



# **FCC Test Report**

## **FCC Part 15.247 for FHSS systems/ CANADA RSS-210**

**FOR:**

**Tri-band GSM/EDGE Mobile Phone with Bluetooth**

**MODEL #: C81**

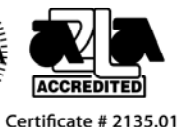
**BenQ Mobile GmbH & Co OHG  
Haidenauplatz 181667 München  
GERMANY**

**FCC ID: PWX-C81**

**IC ID: 6175C-C81**

**TEST REPORT #: EMC\_BENQ0\_009\_06001\_C81\_Bluetooth**

**DATE: May 10th, 2006**



FCC listed # 101450

IC recognized # 3925

**CETECOM Inc.**

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

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

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## 1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.247 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS210.

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

A handwritten signature in black ink, appearing to read "Michael Grings".

---

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:	2400-2483.5MHz
Type(s) of Modulation:	GFSK
Number of Channels:	79
Antenna Type:	Internal
Output Power:	FCC 15.247: 0.0009 Watts Peak Conducted Powerz



#### **4 Subject Of Investigation**

The objective of the measurements done by Cetecom Inc. was to measure the performance of the C81 referred to as EUT as specified by requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS210.

The EUT was maximized in the X,Y, Z positions , all data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

The EUT is able to operate in open and closed position. The worst case was found working in open position. Therefore the testing was conducted in open position.

## 5 Measurements

### 5.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)

#### 5.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1) (2) (3) (4)

Frequency range	RF power output
2400-2483.5 MHz	36dBm EIRP

\*limit is based upon antenna gain of less than or equal to 6dBi.

#### 5.1.2 RESULTS:

TEST CONDITIONS		EIRP (dBm)		
Frequency (MHz)		2402 MHz	2441 MHz	2480 MHz
T <sub>nom</sub> (23)°C	V <sub>nom</sub> VDC	-5.32	-6.26	-8.28
Measurement uncertainty		±0.5dBm		



**EIRP (2402 MHz)**

**CETECOM Inc.**

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

EUT / Description: C81 (#169) + AC charger A5BHTN00102612

Customer: BenQ Mobile

Operating Mode: Bluetooth testmode, CH: 0

Antenna: H

EUT: H

Test operator: Willmes

Voltage: AC 110 V

Sweep: EIRP

**SWEEP TABLE: "EIRP BT low channel"**

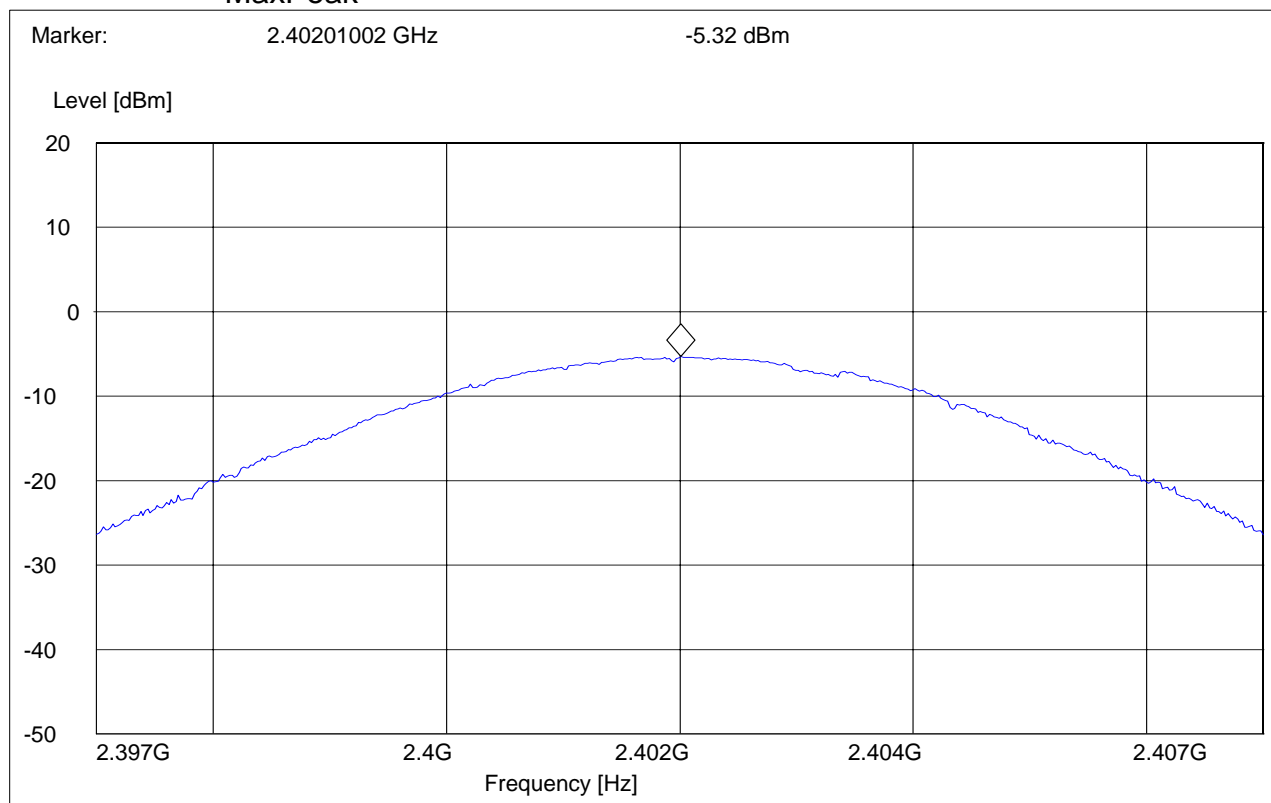
Short Description: EIRP Bluetooth channel-2402MHz

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

2.4 GHz 2.4 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

MaxPeak





**EIRP (2441 MHz)**  
**CETECOM Inc.**

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

EUT / Description: C81 (#169) + AC charger A5BHTN00102612

Customer: BenQ Mobile

Operating Mode: Bluetooth testmode, CH: 39

Antenna: H

EUT: H

Test operator: Willmes

Voltage: AC 110 V

Sweep: EIRP

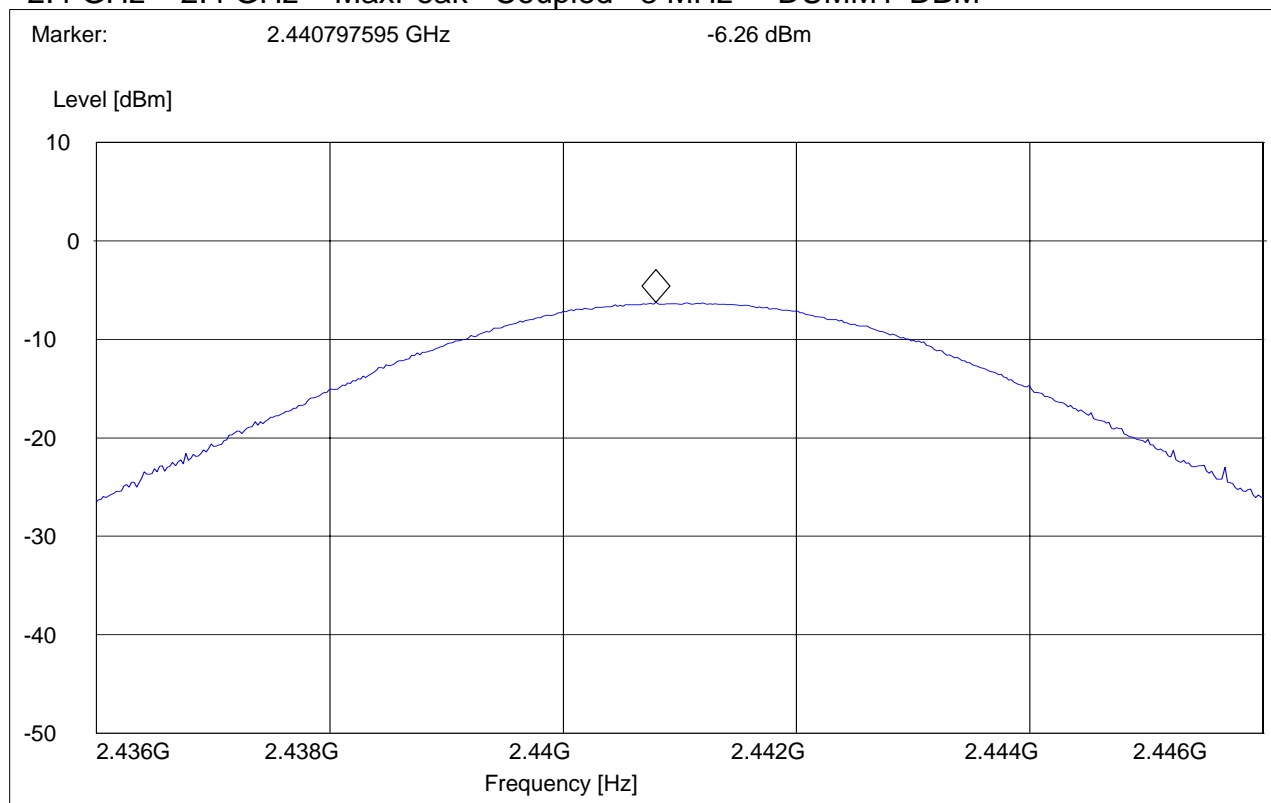
***SWEEP TABLE: "EIRP BT mid channel"***

Short Description: EIRP Bluetooth channel-2441MHz

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

2.4 GHz 2.4 GHz MaxPeak Coupled 3 MHz DUMMY-DBM





## EIRP (2480 MHz)

### **CETECOM Inc.**

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

EUT / Description: C81 (#169) + AC charger A5BHTN00102612

Customer: BenQ Mobile

Operating Mode: Bluetooth testmode, CH: 78

Antenna: H

EUT: H

Test operator: Willmes

Voltage: AC 110 V

Sweep: EIRP

### **SWEEP TABLE: "EIRP BT high channel"**

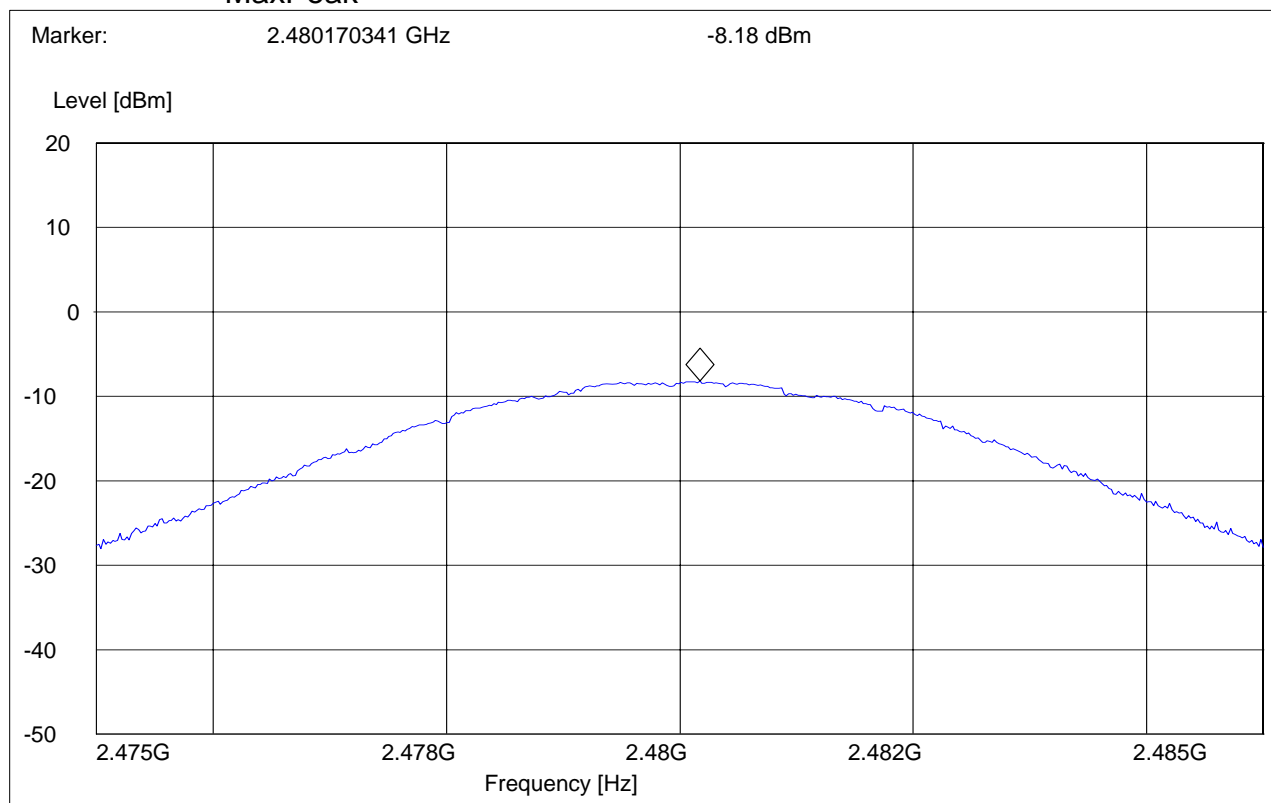
Short Description: EIRP Bluetooth channel-2480MHz

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

2.5 GHz 2.5 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

MaxPeak





## 5.2 MAXIMUM PEAK OUTPUT POWER § 15.247 (CONDUCTED)

### 5.2.1 LIMIT SUB CLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	30dBm

\*limit is based upon antenna gain of less than or equal to 6dBi.

### 5.2.2 RESULTS:

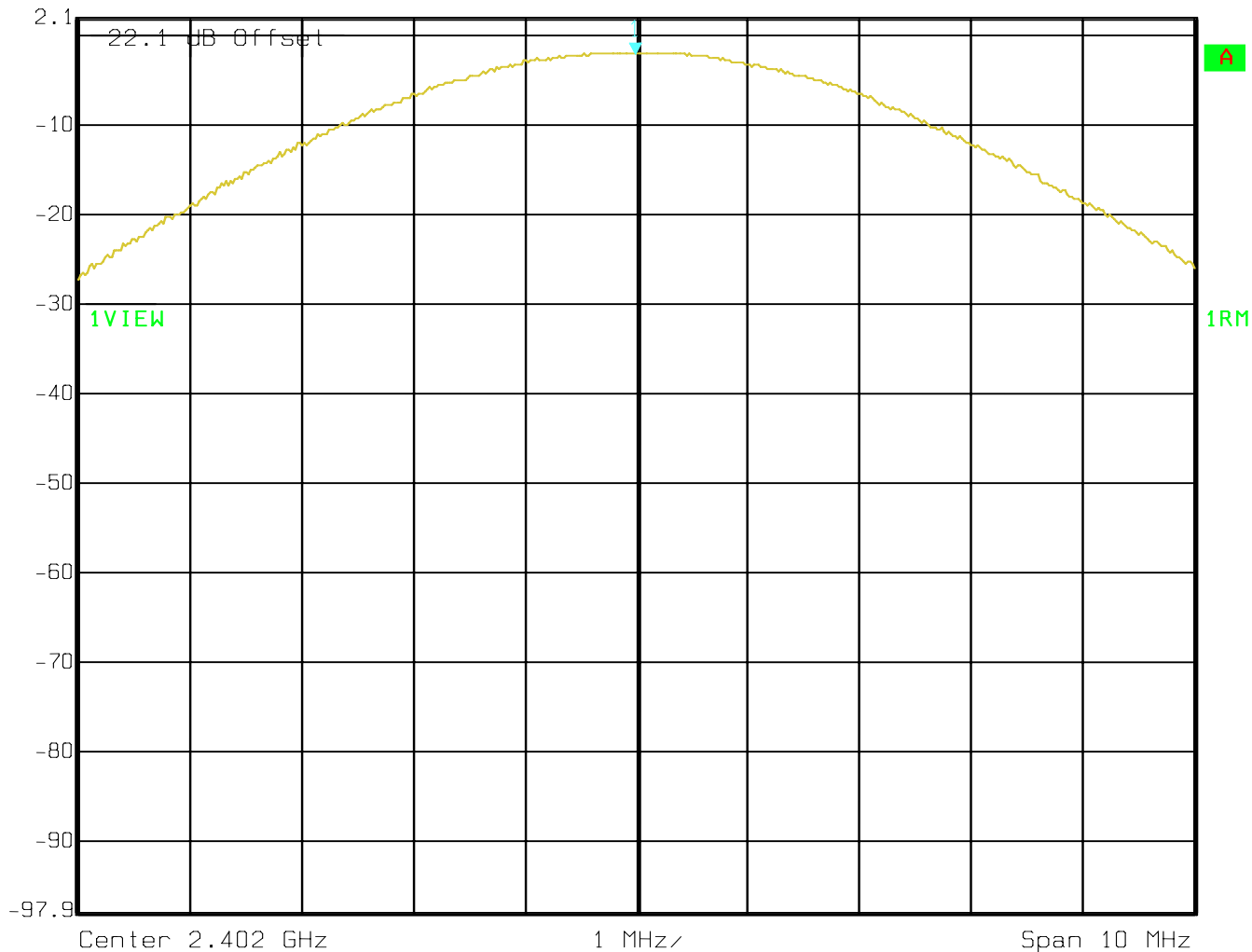
TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402 MHz	2441 MHz	2480 MHz
T <sub>nom</sub> (23)°C	V <sub>nom</sub> VDC	-1.96	-1.48	-0.69

\*ref level offset is based upon BT coupler loss + splitter



(2402 MHz)

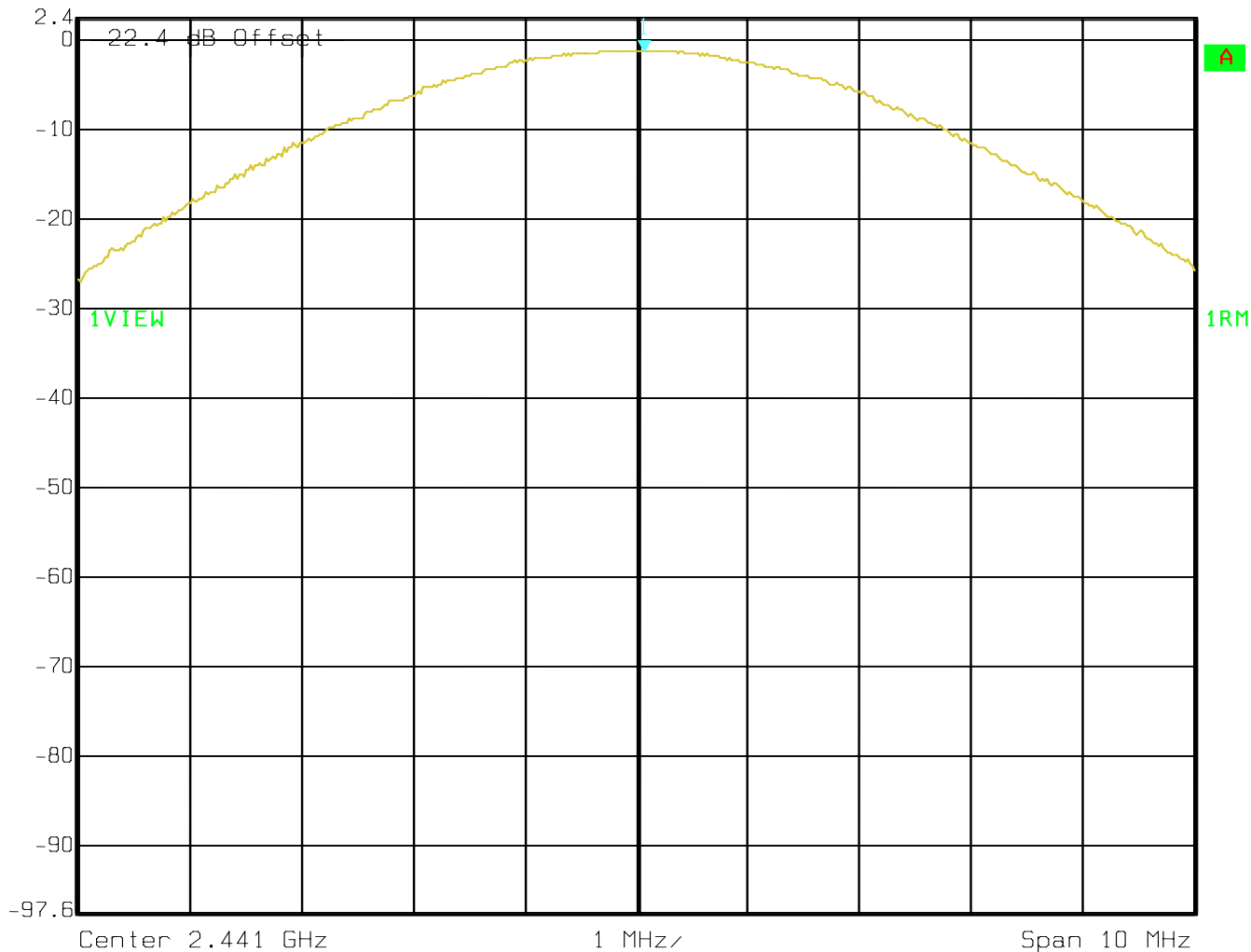
 Ref Lvl 2.1 dBm  
 Marker 1 [T1] -1.96 dBm  
 RBW 3 MHz RF Att 10 dB  
 VBW 3 MHz  
 SWT 5 ms Unit dBm



Date: 09.MAY 2006 14:40:27

(2441 MHz)


 Ref Lvl 2.4 dBm  
 Marker 1 [T1] -1.48 dBm  
 RBW 3 MHz  
 VBW 3 MHz  
 Unit dBm  
 2.44107014 GHz  
 SWT 5 ms

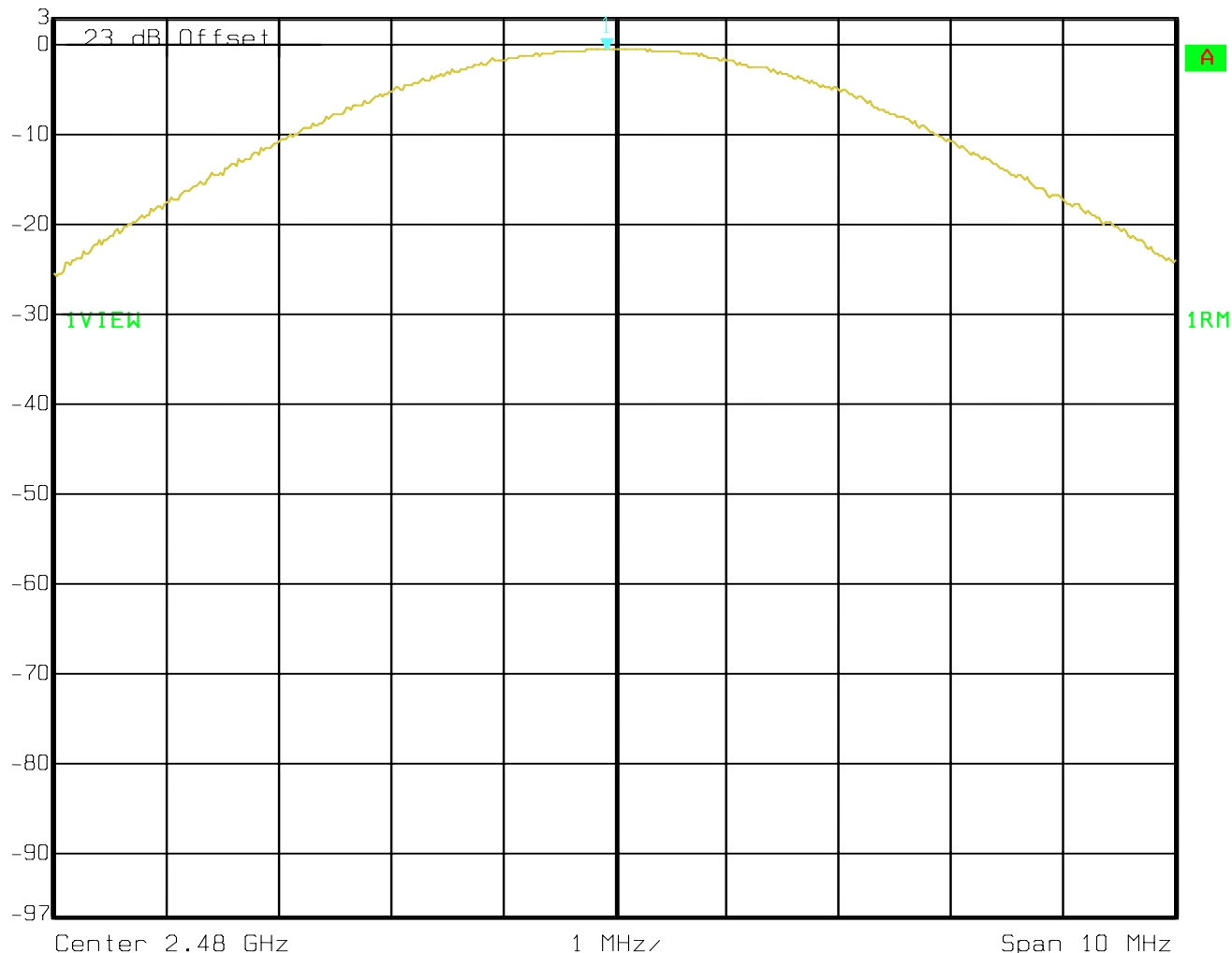


Date: 09.MAY 2006 14:42:50

(2480 MHz)



Ref Lvl 3 dBm  
 Marker 1 [T1] -0.69 dBm  
 2.47992986 GHz  
 RBW 3 MHz  
 VBW 3 MHz  
 SWT 5 ms  
 RF Att 10 dB  
 Unit dBm



Date: 09.MAY 2006 14:42:11



### 5.3 20dB BANDWIDTH

#### 5.3.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

NUMBER OF CHANNELS	BANDWIDTH
79	<1MHz

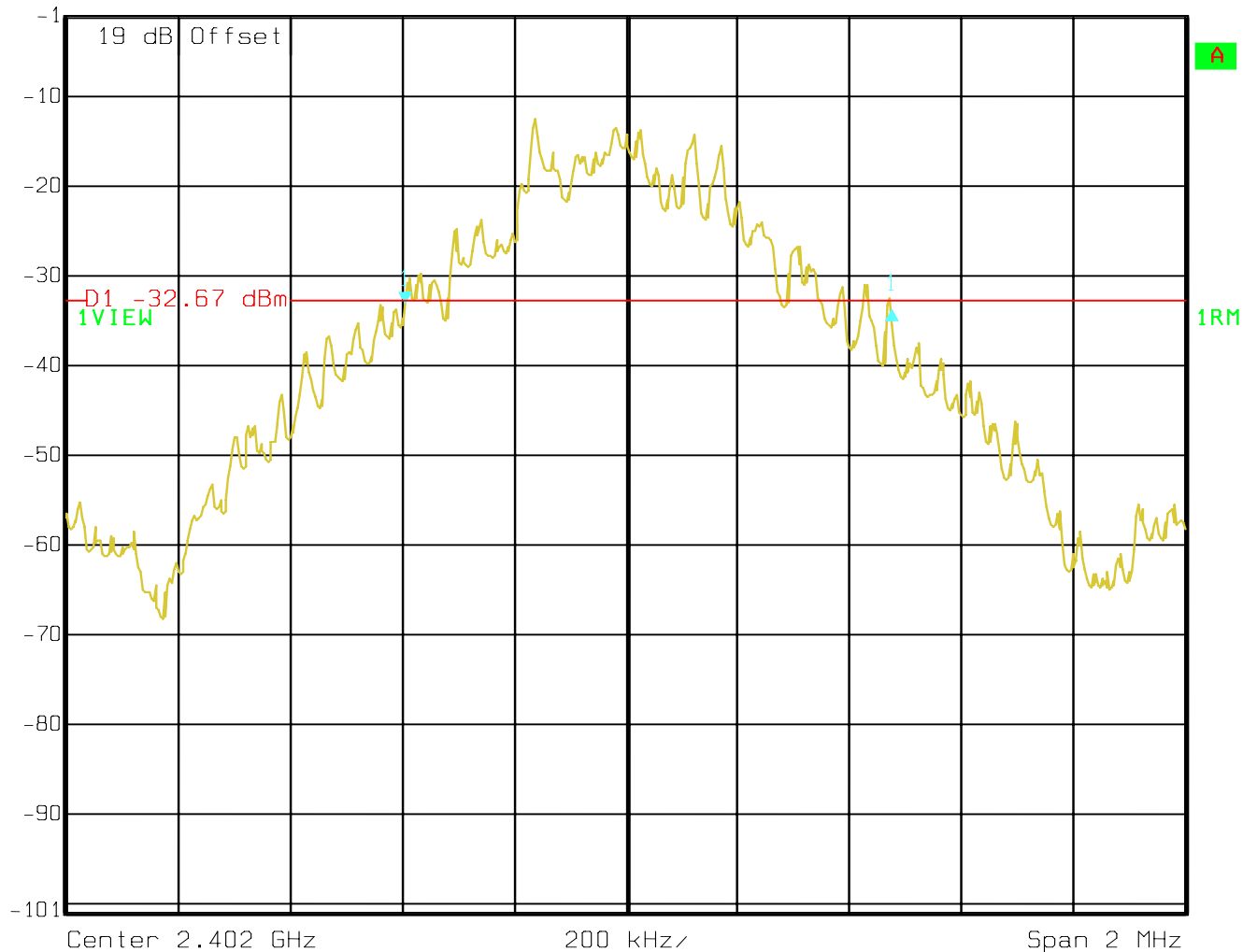
#### 5.3.2 RESULTS:

TEST CONDITIONS		BANDWIDTH (KHz)		
Frequency (MHz)		2402 MHz	2441 MHz	2480 MHz
T <sub>nom</sub> (23)°C	V <sub>nom</sub> VDC	869.74	829.66	829.66



(2402 MHz)

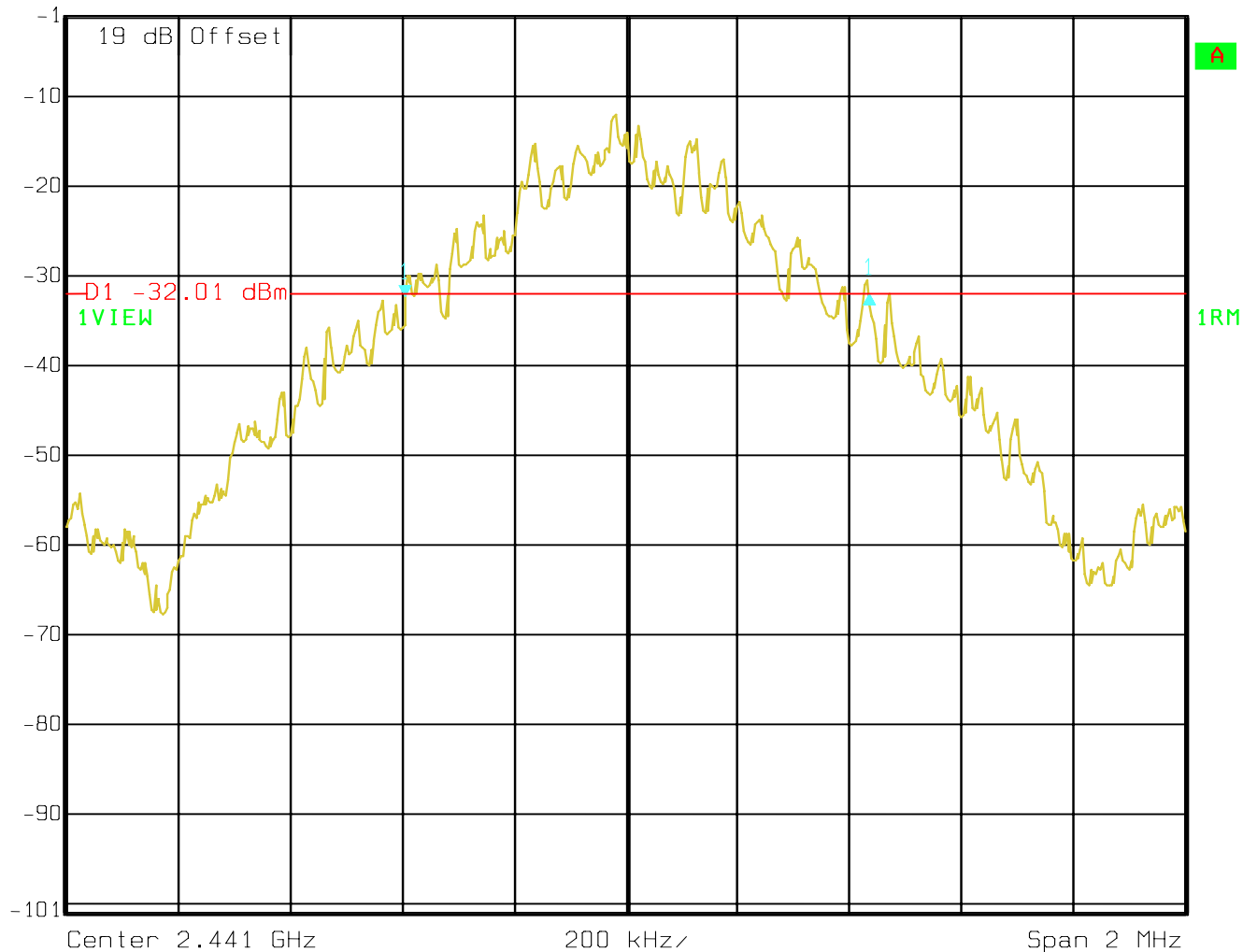

 Delta 1 [T1] RBW 10 kHz RF Att 10 dB  
 Ref Lvl -0.45 dB VBW 30 kHz  
 -1 dBm 869.73947896 kHz SWT 50 ms Unit dBm



Date: 09.MAY 2006 14:28:40

(2441 MHz)

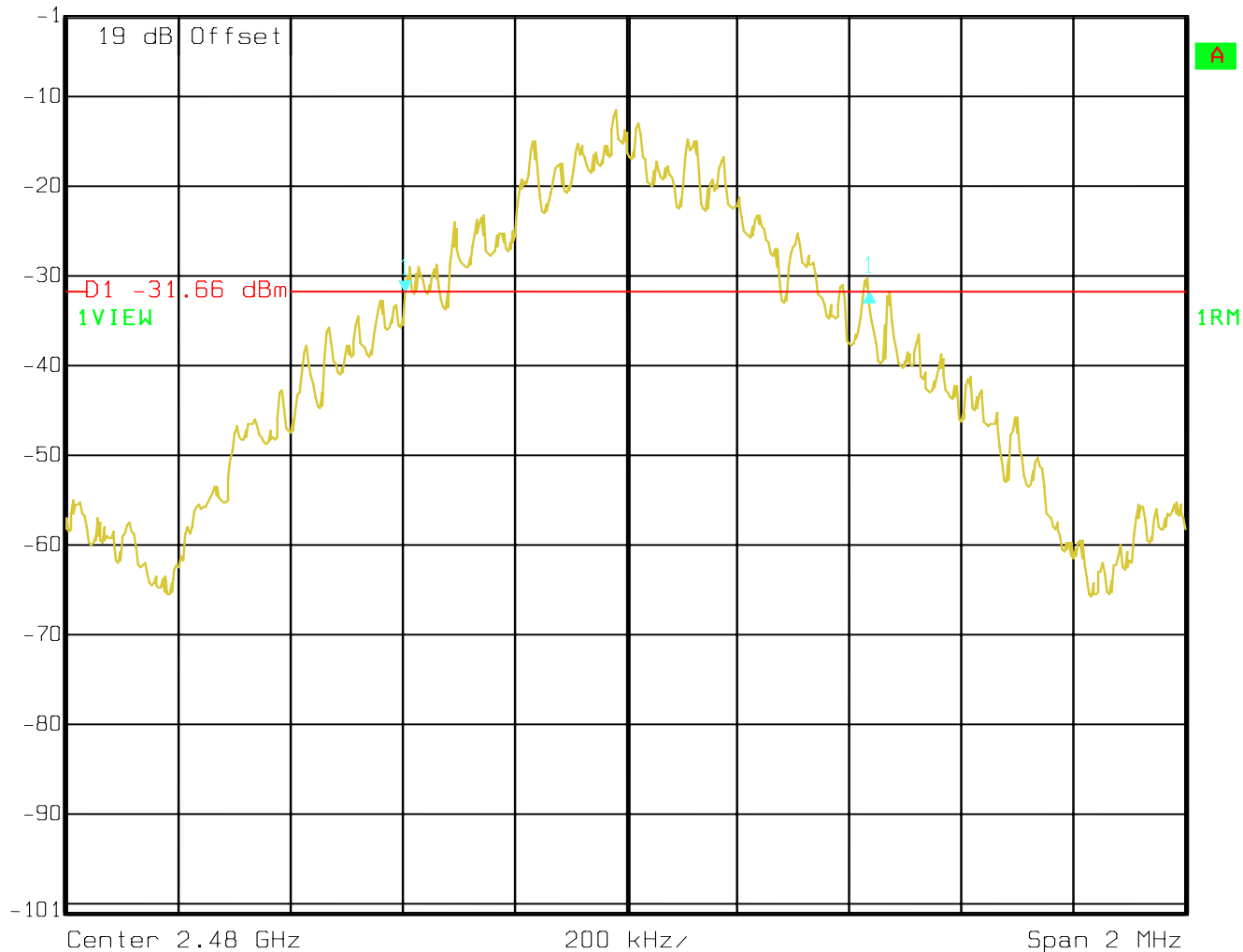
 Delta 1 [T1] RBW 10 kHz RF Att 10 dB  
 Ref Lvl 0.49 dB VBW 30 kHz  
 -1 dBm 829.65931863 kHz SWT 50 ms Unit dBm



Date: 09.MAY 2006 14:31:16

(2480 MHz)

 Delta 1 [T1] RBW 10 kHz RF Att 10 dB  
 Ref Lvl 0.35 dB VBW 30 kHz  
 -1 dBm 829.65931864 kHz SWT 50 ms Unit dBm



Date: 09.MAY 2006 14:32:31

#### 5.4 CARRIER FREQUENCY SEPARATION

##### 5.4.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

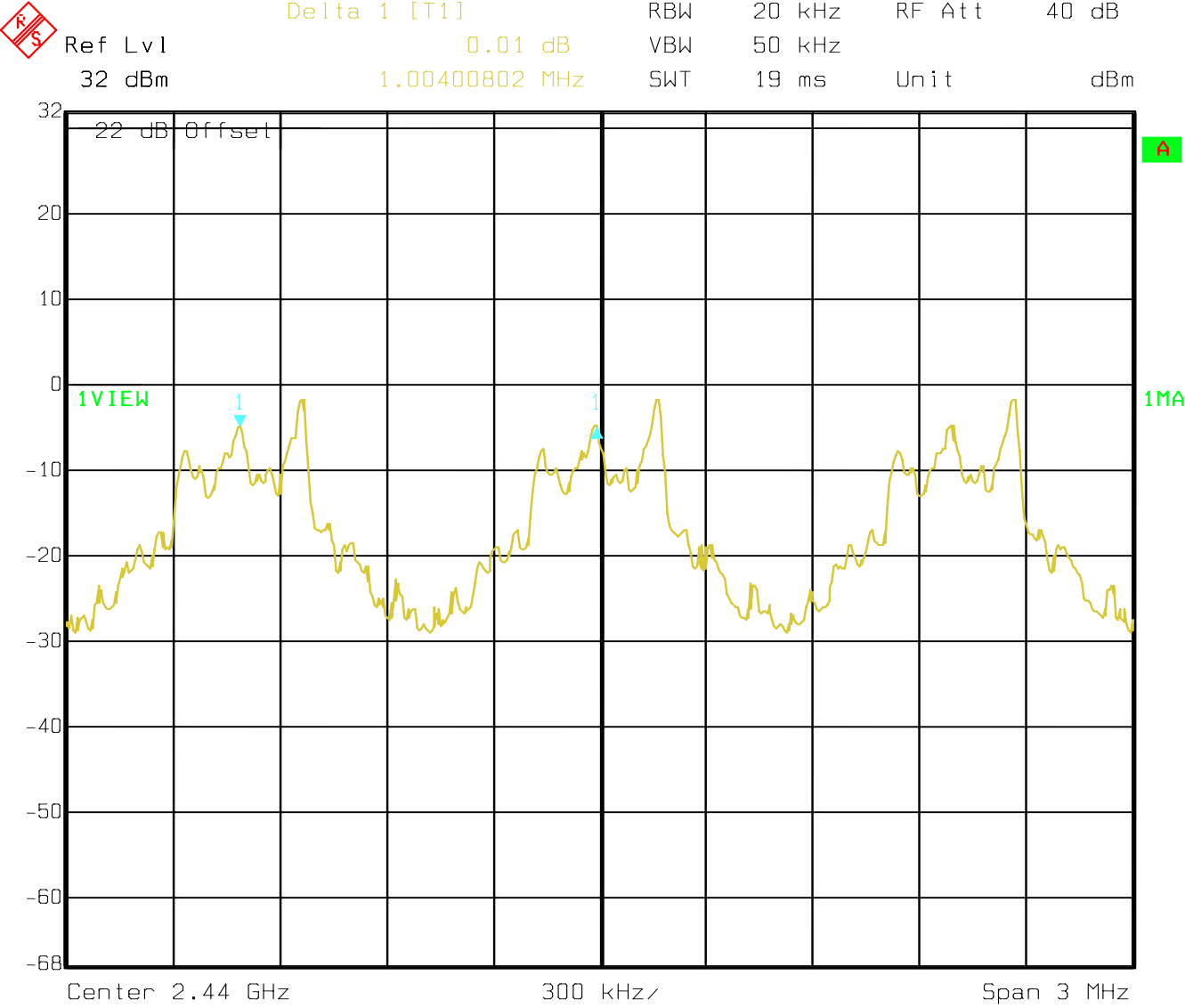
SEPARATION
> 25 KHz or > 20 dB BANDWIDTH

##### 5.4.2 RESULTS:

TEST CONDITIONS		SEPARATION (MHz)
T <sub>nom</sub> (23)°C	V <sub>nom</sub> VDC	1.004



(plot)



Date: 10.MAY 2006 13:17:44

## 5.5 NUMBER OF HOPPING CHANNELS

### 5.5.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (iii)

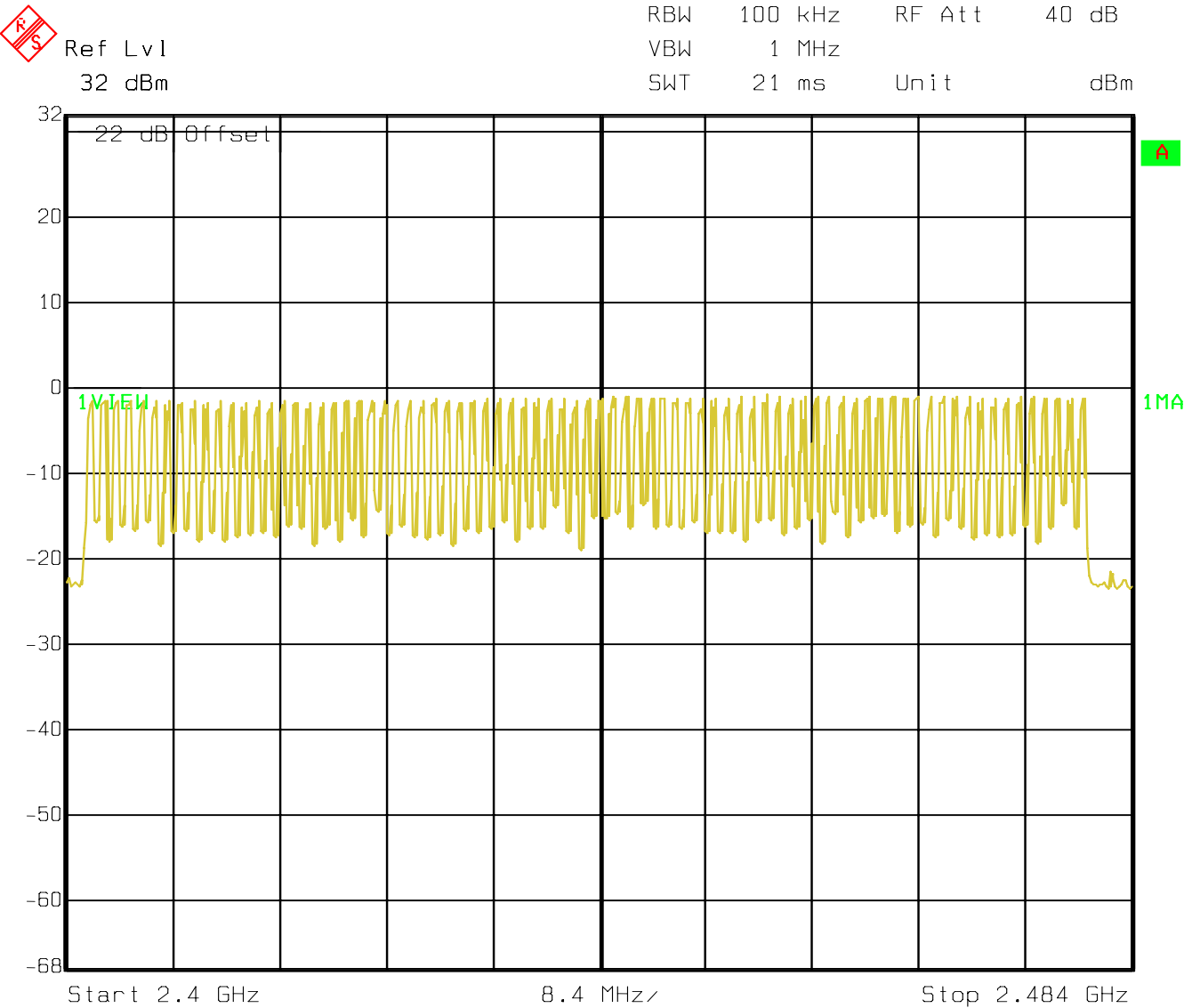
NUMBER OF CHANNELS
> 15

### 5.5.2 RESULTS:

TEST CONDITIONS		NUMBER OF CHANNELS
T <sub>nom</sub> (23)°C	V <sub>nom</sub> VDC	79



Plot



Date: 10.MAY 2006 13:26:05



## 5.6 TIME OF OCCUPANCY (DWELL TIME)

### 5.6.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

FREQUENCY RANGE	AVERAGE TIME OF OCCUPANCY PER 31.6 SECONDS (LIMIT)
2400-2483.5	0.4 SECONDS

### 5.6.2 RESULTS:

TEST CONDITIONS		TIME OF OCCUPANCY IN 31.6 SECONDS		
PACKET TYPE		DH1	DH3	DH5
T <sub>nom</sub> (23)°C	V <sub>nom</sub> VDC	134.9ms	270.8	310.6

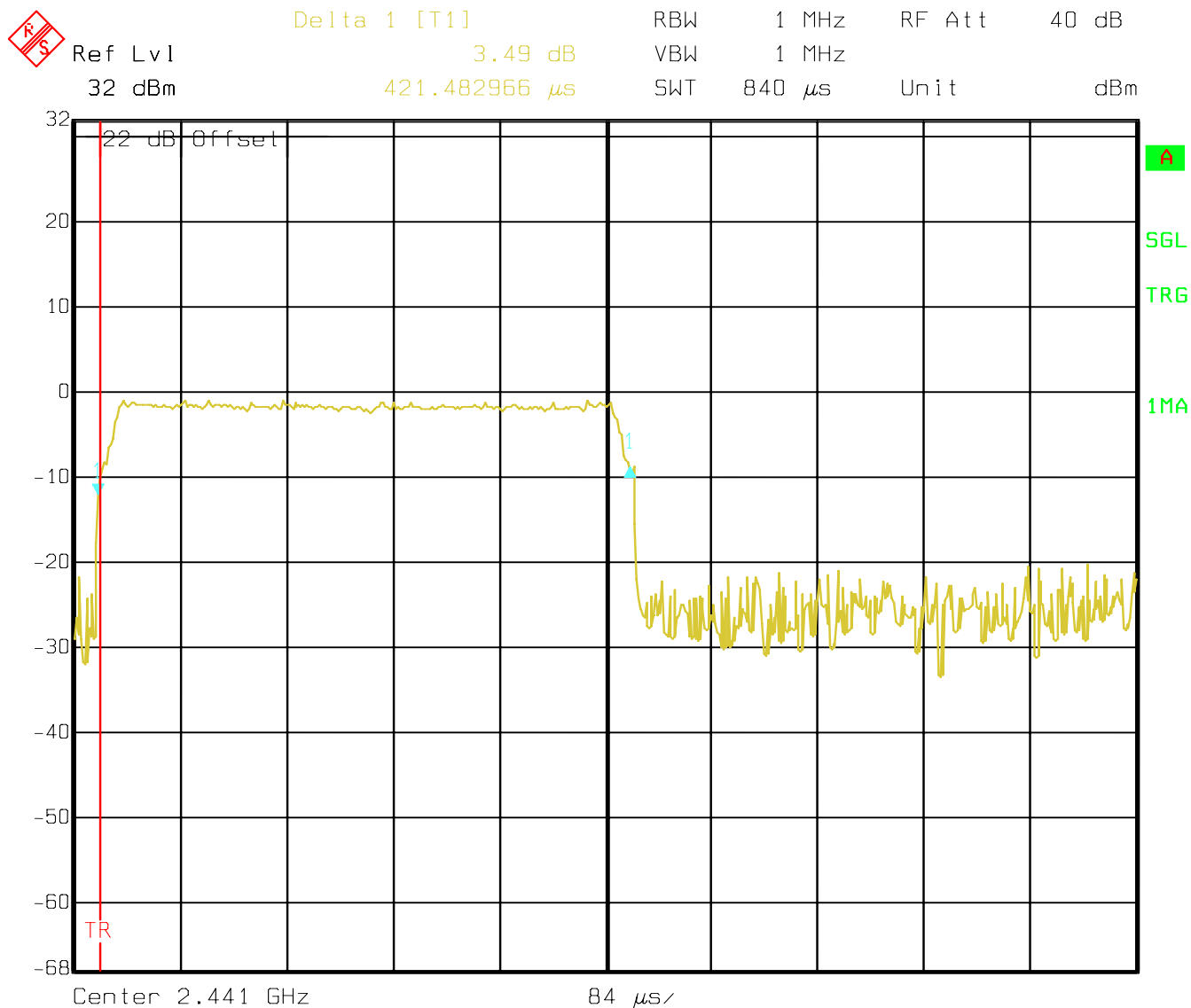


**(DH1)**

The system makes worst case 1600 hops per second or 1 time slot has a length of 625μs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 times per second and so for 31.6 seconds you have 320.108 times of appearance.

Each Tx-time per appearance is 430.86μs.

So we have  $320.108 * 421.48\mu s = 134.9ms$  per 31.6 seconds.



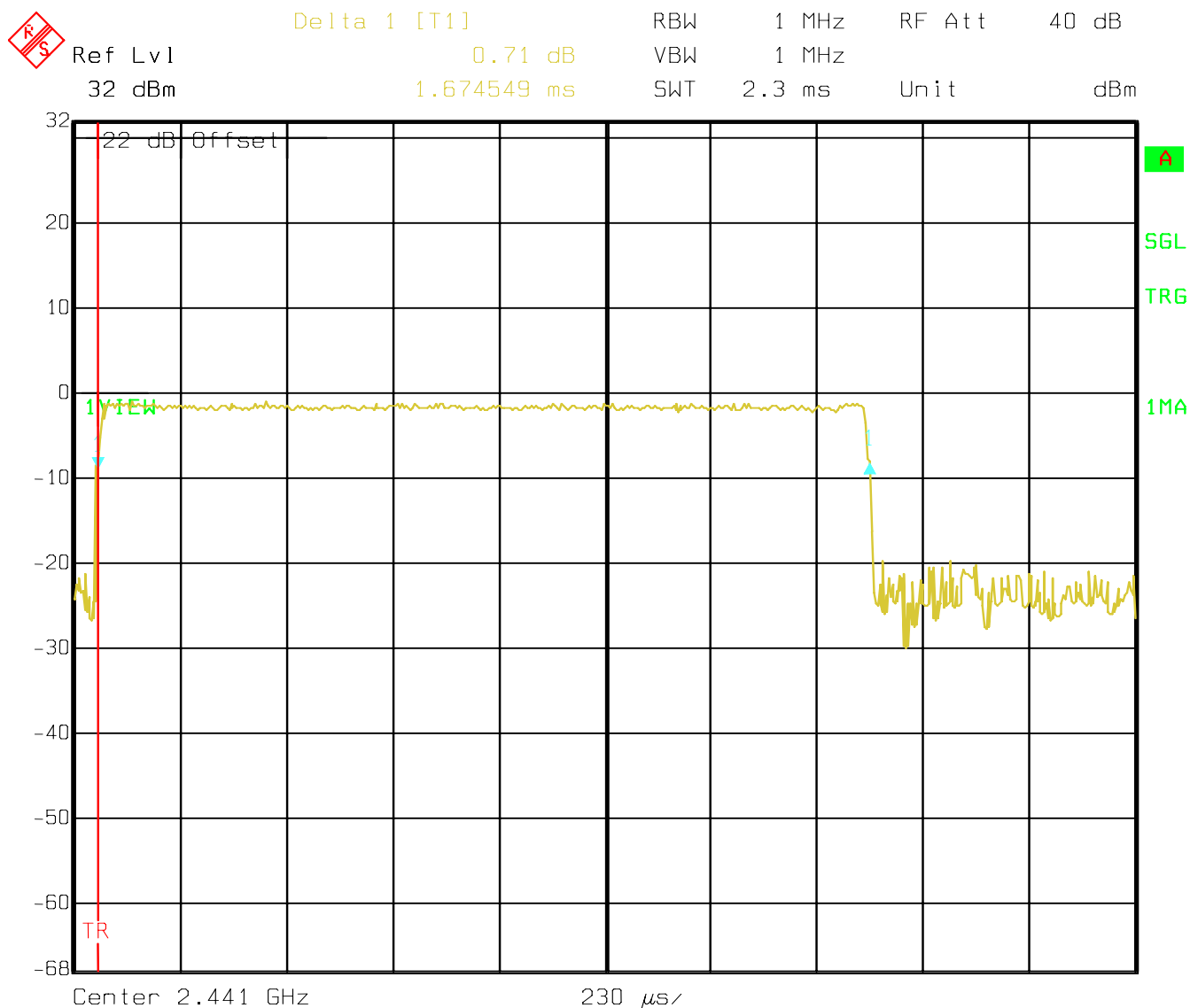
Date: 10.MAY 2006 13:31:43

**(DH3)**

A DH3 Packets need 3 time slots for transmit and 1 for receiving, then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 times per second and so for 31.6 seconds you have 161.16 times of appearance.

Each Tx-time per appearance is 1.693ms.

So we have  $161.16 * 1.68\text{ms} = 270.8\text{ms}$  per 31.6 seconds.



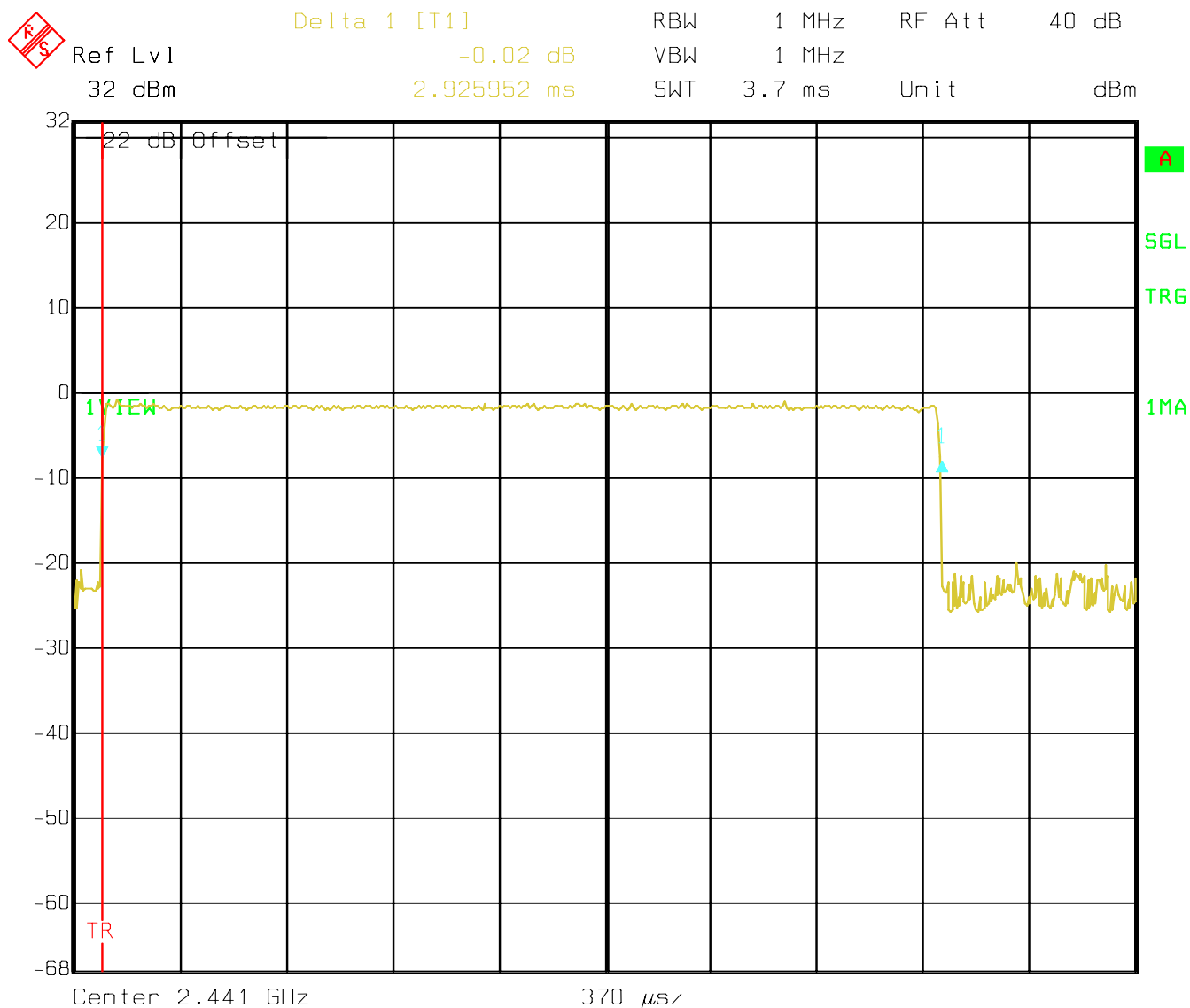
Date: 10.MAY 2006 13:33:05

**(DH5)**

At DH5 Packets you need 5 time slots for transmit and 1 for receiving, then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.36 times per second and so for 30 seconds you have 106.176 times of appearance.

Each Tx-time per appearance is 2.941ms.

So we have  $106.176 * 2.925\text{ms} = 310.6\text{ms}$  per 31.6 seconds.



Date: 10.MAY 2006 13:34:30

## **5.7 CONDUCTED SPURIOUS EMISSIONS**

### **5.7.1 LIMIT SUB CLAUSE § 15.247 (d)**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

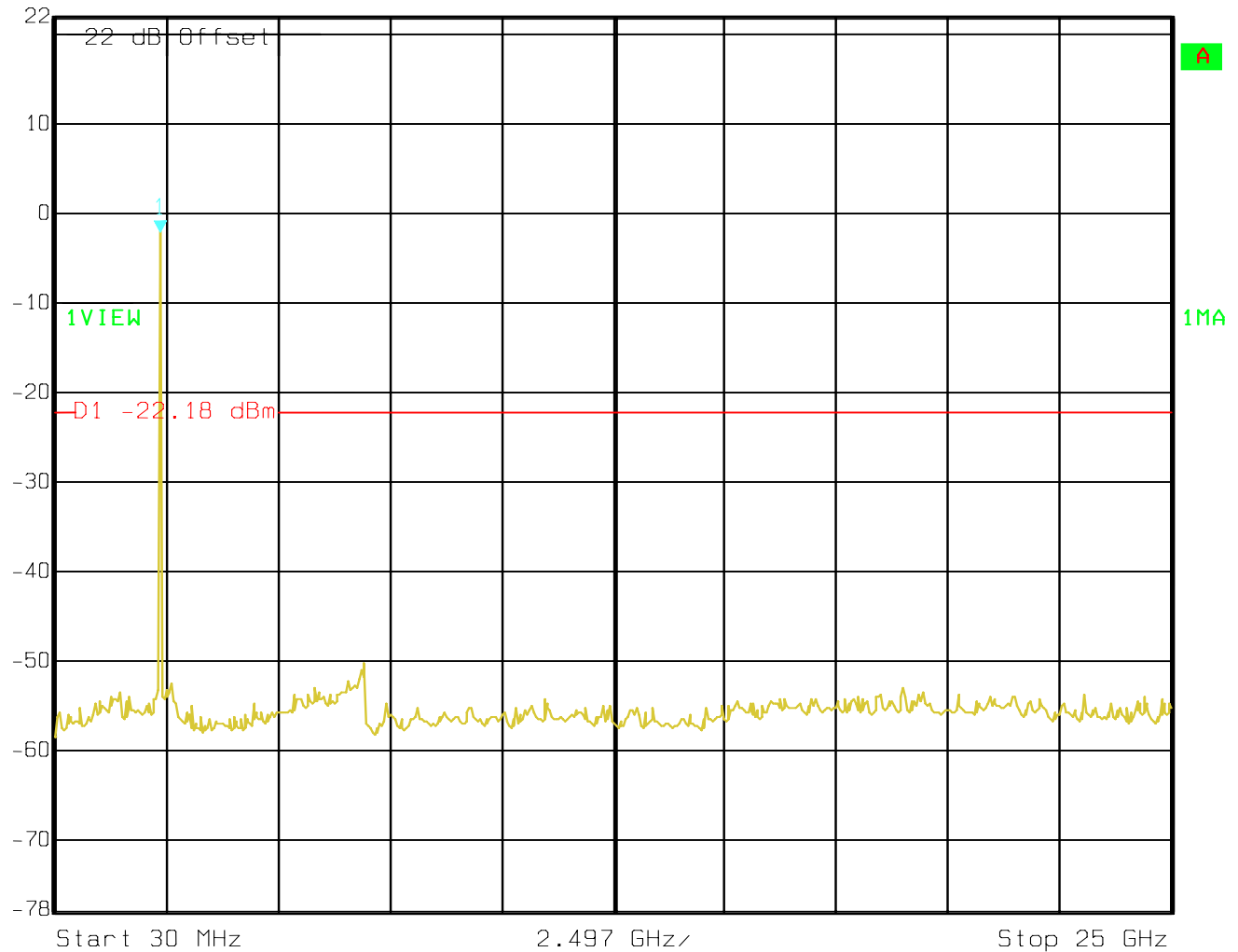
\*ref level offset is based upon BT coupler loss + splitter

## 5.7.2 RESULTS

### CONDUCTED SPURIOUS 2402 MHz



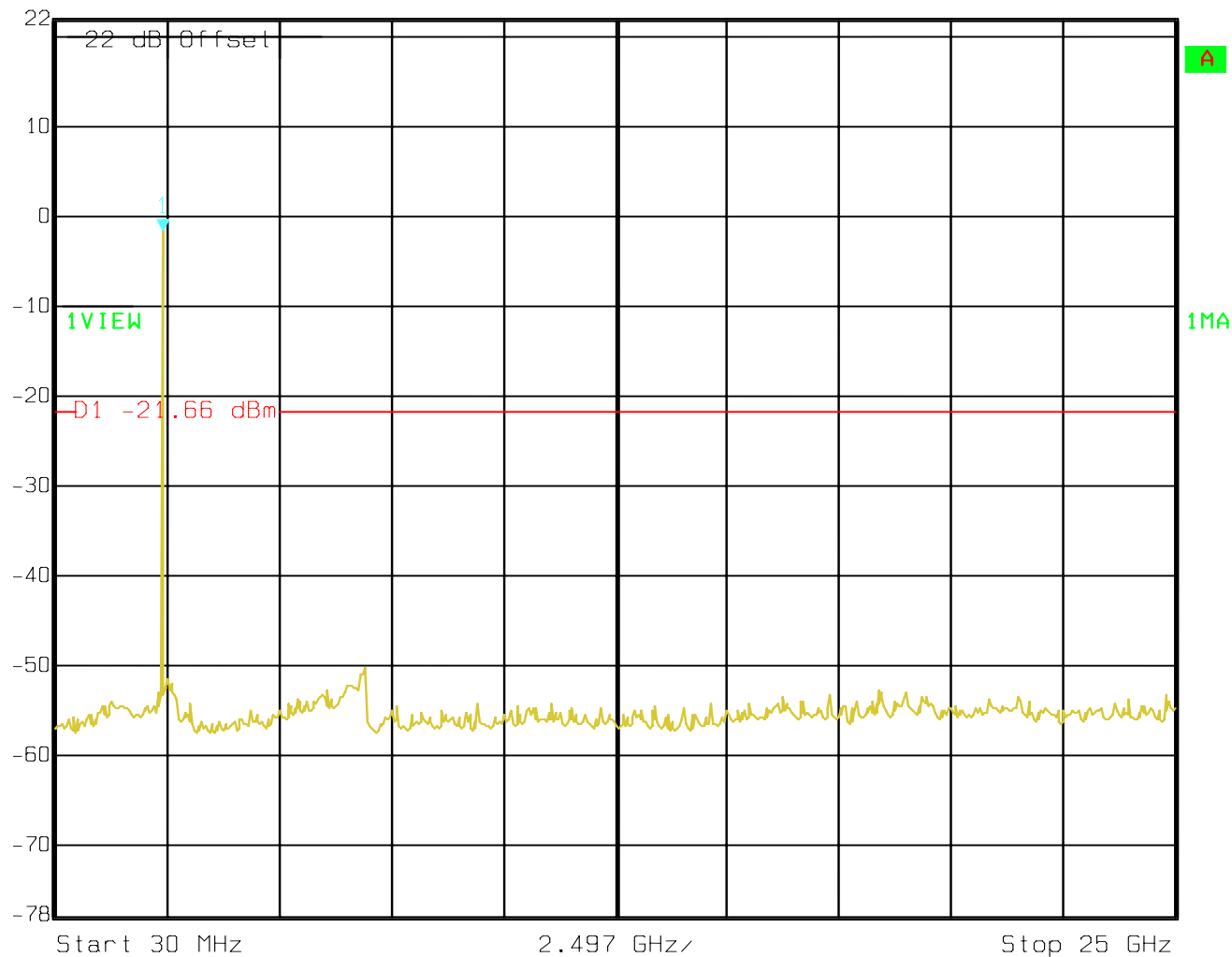
Ref Lvl 22 dBm  
Marker 1 [T1] -2.18 dBm  
RBW 100 kHz RF Att 10 dB  
VBW 100 kHz  
SWT 6.4 s Unit dBm  
2.38188377 GHz



Date: 10.MAY 2006 13:39:48

CONDUCTED SPURIOUS 2441 MHz

 Ref Lvl 22 dBm Marker 1 [T1] -1.66 dBm RBW 100 kHz RF Att 10 dB  
2.43192385 GHz VBW 100 kHz Unit dBm  
SWT 6.4 s



Date: 10.MAY 2006 13:43:18

Date: 10.MAY 2006 13:44:11

## 5.8 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.247/15.205

### 5.8.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

\*PEAK LIMIT= 74dBuV/m

\*AVG. LIMIT= 54dBuV/m





## 5.8.2 RESULTS (2402MHz)

### PEAK

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch0

Antenna: V

EUT: V

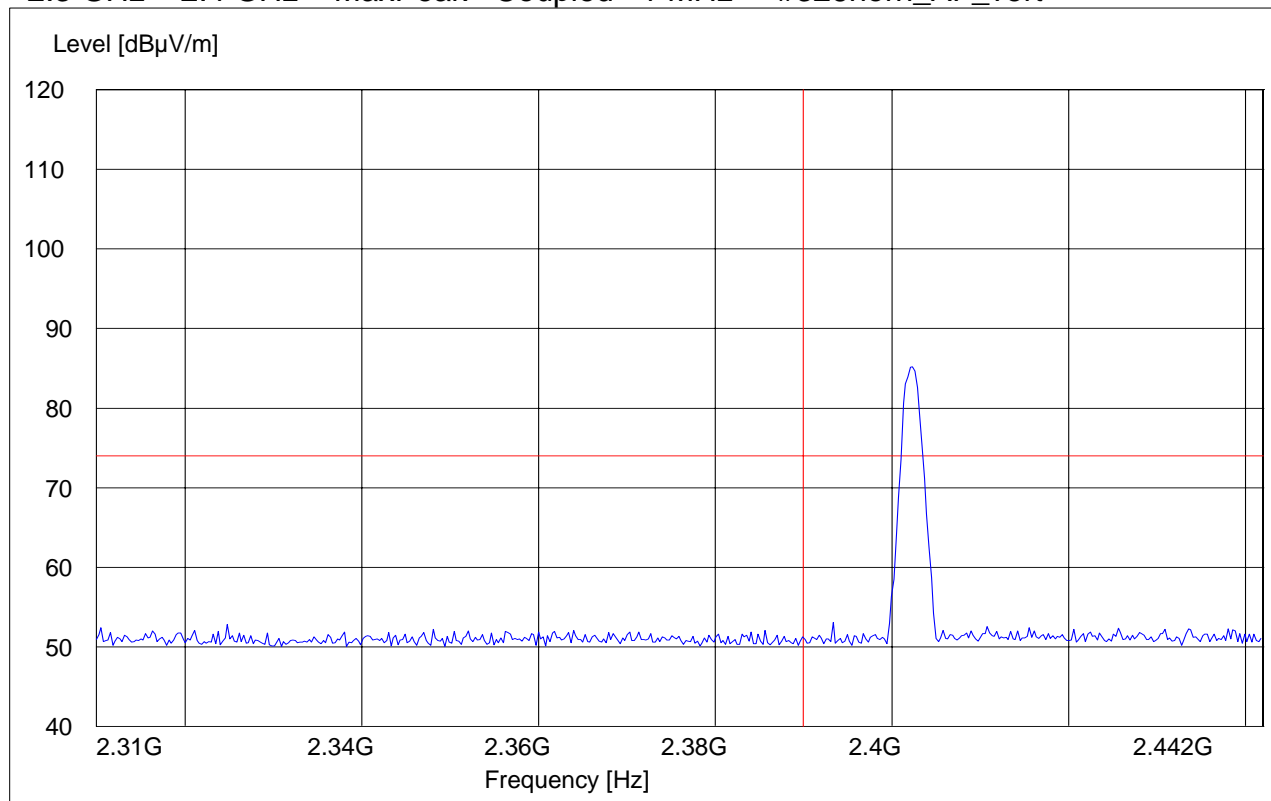
Test operator: Pete

Voltage: DC 4

Sweep: LBE PK

### **SWEEP TABLE: "FCC15.247 LBE\_PK"**

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert





AVG

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch0

Antenna: V

EUT: V

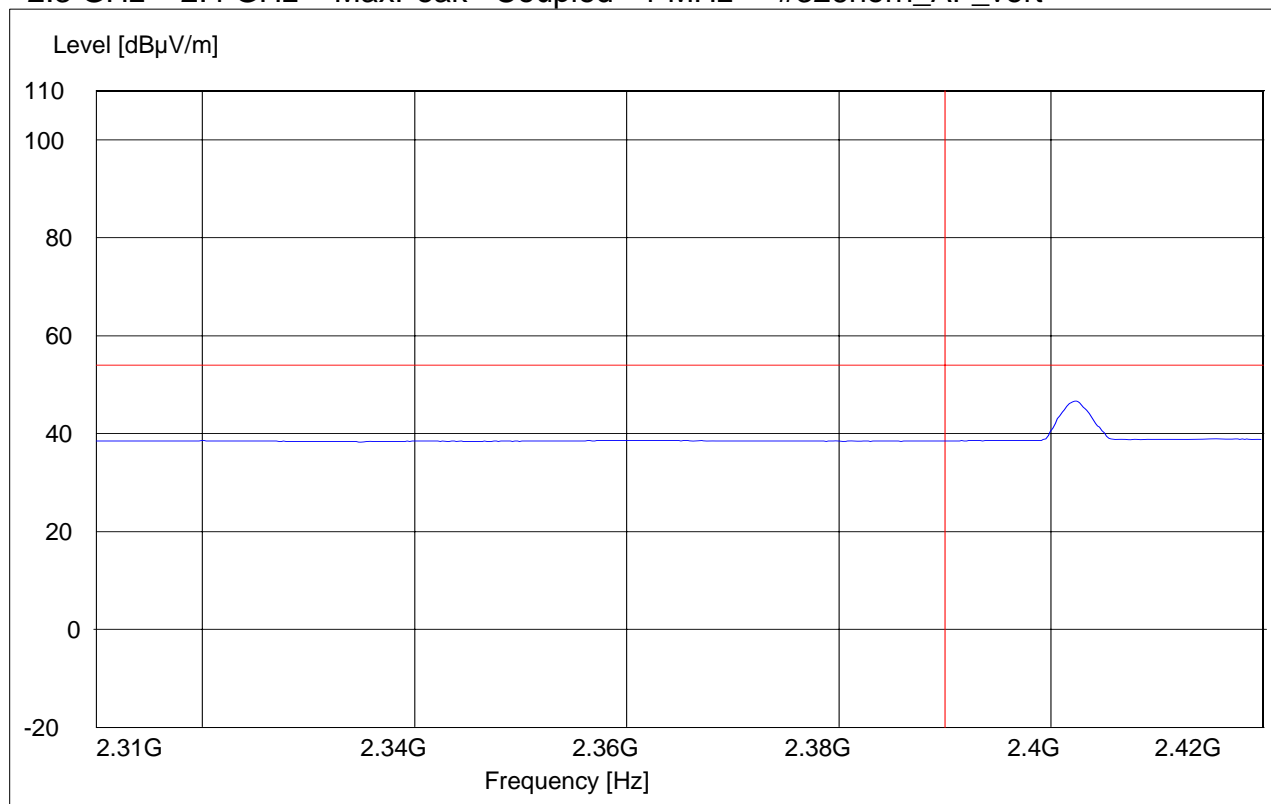
Test operator: Pete

Voltage: DC 4

Sweep: LBE AVG

**SWEEP TABLE: "FCC15.247 LBE\_AVG"**

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



### 5.8.3 RESULTS (2480MHz)

#### PEAK

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch78

Antenna: V

EUT: V

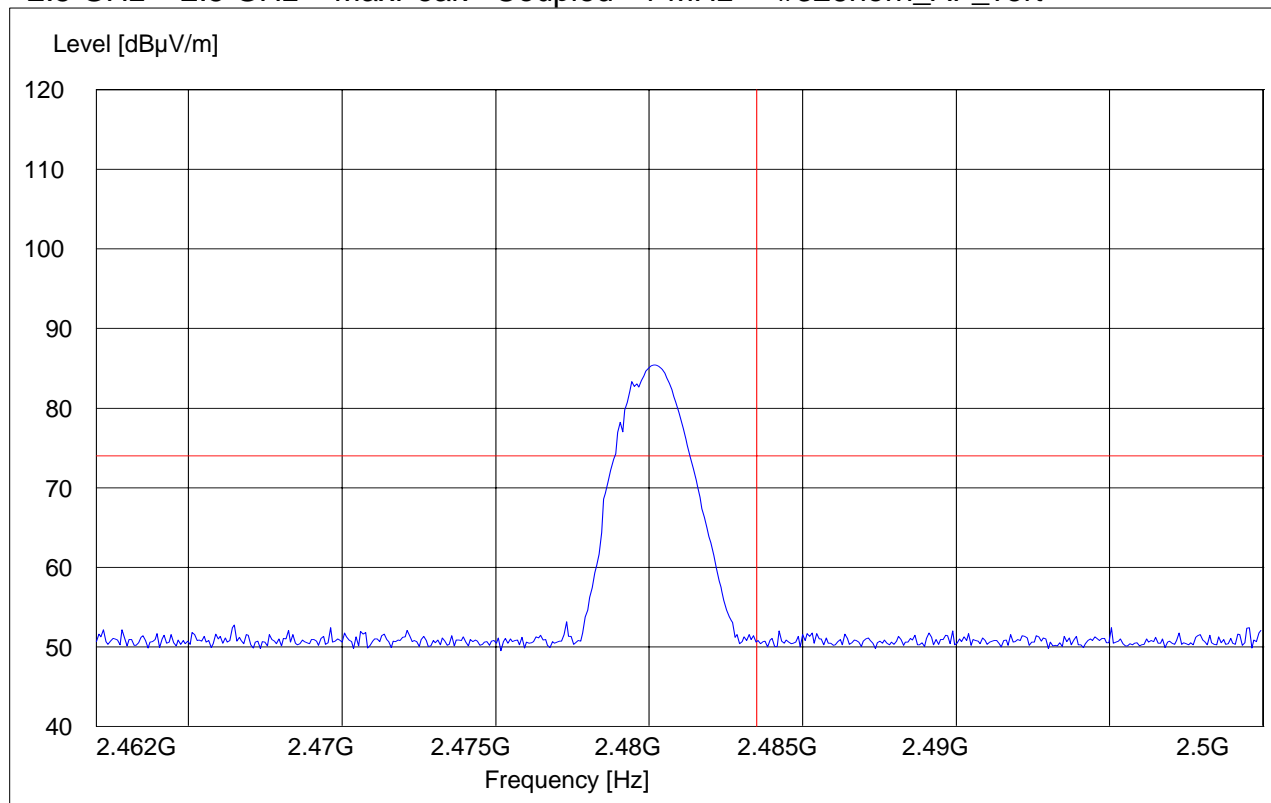
Test operator: Pete

Voltage: DC 4

Sweep: HBE PK

#### **SWEEP TABLE: "FCC15.247 HBE\_PK"**

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert





AVG

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch78

Antenna: V

EUT: V

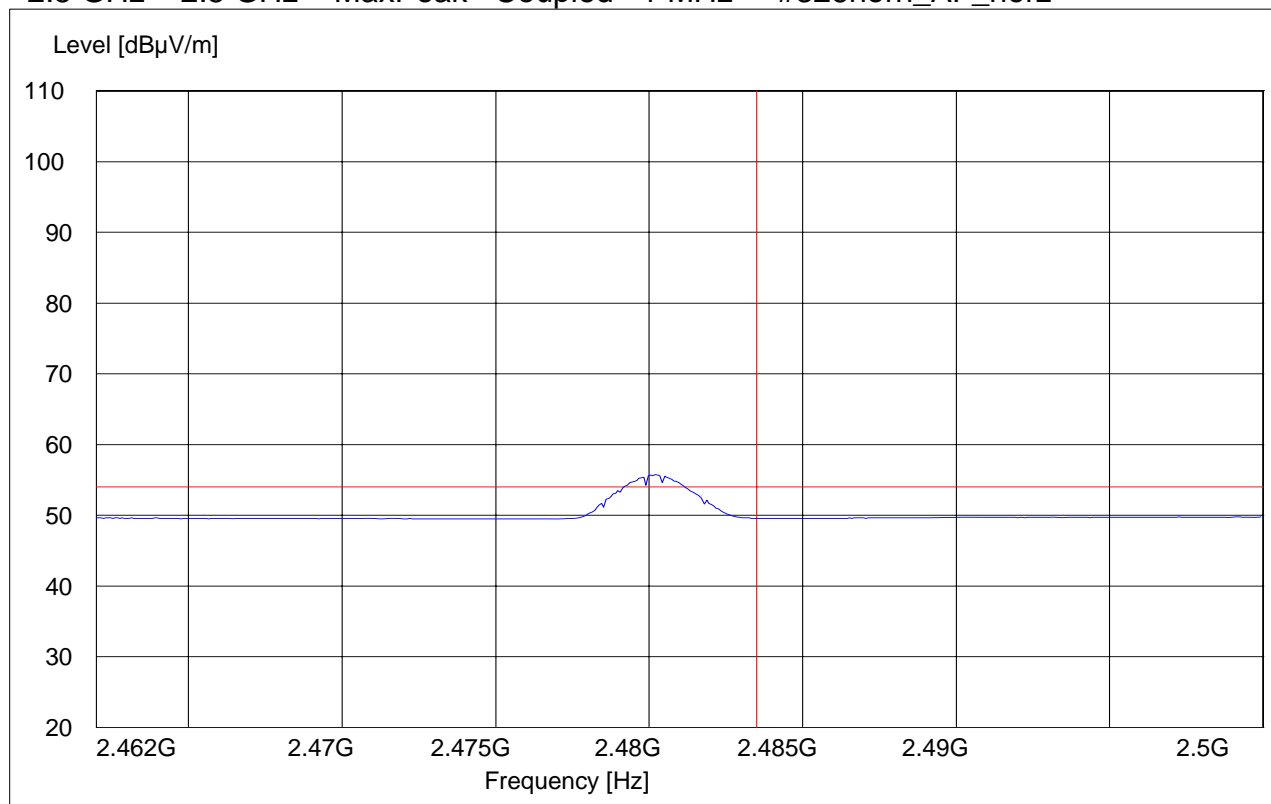
Test operator: Pete

Voltage: DC 4

Sweep: HBE AVG

**SWEEP TABLE: "FCC15.247 HBE\_AVG"**

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



## 5.9 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209

### 5.9.1 LIMITS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

\*PEAK LIMIT= 74dBuV/m

\*AVG. LIMIT= 54dBuV/m

#### 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 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit , unless specified with the plots.

#### Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels



## 5.9.2 RESULTS

30MHz – 1GHz

Antenna: vertical

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

Note: Peak reading vs. Quasi-peak limit

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch0

Antenna: V

EUT: V

Test operator: Pete

Voltage: DC 4

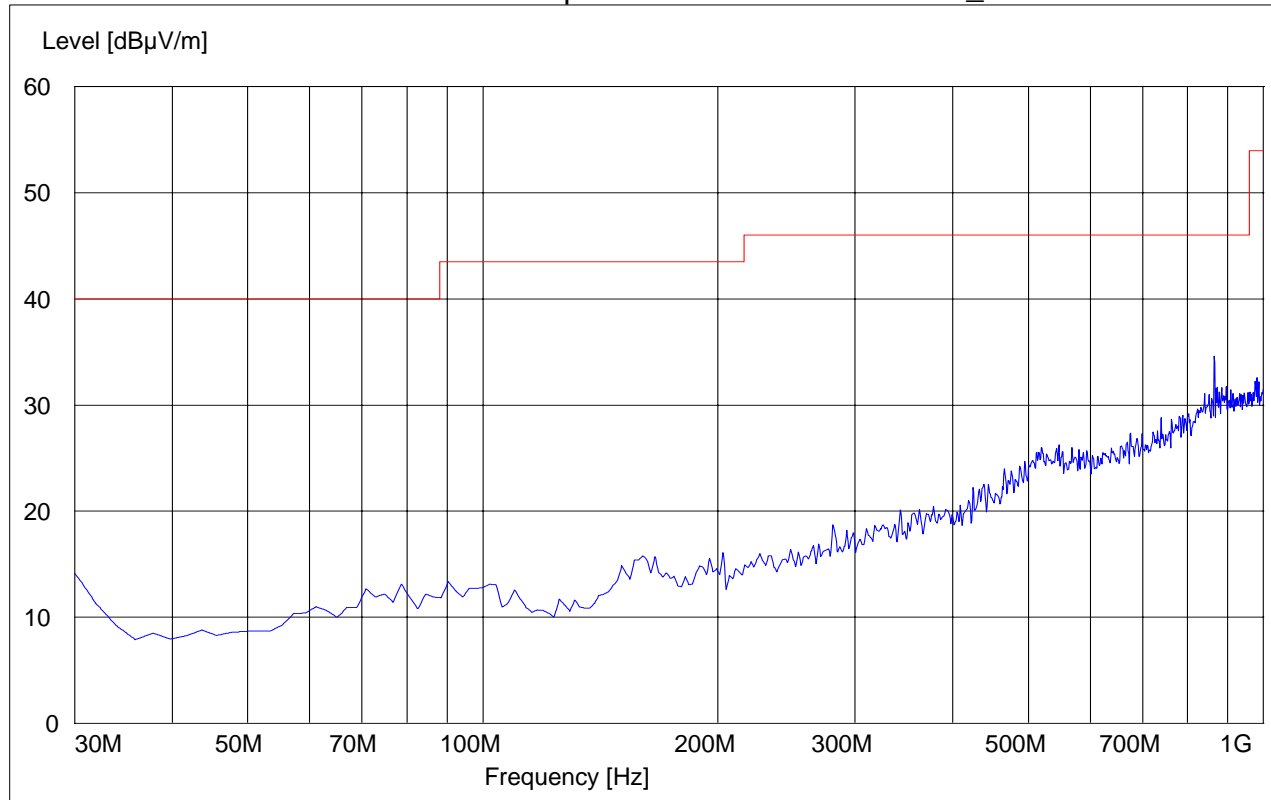
Sweep: 30-1000 MHz

### ***SWEEP TABLE: "FCC15.247\_30M-1G\_Ver"***

Start	Stop	Detector	Meas.	IF	Transducer
-------	------	----------	-------	----	------------

Frequency	Frequency	Time	Bandw.
-----------	-----------	------	--------

30.0 MHz	1.0 GHz	MaxPeak	Coupled 100 kHz	3141-#1186_Vert
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**1-3GHz (2402MHz)**

**Note: The peaks above the limit line is the carrier freq.**

**Note: Peak Reading vs. Average limit**

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch0

Antenna: V

EUT: V

Test operator: Pete

Voltage: DC 4

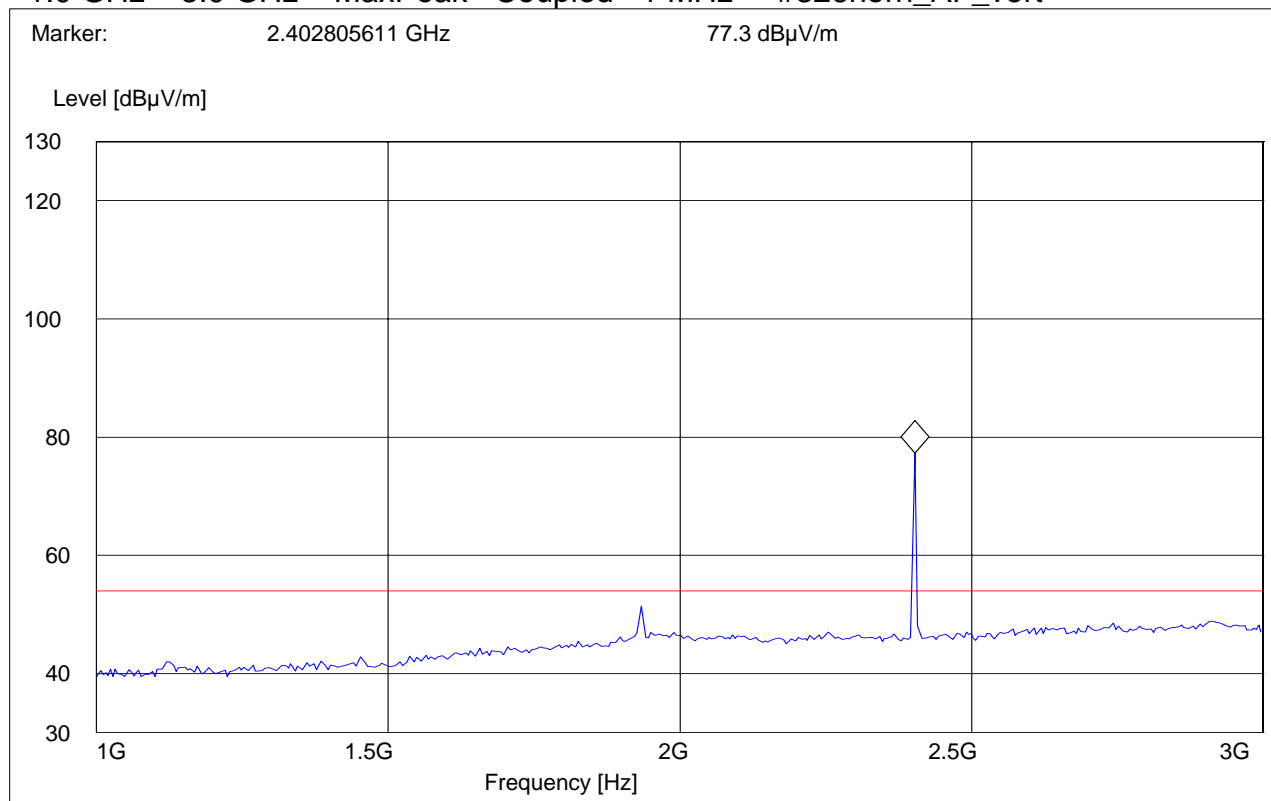
Sweep: 1-3 GHz

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

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 3.0 GHz MaxPeak Coupled 1 MHz #326horn\_AF\_vert





**1-3GHz (2441MHz)**

**Note: The peaks above the limit line is the carrier freq.**

**Note: Peak Reading vs. Average limit**

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch39

Antenna: V

EUT: V

Test operator: Pete

Voltage: DC 4

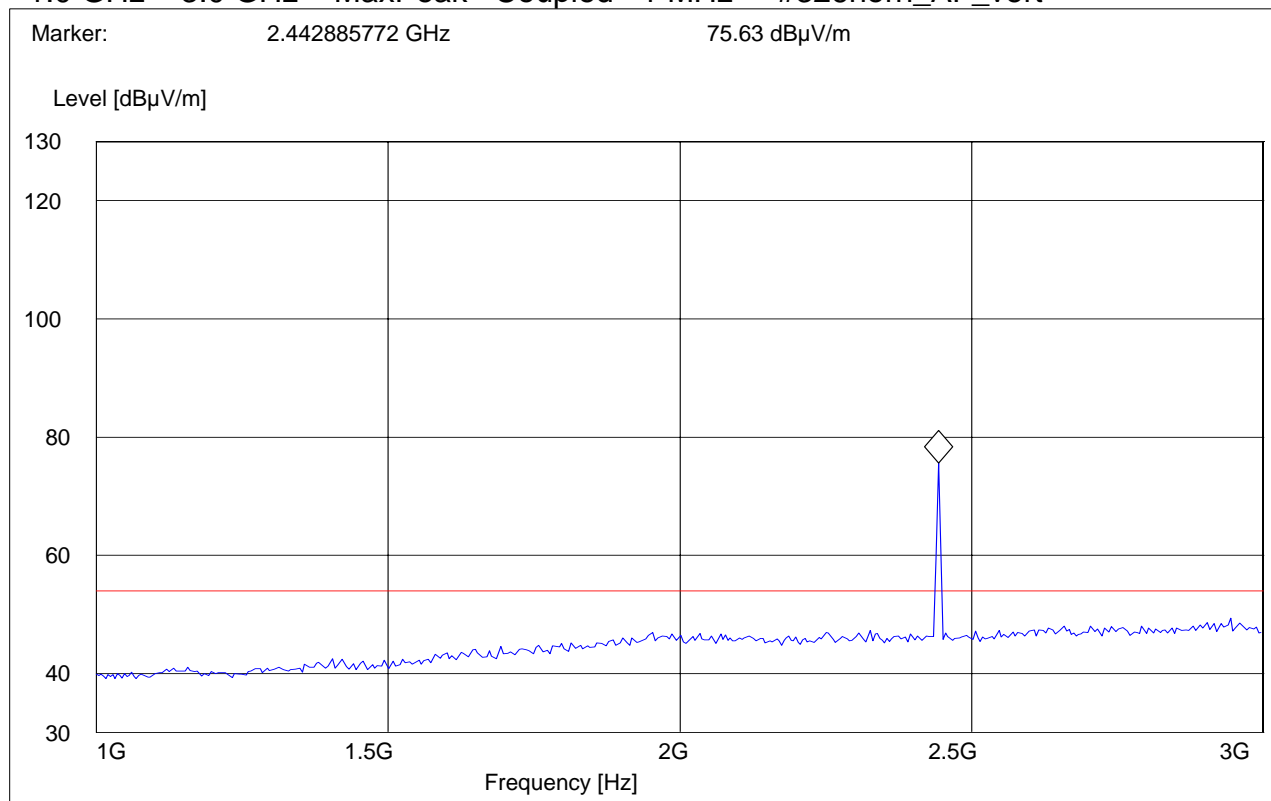
Sweep: 1-3 GHz

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

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 3.0 GHz MaxPeak Coupled 1 MHz #326horn\_AF\_vert







**1-3GHz (2480MHz)**

**Note: The peaks above the limit line is the carrier freq.**

**Note: Peak Reading vs. Average limit**

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch78

Antenna: V

EUT: V

Test operator: Pete

Voltage: DC 4

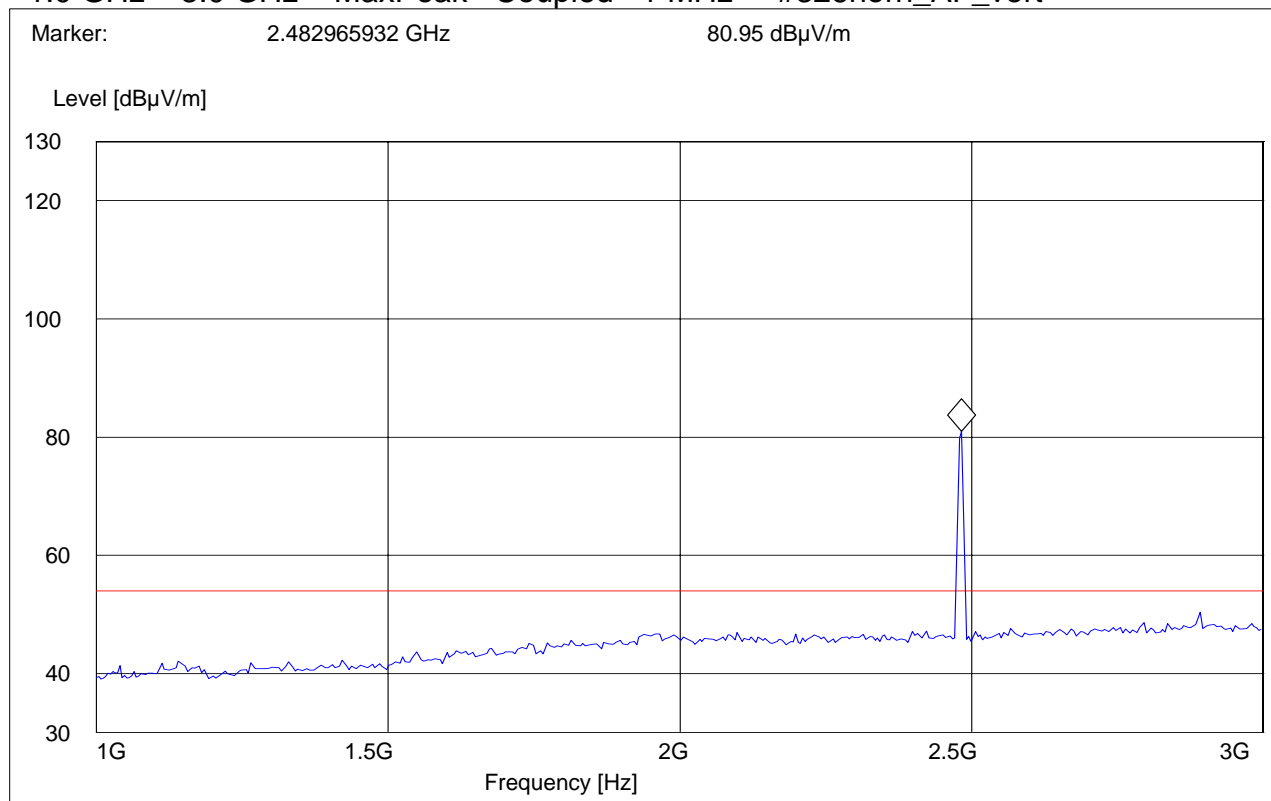
Sweep: 1-3 GHz

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

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 3.0 GHz MaxPeak Coupled 1 MHz #326horn\_AF\_vert





### 3-18GHz (2402MHz)

**Note: Peak Reading vs. Average limit**

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch0

Antenna: V

EUT: V

Test operator: Pete

Voltage: DC 4

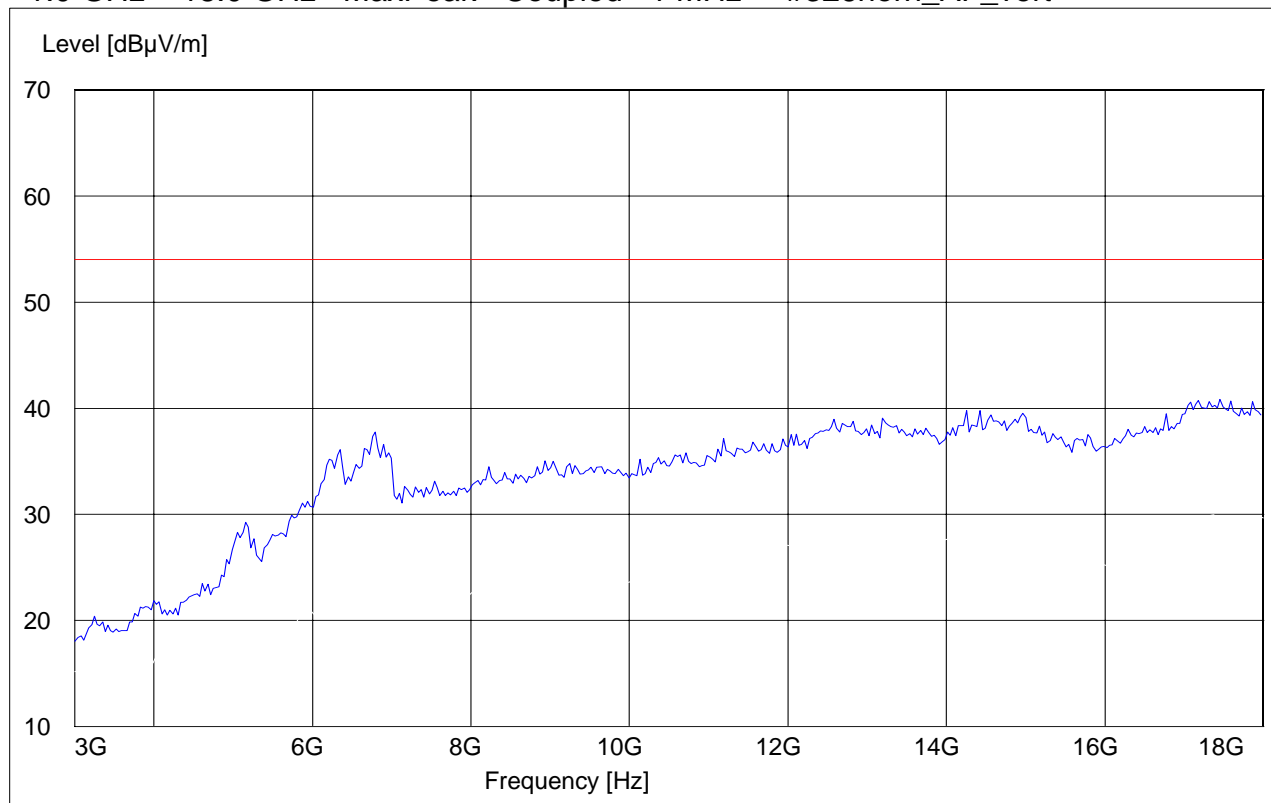
Sweep: 3-18 GHz

### **SWEEP TABLE: "FCC15.247\_3-18G"**

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #326horn\_AF\_vert





**3-18GHz (2441MHz)**

**Note: Peak Reading vs. Average limit**

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch39

Antenna: V

EUT: V

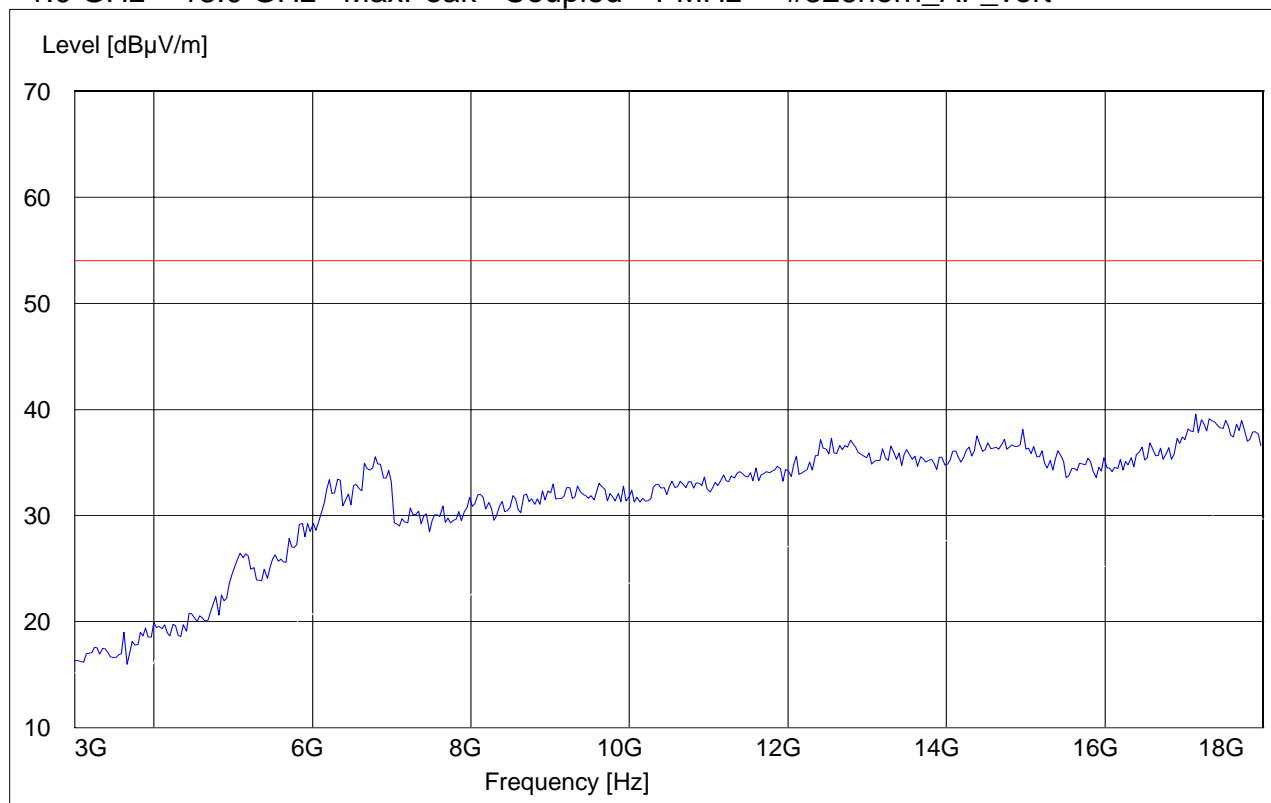
Test operator: Pete

Voltage: DC 4

Sweep: 3-18 GHz

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

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





### 3-18GHz (2480MHz)

**Note: Peak Reading vs. Average limit**

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch78

Antenna: V

EUT: V

Test operator: Pete

Voltage: DC 4

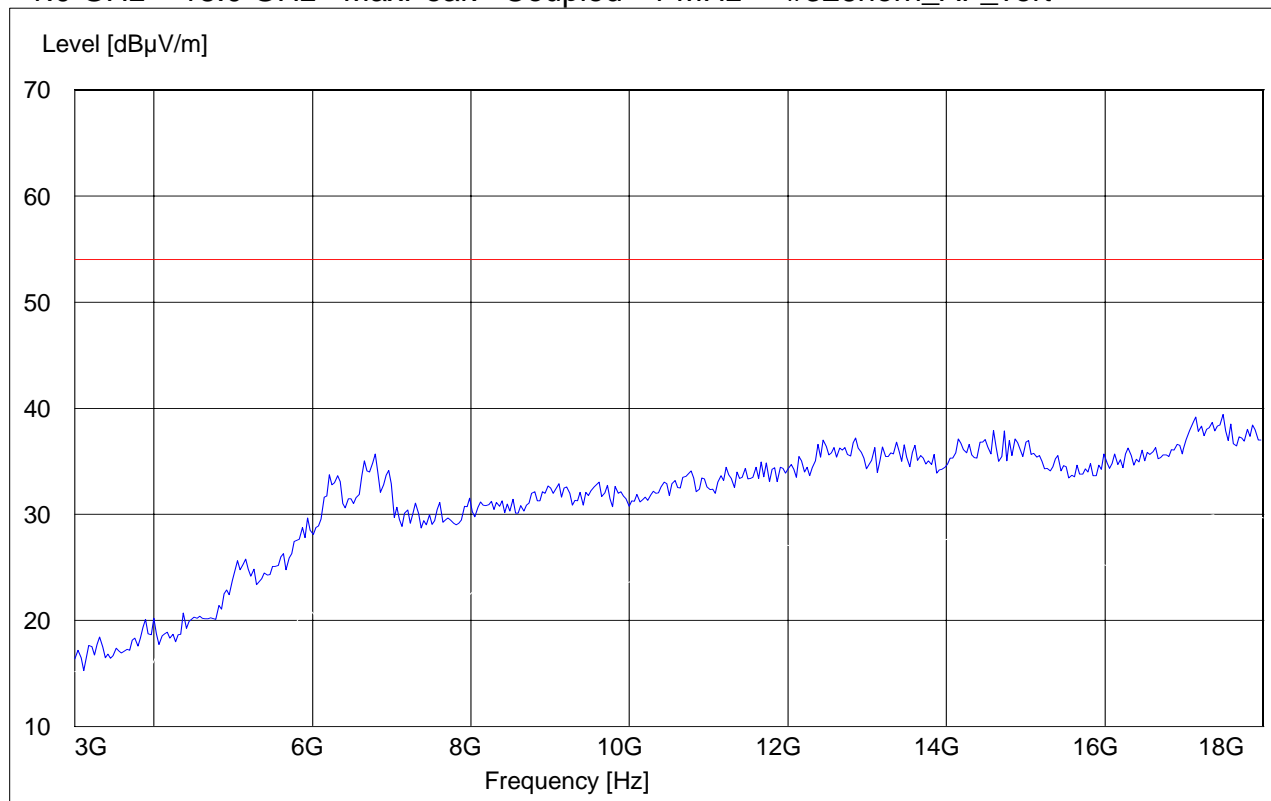
Sweep: 3-18 GHz

### **SWEEP TABLE: "FCC15.247\_3-18G"**

Start Stop Detector Meas. IF Transducer

Frequency Frequency Time Bandw.

1.0 GHz 18.0 GHz MaxPeak Coupled 1 MHz #326horn\_AF\_vert





## 18-25GHz

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

**Note: Peak Reading vs. Average limit**

### **CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: TX Ch0

Antenna: V

EUT: V

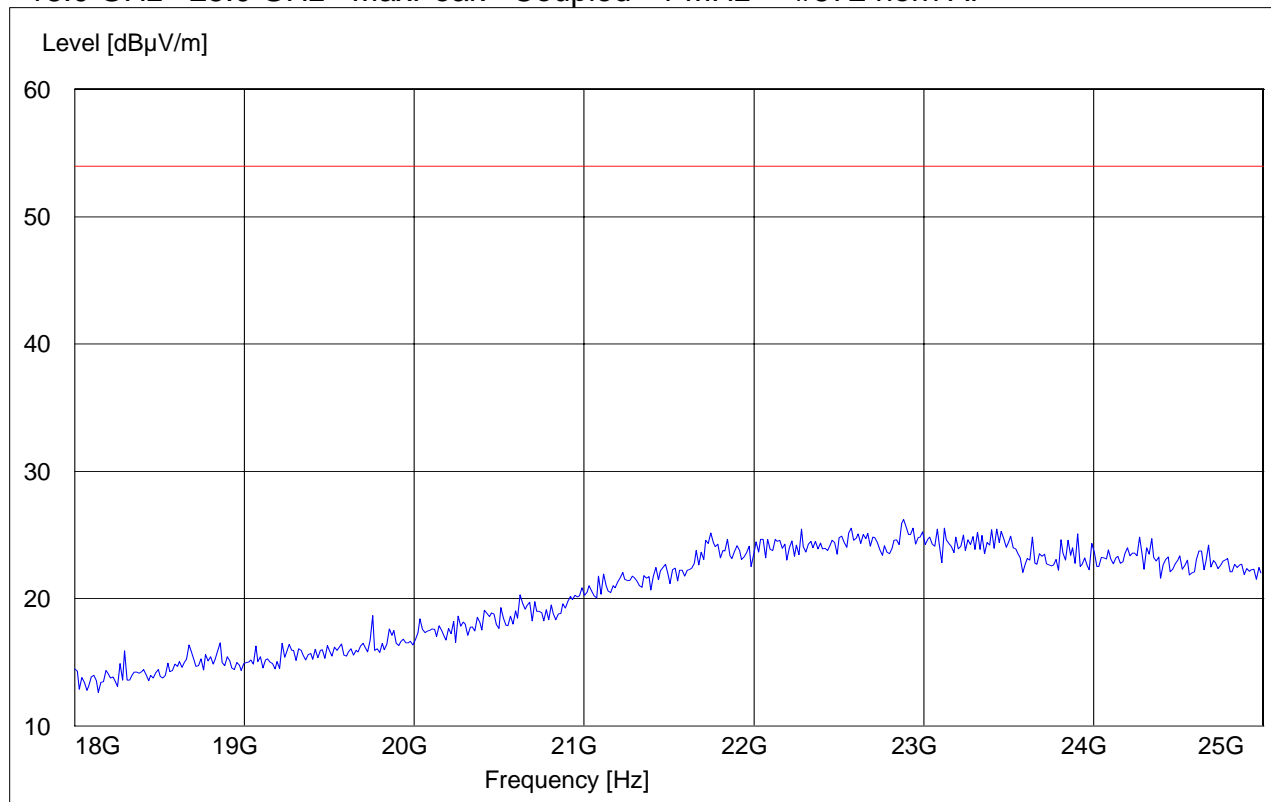
Test operator: Pete

Voltage: DC 4

Sweep: 18-25 GHz

### **SWEEP TABLE: "FCC15.247\_18-26.5G"**

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
18.0 GHz	25.0 GHz	MaxPeak	Coupled	1 MHz	#572 horn AF



## 5.10 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

### 5.10.1 LIMITS

Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	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

#### **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 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using a quasi-peak or average limit , unless specified with the plots.



## 5.10.2 RESULTS

30MHz – 1GHz

Antenna: vertical

Note: Peak Reading vs. Quasi-peak limit

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: RX

Antenna: V

EUT: V

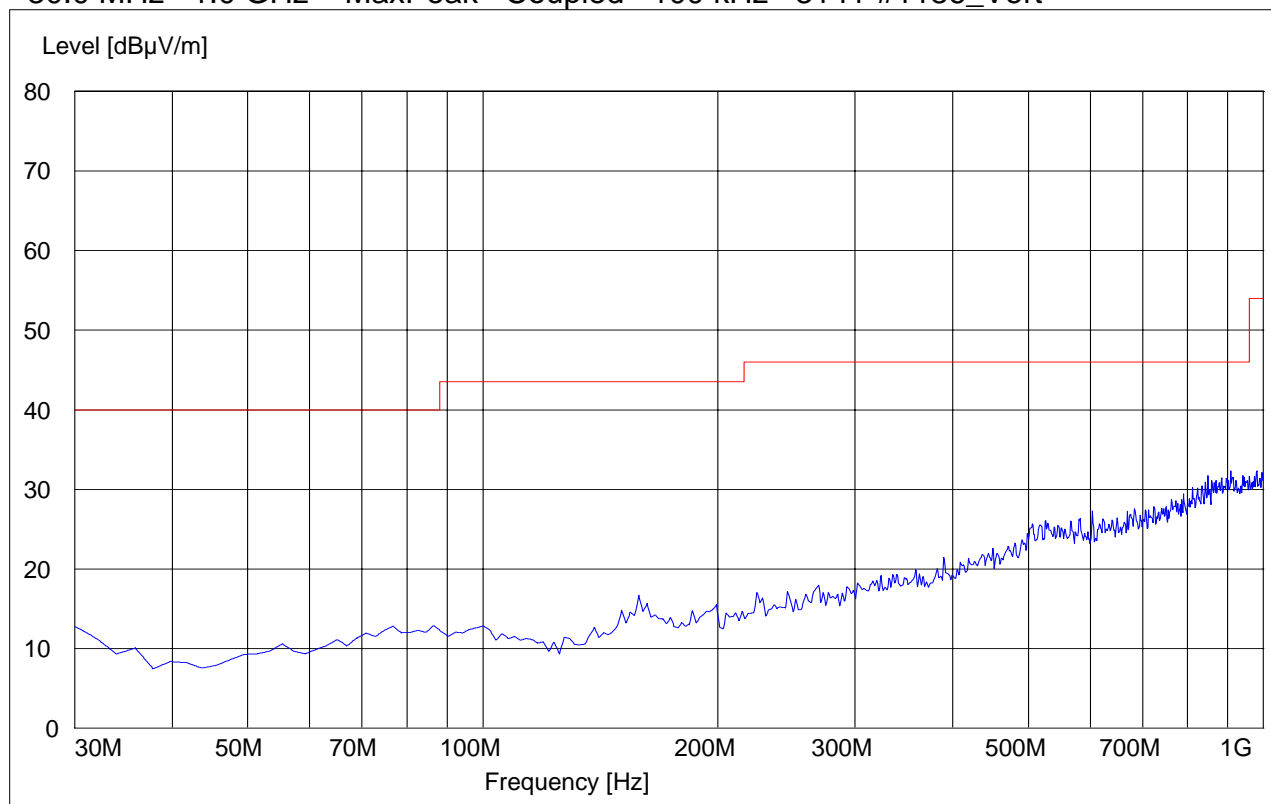
Test operator: Pete

Voltage: DC 4

Sweep: 30-1000 MHz

### **SWEEP TABLE: "CANADA RE\_30M-1G\_Ver"**

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





### 1-3GHz

**Note: Peak Reading vs. Average limit**

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: RX

Antenna: V

EUT: V

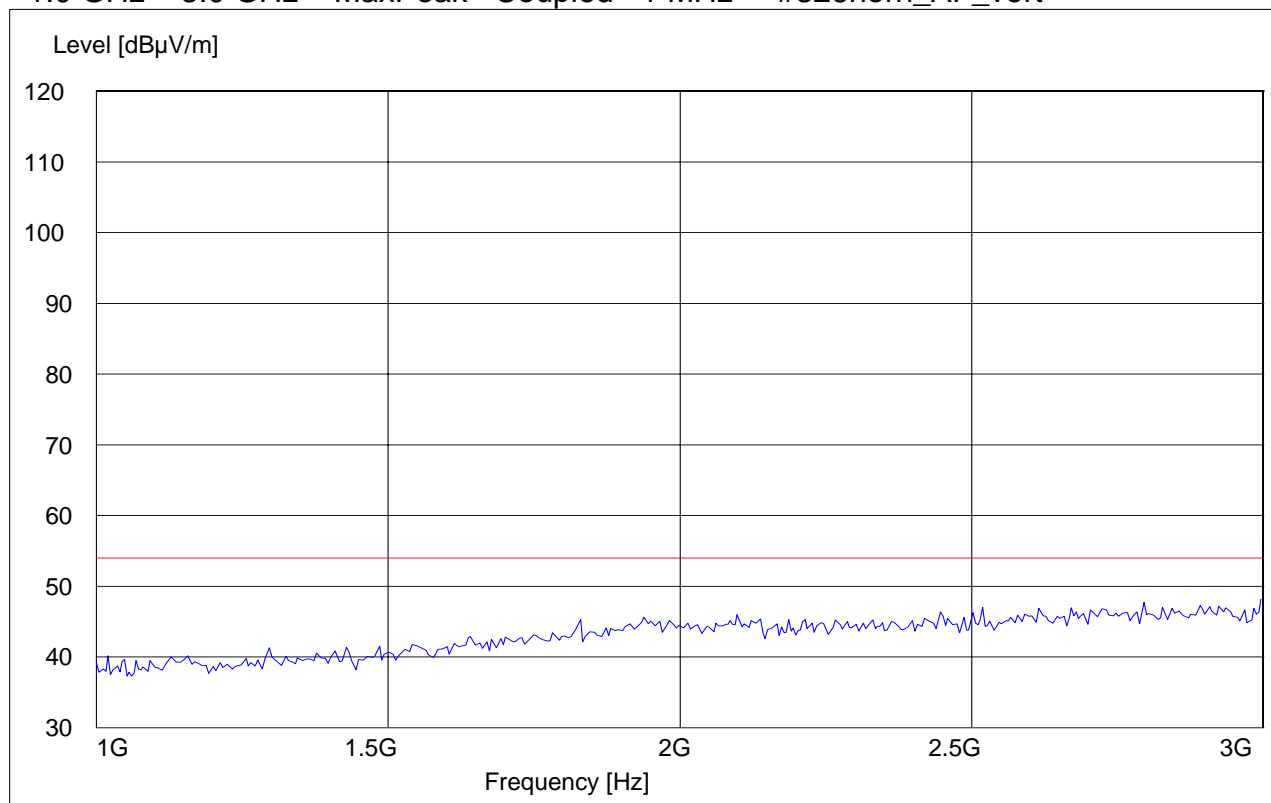
Test operator: Pete

Voltage: DC 4

Sweep: 1-3 GHz

### ***SWEEP TABLE: "CANADA RE\_1-3G"***

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert







### 3-18GHz

Note: Peak Reading vs. Average limit

#### **CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: RX

Antenna: V

EUT: V

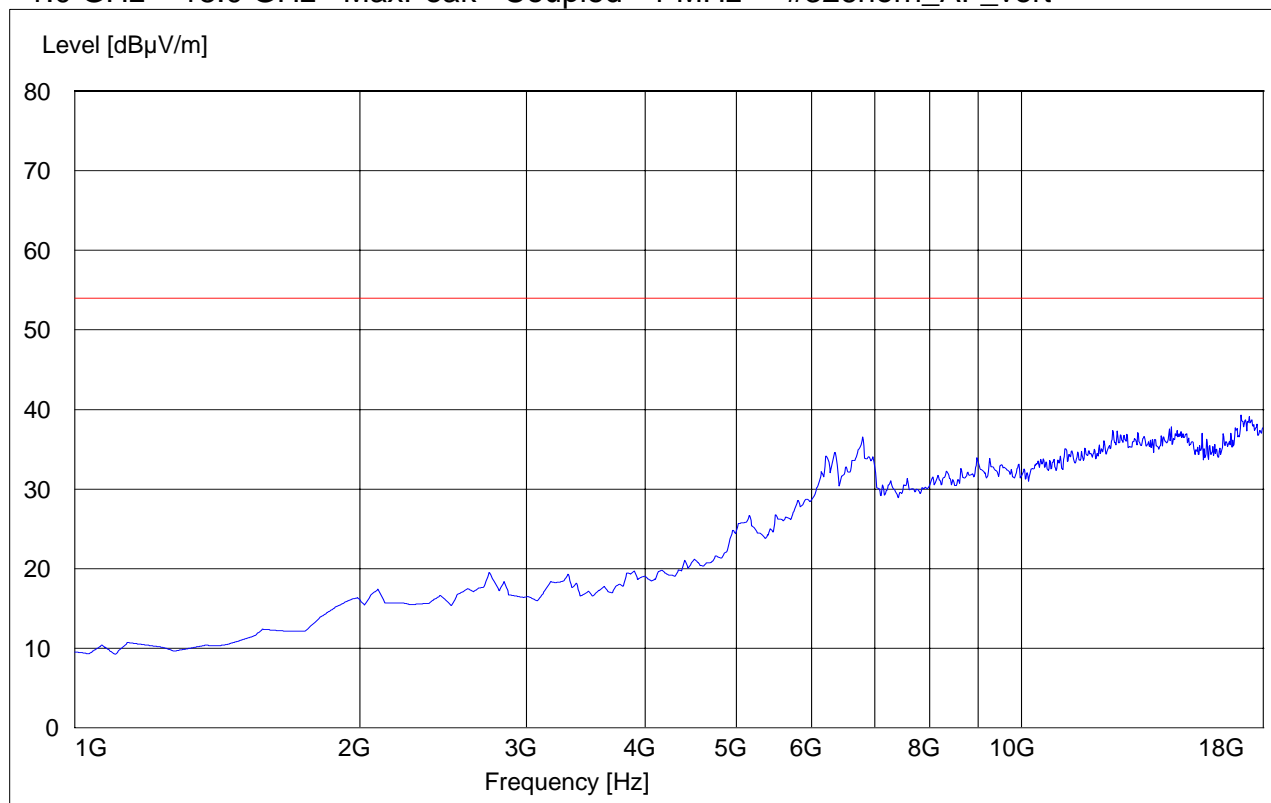
Test operator: Pete

Voltage: DC 4

Sweep: 3-18 GHz

#### **SWEEP TABLE: "CANADA RE\_3-18G"**

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





## 18-25GHz

**Note: Peak Reading vs. Average limit**

**CETECOM Inc.**

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

EUT / Description: C81

Customer: BenQ

Operating Mode: RX

Antenna: V

EUT: V

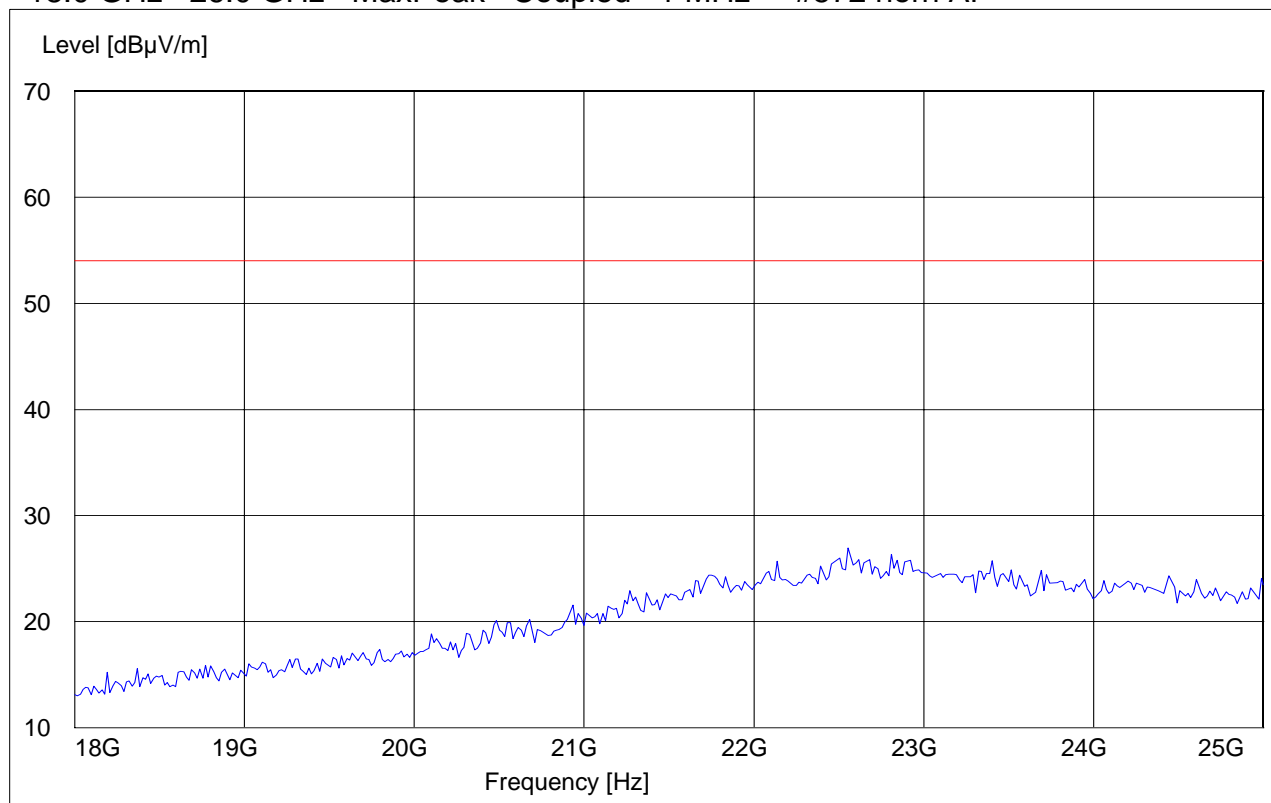
Test operator: Pete

Voltage: DC 4

Sweep: 18-25 GHz

### **SWEEP TABLE: "CANADA RE\_18-26.5G"**

Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
18.0 GHz	26.0 GHz	MaxPeak	Coupled	1 MHz	#572 horn AF





## 5.11 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207

### 5.11.1 LIMITS

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

#### Limit

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	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

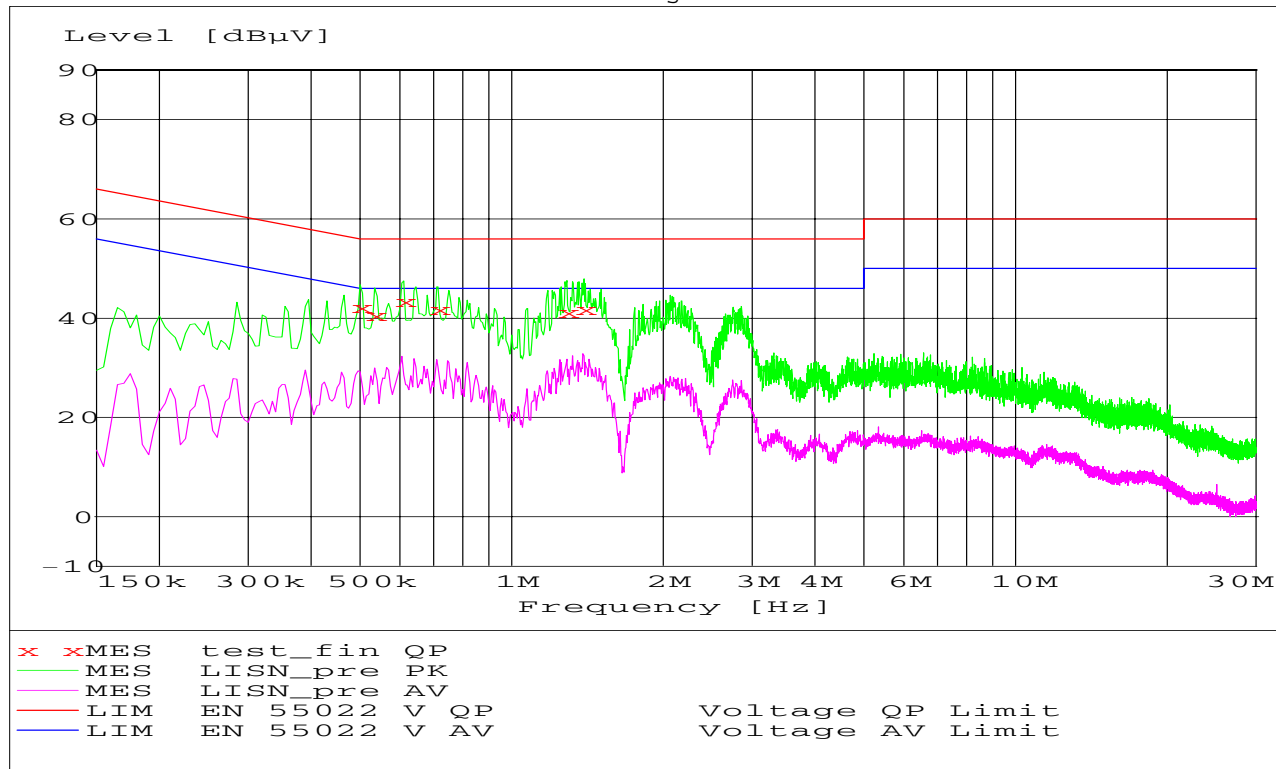
VBW = 10KHz

TYPE	MANF.	MODEL	FCC ID
AC ADAPTER	SIEMENS	A5BHTN00102612	DoC

## 5.11.2 RESULTS

### SCAN TABLE: "EN 55022 Voltage"

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



### 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

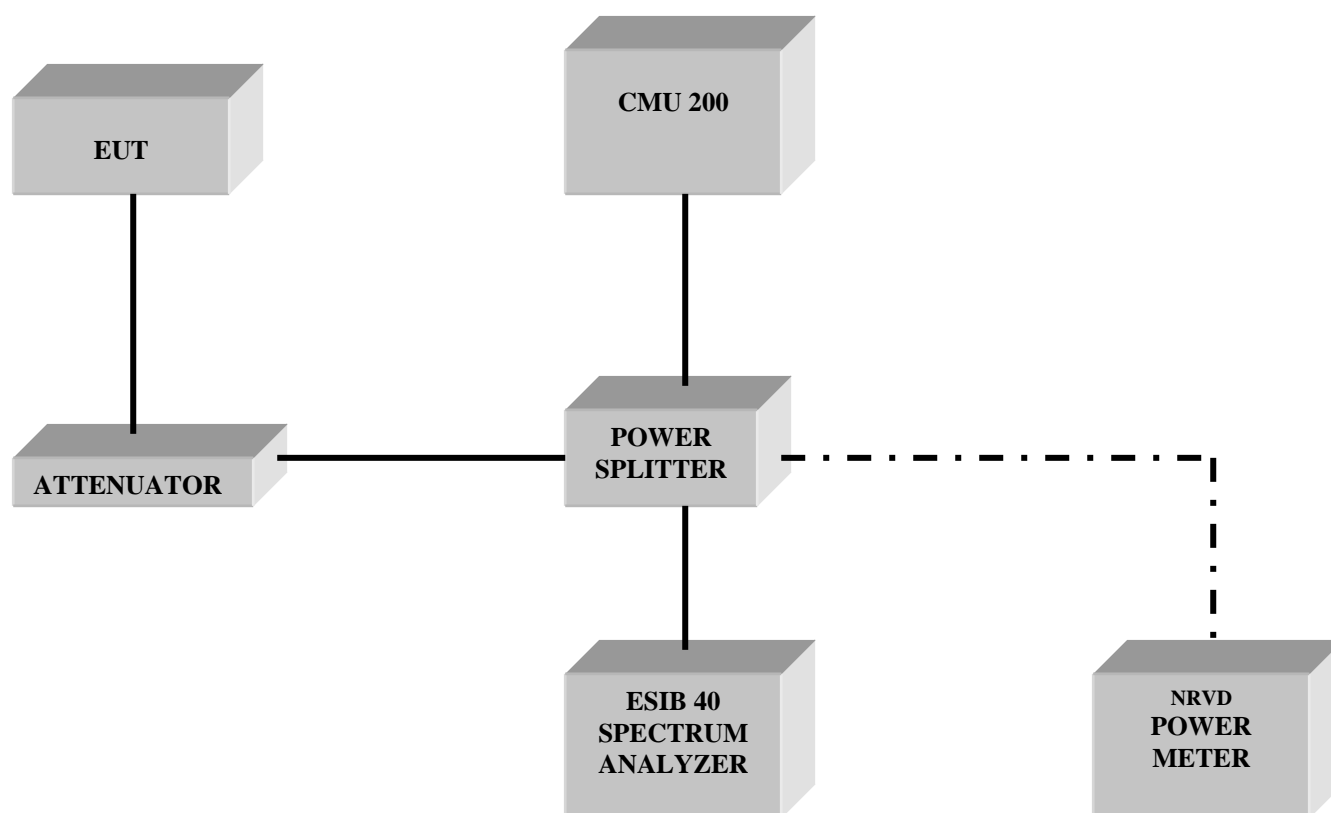


### 5.12 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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

### 5.13 BLOCK DIAGRAMS

#### Conducted Testing



**Radiated Testing**

**ANECHOIC CHAMBER**

