

Prüfbericht-Nr.: <i>Test Report No.:</i>	18052303.r01	Auftrags-Nr.: <i>Order No.:</i>	89213652	Seite 1 von 19 <i>Page 1 of 19</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	4603457	Auftragsdatum: <i>Order date:</i>	30.05.2018	
Auftraggeber: <i>Client:</i>	MYLAPS BV, Zuiderhoutlaan 4 2012PJ Haarlem , Netherlands			
Prüfgegenstand: <i>Test item:</i>	ProChip Timer Communicator			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	ProChip Communicator			
Auftrags-Inhalt: <i>Order content:</i>	Compliance with regulatory requirements			
Prüfgrundlage: <i>Test specification:</i>	47 CFR PART 15 (10-1-17 EDITION), Subpart 15C			
	-			
	-			

Wareneingangsdatum: <i>Date of receipt:</i>	31.05.2018	
Prüfmuster-Nr.: <i>Test sample No.:</i>	177122	
Prüfzeitraum: <i>Testing period:</i>	10.07.2018 – 30.07.2018	
Ort der Prüfung: <i>Place of testing:</i>	Leek	
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland Nederland B.V. Leek Laboratory	
Prüfergebnis*: <i>Test result*:</i>	Pass	

geprüft von / tested by: <i>R.vd Meer</i>			Kontrolliert von / reviewed by: <i>E. van der Wal</i>		
10.10.2018	R.van der Meer/Test Eng.		10.10.2018	E. van der Wal/Senior Eng.	
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other: -					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>			Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
<p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet</p> <p>Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. Test specification(s) F(ail) a.m. test specification(s) N/A = not applicable N/T = not tested</p>					
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the above mentioned testsample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This report does not entitle to carry any test mark</i></p>					

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Liste der verwendeten Prüfmittel
List of used test equipment

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

Prüfmittel Kind of Equipment	Hersteller / Manufacturer	Bezeichnung / Model Name	Prüfmittel- Nr. / ID-Nr. Equipment No. / ID-No.	Kalibrierung Calibration (mm/yyyy)	Nächste Kalibrierung Next calibration (mm/yyyy)
For Radiated Emissions					
Measurement Receiver	Rohde & Schwarz	ESCI	A00314	03/2018	03/2019
RF Cable S-AR	Gigalink	APG0500	A00447	01/2018	01/2019
Controller	Maturo	SCU/088/ 8090811	A00450	NA	NA
Controller	EMCS	DOC202	A00257	NA	NA
Test facility	Comtest	FCC listed: 786213 IC: 2932G-2	A00235	10/2017	10/2020
Spectrum Analyzer	Rohde & Schwarz	FSV	A00337	06/2018	06/2019
Antenna mast	EMCS	AP-4702C	A00258	NA	NA
Temperature- Humiditymeter	Extech	SD500	A00444	06/2018	06/2019
Magnetic Loop Antenna 60cm	Chase	HLA6120	A01491	12/2017	12/2020
Tripod stand for A01491	Chase	CAS6012	A00141	NA	NA
Magnetic Loop Antenna 6cm	EMCO	7405-901	A00309	02/2018	02/2029
Biconilog Testantenna	Teseq	CBL 6111D	A00466	10/2017	10/2018

Prüfmittel Kind of Equipment	Hersteller / Manufacturer	Bezeichnung / Model Name	Prüfmittel- Nr. / ID-Nr. Equipment No. / ID-No.	Kalibrierung Calibration (mm/yyyy)	Nächste Kalibrierung Next calibration (mm/yyyy)
For AC Powerline Conducted Emissions					
Pulse limiter	R&S	ESH3-Z2	A00051	01/2018	01/2019
Variac	RFT	LSS020	A00171	NA	NA
LISN	EMCO	3625/2	A00019	06/2018	06/2019
Measurement Receiver	Rohde & Schwarz	ESCS30	A00726	10/2017	10/2018
Shielded room for Conducted emissions	--	--	A00437	NA	NA
Temperature- Humiditymeter	Extech	SD500	A00441	06/2018	06/2019

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Produktbeschreibung
Product description

1	Produktdetails <i>Product details</i>	MYLAPS Sports Timing – ProChip Communicator
2	Maße / Gewicht <i>Dimensions / Weight</i>	670g (1.5lb)
3	Bedienelemente <i>Operating elements</i>	None
4	Ausstattung / Zubehör <i>Equipment / Accessories</i>	USB cable
5	Verwendete Materialien <i>Used materials</i>	--
6	Sonstiges <i>Other</i>	--

Absatz				
Clause	Anforderungen – Prüfungen / Requirements - Tests			
1	47 CFR Part 15 (10-1-17 Edition) - 15.207(a)	AC Power Line Conducted Emissions	P F N/A N/T	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2	47 CFR Part 15 (10-1-17 Edition) - 15.209	Radiated unwanted emissions	P F N/A N/T	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Testmethods: ANSI C63.10-2013.

Revisions <i>Revisions</i>			
Revision Revision	Datum Date	Anmerkung Remark	Verfasser Author
-	31.07.2018	First release	R. van der Meer
01	10.10.2018	Added A00141 to the equipment list, added Accreditation statement	R. van der Meer
Note: Latest revision report will replace all previous reports			

Accreditation

The reported tests were performed under ISO17025 accreditation, unless otherwise specified as 'not under Accreditation'

An overview of all TÜV Rheinland Nederland B.V. accreditations, notifications and designations, please visit our website www.tuv.com/nl. You can find the relevant declarations under the download link



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1.1 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-17 Edition), sections 15.31, 15.209. The test methods, which have been used, are based on ANSI C63.10-2013.

Radiated emission tests were performed at a measurement distance of 3 meters and measurement results were extrapolated to the applicable distance.

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.

1.2 Test facility.

The Federal Communications Commission has reviewed the technical characteristics of the test facilities at TÜV Rheinland Nederland B.V., located at Eiberkamp 10, 9351 VT Leek, 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 786213. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

1.3 Test conditions.

Normal test conditions:

Temperature (*) : +15°C to +35°C
Relative humidity(*) : 20 % to 75 %
Supply voltage : 5Vdc, USB powered by PC/Notebook (not by power supply adapter).

**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.*

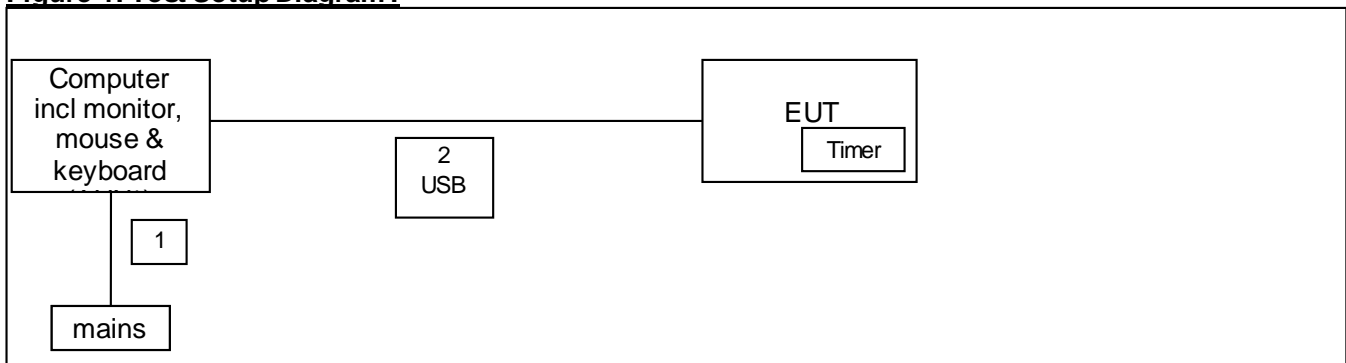
2 System test configuration.

2.1 Justification.

The EUT was configured for testing as normally used. A normal setup consists of a PC which powers the EUT through USB connection (See Figure 1). The EUT is not usable with just a USB power supply. The test sample was configured by the applicant to enable continuous transmit.

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 C63.10-2013.

Figure 1: Test Setup Diagram.



2.2 EUT mode of operation.

The tests have been performed with a complete functioning EUT.

2.3 Special accessories.

The product has been tested together with the following additional accessories:(see next page)



1. AUX1a
Product: Personal Computer
Brand: Dell
Model: Optiplex 780
Serial Number: 1DR3W4J
Remark: host for test software, property applicant MY000132

2. AUX1b
Product: PC Mouse
Brand: Dell
Model: 0Y357c
Serial Number: iOL001JK
Remark: property TR

3. AUX1c
Product: PC Keyboard
Brand: Lenovo
Model: SK-8825(L)
Serial Number: 00941921
Remark: property TR

4. AUX1d
Product: PC Monitor
Brand: Dell
Model: 1908FPb
Serial Number: CN-OD320J-74261-8AA-1CHS
Remark: property TR

2.4 Equipment modifications.

None.

3 Radiated emission data.

3.1 Radiated emission data, H-field

RESULT: PASS

Date of testing: 2018-07-30

Frequency range: 9kHz - 30 MHz

Requirements:

FCC 15.209 and 15.35.

15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Field strength (dB μ V/m)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	43.5-13.8	300
0.490-1.705	24000/F(kHz)	33.8-22.9	30
1.705-30.0	30	29.5	30

Table 2. Field strength limits

Test procedure:

ANSI C63.10-2013.

The EUT 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.

Radiated emission testing was performed at a distance of 3 meters in a 5 meter semi-anechoic chamber. The measured values were corrected to the applicable distance using the extrapolation factor of 40dB/decade or 80sB/decade as per FCC Part 15.31(f)(2).

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 six 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.

3.2 Radiated field strength measurements H-field, frequency range of 0.009-30 MHz.

Frequency	(a) Measurement results	(b) Antenna factor	(c) Cable loss	(d) Distance extrapolation factor	Detector	Measurement results (calculated = a+b+c-d)	Limits
MHz	dBµV @3m	dB	dB	dB		dBµV/m @300m	dBµV/m @300m
0.125 fundamental	15.2	19.5	1	80	Pk	-44.4	45.7
0.125 fundamental	8.8	19.5	1	80	Av	-50.8	25.7
0.067	2.0	19.5	1	80	Pk	-57.5	31.8 Av
0.094	9.6	19.5	1	80	Pk	-49.9	28.1 Av
0.179	2.0	19.5	1	80	Pk	-57.5	22.5 Av
0.250	-0.3	19.3	1	80	Pk	-60.0	19.7 Av
0.375	1.5	19.3	1	80	Pk	-58.2	16.1 Av

Table 3 Radiated emissions of the EUT

The results of the radiated emission tests in the frequency range 0.009 – 30 MHz, carried out in accordance with 47 CFR Part 15 section 15.209 with the EUT operating in continuous transmit mode, are depicted in Tables 3.

Notes:

1. Calculated measurement results are obtained by using the 40 dB/decade extrapolation factor and the antenna factor and cable loss is included. For instance the corrected value for 6.78 MHz fundamental frequency is calculated as:
 Measurement result + Antenna Factor + Cable loss – Extrapolation Factor =>
 15.2 dBµV + 19.5 dB + 1 dB – 80 dB = -44.4 dBµV/m.
2. Field strength values of radiated emissions at frequencies in the frequency range 0.009 – 30 MHz not listed in Tables 3 are more than 20 dB below the applicable limit. The reported value is the worst case found at the reported frequency.
3. The measurement distance was 3m and measured values were corrected to the applicable limit distance.
4. Measured Peak (Pk) values were already within Average (Av) limits, therefor Av not tested.
5. Measurement uncertainty is ±5.0dB.

Test equipment used (for reference see test equipment listing):

A01491	A00235	A00141	A00314		

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

RESULT: PASS

Date of testing: 2018-07-30

Frequency range: 30MHz - 1000MHz

Requirements:

FCC 15.209(a)

Except for Class A digital devices, the field strength of radiated emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (µV/meter)	Field strength (dBµV/m)	Measurement distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0 (Av), 74 (Pk)	3

Table of applicable limits

Test procedure:

Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile.

The spectrum was examined from 30MHz to 1 GHz. 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. 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 reduced Video Bandwidth.

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

Frequency [MHz]	Antenna Orientation	Detector / Bandwidth	Level [dB μ V/m]	Limit QP [dB μ V/m]	Result Pass/Fail
36.21	Vertical	Qp / 120 kHz	20.0	40.0	Pass
48.00	Vertical	Qp / 120 kHz	28.0	40.0	Pass
240.0 ^{*R}	Vertical	Qp / 120 kHz	32.4	46.0	Pass
528.0	Vertical	Qp / 120 kHz	26.0	46.0	Pass
576.0	Vertical	Qp / 120 kHz	27.7	46.0	Pass
672.0	Horizontal	Qp / 120 kHz	42.9	46.0	Pass
960.0 noise	Vertical	Qp / 120 kHz	20.0	46.0	Pass

Table 4 Radiated emissions of the EUT

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.205, 15.209 are depicted in Table 4.

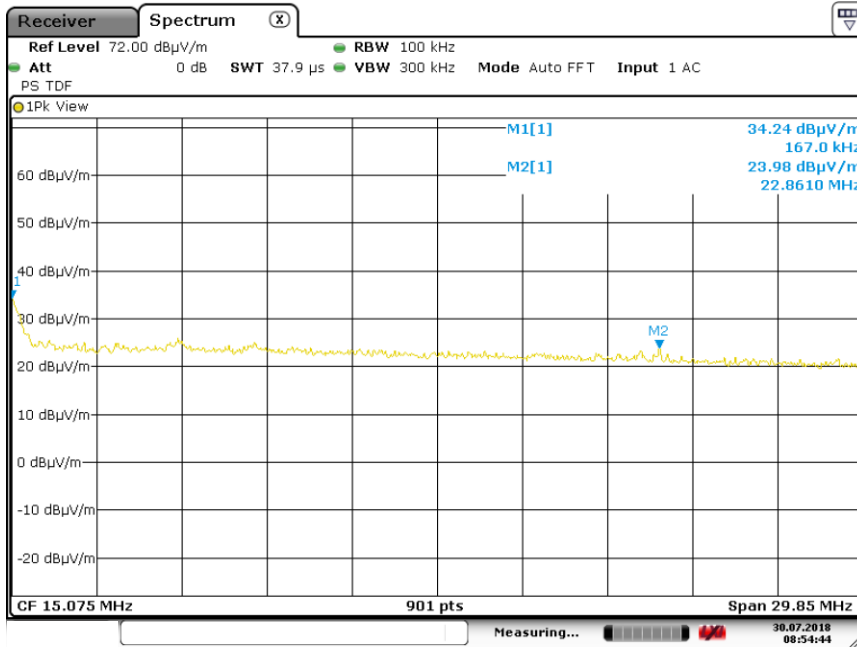
Notes:

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 5.22 dB.
3. The reported value is the worst case found at the reported frequency.
4. ^{*R} refers to a frequency in a restricted band.
5. a selection of plots is provided on the next pages.

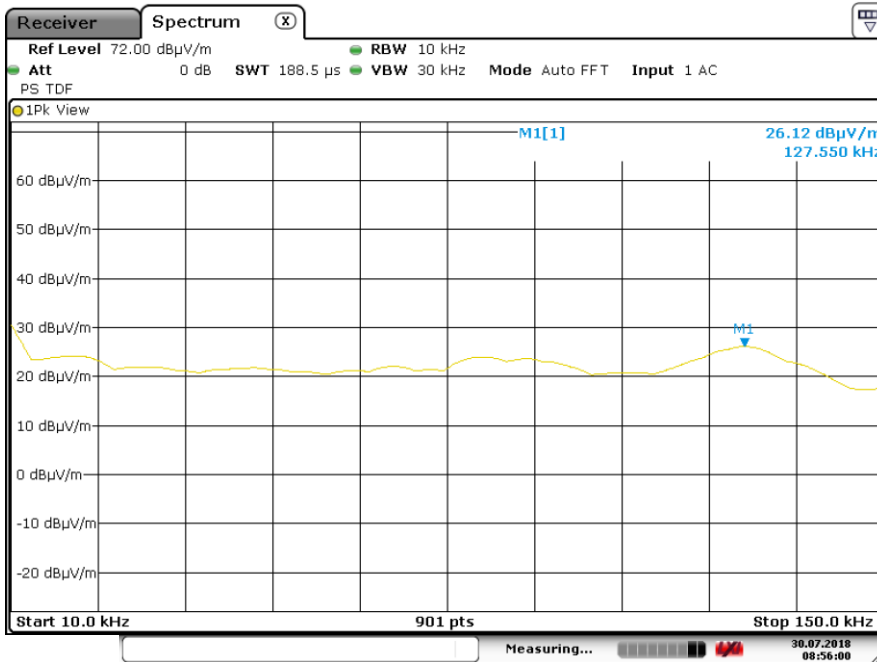
3.4.1 Test equipment used (for reference see test equipment listing).

A00257	A00258	A00314	A00447	A00235	A00466	
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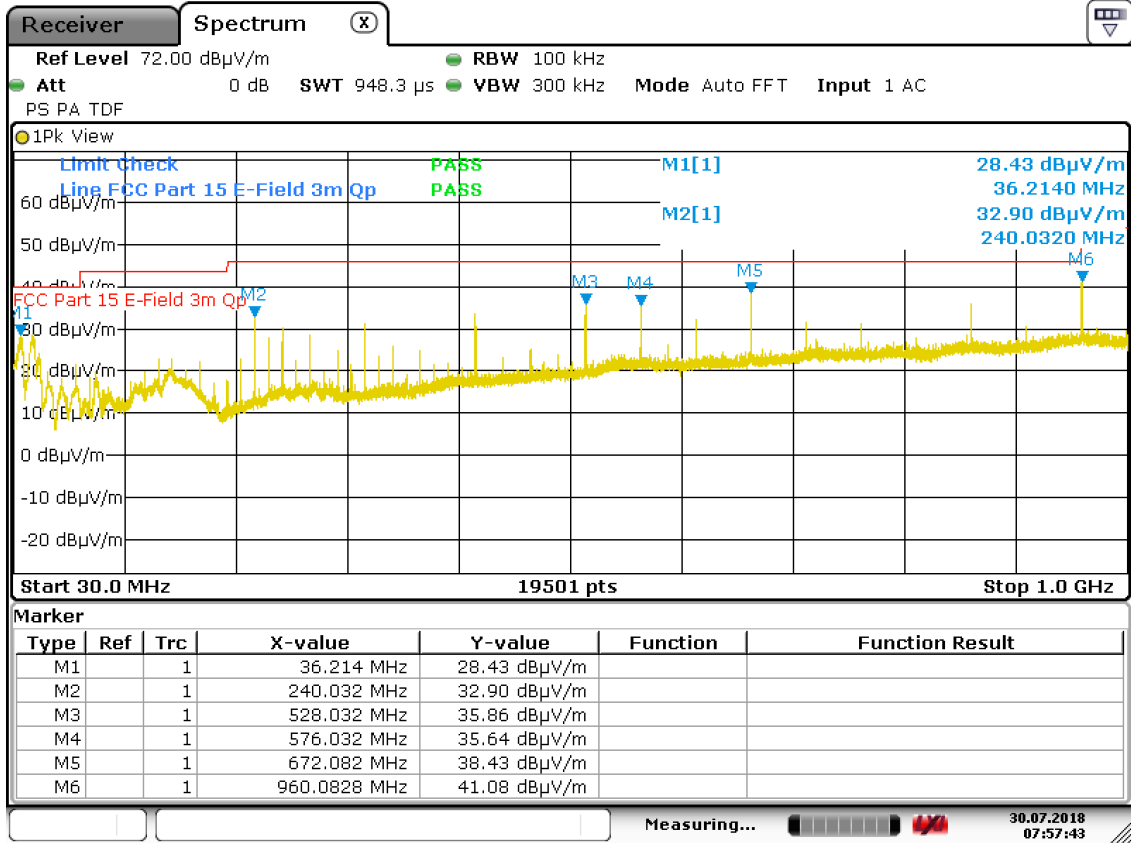
3.4.2 Plot of the emissions below 30 MHz



Plot 1: the emissions, Vertical polarization, Peak values shown



Plot2: Plot of the emissions, Peak values shown



Date: 30.JUL.2018 07:57:43

Plot 3: plot of the emissions, Vertical polarization, Peak values shown

4 Plot of the carrier bandwidth

4.1 Bandwidth of the emission

RESULT: PASS

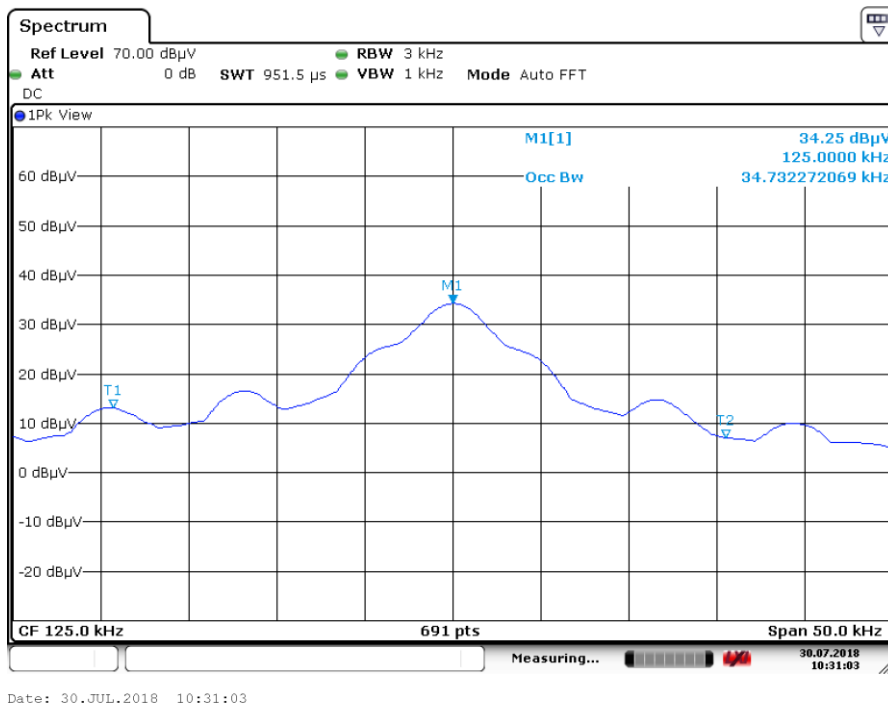
Date of testing: 2018-07-30

Requirements:

The 20 dB bandwidth of the fundamental emission shall lay within the assigned frequency band.

Testprocedure: ANSI C63.10-2013

Testresults: as measured on a spectrum analyzer.



Plot : 20 dB bandwidth of the fundamental, actual bandwidth is 34.7 kHz

Test equipment used (for reference see test equipment listing):

A00309	A00314	A00444					

5 AC Power line Conducted emission data.

5.1 AC Power Line Conducted Emission data of the EUT

RESULT: PASS

Date of testing: 2018-07-30

Requirements: 15.207 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

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 C63.10-2013.

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 was positioned at least 40cm from a vertical ground reference plane and at least 80cm from the LISN.

5.2 AC Power Line Conducted emission data of the EUT, results.

Frequency (MHz)	Measurement results dB(μV) Neutral/L2		Measurement results dB(μV) Line 1		Limits dB(μV)		Result
	QP	AV	QP	AV	QP	AV	
0.177	49.0	-	45.0	-	64.5	54.5	Pass
0.189	50.0	24.0	51.1	24.9	64.0	54.0	Pass
0.196	50.0	25.0	51.1	25.0	63.6	53.6	Pass
0.361	49.0	-	50.0	-	58.7	48.7	Pass
0.545	39.8	-	35.0	-	56.0	46.0	Pass
6.78 ^{*4}	30.0	-	30.0	-	60.0	50.0	Pass
13.93 ^{*4}	35.0	-	34.0	-	60.0	50.0	Pass

Table 4 AC Power Line Conducted emission measurements of the EUT

The results of the AC power line conducted emission tests, carried out in accordance with 47 CFR Part 15 section 15.207, at the 120 Volts AC mains connection terminals of AUX1a of the system, are depicted in Table 4. Maximum values were recorded. For AC Power line conducted emissions only, the EUT was tested in a full system with and without Timer Transponder.

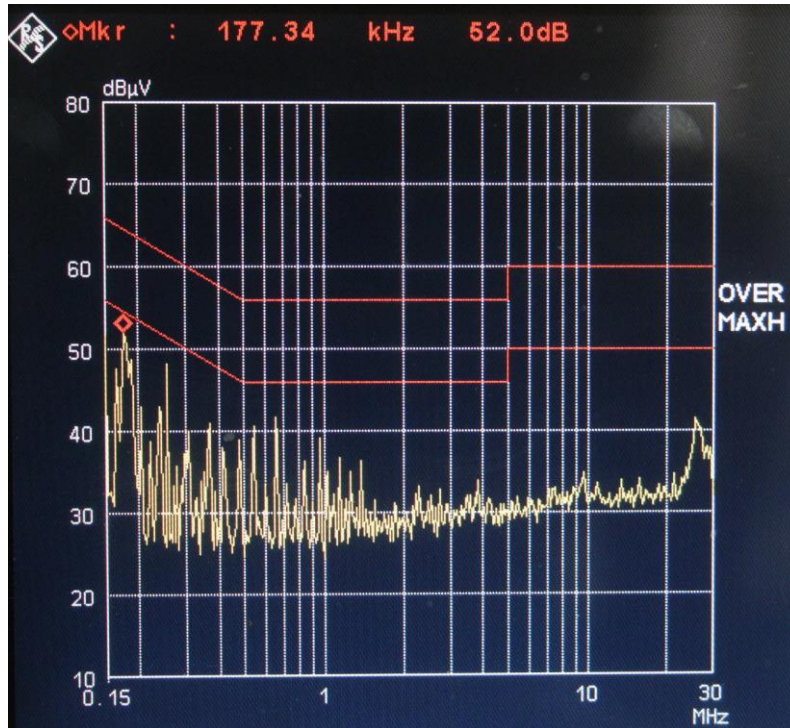
Notes:

1. Measurement uncertainty is 3.5 dB.
2. The resolution bandwidth used was 9 kHz.
3. "-" Not measured as the Quasi Peak values were already within the average limits
4. While reading a Timer transponder

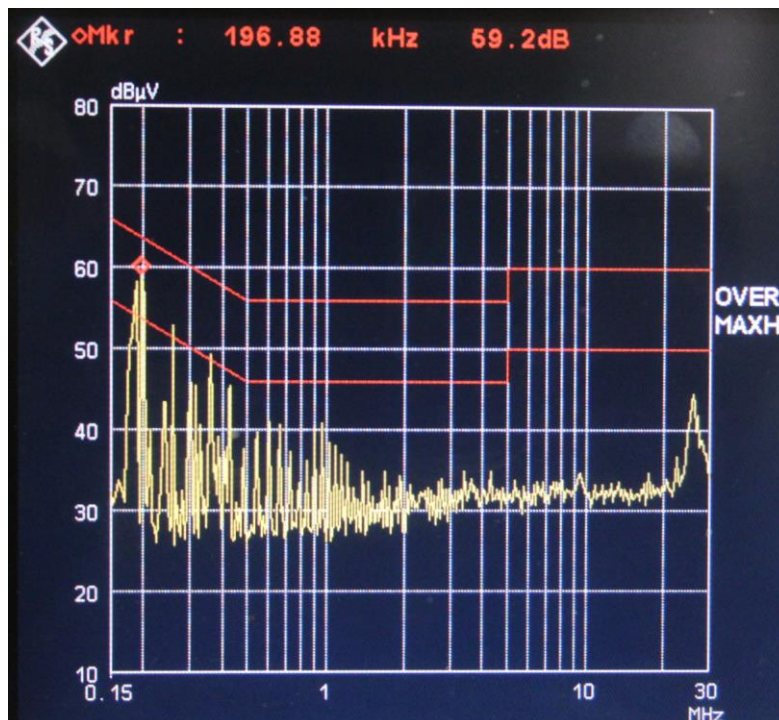
5.2.1 Test equipment used (for reference see test equipment listing).

A00019	A00051	A00726	A00437	A00441		
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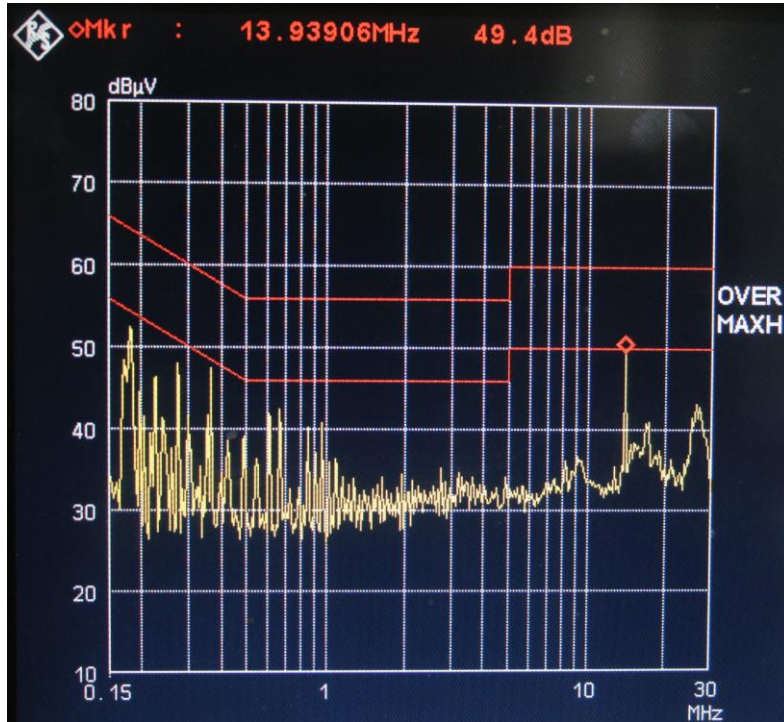
5.2.2 Plots of the AC Power Line Conducted Emissions



Plot of the AC Power Line Conducted Emissions on N, not reading the Timer



Plot of the AC Power Line Conducted Emissions on L1, not reading the Timer



Plot of the AC Power Line Conducted Emissions on N, while reading the Timer

<< End of report >>