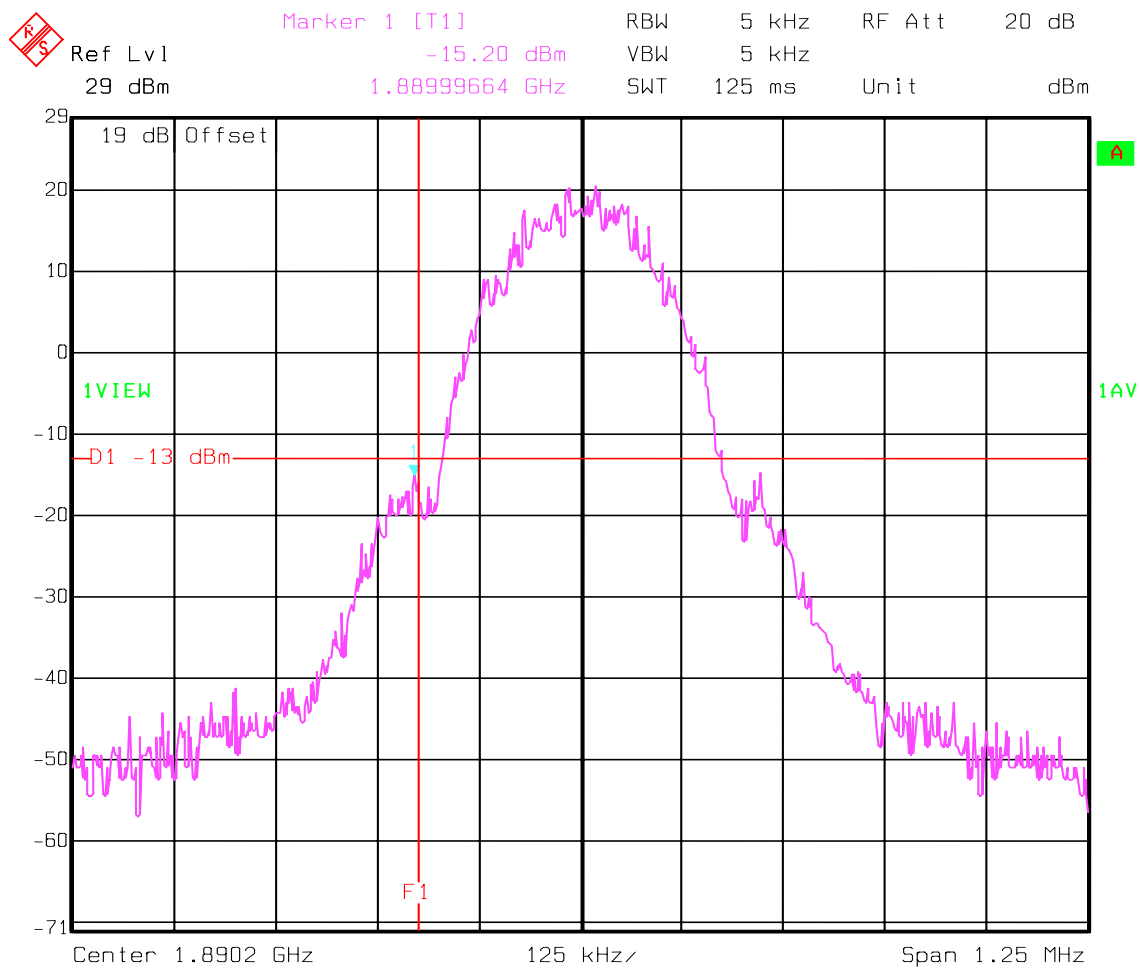
Date: 25.APR.2003 10:11:26

## Higher Band Edge Block-E: (Conducted)



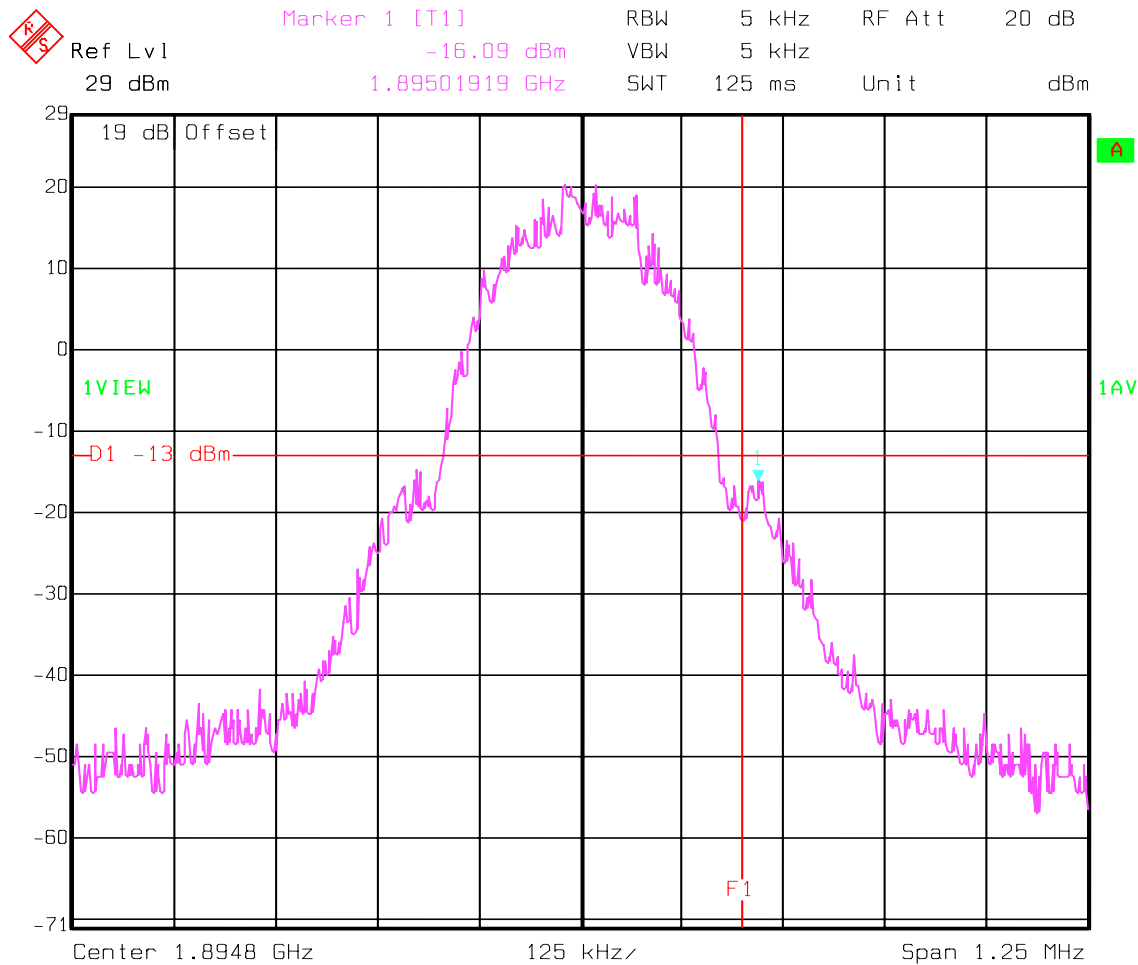
Date: 25.APR.2003 10:12:55

## Lower Band Edge Block-F: (Conducted)



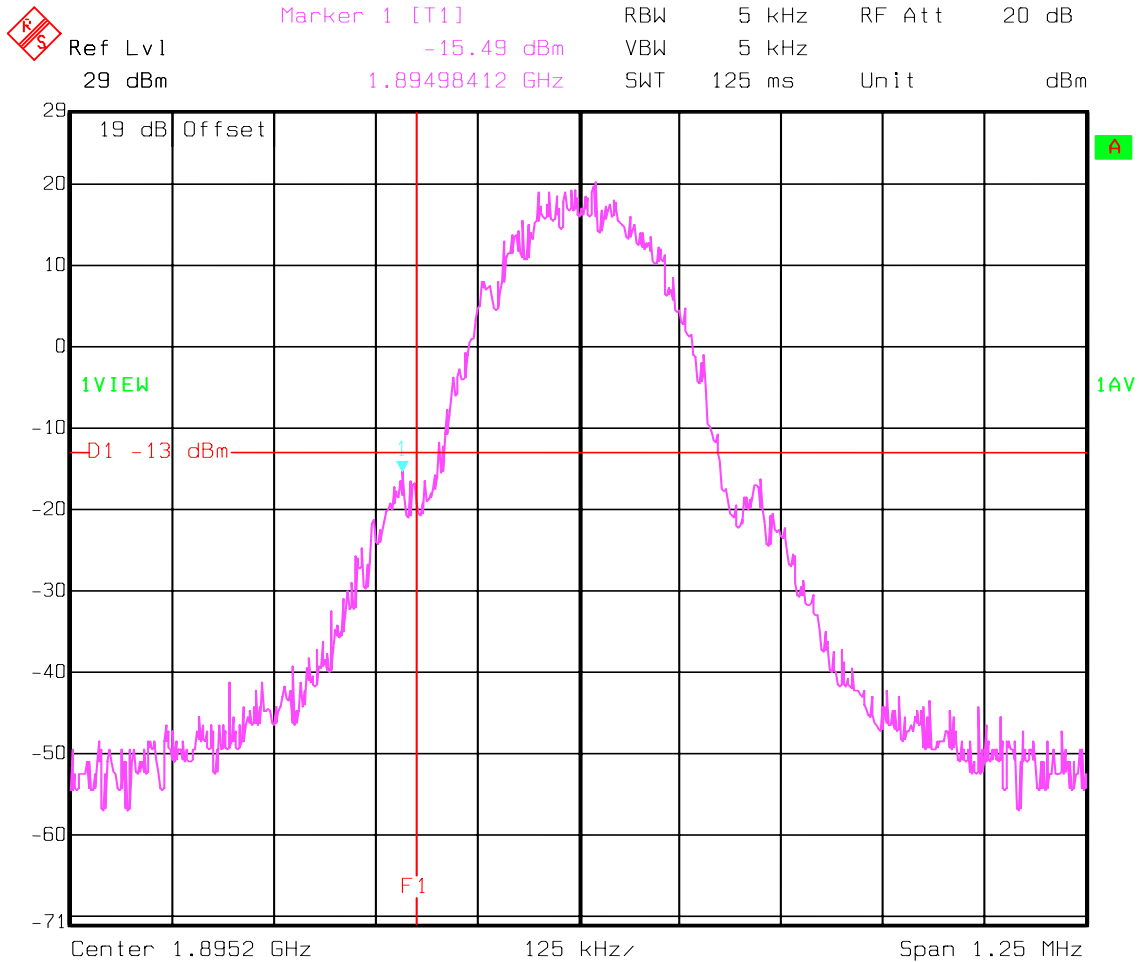
Date: 25.APR.2003 10:14:29

Higher Band Edge Block-F:  
(Conducted)



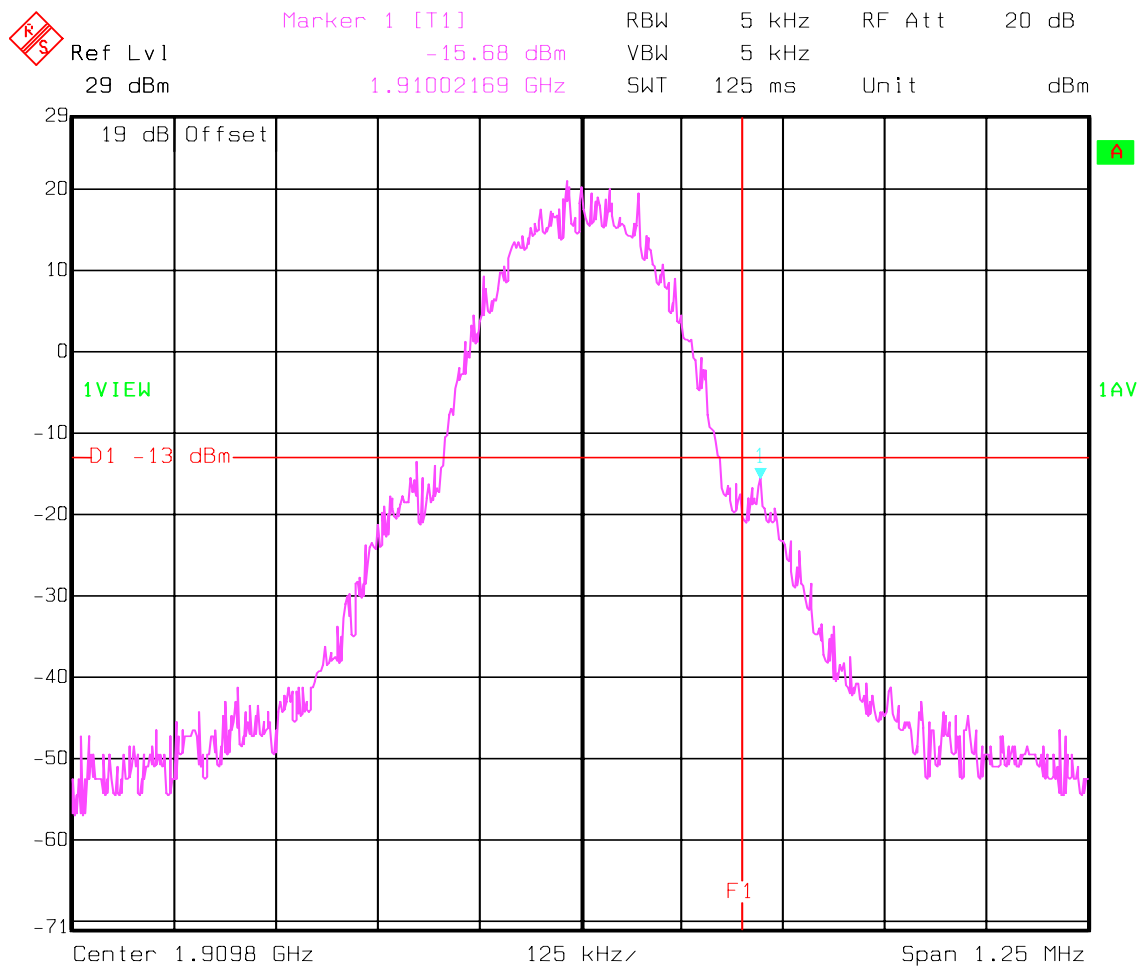
Date:      25.APR.2003    10:16:18

## Lower Band Edge Block-C: (Conducted)



Date: 25.APR.2003 10:17:53

## Higher Band Edge Block-C: (Conducted)



Date: 25.APR.2003 10:19:28



**RECEIVER RADIATED EMISSIONS****§ 15.209 / RSS-133****NOTE:**

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3GHz and 20GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements were done in peak mode unless specified with the plots.

**Limits****SUBCLAUSE § 15.209**

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

## RECEIVER RADIATED EMISSIONS

### EUT in Idle Mode: 30MHz – 1GHz

#### SWEEP TABLE: "FCC 24 Spur 30M-1G"

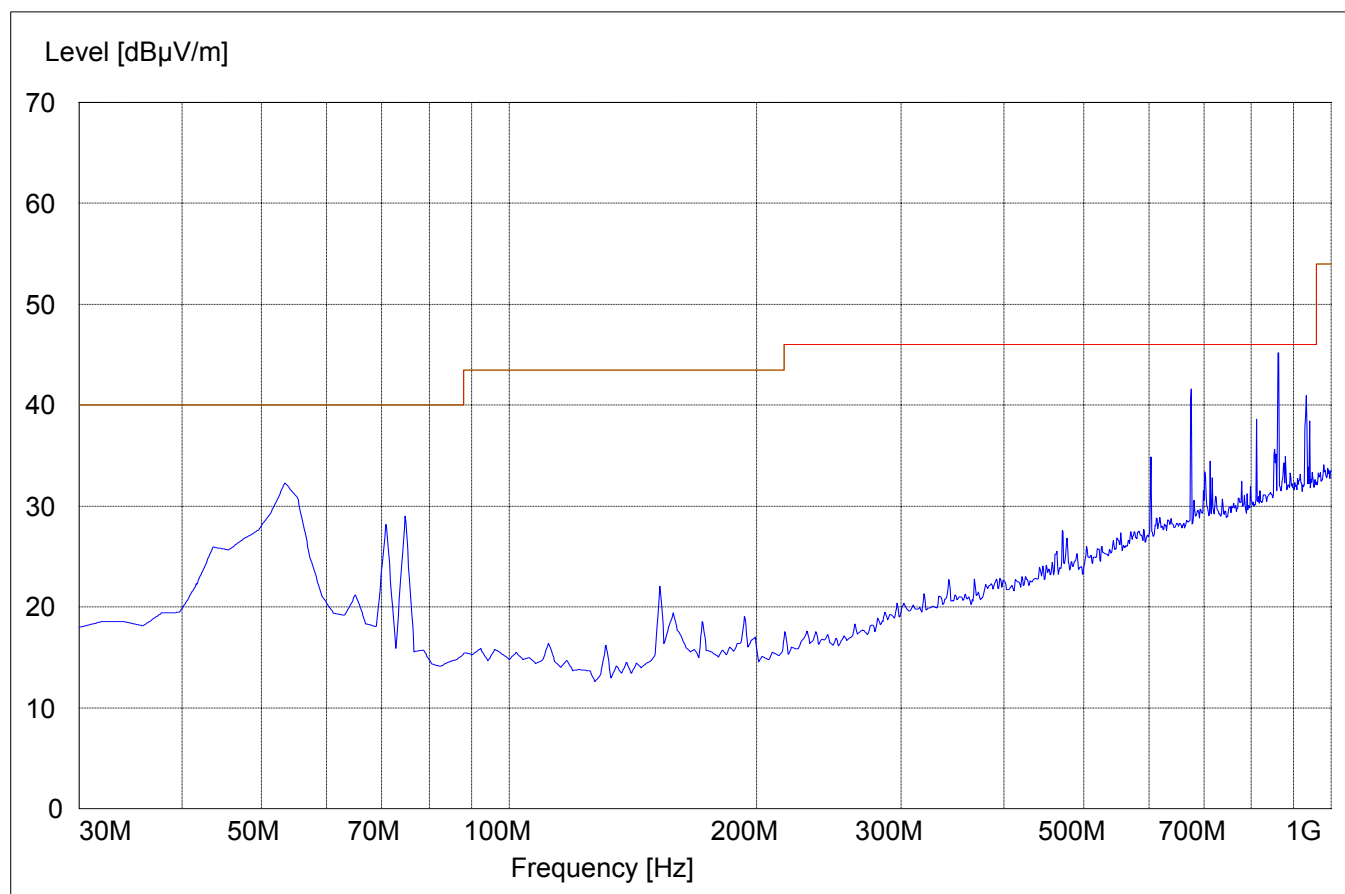
Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
30MHz	1GHz	Max Peak	Coupled	100KHz

**Note: Following peaks were identified as ambient signals due to a bad cable.**

**675.37MHz**

**863.92MHz**

**931.96MHz**

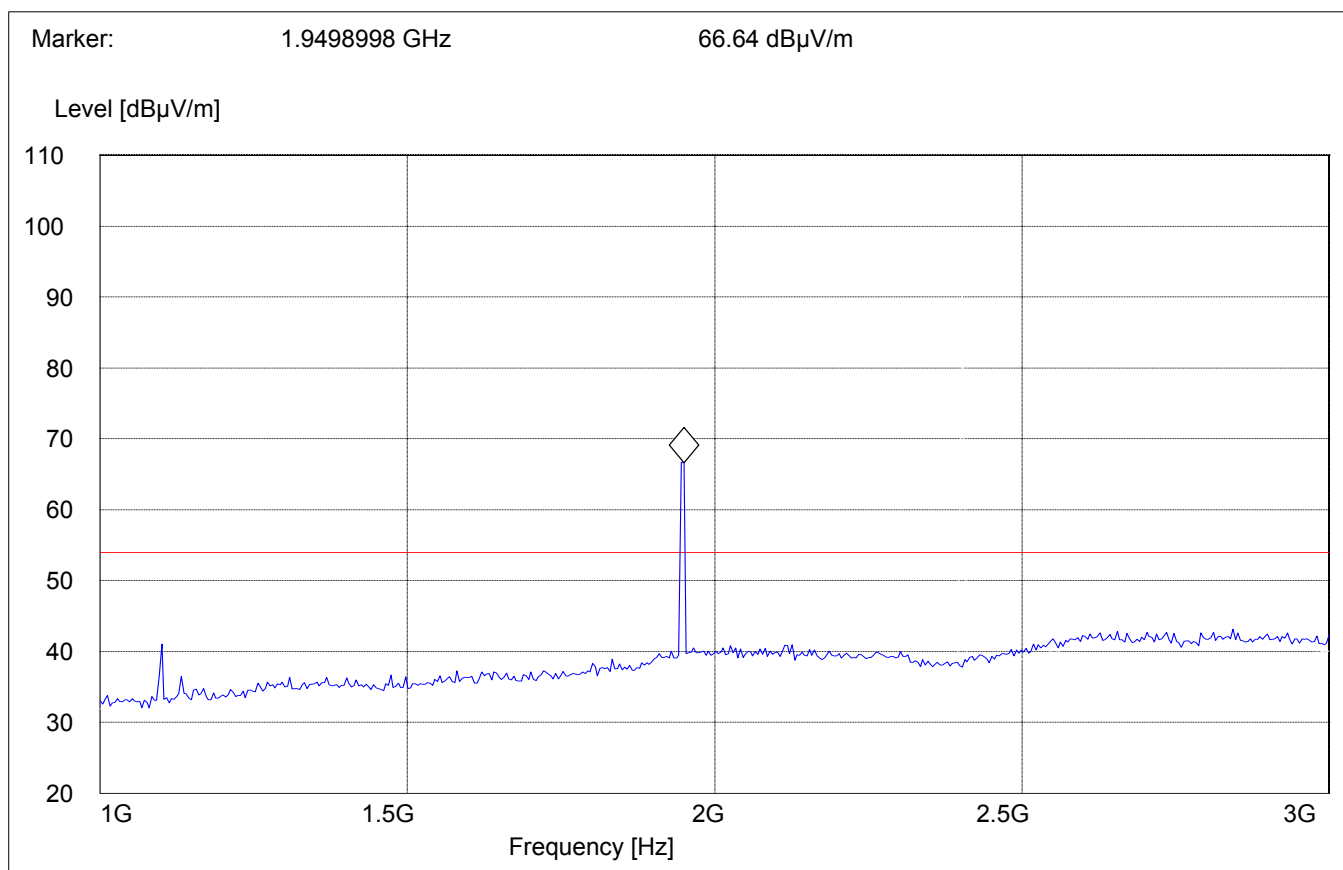


## RECEIVER RADIATED EMISSIONS EUT in Idle Mode: 1GHz – 3GHz

### *SWEEP TABLE: "FCC Spuri 1-3G"*

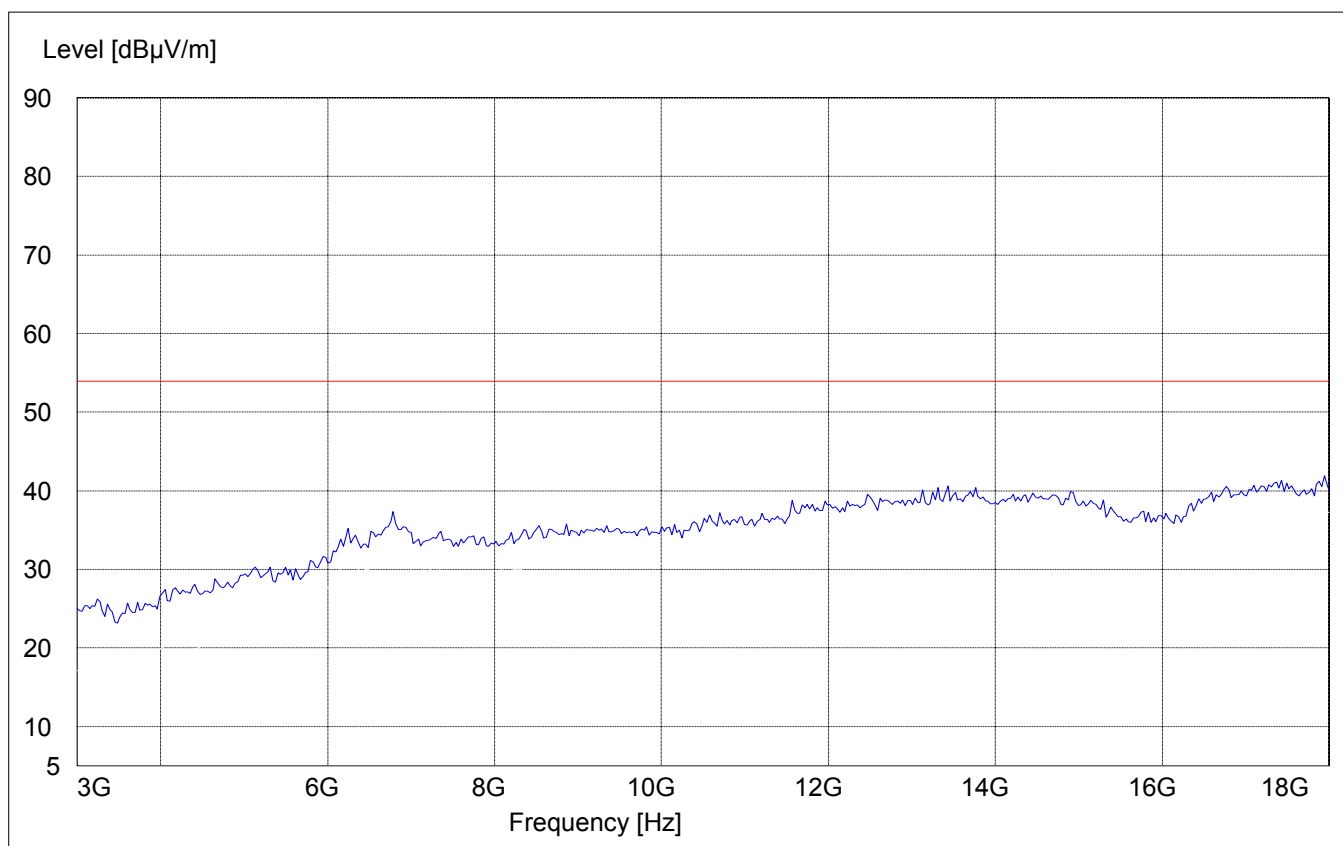
Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
1GHz	3GHz	Max Peak	Coupled	1 MHz

**Note:** The peak above the limit line is the downlink from the base station



**RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 3GHz – 18GHz*****SWEEP TABLE: "FCC 24 spuri 3-18G"***

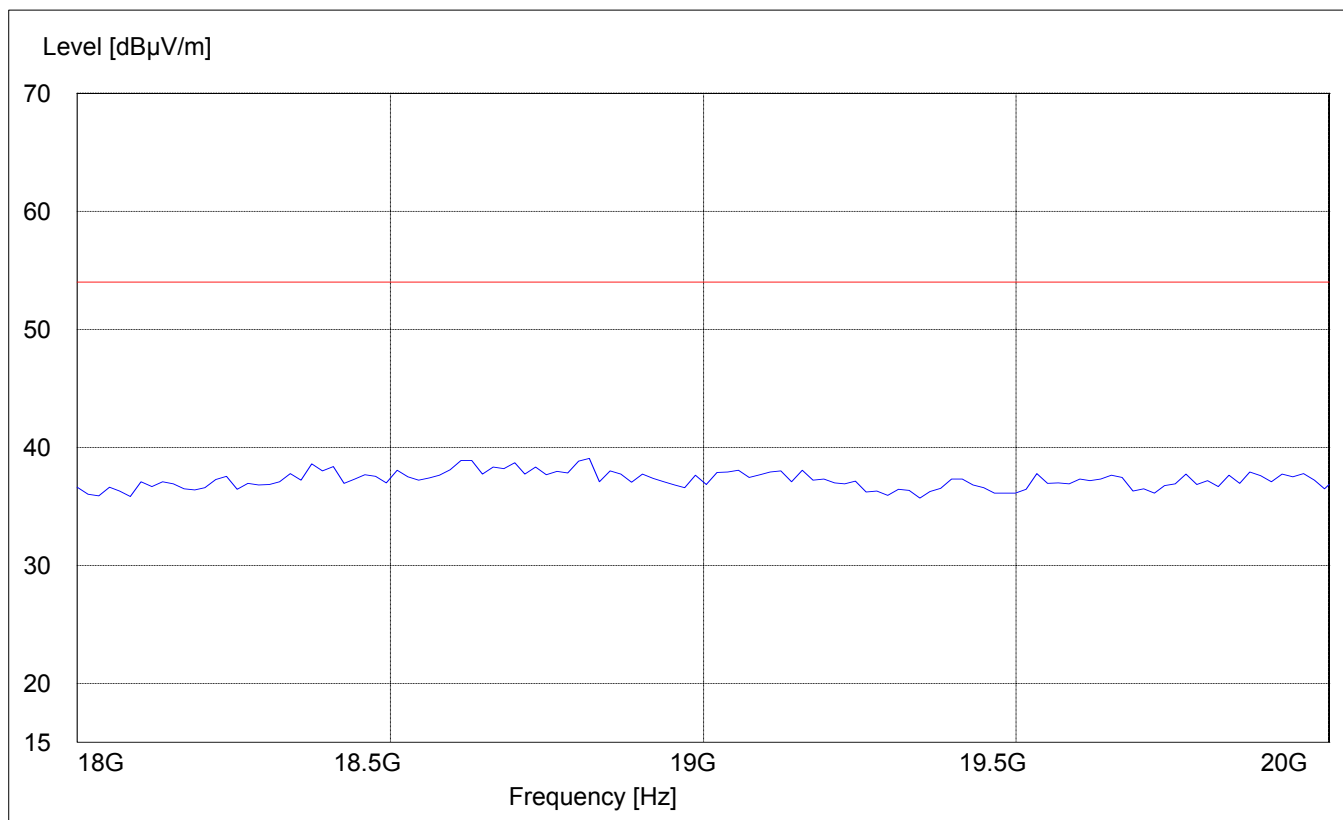
<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
3GHz	18GHz	Max Peak	Coupled	1 MHz



## RECEIVER RADIATED EMISSIONS EUT in Idle Mode: 18GHz – 20GHz

### ***SWEEP TABLE: "FCC 24 spuri 18-20G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
18GHz	20GHz	Max Peak	Coupled	1 MHz



<b>Harmonic</b>	<b>Tx ch. 512 Freq. (MHz)</b>	<b>Level (dBm)</b>	<b>Tx ch. 661 Freq. (MHz)</b>	<b>Level (dBm)</b>	<b>Tx ch. 810 Freq. (MHz)</b>	<b>Level (dBm)</b>
<b>2</b>	<b>3700.4</b>	nf	<b>3760</b>	nf	<b>3819.6</b>	nf
<b>3</b>	<b>5550.6</b>	nf	<b>5640</b>	nf	<b>5729.4</b>	nf
<b>4</b>	<b>7400.8</b>	nf	<b>7520</b>	nf	<b>7639.2</b>	nf
<b>5</b>	<b>9251</b>	nf	<b>9400</b>	nf	<b>9549</b>	nf
<b>6</b>	<b>11101.2</b>	nf	<b>11280</b>	nf	<b>11458.8</b>	nf
<b>7</b>	<b>12951.4</b>	nf	<b>13160</b>	nf	<b>13368.6</b>	nf
<b>8</b>	<b>14801.6</b>	nf	<b>15040</b>	nf	<b>15278.4</b>	nf
<b>9</b>	<b>16651.8</b>	nf	<b>16920</b>	nf	<b>17188.2</b>	nf
<b>10</b>	<b>18502</b>	nf	<b>18800</b>	nf	<b>19098</b>	nf

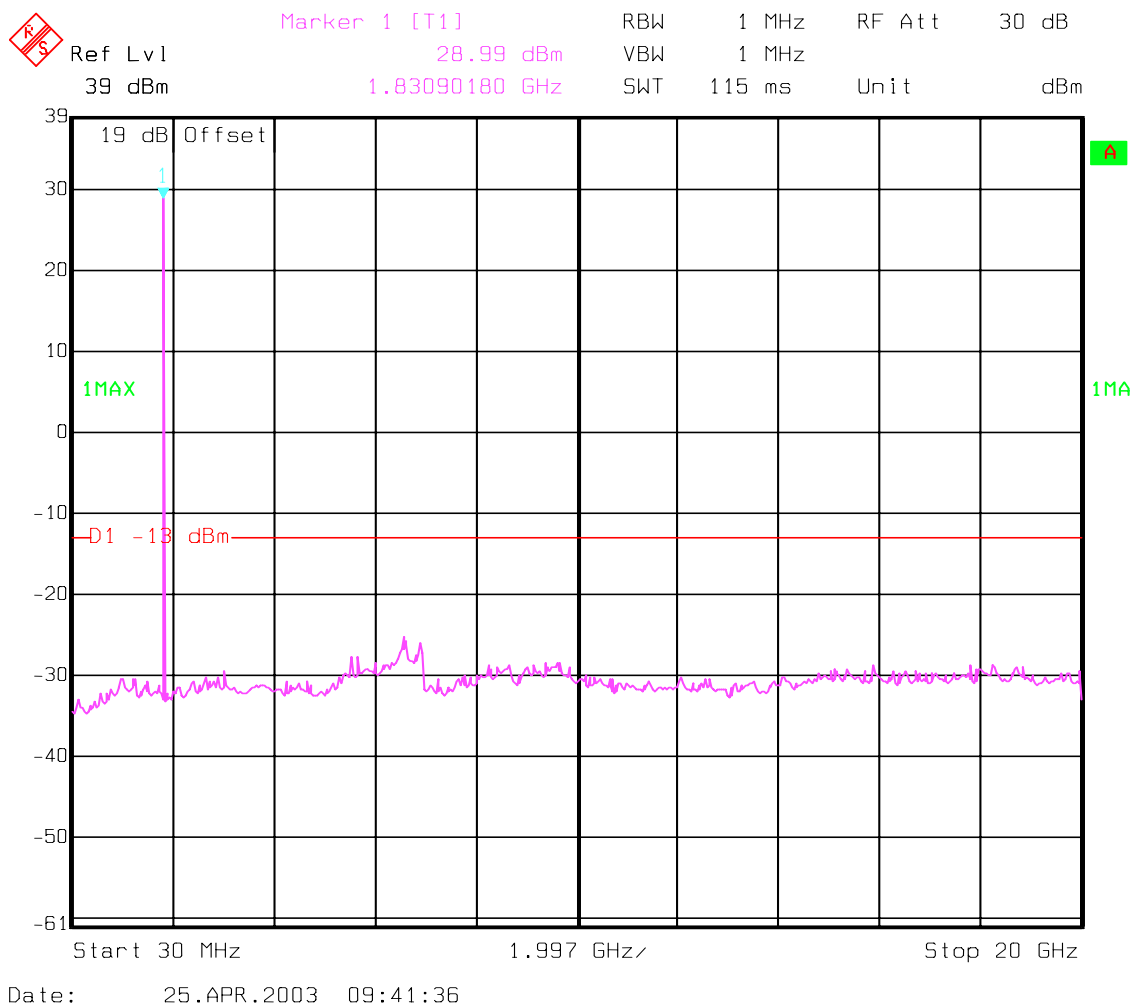
nf = noise floor

## CONDUCTED SPURIOUS EMISSIONS

Channel 512: 30MHz – 20GHz

Spurious emission limit –13dBm

NOTE: peak above the limit line is the carrier frequency.

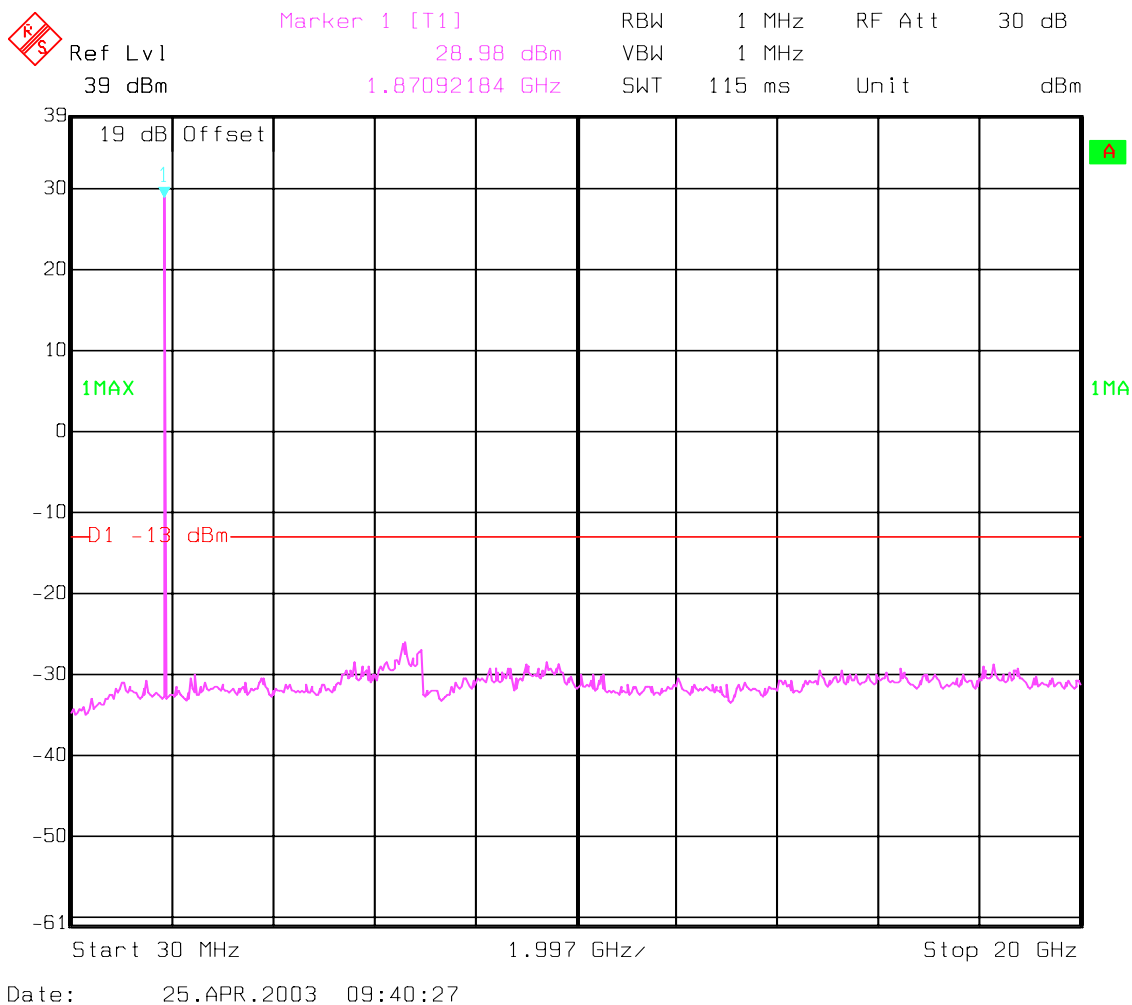


## CONDUCTED SPURIOUS EMISSIONS

Channel 661: 30MHz – 20GHz

Spurious emission limit –13dBm

NOTE: peak above the limit line is the carrier frequency.



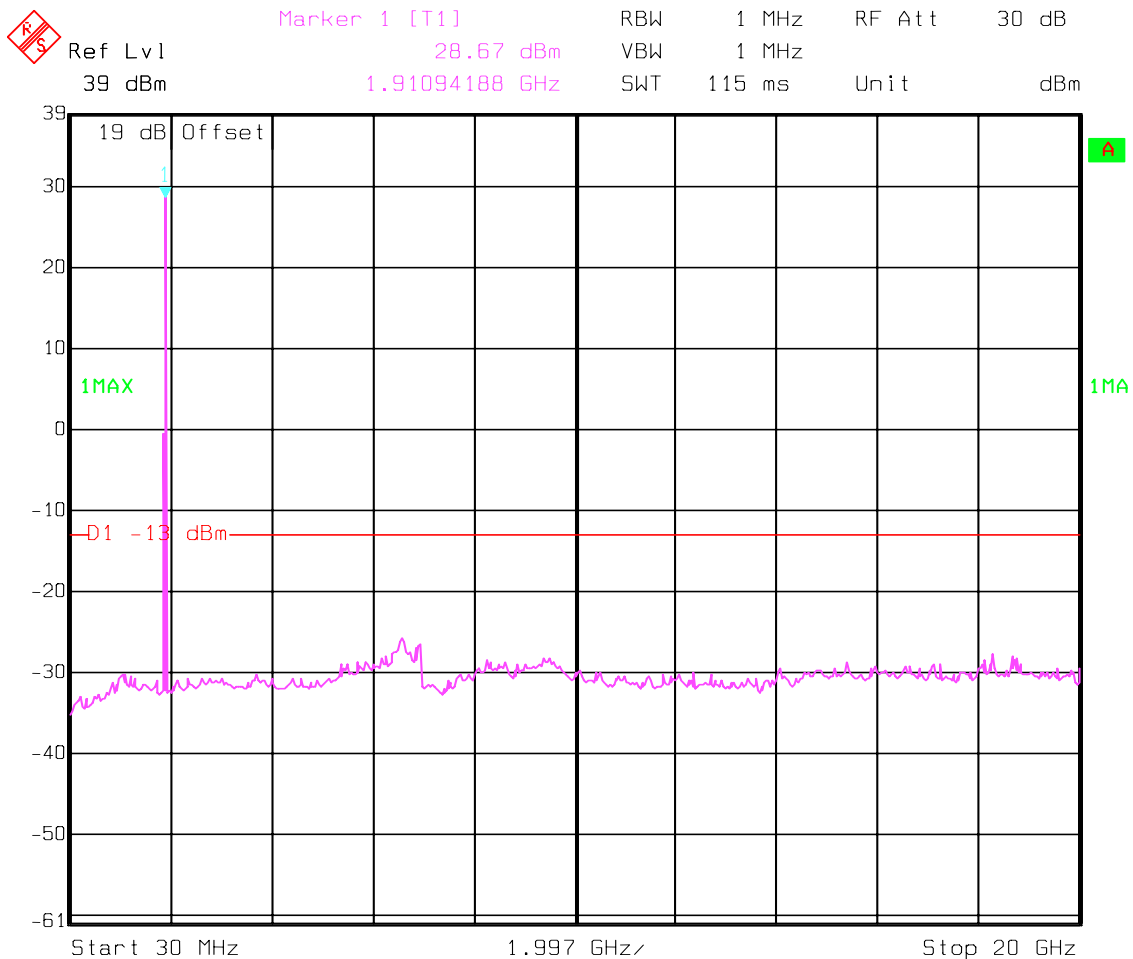


## CONDUCTED SPURIOUS EMISSIONS

Channel 810: 30MHz – 20GHz

Spurious emission limit –13dBm

NOTE: peak above the limit line is the carrier frequency.

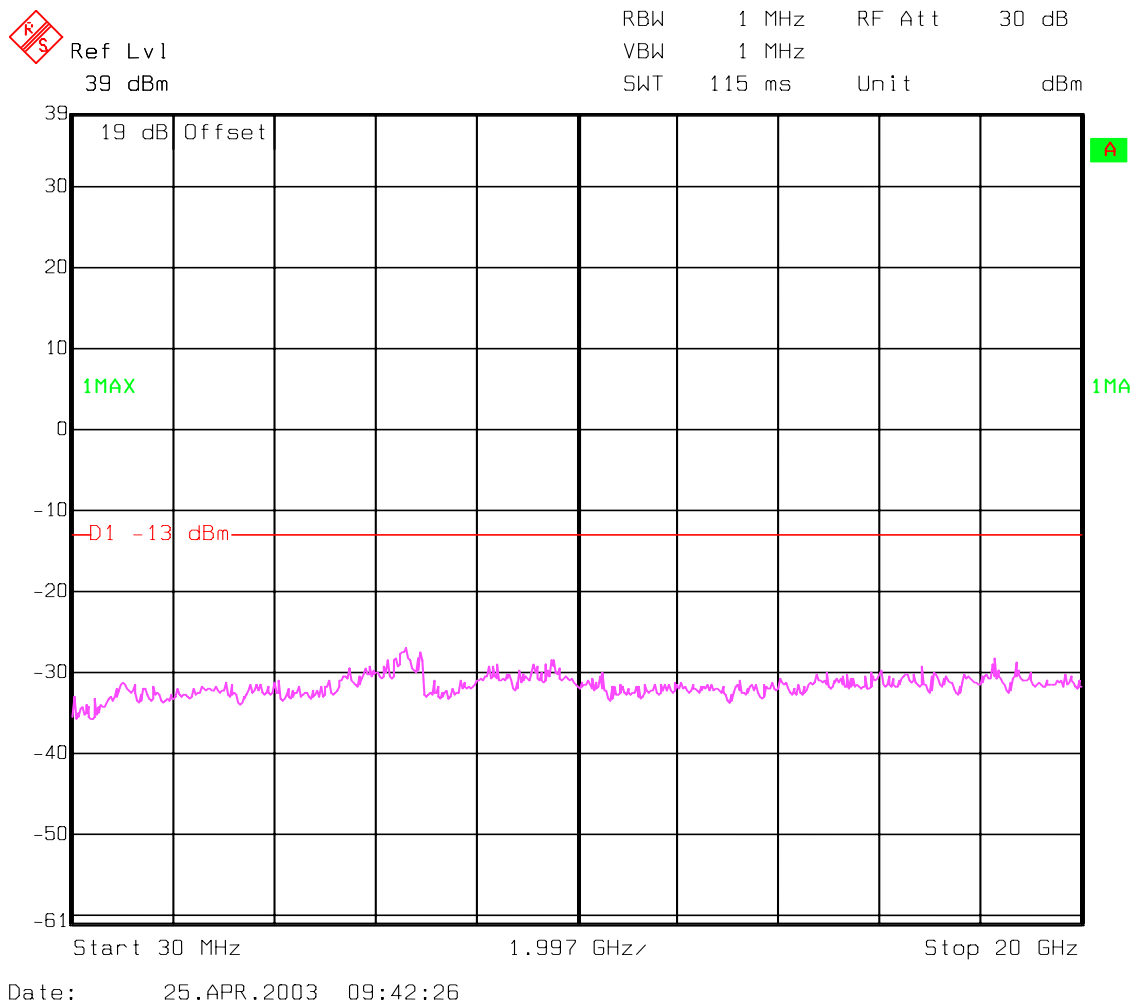


Date: 25.APR.2003 09:39:34

CONDUCTED SPURIOUS EMISSIONS

Idle mode: 30MHz – 20GHz

Spurious emission limit –13dBm



**CONDUCTED EMISSIONS**

§ 15.107/207

Measured with AC/DC power adapter plugged in LISN

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)

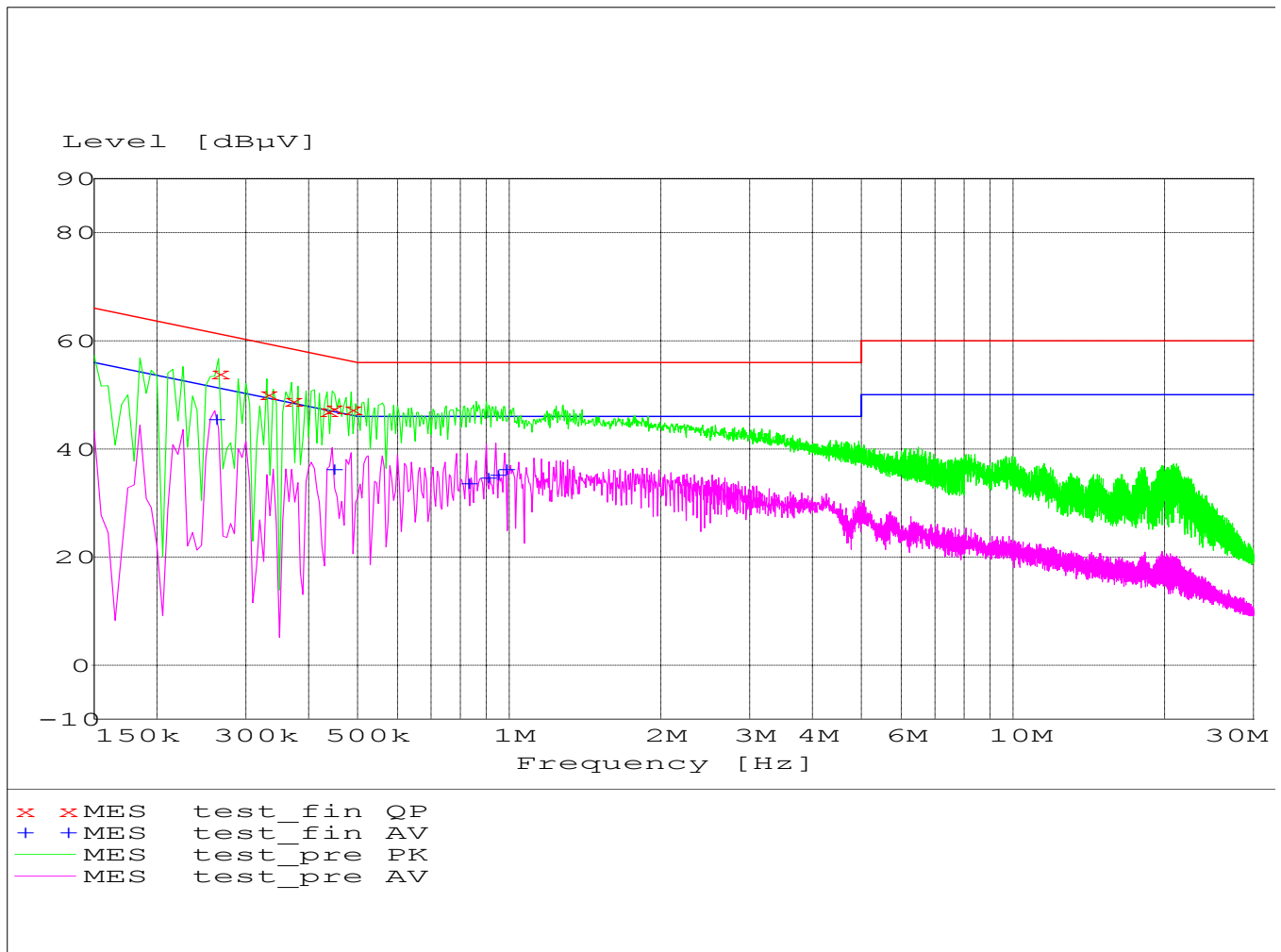
**Limit**

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

\* Decreases with logarithm of the frequency

ANALYZER SETTINGS: RBW = 10KHz

VBW = 10KHz



**MEASUREMENT RESULT: "test\_fin QP"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.265000	54.10	0.0	61	7.2	N	GND
0.330000	50.20	0.0	60	9.3	N	GND
0.370000	48.90	0.0	59	9.6	N	GND
0.435000	47.10	0.0	57	10.0	L1	GND
0.445000	47.70	0.0	57	9.3	N	GND
0.485000	47.30	0.0	56	8.9	N	GND

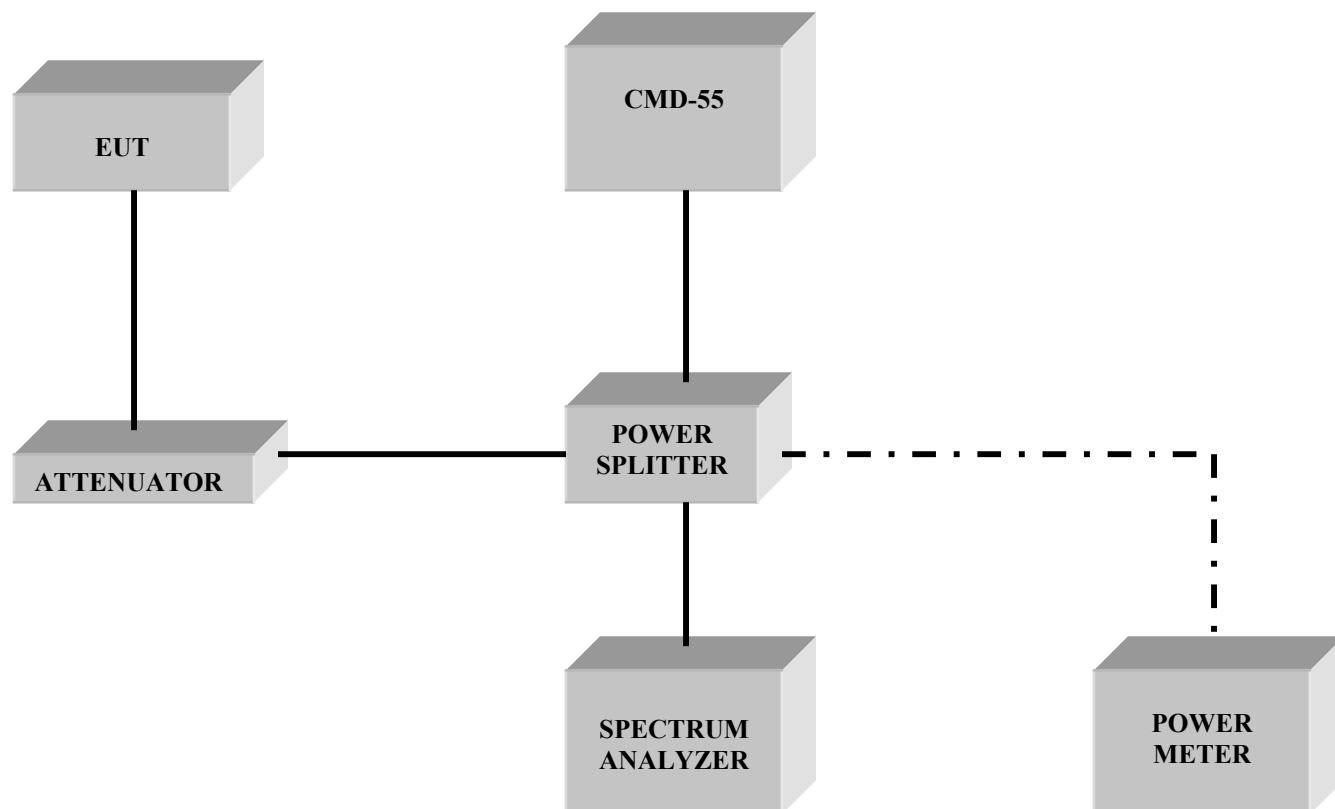
**MEASUREMENT RESULT: "test\_fin AV"**

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.260000	45.40	0.0	51	6.0	L1	GND
0.445000	36.30	0.0	47	10.7	N	GND
0.825000	33.60	0.0	46	12.4	N	GND
0.900000	34.60	0.0	46	11.4	N	GND
0.940000	35.30	0.0	46	10.7	N	GND
0.980000	36.20	0.0	46	9.8	L1	GND

**TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	826880/010
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02
05	Biconilog Antenna	3141	EMCO	0005-1186
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240
08	Power Splitter	11667B	Hewlett Packard	645348
09	Climatic Chamber	VT4004	Voltsch	G1115
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307
12	Pre-Amplifier	JS4-00102600	Miteq	00616
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06

**BLOCK DIAGRAMS**  
**Conducted Testing**



**Radiated Testing**

**ANECHOIC CHAMBER**

