

TEST REPORT


No.: 18-1-0006201T01

According to:
FCC Regulations
Part 15.107 & Part 15.109

for

Prodrive Technologies B.V.

Carrier Controller
CCS, UL + CCM-IO-ETH

Laboratory Accreditation and Listings	
 <p>DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01</p>	 <p>FCC FEDERAL COMMUNICATIONS COMMISSION USA MRA US-EU 0003</p>
accredited according to DIN EN ISO/IEC 17025	
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The listed attachments are an integral part of this report.

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1. Summary of test results

The test results apply exclusively to the test samples as presented in this Report. The CETECOM GmbH does not assume responsibility for any conclusions and generalizations taken in conjunction with other specimens or samples of the type of the item presented to tests. Also we refer on special conditions which the applicant should fulfill according §2.927 to §2.948, special focus regarding modification of the equipment and availability of sample equipment for market surveillance tests.

The Equipment Under Test (in this report, hereinafter referred as EUT) is a digital device. For this test report typical operating mode were tested according intended use of the equipment **excluding wireless operating** modes.


Following tests have been performed to show compliance with applicable FCC Part 15, Subpart B (Unintentional Radiators) of the CFR 47 Rules, September 2018.

1.1. TEST OVERVIEW ACCORDING FCC PART 15B

No. of Diagram group	Test Cases	Port	References, Standards & Limits			EUT set-up	EUT op-mode	Result
			FCC	IC	Limits			
1.01	AC Power Lines Conducted emissions 0.15 – 30 MHz	AC Power lines	§15.107	ANSI C63.4	<input checked="" type="checkbox"/> Class A <input type="checkbox"/> Class B	1	1	passed
2.01	Radiated emissions 9 kHz - 30 MHz	Cabinet + Inter-connecting cables	§15.109	RSS-Gen., Issue 4 Table 5	2400/F(kHz) µV/m 24000/F(kHz) µV/m 30 µV/m	-	-	not applied
3.01	Radiated emissions 30 MHz-1 GHz	Cabinet + Inter-connecting cables	§15.109	ANSI C63.4	<input checked="" type="checkbox"/> Class A <input type="checkbox"/> Class B	1	1	passed
3.02	Radiated emissions 30 MHz-1 GHz	Cabinet + Inter-connecting cables	§15.109	ANSI C63.4	<input checked="" type="checkbox"/> Class A <input type="checkbox"/> Class B	2	1	passed
4.01	Radiated emissions above 1 GHz	Cabinet + Inter-connecting cables	§15.109	ANSI C63.4	<input checked="" type="checkbox"/> Class A <input type="checkbox"/> Class B	1	1	passed
4.02	Radiated emissions above 1 GHz	Cabinet + Inter-connecting cables	§15.109	ANSI C63.4	<input checked="" type="checkbox"/> Class A <input type="checkbox"/> Class B	2	1	passed

1.2. Attestation

I declare that all measurements were performed by me or under my supervision and that all measurements have been performed and are correct to my best knowledge. All requirements as shown in above table are met in accordance with enumerated standards.



 V. Briddigkeit
 Responsible for test section

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 GmbH
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 40472 Düsseldorf
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 Z. Guennoun
 Responsible for test report

Test Report No.: 18-1-0006201T01**2. Administrative Data****2.1. Identification of the testing laboratory**

Company name:	CETECOM GmbH
Address:	Mündelheimer Weg 35 40472 Düsseldorf Germany
Responsible for testing laboratory:	Volker Briddigkeit
Deputy:	Dipl.-Ing. Niels Jeß

2.2. Test location**2.2.1. Test laboratory "CTC"**

Company name:	see chapter 2.1. Identification of the testing laboratory
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2.3. Organizational items

Responsible for test report and project leader:	A. Ueberbach
Receipt of EUT:	2018-05-23
Date(s) of test:	2017-07-21 and 2018-08-01 to 2018-09-14
Date of report:	2018-10-09

Version of template:	2016-08-18 V. Briddigkeit [CETECOM]

2.4. Applicant's details

Applicant's name:	Prodrive Technologies B.V.
Address:	Science Park Eindhoven 5501 5692 EM Son (Netherlands)
Contact person:	Mr. Pim heemskerk

2.5. Manufacturer's details

Manufacturer's name:	please see Applicant's details
Address:	please see Applicant's details

3. Equipment under test (EUT)

3.1. EUT: Type, S/N etc. and short descriptions used in this test report

Short description*)	EUT	Type	S/N serial number	HW hardware status	SW software status
EUT A	Carrier ControllerEUT Name	Master CCM-IO-ETH (62803)	18-08-858-611	6752-1500-0103	CPU: 6752-1400-2608 UC: 6752-1400-3012
EUT B	Carrier Controller	Slave CCS, UL (64534)	18-10-A02-FW3	6752-1600-1500	CPU: NA UC: 6752-1400-3012

*) EUT short description is used to simplify the identification of the EUT in this test report.

3.2. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions

AE short description *)	Auxiliary Equipment	Type	S/N serial number	HW hardware status	SW software status
AE 1	Main harness	--	Cable 1	--	--
AE 2	Cross Belt Motor	80ZWX-15.0505-A	NO #2	100VDC, 1.8N.m 4244 RPM	--
AE 3	DELL Notebook	Latitude E5470	GZ8ZTF2	INTEL Core i7 vPro	Windows Pro
AE 4	Eupen ROD Antenna DS_CAB-R-50_RMC-12-CH	RMC 12-CH-HLFR	--	--	--
AE 5	SEW Eurodrive SWG Antenna	Coupler R-SMA 5.0 GHz	--	--	--
AE 6	XANTREX DC Supply	XFR150-18	E00127650	--	--

*) AE short description is used to simplify the identification of the auxiliary equipment in this test report.

3.3. EUT set-ups

EUT set-up no. *)	Combination of EUT and AE	Remarks
set. 1	EUT A + EUT B + AE 1 + AE 2 + AE 3 + AE 4 + AE 6	AE 2, AE 3 and AE 6 outside SAC during radiated emission
set. 2	EUT A + EUT B + AE 1 + AE 2 + AE 3 + AE 5 + AE 6	AE 2, AE 3 and AE 6 outside SAC during radiated emission

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

Test Report No.: 18-1-0006201T01**3.4. EUT operating mode**

EUT operating mode no. *)	Description of operating mode	Additional information
op. 1	Radio Idle / All interfaces active / Status: 698	-

*) EUT operating mode no. is used to simplify the test report.

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Accredited EMC Test Laboratory
3.5. Additional declaration and description of EUT

 (Applicant's declaration, ☐ = not selected, ☒ = selected)

Set-up 1		<input checked="" type="checkbox"/> Table top <input type="checkbox"/> floor-standing <input type="checkbox"/> wall-mounted <input type="checkbox"/> not defined	typical use <input type="checkbox"/> portable use <input checked="" type="checkbox"/> fixed use <input type="checkbox"/> vehicular use	typical operating cycle of EUT. <input checked="" type="checkbox"/> > 0,5 sec. <input type="checkbox"/> :
Place of use		<input checked="" type="checkbox"/> Residential, commercial and light industry <input checked="" type="checkbox"/> Industrial environment <input type="checkbox"/> vehicular use		
Highest frequency generated or used in the device or on which the device operates or tunes Operation Mode: Continuous switching of valves each second Remark: no test of wireless functions		<input type="checkbox"/> below 1.705 MHz -> up to 30 MHz <input type="checkbox"/> 1.705 MHz – 108 MHz -> up to 1 GHz <input type="checkbox"/> 108 MHz -500 MHz -> up to 2 GHz <input type="checkbox"/> 500MHz 1000 MHz -> up to 5 GHz <input checked="" type="checkbox"/> 1600 MHz (Main PLL) -> 10 GHz		
Power line: <input type="checkbox"/> AC <input type="checkbox"/> L1, <input type="checkbox"/> L2, <input type="checkbox"/> L3, <input type="checkbox"/> N <input type="checkbox"/> 12V, <input type="checkbox"/> 24V, <input type="checkbox"/> 120V, <input type="checkbox"/> 400V <input checked="" type="checkbox"/> 100 V DC (AC 230V / 50Hz over Adaptor for mains conducted emission test)		EUT-grounding: <input checked="" type="checkbox"/> none <input type="checkbox"/> with power supply <input type="checkbox"/> additional: ground bonding strap on the case (in case of deviation during tests the single details are described on chapter 4)		
Other Ports (description of interconnecting cables) Connector		total cable length used during the test	shielding	connected during test
GW connect	-	<input type="checkbox"/> > 1m <input checked="" type="checkbox"/> > 2m <input type="checkbox"/> > 3m <input type="checkbox"/>	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM DC Input	-	<input type="checkbox"/> > 1m <input checked="" type="checkbox"/> > 2m <input type="checkbox"/> > 3m <input type="checkbox"/> : 5.0m	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
GW connect	-	<input type="checkbox"/> > 1m <input checked="" type="checkbox"/> > 2m <input type="checkbox"/> > 3m <input type="checkbox"/> : 5.0m	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCs DC Input	-	<input type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input checked="" type="checkbox"/> > 3m <input type="checkbox"/>	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM X102 (Pick up)	M12	<input type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input checked="" type="checkbox"/> > 3m <input type="checkbox"/>	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM X104 (F-BUS Input)	M12	<input type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input type="checkbox"/> > 3m <input checked="" type="checkbox"/> < 1m	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM X106 (Antenna)	SMA	<input checked="" type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input type="checkbox"/> > 3m <input type="checkbox"/> < 1m	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM X 105 (F-BUS Output)	M12	<input type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input type="checkbox"/> > 3m <input checked="" type="checkbox"/> < 1m	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM X 108 (Mot Pwr)	M12	<input type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input checked="" type="checkbox"/> > 3m <input type="checkbox"/>	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM X 109 (Mot Enc)	M12	<input type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input checked="" type="checkbox"/> > 3m <input type="checkbox"/>	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM X103 (D10)	M12	<input type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input type="checkbox"/> > 3m <input checked="" type="checkbox"/> < 1m	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCS X103 (D10)	M12	<input checked="" type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input type="checkbox"/> > 3m <input type="checkbox"/> < 1m	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
CCM X103 (Ethernet)	M12	<input type="checkbox"/> > 1m <input type="checkbox"/> > 2m <input checked="" type="checkbox"/> > 3m <input type="checkbox"/>	<input checked="" type="checkbox"/> screened <input type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
Does EUT contain devices susceptible to magnetic fields, e.g. Hall elements, electrostatics microphones, etc.?				<input type="checkbox"/> yes <input checked="" type="checkbox"/> no
Is mounting position / usual operating position defined?				<input checked="" type="checkbox"/> yes <input type="checkbox"/> no

Test Report No.: 18-1-0006201T01**3.6. Configuration of cables used for testing**

Cable number	Item	Type	S/N serial number	HW hardware status	Cable length
Cable 1	GW connect CCM DC Input	unshielded	unknown	unknown	2.0 m
Cable 2	GW connect CCs DC Input	unshielded	unknown	unknown	2.0 m
Cable 3	CCM X102 (Pick up)	shielded	unknown	unknown	7.0 m
Cable 4	CCM X104 (F-BUS Input)	shielded	unknown	unknown	0.5 m
Cable 5	CCM X106 (Antenna)	shielded	unknown	unknown	1.05 m
Cable 6	CCM X 105 (F-BUS Output)	shielded	unknown	unknown	0.5 m
Cable 7	CCM X 108 (Mot Pwr)	shielded	unknown	unknown	10.0 m
Cable 8	CCM X 109 (Mot Enc)	shielded	unknown	unknown	10.0 m
Cable 9	CCM X103 (D10)	shielded	unknown	unknown	0.6 m
Cable 10	CCS X103 (D10)	shielded	unknown	unknown	1.4 m
Cable 11	CCM X103 (Ethernet)	shielded	unknown	unknown	10.0 m

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4. Description of test system set-up's
4.1. Test system set-up for AC power-line conducted emission measurements

Specification: ANSI C63.4-2014 chapter 7

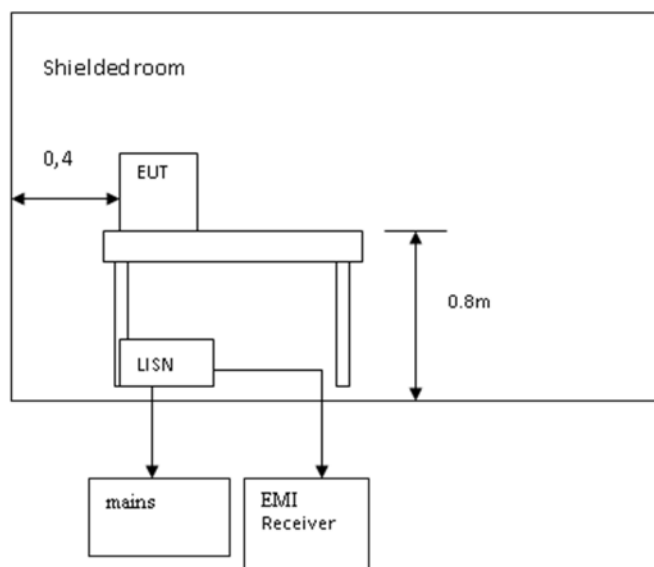
General Description:

The radio frequency voltage conducted back into the AC power line in the frequency range 150 kHz to 30 MHz has to be investigated. Compliance should be tested by measuring the radio frequency voltage between each power line and ground at the power terminals in the stated frequency range.

A 50 Ohm / 50 μ H line impedance stabilization network (LISN) is used coupling the interface to the measurement equipment. The EUT power input leads are connected through the LISN to the AC-power source. The LISN enclosure is electrically connected to the ground plane. The measuring instrument is connected to the coaxial output of the LISN.

Tabletop devices were set-up on a 80 cm height above reference ground plane, floor standing equipment 10 cm raised above ground plane. Measurements have been performed on each phase line and neutral line of the devices AC-power lines. The EUT was power supplied with 120 V/60 Hz. The EUT was tested in the defined operating mode and installed (connected) to accessory equipment according the general description of use given by the applicant.

Schematic:



Testing method:

Exploratory, preliminary measurements as a first step, determines the worst-case phase line (neutral or phase) as well as the most critical operating mode of the equipment. A complete frequency-sweep with PK-Detector is performed on each current-carrying conductor.

Final testing for power phases and critical frequencies (Margin to AV- or QP limit lower than 3 dB) as a second step includes measurements with receivers detector set to Quasi-Peak and Average.

Formula:

$$V_C = V_R + C_L \quad (1)$$

$$M = L_T - V_C \quad (2)$$

V_C = measured Voltage –corrected value

V_R = Receiver reading

C_L = Cable loss

M = Margin

L_T = Limit

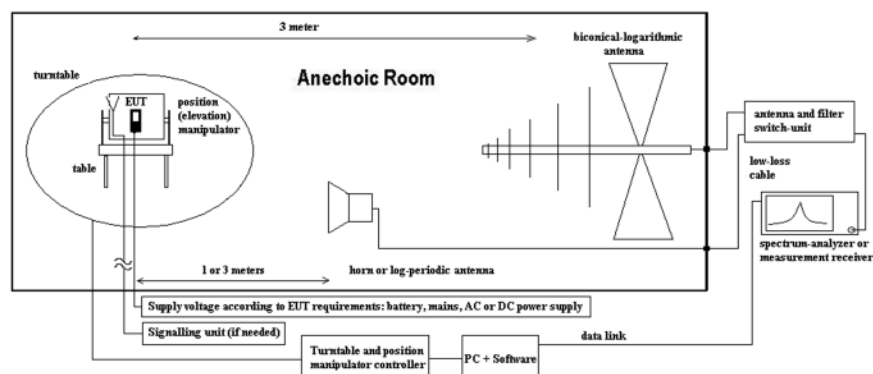
Values are in dB, positive margin means value is below limit.

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4.2. Test system set-up for radiated electric field measurement 30 MHz to 1 GHz

Specification: ANSI C63.4-2014 chapter 8.2.3

General Description: Evaluating the field emissions have to be done first by an exploratory emissions measurement and a final measurement for most critical frequencies. The tests are performed in a NSA-compliant semi anechoic chamber (SAC) recognized by the regulatory commissions.

Schematic:



Testing method:

Exploratory, preliminary measurements

The EUT and its associated accessories are placed on a non-conductive position manipulator (tipping device) of 0.8 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 90°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT) the emission spectrum and its characteristics was recorded with an EMI-receiver, broadband antenna and software.

Measurement antenna: horizontal and vertical, heights: 1,0 m and 1,82 m as worst-case determined by an exploratory emission measurements. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case of them. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

Final measurement on critical frequencies

Based on the exploratory measurements, the most critical frequencies are re-measured by main-taining the EUT's worst-case operation mode, cable position, etc. either on 10m OATS or 3m semi-anechoic chamber.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself either over 3-orthogonal axis (not defined usage position) or 2-orthogonal axis (defined usage position). The measurement antenna height between 1 m and 4 m.

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

Formula:

$$E_C = E_R + AF + C_L + D_F - G_A \quad (1)$$

$$M = L_T - E_C \quad (2)$$

AF = Antenna factor

C_L = Cable loss

D_F = Distance correction factor (if used)

E_C = Electrical field – corrected value

E_R = Receiver reading

G_A = Gain of pre-amplifier (if used)

L_T = Limit

M = Margin

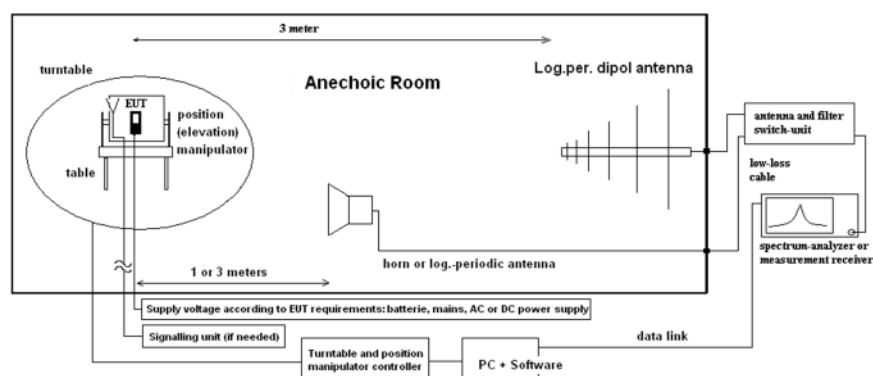
All units are dB-units, positive margin means value is below limit.

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4.3. Test system set-up for radiated electric field measurement above 1 GHz

Specification: ANSI C63.4-2014 chapter 8.3

General Description: Evaluating the emissions have to be done first by an exploratory emissions measurement and a final measurement for most critical frequencies. The tests are performed in a CISPR 16-1-4:2010 compliant semi anechoic room (SAR) with the ground covered with absorber recognized by the regulatory commission. The measurement distance was set to 3 meter for frequencies up to 18 GHz and 2 meter above 18 GHz. A logarithmic periodic antenna is used for the frequency range 30 MHz to 1 GHz. Horn antennas are used for frequency range 1 GHz to 40 GHz. The EUT is aligned within 3 dB beam width of the measurement antenna with three orthogonal axis measurements on the EUT.

Schematic:



Testing method:

Exploratory, preliminary measurements

The EUT and its associated accessories are placed on the turntable. By rotating the turntable (range 0° to 360°, step 15) the emission spectrum and its characteristics was recorded with an EMI-receiver, broadband antenna and software.

The measurements are performed in horizontal and vertical polarization of the measurement antennas. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case of them. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

Final measurement on critical frequencies

Based on the exploratory measurements, the most critical frequencies are re-measured by maintaining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, The measurement antenna height is being varied between 1 m and 4 m and being tilted

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

Formula:

$$E_C = E_R + AF + C_L + D_F - G_A \quad (1)$$

$$M = L_T - E_C \quad (2)$$

E_C = Electrical field – corrected value

E_R = Receiver reading

M = Margin

L_T = Limit

AF = Antenna factor

C_L = Cable loss

D_F = Distance correction factor (if used)

G_A = Gain of pre-amplifier (if used)

All units are dB-units, positive margin means value is below limit.

5. Measurements

5.1. General Limit - Conducted emissions on AC-Power lines

5.1.1. Test location and equipment

test location	<input checked="" type="checkbox"/> CETECOM Duesseldorf (Chapter 2.2.1)				<input type="checkbox"/> Please see Chapter 2.2.2	
test site	<input type="checkbox"/> 25911 EMI field < 1GHz; SAC5	<input type="checkbox"/> 25912 EMI field > 1GHz; SAC5	<input checked="" type="checkbox"/> 25341 Shielded room laboratory 1			
Receiver	<input type="checkbox"/> 25311 ESU 40	<input checked="" type="checkbox"/> 25370 ESR 7	<input type="checkbox"/> 25235 ESCS 30			
Antenna	<input type="checkbox"/> 25038 HFH2-Z2	<input type="checkbox"/> 25357 HL562E	<input type="checkbox"/> 25364 HF907			
LISN	<input checked="" type="checkbox"/> 25021 ESH2-Z5	<input type="checkbox"/> 25156 ESH3-Z6	<input type="checkbox"/> 25263 ESH3-Z6			
signalling	<input type="checkbox"/> 25xxx CMU 200	<input type="checkbox"/> 25xxx CMU 200	<input type="checkbox"/> 594 CMW500	<input type="checkbox"/> not used		
DC voltage	<input type="checkbox"/> 25036 HP 6267 B	<input type="checkbox"/>	<input type="checkbox"/>			
AC voltage	<input checked="" type="checkbox"/> 230 V 50 Hz via Power Supply XANTREX XFR150-18			<input type="checkbox"/> 120 V 60 Hz via EM Test DPA 503N		

5.1.2. Requirements

FCC		Part 15, Subpart B, §15.107			
ANSI		C63.4-2014, § 5.2, 6, 7			
Limit	Frequency [MHz]	<input checked="" type="checkbox"/> Conducted limit Class B		<input type="checkbox"/> Conducted limit Class A	
		QUASI-Peak [dBµV]	AVERAGE [dBµV]	QUASI-Peak [dBµV]	AVERAGE [dBµV]
	0.15 – 0.5	66 to 56*	56 to 46*	79	66
	0.5 – 5	56	46	73	60
	5 – 30	60	50	73	60

Remark: * decreases with the logarithm of the frequency

5.1.3. Test condition and test set-up

Signal link to test system (if used):		<input type="checkbox"/> air link	<input type="checkbox"/> cable connection	<input checked="" type="checkbox"/> none
EUT-grounding		<input checked="" type="checkbox"/> none	<input type="checkbox"/> with power supply	<input type="checkbox"/> additional connection
Equipment set up		<input checked="" type="checkbox"/> table top (40 cm distance to reference ground plane (wall))		
		<input type="checkbox"/> floor standing EUT stands isolated on reference ground plane (floor)		
Climatic conditions		Temperature: (23±3°C)		
		Rel. humidity: (55±20)%		
EMI-Receiver or Analyzer settings	Scan data	<input type="checkbox"/> 9 – 150 kHz, RBW = 200 Hz, Step = 61 Hz		
		<input checked="" type="checkbox"/> 150 kHz – 30 MHz RBW = 9 kHz, Step = 4 kHz		
		<input type="checkbox"/> other:		
	Scan-Mode	10 dB EMI-Receiver Mode		
Pre-measurement		Peak and average detector, Repetitive-Scan, max-hold, sweep-time 10 ms per frequency point		
Final measurement		Average & Quasi-peak detector at critical frequencies		
General measurement procedures		Please see chapter "Test system set-up for AC power line conducted emissions measurements"		

5.1.4. Measurement results

The results are presented below in summary form only. For more information please see the diagrams

EUT set-up no.:			set-up 1		
Diagram-No.	EUT operating mode no. or comment	Used Detector	Power line	Additional (scan-) information or remarks	Result
1.01	EUT operating mode 1	<input checked="" type="checkbox"/> Peak (pre-scan) <input checked="" type="checkbox"/> AV (pre-scan and final) <input checked="" type="checkbox"/> QP (final)	N, L1	-	passed

5.2. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz

5.2.1. Test location and equipment

test location	<input checked="" type="checkbox"/> CETECOM Duesseldorf (Chapter 2.2.1)				<input type="checkbox"/> Please see Chapter 2.2.2	
test site	<input checked="" type="checkbox"/> 25911 EMI field < 1GHz; SAC5	<input type="checkbox"/> 25912 EMI field > 1GHz; SAC5	<input type="checkbox"/> 25901 EMI conducted			
Receiver	<input type="checkbox"/> 25311 ESU 40	<input checked="" type="checkbox"/> 25348 ESR 7	<input type="checkbox"/>			
Antenna	<input type="checkbox"/> 25038 HFH2-Z2	<input checked="" type="checkbox"/> 25357 HL562E	<input type="checkbox"/> 25364 HF907			
LISN	<input type="checkbox"/> 25261 ESH2-Z5	<input type="checkbox"/> 25156 ESH3-Z6	<input type="checkbox"/> 25263 ESH3-Z6			
signalling	<input type="checkbox"/> 20547 CMU 200	<input type="checkbox"/> 25xxx CMU 200	<input type="checkbox"/> 20594 CMW500	<input type="checkbox"/> not used		
DC voltage	<input type="checkbox"/> 25036 HP 6267 B	<input checked="" type="checkbox"/> 100 V Via Power Supply XANTREX XFR150-18	<input type="checkbox"/> 25289 24V via TDK-Lambda Americas Inc.			
AC voltage	<input type="checkbox"/> 230 V 50 Hz via public mains		<input type="checkbox"/> 25289 120 V 60 Hz via EM Test DPA 503N			

5.2.2. Requirements/Limits

FCC		<input checked="" type="checkbox"/> Part 15 Subpart B, §15.109, class B <input type="checkbox"/> Part 15 Subpart C, §15.209 @ frequencies defined in §15.205	
ANSI		<input checked="" type="checkbox"/> C63.4-2014 <input type="checkbox"/> C63.10-2013	
Limit	Frequency [MHz]	Radiated emissions limits, 3 meters	
		QUASI Peak [$\mu\text{V/m}$]	QUASI-Peak [$\text{dB}\mu\text{V/m}$]
	30 - 88	100	40.0
	88 - 216	150	43.5
	216 - 960	200	46.0
	above 960	500	49.0

5.2.3. Test condition and measurement test set-up

Signal link to test system (if used):		<input type="checkbox"/> air link	<input type="checkbox"/> cable connection	<input checked="" type="checkbox"/> none
EUT-grounding		<input checked="" type="checkbox"/> none	<input type="checkbox"/> with power supply	<input type="checkbox"/> additional connection
Equipment set up		<input checked="" type="checkbox"/> table top 0.8 m height		<input type="checkbox"/> floor standing
Climatic conditions		Temperature: (25 \pm 3°C)		Rel. humidity: (48 \pm 20)%
EMI-Receiver (Analyzer) Settings	Scan frequency range:	<input checked="" type="checkbox"/> 30 – 1000 MHz <input type="checkbox"/> other:		
	Scan-Mode	<input checked="" type="checkbox"/> 6 dB EMI-Receiver Mode <input type="checkbox"/> 3 dB spectrum analyser mode		
	Detector	Peak / Quasi-peak		
	RBW/VBW	120 kHz		
	Mode:	Repetitive-Scan, max-hold		
		Scan step 40 kHz		
		Sweep-Time 10 ms		
General measurement procedures		Please see chapter "Test system set-up for electric field measurement in the range 30 MHz to 1 GHz"		

5.2.4. MEASUREMENT RESULTS

The results are presented below in summary form only. For more information please see diagrams included in annex 1.

Table of measurement results:

Dia-gram no.	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
					PK	AV	QP	
3.01	30 MHz – 1 GHz	1	1	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	passed
3.02	30 MHz – 1 GHz	2	1	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	passed

Remark: see diagrams in annex 1 for more details

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5.3. General Limit - Radiated emissions, 1 GHz - 6 GHz
5.3.1. Test location and equipment absorber modified SAC

test location	<input checked="" type="checkbox"/> CETECOM Duesseldorf (Chapter 2.2.1)		<input type="checkbox"/> Please see Chapter 2.2.2	
test site	<input type="checkbox"/> 25911 EMI field < 1GHz; SAC5	<input checked="" type="checkbox"/> 25912 EMI field > 1GHz; SAC5	<input type="checkbox"/> 25901 EMI conducted	
Receiver	<input type="checkbox"/> 25311 ESU 40	<input checked="" type="checkbox"/> 25348 ESR 7	<input type="checkbox"/>	
Antenna	<input type="checkbox"/> 25038 HFH2-Z2	<input type="checkbox"/> 25357 HL562E	<input checked="" type="checkbox"/> 25364 HF907	
LISN	<input type="checkbox"/> 25261 ESH2-Z5	<input type="checkbox"/> 25156 ESH3-Z6	<input type="checkbox"/> 25263 ESH3-Z6	
signalling	<input type="checkbox"/> 20547 CMU 200	<input type="checkbox"/> 25xxx CMU 200	<input type="checkbox"/> 20594 CMW500	<input type="checkbox"/> not used
DC voltage	<input type="checkbox"/> 25036 HP 6267 B	<input checked="" type="checkbox"/> 100 V Via Power Supply XANTREX XFR150-18	<input type="checkbox"/> 25289 24V via TDK-Lambda Americas Inc.	
AC voltage	<input type="checkbox"/> 230 V 50 Hz via public mains		<input type="checkbox"/> 25289 120 V 60 Hz via EM Test DPA 503N	

5.3.2. Requirements/Limits (CLASS B equipment)

FCC	<input checked="" type="checkbox"/> Part 15 Subpart B, §15.109 class B			
IC	<input type="checkbox"/> RSS-Gen., Issue 4, Chapter 8.9, Table 4+6 (transmitter licence exempt) <input type="checkbox"/> RSS-Gen., Issue 4, Chapter 8.9, Table 2 (receiver) <input type="checkbox"/> ICES-003, Issue 6, Chapter 6.2.2, Table 7 (class B)			
ANSI	<input checked="" type="checkbox"/> C63.4-2014 <input type="checkbox"/> C63.10-2013			
Frequency [MHz]	Limits			
	AV [µV/m]	AV [dBµV/m]	Peak [µV/m]	Peak [dBµV/m] or [dBm/MHz]
above 1 GHz for frequencies as defined in §15.205	500	54.0	5000	74.0 dBµV/m

5.3.3. Test condition and measurement test set-up

Signal link to test system (if used):	<input type="checkbox"/> air link	<input type="checkbox"/> cable connection	<input type="checkbox"/> none
EUT-grounding	<input checked="" type="checkbox"/> none	<input type="checkbox"/> with power supply	<input type="checkbox"/> additional connection
Equipment set up	<input checked="" type="checkbox"/> table top	<input type="checkbox"/> floor standing	
Climatic conditions		Temperature: (21.1±3°C)	Rel. humidity: (43±20)%
EMI-Receiver (Analyzer) Settings	Scan frequency range:	<input checked="" type="checkbox"/> 1 – 6 GHz <input type="checkbox"/> other:	
	Scan-Mode	<input checked="" type="checkbox"/> 6 dB EMI-Receiver Mode <input type="checkbox"/> 3 dB spectrum analyser mode	
	Detector	Peak / Average	
	RBW/VBW	1 MHz	
	Mode:	Repetitive-Scan, max-hold	
		Scan step	400 kHz
		Sweep-Time	10 ms
General measurement procedures		Please see chapter "Test system set-up for radiated electric field measurements above 1 GHz"	

5.3.4. Measurement Results

The results are presented below in summary form only. For more information please see diagrams included in annex 1.

Table of measurement results:

Dia-gram no.	Carrier Channel		Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
	Range	No.					PK	AV	QP	
4.01	nominal	--	1 - 6 GHz	1	1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	passed
4.02	nominal	--	1 - 6 GHz	2	1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	passed

Remark: see diagrams in annex 1 for more details

Test Report No.: 18-1-0006201T01
5.4. Measurement uncertainties

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor **k**, such that a confidence level of approximately 95% is achieved.

For uncertainty determination, each component used in the concrete measurement set-up was taken in account and it's contribution to the overall uncertainty according it's statistical distribution calculated.

Following table shows expectable uncertainties for each measurement type performed.

RF-Measurement	Reference	Frequency range	Calculated uncertainty based on a confidence level of 95%	Remarks
Conducted emissions (U _{CISPR})	CISPR 16-2-1	9 kHz - 150 kHz 150 kHz - 30 MHz	4.0 dB 3.6 dB	-
Radiated emissions Enclosure	CISPR 16-2-3	30 MHz - 1 GHz 1 GHz - 18 GHz	4.2 dB 5.1 dB	E-Field
Disturbance power	CISPR 16-2-2	30 MHz - 300 MHz	-	-
Radiated emissions Enclosure	-	150 kHz - 30 MHz	5.0 dB	Magnetic field
		30 MHz - 1 GHz	4.2 dB	E-field
		1 GHz - 20 GHz	3.17 dB	Substitution

Table: measurement uncertainties, valid for conducted/radiated measurements

Test Report No.: 18-1-0006201T01
6. Abbreviations used in this report

The abbreviations	
ANSI	American National Standards Institute
AV , AVG, CAV	Average detector
EIRP	Equivalent isotropically radiated power, determined within a separate measurement
EGPRS	Enhanced General Packet Radio Service
EUT	Equipment Under Test
FCC	Federal Communications Commission, USA
IC	Industry Canada
n.a.	not applicable
Op-Mode	Operating mode of the equipment
PK	Peak
RBW	resolution bandwidth
RF	Radio frequency
RSS	Radio Standards Specification, Dokuments from Industry Canada
Rx	Receiver
TCH	Traffic channel
Tx	Transmitter
QP	Quasi peak detector
VBW	Video bandwidth
ERP	Effective radiated power

7. Accreditation details of CETECOM's laboratories and test sites

Ref.-No.	Accreditation Certificate	Valid for laboratory area or test site	Accreditation Body
-	D-PL-12047-01-01	All laboratories and test sites of CETECOM GmbH, Essen	DAkKS, Deutsche Akkreditierungsstelle GmbH
337 487 558 348 348	MRA US-EU 0003	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAC) Radiated Measurements above 1 GHz, 3 m (FAR) Mains Ports Conducted Interference Measurements Telecommunication Ports Conducted Interference Measurement.	FCC, Federal Communications Commission Laboratory Division, USA
337 487 550 558	3462D-1 3462D-2 3462D-2 3462D-3	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Radiated Measurements above 1 GHz, 3 m (FAR)	IC, Industry Canada Certification and Engineering Bureau
487 550 348 348	R-2666 G-301 C-2914 T-1967	Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Mains Ports Conducted Interference Measurements Telecommunication Ports Conducted Interference Measurements.	VCCI, Voluntary Control Council for Interference by Information Technology Equipment, Japan
OATS = Open Area Test Site, SAC = Semi Anechoic Chamber, FAR = Fully Anechoic Room			

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Accredited EMC Test Laboratory

8. Instruments and Ancillary

8.1. Used equipment "CTC"

The "Ref.-No" in the left column of the following tables allows the clear identification of the laboratory equipment.

8.1.1. Test software and firmware of equipment

Ref.-No.	Equipment	Type	Serial-No.	Version of Firmware or Software during the test
358	Semi Anechoic Chamber	Albatross	No. 5	- -
348	EMI Test Receiver	ESR 7	825132/017	Firm.= 1.21 , OTP=2.0, GRA=2.0
370	EMI Test Receiver	ESR 7	101715	-
235	EMI Test Receiver	ESCS 30	100160	Firm.= 2.30, OTP= 02.01, GRA= 02.36
311	EMI Test Receiver	ESU40	1000-30	Firmware=4.43 SP3, Bios=V5.1-16-3, Spec. =01.00
358	Ultra-Broadband Antenna	HL562E	100824	- -
364	Double Rigid Horn Antenna	HF907	102488	- -
352	Continuous switch Unit	OSP	100123	Firmware=06.06
000	EMI Test Software	EMC 32	-	EMC 32 Version 9.26
021	Line Impedance Stabilization Network [1]	ESH2-Z5	872460/004	CISPR 16 compliant
261	Line Impedance Stabilization Network [2]	ESH2-Z5	871777/041	CISPR 16 compliant
316	Multifunction AC/DC power Source	Netwave 20	V1227113059	Firmware= 5.03.03
360	Antenna Tower	BAM 4.5-P	091/17791115	- -
361	Controller TT & Tower	NCD	202/17791115	Firmware= 0.4.03
363	Turn Table	TT 4.0-4t	553/17791115	- -
362	Measurement table	PTT 1.5 x1x0.8	127	- -

8.1.2. Single instruments and test systems

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
358	Semi Anechoic Chamber	SAC	No. 5	Albatross	10 Y	-	05 / 2026
348	EMI Test Receiver	ESR 7	825132/017	Rohde & Schwarz	24 M	-	12 / 2017
370	EMI Test Receiver	ESR 7	101715	Rohde & Schwarz	24 M	-	01 / 2018
235	EMI Test Receiver	ESCS 30	100160	Rohde & Schwarz	24 M	-	07 / 2018
311	EMI Test Receiver	ESU40	1000-30	Rohde & Schwarz	24 M	-	07 / 2018
358	Ultra-Broadband Antenna	HL562E	100824	Rohde & Schwarz	36 M	-	12 / 2018
364	Double Rigid Horn Antenna	HL562E	102488	Rohde & Schwarz	36 M	-	12 / 2018
352	Continuous switch Unit	OSP	100123	Rohde & Schwarz	36 M	-	12 / 2018
000	EMI Test Software	EMC 32	-	Rohde & Schwarz	- -	-	- -
021	Line Impedance Stabilization Network [1]	ESH2-Z5	872460/004	Rohde & Schwarz	24 M	1a	06/ 2018
261	Line Impedance Stabilization Network [1]	ESH2-Z5	871777/041	Rohde & Schwarz	24 M	3	06 / 2018
316	Multifunction AC/DC power Source	Netwave 20	V1227113059	EM-Test	36 M	1g	05 / 2018
360	Antenna Tower	BAM 4.5-P	872460/004	Maturo	- -	-	- -
361	Controller TT & Tower	NCD	871777/041	Maturo	- -	-	- -
363	Turn Table	TT 4.0-4t	V1227113059	Maturo	- -	-	- -
362	Measurement table	PTT 1.5 x1x0.8	127	Maturo	- -	-	- -

8.1.3. Legend

Interval of calibration	12 M	12 month
	24 M	24 month
	36 M	36 month
	10 Y	10 Years
	24/12 M	Calibration every 24 months, between this every 12 months internal validation
	36/12 M	Calibration every 36 months, between this every 12 months internal validation
	Pre-m	Check before starting the measurement
	-	Without calibration

9. Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial Release	2018-10-09

Annex 1: DIAGRAMS OF TESTING
TEST REPORT
No.: 18-1-0006201T01

According to:
FCC Regulations
Part 15.107 & Part 15.109

for
Prodrive Technologies B.V.

Carrier Controller
CCS, UL + CCM-IO-ETH

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1. Measurement diagrams

1.1. MEASUREMENT DIAGRAMS

1.1. Conducted emissions on AC-mains (230V/50Hz)

1.1.1. Part 15B

1.01

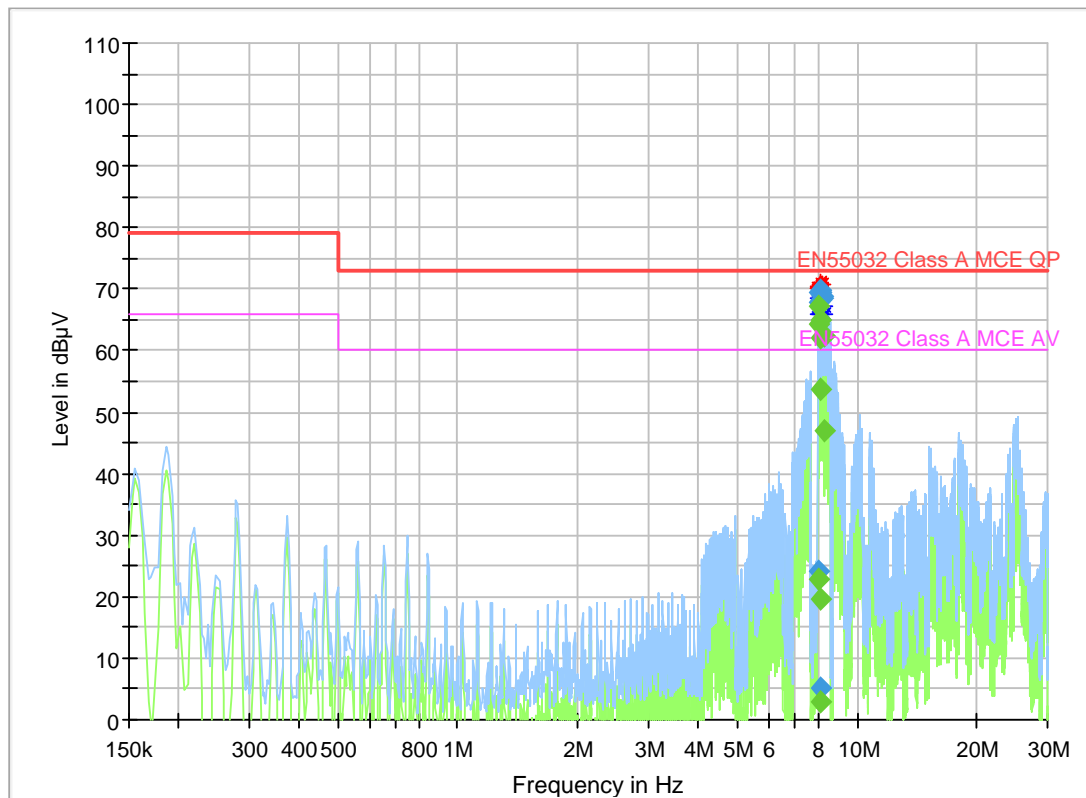
Common Information

Test Description:	Date: 21.07.2017
Test Site & Location:	Conducted Voltage Measurement Class B
Test Specification:	Conducted Emission, CETECOM GmbH Düsseldorf
Operating Mode:	FCC 15.107
Measured on line:	Continuous Operation
Diagram details:	N, L1
Environmental Conditions:	Shows the peak and average values as a sum of measured ports in max hold mode
Operator:	Humidity: 40%rH; Temperature: 24.8°C; Pressure: 1014mbar
	A. Ueberbach

EUT Information

Manufacturer:	Prodrive Technologies
EuT:	CCS-10; CCM-10-ETH-UL
HW Version:	6752-1601-4100; 6752-1500-0102
SW Version:	R07
Serial Number:	17-13-1601-4100; 17-16-008-103
Power Supply:	230 V 50Hz
Comments:	External power supply used for supply of DC 100 V Voltage of EUT

Full Spectrum



Remark: Upper limit line is QPeak, lower limit line shows Average limit. The Scan was performed with Peak & Average Detector of the receiver. Peak result is below Average Limit. No counter measurement necessary. – Diagram shows maximum result of Phase N & L1 measurement.

Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
7.971000	---	22.97	60.00	37.03	1000.0	9.000	L1	GND	0.4
7.971000	24.27	---	73.00	48.73	1000.0	9.000	L1	GND	0.4
7.989000	---	64.24	60.00	-4.24	1000.0	9.000	L1	GND	0.4
7.992000	67.78	---	73.00	5.22	1000.0	9.000	L1	GND	0.4
8.028000	69.37	---	73.00	3.63	1000.0	9.000	L1	GND	0.4
8.031000	---	67.12	60.00	-7.12	1000.0	9.000	L1	GND	0.4
8.049000	---	19.52	60.00	40.48	1000.0	9.000	L1	GND	0.4
8.052000	69.33	---	73.00	3.67	1000.0	9.000	L1	GND	0.4
8.073000	---	65.04	60.00	-5.04	1000.0	9.000	L1	GND	0.4
8.073000	68.18	---	73.00	4.82	1000.0	9.000	L1	GND	0.4
8.091000	5.17	---	73.00	67.83	1000.0	9.000	L1	GND	0.4
8.091000	---	62.07	60.00	-2.07	1000.0	9.000	L1	GND	0.4
8.109000	69.50	---	73.00	3.50	1000.0	9.000	L1	GND	0.4
8.109000	---	2.76	60.00	57.24	1000.0	9.000	L1	GND	0.4
8.130000	69.82	---	73.00	3.18	1000.0	9.000	L1	GND	0.4
8.130000	---	53.77	60.00	6.23	1000.0	9.000	L1	GND	0.4
8.151000	68.64	---	73.00	4.36	1000.0	9.000	L1	GND	0.4
8.172000	68.91	---	73.00	4.09	1000.0	9.000	L1	GND	0.4
8.232000	---	46.85	60.00	13.15	1000.0	9.000	L1	GND	0.4
8.253000	---	62.31	60.00	-2.31	1000.0	9.000	L1	GND	0.4

No further conspicuous frequency found – margin to limit > 10 dB (Peak)

1.2. Radiated emissions in the frequency range 30 to 1000 MHz

1.2.1. Part 15B

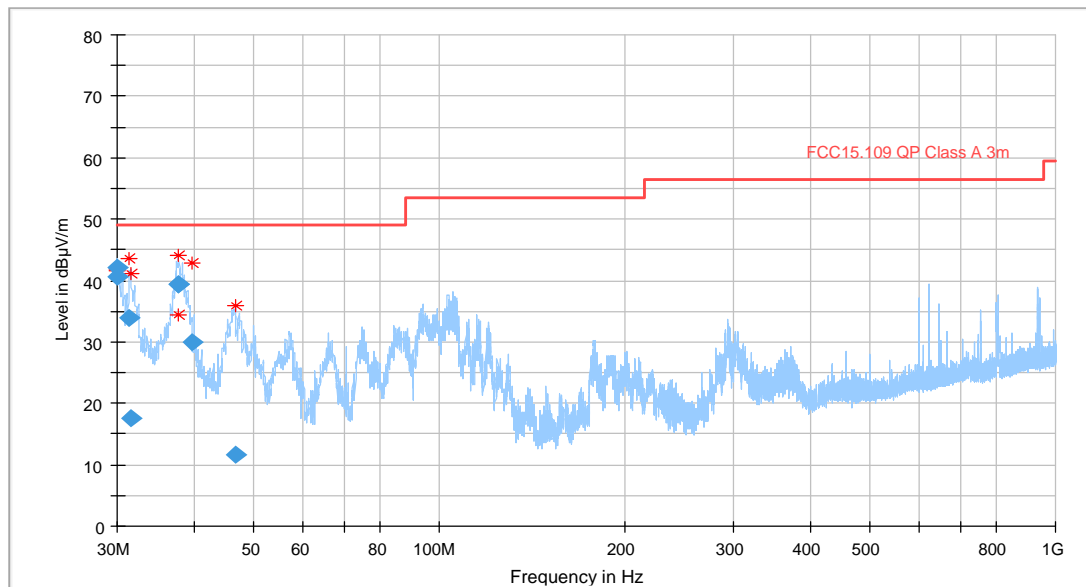
Diagram No. 3.01

Date:	01.08.2018
Test description:	Electric Field Strength Measurement
Test site and distance:	Semi Anechoic Chamber 2 (SAC5) with 3m measurement distance
Test location:	CETECOM GmbH Düsseldorf
Version of Testsoftware:	EMC32 V10.0.0
Test specification:	FCC15.109, class B; RSS-Gen.: Issue 4
Distance correction:	not used
Used filter:	none
Operating Mode:	Continuous Operation
Measured sides of EUT:	front, right, rear, left
Environmental conditions:	Humidity: 43%rH; Temperature: 22°C
Operator:	AUe

EUT Information

Manufacturer:	Prodrive Technologies B.V.
Model:	Carrier Control Master + Carrier Control Slave
Type:	CCM-IO-ETH + CCL, UL
HW version:	6752-1500-0103 + 6752-1600-1500
SW version:	CPU: 6752-1400-2608, uC: 6752-1400-2912
Serial number:	18-08-858-611 + 18-10-A02-FW3
Connected Interfaces:	Motor, Antenna, LAN cable
Power Supply:	100VDC
Comments:	with SEW Antenna

Full Spectrum



Remark: Red marker = Peak result, Blue marker = QPeak result – Diagram shows maximum result of horizontal and vertical antenna polarisation

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.000000	42.03	49.00	6.97	120.000	104.0	V	222.0	19.9
30.056000	40.65	49.00	8.35	120.000	104.0	V	192.0	19.9
31.372000	33.89	49.00	15.11	120.000	100.0	V	-8.0	19.1
31.680000	17.65	49.00	31.35	120.000	151.0	V	206.0	19.0
37.748000	39.35	49.00	9.65	120.000	157.0	V	205.0	15.6
37.764000	39.32	49.00	9.68	120.000	136.0	V	168.0	15.6
39.676000	29.89	49.00	19.11	120.000	119.0	V	151.0	14.5
46.552000	11.71	49.00	37.29	120.000	151.0	V	22.0	10.2

No further conspicuous frequency found – margin to limit > 10 dB (Peak)

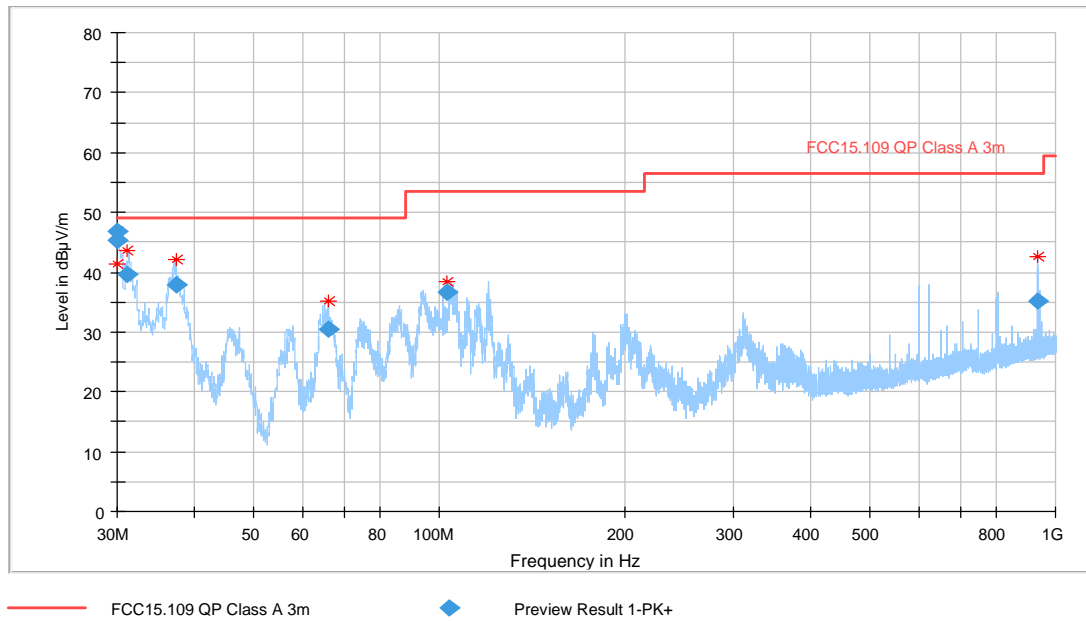
1.2.2. Part 15B**Diagram No. 3.02**

Test description:	Date: 01.08.2018 Electric Field Strength Measurement
Test site and distance:	Semi Anechoic Chamber 2 (SAC5) with 3m measurement distance
Test location:	CETECOM GmbH Düsseldorf
Version of Testsoftware:	EMC32 V10.0.0
Test specification:	FCC15.109, class B; RSS-Gen.: Issue 4
Distance correction:	not used
Used filter:	none
Operating Mode:	Continuous Operation
Measured sides of EUT:	front, right, rear, left
Environmental conditions:	Humidity: 43%rH; Temperature: 22°C
Operator:	AUe

EUT Information

Manufacturer:	Prodrive Technologies B.V.
Model:	Carrier Control Master + Carrier Control Slave
Type:	CCM-IO-ETH + CCL, UL
-----	-----
HW version:	6752-1500-0103 + 6752-1600-1500
SW version:	CPU: 6752-1400-2608, uC: 6752-1400-2912
Serial number:	18-08-858-611 + 18-10-A02-FW3
Connected Interfaces:	Motor, Antenna, LAN cable
Power Supply:	100VDC
Comments:	with Eupen ROD Antenna

Full Spectrum



Remark: Red marker = Peak result, Blue marker = QPeak result – Diagram shows maximum result of horizontal and vertical antenna polarisation

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.020000	46.81	49.00	2.19	120.000	104.0	V	269.0	19.9
30.056000	45.25	49.00	3.75	120.000	100.0	V	200.0	19.9
31.216000	39.63	49.00	9.37	120.000	111.0	V	262.0	19.2
37.420000	37.87	49.00	11.13	120.000	100.0	V	178.0	15.8
65.992000	30.51	49.00	18.49	120.000	136.0	V	162.0	8.2
103.296000	36.57	53.50	16.93	120.000	115.0	V	138.0	11.5
937.032000	35.11	56.50	21.39	120.000	100.0	V	241.0	23.0

No further conspicuous frequency found – margin to limit > 10 dB (Peak)

1.3. Radiated emissions in the frequency range 1000 to 6000 MHz

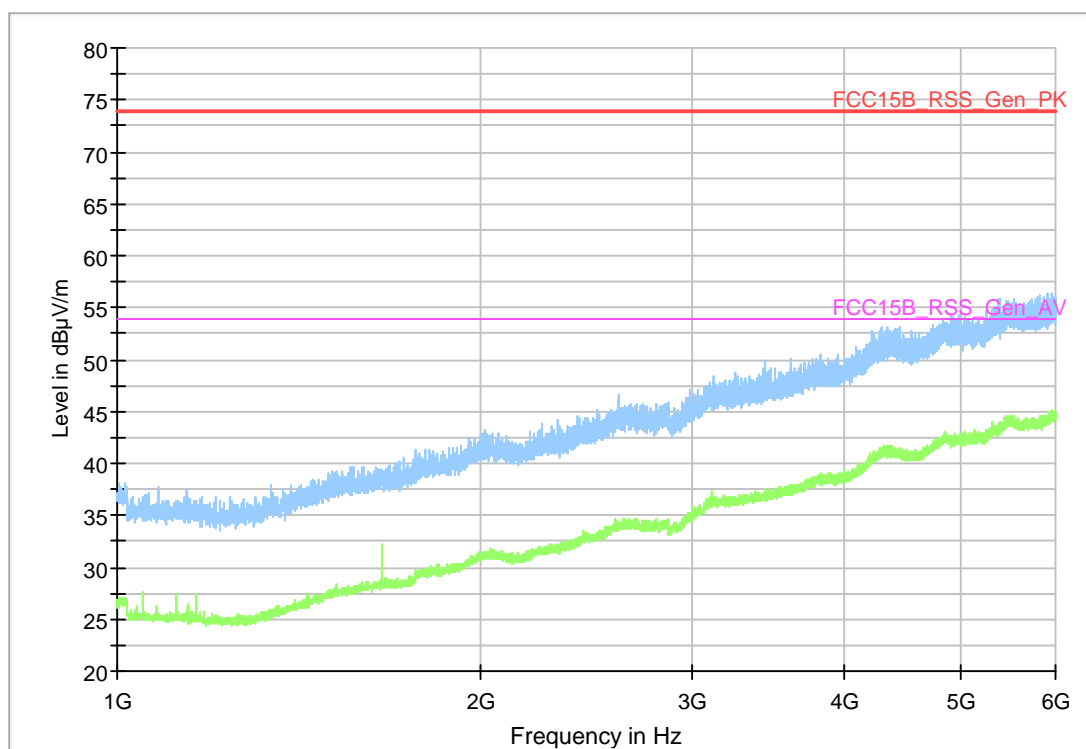
1.3.1. Part 15B

Diagram No. 4.01

Date:	14.09.2018
Test description:	Electric Field Strength Measurement
Test site and distance:	Ref.-Nr. 25358 Semi Anechoic Chamber 2 (SAC5) with 3m measurement distance
Test location:	CETECOM GmbH Düsseldorf
Version of Testsoftware:	EMC32 V10.40.0
Test specification:	FCC15.109, class B; RSS-Gen.: Issue 4
Distance correction:	not used
Technical Data:	Please see page 2 for detailed data of measurement setup
Used filter:	none
Operating mode:	Continuous Operation
Measured sides of EUT:	front, right, rear, left
Environmental conditions:	Humidity: 38%rH; Temperature: 25.6°C; Pressure: 1014hPa
Operator:	GWe / ACh

EUT Information

Manufacturer:	Prodrive Technologies B.V.
Model:	Carrier Control Master + Carrier Control Slave
Type:	CCM-IO-ETH + CCL, UL
HW version:	6752-1500-0103 + 6752-1600-1500
SW version:	CPU: 6752-1400-2608, uC: 6752-1400-2912
Serial number:	18-08-858-611 + 18-10-A02-FW3
Connected Interfaces:	Motor, Antenna, LAN cable
Power Supply:	100VDC
Comments:	with Eupen ROD Antenna



Preview Result 2-AVG Preview Result 1-PK+ * Critical_Freqs AVG
 * Critical_Freqs PK+ FCC15B_RSS_Gen_PK FCC15B_RSS_Gen_AV
 ◆ Final_Result PK+ ◆ Final_Result AVG

Remark: Red marker = Peak result, Blue marker = QPeak result – Diagram shows maximum result of horizontal and vertical antenna polarisation

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
---	---	---	---	---	---	---	---		---

No conspicuous frequency found – margin to limit > 10 dB (Peak)

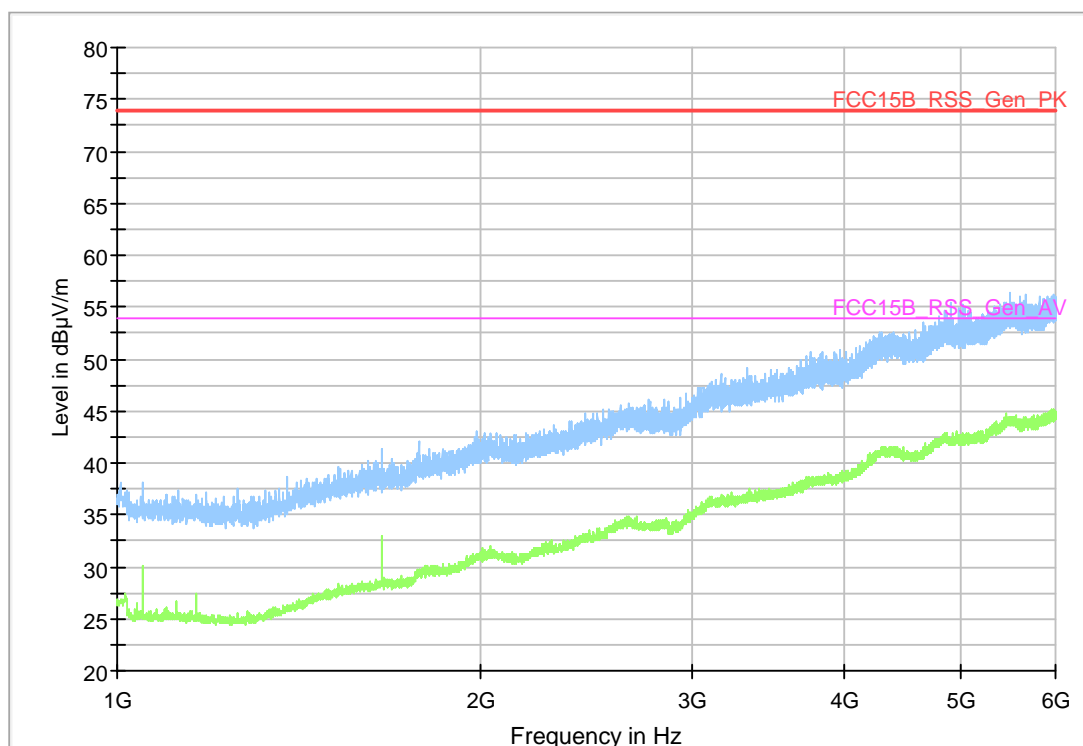
1.3.2. Part 15B

Diagram No. 4.02

Test description:	Date: 14.09.2018
Test site and distance:	Electric Field Strength Measurement Semi Anechoic Chamber 2 (SAC5) with 3m measurement distance
Test location:	CETECOM GmbH Düsseldorf
Version of Testsoftware:	EMC32 V10.40.0
Test specification:	FCC15.109, class B; RSS-Gen.: Issue 4
Distance correction:	not used
Technical Data:	Please see page 2 for detailed data of measurement setup
Used filter:	none
Operating mode:	Continuous Operation
Measured sides of EUT:	front, right, rear, left
Environmental conditions:	Humidity: 39%rH; Temperature: 25.6°C; Pressure: 1014hPa
Operator:	GWe / Ach

EUT Information

Manufacturer:	Prodrive Technologies B.V.
Model:	Carrier Control Master + Carrier Control Slave
Type:	CCM-IO-ETH + CCL, UL
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HW version:	6752-1500-0103 + 6752-1600-1500
SW version:	CPU: 6752-1400-2608, uC: 6752-1400-2912
Serial number:	18-08-858-611 + 18-10-A02-FW3
Connected Interfaces:	Motor, Antenna, LAN cable
Power Supply:	100VDC
Comments:	with SEW Antenna



Preview Result 2-AVG Preview Result 1-PK+ * Critical_Freqs AVG
 * Critical_Freqs PK+ Final_Result PK+ Final_Result AVG FCC15B_RSS_Gen_PK
 Final_Result PK+ Final_Result AVG FCC15B_RSS_Gen_AV

Remark: Red marker = Peak result, Blue marker = QPeak result – Diagram shows maximum result of horizontal and vertical antenna polarisation

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
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No conspicuous frequency found – margin to limit > 10 dB (Peak)

Annex 2: Set-up photographs to
TEST REPORT
No.: 18-1-0006201T01

for

Prodrive Technologies B.V.

Carrier Controller
CCS, UL + CCM-IO-ETH

Table of contents

1. Test set up photographs



Photograph 1: Mains conducted emission measurements test set-up for measurement of frequency up to 30MHz



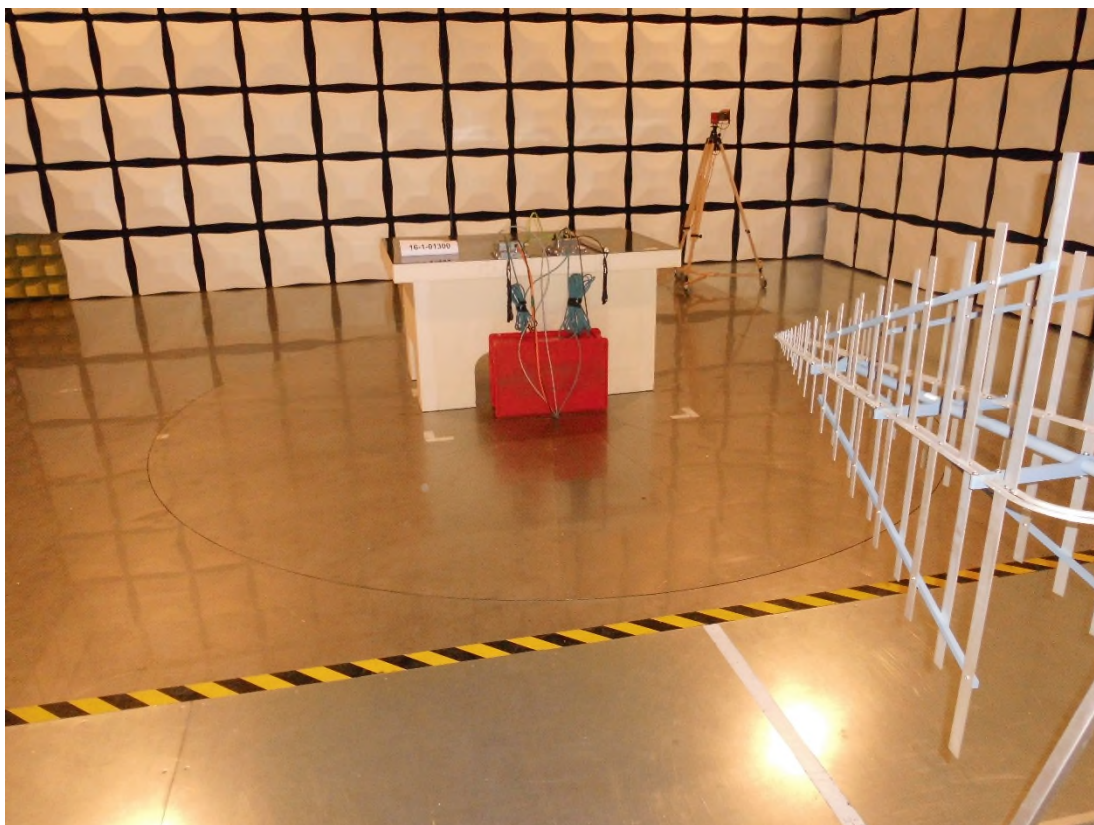
Photograph 2: Radiated emission measurements test set-up for measurement of frequency up to 1000 MHz with SEW Eurodrive antenna
Front side view



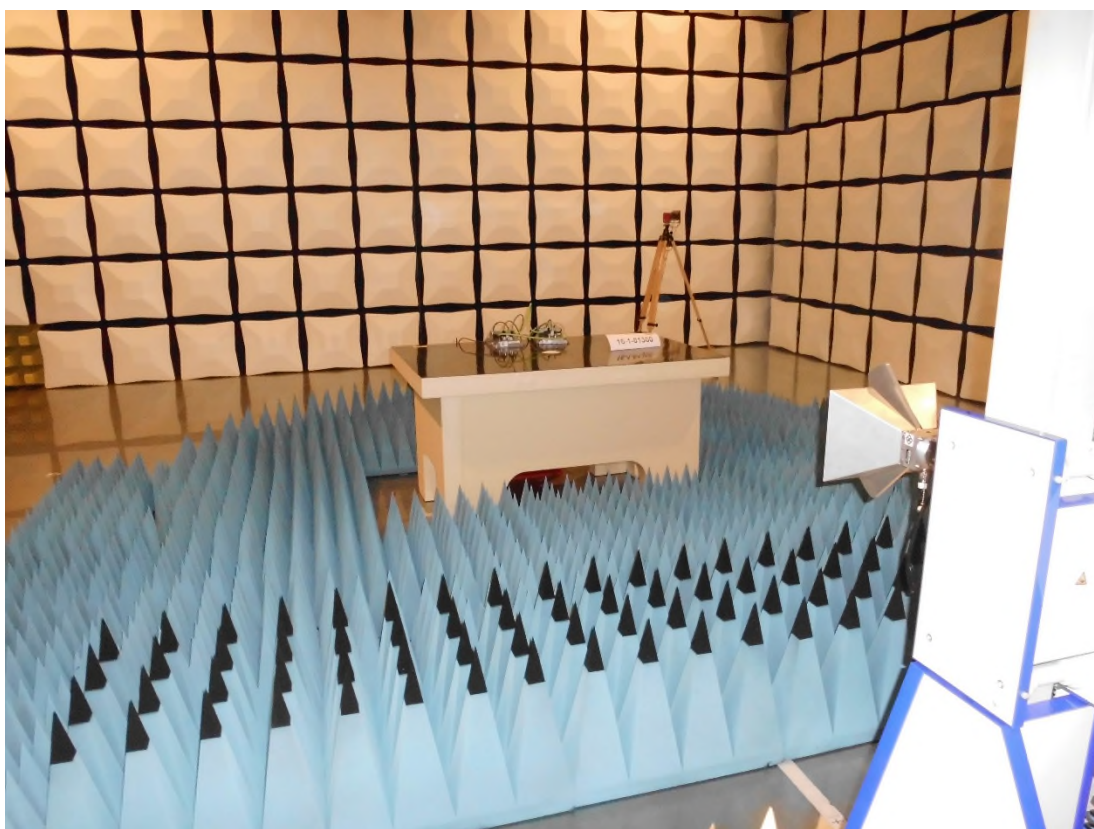
Photograph 3: Radiated emission measurements test set-up for measurement of frequency up to 1000 MHz with SEW Eurodrive antenna
Rear side view



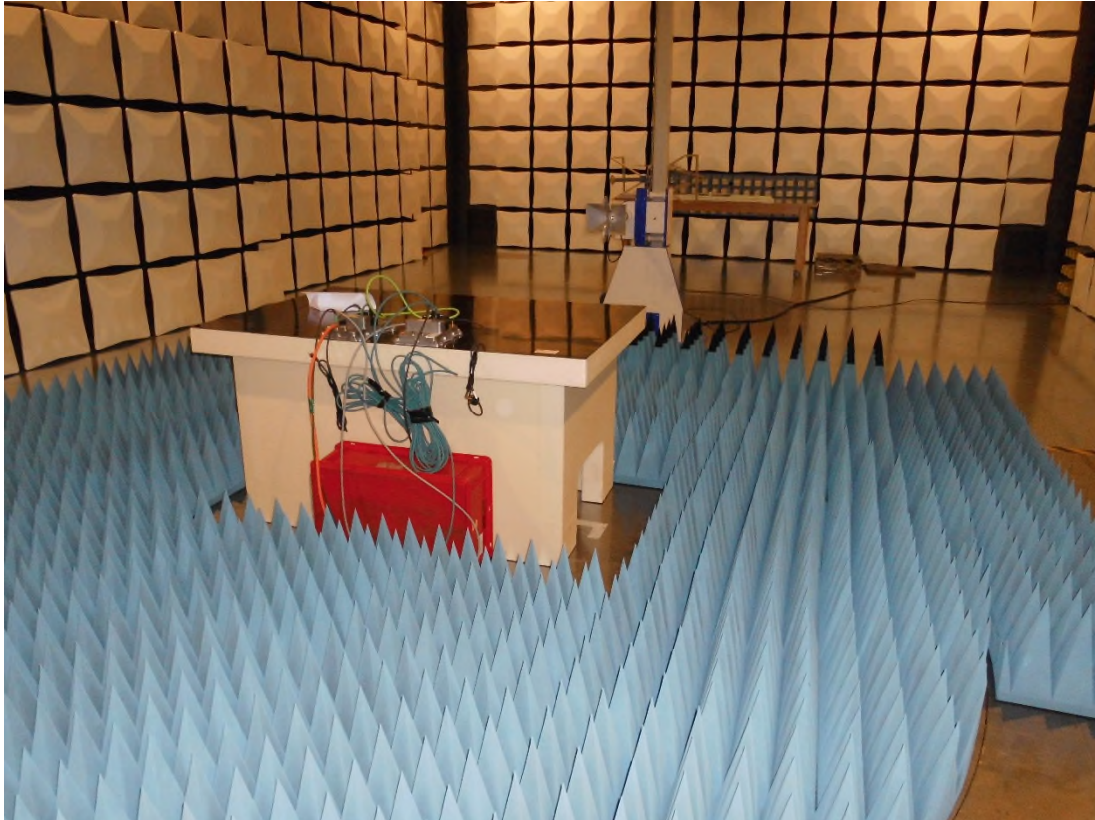
Photograph 4: Radiated emission measurements test set-up for measurement of frequency up to 1000 MHz with rod antenna
Front side view



Photograph 5: Radiated emission measurements test set-up for measurement of frequency up to 1000 MHz with rod antenna
Rear side view



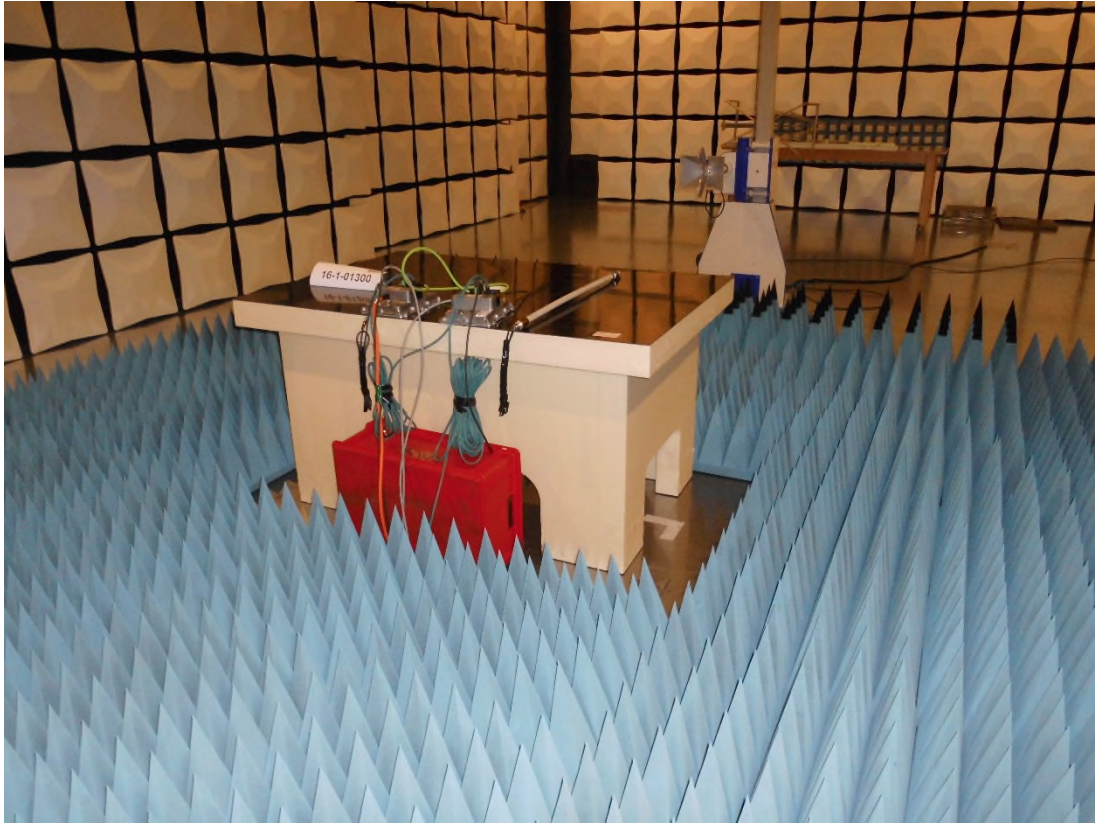
Photograph 6: Radiated emission measurements test set-up for measurement of frequency above 1000 MHz with SEW Eurodrive antenna
Front side view



Photograph 7: Radiated emission measurements test set-up for measurement of frequency above 1000 MHz with SEW Eurodrive antenna
Rear side view



Photograph 8: Radiated emission measurements test set-up for measurement of frequency above 1000 MHz with rod antenna
Front side view



Photograph 9: Radiated emission measurements test set-up for measurement of frequency above 1000 MHz with rod antenna
Rear side view