

FCC ID: NDX-XTENDMAX

EMI - TEST REPORT

- FCC Part 15.209 -



Test Report No. :	T36613-00-02HU	06. February 2013 Date of issue
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Type / Model Name : XtendMax

Product Description : RFID handheld reader for animal identification

Applicant : Datamars S.A.

Address : Via ai Prati

CH – 6930 BEDANO

Manufacturer : Datamars S.A.

Address : Via ai Prati

CH – 6930 BEDANO

Licence holder : Datamars S.A.

Address : Via ai Prati

CH – 6930 BEDANO

Test Result according to the standards listed in clause 1 test standards:	POSITIVE
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

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FCC ID: NDX-XTENDMAX**1 TEST STANDARDS**

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (October, 2012)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (October, 2012)

Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204	External radio frequency power amplifiers and antenna modifications
Part 15, Subpart C, Section 15.205	Restricted bands of operation
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
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ANSI C95.1:1992	IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
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CISPR 16-4-2: 2003	Uncertainty in EMC measurement
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2 SUMMARY

GENERAL REMARKS:

The carrier frequency is 134.2 kHz

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 21. January 2013

Testing concluded on : 30. January 2013

Checked by:

Tested by:

Klaus Gegenfurtner
Dipl.-Ing.(FH)
Manager: Radio Group

Huber Markus

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3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EUT – Detailed photos see Attachment A

mikes

3.2 Power supply system utilised

Power supply voltage: : AC: 115 V / 60 Hz
DC: 2 x 4.0 V

3.3 Short description of the Equipment under Test (EUT)

The EuT is a RFID handheld reader for animal identification.

Number of tested samples: 1
Serial number: Beta 019

EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- Tx mode at 134.2 kHz

- Accu charging mode

—

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- | | |
|--------------------------------|----------------------------------|
| - USB 2.0 Cable A-B, m-m, 2.0 | Model : Supplied by manufacturer |
| - AC/DC Power supply | Model : PHIHONG, PSA10F-050Q |
| - Rhode & Schwarz emi receiver | Model : ESR7, No.: 101108 |
| - | Model : |
| - | Model : |
| - | Model : |
| - customer specific cables | |
| - unscreened power cables | |

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4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 STRASSKIRCHEN
GERMANY

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader may notice that tolerances within the calibration of the equipment and facilities may cause additional uncertainty. The measurement uncertainty is calculated for all measurements listed in this test report acc. to CISPR 16-4-2 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurement“ and documented in the mikes-testingpartners gmbh quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, mikes-testingpartners gmbh, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component diversity and modifications in production process of devices may result in additional deviation. If necessary, refer to the test lab for the actual measurement uncertainty for the specific test. The manufacturer has the sole responsibility of continued compliance of the EUT.

FCC ID: NDX-XTENDMAX**4.4 Measurement Protocol for FCC, VCCI and AUSTEL****4.4.1 GENERAL INFORMATION****4.4.1.1 Test Methodology**

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

4.4.1.2 Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

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5 TEST CONDITIONS AND RESULTS

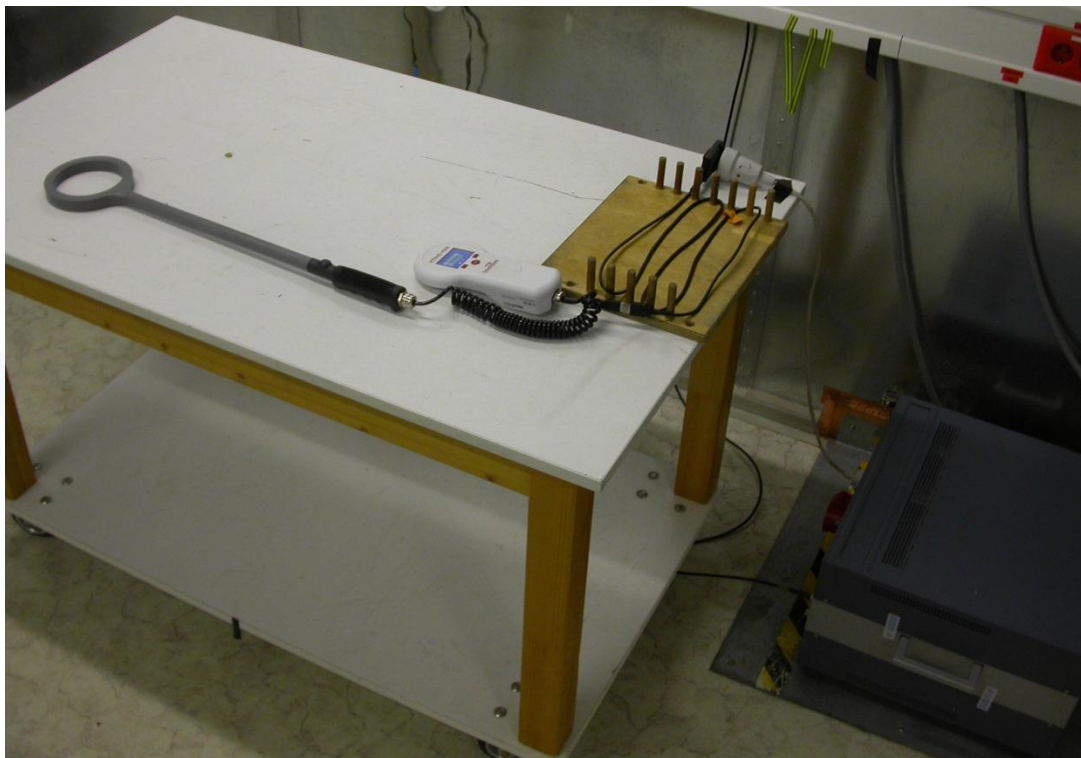
5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up



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5.1.3 Applicable standard

According to FCC Part 15, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, for an intentional radiator 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.

Frequency of Emission (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

5.1.4 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin: 18.6 dB at 0.58 MHz

The requirements are **FULFILLED**.

Remarks: For detailed results, please see the following page(s).

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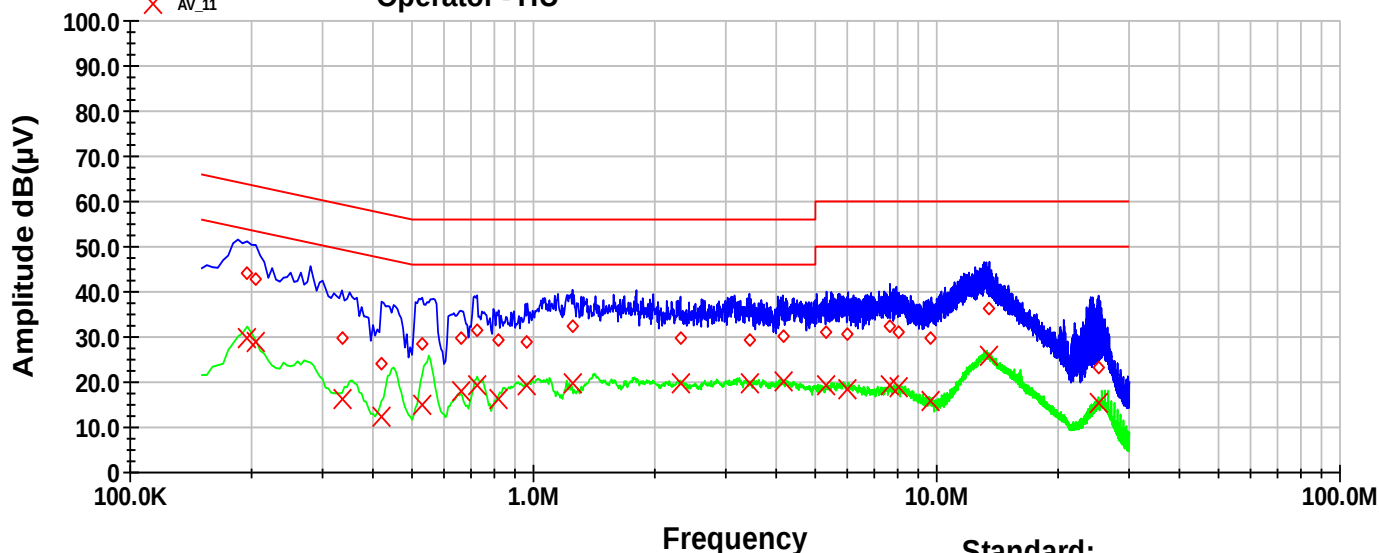
Test point: L1
Operation mode: Accu charging mode
Remarks: PHIHONG PSU
Date:
Tested by: Huber Markus

Result: passed

— LmtAVVoltage
— LmtQPVoltage
— Peak_11
— AVG_11
◇ QP_11
× AV_11

Equipment - XTEND MAX - DATAMARS
Serial No. - Beta - 019
Op Mode 1 - Charging Mode
Operator - HU

Peak Measurement
See Table for QP and AV values
L1 OM1



Standard:
File Number: T36613-00

Frequency MHz	QP Level dB(μV)	QP Margin dB	QP Limit dB	AV Level dB(μV)	AV Margin dB	AV Limit dB
0.195	44.3	-19.5	63.8	29.8	-24.0	53.8
0.205	42.7	-20.7	63.4	29.1	-24.3	53.4
0.335	30.0	-29.4	59.3	16.4	-32.9	49.3
0.42	24.3	-33.2	57.4	12.2	-35.2	47.4
0.53	28.3	-27.7	56.0	15.1	-30.9	46.0
0.66	29.9	-26.1	56.0	18.1	-27.9	46.0
0.725	31.5	-24.5	56.0	19.2	-26.8	46.0
0.82	29.5	-26.5	56.0	16.1	-29.9	46.0
0.965	28.9	-27.1	56.0	19.4	-26.6	46.0
1.25	32.4	-23.6	56.0	19.6	-26.4	46.0
2.315	29.8	-26.2	56.0	19.5	-26.5	46.0
3.43	29.4	-26.6	56.0	19.5	-26.5	46.0
4.15	30.1	-25.9	56.0	20.2	-25.8	46.0
5.33	31.2	-28.8	60.0	19.4	-30.6	50.0
6.03	30.8	-29.2	60.0	18.7	-31.3	50.0
7.65	32.2	-27.8	60.0	19.4	-30.6	50.0
8.055	31.3	-28.7	60.0	19.1	-30.9	50.0
9.695	29.8	-30.2	60.0	15.8	-34.2	50.0
13.5	36.3	-23.7	60.0	25.8	-24.2	50.0
25.18	23.1	-36.9	60.0	15.4	-34.6	50.0

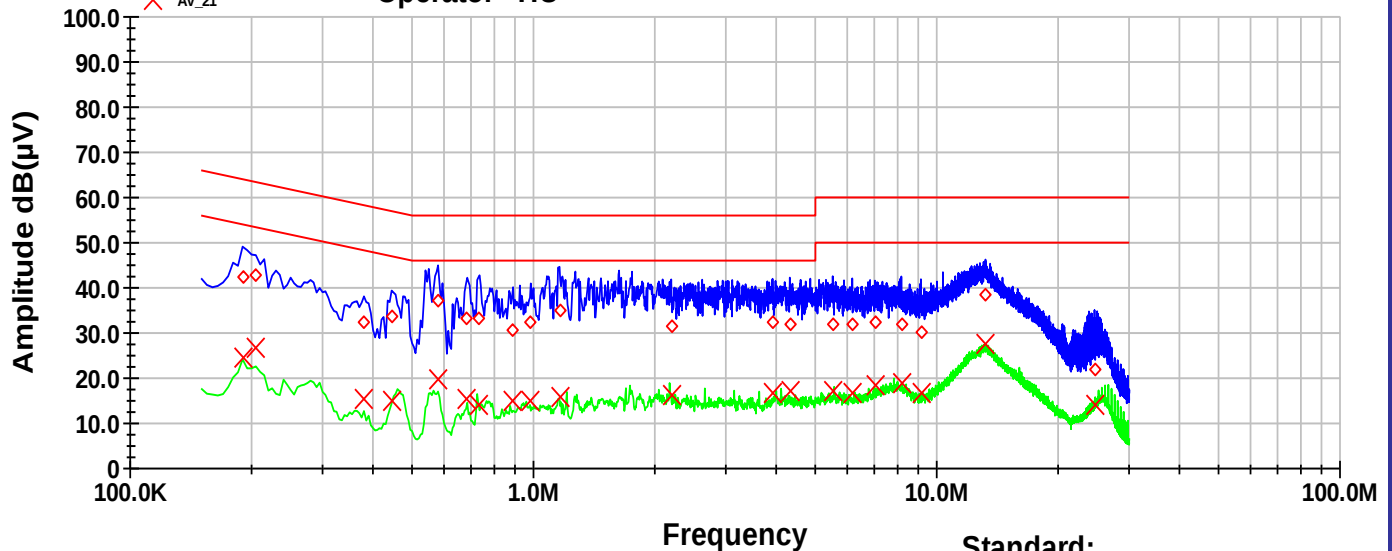
FCC ID: NDX-XTENDMAX

Test point: N
Operation mode: Accu charging mode
Remarks: PHIHONG PSU
Date:
Tested by: Huber Markus

Result: passed

Equipment - XTEND MAX - DATAMARS
Serial No. - Beta - 019
Op Mode 1 - Charging Mode
Operator - HU

Peak Measurement
See Table for QP and AV values
N OM1



Standard:
File Number: T36613-00

Frequency MHz	QP Level dB(μV)	QP Margin dB	QP Limit dB	AV Level dB(μV)	AV Margin dB	AV Limit dB
0.19	42.3	-21.7	64.0	24.8	-29.3	54.0
0.205	42.8	-20.6	63.4	26.9	-26.5	53.4
0.38	32.5	-25.7	58.3	15.2	-33.1	48.3
0.445	33.7	-23.3	57.0	15.1	-31.9	47.0
0.58	37.4	-18.6	56.0	20.0	-26.0	46.0
0.685	33.1	-22.9	56.0	15.6	-30.4	46.0
0.735	33.3	-22.7	56.0	14.1	-32.0	46.0
0.89	30.8	-25.3	56.0	15.0	-31.0	46.0
0.985	32.3	-23.7	56.0	14.9	-31.1	46.0
1.16	35.0	-21.0	56.0	16.0	-30.0	46.0
2.195	31.5	-24.5	56.0	16.5	-29.5	46.0
3.915	32.5	-23.5	56.0	16.8	-29.2	46.0
4.32	31.8	-24.2	56.0	17.0	-29.0	46.0
5.52	32.0	-28.0	60.0	17.1	-32.9	50.0
6.17	32.1	-27.9	60.0	16.9	-33.1	50.0
7.025	32.1	-27.9	60.0	18.4	-31.6	50.0
8.165	32.0	-28.0	60.0	19.0	-31.0	50.0
9.13	30.0	-30.0	60.0	16.6	-33.4	50.0
13.205	38.5	-21.5	60.0	27.5	-22.5	50.0
24.6	21.9	-38.1	60.0	14.0	-36.0	50.0

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5.2 Field strength of the fundamental wave

For test instruments and accessories used see section 6 Part CPR 1.

5.2.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.2.2 Photo documentation of the test set-up



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5.2.1 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the effective field strength limits.

5.2.2 Description of Measurement

The spurious emissions of the EUT have to be measured at an open area test site in the frequency range from 9 kHz to 1000 MHz using a tuned EMI receiver. The set up of the equipment under test will be in accordance with ANSI C63.4. The measurement has been performed at 3 m. The results have been compared to the limits defined at 30 m or 300 m distances according to FCC Part 15C, Section 15.31(f)(2) using an inverse linear distance extrapolation factor of 40 dB/decade. The final measurement has been performed with the EMI receiver using Quasi peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used, according to Section 15.209(d).

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

Example:

Frequency (MHz)	Level (dBμV)	+	Factor (dB)	=	Level dB(μV/m)	-	Limit dB(μV/m)	=	Delta (dB)
1.705	5	+	20	=	25	-	30	=	-5

5.2.3 Test result

Measurement distance: 3 m

Frequency (kHz)	Level PK (dBμV)	Level AV (dBμV)	Level QP (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level AV dB(μV/m)	Corrected Level QP dB(μV/m)	Limit AV dB(μV/m)	Delta (dB)
134.2	84.05	83.45	83.80	0.2	20	104.1	103.5	103.8	105.1	-1.6

Calculated value at distance: 300 m

Frequency (kHz)	Level PK (dBμV)	Level AV (dBμV)	Level QP (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level AV dB(μV/m)	Corrected Level QP dB(μV/m)	Limit AV dB(μV/m)	Delta (dB)
134.2	4.05	3.45	3.80	0.2	20	24.1	23.5	23.8	25.1	-1.6

Limit according to FCC Part 15C, Section 15.209(a):

Frequency (MHz)	Field strength of fundamental wave (μV/m)	dB(μV/m)	Measurement distance (metres)
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F (kHz)	--	30
1.705-30.0	30	29.5	30

The requirements are **FULFILLED**.

Remarks:

FCC ID: NDX-XTENDMAX**5.3 Spurious emissions (magnetic field) 9 kHz – 30 MHz**

For test instruments and accessories used see section 6 Part SER 1.

5.3.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.3.2 Photo documentation of the test set-up

FCC ID: NDX-XTENDMAX

5.3.3 Applicable standard

According to FCC Part 15C, Section 15.209:

The emissions from intentional radiators shall not exceed the effective field strength limits.

5.3.4 Description of Measurement

The spurious emissions of the EUT have to be measured at an open area test site in the frequency range from 9 kHz to 1000 MHz using a tuned EMI receiver. The set up of the equipment under test will be in accordance with ANSI C63.4. The measurement has been performed at 3 m. The results have been compared to the limits defined at 30 m or 300 m distances according to FCC Part 15C, Section 15.31(f)(2) using an inverse linear distance extrapolation factor of 40 dB/decade. The final measurement has been performed with the EMI receiver using Quasi peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used, according to Section 15.209(d).

The resolution bandwidth during the measurement is as follows:

9 kHz – 150 kHz: RBW: 200 Hz

150 kHz – 30 MHz: RBW: 9 kHz

Example:

Frequency (MHz)	Level (dBμV)	+	Factor (dB)	=	Level dB(μV/m)	-	Limit dB(μV/m)	=	Delta (dB)
1.705	5	+	20	=	25	-	30	=	-5

5.3.5 Test result

Measurement distance: 3 m

Frequency (MHz)	Level PK (dBμV)	Level AV (dBμV)	Level QP (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level AV dB(μV/m)	Corrected Level QP dB(μV/m)	Limit AV dB(μV/m)	Delta (dB)
0.268	54.1	37.5	41.9	9	20	74.1	57.5	61.9	95.5	-38.0

Calculated value at distance: 300m

Frequency (MHz)	Level PK (dBμV)	Level AV (dBμV)	Level QP (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level AV dB(μV/m)	Corrected Level QP dB(μV/m)	Limit AV dB(μV/m)	Delta (dB)
0.268	-25.9	-42.5	-38.1	9	20	-5.9	-22.5	-18.1	15.5	-38.0

Values at distance: 30m

Frequency (MHz)	Level PK (dBμV)	Level AV (dBμV)	Level QP (dBμV)	Band- width (kHz)	Correct. factor (dB)	Corrected Level PK dB(μV/m)	Corrected Level AV dB(μV/m)	Corrected Level QP dB(μV/m)	Limit dB(μV/m)	Delta (dB)
0.49 – 30.0				9	20				29.5	> 40

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Limit according to FCC Part 15 Subpart 15.209(a):

Frequency (MHz)	Field strength of spurious emissions		Measurement distance
	($\mu\text{V/m}$)	dB($\mu\text{V/m}$)	(metres)
0.009-0.490	2400/F(kHz)	--	300
0.490-1.705	24000/F (kHz)	--	30
1.705-30.0	30	29.5	30

The requirements are **FULFILLED**.

Remarks: All other unwanted emissions in the frequency range from 9 kHz to 30 MHz were
below < -10.5 dB $\mu\text{V/m}$.

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5.4 Emission Bandwidth

For test instruments and accessories used see section 6 Part MB.

5.4.1 Description of the test location

Test location: AREA4

5.4.2 Photo documentation of the test set-up



Fundamental [kHz] See Plot 1	20dB Bandwidth F1	20dB Bandwidth F2	Measured Bandwidth [kHz]
134.20	133.66	134.72	1.06

Remarks:

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5.4.3 Test protocol

Emission Bandwidth plots

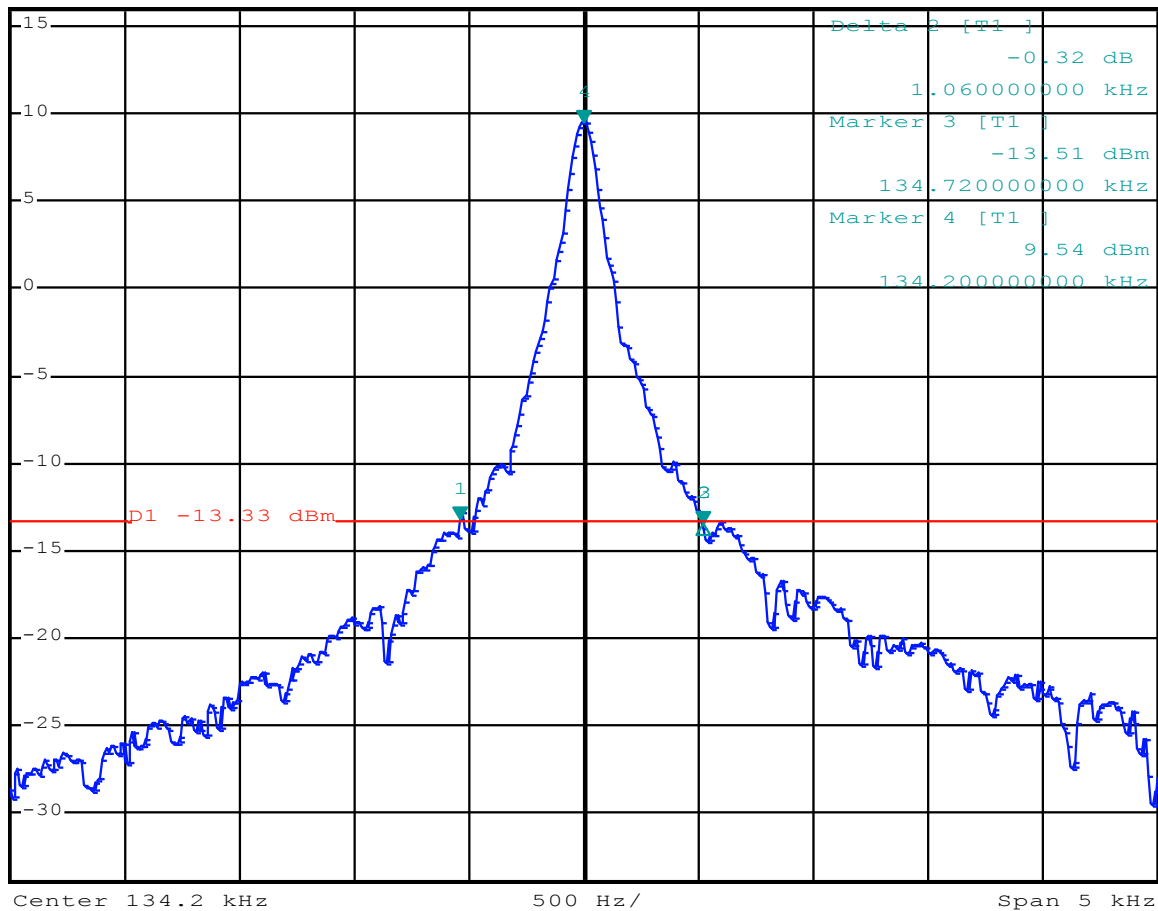


*RBW 100 Hz Marker 1 [T1]
VBW 300 Hz -13.20 dBm
SWT 600 ms 133.660000000 kHz

Ref 16 dBm

Att 50 dB

1 PK
MAXH



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6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	ESHS 30	02-02/03-05-002	11/07/2013	11/07/2012		
	ESH 2 - Z 5	02-02/20-05-004	12/05/2013	12/05/2012	23/07/2013	23/01/2013
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155			02/04/2013	02/10/2012
	SP 103 /3.5-60	02-02/50-05-182				
CPR 1	FMZB 1516	01-02/24-01-018			16/02/2013	16/02/2012
	S10162-B	02-02/50-05-031				
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
MB	FSP 40	02-02/11-11-001	18/09/2013	18/09/2012		
	HFRAE 5161 _ 50kHz-120M	02-02/24-11-004				
	MetraHIT World	02-02/32-10-001	09/08/2013	09/08/2012		
	WK-340/40	02-02/45-05-001	31/05/2013	31/05/2012	09/02/2013	09/08/2012
	HM8143	02-02/50-10-016				
SER 1	FMZB 1516	01-02/24-01-018			16/02/2013	16/02/2012
	S10162-B	02-02/50-05-031				
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				