telefication bv
The Netherlands
Chamber of Commerce
51565536
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telefication

Radio test report
20154735302-Ver 1.00

Based on:

- FCC part 15; subpart C; section 15.249 & 15.209 (10-1-14 edition)
- IC RSS-210, Issue 8, Anex 7
- IC RSS-GEN, Issue 4

Wireless Station
PRIVA
FS Concentrator

Revision history

REVISION	DATE	REMARKS	REVISED BY
Ver 1.00	2015-11-06	Initial Release	ing. J.C. le Clercq
Ver 0.50	2015-10-06	Draft release for peer review	ing. J.C. le Clercq

Contents

This report comprises of three modules. The total number of pages is: 20

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).

Telefication is designated by the FCC as an Accredited Test Firm for compliance testing of equipment subject to Certification under Parts 15 & 18. The Designated Number is: NL 0001.

The Industry Canada registration number for the 3 meter test chamber of Telefication is: 4173A-1.

Ordering party:

Company name	:	Dare Consultancy
Address	:	Vijzelmolenlaan 7
Zipcode	:	3447 GX
City/town	:	Woerden
Country	:	The Netherlands
Date of order	:	11 September 2015

2 Product

A sample of the following product was submitted for testing:

Product name	:	Wireless Station
Type designation	:	FS Concentrator
Manufacturer	:	PRIVA
Trade mark	:	PRIVA
FCC ID	:	2AFNX-FS3771473
IC ID	;	20818-3771473
Hardware version	:	659.99322
Software release	:	1.0.34
Serial number	:	1540166AE001

Variant 1

Product name	:	Wireless Station
Type designation	:	FS Router
Manufacturer	:	PRIVA
Trade mark	:	PRIVA
FCC ID	:	2AFNX-FS3771472
IC ID	:	20818-3771472
Hardware version	:	659.99312
Software release	:	1.0.34
Serial number	:	1540166AE002

Remarks:

The FS Router is almost identical to the FS Concentrator.
The FS-Router does not have a LAN connection
The FS-Router does not contain a Raspberry Pi Model B

3 Test schedule

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

Tests are carried out at the following location:

- Telefication, Zevenaar

The samples of the product were received on:

- 8 September 2015

Tests are carried out between:

- 29 September 2015 and 1 October 2015

4 Product documentation

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

Identification (Concentrator)	Date
3791521_FS_Concentrator_Installing_en-GB.pdf	18 08 2015
3791521_FS_Concentrator_Installing_en-GB.pdf	01 09 2015
FS Concentrator - Raspberry Pi Model B+ (Tweakers).pdf	18 08 2015
FS-Concentrator V3.0 schematics.pdf	25 08 2015
FS-Concentrator_FunctionalDescription.pdf	26 08 2015

Identification (Router)	Date
3791529_FS_Router_Installing_en-GB.pdf	18 08 2015
BlockDiagramRouter_HW3v0.pdf	01 09 2015
FS-Router V3.0 schematics.pdf	25 08 2015
FS-Router_FunctionalDescription.pdf	26 08 2015

The above-mentioned documentation will be filed at Telefication for a period of 10 years following the issue of this test report.

5 Observations and comments

None

6 Modifications to the sample

None.

7 Summary

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

INTENTIONAL RADIATOR OPERATING IN THE FREQUENCY BAND 902 - 928 MHz

The sample is tested according to the following specifications:

FCC part 15; subpart C; section 15.249 & 15.209 (10-1-14 edition)
IC RSS 210, Issue 8, Annex 7
IC RSS-GEN, Issue 4

8 Conclusions

The samples of the product showed **NO NON-COMPLIANCES** to the specifications 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

Review of test report by:

Name : ing. P.A. Suringa

The above conclusions have been verified by the following signatory:

Date : 6 November 2015

Name : A. Amininejad

Function : Operational Manager Radio Laboratory

Signature :

Test results module

1 General information

1.1 Equipment information

Rated radiated RF power	6.49 mW
Operating frequency range	915 and 916 MHz
Type of antenna	Integrated
Modulation	FSK
Duty cycle (during testing)	0.66 %

1.2 Frequency test channels

Channel	TX (MHz)	RX (MHz)
Low	915	915
High	916	916

2 Emission tests

2.1 Field strength of intentional signal

Compliance standard	:	FCC part 15, subpart C, section 15.249 (a) & (e)
Method of test	:	FCC part 15, subpart A, section 15.31(m), 15.33, 15.35, ANSI C63.10-2009, section 6.6
EUT condition	:	transmit mode
Atmospheric pressure	:	Between 86 kPa and 106 kPa
Temperature	:	24 °C
Relative humidity	:	44 %
Test results	:	

Note: only peak field strength was measured.

Peak field strength:

Frequency (MHz)	Test result @ 3 m distance (dBµV/m)	Polarisation	Limit (dBµV/m)
915	108.02	H	114
916	104.53	H	114

The Device-Under-Test transmits very short data packages: 660 µs, at one minute intervals.

Since the the quasi peak detector does not respond to these very short packages the following approach has been determined by the Certification Body:

The rule of section 15.35(b), for frequencies above 1 GHz will be applied for 915 and 916 MHz. signals:

The limit on peak radio frequency emissions is 20 dB above the maximum permitted emission average emission limit applicable to the equipment under test.

At frequencies below 1000 MHz the QP limit is 50 mV/m @ 3 meter distance,
which equals 94 dBµV/m.

For peak field strength measurements, the limit 114 dBµV/m has been applied.

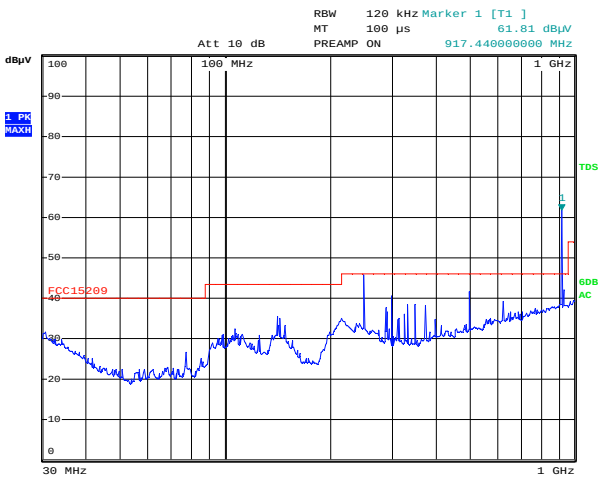
Measurement uncertainty	Vertical polarisation:	
	30 – 200 MHz	5.4 dB
	200 -1000 MHz	4.6 dB
	Horizontal polarisation:	
	30 – 200 MHz	4.5 dB
	200 -1000 MHz	3.6 dB

Measurement equipment used (item numbers refer to section “used test equipment”)	34, 36, 39, 43, 50, 51.

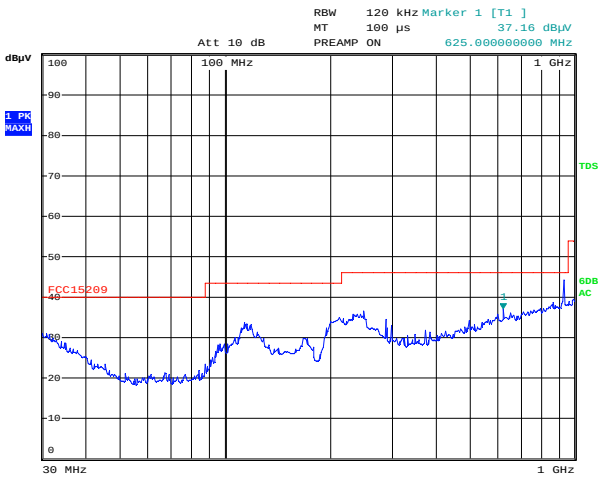
2.2 Field strength of unwanted emissions 30 - 1000 MHz

Compliance standard	:	FCC part 15, subpart C, section 15.209 (a) & 15.249 (d)
Method of test	:	ANSI C63.10-2009, section 6.5 FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.
EUT condition	:	transmit mode
Atmospheric pressure	:	Between 86 kPa and 106 kPa
Temperature	:	24 °C
Relative humidity	:	43 %
Test results	:	

Polarization horizontal (max. hold)

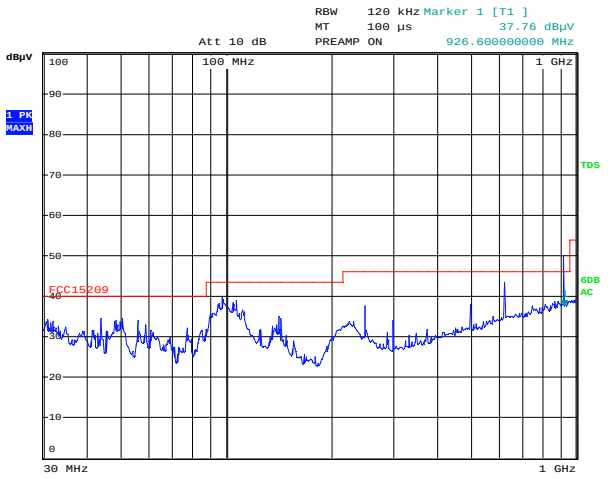


Low channel, 915 MHz

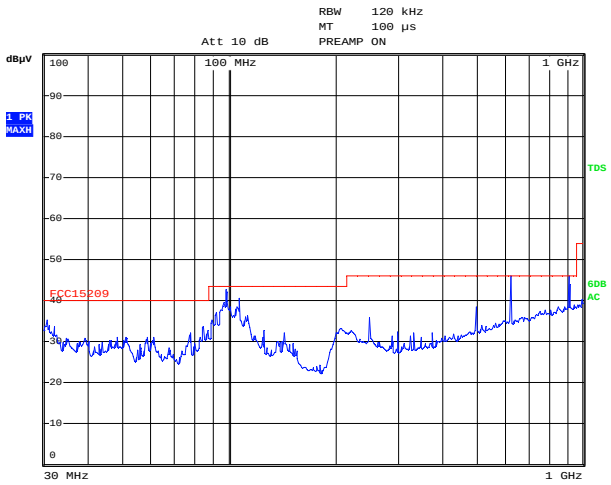


High channel, 916 MHz

Polarization vertical (max. hold)



Low channel, 915 MHz



High channel, 916 MHz

Remark: spurious emissions in the graphs above are caused by Auxiliary Equipment in the Semi Anechoic Chamber

Measurement uncertainty	Vertical polarisation:	
	30 – 200 MHz	5.4 dB
	200 -1000 MHz	4.6 dB
	Horizontal polarisation:	
	30 – 200 MHz	4.5 dB
	200 -1000 MHz	3.6 dB

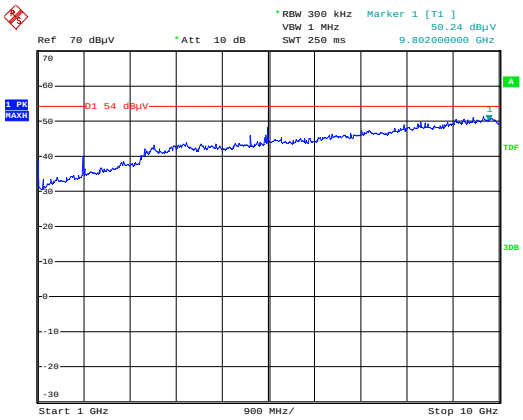
Measurement equipment used (item numbers refer to section “used test equipment”	34, 36, 39, 43, 50, 51.

2.3 Field strength of unwanted emissions > 1000 MHz

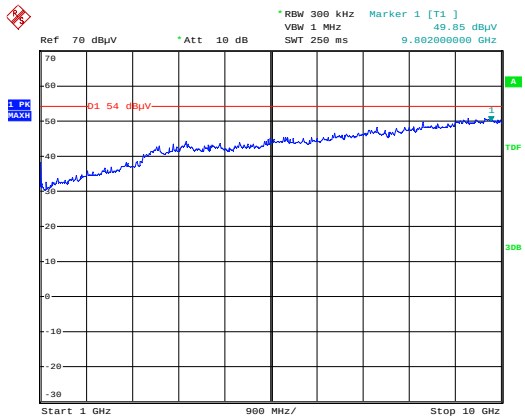
Compliance standard	:	FCC part 15, subpart C, section 15.209 (a) & 15.249 (a) & (e)
Method of test	:	ANSI C63.10-2009, section 6.6 FCC part 15, subpart A, section 15.31(m), 15.33, 15.35
Measuring distance	:	3 m
EUT condition	:	transmit mode
Atmospheric pressure	:	Between 86 kPa and 106 kPa
Temperature	:	23 °C
Relative humidity	:	42 %
Test results	:	

Unwanted emissions transmitter (peak values):

Low channel, 915 MHz

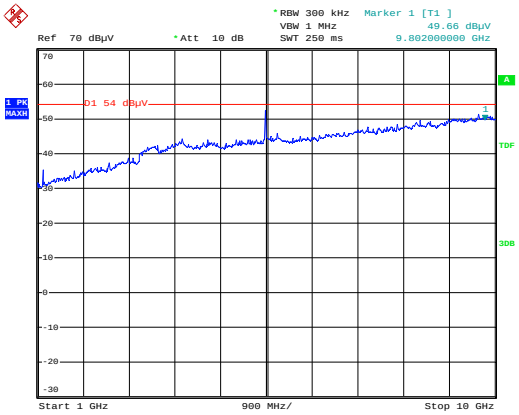


1000 - 10000 MHz
polarization horizontal, (max. hold)

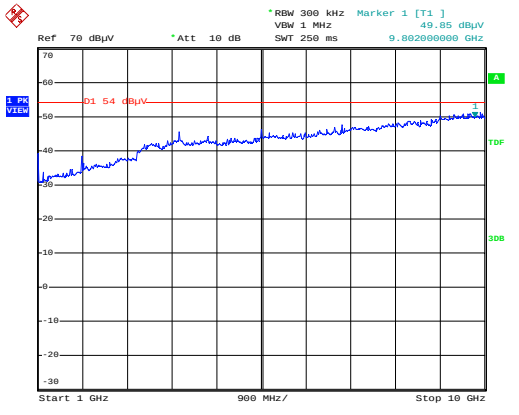


1000 - 10000 MHz
polarization vertical, (max. hold)

High channel, 916 MHz



1000 - 10000 MHz
polarization horizontal, (max. hold)



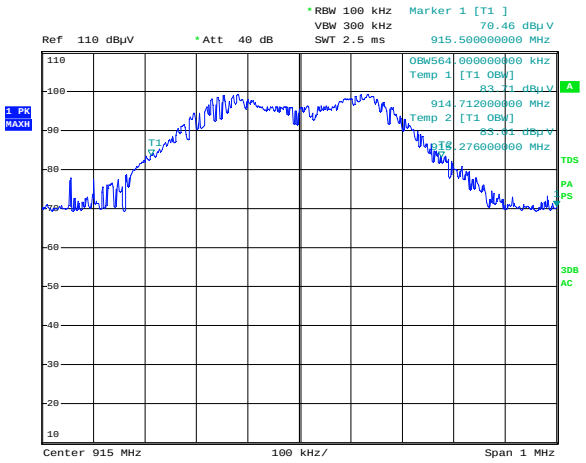
1000 - 10000 MHz
polarization vertical, (max. hold)

Measurement uncertainty	1-18 GHz: +5.7/ -5.7 dB;

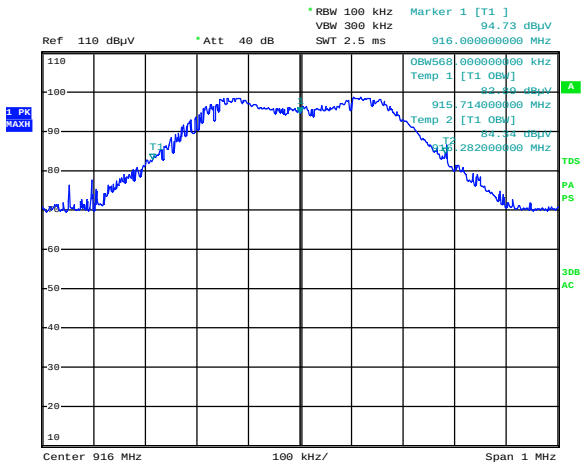
Measurement equipment used (item numbers refer to section “used test equipment”)	24, 34, 42, 46.

2.4 99 % Occupied Band Width

Compliance standard	:	IC RSS GEN, Issue 4, section 6.6
Measuring distance	:	3 m
EUT condition	:	transmit mode
Atmospheric pressure	:	Between 86 kPa and 106 kPa
Temperature	:	24 °C
Relative humidity	:	44 %
Test results	:	



Low channel, 915 MHz



High channel, 916 MHz

Channel low/high	Occupied Band Width (99 %)
915 MHz	564 kHz
916 MHz	568 kHz

Measurement uncertainty	±15 kHz

Measurement equipment used (item numbers refer to section “used test equipment”)	34, 36, 39, 43, 50, 51.

Used test equipment module

Item	Description	Manufacturer	Type	ID
1	Signal generator	Marconi	2042	TE 00030
2	Preamplifier 1 – 26.5 GHz	HP	8449B	TE 00092
3	Preamplifier 1 – 26.5 GHz	HP	8449B	TE 00093
4	Pre-amplifier 10 dB	R & S	ESV-Z3	TE 00097
5	Pre-amplifier 10 dB	R & S	ESV-Z3	TE 00098
6	--	--	--	--
7	Microwave amplifier	HP	HP8349A	TE 00124
8	Digital multimeter	HP	34401A	TE 00143
9	Digital multimeter	HP	3438A	TE 00215
10	Step attenuator	HP	8494A	TE 00233
11	Step attenuator	HP	8496A	TE 00234
12	Power sensor	HP	8484A	TE 00245
13	Power meter	HP	435B	TE 00249
14	Power meter	HP	437B	TE 00354
15	Power sensor	HP	8481A	TE 00355
16	--	--	--	TE 00359
17	Audio analyzer	HP	8903A	TE 00373
18	Signal generator	Marconi	2042	TE 00379
19	Digital thermometer	Fluke	51	TE 00388
20	Step attenuator	HP	8491A	TE 00403
21	Signal generator	HP	8642B	TE 00424
22	Signal generator	Marconi	2042	TE 00427
23	--	--	--	--
24	Horn antenna	EMCO	3115	TE 00531
25	Horn antenna	EMCO	3116	TE 00533
26	Biconilog antenna	EMCO	3143	TE 00700
27	Climate chamber	CTS	C-40/350	TE 00741
28	Active loop antenna	R & S	HFH2-Z2	TE 00746
29	Horn antenna	Quinstar	QWH-1900-AA	TE 00747

Item	Description	Manufacturer	Type	ID
30	Step attenuator	HP	8491A	TE 00787
31	Standard gain horn	Flann	20240-25	TE 00818
32	Power supply for amplifier	R & S	HZ-9	TE 00830
33	Power supply	Delta Elektronika	E030-1	TE 00851
34	Semi Anechoic Room	Comtest	--	TE 00861
35	Power supply	Delta Elektronika	MST030-10	TE 00886
36	Biconilog antenna	Chase	CBL6112A	TE 00967
37	Anechoic chamber	Euroshield	RFB-F-100	TE 01064
38	Triple loop antenna	Telefication	--	TE 01066
39	Temp / RH logger	ATAL	EPD-TRH-INT	TE 01224
40	Broadband resistive power divider	Weinschel	1506A	TE 01120
41	Broadband resistive power divider	Weinschel	1506A	TE 01122
42	Spectrum analyser	R & S	FSP 40	TE 11125
43	EMI test receiver	R & S	ESCI	TE 11128
44	High pass filter	Wainwright	WHK3.0/18G-10EF	TE 01140
45	Pre-amplifier	Miteq	JS4-18004000	TE 11131
46	Low noise amplifier	Miteq	AFS42-041001800	TE 11132
47	Antenna tower	Heinrich Deisel	AS 620P	ANEC
48	Turntable	Heinrich Deisel	DS-412	ANEC
49	Turntable controller	Heinrich Deisel	HD-050	ANEC
50	Antenna mast	EMCO	1070	SAR
51	Turn table	EMCO	1060-2M	SAR
52	Near field probe	--	--	--
53	Digital multimeter	Fluke	87	TE 00257
54	Variable transformer	KSL	RU8	TE 00904
55	Two line V-network	R & S	ESH3-Z5	TE 00208
56	Pulse limiter	R & S	ESH3-Z2	TE 00756

Cross reference table

Transmitter	
IC RSS-210 Issue 8	**FCC 47 CFR Part 15, subpart C (1-Oct-14 edition)**
Section 2.5	§ 15.209
Annex 7	§ 15.249
IC RSS-Gen Issue 4	**FCC 47 CFR Part 15, subpart C (1-Oct-14 edition)**
Section 8.9	§ 15.209
Section 6.6	--