FCC Test Report

FCC Part 24 / RSS 133

.

FOR:

Tri-band GSM/EDGE Mobile Phone with Bluetooth

MODEL #: C81

BenQ Mobile GmbH & Co OHG
Haidenauplatz 181667 München
GERMANY

FCC ID: PWX-C81

IC ID: 6175C-C81

TEST REPORT #: EMC_BENQ0_009_06001_C81_FCC24
DATE: May 10th, 2006

ACCREDITED
Certificate # 2135.01

Deutscher Akkreditierungs Rat
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.**
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 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Parts 2, and 24 of Title 47 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS133.

Company	Description	Model #
BenQ Mobile GmbH & Co OHG	**T Tri-band GSM/EDGE Mobile Phone with Bluetooth**	**C81**

Michael Grings
Deputy Test Lab Manager

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations 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 USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	EMC
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Lothar Schmidt
Responsible Project Leader:	Pete Krebill
Date of test:	05/09/2006 & 005/10/2006

2.2 Identification of the Client

Applicant's Name:	BenQ Mobile GmbH & Co OHG
Street Address:	Haidenauplatz 1
City/Zip Code	81667 München
Country	GERMANY
Contact Person:	Martin Weinberger
Phone No.	+49 89 722 37148
Fax:	+49 89 722 24799
e-mail:	martin.weinberger@benq.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	BenQ Mobile GmbH & Co. OHG
Manufacturers Address:	Südstr. 9
City/Zip Code	D-47475 Kamp-Lintfort
Country	Germany

3 Equipment under Test (EUT)

3.1 Identification of the Equipment under Test

Marketing Name:	BenQ-Siemens C81
Description:	Tri-band GSM/EDGE Mobile Phone with Bluetooth
Model No:	C81
FCC ID:	PWX-C81
IC ID:	6175C-C81
Frequency Range:	1850.2MHz – 1909.8MHz for PCS 1900
Type(s) of Modulation:	GMSK & 8PSK
Number of Channels:	298 for PCS-1900
Antenna Type:	Internal
Output Power:	1.023 Watts Peak conducted power 0.597 Watts EIRP

4 Subject of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the Tri-Band GSM Mobile Phone model#:C81 referred to as EUT as specified by requirements listed in FCC rules Parts 2, and 24 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS133.

5 Measurements

5.1 RF Power Output

5.1.1 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.

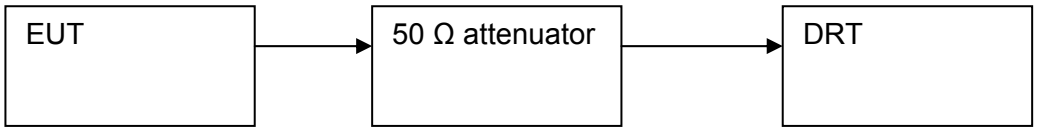
5.1.2 Limits:

5.1.2.1 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.

5.1.3 Conducted Output Power Measurement procedure:

Based on TIA-603B November 2002
2.2.1 Conducted Carrier Output Power Rating



1. Connect the equipment as shown in the above diagram. A Digital Radiocommunication Tester (DRT) is used to enable the EUT to transmit and to measure the output power.
2. Adjust the settings of the DRT to set the EUT to its maximum power at the required channel.
3. Record the output power level measured by the DRT.
4. Correct the measured level for all losses in the RF path.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

5.1.4 Results 1900 MHz band(conducted):

Conducted power measurements are provided by BenQ.
See attachment: EMC_C81.

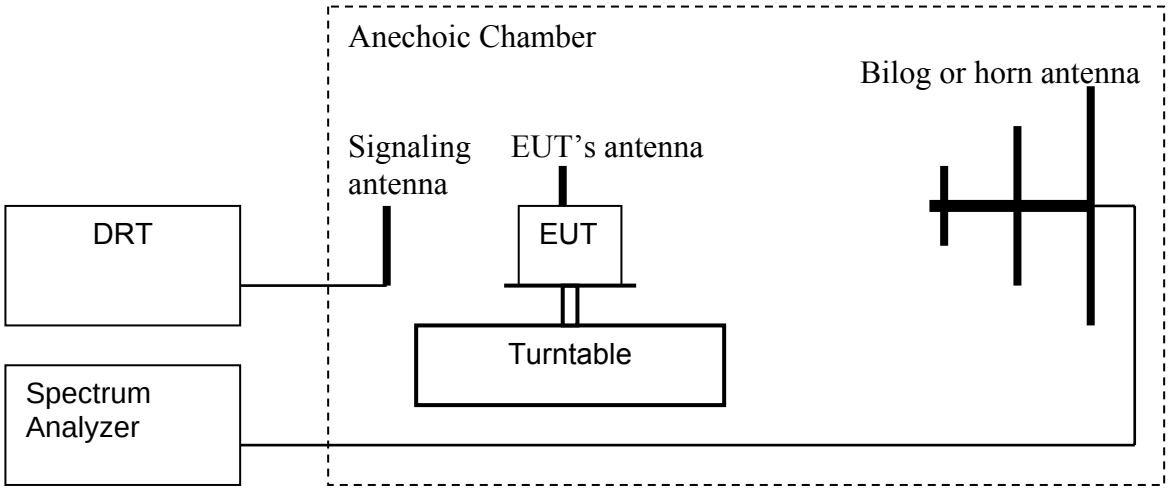
GSM (GMSK)	
Frequency (MHz)	**Conducted Output Power (dBm)**
1850.2	**30.1**
1880.0	**30.1**
1909.8	**30.1**

EDGE (8PSK)	
Frequency (MHz)	**Conducted Output Power (dBm)**
1850.2	**24.6**
1880.0	**24.7**
1909.8	**24.8**

5.1.5 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) + 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band. **Spectrum analyzer settings = rbw=vbw=3MHz**

(**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.)

5.1.6 EIRP Results 1900 MHz band:

Power Control Level	Burst Peak EIRP
0	≤33dBm (1W)

GSM (GMSK)	
Frequency (MHz)	EIRP (dBm)
1850.2	25.31
1880.0	27.56
1909.8	27.76

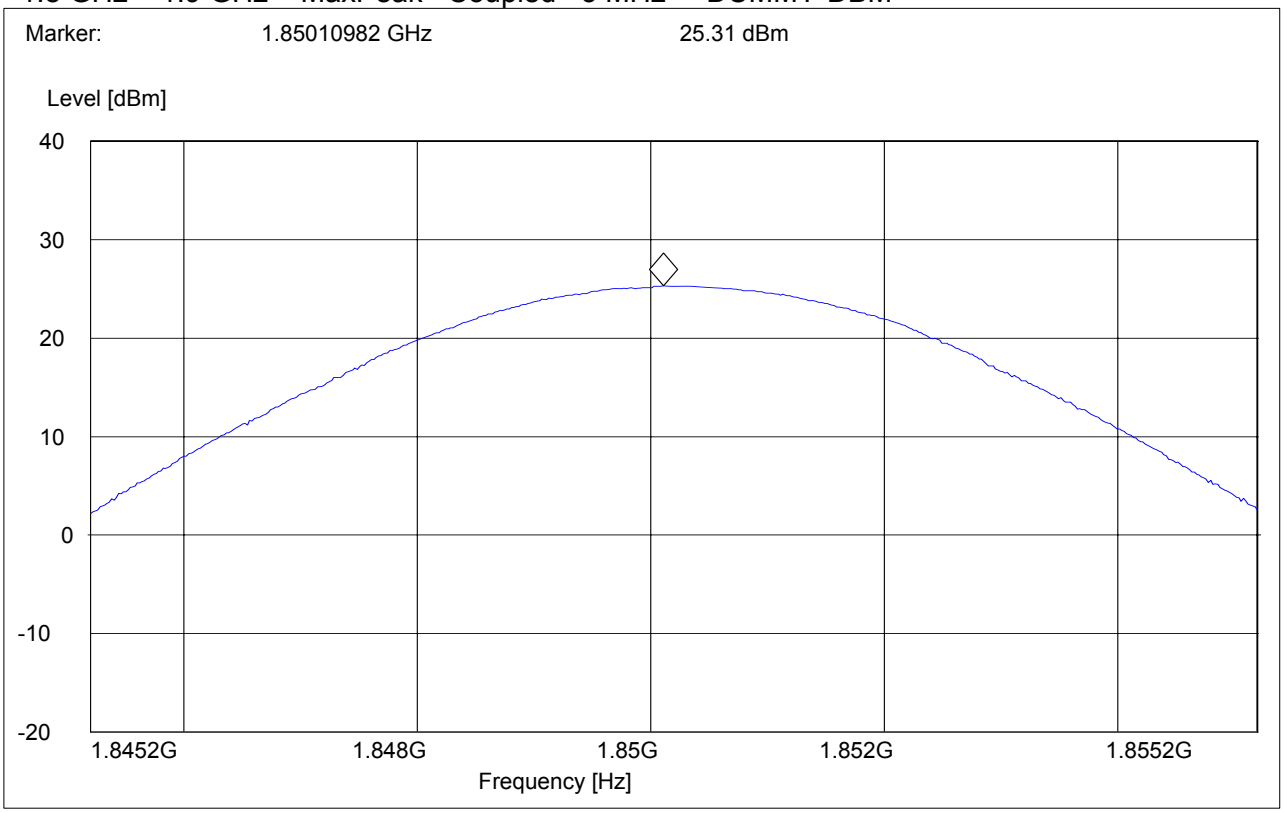
EDGE (8PSK)	
Frequency (MHz)	EIRP (dBm)
1850.2	22.47
1880.0	23.19
1909.8	23.15

EIRP Ch512 GSM (GMSK):

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81 (#169) + AC charger A5BHTN00102612
Customer: BenQ Mobile
Operating Mode: PCS 1900, TCH: 512, PCL: 0
Antenna: H
EUT: H
Test operator: Willmes
Voltage: AC 110 V
Sweep: EIRP

SWEEP TABLE: "EIRP 1900 CH512"
Short Description: EIRP PCS 1900 for channel-512

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.8 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM

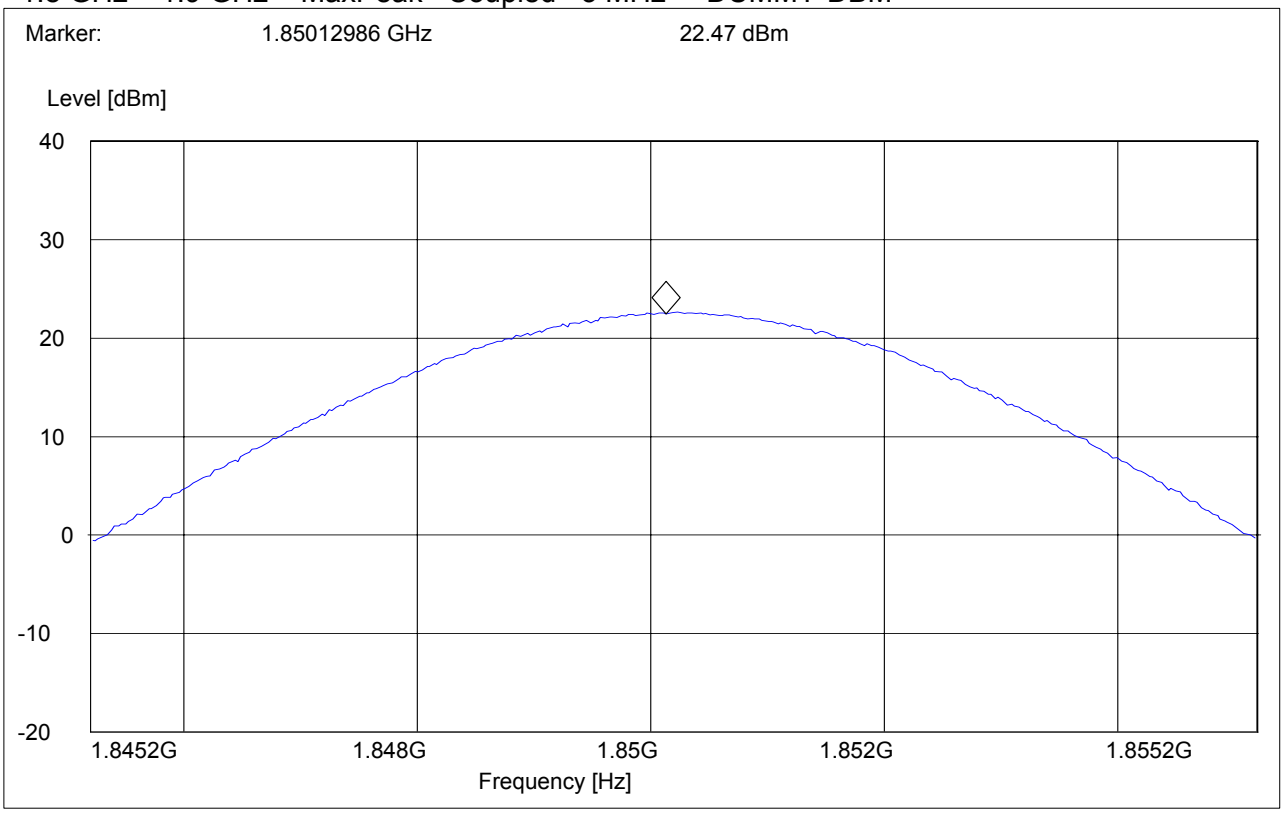


EIRP Ch512 EDGE (8PSK):

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: EDGE Ch 512 2 timeslots
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: EIRP

SWEEP TABLE: "EIRP 1900 CH512"
Short Description: EIRP PCS 1900 for channel-512

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.8 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM

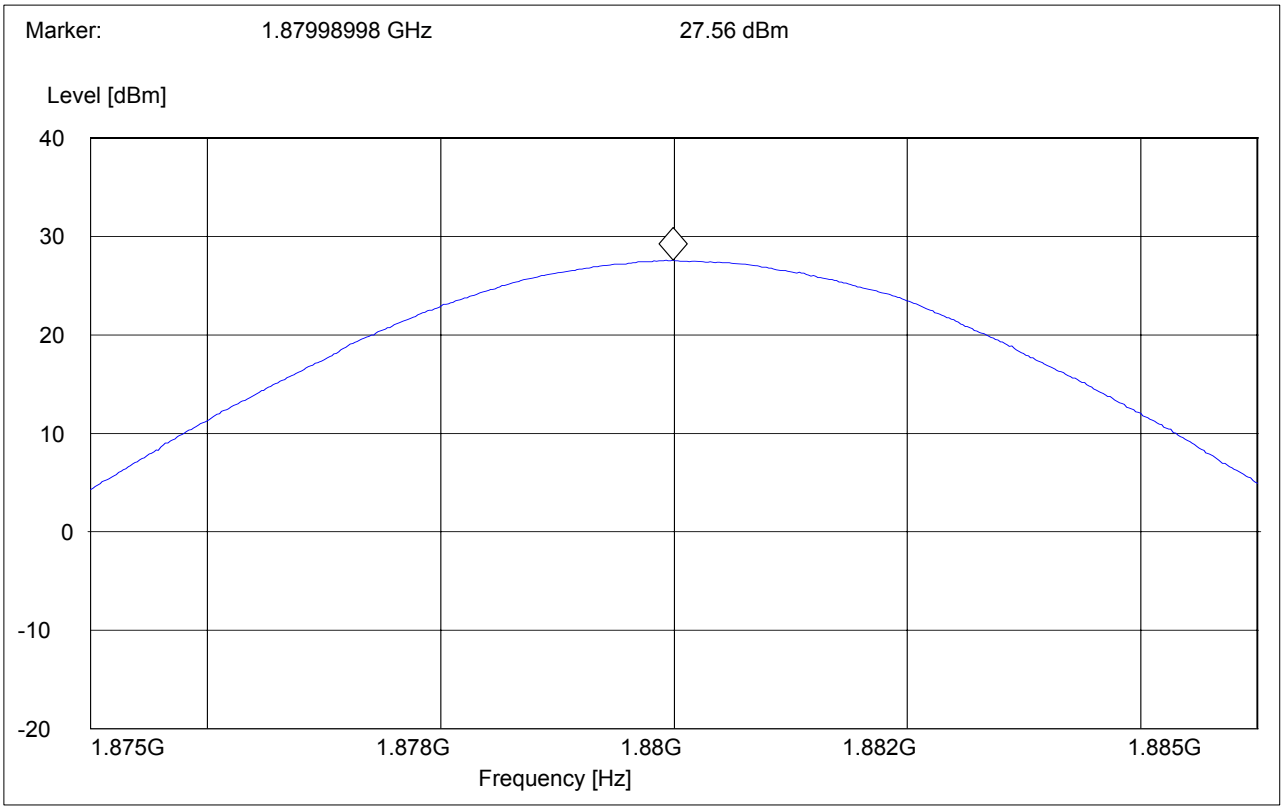


EIRP Ch661 GSM (GMSK):

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81 (#169) + AC charger A5BHTN00102612
Customer: BenQ Mobile
Operating Mode: PCS 1900, TCH: 661, PCL: 0
Antenna: H
EUT: H
Test operator: Willmes
Voltage: AC 110 V
Sweep: EIRP

SWEEP TABLE: "EIRP 1900 CH661"

Short Description:	EIRP PCS 1900 for channel-661				
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.9 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM MaxPeak

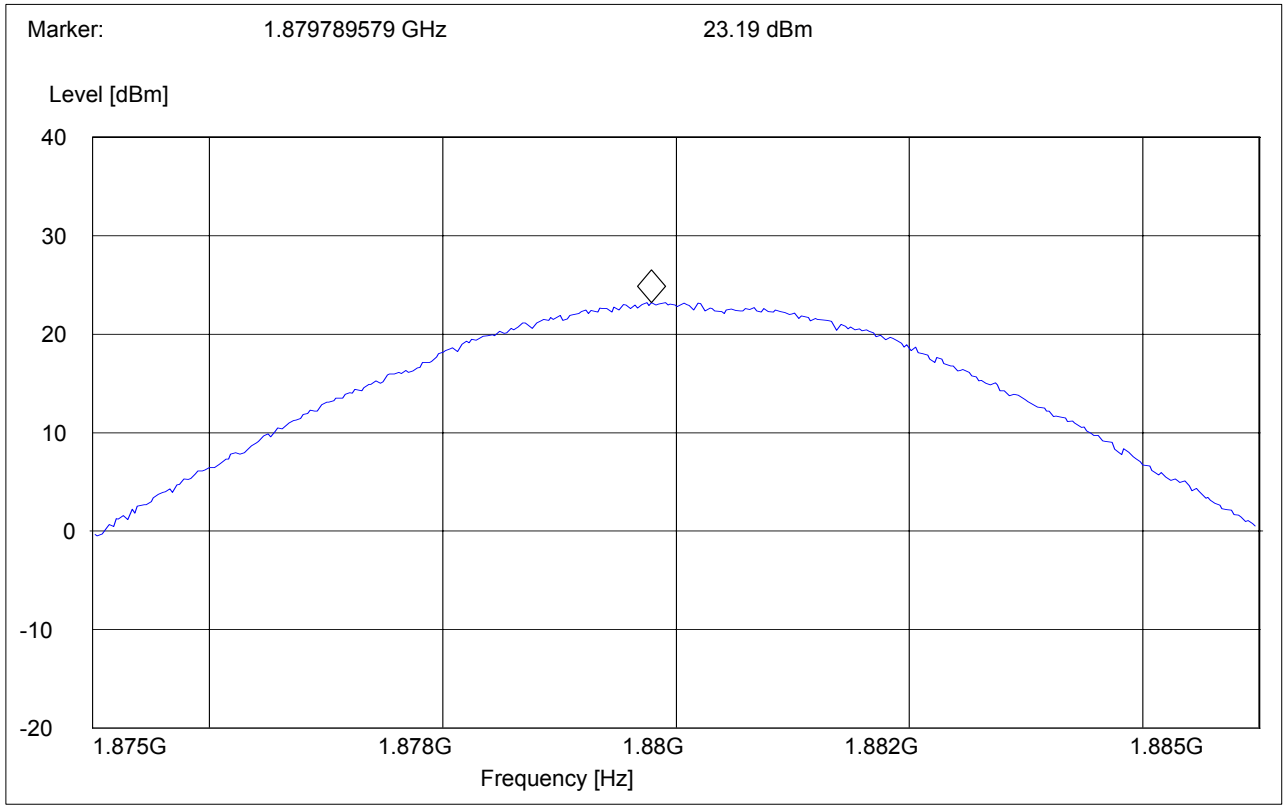


EIRP Ch661 EDGE (8PSK):

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: EDGE Ch 661 2 timeslots
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: EIRP

SWEEP TABLE: "EIRP 1900 CH661"

Short Description:	EIRP PCS 1900 for channel-661				
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.9 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM MaxPeak



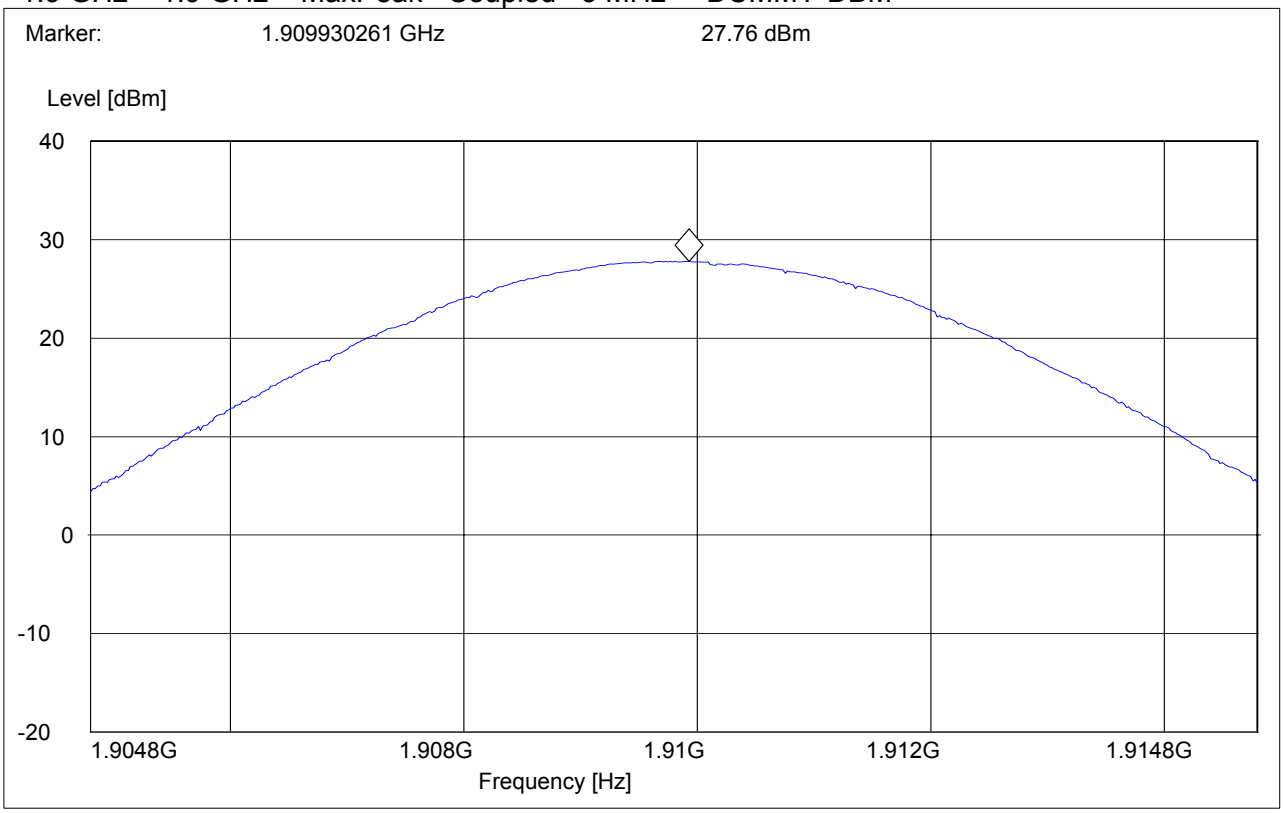
EIRP Ch810 GSM (GMSK):

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81 (#169) + AC charger A5BHTN00102612
Customer: BenQ Mobile
Operating Mode: PCS 1900, TCH: 810, PCL: 0
Antenna: H
EUT: H
Test operator: Willmes
Voltage: AC 110 V
Sweep: EIRP

SWEEP TABLE: "EIRP 1900 CH810"

Short Description: EIRP PCS 1900 for channel-810

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.9 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM



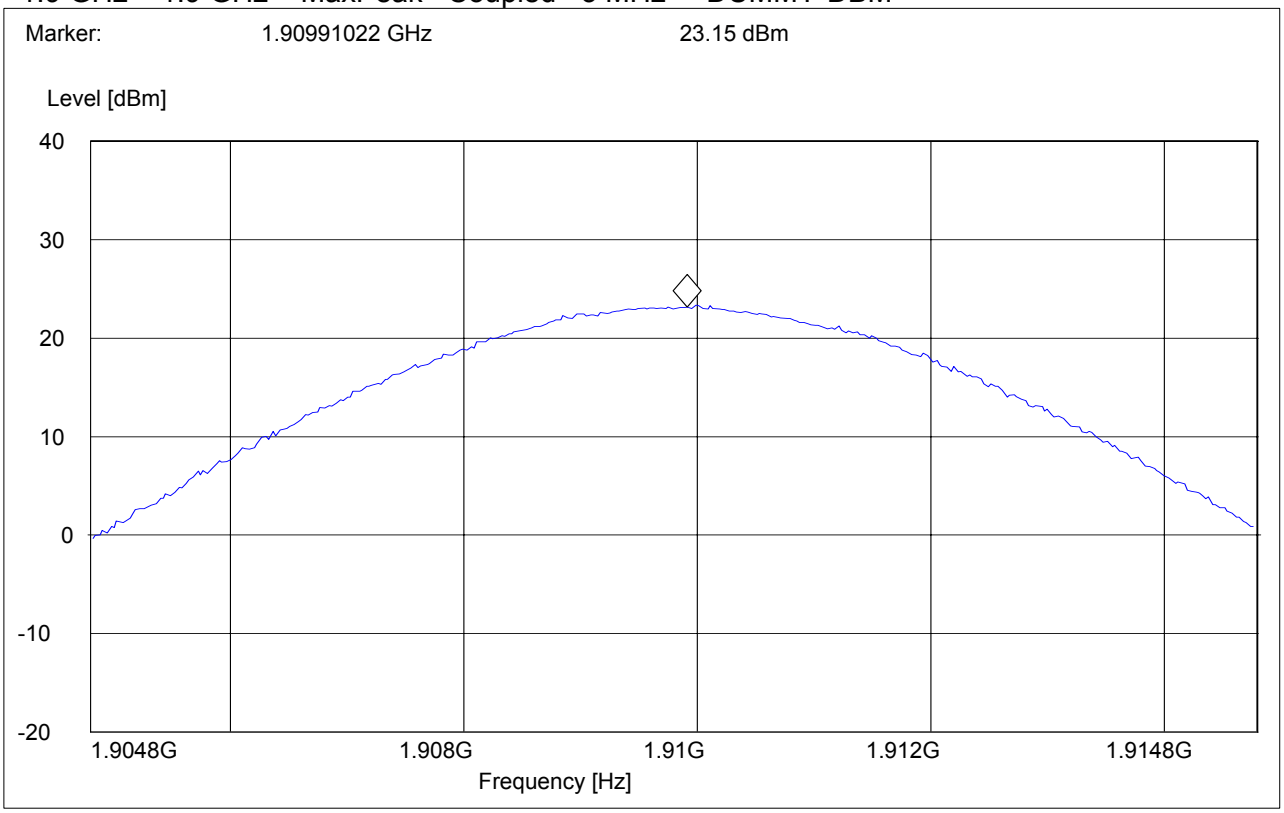
EIRP Ch810 EDGE (8PSK):

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: EDGE Ch 810 2 timeslots
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: EIRP

SWEEP TABLE: "EIRP 1900 CH810"

Short Description: EIRP PCS 1900 for channel-810

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.9 GHz	1.9 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM

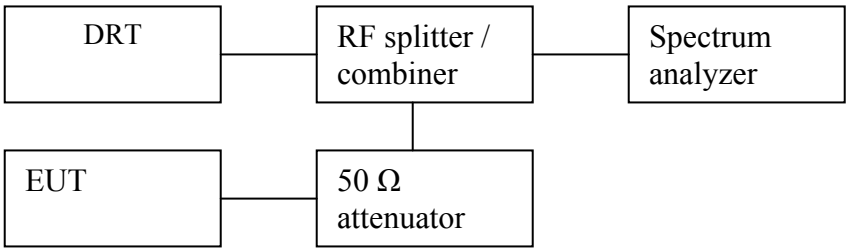


5.2 Occupied Bandwidth/Emission Bandwidth

5.2.1 FCC 2.1049 Measurements required: Occupied bandwidth

The occupied bandwidth, that is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable.
(h) Transmitters employing digital modulation techniques-when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated.

5.2.2 Occupied / emission bandwidth measurement procedure:



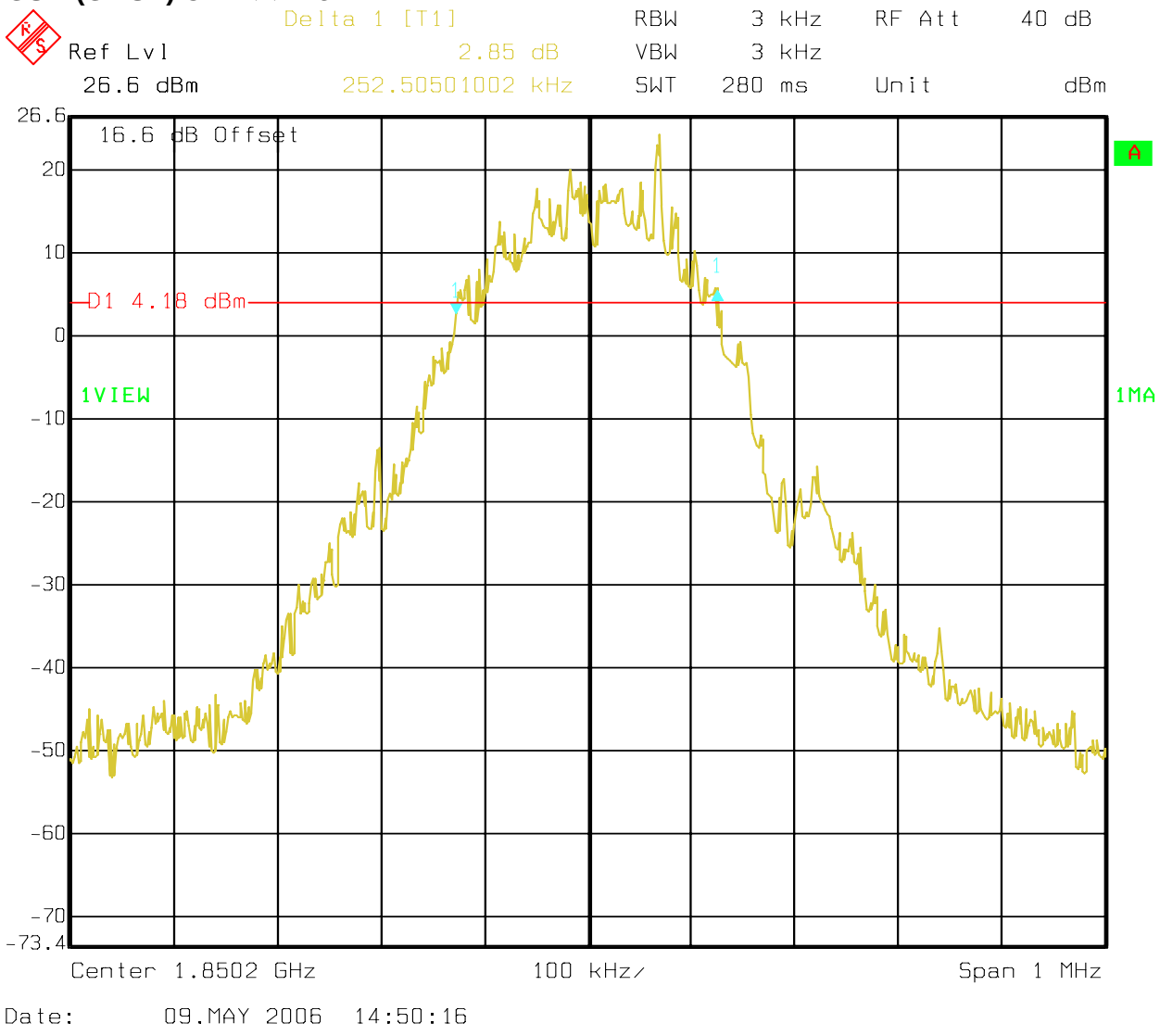
1. Connect the equipment as shown in the above diagram.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure the 99% (-20 dB) occupied bandwidth. Record the value.
4. Set the spectrum analyzer to measure the 99.5% (-26 dB) emission bandwidth. Record the value.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

5.2.3 Occupied / Emission bandwidth results 1900 MHz band:

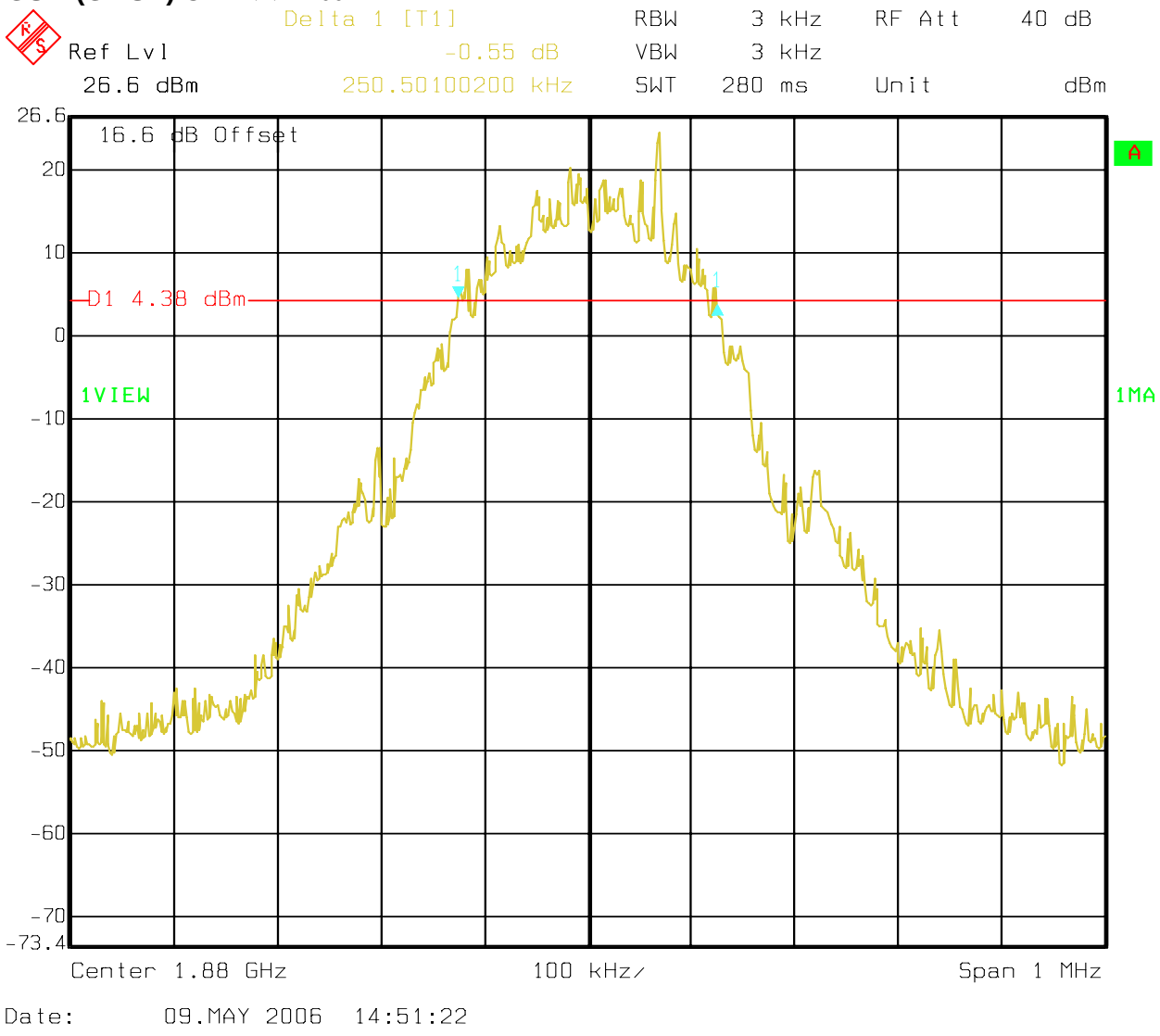
GSM (GMSK)		
Frequency (MHz)	**Occupied B/W -20 dB (KHz)**	**Emission B/W -26 dB (KHz)**
1850.2	**252.5**	**308.6**
1880.0	**250.5**	**308.6**
1909.8	**248.5**	**296.6**

EDGE (8PSK)		
Frequency (MHz)	**Occupied B/W -20 dB (KHz)**	**Emission B/W -26 dB (KHz)**
1850.2	**274.55**	**302.61**
1880.0	**278.56**	**302.61**
1909.8	**278.56**	**306.61**

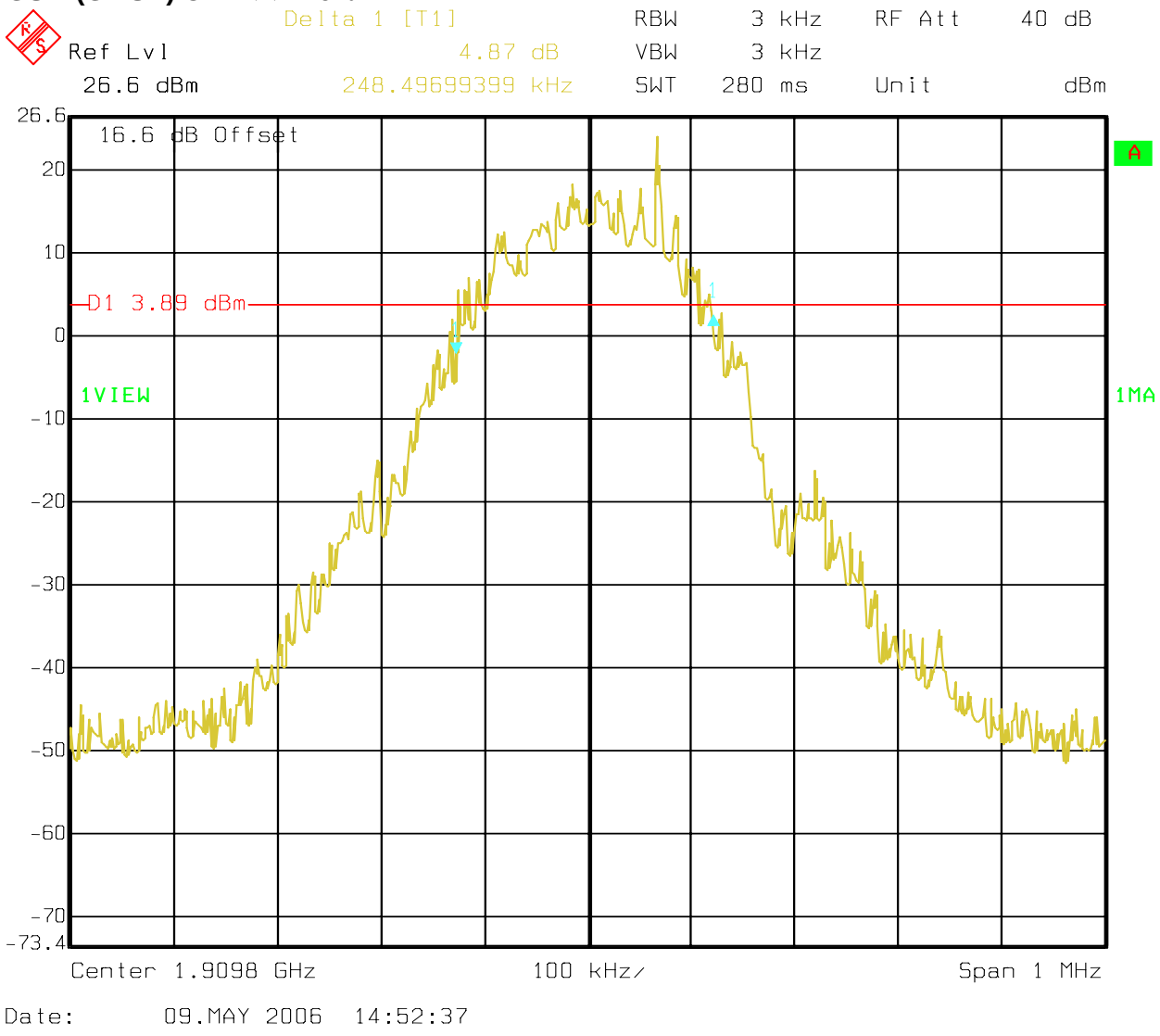
-20dB (PCS-1900)
GSM (GMSK) CHANNEL 512



-20dB (PCS-1900)
GSM (GMSK) CHANNEL 661

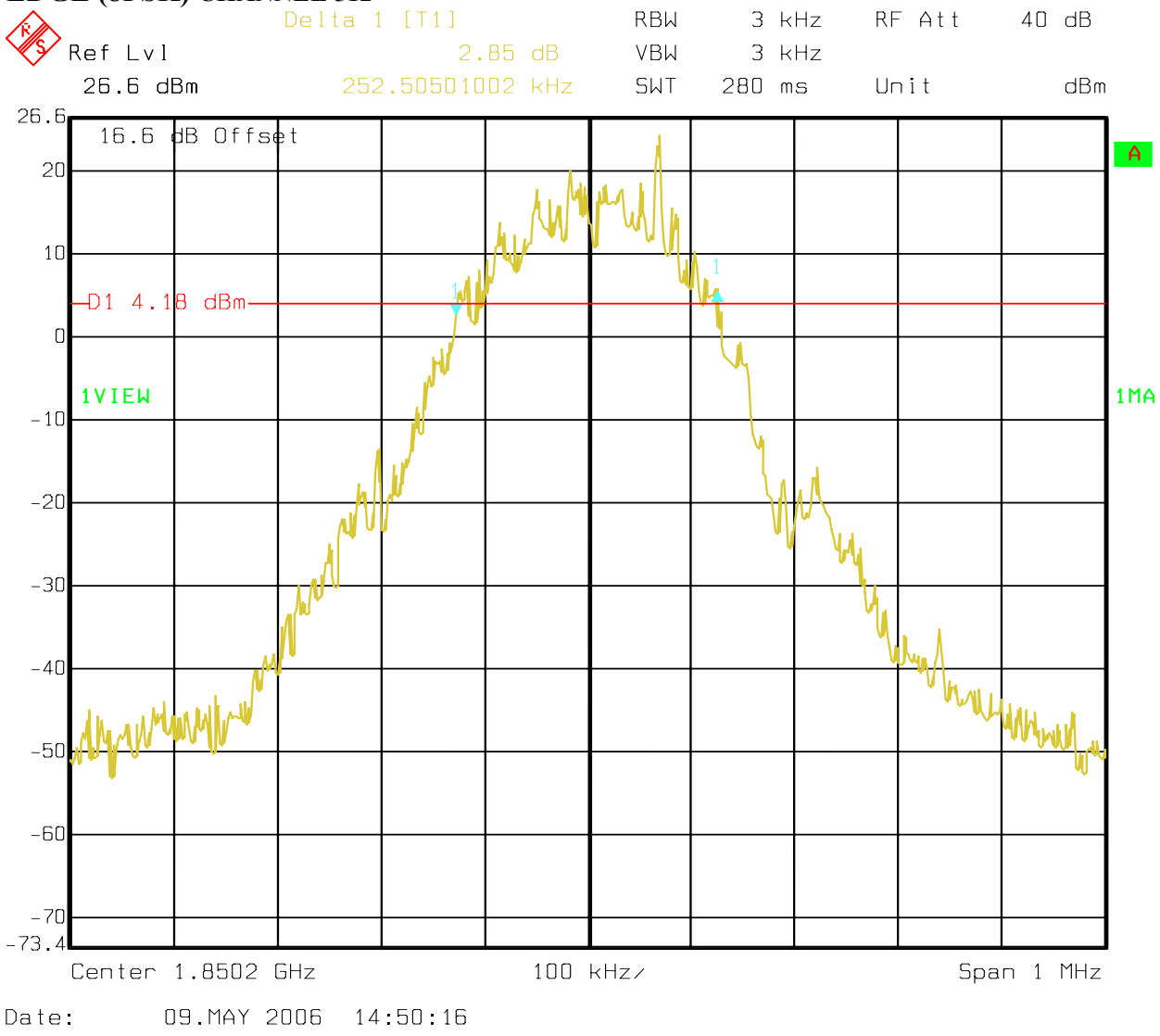


-20dB (PCS-1900)
GSM (GMSK) CHANNEL 810



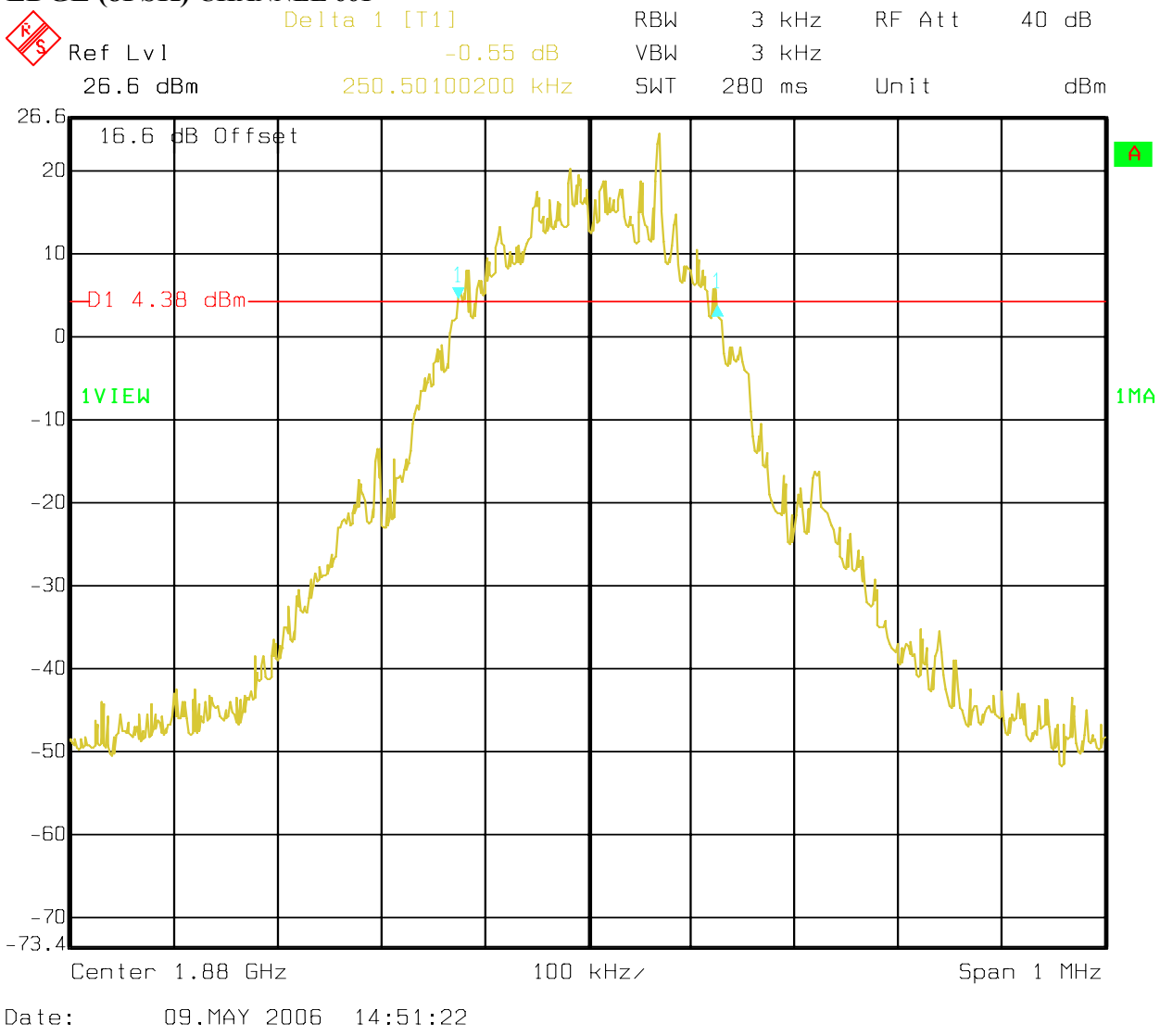
-20dB (PCS-1900)

EDGE (8PSK) CHANNEL 512



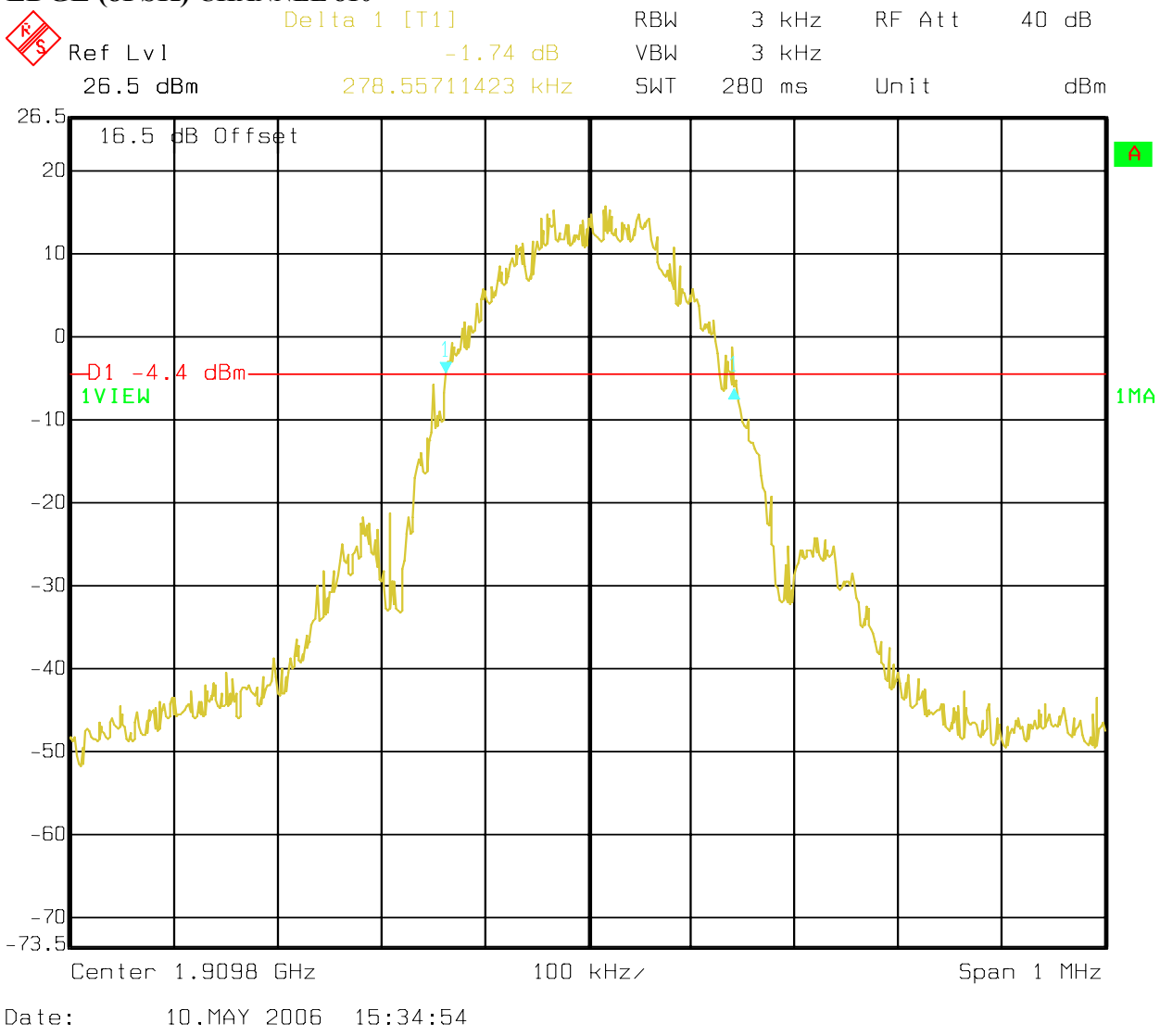
-20dB (PCS-1900)

EDGE (8PSK) CHANNEL 661

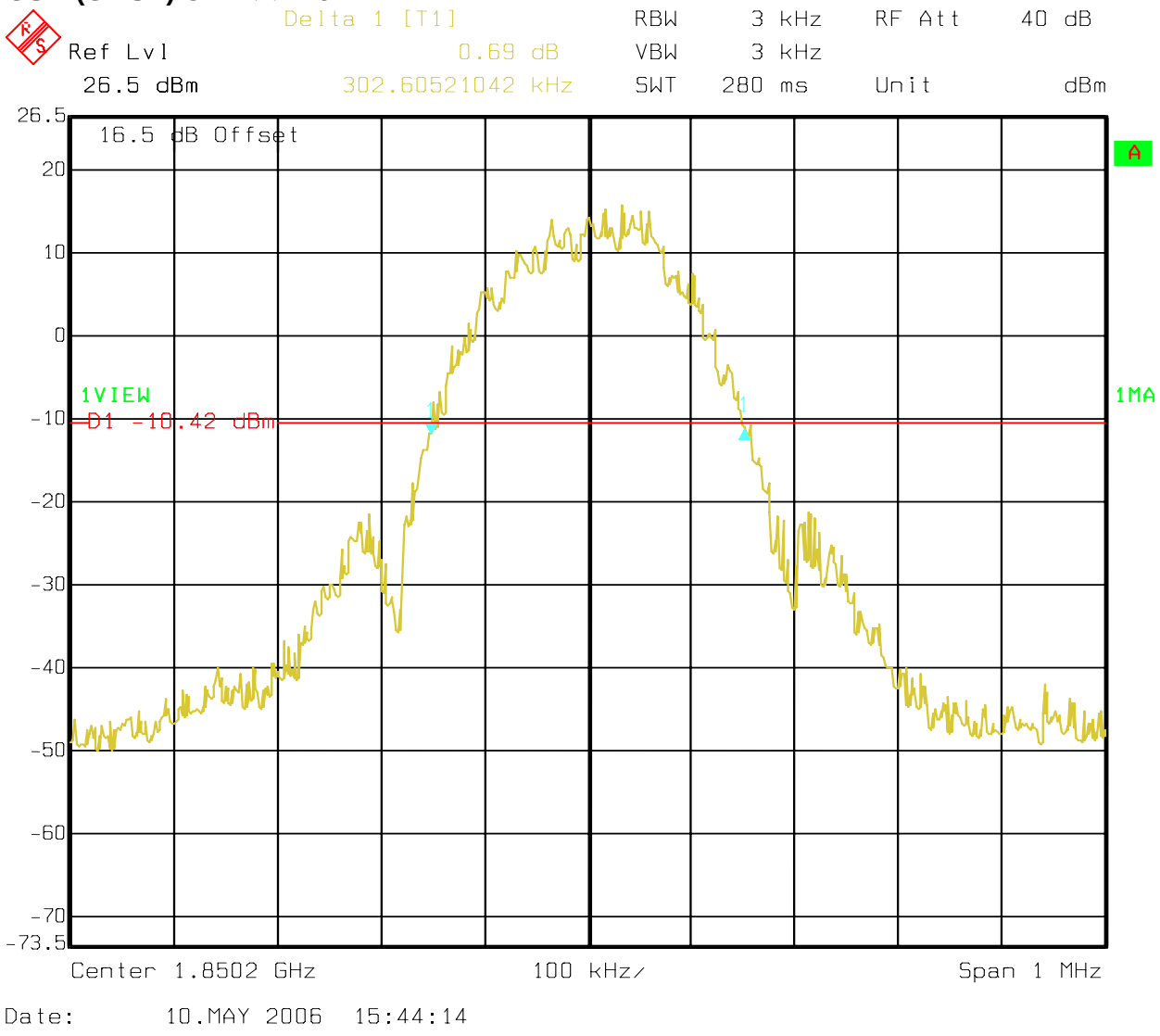


-20dB (PCS-1900)

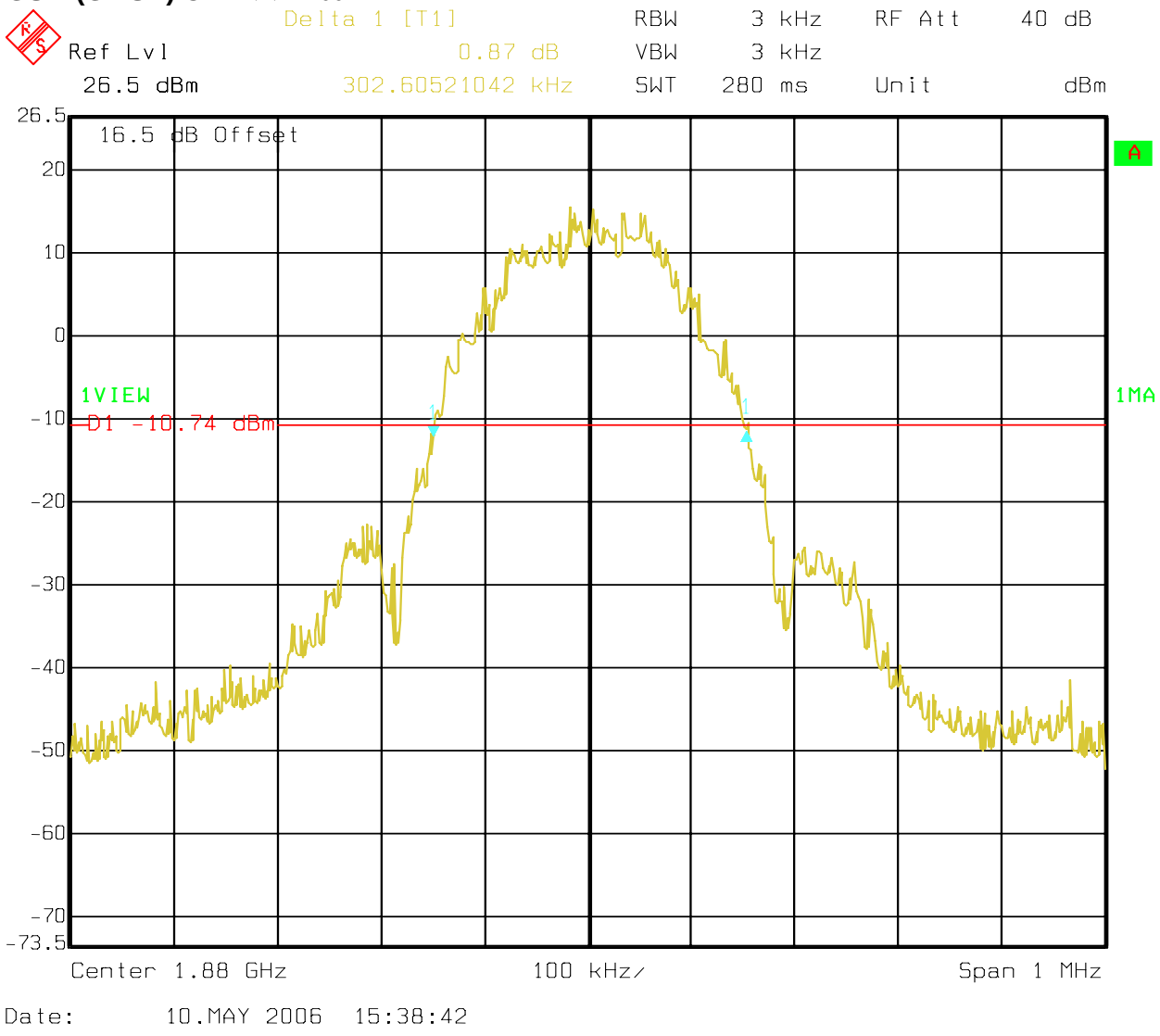
EDGE (8PSK) CHANNEL 810



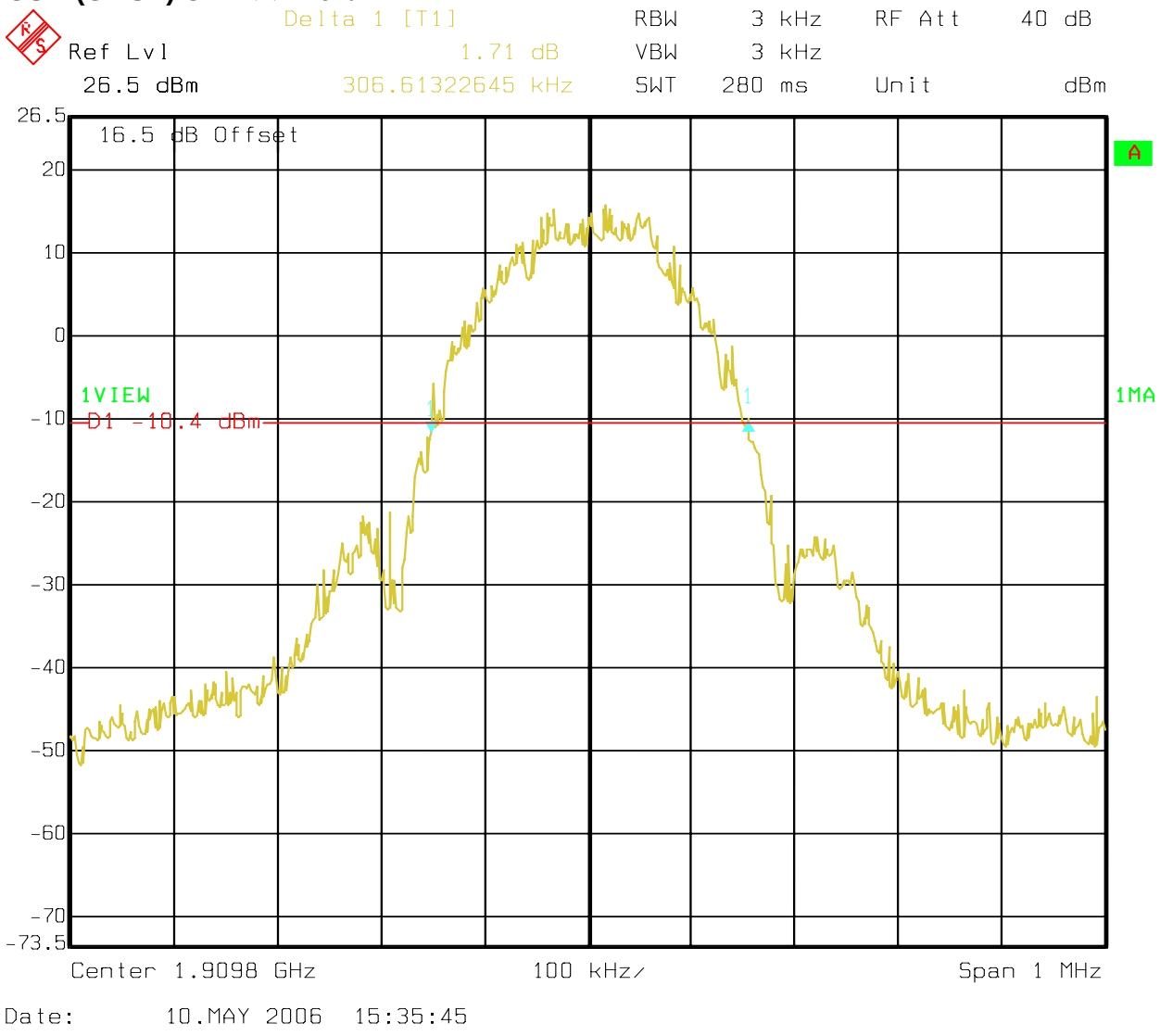
-26dB (PCS-1900)
GSM (GMSK) CHANNEL 512



-26dB (PCS-1900)
GSM (GMSK) CHANNEL 661

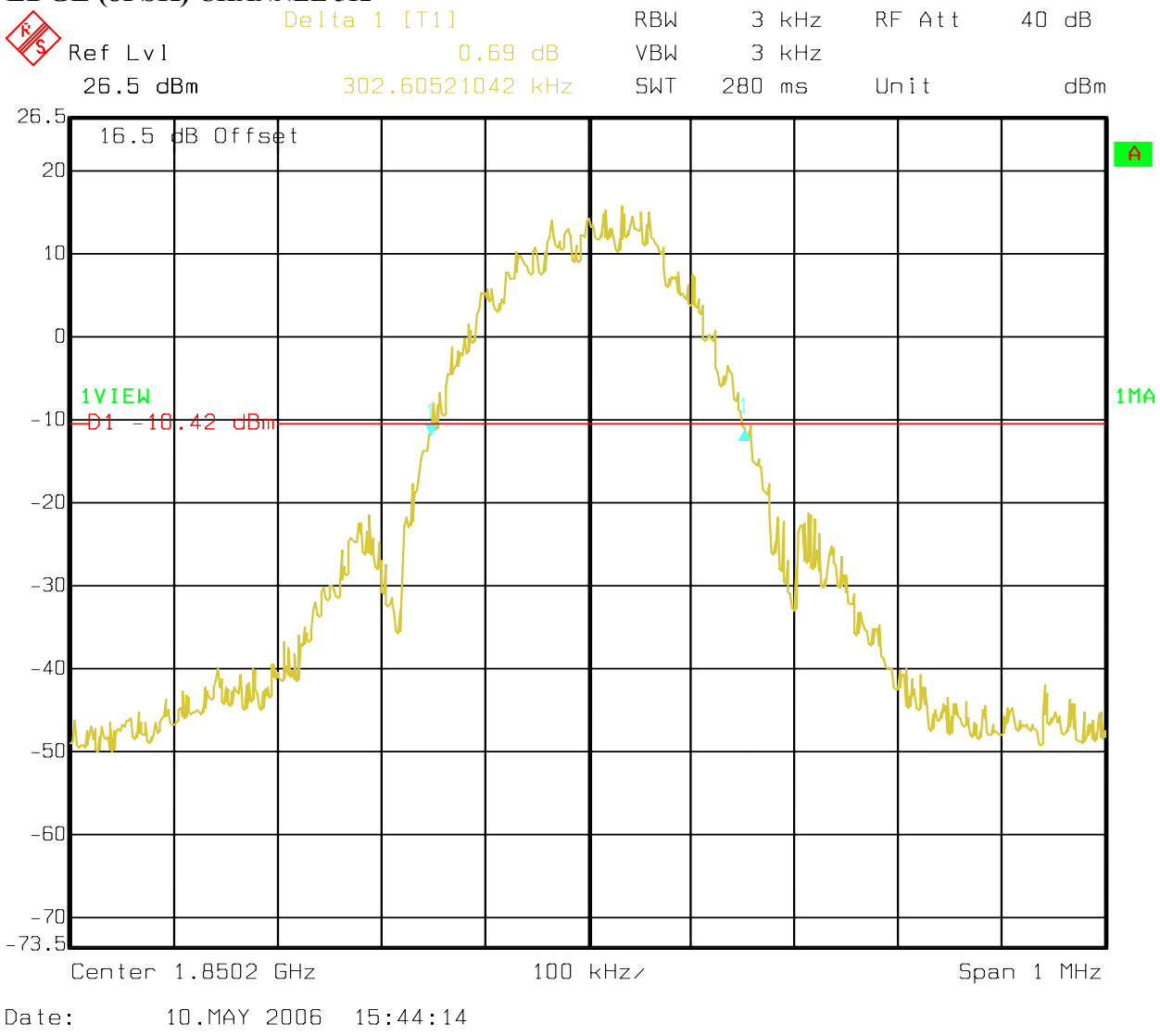


-26dB (PCS-1900)
GSM (GMSK) CHANNEL 810



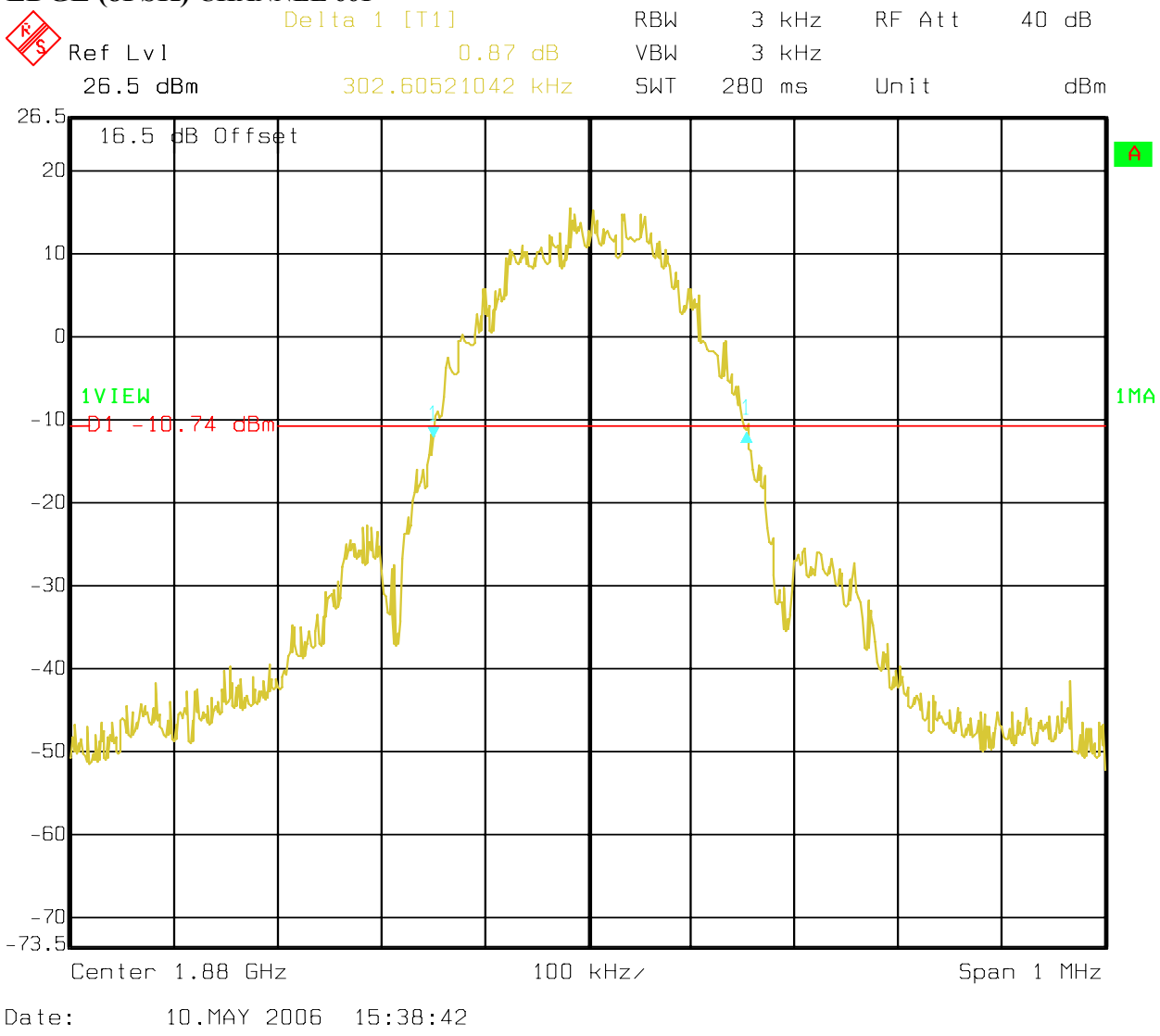
-26dB (PCS-1900)

EDGE (8PSK) CHANNEL 512



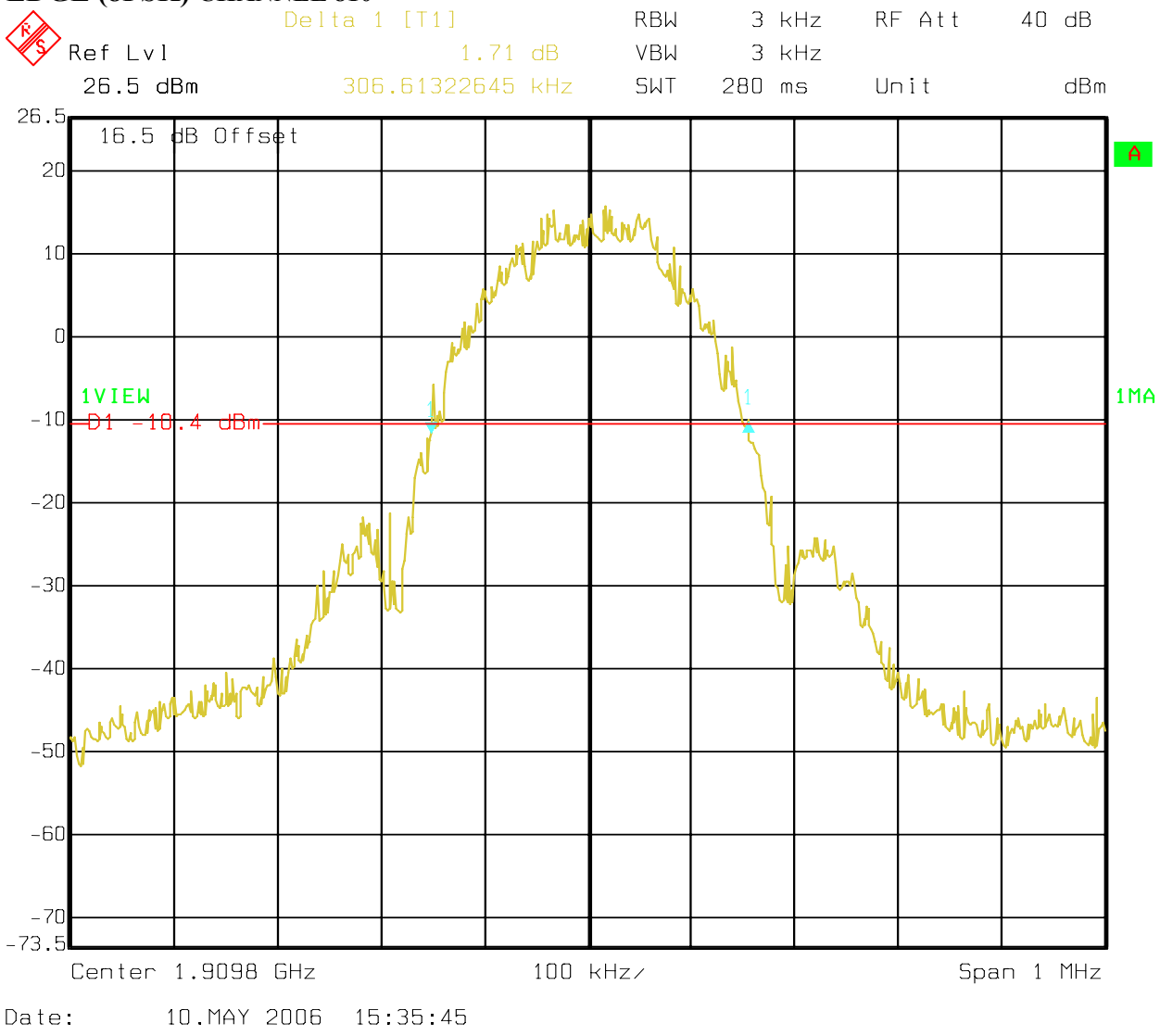
-26dB (PCS-1900)

EDGE (8PSK) CHANNEL 661



-26dB (PCS-1900)

EDGE (8PSK) CHANNEL 810



5.3 Frequency Stability

Note: Measurements performed on Siemens model S75 (FCC ID: PWX-S75, IC ID: 267E-S75).

5.3.1 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.

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 CMU 200 UNIVERSAL 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 CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 661 for PCS-1900), 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 CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 661 for PCS-1900), 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.

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 to vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

5.3.2 FREQUENCY STABILITY (PCS-1900)

AFC FREQ ERROR vs. VOLTAGE

Voltage (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
3.6	53	0.063351661
4.5	57	0.068132919

AFC FREQ ERROR vs. TEMPERATURE

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	51	0.060961033
-20	50	0.059765718
-10	63	0.075304805
0	55	0.06574229
+10	52	0.062156347
+20	55	0.06574229
+30	63	0.075304805
+40	64	0.07650012
+50	55	0.06574229

5.4 Spurious Emissions Conducted

5.4.1 FCC 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in FCC 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

5.4.2 Limits:

5.4.2.1 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.

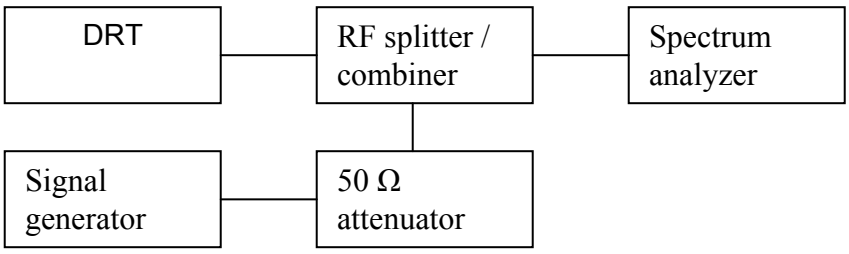
(a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(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.

5.4.3 Conducted out of band emissions measurement procedure:

Based on TIA-603B November 2002

2.2.13 Unwanted Emissions: Conducted Spurious



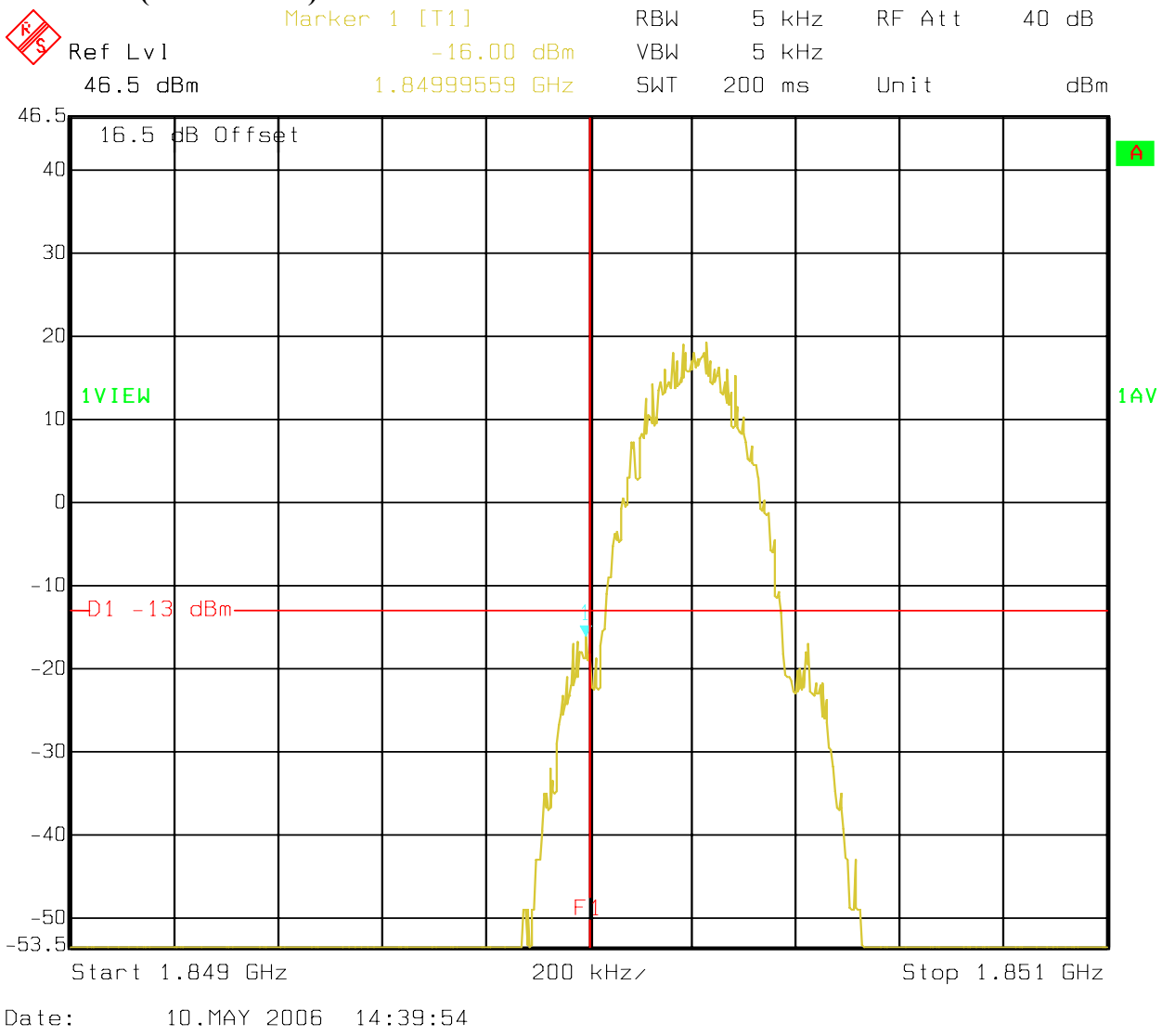
1. Connect the equipment as shown in the above diagram.
2. Set the spectrum analyzer to measure peak hold with the required settings.

3. Set the signal generator to a known output power and record the path loss in dB (**LOSS)** for frequencies up to the tenth harmonic of the EUT's carrier frequency. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
4. Replace the signal generator with the EUT.
5. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
6. Set the spectrum analyzer to measure peak hold with the required settings. Offset the spectrum analyzer reference level by the path loss measured above.
7. Measure and record all spurious emissions up to the tenth harmonic of the carrier frequency.
8. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
9. If necessary steps 6 and 7 may be performed with the spectrum analyzer set to average detector.

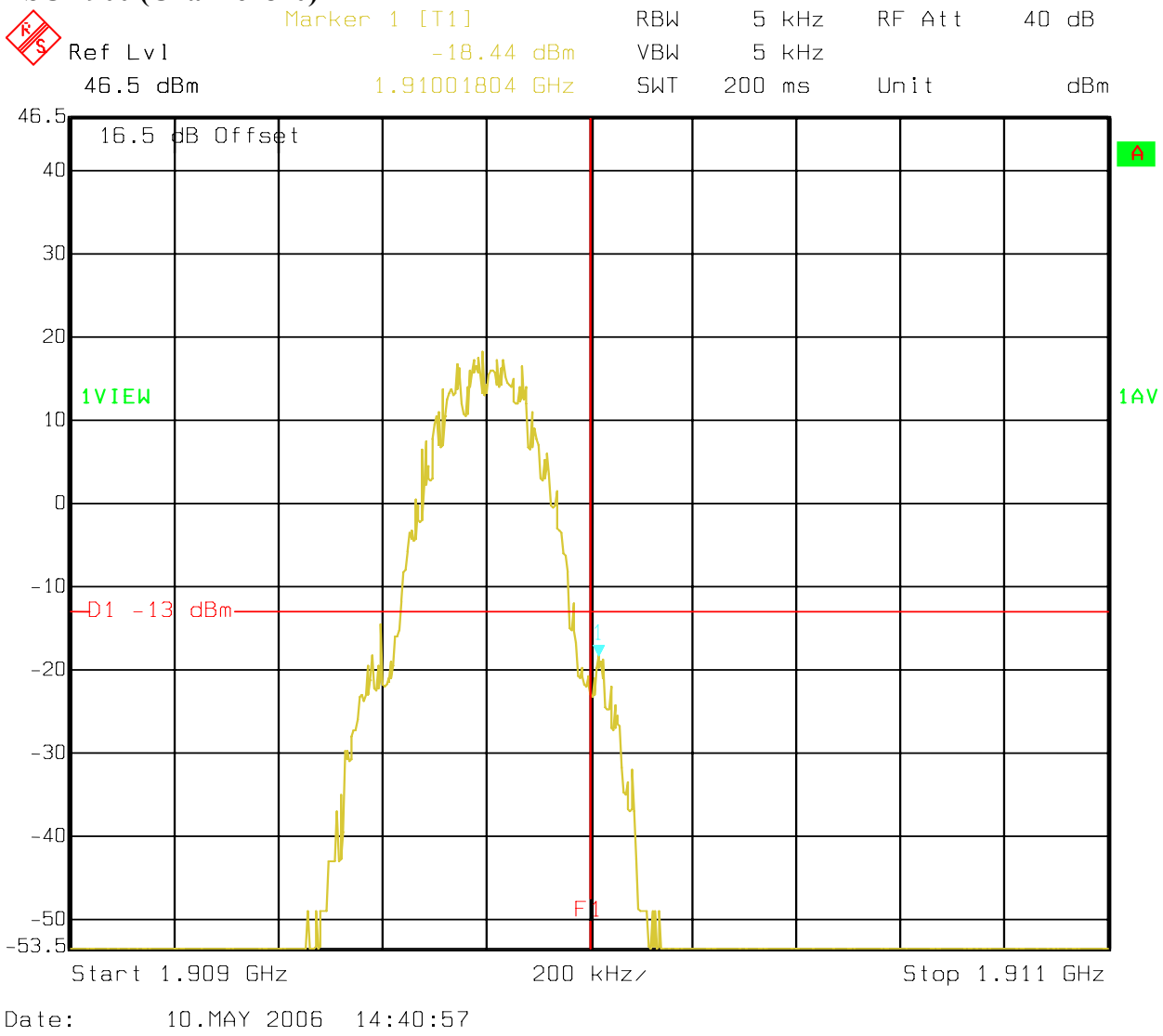
(**note:** Step 3 above is performed prior to testing and **LOSS** is recorded by test software. Steps 2, 6, and 7 above are performed with test software.)

5.4.4 Bandedge Results PCS-1900

PSC-1900 (Channel 512)

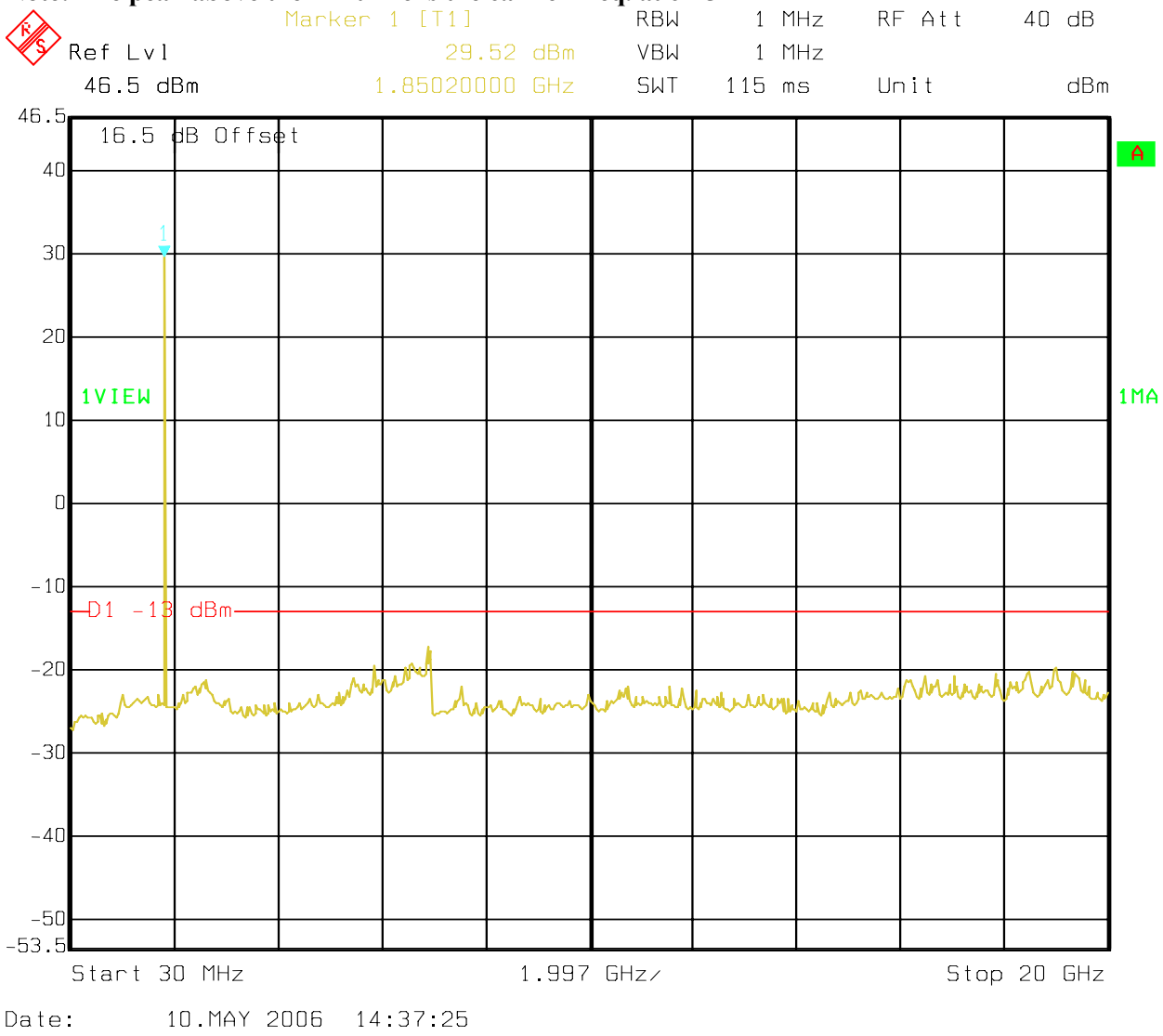


PSC-1900 (Channel 810)

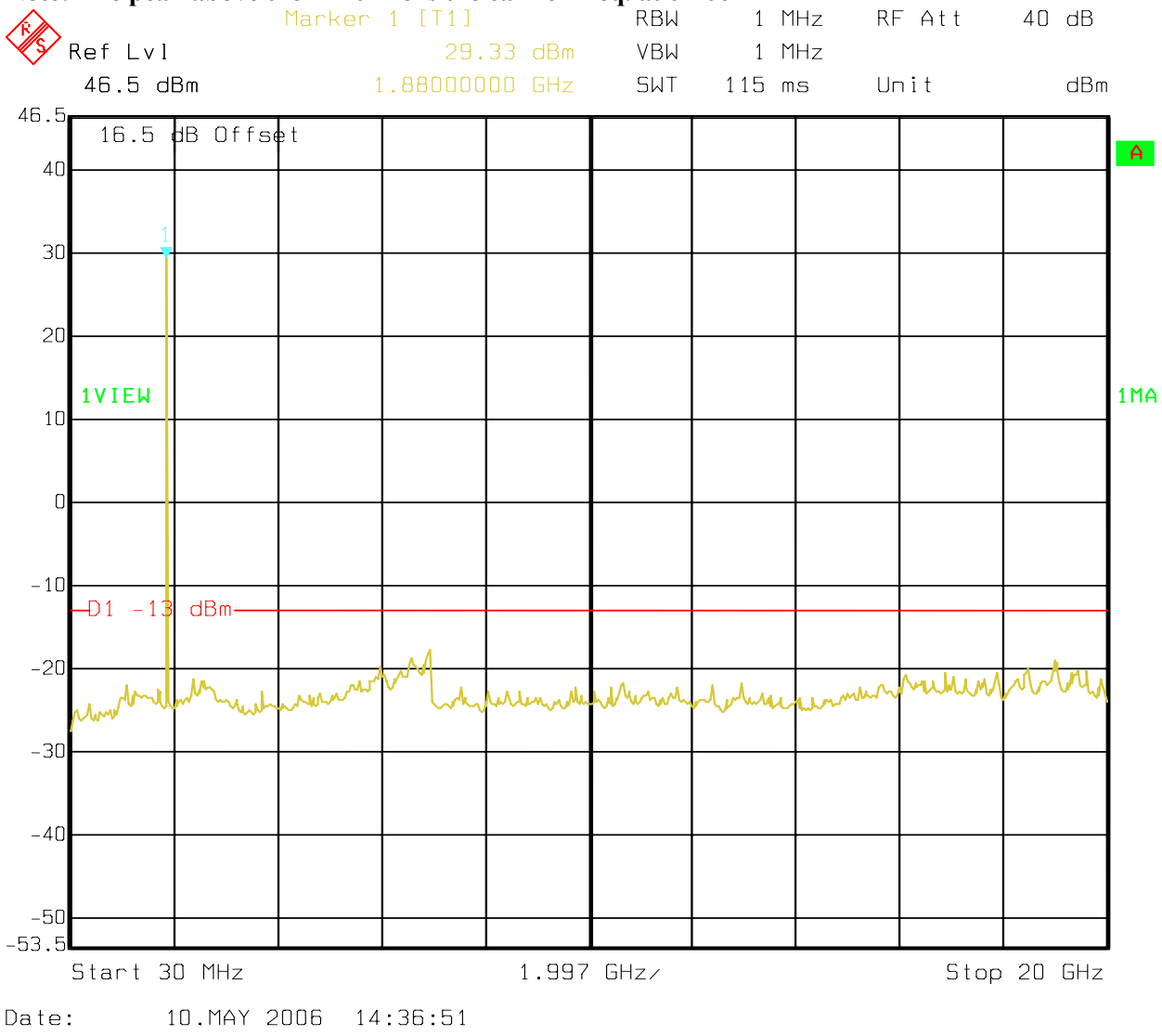


5.4.5 Conducted Spurious Results PCS-1900

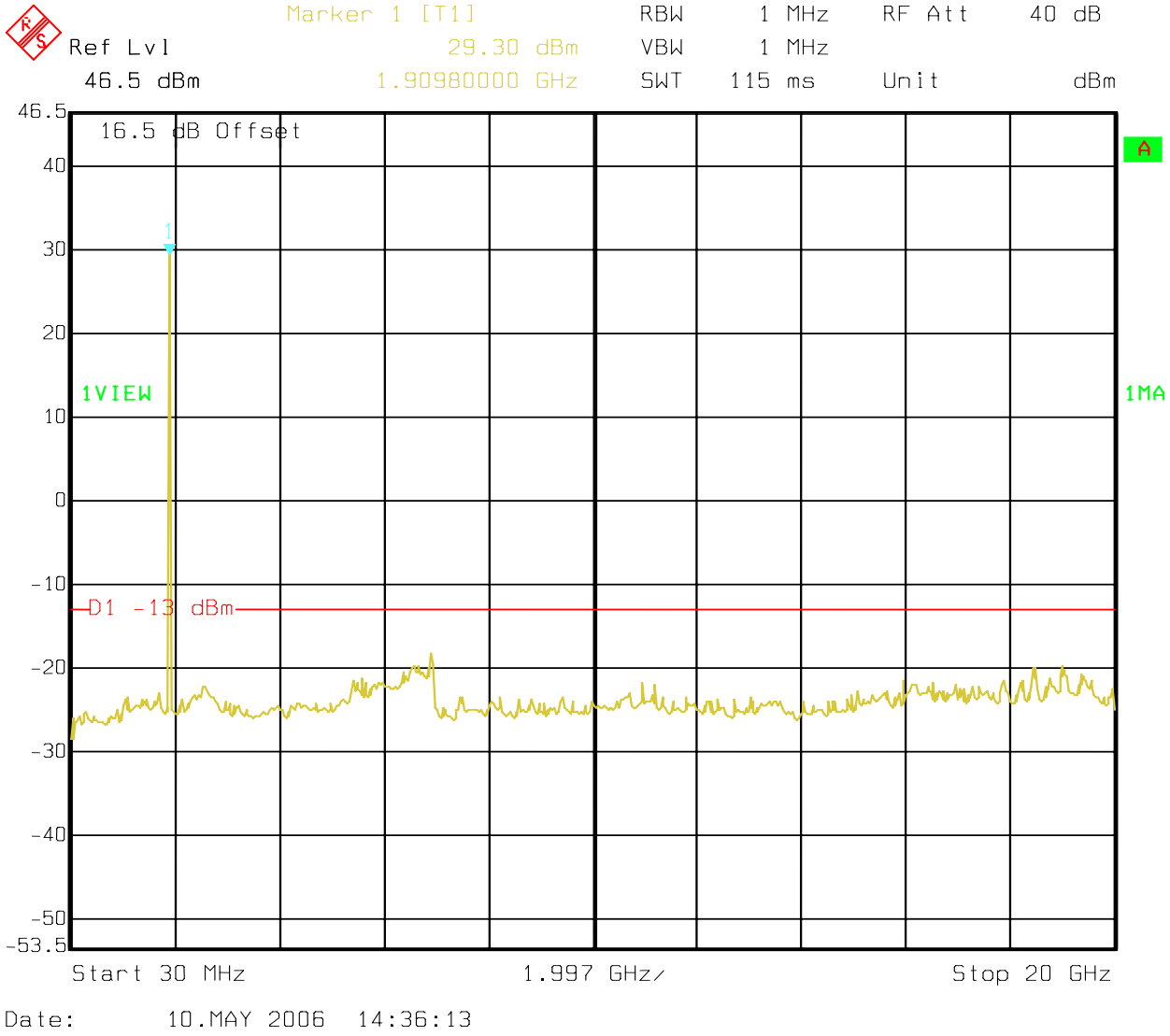
CHANNEL 512 (PCS-1900)
30MHz – 20GHz
Note: The peak above the limit line is the carrier freq. at ch-512



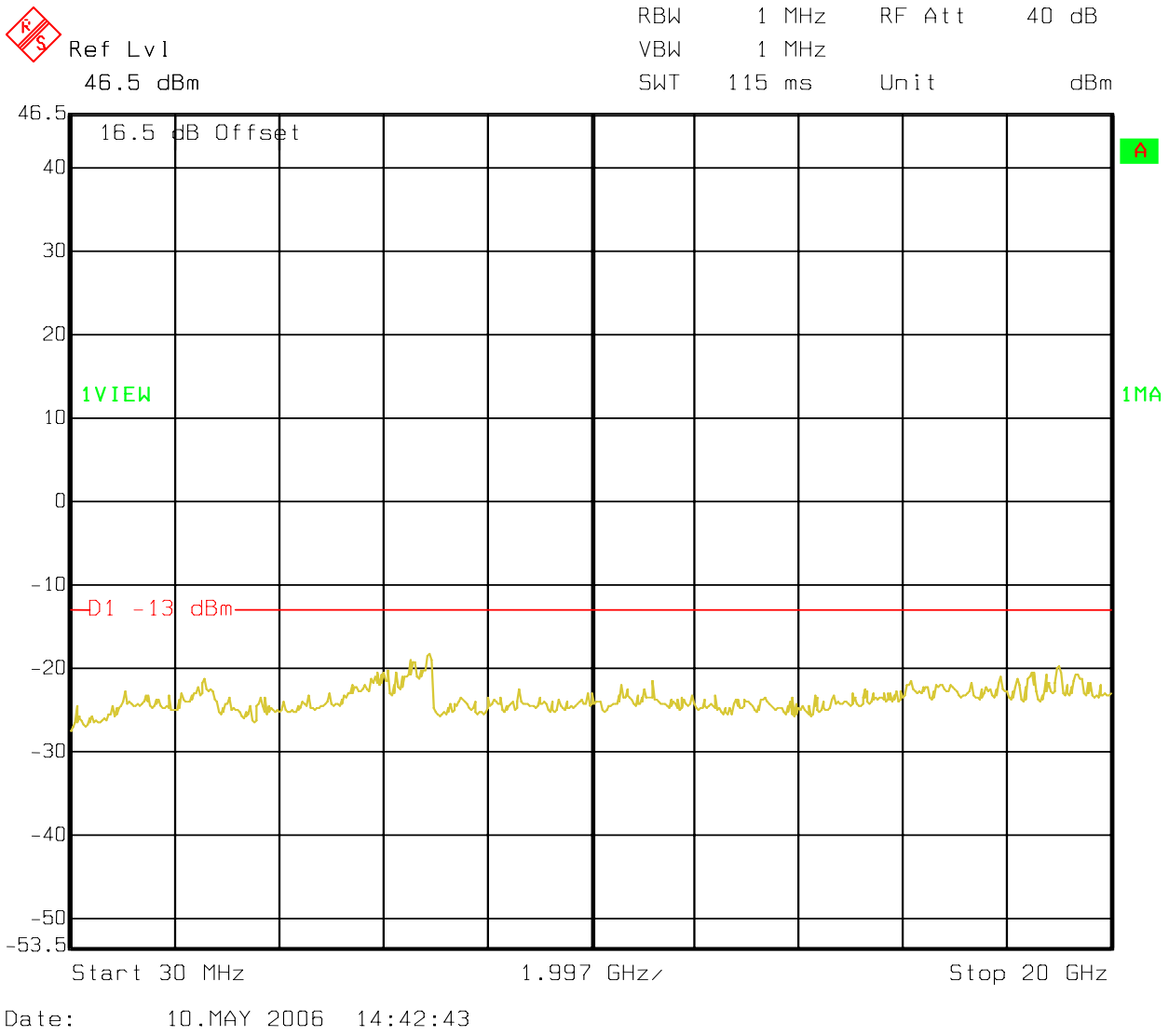
CHANNEL 661 (PCS-1900)
30MHz – 20GHz
Note: The peak above the limit line is the carrier freq. at ch-661



CHANNEL 810 (PCS-1900)
30MHz – 20GHz
Note: The peak above the limit line is the carrier freq. at ch-810



IDLE (PCS-1900)
30MHz – 20GHz



5.5 Spurious Emissions Radiated

5.5.1 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.

5.5.2 Limits:

5.5.2.1 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.

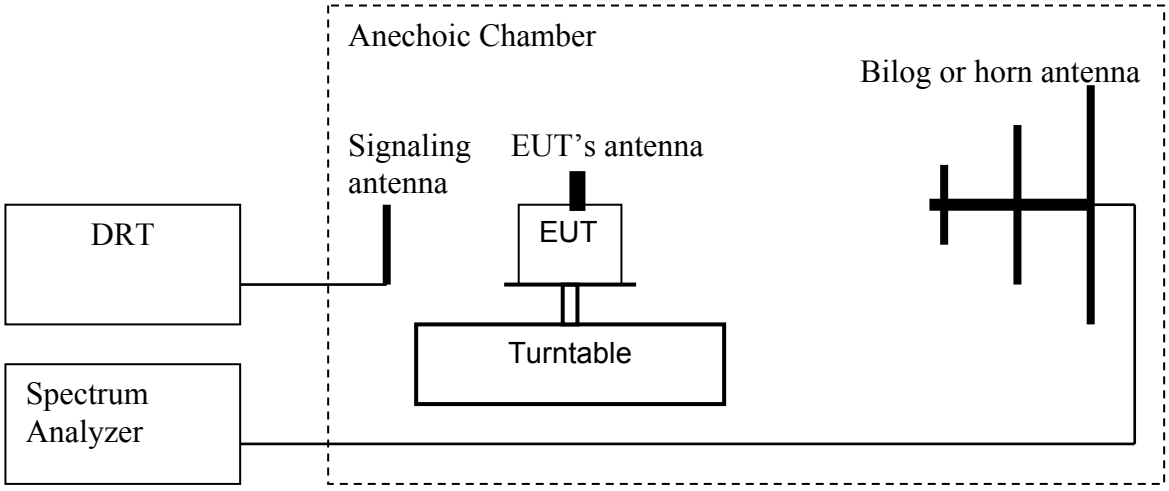
(a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(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.

5.5.3 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 PCS-1900 band. 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 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 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

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

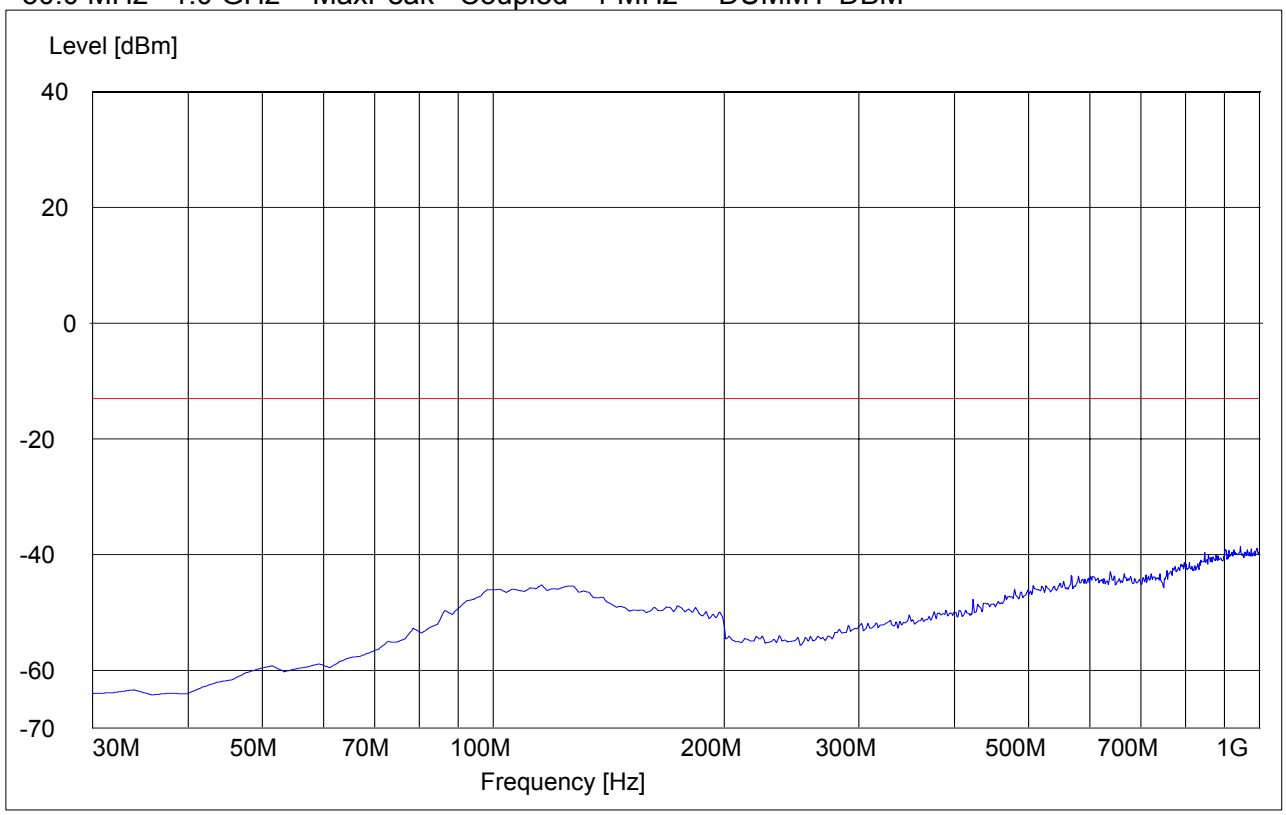
CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: C81
Customer: BenQ
Operating Mode: GSM Ch 512
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 30-1000 MHz

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

Short Description: FCC 24 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

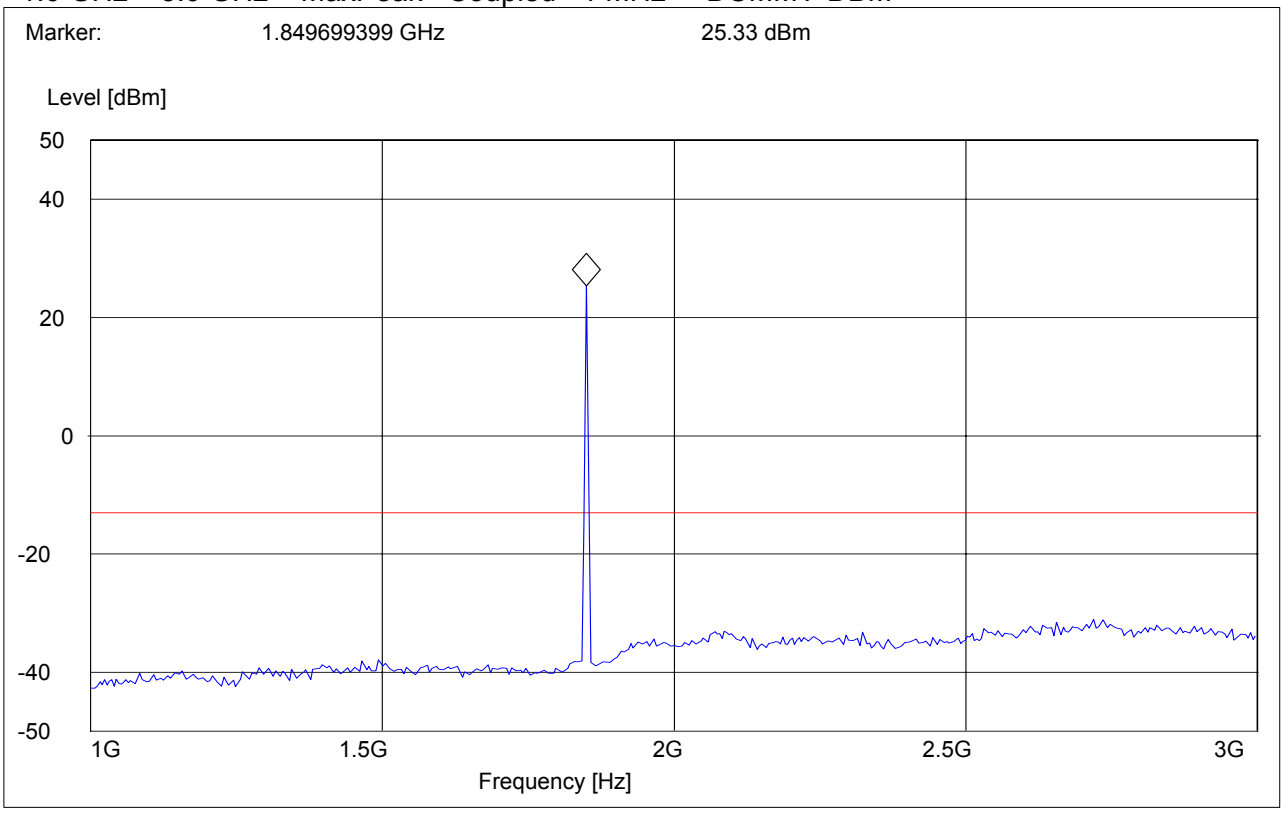


RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx 1GHz – 3GHz
Spurious emission limit –13dBm
Antenna: Vertical

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: GSM Ch 512
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 1-3 GHz

SWEEP TABLE: "FCC 24Spuri 1-3G"
Short Description: FCC 24 1GHz-8GHz

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



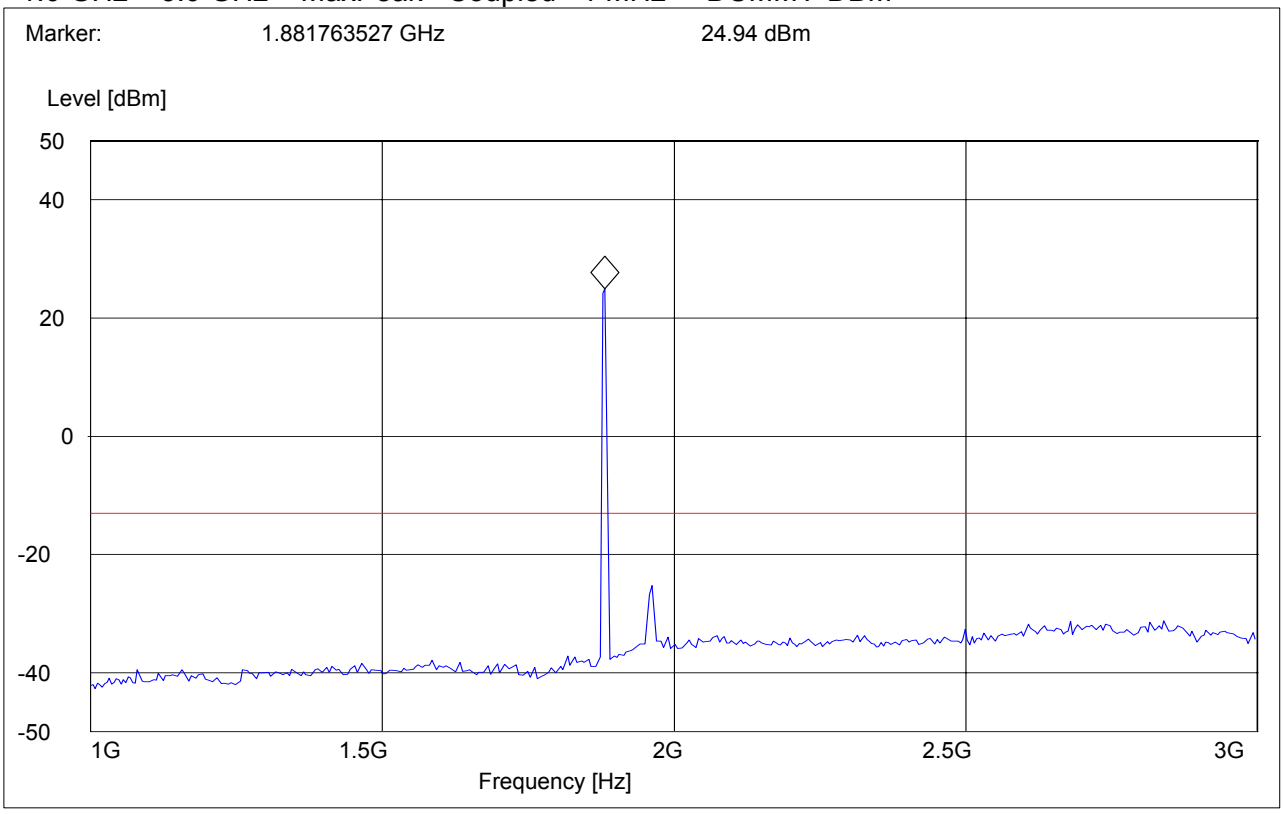
Note: The peak above the limit line is the carrier freq. at ch-512

RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx 1GHz – 3GHz
Spurious emission limit –13dBm
Antenna: Vertical

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: GSM Ch 661
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 1-3 GHz

SWEEP TABLE: "FCC 24Spuri 1-3G"
Short Description: FCC 24 1GHz-8GHz

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



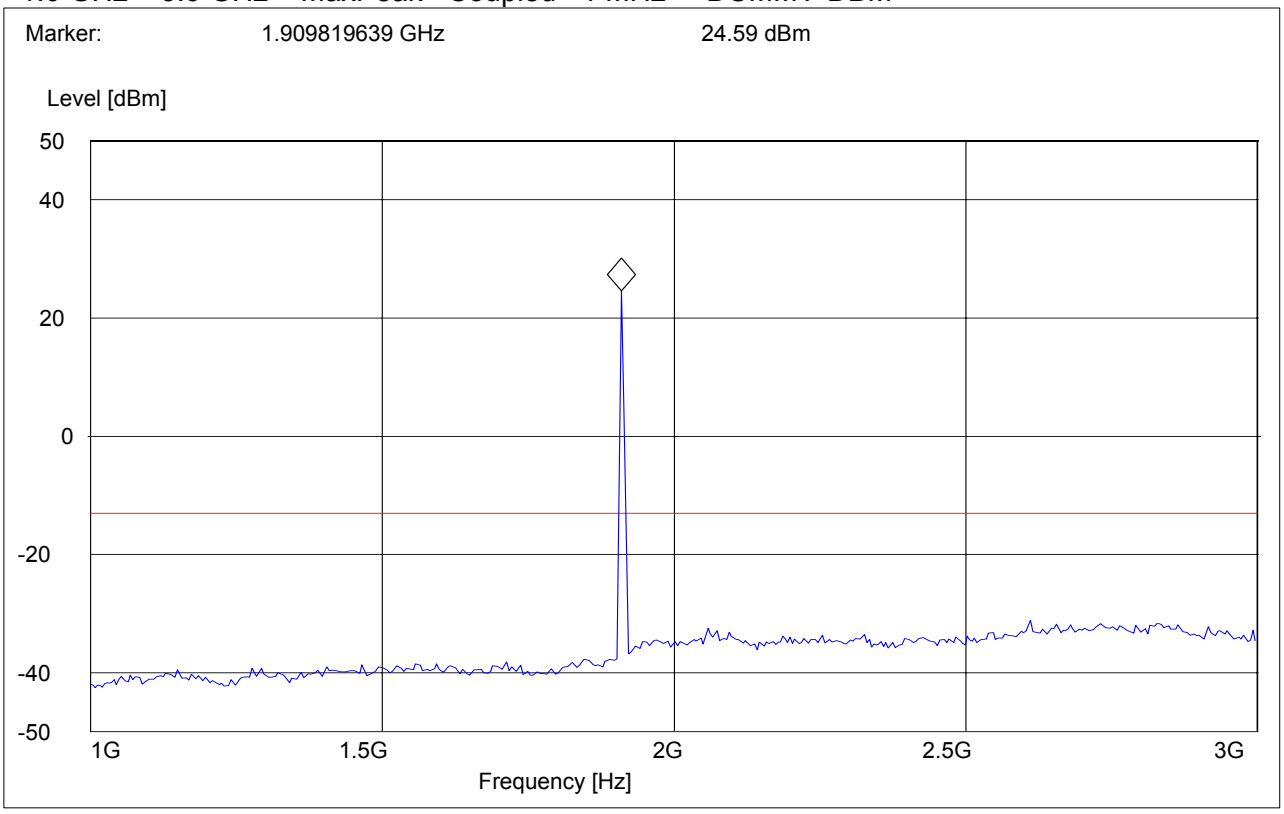
Note: The peak above the limit line is the carrier freq. at ch-661.

RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx 1GHz – 3GHz
Spurious emission limit –13dBm
Antenna: Vertical

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: GSM Ch 810
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 1-3 GHz

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

Short Description:		FCC 24 1GHz-8GHz			
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



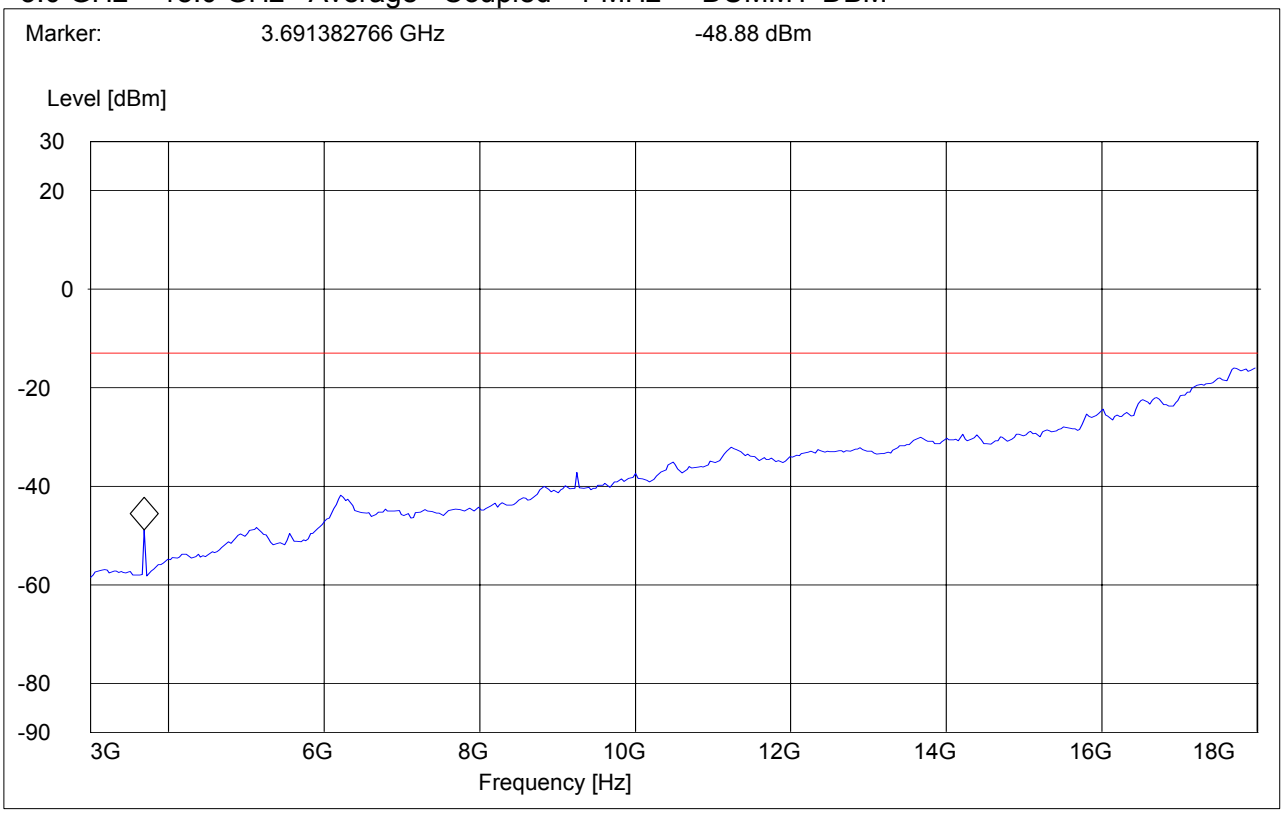
Note: The peak above the limit line is the carrier freq. at ch-810.

RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx 3GHz – 18GHz
Spurious emission limit –13dBm
Antenna: Vertical

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: GSM Ch 512
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 3-18 GHz

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

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

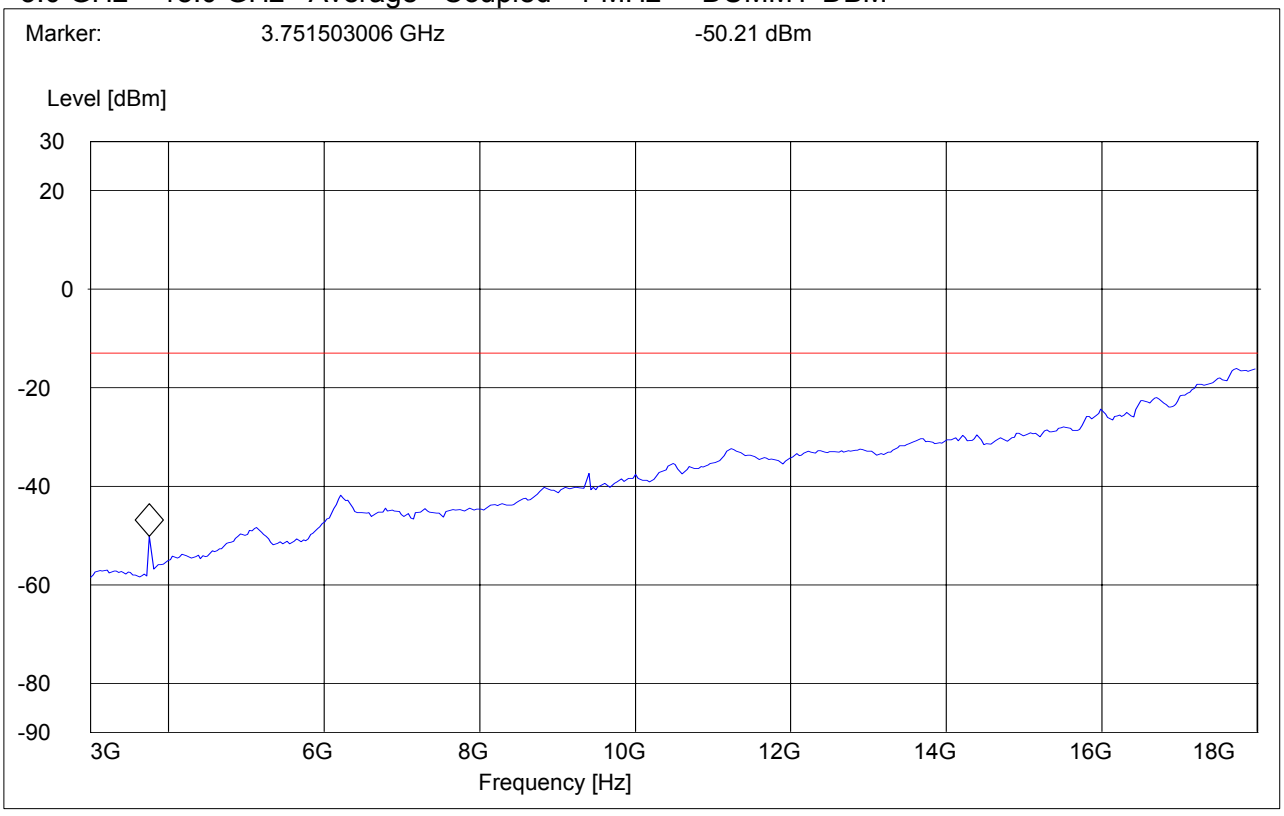


RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx 3GHz – 18GHz
Spurious emission limit –13dBm
Antenna: vertical

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: GSM Ch 661
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 3-18 GHz

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

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

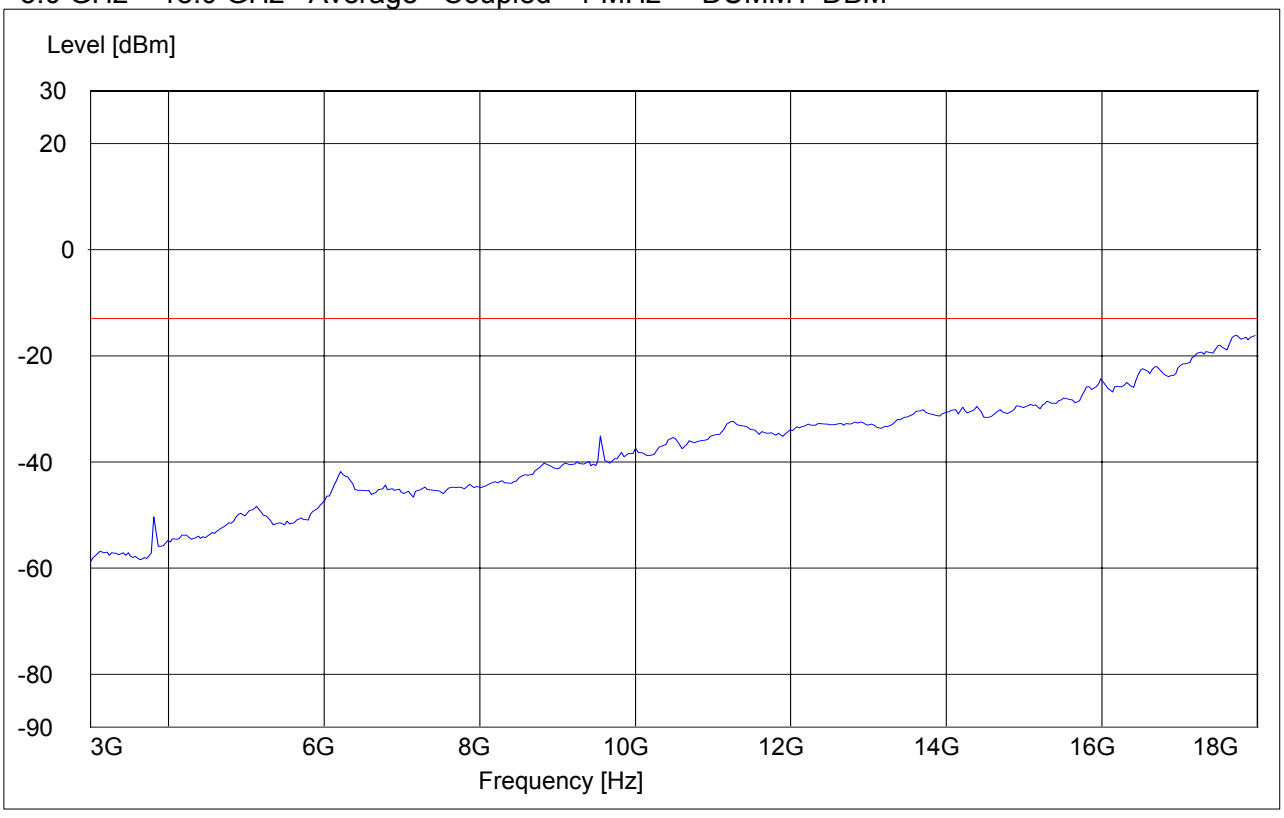


RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx 3GHz – 18GHz
Spurious emission limit –13dBm
Antenna: vertical

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: GSM Ch 810
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 3-18 GHz

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

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

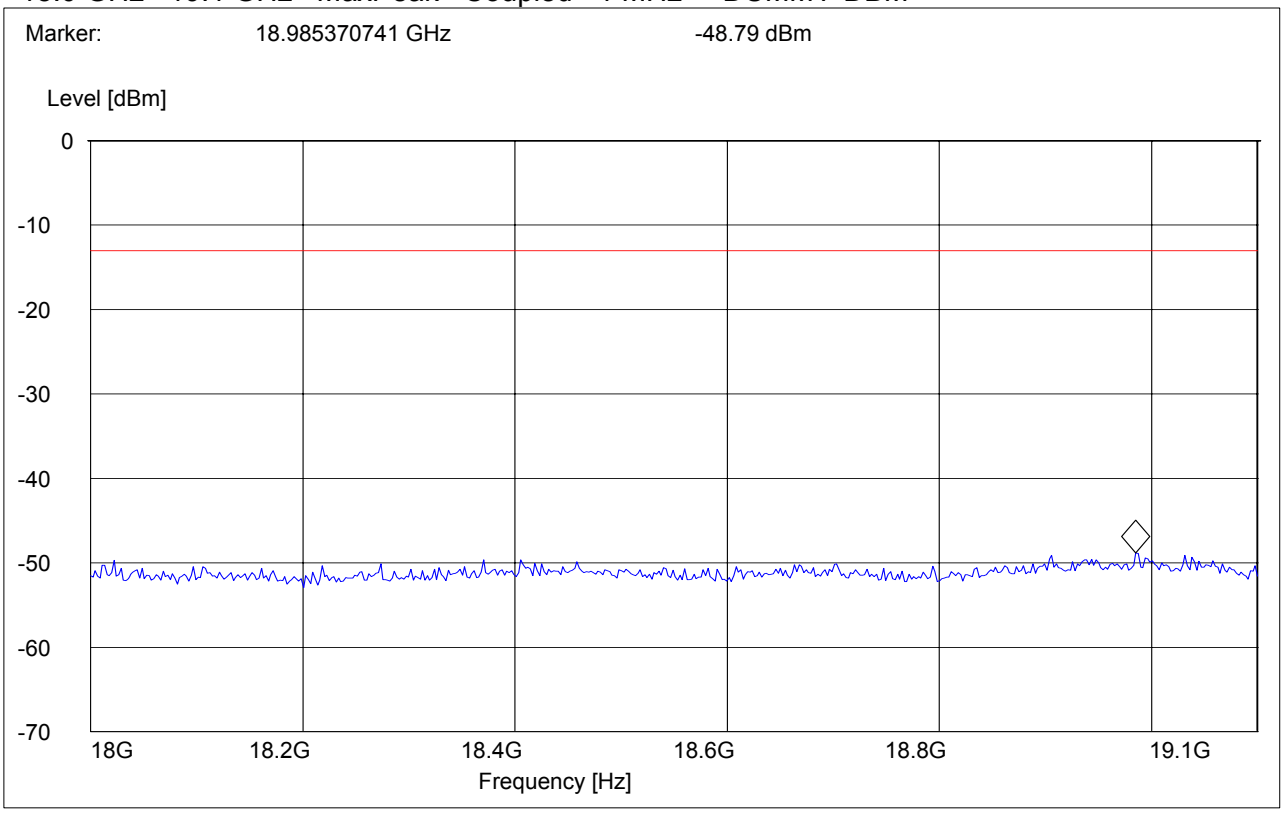


RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx 18GHz – 19.1GHz
Spurious emission limit –13dBm
Note: This plot is valid for low, mid & high channels (worst-case plot)

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: GSM Ch 810
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 18-19.1 GHz

SWEEP TABLE: "FCC 24spuri 18-19.1G"
Short Description: FCC 24 18GHz-19.1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	19.1 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

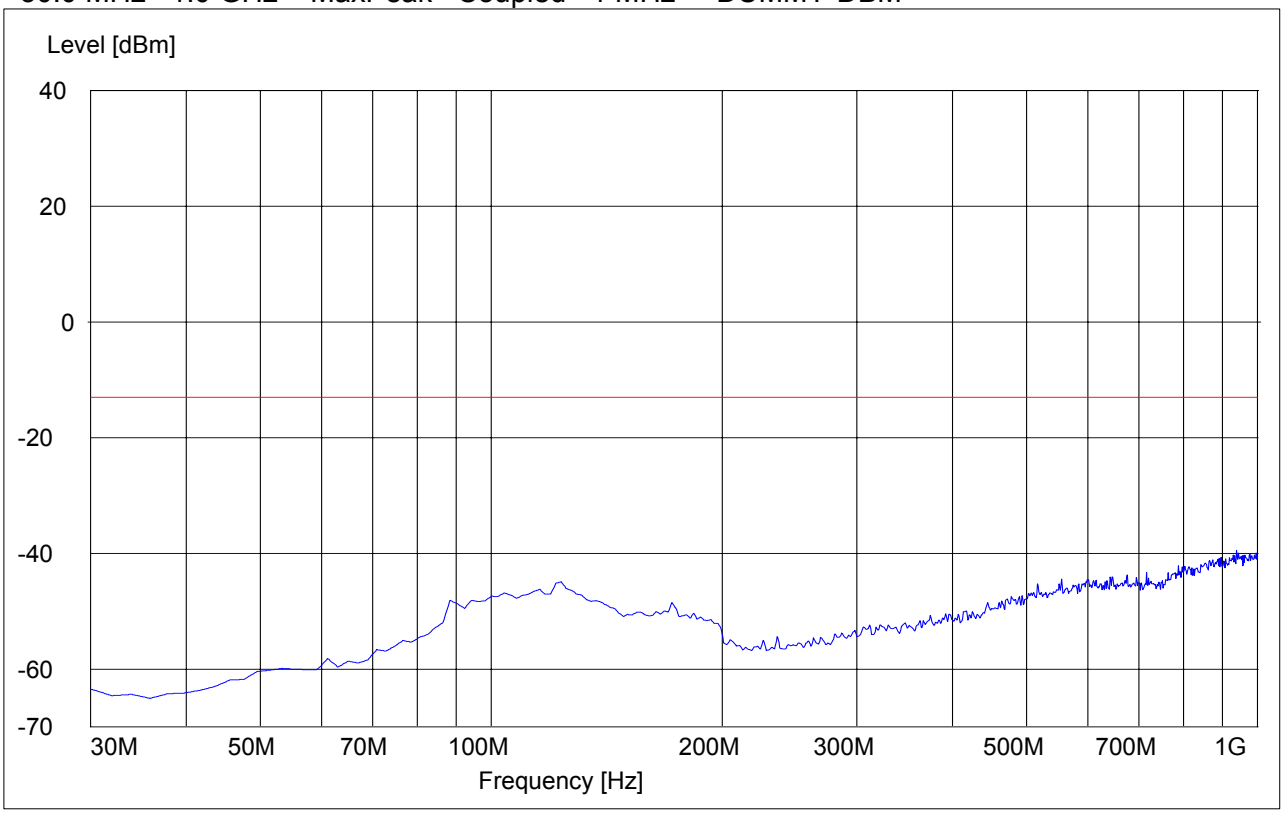


RADIATED SPURIOUS EMISSIONS (IDLE MODE)
EUT in Idle Mode: 30MHz – 1GHz
Spurious emission limit –13dBm
Antenna: vertical

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: idle
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 30-1000 MHz

SWEEP TABLE: "FCC 24 Spur 30M-1G_V"
Short Description: FCC 24 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

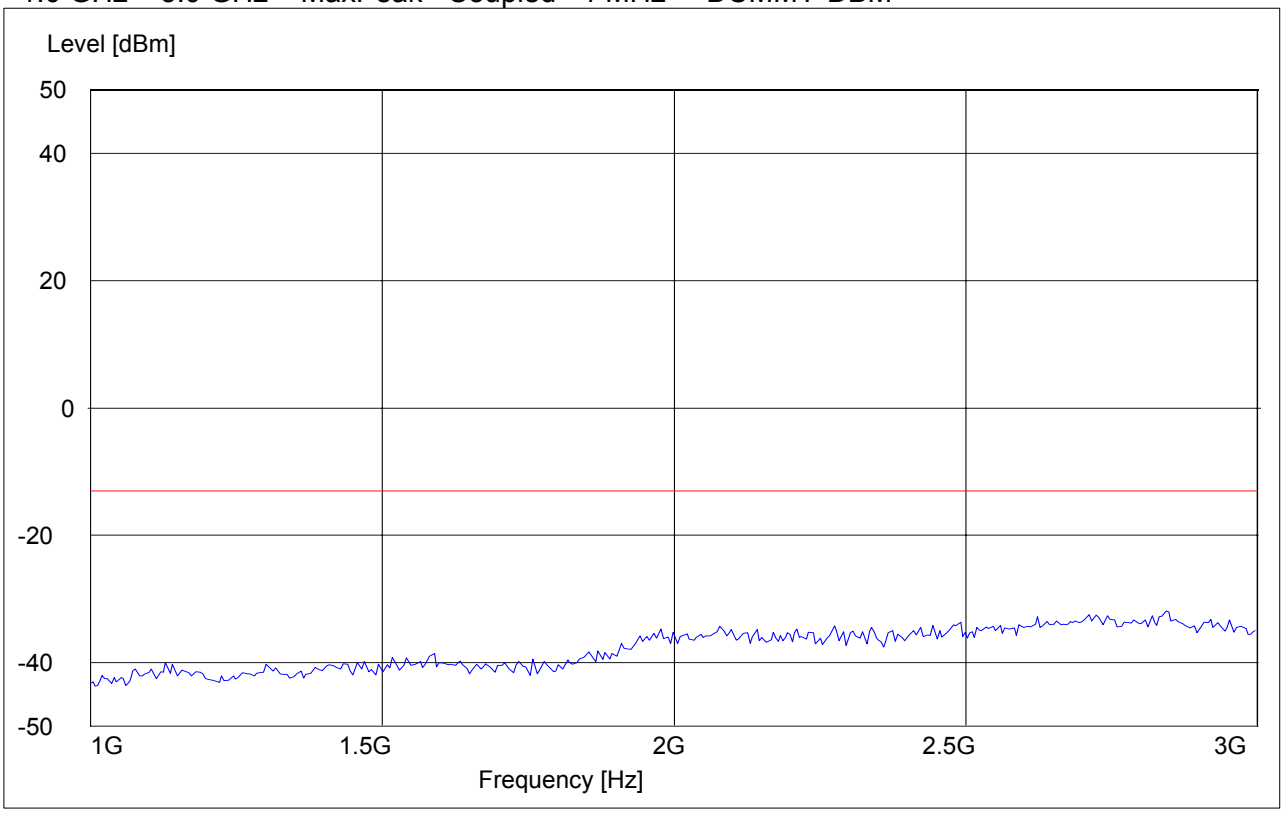


RADIATED SPURIOUS EMISSIONS (IDLE MODE)
EUT in Idle Mode: 1GHz – 3GHz
Spurious emission limit –13dBm

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: Idle
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 1-3 GHz

SWEEP TABLE: "FCC 24Spuri 1-3G"
Short Description: FCC 24 1GHz-8GHz

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

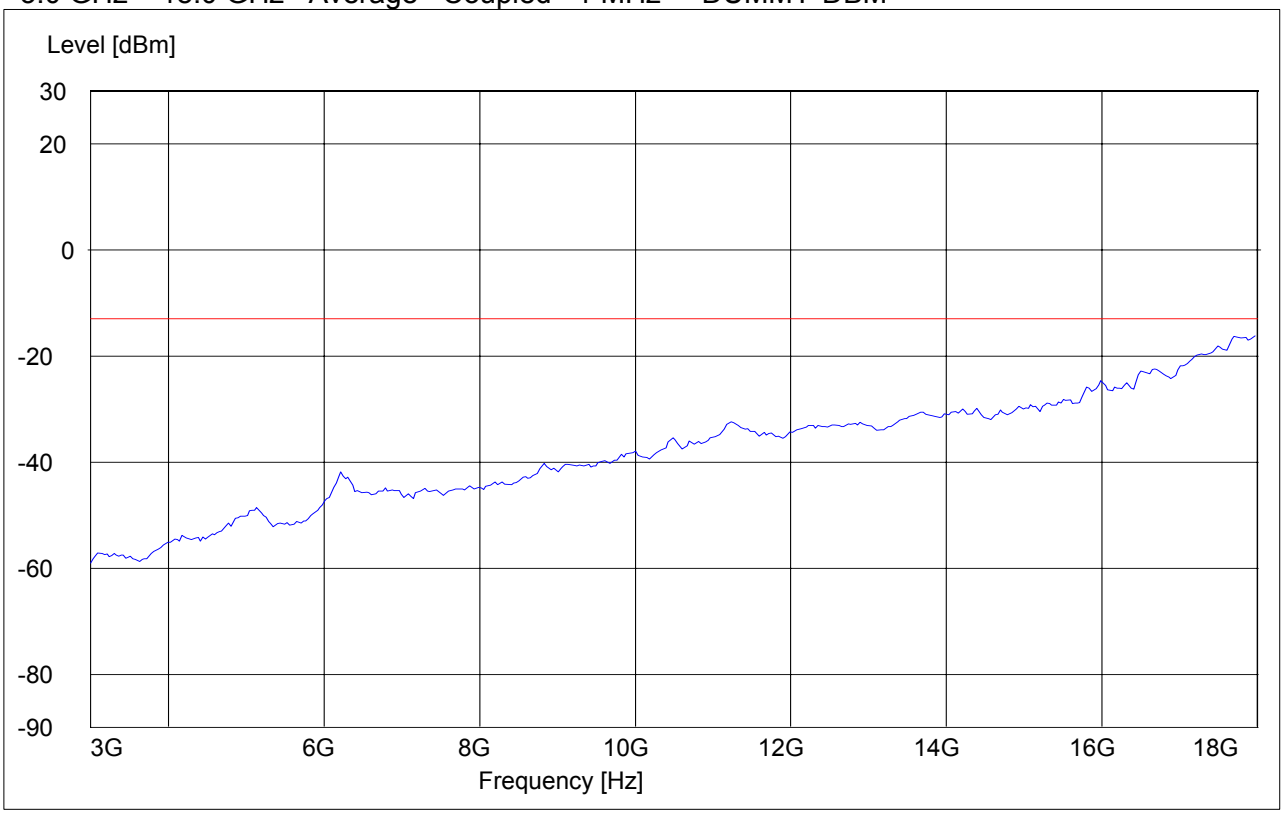


RADIATED SPURIOUS EMISSIONS (IDLE MODE)
EUT in Idle Mode: 3GHz – 18GHz
Spurious emission limit –13dBm

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: Idle
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 3-18 GHz

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

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

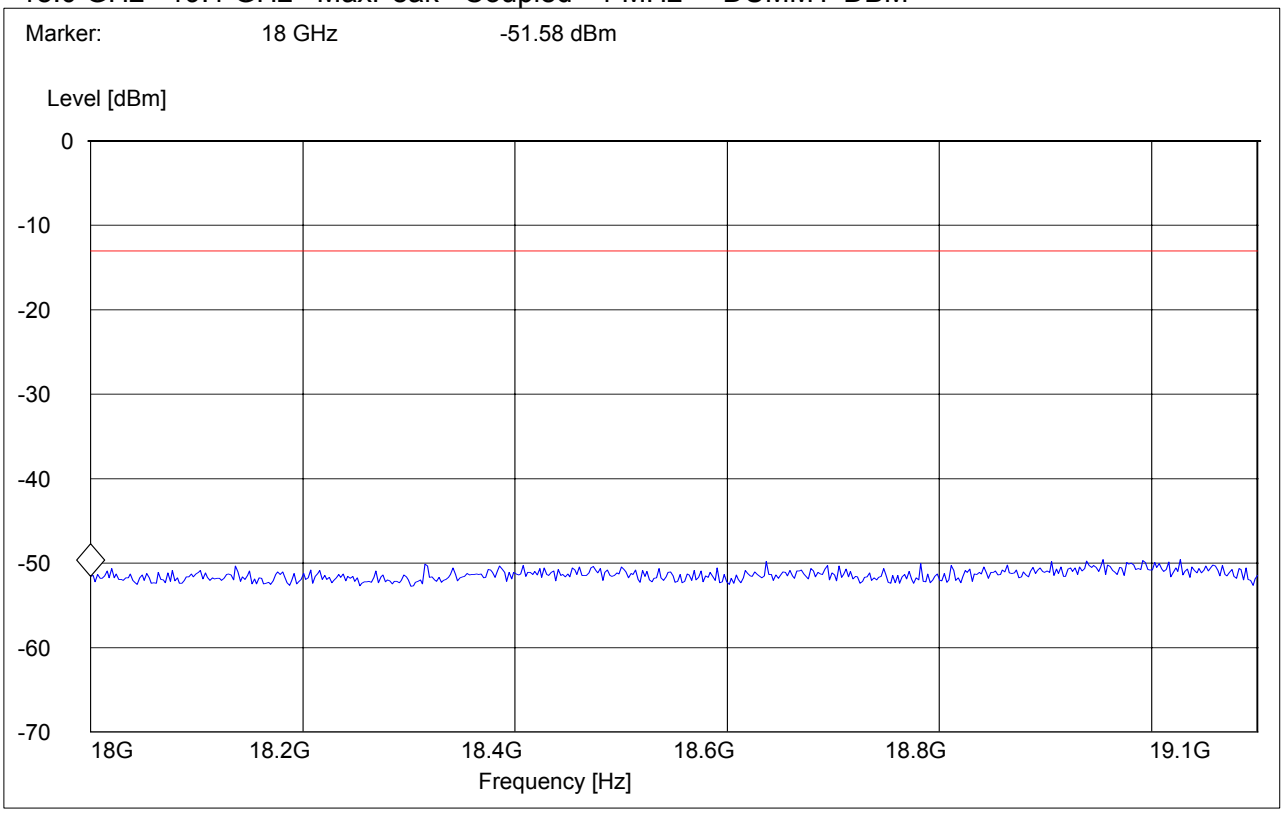


RADIATED SPURIOUS EMISSIONS (IDLE MODE)
EUT in Idle Mode: 18GHz – 19.1GHz
Spurious emission limit –13dBm

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: Idle
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 18-19.1GHz

SWEEP TABLE: "FCC 24spuri 18-19.1G"
Short Description: FCC 24 18GHz-19.1GHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	19.1 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



5.6 RECEIVER RADIATED EMISSIONS § 2.1053 / 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 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

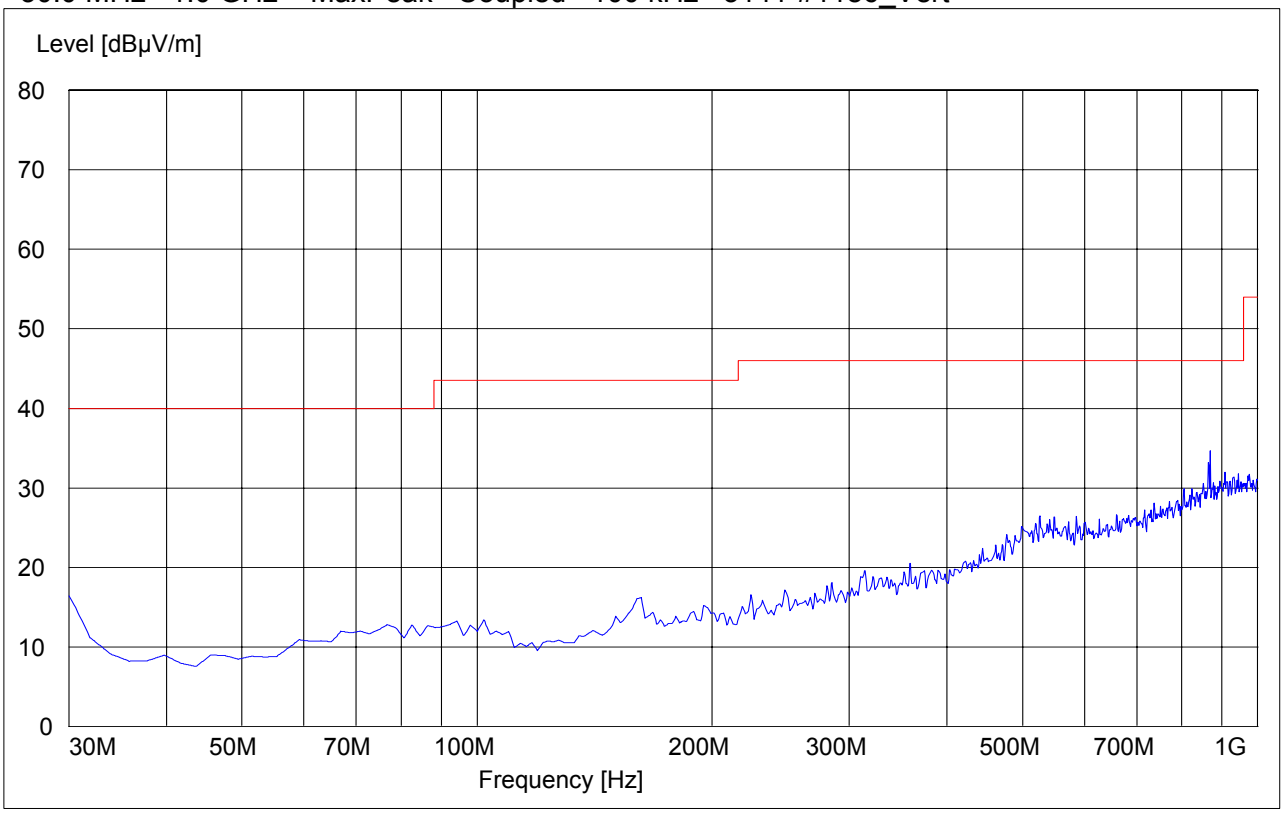
5.6.1 Receiver Spurious on EUT

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

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: RX
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 30-1000 MHz

SWEEP TABLE: "CANADA RE_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 1GHz – 18GHz

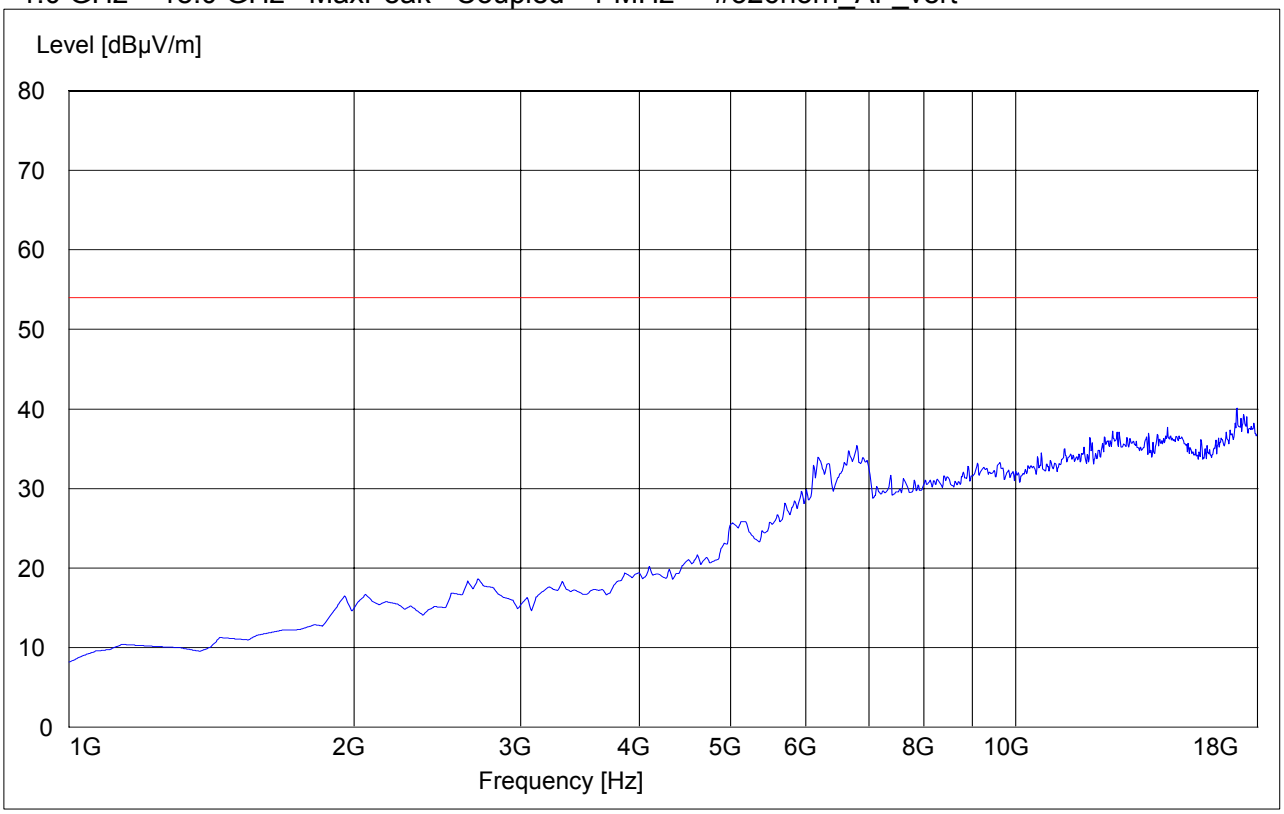
CETECOM Inc.

411 Dixon Landing Road, Milpitas CA 95035, USA

EUT / Description: C81
Customer: BenQ
Operating Mode: RX
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 1-18 GHz

SWEEP TABLE: "CANADA RE_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

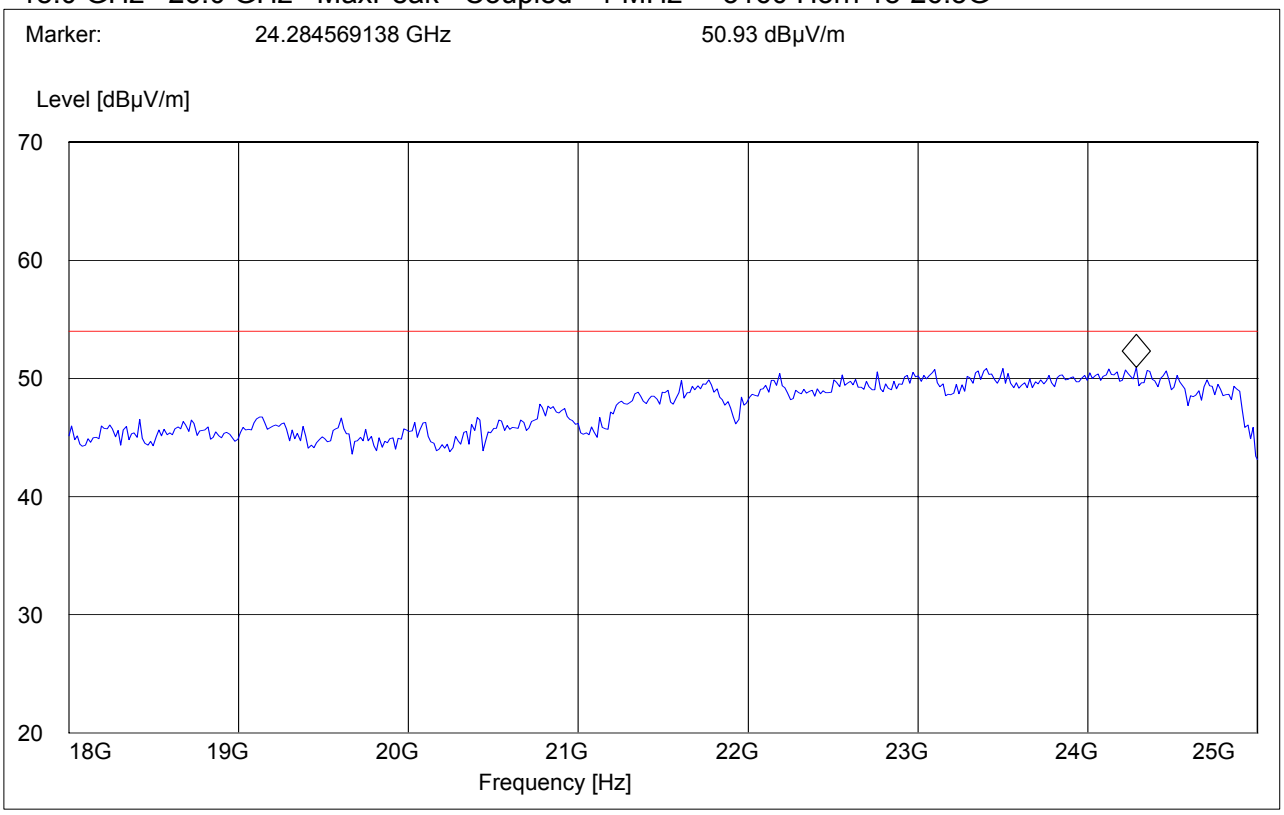


RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 18GHz – 19.1GHz

CETECOM Inc.
411 Dixon Landing Road, Milpitas CA 95035, USA
EUT / Description: C81
Customer: BenQ
Operating Mode: RX
Antenna: V
EUT: V
Test operator: Pete
Voltage: DC 4
Sweep: 18-25 GHz

SWEEP TABLE: "CANADA RE_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.0 GHz	MaxPeak	Coupled	1 MHz	3160 Horn 18-26.5G



5.7 AC POWERLINE CONDUCTED EMISSIONS § 15.107/207

TYPE	MANF.	MODEL	FCC ID
AC ADAPTER	SIEMENS	A5BHTN00102612	DoC

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

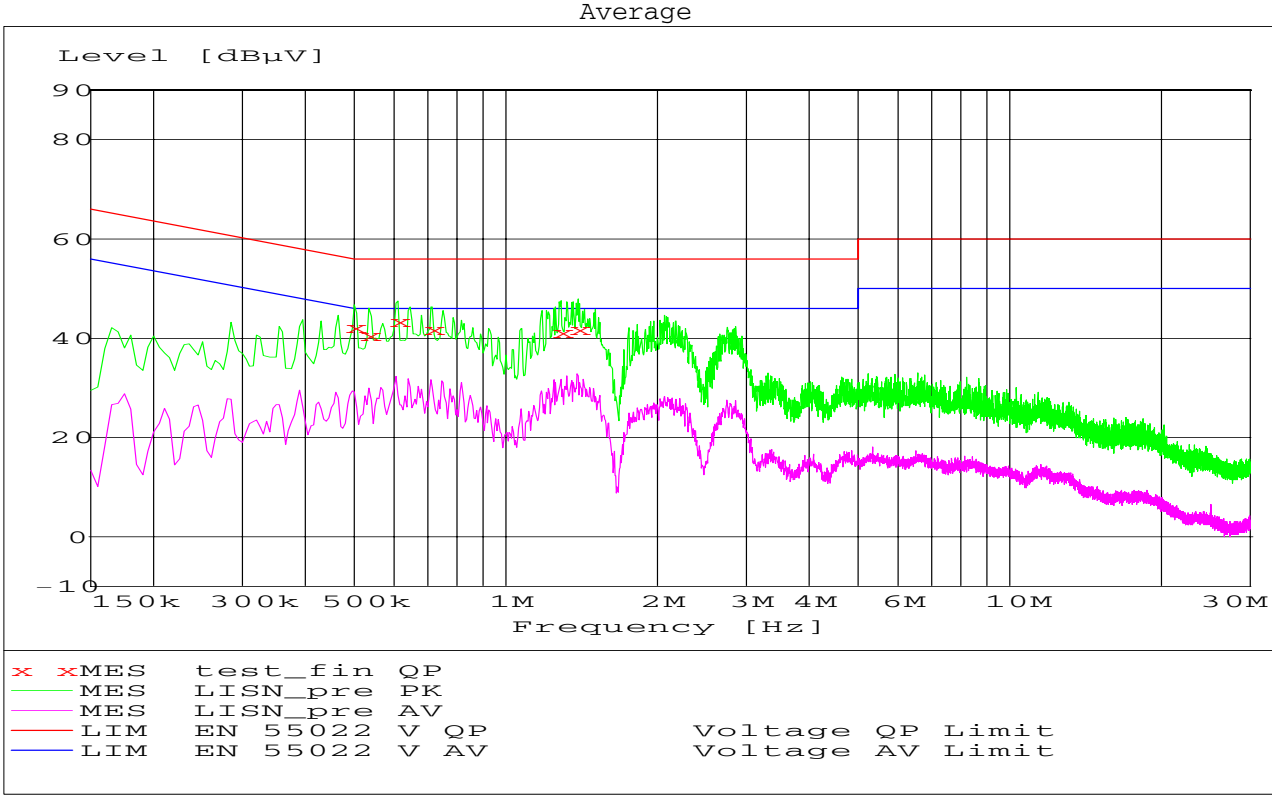
Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz

5.7.1 Results EUT

SCAN TABLE: "EN 55022 Voltage"

Short Description:			EN 55022 Voltage			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "test_fin QP"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.500000	42.10	0.0	56	13.9	N	GND
0.535000	40.60	0.0	56	15.4	L1	GND
0.610000	43.50	0.0	56	12.5	L1	GND
0.715000	41.80	0.0	56	14.2	N	GND
1.285000	41.20	0.0	56	14.8	N	GND
1.390000	41.80	0.0	56	14.2	L1	GND

6 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 2007	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2006	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2007	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2007	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 2007	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 2007	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2007	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2007	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2007	1 year

7 References

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,
PART 2--FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS October 1, 2001.

FCC Report and order 02-229 September 24, 2002.

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.