

Test Report

Product	Activity Meter 2 Tester
Name and address of the applicant	DeLaval International AB Gustav Delavals väg 15, SE-14721 Tumba, Sweden
Name and address of the manufacturer	DeLaval International AB Gustav Delavals väg 15, SE-14721 Tumba, Sweden
Model	Activity Meter 2 Tester
Rating	3.Vdc
Trademark	DeLaval
Serial number	/
Additional information	134.2 kHz RFID
Tested according to	FCC Part 15.209 Digital Transmission Systems Industry Canada RSS-210, Issue 8 Low Power Licence-Exempt Radiocommunications Devices
Order number	300208
Tested in period	2016.01.19 - 2016.01.20
Issue date	2016.03.21
Name and address of the testing laboratory	 FCC No: 994405 IC OATS: 2040D-1 TEL: +47 22 96 03 30 FAX: +47 22 96 05 50 Instituttveien 6 Kjeller, Norway
 Prepared by [G.Suhanthakumar]  Approved by [Frode Sveinsen]	
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1 INFORMATION

1.1 Test Item

Name :	DeLaval
FCC ID :	UCS88620301
IC :	N/A
Model/version :	Activity Meter 2 Tester
Serial number :	PROTO 008
Hardware identity and/or version:	1.1.0
Software identity and/or version :	Att_emc-F418-SN8-RSS150.hex
Frequency Range :	134.2 kHz
Operating frequency :	134.2 kHz
Type of Modulation :	Unmodulated CW signal
Output Power:	0.0019nW (Average, Radiated)
User Frequency Adjustment :	None
Type of Power Supply :	3.0Vdc Primary Batteries (2x AA)
Antenna Connector :	No (integral loop antenna)
Antenna Diversity Supported :	No

Description of Test Item

This device is a utility used to read serial numbers over 418 MHz from DeLaval AM2 units. The AM2 units are activated by using an RFID signal that operates on 134.2 kHz.

1.2 Test Environment

1.2.1 *Normal test condition*

Temperature: 20 - 23 °C

Relative humidity: 40 - 50 %

Normal test voltage: 3.0Vdc

The values are the limit registered during the test period.

1.3 Test Engineer(s)

G.Suwanthakumar

1.4 Test Equipment

See list of test equipment in clause 4.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted for the purpose of demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.209, Industry Canada RSS-210, Issue 8 and RSS-GEN, Issue 4.

Radiated tests were conducted in accordance with ANSI C63.4-2014. The radiated tests were made in a semi-anechoic chamber at measuring distances of 3m and 10m.

A description of the test facility is on file with the FCC and Industry Canada.

☒ New Submission

☒ Production Unit

☐ Class II Permissive Change

☐ Pre-production Unit

DCD Equipment Code

☐ Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-210 Issue 8 reference RSS-GEN Issue 4 reference	Result
Power Line Conducted Emission	15.107(a) 15.207(a)	8.8 (RSS-GEN)	N/A*
Spurious Emissions (Radiated)	15.31 15.33 15.35 15.209(a)(d)	A8.5	Pass

*This is a battery operated EUT.

2.3 Description of modification for Modification Filing

Not applicable.

2.4 Comments

All ports were populated during spurious emission measurements.

2.5 Family List Rational

Not Applicable.

3 TEST RESULTS

3.1 Power Line Conducted Emissions

FCC §15.207(a)

Test Performed By: -	Date of Test: -
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Measurement procedure: ANSI C63.4-2014 using 50 μ H/50 ohms LISN.

Test Results: Complies

Measurement Data: N/A

3.2 20 dB Bandwidth

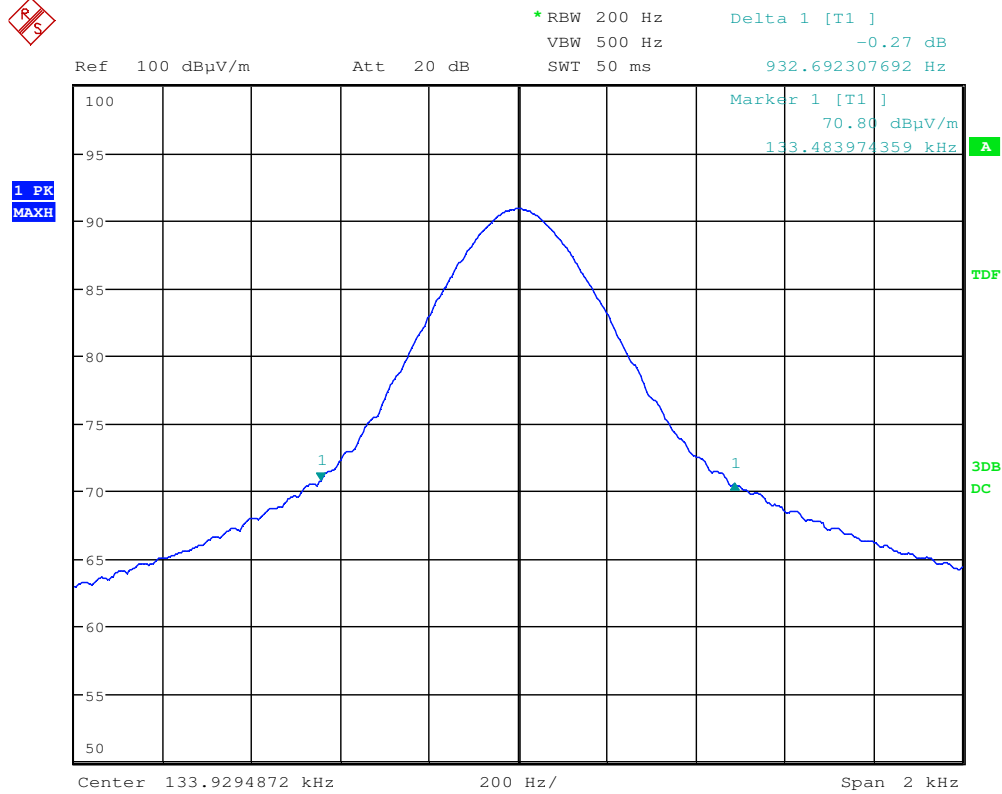
Test Performed By: G.Suwanthakumar

Date of Test: 2016.01.19

Measurement Data:

Measured 20 dB Bandwidth
933 Hz

Requirements: No requirements. Reported for information only.



Date: 19.JAN.2016 14:35:29

20 dB Bandwidth at 133.9 kHz

3.3 Spurious Emissions (Radiated)

Para. No.: 15.31, 15.33, 15.35, 15.209 (a) (d)

Test Performed By: G.Suhandhakumar

Date of Test: 2016.01.19

Test Results: Complies

Measurement Data:

Radiated emissions 9kHz - 30 MHz.

Detector: Average

Measuring distance 10m

Frequency kHz	Channel kHz	Measured Field Strength @10m (dBμV/m)	Detector	Limit @10m dBμV/m	Margin dB
133.94	134	8.16	AV	84.13	75.97

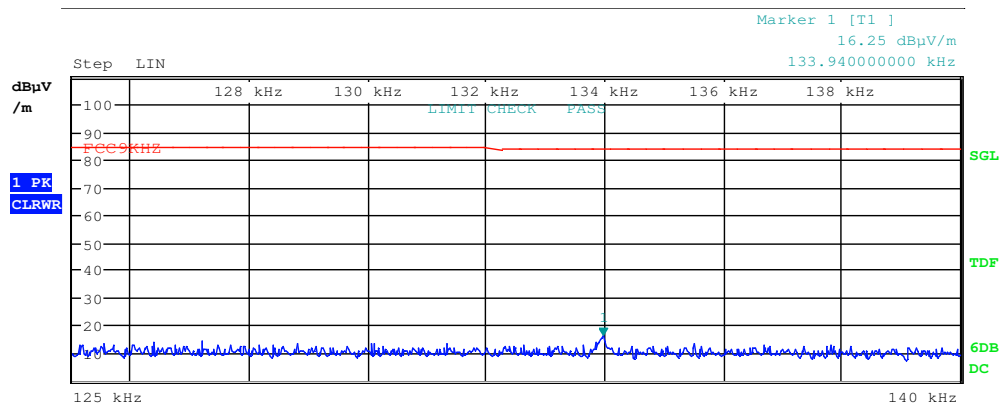
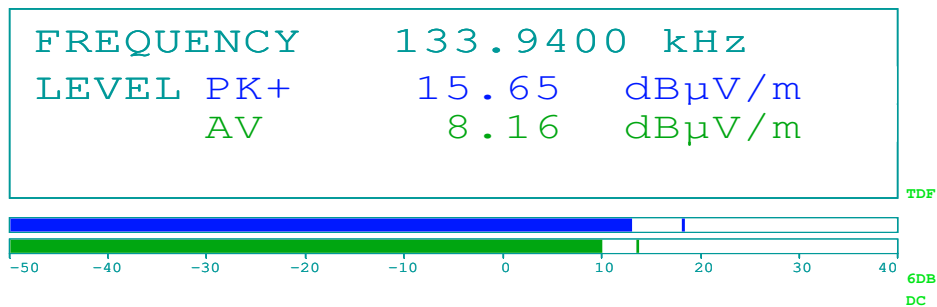
The limit line in the graph is corrected for 10m distance.

Antenna factor, amplifier gain and cable loss are included in Spectrum Analyzer "Transducer factor".

See attached graphs.



Att 0 dB AUTO RBW 200 Hz
MT 2 s
PREAMP ON

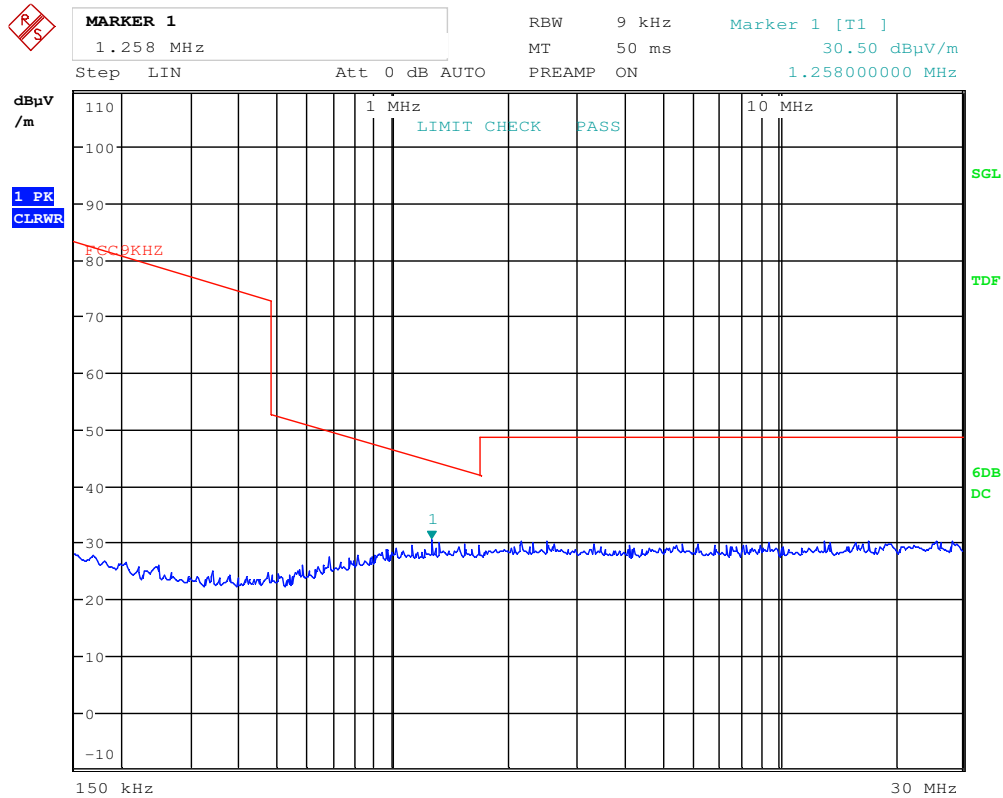


Date: 19.JAN.2016 12:28:43

Average detector – 134.2kHzkHz @10m

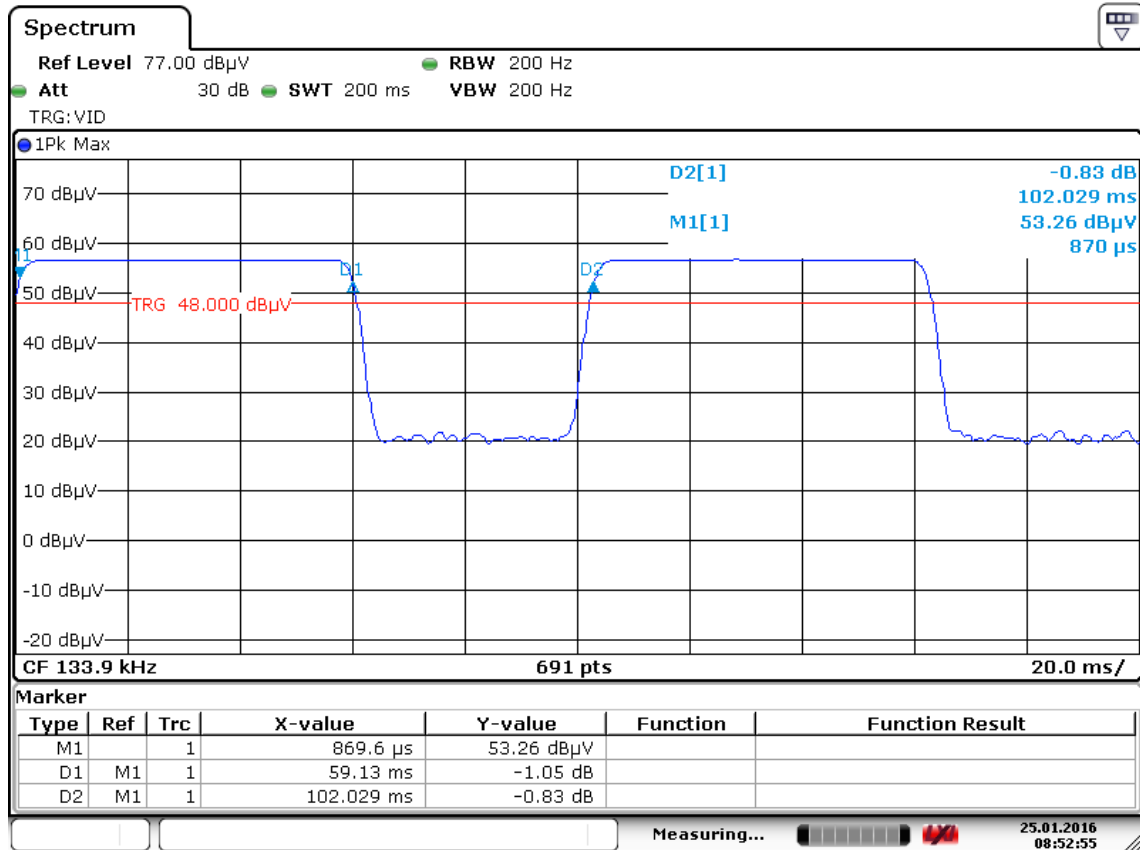


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Date: 19.JAN.2016 13:05:49

134.2kHz; Radiated Emissions, 0.15 - 30MHz @10m – Peak scan



Duty cycle ON/off time RFID

Radiated emission 30 – 1000 MHz.

Detector: Peak

Measuring distance at 3m.

All values are below the limit even when measured with Peak Detector.

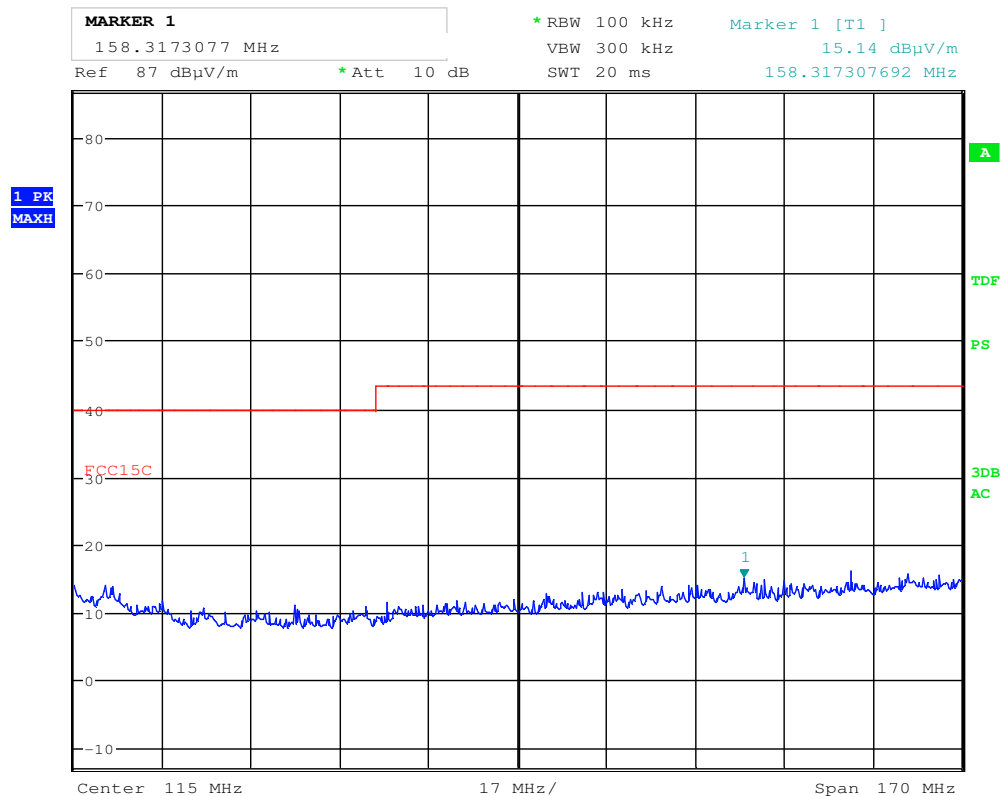
Frequency	Operational condition	Field strength	Measuring distance	Limit FCC15.209	Margin
MHz		dB μ V/m	metres	dB μ V/m	dB
All freqs	TX on	/	3	/	>10

Tested only with Peak Detector.

See attached graphs.

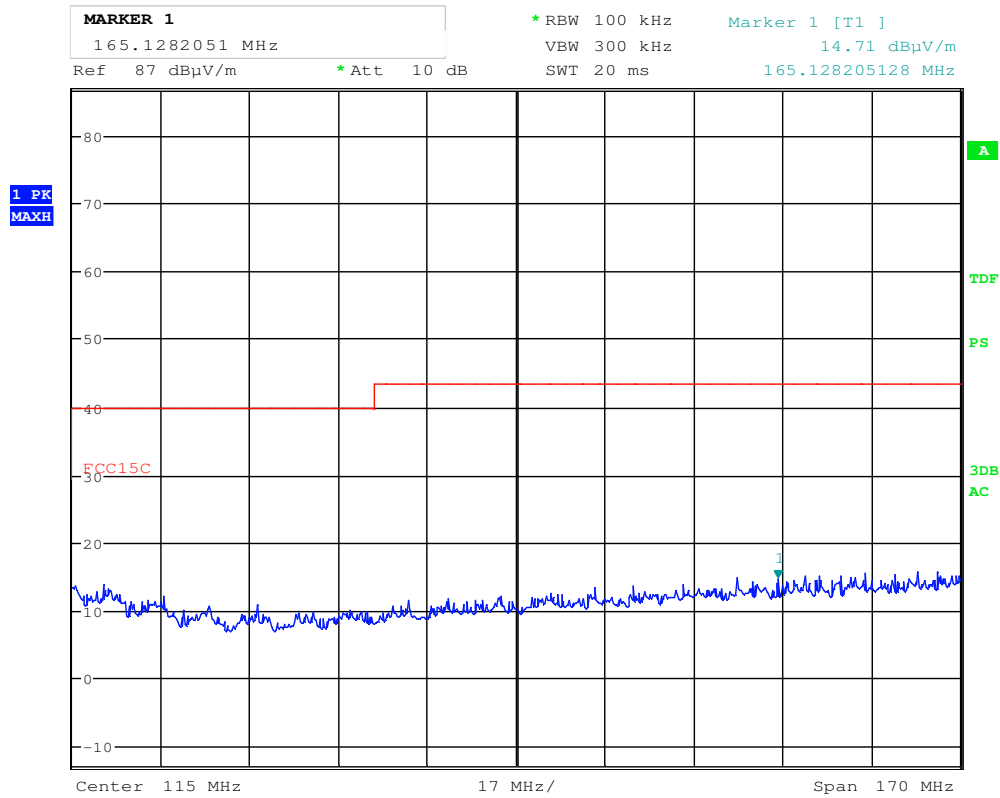
Antenna factor, amplifier gain and cable loss are included in Spectrum Analyzer "Transducer factor".

See attached graphs.



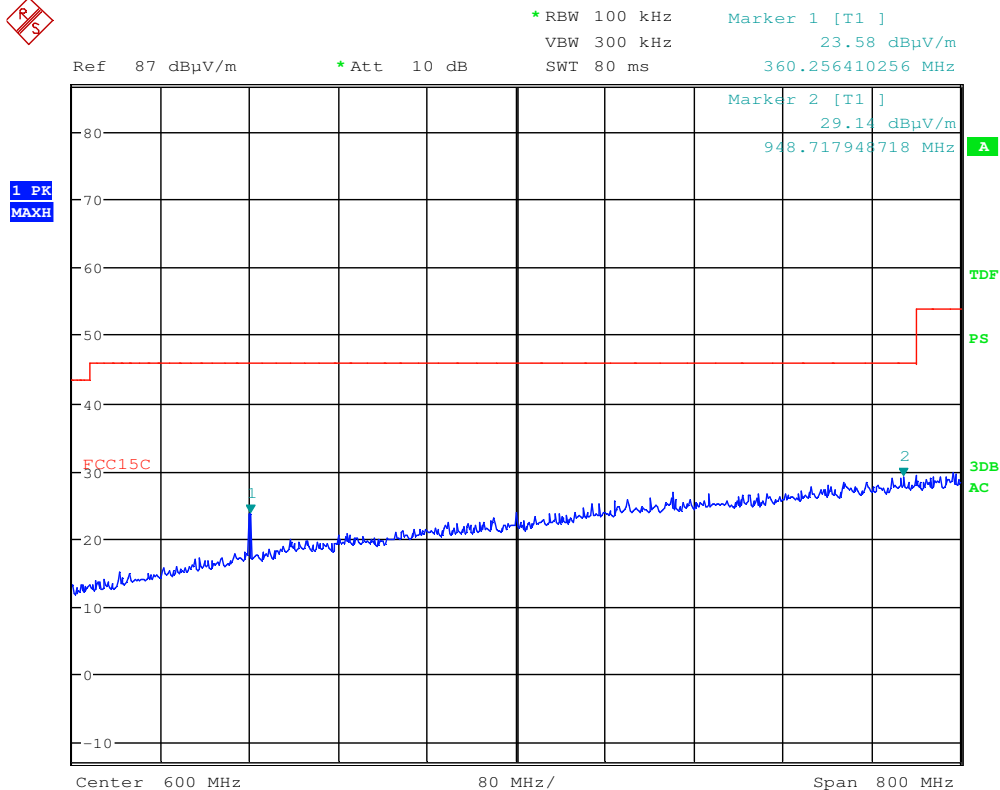
Date: 19.JAN.2016 10:05:46

Radiated Emissions, 30 – 200 MHz, VP, @3m



Date: 19.JAN.2016 10:04:18

Radiated Emissions, 30 – 200 MHz, HP, @3m



Date: 19.JAN.2016 10:17:24

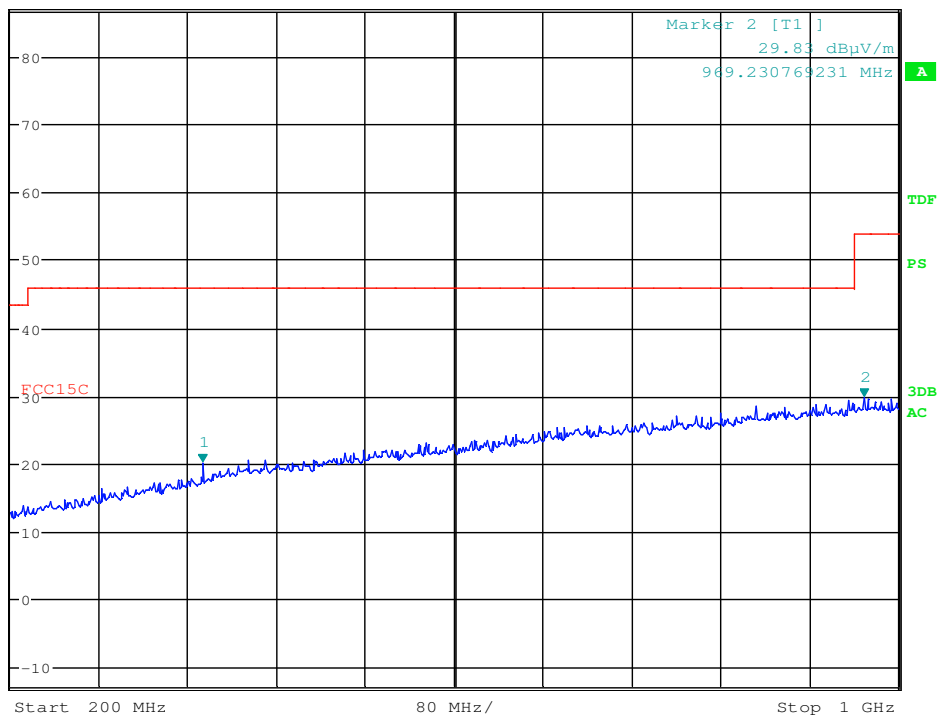
Radiated Emissions, 200 - 1000 MHz, VP, @3m



MARKER 1
373.0769231 MHz
Ref 87 dBμV/m * Att 10 dB

* RBW 100 kHz Marker 1 [T1]
VBW 300 kHz 20.01 dBμV/m
SWT 80 ms 373.076923077 MHz

1 PK
MAXH



Date: 19.JAN.2016 10:21:03

Radiated Emissions, 200 - 1000 MHz, HP, @3m

Radiated Emissions, 1-6 GHz

1-6 GHz measured at a distance of 3 m

All values are below the average limit even when measured with Peak Detector.

Peak detector

Frequency GHz	Field Strength @3m dBμV/m	Detector	Limit dBμV/m	Margin dB
3.50	46.41	Pk	74	27.59
5.75	47.52	Pk	74	26.48
5.80	47.26	Pk	74	26.74

Average detector

Frequency GHz	Field Strength @3m dBμV/m	Detector	Limit dBμV/m	Margin dB
3.50	-	Av	54	-
5.75	-	Av	54	-
5.80	-	Av	54	-

Antenna factor, amplifier gain and cable loss are included in Spectrum Analyzer "Transducer factor".

See attached graphs.



MARKER 1

3.508012821 GHz

* RBW 1 MHz

Marker 1 [T1]

VBW 3 MHz

46.41 dBuV/m

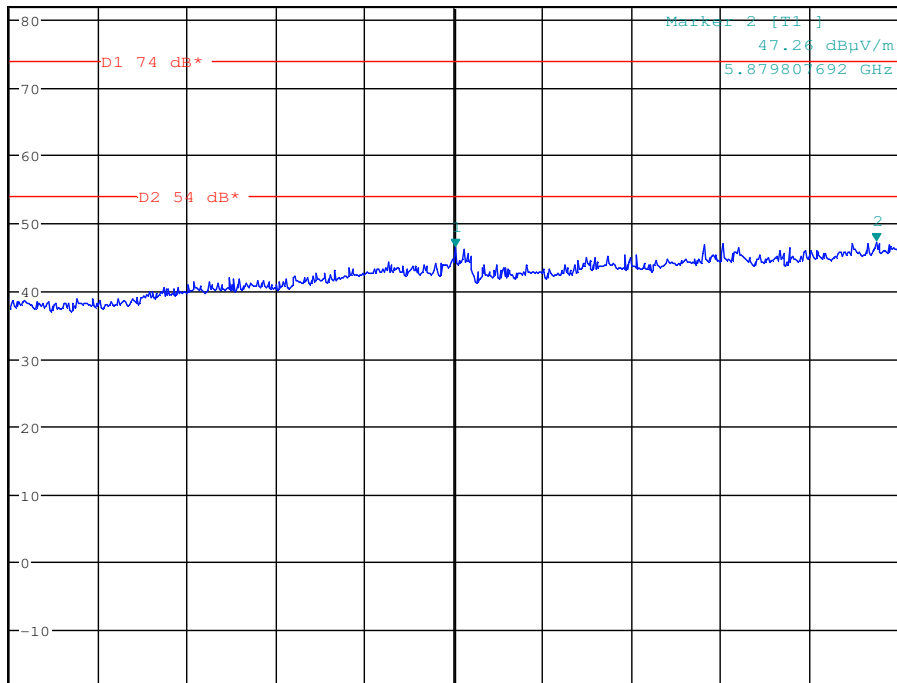
Ref 82 dBuV/m

* Att 10 dB

SWT 30 ms

3.508012821 GHz

1 PK
MAXH



Start 1 GHz

500 MHz/

Stop 6 GHz

Date: 19.JAN.2016 11:04:27

HP: 1 - 6GHz



MARKER 1
5.759615385 GHz

* RBW 1 MHz

Marker 1 [T1]

VBW 3 MHz

47.52 dBμV/m

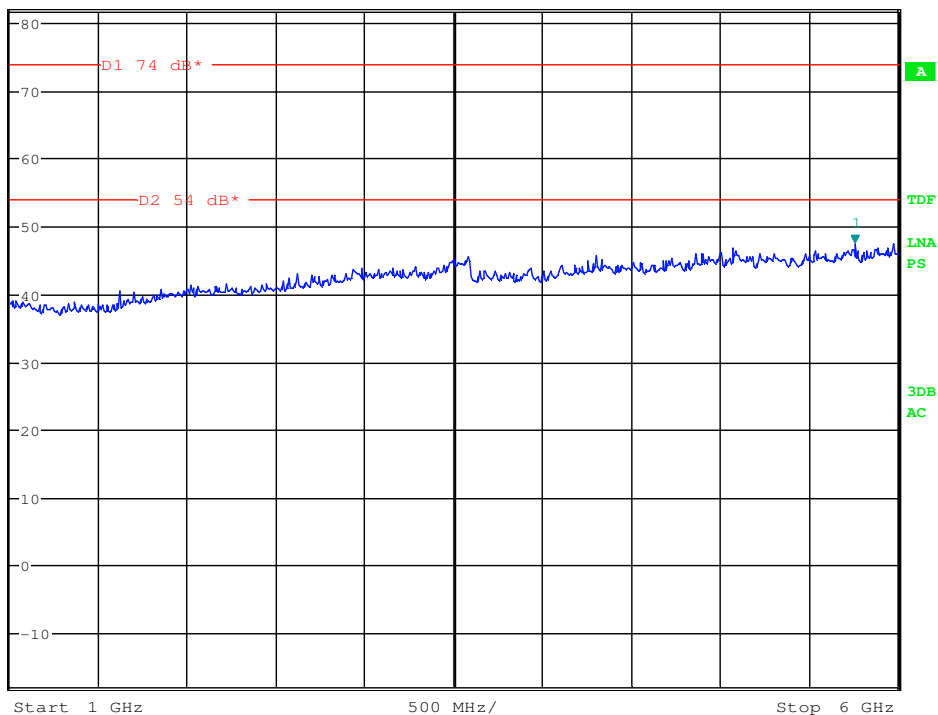
Ref 82 dBμV/m

* Att 10 dB

SWT 30 ms

5.759615385 GHz

1 PK
MAXH



Date: 19.JAN.2016 11:06:05

VP: 1 – 6GHz

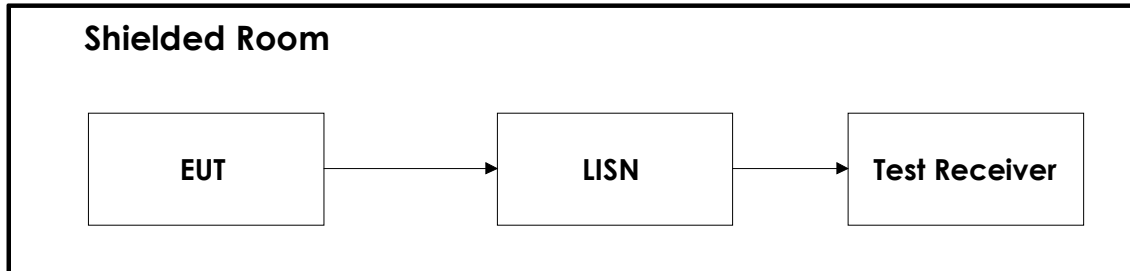
4 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the test laboratory.

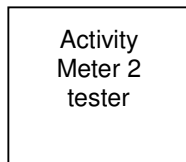
No.	Instrument/ ancillary	Type of instrument/ ancillary	Manufacturer	Ref. no.	Cal. Date	Cal. Due
1.	ESU40	EMI Receiver	Rohde & Schwarz	LR1639	2015.11	2016.11
2.	HFH2-Z2	Loop antenna	Rohde & Schwarz	LR1660	2014.10	2017.10
3.	3115	Antenna horn	EMCO	LR 1330	2010.08	2017.08
4.	HK116	Biconical Antenna	Rohde & Schwarz	LR 1260	2013.12	2016.12
5.	HL223	Log Periodic antenna	Rohde & Schwarz	LR 1261	2013.12	2016.12
6.	8449B	Pre-amplifier	Hewlett Packard	LR 1322	2015.09	2016.09
7.	HP 10855A	Pre-amplifier	Hewlett Packard	LR 1445	2015.10	2016.10
8.	Model 87 V	Multimeter	Fluke	LR 1597	2015.10	2016.10

5 BLOCK DIAGRAM

5.1 Power Line Conducted Emission



5.2 Test Setup Radiated Emission



Revision history

Version	Date	Comment	Sign
1.0	2016.01.28	Test report	GNS
2.0	2016.03.21	Frequency range corrected	FS