

Electromagnetic Compatibility Test Report

Tested to FCC Part 15C & RSS-210 Issue 8

On

OmniMOVE Wrist Watch

Model: M328

**Timex Group USA Inc.
555 Christian Rd.
Middlebury CT 06787 USA**

Prepared by:

TUV Rheinland of North America, Inc.

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Manufacturer's statement - attestation

The manufacturer; Timex Group USA Inc., as the responsible party for the equipment tested, hereby affirms:

- a) That he has 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.

Sam Everett

Printed name of official

Timex Group USA Inc.
555 Christian Road
Middlebury CT 06787 USA

Address

203-346-5603

Telephone number



Signature of official

20 April 2015

Date


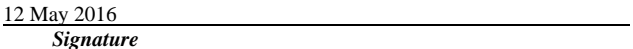



severett@timexgroup.com

Email address of official

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Report No.:
31660199.001

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Client:	TIMEX GROUP	Timex Group USA Inc. 555 Christian Rd. Middlebury CT 06787 USA	Sam Everett Ph: 203-346-5603 Fax: 203-346-7163 severett@timexgroup.com
Identification:	OmniMOVE Wrist Watch	Serial No.:	PRODUCTION PROTOTYPE
Test item:	Model: M328	Date tested:	19 April 2016
Testing location:	TUV Rheinland of North America 762 Park Avenue Youngsville, NC 27596-9470 U.S.A.	Tel: (919) 554-3668 Fax: (919) 554-3542	
Test specification:	Emissions: FCC Part 15, Subpart C, RSS-210 Issue 8: FCC Parts 15.207(a) and RSS-GEN 7.2.4, FCC Parts 15.249(d), 15.209, 15.215(c) and RSS-210 A2.9, RSS-GEN 7.2.1 FCC Part 15.249 and RSS-210 Annex 2.9, FCC Parts 15.249(a), 15.249(c), RSS-210 A2.9(a), FCC Part 2.1093 and RSS-102, Issue 4,		
Test Result	The above product was found to be Compliant to the above test standard(s)		
tested by: Mark Ryan		reviewed by: Robert Richards	
 12 May 2016 Signature		 12 May 2016 Signature	
Other Aspects:	None		
Abbreviations:	OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable		
	 	Industry Canada	
90552 and 100881	Testing Cert #3331.05	2932H-1 and 2932H-2	

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1 General Information

1.1 Scope

This report is intended to document the status of conformance with the requirements of the standard(s), based on the results of testing performed on 19 April 2016 on the OmniMOVE Wrist Watch, Model No. M328, manufactured by Timex Group USA Inc. 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 model 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.

1.3 Revision History

Revision	Date	Description of Revision
--	20 April 2016	Initial Release
A	12 May 2016	Corrected typos and added test setup diagrams.

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1.1 Summary of Test Results

Applicant	Timex Group USA Inc. 555 Christian Rd Middlebury CT 06787 USA	Tel	203-346-5603	Contact	Sam Everett
		Fax	203-346-7163	e-mail	severett@timexgroup.com
Description	OmniMOVE Watch	Model	M328		
Serial Number	Production Prototype	Test Voltage/Freq.	3 V DC Lithium battery		
Test Date Completed:	19 April 2016	Test Engineer	Mark Ryan		
Standards	Description	Severity Level or Limit		Worst-case Values	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 15.249 and RSS-210 Annex 2.9	Operation within the band 2400 to 2483.5 MHz	See called out parts below		See Below	Complies
FCC Parts 15.249(a), 15.249(c), RSS-210 A2.9(a)	Radiated Output Power for Fundamental and Harmonic Frequencies	Fund: Shall not exceed 50 mV/m at 3m Harmonics: Shall not exceed 500µV/m (0.5 mV/m) at 3m, (unrestricted bands)		4.73 mV/m 204 µV/m -	Complies
FCC Parts 15.249(d), 15.209, 15.215(c) and RSS-210 A2.9, RSS-GEN 7.2.1	Out-of-Band Spurious Emissions and Band Edges (EUT in Transmit Mode)	Below the applicable limits		46.18 dBµV	Complies
FCC Parts 15.207(a) and RSS-GEN 7.2.4	Conducted Emissions on AC Mains	NA, The EUT is battery operated only		NA	NA
RSS-210 A1.1.3	Occupied Bandwidth	99% BW ≤ 0.5% of center freq.		1.064 MHz	Complies
FCC Part 2.1093 and RSS-102, Issue 4	RF Exposure and Antenna Gain Calculation	SAR or MPE Requirements		0.442 mW	Complies

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2 Laboratory Information

2.1 Accreditations

2.1.1 US Federal Communications Commission

TUV Rheinland of North America located at 762 Park Avenue, Youngsville, NC 27596-9470 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 90552 and 100881). 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

The laboratory has been assessed and accredited by A2LA in accordance with ISO Standard 17025:2005 (Certificate Number: 3331.05, Master Code: 134288). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Industry Canada

Registration No.: 2932H-1 The OATS has been accepted by Industry Canada to perform testing to 3 and to 10 meters, based on the test procedures described in ANSI C63.4-2009.

Registration No.: 2932H-2 The 5 meter chamber has been accepted by Industry Canada to perform testing to 3 meters, based on the test procedures described in ANSI C63.4-2009.

2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland at the 762 Park Ave. Youngsville, N.C 27596 address has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Laboratory Registration No: A-0034).

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2.1.5 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 (dB μ V)

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.

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2.4 Measurement Equipment Used

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
Radiated Emissions (5 Meter Chamber)					
Receiver, EMI	Rohde & Schwarz	ESIB40	100043	19-Aug-15	19-Aug-16
Receiver, EMI	Rohde & Schwarz	ESCI 7	100917	19-Aug-15	19-Aug-16
Spectrum Analyzer	Agilent Tec.	E7405A	US39440161	18-Aug-15	18-Aug-16
Amplifier, preamp	Agilent Technologies	8449B	3008A01480	20-Aug-15	20-Aug-17
Ant. BiconiLog	Chase	CBL6140A	1108	06-Oct-15	06-Oct-17
Antenna Horn 1-18GHz	EMCO	3115	2236	18-Nov-15	18-Nov-17
Antenna Horn 18-26.5 GHz	ATM	42-442-6/cal	G181104-01	31-Dec-14	31-Dec-16
Cable, Coax	MicroCaox	MKR300C-0-0-1200-500500	002	20-Aug-15	20-Aug-16
Cable, Coax	MicroCaox	MKR300C-0-1968-500310	005	20-Aug-15	20-Aug-16
Cable, Coax	MicroCaox	UFB29C-1-5905-50U-50U	009	20-Aug-15	20-Aug-16
Cable, Coax	Andrew	FSJ1-50A	045	20-Aug-15	20-Aug-16
General Laboratory Equipment					
Meter, Multi	Fluke	179	90580752	17-Aug-15	17-Aug-16
Meter, Temp/Humid/Barom	ExTech	SD700	Q677933	21-Dec-15	21-Dec-17
Meter, Temp/Humid/Barom	ExTech	SD700	Q677942	21-Dec-15	21-Dec-17

3 Product Information

3.1 Product Description

The EUT is a variety of wrist watches with a Bluetooth Low-Energy (BLE) The model is M328.

Two sets of each EUT were provided for testing. One is normal a configuration for unintentional cabinet radiation. The second was modified with test firmware to allow the low, medium and high hopping channels to continuously transmit with modulation. External batteries were not included on the modified devices to allow long-term transmissions. Fresh batteries were installed frequently.

3.2 Equipment Modifications

No modifications were needed to bring product into compliance.

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4 Radiated Emissions in Transmit mode

4.1 Radiated emissions - FCC Parts 15.249, RSS-210 A2.9(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limits:

Fundamental Frequency: 2400 to 2483.5 MHz – 50 mV/m (94 dB μ V/m) at 3m.

Harmonic Frequencies: 500 μ V/m (54 dB μ V/m) at 3m.

Spurious Emissions: To the limits of FCC Part 15.209 and RSS-GEN 7.2.1.

4.1.1 Over View of Test

Results	Complies (as tested per this report)			Date	12-13 April 2016		
Standard	FCC Parts 15.205, 15.209, 15.215(c), 15.249(a), 15.249(c), 15.249(d) RSS-210 A2.9, and RSS-GEN						
Product Model	M328	Serial#	Production Prototype				
Test Set-up	Tested in a 5m Semi Anechoic chamber, placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane on a turn-table.						
EUT Powered By	3.0 V DC Lithium battery	Temp	73° F	Humidity	35%	Pressure	998 mbar
Perf. Criteria	(Below Limit)		Perf. Verification		Readings Under Limit		
Mod. to EUT	None		Test Performed By		Mark Ryan		

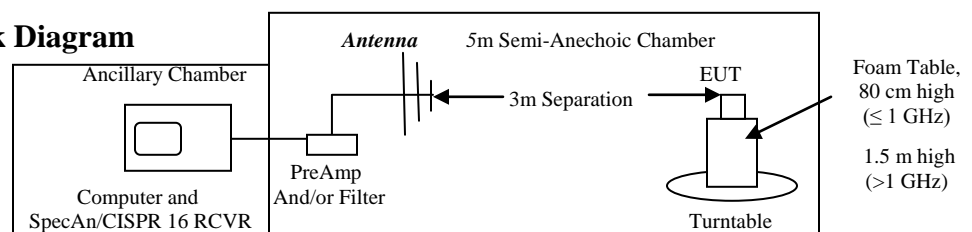
4.1.2 Test Procedure

Testing was performed in accordance with 47 CFR Part 15, ANSI C63.10:2013, RSS-GEN Issue 4. These test methods are listed under the laboratory's A2LA 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.

4.1.3 Deviations

Since all emissions outside the band are within the limits of FCC Part 15.209 and RSS-GEN 7.2.1, the emissions shown below are also compliant with FCC Parts 15.205, 15.209, 15.215(c), 15.249(d), RSS-210 A8.5, and RSS-GEN 7.2.1.

4.1.1 Test Setup Block Diagram



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4.1.1 Final Test

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

The worst –case emissions are shown below. All other emissions are on file at TUV Rheinland.

4.1.1.1 Worst Case Emissions inside the Frequency Band

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Equivalent EIRP level (mV/m)	Spec Limit (mV/m)
Orientation A:										
2402.00	H	1.6	0	36.09	0.00	5.89	28.54	70.52		
2402.00	V	1.3	0	27.64	0.00	5.89	28.54	62.07		
2402.00	H	1.6	0	42.21	0.00	5.89	28.54	76.64		
2402.00	V	1.3	0	34.86	0.00	5.89	28.54	69.29		
2440.00	V	1.5	0	31.09	0.00	5.95	28.56	65.60		
2440.00	V	1.5	0	42.97	0.00	5.95	28.56	77.48		
2480.00	V	1.7	0	38.30	0.00	5.98	28.68	72.96		
2480.00	V	1.7	0	44.28	0.00	5.98	28.68	78.94		
Orientation B:										
2480.00	H	1.6	0	38.83	0.00	5.98	28.68	73.49	4.73	50.00
2480.00	V	1.6	0	29.38	0.00	5.98	28.68	64.04		
2480.00	H	1.6	0	45.66	0.00	5.98	28.68	80.32	10.37	500.00
2480.00	V	1.6	0	36.43	0.00	5.98	28.68	71.09		
2440.00	H	1.6	0	38.49	0.00	5.95	28.56	73.00		
2440.00	H	1.6	0	44.58	0.00	5.95	28.56	79.09		
2402.00	H	1.6	0	31.88	0.00	5.89	28.54	66.31		
2402.00	H	1.6	0	43.51	0.00	5.89	28.54	77.94		
Orientation C:										
2480.00	H	2	0	33.91	34.00	8.32	28.68	36.90		
2480.00	V	1.9	66	33.62	34.00	8.32	28.68	36.61		
2480.00	H	2	0	40.31	34.00	8.32	28.68	43.30		
2480.00	V	1.9	66	40.06	34.00	8.32	28.68	43.05		
2402.00	H	2	0	32.13	33.99	8.20	28.54	34.89		
2402.00	V	1.9	66	32.86	33.99	8.20	28.54	35.62		
2440.00	H	2	0	32.91	34.06	8.29	28.56	35.70		
2440.00	V	1.9	66	32.62	34.06	8.29	28.56	35.41		

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: **GREEN = Average Detector, Blue = Peak Detector**

The Limit using the Peak Detector is 20dB higher than the Average Detector limit.

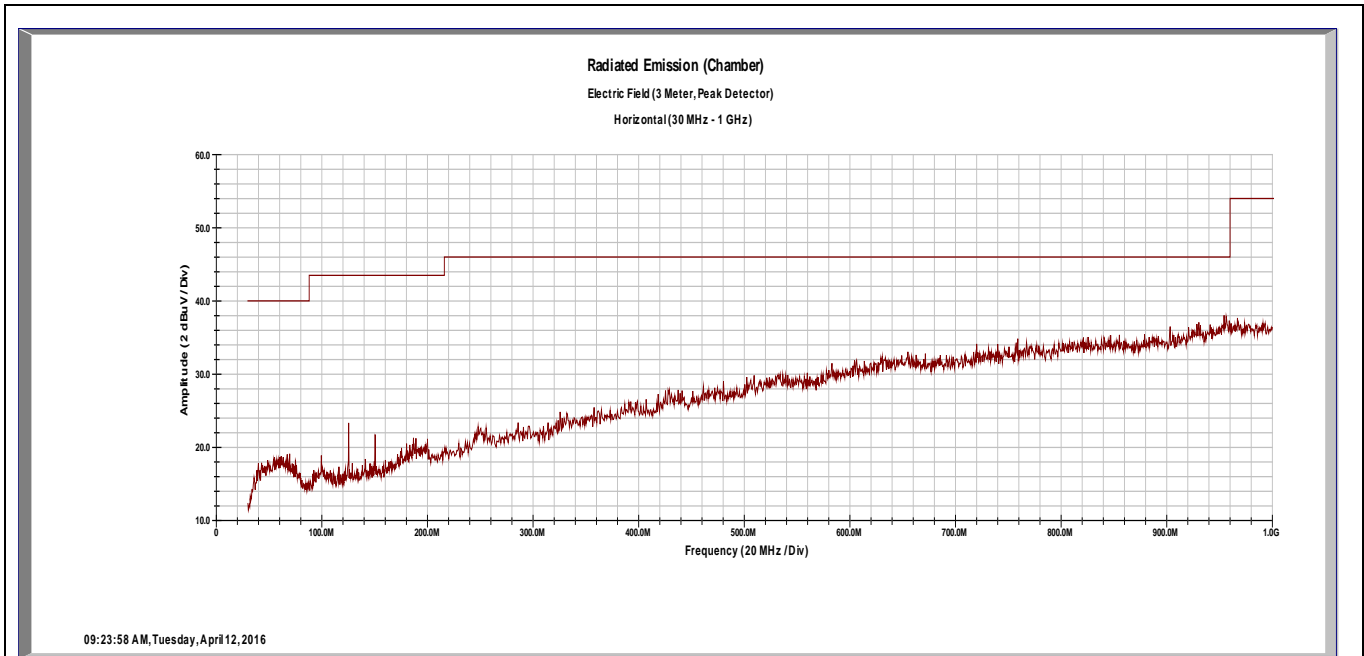
EUT in Orientation A is worst case as shown. All other data is on file at TUV Rheinland.

This **highlighted** frequency and orientation was Highest Emission (2480 MHz, Orientation B).

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4.1.1.2 Emissions Outside the Frequency Band:

Radiated Emissions – 30 MHz to 1000 MHz
Horizontal



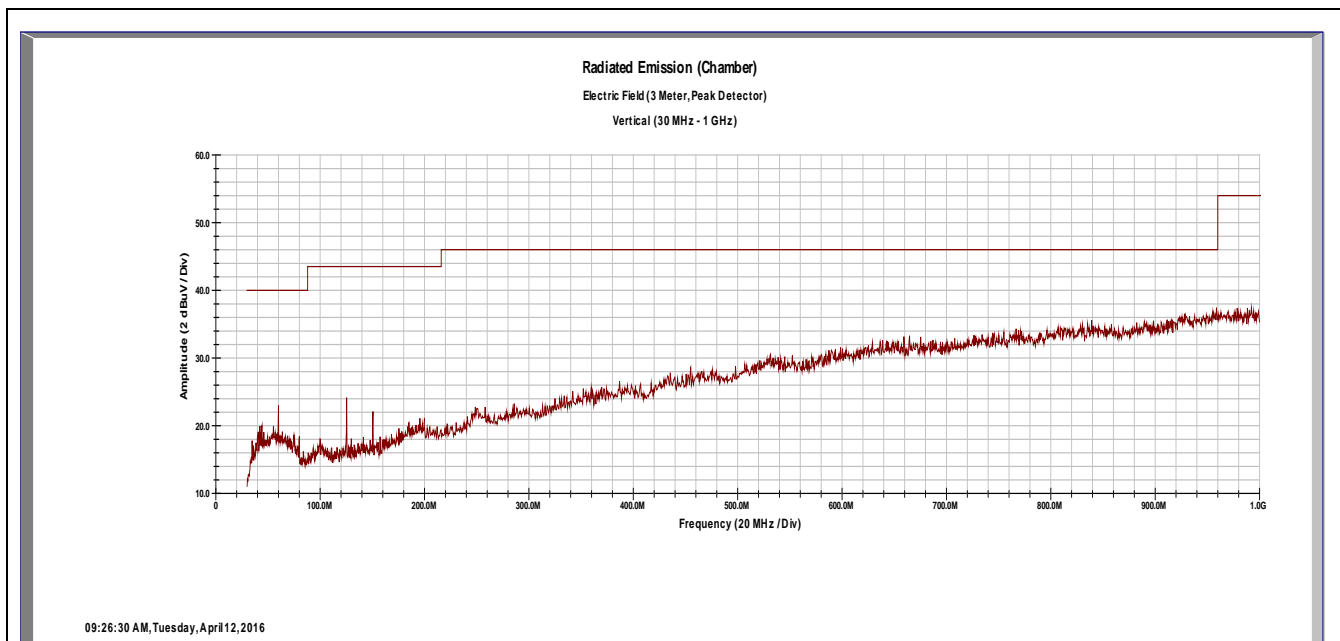
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
600.50	H	1	0	1.22	0.00	2.84	23.71	27.77	46.00	-18.23

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: The remaining two channels gave very similar results.
The signals shown below 200 MHz are anomalies in the preamp of the measuring instrument.
A notch filter at the transmitter fundamental frequency was not used.

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Radiated Emissions Ch 2 – 30 MHz to 1000 MHz
Vertical



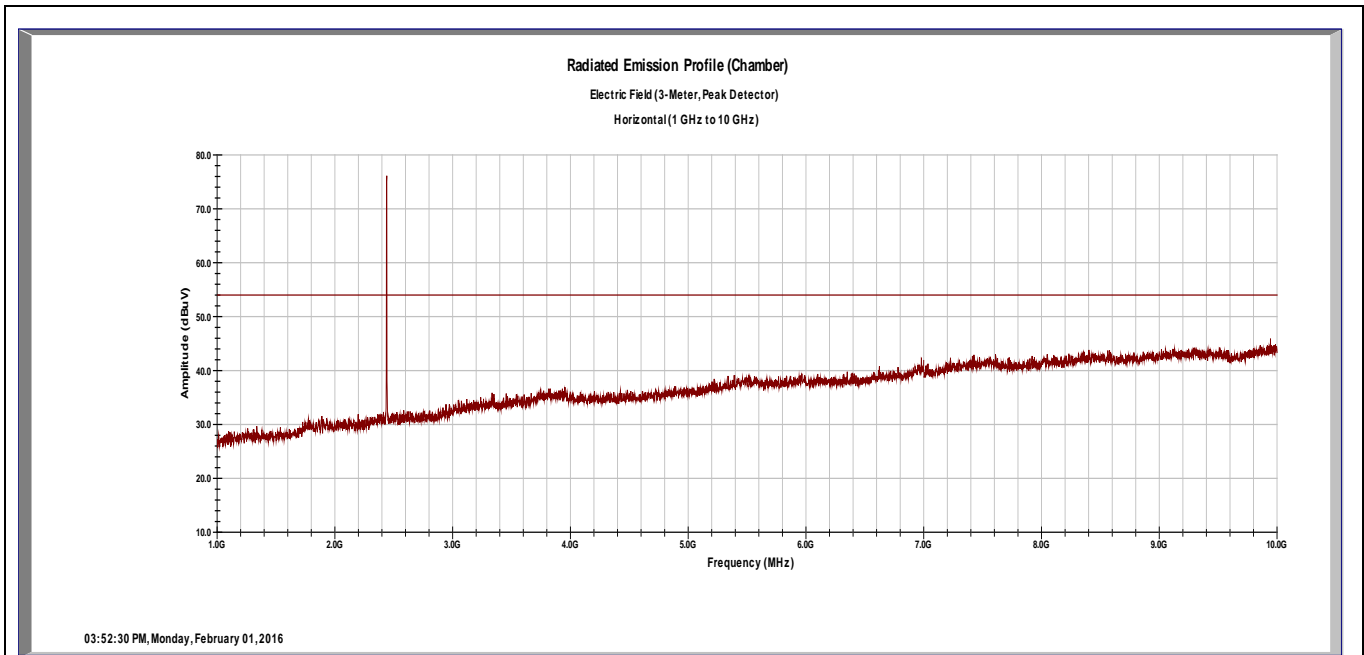
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
800.76	H	1	0	0.00	0.00	3.28	26.06	29.34	46.00	-16.66

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: The remaining two channels gave very similar results.
The signals shown below 200 MHz are anomalies in the preamp of the measuring instrument.
A notch filter at the transmitter fundamental frequency was not used.

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Worst Case Radiated Emissions – 1 to 10 GHz
Horizontal



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
1204.00	H	1	0	12.81	35.04	5.92	25.31	9.01	54.00	-44.99
1204.00	H	1	0	26.80	35.04	5.92	25.31	23.00	74.00	-51.00
4804.00	H	1	0	12.02	33.84	11.60	32.88	22.66	54.00	-31.34
4804.00	H	1	0	25.69	33.84	11.60	32.88	36.33	74.00	-37.67

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: Worst Case Emissions was at high frequency (2480MHz)

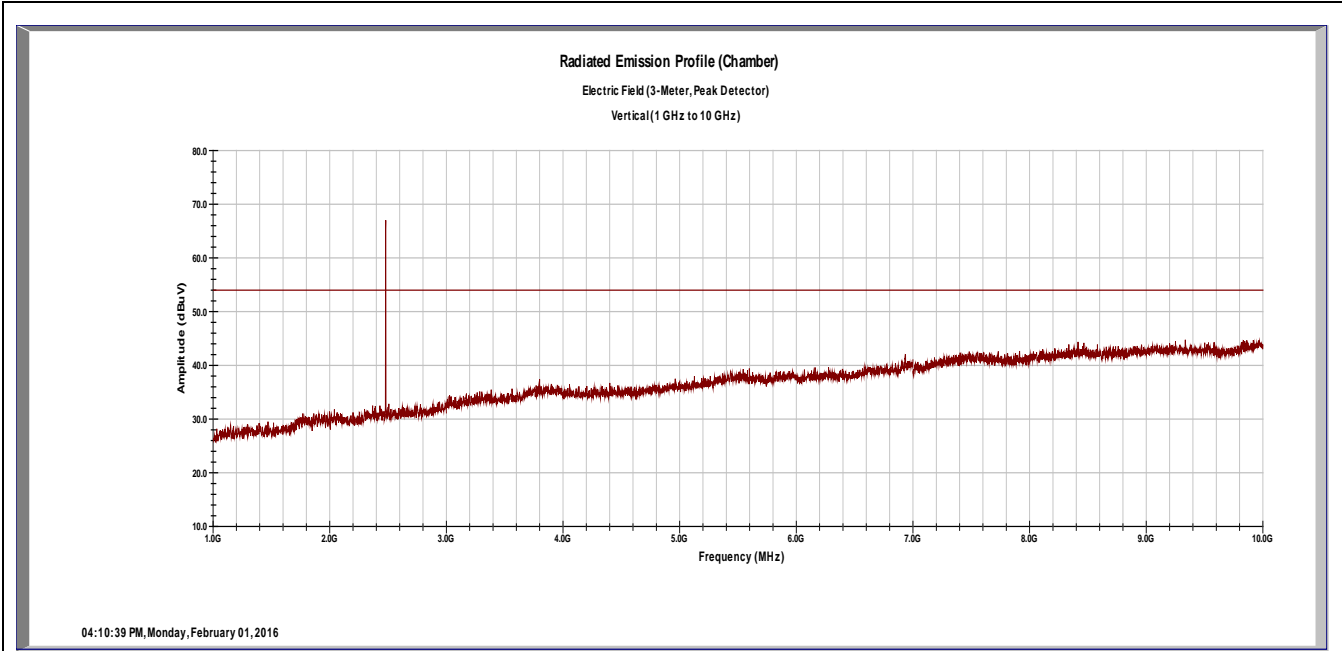
The Emissions from the transmitter was low enough that a notch filter or HPF was not required.

The Low and Mid band frequencies give very similar results.

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Worst Case Radiated Emissions - 1 to 10 GHz

Vertical



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
7206.00	V	1	0	14.89	33.61	14.51	36.07	31.86	54.00	-22.14
7206.00	V	1	0	28.01	33.61	14.51	36.07	44.98	74.00	-29.02
9608.00	V	1	0	14.02	34.18	16.88	37.93	34.65	54.00	-19.35
9608.00	V	1	0	27.23	34.18	16.88	37.93	47.86	74.00	-26.14

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

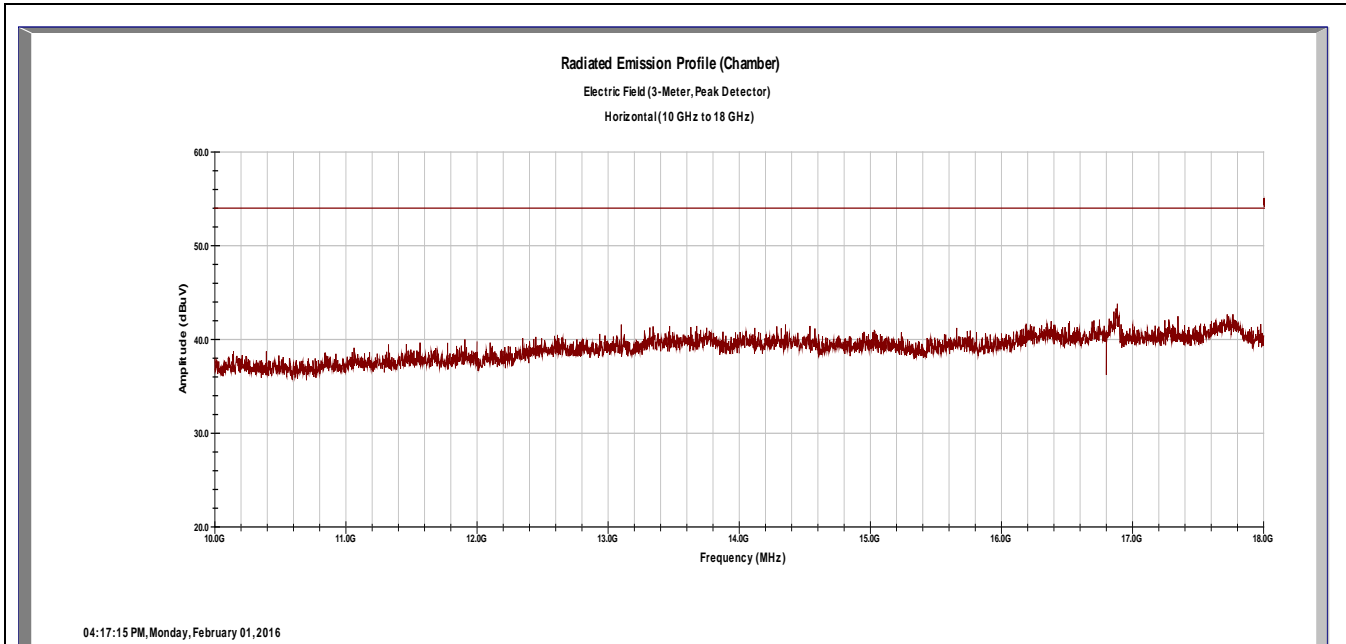
Notes: Worst Case Emissions was at high frequency (2480MHz)

The Emissions from the transmitter was low enough that a notch filter or HPF was not required.

The Low and Mid band frequencies give very similar results.

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Radiated Emissions Ch 2 – 10 to 18 GHz
Horizontal



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
12010.00	H	1	0	14.73	33.30	19.41	39.35	40.18	54.00	-13.82
12010.00	H	1	0	27.52	33.30	19.41	39.35	52.97	74.00	-21.03

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: Worst Case Emissions was at high frequency (2480MHz)

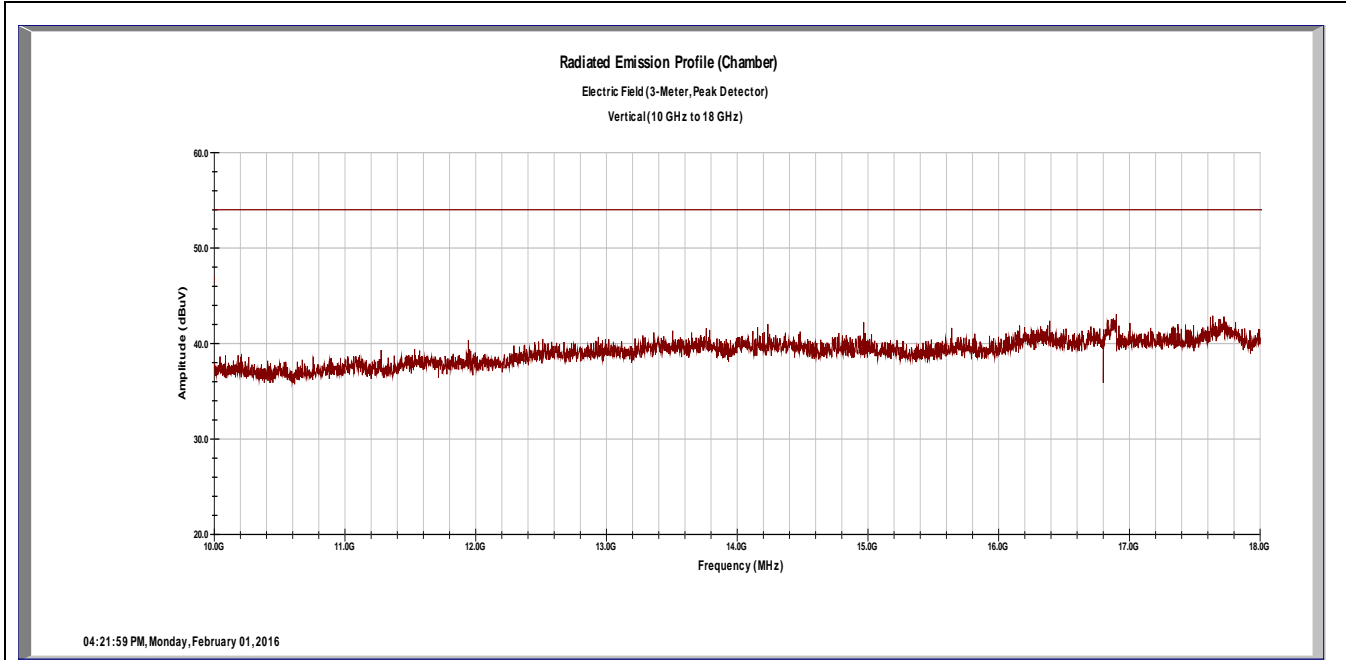
The Emissions from the transmitter was low enough that a notch filter or HPF was not required.

The Low and Mid band frequencies give very similar results.

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Radiated Emissions Ch 2 – 10 to 18 GHz

Vertical



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
16814.00	V	1	0	14.10	32.04	24.26	39.86	46.18	54.00	-7.82
16814.00	V	1	0	27.60	32.04	24.26	39.86	59.68	74.00	-14.32

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: Worst Case Emissions was at high frequency (2480MHz)

The Emissions from the transmitter was low enough that a notch filter or HPF was not required.

The Low and Mid band frequencies give very similar results.

46.18dBuV is the worst case harmonic emissions which is equivalent to 0.204 mV/m

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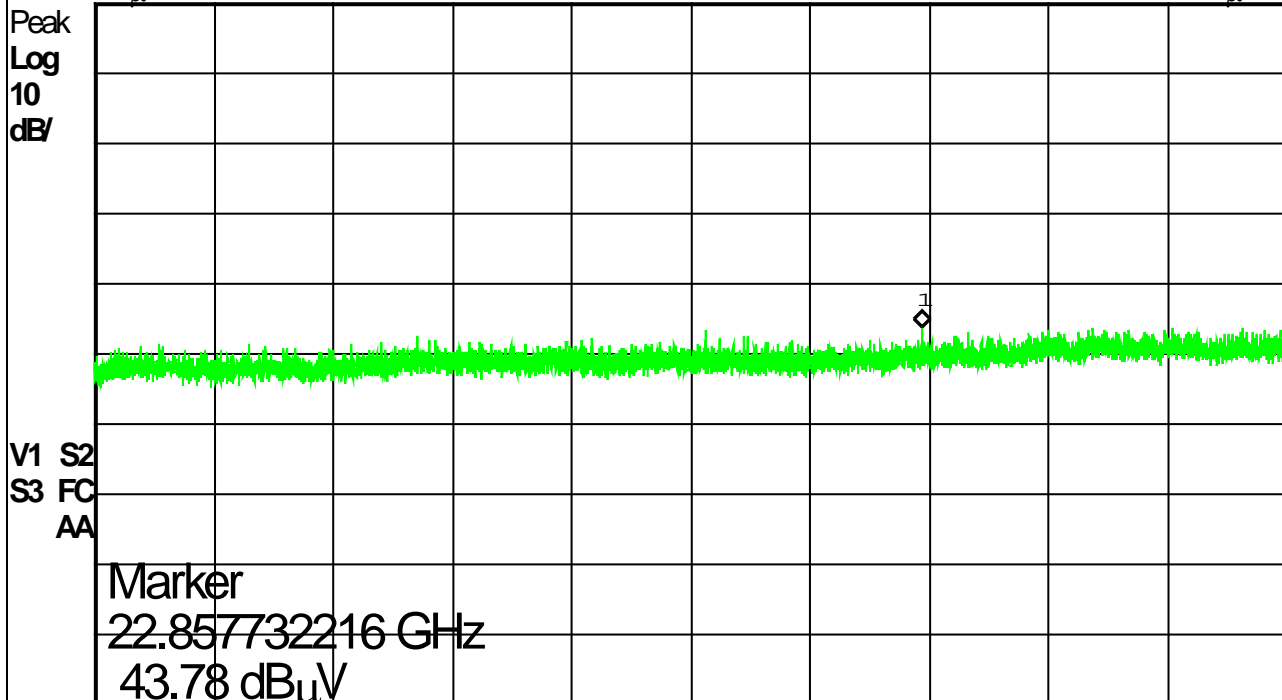
Radiated Emissions Ch 2 – 18 to 25 GHz
Horizontal

Agilent 10:26:08 Apr 13, 2016

Mkr1 22.8577 GHz
43.78 dB μ V

Ref 90 dB μ V

#Atten 0 dB



Start 18 GHz

Res BW 1 MHz

VBW 3 MHz

Stop 25 GHz
Sweep 79.99 ms (8000 pts)

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Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: No measurable emissions were noted.

No correction factors were used for the above graph. The number of Sweep Points was increased to 8000.

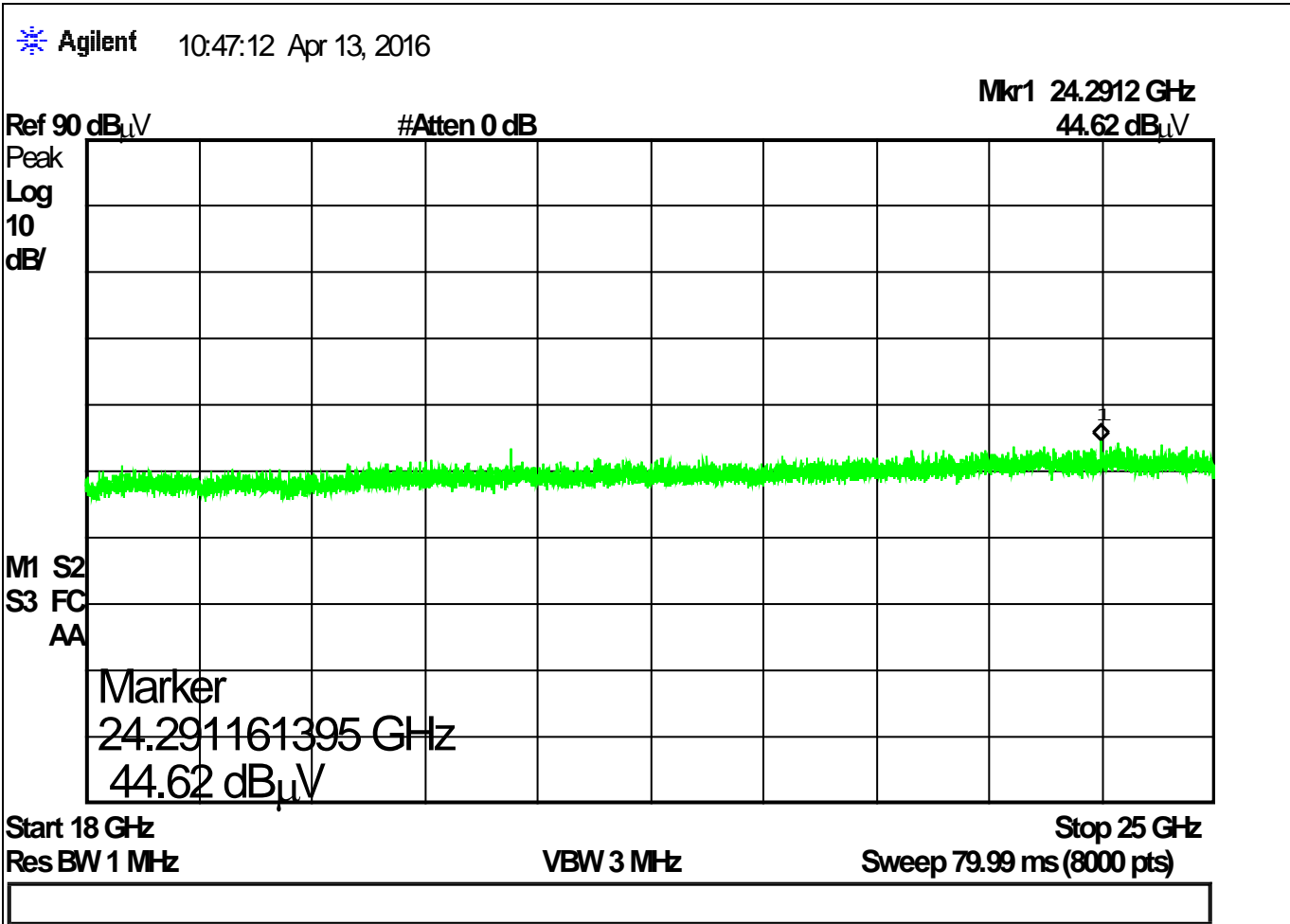
The Measuring distance was decreased to 1 meter.

No notch filter was used for this frequency range.

The other two channels presented very similar results. Plots for other the channels are on file at TUV Rheinland.

Radiated Emissions Ch 2 – 18 to 25 GHz

Vertical



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Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: No measurable emissions were noted.

No correction factors were used for the above graph. The number of Sweep Points was increased to 8000.

The Measuring distance was decreased to 1 meter.

No notch filter was used for this frequency range.

The other two channels presented very similar results. Plots for other the channels are on file at TUV Rheinland.

4.2 Band Edge requirements - FCC Part 15.249(d), RSS-210 2.2

4.2.1 Test Over View

Results	Complies (as tested per this report)					Date	1 February 2016	
Standard	FCC Part 15.249(d), RSS 210 2.2							
Product Model	M328				Serial#	Production Prototype		
Test Set-up	Direct Measurement from antenna port							
EUT Powered By	3.0 V DC Lithium battery	Temp	73° F	Humidity	35%	Pressure	998 mbar	
Perf. Criteria	(Below Limit)			Perf. Verification	Readings Under Limit			
Mod. to EUT	None			Test Performed By	Mark Ryan			

4.2.2 Test Procedure

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Sec. 15.209, whichever is the lesser attenuation.

4.2.3 Deviations

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

RBW of 100 kHz was chosen as it is within 1% to 5% of the total span. (4.8%)

The VBW of 300 kHz was chosen as it is 3 times the 100 kHz RBW.

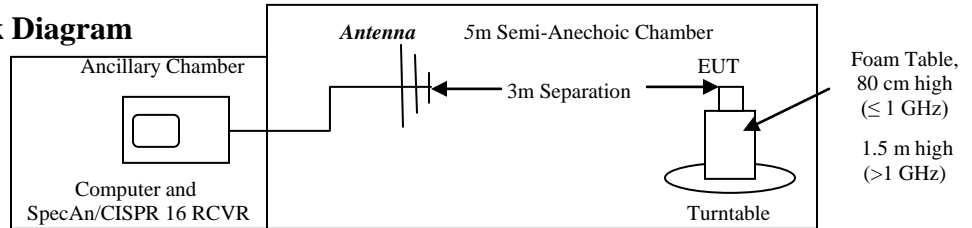
The Sweep time was set to Auto.

4.2.4 Final Test

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

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4.2.1 Test Setup Block Diagram



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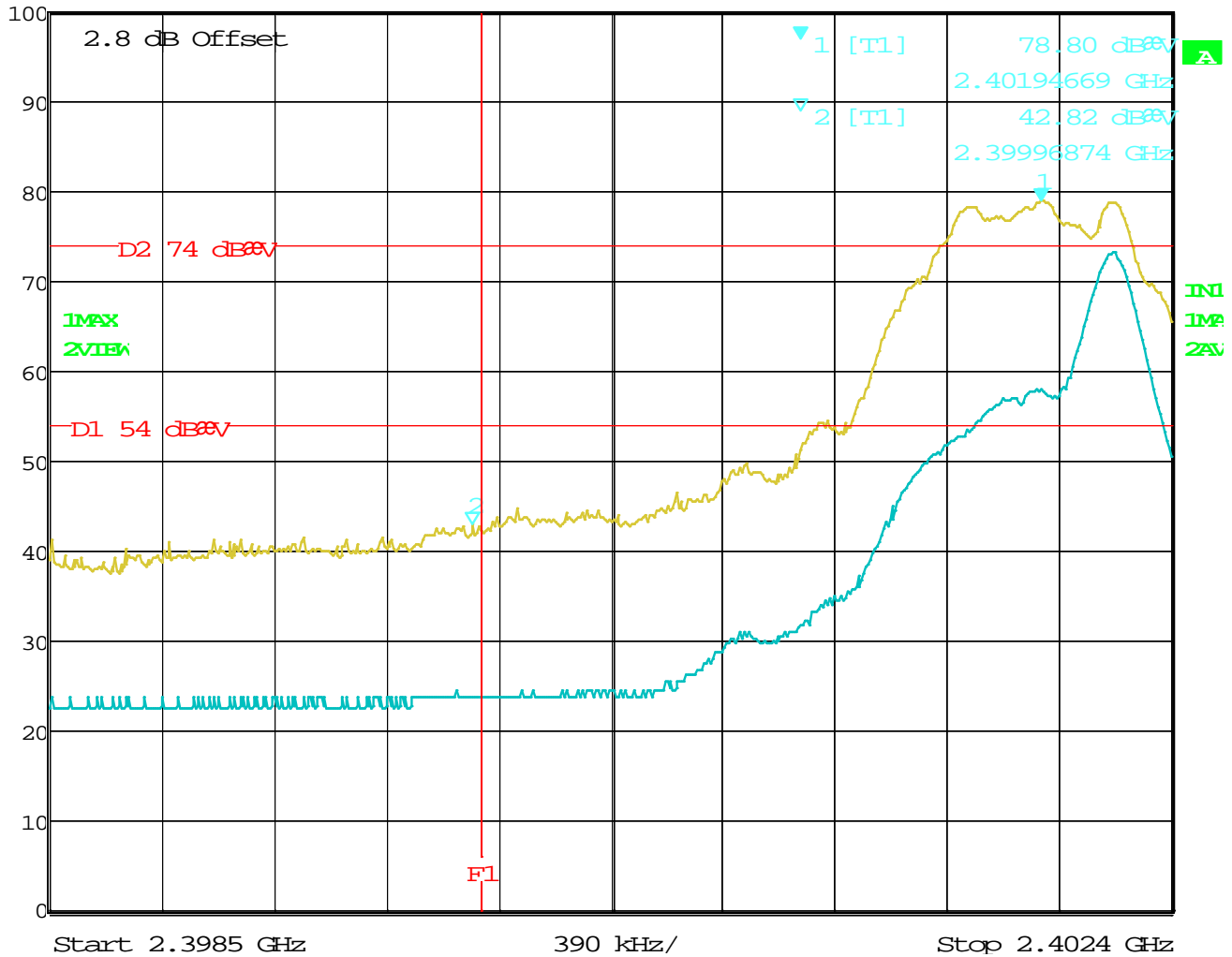
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Marker 1 [T1] REW 100 kHz RF Att 10 dB
Ref Lvl 78.80 dB μ V VBW 300 kHz
100 dB μ V 2.40194669 GHz SWT 500 ms Unit dB μ V



Date: 1.FEB.2016 14:35:47

Notes: Measured using the Peak (top trace) and Average detectors (lower trace).
Band Edge is at 2.4 GHz (Line F1).

The nearest restricted band (2390MHz) is 10 MHz below the band edge

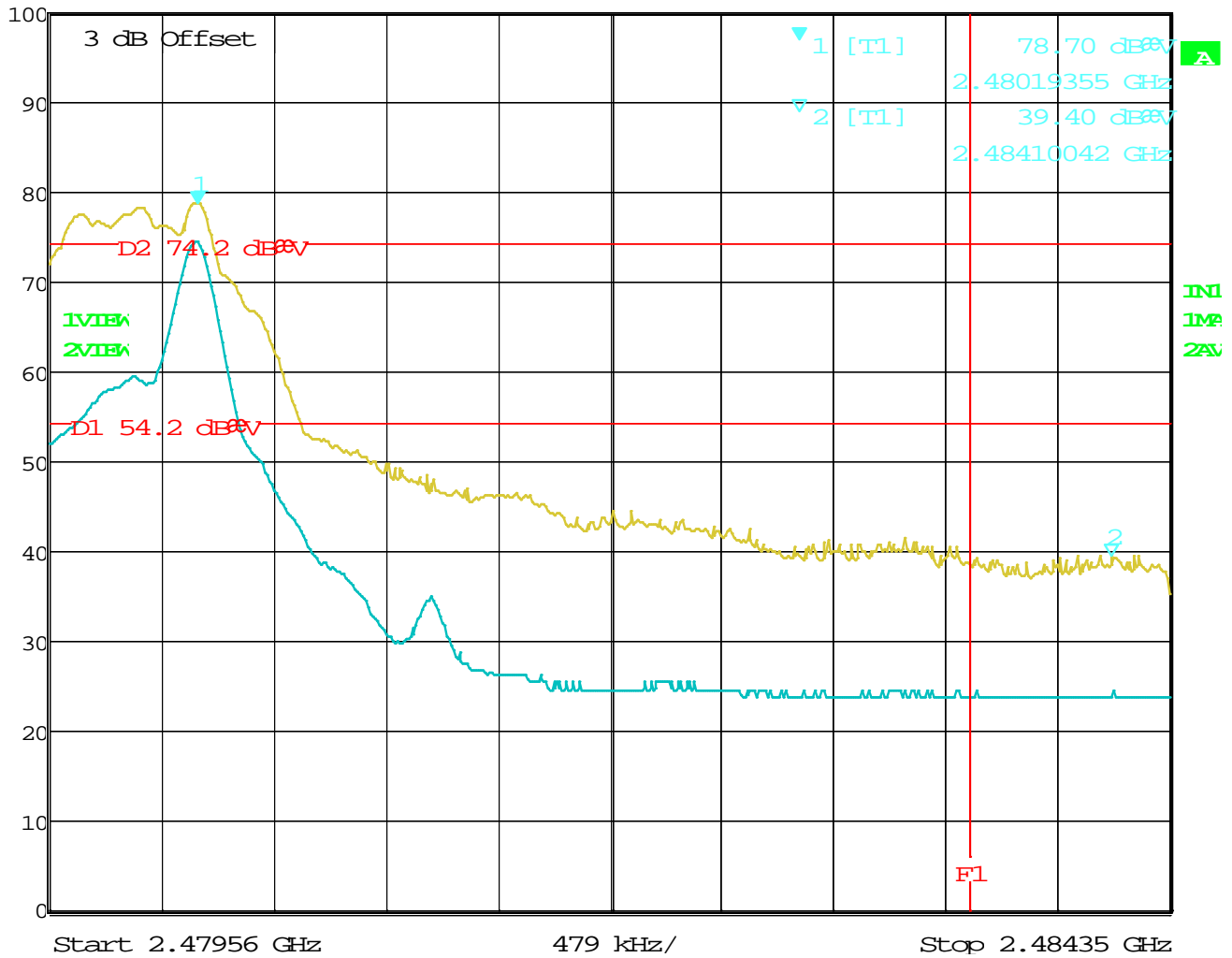
The Highest frequency outside the band is at 50.06 dB μ V (using the Average Detector) which is below the Average restricted-band limits)

Figure 1: Lower Band Edge Measurement (Radiated Emission)

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Marker 1 [T1] REW 100 kHz RF Att 10 dB
 Ref Lvl 78.70 dBμV VBW 300 kHz
 100 dBμV 2.48019355 GHz SWF 500 ms Unit dBμV



Date: 1.FEB.2016 14:48:14

Note: Measured using the Peak detector. Band Edge is at 2.483.5 MHz (Line F1).

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

The Highest frequency outside the band is at 47.46 dBμV (using the Peak Detector) which is below the Average restricted-band limits)

Figure 2: Upper Band Edge Measurement (Radiated Emission)

The EUT is compliant with the rules.

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4.1 Conducted Emissions on AC Mains – FCC 207(a) and RSS-GEN 7.2.4

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

4.1.1 Over View of Test

Results	NA EUT is battery operated only			Date	NA		
Standard	FCC Parts 15.207(a) and RSS-GEN 7.2.4						
Product Model	M328			Serial#	NA		
Test Set-up	Tested in shielded room. EUT placed on table, see test plans for details						
EUT Powered By	3.0 V DC Lithium battery	Temp	NA	Humidity	NA	Pressure	NA
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	NA				

4.1.2 Test Procedure

Conducted emissions tests were performed using the procedures of ANSI C64.4: 2009, including methods for signal maximizations and EUT configuration. The photos included with the report show the EUT in its maximized configuration.

4.1.3 Deviations

The Test sample is battery operated only. It does not have provision for external power of any kind.

4.1.4 Final Test

This test is not applicable for the device submitted for testing

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4.2 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. This device operates above 900 MHz.

4.2.1 Test Over View

Results	Complies (as tested per this report)				Date	1 February 2016	
Standard	RSS-210 Section A1.1.3						
Product Model	M328			Serial#	Production Prototype		
Test Set-up	Direct Measurement from antenna port						
EUT Powered By	3 V DC Lithium battery	Temp	73° F	Humidity	35%	Pressure	998 mbar
Perf. Criteria	(Below Limit)			Perf. Verification	Readings Under Limit		
Mod. to EUT	None			Test Performed By	Mark Ryan		

4.2.2 Test Procedure

Using the procedures of RSS-GEN section 4.6.1, the 3 kHz resolution bandwidth is 1% of the 300 kHz span. The 10 kHz video bandwidth is over 3 times that of the resolution bandwidth.

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

4.2.3 Deviations

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

4.2.4 Final Results

The measured 99% bandwidth is 146.69 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.

Frequency (MHz)	99% BW (MHz)	Limit (MHz)	Margin (MHz)
2402	1.046	12.0	-10.954
2440	1.064	12.0	-10.936
2480	1.058	12.0	-10.942

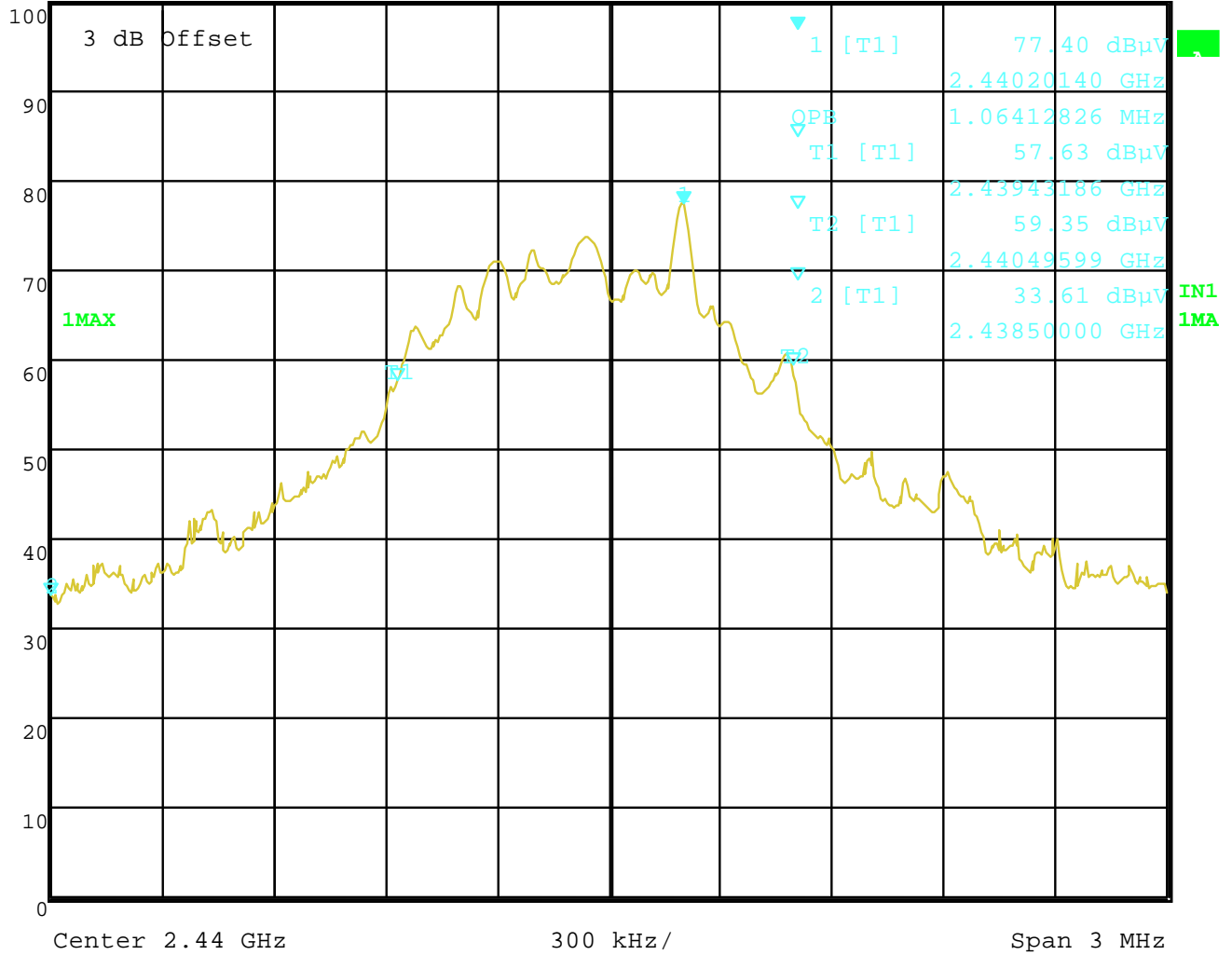
99% Power Band Width.

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4.2.5 Final Data



Marker 1 [T1] PRW 30 kHz RF Att 10 dB
 Ref Level 77.40 dBµV VBW 100 kHz
 100 dBµV 2.44020140 GHz SWT 500 ms Unit dBµV



Date: 1.FEB.2016 15:10:51

Figure 3 – 99% Power Bandwidth = 1.07 MHz. The Worst-Case shown.
 Span = 3MHz, RBW = 30 kHz (1% of Span), VBW = 100 kHz (≥ 3x RBW)

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

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