



FCC Test Report

FCC Part 15.247 for FHSS systems/ CANADA RSS-210

FOR:

Portable Data Terminal with
BT BGB203 and
WLAN BGW200

MODEL #: 7850LPGE

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

**FCC ID: HD57850LPGE
IC ID: 1693B-7850GE**

**TEST REPORT #: EMC_INTRI_002_06002_15.247_BT_1
DATE: 2006-10-17**



**FCC listed#
101450
IC recognized #
3925**

CETECOM Inc.

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CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
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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	7850LPGE

A handwritten signature in black ink that reads "Michael Grings". The signature is written in a cursive, flowing style.

Michael Grings
Project Engineer

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:	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:	7850LPGE
Hardware Revision:	2.0
Software Revision :	14.02
FCC ID:	HD57850LPGE
IC ID:	1693B-7850GE
Frequency Range:	2402-2483.5MHz
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
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4 Subject Of Investigation

All testing was performed on the PDT7850 referred 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

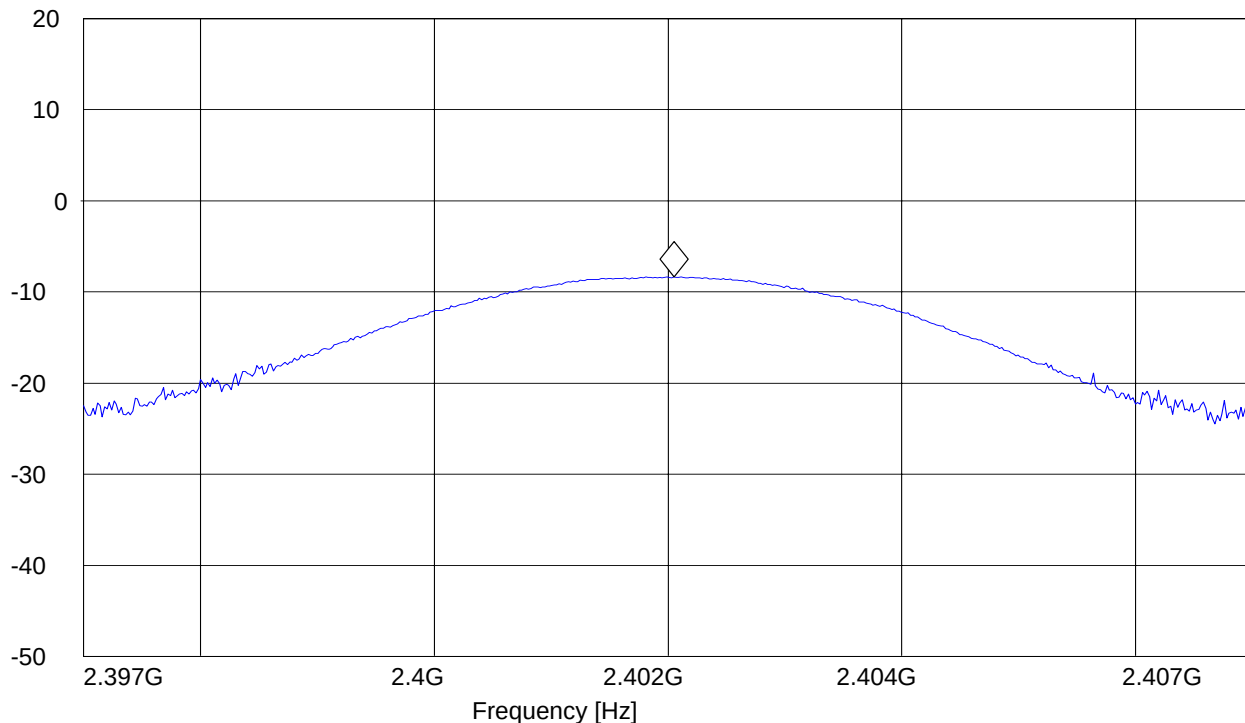
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT; CHAN 0, WLAN OFF, max sig at 160° rotation, eut horiz
Antenna: V
EUT: H
Test Engineer: Ed
Voltage: Battery mode
Sweep: EIRP BT low channel

SWEEP TABLE: "EIRP BT low channel"

Short Description:		EIRP Bluetooth channel-2402MHz			
Start	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.4 GHz	2.4 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
MaxPeak					

Marker: 2.4020501 GHz -8.32 dBm

Level [dBm]





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

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

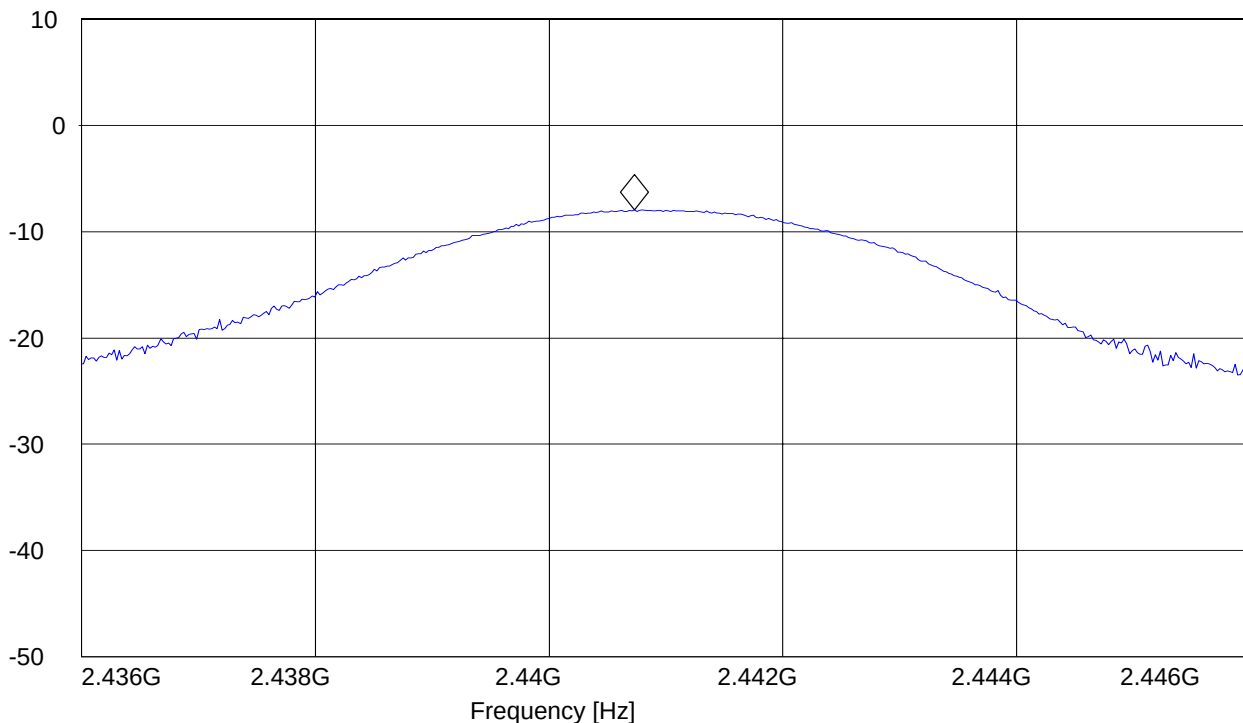
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT; CHAN 39, WLAN OFF, max sig at 160° rotation, eut horiz
Antenna: V
EUT: H
Test Engineer: Ed
Voltage: Battery mode
Sweep: EIRP BT mid channel

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

Marker: 2.440731463 GHz -7.93 dBm

Level [dBm]





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

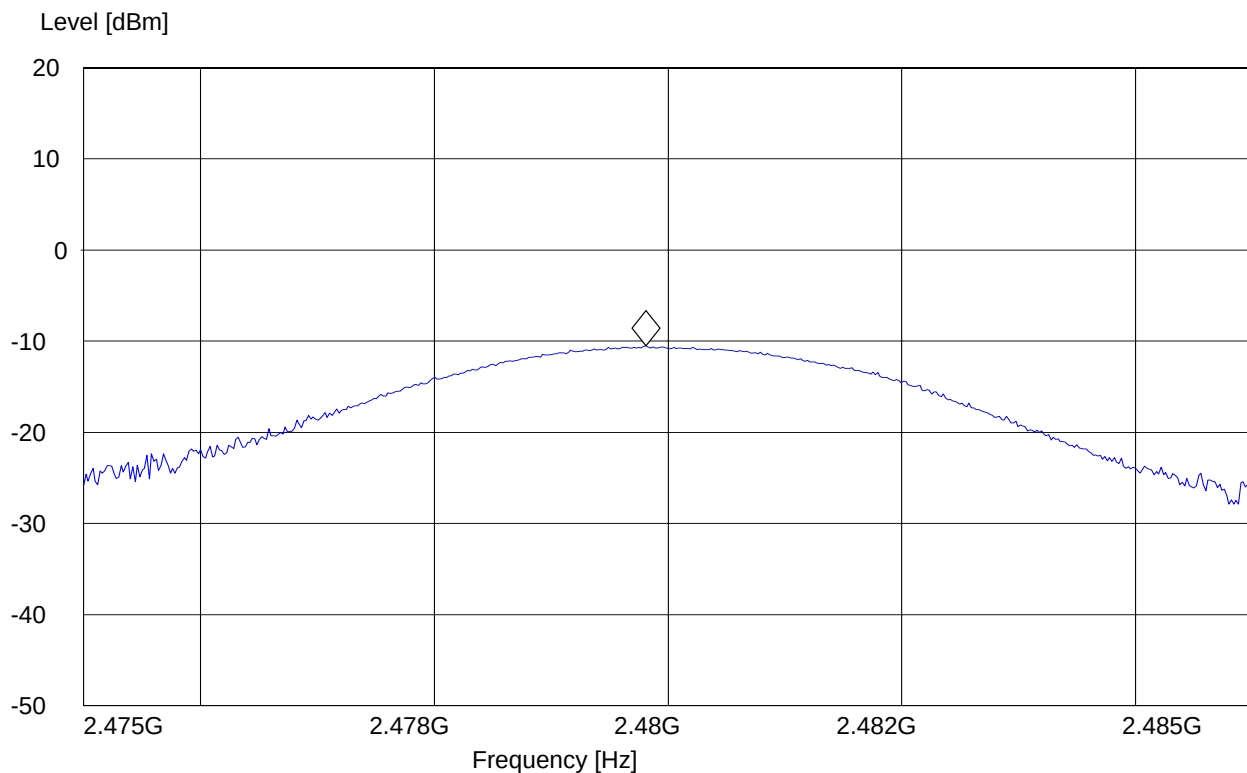
CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

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	Stop	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
2.5 GHz	2.5 GHz	MaxPeak	Coupled	3 MHz	DUMMY-DBM
MaxPeak					

Marker: 2.479809619 GHz -10.5 dBm





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)

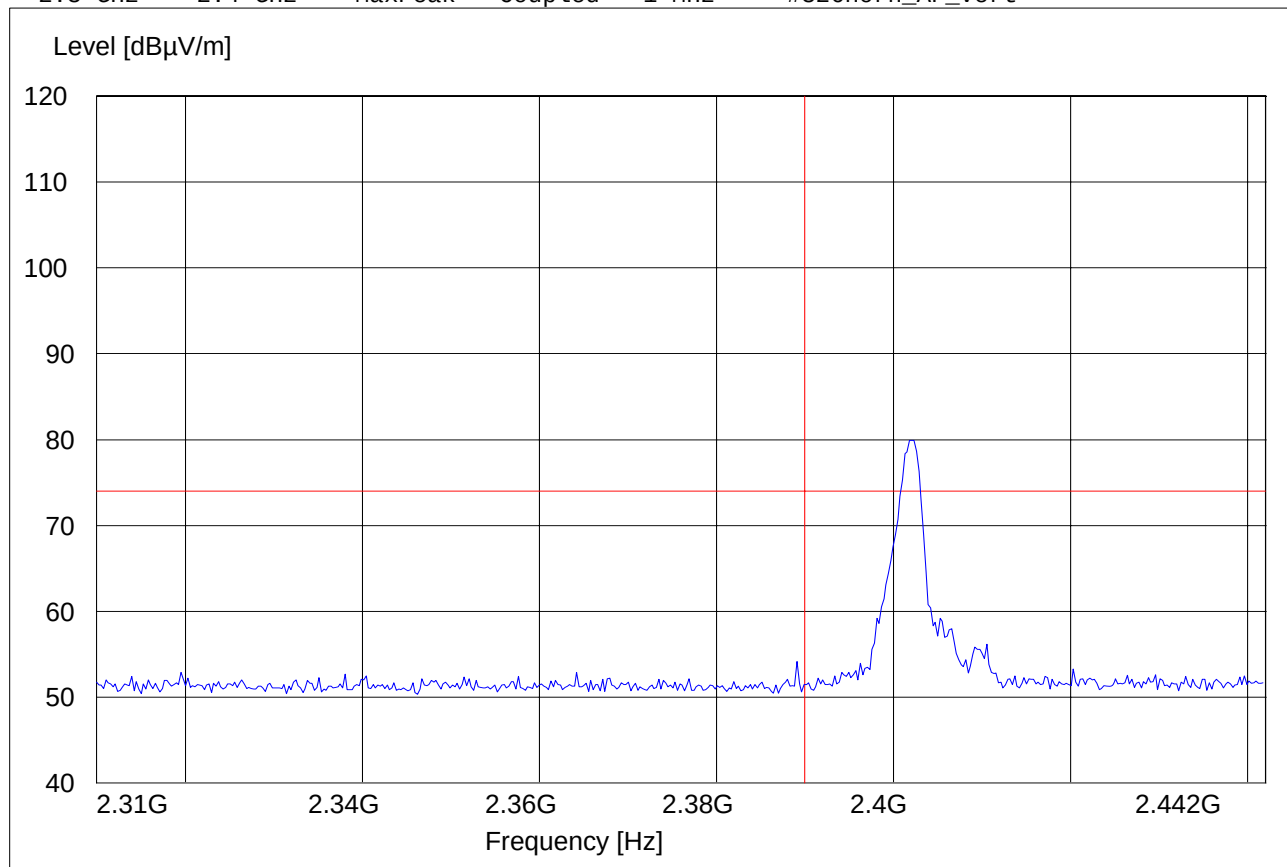
PEAK

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

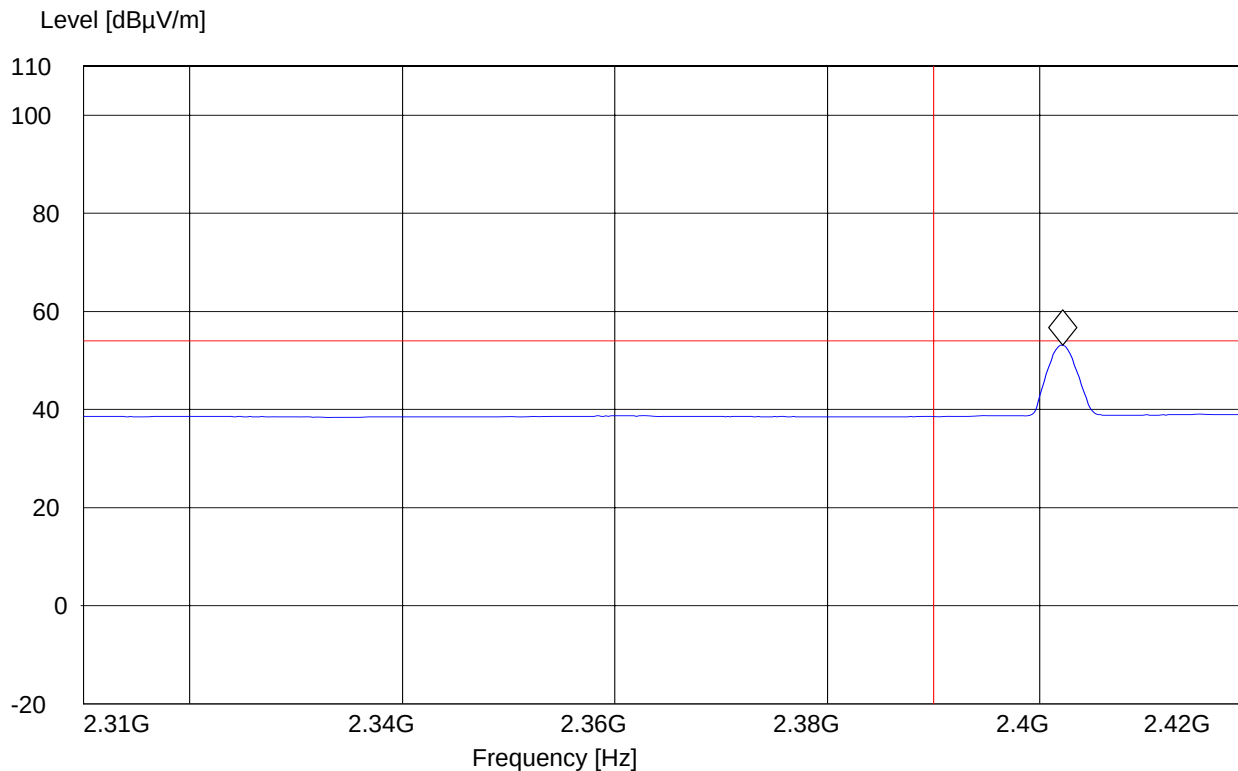
CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

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

Marker: 2.402144289 GHz 53.17 dBμV/m





5.2.3 RESULTS (2480MHz) PEAK

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

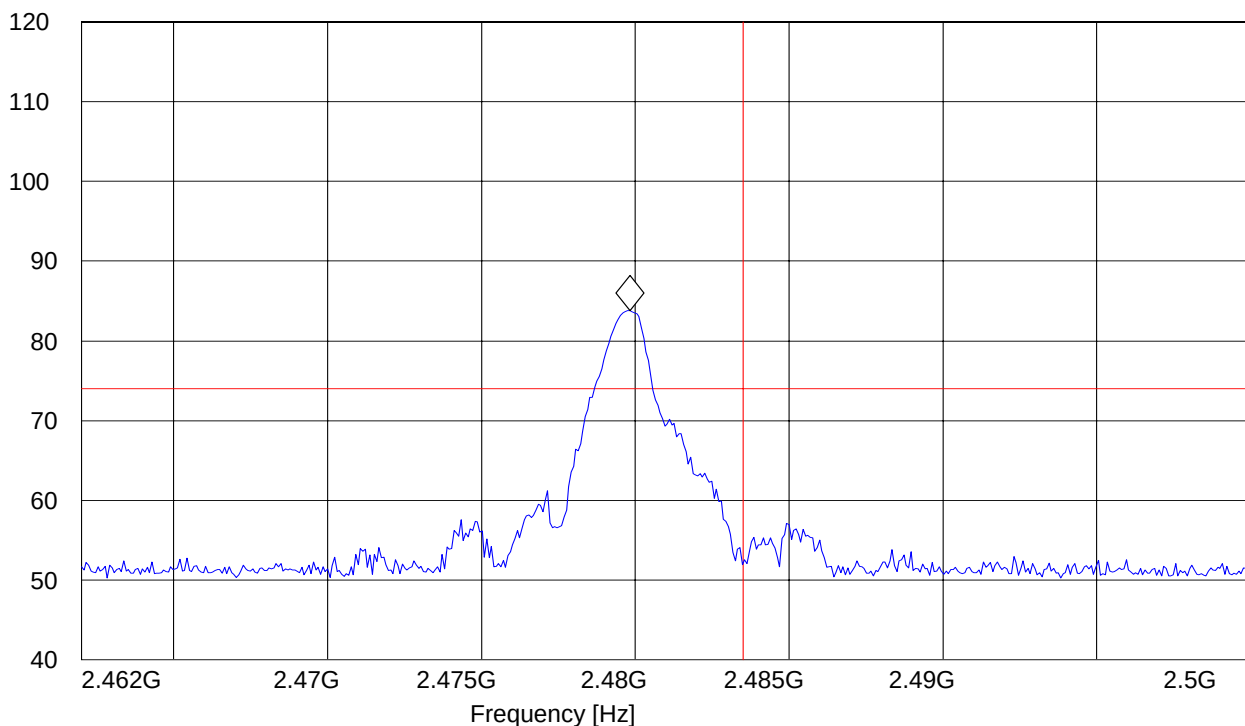
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT; CHAN 0, WLAN OFF
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter w/ USB cable
Sweep: FCC 15.247 HBE_PK

SWEEP TABLE: "FCC15.247 HBE_PK"

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

Marker: 2.479819639 GHz 83.77 dBμV/m

Level [dBμV/m]





AVG

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

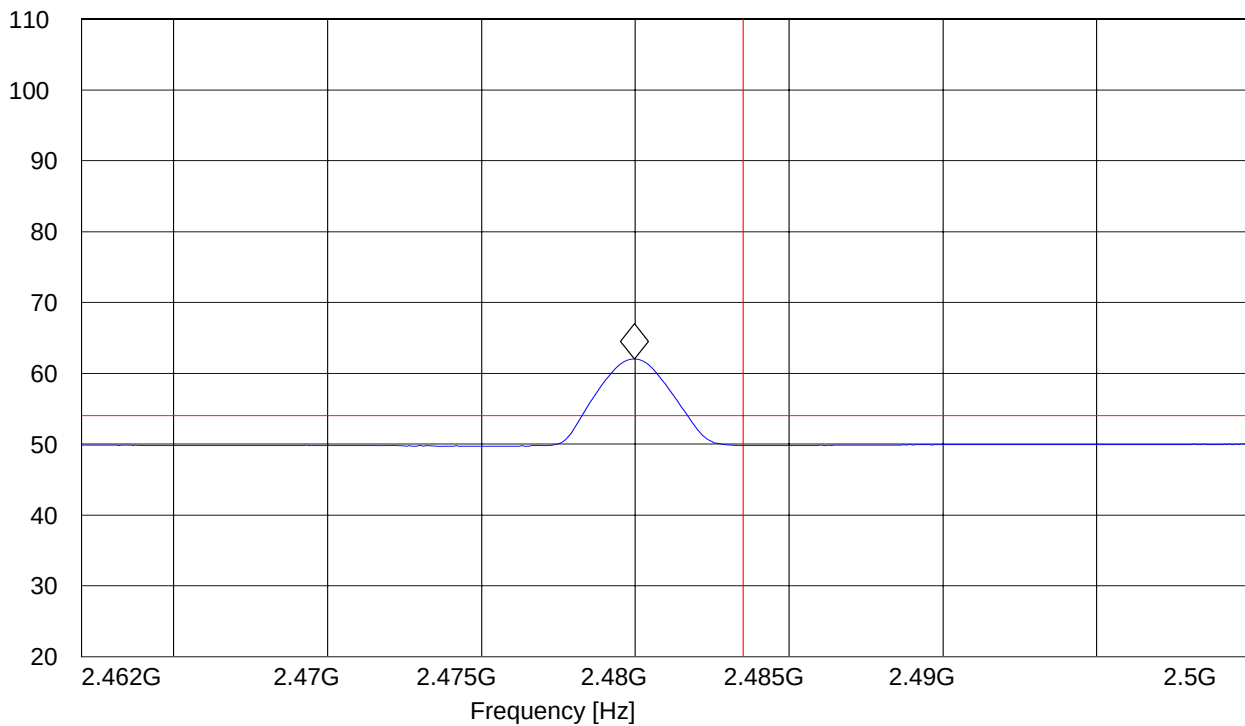
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT; CHAN 0, WLAN OFF, 360 rotation in 90° incr.
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter w/ USB cable
Sweep: FCC 15.247 HBE_AVG

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

Marker: 2.479971944 GHz 62.01 dBμV/m

Level [dBμV/m]



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

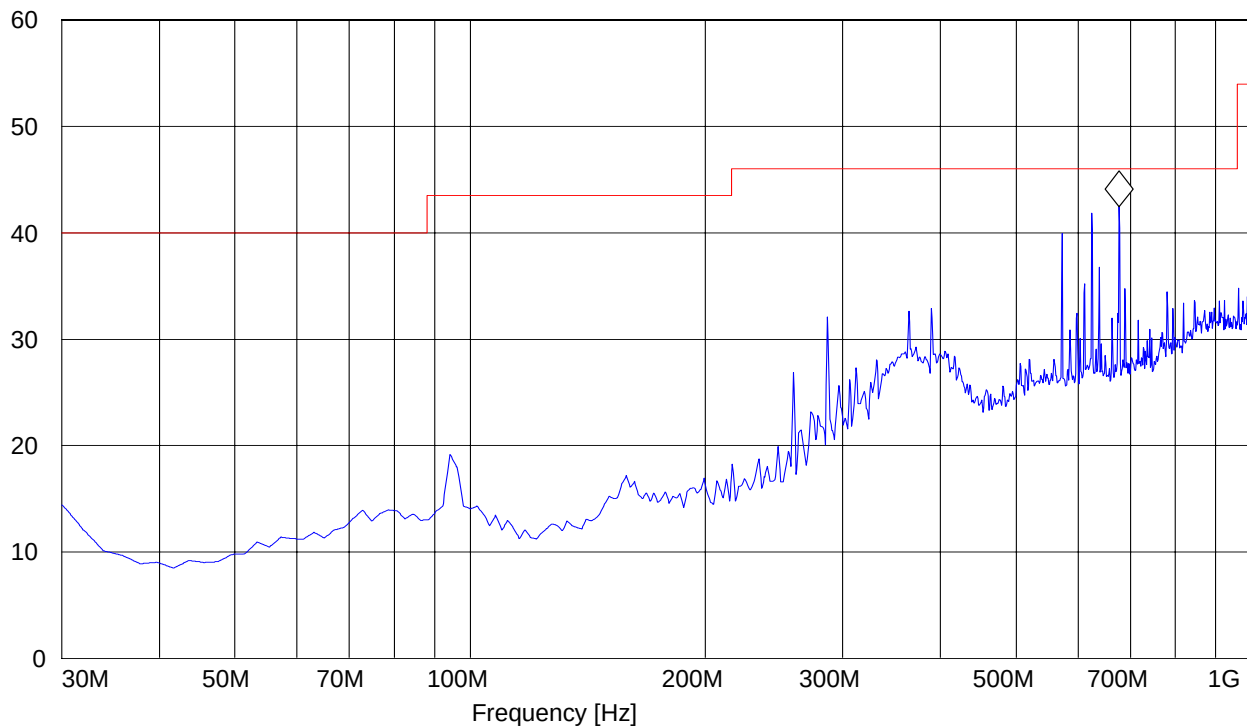
EUT / Description: PTD7850/B14
Customer: Intrinsync
Operating Mode: WLAN (ch 6) + BT (ch 39)
Antenna: V
EUT: V
Test Engineer: SATYA
Voltage: Battery
Sweep: FCC15.247_30M-1G_Ver

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_Ver

Marker: 677.314629 MHz 42.43 dBμV/m

Level [dBμV/m]





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

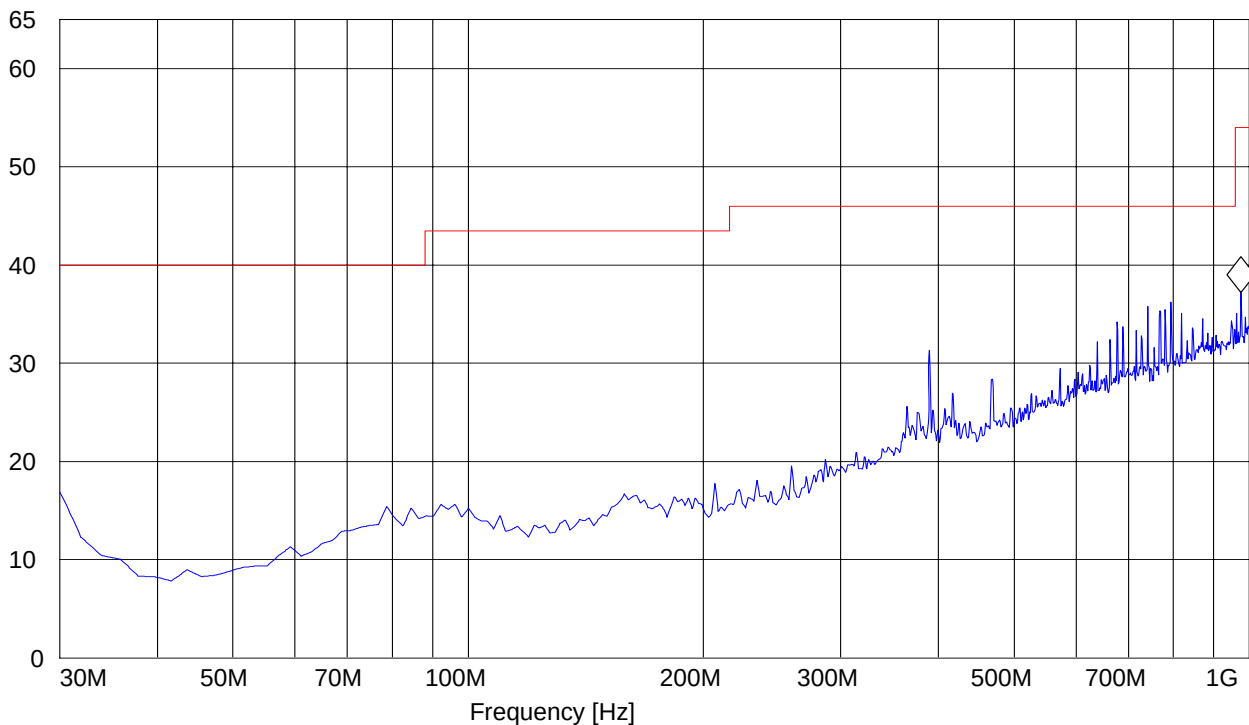
EUT / Description: PTD7850/B14
Customer: Intrinsync
Operating Mode: WLAN (ch 6) + BT (ch 39)
Antenna: H
EUT: V
Test Engineer: SATYA
Voltage: Battery
Sweep: FCC15.247_30M-1G_H0R

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

Marker: 976.673347 MHz 37.19 dBμV/m

Level [dBμV/m]





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

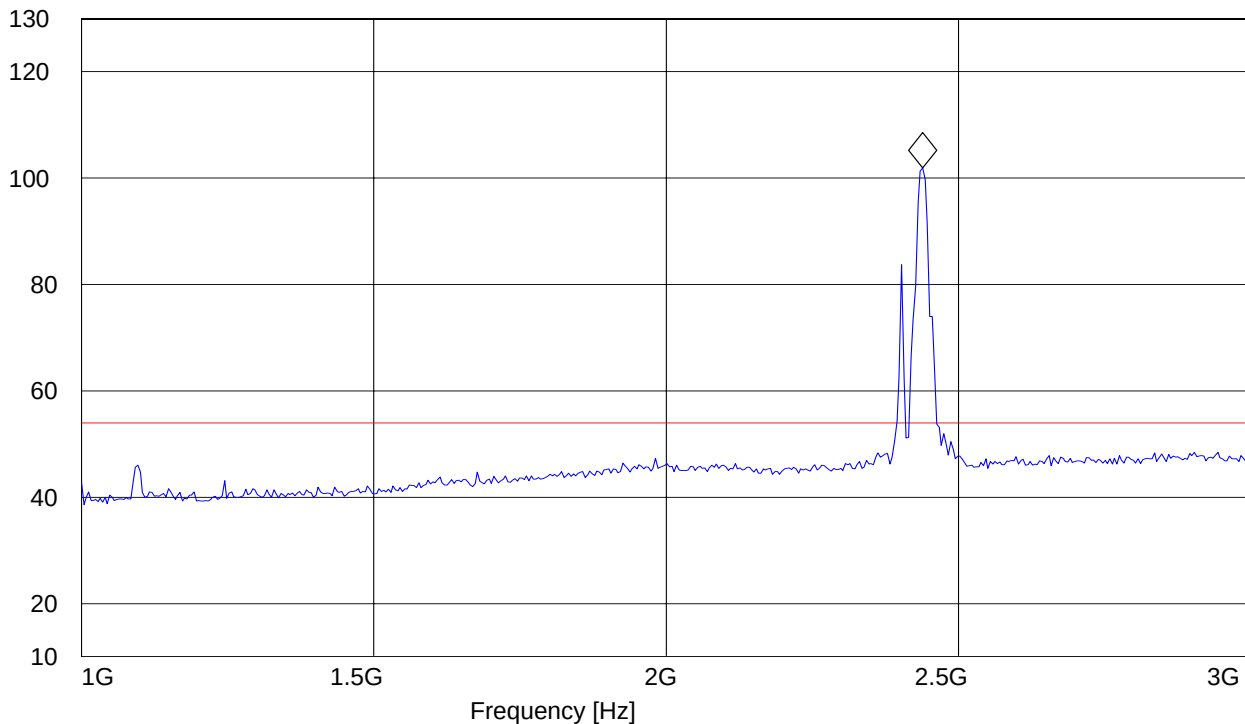
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT + WLAN (BT chan 0) (marker on WLAN)
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter
Sweep: FCC15.247_1-3G

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

Marker: 2.438877756 GHz 101.91 dB μ V/m

Level [dB μ V/m]





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

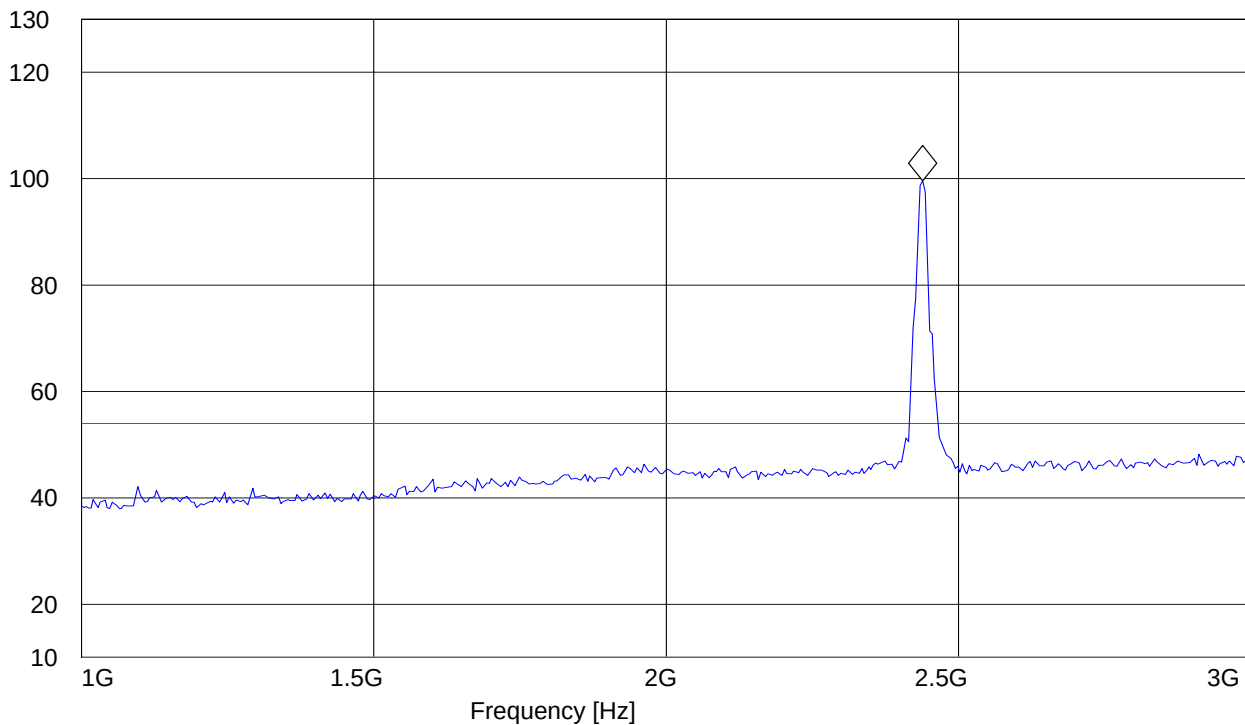
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT + WLAN (BT chan 39) (marker on WLAN ch6 + BT)
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter
Sweep: FCC15.247_1-3G

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

Marker: 2.438877756 GHz 99.63 dB μ V/m

Level [dB μ V/m]





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

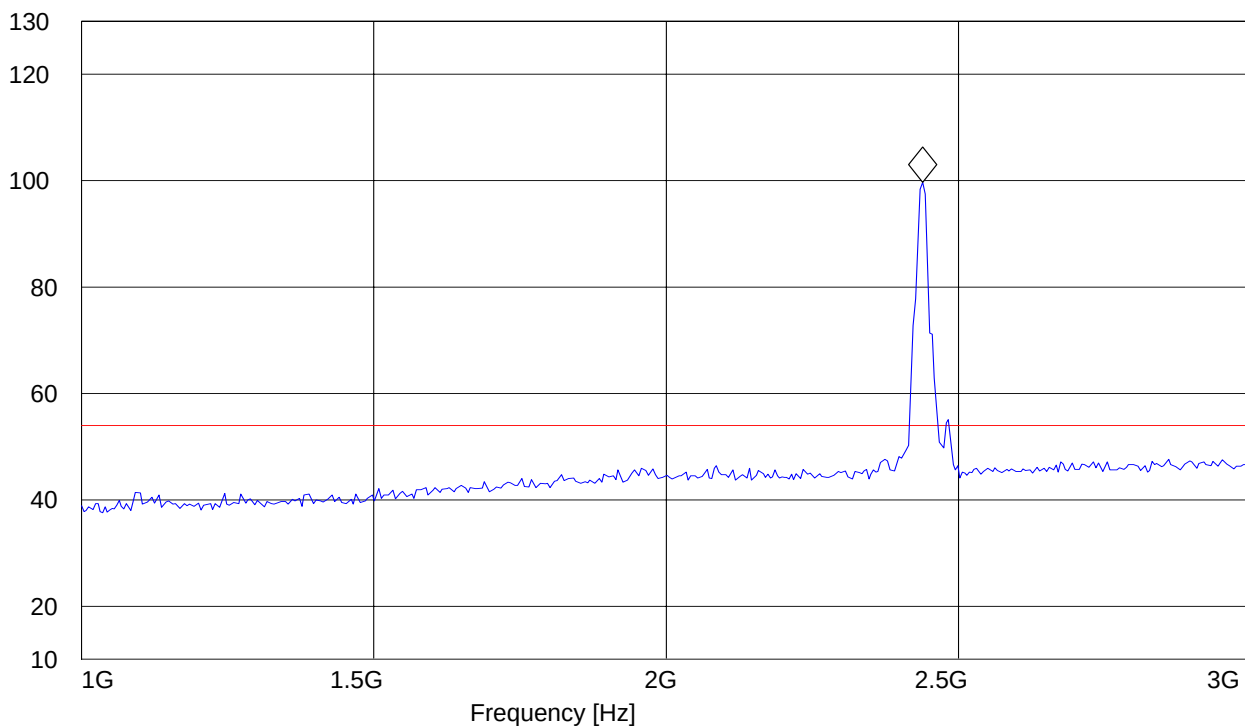
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT + WLAN (BT chan 78) (marker on WLAN ch 6, second peak is BT)
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter
Sweep: FCC15.247_1-3G

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

Marker: 2.438877756 GHz 99.68 dB μ V/m

Level [dB μ V/m]





3-18GHz (2402MHz)

Note: Peak Reading vs. Average limit

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

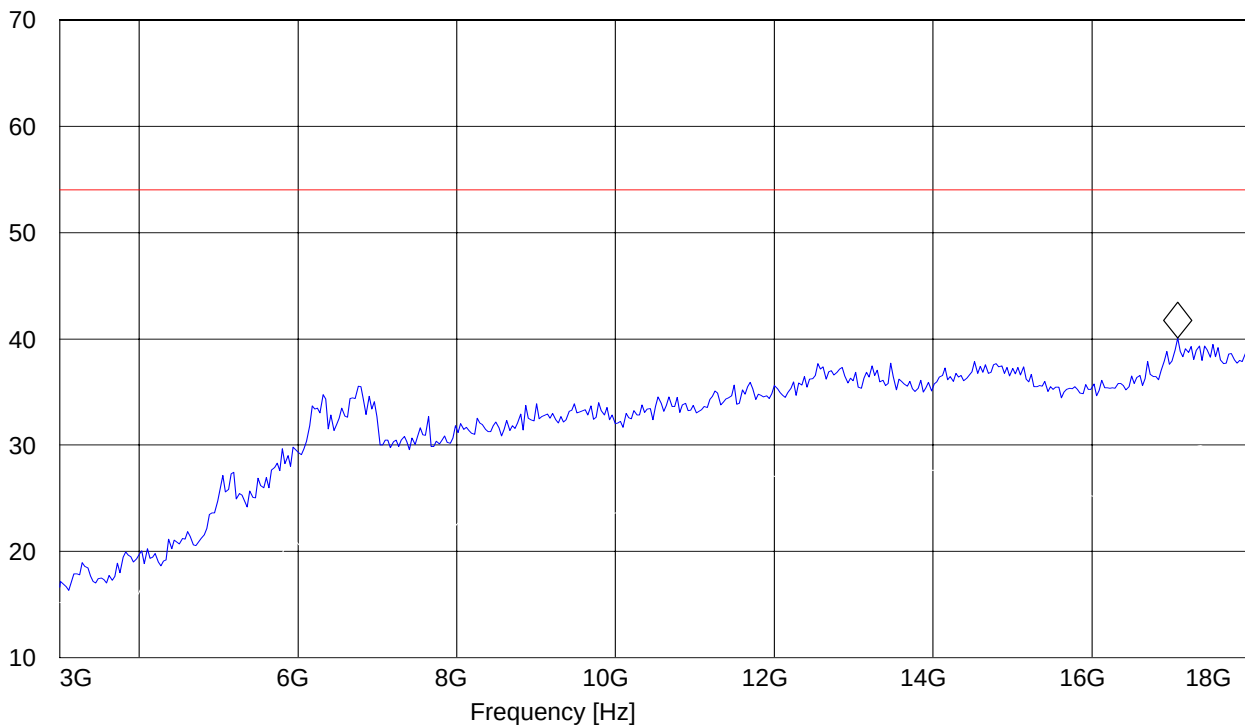
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT + WLAN (BT chan 0)
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter
Sweep: FCC15.247_3-18G

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

Marker: 17.080160321 GHz 40.06 dBμV/m

Level [dBμV/m]





3-18GHz (2441MHz)

Note: Peak Reading vs. Average limit

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

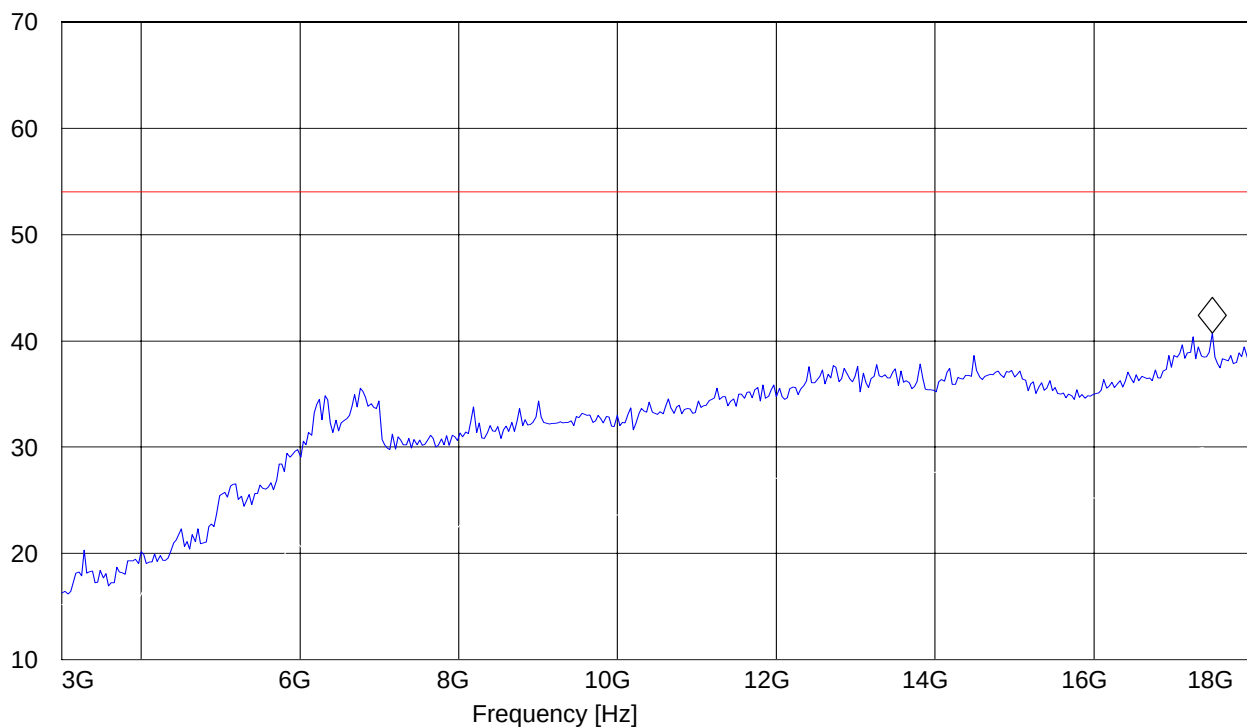
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT + WLAN (BT chan 39)
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter
Sweep: FCC15.247_3-18G

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

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

Marker: 17.488977956 GHz 40.74 dBμV/m

Level [dBμV/m]





3-18GHz (2480MHz)

Note: Peak Reading vs. Average limit

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

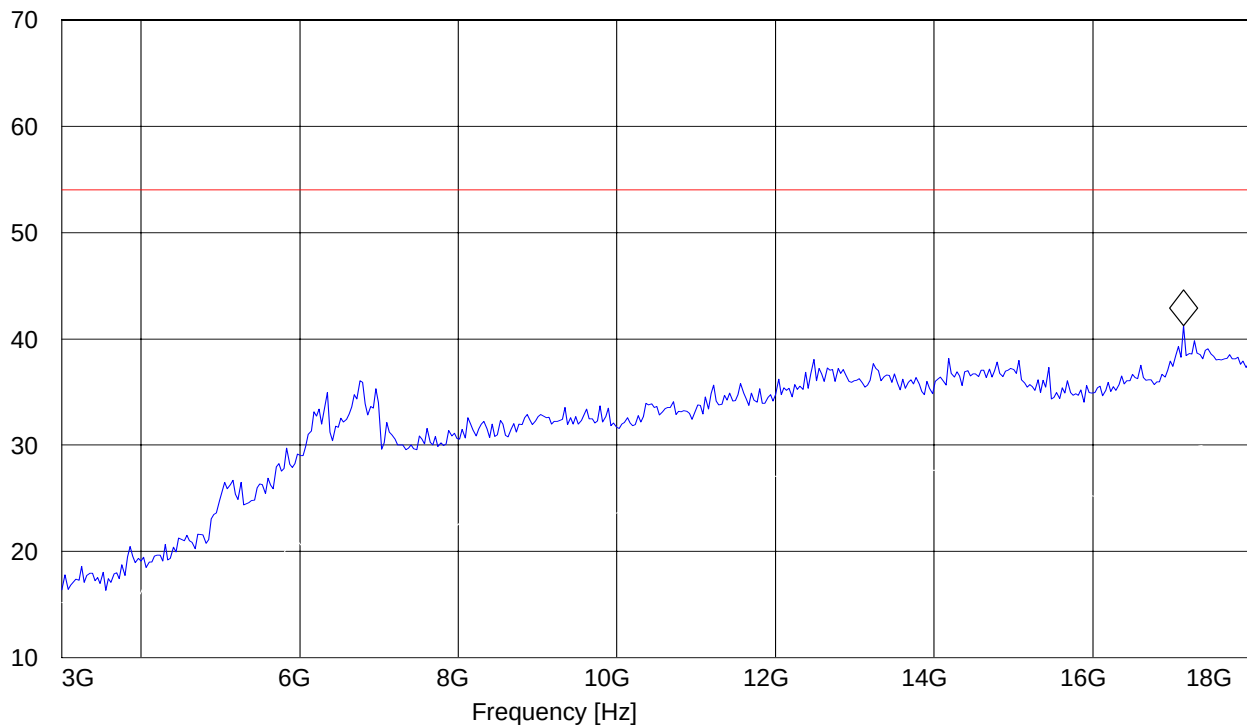
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT + WLAN (BT chan 78)
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter
Sweep: FCC15.247_3-18G

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

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

Marker: 17.148296593 GHz 41.21 dB μ V/m

Level [dB μ V/m]





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

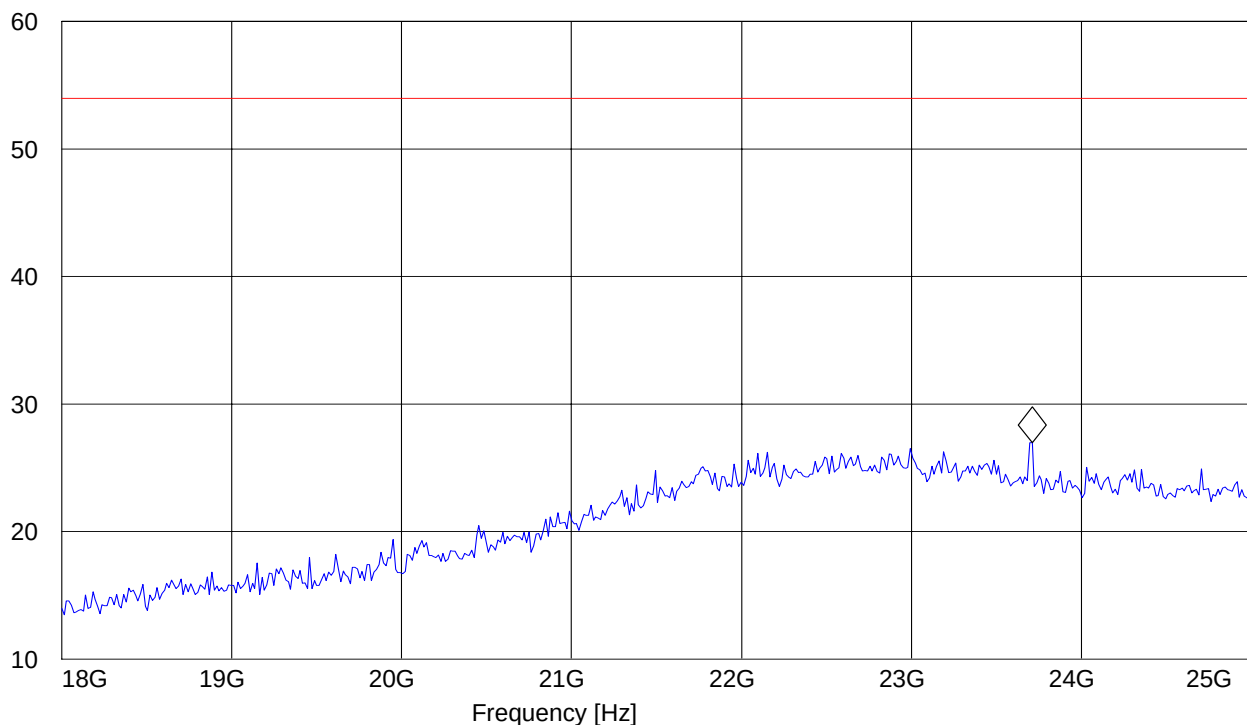
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: BT + WLAN (BT chan 0)
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter
Sweep: FCC15.247_18-26.5G

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

Marker: 23.709418838 GHz 26.98 dB μ V/m

Level [dB μ V/m]



5.4 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

5.4.1 LIMITS

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	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

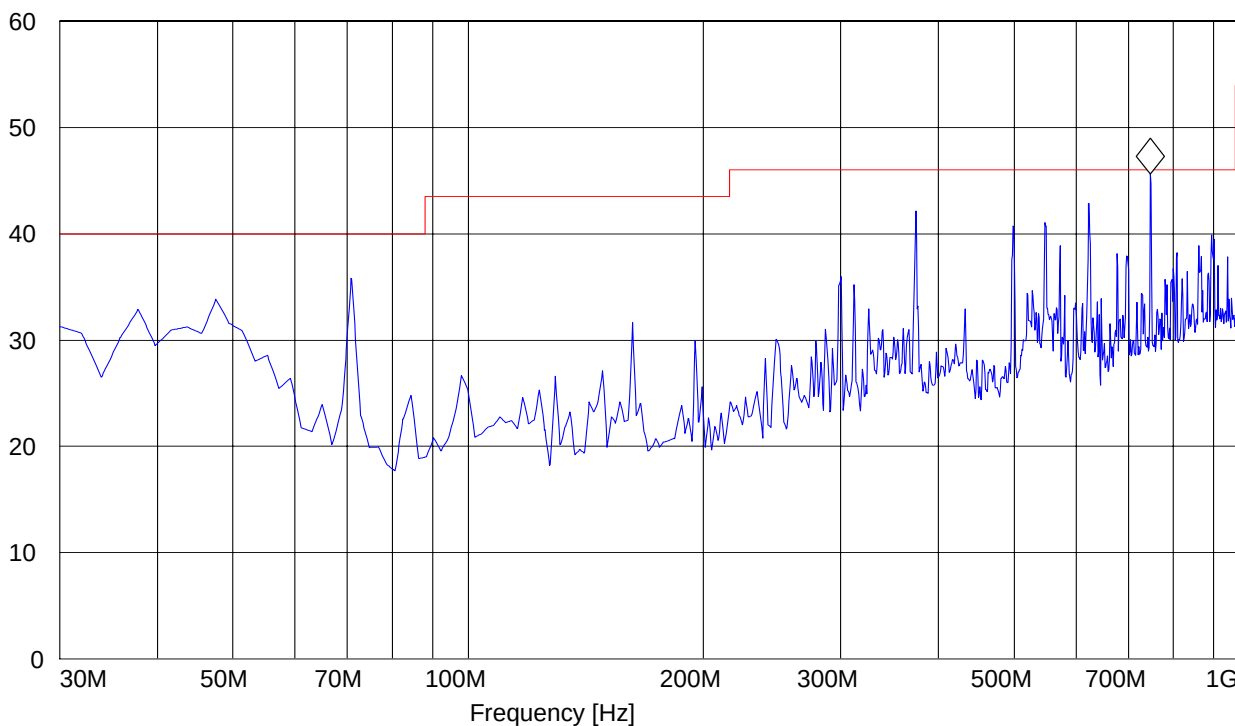
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: WLAN + BT; Receive mode, 360° rotation
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter w/ USB cable
Sweep: Canada RE_30M-1G_Ver

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_Ver

Marker: 747.294589 MHz 45.62 dBμV/m

Level [dBμV/m]





1-3GHz

Note: Peak Reading vs. Average limit

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

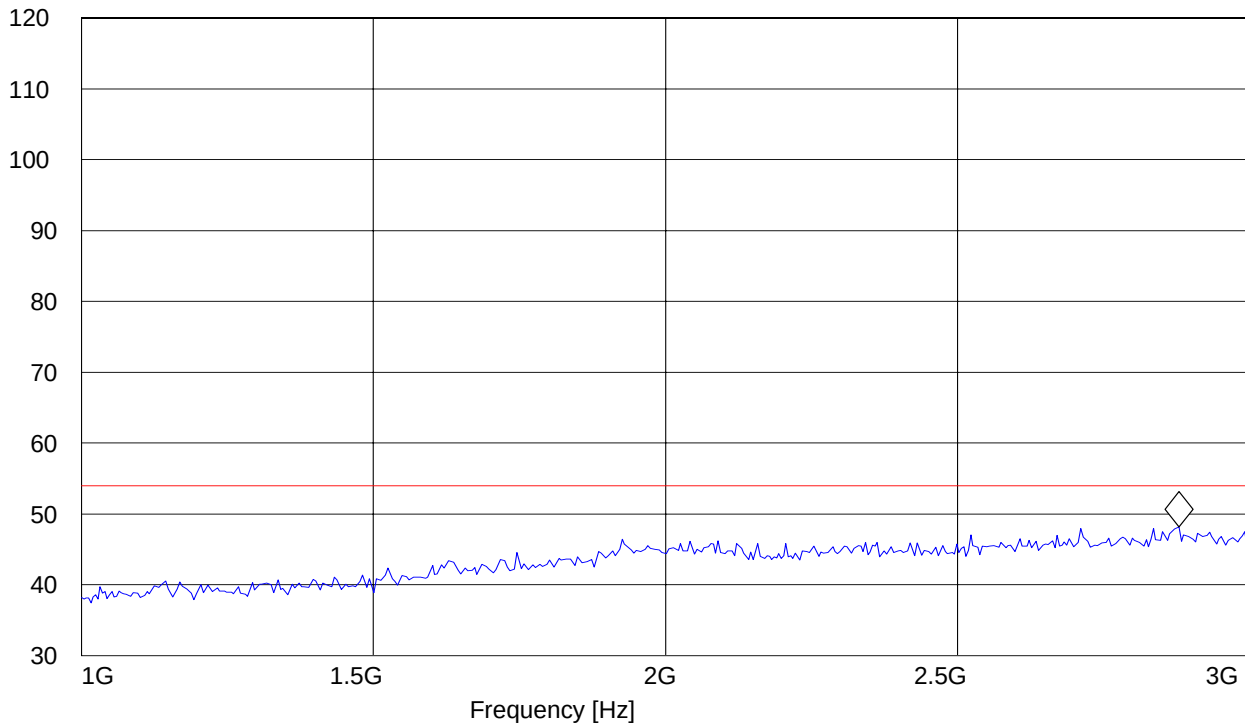
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: WLAN + BT; Receive mode
Antenna: H
EUT: V
Test Engineer: Ed
Voltage: AC Adapter w/ USB cable
Sweep: Canada RE_1-3G

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

Marker: 2.879759519 GHz 48.2 dB μ V/m

Level [dB μ V/m]





3-18GHz

Note: Peak Reading vs. Average limit

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

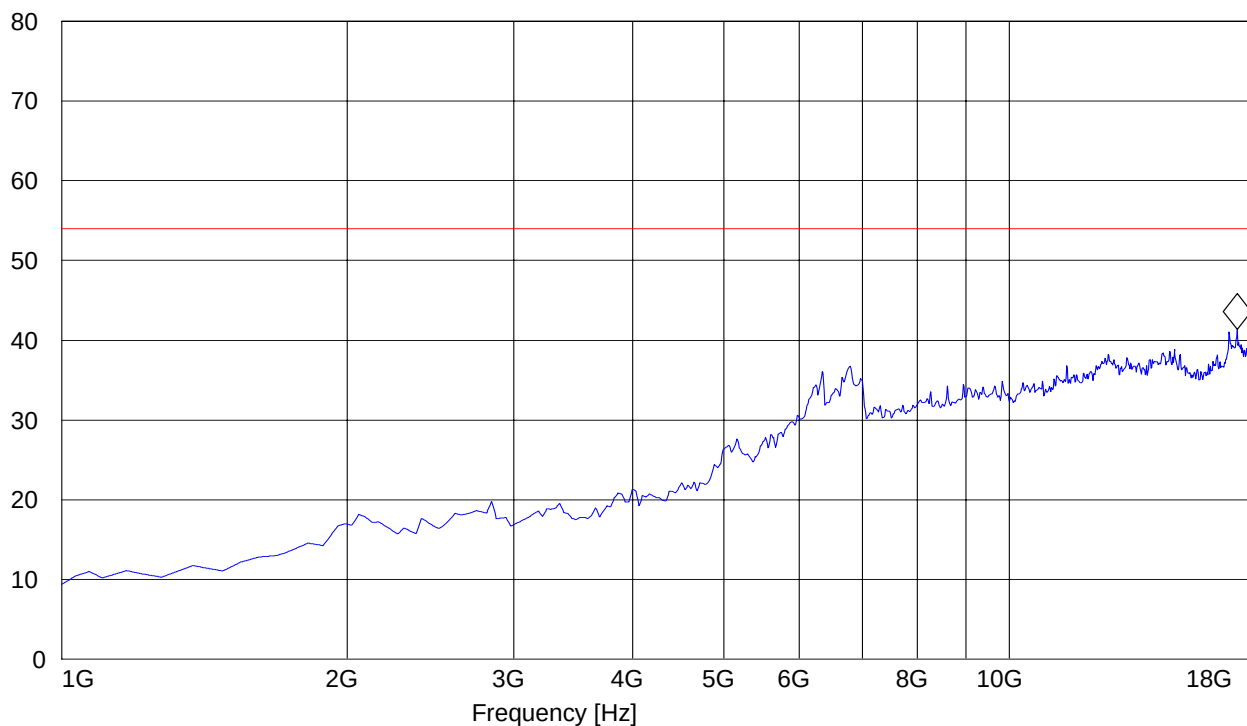
EUT / Description: PTD7850/B14
Customer: HHP
Operating Mode: WLAN + BT; Receive mode
Antenna: V
EUT: V
Test Engineer: Ed
Voltage: AC Adapter w/ USB cable
Sweep: Canada RE_3-18G
Sweep: CANADA RE_3-18G

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

Marker: 17.386773547 GHz 41.35 dB μ V/m

Level [dB μ V/m]





18-25GHz

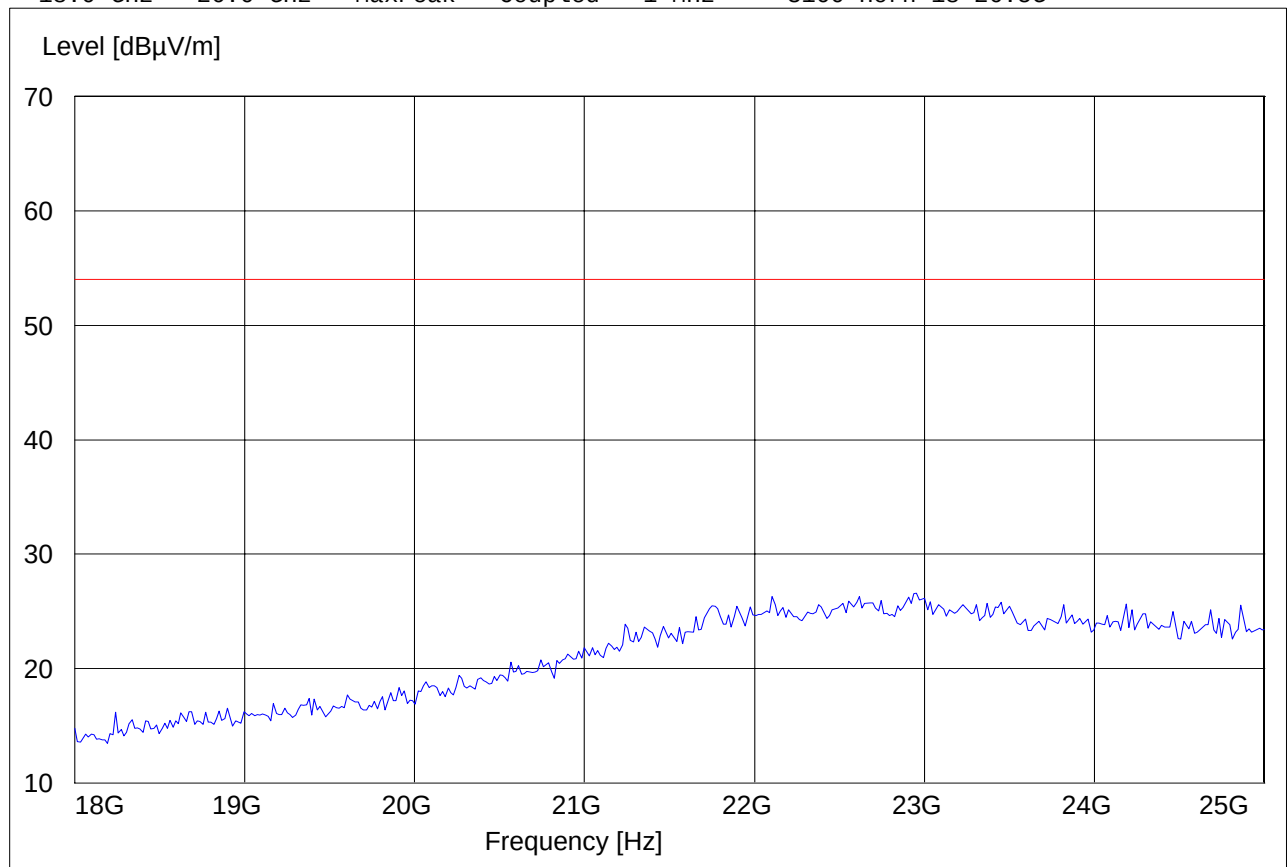
Note: Peak Reading vs. Average limit

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

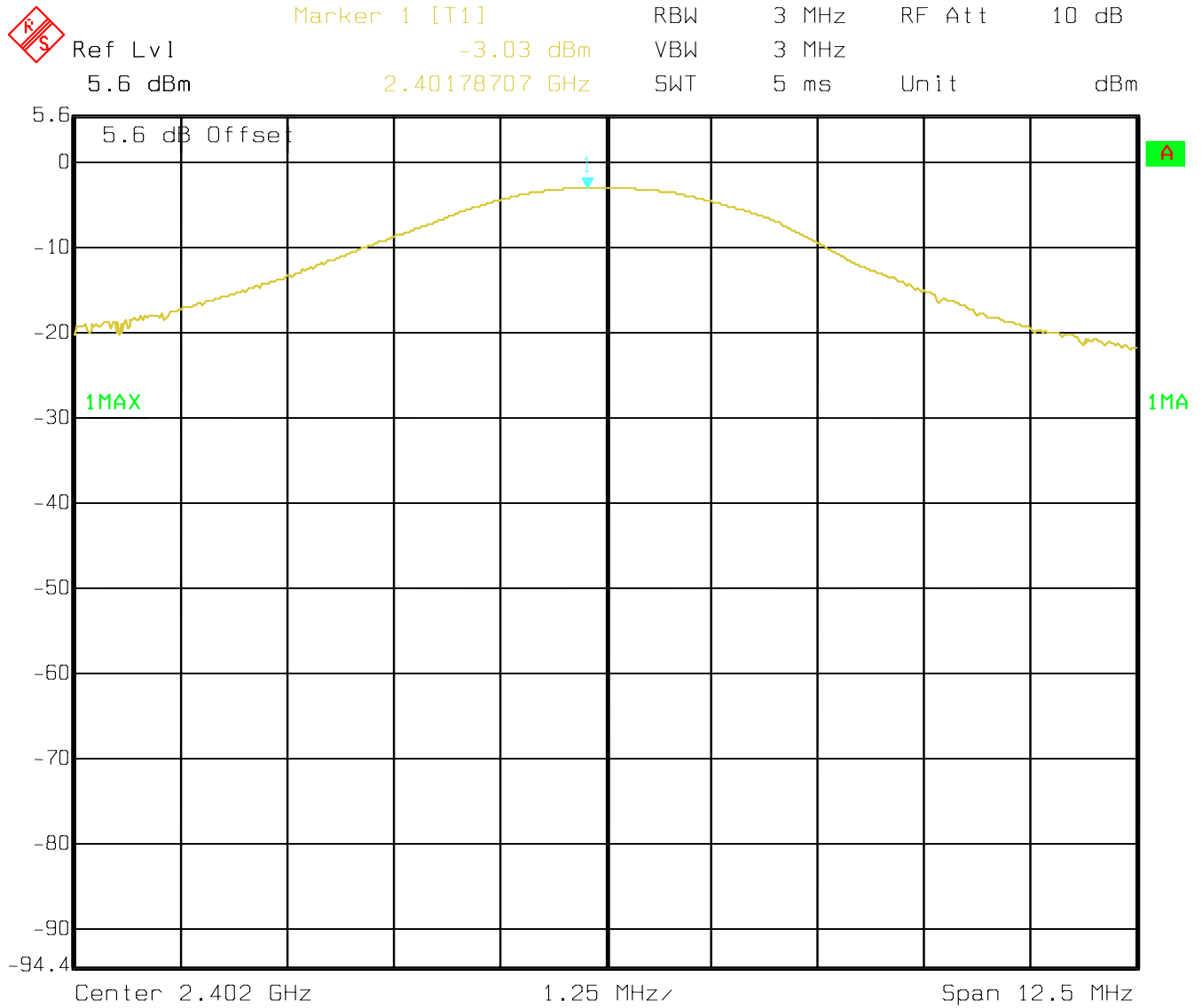
*limit is based upon antenna gain of less than or equal to 6dBi.

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



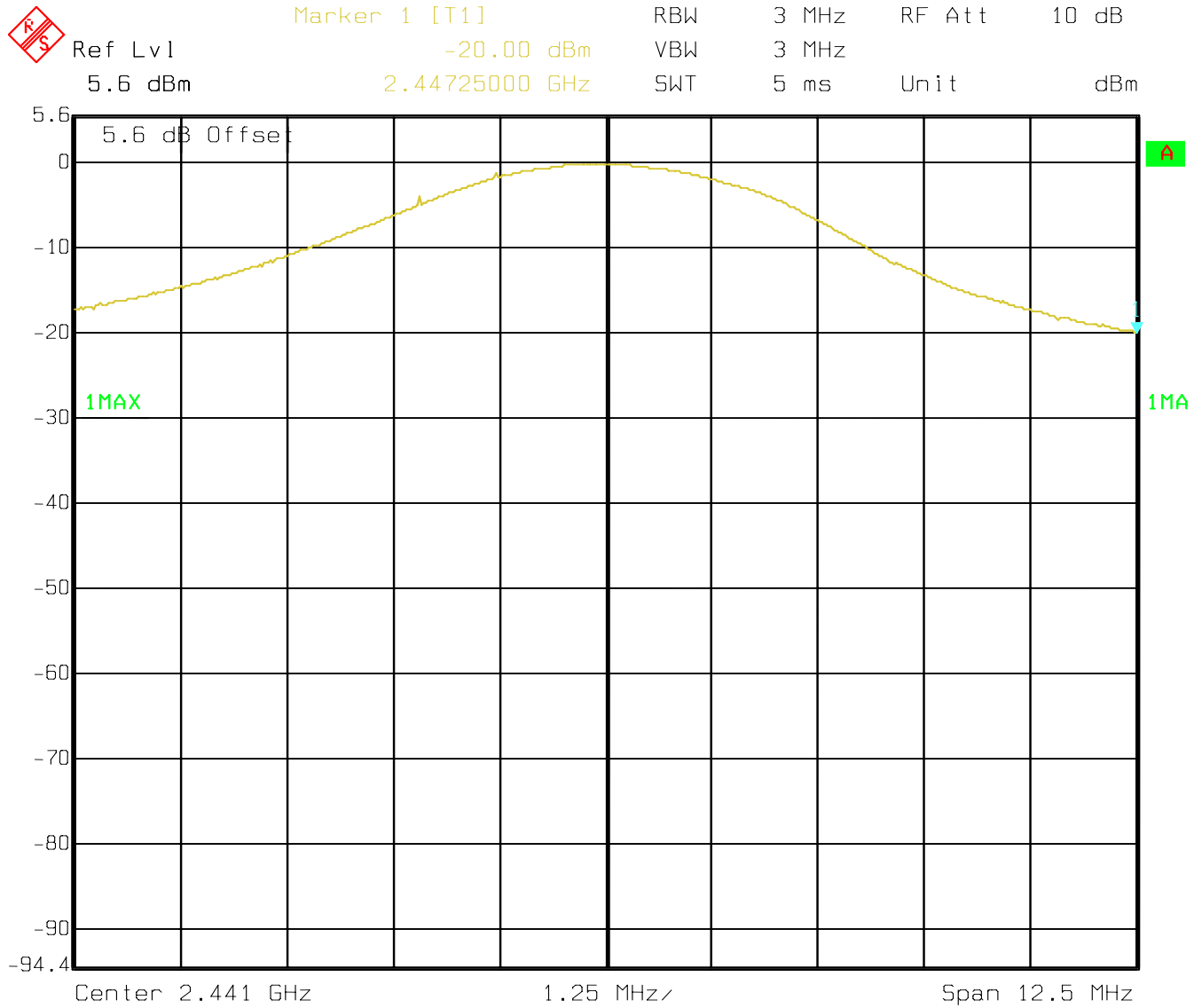
(2402 MHz)



Date: 14.AUG.2006 12:08:46



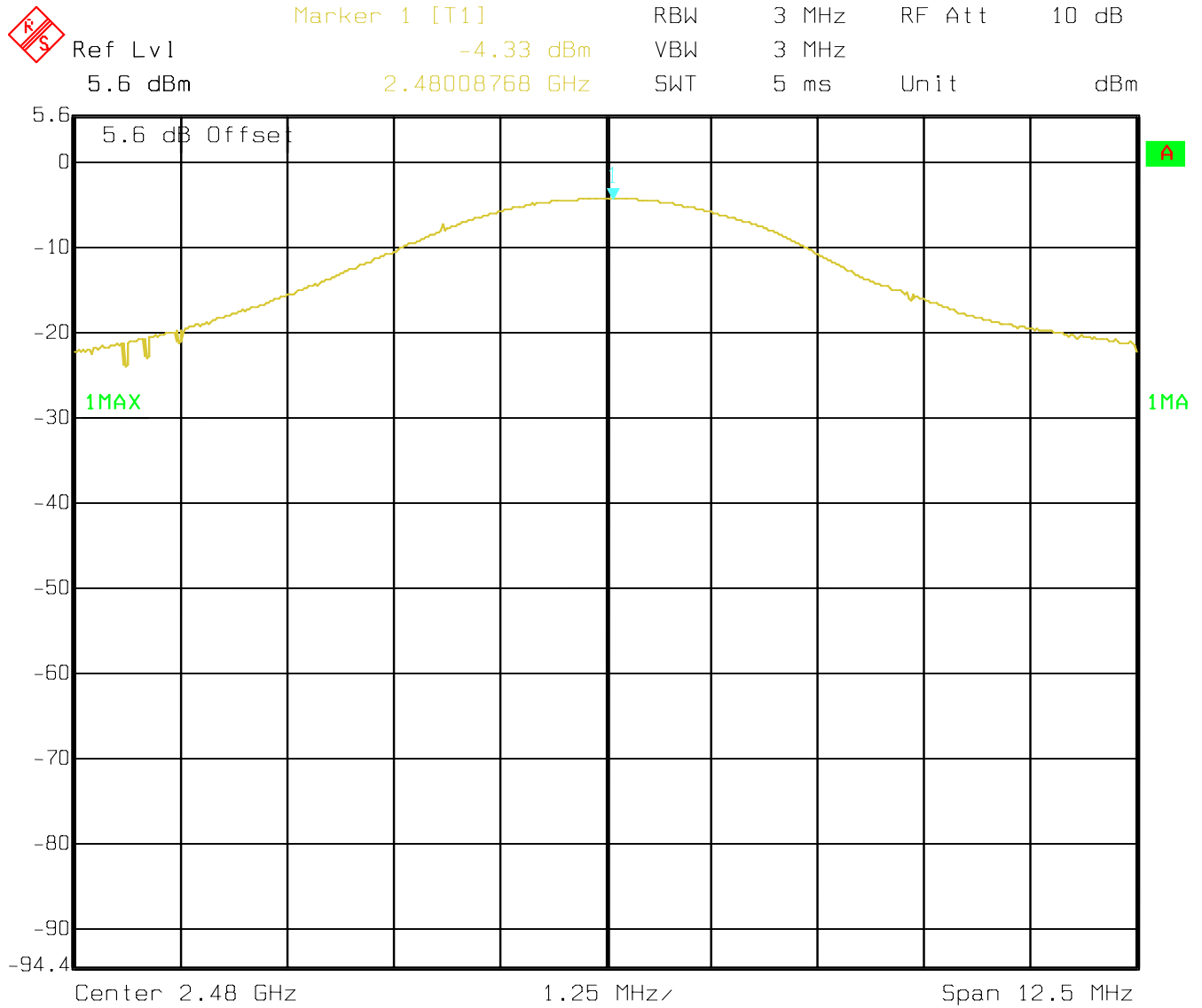
(2441 MHz)



Date: 14.AUG.2006 12:18:48



(2480 MHz)



Date: 14.AUG.2006 12:17:22



6.2 20dB BANDWIDTH

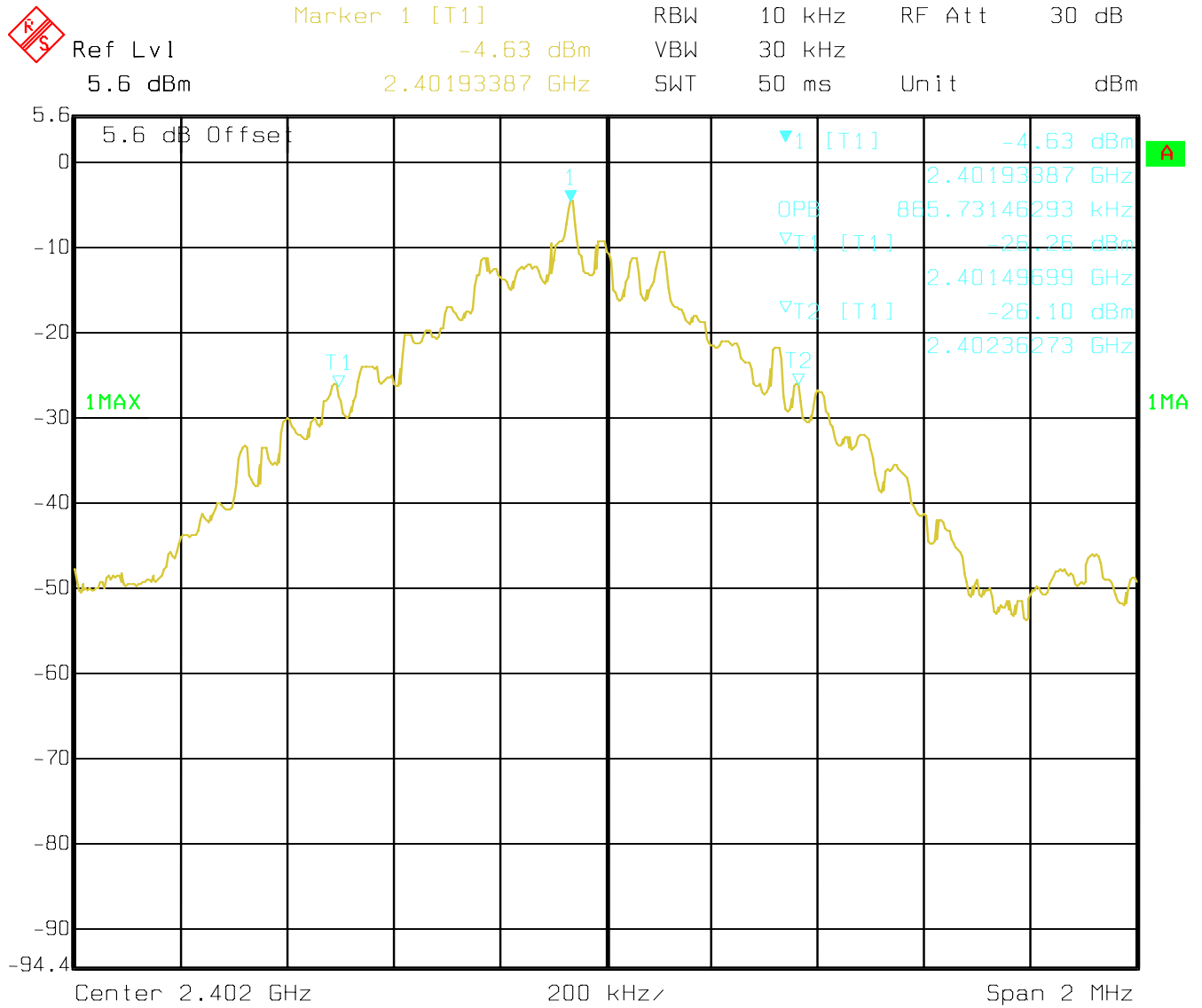
6.2.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

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

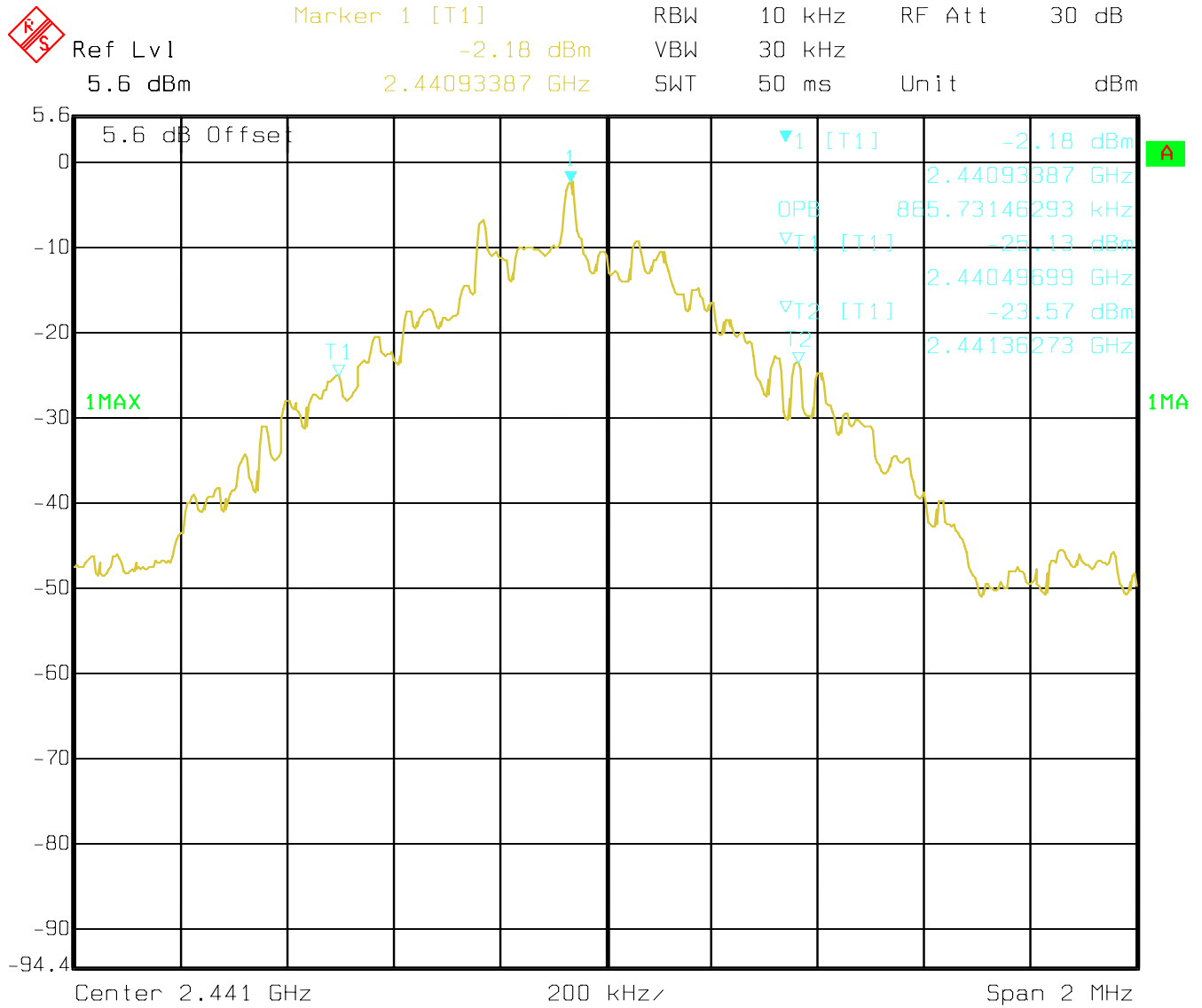
(2402 MHz)



Date: 14.AUG.2006 17:30:48



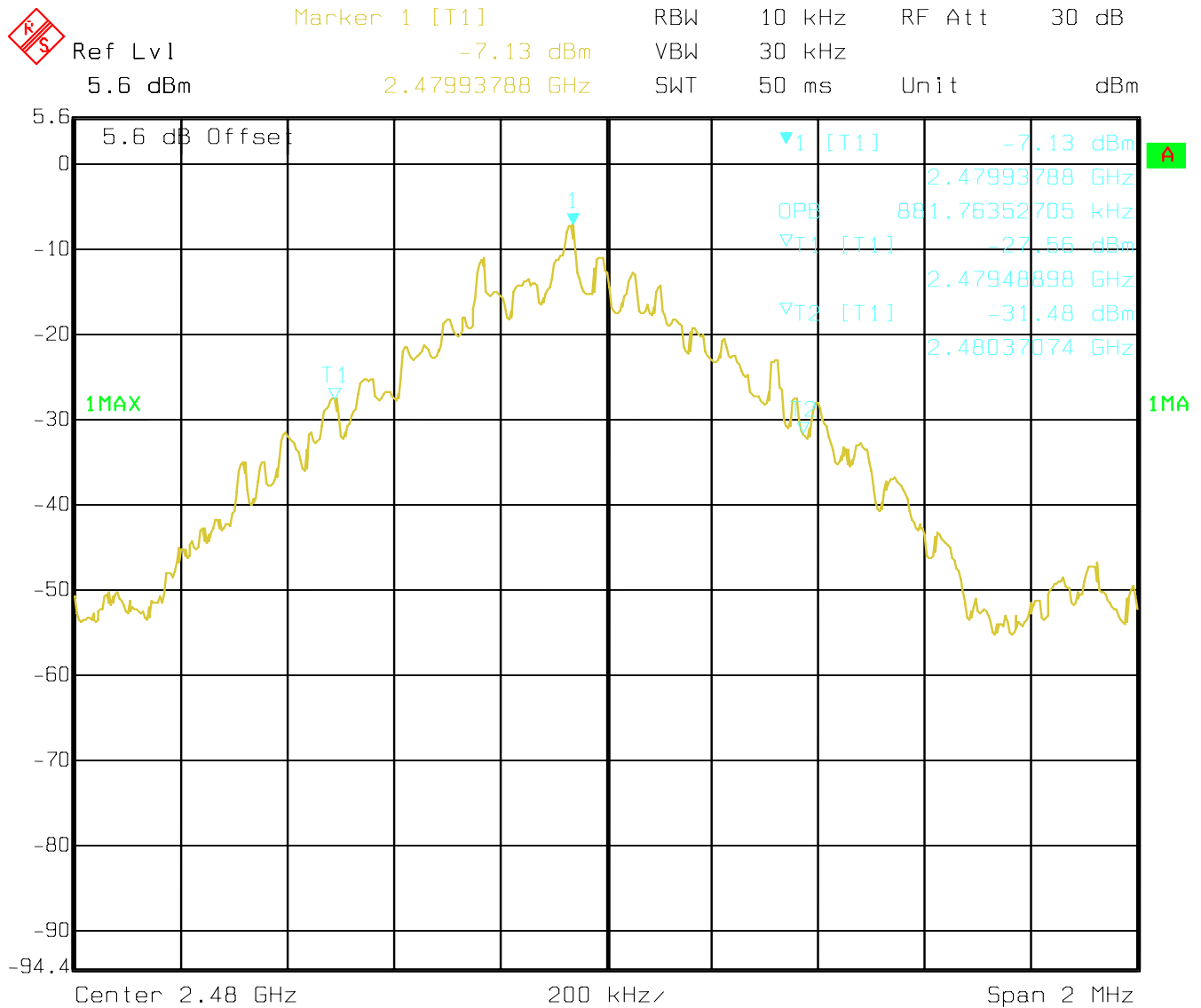
(2441 MHz)



Date: 14.AUG.2006 17:26:26



(2480 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)

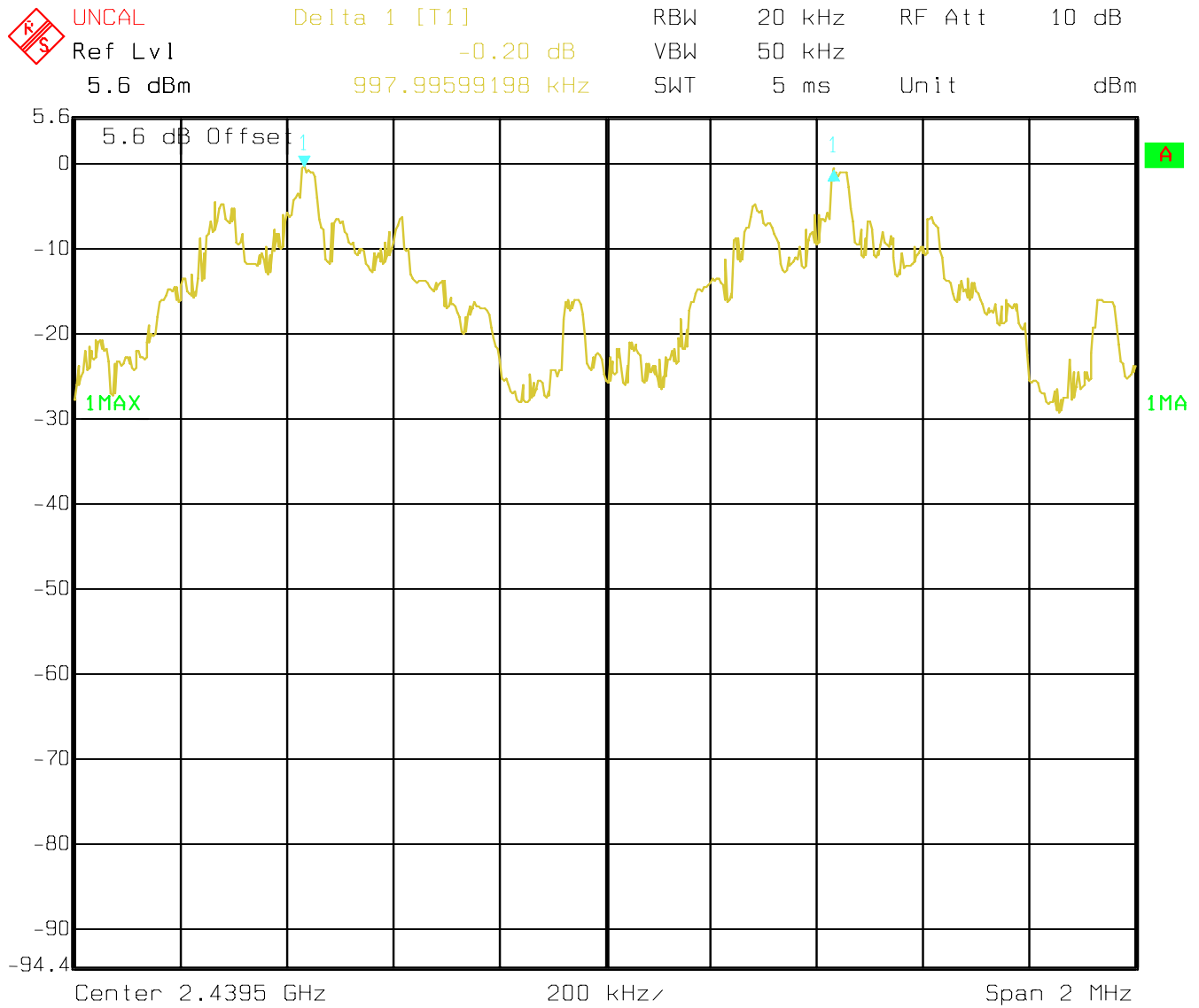
SEPARATION
> 25 KHz or > 20 dB BANDWIDTH

6.3.2 RESULTS:

TEST CONDITIONS		SEPARATION (MHz)
T _{nom} (23)°C	V _{nom} VDC	0.998



(plot)



Date: 14.AUG.2006 13:00:20



6.4 NUMBER OF HOPPING CHANNELS

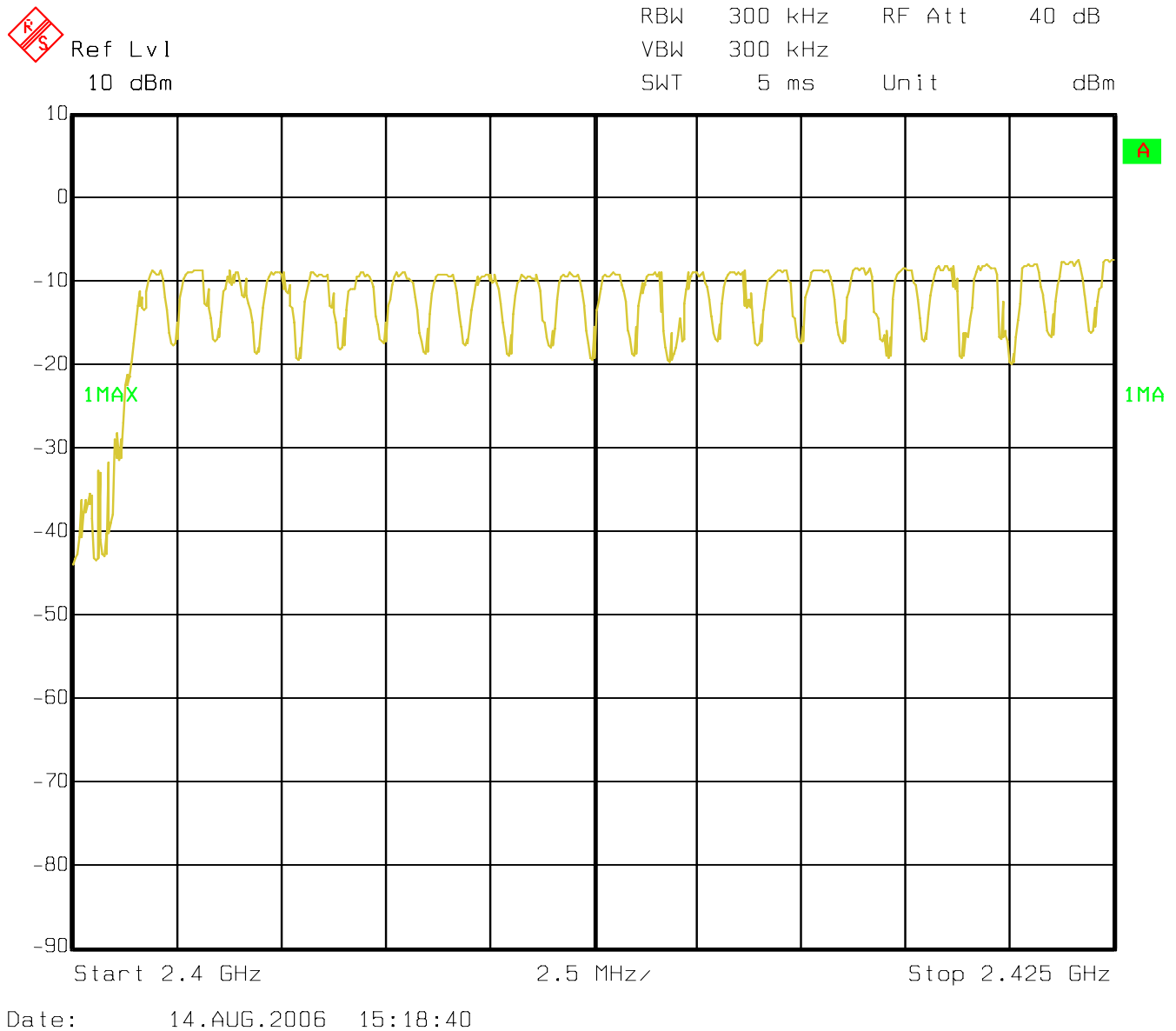
6.4.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (iii)

NUMBER OF CHANNELS
> 15

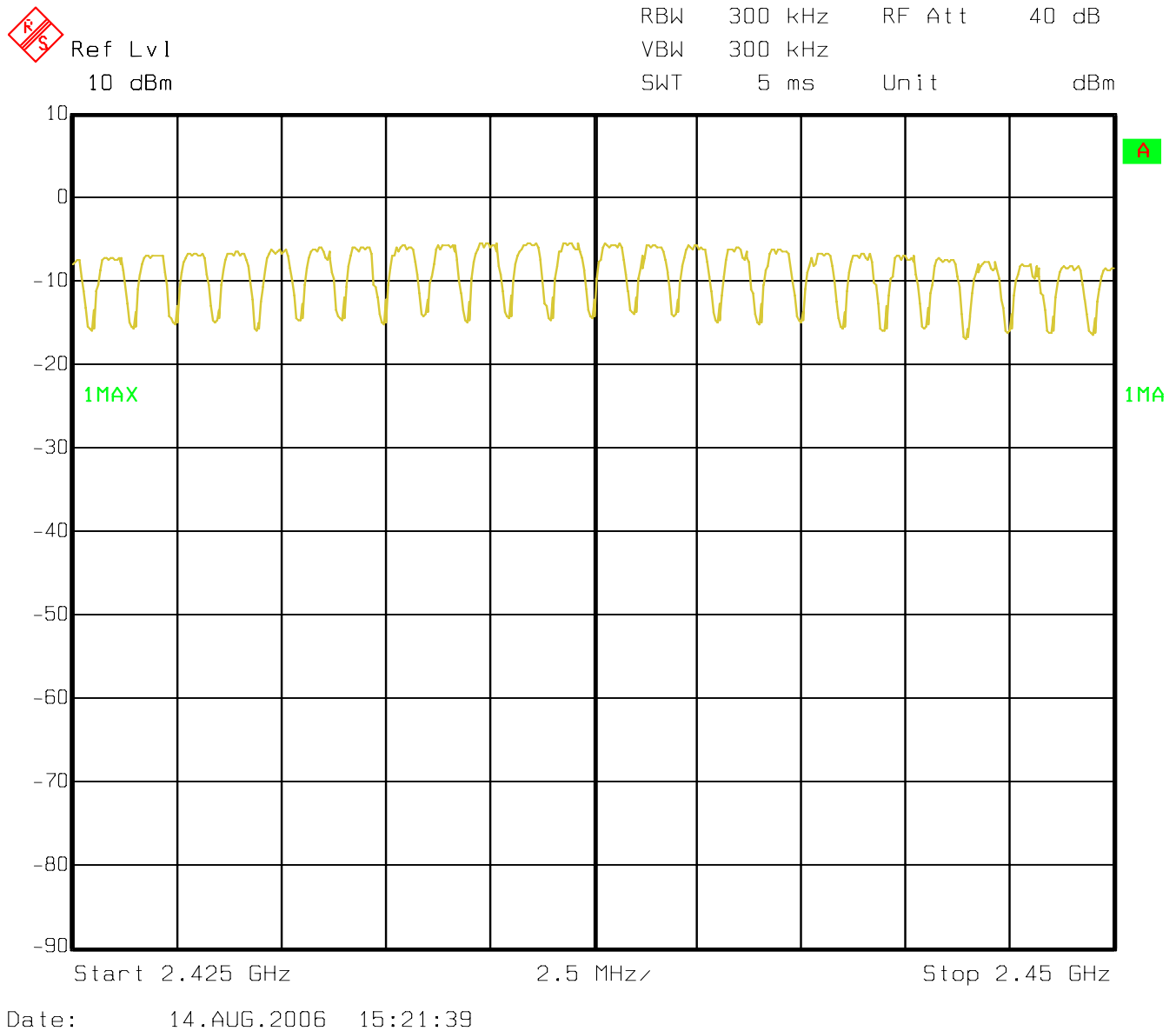
6.4.2 RESULTS:

TEST CONDITIONS		NUMBER OF CHANNELS
T _{nom} (23)°C	V _{nom} VDC	79

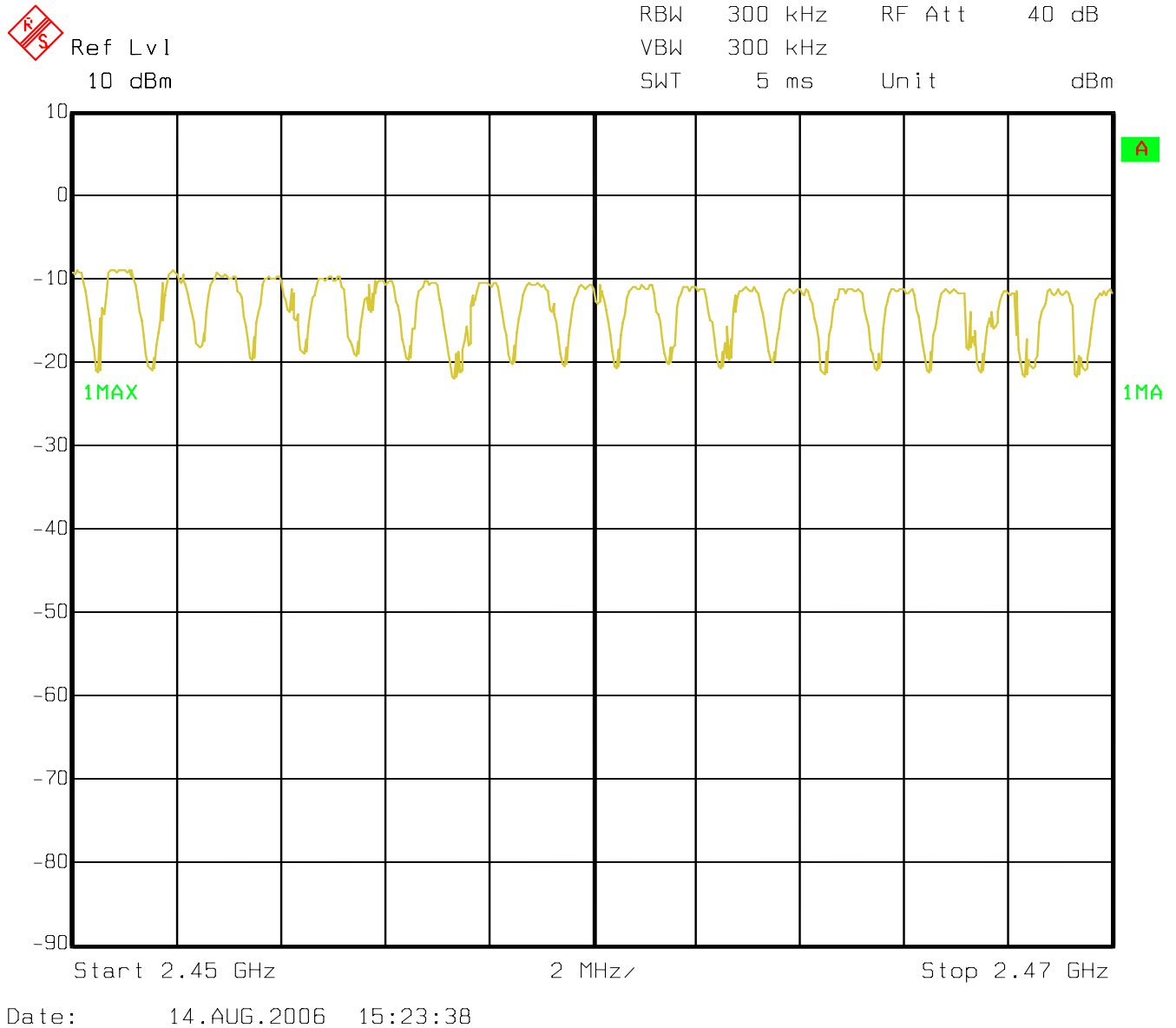
(PLOT 1)
(F1-F2=2402MHz to 2425MHz)



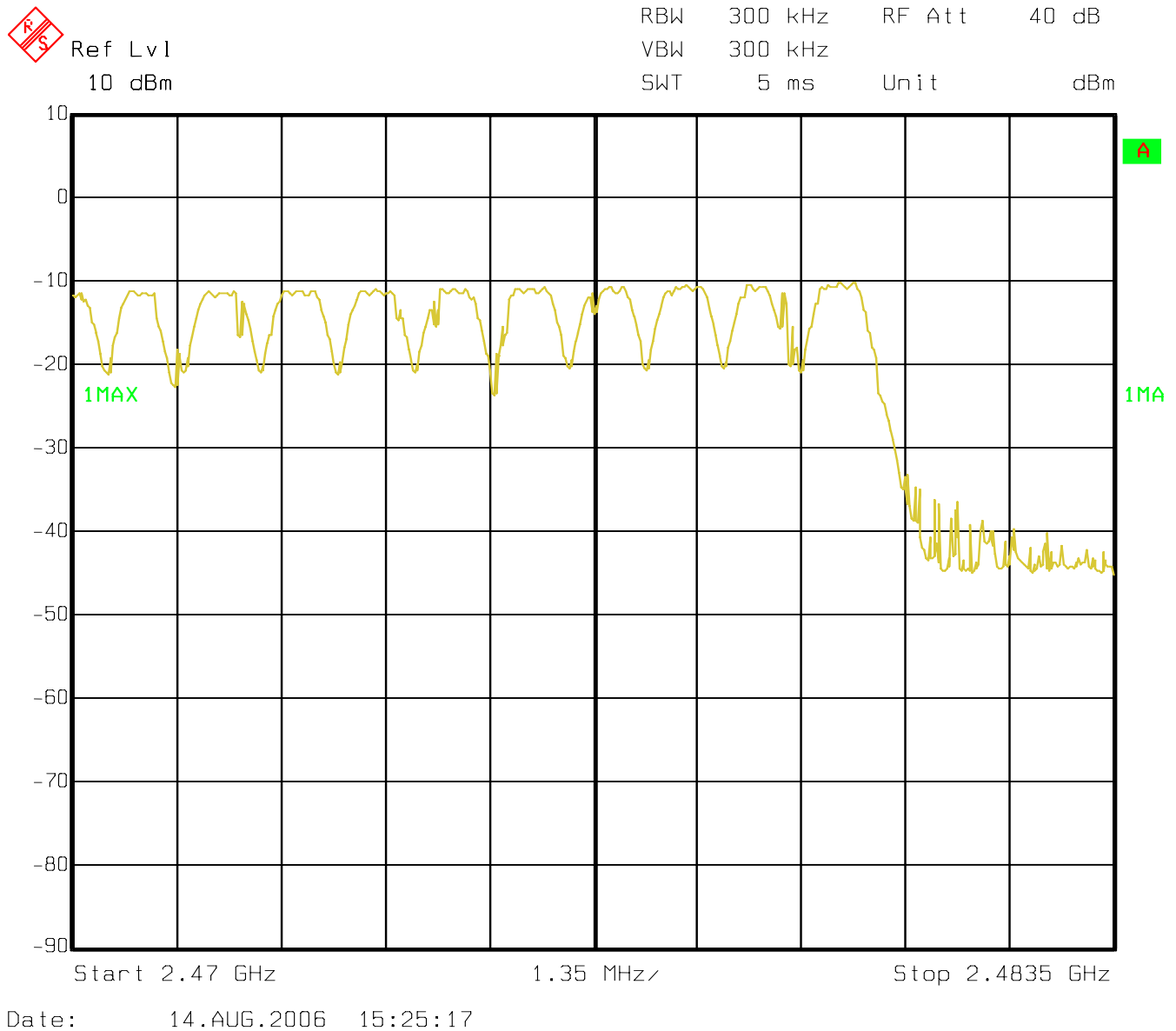
(PLOT 2)
(F1-F2=2425MHz to 2450MHz)



(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:

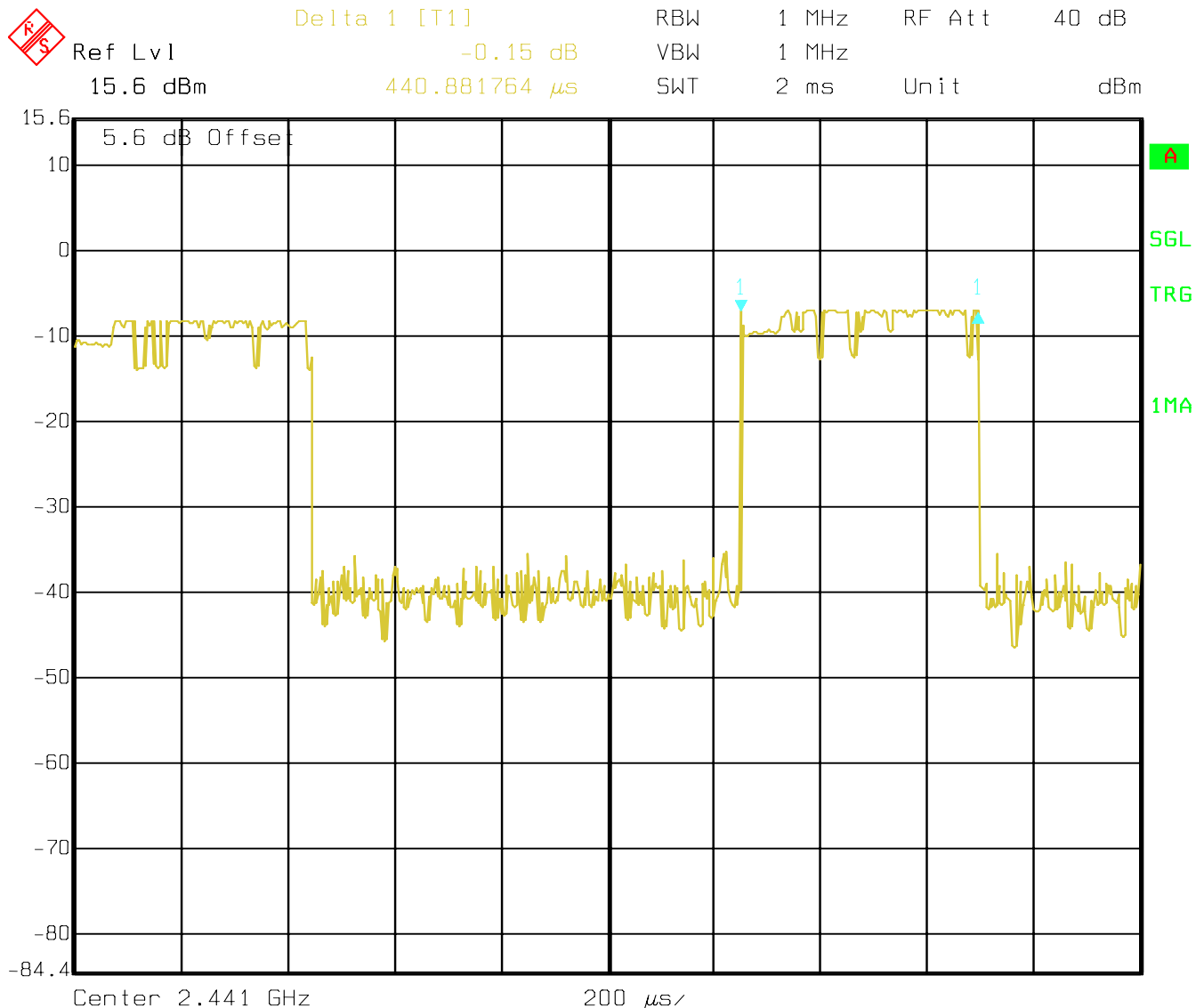
TEST CONDITIONS		TIME OF OCCUPANCY IN 31.6 SECONDS		
PACKET TYPE		DH1	DH3	DH5
T _{nom} (23)°C	V _{nom} VDC	0.440	1.703	2.936

(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 $320.108 * 440.9\mu s = 141.3ms$ per 31.6 seconds.



Date: 15.AUG.2006 17:57:11

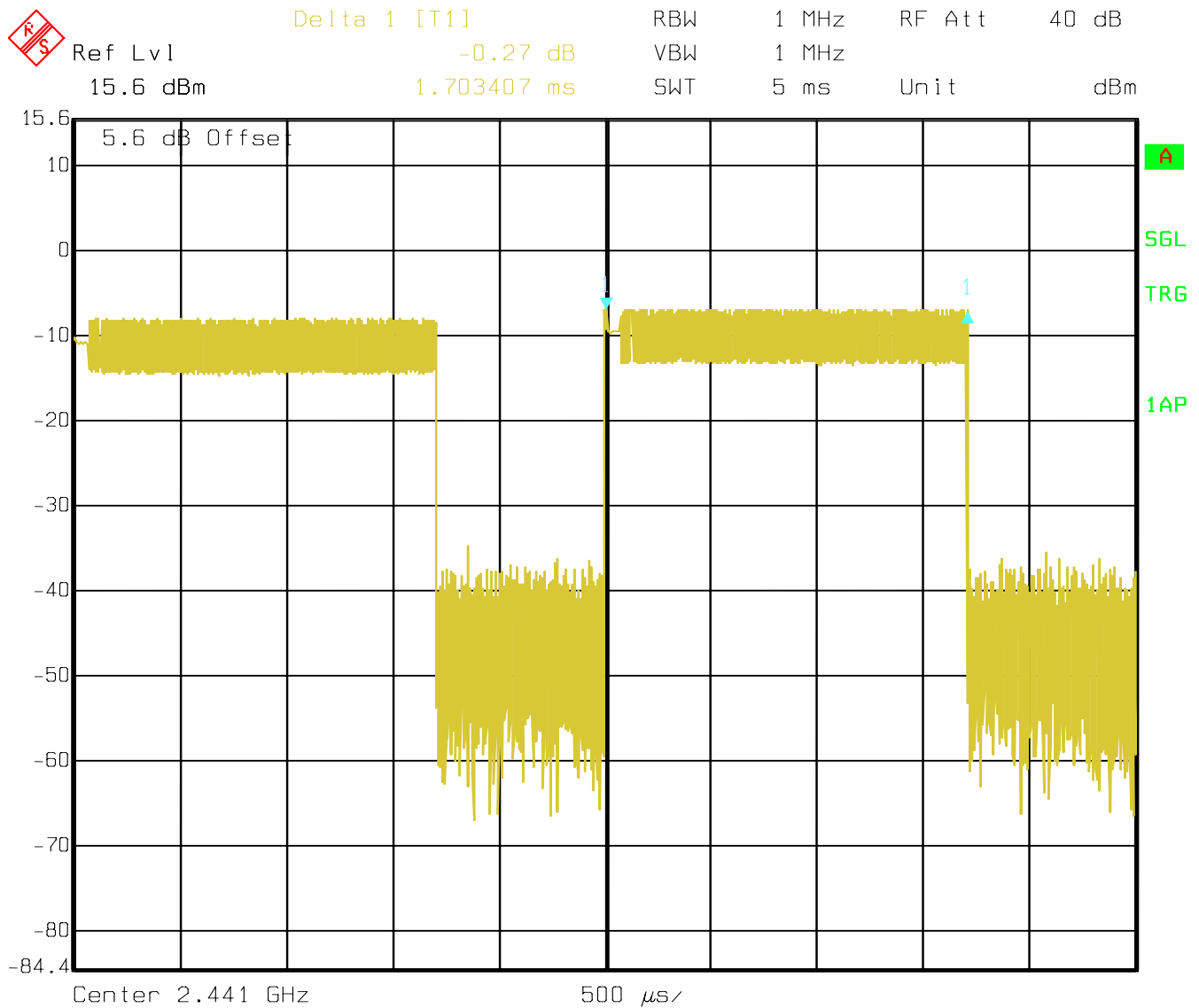


(DH3)

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 $161.16 * 1.703\text{ms} = 274.5\text{ms}$ per 31.6 seconds.



Date: 15.AUG.2006 17:49:30

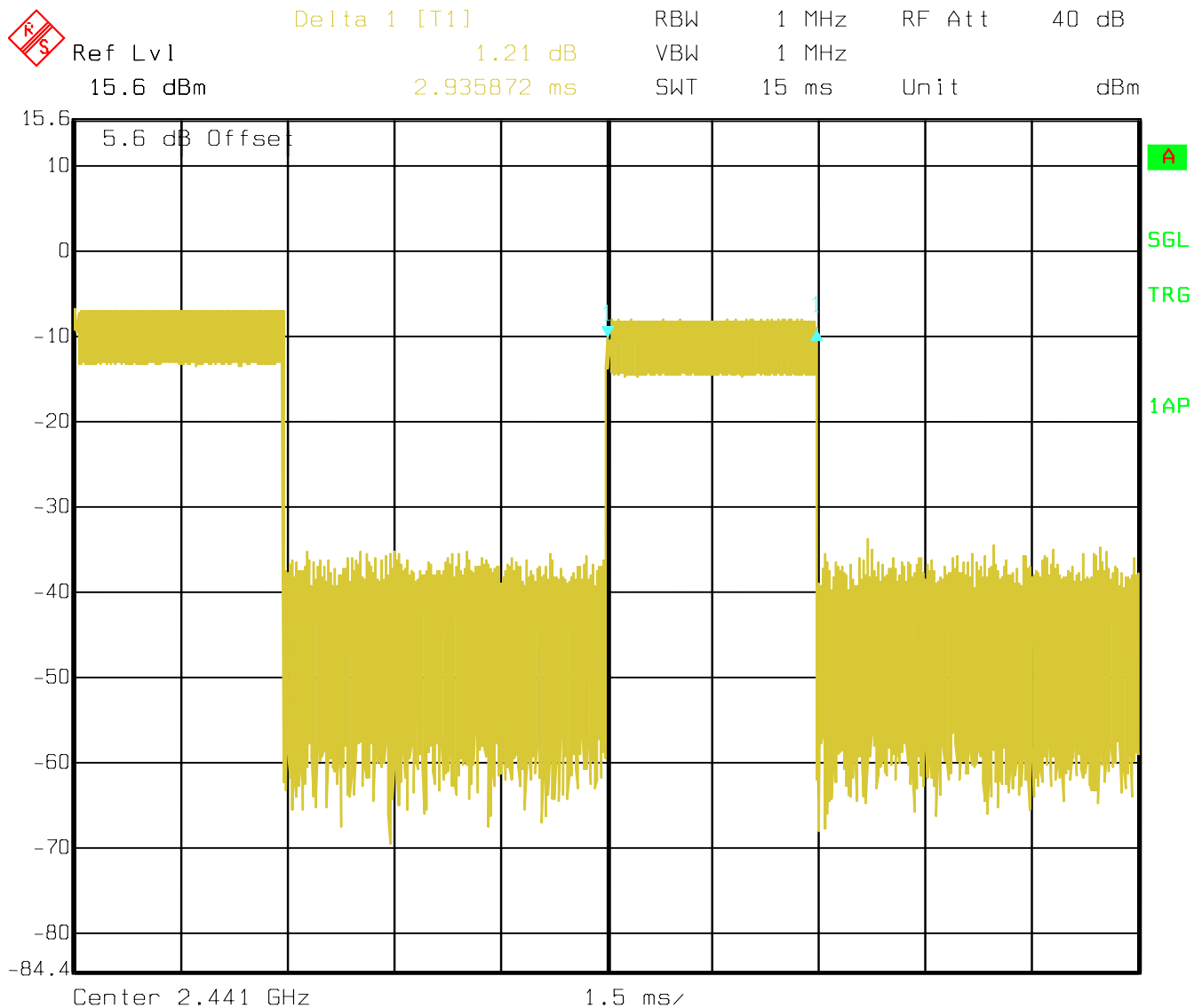


(DH5)

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 $106.176 * 2.936\text{ms} = 311.8\text{ms}$ per 31.6 seconds.



Date: 15.AUG.2006 17:53:04

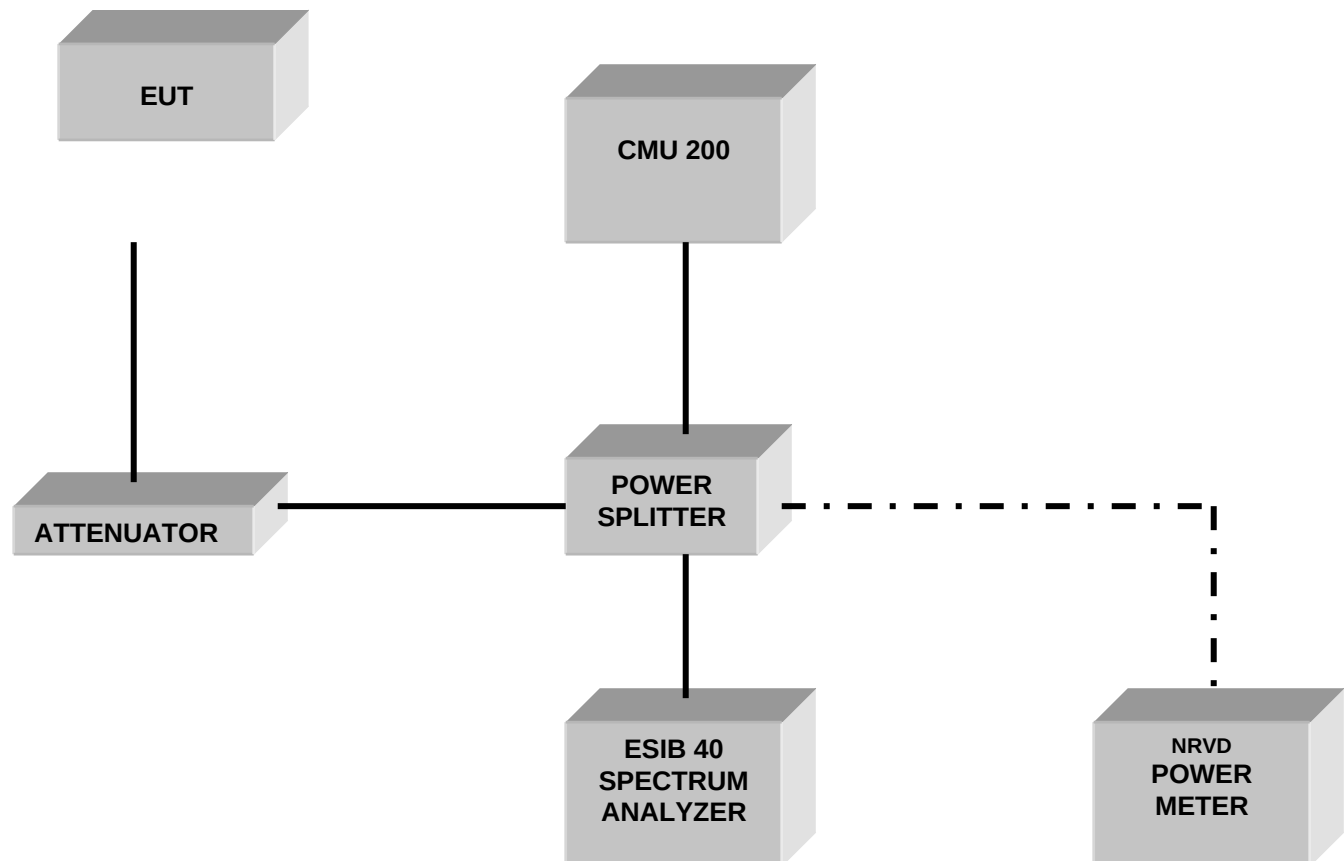


7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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

ANECHOIC CHAMBER

