FCC Test Report

FCC Part 15.247 for FHSS systems/ CANADA RSS-210

FOR:

Portable Data Terminal with
BT BGB203 and
WLAN BGW200

MODEL #: 7850-L0E and 7850-LPE

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

FCC ID: HD57850LPE
IC ID: 1693B-7850E

TEST REPORT #: EMC_INTRI_002_06002_15.247BT
DATE: 2006-10-17

ilac-MRA ACCREDITED Certificate # 2135.01

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.
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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 #
Hand Held Products, Inc.	**Portable Data Terminal with BT BGB0203 and WLAN BGW200**	**7850-L0E and 7850-LPE**

Michael Grings
Project Engineer

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:	**Michael Grings**
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:	**Mandana Mobasher**
Phone No.	**704-998-3890**
Fax:	
e-mail :	**Mandana.Mobasher@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:	**Dolphin 7850**
Description:	**Portable Data Terminal with BT BGB0203 and WLAN BGW200**
Model No:	**7850-L0E and 7850-LPE**
Hardware Revision:	**2.0**
Software Revision :	**14.02**
FCC ID:	**HD57850LPE**
IC ID:	**1693B-7850E**
Frequency Range:	**2402-2480MHz**
Type(s) of Modulation:	**GFSK, DSSS**
Number of Channels:	**79**
Antenna Type:	**Diversity pc board, Centurion Bluechip/typically > 2dB**
Output Power:	**1mW conducted and 0.161 mW EIRP@ 2441 MHz**

3.2 Identification of the Equipment Under Test (EUT)

EUT #	TYPE	MANF.	MODEL	SERIAL #
1	Portable Data Terminal	Hand Held Products	PDT7850	UNIT 1 06153A1803
2	Portable Data Terminal	Hand Held Products	PDT7850	UNIT 2 06129A1C11

3.3 Identification of Accessory equipment

AE #	TYPE	MANF.	MODEL	SERIAL #
1	AC/DC ADAPTER	DVL	DSA-0151D-09.5	41206346-01
2	AC/DC ADAPTER	DVL	DSA-0421S-09 3 38	n/a

3	Charging Cradle	Hand Held Products	7850-HB	B1000102

4 Subject Of Investigation

All testing was performed on the PDT7850 refered to as EUT. This test report contains full radiated and conducted testing for the **Bluetooth Module** as per FCC15.247.

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. The maximization of portable equipment is conducted in accordance with ANSI C63.4.

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.**

5.1.2 EIRP:

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T_{nom}(23)°C	V_{nom}VDC	-8.32	-7.93	-10.5
Measurement uncertainty		±0.5dBm		

MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)
EIRP (2402 MHz)

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

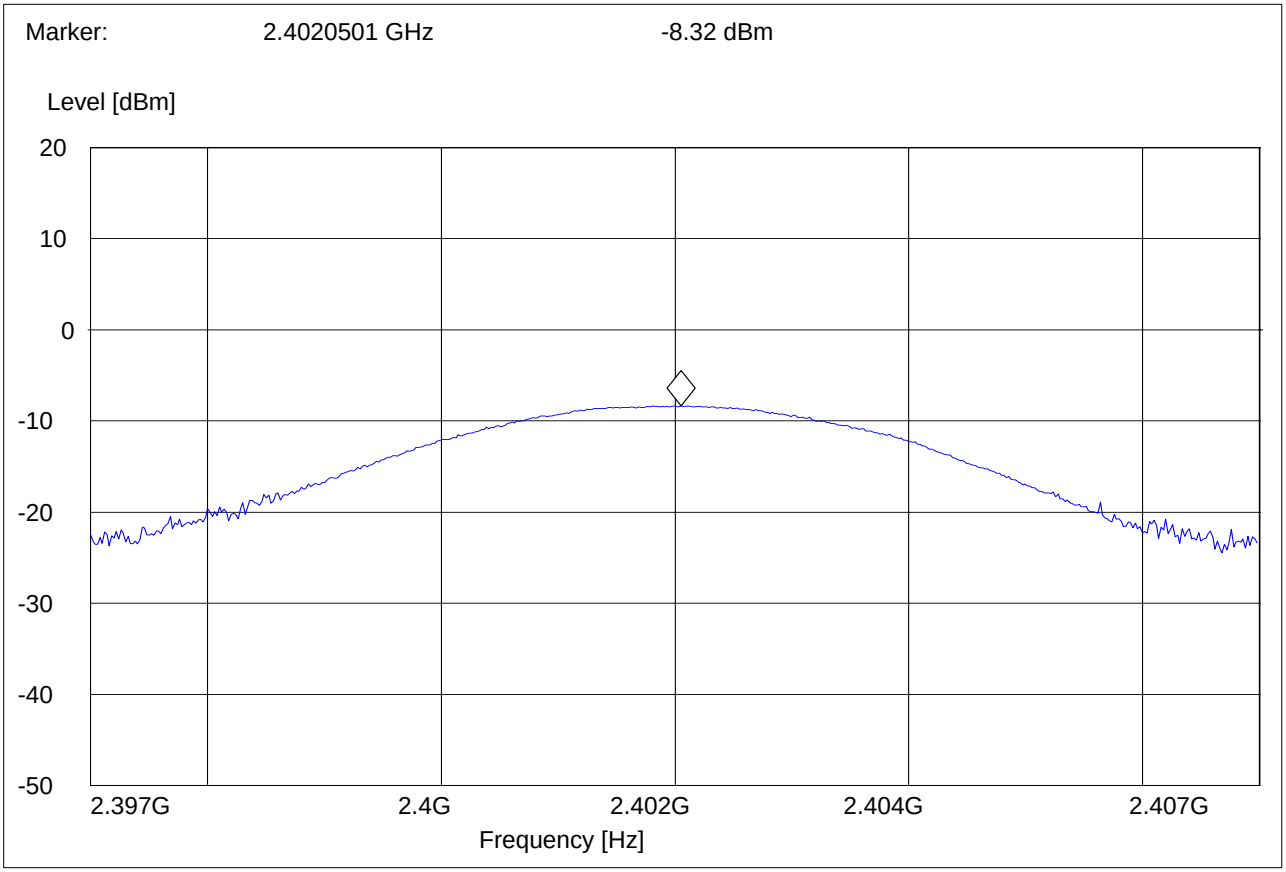
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT; CHAN 0, WLAN OFF, max sig at 160° rotation, eut horiz
Antenna: V
EUT: H
Test Engineer: Ed
Voltage: Battery mode
Sweep: EIRP BT low channel

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



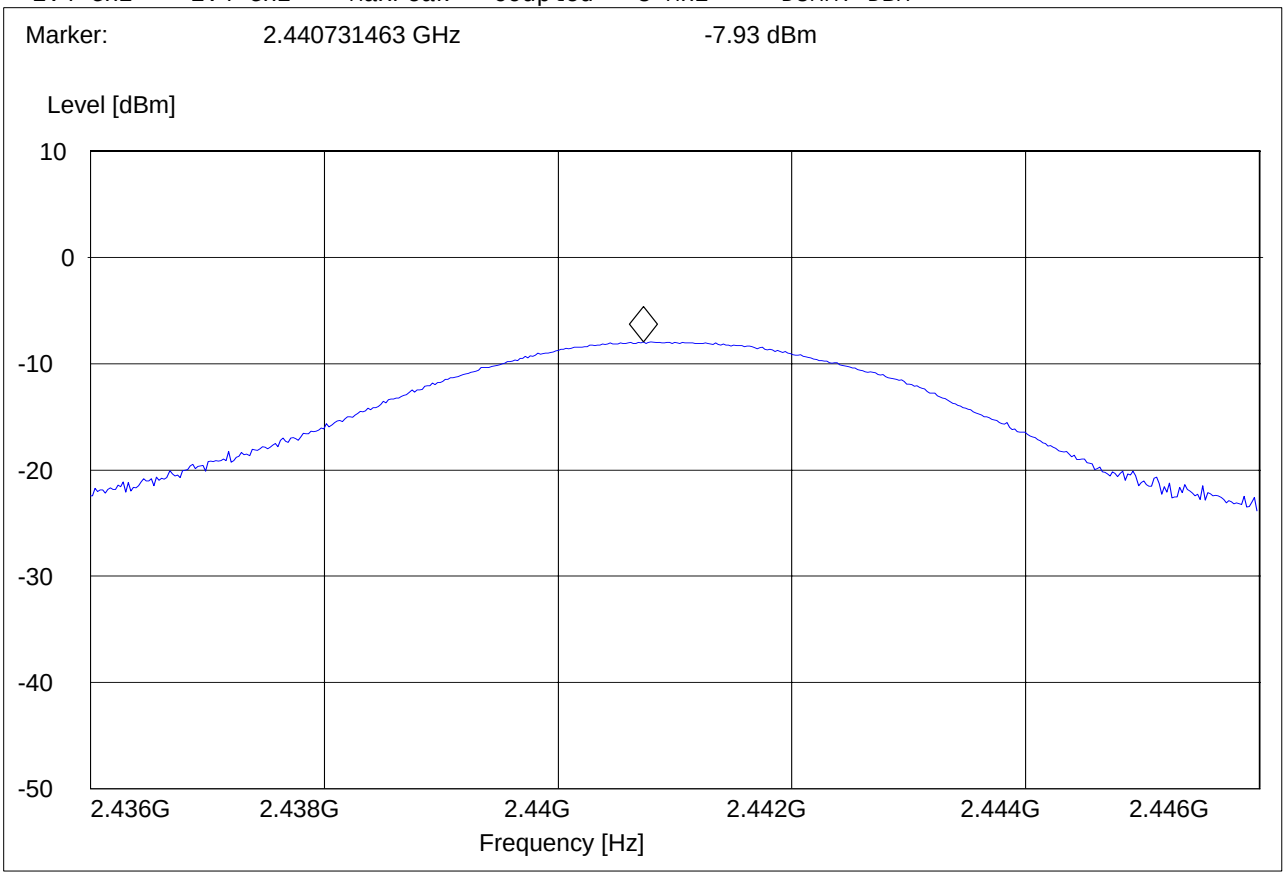
MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)
EIRP (2441 MHz)

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT; CHAN 39, WLAN OFF,  max sig at 160° rotation, eut horiz
Antenna:           V
EUT:               H
Test Engineer:     Ed
Voltage:           Battery mode
Sweep:             EIRP BT mid channel
```

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
```



MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)
EIRP (2480 MHz)

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

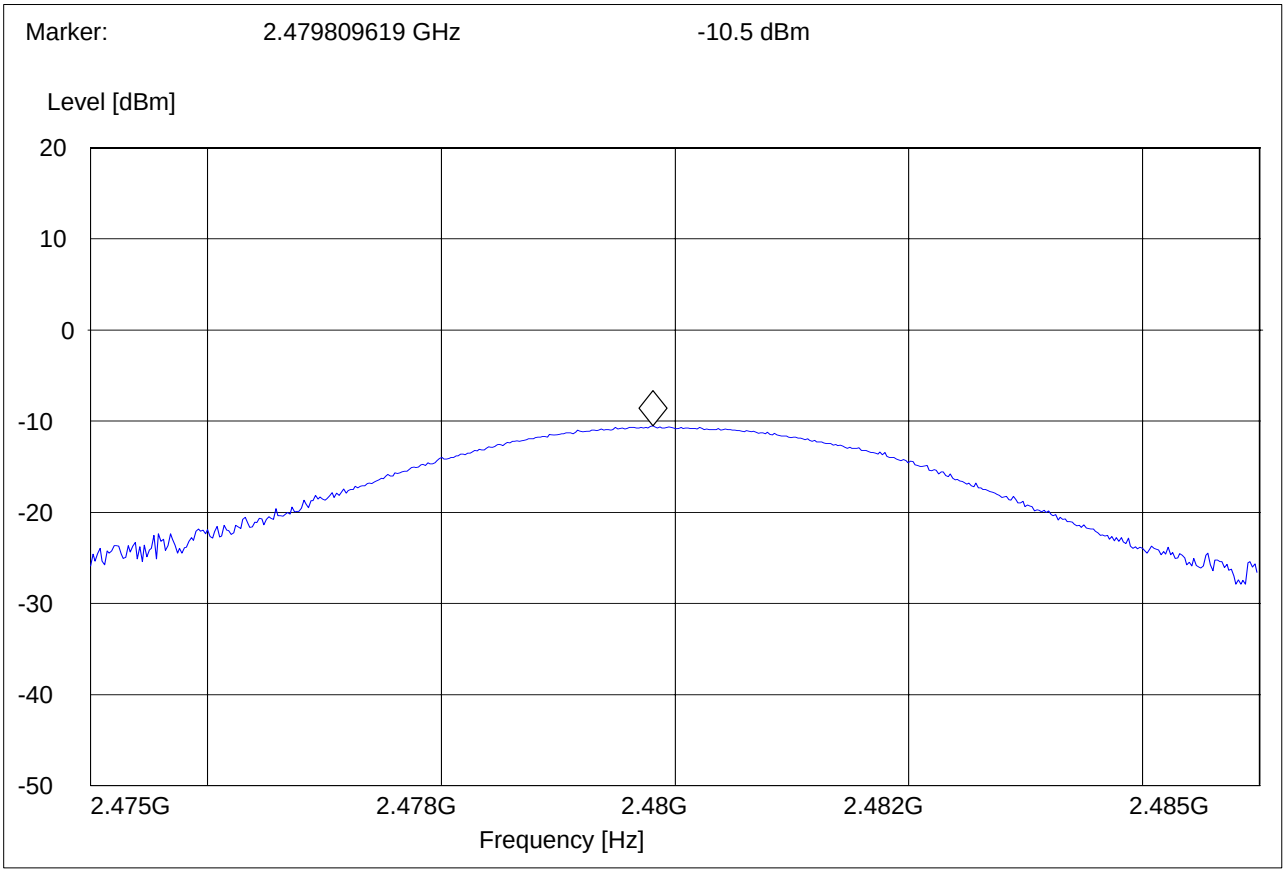
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT; CHAN 78, WLAN OFF, max sig at 160° rotation, eut horiz
Antenna: V
EUT: H
Test Engineer: Ed
Voltage: Battery mode
Sweep: EIRP BT high channel

SWEEP TABLE: "EIRP BT high channel"

Short Description: EIRP Bluetooth channel-2480MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
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)

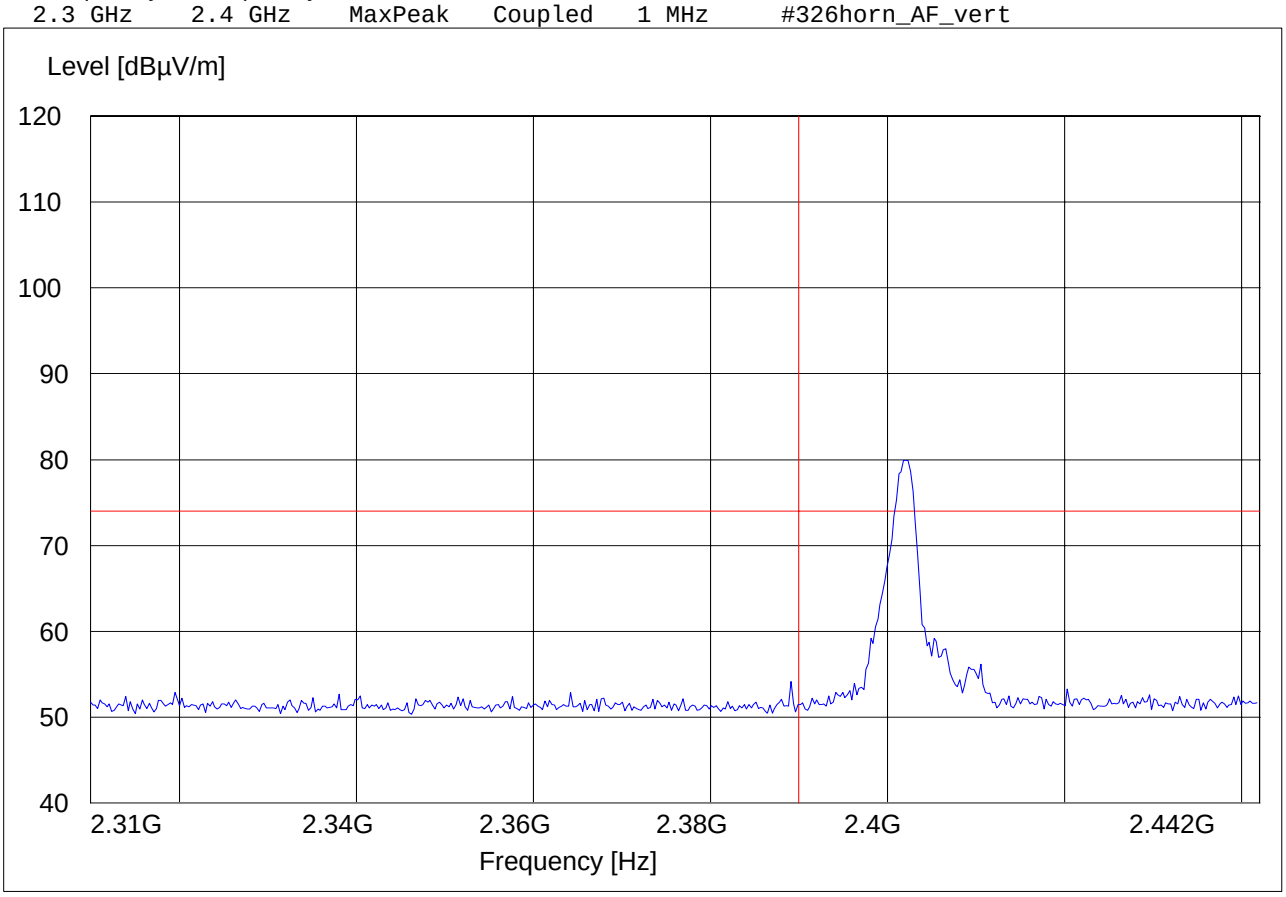
PEAK

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT; CHAN 0, WLAN OFF
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter w/ USB cable
Sweep:             FCC 15.247 LBE_PK
```

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



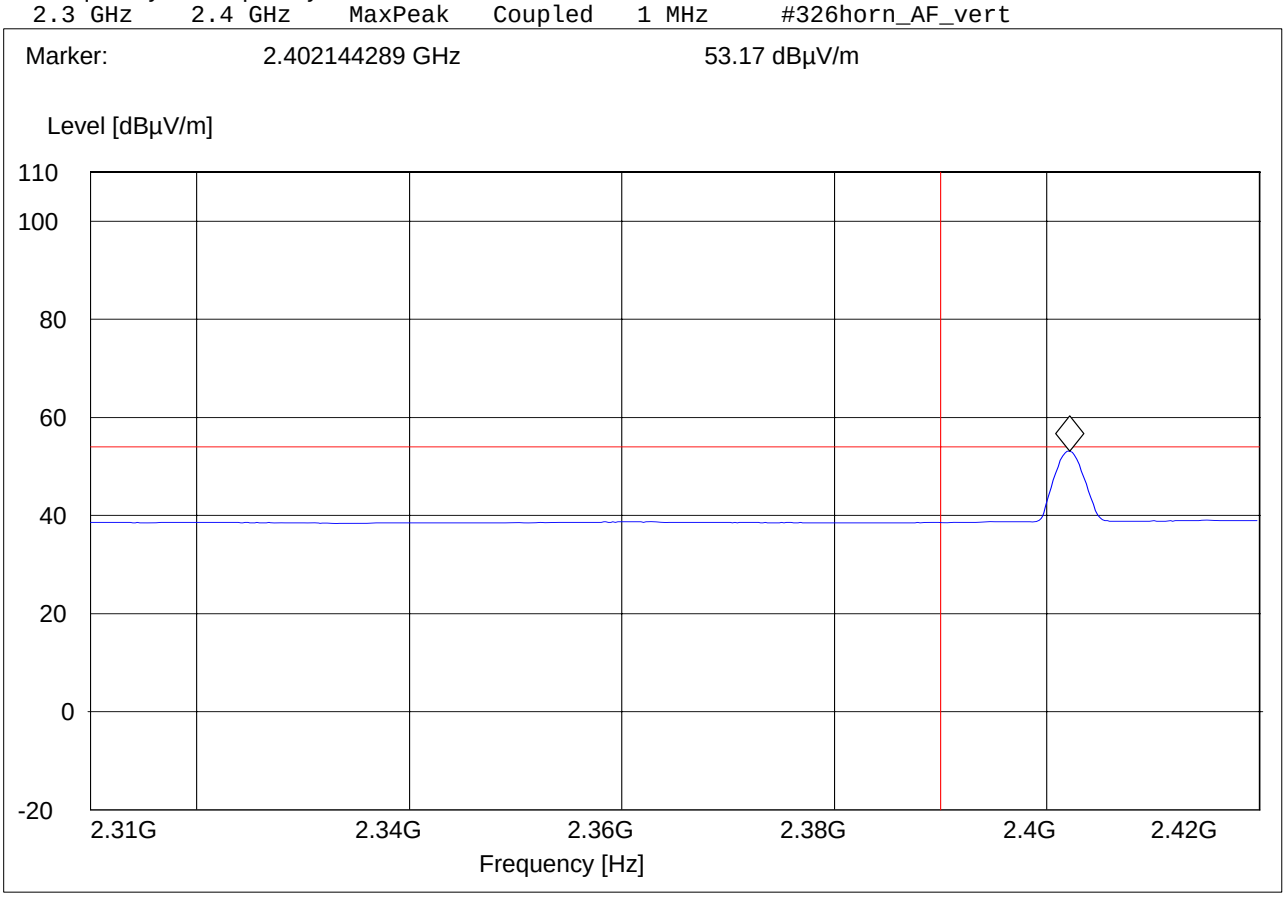
AVG

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT; CHAN 0, WLAN OFF, 360° rotation in 90° incr.
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter w/ USB cable
Sweep:             FCC 15.247 LBE_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



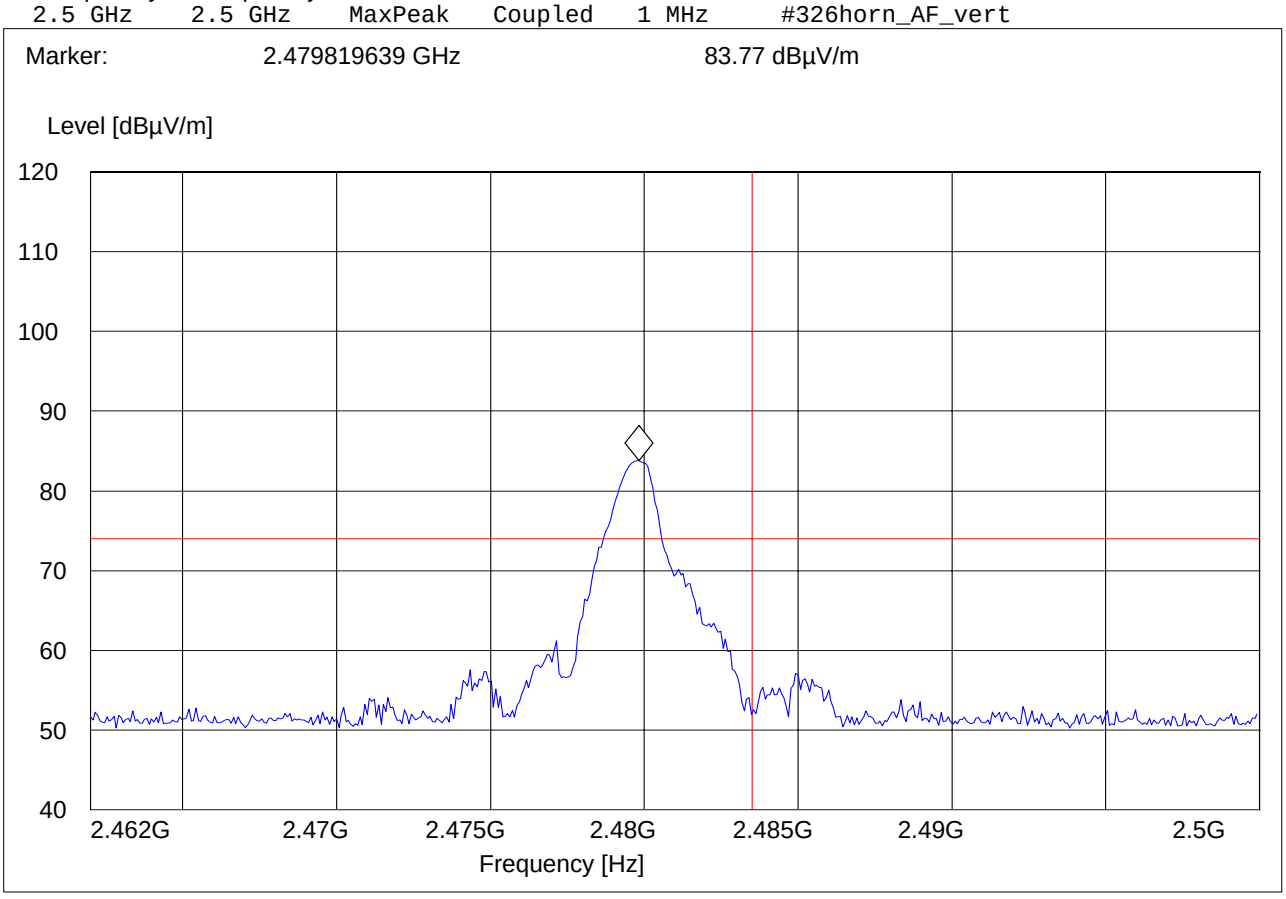
5.2.3 RESULTS (2480MHz)
PEAK

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT; CHAN 0, WLAN OFF
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter w/ USB cable
Sweep:             FCC 15.247 HBE_PK
```

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



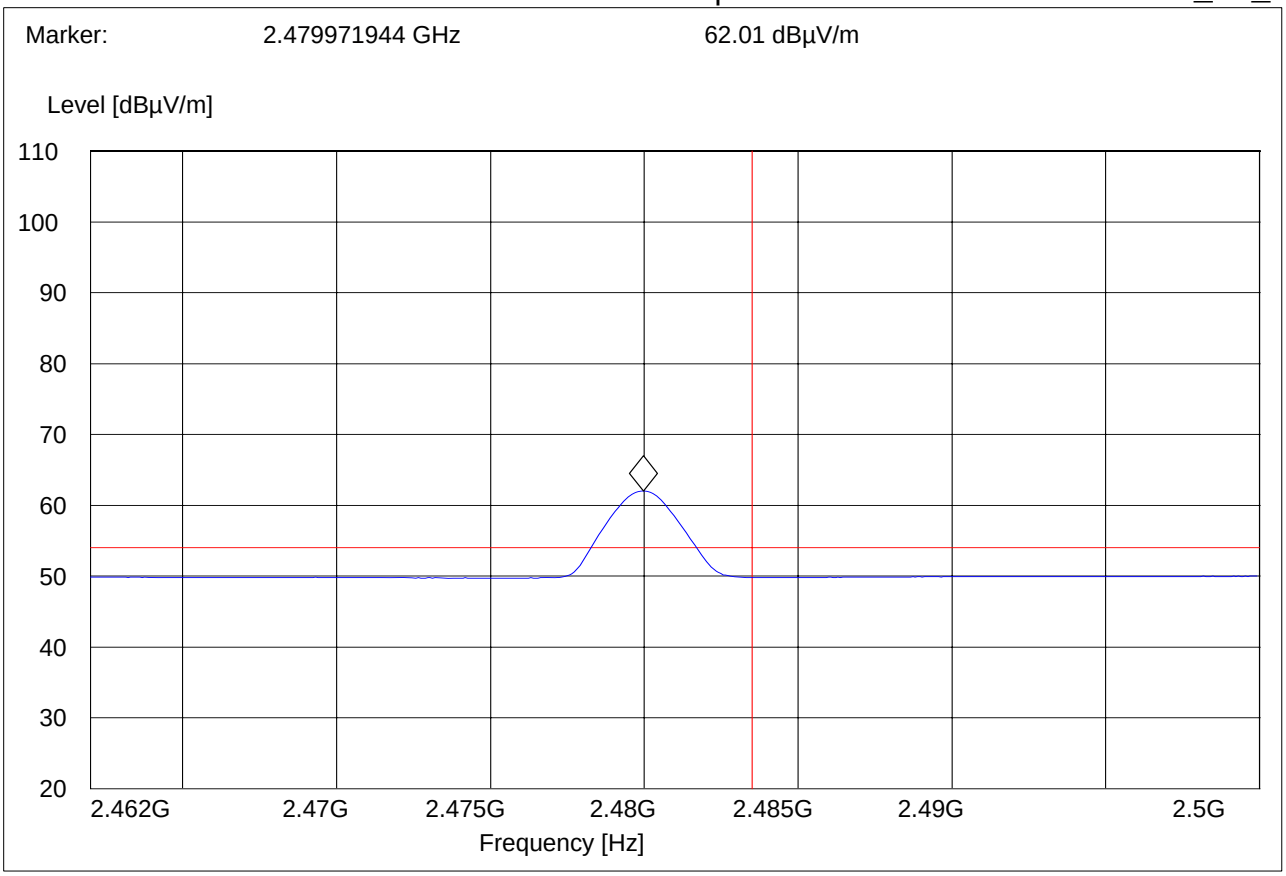
AVG

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT; CHAN 0, WLAN OFF, 360 rotation in 90° incr.
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter w/ USB cable
Sweep:             FCC 15.247 HBE_AVG
```

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

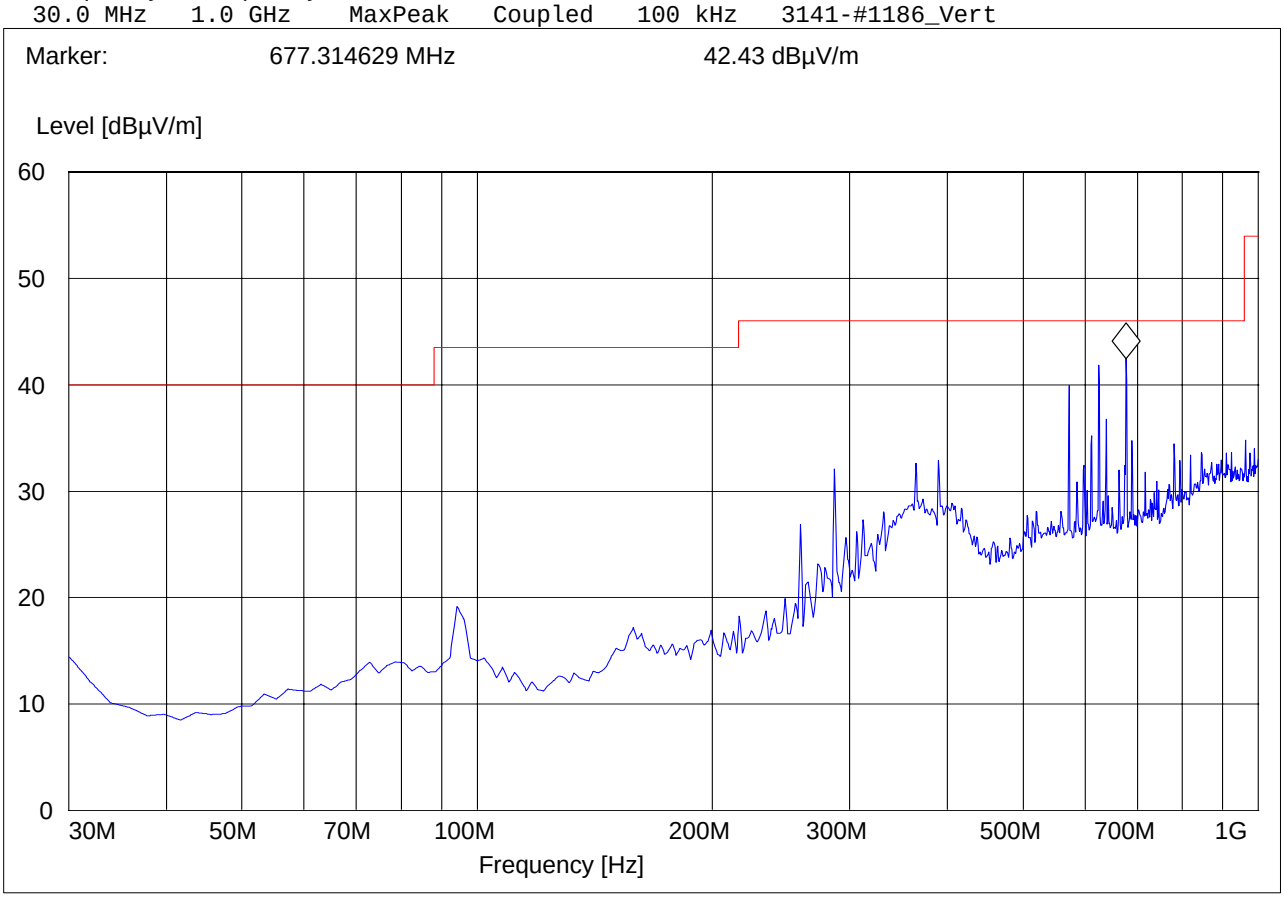
Note: This plot is valid for low, mid, high channels (worst-case plot)

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

```
EUT / Description: PTD7850/B14
Customer:          Intrinsync
Operating Mode:    WLAN (ch 6) + BT (ch 39)
Antenna:           V
EUT:               V
Test Engineer:     SATYA
Voltage:           Battery
Sweep:             FCC15.247_30M-1G_Ver
```

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



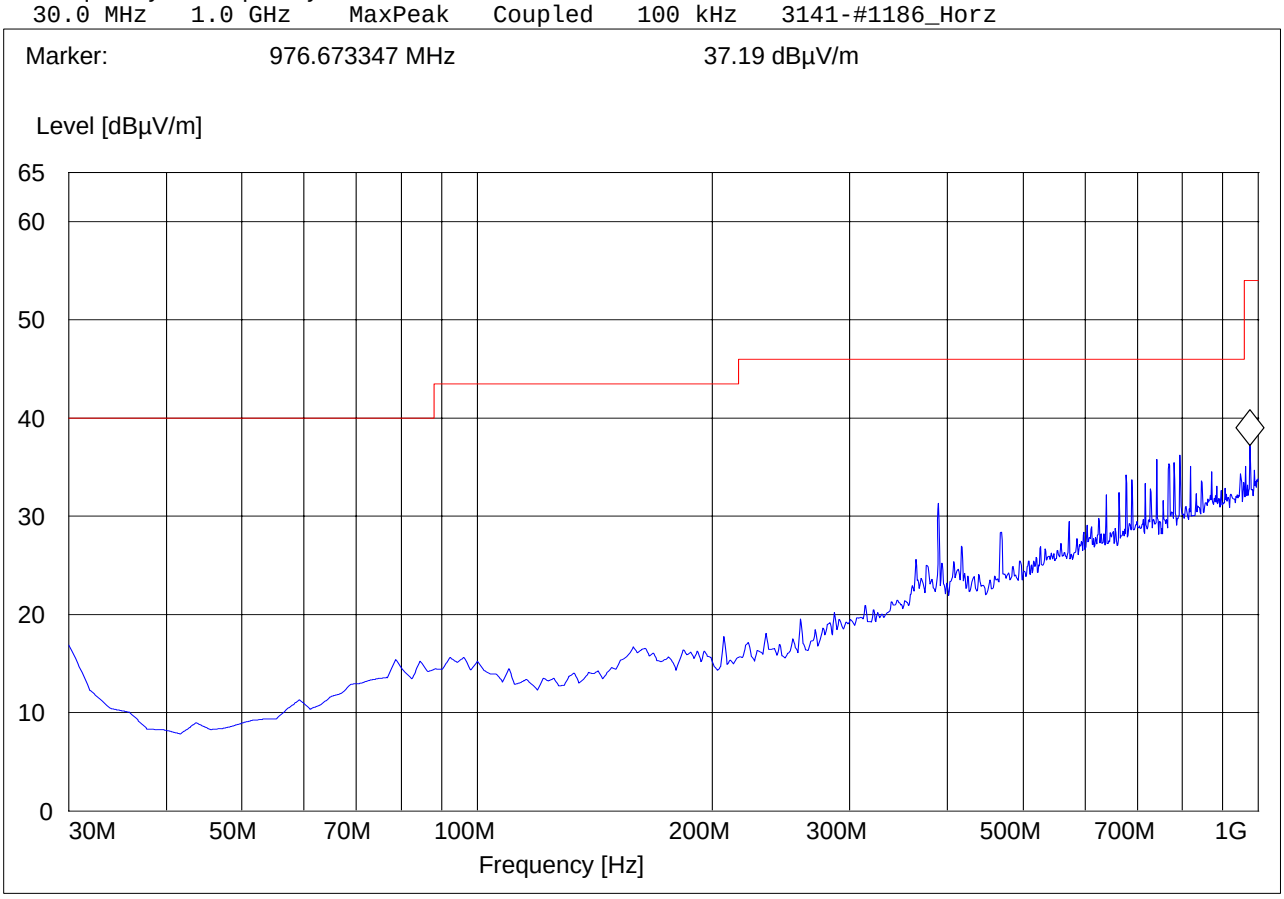
30MHz – 1GHz
Antenna: horizontal
Note: This plot is valid for low, mid, high channels (worst-case plot)

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

```
EUT / Description: PTD7850/B14
Customer:          Intrinsync
Operating Mode:    WLAN (ch 6) + BT (ch 39)
Antenna:           H
EUT:               V
Test Engineer:     SATYA
Voltage:           Battery
Sweep:             FCC15.247_30M-1G_H0R
```

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



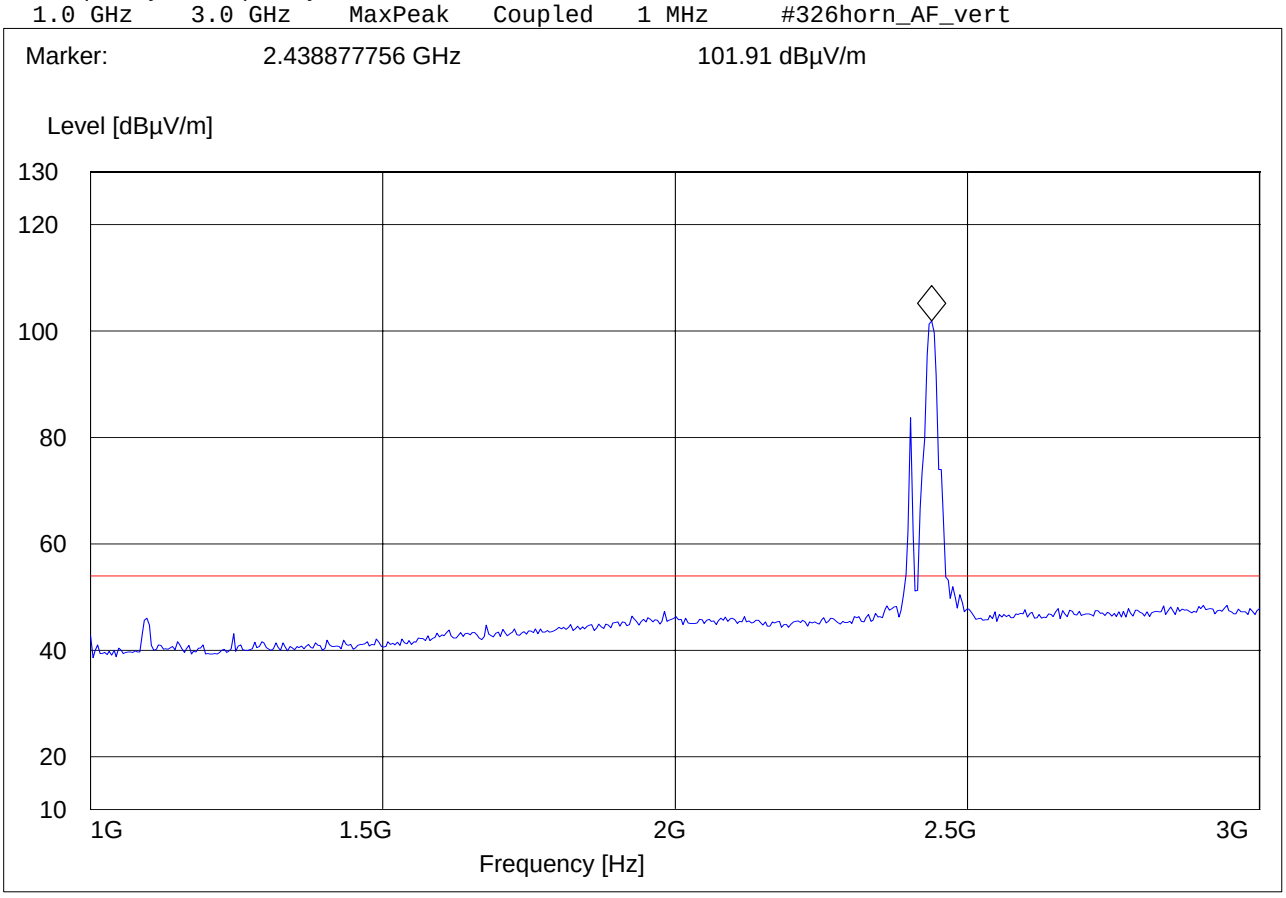
1-3GHz (2402MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT + WLAN (BT chan 0)   (marker on WLAN)
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter
Sweep:             FCC15.247_1-3G
```

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



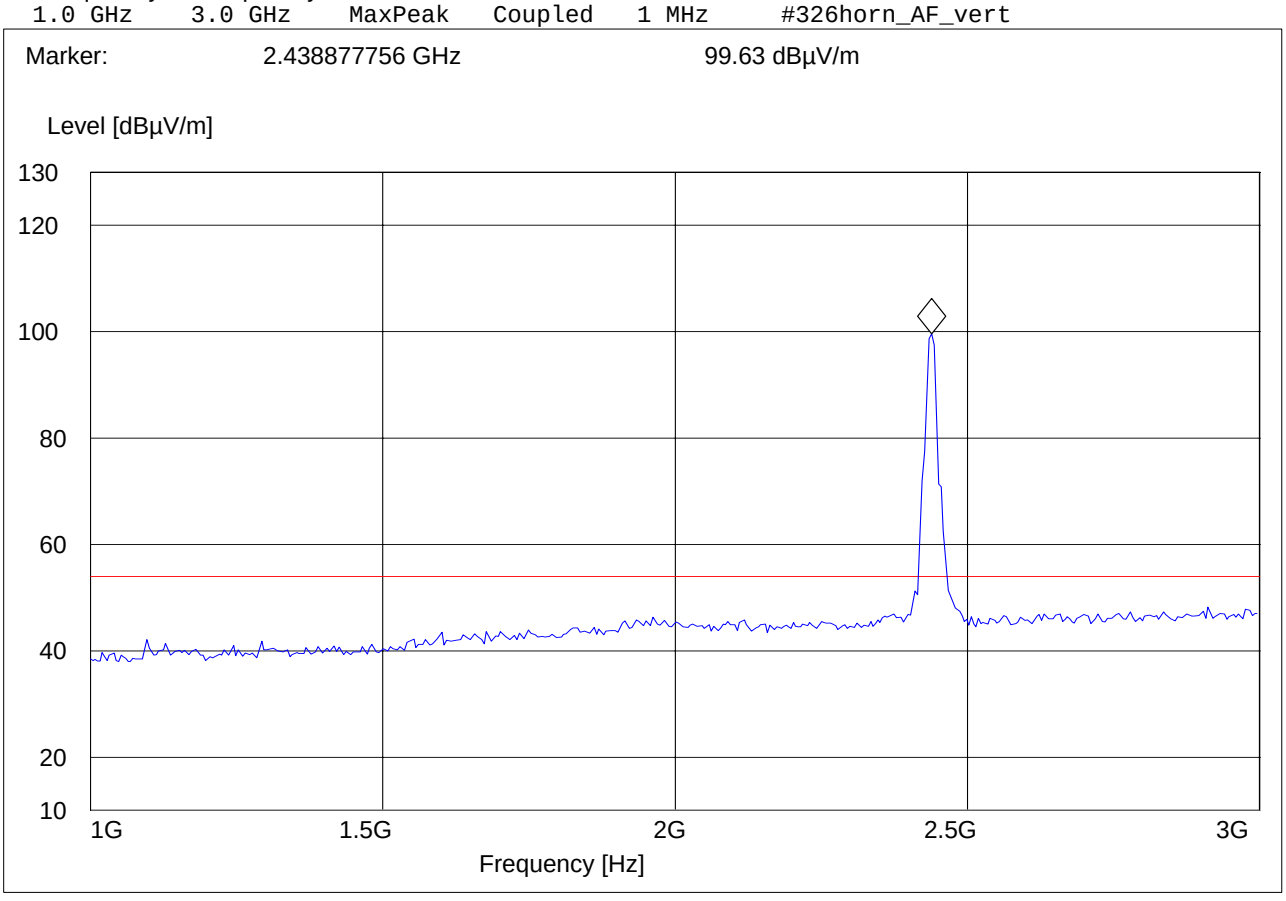
1-3GHz (2441MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT + WLAN (BT chan 39)   (marker on WLAN ch6 + BT)
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter
Sweep:             FCC15.247_1-3G
```

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



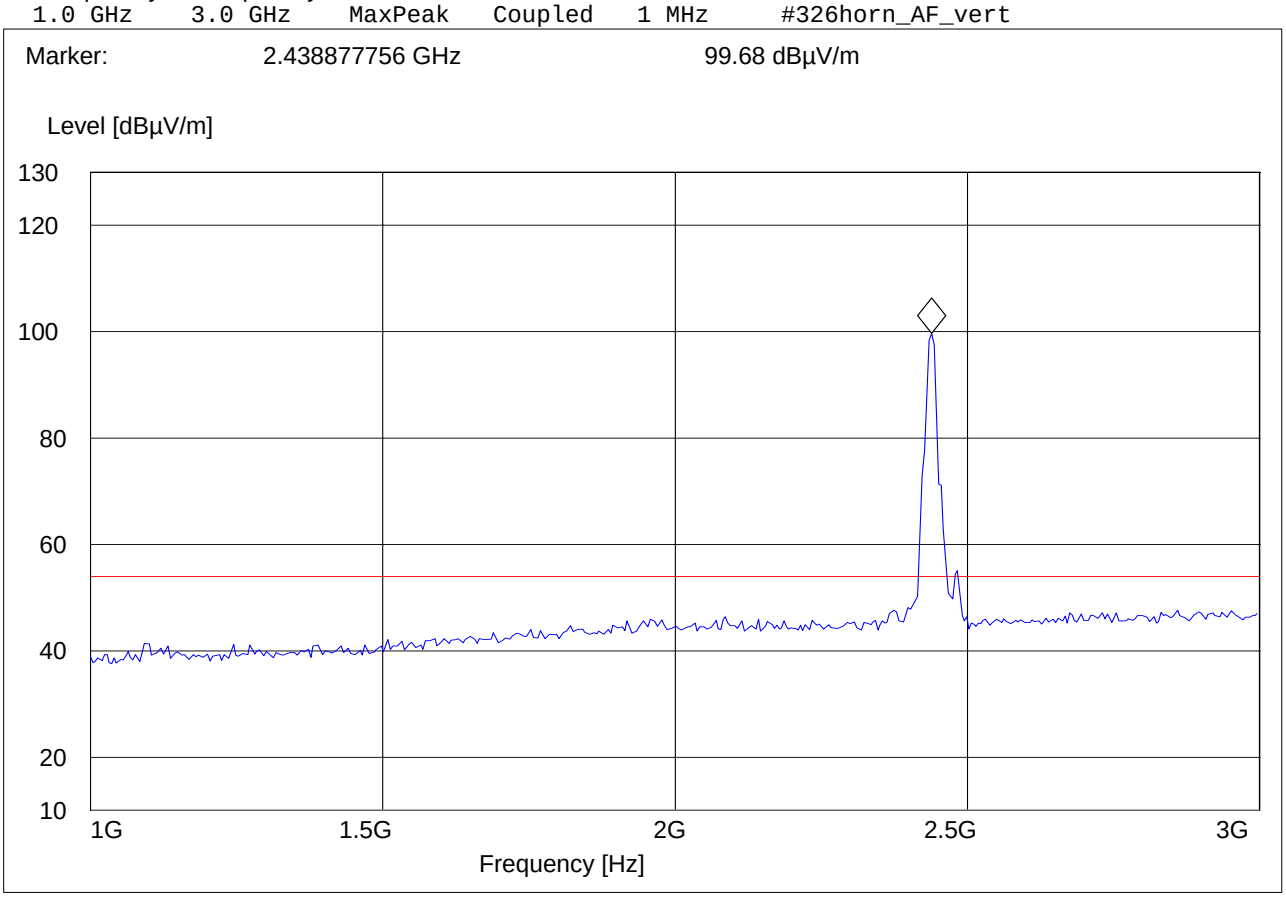
1-3GHz (2480MHz)
Note: The peaks above the limit line is the carrier freq.
Note: Peak Reading vs. Average limit

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

```
EUT / Description:  PTD7850/B14
Customer:           HHP
Operating Mode:     BT + WLAN (BT chan 78) (marker on WLAN ch 6, second peak is BT)
Antenna:            V
EUT:                V
Test Engineer:      Ed
Voltage:            AC Adapter
Sweep:              FCC15.247_1-3G
```

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



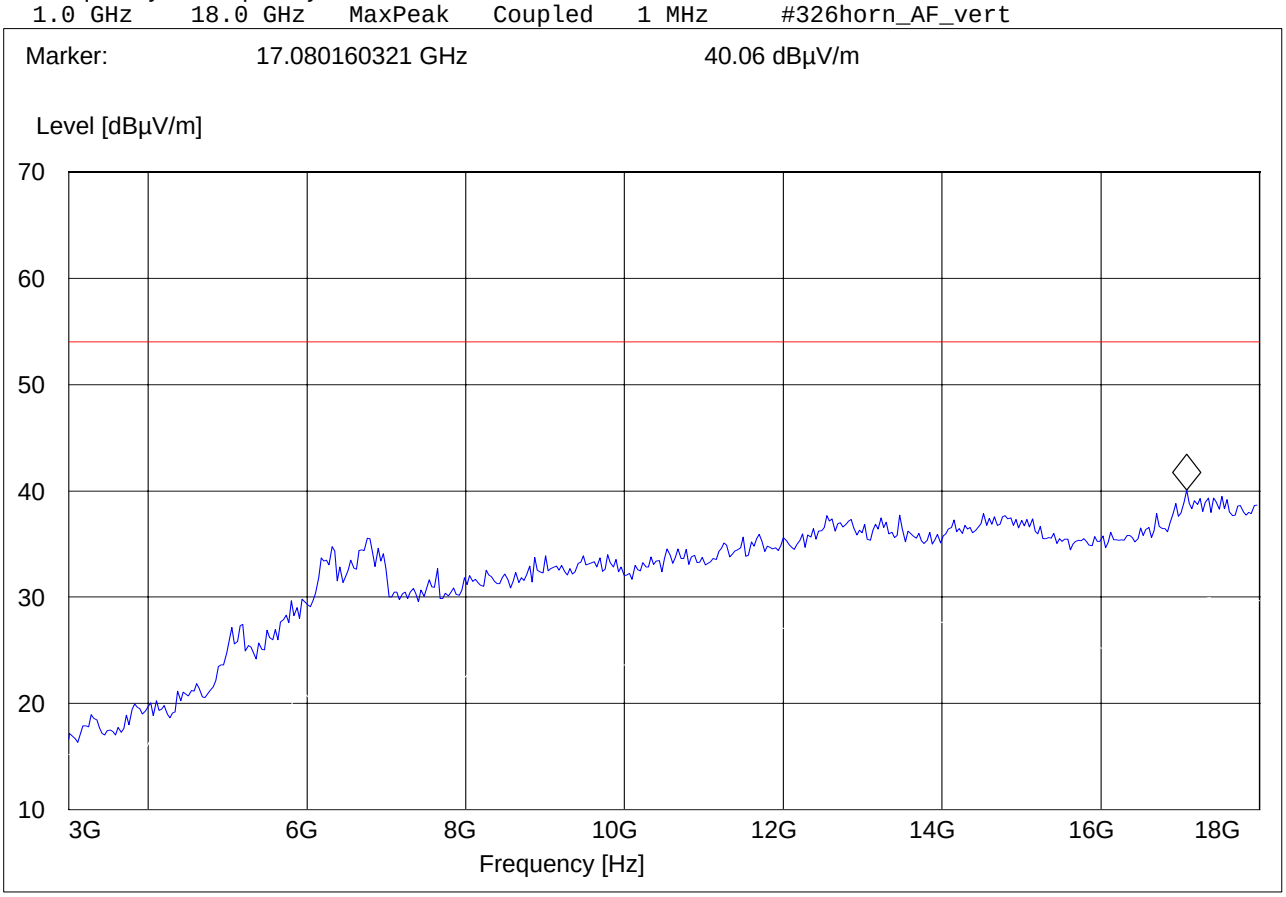
3-18GHz (2402MHz)
Note: Peak Reading vs. Average limit

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT + WLAN (BT chan 0)
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter
Sweep:             FCC15.247_3-18G
```

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



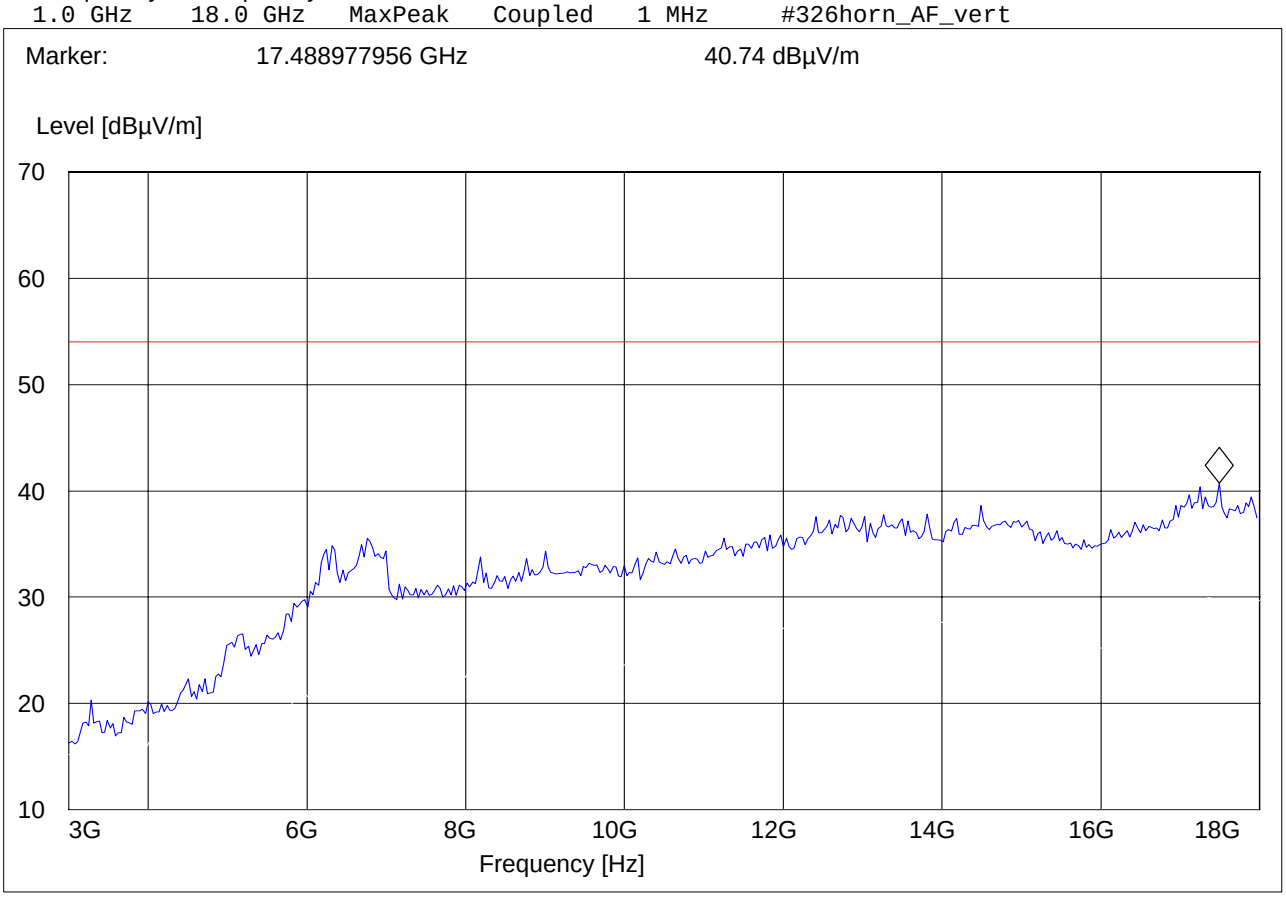
3-18GHz (2441MHz)
Note: Peak Reading vs. Average limit

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    BT + WLAN (BT chan 39)
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter
Sweep:             FCC15.247_3-18G
```

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



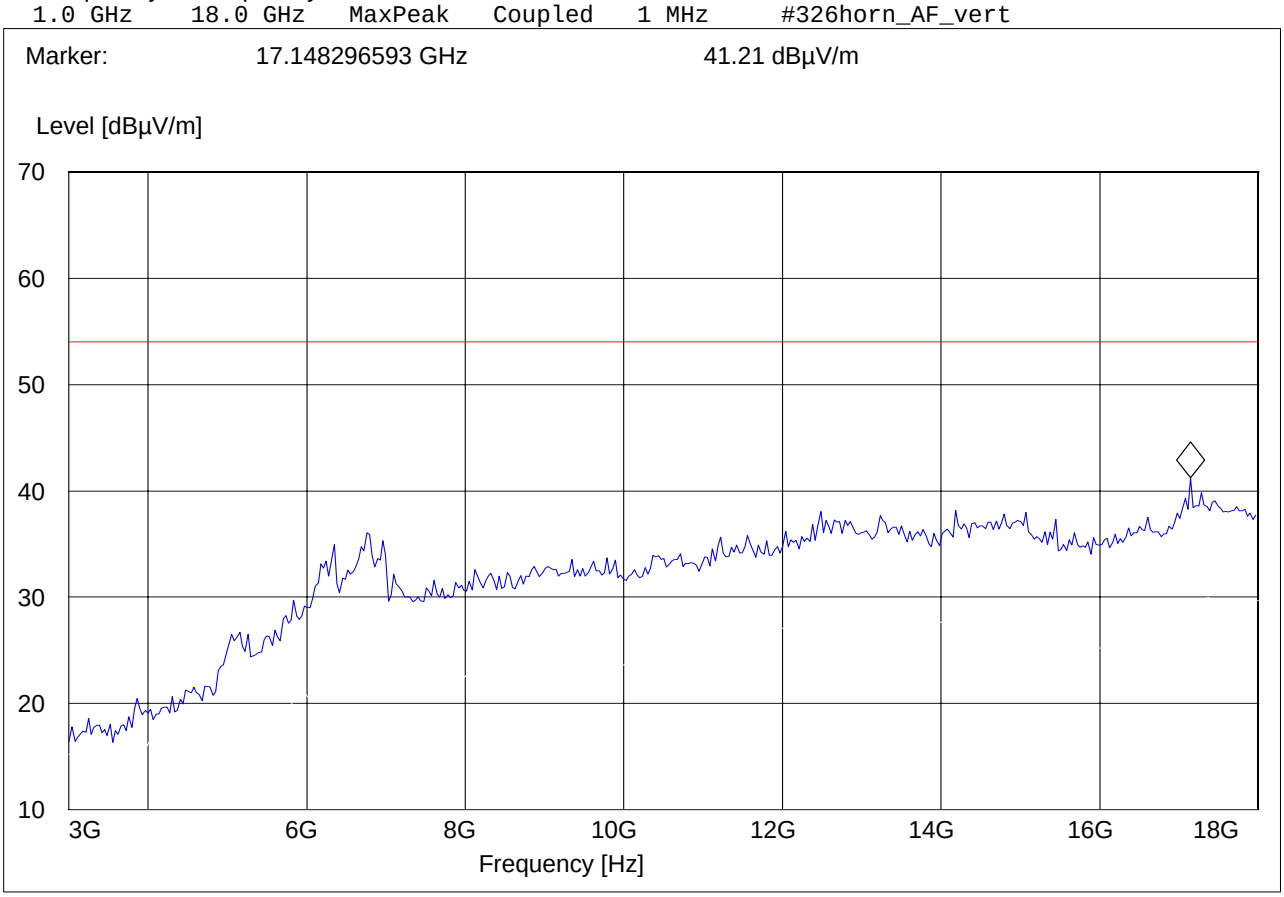
3-18GHz (2480MHz)
Note: Peak Reading vs. Average limit

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

```
EUT / Description:  PTD7850/B14
Customer:           HHP
Operating Mode:     BT + WLAN (BT chan 78)
Antenna:            V
EUT:                V
Test Engineer:      Ed
Voltage:            AC Adapter
Sweep:              FCC15.247_3-18G
```

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



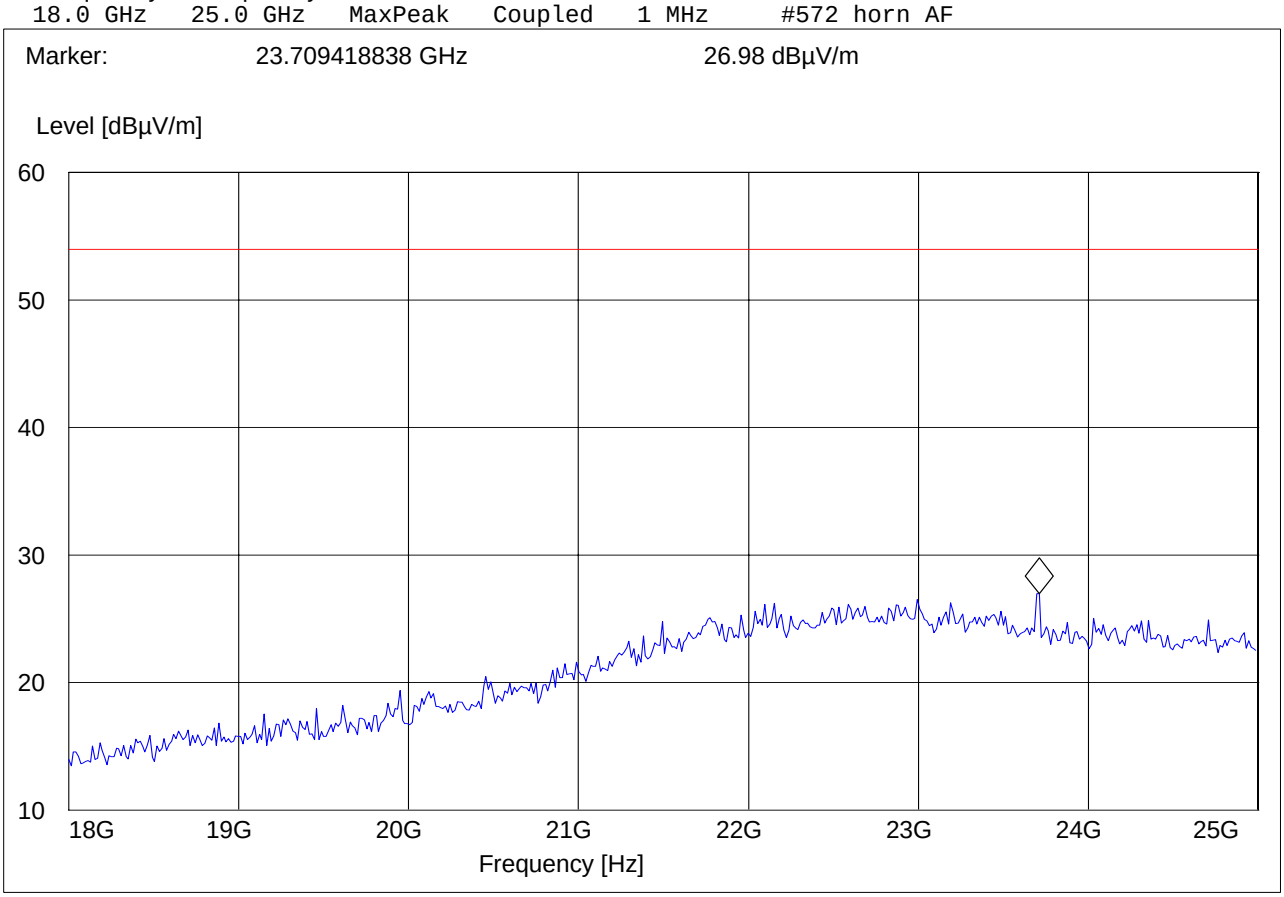
18-25GHz
Note: This plot is valid for low, mid, high channels (worst-case plot)
Note: Peak Reading vs. Average limit

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

```
EUT / Description:  PTD7850/B14
Customer:           HHP
Operating Mode:     BT + WLAN (BT chan 0)
Antenna:            V
EUT:                V
Test Engineer:      Ed
Voltage:            AC Adapter
Sweep:              FCC15.247_18-26.5G
```

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

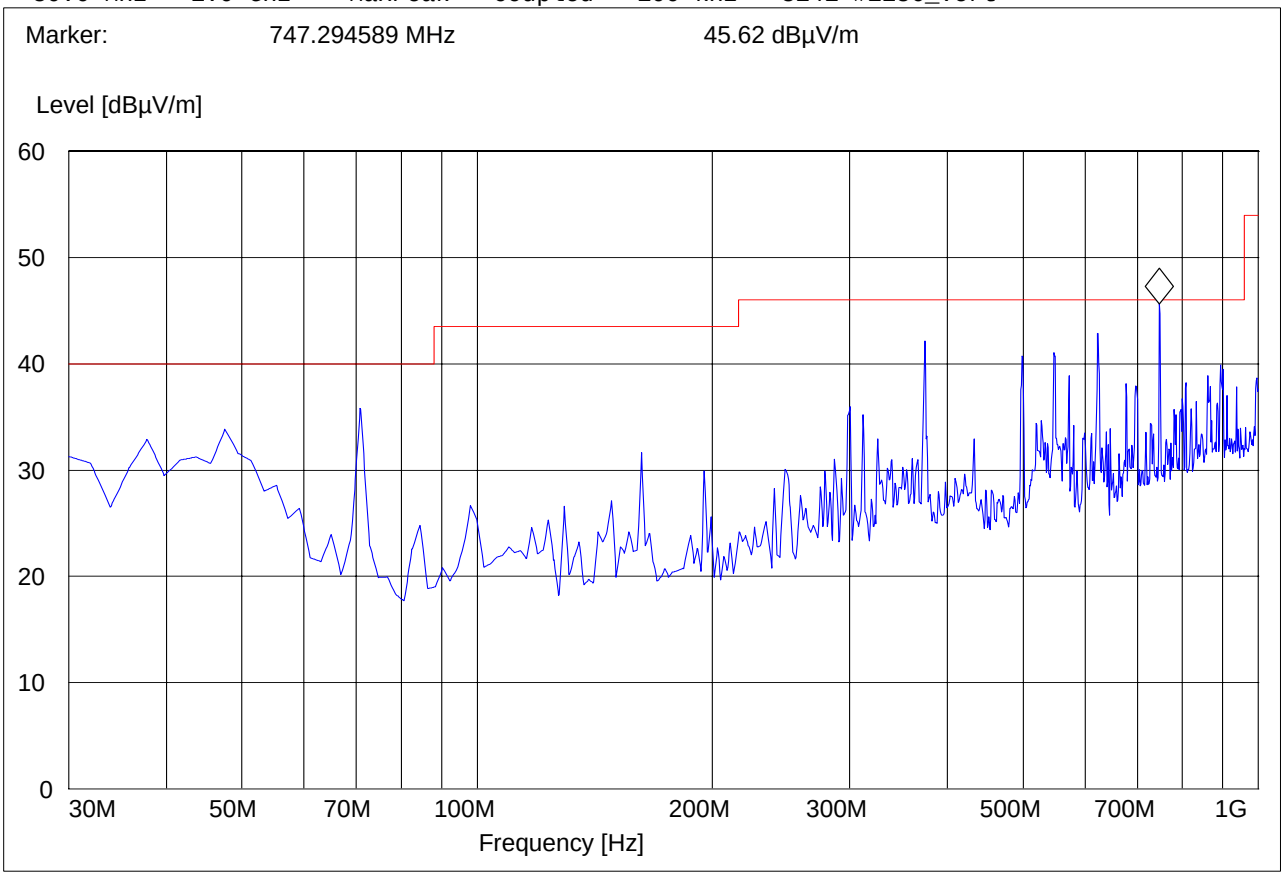
Note: This plot is valid for all polarizations and low, mid, high channels (worst-case plot)
Note: Peak Reading vs. Quasi-peak limit

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    WLAN + BT; Receive mode, 360° rotation
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter w/ USB cable
Sweep:             Canada RE_30M-1G_Ver
```

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



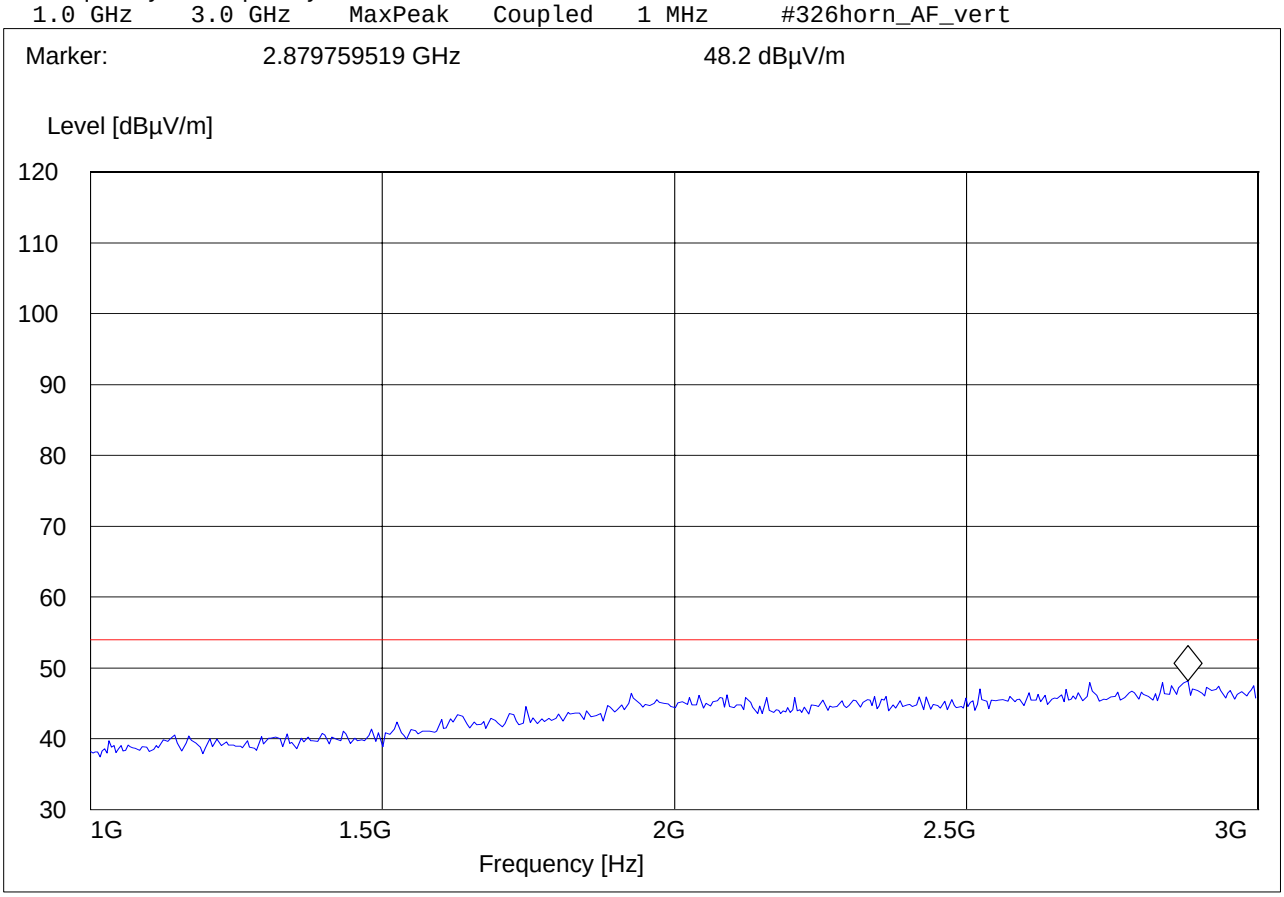
1-3GHz
Note: Peak Reading vs. Average limit

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    WLAN + BT; Receive mode
Antenna:           H
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter w/ USB cable
Sweep:             Canada RE_1-3G
```

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



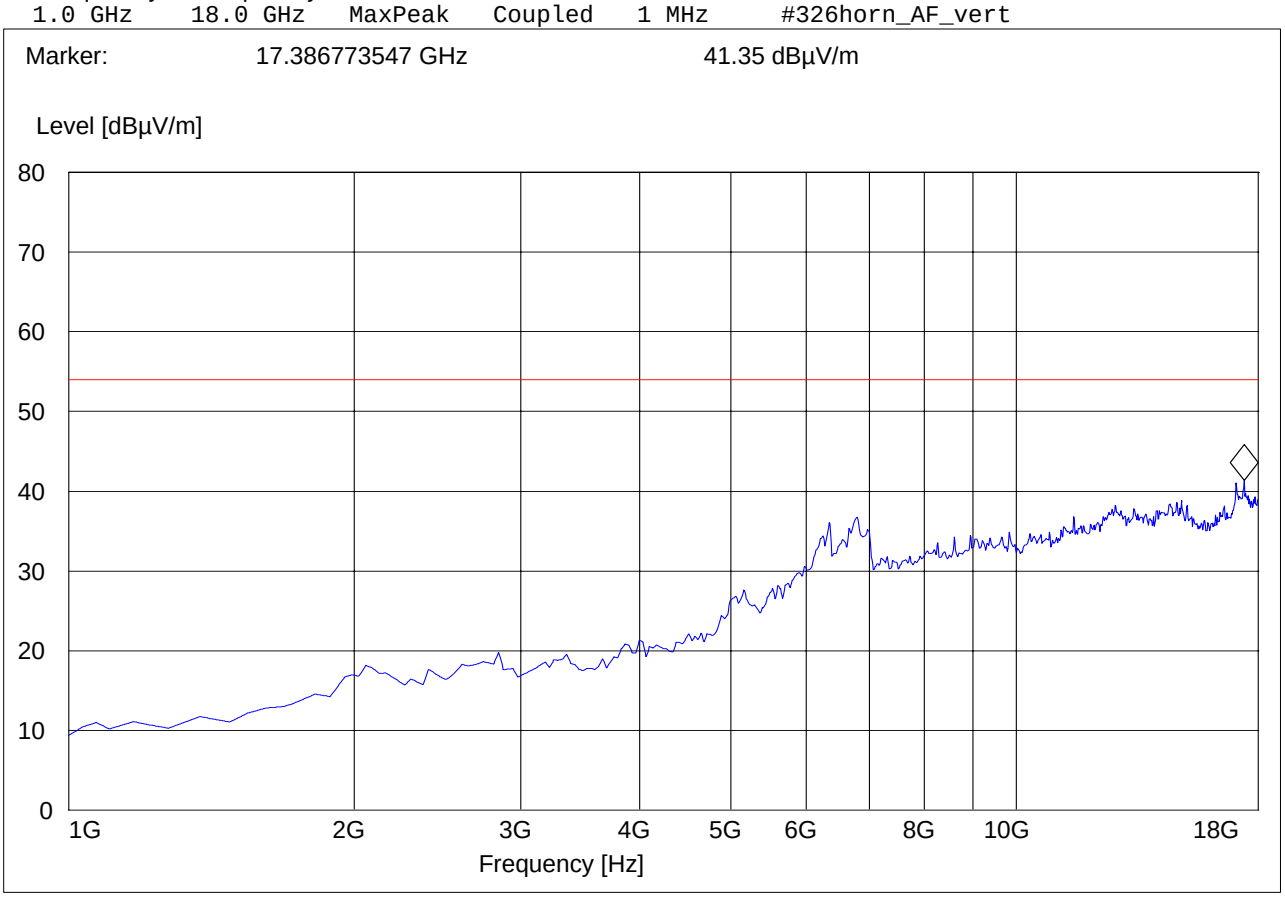
3-18GHz
Note: Peak Reading vs. Average limit

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    WLAN + BT; Receive mode
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter w/ USB cable
Sweep:             Canada RE_3-18G
Sweep:                  CANADA RE_3-18G
```

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



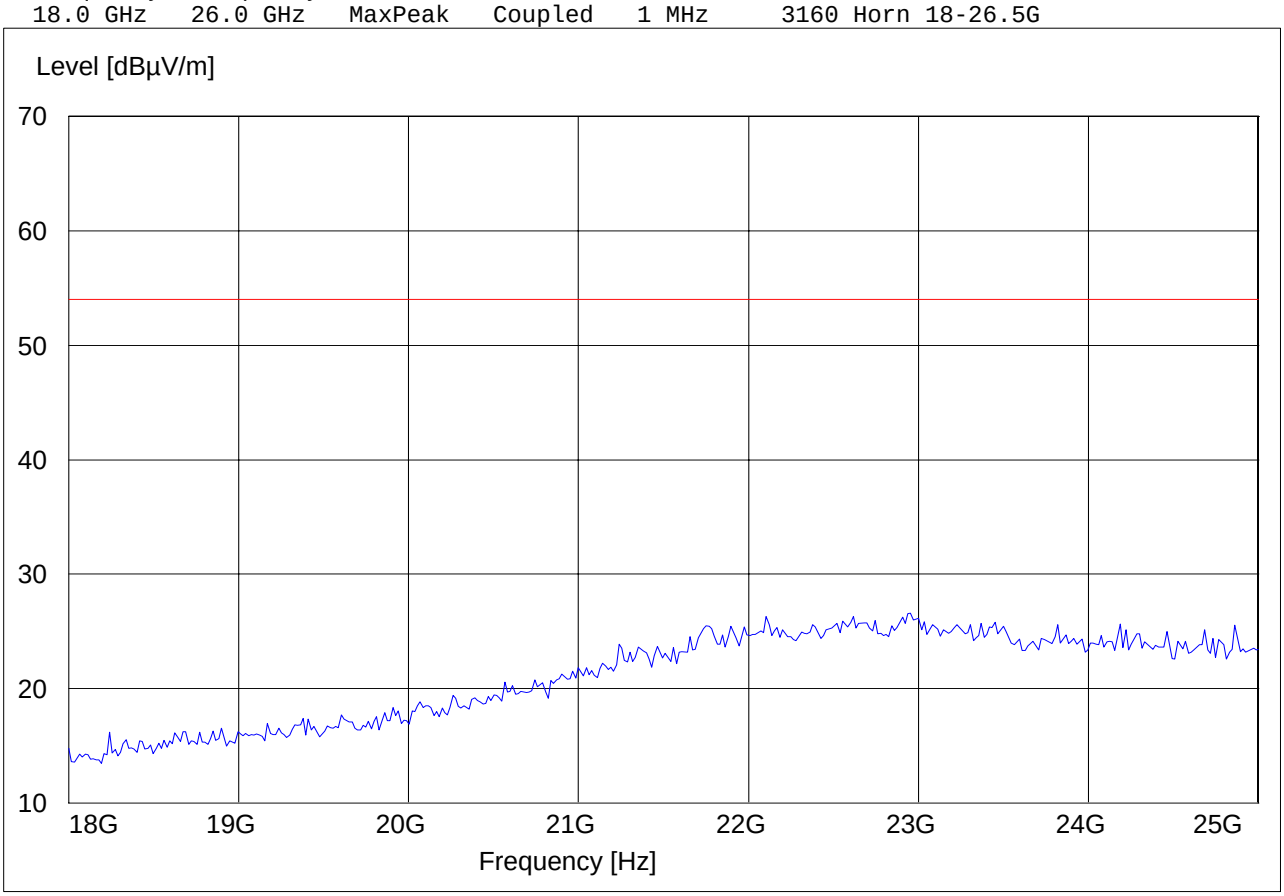
18-25GHz
Note: Peak Reading vs. Average limit

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

```
EUT / Description: PTD7850/B14
Customer:          HHP
Operating Mode:    WLAN + BT; Receive mode
Antenna:           V
EUT:               V
Test Engineer:     Ed
Voltage:           AC Adapter w/ USB cable
Sweep:             Canada RE_18-26.5G
```

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)

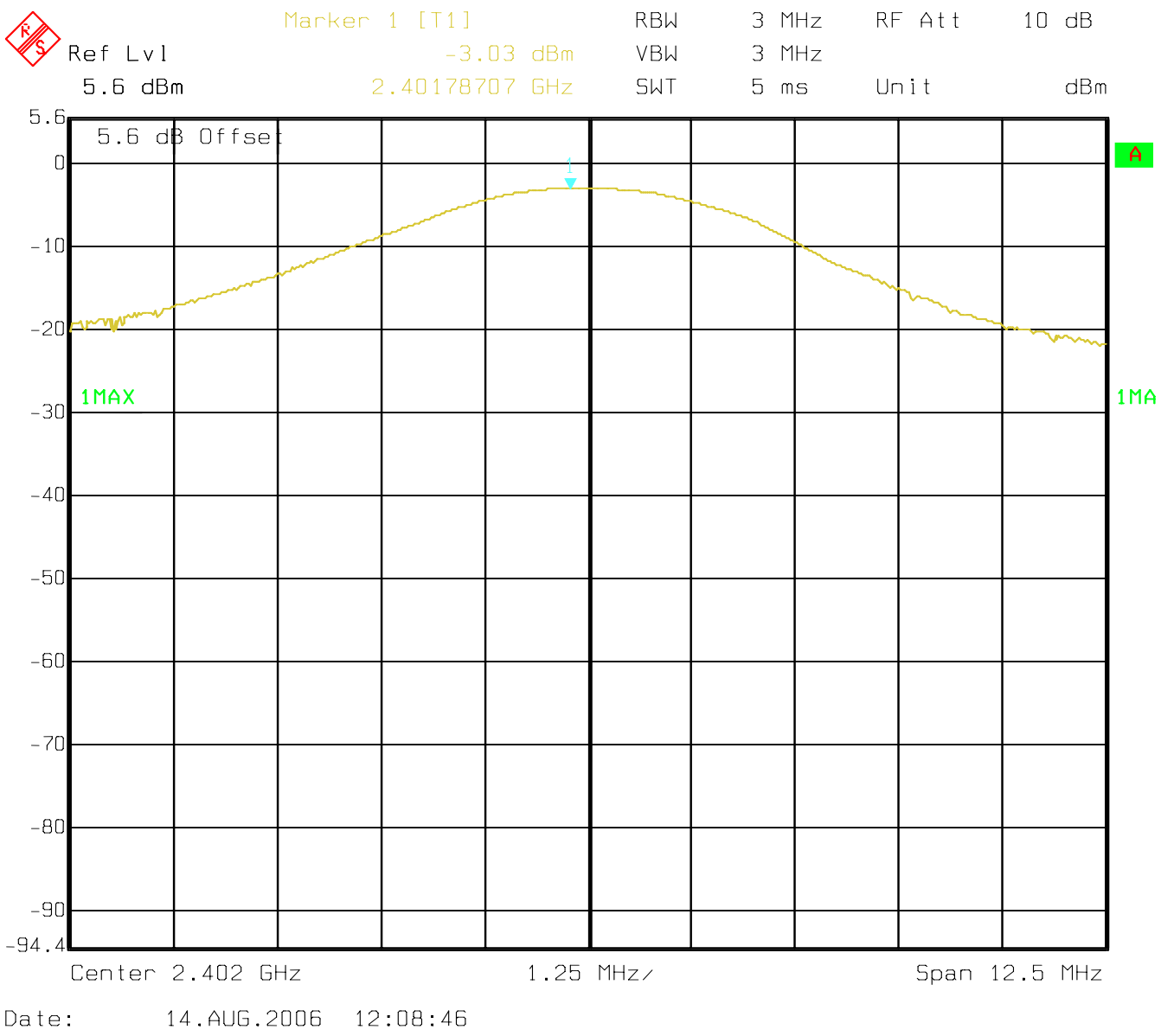
Frequency range	RF power output
2400-2483.5 MHz	30dBm

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

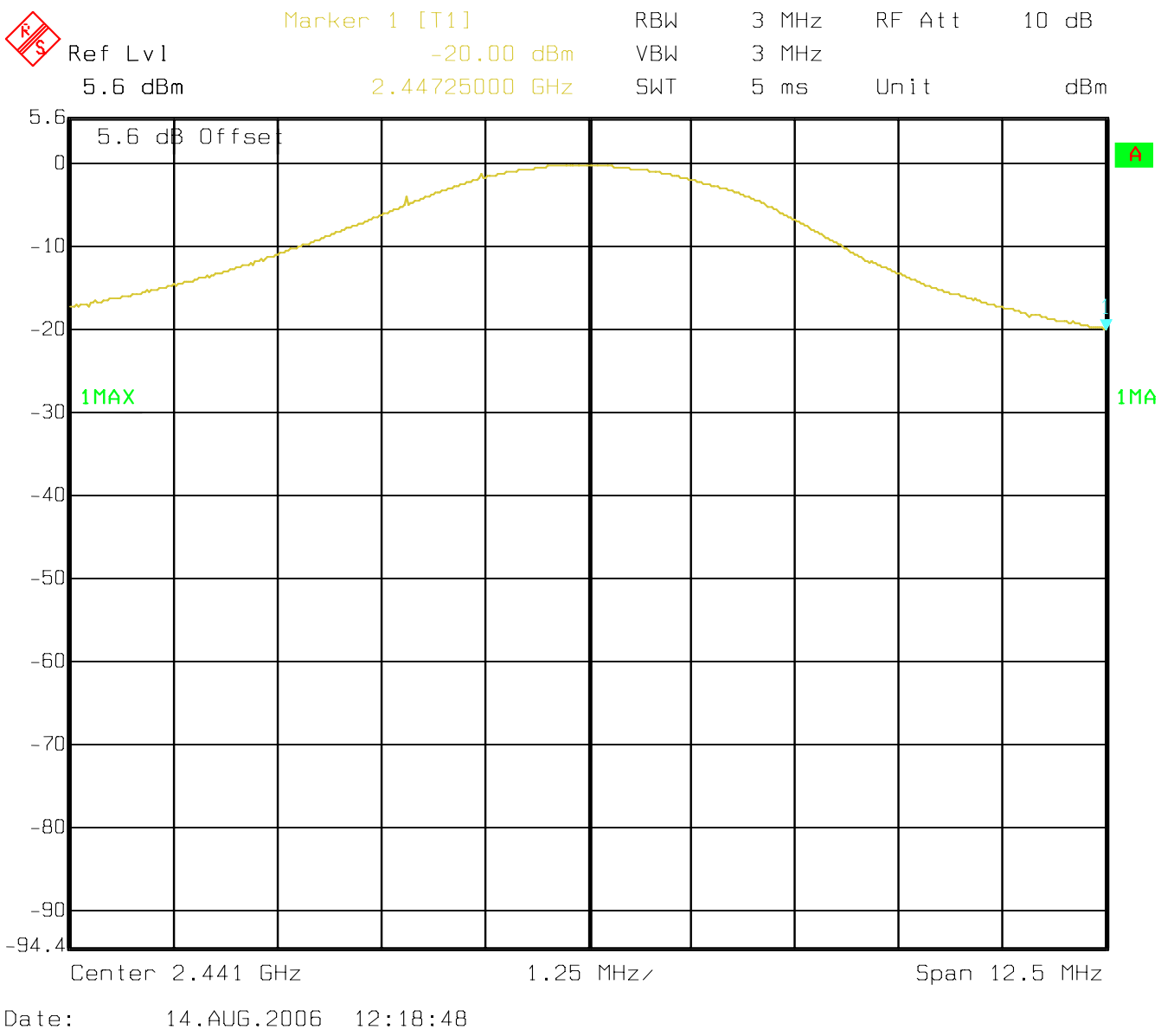
6.1.2 RESULTS:

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402 MHz	2441 MHz	2480 MHz
T_{nom}(23)°C	V_{nom}VDC	-3.03	0	-4.33

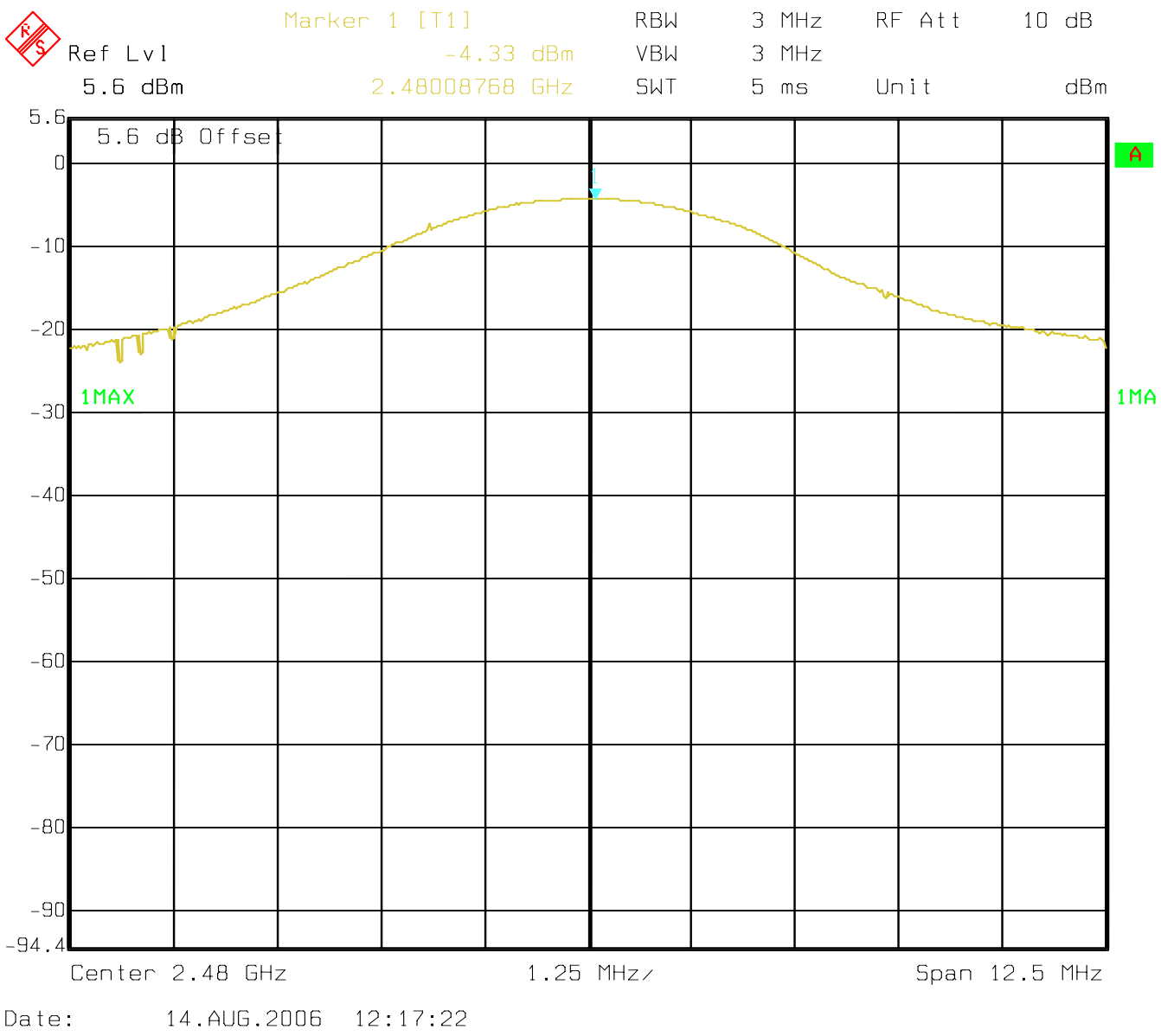
(2402 MHz)


Marker 1 [T1]
-3.03 dBm
2.40178707 GHz
RBW 3 MHz
VBW 3 MHz
SWT 5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
5.6 dBm
5.6 dB Offset
1MAX
1MA
A
5.6
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-94.4
Center 2.402 GHz
1.25 MHz/
Span 12.5 MHz
Date: 14.AUG.2006 12:08:46

(2441 MHz)


Marker 1 [T1]
Ref Lvl
5.6 dBm
-20.00 dBm
2.44725000 GHz
RBW 3 MHz
VBW 3 MHz
SWT 5 ms
RF Att 10 dB
Unit dBm
5.6 dB Offset
1MAX
1MA
A
5.6
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-94.4
Center 2.441 GHz
1.25 MHz/
Span 12.5 MHz
Date: 14.AUG.2006 12:18:48

(2480 MHz)


Marker 1 [T1]
Ref Lvl
5.6 dBm
-4.33 dBm
2.48008768 GHz
RBW 3 MHz
VBW 3 MHz
SWT 5 ms
RF Att 10 dB
Unit dBm
5.6 dB Offset
1MAX
1MA
A
5.6
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-94.4
Center 2.48 GHz
1.25 MHz/
Span 12.5 MHz
Date: 14.AUG.2006 12:17:22

6.2 20dB BANDWIDTH

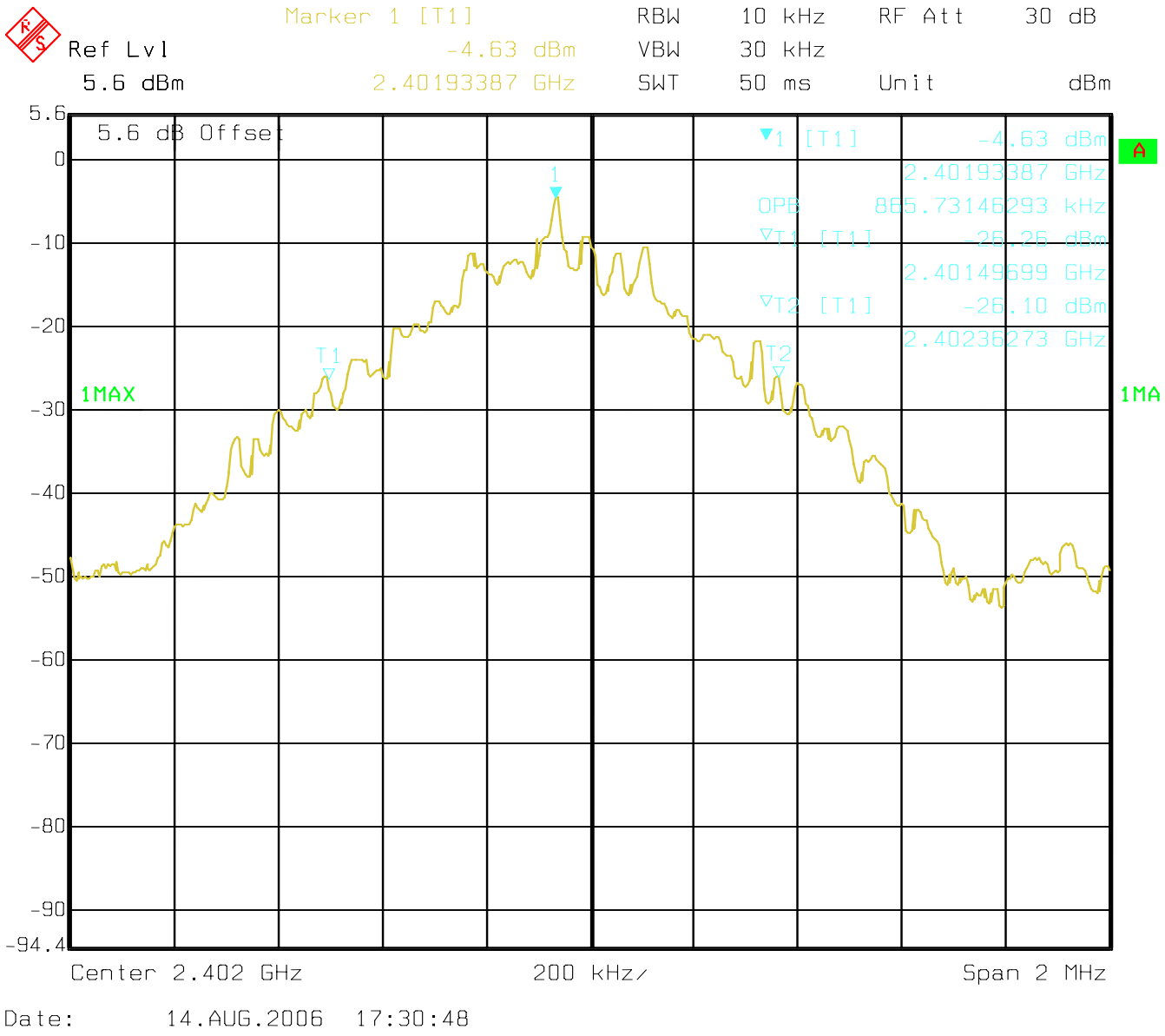
6.2.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

NUMBER OF CHANNELS	BANDWIDTH
79	<1MHz

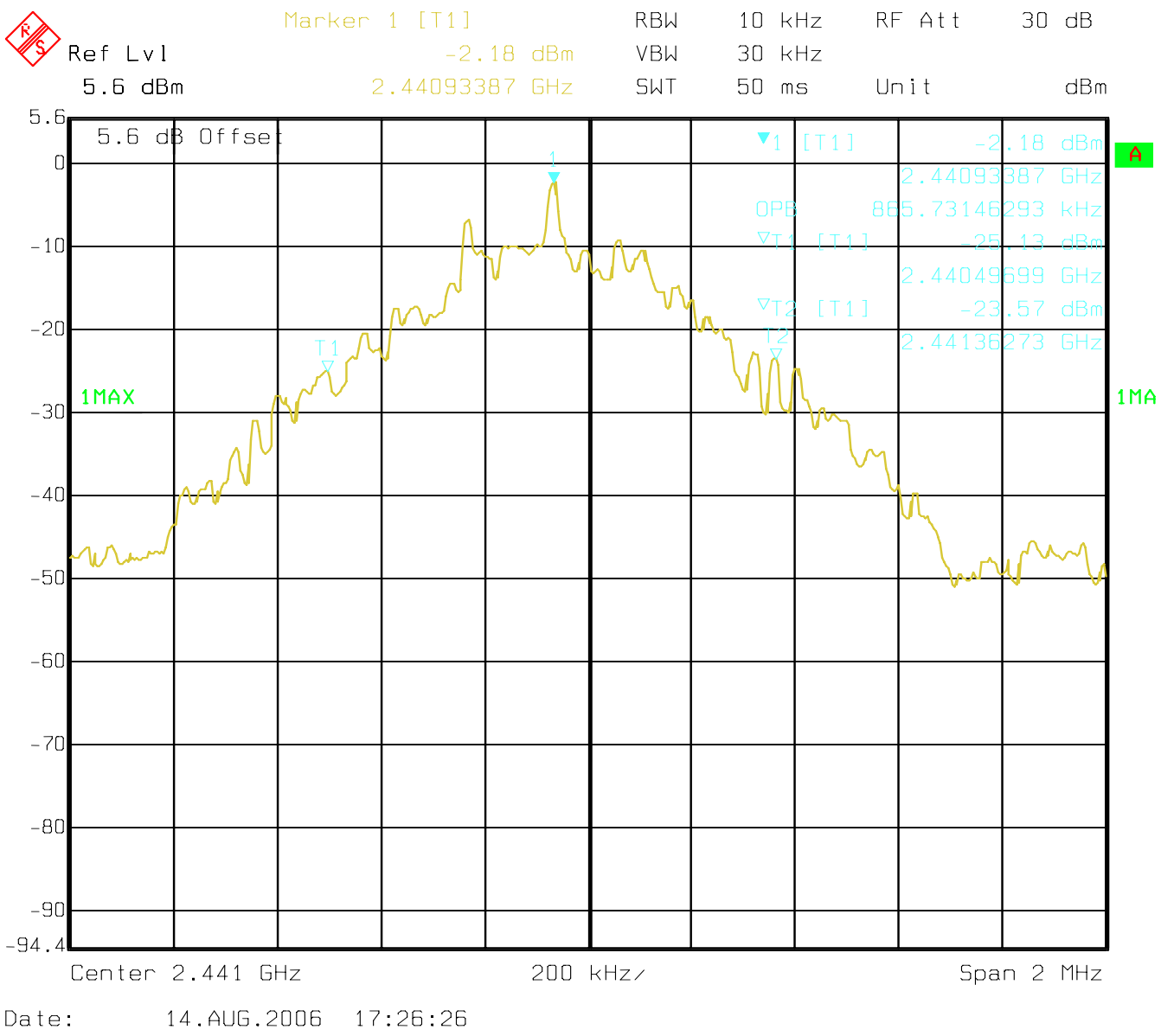
6.2.2 RESULTS:

TEST CONDITIONS		BANDWIDTH (KHz)		
Frequency (MHz)		2402 MHz	2441 MHz	2480 MHz
T_{nom}(23)°C	V_{nom}VDC	865.7	865.7	881.8

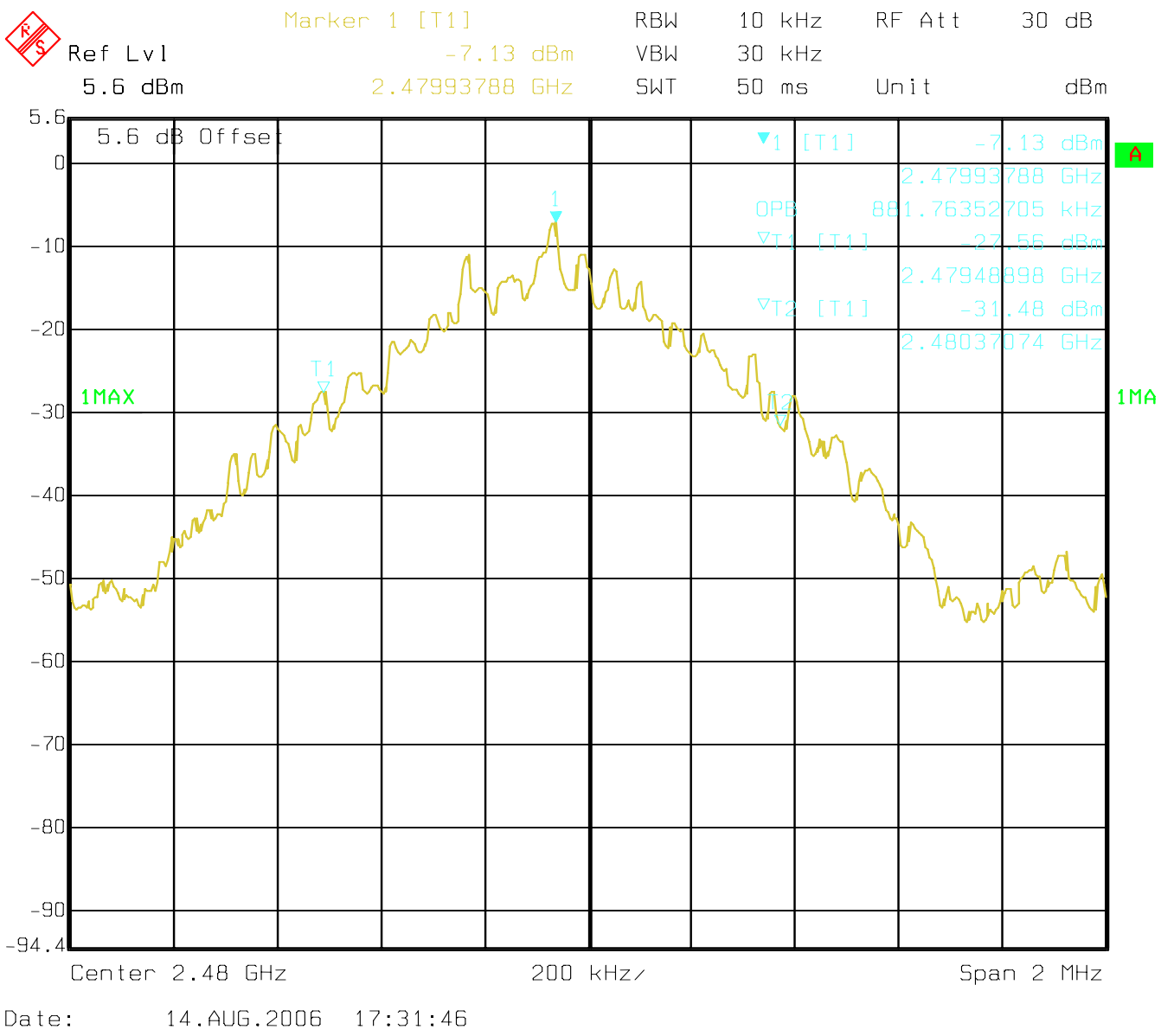
(2402 MHz)


Marker 1 [T1]
-4.63 dBm
2.40193387 GHz
RBW 10 kHz
VBW 30 kHz
SWT 50 ms
RF Att 30 dB
Unit dBm
Ref Lvl
5.6 dBm
5.6 dB Offset
1 [T1] -4.63 dBm
2.40193387 GHz
OPB 865.73146293 kHz
T1 [T1] -26.26 dBm
2.40149699 GHz
T2 [T1] -26.10 dBm
2.40236273 GHz
1MAX
1MA
A
5.6
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-94.4
Center 2.402 GHz
200 kHz/
Span 2 MHz
Date: 14.AUG.2006 17:30:48

(2441 MHz)


Marker 1 [T1]
Ref Lvl
5.6 dBm
-2.18 dBm
2.44093387 GHz
RBW 10 kHz
VBW 30 kHz
SWT 50 ms
RF Att 30 dB
Unit dBm
5.6 dB Offset
1 [T1] -2.18 dBm
2.44093387 GHz
OPB 865.73146293 kHz
T1 [T1] -25.13 dBm
2.44049699 GHz
T2 [T1] -23.57 dBm
2.44136273 GHz
1MAX
1MA
A
5.6
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-94.4
Center 2.441 GHz
200 kHz/
Span 2 MHz
Date: 14.AUG.2006 17:26:26

(2480 MHz)


Marker 1 [T1]
RBW 10 kHz
RF Att 30 dB
Ref Lvl
-7.13 dBm
VBW 30 kHz
5.6 dBm
2.47993788 GHz
SWT 50 ms
Unit dBm
5.6 dB Offset
1 [T1] -7.13 dBm
2.47993788 GHz
OPB 881.76352705 kHz
T1 [T1] -27.56 dBm
2.47948898 GHz
T2 [T1] -31.48 dBm
2.48037074 GHz
A
1MAX
1MA
5.6
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-94.4
Center 2.48 GHz
200 kHz/
Span 2 MHz
Date: 14.AUG.2006 17:31:46

6.3 CARRIER FREQUENCY SEPARATION

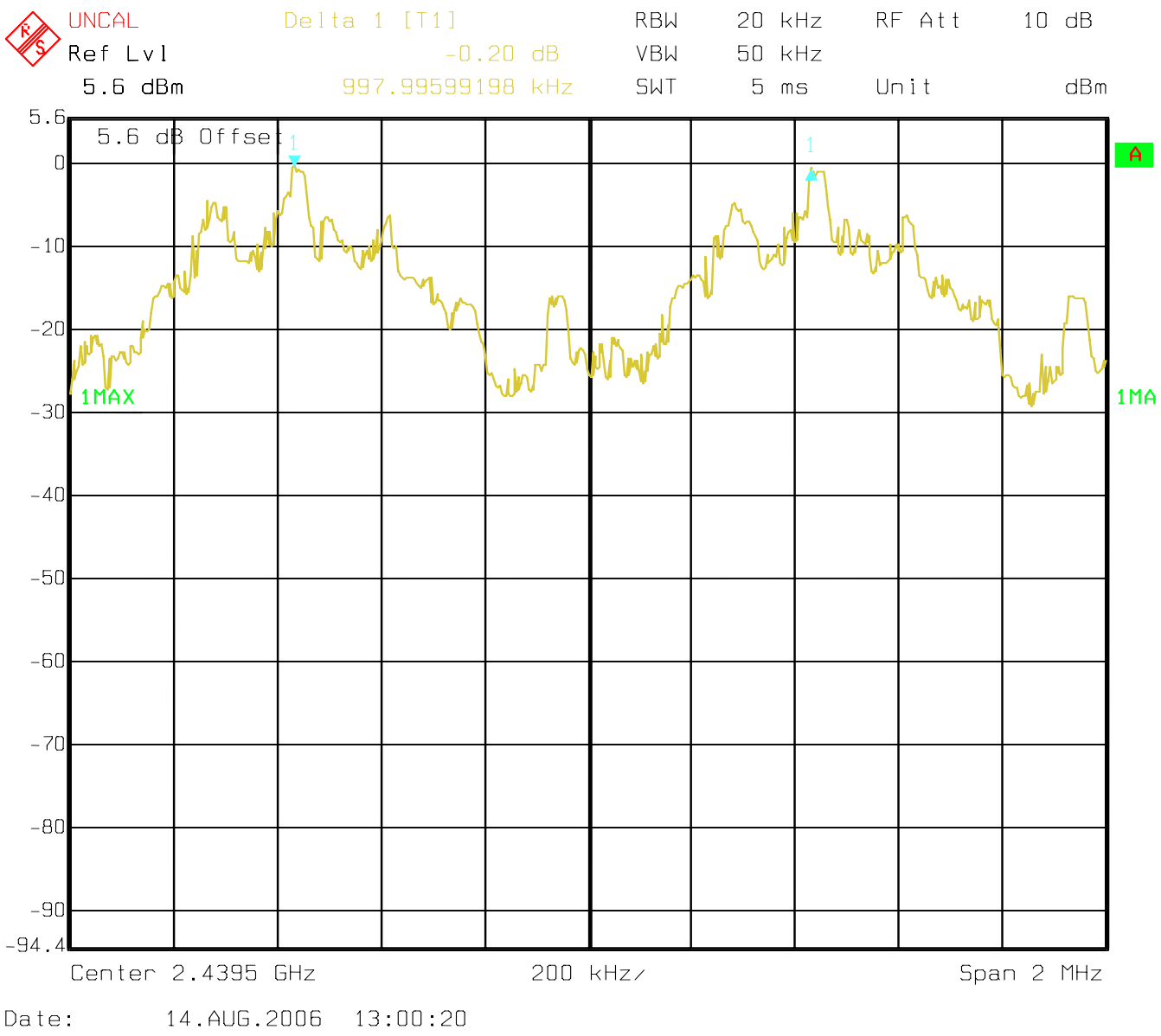
6.3.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

SEPARATION
> 25 KHz or > 20 dB BANDWIDTH

6.3.2 RESULTS:

TEST CONDITIONS		SEPARATION (MHz)
T_{nom}(23)°C	V_{nom}VDC	0.998

(plot)


UNCAL
Delta 1 [T1]
RBW 20 kHz
RF Att 10 dB
Ref Lvl
-0.20 dB
VBW 50 kHz
5.6 dBm
997.99599198 kHz
SWT 5 ms
Unit dBm
5.6 dB Offset
5.6
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-94.4
1MAX
1MA
A
Center 2.4395 GHz
200 kHz/
Span 2 MHz
Date: 14.AUG.2006 13:00:20

6.4 NUMBER OF HOPPING CHANNELS

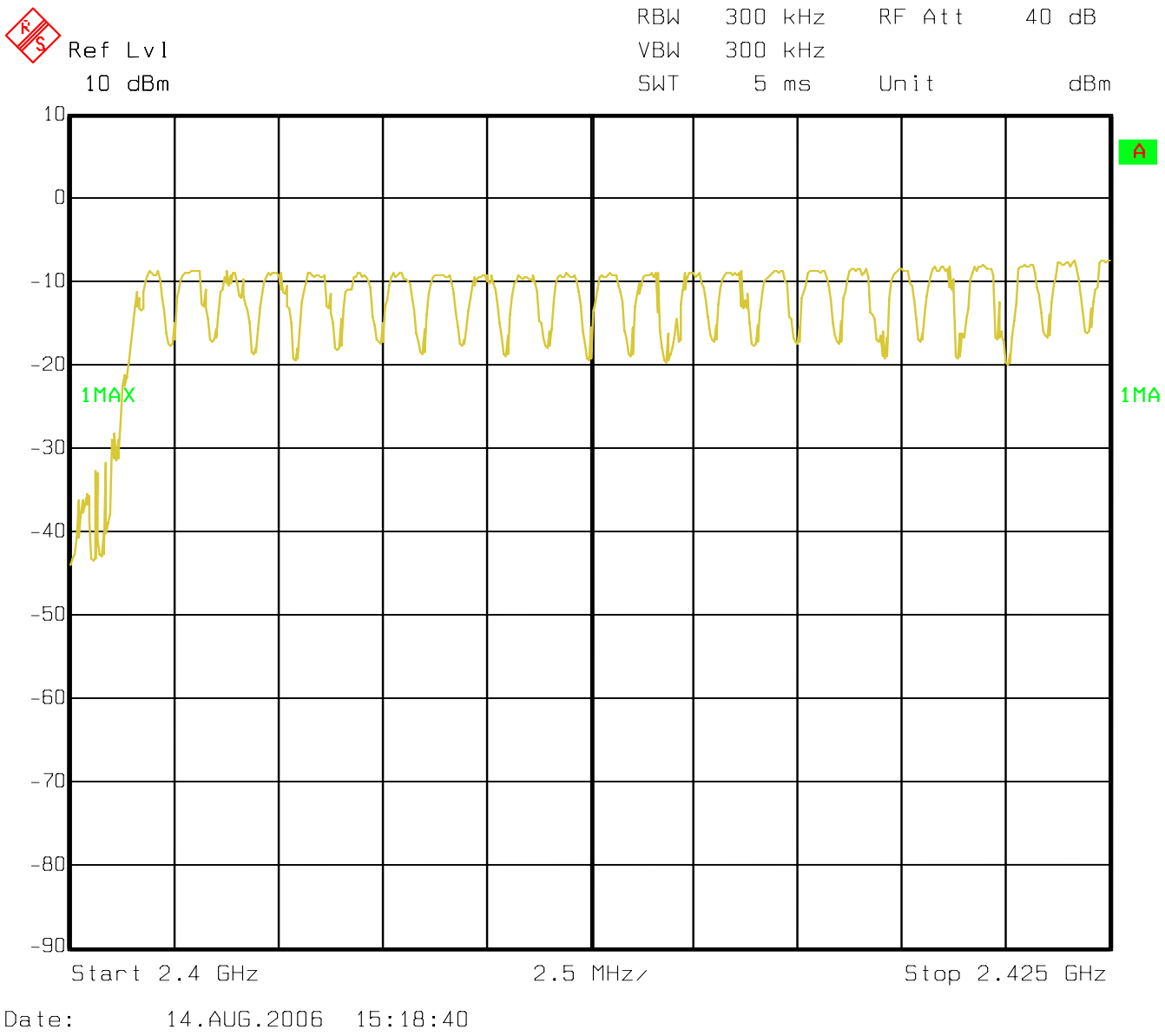
6.4.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (iii)

NUMBER OF CHANNELS
> 15

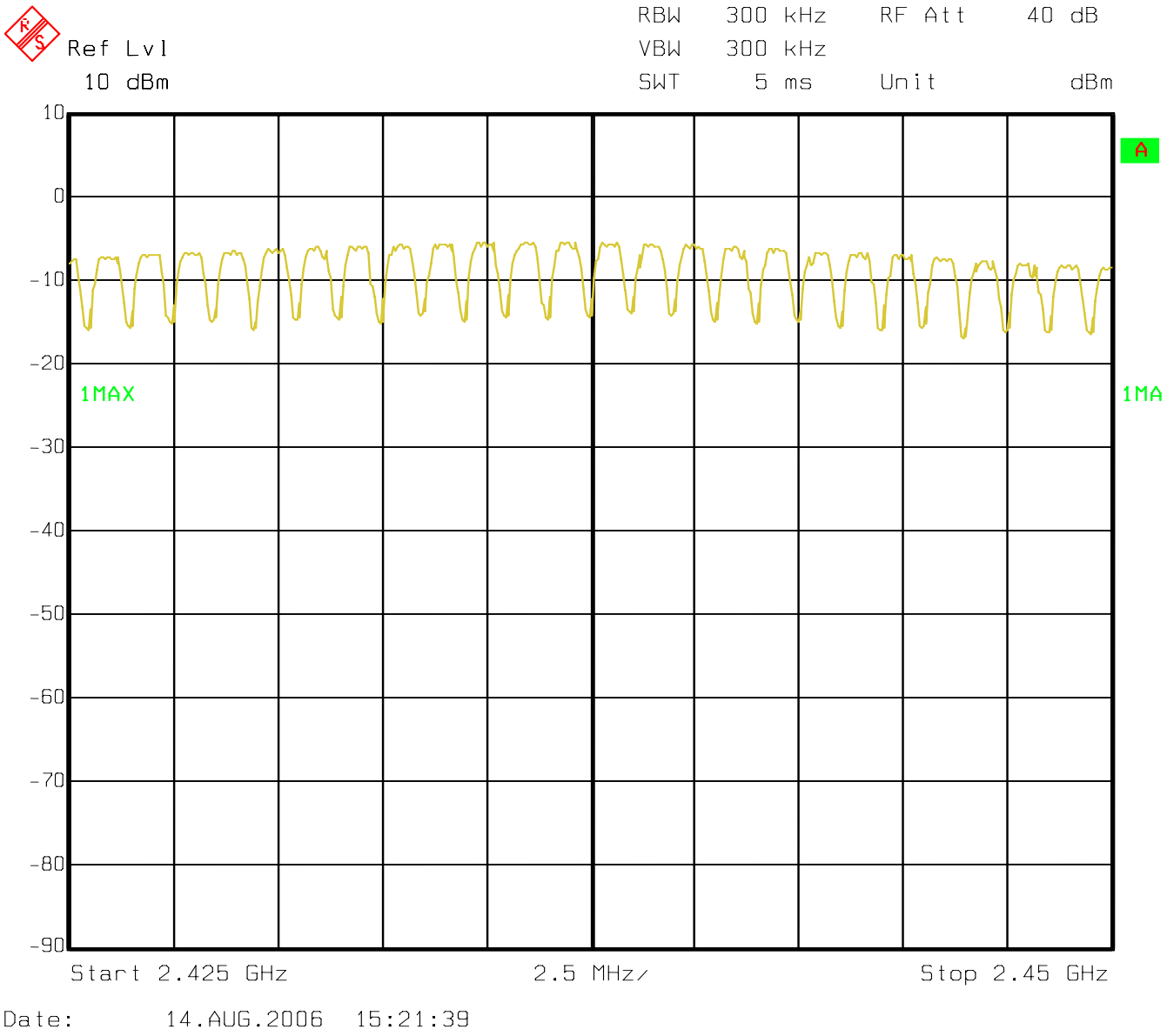
6.4.2 RESULTS:

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

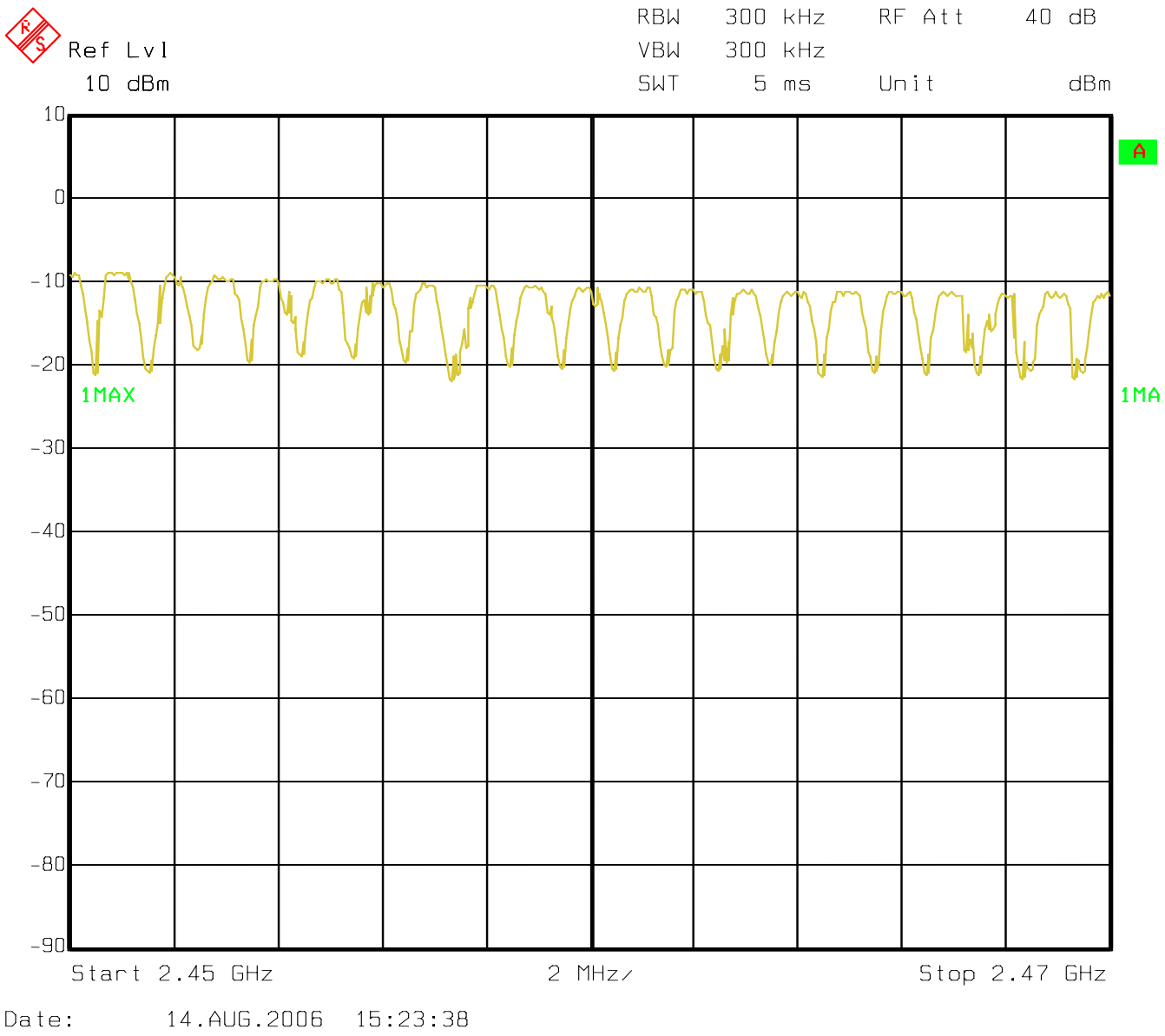
(PLOT 1)
(F1-F2=2402MHz to 2425MHz)



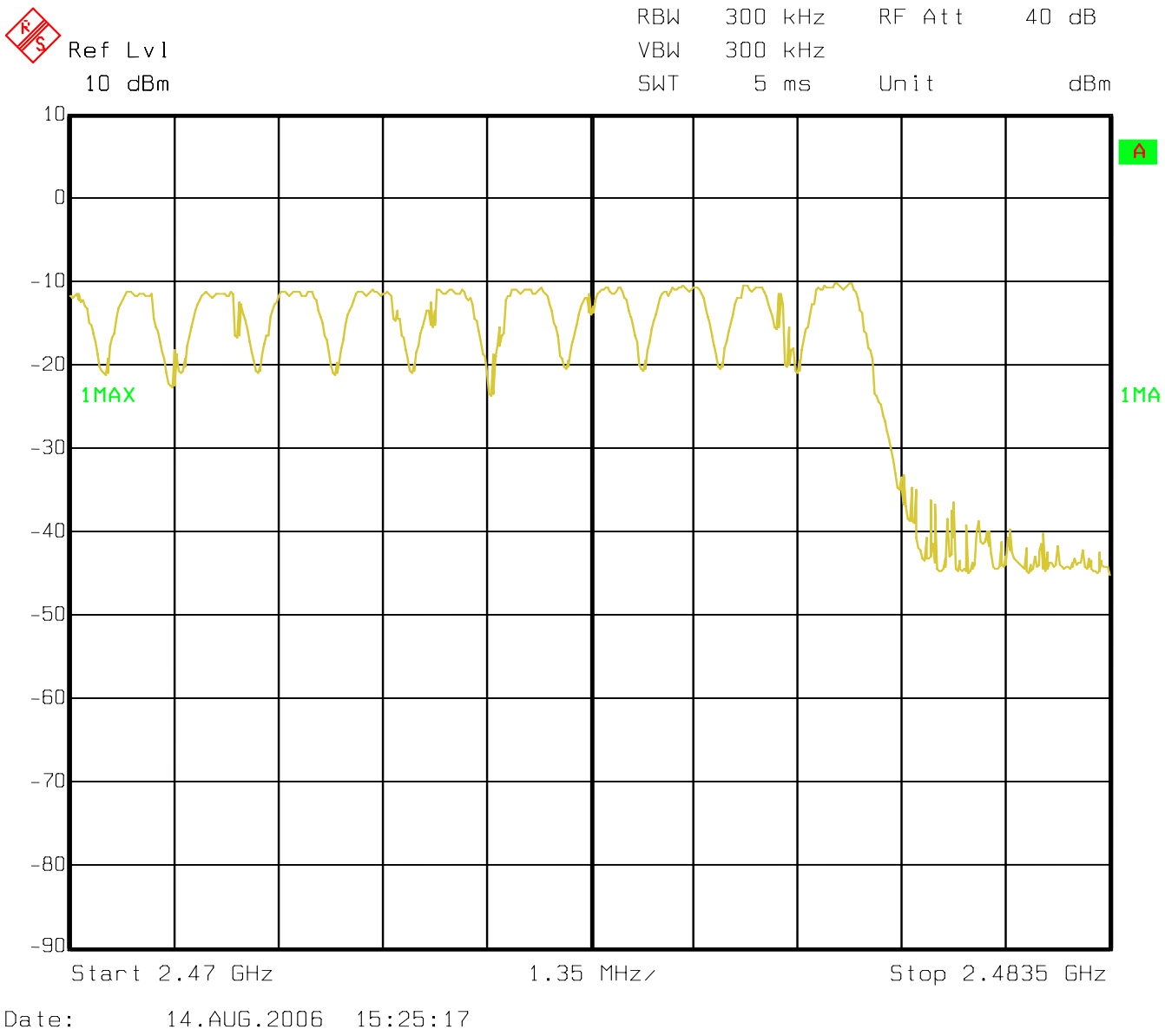
(PLOT 2)
(F1-F2=2425MHz to 2450MHz)



(PLOT 3)
(F1-F2=2450MHz to 2470MHz)



(PLOT 4)
(F1-F2=2470MHz to 2480MHz)



6.5 TIME OF OCCUPANCY (DWELL TIME)

6.5.1 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

6.5.2 RESULTS:

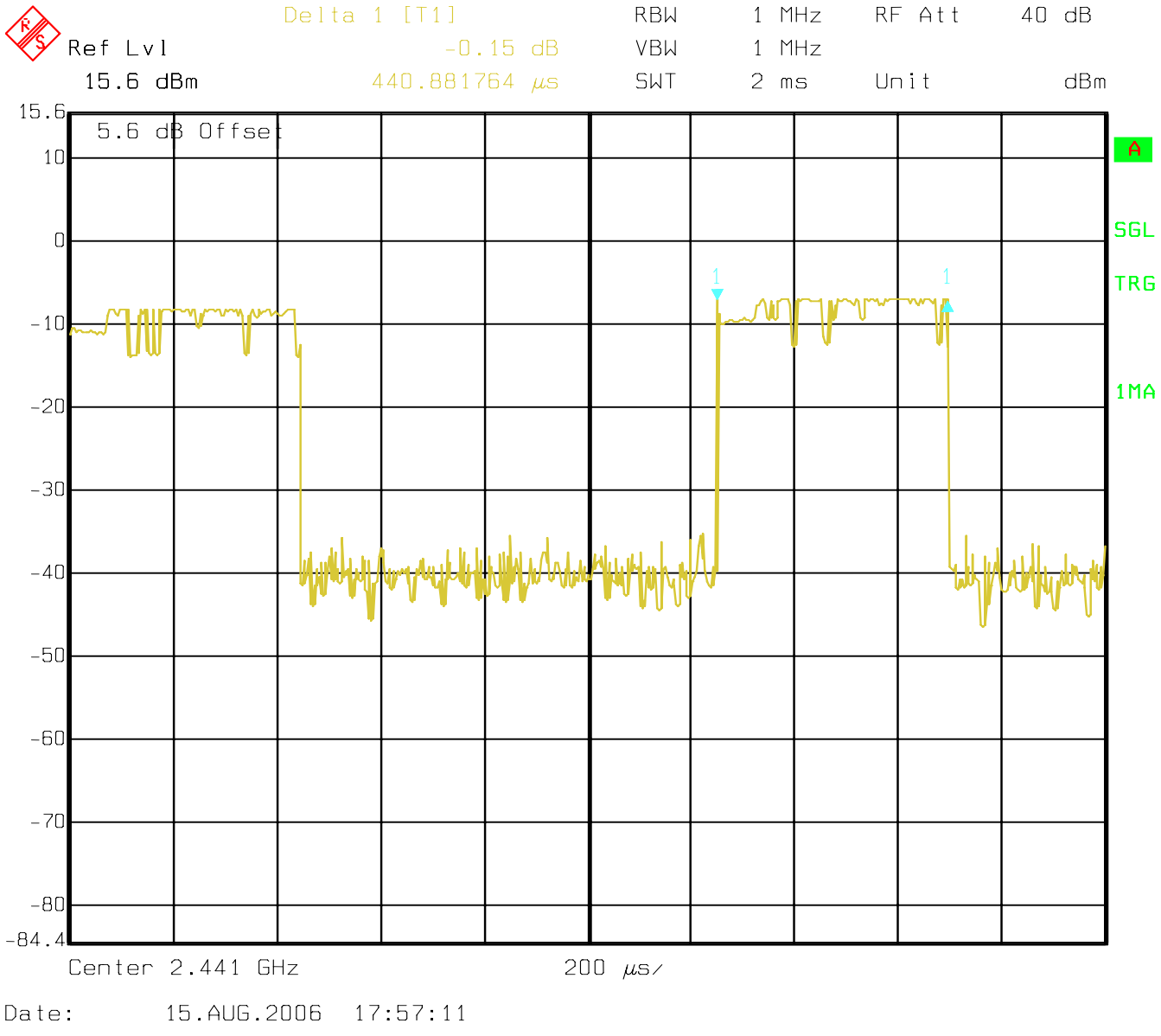
TEST CONDITIONS		TIME OF OCCUPANCY IN 31.6 SECONDS		
PACKET TYPE		DH1	DH3	DH5
T_{nom}(23)°C	V_{nom}VDC	0.440	1.703	2.936

(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 440.9µs.

So we have 320.108 * 440.9µs = 141.3ms per 31.6 seconds.

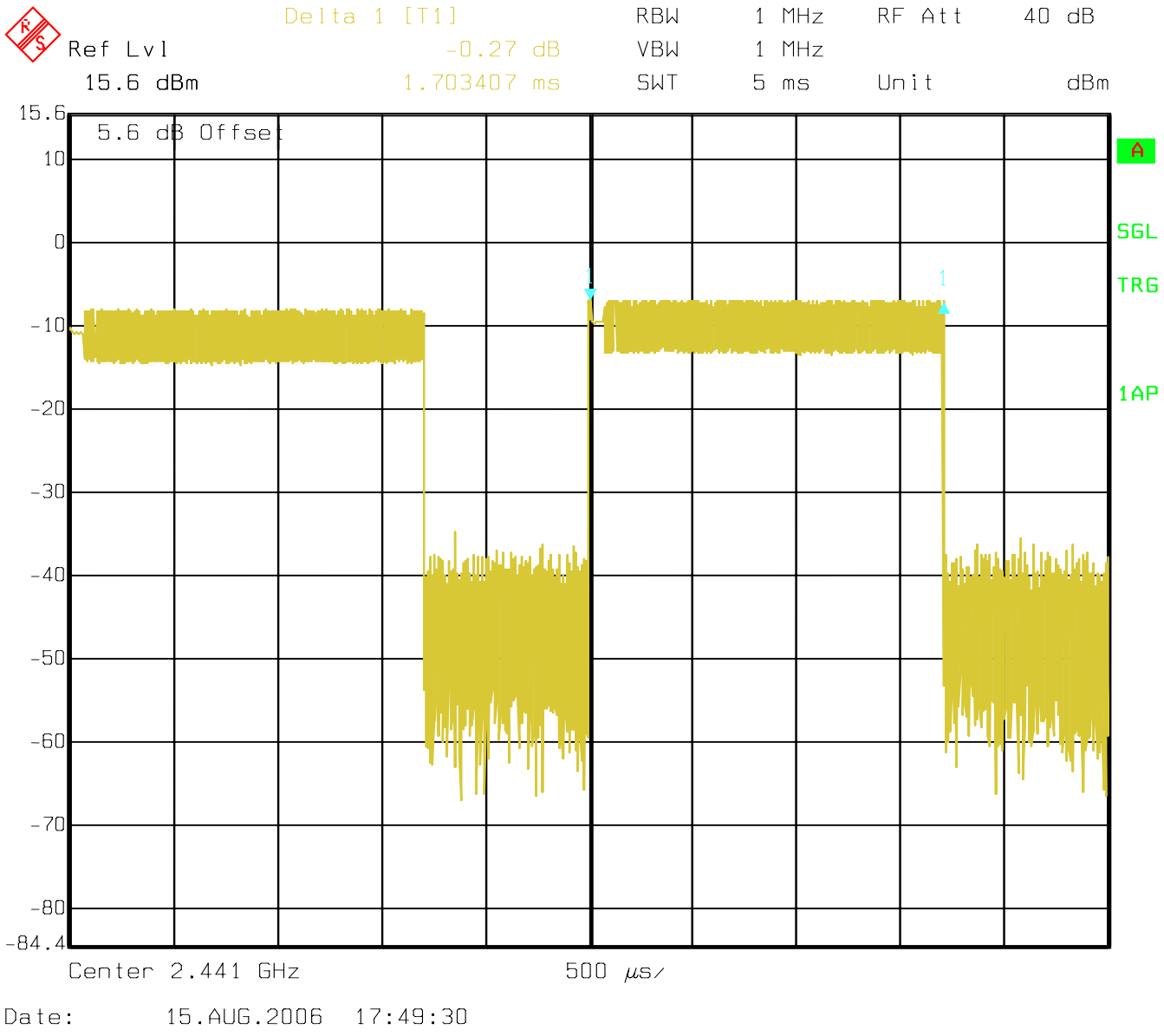


(DH3)

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 1.703ms.

So we have 161.16 * 1.703ms = 274.5ms per 31.6 seconds.

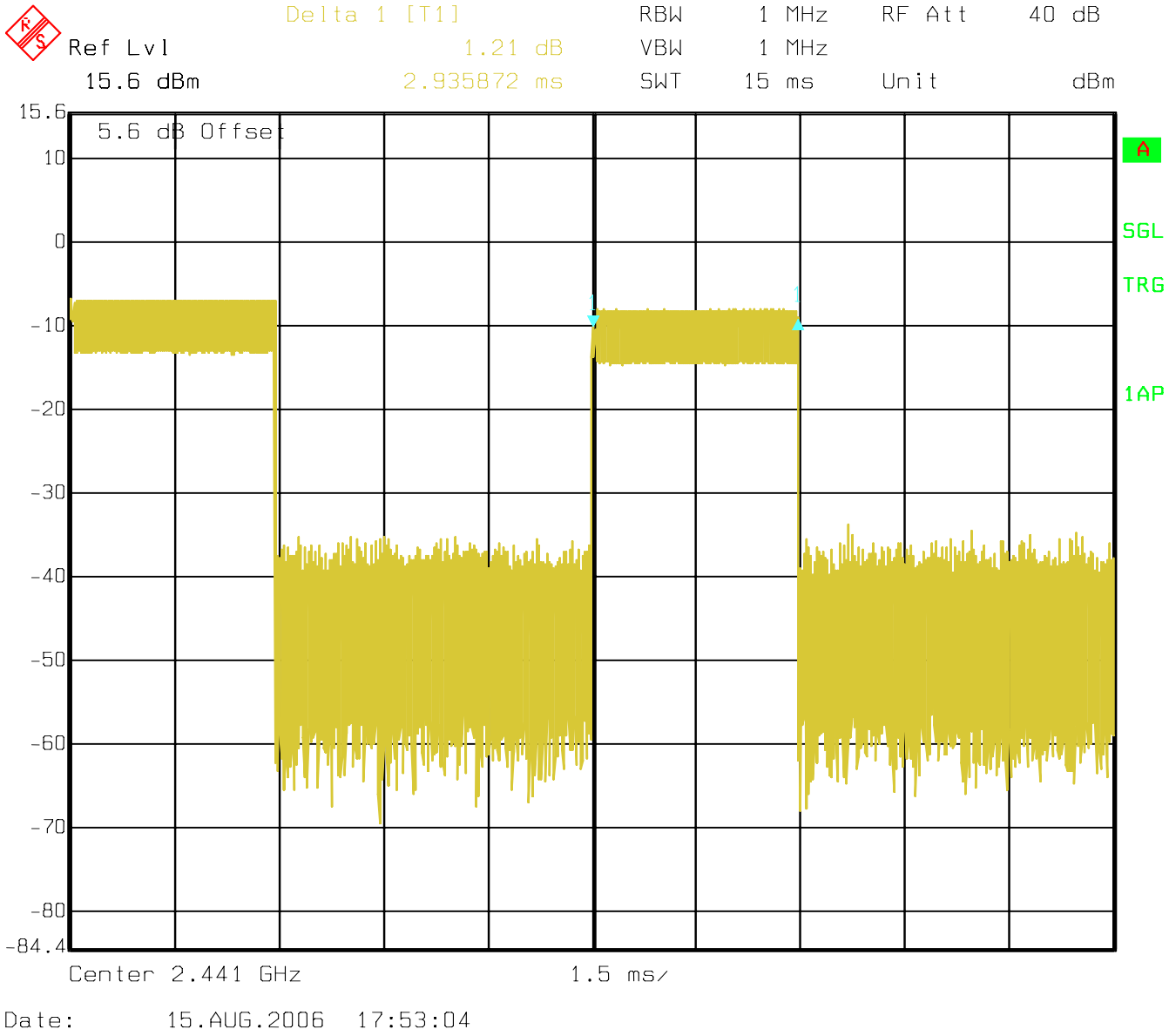


(DH5)

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 2.936ms.

So we have 106.176 * 2.936ms = 311.8ms per 31.6 seconds.

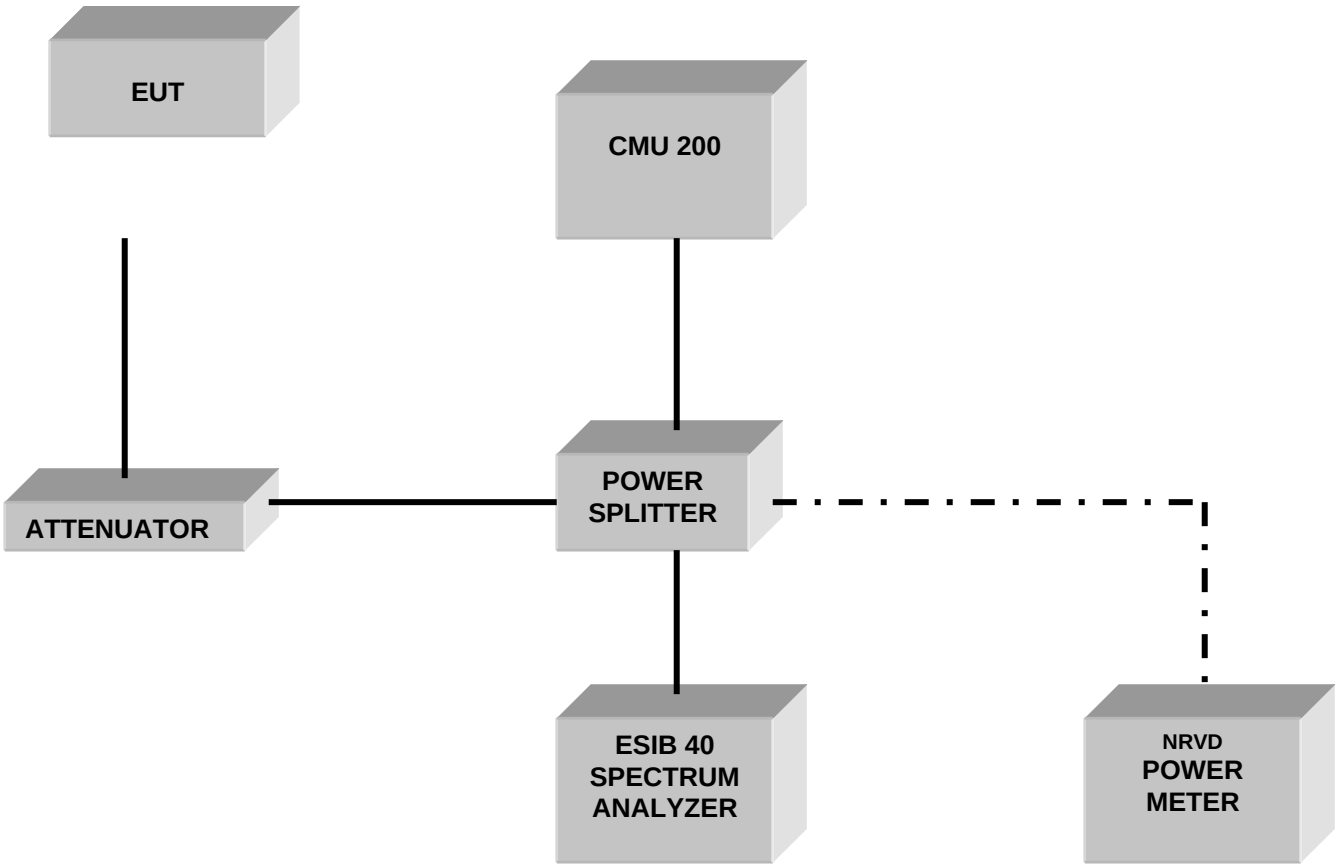


7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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