

**TEST REPORT CONCERNING THE VERIFICATION OF
COMPLIANCE OF A PHERIPHERAL DEVICE,
BRAND SIEMENS,
MODEL LMS SCADAS PBN system
WITH 47 CFR PART 15-SUBPART B (10-1-14 Edition)**

**15100802.fcc02_Rev01
November 21, 2015**

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

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MEASUREMENT/TECHNICAL REPORT

Brand: Siemens
Model: LMS SCADAS PBN system

This report concerns: ~~Original certification~~ ~~Class 2 change~~ Verification/Declaration of Conformity

Equipment type: JBP Computer Device Peripheral

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The data taken for this test and report herein was done in accordance with 47 CFR Part 15, Subpart B (10-1-14 edition) and the measurement procedures of ANSI C63.4-2014. 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: November 21, 2015

Signature:


T. Koning
Senior Engineer TÜV Rheinland Nederland B.V.

Summary

The device under test does:

- fulfill the general approval requirements as identified in this test report
- not fulfill the general approval requirements as identified in this test report



Description of test item

Test item	:	Peripheral device
Manufacturer	:	Siemens Industry Software B.V.
Brand	:	Siemens
Model	:	LMS SCADAS PBN system
Serial number	:	Unidentified test sample
Revision	:	--

Applicant information

Applicant's representative	:	Mr. Jos op 't Hoog
Company	:	Siemens Industry Software B.V.
Address	:	Druivenstraat 47
Postal code	:	4816KB
City	:	Breda
Country	:	The Netherlands
Telephone number	:	+31765736363
Telefax number	:	+31765736373

Test(s) performed

Location	:	Leek
Test(s) started	:	September 29, 2014
Test(s) completed	:	January 13, 2015
Purpose of test(s)	:	Declaration of Conformity (DoC)
Test specification(s)	:	47 CFR Part 15, subpart B (10-1-14 Edition)
Test engineer(s)	:	R. van der Meer 
Report written by	:	R. van der Meer 
Report date	:	November 21, 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.

1.1.1 Introduction.

The EUT is a radio module that is used in two hosts that are part of the LMS SCADAS Pass-By Noise system.

The LMS SCADAS Pass-By Noise system consists of 3 units that contain one – or more transmitters.

Unit model SCM205 contains the following pre-certified modules:

- FCC ID: 2AF88-1218RF DSS module
- FCC ID: PVH0946 BlueTooth module and
- FCC ID: KQL-PM024 Low speed RF transmitter.

Unit model SCM201 contains the following pre-certified modules:

- FCC ID: PVH0946 BlueTooth module and
- FCC ID: KQL-PM024 Low speed RF transmitter.

Unit model MIC contains the following pre-certified module:

- FCC ID: 2AF88-1218RF DSS module

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

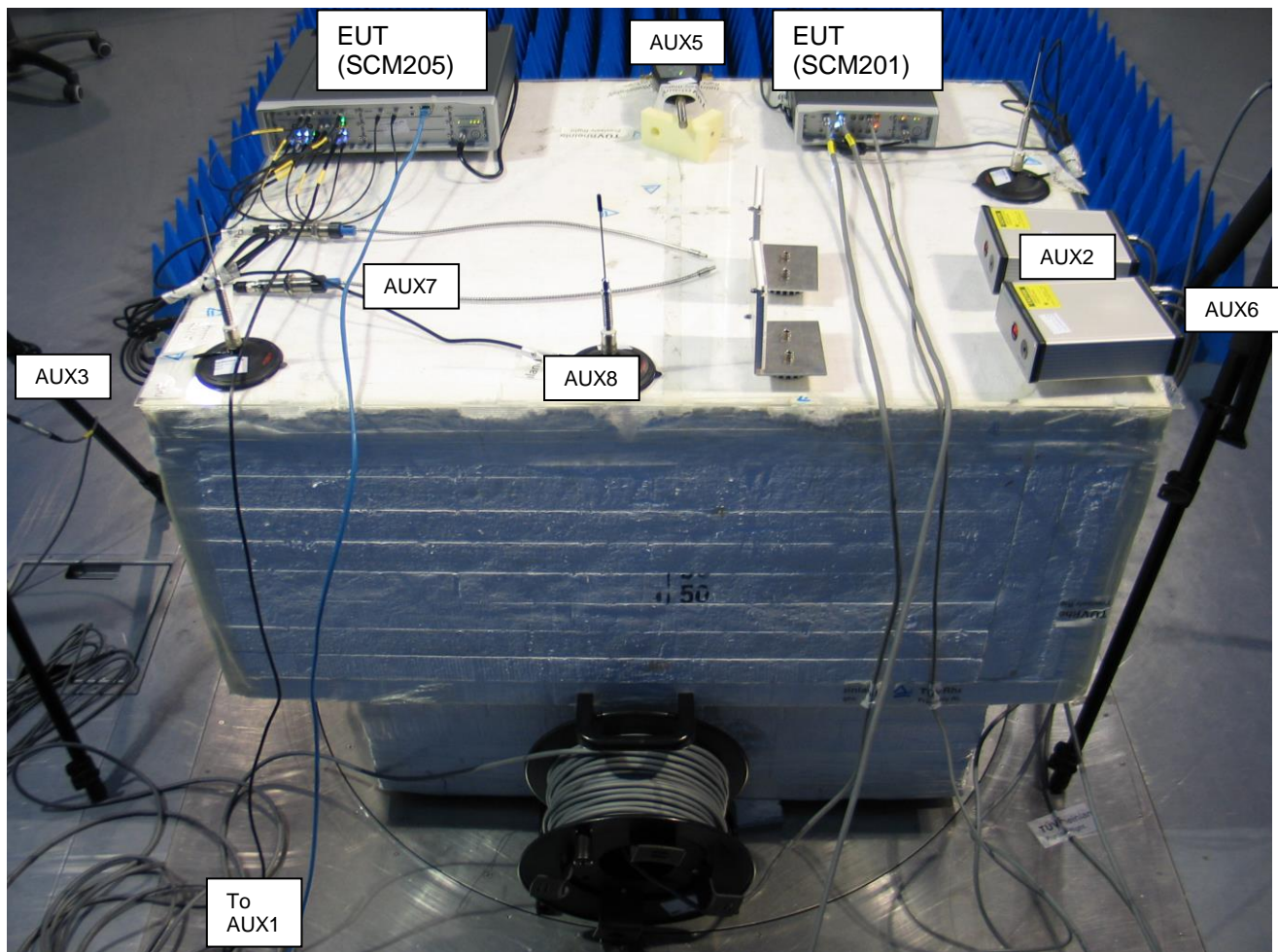
1.2 Related submittal(s) and/or Grant(s).

1.2.1 General.

This test report supports the original grant/certification in equipment authorization files under
FCC ID: 2AF88-1218RF.

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.



Photograph of the EUT.

EUT	:	LMS SCADAS Pass-By Noise system
Manufacturer	:	Siemens Industry Software B.V.
Brand	:	Siemens
Model	:	SCM205 and SCM201
Serial number	:	SCM205 (25143423) SCM201 (unidentified test sample)
Voltage input rating	:	100 - 240 Vac
Voltage output rating	:	n.a.
Current input rating	:	--
Antenna	:	External
Remarks	:	Contains 3 Transmitters

AUX1	:	Notebook computer
Manufacturer	:	Dell
Brand	:	Dell
Model	:	Latitude E6230
Serial number	:	7ZJKNX1
Remarks	:	Property applicant

AUX2	:	Light Barrier set (LB1, LB2)
Manufacturer	:	Siemens Industry Software B.V.
Brand	:	Siemens
Model	:	--
Serial number	:	--
Remarks	:	--

AUX3	:	Weather station (WS)
Manufacturer	:	Reinhardt System und mess GmbH
Brand	:	Reinhardt
Model	:	MWS 5MV
Serial number	:	1028332
Remarks	:	--

AUX4	:	RPM / Throttle sensor
Manufacturer	:	--
Brand	:	--
Model	:	--
Serial number	:	--
Remarks	:	--

AUX5	:	Microphone set (Mic1, Mic2)
Manufacturer	:	Siemens Industry Software B.V.
Brand	:	Siemens
Model	:	--
Serial number	:	--
Remarks	:	--

AUX6	:	Speed radar (Speed)
Manufacturer	:	Stalker RADAR
Brand	:	Stalker
Model	:	Stalker Pro2
Serial number	:	SM003626
Remarks	:	--
FCC ID	:	IBQACMI002
AUX7	:	Optical sensor
Manufacturer	:	Wenglor
Brand	:	Wenglor
Model	:	UC55PCV3
Serial number	:	-
Remarks	:	--
AUX8	:	Antenna Low speed RF (LS RF)
Manufacturer	:	Diamond Antenna
Brand	:	Diamond
Model	:	--
Serial number	:	--
Remarks	:	--

1.3.1 Description of input and output ports.

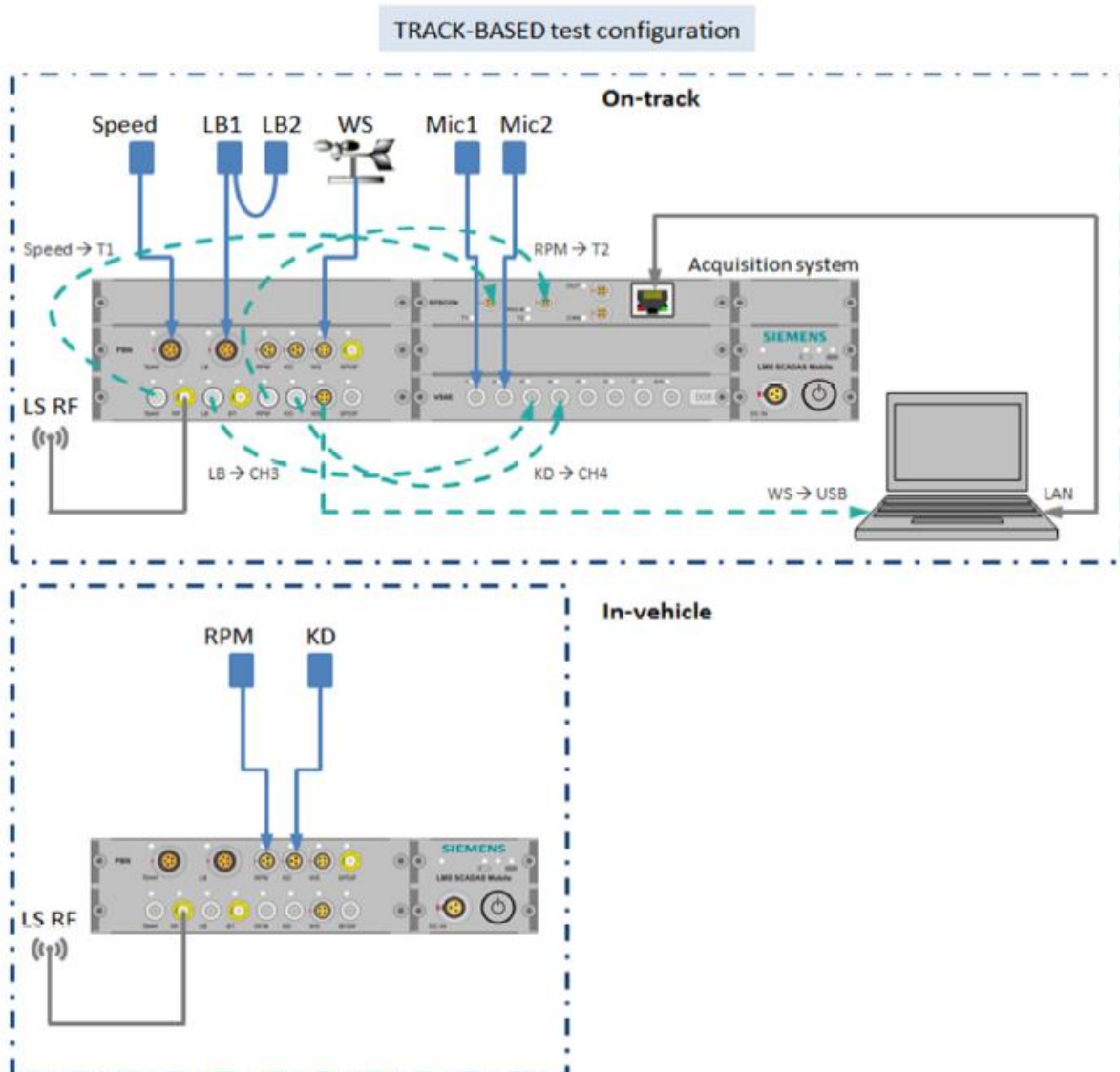


Figure 1. Blockdiagram of the basic test setup and connections (track-based)

1.4 Test 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 Subpart B (10-1-14 Edition)				
15.107(a)		AC Power Line Conducted emissions	17 – 22	Pass
15.109(a)		Radiated emissions	14 – 16	Pass

Table 2: Testspecifications

Testmethods: ANSI C63.4-2014

Note: see end of the report for setup photographs.

1.5 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15, Subpart B (10-1-14 Edition), sections 15.107 and 15.109.

The test methods, which have been used, are based on ANSI C63.4-2014.

Radiated emission tests above 30 MHz were performed at a measurement distance of 3 meters. To calculate the field strength level from these results to the appropriate distance at which the limit is specified, the appropriate extrapolation factor is used.

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	: 120 Vac
Air pressure	: 950 – 1050 hPa

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 C63.4-2014.

2.2 EUT mode of operation.

Testing was performed while EUT was operating in normal operating mode and all transmitters active and transmitting.

2.3 Test Software

The operation modes 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 : LMS Test Lab Signature Acquisition

This software was running on a laptop computer (AUX1). It was used to enable the test operation modes listed in section 2.2 as appropriate

2.4 Special accessories.

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

2.5 Equipment modifications.

No modifications have been made to the equipment.

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

2.6 Product Labelling

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

2.7 Block diagram of the EUT.

The block diagram is available in the technical documentation package.

2.8 Schematics of the EUT.

The schematics are available in the technical documentation package.

2.9 Part list of the EUT.

The part list is available in the technical documentation package.

3 Radiated emission data.

RESULT: PASS

Date of testing: 2014-09-29 and 30

Frequency range: 30MHz - 125000MHz

Requirements:

FCC 15.109(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/m)	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	3

Test procedure:

ANSI C63.4-2014.

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.

The spectrum was examined from 30 MHz to 12.5 GHz since the devices contain pre-certified transmitters operating in the 2402-2483.5 MHz band. 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.

3.1 Radiated emissions data (30 MHz – 1 GHz).

Frequency (MHz)	Antenna polarization	Results @3m (dBμV/m)	Limits @3m (dBμV/m)	Pass/Fail
249.22	Vertical	33.2	46.0	Pass
291.90	Vertical	37.4	46.0	Pass
314.92	Vertical	30.5	46.0	Pass
344.07	Vertical	30.9	46.0	Pass
380.93	Vertical	30.4	46.0	Pass
406.36	Horizontal	23.8	46.0	Pass

Table 3a Radiated emissions of the whole system

Frequency (MHz)	Antenna polarization	Results @3m (dBμV/m)	Limits @3m (dBμV/m)	Pass/Fail
249.22	Horizontal	30.3	46.0	Pass
317.12	Horizontal	31.6	46.0	Pass
330.70	Horizontal	40.8	46.0	Pass
342.00	Horizontal	28.0	46.0	Pass
577.08	Vertical	29.2	46.0	Pass
840.02	Horizontal	41.5	46.0	Pass

Table 3b Radiated emissions of the SCM205

Frequency (MHz)	Antenna polarization	Results @3m (dBμV/m)	Limits @3m (dBμV/m)	Pass/Fail
70.74	Vertical	25.8	40.0	Pass
134.75	Vertical	23.5	43.5	Pass
282.20	Vertical	21.0	46.0	Pass
307.12	Vertical	33.7	46.0	Pass
330.70	Vertical	24.3	46.0	Pass
454.68	Vertical	45.0	46.0	Pass

Table 3d Radiated emissions of the Mic

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.109 are depicted in Table 3a through 3c. The system is tested as in whole-Table 3a, so with all equipment as shown in Figure.1 in place and functioning and for Tables 3b and 3c for the individual units

See notes on the next page.

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 3 positions, the antenna was varied in horizontal and vertical orientations and also in height (between 1m and 4m).
4. A Quasi-peak detector was used with a resolution bandwidth of 120 kHz.
5. The EUT was tested in in normal operation mode with all transmitters active and transmitting. Worst case values have been noted.

Used test equipment and ancillaries:

A00257	A00258	A00314	A00450	A00447	A00235	A00466		

4 AC Power Line Conducted emission data.

RESULT: Pass.

Date of testing: 2015-01-13

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 (dBμV) Quasi-Peak	Conducted Limit (dBμV) 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 C63.4-2014.

Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a 50 μH / 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 placed on a non-conductive table 0.8m above the 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 L1 (dBµV)		Measurement results L2/Neutral (dBµV)		Limits (dBµV)		Verdict (Pass/Fail)
	QP	AV	QP	AV	QP	AV	
0.15781	59.1	55.6	60.4	57.1	65.5	55.5	Pass
0.20859	42.2	23.8	43.6	22.2	63.2	53.2	Pass
0.26328	36.4	34.9	40.2	40.1	61.4	51.4	Pass
4.56406	34.0	27.0	34.8	37.3	56.0	46.0	Pass
8.51328	40.0	30.3	41.2	32.1	60.0	50.0	Pass
23.53672	36.8	30.1	30.2	23.0	60.0	50.0	Pass

Table 4 AC Power Line Conducted Emissions testresults, track-based setup

The results of the AC power line conducted emission tests, carried out in accordance with 47 CFR Part 15 section 15.107(a), at the 120 Volts/ 60 Hz AC mains connection terminals of the EUT, are depicted in the Table 4 above. The system is tested as in whole, so with all equipment as shown in Figure.1a/1b in place and functioning

Notes:

1. The resolution bandwidth used was 9 kHz.
2. Tested in the normal operation mode wherein all 3 transmitters were operational and also the Speed radar active and transmitting. Worst case values noted.
3. Plots are provided on the next pages.

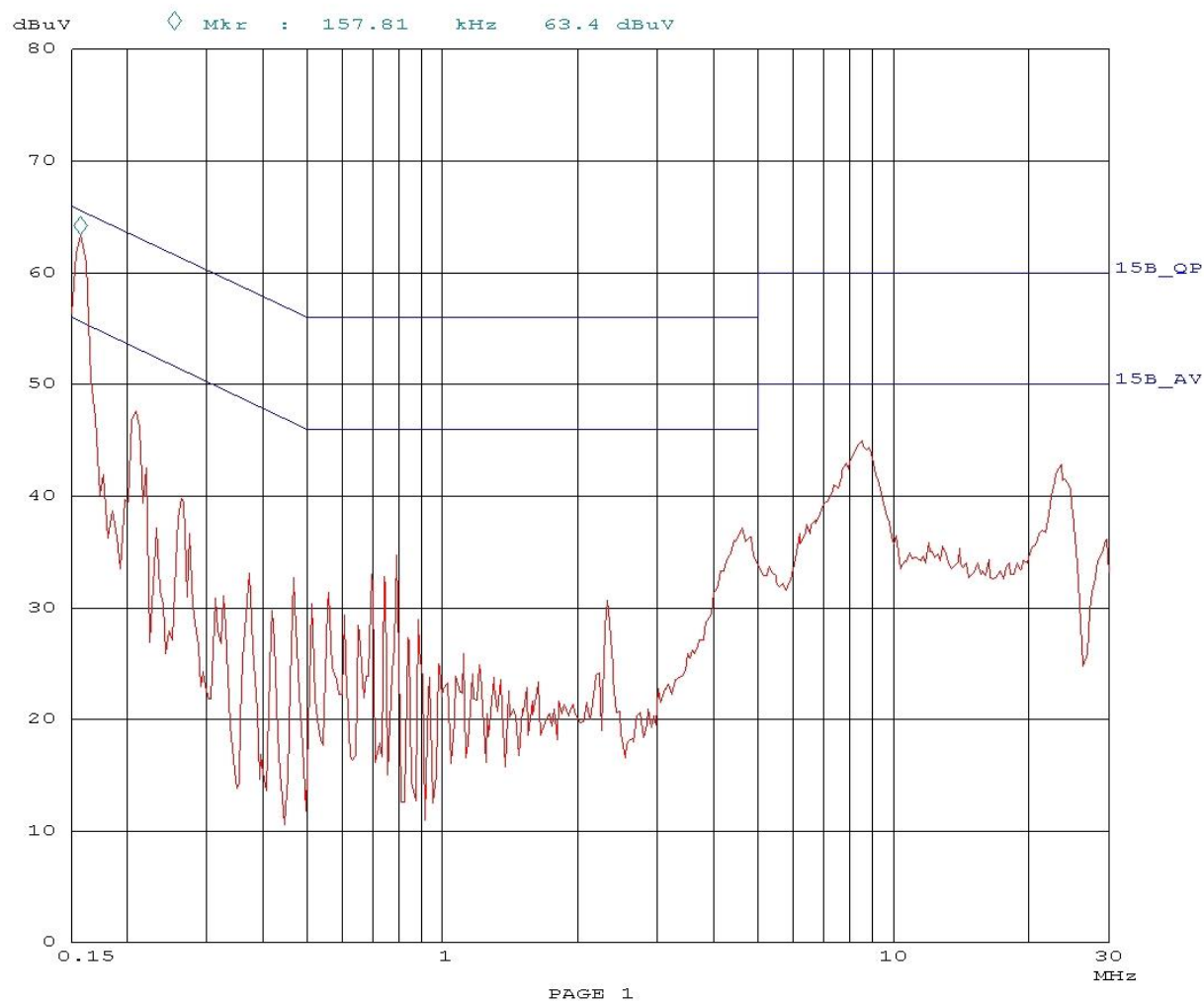
Used test equipment and ancillaries:

A00022	A00051	A00171	A00437	A00444	A00726	

13. Jan 15 10:46

Overview Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	
150k	30M	3.9k	9k	PK	10ms	0dB	LN	OFF

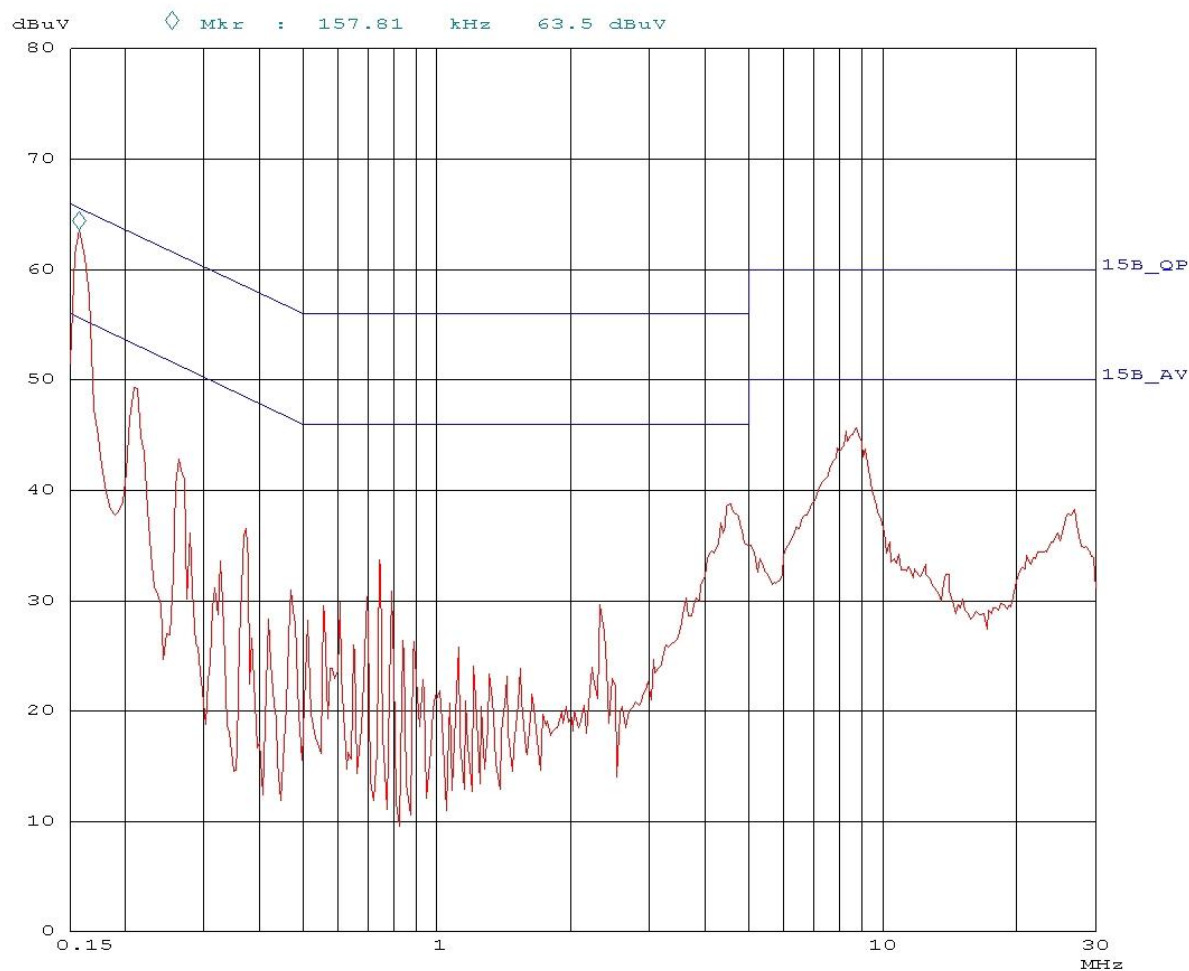


Plot 1 Conducted emissions on L1 (Peak values), track-based

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Overview Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	
150k	30M	3.9k	9k	PK	10ms	0dB	OFF	



Plot 2 Conducted emissions on L2 (Peak values), track-based

5 List of utilized test equipment.

Kind of Equipment	Manufacturer	Model Name	Inventory number	Calibration date (mm/yyyy)	Calibration due date (mm/yyyy)
For Radiated Emissions					
Measurement Receiver	Rohde & Schwarz	ESCI	A00314	03/2014	03/2015
RF Cable S-AR	Gigalink	APG0500	A00447	01/2014	01/2016
Controller	Maturo	SCU/088/ 8090811	A00450	N/A	N/A
Controller	EMCS	DOC202	A00257	N/A	N/A
Test facility	Comtest	FCC listed: 90828 IC: 2932G-2	A00235	04/2014	04/2017
Measuring receiver	R&S	ESCI	A00314	03/2014	03/2015
Antenna mast	EMCS	AP-4702C	A00258	N/A	N/A
Temperature-Humiditymeter	Extech	SD500	A00444	03/2014	03/2015
Biconilog Testantenna	Teseq	CBL 6111D	A00466	06/2014	06-11/2015
For AC Power Line	Conducted	Emissions			
Pulse limiter	R&S	ESH3-Z2	A00051	01/2014	01/2016
Variac	RFT	LSS020	A00171	NA	NA
LISN	EMCO	3625/2	A00022	01/2014	01/2016
Measurement Receiver	Rohde & Schwarz	ESCS30	A00726	09/2014	09/2015
Shielded room for Conducted emissions	--	--	A00437	NA	NA
Temperature-Humiditymeter	Extech	SD500	A00444	03/2014	03/2015

NA= Not Applicable

Conformance of the used measurement and test equipment with the requirements of ISO/IEC 17025:2005 has been confirmed before testing.

<<< END OF REPORT >>>