

Testing laboratory

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Accredited Testing Laboratory: The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS) The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-00

Applicant

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Manufacturer

Raytheon Anschütz GmbH Zeyestraße 16-24 24106 Kiel / GERMANY

Test standard/s

FCC CFR 47 Part 80 Stations in the Maritime Services

FCC CFR 47 Part 15B Radio Frequency Devices / Unintentional Radiators

For further applied test standards please refer to section 4 of this test report.

Test Item				
Kind of test item:	Shipborne Radar - S-Band Up Mast Transceiver			
Model name: NSX S Up 230V Pedestal				
Туре:	770-003.NG001			
FCC-ID:	ASLNSX-30U			
Frequency range:	2.9 – 3.1 GHz			
Tx power conducted:	30 kW (nominal pulse power)			
Power Supply:	115/230 V AC			
Temperature Range:	-25°C to +55°C			

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

Meheza Walla Lab Manager Radio Communications & EMC

Test performed:

Karsten Geraldy Lab Manager Radio Communications & EMC



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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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2.2 Application details

Date of receipt of order:2015-05-06Date of receipt of test item:2015-05-26Start of test:2015-05-26End of test:2015-06-03Laboratory reference number:018.15Person(s) present during the test:Mr. Henning Mextorf

3 Test location

CETECOM ICT Services GmbH Untertuerkheimer Strasse 6 - 10 66117 Saarbruecken / GERMANY



4 Test standard/s and Reference/s

Test standard/s	Date	Description	
FCC CFR 47 Part 80	2013/2014	Stations in the Maritime Services	
FCC CFR 47 Part 15B	2013/2014	Radio Frequency Devices / Unintentional Radiators	
Poforonco/c	Data		
REIEIEII.E/S	11-1-1-1-0	Decerintion	
Kelelenee/5	Date	Description	
ITU-R M.1177-4	2011-04	Description Techniques for measurement of unwanted emissions of radar systems	
ITU-R M.1177-4 ITU-R SM.329-12	2011-04 2012-09	Description Techniques for measurement of unwanted emissions of radar systems Unwanted emissions in the spurious domain	

5 Test environme	nt	
Temperature:	T _{nom} T _{min} T _{max}	+22 °C during room temperature tests -30 °C +55 °C
Relative humidity:		45 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	Vnom	115/230 V AC

6 Test laboratory/ies sub-contracted

none



7 Test item

7.1 General Description

Kind of test item	Shipborne Radar - S-Band Up Mast Transceiver		
Model name	NSX S Up 230V Pedestal		
Type identification	770-003.NG001		
S/N serial number	4006168000107		
Frequency band	2.9 – 3.1 GHz		
TX output power conducted	30 kW (nominal pulse power of magnetron)		
Type of modulation	sequence of unmodulated pulses		
Type of radio transmission	PON		
Power supply	115/230 V AC		
Temperature range	-25°C to +55°C		

7.2 List of components

NSX S Up 230V Pedestal equipped with:

- 30 kW magnetron, EEV Magnetron, Type MG5223, S/N 0032513

7.3 Antenna system(s)

Antenna size	Concept	Manufacturer	Туре	TX gain dBi (mid)	Polarization	pattern / test report
12 ft	endfed slotted waveguide	Kelvin Hughes	28.0	LPR-A1	horizontal	data sheet / spec. available

7.4 Operating conditions

Operating condition 1: S-Band radar, 30 kW, EEV Magnetron, Type MG5223, S/N 0032513

7.5 Additional information

The indirect test method as described in ITU-R M.1177 was used to perform the measurements.

Test setup- and EUT-photos are included in test report: 4-3702_15-01-01_AnnexA (External Photos)

4-3702_15-01-01_AnnexA (External Photos) 4-3702_15-01-01_AnnexB (Internal Photos) 4-3702_15-01-01_AnnexC (Test Setup)



8 **RF** measurements

8.1 Description of test setup

Following diagrams show possible test setups. They can be considered as applicable in general. Depending on the tests performed and/or depending on the EUT configuration (e.g. amount of different components, setup, ...) the real test setup may vary slightly from the diagrams shown below.

8.1.1 Conducted measurements











8.1.2 Radiation measurements

Setup 2.1: Radiated measurements chamber F

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Setup 2.2: Radiated measurements chamber C





Setup 2.3: Radiated measurements in test lab up to 50 GHz



Setup 2.4: Radiated measurements in test lab above 50 GHz





8.2 Test environment

The environment conditions are documented with each test (see annex(e) with measurement results).

8.3 Measurement uncertainties

The measurement and test setup is in accordance to the specification and schematically shown in 8.1. The reference to each test is shown in annex(e) with measurement results.

Measurement uncertainties: Potential error sources/effects in that setup:

- mismatch HF Cable RF Input of Analyzer
- mismatch Waveguide Adaptor HF Cable
- mismatch Waveguide Adaptor Directional Coupler
- mismatch Pedestal Flange Directional Coupler
- Spectrum Analyzer frequency response
- Spectrum Analyzer IF gain uncertainty
- HF-Cable frequency response calibration uncertainty
- HF-Cable frequency response data conversion uncertainty
- Directional Coupler frequency response calibration uncertainty
- Directional Coupler frequency response data conversion uncertainty
- Attenuator frequency response calibration uncertainty
- Attenuator frequency response data conversion uncertainty

Our total uncertainty for above listed factors with a 95% confidence level (acc. UKAS, ETSI) is $\leq \pm 1.5$ dB.



9 Test results

9.1 Summary

\boxtimes	No deviations from the technical specifications were ascertained
	There were deviations from the technical specifications ascertained

The present test report:

\boxtimes	describes the first test
	describes an additional test
	is a verification of documents
	is only valid with the test report no .:

TC identifier	Description	Verdict	Date	Remark
RF-Testing	FCC CFR 47 Part 80 / FCC CFR 47 Part 15B	see below	2015-07-24	-/-

Test Specification Clause	Test Case	Pass	Fail	N/A	N/P	Results
§2.1046 / §80.215	Measurements required: RF power output / Transmitter power.	х				pk: 73.9 dBm avg: 41.2 dBm
§2.1047 / §80.213	Measurements required: Modulation characteristics / Modulation requirements	х				complies
§2.1049	Measurements required: Occupied bandwidth (Necessary Bandwidth)	х				max. 60 MHz max. 72 MHz
§2.1051 /	Measurements required: Spurious emissions at antenna terminals /	х				complies
§80.211	Emission limitations (conducted emissions)					
00.4050						
§2.1053 / §80.211	Measurements required: Field strength of spurious radiation / Emission limitations (radiated emissions)	х				complies
-						
§2.1055 / §80.209	Measurements required: Frequency stability / Transmitter frequency tolerances	х				+957 ppm -998 ppm
§15.107	Conducted limits	Х				complies
§15.109	Radiated emission limits	Х				complies

N/A: Not Applicable N/P: Not Performed



9.2 Overview

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I. Transmitter characteristics / output power

Description / Limit:

§ 80.215

(a) Transmitter power shown on the radio station authorization is the maximum power the licensee is authorized to use. Power is expressed in the following terms:(3) For P0N and F3N emission: Mean power.

Limit: no limitations

Test setup: no. 1.2

Measurement results:

Mode	T _{pulse} [ns]	T _{rise} [ns]	T _{fall} [ns]	PRF [Hz]	P _{out pulse} [dBm]	P _{out mean} [dBm]
short pulse	47.14	13.3	42.07	3000	73.5	35.0
medium 1 pulse	156.2	8.0	46.27	2000	73.9	38.8
medium 2 pulse	421.4	7.2	49.21	1000	73.4	39.6
long pulse	822.7	6.8	47.22	750	73.3	41.2

Note:

 $P_{\text{out\,mean}}$ is calculated based on $P_{\text{out\,pulse}}$ and duty cycle of transmitter. see also Annex B, plots 1 - 8



II. Modulation requirements

Description / Limit:

§ 80.213

(a) Transmitters must meet the following modulation requirements:

(g) Radar stations operating in the bands above 2.4 GHz may use any type of modulation consistent with the bandwidth requirements in § 80.209(b).

§ 80.209

(b) When pulse modulation is used in land and ship radar stations operating in the bands above 2.4 GHz the frequency at which maximum emission occurs must be within the authorized bandwidth and must not be closer than 1.5/T MHz to the upper and lower limits of the authorized bandwidth where "T" is the pulse duration in microseconds.

Test setup: no. 1.2

Measurement results:

see page 18, VII Transmitter frequency tolerance



III. Occupied bandwidth / Necessary bandwidth / B-40 dB bandwidth

Description:

§ 2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

ITU-R SM.1541: Necessary bandwidth

For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

ITU-R SM.1541, Annex 8, 2.1 Un-modulated radar pulses

Recommendation ITU-R SM.853 provides guidance for determining the necessary bandwidth (20 dB below the peak envelope value) for rectangular and trapezoidal pulses. For these systems, the necessary bandwidth B_N is the smaller of:

$$\mathsf{B}_{\mathsf{N}} = \frac{1.79}{\sqrt{t \cdot tr}} \text{ or } \frac{6.36}{t}$$

where *t* is the pulse duration (at half amplitude) and *tr* is the rise time, both in seconds.

ITU-R SM.1541, Annex 8, 3.1 Formulas for the 40 dB bandwidth

The following formulas for the 40 dB bandwidth (B–40) of primary radar transmitters have been established. For non-FM pulse radars, including spread spectrum or coded pulse radars, the bandwidth is the lesser of:

$$\mathsf{B}_{-40\mathsf{dB}} = \frac{K}{\sqrt{t \cdot tr}} \text{ or } \frac{64}{t}$$

where the coefficient *K* is 7.6 for lower-power radars (< 100kW) and radars operating in the radionavigation service in the 2 900-3 100 MHz and 9 200-9 500 MHz bands. The latter expression applies if the rise time *tr* is less than about 0.0094t when *K* is 6.2, or about 0.014t when *K* is 7.6.

Limit: no limitations

Measurement results:

Mode	measured occupied bw [MHz]	calculated necessary bw [MHz]	calculated B _{-40 dB} bandwidth [MHz]	see annex C, plot no.
short pulse	60.0	71.5	303.5	5
medium 1 pulse	34.8	40.7	215.0	6
medium 2 pulse	21.0	15.1	138.0	7
long pulse	14.3	7.73	77.8	8

Note:

see also Annex C, plots 5 – 8



IV. Emission limits (RF spectrum mask)

Description / Limit:

§ 80.211

The emissions must be attenuated according to the following schedule:

(f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section: (1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.

Test setup: no. 1.2

Measurement results:

Mode	see following plots
short pulse	Annex C, plot no. 9
medium 1 pulse	Annex C, plot no.10
medium 2 pulse	Annex C, plot no.11
long pulse	Annex C, plot no.12

Note:

see also Annex C, plots 9 – 12



V. Emissions limits (conducted emissions)

Description / Limit:

§ 80.212

The emissions must be attenuated according to the following schedule:

(f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section: (1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.

Test setup: no. 1.2

Measurement results:

Conducted Spurious Emissions [dBm]									
	short pulse			limit line			long pulse		
F [GHz]	Detector	Level [dBm]	Limit [dBm]		Limit [dBm]	F [GHz]	F [GHz] Detector [
2.61	RMS	-37.7	-13		-13	2.61	RMS	-37.3	
4.98	RMS	-44.1	-13		-13	4.98	RMS	-42.4	
6.09	RMS	-37.6	-13		-13	6.11	6.11 RMS		
Measurement uncertainty					± 1.	5 dB			

n.f. = nothing found

Note:

see also Annex C, plots 13 – 28

For performing the measurements the indirect test method as described in ITU-R M.1177-4 was used. A directional coupler with dummy load was connected at the transmitter output.



VI. Emissions limits (radiated emissions)

Description / Limit:

§ 80.212

The emissions must be attenuated according to the following schedule:

(f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section: (1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus 10log10 (mean power in watts) dB.

Test setup: no. 2.2 and 2.3

Measurement results:

Radiated Spurious Emissions [dBm]									
	short pulse			limit line			long pulse		
F [GHz]	Detector	Level [dBm]	Limit [dBm]		Limit [dBm]	F [GHz]	F [GHz] Detector [dB		
12.22	RMS	-71.3	-13		-13	12.21	RMS	-61.4	
					-13	21.37	RMS	-64.6	
					-13	27.47	RMS	-73.2	
Measurement uncertainty			± 3 dB						

n.f. = nothing found v / h = vertical / horizontal

Note:

see also Annex C, plots 29 - 36



VII. Transmitter frequency tolerance

Description:

§ 80.209

(b) When pulse modulation is used in land and ship radar stations operating in the bands above 2.4 GHz the frequency at which maximum emission occurs must be within the authorized bandwidth and must not be closer than 1.5/T MHz to the upper and lower limits of the authorized bandwidth where "T" is the pulse duration in microseconds.

Mode	T _{pulse} [ns]	1.5/T [MHz]	f _{min} [GHz]	f _{max} [GHz]	
short pulse	47.1	31.82	2.9318	3.0682	
medium 1 pulse	156.2	9.60	2.9096	3.0904	
medium 2 pulse	421.4	3.56	2.9036	3.0964	
long pulse	822.7	1.82	2.9018	3.0982	

Note:

 f_{min} and f_{max} are based on 2.9 GHz – 3.1 GHz band.

Test setup: no. 1.2

Measurement results:

Temperature	Voltage	Reference Frequency	Measured Frequency	Deviation [MHz]	Deviation [ppm]
-30	115	3.051712	3.054632	2.920	957
-20	115	3.051712	3.054037	2.325	762
-10	115	3.051712	3.053347	1.635	536
0	115	3.051712	3.052632	0.920	301
10	115	3.051712	3.051892	0.180	59
20	115	3.051712	3.051712	0.000	0
20	115	3.051712	3.051712	0.000	0
20	98	3.051712	3.051712	0.000	0
30	132	3.051712	3.050907	-0.805	-264
40	115	3.051712	3.049957	-1.755	-575
50	115	3.051712	3.048667	-3.045	-998



VIII. AC Conducted Limits

Description / Limit:

§15.107 / 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 omission [MHz]	Conducted limit [dBµV]			
	Quasi-peak	Average		
0.15 - 0.5	66 to 56*	56 to 46*		
0.5 - 5	56	46		
5 - 30	60	50		

*Decreases with the logarithm of the frequency.

Test setup: 1.1

Measurement results:

AC conducted emissions < 30 MHz [dBµV/m]						
Frequency [MHz]	Detector	Level [dBµV/m]				
No critical peaks detec	No critical peaks detected. All detected peak values are below the average limits.					
Measurement uncertainty ± 3 dB						

Note:

see also Annex D, plot 1



IX. Radiated Emission Limits

Description / Limit:

§15.109 / 209

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission [MHz]	Field strength [microvolts/meter]	Field strength [dBµV/meter]	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)		300
0.490 - 1.705	24000/F(kHz)		30
1.705 – 30	30	29.5	30
30 - 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
above 960	500	54.0	3

(c) In the emission tables above, the tighter limit applies at the band edges.

Test setup: 2.1 – 2.3

Measurement results:

Spurious Emissions Radiated [dBµV/m]						
Frequency [GHz]	Detector	Level [dBµV/m]				
No critical peaks dete	No critical peaks detected. All detected peak values are below the average limits.					
Measurement uncertainty	ertainty ± 3 dB					

Note: see also Annex D, plots 2 – 8



Annex A Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

No.	Lab / Item	Equipment	Туре	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	30000368	g		
2	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
3	50	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B5979	300000210	ne		
4	50	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	27.01.2014	27.01.2015
5	50	Analyzer-Reference- System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	Ve	11.02.2014	11.02.2015
6	50	Amplifier	JS42-00502650-28- 5A	MITEQ	1084532	300003379	ev		
7	50	Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745	izw		
8	50	Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746	izw		
9	50	Turntable Interface- Box	Model 105637	ETS-LINDGREN	44583	300003747	izw		
10	50	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	22.04.2014	22.04.2016
11	50	Spectrum-Analyzer	FSU26	R&S	200809	300003874	k	22.01.2014	22.01.2015
12	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	12.01.2012	12.01.2015
13	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	08.05.2013	08.05.2015
14	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
15	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
16	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	30.01.2014	30.01.2016
17	9	Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	Erfi	91350	300001155	ne		
18	90	Active Loop Antenna 10 kHz to 30 MHz	6502	Kontron Psychotech	8905-2342	300000256	k	13.06.2013	13.06.2015
19	90	Amplifier	js42-00502650-28- 5a	Parzich GMBH	928979	300003143	ne		
20	90	Band Reject filter	WRCG1855/1910- 1835/1925-40/8SS	Wainwright	7	300003350	ev		
21	90	Band Reject filter	WRCG2400/2483- 2375/2505-50/10SS	Wainwright	11	300003351	ev		
22	90	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
23	90	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	viKi!	29.10.2014	29.10.2017
24	90	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	13.03.2014	13.03.2015
25	90	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne		
26	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
27	231	Stub Tuner (double)	N300A	Microlab/Fxr	00419	300002042	ev		
28	240	Directional Coupler RPS90	90-2-N-F-40-SP-SP- C	СМТ	900687-002	300001598	ev		
29	217	HF-Cable	KPS1533-590-KPS	Insulated Wire	900687-002	300002290	ev		
30	R001	Spectrum Analyzer 9kHz-50GHz portable spectrum analyzer	8565E	HP Meßtechnik	3515A00283	300000916	Ve	28.01.2013	28.01.2015
31	241	Waveguide Directional Couplerr, 8.2 to 12.4 GHz, 20	X752D	HP	1829A21784	300000484	ev		



		dB							
32	214	Attenuator (N- connector)	10 dB / 10 W	Spinner	745379	40000047	ev		
33	214	RF Peak Power Analyzer+ PPA Sensor	4500B + 58318	Boonton Electronics	12331 + 6276	300003871	k	29.01.2014	29.01.2015
34	CR 79	Std. Gain Horn Antenna 26.5-40.0 GHz	V637	Narda	7911	300001751	ne		
35	A026	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda	8402	300000787	k	22.07.2013	22.07.2015
36	A029	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda	8205	300002442	k	19.07.2013	19.07.2015
37	A029	PXA Spectrum Analyzer 3Hz to 50GHz	N9030A PXA Signal Analyzer	Agilent Technologies	US51350267	300004338	k	09.01.2014	09.01.2015

Agenda: Kind of Calibration

- k calibration / calibrated
- not required (k, ev, izw, zw not required) ne
- periodic self verification ev
- Ve
- long-term stability recognized Attention: extended calibration interval vlkl!
- NK! Attention: not calibrated

- ΕK limited calibration
- cyclical maintenance (external cyclical maintenance) ZW
- izw internal cyclical maintenance
- blocked for accredited testing g
- *) next calibration ordered / currently in progress



Annex B Measurement results, part 1 (PPA)

This annex consists of 5 pages including this page.



Plot No. 1: short pulse



Plot No. 2: short pulse





Plot No. 3: medium 1 pulse



Plot No. 4: medium 1 pulse





Plot No. 5: medium 2 pulse



Plot No. 6: medium 2 pulse





Plot No. 7: long pulse



Plot No. 8: long pulse

Boonton 4500B Pulse Mark >						Marker 1
Width Rise	4.001 us s	Period PRFrq	1.316 ms 759.5 Hz	OffTm Peak	1.312 ms 75.270 dBm	1280 us
Fall	s	IDCyc1e	303.9 m%	Pulse	dBm	Delta Time
53.7	745 dBm	33.	567_{dB}^{Ratio}	20	1.179 ^{×MK2}	52 us
						Marker 2
			+		+	1332 us
						Set Vrt Cntr
						CENTER
			-			Extensions
-100 us		200	∓ us/Div		1900 us	MENU
Iriggered						



Annex C Measurement results, part 2 (FCC Part 80)

This annex consists of 37 pages including this page.



Plot No. 1 (36)





Plot No. 2 (36)





Plot No. 3 (36)





Plot No. 4 (36)





Plot No. 5 (36)





Plot No. 6 (36)





Plot No. 7 (36)





Plot No. 8 (36)




Plot No. 9 (36)





Plot No. 10 (36)





Plot No. 11 (36)





Plot No. 12 (36)





Plot No. 13 (36)





Plot No. 14 (36)





Plot No. 15 (36)





Plot No. 16 (36)





Plot No. 17 (36)





Plot No. 18 (36)





Plot No. 19 (36)





Plot No. 20 (36)





Plot No. 21 (36)





Plot No. 22 (36)





Plot No. 23 (36)





Plot No. 24 (36)





Plot No. 25 (36)





Plot No. 26 (36)





Plot No. 27 (36)





Plot No. 28 (36)





Plot No. 29 (32)





Plot No. 30 (32)





Plot No. 31 (36)





Plot No. 32 (36)





Plot No. 33 (36)





Plot No. 34 (36)





Plot No. 35 (36)





Plot No. 36 (36)





Annex D Measurement results, part 3 (FCC Part 15B)

This annex consists of 6 pages including this page.

Measurements documented by this annex were performed with transmitter on (short pulse and long pulse) as worst case scenario.



Plot No. 1: AC conducted, Tx off





Plot No. 2: Tx on, short pulse, magnetic



Plot No. 3: Tx on, long pulse, magnetic





Plot No. 4: Tx on, short pulse



Critical_Freqs

Frequency	MaxPeak	Limit	Margin	Meas. Time	BW	Height	Pol	Azimuth	Corr.
(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(ms)	(kHz)	(cm)		(deg)	(dB)
30.892500	20.28	30.00	9.72			300.0	Н	315	13.4
46.065000	19.05	30.00	10.95			300.0	Н	180	13.6
62.002500	15.95	30.00	14.05			100.0	V	135	10.1
87.502500	13.96	30.00	16.04			300.0	Н	270	9.9
168.975000	14.56	33.50	18.94			100.0	V	180	9.7
208.245000	18.33	33.50	15.17			300.0	Н	315	12.0
360.352500	22.12	36.00	13.88			300.0	Н	0	16.2
503.535000	23.99	36.00	12.01			100.0	Н	270	18.8
699.120000	27.65	36.00	8.35			300.0	V	225	21.5
878.895000	29.98	36.00	6.02			300.0	Η	180	23.8



Plot No. 5: Tx off



Plot No. 6: Tx off





Plot No. 7: Tx off



Plot No. 8: Tx off





Annex E Document history

Version	Applied changes	Date of release	
DRAFT	Initial release - DRAFT	2015-07-16	
	minor changes based on manufacturer's information	2015-07-24	

Annex F Further information

<u>Glossary</u>

AVG	-	Average
DUT	-	Device under test
EMC	-	Electromagnetic Compatibility
EN	-	European Standard
EUT	-	Equipment under test
ETSI	-	European Telecommunications Standard Institute
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	Not applicable
PP	-	Positive peak
QP	-	Quasi peak
S/N	-	Serial number
SW	-	Software



Annex G Accreditation Certificate

Front side of certificate Back side of certificate **DAkkS** Deutsche Akkreditie Deutsche Akkreditierungsstelle GmbH Deutsche Akkreditierungsstelle GmbH Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV Unterzeichnerin der Multilateralen Abkommen von EA, ILAC und IAF zur gegenseitigen Anerkennung Standort Berlin Spittelmarkt 10 10117 Berlin Standort Frankfurt am Main Gartenstra3e 6 60594 Frankfurt am Main Standort Braunschwo Bundesallee 100 38116 Braunschweig * Akkreditierung Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium CETECOM ICT Services GmbH Untertürkheimer Straße 6-10, 66117 Saarbrücken die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen: durchzuführen: Drahtgebundene Kommunikation einschilleßlich xDSL VolP und DECT Akustik Funk einschließlich WLAN Find Envices (SRO) RFID WilMax und Richtfunk Mobilfunk (SRM / DCS, Over the Air (OTA) Performance) Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive Produktsicherheit SAR und Hearing Ald Compatibility (HAC) Umweitsimulation Smart Card Terminals Blueboch Wi-FF-Services Die auszugsweise Veröffentlichung der Aktraditiorungsurkunde becarf der vorhorigen schriftlichen Zusämmung der Deutsche Aktraditiorungsstelle GmbH (bAkKS). Ausgenammen davon ist die separate Weitzretroneitung des Deukbattes durch die umsettig genernte Kunformitälsbewertungsstelle in unwei 3 oktret Form. Es darf nicht der Anschein erweckt werden, dass sich die Akkred lierung auch auf Bersiche erstreed, die über den durch die DAkkS bestätigten Akkreditierungsbernich hinausgehen. Die Aktreditierung erfolgte gemößt der Geschroßbeiten der Abhreditissen geschlaft (Aktisselleci) vom 31 Jahr 2009 (RGH) 15. 3750 Jahre der Veronteung (SGI M. 7557/2003 des Scragalishen Parlaments und ders Ratis vom 9. Jahr 2008 Unter der Veronteung (SGI M. 7557/2003 des Scragalishen Parlaments und ders Ratis vom 9. Jahr 2008 Unter der Veronteung (SGI M. 7557/2003 des Scragalishen Parlaments Die Dakk Sist Unterschnern der Veronteung Handleiten (Abh. 128 vom 9. Jahr 2008), 9.30, Die Dakk Sist Unterschnern der Veronteung der Franklichen (Abh. 128 vom 9. Jahr 2008), 9.30, Die Dakk Sist Unterschnern der Veronteung der Franklichen (Abh. 128 vom 9. Jahr 2008), 9.30, Die Dakk Sist Unterschnern der Veronteung der Franklichen (Abh. 228 vom 9. Jahr 2008), 9.30, Die Abhreiten (Jahrenzehrung einer Schlichen (Jahrenzehrung auf einer Europeren nich geschlichen (Jahrenzehrung einer Schlichen (Jahrenzehrung auf einer der international Jahrenzehrung einer Schlichen (Jahrenzehrung einer der international Jahrenzehrung einer Schlichen (Jahrenzehrung einer einer Jahrenzehrung einer der international Jahrenzehrung einer Schlichen (Jahrenzehrung einer der international Jahrenzehrung einer Jahrenzehrung einer Jahrenzehrung einer Jahrenzehrung einer Jahrenzehrung einer Jahrenzehrung einer Jahrenzehrung Die Aldreditierungsurkunde gilt nur in Verbindung nit: dem Bescheld vom 07.03 2014 mit der Akkreditierungsmannen D-PI-12076-01 und ist gältig 17.01.2018. Sie besteht aus diesem Deckblart, der Rüchseite des Deckblart, sum der fulgenden Anlage mit Ingesamt 77 Seiten. Der aktive in Stand der Viliglindkartaft knin folgen den Websetten ertnommen werden: F&. www.stanzegisten acceditetion.org II-AC, www.illukerg II-AC, www.illukerg Registrierunganummer der Urkunde: D-PL-12076-01-00 Frankfurt am Main, 07.03.2014 Siete Havain aaf der Room te

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