Test of Axxcelera ETDAP-C9AC

To: FCC 47 CFR Part 90 SubPart Z

Test Report Serial No.: AXXC08-A2 Rev A

TEST REPORT

FROM

Test of Axxcelera ETDAP-C9AC

To FCC 47 CFR Part 90 SubPart Z

Test Report Serial No.: AXXC08-A2 Rev A

This report supersedes None

Manufacturer: Axxcelera Broadband Wireless, Inc
1600 E.Parham Road
Richmond Virginia 23228
USA

Product Function: Wireless Broadband Access Point

Copy No: pdf **Issue Date:** 11th March 2009

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
440 Boulder Court, Suite 200
Pleasanton, CA 94566 USA
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ACCREDITED
CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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ACCREDITATION, LISTINGS and RECOGNITION

MiCOM Labs, Inc. an accredited laboratory complies with the international standard BS EN 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

THE 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 18 June 2005*).

Presented this 26th day of February 2008.

President
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2009

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

LISTINGS

MiCOM Labs test facilities are listed by the following organizations;

North America

United States of America
Federal Communications Commission (FCC) Listing #: 102167

Canada
Industry Canada (IC) Listing #:4143A-2

Japan Registration

VCCI Membership Number: 2959

- Radiation 3 meter site; Registration No. R-2881
- Line Conducted, Registration Nos. C-3181 & T-1470
- Emissions; Registration Nos. C-3180 & T-1469

RECOGNITION

APEC MRA (Asia-Pacific Economic Community Mutual Recognition Agreement)

Conformity Assessment Body (CAB) – MiCOM Labs

Test data generated by MiCOM Labs is accepted in the following countries under the APEC MRA.

Country	Recognition Body	Phase	CAB Identification No.
Australia	Australian Communications and Media Authority (ACMA)	I	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	I	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	I	
Singapore	Infocomm Development Authority (IDA)	I	
Taiwan	Directorate General of Telecommunications (DGT) Bureau of Standards, Metrology and Inspection (BSMI)	I I	

DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft		
A	11th March 2009	Initial Release

1. TEST RESULT CERTIFICATE

Manufacturer:	Axxcelera Broadband Wireless, Inc 1600 E.Parham Road Richmond Virginia 23228 USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
EUT:	Wireless Voice and Data Communication	Telephone:	+1 925 462 0304
Model:	ETDAP-C9AC	Fax:	+1 925 462 0306
S/N:	N/A		
Test Date(s):	10th to 12th Feb '09	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part 90 SubPart Z	EQUIPMENT COMPLIES
(Limited to partial testing on 5 MHz channel spacing)	

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.

ACCREDITED
CERTIFICATE #2381.01

Approved & Released for MiCOM Labs, Inc. by:

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 Part 90	2004	Code of Federal Regulations
(ii)	ANSI C63.4	2003	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	1997 1998	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(iv)	M 3003	Edition 1 Dec. 1997	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	14th September 2005	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 Axxcelera ETDAP-C9AC to FCC 47 CFR Part 90 SubPart Z regulations.	
Applicant:	Axxcelera Broadband Wireless, Inc 1600 E.Parham Road Richmond Virginia 23228 USA	
Manufacturer:	As ApplicantApplicantAddress	
Laboratory performing the tests:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA	
Test report reference number:	AXXC08-A2 Rev A	
Date EUT received:	10th February 2009	
Dates of test (from - to):	10th to 12th Feb '09	
Standard(s) applied:	FCC 47 CFR Part 90 SubPart Z	
No of Units Tested:	1	
Type of Equipment:	Access Point	
Model:	ETDAP-C9AC Note: the C9 is equal to the C4 except it has the regulatory file installed for the US only	
Location for use:	Outdoor use only	
Declared Frequency Range(s):	Transmit: 3650 - 3675 MHz Receiver: 3650 - 3675 MHz	
Type of Modulation:	BPSK, QPSK, 16QAM, 64QAM	
Operational Bandwidths:	3.5, 5, 7 MHz	
Declared Maximum Output Power:	+25 dBm	
ITU Emission Designator:	Modulation	5 MHz
	BPSK	4M7W7D
	QPSK	4M7W7D
	16QAM	4M6W7D
	64QAM	4M7W7D
Transmit/Receive Operation:	OFDM Time Division Duplex (TDD)	
Software Revision:	3.4.4.3	
Rated Input Voltage and Current:	POE Operation Input: 120Vac 60Hz Output: 48Vdc 0.6A	
Operating Temperature Range:	Client declared: -33ºC to +55ºC	
Clock/Oscillator(s):	160kHz, 40MHz, 200 MHz	
Frequency Stability:	±20 ppm /year	
Equipment Dimensions:	3” X 10” X 10”	
Weight:	7 lbs	
Primary function of equipment:	Wireless Broadband Access Point	

3.2. Scope of Test Program

The scope of the test program was to test the Axxcelera ETDAP-C9AC for compliance against;-

FCC 47 CFR Part 90, Subpart Z regulatory requirements.

The Axxcelera ETDAP-C9AC has three operational bandwidths 3.5, 5, 7 MHz and employs four modulation schemes BPSK, QPSK, 16QAM, 64QAM in the frequency range 3650 to 3700 MHz.

Model Naming Convention
E = ExcelMax
TD = TDD system
AP = Access Point
C9 = Version
AC = Power Option

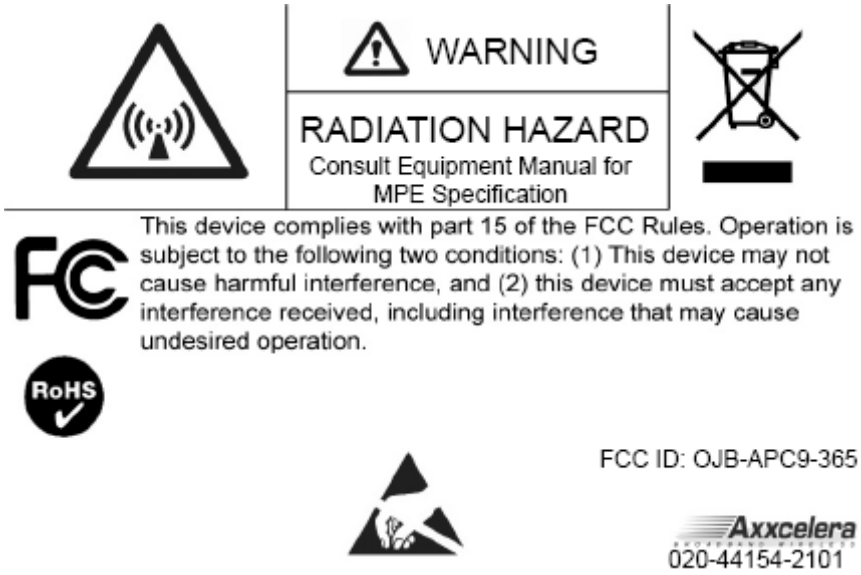
Applicable Variants
This report contains data with respect to a single bandwidth (5 MHz). Two bandwidths 3.5 & 7 MHz were completed in a separate test program with results reported in test report ABW-007FCC90Z. This report (AXXC08-A2) was generated to augment the original report.

Transmission Restrictions
Per Part 90 SubPart Z, 90.1319 “equipment incorporating a restricted contention based protocol may operate in and shall only tune over, the lower 25 MHz of this frequency band”.

As the Axxcelera ETDAP-C9AC incorporates a restricted contention based protocol the frequency range is limited to the lower 25 MHz of the band (3650 to 3675 MHz).

Axxcelera ETDAP-C9AC

Axxcelera ETDAP-C9AC Product Label



Axxcelera ETDAP-C9AC Product Label Position

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

EUT/ Support	Manufacturer	Equipment Description (Including Brand Name)	Model No.	Serial No.
EUT	Axxcelera	ExcelMAX 3650 MHz Transceiver	ETDAP-C9AC	N/A
EUT	Cinnon Electronics Co.	DC POE Power Injector ac/dc Adapter 120-240Vac 50-60Hz, 0.6A O/P 48Vdc 0.5A	TR60A-POE-L	N/A
Support	Dell Laptop	Computer		

3.4. Antenna Details

Antenna Type	Gain (dBi)	Manufacturer	Model No.	Serial No.
External Sector 60°, 90°, Omni	16 , 14, 10	Various	3.3 – 3.8 GHz	N/A

3.5. Cabling and I/O Ports

Number and type of I/O ports

1. 10/100 BT Ethernet non-shielded cable (includes POE Power)
2. N-Type RF Antenna Port
3. GPS Antenna Port

3.6. Test Configurations

Test Matrix V's Variants

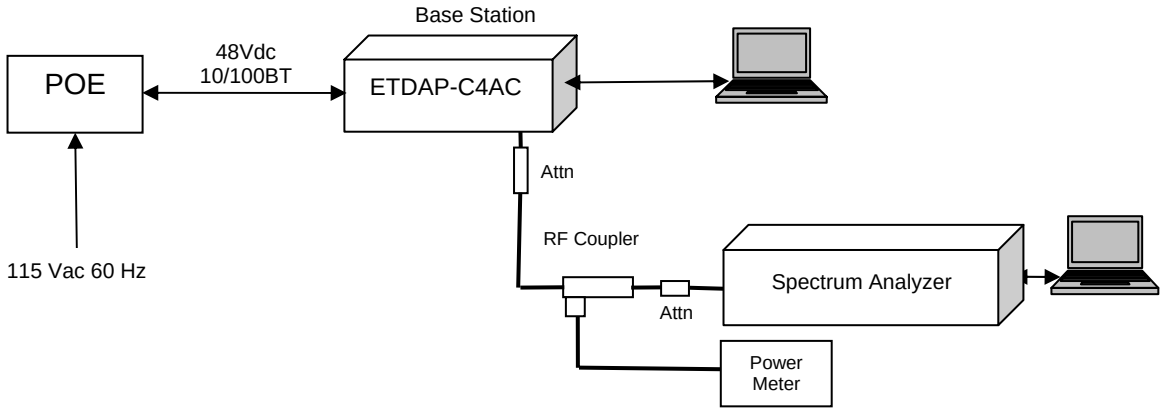
Parameter	Operational Mode	Test Conditions	Bandwidths (MHz)
99% Occupied BW	Modulated - BPSK QPSK, 16QAM, 64QAM	Ambient, 48Vdc	5
Output power			
Spectrum Mask			
Power Spectral Density			
Frequency Stability	Covered under test report #: ABW-007FCC90Z		
Conducted Spurious Emissions	Covered under test report #: ABW-007FCC90Z		
Radiated Spurious Emissions	Covered under test report #: ABW-007FCC90Z		
AC Wireline Emissions	Covered under test report #: ABW-007FCC90Z		

Test Frequencies

Bandwidth (MHz)	Modulation BPSK, QPSK, 16QAM, 64QAM		
	Low (MHz)	Mid (MHz)	High (MHz)
5	3653.00	3662.50	3675.00

Test Set-Up

Test software was available to exercise the Base Station and the equipment was tested using the following test configuration.



Test Set-Up

3.7. Equipment Modifications

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

1. Output Power Reduction

   Initial output power setting was for +27 dBm however during testing of Peak EIRP Power Density it was found a reduction in power was required in order to comply. Power was reduced to the following.

Channel (MHz)	Power Setting (dBm)	Power Reduction (dB)
3653.0	26	1
3662.5	26	1
3675.0	25	2

3.8. Deviations from the Test Standard

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

1. NONE

3.9. Subcontracted Testing or Third Party Data

1. NONE

4. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 90**, **Subpart Z.**

Section(s)	Test Items	Description	Condition	Result	Test Report Section
2.1049	99% Occupied Bandwidth	Bandwidth measurement(s)	Conducted	Complies	5.1.1
2.1046; 90.1321 (a)	EIRP Rated Power	Modulated Output Power	Conducted	Complies	5.1.2
2.1046; 90.1321 (a)	Peak EIRP Power Density	Maximum Spectral Density	Conducted	Complies	5.1.3
Subpart C 90.1217	Maximum Permissible Exposure	Exposure to radio frequency energy levels	Calculated	Complies	5.1.4
2.1055(a)(1)	Frequency Stability	Includes temperature and voltage variations	Conducted	Not Tested	See report #: ABW-007FCC90Z
2.1051; 90.1323	Spectrum Mask	Emissions from the antenna port	Conducted	Complies	5.1.5
2.1051; 90.1323	Conducted Spurious Emissions	Emissions from the antenna port	Conducted	Not Tested	See report #: ABW-007FCC90Z
2.1053; 90.1323 ANSI/TIA-603	Radiated Spurious Emissions	Spurious emissions	Radiated	Not Tested	See report #: ABW-007FCC90Z
15.207	AC Wireline Conducted	Emissions 150 kHz–30 MHz	Conducted	Not Tested	See report #: ABW-007FCC90Z

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*
Note 3: *Section 3.7 'Equipment Modifications' highlight the equipment modifications that were required to bring the product into compliance with the above matrix*

5. TEST RESULTS

5.1. Device Characteristics

5.1.1. Occupied Bandwidth

FCC 47 CFR Part 90, Subpart Z; 2.1049;

Test Procedure

The transmitter terminal of EUT was connected to the input of the spectrum analyzer set to measure the 99% occupied bandwidth. The system highest power setting was selected with modulation ON.

The measurement of channel bandwidth used a resolution bandwidth of at least one percent of the occupied bandwidth of the fundamental emission and a video bandwidth of 30 kHz.

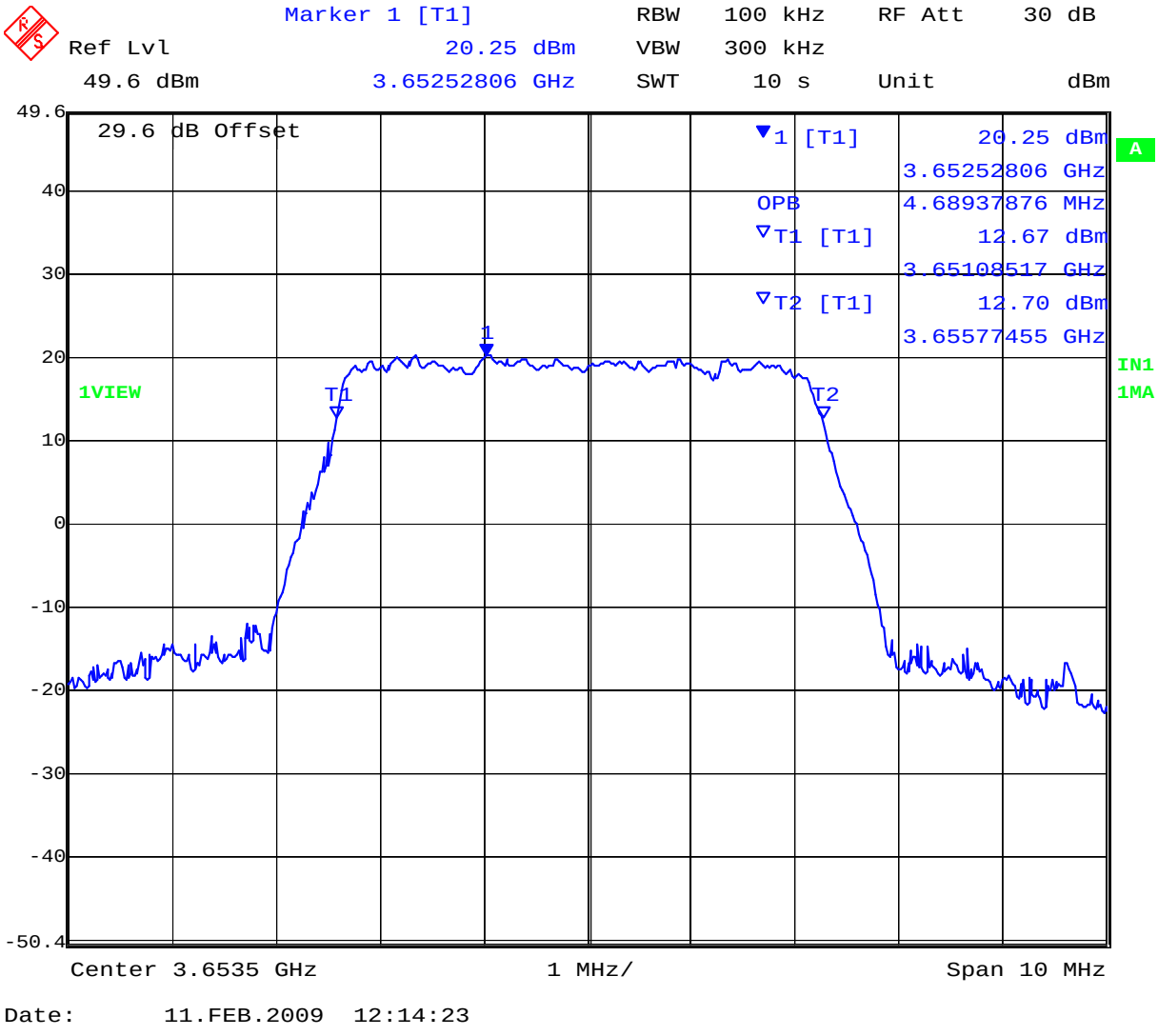
Test Set-up is shown in Section 3.6 Test Configuration

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

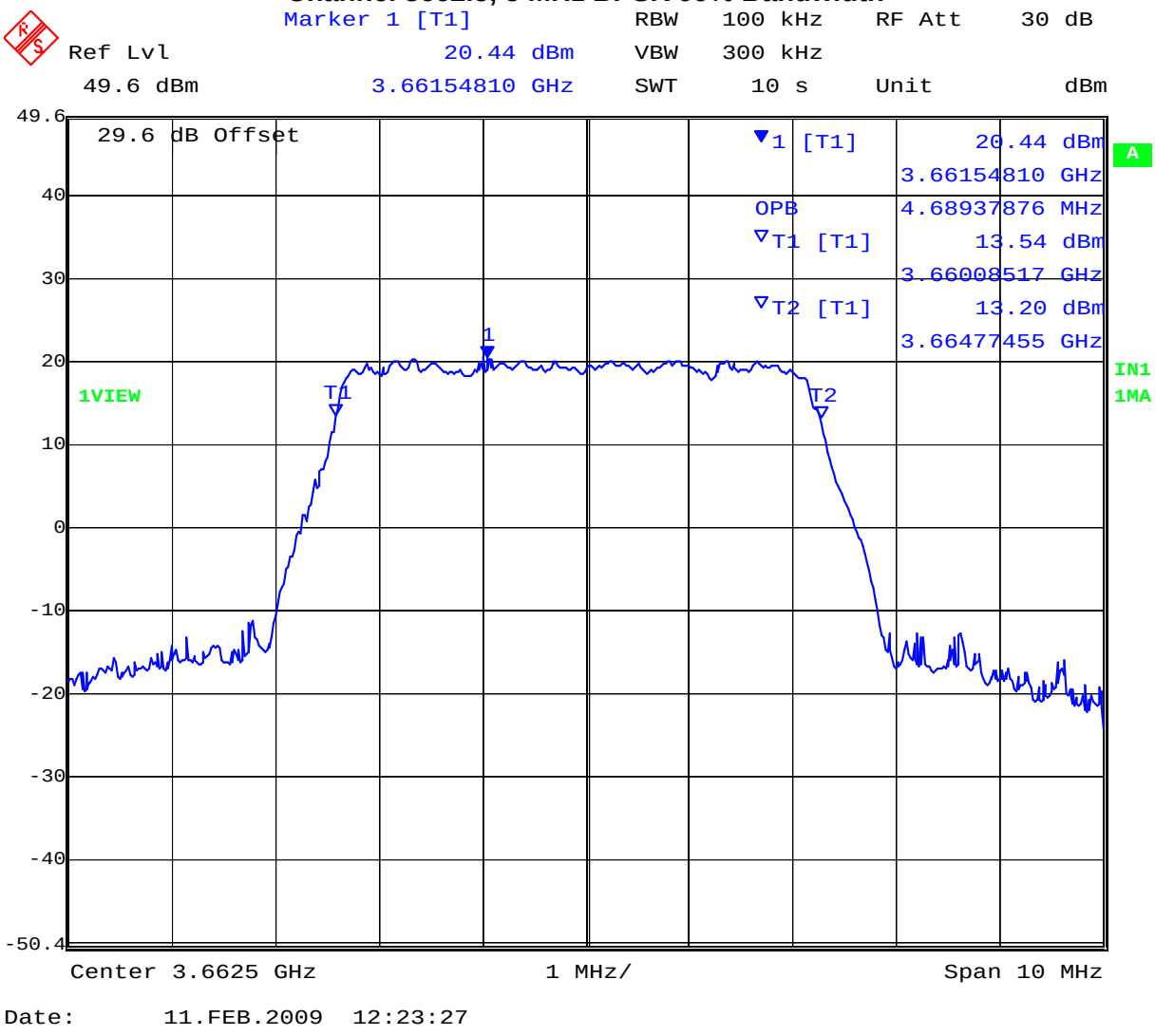
BPSK Modulation

Modulation	Bandwidth (MHz)	Center Frequency (MHz)	99% Bandwidth (MHz)
BPSK	5	3653.00	4.689
		3662.50	4.689
		3675.00	4.689

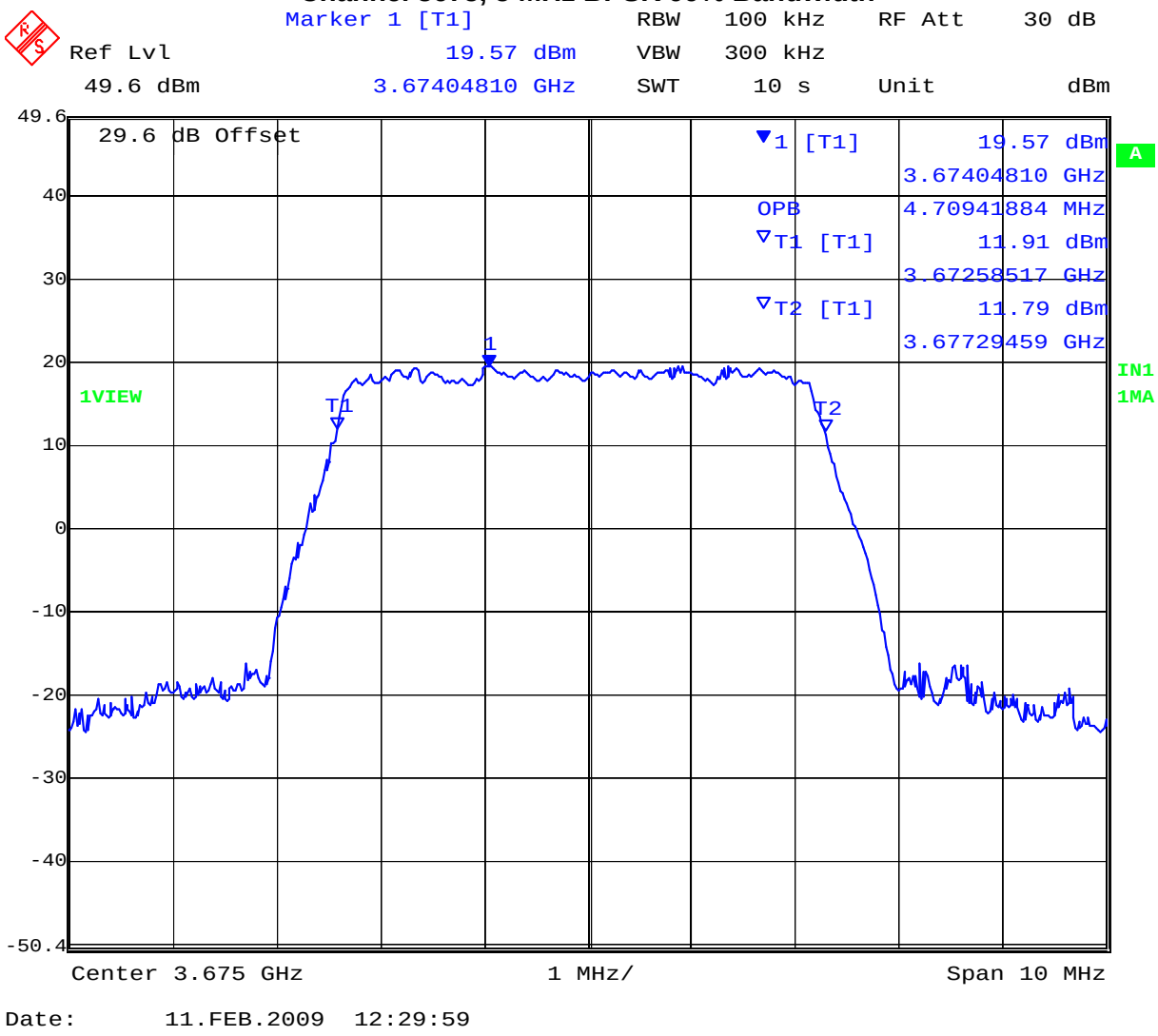
Channel 3653.0, 5 MHz BPSK 99% Bandwidth



Channel 3662.5, 5 MHz BPSK 99% Bandwidth



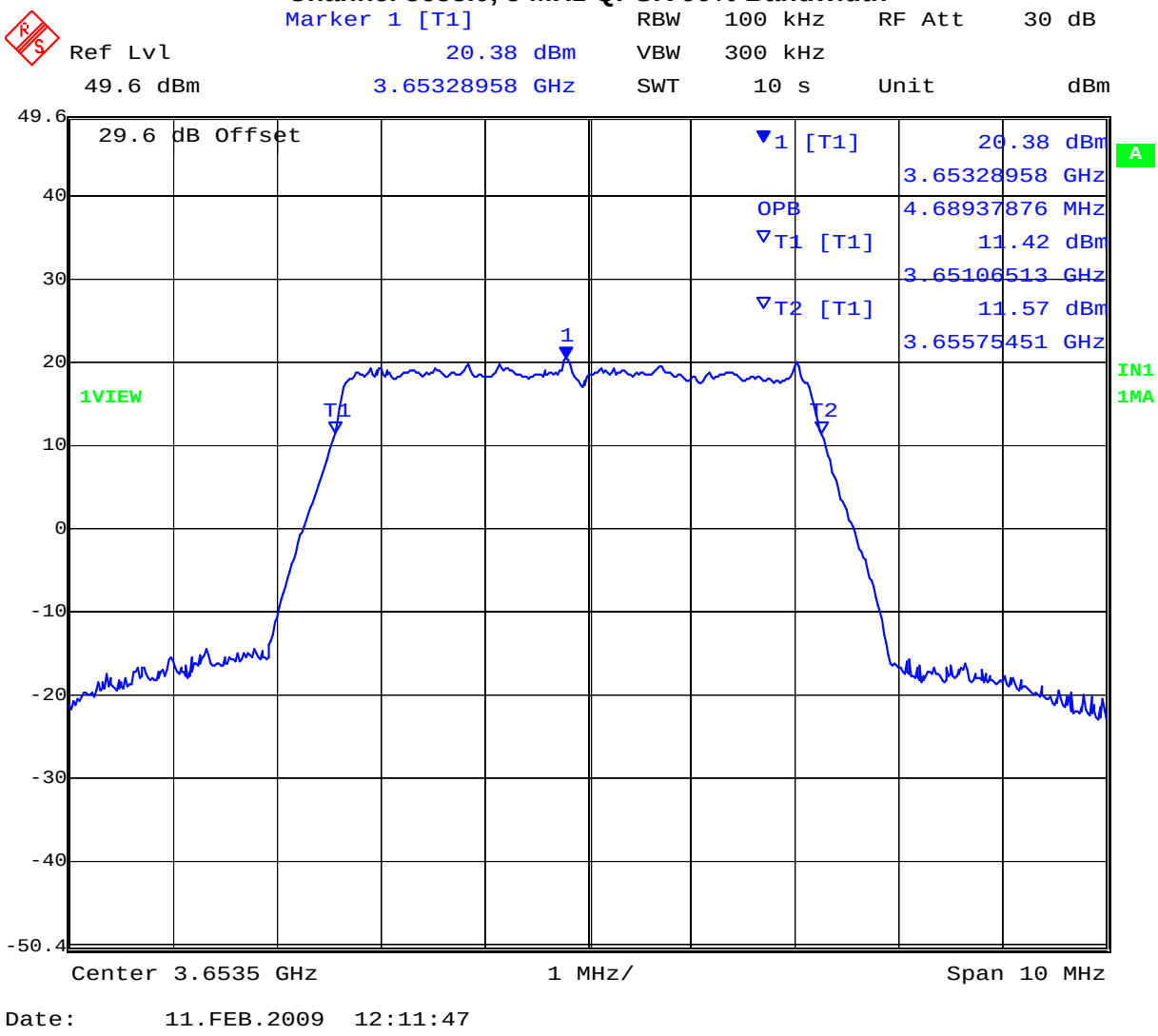
Channel 3675, 5 MHz BPSK 99% Bandwidth



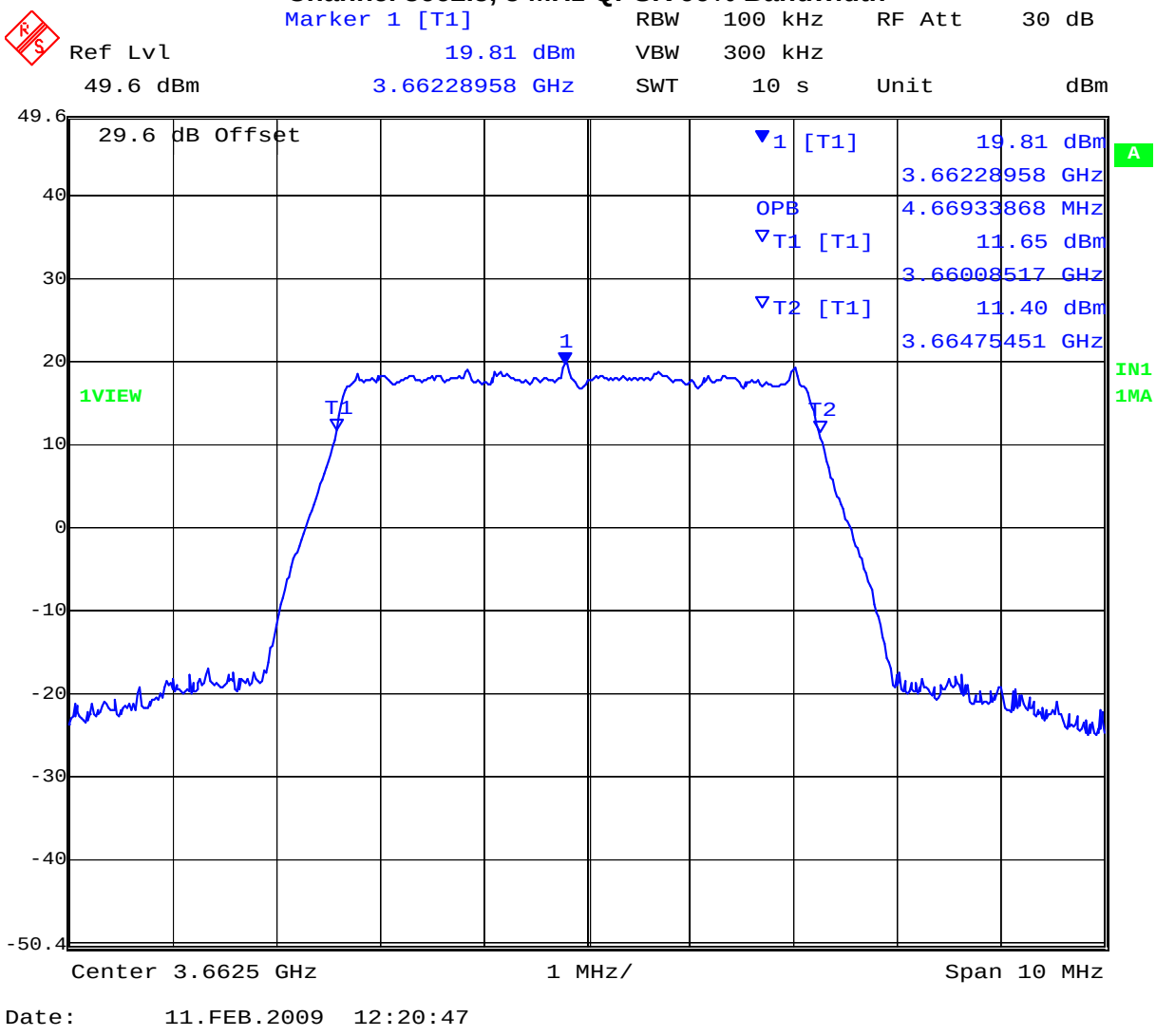
QPSK Modulation

Modulation	Bandwidth (MHz)	Center Frequency (MHz)	99% Bandwidth (MHz)
QPSK	5	3653.00	4.689
		3662.50	4.669
		3675.00	4.689

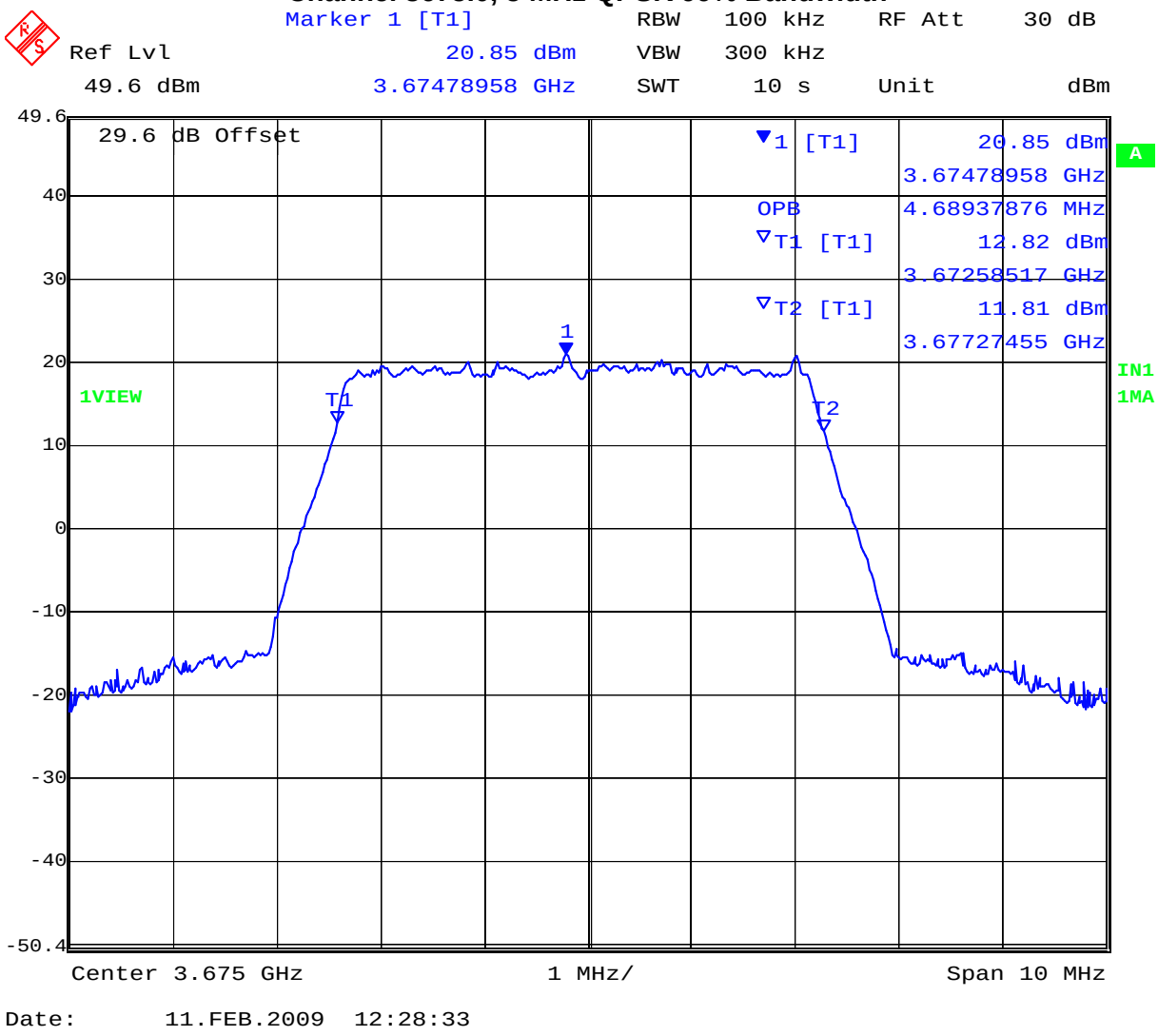
Channel 3653.0, 5 MHz QPSK 99% Bandwidth



Channel 3662.5, 5 MHz QPSK 99% Bandwidth



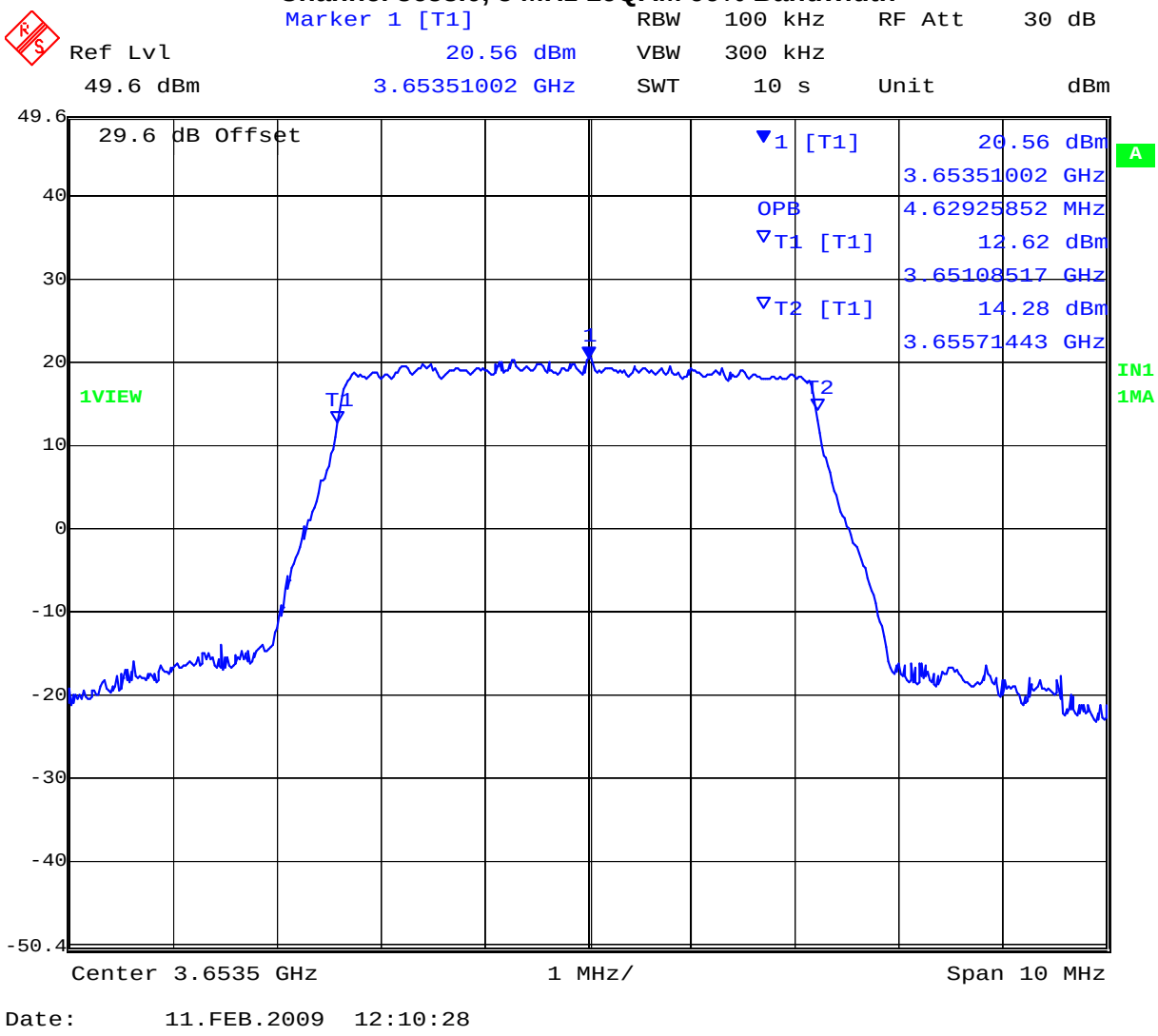
Channel 3675.0, 5 MHz QPSK 99% Bandwidth



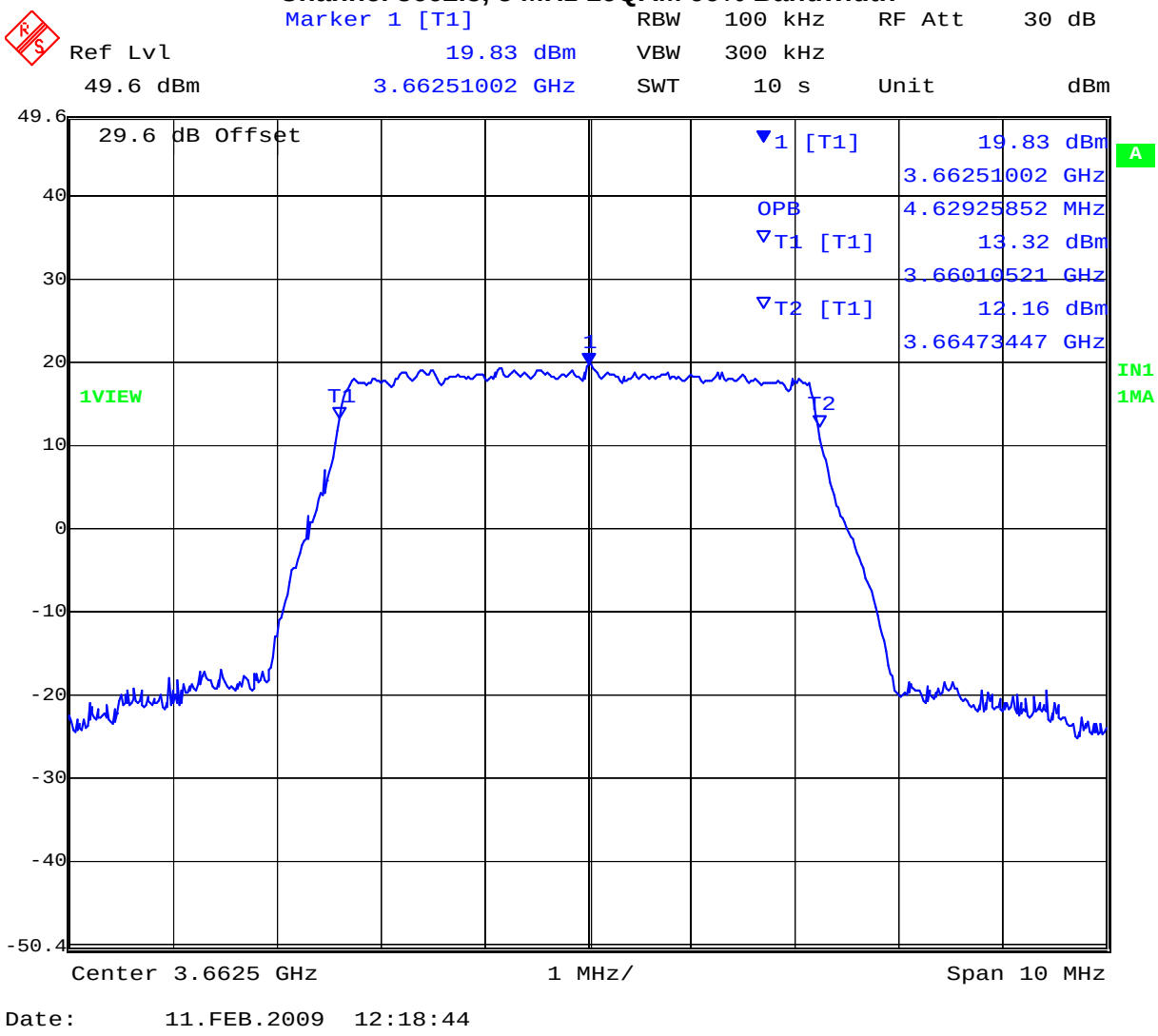
16QAM Modulation

Modulation	Bandwidth (MHz)	Center Frequency (MHz)	99% Bandwidth (MHz)
16QAM	5	3653.00	4.629
		3662.50	4.629
		3675.00	4.629

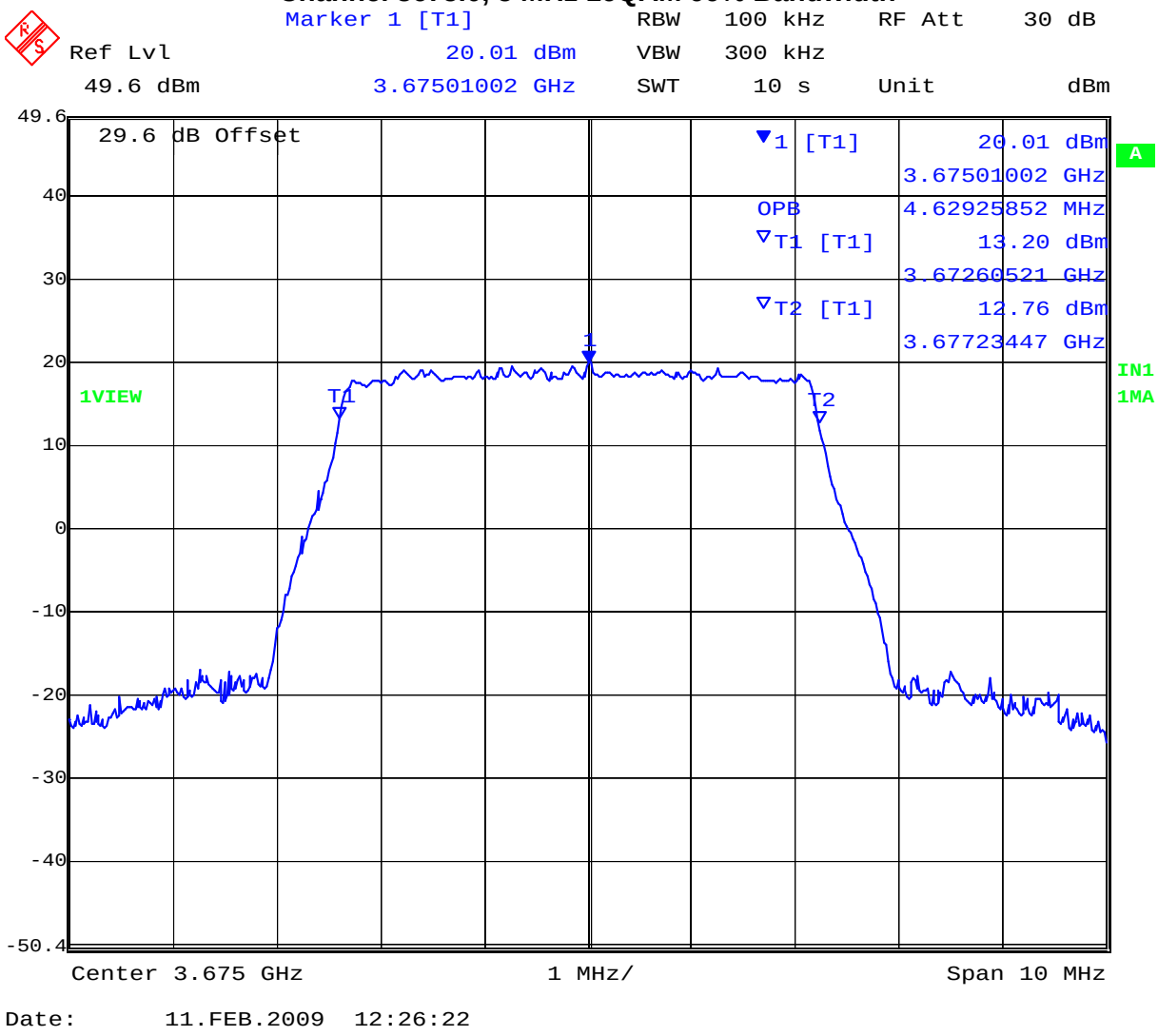
Channel 3653.0, 5 MHz 16QAM 99% Bandwidth



Channel 3662.5, 5 MHz 16QAM 99% Bandwidth



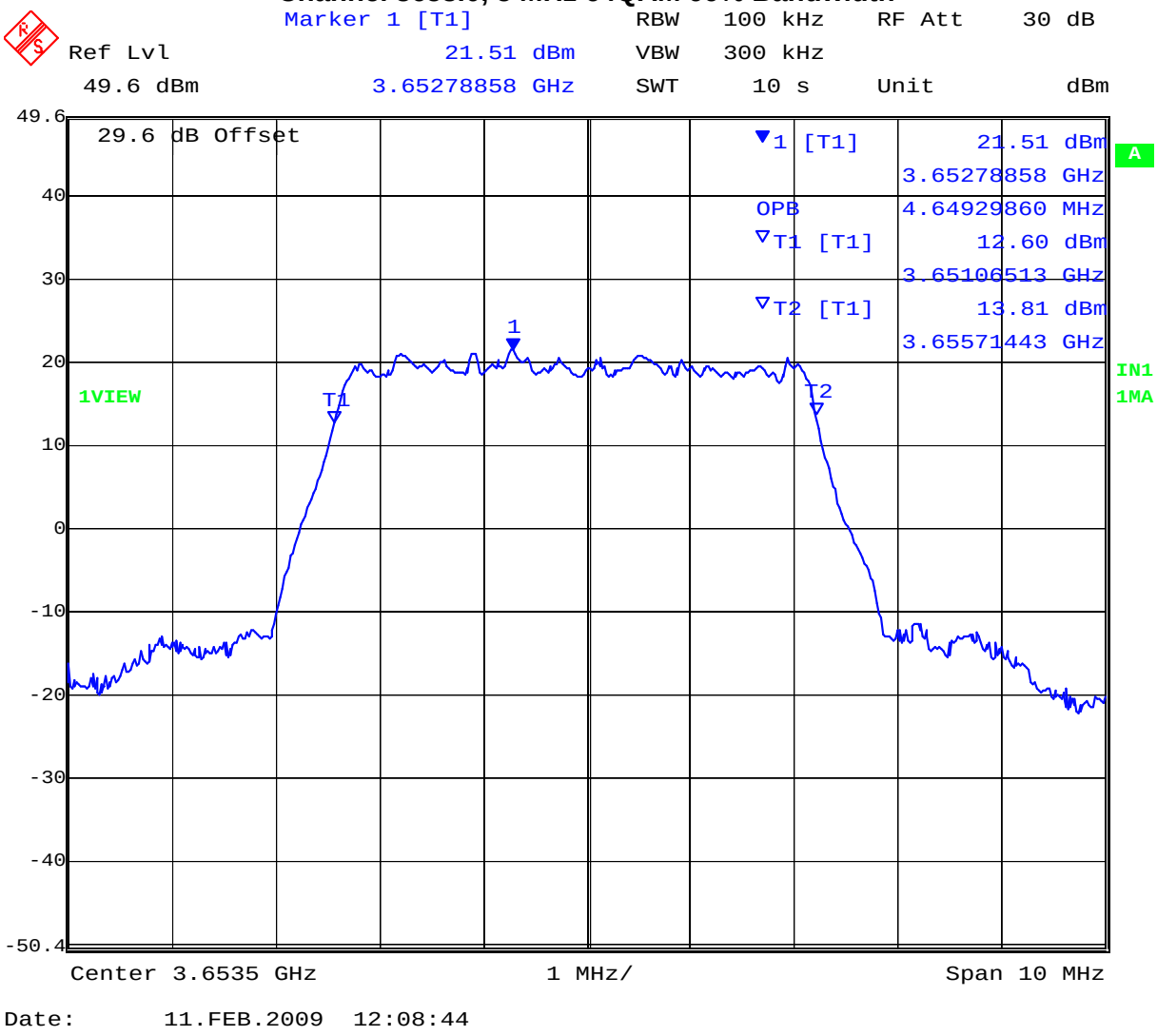
Channel 3675.0, 5 MHz 16QAM 99% Bandwidth



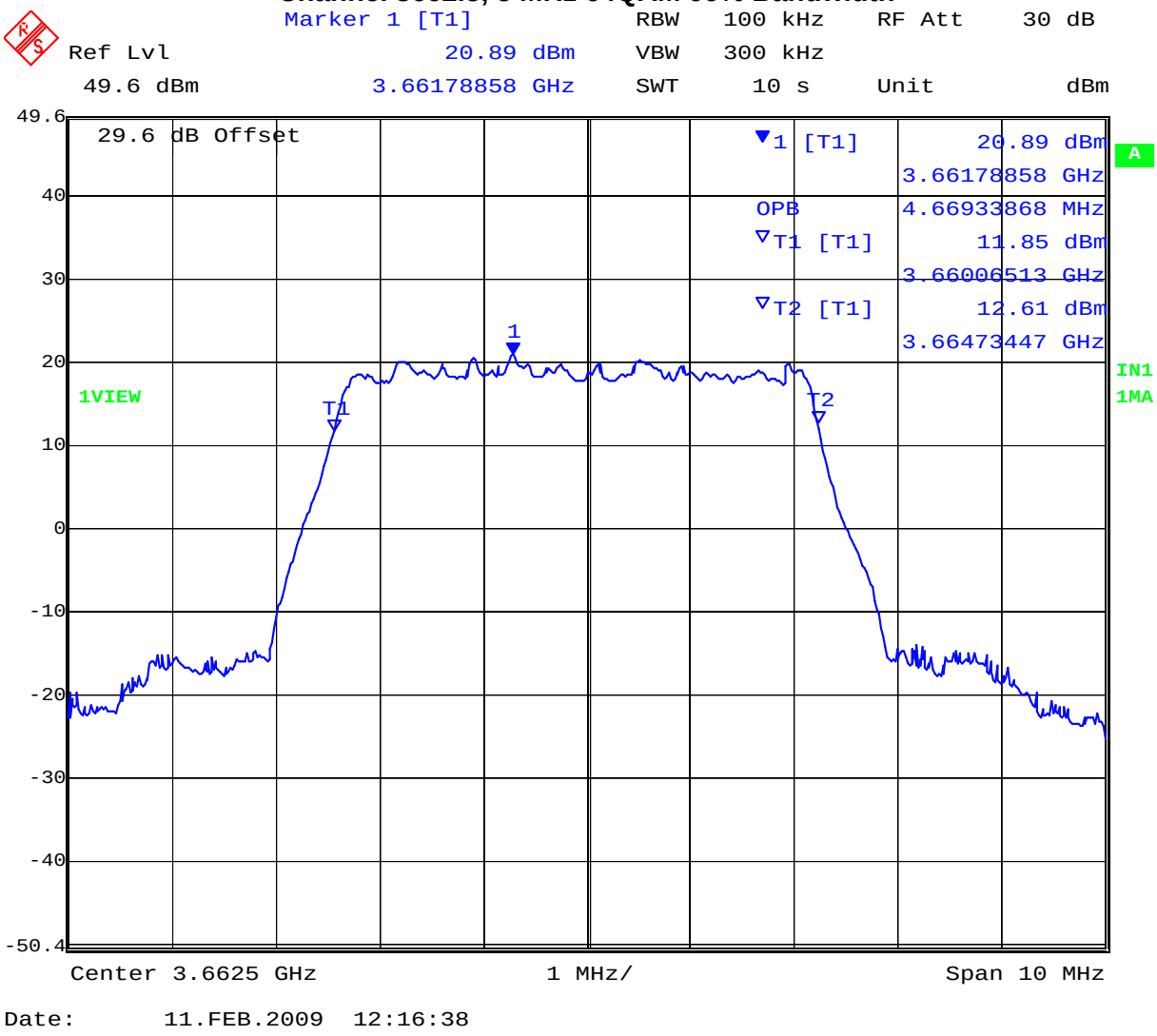
64QAM Modulation

Modulation	Bandwidth (MHz)	Center Frequency (MHz)	99% Bandwidth (MHz)
64QAM	5	3653.00	4.649
		3662.50	4.669
		3675.00	4.669

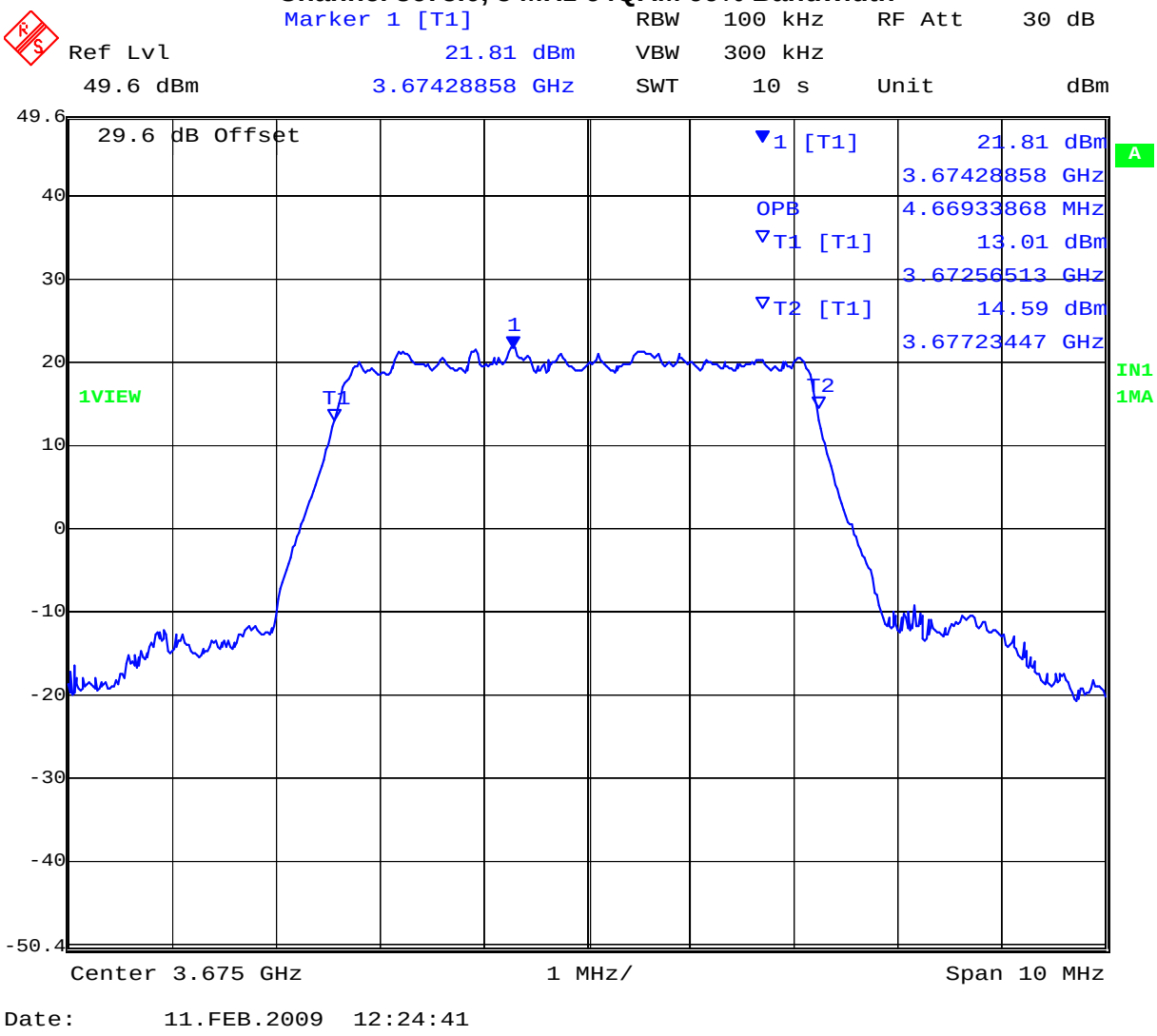
Channel 3653.0, 5 MHz 64QAM 99% Bandwidth



Channel 3662.5, 5 MHz 64QAM 99% Bandwidth



Channel 3675.0, 5 MHz 64QAM 99% Bandwidth



Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Spectrum Mask'	0070, 0116, 0158, 0193, 0252, 0313, 0314.

5.1.2. Peak Output Power

FCC 47 CFR Part 90, Subpart Z; §90.1321(a)
The following power limits apply to the 3650 – 3675 MHz band.

Base and fixed stations are limited to 25W/25 MHz equivalent isotropically radiated power (EIRP). In any event the peak EIRP power density shall not exceed 1 Watt (+30 dBm) in any one Megahertz slice of spectrum.

Power Limit 3.5 MHz Channel Spacing = +35.4 dBm
Power Limit 5 MHz Channel Spacing = +37.0 dBm
Power Limit 7 MHz Channel Spacing = +38.4 dBm

Test Procedure
Average power measurements were measured with the use of an average power head. The system highest power setting was selected with modulation ON.

Test Set-up is shown in Section 3.6 Test Configuration

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

MAXIMUM OUTPUT POWER V'S ANTENNA GAIN

Power Limit Channel Spacing V's Antenna Gain

Antenna Type	Channel Spacing (MHz)	Gain (dBi)	EIRP Limit (dBm)	Maximum Permissible Conducted Power (dBm)
OMNI / Sector	5	10.0	+37.0	+27.0
		14.0		+23.0
		16.0		+21.0

Maximum Power - 5 MHz Bandwidth

Power Settings, see Section 3.7 Equipment Modifications (#1)
Channel 3653.0 MHz +26 dBm
Channel 3662.5 MHz +26 dBm
Channel 3675.0 MHz +25 dBm

Modulation	Center Frequency (MHz)	Conducted Peak Power (dBm)	EIRP Limit (dBm)	Margin (dB)
BPSK	3653.00	+24.60	+37.0	-12.40
	3662.50	+24.13		-12.87
	3675.00	+24.15		-12.85
QPSK	3653.00	+24.50		-12.50
	3662.50	+24.01		-12.99
	3675.00	+24.12		-12.88
16QAM	3654.25	+24.40		-12.60
	3662.50	+24.08		-12.92
	3675.00	+24.05		-12.95
64QAM	3654.25	+24.55		-12.45
	3662.50	+24.07		-12.93
	3675.00	+24.11		-12.89

Laboratory Measurement Uncertainty for Power Measurement

Measurement uncertainty	±1.33 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Output Power'	0070, 0116, 0158, 0193, 0252, 0313, 0314.

5.1.3. Power Spectral Density

FCC 47 CFR Part 90, Subpart Z; §90.1321(a)

The following power limits apply to the 3650 – 3675 MHz band.

Base and fixed stations are limited to 25W/25 MHz equivalent isotropically radiated power (EIRP). In any event the peak EIRP power density shall not exceed 1 Watt (+30 dBm) in any one Megahertz slice of spectrum.

Limit
Power Spectral Density 5 MHz Channel Spacing = +30 dBm/MHz

Test Procedure
The test methodology used for this measurement was determined to provide the highest possible power density readings.

Power spectral density measurements were performed via the spectrum analyzer and plots were recorded. The system highest power setting was selected and modulation was ON. An initial measurement was made to detect the frequency with the highest spectral density. This frequency was found by encompassing twice the bandwidth of the signal being measured i.e. for the 5 MHz initial span was 10 MHz in max hold mode. For greater resolution the highest peak found was centered on the analyzer and the span reduced to 5 MHz. Sweep time was set for 10s and the highest peak was measured and recorded.

Test Set-up is shown in Section 3.6 Test Configuration

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Output Power Reduction Required

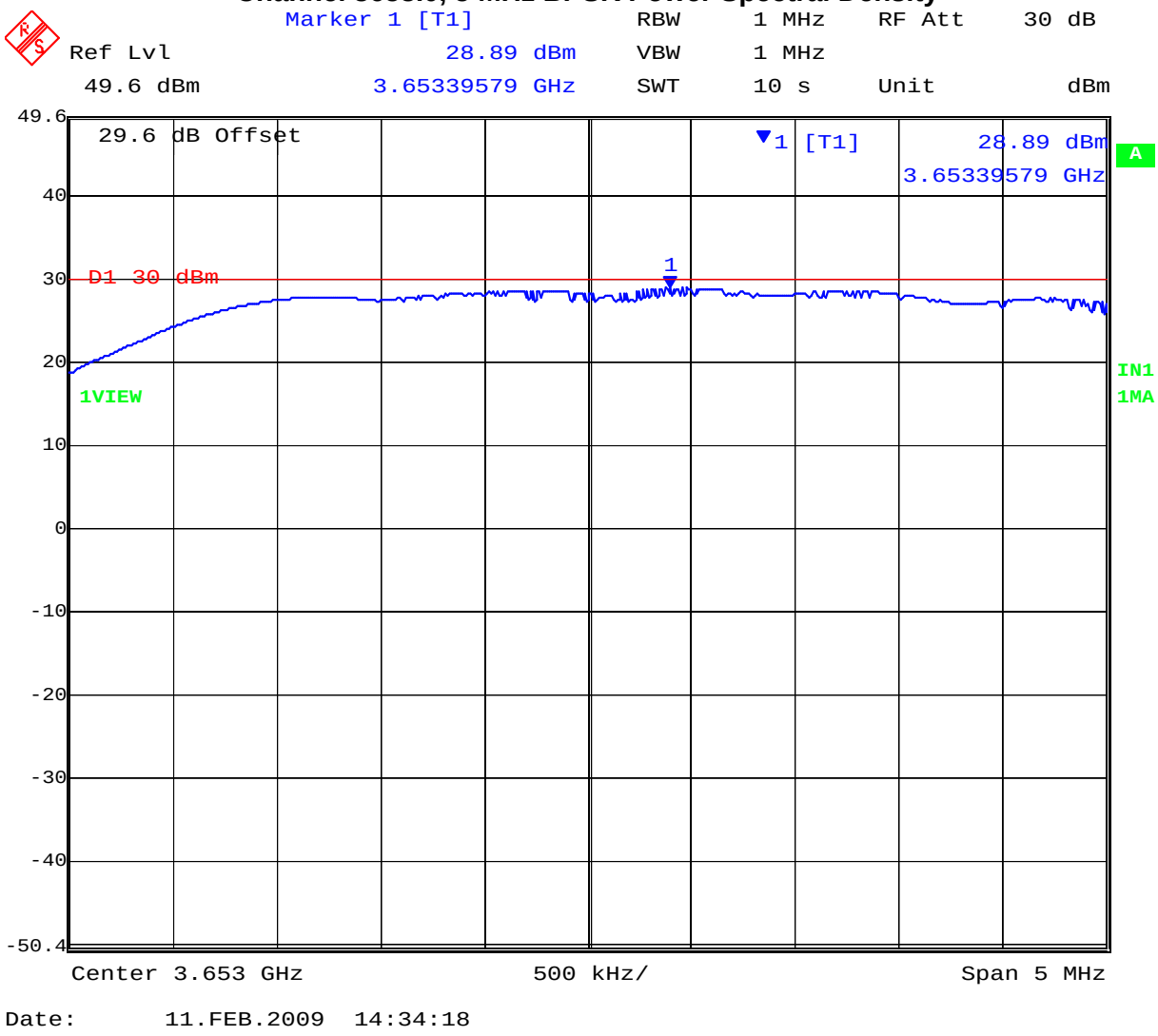
Initial output power setting was for +27 dBm however during Power Density testing it was found a reduction in power was required in order to comply. Power was reduced to the following.

Channel (MHz)	Power Setting (dBm)	Power Reduction (dB)
3653.0	26	1
3662.5	26	1
3675.0	25	2

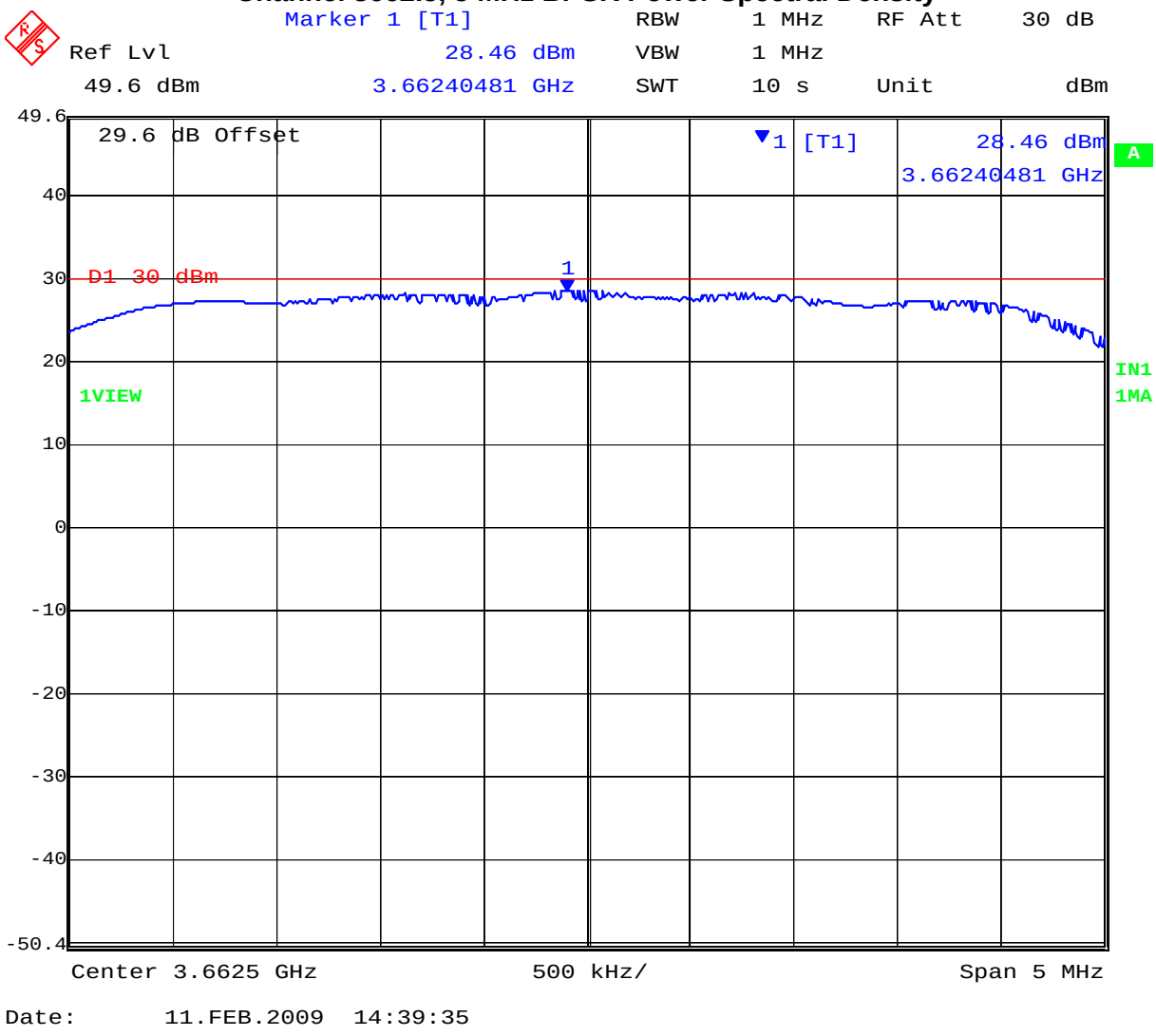
BPSK Modulation

Modulation	Bandwidth (MHz)	Center Frequency (MHz)	Frequency of Emission (MHz)	PPSD (dBm/MHz)	Limit (dBm)	Margin (dB)
BPSK	5	3653.0	3653.39579	+28.89	+30.0	-1.11
		3662.5	3662.40481	+28.46		-1.54
		3675.0	3674.97495	+28.54		-1.46
QPSK		3653.00	3653.377655	+28.45		-1.55
		3662.50	3662.77555	+28.11		-1.89
		3675.00	3675.30561	+28.27		-1.73
16QAM		3654.25	3653.60621	+29.45		-0.55
		3662.50	3662.73547	+29.08		-0.92
		3675.00	3675.06513	+29.05		-0.95
64QAM		3653.0	3653.63627	+28.97		-1.03
		3662.5	3662.68537	+28.57		-1.43
		3675.0	3675.21543	+28.71		-1.29

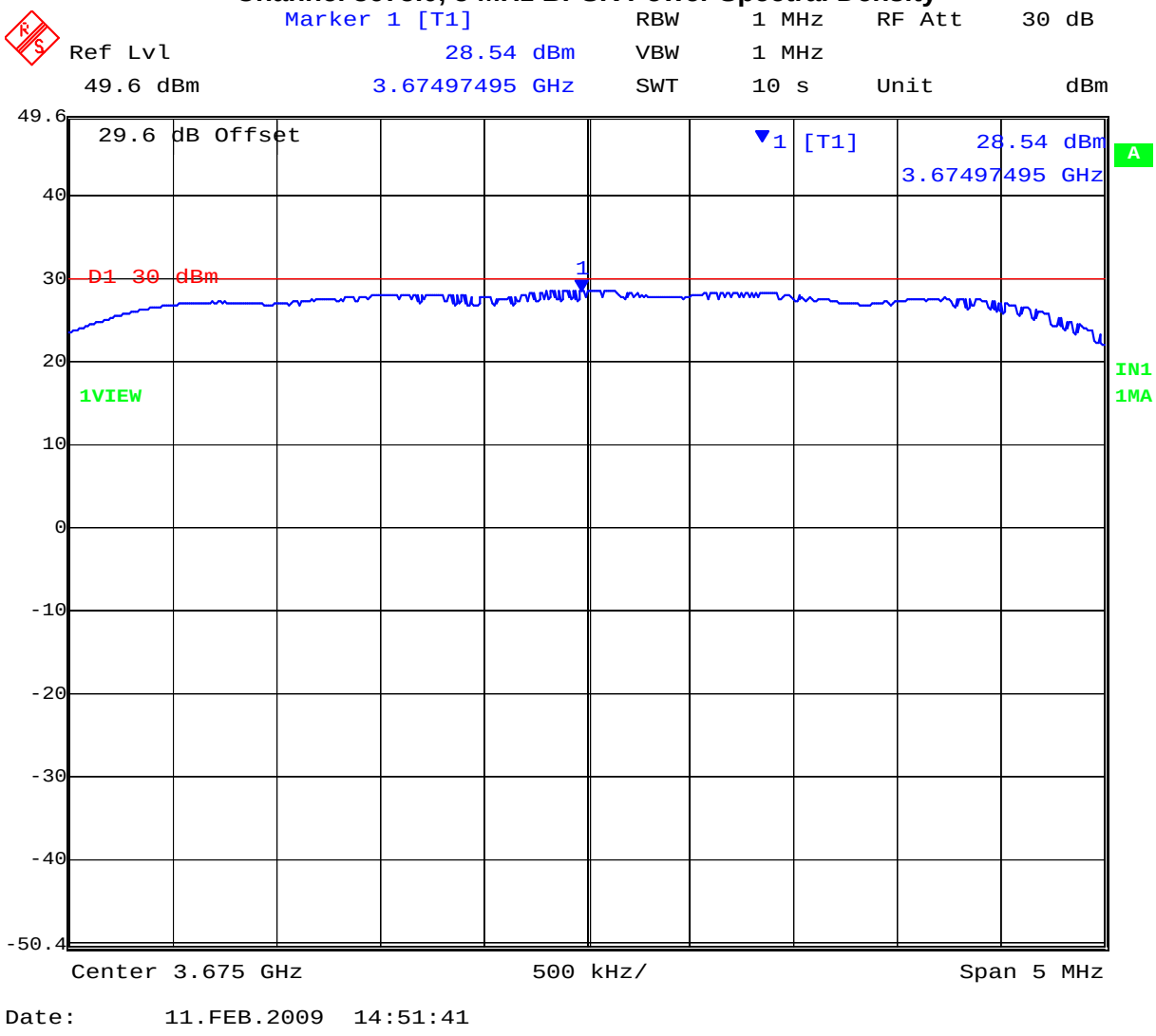
Channel 3653.0, 5 MHz BPSK Power Spectral Density



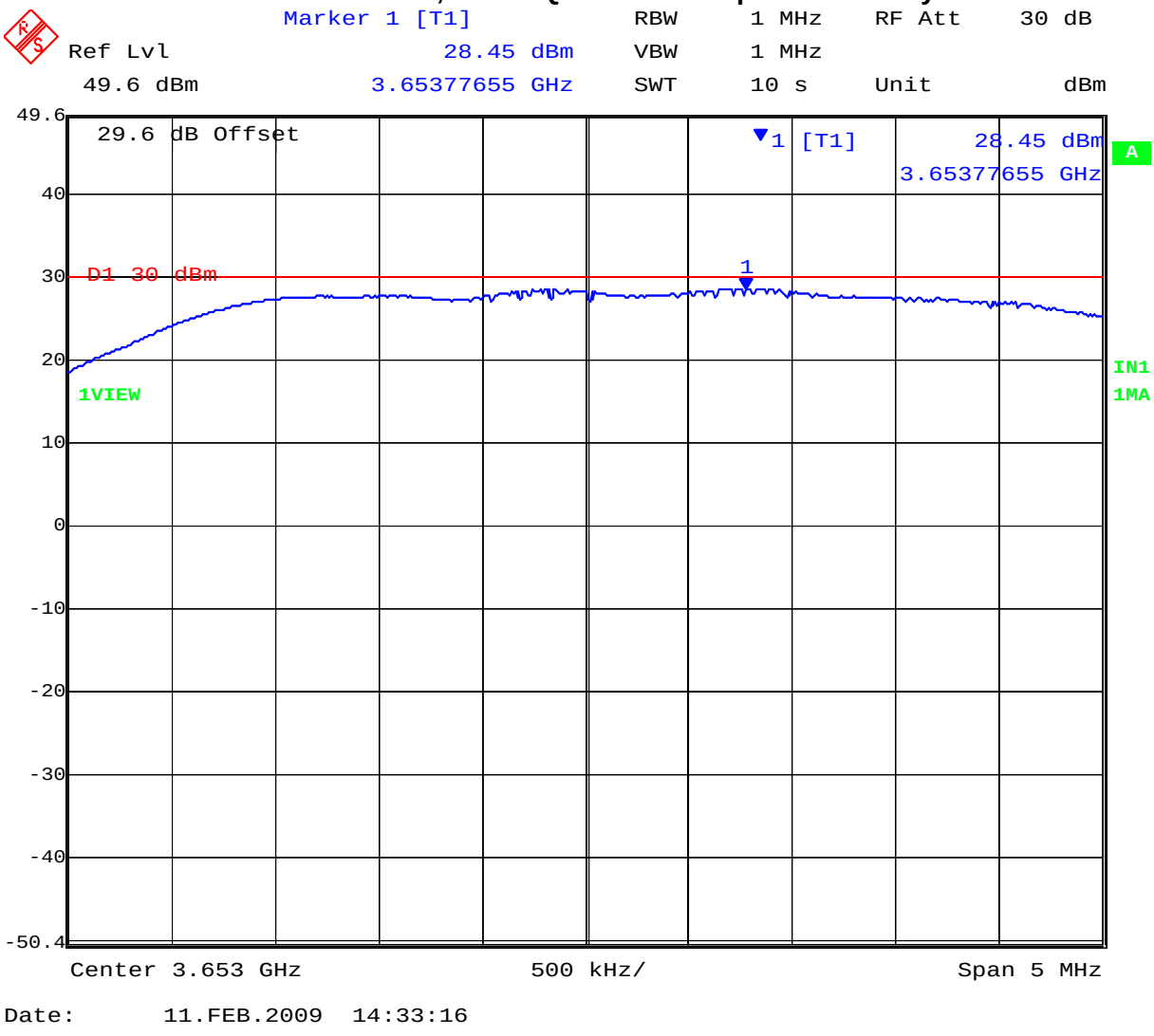
Channel 3662.5, 5 MHz BPSK Power Spectral Density



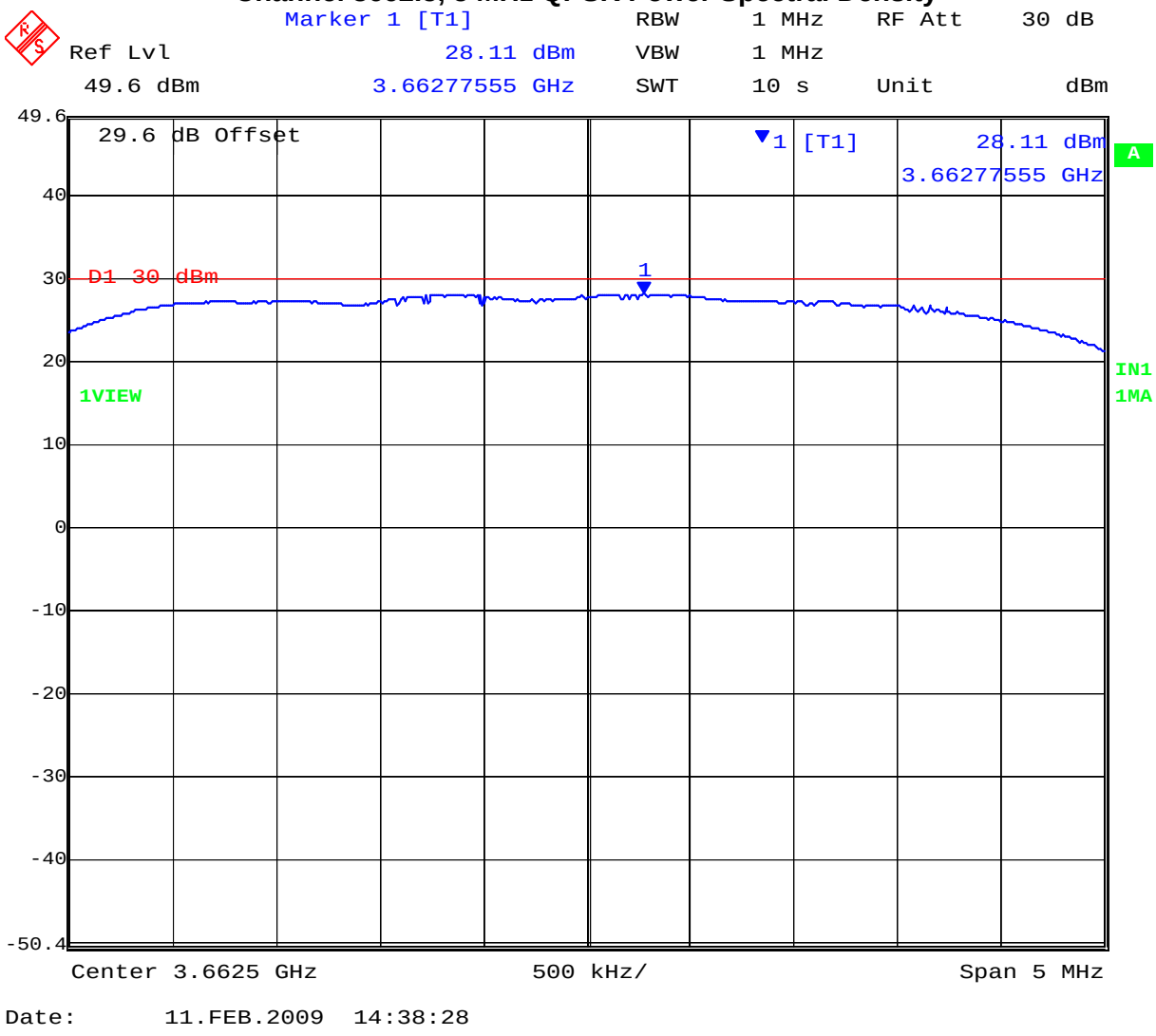
Channel 3675.0, 5 MHz BPSK Power Spectral Density



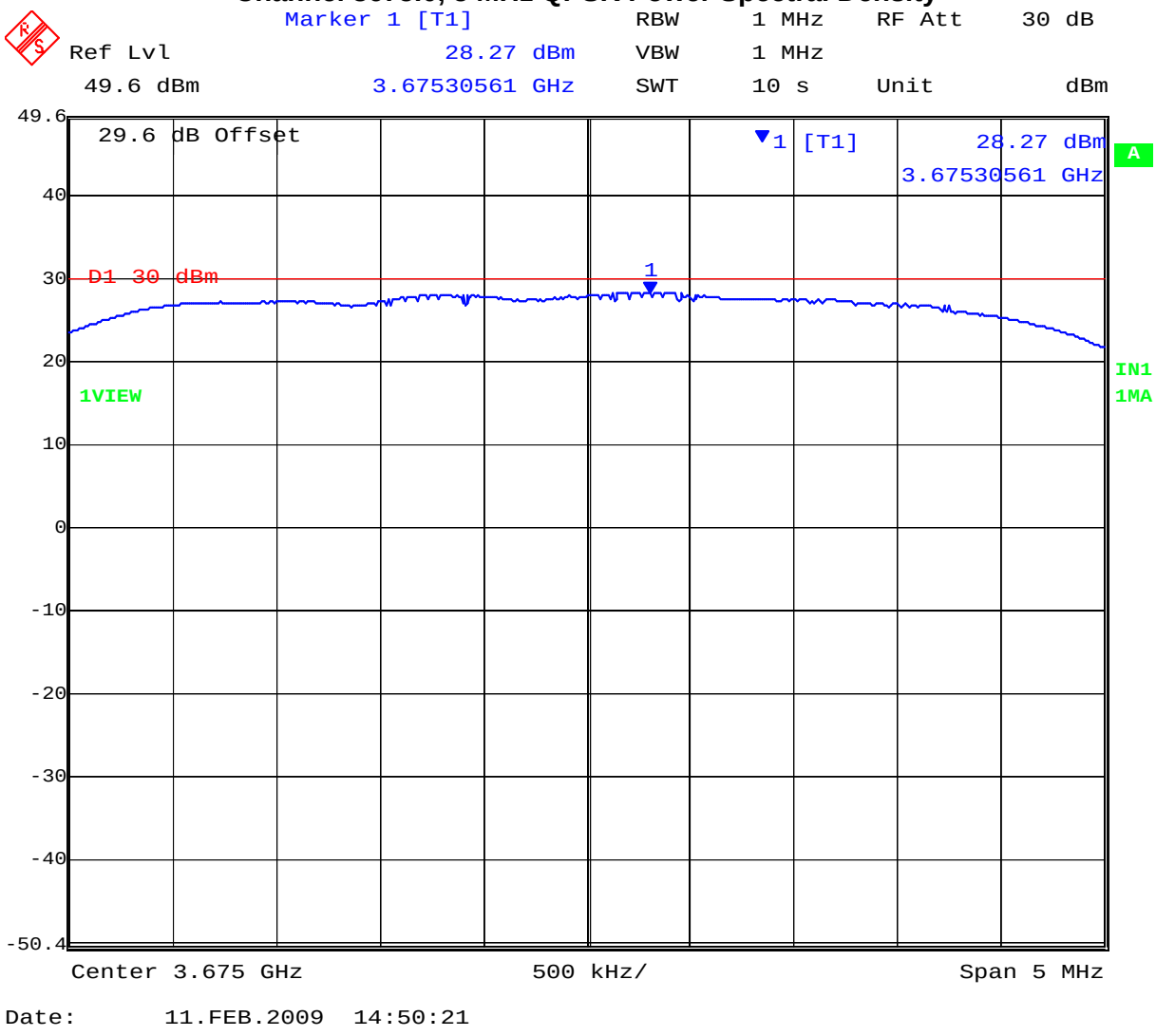
Channel 3653.0, 5 MHz QPSK Power Spectral Density



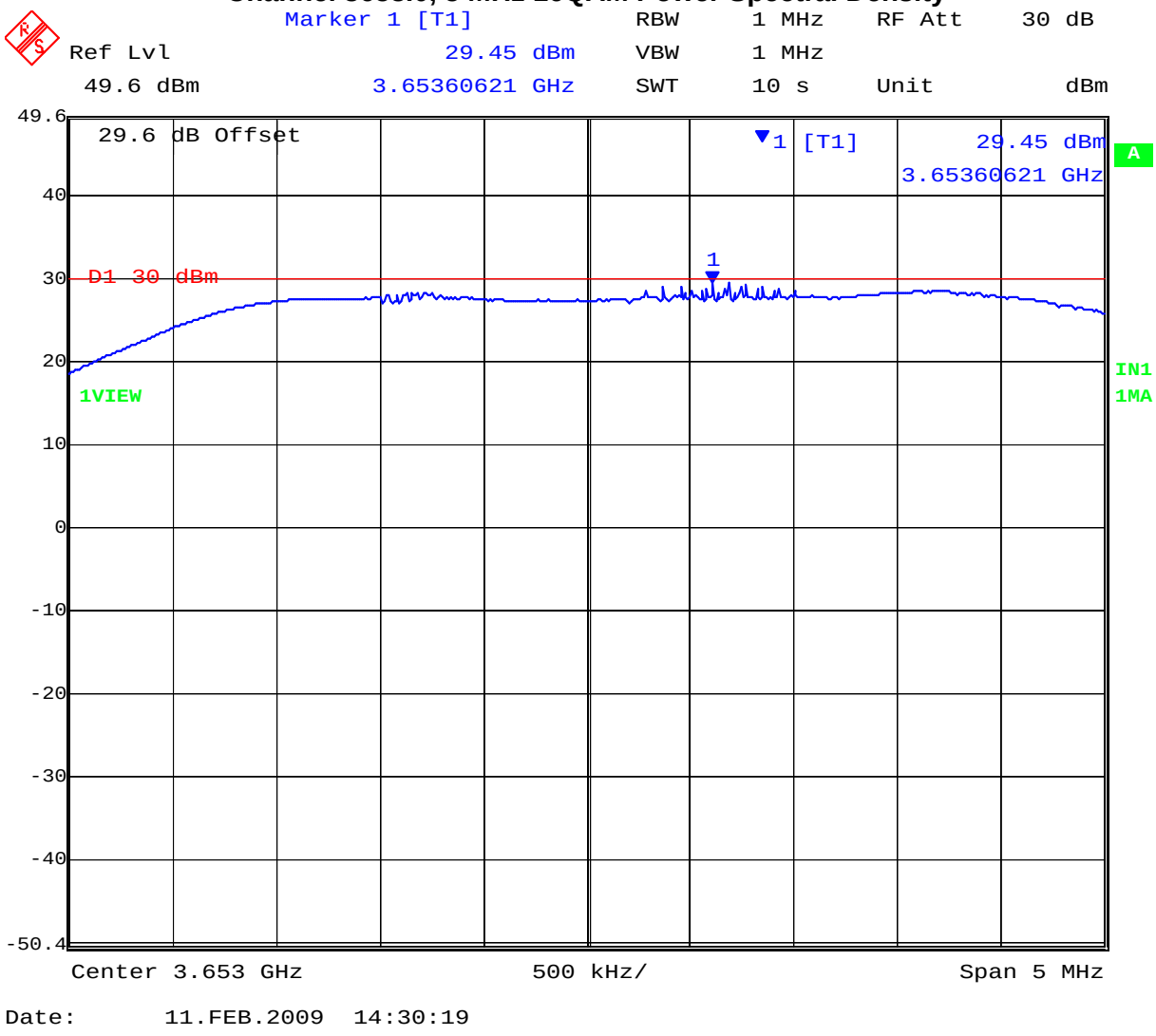
Channel 3662.5, 5 MHz QPSK Power Spectral Density



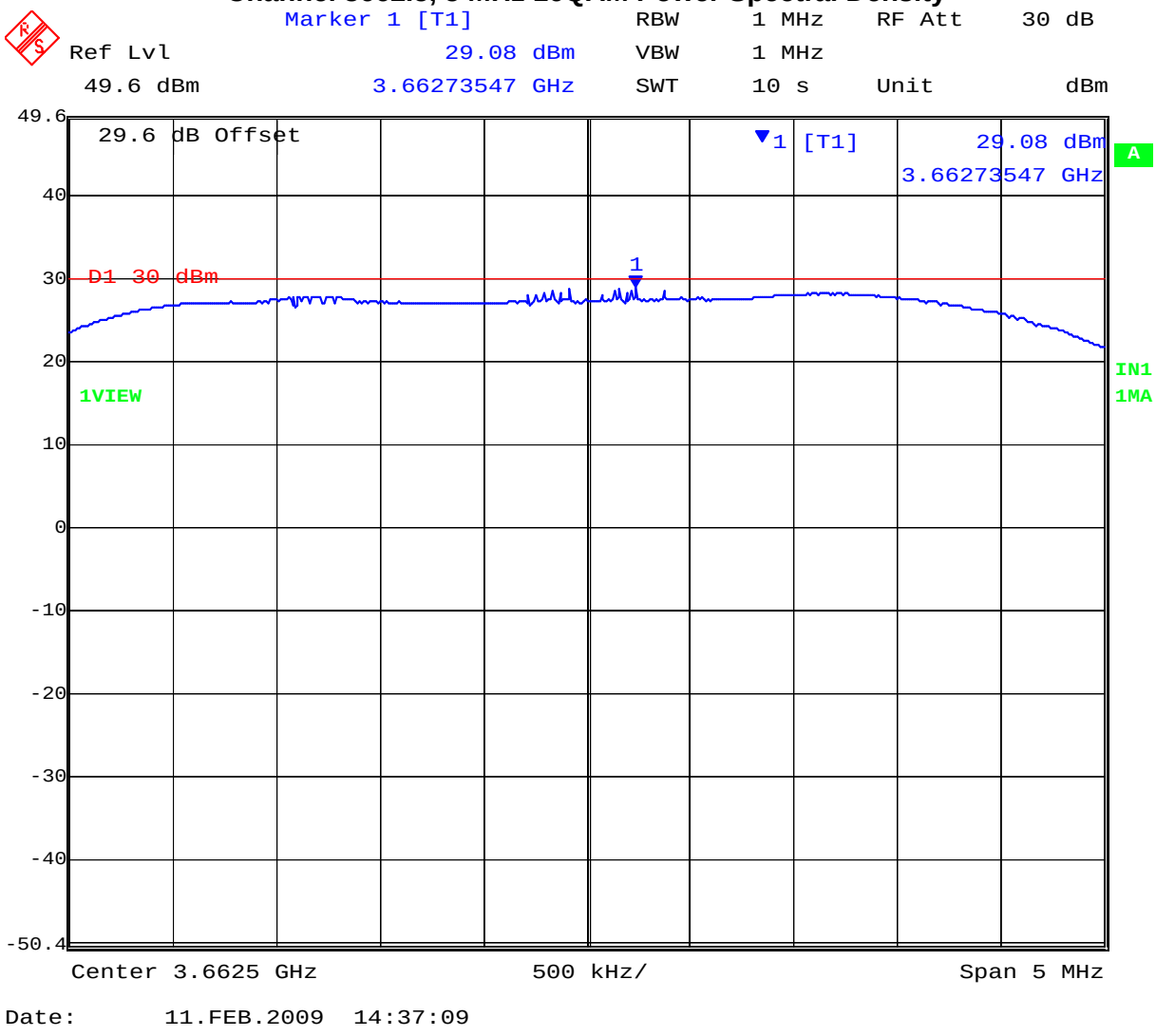
Channel 3675.0, 5 MHz QPSK Power Spectral Density



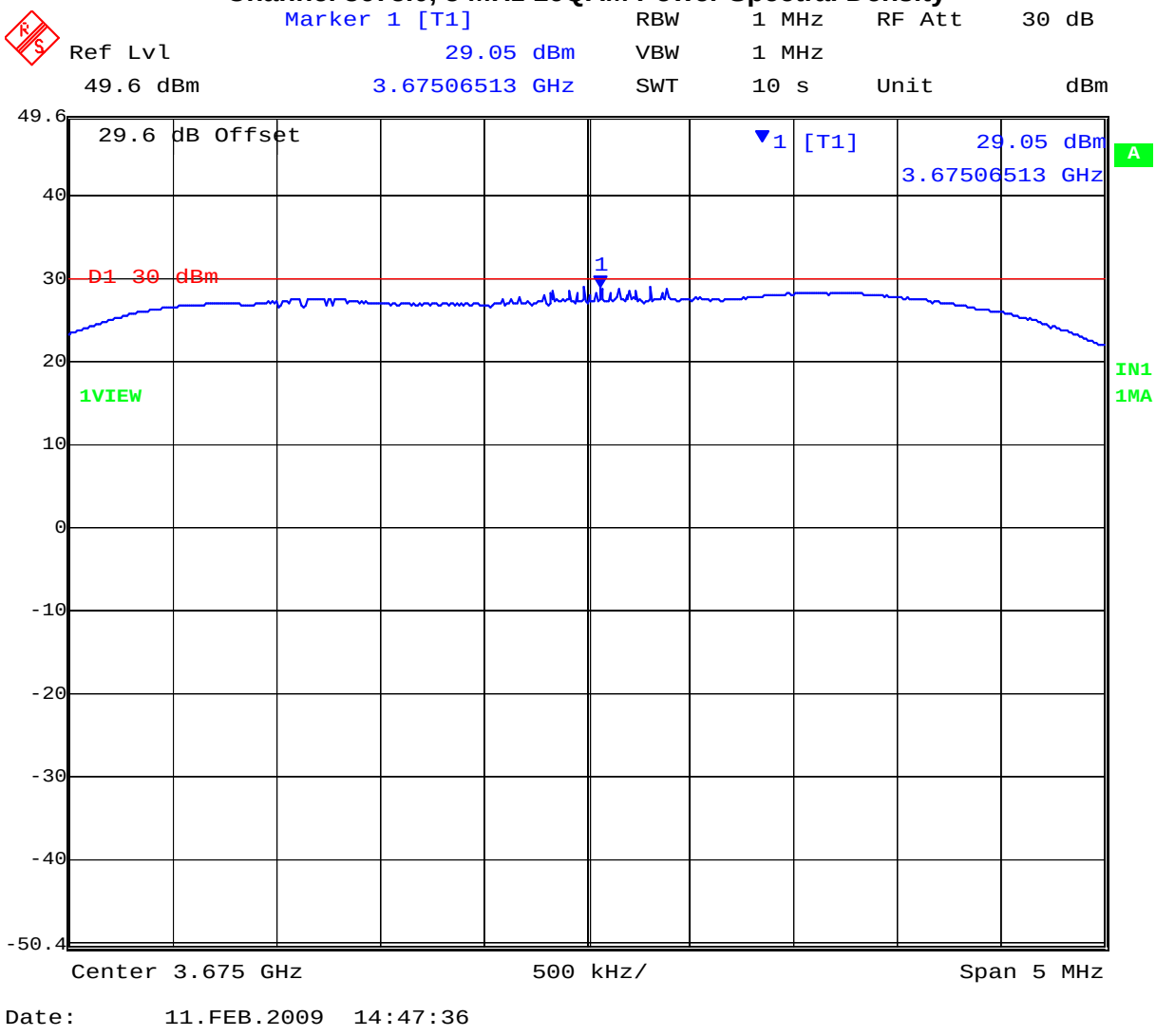
Channel 3653.0, 5 MHz 16QAM Power Spectral Density



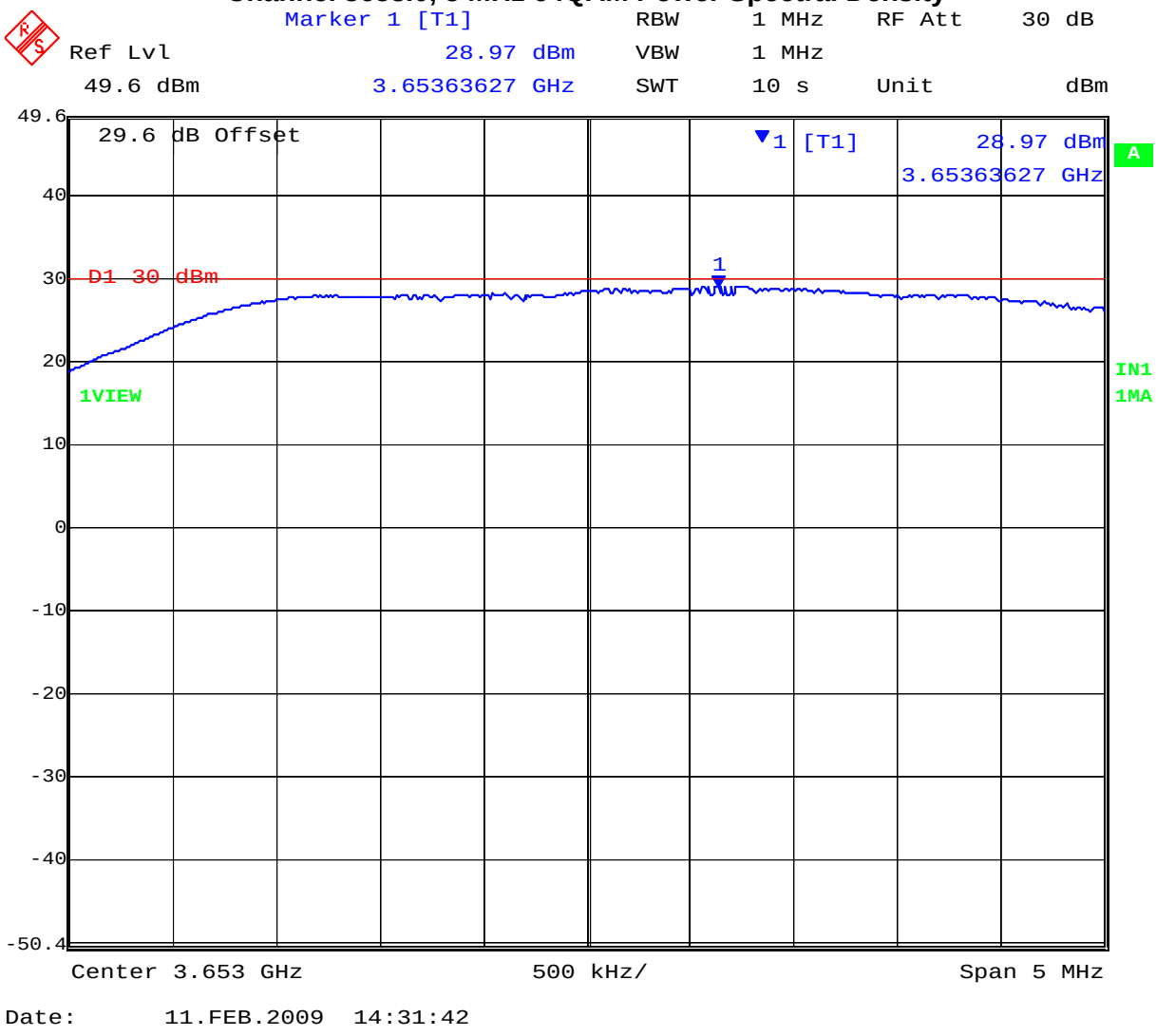
Channel 3662.5, 5 MHz 16QAM Power Spectral Density



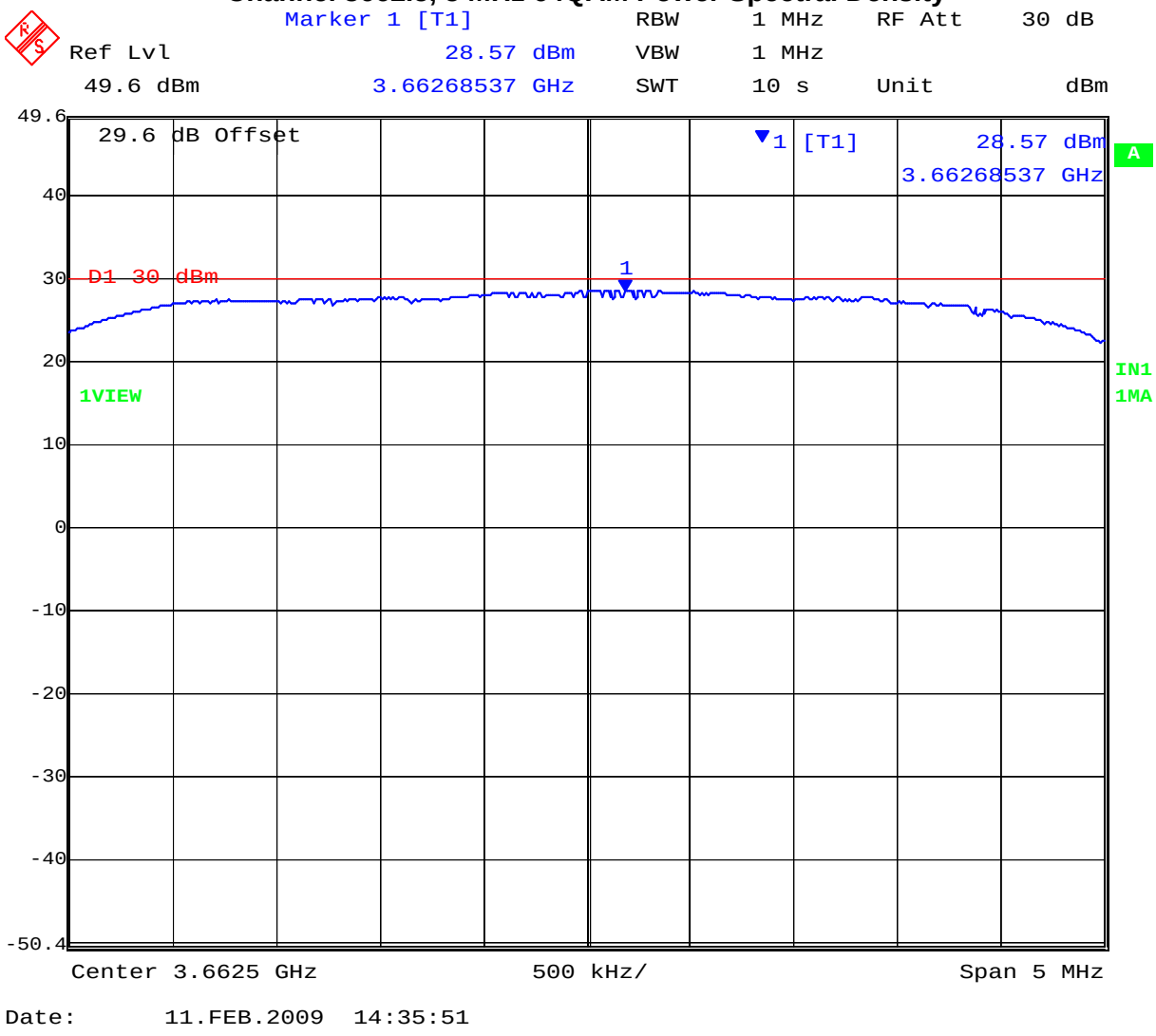
Channel 3675.0, 5 MHz 16QAM Power Spectral Density



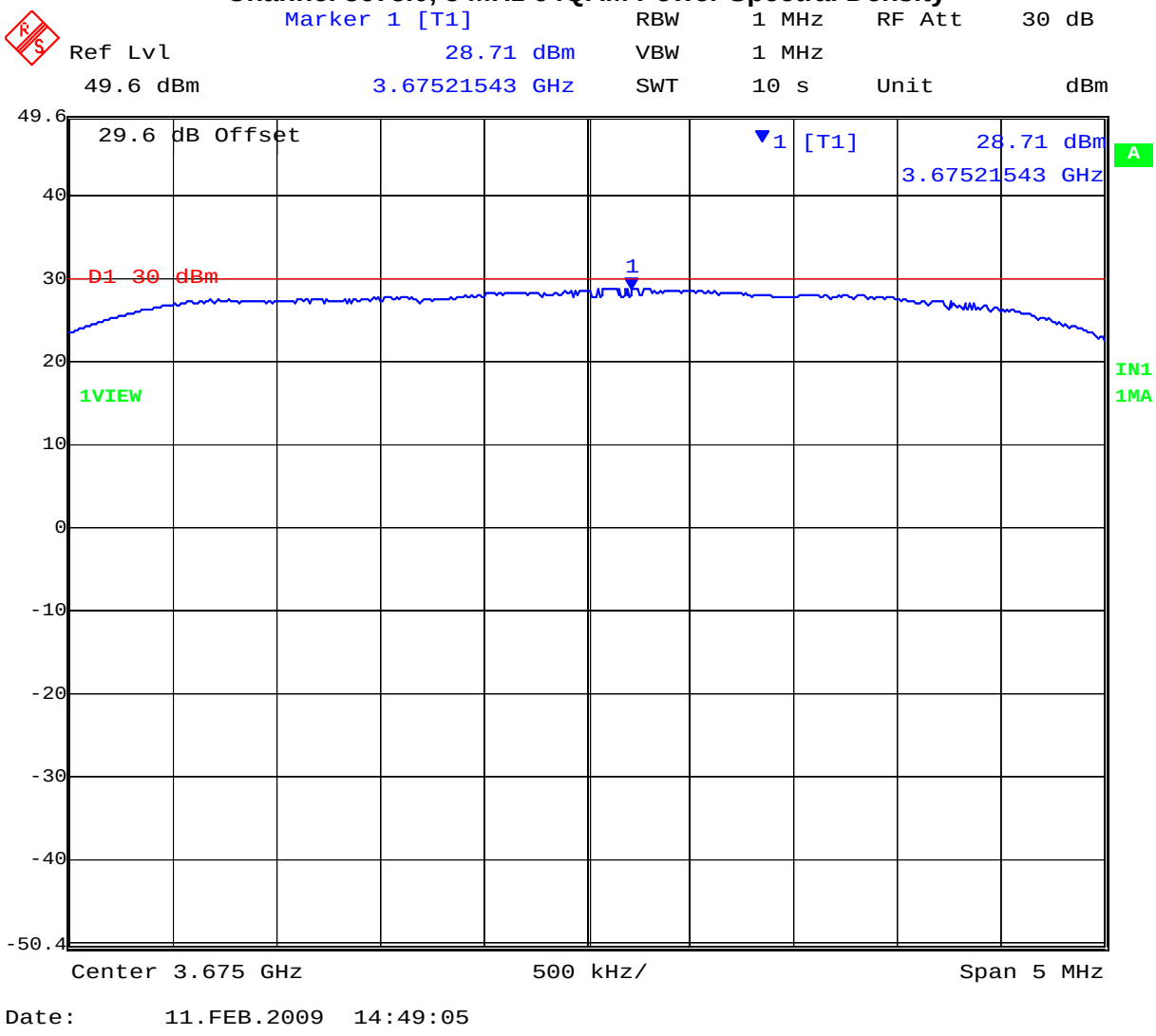
Channel 3653.0, 5 MHz 64QAM Power Spectral Density



Channel 3662.5, 5 MHz 64QAM Power Spectral Density



Channel 3675.0, 5 MHz 64QAM Power Spectral Density



Laboratory Measurement Uncertainty for Power Measurement

Measurement uncertainty	±1.33 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Output Power'	0070, 0116, 0158, 0193, 0252, 0313, 0314.

5.1.4. Maximum Permissible Exposure

FCC, Part 90 Subpart C §90.1217

Calculations for Maximum Permissible Exposure Levels

Power Density = Pd (mW/cm^2) = EIRP/(4πd^2)

EIRP = P * G

P = Peak output power (mW)

G = Antenna numeric gain (numeric)

d = Separation distance (cm)

Numeric Gain = 10 ^ (G (dBi)/10)

The Axxcelera ETDAP-C9AC has a single transmitter. The peak power in the table below is calculated by assuming a worst case scenario for the maximum gain antenna and output power. The calculated separation distance is for worst case highest power level.

Because the EUT belongs to the General Population/Uncontrolled Exposure the limit of power density is 1.0 mW/cm^2

Freq. Band (GHz)	Antenna Gain (dBi)	Numeric Gain (numeric)	Max Peak Output Power (dBm)	Peak Output Power (mW)	Calculated Safe Distance @ 1mW/cm^2 Limit(cm)	Minimum Separation Distance (cm)
3650	16	39.81	+21.0	125.89	19.97	20.0*

*Note: for mobile or fixed location transmitters the minimum separation distance is 20cm, even if the calculations indicate the MPE distance to be lower.

Specification
Maximum Permissible Exposure Limits

§90.1217 Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency levels in excess of the Commission's guidelines. See §1.1307 (b)(1) of this chapter.

Limit = 5mW / cm^2 from 1.310 Table 1

Note: for mobile or fixed location transmitters the minimum separation distance is 20cm, even if calculations indicate the MPE distance to be less.

Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33dB

5.1.5. Frequency Stability; Temperature Variations, and Voltage Variations

FCC 47 CFR Part 90, Subpart Z; 2.1055(a)(1)

Frequency Stability results included in test report #: ABW-007FCC90Z

5.1.6. Spectrum Mask (Band-Edge) & Spurious Emissions

FCC 47 CFR Part 90, Subpart Z; §90.1323, 2.1051

5.1.6.1. Spectrum Mask (Band-Edge)

Test Procedure
Transmitter spectrum mask was measured for all modulation schemes and channel bandwidths at the 3,650 MHz band-edge only. Transmitter conducted spurious emissions were measured for 3.5 MHz BPSK modulation state only. Measurement were made while EUT was operating in a modulated transmit mode of operation, at the appropriate center frequency. Conducted spurious emissions were measured to 40 GHz in a peak hold mode.

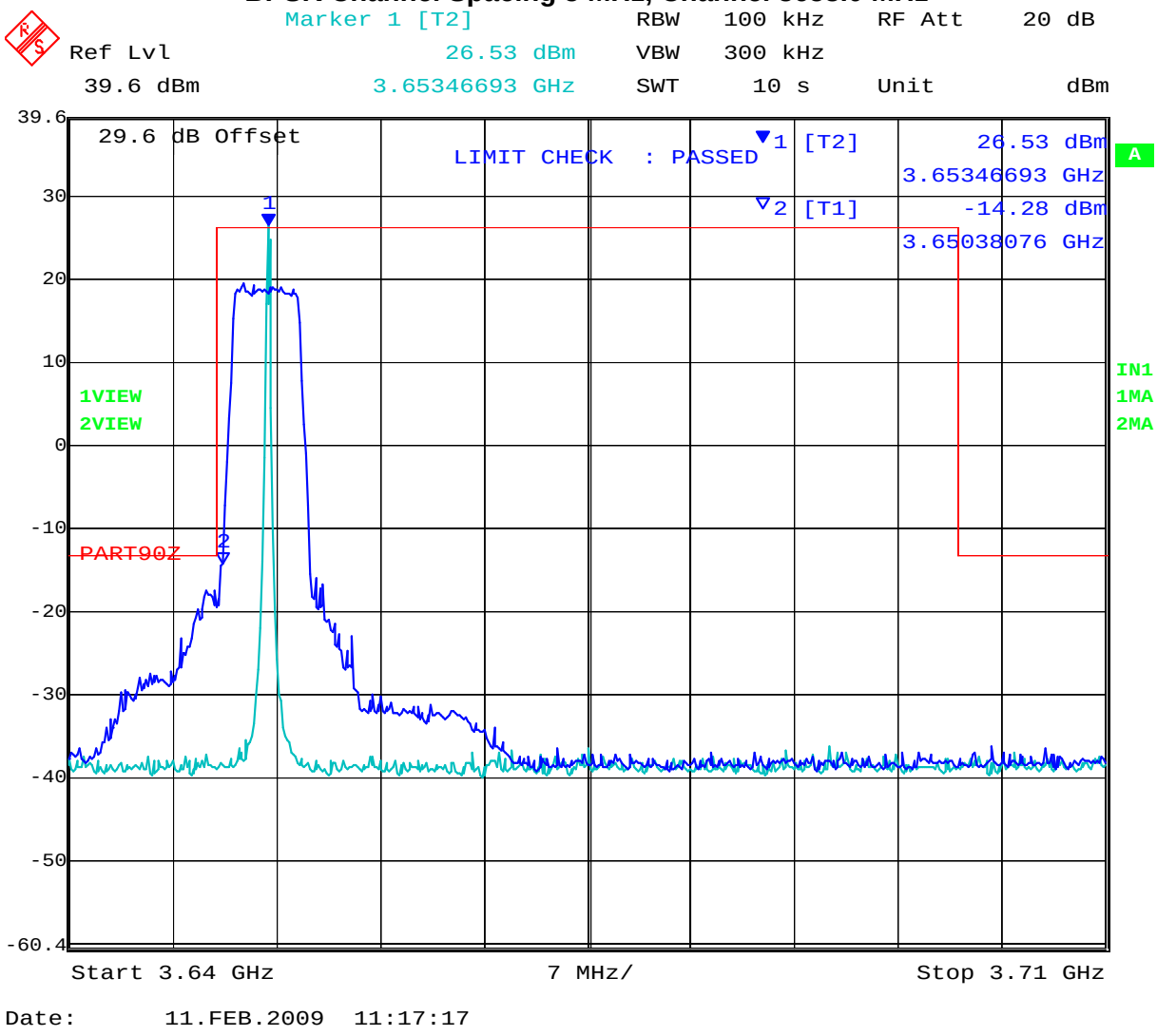
Test Set-up is shown in Section 3.6 Test Configuration

Limit
For operation in the 3650 – 3700 band the power of any emission outside the frequency band of operation shall be attenuated below the transmitter power (P) within the licensed band of operation, measured in Watts, by at least 43 + 10*Log (P) = -13dBm.

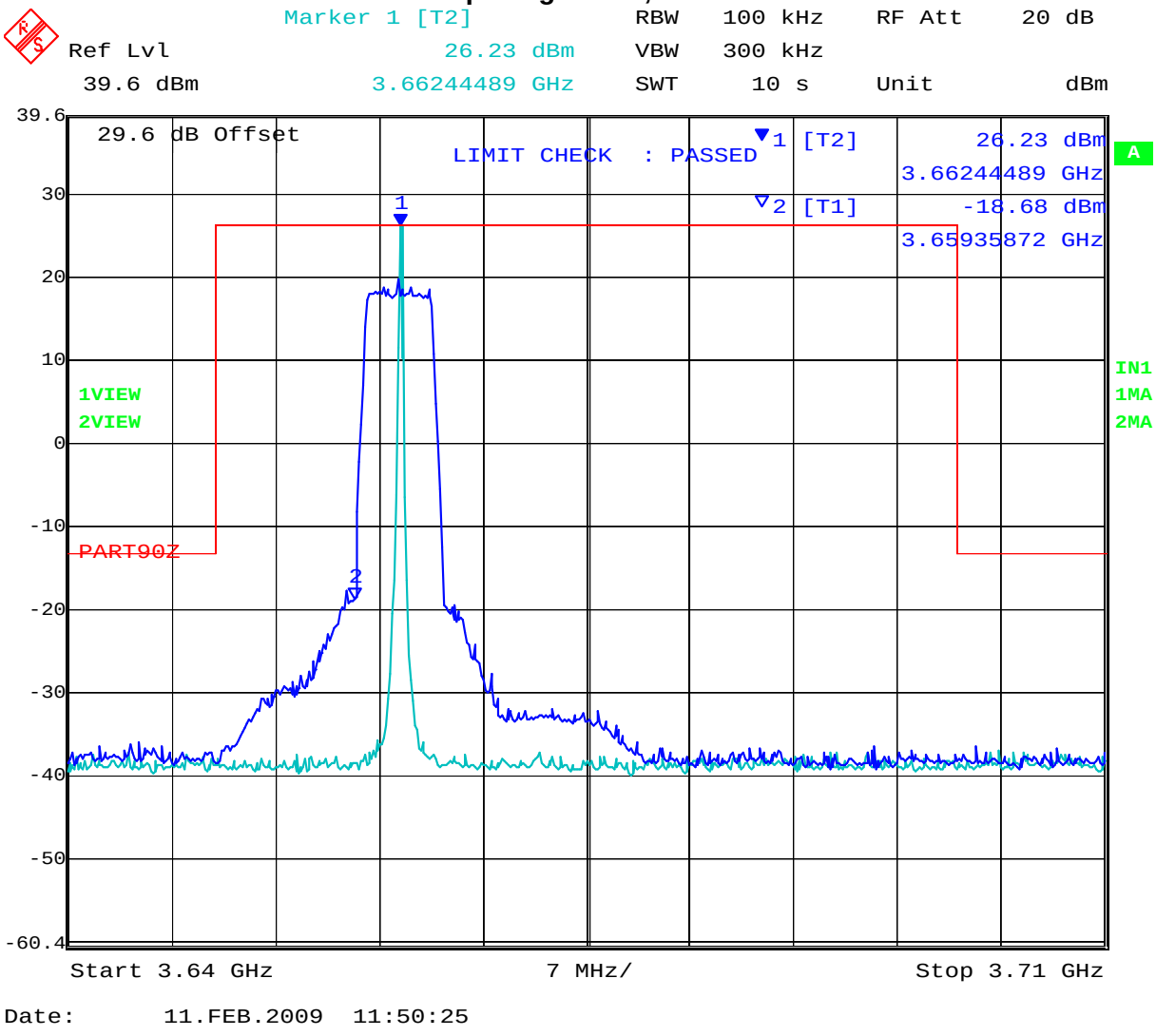
Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Spectrum Mask, Band-Edge Emissions

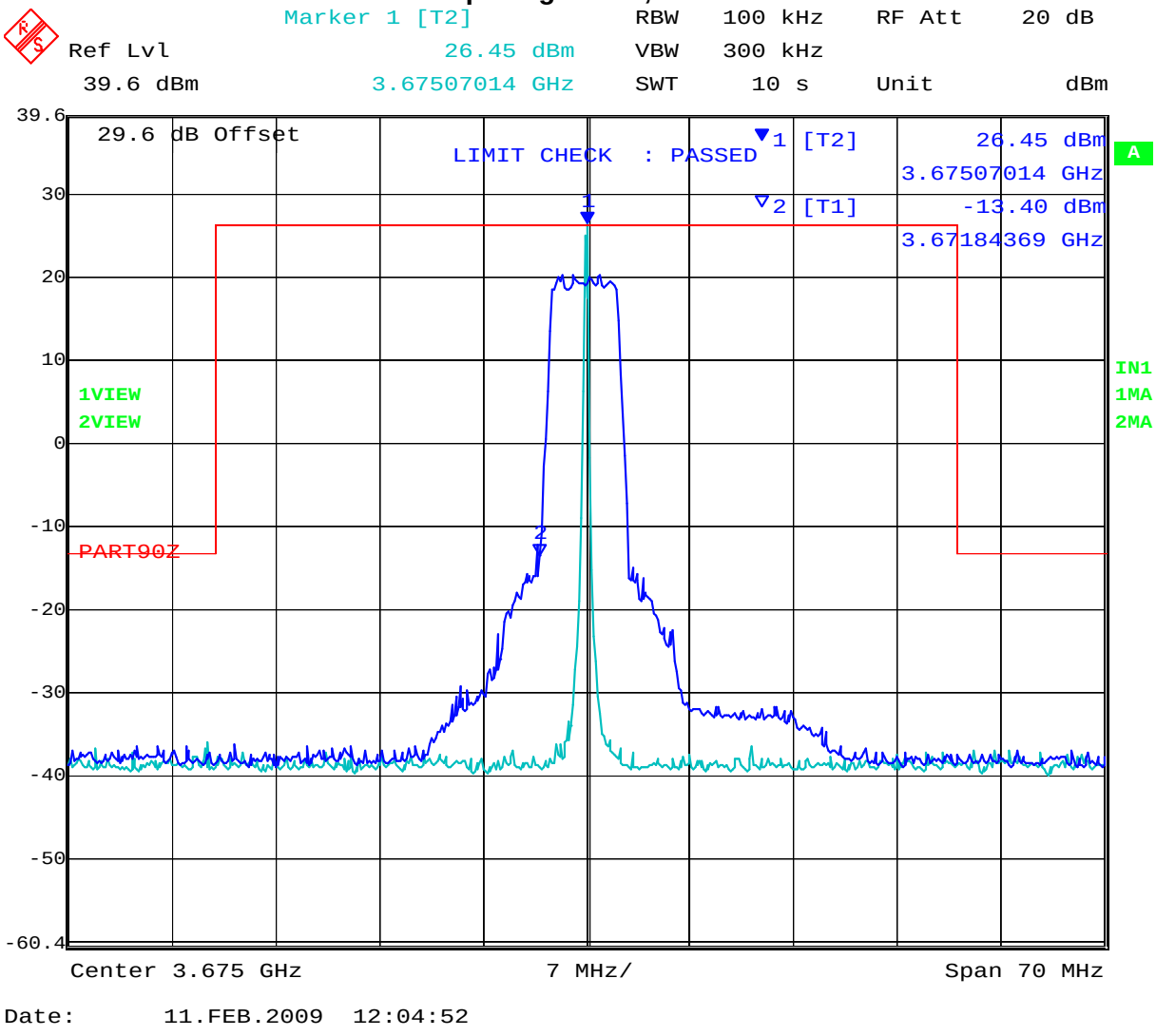
BPSK Channel Spacing 5 MHz, Channel 3653.0 MHz



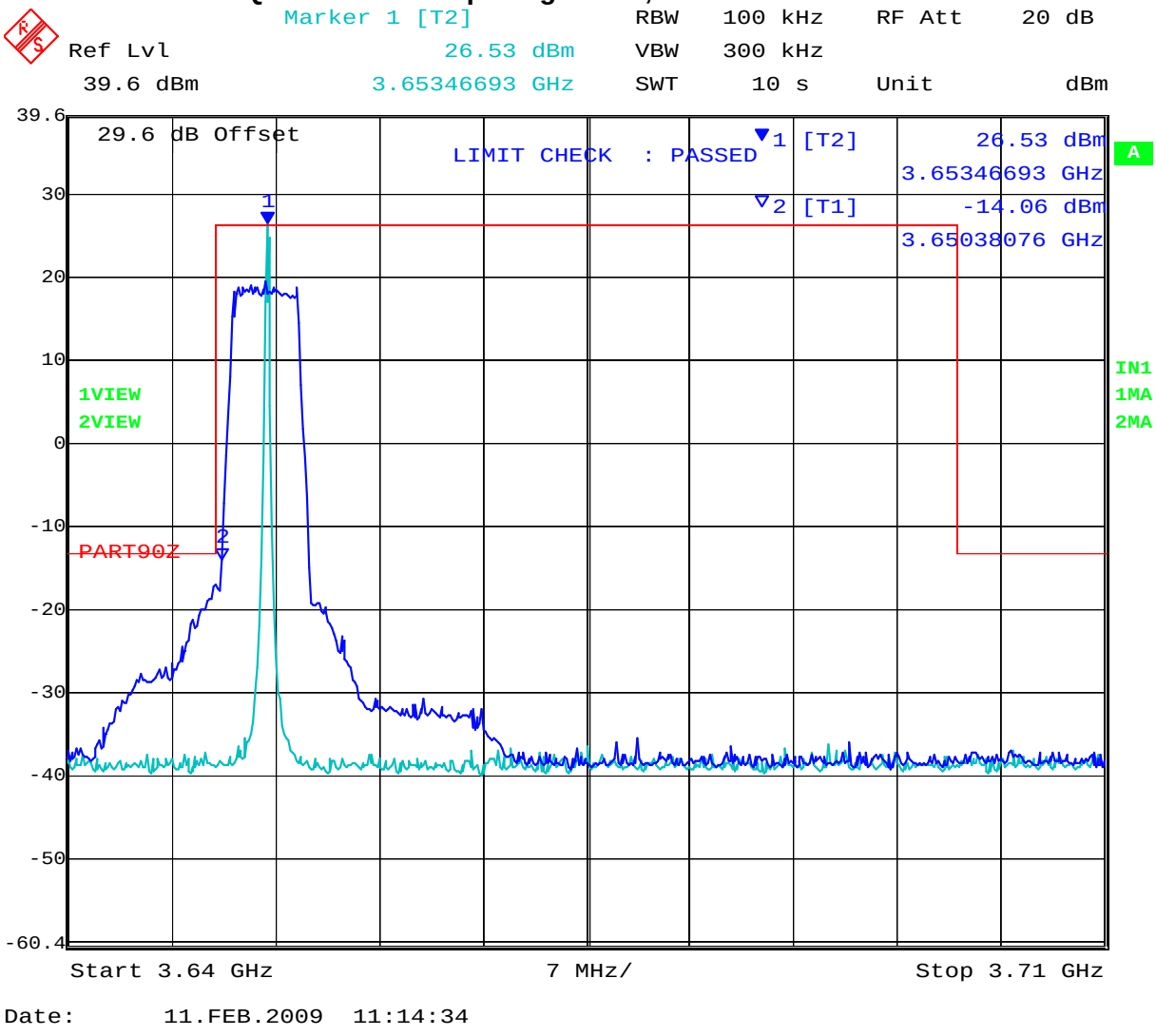
BPSK Channel Spacing 5 MHz, Channel 3662.5 MHz



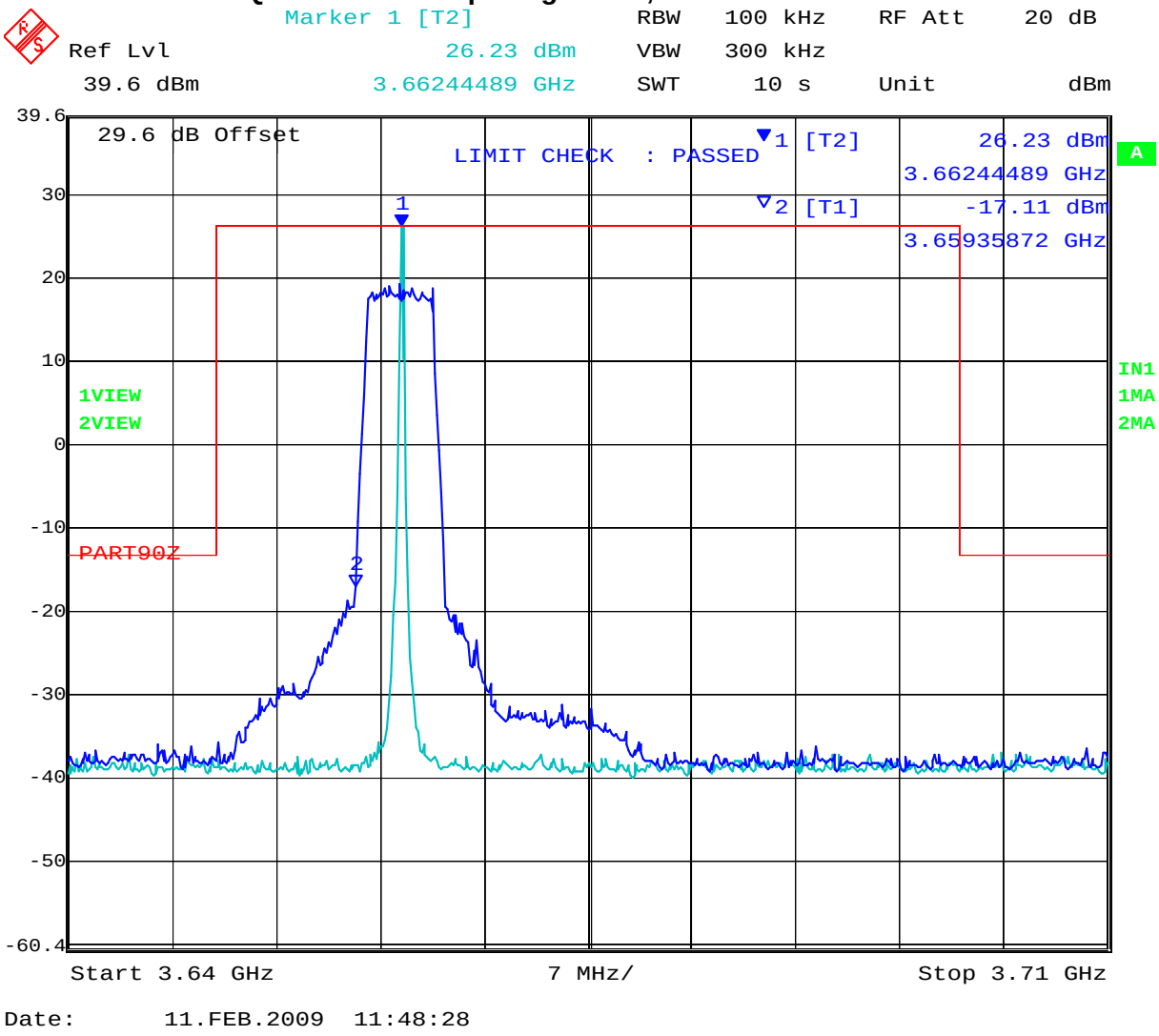
BPSK Channel Spacing 5 MHz, Channel 3675.0 MHz



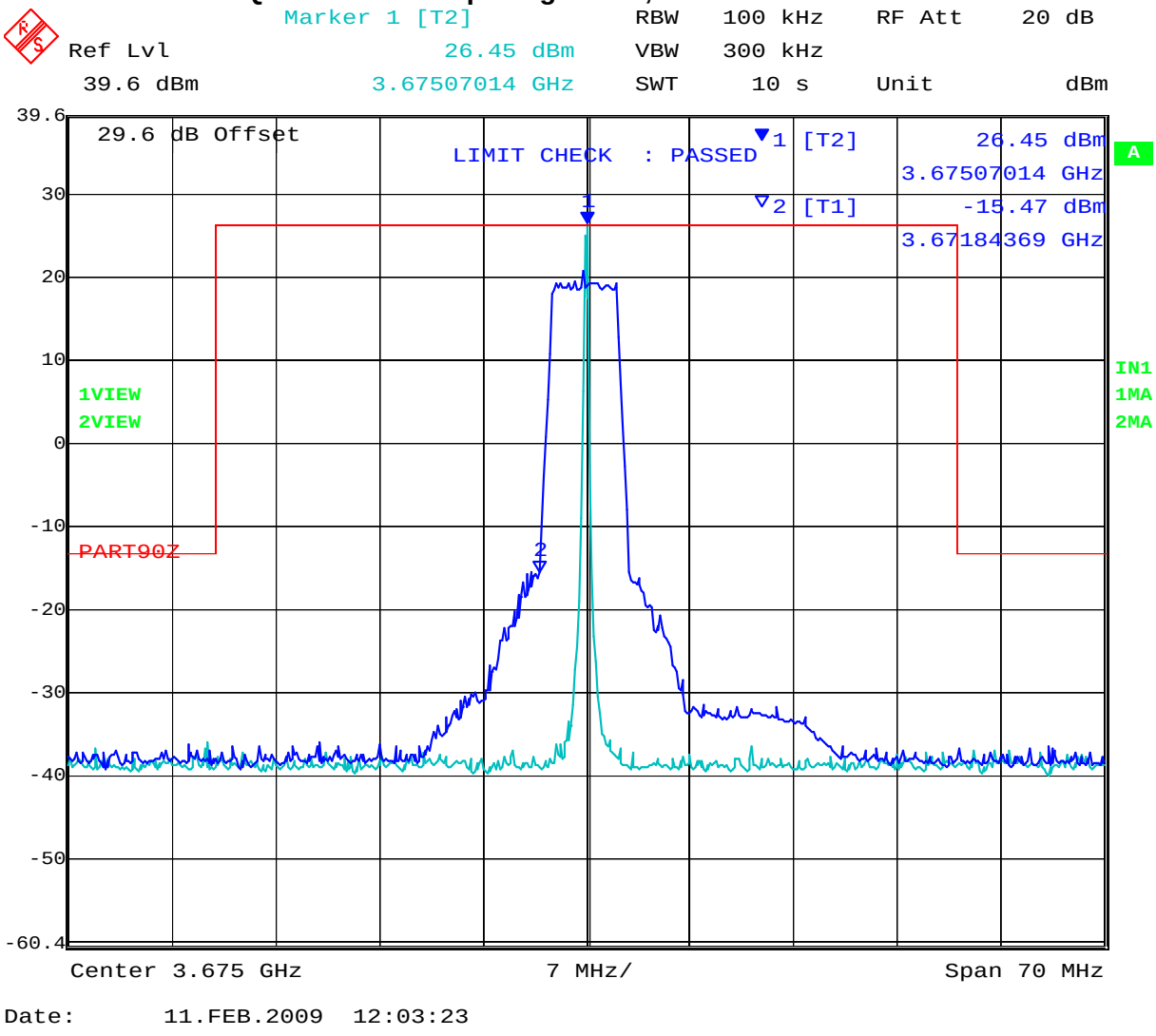
QPSK Channel Spacing 5 MHz, Channel 3653.0 MHz



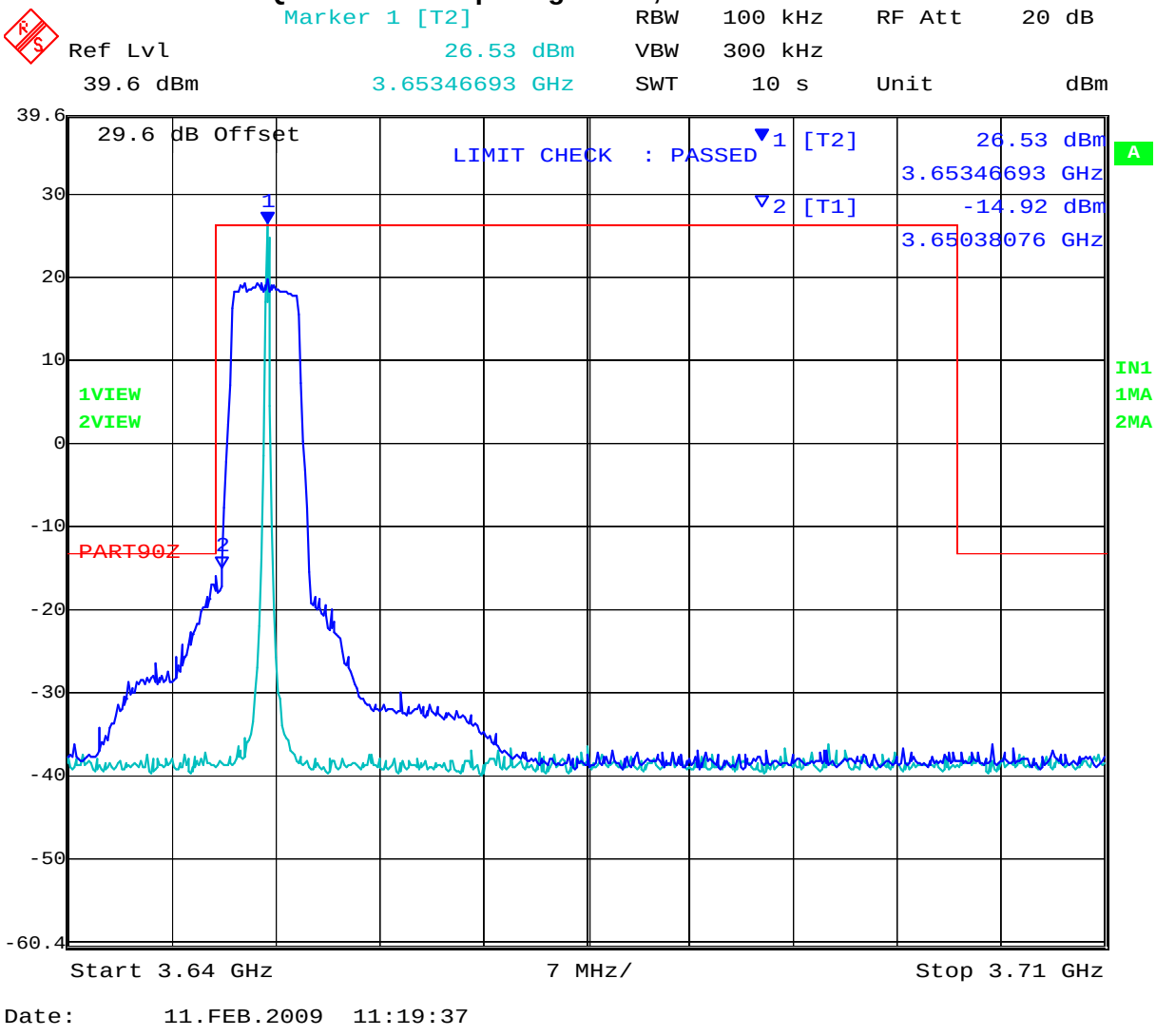
QPSK Channel Spacing 5 MHz, Channel 3662.5 MHz



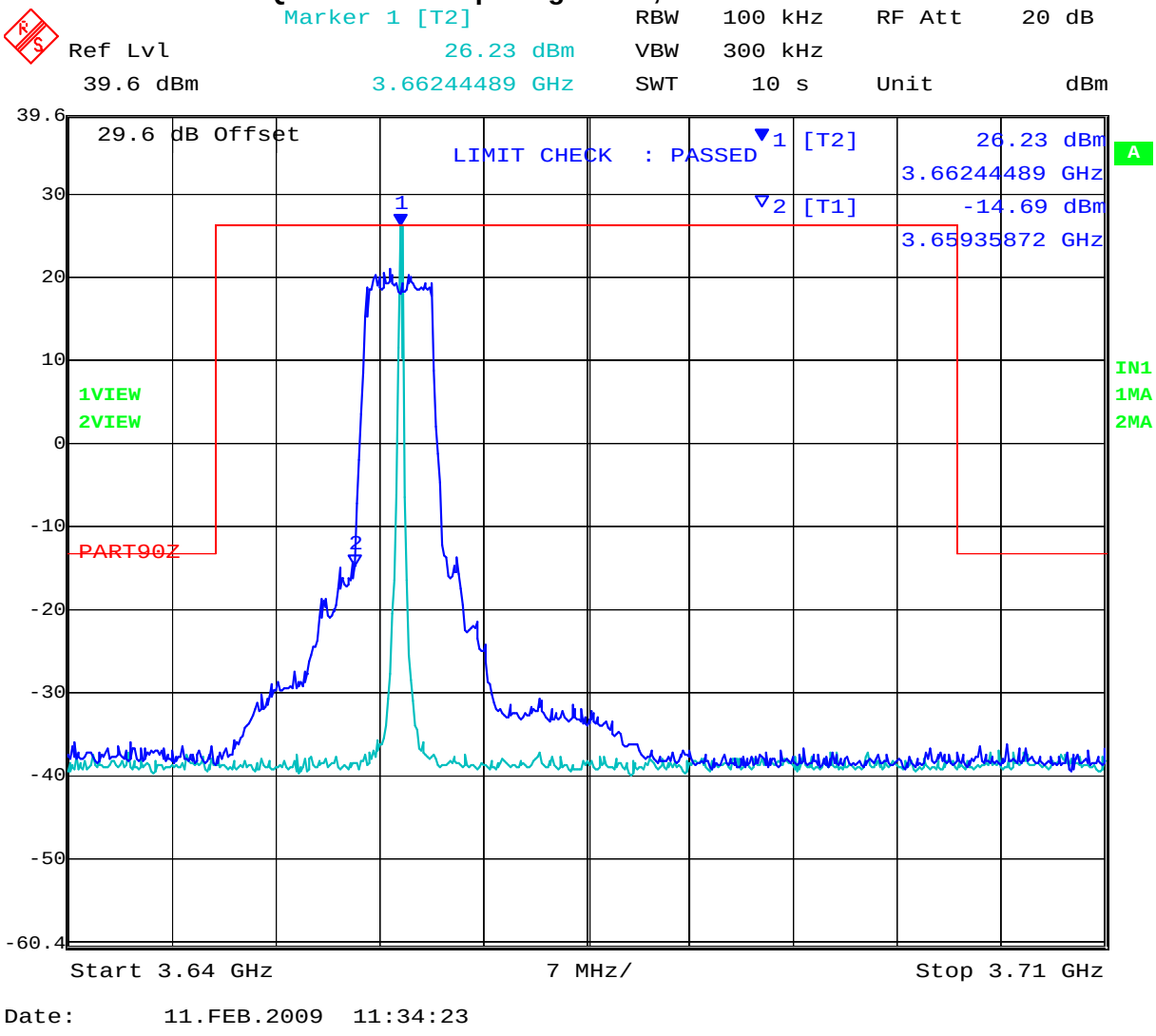
QPSK Channel Spacing 5 MHz, Channel 3675.0 MHz



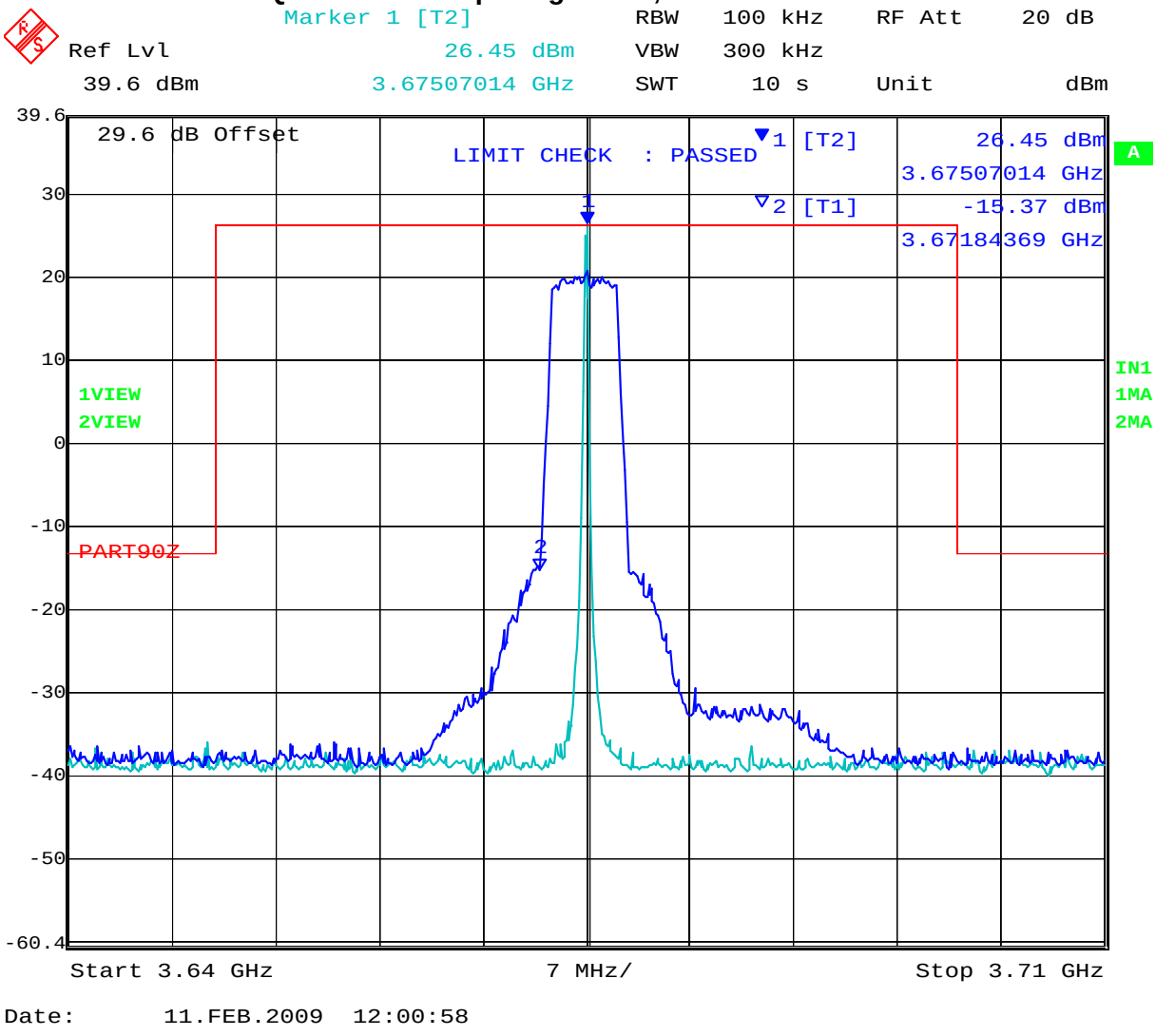
16QAM Channel Spacing 5 MHz, Channel 3653.0 MHz



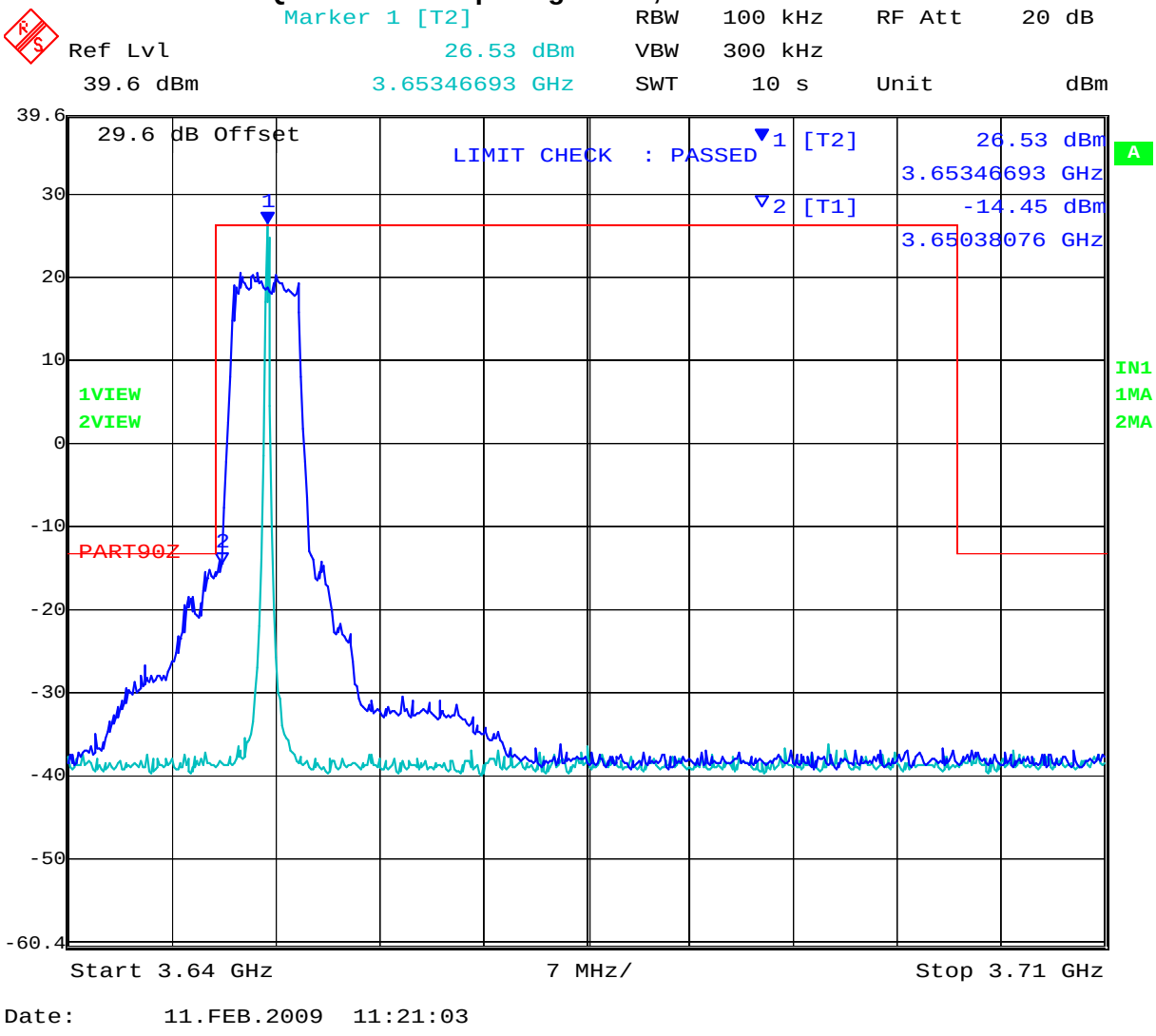
16QAM Channel Spacing 5 MHz, Channel 3662.5 MHz



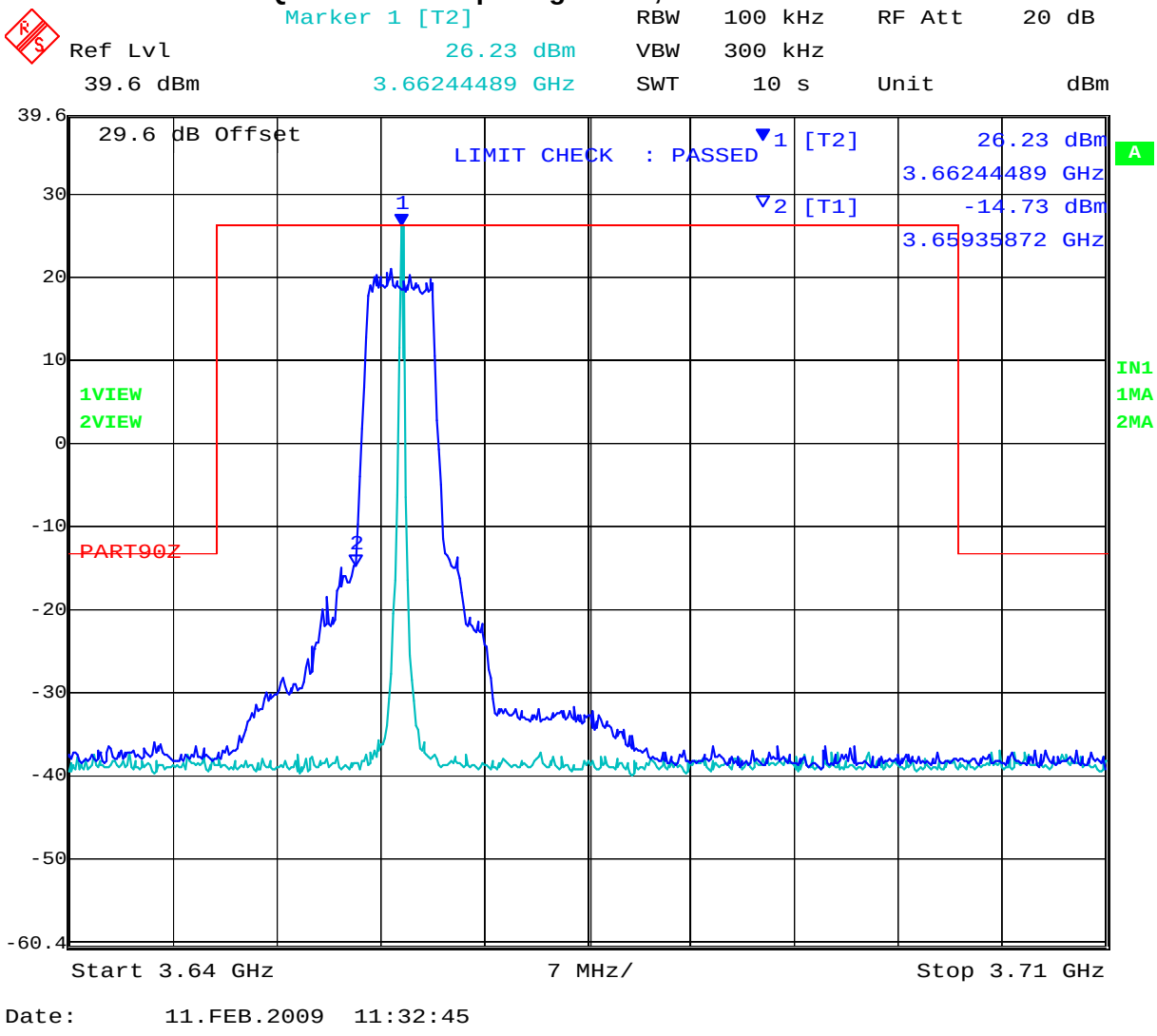
16QAM Channel Spacing 5 MHz, Channel 3675.0 MHz



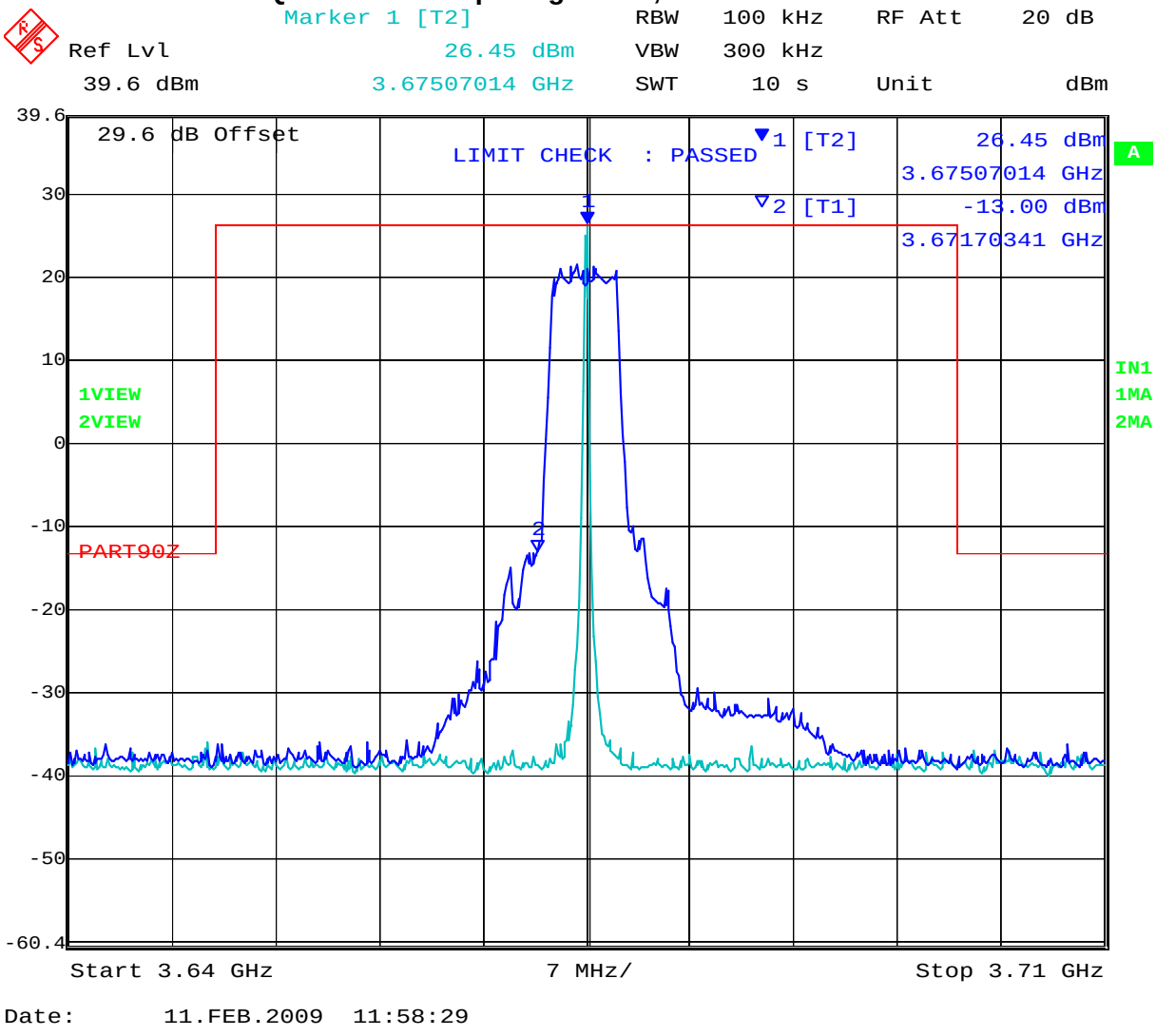
64QAM Channel Spacing 5 MHz, Channel 3653.0 MHz



64QAM Channel Spacing 5 MHz, Channel 3662.5 MHz



64QAM Channel Spacing 5 MHz, Channel 3675.0 MHz



5.1.6.2. Transmitter Conducted Spurious Emissions (30 M- 40 GHz)

Spurious Emission results included in test report #: ABW-007FCC90Z

Laboratory Measurement Uncertainty for Conducted Spurious Emissions

Measurement uncertainty	±2.37 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-05 'Measurement of Spurious Emissions'	0070, 0116, 0158, 0088, 0252, 0313, 0314

5.1.7. Radiated Spurious Emissions

5.1.7.1. Transmitter Radiated Emissions above 1 GHz

FCC 47 CFR Part 90, Subpart Z; §90.1323, 2.1053;
ANSI/TIA-603

Transmitter Spurious Emission results included in test report #: ABW-007FCC90Z

5.1.7.2. Transmitter Radiated Spurious Emissions (30M-1 GHz)

FCC, Part 15 Subpart C §15.205/ §15.209
Industry Canada RSS-111 §4.4

Transmitter Radiated Spurious Emission (30M – 1 GHz) results included in test report #: ABW-007FCC90Z

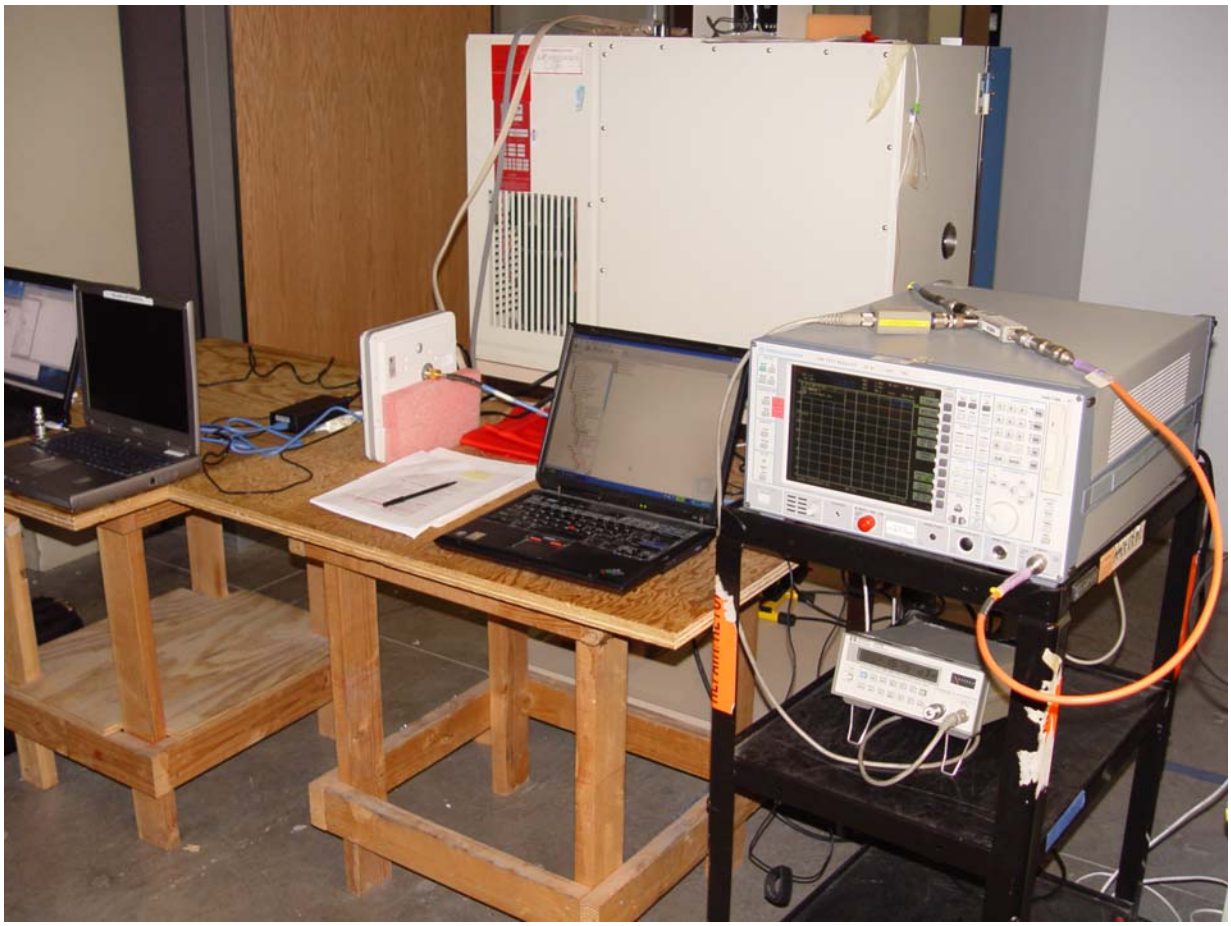
5.1.8. AC Wireline Conducted Emissions (0.15 – 30 MHz)

FCC, Part 15 Subpart C §**15.207**
Industry Canada RSS-Gen §**7.2.2**

ac Wireline Conducted Emissions (0.15 – 30 MHz) results included in test report #: ABW-007FCC90Z

6. TEST SET-UP PHOTOGRAPHS

6.1. General Measurement Test Set-Up



7. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0088	Spectrum Analyzer	Hewlett Packard	8564E	3410A00141
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0252	SMA Cable	Megaphase	Sucoflex 104	None
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0190	LISN	Rhode & Schwartz	ESH3Z5	836679/006
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0301	5.6 GHz Notch Filter	Micro-Tronics	RBC50704	001
0302	5.25 GHz Notch Filter	Micro-Tronics	BRC50703	002
0303	5.8 GHz Notch Filter	Micro-Tronics	BRC50705	003
0304	2.4GHzHz Notch Filter	Micro-Tronics	--	001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002
0335	1-18GHz Horn Antenna	ETS- Lindgren	3117	00066580
0337	Amplifier	MiCOM Labs	--	--
0338	Antenna	Sunol Sciences	JB-3	A052907

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