FCC Part 22 & 24 / RSS 132 & 133

Test report no.: EMC_819_2004_FCC22_24

Model: Teletrac PRISM TM2

FCC ID: NIUBTLTRC

Deutscher Akkreditierungs Rat

TTI-P-G 081/94-A0

Accredited according to **ISO/IEC 17025**

Bluetooth Qualification Test Facility (BQTF)

Authorized Testing Laboratory

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@cetecomusa.com ◆ http://www.cetecom.com

CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686

Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

Table of Contents

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: Pete Krebill

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@cetecomusa.com
Internet: www.cetecom.com

1.3 Details of applicant

Name	**:**	**Teletrac Inc**
Street	**:**	**7391 Lincoln Way**
City / Zip Code	**:**	**Garden Grove CA**
Country	**:**	**USA**
Contact	**:**	**Frank Cruz**
Telephone	**:**	**714 890 7631**
e-mail	**:**	Fcruz@teletrac.net

1.4 Application details

Date of receipt test item	:	5/3/2006
Date of test	:	5/3/2006

1.5 Test item

Manufacturer	:	Applicant
Marketing Name	:	Teletrac TM2
Model No.	:	PRISM TM2
Description	:	GSM / GPRS Vehicle Tracking Unit
FCC-ID	:	NIUBTLTRC
Additional information		
Frequency	:	824.2 MHz – 848.8 MHz & 1850.2MHz – 1909.8MHz
Type of modulation	:	GMSK
Number of channels	:	299 for PCS-1900
Antenna	:	External
Power supply	:	12VDC Nominal voltage
Output power	:	25.4dBm (346.73mW) max. EIRP measured in PCS-1900
Extreme voltage limits	:	9.6VDC to 16.5VDC
Extreme temp. Tolerance	:	Lower: -30°C Upper: +60°C

1.6 Test standards

FCC Part 22, 24 / RSS132, 133

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

The EUT (Teletrac PRISM TM2) carries pre-certified Siemens GSM module model# MC46 with FCC ID: QIPMC46

This test report covers full radiated testing as per FCC 22/24 on EUT with GSM module. All conducted measurements are covered under *Cond_GSM850_2_3350-01-01_03 & Cond_GSM1900_2_205420436_02.*

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”)	**Passed**

Technical responsibility for area of testing:

Date	Section	Name	Signature
5/4/2006	EMC & Radio	Lothar Schmidt (Technical Manager)	

Responsible for test report and project leader:

Date	Section	Name	Signature
5/4/2006	EMC & Radio	Pete Krebill (EMC Engineer)	

2.2 Test report

TEST REPORT

Test report no.: EMC_819_2004_FCC22_24
Model: Teletrac PRISM TM2

TEST REPORT REFERENCE

PARAMETER TO BE MEASURED PARAGRAPH PAGE

Measurements

RF Power Output

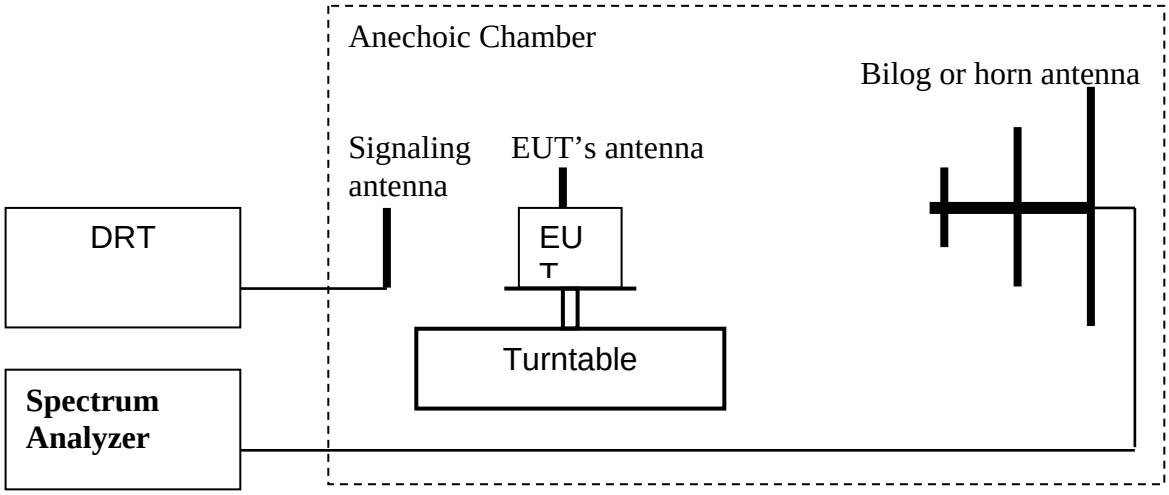
FCC 2.1046 Measurements required: RF power output.
Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

Limits:

FCC 22.913 (a) Effective radiated power limits.
The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

FCC 24.232 (b)(c) Power limits.
(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).
(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

Radiated Output Power Measurement procedure:
Based on TIA-603B November 2002
2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.

2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
   ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
8. Determine the EIRP using the following equation:
   EIRP (dBm) = **ERP** (dBm) + 2.15 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

(**note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

Spectrum analyzer settings:
Res B/W: 3 MHz
Vid B/W: 3 MHz

ERP Results 800 MHz band:

Frequency (MHz)	Effective Radiated Power (dBm)
824.2	29.2
836.6	29.75
848.8	30.71

Note: EIRP was measured and converted to ERP in the table above.

EIRP Results 1900 MHz band:

Frequency (MHz)	Effective Isotropic Radiated Power (dBm)
1850.2	23.44
1880.0	23.93
1909.8	23.55

EIRP (GSM 850) **§22.913(a)**

CHANNEL 128

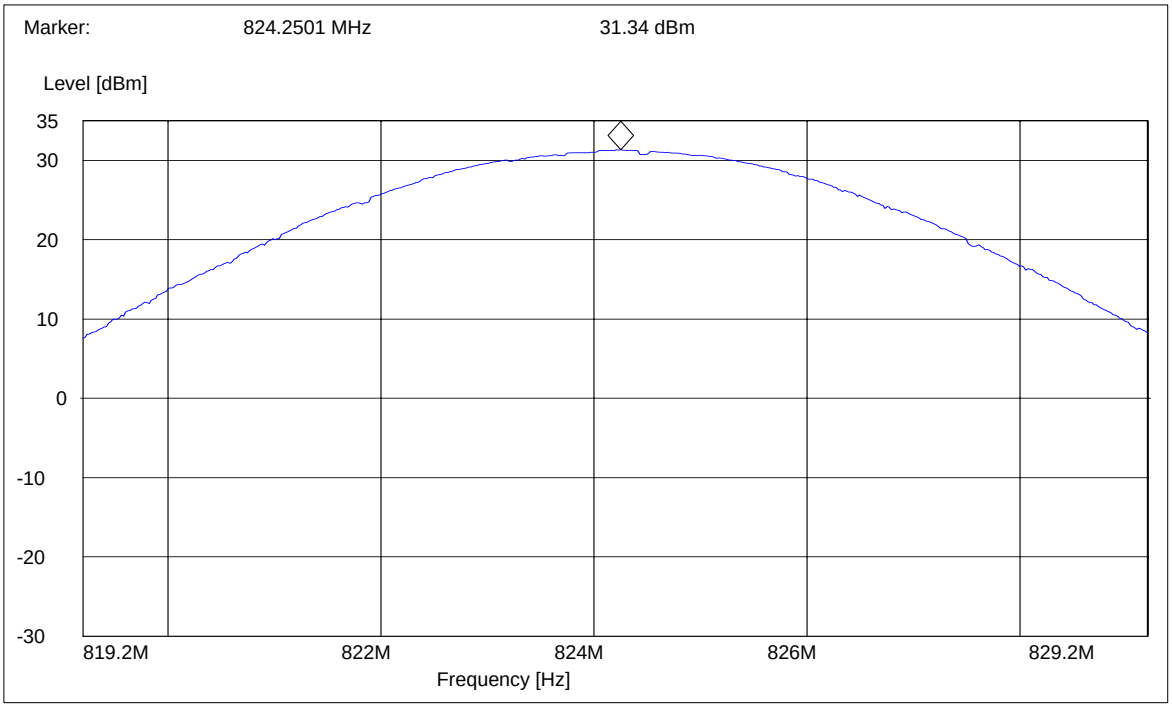
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-128
Antenna: H
EUT: H
Test Engineer: Mark
Comment: EIRP

SWEEP TABLE: "EIRP 850 CH 128 H"

Unit: dBm
Detector: Mode:
Curve 1: MaxPeak MaxHold



EIRP (GSM 850) **§22.913(a)**

CHANNEL 190

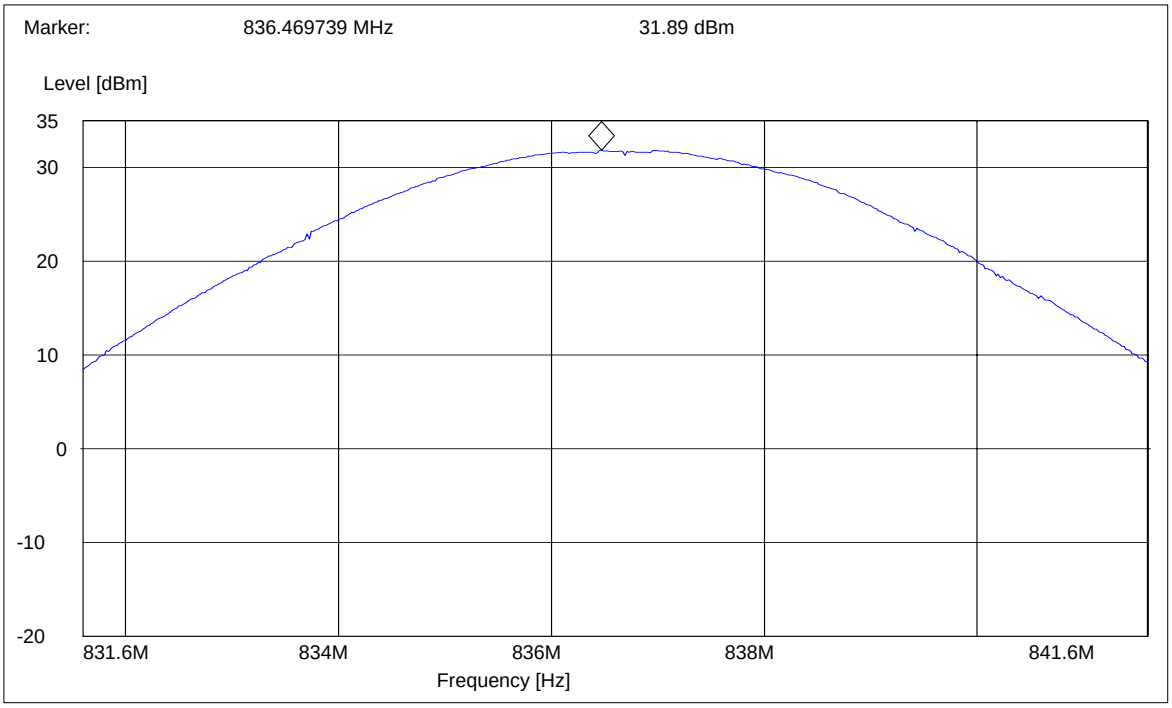
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-190
Antenna: H
EUT: H
Test Engineer: Mark
Comment: EIRP

SWEEP TABLE: "EIRP 850 CH 190 H"

Unit: dBm
Detector: Mode:
Curve 1: MaxPeak MaxHold



EIRP (GSM 850) **§22.913(a)**

CHANNEL 251

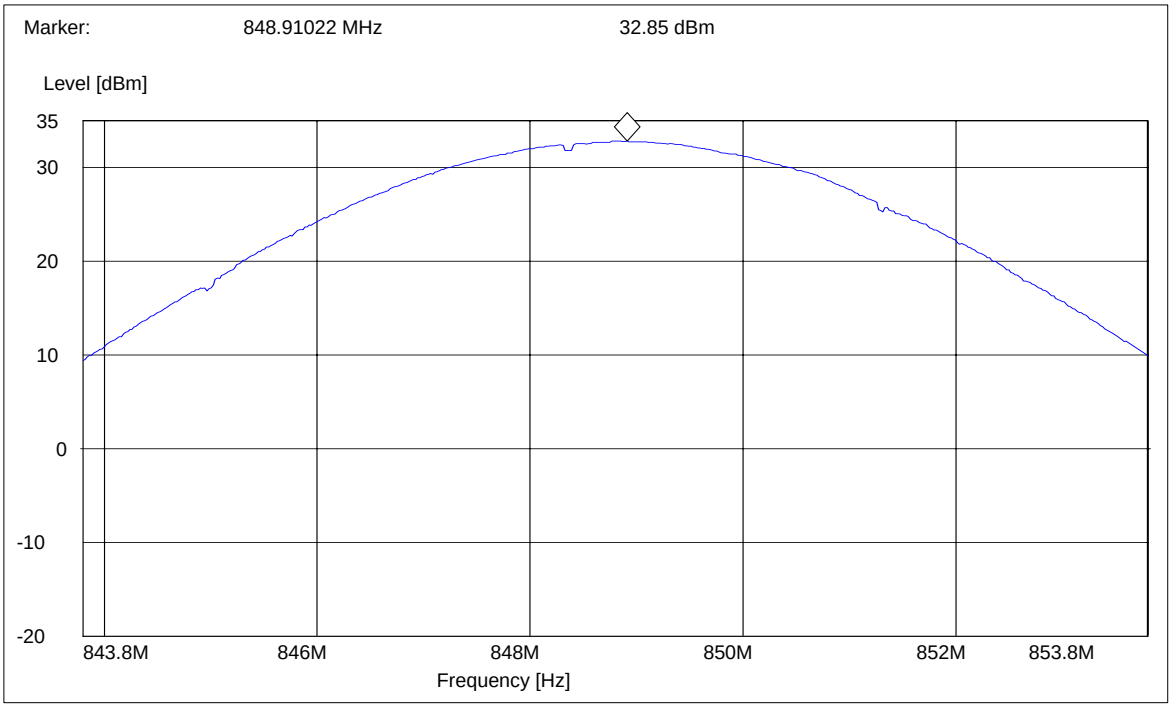
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-251
Antenna: H
EUT: H
Test Engineer: Mark
Comment: EIRP

SWEEP TABLE: "EIRP 850 CH 251 H"

Unit: dBm
Detector: Mode:
Curve 1: MaxPeak MaxHold



EIRP (PCS-1900) **§24.232(b)**

CHANNEL 512

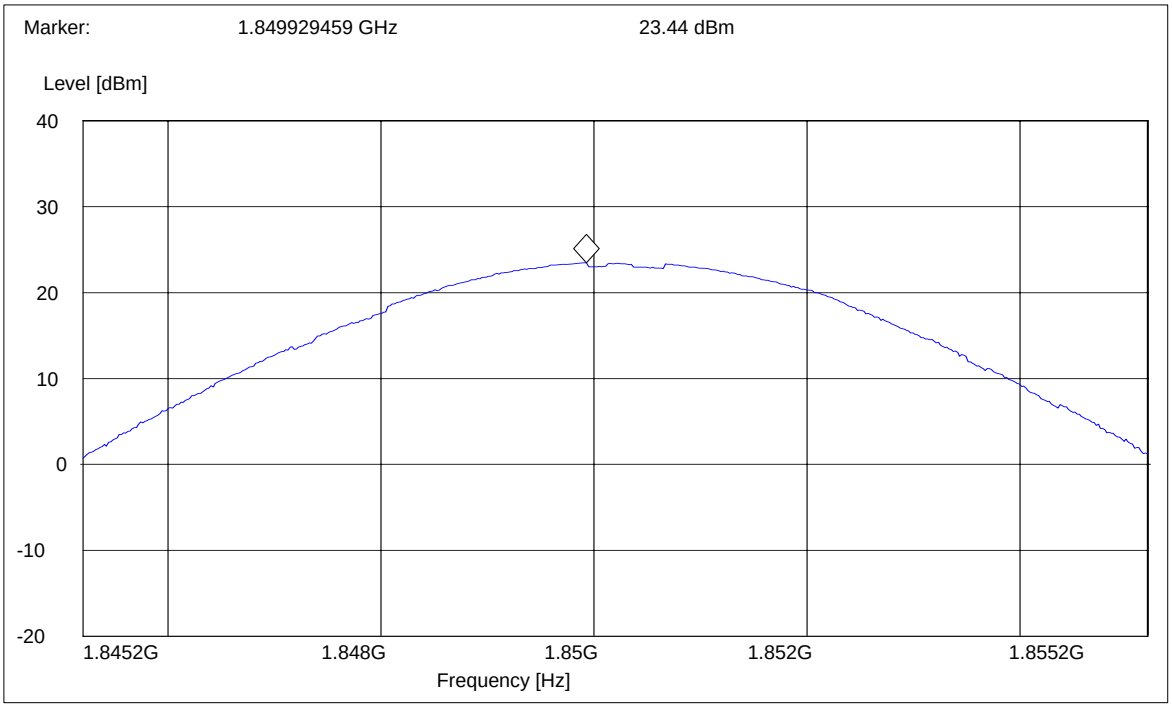
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 Ch 512
Antenna: V
EUT: V
Test Engineer: Pete
Comment: FCC 24

SWEEP TABLE: "EIRP 1900 CH512"

Short Description: EIRP PCS 1900 for channel-512
Unit: dBm
Detector: Mode:



EIRP (PCS-1900) **§24.232(b)**

CHANNEL 661

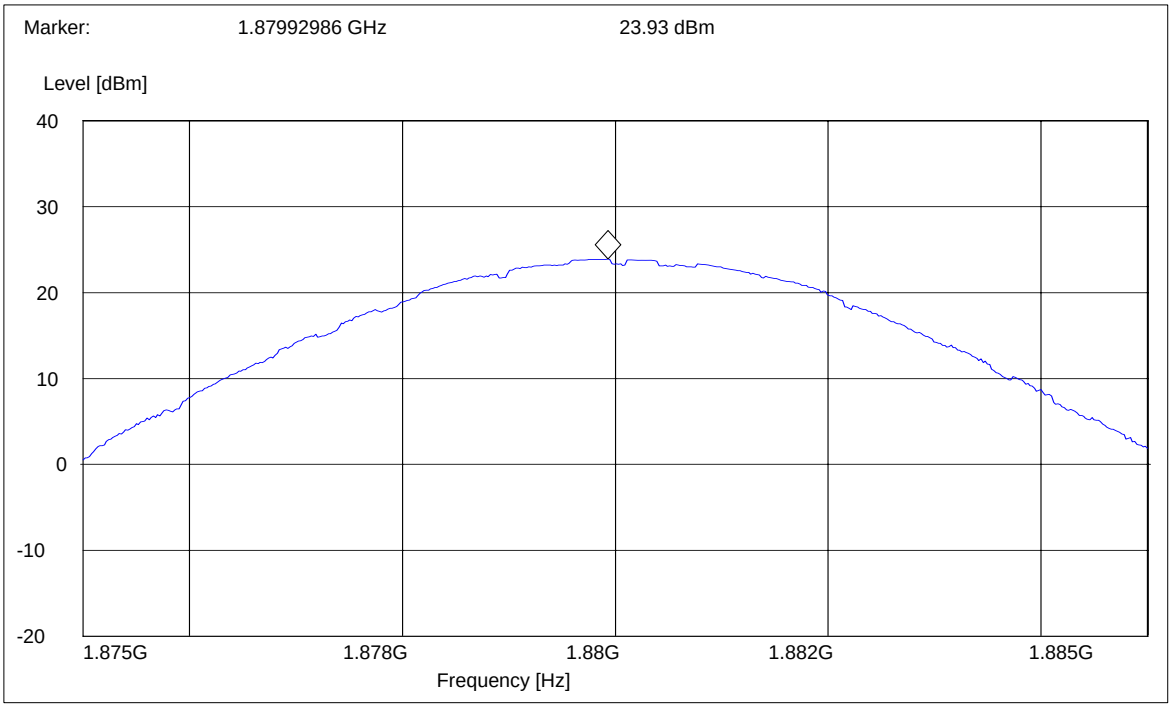
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 Ch 661
Antenna: V
EUT: V
Test Engineer: Pete
Comment: FCC 24

SWEEP TABLE: "EIRP 1900 CH661"

Short Description: EIRP PCS 1900 for channel-661
Unit: dBm
Detector: Mode:



EIRP (PCS-1900) **§24.232(b)**

CHANNEL 810

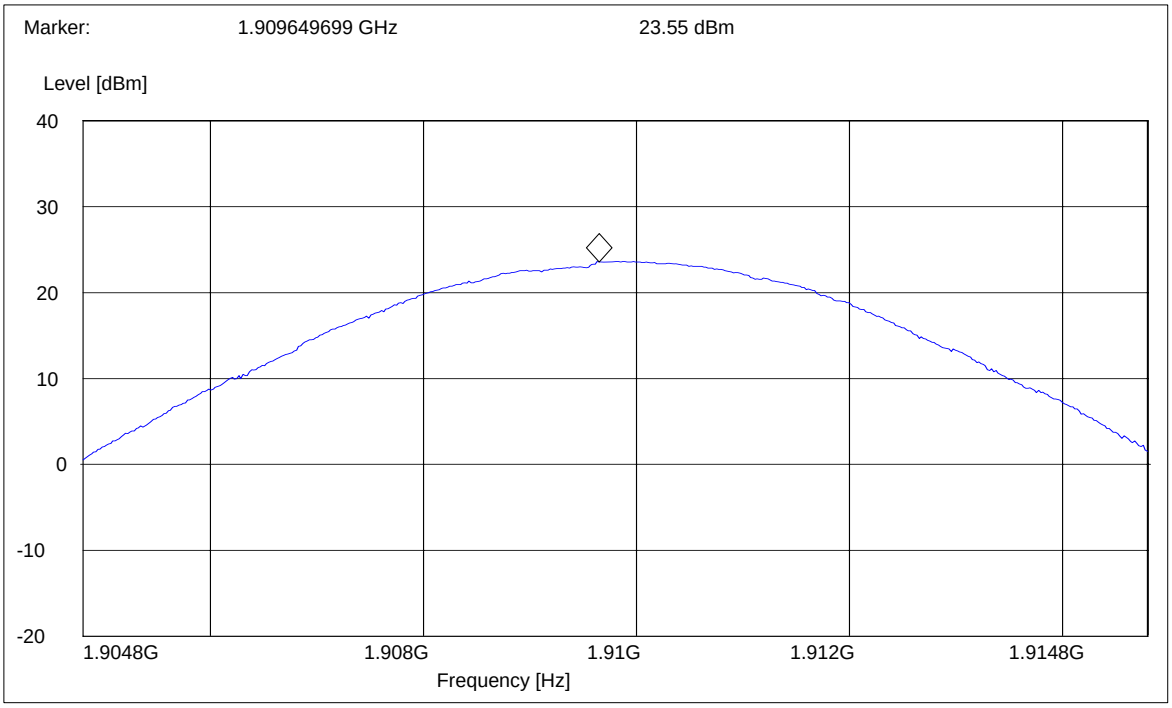
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 Ch 810
Antenna: V
EUT: V
Test Engineer: Pete
Comment: FCC 24

SWEEP TABLE: "EIRP 1900 CH810"

Short Description: EIRP PCS 1900 for channel-810
Unit: dBm
Detector: Mode:



Spurious Emissions Radiated

FCC 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

Limits:

FCC 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC 24.238 Emission limitations for Broadband PCS equipment.

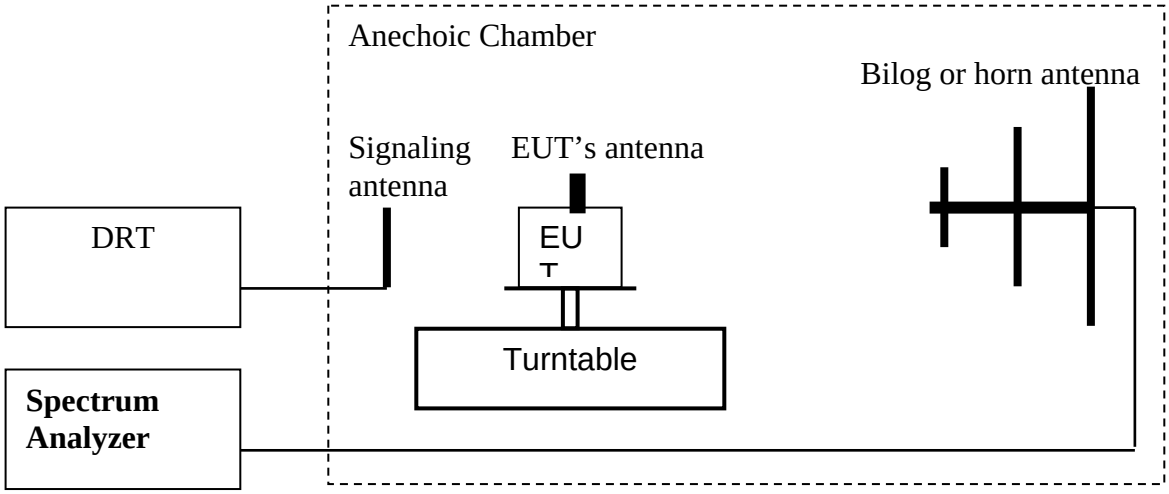
The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the

carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Radiated out of band measurement procedure:
Based on TIA-603B November 2002
2.2.12 Unwanted emissions: Radiated Spurious



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation:
   Spurious (dBm) = **LVL** (dBm) + **LOSS** (dB):
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:
   Spurious (dBm) = **LVL** (dBm) + **LOSS** (dB):
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

(**note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

Spectrum analyzer settings:
Res B/W: 1 MHz
Vid B/W: 1 MHz

Measurement Survey:
Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the GSM-850 & PCS-1900 bands. 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 GSM-850 & PCS-1900 band into any of the other blocks respectively. 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.

RESULTS OF RADIATED TESTS GSM-850:

Harmonics	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
2	**1648.4**	NF	**1673.2**	NF	**1697.6**	NF
3	**2472.6**	-38	**2509.8**	-35.11	**2546.4**	-38.49
4	**3296.8**	NF	**3346.4**	NF	**3395.2**	NF
5	**4121**	NF	**4183**	NF	**4244**	-NF
6	**4945.2**	-44.93	**5019.6**	-44.45	**5092.8**	-47.34
7	**5769.4**	NF	**5856.2**	NF	**5941.6**	NF
8	**6593.6**	NF	**6692.8**	NF	**6790.4**	NF
9	**7417.8**	NF	**7529.4**	NF	**7639.2**	NF
10	**8242**	NF	**8366**	NF	**8488**	NF
NF = NOISE FLOOR						

RADIATED SPURIOUS EMISSIONS (GSM-850)

TX: 30MHz - 1GHz

Spurious emission limit –13dBm

Antenna: vertical

SWEEP TABLE: "FCC 22 Spur 30M-1G"

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

Note:

1.The peak above the limit line is the carrier freq.

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

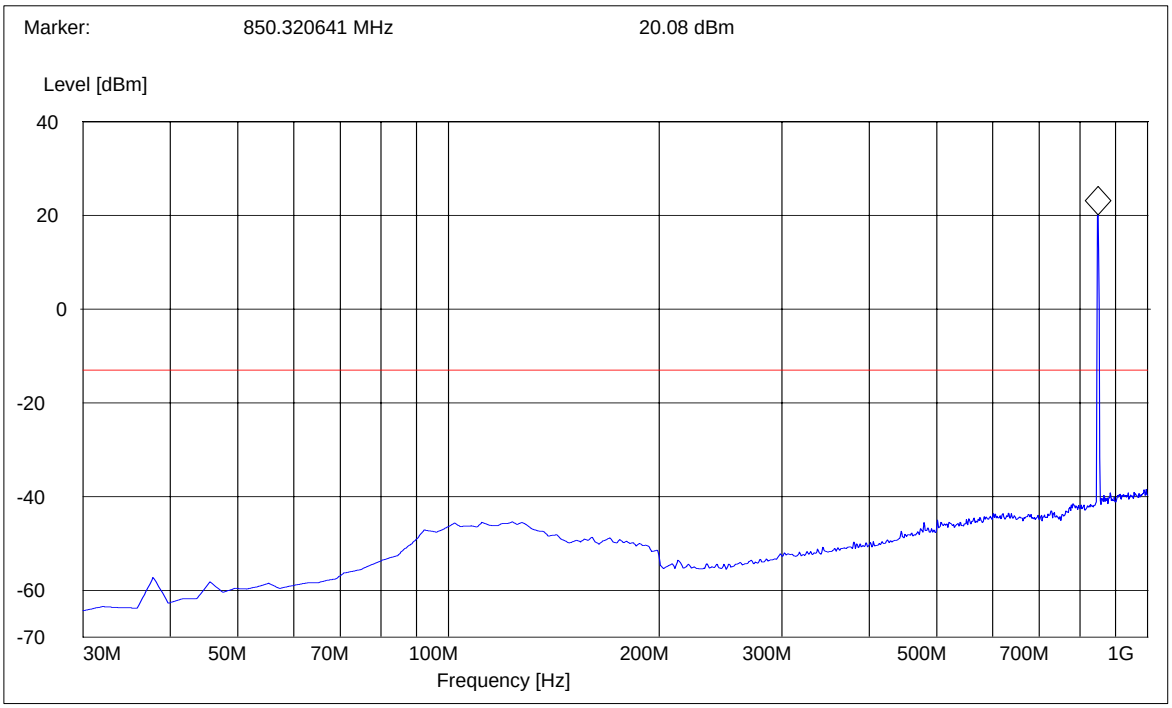
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-128
Antenna: V
EUT: H
Test Engineer: Mark
Comment: 30MHz-1GHz

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"

Short Description: FCC 24 30MHz-1GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 824.2MHz: 1GHz – 1.58GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1-1.58G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz

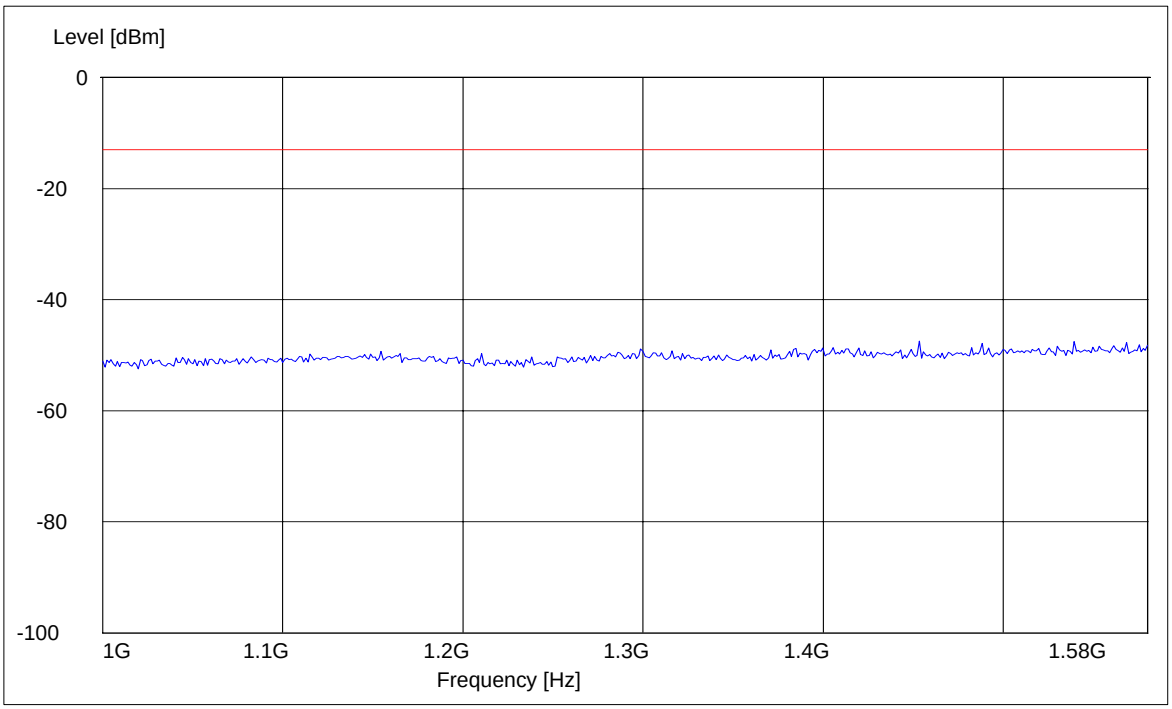
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-128
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 1GHz-1.58GHz

SWEEP TABLE: "FCC 22Spuri 1-1.58G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 824.2MHz: 1.58GHz – 3GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1.58-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

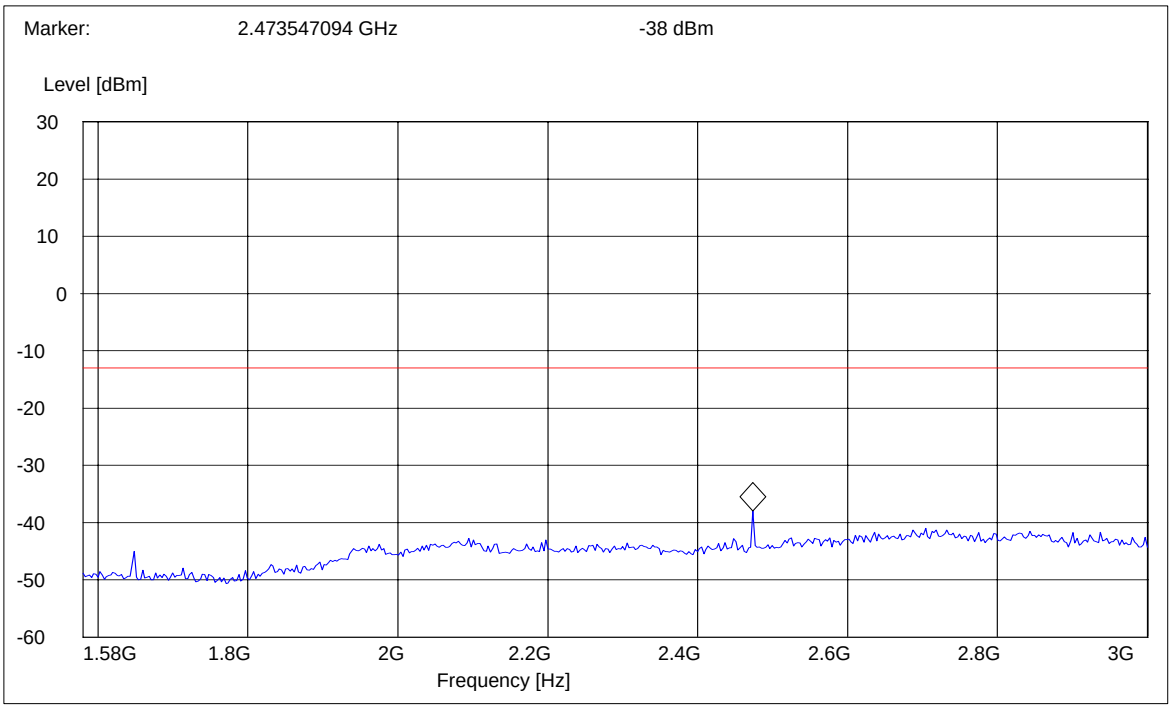
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-128
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 1.58GHz-3GHz

SWEEP TABLE: "FCC 22Spuri 1.58-3G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 824.2MHz: 3GHz – 9GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 3-9G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz

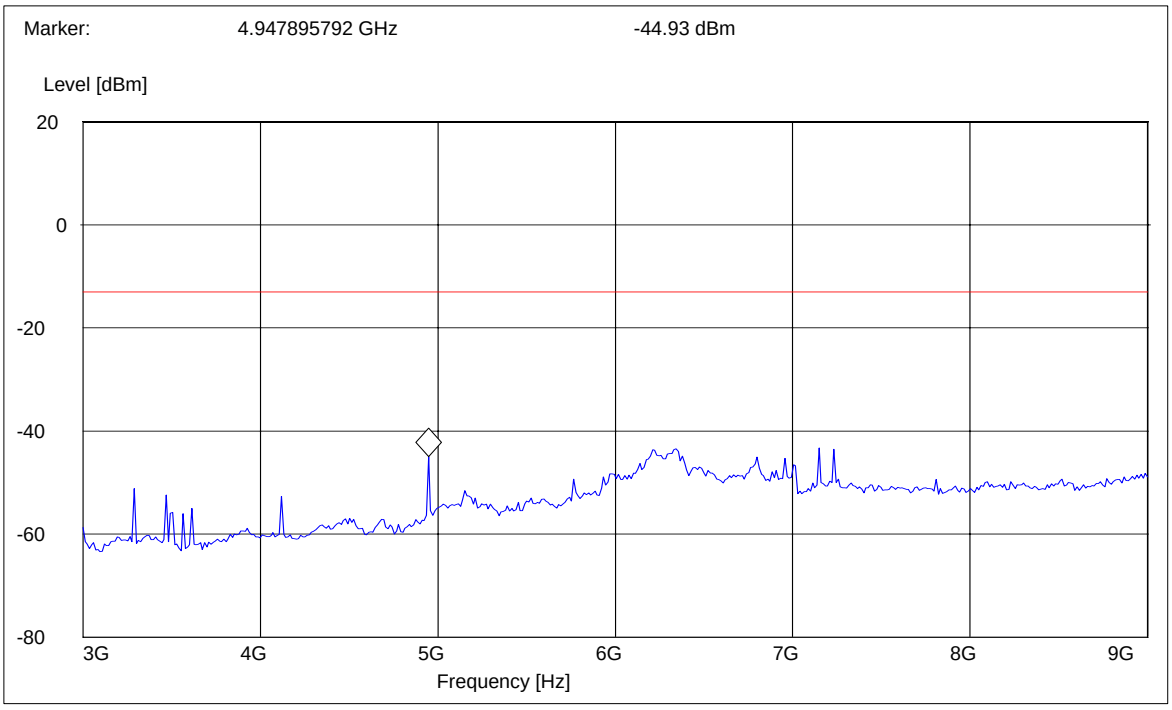
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-128
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 3GHz-9GHz

SWEEP TABLE: "FCC 22Spuri 3-9G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 836.6MHz: 1GHz – 1.58GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1-1.58G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz

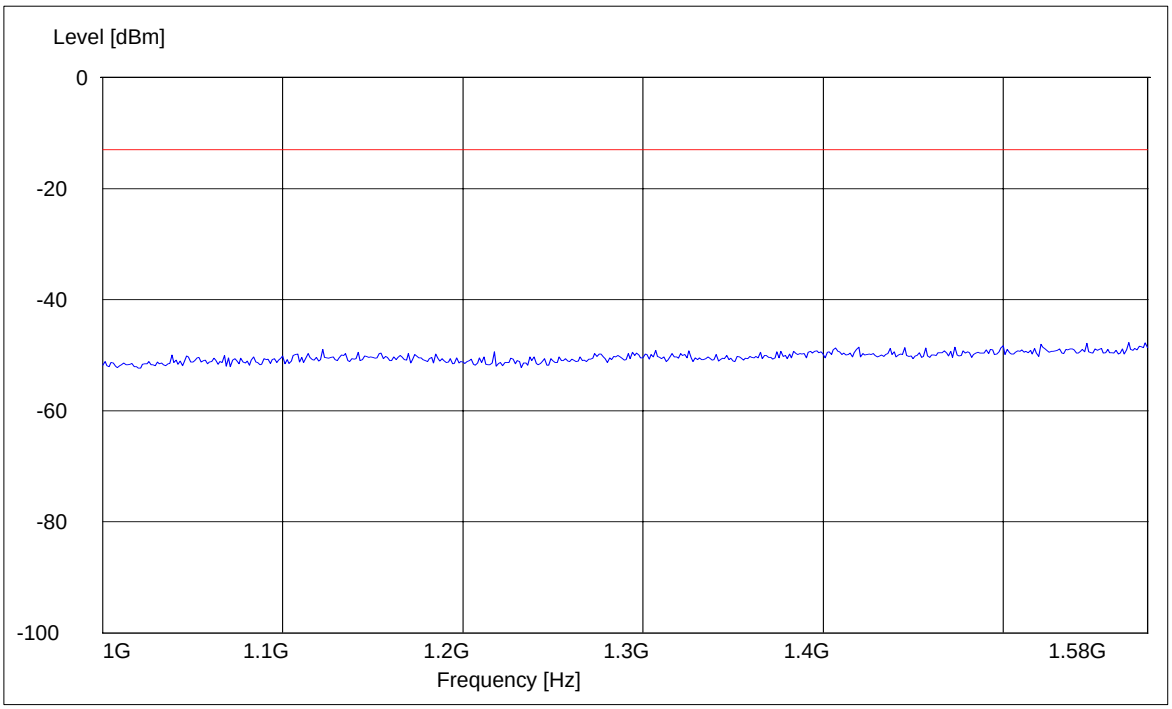
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-190
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 1GHz-1.58GHz

SWEEP TABLE: "FCC 22Spuri 1-1.58G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 836.6MHz: 1.58GHz – 3GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1.58-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

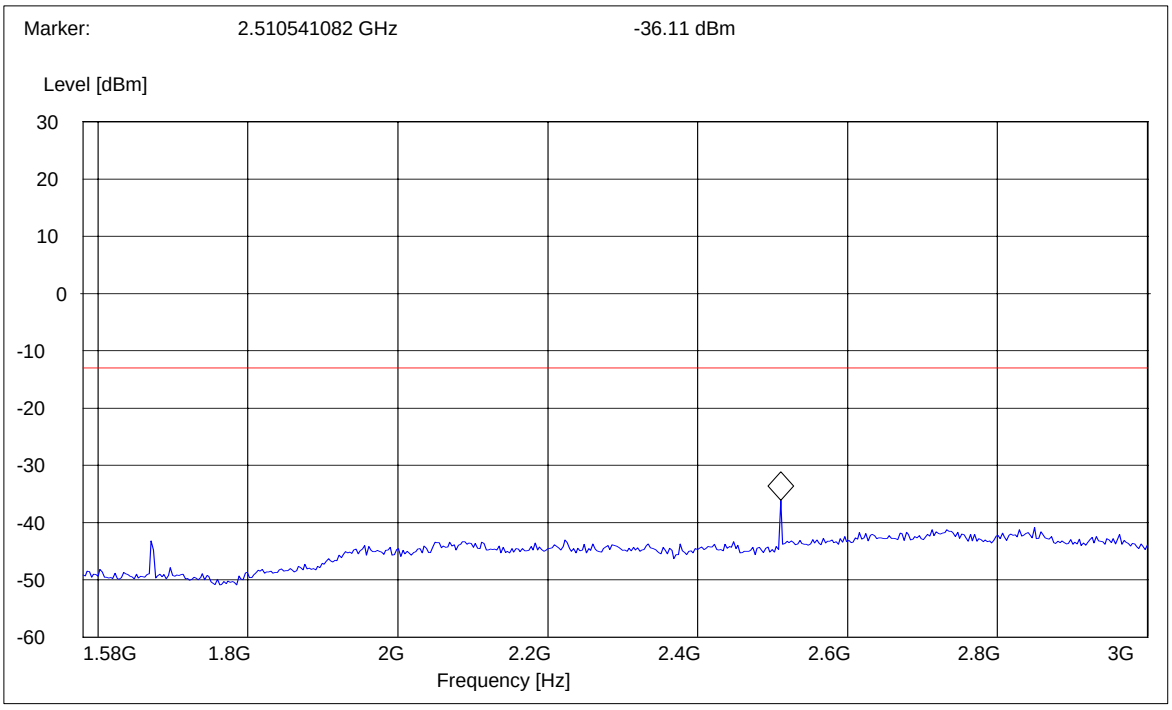
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-190
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 1.58GHz-3GHz

SWEEP TABLE: "FCC 22Spuri 1.58-3G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 836.6MHz: 3GHz – 9GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 3-9G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz

CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem

Customer: Teletrac

Operating Mode: GSM 850 traffic channel-190

Antenna: H

EUT: H

Test Engineer: Mark

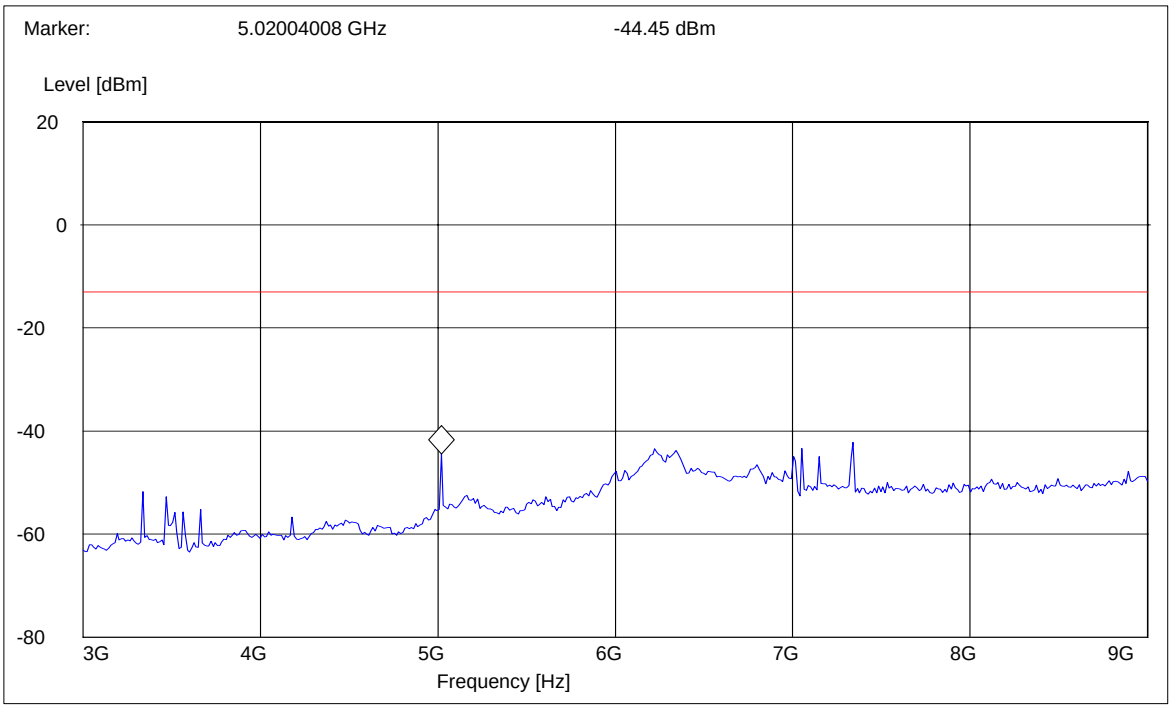
Comment: 3GHz-9GHz

SWEEP TABLE: "FCC 22Spuri 3-9G"

Short Description: FCC 24 1GHz-8GHz

Unit: dBm

Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 848.8MHz: 1GHz – 1.58GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1-1.58G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz

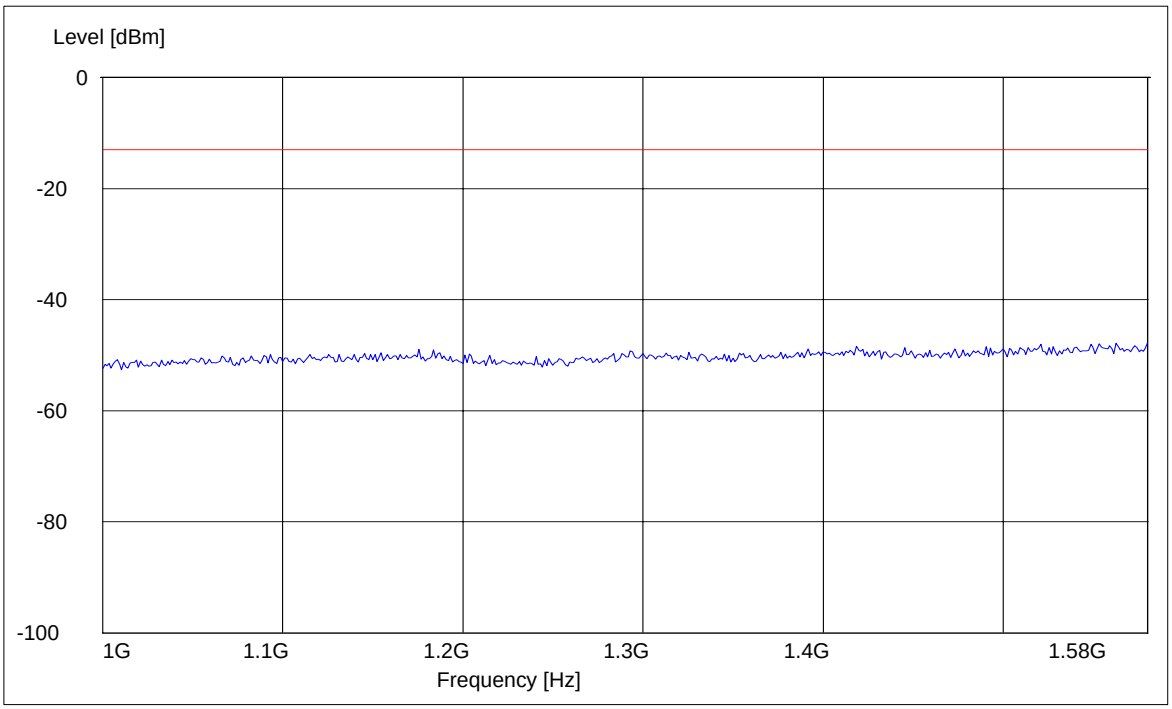
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-251
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 1GHz-1.58GHz

SWEEP TABLE: "FCC 22Spuri 1-1.58G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 848.8MHz: 1.58GHz – 3GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1.58-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

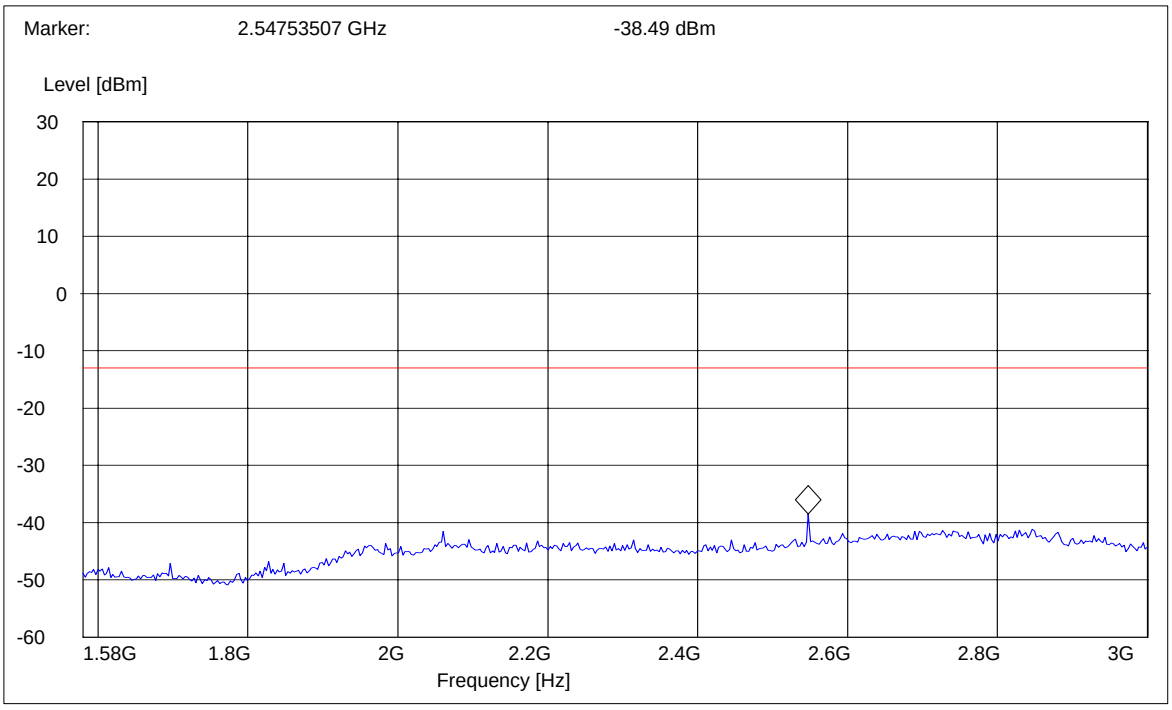
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-251
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 1.58GHz-3GHz

SWEEP TABLE: "FCC 22Spuri 1.58-3G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

Tx @ 848.8MHz: 3GHz – 9GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 3-9G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz

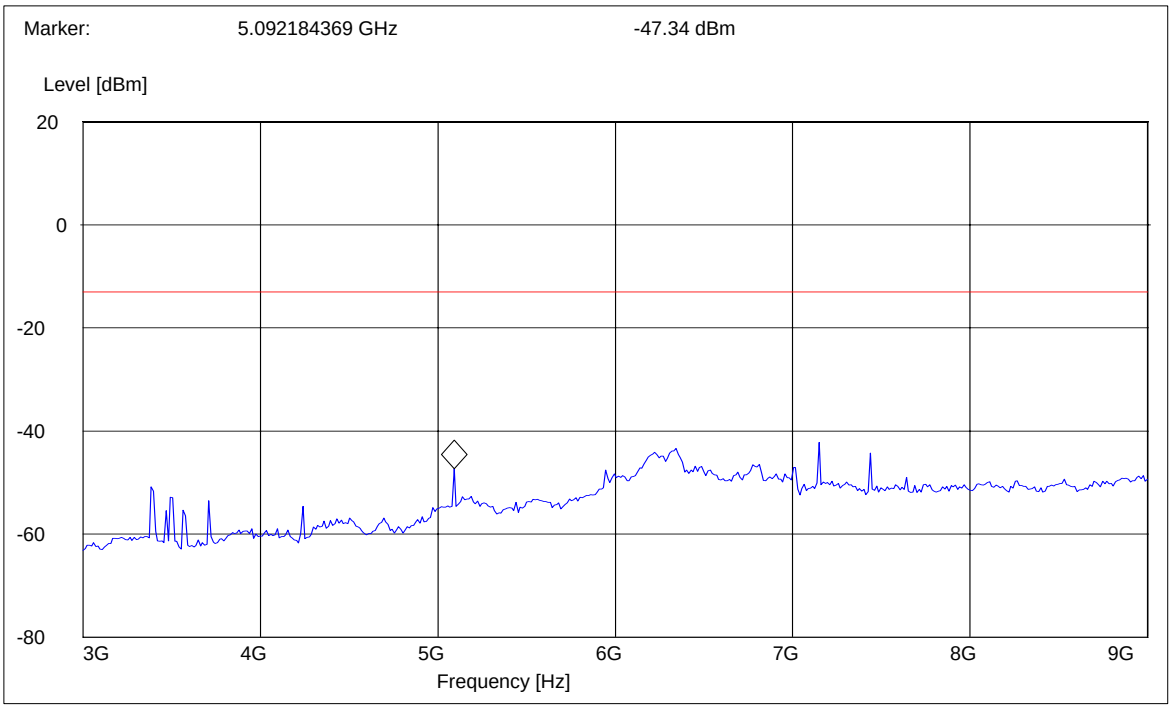
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 traffic channel-251
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 3GHz-9GHz

SWEEP TABLE: "FCC 22Spuri 3-9G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

IDLE: 30MHz - 1GHz

Spurious emission limit –13dBm

Antenna: vertical

SWEEP TABLE: "FCC 22 Spur 30M-1G"

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

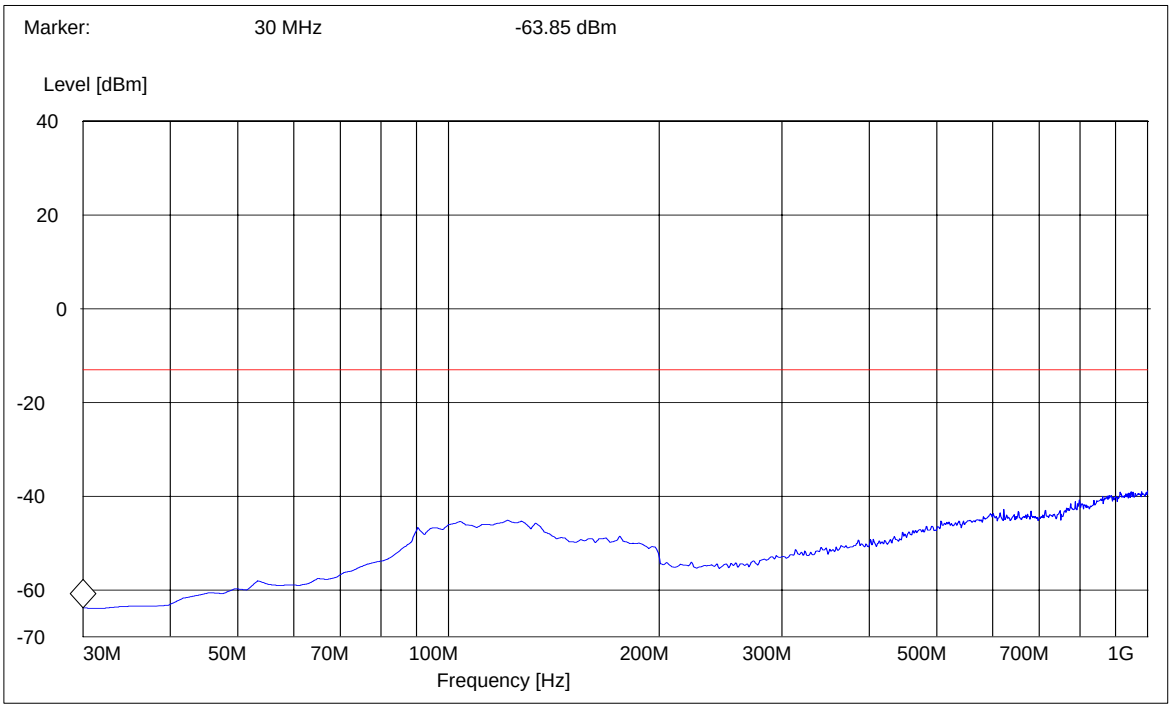
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 idle
Antenna: V
EUT: H
Test Engineer: Mark
Comment: 30MHz-1GHz

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"

Short Description: FCC 24 30MHz-1GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

IDLE: 1GHz – 3GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1-3G"

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

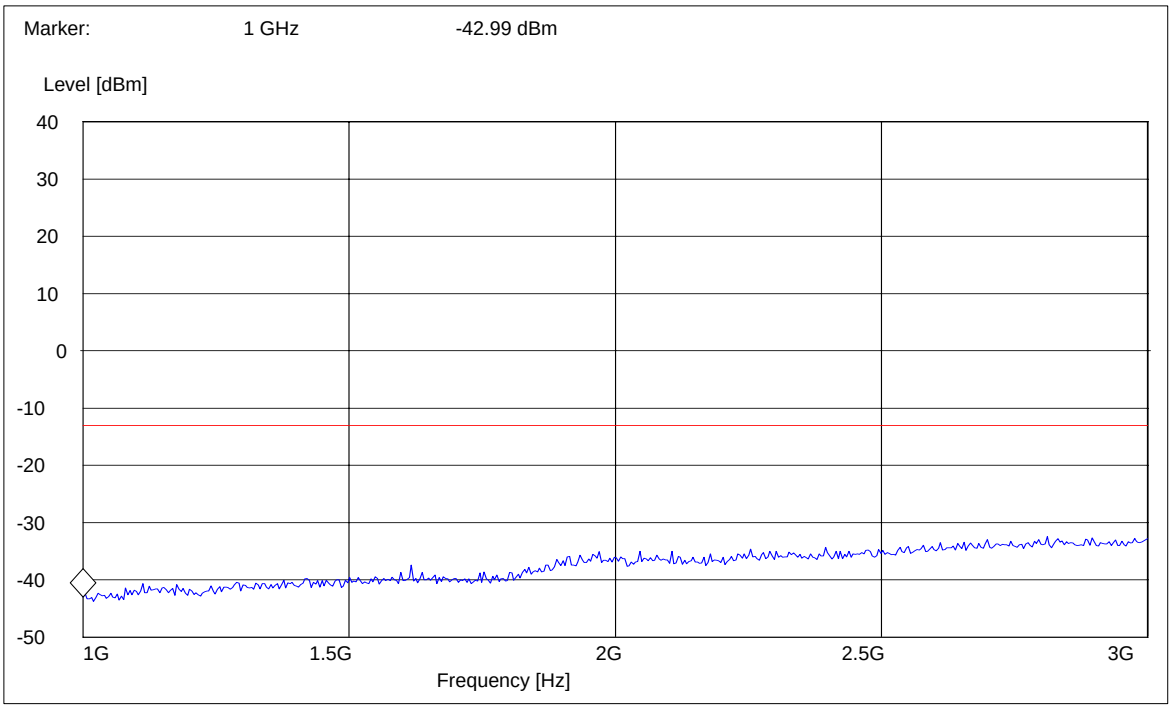
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 idle
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 1GHz-3GHz

SWEEP TABLE: "FCC 24Spuri 1-3G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (GSM-850)

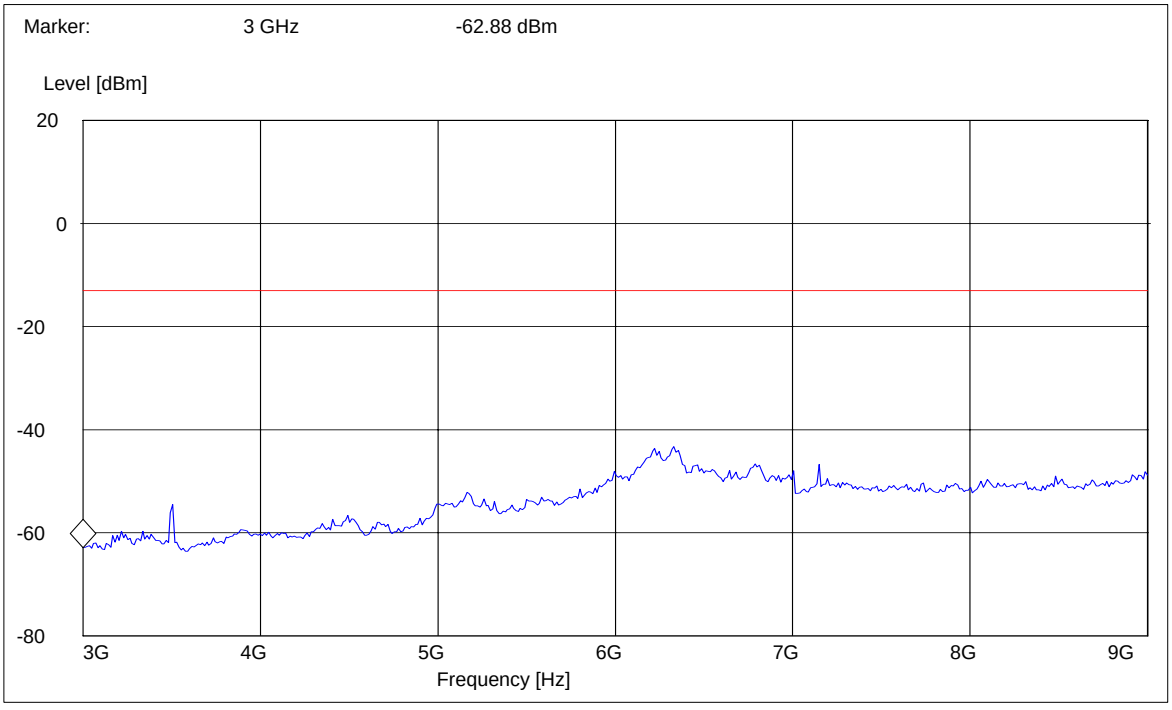
IDLE: 3GHz – 9GHz

SWEEP TABLE: "FCC 22 Spur 3-9G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: GSM 850 idle
Antenna: H
EUT: H
Test Engineer: Mark
Comment: 3GHz-9GHz

SWEEP TABLE: "FCC 22Spuri 3-9G"
Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RESULTS OF RADIATED TESTS PCS-1900:

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						

RADIATED SPURIOUS EMISSIONS(PCS 1900)

TX: 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	1 MHz

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

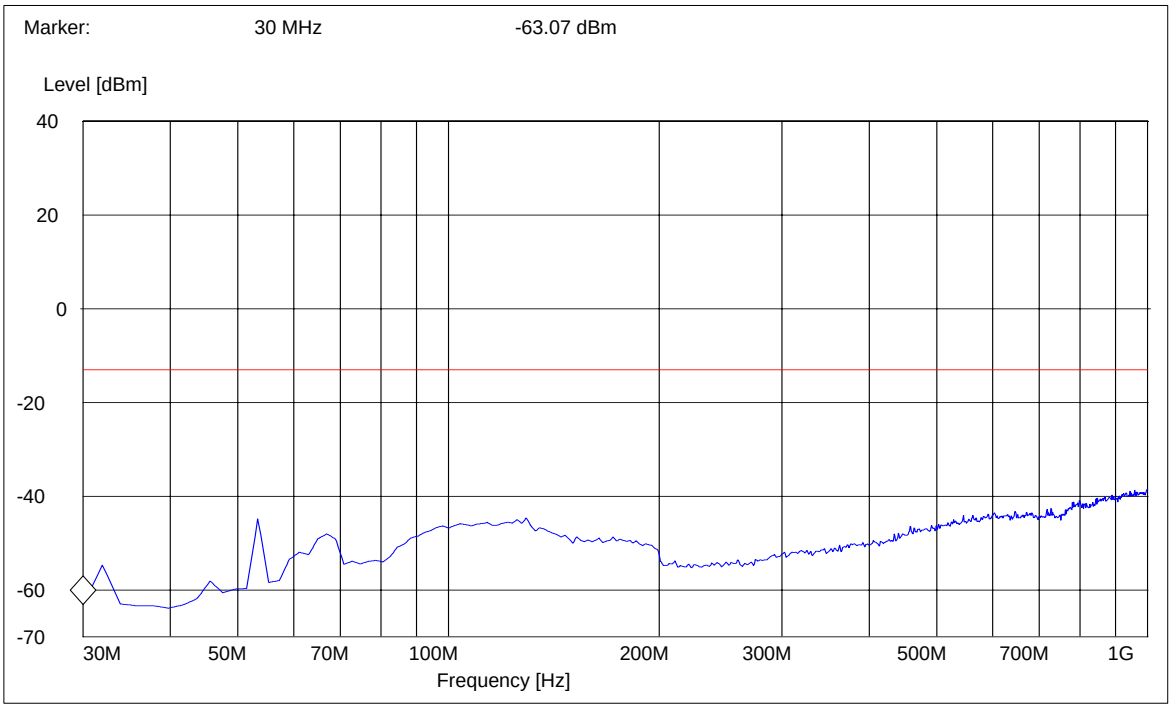
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 traffic channel-512
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 30MHz-1GHz

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"

Short Description: FCC 24 30MHz-1GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS(PCS 1900)

Tx @ 1850.2MHz: 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	1 MHz

Note: The peak above the limit line is the carrier freq. at ch-512.

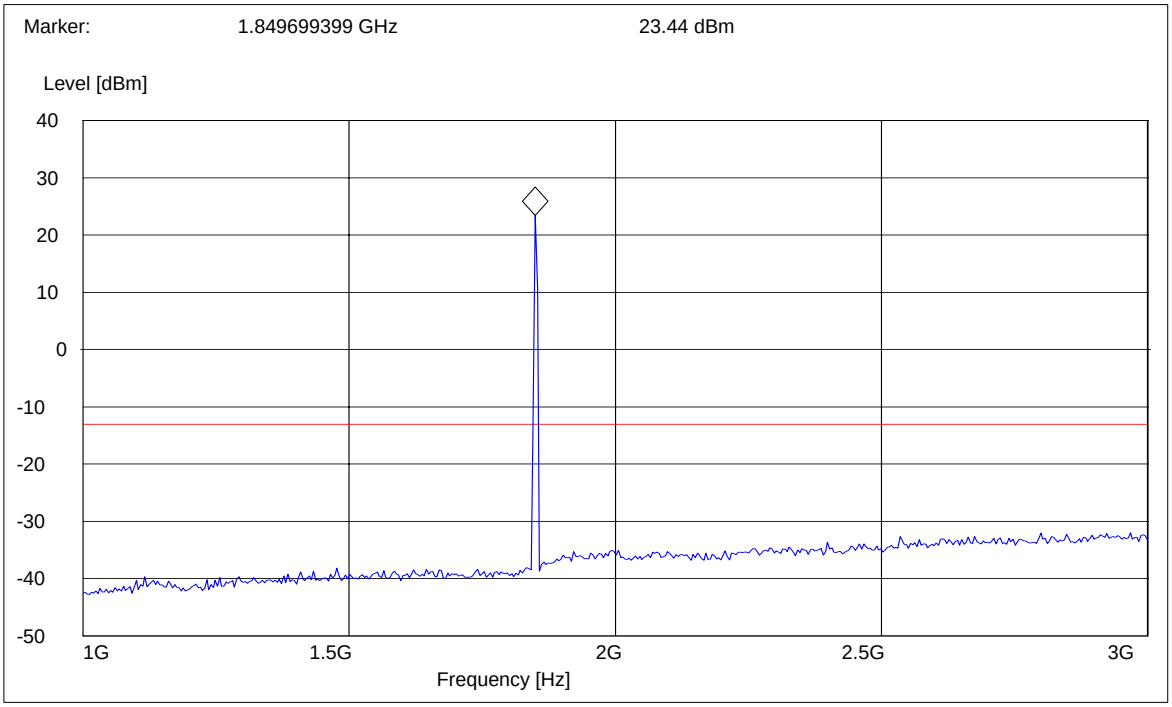
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 Ch 512
Antenna: V
EUT: V
Test Engineer: Pete
Comment: FCC 24

SWEEP TABLE: "FCC 24Spuri 1-3G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS(PCS 1900)

Tx @ 1850.2MHz: 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	1 MHz

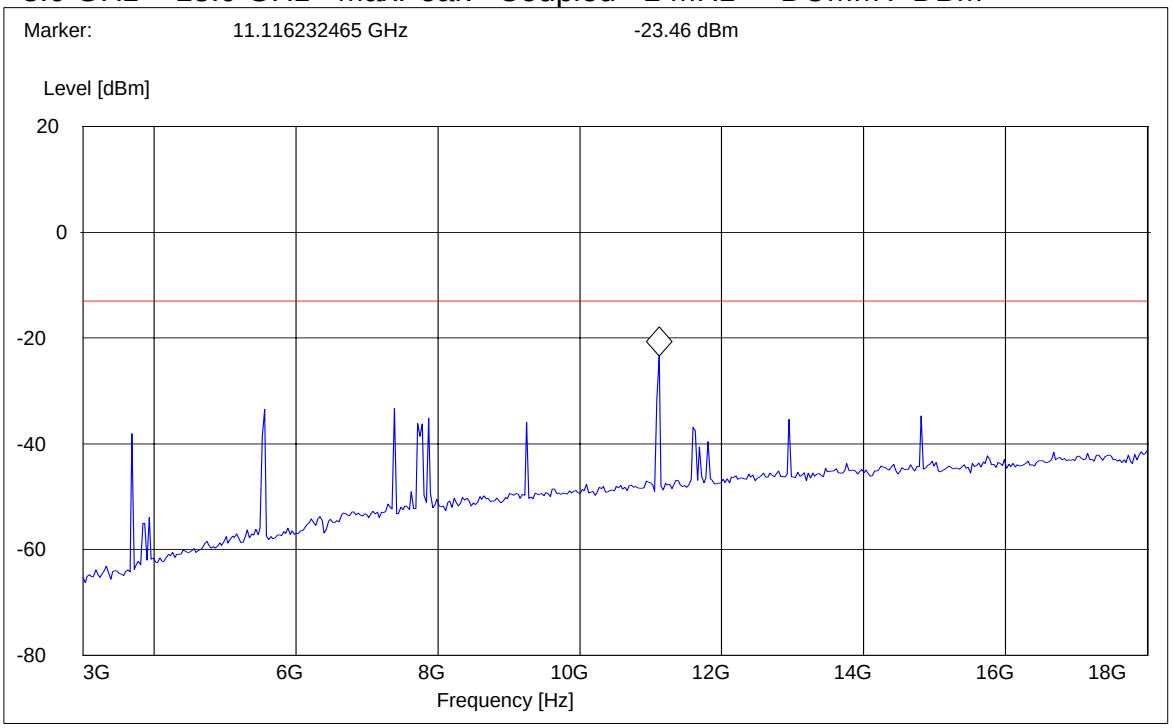
CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Teletrac MC45 GMI / triband 900/1800/1900 modem
Customer: Siemens
Operating mode: PCS 1900 traffic channel-512
Test Engineer: Mark
Antenna: horizontal
EUT plane: vertical
Voltage: 16.5 volt
Spec: FCC-24 radiated spurious 3GHz-18GHz

SWEEP TABLE: "FCC 24Spuri 3-18G"

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



RADIATED SPURIOUS EMISSIONS(PCS 1900)

Tx @ 1880.0MHz: 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	1 MHz

Note: The peak above the limit line is the carrier freq. at ch-661.

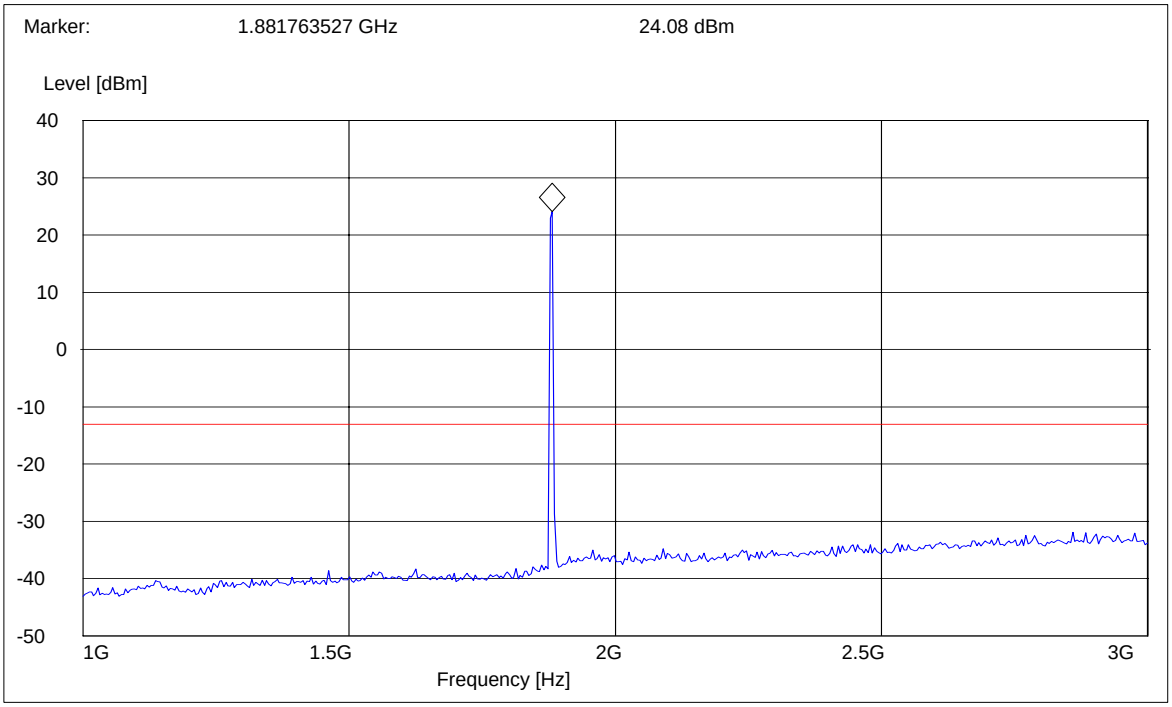
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 Ch 661
Antenna: V
EUT: V
Test Engineer: Pete
Comment: FCC 24

SWEEP TABLE: "FCC 24Spuri 1-3G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS(PCS 1900)

Tx @ 1880.0MHz: 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	1 MHz

CETECOM Inc.

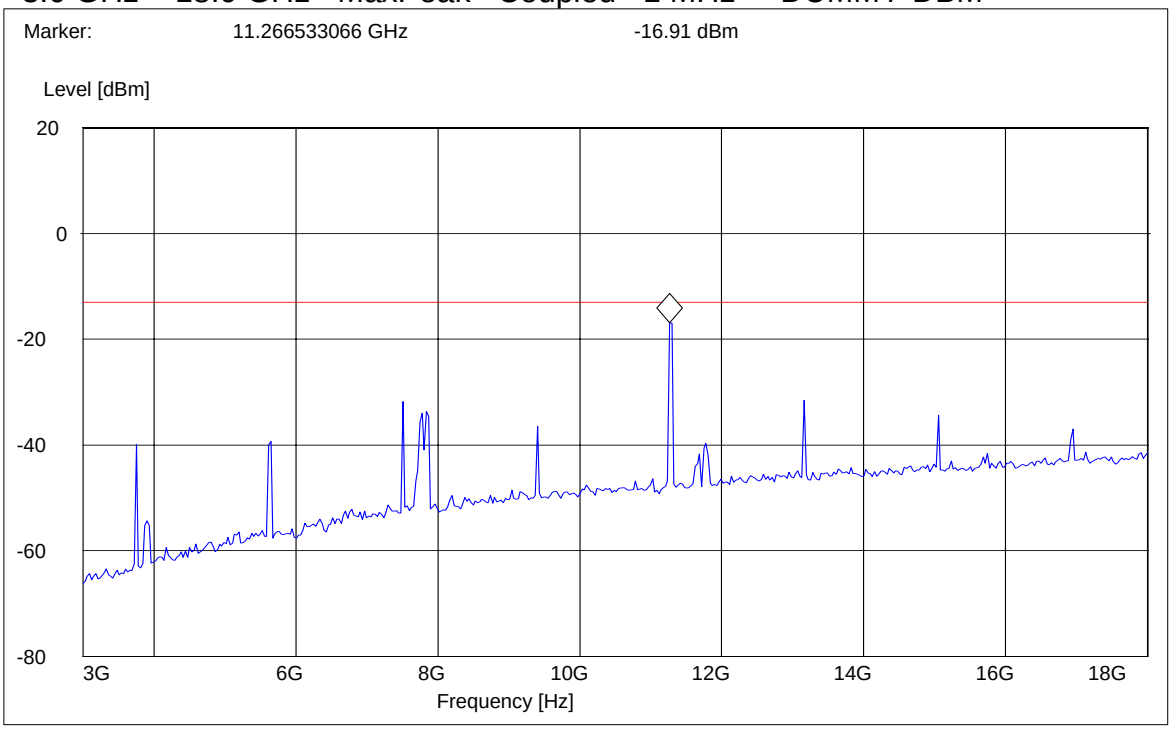
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Teletrac MC45 GMI / triband 900/1800/1900 modem
Customer: Siemens
Operating mode: PCS 1900 traffic channel-661
Test Engineer: Mark
Antenna: horizontal
EUT plane: vertical
Voltage: 16.5 volt
Spec: FCC-24 radiated spurious 3GHz-18GHz

SWEEP TABLE: "FCC 24Spuri 3-18G"

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



RADIATED SPURIOUS EMISSIONS(PCS 1900)

Tx @ 1909.8MHz: 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	1 MHz

Note: The peak above the limit line is the carrier freq. at ch-810.

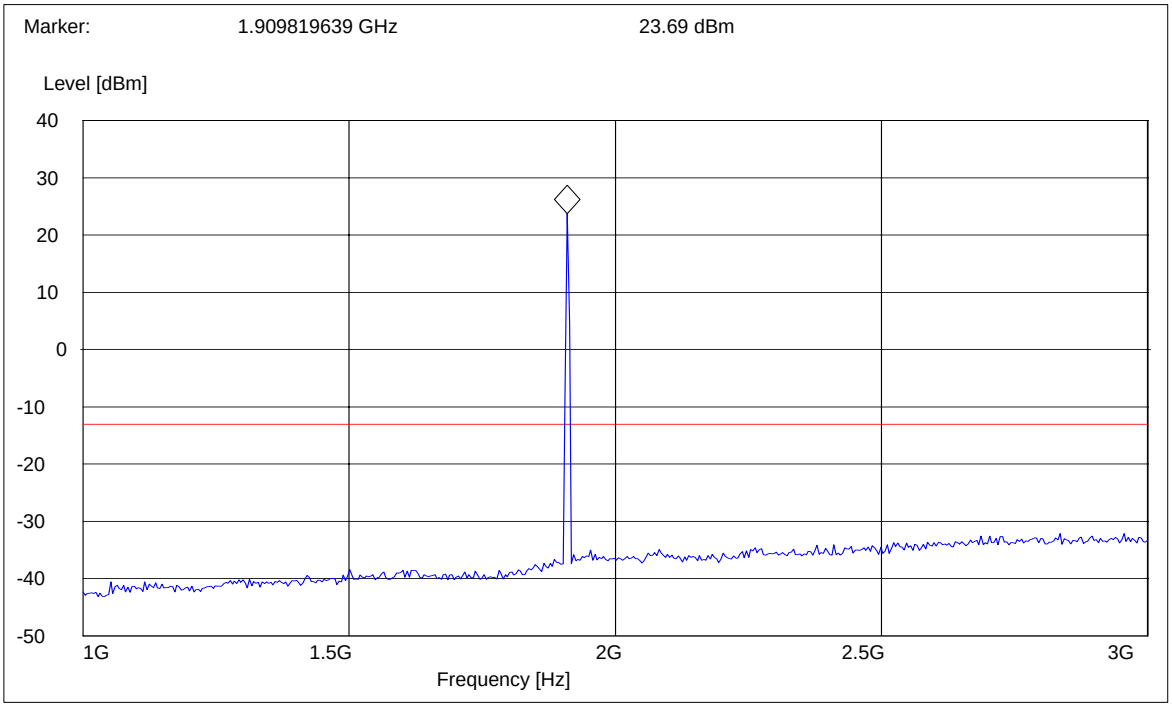
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 Ch 810
Antenna: V
EUT: V
Test Engineer: Pete
Comment: FCC 24

SWEEP TABLE: "FCC 24Spuri 1-3G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS(PCS 1900)

Tx @ 1909.8MHz: 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	1 MHz

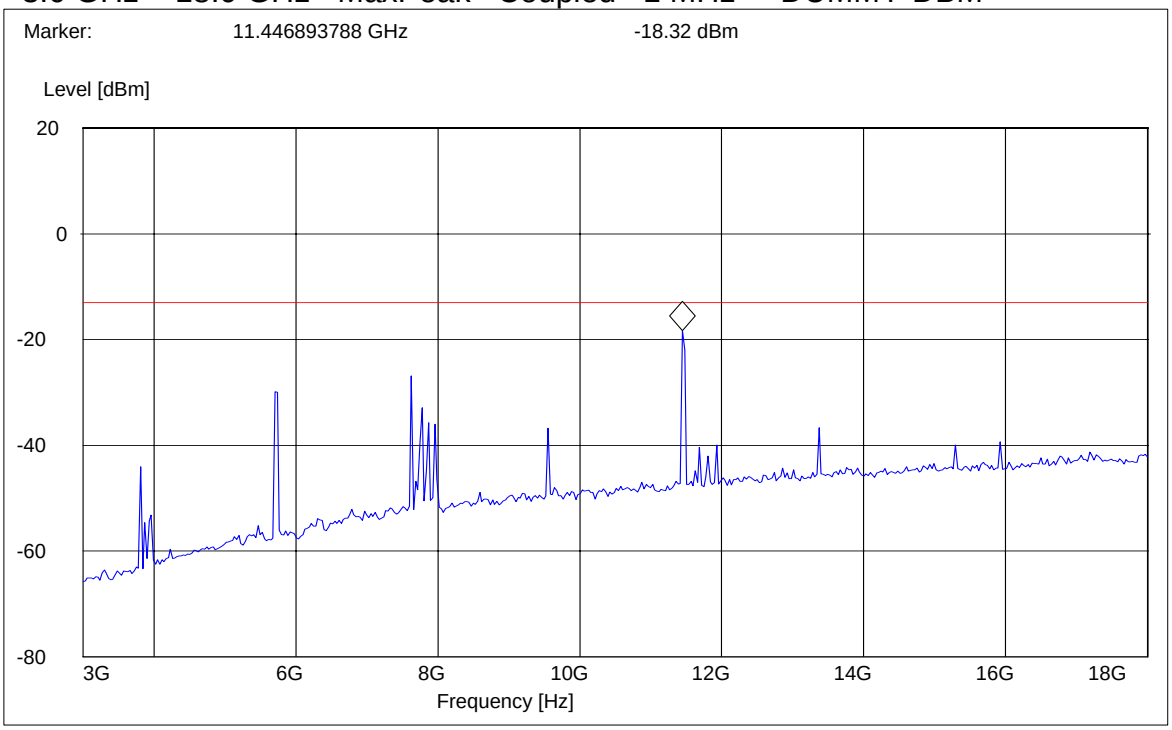
CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: Teletrac MC45 GMI / triband 900/1800/1900 modem
Customer: Siemens
Operating mode: PCS 1900 traffic channel-810
Test Engineer: Mark
Antenna: horizontal
EUT plane: vertical
Voltage: 16.5 volt
Spec: FCC-24 radiated spurious 3GHz-18GHz

SWEEP TABLE: "FCC 24Spuri 3-18G"

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



RADIATED SPURIOUS EMISSIONS(PCS 1900)

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	1 MHz

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

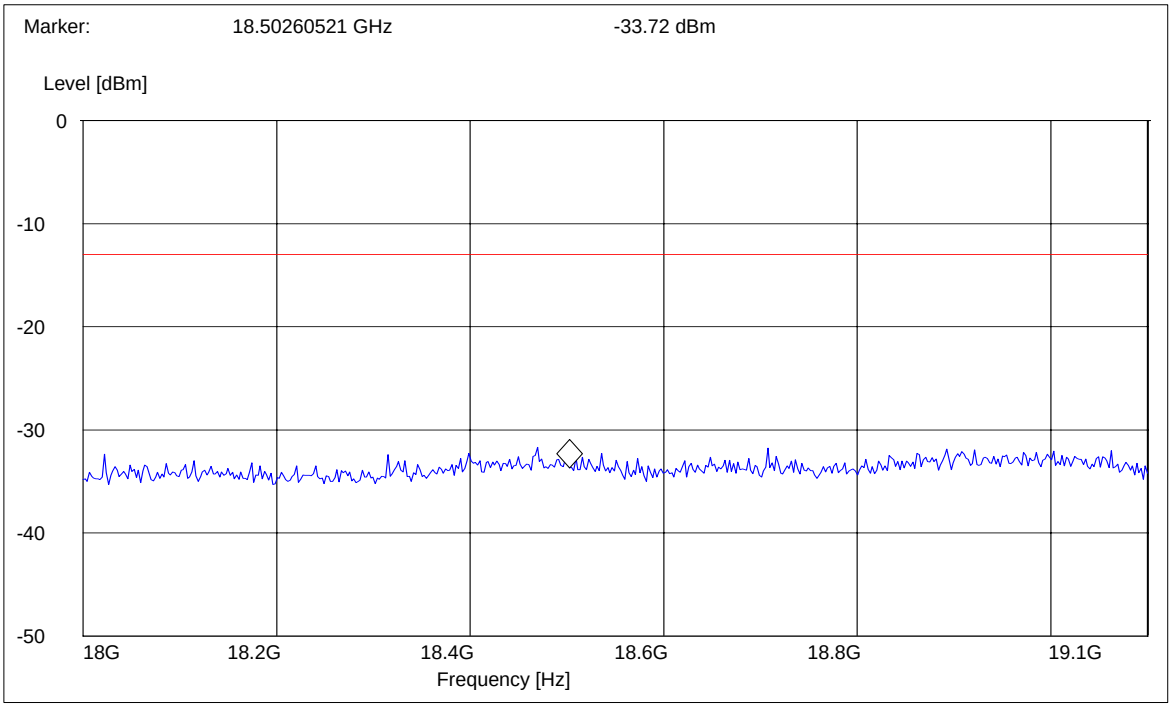
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 Ch 512
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 18GHz-19.1GHz

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

Short Description: FCC 24 18GHz-19.1GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (IDLE MODE)

EUT in Idle Mode: 30MHz – 1GHz

Spurious emission limit –13dBm

Antenna: vertical

SWEEP TABLE: "FCC 22 Spur 30M-1G"

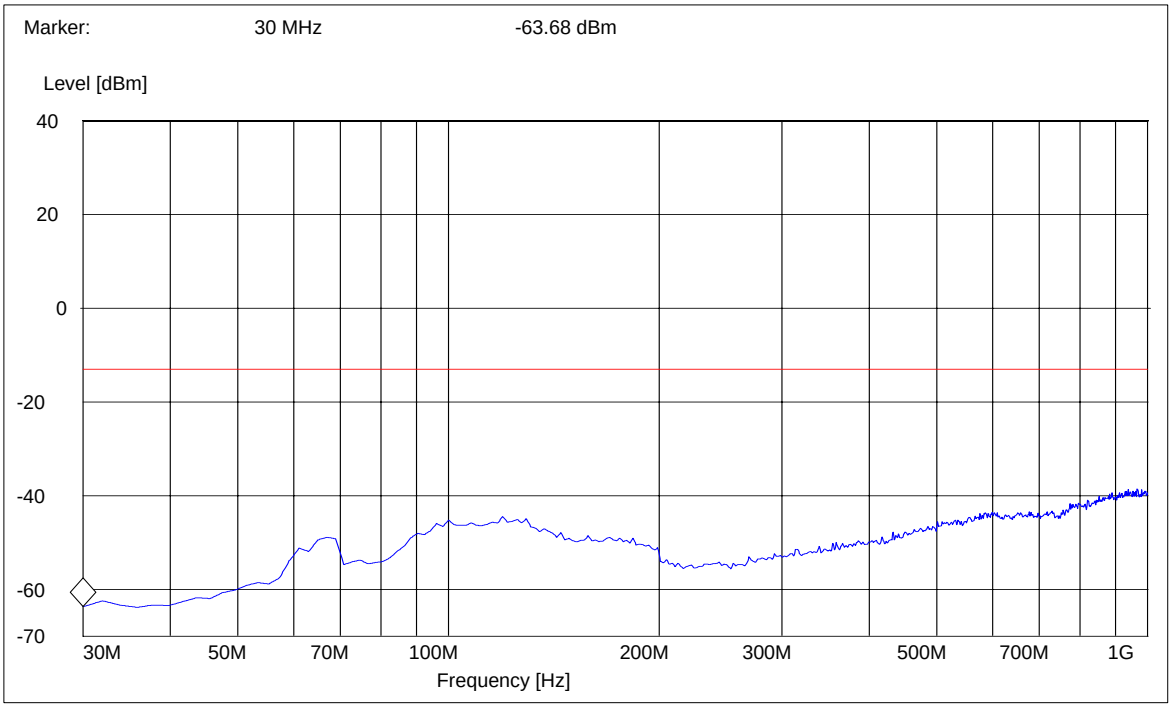
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	1 MHz	1 MHz

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 idle
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 30MHz-1GHz

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"

Short Description: FCC 24 30MHz-1GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (IDLE MODE)

EUT in Idle Mode: 1GHz – 3GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC Spuri 1-3G"

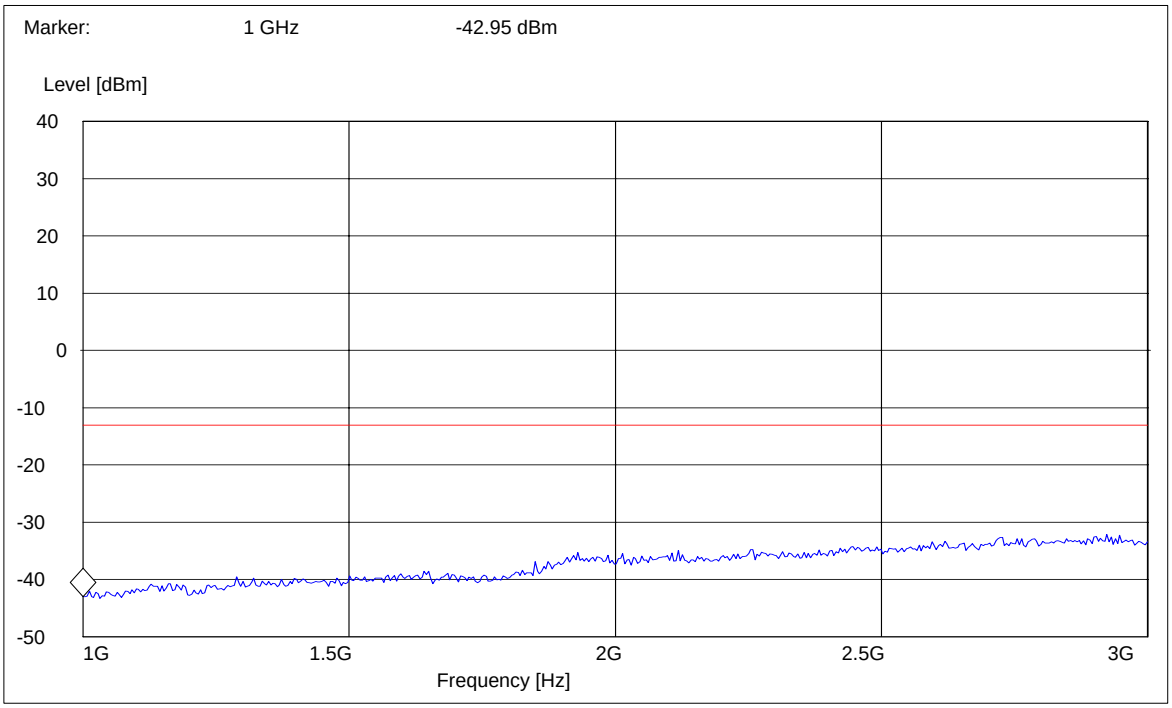
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 idle
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 1GHz-3GHz

SWEEP TABLE: "FCC 24Spuri 1-3G"

Short Description: FCC 24 1GHz-8GHz
Unit: dBm
Detector: Mode:



RADIATED SPURIOUS EMISSIONS (IDLE MODE)

EUT in Idle Mode: 3GHz – 18GHz

Spurious emission limit –13dBm

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

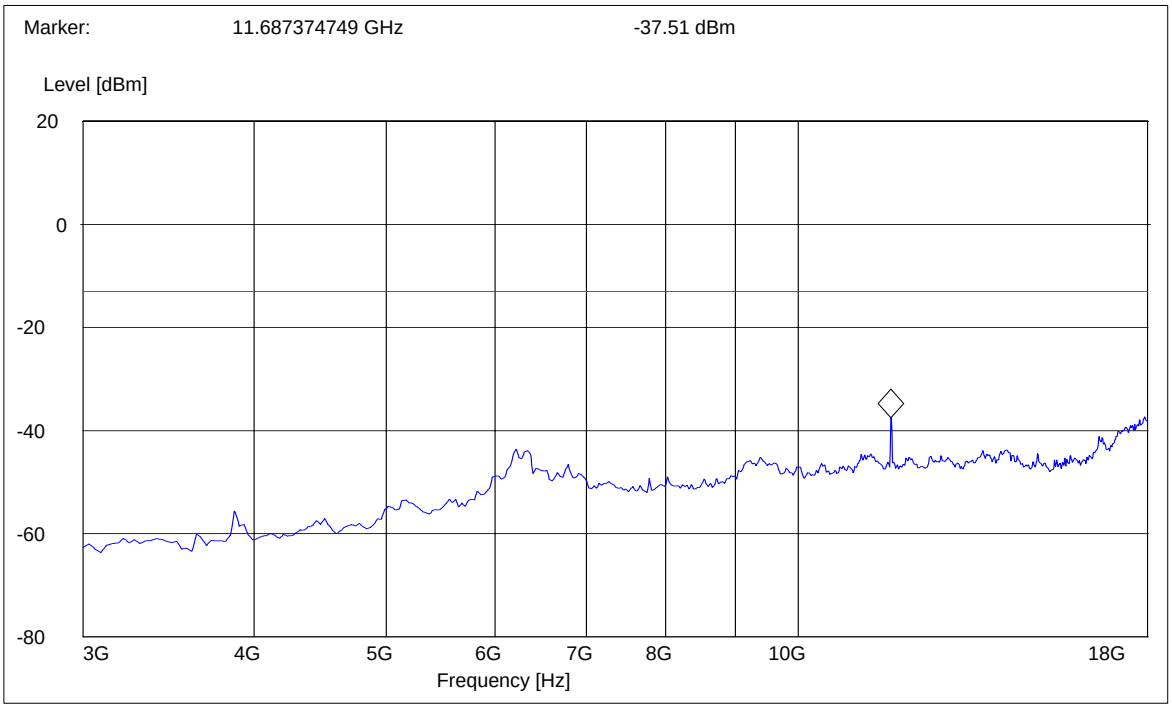
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 idle
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 3GHz-18GHz

SWEEP TABLE: "FCC 24Spuri 3-18G"

Unit: dBm
Detector: Mode:
Curve 1: MaxPeak MaxHold



RADIATED SPURIOUS EMISSIONS (IDLE MODE)

EUT in Idle Mode: 18GHz – 19.1GHz

Spurious emission limit –13dBm

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

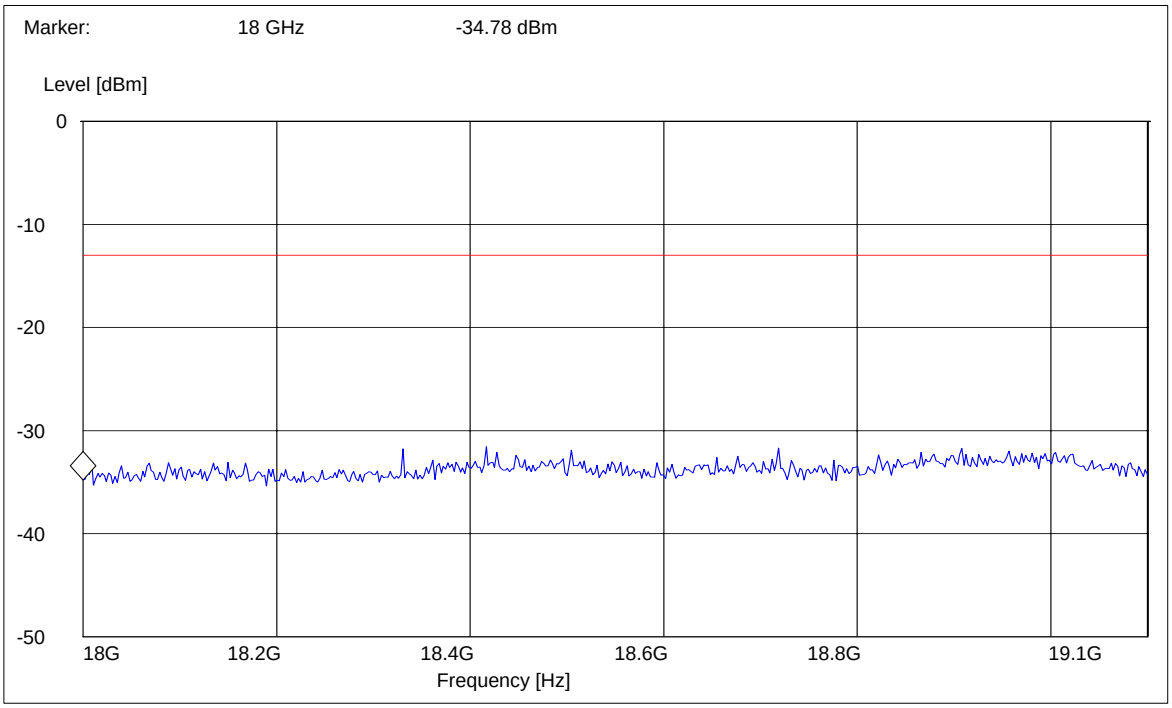
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	19.1GHz	Max Peak	Coupled	1 MHz	1 MHz

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 idle
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 18GHz-19.1GHz

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

Short Description: FCC 24 18GHz-19.1GHz
Unit: dBm
Detector: Mode:



RECEIVER RADIATED EMISSIONS § 2.1053 / RSS-132 & 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 26.5GHz very short cable connections to the antenna was used to minimize the noise level.**

Limits **SUBCLAUSE § RSS-133**

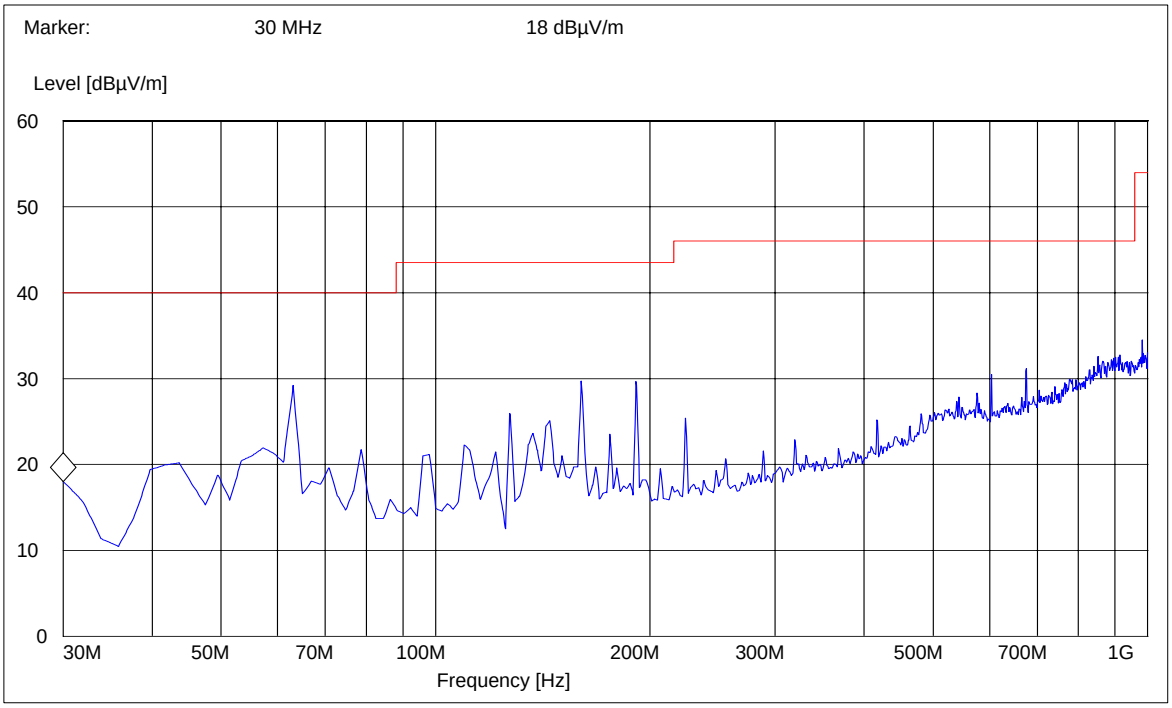
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Receiver Spurious on EUT
RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 30MHz – 1GHz
Antenna: vertical
SWEEP TABLE: "FCC Spur 30M-1G"

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

Note: Peak Reading Vs. Quasi-Peak Limit.
CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: MC46 / dual band 850/1900 GSM/GPS modem
Customer: Teletrac
Operating Mode: PCS 1900 idle
Antenna: V
EUT: H
Test Engineer: Mark
Comment: 30MHz-1GHz FCC15.209

SWEEP TABLE: "FCC15.247_30M-1G_Ver"
Unit: dBµV/m
Detector: Mode:
Curve 1: MaxPeak MaxHold



RECEIVER RADIATED EMISSIONS
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	1 MHz

Note: Peak Reading Vs. Average Limit.

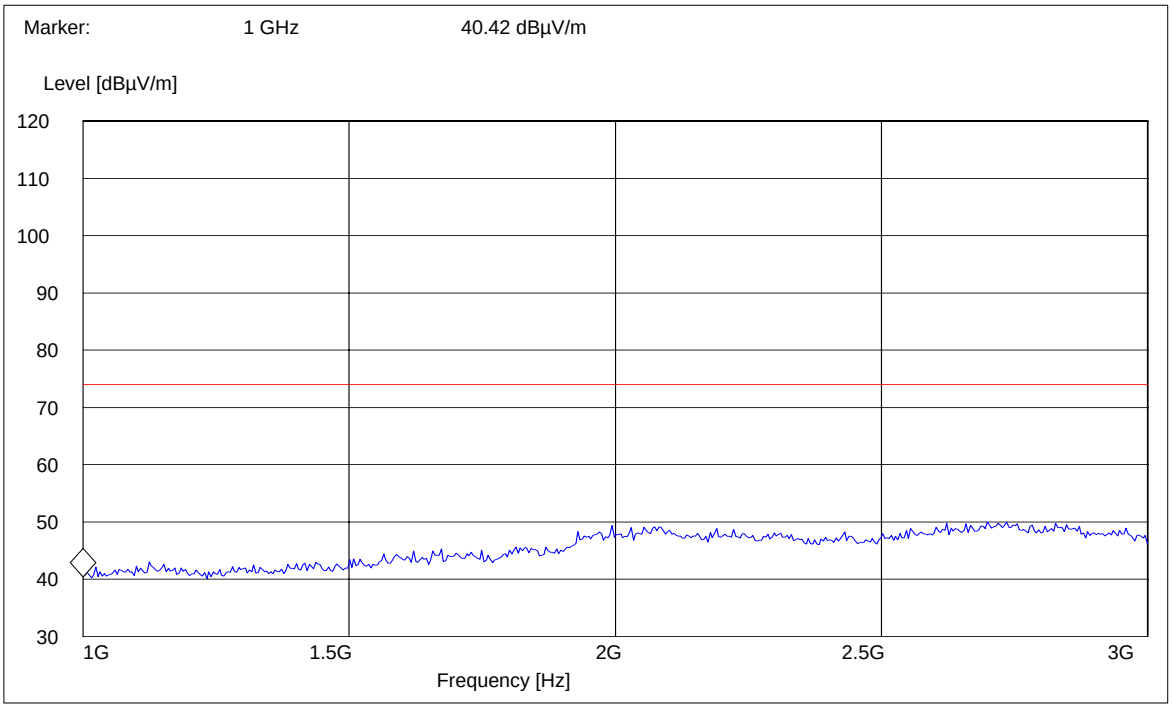
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 idle
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 1GHz-3GHz FCC15.209

SWEEP TABLE: "FCC15.247_1-3G"

Unit: dBµV/m
Detector: Mode:
Curve 1: MaxPeak MaxHold



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

SWEEP TABLE: "FCC spuri 3-18G"

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

Note: Peak Reading Vs. Average Limit.

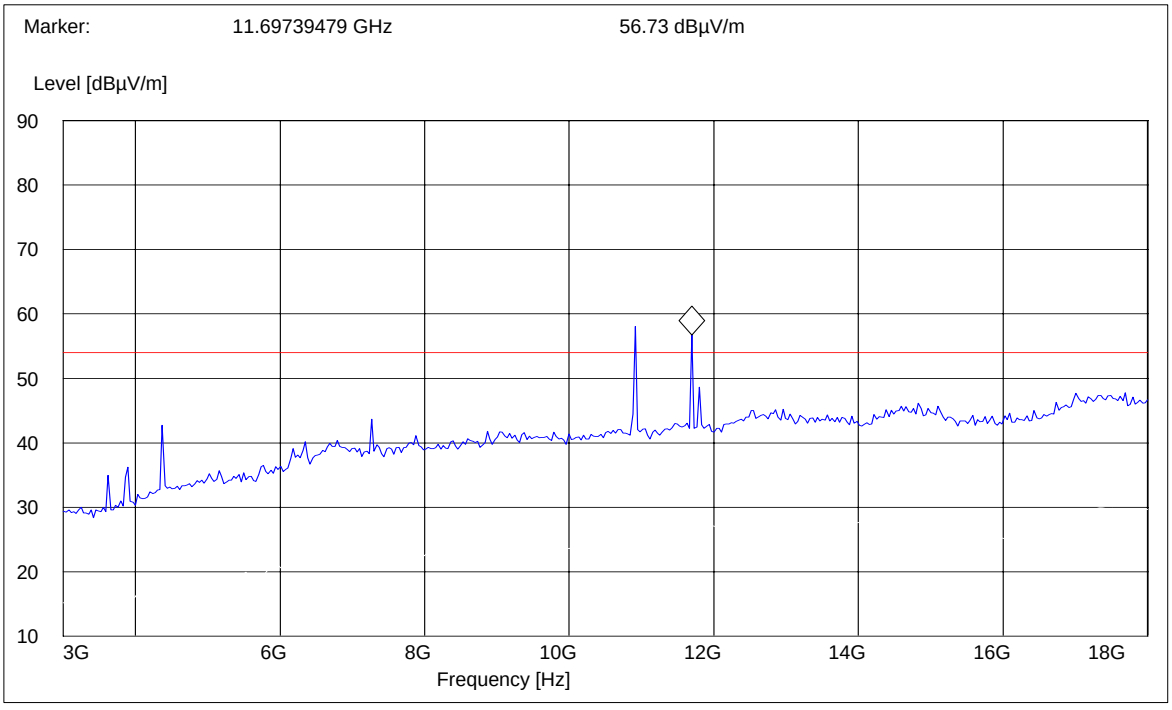
CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 idle
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 3GHz-18GHz FCC15.209

SWEEP TABLE: "FCC15.247_3-18G"

Unit: dBµV/m

	Detector:	Mode:
Curve 1:	MaxPeak	MaxHold

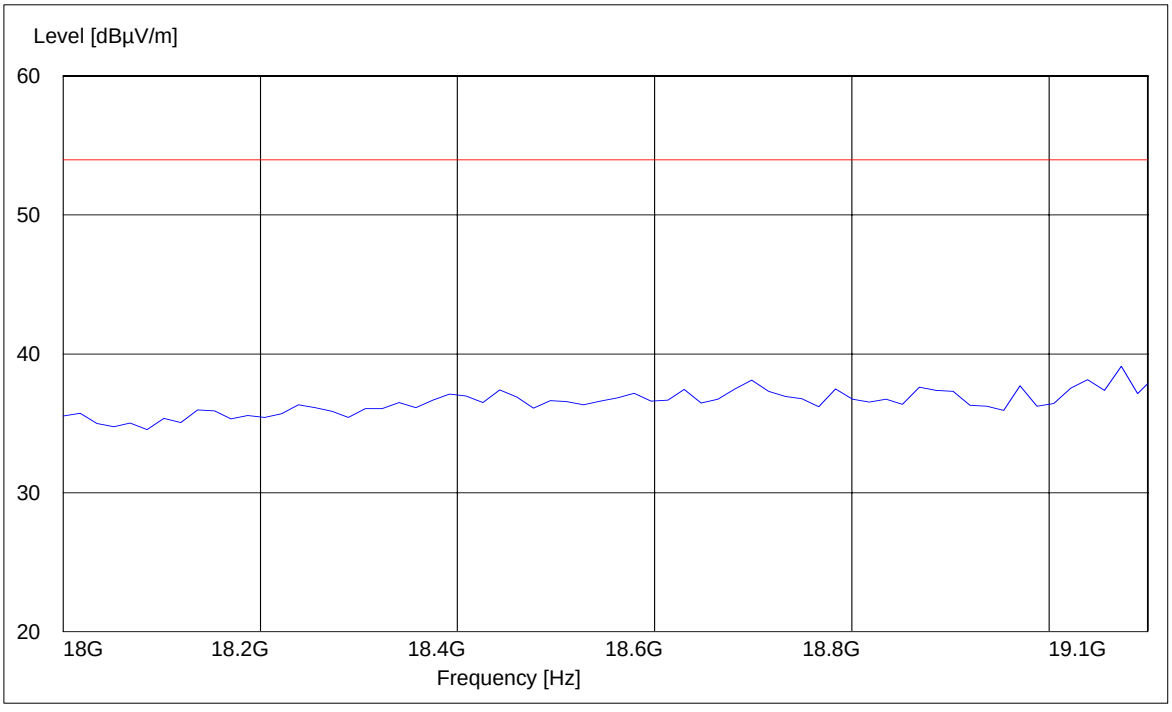


RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 18GHz – 19.1GHz
SWEEP TABLE: "FCC spuri 18-19.1G"

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

Note: Peak Reading Vs. Average Limit.
CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: MC46
Customer: Teletrac
Operating Mode: PCS 1900 idle
Antenna: V
EUT: V
Test Engineer: Mark
Comment: 18GHz-19.1GHz FCC15.209

SWEEP TABLE: "FCC15.247_18-26.5G"
Unit: dBµV/m
Detector: Mode:
Curve 1: MaxPeak MaxHold



TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2006	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2006	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2006	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2006	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2006	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2006	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2006	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2006	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2006	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2006	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2006	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2006	1 year

References

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PART 2--FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS October 1, 2001.

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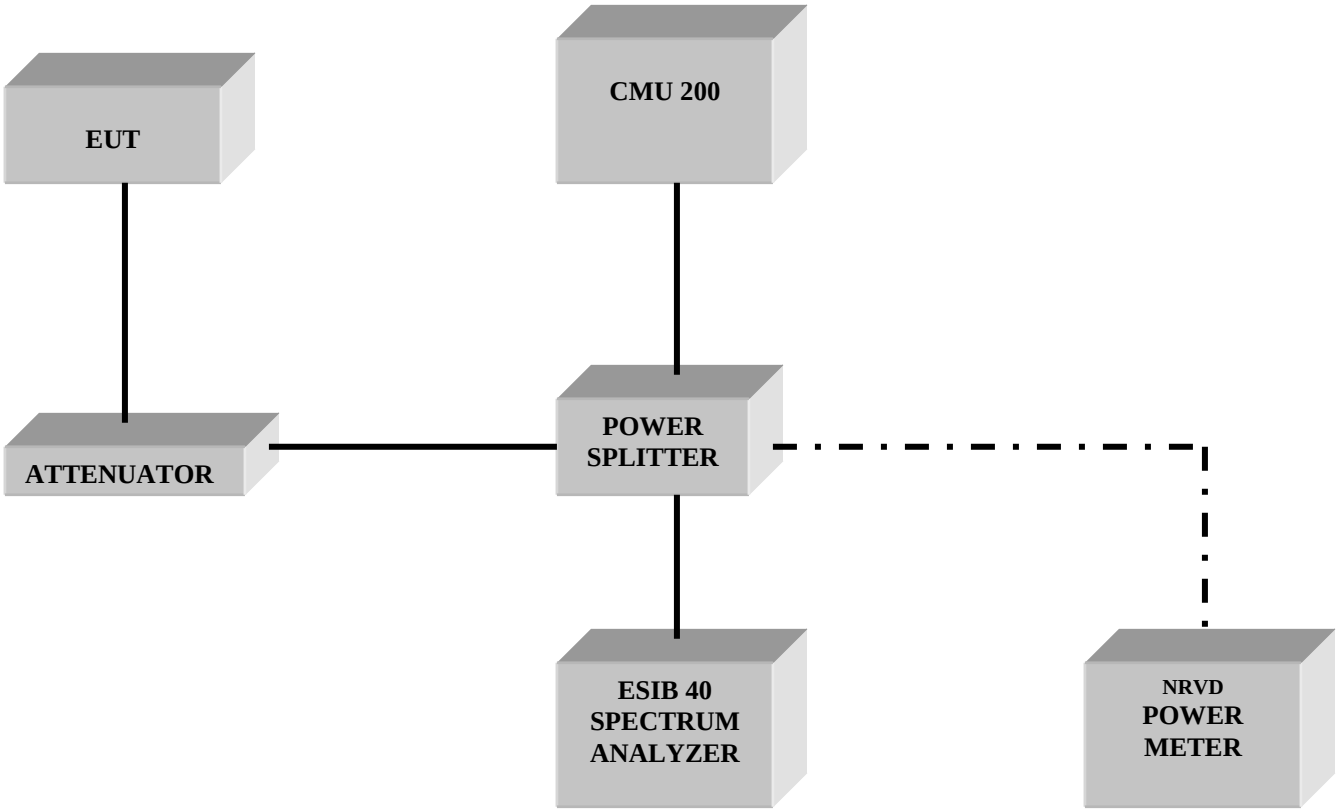
Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,
PART 24 PERSONAL COMMUNICATIONS SERVICES October 1, 1998.

ANSI / TIA-603-B-2003 Land Mobile FM or PM Communications Equipment Measurement and Performance Standard November 7, 2002.

BLOCK DIAGRAMS

Conducted Testing



Radiated Testing