

Electromagnetic Compatibility Test Report

Prepared in accordance with

FCC Part 15C, RSS-210 Issue 8 and ANSI C63.10

On

WATCH

IRONMAN

Timex

555 Christian Road

Middlebury, CT 06762

Prepared by:

TUV Rheinland of North America, Inc.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Manufacturer's statement - attestation

The manufacturer; Timex, as the responsible party for the equipment tested, hereby affirms:

- a) That they have reviewed and concurs that the test shown in this report are reflective of the operational characteristics of the device for which certification is sought;
- b) That the device in this test report will be representative of production units;
- c) That all changes (in hardware and software/firmware) to the subject device will be reviewed.
- d) That any changes impacting the attributes, functionality or operational characteristics documented in this report will be communicated to the body responsible for approving (certifying) the subject equipment.

Samuel Everett

Printed name of official



Signature of official

555 Christian Road
Middlebury, CT 06762

Address

9/18/2014

Date

203-346-5603

Telephone number

severett@timexgroup.com

Email address of official

Report No.: 31452665.006 Ironman.doc

Page 3 of 43

Client:	Timex 555 Christian Road Middlebury, CT 06762	Name: Tel: Fax: e-mail	Stan Vreeland 203-346-5485 860-302-1275 svreeland@timex.com	
Identification:	WATCH	Serial No.:	E952-48	
Test item:	IRONMAN	Date tested:	9/3/2014	
Testing location:	TUV Rheinland of North America 710 Resende Road, Building 199 Webster, NY 14580 U.S.A.	Tel: (585) 645-0125		
Test specification:	Emissions: FCC Part 15, Subpart C, RSS-210 Issue 8: AS/NZS 4268:2012 FCC Parts 15.107(c), 15.207(c) and RSS-GEN 7.2.2 FCC Parts 15.247(d), 15.205, 15.209, 15.215(c) and RSS-210 A8.5 and RSS-GEN 7.2.1 FCC Part 15.247(a)(2) and RSS-210 A1.1.3, FCC Part 15.247 and RSS-210 Annex 8, FCC Part 15.247(b)(3) and RSS-210 A8.4(4), FCC Part 15.247(d) and RSS-210 2.2, FCC Parts 15.109(a) and RSS-210 2.2, 2.6, A8.5, RSS-GEN 7.2.3.2 FCC Parts 15.247(i) and RSS-102, Issue 4,			
Test Result	The above product was found to be Compliant to the above test standard(s)			
tested by: Randall Masline		reviewed by: Cecil Gittens		
6 October 2014 _____ Signature		6 October 2014 _____ Signature		
Other Aspects:	None			
Abbreviations: OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable				
		Industry Canada	VCCI	BSMI
US5253	Testing Cert.# 3331.04	3466C-1	A-0037	SL2-IN-E-050R

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

TABLE OF CONTENTS

1	GENERAL INFORMATION	6
1.1	SCOPE	6
1.2	PURPOSE	6
1.3	SUMMARY OF TEST RESULTS	7
2	LABORATORY INFORMATION	8
2.1	ACCREDITATIONS & ENDORSEMENTS.....	8
2.2	MEASUREMENT UNCERTAINTY EMISSIONS	9
2.3	CALIBRATION TRACEABILITY	9
2.4	MEASUREMENT EQUIPMENT USED	10
3	PRODUCT INFORMATION	11
3.1	EQUIPMENT MODIFICATIONS	11
3.2	TEST PLAN	11
4	RADIATED EMISSIONS	12
4.1	SPURIOUS EMISSIONS OUTSIDE THE BAND - FCC 15.247(D), RSS-210 A8.5	12
4.2	BAND EDGE	22
4.1	CONDUCTED EMISSIONS ON AC MAINS.....	25
5	ANTENNA PORT CONDUCTED EMISSIONS	26
5.1	CONDUCTED OUTPUT POWER, FCC 15.247(B)(3) AND RSS-210 A8.4(4)	26
5.2	OCCUPIED BANDWIDTH	31
5.3	AVERAGE TIME OF OCCUPANCY FCC PART 15.247(A)(3).....	35
6	RF EXPOSURE FOR PORTABLE DEVICE.....	39
6.1	RF EXPOSURE EVALUATION - FCC PART 15.247(I).....	39
6.2	RF EXPOSURE EVALUATION - RSS-102, ISSUE 4.....	39
6.3	EUT OPERATING CONDITION	39
APPENDIX A		40
7	TEST PLAN.....	40
7.1	GENERAL INFORMATION	40
7.2	MODEL(S) NAME	40
7.3	TYPE OF PRODUCT.....	40
7.4	EQUIPMENT UNDER TEST (EUT) DESCRIPTION	41
7.5	MODIFICATIONS	41
7.6	PRODUCT ENVIRONMENT	41
7.7	COUNTRIES	41
7.8	EUT ELECTRICAL POWERED INFORMATION	42
7.9	EUT MODES OF OPERATION	42
7.10	EUT CLOCK/OSCILLATOR FREQUENCIES	42

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

7.11	ELECTRICAL SUPPORT EQUIPMENT.....	42
7.12	NON - ELECTRICAL SUPPORT EQUIPMENT	43
7.13	EUT EQUIPMENT/CABLING INFORMATION	43
7.14	EUT TEST PROGRAM.....	43
7.15	CONDITION RECEIVED.....	43

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

1 General Information

1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Part 15C, RSS-210 Issue 8 and ANSI C63.10 based on the results of testing performed on 9/3/2014 on the WATCH, IRONMAN No. IRONMAN, manufactured by Timex. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this IRONMAN are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 7 of 43

1.3 Summary of Test Results

Applicant	Timex 555 Christian Road Middlebury, CT 06762	Tel	203-346-5485	Contact	Stan Vreeland
		Fax	860-302-1275	e-mail	svreeland@timex.com
Description:	WATCH	Model:	IRONMAN		
Serial Number	E952-48	Test Voltage/Freq.	3.7 VDC Battery		
Test Date Completed:	9/3/2014	Test Engineer	Randall Masline		
Standards	Watch	Severity Level or Limit		Criteria	Test Result
FCC Part 15, Subpart C Standard	Radio Frequency Devices- Subpart C: Intentional Radiators	See called out parts below		See Below	Complies
RSS-210 Issue 8 Standard	Low-Power Licence-exempt Radiocommunication Devices Category I Equipment	See called out parts below		See Below	Complies
FCC Part 15.247 and RSS-210 Annex 8	Operation within the band 2400 to 2483.5 MHz	See called out parts below		Below Limit	Complies
FCC Parts 15.247(d), 15.205, 15.209, 15.215(c) and RSS-210 A8.5 and RSS-GEN 7.2.1	Out-of-Band Spurious and Harmonic Emissions (EUT in Transmit Mode)	Below the applicable limits		Below Limit	Complies
FCC Parts 15.107(c), 15.207(c) and RSS-GEN 7.2.2	Conducted Emissions on AC Mains	NA, EUT is 3.7 VDC Battery operated		NA	NA
FCC Part 15.247(d) and RSS-210 2.2	Band Edge Radiated Emission	Per requirements of the standard		Below Limit	Complies
FCC Part 15.247(b)(3) and RSS-210 A8.4(4)	Conducted Output Power	Shall not exceed 1.0 Watts		Below Limit	Complies
FCC Part 15.247(a)(2) and RSS-210 A1.1.3	Occupied Bandwidth	6 dB ≥ 500 kHz 99% BW ≤ 0.5% of center freq.		Within Limit	Complies
FCC Part 15.247(a)(3)	Time of Occupancy	Shall not be greater than 0.4 seconds within a period of 0.4 x number of channels		Below Limit	Complies
FCC Part 15.31(e)	Voltage Requirements	Tested with a fully Charged 3.7 VDC Battery		Below Limit	Complies
FCC Parts 15.109(a) and RSS-210 2.2, 2.6, A8.5, RSS-GEN 7.2.3.2	Radiated Emissions while EUT in Receive Mode	Below limit of section 15.109(a) Class B		Below Limit	Complies
FCC Parts 15.247(i) and RSS-102, Issue 4	RF Exposure	SAR or MPE Requirements		Below Limit	Complies (without testing)
FCC Part 15.203	Antenna Requirements	The antenna is permanently attached			Complies (without testing)
AS/NZS 4268:2012	Radio equipment and systems-Short range devices- Limits and methods of measurement	See called out basic standards below		See Below	Complies

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America located at, 710 Resende Road, Building 199, Webster, NY 14580 is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 90575). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

2.1.2 ILAC/A2LA

This is a program which is administered under the auspices of A2LA. The laboratory has been assessed and accredited in accordance with ISO Standard 17025:2005 (Certificate Number: 3331.04). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 VCCI

VCCI Accredited test lab. Registration numbers A-0037, R-3673, C-4113, C-4114, C-4115, T-1158, T-1159 G429.

2.1.4 Industry Canada

(Registration No.: 3466C-1) The OATS has been accepted by Industry Canada to perform testing to 3 and to 10m, based on the test procedures described in ANSI C63.4-2009.

2.1.5 BSMI

Registration No.: SL2-IN-E-050R. The BSMI accreditation was obtained by NIST MRA with the BSMI.

2.1.6 Korea

Recognized by Radio Research Agency as an accredited Conformity Assessment Body (CAB) under the terms of Phase I of the APEC TEL.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

2.1.7 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V / m}}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

$$25 \text{ dBuV/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dBuV/m}$$

2.2 Measurement Uncertainty Emissions

	U_{lab}	U_{cispr}
Radiated Disturbance @ 10m		
30 MHz – 1,000 MHz	3.3 dB	5.2 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.18 dB	3.6 dB
Disturbance Power		
30 MHz – 300 MHz	3.88 dB	4.5 dB

2.3 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

2.4 Measurement Equipment Used

Equipment	Manufacturer	Model #	Ref.	Serial #	Last Cal dd/mm/yy	Next Cal dd/mm/yy	Test
Radiated Emissions							
Horn	ETS/Lindgren	3117		00109306	06-Jan 14	06-Jan-16	RE
BiLog	Chase	CBL6111	C041	1170	12-Sept-12	12-Sept-14	RE
Receiver (20Hz-40GHz)	Rohde & Schwarz	ESI(B) 40	C320	839283/005	16-Jan-14	16-Jan-15	RE
Multimeter	Fluke	83	C437	48162892	06-Aug-14	06-Aug-15	RE
BiLog	Chase	CBL6111B	C448	2081	22-Aug-13	22-Aug-15	RE
Horn(18-26.5 GHz)	EMCO	3160-09	C447	C447	8-Mar-13	8-Mar-15	RE

Note: CE = Conducted Emissions, CI= Conducted Immunity, DP=Disturbance Power, EFT=Electrical Fast Transients, ESD = Electrostatic Discharge, FLI=Flicker, HAR=Harmonics, MF=Magnetic Field Immunity, RE=Radiated Emissions, RI=Radiated Immunity, SI=Surge Immunity, VDSI=Voltage Dips and Short Interruptions

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

3 Product Information

3.1 Equipment Modifications

No modifications were needed to bring product into compliance.

3.2 Test Plan

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in appendix A of this report.

The Bluetooth watch radio operates in the 2400 -2483.5 MHz band and uses 79 Channels, and under LE (low energy) will use 40 channels.

The antenna gain is -1.3 dBi

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

4 Radiated Emissions

4.1 Spurious Emissions Outside the band - FCC 15.247(d), RSS-210 A8.5

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power, based on either RF conducted or radiated measurements. Conducted antenna port measurements are provided below to show that the EUT meets these requirements at the band edges.

4.1.1 Over View of Test

Results	Complies (as tested per this report)					Date	9/10/2014	
Standard	FCC Parts 15.205, 15.209, 15.215(c), 15.247(d), RSS-210 A8.5, and RSS-GEN 7.2.1							
Product Model:	IRONMAN				Serial#	E952-48		
Test Set-up	Tested in a 10m Anechoic chamber, placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane on a turn-table. See test plans for details							
EUT Powered By	3.7 VDC Battery	Temp	76 °F	Humidity	36%	Pressure	1007 mbar	
Perf. Criteria	(Below Limit)			Perf. Verification		Readings Under Limit		
Mod. to EUT	None			Test Performed By		Randall Masline		

4.1.2 Test Procedure

Testing was performed in accordance with 47 CFR Part 15, ANSI C63.10:2009, RSS-GEN Issue 2.

This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.1.3 Deviations

There were no deviations from the test methodology listed in the test plan for the radiated emission test.

4.1.4 Final Test

All final radiated spurious emissions measurements were below (in compliance) the limits.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

4.1.4.1 Emissions Outside the Frequency Band

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of desired power, based on either RF conducted or radiated measurements. Conducted antenna port measurements are provided below to show that the EUT meets these requirements at the band edges.

NOTE: Scans were taken with Res band of 100 kHz and Vid band of 300 kHz, the actual measurements were taken with a Res band of 1 MHz and Vid Band of 3 MHz

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

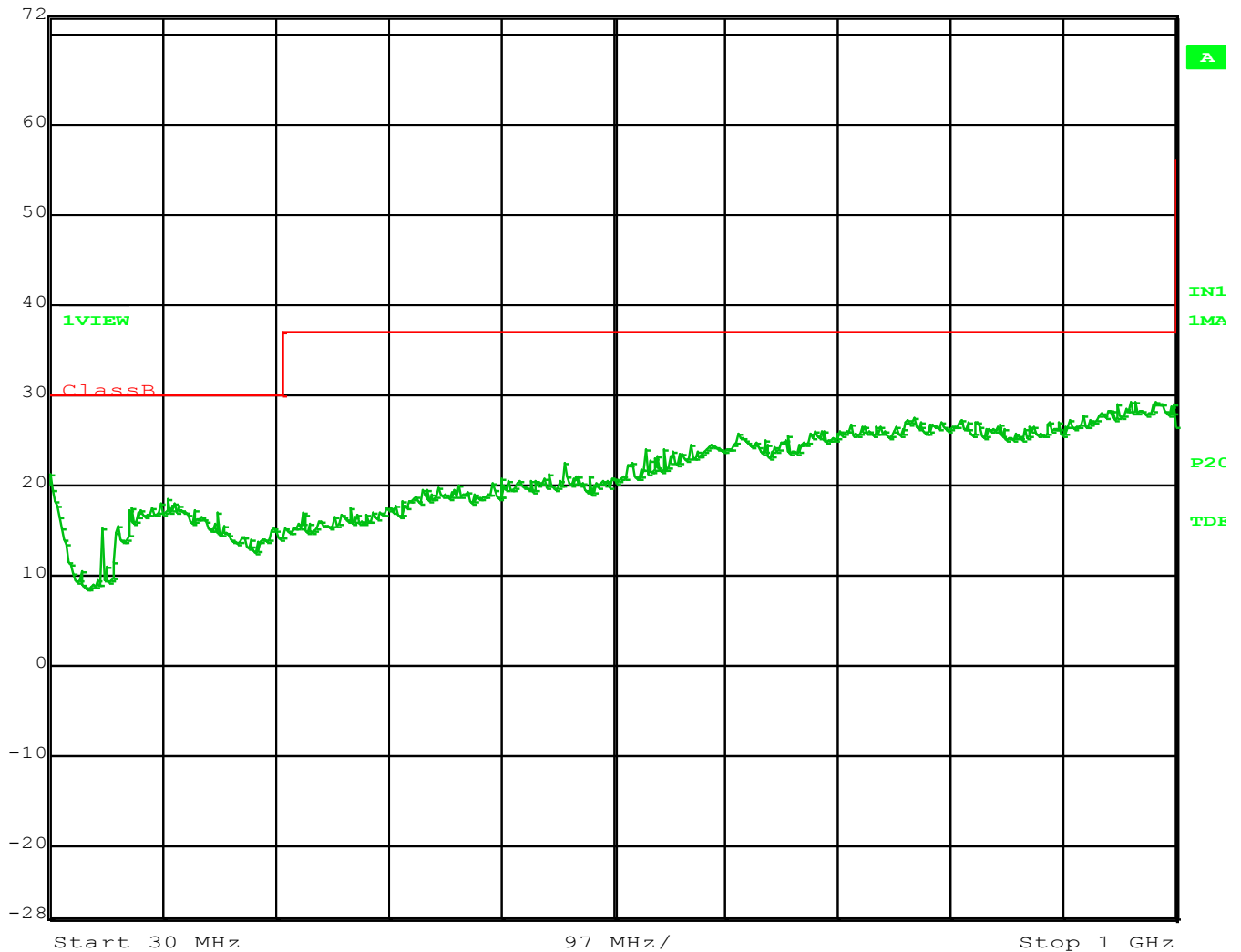
Worst-Case Radiated Emissions 30MHz to 1000MHz

Horizontal



Ref Lvl
72 dB*

RBW 100 kHz RF Att 0 dB
VBW 300 kHz
SWT 300 ms Unit dBμV/m

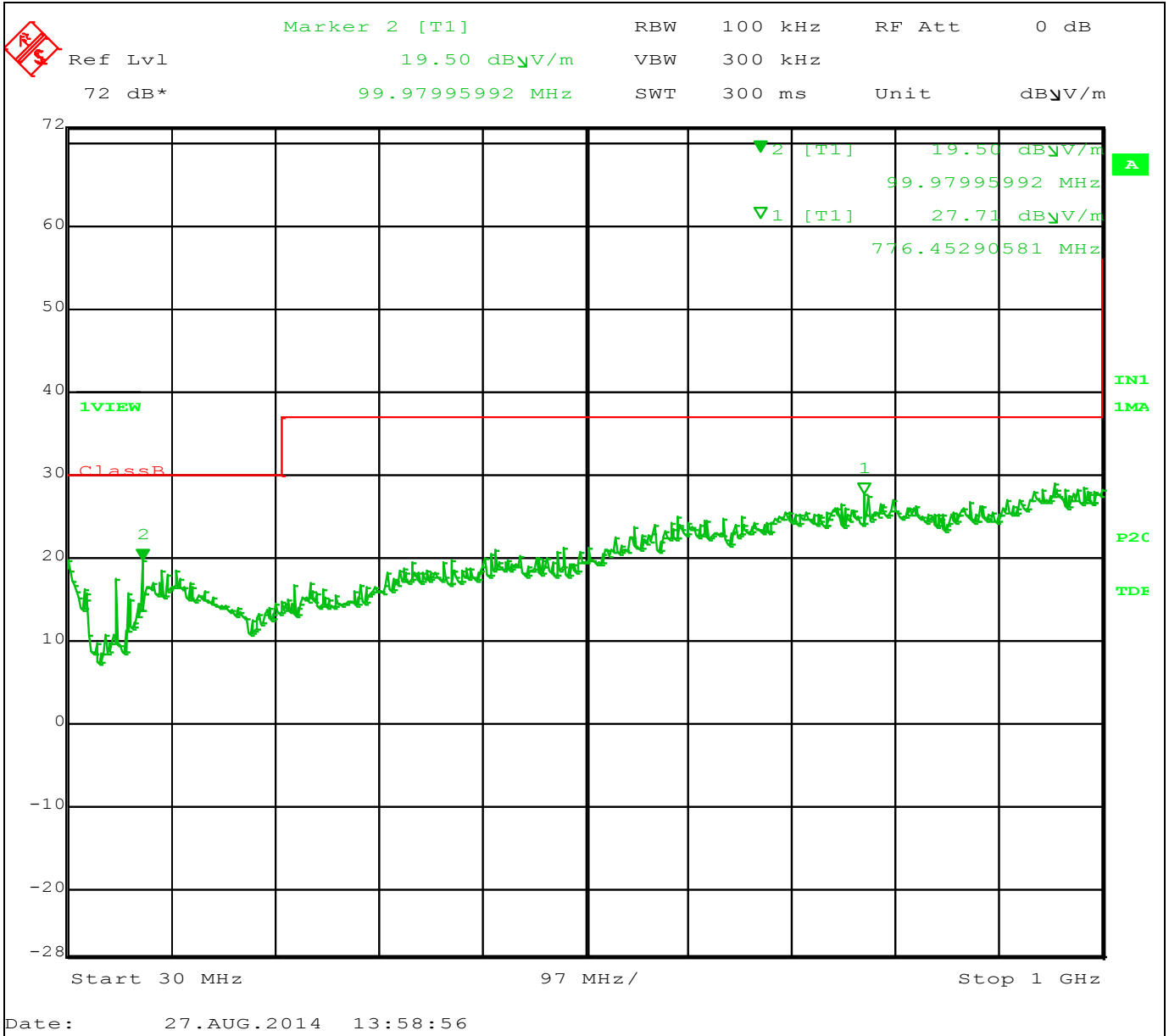


Date: 27.AUG.2014 13:57:23

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Worst-Case Radiated Emissions 30MHz to 1000MHz

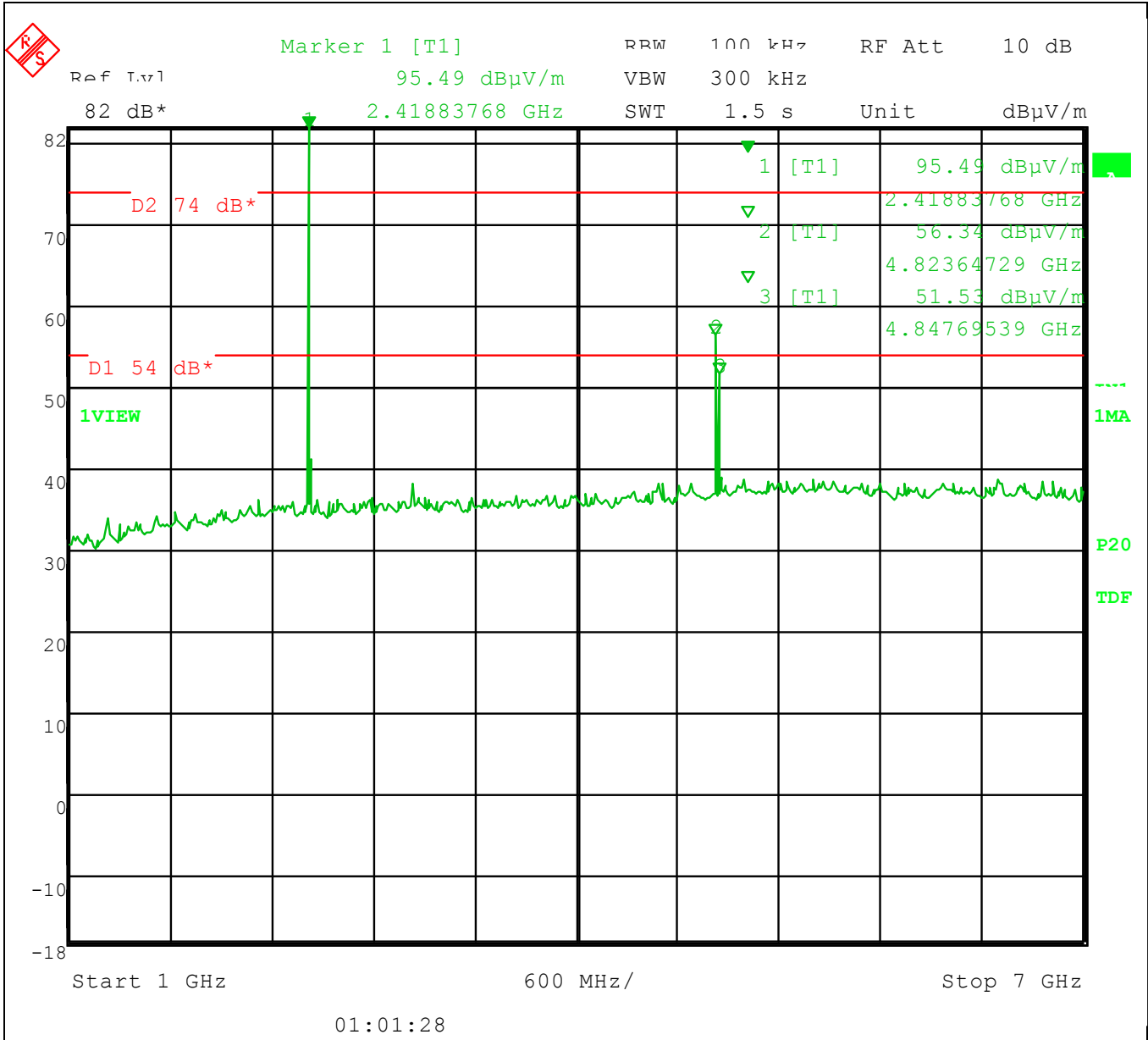
Vertical



The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Worst-Case Radiated Emissions 1GHz to 7GHz

Horizontal

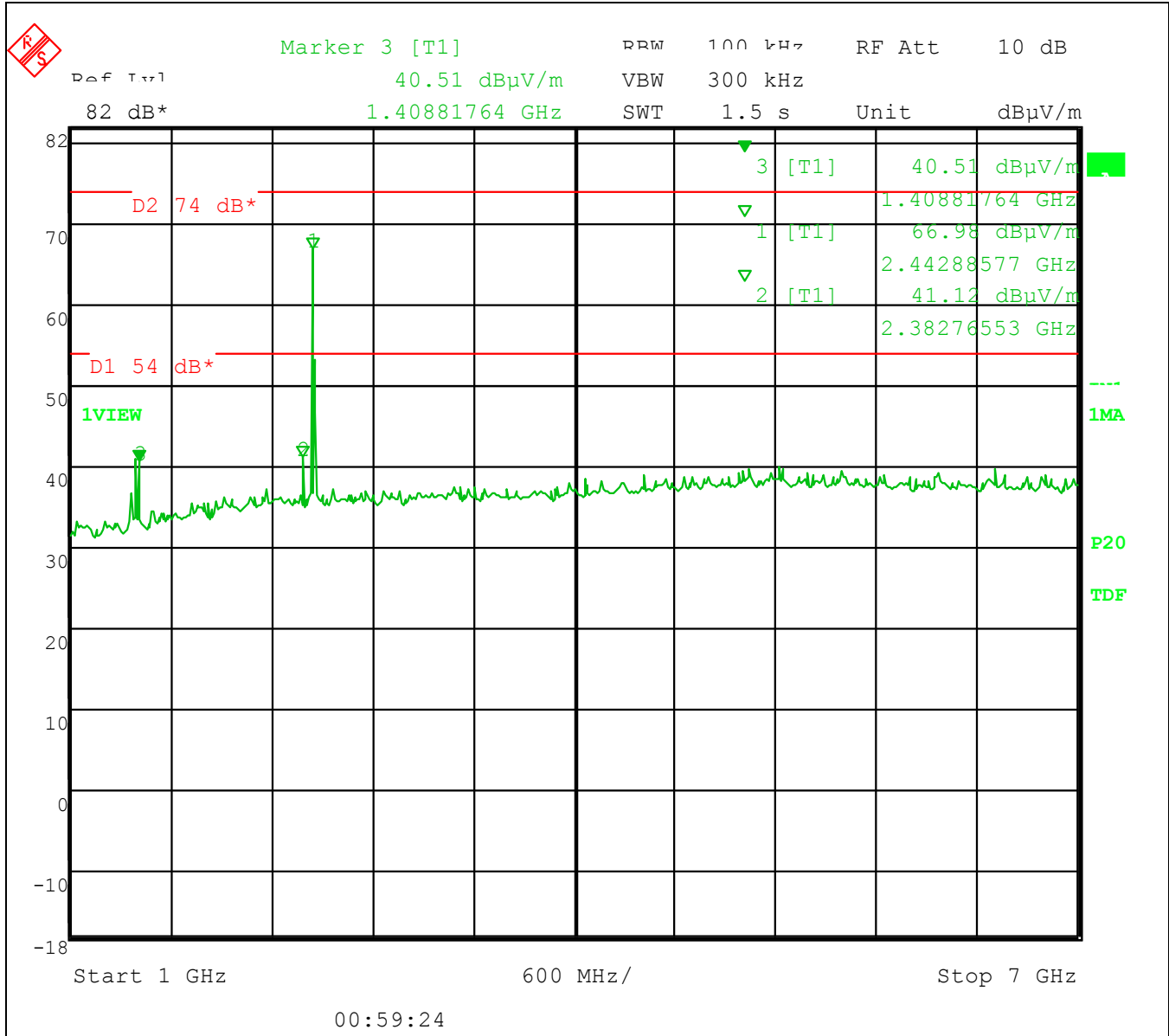


NOTE: Scans were taken August 28, 2014

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Worst-Case Radiated Emissions 1GHz to 7GHz

Vertical

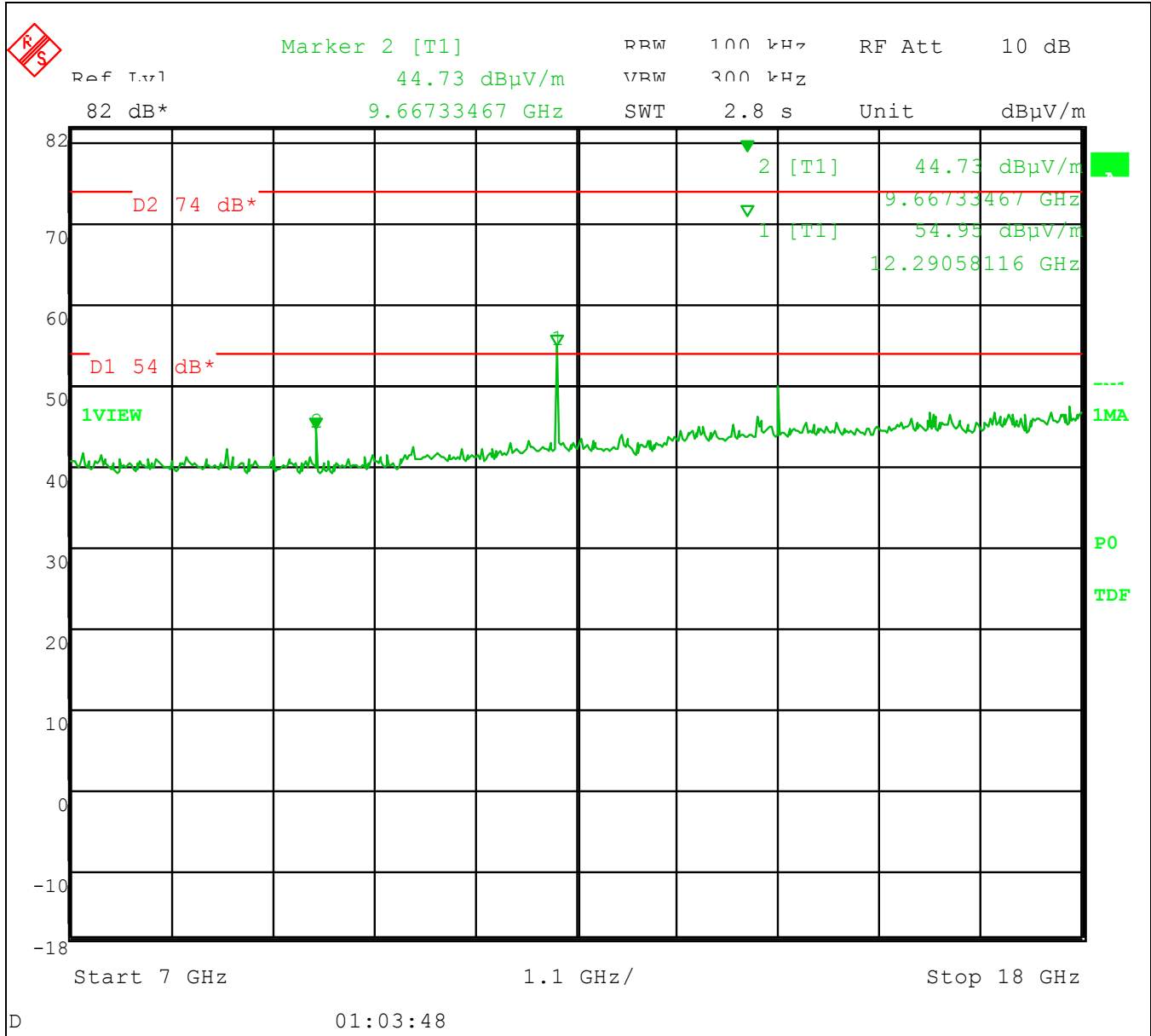


NOTE: Scans were taken August 28, 2014

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Worst-Case Radiated Emissions 7GHz to 18GHz

Horizontal



NOTE: Scans were taken August 28, 2014

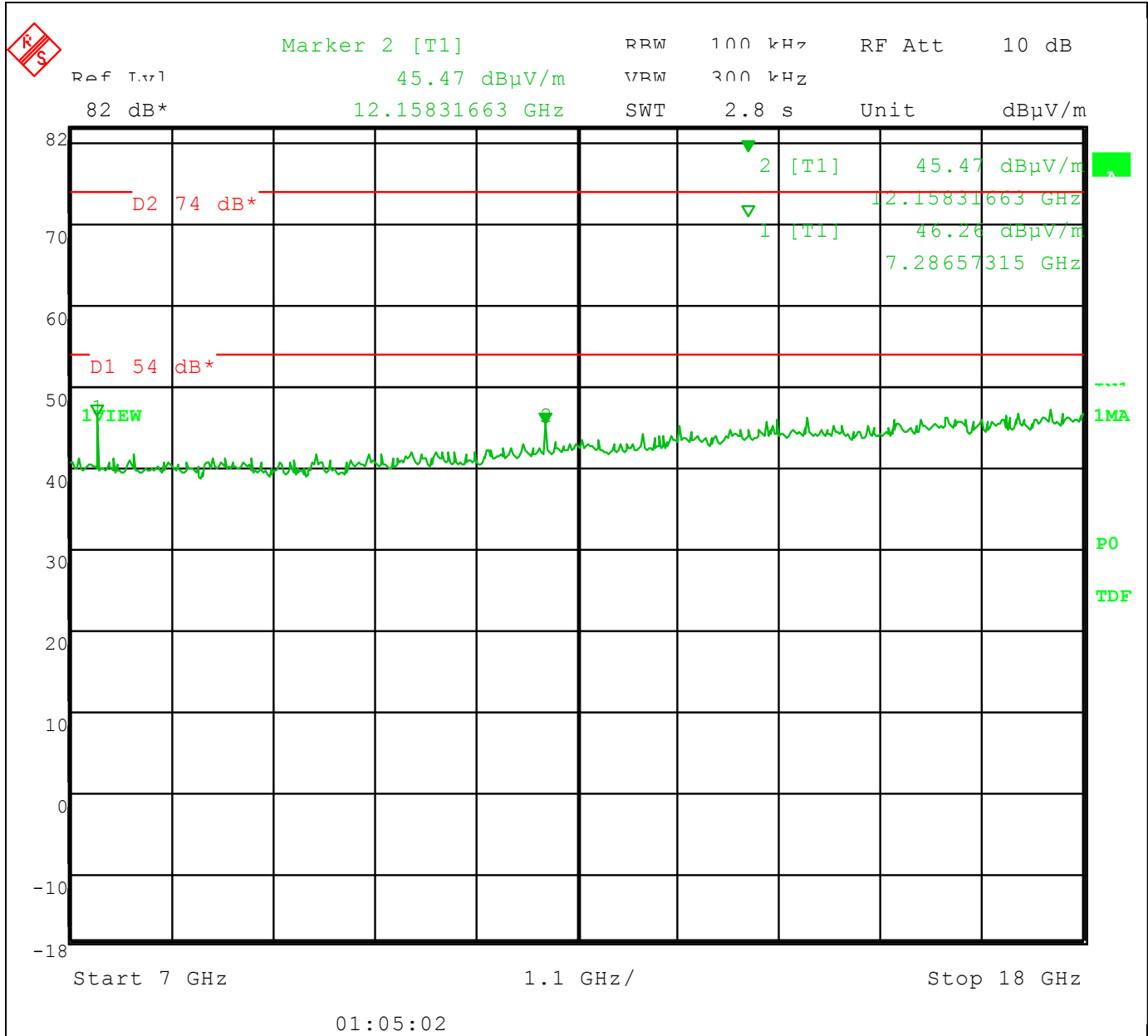
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 19 of 43

Worst-Case Radiated Emissions 7GHz to 18GHz

Vertical

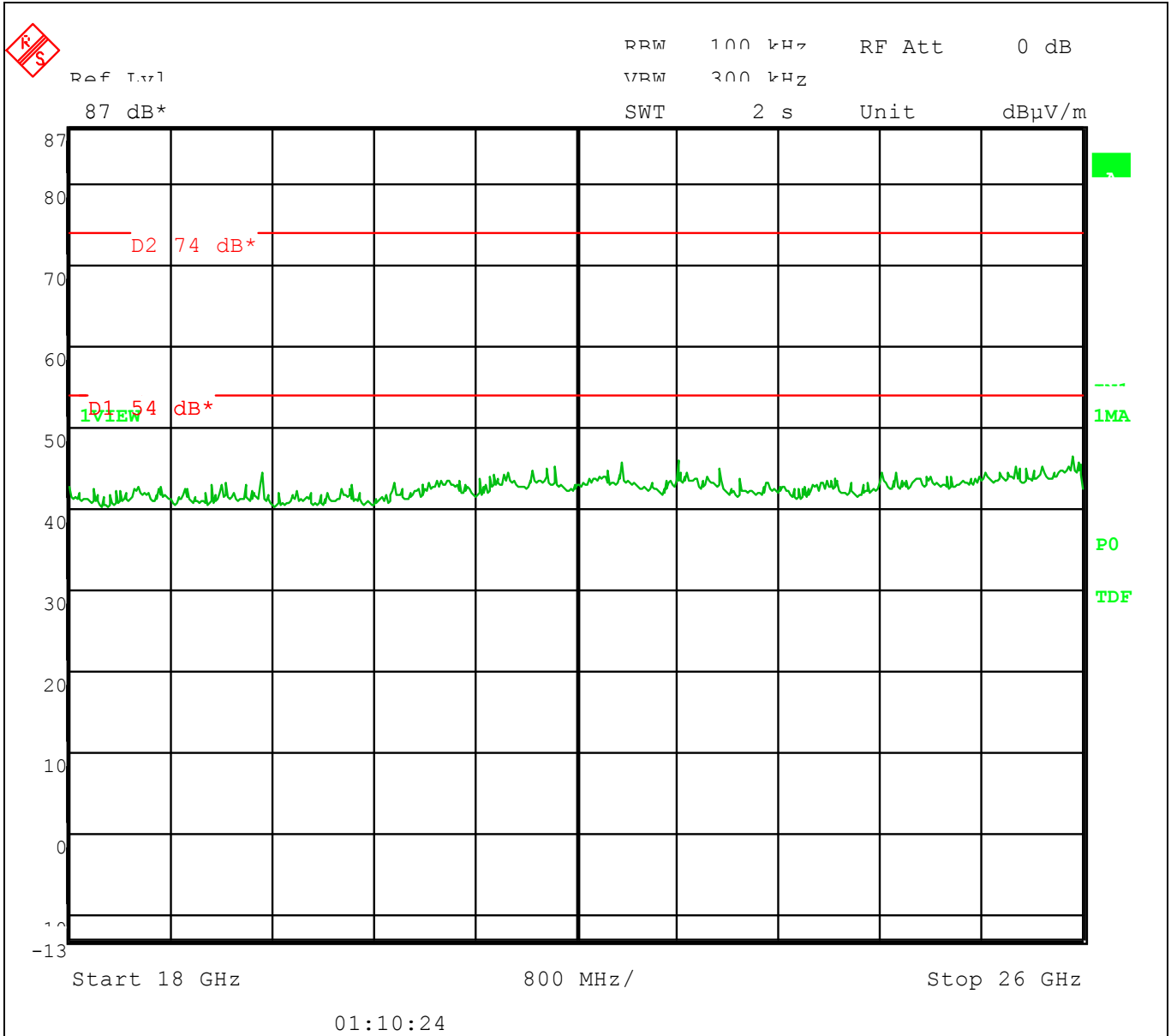


NOTE: Scans were taken August 28, 2014

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Worst-Case Radiated Emissions 18GHz to 26GHz

Horizontal

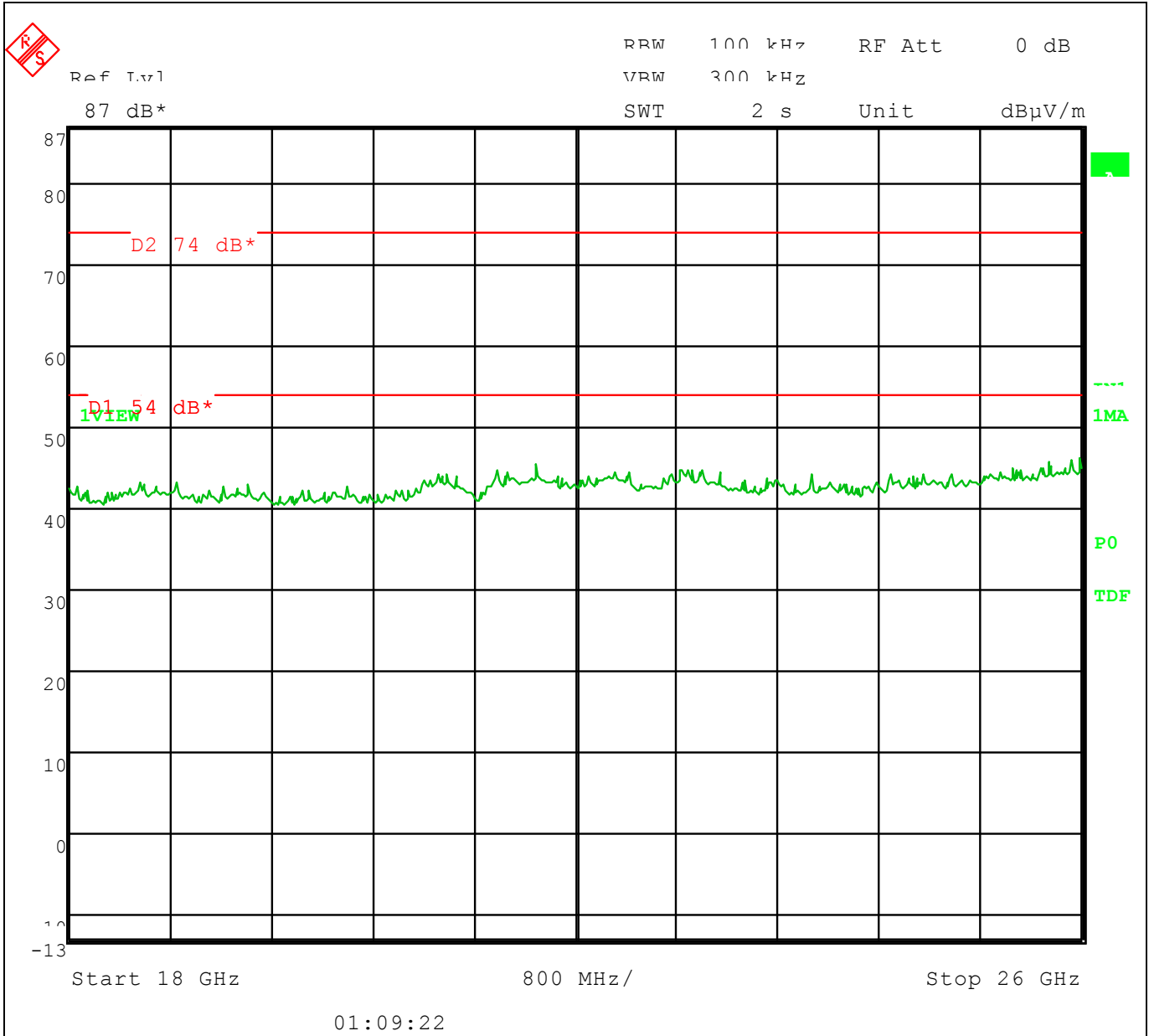


NOTE: Scans were taken August 28, 2014

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Worst-Case Radiated Emissions 18GHz to 26GHz

Vertical



NOTE: Scans were taken August 28, 2014

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

4.2 Band Edge

4.2.1 Test Over View

Results	Complies (as tested per this report)					Date	9/9/2014	
Standard	FCC Part 15.247(d), RSS 210 2.2							
Product Model	IRONMAN				Serial#	E952-48		
Test Set-up	Radiated at 3m							
EUT Powered By	3.7 VDC Battery	Temp	76° F	Humidity	46%	Pressure	1002 mbar	
Perf. Criteria	(Below Limit)		Perf. Verification			Readings Under Limit		
Mod. to EUT	None		Test Performed By			Randall Masline		

4.2.2 Test Procedure

Intentional radiators operating under the alternative provisions to the general emission limits must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

4.2.3 Deviations

There were no deviations from the test methodology listed in the test plan for the Radiated Immunity test.

4.2.4 Final Test

The EUT met the performance criteria requirement as specified in the standards.

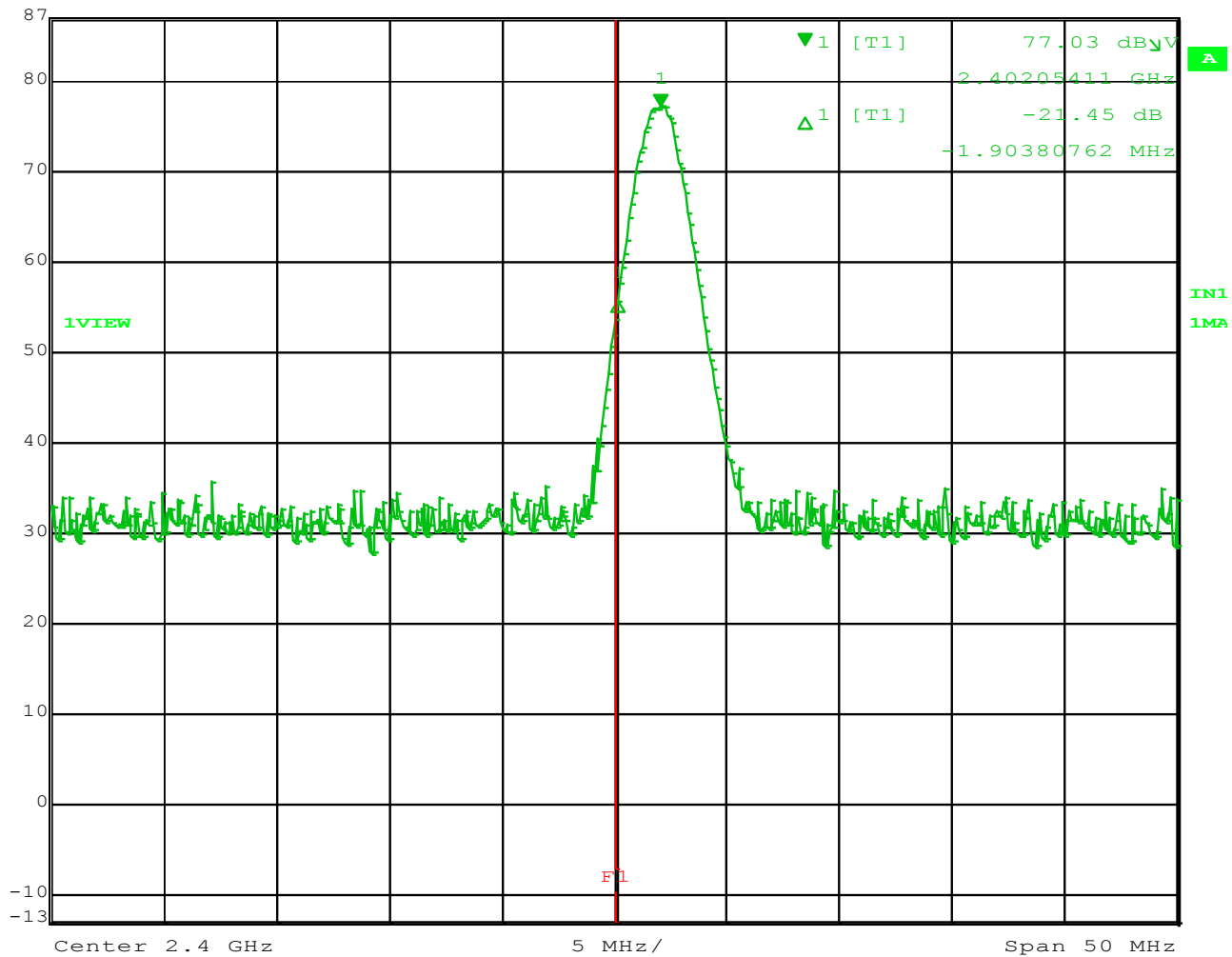
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 23 of 43



Ref Lvl 87 dBμV
Marker 1 [T1] 77.03 dBμV
2.40205411 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 10 dB
Unit dBμV



Date: 25.SEP.2014 05:52:54

Notes: Measured using the Peak detector. Band Edge is at 2.4 GHz (F1).

Figure 1: Lower Band Edge Measurement (Radiated Emission)

The EUT is compliant with the rules.

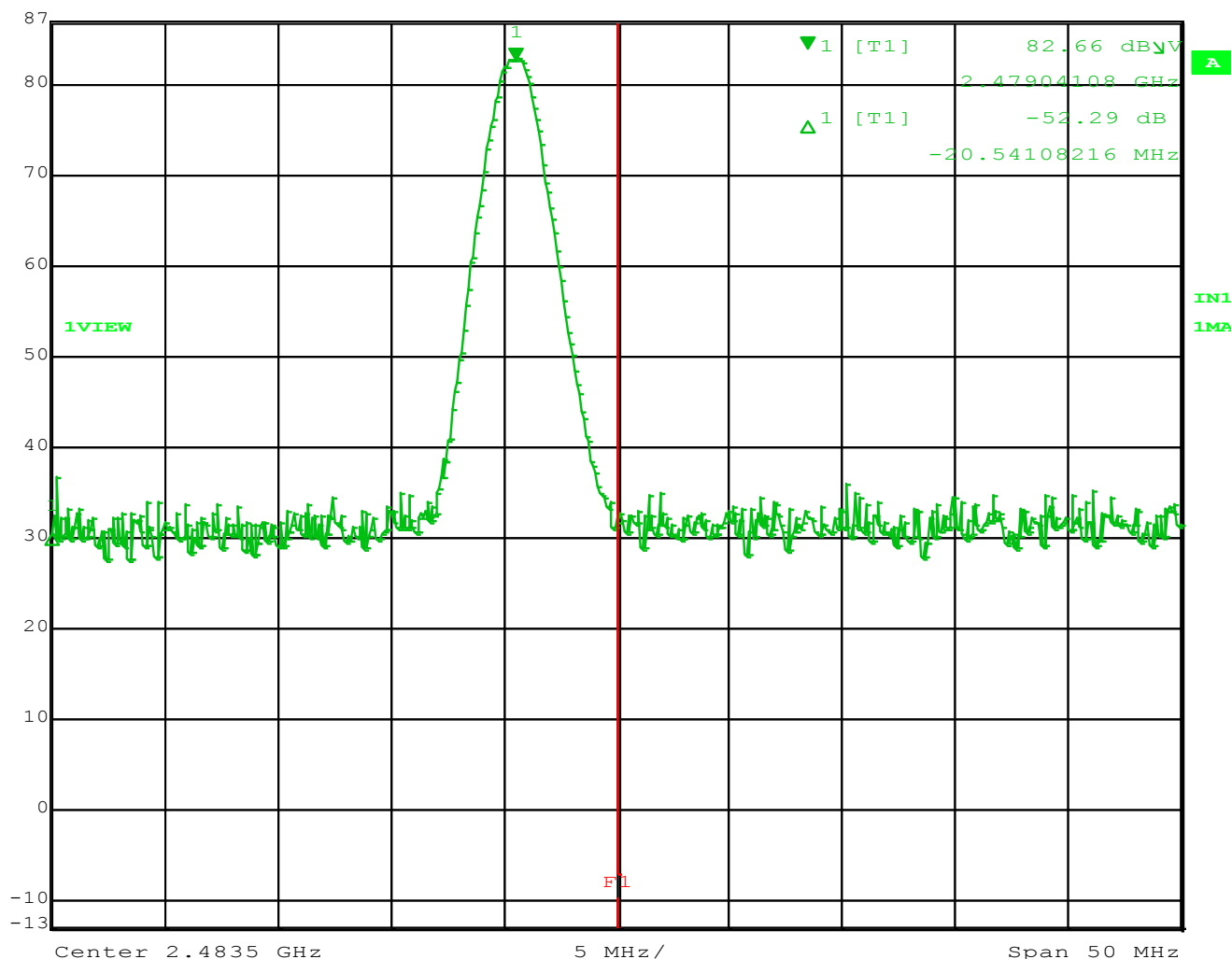
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 24 of 43



Marker 1 [T1] RBW 1 MHz RF Att 10 dB
Ref Lvl 82.66 dBμV VBW 3 MHz
87 dBμV 2.47904108 GHz SWT 5 ms Unit dBμV



Date: 25.SEP.2014 05:53:56

Note: Measured using the Peak and Average detectors.

Band edge (Center) at 2483.5 MHz is also the start of a restricted band, so the rules of 15.205 apply.

Figure 2: Upper Band Edge Measurement (Radiated Emission)

The EUT is compliant with the rules.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

4.1 Conducted Emissions on AC Mains

This test measures the electromagnet levels of spurious signals generated by the EUT on the AC power line that may affect the performance of other near by electronic equipment.

4.1.1 Over View of Test

Results	Complies (as tested per this report)					Date		
Standard	FCC Parts 15.107(c), 15.207(c) and RSS-GEN 7.2.2							
Product Model	IRONMAN				Serial#	NA		
Test Set-up	Tested in shielded room. EUT placed on table, see test plans for details							
EUT Powered By	4.5VDC 3.7 VDC Battery	Temp	73° F	Humidity	25%	Pressure	1011 mbar	
Frequency Range	150 kHz – 30 MHz							
Perf. Criteria	(Below Limit)		Perf. Verification		Readings Under Limit for L1 & Neutral			
Mod. to EUT	None		Test Performed By		Randall Masline			

4.1.2 Test Procedure

This device is 3.7 VDC Battery powered; therefore per FCC Part 15.207(c) this test is not required.

4.1.3 Final Test

Since the EUT is Battery powered at 3.7 VDC, and charged via USB cable, this test is not applicable.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

5 Antenna Port Conducted Emissions

For conducted tests, the emissions were measured at the antenna port.

Testing was performed in accordance with 47 CFR Part 15, ANSI C63.10:2009, RSP-100 Issue 9. These test methods are listed under the laboratory's Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

5.1 Conducted Output Power, FCC 15.247(b)(3) and RSS-210 A8.4(4)

5.1.1 For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

5.1.2 Test Over View

Results	Complies (as tested per this report)					Date		
Standard	FCC Part 15.247(b)(3) and RSS-210 A8.4(4)							
Product Model	IRONMAN				Serial#	E952-48		
Test Set-up	Measured at 3m distance from antenna, in 10m Anechoic chamber							
EUT Powered By	3.7 VDC Battery	Temp	74° F	Humidity	32%	Pressure	1010mbar	
Perf. Criteria	(Below Limit)		Perf. Verification			Readings Under Limit		
Mod. to EUT	None		Test Performed By			Randall Masline		

5.1.3 Test Procedure

The peak output power was measured at the low, mid and high band frequencies. The measurement was made as a field strength measurement at 3m. The cable loss and the attenuator was measured and added in the reference level offset in the spectrum analyzer. The spectrum analyzer's resolution bandwidth was greater than the 20dB bandwidth of the modulated carrier and the video bandwidth was equal to the resolution bandwidth.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

5.1.4 Deviations

There were no deviations from the test methodology listed in the test plan for this test.

5.1.5 Final Test

The EUT met the performance criteria requirement as specified in the test plan of this report and in the standards.

5.1.6 Final Tabulated Data at 3 meters

Frequency (MHz)	Antenna Polarity (H-V)	Antenna Height (M)	Measurement (dBm)	Limit	Result
2402	V	1.0	-5.45	1W/30dBm	Complies
2440	V	1.0	-5.12	1W/30dBm	Complies
2478	V	1.0	-3.95	1W/30dBm	Complies

Antenna is a ceramic chip, the gain is -1.3 dBi

Duty Cycle for this test is 100%

Antenna Gain

The Antenna used is below 6dBi gain.

The EUT is also compliant to FCC Part 15.247(b)(4)

Results

As tested, the EUT was found to be compliant to the requirements of the test standard.

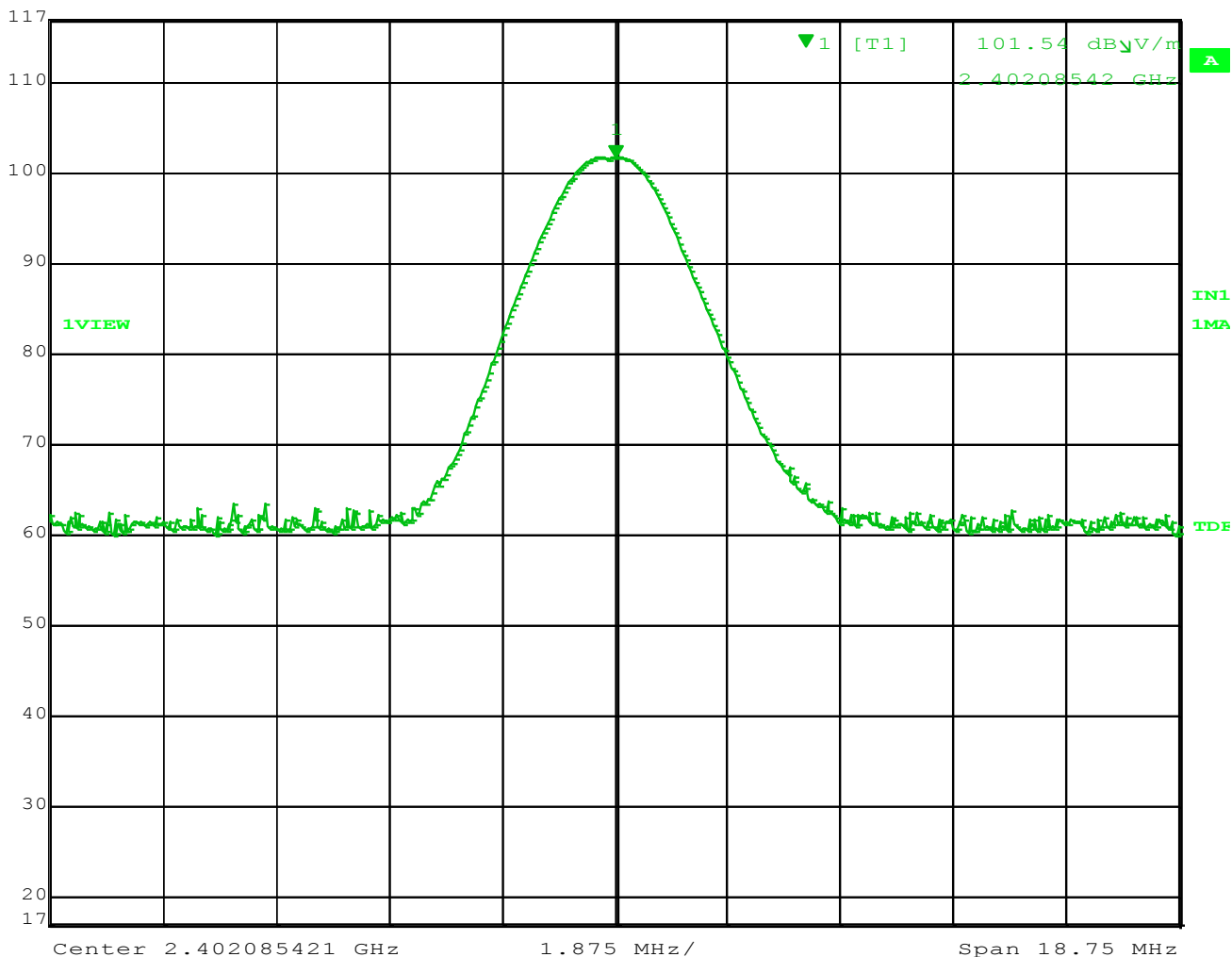
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 28 of 43



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	30 dB
117 dB*	101.54 dBμV/m	VBW	3 MHz		
	2.40208542 GHz	SWT	5 ms	Unit	dBμV/m



Date: 1.JAN.1997 00:49:42

NOTE: Scans were taken August 28, 2014

Figure 3 – Effective Radiated Power Low Channel 2402 MHz, Vertical

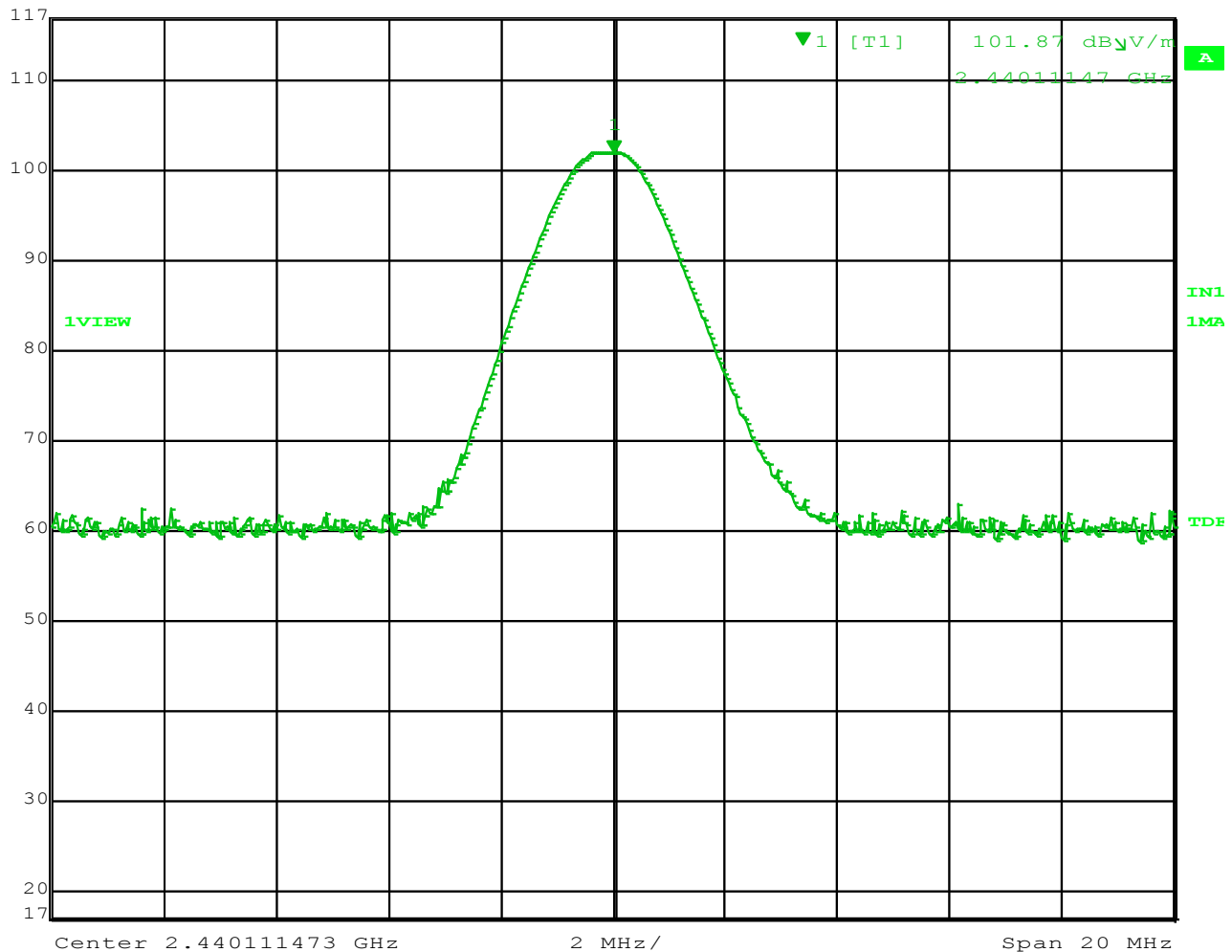
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 29 of 43



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	30 dB
117 dB*	101.87 dBV/m	VBW	3 MHz		
	2.44011147 GHz	SWT	5 ms	Unit	dBV/m



Date: 1.JAN.1997 00:59:15

NOTE: Scans were taken August 28, 2014

Figure 4 – Effective Radiated Power Mid channel 2440 MHz, Vertical

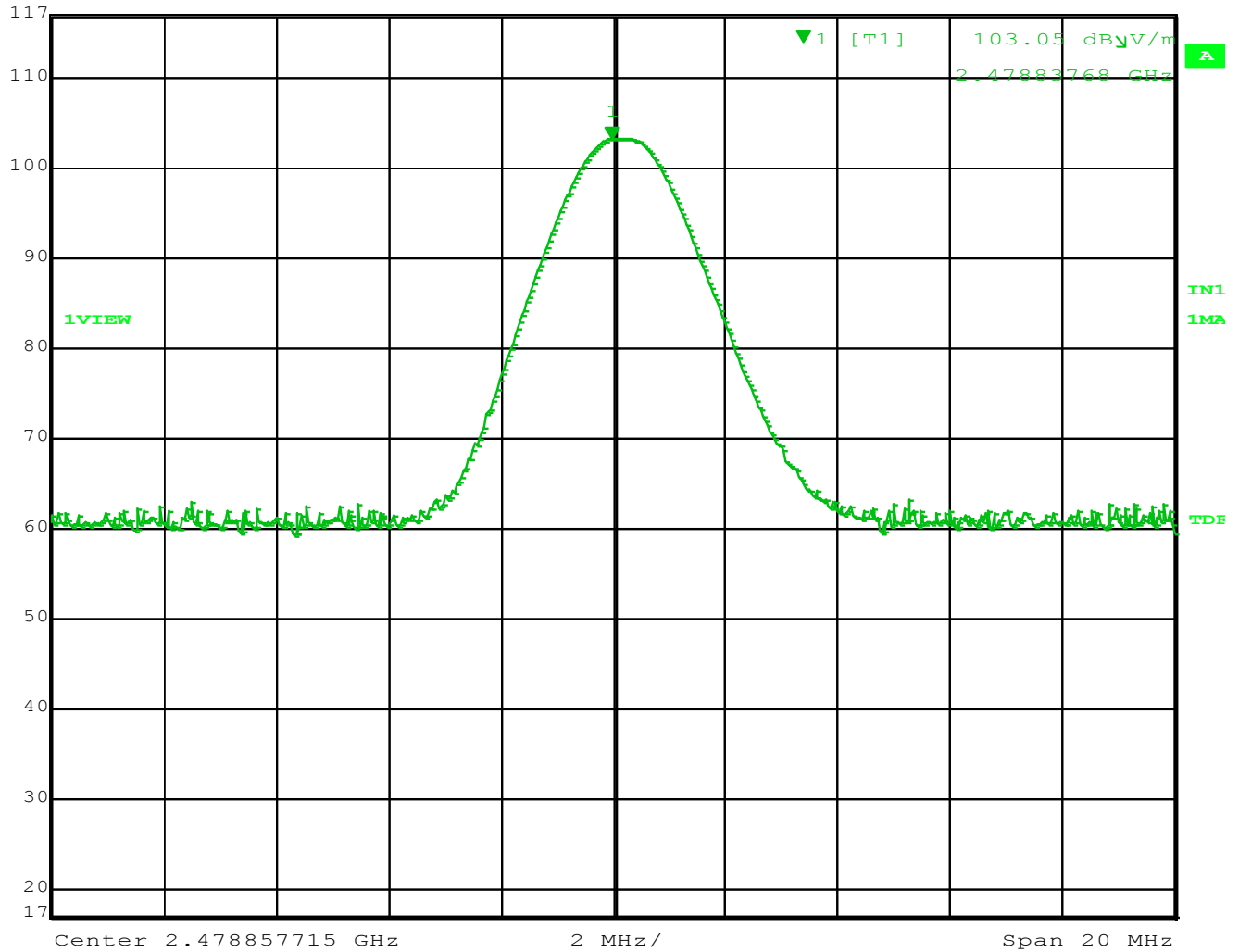
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 30 of 43



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	30 dB
117 dB*	103.05 dBμV/m	VBW	3 MHz		
	2.47883768 GHz	SWT	5 ms	Unit	dBμV/m



Date: 1.JAN.1997 01:20:06

NOTE: Scans were taken August 28, 2014

Figure 5 – Effective Radiated Power High Channel 2478 MHz, Vertical

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

5.2 Occupied Bandwidth

Systems using digital modulation techniques may operate in the 2400–2483.5 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.2.1 Test Over View

Results	Complies (as tested per this report)					Date	9/3/2014	
Standard	FCC Part 15.247(a)(2)							
Product Model	IRONMAN				Serial#	E952-48		
Test Set-up	Direct Measurement from antenna port							
EUT Powered By	3.7 VDC Battery	Temp	74° F	Humidity	32%	Pressure	1010 mbar	
Perf. Criteria	(Below Limit)		Perf. Verification			Readings Under Limit		
Mod. to EUT	None		Test Performed By			Randall Masline		

5.2.2 Test Procedure

Minimum allowed 6dB Bandwidth = 500 kHz

5.2.3 Deviations

There were no deviations from the test methodology listed in the test plan for the Radiated Immunity test.

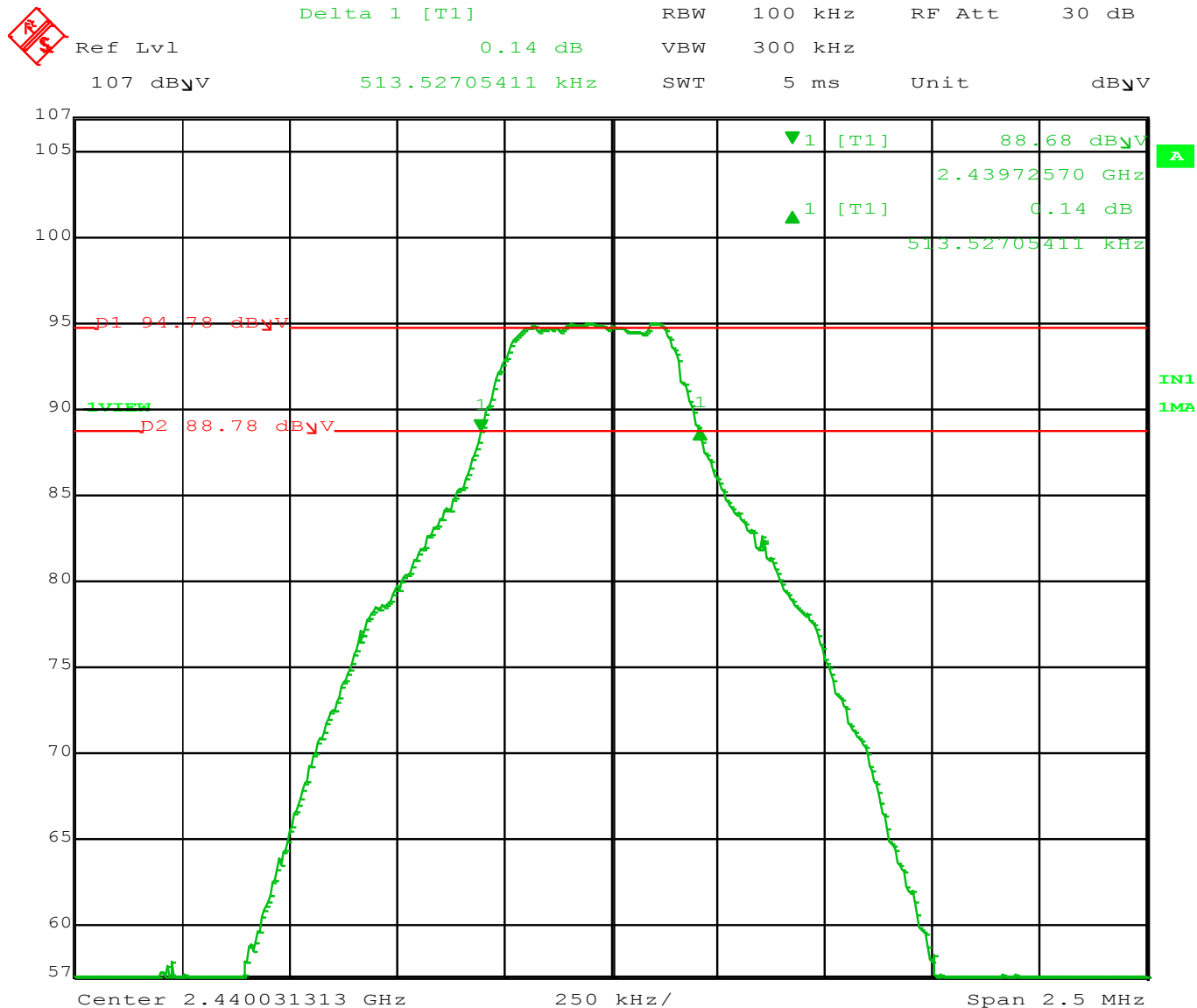
5.2.4 Final Test

6dB Band width is 513 kHz which is > 500 kHz

The EUT met the performance criteria requirement as specified in the standards.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

5.2.5 Final Data



Date: 1.JAN.1997 00:35:14

Figure 6: 6dB Occupied Bandwidth

Note: The above plot is the worst case.

6dB Band width is 513 kHz which is > 500 kHz

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

5.2.6 99% Power Bandwidth

For the purpose of Section A1.1, the 99% bandwidth shall be no wider than .25% of the center frequency for devices operating between 70-900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

5.2.7 Test Over View

Results	Complies (as tested per this report)					Date	9/3/2014	
Standard	RSS-210 Section A1.1.3							
Product Model	IRONMAN				Serial#	E952-48		
Test Set-up	Direct Measurement from antenna port							
EUT Powered By	3.7 VDC Battery	Temp	74° F	Humidity	32%	Pressure	1010mbar	
Perf. Criteria	(Below Limit)			Perf. Verification		Readings Under Limit		
Mod. to EUT	None			Test Performed By		Randall Masline		

5.2.8 Test Procedure

Using the procedures of RSS-GEN section 4.6.1, the 1 kHz resolution bandwidth is 1% of the 1 MHz span. The Video bandwidth is 3 times that of the resolution bandwidth.

The limit of the bandwidth would be 0.5% of 2.4 GHz or 12 MHz.

5.2.9 Deviations

There were no deviations from the test methodology listed in the test plan for the Electrical Fast transients (EFT) Immunity test.

5.2.10 Final Results

The measured 99% bandwidth is 971 kHz, which is well below the 12 MHz limit.

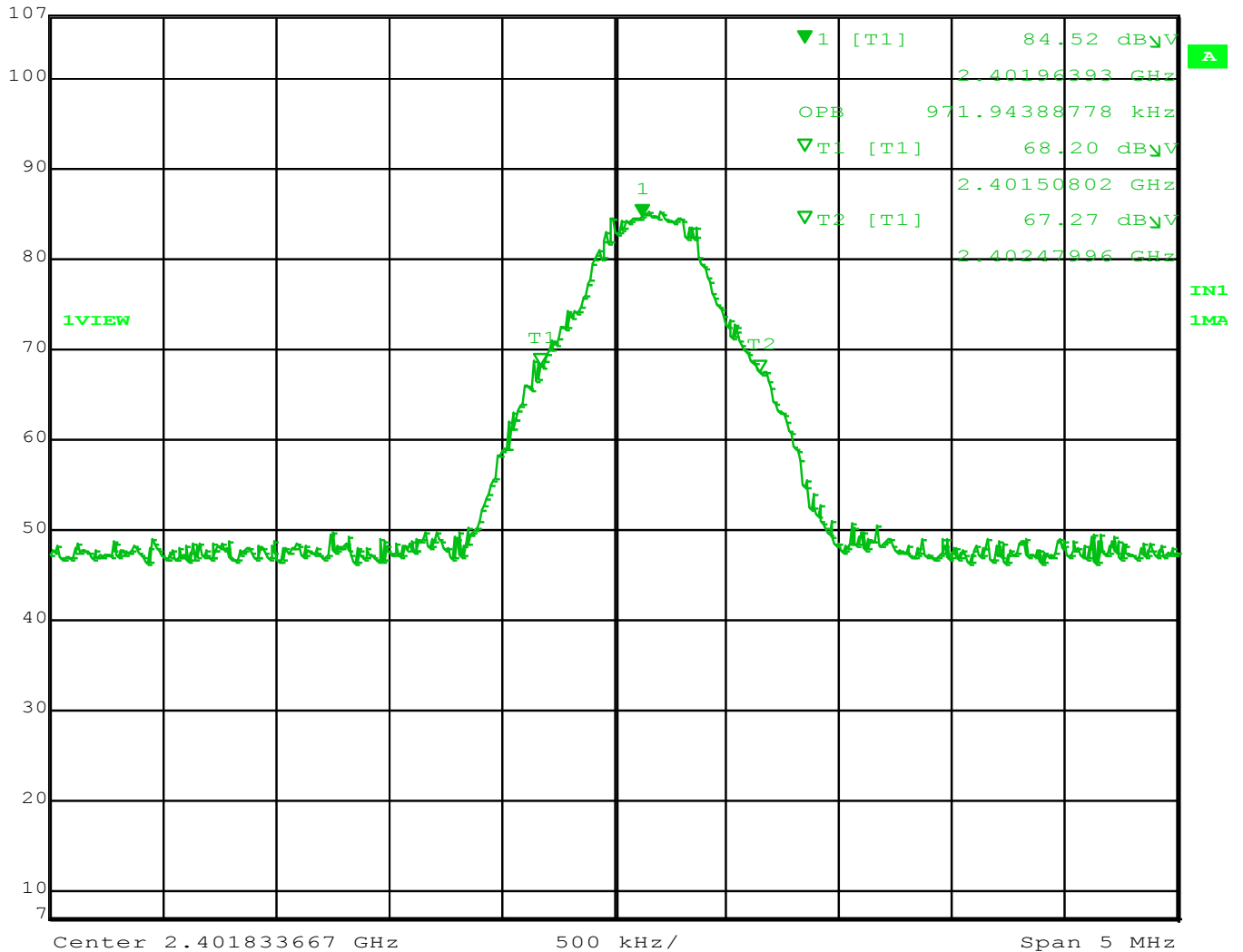
The EUT met the performance criteria requirement as specified in the test plan of this report and in the standards.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

5.2.11 Final Data



Marker 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl 84.52 dBμV VBW 300 kHz
107 dBμV 2.40196393 GHz SWT 5 ms Unit dBμV



Date: 1.JAN.1997 00:27:31

Figure 7 – 99% Power Bandwidth = 971 kHz

The EUT is compliant to the requirements of RSS-210 A1.1.3

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

5.3 **Average time of Occupancy** FCC Part 15.247(A)(3)

FCC Part 15.247(A)(3) states that the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

5.3.1 **Over View of Test**

Results	Complies (as tested per this report)		Date	9/9/2014
Standard	FCC Part 15.247(a)(3)			
Product Model	MODEL	Serial#	S/N	
Test Set-up	Tested in shielded room. EUT placed on table, see test plans for details			
Mod. to EUT	None	Test Performed By	Randall Masline	

5.3.2 **Test Procedure**

Measurement was taken of on-time during one transmission, then using a 0 Hz span, the number of on-time incidences was recorded over a 100ms sweep and then the average on-time was calculated.

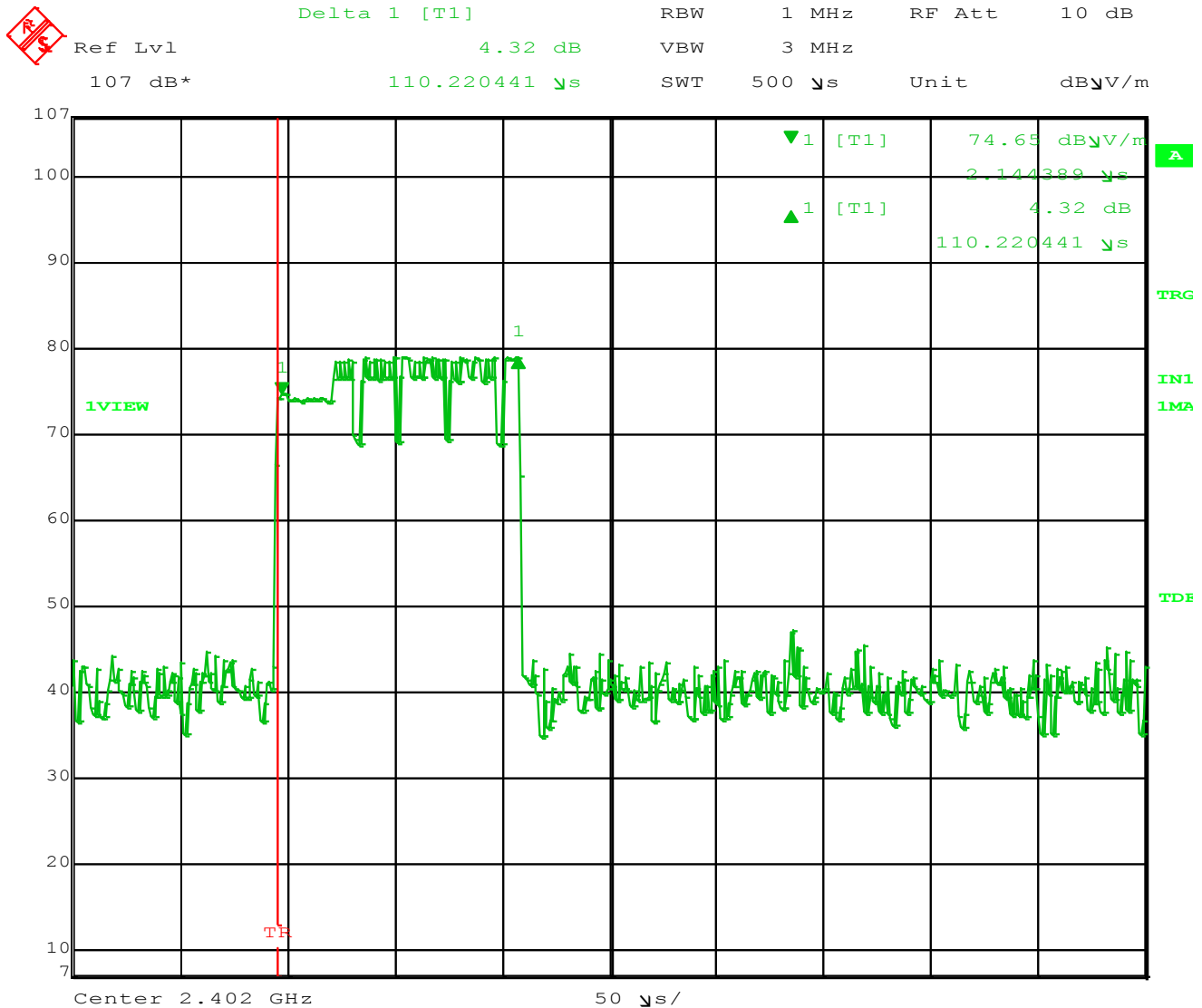
5.3.1 **Deviations**

There were no deviations from the test methodology listed in the test plan for the this test.

5.3.2 **Final Results**

The measured 99% bandwidth is 971 kHz, which is well below the 12 MHz limit.

The EUT met the performance criteria requirement as specified in the test plan of this report and in the standards.



Date: 1.JAN.1997 00:04:23

Figure 8 – On-time of one transmission pulse = 110us

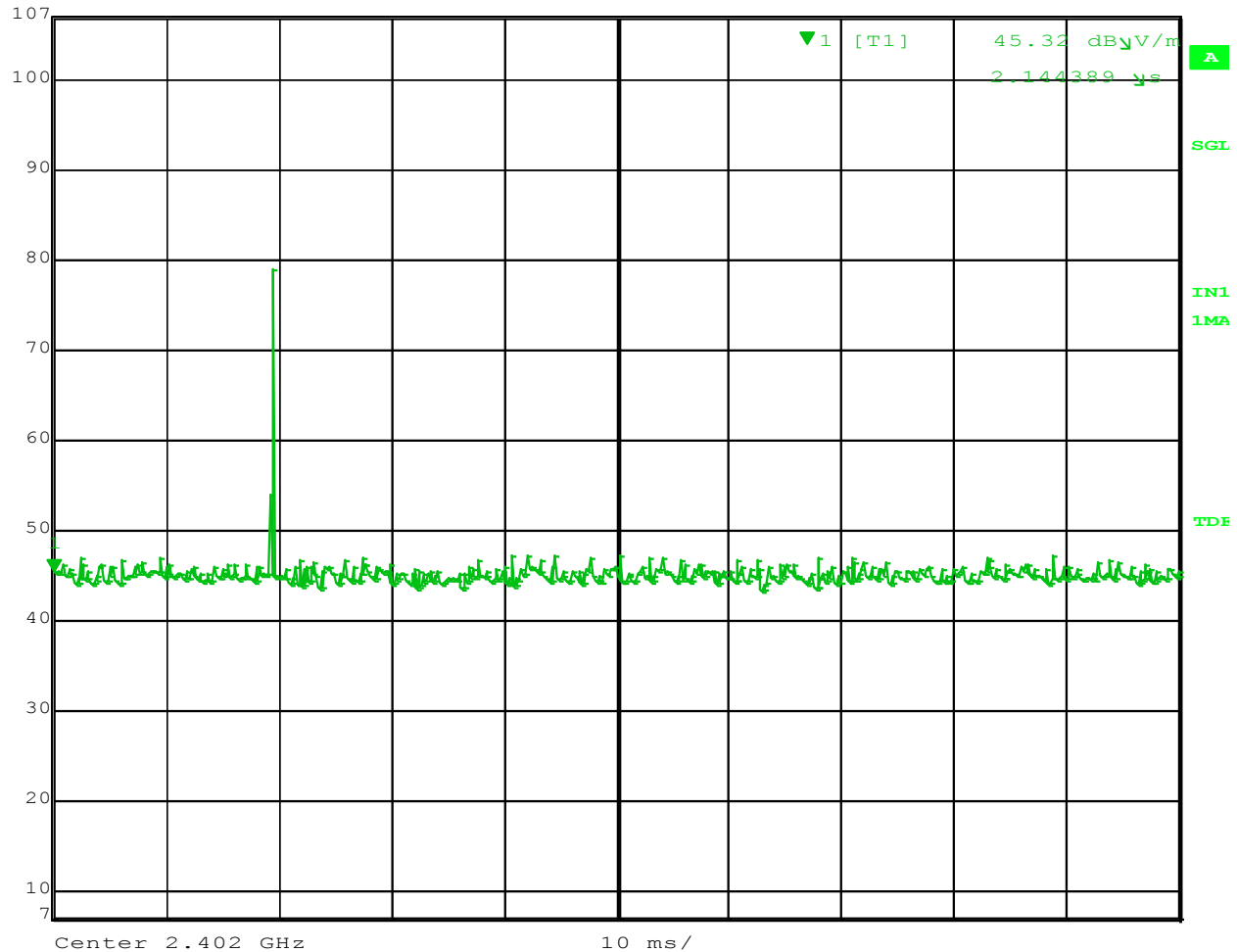
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 37 of 43



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	10 dB
107 dB*	45.32 dBV/m	VBW	3 MHz		
	2.144389 μ s	SWT	100 ms	Unit	dBV/m



Date: 1.JAN.1997 00:09:28

Figure 9 – 0 Hz span, single sweep of 100 ms

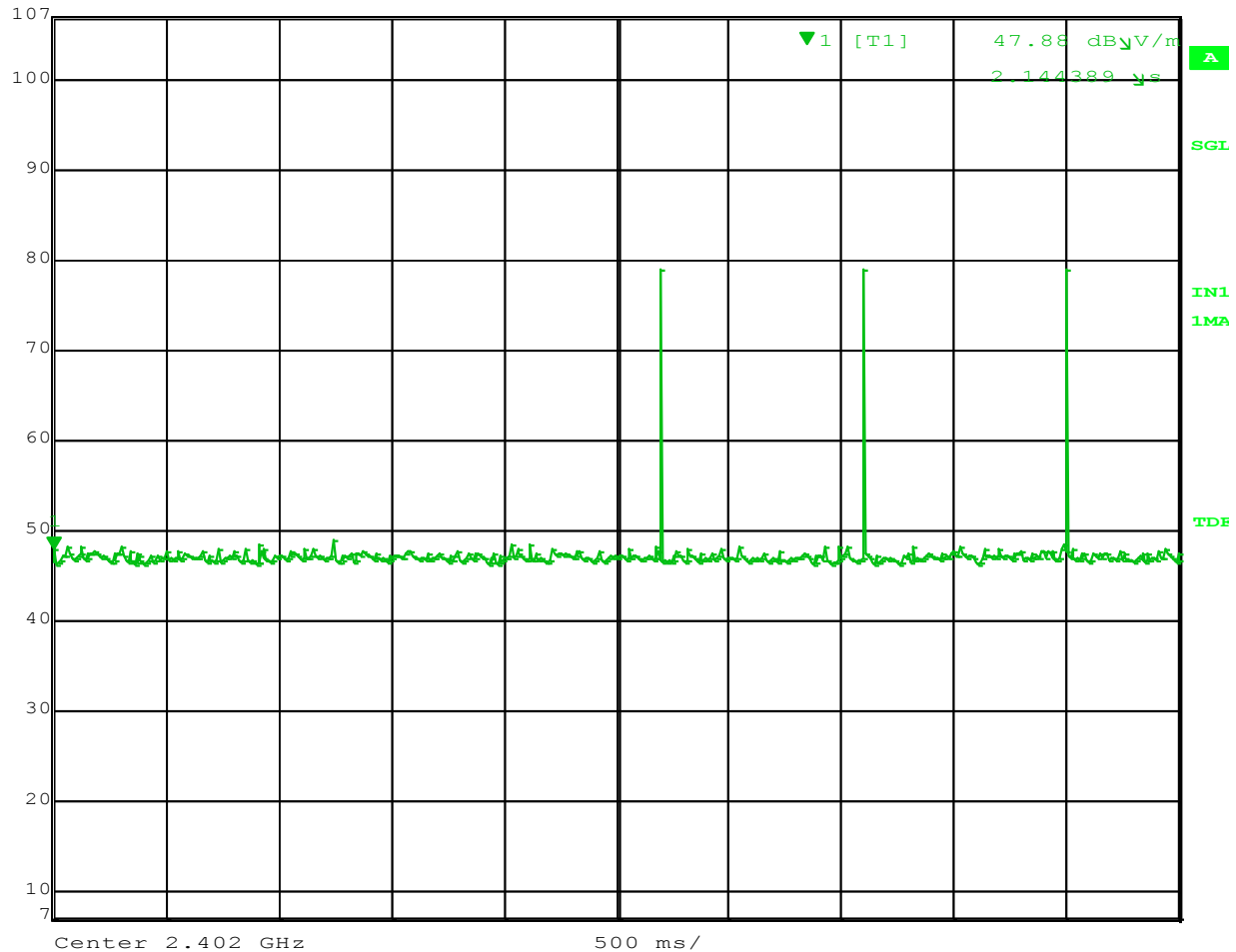
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc

Page 38 of 43



Ref Lvl	Marker 1 [T1]	RBW	1 MHz	RF Att	10 dB
107 dB*	47.88 dBV/m	VBW	3 MHz		
	2.144389 μ s	SWT	5 s	Unit	dBV/m



Date: 1.JAN.1997 00:10:23

Figure 10 – 0 Hz span, single sweep of 5 seconds

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

6 RF Exposure for Portable Device

6.1 RF Exposure Evaluation - FCC Part 15.247(i)

Systems operating under these provisions shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

6.1.1 SAR Test Exclusion Threshold

FCC KDB # 447498 DO1 v05r02 - Mobile and Portable Device RF Exposure and Procedures and Equipment Authorization Policies, Appendix A shows that a device is exempt from SAR testing if the output power is less than **10mW** with a 5mm separation at 2450 MHz.

The maximum output power is 7.05 dBm

The maximum measured Gain of the antenna is -1.3 dBi or 0.74 (Linear scale).

The Maximum EIRP output power is 7.05 dBm + -1.3 dBi = 5.75 dBm or 3.75 **mW**.

The EUT is exempt from SAR Testing.

6.2 RF Exposure Evaluation - RSS-102, Issue 4

6.2.1 RF Exposure Limit

RSS-102, Issue 4 section 2.5.1 states that a device is exempt from routine SAR Evaluation if: above 2.2 GHz and up to 3 GHz inclusively, and with output power is less than 20 mW for general public use.

The maximum output power is 7.05 dBm

The maximum measured Gain of the antenna is -1.3 dBi or 0.74 (Linear scale).

The Maximum EIRP output power is 7.05 dBm + -1.3 dBi = 5.75 dBm or 3.75 **mW**.

The EUT is exempt from SAR Testing.

6.3 EUT Operating condition

The software provided by Manufacturer enabled the EUT to transmit data at lowest, middle and highest channel individually.

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Appendix A

7 Test Plan

This test report is intended to follow this test plan outlined here in unless other wise stated in this here report. The following test plan will give details on product information, standards to be used, test set ups and refer to TUV test procedures. The test procedures will give the steps to be taken when performing the stated test. The product information below came via client, product manual, product itself and or the internet.

7.1 General Information

Client	Timex
Address 1	555 Christian Road
Address 2	Middlebury, CT 06762
Contact Person	Stan Vreeland
Telephone	203-346-5485
Fax	860-302-1275
e-mail	svreeland@timex.com

7.2 Model(s) Name

IRONMAN

7.3 Type of Product

Watch

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc*Page 41 of 43*

7.4 Equipment Under Test (EUT) Description

Bluetooth enabled watch.

7.5 Modifications

No modifications were necessary.

7.6 Product Environment

☒	Residential	☐	Hospital
☐	Light Industrial	☐	Small Clinic
☐	Industrial	☐	Doctor's office
☐	Other		

*Check all that apply

7.7 Countries

☒	USA
☒	Canada

*Check all that apply

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

7.8 EUT Electrical Powered Information

7.8.1 Electrical Power Type

☐	AC	☐	DC	☒	Batteries	☐	Host -
--------------------------	----	--------------------------	----	-------------------------------------	-----------	--------------------------	--------

7.9 EUT Modes of Operation

Transmitting Continuously.

7.10 EUT Clock/Oscillator Frequencies

☒	Less than 108MHz	FCC – scan up to 1GHz
☐	Less than 500MHz	FCC – scan up to 2GHz
☐	Less than 1000MHz	FCC – scan up to 5GHz
☐	Greater than 1000MHz	FCC – scan up to 5 th Harmonic or 40GHz

7.11 Electrical Support Equipment

Type	Manufacture	Model	Connected To

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.

Report No.: 31452665.006 Ironman.doc
Page 43 of 43

7.12 Non - Electrical Support Equipment

Item	Notes
Gas	None
Water	None
Air	None

7.13 EUT Equipment/Cabling Information

EUT Port	Connected To	Location	Cable Type		
			Length	Shielded	Bead
USB	USB Power	Back of watch	1m	no	no

7.14 EUT Test Program

Running Bluetooth testing at high, middle and lowest frequency at highest power output, and normal hopping operation.

7.15 Condition Received

☒	Operational	☐	Other
Notes			

The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TUV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA, or any agency of the Federal Government.