REV	Δ	DESCRIPTION	SHEET EFFECTED	DATE	DRAWN	CHECKED
A				20.05.2010	M. Reuben	S. Cohen

EMC Laboratory

WipAir X000

Manufactured by WaveIP LTD.

Output Power Test Results Point-to-multipoint Annex to Peak Output Power

According to FCC Part 15.247

	Fonction/Title	Name	Signature	Date
Prepared by:	Technical Writer	M. Reuben		20.05.2010
Checked by:	Test Engineer	I. Arbitman		17.05.2010
Approved By:	EMC Lab. Manager	S. Cohen		23.05.2010

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1. ADMINISTRATIVE DATA

1.1. Scope

This document describes the measurement procedures and tests for Radiated and conducted emission testing of the WipAir X000 manufactured by WaveIP Ltd.

2. GENERAL INFORMATION

2.1. Description of equipment Under Test

Equipment Under Test	WipAir 6000/3000
FCCID	QQ2-WA605X
Manufacturer	WaveIP Ltd.
Serial Numbers	0050C26FB1CA
Mode of Operation	Tranceiver MODE
Receiver operating frequency	5730 MHz – 5845 MHz
Year of Manufacture	2010

2.2. Applicant Information:

Applicant	WaveIP Ltd
Applicant Address	Teradion Indistrial park, Misgav 20179, Israel
Telephone	+972-4-9027000
FAX	+972-4-9990324
The testing was observed by	AMIT ARAZI

2.3. Test Performance:

Dates of testing	May 2010
Test Laboratory Location	Elbit Systems Land and C^{4}I - Tadiran Ltd., EMC LAB, Hashoftim 26 Holon 58102 ISRAEL Tel: 972-3-5574476 Fax: 972-3-5575320
Applicable EMC Specification	Federal Communication Commission (FCC), FCC Part 15: Radio Frequency Devices, Sections 15.109, 15.209, 15.207 & 15.247

3. TEST SUMMARY AND SIGNATURES.

Elbit Systems Land and C^{4}I - Tadiran Ltd., EMC Laboratory has completed testing of E.U.T in accordance with the requirements of the FCC Part 15 Regulations for Class B equipment.

The E.U.T was found to comply with the requirements of the FCC Part 15 Regulations given below

Test	Test Description	Section	PASS/FAIL
1	Peak Output Power PTMP mode	15.247 (b)(3), RSS-210 section A8.4(4)	PASS*

***:** All power measurements were performed under the nominal power voltage as all RF circuits are powered from voltage regulators in RF_schematics_18826.pdf on page 8.

3.1. Test performed by:

I. Arbitman

3.2. Test Report prepared by:

M. Reuben

3.3. Test Report Approved by:

Mr. Samuel Cohen EMC Lab. Manager

4. E.U.T INFORMATION

4.1. E.U.T description

WipAir_X000 is WaveIP's wireless point-to-point and point to multi point broadband wireless communication system. The system uses dual or single radio channels,(defined by software) in the 5GHz bands, utilizing 5,10,20,40 MHz channels, OFDM modulation, and TDD Spectrum Management.

The total conducted output power is up to 1Watt (sum of both channels), with dynamic range of 45 dB.

WipAir6000 uses two RF ports, hence WipAir 6000 was tested.

Antennas used during tests:

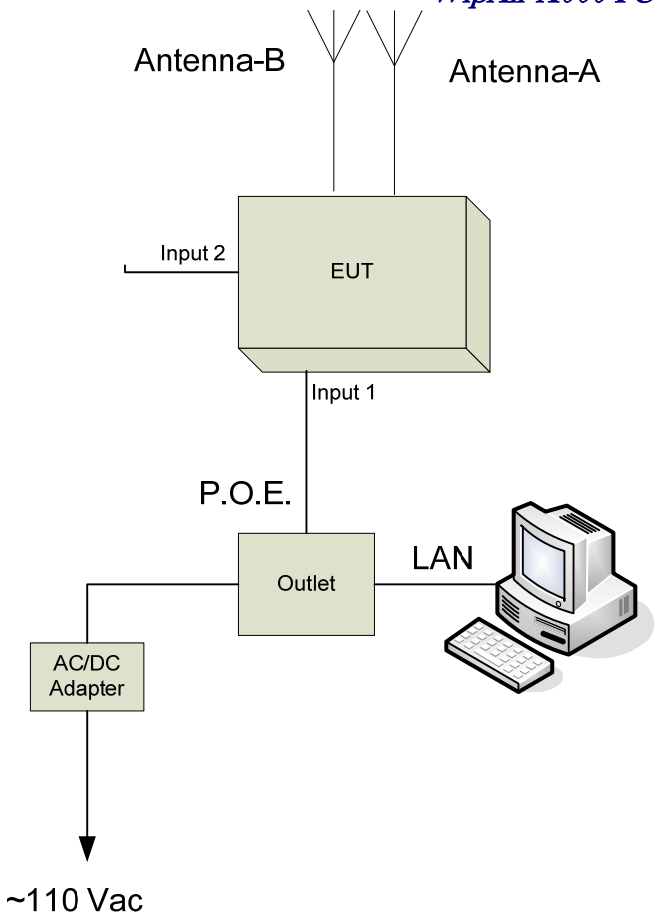
Type	MFG	MODLE	GAIN
Flat panel, dual polarization, integrated	MTI	MT-485048/CVH/A	23
Dish dual polarization, detached	KBT	DP-5X-285D-005	28.5

EUT Technical characteristics

Transmitter characteristics		Notes
Assigned frequency	5725-5850MHZ	
Operating Frequency range	5730-5845MHZ	5MHz Channel
	5735-5840MHZ	10MHz Channel
	5735-5840MHZ	20MHz Channel
	5745-5830MHZ	40MHz Channel
Antenna Ports	TNC	For detached option only
Modulations type	QPSK, 4QAM, 16QAM, 64QAM	
Multiplexing type	OFDM	
Modulating Test Signal	PRBS	

4.2. E.U.T Test Configuration

E.UT. test configuration is shown in figure bellow



4.3. E.U.T Mode of Operation description

5730 MHz – 5845 MHz TRANCEIVER

5. OUTPUT POWER TEST

Equipment Under Test	WipAir 6000/3000
Test Method	FCC New Guidance on Measurements for DTS in section 15.247(b), Option 2, Method #3.
Date	17.05.2010
Relative Humidity	40%
Ambient Temperature	25^0 C
Air Pressure	1010 hPa
Test Setup	Figure 2

Testing Engineer: I. Arbitman **Date** 17.05.2010

5.1. Test Results Summary & Conclusions

The E.U.T was found in compliance with Peak Output Power requirements

5.2. Limits of Peak Output Power according 15.231(b)

The test unit shall meet the limits of Table 1

Table 1: Limits for Fundamental

Assigned Frequency (MHz)	Modulation Envelope Reference Points* (dBi)	Peak Output Power	
		W	dBm
902.0 – 928.0	6.0	1.0	30.0
2400.0 – 2483.5			
5725.0 – 5850.0			

*: If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power limit shall be reduced below the .stated value as follows:

- By 1 dB for every 3 dB that the directional gain of antenna exceeds 6 dBi for fixed point to point transmitters operate in 2400 – 2483.5 MHz band.
- Without any corresponding reduction for fixed-point-to-point transmitters operate in 5725 – 5850 MHz band;
- By the amount in dB that the directional gain of antenna exceeds 6 dBi for the rest of transmitters.

5.3. Test Instrumentation and Equipment

Table 2: Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	E7405A	Agilent	27.05,2010
30db attenuator	769-30	Narda	21.06.2011

5.4. Test Procedure

The measurements were conducted for normal transmitting mode of operation for carrier channel frequency for top, middle and bottom frequency and at the top of 5725 – 5850 MHz frequency band for maximum data transfer bit rate. The RE output of the EUT was connected to the spectrum analyzer through an appropriate attenuator and accounted for cable loss in SA settings.

Peak power measurement was done using spectrum analyzer, as the EBW was larger than the largest available RBW therefore:

Peak power was measured at 1MHz resolution BW, while UUT transmitted 100% duty cycle. Actual 26 dB BW was measured for each RF channel and all BW (all plots and BW results are in the original report)

Correction factor is calculated as 10 log (actual BW / Measurement BW).

Total peak output power was computed as 'Measured power @ 1MHz + correction factor'.

5.5. Test Setup

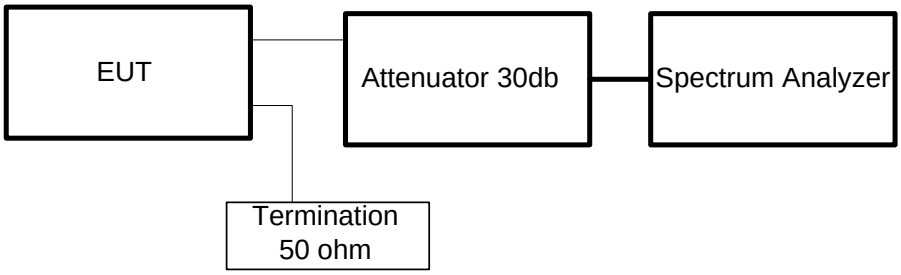


Figure 2: Field strength of fundamental test setup

5.6. Calculated Results for both ports

Table 13: Settings for 23 dBi Antenna PTMP mode

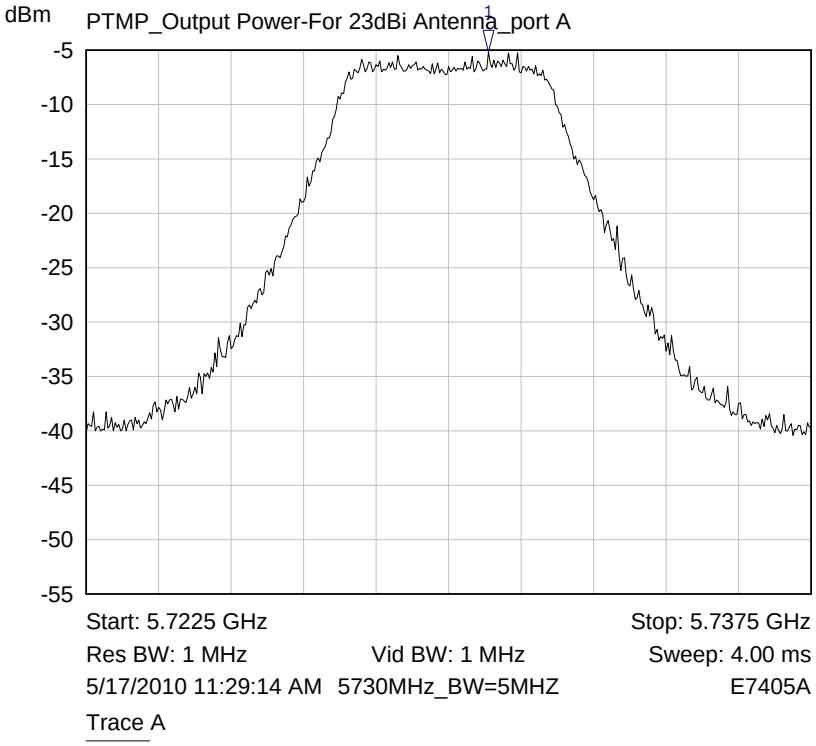
Frequency MHz	BW MHz	PortA dBm	PortA mW	PortB dBm	PortB mW	Total Power mW	Total Power dBm	Antenna Gain dBi	EIRP	Limit EIRP	Pass/Fail
5730	5	3.5376	2.26	3.7354	2.36	4.62	6.65	23	29.65	30	Pass
5790	5	3.4533	2.21	3.5854	2.28	4.50	6.53	23	29.53	30	Pass
5845	5	3.8473	2.43	3.7098	2.35	4.77	6.79	23	29.79	30	Pass
5735	10	3.2193	2.10	3.4092	2.19	4.29	6.33	23	29.33	30	Pass
5790	10	3.2559	2.12	3.449	2.21	4.33	6.36	23	29.36	30	Pass
5840	10	3.9659	2.49	3.3856	2.18	4.67	6.70	23	29.70	30	Pass
5735	20	3.9401	2.48	3.9493	2.48	4.96	6.96	23	29.96	30	Pass
5790	20	3.802	2.40	3.6118	2.30	4.70	6.72	23	29.72	30	Pass
5840	20	3.7706	2.38	3.7562	2.37	4.76	6.77	23	29.77	30	Pass
5745	40	3.12	2.05	3.8998	2.45	4.51	6.54	23	29.54	30	Pass
5790	40	3.802	2.40	3.6118	2.30	4.70	6.72	23	29.72	30	Pass
5830	40	3.7098	2.35	3.3282	2.15	4.50	6.53	23	29.53	30	Pass

*: The Bandwidth correction factor is based on BW measurements (see WipAir 6000-3000 FCC TX 15.247 – 1)

Table 14: Settings for 28.5 dBi Antenna PTMP mode

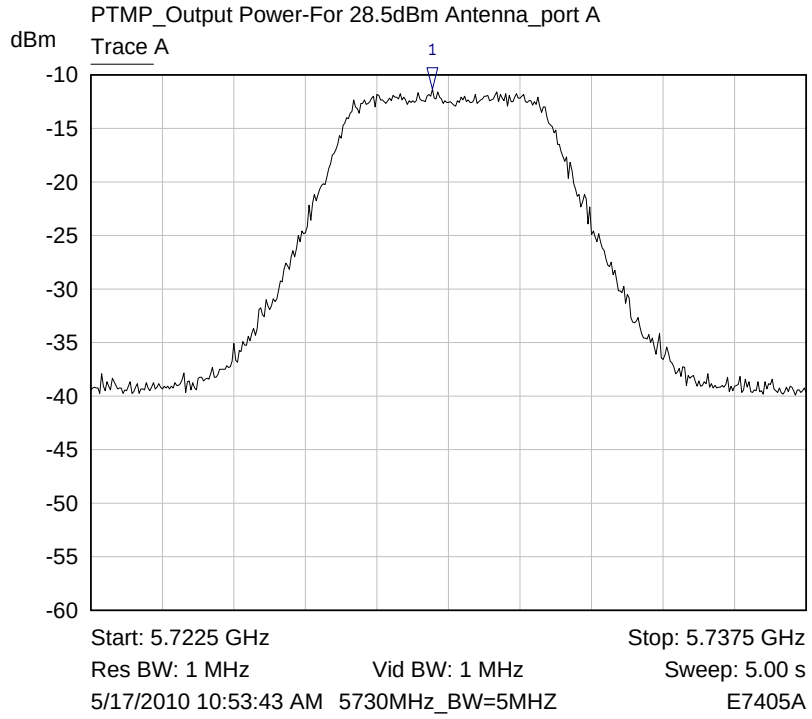
Frequency MHz	BW MHz	PortA dBm	PortA mW	PortB dBm	PortB mW	Total Power mW	Total Power dBm	Antenna Gain dBi	EIRP	Limit EIRP	Pass/Fail
5730	5	-2.6224	0.55	-1.4146	0.72	1.27	1.03	28.5	29.53	30	Pass
5790	5	-1.8967	0.65	-2.091	0.62	1.26	1.02	28.5	29.52	30	Pass
5845	5	-2.2727	0.59	-2.3202	0.59	1.18	0.71	28.5	29.21	30	Pass
5735	10	-1.6607	0.68	-1.5708	0.70	1.38	1.39	28.5	29.89	30	Pass
5790	10	-1.5141	0.71	-2.091	0.62	1.32	1.22	28.5	29.72	30	Pass
5840	10	-1.5641	0.70	-1.7844	0.66	1.36	1.34	28.5	29.84	30	Pass
5735	20	-1.8899	0.65	-1.9908	0.63	1.28	1.07	28.5	29.57	30	Pass
5790	20	-1.8219	0.66	-1.5282	0.70	1.36	1.34	28.5	29.84	30	Pass
5840	20	-1.5994	0.69	-1.7538	0.67	1.36	1.33	28.5	29.83	30	Pass
5745	40	-2.1202	0.61	-1.9121	0.64	1.26	1.00	28.5	29.50	30	Pass
5790	40	-1.5141	0.71	-1.5334	0.70	1.41	1.49	28.5	29.99	30	Pass
5830	40	-1.8102	0.66	-1.5218	0.70	1.36	1.35	28.5	29.85	30	Pass

*: The Bandwidth correction factor is based on BW measurements (see WipAir 6000-3000 FCC TX 15.247 – 1)



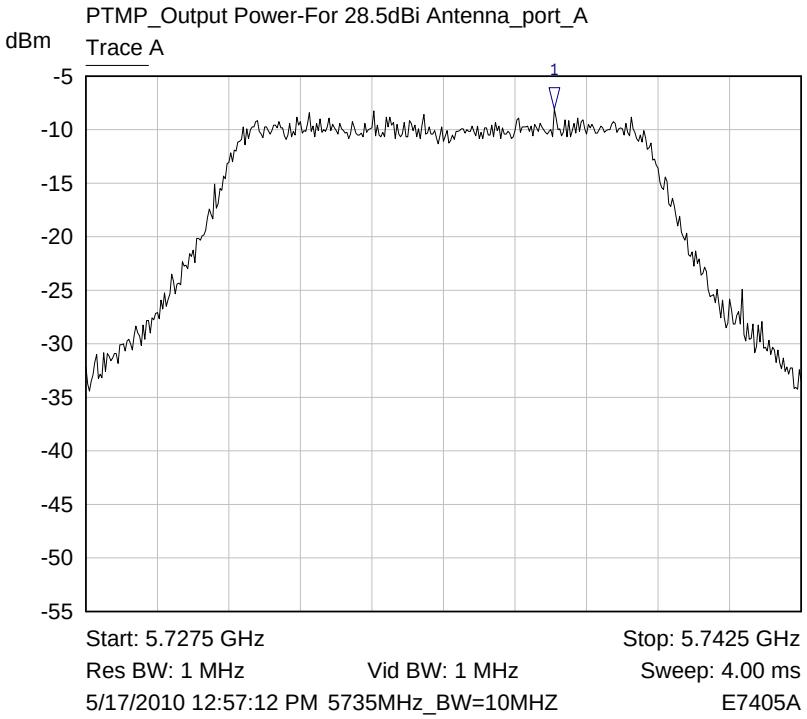
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7308 GHz	-5.14 dBm	P=-5.14+8.6776=3.5376

Plot PTMP Power/1



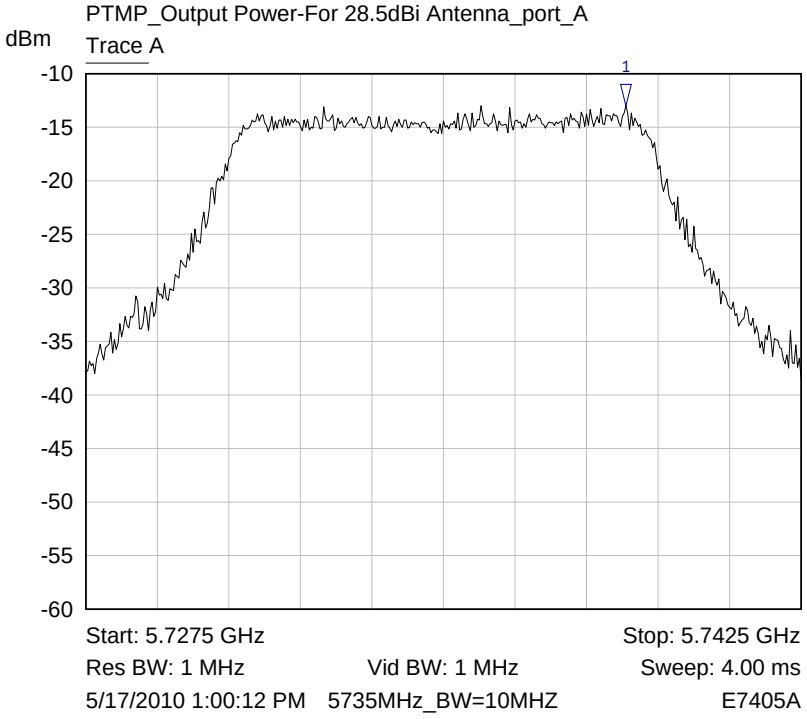
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7297 GHz	-11.30 dBm	P=-11.3+8.6776=-2.6224

Plot PTMP Power/2



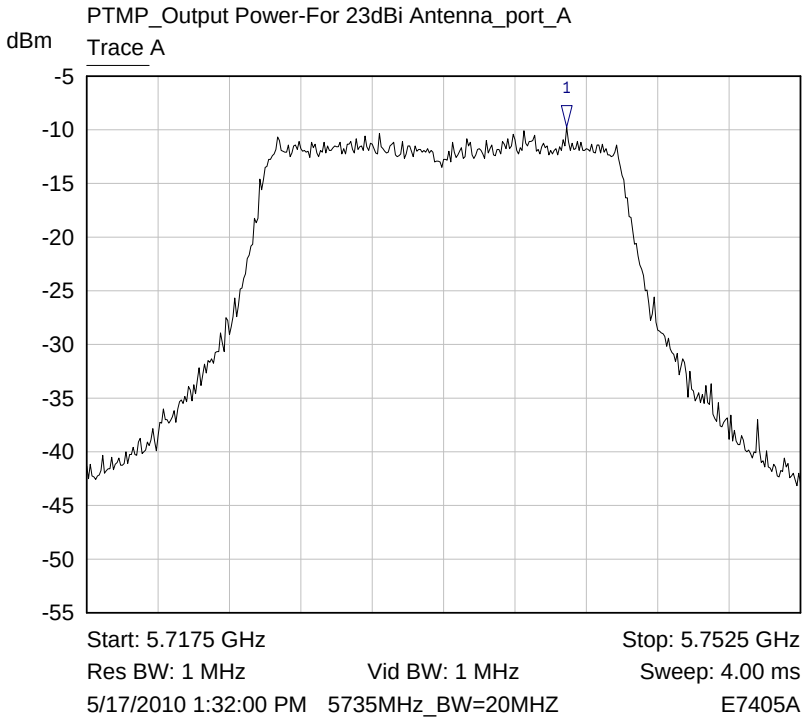
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7373 GHz	-8.10 dBm	P=-8.10+11.3193=3.2193

Plot PTMP Power/3



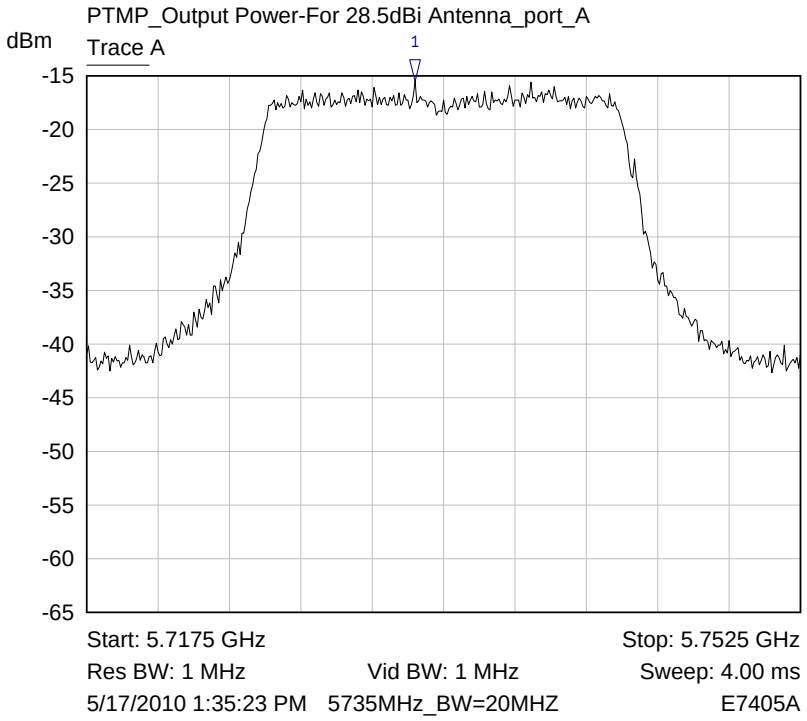
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7388 GHz	-12.98 dBm	P=-12.98+11.3193=-1.6607

Plot PTMP Power/4



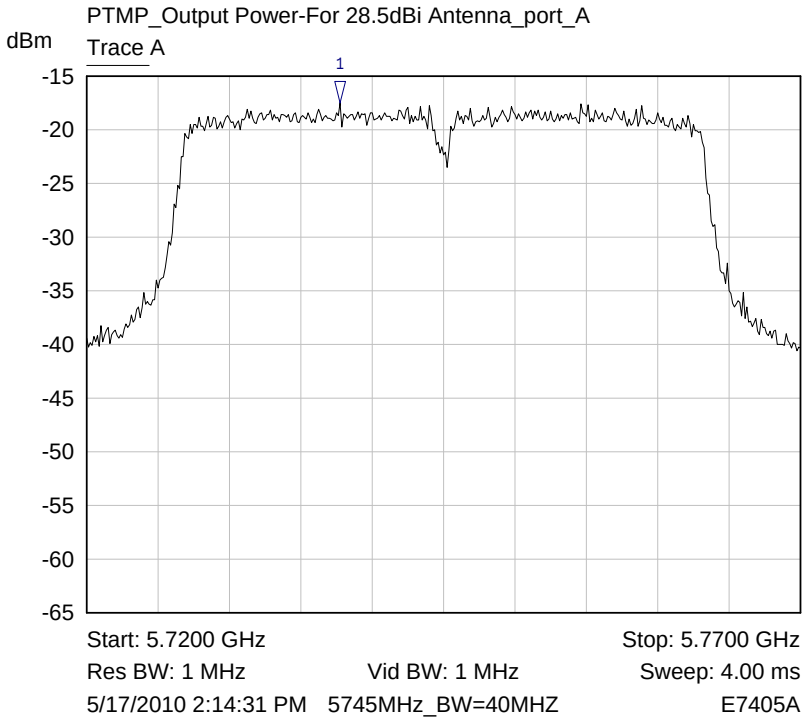
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7410 GHz	-9.71 dBm	P=-9.71+13.6501=3.9401

Plot PTMP Power/5



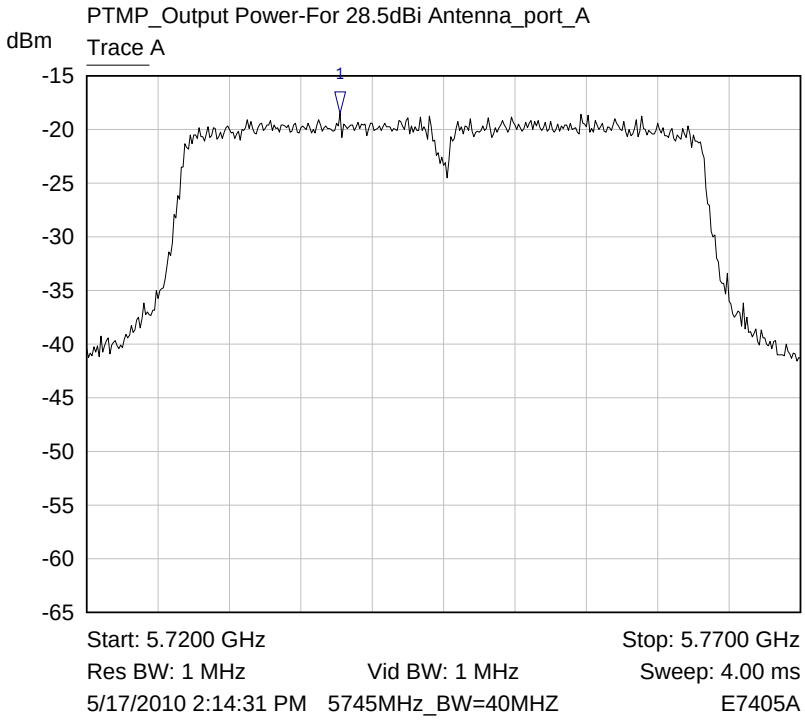
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7336 GHz	-15.54 dBm	P=-15.54+13.6501=-1.8899

Plot PTMP Power/6



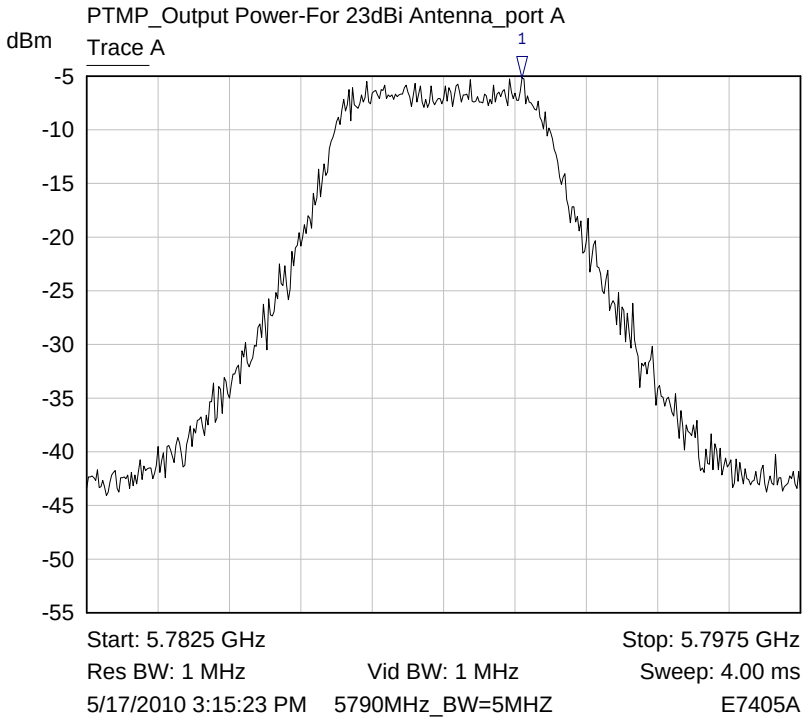
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7378 GHz	-17.48 dBm	P=-17.48+16.3598=-3.1202

Plot PTMP Power/7



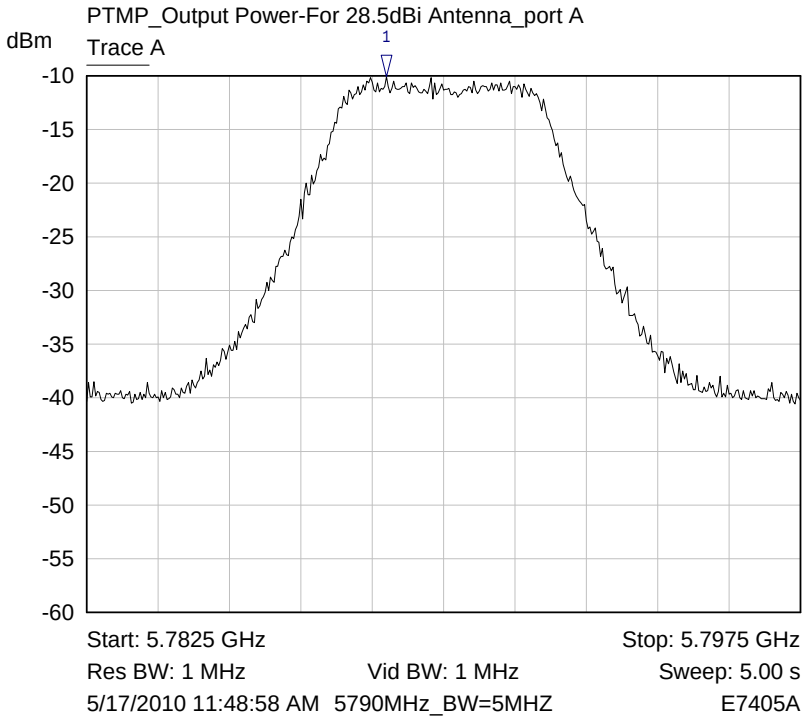
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7378 GHz	-18.48 dBm	P=-18.48+16.3598=-2.1202

Plot PTMP Power/8



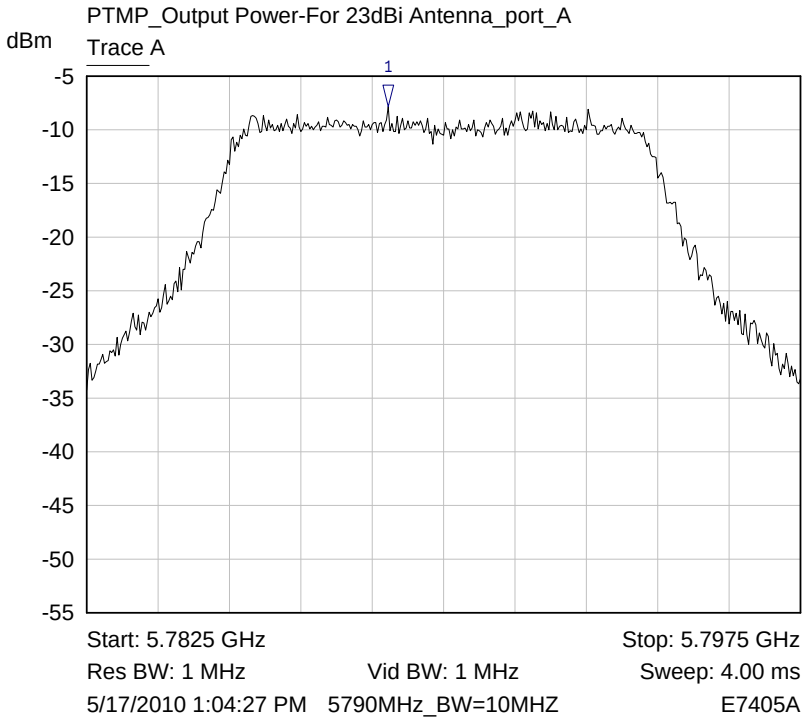
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7917 GHz	-5.15 dBm	P=-5.15+8.6033=3.4533

Plot PTMP Power/9



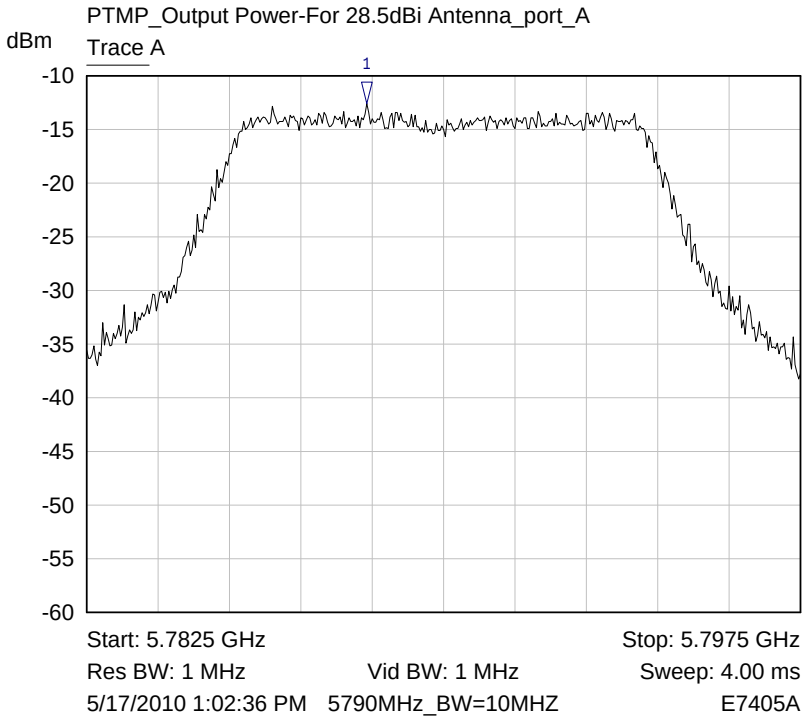
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7888 GHz	-10.05 dBm	P=-10.05+8.6033=-1.8967

Plot PTMP Power/10



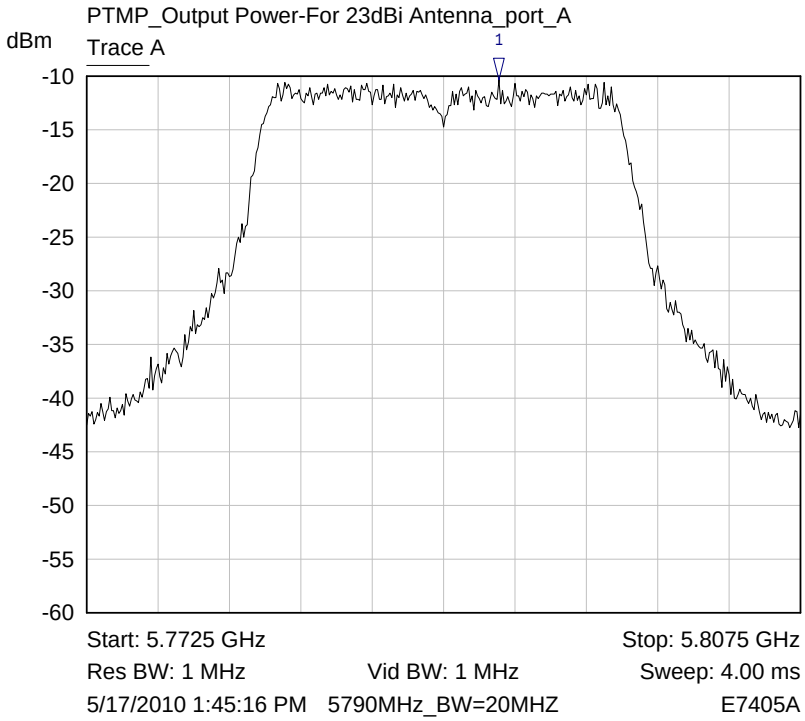
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7888 GHz	-7.85 dBm	P=-7.85+11.1059=3.2559

Plot PTMP Power/11



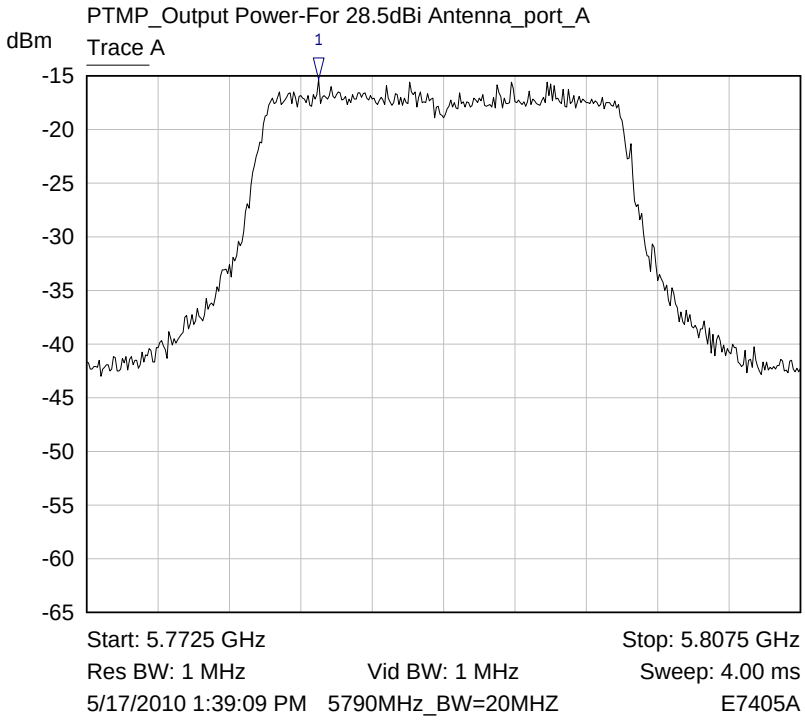
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7884 GHz	-12.62 dBm	P=-12.62+11.1059=-1.5141

Plot PTMP Power/12



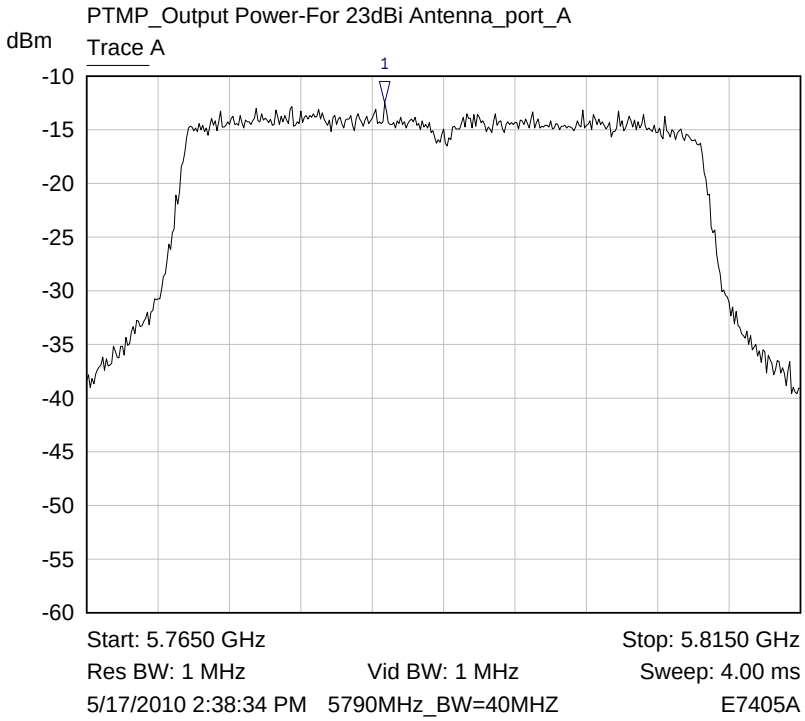
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7927 GHz	-10.30 dBm	P=-10.3+13.4781=3.1781

Plot PTMP Power/13



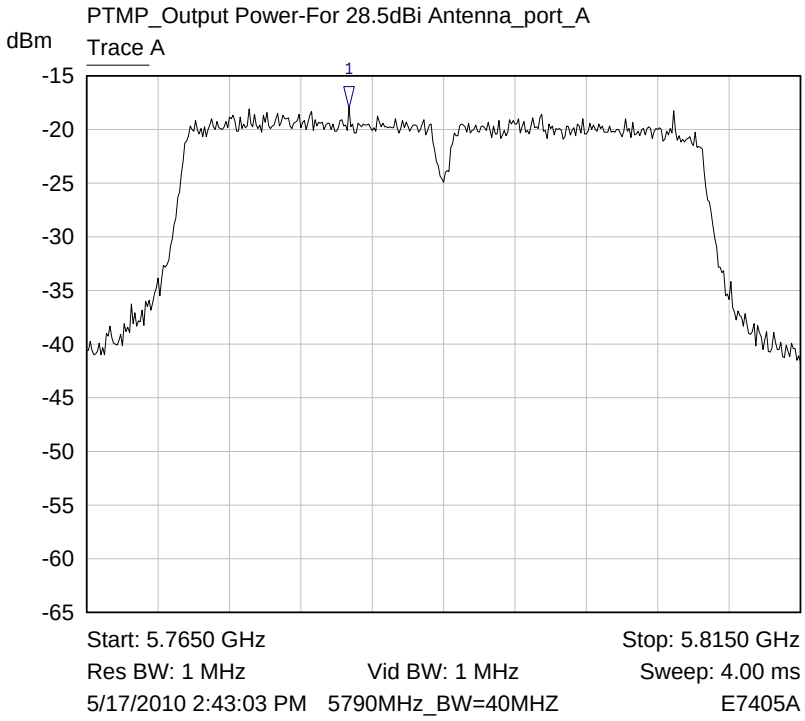
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7839 GHz	-15.30 dBm	P=-15.30+13.4781=-1.8219

Plot PTMP Power/14



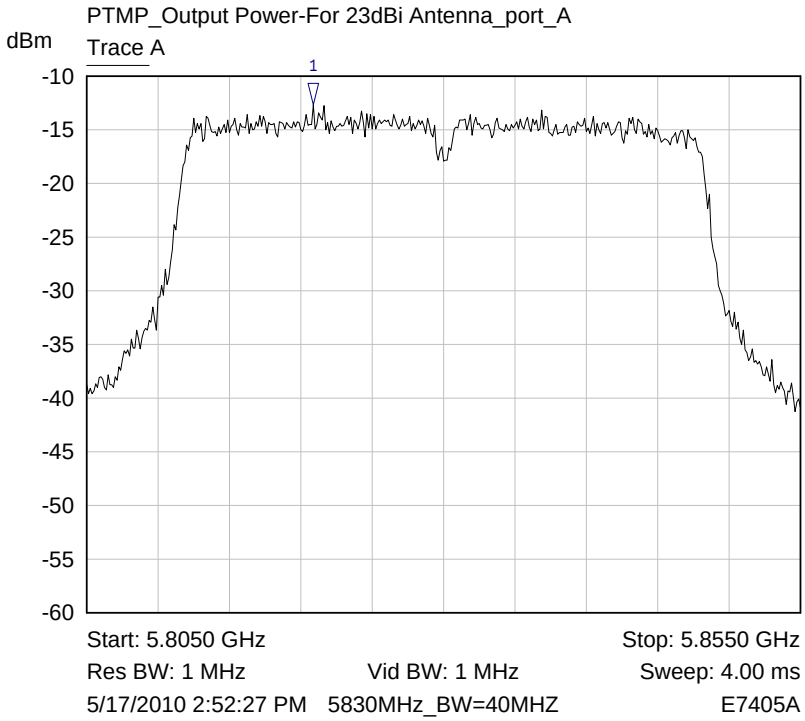
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7859 GHz	-12.52 dBm	P=-12.52+16.3220=3.802

Plot PTMP Power/15



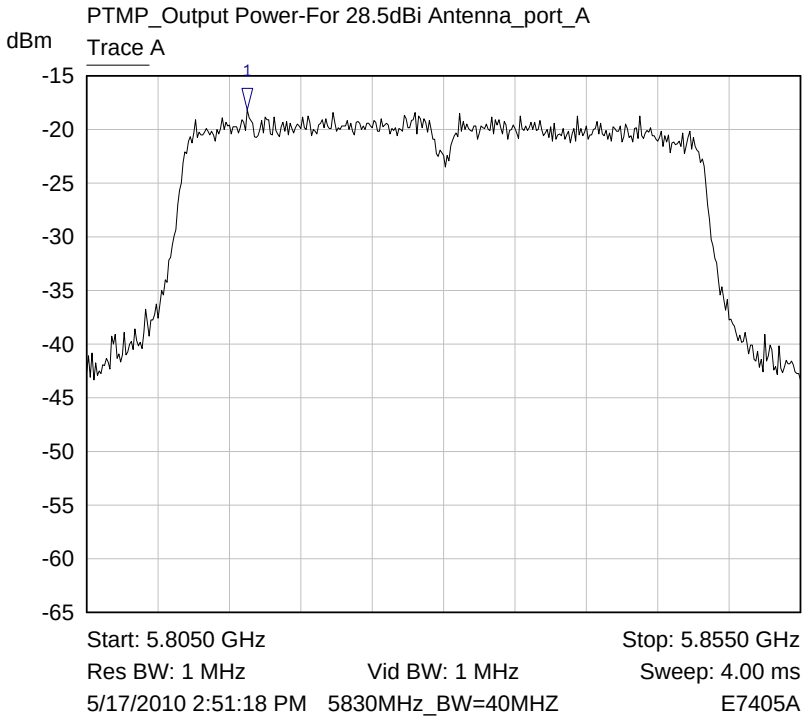
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7834 GHz	-17.99 dBm	P=-17.99+16.3220=-1.668

Plot PTMP Power/16



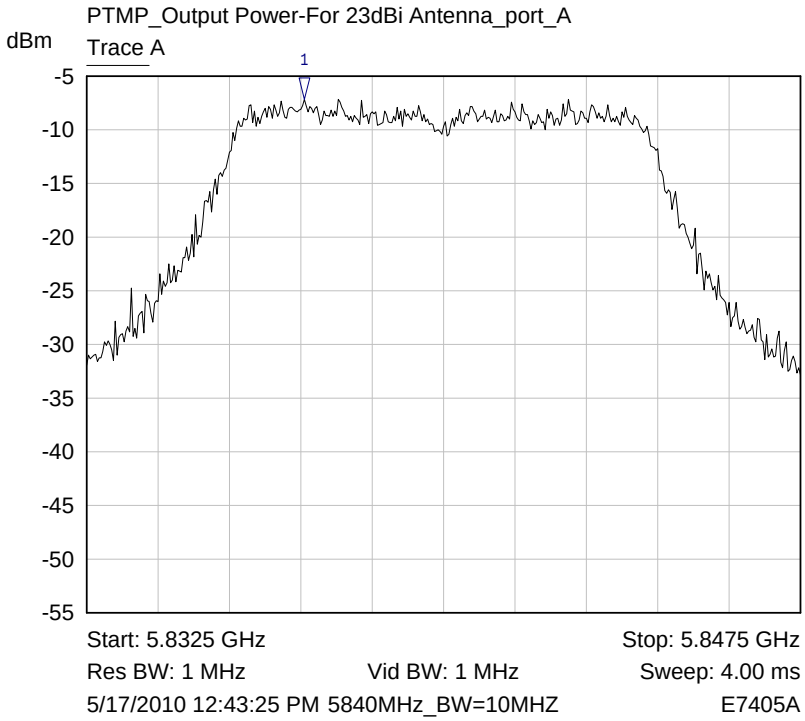
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8209 GHz	-12.65 dBm	P=-12.65+16.3598=3.7098

Plot PTMP Power/17



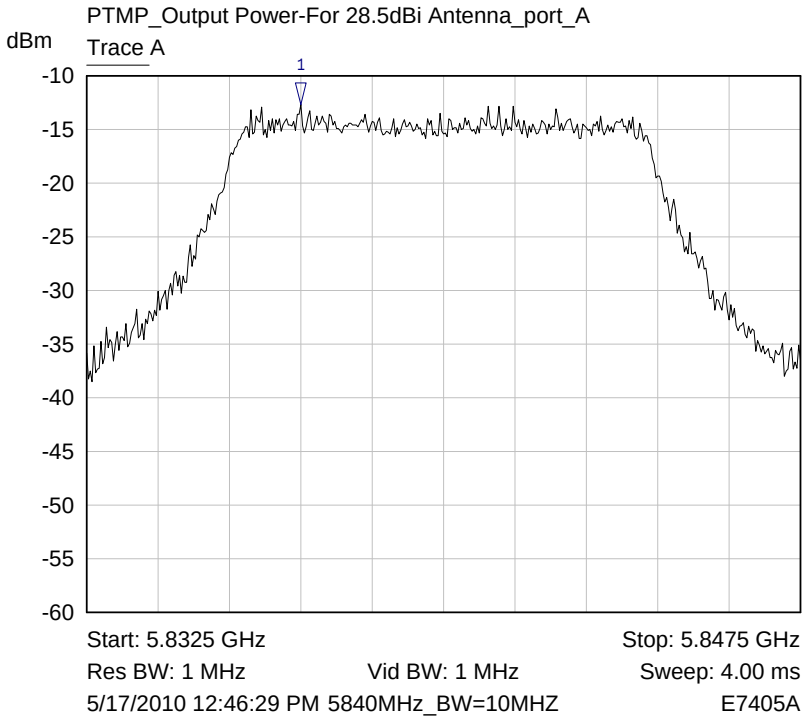
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8163 GHz	-18.17 dBm	P=-18.17+16.3598=-1.8102

Plot PTMP Power/18



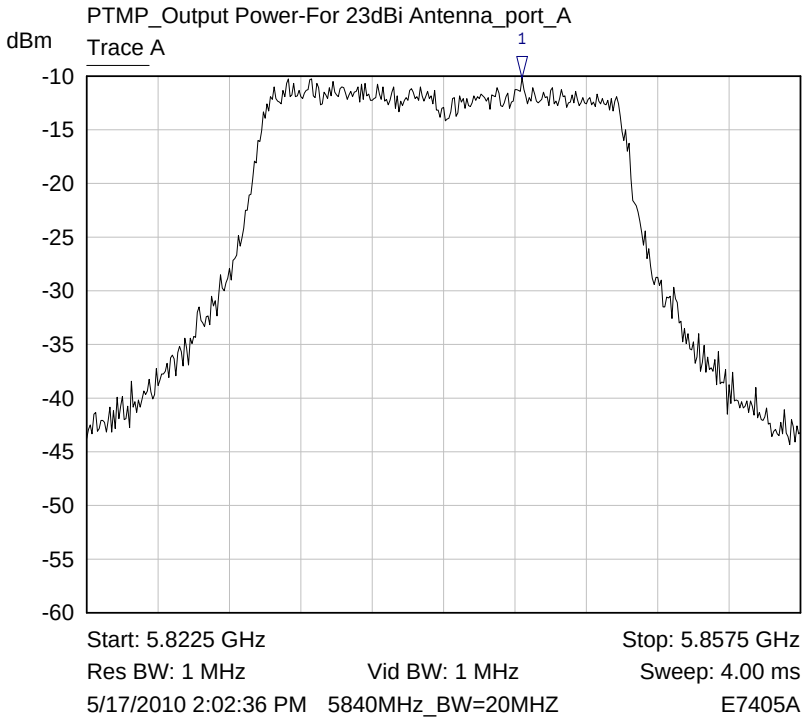
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8371 GHz	-7.14 dBm	P=-7.14+11.1059=3.9659

Plot PTMP Power/19



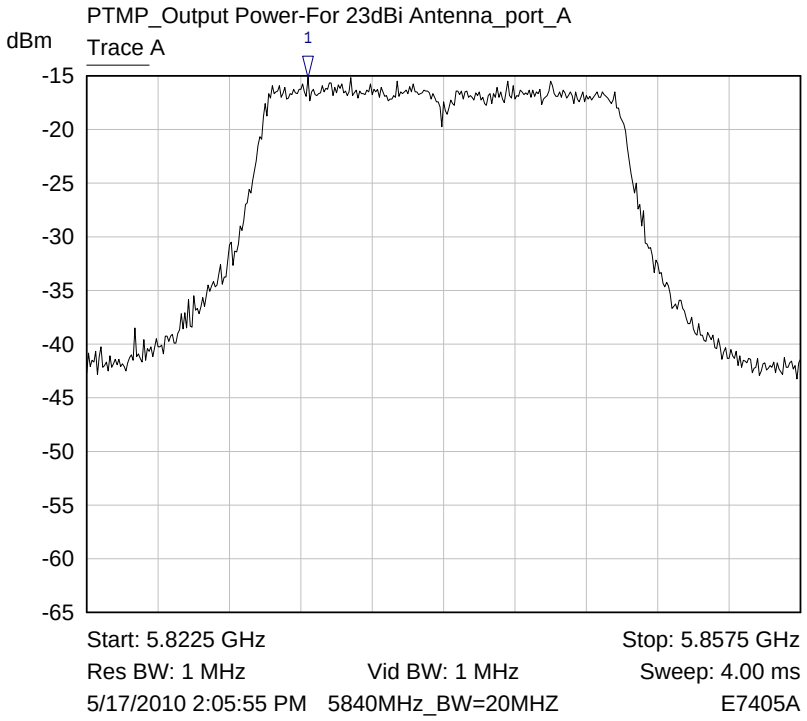
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8370 GHz	-12.67 dBm	P=-12.67+11.1059=-1.5641

Plot PTMP Power/20



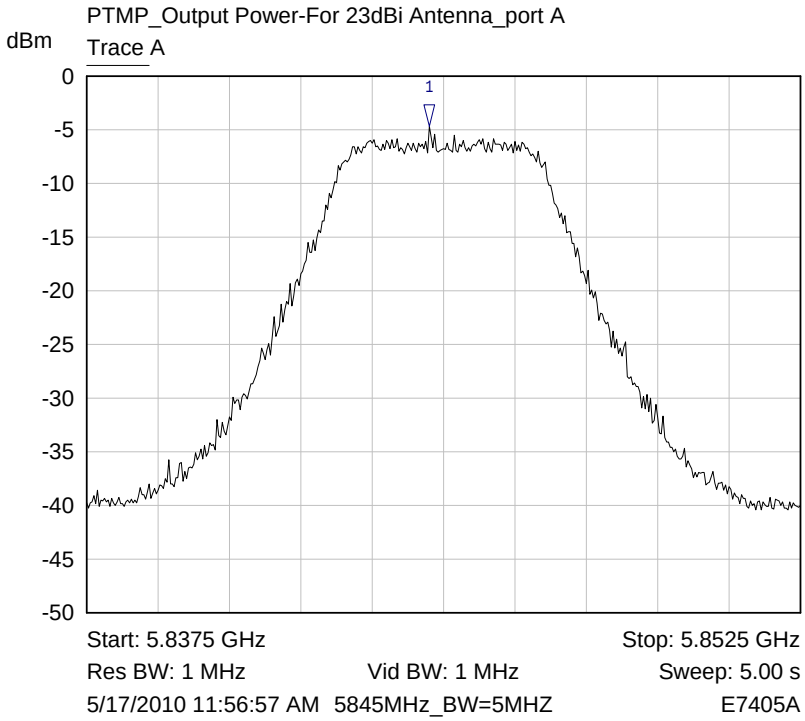
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8439 GHz	-10.18 dBm	P=-10.18+13.5506=3.7706

Plot PTMP Power/21



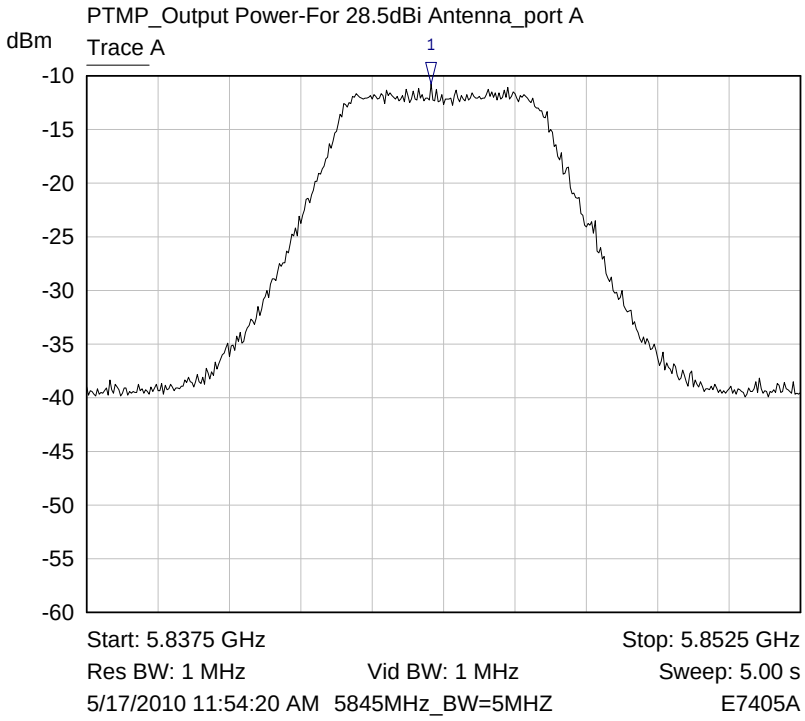
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8334 GHz	-15.15 dBm	P=-15.15+13.5506=-1.5994

Plot PTMP Power/22



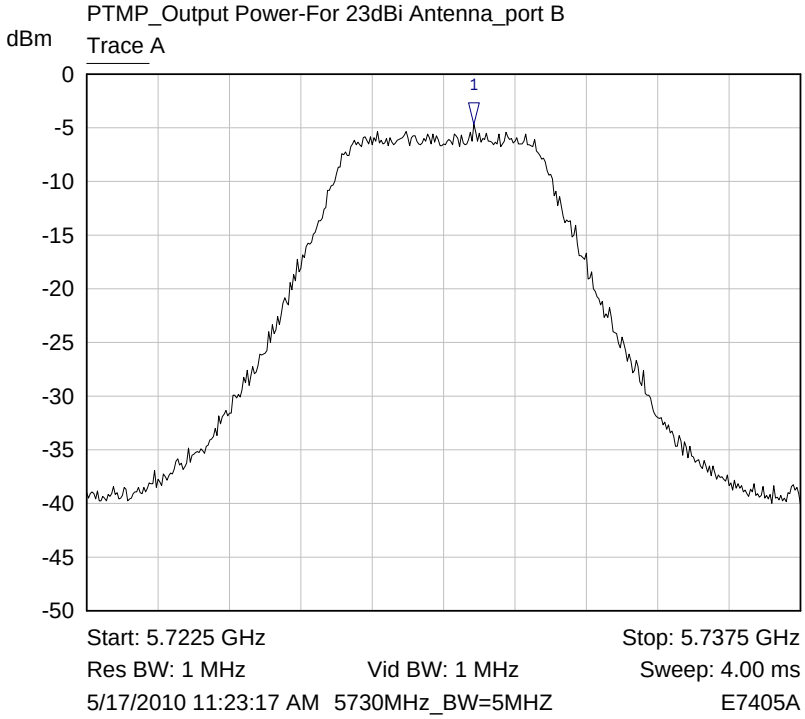
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8447 GHz	-4.64 dBm	P=-4.64+8.4873=3.8473

Plot PTMP Power/23



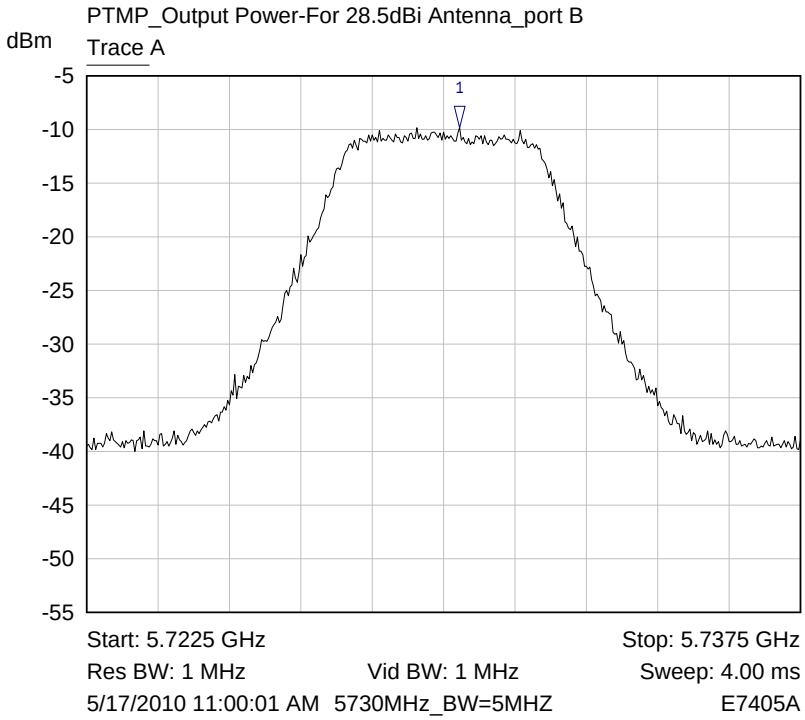
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8447 GHz	-10.76 dBm	P=-10.76+8.4873=-2.2727

Plot PTMP Power/24



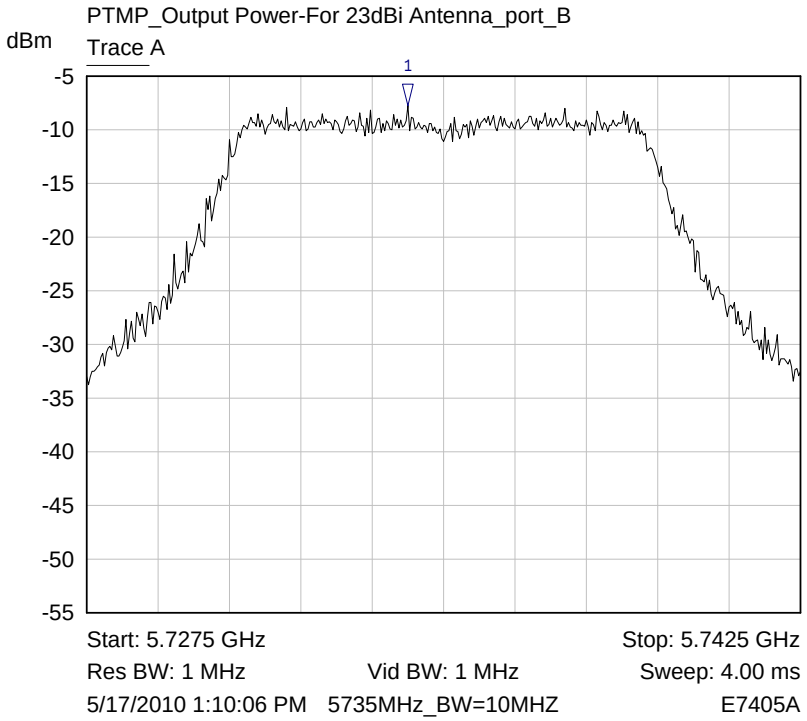
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7306 GHz	-4.70 dBm	P=-4.70+8.4354=3.7354

Plot PTMP Power/25



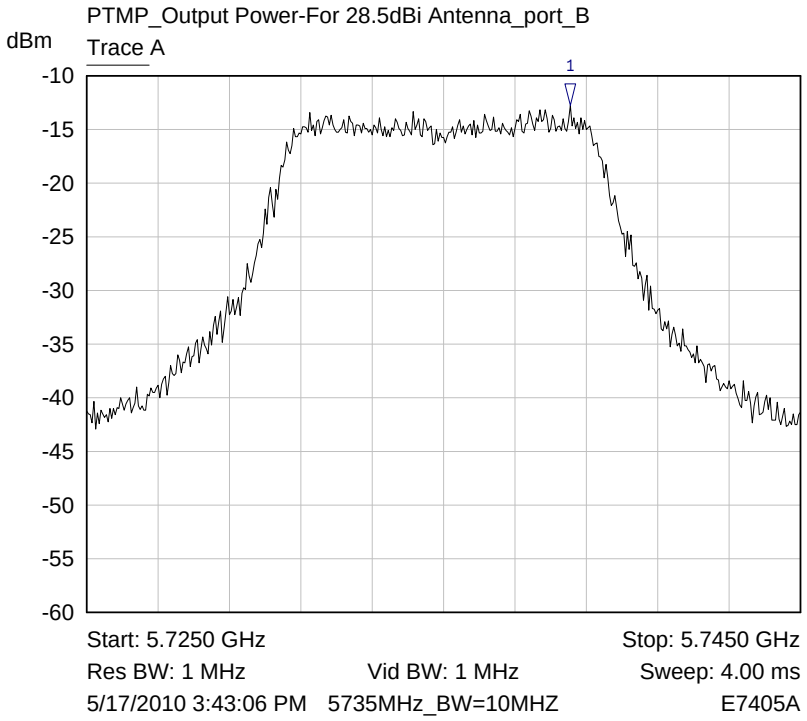
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7303 GHz	-9.85 dBm	P=-9.85+8.4354=-1.4146

Plot PTMP Power/26



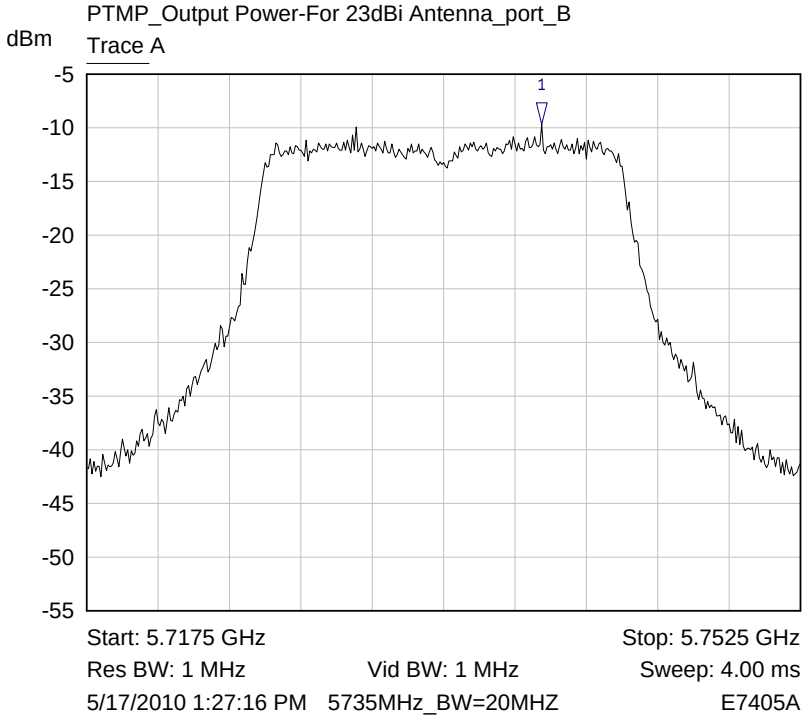
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7343 GHz	-7.78 dBm	P=-7.78+11.1892=3.4092

Plot PTMP Power/27



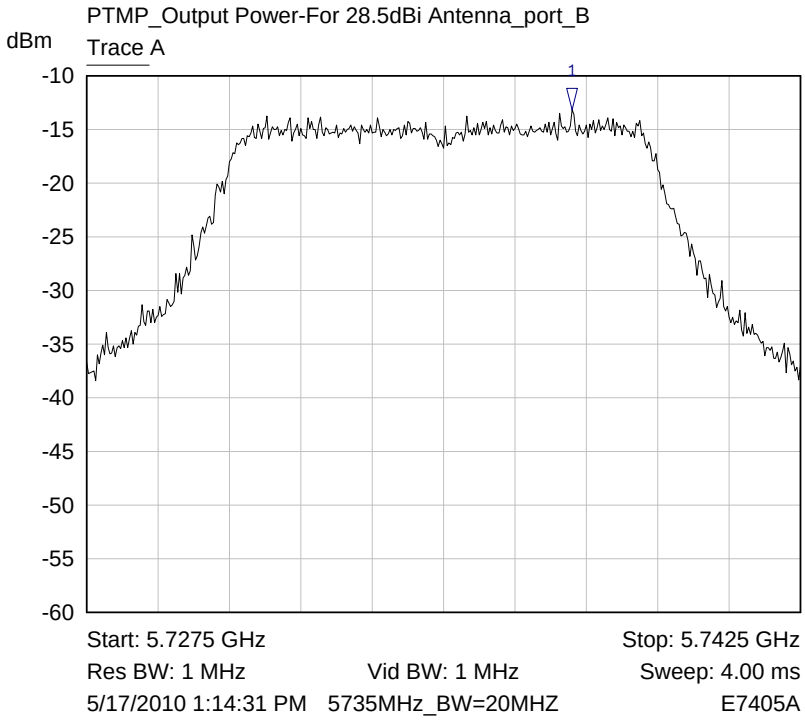
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7386 GHz	-12.76 dBm	P=-12.76+11.1892=-1.5708

Plot PTMP Power/28



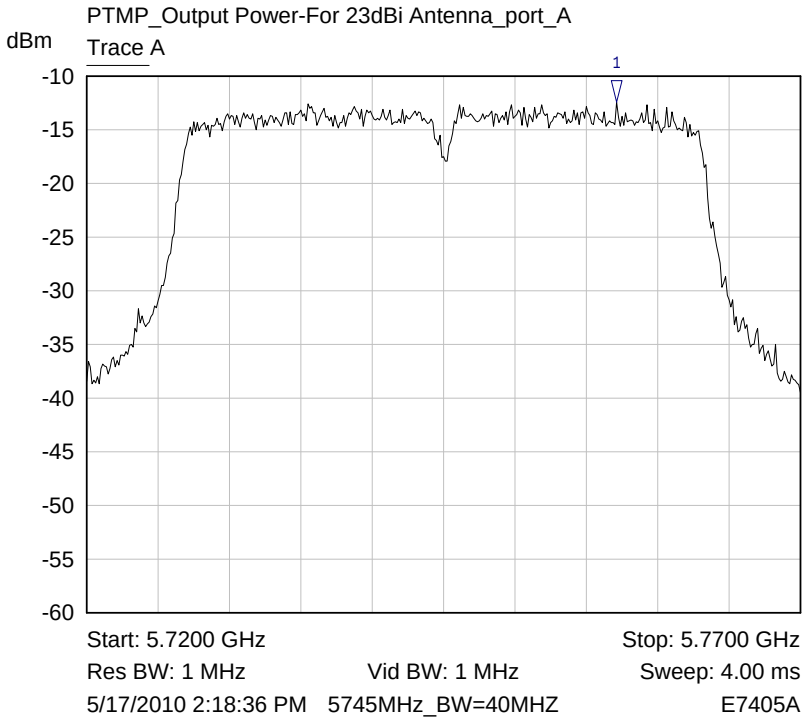
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7398 GHz	-9.63 dBm	P=-9.63+13.5793=3.9493

Plot PTMP Power/29



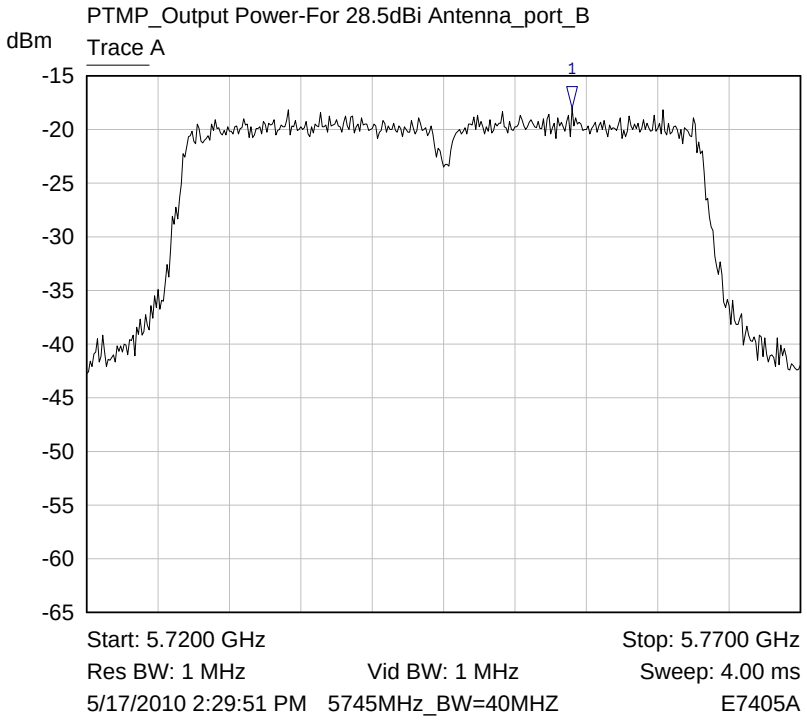
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7377 GHz	-13.18 dBm	P=-13.18+11.1892=-1.9908

Plot PTMP Power/30



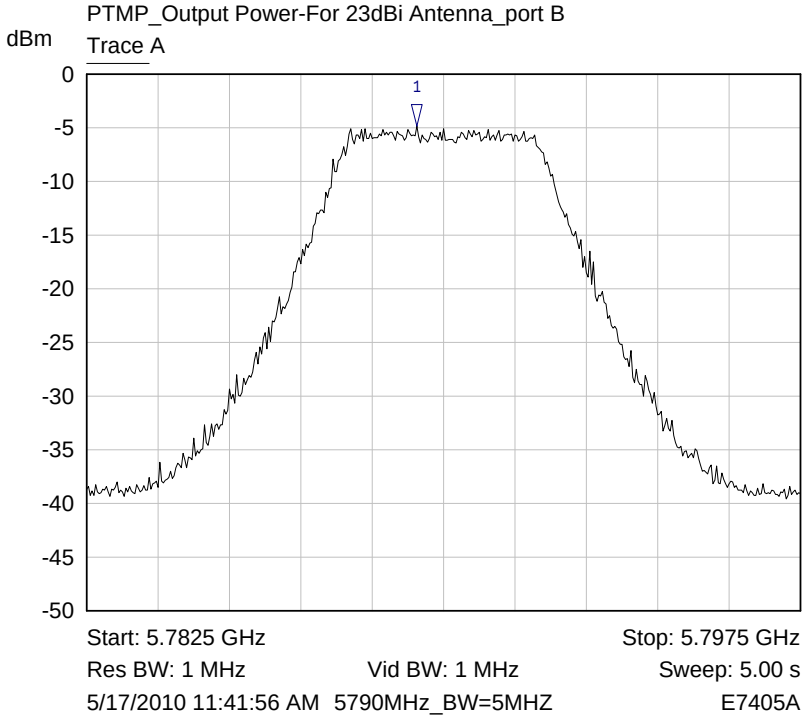
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7571 GHz	-12.46 dBm	P=-12.46+16.3598=-3.8998

Plot PTMP Power/31



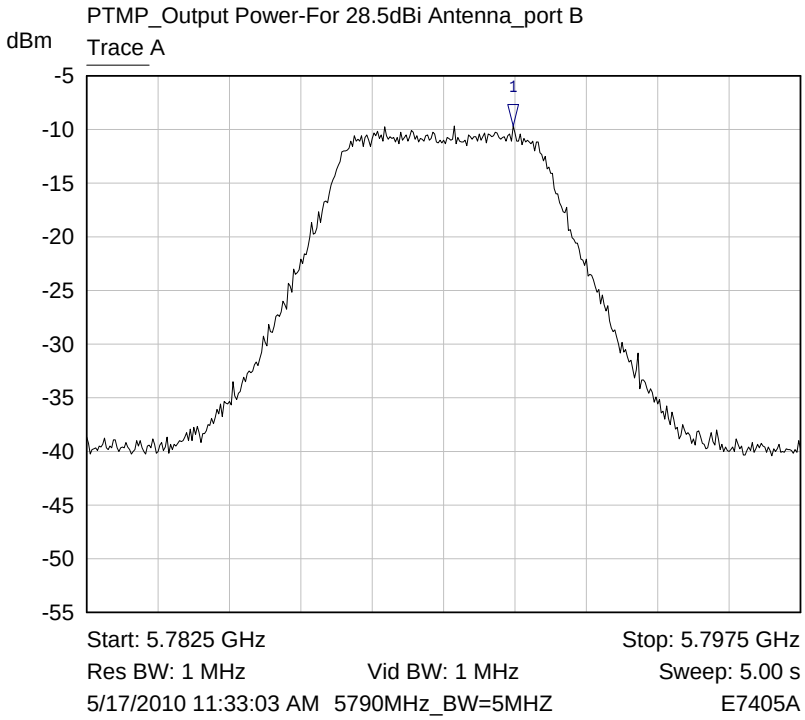
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7540 GHz	-18.00 dBm	P=-18.00+16.0879=-1.9121

Plot PTMP Power/32



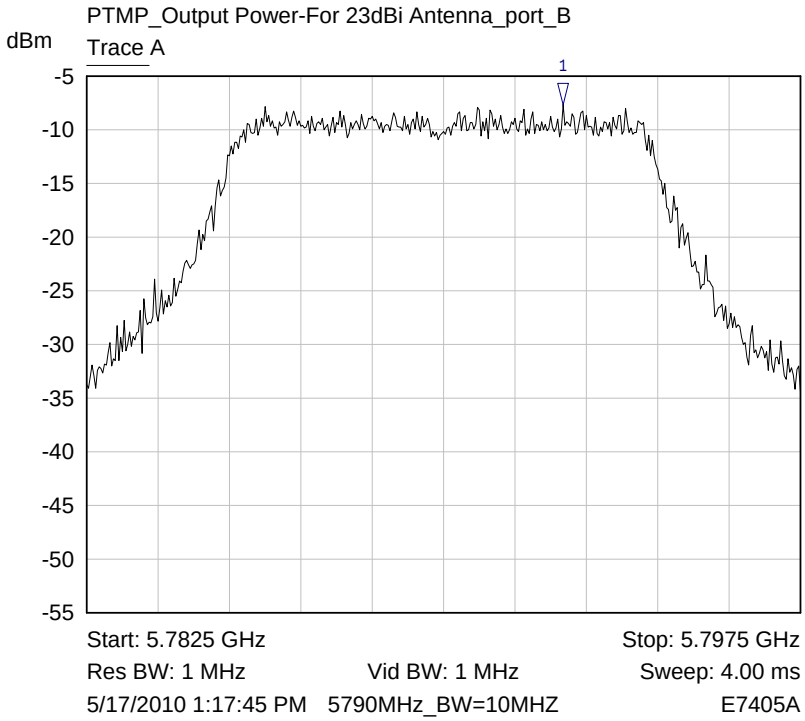
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7894 GHz	-4.85 dBm	P=-4.85+8.4354=3.5854

Plot PTMP Power/33



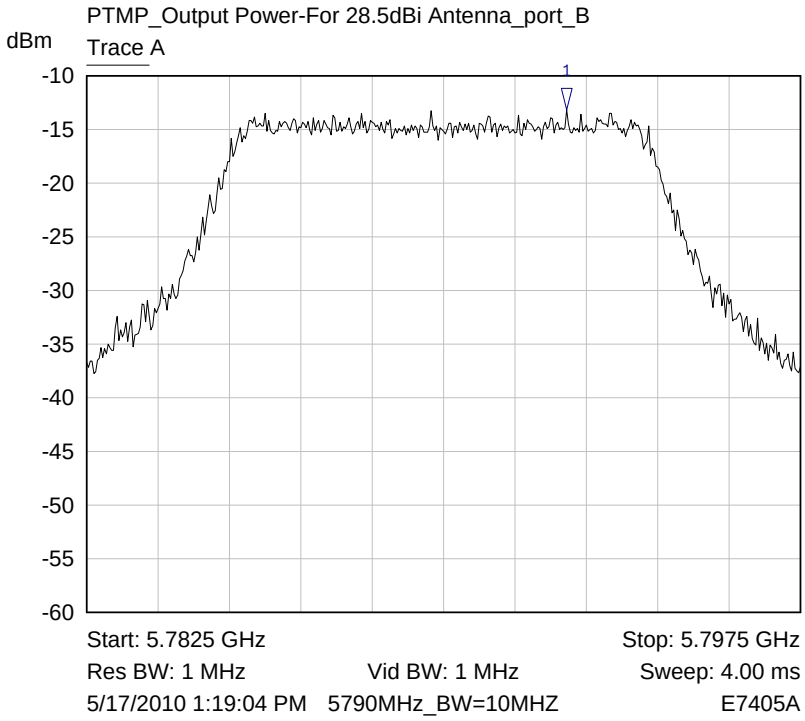
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7915 GHz	-9.63 dBm	P=-9.63+8.4354=-1.1946

Plot PTMP Power/34



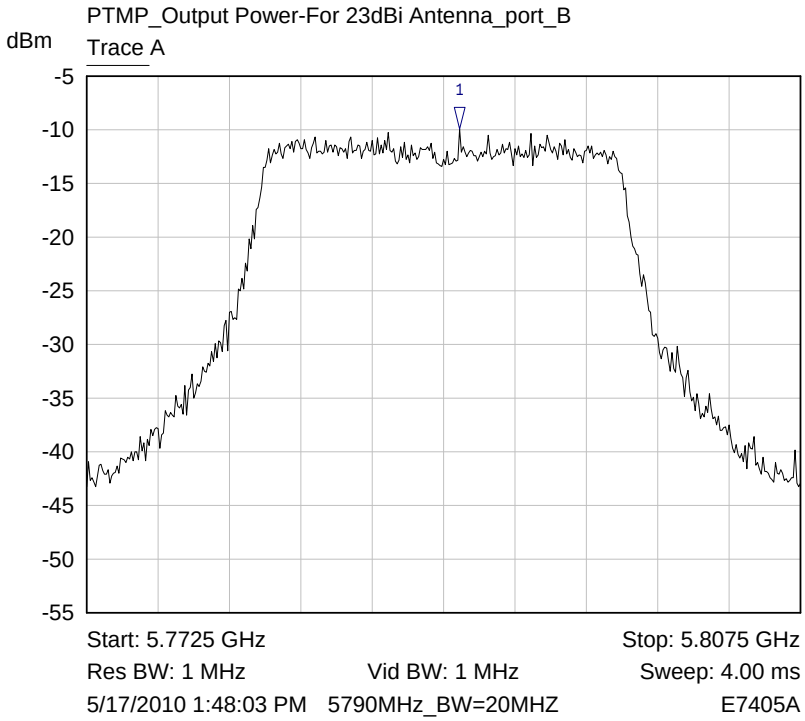
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7925 GHz	-7.64 dBm	P=-7.64+11.089=3.449

Plot PTMP Power/35



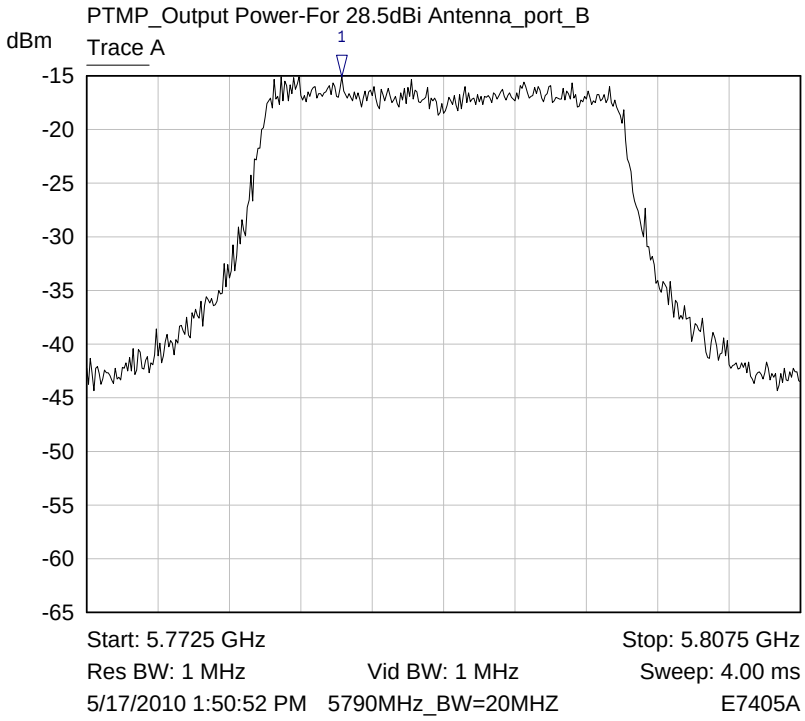
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7926 GHz	-13.18 dBm	P=-13.18+11.089=-2.091

Plot PTMP Power/36



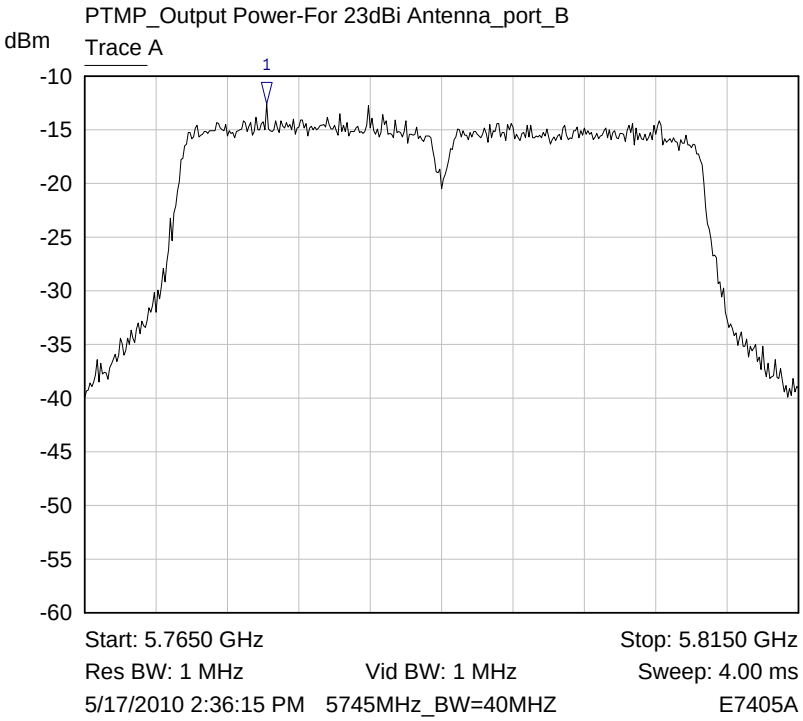
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7908 GHz	-9.91 dBm	P=-9.91+13.5218=3.6118

Plot PTMP Power/37



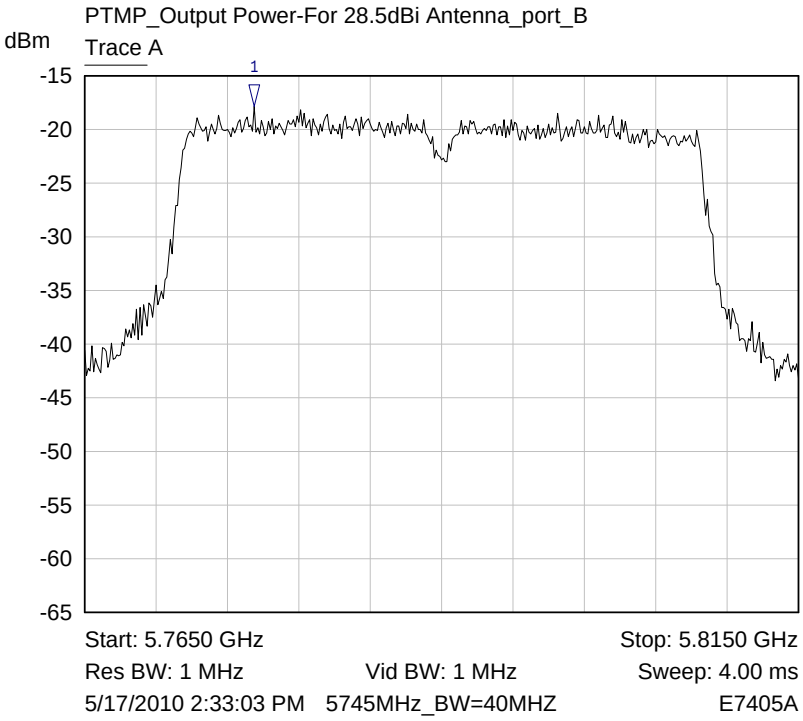
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7850 GHz	-15.05 dBm	P=-15.05+13.5218=-1.5282

Plot PTMP Power/38



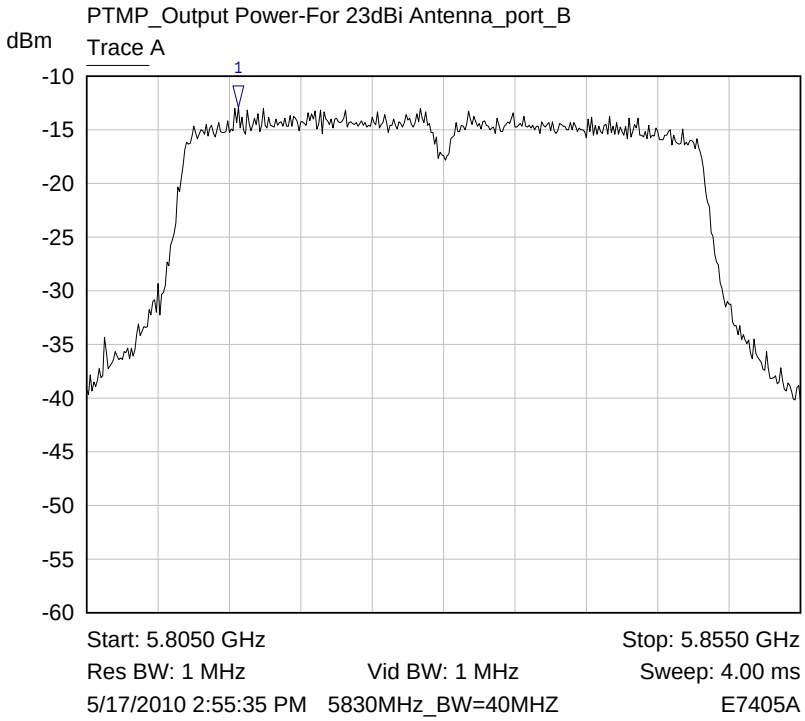
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7778 GHz	-12.59 dBm	P=-12.59+16.2966=3.7066

Plot PTMP Power/39



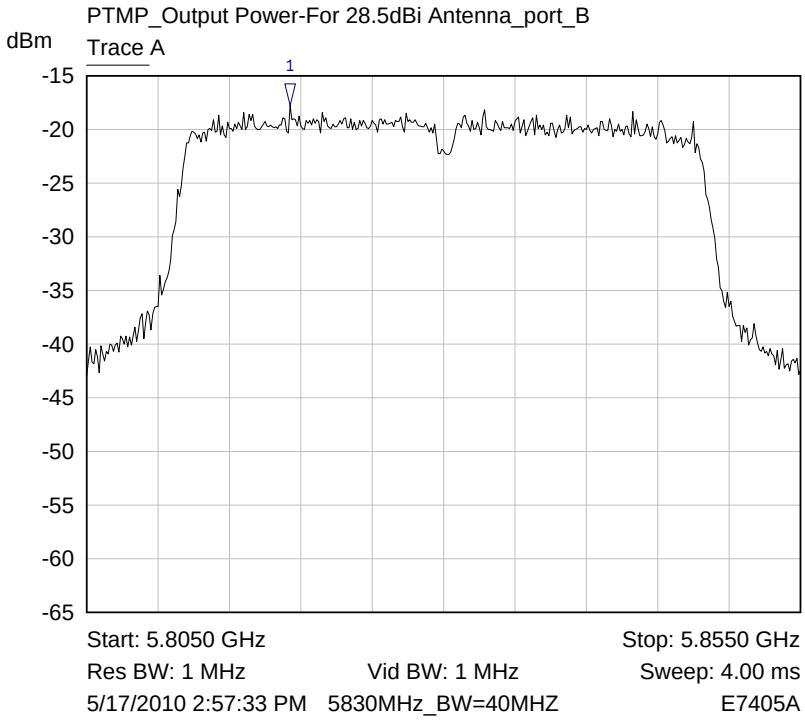
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.7769 GHz	-17.83 dBm	P=-17.83+16.2966=-1.5334

Plot PTMP Power/40



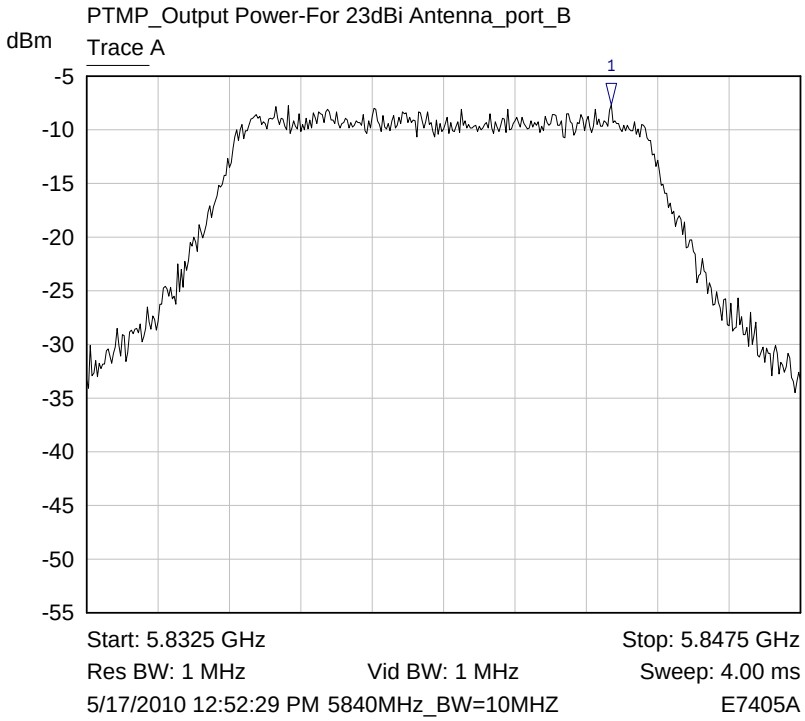
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8156 GHz	-12.93 dBm	P=-12.93+16.2582=3.3282

Plot PTMP Power/41



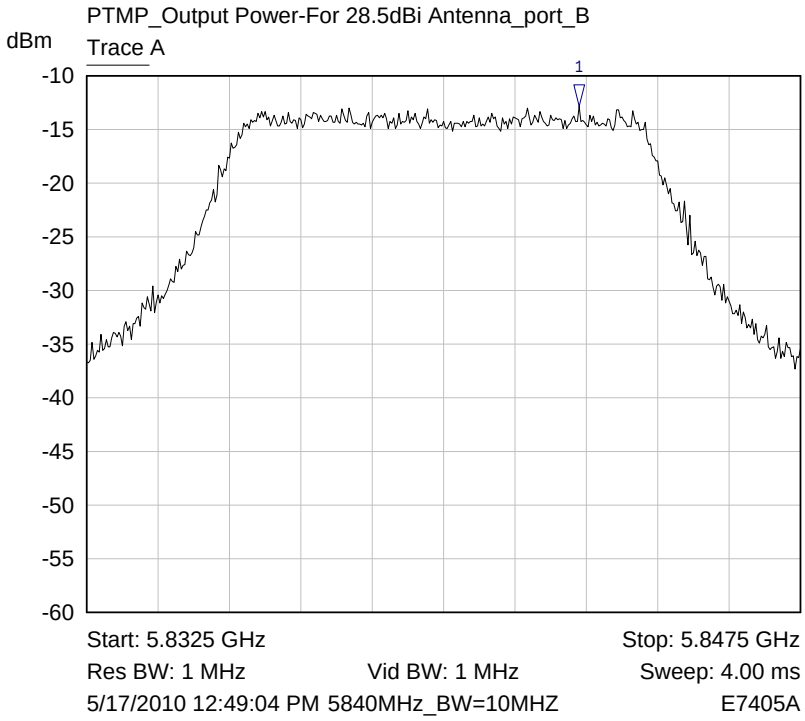
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8193 GHz	-17.78 dBm	P=-17.78+16.2582=-1.5218

Plot PTMP Power/42



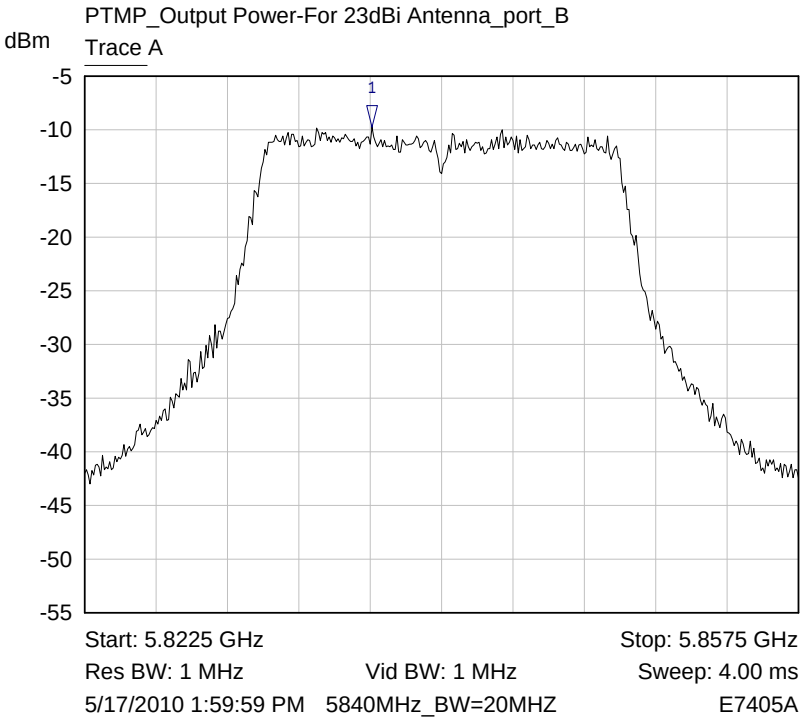
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8435 GHz	-7.70 dBm	P=-7.70+11.0856=3.3856

Plot PTMP Power/43



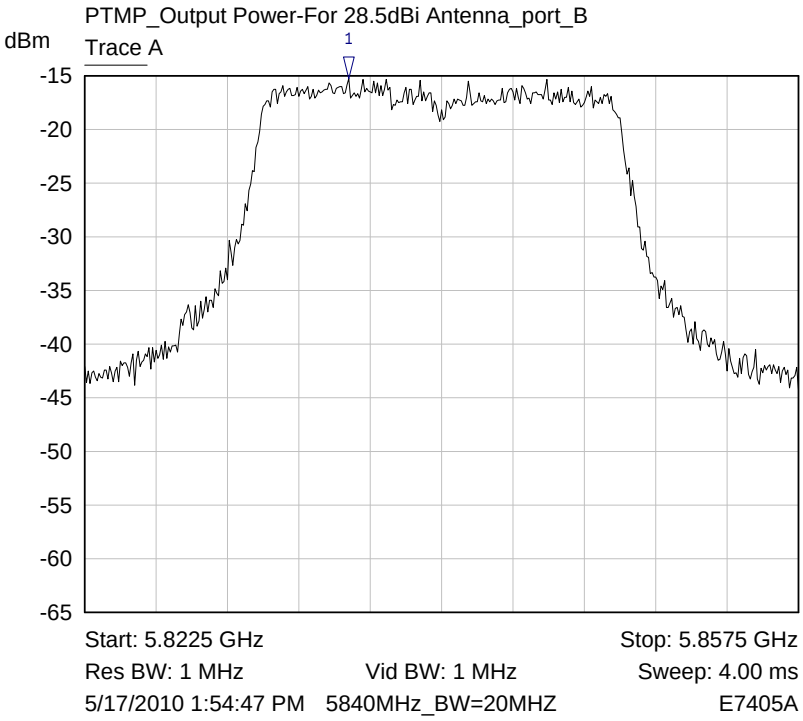
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8429 GHz	-12.87 dBm	P=-12.87+11.0856=-1.7844

Plot PTMP Power/44



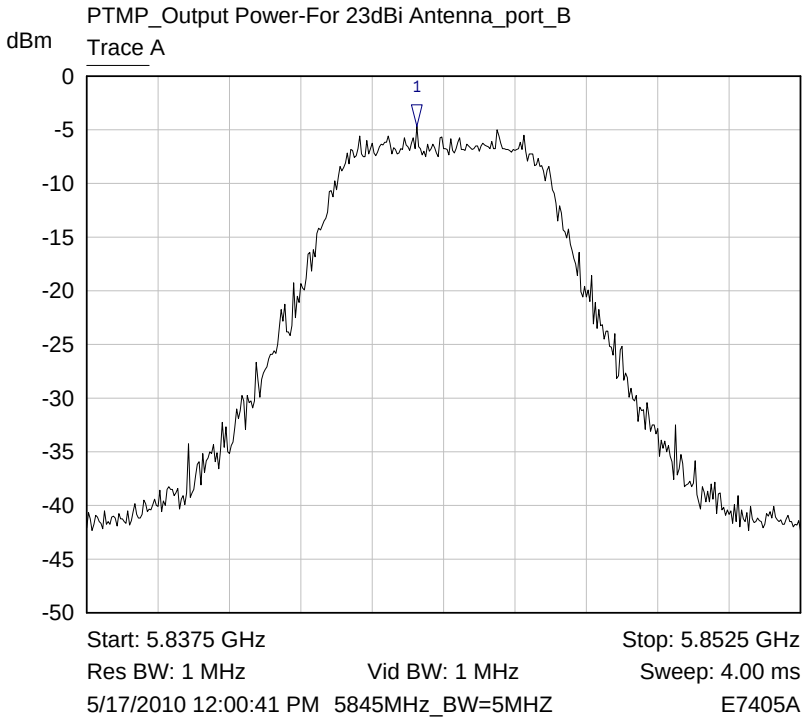
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8366 GHz	-9.78 dBm	P=-9.78+13.5362=3.7562

Plot PTMP Power/45



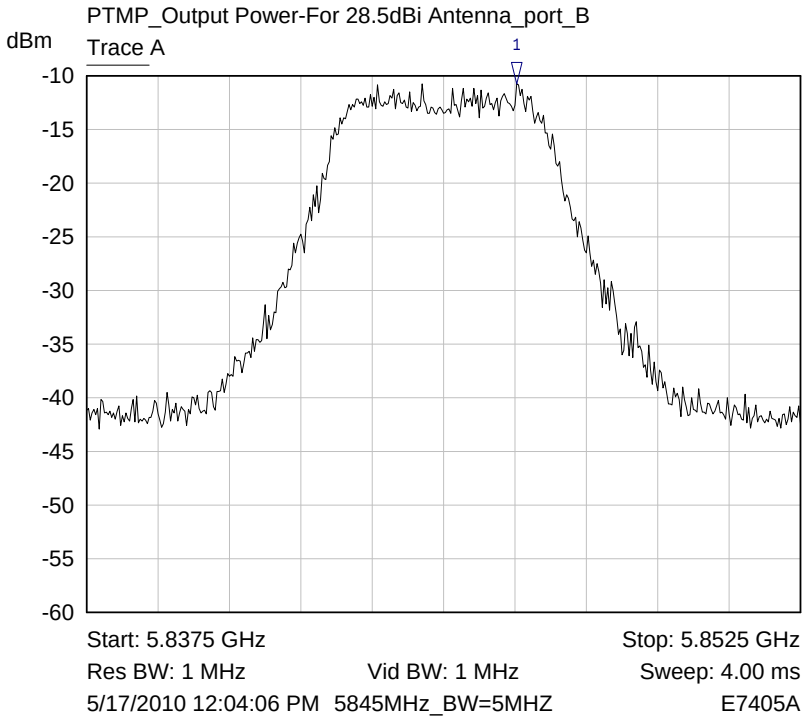
Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8355 GHz	-15.29 dBm	P=-15.29+13.5362=-1.7538

Plot PTMP Power/46



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8444 GHz	-4.71 dBm	P=-4.71+8.4198=3.7098

Plot PTMP Power/47



Mkr	Trace	X-Axis	Value	Notes
1 ▽	Trace A	5.8465 GHz	-10.74 dBm	P=-10.74+8.4198=-2.3202

Plot PTMP Power/48