FCC Test Report

FCC Part 15.247 for FHSS systems/ CANADA RSS-210

FOR:

Quickcheck Verifier (Bar Code Scanner) with BT

MODEL #: QC900 and QC890

Hand Held Products, Inc.
700 Vision Drive
Skaneateles Falls, NY 13153
U.S.A

FCC ID: HD5QC900A
IC ID: 1693B-QC900A

TEST REPORT #: HANDH_003_05002_15.247BT
DATE: 2007-1-11

Certificate # 2135.01

Bluetooth Qualification Test Facility (BQTF)

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 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 #
Hand Held Products, Inc.	Quickcheck Verifier with BT	QC890 and QC900

Technical responsibility for area of testing:

Date	Section	Name	Signature
2006-12-01	EMC & Radio	Lothar Schmidt (Test Lab Manager)	

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:	**Peter Mu**
Date of test:	**2006-08-23 to 2006-09-01**

2.2 Identification of the Client

Applicant's Name:	**Hand Held Products, Inc.**
Street Address:	**700 Vision Drive**
City/Zip Code	**Skaneateles Falls, NY 13153**
Country	**U.S.A**
Contact Person:	**Michael Robinson**
Phone No.	**+ 1 800 782 4263**
Fax:	**+1 315 685 1210**
e-mail :	**Michael.Robinson@handheld.com**

2.3 Identification of the Manufacturer

Manufacturer's Name:	**Hand Held Products, Inc.**
Manufacturers Address:	**700 Vision Drive**
City/Zip Code	**Skaneateles Falls, NY 13153**
Country	**U.S.A**

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	**Quickcheck Verifier QC890 and QC900**
Description:	**Barcode verifier with Bluetooth**
Model No:	**QC890 and QC900**
FCC ID:	**HD5QC900A**
IC ID:	**1693B-QC900A**
Frequency Range:	**2400-2483.5MHz**
Type(s) of Modulation:	**GFSK**
Number of Channels:	**79**
Antenna Type:	**Chip**
Output Power:	Please see section 5.1.2 for EIRP measurement rerults and section 6.1.2 for Conducted Output Power measurement results**.** **1.82dBm (1.52mW) EIRP@ 2402 MHz** **-0.13dBm (0.971mW) @ 2480MHz.**

3.2 Identification of the Equipment Under Test (EUT)

EUT #	TYPE	MANF.	MODEL	SERIAL #
1	Bar Code Verifier	Hand Held Products Inc.	QC890/900	UNIT 1

3.3 Identification of Accessory equipment

AE #	TYPE	MANF.	MODEL	SERIAL #
1	AC/DC ADAPTER	DVE	DSA-0151D-05	None

4 Subject Of Investigation

All testing was performed on the product reffered to in Section 3 as EUT.

During the testing process the EUT was tested on a single channel using PRBS9 payload using DH5 packets, all data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the 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.

5 Measurements (RADIATED)

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	30dBm EIRP

***limit is based upon antenna gain of less than or equal to 6dBi according § 15.247 (b) (4).**

5.1.2 EIRP:

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom}(23)°C	V_{nom}VDC	1.82	-0.17	-2.35
Measurement uncertainty		±0.5dBm		

EIRP (2402 MHz)

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

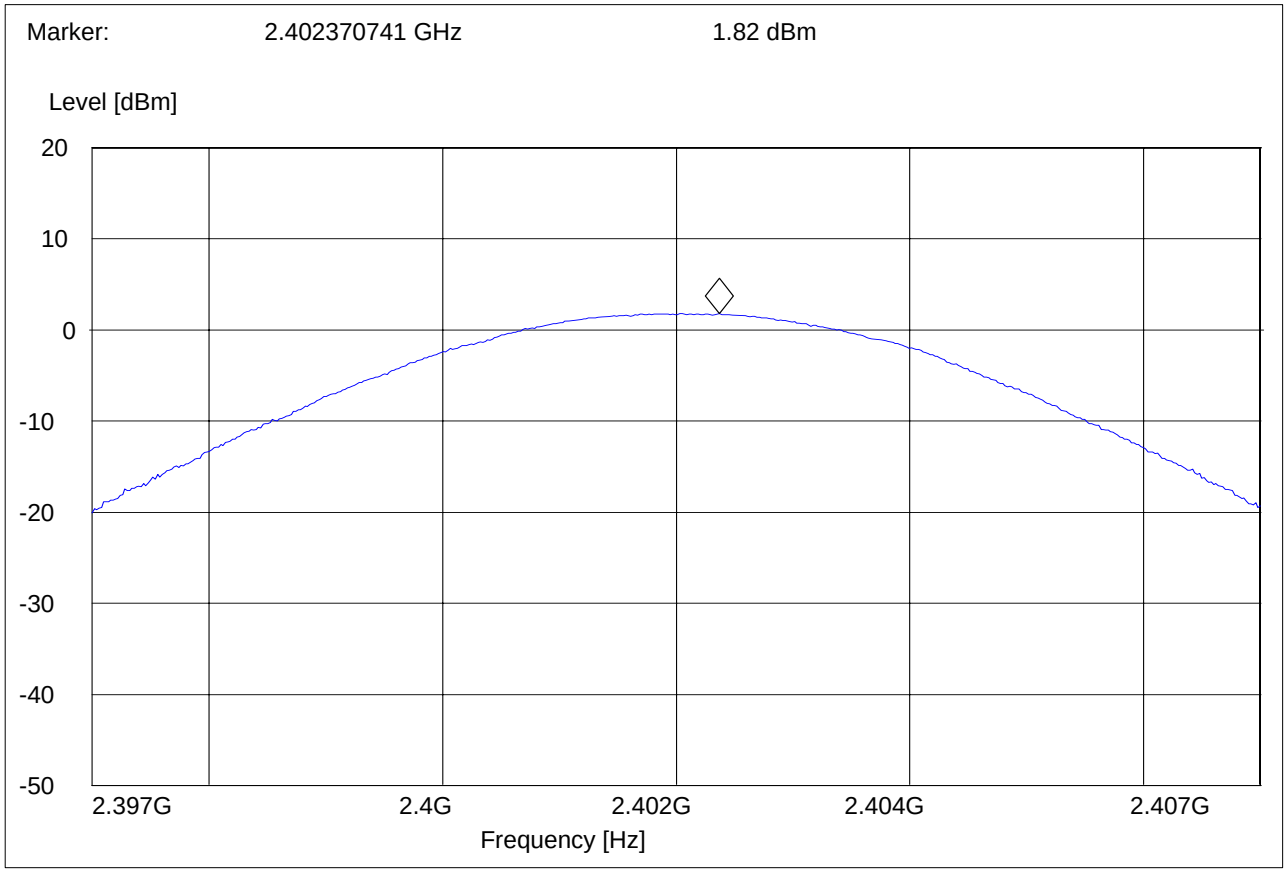
```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2402
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           EIRP
```

SWEEP TABLE: "EIRP BT low channel"

Short Description: EIRP Bluetooth channel-2402MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.4 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM

MaxPeak



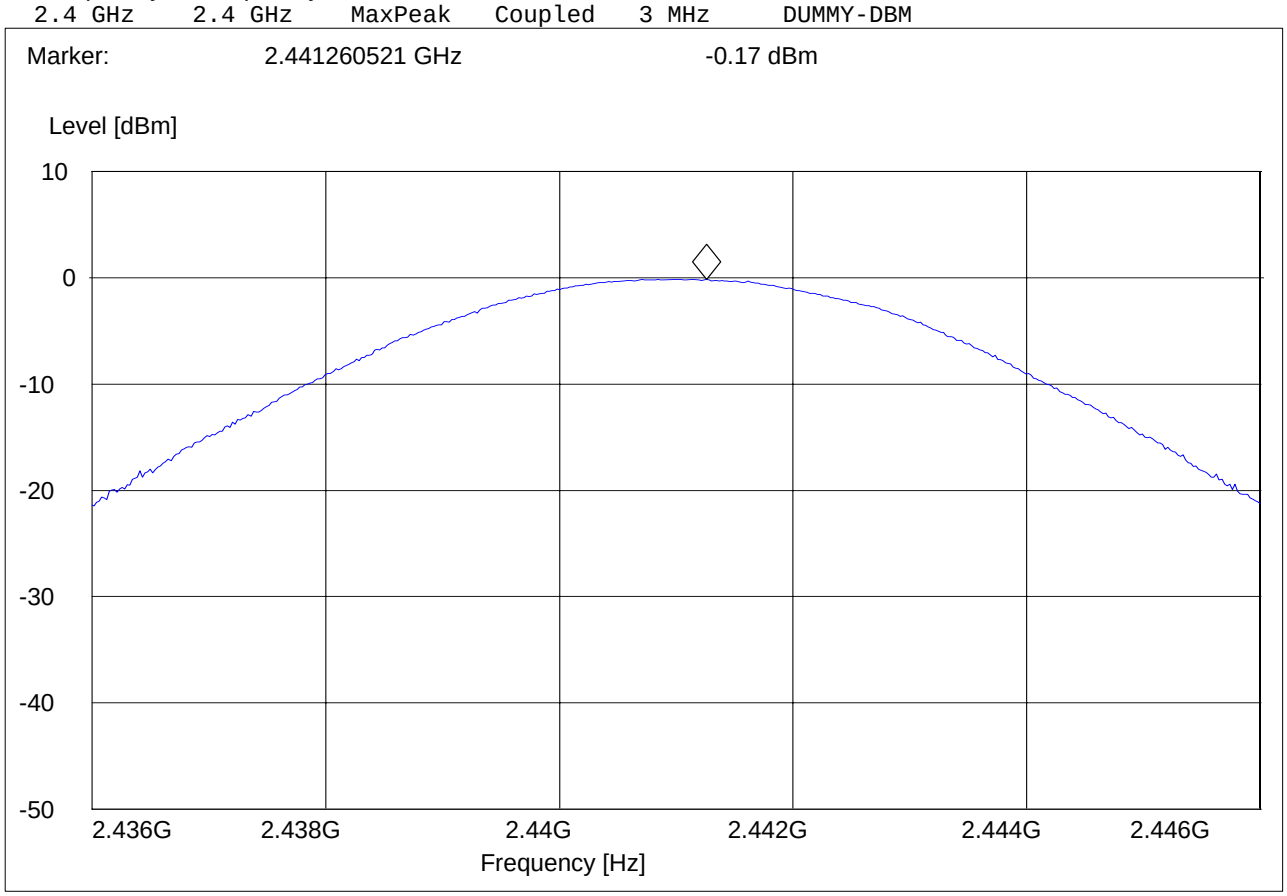
EIRP (2441 MHz)

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2441
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           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
```



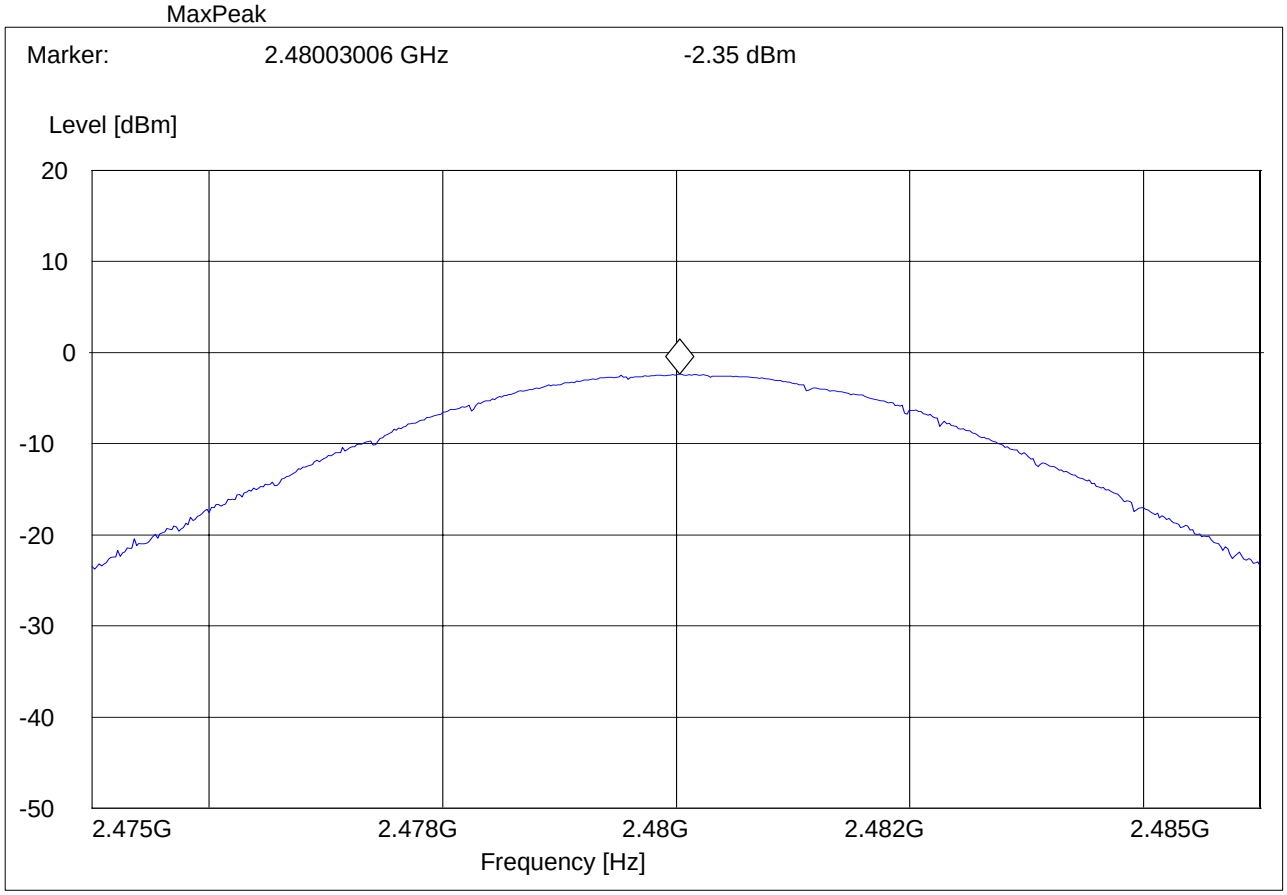
EIRP (2480 MHz)

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2480
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           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 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.247/15.205

5.2.1 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
[1]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	([2])
13.36 - 13.41			

***PEAK LIMIT= 74dBuV/m**
***AVG. LIMIT= 54dBuV/m**

5.2.2 RESULTS (2402MHz)

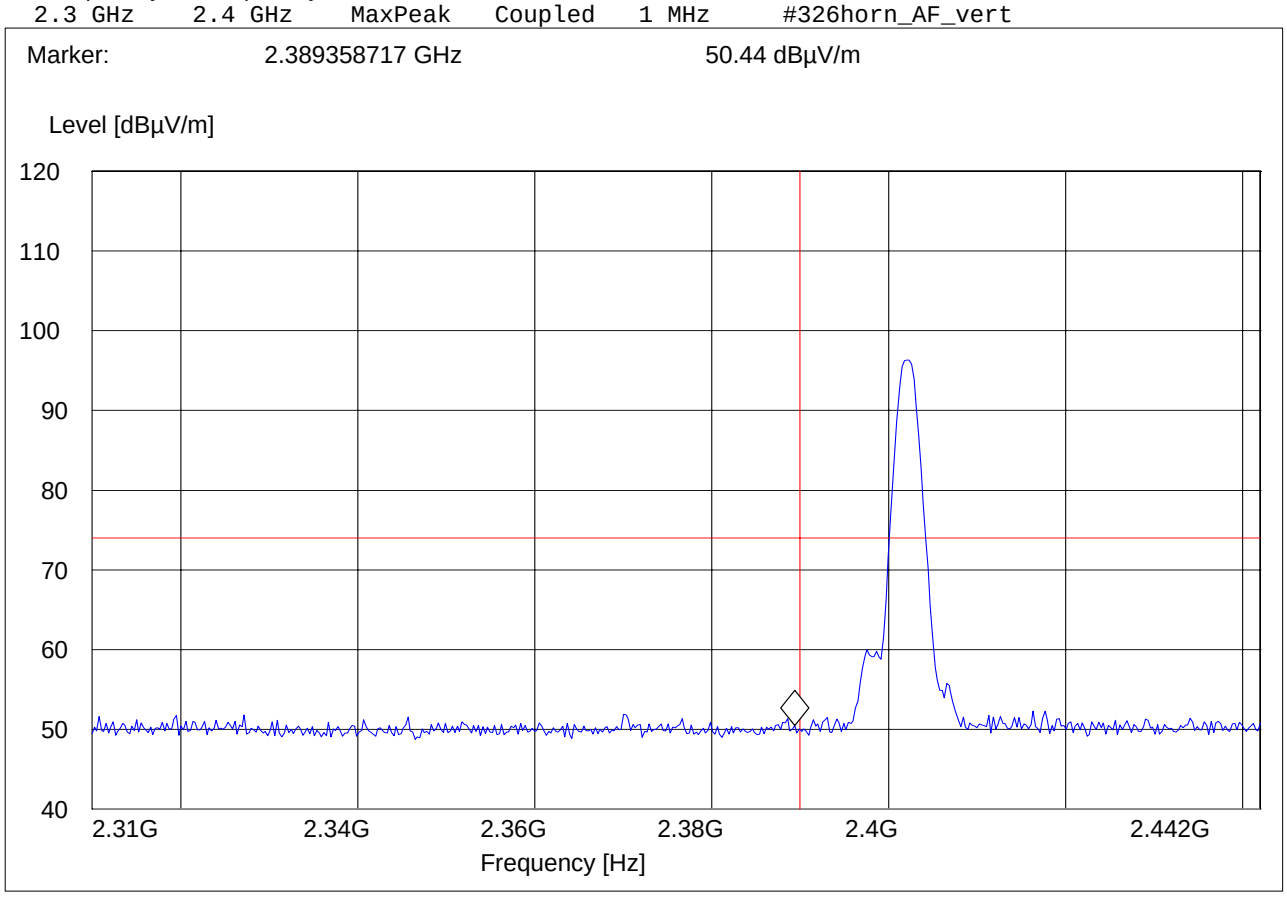
PEAK

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2402
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           BANDEDGE PEAK
```

SWEEP TABLE: "FCC15.247 LBE_PK"

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



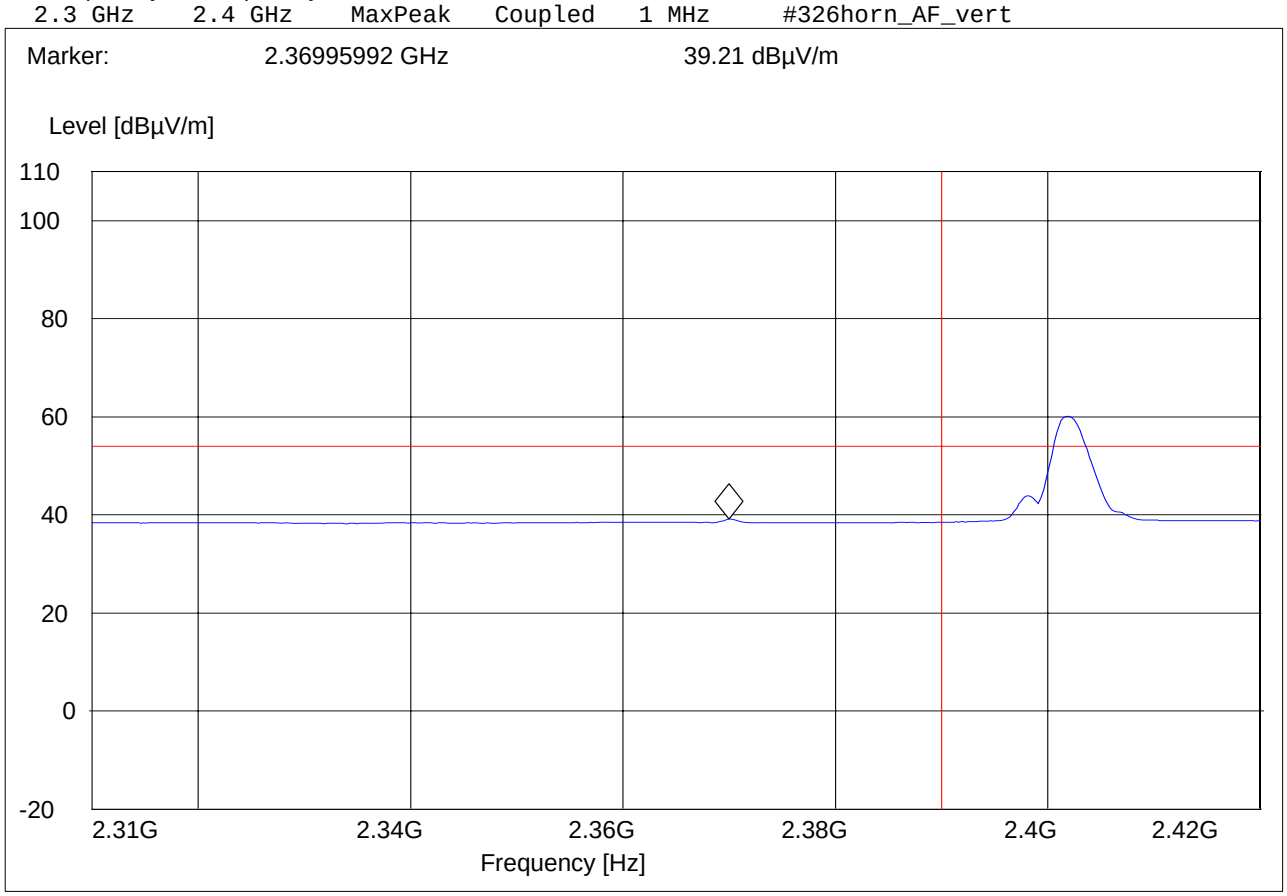
AVG

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2402
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           BANDEDGE AVG
```

SWEEP TABLE: "FCC15.247 LBE_AVG"

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



5.2.3 RESULTS (2480MHz)

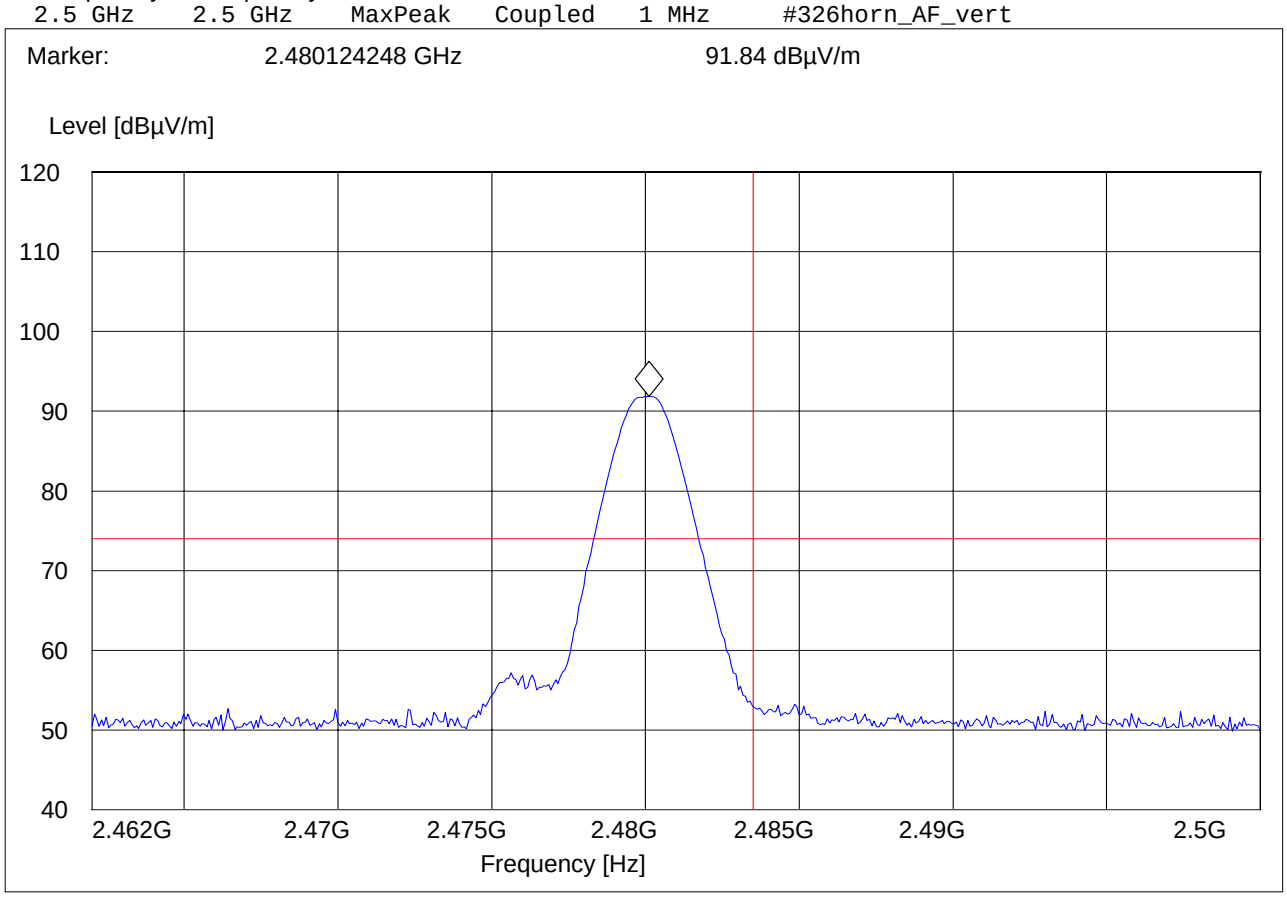
PEAK

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2480
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           BANDEDGE PEAK
```

SWEEP TABLE: "FCC15.247 HBE_PK"

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



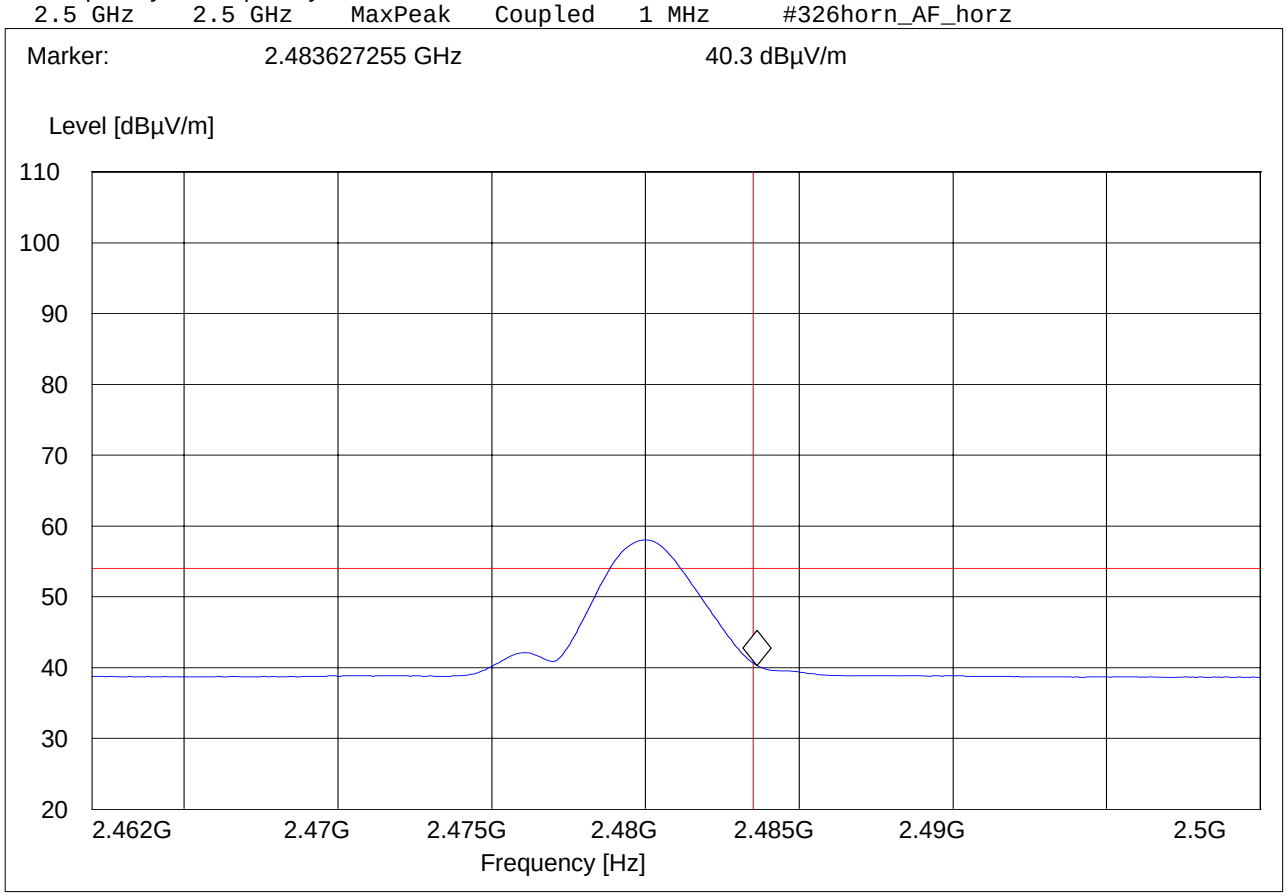
AVG

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2480
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           BANDEDGE AVERAGE
```

SWEEP TABLE: "FCC15.247 HBE_AVG"

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



5.3 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209

5.3.1 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
[1]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	([2])
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

5.3.2 RESULTS

30MHz – 1GHz

Antenna: vertical

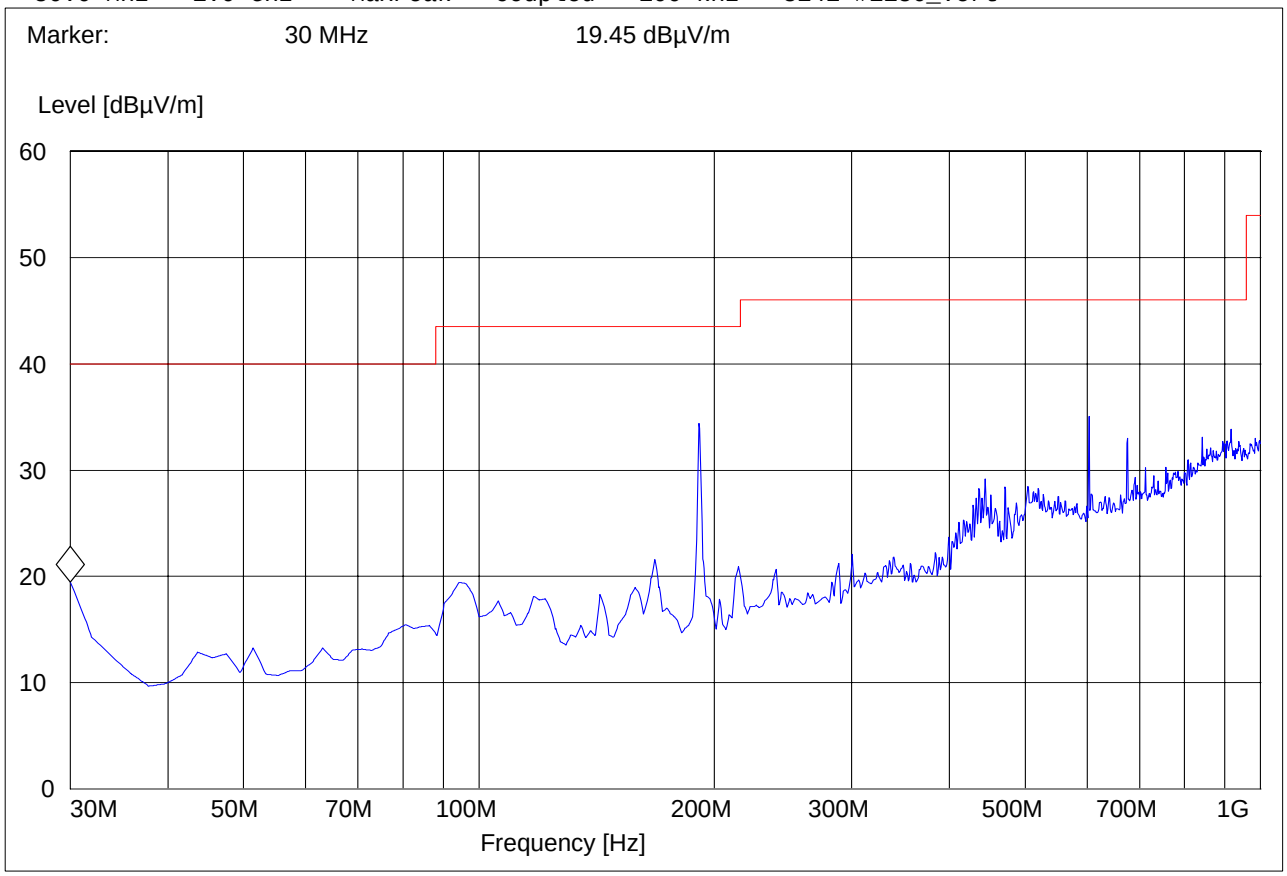
Note: This plot is valid for low, mid, high channels (worst-case plot)

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2402
Antenna:           V
EUT:               V normal
Test Engineer:     Neelesh
Comment:           30MHz-1GHz
```

SWEEP TABLE: "FCC15.247_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



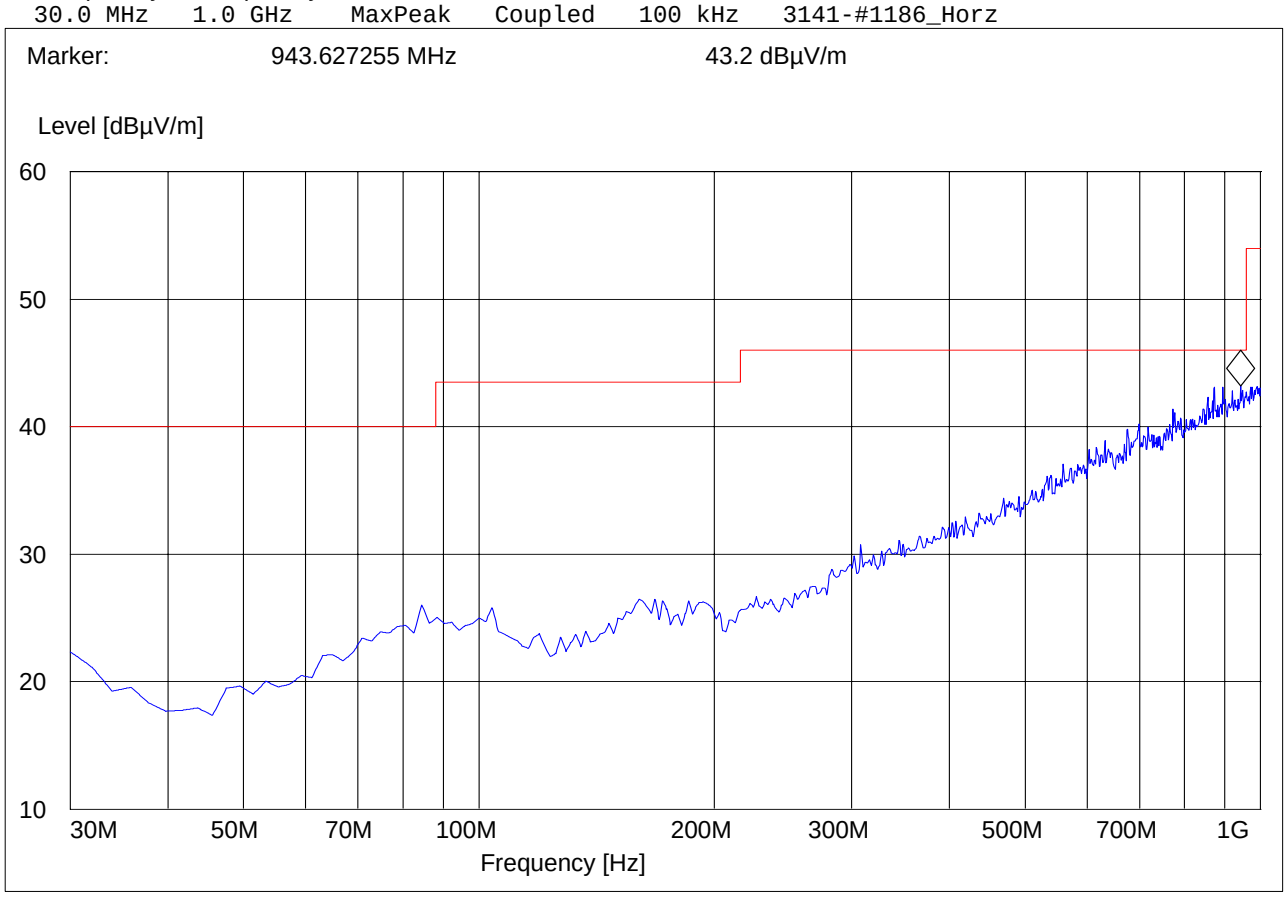
30MHz – 1GHz
Antenna: horizontal
Note: This plot is valid for low, mid, high channels (worst-case plot)

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2402
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           30MHz-1GHz
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

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



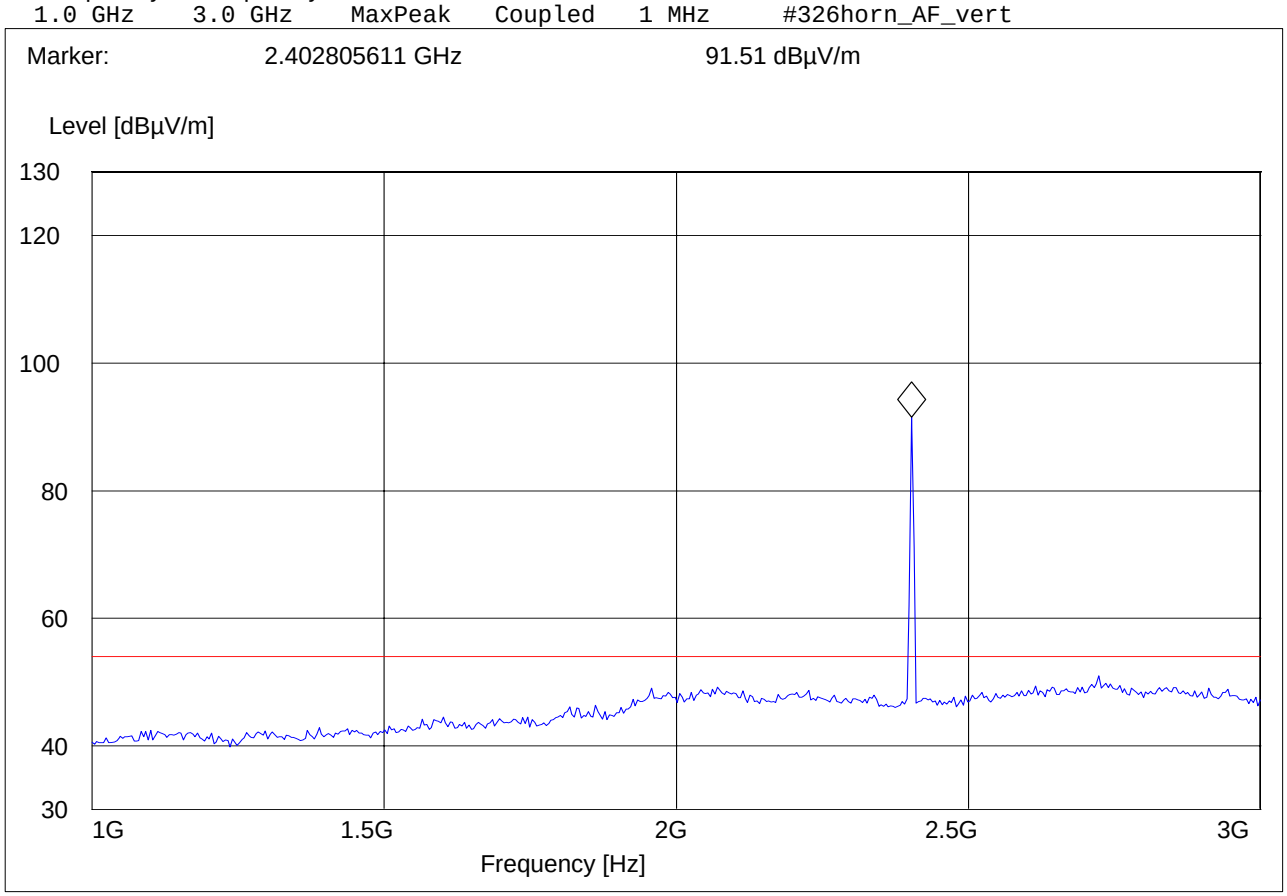
1-3GHz (2402MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2402
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           1GHz-3GHz
```

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

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



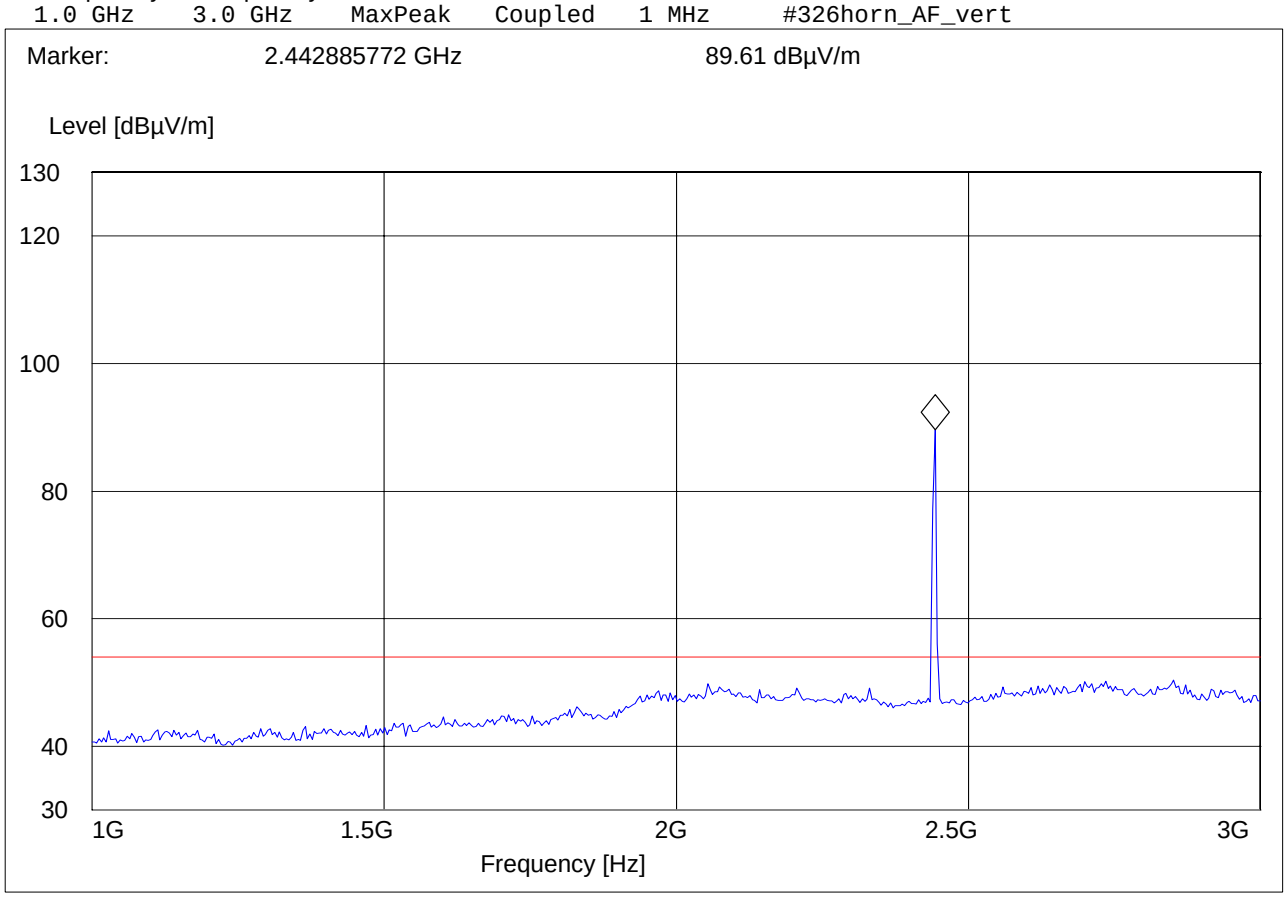
1-3GHz (2441MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2441
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           1GHz-3GHz
```

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

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



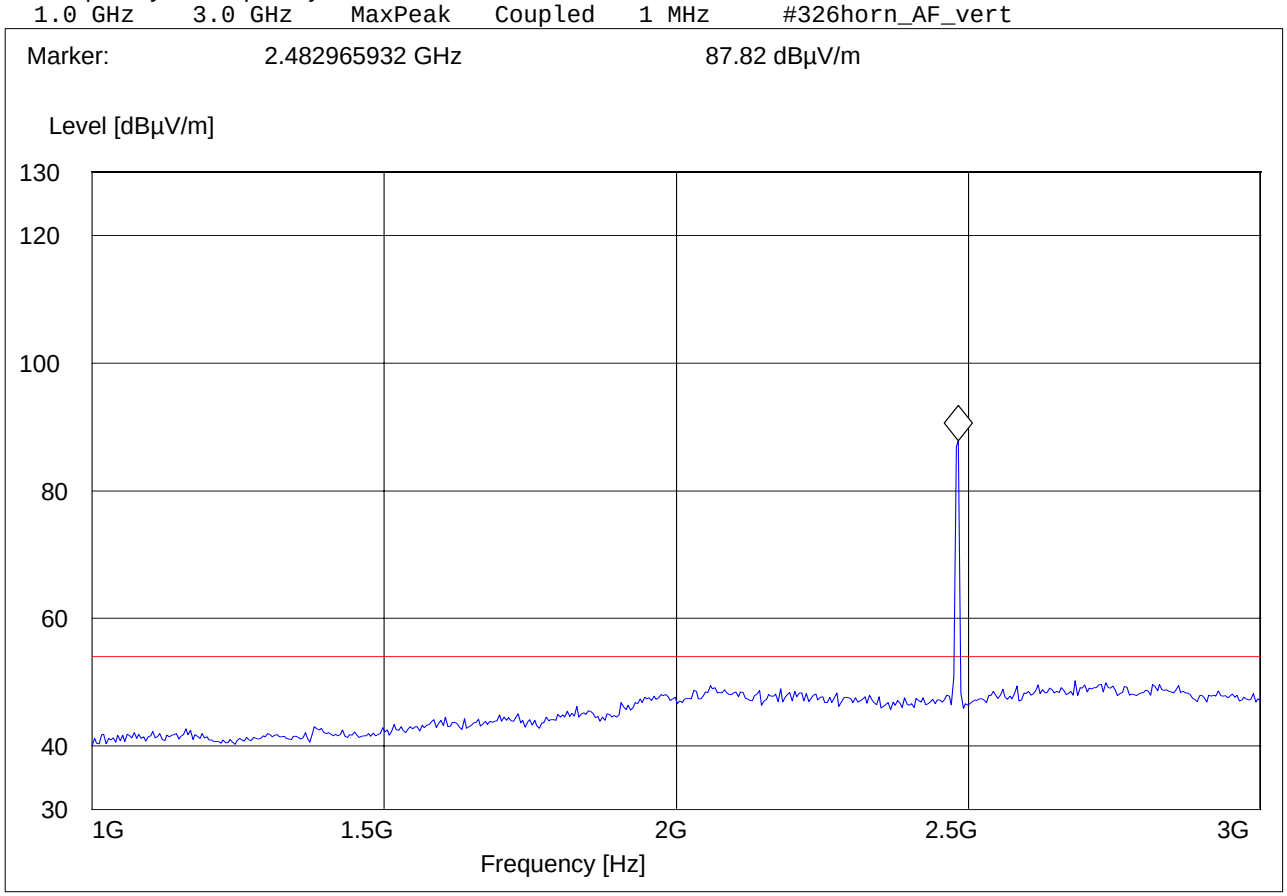
1-3GHz (2480MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2480
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           1GHz-3GHz
```

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

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



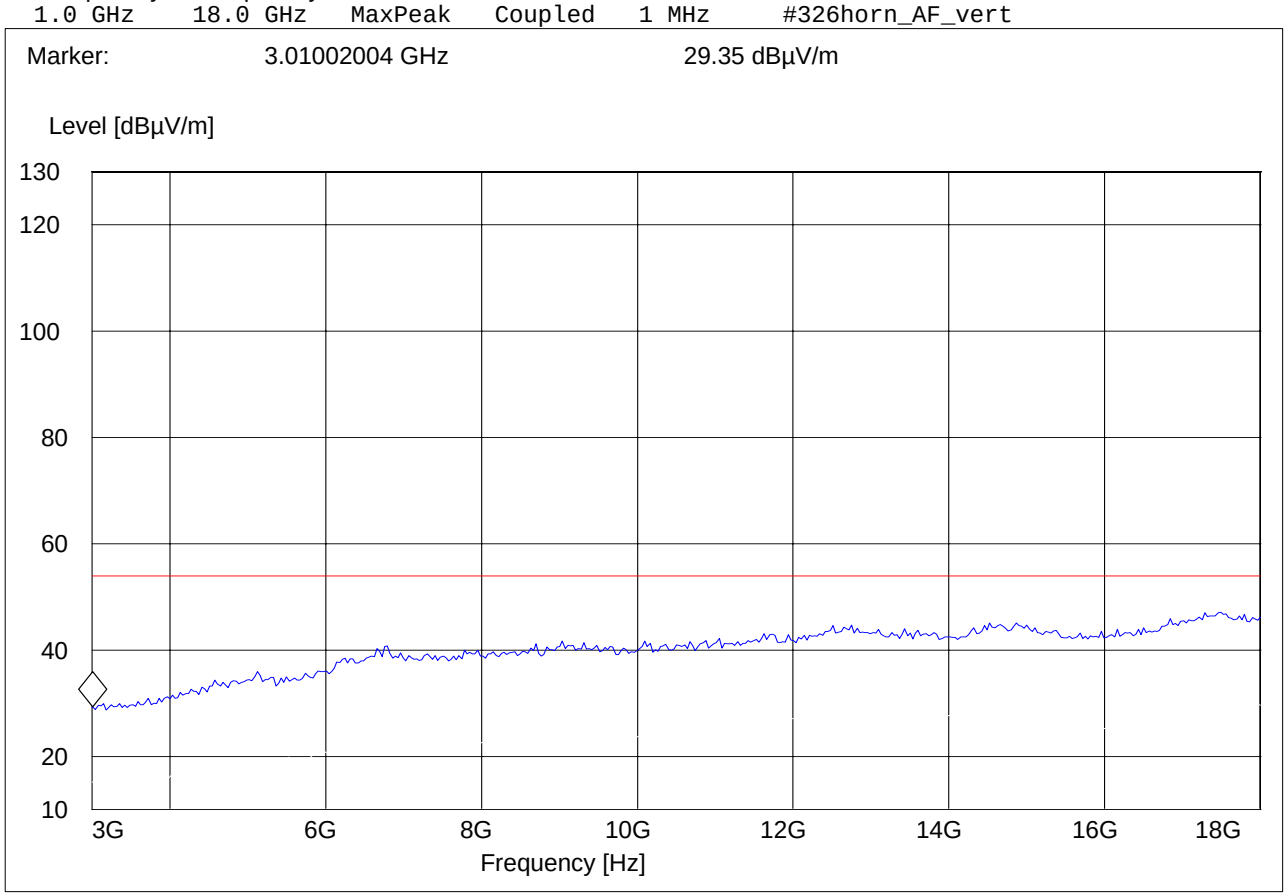
3-18GHz (2402MHz)
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2402MHz
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           3GHz-18GHz
```

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

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



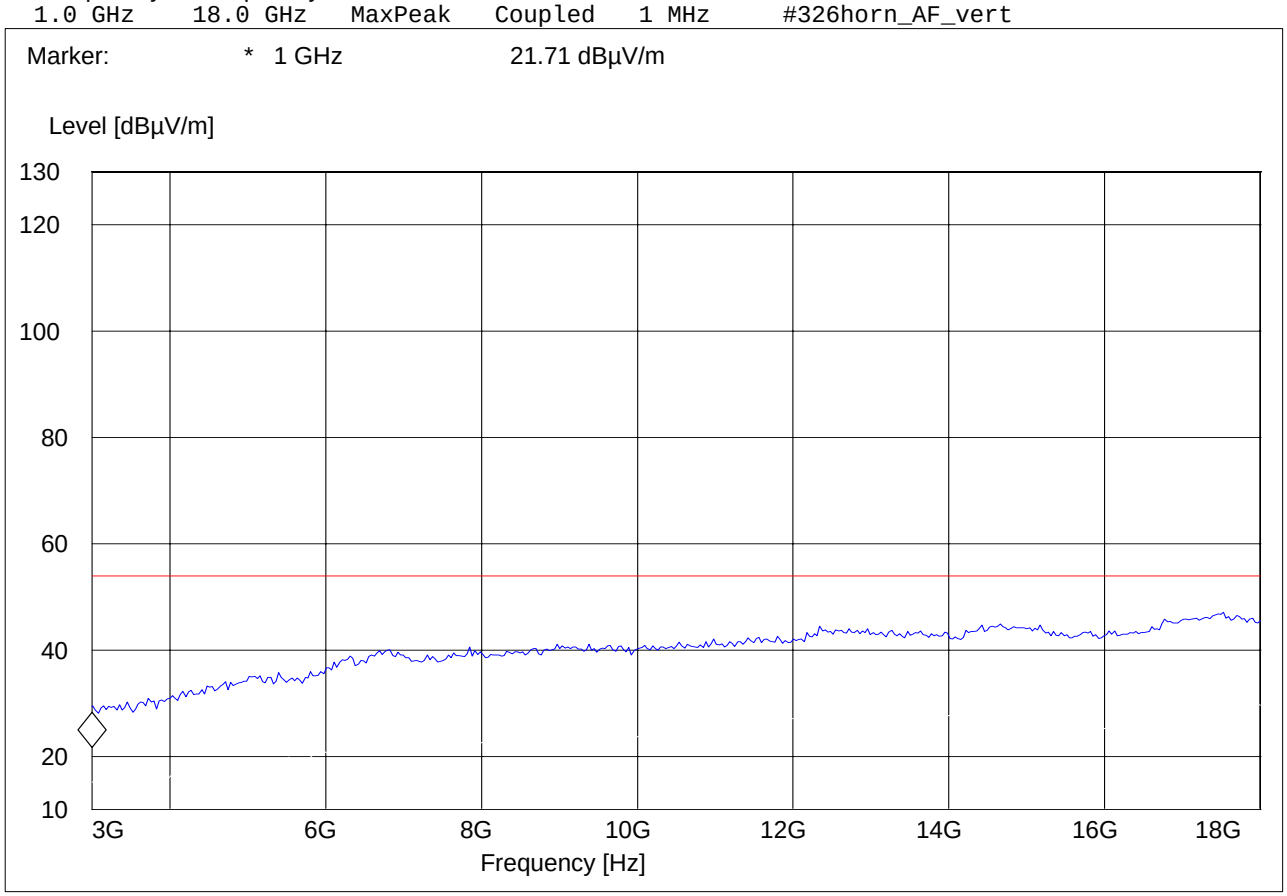
3-18GHz (2441MHz)
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2441MHz
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           3GHz-18GHz
```

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

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



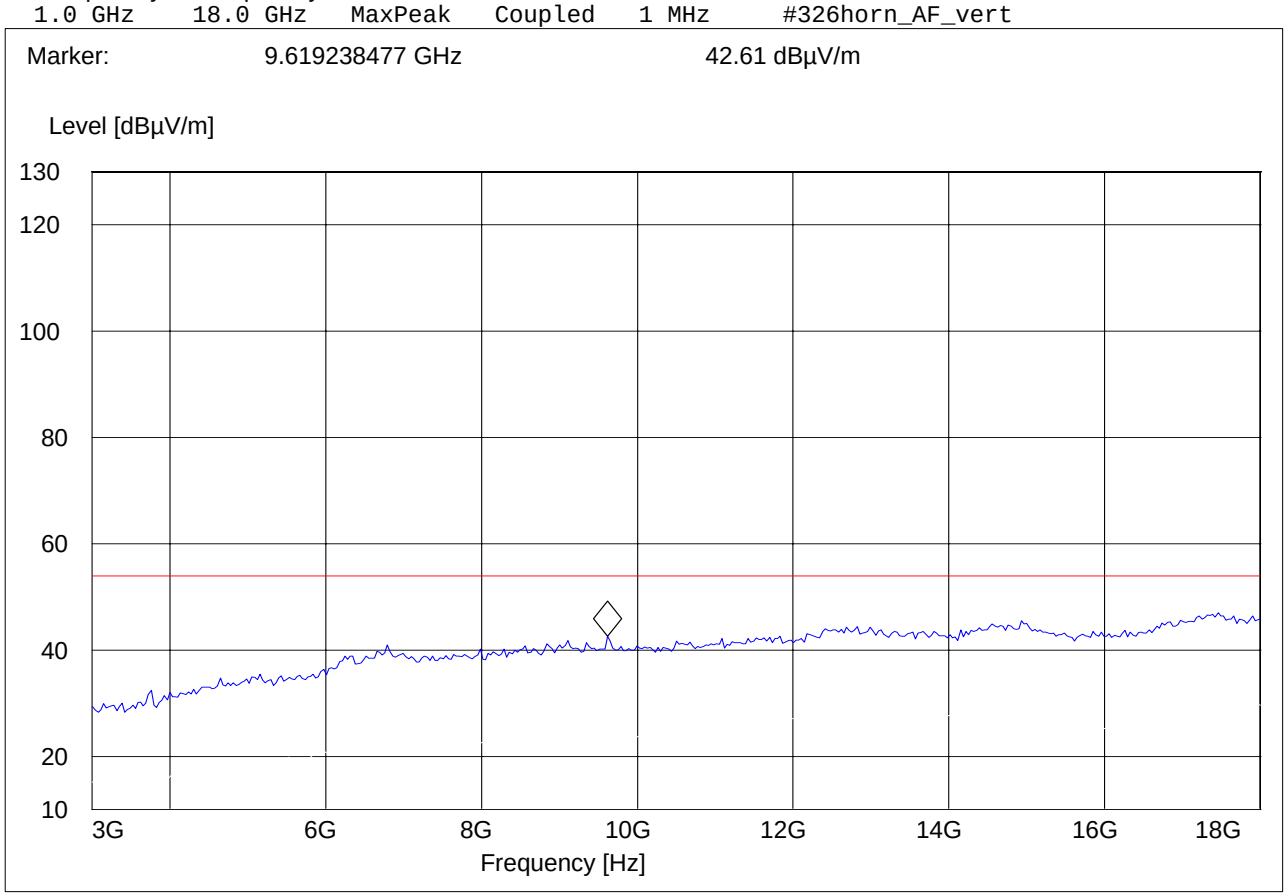
3-18GHz (2480MHz)
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2480MHz
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           3GHz-18GHz
```

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

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



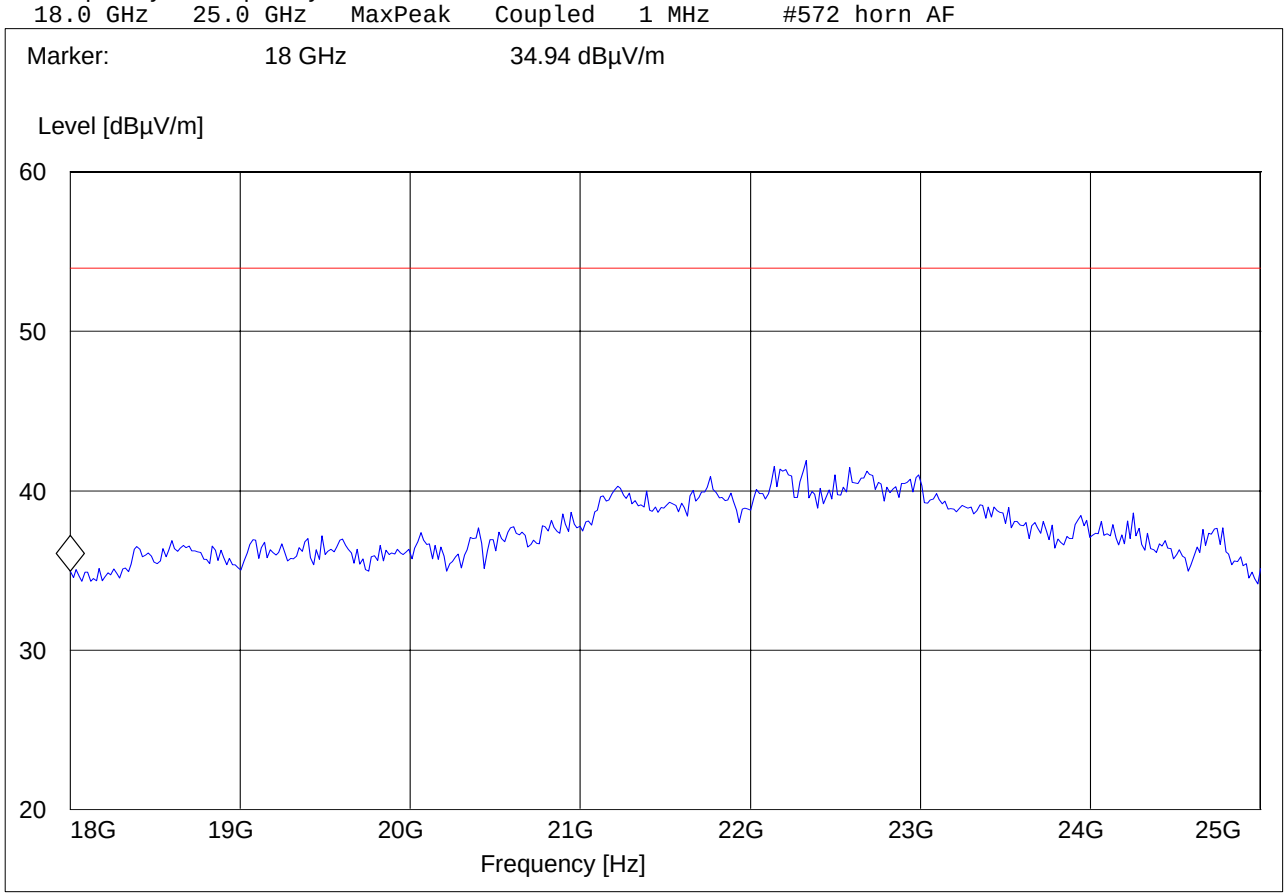
18-25GHz
Note: This plot is valid for low, mid, high channels (worst-case plot)
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    TX@2402MHz
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           18GHz-25GHz
```

SWEEP TABLE: "FCC15.247_18-26.5G"

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



5.4 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

5.4.1 LIMITS

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	2400/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.

5.4.2 RESULTS

30MHz – 1GHz
Antenna: horizontal

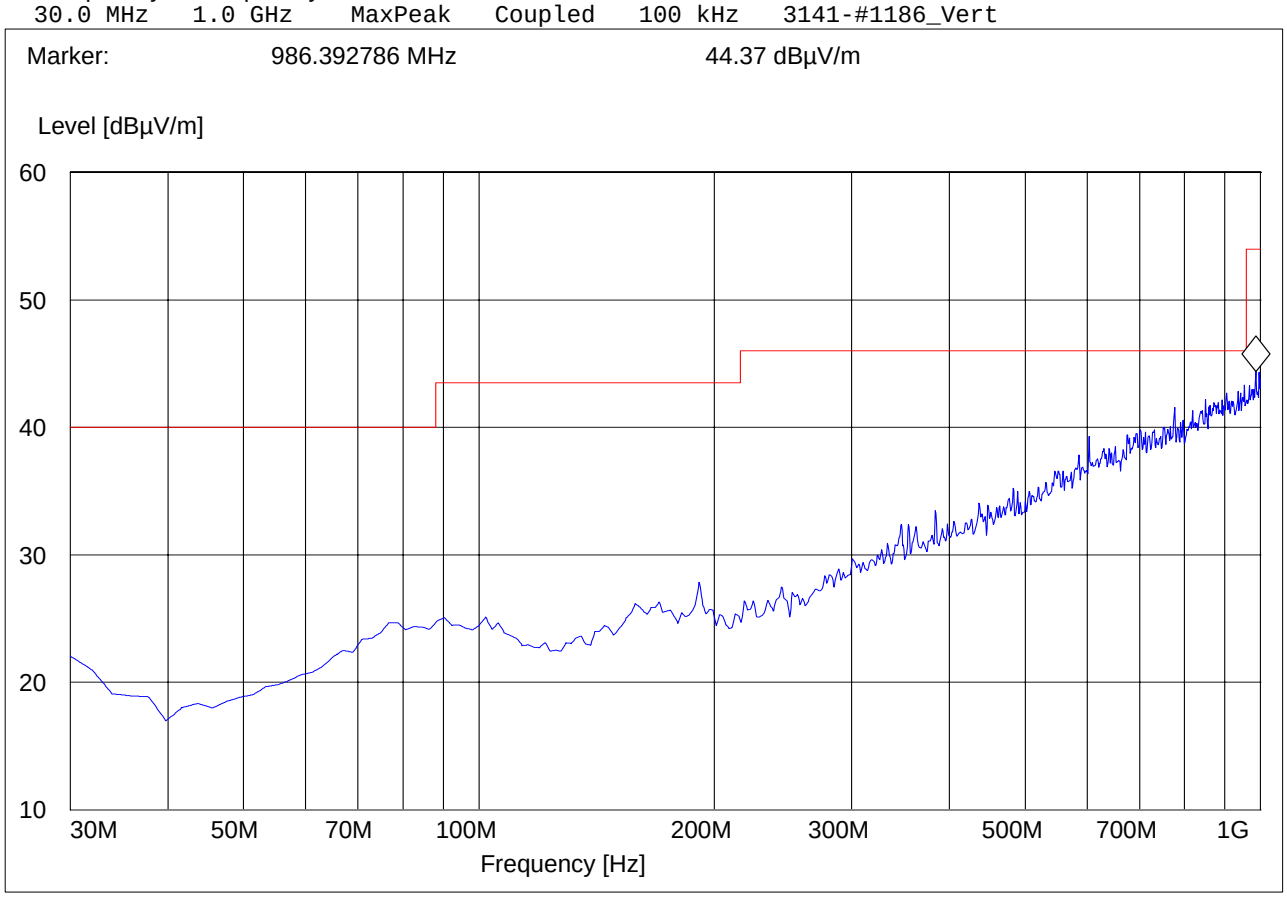
Note: This plot is valid for all polarizations and low, mid, high channels (worst-case plot)
Note: Peak Reading vs. Quasi-peak limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    RX@2402
Antenna:           H
EUT:               V normal
Test Engineer:     Neelesh
Comment:           30MHz-1GHz
```

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



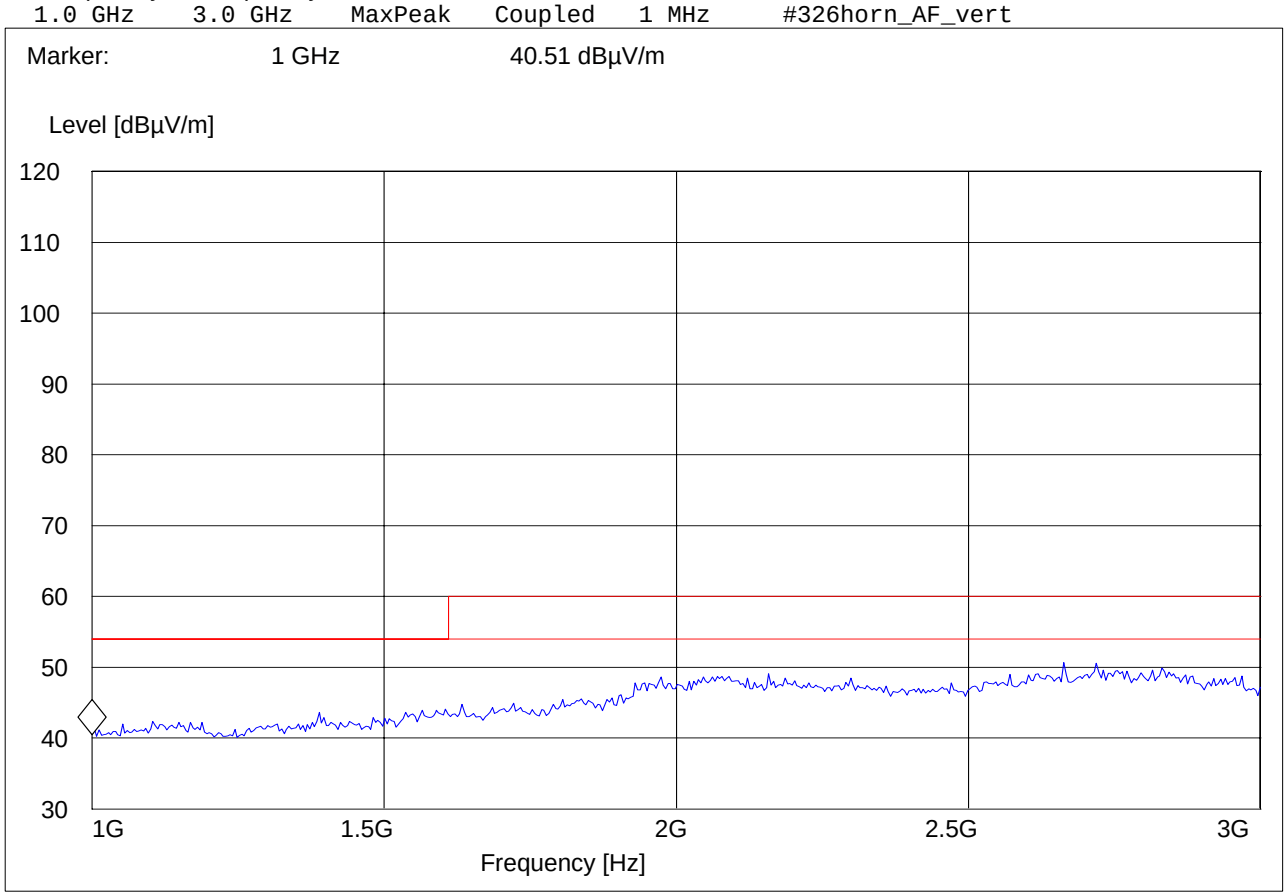
1-3GHz
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    RX mode
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           1GHz-3GHz   FCC15.209 Class B (Canada)
```

SWEEP TABLE: "CANADA RE_1-3G"

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



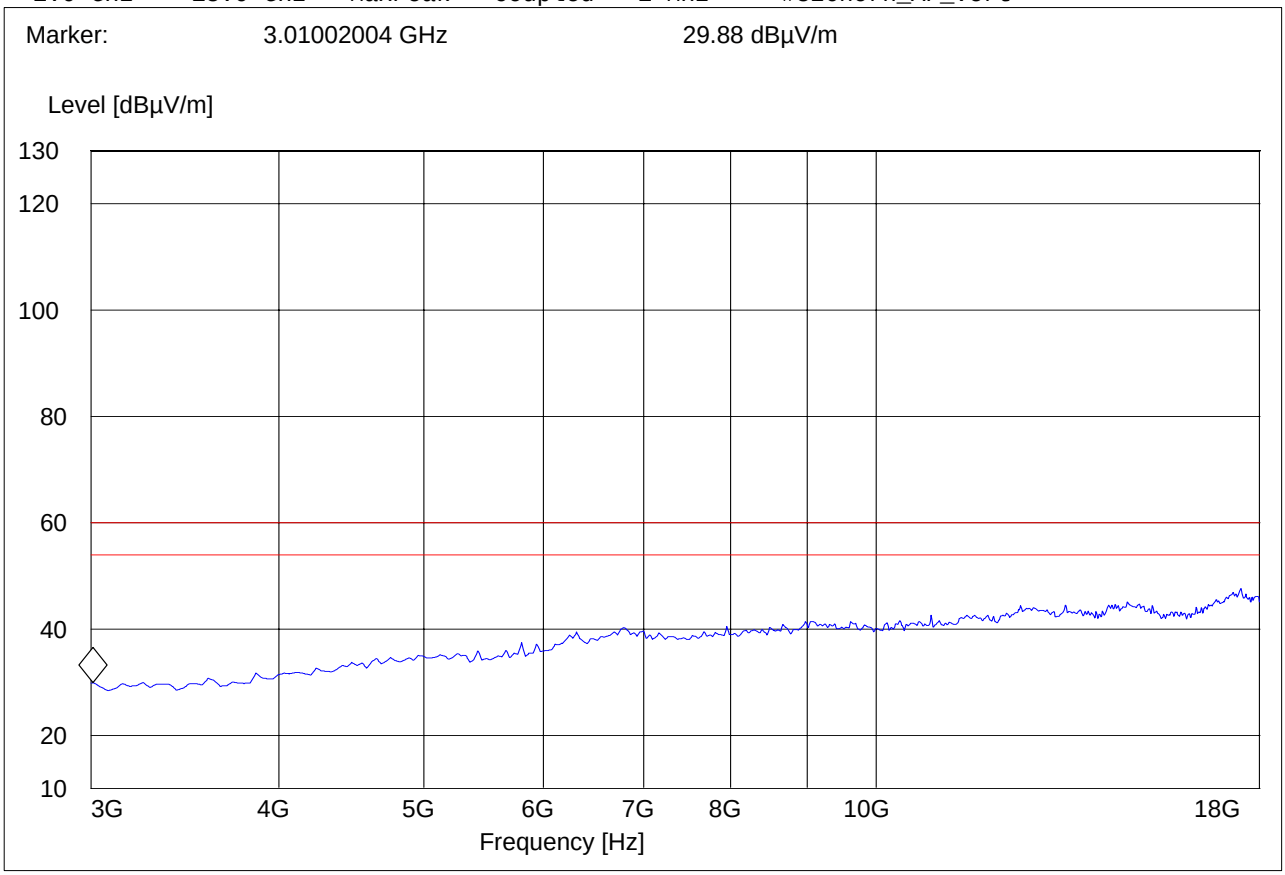
3-18GHz
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    RX mode
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           3GHz-18GHz   FCC15.209 Class B (Canada)
```

SWEEP TABLE: "CANADA RE_3-18G"

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



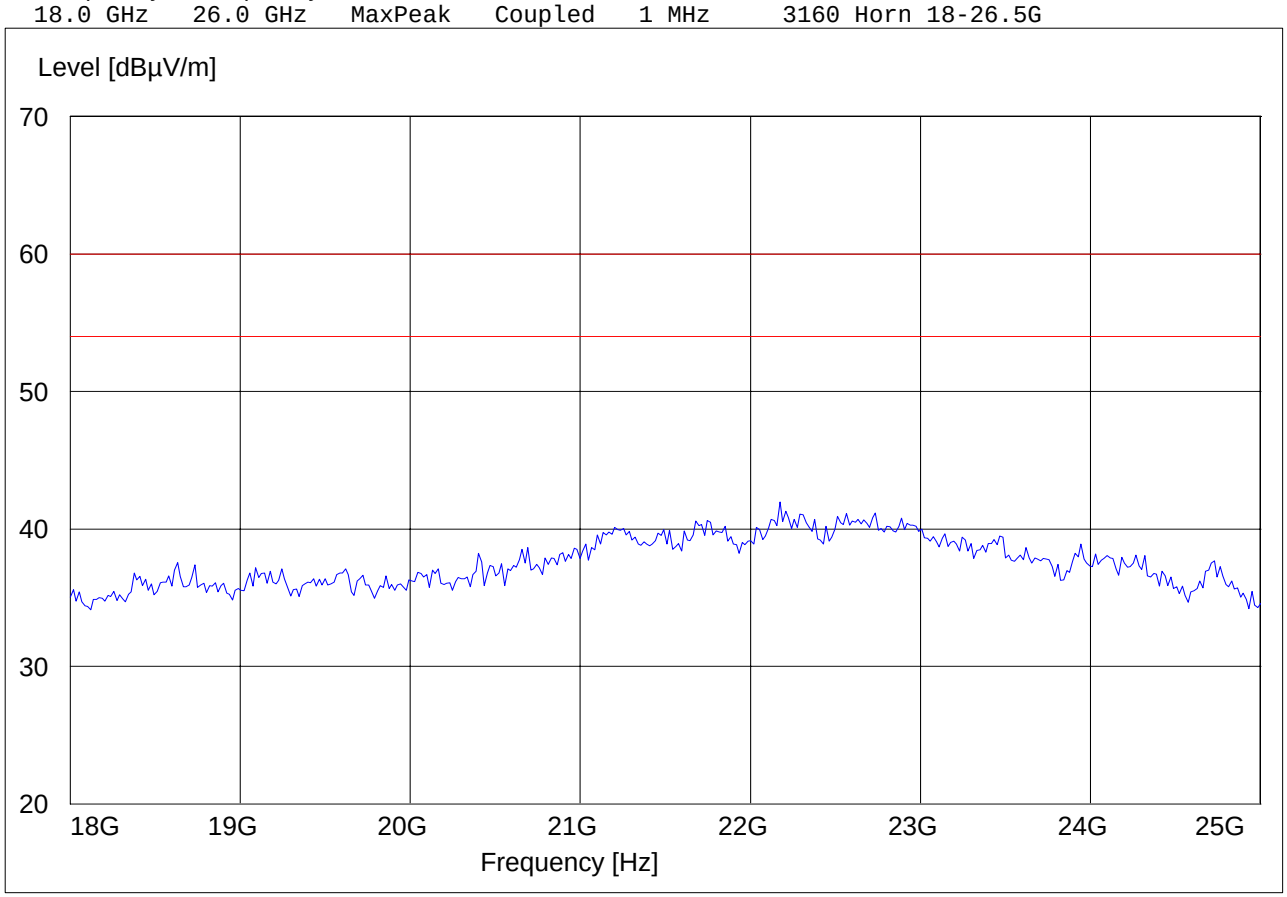
18-25GHz
Note: Peak Reading vs. Average limit

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

```
EUT / Description: QC900 BT scanner
Customer:          HHP
Operating Mode:    RX mode
Antenna:           H
EUT:               V normal
Test Engineer:     Mark
Comment:           18GHz-25GHz   FCC15.209 Class B (Canada)
```

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



6 Measurements (CONDUCTED)

6.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (CONDUCTED)

6.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	30dBm

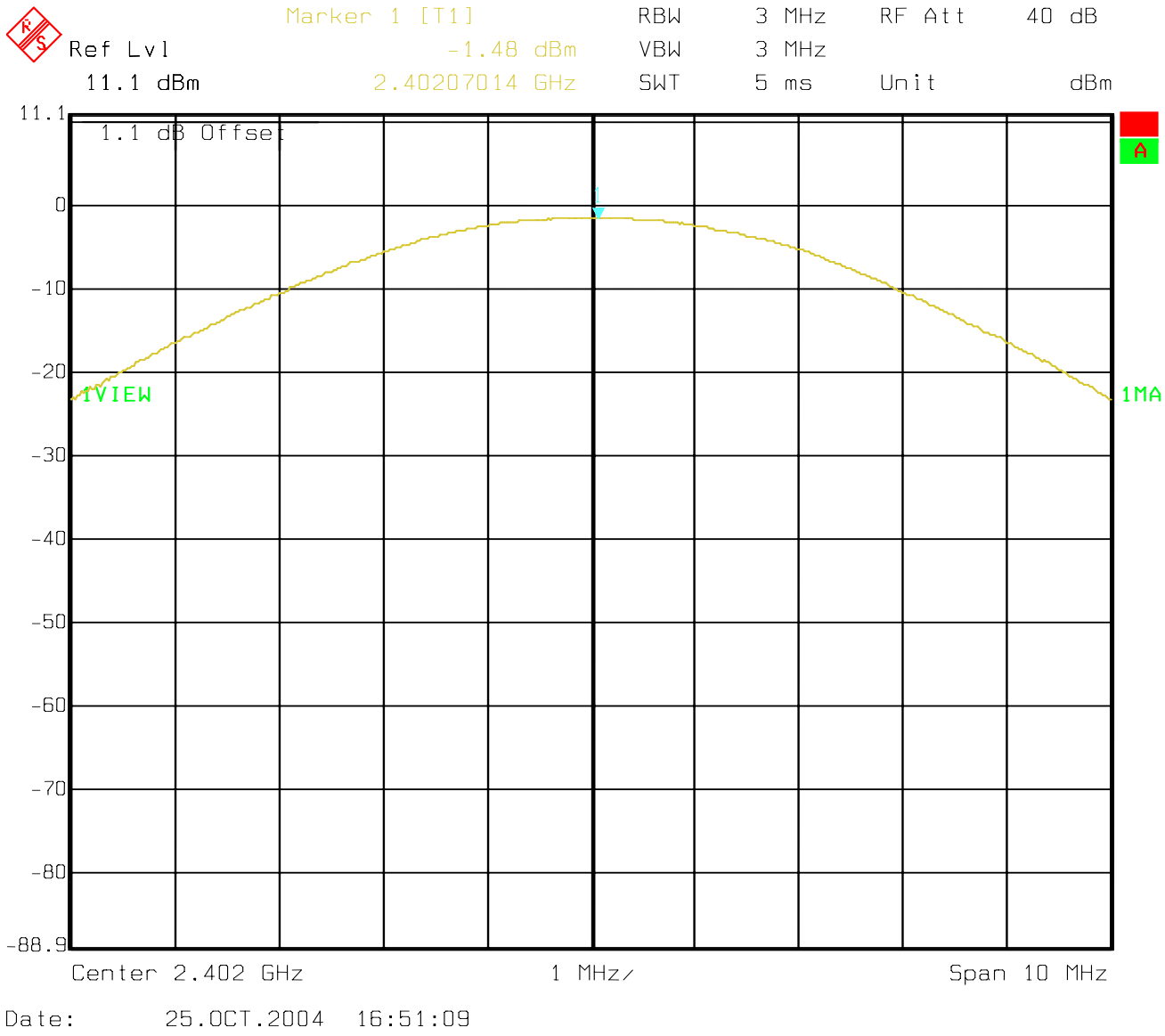
***limit is based upon antenna gain of less than or equal to 6dBi according § 15.247 (b) (4).**

6.1.2 RESULTS:

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402 MHz	2441 MHz	2480 MHz
T_{nom}(23)°C	V_{nom}VDC	-1.48	-1.30	-0.13

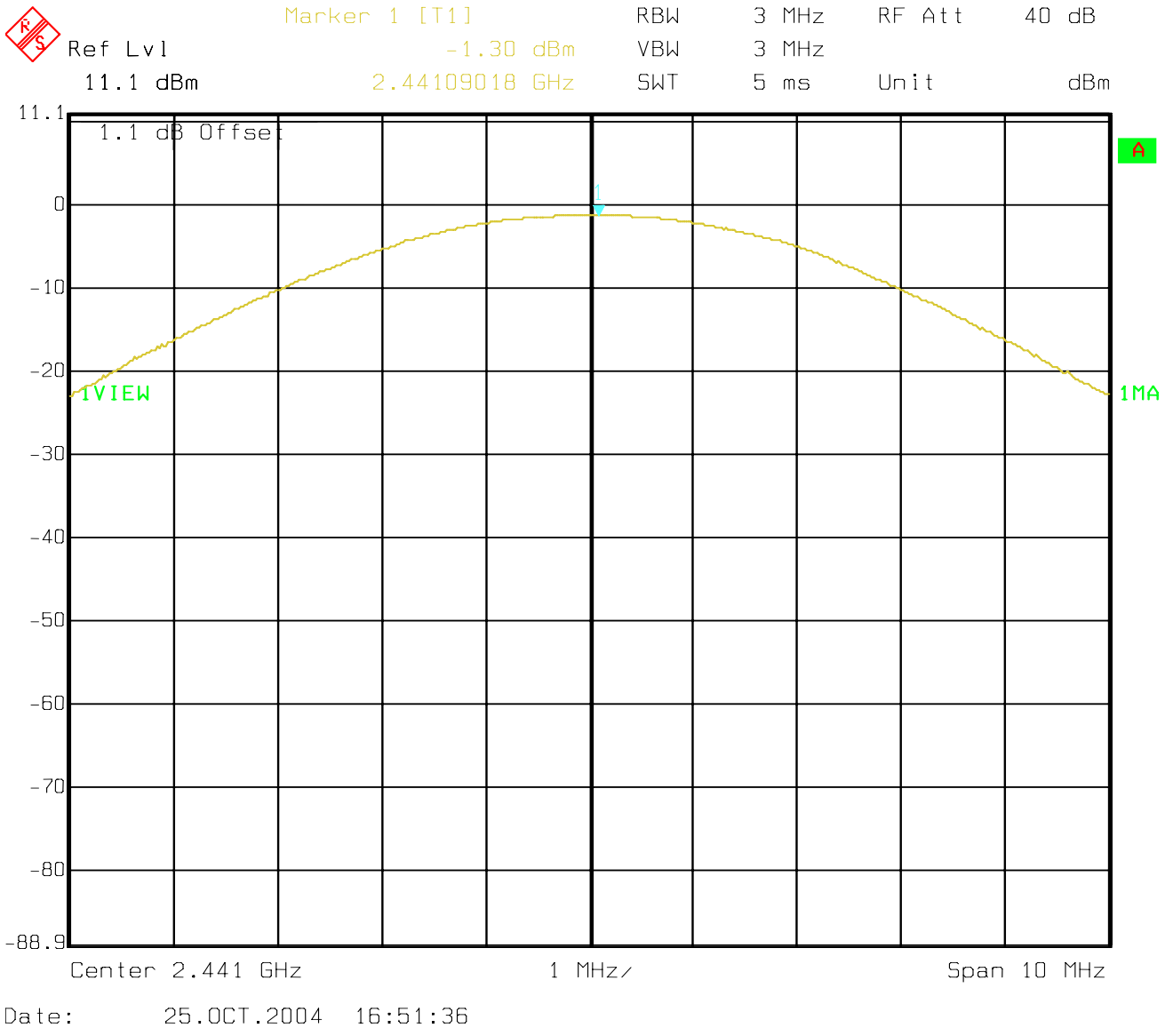
PEAK OUTPUT POWER (CONDUCTED) §15.247 (b)

(2402 MHz)



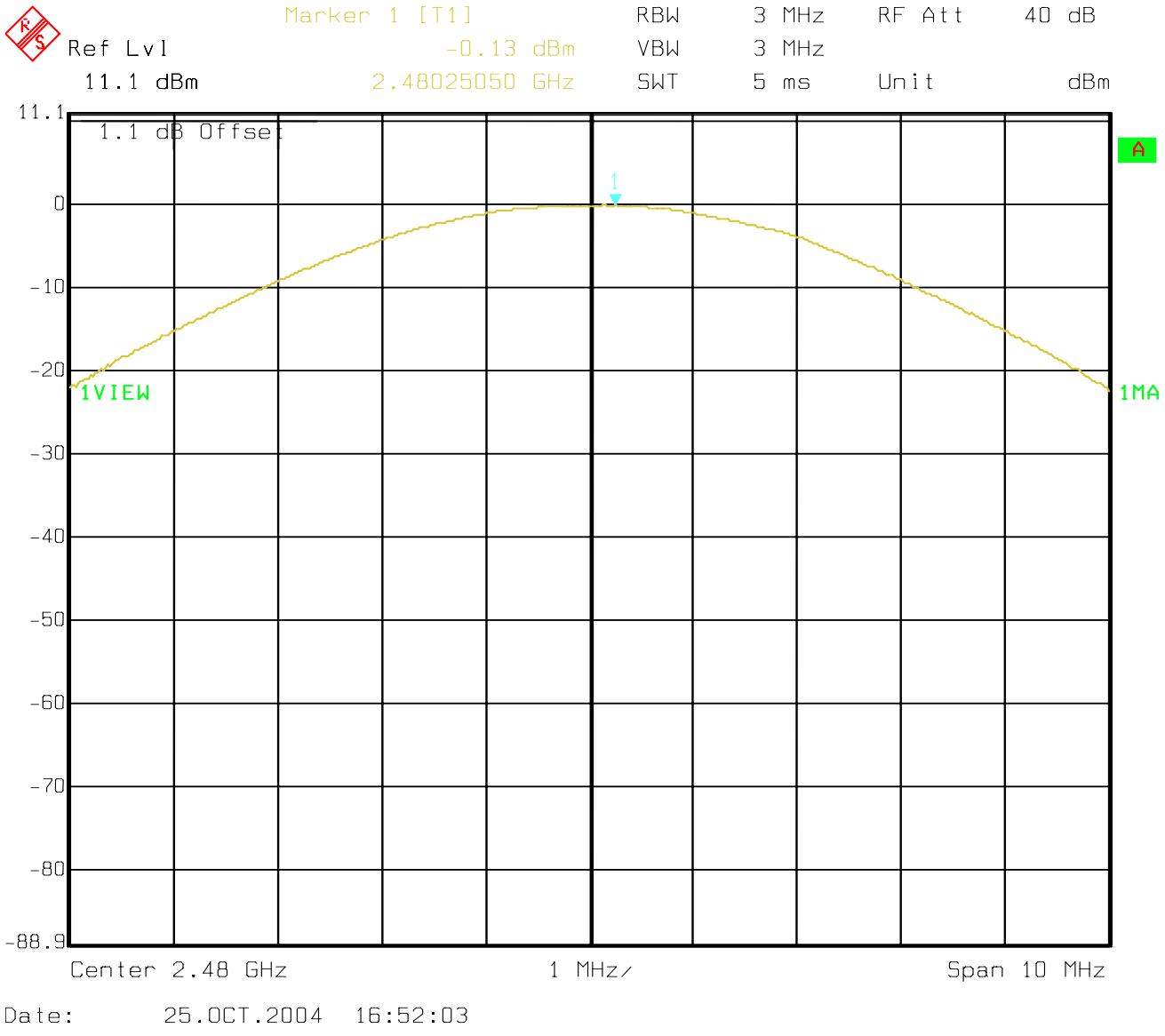
PEAK OUTPUT POWER (CONDUCTED) §15.247 (b)

(2441 MHz)



PEAK OUTPUT POWER (CONDUCTED) §15.247 (b)

(2480 MHz)



6.2 20dB BANDWIDTH

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

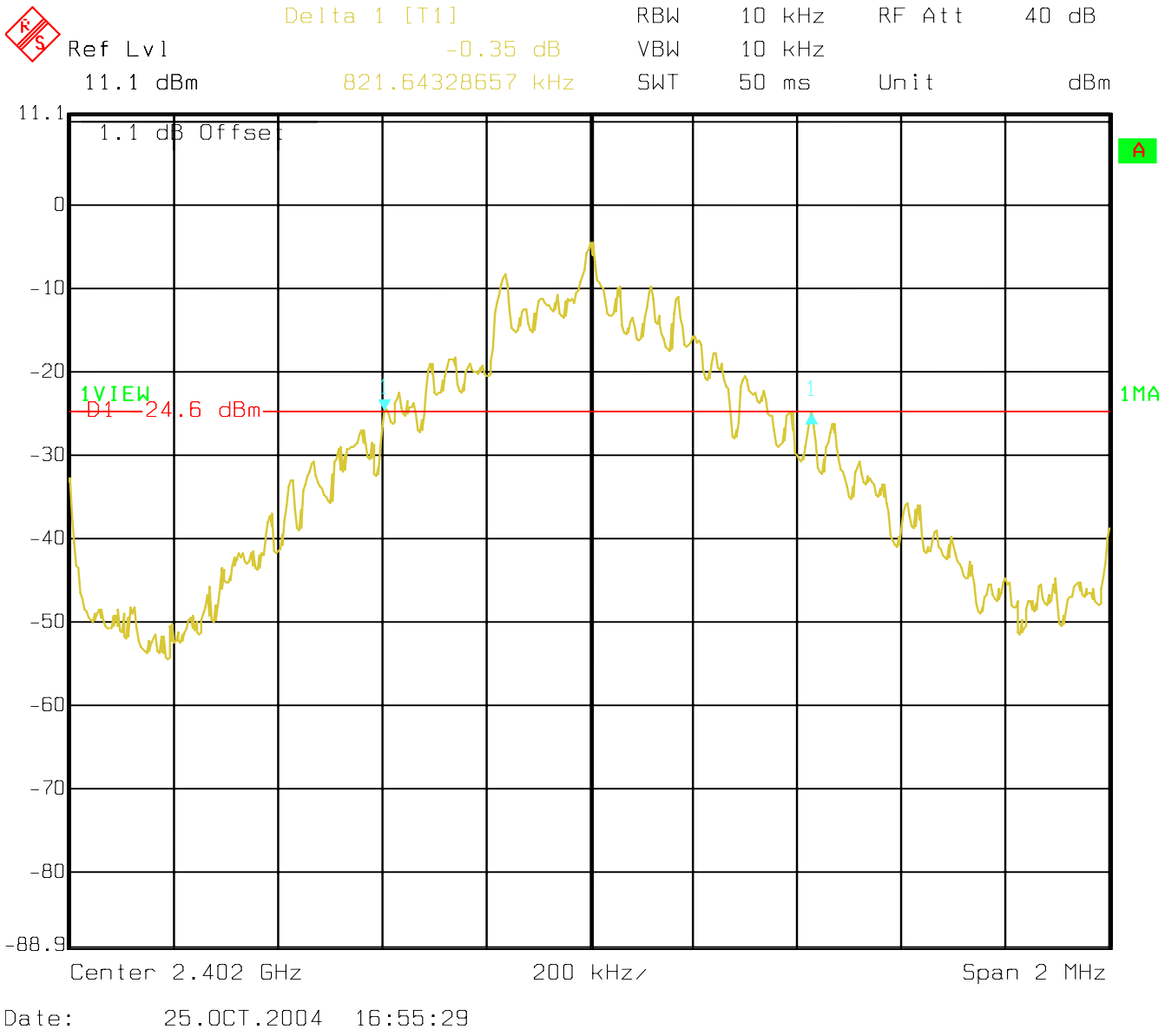
NUMBER OF CHANNELS	BANDWIDTH
79	<1MHz

6.2.2 RESULTS:

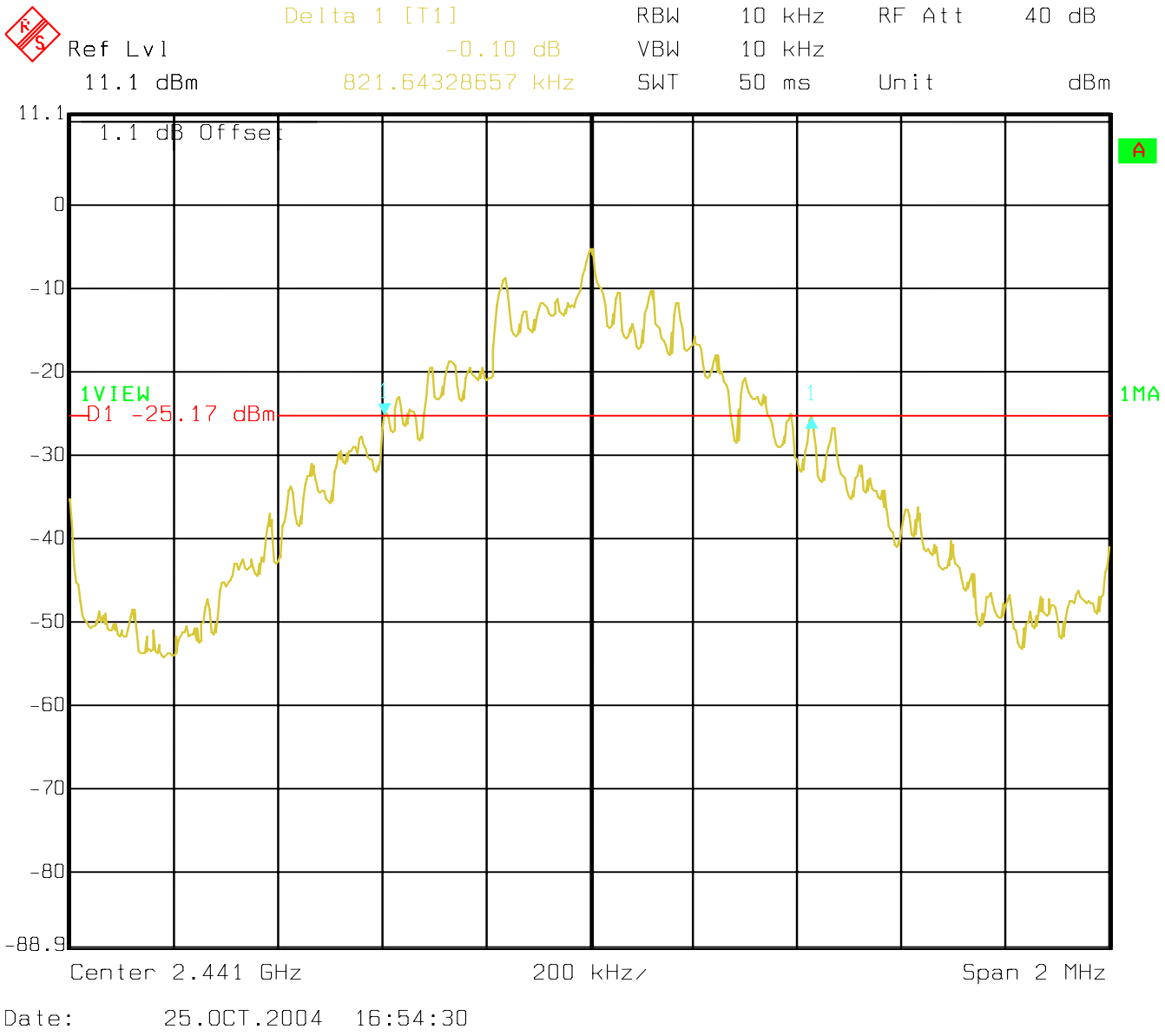
TEST CONDITIONS		BANDWIDTH (KHz)		
Frequency (MHz)		2402 MHz	2441 MHz	2480 MHz
T_{nom}(23)°C	V_{nom}VDC	821.64	821.64	821.64

RBW / VBW as provided in the "Measurement Guidelines'' (DA 00-705, March 30, 2000)

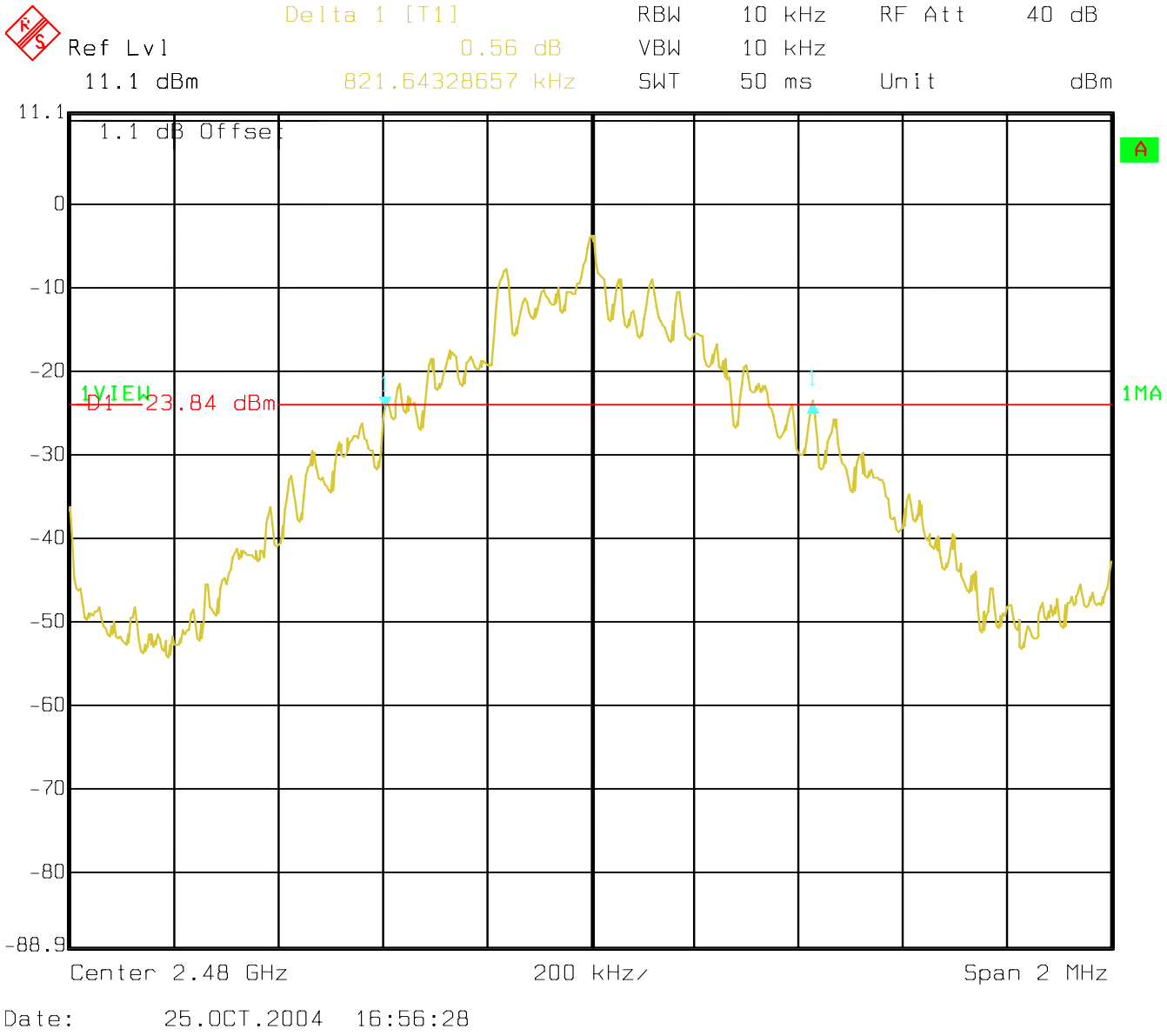
SPECTRUM BANDWIDTH OF FHSS SYSTEM §15.247(a) (2402 MHz)



SPECTRUM BANDWIDTH OF FHSS SYSTEM §15.247(a) (2441 MHz)



SPECTRUM BANDWIDTH OF FHSS SYSTEM §15.247(a) (2480 MHz)



CARRIER FREQUENCY SEPARATION

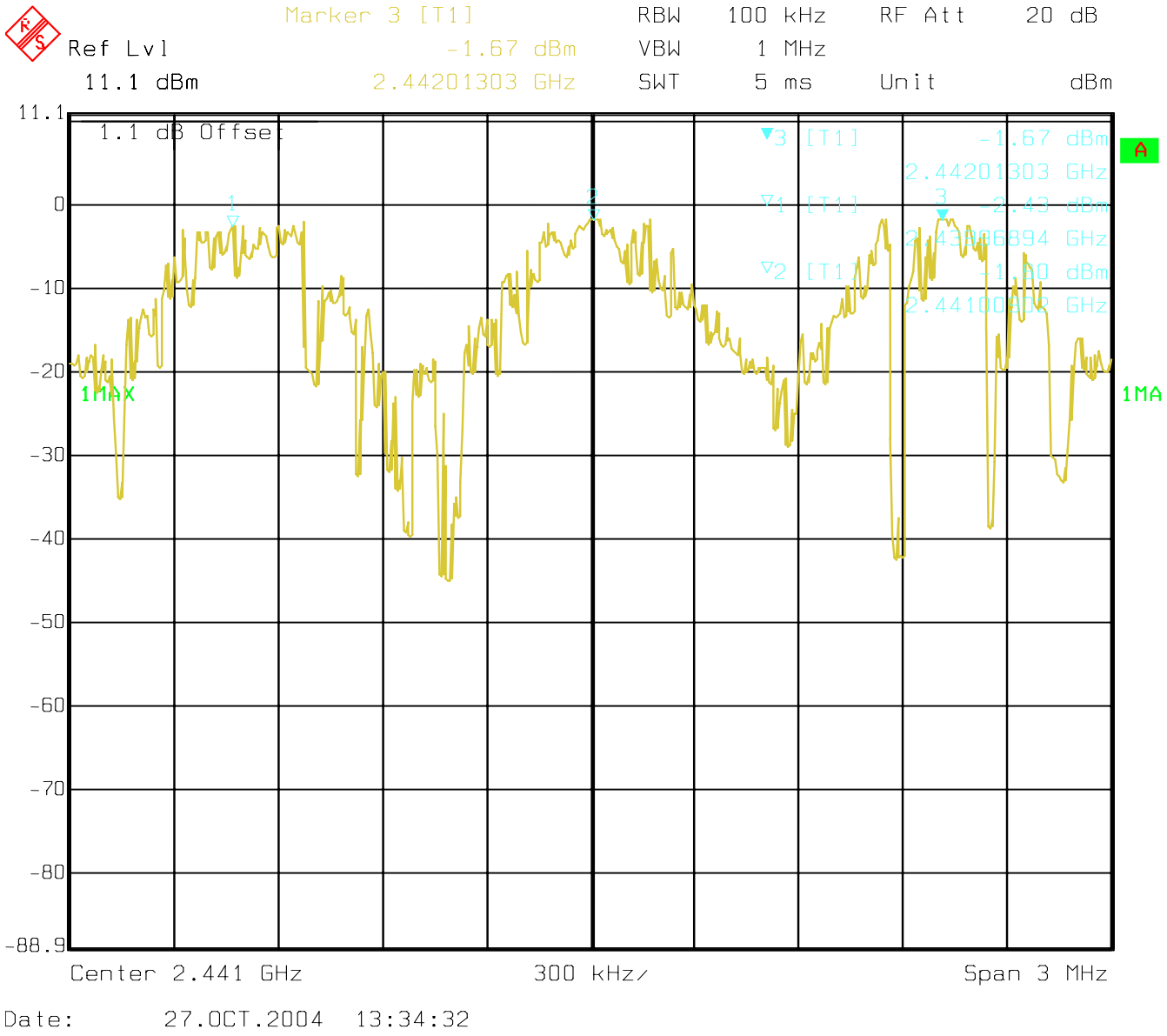
6.2.3 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

SEPARATION
> 25 KHz or > 20 dB BANDWIDTH

6.2.4 RESULTS:

TEST CONDITIONS		SEPARATION (MHz)
T_{nom}(23)°C	V_{nom}VDC	1.01

(plot)


Marker 3 [T1]
Ref Lvl
11.1 dBm
-1.67 dBm
2.44201303 GHz
RBW 100 kHz
VBW 1 MHz
SWT 5 ms
RF Att 20 dB
Unit dBm
1.1 dB Offset
▼3 [T1] -1.67 dBm
2.44201303 GHz
▽1 [T1] -2.43 dBm
▽2 [T1] -1.00 dBm
1MAX
1MA
A
11.1
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.9
Center 2.441 GHz
300 kHz/
Span 3 MHz
Date: 27.OCT.2004 13:34:32

6.3 NUMBER OF HOPPING CHANNELS

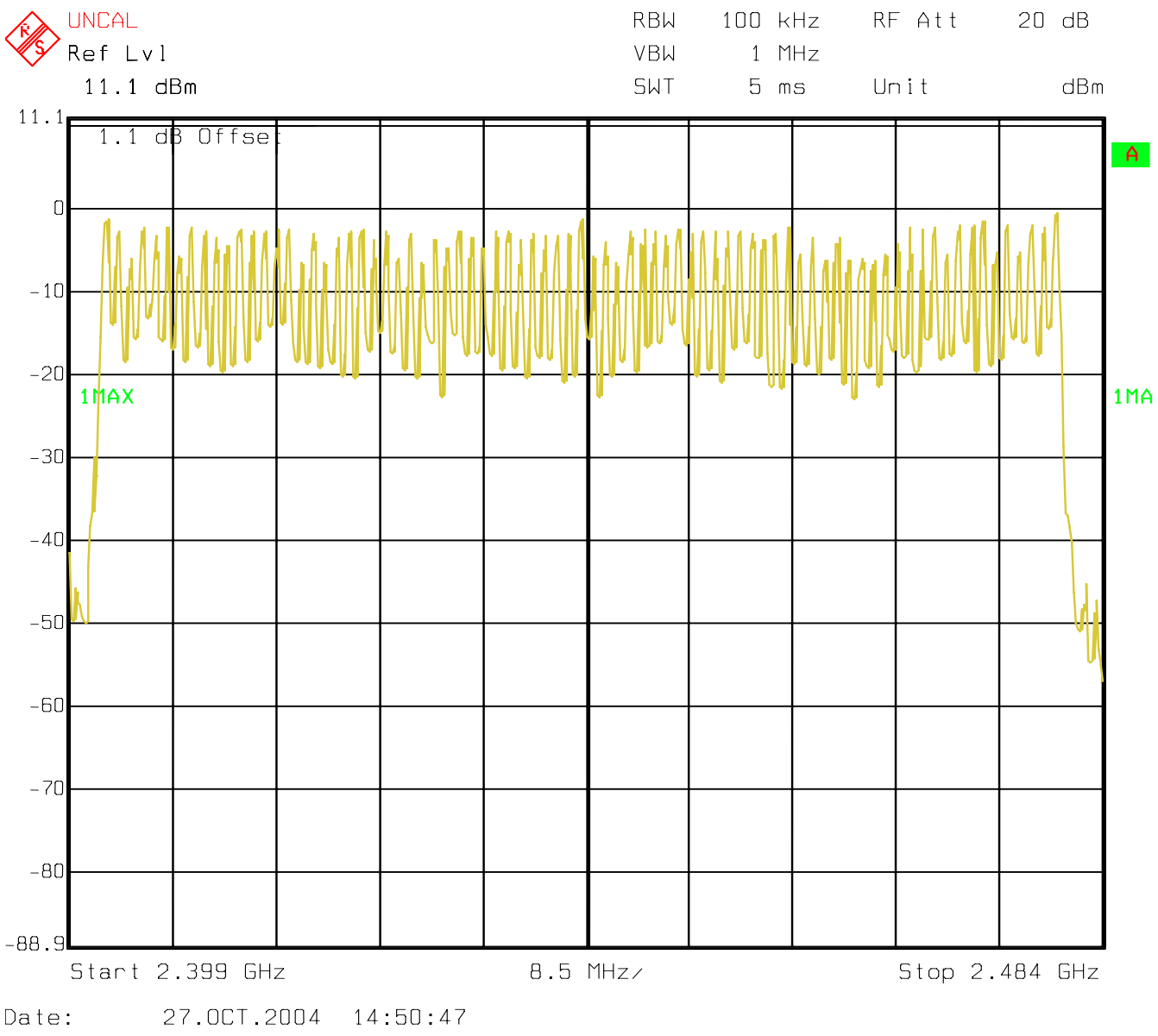
6.3.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (iii)

NUMBER OF CHANNELS
> 15

6.3.2 RESULTS:

TEST CONDITIONS		NUMBER OF CHANNELS
T_{nom}(23)°C	V_{nom}VDC	79

(PLOT 1)


UNCAL
Ref Lvl
11.1 dBm
RBW 100 kHz
VBW 1 MHz
SWT 5 ms
RF Att 20 dB
Unit dBm
11.1
1.1 dB Offset
0
-10
-20
-30
-40
-50
-60
-70
-80
-88.9
1MAX
A
1MA
Start 2.399 GHz
8.5 MHz/
Stop 2.484 GHz
Date: 27.OCT.2004 14:50:47

6.4 TIME OF OCCUPANCY (DWELL TIME)

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

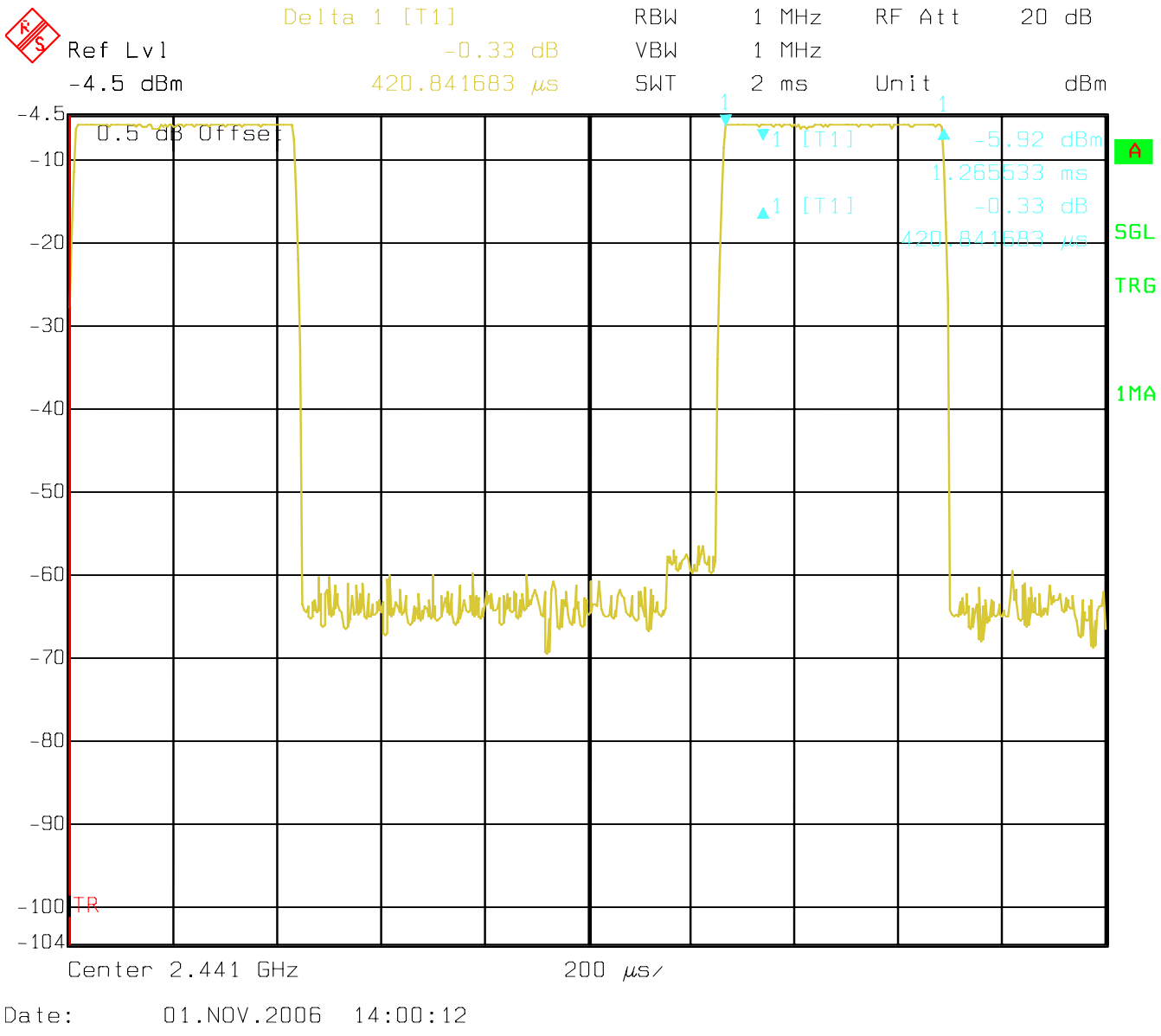
FREQUENCY RANGE	AVERAGE TIME OF OCCUPANCY PER 31.6 SECONDS (LIMIT)
2400-2483.5	0.4 SECONDS

6.4.2 RESULTS:

TEST CONDITIONS		TIME OF OCCUPANCY IN 31.6 SECONDS (ms)		
PACKET TYPE		DH1	DH3	DH5
T_{nom}(23)°C	V_{nom}VDC	134.710	269.999	310.655

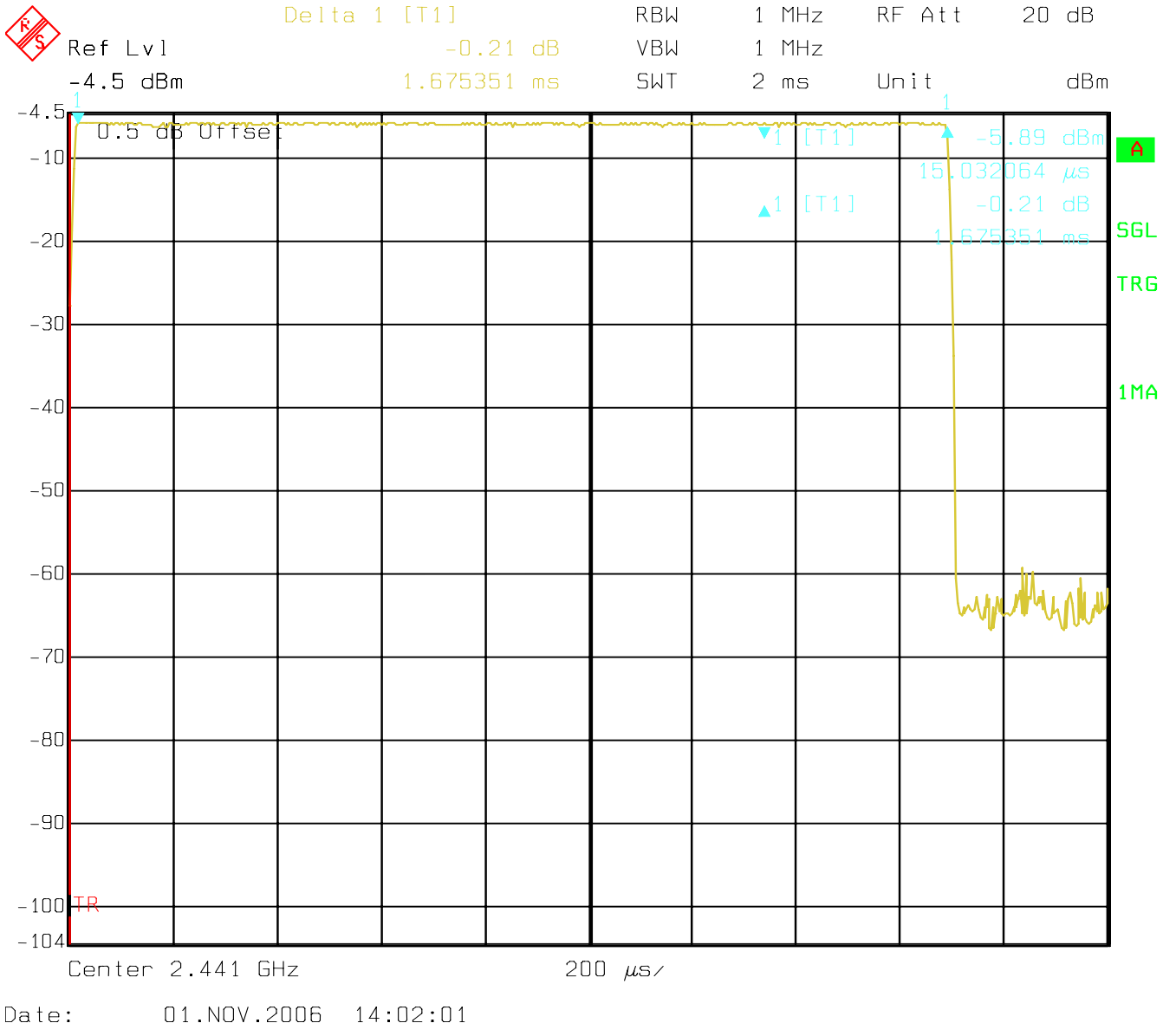
(DH1)

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 420.84µs.
<u>So we have 320.108 * 420.84µs = 134.710ms per 31.6 seconds.</u>

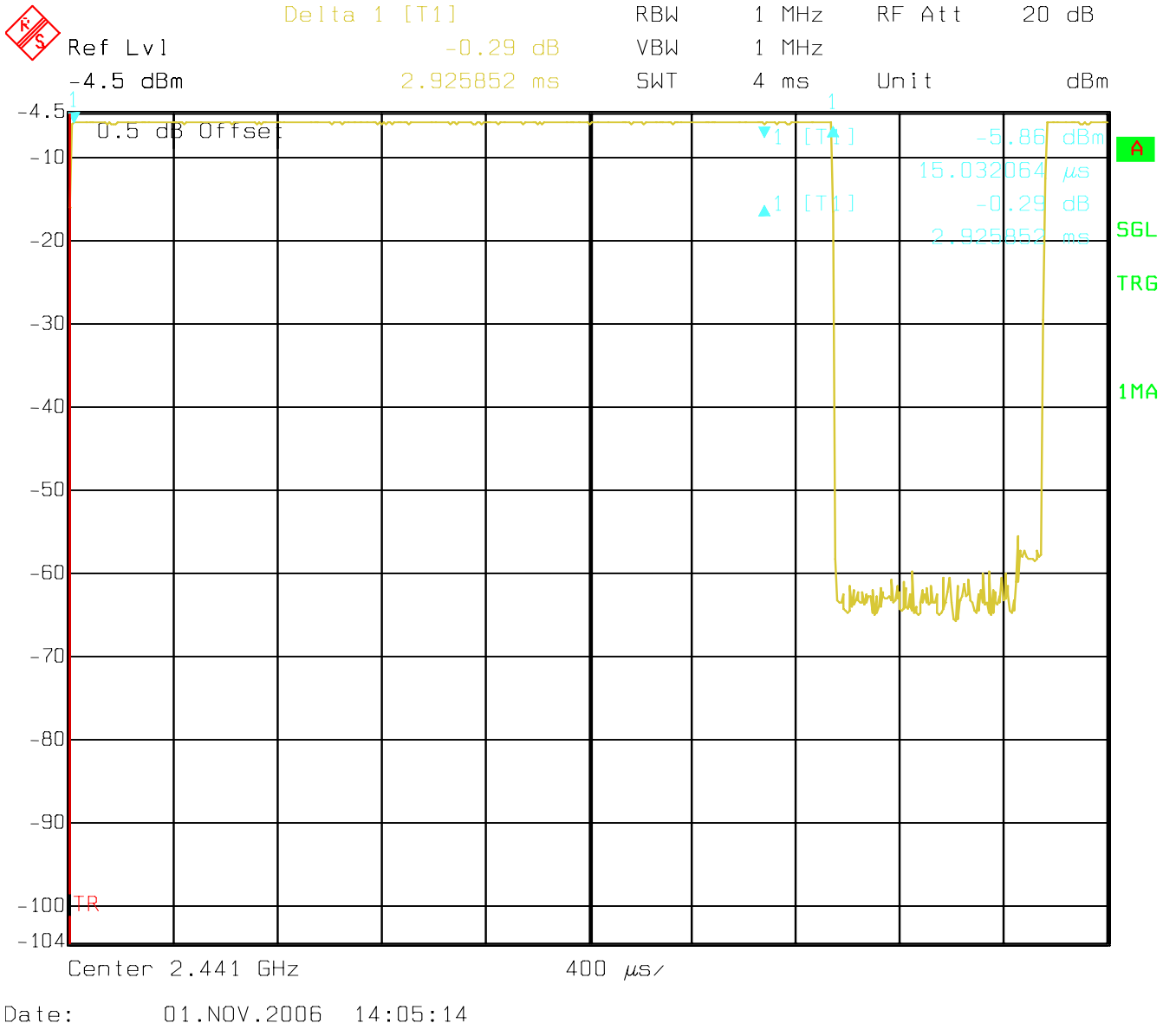


(DH3)

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 1.676ms.
So we have 161.16 * 1.675.35ms = 269.999ms per 31.6 seconds.



At DH5 Packets there are 5 time slots for transmit and 1 for receiving, then the system makes worst case 266.7 hops per second with 79 channels. So each channel 3.36 times per second and so for 30 seconds there are 106.176 times of appearance.
Each Tx-time per appearance is 2.92585ms.
Therefore106.176 * 2.92585ms = 310.655ms per 31.6 seconds.



6.5 AC Line Conducted Emission § 15.207

6.5.1 110V Measurement

```
EUT / Description: QC900 / bluetooth scanner
Manufacturer:      HHP
Test mode:         TX@2441MHz
Test Engineer:     Mark
Phase:             L & N
Comment:           110 volt

Start of Test:     7/5/2005 / 7:02:44PM
```

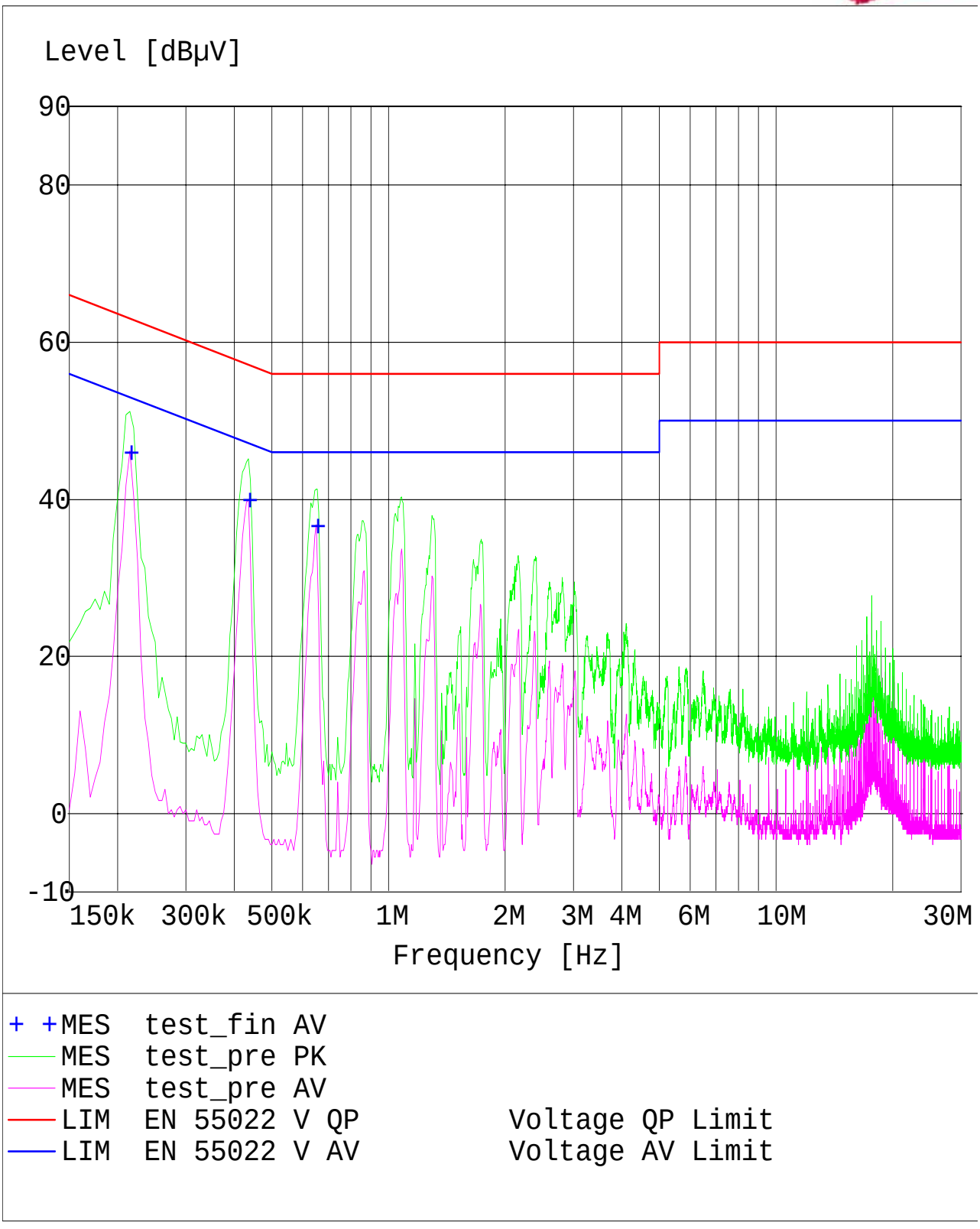
SCAN TABLE: "EN 55022 Voltage"

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 AV"

7/5/2005 7:05PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.215000	45.80	0.0	53	7.3	N	GND
0.435000	39.80	0.0	47	7.4	L1	GND
0.650000	36.40	0.0	46	9.6	N	GND


Level [dBµV]
90
80
60
40
20
0
-10
150k
300k
500k
1M
2M
3M
4M
6M
10M
30M
Frequency [Hz]
+ +MES test_fin AV
MES test_pre PK
MES test_pre AV
LIM EN 55022 V QP Voltage QP Limit
LIM EN 55022 V AV Voltage AV Limit

6.5.2 220V Measurement

```
EUT / Description: QC900 / bluetooth scanner
Manufacturer:      HHP
Test mode:         TX@2441MHz
Test Engineer:     Mark
Phase:             L & N
Comment:           220 volt

Start of Test:     7/5/2005 / 7:13:17PM
```

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"

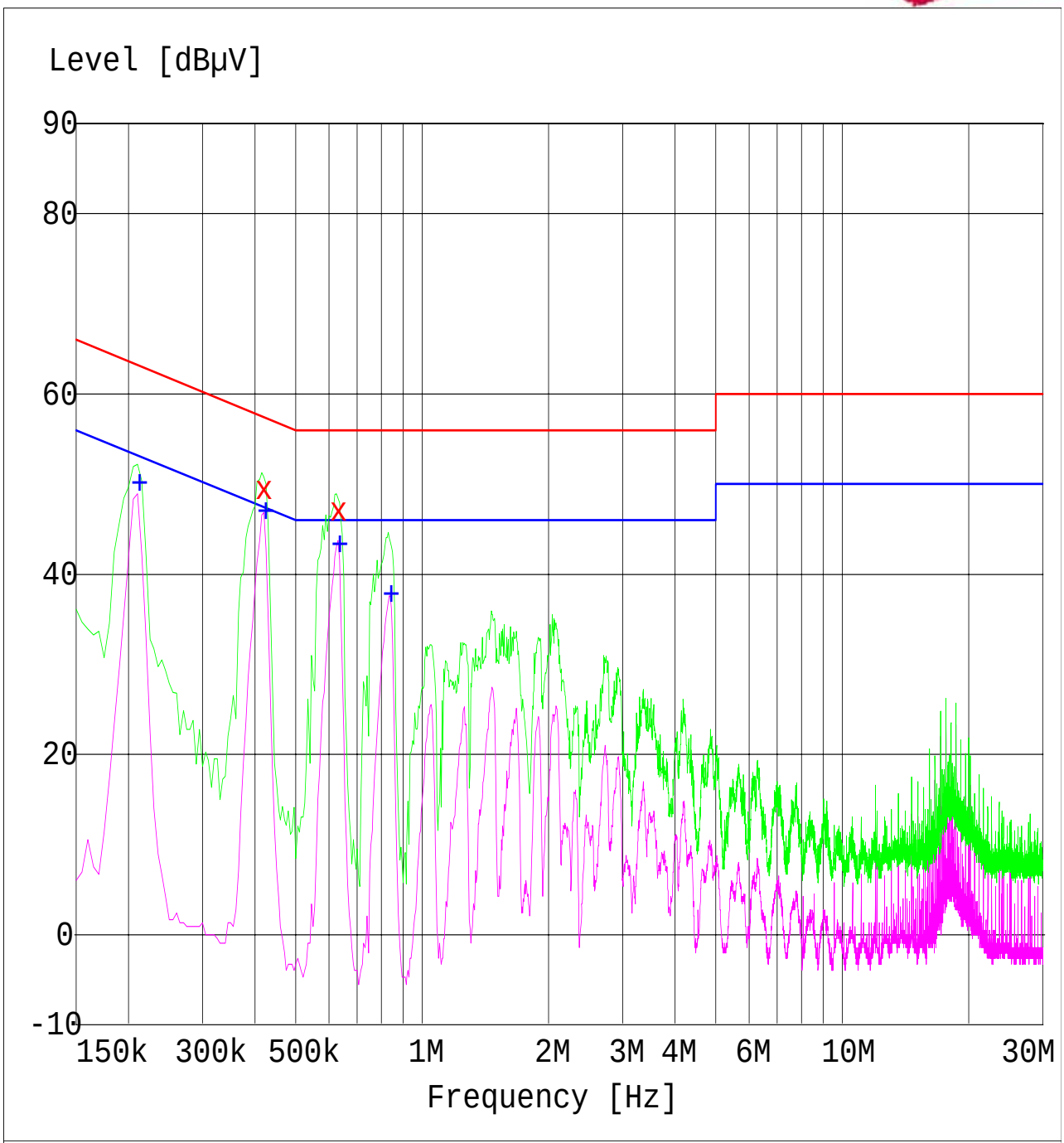
```
7/5/2005  7:16PM
   Frequency    Level  Transd  Limit  Margin  Line   PE
         MHz     dBµV      dB   dBµV      dB

    0.415000    49.40     0.0     58     8.2  N     GND
    0.625000    47.10     0.0     56     8.9  N     GND
```

MEASUREMENT RESULT: "test_fin AV"

```
7/5/2005  7:16PM
   Frequency    Level  Transd  Limit  Margin  Line   PE
         MHz     dBµV      dB   dBµV      dB

    0.210000    50.00     0.0     53     3.3  N     GND
    0.420000    46.90     0.0     47     0.5  N     GND
    0.630000    43.20     0.0     46     2.8  N     GND
    0.835000    37.70     0.0     46     8.3  L1    GND
```



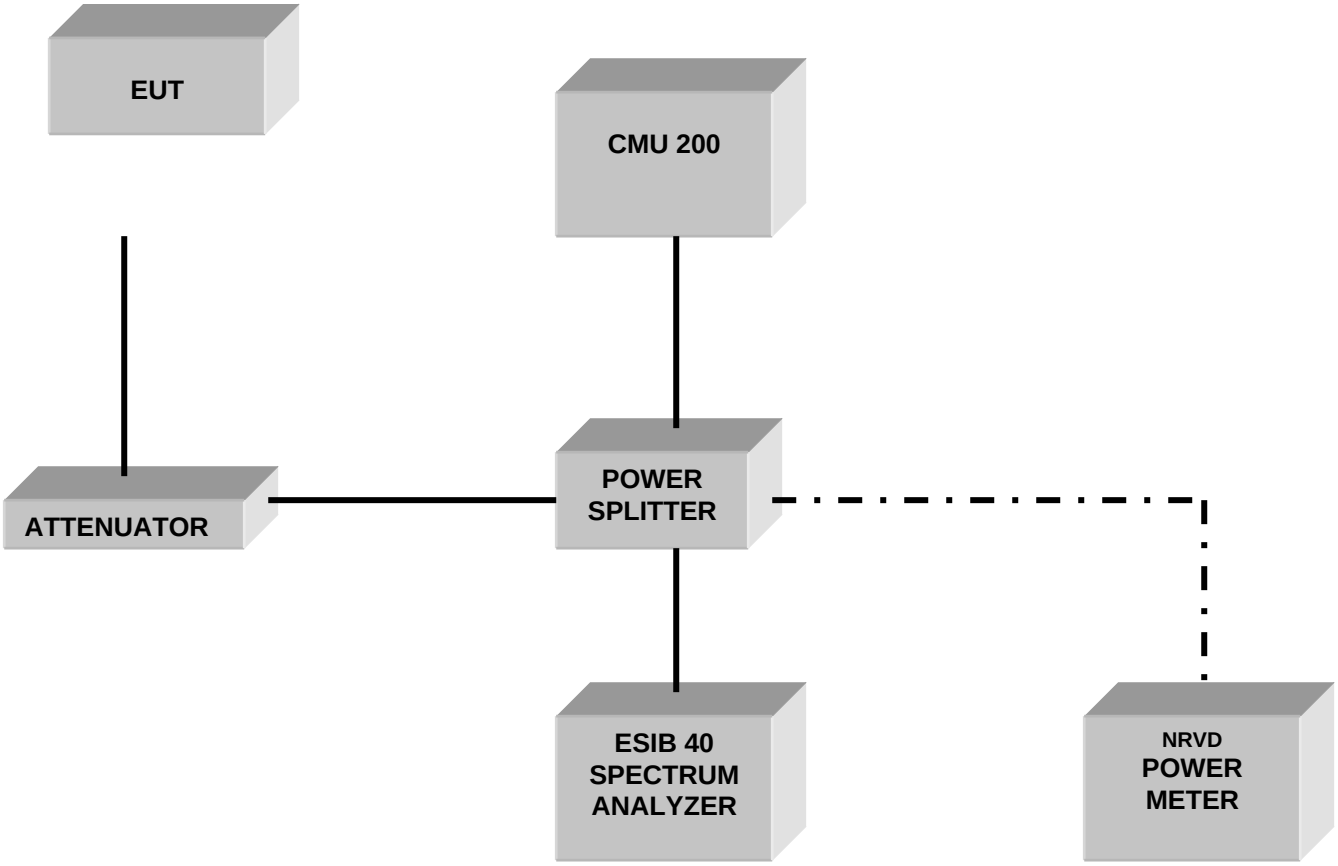
X XMES test_fin QP
\+ +MES test_fin AV
MES test_pre PK
MES test_pre AV
LIM EN 55022 V QP Voltage QP Limit
LIM EN 55022 V AV Voltage AV Limit

7 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 2007	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 2007	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2007	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2007	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
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2007	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2007	2 years

8 BLOCK DIAGRAMS

Conducted Testing



Radiated Testing