

Allegion

EMC TEST REPORT FOR

**MultiTech Reader
Model: MT11-485**

Tested To The Following Standard:

**FCC Part 15 Subpart C Section
15.225**

Report No.: 97092-2

Date of issue: May 28, 2015



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Allegion
500 Golden Ridge Road, Bldg 1, Suite 160
Golden, CO 80401

REPORT PREPARED BY:

Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

REPRESENTATIVE: Bryan Hoff
Customer Reference Number: 4052619

Project Number: 97092

DATE OF EQUIPMENT RECEIPT:

May 14, 2015

DATE(S) OF TESTING:

May 14-21, 2015

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

A handwritten signature in black ink that reads "Steve Behm".

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.02.00
Immunity	5.02.00

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Mariposa A	US0103	SL2-IN-E-1147R	3082A-2	90477	A-0136

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Test Procedure	Description	Modifications*	Results
15.207	Conducted Emissions	NA	Pass
15.225 (a) – (d)	Field Strength of Spurious Emissions and Mask	NA	Pass

Modifications* During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

*Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
The EUT was previously tested and passed compliance testing. Since the time of testing the PCBs were built with a thinner PCB layer stack up which caused the EUT not to read cards. In order to read the cards the impedance tuning on the 13.56MHz antenna was altered by changing the capacitor values. This partial testing is to insure continued compliance.

EQUIPMENT UNDER TEST (EUT)

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
MultiTech Reader	Allegion	MT11-485	P2

Support Equipment:

Device	Manufacturer	Model #	S/N
Dual Tracking DC Power Supply	Topward Electronic Instruments CO. LTD.	4303	918520

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
MultiTech Reader	Allegion	MT11-485	P3

Support Equipment:

Device	Manufacturer	Model #	S/N
Dual Tracking DC Power Supply	Topward Electronic Instruments CO. LTD.	4303	918520

FCC PART 15 SUBPART C

15.207 AC Conducted Emissions

Test Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • (209) 966-5240
 Customer: **Allegion**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **97092** Date: 5/14/2015
 Test Type: **Conducted Emissions** Time: 1:39:04 PM
 Tested By: Eddie Mariscal Sequence#: 1
 Software: EMITest 5.02.00 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The EUT is placed in a continuous operation mode.
A dummy load is installed in place of the transmit antenna.
 A support AC-DC power supply is used to supply the EUT with 12VDC.
 The measurement is taken at the input to the power supply.

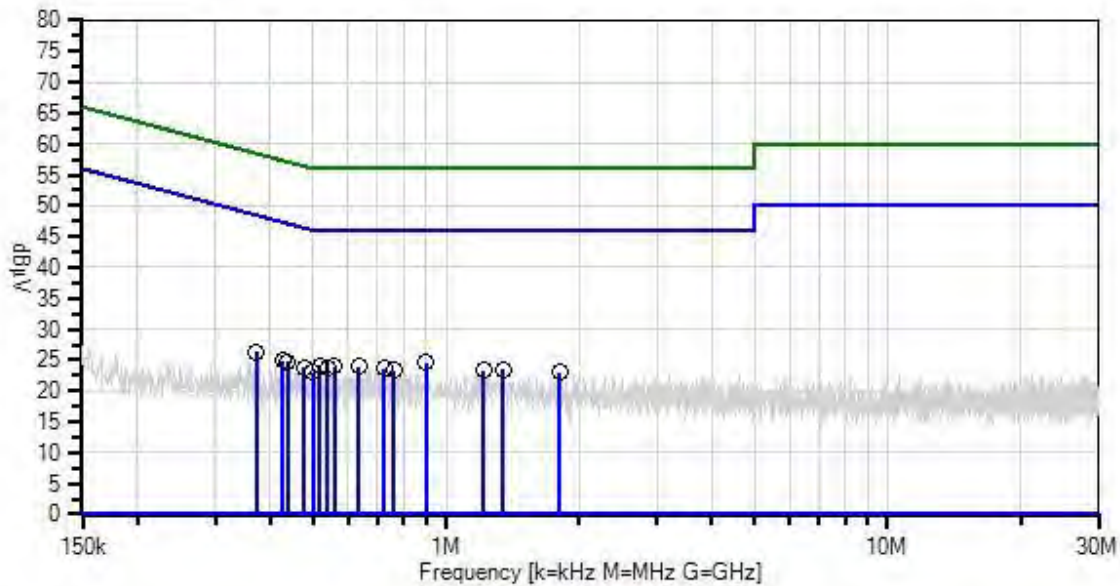
This measurement was made to ensure compliance within the operating frequency range in accordance with KDB 174176 D01.

Tested in accordance with ANSI C63.4 (2009).

Frequency Range of Interest: 0.15-30MHz
 RBW = 9kHz; VBW > RBW

Environmental Conditions:
 Temperature = 19°C
 Relative Humidity = 42%
 Atmospheric Pressure = 97.8kPa

CKC Laboratories, Inc. Date: 5/14/2015 Time: 1:39:04 PM Allegion WO#: 97092
15.207 AC Mains - Average Test Lead: Black 120V 60Hz Sequence#: 1 Ext ATTN: 0 dB



— Sweep Data	— Readings	○ Peak Readings
x QP Readings	* Average Readings	▼ Ambient
Software Version: 5.02.00	— 1 - 15.207 AC Mains - Average	— 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	8/4/2014	8/4/2015
T1	AN02609	High Pass Filter	HE9615-150K-50-720B	3/25/2014	3/25/2016
T2	ANMACOND	Cable		8/26/2014	8/26/2016
T3	ANP06770	Attenuator	PE7010-10	1/15/2015	1/15/2017
T4	AN00374	50uH LISN-Black (dB)	8028-TS-50-BNC	2/4/2015	2/4/2016
	AN00374	50uH LISN-White (dB)	8028-TS-50-BNC	2/4/2015	2/4/2016

Measurement Data:

Reading listed by margin.

Test Lead: Black

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	902.721k	14.2	+0.2	+0.1	+10.1	+0.0	+0.0	24.6	46.0	-21.4	Black
2	518.693k	13.6	+0.2	+0.1	+10.1	+0.0	+0.0	24.0	46.0	-22.0	Black
3	559.416k	13.6	+0.2	+0.1	+10.1	+0.0	+0.0	24.0	46.0	-22.0	Black
4	632.864k	13.5	+0.2	+0.1	+10.1	+0.0	+0.0	23.9	46.0	-22.1	Black
5	371.797k	16.0	+0.1	+0.1	+10.1	+0.0	+0.0	26.3	48.5	-22.2	Black
6	539.782k	13.2	+0.2	+0.1	+10.1	+0.0	+0.0	23.6	46.0	-22.4	Black
7	725.219k	13.2	+0.2	+0.1	+10.1	+0.0	+0.0	23.6	46.0	-22.4	Black
8	436.519k	14.3	+0.2	+0.1	+10.1	+0.0	+0.0	24.7	47.1	-22.4	Black
9	426.338k	14.5	+0.2	+0.1	+10.1	+0.0	+0.0	24.9	47.3	-22.4	Black
10	1.345M	13.0	+0.2	+0.2	+10.1	+0.0	+0.0	23.5	46.0	-22.5	Black
11	477.969k	13.4	+0.2	+0.1	+10.1	+0.0	+0.0	23.8	46.4	-22.6	Black
12	760.125k	12.9	+0.2	+0.1	+10.1	+0.0	+0.0	23.3	46.0	-22.7	Black
13	1.213M	12.8	+0.2	+0.2	+10.1	+0.0	+0.0	23.3	46.0	-22.7	Black
14	500.513k	12.6	+0.2	+0.1	+10.1	+0.0	+0.0	23.0	46.0	-23.0	Black
15	1.804M	12.4	+0.2	+0.2	+10.1	+0.1	+0.0	23.0	46.0	-23.0	Black

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • (209) 966-5240
 Customer: **Allegion**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **97092** Date: 5/14/2015
 Test Type: **Conducted Emissions** Time: 1:41:48 PM
 Tested By: Eddie Mariscal Sequence#: 2
 Software: EMITest 5.02.00 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The EUT is placed in a continuous operation mode.
A dummy load is installed in place of the transmit antenna.
 A support AC-DC power supply is used to supply the EUT with 12VDC.
 The measurement is taken at the input to the power supply.

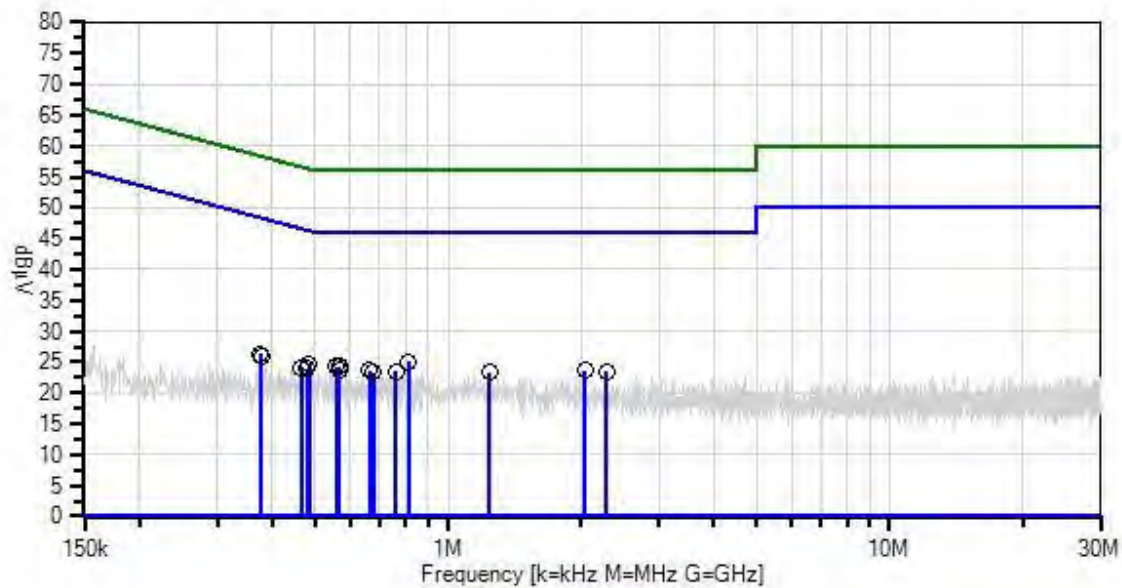
 This measurement was made to ensure compliance within the operating frequency range in accordance with KDB 174176 D01.

 Tested in accordance with ANSI C63.4 (2009).

 Frequency Range of Interest: 0.15-30MHz
 RBW = 9kHz; VBW > RBW

 Environmental Conditions:
 Temperature = 19°C
 Relative Humidity = 42%
 Atmospheric Pressure = 97.8kPa

CKC Laboratories, Inc. Date: 5/14/2015 Time: 1:41:48 PM Allegion W/O#: 97092
 15.207 AC Mains - Average Test Lead: White 120V 60Hz Sequence#: 2 Ext ATTN: 0 dB



— Sweep Data	— Readings	○ Peak Readings
x QP Readings	* Average Readings	▼ Ambient
Software Version: 5.02.00	— 1 - 15.207 AC Mains - Average	— 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	8/4/2014	8/4/2015
T1	AN02609	High Pass Filter	HE9615-150K-50-720B	3/25/2014	3/25/2016
T2	ANMACOND	Cable		8/26/2014	8/26/2016
T3	ANP06770	Attenuator	PE7010-10	1/15/2015	1/15/2017
	AN00374	50uH LISN-Black (dB)	8028-TS-50-BNC	2/4/2015	2/4/2016
T4	AN00374	50uH LISN-White (dB)	8028-TS-50-BNC	2/4/2015	2/4/2016

Measurement Data:

Reading listed by margin.

Test Lead: White

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	815.393k	14.5	+0.2	+0.1	+10.1	+0.1	+0.0	25.0	46.0	-21.0	White
2	483.787k	14.2	+0.2	+0.1	+10.1	+0.1	+0.0	24.7	46.3	-21.6	White
3	559.416k	13.8	+0.2	+0.1	+10.1	+0.1	+0.0	24.3	46.0	-21.7	White
4	568.143k	13.8	+0.2	+0.1	+10.1	+0.1	+0.0	24.3	46.0	-21.7	White
5	374.706k	15.9	+0.1	+0.1	+10.1	+0.1	+0.0	26.3	48.4	-22.1	White
6	565.961k	13.3	+0.2	+0.1	+10.1	+0.1	+0.0	23.8	46.0	-22.2	White
7	662.680k	13.2	+0.2	+0.1	+10.1	+0.1	+0.0	23.7	46.0	-22.3	White
8	2.038M	13.1	+0.1	+0.2	+10.1	+0.1	+0.0	23.6	46.0	-22.4	White
9	377.615k	15.4	+0.2	+0.1	+10.1	+0.1	+0.0	25.9	48.3	-22.4	White
10	478.697k	13.5	+0.2	+0.1	+10.1	+0.1	+0.0	24.0	46.4	-22.4	White
11	464.880k	13.6	+0.2	+0.1	+10.1	+0.1	+0.0	24.1	46.6	-22.5	White
12	761.580k	12.9	+0.2	+0.1	+10.1	+0.1	+0.0	23.4	46.0	-22.6	White
13	2.289M	12.9	+0.1	+0.2	+10.1	+0.1	+0.0	23.4	46.0	-22.6	White
14	677.951k	12.8	+0.2	+0.1	+10.1	+0.1	+0.0	23.3	46.0	-22.7	White
15	1.243M	12.8	+0.2	+0.1	+10.1	+0.1	+0.0	23.3	46.0	-22.7	White

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • (209) 966-5240
 Customer: **Allegion**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **97092** Date: 5/21/2015
 Test Type: **Conducted Emissions** Time: 3:17:19 PM
 Tested By: Eddie Mariscal Sequence#: 6
 Software: EMITest 5.02.00 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The EUT is placed in a continuous operation mode.
The EUT has an integral antenna installed.
 A support AC-DC power supply is used to supply the EUT with 12VDC.
 The measurement is taken at the input to the power supply.

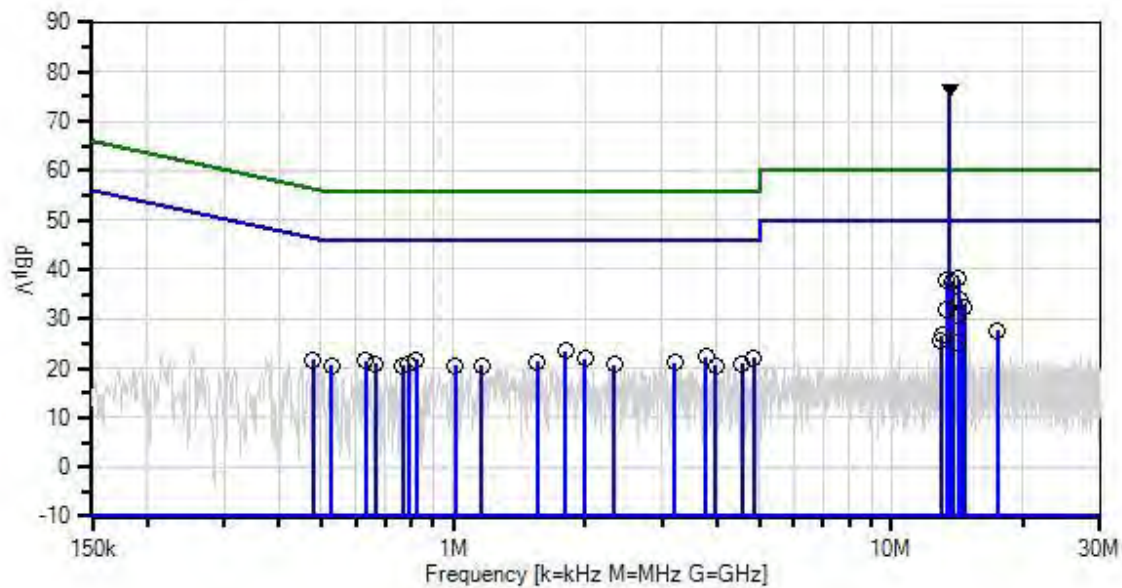
This measurement was made to ensure compliance outside of the operating frequency range in accordance with KDB 174176 D01. The fundamental emission can be disregarded.

Tested in accordance with ANSI C63.4 (2009).

Frequency Range of Interest: 0.15-30MHz
 RBW = 9kHz; VBW > RBW

Environmental Conditions:
 Temperature = 19°C
 Relative Humidity = 42%
 Atmospheric Pressure = 97.8kPa

CKC Laboratories, Inc. Date: 5/21/2015 Time: 3:17:19 PM Allegion WO#: 97092
 15.207 AC Mains - Average Test Lead: Black 120V 60Hz Sequence#: 6 Ext ATTN: 0 dB



Sweep Data
 x QP Readings
 Software Version: 5.02.00

Readings
 * Average Readings
 1 - 15.207 AC Mains - Average

Peak Readings
 Ambient
 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN02668	Spectrum Analyzer	E4446A	8/4/2014	8/4/2015
T2	AN02609	High Pass Filter	HE9615-150K-50-720B	3/25/2014	3/25/2016
T3	ANMACOND	Cable		8/26/2014	8/26/2016
T4	ANP06770	Attenuator	PE7010-10	1/15/2015	1/15/2017
T5	AN00374	50uH LISN-Black (dB)	8028-TS-50-BNC	2/4/2015	2/4/2016
	AN00374	50uH LISN-White (dB)	8028-TS-50-BNC	2/4/2015	2/4/2016

Measurement Data:

Reading listed by margin.

Test Lead: Black

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	13.562M Ambient	65.6	+0.0 +0.1	+0.1	+0.5	+10.1	+0.0	76.4	50.0	+26.4	Black
2	14.265M	27.3	+0.0 +0.2	+0.1	+0.5	+10.1	+0.0	38.2	50.0	-11.8	Black
3	13.400M	27.0	+0.0 +0.1	+0.1	+0.5	+10.1	+0.0	37.8	50.0	-12.2	Black
4	13.779M	26.5	+0.0 +0.2	+0.1	+0.5	+10.1	+0.0	37.4	50.0	-12.6	Black
5	14.382M	23.1	+0.0 +0.2	+0.1	+0.5	+10.1	+0.0	34.0	50.0	-16.0	Black
6	14.688M	21.3	+0.0 +0.2	+0.1	+0.6	+10.1	+0.0	32.3	50.0	-17.7	Black
7	13.373M	20.9	+0.0 +0.1	+0.1	+0.5	+10.1	+0.0	31.7	50.0	-18.3	Black
8	14.211M	20.0	+0.0 +0.2	+0.1	+0.5	+10.1	+0.0	30.9	50.0	-19.1	Black
9	17.481M	16.7	+0.0 +0.2	+0.1	+0.6	+10.1	+0.0	27.7	50.0	-22.3	Black
10	1.804M	12.8	+0.0 +0.1	+0.2	+0.2	+10.1	+0.0	23.4	46.0	-22.6	Black
11	13.058M	15.9	+0.0 +0.1	+0.1	+0.5	+10.1	+0.0	26.7	50.0	-23.3	Black
12	3.778M	11.8	+0.0 +0.1	+0.1	+0.3	+10.1	+0.0	22.4	46.0	-23.6	Black
13	4.841M	11.5	+0.0 +0.1	+0.1	+0.3	+10.1	+0.0	22.1	46.0	-23.9	Black
14	2.000M	11.4	+0.0 +0.1	+0.1	+0.2	+10.1	+0.0	21.9	46.0	-24.1	Black
15	823.392k	11.4	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	21.8	46.0	-24.2	Black
16	631.410k	11.2	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	21.6	46.0	-24.4	Black
17	12.950M	14.7	+0.0 +0.1	+0.1	+0.5	+10.1	+0.0	25.5	50.0	-24.5	Black

18	1.558M	10.9	+0.0 +0.0	+0.2	+0.2	+10.1	+0.0	21.4	46.0	-24.6	Black
19	477.969k	11.3	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	21.7	46.4	-24.7	Black
20	3.208M	10.6	+0.0 +0.1	+0.1	+0.2	+10.1	+0.0	21.1	46.0	-24.9	Black
21	792.850k	10.6	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	21.0	46.0	-25.0	Black
22	665.589k	10.6	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	21.0	46.0	-25.0	Black
23	14.238M	14.1	+0.0 +0.2	+0.1	+0.5	+10.1	+0.0	25.0	50.0	-25.0	Black
24	4.573M	10.4	+0.0 +0.1	+0.1	+0.3	+10.1	+0.0	21.0	46.0	-25.0	Black
25	2.327M	10.3	+0.0 +0.1	+0.1	+0.2	+10.1	+0.0	20.8	46.0	-25.2	Black
26	527.419k	10.2	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	20.6	46.0	-25.4	Black
27	1.013M	10.2	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	20.6	46.0	-25.4	Black
28	768.852k	10.1	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	20.5	46.0	-25.5	Black
29	1.162M	10.1	+0.0 +0.0	+0.2	+0.1	+10.1	+0.0	20.5	46.0	-25.5	Black
30	3.977M	9.9	+0.0 +0.1	+0.1	+0.3	+10.1	+0.0	20.5	46.0	-25.5	Black

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • (209) 966-5240
 Customer: **Allegion**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **97092** Date: 5/21/2015
 Test Type: **Conducted Emissions** Time: 3:28:32 PM
 Tested By: Eddie Mariscal Sequence#: 8
 Software: EMITest 5.02.00 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The EUT is placed in a continuous operation mode.
The EUT has an integral antenna installed.
 A support AC-DC power supply is used to supply the EUT with 12VDC.
 The measurement is taken at the input to the power supply.

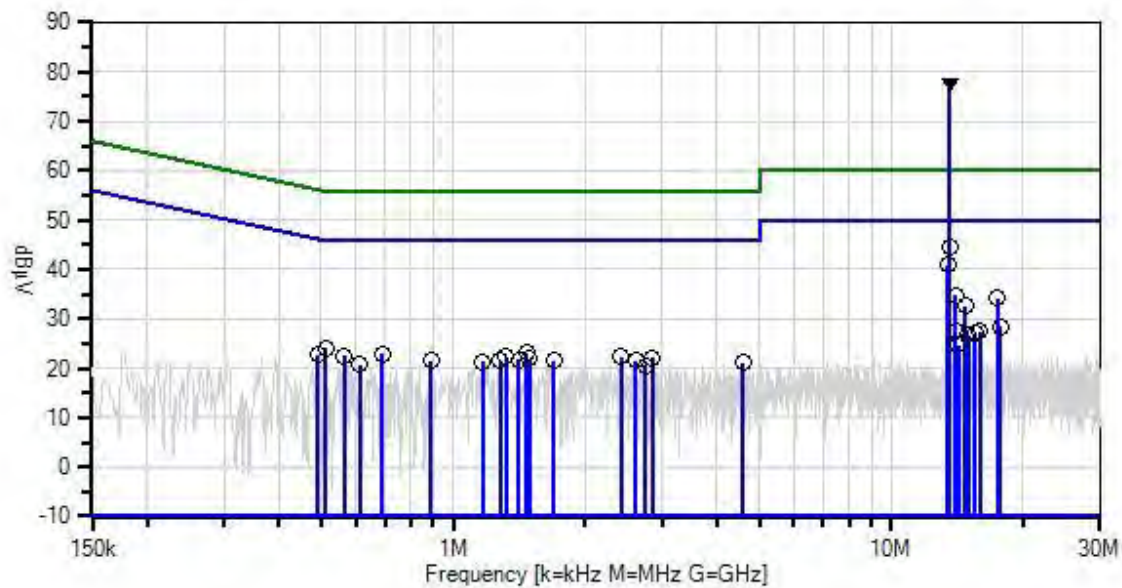
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 Tested in accordance with ANSI C63.4 (2009).

 Frequency Range of Interest: 0.15-30MHz
 RBW = 9kHz; VBW > RBW

 Environmental Conditions:
 Temperature = 19°C
 Relative Humidity = 42%
 Atmospheric Pressure = 97.8kPa

CKC Laboratories, Inc. Date: 5/21/2015 Time: 3:28:32 PM Allegion W/O#: 97092
15.207 AC Mains - Average Test Lead: White 120V 60Hz Sequence#: 8 Ext ATTN: 0 dB



— Sweep Data
x QP Readings
Software Version: 5.02.00

— Readings
* Average Readings
— 1 - 15.207 AC Mains - Average

○ Peak Readings
▼ Ambient
— 2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
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T2	AN02609	High Pass Filter	HE9615-150K-50-720B	3/25/2014	3/25/2016
T3	ANMACOND	Cable		8/26/2014	8/26/2016
T4	ANP06770	Attenuator	PE7010-10	1/15/2015	1/15/2017
	AN00374	50uH LISN-Black (dB)	8028-TS-50-BNC	2/4/2015	2/4/2016
T5	AN00374	50uH LISN-White (dB)	8028-TS-50-BNC	2/4/2015	2/4/2016

Measurement Data:

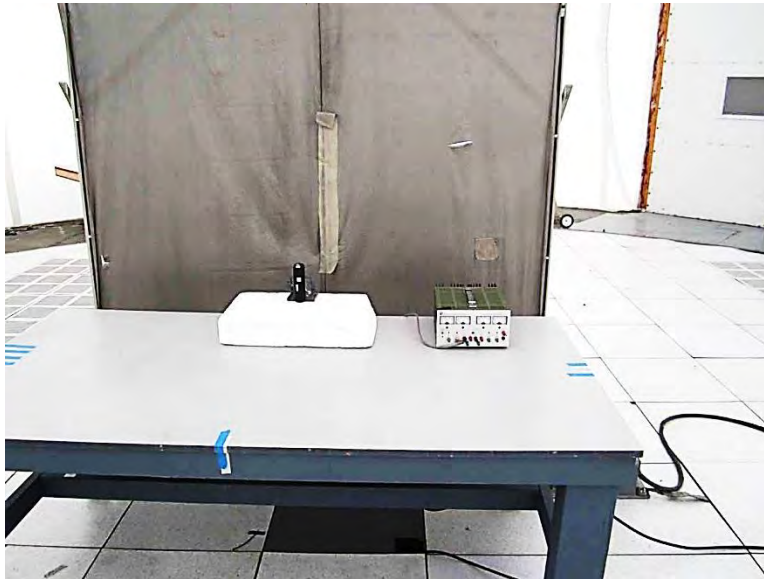
Reading listed by margin.

Test Lead: White

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV	dBμV	dB	Ant
1	13.562M Ambient	66.6	+0.0 +0.3	+0.1	+0.5	+10.1	+0.0	77.6	50.0	+27.6	White
2	13.589M	33.7	+0.0 +0.3	+0.1	+0.5	+10.1	+0.0	44.7	50.0	-5.3	White
3	13.445M	29.8	+0.0 +0.3	+0.1	+0.5	+10.1	+0.0	40.8	50.0	-9.2	White
4	13.986M	23.7	+0.0 +0.3	+0.1	+0.5	+10.1	+0.0	34.7	50.0	-15.3	White
5	17.481M	22.9	+0.0 +0.4	+0.1	+0.6	+10.1	+0.0	34.1	50.0	-15.9	White
6	14.761M	21.5	+0.0 +0.3	+0.1	+0.6	+10.1	+0.0	32.6	50.0	-17.4	White
7	17.734M	17.3	+0.0 +0.4	+0.1	+0.6	+10.1	+0.0	28.5	50.0	-21.5	White
8	511.421k	13.5	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	24.0	46.0	-22.0	White
9	14.013M	16.6	+0.0 +0.3	+0.1	+0.5	+10.1	+0.0	27.6	50.0	-22.4	White
10	15.950M	16.3	+0.0 +0.4	+0.1	+0.6	+10.1	+0.0	27.5	50.0	-22.5	White
11	1.468M	12.6	+0.0 +0.1	+0.2	+0.2	+10.1	+0.0	23.2	46.0	-22.8	White
12	15.499M	16.0	+0.0 +0.3	+0.1	+0.6	+10.1	+0.0	27.1	50.0	-22.9	White
13	690.314k	12.4	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	22.9	46.0	-23.1	White
14	491.059k	12.3	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	22.8	46.1	-23.3	White
15	14.995M	15.5	+0.0 +0.3	+0.1	+0.6	+10.1	+0.0	26.6	50.0	-23.4	White
16	565.234k	12.1	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	22.6	46.0	-23.4	White
17	1.319M	11.9	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	22.4	46.0	-23.6	White

18	2.412M	11.9	+0.0 +0.1	+0.1	+0.2	+10.1	+0.0	22.4	46.0	-23.6	White
19	2.855M	11.6	+0.0 +0.1	+0.1	+0.2	+10.1	+0.0	22.1	46.0	-23.9	White
20	1.494M	11.3	+0.0 +0.1	+0.2	+0.2	+10.1	+0.0	21.9	46.0	-24.1	White
21	1.413M	11.2	+0.0 +0.1	+0.2	+0.2	+10.1	+0.0	21.8	46.0	-24.2	White
22	1.281M	11.1	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	21.6	46.0	-24.4	White
23	1.698M	11.0	+0.0 +0.1	+0.2	+0.2	+10.1	+0.0	21.6	46.0	-24.4	White
24	2.617M	11.1	+0.0 +0.1	+0.1	+0.2	+10.1	+0.0	21.6	46.0	-24.4	White
25	889.963k	11.0	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	21.5	46.0	-24.5	White
26	1.166M	10.8	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	21.3	46.0	-24.7	White
27	4.577M	10.6	+0.0 +0.1	+0.1	+0.3	+10.1	+0.0	21.2	46.0	-24.8	White
28	613.230k	10.3	+0.0 +0.1	+0.2	+0.1	+10.1	+0.0	20.8	46.0	-25.2	White
29	14.220M	13.7	+0.0 +0.3	+0.1	+0.5	+10.1	+0.0	24.7	50.0	-25.3	White
30	2.753M	10.1	+0.0 +0.1	+0.1	+0.2	+10.1	+0.0	20.6	46.0	-25.4	White

Test Setup Photos



15.225 (a) – (d) Field Strength of Spurious Emissions and Mask

Test Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • (209) 966-5240
 Customer: **Allegion**
 Specification: **15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)**
 Work Order #: **97092** Date: 5/14/2015
 Test Type: **Maximized Emissions** Time: 10:42:57
 Tested By: Eddie Mariscal Sequence#: 1
 Software: EMITest 5.02.00

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The EUT is placed in a continuous operation mode.
 A card is presented to the EUT to ensure continuous transmission.
 A support AC-DC power supply is used to supply the EUT with 12VDC.

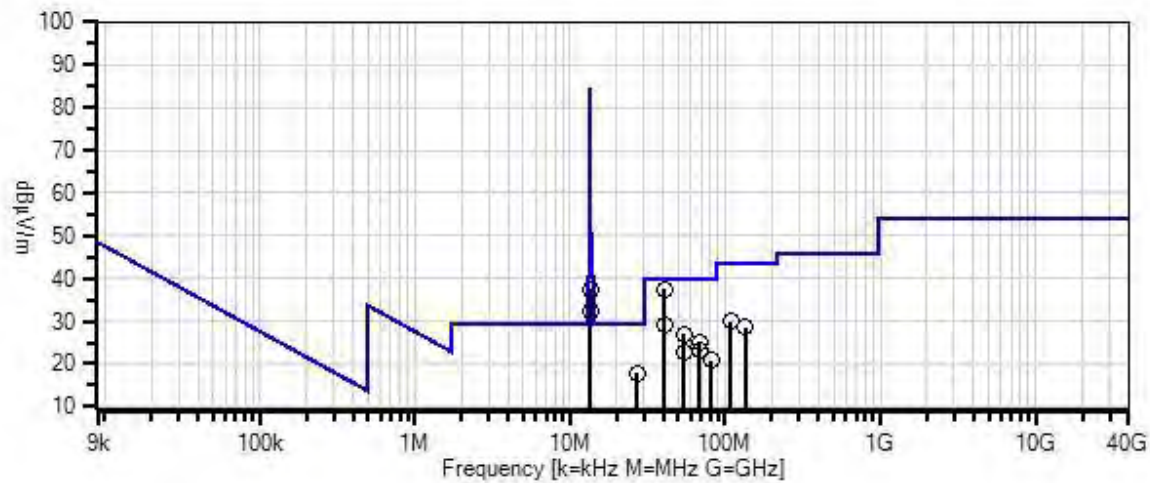
Tested in accordance with ANSI C63.4 (2009).

Frequency Range Investigated: Fundamental and Harmonics
 9kHz-30MHz: RBW = 9kHz; VBW > RBW
 30MHz-1000MHz: RBW = 120kHz; VBW > RBW

Environmental Conditions:

Temperature = 19°C
 Relative Humidity = 42%
 Atmospheric Pressure = 97.8kPa

CKC Laboratories, Inc. Date: 5/14/2015 Time: 10:42:57 Allegion WO#: 97092
 15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter) Test Distance: 10 Meters Sequence#: 1 Ext
 ATTN: 0 dB



- Readings
- Peak Readings
- × QP Readings
- * Average Readings
- ▼ Ambient
- Software Version: 5.02.00
- 1 - 15.225 Carrier and Spurious Emissions (13.110-14.010 MHz Transmitter)

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	AN00226	Loop Antenna	6502	3/28/2014	3/28/2016
T2	ANMACOND	Cable		8/26/2014	8/26/2016
T3	ANP06228	Cable	CXTA04A-100	9/5/2014	9/5/2016
T4	AN02668	Spectrum Analyzer	E4446A	8/4/2014	8/4/2015
T5	AN01991	Biconilog Antenna	CBL6111C	3/7/2014	3/7/2016
T6	ANMA10M	Cable		8/26/2014	8/26/2016
T7	AN00449	Preamp-Bottom Amp (dB)	8447F	4/7/2014	4/7/2016

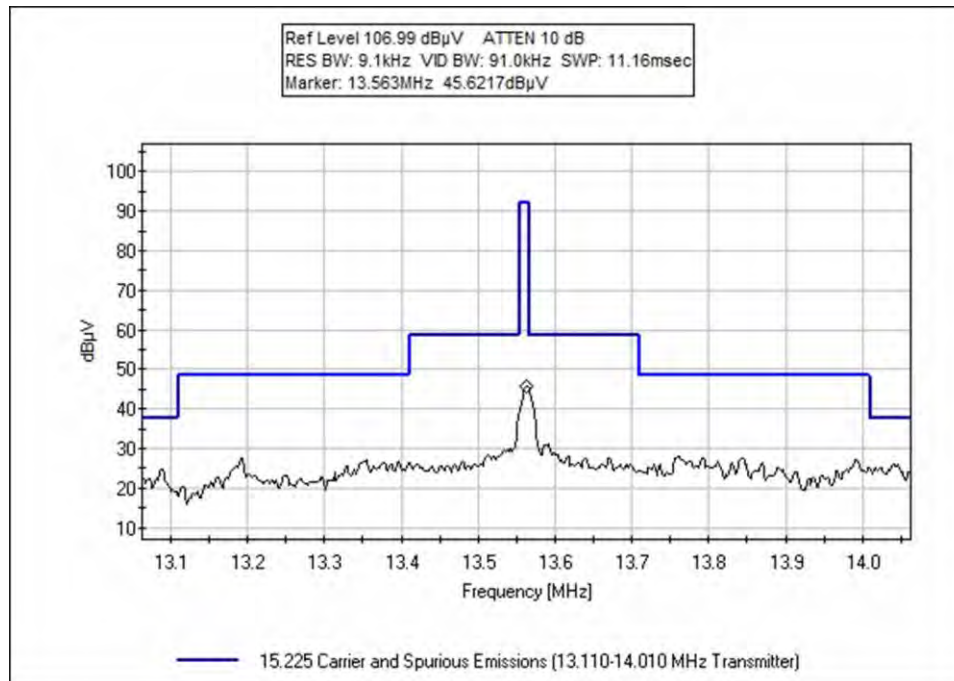
Measurement Data:

Reading listed by margin.

Test Distance: 10 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	40.696M	34.1	+0.0 +13.7	+0.0 +1.5	+0.0 -22.3	+0.0	+10.5	37.5	40.0	-2.5	Vert
2	40.695M	25.9	+0.0 +13.7	+0.0 +1.5	+0.0 -22.3	+0.0	+10.5	29.3	40.0	-10.7	Horiz
3	27.086M	27.8	+7.2 +0.0	+0.8 +0.0	+1.1 +0.0	+0.0	-19.1	17.8	29.5	-11.7	Paral
4	54.260M	29.5	+0.0 +7.5	+0.0 +1.8	+0.0 -22.3	+0.0	+10.5	27.0	40.0	-13.0	Vert
5	108.520M	28.2	+0.0 +10.8	+0.0 +2.7	+0.0 -22.2	+0.0	+10.5	30.0	43.5	-13.5	Vert
6	135.651M	25.7	+0.0 +11.6	+0.0 +3.1	+0.0 -22.3	+0.0	+10.5	28.6	43.5	-14.9	Horiz
7	67.825M	28.7	+0.0 +6.2	+0.0 +2.0	+0.0 -22.3	+0.0	+10.5	25.1	40.0	-14.9	Horiz
8	67.825M	27.0	+0.0 +6.2	+0.0 +2.0	+0.0 -22.3	+0.0	+10.5	23.4	40.0	-16.6	Vert
9	54.260M	25.3	+0.0 +7.5	+0.0 +1.8	+0.0 -22.3	+0.0	+10.5	22.8	40.0	-17.2	Horiz
10	81.390M	22.7	+0.0 +7.6	+0.0 +2.3	+0.0 -22.3	+0.0	+10.5	20.8	40.0	-19.2	Horiz
11	13.563M	45.6	+9.7 +0.0	+0.5 +0.0	+0.7 +0.0	+0.0	-19.1	37.4	84.0	-46.6	Paral
12	13.563M	40.6	+9.7 +0.0	+0.5 +0.0	+0.7 +0.0	+0.0	-19.1	32.4	84.0	-51.6	Perpe

Emissions Mask



Test Setup Photo



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBμV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBμV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.