

Radio test report

99561532

based on:

FCC part 15; subpart C; sections 15.209 and 15.249
(10-1-03 edition)

Intelligent Tag; Sensor Terminal
Sensite Solutions
BN215; BN223; BN283; ST208

Contents

MAIN MODULE.....	3
1 INTRODUCTION	3
2 PRODUCT	4
3 TEST SCHEDULE	4
4 OBSERVATIONS AND COMMENTS	5
5 MODIFICATIONS TO THE SAMPLE.....	5
6 SUMMARY.....	5
7 CONCLUSIONS.....	6
TEST RESULTS MODULE	7
1 GENERAL INFORMATION	7
1.1 Equipment information.....	7
2 EMISSION TESTS.....	8
2.1 Field strength of intentional signal	8
2.2 Field strength of unwanted emissions 30 –1000 MHz	10
2.3 Field strength of unwanted emissions > 1000 MHz	11
USED TEST EQUIPMENT MODULE	17

This report comprises of three modules. The total number of pages is: 17

Main module

1 Introduction

This report contains the result of tests performed by:

Telefication bv
Edisonstraat 12a
6902 PK Zevenaar
The Netherlands

Telefication complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:1999. 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 : Sensite Solutions B.V.
Address : Keizersgracht 23B
Zipcode : 5611 GC
City/town : Eindhoven
Country : The Netherlands
Date of order : 31 August 2004

2 Product

A sample of the following product was submitted for testing:

Product description	: Intelligent Tag; Sensor Terminal
Manufacturer	: Sensite Solutions
Trade mark	: Sensite Solutions
Type designation	: BN215; BN223; BN283; ST208
FCC ID	: SQ4LogiSphere
Hardware version	: --
Serial number	: --
Software release	: --

3 Test schedule

Tests were carried out in accordance with the specification detailed in chapter 6 “Summary” of this report.

Tests were carried out at the following locations:

Radiated measurements <1 GHz:

- TNO Electronic Products & Services (EPS) B.V
Smidshornerweg 18
9822 TL Niekerk
The Netherlands

FCC listed : 90828
Industry Canada : IC3501

All other measurements:

- Telefication, Zevenaar

The samples of the product were received on:

- 1 September 2004

Tests were carried out between:

- 1 September and 15 March 2005

4 Observations and comments

The following products have been tested:

Type	Function	
BN215	High accuracy temperature & motion sensor	Intelligent Tag
BN223	Reed contact	Intelligent Tag
BN283	High accuracy humidity sensor	Intelligent Tag
ST208	Sensor Terminal	Sensor Terminal

The output RF-levels of the products during all tests were fixed at the values corresponding to the register setting as specified below:

Type	Output RF-level register setting
BN215	9593
BN223	9593
BN283	0D00
ST208	0980

5 Modifications to the sample

No modifications were made to the sample.

6 Summary

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

INTENTIONAL RADIATOR OPERATING IN THE FREQUENCY BAND 902 - 928 MHz

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

FCC part 15; subpart C; sections 15.209 and 15.249 (10-1-03 edition)

7 Conclusions

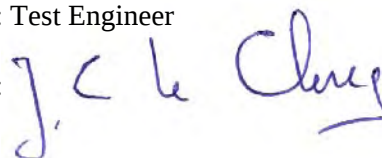
The samples of the product showed **NO NON-COMPLIANCES** to the specifications stated in chapter 6 of this report.

The results of the tests as stated in this report, are exclusively applicable to the product items as identified in this test report. Telefication does not accept any responsibility for the results stated in this test report, with respect to the properties of product items not involved in these tests.

All tests are performed by:

name : ing. J.C. le Clercq

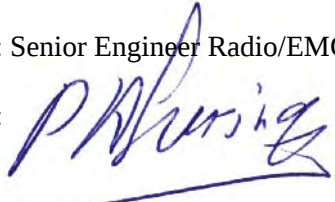
function : Test Engineer

signature : 

Review of test report by:

name : ing. P.A. Suringa

function : Senior Engineer Radio/EMC

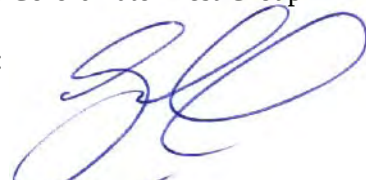
signature : 

The above conclusions have been verified by the following signatory:

Date : 23 Maart 2005

name : J.P. van de Poll

function : Co-ordinator Test Group

signature : 

Test results module

1 General information

1.1 Equipment information

Rated RF output power	n.a., integral antenna
Rated radiated RF power	--
Operating frequency range	909 to 925 MHz (single channel)
Modulation	FSK
Modulation bit rate	--
ITU emission class	--
FCC ID	SQ4LogiSphere

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 : ANSI C63.4-2003, sections 5.5 & 8.2.4
Test results :

Quasi-peak field strength:

Type	Frequency (MHz)	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (mV/m)
BN215	909	88.3	H	93.98	50
BN215	909	86.3	V	93.98	50
BN223	909	84.6	H	93.98	50
BN223	909	86.5	V	93.98	50
BN283	909	91.9	H	93.98	50
BN283	909	92.3	V	93.98	50
ST208	909	92.2	H	93.98	50
ST208	909	90.6	V	93.98	50

Type	Frequency (MHz)	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (mV/m)
BN215	915	90.7	H	93.98	50
BN215	915	89.3	V	93.98	50
BN223	915	89.0	H	93.98	50
BN223	915	87.5	V	93.98	50
BN283	915	91.4	H	93.98	50
BN283	915	91.8	V	93.98	50
ST208	915	92.5	H	93.98	50
ST208	915	92.3	V	93.98	50

Type	Frequency (MHz)	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (mV/m)
BN215	925	89.2	H	93.98	50
BN215	925	85.9	V	93.98	50
BN223	925	88.7	H	93.98	50
BN223	925	86.3	V	93.98	50
BN283	925	92.8	H	93.98	50
BN283	925	90.4	V	93.98	50
ST208	925	89.0	H	93.98	50
ST208	925	89.3	V	93.98	50

Measurement uncertainty: +1.6 dB / -2.4 dB

2.2 Field strength of unwanted emissions 30 –1000 MHz

Compliance standard : FCC part 15, subpart C, section 15.209 (a)
Method of test : ANSI C63.4-2003, sections 5.5, 8.2.3, 8.2.4 & 8.3.1.2;
FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.

EUT condition : transmitting on 909, 915 and 925 MHz respectively
Test results :

average field strength:

Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (AV)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
No unwanted emissions detected		H/V	53.98	500

peak field strength:

Frequency (MHz)	Test result @ 3 m distance (dB μ V/m) (PK)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
No unwanted emissions detected		H/V	73.98	5000

Measurement uncertainty: N/A

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 C63.4-2003, sections 5.5, 8.2.3, 8.2.4 & 8.3.1.2;
FCC part 15, subpart A, section 15.31(m), 15.33, 15.35.

EUT condition : transmitting on 909, 915 and 925 MHz respectively
Test results :

average field strength:

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dBµV/m)	Polarisation	Limit (dBµV/m)	Limit (µV/m)
BN215	1818	harmonic	37.17	H	53.98	500
BN215	2727	harmonic	41.00	H	53.98	500
BN215	3636	harmonic	41.30	H	53.98	500
BN223	1818	harmonic	35.33	H	53.98	500
BN223	2727	harmonic	40.83	H	53.98	500
BN223	3636	harmonic	38.97	H	53.98	500
BN283	1818	harmonic	37.83	H	53.98	500
BN283	2727	harmonic	39.67	H	53.98	500
BN283	3636	harmonic	38.47	H	53.98	500
ST208	1818	harmonic	35.50	H	53.98	500
ST208	2727	harmonic	35.50	H	53.98	500
ST208	3636	harmonic	39.13	H	53.98	500

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dBµV/m)	Polarisation	Limit (dBµV/m)	Limit (µV/m)
BN215	1818	harmonic	37.17	V	53.98	500
BN215	2727	harmonic	40.33	V	53.98	500
BN215	3636	harmonic	43.30	V	53.98	500
BN223	1818	harmonic	36.00	V	53.98	500
BN223	2727	harmonic	40.67	V	53.98	500
BN223	3636	harmonic	41.97	V	53.98	500
BN283	1818	harmonic	43.83	V	53.98	500
BN283	2727	harmonic	39.00	V	53.98	500
BN283	3636	harmonic	40.63	V	53.98	500
ST208	1818	harmonic	36.00	V	53.98	500
ST208	2727	harmonic	38.50	V	53.98	500
ST208	3636	harmonic	39.13	V	53.98	500

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1830	harmonic	36.20	H	53.98	500
BN215	2745	harmonic	39.37	H	53.98	500
BN215	3660	harmonic	38.03	H	53.98	500
BN223	1830	harmonic	33.87	H	53.98	500
BN223	2745	harmonic	38.37	H	53.98	500
BN223	3660	harmonic	37.37	H	53.98	500
BN283	1830	harmonic	36.70	H	53.98	500
BN283	2745	harmonic	38.20	H	53.98	500
BN283	3660	harmonic	37.53	H	53.98	500
ST208	1830	harmonic	35.53	H	53.98	500
ST208	2745	harmonic	36.20	H	53.98	500
ST208	3660	harmonic	36.37	H	53.98	500

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1830	harmonic	36.20	V	53.98	500
BN215	2745	harmonic	39.03	V	53.98	500
BN215	3660	harmonic	40.03	V	53.98	500
BN223	1830	harmonic	34.53	V	53.98	500
BN223	2745	harmonic	39.53	V	53.98	500
BN223	3660	harmonic	39.53	V	53.98	500
BN283	1830	harmonic	35.87	V	53.98	500
BN283	2745	harmonic	38.37	V	53.98	500
BN283	3660	harmonic	38.20	V	53.98	500
ST208	1830	harmonic	35.20	V	53.98	500
ST208	2745	harmonic	36.87	V	53.98	500
ST208	3660	harmonic	37.87	V	53.98	500

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1850	harmonic	35.00	H	53.98	500
BN215	2775	harmonic	39.27	H	53.98	500
BN215	3700	harmonic	38.47	H	53.98	500
BN223	1850	harmonic	35.33	H	53.98	500
BN223	2775	harmonic	40.10	H	53.98	500
BN223	3700	harmonic	39.30	H	53.98	500
BN283	1850	harmonic	36.33	H	53.98	500
BN283	2775	harmonic	38.77	H	53.98	500
BN283	3700	harmonic	38.80	H	53.98	500
ST208	1850	harmonic	35.67	H	53.98	500
ST208	2775	harmonic	37.77	H	53.98	500
ST208	3700	harmonic	38.63	H	53.98	500

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1850	harmonic	36.00	V	53.98	500
BN215	2775	harmonic	38.27	V	53.98	500
BN215	3700	harmonic	40.80	V	53.98	500
BN223	1850	harmonic	35.33	V	53.98	500
BN223	2775	harmonic	40.43	V	53.98	500
BN223	3700	harmonic	46.30	V	53.98	500
BN283	1850	harmonic	36.00	V	53.98	500
BN283	2775	harmonic	38.77	V	53.98	500
BN283	3700	harmonic	39.97	V	53.98	500
ST208	1850	harmonic	36.50	V	53.98	500
ST208	2775	harmonic	38.10	V	53.98	500
ST208	3700	harmonic	39.63	V	53.98	500

peak field strength:

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1818	harmonic	66.33	H	73.98	5000
BN215	2727	harmonic	70.00	H	73.98	5000
BN215	3636	harmonic	61.63	H	73.98	5000
BN223	1818	harmonic	55.17	H	73.98	5000
BN223	2727	harmonic	68.83	H	73.98	5000
BN223	3636	harmonic	53.97	H	73.98	5000
BN283	1818	harmonic	67.50	H	73.98	5000
BN283	2727	harmonic	62.17	H	73.98	5000
BN283	3636	harmonic	52.13	H	73.98	5000
ST208	1818	harmonic	45.83	H	73.98	5000
ST208	2727	harmonic	49.50	H	73.98	5000
ST208	3636	harmonic	52.13	H	73.98	5000

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1818	harmonic	63.00	V	73.98	5000
BN215	2727	harmonic	67.00	V	73.98	5000
BN215	3636	harmonic	71.47	V	73.98	5000
BN223	1818	harmonic	57.00	V	73.98	5000
BN223	2727	harmonic	70.17	V	73.98	5000
BN223	3636	harmonic	61.80	V	73.98	5000
BN283	1818	harmonic	62.17	V	73.98	5000
BN283	2727	harmonic	60.67	V	73.98	5000
BN283	3636	harmonic	40.63	V	73.98	5000
ST208	1818	harmonic	46.50	V	73.98	5000
ST208	2727	harmonic	49.17	V	73.98	5000
ST208	3636	harmonic	52.47	V	73.98	5000

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1830	harmonic	60.87	H	73.98	5000
BN215	2745	harmonic	62.20	H	73.98	5000
BN215	3660	harmonic	59.53	H	73.98	5000
BN223	1830	harmonic	50.87	H	73.98	5000
BN223	2745	harmonic	61.03	H	73.98	5000
BN223	3660	harmonic	52.03	H	73.98	5000
BN283	1830	harmonic	63.70	H	73.98	5000
BN283	2745	harmonic	59.37	H	73.98	5000
BN283	3660	harmonic	52.03	H	73.98	5000
ST208	1830	harmonic	64.20	H	73.98	5000
ST208	2745	harmonic	66.37	H	73.98	5000
ST208	3660	harmonic	62.03	H	73.98	5000

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1830	harmonic	55.87	V	73.98	5000
BN215	2745	harmonic	65.03	V	73.98	5000
BN215	3660	harmonic	67.37	V	73.98	5000
BN223	1830	harmonic	52.87	V	73.98	5000
BN223	2745	harmonic	68.20	V	73.98	5000
BN223	3660	harmonic	58.87	V	73.98	5000
BN283	1830	harmonic	60.03	V	73.98	5000
BN283	2745	harmonic	61.37	V	73.98	5000
BN283	3660	harmonic	54.37	V	73.98	5000
ST208	1830	harmonic	66.37	V	73.98	5000
ST208	2745	harmonic	71.87	V	73.98	5000
ST208	3660	harmonic	67.03	V	73.98	5000

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1850	harmonic	61.50	H	73.98	5000
BN215	2775	harmonic	65.60	H	73.98	5000
BN215	3700	harmonic	64.13	H	73.98	5000
BN223	1850	harmonic	53.17	H	73.98	5000
BN223	2775	harmonic	63.43	H	73.98	5000
BN223	3700	harmonic	53.30	H	73.98	5000
BN283	1850	harmonic	58.17	H	73.98	5000
BN283	2775	harmonic	57.60	H	73.98	5000
BN283	3700	harmonic	51.97	H	73.98	5000
ST208	1850	harmonic	46.33	H	73.98	5000
ST208	2775	harmonic	49.77	H	73.98	5000
ST208	3700	harmonic	52.30	H	73.98	5000

Type	Frequency (MHz)	Nature of emission	Test result @ 3 m distance (dB μ V/m)	Polarisation	Limit (dB μ V/m)	Limit (μ V/m)
BN215	1850	harmonic	62.83	V	73.98	5000
BN215	2775	harmonic	63.77	V	73.98	5000
BN215	3700	harmonic	72.30	V	73.98	5000
BN223	1850	harmonic	55.83	V	73.98	5000
BN223	2775	harmonic	66.60	V	73.98	5000
BN223	3700	harmonic	60.45	V	73.98	5000
BN283	1850	harmonic	55.67	V	73.98	5000
BN283	2775	harmonic	57.60	V	73.98	5000
BN283	3700	harmonic	54.63	V	73.98	5000
ST208	1850	harmonic	46.33	V	73.98	5000
ST208	2775	harmonic	49.43	V	73.98	5000
ST208	3700	harmonic	53.63	V	73.98	5000

Spurious emissions up to 10 GHz have been investigated.

Measurement uncertainty: +4.5 dB / -6.1 dB

Used test equipment module

The following measurement equipment was used:

Location Telefication Zevenaar:

Description	ID / SN	Manufacturer	Model
Spectrum Analyzer	TE 00481	Hewlett Packard	HP8563E
RF Preamplifier	TE 00124	Hewlett Packard	HP8349A
Biconilog antenna	TE 00700	EMCO	3143
Horn Antenna	TE 00531	EMCO	3115
Anechoic Chamber	--	Euroshield	RFD-F-100
Digital Thermometer	TE 00388	Fluke	Fluke 51
Antenna tower	--	HD	AS 620p
Turntable	--	HD	DS 412
Turntable controller	--	HD	HD 050

Location TNO Nierkerk:

Description	ID / SN	Manufacturer	Model
Plastic measurement room	12636	Polyforce	-
Open Area Test Site	13886	Comtest	-
Antenna mast 4 m	14277	Heinrich Deisel	MA240
Controller OATS	14278	Heinrich Deisel	HD100
Loop Antenna	1107	Chase	HLA6120
Biconilog antenna 30 MHz - 1000 MHz	15633	Chase	CBL6111B
EMI test receiver	15667	Rohde & Schwarz	ESCS 30
Turntable OATS	99108	Heinrich Deisel	HD050