Compliance Testing, LLC
Previously Flom Test Lab
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268
fax: (480) 926-3598
http://www.ComplianceTesting.com
info@ComplianceTesting.com

Test Report

Prepared for: G-Wave Incorporated

Model: BDA-LTE/LABC-33/33-90-R3U15

Description: Bi-Directional Amplifier

Serial Number: 18091001

FCC ID: Q8KLABC3390R

To

FCC Part 20
FCC Part 27

Date of Issue: November 21, 2018

On the behalf of the applicant:	**G-Wave Incorporated** **38 Leuning St.** **South Hackensack, NJ 07606**
Attention of:	**Greg David, VP of Engineering** **Ph: (201) 343-6388** **E-Mail: tech-support@gwaverf.com**

Prepared By
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Mesa, AZ 85204
(480) 926-3100 phone / (480) 926-3598 fax
www.compliancetesting.com
Project No: p1890002

Christian Pawlak
Project Test Engineer

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	September 24, 2018	Christian Pawlak	Original Document
2.0	October 8, 2018	Christian Pawlak	Clarified test procedure, KDB references
3.0	October 24, 2018	Christian Pawlak	Corrected gain units to dB.

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ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009)

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to http://www.compliancetesting.com/labscope.html for current scope of accreditation.

Testing Certificate Number: **2152.01**

FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

Test and Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, KDB 935210 D05 Indus Booster Basic Measurements v01r02 and FCC Part 2, Part 20.21, Part 27 where appropriate.

Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing.

In accordance with ANSI C63.26, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Environmental Conditions		
Temp (ºC)	**Humidity (%)**	**Pressure (mbar)**
27.4	35.6	966.8

Measurement results, unless otherwise noted, are worst-case measurements.

Highest Clock Frequency: 746 MHz

EUT Operation during Tests: Uplink and Downlink gain set to Maximum

The signal booster uses the following frequency bands.
The emission designators listed are representative emission designators used by transmitters whose signal is amplified by this booster.

Frequency Band (MHz)	
Uplink	698 - 716
Downlink	728 – 746
Modulation Type	LTE

Emission Designators
LTE
G7D

The EUT does not support GSM signaling, nor are GSM signals present in the passband.

Cables:

Qty	Description	Length (M)	Shielding Y/N	Shielded Hood Y/N	Termination
1	Mains Power Cable	2	N	N	N/A

Accessories: None

Modifications: None

Test Result Summary

Specification	Test Name	Pass, Fail, N/A	Comments
KDB 935210 D05	AGC Threshold	Pass	
KDB 935210 D05	Out-of-Band Rejection	Pass	
KDB 935210 D05	Input-Versus-Output Signal Comparison	Pass	
2.1046 KDB 935210 D05	Mean Output Power and Amplifier gain	Pass	
KDB 935210 D05	Out-Of-Band/Block Emissions Conducted	Pass	
2.1051 KDB 935210 D05	Spurious Emissions Conducted	Pass	
KDB 935210 D05	Frequency Stability	N/A	Does not have Frequency translation
2.1053 KDB 935210 D05	Spurious Emissions Radiated	Pass	

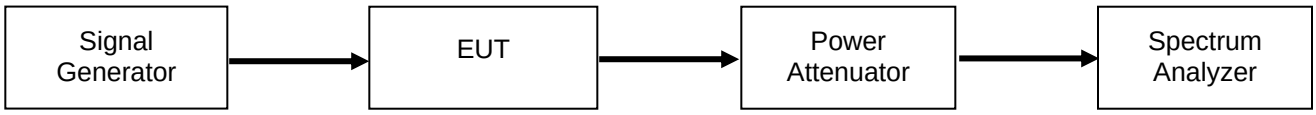
3.2 AGC Threshold

Engineer: Christian Pawlak
Test Date: 9/17/2018

Test Procedure

The Test Procedure used was ANSI C63.26-2015 7.2.2.1 with no deviations. EUT does not support narrowband signal.

Test Setup



Downlink

Tuned Frequency (MHz)	AGC Threshold (dBm)	
	AWGN	GSM
737.0	-53.0	N/A

Uplink

Tuned Frequency (MHz)	AGC Threshold (dBm)	
	AWGN	GSM
707.0	-53.0	N/A

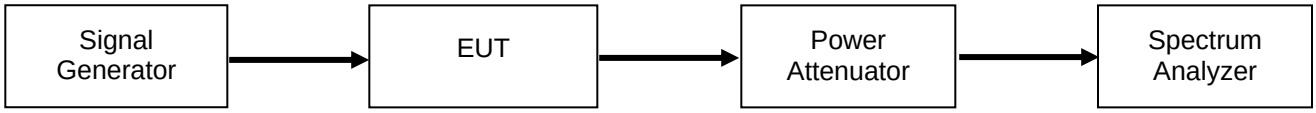
3.3 Out-Of-Band Rejection

Engineer: Christian Pawlak
Test Date: 9/14/2018

Test Procedure

The Test Procedure used was ANSI C63.26-2015 7.2.2.2 with no deviations. EUT does not support narrowband signal.

Test Setup



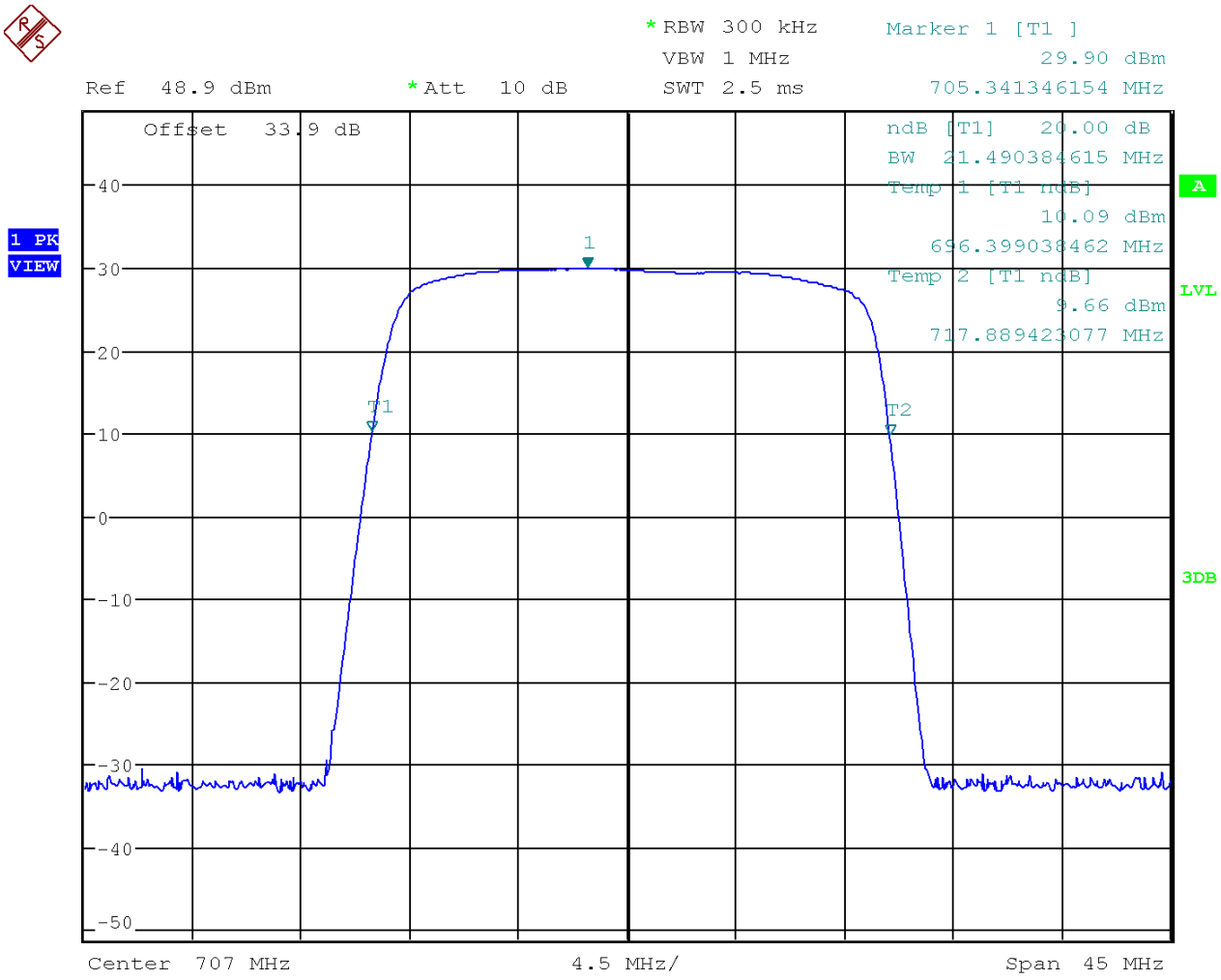
Uplink Test Results

Frequency Band (MHz)	Start Frequency (MHz)	Stop Frequency (MHz)	20 dB Bandwidth (MHz)
698 - 716	696.40	717.89	21.49

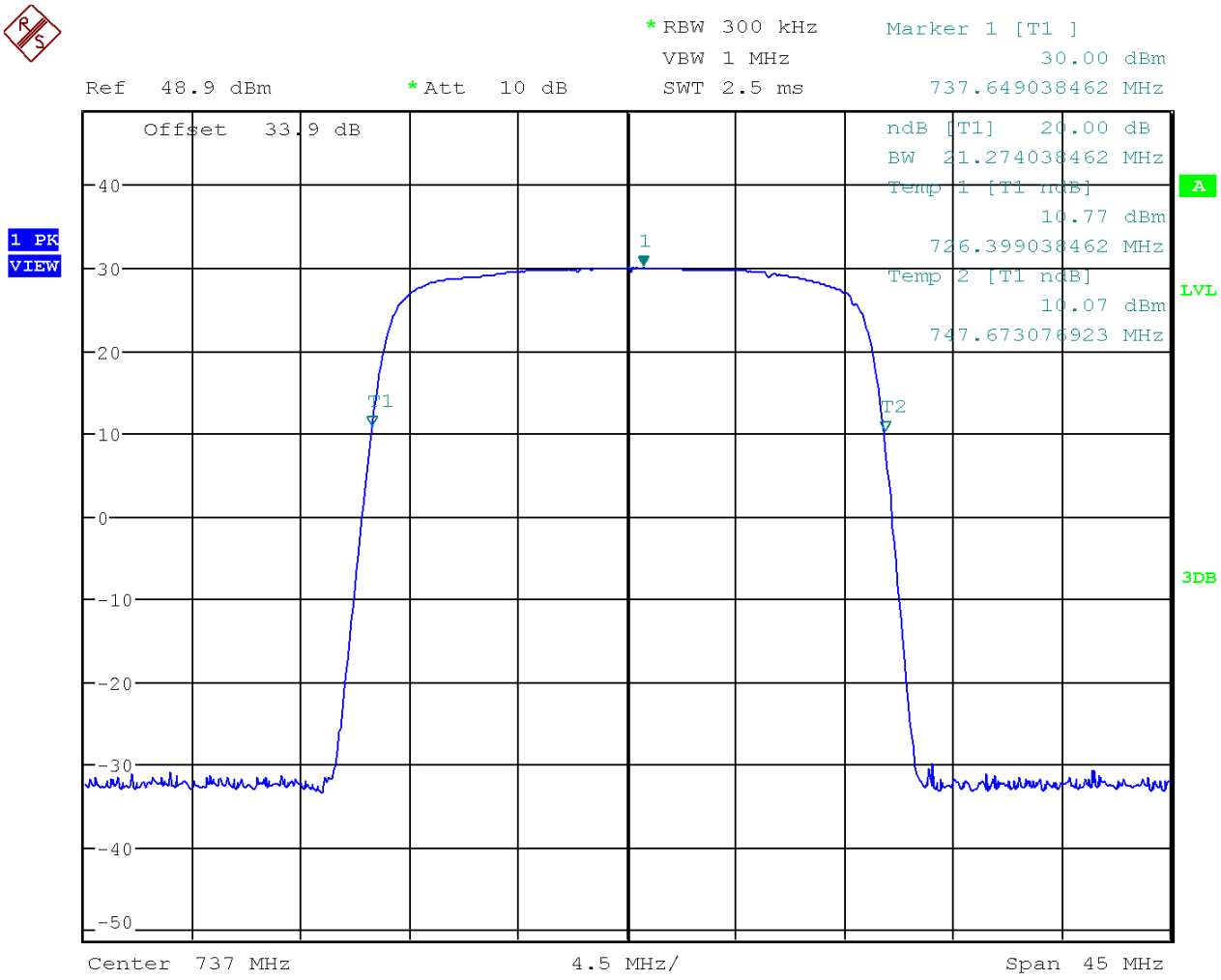
Downlink Test Results

Frequency Band (MHz)	Start Frequency (MHz)	Stop Frequency (MHz)	20 dB Bandwidth (MHz)
728 - 746	726.40	747.67	21.27

Out-of-band rejection - Uplink



Out-of-band rejection - Downlink



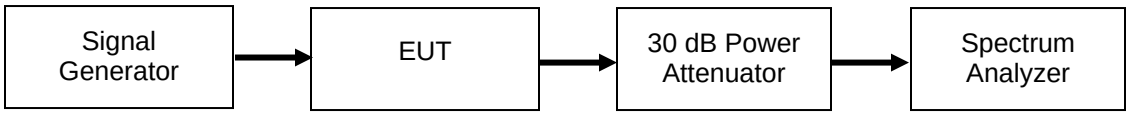
3.4 Input-Versus-Output Signal Comparison

Engineer: Christian Pawlak
Test Date: 9/14/2018

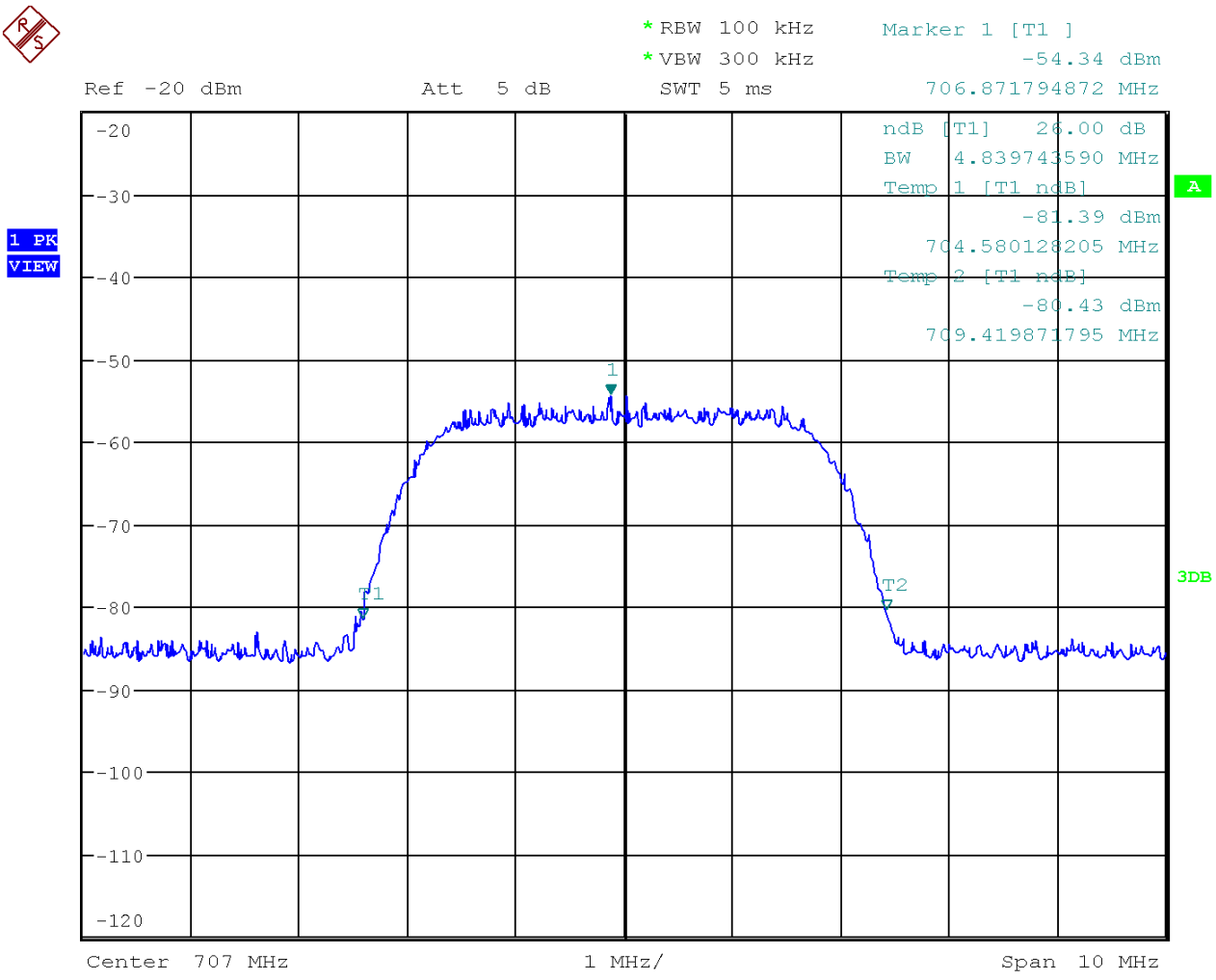
Test Procedure

The Test Procedure used was ANSI C63.26-2015 7.2.2.3 with no deviations. EUT does not support narrowband signal.

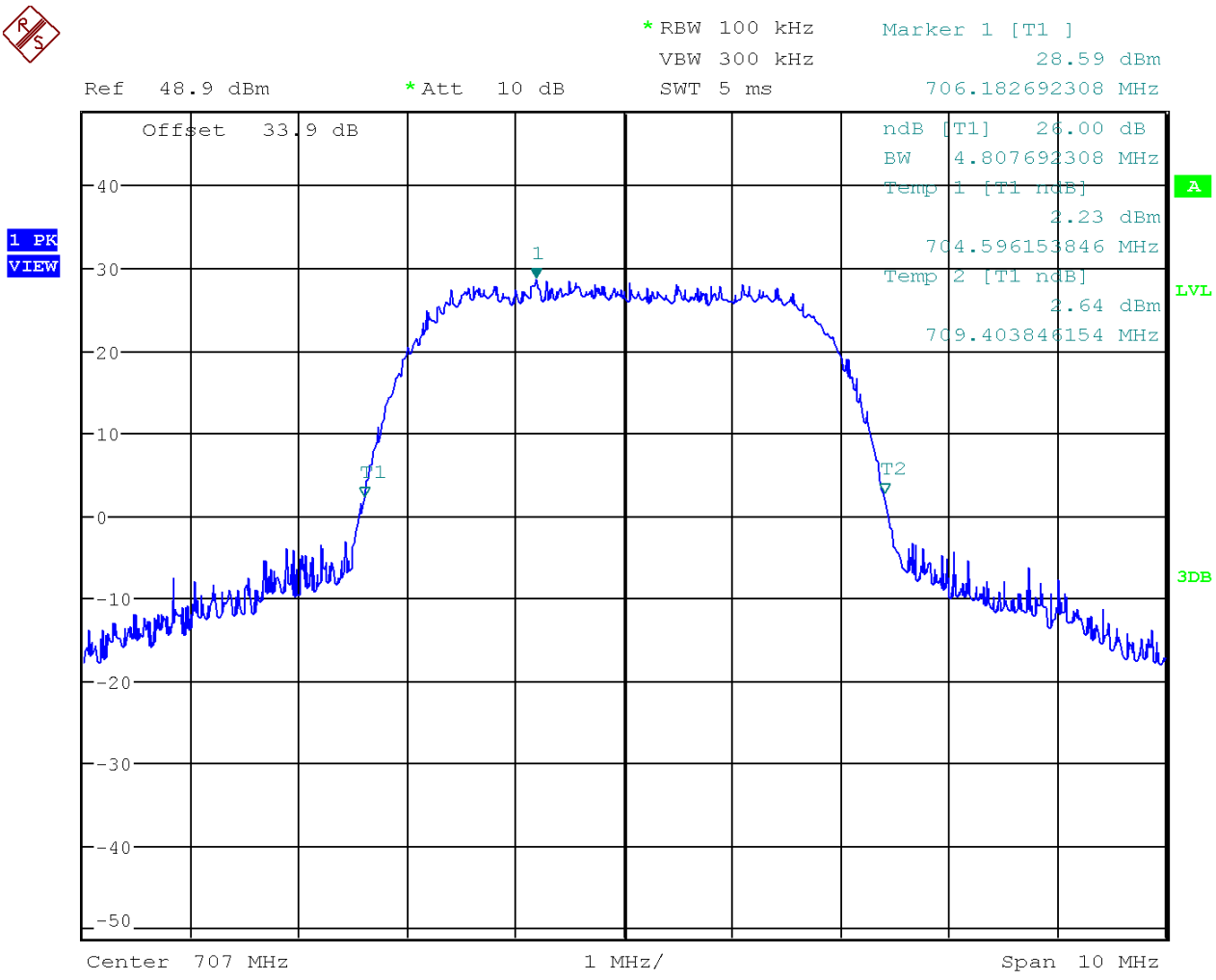
Test Setup



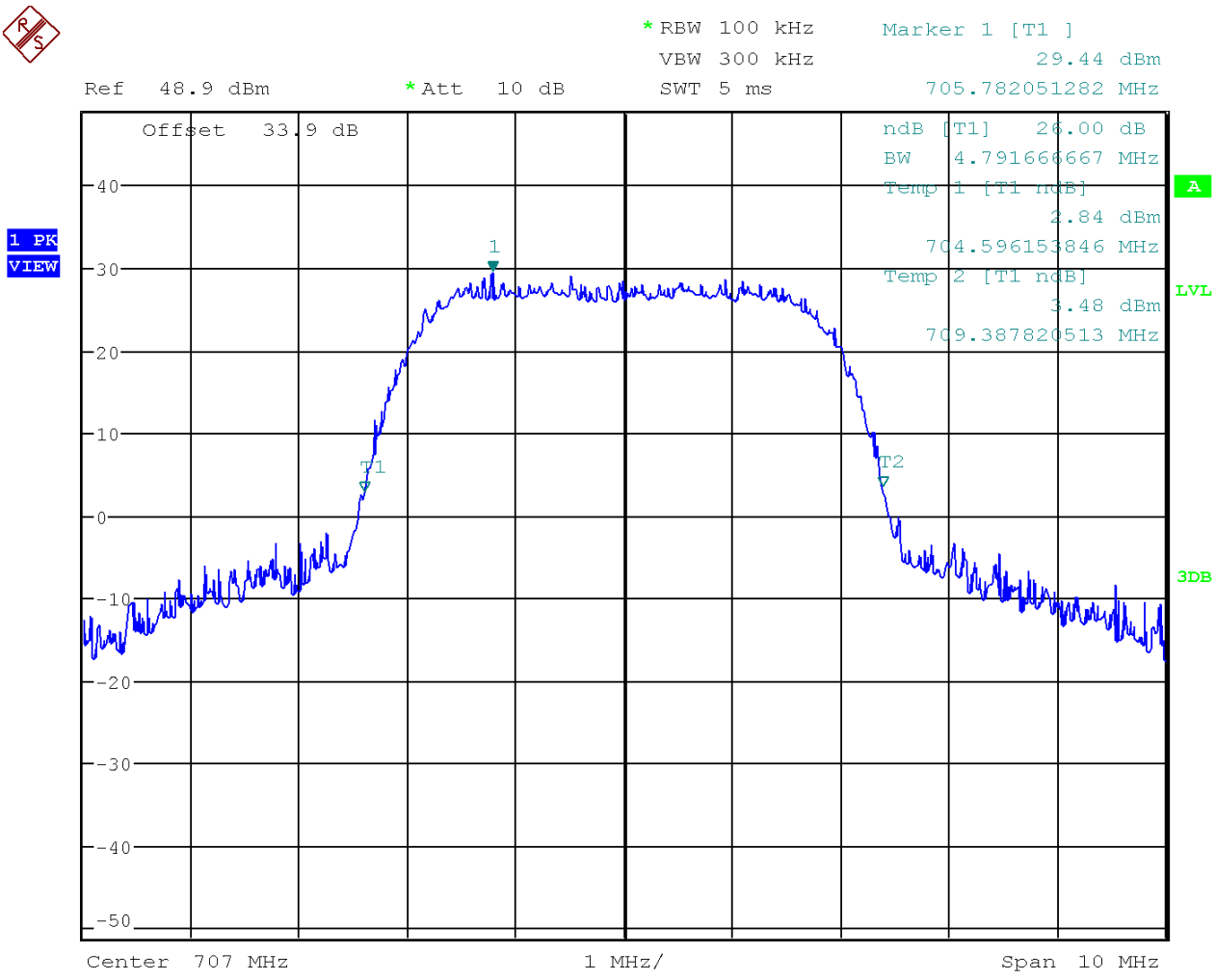
Input-versus-output spectrum – Input Signal



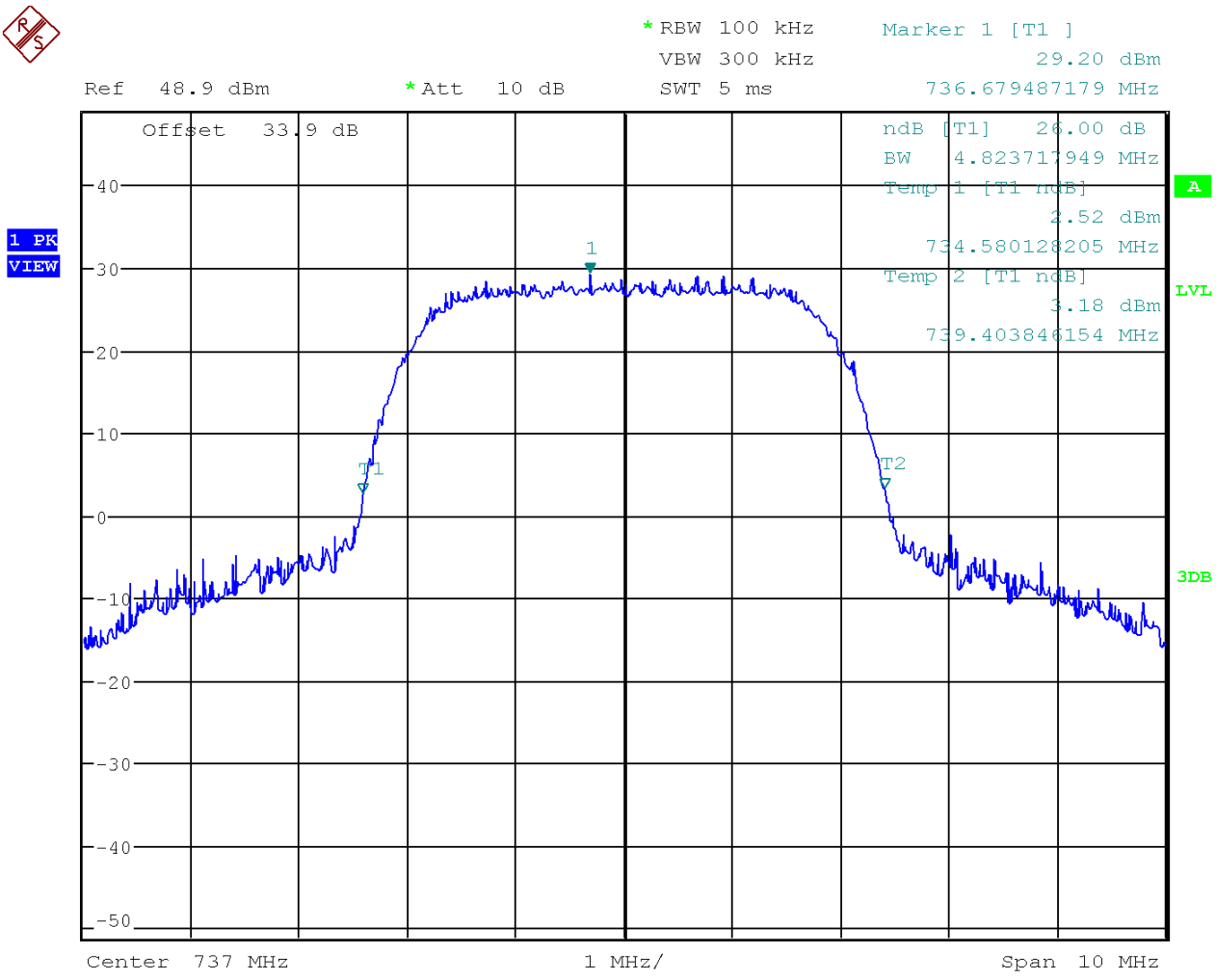
Input-versus-output spectrum – Uplink without AGC



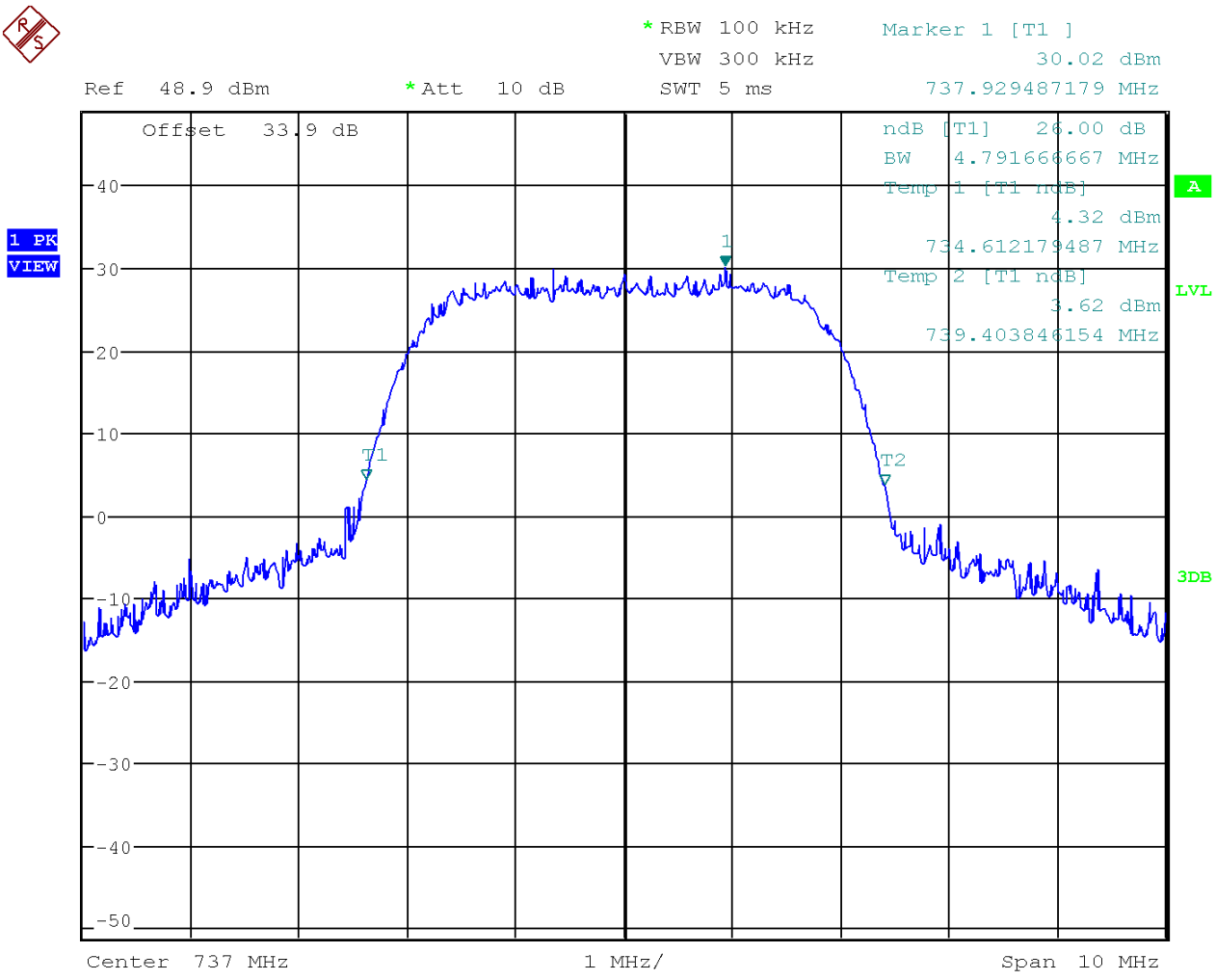
Input-versus-output spectrum – Uplink with AGC



Input-versus-output spectrum – Downlink without AGC



Input-versus-output spectrum – Downlink with AGC



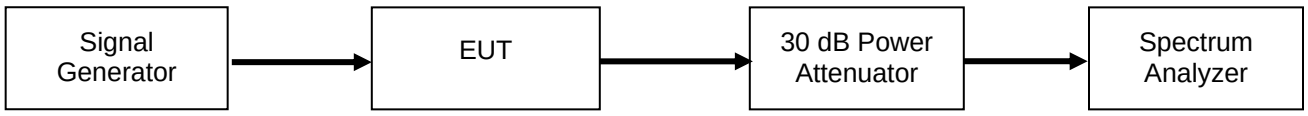
3.5 Mean Output and Amplifier Gain

Engineer: Christian Pawlak
Test Date: 9/17/2018

Test Procedure

The Test Procedure used was ANSI C63.26-2015 7.2.2.4 with no deviations. EUT does not support narrowband signal.

Test Setup



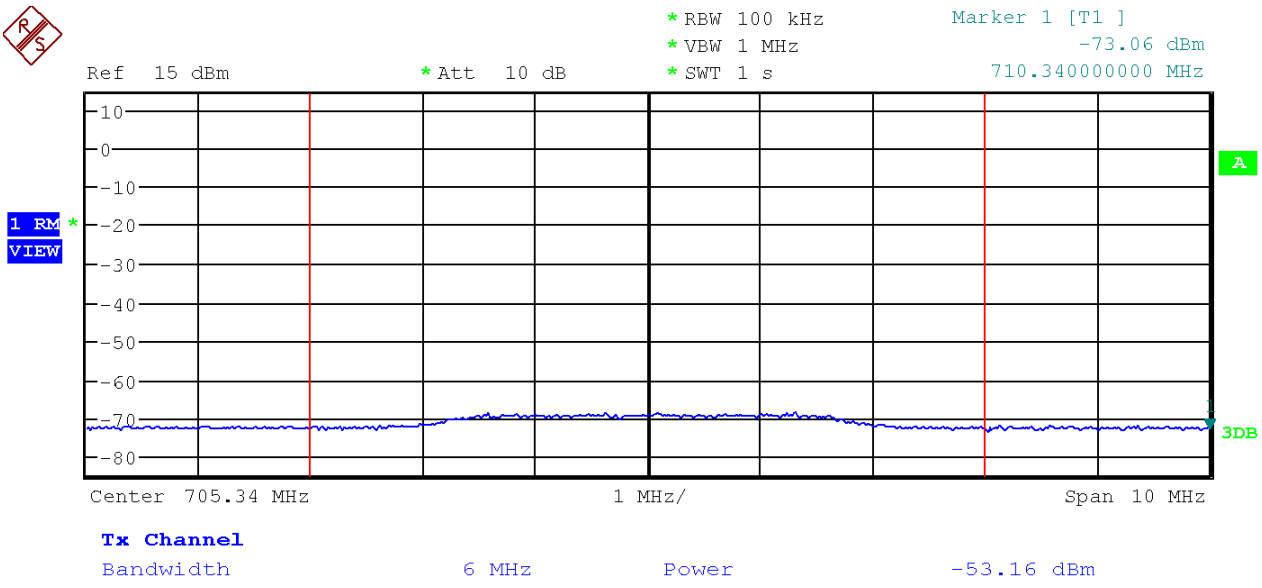
Uplink Test Results

Frequency Band (MHz)	Signal Type	AGC	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Nominal Gain (dB)	Result
698 - 716	LTE	OFF	-53.16	33.14	86.30	90	Pass
		ON	-50.49	33.35	83.84	90	Pass

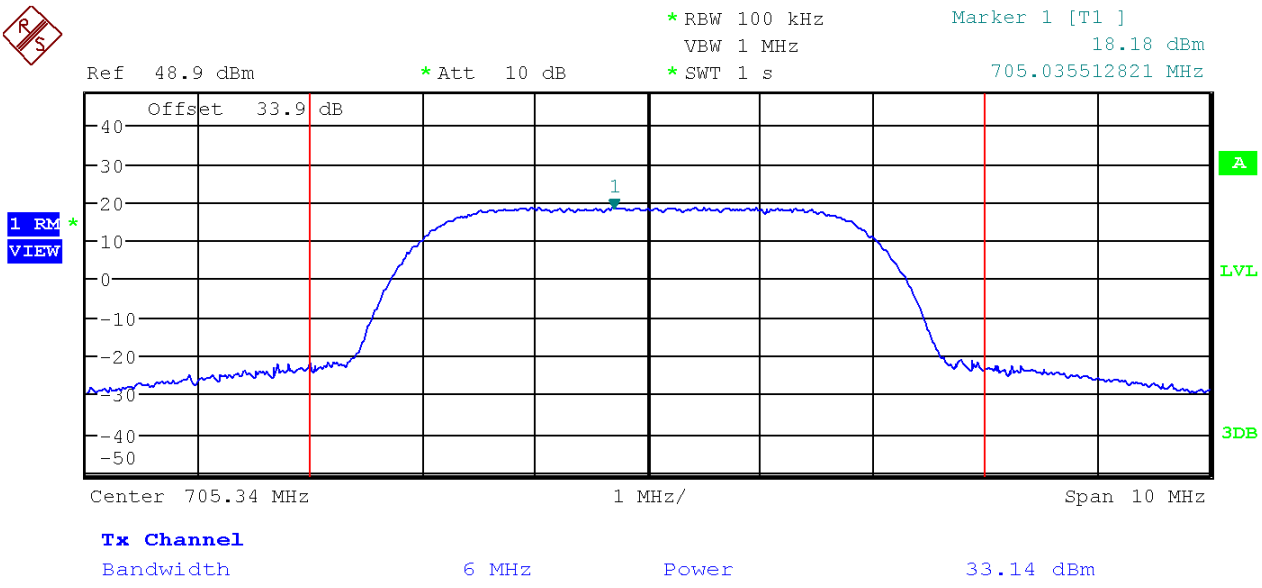
Downlink Test Results

Frequency Band (MHz)	Signal Type	AGC	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Nominal Gain (dB)	Result
728 - 746	LTE	OFF	-53.17	32.96	86.13	90	Pass
		ON	-50.51	33.28	83.79	90	Pass

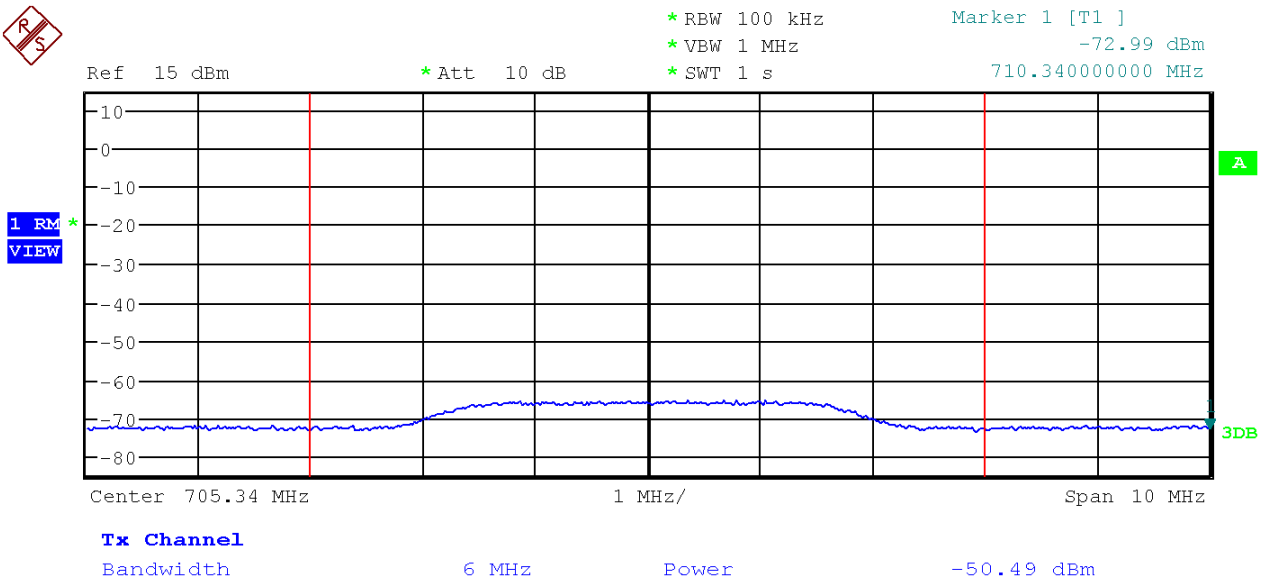
Mean output power and zone enhancer gain – Uplink Reference without AGC



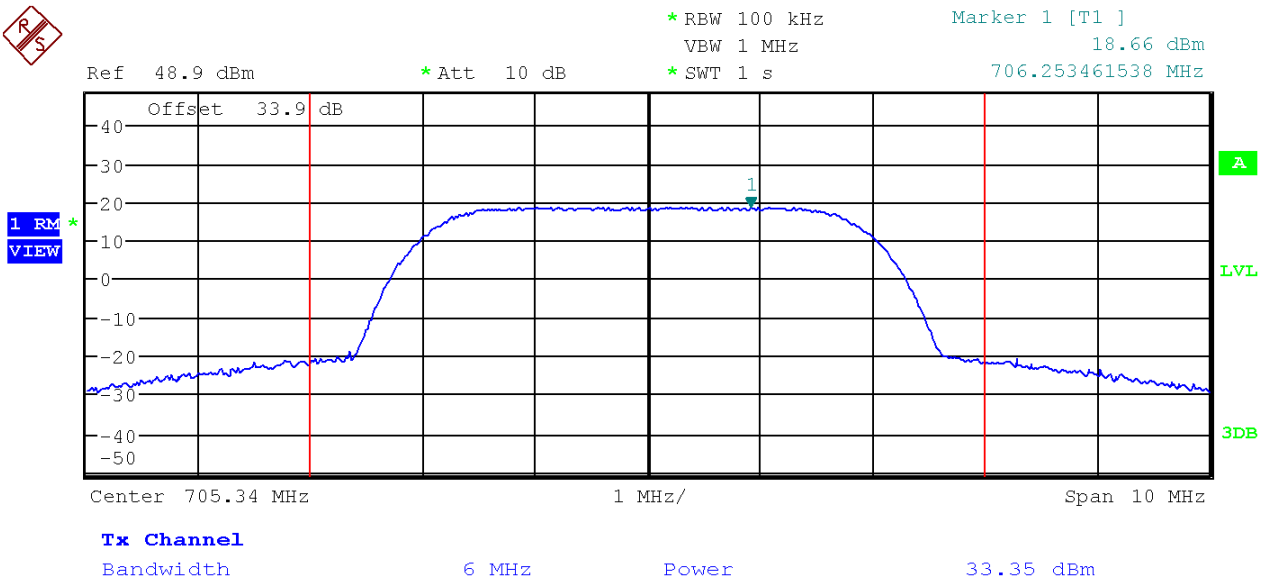
Mean output power and zone enhancer gain – Uplink without AGC



Mean output power and zone enhancer gain – Uplink Reference with AGC



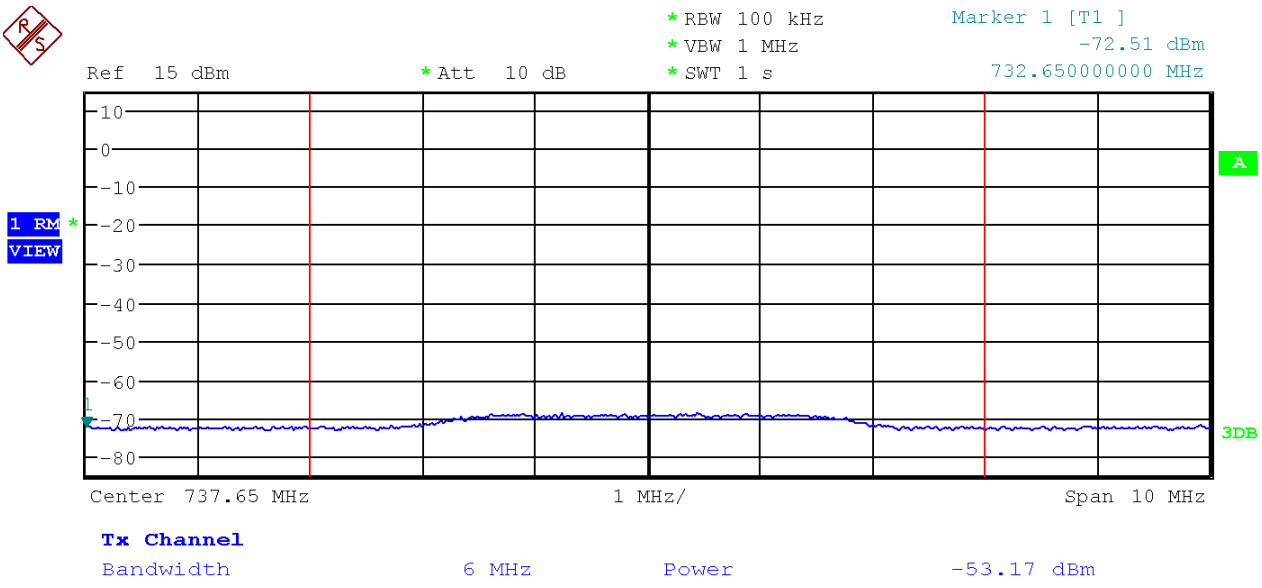
Mean output power and zone enhancer gain – Uplink with AGC



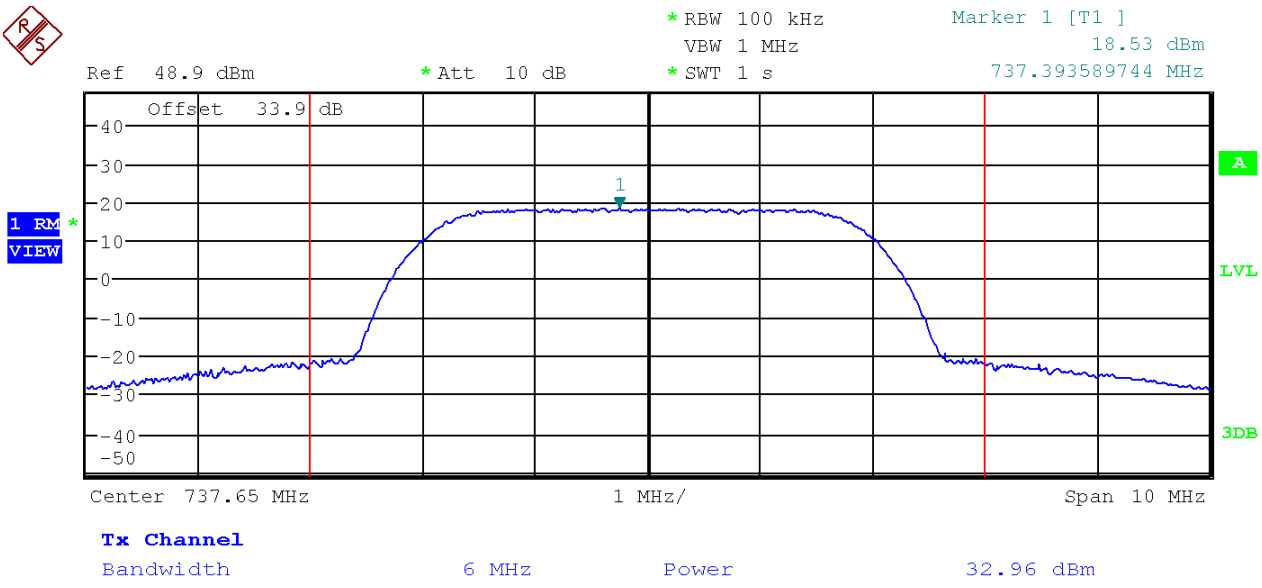
Tx Channel

Bandwidth	6 MHz	Power	33.35 dBm

Mean output power and zone enhancer gain – Downlink Reference without AGC



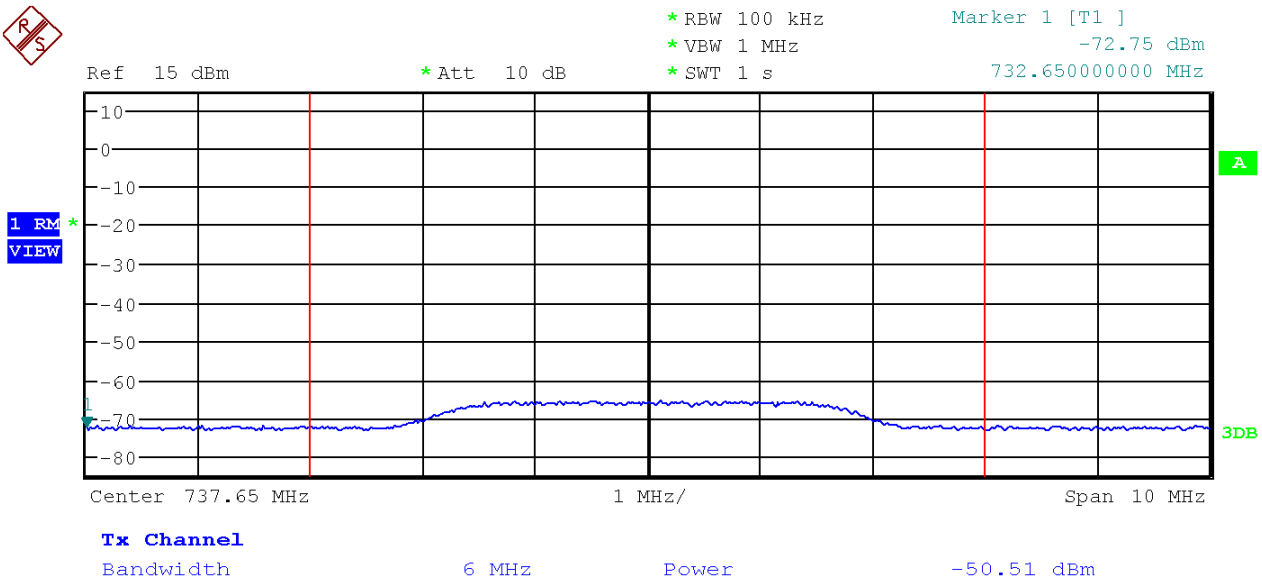
Mean output power and zone enhancer gain – Downlink without AGC



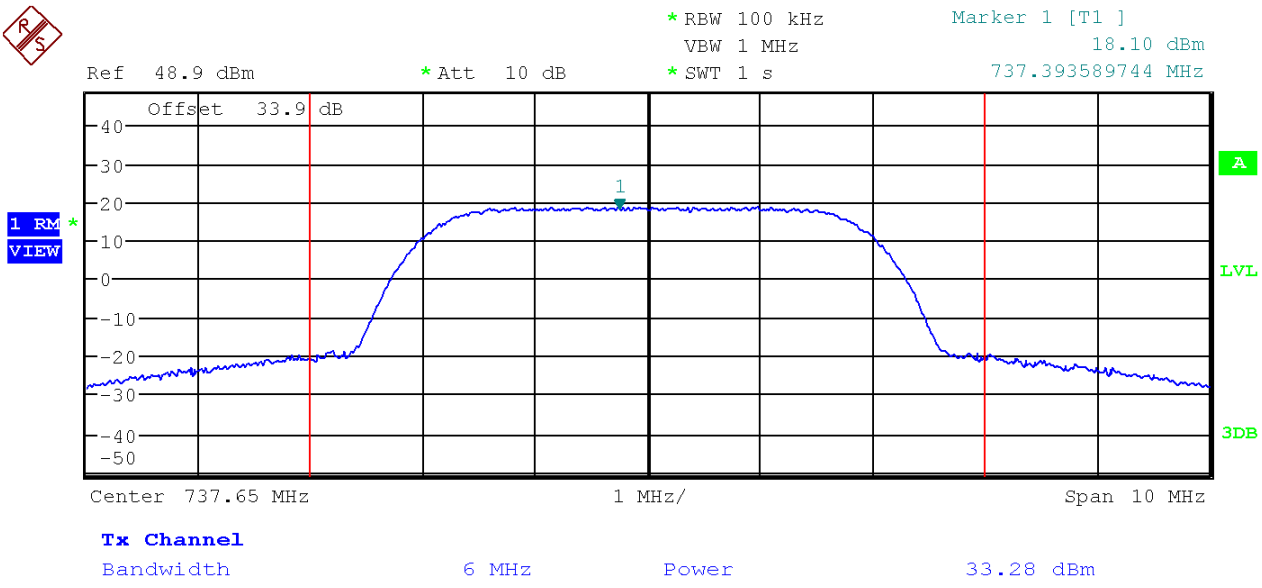
Tx Channel

Bandwidth	6 MHz	Power	32.96 dBm

Mean output power and zone enhancer gain – Downlink Reference with AGC



Mean output power and zone enhancer gain – Downlink with AGC



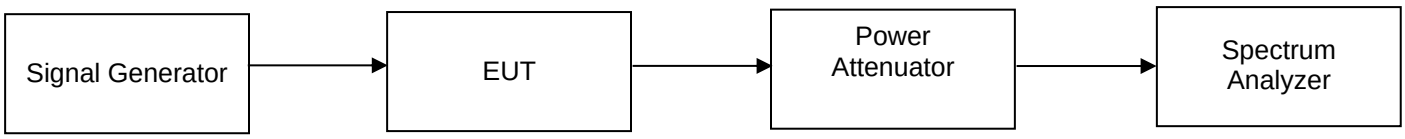
3.6.2 Out-Of-Band/Block Emission (Dual Carrier)

Engineer: Christian Pawlak
Test Date: 9/17/2018

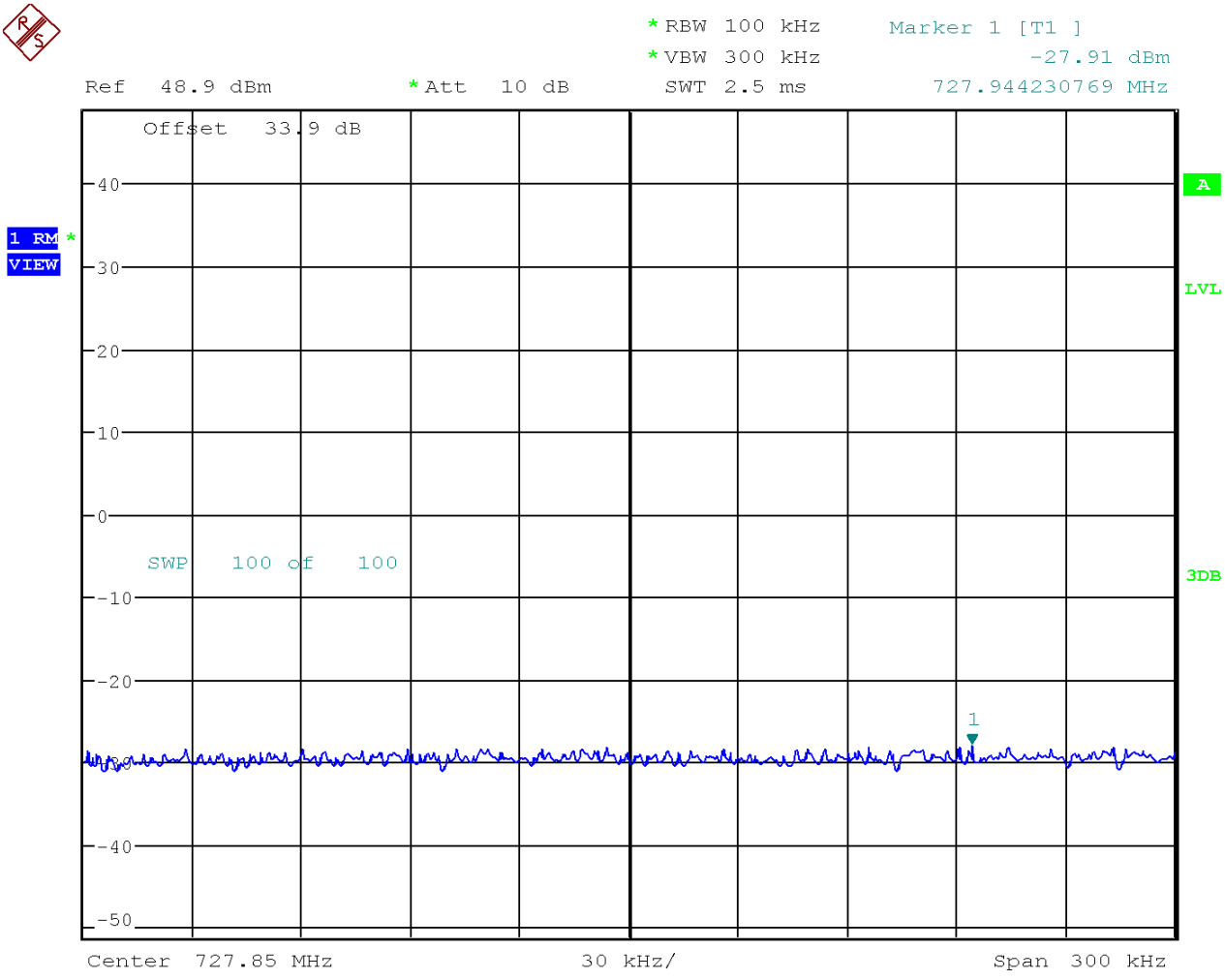
Test Procedure

The Test Procedure used was ANSI C63.26-2015 7.2.2.5.2 with no deviations. EUT does not support narrowband signal.

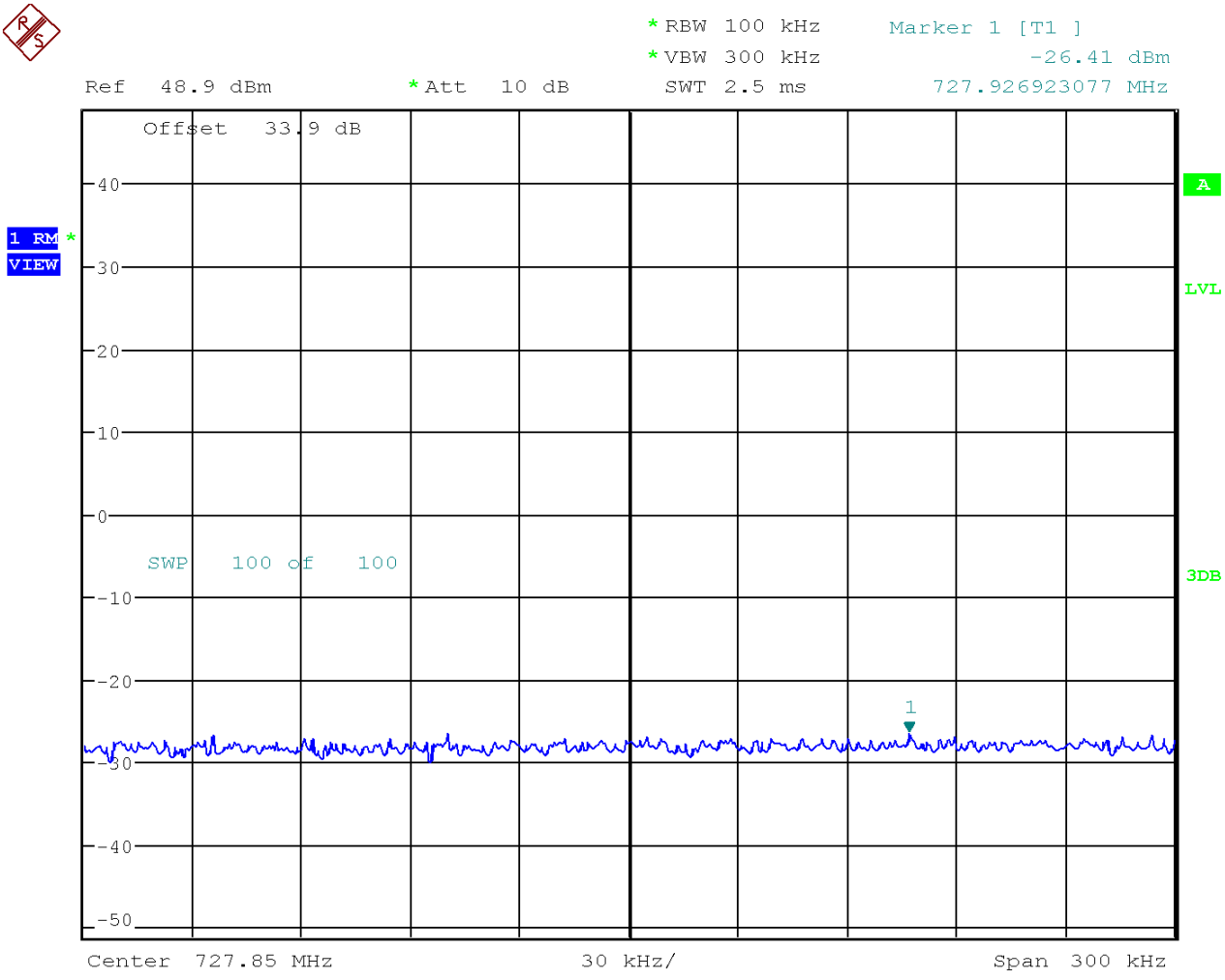
Test Setup



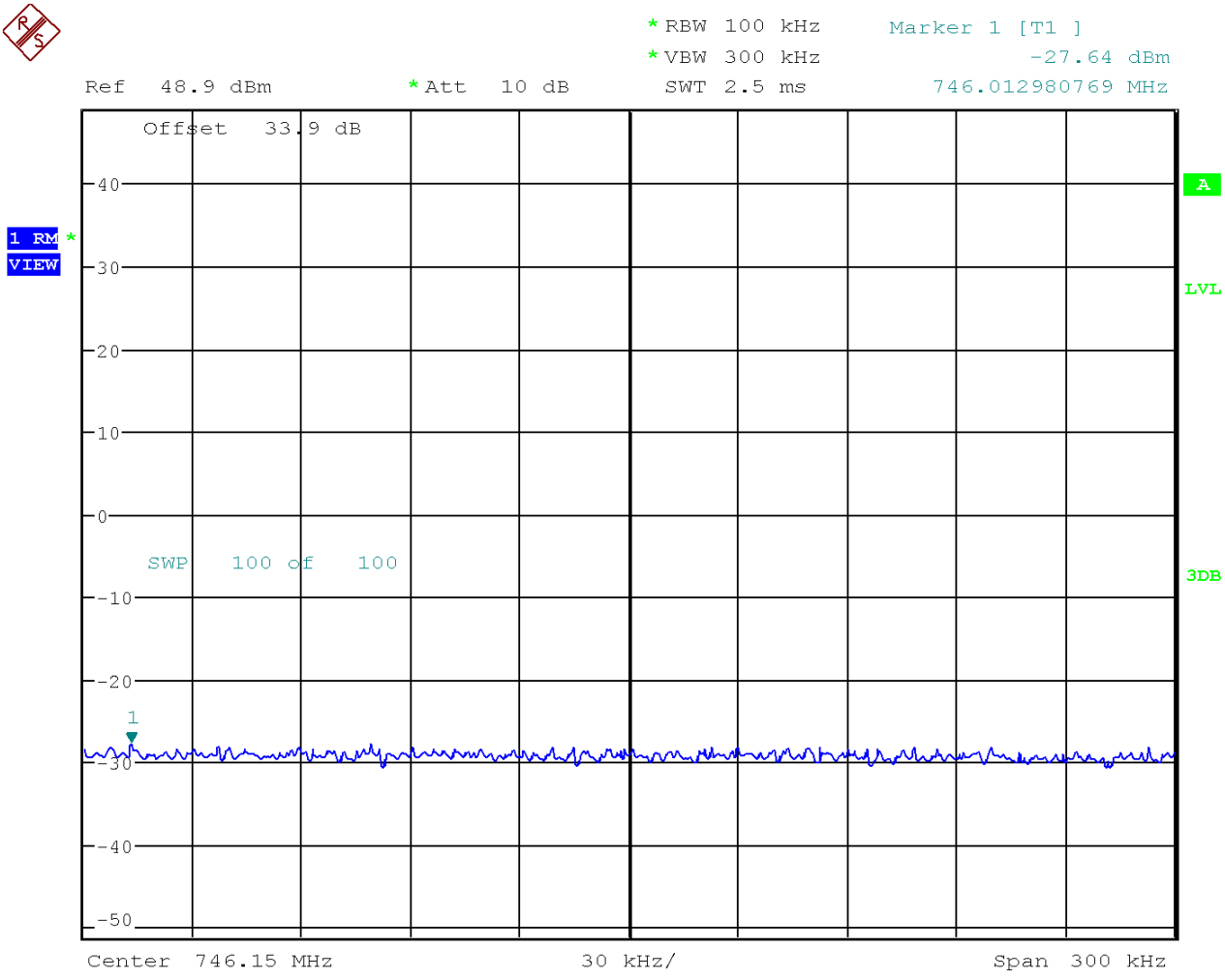
Out-Of-Band/Block Emission (Dual Carrier) – Downlink Lower Without AGC



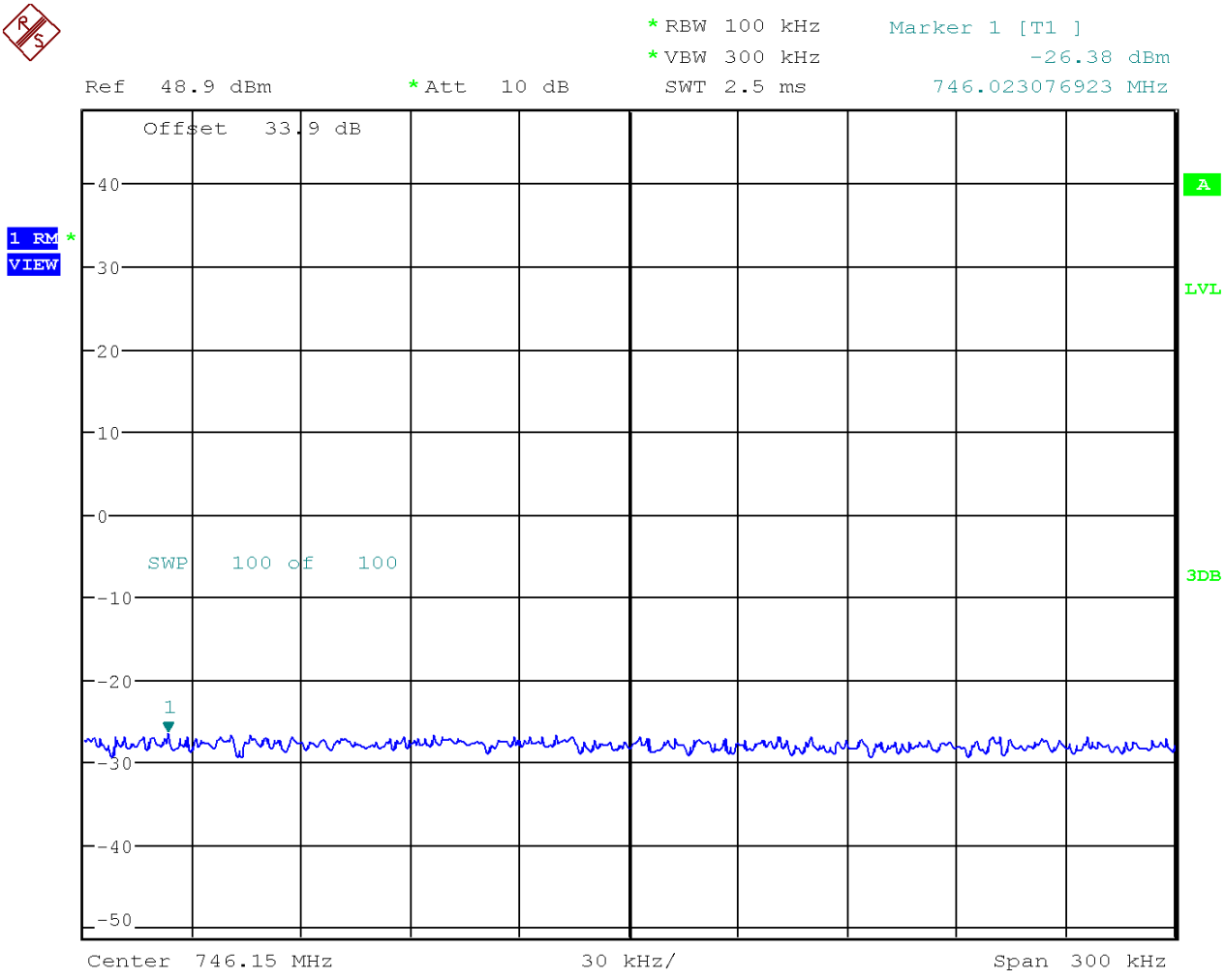
Out-Of-Band/Block Emission (Dual Carrier) – Downlink Lower With AGC



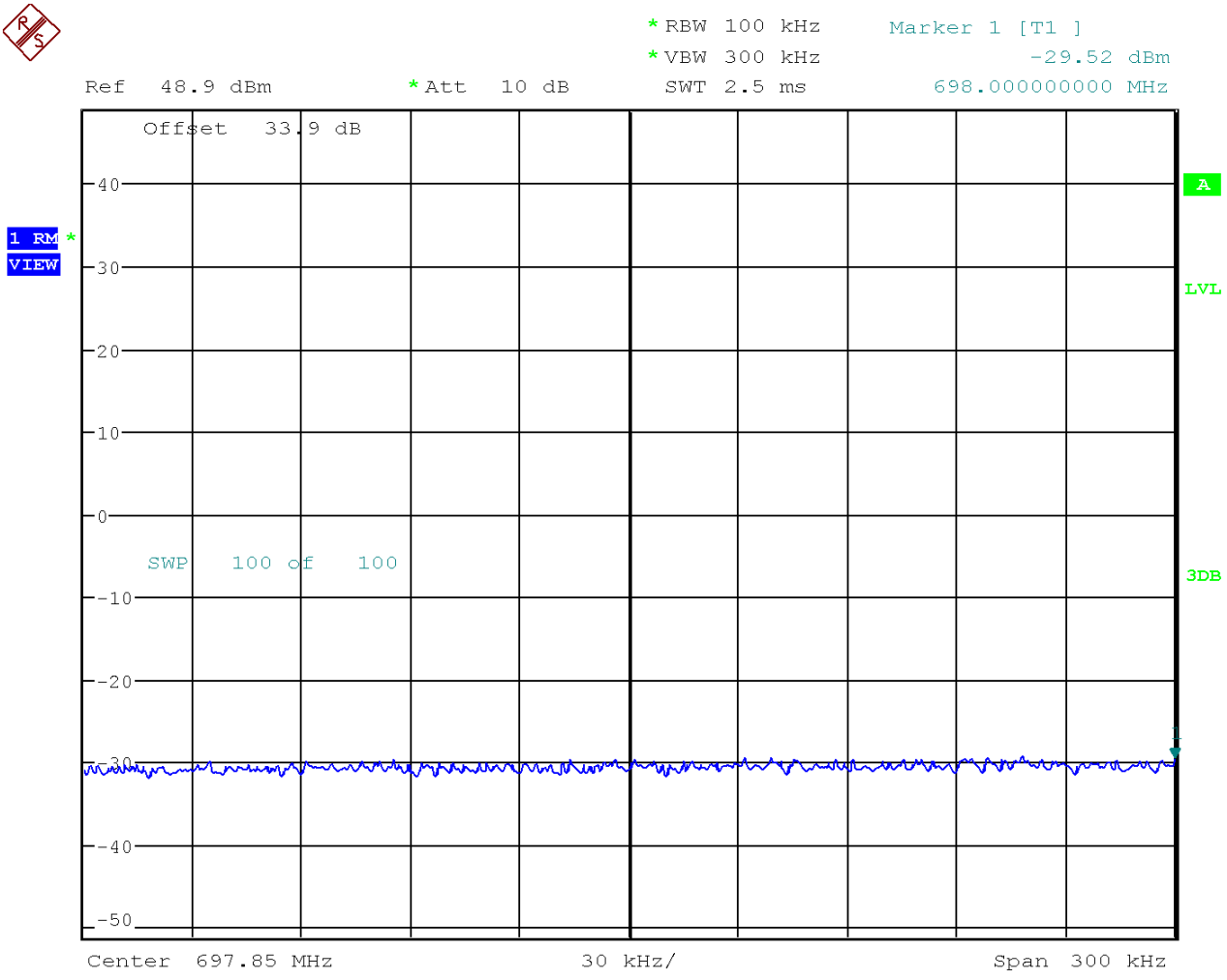
Out-Of-Band/Block Emission (Dual Carrier) – Downlink Upper Without AGC



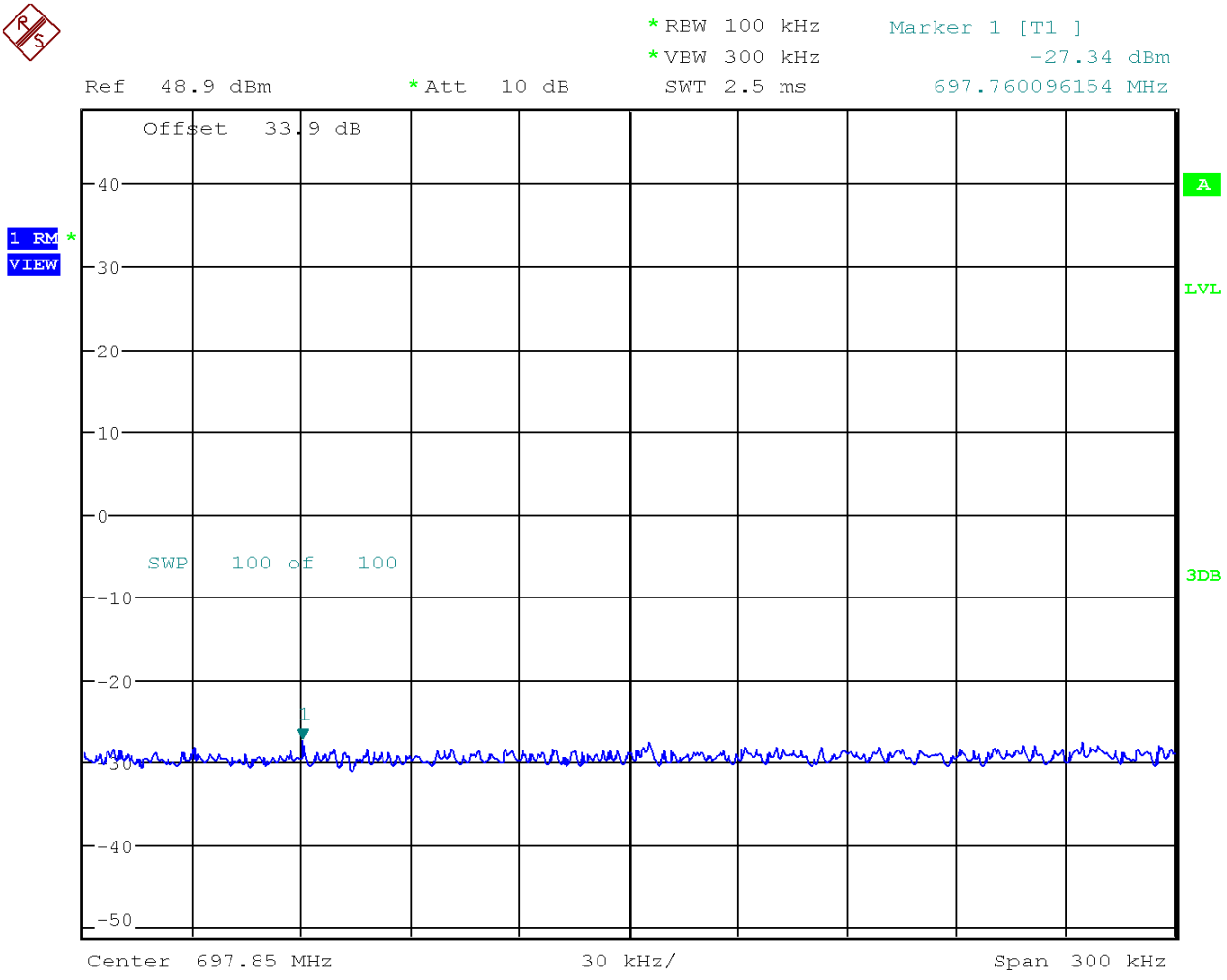
Out-Of-Band/Block Emission (Dual Carrier) – Downlink Upper With AGC



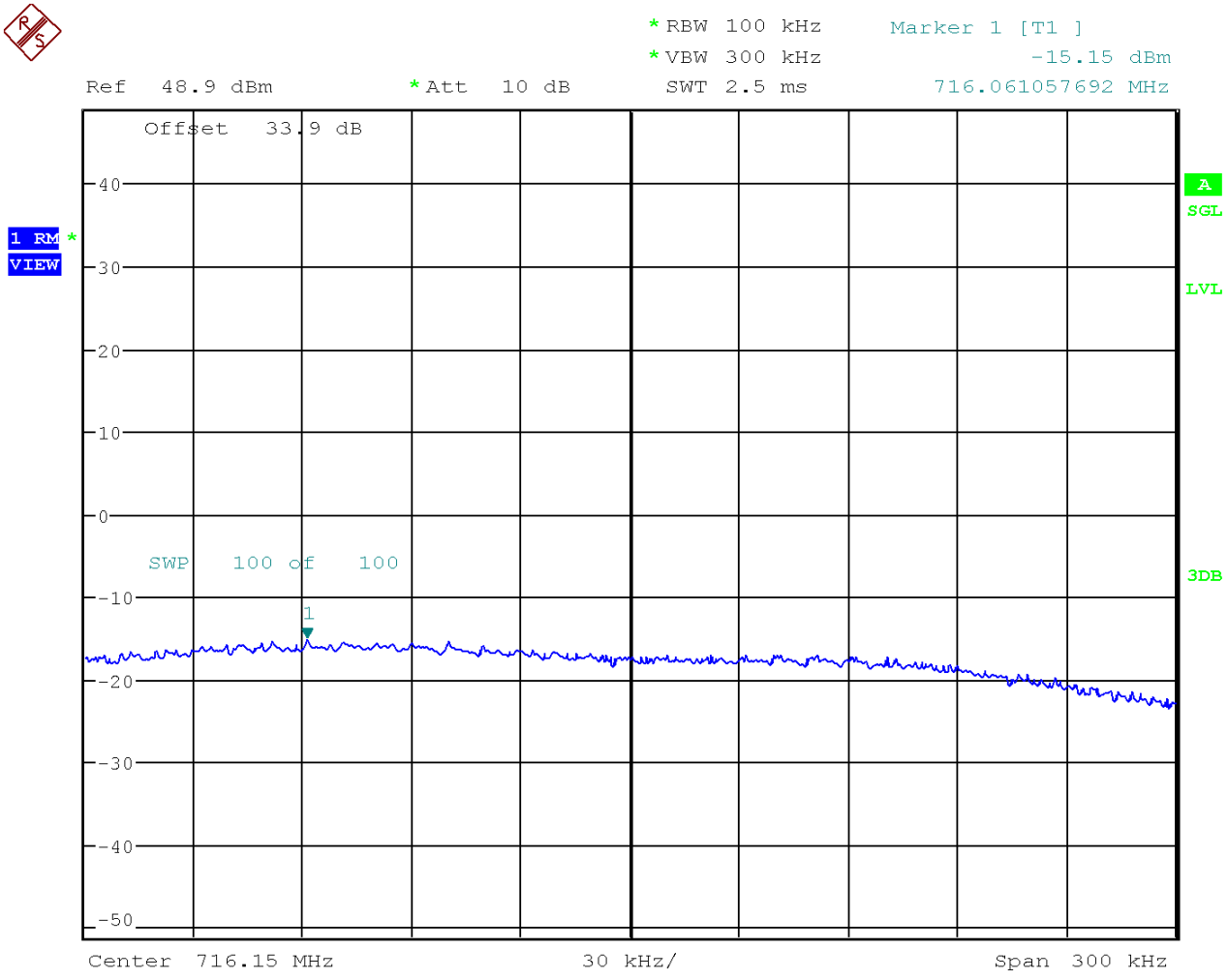
Out-Of-Band/Block Emission (Dual Carrier) – Uplink Lower Without AGC



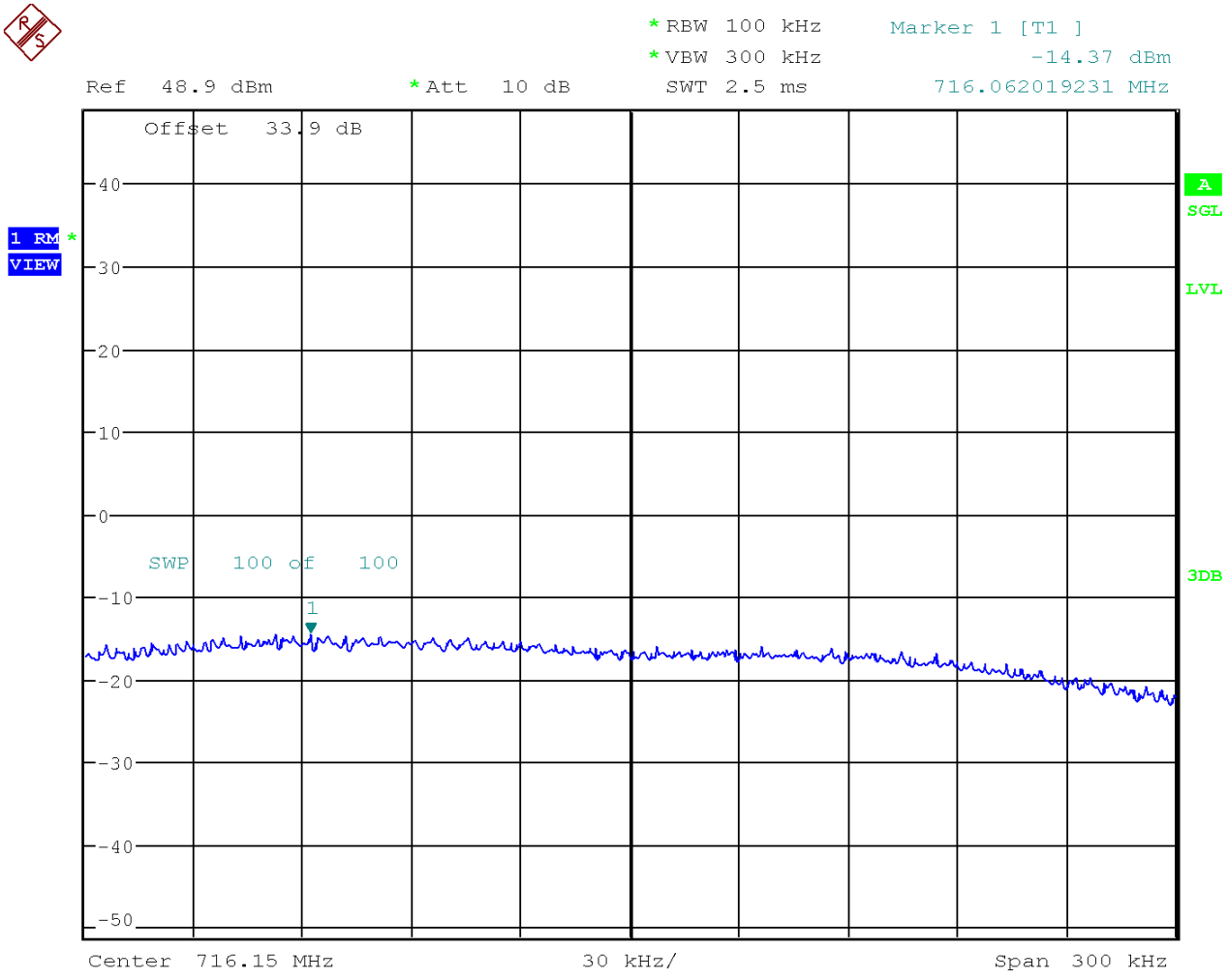
Out-Of-Band/Block Emission (Dual Carrier) – Uplink Lower With AGC



Out-Of-Band/Block Emission (Dual Carrier) – Uplink Upper Without AGC



Out-Of-Band/Block Emission (Dual Carrier) – Uplink Upper With AGC



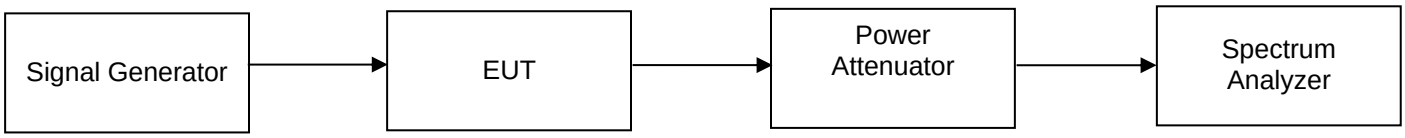
3.6.2 Out-Of-Band/Block Emission (Single Carrier)

Engineer: Christian Pawlak
Test Date: 9/17/2018

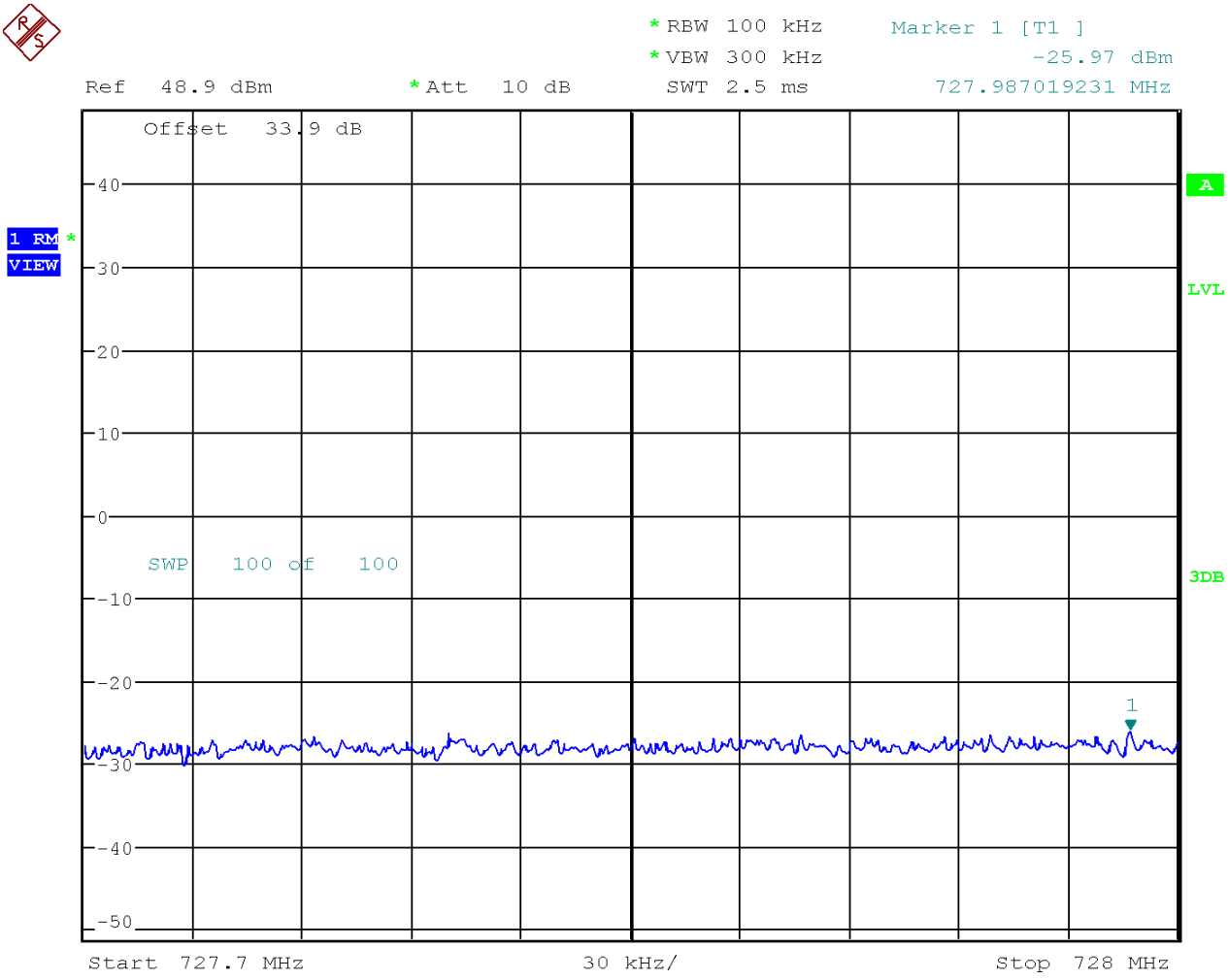
Test Procedure

The Test Procedure used was ANSI C63.26-2015 7.2.2.5.2 with no deviations. EUT does not support narrowband signal.

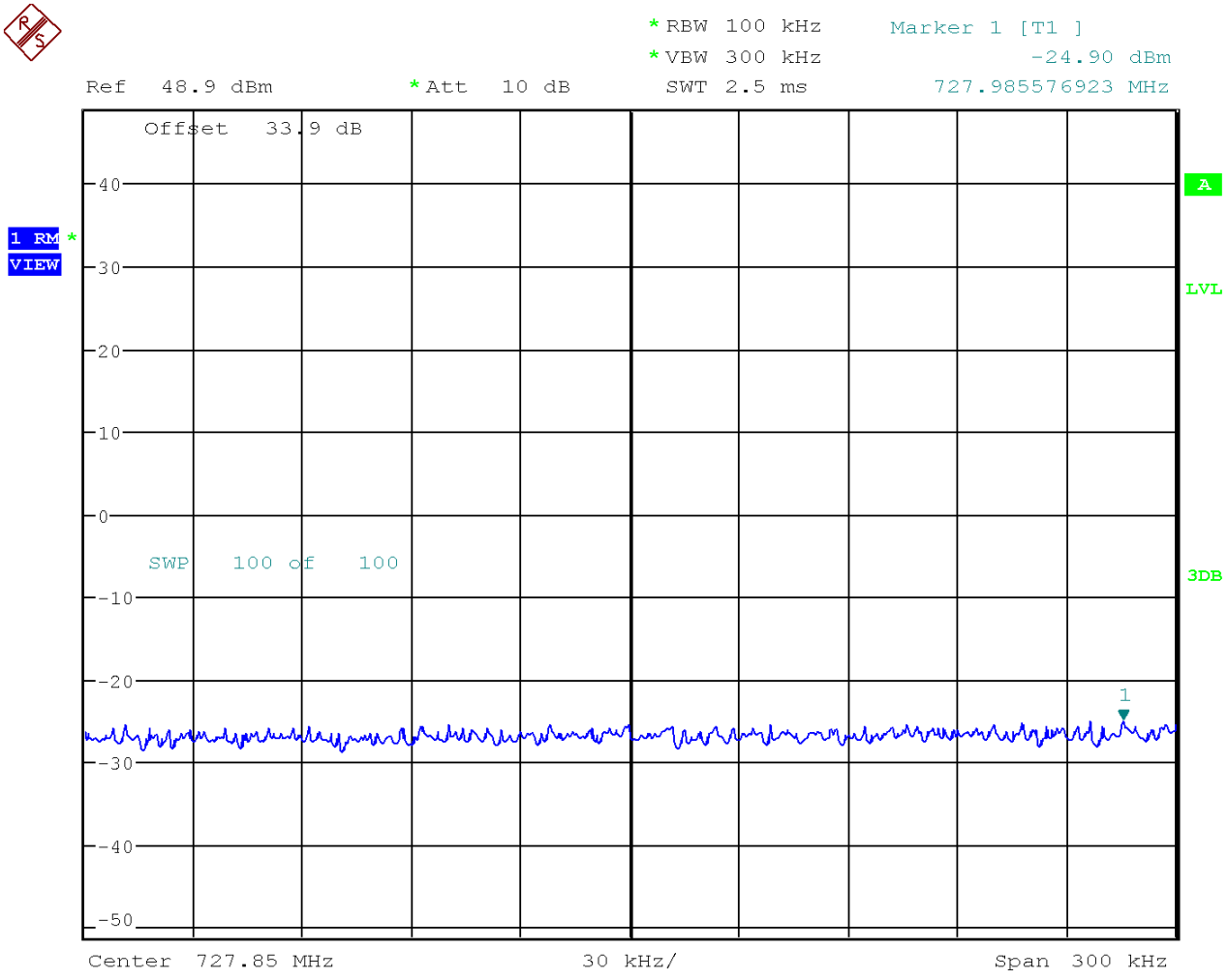
Test Setup



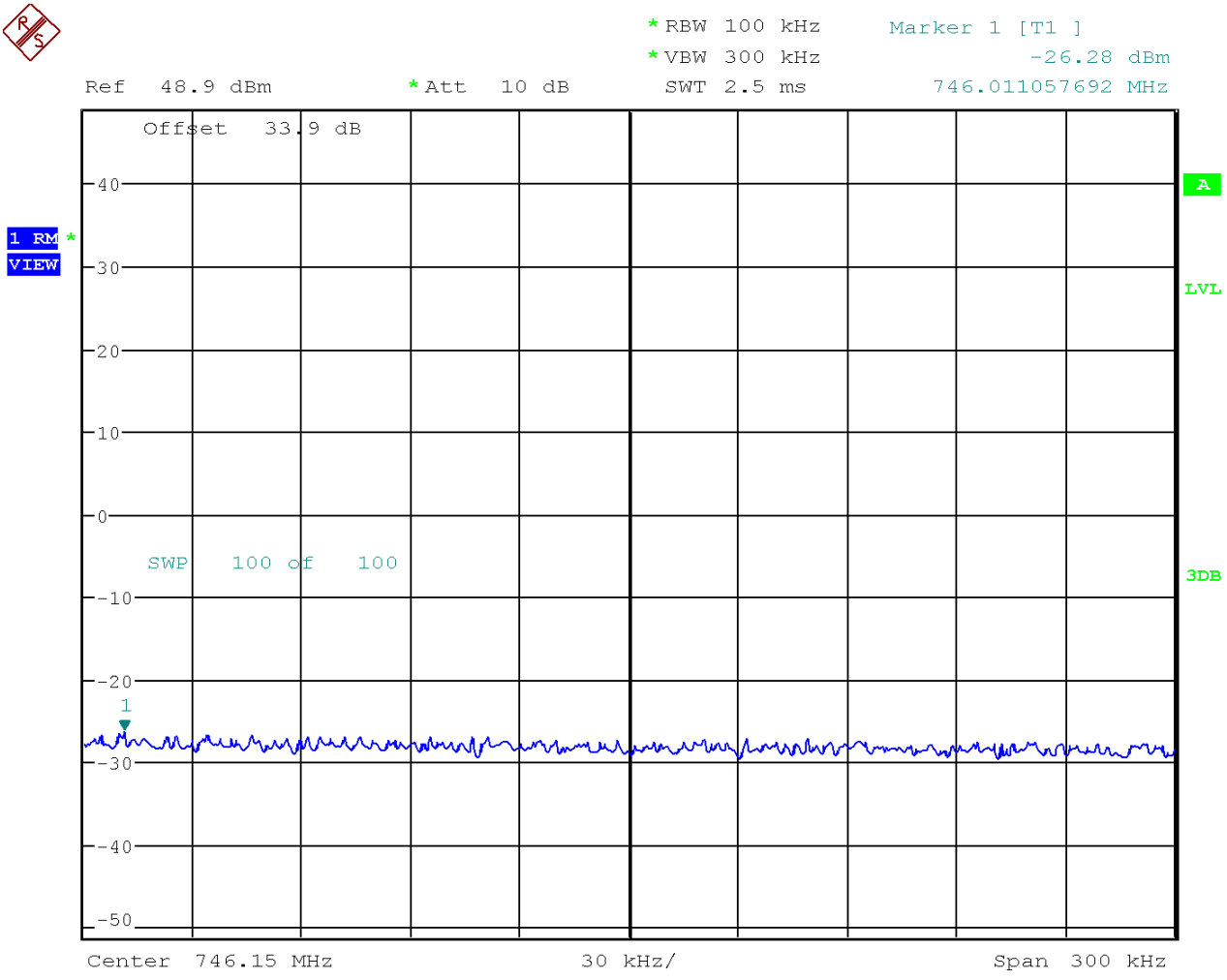
Out-Of-Band/Block Emission (Single Carrier) – Downlink Lower Without AGC



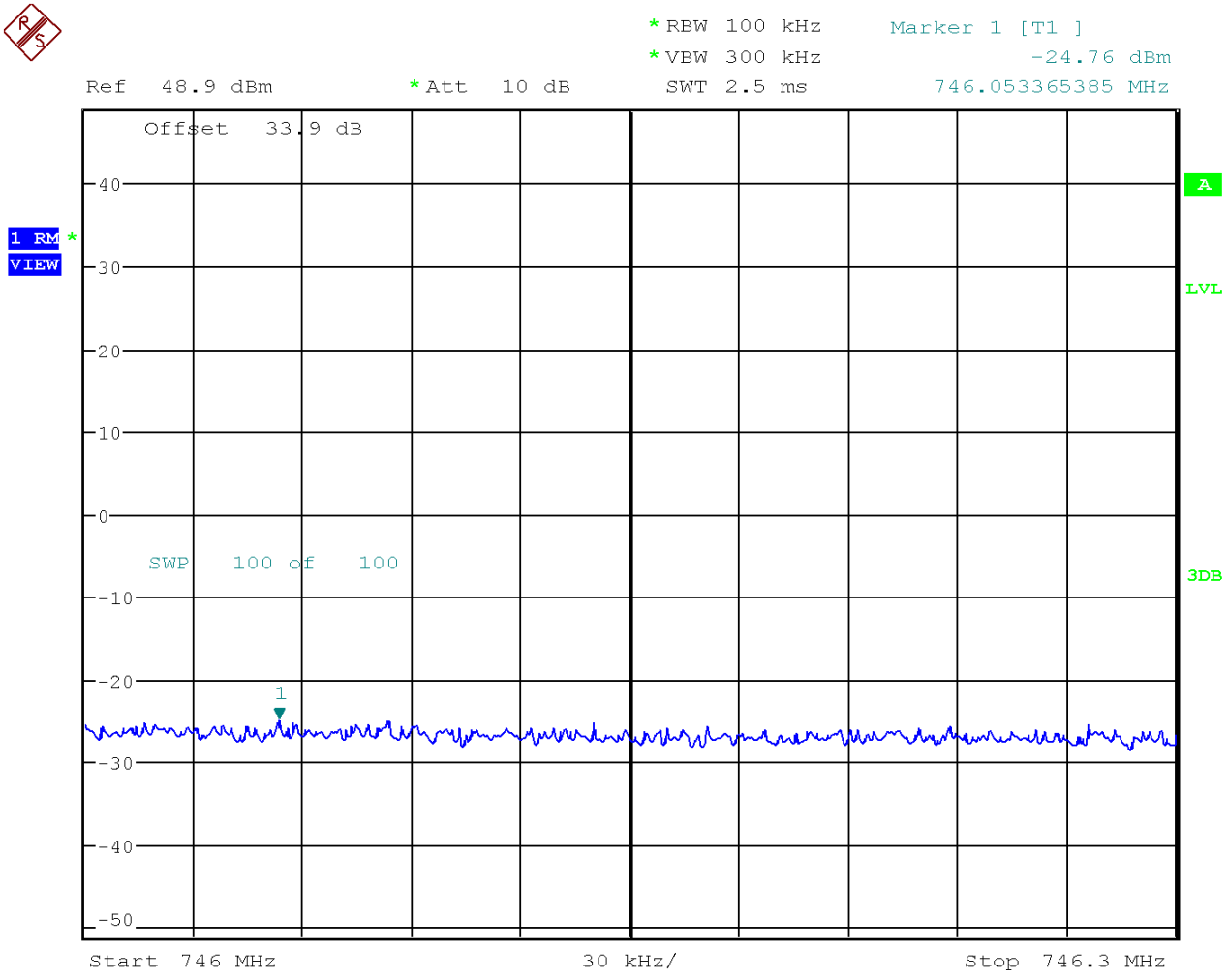
Out-Of-Band/Block Emission (Single Carrier) – Downlink Lower With AGC



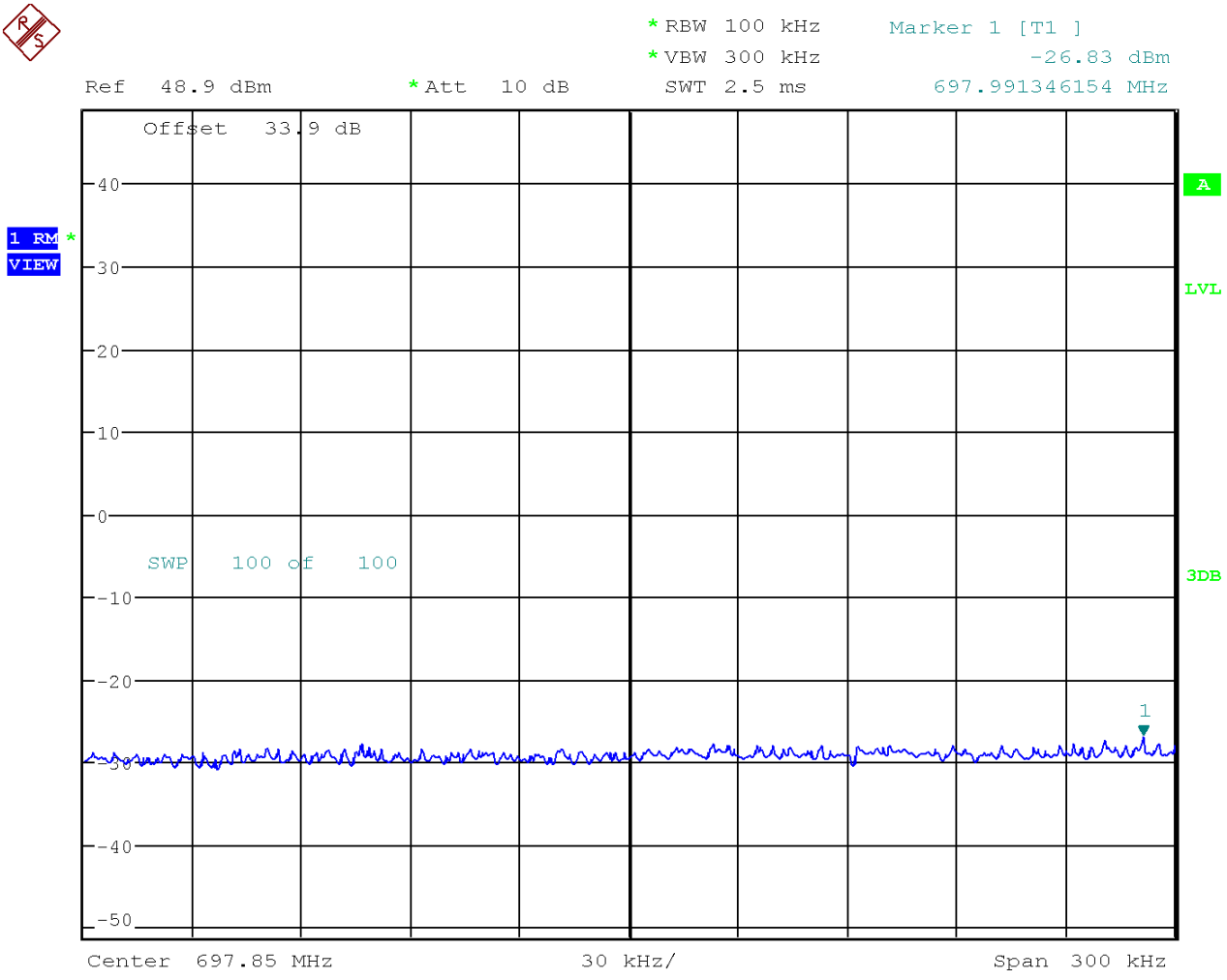
Out-Of-Band/Block Emission (Single Carrier) – Downlink Upper Without AGC



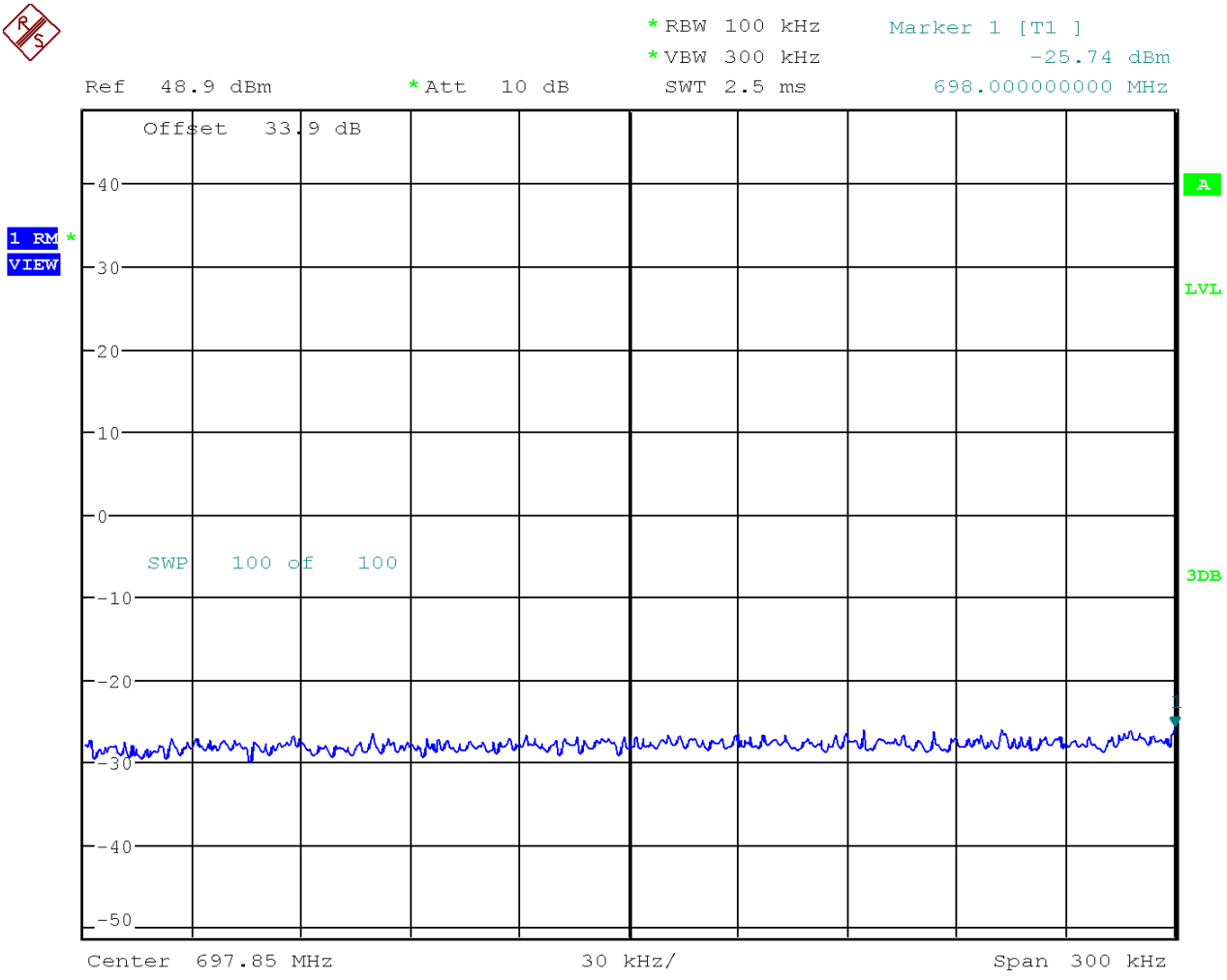
Out-Of-Band/Block Emission (Single Carrier) – Downlink Upper With AGC



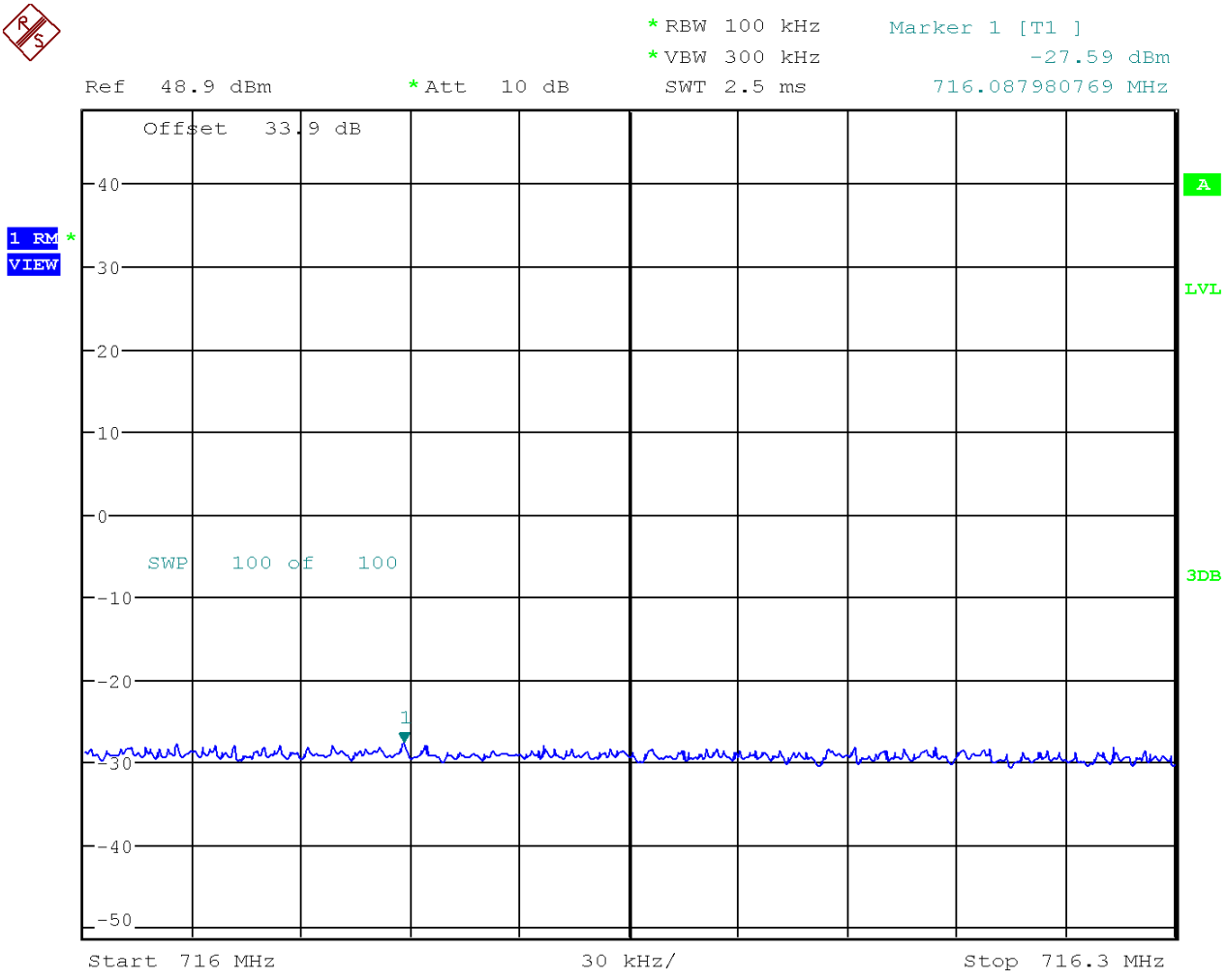
Out-Of-Band/Block Emission (Single Carrier) – Uplink Lower Without AGC



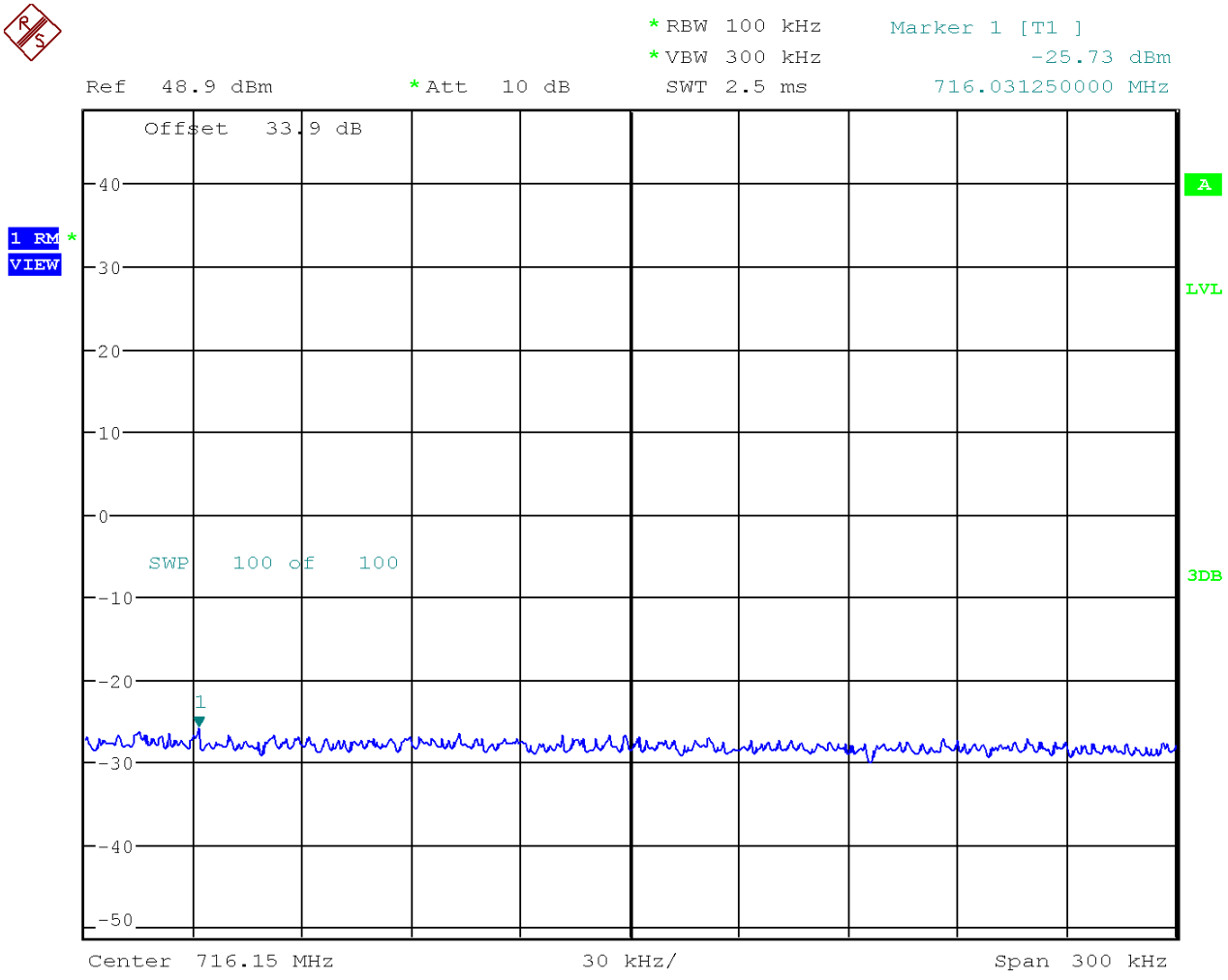
Out-Of-Band/Block Emission (Single Carrier) – Uplink Lower With AGC



Out-Of-Band/Block Emission (Single Carrier) – Uplink Upper Without AGC



Out-Of-Band/Block Emission (Single Carrier) – Uplink Upper With AGC



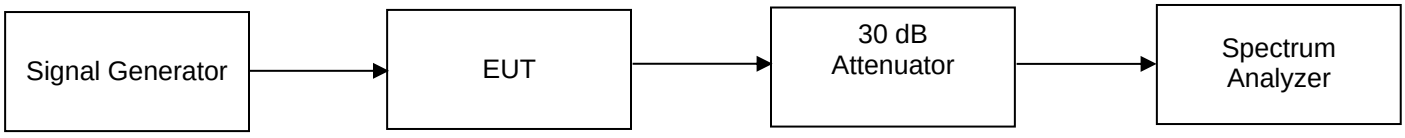
3.6.3 Conducted Spurious Emissions

Engineer: Christian Pawlak
Test Date: 9/17/2018

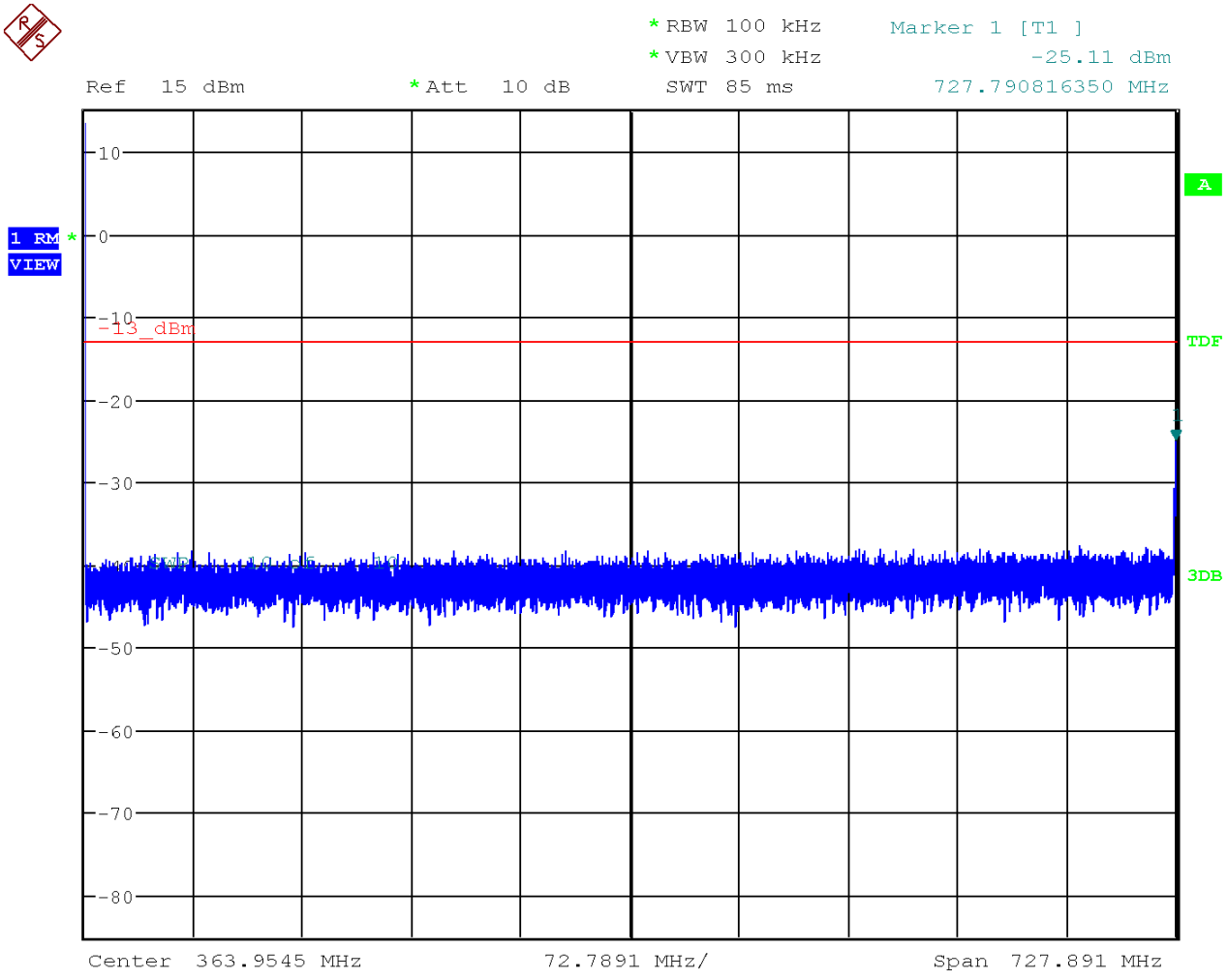
Test Procedure

The Test Procedure used was ANSI C63.26-2015 7.2.2.5.3 with no deviations. EUT does not support narrowband signal.

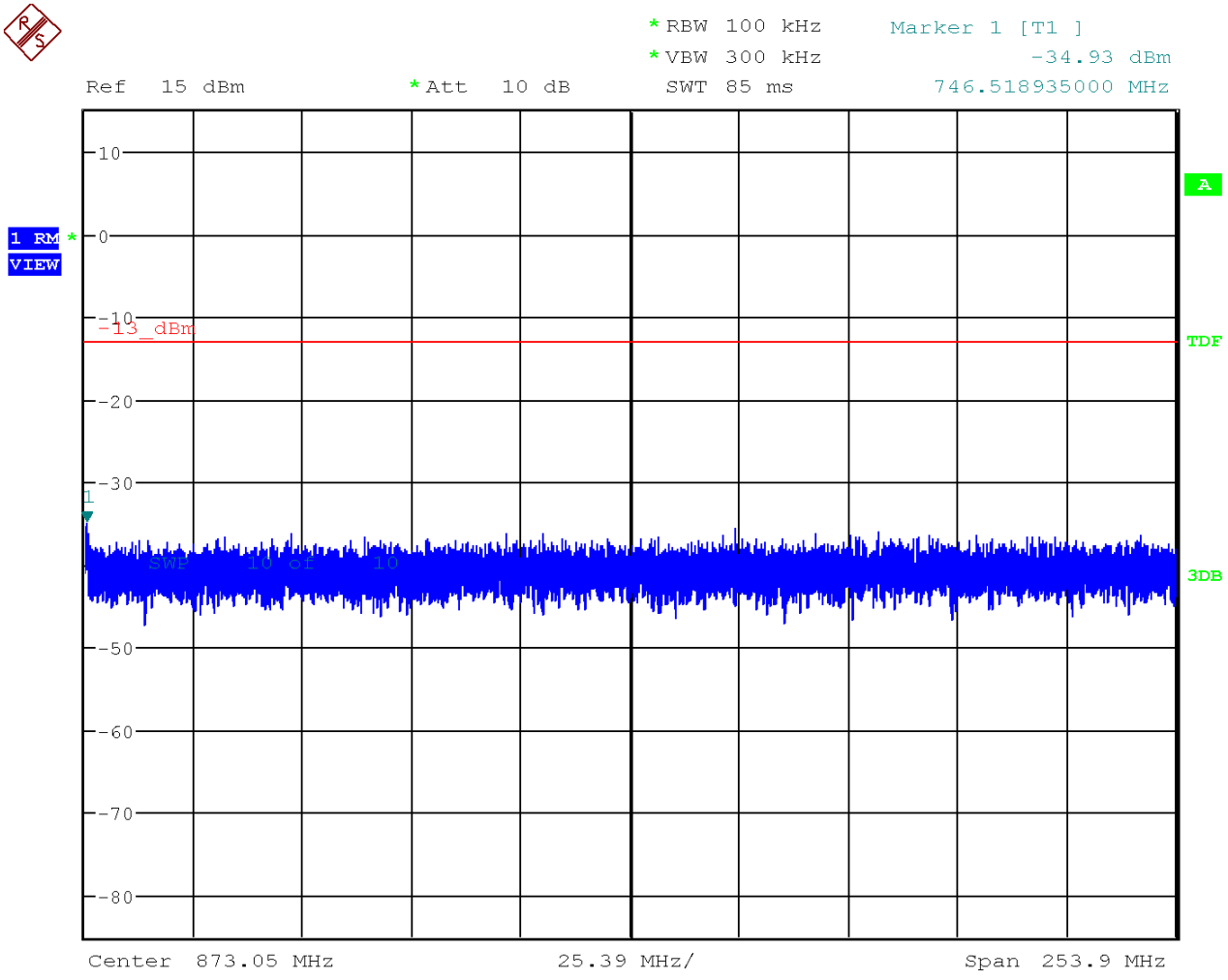
Test Setup



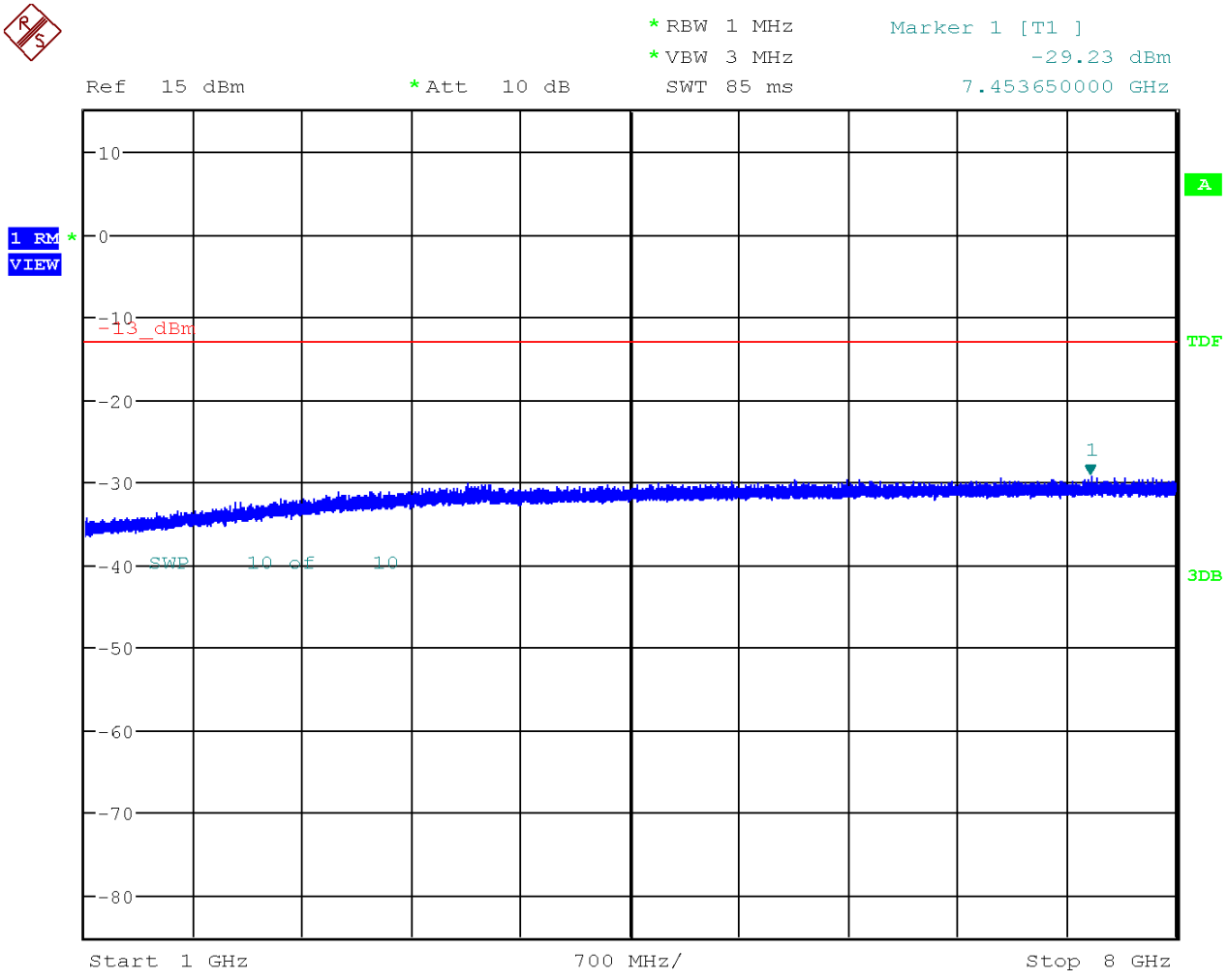
Conducted Spurious Emissions – Downlink Low Frequency 9 kHz – 728 MHz



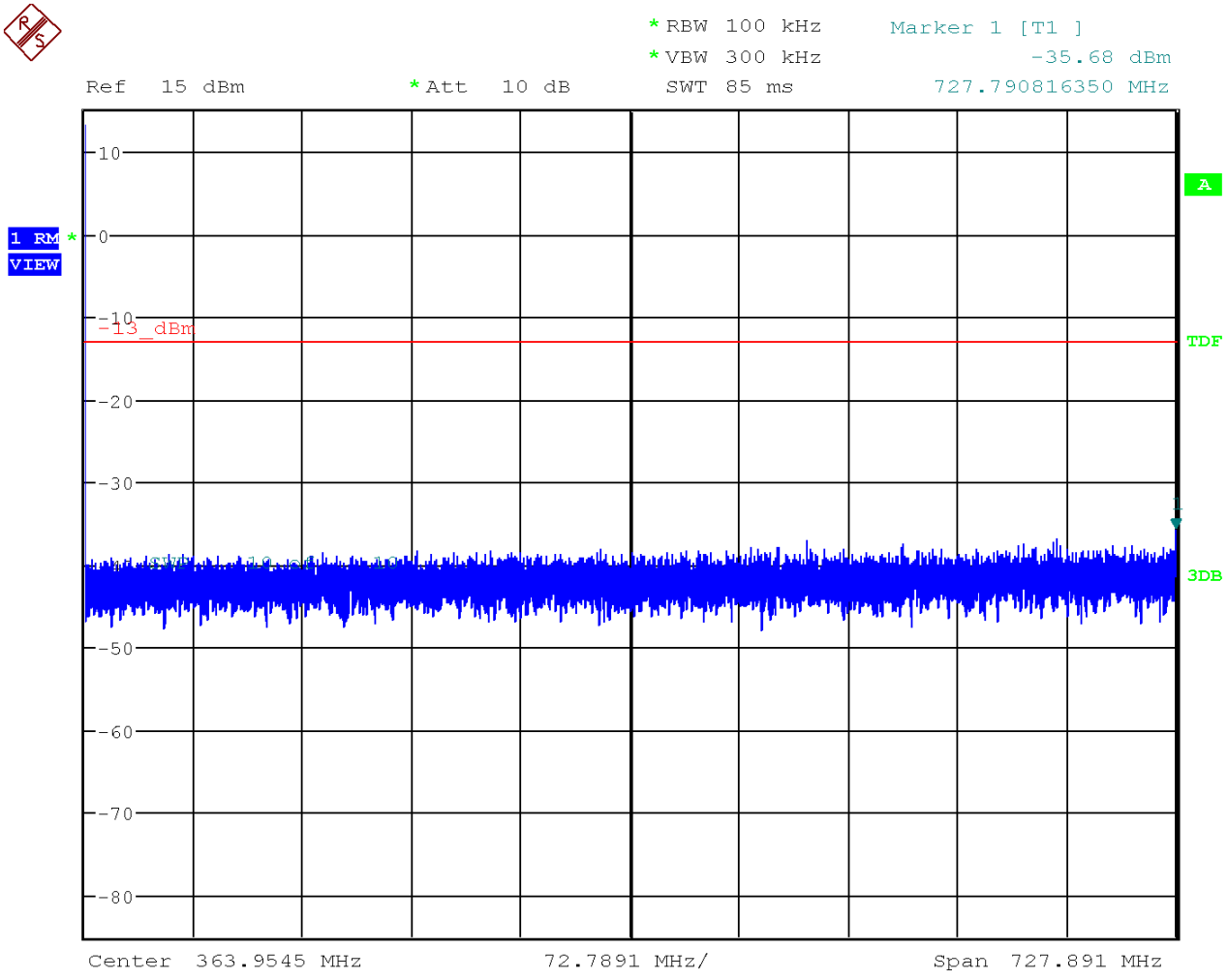
Conducted Spurious Emissions – Downlink Low Frequency 746 MHz – 1 GHz



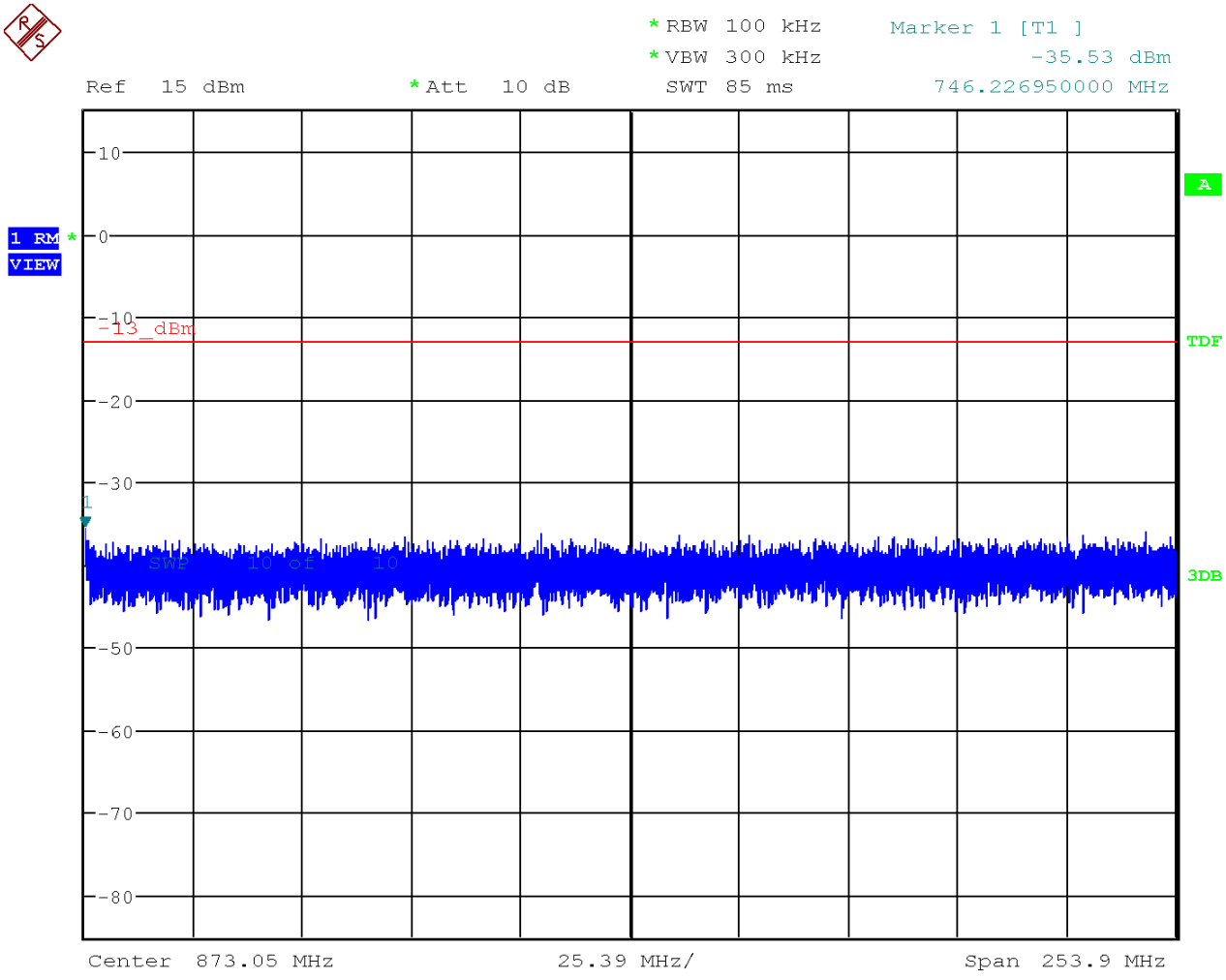
Conducted Spurious Emissions – Downlink Low Frequency 1 GHz – 8 GHz



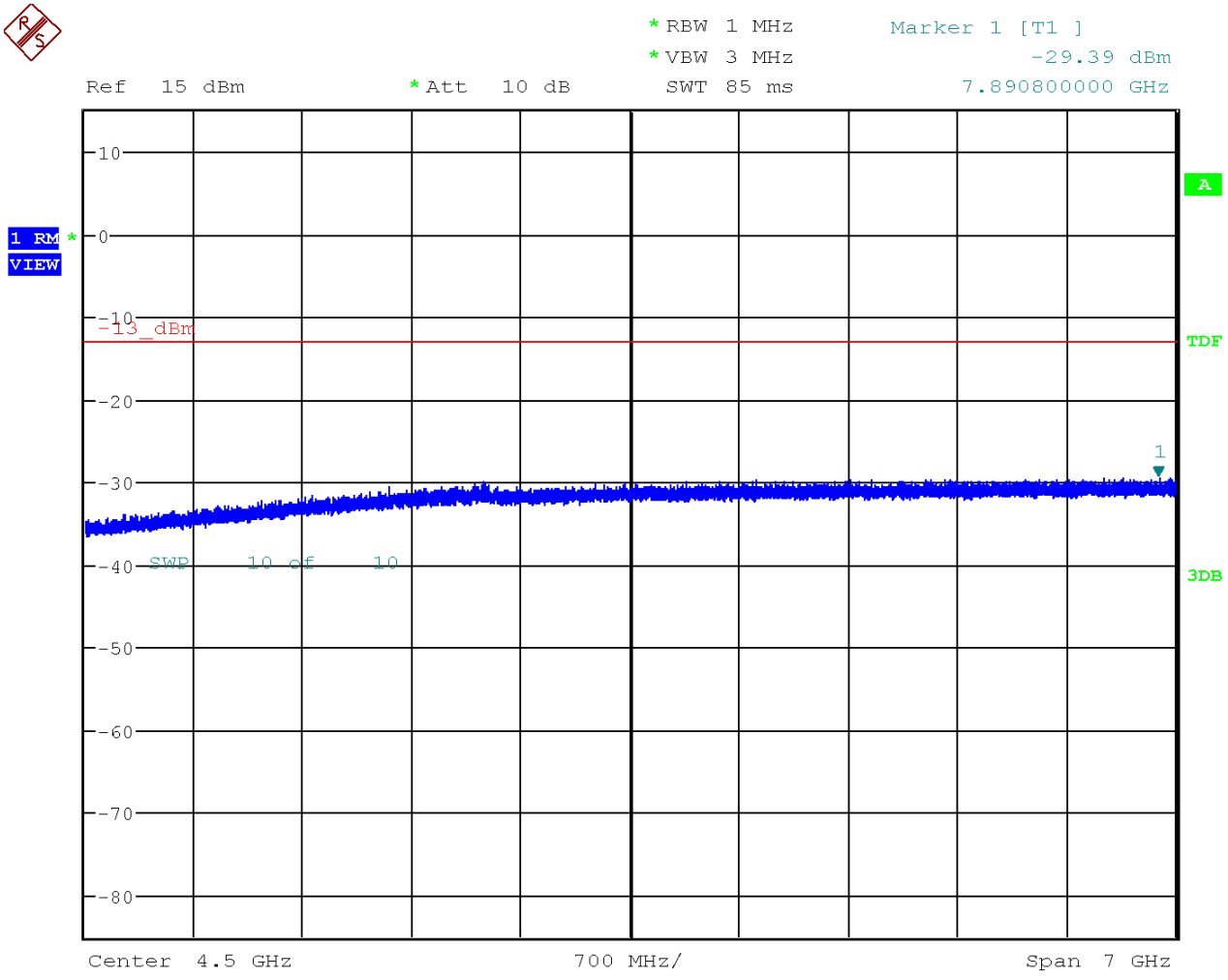
Conducted Spurious Emissions – Downlink Mid Frequency 9 kHz – 728 MHz



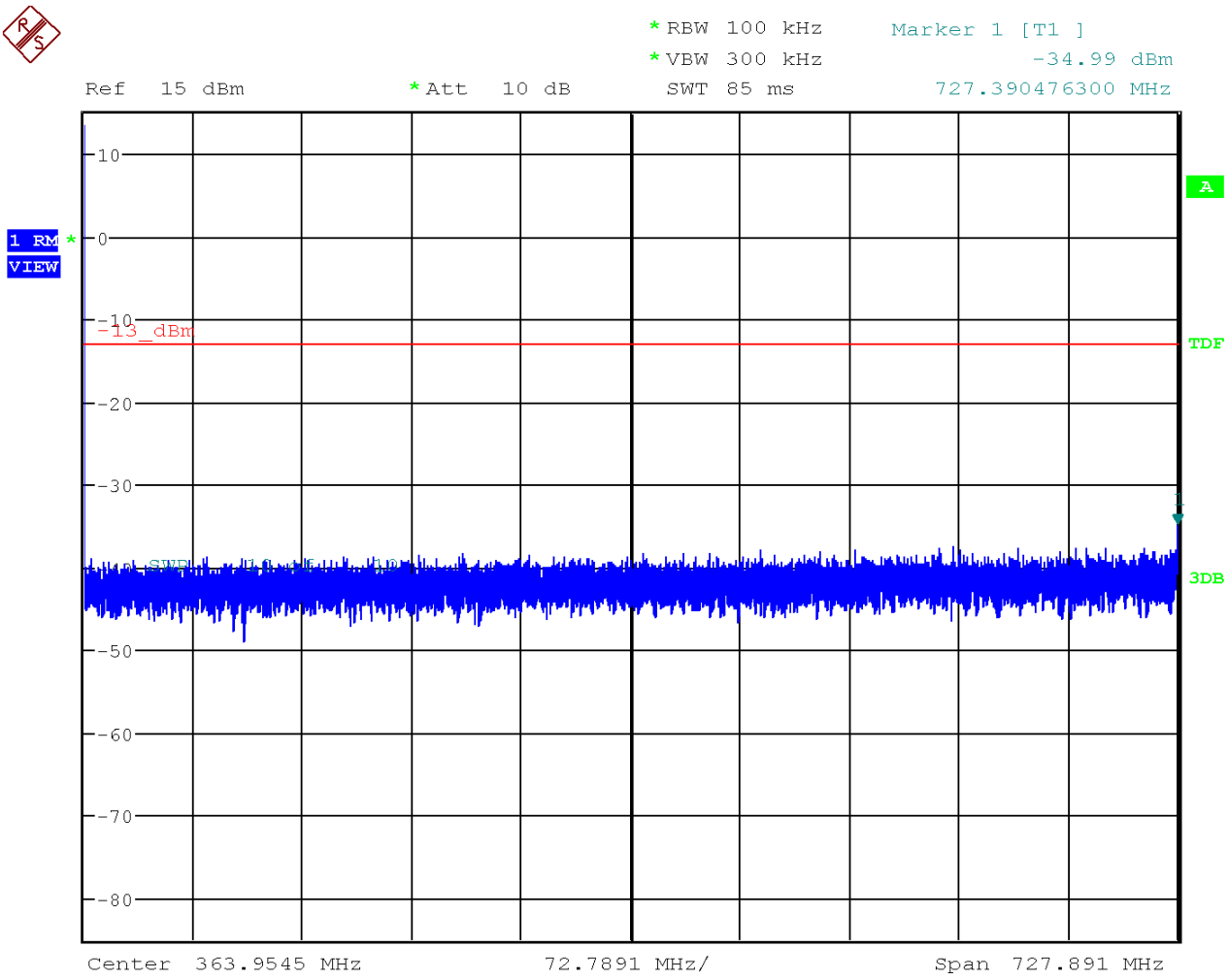
Conducted Spurious Emissions – Downlink Mid Frequency 746 MHz – 1 GHz



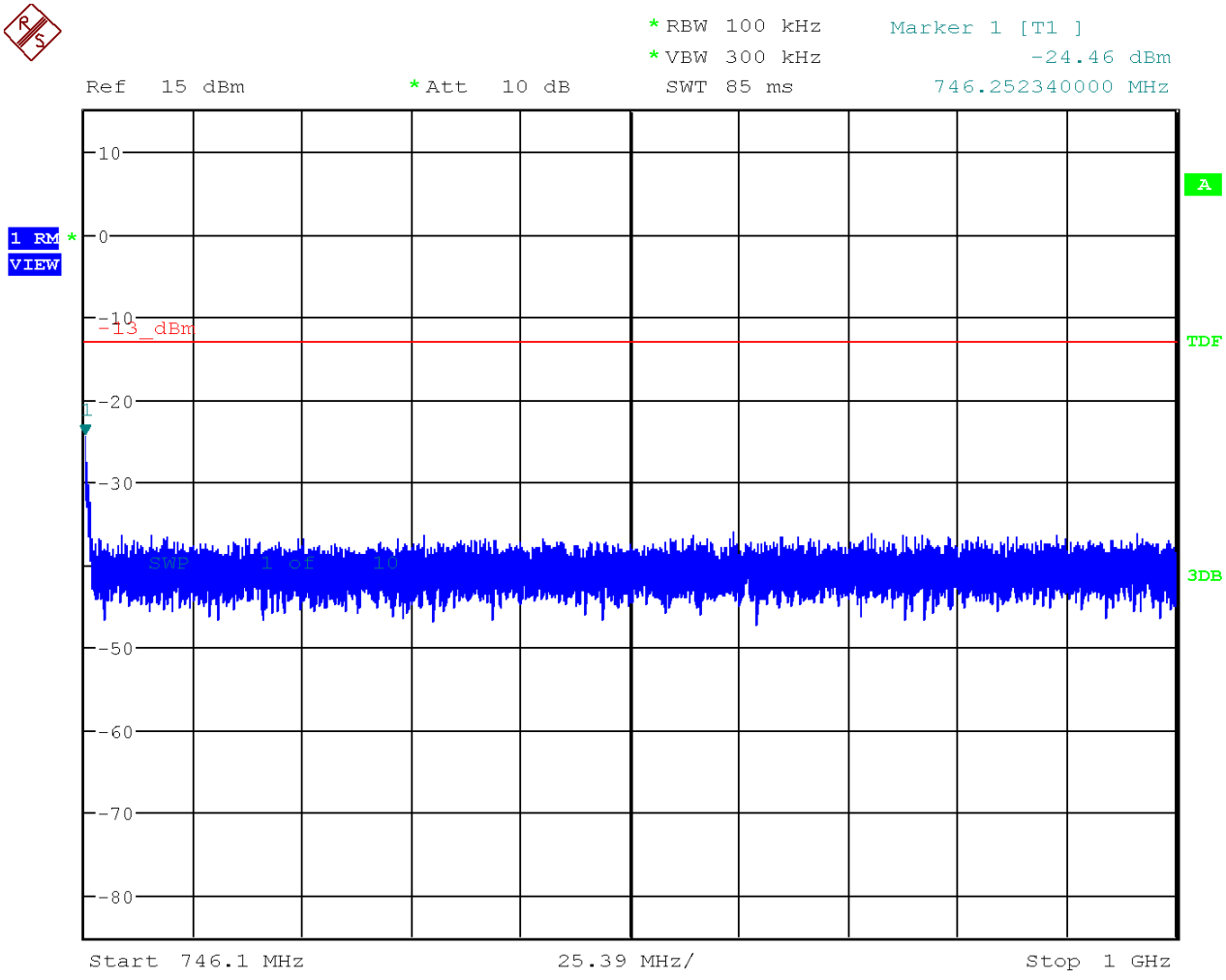
Conducted Spurious Emissions – Downlink Mid Frequency 1 GHz – 8 GHz



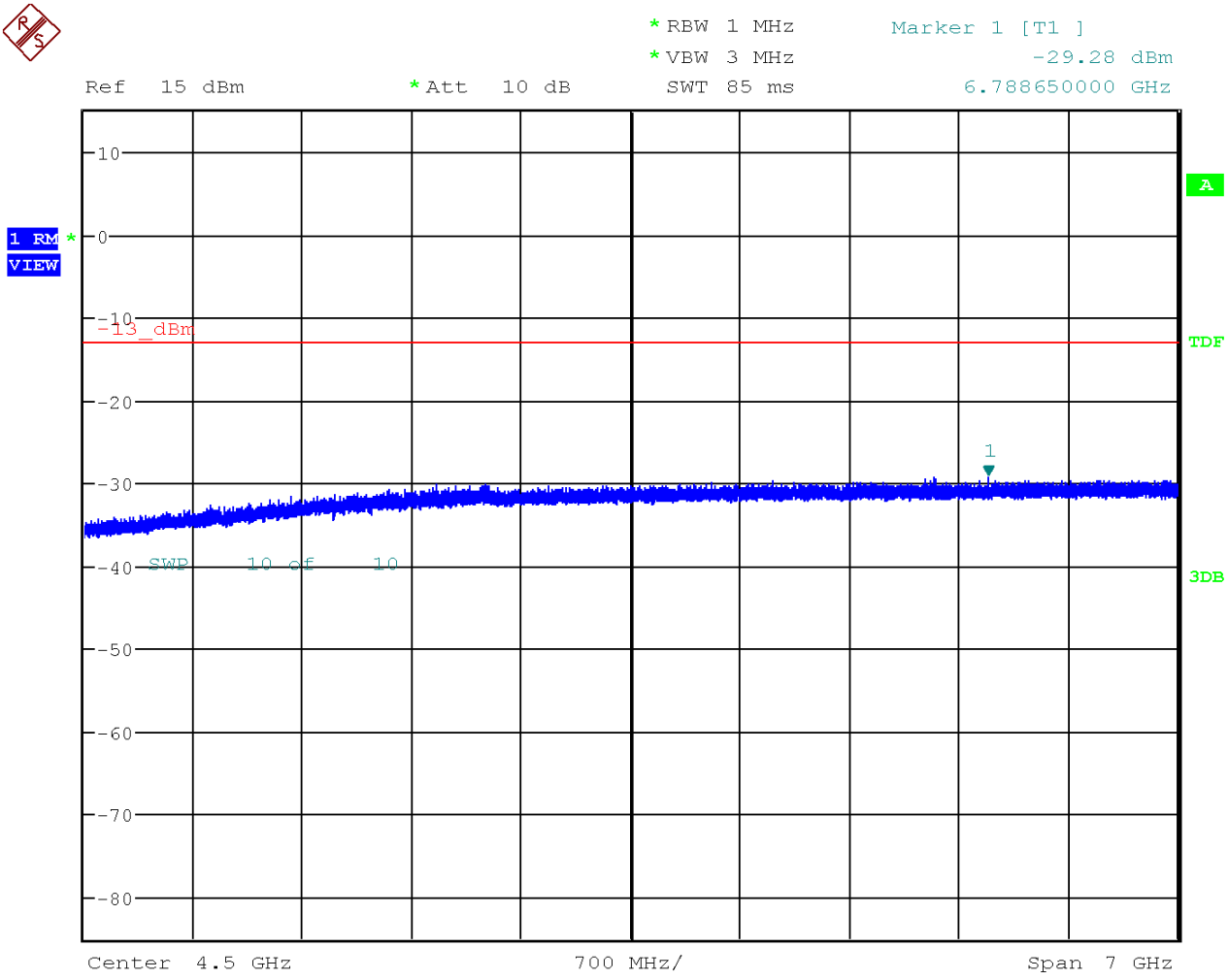
Conducted Spurious Emissions – Downlink High Frequency 9 kHz – 728 MHz



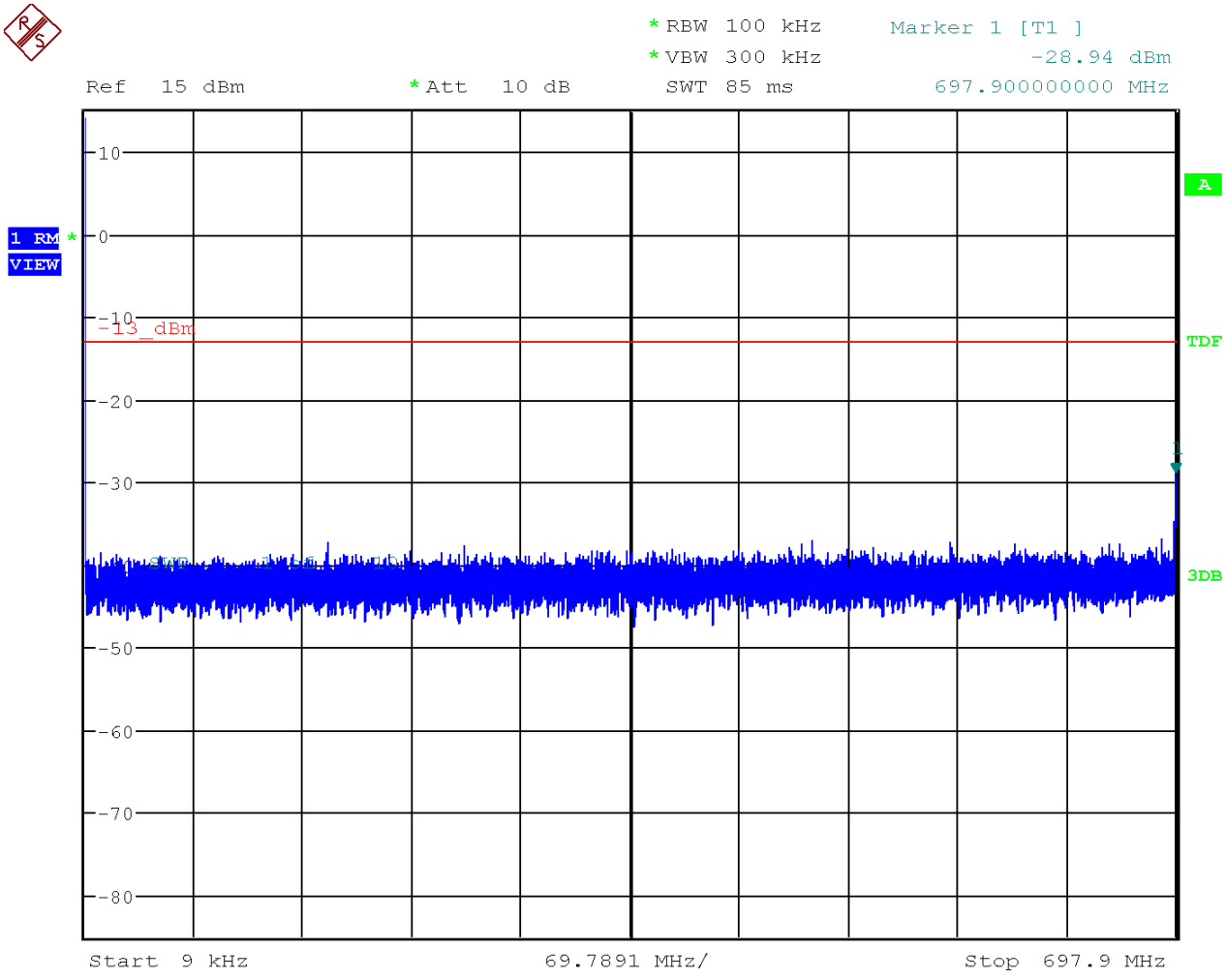
Conducted Spurious Emissions – Downlink High Frequency 746 MHz – 1 GHz



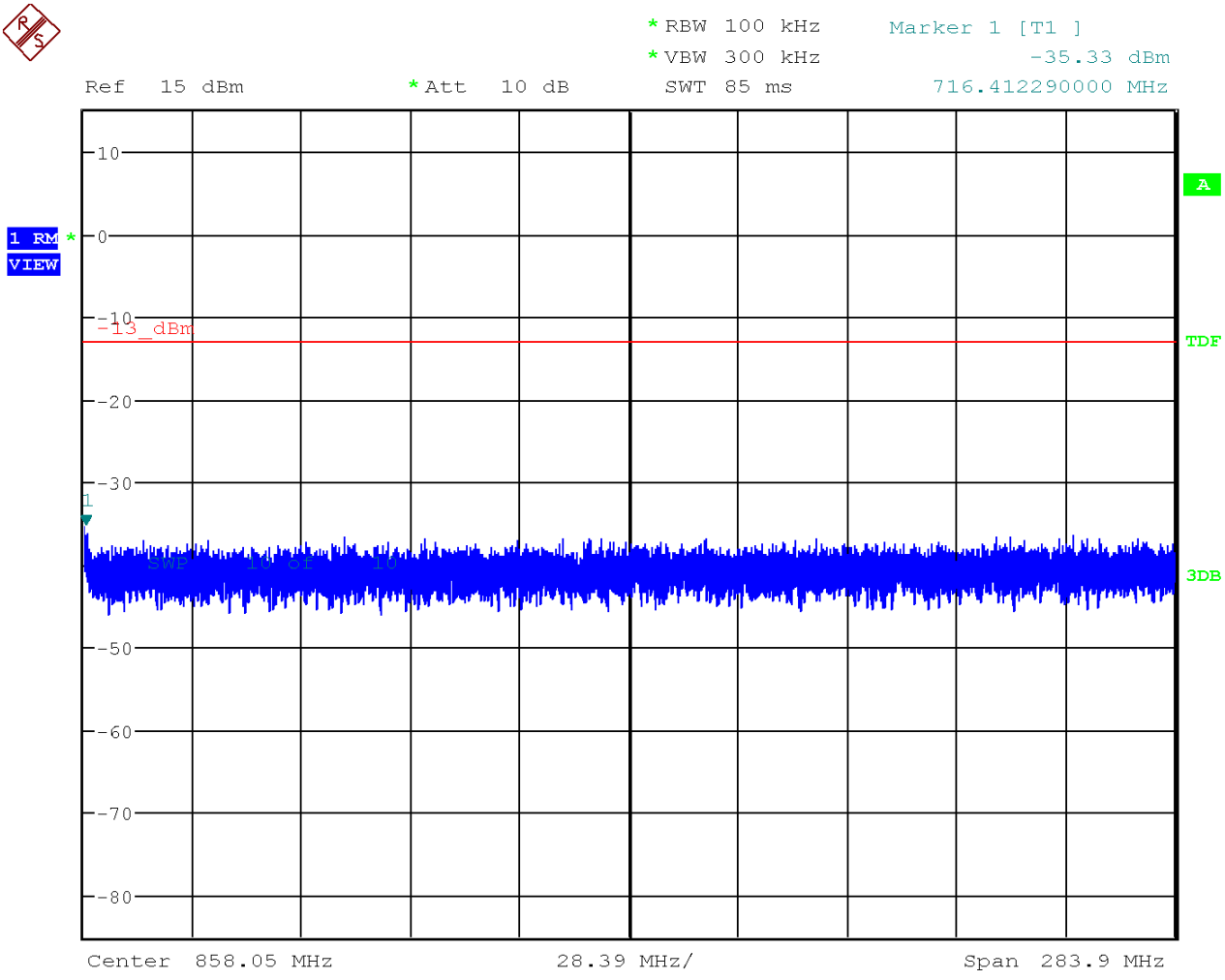
Conducted Spurious Emissions – Downlink High Frequency 1 GHz – 8 GHz



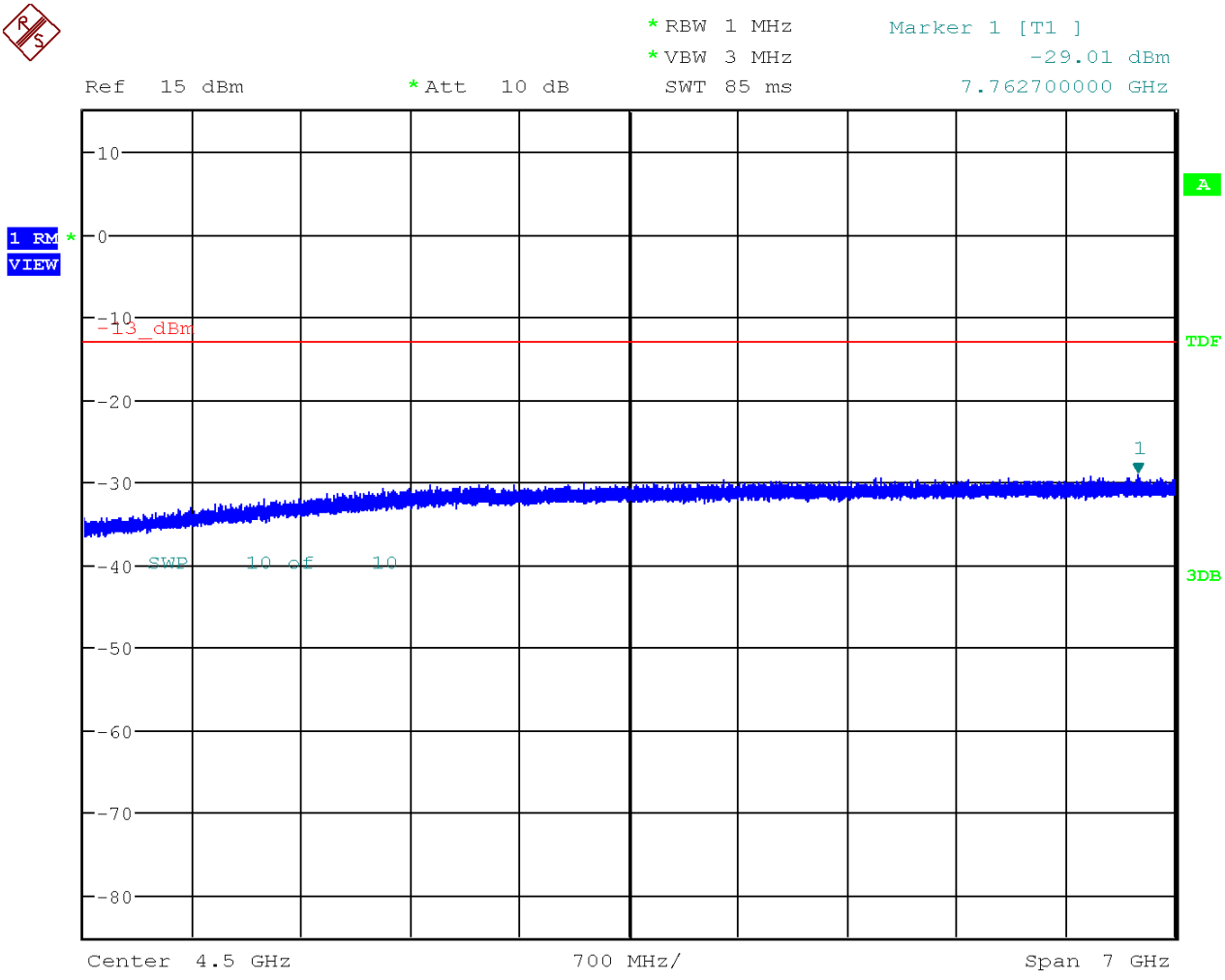
Conducted Spurious Emissions – Uplink Low Frequency 9 kHz – 698 MHz



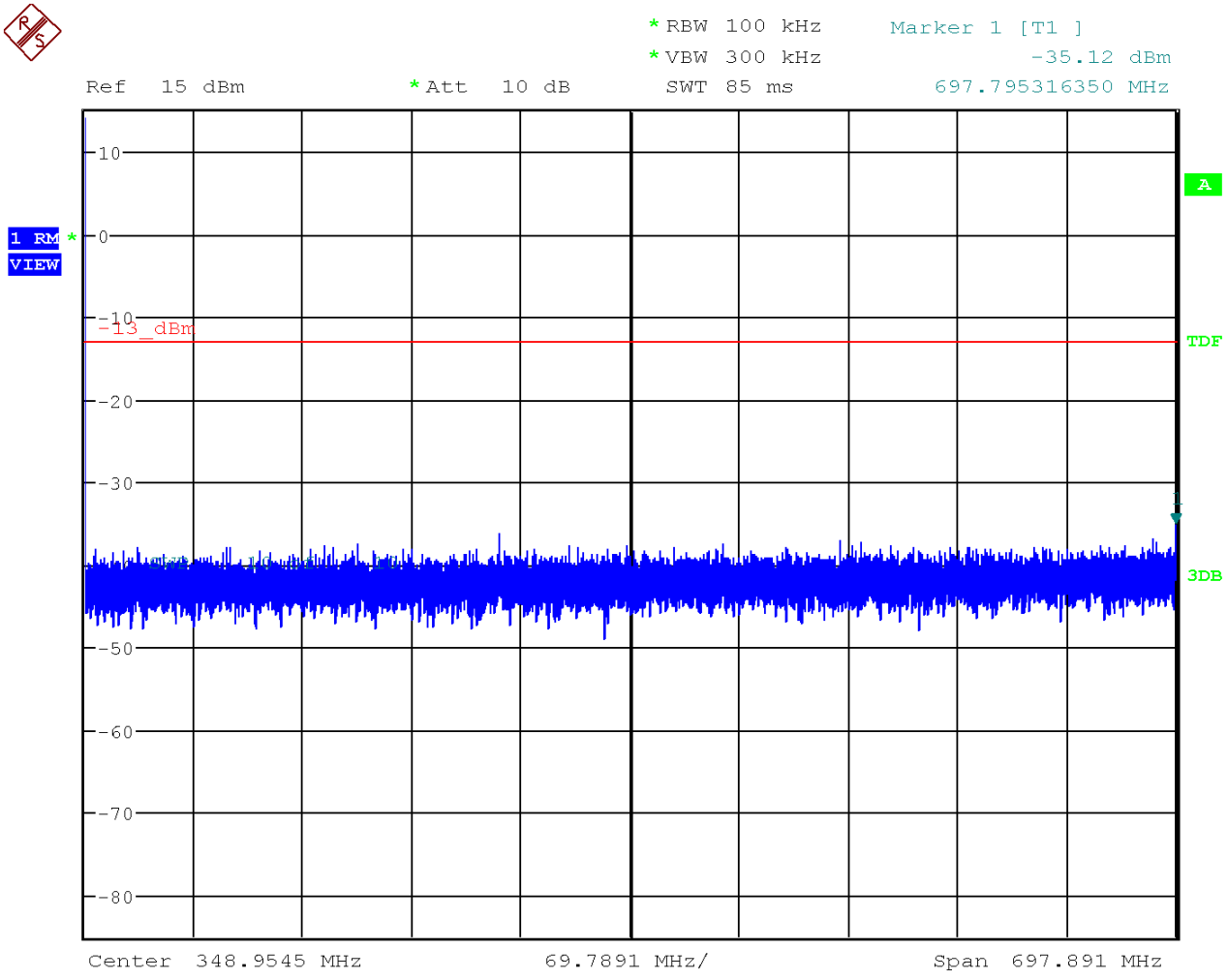
Conducted Spurious Emissions – Uplink Low Frequency 716 MHz – 1 GHz



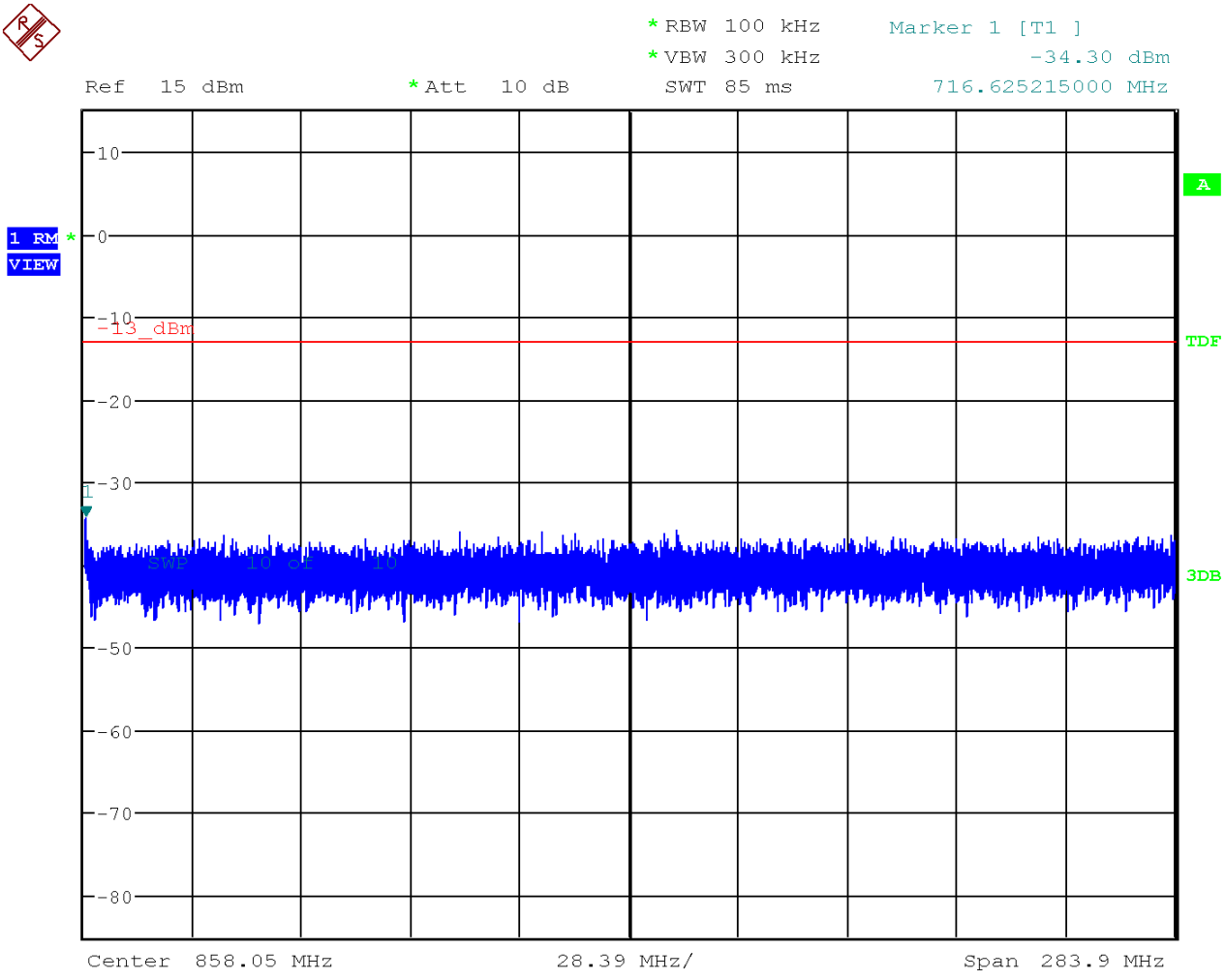
Conducted Spurious Emissions – Uplink Low Frequency 1 GHz – 8 GHz



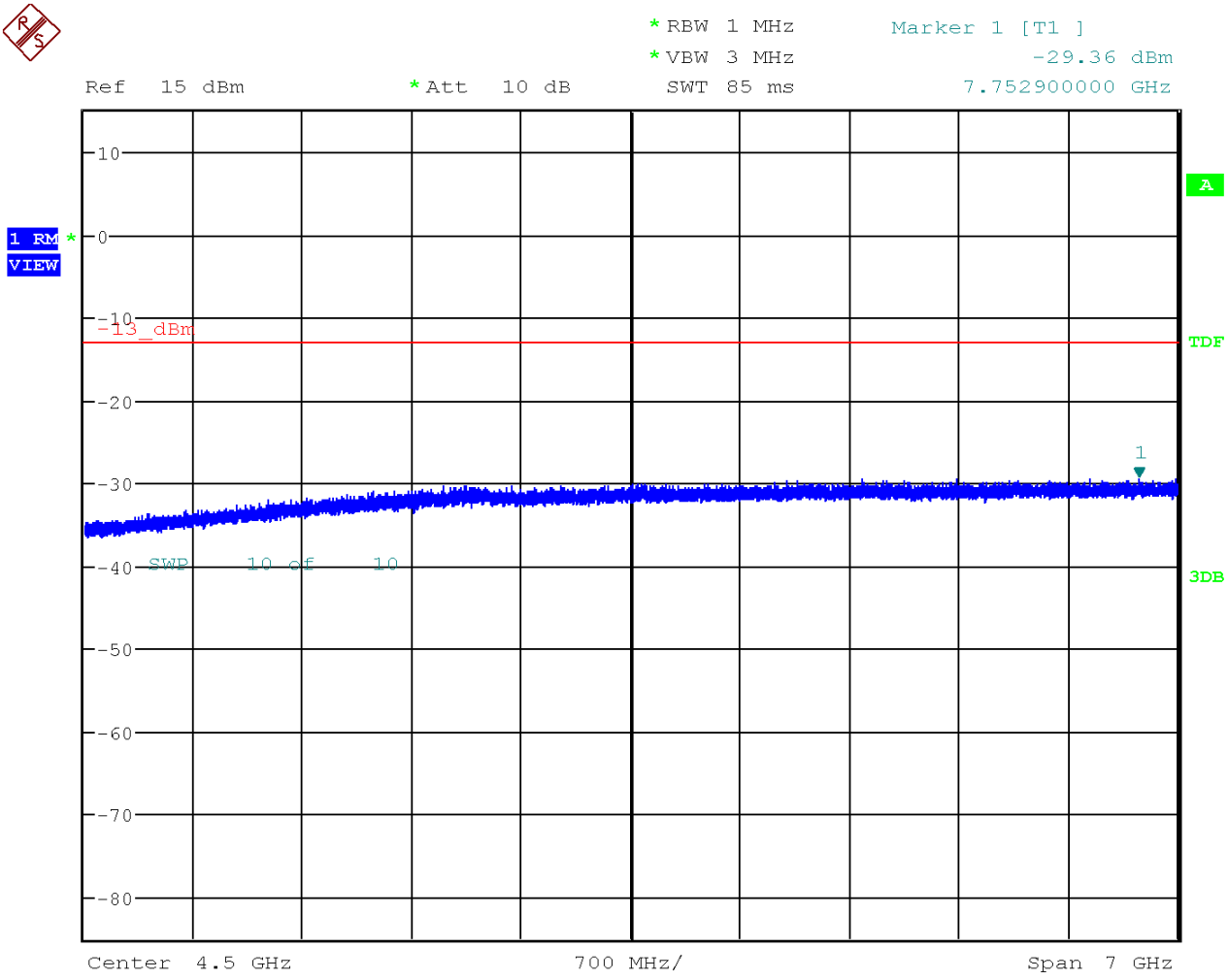
Conducted Spurious Emissions – Uplink Mid Frequency 9 kHz – 698 MHz



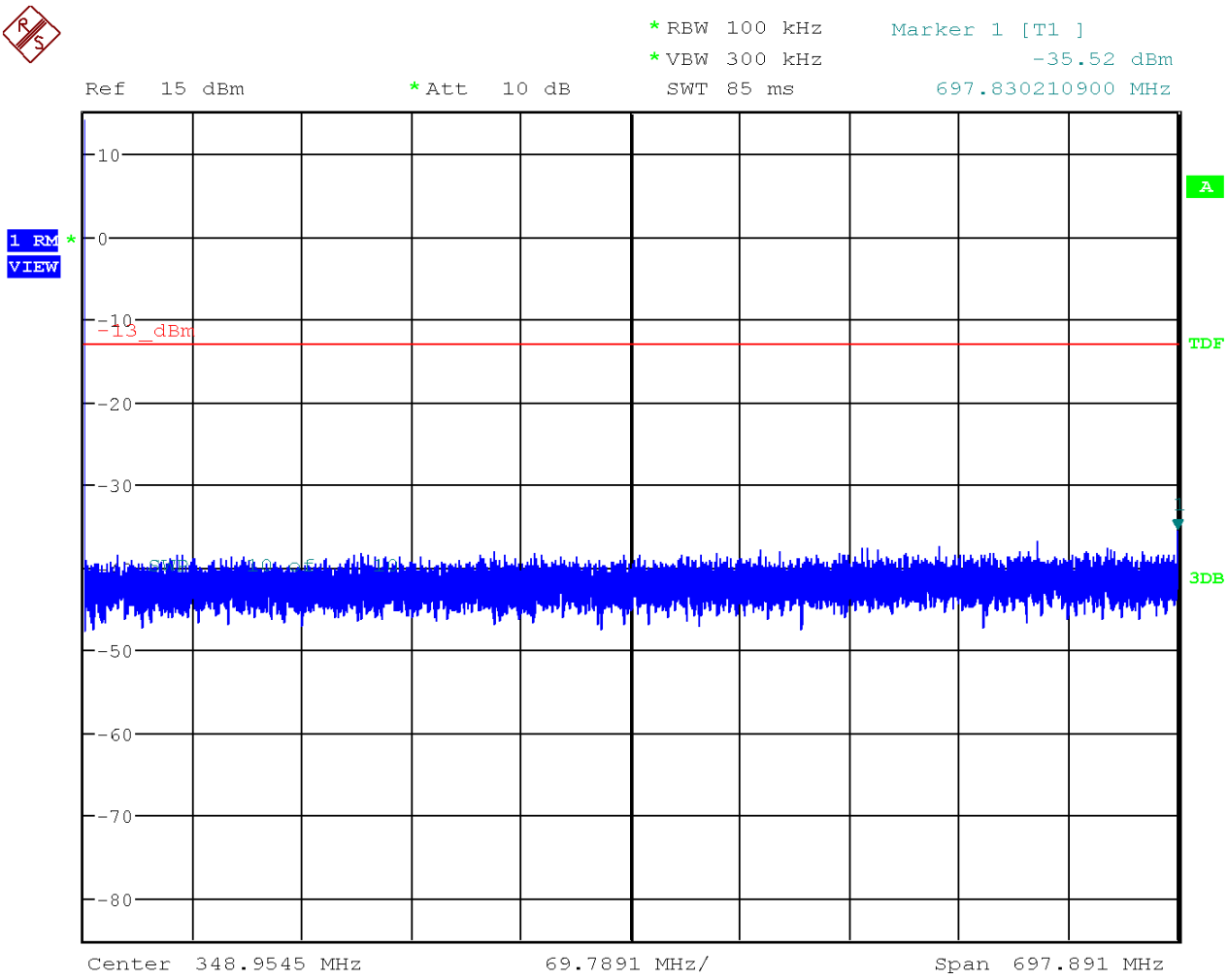
Conducted Spurious Emissions – Uplink Mid Frequency 716 MHz – 1 GHz



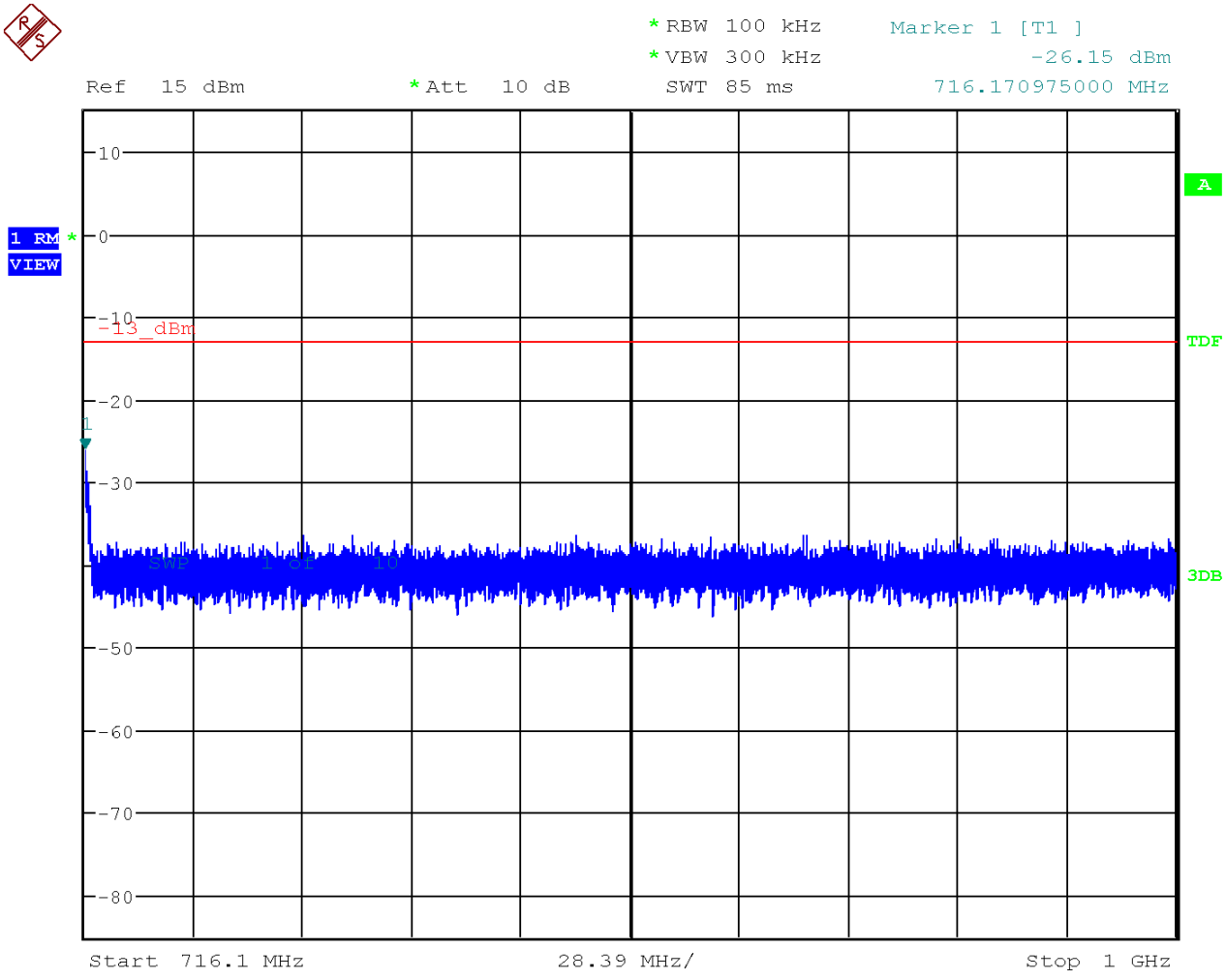
Conducted Spurious Emissions – Uplink Mid Frequency 1 GHz – 8 GHz



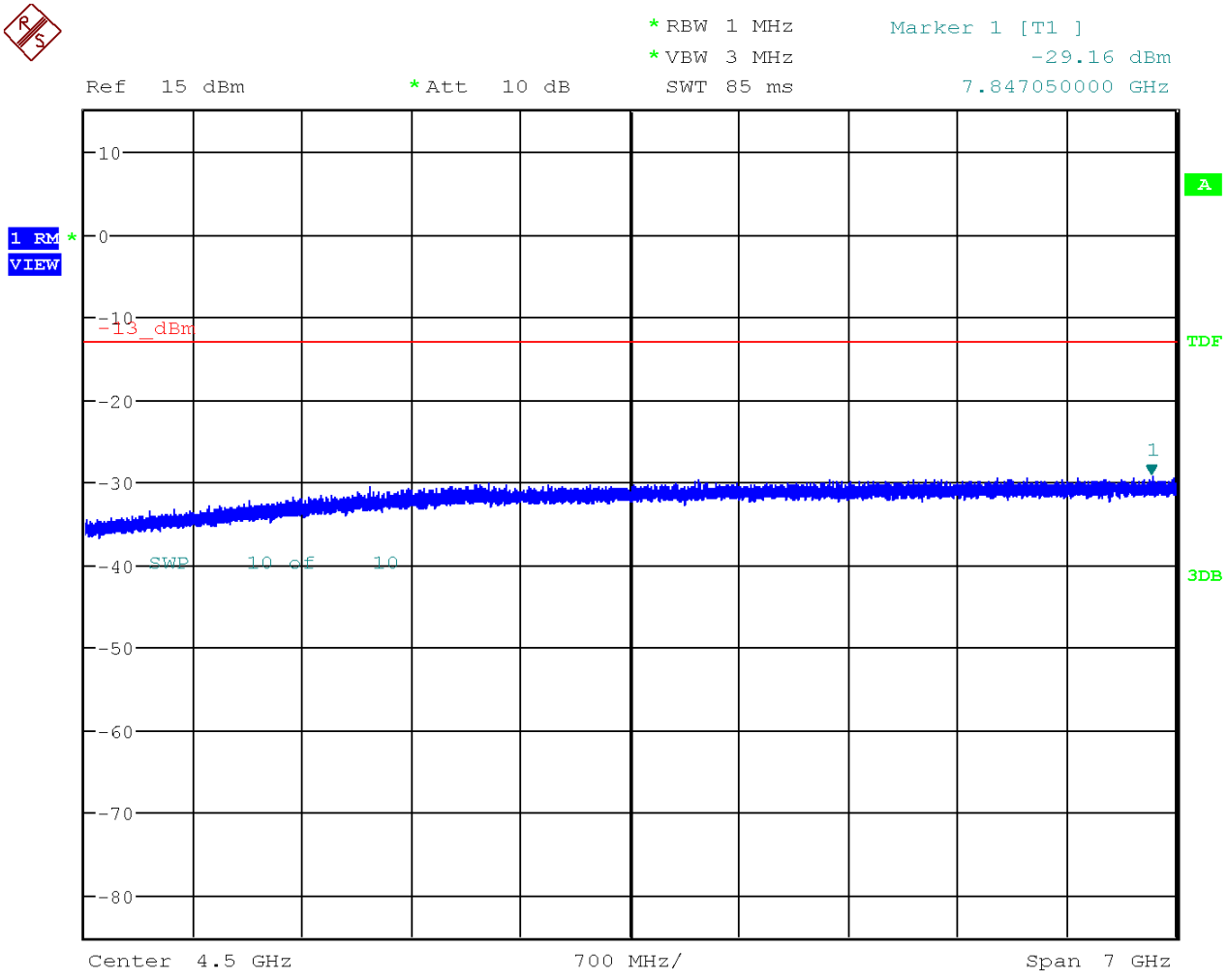
Conducted Spurious Emissions – Uplink High Frequency 9 kHz – 698 MHz



Conducted Spurious Emissions – Uplink High Frequency 716 MHz – 1 GHz



Conducted Spurious Emissions – Uplink High Frequency 1 GHz – 8 GHz



3.8 Radiated Spurious Emissions

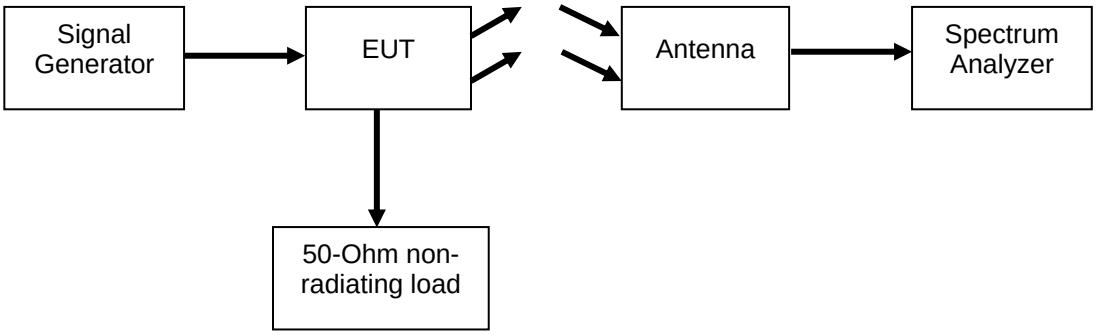
Engineer: Christian Pawlak

Test Date: 9/18/2018

Test Procedure

The Test Procedure used was ANSI C63.26-2015 7.2.2.7 with no deviations. EUT does not support narrowband signal.

Test Setup



No Spurious Emissions found within 20 dB of the Limit

Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna, Amplified	ARA	DRG-118/A	i00271	06/16/2018	06/16/2020
Bi-Log Antenna	Chase	CBL 6111C	i00267	03/08/2018	03/08/2020
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	06/29/2018	06/29/2020
Spectrum Analyzer	Agilent	E4407B	i00331	11/21/2017	11/21/2018
Spectrum Analyzer	Rhode & Schwarz	FSU	i00501	03/27/2018	03/27/2019
Signal Generator	Rhode & Schwarz	SMU200A	i00405	05/10/2018	05/10/2019

In addition to the above listed equipment standard RF connectors, cables, and other passive devices were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT