Test of Mimosa Networks

To: FCC 47 CFR Part 101

Test Report Serial No.: MIMO04-U3 Rev A

TEST REPORT

FROM

MiCOM Labs

Test of Mimosa Networks

to

To FCC 47 CFR Part 101

Test Report Serial No.: MIMO04-U3 Rev A

This report supersedes NONE

Applicant: Mimosa Networks
469 El Camino Real, Suite 100
Santa Clara, California 95050
USA

Product Function: Microwave Fixed Link

Copy No: pdf Issue Date: 9th November 2015

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
575 Boulder Court,
Pleasanton, CA 94566 USA
Phone: +1 (925) 462-0304
Fax: +1 (925) 462-0306
www.micomlabs.com

A2LA ACCREDITED
TESTING CERT #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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ACCREDITATION, LISTINGS & RECOGNITION

ACCREDITATION - TESTING

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025. 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

ilac-MRA

American Association for Laboratory Accreditation

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 17025:2005 *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 8 January 2009*).

Presented this 28th day of February 2014.

President & CEO
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2015

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

RECOGNITION

MiCOM Labs, Inc has widely recognized Electrical testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA** countries. Our test reports are widely accepted for global type approvals.

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	

**APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement.
Is a 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
N/A – Not Applicable

**EU MRA – European Union Mutual Recognition Agreement.
Is a recognition agreement under which test lab is accredited to regulatory standards of the EU member countries.

**NB – Notified Body

PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065. 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

United States of America – Telecommunication Certification Body (TCB)
TCB Identifier – US0159

Industry Canada – Certification Body
CAB Identifier – US0159

Europe – Notified Body
Notified Body Identifier - 2280

Japan – Recognized Certification Body (RCB)
RCB Identifier - 210

DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft	2nd November 2015	
Draft #2	5th November 2015	
Rev A	9th November 2015	Initial Release

1. TEST RESULT SUMMARY

Applicant:	Mimosa Networks 469 El Camino Real, Suite 100 Santa Clara, California 95050 USA	Tested by:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California, 94566, USA
EUT:	Microwave Fixed Link	Tel:	+1 925 462 0304
Model:	B11	Fax:	+1 925 462 0306
S/N:	Not Available		
Test Date(s):	20th to 26th October 2015	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 101	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.

Approved & Released for MiCOM Labs, Inc. by:

A2LA ACCREDITED
TESTING CERT #2381.01

Graeme Grieve
Quality Manager MiCOM Labs,

Gordon Hurst
President & CEO MiCOM Labs, Inc.

2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR 101	Oct 2015	Code of Federal Regulations
(ii)	ANSI C63.4	2009	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
(iii)	CISPR 22/ EN 55022	2008 2006+A1:2007	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(iv)	M 3003	Edition 2 Jan. 2007	Expression of Uncertainty and Confidence in Measurements
(v)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(vi)	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
(vii)	A2LA	July 2012	Reference to A2LA Accreditation Status – A2LA Advertising Policy

2.2. Test and Uncertainty Procedures

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.

3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the Mimosa Networks B11 in the frequency range 10.7 – 11.7 GHz to FCC Part 101 regulations.
Applicant:	Mimosa Networks 469 El Camino Real, Suite 100 Santa Clara, California 95050 USA
Manufacturer:	As Applicant
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton, 94566 California USA
Test report reference number:	MIMO04-U3 Rev A
Date EUT received:	20th October 2015
Standard(s) applied:	FCC 47 CFR Part 101
Dates of test (from - to):	20th to 26th October 2015
No of Units Tested:	One
Type of Equipment:	Microwave Fixed Link
Model(s):	B11
Location for use:	Outdoor only
Declared Frequency Range(s):	10.7 – 11.7 GHz
Hardware Rev	2.0
Software Rev	1.3.0
EUT Modes of Operation:	20, 40, 80 MHz Channel Spacing
Type of Modulation:	BPSK, 16 QAM, 64 QAM, 128 QAM, 256 QAM
Transmit/Receive Operation:	Full Duplex
System Beam Forming:	Antenna beam forming is not implemented in this device
Rated Input Voltage and Current:	Nominal: 48 Vdc, 0.8 A Maximum 43.2 Vdc Minimum 52.8 Vdc
Operating Temperature Range:	Declared range -40 to +55ºC
ITU Emission Designator:	20 MHz: 18M6D7D 40 MHz: 37M7D7D 80 MHz: 77M0D7D
Equipment Dimensions:	Height: 260mm (10.2”) Width: 158mm (9.6”) Depth: 70mm (2.8”)
Weight:	2kg (4.5lbs)
Primary function of equipment:	Microwave Fixed Link

3.2. Scope of Test Program

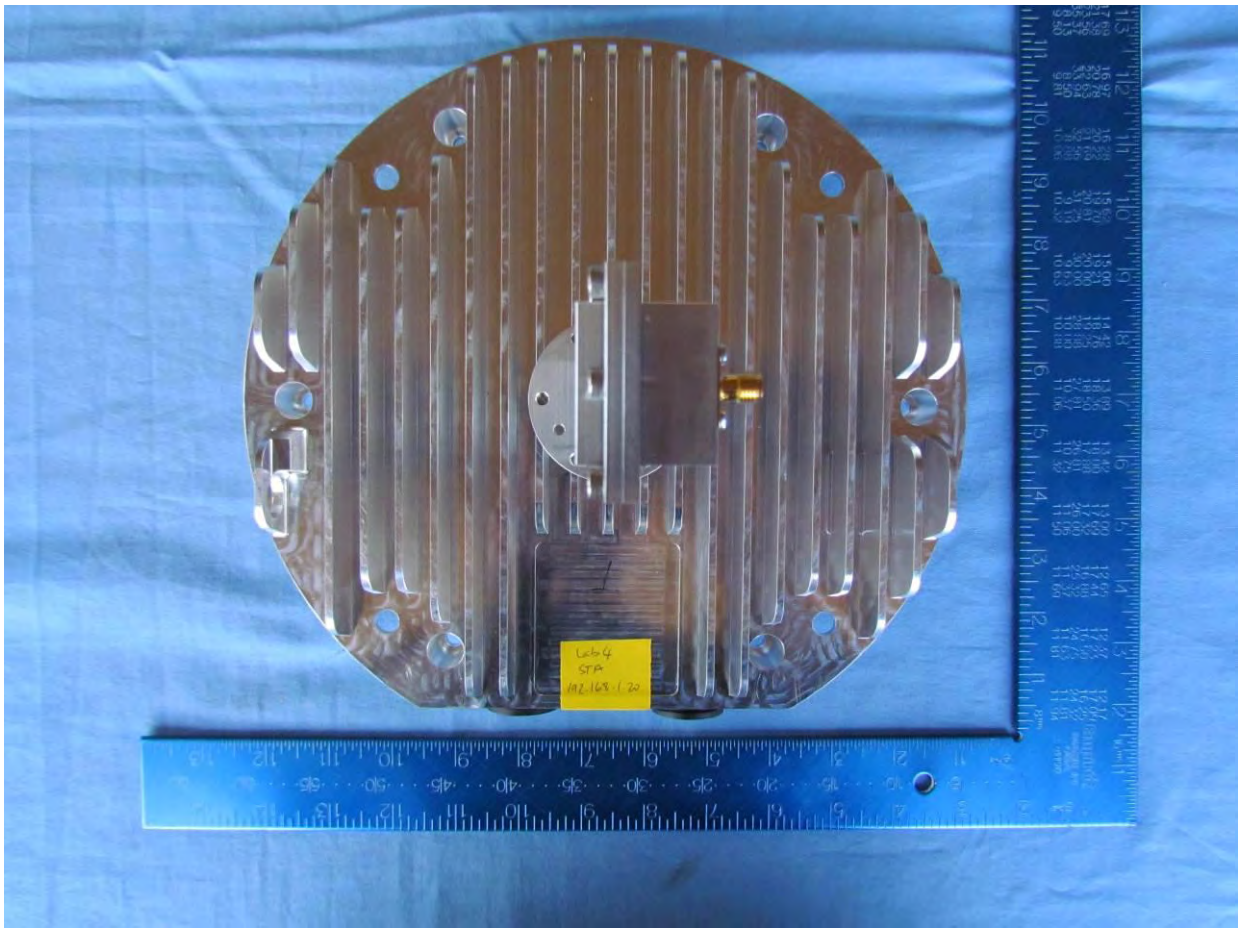
Mimosa Networks RF Testing

The scope of the test program was to test the Mimosa Networks B11, in the frequency range 10.7 – 11.7 GHz for compliance against FCC 47 CFR Part 101 specification.

FCC CFR 47 Part 101 10.7 – 11.7 GHz Fixed Microwave Services

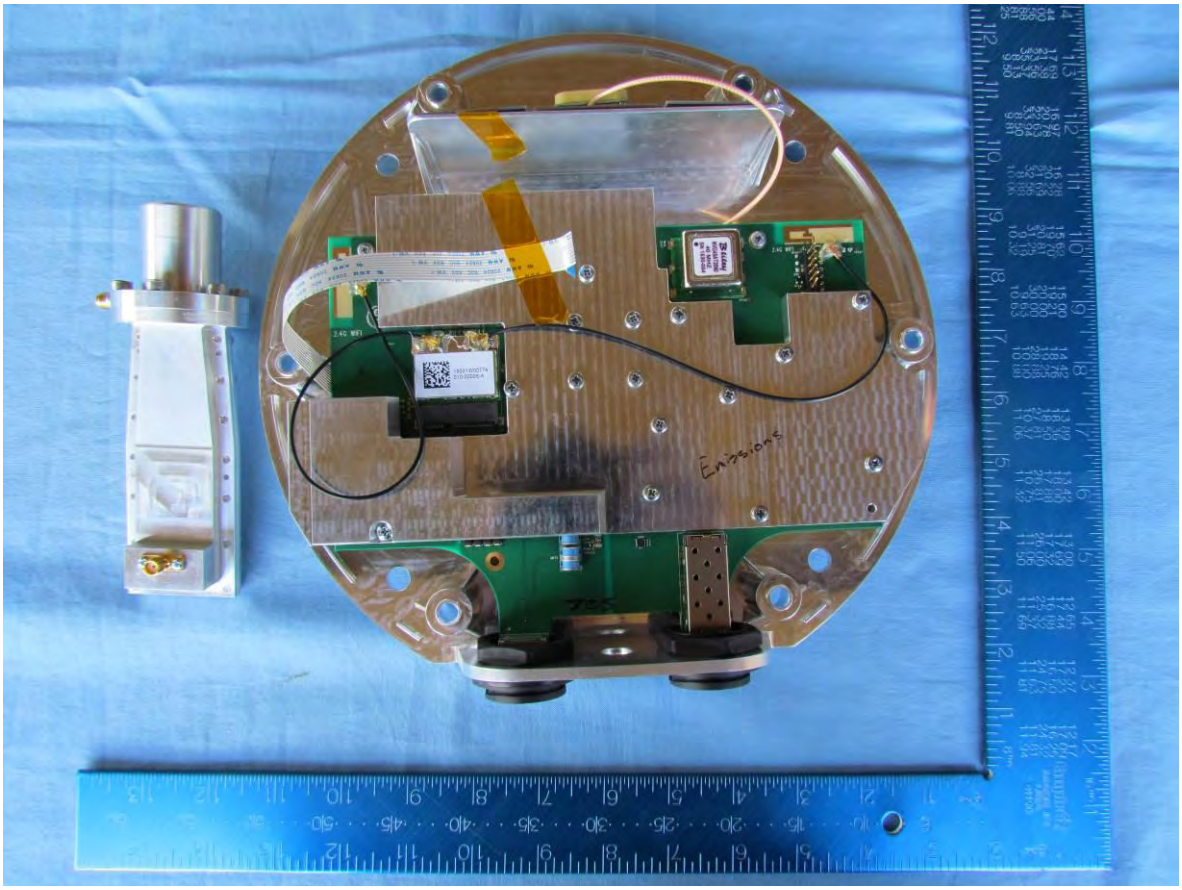
Mimosa Networks B11
Mimosa Networks B11: dual polarization, dual channel, 10.7-11.7 GHz radio. Supports 256-QAM, up to 1.5 GBit IP throughout. GPS synchronized.

Mimosa Networks B11



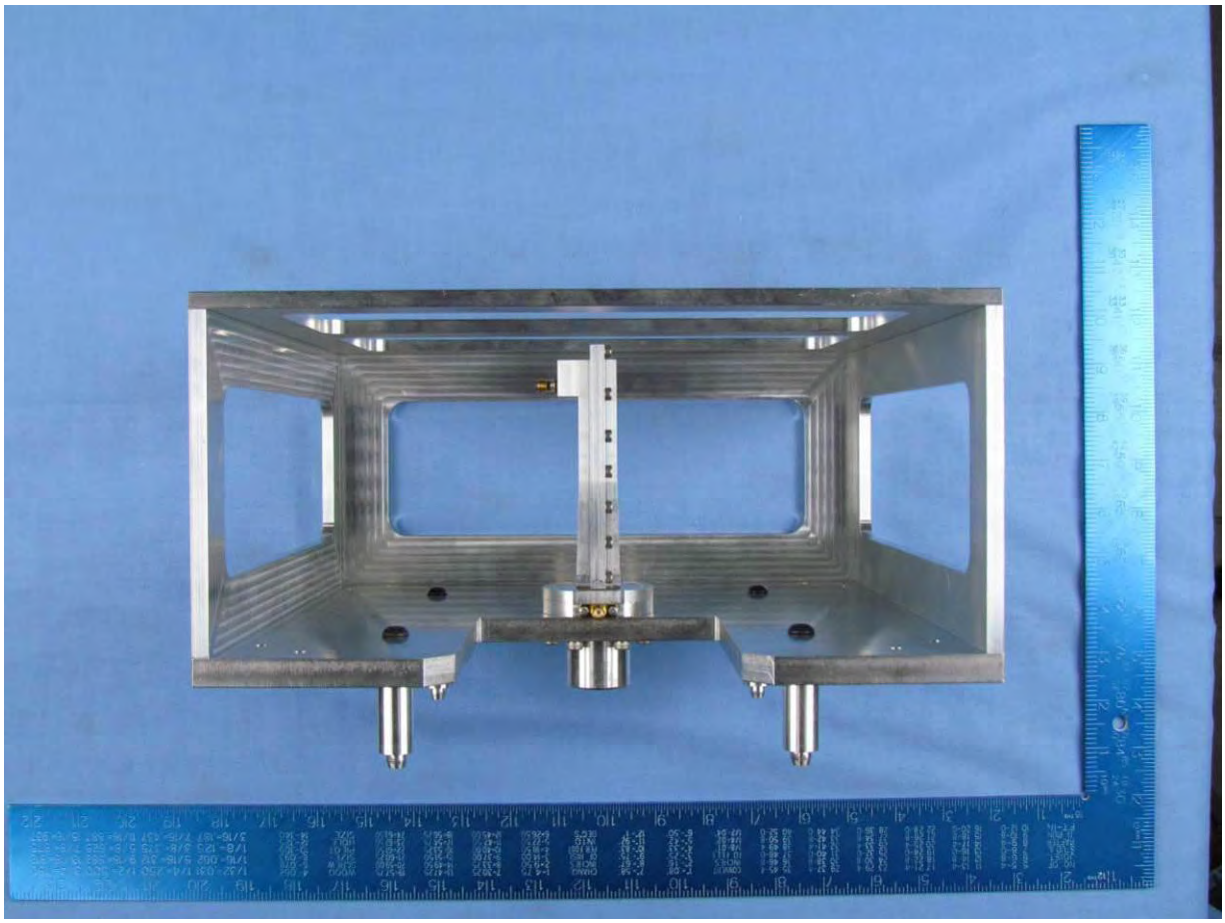
B11 underside

Mimosa Networks B11



B11 with waveguide test adapter

Mimosa Networks B11 Label



B11 Test Fixture

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

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Microwave Fixed Link	Mimosa Networks	B11	Not Available
Support	Laptop PC	IBM	Unknown	None

3.4. Antenna Details

Type	Manufacturer	Model Number	Azimuth/Elevation	Antenna Gain (dBi)
				@ 11.7 GHz
Parabolic	Jirous	JRMC-680-10/11	Unknown	35.5
Parabolic	Jirous	JRMB-900-10/11	Unknown	37.5
Parabolic	Jirous	JRMB-1200-10/11	Unknown	41.0

3.5. Cabling and I/O Ports

Number and type of I/O ports

Port Type	Max Cable Length	# Of Ports	Screened	Conn Type	Data Type
Ethernet	100m	1	Y	RJ-45	Packet
SFP Fiber	50 km	1	N/A	SFP	Optical

3.6. Test Configurations

Matrix of test configurations

Operational Mode(s) (MHz)	Variant	Test Frequencies (MHz)
20, 40, 80	BPSK + 256 QAM	10,715.00 11,245.00 11,685.00

3.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. **Digital Emission Issue**

   Problem

   The device when initially tested was found to fail digital emissions (0.03 – 1000 MHz)

   Solution

   Cabling within the device was re-routed then re-tested. The device complies with Class A emissions

3.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. Conducted Spurious Emissions (Section 6.1.1.4 Emission Limitations)

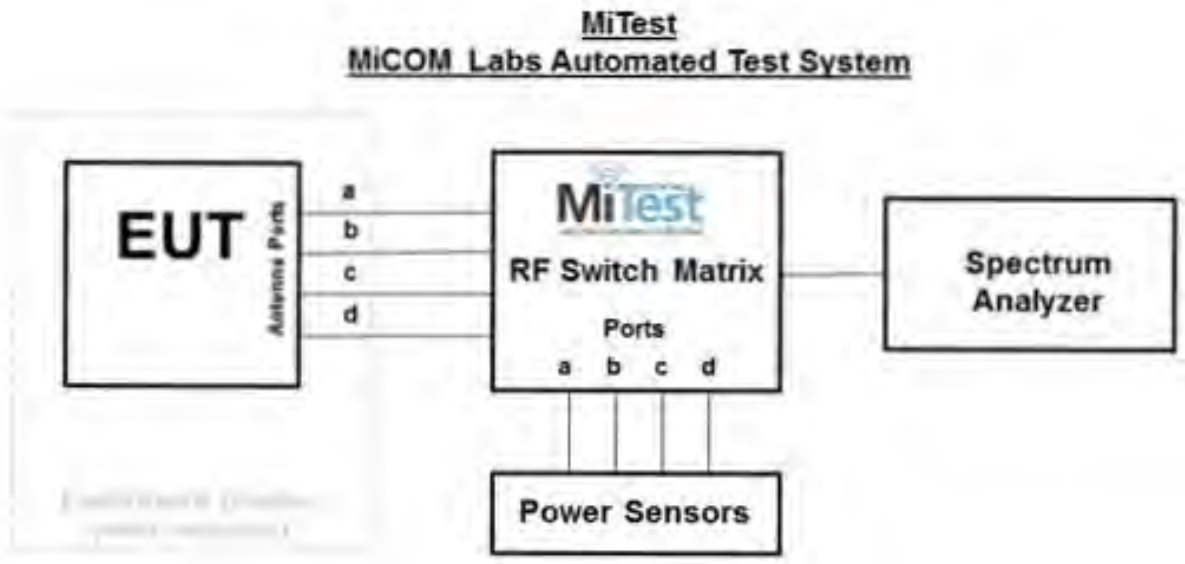
   Client delivered a test fixture in order to test the B11 device. The test fixture had a waveguide to SMA coupler on each of the antenna ports which could not be removed. As a result spurious emissions above 40 GHz were not be measured. Harmonic mixers are used to measure >40 GHz and are directly connect into the waveguide of the device under test.

4. TESTING EQUIPMENT CONFIGURATION(S)

4.1. Conducted RF Emission Test Set-up

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Section 6.1.1.1 Bandwidth
2. Frequency Tolerance
3. Section 6.1.1.4. Output Power
4. Section 6.1.1.5.1 Conducted Emissions
5. Section 6.1.1.5.2 Conducted Band-Edge Spurious Emissions



Conducted Test Measurement 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.

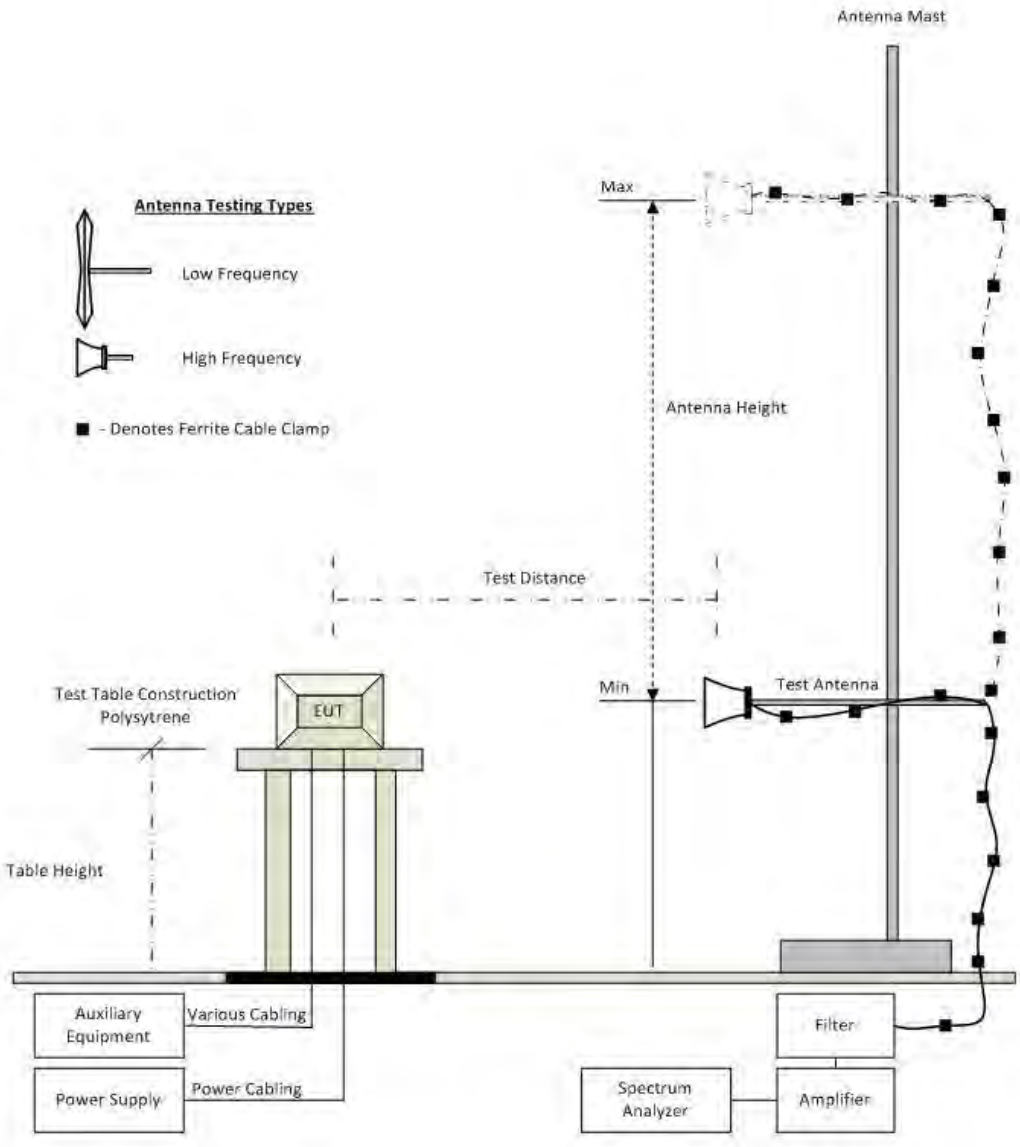
Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2015
249	Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	30 Oct 2015
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	27 Aug 2016
361	Desktop for RF#1, Labview Software installed	Dell	Vostro 220	WS RF#1	Not Required
378	Rohde & Schwarz 40 GHz Receiver with Generator	Rhode & Schwarz	ESIB40	100107/040	04 Aug 2016
380	4x4 RF Switch Box	MiCOM Labs	MiTest RF Switch Box	MIC001	20 Dec 2015
390	USB Power Head 50MHz - 24GHz -60 to +20dBm	Agilent	U2002A	MY50000103	17 Oct 2016
398	Test Software	MiCOM	MiTest ATS	Version 3.0.0.16	Not Required
405	DC Power Supply 0-60V	Agilent	6654A	MY4001826	Cal when used
408	USB to GPIB interface	National Instruments	GPIB-USB HS	14C0DE9	Not Required
436	USB Wideband Power Sensor	Boonton	55006	8731	31 Jul 2016
437	USB Wideband Power Sensor	Boonton	55006	8759	31 Jul 2016
75	Environmental Chamber	Thermatron	SE-300-2-2	27946	28 Nov 2015
RF#1 GPIB#1	GPIB cable to Power Supply	HP	GPIB	None	Not Required
RF#1 SMA SA #452	Precision SMA Male RG-402 Spectrun Analyzer	Fairview Microwave	Precision SMA Male RG 402 coax	None	20 Dec 2015
RF#1 SMA#1	EUT to Mitest box port 1	Flexco	SMA Cable port1	None	20 Dec 2015
RF#1 SMA#2	EUT to Mitest box port 2	Flexco	SMA Cable port2	None	20 Dec 2015
RF#1 SMA#3	EUT to Mitest box port 3	Flexco	SMA Cable port3	None	20 Dec 2015
RF#1 SMA#4	EUT to Mitest box port 4	Flexco	SMA Cable port4	None	20 Dec 2015
RF#1 USB#1	USB Cable to Mitest Box	Dynex	USB Cable	None	Not Required

4.2. Radiated Spurious Emission Test Set-up

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Digital Emissions

Radiated Emission Measurement Setup – Above 1 GHz



Radiated Emission 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
158	Barometer/Thermometer	Control Company	4196	E2846	04 Dec 2015
170	Video System Controller for Semi Anechoic Chamber	Panasonic	WV-CY101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	27 Aug 2016
310	SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001	30 Oct 2015
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	15 Aug 2016
393	DC - 1050 MHz Low Pass Filter	Microcircuits	VLFX-1050	N/A	08 Oct 2016
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	24 Feb 2016
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	10 Nov 2015
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	28 May 2016
410	Desktop Computer	Dell	Inspiron 620	WS38	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
416	Gigabit ethernet filter	ETS-Lingren	Gigafoil 260366	None	Not Required
447	Rad Emissions Test Software	MiCOM	Software Ver. 1.0.73	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	25 Feb 2016
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	25 Feb 2016
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	25 Feb 2016
480	Cable - Bulkhead to Amp	SRC Haverhill	157-157-3050360	480	11 Aug 2016
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-151-3050787	481	11 Aug 2016
482	Cable - Amp to Antenna	SRC Haverhill	157-157-3051574	482	11 Aug 2016

5. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 101**

Section(s)	Test Items	Description	Condition	Result	Test Report Section
101.109	Bandwidth	99% Emission bandwidth	Conducted	Complies	6.1.1.1
101.107	Frequency Tolerance	Frequency contained within band of interest	Conducted	Complies	6.1.1.2
101.113	Transmitter Power Limitations	Power Measurement	Conducted	Complies	6.1.1.3
101.113	Emission Limitations	Transmitter Mask & Spurious Emissions	Conducted	Complies	6.1.1.4
Part 15B	Digital Emissions	Digital Emissions	Radiated	Complies Class A	6.1.1.5
Part 15B	ac Wireline Emissions	Powerline Emissions	Conducted	*Not Applicable	6.1.1.6

* - *Device is powered by 48 Vdc*

Note 1: Test results reported in this document relate only to the items tested

Note 2: The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria

6. TEST RESULTS

6.1. Device Characteristics

6.1.1. Conducted Testing

6.1.1.1. Bandwidth

Conducted Test Conditions for Occupied Bandwidth			
Standard:	FCC CFR 47:Part 101	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Occupied Bandwidth	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	101.109	**Pressure (mBars):**	999 - 1001
Reference Document(s):			

Test Procedure for Channel Bandwidth Measurement

The 99 % channel bandwidth is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.

Limits

The channel bandwidth shall be equal to or greater than 1 MHz and shall be reported by the certification applicant. Based on the channel bandwidth, the channel edge shall be used as reference point in the measurement of the transmitter unwanted emission power.

Measurement Results for 99 % Operational Bandwidth

Equipment Configuration for 99% Occupied Bandwidth			
Variant:	20 MHz	**Duty Cycle (%):**	100
Data Rate:	Unknown	**Antenna Gain (dBi):**	Not Applicable
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results								
Test Frequency	**Measured 99% Bandwidth (MHz)**							
	Port(s)							
MHz	**a**	**b**	**c**	**d**				
10715.00	18.196	--	--	--				
11245.00	18.597	--	--	--				
11685.00	18.196	--	--	--				

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

Equipment Configuration for 99% Occupied Bandwidth			
Variant:	20 MHz	**Duty Cycle (%):**	100
Data Rate:	Unknown	**Antenna Gain (dBi):**	Not Applicable
Modulation:	256 QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results								
Test Frequency	**Measured 99% Bandwidth (MHz)**							
	Port(s)							
MHz	**a**	**b**	**c**	**d**				
10715.00	18.196	--	--	--				
11245.00	18.036	--	--	--				
11685.00	18.276	--	--	--				

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

Equipment Configuration for 99% Occupied Bandwidth			
Variant:	40 MHz	**Duty Cycle (%):**	100
Data Rate:	Unknown	**Antenna Gain (dBi):**	Not Applicable
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results								
Test Frequency	**Measured 99% Bandwidth (MHz)**							
	Port(s)							
MHz	**a**	**b**	**c**	**d**				
10735.00	36.194	--	--	--				
11225.00	37.675	--	--	--				
11665.00	37.194	--	--	--				

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

Equipment Configuration for 99% Occupied Bandwidth			
Variant:	40 MHz	**Duty Cycle (%):**	100
Data Rate:	Unknown	**Antenna Gain (dBi):**	Not Applicable
Modulation:	256 QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results								
Test Frequency	**Measured 99% Bandwidth (MHz)**							
	Port(s)							
MHz	**a**	**b**	**c**	**d**				
10735.00	36.873	--	--	--				
11225.00	37.515	--	--	--				
11665.00	37.034	--	--	--				

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

Equipment Configuration for 99% Occupied Bandwidth			
Variant:	80 MHz	**Duty Cycle (%):**	100
Data Rate:	Unknown	**Antenna Gain (dBi):**	Not Applicable
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results								
Test Frequency	**Measured 99% Bandwidth (MHz)**							
	Port(s)							
MHz	**a**	**b**	**c**	**d**				
10755.00	76.633	--	--	--				
11215.00	76.953	--	--	--				
11645.00	76.312	--	--	--				

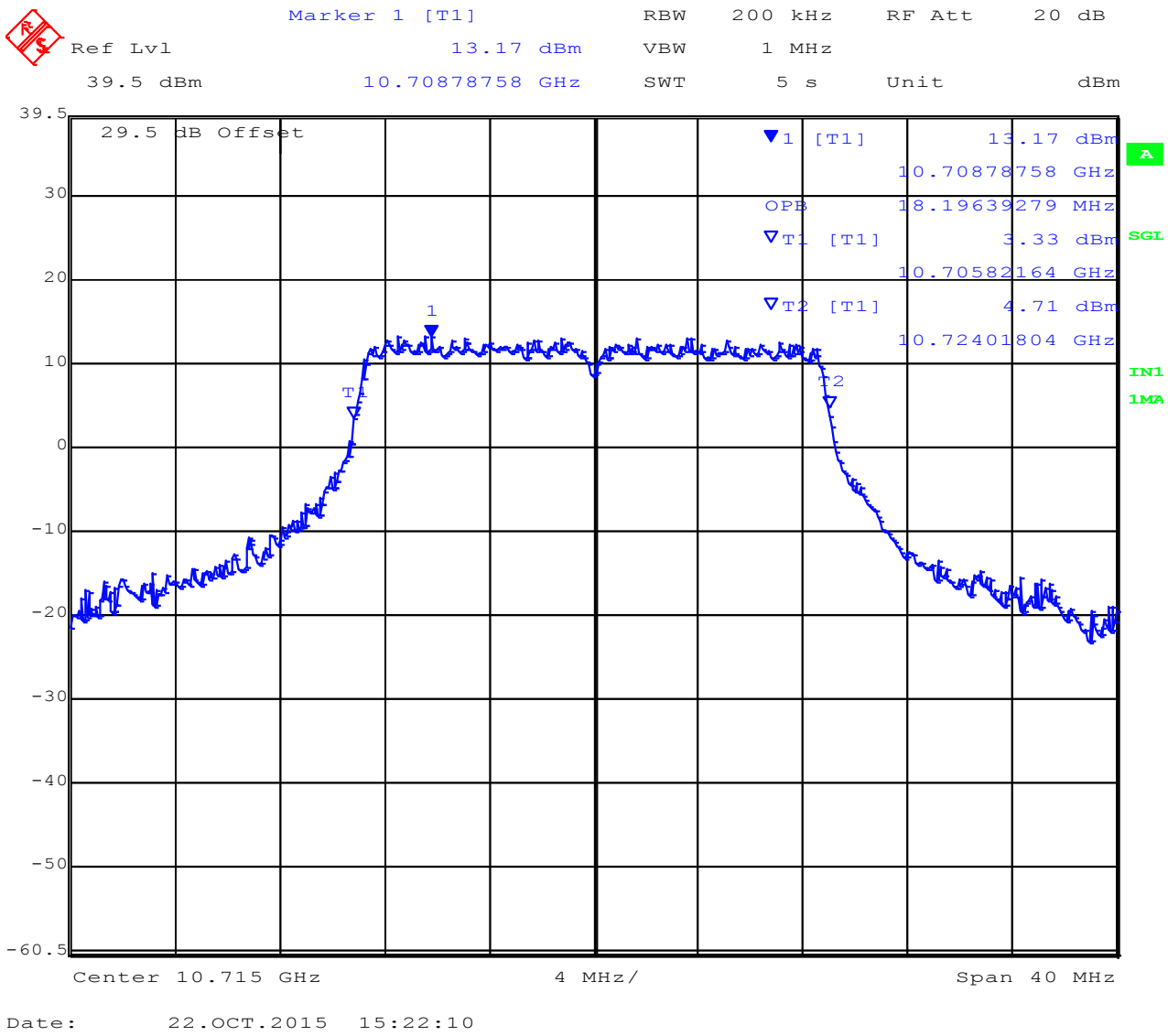
Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-03 MEASURING RF SPECTRUM MASK
Measurement Uncertainty:	±2.81 dB

Equipment Configuration for 99% Occupied Bandwidth			
Variant:	80 MHz	**Duty Cycle (%):**	100
Data Rate:	Unknown	**Antenna Gain (dBi):**	Not Applicable
Modulation:	256 QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

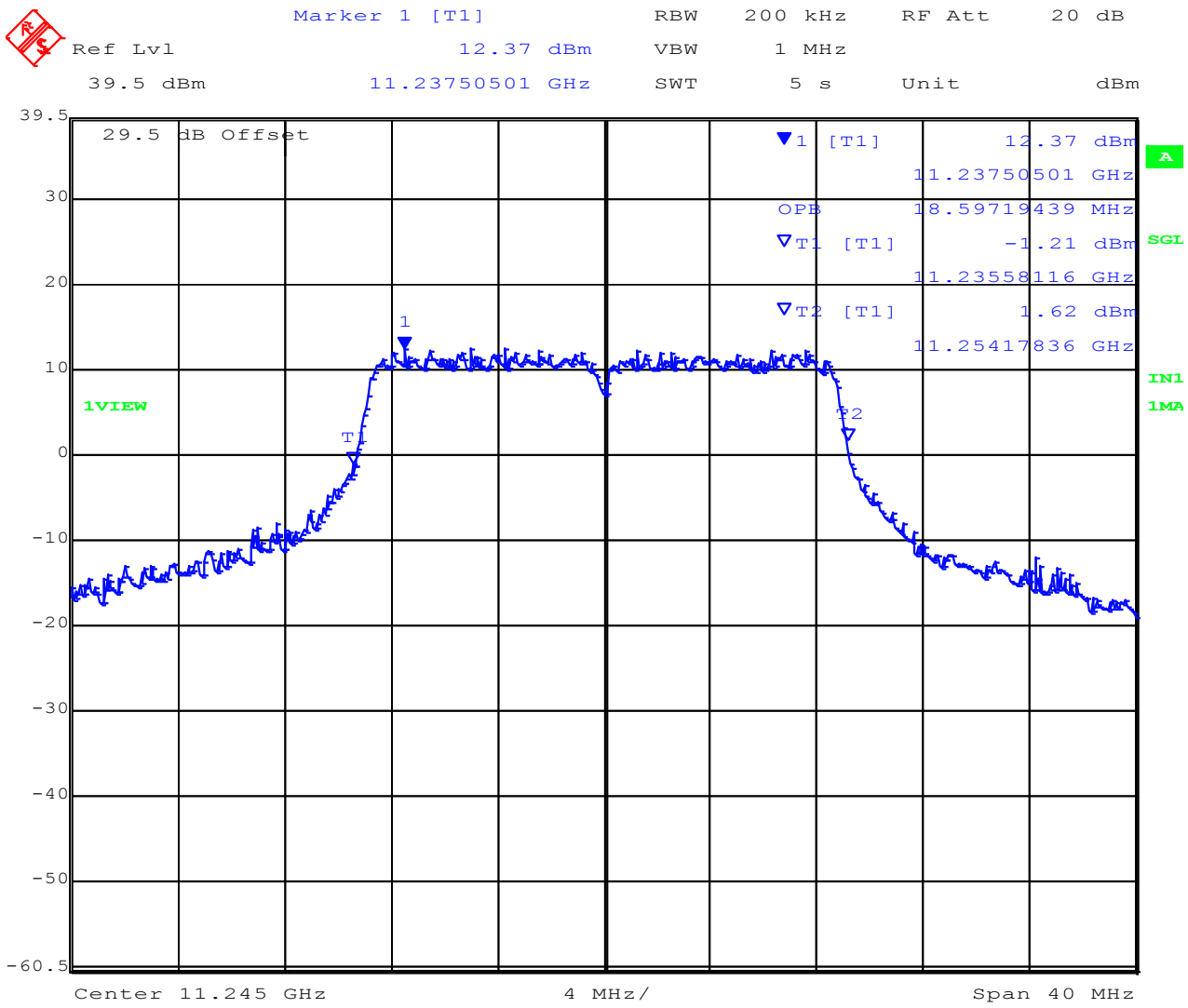
Test Measurement Results								
Test Frequency	**Measured 99% Bandwidth (MHz)**							
	Port(s)							
MHz	**a**	**b**	**c**	**d**				
10755.00	76.312	--	--	--				
11215.00	76.633	--	--	--				
11645.00	75.991	--	--	--				

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

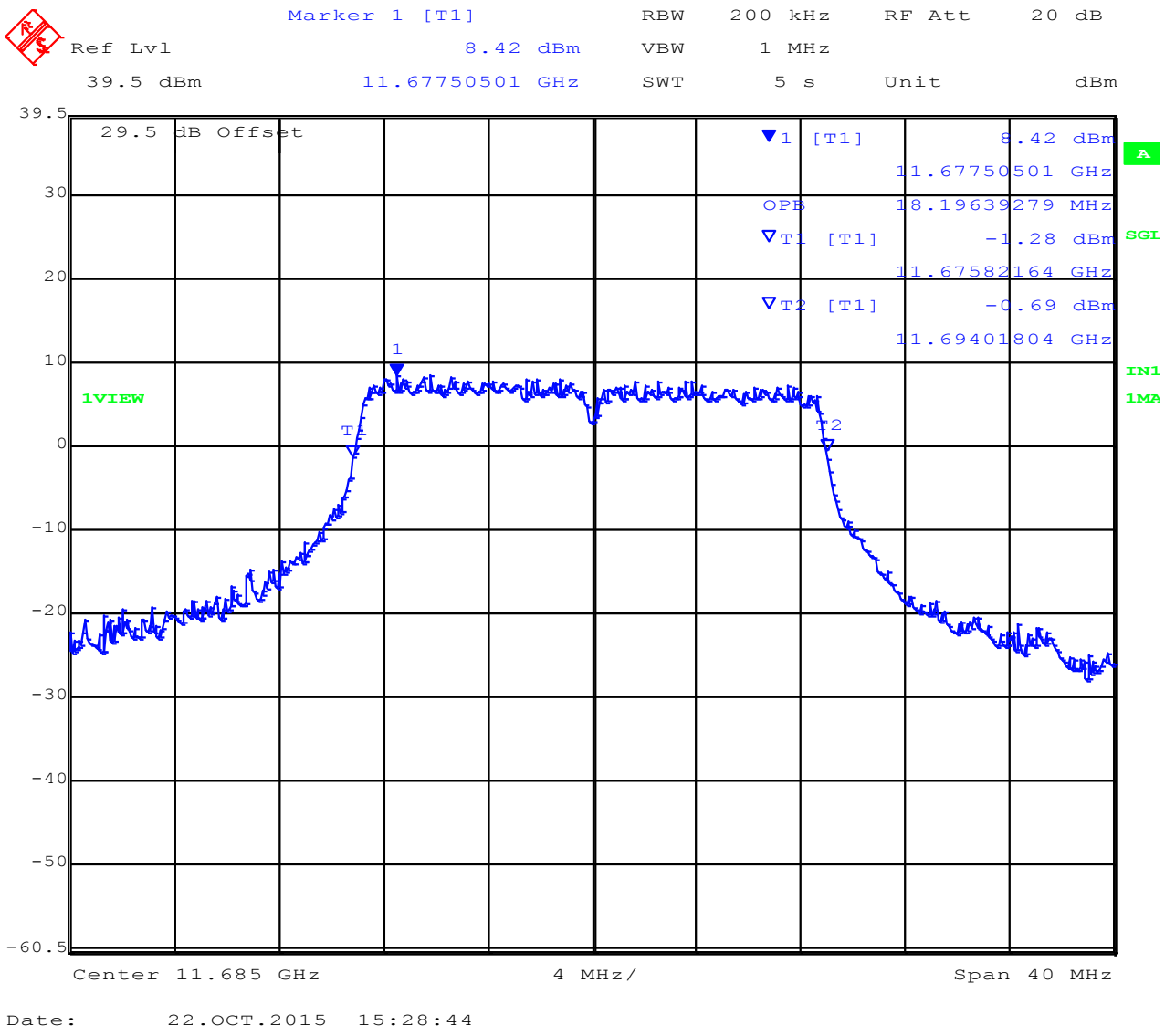
BPSK 20 MHz 10,755 MHz



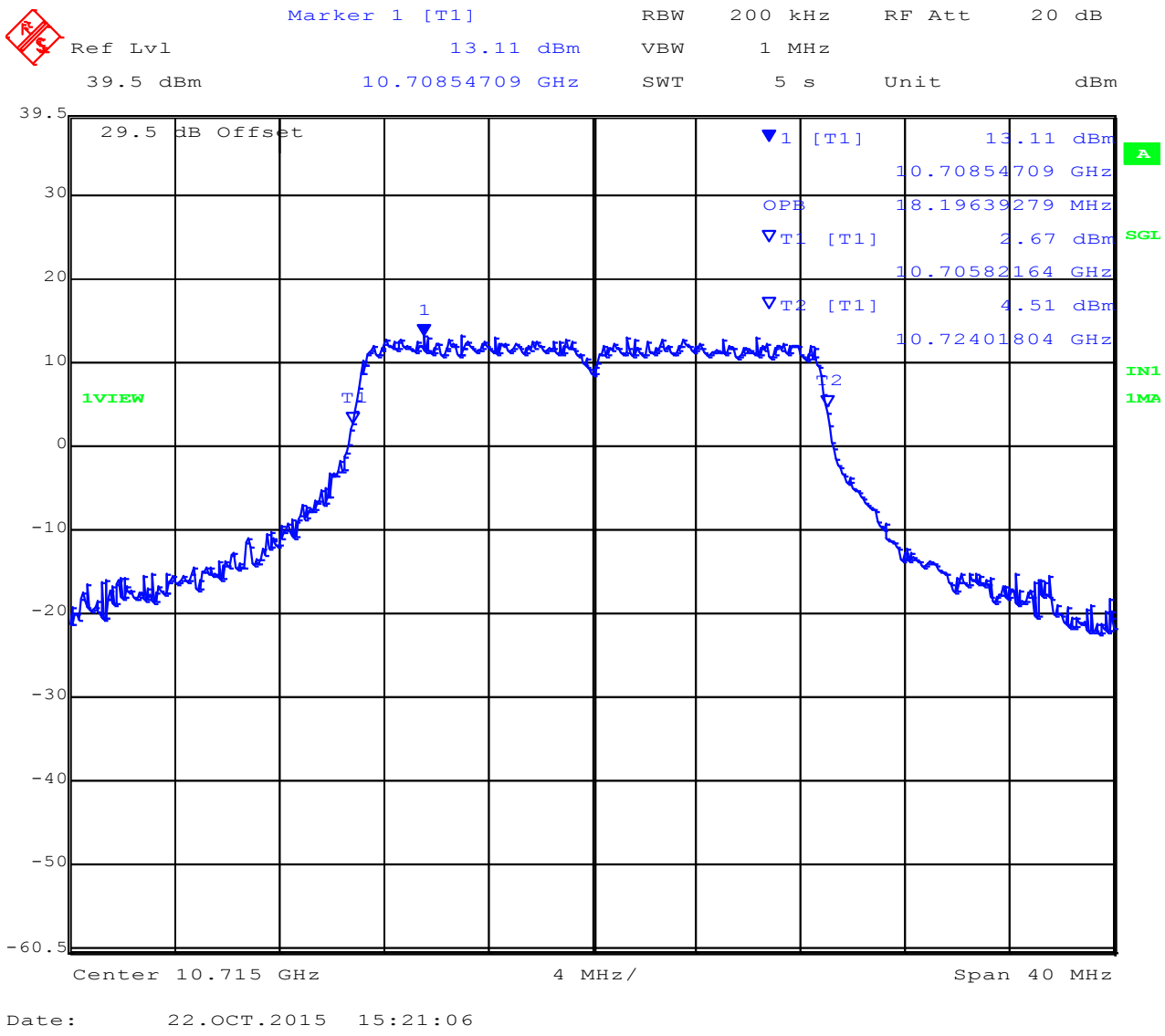
BPSK 20 MHz 11,215 MHz



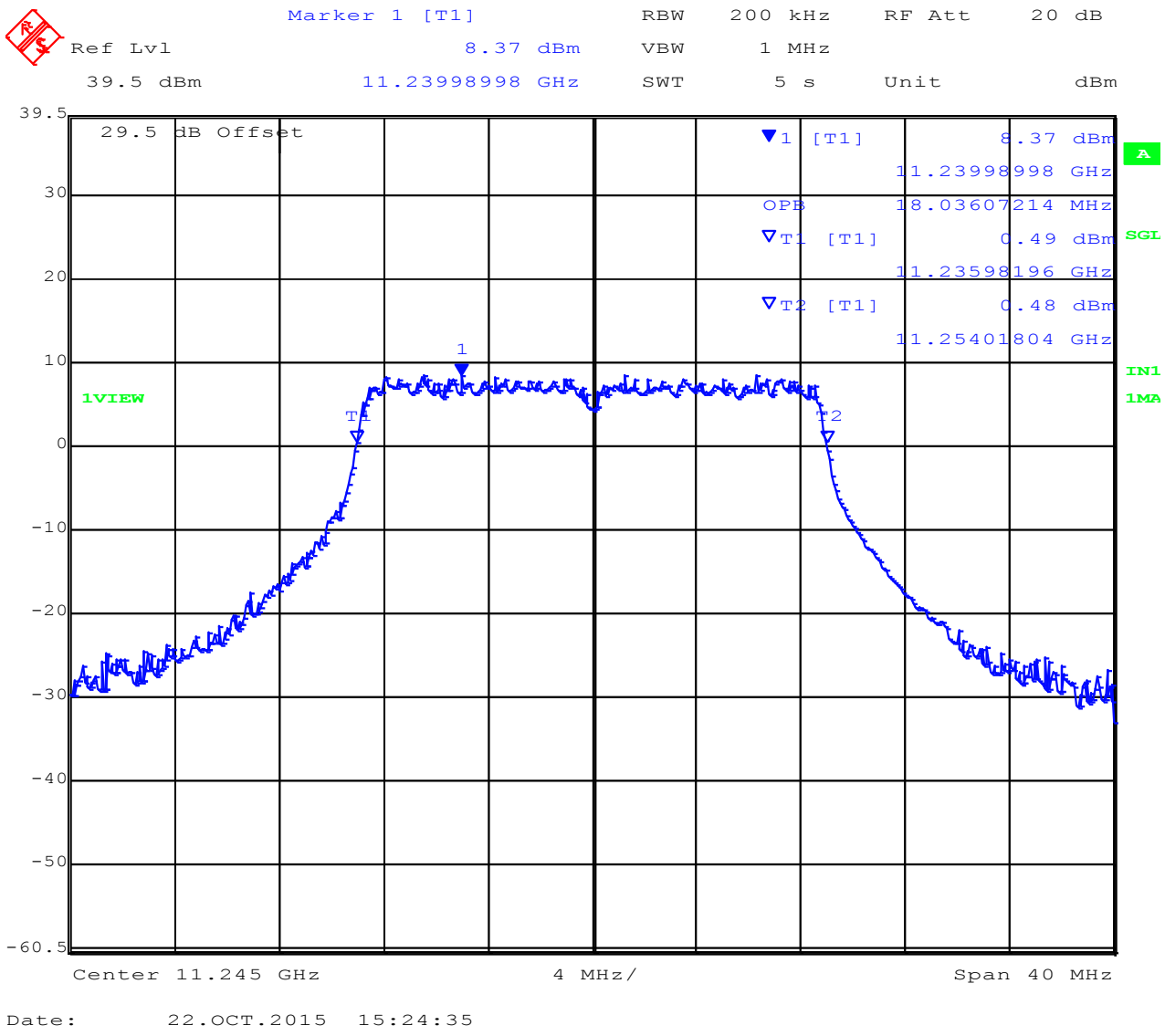
BPSK 20 MHz 11,645 MHz



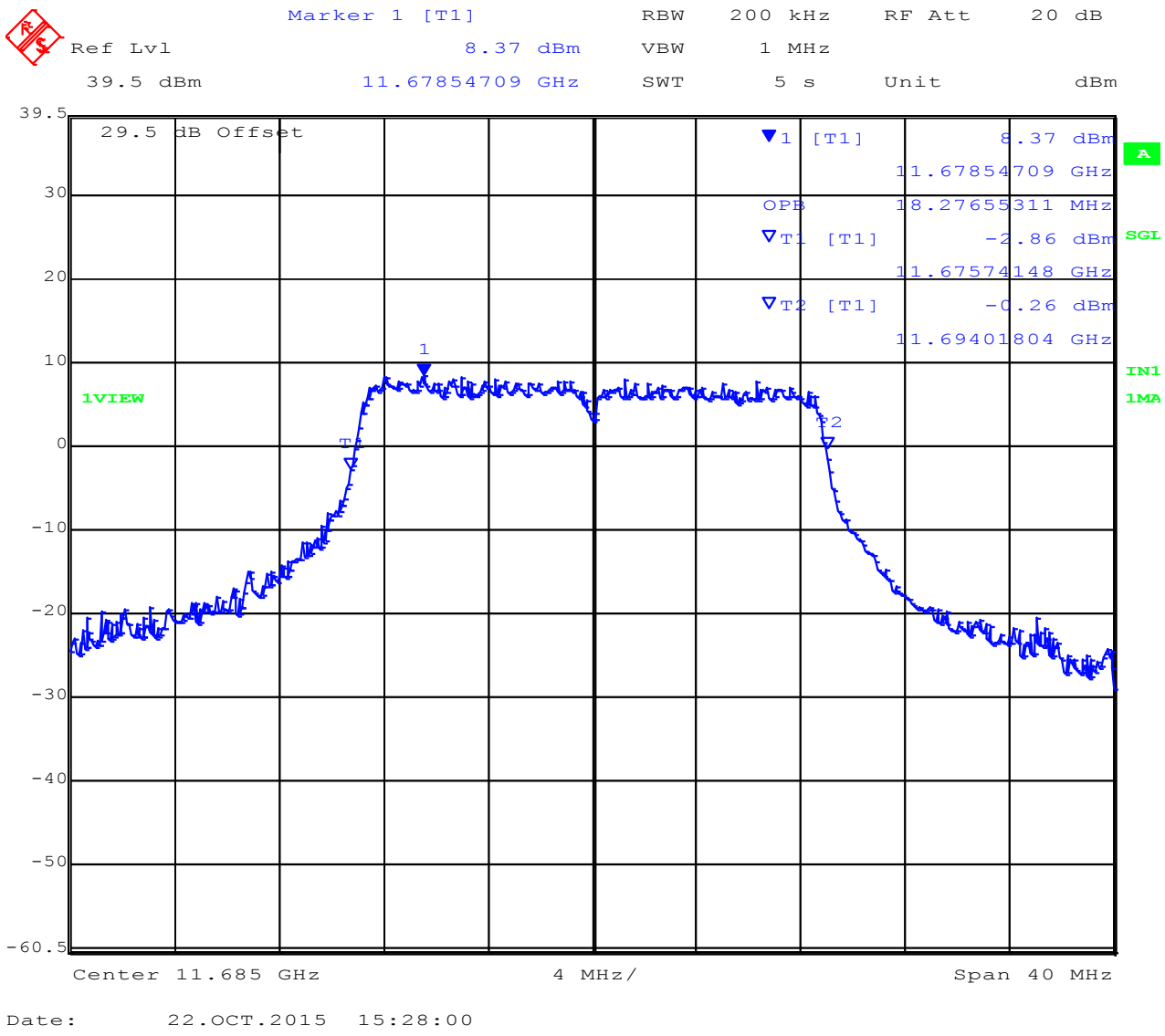
256QAM 20 MHz 10,755 MHz



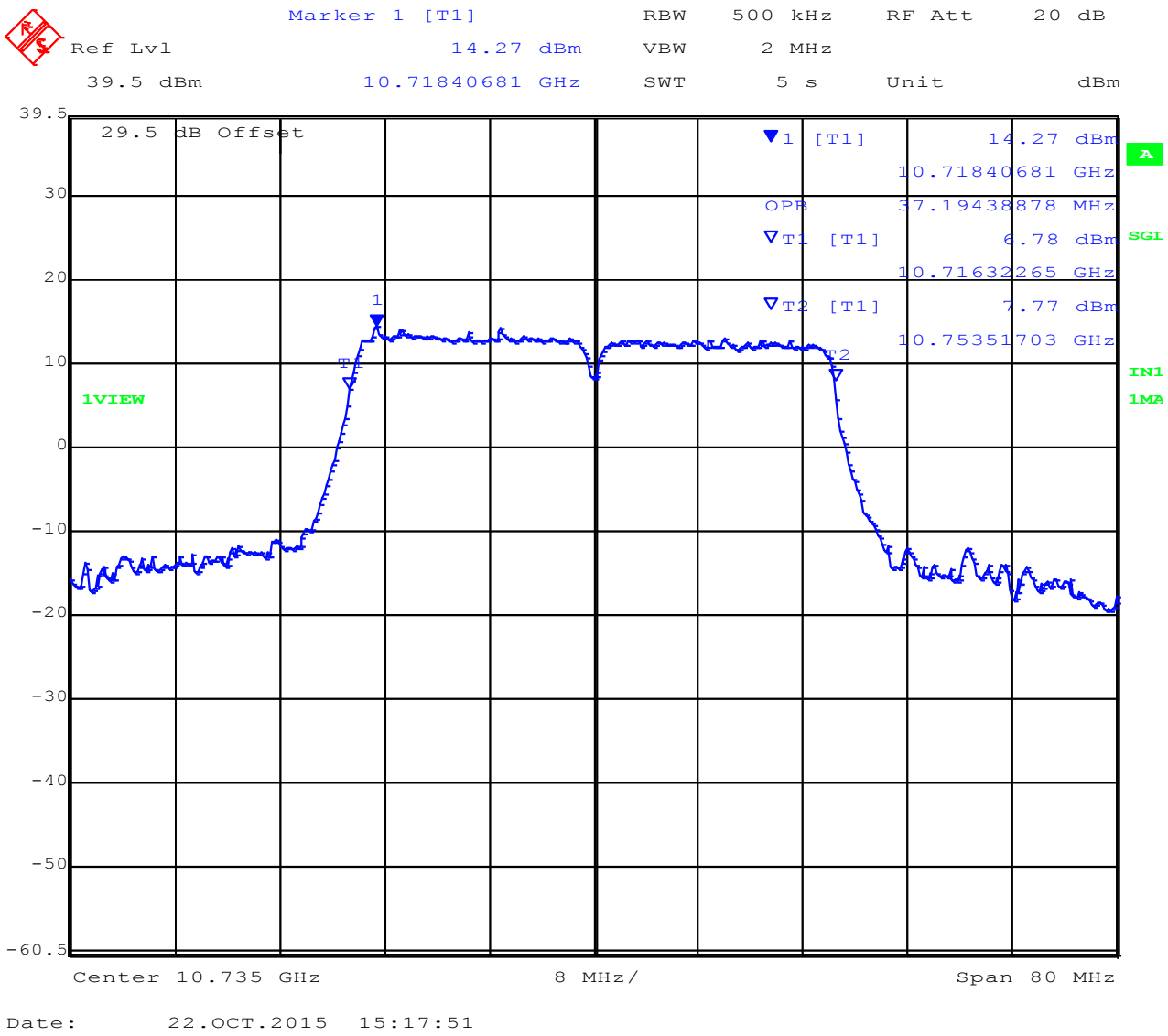
256QAM 20 MHz 11,215 MHz



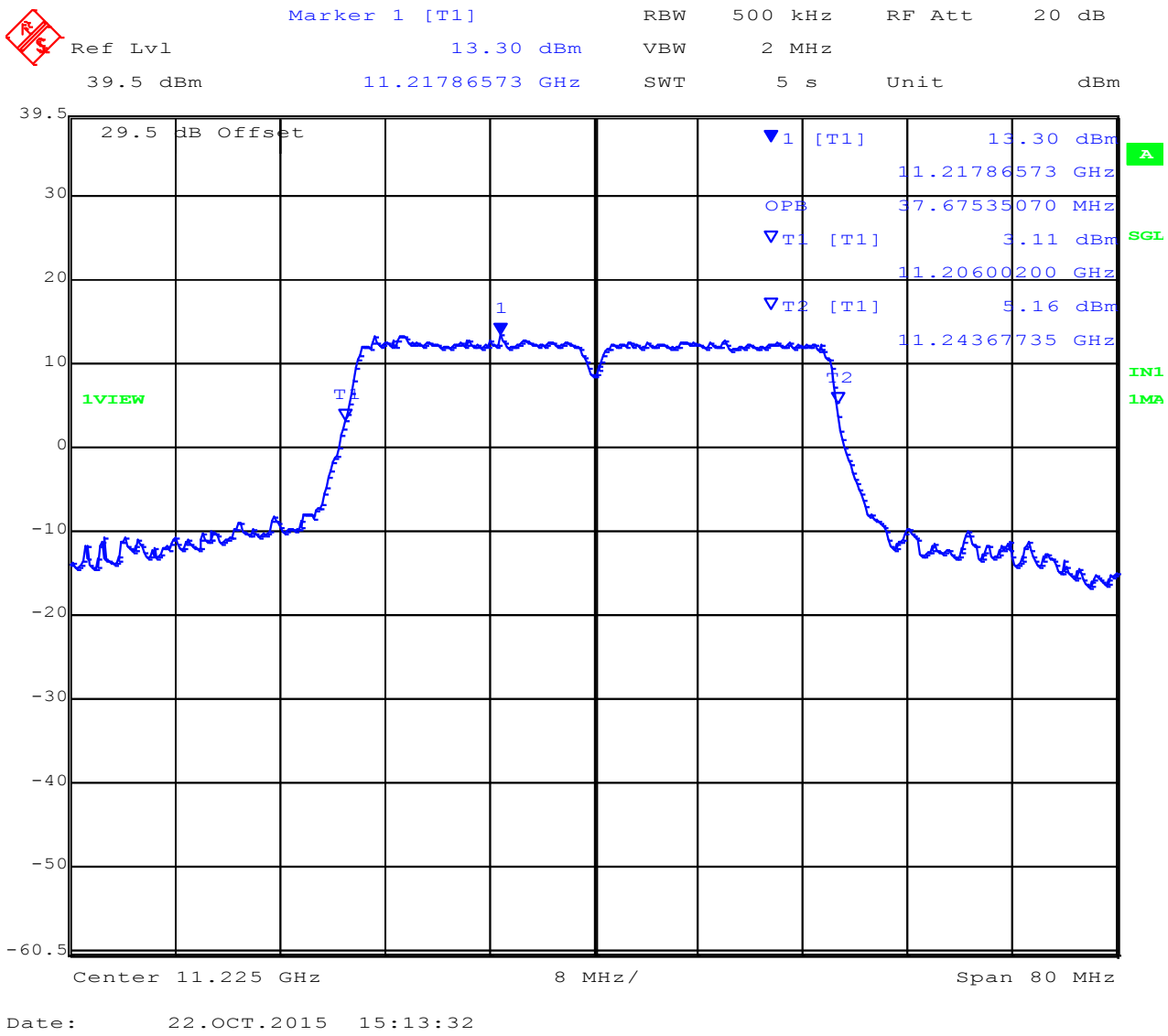
256QAM 20 MHz 11,645 MHz



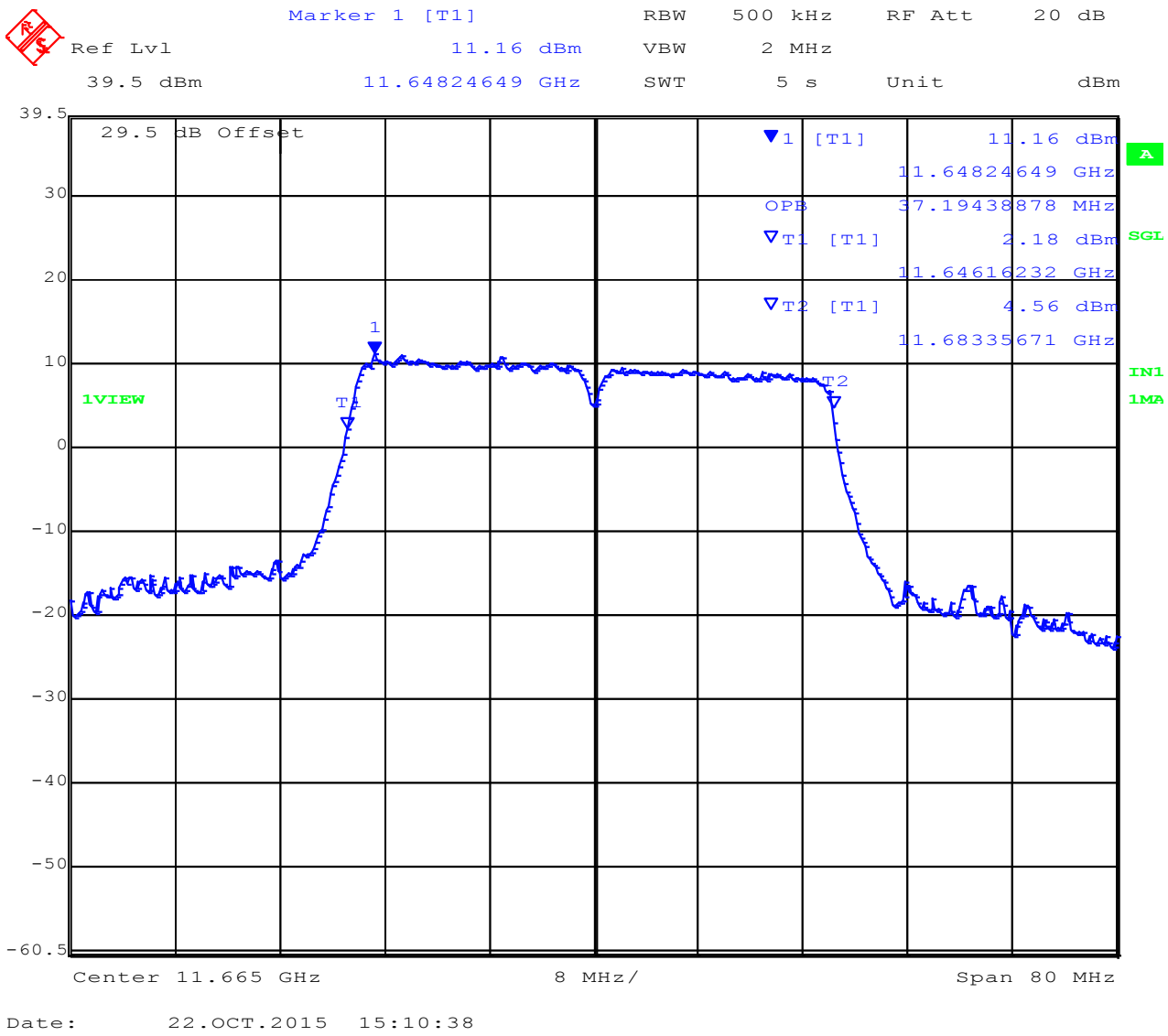
BPSK 40 MHz 10,735 MHz



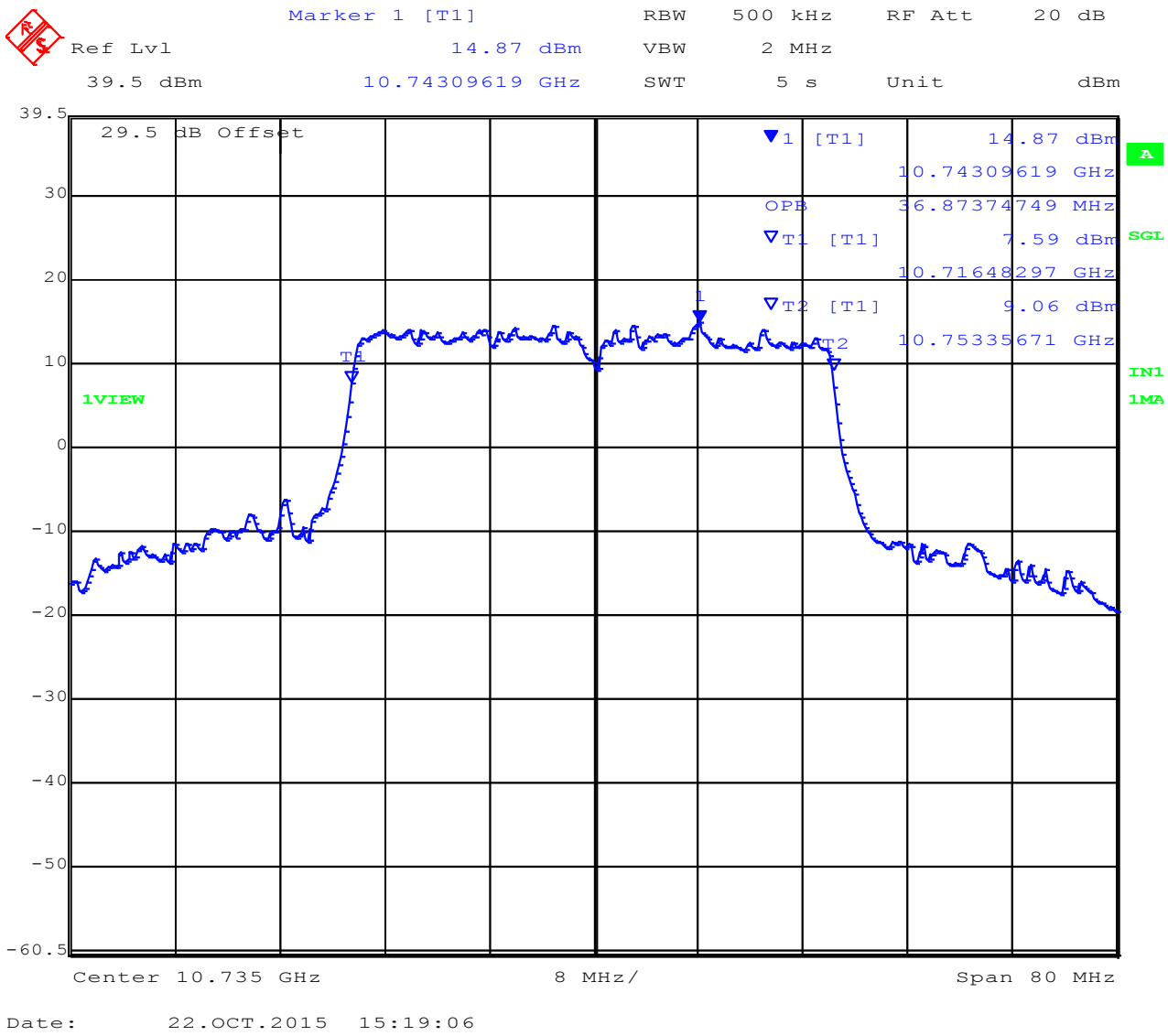
BPSK 40 MHz 11,225 MHz



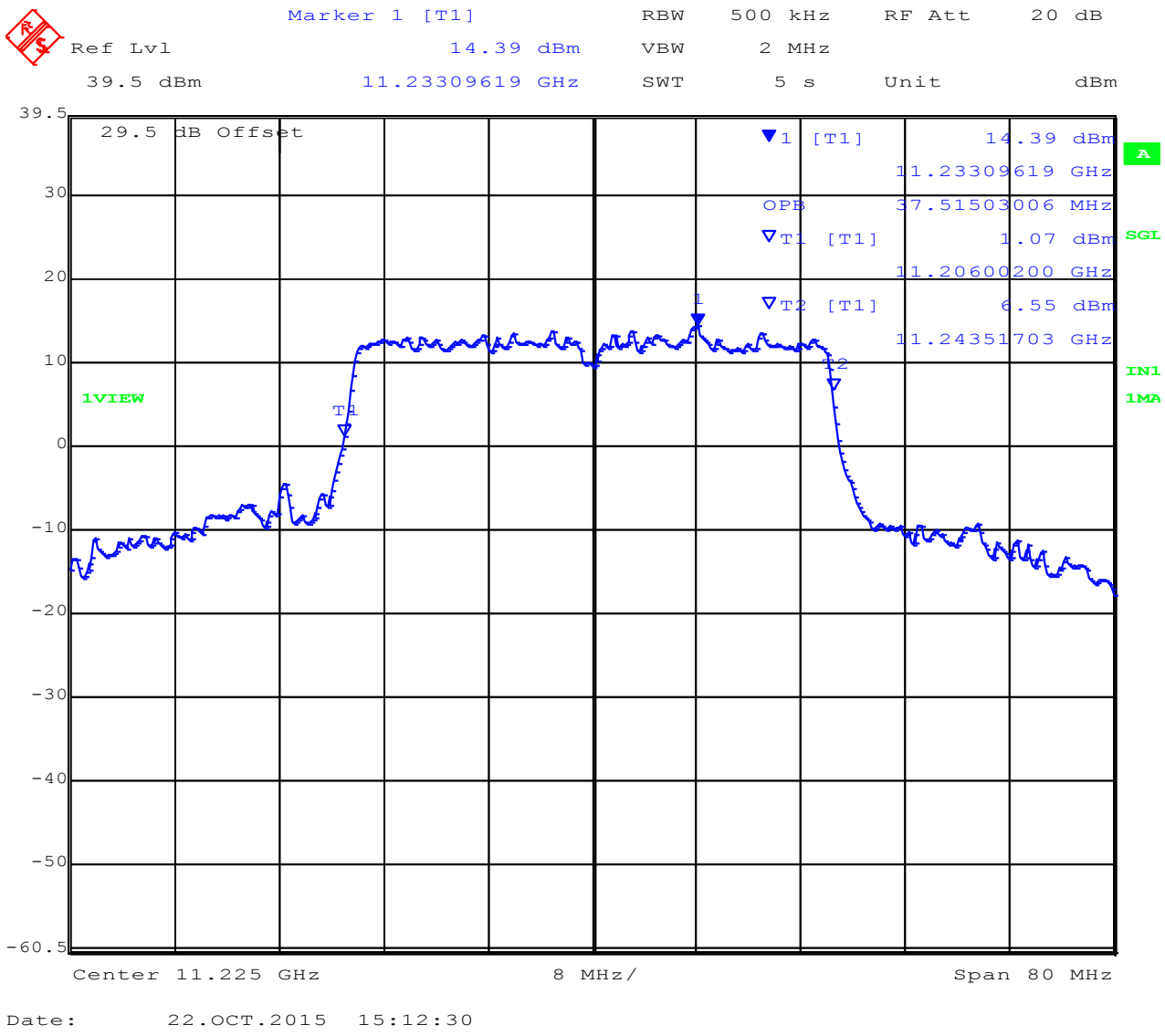
BPSK 40 MHz 11,665 MHz



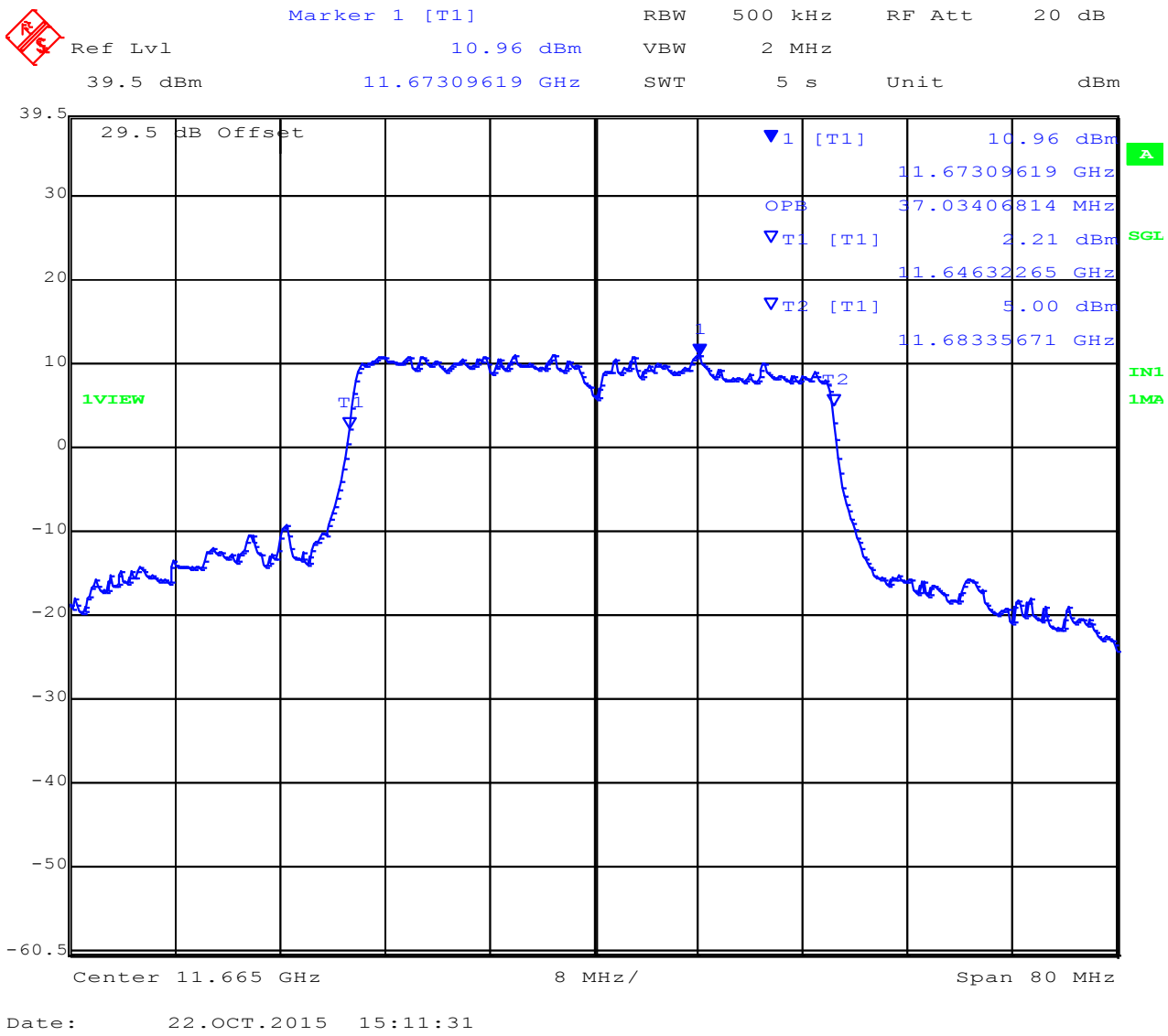
256QAM 40 MHz 10,735 MHz



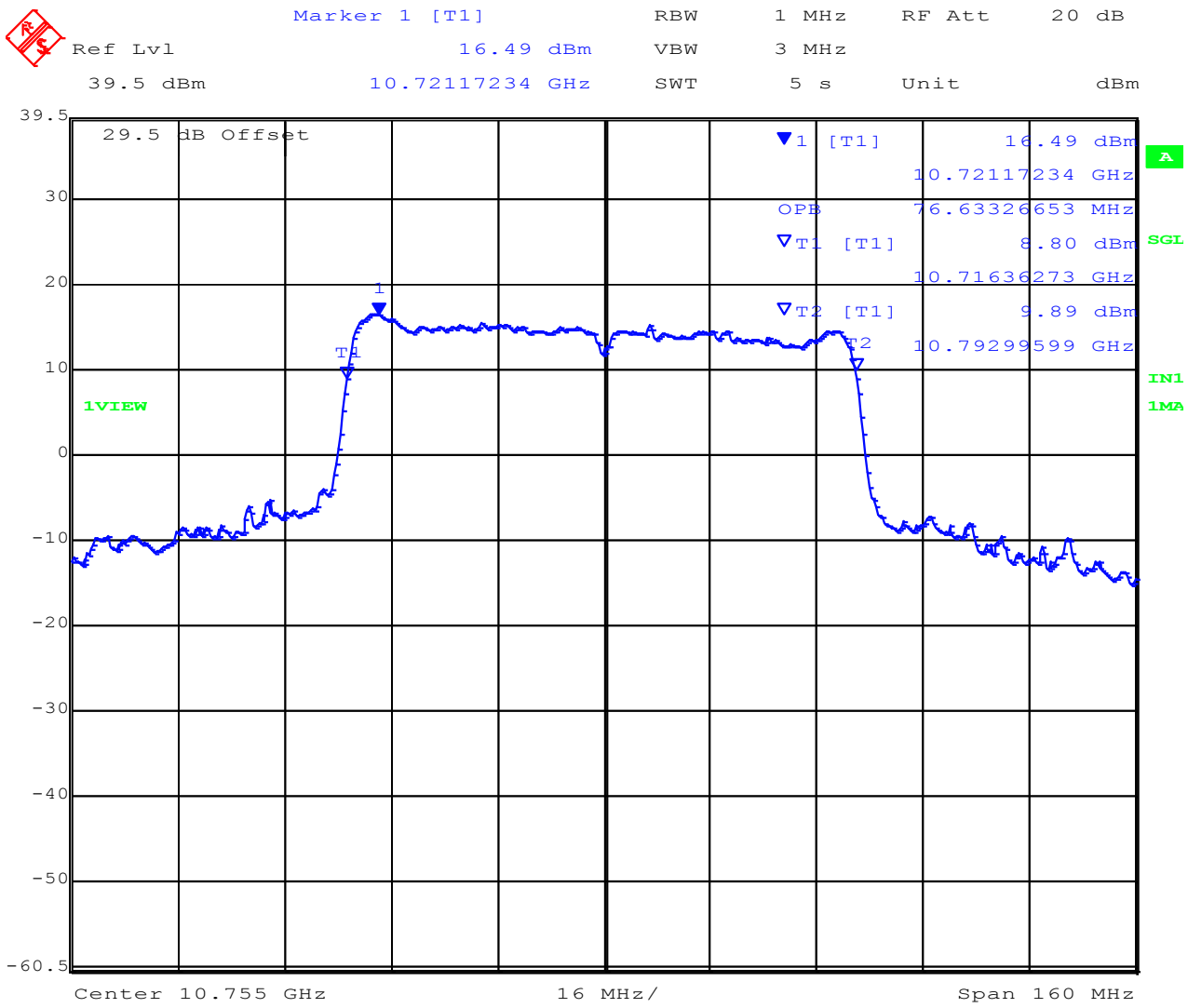
256QAM 40 MHz 11,225 MHz



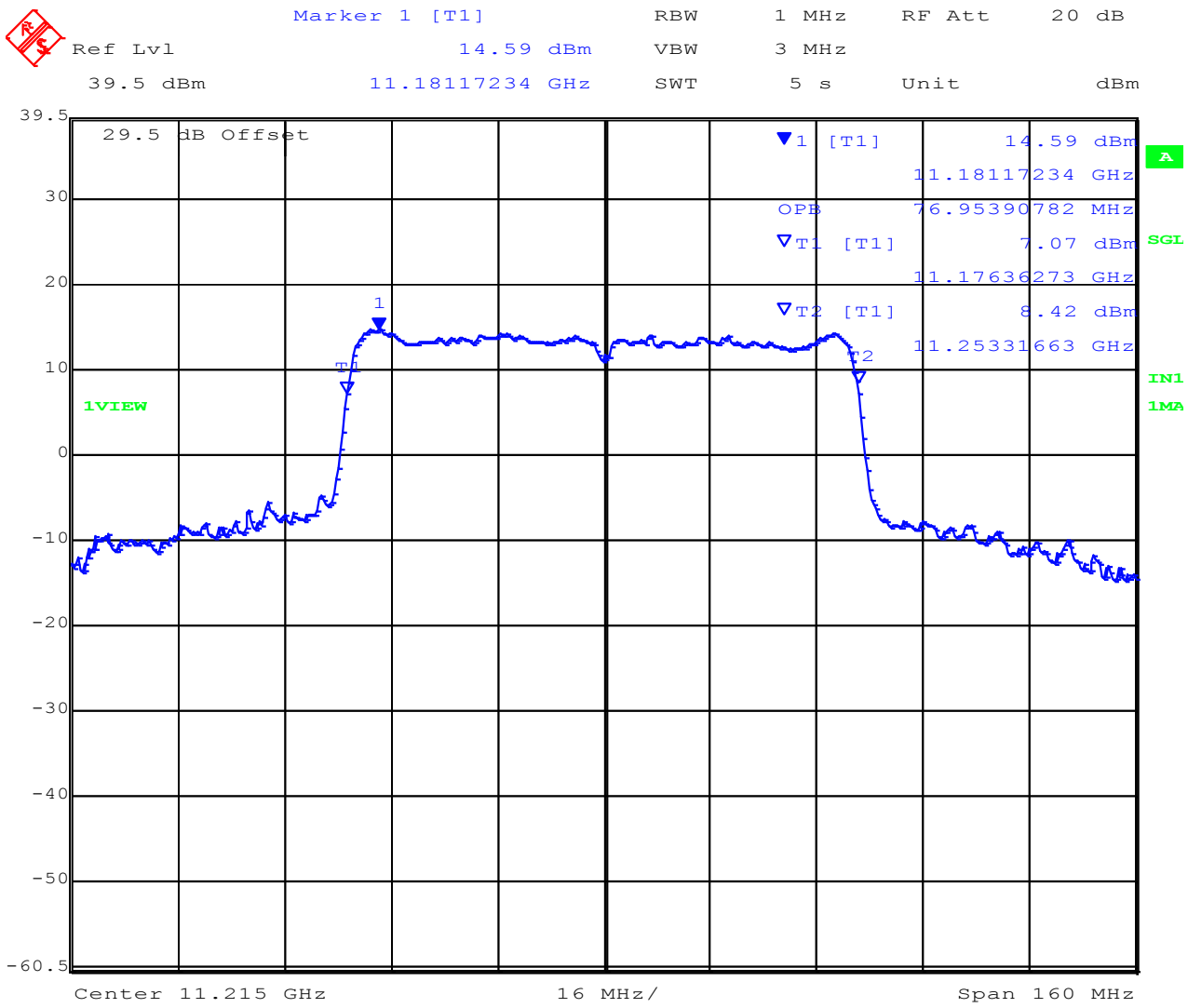
256QAM 40 MHz 11,665 MHz



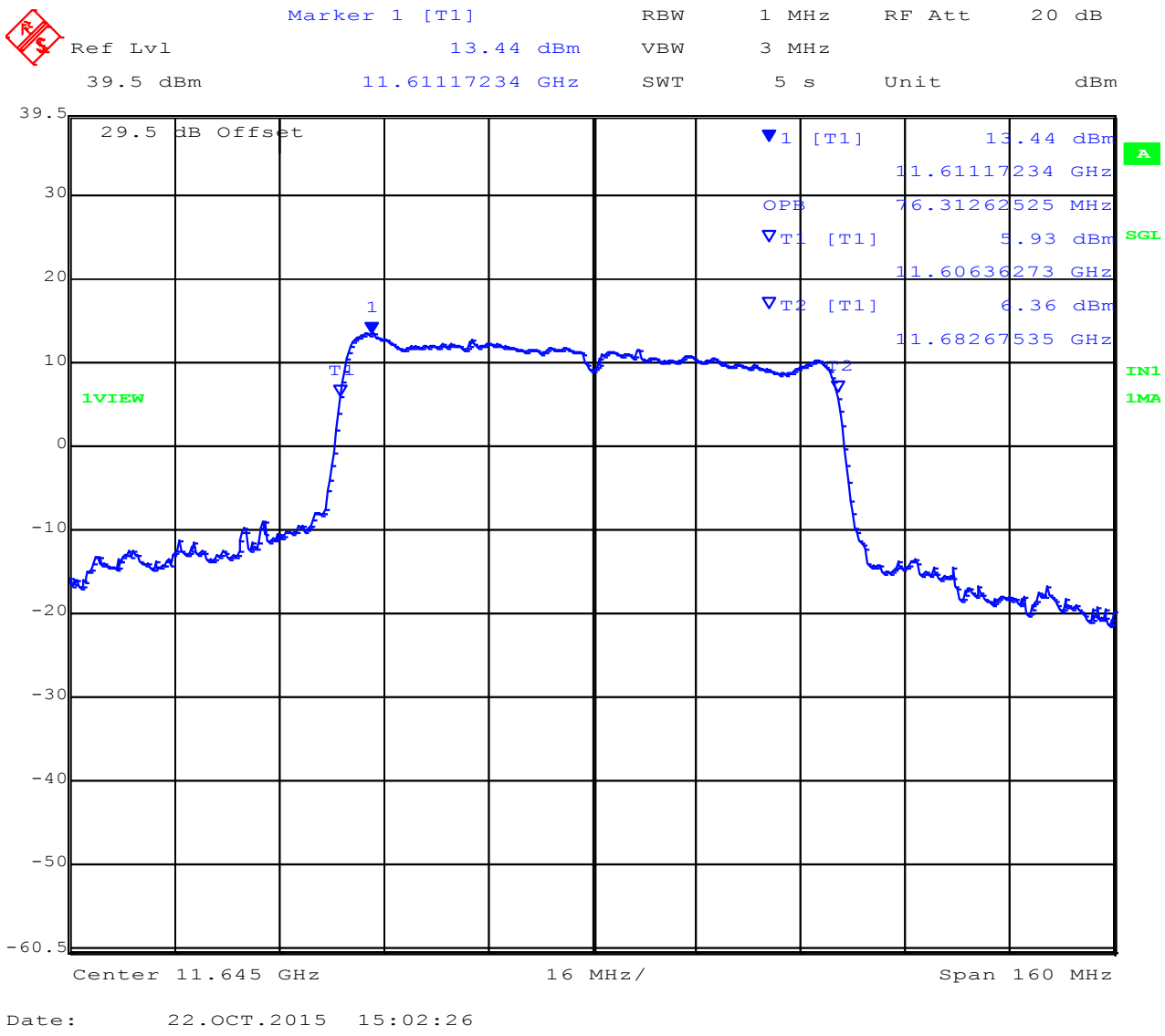
BPSK 80 MHz 10,755 MHz



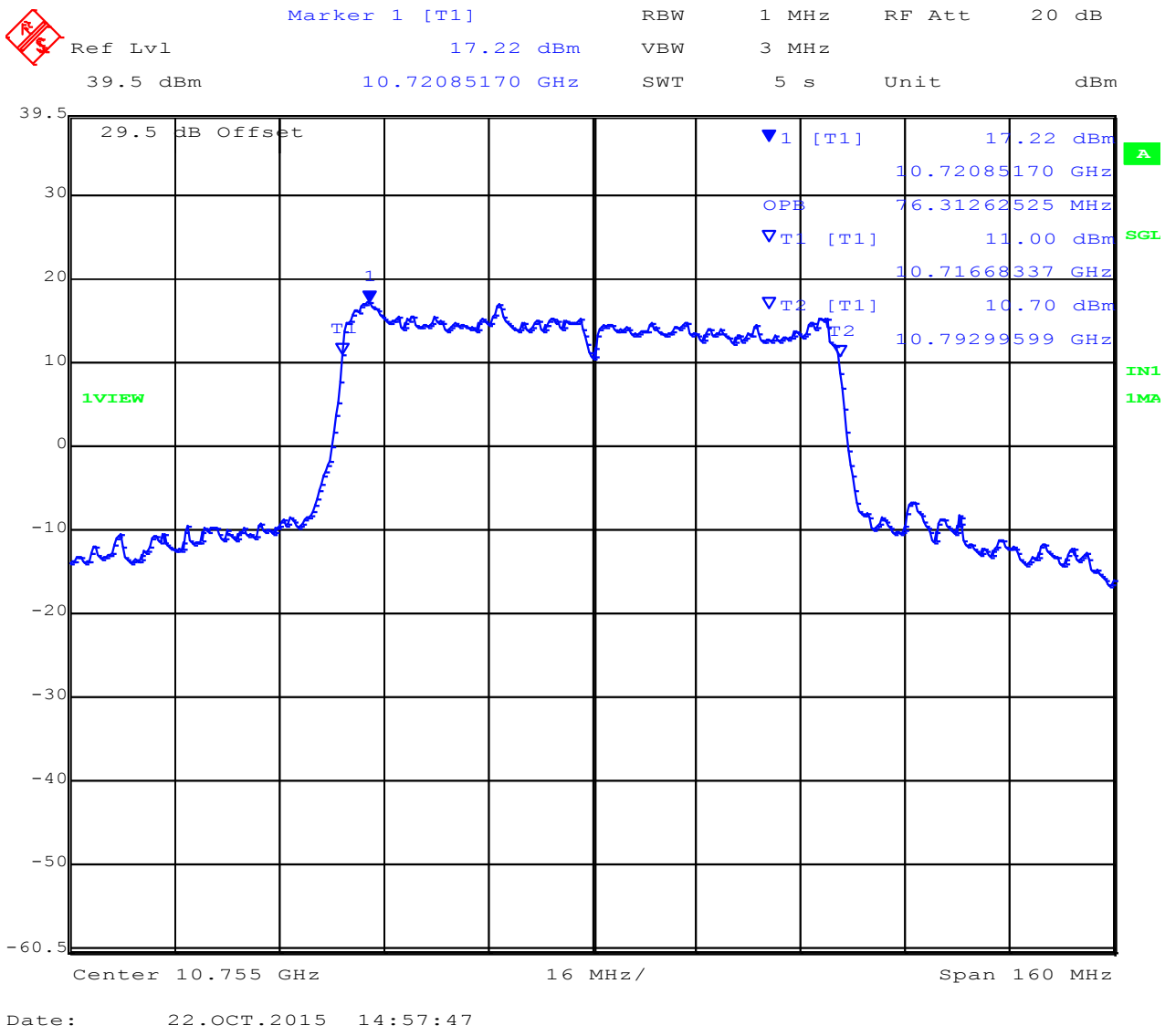
BPSK 80 MHz 11,215 MHz



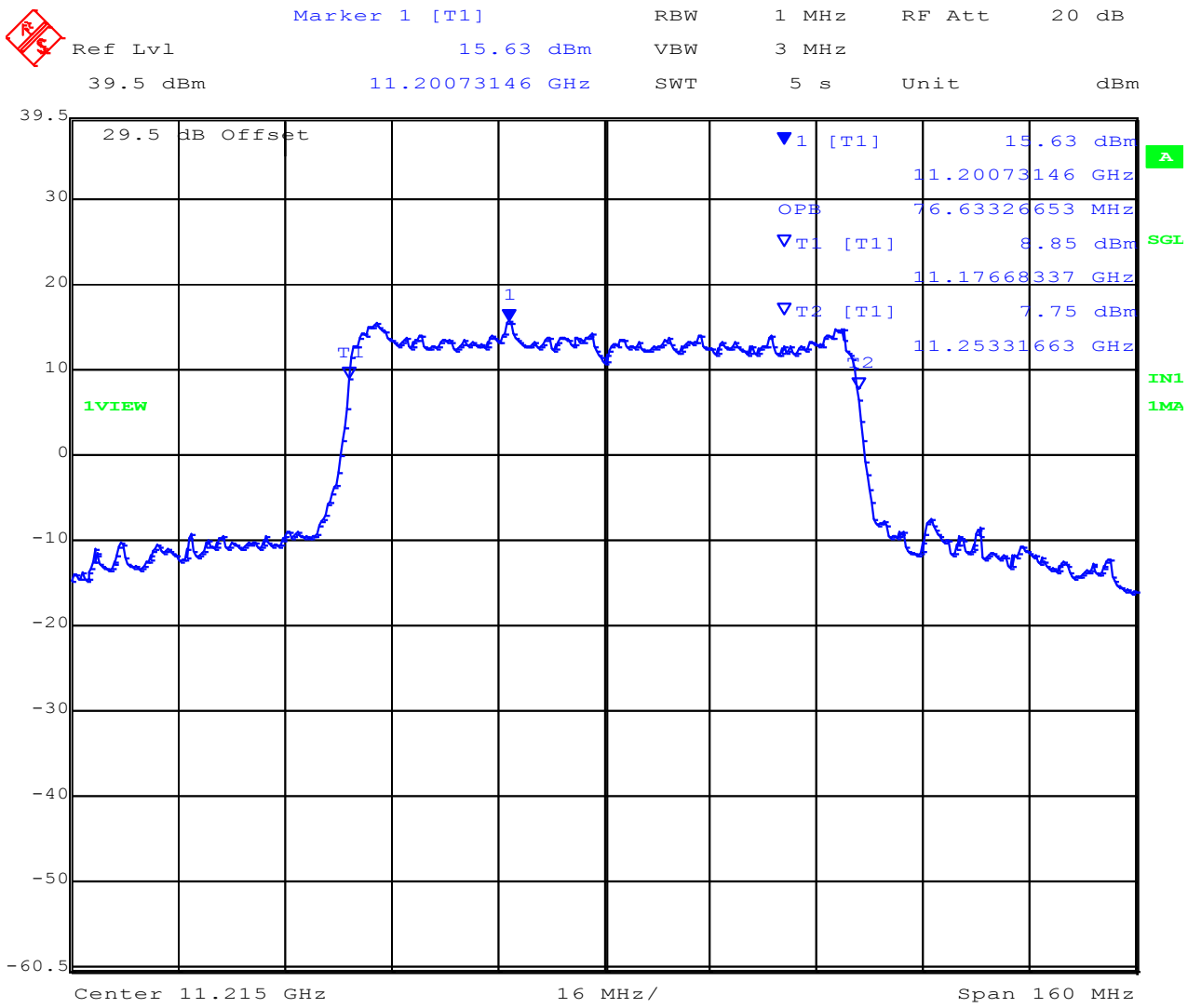
BPSK 80 MHz 11,645 MHz



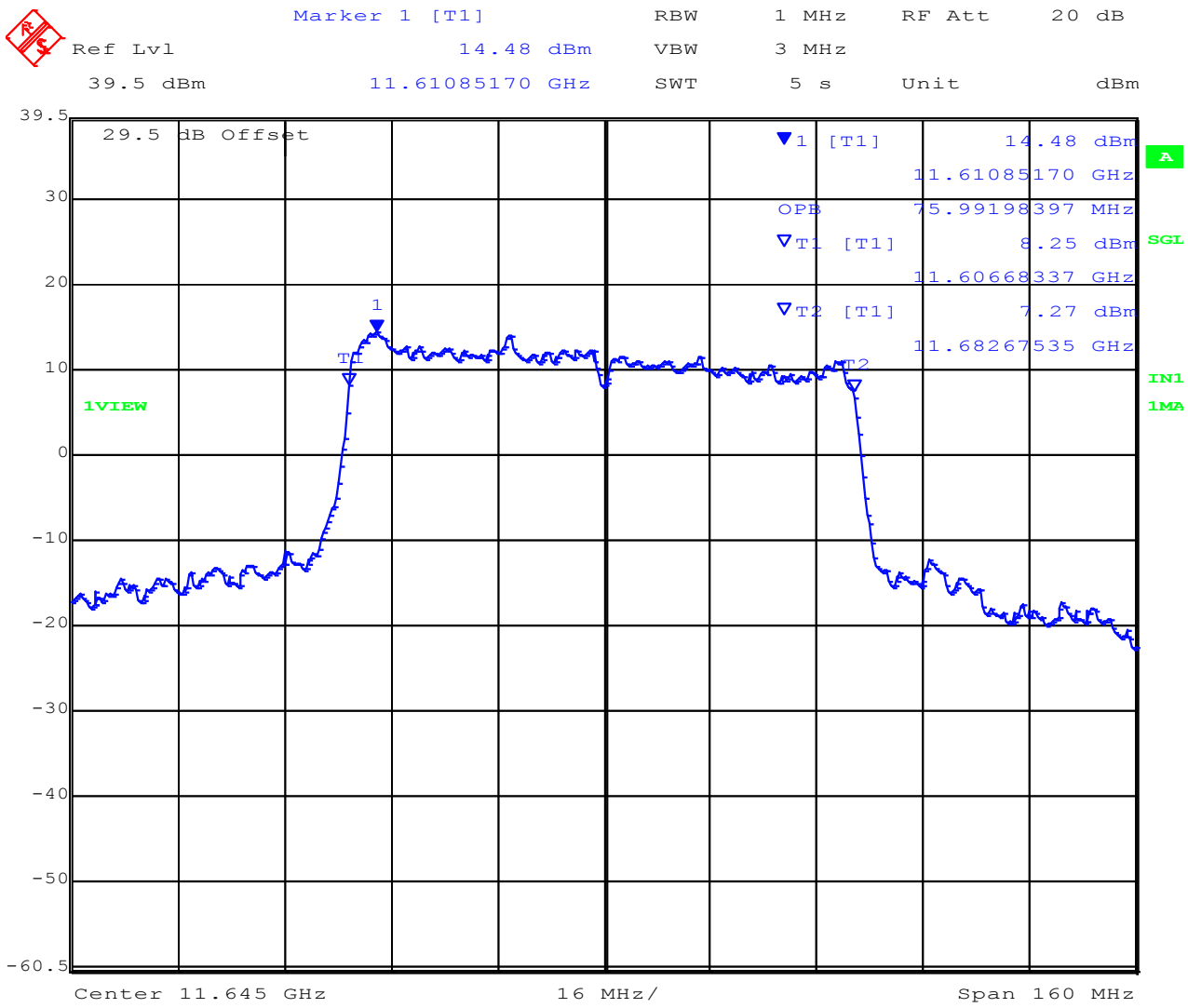
256QAM 80 MHz 10,755 MHz



256QAM 80 MHz 11,215 MHz



256QAM 80 MHz 11,645 MHz



6.1.1.2. Frequency Tolerance

Conducted Test Conditions for Maximum Conducted Output Power EIRP			
Standard:	FCC CFR 47 Part 101	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Frequency Tolerance	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	101.107	**Pressure (mBars):**	999 - 1001
Reference Document(s):			

Test Procedure for Transmitter Frequency Stability
Transmitter Frequency Tolerance testing was performed over nominal voltage and ambient temperature and results reported are for a single antenna port (should the device have multiple ports i.e. MIMO device).

Definition
The center frequency is the center of the channel declared by the manufacturer as part of the declared channel plan(s).

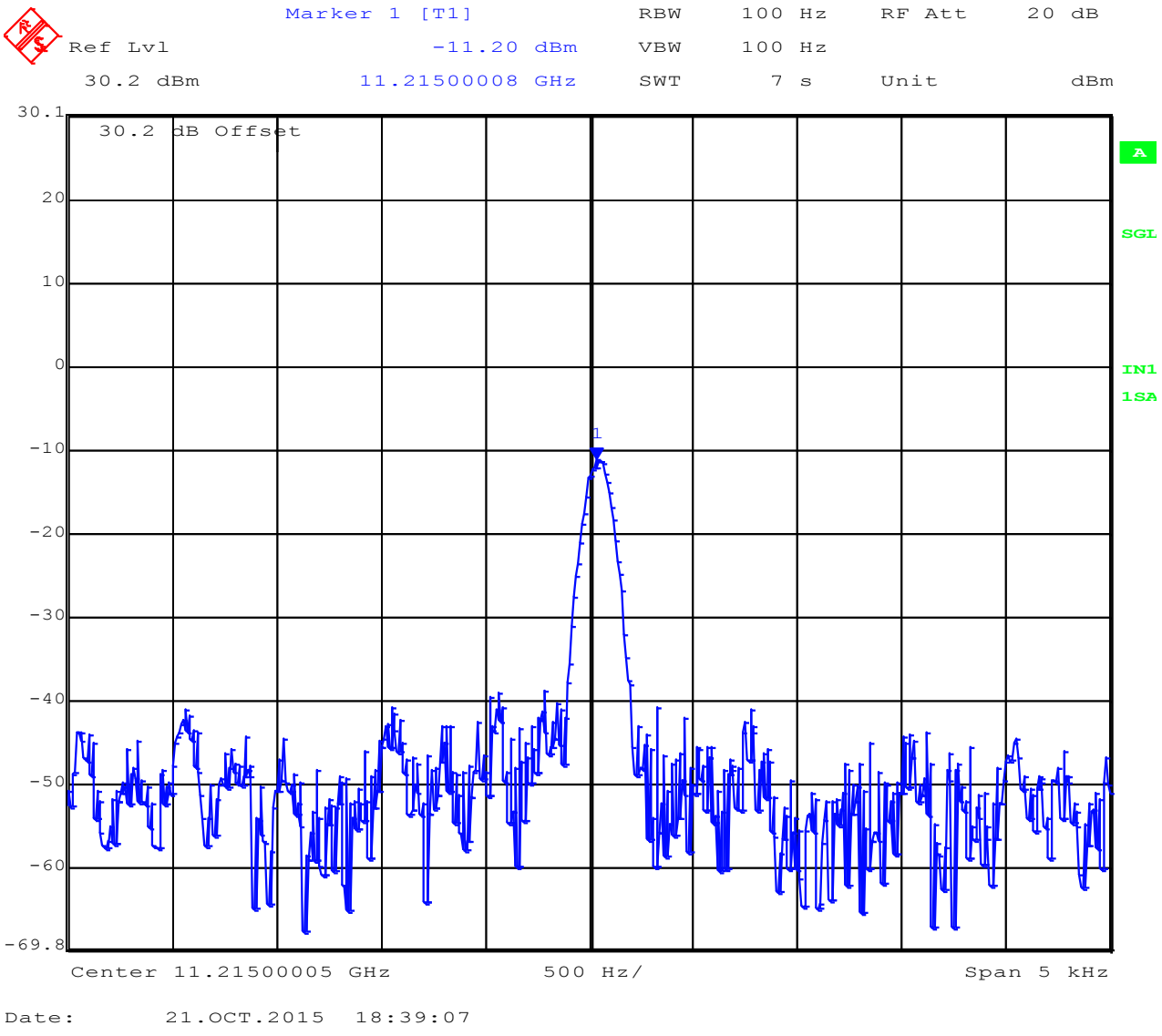
Limits
The applicant shall ensure frequency stability by showing that fundamental emissions are maintained within the frequency band of operation when tested at the temperature and supply voltage variations specified in the relevant standard.

Test Type: Modulated (carrier breakthrough was used for measurement purposes)

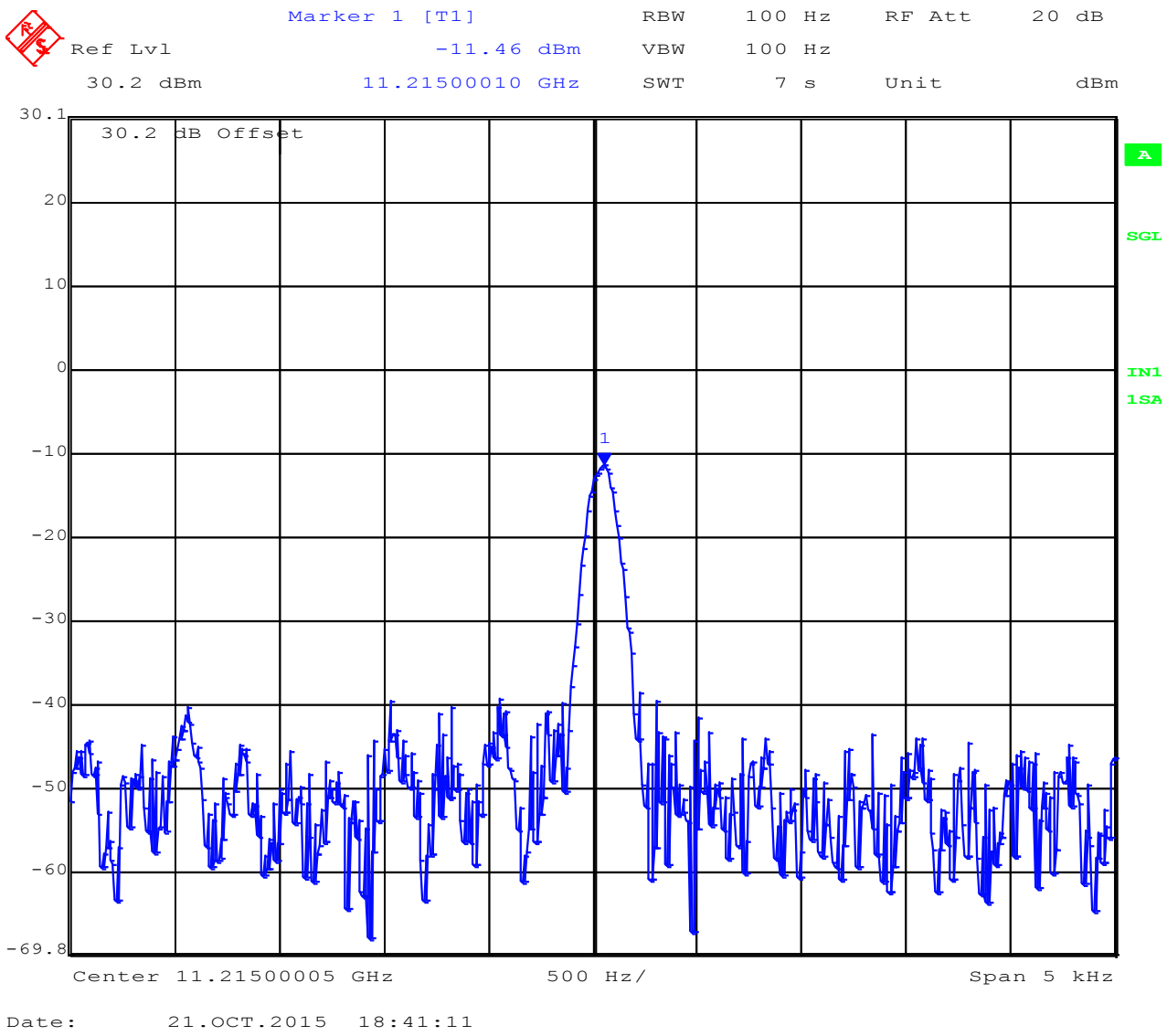
Measurement Results for Transmitter Frequency Stability

Test frequency	2593 MHz	Measured Frequency	Frequency Toerlance	
Temperature	**Voltage**	**Hz**	**%**	**Limit %**
20 °C	43.2 VDC	11215000080.20	0.0000007	±0.005
20 °C	52.8 VDC	11215000090.18	0.0000008	
20 °C	48.0 Vdc	11215000080.16	0.0000007	
-40 °C		11214999834.67	-0.0000015	
-30 °C		11214999894.79	-0.0000009	
-20 °C		11214999949.90	-0.0000004	
-10 °C		11214999974.95	-0.0000002	
0 °C		11215000015.03	0.0000001	
+10 °C		11215000045.09	0.0000004	
+25 °C		11215000135.27	0.0000012	
+35 °C		11215000165.33	0.0000015	
+45 °C		11215000190.38	0.0000017	
+55 °C		11215000240.48	0.0000021	

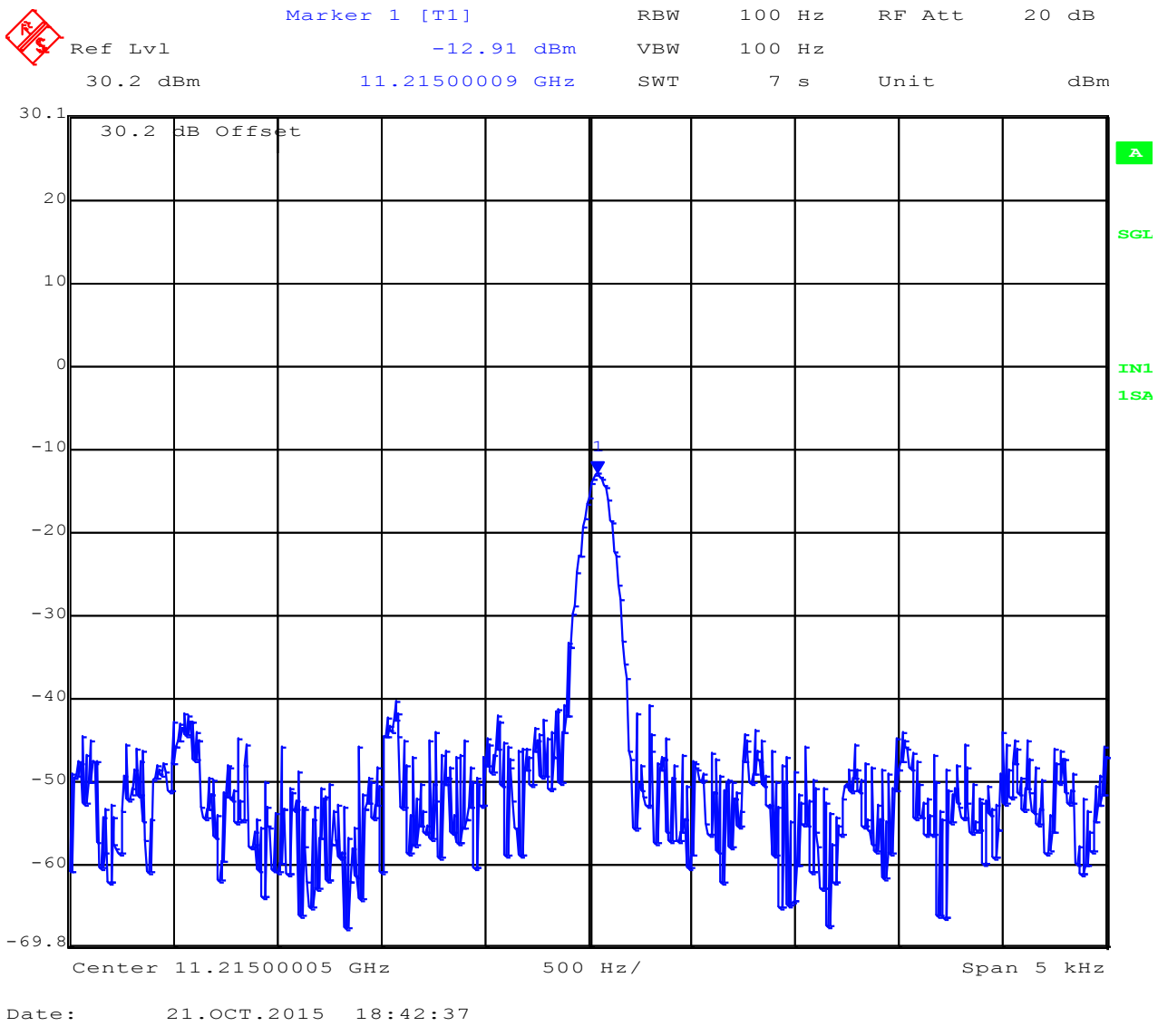
Frequency Stability 48 Vdc, +20°C



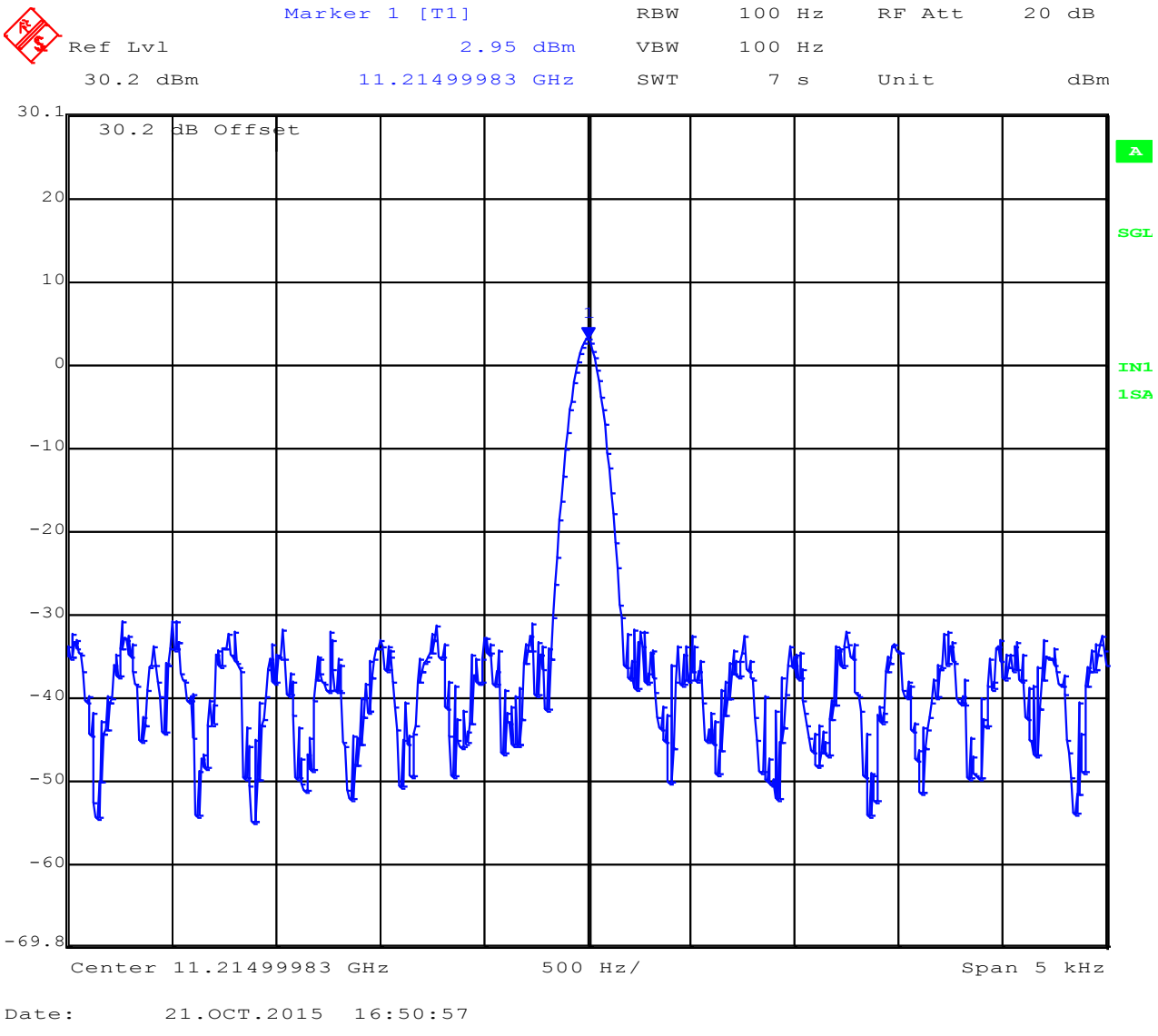
Frequency Stability 43.2 Vdc, +20°C



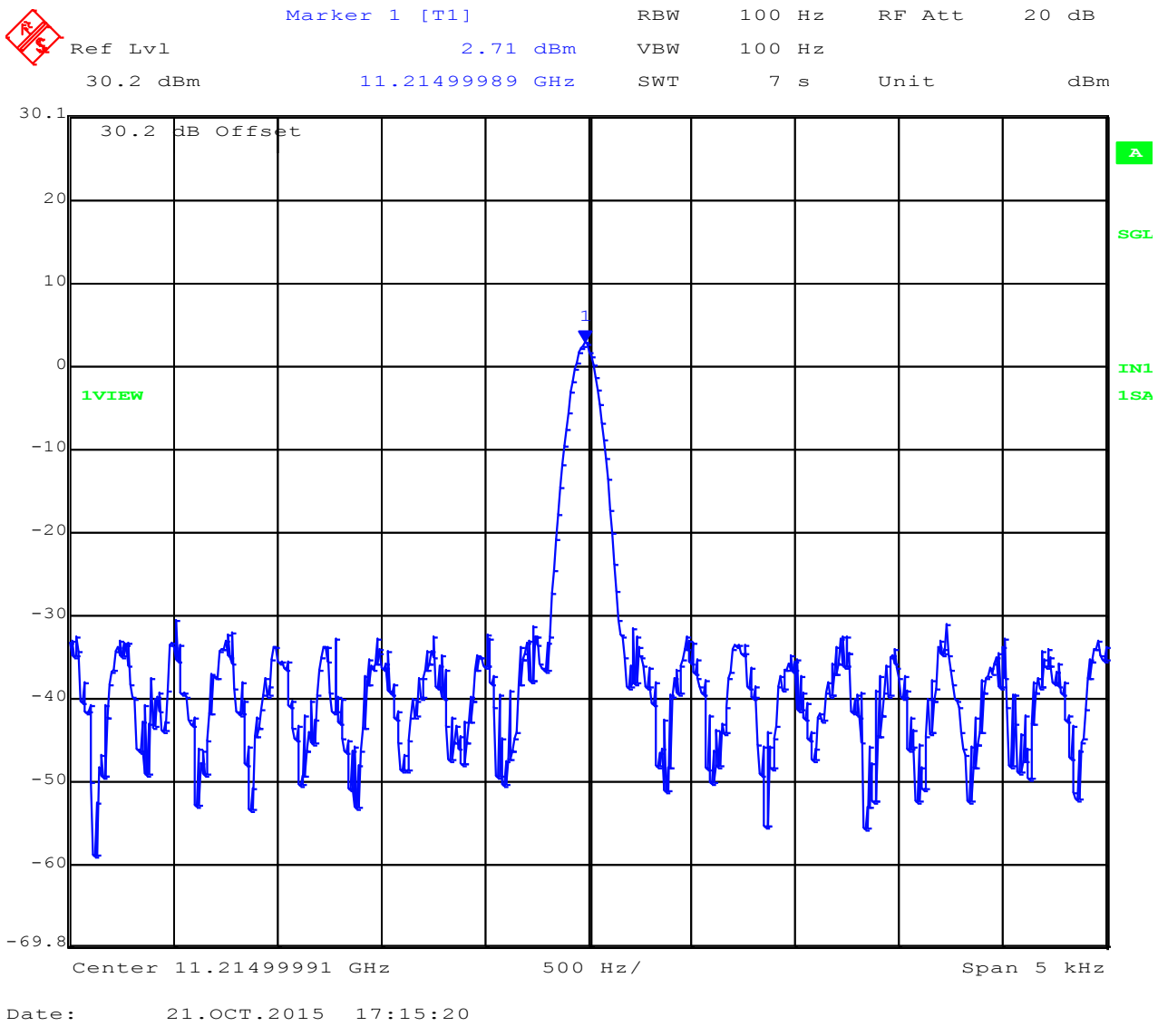
Frequency Stability 52.8 Vdc, +20°C



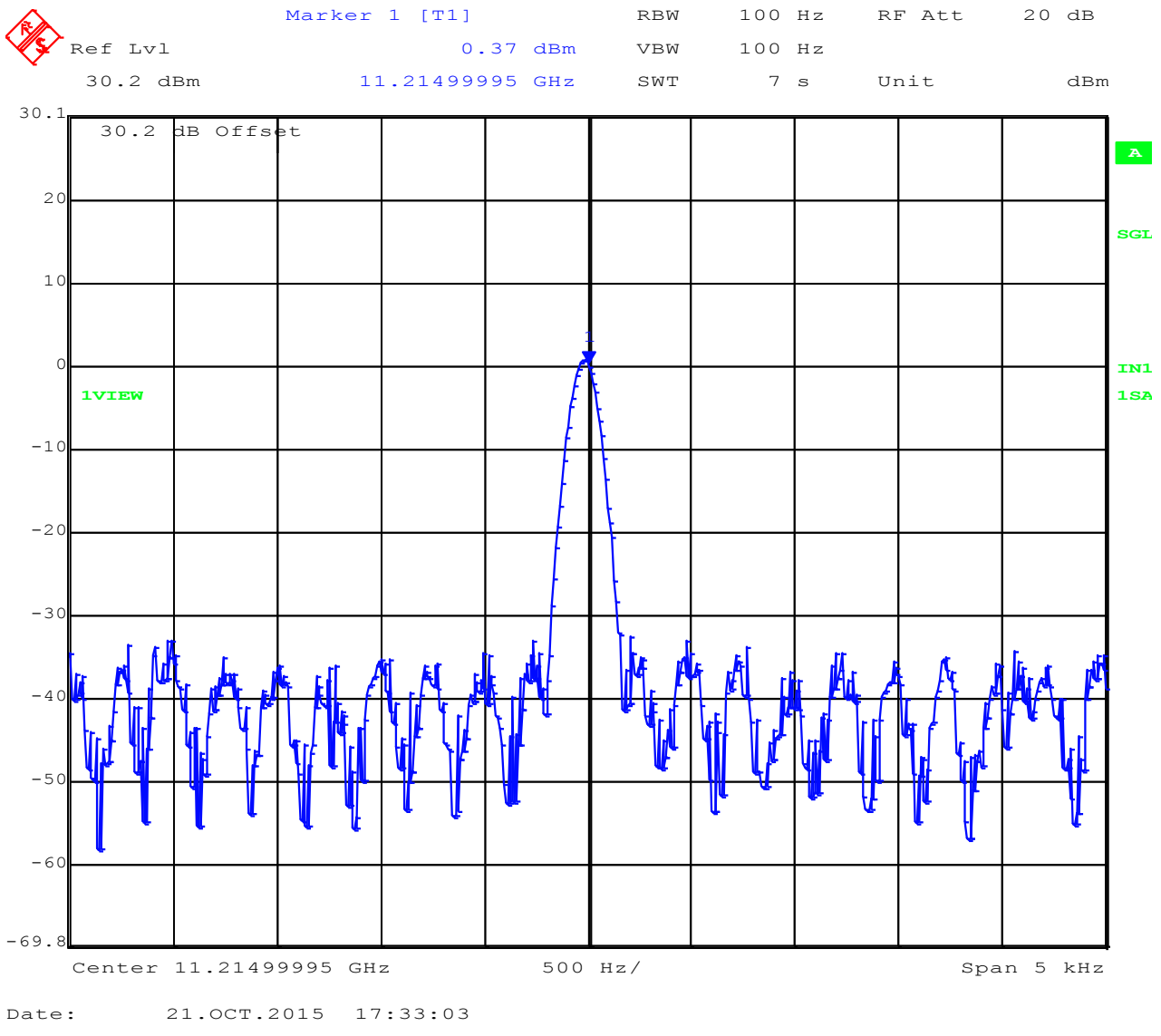
Frequency Stability 48 Vdc, -40°C



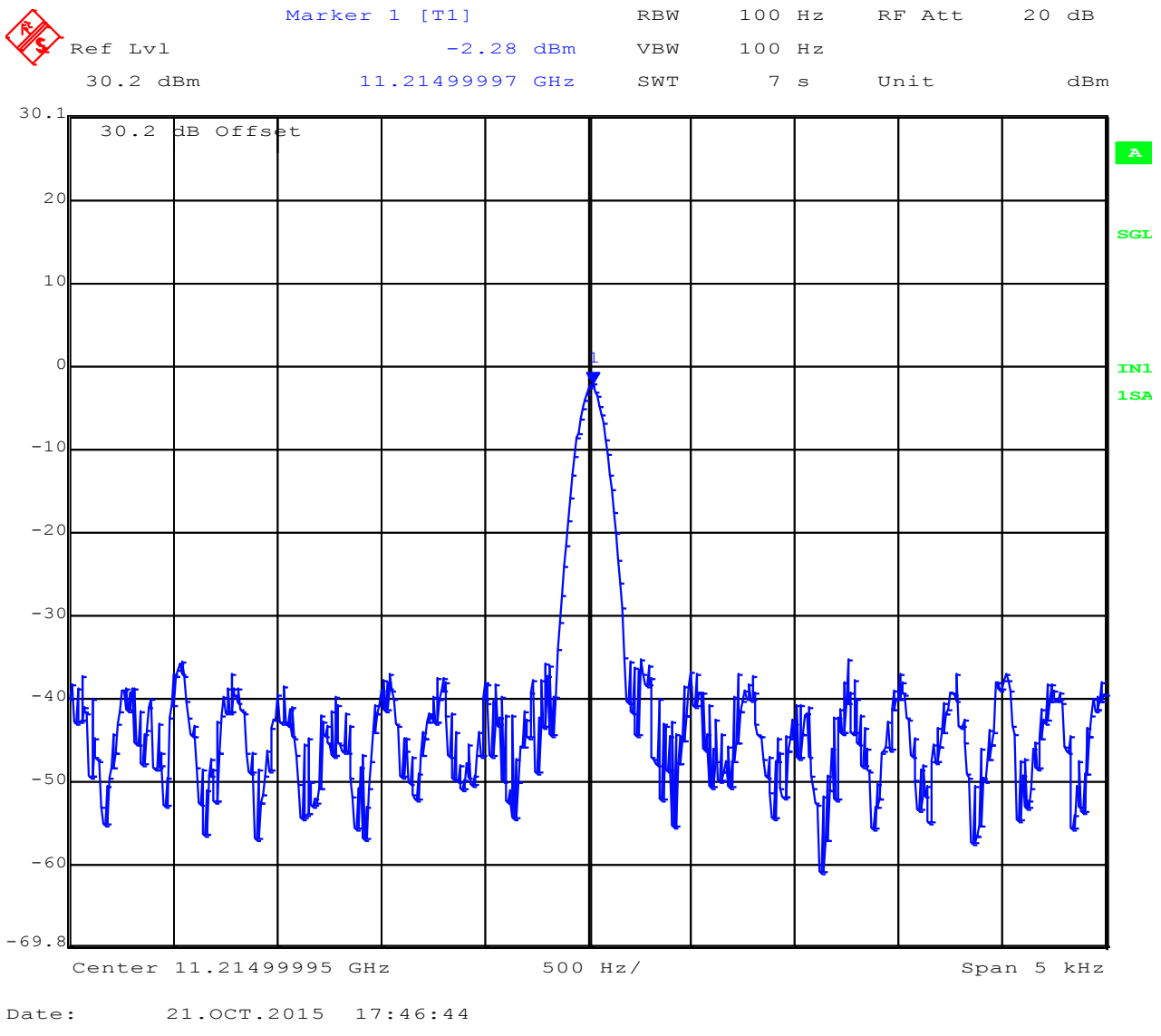
Frequency Stability 48 Vdc, -30°C



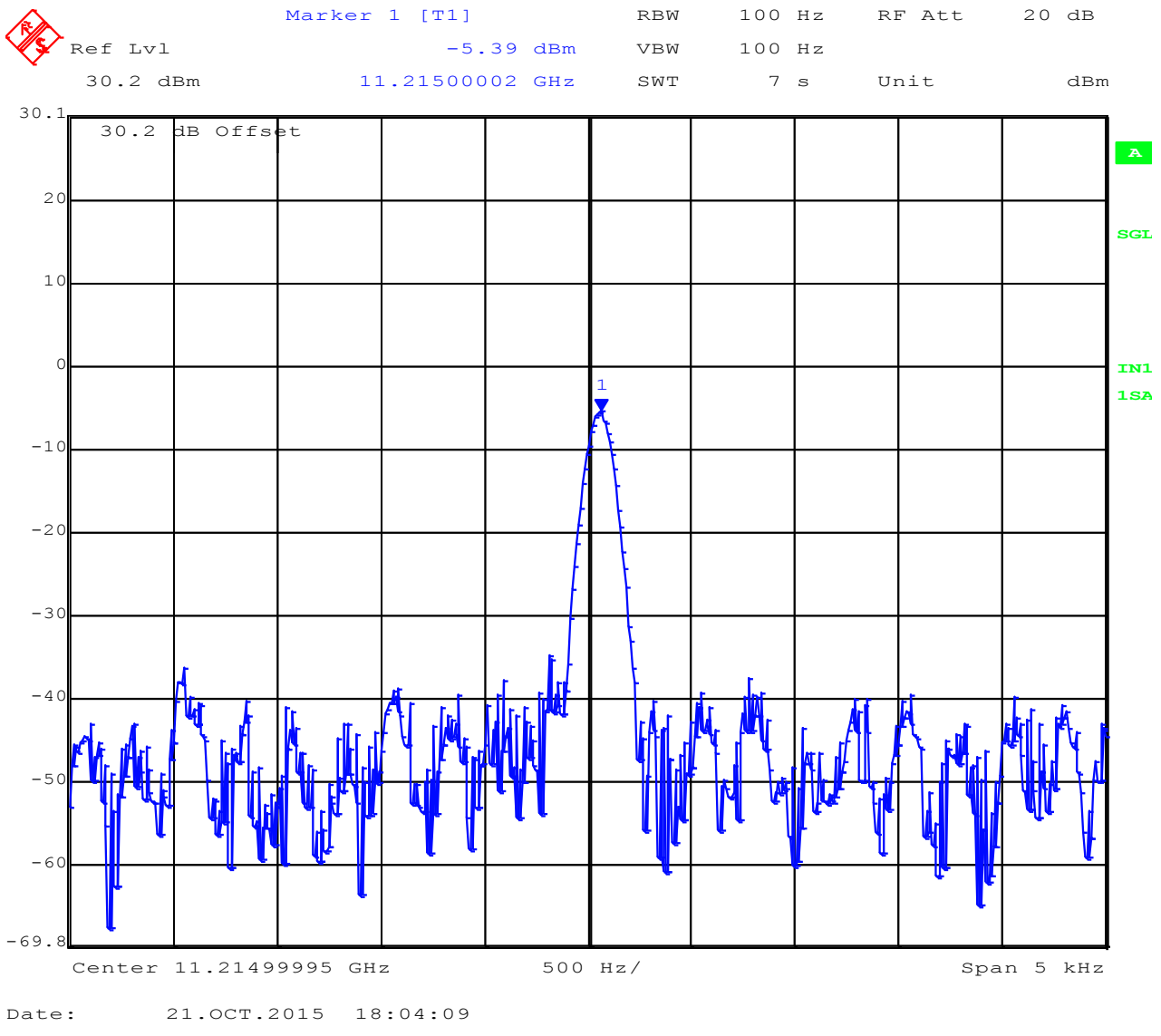
Frequency Stability 48 Vdc, -20°C



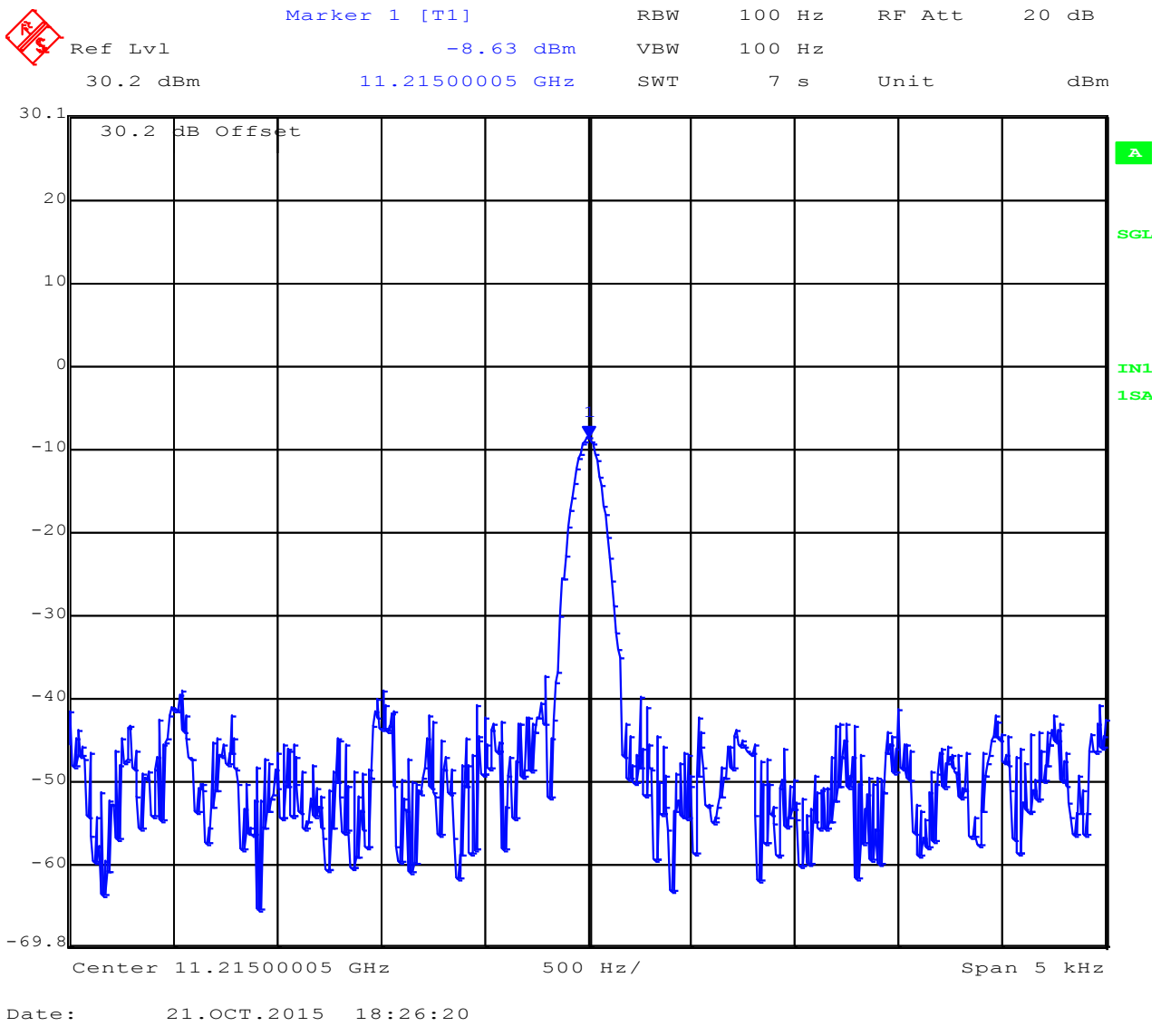
Frequency Stability 48 Vdc, -10°C



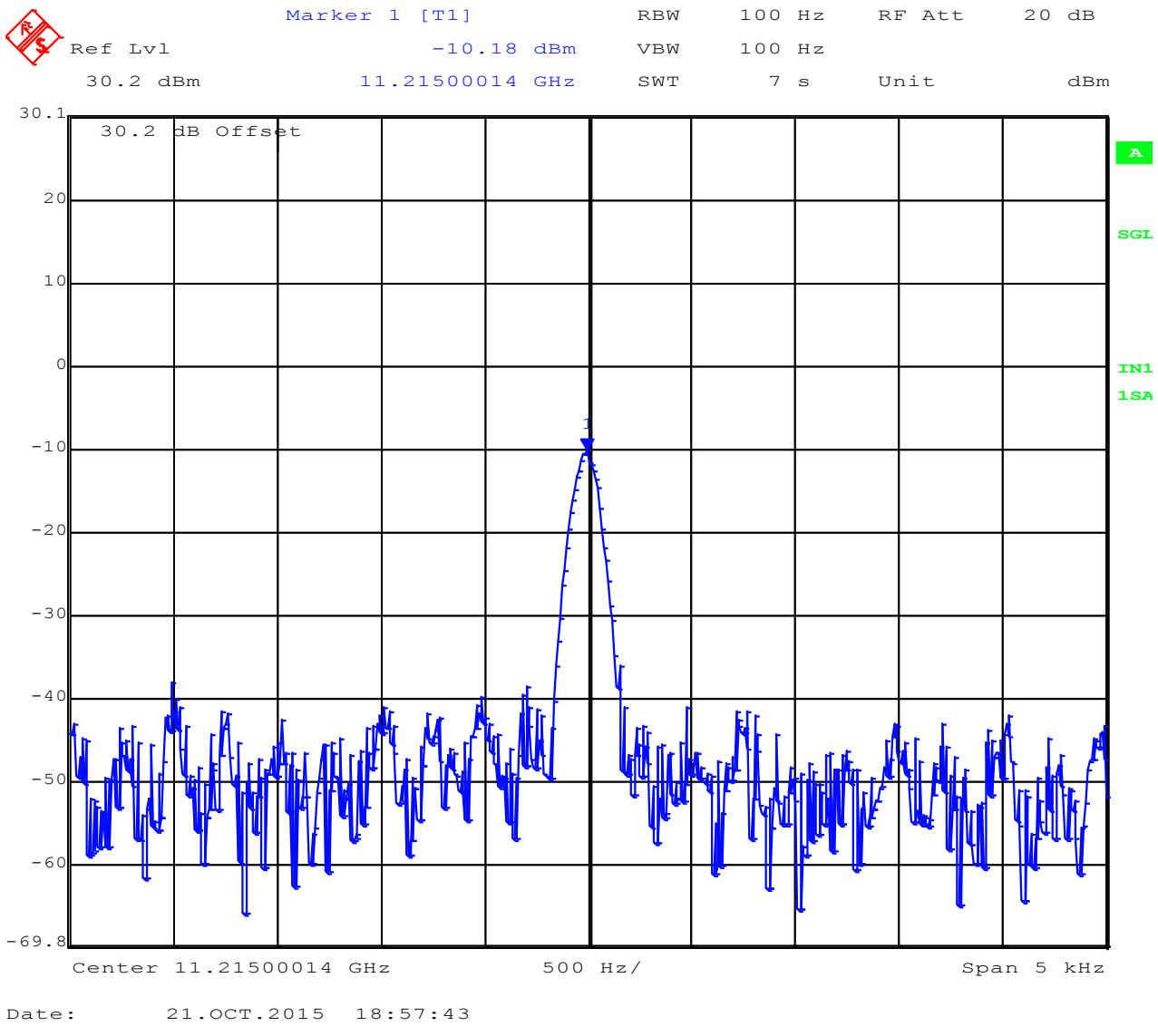
Frequency Stability 48 Vdc, +0°C



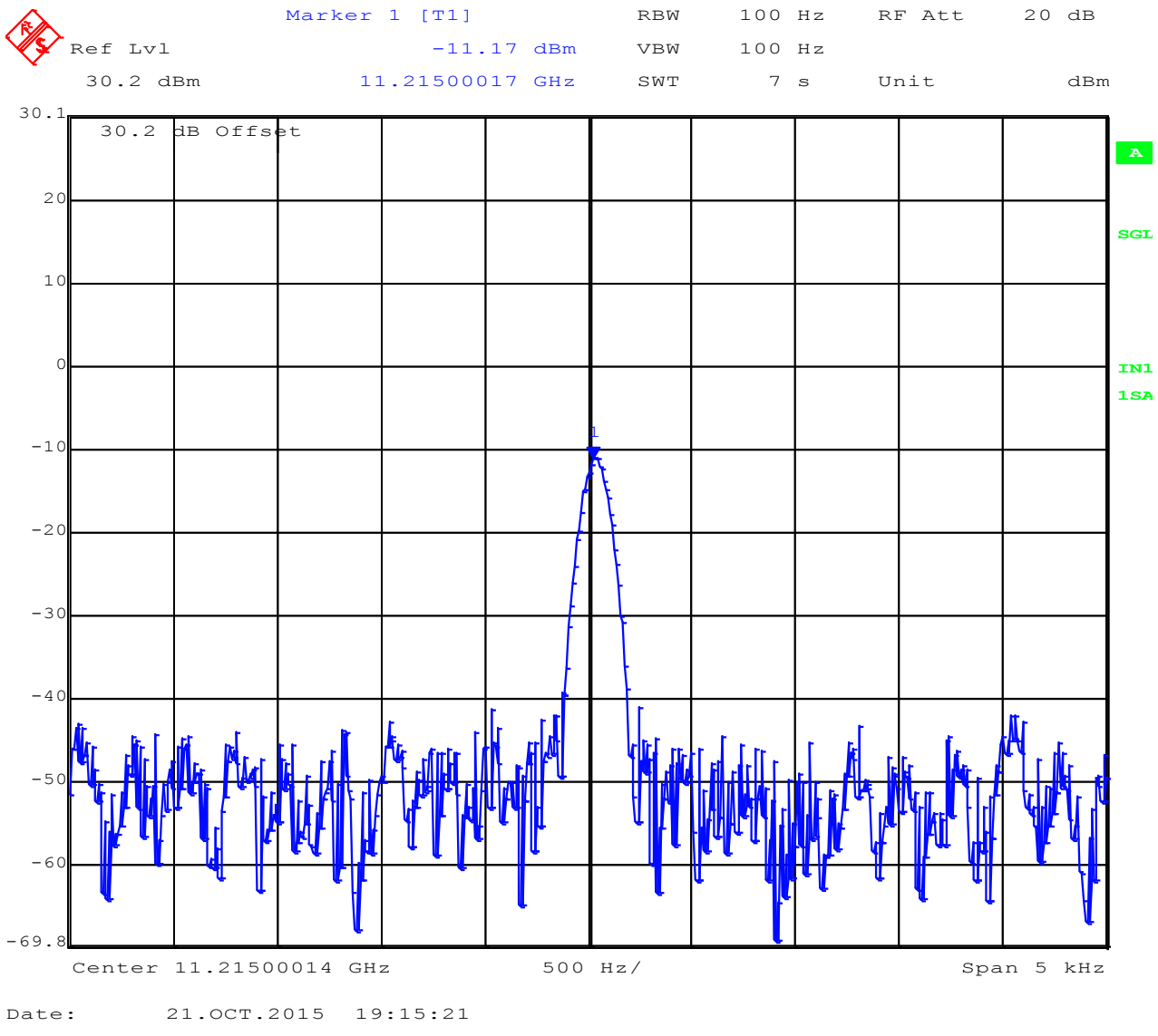
Frequency Stability 48 Vdc, +10°C



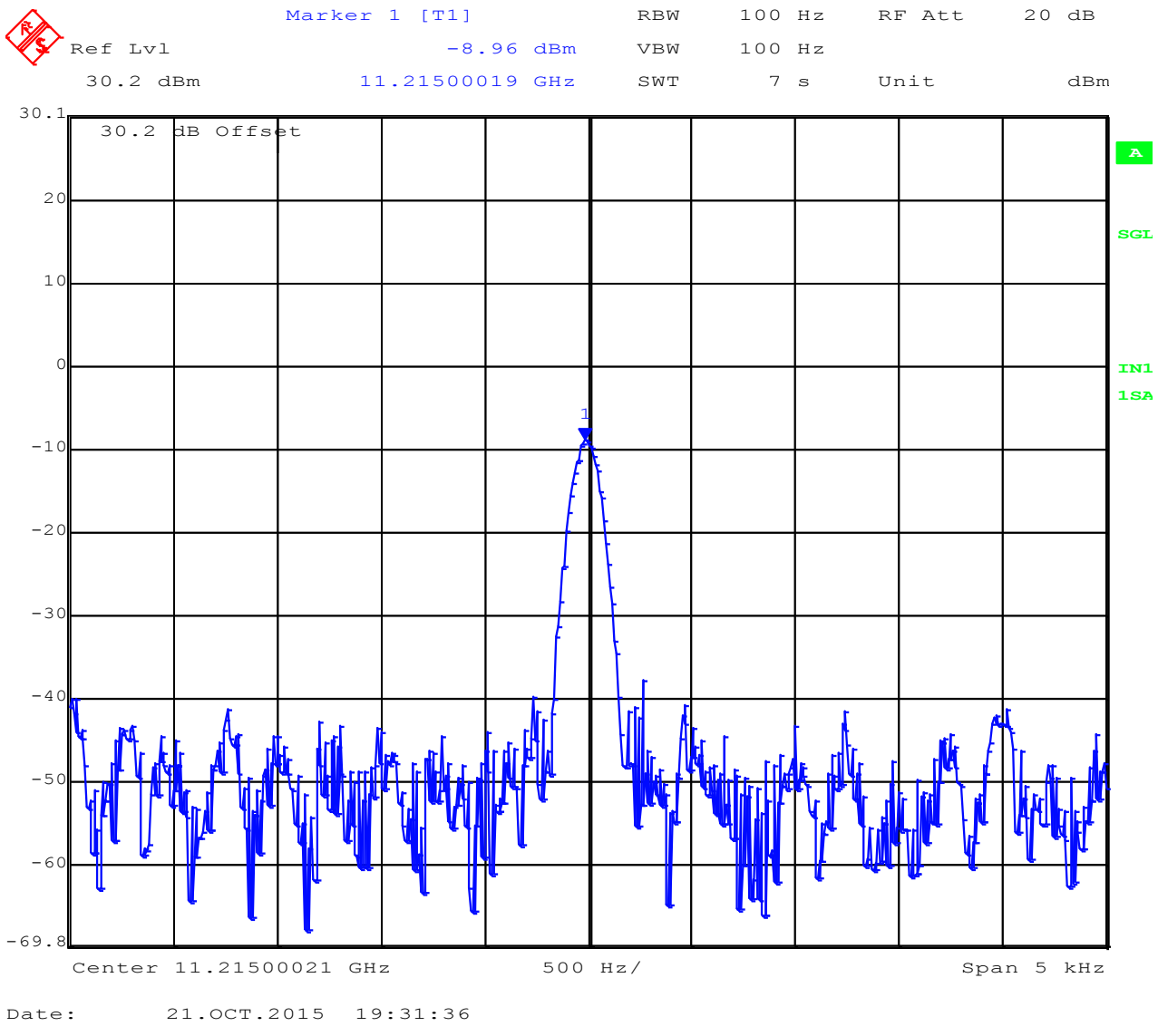
Frequency Stability 48 Vdc, +30°C



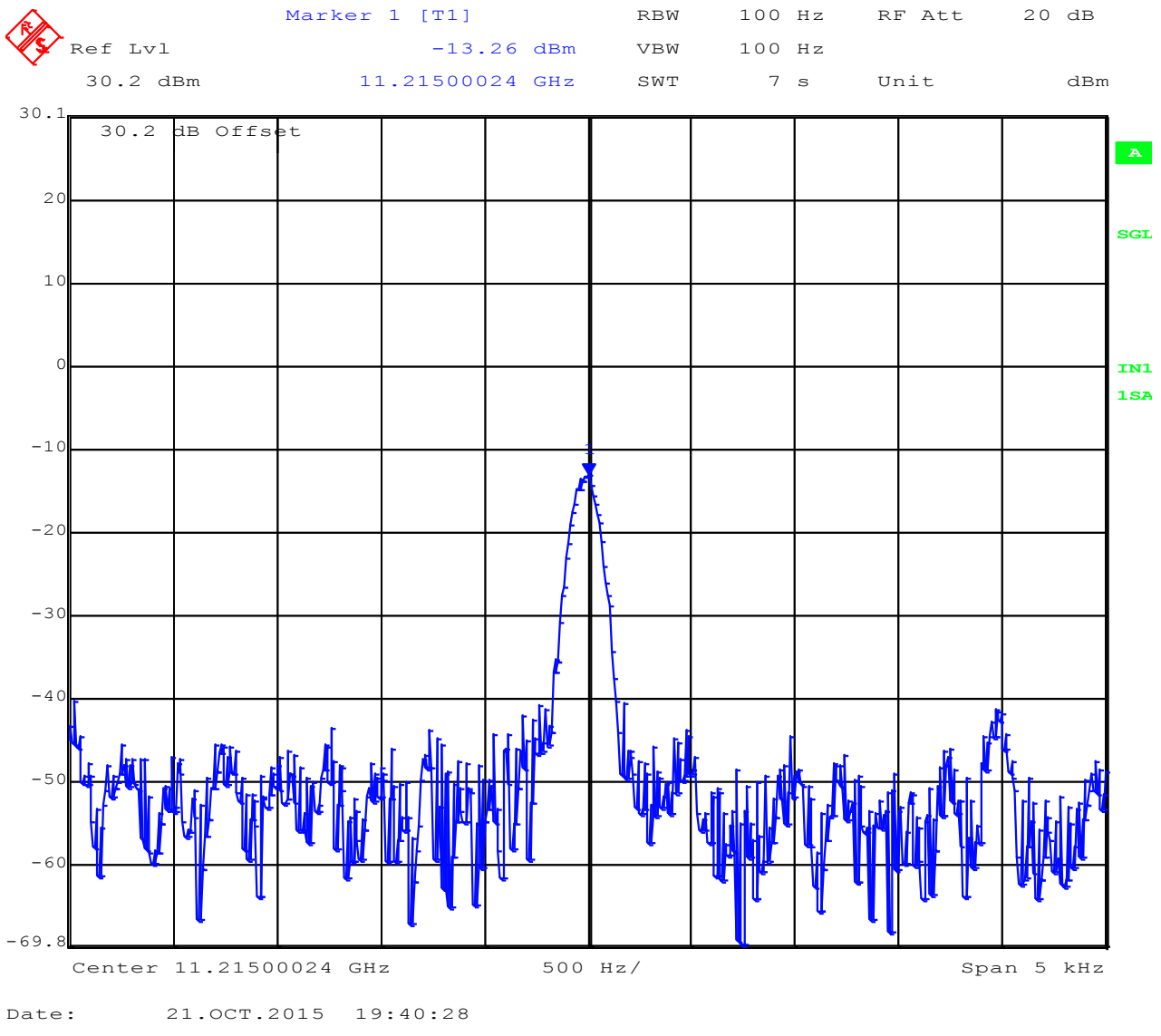
Frequency Stability 48 Vdc, +40°C



Frequency Stability 48 Vdc, +50°C



Frequency Stability 48 Vdc, +55°C



6.1.1.3. Output Power

Conducted Test Conditions for Maximum Conducted Output Power EIRP			
Standard:	FCC CFR 47 Part 101	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Output Power	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	101.113	**Pressure (mBars):**	999 - 1001
Reference Document(s):			

Test Procedure for Maximum Conducted Output Power Measurement (EIRP)

Test methodology used a wideband average power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate centre frequency. All cable losses and offsets were taken into consideration in the measured result. All operational modes and frequency bands were measured independently and the resultant power calculated. For multiple outputs, the measurements were made simultaneously on each output port and summed in a linear fashion. This technique was used in order to prove compliance.

Power Settings
Power measurements were made from each antenna port and the power setting logged for each measurement.

Limits
Base stations are limited to less than 55 dBW (+85 dBm) maximum equivalent isotropically radiated power (e.i.r.p.).

Measurement Results for Conducted Output Power

Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	100.00
Data Rate:	Unknown	**Antenna Gain (dBi):**	50.0
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	EIRP	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
10715.00	24.46	24.26	--	--	27.37	77.27	85.00	-7.63	Unknown
11245.00	24.36	24.00	--	--	27.19	77.19	85.00	-7.81	Unknown
11685.00	18.97	20.22	--	--	22.65	72.65	85.00	-12.35	Unknown

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

Equipment Configuration for Peak Transmit Power			
Variant:	20 MHz	**Duty Cycle (%):**	100.00
Data Rate:	Unknown	**Antenna Gain (dBi):**	50.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	EIRP	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
10715.00	24.43	24.18	--	--	27.32	77.32	85.00	-7.68	Unknown
11245.00	24.40	24.23	--	--	27.33	77.33	85.00	-7.67	Unknown
11685.00	18.98	20.25	--	--	22.67	72.67	85.00	-12.33	Unknown

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

Equipment Configuration for Peak Transmit Power

Variant:	40 MHz	**Duty Cycle (%):**	100.00
Data Rate:	Unknown	**Antenna Gain (dBi):**	50.0
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	EIRP	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
10735.00	23.99	24.40	--	--	27.21	77.21	85.00	-7.79	Unknown
11225.00	24.64	24.45	--	--	27.56	77.56	85.00	-7.44	Unknown
11665.00	20.58	20.95	--	--	23.78	73.78	85.00	-11.22	Unknown

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

Equipment Configuration for Peak Transmit Power

Variant:	40 MHz	**Duty Cycle (%):**	100.00
Data Rate:	Unknown	**Antenna Gain (dBi):**	50.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	EIRP	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
10735.00	23.77	24.44	--	--	27.13	77.13	85.00	-7.87	Unknown
11225.00	24.54	24.20	--	--	27.38	77.38	85.00	-7.62	Unknown
11665.00	20.40	20.78	--	--	23.60	73.60	85.00	-11.40	Unknown

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

Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	100.00
Data Rate:	Unknown	**Antenna Gain (dBi):**	50.0
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	EIRP	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
10755.00	23.93	24.57	--	--	27.27	77.27	85.00	-7.73	Unknown
11215.00	24.25	24.70	--	--	27.49	77.49	85.00	-7.51	Unknown
11645.00	22.42	21.94	--	--	25.20	75.20	85.00	-9.80	Unknown

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

Equipment Configuration for Peak Transmit Power			
Variant:	80 MHz	**Duty Cycle (%):**	100.00
Data Rate:	Unknown	**Antenna Gain (dBi):**	50.0
Modulation:	256QAM	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	CC
Engineering Test Notes:			

Test Measurement Results

Test Frequency	Measured Conducted Output Power (dBm) Port(s)				Calculated Total Power	EIRP	Limit	Margin	EUT Power Setting
MHz	a	b	c	d	Σ Port(s) dBm	dBm	dBm	dBm	
10755.00	24.30	24.22	--	--	27.27	77.27	85.00	-7.73	Unknown
11215.00	23.80	24.36	--	--	27.10	77.10	85.00	-7.90	Unknown
11645.00	21.77	21.64	--	--	24.72	74.72	85.00	-10.28	Unknown

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

6.1.1.4. Emission Limitations

Conducted Test Conditions for Transmitter Unwanted Emissions			
Standard:	FCC CFR 47: Part 101	**Ambient Temp. (ºC):**	24.0 - 27.5
Test Heading:	Emission Limitations	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	101.113	**Pressure (mBars):**	999 - 1001
Reference Document(s):			

Test Procedure for Emission Limitations

The Transmitter Unwanted Emissions were measurement conductively. Testing was performed on individual antenna ports and limits applied to each plot respectively.

Limits

i) For operating frequencies below 15 GHz, in any 4 KHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth: As specified by the following equation but in no event less than 50 decibels:

A = 35 + 0.8(P −50) + 10 Log10 B. (Attenuation greater than 80 decibels or to an absolute power of less than −13 dBm/1MHz is not required.) where:

A = Attenuation (in decibels) below the mean output power level.

P = Percent removed from the center frequency of the transmitter bandwidth.

B = Authorized bandwidth in MHz.

Maximum chain output power found = +24.70 dBm (0.295 W) (80 MHz bandwidth, Channel 11,215.0 MHz, BPSK, Port B)

Limit = $35 + 0.8(0.295 - 50) + 10 \log_{10} (76.953) = 14.1$ dB

Limit = 24.70 – 14.1 = 10.6 dBm therefore Limit = -13 dBm

NOTE: Each port on the device was tested individually to the worst case -13 dBm limit.

NOTE: See Section 3.8 Deviations from the Test Standard

6.1.1.4.1 Conducted Spurious Emissions

Equipment Configuration for Conducted Spurious Emissions			
Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	100
Channel Frequency:	10,715 MHz	**Antenna Gain (dBi):**	Not Applicable
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

CHAIN A					
Temperature	**20.0 °C**	**Maximum Observed Spurious Emission**		**Limit**	**Margin**
Voltage	**48.00 Vdc**	**Amplitude**	**Emission Frequency**		
Test Frequency	**Frequency Range**	**dBm**	**MHz**	**dBm**	**dB**
10,715 MHz	**0.03 – 1 GHz**	-47.44	908.637	-13.0	-34.44
	1 – 10.0 GHz	-36.36	6,969.940		-23.36
	10.0 – 20.0 GHz	-31.84	12,464.929		-18.84
	20.0 – 30.0 GHz	-24.14	29,238.476		-11.14
	30.0 – 40.0 GHz	-21.35	35,531.062		-8.35
	>40 GHz (not measured)*				

CHAIN B					
Temperature	**20.0 °C**	**Maximum Observed Spurious Emission**		**Limit**	**Margin**
Voltage	**48.00 Vdc**	**Amplitude**	**Emission Frequency**		
Test Frequency	**Frequency Range**	**dBm**	**MHz**	**dBm**	**dB**
10,715 MHz	**0.03 – 1 GHz**	-47.61	974.729	-13.0	-34.61
	1 – 10.0 GHz	-36.37	6,987.976		-23.10
	10.0 – 20.0 GHz	-19.61	12,484.969		-6.61
	20.0 – 30.0 GHz	-23.81	26,953.907		-10.81
	30.0 – 40.0 GHz	-21.66	35,430.861		-8.66
	>40 GHz (not measured)*				

* See Section 3.8 Deviations from the Test Standard

Equipment Configuration for Conducted Spurious Emissions			
Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	100
Channel Frequency:	11,245 MHz	**Antenna Gain (dBi):**	Not Applicable
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

CHAIN A					
Temperature	**20.0 °C**	**Maximum Observed Spurious Emission**		**Limit**	**Margin**
Voltage	**48.00 Vdc**	**Amplitude**	**Emission Frequency**		
Test Frequency	**Frequency Range**	**dBm**	**MHz**	**dBm**	**dB**
10,715 MHz	**0.03 – 1 GHz**	-47.49	961.122	-13.0	-34.49
	1 – 10.0 GHz	-36.39	9,458.917		-23.39
	10.0 – 20.0 GHz	-24.62	10,781.563		-11.62
	20.0 – 30.0 GHz	-24.11	29,278.557		-11.11
	30.0 – 40.0 GHz	-21.50	35,470.941		-8.50
	>40 GHz (not measured)*				

CHAIN B					
Temperature	**20.0 °C**	**Maximum Observed Spurious Emission**		**Limit**	**Margin**
Voltage	**48.00 Vdc**	**Amplitude**	**Emission Frequency**		
Test Frequency	**Frequency Range**	**dBm**	**MHz**	**dBm**	**dB**
10,715 MHz	**0.03 – 1 GHz**	-48.21	9,53.346	-13.0	-35.21
	1 – 10.0 GHz	-36.37	7,438.877		-23.37
	10.0 – 20.0 GHz	-19.89	12,484.969		-6.89
	20.0 – 30.0 GHz	-23.09	29,338.677		-10.09
	30.0 – 40.0 GHz	-21.72	35,450.901		-8.72
	>40 GHz (not measured)*				

* See Section 3.8 Deviations from the Test Standard

Equipment Configuration for Conducted Spurious Emissions

Variant:	20 MHz Bandwidth	**Duty Cycle (%):**	100
Channel Frequency:	11,685 MHz	**Antenna Gain (dBi):**	Not Applicable
Modulation:	BPSK	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

CHAIN A

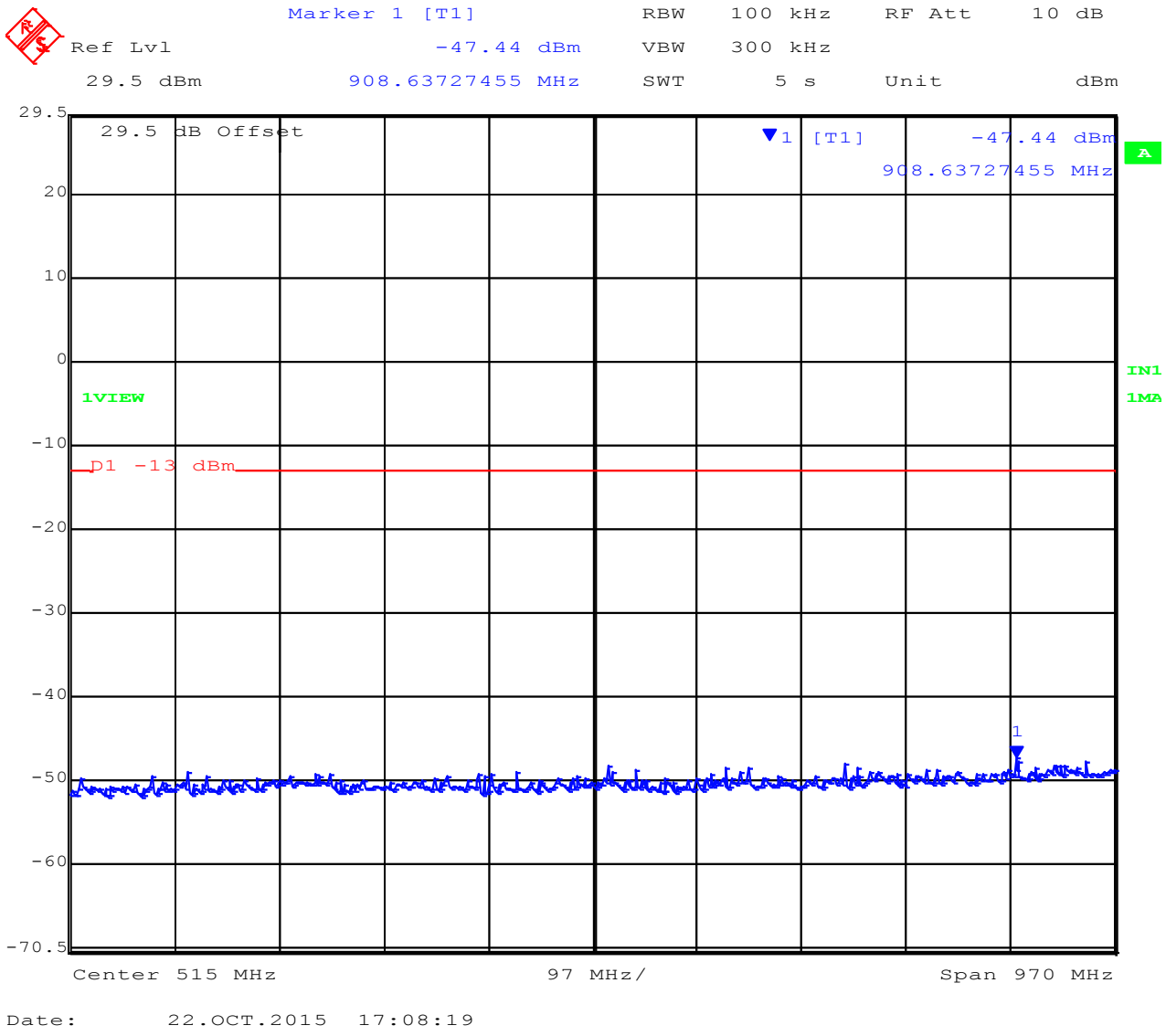
Temperature	**20.0 °C**	**Maximum Observed Spurious Emission**		**Limit**	**Margin**
Voltage	**48.00 Vdc**	**Amplitude**	**Emission Frequency**		
Test Frequency	**Frequency Range**	**dBm**	**MHz**	**dBm**	**dB**
10,715 MHz	**0.03 – 1 GHz**	-48.07	9,222.444	-13.0	-35.07
	1 – 10.0 GHz	-26.35	9,909.819		-13.35
	10.0 – 20.0 GHz	-25.85	10,020.040		-12.85
	20.0 – 30.0 GHz	-23.98	29,138.276		-10.98
	30.0 – 40.0 GHz	-21.15	35,450.901		-8.15
	>40 GHz (not measured)*				

CHAIN B

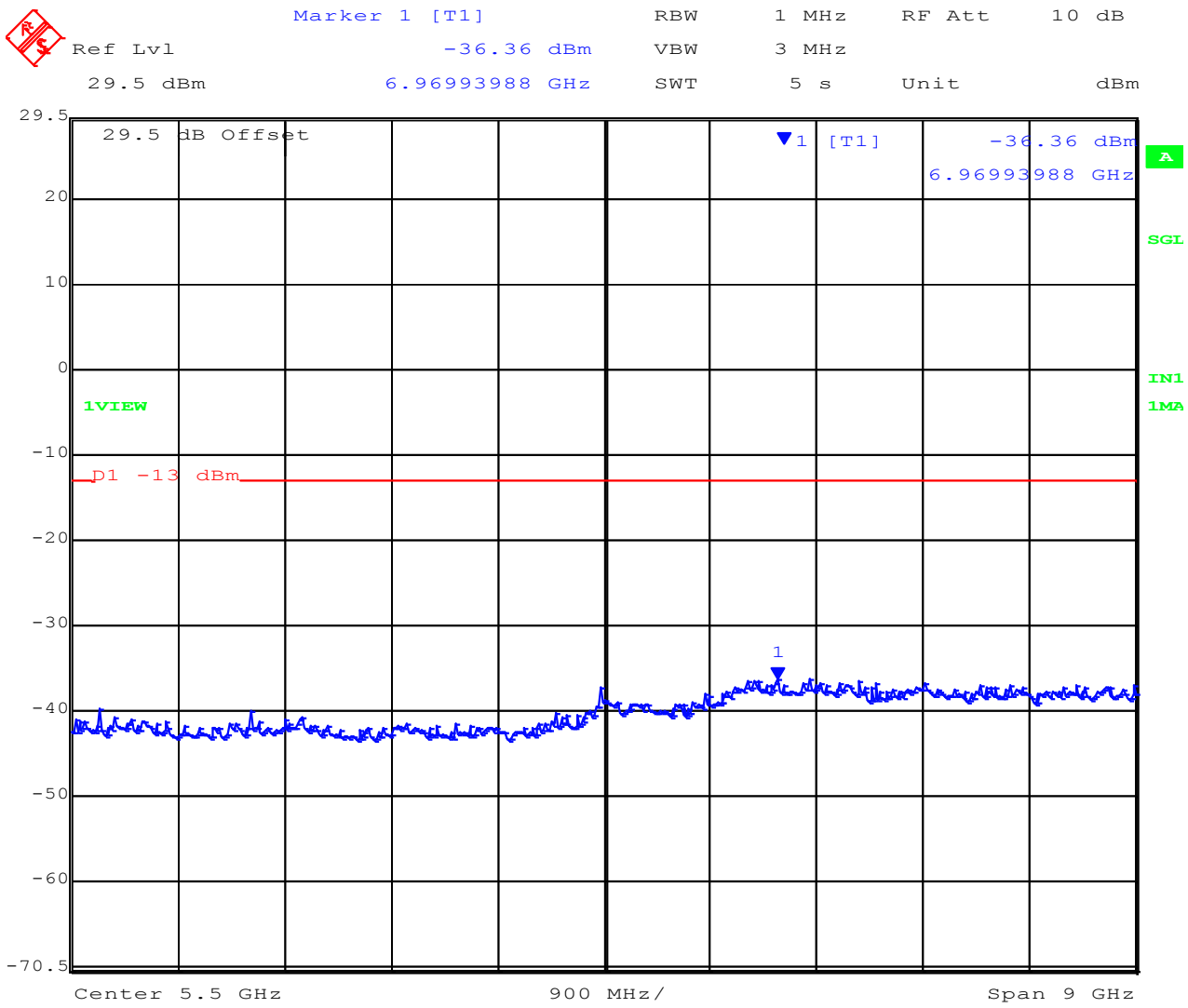
Temperature	**20.0 °C**	**Maximum Observed Spurious Emission**		**Limit**	**Margin**
Voltage	**48.00 Vdc**	**Amplitude**	**Emission Frequency**		
Test Frequency	**Frequency Range**	**dBm**	**MHz**	**dBm**	**dB**
10,715 MHz	**0.03 – 1 GHz**	-47.19	9,630.661	-13.0	-34.19
	1 – 10.0 GHz	-30.03	9,927.855		-17.03
	10.0 – 20.0 GHz	-19.81	12,484.969		-6.81
	20.0 – 30.0 GHz	-23.89	29,398.797		-10.89
	30.0 – 40.0 GHz	-20.90	35,430.861		-7.90
	>40 GHz (not measured)*				

* See Section 3.8 Deviations from the Test Standard

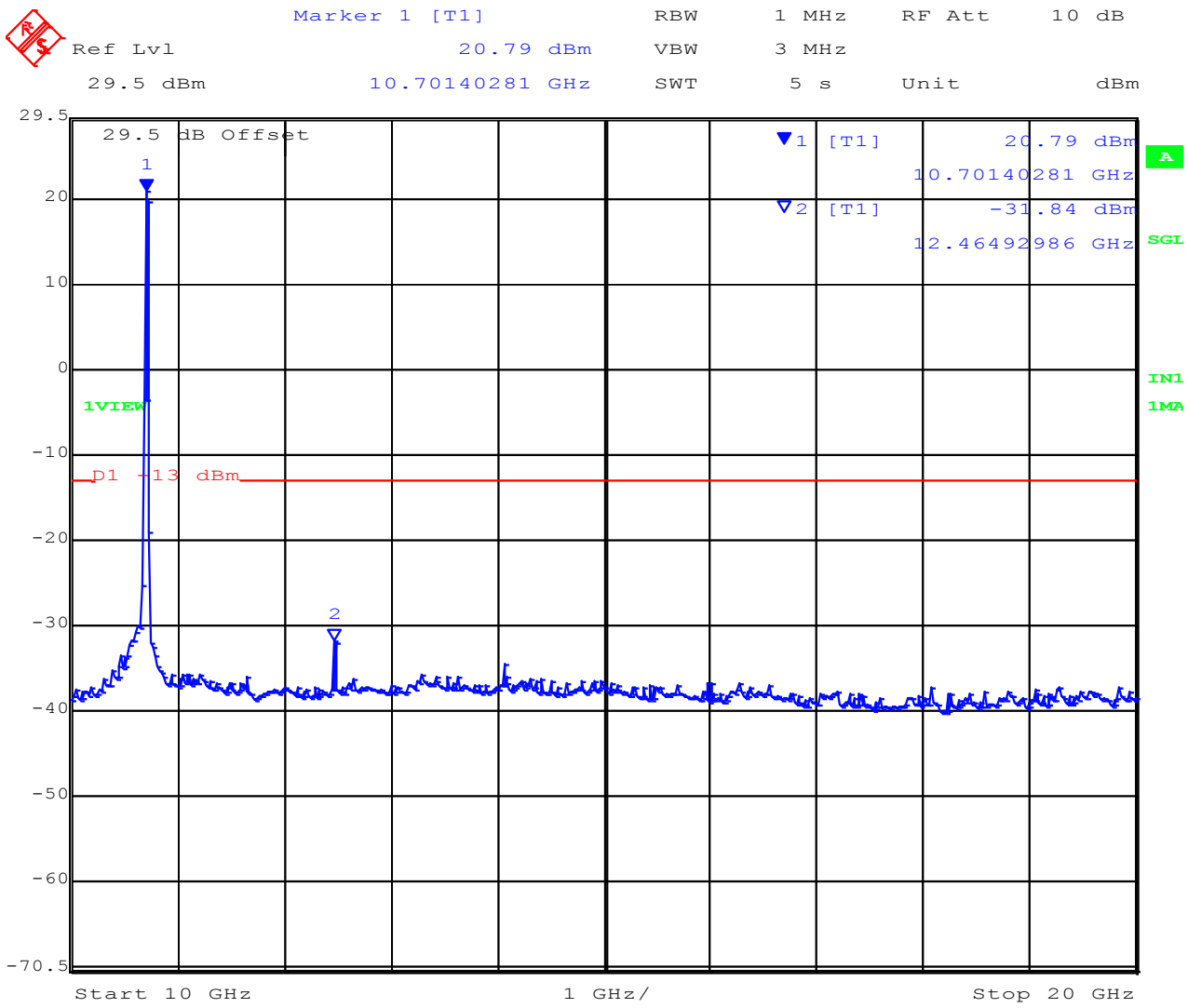
Chain A Channel Frequency 10,715 MHz 0.03 – 1 GHz 20 MHz BPSK Spurious Emissions



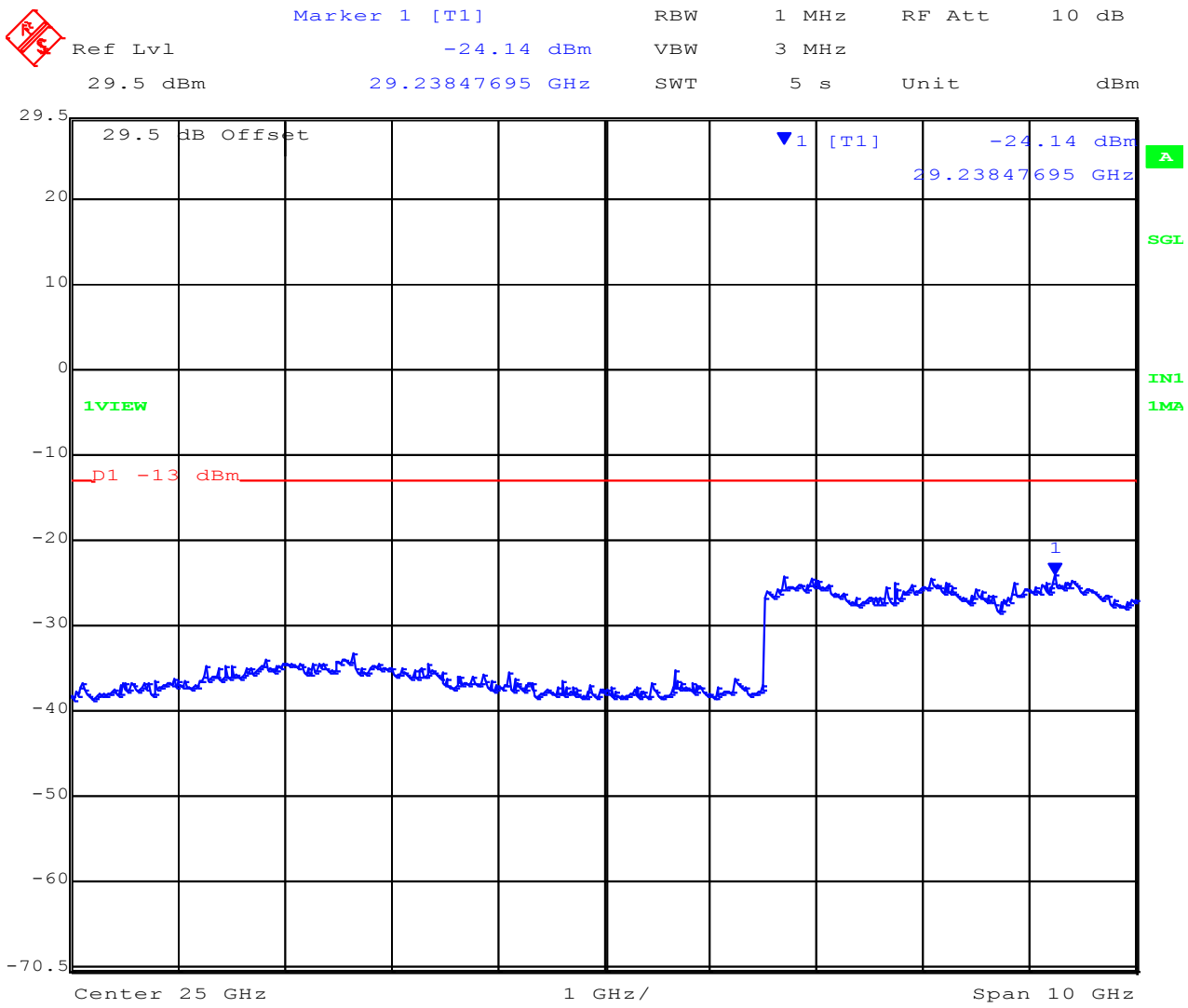
Chain A Channel Frequency 10,715 MHz 1 – 10 GHz 20 MHz BPSK Spurious Emissions



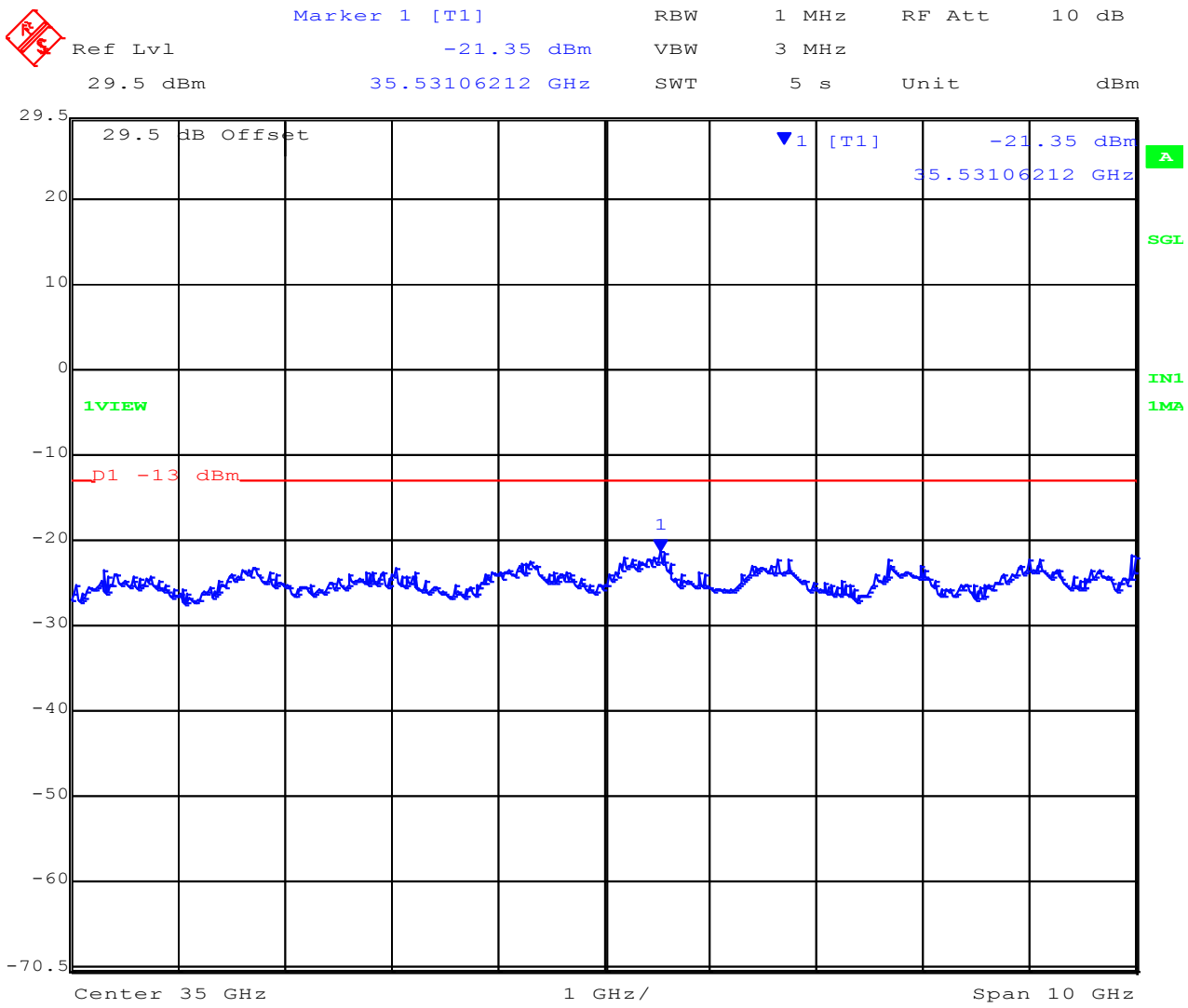
Chain A Channel Frequency 10,715 MHz 10 – 20 GHz 20 MHz BPSK Spurious Emissions



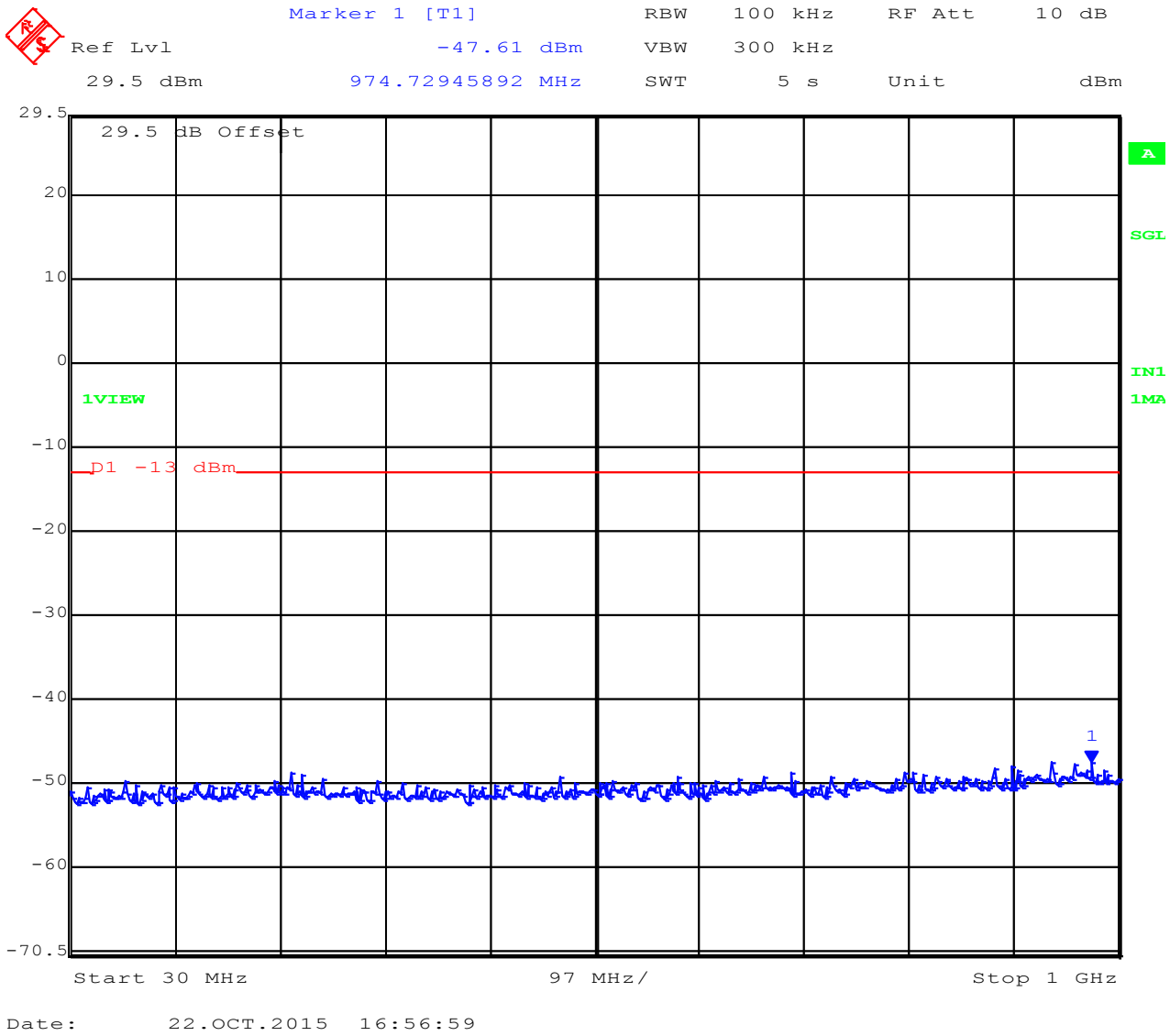
Chain A Channel Frequency 10,715 MHz 20 – 30 GHz 20 MHz BPSK Spurious Emissions



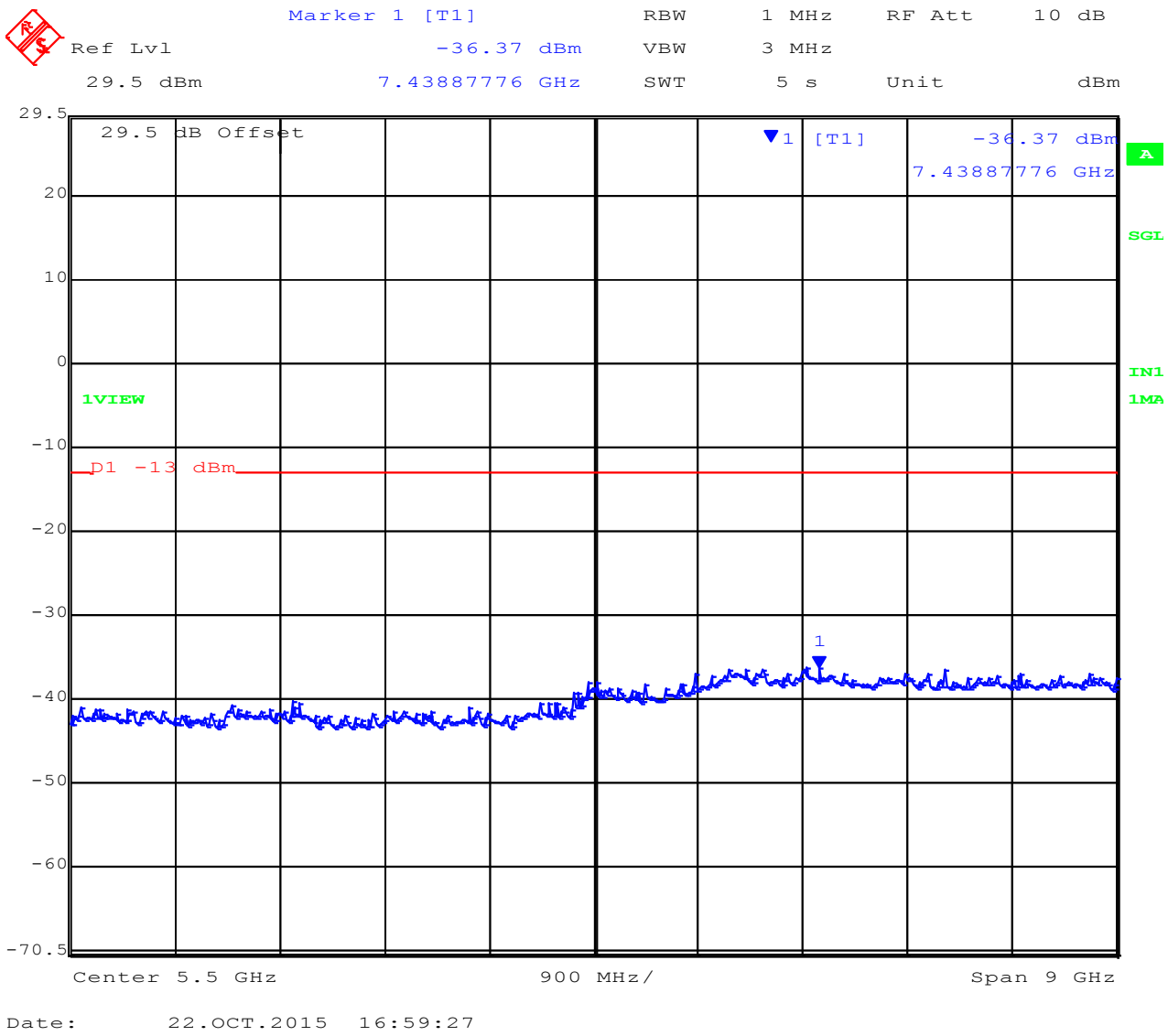
Chain A Channel Frequency 10,715 MHz 30 – 40 GHz 20 MHz BPSK Spurious Emissions



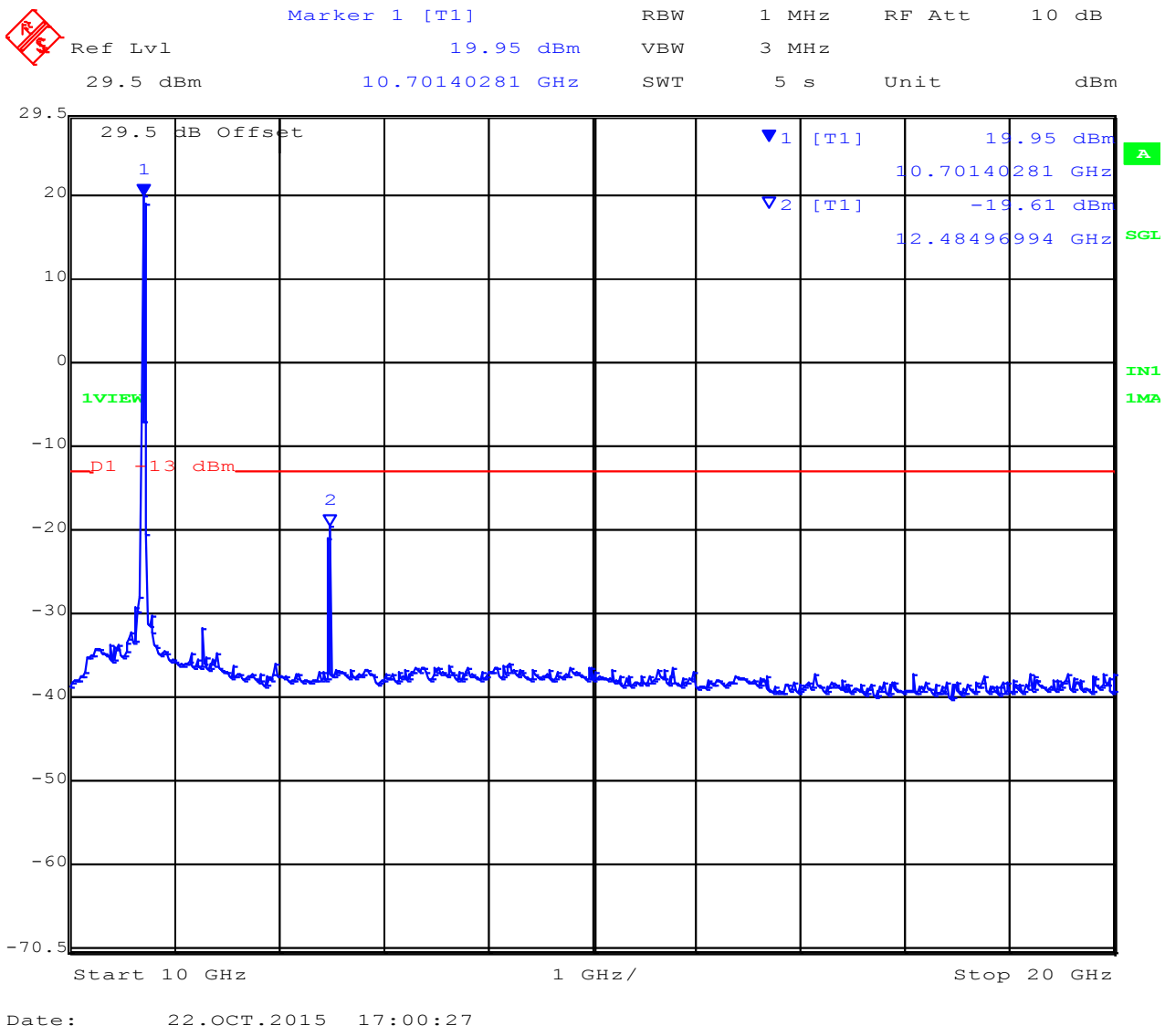
Chain B Channel Frequency 10,715 MHz 0.03 – 1 GHz 20 MHz BPSK Spurious Emissions



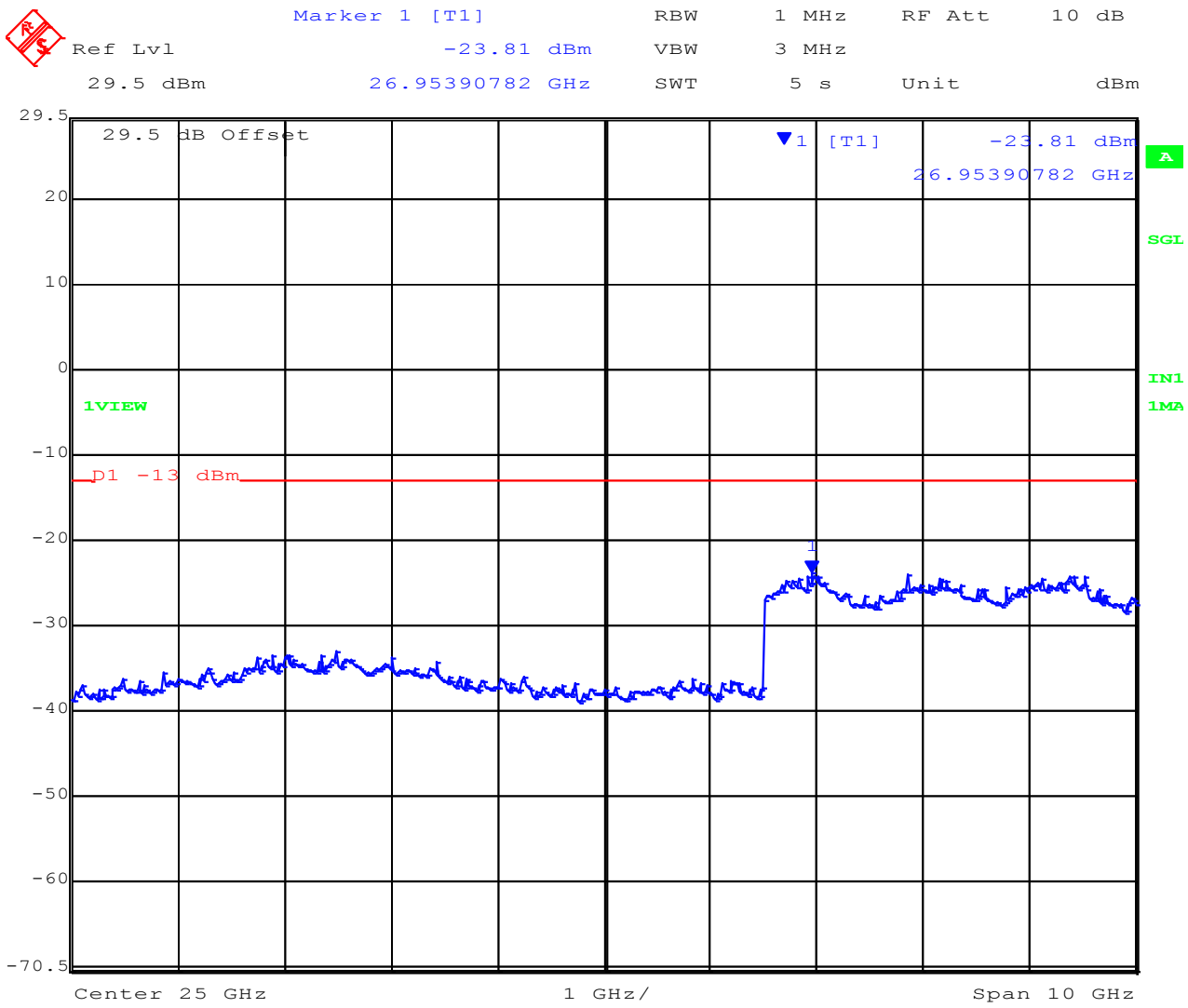
Chain B Channel Frequency 10,715 MHz 1 – 10 GHz 20 MHz BPSK Spurious Emissions



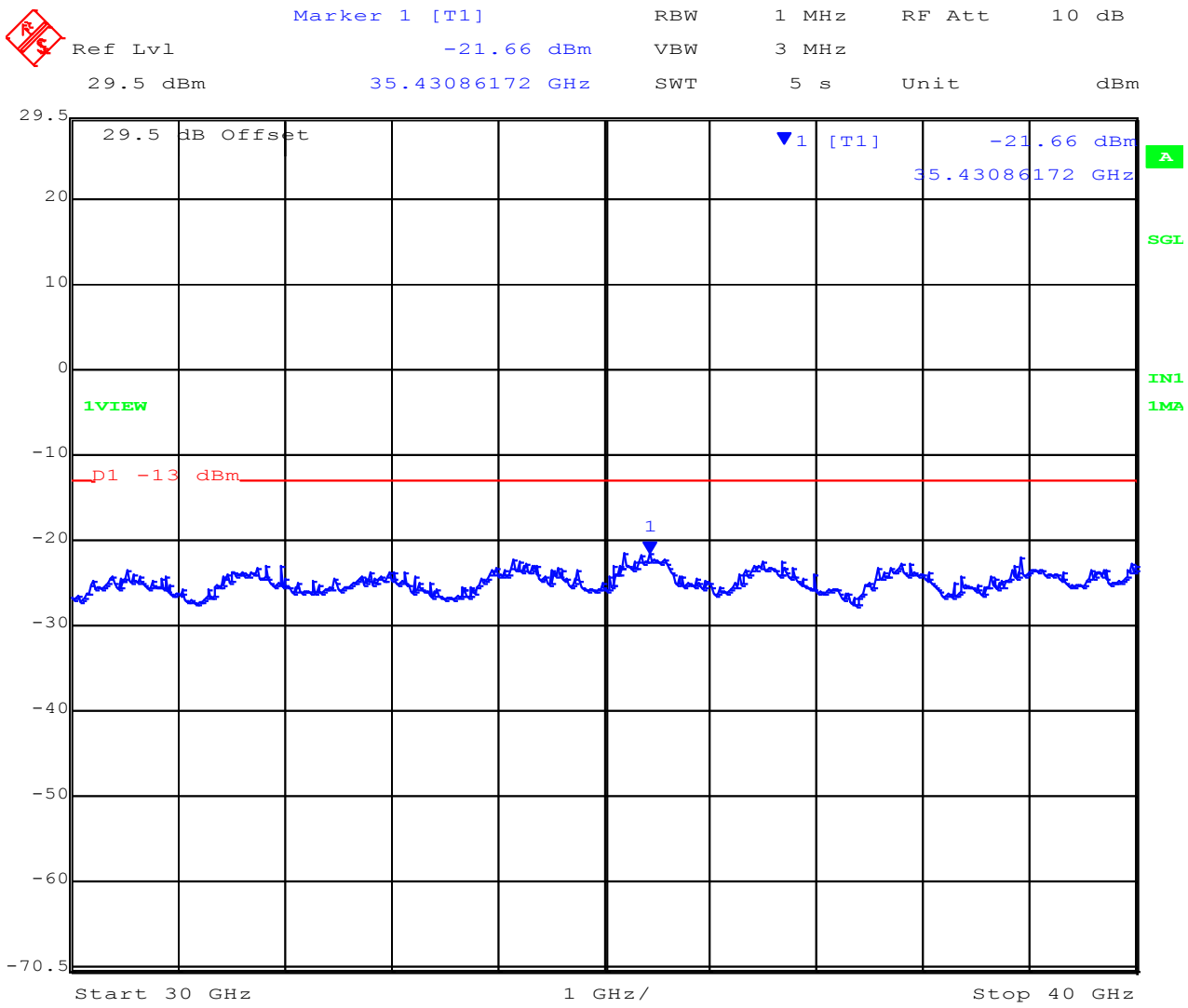
Chain B Channel Frequency 10,715 MHz 10 – 20 GHz 20 MHz BPSK Spurious Emissions



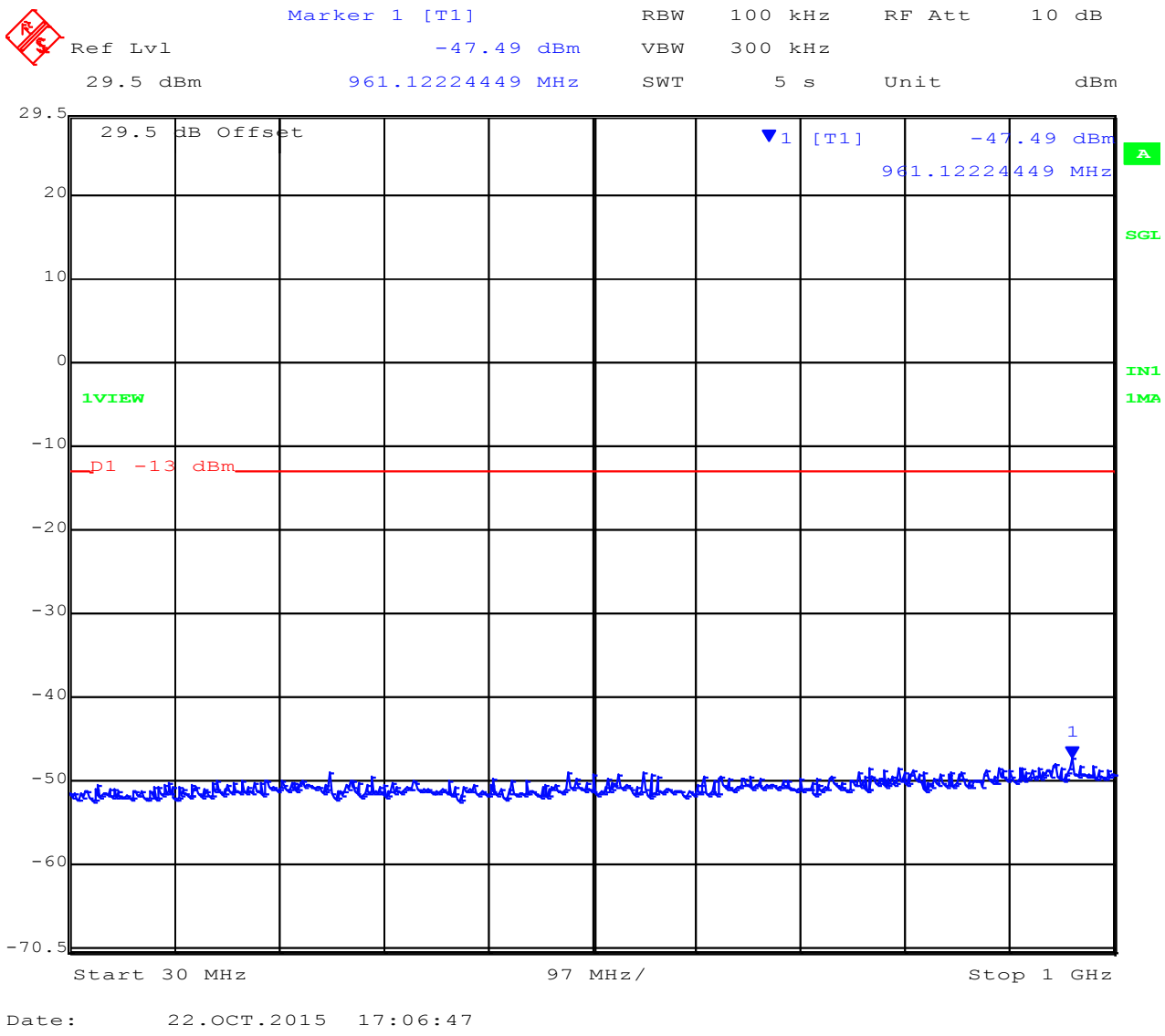
Chain B Channel Frequency 10,715 MHz 20 – 30 GHz 20 MHz BPSK Spurious Emissions



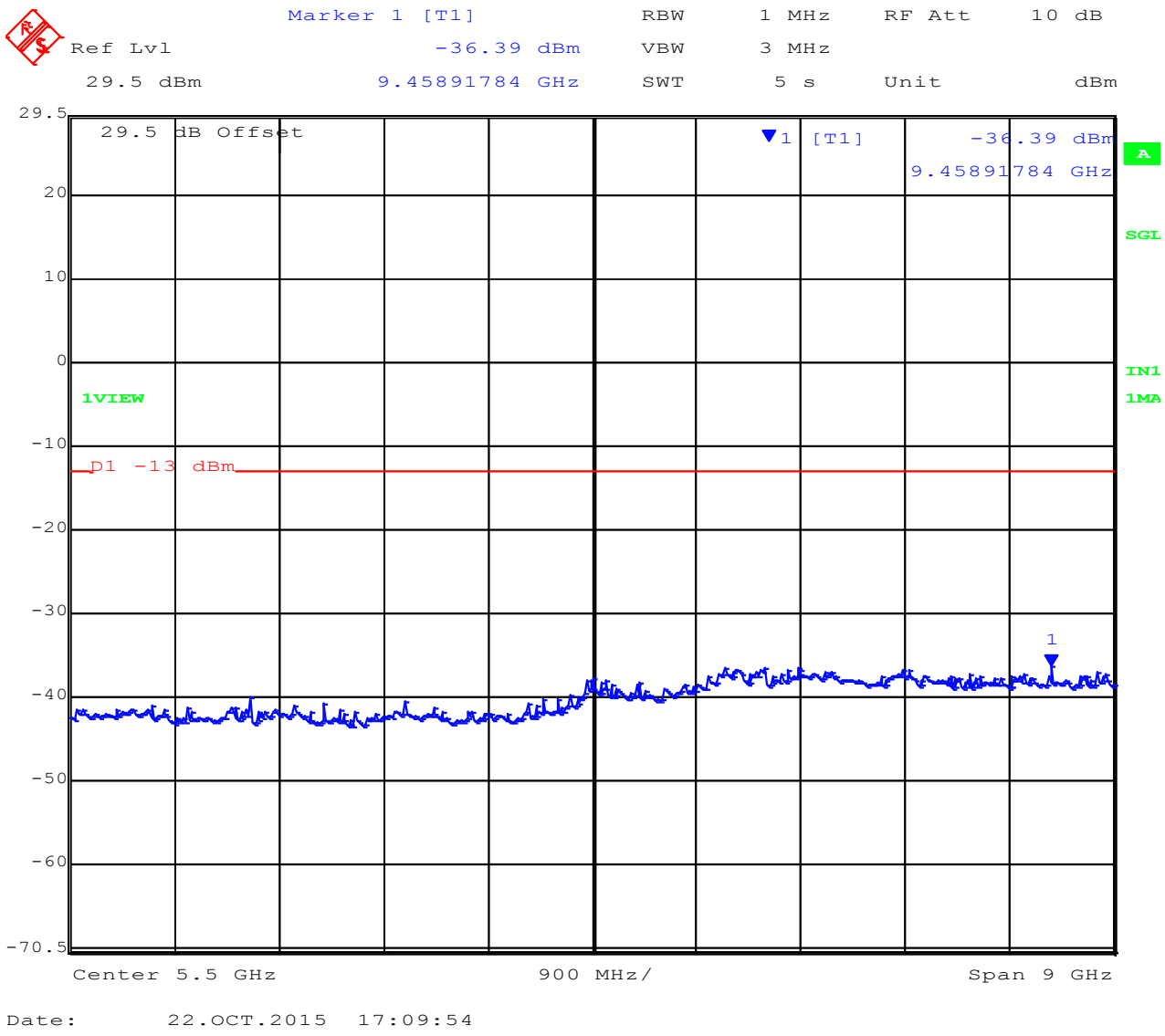
Chain B Channel Frequency 10,715 MHz 30 – 40 GHz 20 MHz BPSK Spurious Emissions



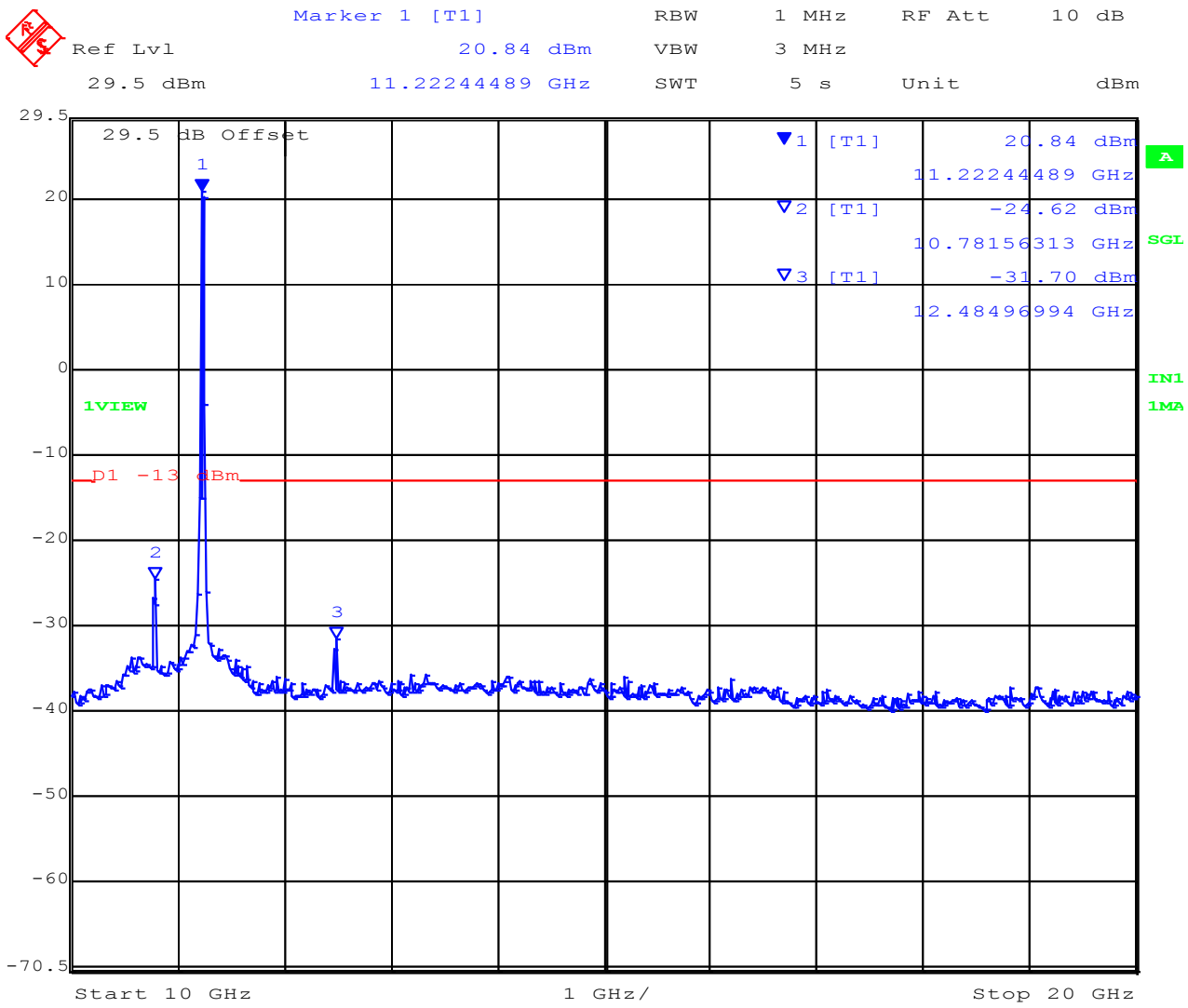
Chain A Channel Frequency 11,245 MHz 0.03 – 1 GHz 20 MHz BPSK Spurious Emissions



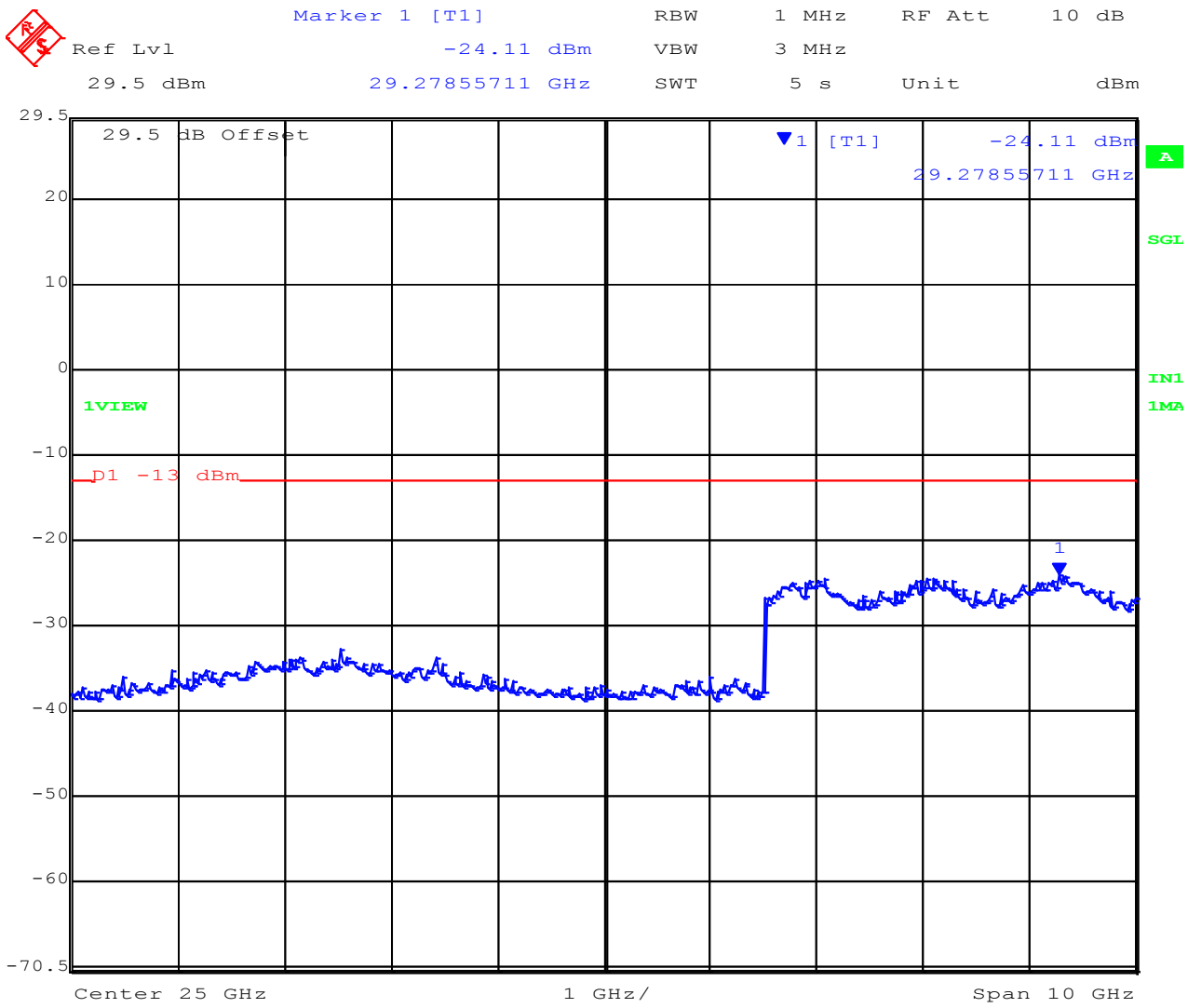
Chain A Channel Frequency 11,245 MHz 1 – 10 GHz 20 MHz BPSK Spurious Emissions



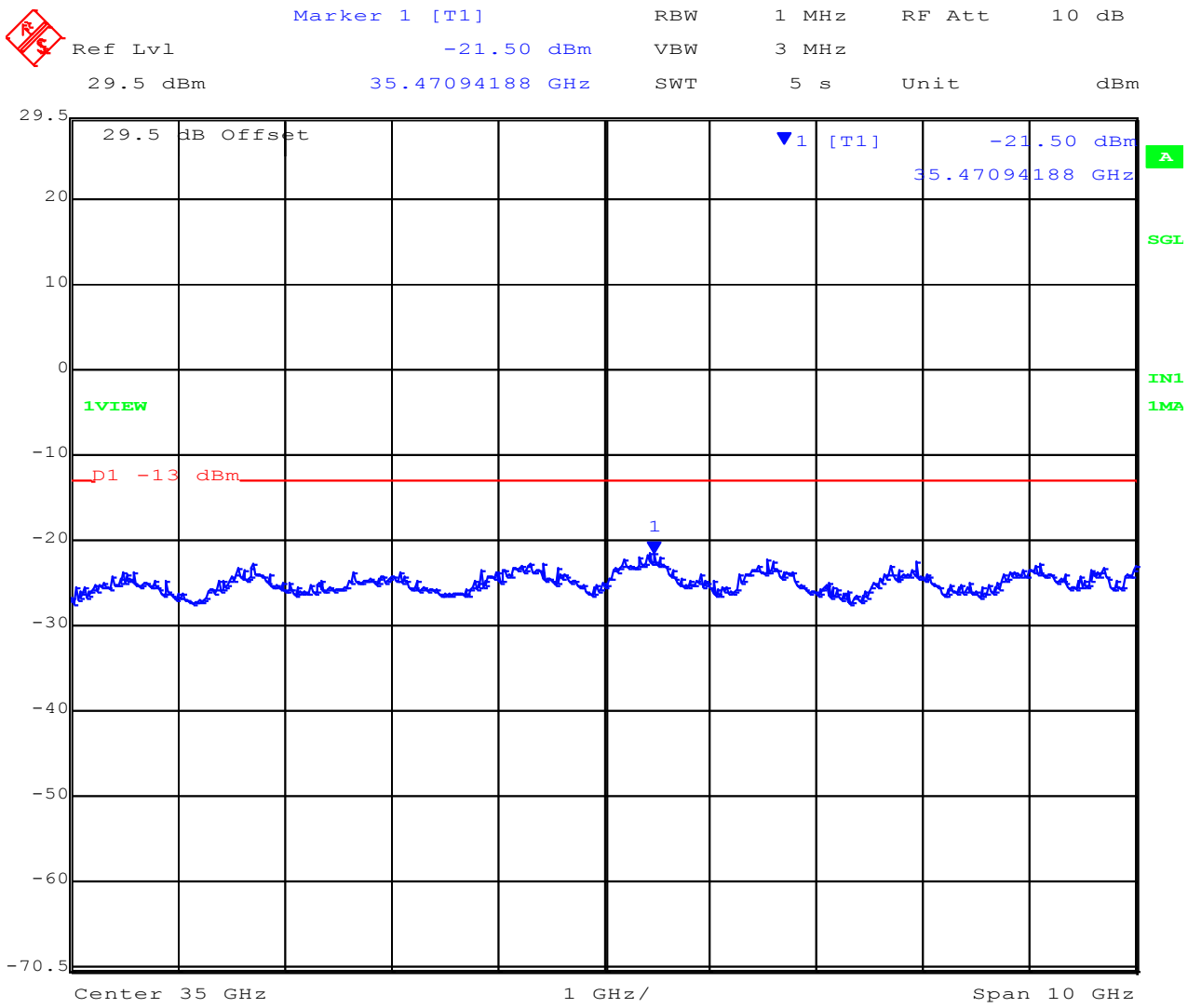
Chain A Channel Frequency 11,245 MHz 10 – 20 GHz 20 MHz BPSK Spurious Emissions



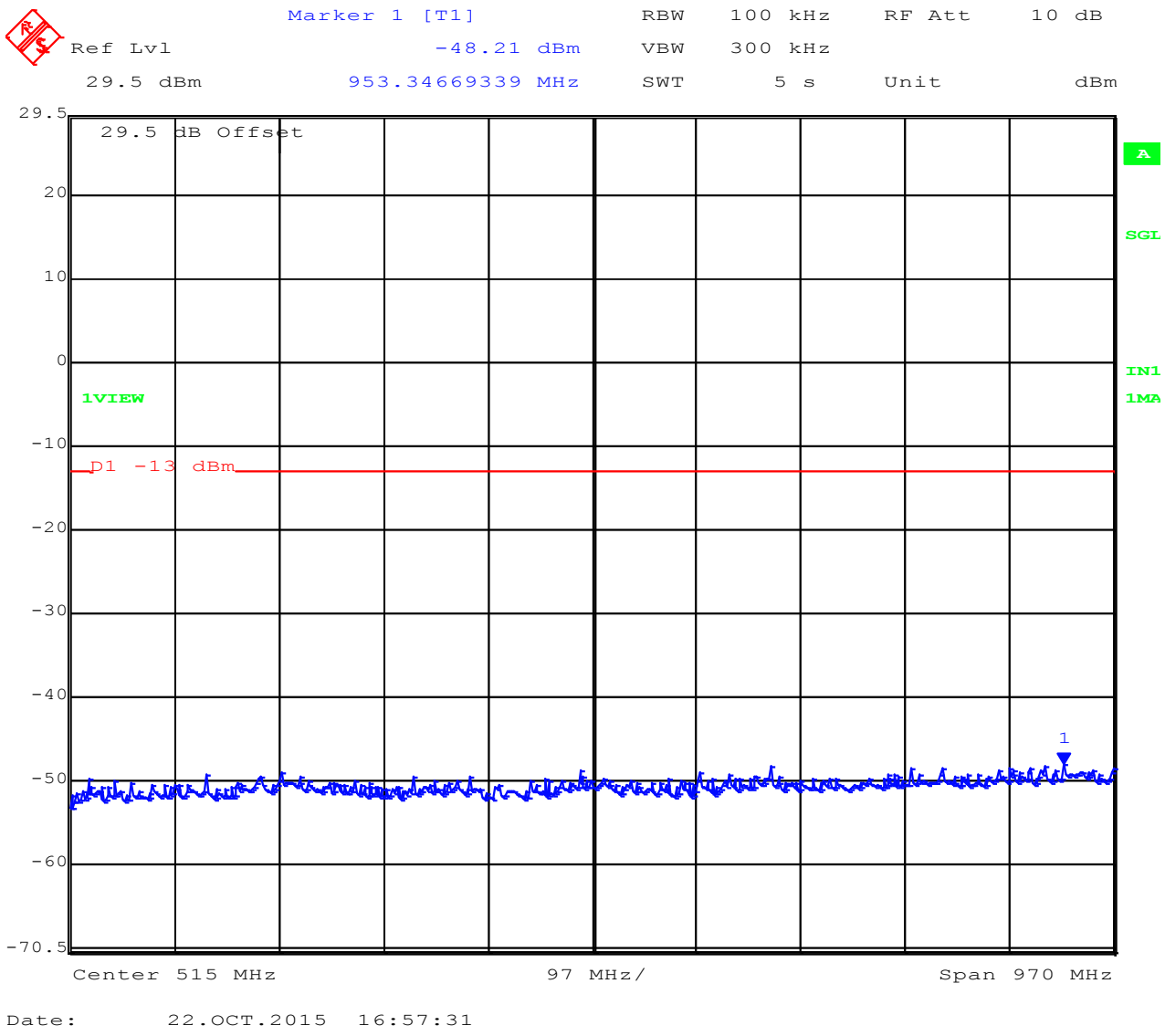
Chain A Channel Frequency 11,245 MHz 20 – 30 GHz 20 MHz BPSK Spurious Emissions



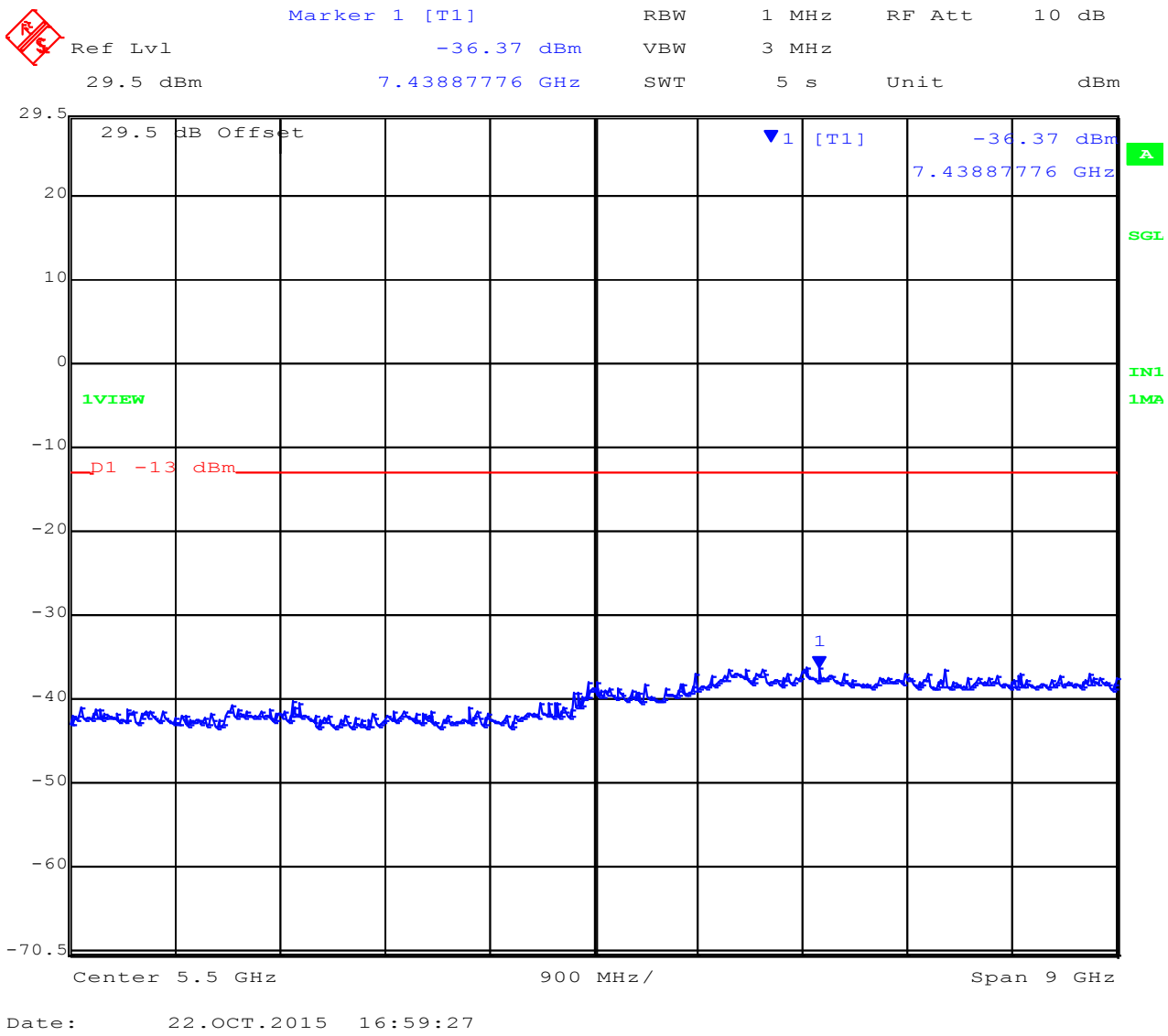
Chain A Channel Frequency 11,245 MHz 30 – 40 GHz 20 MHz BPSK Spurious Emissions



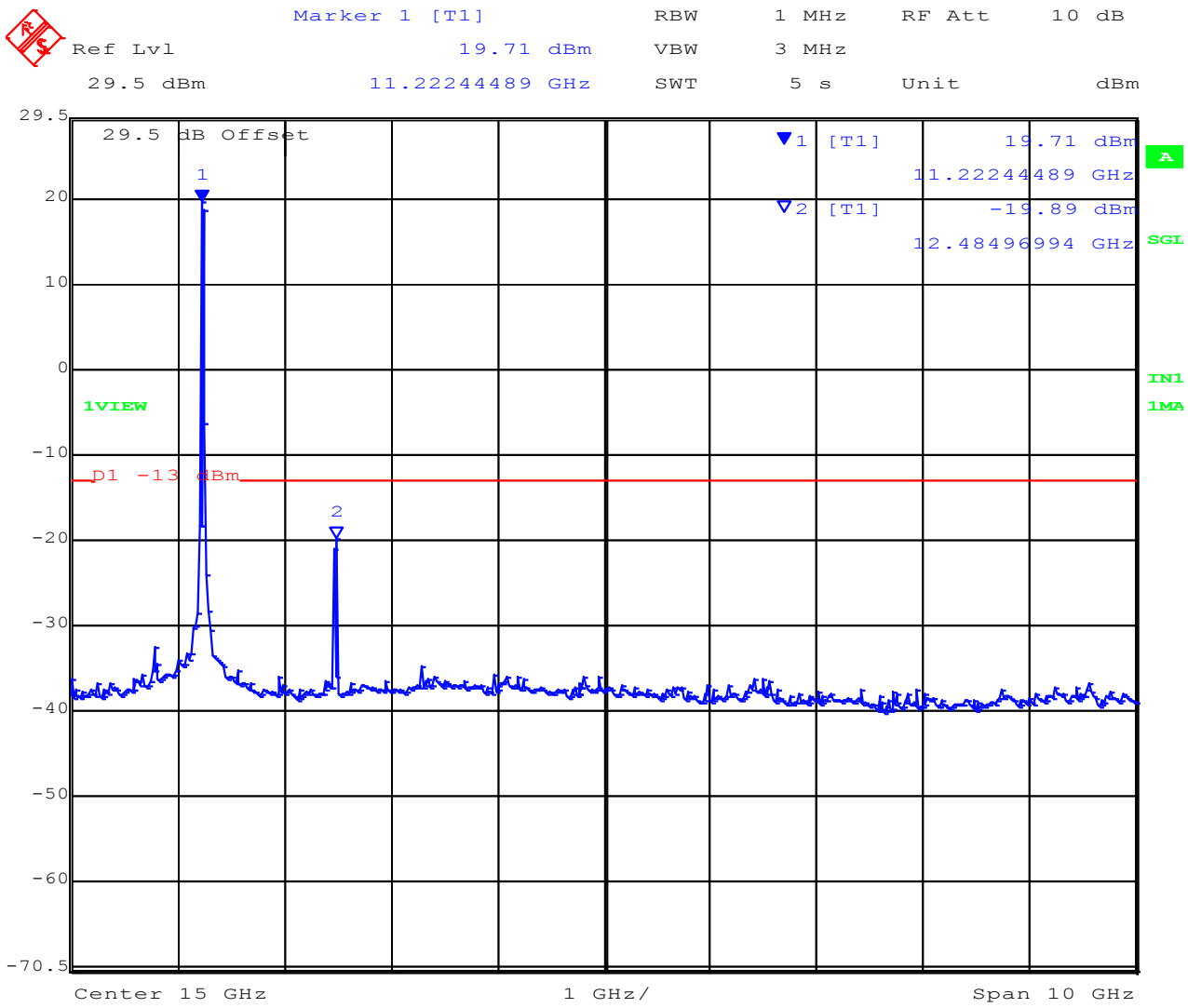
Chain B Channel Frequency 11,245 MHz 0.03 – 1 GHz 20 MHz BPSK Spurious Emissions



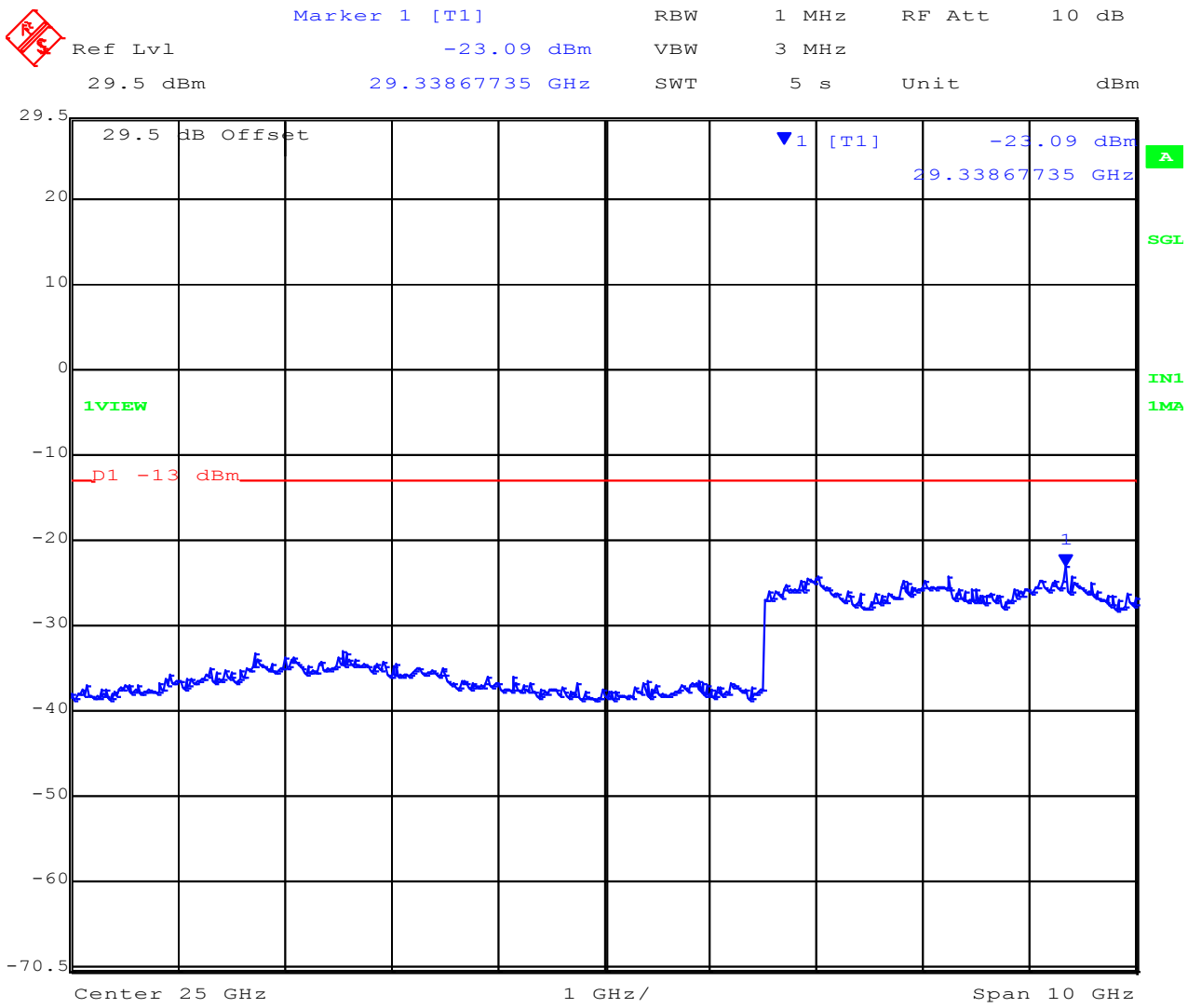
Chain B Channel Frequency 11,245 MHz 1 – 10 GHz 20 MHz BPSK Spurious Emissions



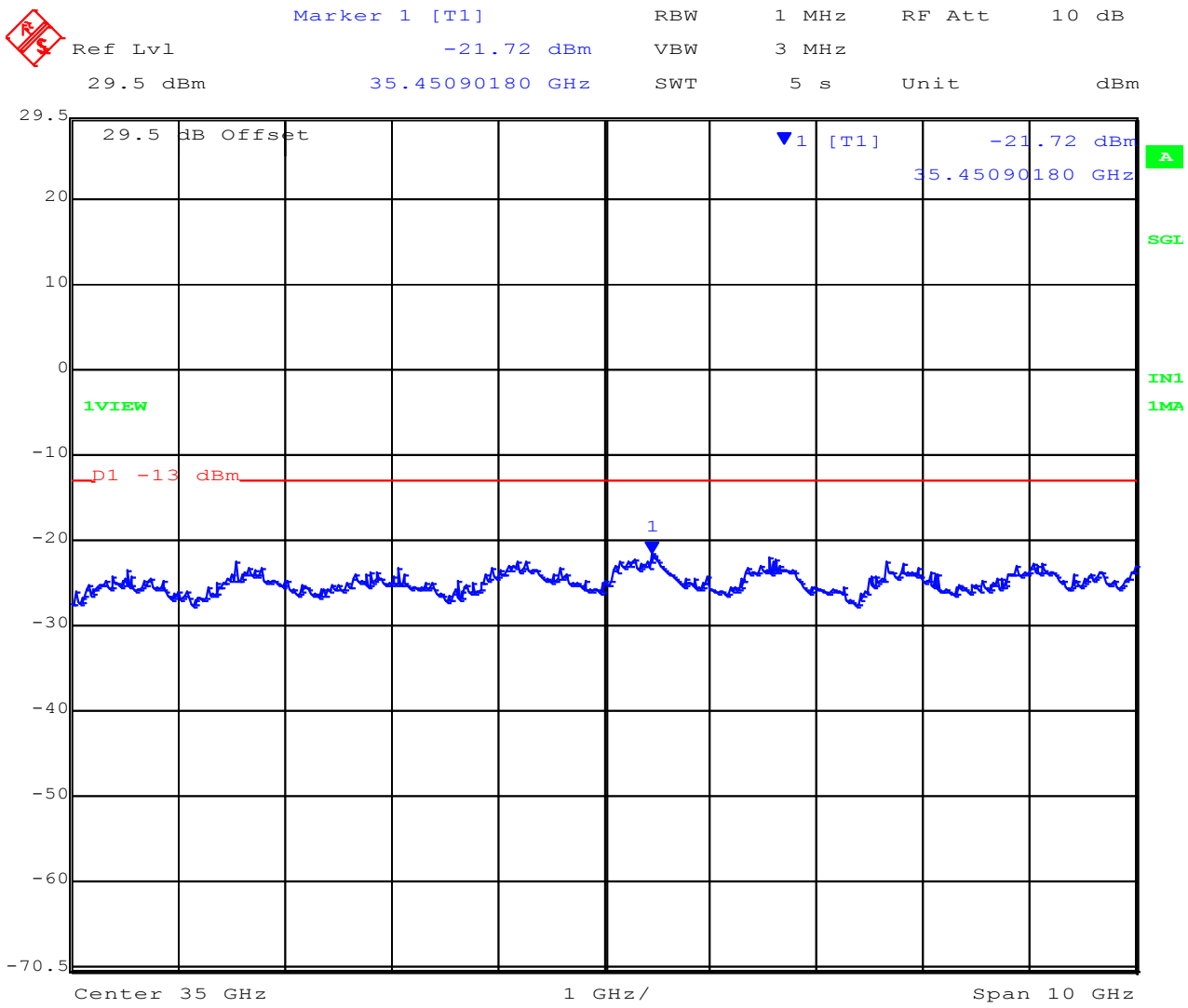
Chain B Channel Frequency 11,245 MHz 10 – 20 GHz 20 MHz BPSK Spurious Emissions



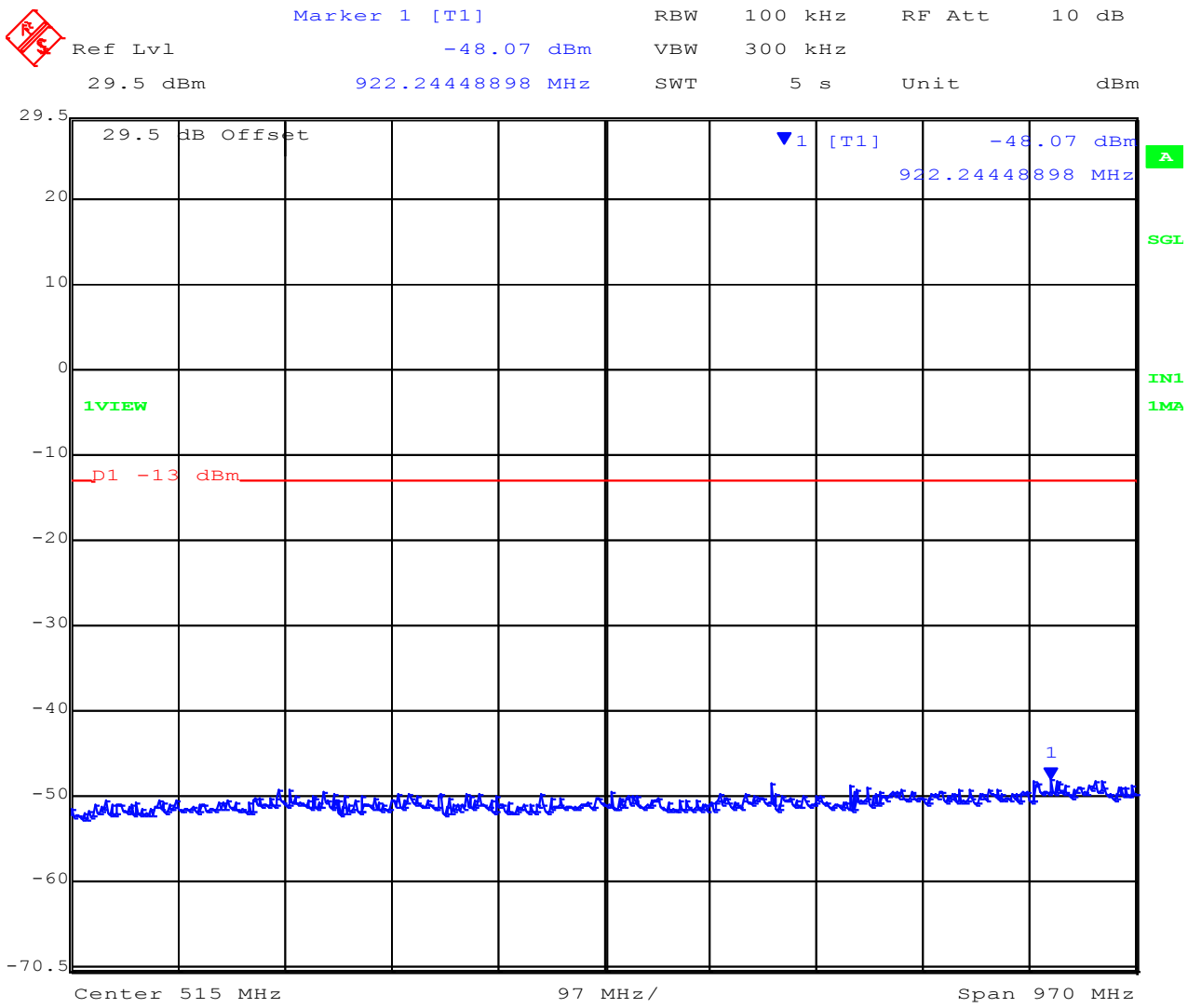
Chain B Channel Frequency 11,245 MHz 20 – 30 GHz 20 MHz BPSK Spurious Emissions



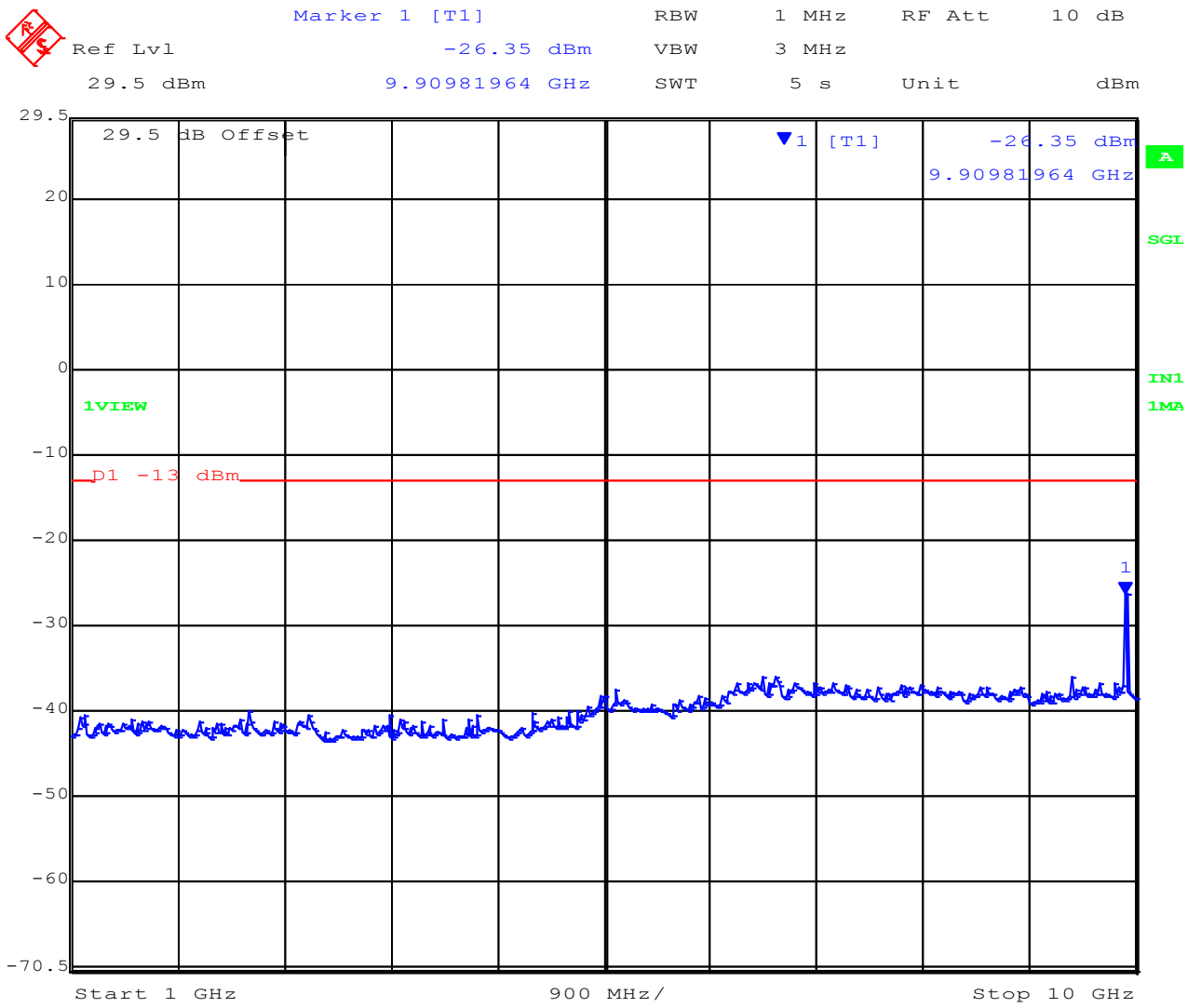
Chain B Channel Frequency 11,245 MHz 30 – 40 GHz 20 MHz BPSK Spurious Emissions



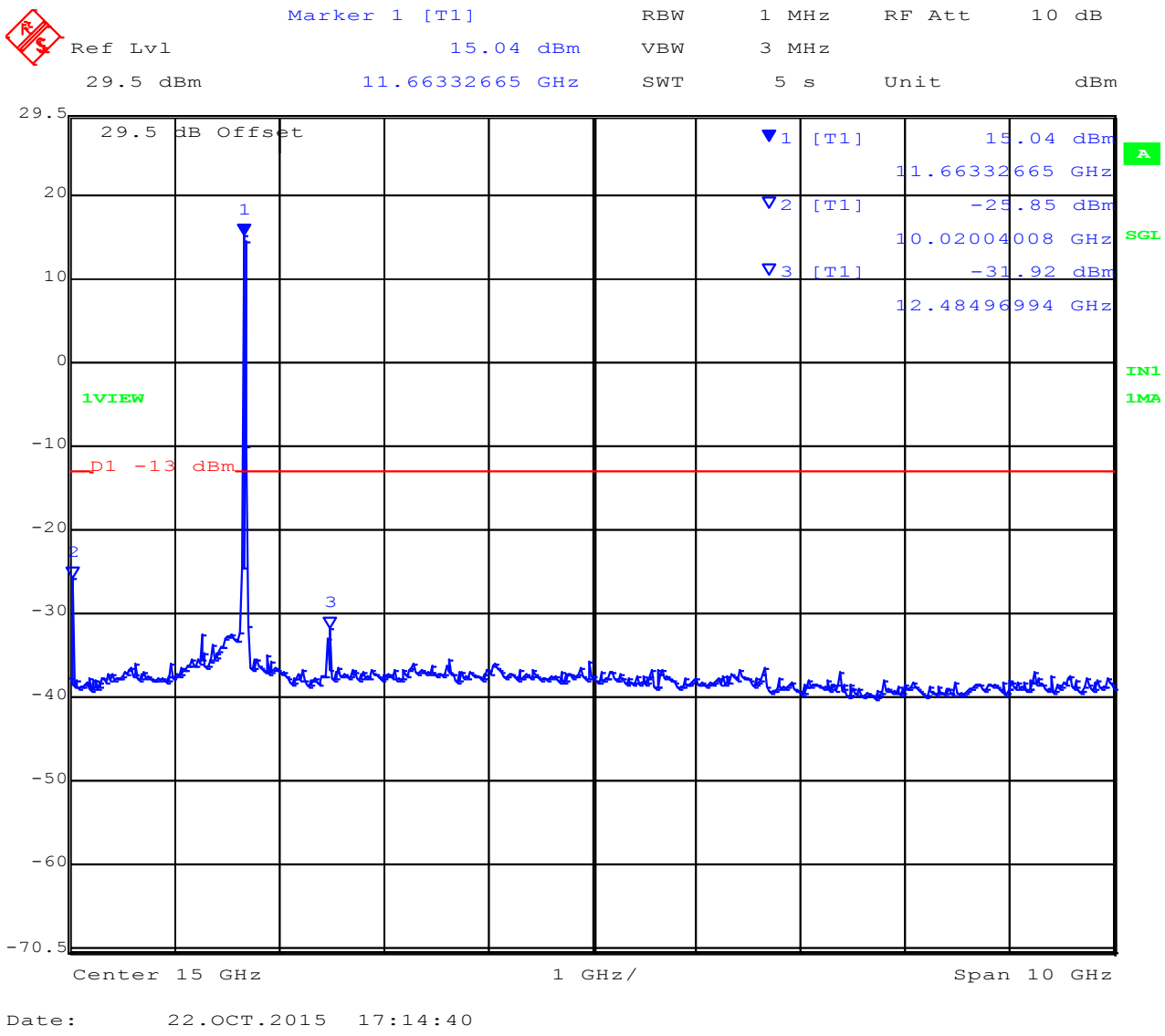
Chain A Channel Frequency 11,685 MHz 0.03 – 1 GHz 20 MHz BPSK Spurious Emissions



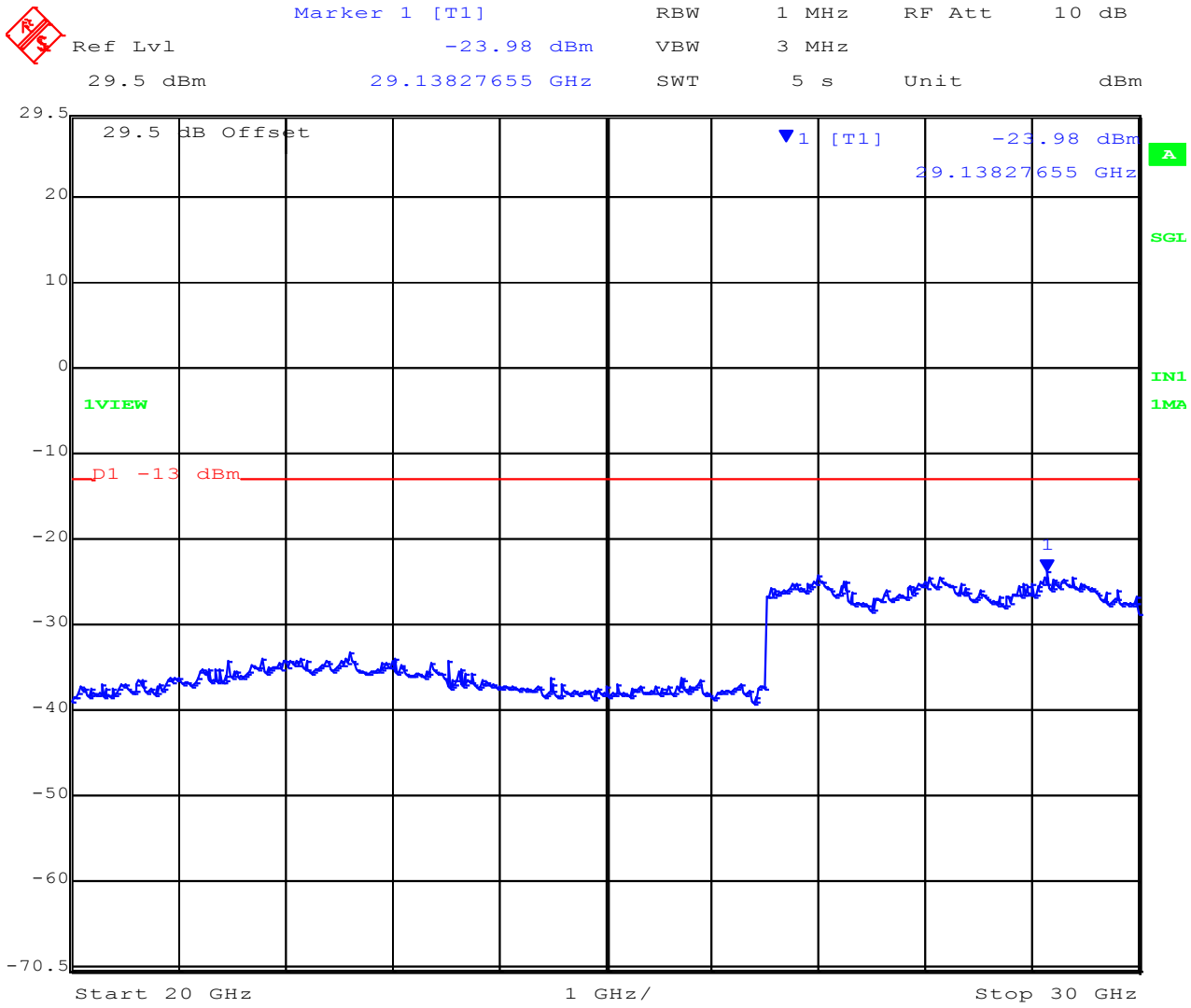
Chain A Channel Frequency 11,685 MHz 1 – 10 GHz 20 MHz BPSK Spurious Emissions



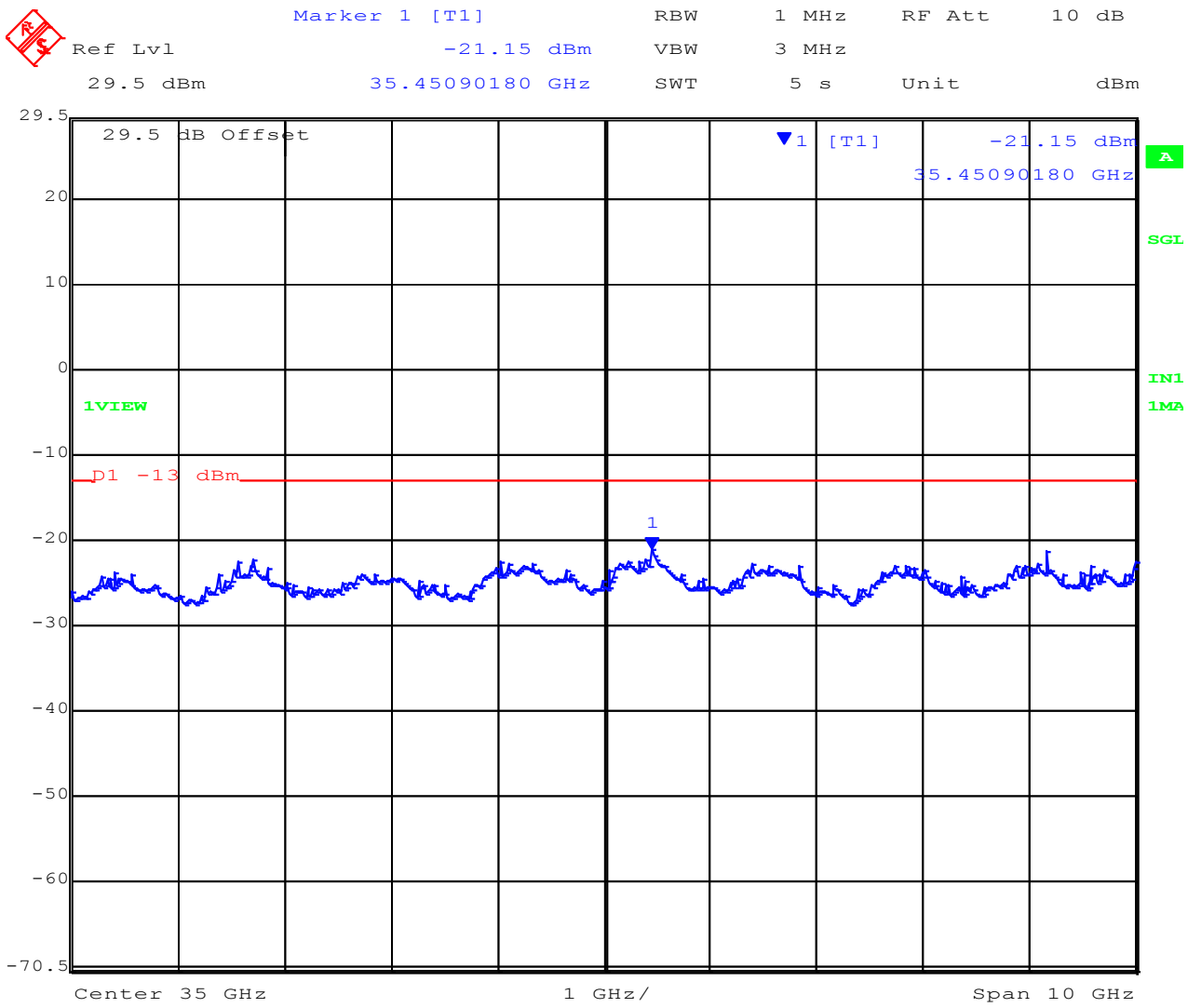
Chain A Channel Frequency 11,685 MHz 10 – 20 GHz 20 MHz BPSK Spurious Emissions



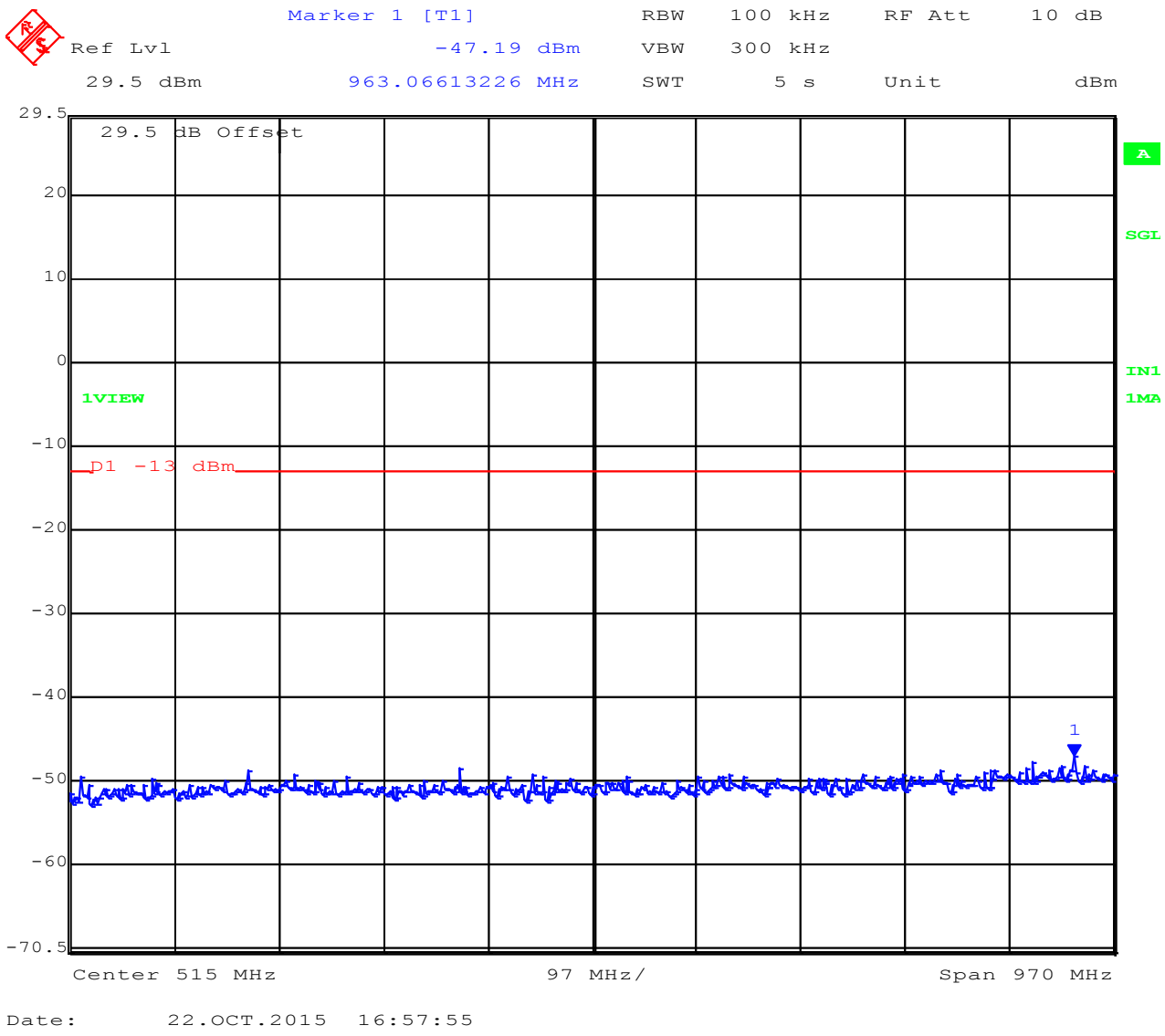
Chain A Channel Frequency 11,685 MHz 20 – 30 GHz 20 MHz BPSK Spurious Emissions



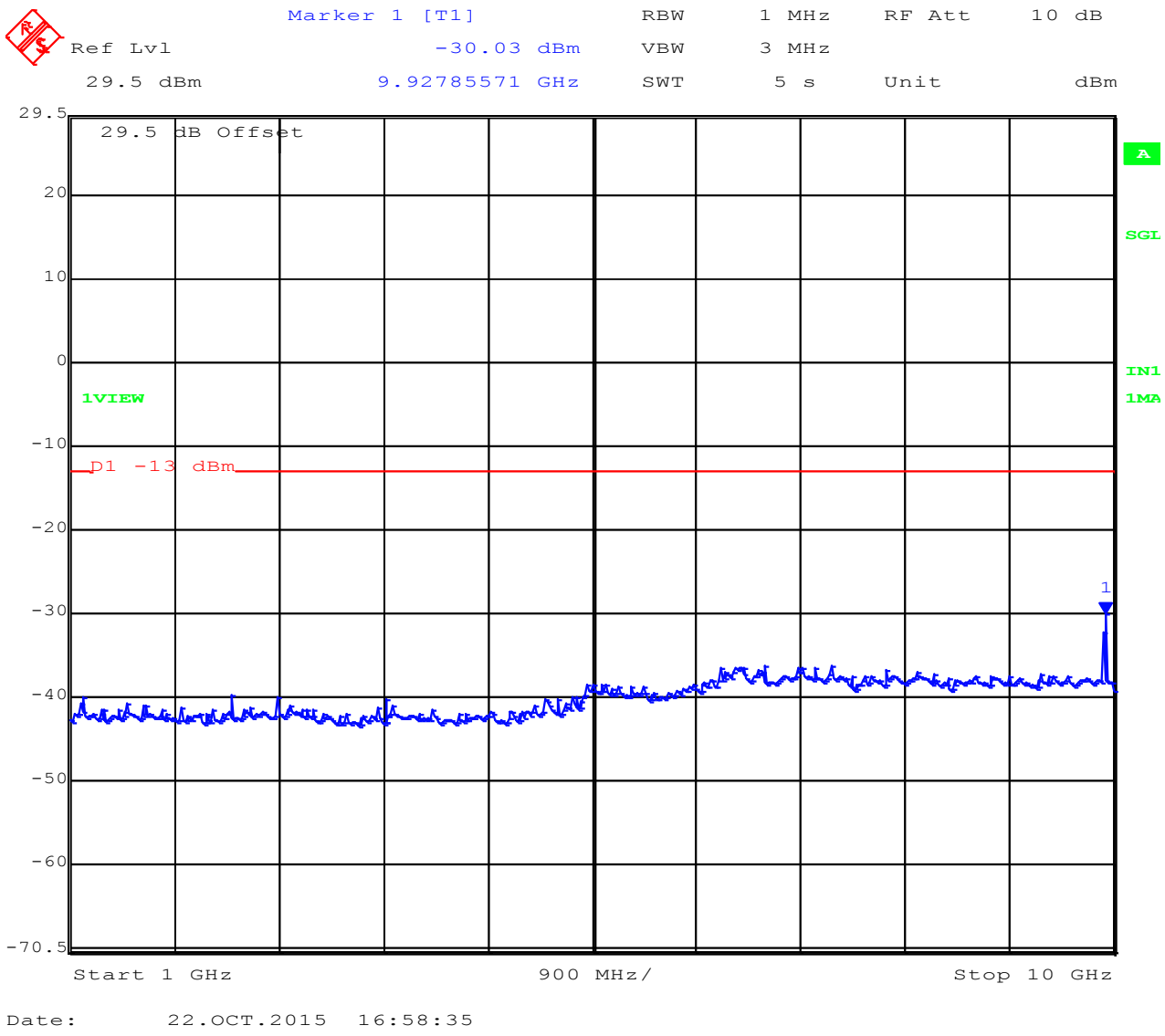
Chain A Channel Frequency 11,685 MHz 30 – 40 GHz 20 MHz BPSK Spurious Emissions



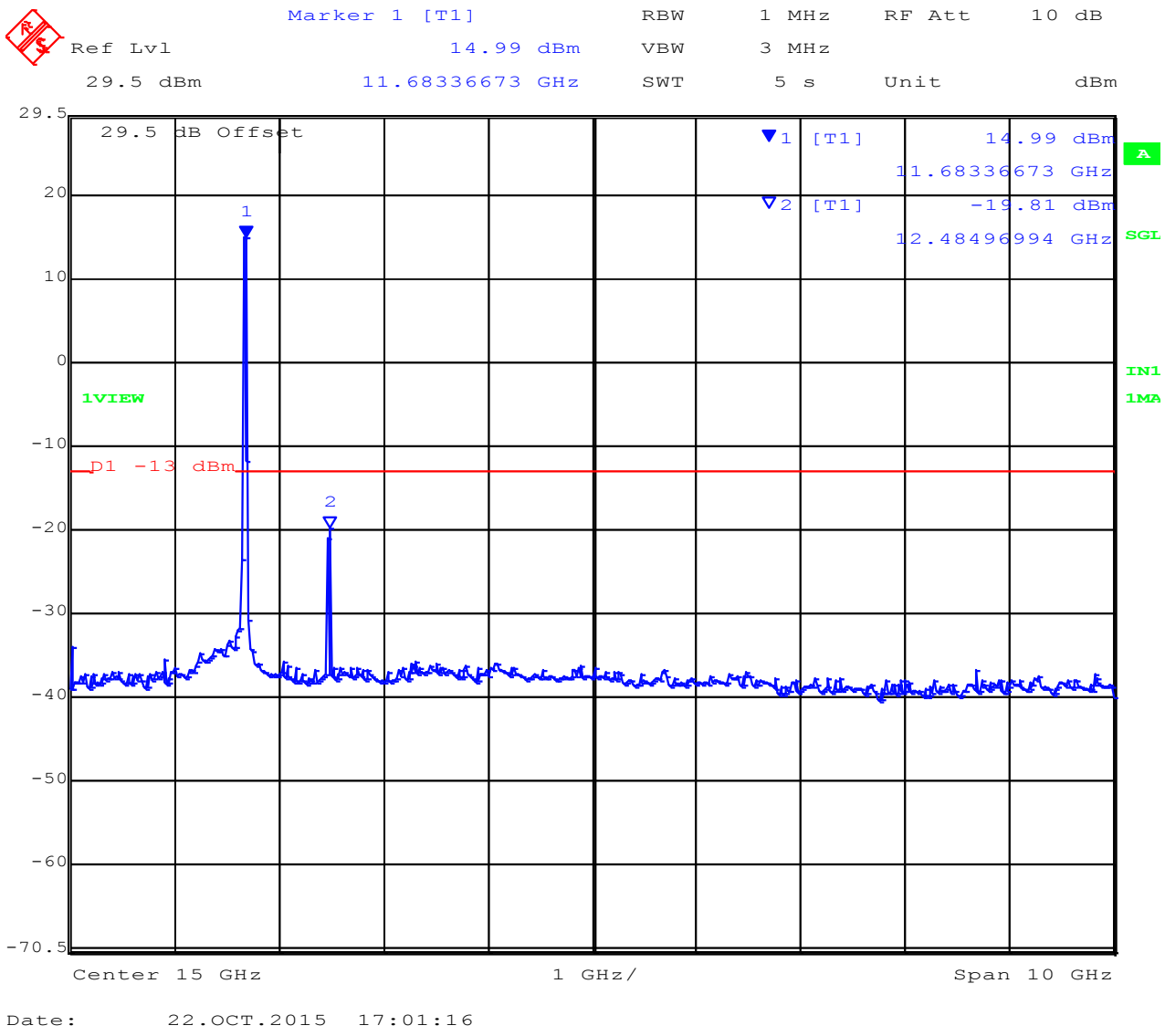
Chain B Channel Frequency 11,685 MHz 0.03 – 1 GHz 20 MHz BPSK Spurious Emissions



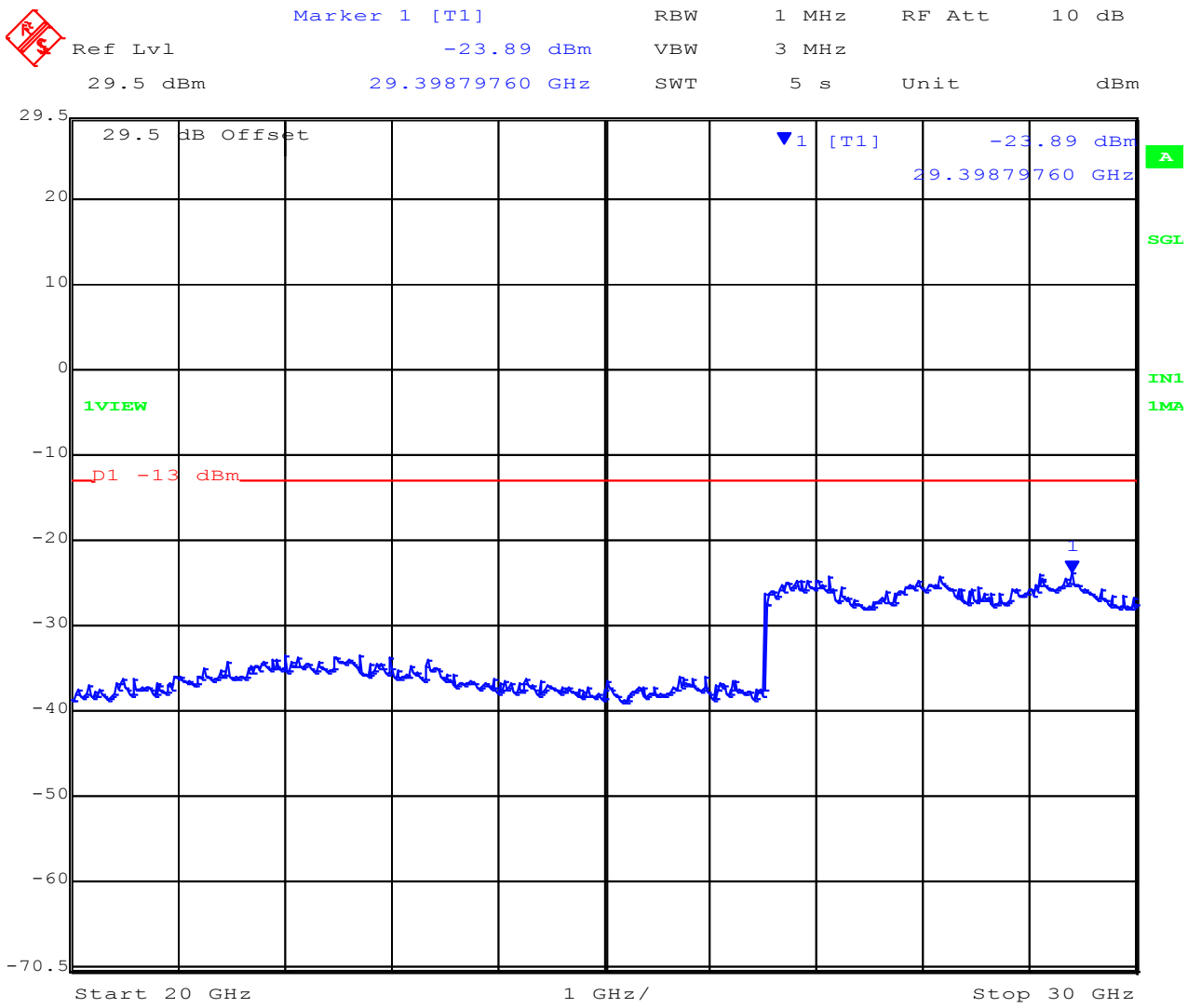
Chain B Channel Frequency 11,685 MHz 1 – 10 GHz 20 MHz BPSK Spurious Emissions



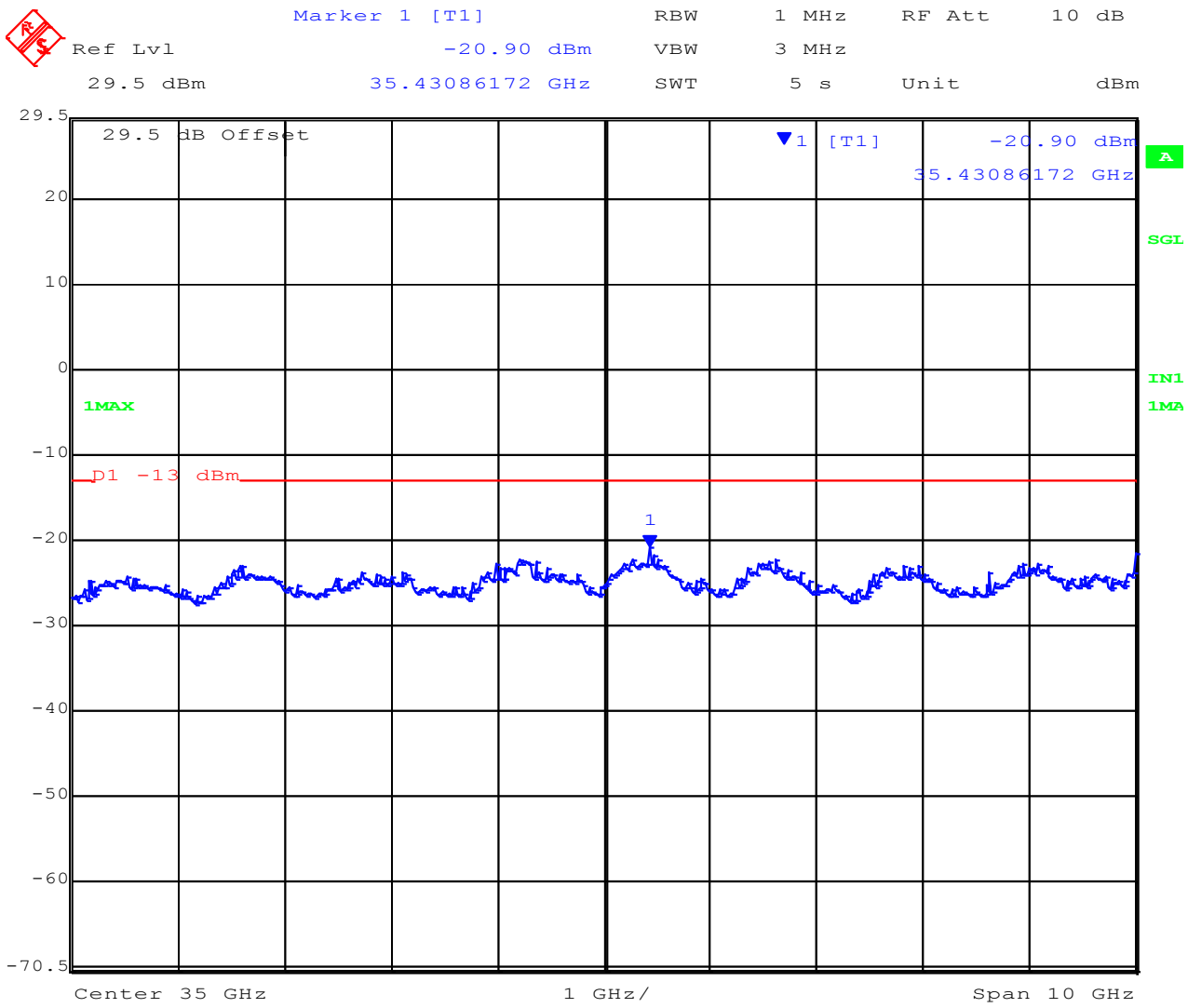
Chain B Channel Frequency 11,685 MHz 10 – 20 GHz 20 MHz BPSK Spurious Emissions



Chain B Channel Frequency 11,685 MHz 20 – 30 GHz 20 MHz BPSK Spurious Emissions

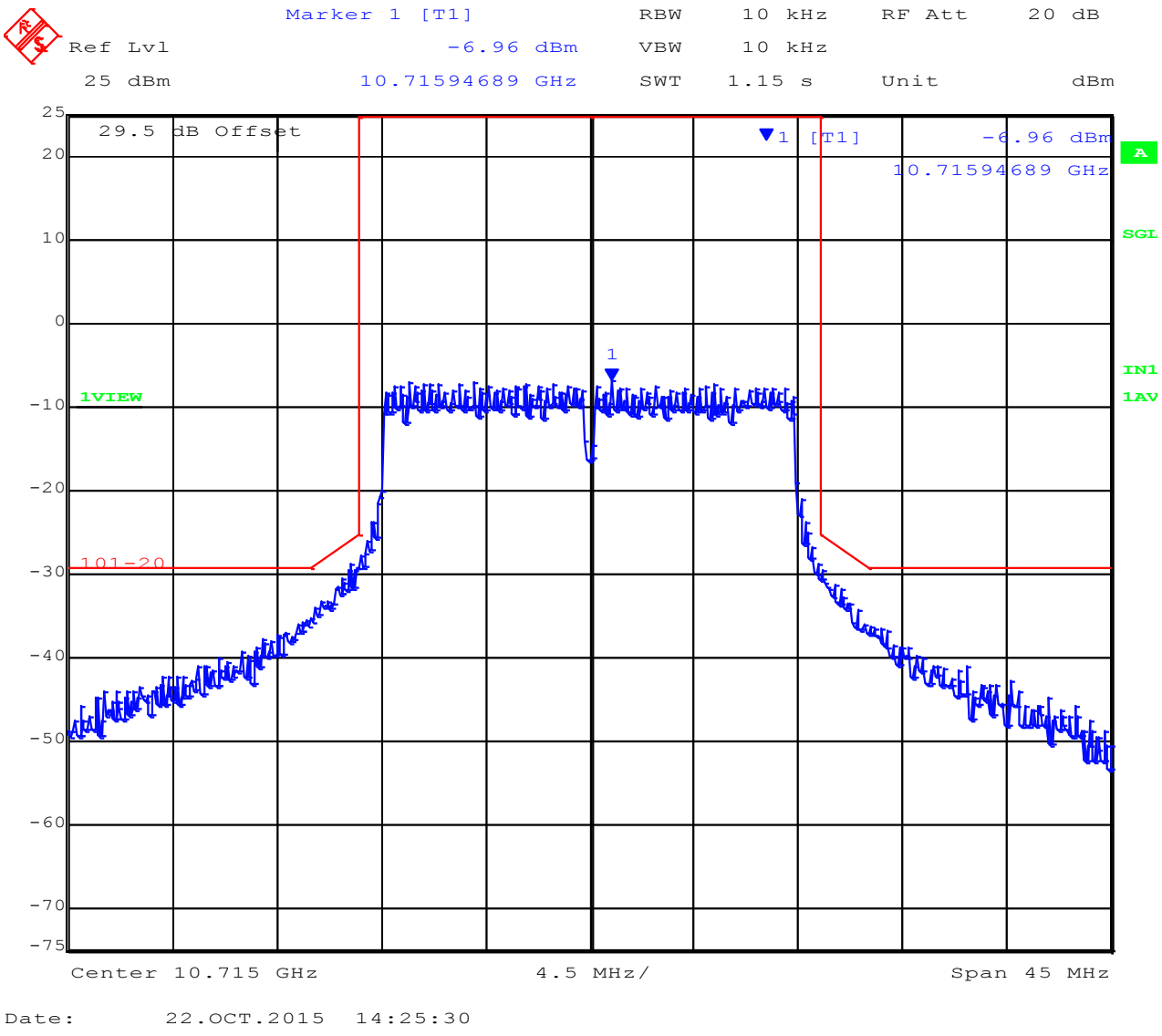


Chain B Channel Frequency 11,685 MHz 30 – 40 GHz 20 MHz BPSK Spurious Emissions

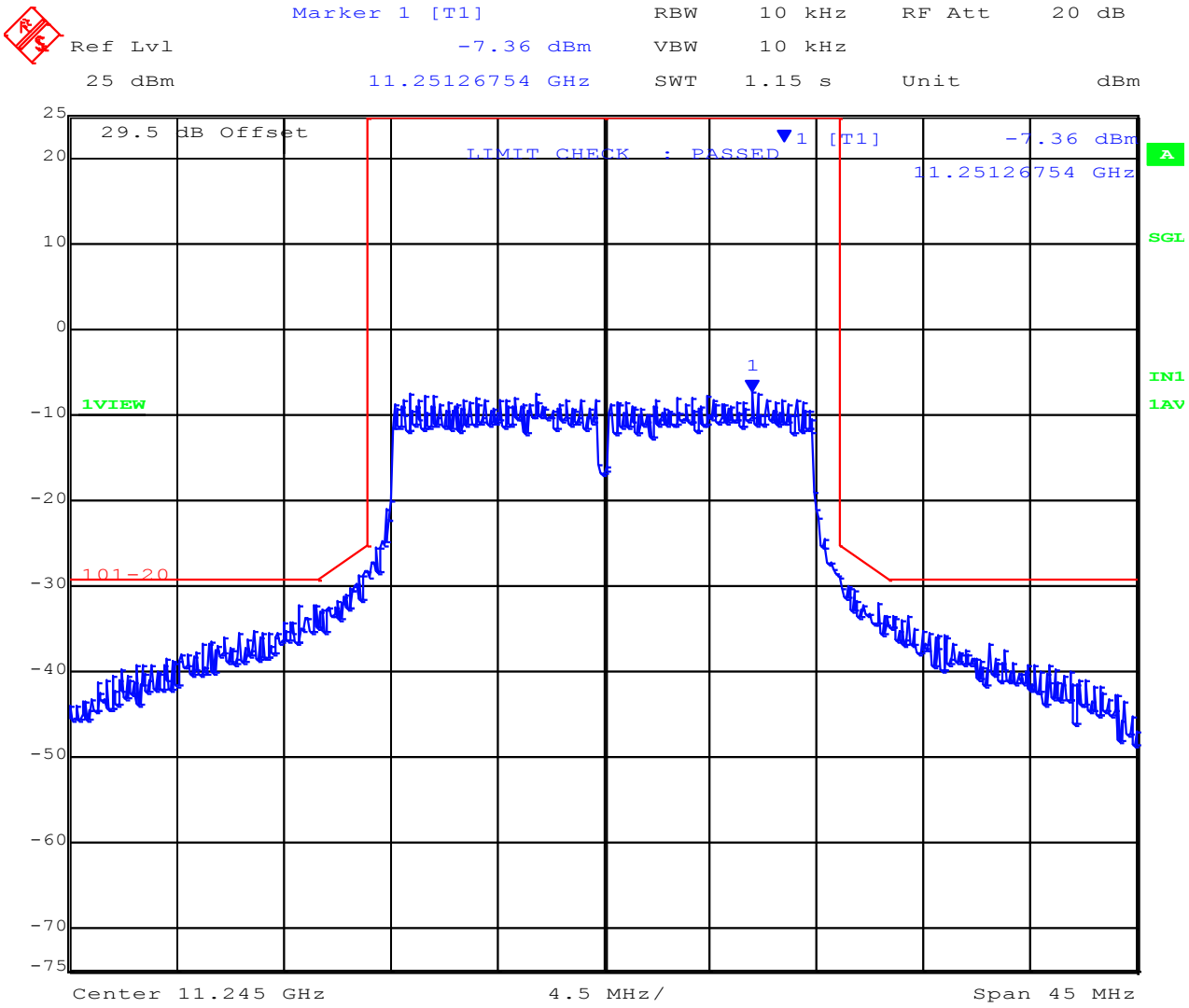


6.1.1.4.2 Spectrum Mask

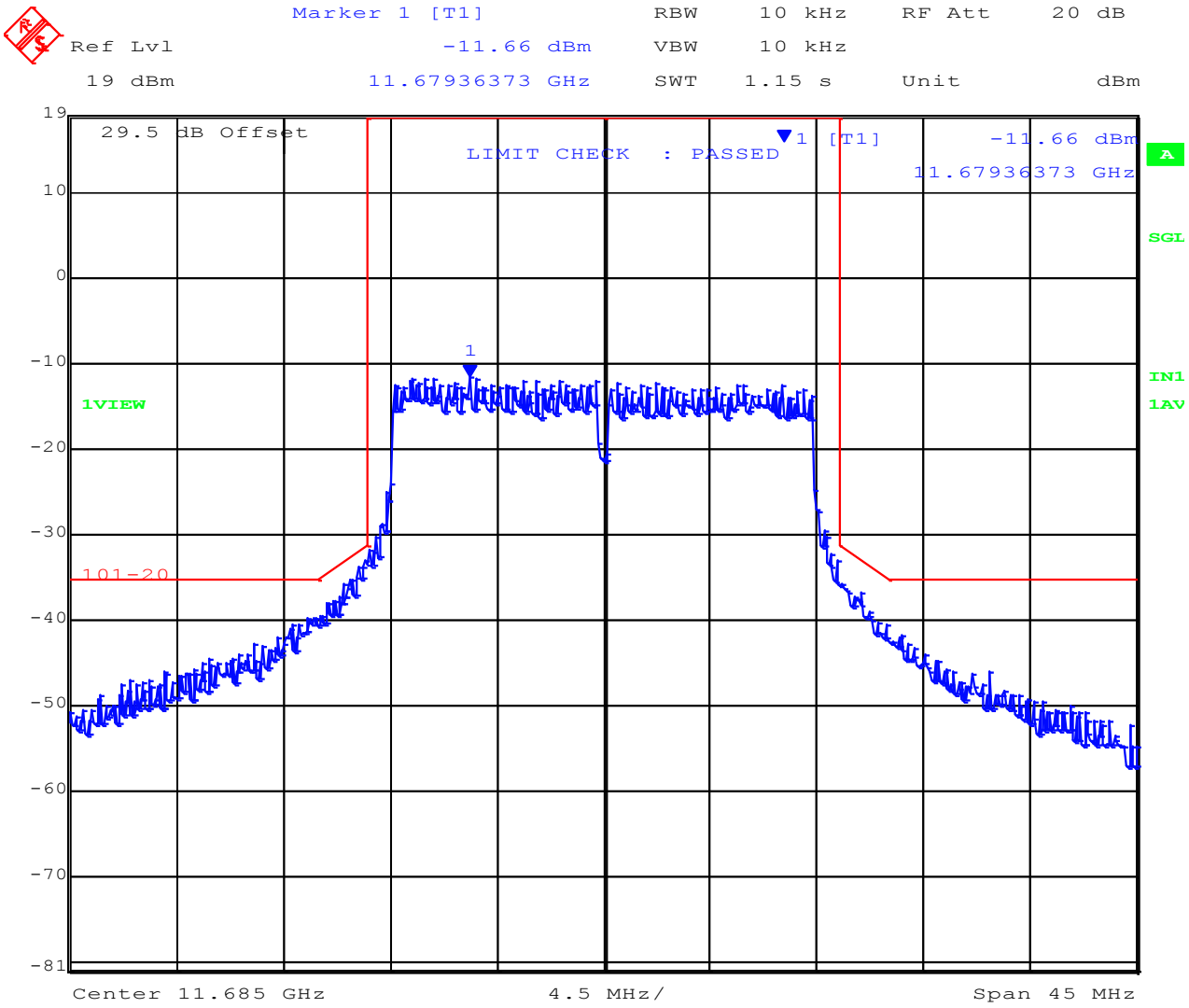
BPSK 20 MHz 10,715 MHz



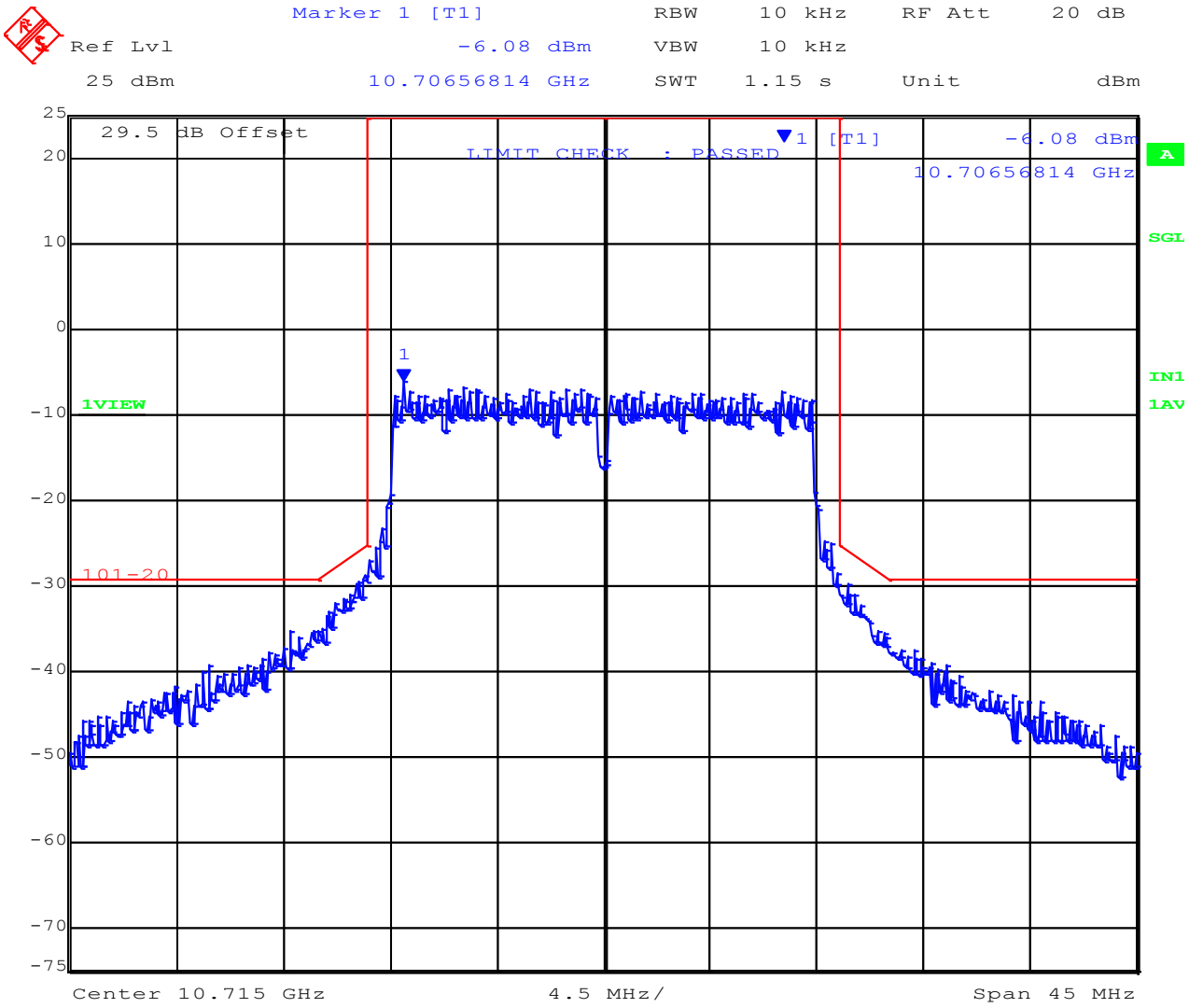
BPSK 20 MHz 11,245 MHz



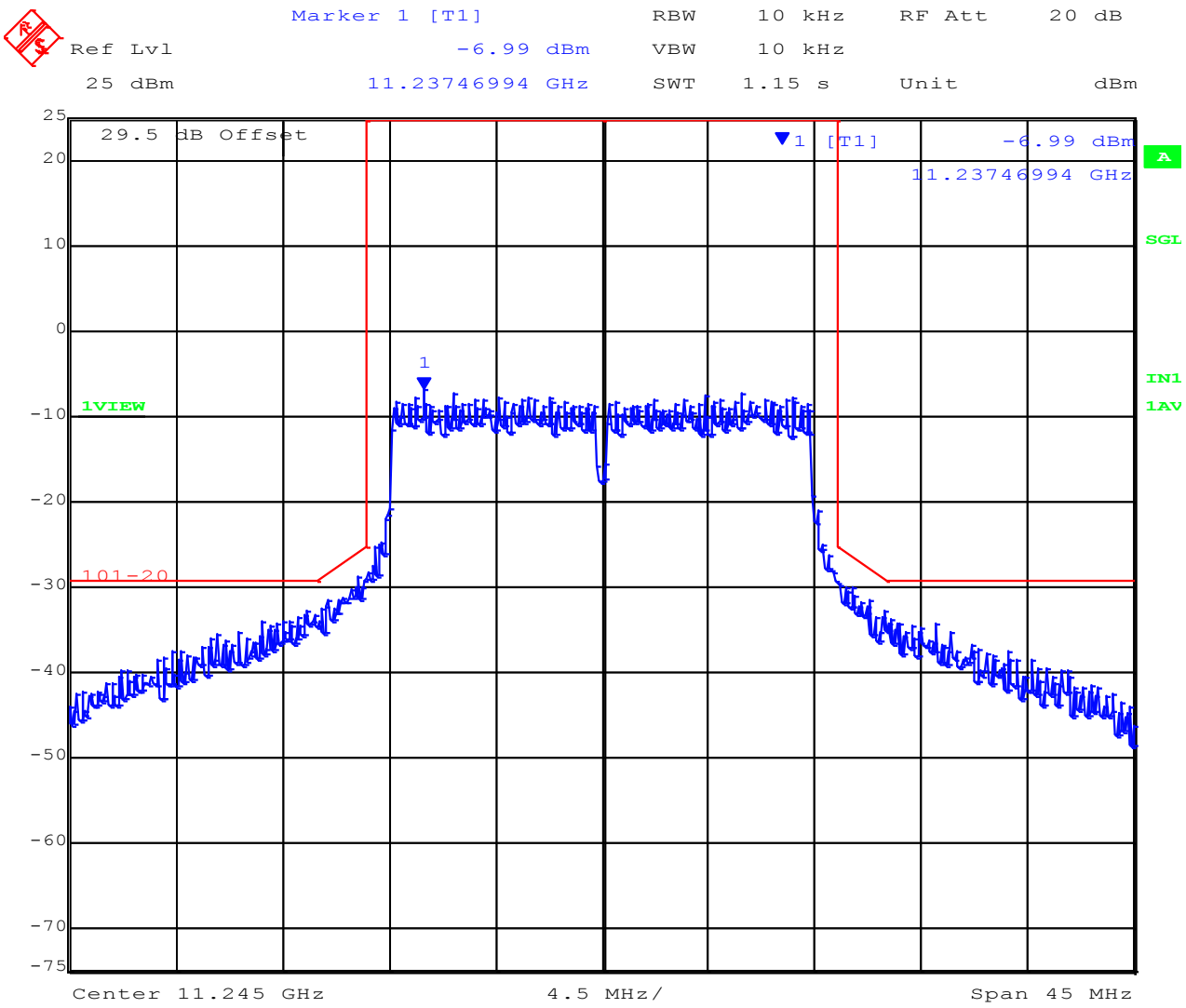
BPSK 20 MHz 11,685 MHz



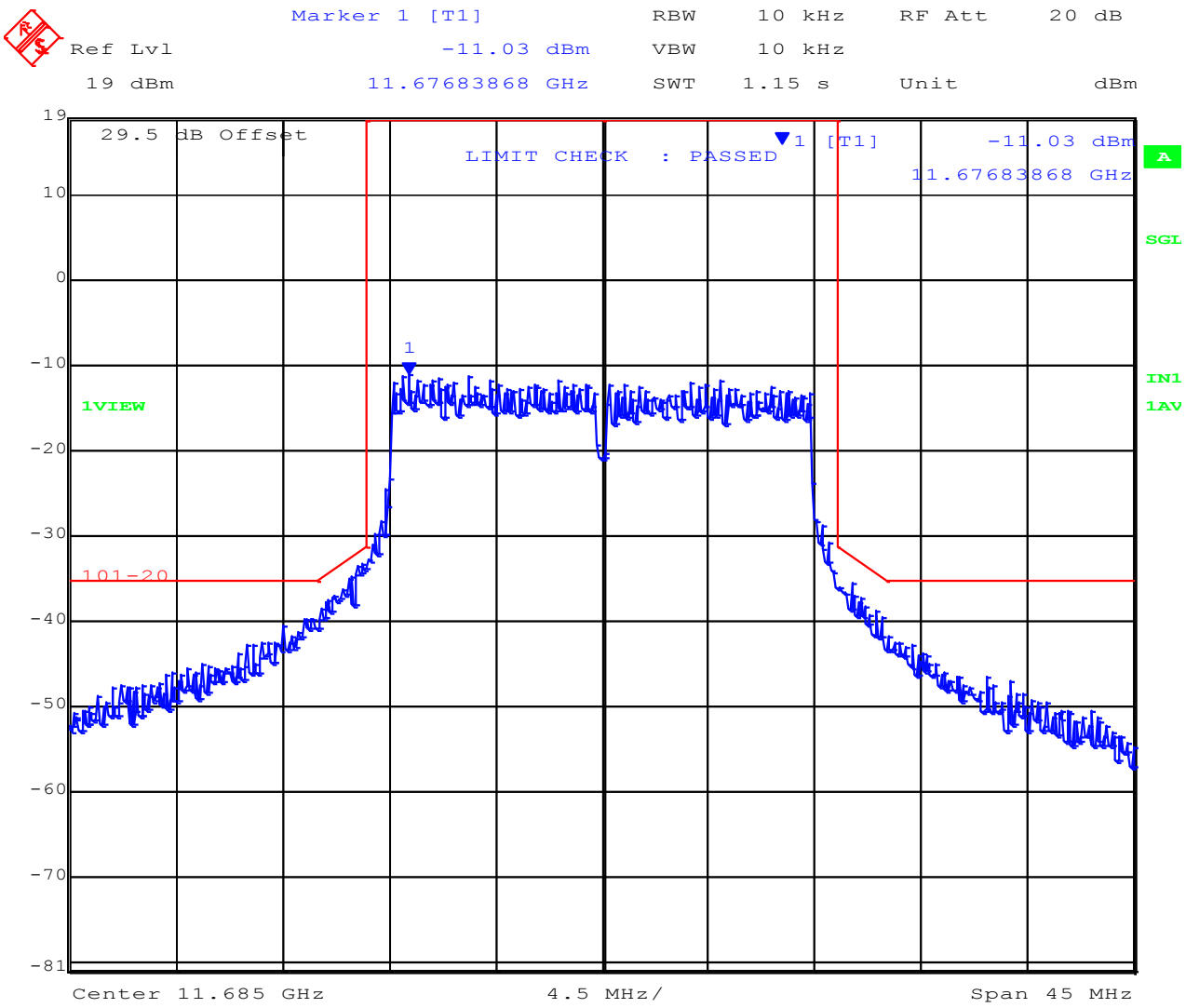
256QAM 20 MHz 10,715 MHz



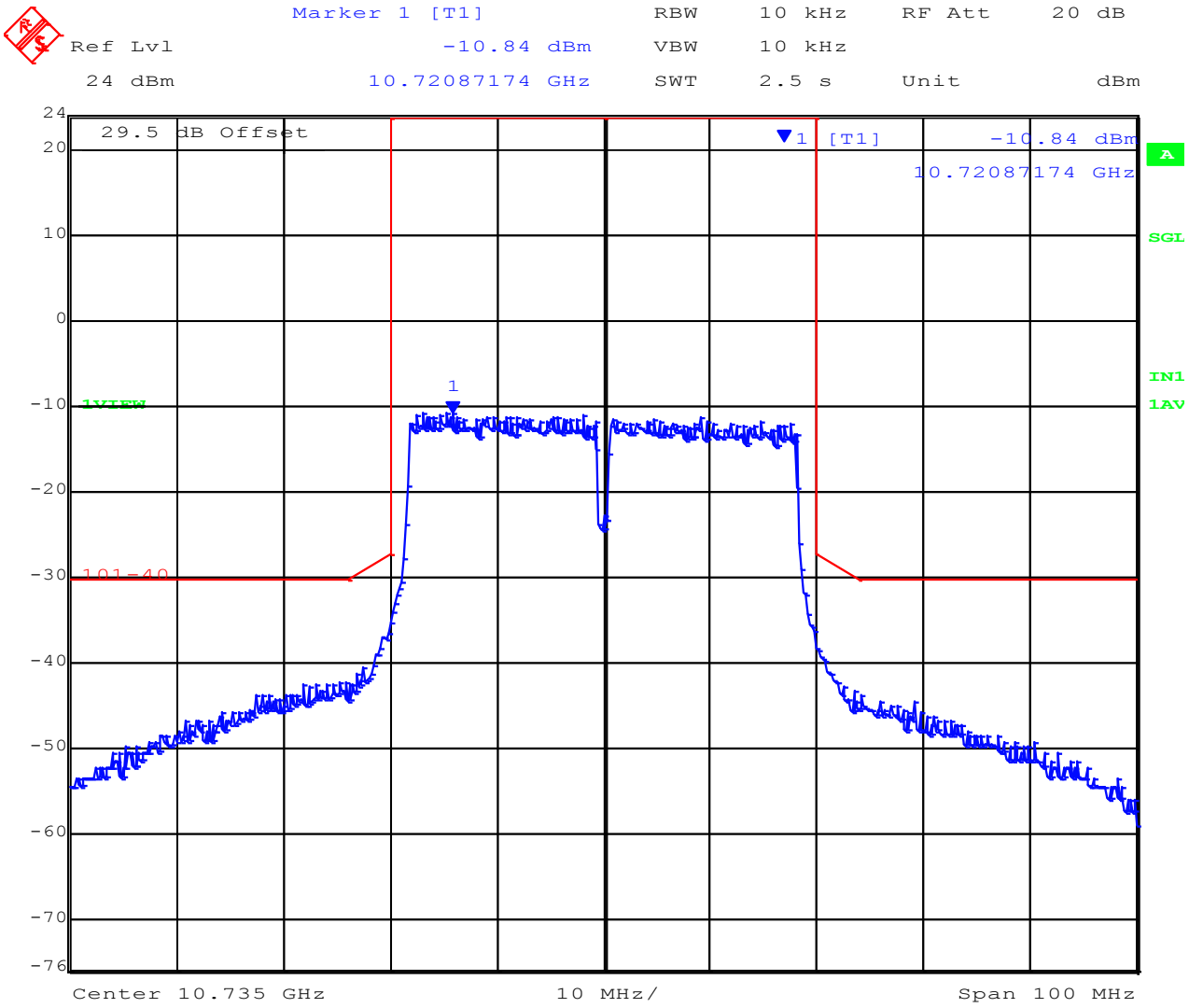
256QAM 20 MHz 11,245 MHz



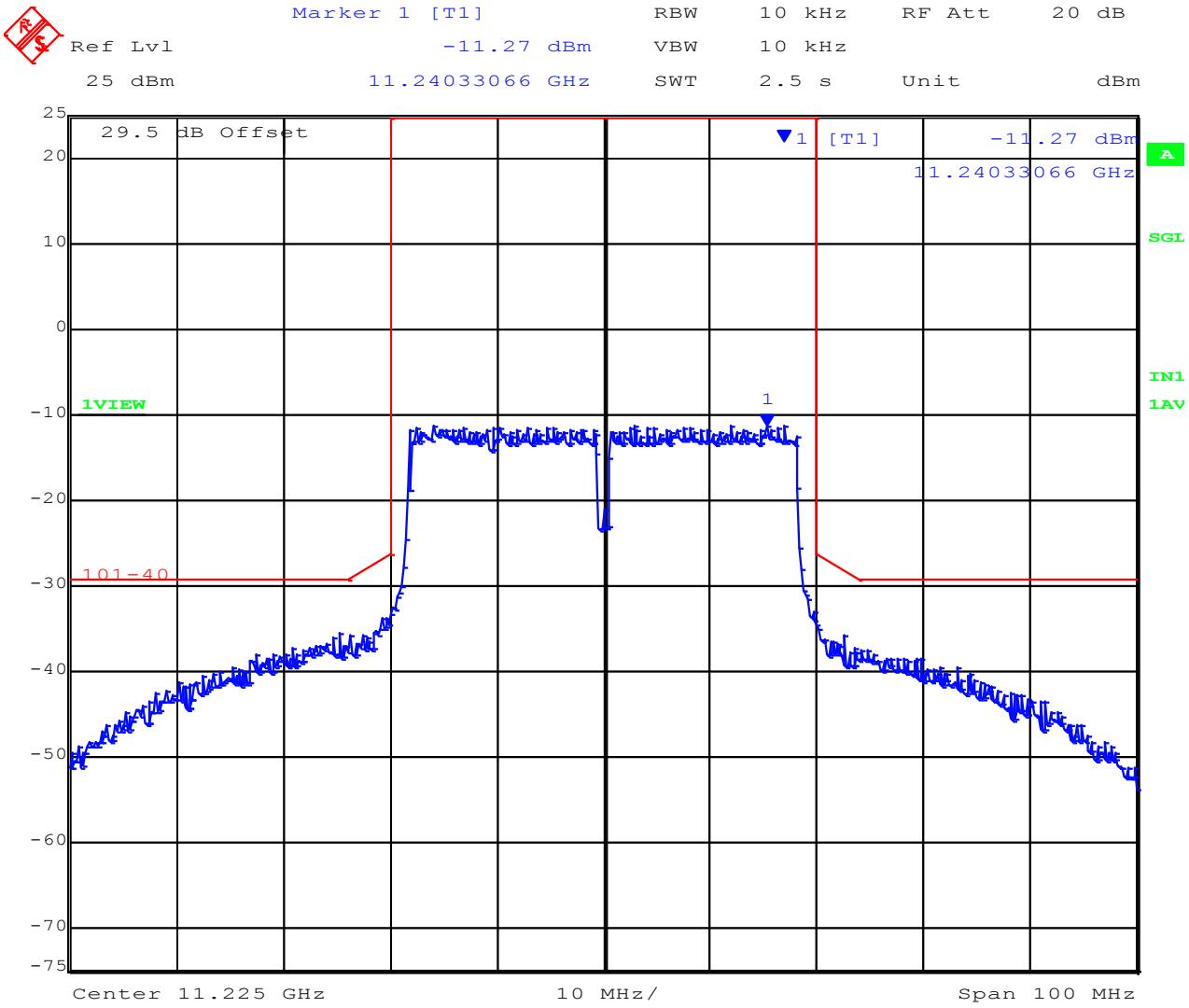
256QAM 20 MHz 11,685 MHz



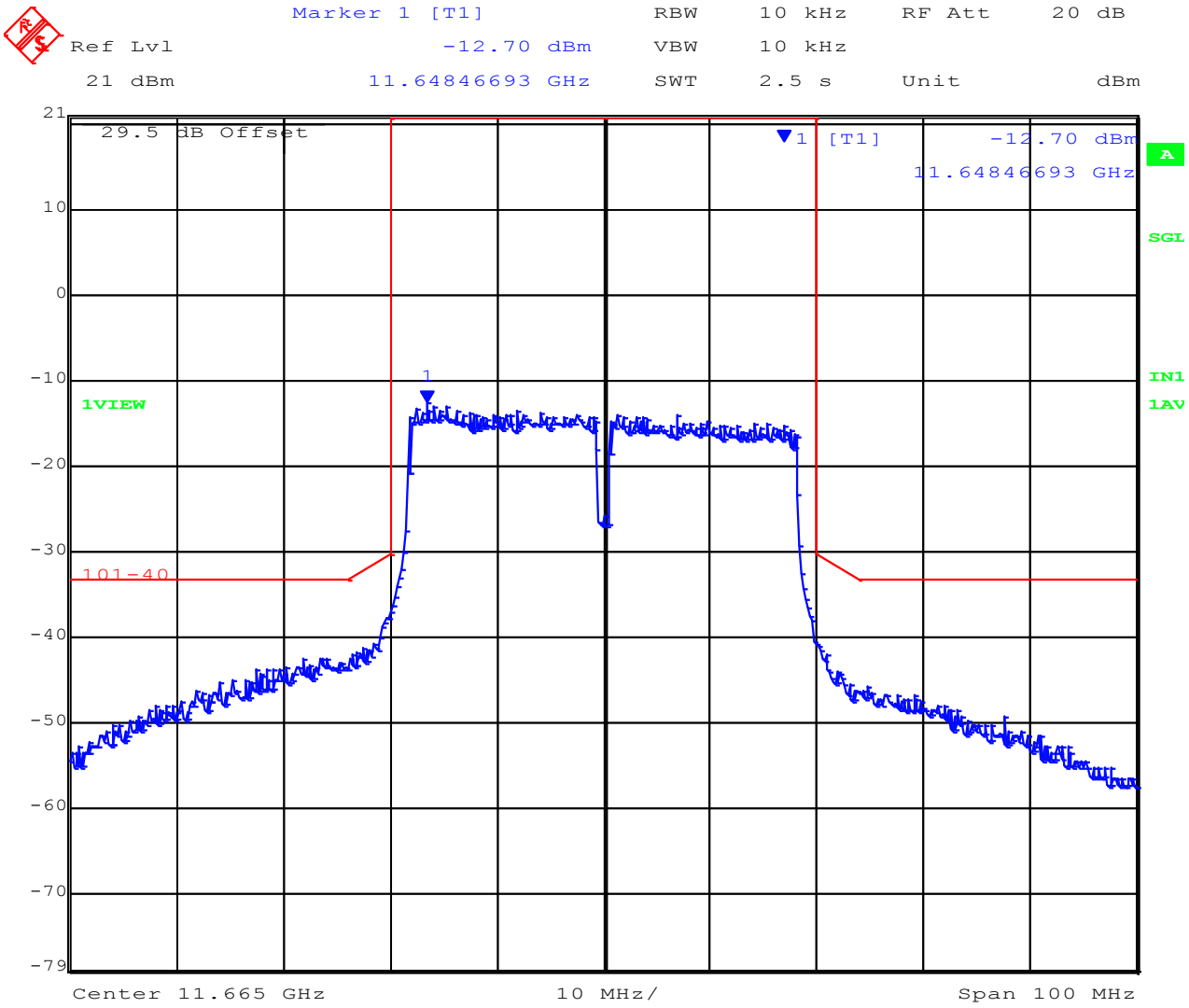
BPSK 40 MHz 10,735 MHz



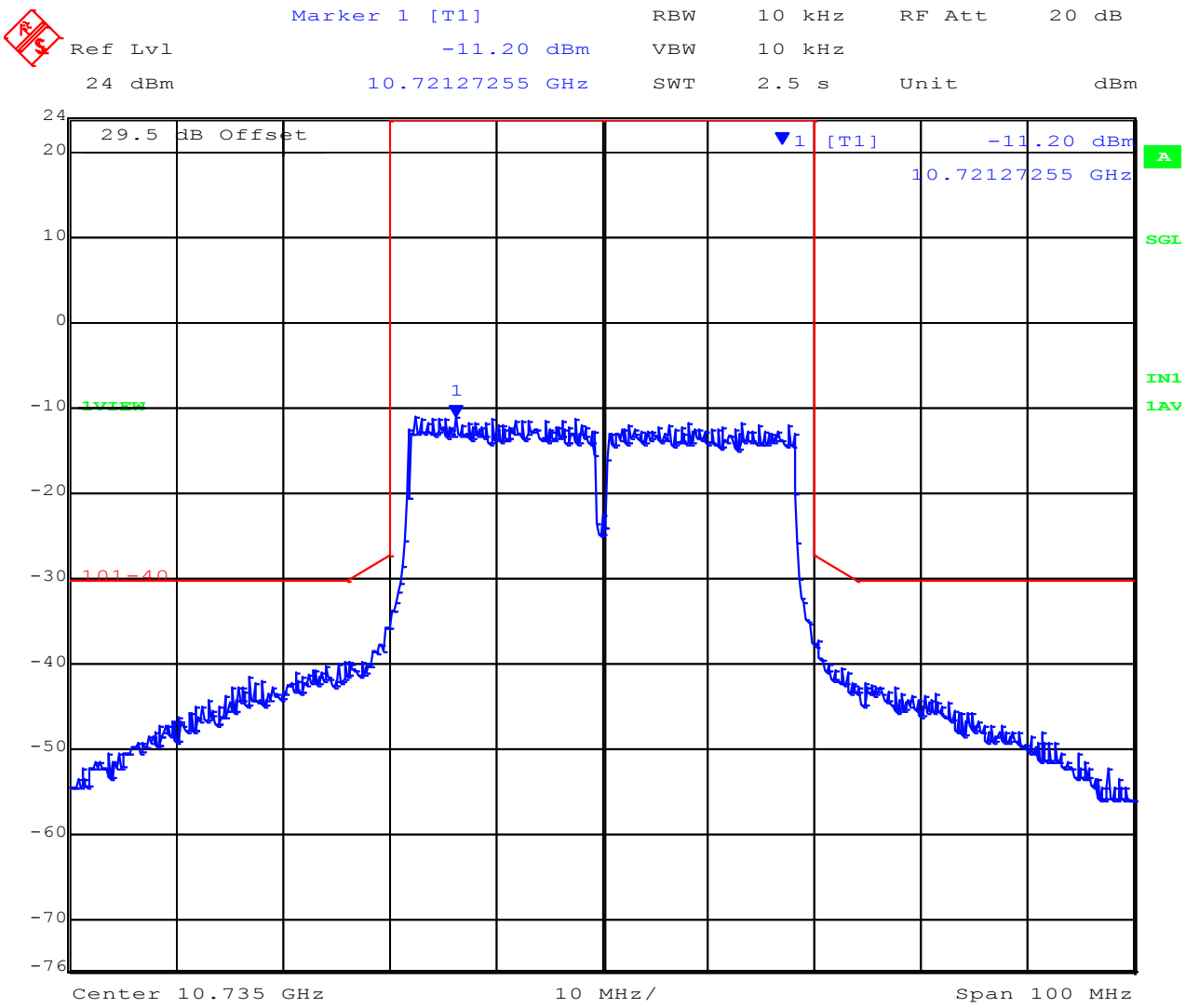
BPSK 40 MHz 11,225 MHz



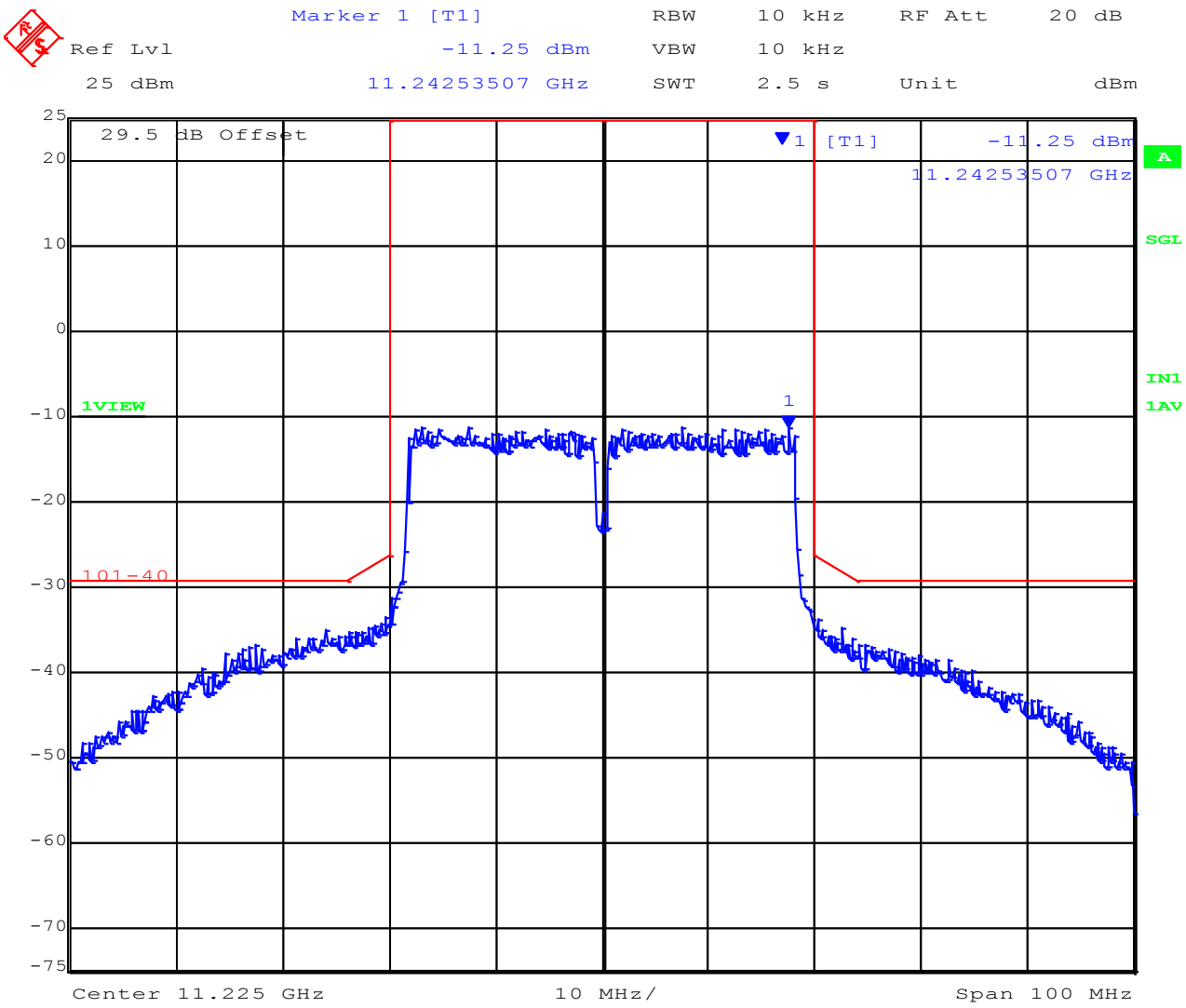
BPSK 40 MHz 11,665 MHz



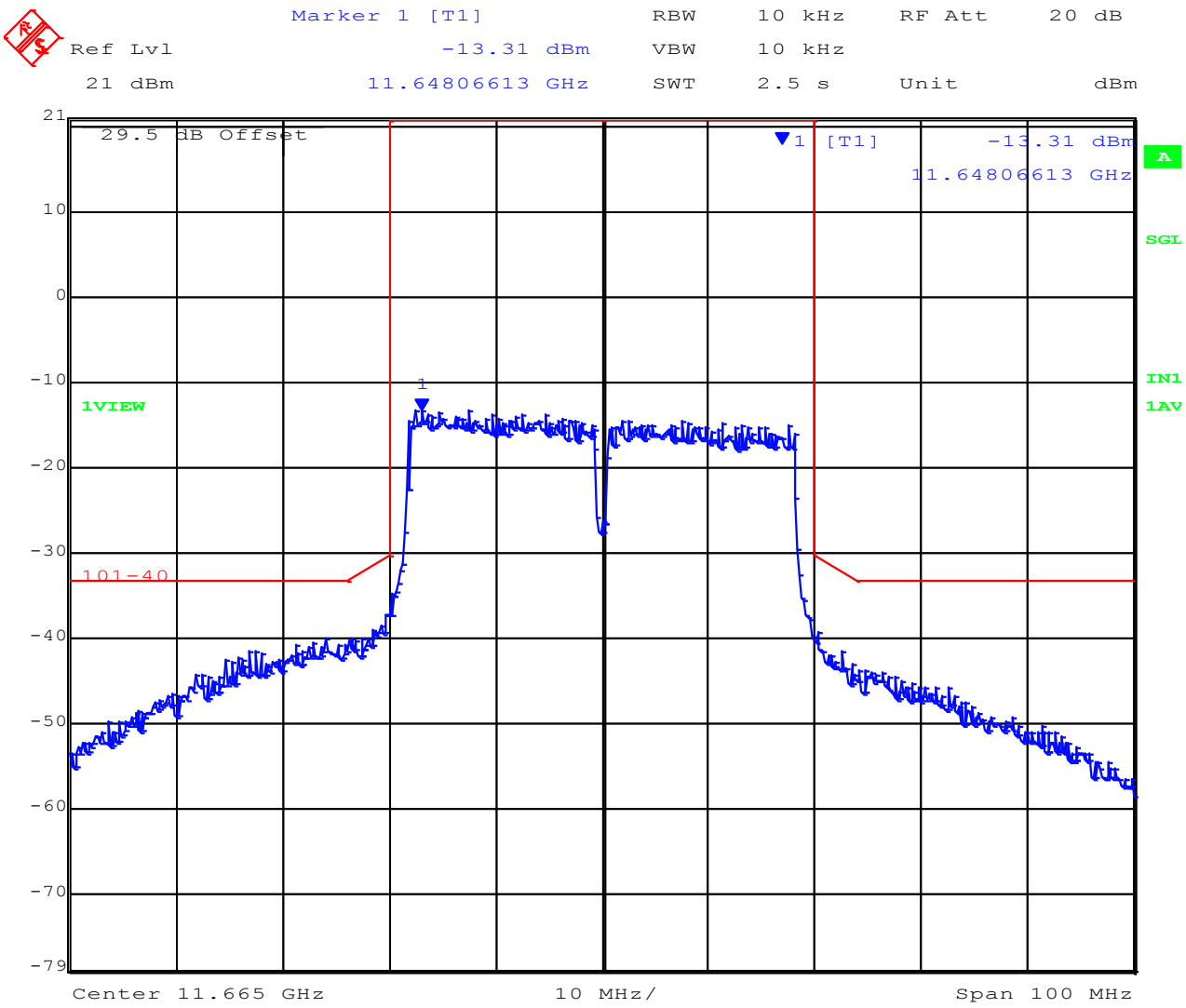
256QAM 40 MHz 10,735 MHz



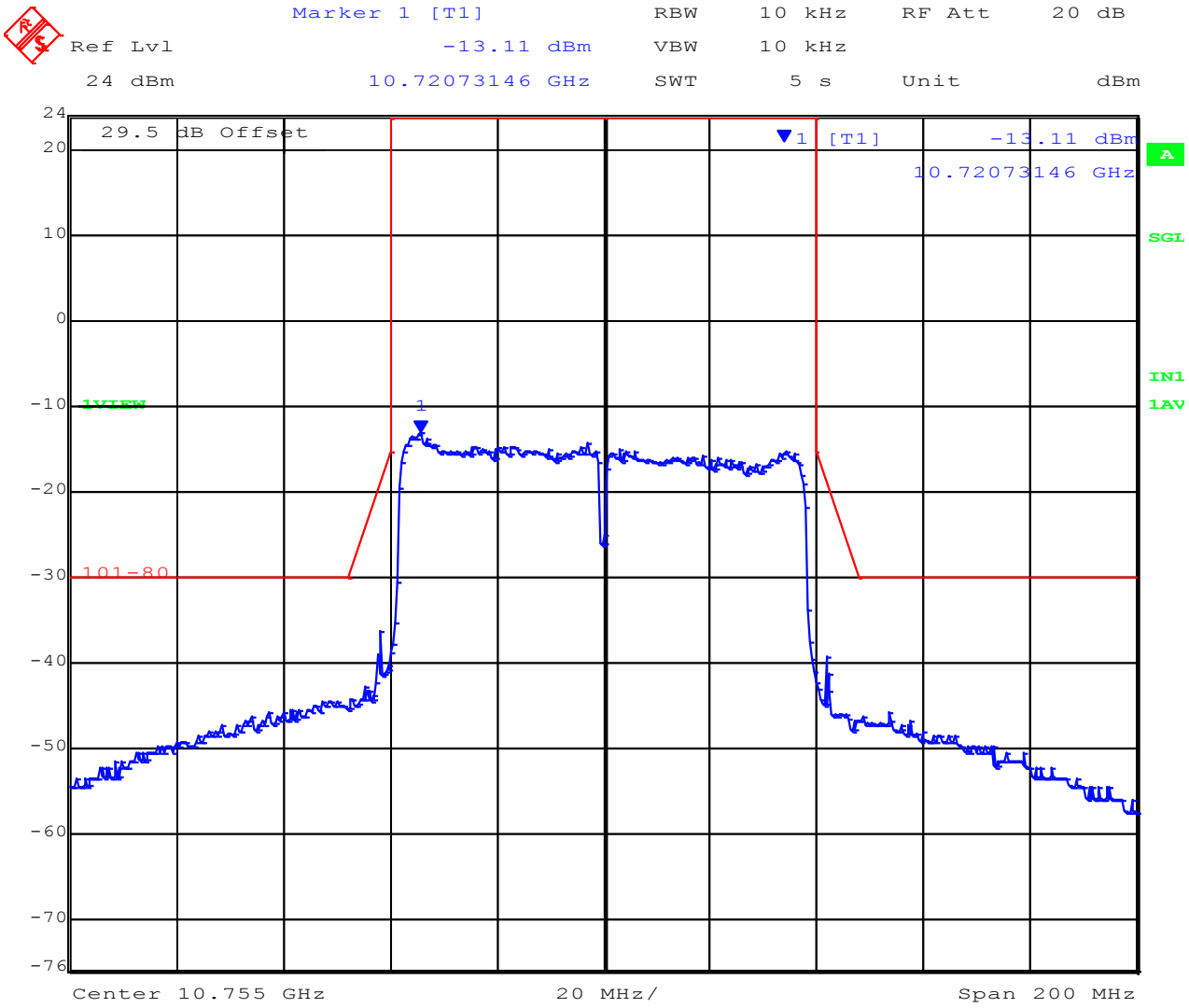
256QAM 40 MHz 11,225 MHz



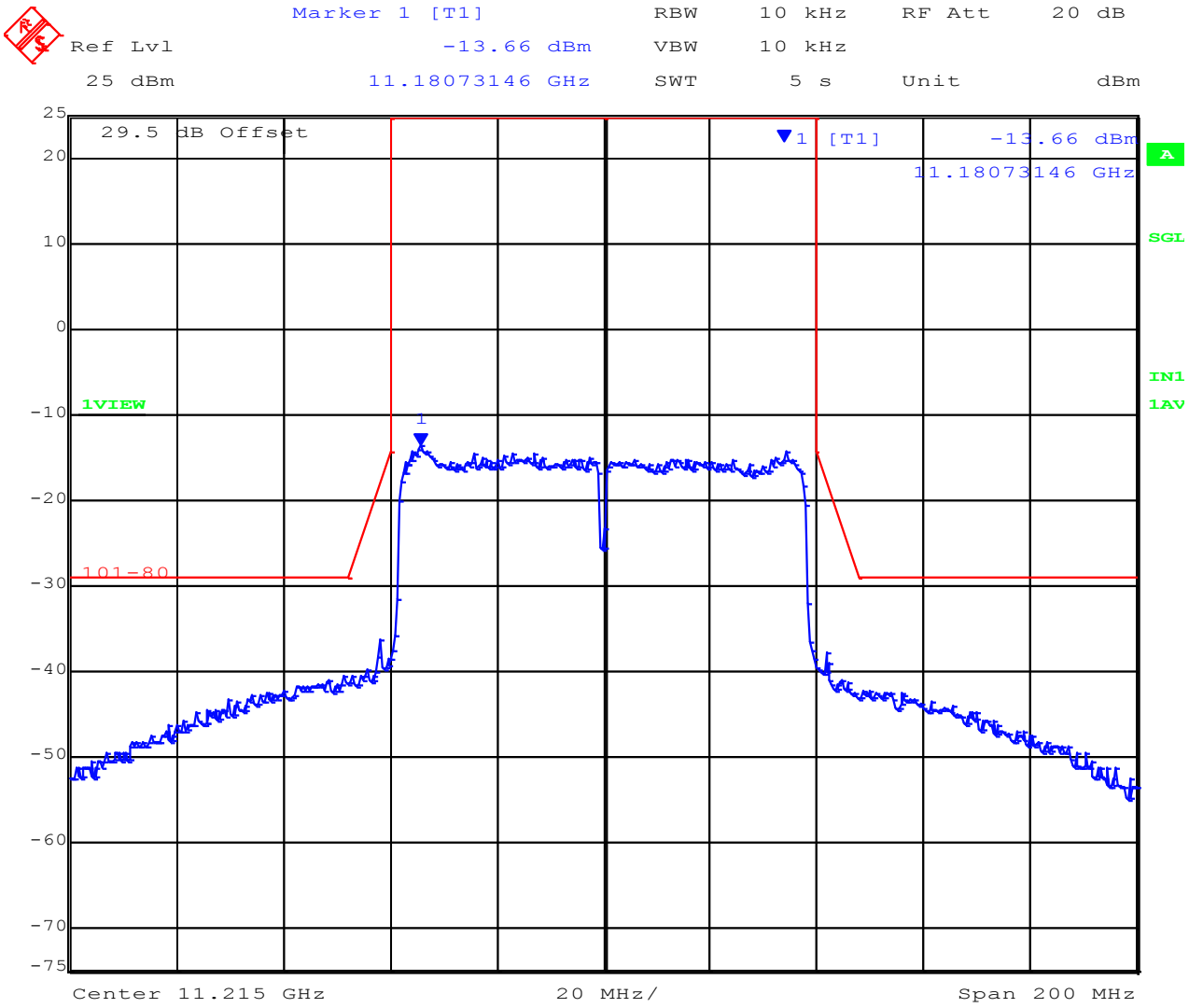
256QAM 40 MHz 11,665 MHz



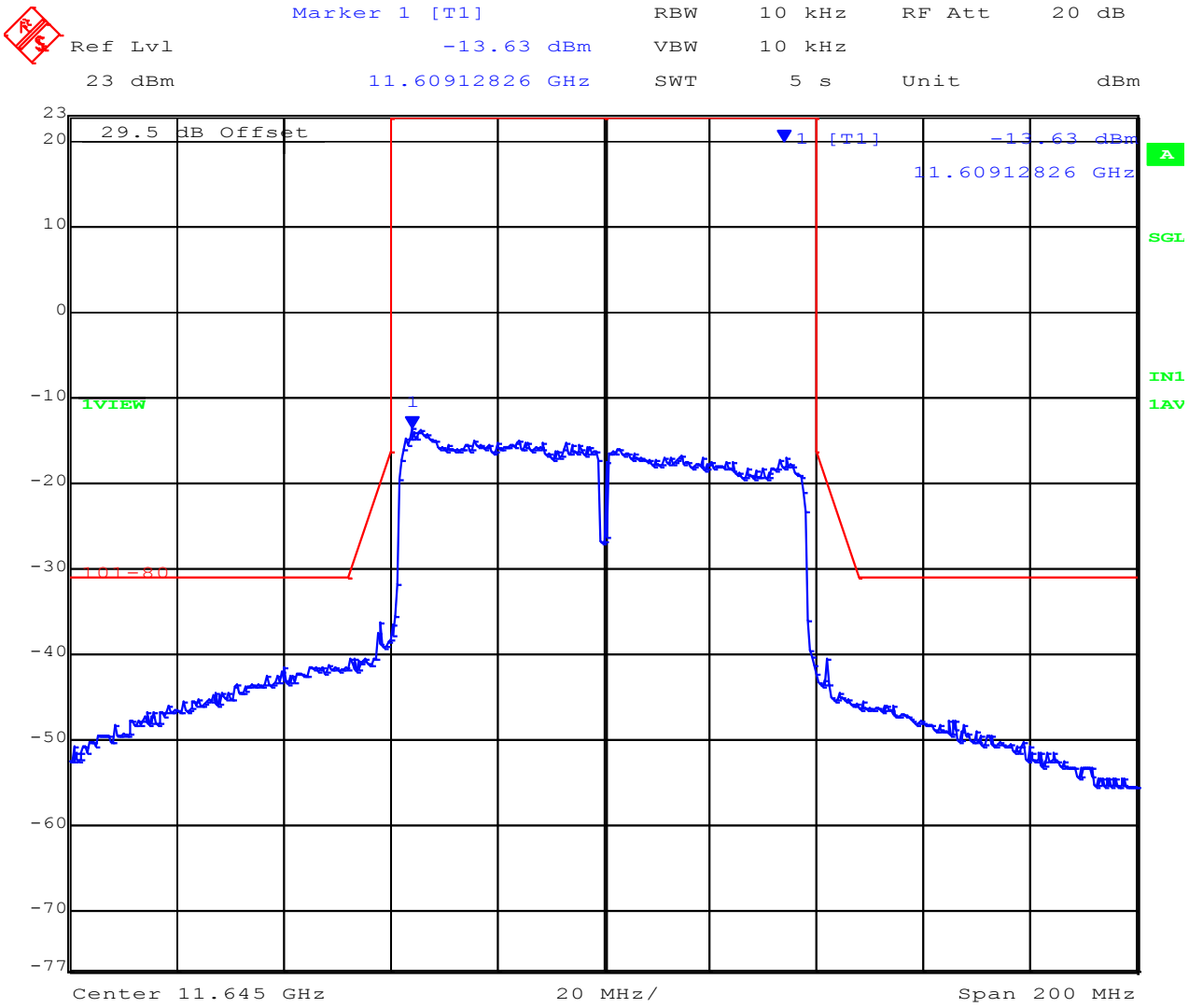
BPSK 80 MHz 10,755 MHz



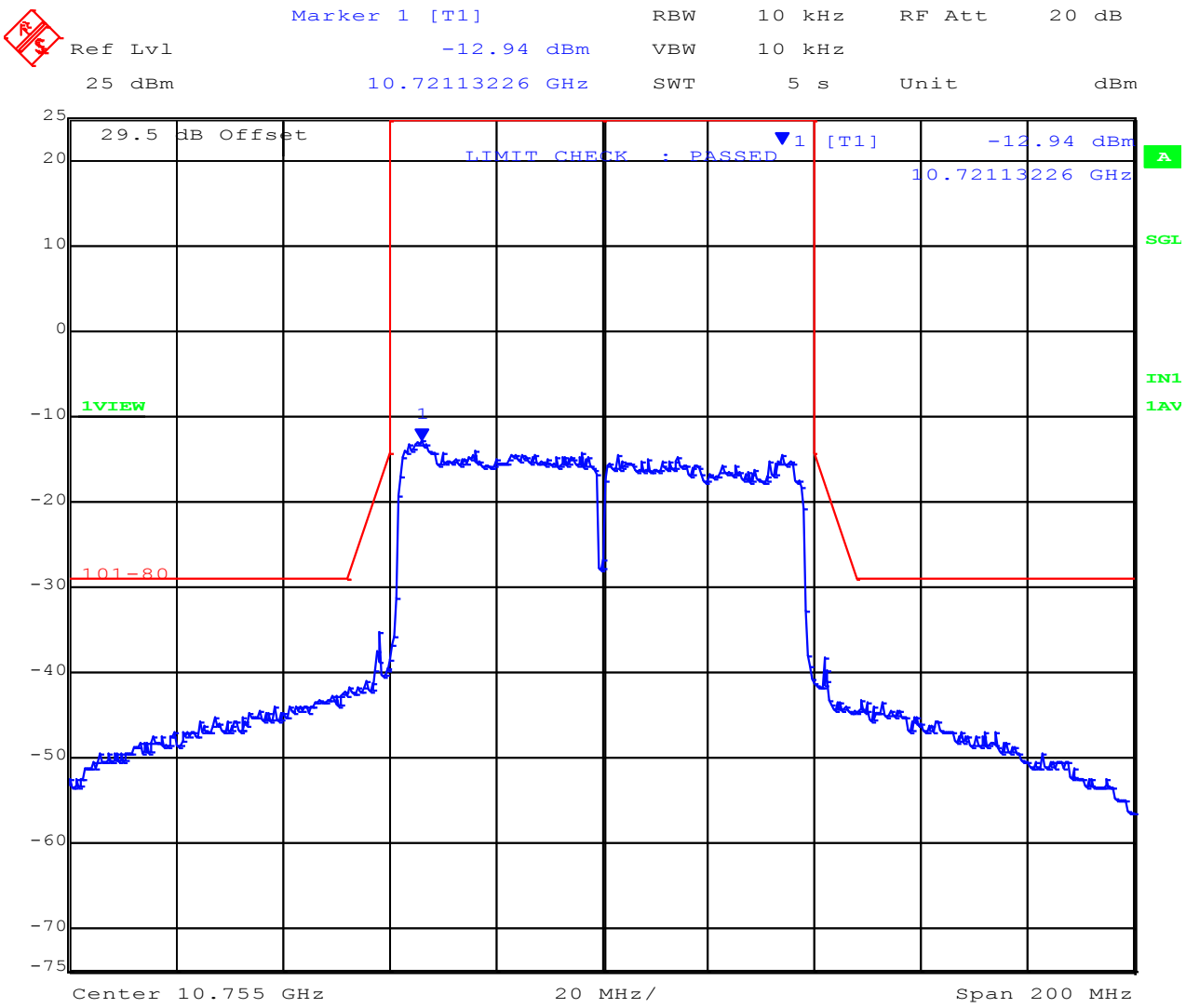
BPSK 80 MHz 11,215 MHz



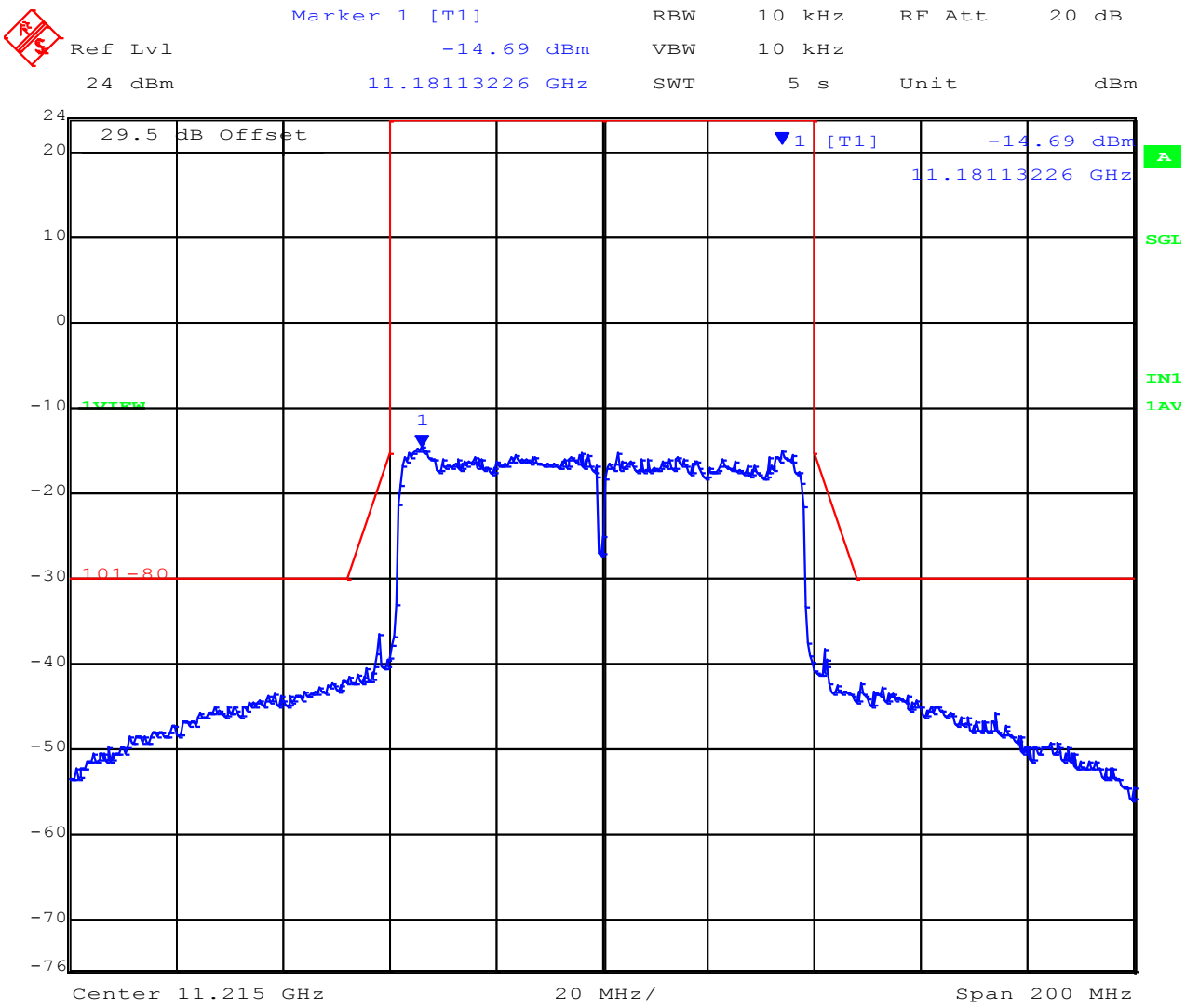
BPSK 80 MHz 11,645 MHz



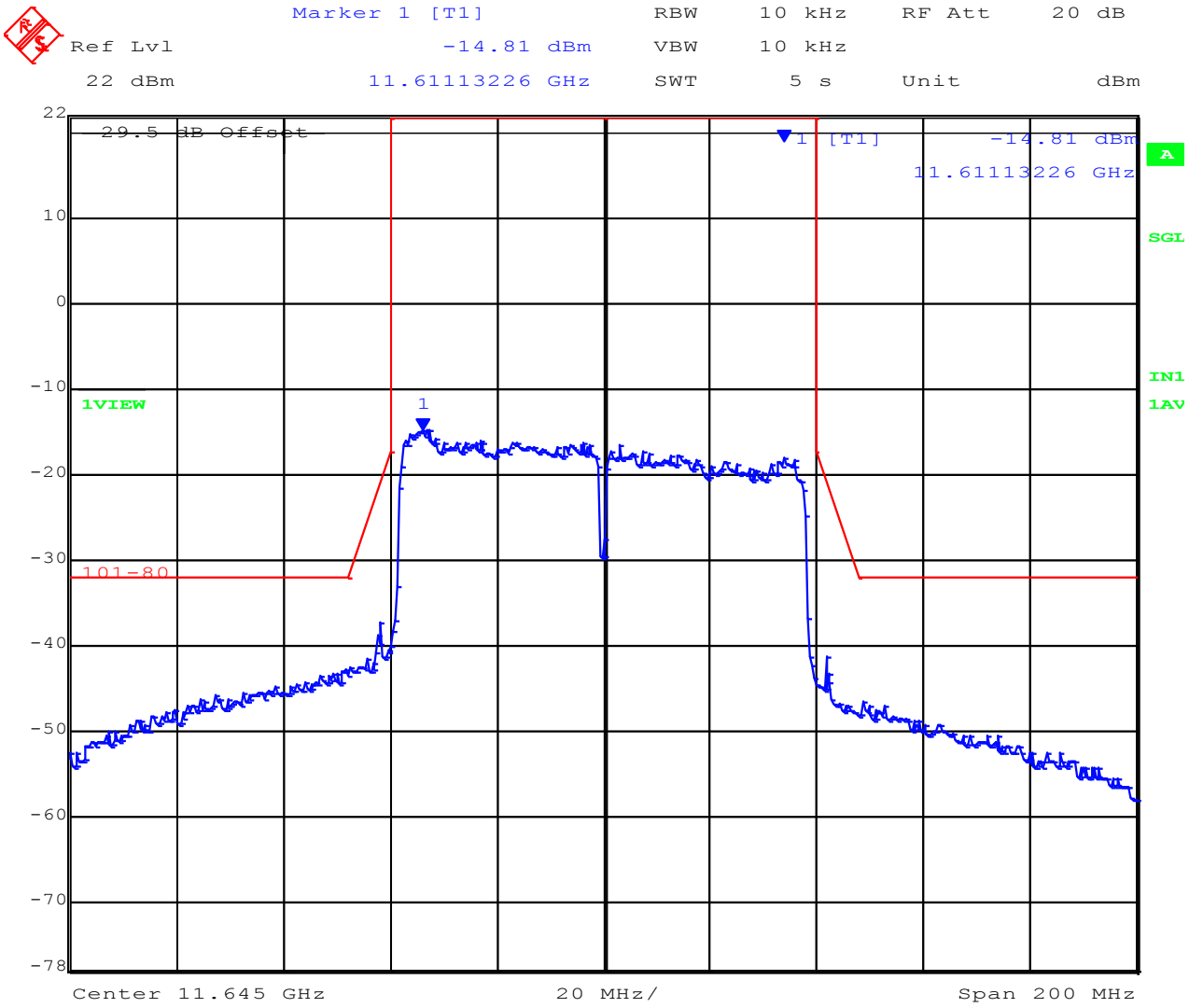
256QAM 80 MHz 10,755 MHz



256QAM 80 MHz 11,215 MHz



256QAM 80 MHz 11,645 MHz



6.1.2. Radiated Testing

Test Procedure
Testing 30M-1 GHz was performed in a 3-meter anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed. The anechoic chamber test set-up is identified in Section 6 Test Set-Up Photographs.

Field Strength Calculation
The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:
Given a Receiver input reading of 51.5dBμV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

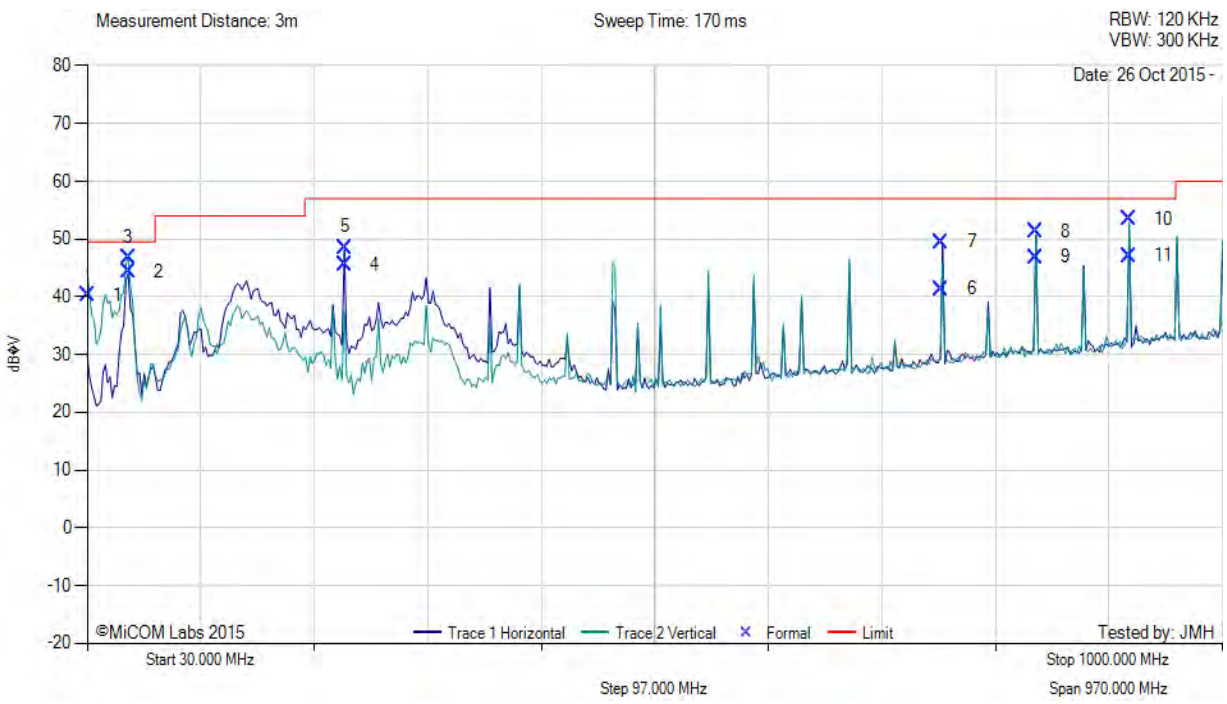
$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 dB\mu V/m$$

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

$$Level\ (dB\mu V/m) = 20 * Log\ (level\ (\mu V/m))$$

40 dBμV/m = 100μV/m
48 dBμV/m = 250μV/m

Variant: Dig Em, Test Freq: 0.00 MHz, Antenna: NA, Power Setting: NA



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	30.18	46.62	3.42	-9.72	40.32	MaxQP	Vertical	100	205	49.5	-9.2	Pass
2	65.00	64.23	3.67	-23.51	44.39	MaxQP	Vertical	100	227	49.5	-5.1	Pass
3	65.00	66.64	3.67	-23.51	46.80	Peak (Scan)	Vertical	100	1	--	--	
4	250.01	60.11	4.53	-19.05	45.59	Peak (Scan)	Horizontal	100	1	--	--	
5	250.01	63.10	4.53	-19.05	48.58	MaxQP	Horizontal	121	77	57.0	-8.4	Pass
6	760.00	44.62	6.02	-9.30	41.34	Peak (Scan)	Horizontal	100	1	--	--	
7	760.00	52.75	6.02	-9.30	49.47	MaxQP	Horizontal	100	196	57.0	-7.5	Pass
8	839.99	53.58	6.22	-8.49	51.31	MaxQP	Horizontal	145	215	57.0	-5.7	Pass
9	839.99	49.11	6.22	-8.49	46.84	Peak (Scan)	Horizontal	100	1	--	--	
10	919.99	54.81	6.44	-7.74	53.51	MaxQP	Vertical	100	102	57.0	-3.5	Pass
11	919.99	48.40	6.44	-7.74	47.10	Peak (Scan)	Vertical	100	1	--	--	

Test Notes: EUT on Table powered by Mimosa POE. B11 is a Class A device

575 Boulder Court,
Pleasanton, California 94566, USA
Tel: 1.925.462.0304
Fax: 1.925.462.0306
www.micomlabs.com