telefication bv
The Netherlands
Chamber of Commerce
51565536
www.telefication.com

telefication

Radio test report
20144101301-Ver 2.01

based on:
FCC part 15C, section 15.225 (Ed 10-1-15)

Payment terminal
P68 THE ARC
P68.0.01

Revision history

REVISION	DATE	REMARKS	REVISED BY
Ver 2.10	1 June 2016	Type designation slightly changed	ing P.A. Suringa.
Ver 2.00	11 May 2016	Release with changes regarding product description.	ing P.A. Suringa.
Ver 1.00	10 May 2016	Initial release	ing P.A. Suringa.
Ver 0.50	4 May 2016	Release for review	ing P.A. Suringa.

Contents

This report comprises of three modules. The total number of pages is: 19

Main module

1 Introduction

This report contains the result of tests performed by:

Telefication B.V.
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:2005. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie).

Telefication is designated by the FCC as an Accredited Test Firm for compliance testing of equipment subject to Certification under Parts 15 & 18. The designation number is: NL0001.

The Industry Canada registration number for the 3 meter test chamber of Telefication is: 4173A-1.

Ordering party:

Company name	:	Payter B.V.
Address	:	Rozenlaan 115
Zipcode	:	3051 LP
City/town	:	Rotterdam
Country	:	The Netherlands
Date of order	:	17 July 2014

2 Product

A sample of the following product was submitted for testing:

Product description	:	Payment terminal
Manufacturer	:	Payter B.V.
Trade mark	:	P68 THE ARC
Type designation	:	P68.0.01
FCC ID	:	2AHPPP68001
Hardware version	:	v04
Serial number	:	P6X20160400041
Firmware release	:	v2.0.0.0.sp7.emv-6-g37fd08a-dev

3 Test schedule

Tests are carried out in accordance with the specification detailed in chapter 7 “Summary” of this report.

Tests are carried out at the following location:

- Telefication, Zevenaar

The sample of the product is received on:

- 16 March 2016

Tests are carried out between:

- 16 March and 4 May 2016

4 Product documentation

For production of this report no product documentation has been used.

5 Observations and comments

None.

6 Modifications to the sample

Initially the sample did not fulfil the requirement for radiated emissions at 144 MHz.
A ferrite was internally mounted around the IFM cable between the Main PCB and IFM PCB.

7 Summary

The product is intended for use in the following application area:

INTENTIONAL RADIATOR OPERATING IN THE FREQUENCY BAND 13.11 – 14.01 MHz

The sample is tested according to the following specification:

FCC part 15C, section 15.225 (Ed 10-1-15)

8 Conclusions

The samples of the product showed **NO NON-COMPLIANCES** to the specification stated in chapter 7 of this report:

The results of the tests as stated in this report, are exclusively applicable to the product item as identified in this report. Telefication accepts no responsibility for any stated properties of product items in this test report, which are not supported by the tests as specified in section *7 "Summary"*.

All tests are performed by:

name : ing. P.A. Suringa

Review of test methods and report by:

name : ing. R. van Barneveld

The above conclusions have been verified by the following signatory:

Date : 1 June 2016

name : ing. M.T.P.M. Wouters v/d Oudenweijer

function : Director Certification

signature :

Test results module

1 General information

1.1 Equipment information

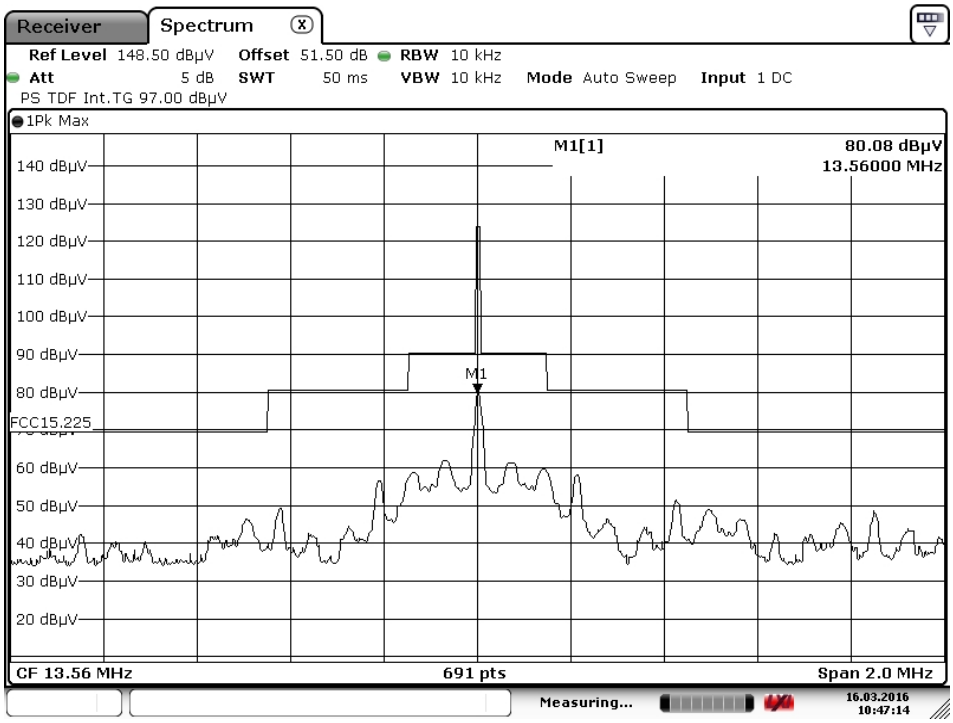
Type of equipment	Payment terminal
Modulation	ASK
Emission designator	14K0K1D
Bit rate	Up to 848 kbps
Operating frequency	13.56 MHz
Duty cycle (during testing)	54 %

2 Emission tests

2.1 Field strength of the emission in the band 13.110 – 14.010 MHz

Compliance standard	:	FCC part 15, subpart C, section 15.225 (a), (b), (c)
Method of test	:	ANSI C63.4-2014, sections 5.3 & 8.2.1; FCC part 15, subpart A, section 15.31 (f) (2), 15.33, 15.35.
Test results	:	Graph

(Unit in dBµV/m)



Date: 16.MAR.2016 10:47:12

The maximum field strength at 13.56 MHz is: 80.1 dBµV/m (3 m distance)

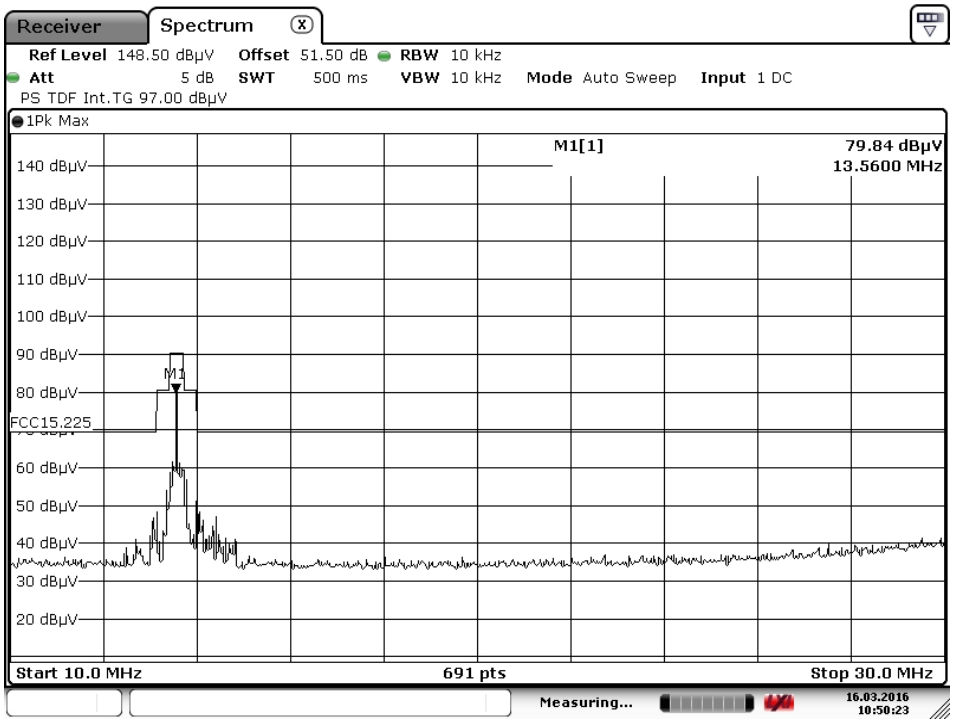
Measurement uncertainty	+3.0 / -2.5 dB

Remark: in the plots above, the limit is modified for an inverse linear distance extrapolation factor of 40 dB/decade.

2.2 Field strength of emissions (10 - 30 MHz)

Compliance standard	:	FCC part 15, subpart C, section 15.225 (d) FCC part 15, subpart C, section 15.205; FCC part 15, subpart B, section 15.209 (a)
Method of test	:	ANSI C63.4-2014, sections 5.3 & 8.2.1; FCC part 15, subpart A, section 15.31 (f) (2), 15.33, 15.35.
Test results	:	Graph

(Unit in dBµV/m)



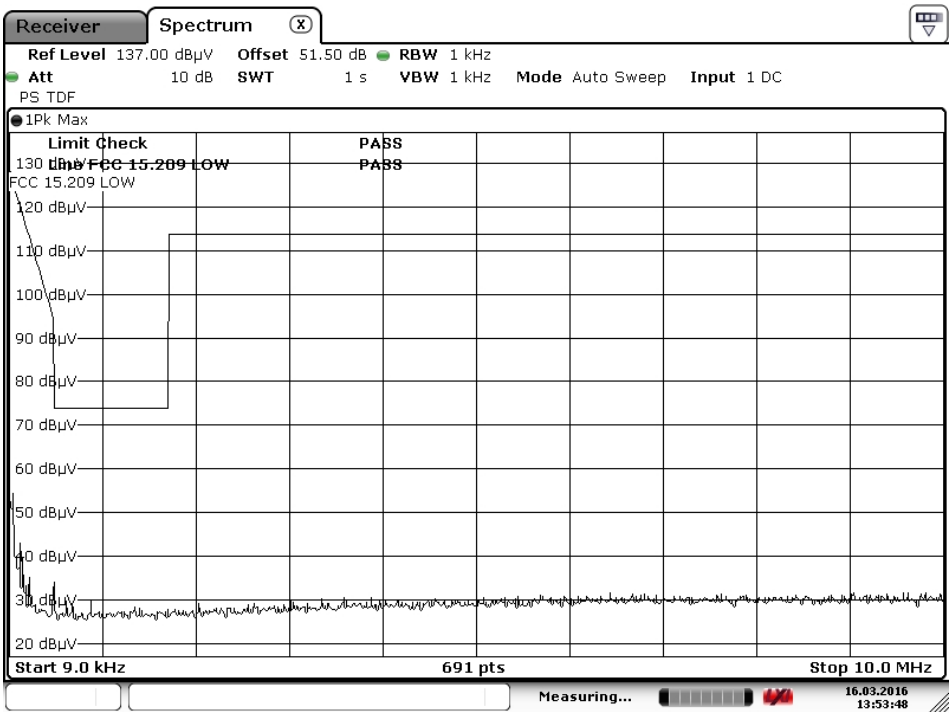
Date: 16.MAR.2016 10:50:21

Measurement uncertainty	+3.0 / -2.5 dB

2.3 Field strength of emissions (radiated, 0.009 - 10 MHz)

Compliance standard	:	FCC part 15, subpart C, section 15.225 (d)
Method of test	:	ANSI C63.4-2014, sections 5.3 & 8.2.1; FCC part 15, subpart A, section 15.31 (f) (2), 15.33, 15.35.
Test results	:	Graph

(Unit in dBµV/m)



Date: 16.MAR.2016 13:53:46

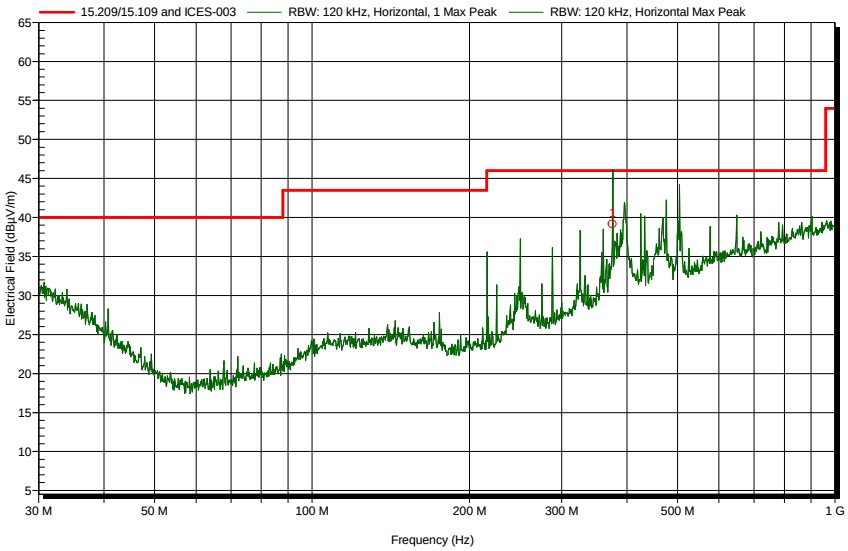
Measurement uncertainty	+3.0 / -2.5 dB

2.4 Field strength of unwanted emissions (radiated, 0.03 - 1 GHz)

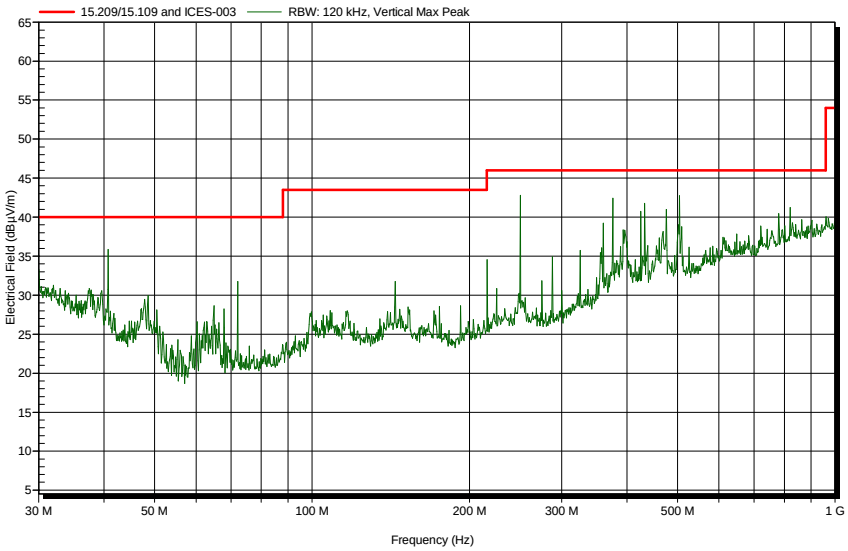
Compliance standard	:	FCC part 15, subpart C, section 15.225 (d) FCC part 15, subpart C, section 15.205 FCC part 15, subpart C, section 15.209 (a)
Method of test	:	ANSI C63.4-2014, sections 5.4.2 & 8.2.3; FCC part 15, subpart A, sections 15.33, 15.35.
Test results:	:	Graphs/table

Pre scans

Horizontal polarization



Vertical polarization



Final measurement

Frequency	Polarization	Value dBµV/m (PK)	Height
375,018 MHz	Horizontal	39.2	1 m

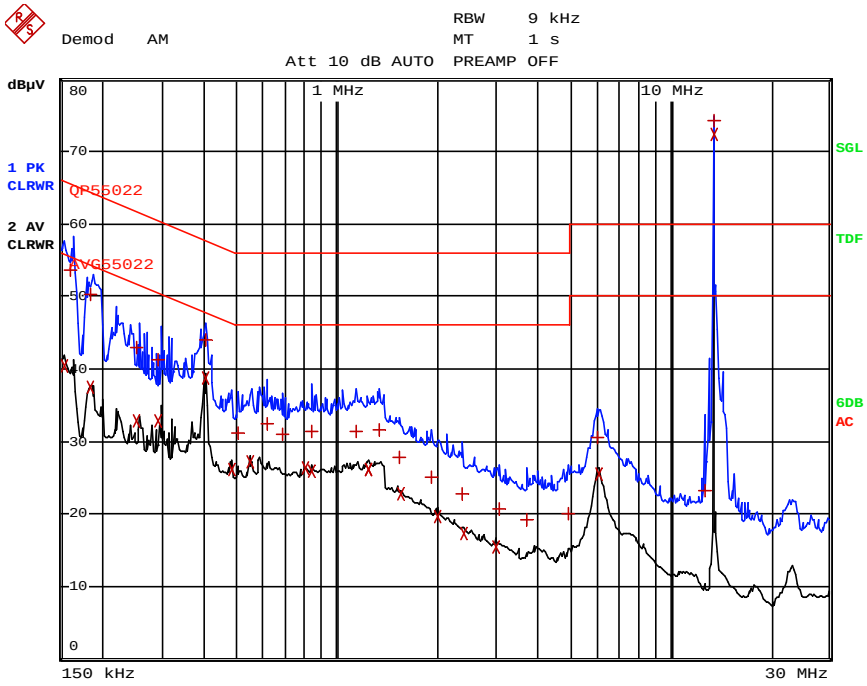
Measurement uncertainty

Frequency range (MHz)	Horizontal polarization	Vertical polarization
30 – 200	4.5 dB	5.4 dB
200 – 1000	3.6 dB	4.6 dB

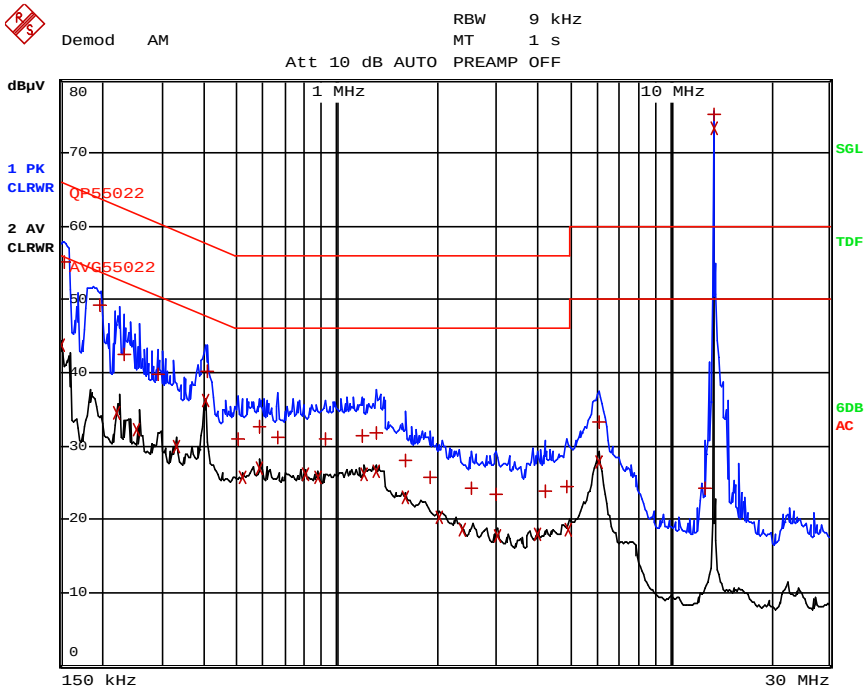
2.5 Conducted emissions at mains terminals (0.15 – 30 MHz)

Compliance standard	:	FCC part 15, subpart C, section 15.207(a)
Method of test	:	ANSI C63.4: 2014, section 13.3
EUT configuration	:	Integral antenna
Atmospheric pressure	:	Between 86 kPa and 106 kPa
Temperature	:	23 °C
Relative humidity	:	43 %
Test results	:	Graphs

Neutral



Live



Note: "+" signs in the graphs above indicate the quasi peak values, whereas the "x" signs indicate the average values. All values are below the applicable limit, except at 13.56 MHz which is evaluated by a different approach, see next page.

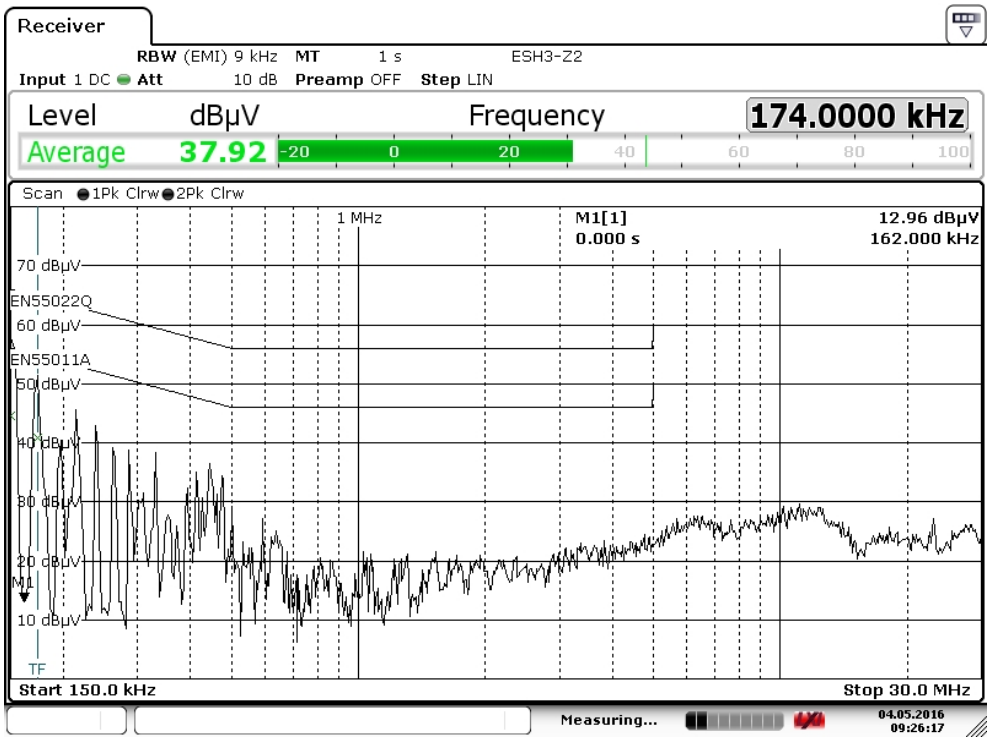
Limit	See table in section 15.207(a) of FCC part 15, subpart C

Measurement uncertainty : +/- 3.6 dB.
The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approx. 95%, but excluding the effect of measurement system repeatability.

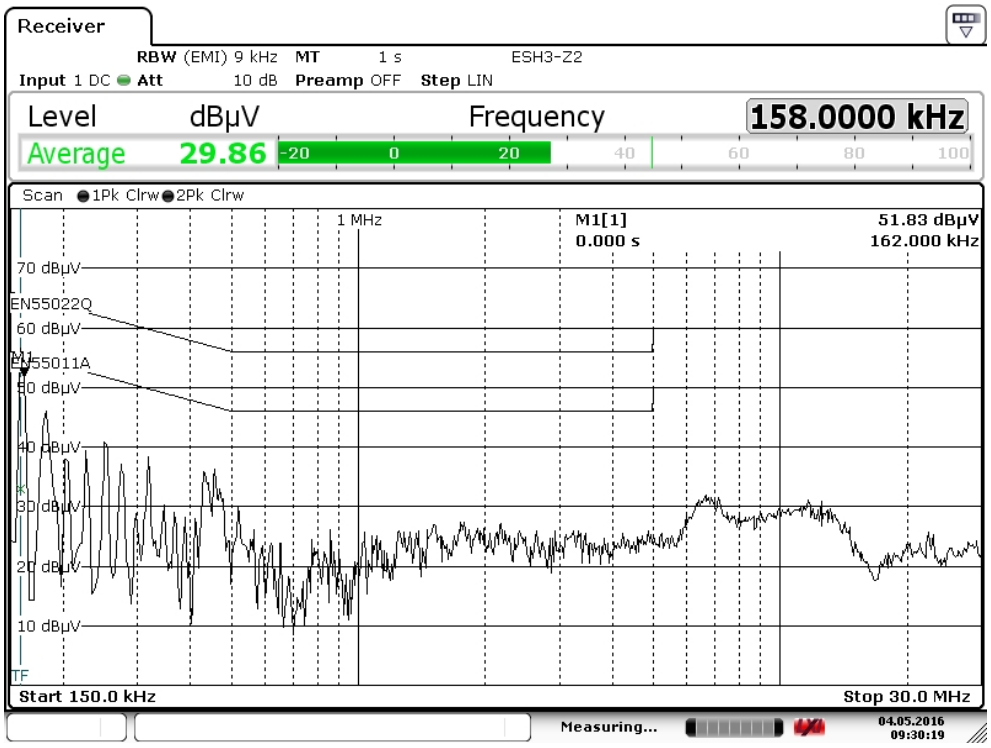
2.6 Conducted emissions at mains terminals (0.15 – 30 MHz) (cont'd)

Compliance standard	:	FCC part 15, subpart C, section 15.207(a)
Method of test	:	ANSI C63.4: 2014, section 13.3
EUT configuration	:	Integral antenna disconnected; RF output terminated with dummy load
Atmospheric pressure	:	Between 86 kPa and 106 kPa
Temperature	:	23 °C
Relative humidity	:	43 %
Test results	:	Graphs

Neutral



Live



Final measurements

Freq (MHz)	Value (dBµV)	Detector (QP/AV)	AV Limit (dBµV)
158	33	AV	55.5
162	26.8	AV	55.3
186	32.6	AV	54.3
210	35.2	AV	53.2

Measurement uncertainty : +/- 3.6 dB.
The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approx. 95%, but excluding the effect of measurement system repeatability.

2.7 Frequency tolerance

Compliance standard : FCC part 15, subpart C, section 15.225 (e)
Method of test : ANSI C63.10-2013, clause 6.8
Test results: : Tables

Temperature variation:

Temp. (ºC)	-20	-10	0	10	20	30	40	50
Frequency (MHz) at start up	13.561413	13.561437	13.561444	13.561446	13.561436	13.561425	13.561420	13.561455
Frequency (MHz) after 2 min.	13.561445	13.561450	13.561446	13.561444	13.561429	13.561425	13.561434	13.561514
Frequency (MHz) after 5 min.	13.561450	13.561450	13.561444	13.561438	13.561427	13.561428	13.561414	13.561517
Frequency (MHz) after 10 min.	13.561451	13.561448	13.561439	13.561434	13.561427	13.561432	13.561449	13.561518
Max deviation (%)*)	0.00018	0.00017	0.00014	0.00014	0.00007	0.00004	0.00017	0.00021
Limit (%)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

*) w.r.t. nominal frequency of 13.5614265 MHz

Voltage variation:

Voltage (V_{ac})	**Frequency (MHz)**	**Deviation (%)*)**	**Limit (%)**
93.5	13.561430	0.000026	0.01
110	13.561430	0.000026	0.01
126.5	13.561428	0.000011	0.01

*) w.r.t. nominal frequency of 13.5614265 MHz

Measurement uncertainty	+ /- 14 Hz

Used test equipment module

Description	ID	Manufacturer	Model	Used at par.
Spectrum Analyzer	TE 01220	Rohde & Schwarz	ESR7	2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7
Semi Anechoic Room	TE 00861	Comtest	--	2.4
EMI test receiver	TE 11128	Rohde & Schwarz	ESCI	2.5, 2.6
Biconilog antenna	TE 00967	Chase	CBL6112A	2.4
Triple loop antenna	TE 01311	Schwarzbeck	HXYZ 9170	2.1, 2.2, 2.3
Digital Multi Meter	TE 01305	Fluke	87 V	2.5, 2.6
Climate Chamber	TE 00741	CTS	-40/350	2.7
Artificial Mains Network (AMN)	TE 00208	Rohde & Schwarz	ESH3-Z5	2.5, 2.6
Pulse limiter	TE 00756	Rohde & Schwarz	ESH3-Z2	2.5, 2.6