# FCC Test report

**Test report no.: EMC_658FCC-24_2004_C65**

**FCC Part 24 / RSS 133**

**FCC ID: PWX-C65**

**IC ID: 267E-C65**

Deutscher Akkreditierungs Rat DAR

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

Accredited according to **ISO/IEC 17025**

Bluetooth™

**Bluetooth Qualification Test Facility (BQTF)**

CTIA Authorized Testing Laboratory

**FCC listed # 101450**

**IC recognized # 3925**


***CETECOM* Inc.**

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## 1 General information

### 1.1 Notes

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

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## 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** | **:** | Kevin Wolentarski |
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| **e-mail** | **:** | kevin.wolentarski@siemens.com |

## 1.4 Application details

| | | |
|---|---|---|
| Date of receipt test item | : | 2004-05-13 |
| Date of test | : | 2004-05-13/14/17 |

## 1.5 Test item

| | | |
|---|---|---|
| Manufacturer | : | SIEMENS |
| Street Address | : | Suedstr. 9 |
| City / Zip Code | : | 47475 Kamp-Lintfort |
| Country | : | Germany |
| Marketing Name | : | C65, CV65, CT65 |
| Model No. | : | **C65** |
| Description | : | GSM 1900 Mobile Phone |
| FCC-ID | : | PWX-C65 |
| IC ID | : | 267E-C65 |

**Additional information**

| | | |
|---|---|---|
| Frequency | : | 1850.2MHz – 1909.8MHz for PCS 1900 |
| Type of modulation | : | GMSK |
| Number of channels | : | 299 for PCS 1900 |
| Antenna | : | External |
| Power supply | : | Battery or Charger (AC Adaptor) |
| Output power | : | 28.85dBm (767.36mW) max. EIRP measured for PCS 1900 |
| Extreme vol. Limits | : | 3.6VDC to 4.5VDC (nominal: 3.7VDC) |
| 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:<br>(only “passed” if all single measurements are “passed”) | **Passed** |

**Technical responsibility for area of testing:**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2004-05-26 | EMC & Radio | Lothar Schmidt (Manager) |  |

**Responsible for test report and project leader:**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2004-05-26 | EMC & Radio | Harpreet Sidhu (EMC Engineer) |  |

## 2.2 Test report

**TEST REPORT**

**Test report no.: EMC_658FCC-24_2004_C65**

## TEST REPORT REFERENCE

## 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 | ≤30dBm (1W)* | ± 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: *"FCC_C65_Conducted_Power"*
(Page 3, section 2.1, Siemens C65, "FCC Sample-2" IMEI: 004400005165616)

| Frequency (MHz) | Burst Average Power (dBm) |
|---|---|
| 1850.2 | 29.3 |
| 1880.0 | 29.3 |
| 1909.8 | 29.2 |

**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 Pin + 2.1 - Pr.
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 -2.1dBi.

**Limits:**

| Power Step | Burst Peak EIRP (dBm) |
|---|---|
| 0 | ≤33dBm (1W) |

**Power Measurements:**
Plots are shown on next pages

**Radiated:**

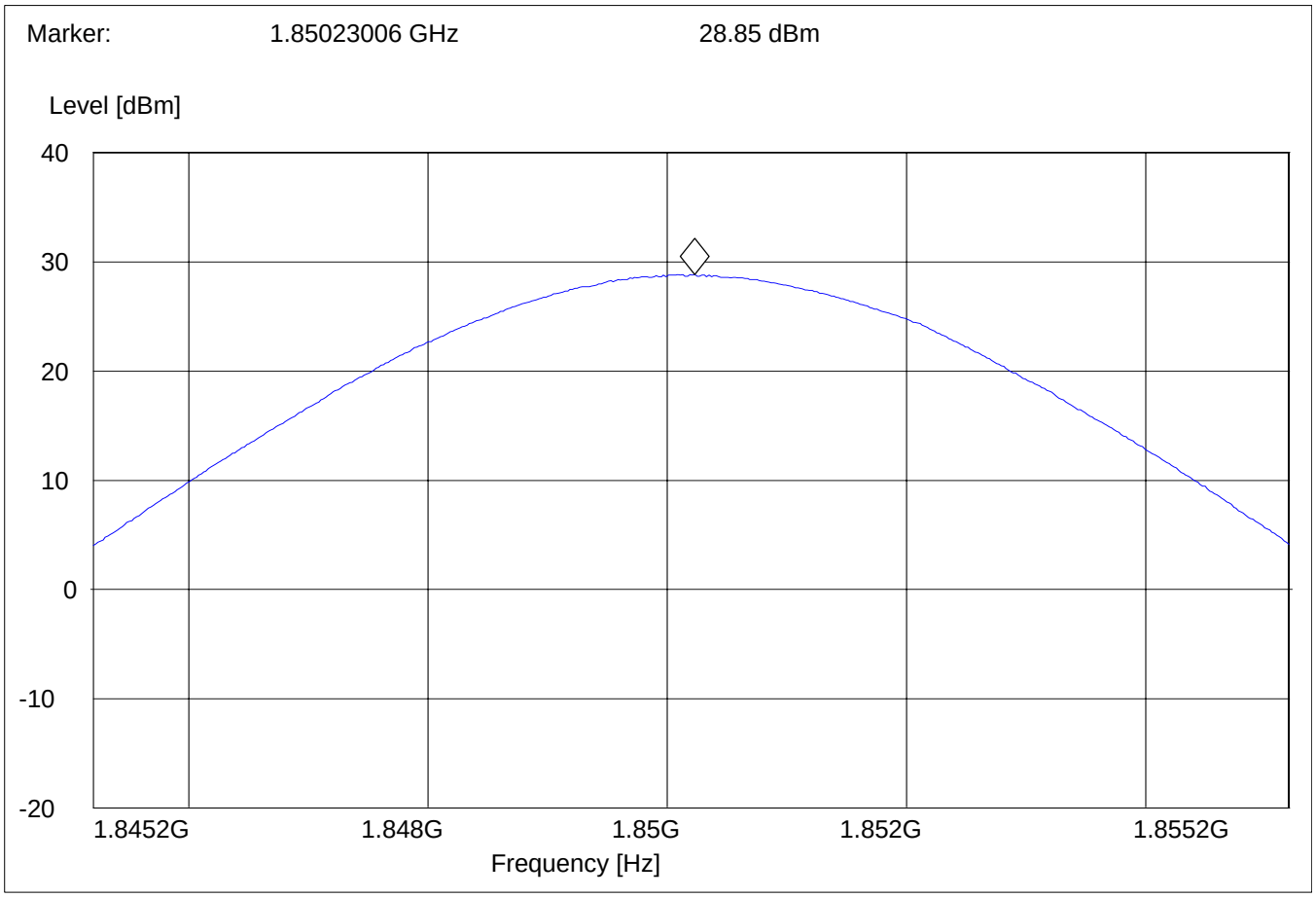
| Frequency (MHz) | Power Step | Burst Peak EIRP (dBm) |
|---|---|---|
| | | EIRP |
| 1850.2 | 0 | 28.85 |
| 1880.0 | 0 | 28.81 |
| 1909.8 | 0 | 26.25 |
| | ±0.5 dB | |

**ANALYZER SETTINGS: RBW = VBW = 3MHz**

**EIRP CHANNEL 512**

SWEEP TABLE: "EIRP 1900 CH512"

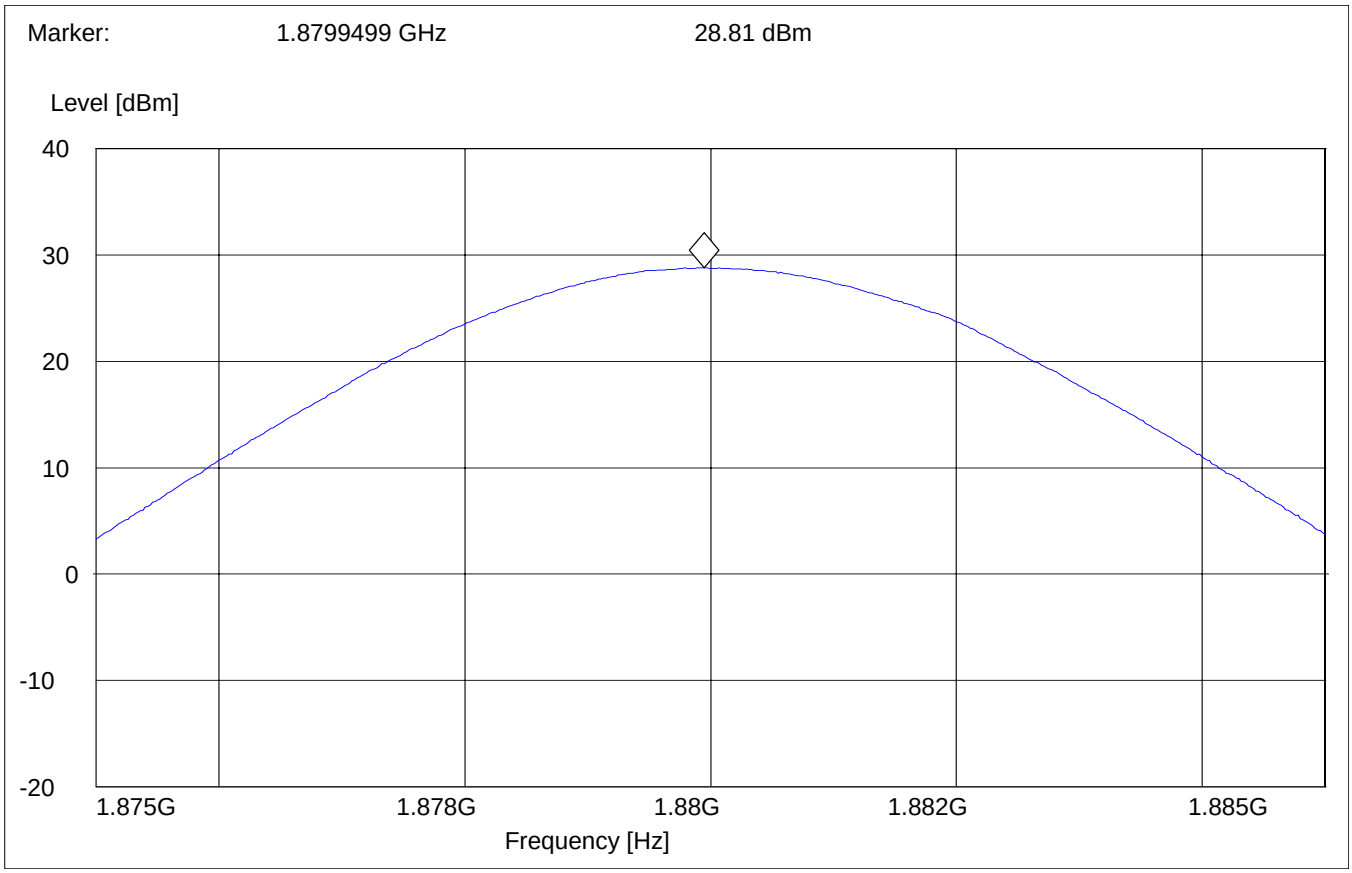
| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 1.8452 GHz | 1.8552 GHz | Max Peak | Coupled | 3 MHz |



**EIRP CHANNEL 661:**

SWEEP TABLE: "EIRP 1900 CH661"

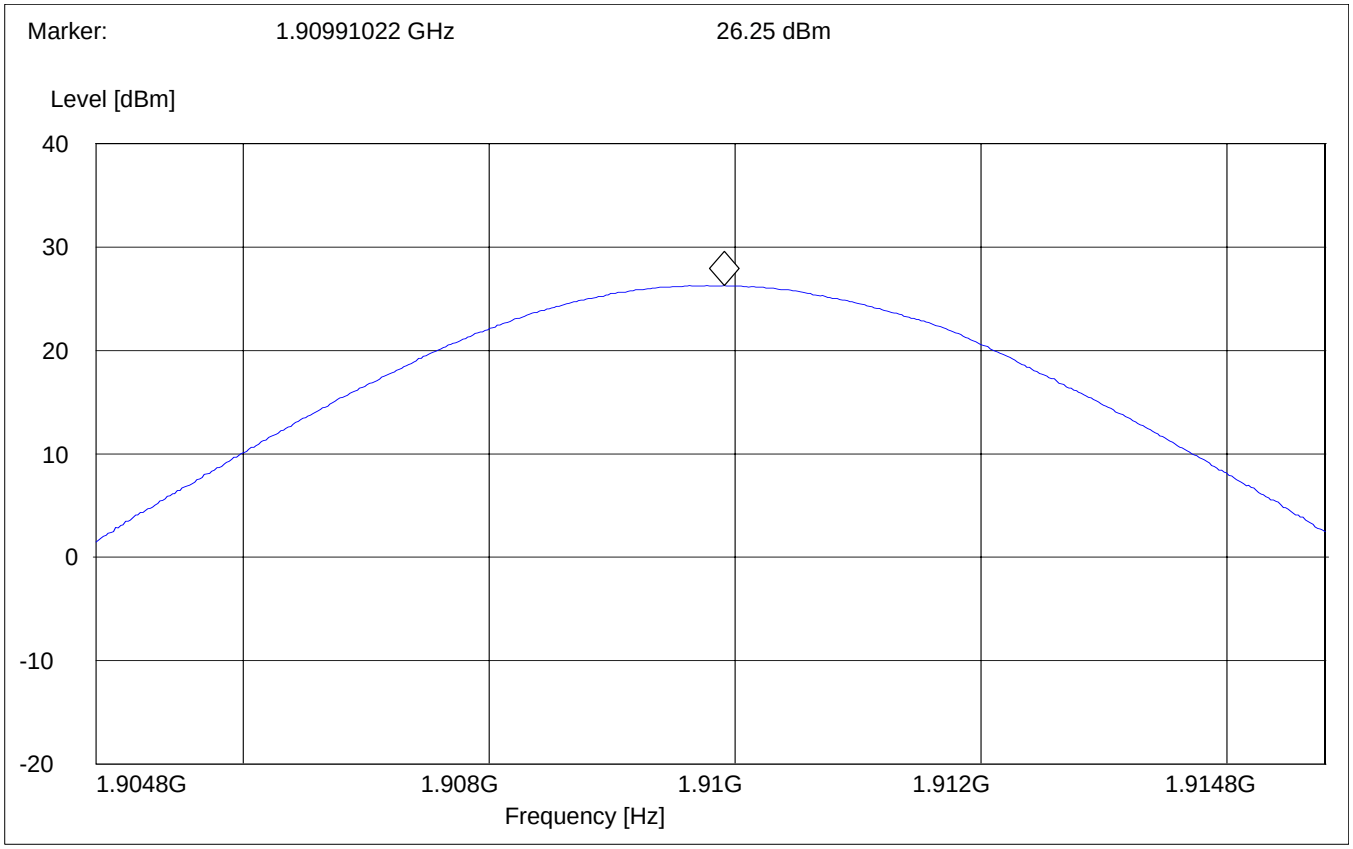
| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 1.875 GHz | 1.885 GHz | Max Peak | Coupled | 3 MHz |



**EIRP CHANNEL 810:**

SWEEP TABLE: "EIRP 1900 CH810"

| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 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 0.1Volt 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 3.6VDC and 4.5VDC, with a nominal voltage of 3.7VDC. 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 –2.7 % and +21.62 %. 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

| Voltage (VDC) | Frequency Error (Hz) | Frequency Error (ppm) |
|---|---|---|
| 3.6 | 12 | 0.0064 |
| 4.5 | 15 | 0.0080 |

## AFC FREQ ERROR vs. TEMPERATURE

| TEMPERATURE (°C) | Frequency Error (Hz) | Frequency Error (ppm) |
|---|---|---|
| -30 | 28 | 0.0149 |
| -20 | 36 | 0.0191 |
| -10 | 27 | 0.0144 |
| 0 | 26 | 0.0138 |
| +10 | 29 | 0.0154 |
| +20 | 25 | 0.0133 |
| +30 | 28 | 0.0149 |
| +40 | 33 | 0.0176 |
| +50 | 27 | 0.0144 |

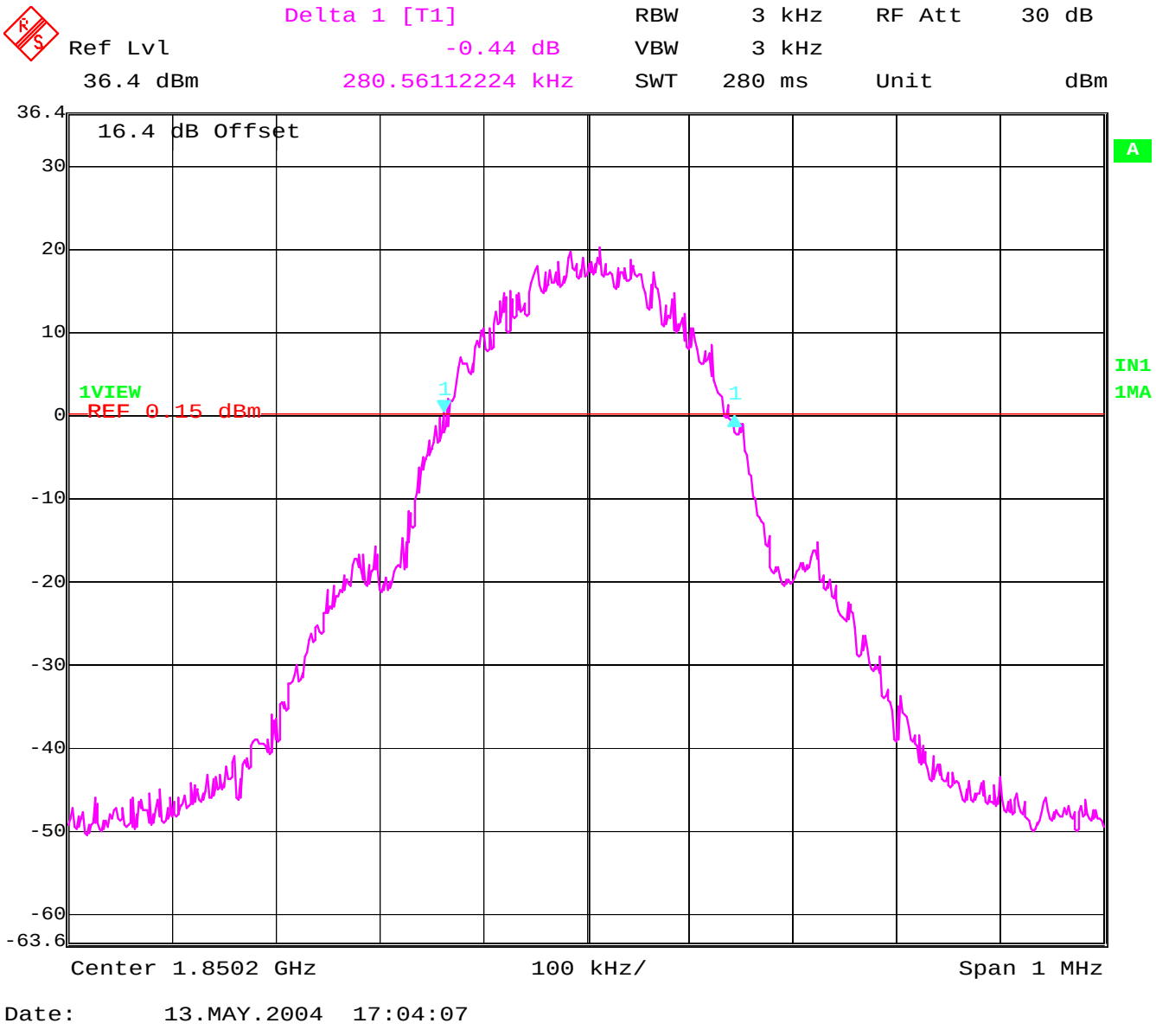
## OCCUPIED BANDWIDTH §2.1049(h)(i)

**Occupied Bandwidth Results**

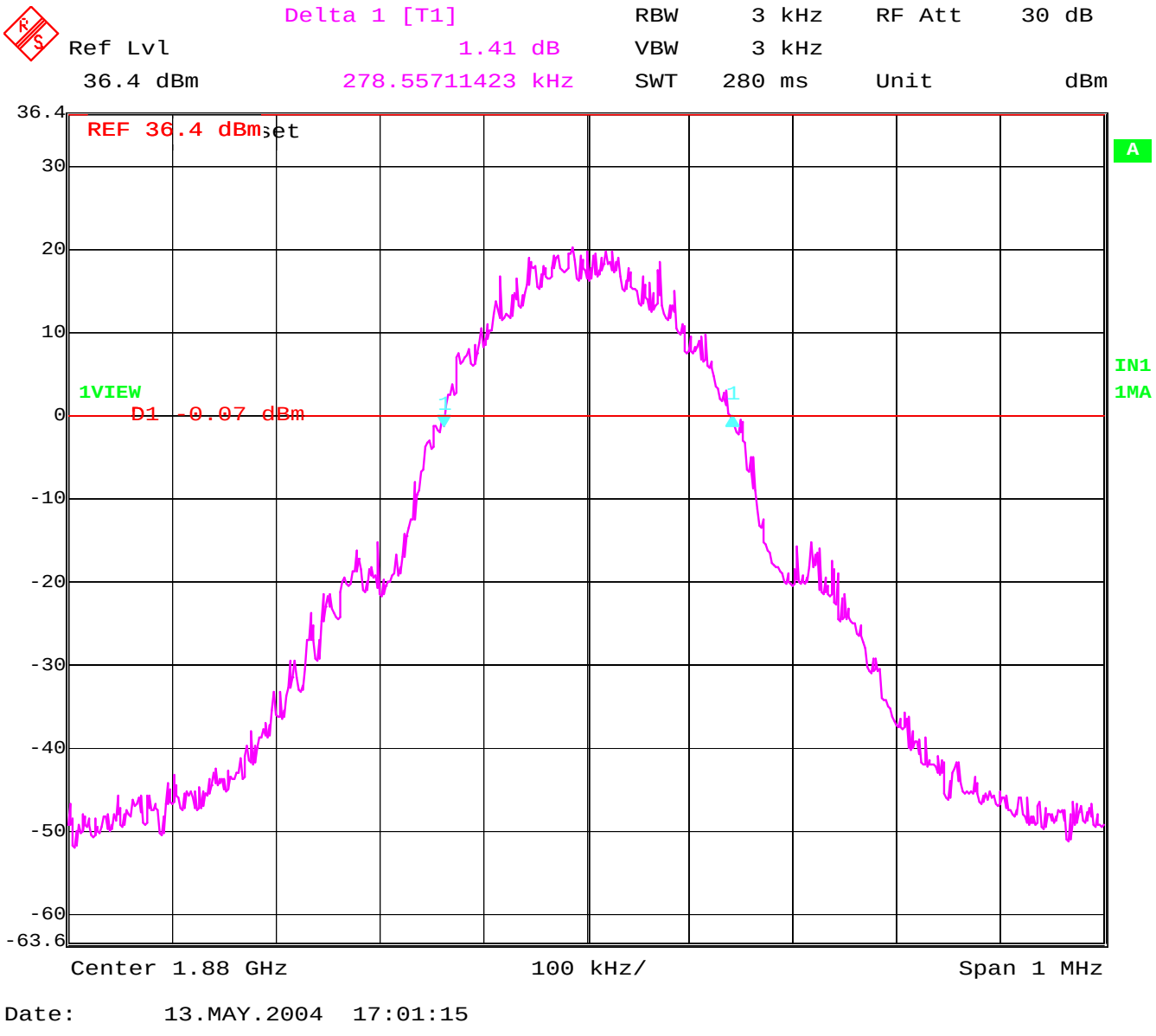
Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. Table below lists the measured -20dBc BW (99%). Spectrum analyzer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

| Frequency | Occupied Bandwidth (–20dBc BW) |
|---|---|
| 1850.2 MHz | 280.56 |
| 1880.0 MHz | 278.55 |
| 1909.8 MHz | 272.54 |

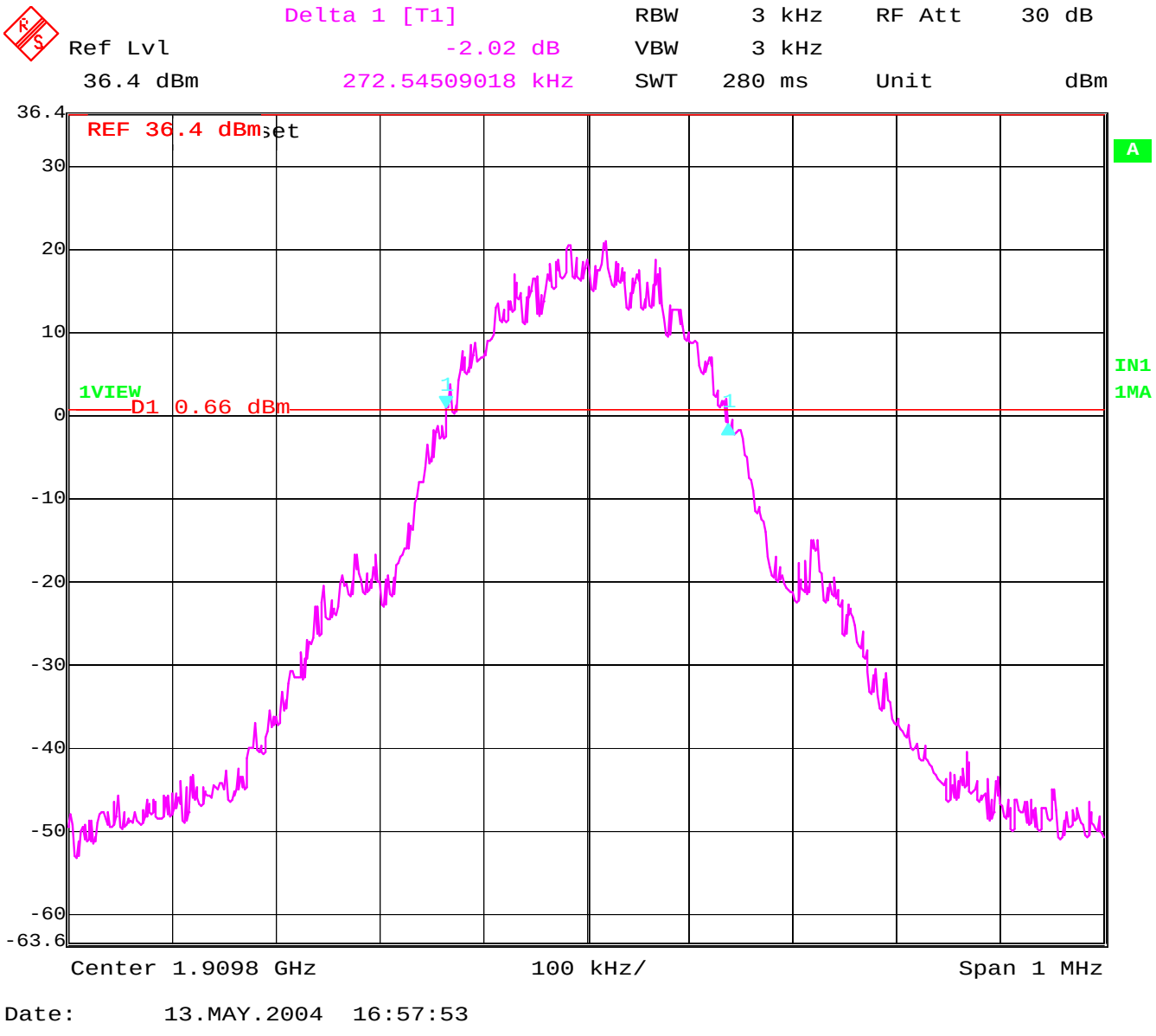
**Channel 512**
**Occupied Bandwidth (-20dBc BW)**



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



**Channel 810**
**Occupied Bandwidth (-20dBc BW)**



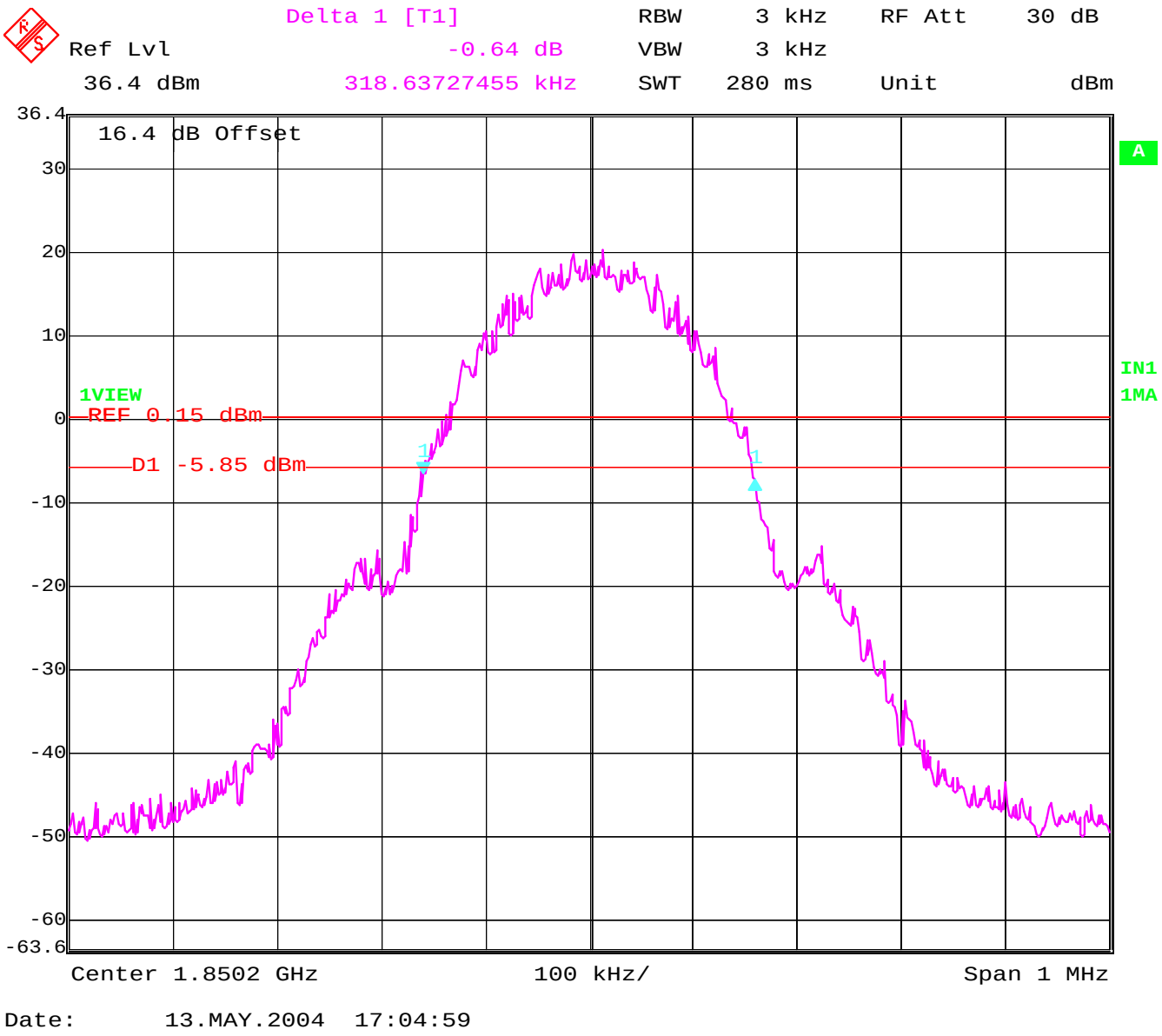
## EMISSION BANDWIDTH §24.238(b)

**Emission Bandwidth Results**

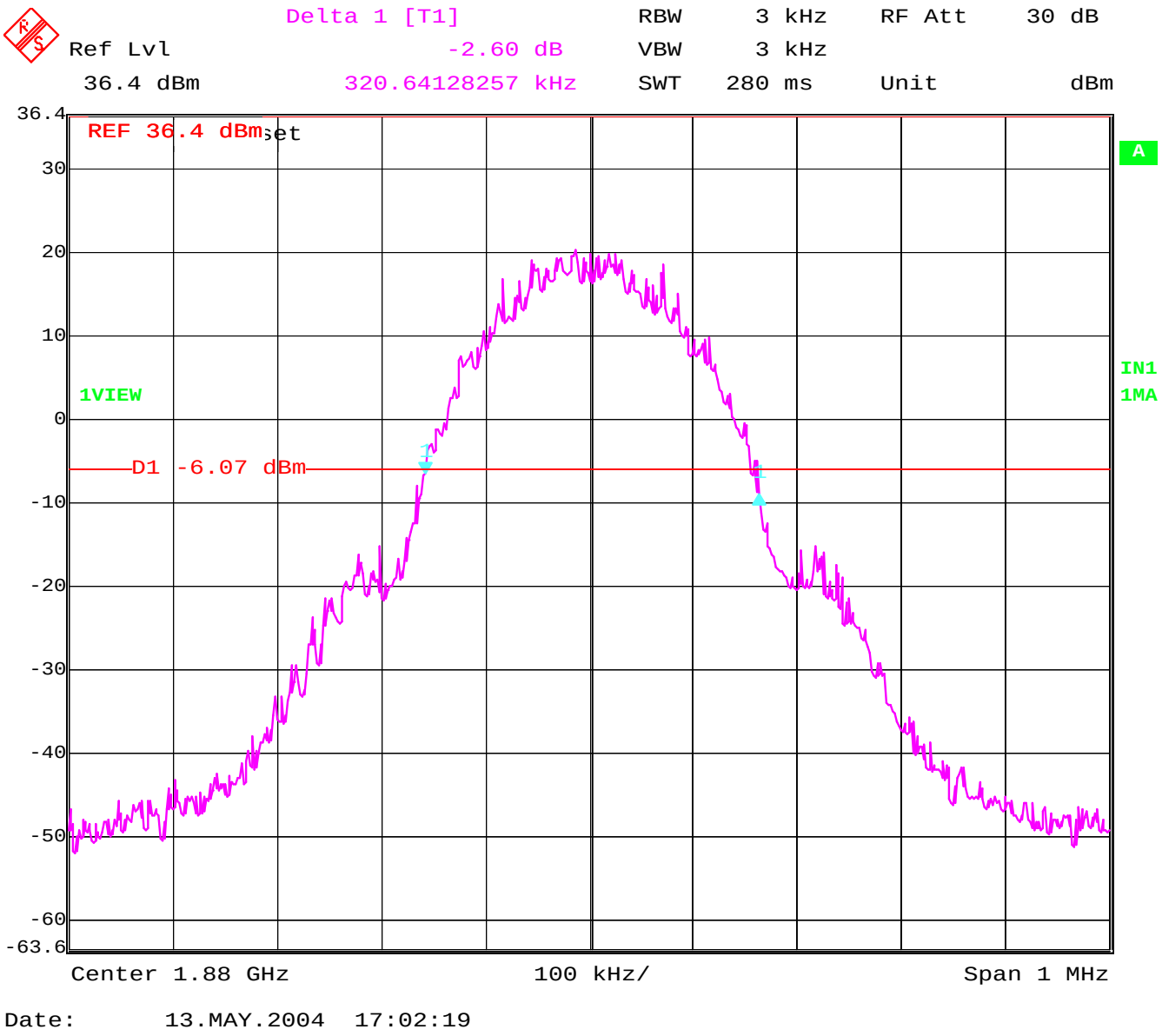
Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. Table below lists the measured -26dBc BW. Spectrum analyzer plots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

| Frequency | Emission Bandwidth (–26dBc BW) |
|---|---|
| 1850.2 MHz | 318.63 |
| 1880.0 MHz | 320.64 |
| 1909.8 MHz | 312.62 |

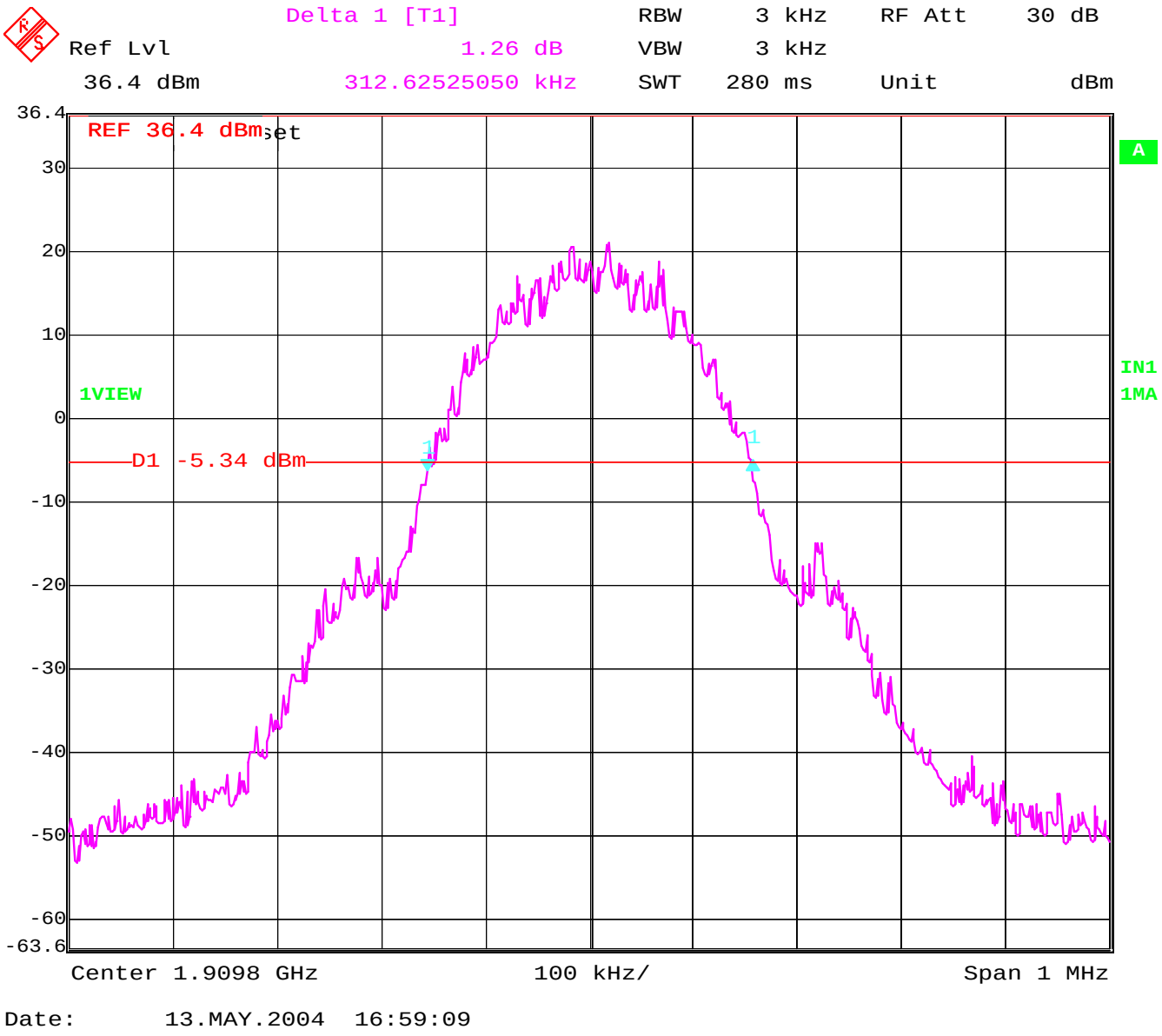
**Channel 512**
**Emission Bandwidth (-26dBc BW)**



**Channel 661**
**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+10Log(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** | -36.18 | **3760** | -34.61 | **3819.6** | -39.69 |
| **3** | **5550.6** | -30.36 | **5640** | -34.38 | **5729.4** | -32.00 |
| **4** | **7400.8** | -38.26 | **7520** | -41.22 | **7639.2** | -41.65 |
| **5** | **9251** | nf | **9400** | -42.51 | **9549** | nf |
| **6** | **11101.2** | nf | **11280** | nf | **11458.8** | nf |
| **7** | **12951.4** | nf | **13160** | nf | **13368.6** | nf |
| **8** | **14801.6** | nf | **15040** | nf | **15278.4** | nf |
| **9** | **16651.8** | nf | **16920** | nf | **17188.2** | nf |
| **10** | **18502** | nf | **18800** | nf | **19098** | nf |

nf: noise floor

## RADIATED SPURIOUS EMISSIONS

**Channel 512: 30MHz - 1GHz**

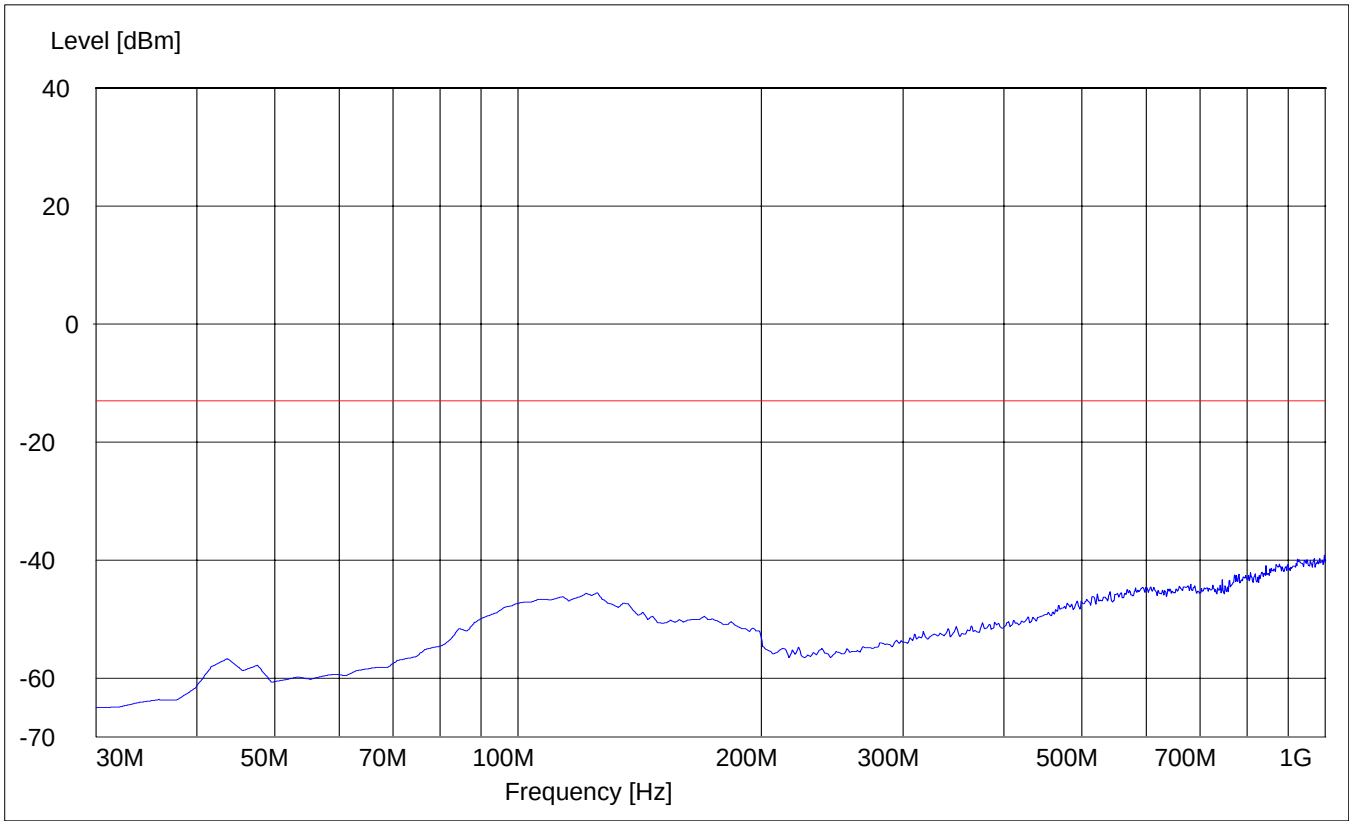
Spurious emission limit –13dBm

**Antenna: vertical**

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

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

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



## RADIATED SPURIOUS EMISSIONS

**Channel 512: 30MHz - 1GHz**

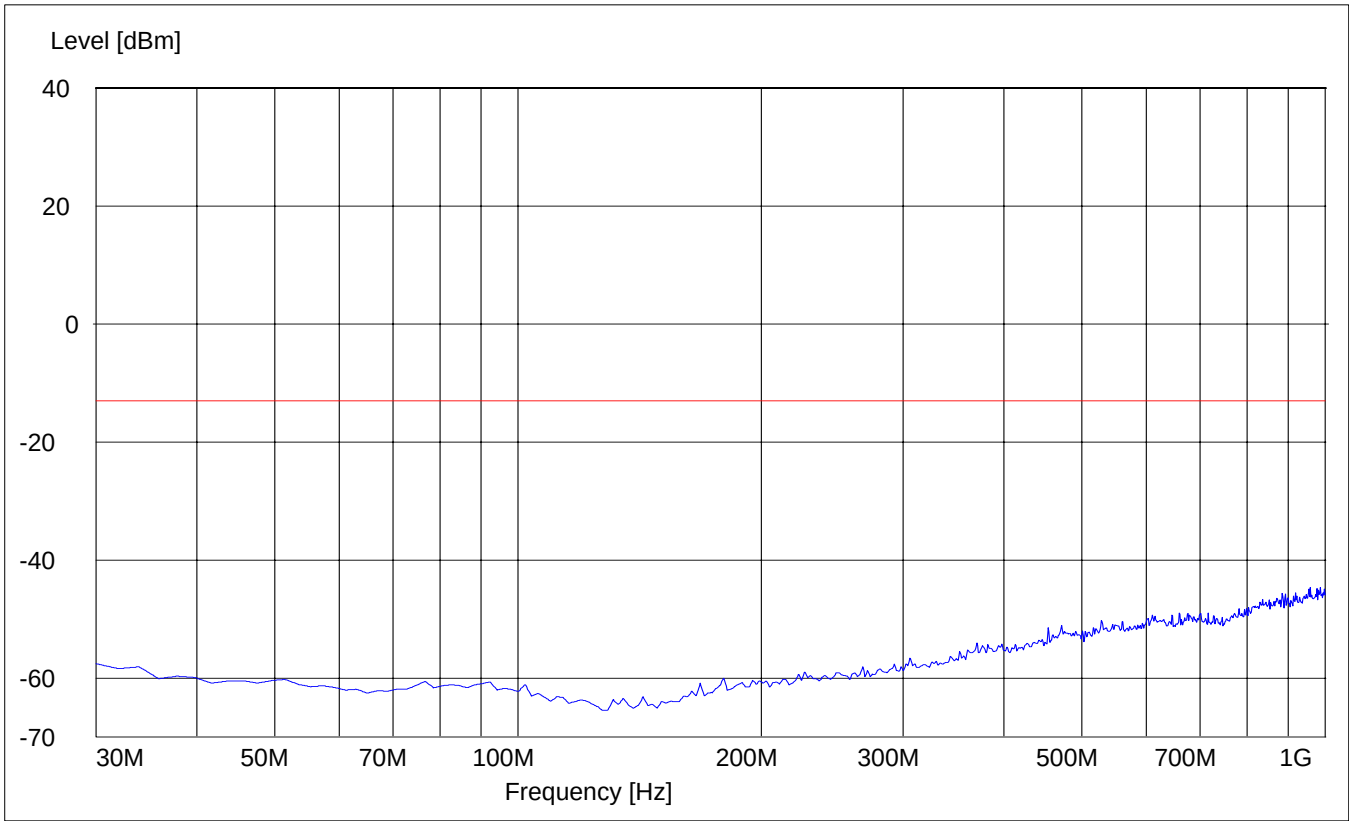
Spurious emission limit –13dBm

**Antenna: horizontal**

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

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

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



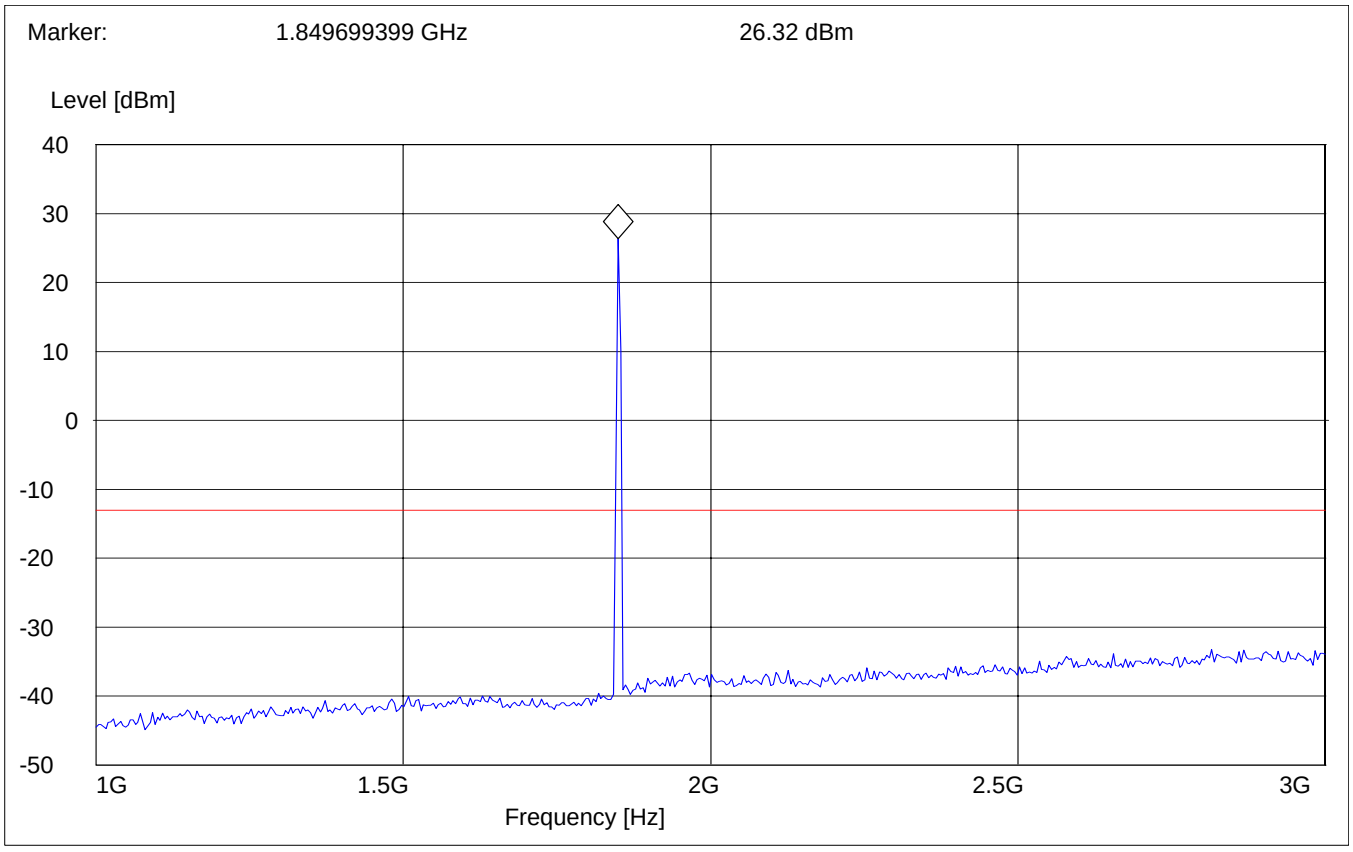
## RADIATED SPURIOUS EMISSIONS
## Channel 512: 1GHz – 3GHz

Spurious emission limit –13dBm

**NOTE: peak above the limit line is the Carrier frequency @ ch-512.**

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

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



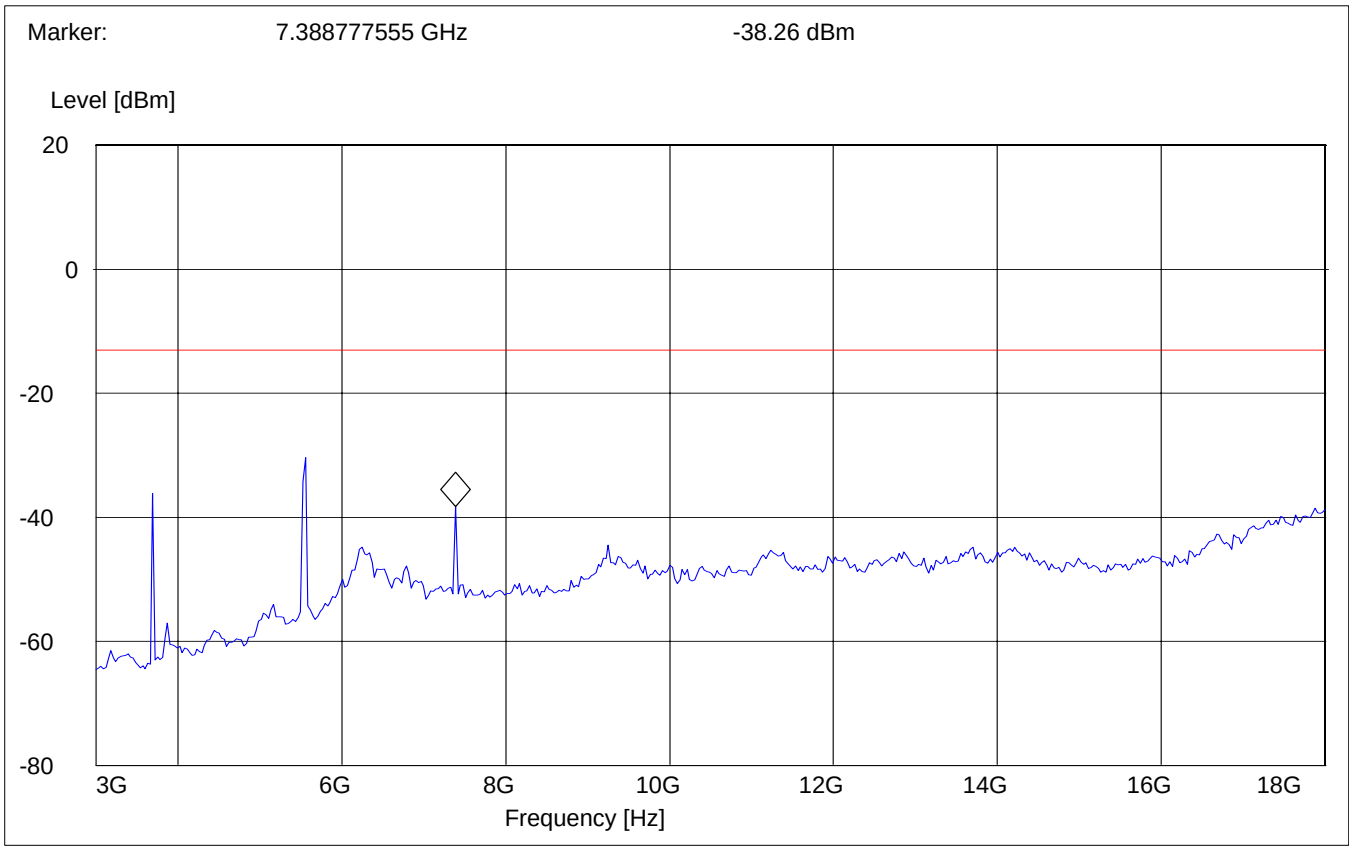
## RADIATED SPURIOUS EMISSIONS

### Channel 512: 3GHz – 18GHz

Spurious emission limit –13dBm

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

| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 3GHz | 18GHz | Max Peak | Coupled | 1 MHz |



## RADIATED SPURIOUS EMISSIONS

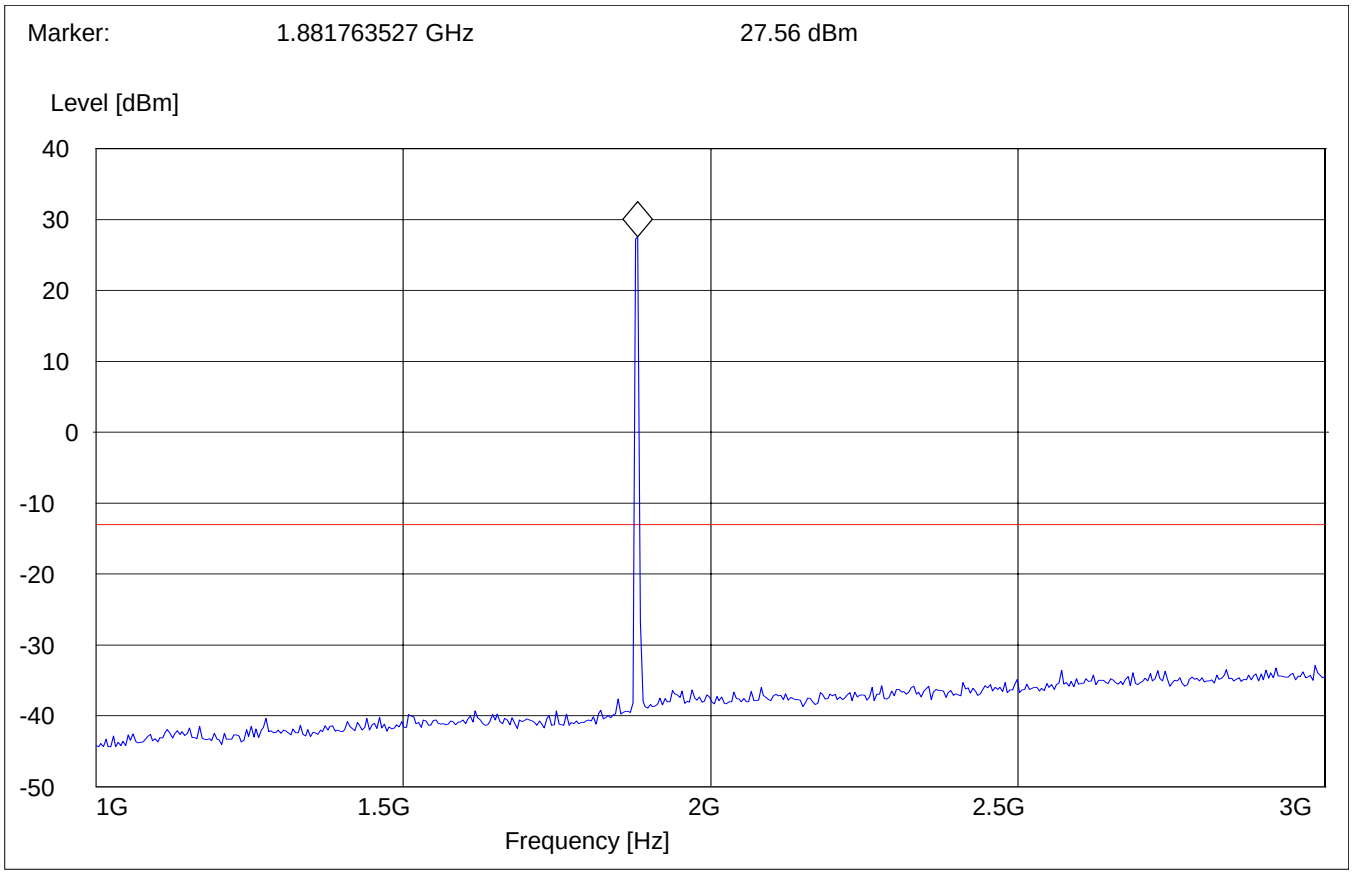
### Channel 661: 1GHz – 3GHz

Spurious emission limit –13dBm

**NOTE: peak above the limit line is the Carrier frequency @ ch-661**

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

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



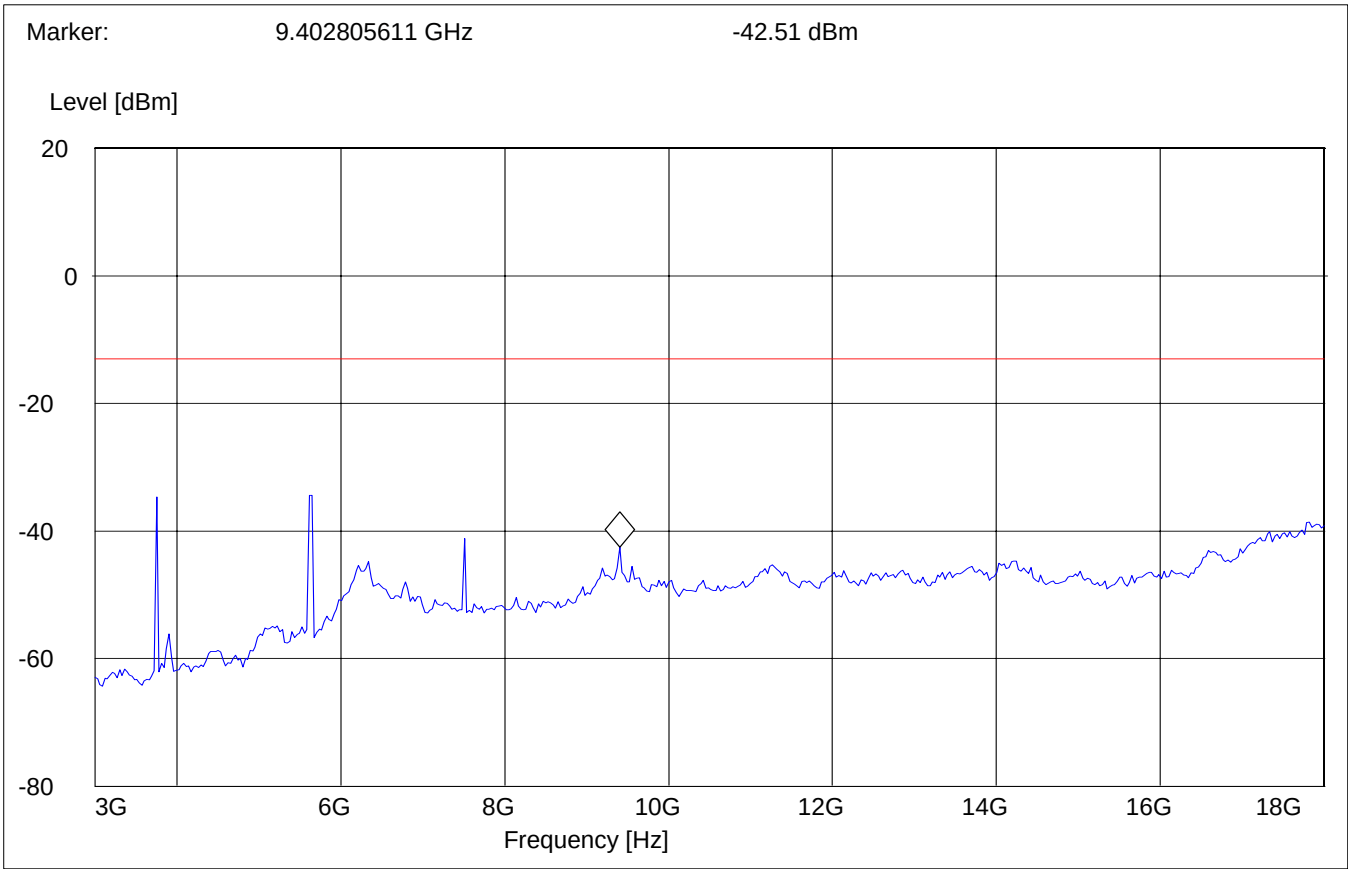
## RADIATED SPURIOUS EMISSIONS

### Channel 661: 3GHz – 18GHz

Spurious emission limit –13dBm

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

| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 3GHz | 18GHz | Max Peak | Coupled | 1 MHz |



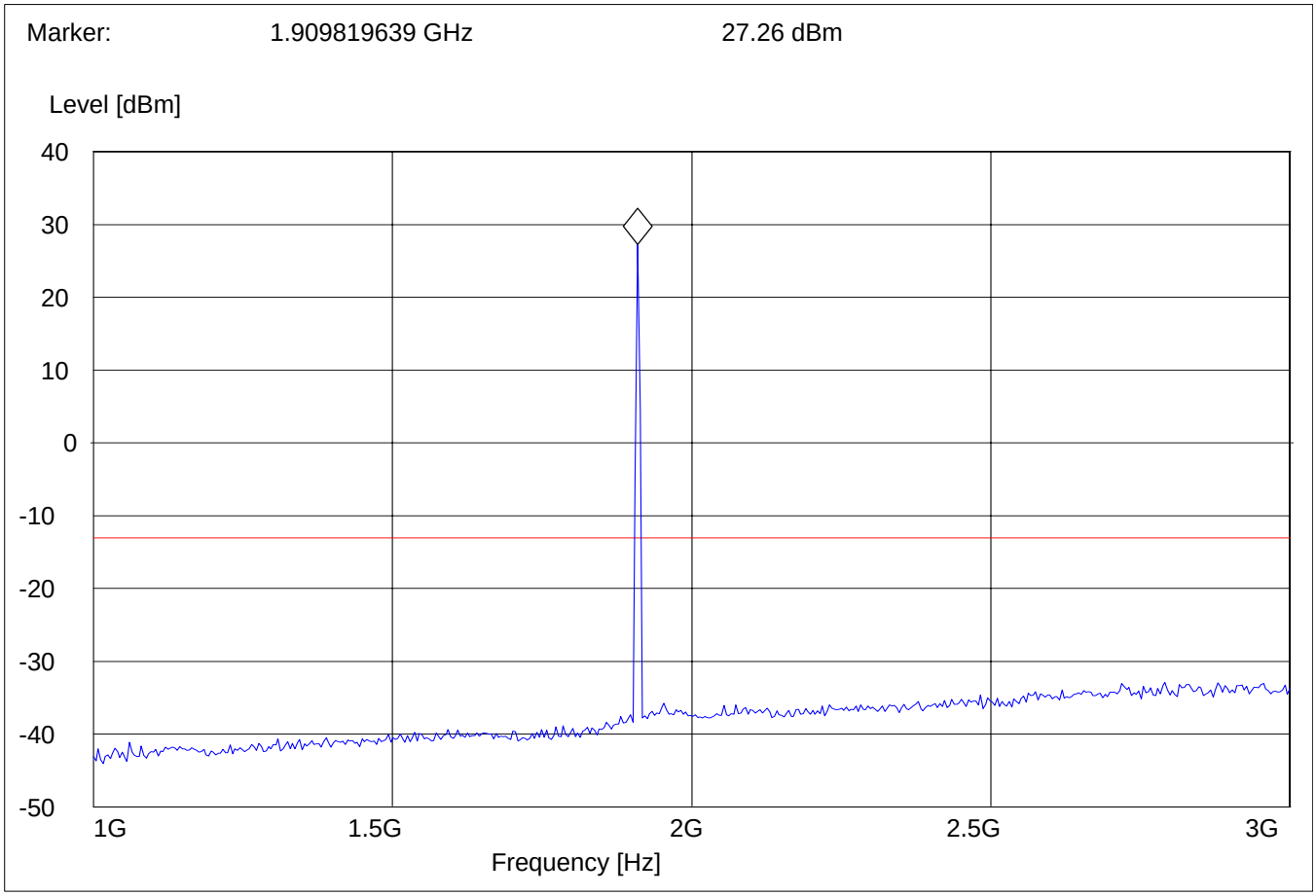
## RADIATED SPURIOUS EMISSIONS
## Channel 810: 1GHz – 3GHz

Spurious emission limit –13dBm

**NOTE: marked peak above the limit line is the Carrier frequency @ ch-810**

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

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



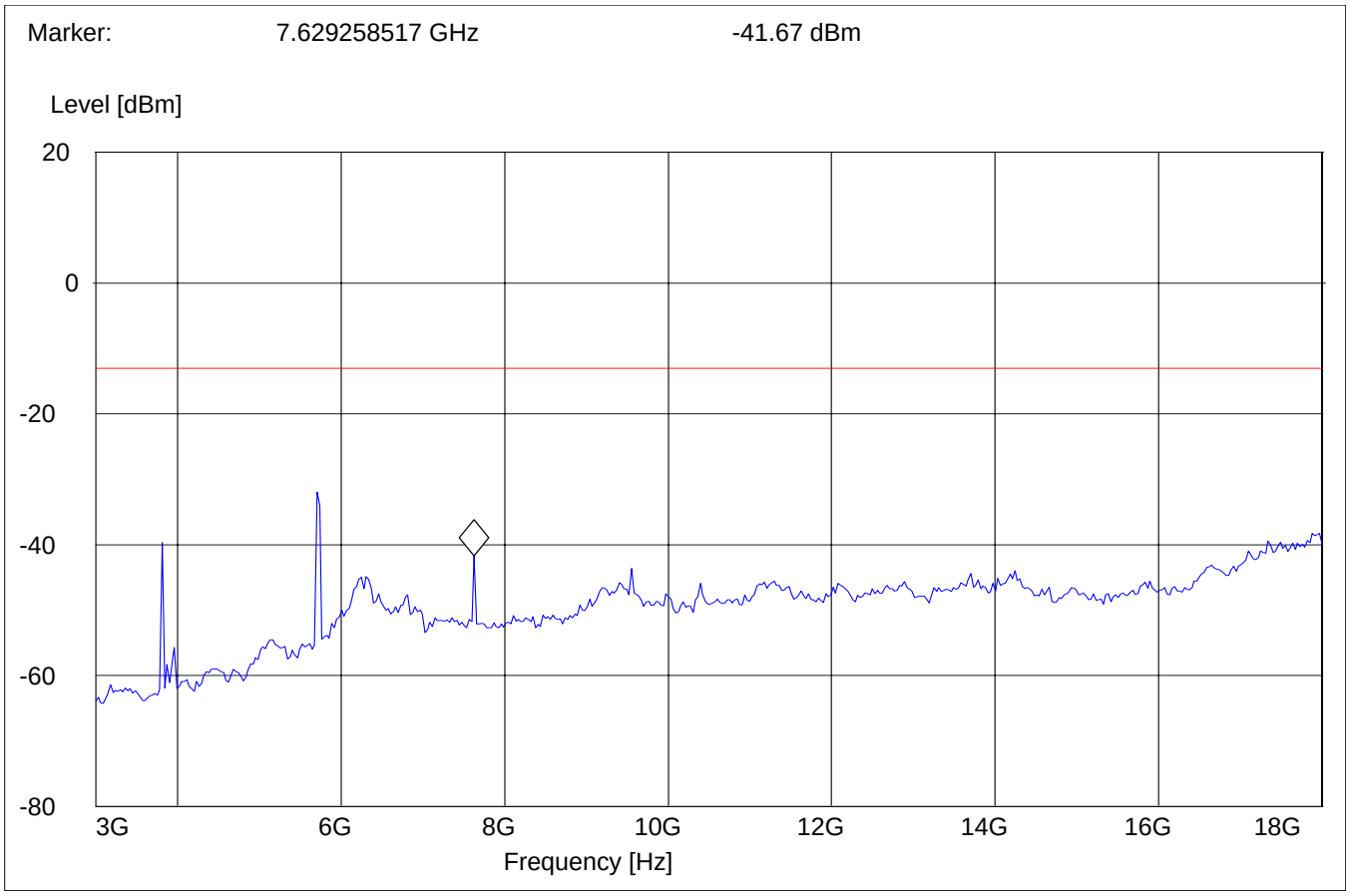
## RADIATED SPURIOUS EMISSIONS

### Channel 810: 3GHz – 18GHz

Spurious emission limit –13dBm

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

| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 3GHz | 18GHz | Max Peak | Coupled | 1 MHz |



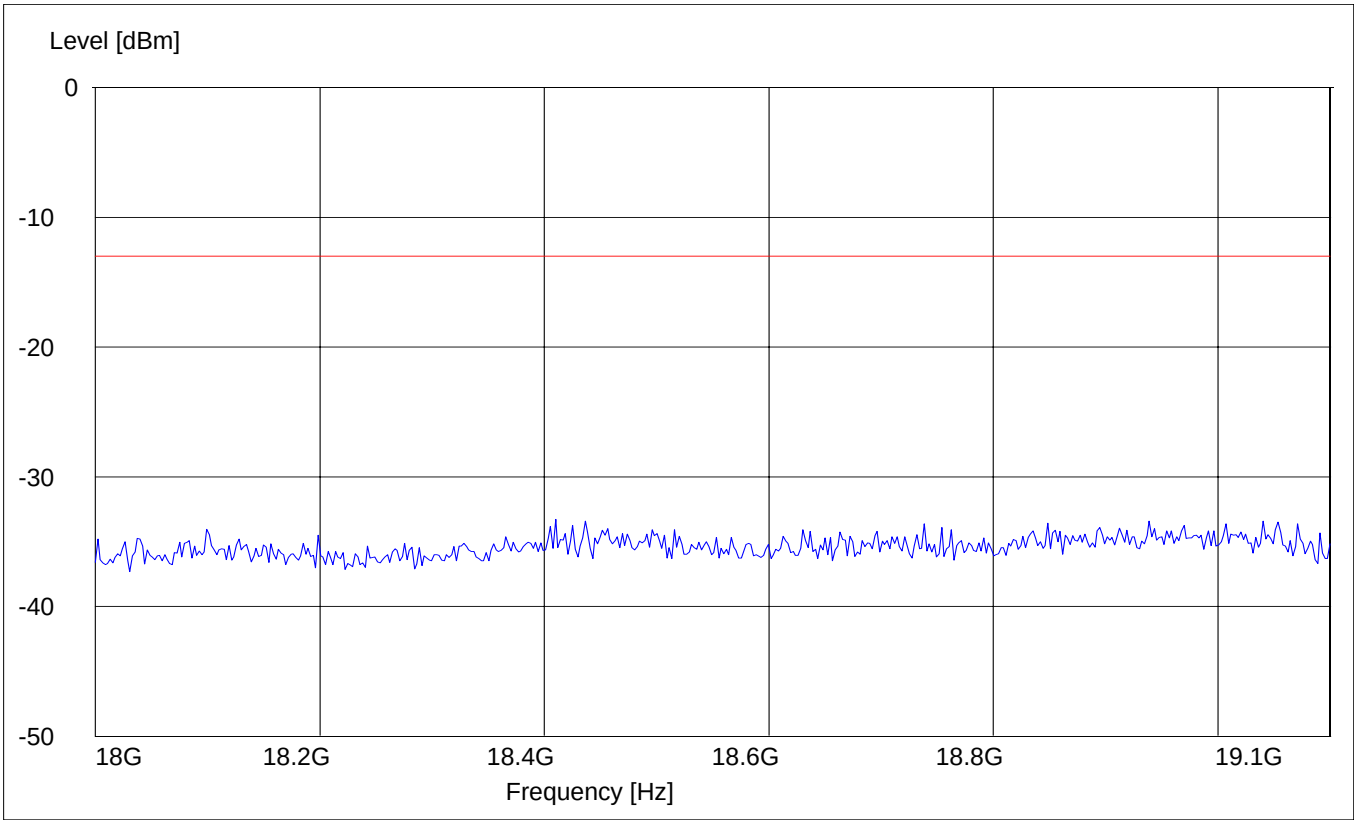
## RADIATED SPURIOUS EMISSIONS
## 18GHz – 19.1GHz

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"***

| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 18GHz | 19.1GHz | Max Peak | Coupled | 1 MHz |



## RADIATED SPURIOUS EMISSIONS

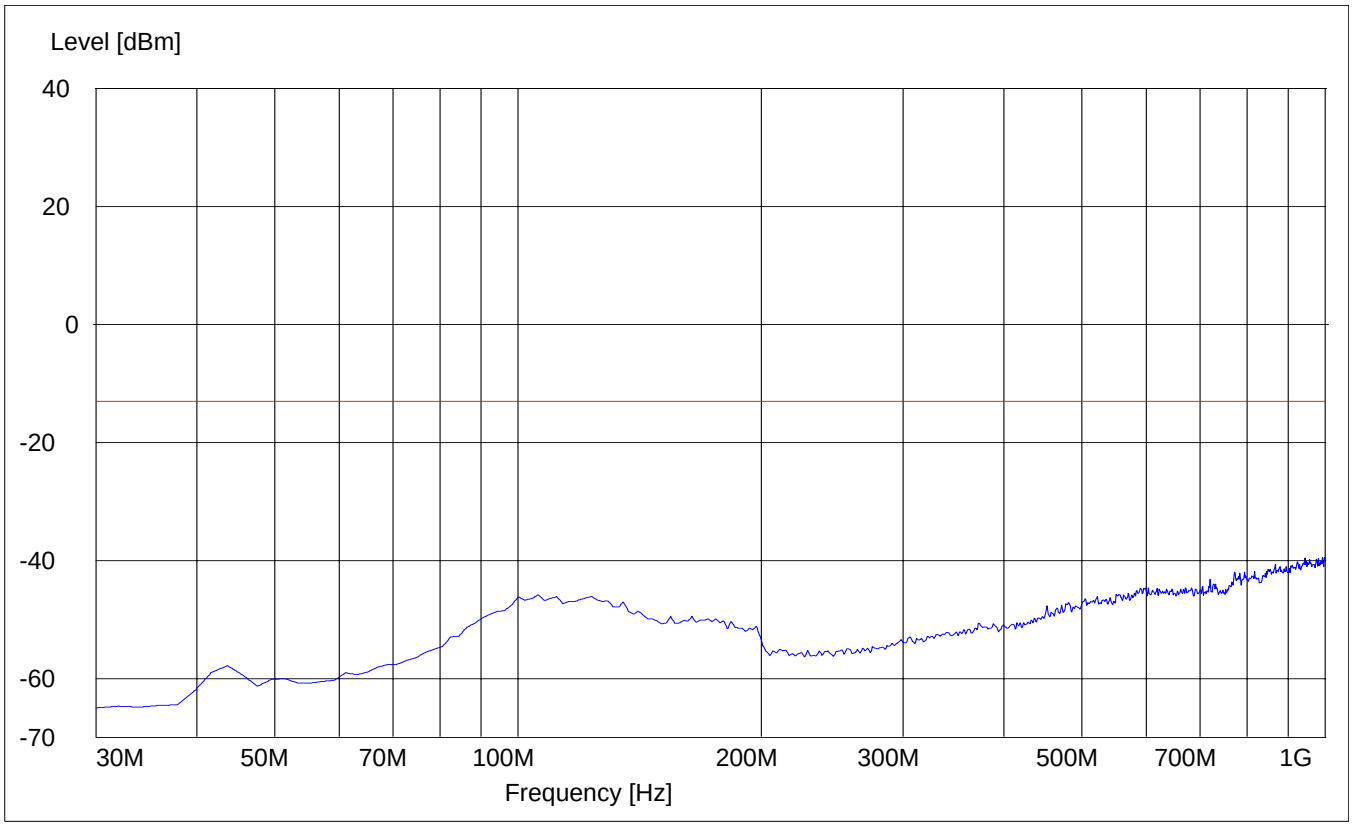
## EUT in Idle Mode: 30MHz – 1GHz

Spurious emission limit –13dBm

### Antenna: vertical

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

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



## RADIATED SPURIOUS EMISSIONS

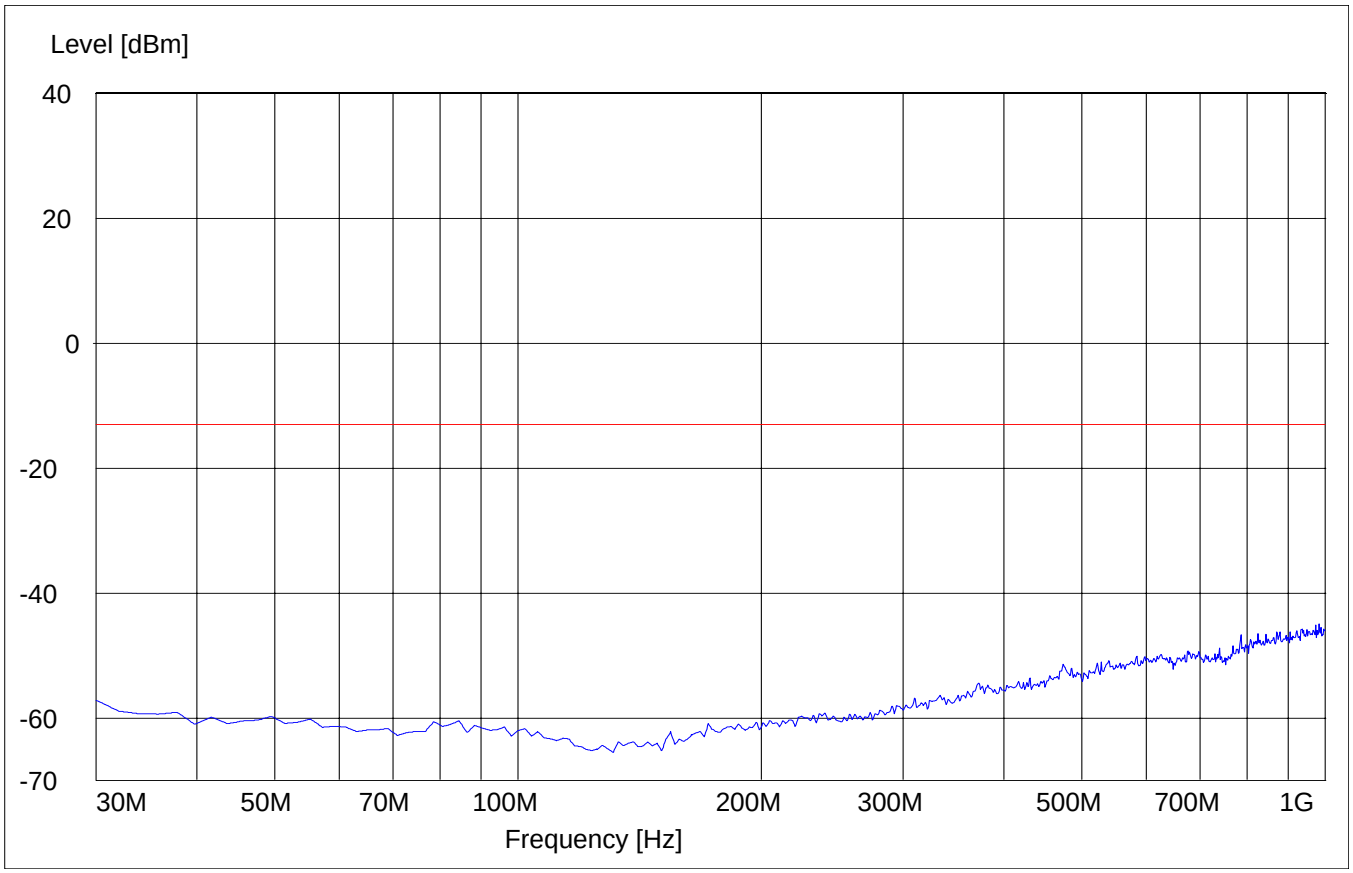
### EUT in Idle Mode: 30MHz – 1GHz

Spurious emission limit –13dBm

### Antenna: horizontal

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

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

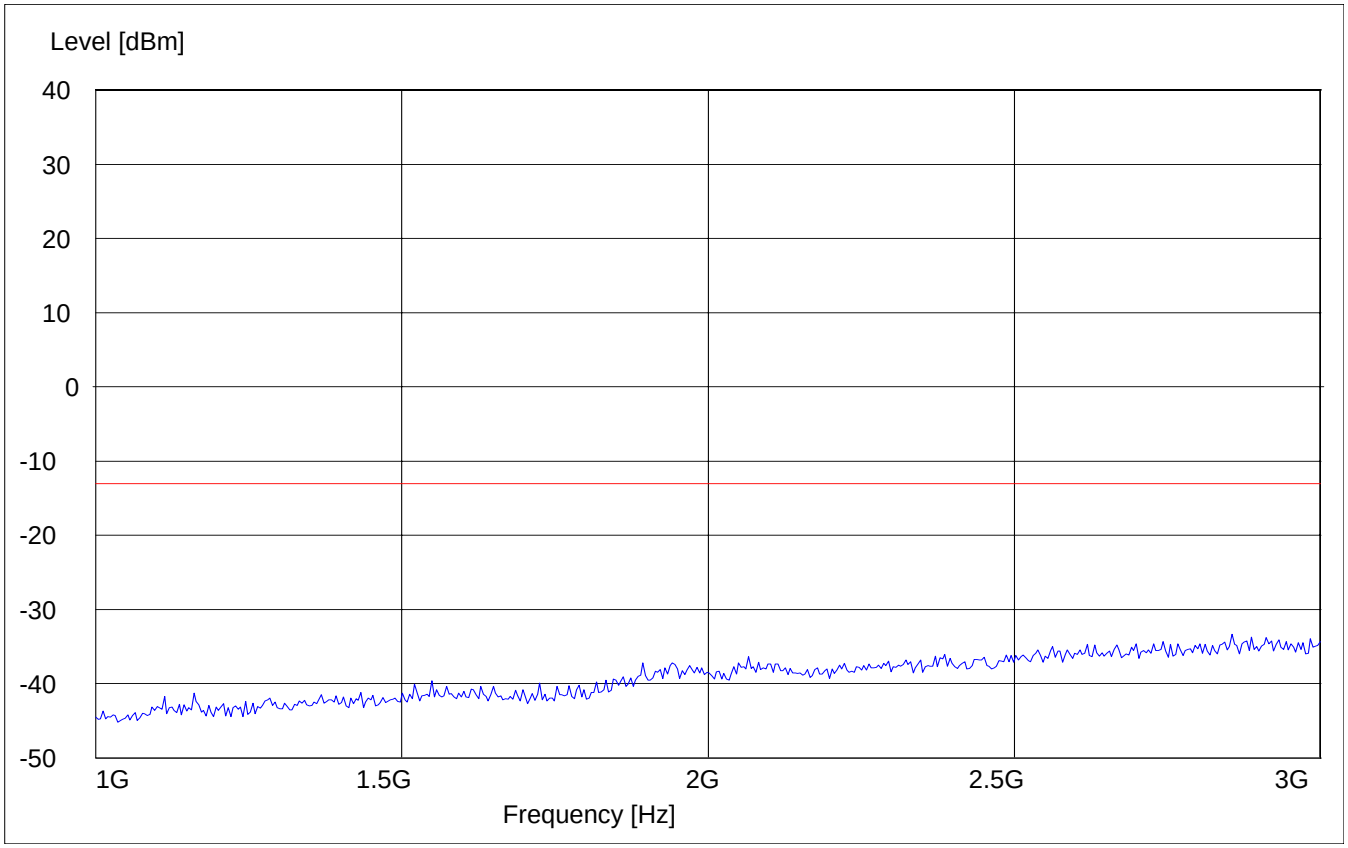


## RADIATED SPURIOUS EMISSIONS
## EUT in Idle Mode: 1GHz – 3GHz

Spurious emission limit –13dBm

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

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

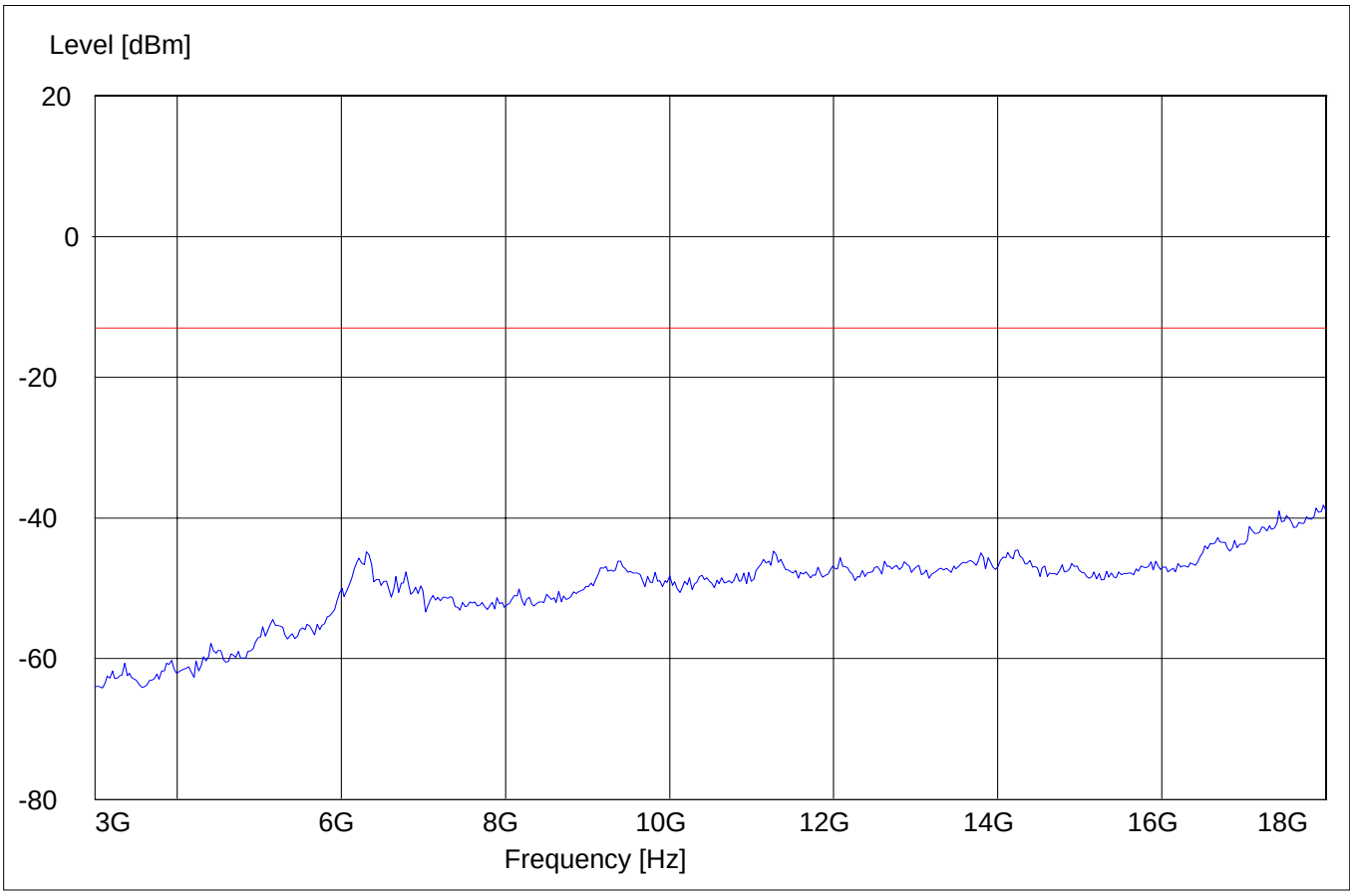


## RADIATED SPURIOUS EMISSIONS
## EUT in Idle Mode: 3GHz – 18GHz

Spurious emission limit –13dBm

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

| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 3GHz | 18GHz | Max Peak | Coupled | 1 MHz |

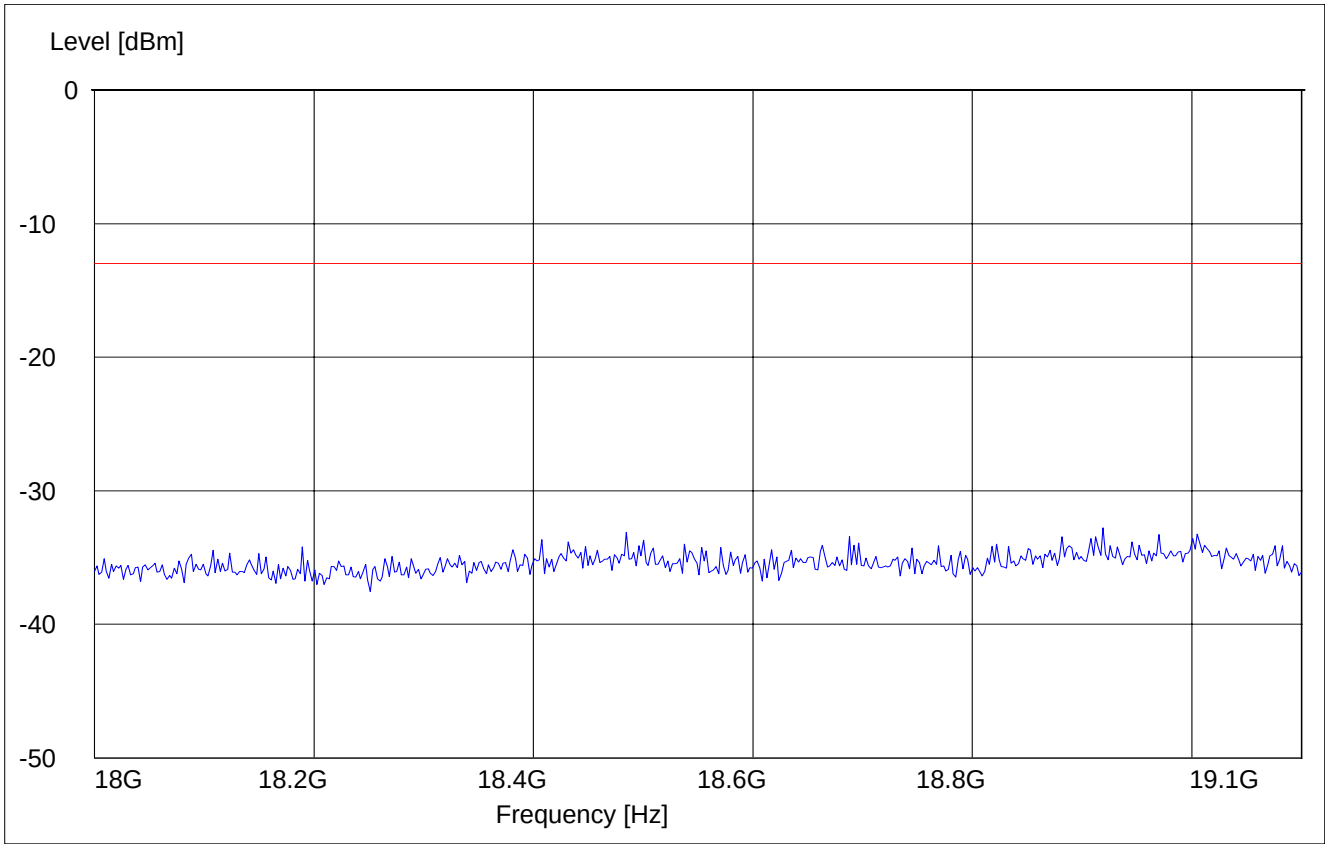


## RADIATED SPURIOUS EMISSIONS
## EUT in Idle Mode: 18GHz – 19.1GHz

Spurious emission limit –13dBm

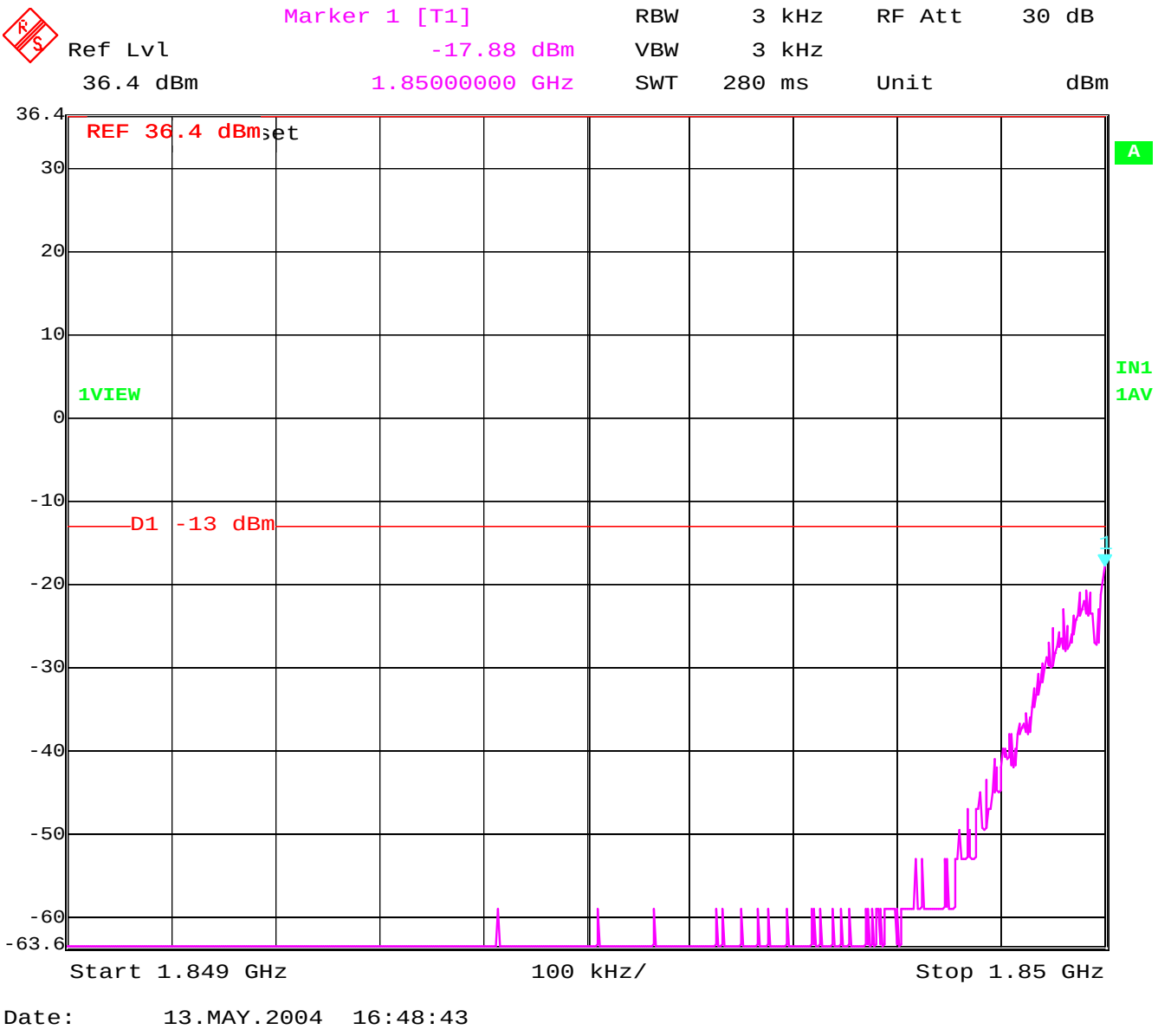
***SWEEP TABLE: "FCC 24 spuri 18-19.1G"***

| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 18GHz | 19.1GHz | Max Peak | Coupled | 1 MHz |

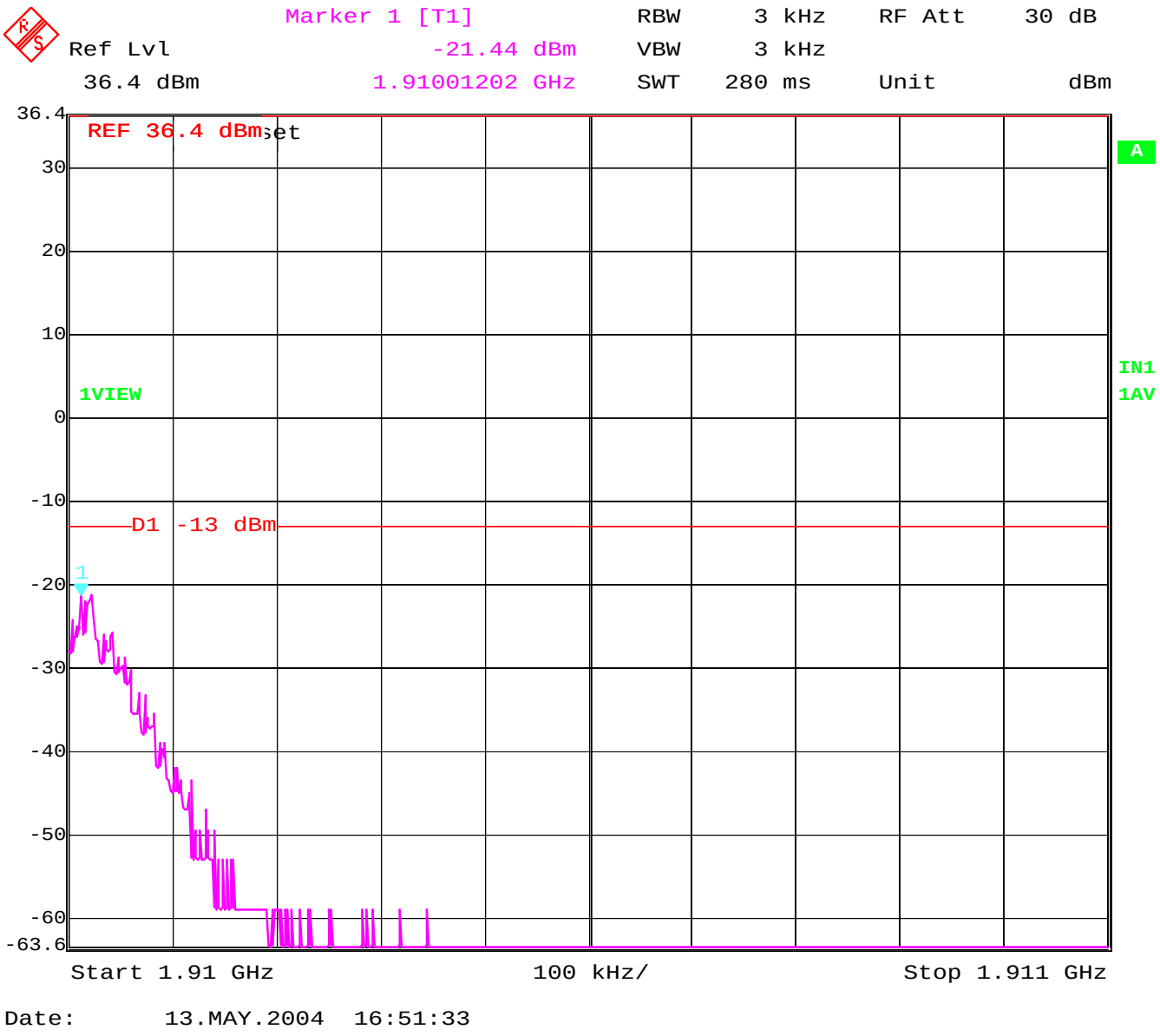


**BAND EDGE COMPLIANCE** **§24.238(b)**
**(Conducted)**

**LOW BAND EDGE BLOCK-A (PCS-1900)** **§2.1049, §24.238 (a)(b)**
**(Conducted)**
**Channel: 512**



**HIGH BAND EDGE BLOCK-C (PCS-1900)** **§2.1049, §24.238 (a)(b)**
**(Conducted)**
**Channel: 810**



## RECEIVER RADIATED EMISSIONS § 15.209

**NOTE: 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 26.5GHz very short cable connections to the antenna was used to minimize the noise level.**

**Limits** **SUBCLAUSE § 15.209**

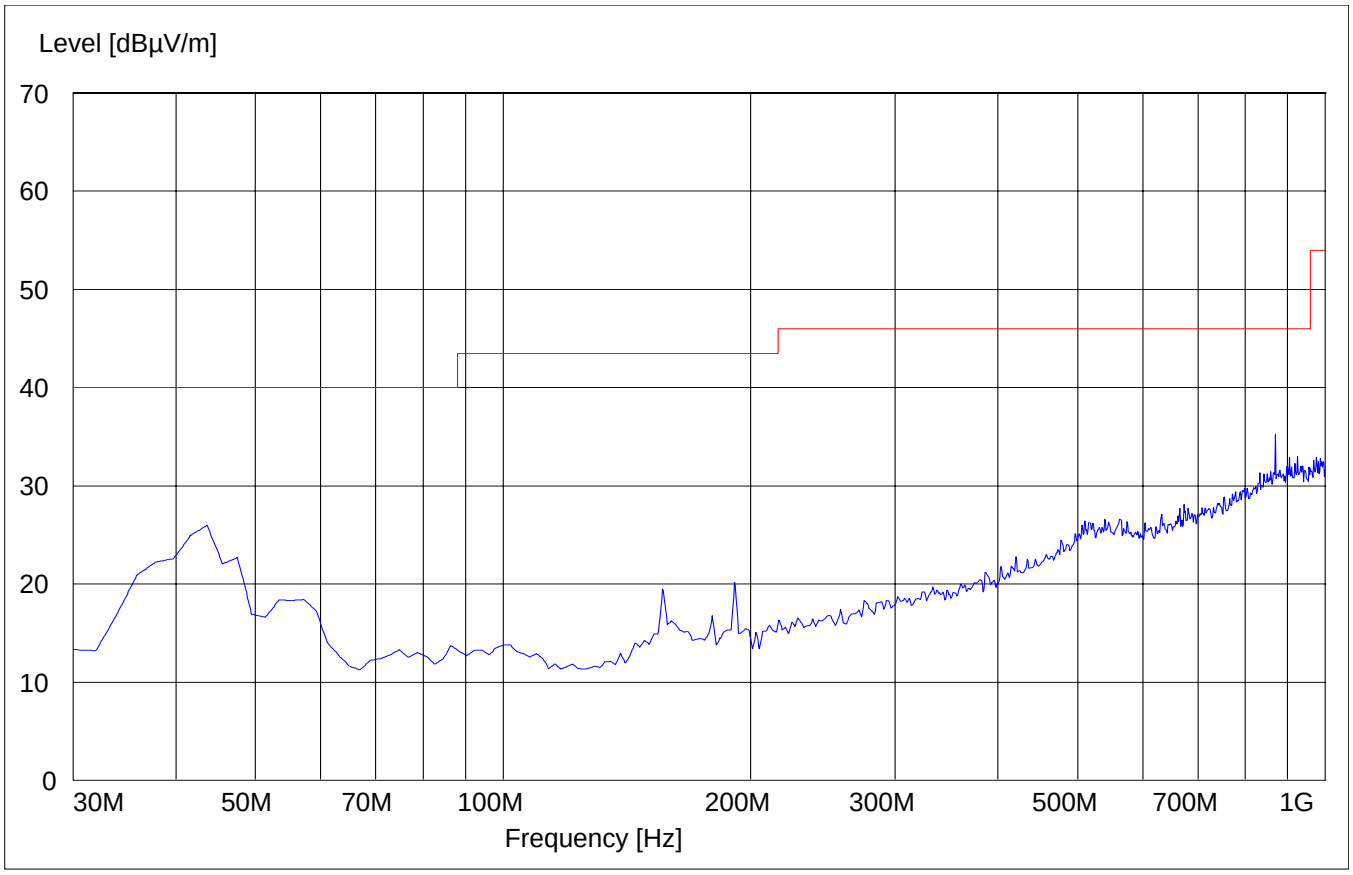
| Frequency (MHz) | Field strength (µV/m) | Measurement distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

## RECEIVER RADIATED EMISSIONS
## EUT in Idle Mode: 30MHz – 1GHz

**Antenna: vertical**

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

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

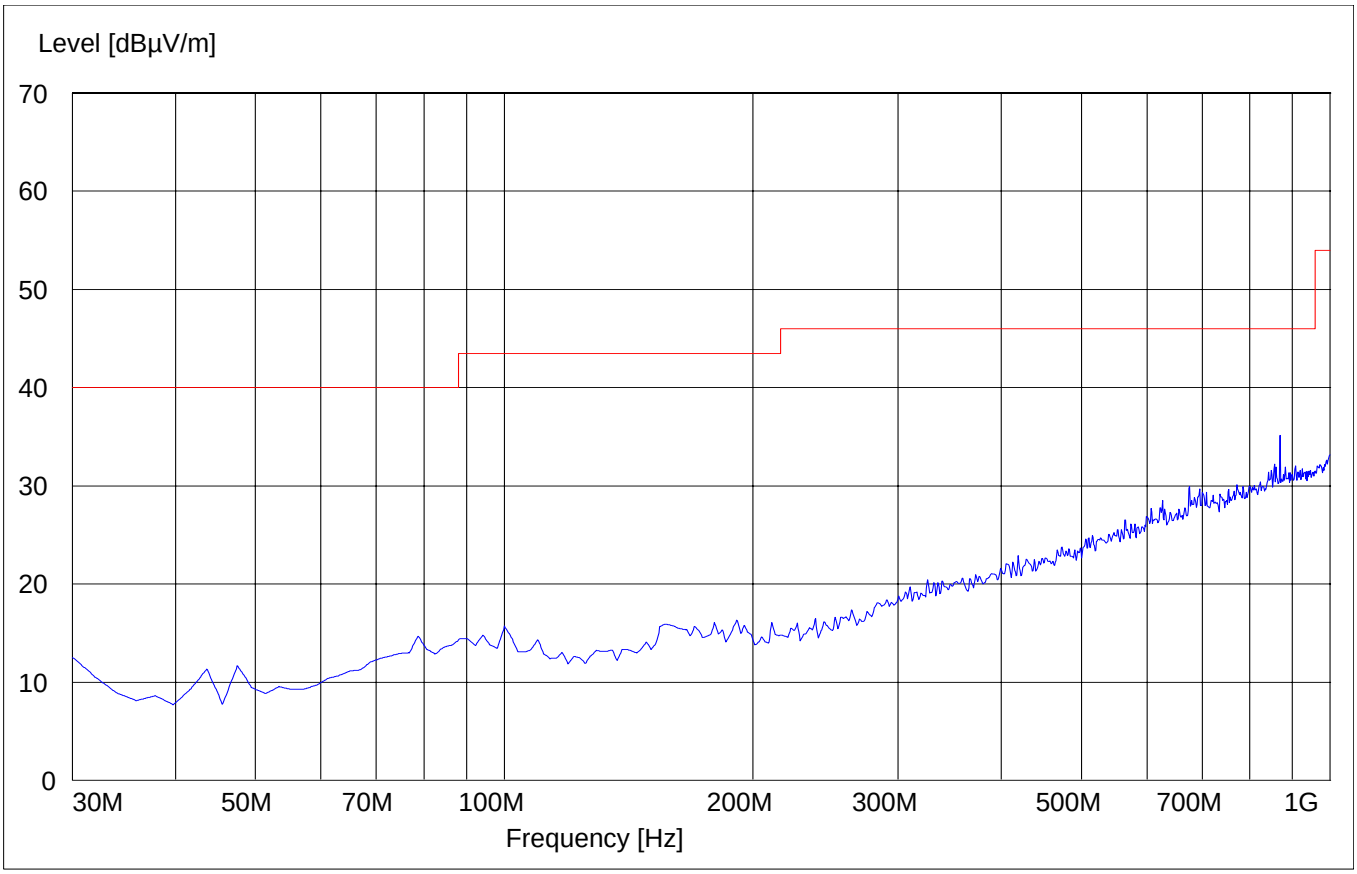


## RECEIVER RADIATED EMISSIONS
## EUT in Idle Mode: 30MHz – 1GHz

**Antenna: horizontal**

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

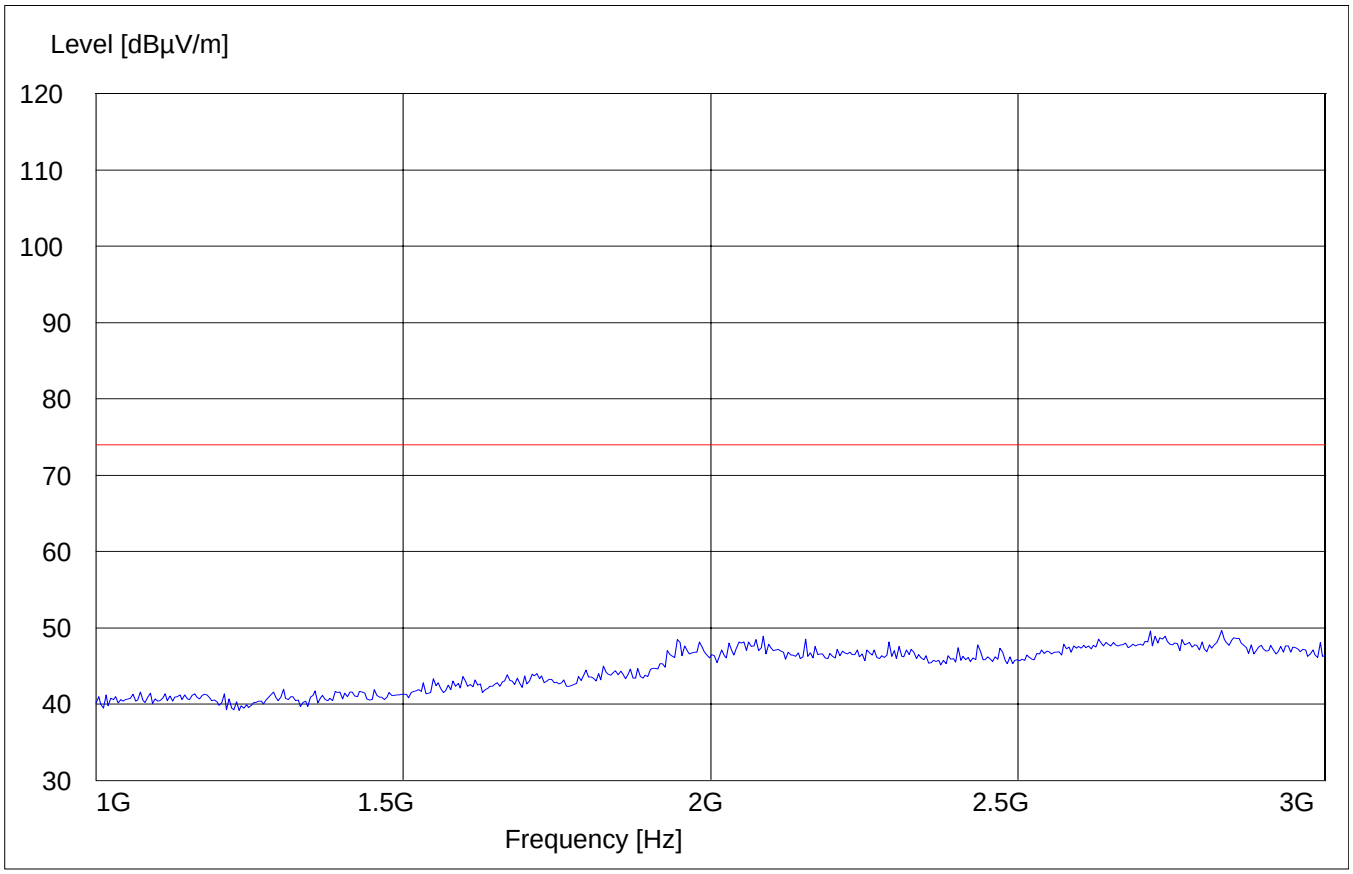
| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 30MHz | 1GHz | Max Peak | Coupled | 100KHz |



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

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

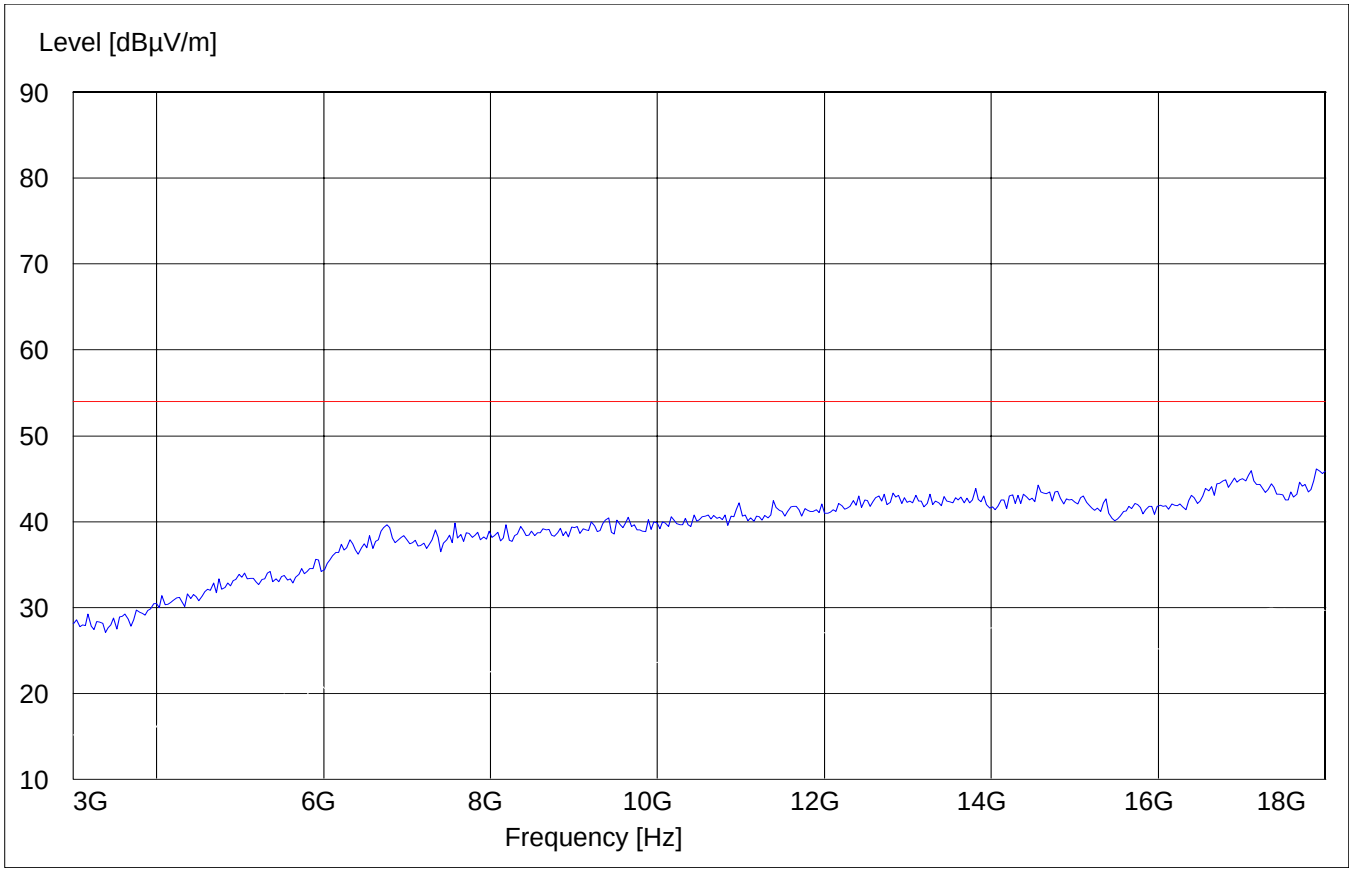
| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 1GHz | 3GHz | Max Peak | Coupled | 1 MHz |



## RECEIVER RADIATED EMISSIONS
## EUT in Idle Mode: 3GHz – 18GHz

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

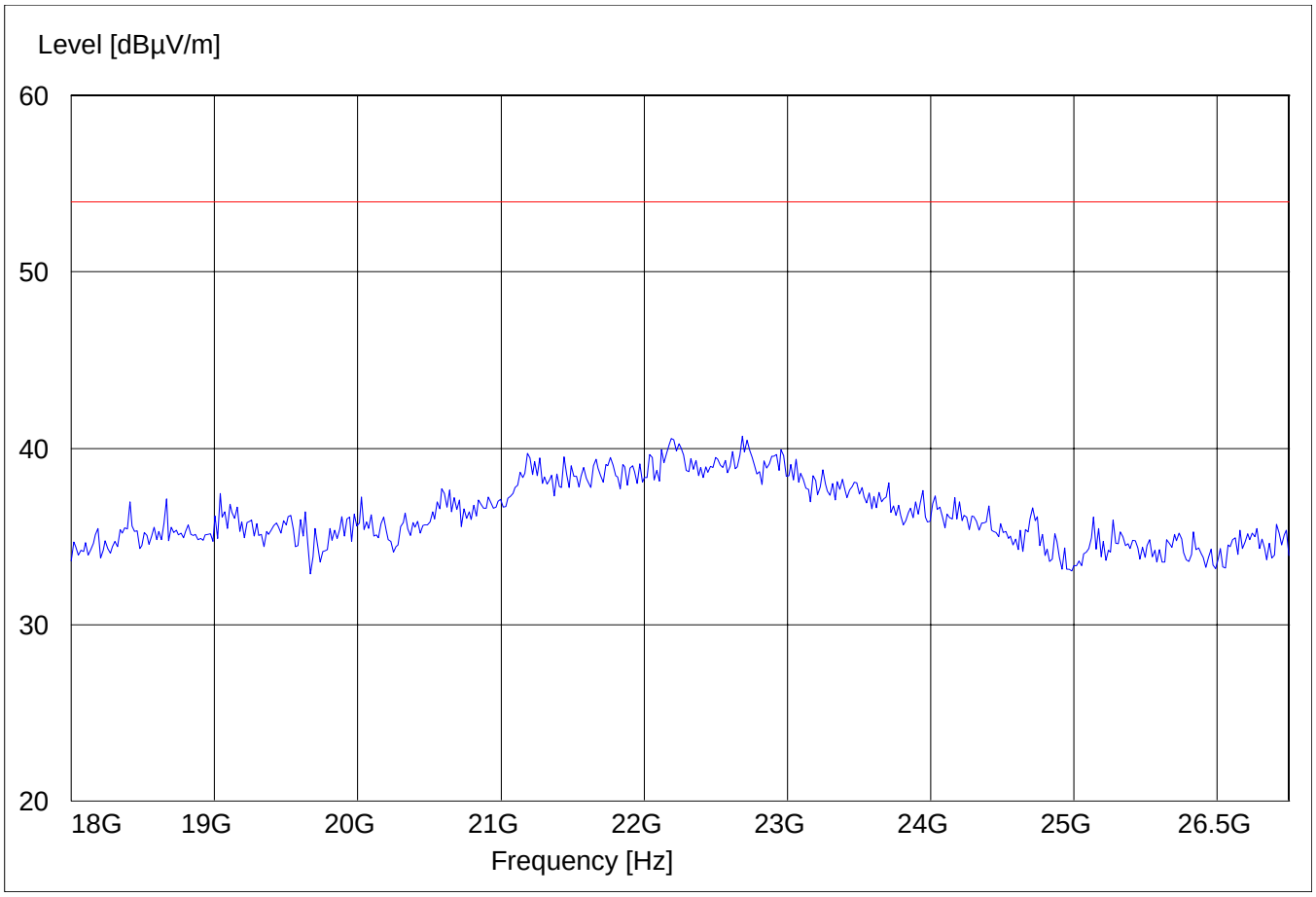
| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 3GHz | 18GHz | Max Peak | Coupled | 1 MHz |



## RECEIVER RADIATED EMISSIONS
## EUT in Idle Mode: 18GHz – 26.5GHz

***SWEEP TABLE: "FCC 24 spuri 18-26.5G"***

| *Start Frequency* | *Stop Frequency* | *Detector* | *Meas. Time* | *RBW/VBW* |
|---|---|---|---|---|
| 18GHz | 26.5GHz | Max Peak | Coupled | 1 MHz |



## CONDUCTED SPURIOUS EMISSIONS

**Measurement Procedure:**
The following steps outline the procedure used to measure the conducted emissions from the EUT.
1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.
For the equipment under test, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

**USPCS Transmitter**

| **Channel** | **Frequency** |
|---|---|
| 512 | 1850.2 MHz |
| 661 | 1880.0 MHz |
| 810 | 1909.8 MHz |

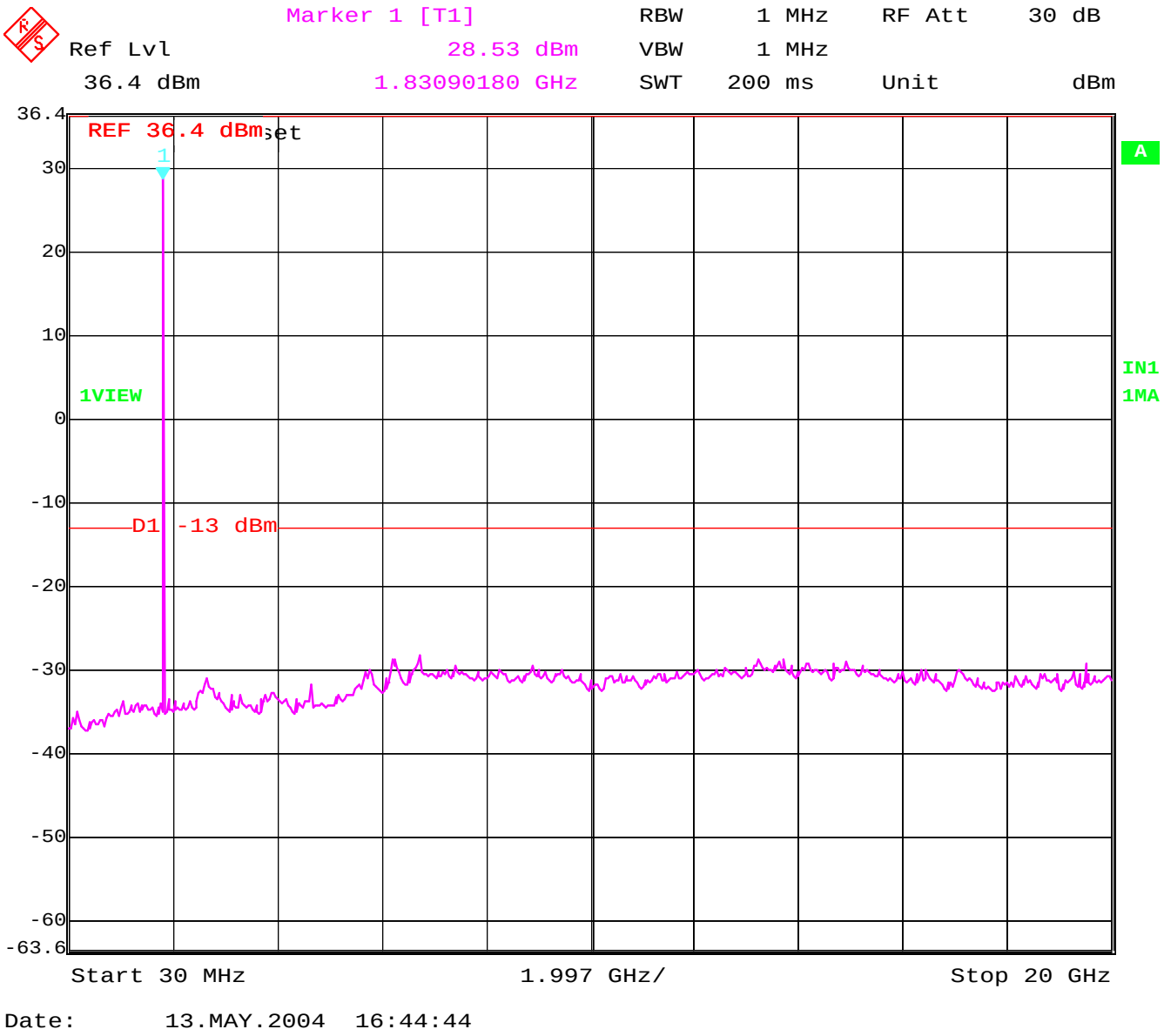
**Measurement Limit:**
Sec. 24.238 Emission Limits.
(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

| **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** | nf | **3760** | nf | **3819.6** | nf |
| **3** | **5550.6** | nf | **5640** | nf | **5729.4** | nf |
| **4** | **7400.8** | nf | **7520** | nf | **7639.2** | nf |
| **5** | **9251** | nf | **9400** | nf | **9549** | nf |
| **6** | **11101.2** | nf | **11280** | nf | **11458.8** | nf |
| **7** | **12951.4** | nf | **13160** | nf | **13368.6** | nf |
| **8** | **14801.6** | nf | **15040** | nf | **15278.4** | nf |
| **9** | **16651.8** | nf | **16920** | nf | **17188.2** | nf |
| **10** | **18502** | nf | **18800** | nf | **19098** | nf |
| nf = noise floor | | | | | | |

## CONDUCTED SPURIOUS EMISSIONS
## Channel 512: 30MHz – 20GHz

Spurious emission limit –13dBm

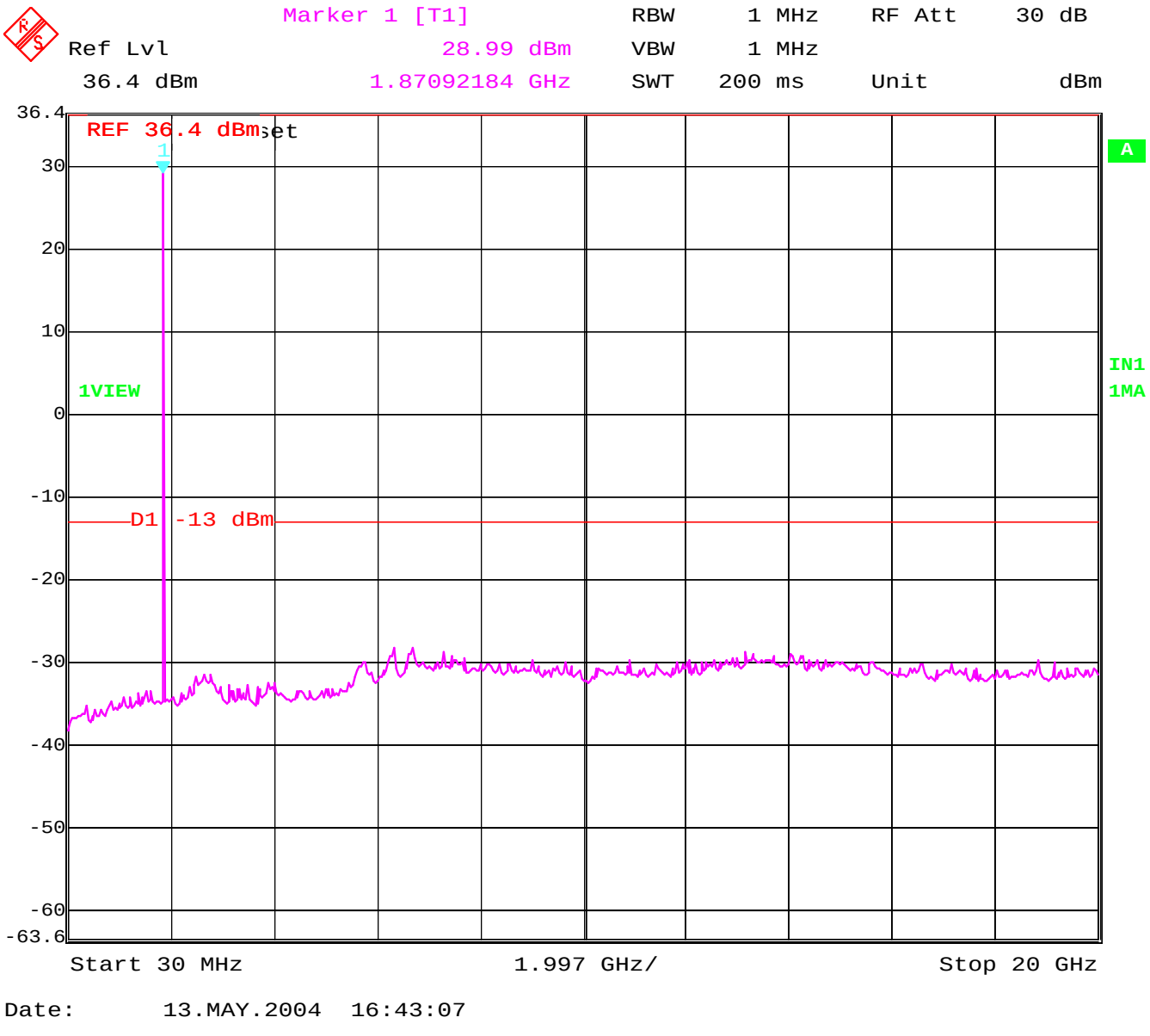
**NOTE: peak above the limit line is the carrier frequency.**



## CONDUCTED SPURIOUS EMISSIONS
## Channel 661: 30MHz – 20GHz

Spurious emission limit –13dBm

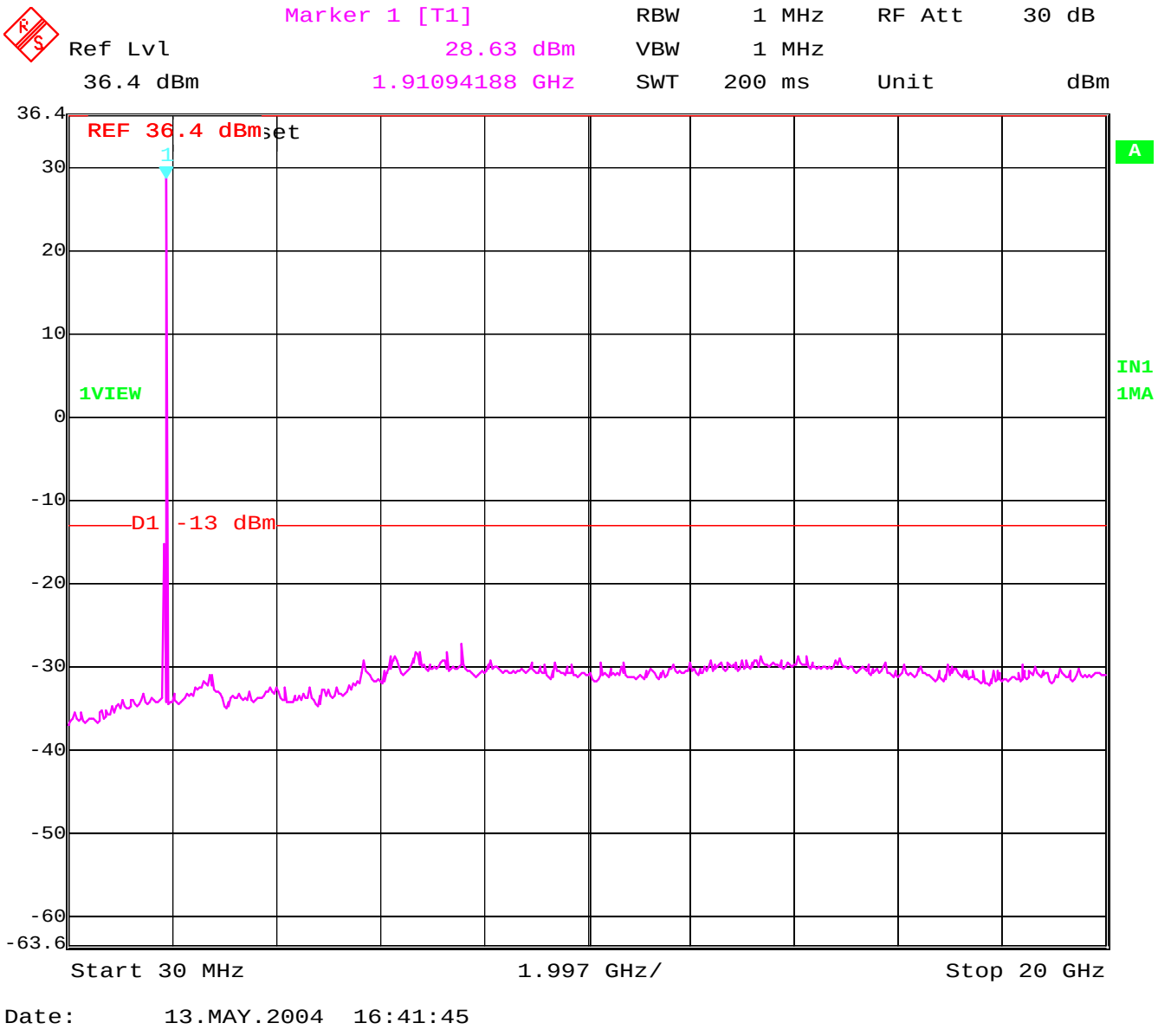
**NOTE: peak above the limit line is the carrier frequency.**



## CONDUCTED SPURIOUS EMISSIONS
## Channel 810: 30MHz – 20GHz

Spurious emission limit –13dBm

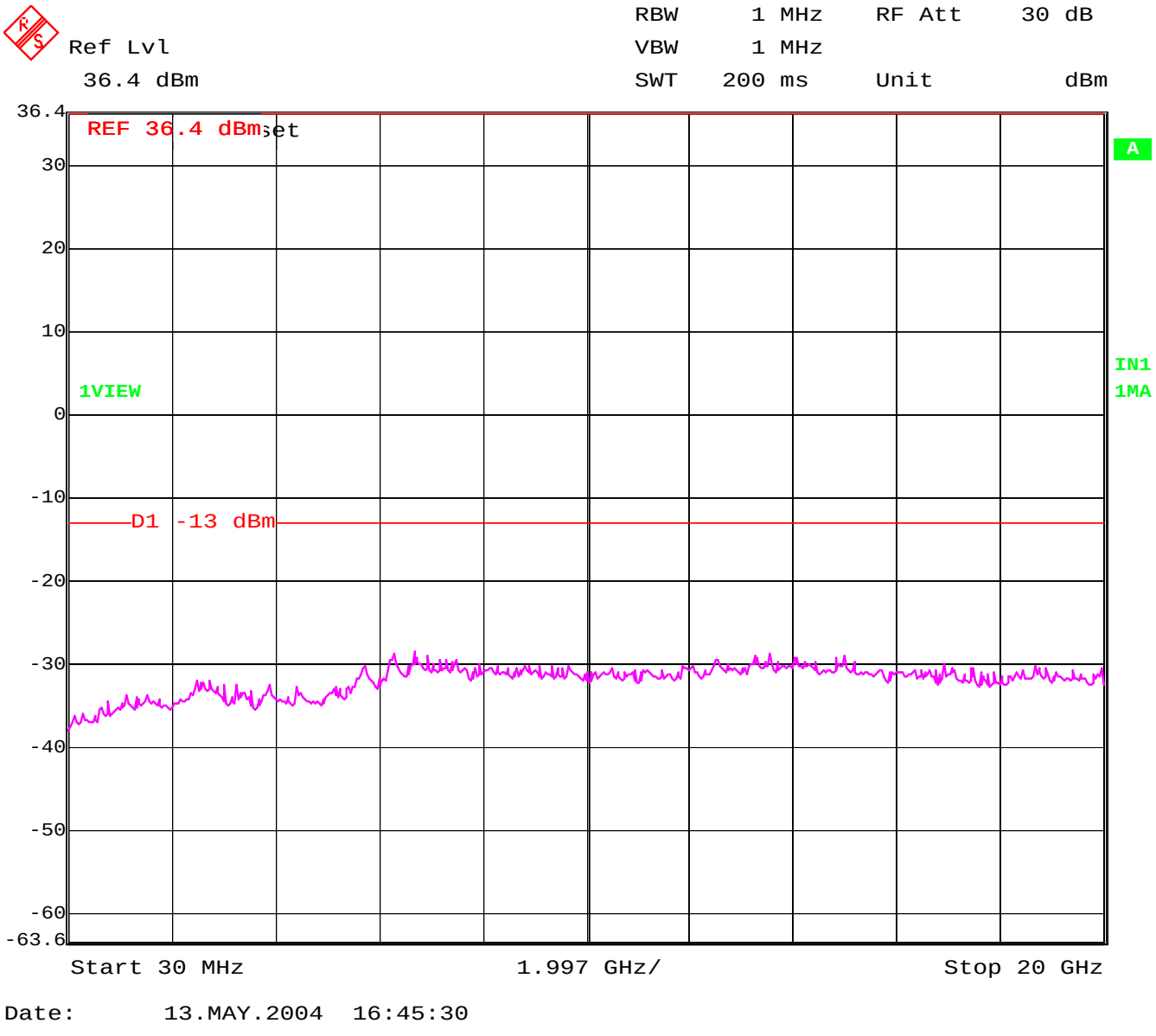
**NOTE: peak above the limit line is the carrier frequency.**



## CONDUCTED SPURIOUS EMISSIONS

### Idle mode: 30MHz – 20GHz

Spurious emission limit –13dBm



**CONDUCTED EMISSIONS** **§ 15.107/207**

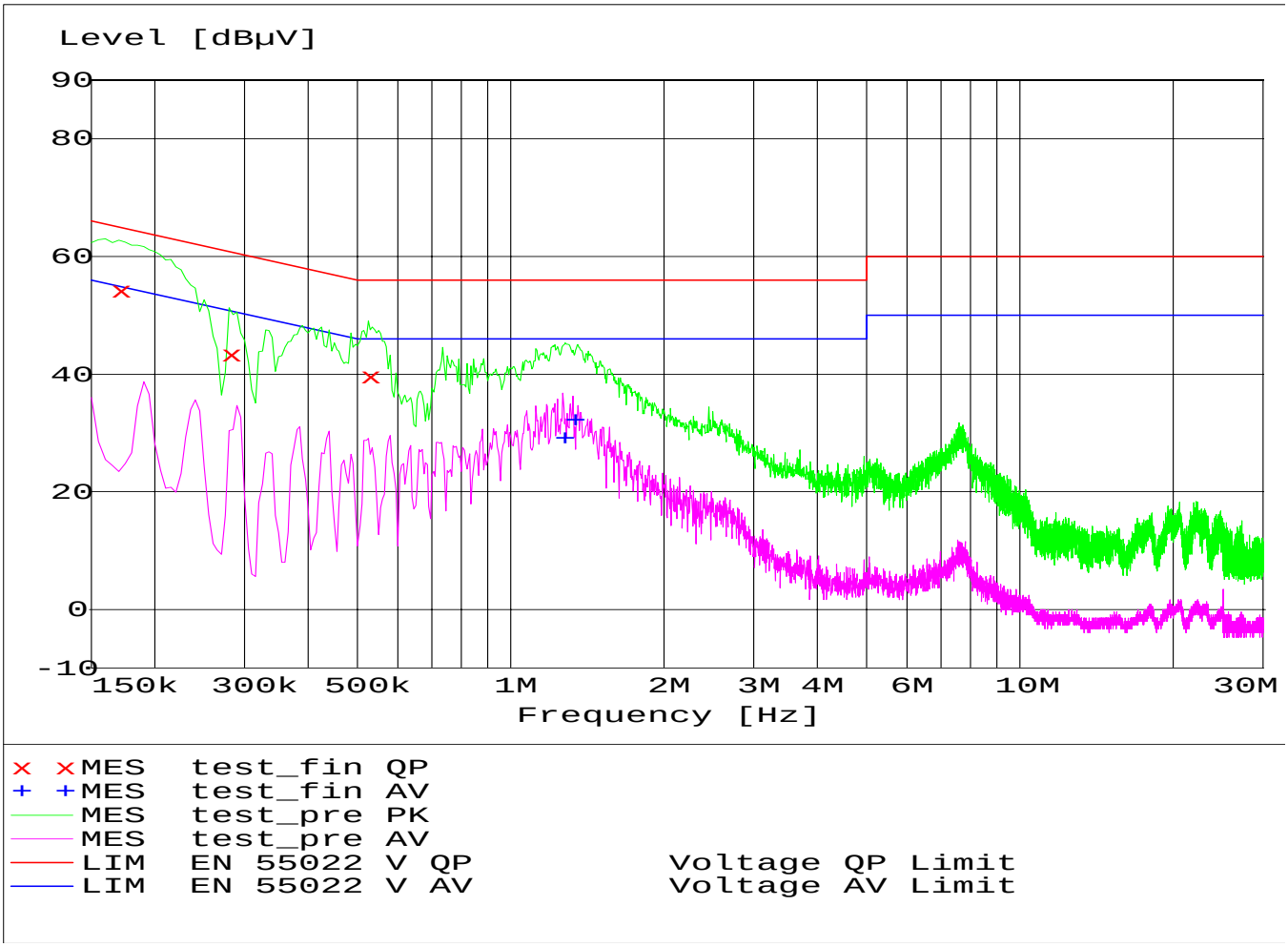
**Measured with AC/DC power adapter plugged in LISN**

**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 |
|---|---|---|---|---|---|---|
| 0.170000 | 54.20 | 0.0 | 65 | 10.8 | L1 | GND |
| 0.280000 | 43.20 | 0.0 | 61 | 17.7 | L1 | GND |
| 0.525000 | 39.60 | 0.0 | 56 | 16.4 | N | GND |

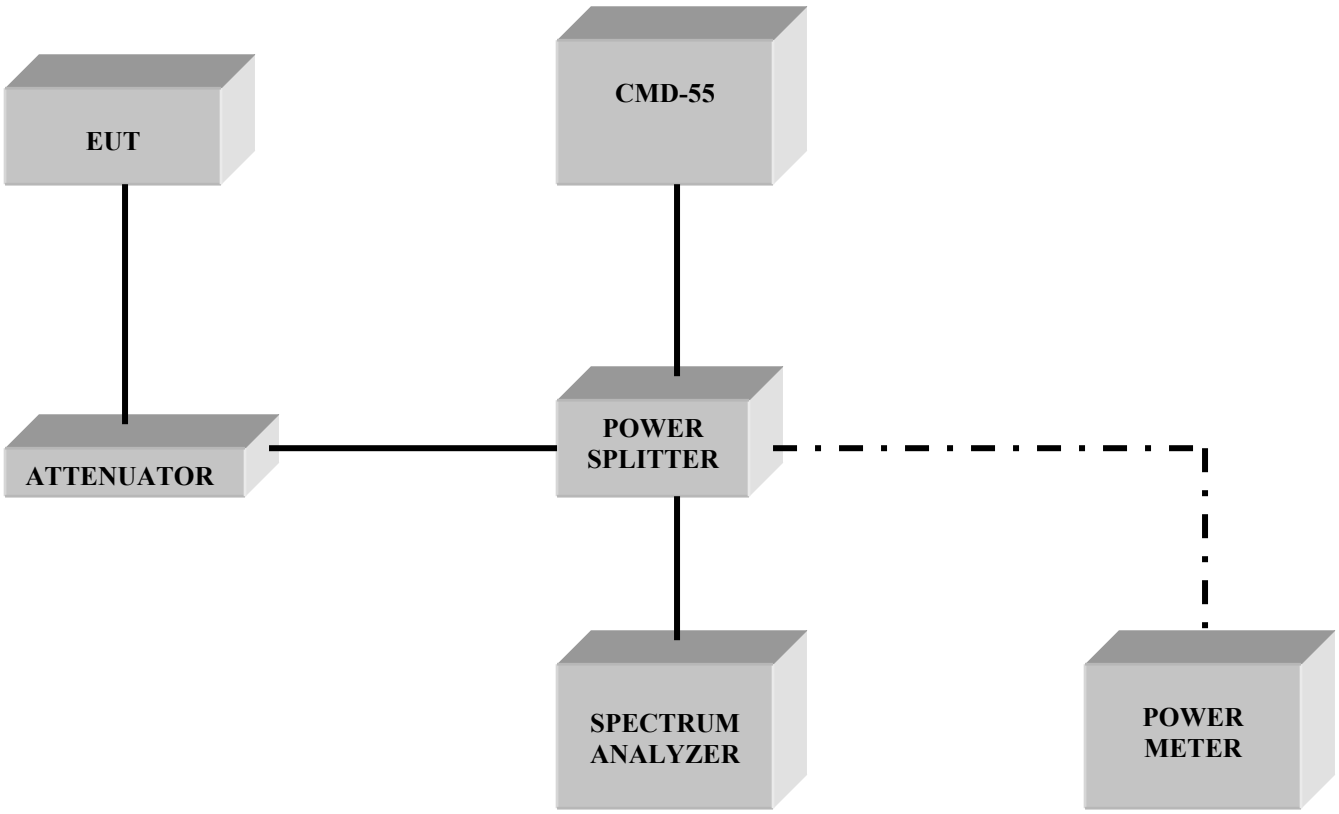
***MEASUREMENT RESULT: "test_fin AV"***

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 1.265000 | 29.00 | 0.0 | 46 | 17.0 | L1 | GND |
| 1.325000 | 32.10 | 0.0 | 46 | 13.9 | N | 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