

**TEST REPORT CONCERNING THE COMPLIANCE OF A
Low Power Communication Device Transmitter (DXX)
OPERATING IN THE FREQUENCYRANGE 2402 – 2480 MHz,
BRAND Tacx, MODEL T2180 Vortex
WITH 47 CFR PART 15 (10-1-13 Edition) and
RSS-Gen (Issue 4, November 2014) and
RSS-210 (Issue 8, December 2010)**

**14081901.fcc02_Rev02
January 05, 2015**

FCC listed : 90828
Industry Canada : 2932G-2
R&TTE, LVD, EMC Notified Body : 1856

**TÜV Rheinland Nederland B.V.
P.O. Box 37
9350 AA Leek (NL)
Eiberkamp 10
9351 VT Leek (NL)**

Telephone: +31 594 505005
Telefax: +31 594 504804

E-mail: info@nl.tuv.com
Web: www.tuv.com

MEASUREMENT/TECHNICAL REPORT

Brand: Tacx
Model: T2180 Vortex

FCC ID: 2AAMI-T2180
IC: 11353A-T2180

This report concerns: Original grant, certification / ~~Limited Single Modular Approval~~ ~~Class 2 change~~
~~Verification~~

Equipment type: Low Power Communication Device Transmitter (DXX)

Report prepared by:

Name	: Richard van der Meer
Company name	: TÜV Rheinland Nederland B.V.
Address	: Eiberkamp 10
Postal code/city	: 9351VT Leek
Mailing address	: P.O. Box 37
Postal code/city	: 9350AA Leek
Country	: The Netherlands
Telephone number	: + 31 594 505 005
Telefax number	: + 31 594 504 804
E-mail	: info@nl.tuv.com

The data taken for this test and report herein was done in accordance with 47 CFR Part 15 (10-1-13 Edition), RSS-Gen (Issue 4, November 2014) and RSS-210 (Issue 8, December 2010) and the measurement procedures of ANSI C63.10-2009. TÜV Rheinland Nederland B.V. at Leek, The Netherlands, certifies that the data is accurate and contains a true representation of the emission profile of the Equipment Under Test (EUT) on the date of the test as noted in the test report. I have reviewed the test report and find it to be an accurate description of the test(s) performed and the EUT so tested.

Date: January 05, 2015

Signature:



Pieter de Beer
Business Field Manager Electrical
TÜV Rheinland Nederland B.V.

Description of test item

EUT : Low Power Communication Device Transmitter (DXX)
Manufacturer : Tacx b.v.
Brand : Tacx
Model(s) : T2180 Vortex
Serial Number : 801407144 (conducted tests) and 801407091 (radiated tests)
Voltage input rating : 100 – 230 Vac
Voltage output rating : --
Current input rating : --
Antenna : Internal, integrated on the PCB
Antenna Gain : + 2dBi (stated by the applicant)
Operating frequency : 2402 MHz-2480 MHz.
Modulation : GFSK
Remarks : n.a.

Applicant information

Applicant's representative : Martin Smits
Company : Tacx b.v.
Address : Rijksstraatweg 52
Postal code : 2241BW,
City : Wassenaar
Country : Netherlands
Telephone number : +31705119259
Telefax number : +31705116411

Test(s) performed

Location : Leek
Test(s) started : October 07, 2014
Test(s) completed : November 25, 2014
Purpose of test(s) : Equipment Authorization (Original grant/certification)

Test specification(s) : 47 CFR Part 15, Subpart C, Section 15.249 (10-1-13 Edition) and RSS-GEN (ISSUE 4, NOVEMBER 2014) AND RSS-210 (ISSUE 8, DECEMBER 2010).

Test engineer(s) : R. van der Meer



Report written by : R. van der Meer



Report date : January 05, 2015

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The test results relate only to the item(s) tested.

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1 General information.

1.1 Product description.

The brand Tacx, Model T2180 Vortex, hereafter referred to as EUT, is a Low Power Communication Device Transmitter (DXX), BlueTooth Low Energy used in an interactive hometrainer system for bicycles to transmit performance data to PC, Tablet or smartphone. The EUT is factory configured for the 2402-2480 MHz band. The EUT also contains a Digital Transmission System (DTS) operating in the frequencyband 2403-2480 MHz, based on ANT technology, although the two transmitters never transmit at the same time. The DTS transmitter is covered in a separate report.

1.1.1 Introduction.

The content of this report and measurement results have not been changed other than the way of presenting the data.

1.2 Related submittal(s) and/or Grant(s).

1.2.1 General.

This test report supports the original grant/certification in equipment authorization files under:
 FCC ID: 2AAMI-T2180 and IC: 11353A-T2180.

1.3 Tested system details.

Details and an overview of the system and all of its components, as it has been tested, may be found below.

EUT	:	Low Power Communication Device Transmitter (DXX)
Manufacturer	:	Tacx b.v.
Brand	:	Tacx
Model(s)	:	T2180 Vortex
Serial Number	:	801407144 (conducted tests) and 801407091 (radiated tests)
Voltage input rating	:	100 – 230 Vac
Voltage output rating	:	--
Current input rating	:	--
Antenna	:	Internal, integrated on the PCB
Antenna Gain	:	+ 2dBi (stated by the applicant)
Operating frequency	:	2402 MHz-2480 MHz.
Modulation	:	GFSK
Spreading technique	:	Digital modulation
Remarks	:	n.a.

Auxiliary equipment 1 (AUX1)	:	Notebook computer
Brand	:	Hewlett-Packard
Model	:	Compaq 6710b
Serial number	:	CNU8150MD3
Remark	:	used for programming the EUT, property applicant

Auxiliary equipment 2 (AUX2)	:	Programming interface
Brand	:	Segger
Model	:	J-Link v 9.2
Serial number	:	59200824
Remarks	:	--

The testsoftware (as installed on AUX1) is used to program the operating frequency of the EUT. AUX2 were used only to program the operating frequency and once set the auxiliary items were removed from the test-setup and the EUT operates on it's own.

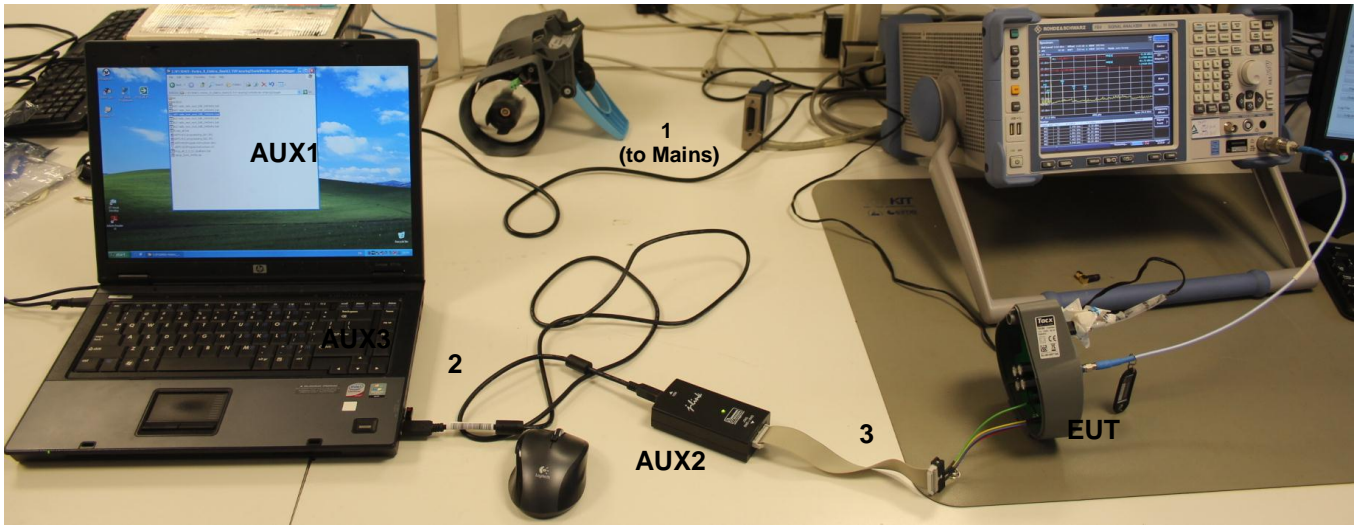


Photo 1: basic setup for frequency programming

1.3.1 Description of input and output ports.

Number	Terminal	From	To	Remarks
1	Mains	Mains	(AUX1)	--
2	Usb	AUX1	AUX2	--
3	datacom	AUX2	EUT	--

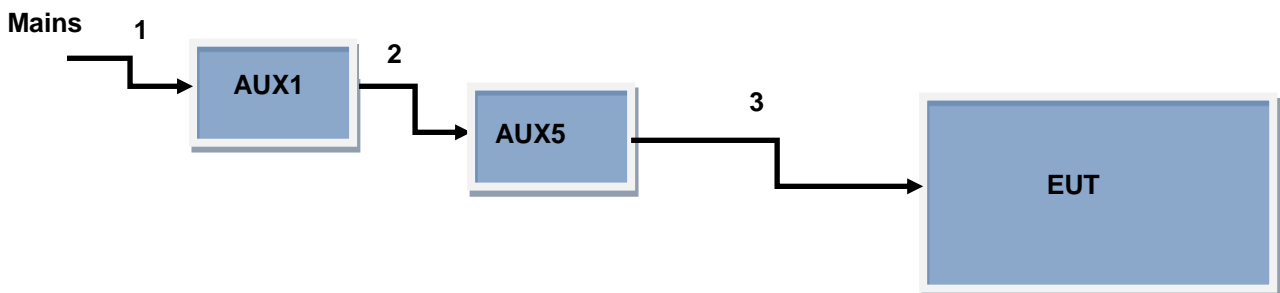


Figure 1. Basic set-up

1.4 Test results summary

The EUT was tested in accordance with the specifications given in the table below.

Test Standard		Description	Page	Pass / Fail
47 CFR Part 15 (10-1-13 Edition)	RSS-210 Issue 8, December 2010			
15.207(a)	RSS-Gen(8.8)	AC Powerline Conducted emissions	15 - 18	Pass
15.205 and 15.209	RSS-Gen(8.9, 8.10) and RSS-210(2.5)	Radiated emissions	10 - 14	Pass
15.249(d)	RSS-210 section A2.9	Band Edge emissions	19 - 19	Pass
15.215(c)	RSS-Gen(6.6)	Occupied bandwidth	20 - 23	Pass

Table : testspecifications

Testmethods: ANSI C63.10-2009 and RSS-Gen Issue 4, November 2014

1.5 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-13 Edition), sections 15.31, 15.205, 15.207, 15.209 and 15.249, RSS-GEN (ISSUE 4, NOVEMBER 2014) RSS-210 (ISSUE 8, DECEMBER 2010).

The test methods, which have been used, are based on ANSI C63.10- 2009.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters.
Radiated emission tests below 30 MHz were performed at a measurement distance of 3 meters.

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

1.6 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland Nederland B.V. , located in Leek, 9351VT Eiberkamp 10, The Netherlands, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under registration number 90828. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The description of the test facilities has been filed to Industry Canada under registration number 2932G-2. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

1.7 Test conditions.

Normal test conditions:

Temperature (*) : +15°C to +35°C
Relative humidity(*) : 20 % to 75 %
Supply voltage : 120VAC/60Hz

When it was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately.

2 System test configuration.

2.1 Justification.

The system was configured for testing in a typical fashion (as a customer would normally use it).

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.10- 2009.

2.2 EUT mode of operation.

The EUT has been tested in continues transmit mode with a modulated carrier. The output power was set for maximum output by the applicant. The intentional radiator tests have been performed with a complete functioning EUT.

A continuous transmit mode could be initiated by using test software as supplied by the applicant. The test software was used to define various different operational modes of the EUT for the purpose of compliance testing. The version of the test software, as supplied by the applicant and used during all tests is:

Test software : ANTware2 v 3.1.0

Batch files programmed by the applicant are used to make the required settings. This software was running on a laptop computer (AUX1).

2.3 Special accessories.

No special accessories are used and/or needed to achieve compliance.

2.4 Equipment modifications.

No modifications have been made to the equipment in order to achieve compliance.

2.5 Product Labeling

The product labeling information is available in the technical documentation package.

2.6 Block diagram of the EUT.

The block diagram is available in the technical documentation package.

2.7 Schematics of the EUT.

The schematics are available in the technical documentation package.

2.8 Part list of the EUT.

The part list is available in the technical documentation package.

3 Radiated emission data.

RESULT: PASS

Date of testing: 2014-11-07
Frequency range: 30MHz - 25GHz

Requirements:

FCC 15.205, FCC 15.209, FCC 15.249 and IC RSS-Gen(8.9, 8.10) and RSS-210(2.5)

Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the radiated emission limits specified in FCC 15.209(a).

Radiated emissions which fall outside the operation frequency band and outside restricted bands shall either meet the limit specified in FCC 15.209(a)/ RSS-Gen (8.8) or be attenuated at least 20dB below the power level in the 100kHz bandwidth within the band that contains the highest level of the desired power (the less severe limit applies).

Test procedure:

ANSI C63.10-2009.

The EUT is considered as floor-standing equipment not typically installed with its base in direct electrical contact with, or connected to, a metal floor or grid. The EUT was placed on the testsite turntable with insulation material in-between of up to 12mm thickness to prevent electric contact.

was placed on a nonconductive turntable 0.8m above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile. The physical arrangement of the test system, the associated cabling and the EUT orientation (X, Y, Z) were varied in order to ensure that maximum emission amplitudes were attained.

The spectrum was examined from 30MHz to the 10th harmonic of the highest fundamental transmitter frequency (25GHz). Final radiated emission measurements were made at 3m distance.

At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations.

The highest emission amplitudes relative to the appropriate limit were recorded in this report. Field strength values of radiated emissions at frequencies not listed in the tables are more than 20 dB below the applicable limit. The levels are expressed in dBm which are derived from $\text{dBm} = E(\text{dB}\mu\text{V}/\text{m}) - 95.2\text{dB}$. Where Peak (Pk) values were at least 6 dB under the Average (Av) limits, Av value was not tested. Where Average values were tested, Average values were measured using a 10Hz Video Bandwidth.

3.1 Radiated field strength measurements (30 MHz – 1 GHz, E-field)

3.1.1 Radiated field strength measurements (30 MHz- 1 GHz, E-field)

Freq. [MHz]	Antenna Orientation	Level QP [dB μ V/m]	Limit [dB μ V/m]	Result Pass/Fail
43.40	Vertical	24.7	40.0	Pass
49.40	Vertical	22.9	40.0	Pass
66.86	Vertical	19.9	40.0	Pass
194.90	Vertical	19.4	43.5	Pass
606.18	Vertical	29.1	46.0	Pass
949.56	Vertical	35.4	46.0	Pass

Table 1 Radiated emissions of the EUT in the frequency range 30 MHz – 1 GHz.

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209, 15.249 and RSS-210 section A2.9 and RSS-Gen section 8.9 with the EUT operating in continues transmit mode are depicted in Table 1.

Notes:

1. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
2. Measurement uncertainty is ± 5.0 dB
3. The reported field strength values are the worst case values at the indicated frequency. The EUT was varied in 2 positions (horizontal and vertical) because of it's physical limitations, the antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. The EUT was tested in on the lowest frequency (2402 MHz), a middle frequency (2440 MHz) and the highest frequency (2480 MHz) in the 2402 – 2480 MHz band wherein it operates.
5. A Quasi-peak detector was used with a resolution bandwidth of 120 kHz.

Used test equipment and ancillaries:

99608	99609	99699	99861	99858	99580/99847			

3.2 Radiated field strength measurements (1 - 25 GHz, E-field), Peak values

3.2.1 Radiated field strength measurements (1 - 25 GHz, E-field), EUT's TX Frequency 2402 MHz

Frequency [MHz]	Antenna Orientation	Detector	Resolution Bandwidth (kHz)	Level [dBm]	Limit [dBm]	Result
2402 (fundamental)	Horizontal	Peak	1000	-22.26	-1.2 Av +18.9 Pk	Pass
4062 ^R	Vertical	Peak	1000	-57.8	-41.2 Av -21.2 Pk	Pass
4804 ^{HR}	Vertical	Peak	1000	-28.1	-21.2 Pk	Pass
4804 ^{HR}	Vertical	Average	1000	-44.1	-41.2 Av	Pass
6536	Vertical	Peak	1000	-51.6	-41.2 Av -21.2 Pk	Pass
7213 ^H	Vertical	Peak	1000	-34.9	-21.2 Pk	Pass
7213 ^H	Vertical	Average	1000	-47.2	-41.2 Av	Pass
9610 ^H	Vertical	Peak	1000	-45.2	-21.2 Pk	Pass
9610 ^H	Vertical	Average	1000	-51.9	-41.2 Av	Pass

Table 2

3.2.2 Radiated field strength measurements (1 - 25 GHz, E-field), EUT's TX Frequency 2440 MHz

Frequency [MHz]	Antenna Orientation	Detector	Resolution Bandwidth (kHz)	Level [dBm]	Limit [dBm]	Result
2440 (fundamental)	Horizontal	Peak	1000	-22.75	-1.2 Av +18.9 Pk	Pass
1072 ^R	Horizontal	Peak	1000	-60.4	-41.2 Av -21.2 Pk	Pass
1438 ^R	Horizontal	Peak	1000	-63.0	-41.2 Av -21.2 Pk	Pass
4876 ^{HR}	Vertical	Peak	1000	-31.6	-41.2 Av -21.2 Pk	Pass
7312 ^{HR}	Vertical	Peak	1000	-36.9	-21.2 Pk	Pass
7312 ^{HR}	Vertical	Average	1000	-47.5	-41.2 Av	Pass
9763 ^H	Vertical	Peak	1000	-48.3	-41.2 Av -21.2 Pk	Pass

Table 3

3.2.3 Radiated field strength measurements (1 - 25 GHz, E-field), EUT's TX Frequency 2480 MHz

Frequency [MHz]	Antenna Orientation	Detector	Resolution Bandwidth (kHz)	Level [dBm]	Limit [dBm]	Result
2480 (fundamental)	Horizontal	Peak	1000	-24.6	-1.2 Av +18.9 Pk	Pass
1071 ^R	Horizontal	Peak	1000	-59.5	-41.2 Av -21.2 Pk	Pass
1436 ^R	Vertical	Peak	1000	-61.7	-41.2 Av -21.2 Pk	Pass
4961 ^{HF-R}	Vertical	Peak	1000	-35.3	-21.2 Pk	Pass
4961 ^{HF-R}	Vertical	Average	1000	-44.1	-41.2 Av	Pass
7433 ^{HF-R}	Vertical	Peak	1000	-40.5	-21.2 Pk	Pass
7433 ^{HF-R}	Vertical	Peak	1000	-47.3	-41.2 Av	Pass
9925 ^H	Vertical	Peak	1000	-51.6	-41.2 Av -21.2 Pk	Pass

Table 4

3.2.4 Radiated field strength measurements (1 - 25 GHz, E-field), EUT normal operation

Frequency [MHz]	Antenna Orientation	Detector	Resolution Bandwidth (kHz)	Level [dBm]	Limit [dBm]	Result
1071 ^R	Vertical	Peak	1000	-59.8	-41.2 Av -21.2 Pk	Pass
1436 ^R	Horizontal	Peak	1000	-60.8	-41.2 Av -21.2 Pk	Pass
4799 ^{HF-R}	Vertical	Peak	1000	-39.8	-21.2 Pk	Pass
4799 ^{HF-R}	Vertical	Average	1000	-43.9	-41.2 Av	Pass
4941 ^{HF-R}	Horizontal	Peak	1000	-40.0	-21.2 Pk	Pass
4941 ^{HF-R}	Horizontal	Average	1000	-45.2	-41.2 Av	Pass
7210 ^H	Vertical	Peak	1000	-39.9	-21.2 Pk	Pass
7210 ^H	Vertical	Average	1000	-44.9	-41.2 Av	Pass
7271 ^{HF-R}	Vertical	Peak	1000	-40.8	-21.2 Pk	Pass
7271 ^{HF-R}	Vertical	Average	1000	-45.2	-41.2 Av	Pass
7372 ^{HF-R}	Vertical	Peak	1000	-39.4	-21.2 Pk	Pass
7372 ^{HF-R}	Vertical	Average	1000	-44.7	-41.2 Av	Pass
7433 ^{HF-R}	Vertical	Peak	1000	-41.5	-21.2 Pk	Pass
7433 ^{HF-R}	Vertical	Average	1000	-47.7	-41.2 Av	Pass

Table 5

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.209 and 15.249 and RSS-210 section A2.9 and RSS-Gen section 8.9 with the EUT operating in continues transmit mode are depicted in Tables 2 through 5.

Notes:

1. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit.
2. Measurement uncertainty is ± 5.0 dB
3. The reported field strength values are the worst case values at the indicated frequency. The EUT was varied in three positions, the antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. The EUT was tested in on the lowest frequency (2402 MHz), a middle frequency (2440 MHz) and the highest frequency (2480 MHz) in the 2402 – 2480 MHz band wherein it operates and the normal operation with both transmitters (ANT and BLE) active, although they never transmit simultaneously.
5. Most Peak values were within Average limits, therefor not retested with Average detector, except where Peak value exceeds Average limit.
6. ^h indicates a harmonic frequency, ^R indicates a frequency in the restricted band and ^{H-R} indicates a harmonic frequency in a restricted band.

Used test equipment and ancillaries:

99608	99609	99699	99861	99858	99580/99847			

4 AC Powerline Conducted Emission Data.

4.1 AC Power Line Conducted Emission data of the EUT

RESULT: Pass

Date of testing: 2014-11-12

Requirements:

Except when the requirements applicable to a given device state otherwise, for any license-exempt radio communication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the following table. The tighter limit applies at the frequency range boundaries.

Frequency of Emission (MHz)	Conducted Limit (dB μ V) Quasi-Peak	Conducted Limit (dB μ V) Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 - 30	46	50

*Decreases with the logarithm of the frequency.

Test procedure:

ANSI C63.10-2009.

Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a 50 μ H / 50 Ω LISN. The frequency range from 150kHz to 30MHz was searched. The six highest EUT emissions relative to the limit were noted. The EUT is considered a floor-standing device. The EUT is placed on a non-conductive plate of 5mm thick above the ground plane, so to isolate it from the ground plane because the EUT normally does not make electrical contact with a ground plane. The EUT was positioned at least 80cm from the LISN. The power cable was routed over the non-conductive plate to the LISN.

4.1.1 Testresults

Frequency (MHz)	Measurement results (dB μ V) L1		Measurement results (dB μ V) L2/Neutral		Limits (dB μ V)		Verdict (Pass/Fail)
	QP	AV	QP	AV	QP	AV	
0.150	54.4	22.1	54.1	22.2	66.0	56.0	Pass
0.160	52.9	20.3	52.7	20.2	65.5	55.5	Pass
0.170	51.5	23.2	51.3	22.6	65.0	55.0	Pass
0.180	50.1	17.2	49.9	15.9	64.5	54.5	Pass
0.190	48.8	16.2	48.7	16.7	64.0	54.0	Pass
0.200	47.4	15.3	47.4	15.1	63.6	53.6	Pass

The results of the conducted emission tests, carried out in accordance with 47 CFR Part 15 section 15.207(a) and RSS-Gen section 8.8, at the 120 Volts/ 60 Hz AC mains connection terminals of the EUT, are depicted in the table above.

Notes:

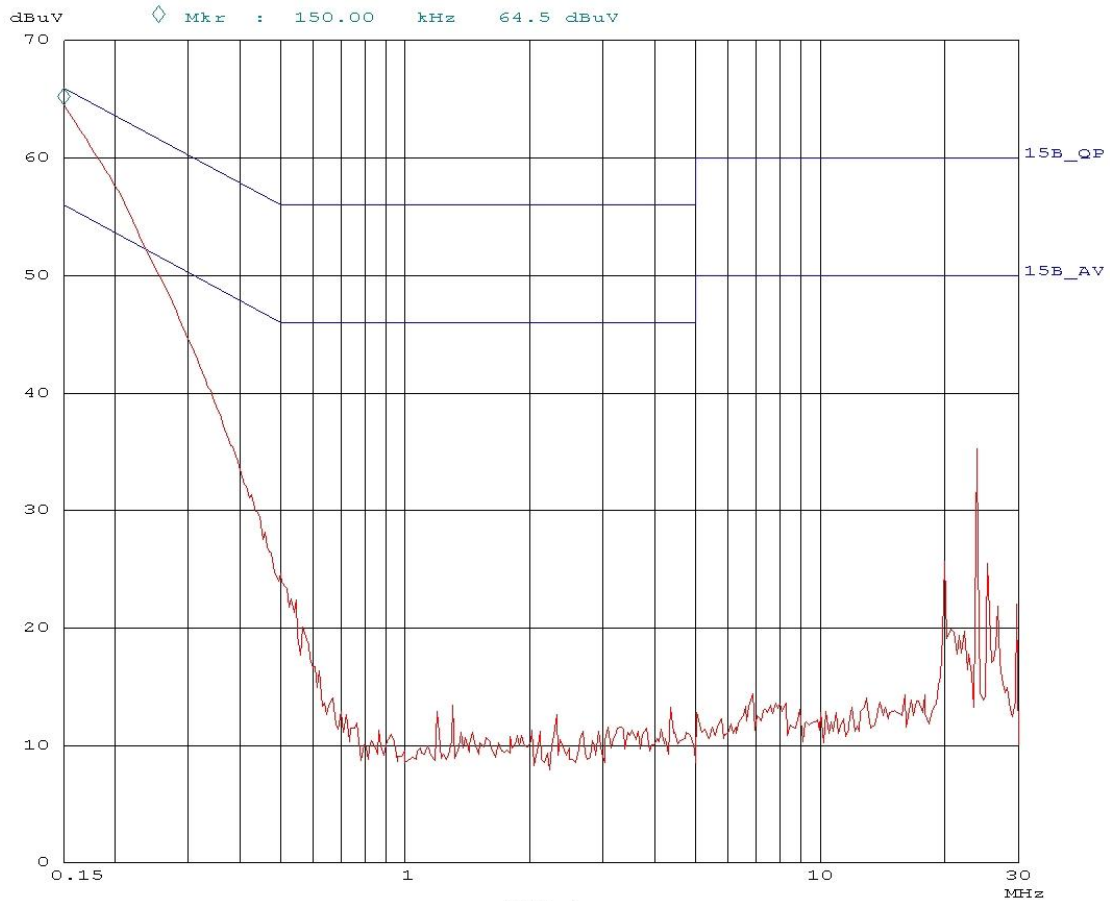
1. The resolution bandwidth used was 9 kHz.
2. From pre-test the worst case configuration proved to be the normal operation mode wherein both DTS transmitter and Bluetooth were operational. Worst case values noted.
3. Plots are provided on the next pages.

Used test equipment and ancillaries:

13313	99220	12512	15667	99852	99848	

12. Nov 14 15:21

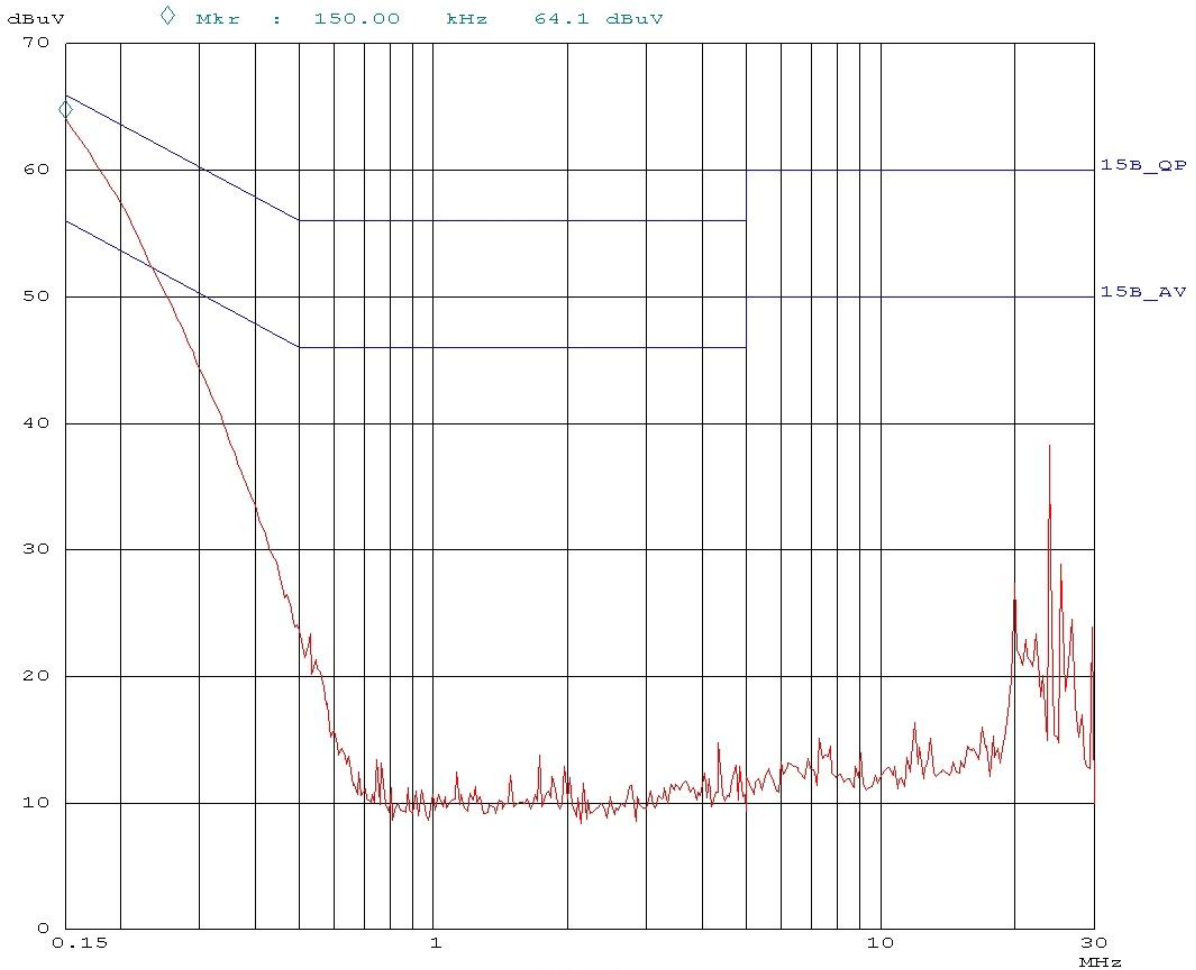
Scan Settings (1 Range)			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	
150k	30M	5k	9k	PK	20ms	OdBLN	OFF	



Plot 1 Conducted emissions on L1

12. Nov 14 15:50

Scan Settings (1 Range)			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	5k	9k	PK	20ms	0dB	OFF



Plot 2 Conducted emissions on L2

5 Emissions at the band edges

RESULT: Pass

Date of testing: 2014-10-29

The tables below show compliance with the 47 CFR Part 15 section 15.249(d) and RSS-210 section A2.9, this section requires the emissions outside the 2400 and 2483.5 MHz frequency band to be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in section 15.209 and RSS-Gen section 7.2.5, whichever is the lower attenuation.

Table 6 and Table 7 below show the levels at the band edges in respect to the general radiated emission limits.

EUT Frequency [MHz]	Band Edge Frequency [MHz]	Antenna Orientation	Level Pk [dBm]	Limit Pk [dBm]	Result Pass/Fail
2402	2399.90	Horizontal	-48.2	-21.2	Pass
2480	2483.60	Horizontal	-48.6	-21.2	Pass

Table 6 level of the band edge emissions, Peak values

EUT Frequency [MHz]	Band Edge Frequency [MHz]	Antenna Orientation	Level Pk [dBm]	Limit Av [dBm]	Result Pass/Fail
2402	2399.90	Horizontal	-48.2	-41.2	Pass
2480	2483.60	Horizontal	-48.6	-41.2	Pass

Table 7 level of the band edge emissions, Average values

Notes:

1. Measurement uncertainty is ± 5.0 dB
2. The reported field strength values are the worst case values at the indicated frequency. The EUT was varied in three positions, the antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
3. The EUT was tested in on the lowest frequency (2402 MHz) and the highest frequency (2480 MHz) in the 2402 – 2480 MHz band wherein it operates.

Used test equipment and ancillaries:

99608	99609	99699	99861	99858	99580/99847			
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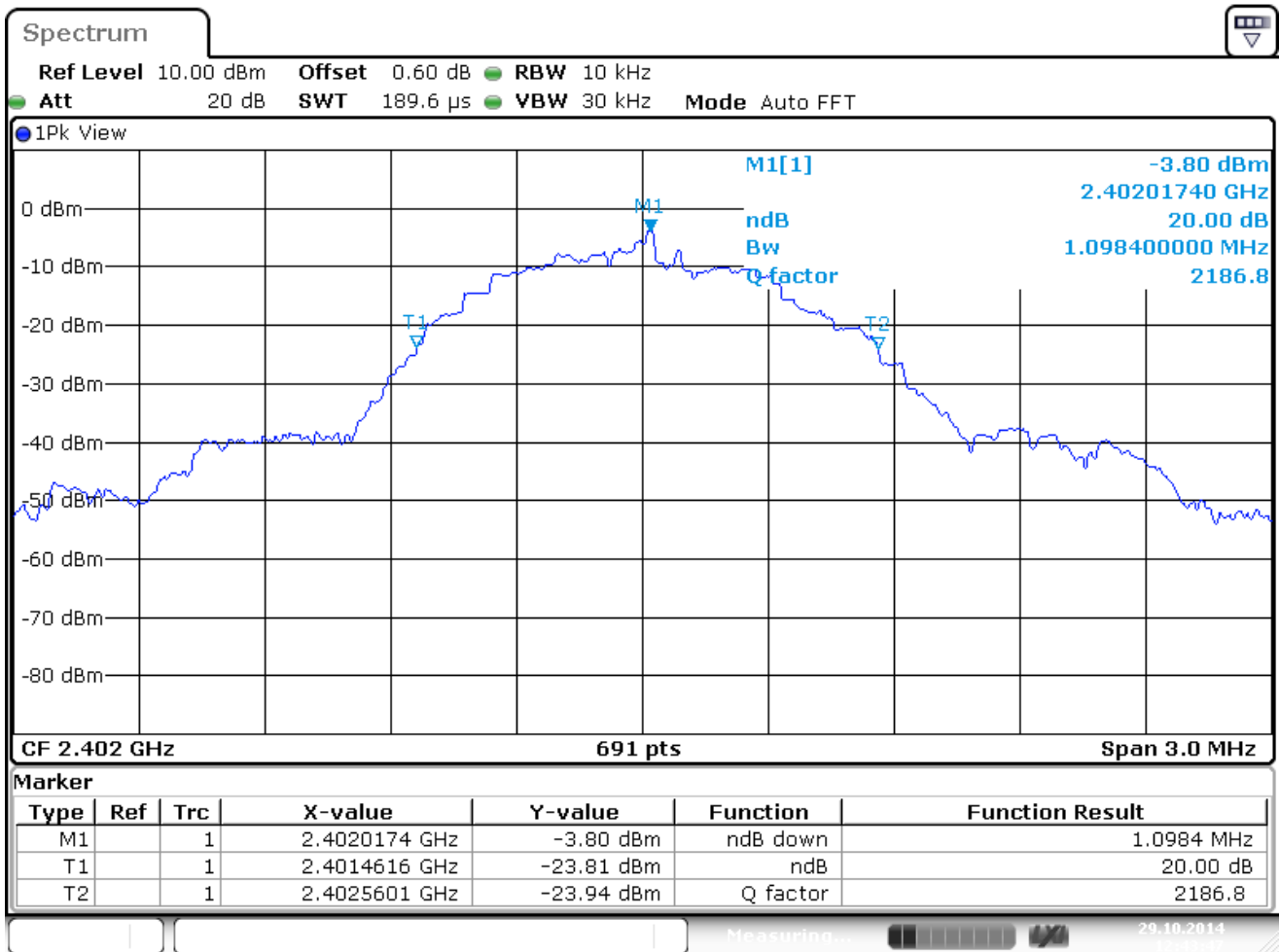
6 Bandwidth of the emission

RESULT: PASS

Date of testing: 2014-10-29

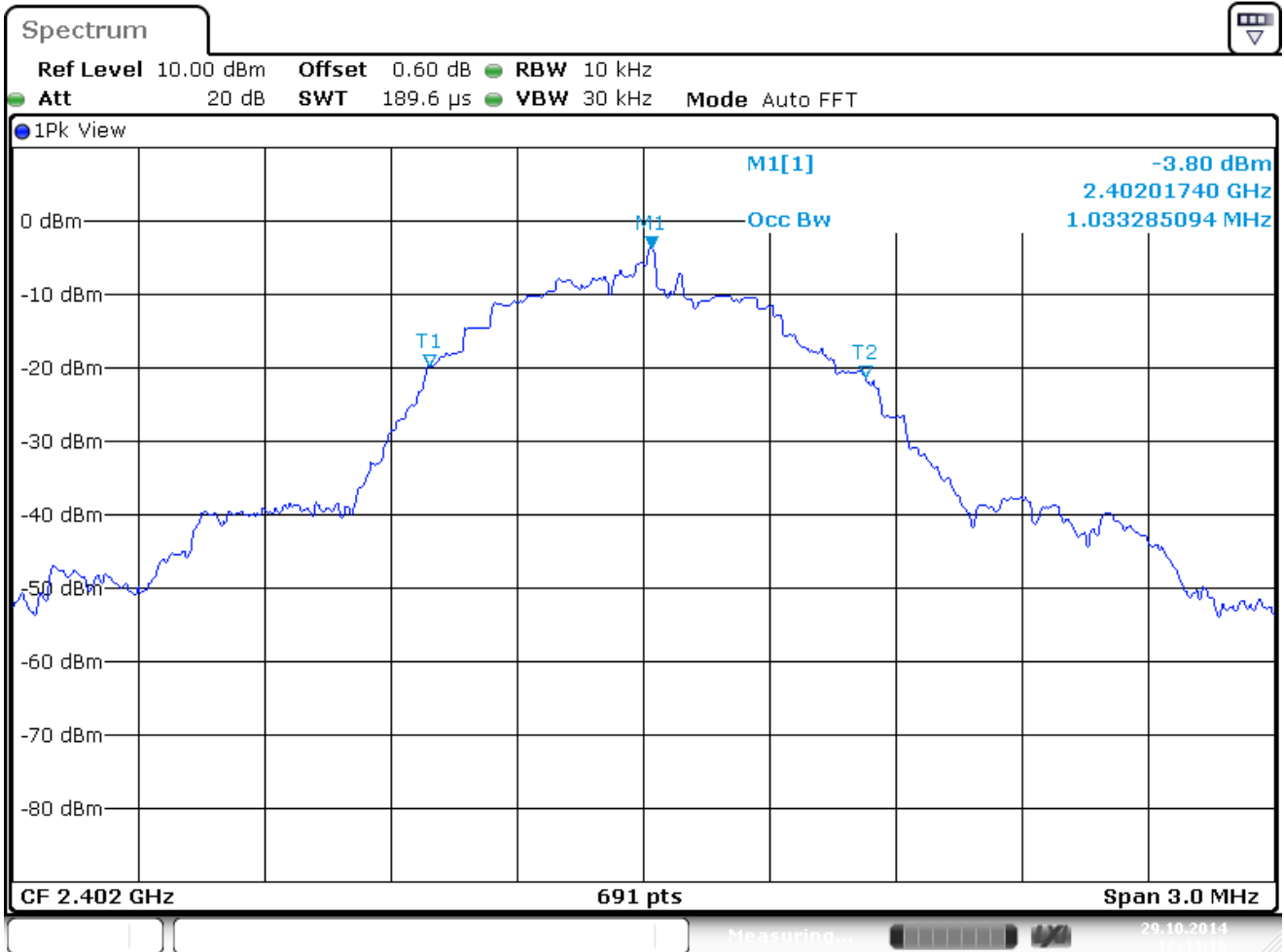
This was tested with a spectrum analyzer connected by a RF cable to the EUT antenna connector. Power level therefor differs from the radiated power levels.

The plots below show compliance with the 47 CFR Part 15 section 15.215(c), this section requires the 20 dB emission bandwidth is within the frequencyband designated in section 15.249.



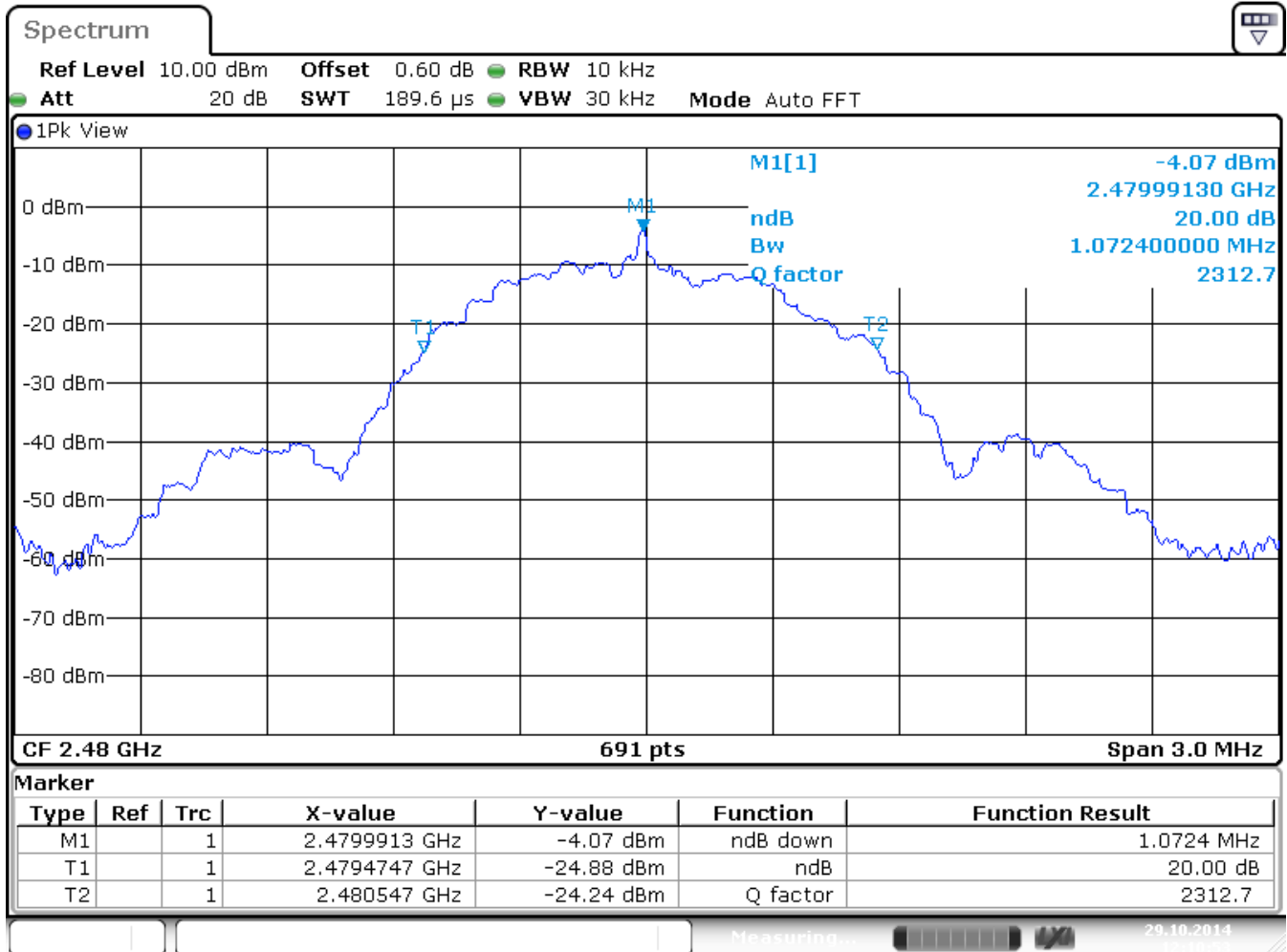
Date: 29.OCT.2014 12:43:47

Plot lowest channel - 2402 MHz, Occupied bandwidth is 1098.4 kHz as measured on a spectrum analyzer.



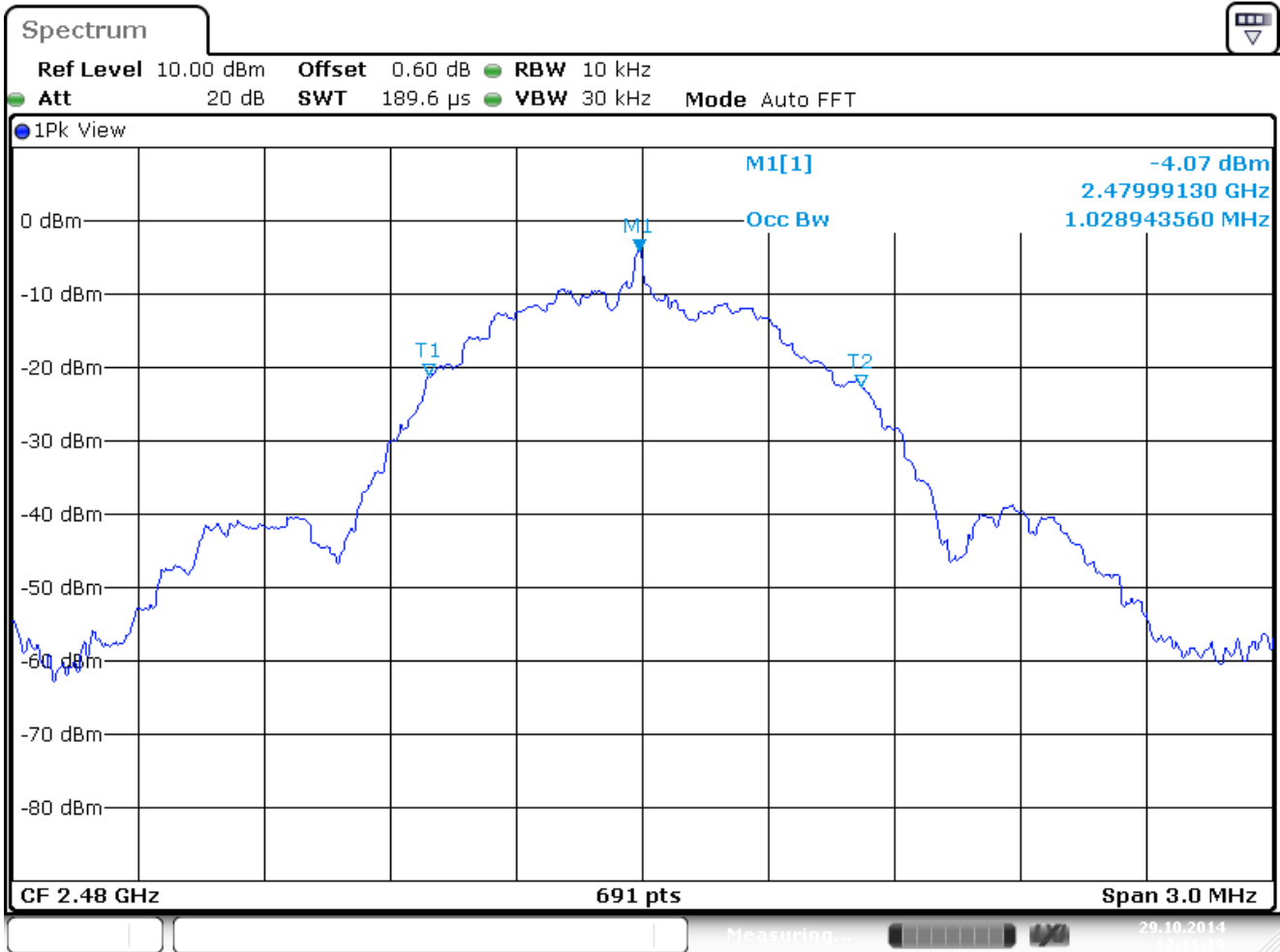
Date: 29.OCT.2014 12:44:16

Plot lowest channel - 2402 MHz, 99% bandwidth is 1033.3 kHz as measured on a spectrum analyzer.



Date: 29.OCT.2014 12:10:52

Plot highest channel - 2480 MHz, Occupied bandwidth is 1072.4 kHz as measured on a spectrum analyzer.



Date: 29.OCT.2014 12:11:19

Plot highest channel - 2480 MHz, 99% bandwidth is 1028.9 kHz as measured on a spectrum analyzer

7 List of utilized test equipment.

Kind of Equipment	Manufacturer	Model Name	Inventory number	Calibration date (mm/yyyy)	Calibration due date (mm/yyyy)
For Antenna Port Conducted Emissions					
Temperature-Humiditymeter	Extech	SD500	A00446/ 99857	03/2014	03/2015
Spectrum Analyzer	Rohde & Schwarz	FSV	A00337/ 99733	08/2014	08/2015
For Radiated Emissions					
Measurement Receiver	Rohde & Schwarz	ESCI	A00314/ 99699	03/2014	03/2015
RF Cable S-AR	Gigalink	APG0500	A00447/ 99858	01/2014	01/2015
Controller	Maturo	SCU/088/ 8090811	A00450/ 99861	N/A	N/A
Controller	EMCS	DOC202	A00257/ 99608	N/A	N/A
Test facility	Comtest	FCC listed: 90828 IC: 2932G-2	A00235/ 99580	04/2014	04/2017
Spectrum Analyzer	Rohde & Schwarz	FSV	A00337/ 99733	08/2014	08/2015
Antenna mast	EMCS	AP-4702C	A00258/ 99609	N/A	N/A
Temperature-Humiditymeter	Extech	SD500	A00444/ 99855	03/2014	03/2015
Guidehorn 1-18 GHz	EMCO	3115	A00009/ 12484	04/2014	04/2015
Guidehorn 18-40 GHz	EMCO	RA42-K-F-4B-C	A0012/ 12488	04/2014	04/2015
Biconilog Testantenna	Teseq	CBL 6111D	A00466/ 99877	06/2014	06/2015
2.4 GHz bandreject filter	BSC	XN-1783	A00065/ 14450	N/A	N/A
Bandpass filter 4-10 GHz	Reactel	7AS-7G-6G-511	A00131/ 99076	N/A	N/A
Bandpass filter 10-26 GHz	Reactel	9HS-10G/26.5G-S11	A00151/ 99136	N/A	N/A
Preamplifier 0.5 - 18 GHz	Miteq	AMF-5D-005180-28-13p	A00247/ 99596	N/A	N/A
Filterbox	EMCS	RFS06S	A00255/ 99606	08/2014	08/2015

Kind of Equipment	Manufacturer	Model Name	Inventory number	Calibration date (mm/yyyy)	Calibration due date (mm/yyyy)
For AC Powerline Conducted Emissions					
Pulse limiter	R&S	ESH3-Z2	A00051/ 13313	01/2014	01/2015
Variac	RFT	LSS020	A00171/ 99220	NA	NA
LISN	EMCO	3625/2	A00022/ 12512	01/2014	01/2016
Measurement Receiver	Rohde & Schwarz	ESCS30	A00726	09/2014	09/2015
Shielded room for Conducted emissions	--	--	A00437/ 99848	NA	NA
Temperature-Humiditymeter	Extech	SD500	A00444/ 99855	03/2014	03/2015

Conformance of the used measurement and test equipment with the requirements of ISO/IEC 17025:2005 has been confirmed before testing.
 NA= Not Applicable

End of report