

Radio test report

20103163304 - Rev. 1.0

based on:
FCC part 15; subpart C; section 15.231e
(10-1-09 edition)

IntelliCap
MediMetrics
358iD220

Contents

MAIN MODULE.....	3
1.....INTRODUCTION	3
2.....PRODUCT	4
3.....TEST SCHEDULE	4
4.....PRODUCT DOCUMENTATION.....	5
5.....OBSERVATIONS AND COMMENTS	5
6.....MODIFICATIONS TO THE SAMPLE	5
7.....SUMMARY.....	5
8.....CONCLUSIONS	6
TEST RESULTS MODULE.....	7
1.....EMISSION TESTS	7
1.1 Field strength of radiated emissions of unintentional radiators.....	7
1.2 Field strength of radiated emissions of intentional radiators.....	11
1.3 Transmission time	19
1.4 Occupied bandwidth	21
USED TEST EQUIPMENT MODULE.....	22
REVISION HISTORY	23

This report comprises of three modules. The total number of pages is: 23

Main module

1 Introduction

This report contains the result of tests performed by:

Telefication B.V.
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:2005. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L021 and is granted on 30 November 1990 by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie). The contents of this test report, if reproduced, shall be copied in full, unless special consent in writing for reproduction in part is granted by Telefication. Copyright of this test report is reserved to Telefication.

Ordering party:

Company name	:	Medimetrics
Address	:	High Tech Campus 34 (WB2 053)
Zipcode	:	5656 AE
City/town	:	Eindhoven
Country	:	The Netherlands
Date of order	:	9 February 2010

2 Product

A sample of the following product was submitted for testing:

Product description	:	Short Range Device
Manufacturer	:	MediMetrics
Trade mark	:	IntelliCap
Type designation	:	358iD220
FCC ID	:	YDVINTELLICAP-CI
Hardware version	:	2.0.2
Serial number	:	--
Software release	:	2.0.2.2308

3 Test schedule

Tests were carried out in accordance with the specification detailed in chapter 7 “Summary” of this report.

Tests were carried out at the following location:

- Telefication, Zevenaar

The sample of the product was received on:

- 10 February 2010

Tests were carried out between the following dates:

- 10 February and 30 April 2010

4 Product documentation

For production of this report the following product documentation was used:

Description:	Date:	Identification:
Bill Of Materials	2010-04-14	iPill_BOM.pdf
Circuit diagram	2010-04-14	iPill_circuit.pdf
PCB layout	2010-04-14	iPill_flexPCB.pdf
Technical file	2010-04-14	iPill_Mar2010_tech.pdf
CommunicationProtocols	2010-04-14	iPS-090032 Communication Protocols.pdf

The fore mentioned documentation would be filed at Telefication for a period of 10 years following the issue of this report.

5 Observations and comments

In order to facilitate testing of fundamental and spurious emissions a sample modified for continuous transmitting was provided by the applicant. All other tests are performed with the (unmodified) automatically operating sample.

Because the electrical capacity of the internal battery is very small, an external battery was attached to the sample.

6 Modifications to the sample

No modifications were made to the sample.

7 Summary

The product is intended for use in the following application area(s):

- PART 15 DATA TRANSMISSION

The sample was tested according to the following specification(s):

- FCC part 15; subpart C; section 15.231e (10-1-09 edition)

8 Conclusions

The sample of the product showed **NO NON-COMPLIANCES** to the specification stated in chapter 7 of this report.

The results of the tests as stated in this report, are exclusively applicable to the product item as identified in this report. Telefication accepts no responsibility for any stated properties of product items in this test report, which are not supported by the tests as specified in chapter 7 "*Summary*".

All tests are performed by:

name : ing. J.C. le Clercq

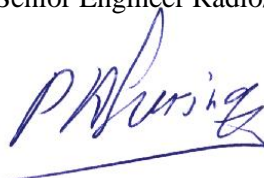
function : Test Engineer

signature : 

Review of test report by:

name : ing. P.A. Suringa

function : Senior Engineer Radio/EMC


signature : 

The above conclusions have been verified by the following signatory:

Date : 28 April 2011

name : ing. A. van der Valk

function : Co-ordinator Test Group

signature : 

Test results module

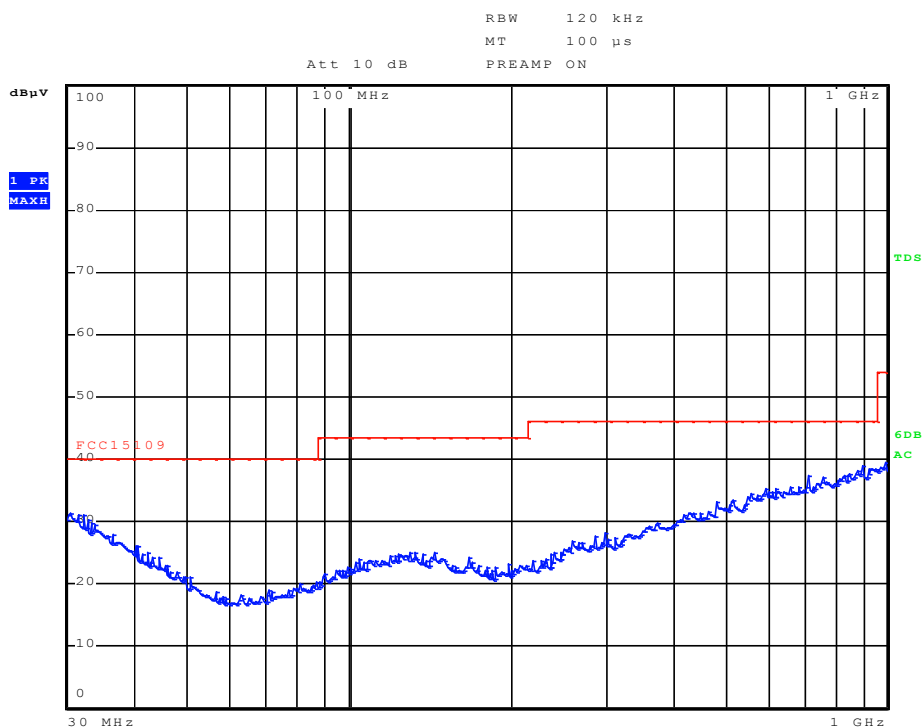
1 Emission tests

1.1 Field strength of radiated emissions of unintentional radiators

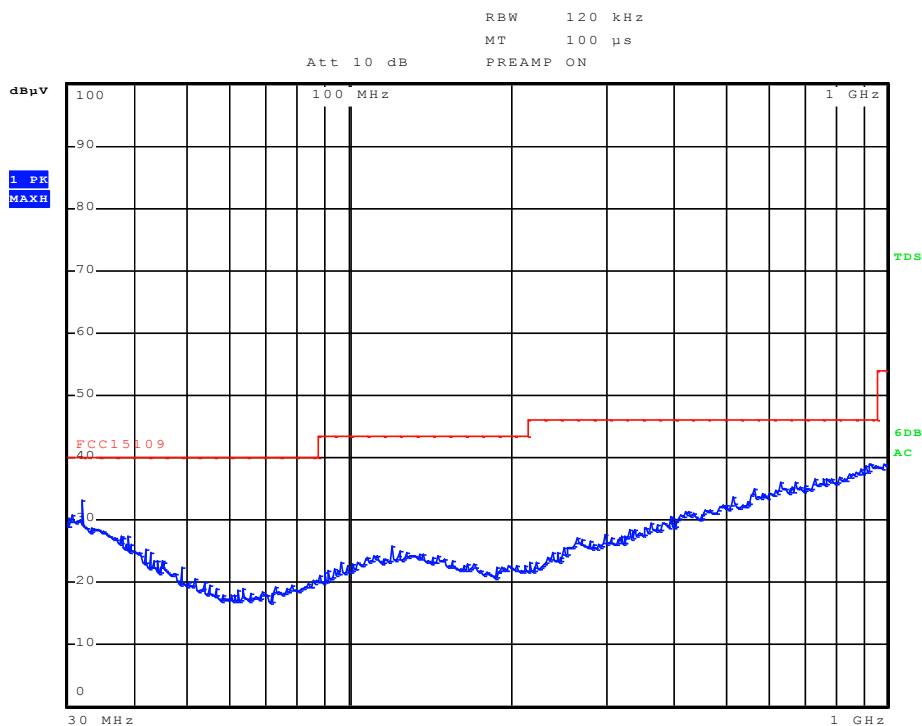
Compliance standard : FCC part 15, subpart B, section 15.109 (a).
Method of test : ANSI C63.4-2003, sections 5.4, 5.5, 8.2.3, 8.2.4 & 8.3.1.2; annex H.4
FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.
EUT condition : Continuously receiving
Test results :

Receiver : operating

Vertical polarization 0.03 – 1 GHz



Horizontal polarization: 0.03 - 1 GHz



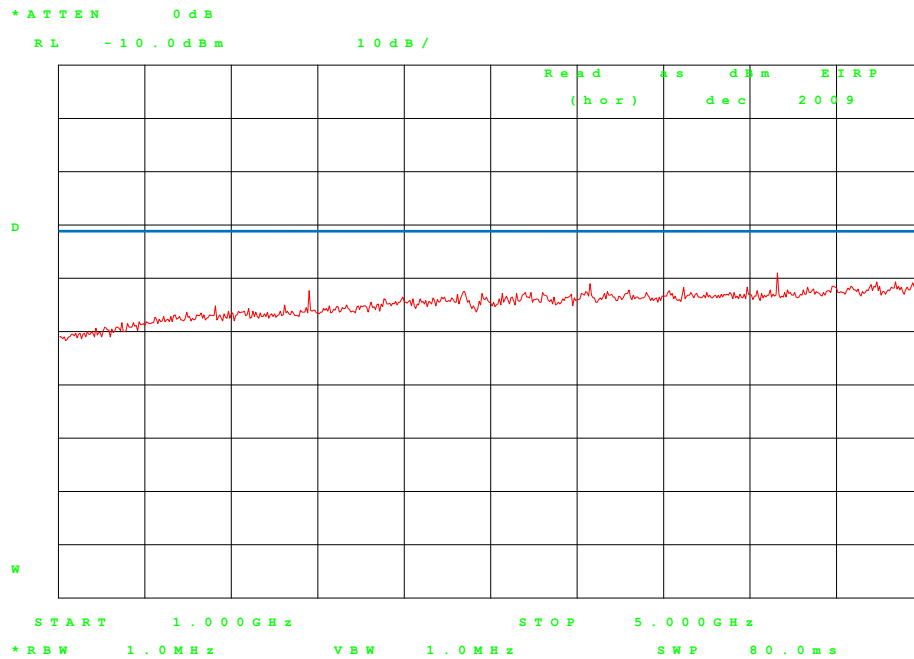
Measurement uncertainty	Horizontal polarization	
	30 – 200 MHz	4.5 dB
	200 – 1000 MHz	3.6 dB
	Vertical polarization	
	30 – 200 MHz	5.4 dB
	200 – 1000 MHz	4.6 dB

Limit	See plot
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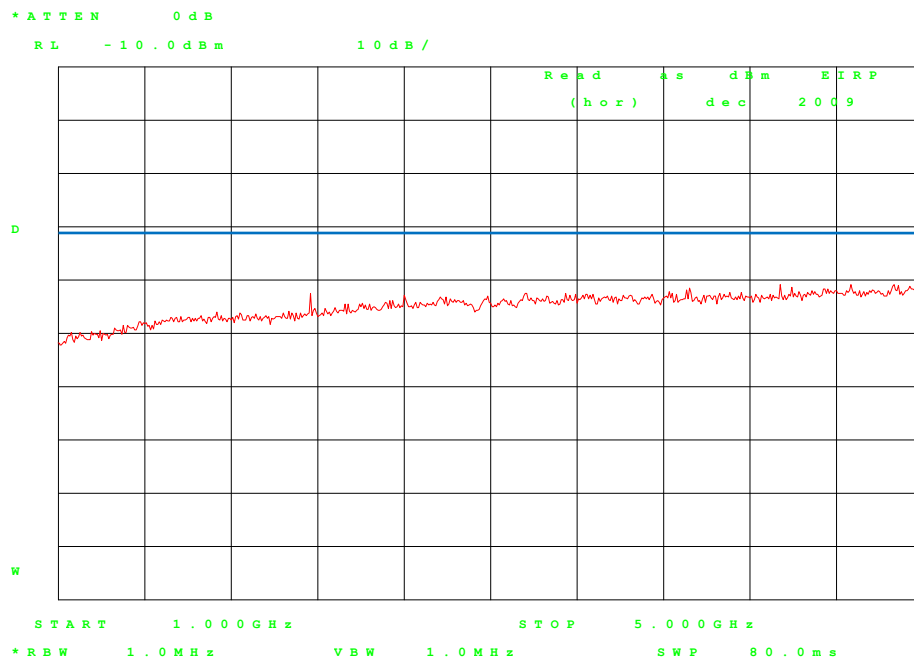
Measurement equipment used (item numbers refer to section “used test equipment”)	1, 2, 3, 4
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Receiver : operating

Vertical polarization 1-5 GHz



Horizontal polarization 1- 5 GHz

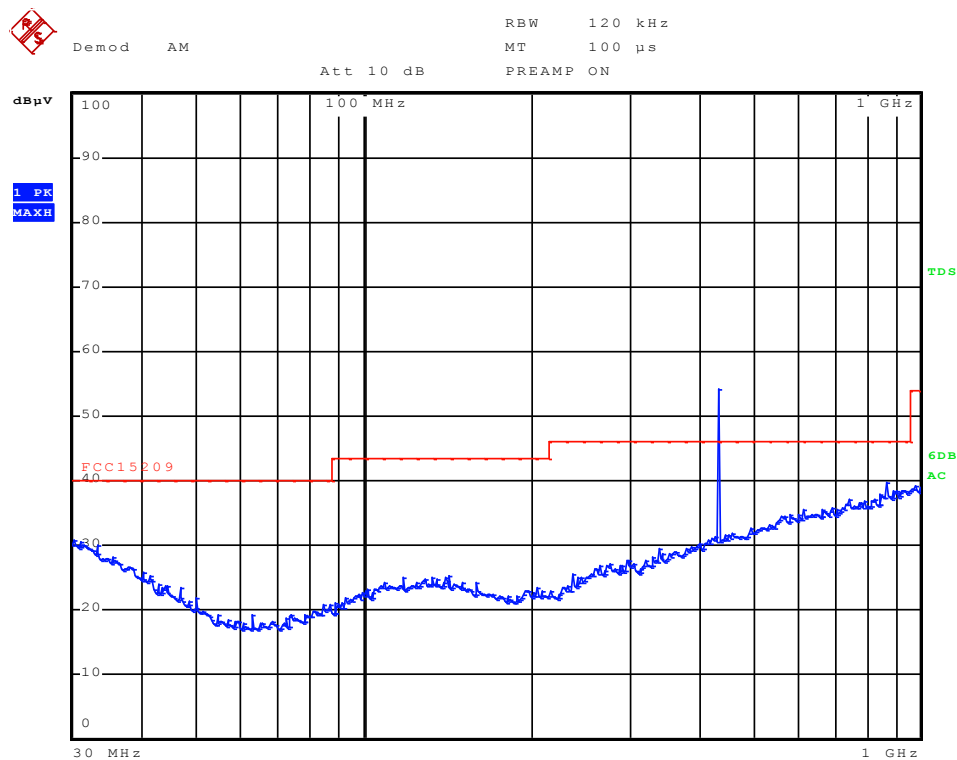


Measurement uncertainty	+4.5 /-6.1 dB
Limit	$\leq 500 \mu\text{V/m}$ (54 dB $\mu\text{V/m}$) which corresponds with -41.2 dBm e.i.r.p. @ 3 meter distance in a full anechoic test chamber.
Measurement equipment used (item numbers refer to section "used test equipment")	5, 6, 8, 10, 11, 12, 13

1.2 Field strength of radiated emissions of intentional radiators

Compliance standard	:	FCC part 15, subpart C, section 15.231 (e).
Method of test	:	ANSI C63.4-2003, sections 5.4, 5.5, 8.2.3, 8.2.4 & 8.3.1.2; annex H.4
EUT condition	:	FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.
Test results	:	Continuously transmitting
<i>Transmitter</i>	:	<i>operating on Channel 1, 433.2 MHz</i>
<i>Modulation</i>	:	<i>present</i>

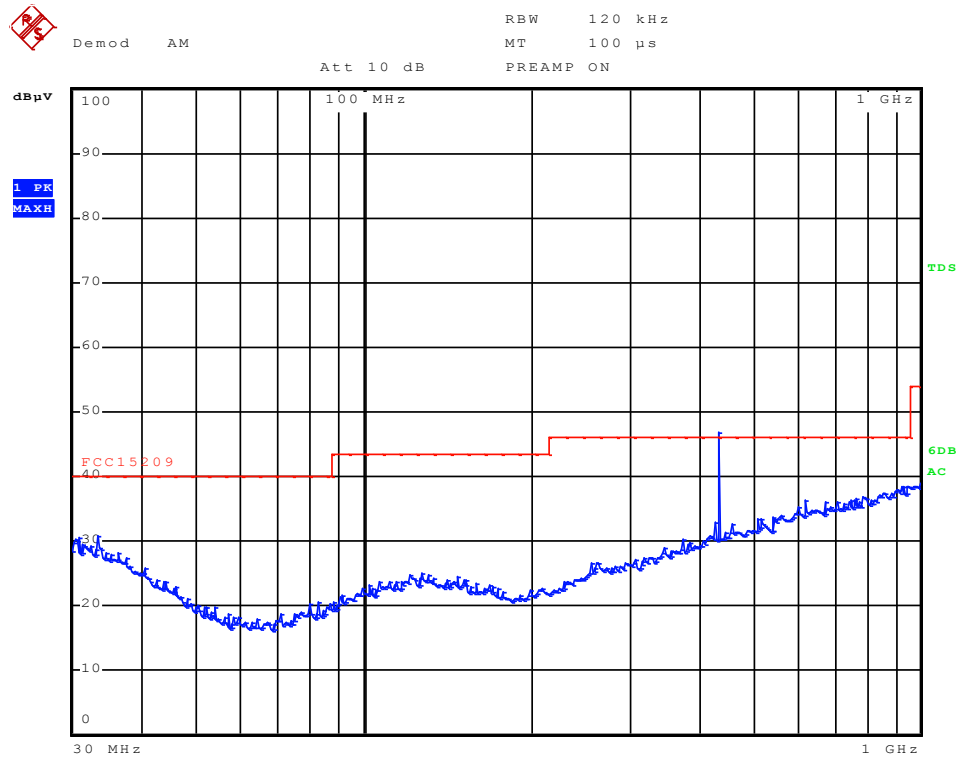
Vertical polarization 0.03 – 1 GHz



Remark:

The intentional signal on 433.2 MHz is not subject to the spurious limit of section 15.209

Horizontal polarization: 0.03 - 1 GHz

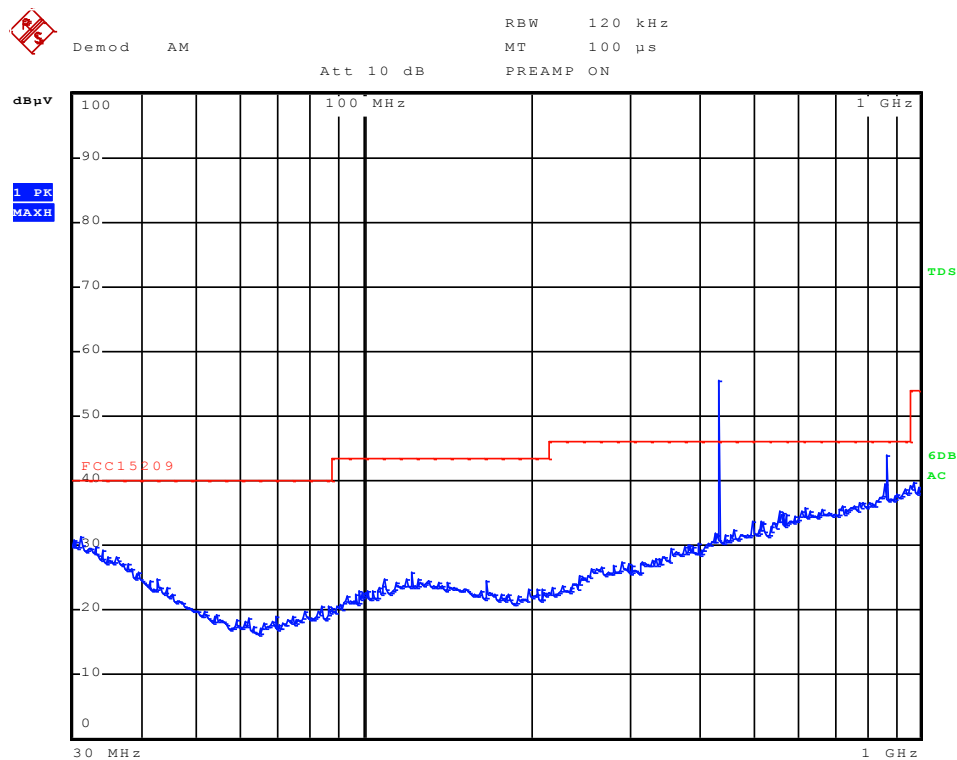


Remark:

The intentional signal on 433.2 MHz is not subject to the spurious limit of section 15.209

Transmitter: operating on Channel 5, 434.6 MHz
Modulation: present

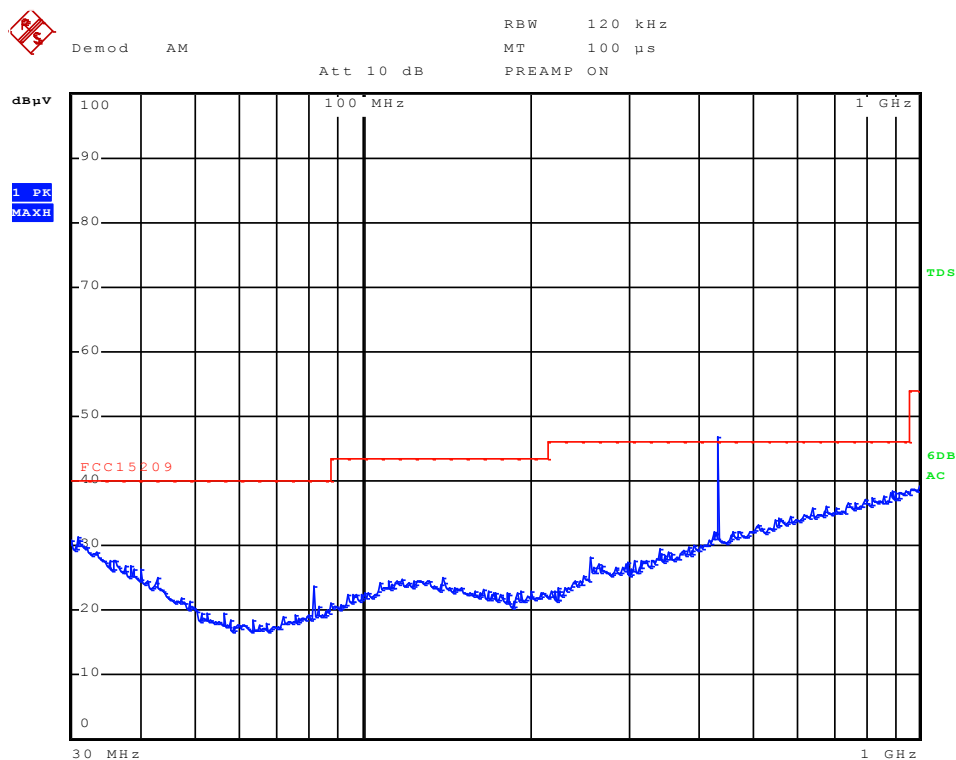
Vertical polarization 0.03 – 1 GHz



Remark:

The intentional signal on 434.6MHz is not subject to the spurious limit of section 15.209

Horizontal polarization: 0.03 - 1 GHz



Remark:

The intentional signal on 434.6 MHz is not subject to the spurious limit of section 15.209

Frequency (MHz)	Detector	Level dBμV/m	Limit* dBμV/m
433.2	QP	55.3	72.8
866.4	QP	37.9	52.8
434.6	QP	56.5	72.9
869.2	QP	40.7	52.9

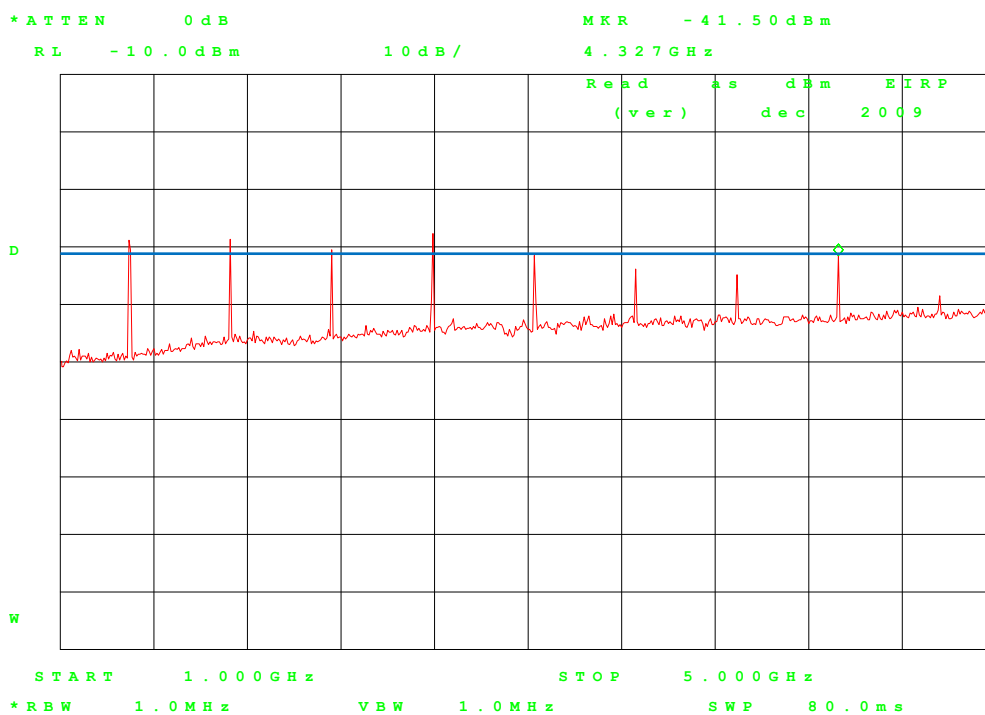
*) Limits according to par. 15.231e

Measurement uncertainty	Horizontal polarization	
	30 – 200 MHz	4.5 dB
	200 – 1000 MHz	3.6 dB
	Vertical polarization	
	30 – 200 MHz	5.4 dB
	200 – 1000 MHz	4.6 dB

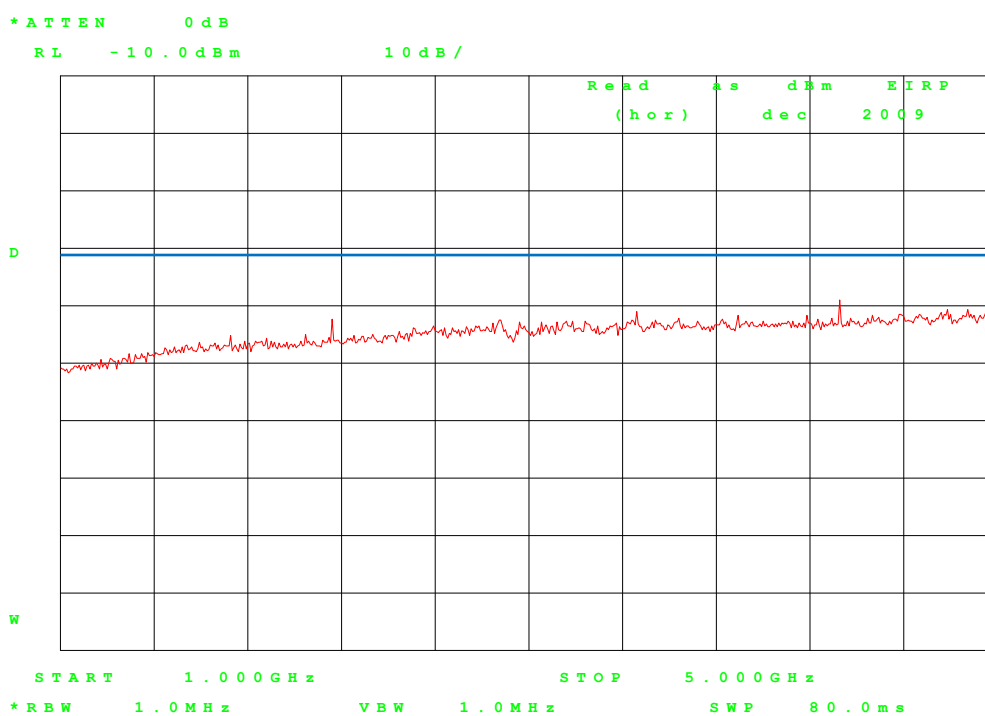
Measurement equipment used (item numbers refer to section “used test equipment”)	1, 2, 3, 4
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Transmitter: operating on Channel 1, 433.2 MHz
Modulation: present

Vertical polarization 1-5 GHz

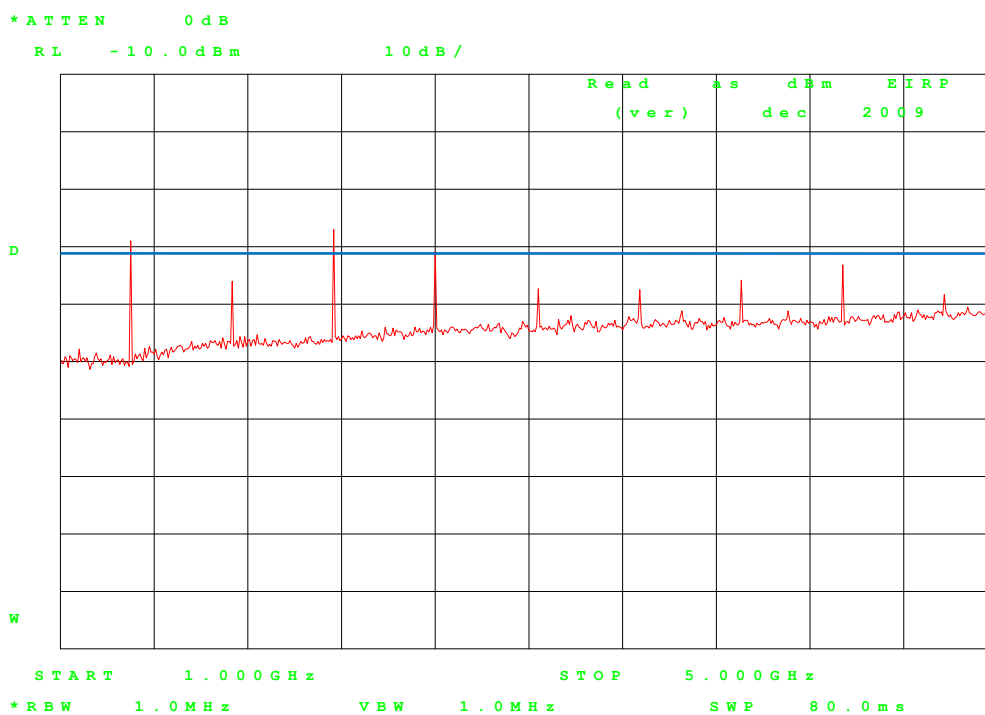


Horizontal polarization 1- 5 GHz

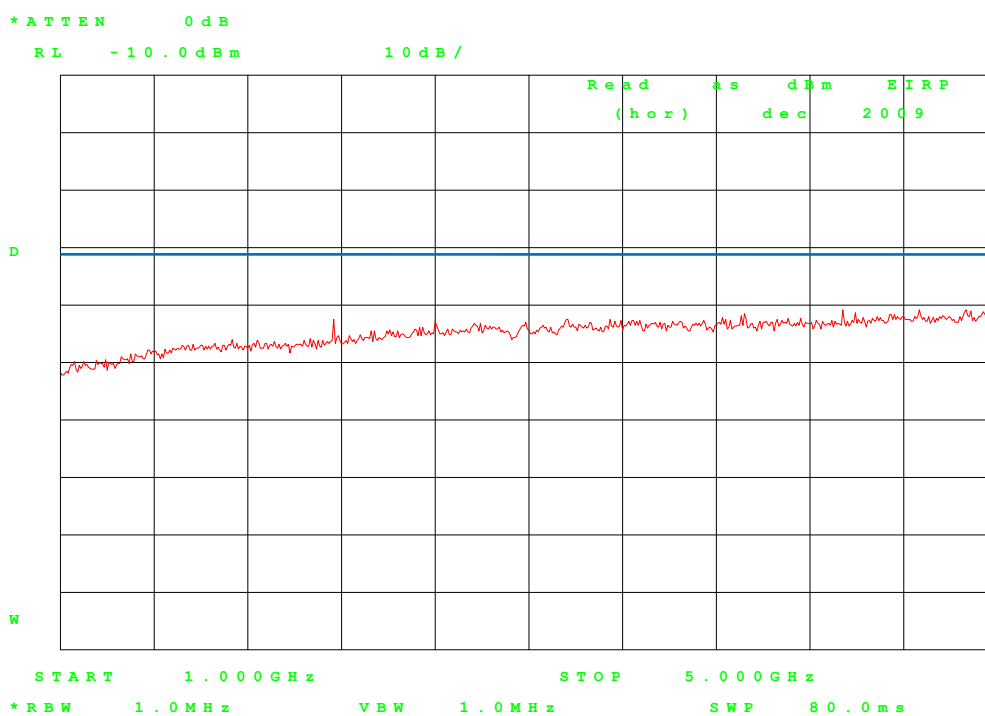


Transmitter: operating on Channel 5, 434.6 MHz
Modulation: present

Vertical polarization 1-5 GHz



Horizontal polarization 1- 5 GHz



Channel	Frequency	Polarisation	Detector	Level	Limit
(MHz)	(MHz)			dBm eirp	dBm eirp
433.2	1293	V	PK	-38.8	-22.3
433.2	1727	V	PK	-38.7	-22.3
433.2	2160	V	PK	-40.5	-22.3
433.2	2593	V	PK	-37.7	-22.3
433.2	3027	V	PK	-41.5	-22.3
433.2	3460	V	PK	-43.8	-22.3
433.2	2893	V	PK	-44.8	-22.3
433.2	4327	V	PK	-41.5	-22.3
434.6	1300	V	PK	-39.0	-22.3
434.6	1733	V	PK	-46.0	-22.3
434.6	2167	V	PK	-37.0	-22.3
434.6	2600	V	PK	-40.8	-22.3
434.6	3040	V	PK	-47.3	-22.3
434.6	3473	V	PK	-47.5	-22.3
434.6	3907	V	PK	-45.8	-22.3
434.6	4340	V	PK	-43.2	-22.3

Channel	Frequency	Polarisation	Duty cycle correction factor	Level	Limit
(MHz)	(MHz)	H/V	dB	dBm eirp	dBm eirp
433.2	1293	V	59.1	-97,9	-42.3
433.2	1727	V	59.1	-97,8	-42.3
433.2	2160	V	59.1	-99,6	-42.3
433.2	2593	V	59.1	-96,8	-42.3
433.2	3027	V	59.1	-100,6	-42.3
433.2	3460	V	59.1	-102,9	-42.3
433.2	2893	V	59.1	-103,9	-42.3
433.2	4327	V	59.1	-100,6	-42.3
434.6	1300	V	59.1	-98,1	-42.3
434.6	1733	V	59.1	-105,1	-42.3
434.6	2167	V	59.1	-96,1	-42.3
434.6	2600	V	59.1	-99,9	-42.3
434.6	3040	V	59.1	-106,4	-42.3
434.6	3473	V	59.1	-106,6	-42.3
434.6	3907	V	59.1	-104,9	-42.3
434.6	4340	V	59.1	-102,3	-42.3

According to ANSI C63.4-2003, par. 13.1.4.2 a duty cycle correction factor has been applied, in order to obtain average measurement results

A duty cycle correction factor of 59.1 dB has applied:

Transmission time: 12.083 ms
Transmitter repeat time: 10.933 sec

Measurement uncertainty	+4.5 /-6.1 dB
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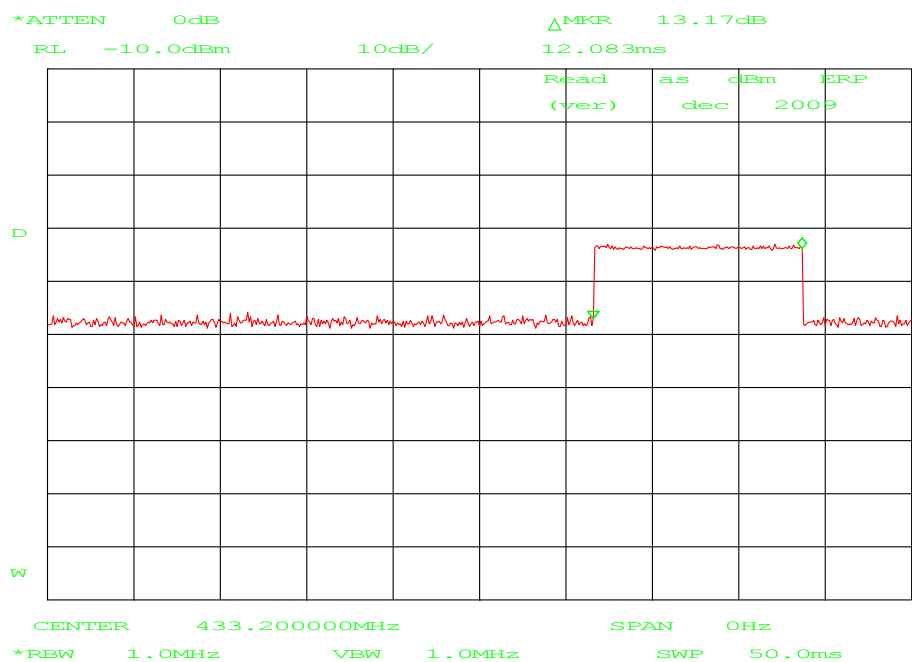
Limit according to par. 15.231e	20 dB below fundamental limit
Limit inside restricted bands according to par. 15.205	$\leq 500 \mu\text{V/m}$ (54.0 dB $\mu\text{V/m}$) which converts to -41.2 dBm e.i.r.p. @ 3 meter distance in a full anechoic test chamber.
According to par. 15.35, Peak limit =	Average limit + 20 dB

Measurement equipment used (item numbers refer to section “used test equipment”)	5, 6, 8, 10, 11, 12, 13
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1.3 Transmission time

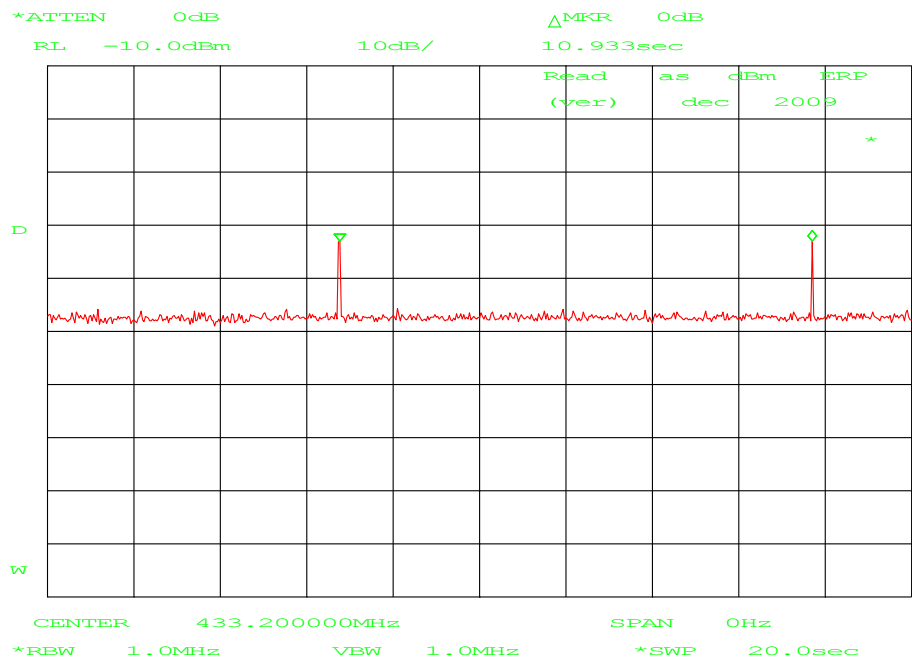
Compliance standard : FCC part 15, subpart C, section 15.231 (e).
Method of test : Analyzer in zero span
EUT condition : Automatic operation
Test results :

Plot of transmitter on time:



Transmission time: 12.083 ms

Plot of transmitter repeat time:

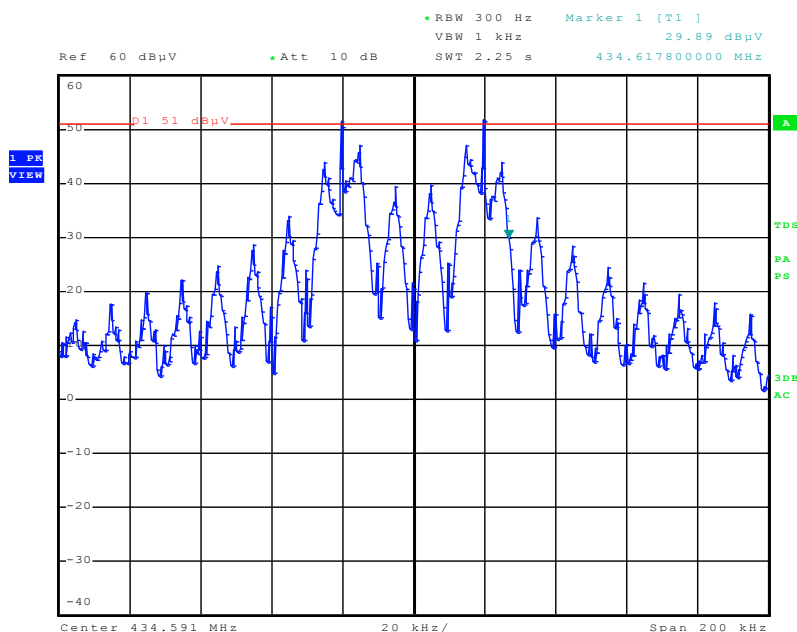


Transmitter repeat time: 10.933 sec

Measurement uncertainty	+/- 6 msec.
Limit	≤ 5 seconds
Measurement equipment used (item numbers refer to section “used test equipment”)	1, 2, 3, 4

1.4 Occupied bandwidth

Compliance standard : FCC part 15, subpart C, section 15.231 (c).
Method of test : ANSI C63.4-2003, annex H.6
EUT condition : Automatic operation
Test results :



-20 dB bandwidth: 54.0 kHz

Measurement uncertainty	+ 6 /- 6 kHz
Limit	0.25 % of centre frequency for devices operating between 70 and 900 MHz
	$0.25 * 0.01 * 434.6 = 1.0865 \text{ MHz}$
Measurement equipment used (item numbers refer to section “used test equipment”)	1, 2, 3, 4

Used test equipment module

No.	Test equipment	Manufacturer	Type	Ident.
1	EMI test receiver	R&S	ESCI	TE 00481
2	Biconilog antenna	Chase	CBL6112A	TE 00967
3	Antenna tower	inn-Co	MA4000	SAR
4	Semi Anechoic Room	Comtest	--	TE 00861
5	Full Anechoic Chamber	Euroshield	RFD-F-100	TE 01064
6	Spectrum analyzer	HP	8563E	TE 00481
7	Pre-amplifier	R & S	ESV-Z3	TE 00098
8	Pre-amplifier	HP	8449B	TE 00092
9	Biconilog antenne	EMCO	3143	TE 00700
10	Double ridged guide antenna	EMCO	3115	TE 00531
11	Antenna tower	HD	AS 620P	ANEC
12	Turntable	HD	DS-412	ANEC
13	Turntable controller	HD	HD-050	ANEC

Revision history

revision	date	remarks	modified by
1.0	28 April 2011	--FCC ID changed to YDVINTELLICAP-CI	PR