REGULATORY COMPLIANCE TEST REPORT

FCC CFR 47 15.407, RSS-247 Issue 2

Report No.: RDWN69-U2 Rev A

Company: Radwin Ltd.

Model Name: RADWIN JET DUO 5.x/5.x GHz

REGULATORY COMPLIANCE TEST REPORT

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Model Name: RADWIN JET DUO 5.x/5.x GHz

To: FCC CFR 47 Part 15 Subpart E 15.407, RSS-247

Test Report Serial No.: RDWN69-U2 Rev A

This report supersedes: NONE

Applicant: Radwin Ltd.
27 Habarzel Street
Tel Aviv, 6971039
Israel

Issue Date: 10th June 2020

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
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ACCREDITED
TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2017. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf

Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 24th day of February 2020.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2021

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

1.2. RECOGNITION

MiCOM Labs, Inc has widely recognized wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

Country	Recognition Body	Status	Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	US0159 Listing #: 102167
Canada	Industry Canada (IC)	FCB	APEC MRA 2	US0159 Listing #: 4143A-2 4143A-3
Japan	MIC (Ministry of Internal Affairs and Communication)	CAB	APEC MRA 2	RCB 210
	VCCI	--	--	A-0012
Europe	European Commission	NB	EU MRA	NB 2280
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	CAB	APEC MRA 1	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	CAB	APEC MRA 1	
Singapore	Infocomm Development Authority (IDA)	CAB	APEC MRA 1	
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)	CAB	APEC MRA 1	
Vietnam	Ministry of Communication (MIC)	CAB	APEC MRA 1	

EU MRA – European Union Mutual Recognition Agreement.
NB – Notified Body
APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing
Phase II – recognition for both product testing and certification

1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-02.pdf

Accredited Product Certification Body

A2LA has accredited

MiCOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 Requirements for bodies certifying products, processes and services. This product certification body also meets the A2LA R322 – Specific Requirements – Notified Body Accreditation Requirements and A2LA R308 - Specific Requirements - ISO-IEC 17065 - Telecommunication Certification Body Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 24th day of February 2020

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2021

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159
Europe – Notified Body (NB), NB Identifier - 2280
Japan – Recognized Certification Body (RCB), RCB Identifier - 210

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	29th May 2020	Draft for comment
Rev A	10th June 2020	Initial Release

In the above table the latest report revision will replace all earlier versions.

3. TEST RESULT CERTIFICATE

Manufacturer:	Radwin Ltd. 27 Habarzel Street Tel Aviv, 6971039 Israel	**Tested By:**	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Model:	RADWIN JET DUO 5.x/5.x GHz	**Telephone:**	+1 925 462 0304
Equipment Type:	Dual Carrier 5.x GHz Base Station with Beamforming Antenna	**Fax:**	+1 925 462 0306
S/N's:	Prototype		
Test Date(s):	13th – 21st May 2020	**Website:**	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15 Subpart E 15.407 **ISED RSS-247 Issue 2**	**EQUIPMENT COMPLIES**

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

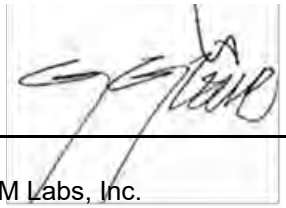
1. This document reports conditions under which testing was conducted and the results of testing performed.

2. Details of test methods used have been recorded and kept on file by the laboratory.

3. Test results apply only to the item(s) tested.

A2LA ACCREDITED
TESTING CERT #2381.01

Approved & Released for MiCOM Labs, Inc. by:



Graeme Grieve
Quality Manager MiCOM Labs, Inc.

Gordon Hurst
President & CEO MiCOM Labs, Inc.

4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
I	KDB 662911 D01 v02r01	31st October 2013	Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band
II	KDB 662911 D02 V01	25th October 2013	MIMO with Cross-Polarized Antenna
III	KDB 905462 D07 v02	22nd August 2016	Test guidance to demonstrate compliance for U-NII devices subject to DFS requirements.
IV	KDB 926956 D01 V02	22nd August 2016	U-NII Device Transition Plan
V	A2LA	October 2019	R105 - Requirement's When Making Reference to A2LA Accreditation Status
VI	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
VII	ANSI C63.4	2014	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
VIII	CISPR 32	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements
IX	ETSI TR 100 028	2001-12	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
X	FCC 06-96	Jun 30 2006	Memorandum Opinion and Order
XI	FCC 47 CFR Part 15.407	2016	Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices
XII	ICES-003	Issue 6 Jan 2016; Updated April 2019	Information Technology Equipment (Including Digital Apparatus) – Limits and methods of measurement.
XIII	M 3003	Edition 3 Nov.2012	Expression of Uncertainty and Confidence in Measurements
XIV	RSS-247 Issue 2	Feb 2017	Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and Licence-Exempt Local Area Network (LE-LEN) Devices
XV	RSS-Gen Issue 5	March 2019 Amendment 1	General Requirements for Compliance of Radio Apparatus
XVI	FCC 47 CFR Part 2.1033	2016	FCC requirements and rules regarding photographs and test setup diagrams.
XVII	KDB 789033 D02 V02r01	14th December 2017	Guidelines for Compliance Testing Of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E

4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

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5. PRODUCT DETAILS AND TEST CONFIGURATIONS

5.1. Technical Details

Details	Description
Purpose:	Test of the RADWIN Dual Carrier 5.x GHz Base Station with Beamforming Antenna to; FCC CFR 47 Part 15 Subpart E 15.407 ISED RSS-247 Issue 2
Applicant:	Radwin 27 Habarzel Street Tel Aviv 6971039 Israel
Manufacturer:	Same as applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Test report reference number:	RDWN69-U2
Date EUT received:	13th May 2020
Standard(s) applied:	FCC CFR 47 Part 15 Subpart E 15.407 ISED RSS 15.247 Issue 2
Dates of test (from - to):	13th – 21st May 2020
No of Units Tested:	2
Product Family Name:	RADWIN JET
Model(s):	RADWIN JET DUO 5.x/5.x GHz
Location for use:	Outdoor
Declared Frequency Range(s):	5250 – 5350, 5470 - 5725 MHz
Type of Modulation:	OFDM
EUT Bandwidths:	20; 40; 80 MHz
Declared Nominal Output Power (dBm):	+30 dBm EIRP
Transmit/Receive Operation:	Transceiver
Rated Input Voltage and Current:	55V DC
Operating Temperature Range:	-40 to +60 ºC
ITU Emission Designator:	20M0W7W, 40M0W7W, 80M0W7W
Equipment Dimensions:	2.6 x 14.2 x 13.9 in
Weight:	14.0 lb
Hardware Rev:	Prototype
Software Rev:	(DFS): 4.9.80_b0022_Mar 19 2020

5.2. Scope Of Test Program

RADWIN JET DUO 5.x/5.x GHz

The scope of the test program was to test the RADWIN JET DUO 5.x/5.x GHz, Dual Carrier 5.x GHz Base Station with Beamforming Antenna configurations in the frequency ranges 5250 - 5350 MHz; 5470 - 5725 MHz; for compliance against the following specification:

FCC CFR 47 Part 15 Subpart E 15.407
Compliance Measurement Procedures for Unlicensed National Information Infrastructure devices operating in the 5250 to 5350 MHz and 5470 t0 5725 bands.

RSS-247 Issue 2
Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and License-Exempt Local Area Network (LE-LEN) Devices.

As the RADWIN JET DUO 5.x/5.x GHz has integrated beamforming antenna the test program was completed all radiatively.

System Test and Measurement Configurations
The RADWIN JET DUO 5.x/5.x GHz consists of 2 identical radios each with 2 ports driving one cross polarized antenna per radio. Each radio can transmit on all available frequencies, but both radios cannot transmit on the same frequency simultaneously.

5.3. Equipment Model(s) and Serial Number(s)

Type (EUT/ Support)	Equipment Description	Manufacturer	Model No.	Serial No.
EUT	Dual Carrier 5.x GHz Base Station with Beamforming Antenna	RADWIN	RADWIN JET DUO 5.x/5.x GHz	Prototype
EUT	Dual Carrier 5.x GHz Base Station with Beamforming Antenna	RADWIN	RADWIN JET DUO 5.x/5.x GHz	DFS Master
Support	POE Power Supply	Sinpro	CPU55A-270-1	--
Support	Laptop	Dell	--	--
Support	5.x GHz Client endpoint device	RADWIN	RADWIN SU-INT	DFS Client

5.4. Antenna Details

Type	Manufacturer	Model	Family	Gain (dBi)	BF Gain	Dir BW	X-Pol	Frequency Band (MHz)
Integrated	RADWIN Ltd.	AP0200600	Panel	9.0	--	80	Yes	5250 - 5725
Integrated	RADWIN Ltd.	AP0200600	Directional	19.0	10.0	19	Yes	5250 - 5725

BF Gain - Beamforming Gain
Dir BW - Directional BeamWidth
X-Pol - Cross Polarization

5.5. Cabling and I/O Ports

Port Type	Max Cable Length	# of Ports	Screened	Connector Type	Data Type	Data Rate(s)
Ethernet PoE IN	>30m	1	No	RJ45	Packet	10,100,1000

5.6. Test Configurations

Results for the following configurations are provided in this report:

Channel Bandwidths	Data Rate with Highest Power MBit/s	Channel Frequency (MHz)		
		Low	Mid	High
5250 - 5350 MHz				
20	78	5,265.00	5,300.00	5,330.00
40	180	5,275.00	5,300.00	5,320.00
80	390	5,290.00	5,295.00	5,300.00
5470 - 5725 MHz				
20	78	5,490.00	5,590.00	5,705.00
40	180	5,500.00	5,580.00	5,695.00
80	390	5,525.00	5,560.00	5,675.00

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:
1. NONE

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:
1. NONE

6. TEST SUMMARY

List of Measurements

Test Header	Result	Data Link
Peak Transmit Power	Complies	View Data
26 dB & 99% Bandwidth	Complies	View Data
6 dB & 99% Bandwidth	Complies	View Data
Power Spectral Density	Complies	View Data
Radiated	Complies	See Part 2
TX Spurious & Restricted Band Emissions	Complies	See Part 2
Antenna AP0200600	Complies	See Part 2
Antenna AP0200600 BF	Complies	See Part 2
Restricted Edge & Band-Edge Emissions	Complies	See Part 2
Antenna AP0200600	Complies	See Part 2
Antenna AP0200600 BF	Complies	See Part 2
Dynamic Frequency Selection (DFS)	Complies	See Part 3
Channel Availability Check	Complies	See Part 3
Initial CAC	Complies	See Part 3
Beginning CAC	Complies	See Part 3
End CAC	Complies	See Part 3
Channel Close / Transmission Time	Complies	See Part 3
Non-Occupancy Period	Complies	See Part 3
Probability of Detection	Complies	See Part 3
Detection Bandwidth	Complies	See Part 3
AC Wireline	Complies*	

*ac Wireline test results, see MiCOM Labs test report RDWN64-U2 (Non-DFS Bands)

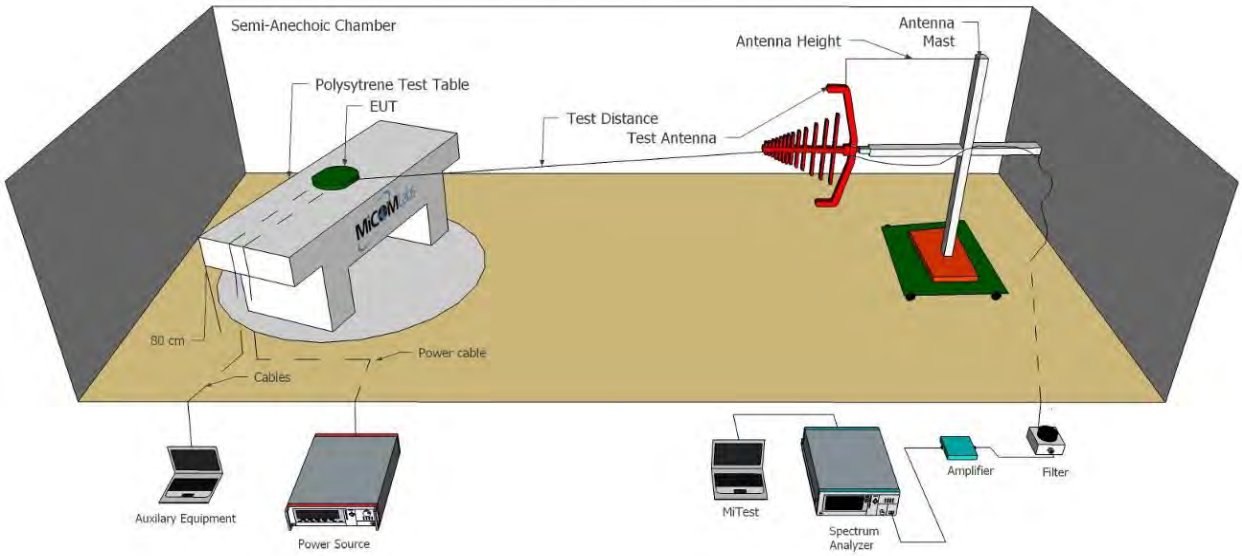
Test Report Part 2 Contains: Radiated Spurious Results
Test Report Part 3 Contains: Dynamic Frequency Selection (DFS) Results

7. TEST EQUIPMENT CONFIGURATION(S)

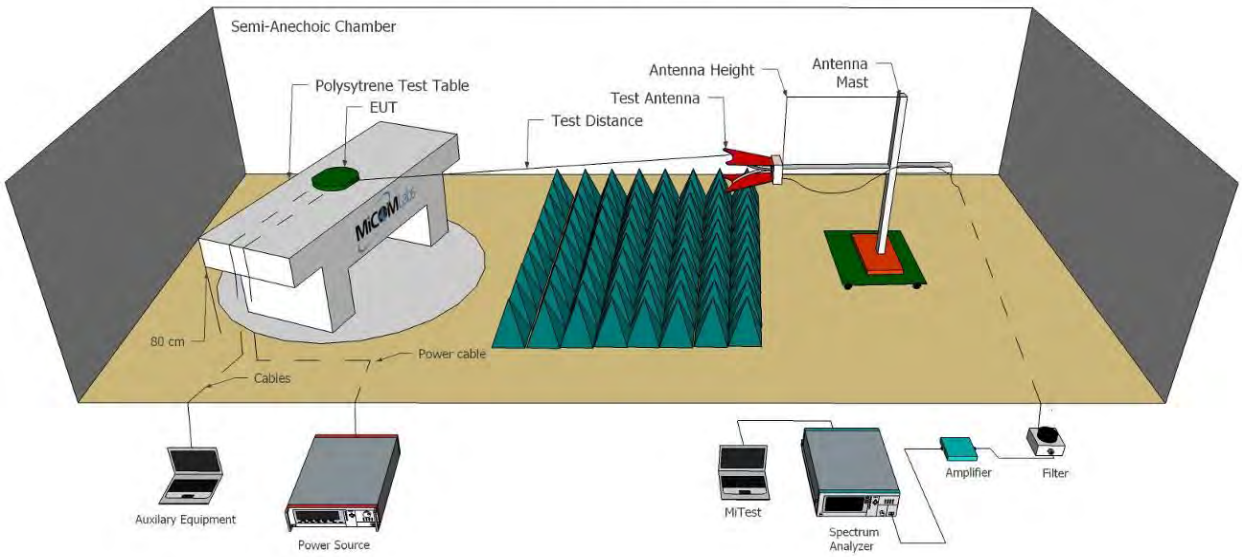
7.1. Radiated Emissions - 3m Chamber

Test Setup for Radiated Emissions for above and below 1 GHz

Radiated Emissions Below 1GHz Test Setup



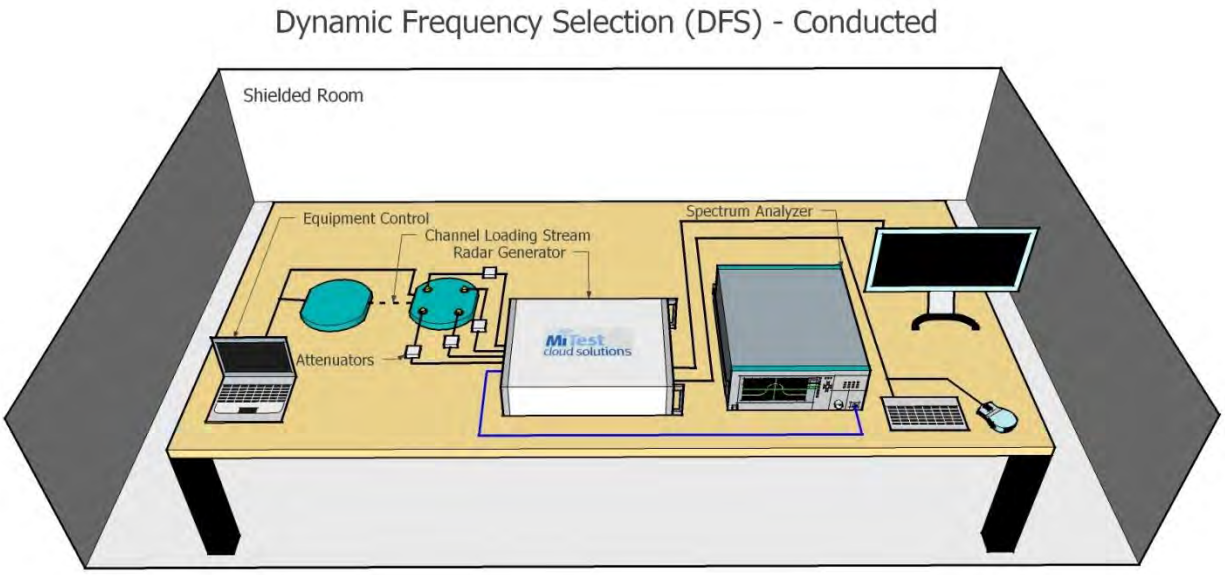
Radiated Emissions Above 1GHz Test Setup



A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	8 Oct 2020
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	26 Feb 2020
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	4 Apr 2020
377	Band Rejection Filter 5150 to 5880MHz	Microtronics	BRM50716	034	3 Sep 2020
396	2.4 GHz Notch Filter	Microtronics	BRM50701	001	3 Mar 2020
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	6 Sep 2020
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	12 Oct 2020
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	9 Sep 2020
410	Desktop Computer	Dell	Inspiron 620	WS38	Not Required
411	Mast/Turntable Controller	Sunol Sciences	SC98V	060199-1D	Not Required
412	USB to GPIB Interface	National Instruments	GPIB-USB HS	11B8DC2	Not Required
413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
447	MiTest Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	5 Sep 2020
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	5 Sep 2020
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	9 Sep 2020
466	Low Pass Filter DC-1500 MHz	Mini-Circuits	NLP-1750+	VUU10401438	3 Sep 2020
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	9 Sep 2020
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	9 Sep 2020
510	Barometer/Thermometer	Control Company	68000-49	170871375	20 Dec 2020
518	Cable - Amp to Antenna	SRC Haverhill	157-3051574	518	9 Sep 2020

7.2. DFS - Conducted



A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
422	Splitter/Combiner	Pasternack	PE 2031	001	Cal when used
495	RF Power Divider	Micon Precise Corp	91002	495	Cal when used
504	MiTest Cloud Solutions RF Test Box	MiCOM	2nd Gen	504	5 Mar 2020
510	Barometer/Thermometer	Control Company	68000-49	170871375	20 Dec 2020
533	MiTest DFS Test Software	MiCOM	MiTest DFS Test software Version 2.8	533	Not Required
71	Spectrum Analyser 9KHz-50GHz	HP	8565E	3425A00181	Not Required
DFS SMA#1	SMA Cable for DFS	Megaphase	SMA Cable	None	Cal when used
DFS SMA#2	SMA Cable for DFS	Megaphase	SMA Cable	None	Cal when used
DFS SMA#3	SMA Cable for DFS	Megaphase	SMA Cable	None	Cal when used
DFS SMA#4	SMA Cable for DFS	Megaphase	SMA Cable	None	Cal when used

8. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by MiTest. MiTest is an automated test system developed by MiCOM Labs. MiTest is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.

The MiCOM Labs "MiTest" Automated Test System" (Patent Pending)

9. TEST RESULTS

9.1. Peak Transmit Power

Conducted Test Conditions for Maximum Conducted Output Power			
Standard:	FCC CFR 47:15.407 RSS-247: 6.2.4.1	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Maximum Output Power	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)(2)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 789033 - D02 General UNII Test Procedures New Rules v01		

Test Procedure for Maximum Output Power Measurement
Spectrum Analyzer Method. KDB 789033 defines a methodology using spectrum analyzer. Where power shall be calculated by integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99% occupied bandwidth of the signal. However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with Section 15.407(a). Testing was performed under ambient conditions at nominal voltage.

Test configuration and setup used for the measurement was per the Radiated Test Set-up section specified in this document. Supporting KDB's referenced below.
KDB 662911 D01 & KDB 662911 D02

NOTE: KDB 412172 D01 was used to determine the EIRP from the results of a power measurements performed under far-field conditions with respect to all transmit and receive (measurement) antennas.

Radiated measurements used for compliance with conducted limits, the following steps are required to ensure that the total emission power is determined for equipment driving cross polarized antennas:

(1) Measure radiated emissions with vertical and horizontal polarizations of the measurement antenna;
(2) Convert each radiated measurement to transmit power based on the antenna gain;

EIRP level to an equivalent electric field strength using the following relationship:
E = EIRP – 20*log (D) + 104.8

Where:
E = electric field strength in dBµV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.

(3) Sum the powers across the two polarizations to compare the resultant electric field strength level to the applicable limit.

Calculated Power = A + G + Y+ 10 log (1/x) dBm

A = Total Power [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
G = Antenna Gain
Y = Beamforming Gain
x = Duty Cycle (average power measurements only)

Limits Maximum Conducted Output Power

Operating Frequency Band 5250-5350 and 5470 – 5725 MHz

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Consolidated Power Results, EIRP Limits

The EUT was tested for Radiated Output Power and the following tables define the worst case compliant results defined for each Antenna

Output Power Summary Table

Antenna Type – Integrated (outdoor use only)

Antenna	Gain	Channel Bandwidths	Channel	Combined Output Power (*H+V*)	Limit	Margin	Power Setting
Model Number	**dBi**	**MHz**	**MHz**	**dBm**	**dBm/EIRP**	**dB**	
AP0200600 80º	9.0	20	5265	20.63	21.00	-0.37	14.0
			5300	20.98	21.00	-0.02	12.5
			5330	20.75	21.00	-0.25	13.0
		40	5275	20.75	21.00	-0.25	15.0
			5300	20.98	21.00	-0.02	14.0
			5320	15.62	21.00	-5.38	8.5*
		80	5290	20.75	21.00	-0.25	14.0
			5295	20.77	21.00	-0.23	14.0
			5300	15.61	21.00	-5.39	8.0*
AP0200600 19º (with Beam Forming)	19.0	20	5265	10.47	10.52	-0.05	7.0
			5300	10.36	10.52	-0.16	6.5
			5330	10.31	10.52	-0.21	7.0
		40	5275	10.77	11.0	-0.23	6.0
			5300	10.82	11.0	-0.18	6.0
			5320	8.83	11.0	-2.17	4.0*
		80	5290	10.73	11.0	-0.27	6.0
			5295	10.89	11.0	-0.11	6.0
			5300	8.62	11.0	-2.38	3.5*

Note* = Power reduction due to Band Edge Testing

Output Power Summary Table

Antenna Type – Integrated (outdoor use only)

Antenna	Gain	Channel Bandwidths	Channel	Combined Output Power (*H+V*)	Limit	Margin	Power Setting
Model Number	**dBi**	**MHz**	**MHz**	**dBm**	**dBm/EIRP**	**dB**	
AP0200600 80º	9.0	20	5490	20.88	21.00	-0.12	14.5
			5590	20.59	21.00	-0.41	13.0
			5705	20.51	21.00	-0.49	15.0
		40	5500	15.65	21.00	-5.35	8.5*
			5580	20.99	21.00	-0.01	13.0
			5695	20.57	21.00	-0.43	14.0
		80	5525	17.61	21.00	-3.39	9.0*
			5560	20.93	21.00	-0.07	12.5
			5675	20.67	21.00	-0.33	14.5
AP0200600 19º (with Beam Forming)	19.0	20	5490	9.80	10.52	-0.72	5.0*
			5590	10.35	10.52	-0.17	3.0
			5705	10.26	10.52	-0.26	5.5
		40	5500	4.64	11.00	-6.36	-1.5*
			5580	10.73	11.00	-0.27	3.5
			5695	10.80	11.00	-0.2	4.5
		80	5525	6.81	11.00	-4.19	-1.0*
			5560	10.71	11.00	-0.29	2.5
			5675	10.71	11.00	-0.29	3.5

Note* = Power reduction due to Band Edge Testing

9.2. 26 dB & 99% Bandwidth

Conducted Test Conditions for 26 dB and 99% Bandwidth			
Standards:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	26 dB and 99 % Bandwidth	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for 26 dB and 99% Bandwidth Measurement
The bandwidth at 26 dB and 99 % is measured radiated, in a 3 meter chamber, while EUT is operating in transmission mode at the appropriate center frequency. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.
Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported. In this case Vertical a (V) and Horizontal for port b (H).

Test configuration and setup used for the measurement was per the Radiated Test Set-up section specified in this document.

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	Not Applicable
Data Rate:	78 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Frequency	Measured 26 dB Bandwidth (MHz)		26 dB Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5265	22.68	23.16	23.16	22.68		
5300	22.76	23.32	23.32	22.76		
5330	22.58	22.82	22.82	22.58		

Test Frequency	Measured 99% Bandwidth (MHz)		99% Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5265	17.79	17.87	17.87	17.79		
5300	17.79	17.87	17.87	17.79		
5330	17.79	17.87	17.87	17.79		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	40 MHz Bandwidth	**Duty Cycle (%):**	Not Applicable
Data Rate:	180 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Frequency	Measured 26 dB Bandwidth (MHz)		26 dB Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5275	44.56	45.85	45.85	44.56		
5300	44.40	46.33	46.33	44.40		
5320	44.86	46.63	46.63	44.86		

Test Frequency	Measured 99% Bandwidth (MHz)		99% Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5275	36.71	36.71	36.71	36.71		
5300	36.71	36.71	36.71	36.71		
5320	36.71	36.87	36.87	36.71		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	80 MHz Bandwidth	**Duty Cycle (%):**	Not Applicable
Data Rate:	390 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Frequency	Measured 26 dB Bandwidth (MHz)		26 dB Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5290	92.74	95.63	95.63	92.74		
5295	93.30	96.27	96.27	93.30		
5300	93.17	101.08	101.08	93.17		

Test Frequency	Measured 99% Bandwidth (MHz)		99% Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5290	76.31	76.95	76.95	76.31		
5295	76.63	76.95	76.95	76.63		
5300	76.63	77.27	77.27	76.63		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	Not Applicable
Data Rate:	78 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Frequency	Measured 26 dB Bandwidth (MHz)		26 dB Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5490	23.00	23.24	23.24	23.00		
5590	22.20	22.76	22.76	22.20		
5705	23.40	23.32	23.40	23.32		

Test Frequency	Measured 99% Bandwidth (MHz)		99% Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5490	17.87	17.87	17.87	17.87		
5590	17.87	17.87	17.87	17.87		
5705	17.87	17.95	17.95	17.87		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	40 MHz Bandwidth	**Duty Cycle (%):**	Not Applicable
Data Rate:	180 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Frequency	Measured 26 dB Bandwidth (MHz)		26 dB Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5500	44.88	45.05	45.05	44.88		
5580	45.05	44.56	45.05	44.56		
5695	46.33	45.53	46.33	45.53		

Test Frequency	Measured 99% Bandwidth (MHz)		99% Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5500	36.55	36.71	36.71	36.55		
5580	36.71	36.55	36.71	36.55		
5695	36.71	36.87	36.87	36.71		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

Equipment Configuration for 26 dB & 99% Occupied Bandwidth			
Variant:	80 MHz Bandwidth	**Duty Cycle (%):**	Not Applicable
Data Rate:	390 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Frequency	Measured 26 dB Bandwidth (MHz)		26 dB Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5525	93.30	96.46	96.46	93.30		
5560	92.61	99.07	99.07	92.61		
5675	92.98	96.51	96.51	92.98		

Test Frequency	Measured 99% Bandwidth (MHz)		99% Bandwidth (MHz)			
MHz	**H**	**V**	**Highest**	**Lowest**		
5525	76.63	76.95	76.95	76.63		
5560	76.63	76.63	76.63	76.63		
5675	76.63	76.95	76.95	76.63		

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Note: click the links in the above matrix to view the graphical image (plot).

9.3. Power Spectral Density

Conducted Test Conditions for Power Spectral Density			
Standard:	FCC CFR 47:15.407	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Power Spectral Density	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.407 (a)	**Pressure (mBars):**	999 - 1001
Reference Document(s):	KDB 789033 - D02 General UNII Test Procedures New Rules v01		

Test Procedure for Power Spectral Density

The In-Band power spectral density was measured using the measure and sum approach per FCC KDB 662911 (D01 Multiple Transmitter Output v02.)

Measure and sum the spectra across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The individual spectra are then summed mathematically in linear power units. Unlike in-band power measurements, in which the sum involves a single measured value (output power) from each output, measurements for compliance with PSD limits involve summing entire spectra across corresponding frequency bins on the various outputs. Consistency is maintained for any device with N transmitter outputs to be certain the individual outputs are all aligned with the same span and same number of points. In this instance, the linear power spectrum value within the first spectral bin of output 0 is summed with that in the first spectral bin of output 1, and the first spectral bin of output 2, and so on up to the Nth output to obtain the true value for the first frequency bin of the summed spectrum. The summed spectrum value for each frequency bin is computed in this fashion. These summed spectral values were calculated on a computer, and the results read back into the spectrum analyzer as a data file to produce a representative plot of total spectral power density.

Calculated Power = A + 10 log (1/x) dBm

A = Total Power Spectral Density [10 Log10 (10a/10 + 10 b/10 + 10c/10 + 10d/10)]

x = Duty Cycle

Test configuration and setup used for the measurement was per the Radiated Test Set-up section specified in this document. Supporting KDB's referenced below.

KDB 662911 D01 & KDB 662911 D02

Radiated measurements used for compliance with conducted limits, the following steps are required to ensure that the total emission power s determined for equipment driving cross polarized antennas:

(1) Measure radiated emissions with vertical and horizontal polarizations of the measurement antenna;
(2) Convert each radiated measurement to transmit power based on the antenna gain;

EIRP level to an equivalent electric field strength using the following relationship:
E = EIRP – 20*log (D) + 104.8

Where:
E = electric field strength in dBµV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.

(3) Sum the powers or PSDs across the two polarizations to compare the resultant electric field strength level to the applicable limit.

Calculated Power = A + G + Y+ 10 log (1/x) dBm

A = Total Power [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
G = Antenna Gain
Y = Beamforming Gain
x = Duty Cycle (average power measurements only)

Limits Maximum Power Spectral Density

Operating Frequency Band 5250-5350 and 5470 – 5725 MHz

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.3.1.1. Antenna AP0200600

Equipment Configuration for Power Spectral Density			
Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	91.0
Data Rate:	78 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+0.41 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5265	102.73	101.67	1.42	8.00	-6.58
5300	104.63	99.6	2.00	8.00	-6.00
5330	104.24	100.08	2.04	8.00	-5.96

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	40 MHz Bandwidth	**Duty Cycle (%):**	82.4
Data Rate:	180 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+0.84 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5275	100.64	98.98	-0.49	8.00	-8.49
5300	101.58	99.72	0.37	8.00	-7.63
5320	103.31	99.20	1.35	8.00	-6.65

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF – Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	80 MHz Bandwidth	**Duty Cycle (%):**	72.5
Data Rate:	390 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+1.44 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5290	98.21	94.79	-2.99	8.00	-10.99
5295	97.65	95.52	-3.11	8.00	-11.11
5300	98.12	94.32	-3.20	8.00	-11.20

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF – Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	91.0
Data Rate:	78 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+0.41 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5490	102.78	103.44	2.31	8.00	-5.69
5590	105.30	103.03	3.50	8.00	-4.50
5705	106.31	100.72	3.55	8.00	-4.45

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	40 MHz Bandwidth	**Duty Cycle (%):**	82.4
Data Rate:	180 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+0.84 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5500	101.49	99.87	0.38	8.00	-7.62
5580	102.39	100.14	1.03	8.00	-6.97
5695	104.51	98.65	2.12	8.00	-5.88

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF – Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	80 MHz Bandwidth	**Duty Cycle (%):**	72.5
Data Rate:	390 MBit/s	**Antenna Gain (dBi):**	9.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+1.40 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5525	98.24	95.6	-2.70	8.00	-10.70
5560	98.18	96.3	-2.48	8.00	-10.48
5675	101.91	97.2	0.34	8.00	-7.66

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF – Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

9.3.1.2. Antenna AP0200600 BF

Equipment Configuration for Power Spectral Density			
Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	91.0
Data Rate:	78 MBit/s	**Antenna Gain (dBi):**	19.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBuV/MHz)		Summation Peak Marker + DCCF (+0.41 dB)	Limit	Margin
MHz	H	V	dBm/MHz	dBm/MHz	dB
5265	104.33	104.57	-6.36	-2.00	-4.36
5300	105.91	102.03	-6.42	-2.00	-4.42
5330	105.24	102.56	-6.70	-2.00	-4.70

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	40 MHz Bandwidth	**Duty Cycle (%):**	82.4
Data Rate:	180 MBit/s	**Antenna Gain (dBi):**	19.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+0.84 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5275	101.30	101.16	-9.15	-2.00	-7.15
5300	101.94	100.15	-9.24	-2.00	-7.24
5320	101.68	97.92	-10.18	-2.00	-8.18

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF – Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	80 MHz Bandwidth	**Duty Cycle (%):**	72.5
Data Rate:	390 MBit/s	**Antenna Gain (dBi):**	19.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+1.44 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5290	99.48	97.76	-11.12	-2.00	-9.12
5295	100.11	98.15	-10.58	-2.00	-8.58
5300	99.49	96.27	-11.65	-2.00	-9.65

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF – Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	91.0
Data Rate:	78 MBit/s	**Antenna Gain (dBi):**	19.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Power Spectral Density (dBuV/MHz)		Summation Peak Marker + DCCF (+0.41 dB)	Limit	Margin
MHz	H	V	dBm/MHz	dBm/MHz	dB
5490	105.24	103.35	-6.41	-2.00	-4.41
5590	106.09	102.65	-6.11	-2.00	-4.11
5705	105.58	102.37	-6.54	-2.00	-4.54

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	2.81 dB

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	40 MHz Bandwidth	**Duty Cycle (%):**	82.4
Data Rate:	180 MBit/s	**Antenna Gain (dBi):**	19.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+0.84 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5500	101.24	99.96	-9.73	-2.00	-7.73
5580	102.02	99.21	-9.54	-2.00	-7.54
5695	102.14	99.45	-9.38	-2.00	-7.38

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

DCCF – Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

Equipment Configuration for Power Spectral Density			
Variant:	80 MHz Bandwidth	**Duty Cycle (%):**	72.5
Data Rate:	390 MBit/s	**Antenna Gain (dBi):**	19.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	JMH
Engineering Test Notes:			

Test Measurement Results					
Test Frequency	**Measured Power Spectral Density (dBuV/MHz)**		**Summation Peak Marker + DCCF (+1.40 dB)**	**Limit**	**Margin**
MHz	**H**	**V**	**dBm/MHz**	**dBm/MHz**	**dB**
5525	98.53	95.80	-12.44	-2.00	-10.44
5560	95.57	95.25	-14.41	-2.00	-12.41
5675	98.26	96.08	-12.52	-2.00	-10.52

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

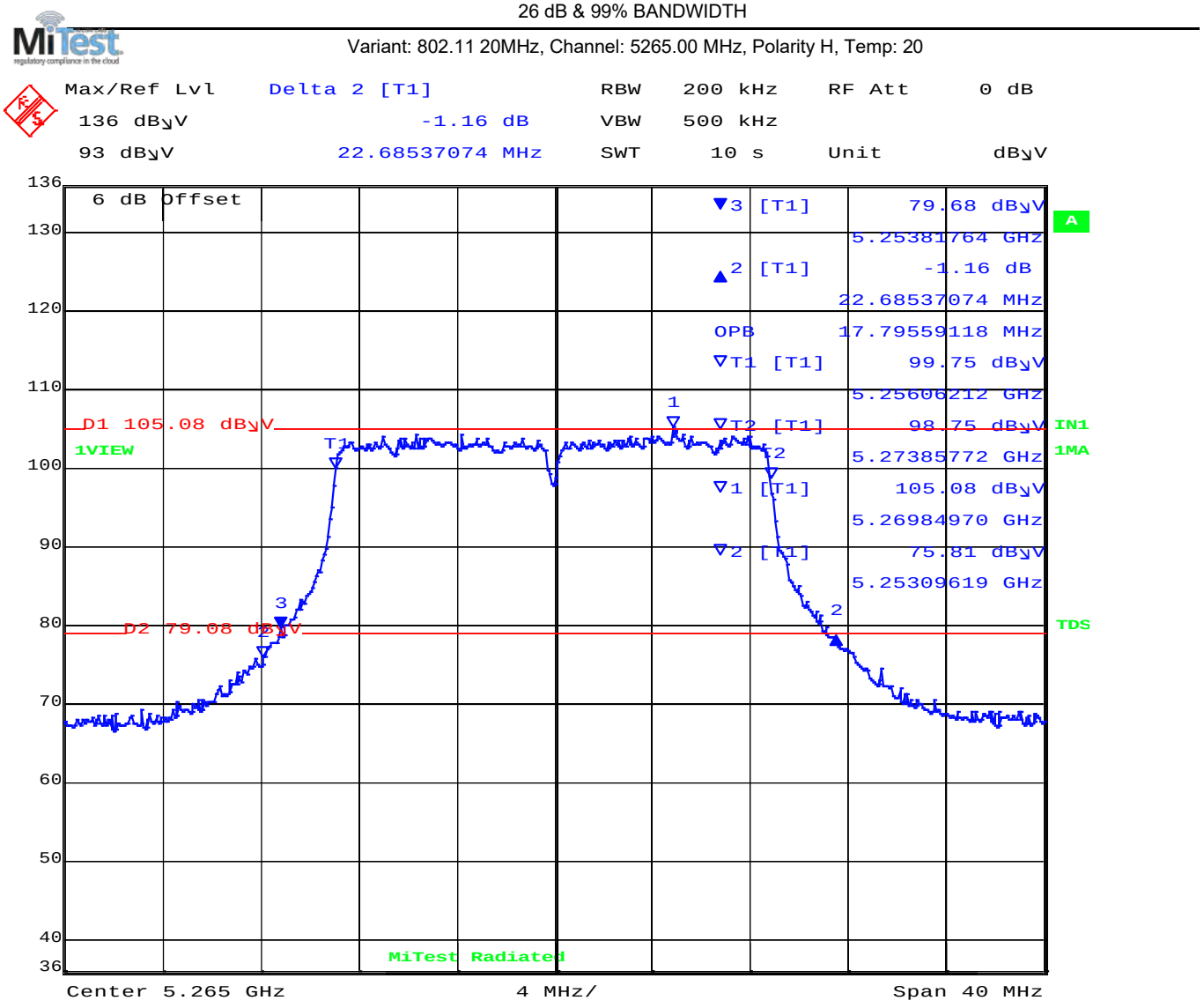
DCCF – Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).

KDB 789033 - D02 General UNII Test Procedures New Rules v01 was used to calculate the above Power Spectral Density

APPENDIX A - GRAPHICAL IMAGES

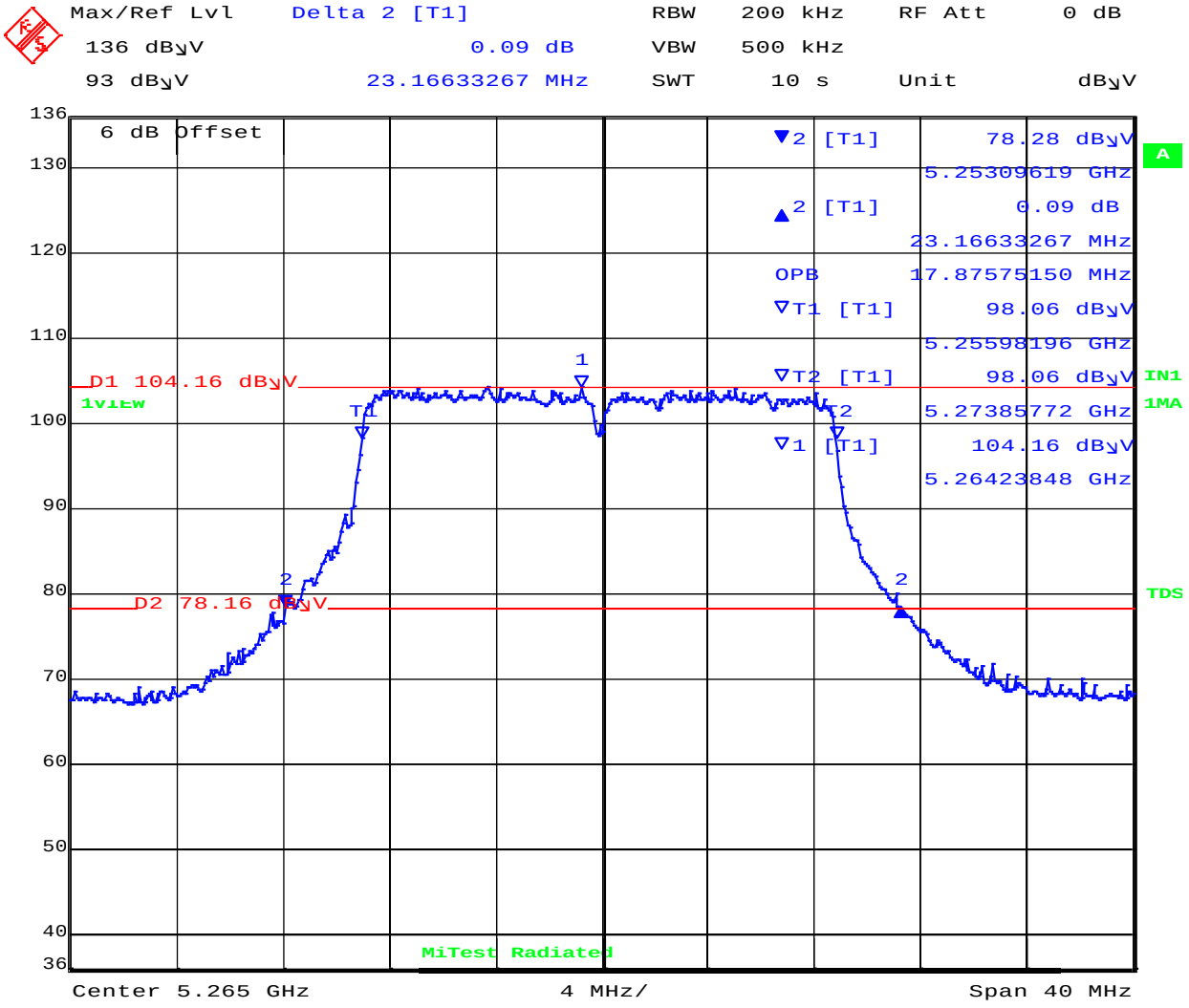
A.1. 26 dB & 99% Bandwidth



back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5265.00 MHz, Polarity V, Temp: 20

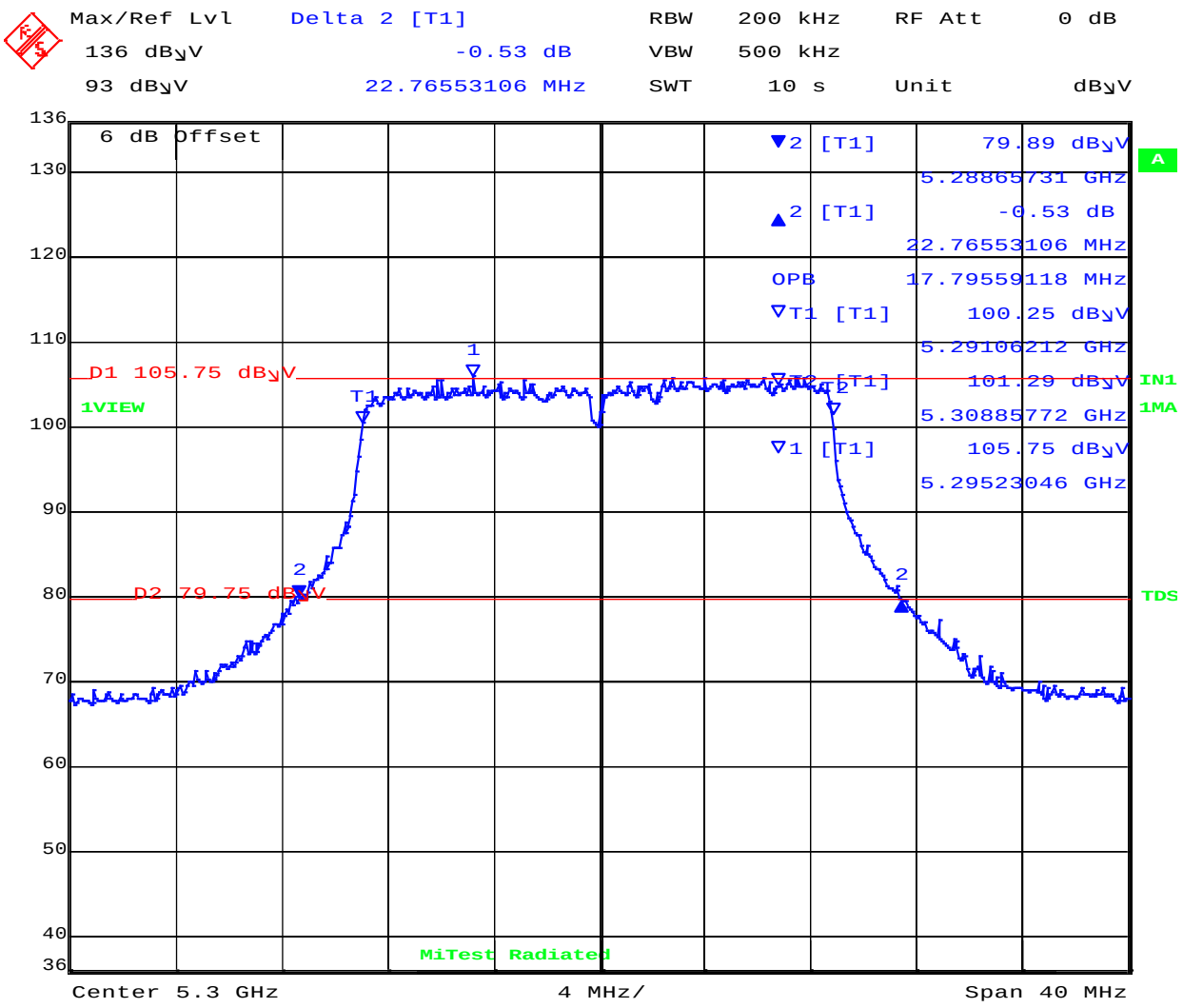


Date: 14.MAY.2020 12:15:15

back to matrix

26 dB & 99% BANDWIDTH

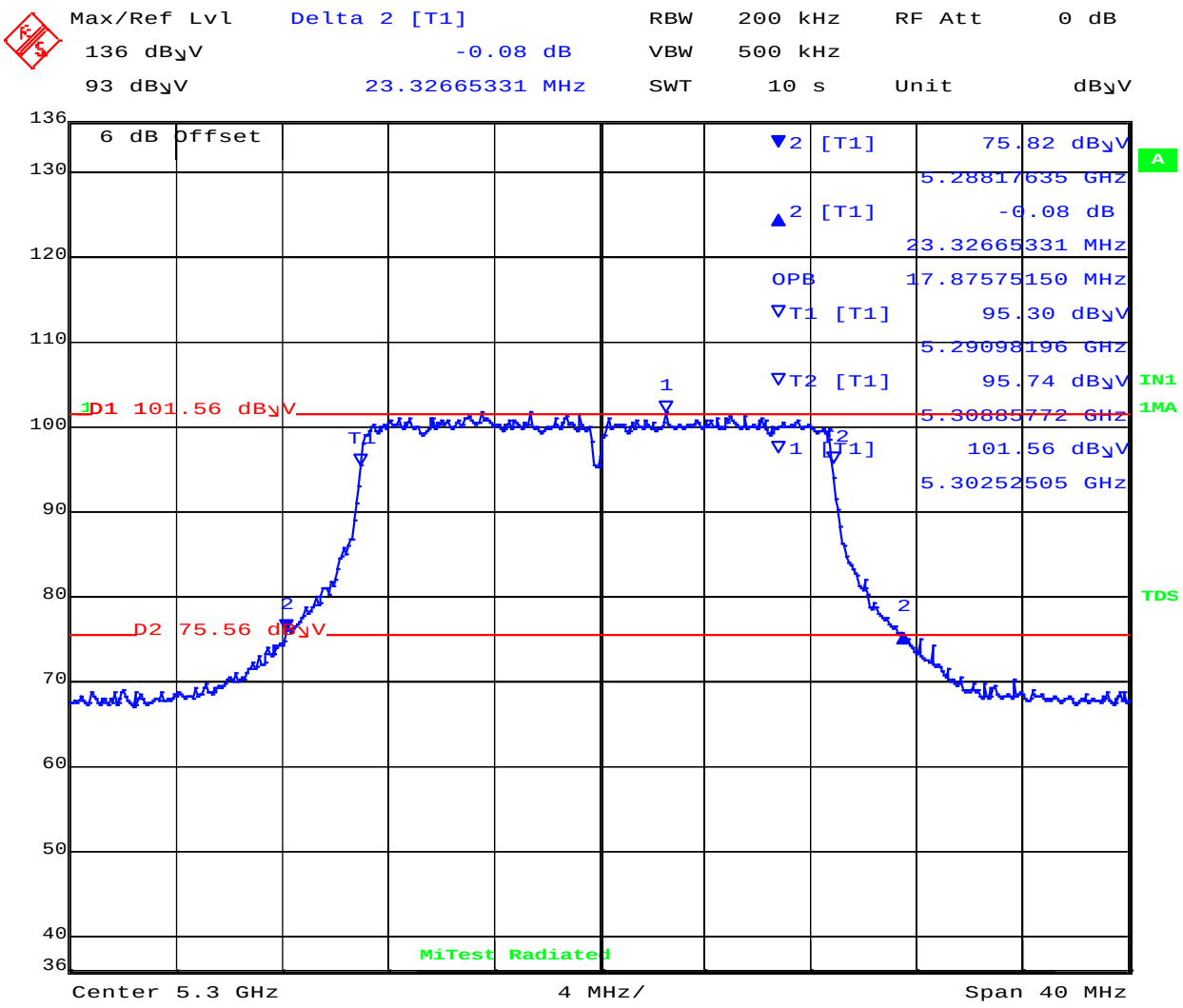
Variant: 802.11 20MHz, Channel: 5300.00 MHz, Polarity H, Temp: 20



back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5300.00 MHz, Polarity V, Temp: 20

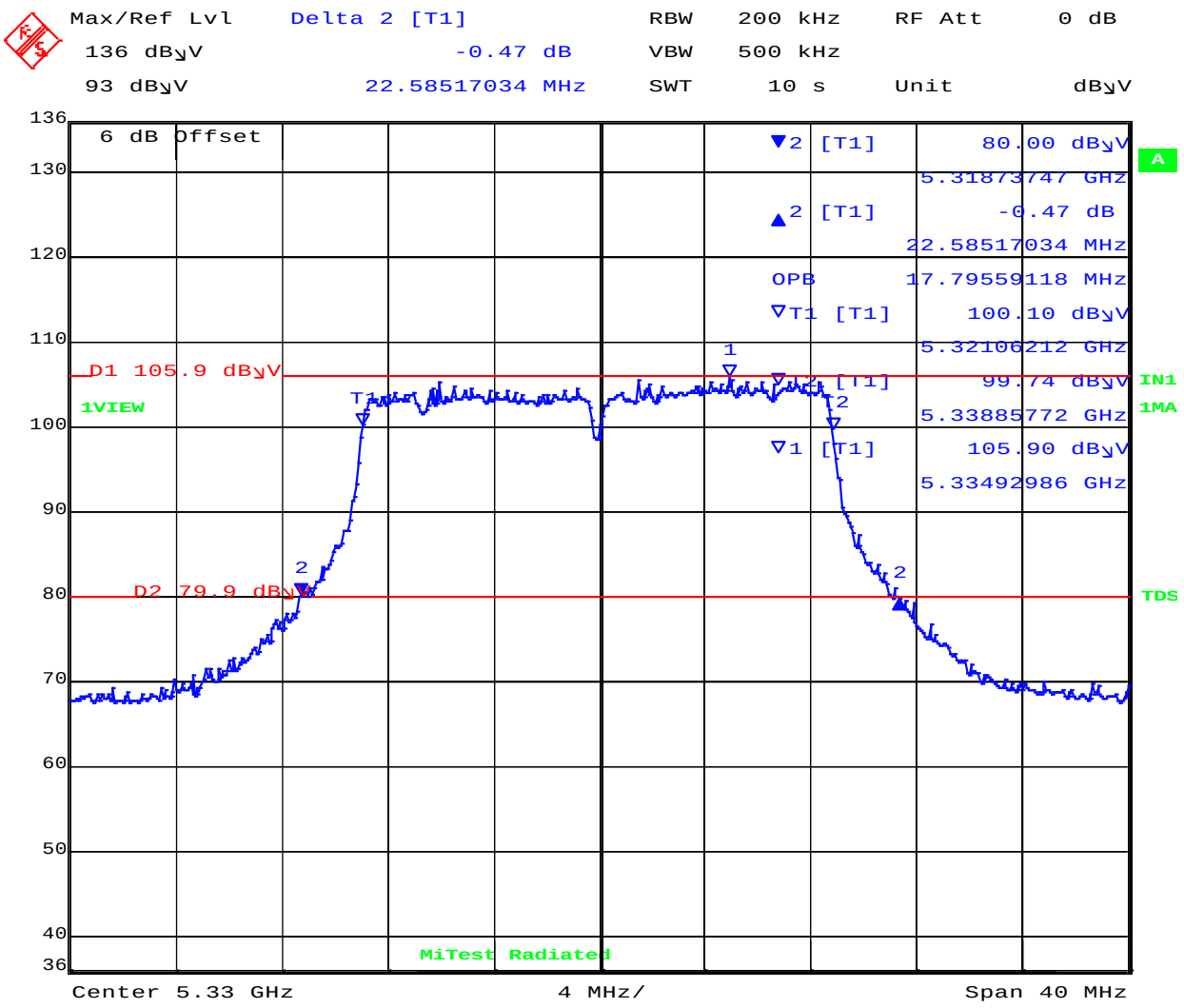


Date: 14.MAY.2020 13:32:52

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5330.00 MHz, Polarity H, Temp: 20

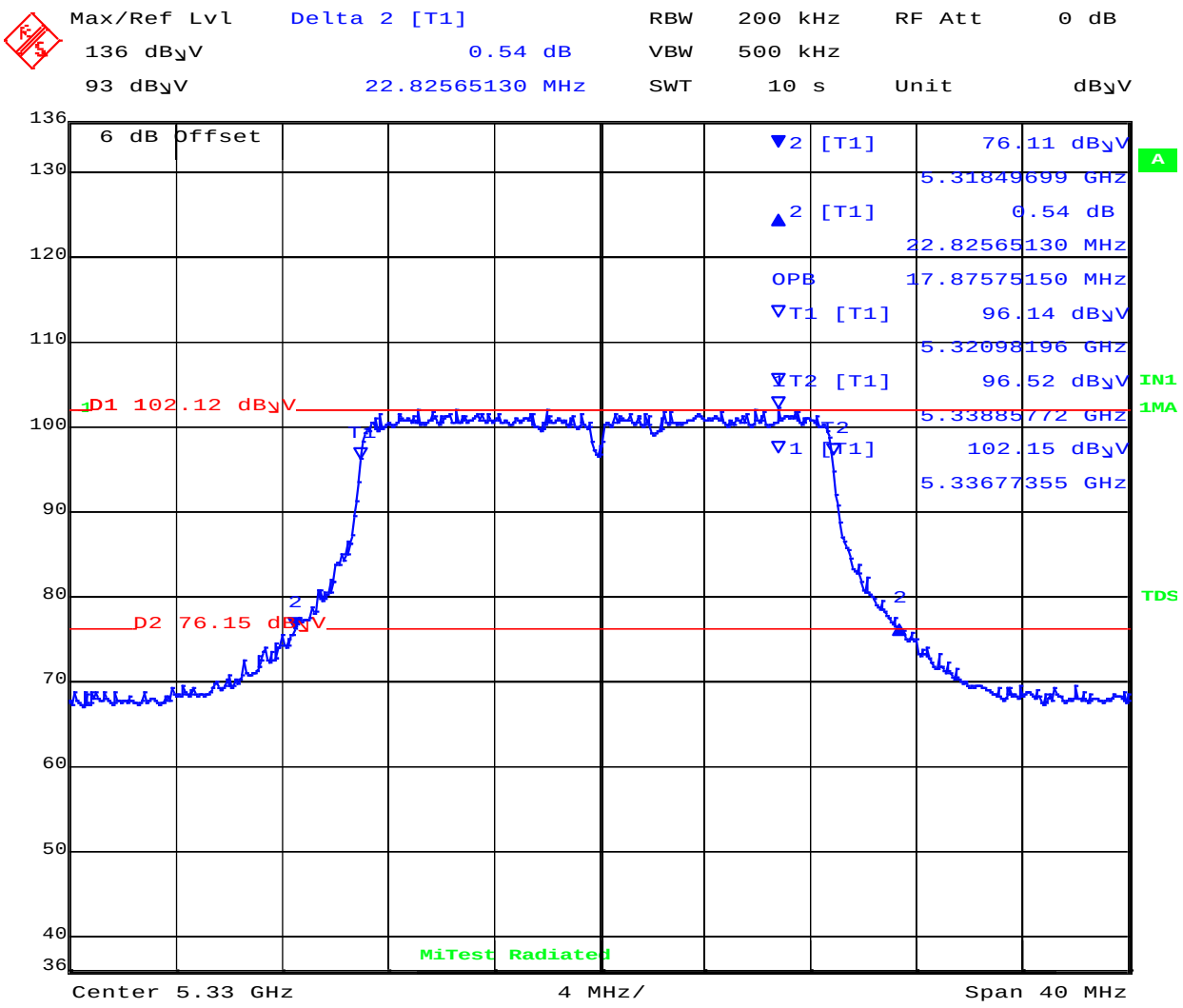


Date: 14.MAY.2020 13:49:32

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5330.00 MHz, Polarity V, Temp: 20

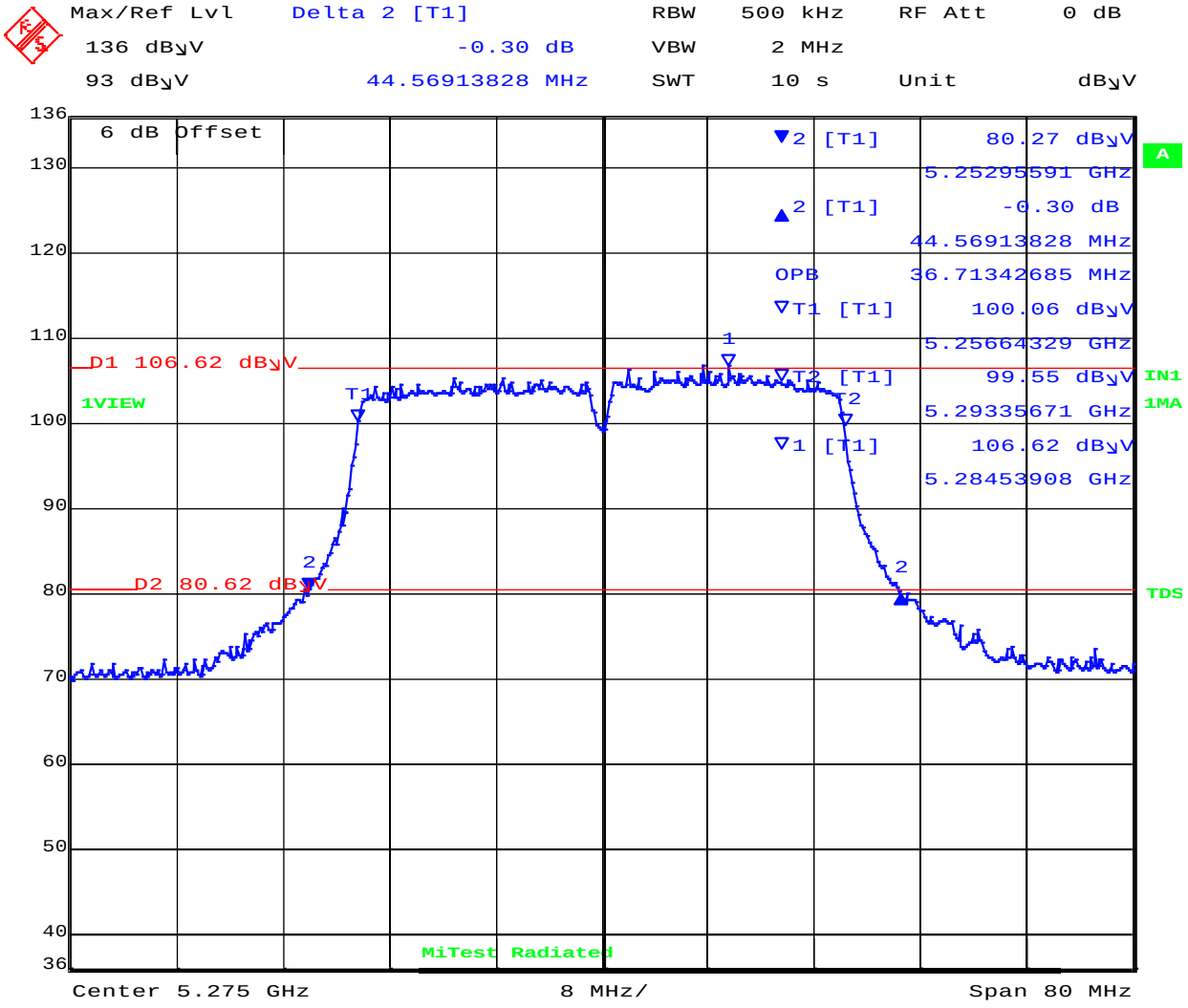


Date: 14.MAY.2020 13:39:18

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5275.00 MHz, Polarity H, Temp: 20

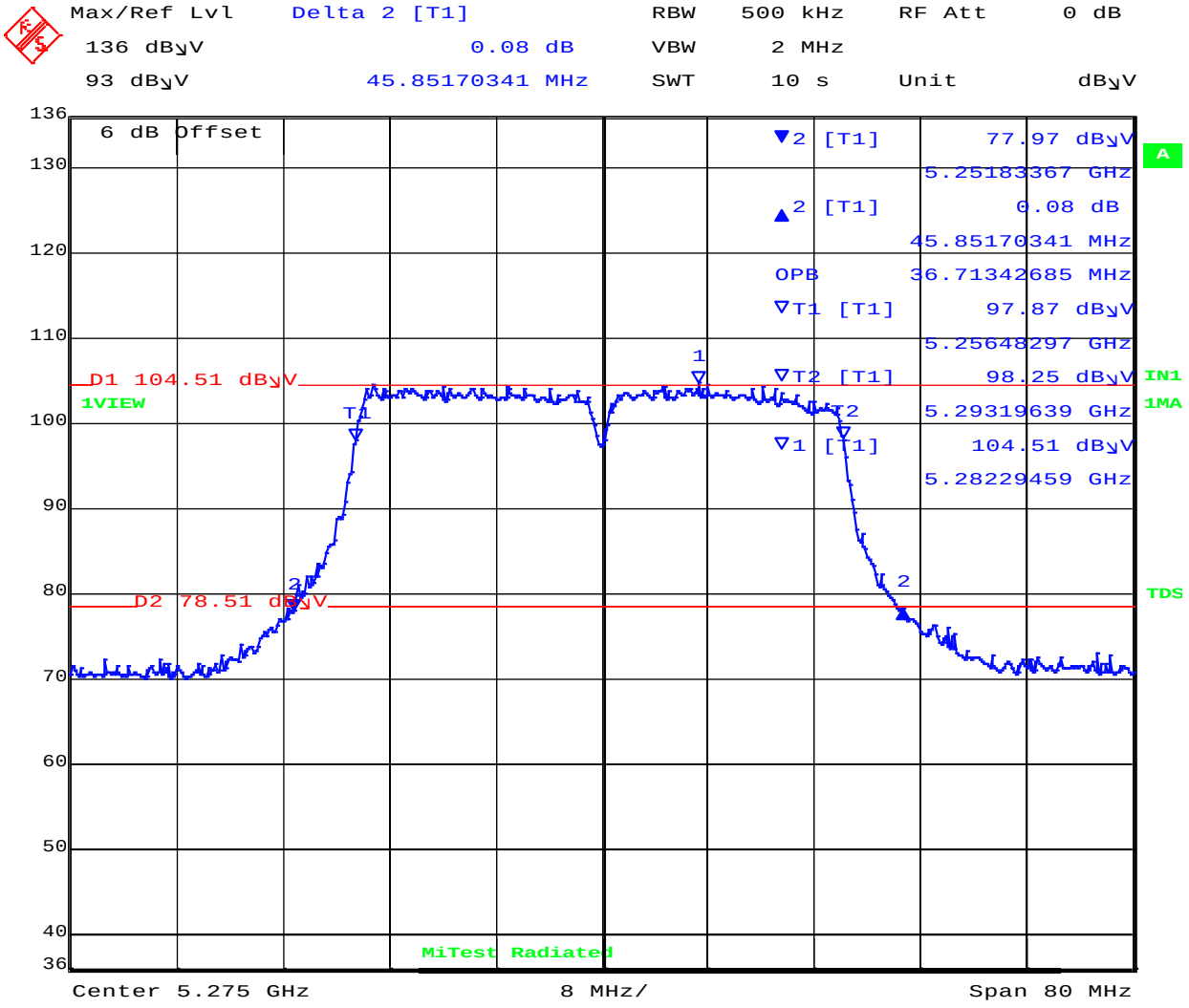


Date: 14.MAY.2020 14:34:39

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5275.00 MHz, Polarity V, Temp: 20

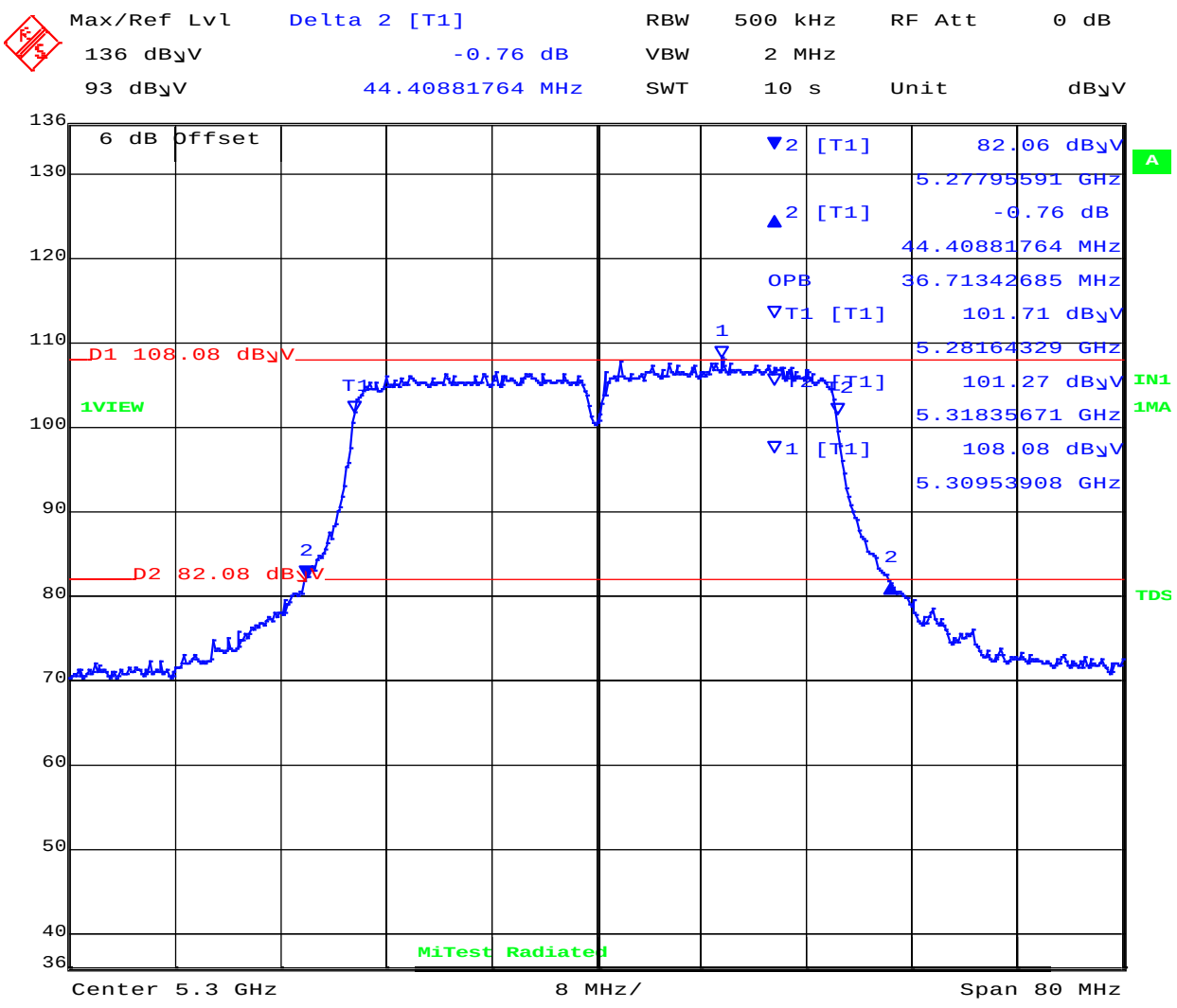


Date: 14.MAY.2020 14:32:26

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5300.00 MHz, Polarity H, Temp: 20

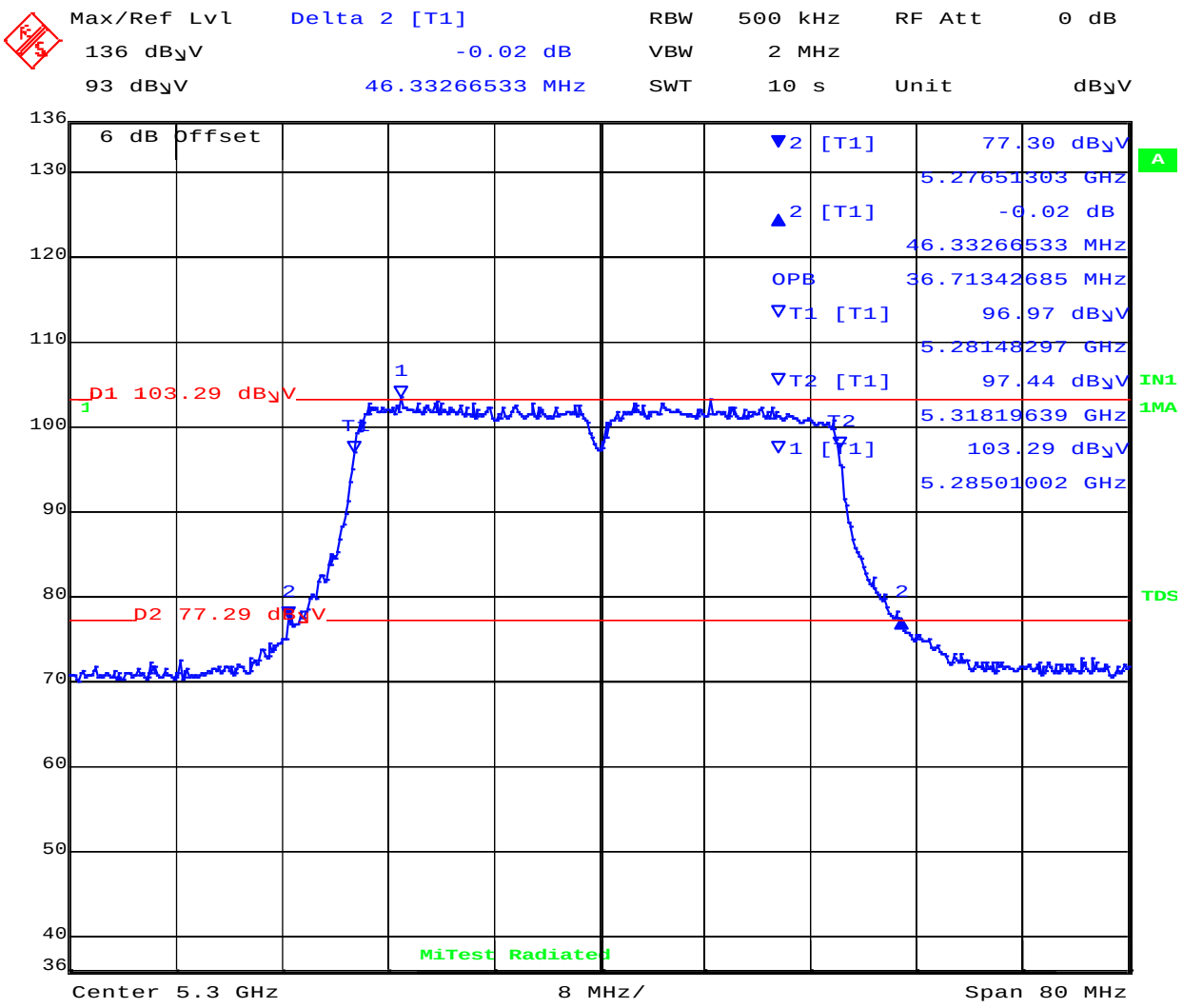


Date: 14.MAY.2020 14:44:49

back to matrix

26 dB & 99% BANDWIDTH

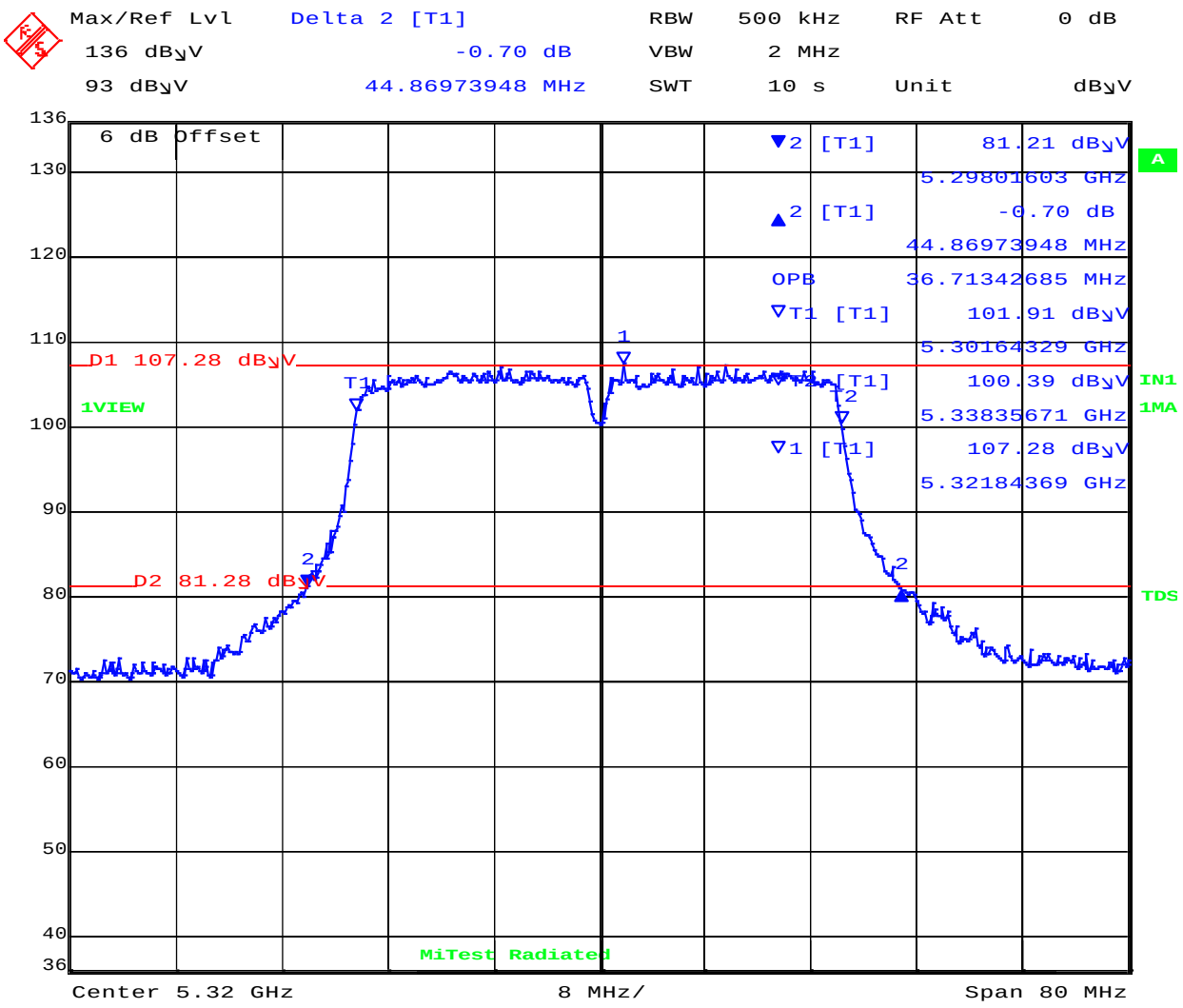
Variant: 802.11 40MHz, Channel: 5300.00 MHz, Polarity V, Temp: 20



back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5320.00 MHz, Polarity H, Temp: 20

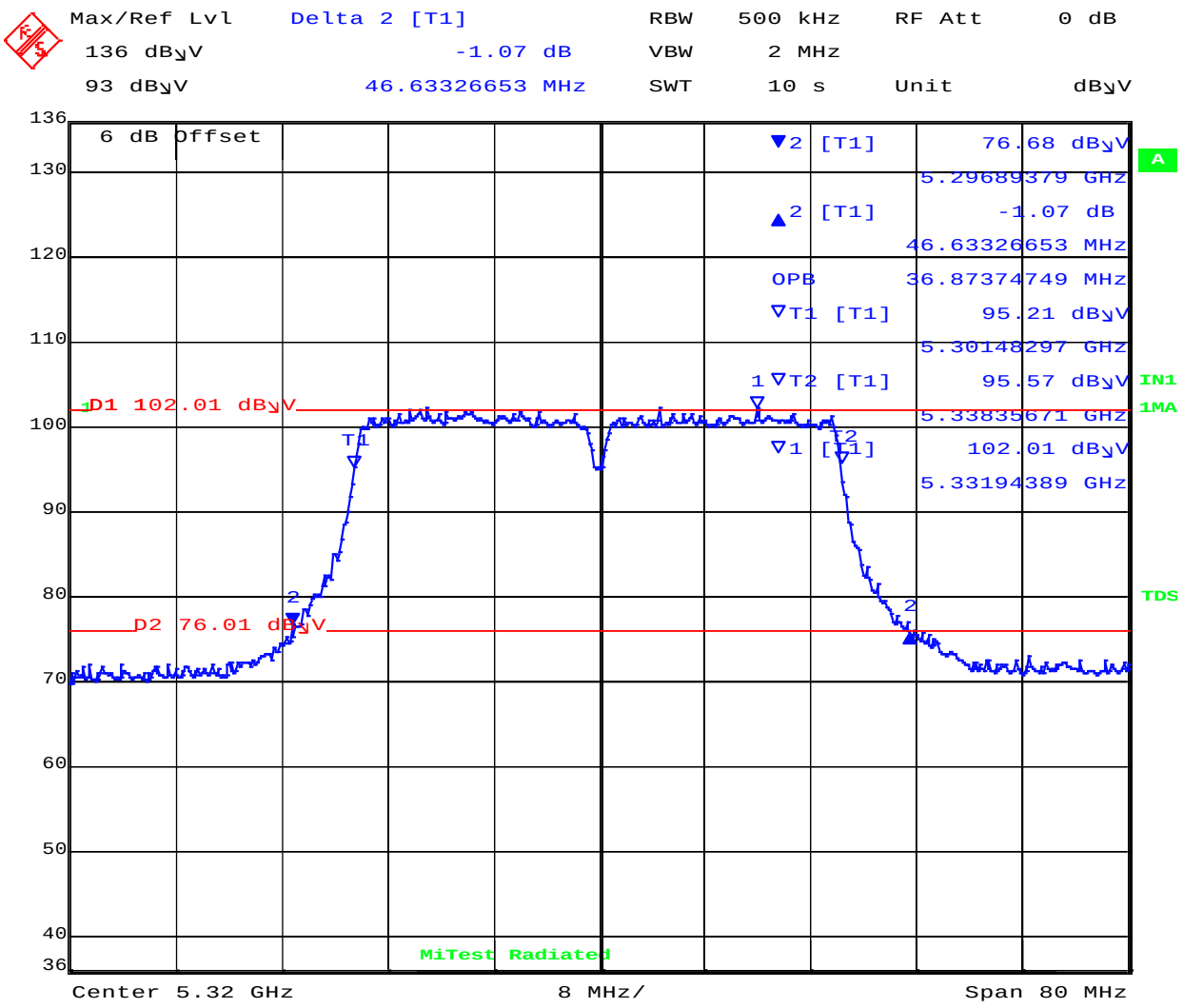


Date: 14.MAY.2020 15:14:18

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5320.00 MHz, Polarity V, Temp: 20

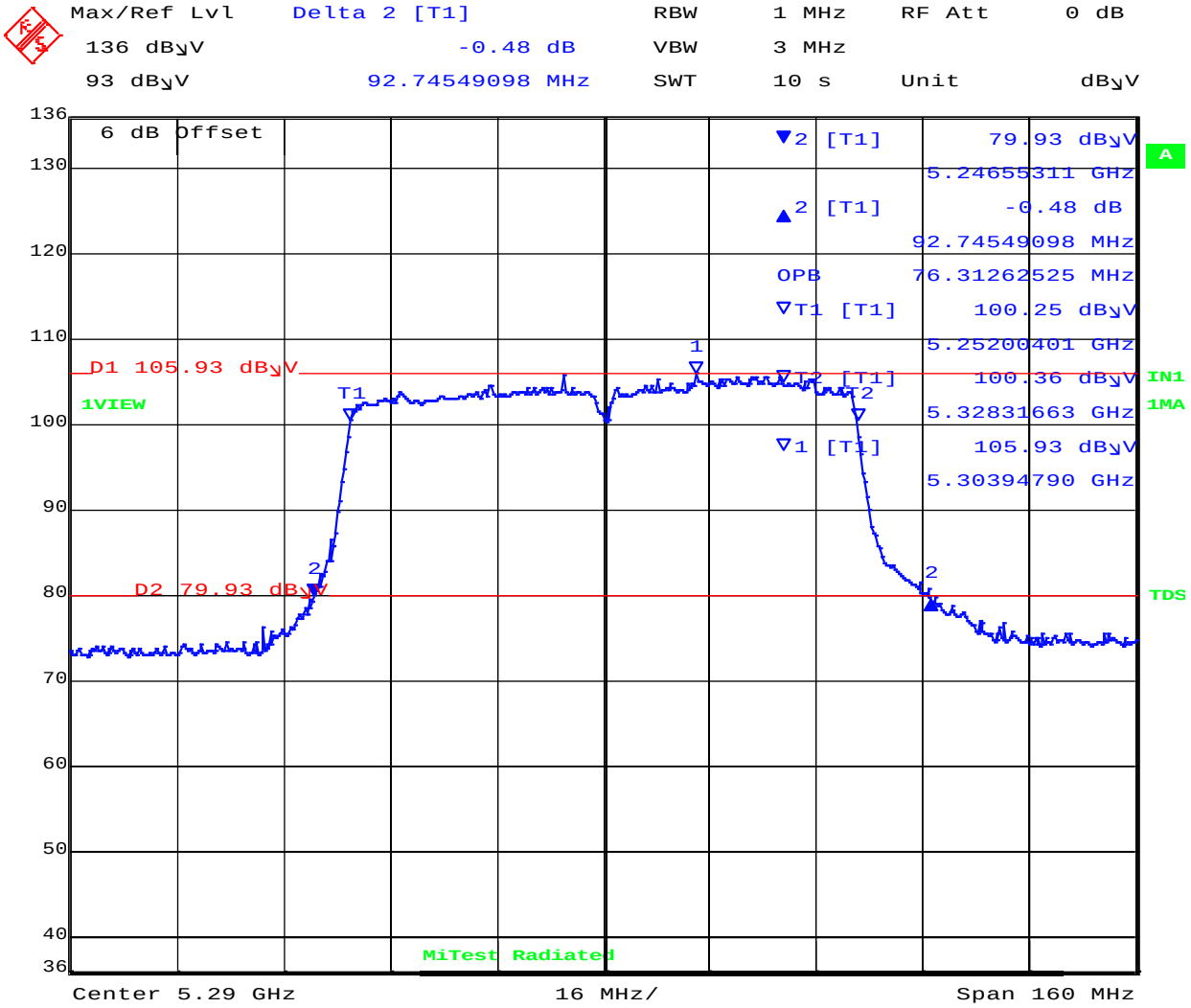


Date: 14.MAY.2020 15:10:50

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 80MHz, Channel: 5290.00 MHz, Polarity H, Temp: 20

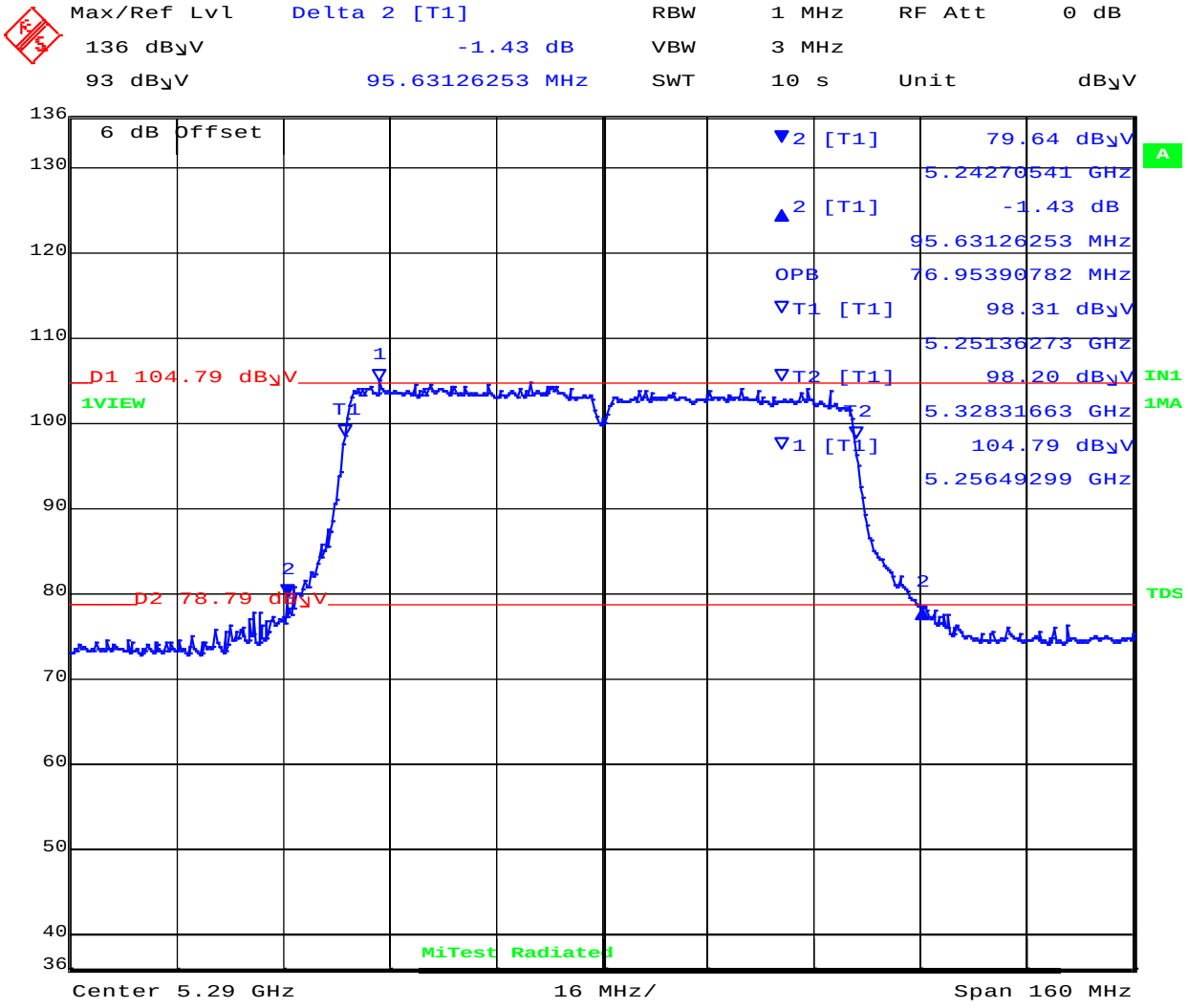


Date: 14.MAY.2020 17:03:36

back to matrix

26 dB & 99% BANDWIDTH

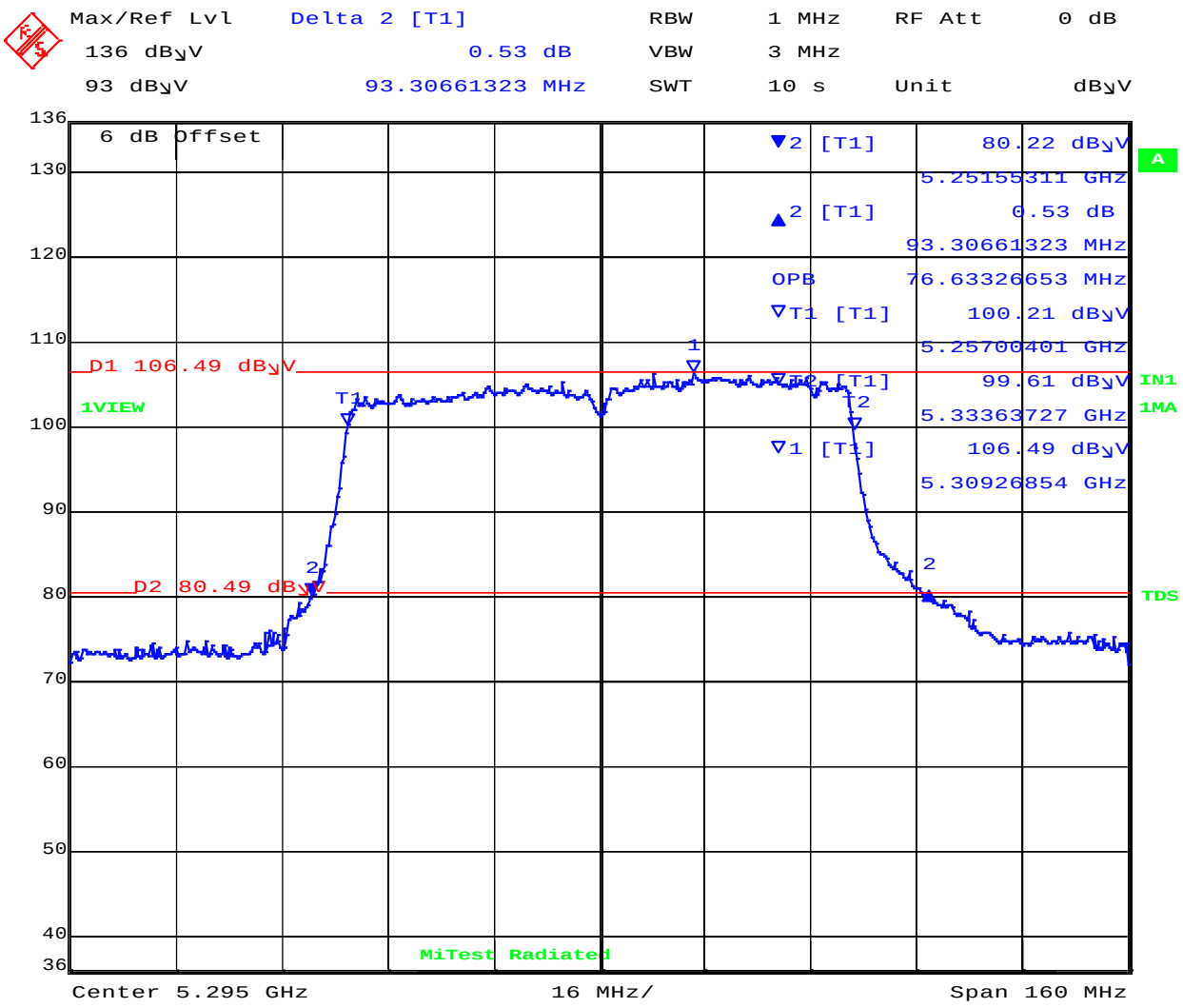
Variant: 802.11 80MHz, Channel: 5290.00 MHz, Polarity V, Temp: 20



back to matrix

26 dB & 99% BANDWIDTH

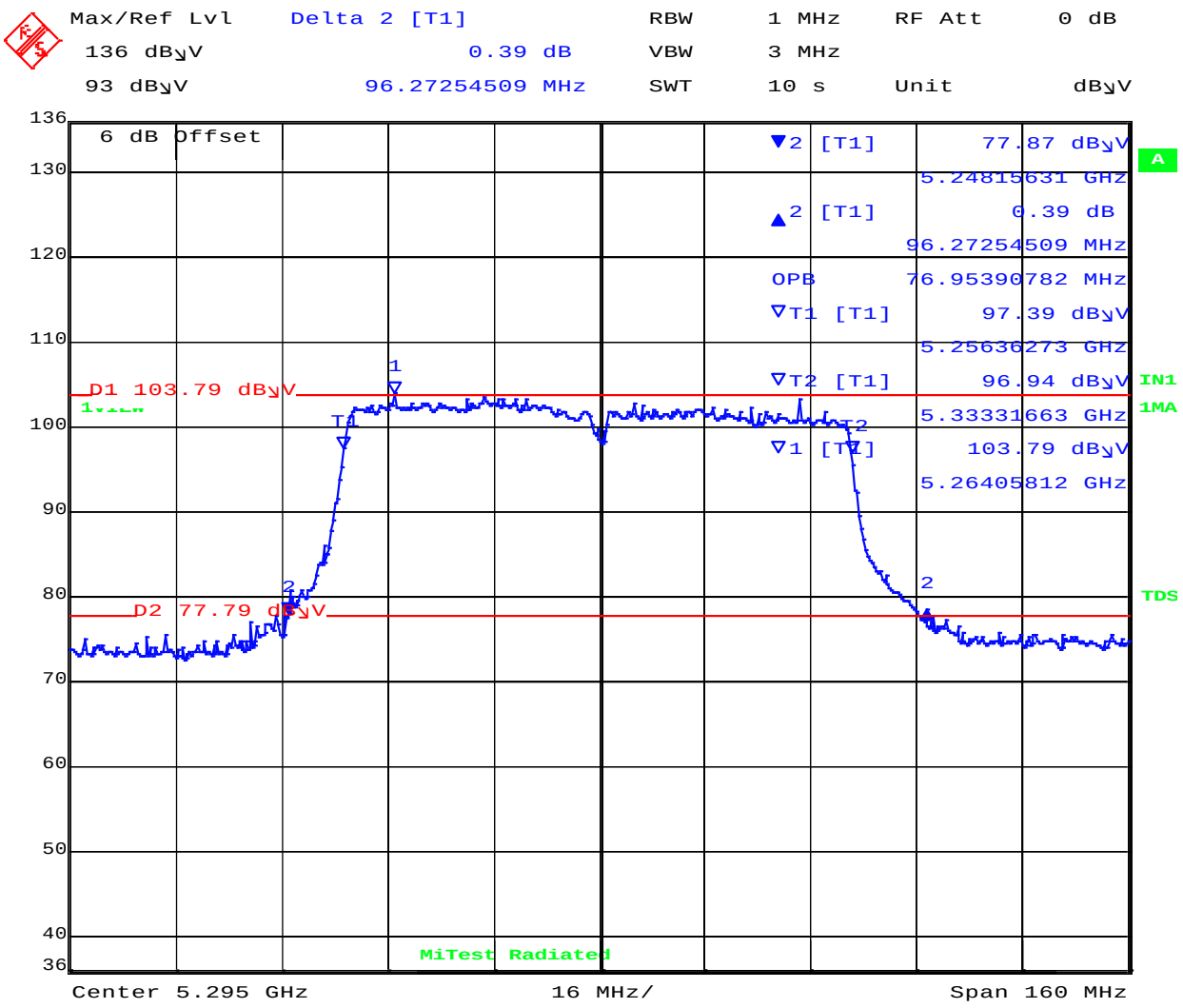
Variant: 802.11 80MHz, Channel: 5295.00 MHz, Polarity H, Temp: 20



back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 80MHz, Channel: 5295.00 MHz, Polarity V, Temp: 20

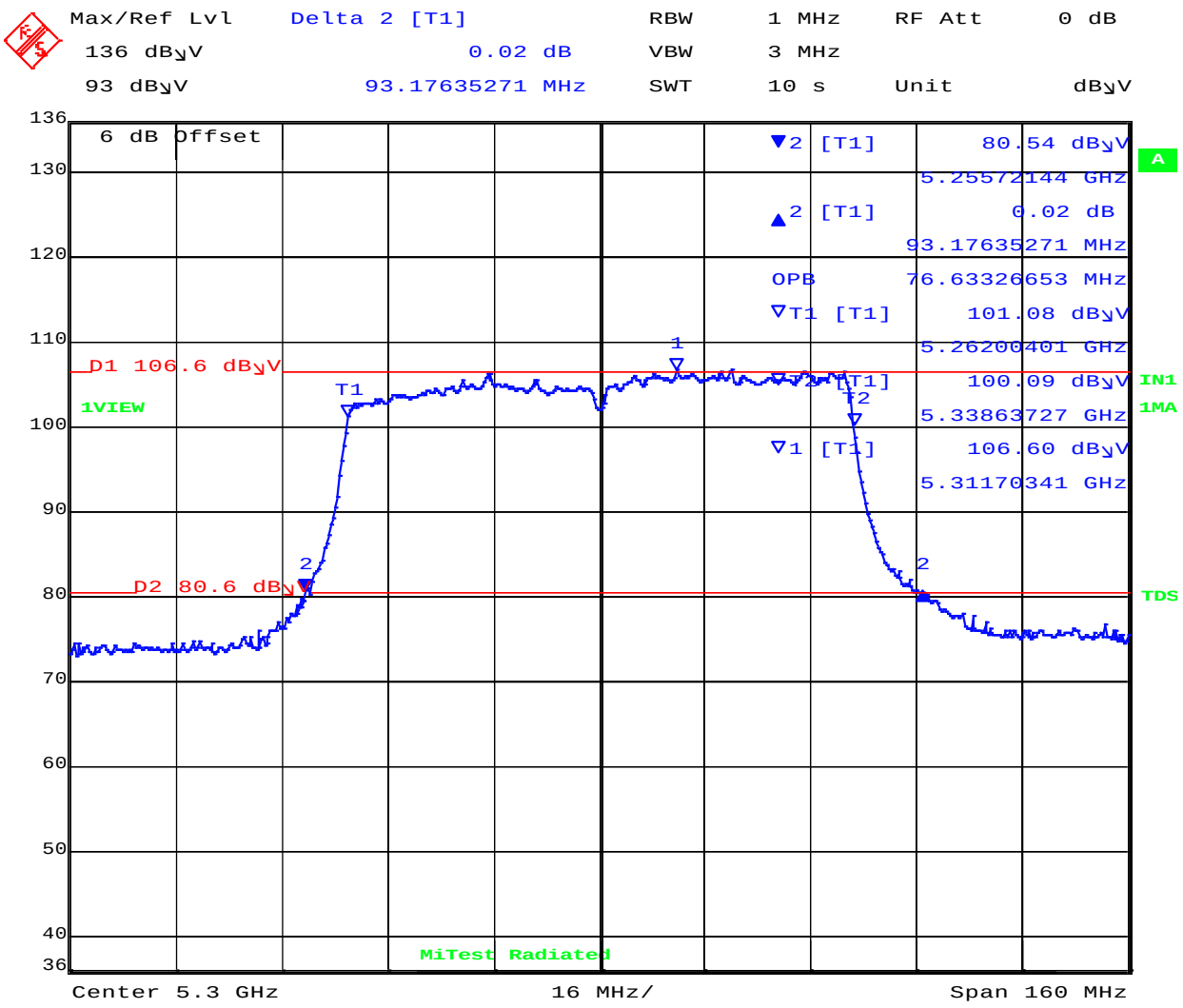


Date: 15.MAY.2020 08:09:44

back to matrix

26 dB & 99% BANDWIDTH

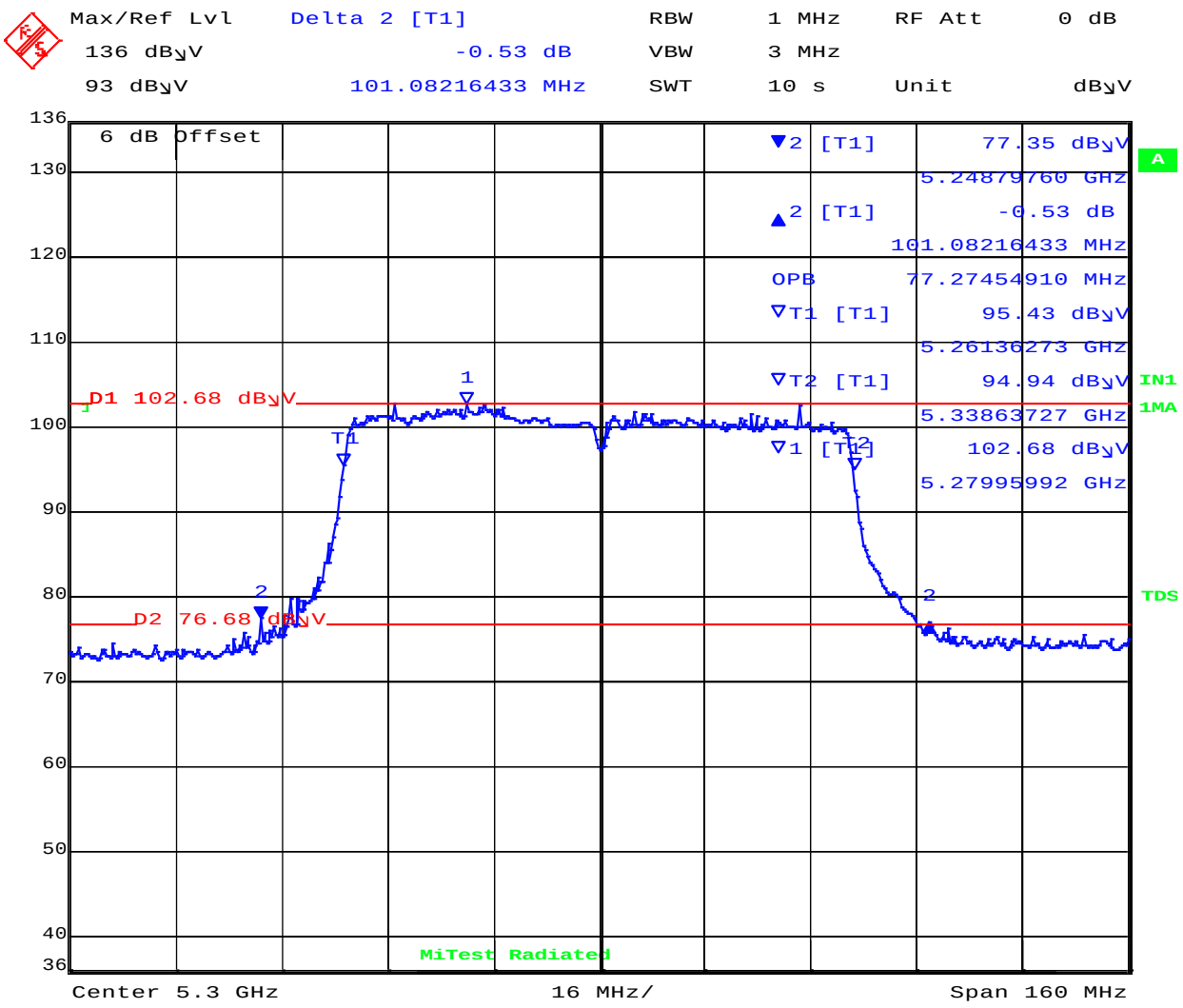
Variant: 802.11 80MHz, Channel: 5300.00 MHz, Polarity H, Temp: 20



back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 80MHz, Channel: 5300.00 MHz, Polarity V, Temp: 20

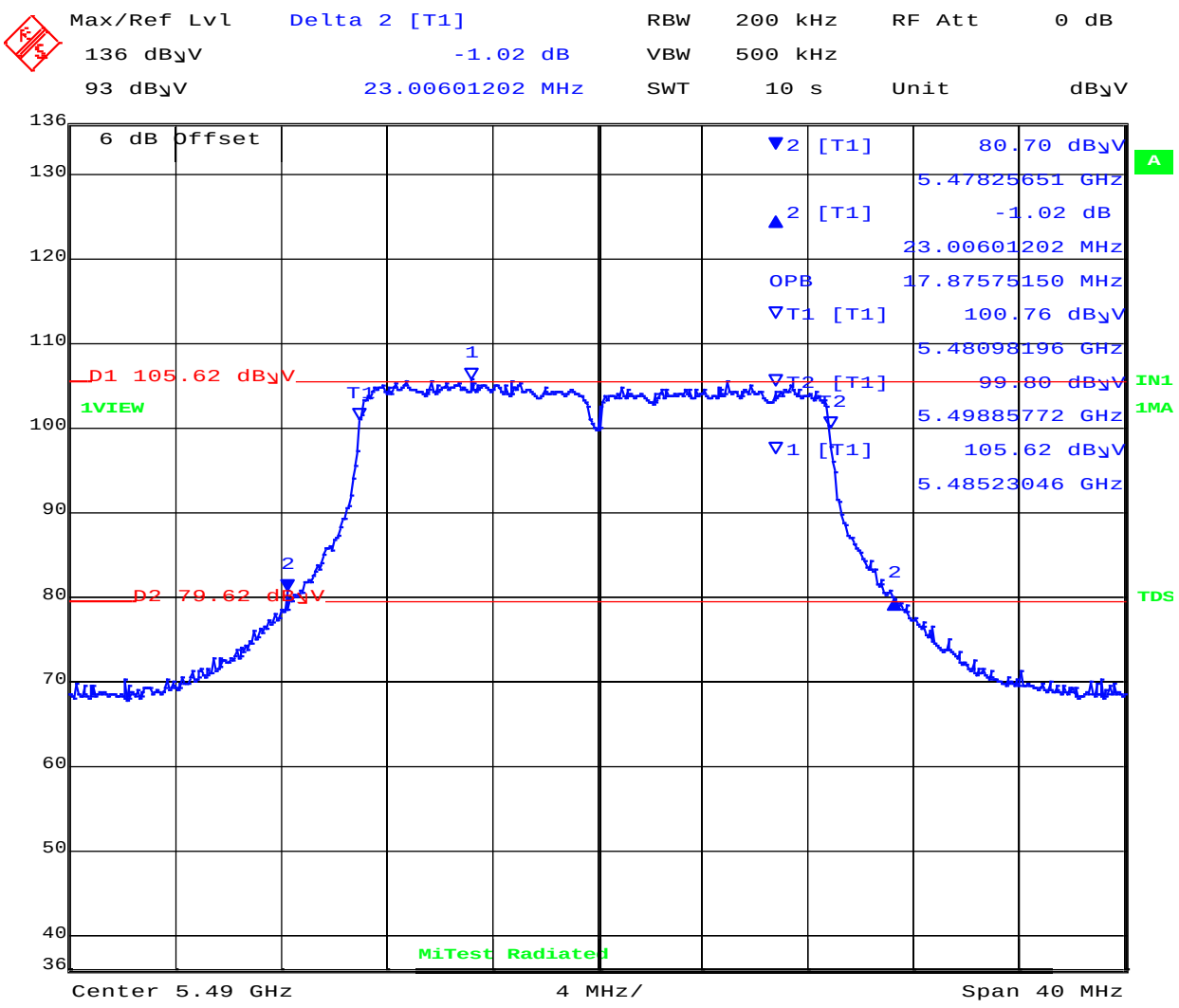


Date: 15.MAY.2020 08:25:45

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5490.00 MHz, Polarity H, Temp: 20

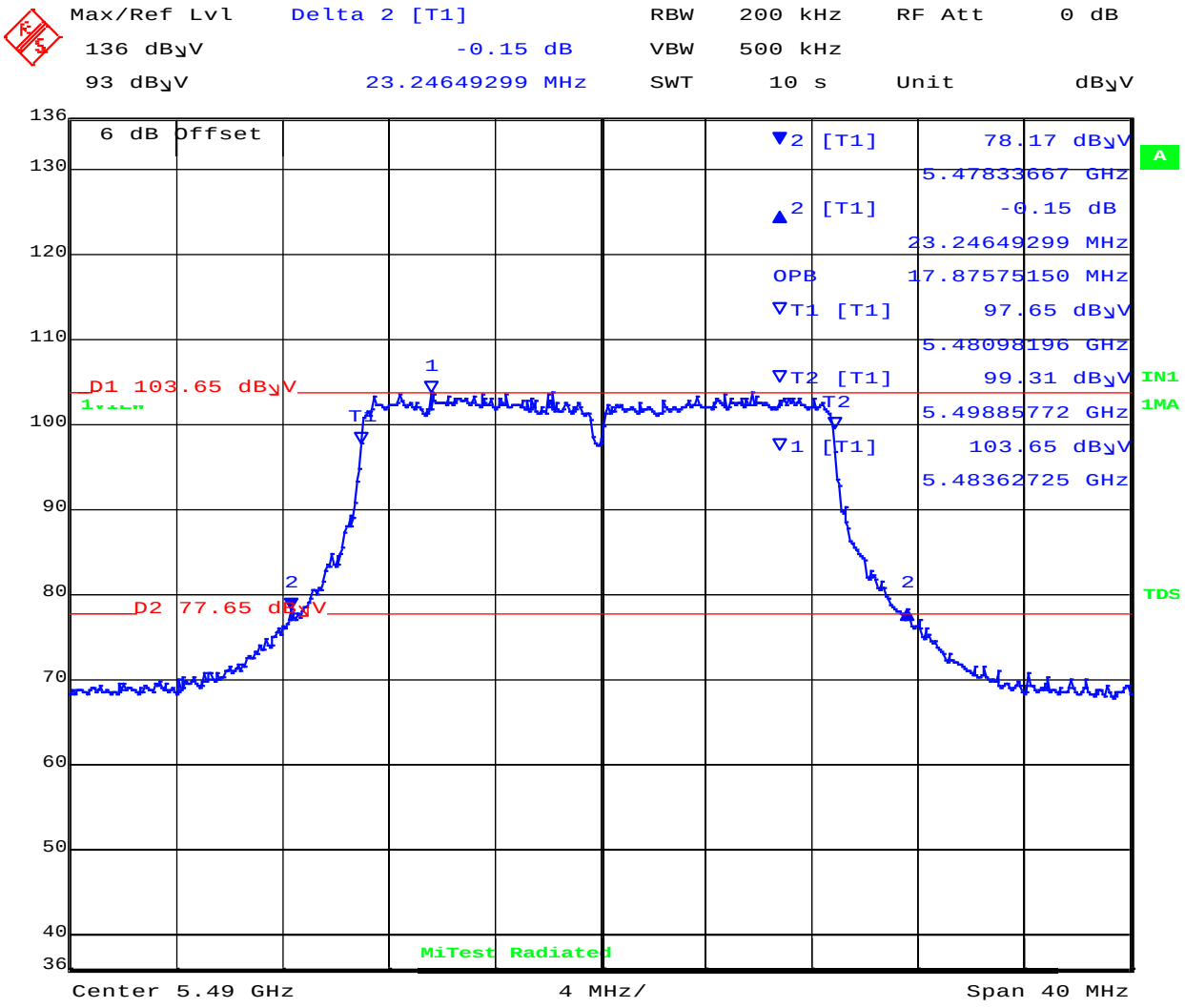


Date: 14.MAY.2020 13:53:17

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5490.00 MHz, Polarity V, Temp: 20

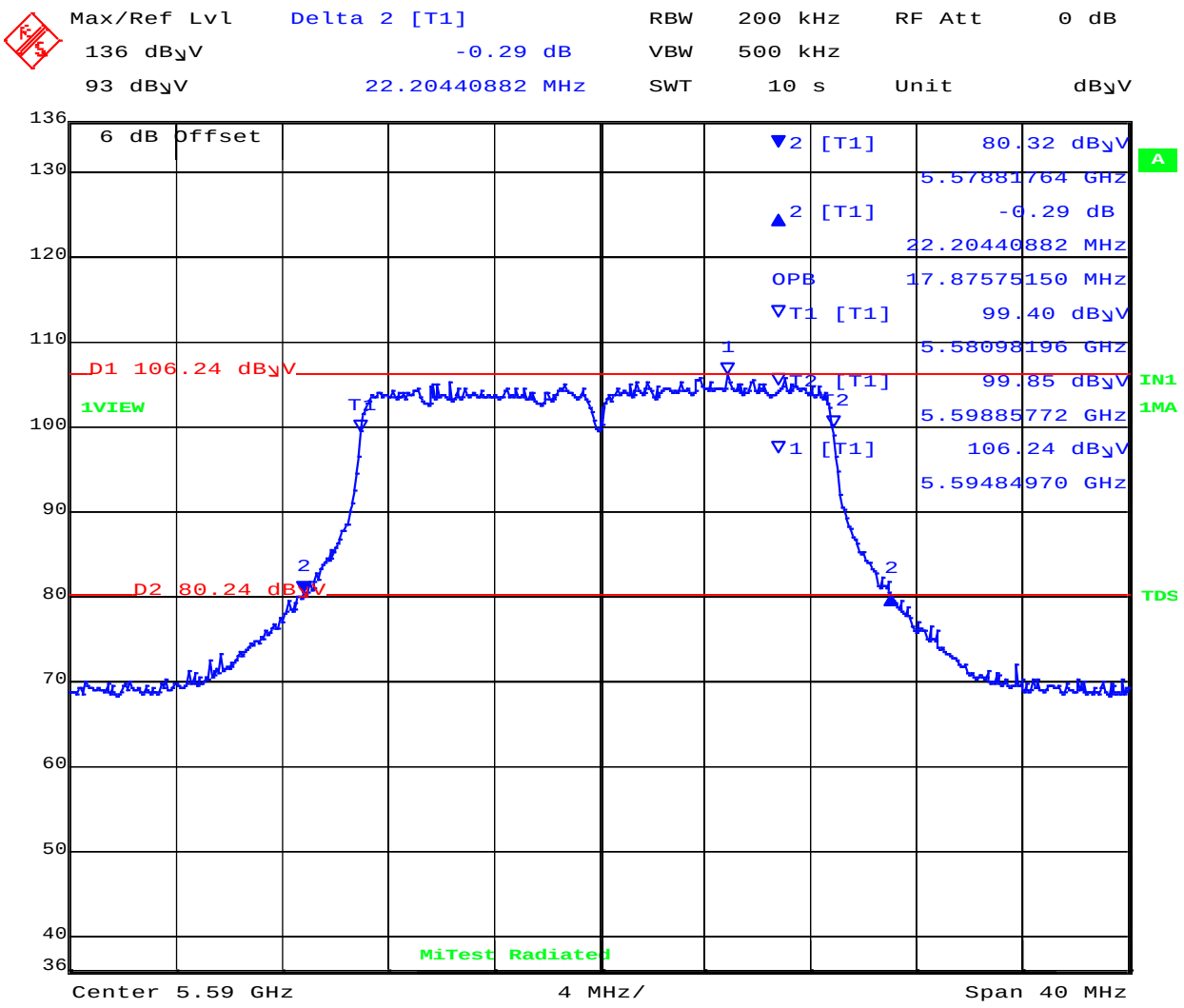


Date: 14.MAY.2020 13:56:04

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5590.00 MHz, Polarity H, Temp: 20

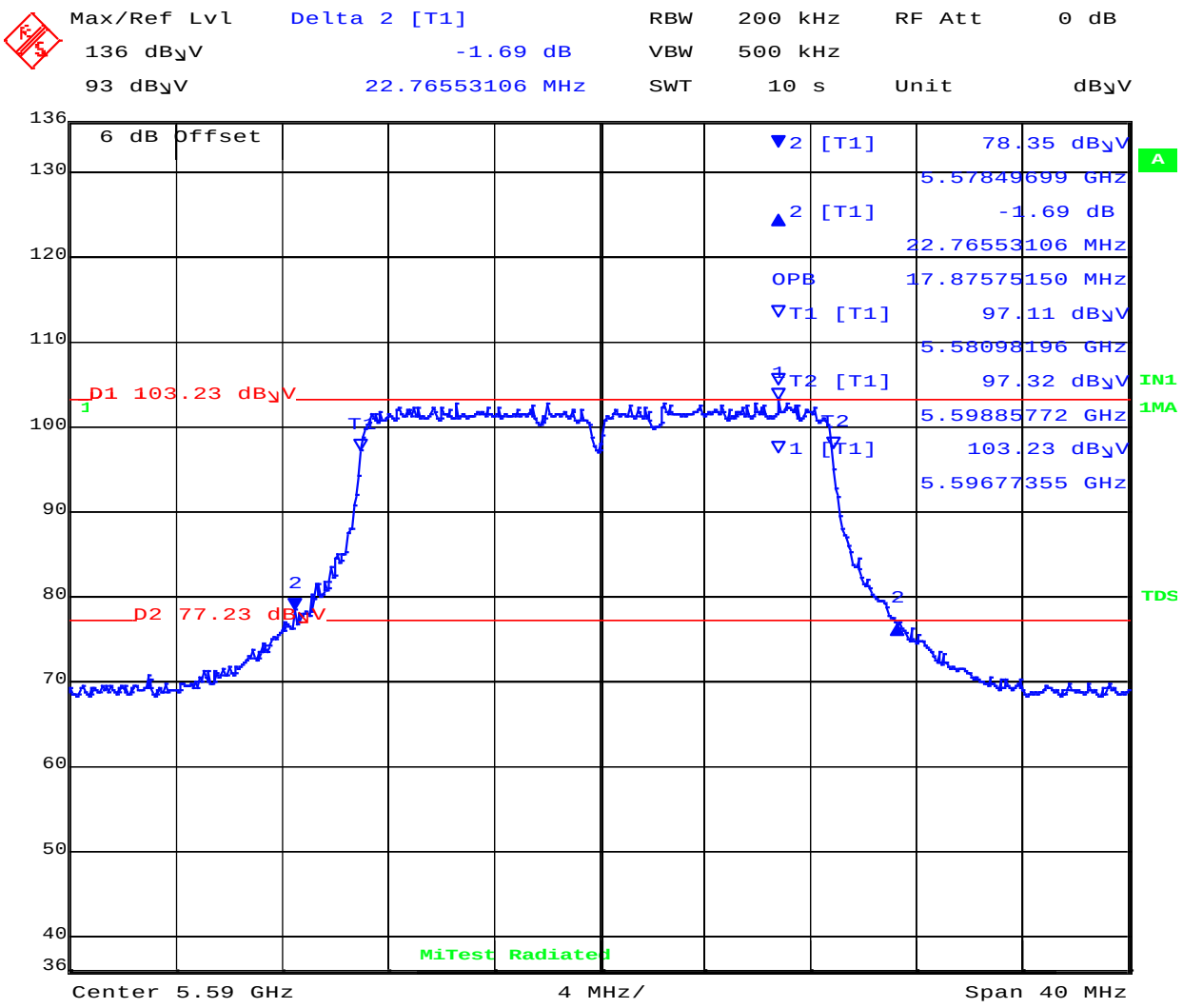


Date: 14.MAY.2020 14:02:09

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5590.00 MHz, Polarity V, Temp: 20

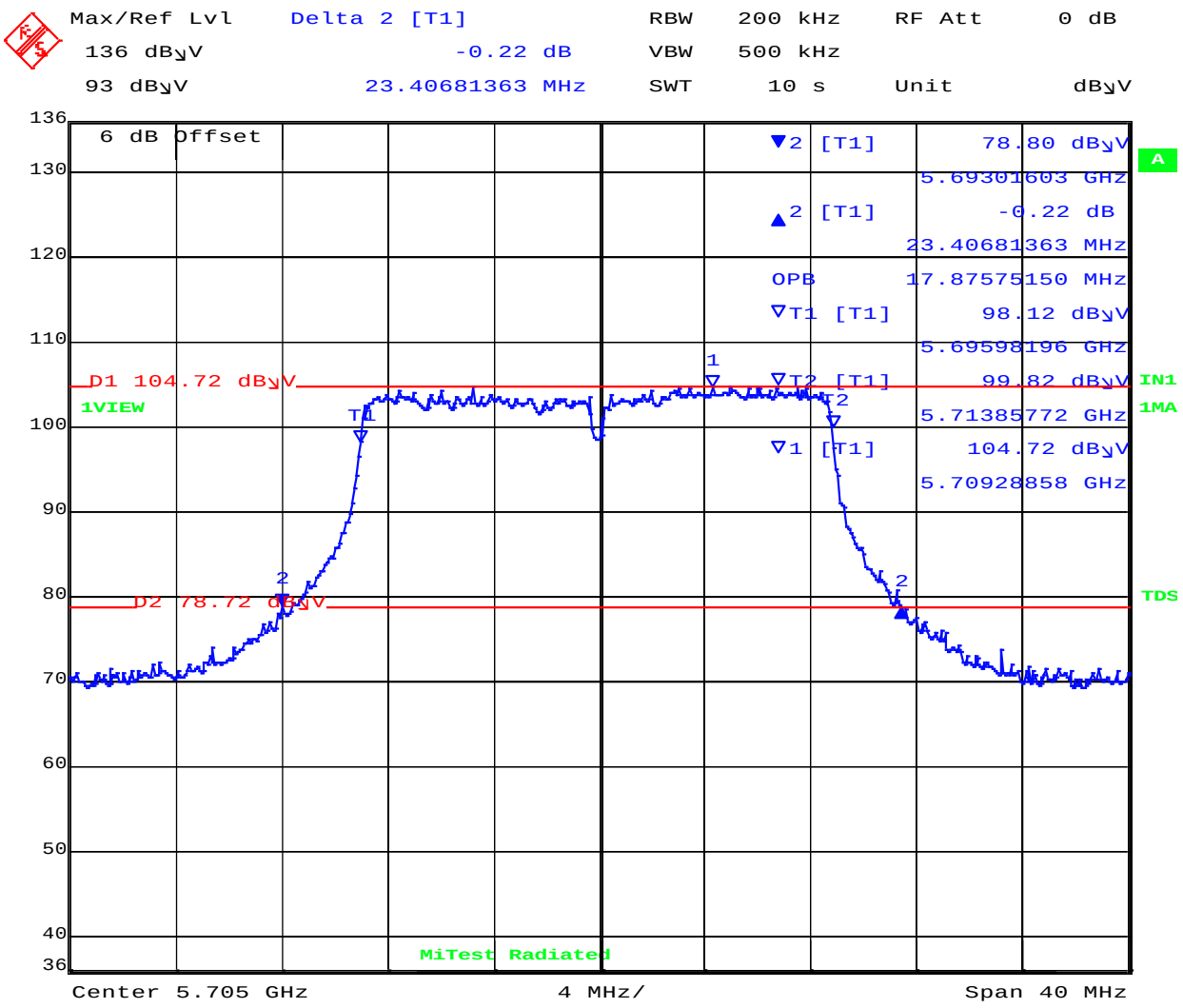


Date: 14.MAY.2020 13:59:48

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5705.00 MHz, Polarity H, Temp: 20

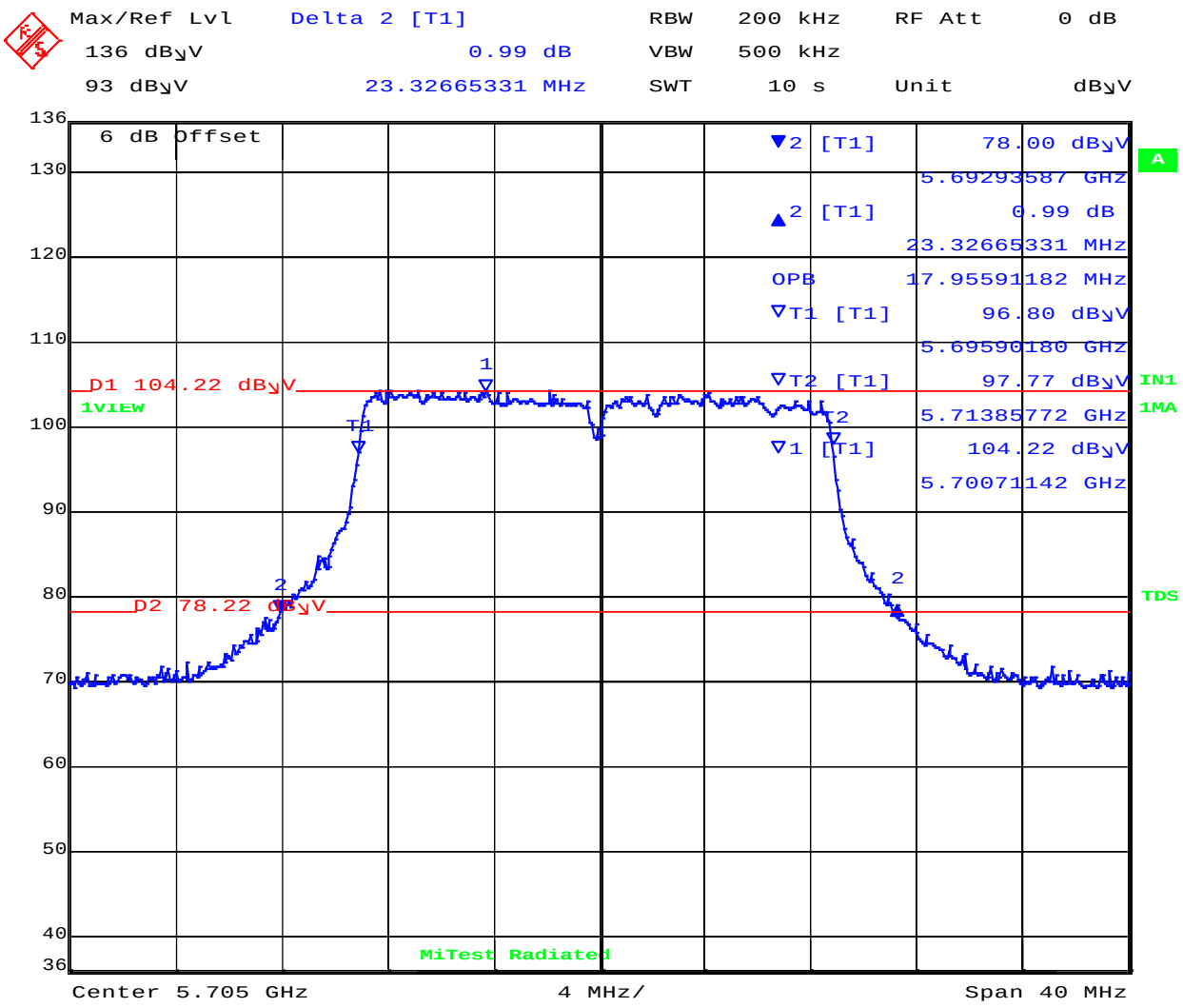


Date: 14.MAY.2020 14:06:34

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 20MHz, Channel: 5705.00 MHz, Polarity V, Temp: 20

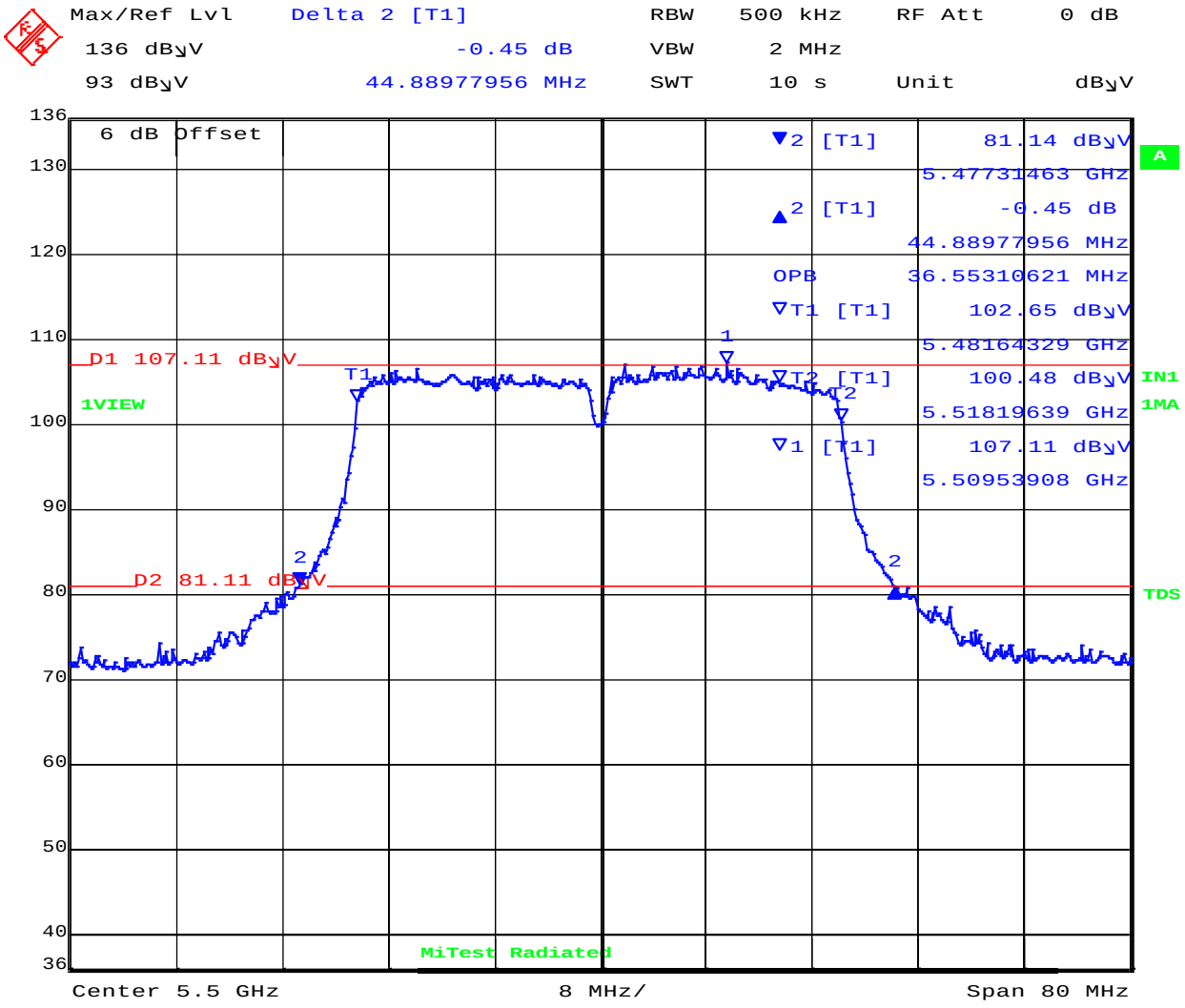


Date: 14.MAY.2020 14:08:37

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5500.00 MHz, Polarity H, Temp: 20

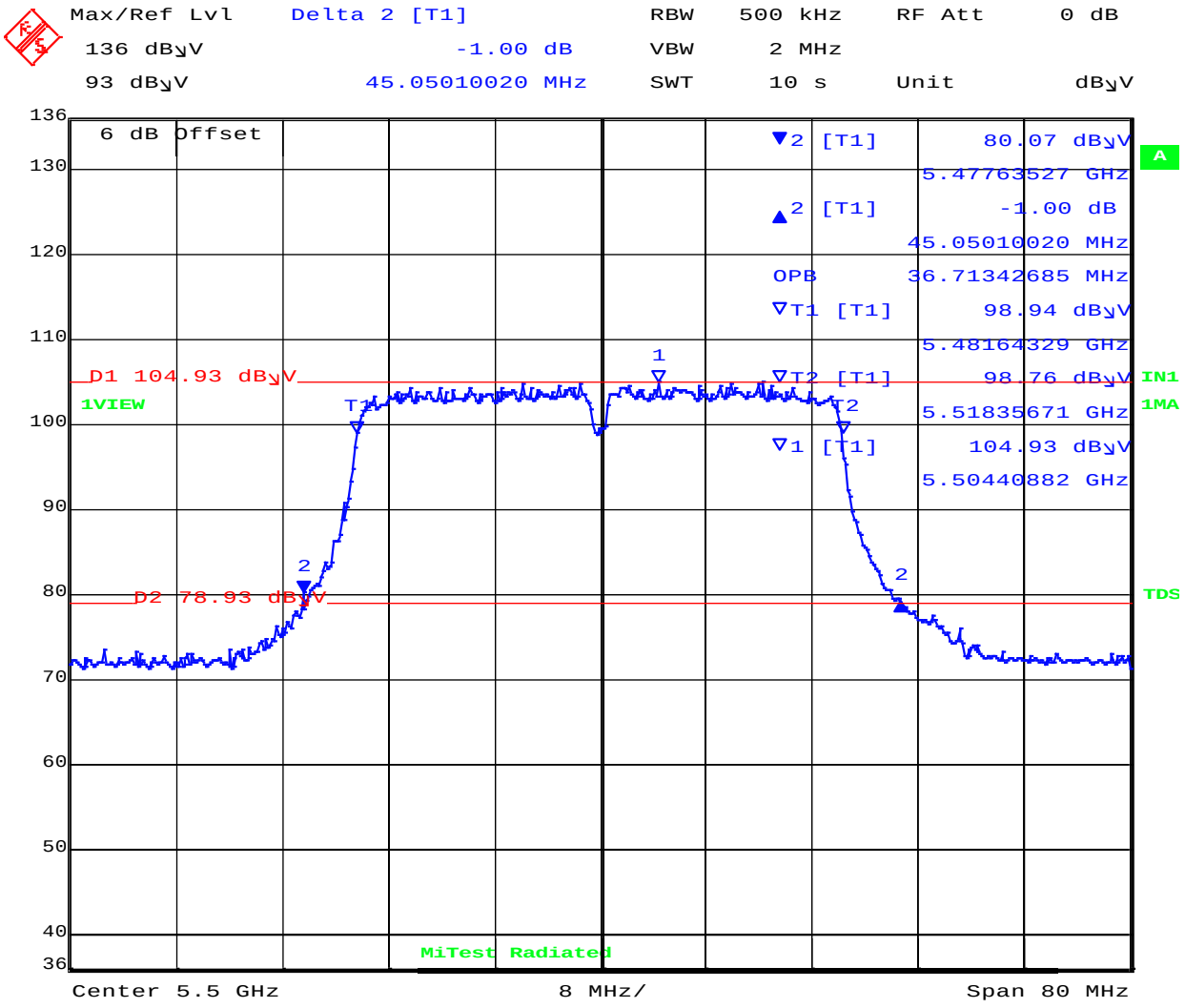


Date: 14.MAY.2020 15:32:15

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5500.00 MHz, Polarity V, Temp: 20

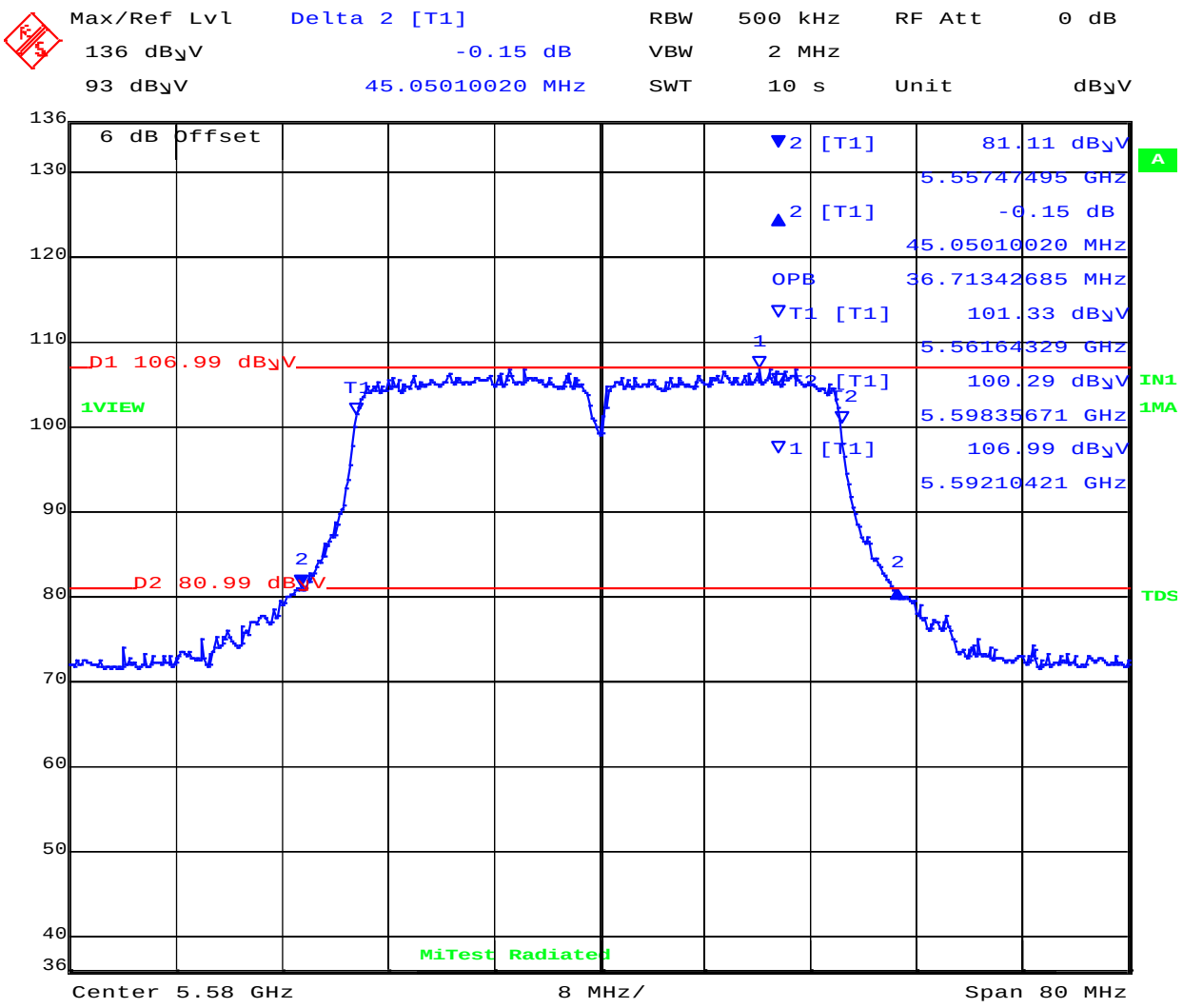


Date: 14.MAY.2020 15:34:59

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5580.00 MHz, Polarity H, Temp: 20

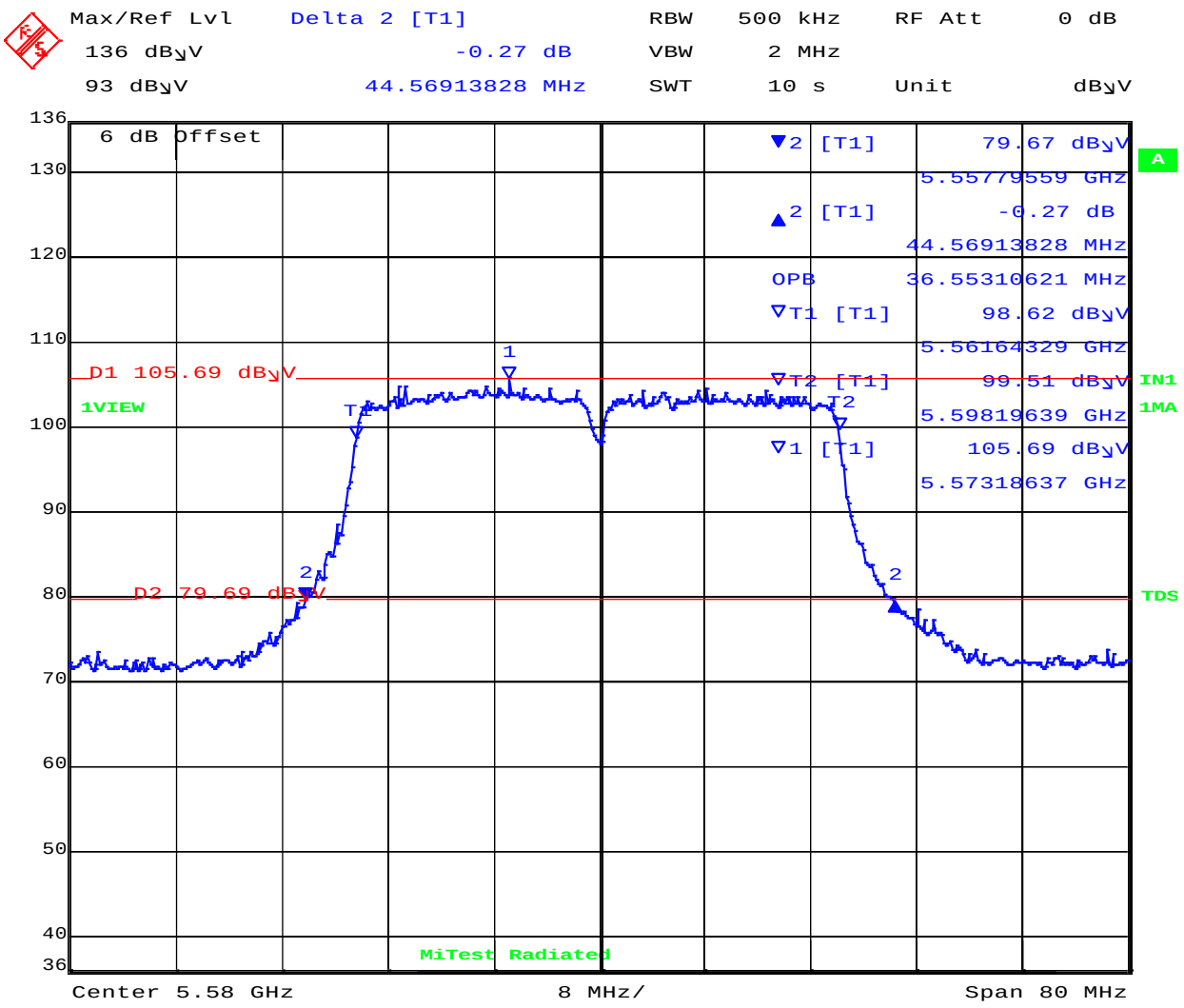


Date: 14.MAY.2020 15:59:10

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5580.00 MHz, Polarity V, Temp: 20

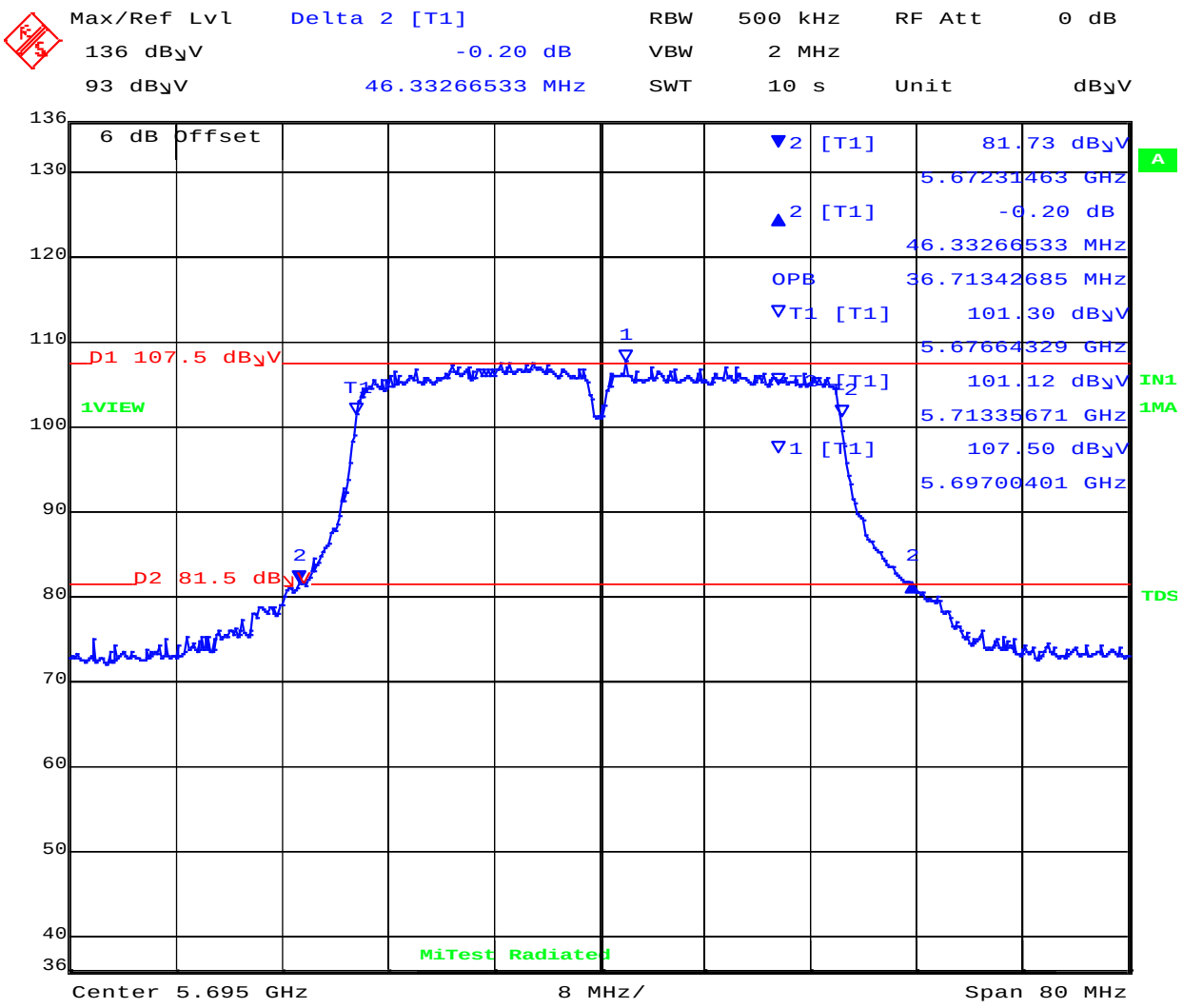


Date: 14.MAY.2020 16:02:12

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5695.00 MHz, Polarity H, Temp: 20

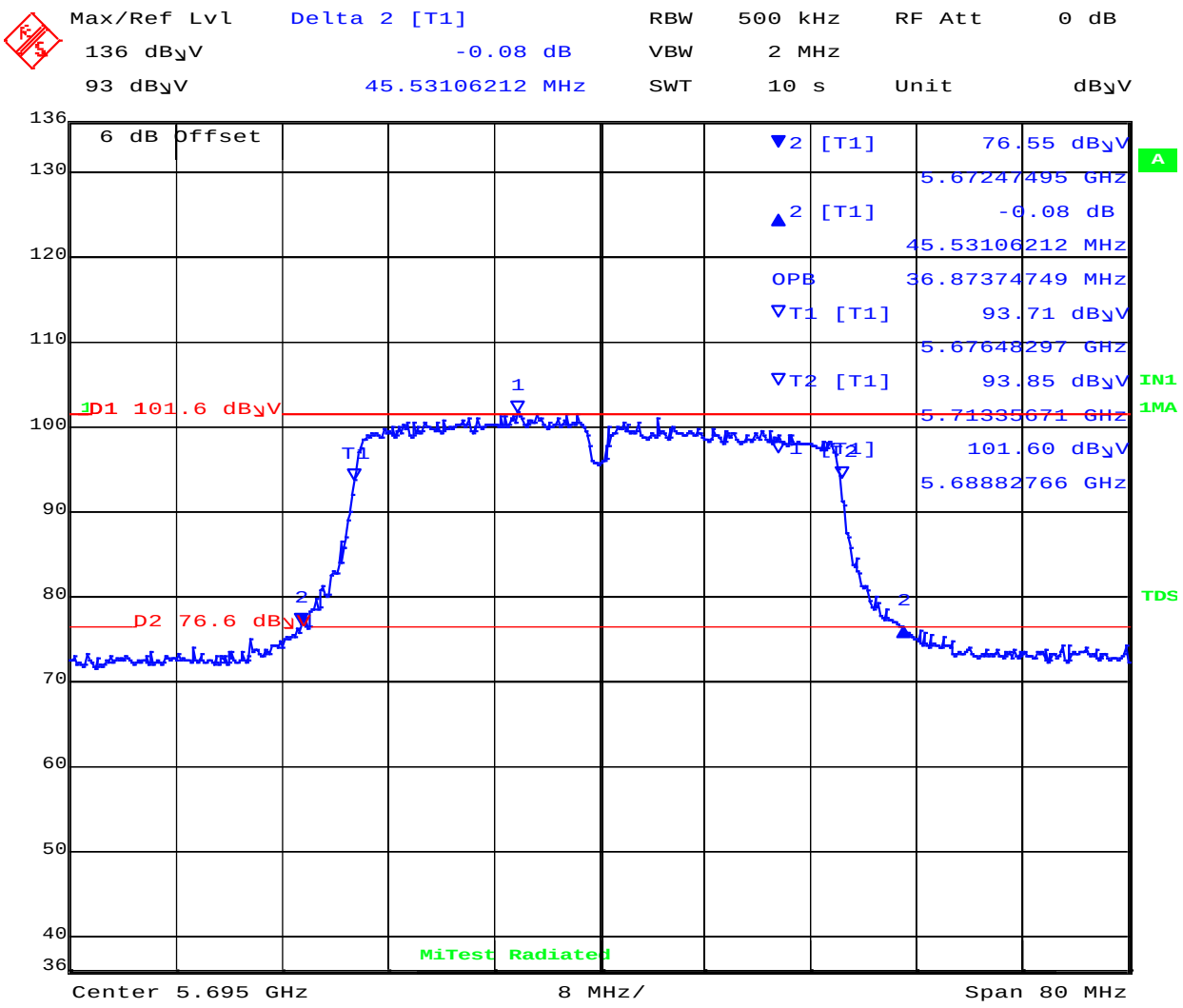


Date: 14.MAY.2020 16:33:12

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 40MHz, Channel: 5695.00 MHz, Polarity V, Temp: 20

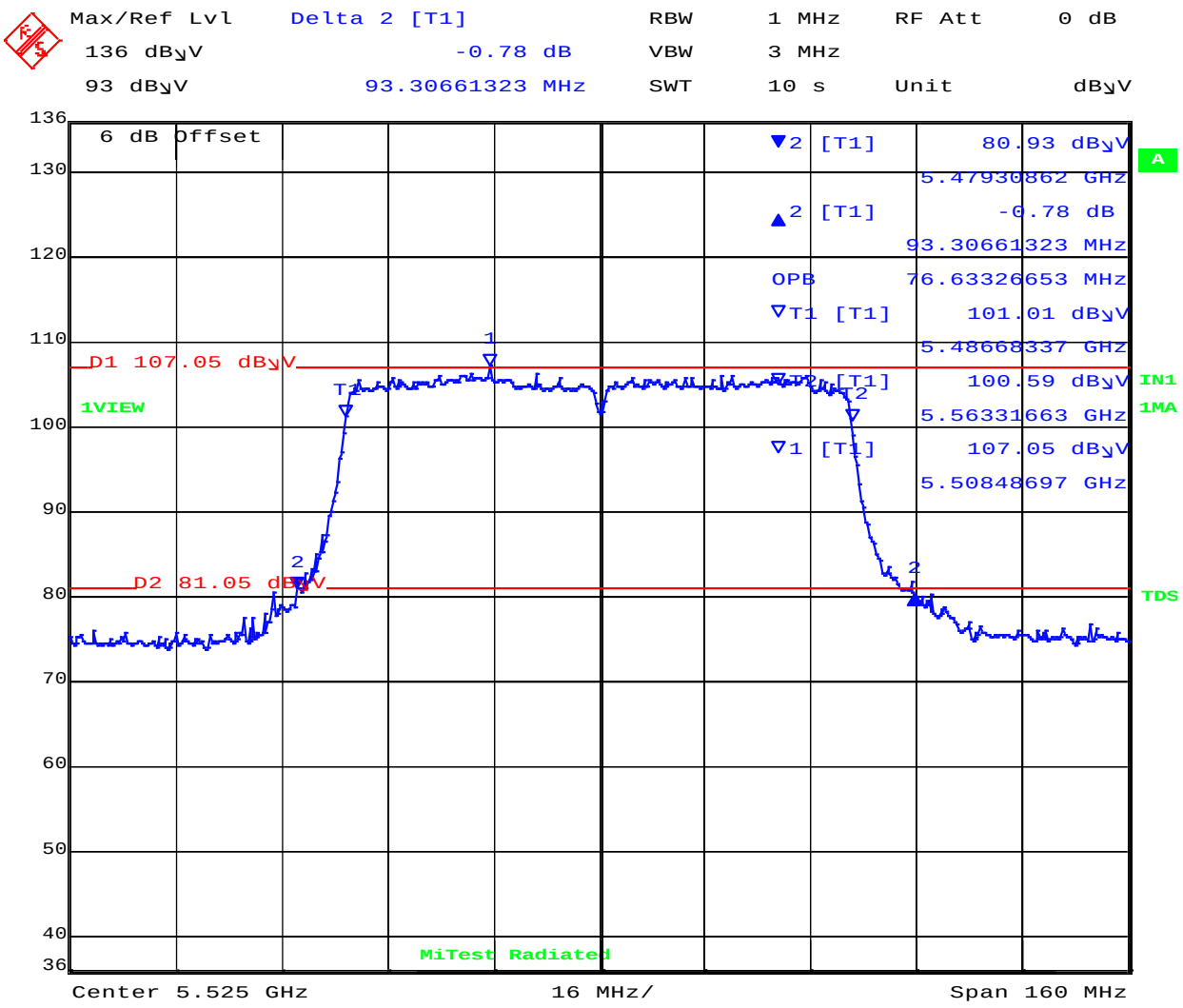


Date: 14.MAY.2020 16:36:03

back to matrix

26 dB & 99% BANDWIDTH

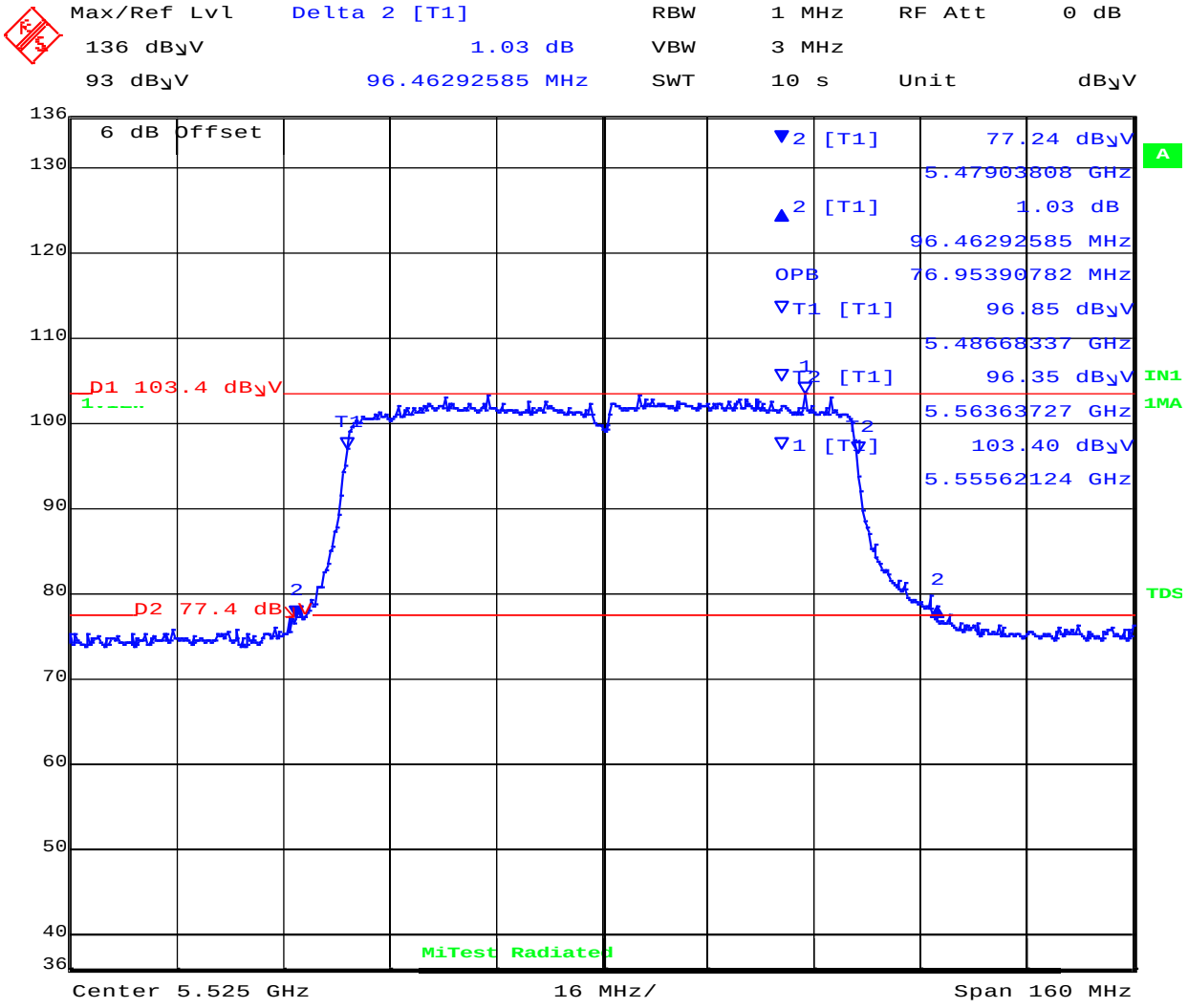
Variant: 802.11 80MHz, Channel: 5525.00 MHz, Polarity H, Temp: 20



back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 80MHz, Channel: 5525.00 MHz, Polarity V, Temp: 20

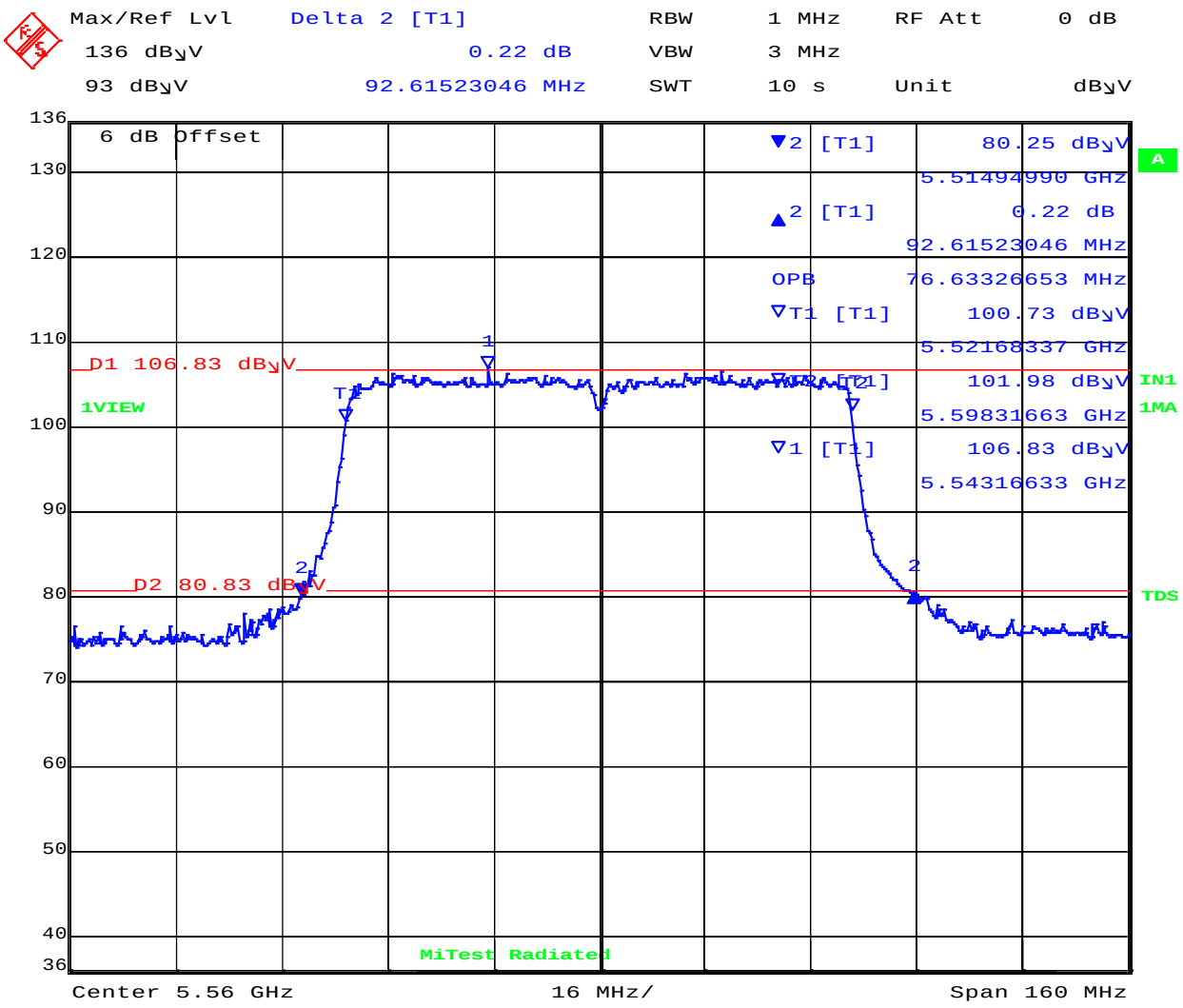


Date: 15.MAY.2020 08:49:25

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 80MHz, Channel: 5560.00 MHz, Polarity H, Temp: 20

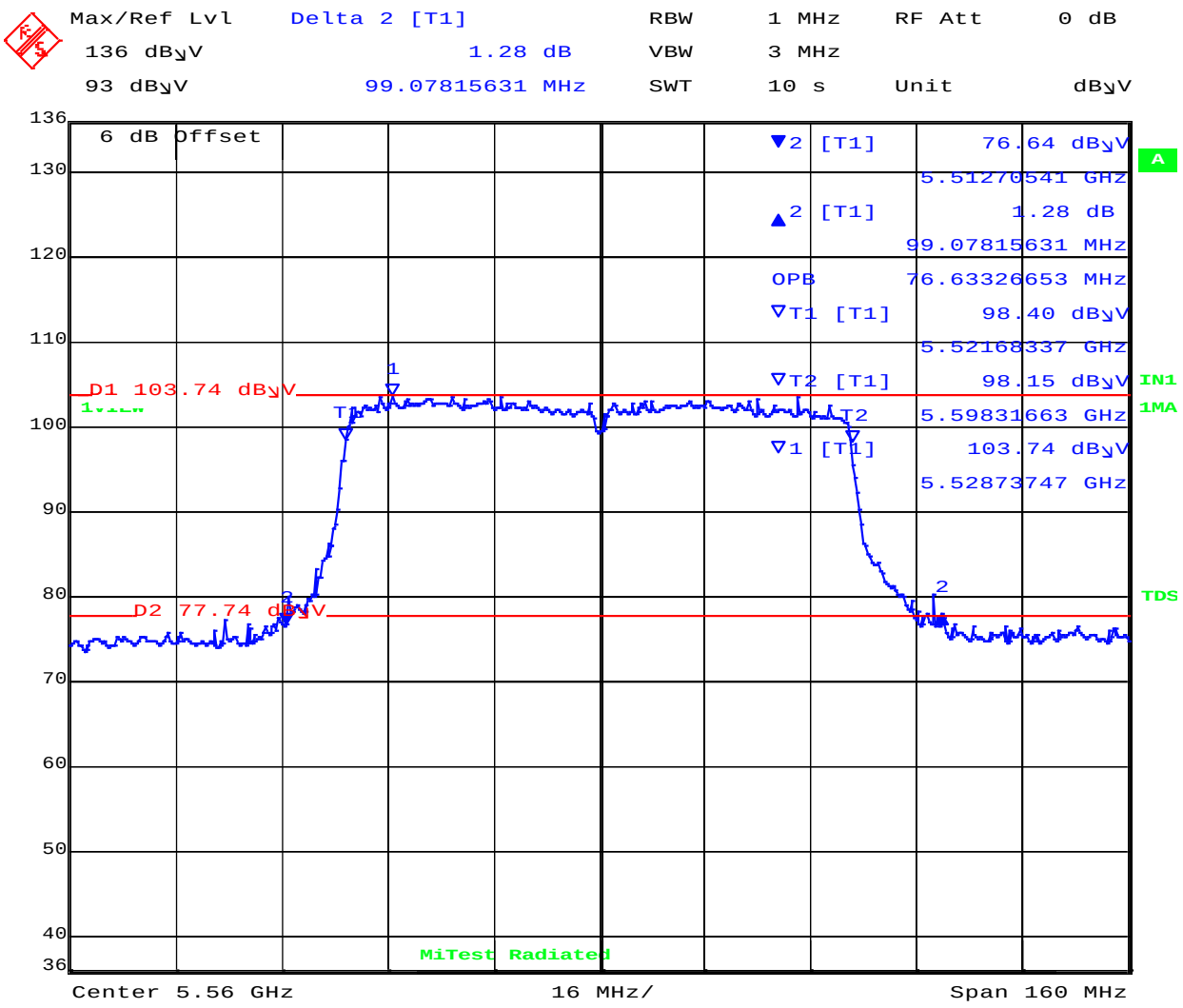


Date: 15.MAY.2020 08:58:15

back to matrix

26 dB & 99% BANDWIDTH

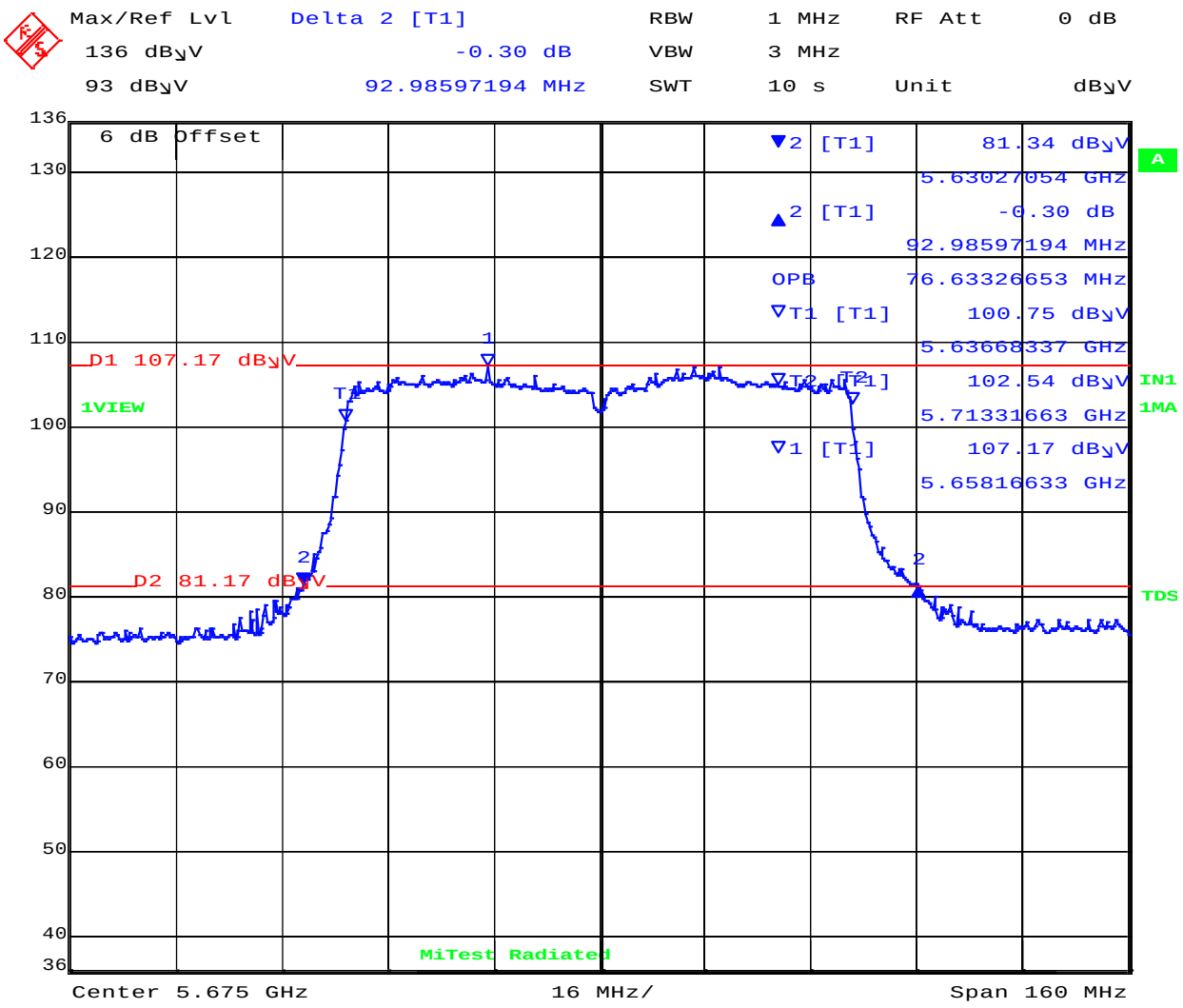
Variant: 802.11 80MHz, Channel: 5560.00 MHz, Polarity V, Temp: 20



back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 80MHz, Channel: 5675.00 MHz, Polarity H, Temp: 20

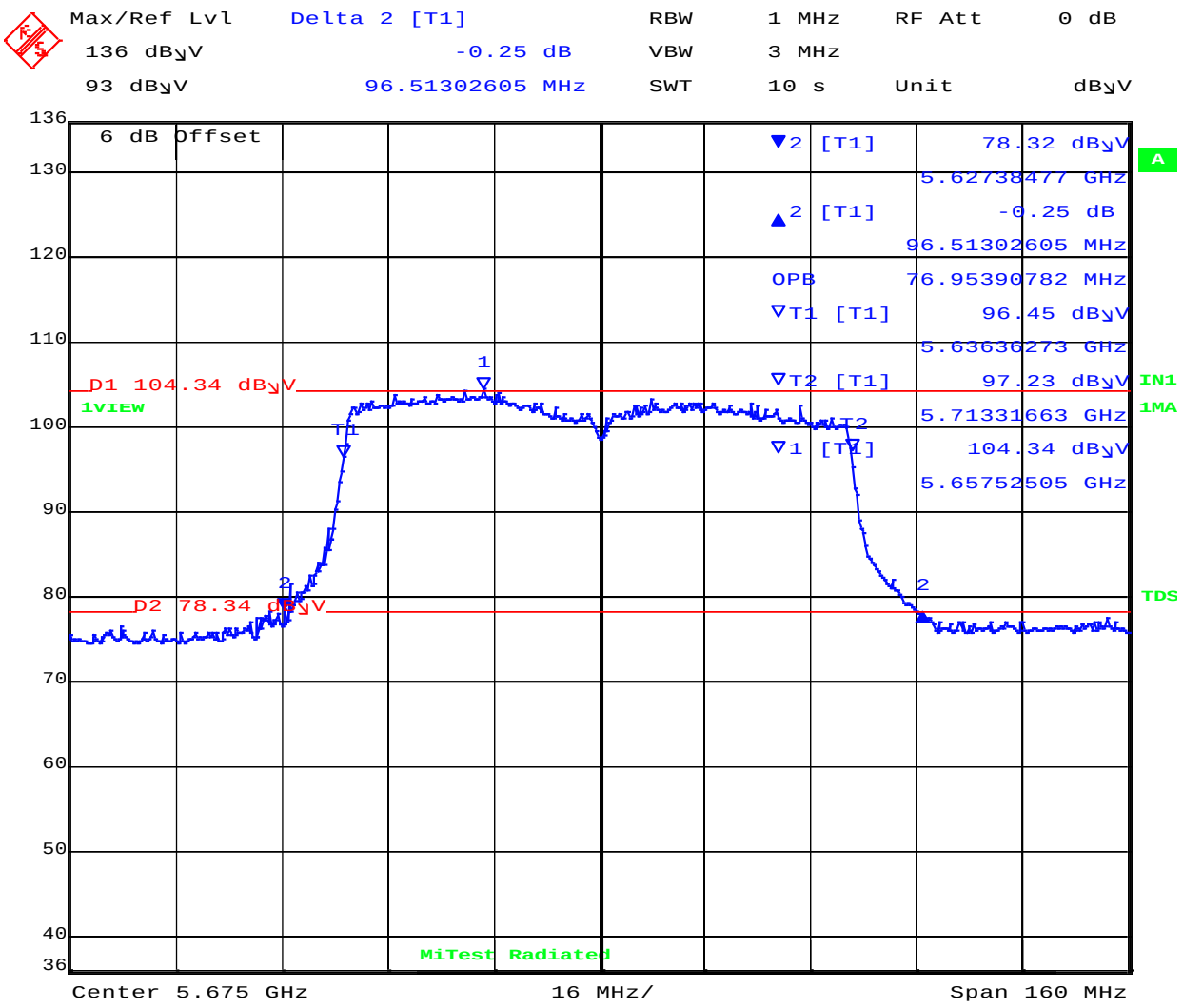


Date: 15.MAY.2020 09:26:53

back to matrix

26 dB & 99% BANDWIDTH

Variant: 802.11 80MHz, Channel: 5675.00 MHz, Polarity V, Temp: 20



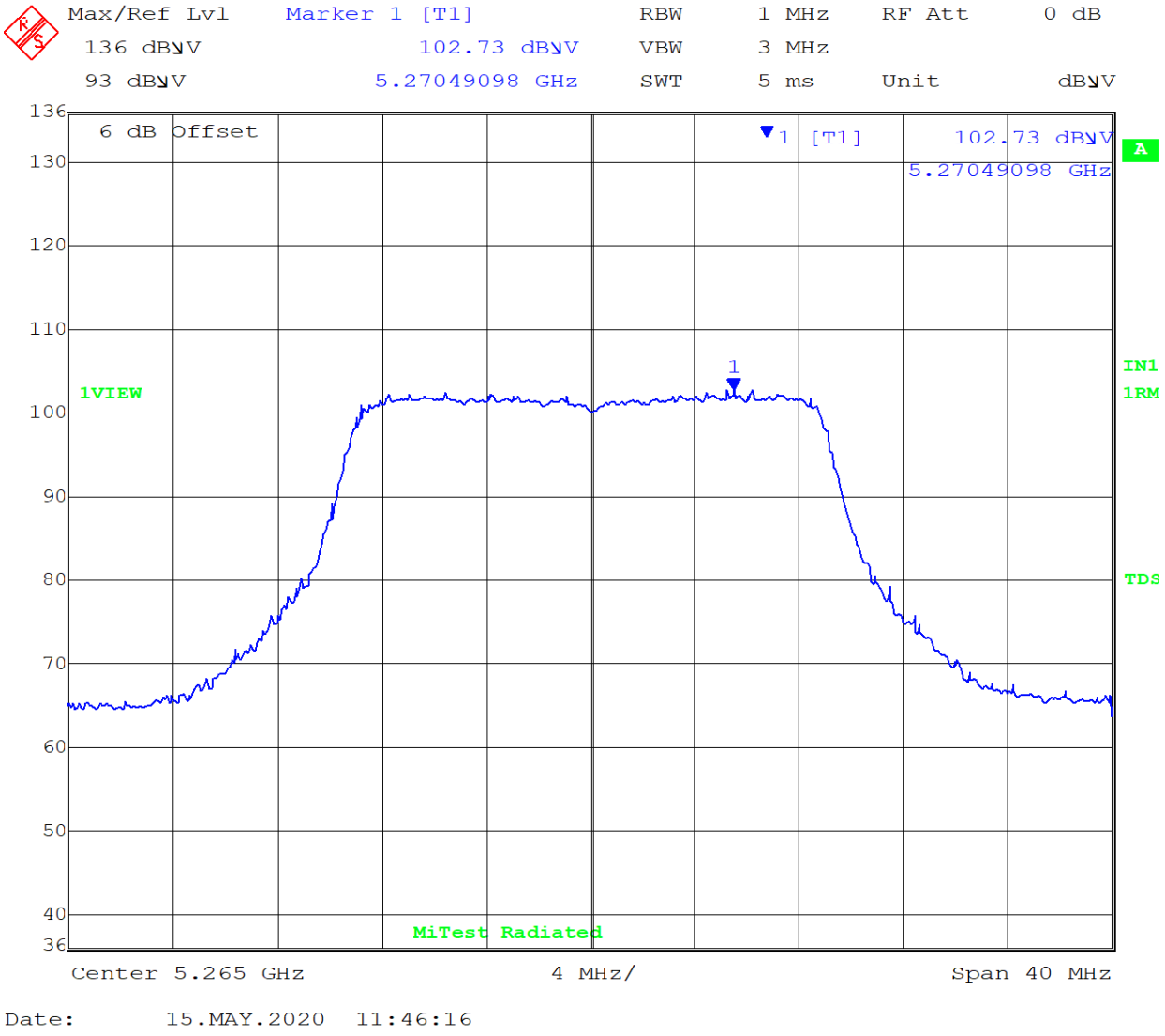
Date: 15.MAY.2020 09:23:19

back to matrix

A.2. Power Spectral Density

POWER SPECTRAL DENSITY

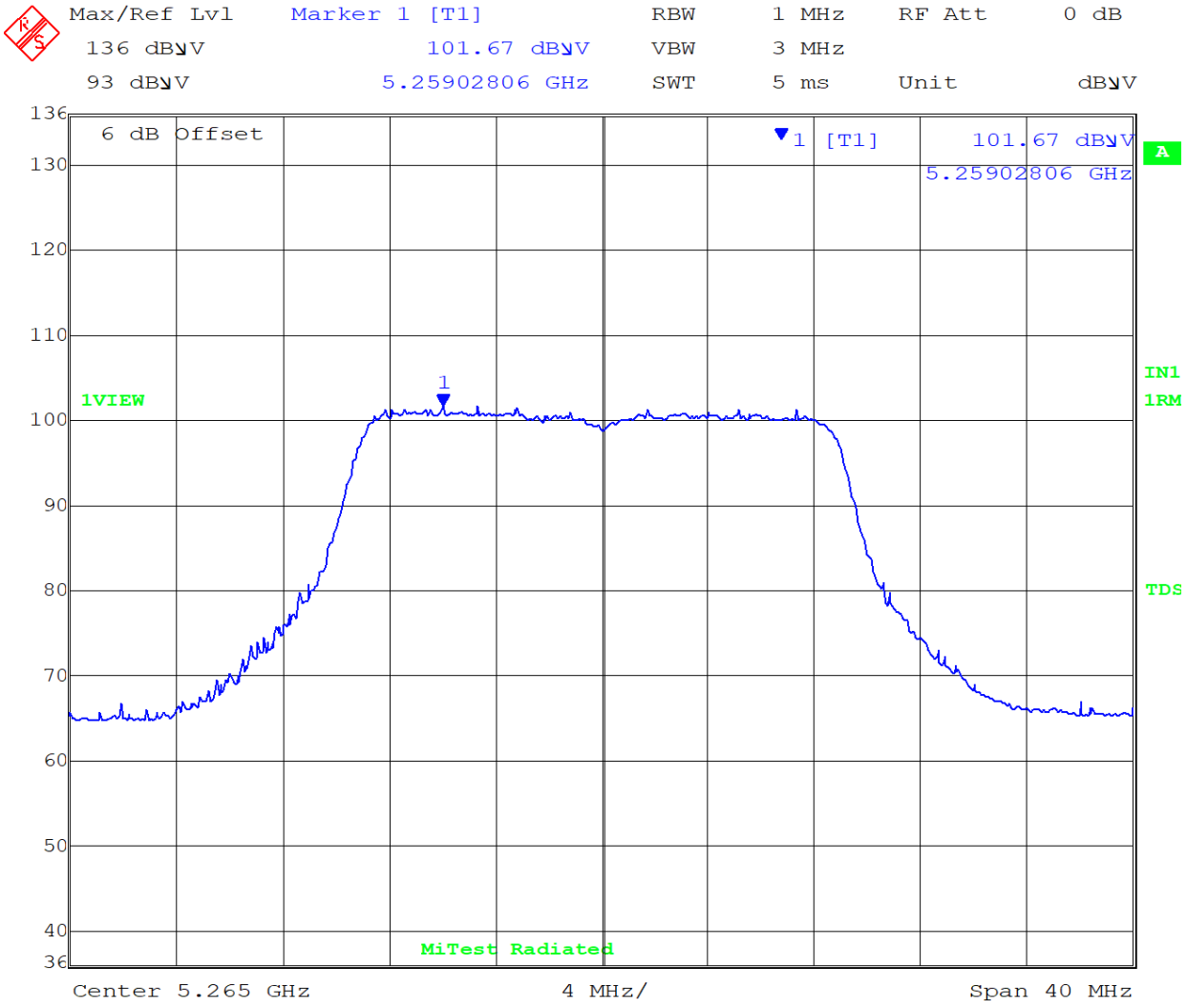
Variant: 20 MHz, Channel: 5265.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

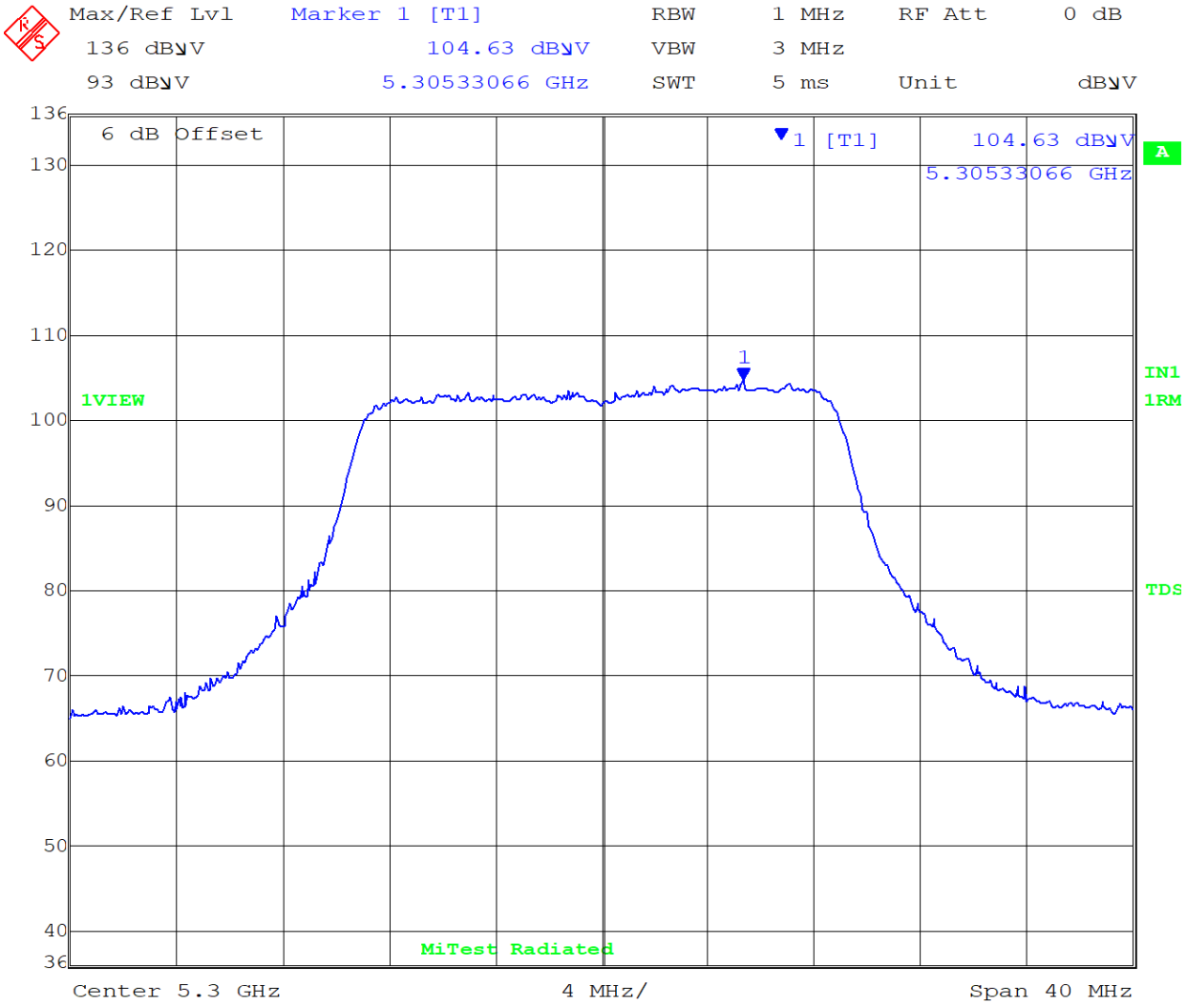
Variant: 20 MHz, Channel: 5265.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

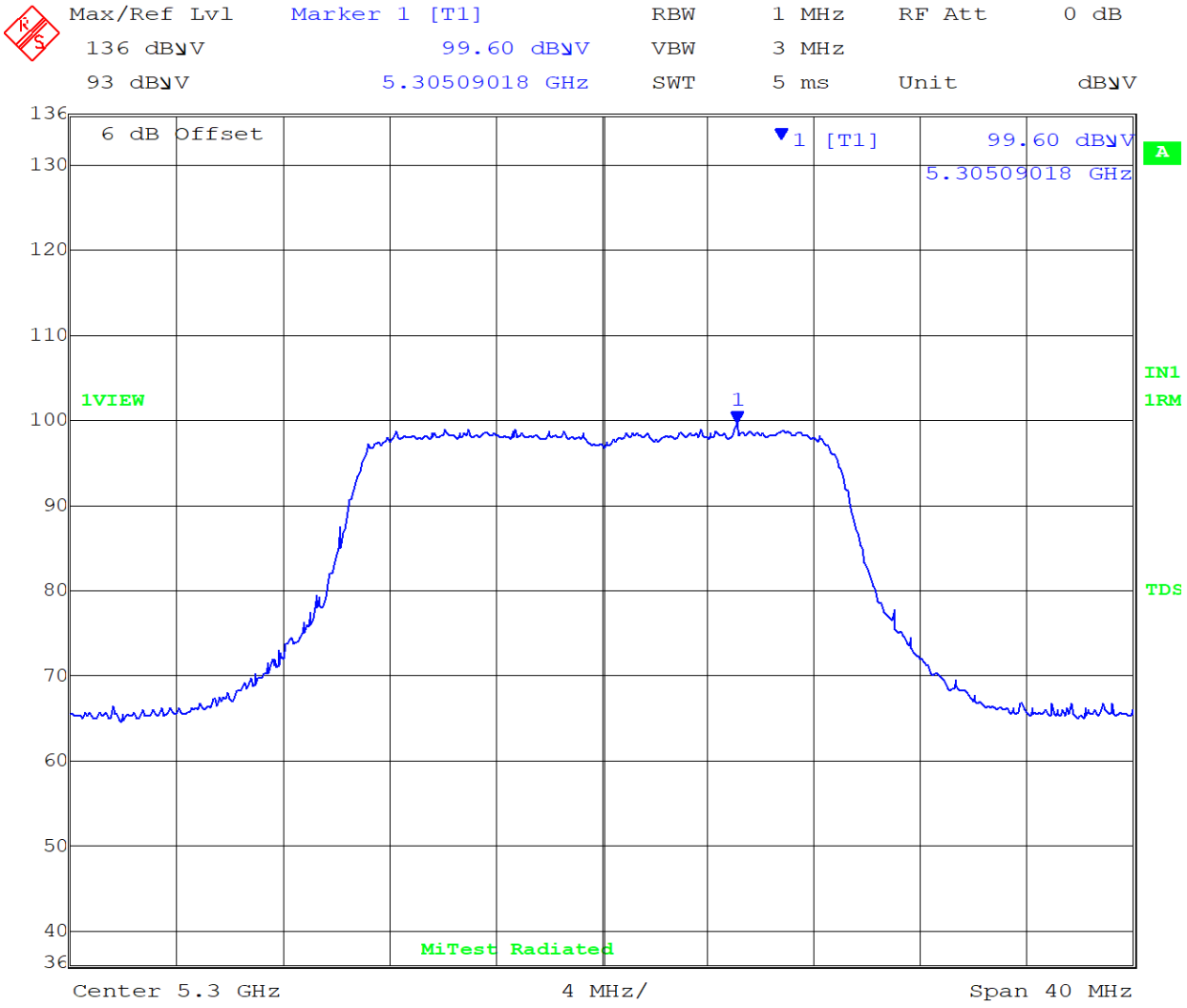
Variant: 20 MHz, Channel: 5300.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

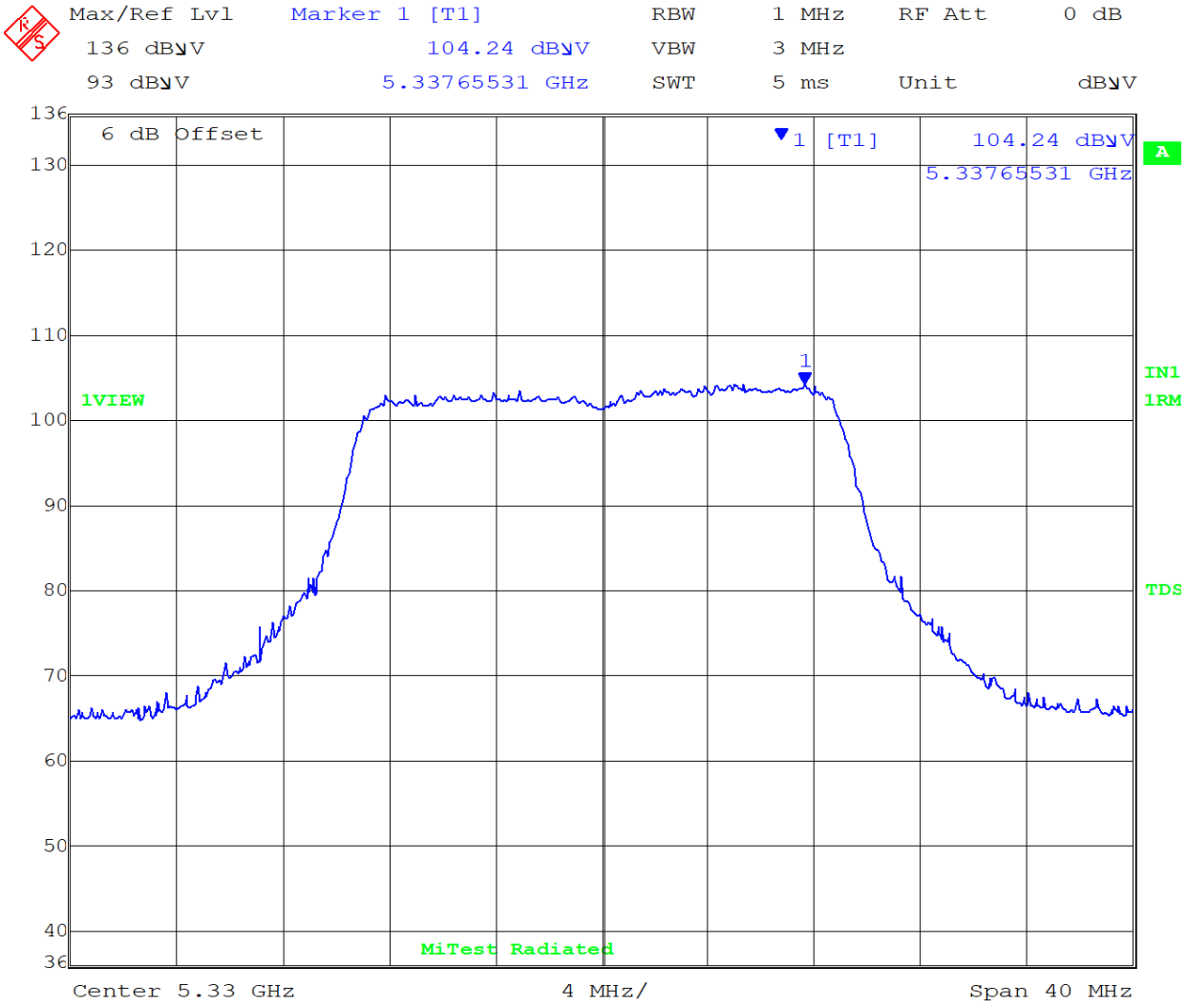
Variant: 20 MHz, Channel: 5300.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

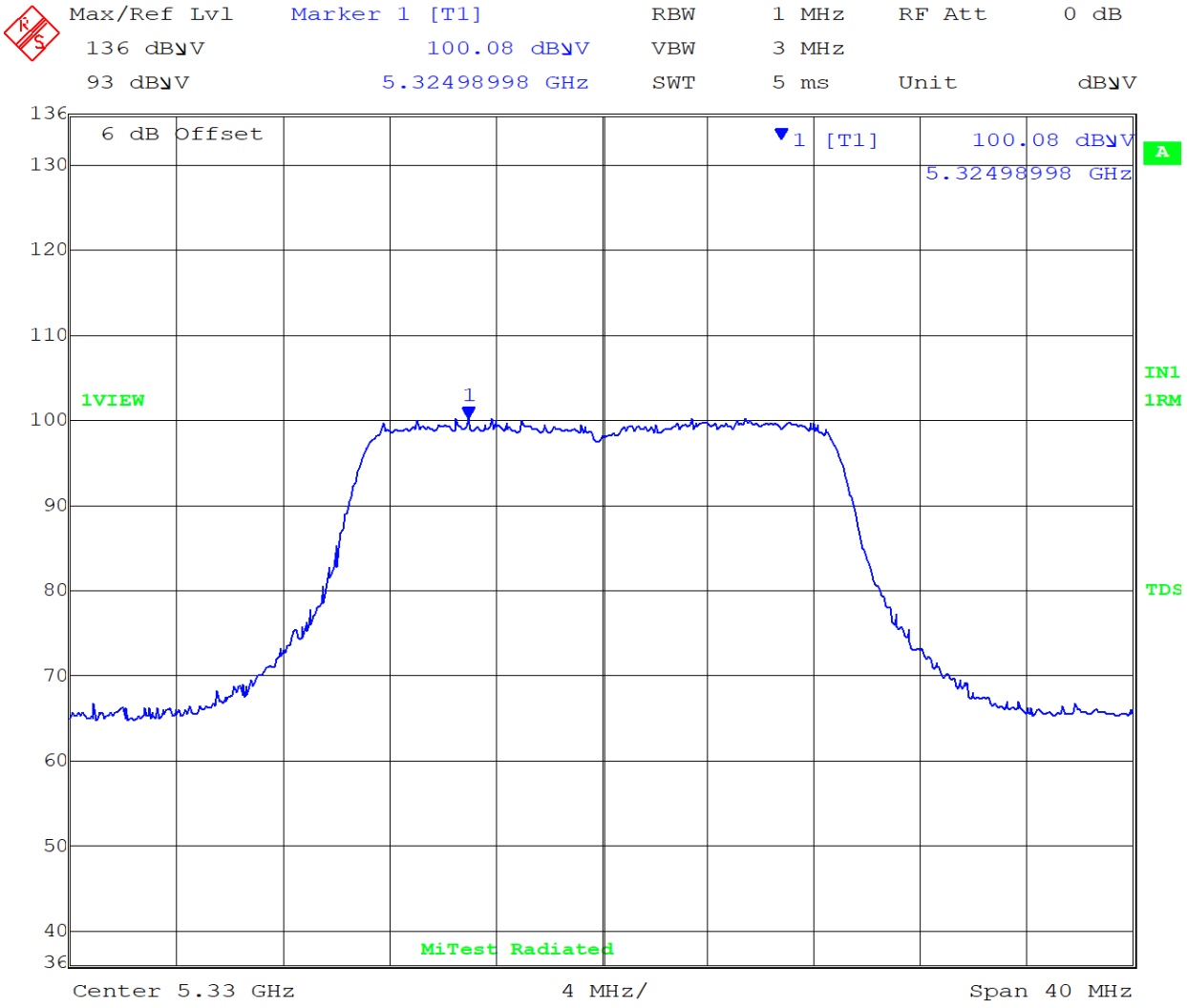
Variant: 20 MHz, Channel: 5330.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

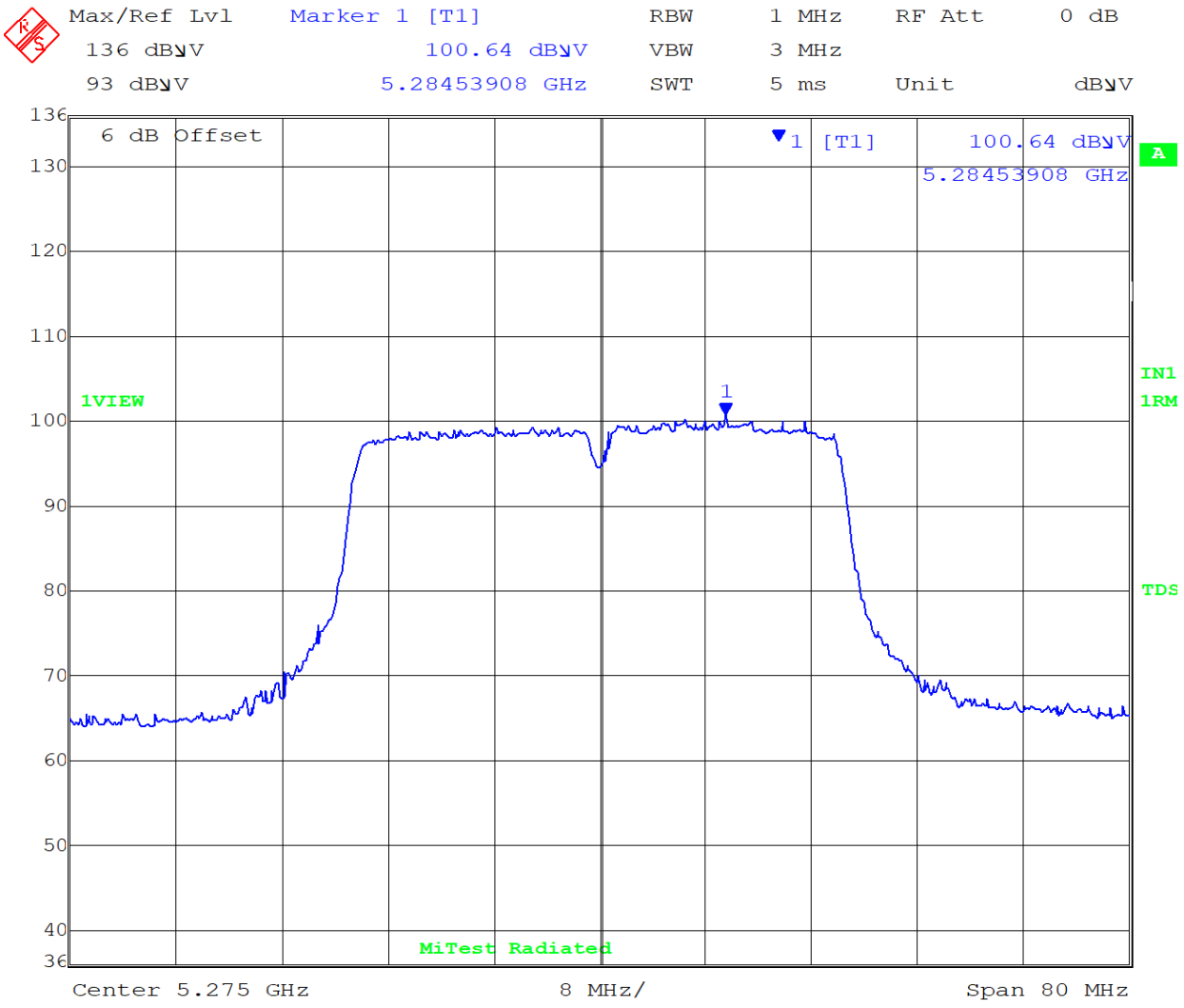
Variant: 20 MHz, Channel: 5330.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

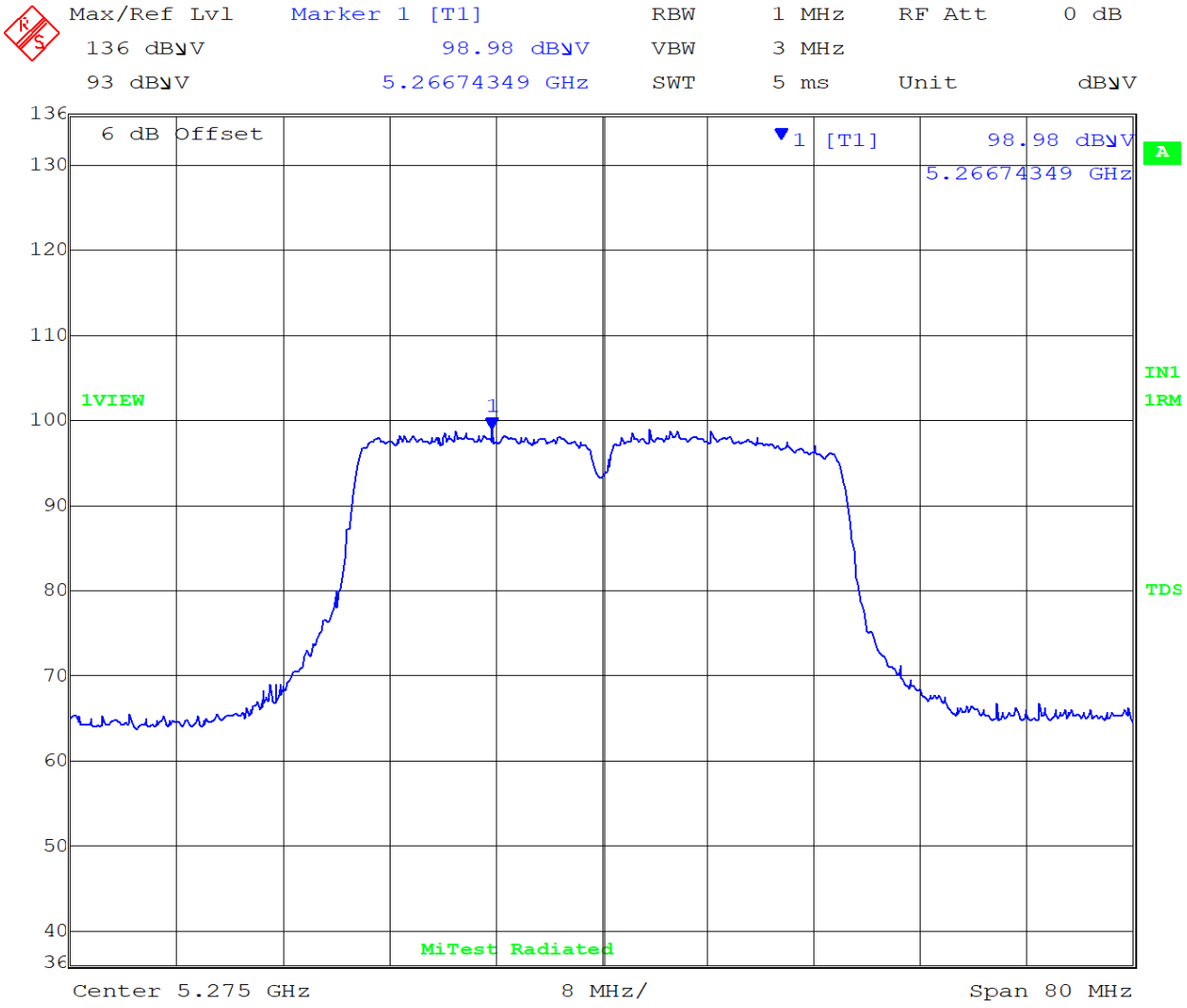
Variant: 40 MHz, Channel: 5275.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

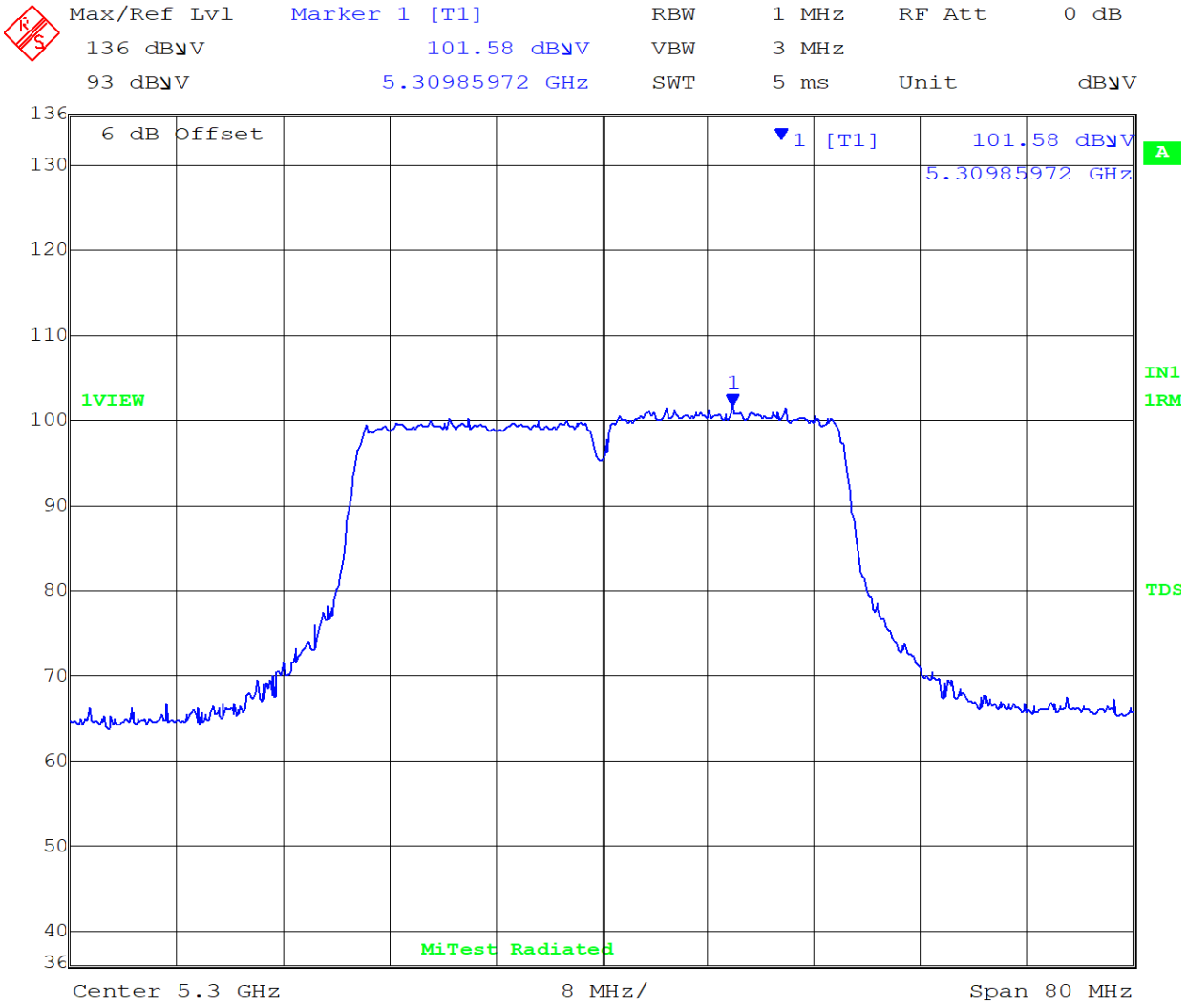
Variant: 40 MHz, Channel: 5275.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

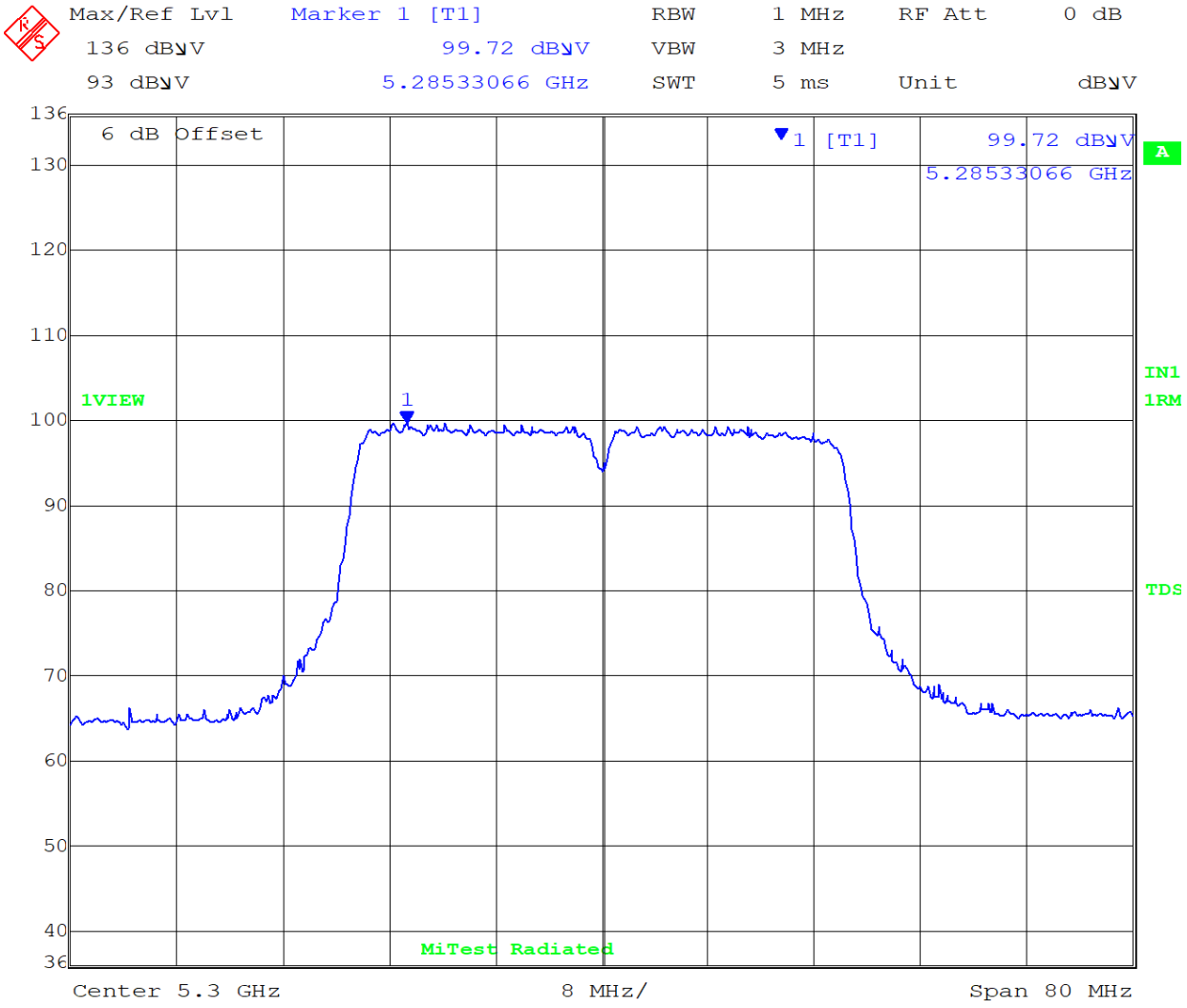
Variant: 40 MHz, Channel: 5300.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 40 MHz, Channel: 5300.00 MHz, Polarity V

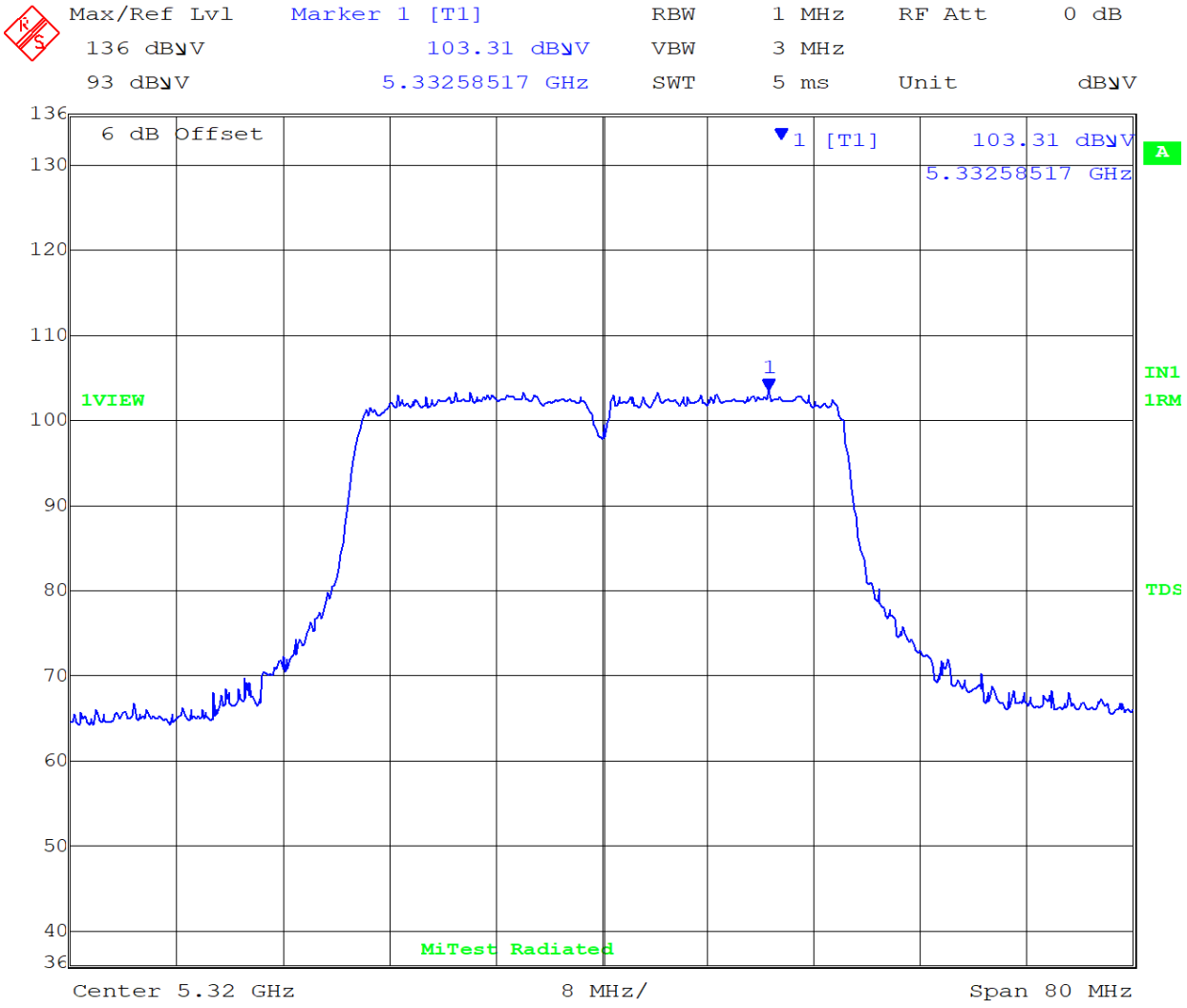


Date: 15.MAY.2020 14:54:49

back to matrix

POWER SPECTRAL DENSITY

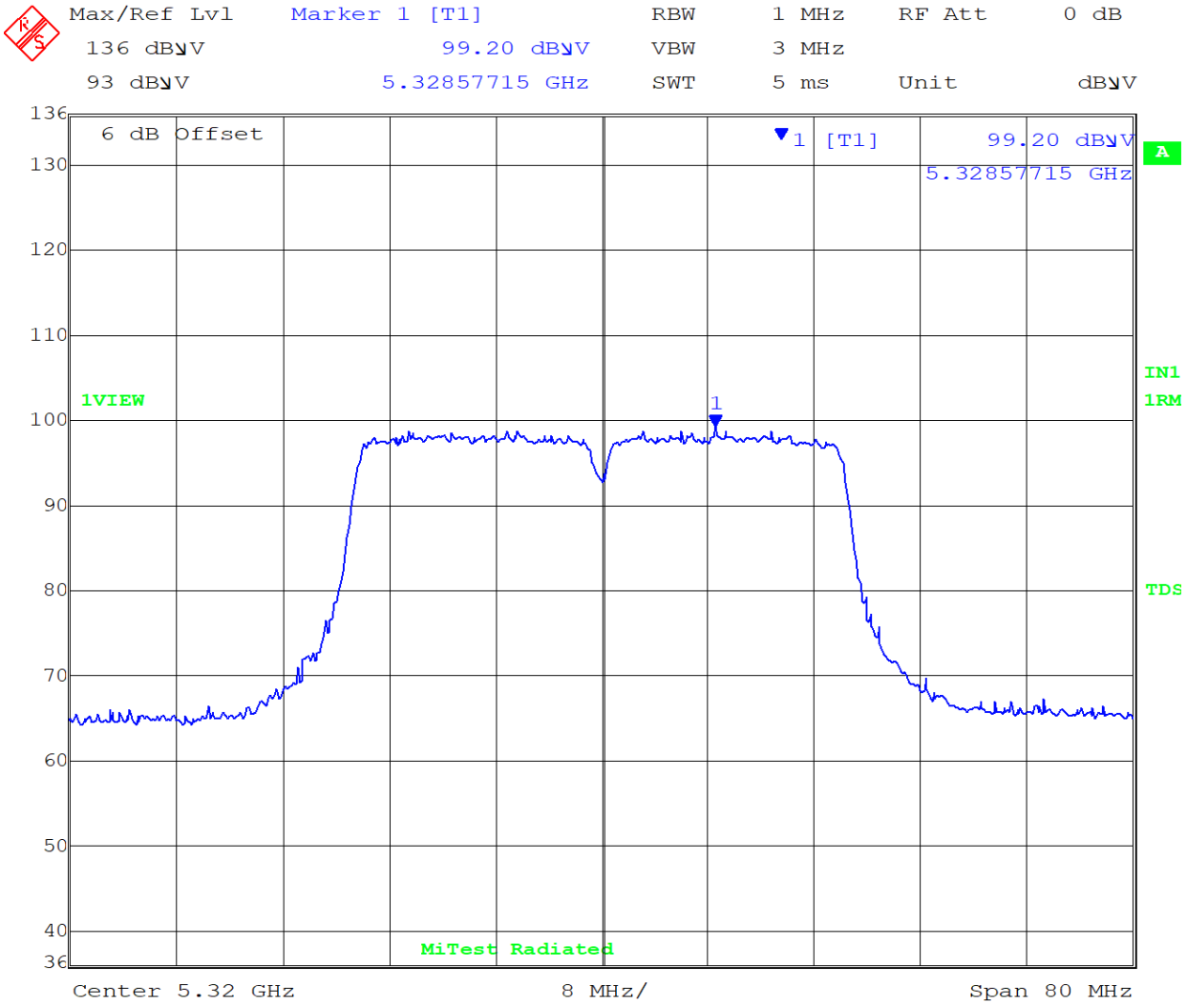
Variant: 40 MHz, Channel: 5320.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

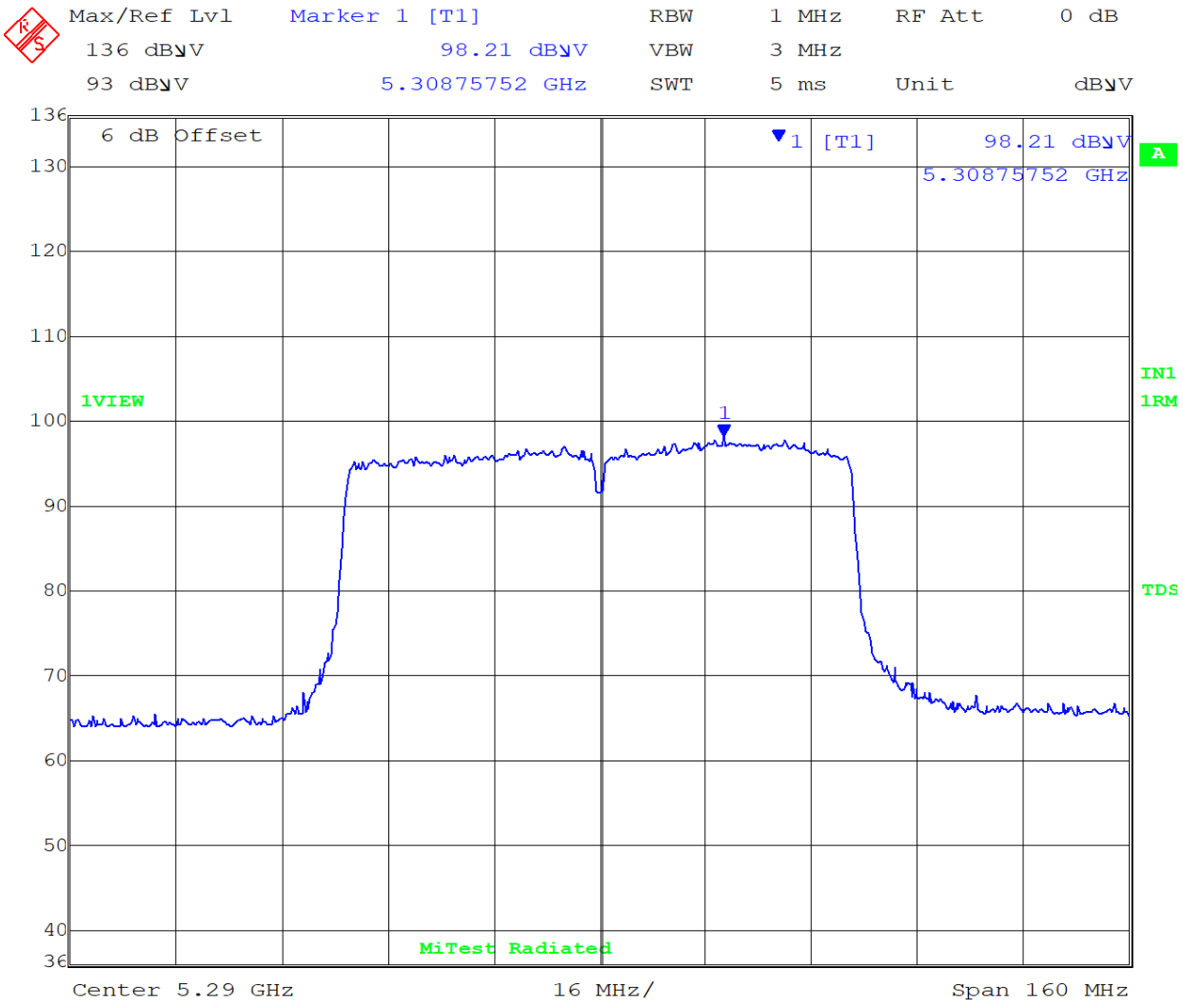
Variant: 40 MHz, Channel: 5320.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

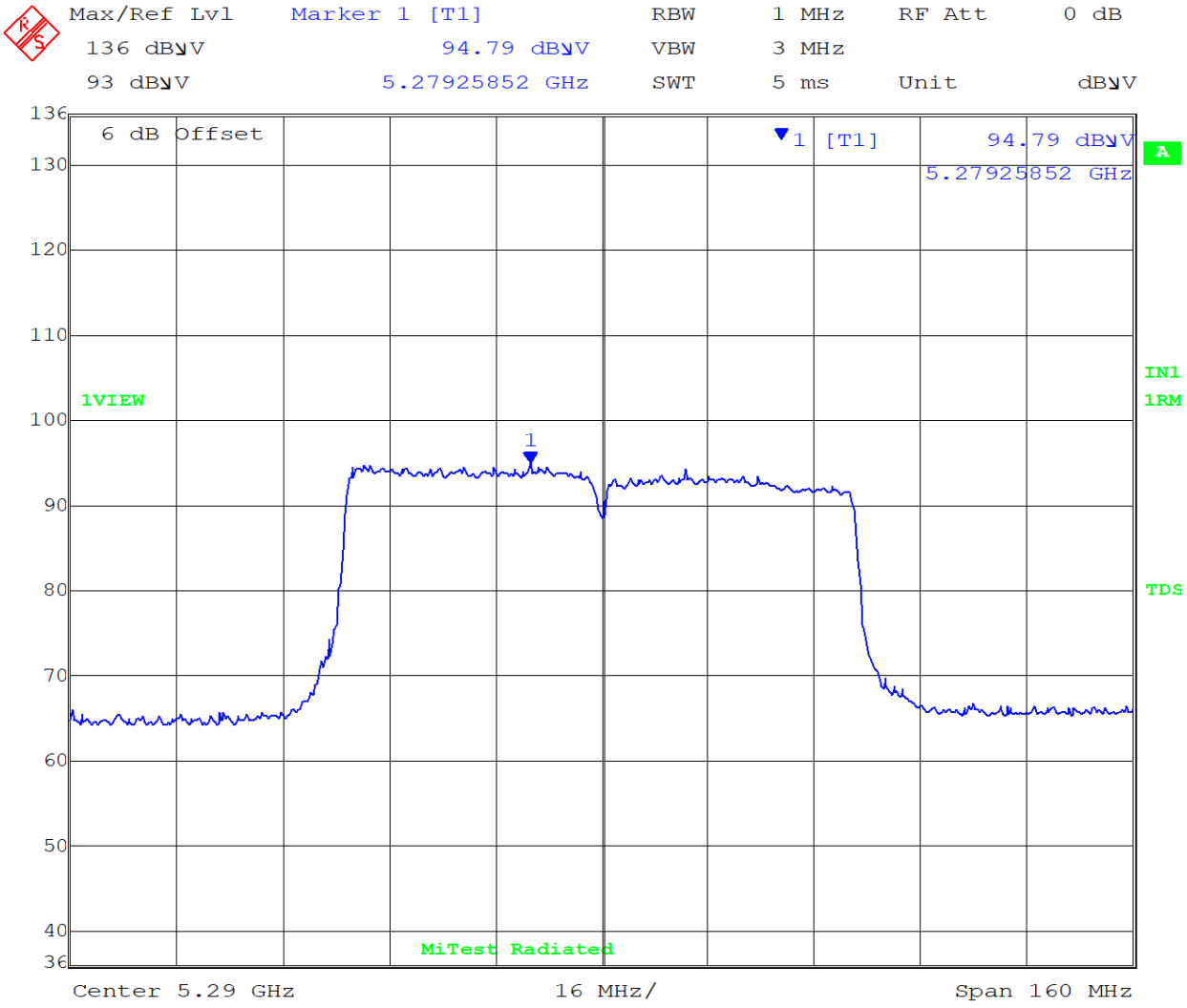
Variant: 80 MHz, Channel: 5290.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

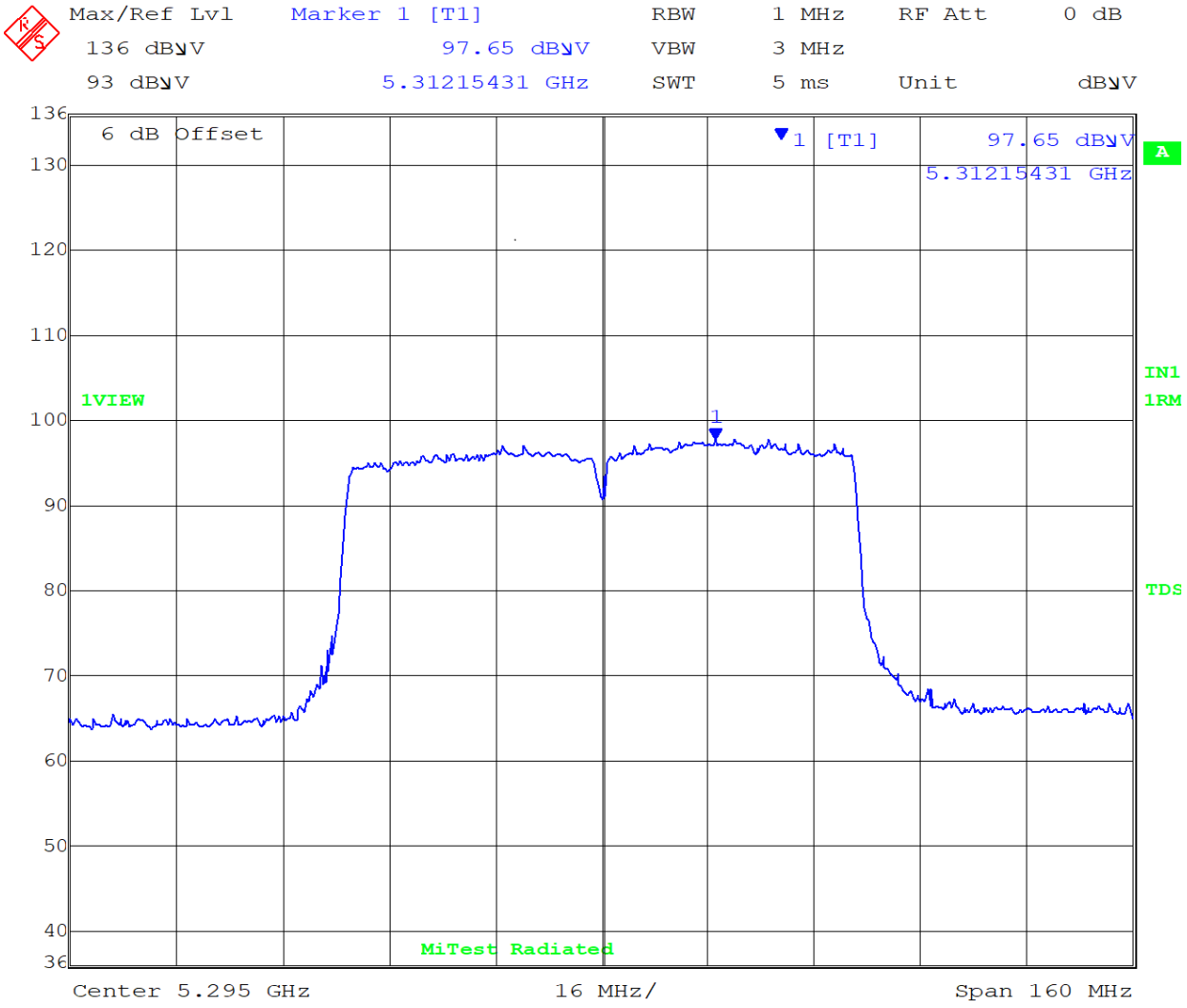
Variant: 80 MHz, Channel: 5290.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

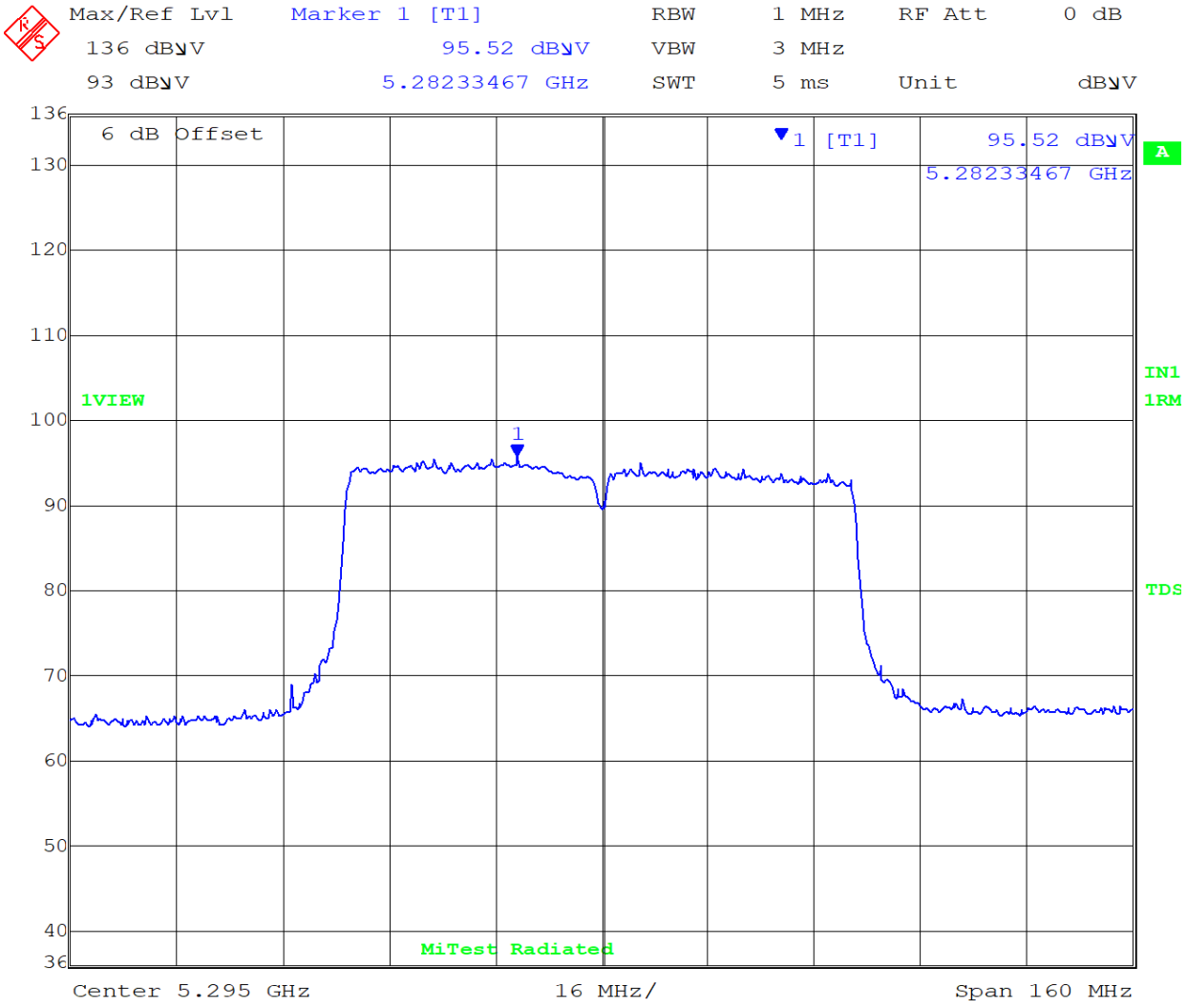
Variant: 80 MHz, Channel: 5295.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

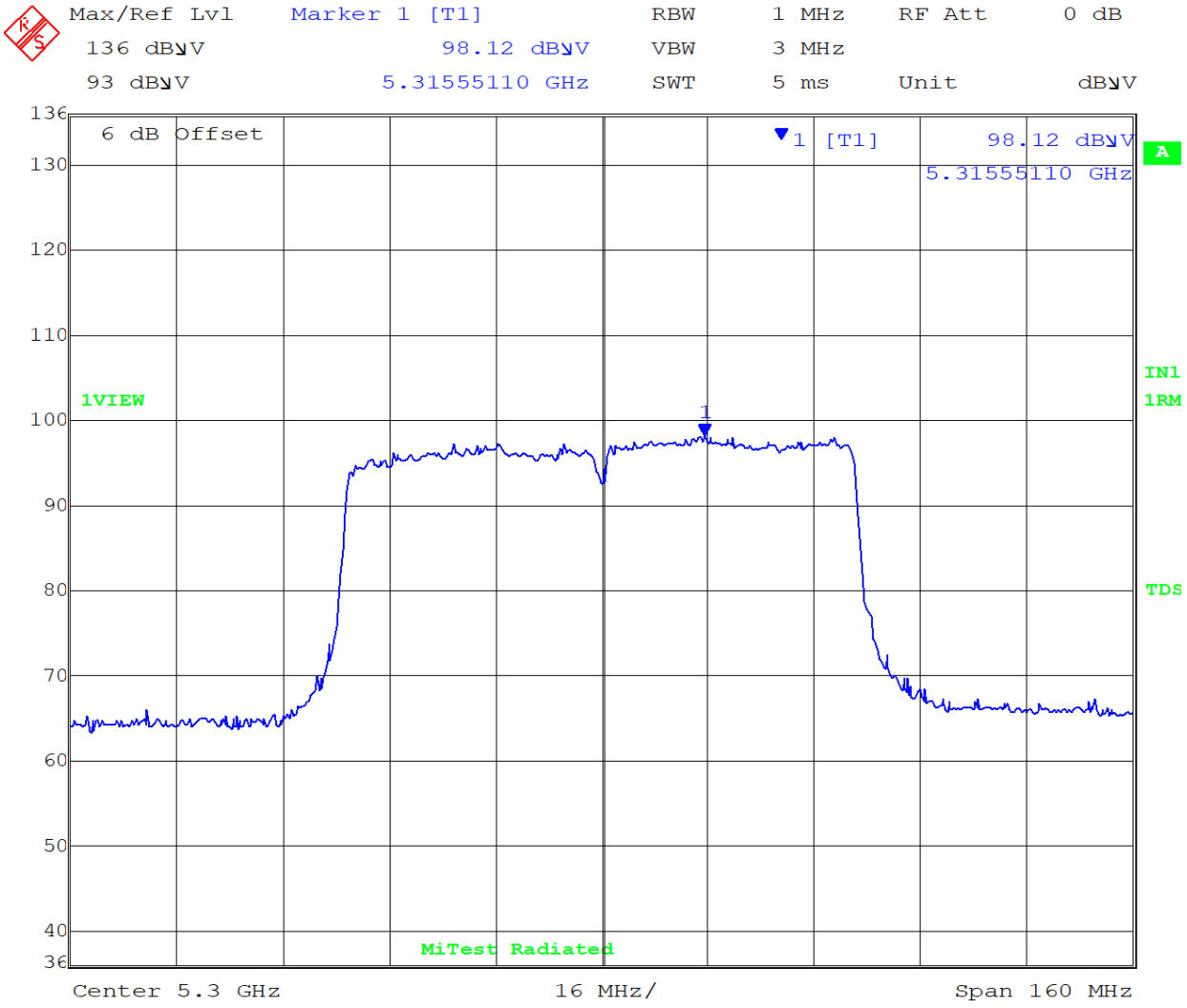
Variant: 80 MHz, Channel: 5295.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

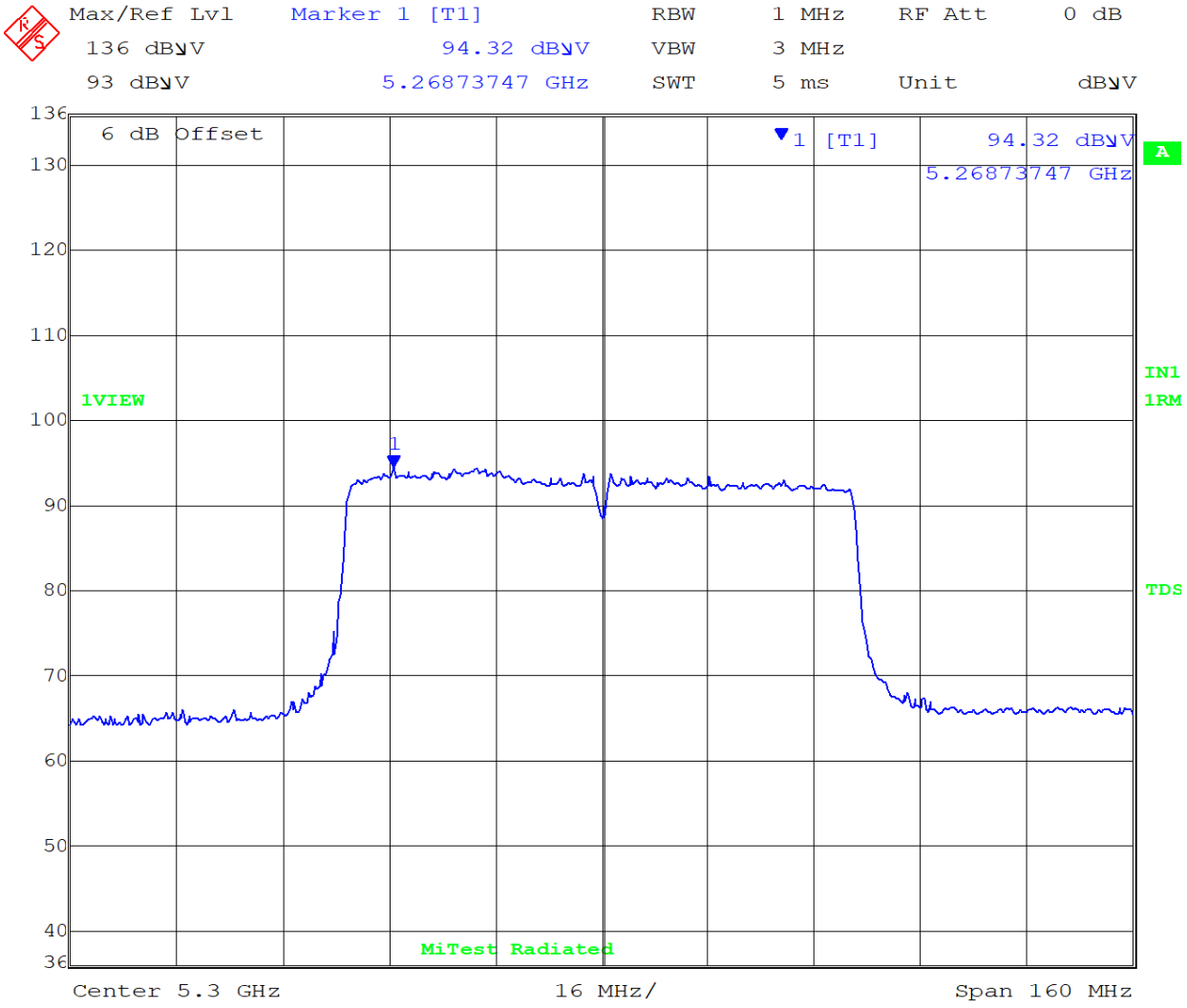
Variant: 80 MHz, Channel: 5300.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

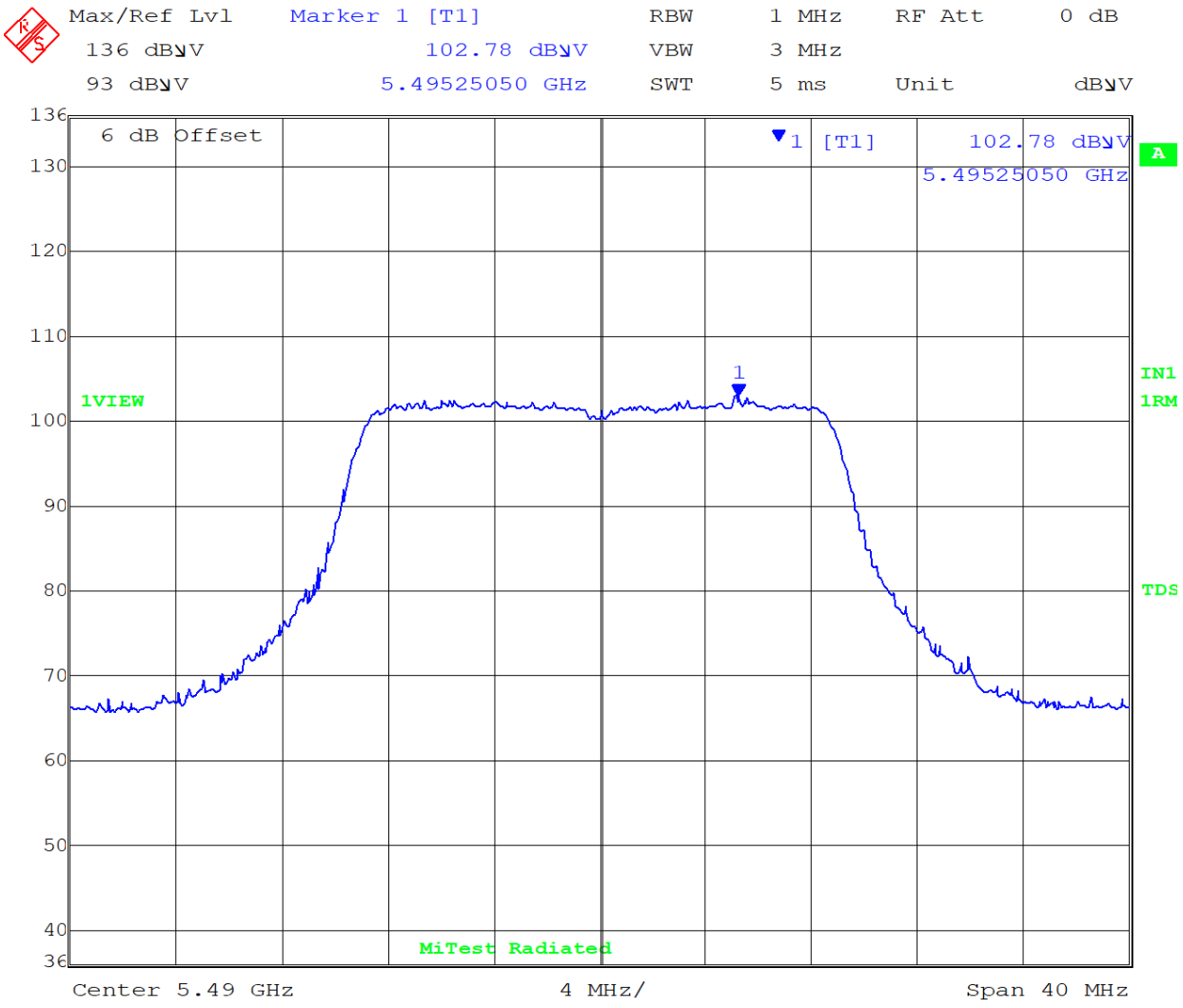
Variant: 80 MHz, Channel: 5300.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

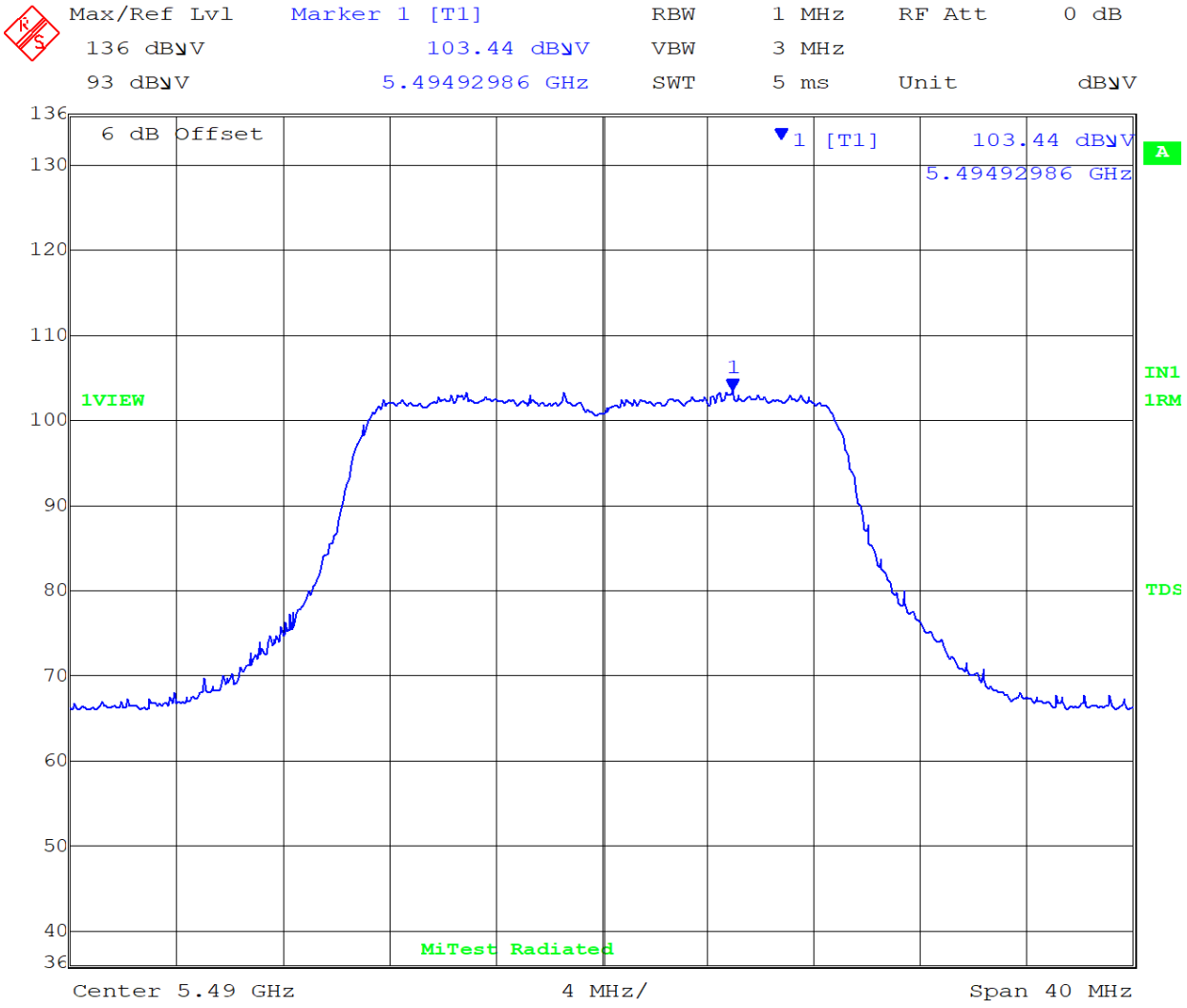
Variant: 20 MHz, Channel: 5490.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

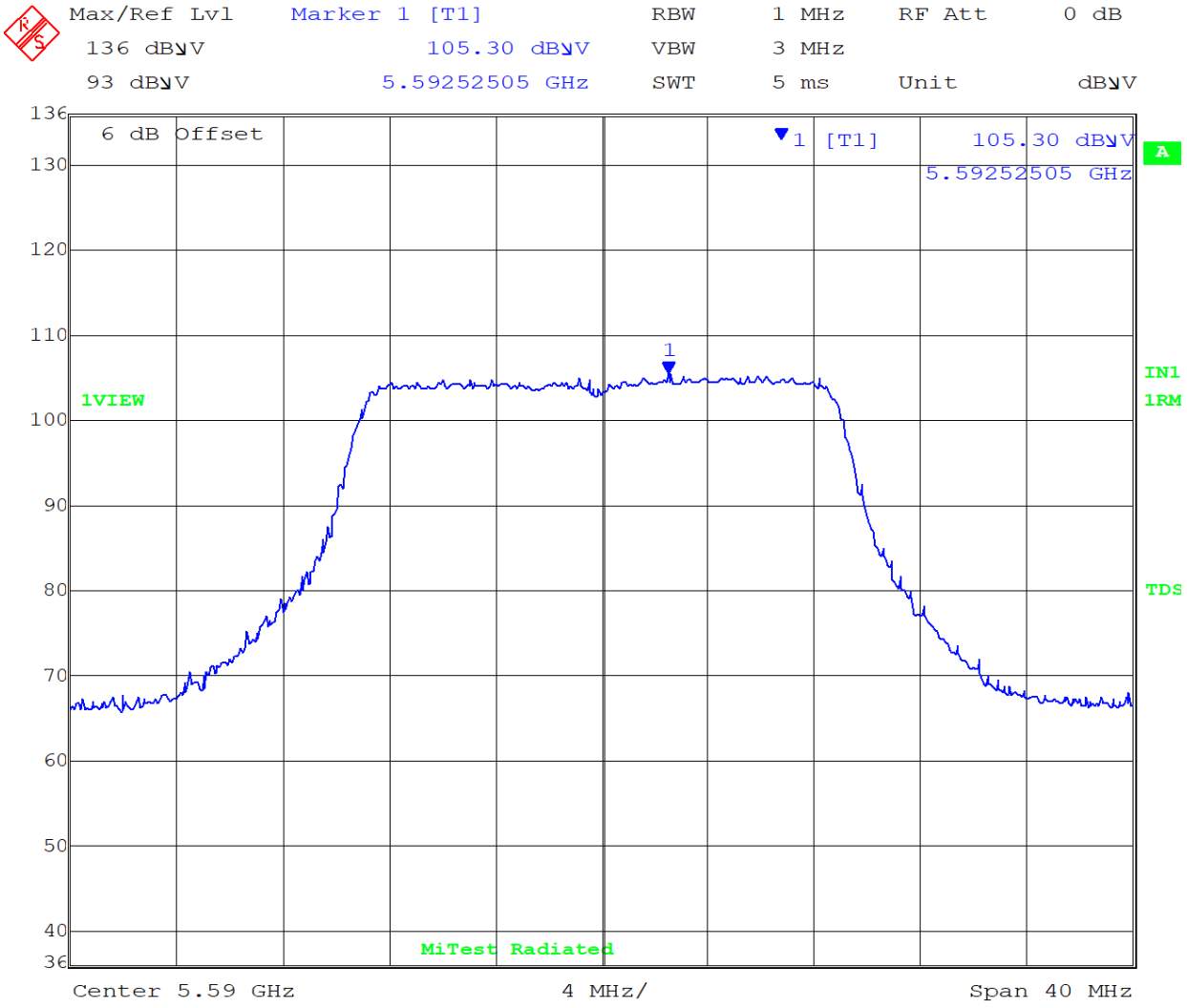
Variant: 20 MHz, Channel: 5490.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

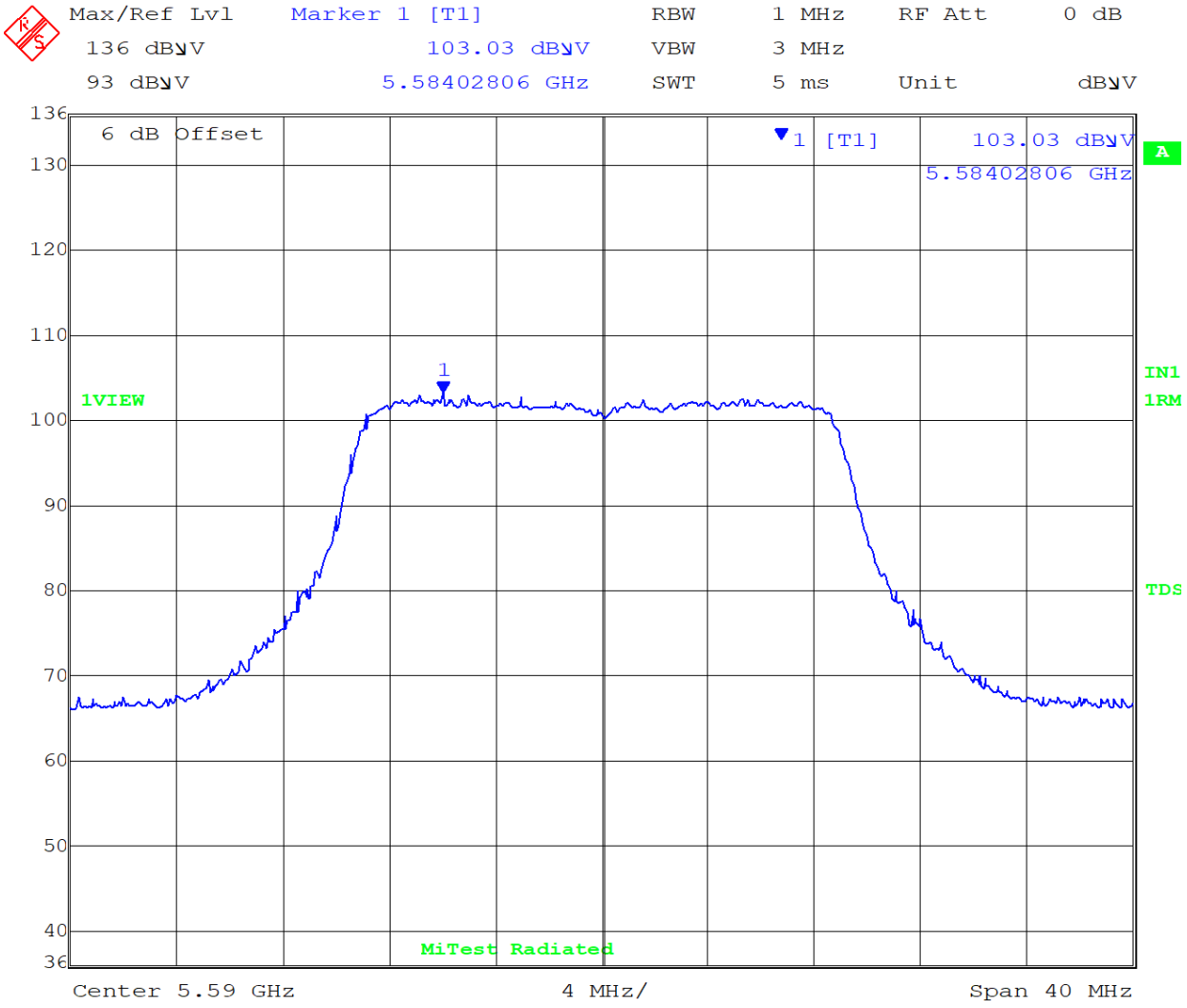
Variant: 20 MHz, Channel: 5590.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 20 MHz, Channel: 5590.00 MHz, Polarity V



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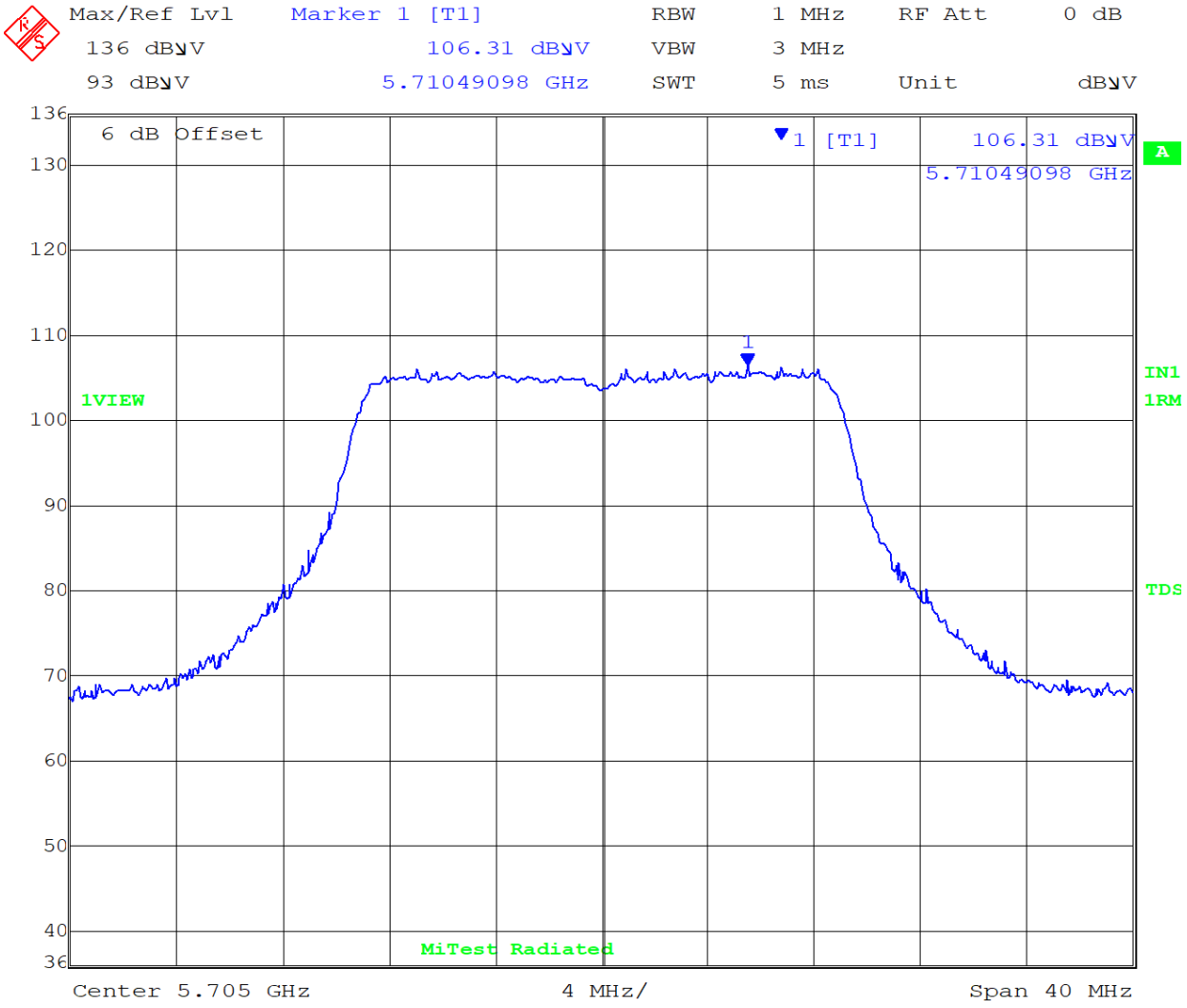
POWER SPECTRAL DENSITY

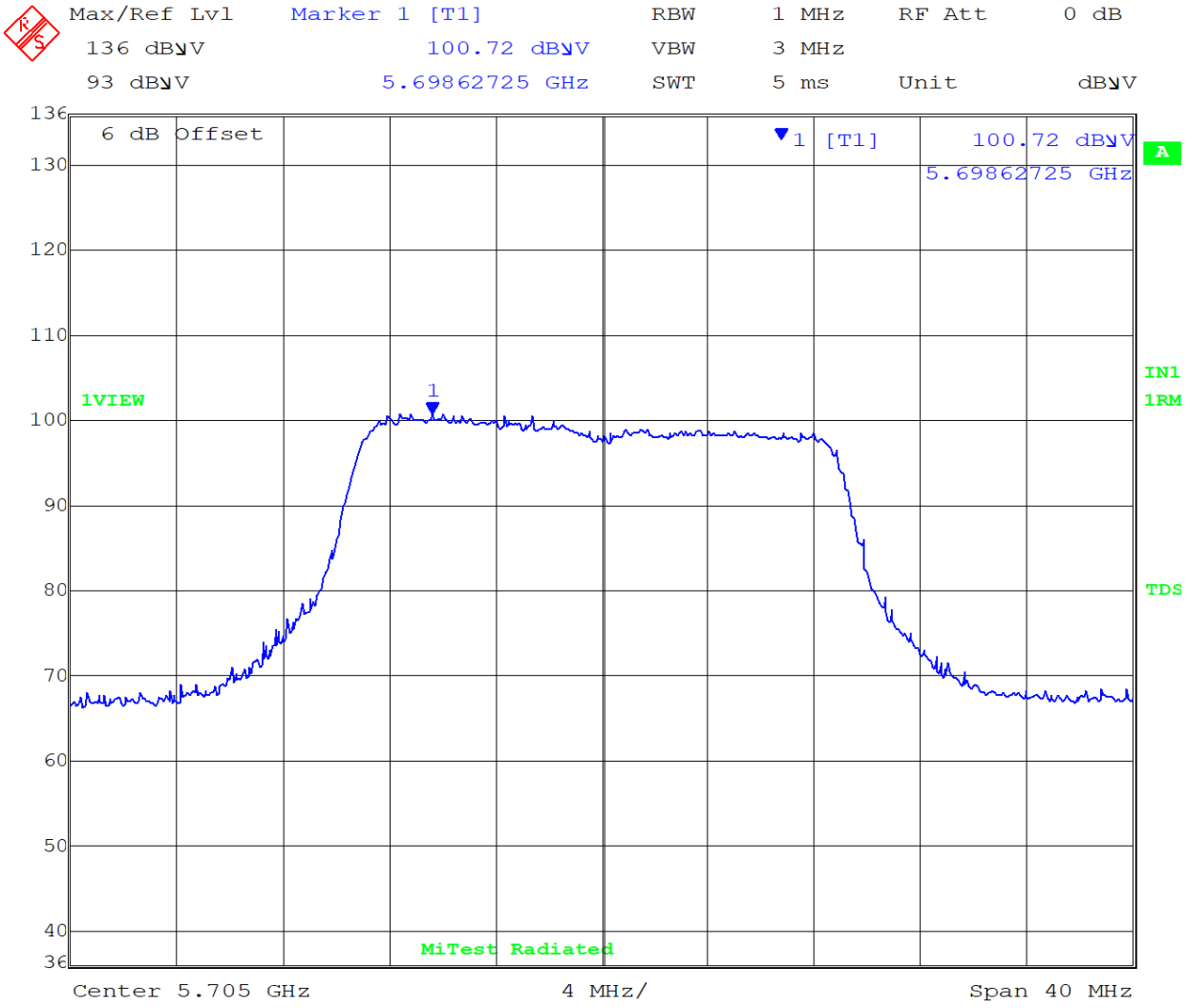
Variant: 20 MHz, Channel: 5705.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

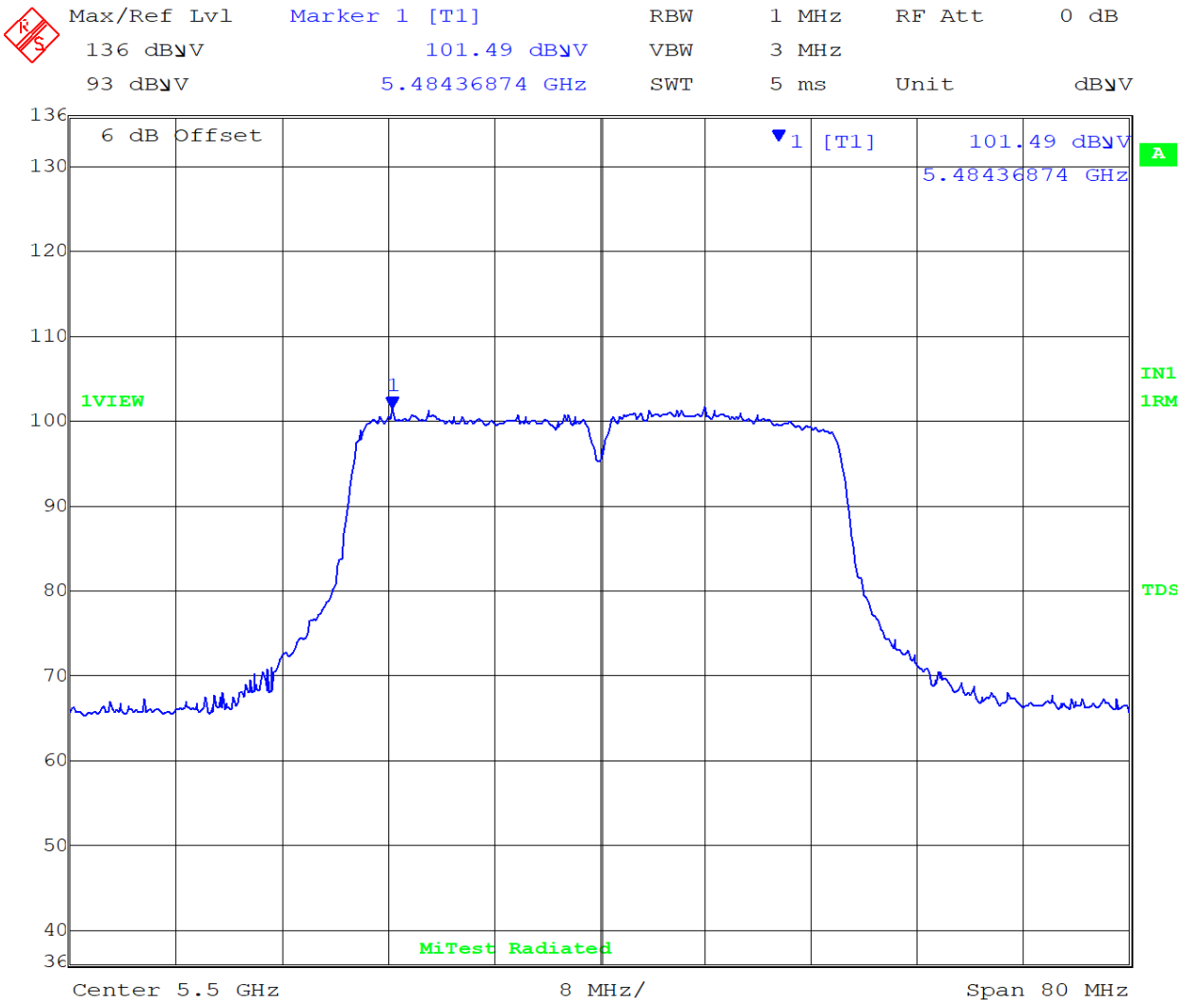
Variant: 20 MHz, Channel: 5705.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

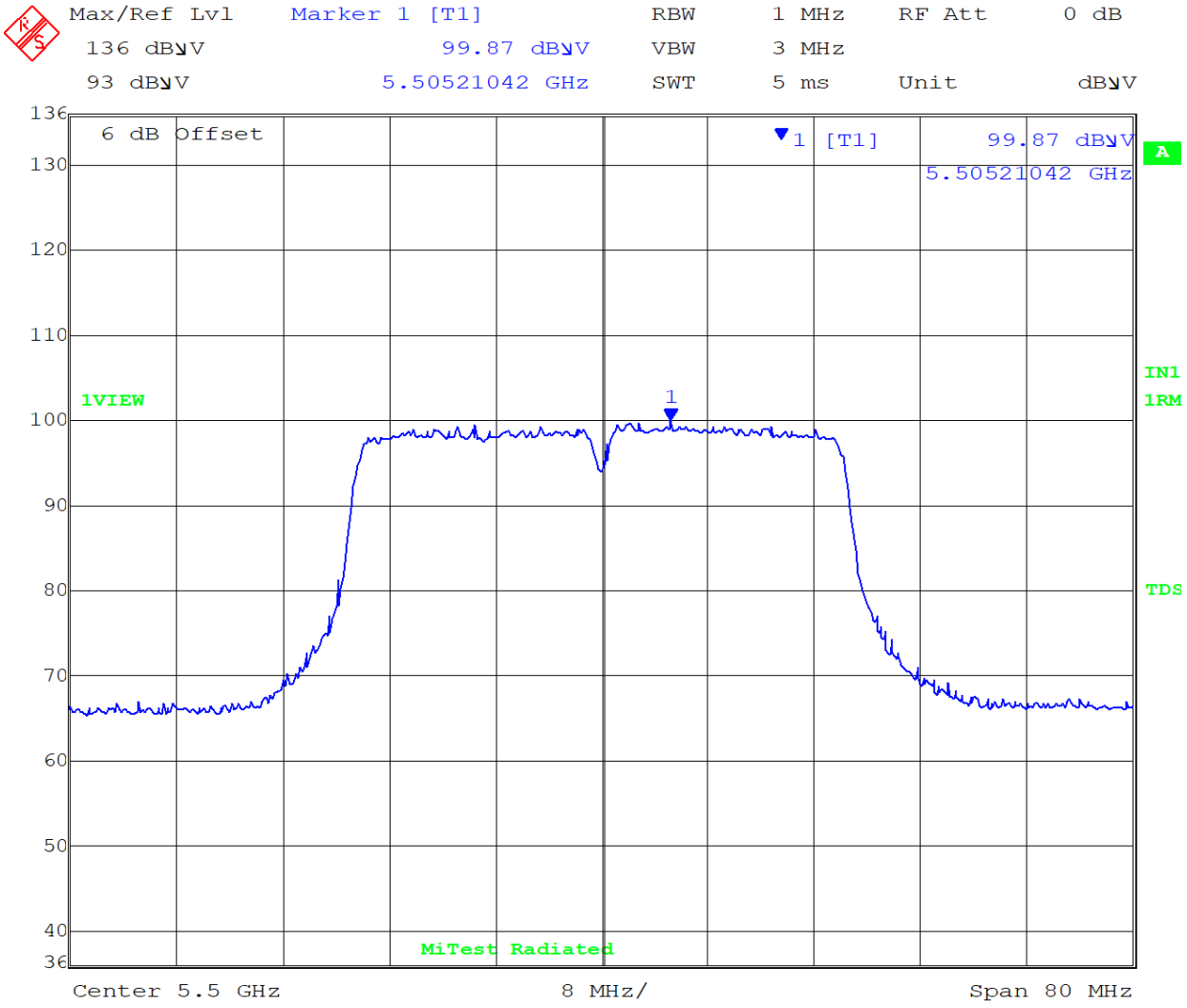
Variant: 40 MHz, Channel: 5500.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

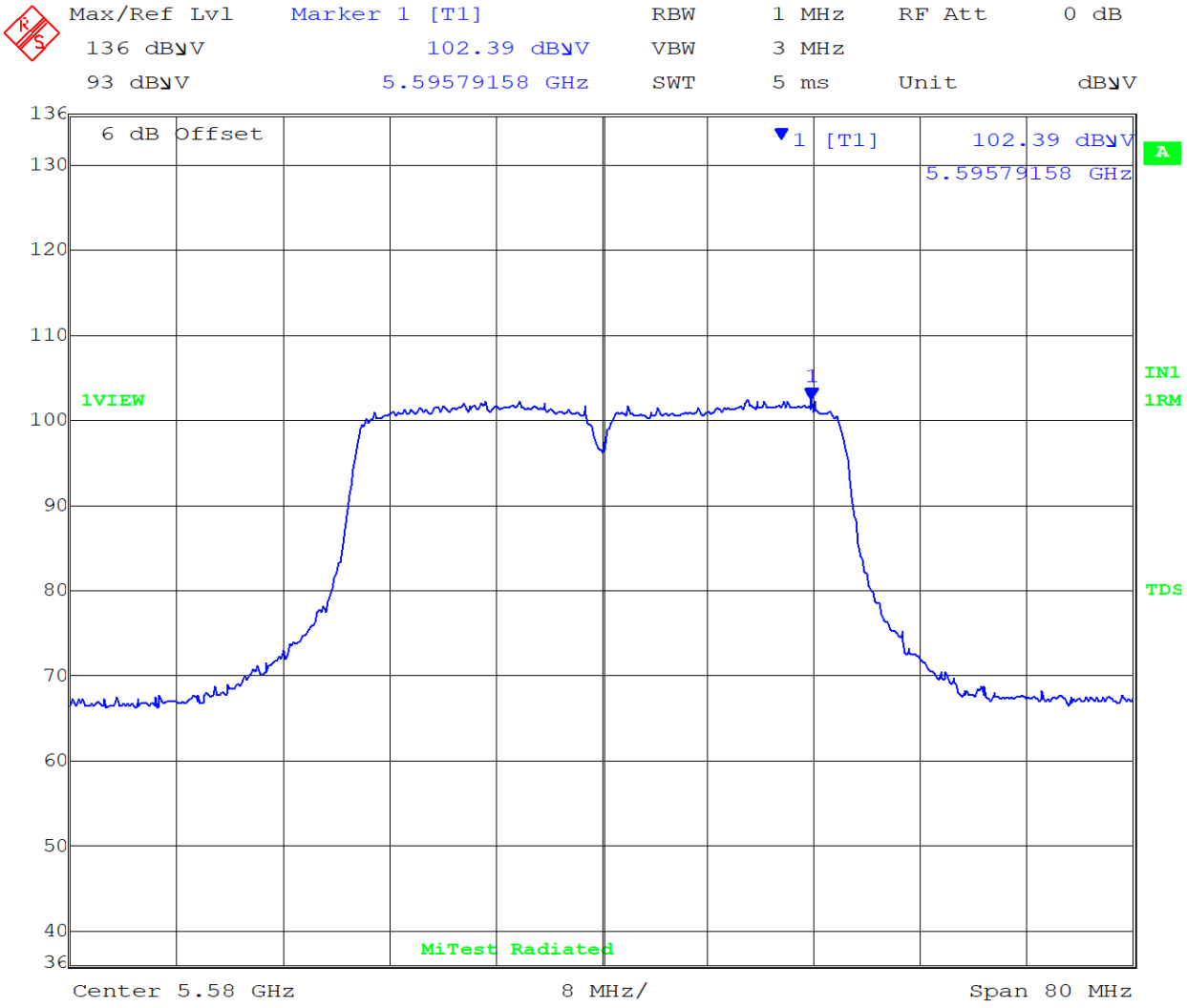
Variant: 40 MHz, Channel: 5500.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

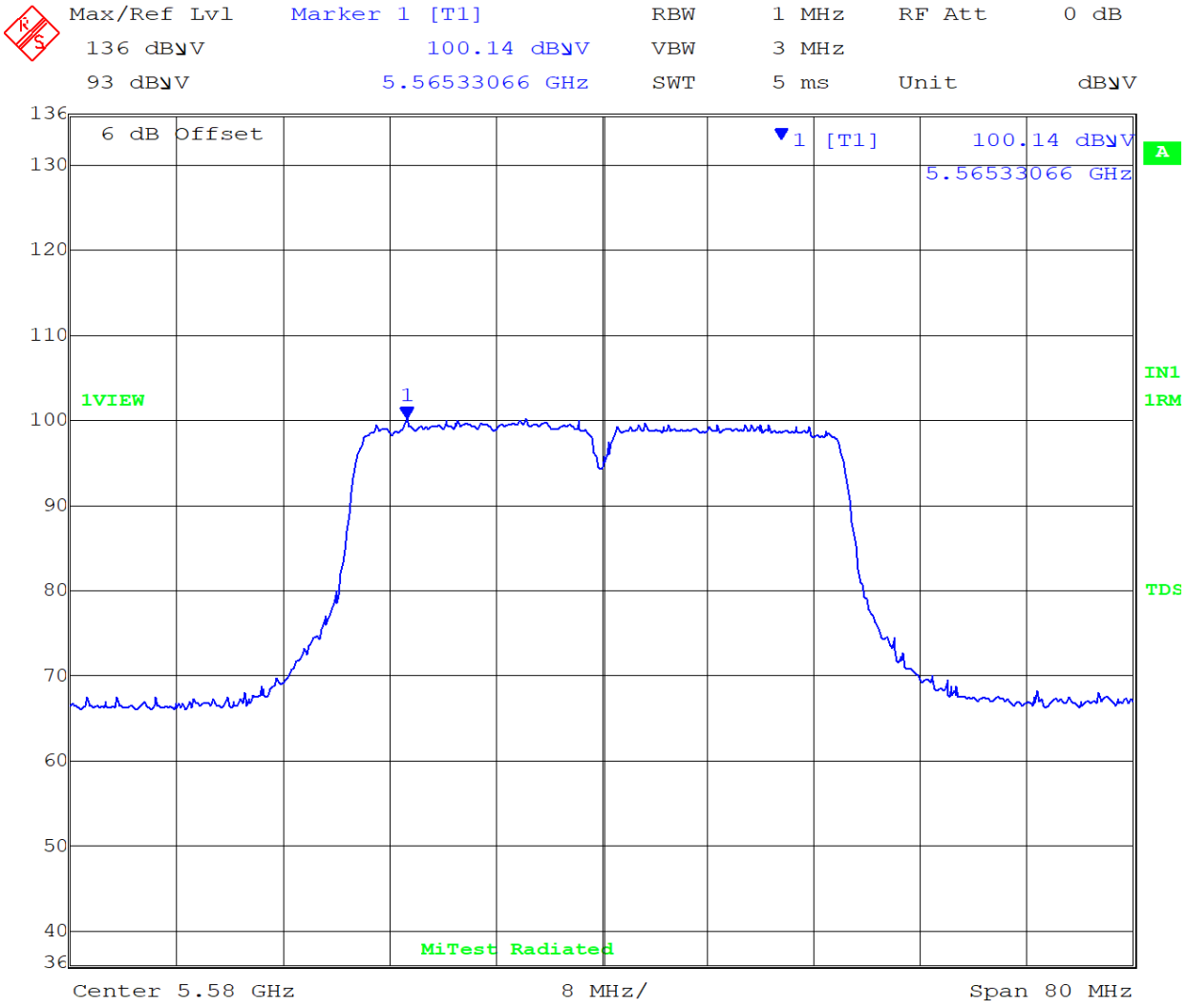
Variant: 40 MHz, Channel: 5580.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

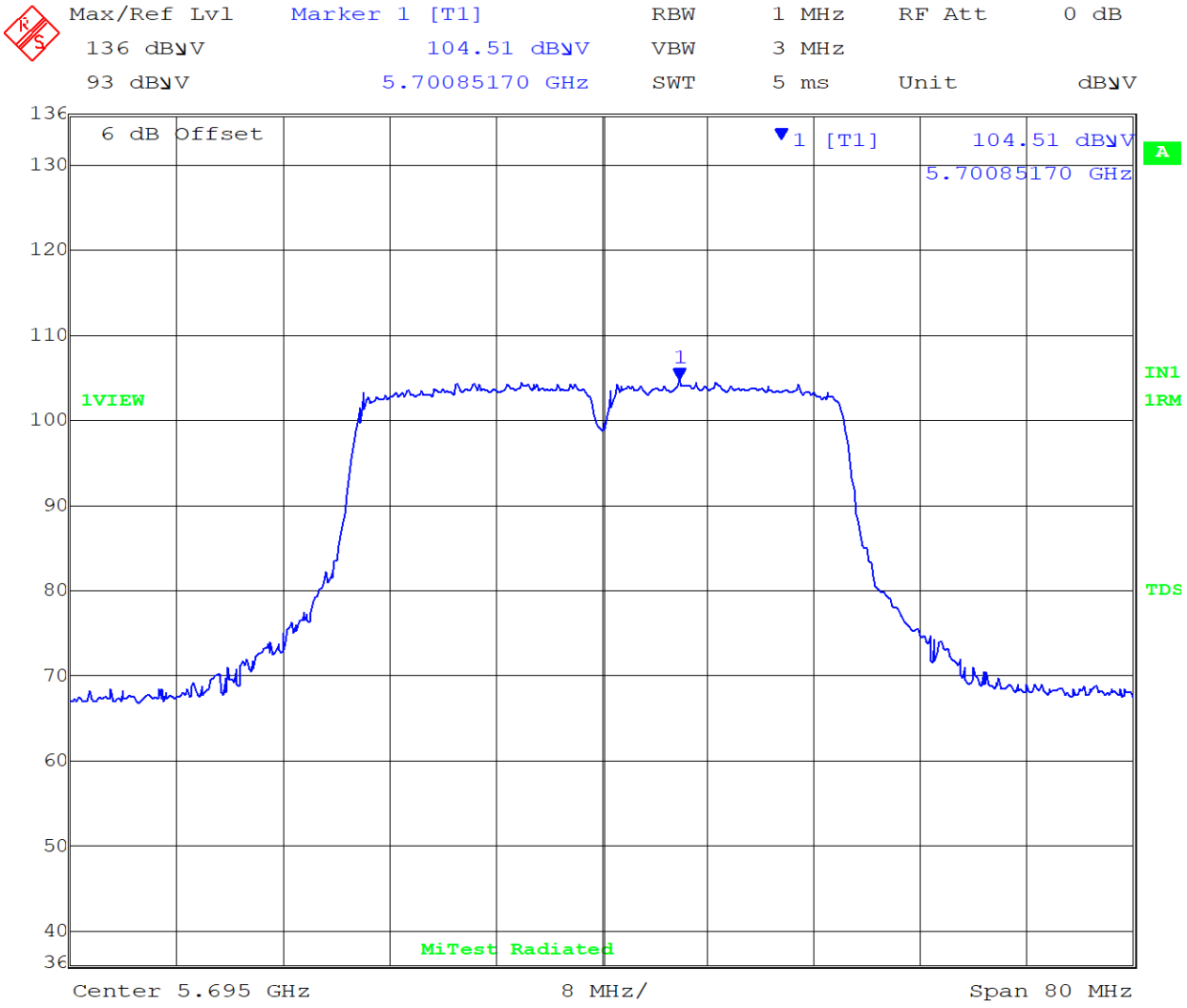
Variant: 40 MHz, Channel: 5580.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

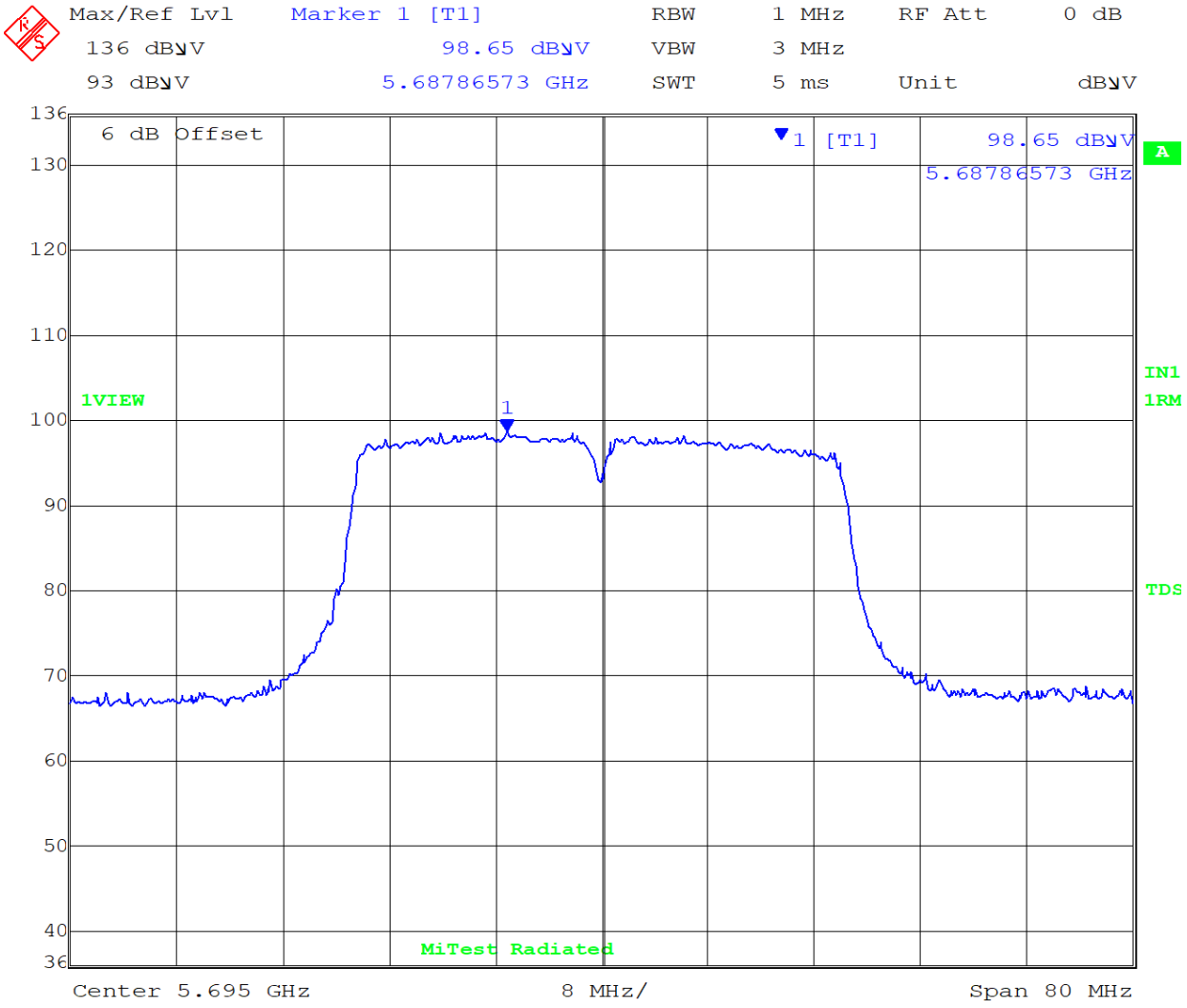
Variant: 40 MHz, Channel: 5695.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

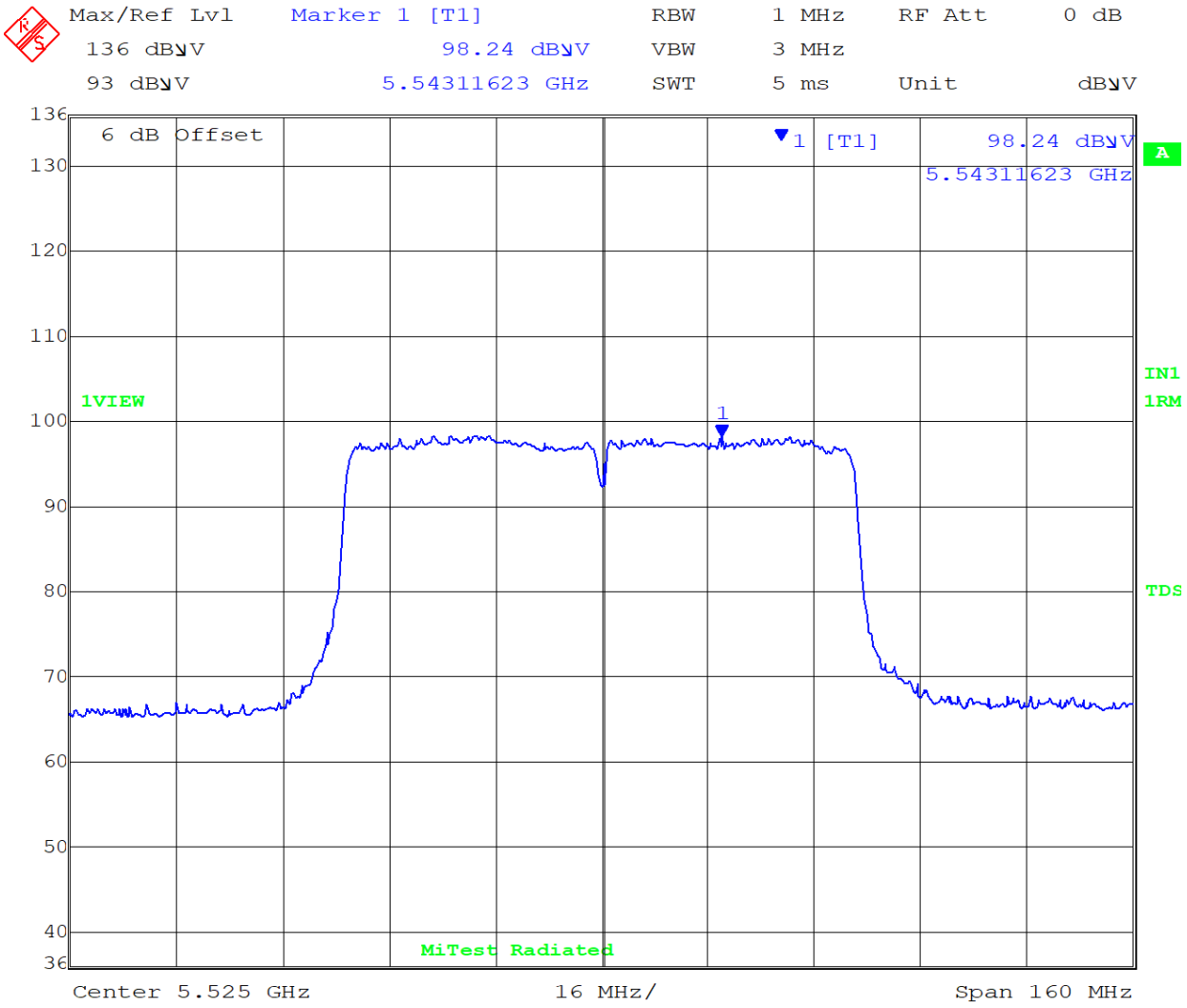
Variant: 40 MHz, Channel: 5695.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

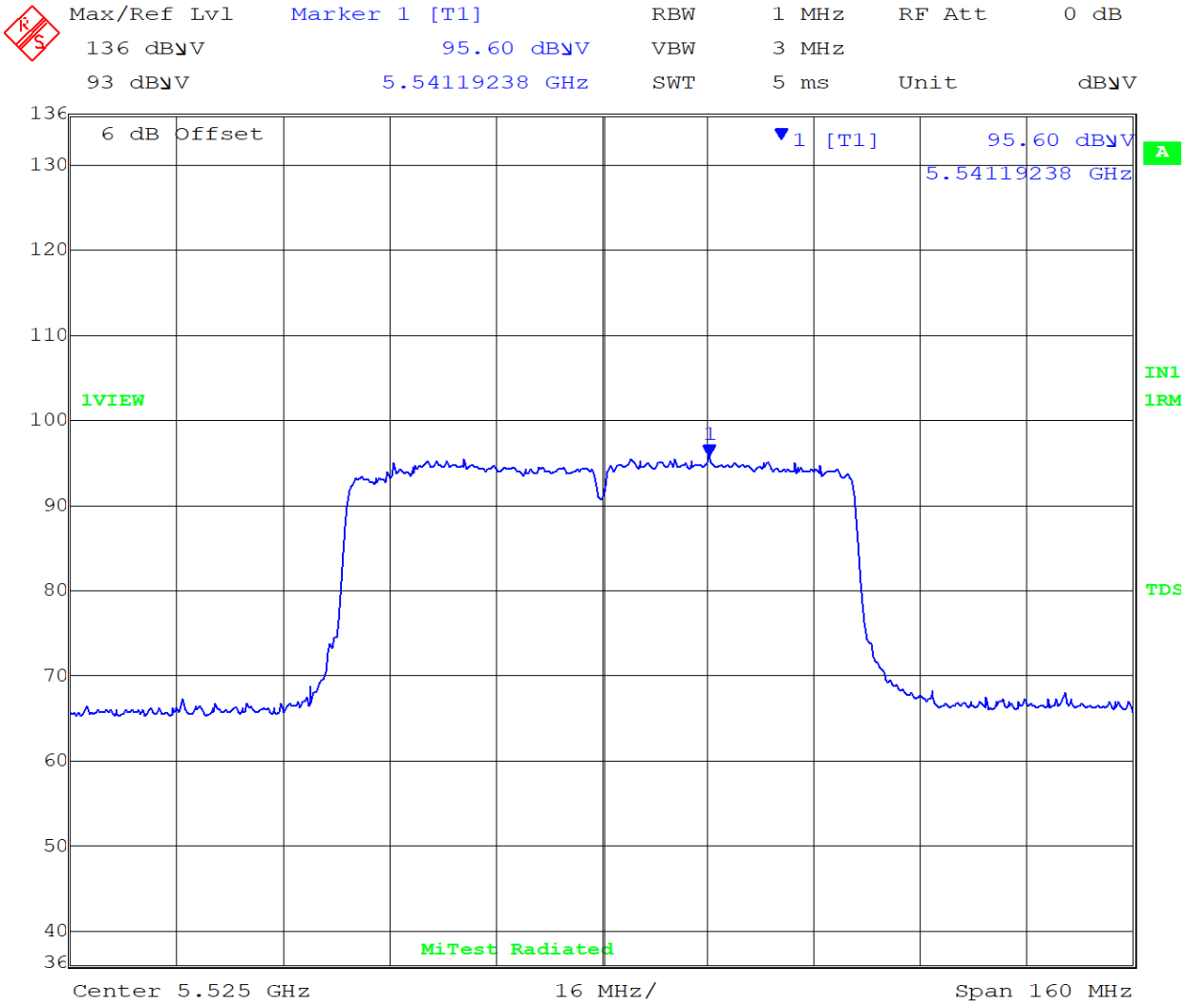
Variant: 80 MHz, Channel: 5525.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

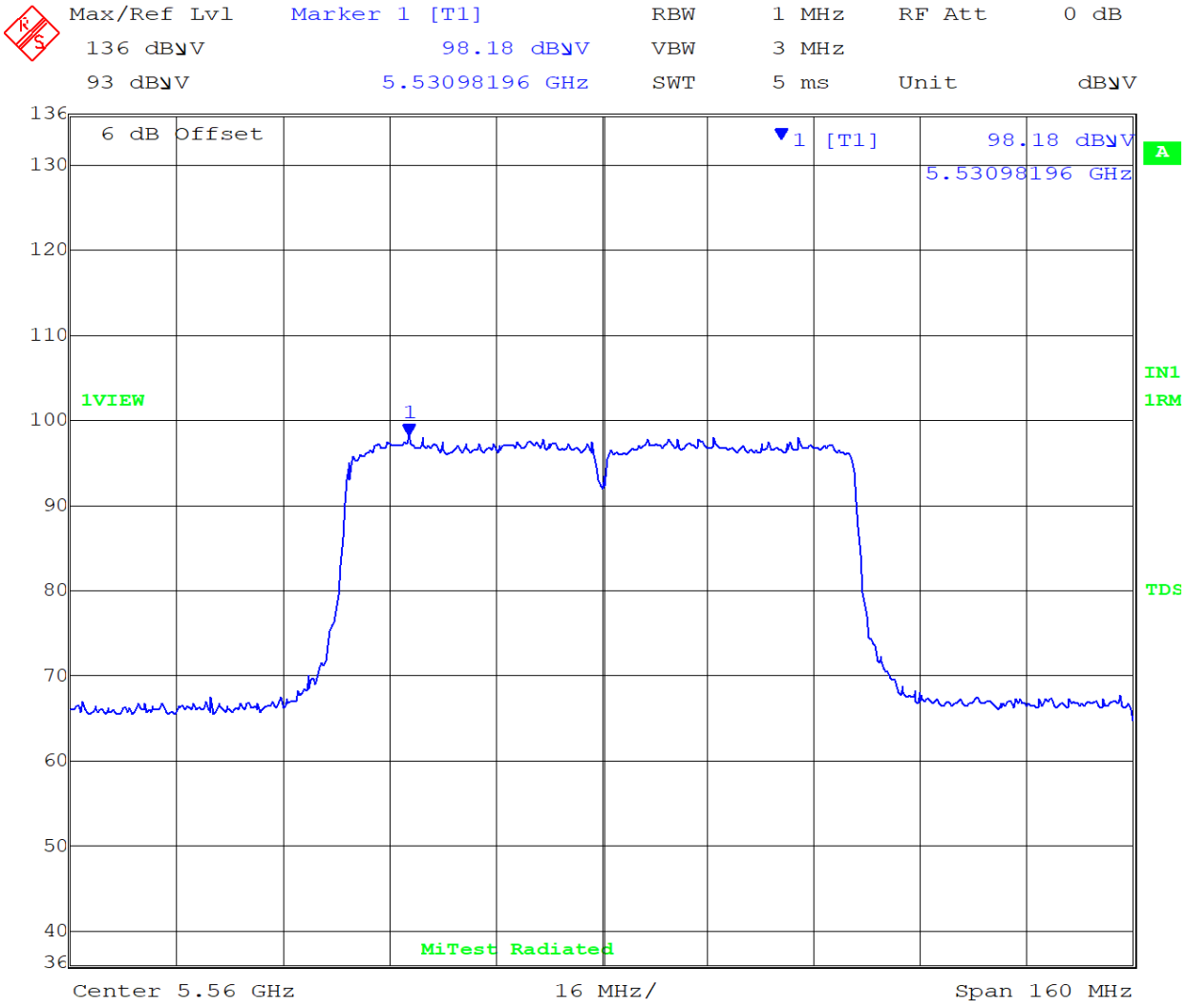
Variant: 80 MHz, Channel: 5525.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

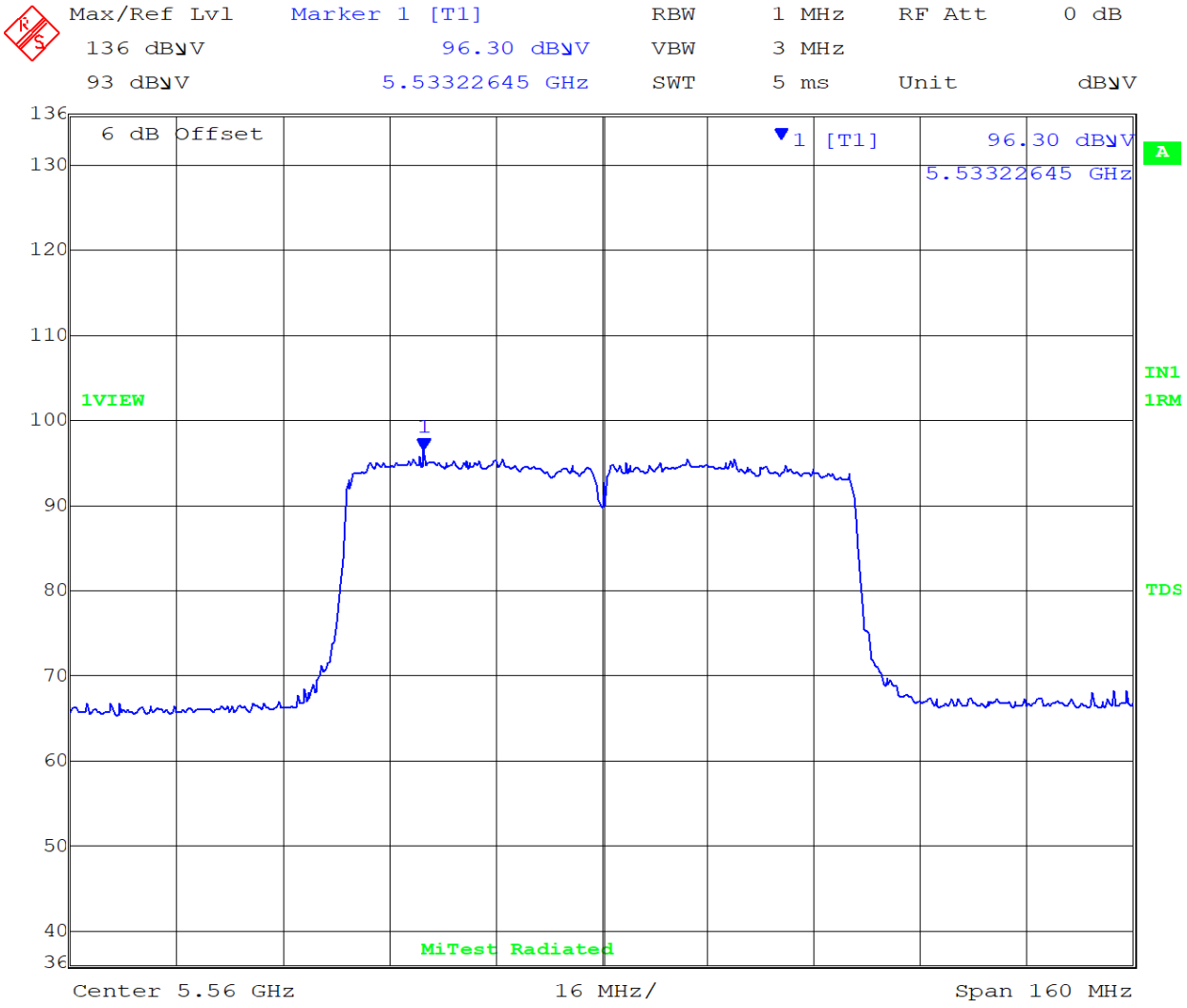
Variant: 80 MHz, Channel: 5560.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

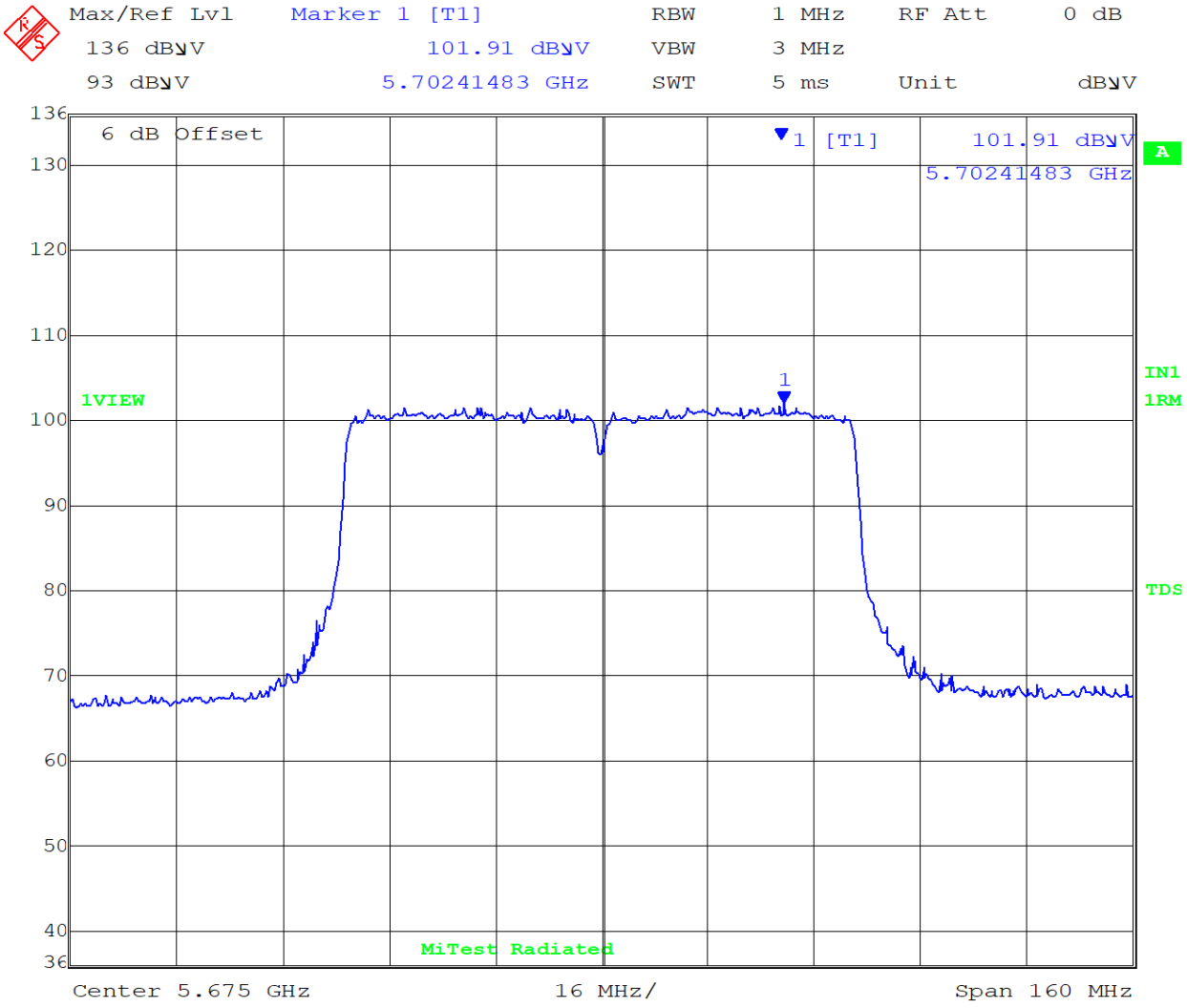
Variant: 80 MHz, Channel: 5560.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

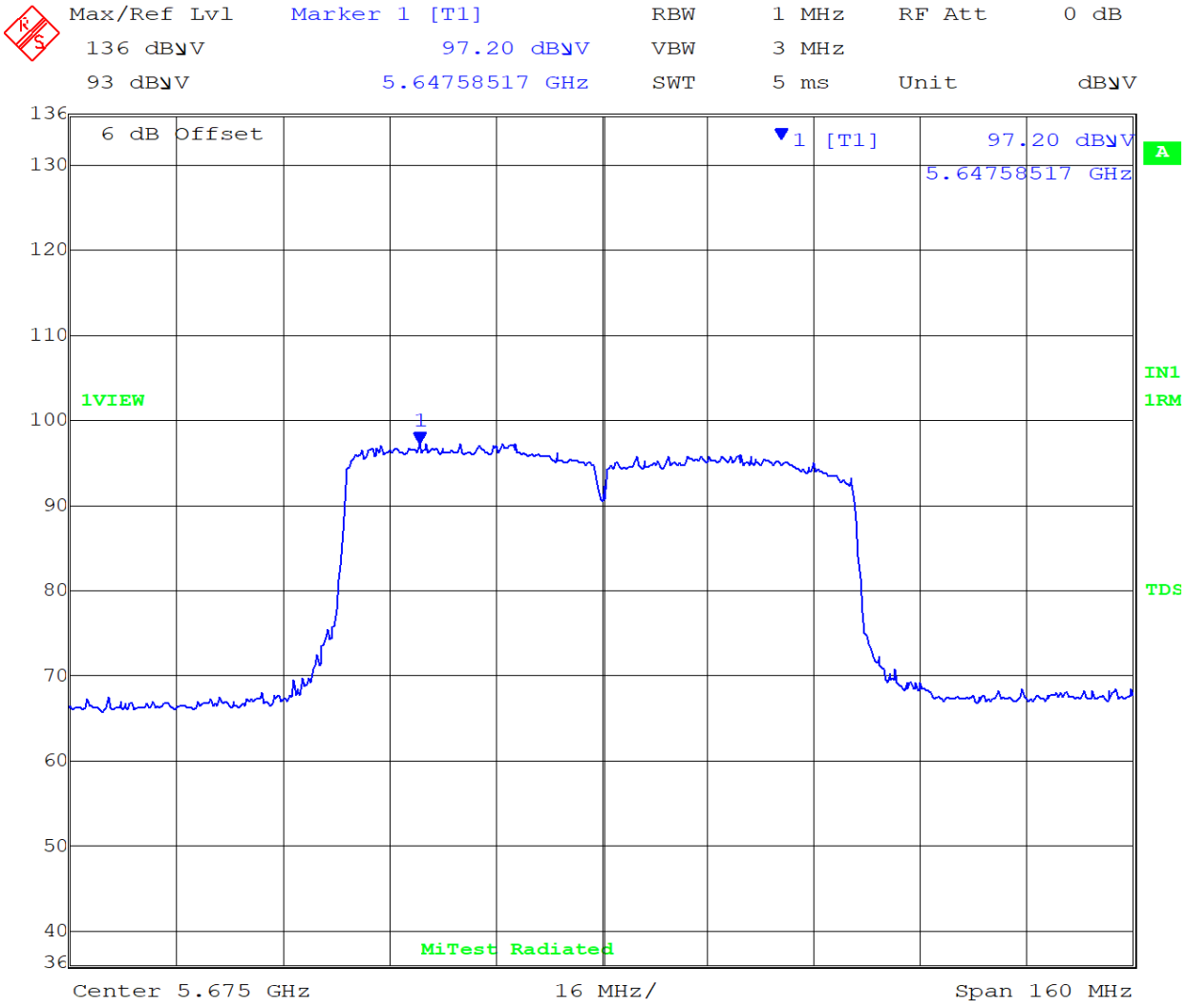
Variant: 80 MHz, Channel: 5675.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

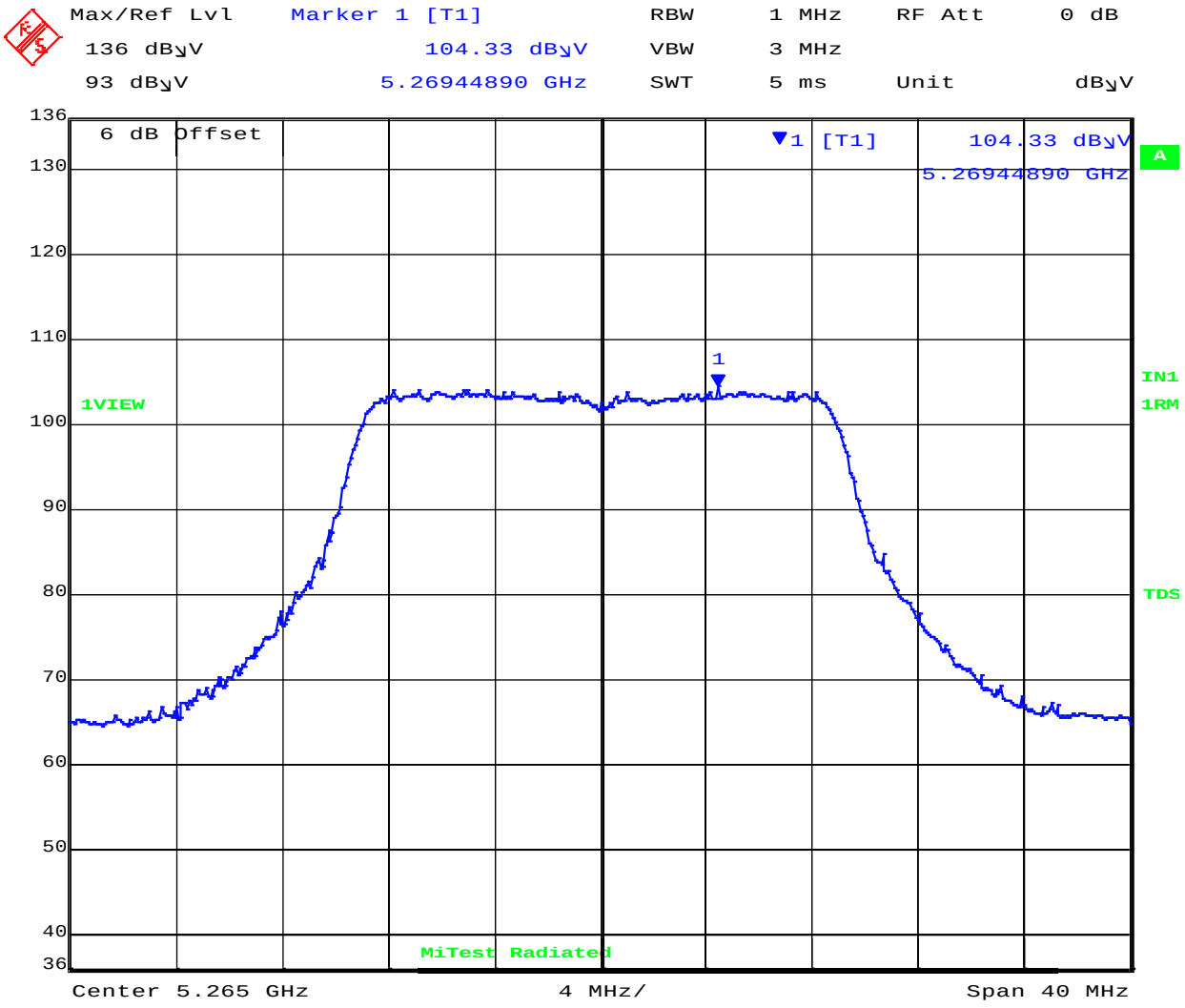
Variant: 80 MHz, Channel: 5675.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

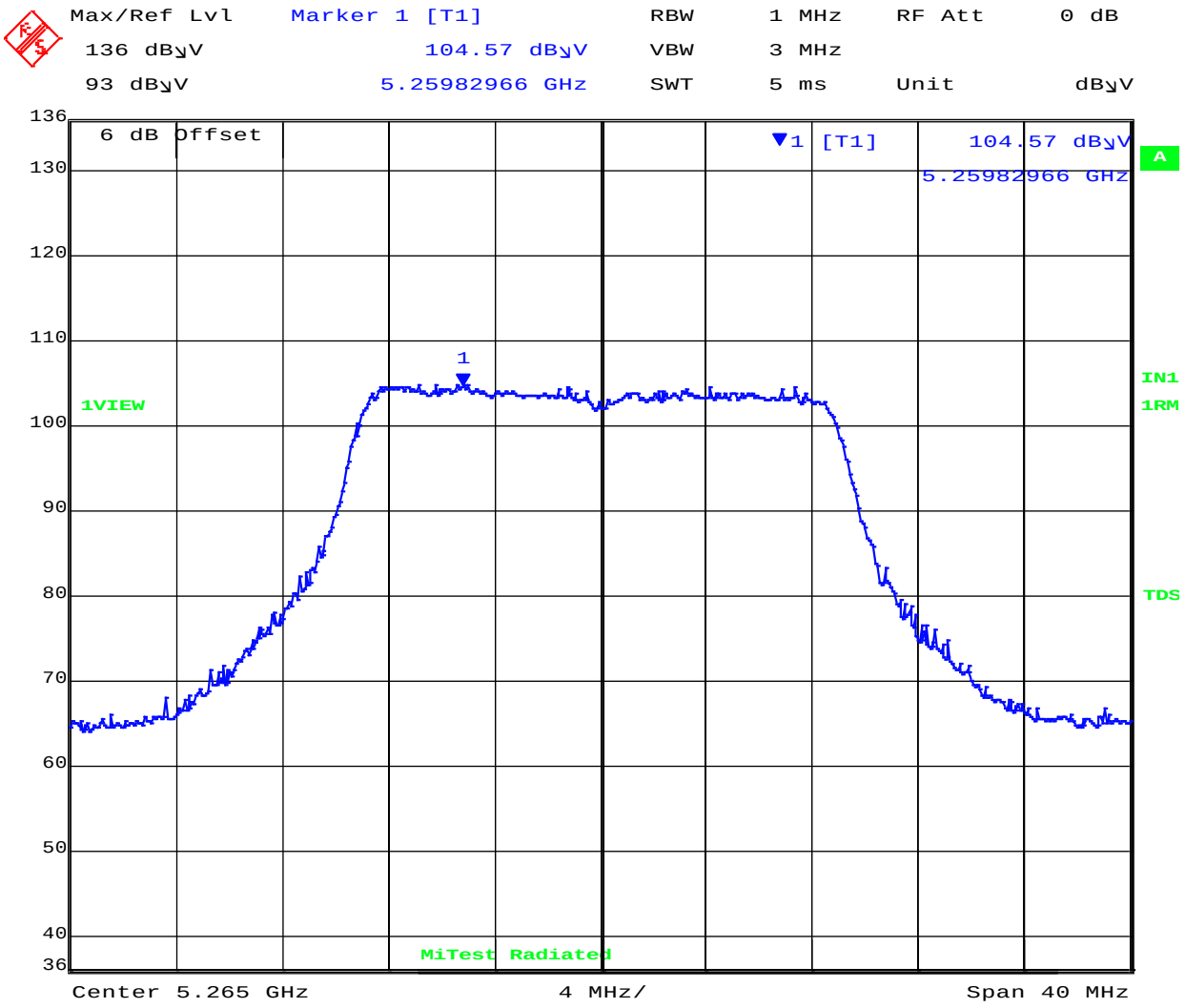
Variant: 20 MHz, Channel: 5265.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 20 MHz, Channel: 5265.00 MHz, Polarity V



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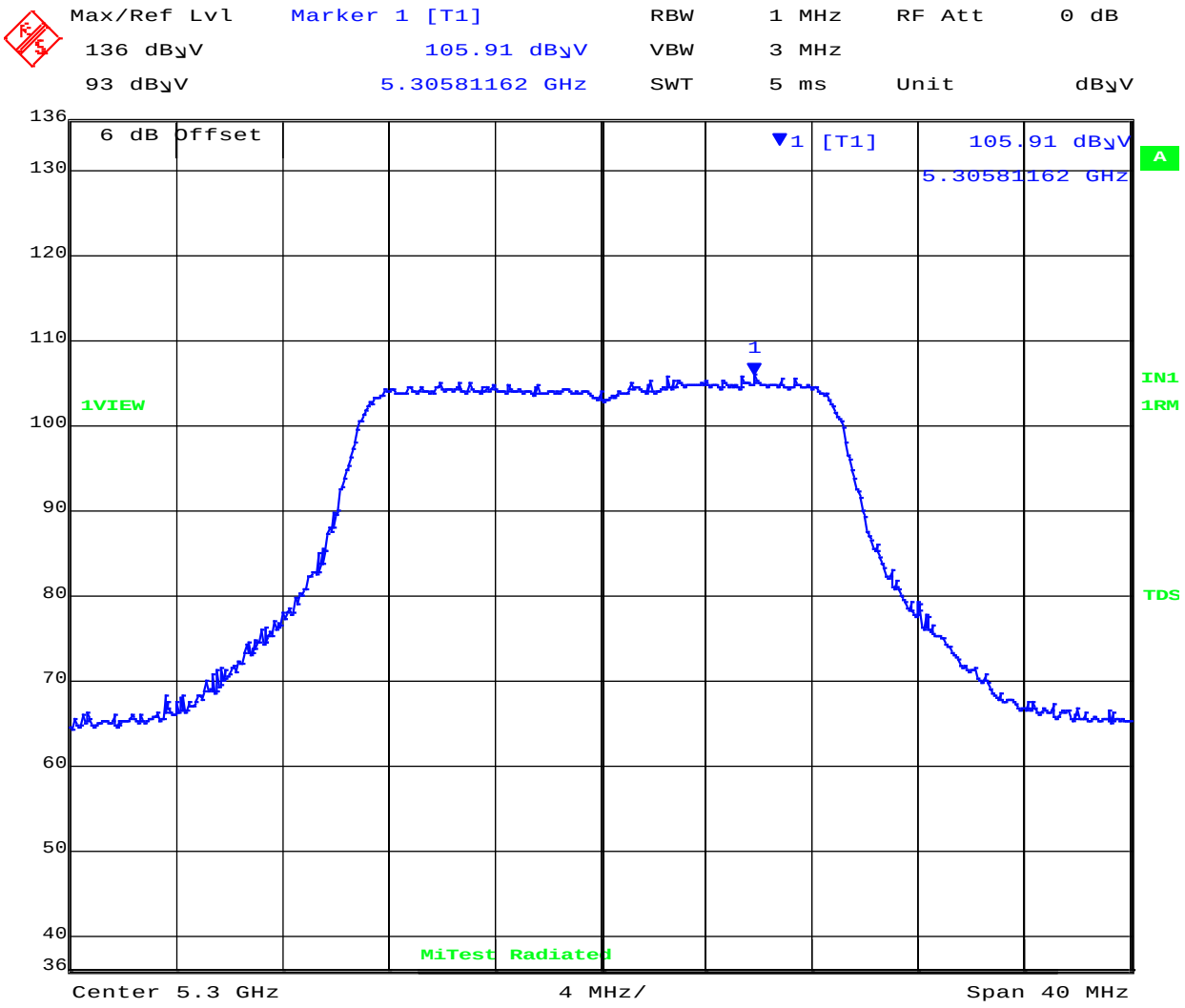
POWER SPECTRAL DENSITY

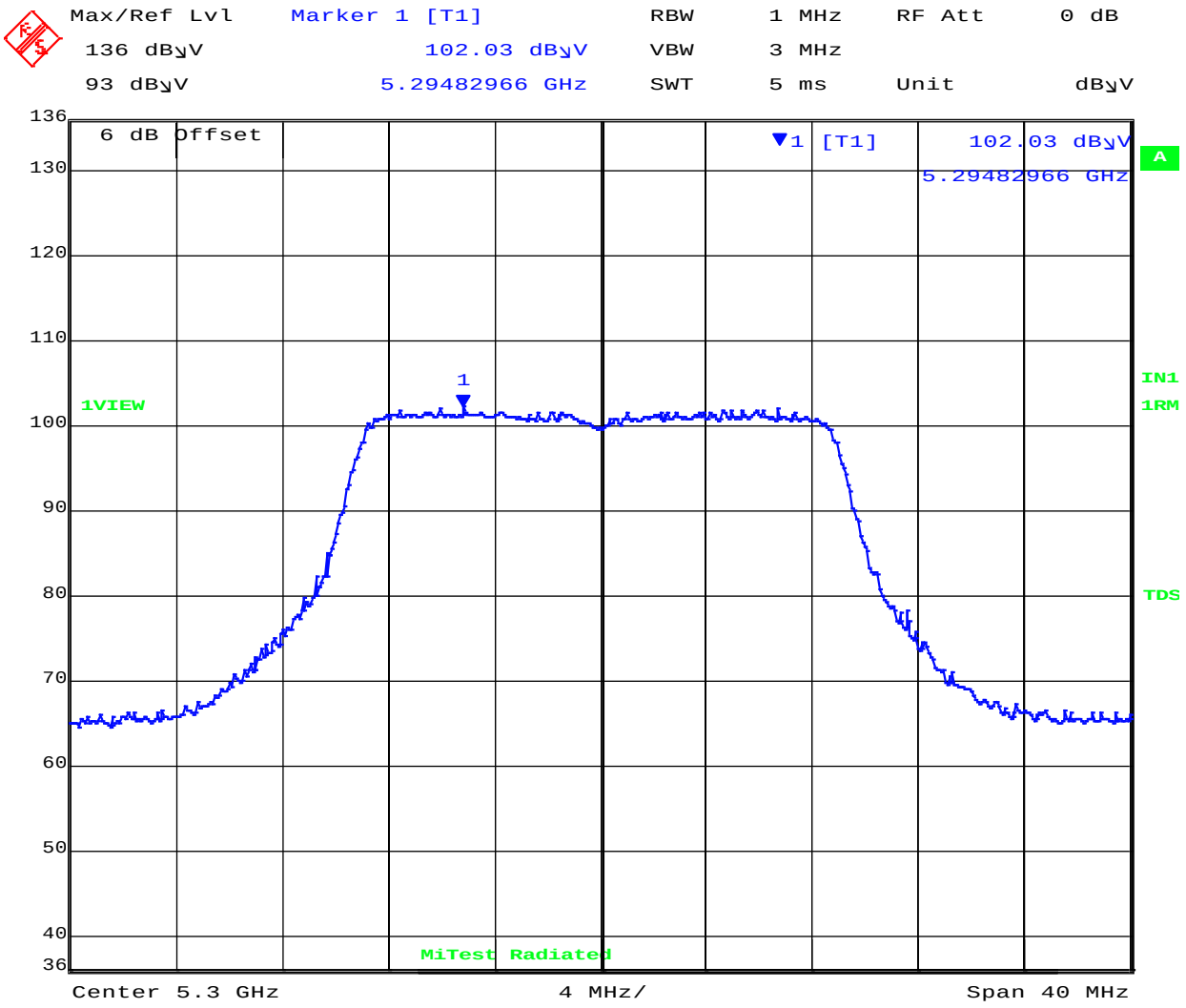
Variant: 20 MHz, Channel: 5300.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 20 MHz, Channel: 5300.00 MHz, Polarity V



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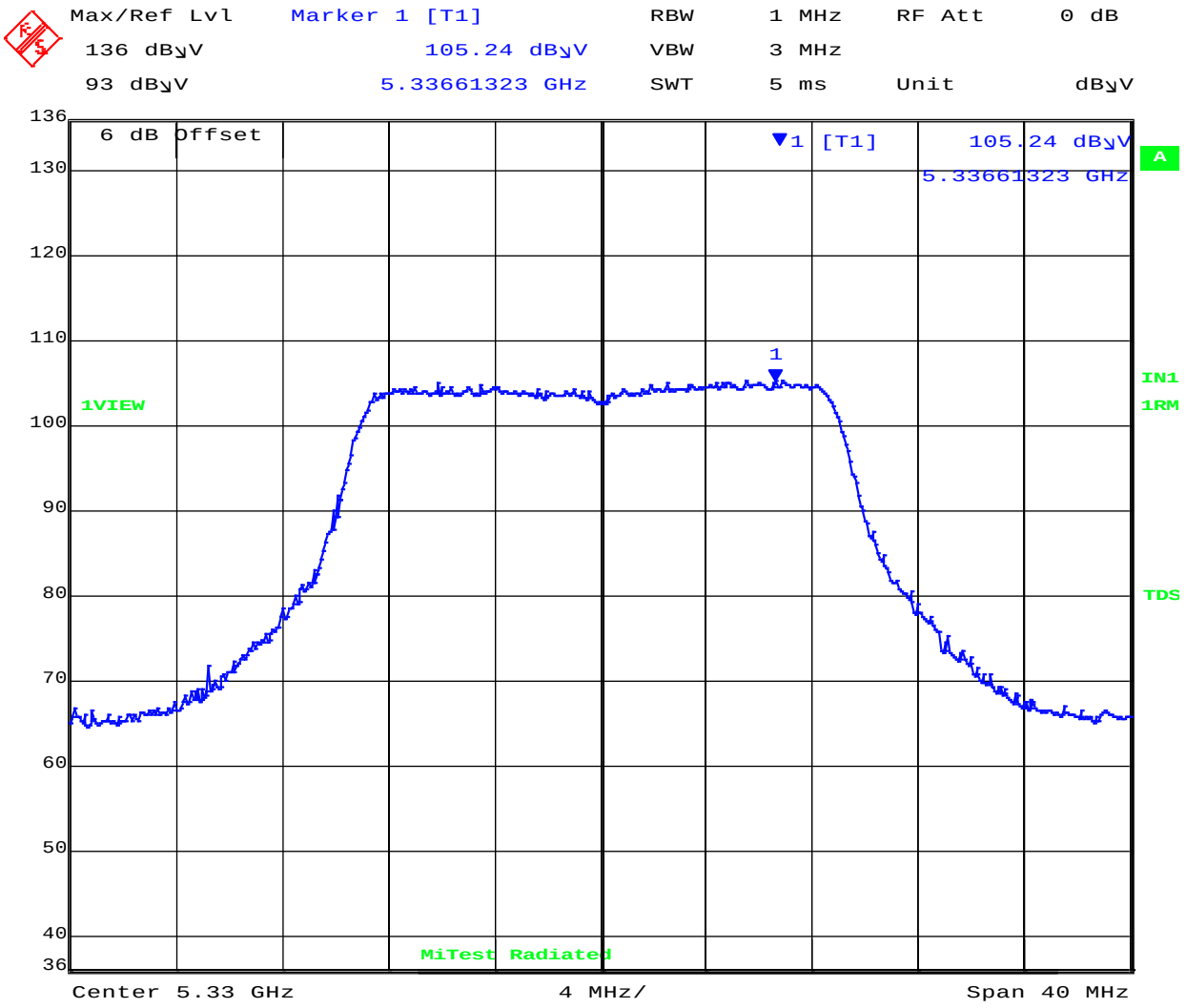
POWER SPECTRAL DENSITY

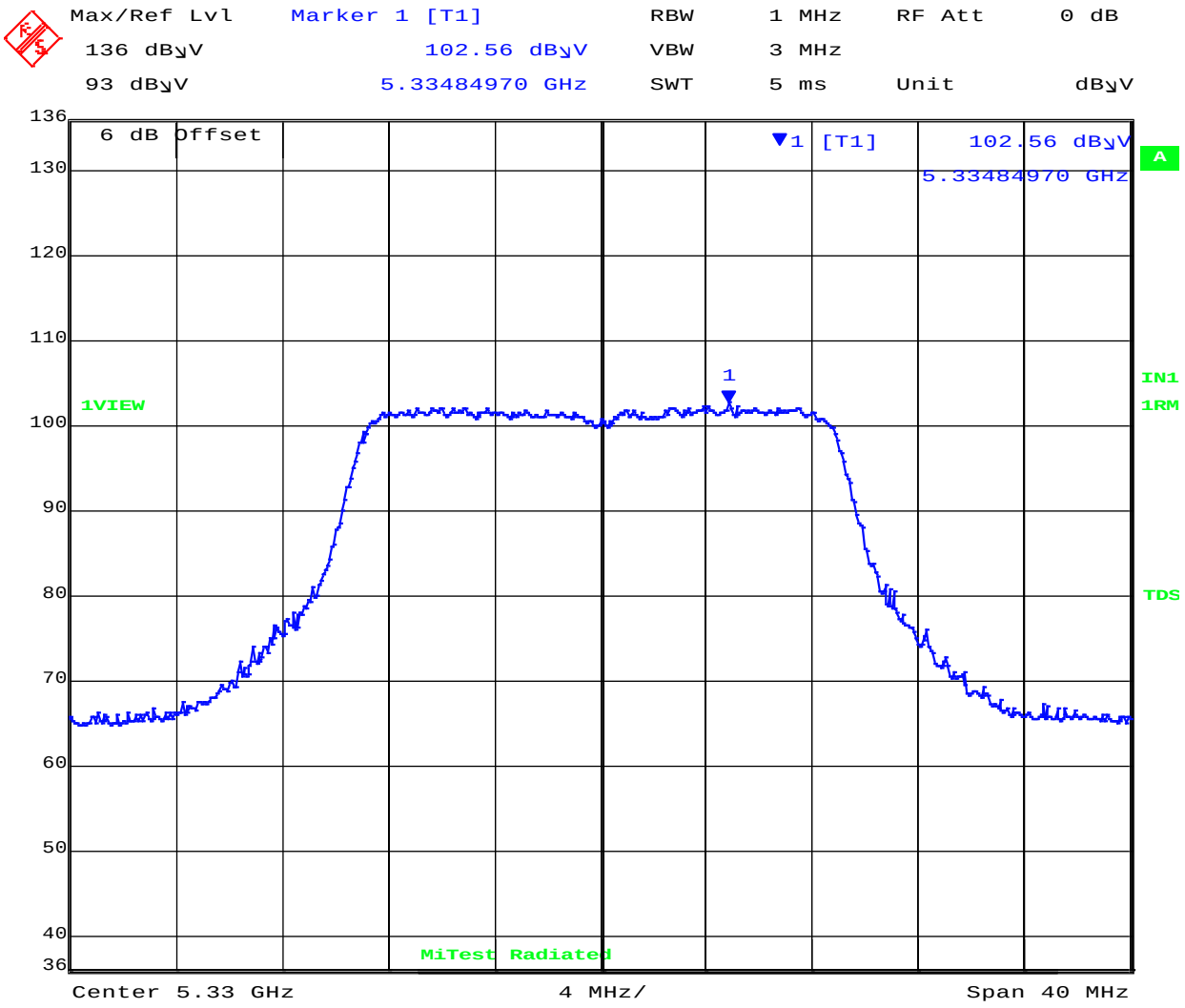
Variant: 20 MHz, Channel: 5330.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 20 MHz, Channel: 5330.00 MHz, Polarity V



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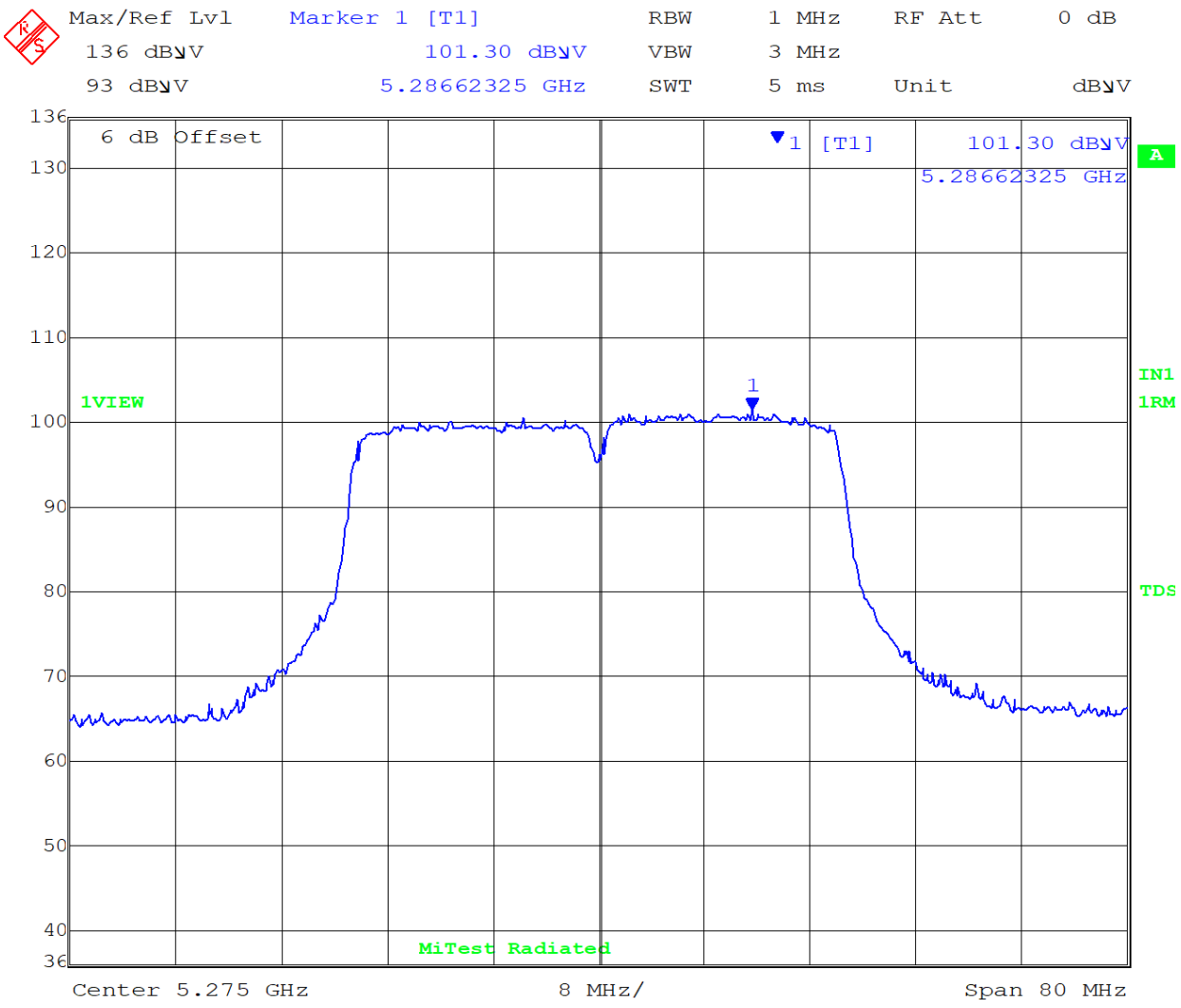
back to matrix

POWER SPECTRAL DENSITY

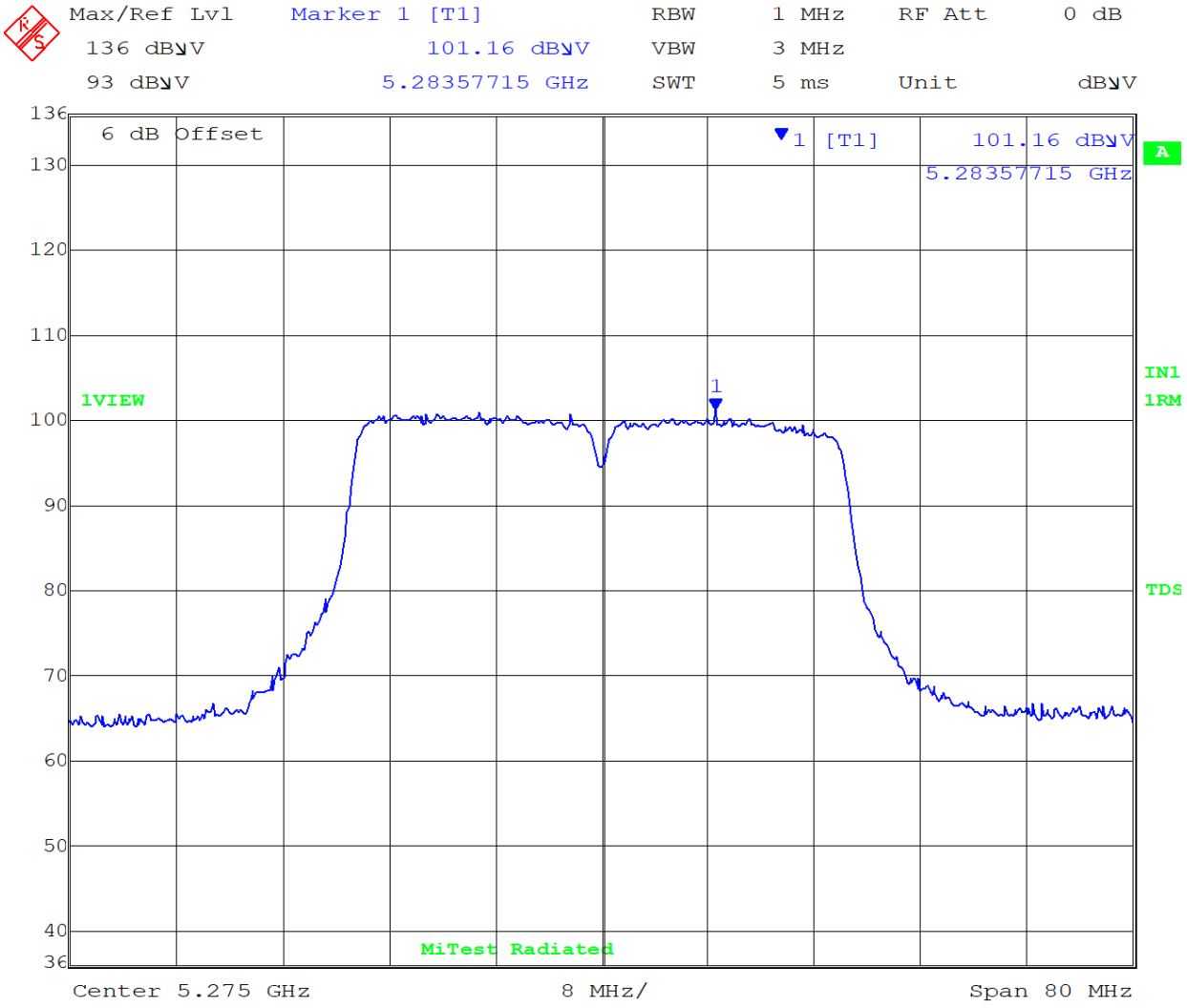
Variant: 40 MHz, Channel: 5275.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

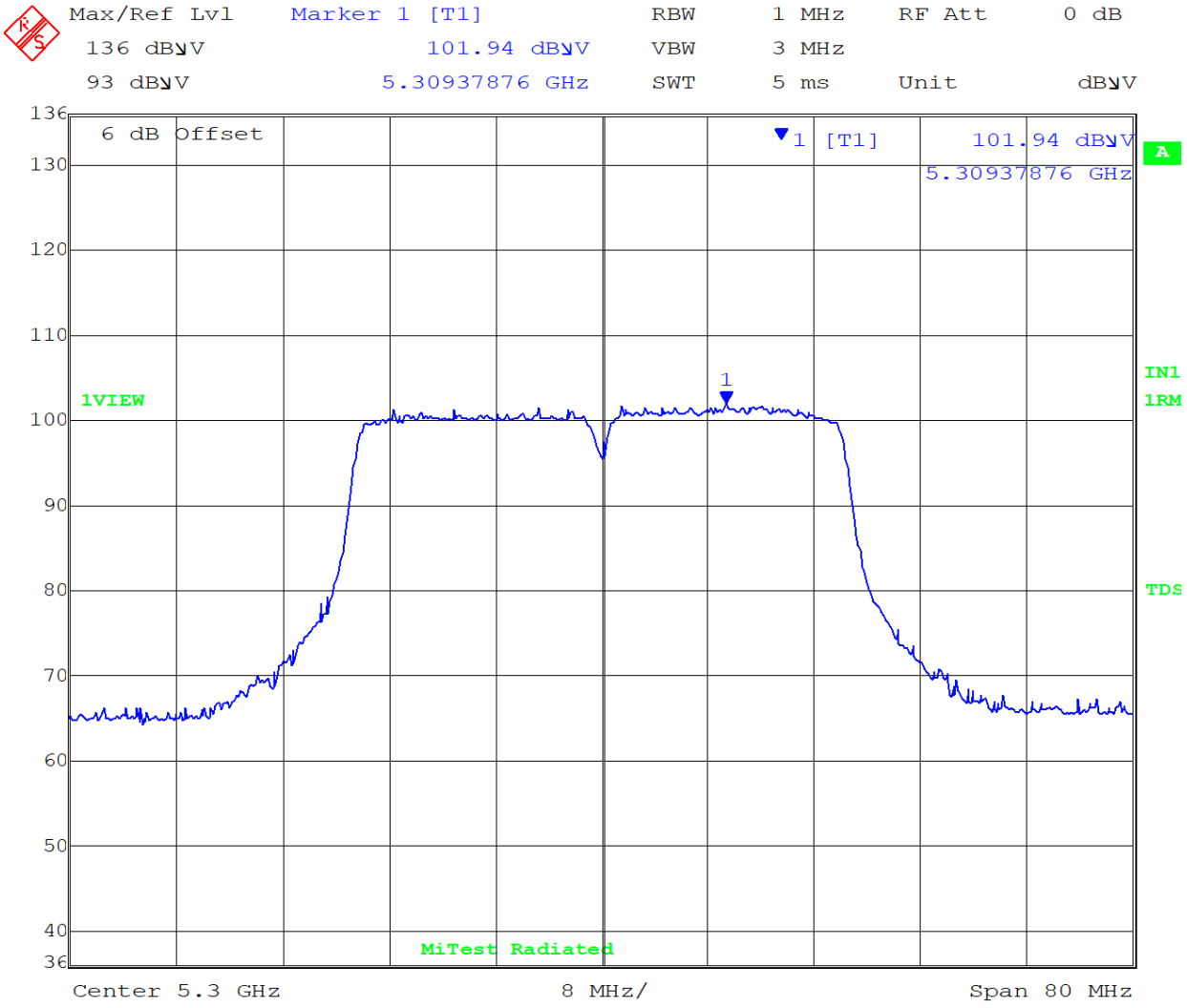
Variant: 40 MHz, Channel: 5275.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

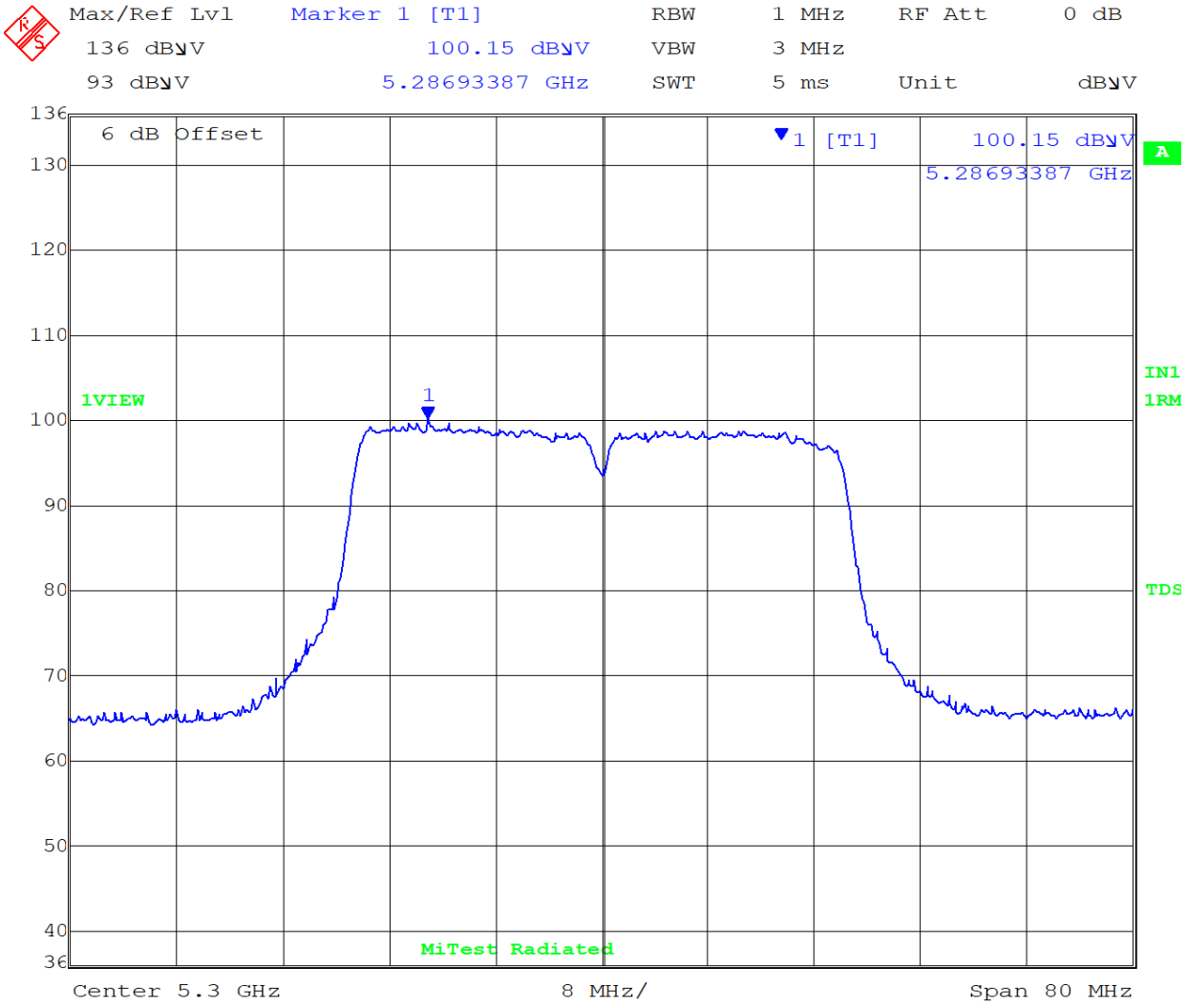
Variant: 40 MHz, Channel: 5300.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

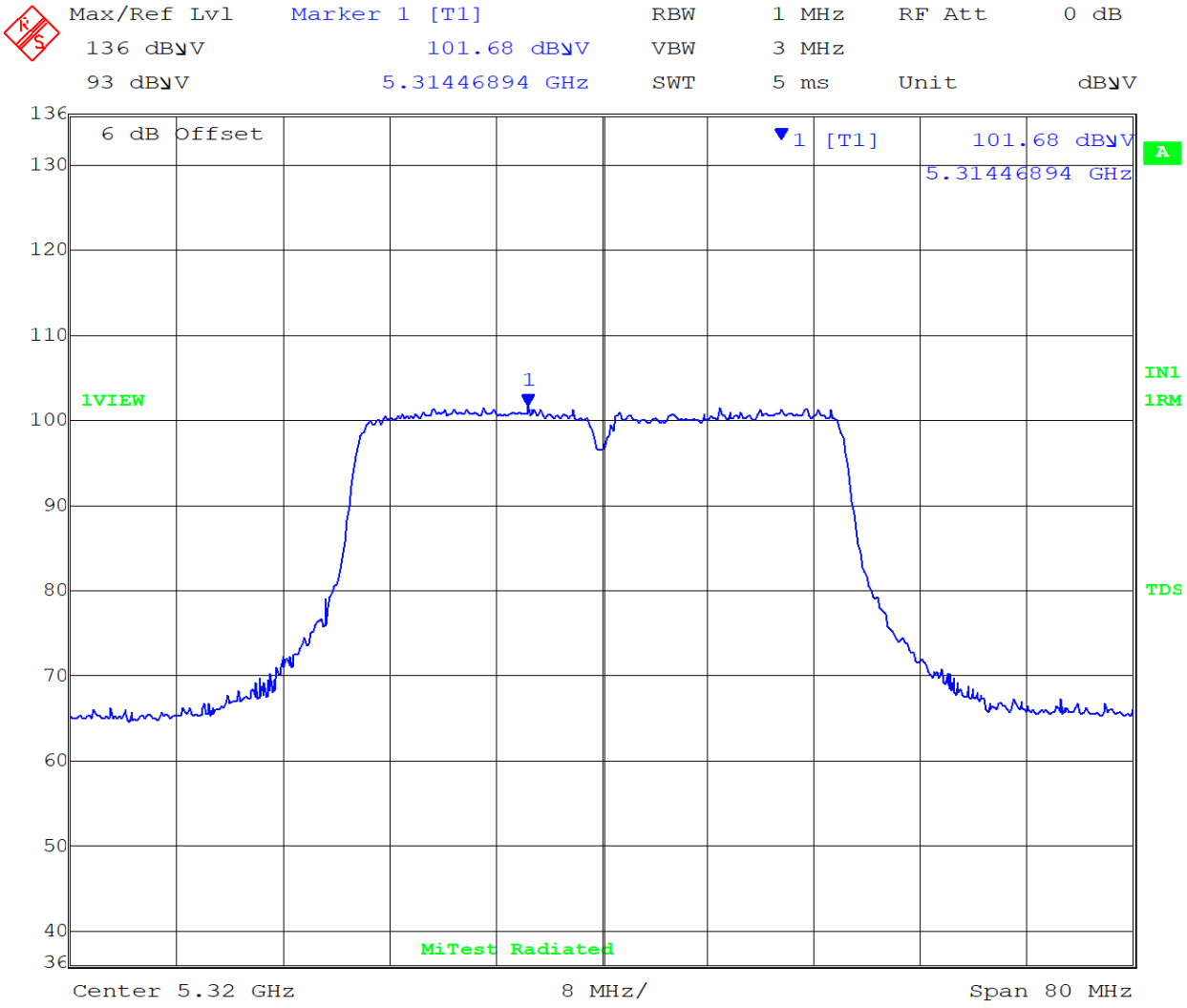
Variant: 40 MHz, Channel: 5300.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

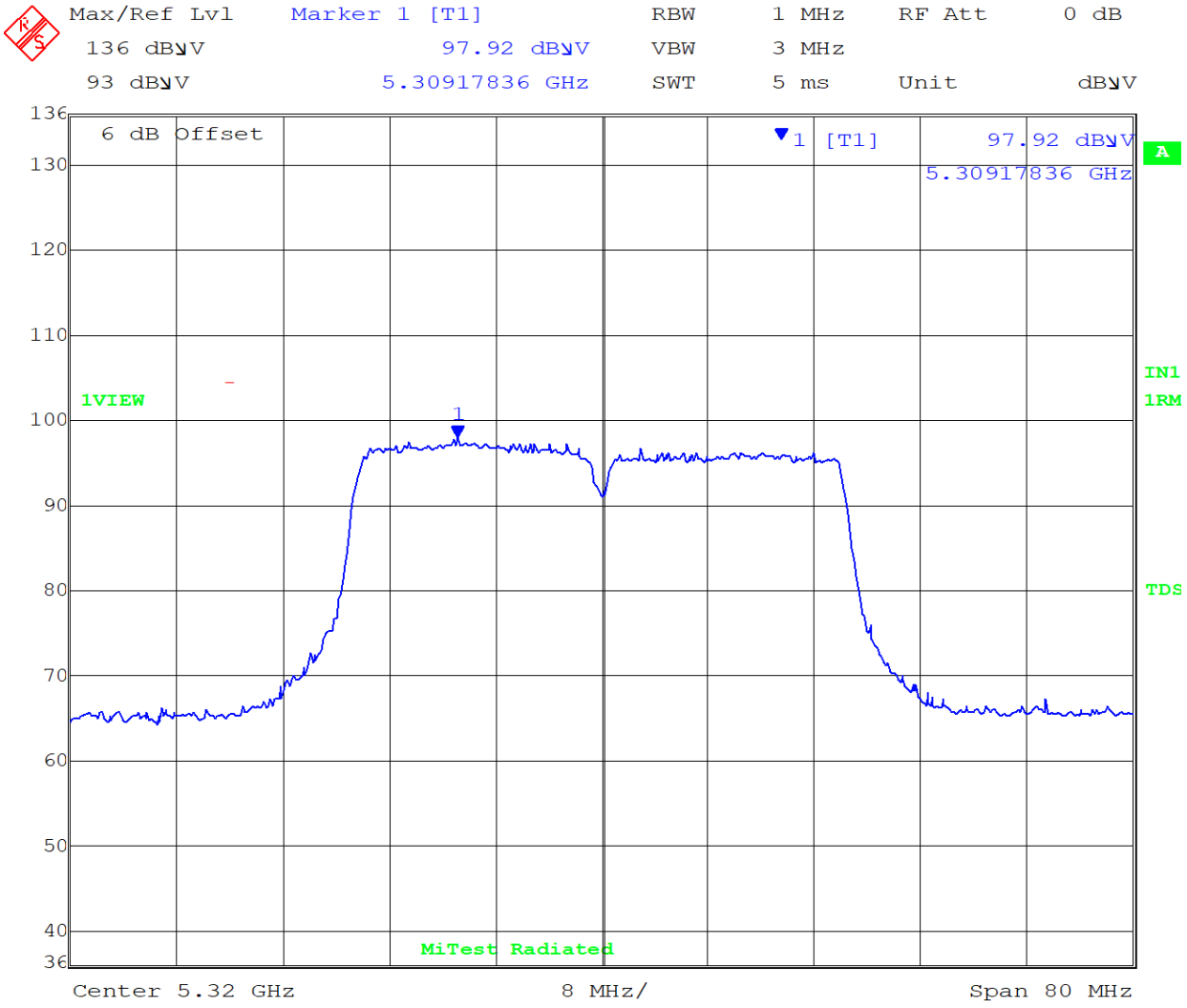
Variant: 40 MHz, Channel: 5320.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

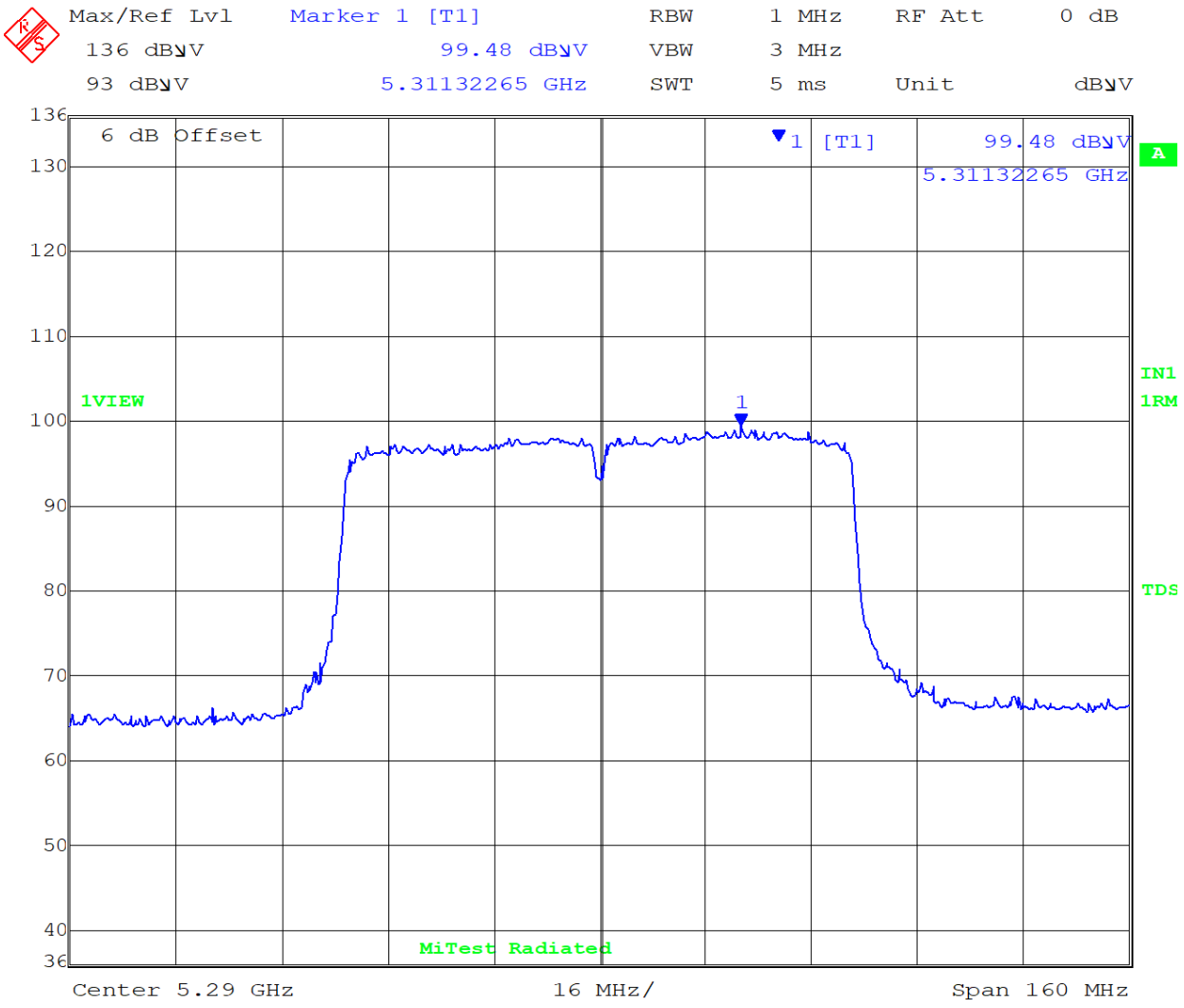
Variant: 40 MHz, Channel: 5320.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

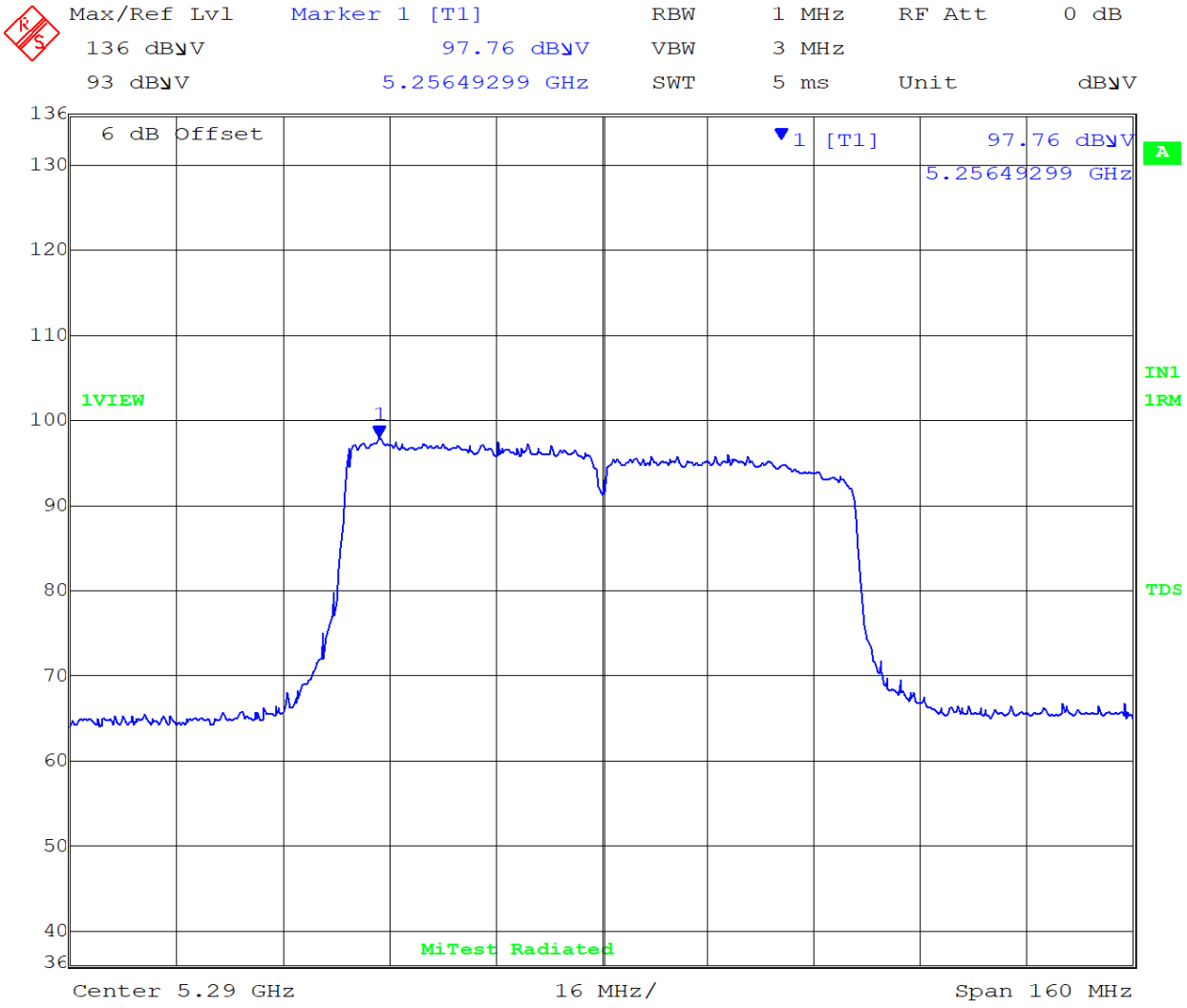
Variant: 80 MHz, Channel: 5290.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 80 MHz, Channel: 5290.00 MHz, Polarity V



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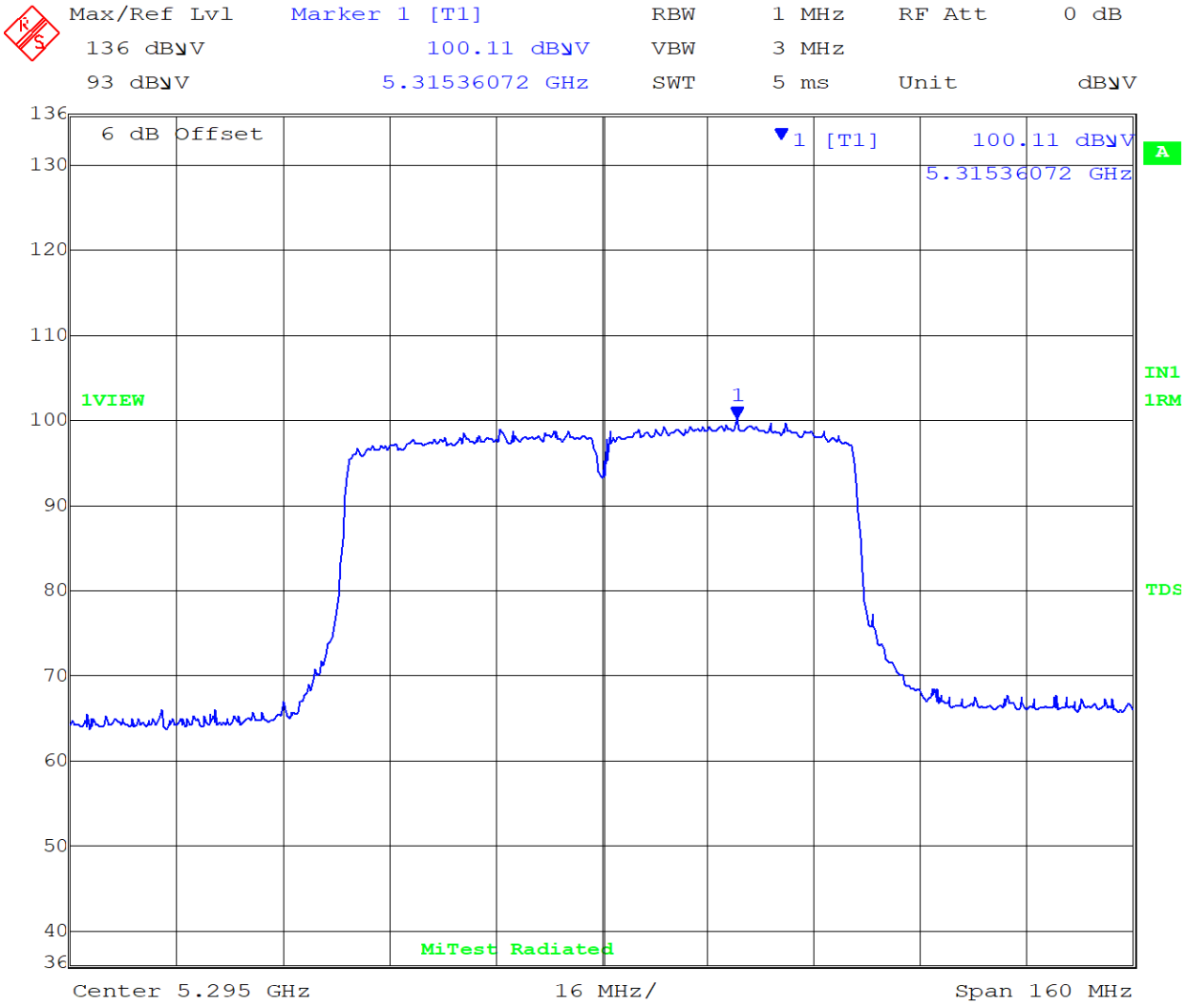
POWER SPECTRAL DENSITY

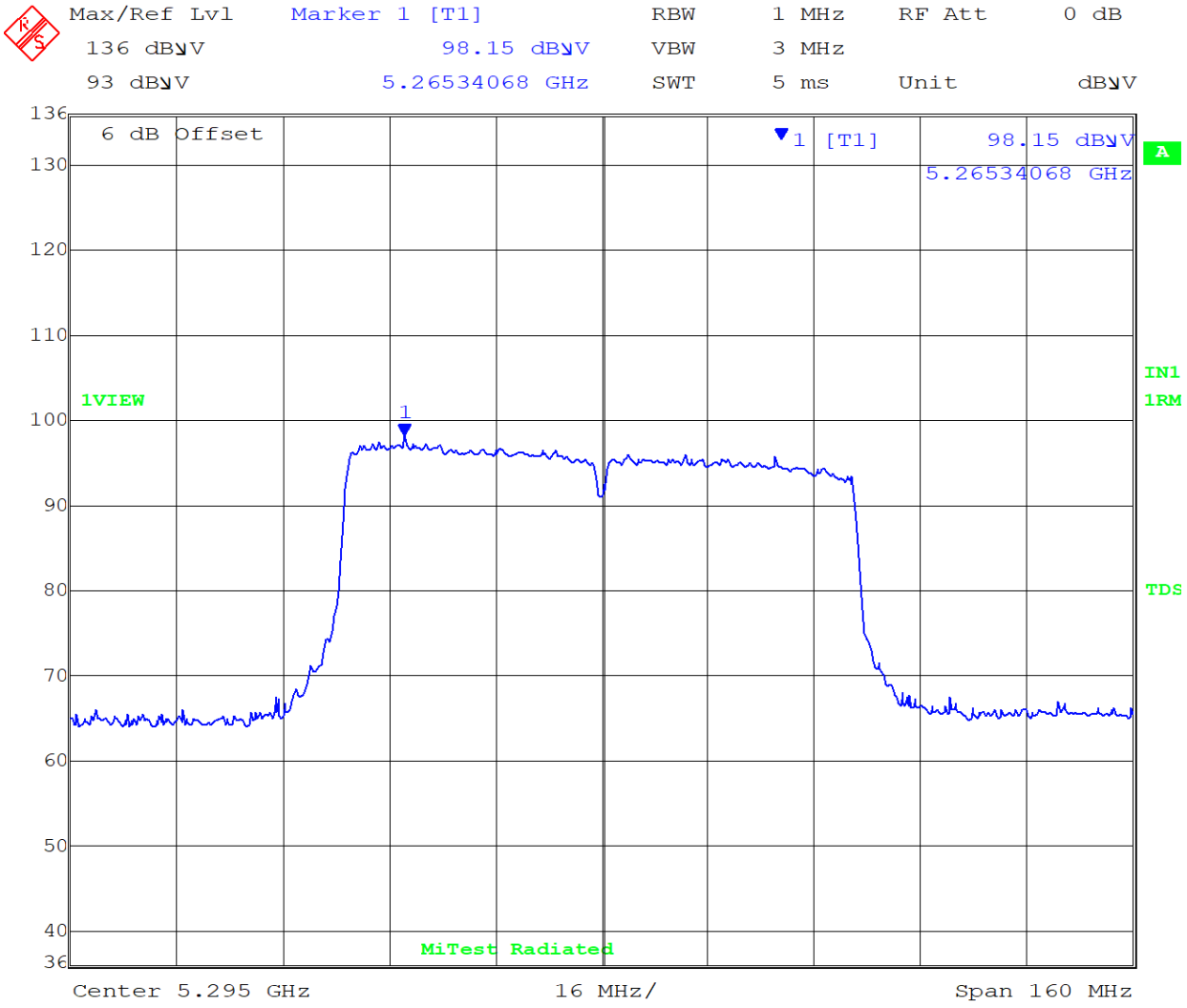
Variant: 80 MHz, Channel: 5295.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

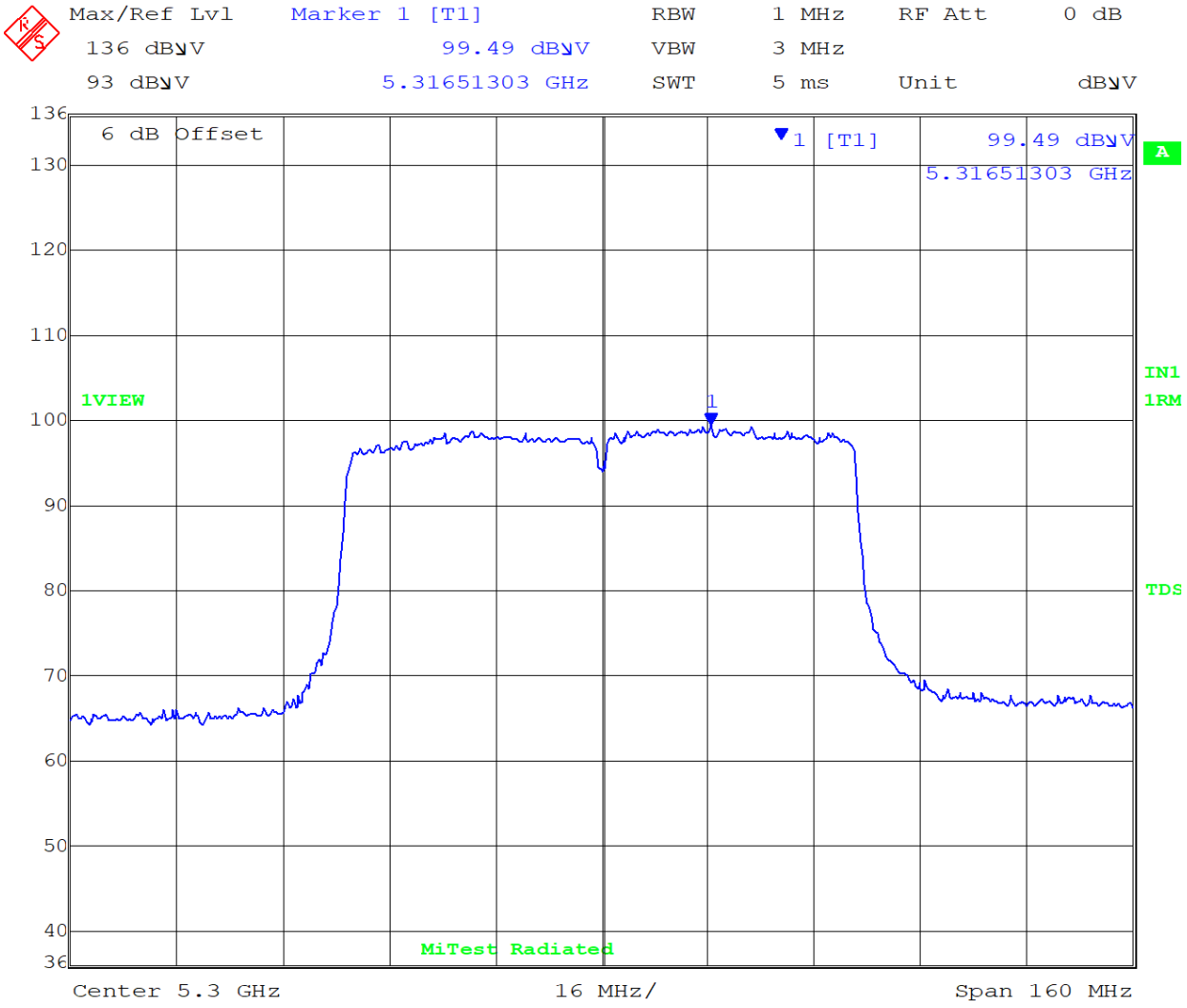
Variant: 80 MHz, Channel: 5295.00 MHz, Polarity V



back to matrix

POWER SPECTRAL DENSITY

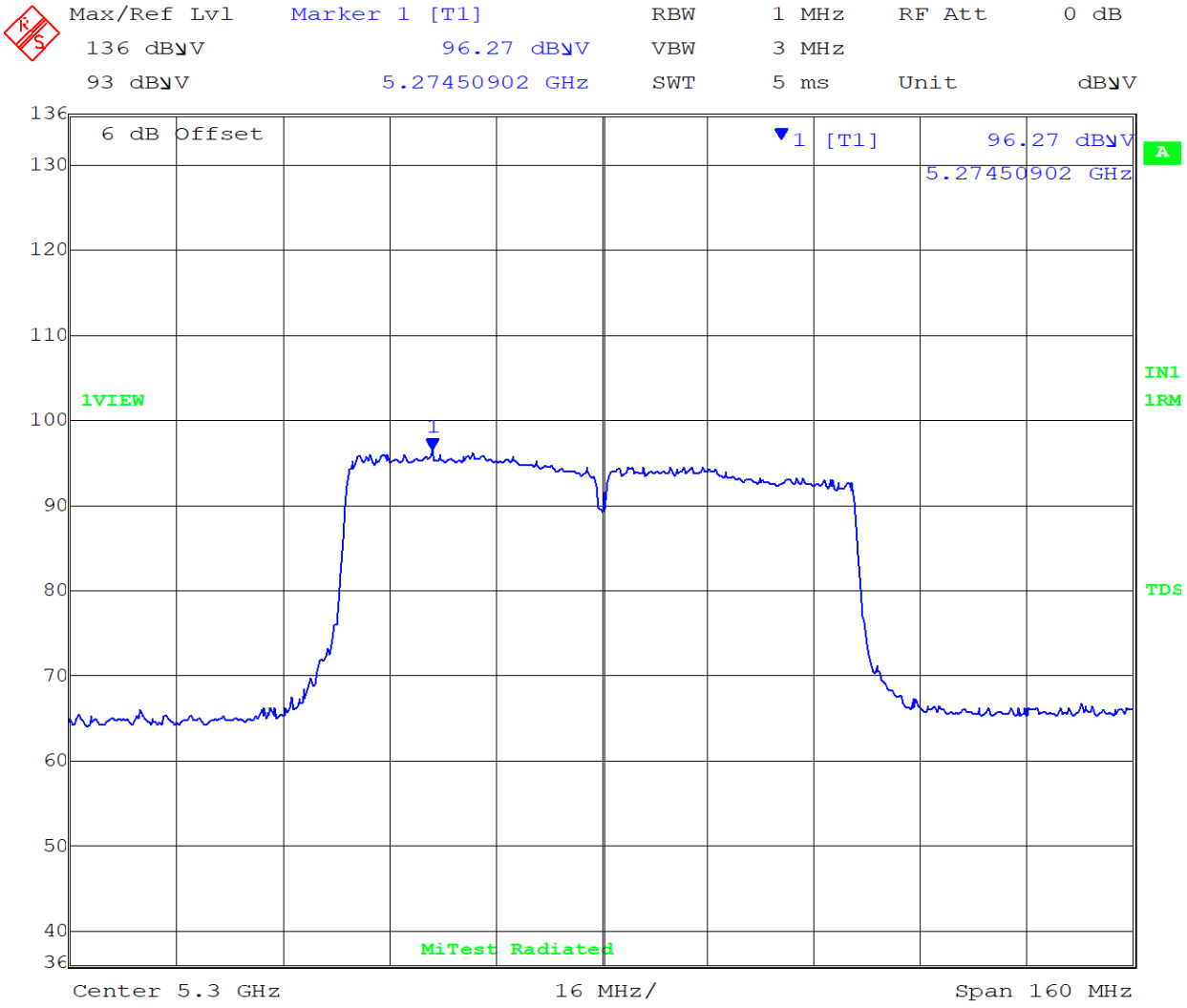
Variant: 80 MHz, Channel: 5300.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 80 MHz, Channel: 5300.00 MHz, Polarity V



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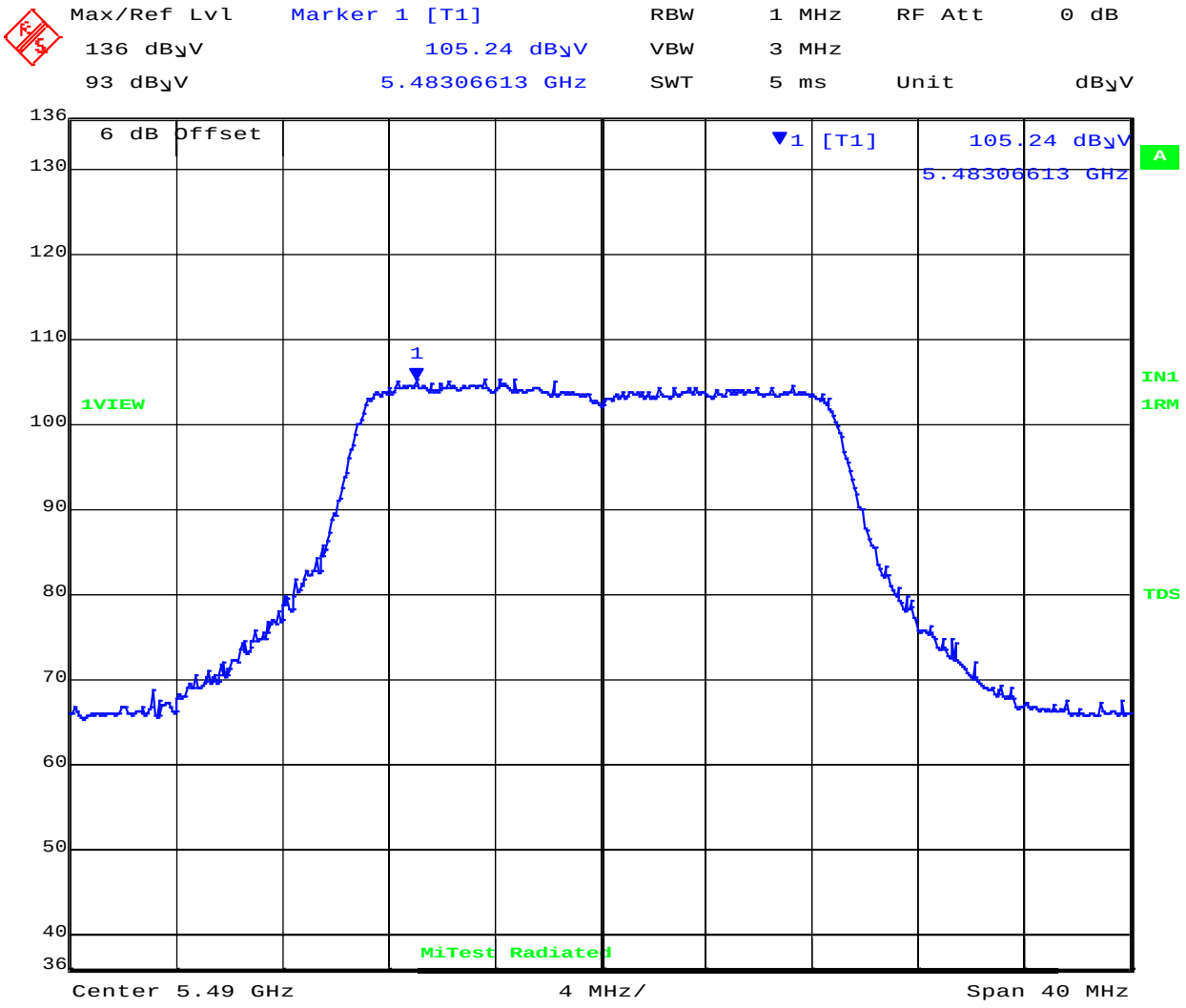
back to matrix

POWER SPECTRAL DENSITY

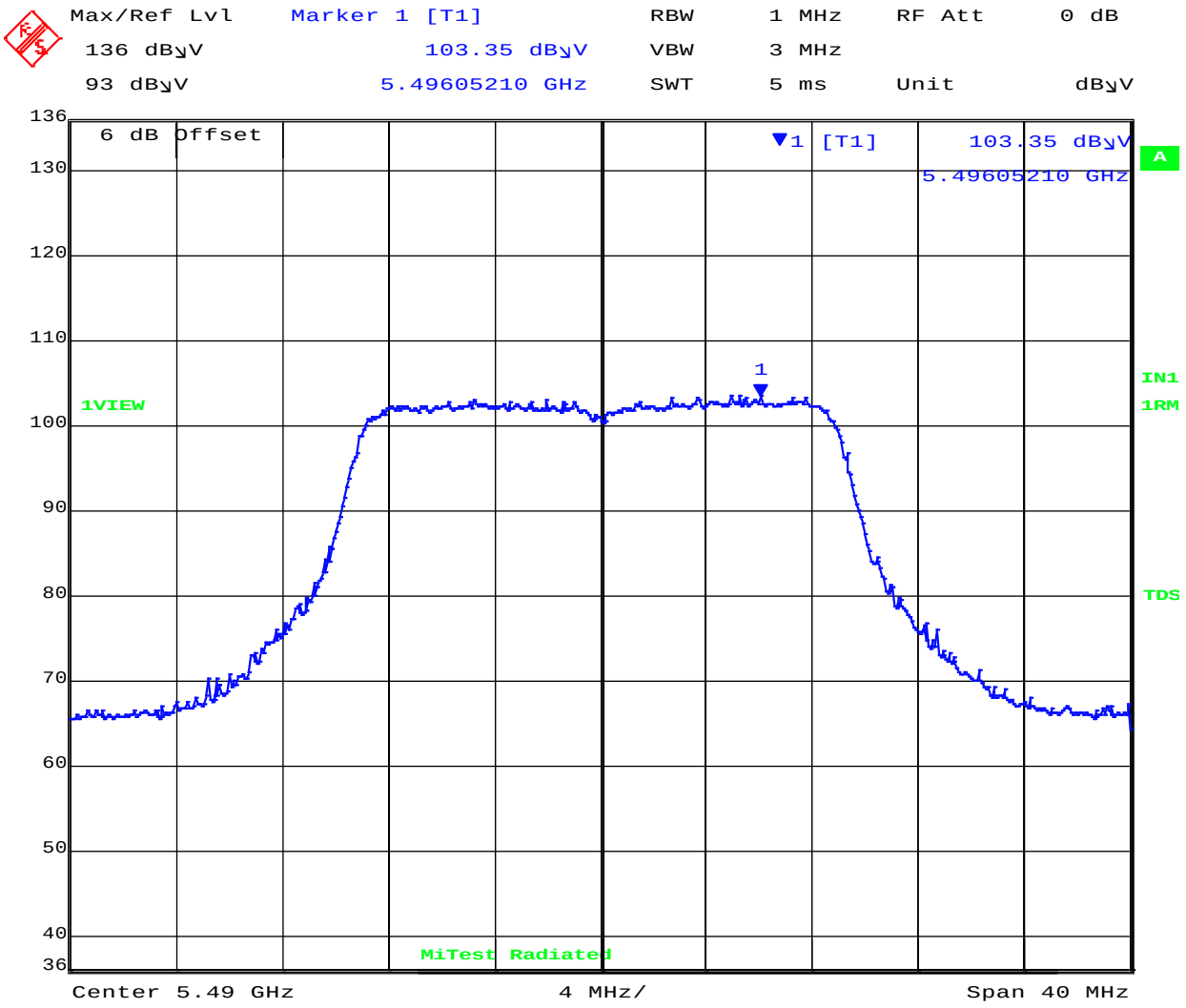
Variant: 20 MHz, Channel: 5490.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 20 MHz, Channel: 5490.00 MHz, Polarity V



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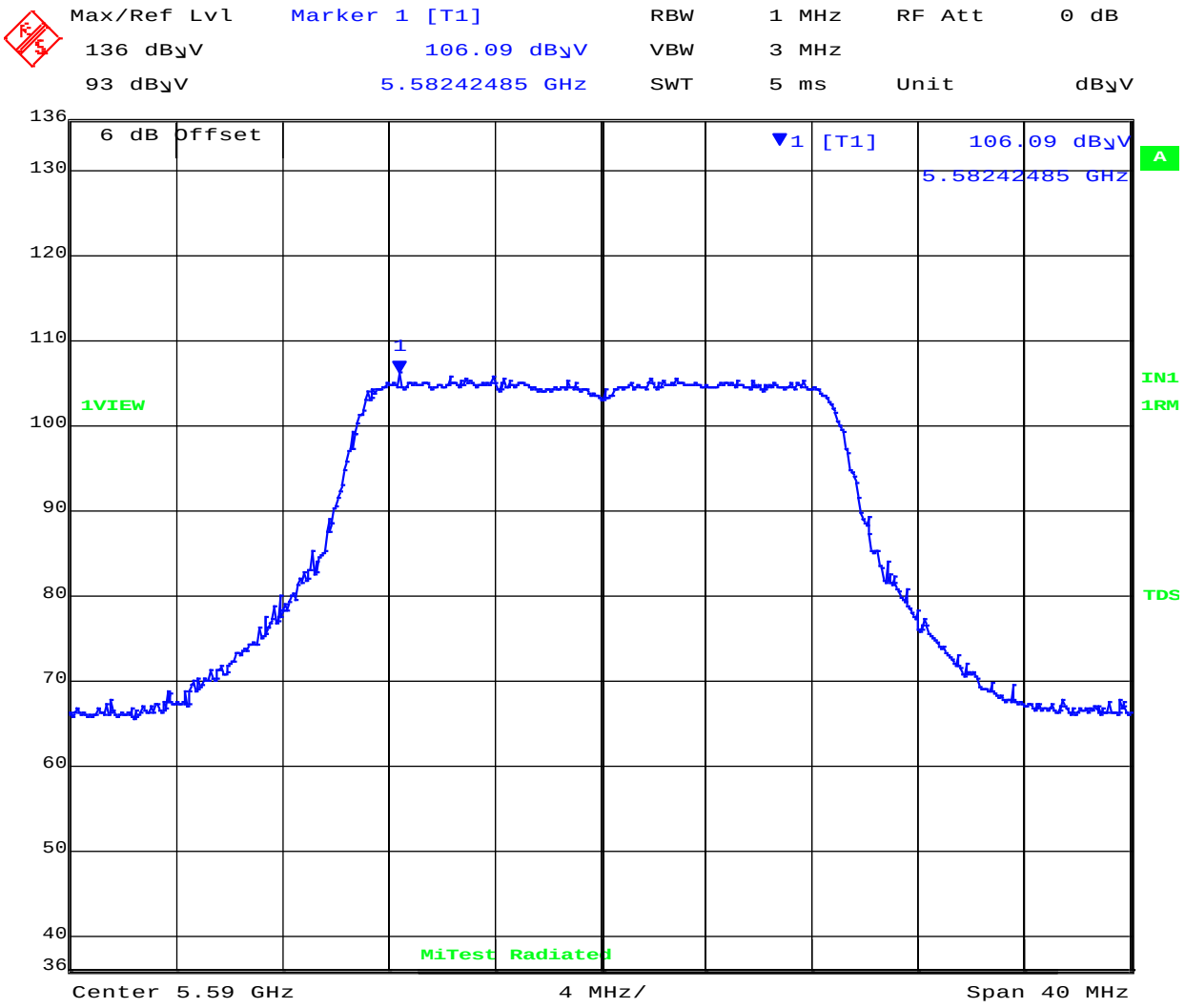
POWER SPECTRAL DENSITY

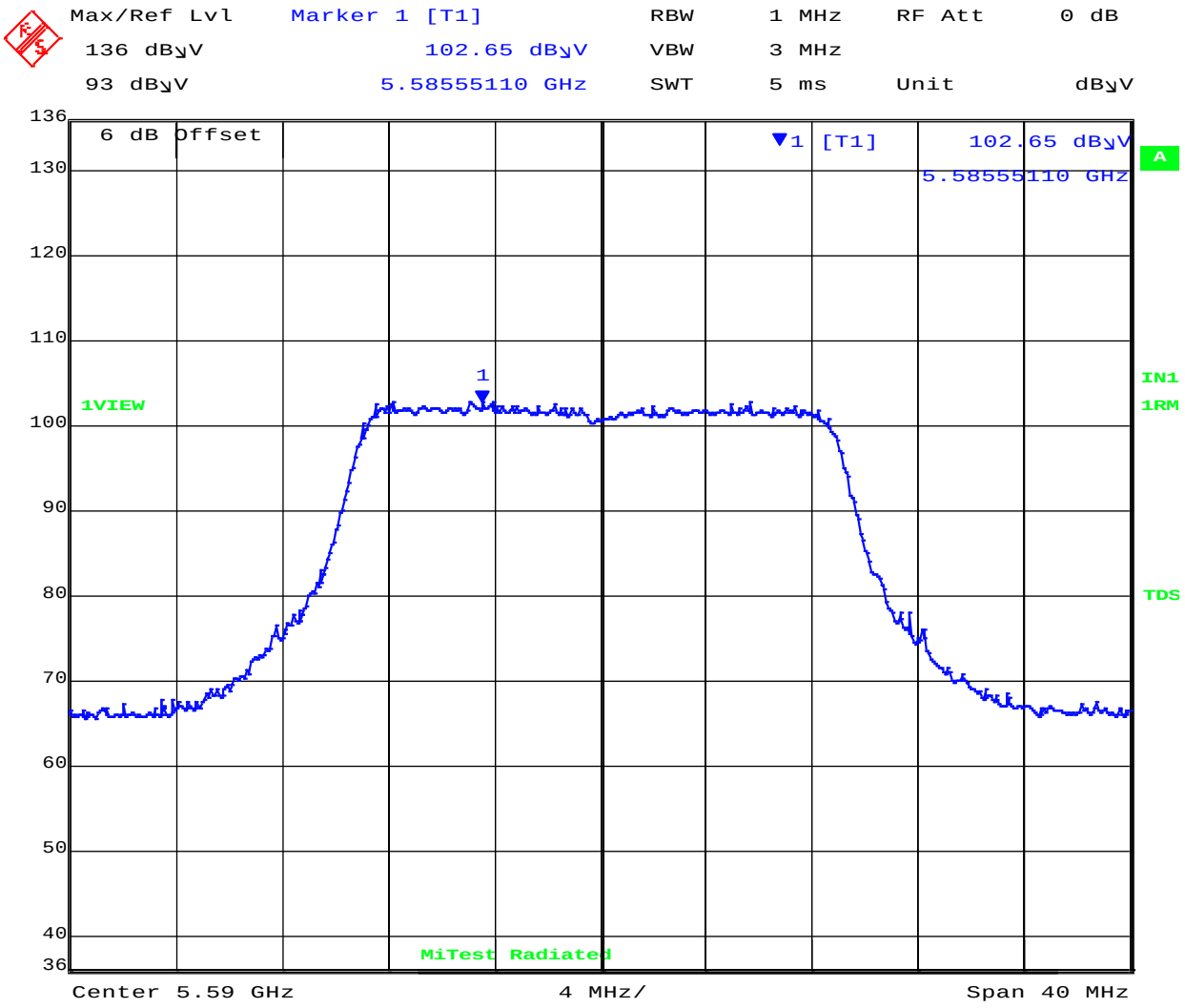
Variant: 20 MHz, Channel: 5590.00 MHz, Polarity H



back to matrix

POWER SPECTRAL DENSITY

Variant: 20 MHz, Channel: 5590.00 MHz, Polarity V



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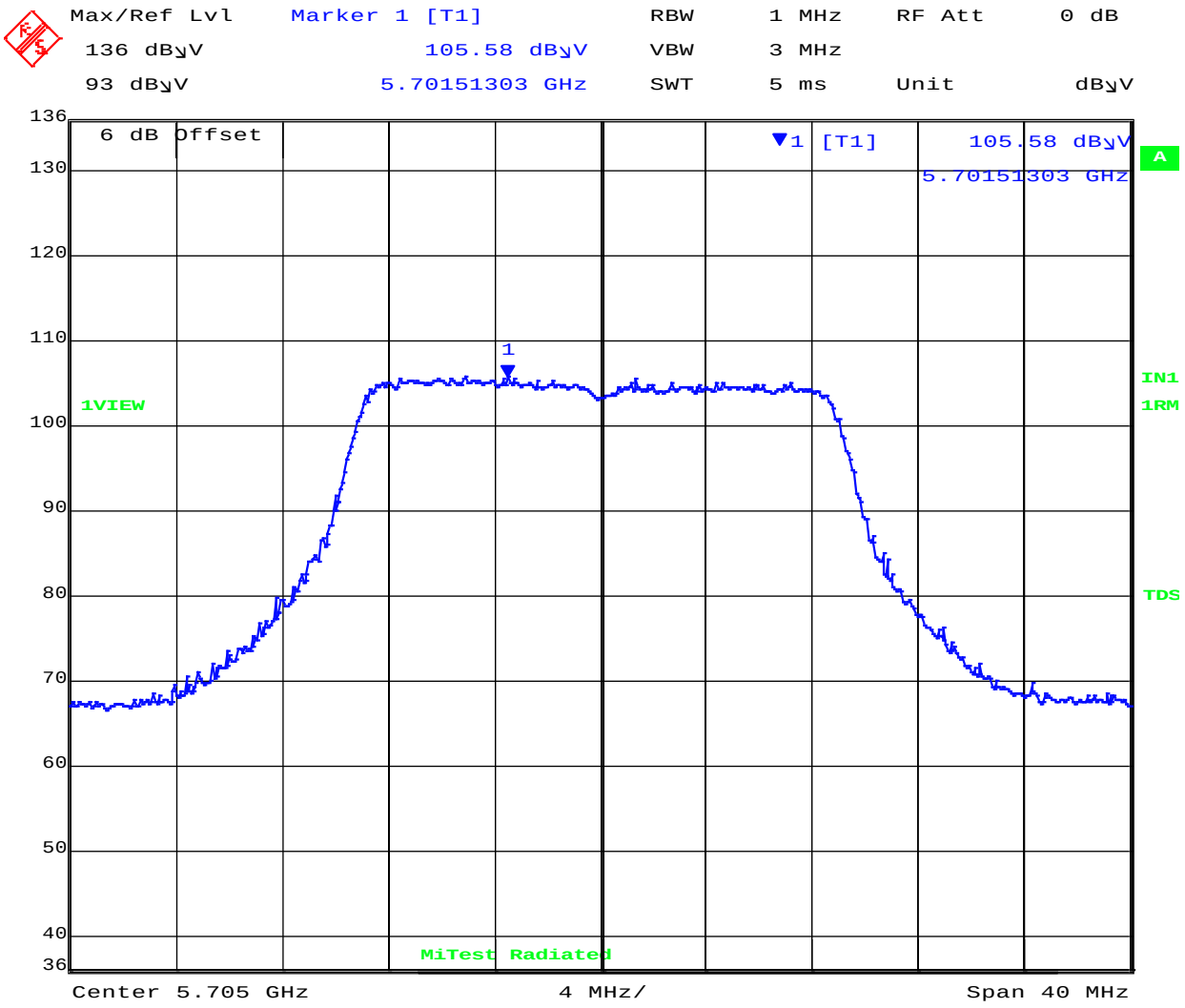
POWER SPECTRAL DENSITY

Variant: 20 MHz, Channel: 5705.00 MHz, Polarity H



Date: 18.MAY.2020 16:47:18

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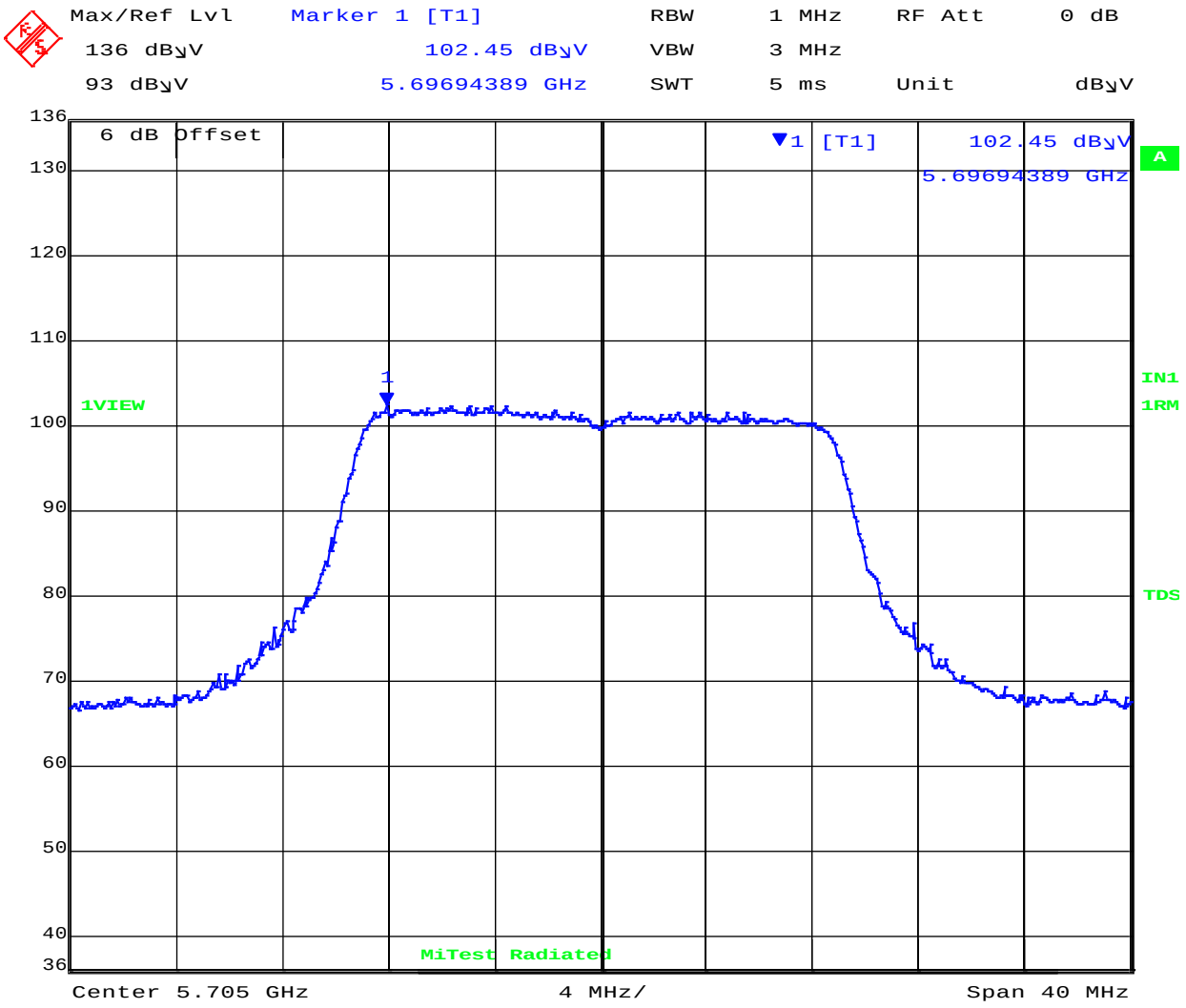
POWER SPECTRAL DENSITY

Variant: 20 MHz, Channel: 5705.00 MHz, Polarity V



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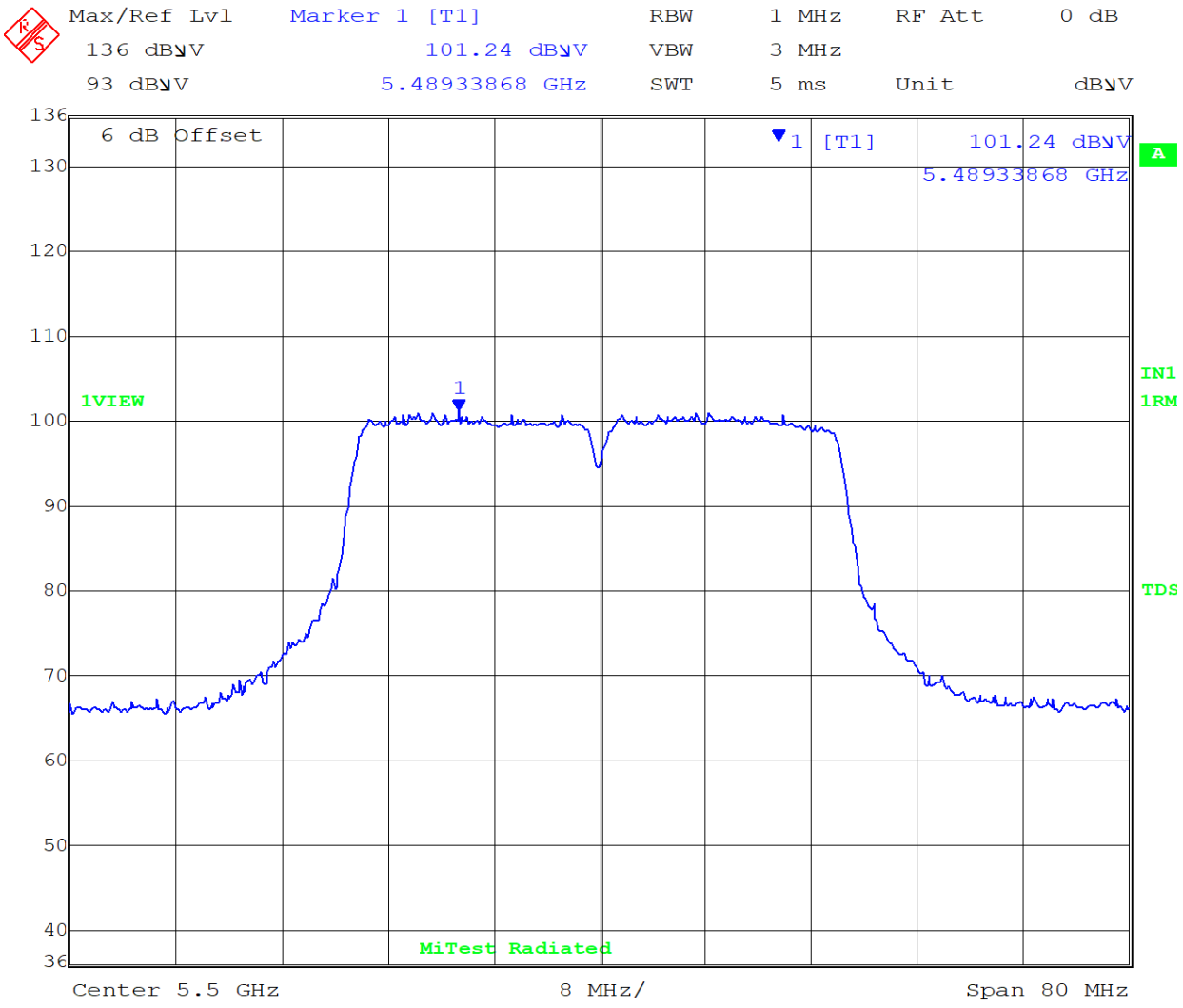
POWER SPECTRAL DENSITY

Variant: 40 MHz, Channel: 5500.00 MHz, Polarity H



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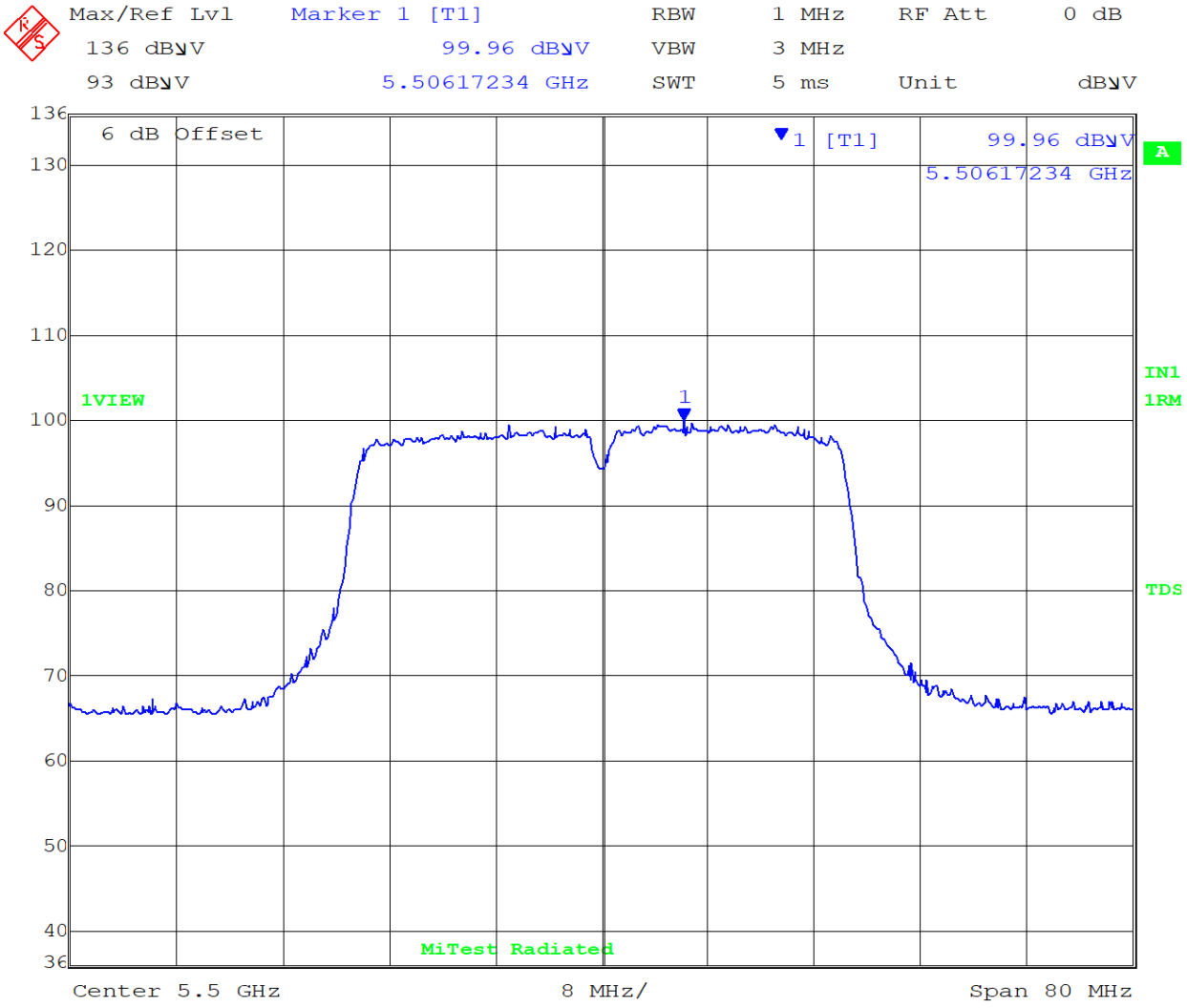
POWER SPECTRAL DENSITY

Variant: 40 MHz, Channel: 5500.00 MHz, Polarity V



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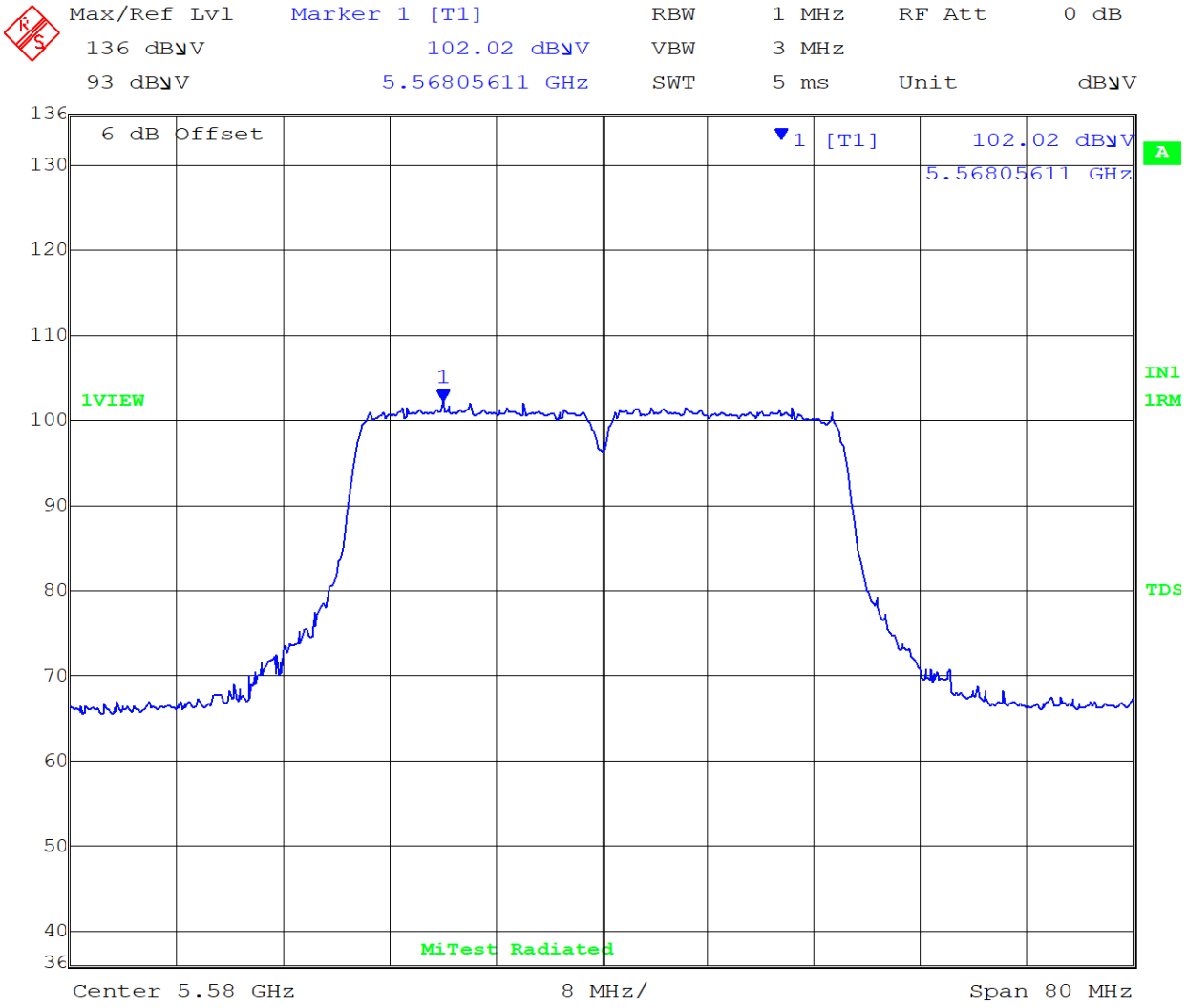
POWER SPECTRAL DENSITY

Variant: 40 MHz, Channel: 5580.00 MHz, Polarity H



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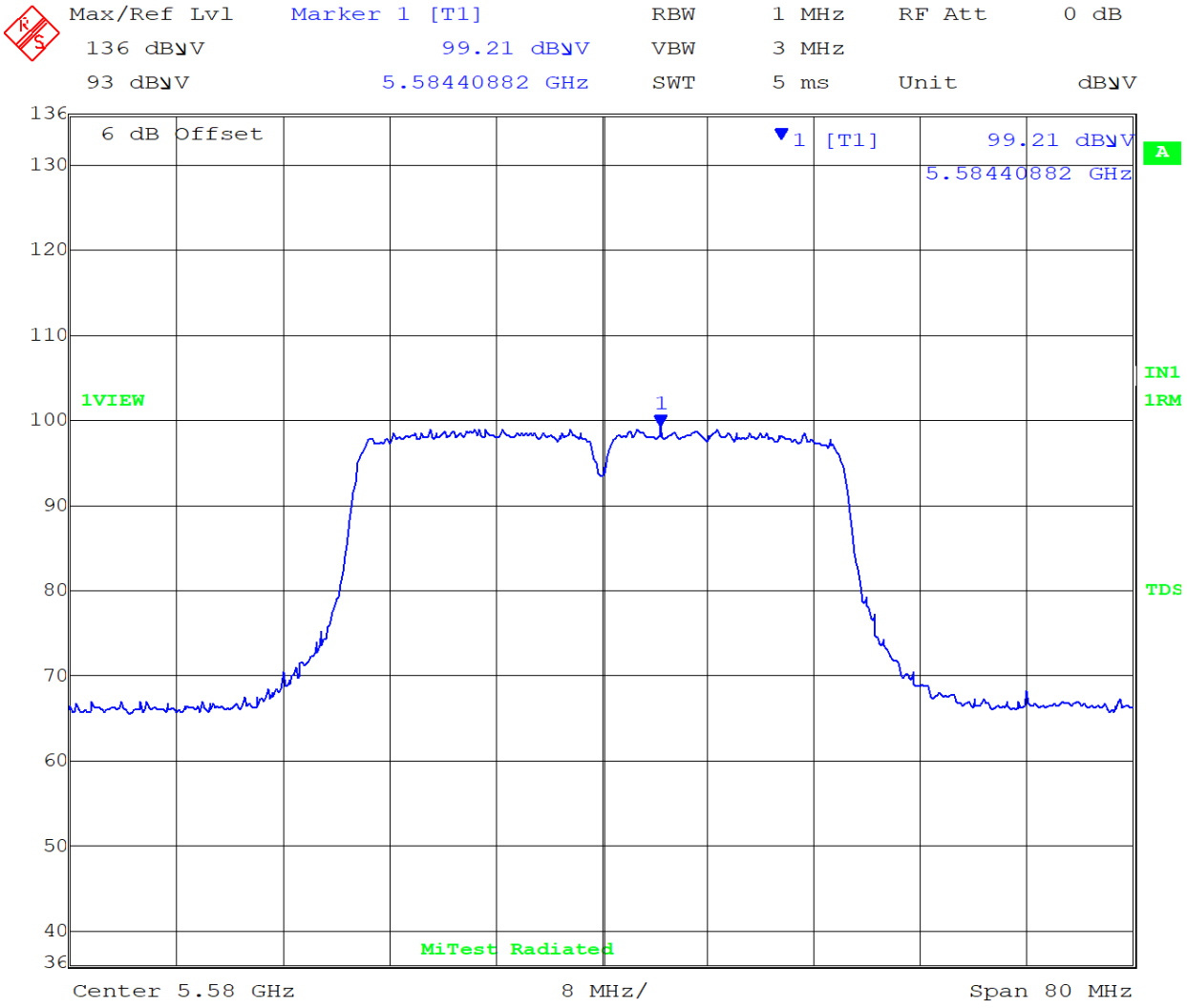
POWER SPECTRAL DENSITY

Variant: 40 MHz, Channel: 5580.00 MHz, Polarity V



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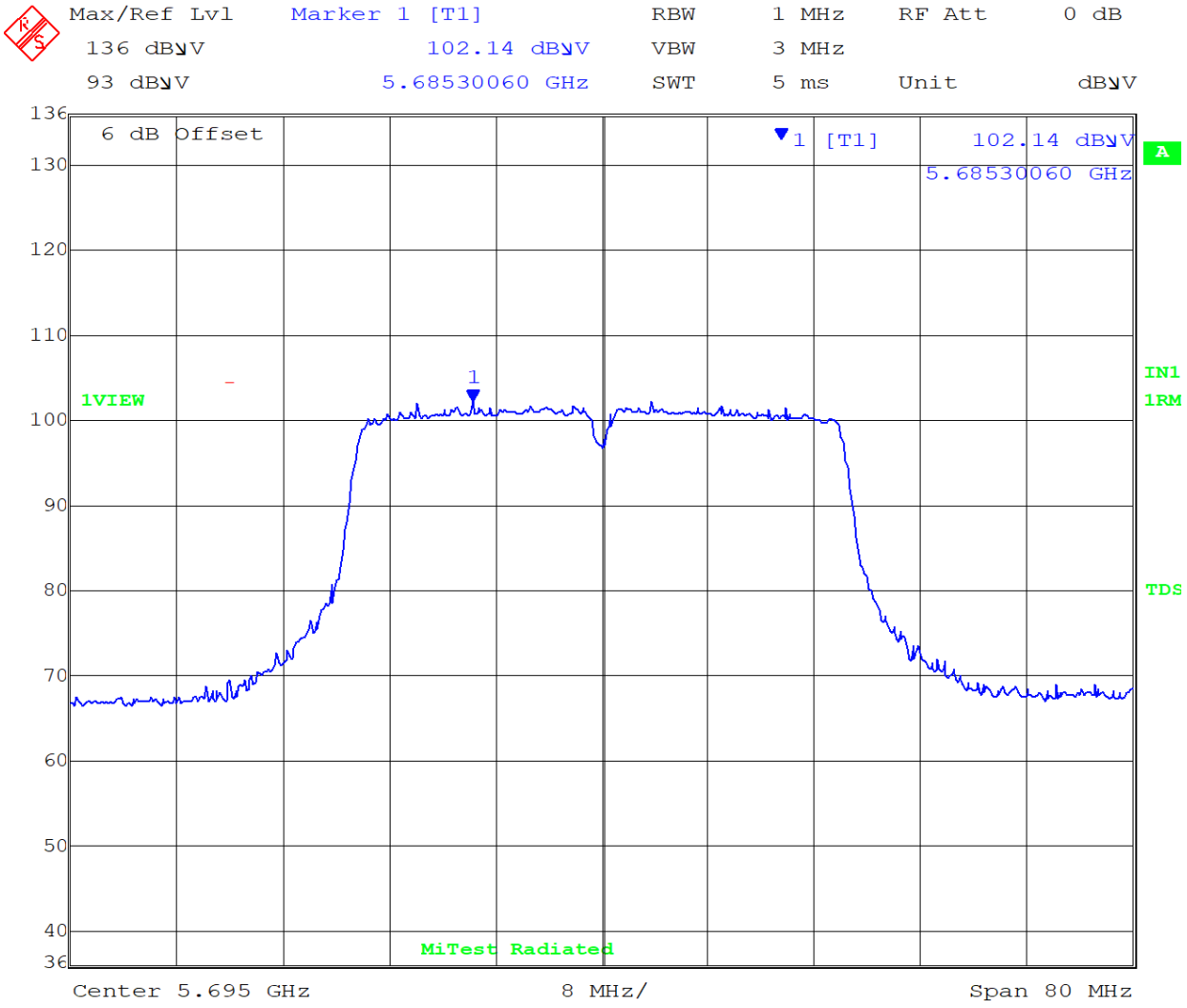
POWER SPECTRAL DENSITY

Variant: 40 MHz, Channel: 5695.00 MHz, Polarity H



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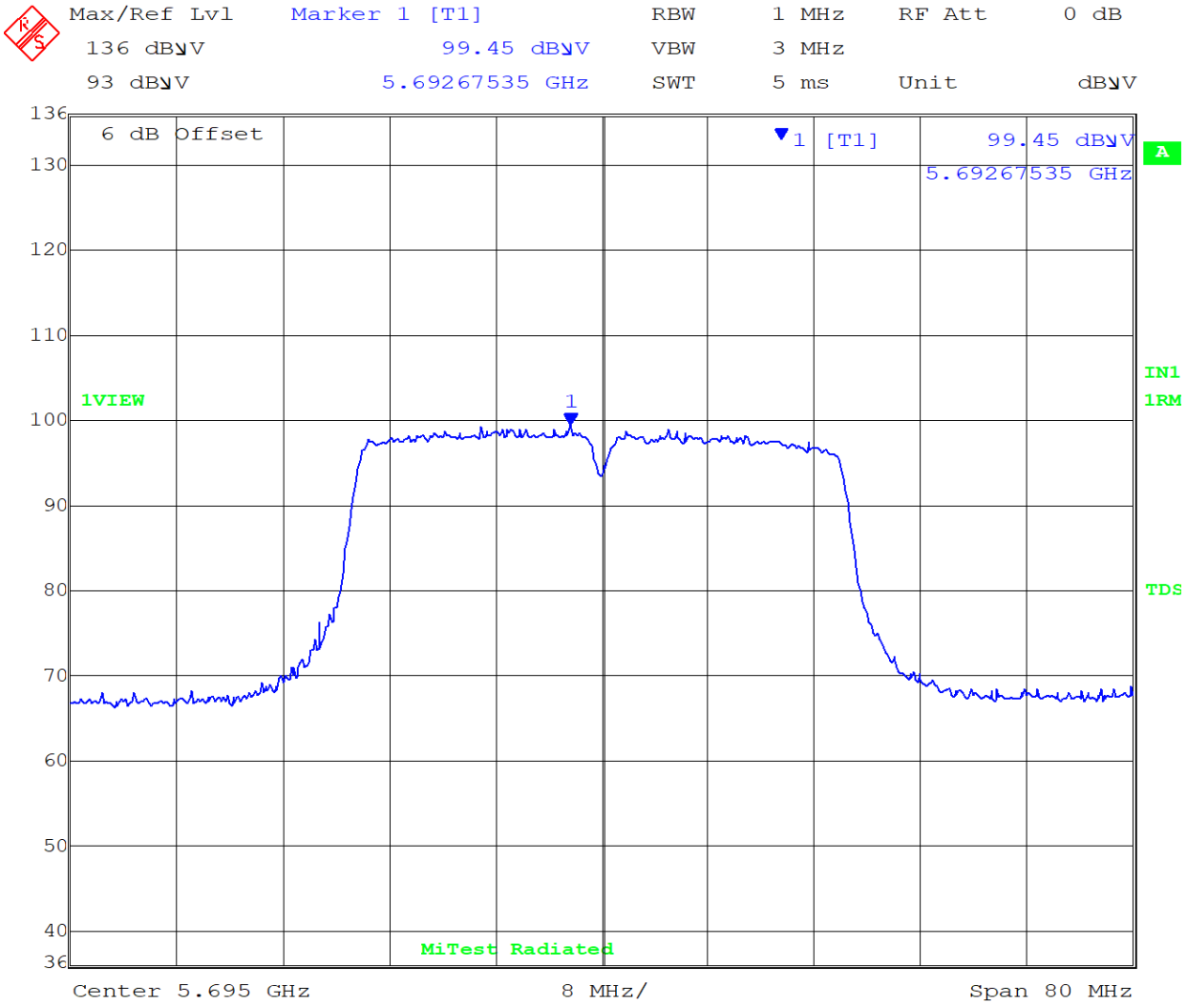
POWER SPECTRAL DENSITY

Variant: 40 MHz, Channel: 5695.00 MHz, Polarity V



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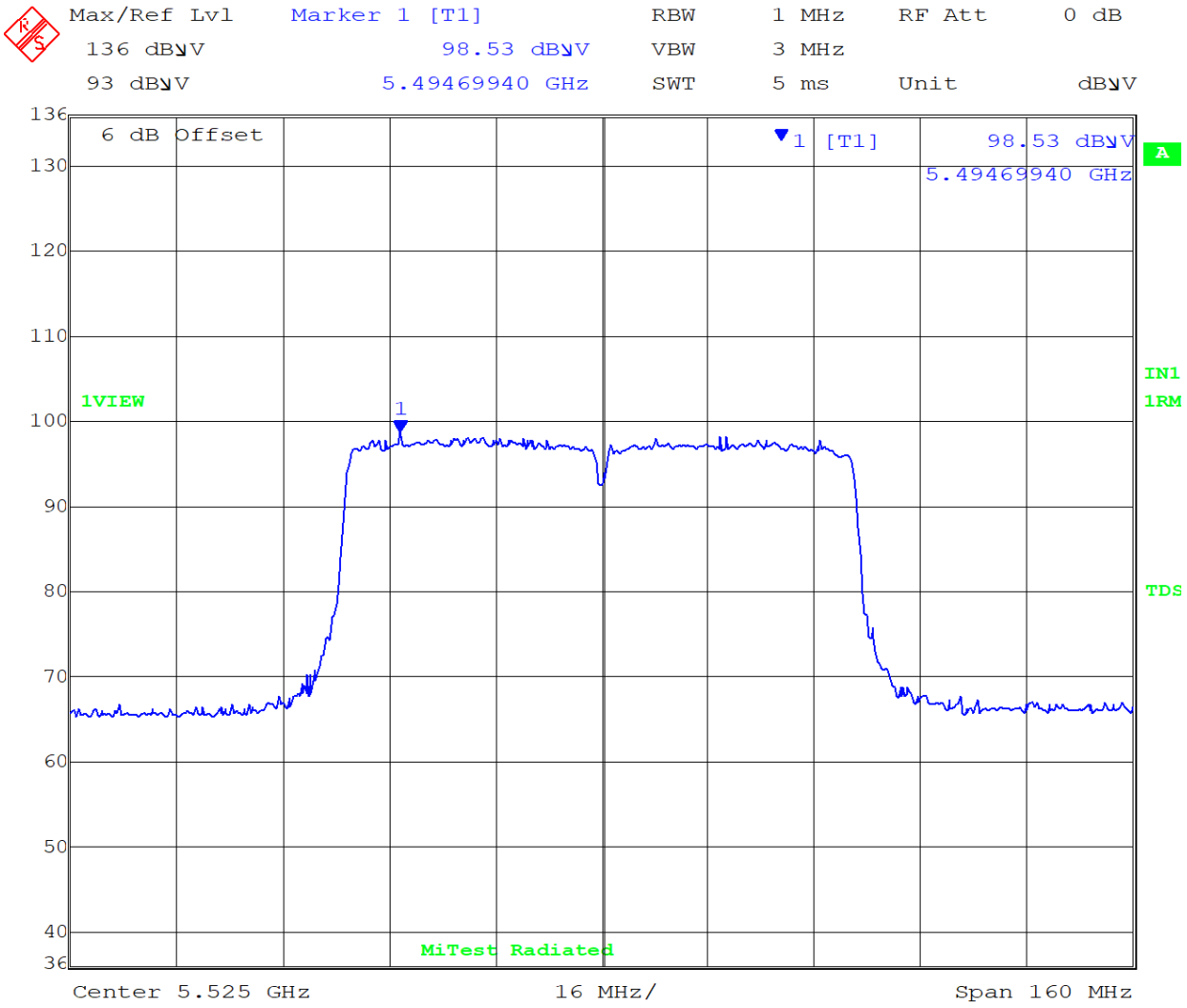
POWER SPECTRAL DENSITY

Variant: 80 MHz, Channel: 5525.00 MHz, Polarity H



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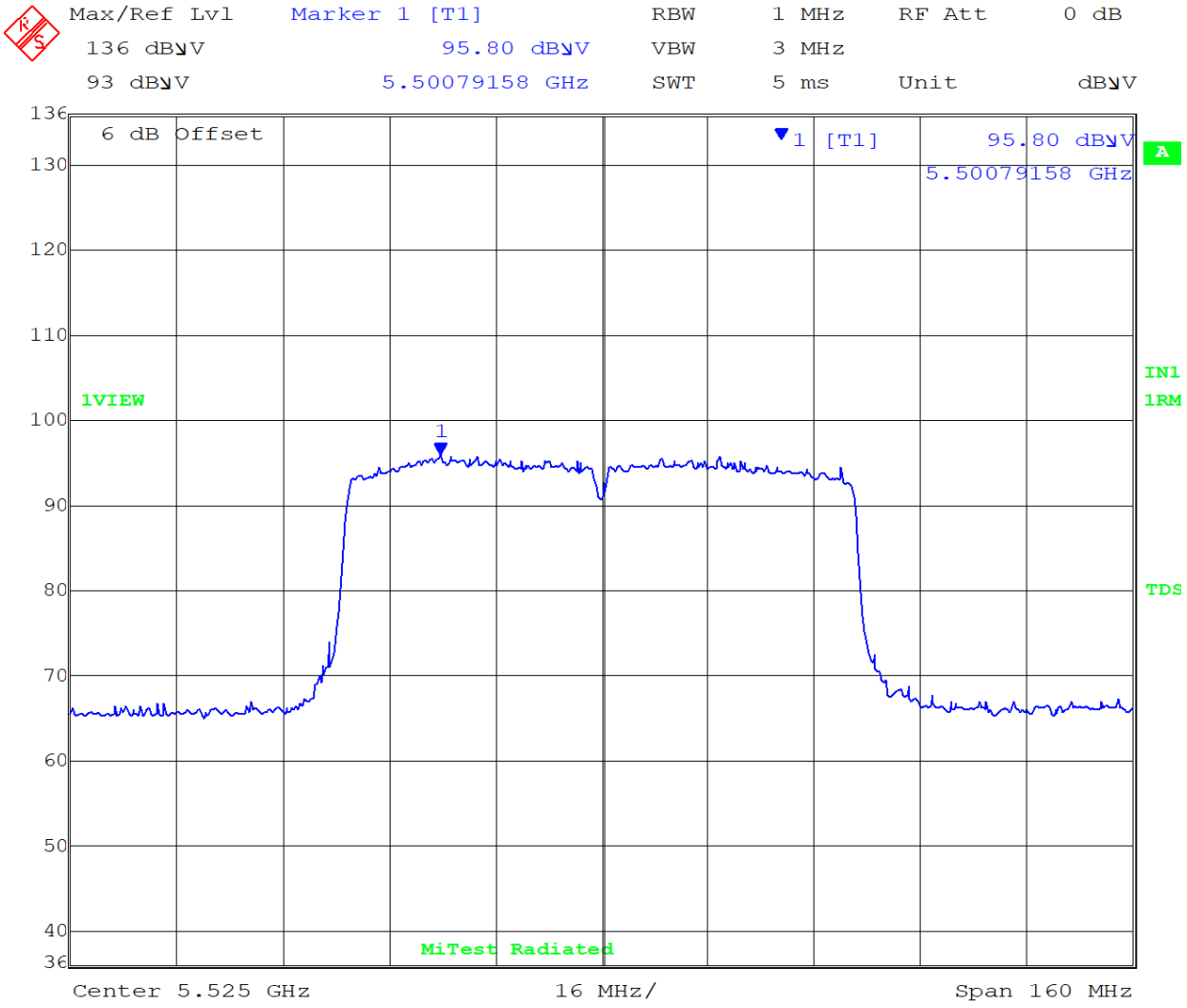
POWER SPECTRAL DENSITY

Variant: 80 MHz, Channel: 5525.00 MHz, Polarity V



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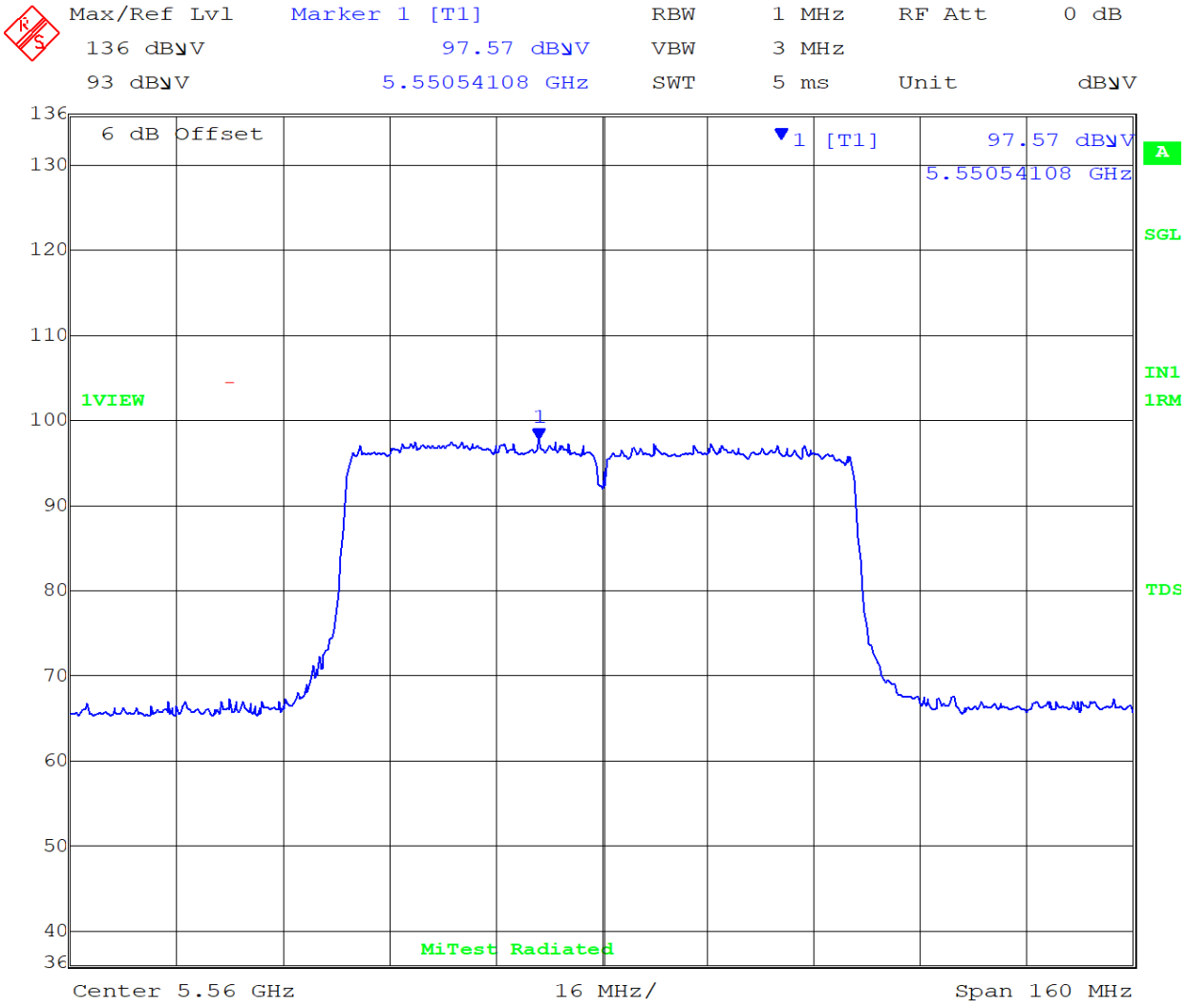
POWER SPECTRAL DENSITY

Variant: 80 MHz, Channel: 5560.00 MHz, Polarity H



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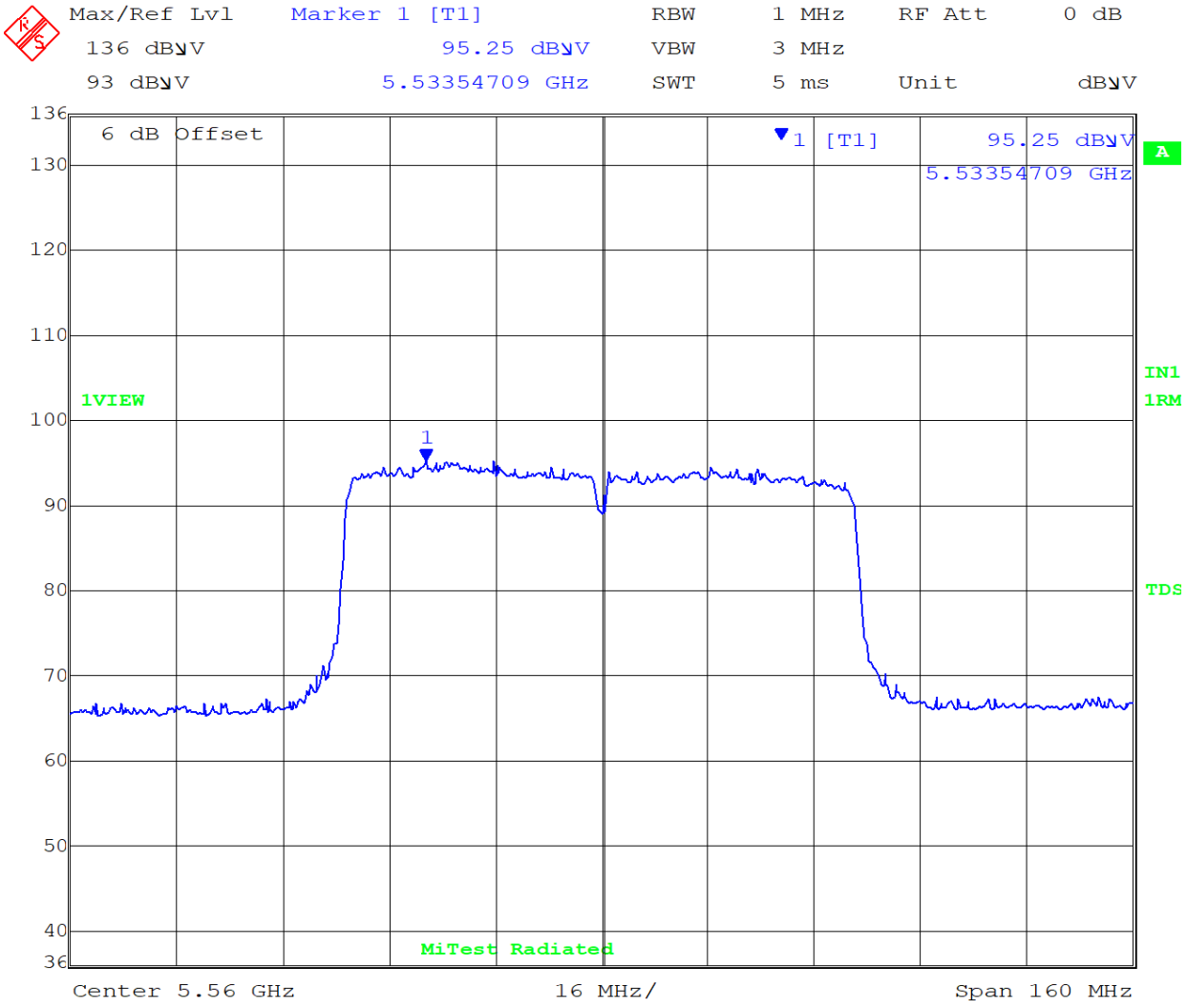
POWER SPECTRAL DENSITY

Variant: 80 MHz, Channel: 5560.00 MHz, Polarity V



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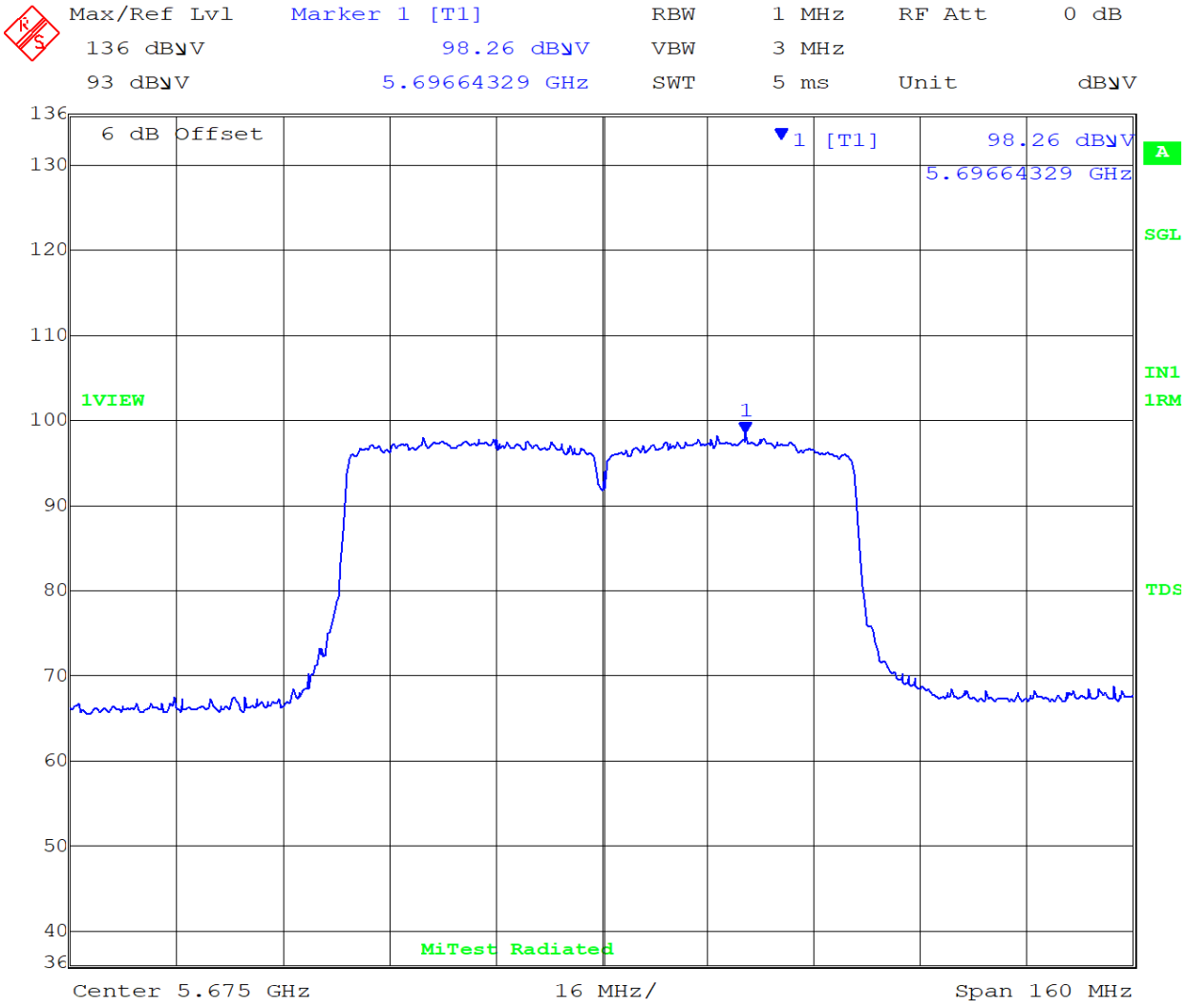
POWER SPECTRAL DENSITY

Variant: 80 MHz, Channel: 5675.00 MHz, Polarity H



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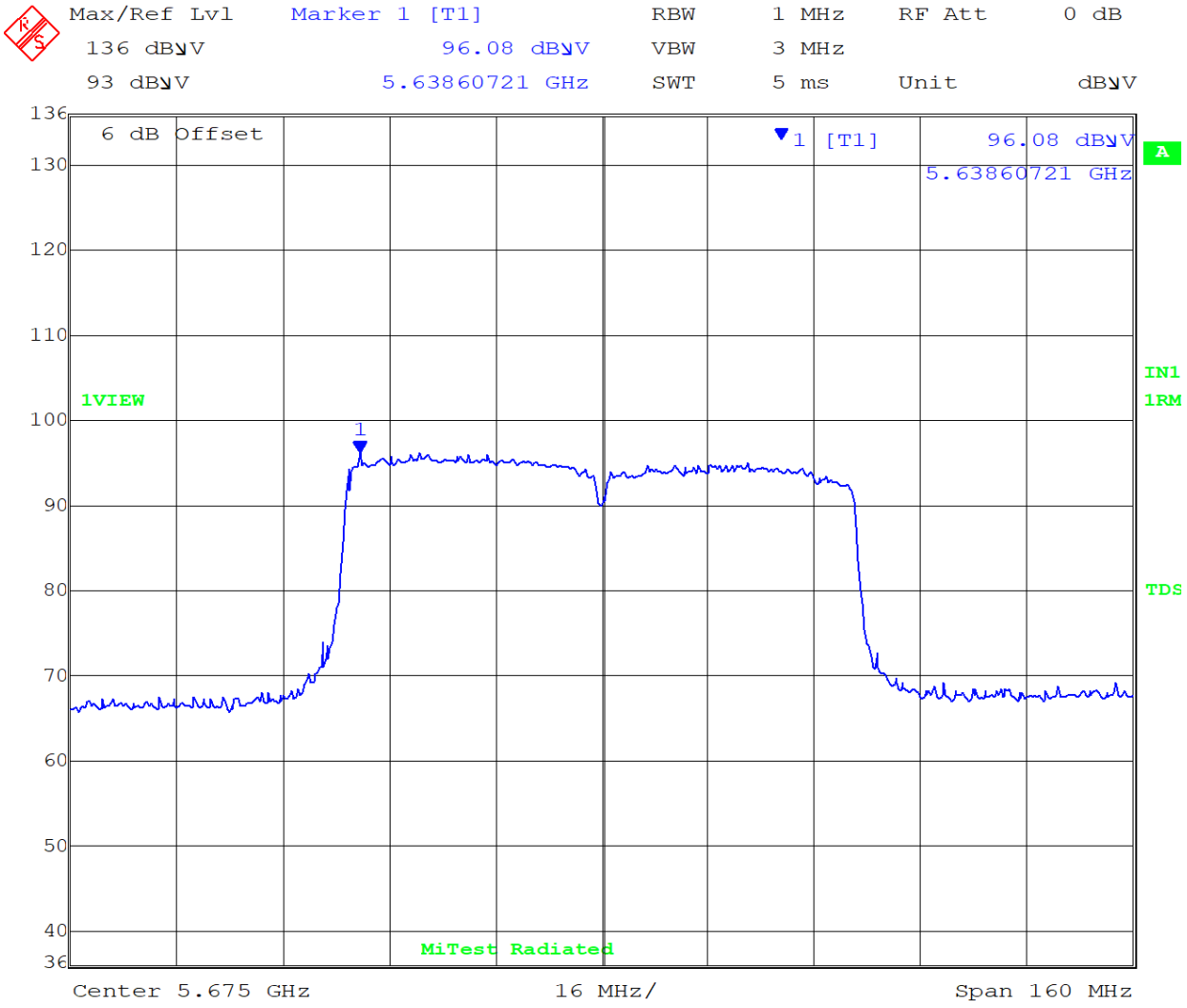
POWER SPECTRAL DENSITY

Variant: 80 MHz, Channel: 5675.00 MHz, Polarity V



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