

# Radio test report

## 20153854301-Ver 1.10

Additional to 20153854300

based on:

FCC part 15C; section 15.247 (ed. 10-1-14); RSS-247, issue 1

XS4 Mifare + Bluetooth Low Energy Electronic Lock  
Series  
SALTO  
ABXW

## Revision history

REVISION	DATE	REMARKS	REVISED BY
Ver 1.10	12 April 2016	<ul style="list-style-type: none"><li>• IC ID changed;</li><li>• Product description changed</li></ul>	ing. P.A. Suringa
Ver 1.00	7 December 2015	Initial release	ing. P.A. Suringa
Ver 0.50	20 November 2015	Version for peer review	ing. P.A. Suringa

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## 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 Registration Number is: 282250.*

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

*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 : Salto Systems, S.L.  
Address : C/Arkotz 9 Pol. Lanbarren  
Zipcode : 20180  
City/town : Oiartzun  
Country : Spain  
Date of order : 19 June 2015

## 2 Product

A sample of the following product was submitted for testing:

Product description	:	XS4 Mifare + Bluetooth Low Energy Electronic Lock Series
Manufacturer	:	Salto systems, S.L.
Trade mark	:	SALTO
Type designation	:	ABXW
FCC ID	:	UKCABXW
IC ID	:	10088A-ABXW
Serial number	:	--
Hardware release	:	--
Software release	:	--

## 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 sample of the product is received on:

- 3 September 2015

Tests are carried out between:

- 12 October and 18 November 2015

## 4 Product documentation

For production of this report the following product documentation has been used:

Identification:	Date:
ABXW_Schematic_Reader.PDF	22-7-2015
RF_722_09, IC Application form RSP-100, annex A.docx	9-9-2015
ABXW Operational Description.pdf , version 2.3	2-9-2015

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

The product under test, type ABXW, is a wireless entry system operating on Bluetooth LE, RFID on 13.56 MHz and ZigBee (IEEE 802.15.4).

A variant, type ABXX, is a wireless entry system containing Bluetooth LE and RFID on 13.56 MHz. Test results of the variant are contained in test report no. 20153854300.

This test report, containing ZigBee results only, is additional to Telefication test report 20153854300.

## 6 Modifications to the sample

No modifications are made to the sample.

## 7 Summary

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

INTENTIONAL RADIATOR OPERATING IN THE FREQUENCY BAND 2400 - 2483.5 MHz

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

FCC part 15C; section 15.247 (ed. 10-1-14); RSS-247, issue 1

## 8 Conclusions

The samples 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 section 7 “*Summary*”.

All tests are performed by:

name : ing. P.A. Suringa

Review of test report by:

name : ing. J.C. le Clercq

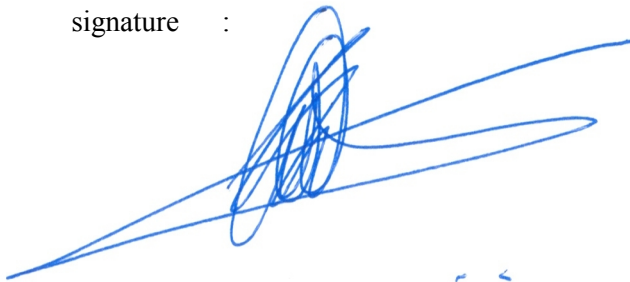
The above conclusions have been verified by the following signatory:

date : 12 April 2016

name : ing. M.T.P.M. Wouters v/d Oudenweijer

function : Director Certification

signature :



## Test results module

### 1 General information

#### 1.1 Equipment information

Type of equipment	Wireless entry system using IEEE 802.15.4 (Zigbee)
Modulation	O-QPSK
Spreading type	DSSS
Chip rate	2Mbit/s
Data rate	250 kbit/s
Emission designator	1M30G1D
Operating frequencies (MHz)	2405 + 5 (k - 11) with k = 11, 12.....26

#### 1.2 Tested channels

Ch	Frequency (MHz)
1	2405
2	2450
3	2480



## 2 Emission tests

### 2.1 Maximum radiated peak power

Compliance standard : FCC part 15, subpart C, section 15.247 (b) (3) (4)  
 Method of test : FCC KDB publication No. 558074 D01 v03r01  
 Ambient temperature : 23 °C  
 Relative humidity : 36 %

Test results :

Mode	Level (dBm)		
	CH 1	CH 2	CH 3
Continuously transmitting	-2.8	-1.9	2.4

Measurement uncertainty: + 1.6 /- 1.9 dB

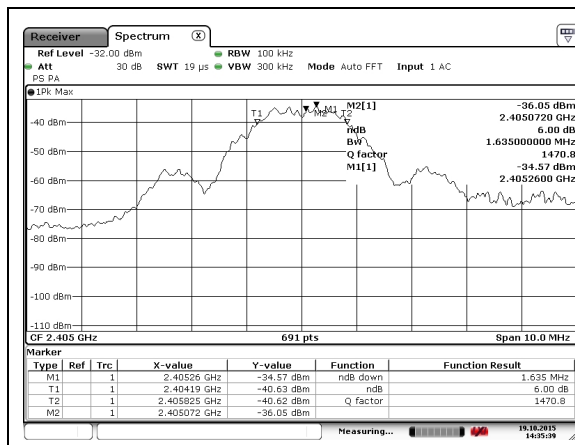
#### Limit:

Maximum conducted output power	≤ 30 dBm (antenna gain < 6 dBi)
<i>De facto</i> maximum radiated output power	≤ 36 dBm e.i.r.p.

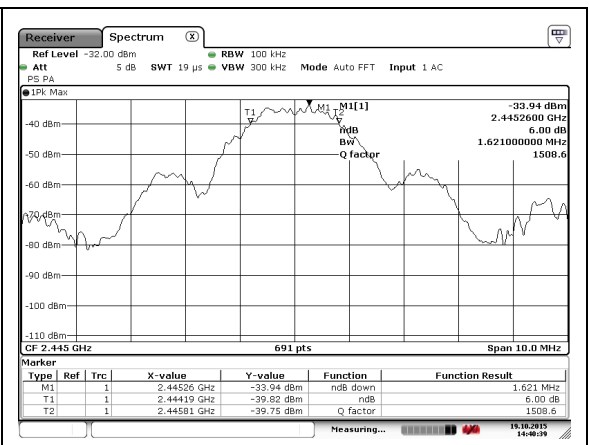
## 2.2 Minimum 6 dB bandwidth

Compliance standard : FCC part 15, subpart C, section 15.247 (a) (2)  
 Method of test : FCC KDB publication No. 558074 D01 v03r01  
 Ambient temperature : 23 °C  
 Relative humidity : 36 %

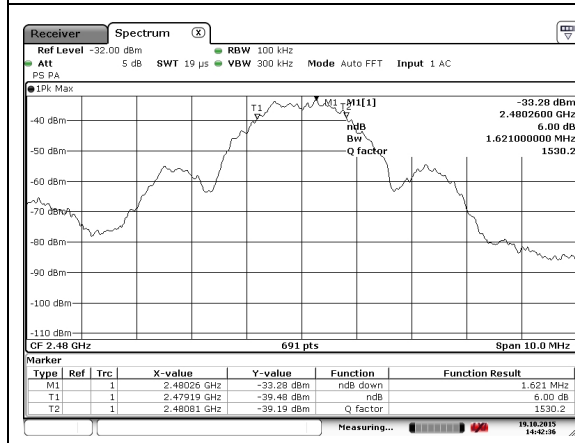
Test results :



CH 1: -6dB bandwidth = 1.64 MHz



CH 2: -6dB bandwidth = 1.62 MHz



CH 3: -6 dB bandwidth = 1.62 MHz

Intentionally left blank

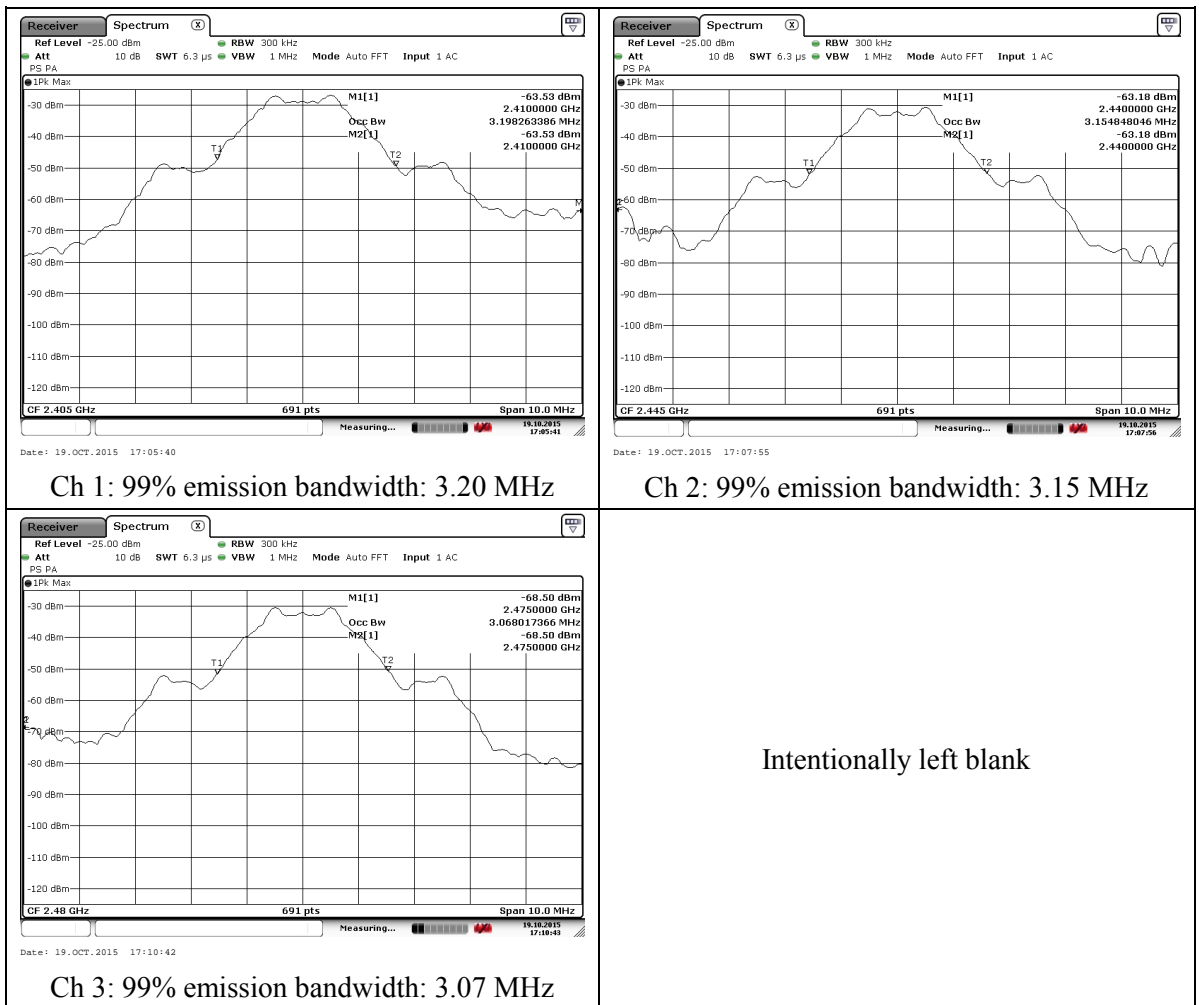
Measurement uncertainty: +/- 2 kHz

Limit:

Minimum 6 dB bandwidth	at least 500 kHz
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### 2.3 99% emission bandwidth

Compliance standard : IC RSS-Gen, section 4.6.1  
 Method of test : IC RSS-Gen, section 4.6.1  
 Ambient temperature : 23 °C  
 Relative humidity : 36 %



Measurement uncertainty: +/- 2 kHz

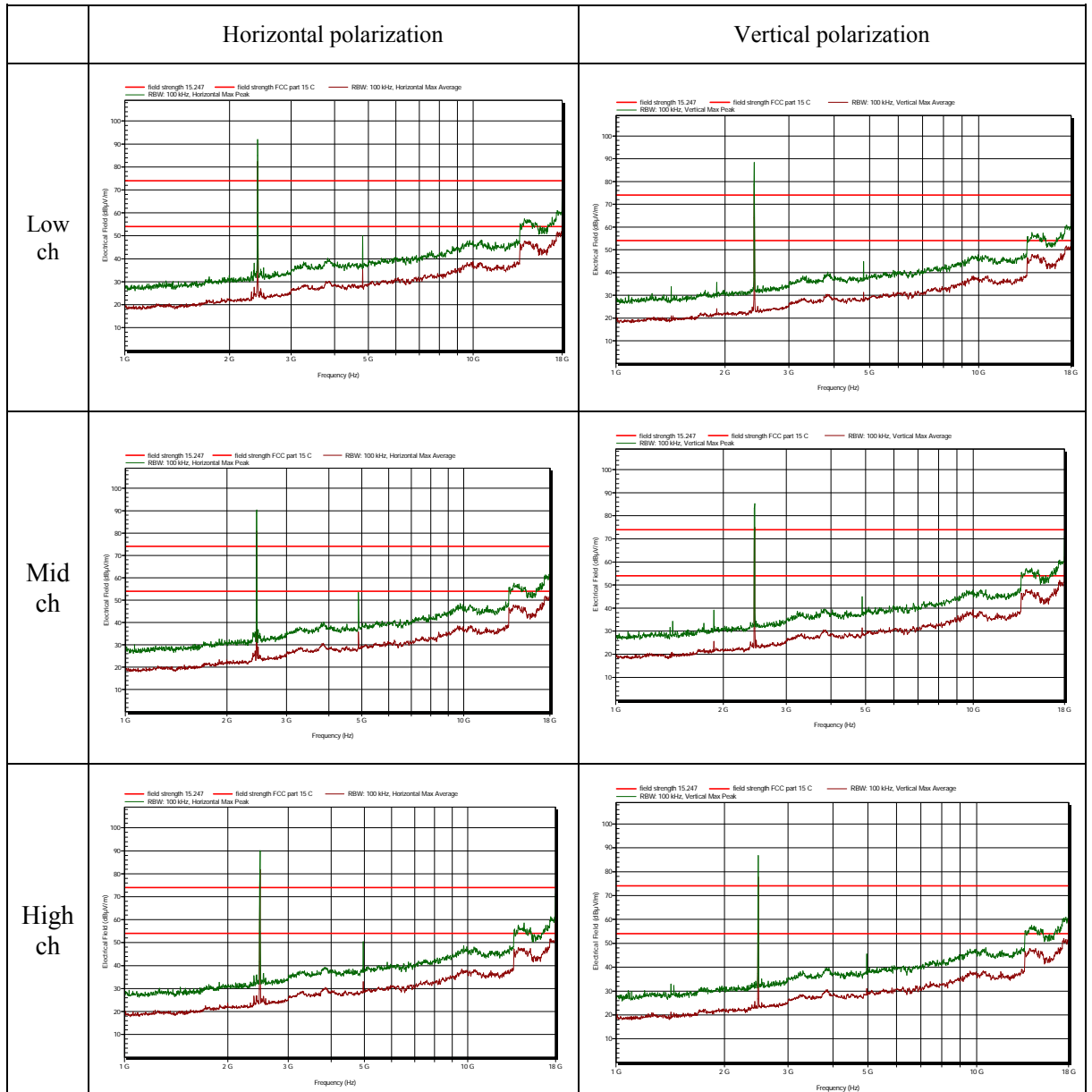
**Limit:**

99% emission bandwidth	Not applicable
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## 2.4 TX spurious emissions (radiated, 1 - 18 GHz)

Compliance standard : FCC part 15, subpart C, section 15.247(d)  
 Method of test : FCC KDB publication No. 558074 D01 v03r01  
 Ambient temperature : 23 °C  
 Relative humidity : 36 %

Test results :



Measurement uncertainty: < 2 GHz: + 1.7/- 1.9 dB; ≥ 2 GHz: +2.4/-2.7 dB

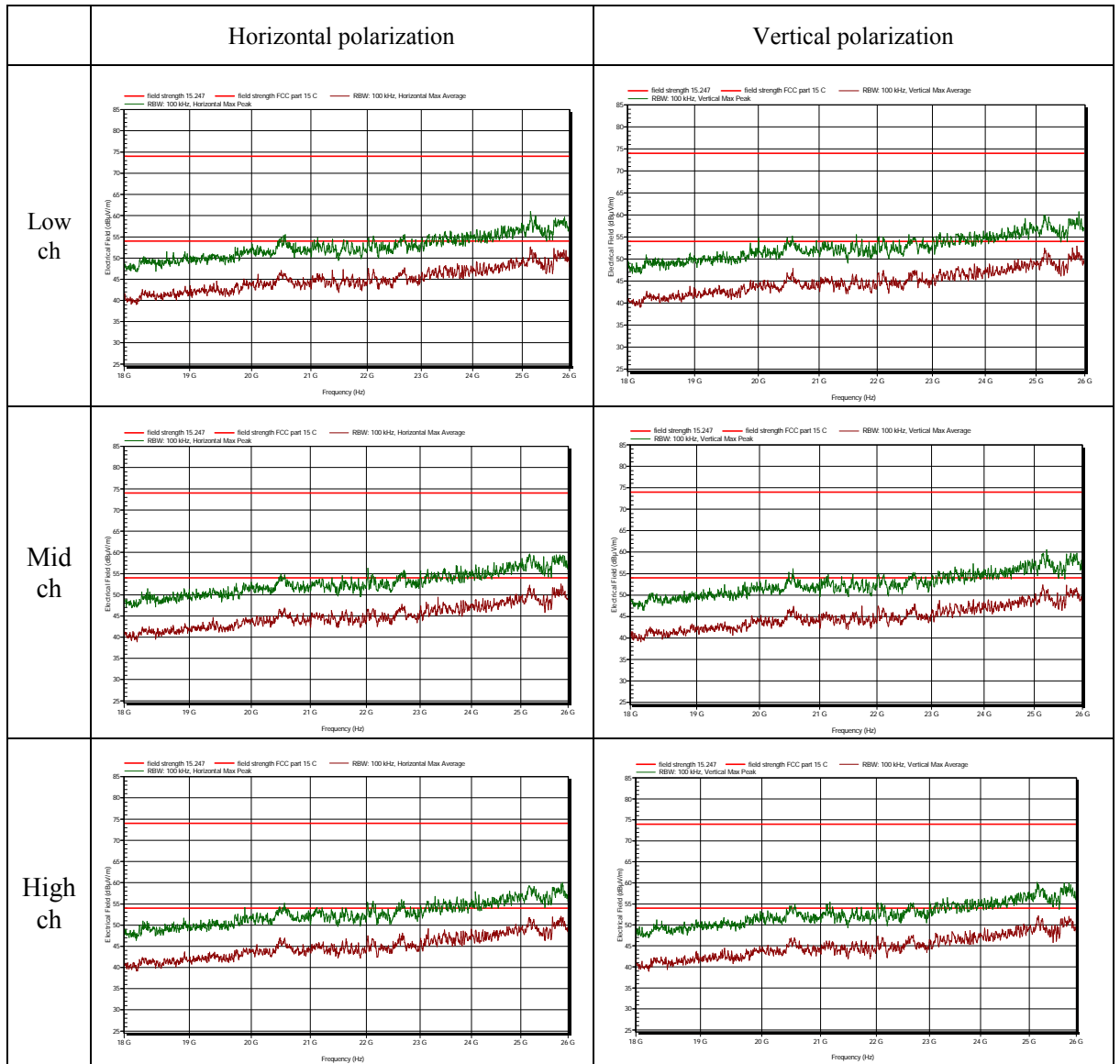
**Limits:**

In any 100 kHz bandwidth	At least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz bandwidth.
In restricted bands	≤ 54 dBµV/m

## 2.5 TX spurious emissions (radiated, 18 - 26 GHz)

Compliance standard : FCC part 15, subpart C, section 15.247(d)  
 Method of test : FCC KDB publication No. 558074 D01 v03r01  
 Ambient temperature : 23 °C  
 Relative humidity : 36 %

Test results :



Measurement uncertainty: < 2 GHz: + 1.7/- 1.9 dB; ≥ 2 GHz: +2.4/-2.7 dB

**Limits:**

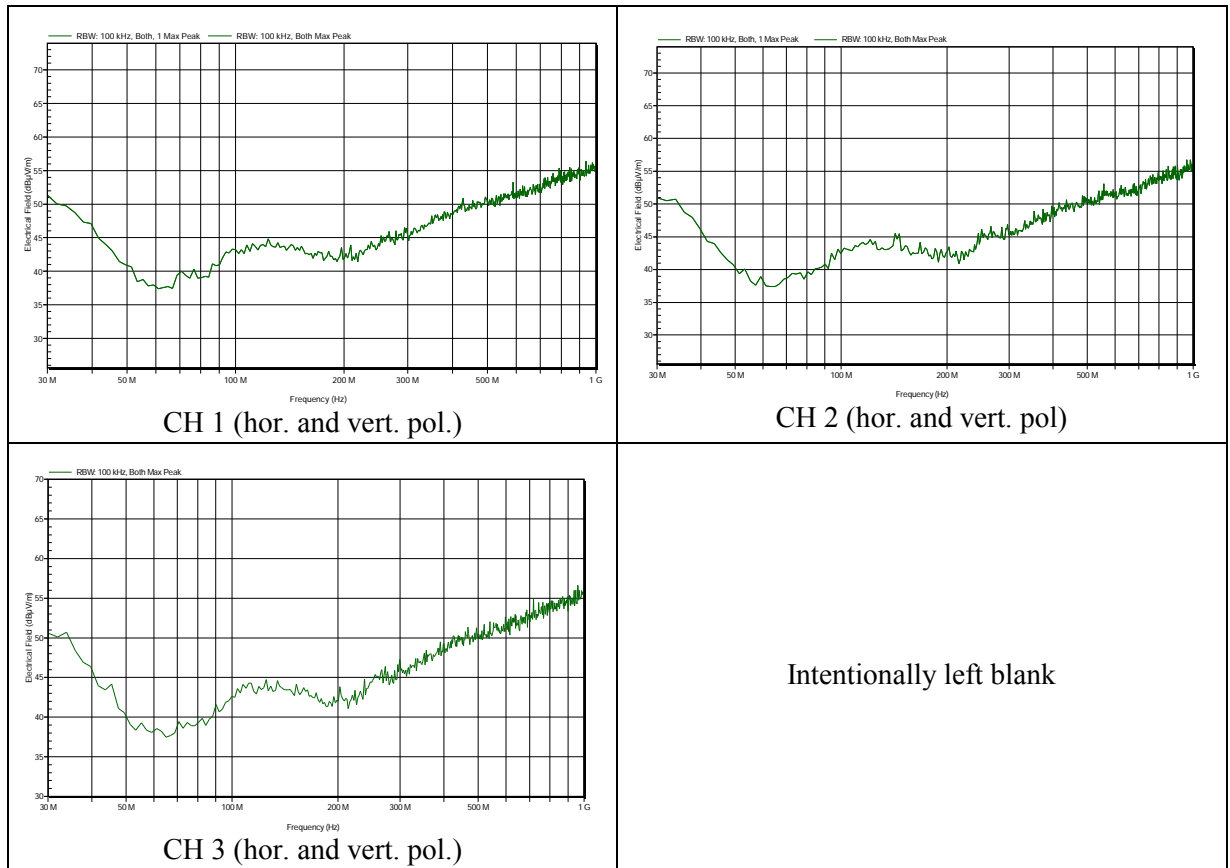
In any 100 kHz bandwidth	At least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz bandwidth.
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In restricted bands	≤ 54 dBµV/m
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## 2.6 TX spuriuos emissions (radiated, 0.03-1 GHz)

Compliance standard : FCC part 15, subpart C, section 15.247(d)  
 Method of test : FCC KDB publication No. 558074  
 Ambient temperature : 23 °C  
 Relative humidity : 23 %

Test results :



### Limit:

Field strength at 3 meter distance	30 – 88 MHz: $\leq 40 \text{ dB}\mu\text{V/m}$ ; 88 – 216 MHz: $\leq 43.5 \text{ dB}\mu\text{V/m}$ ; 216 – 960 MHz: $\leq 46 \text{ dB}\mu\text{V/m}$ ; Above 960 MHz: $\leq 54 \text{ dB}\mu\text{V/m}$
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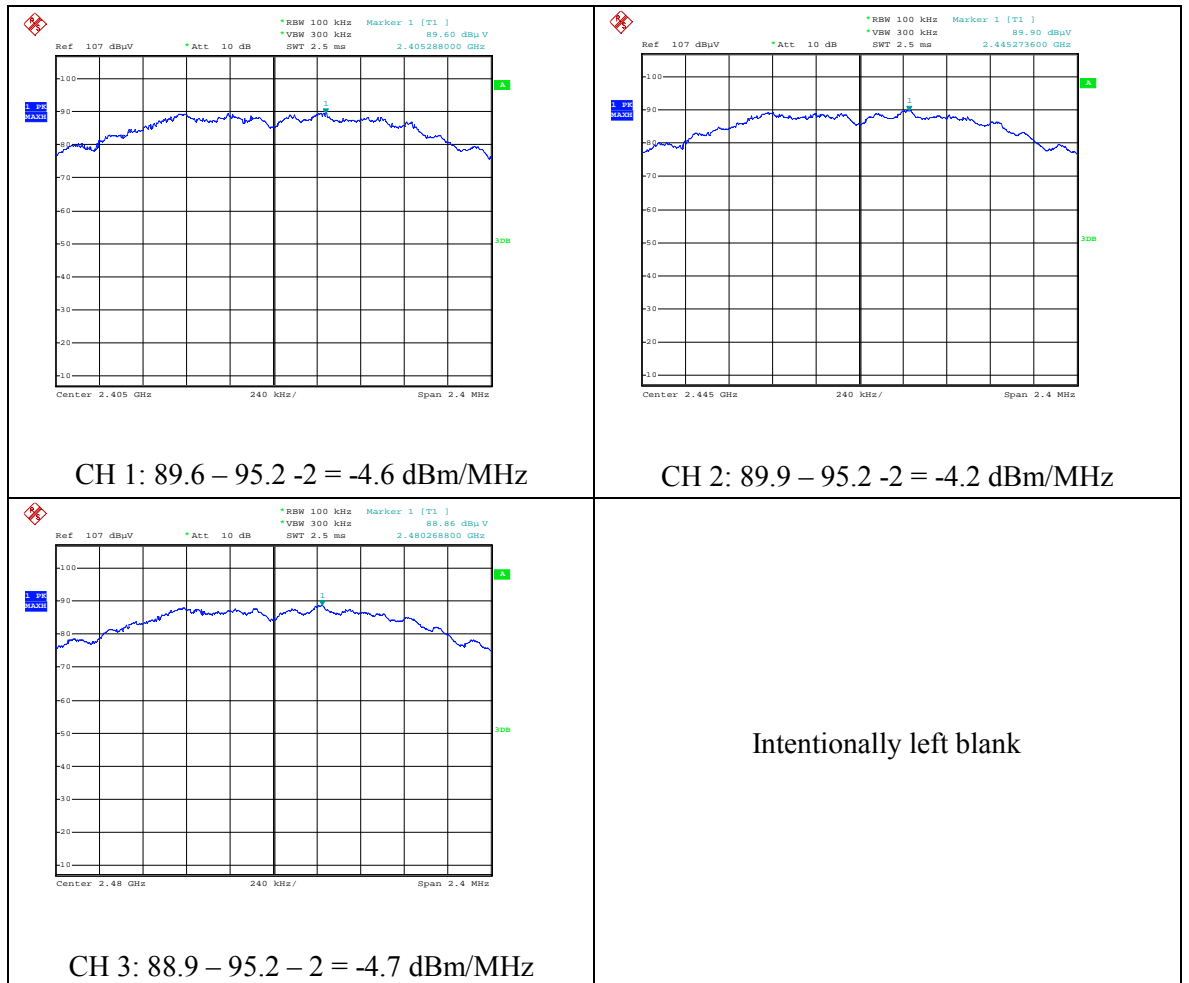
### Measurement uncertainty:

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

## 2.7 Power spectral density conducted to the antenna

Compliance standard : FCC part 15, subpart C, section 15.247(e)  
 Method of test : FCC KDB publication No. 558074 D01 v03r01  
 Ambient temperature : 23 °C  
 Relative humidity : 36 %

Test results :



Measurement uncertainty: < 2 GHz: + 1.7/- 1.9 dB;  
 ≥ 2 GHz: + 2.4/- 2.7 dB

**Limit:**

In any 3 kHz band	Not greater than 8 dBm during any time of continuous transmission
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## Used test equipment module

Description	ID	Manufacturer	Model	Used at par.
Spectrum Analyzer	TE 11125	Rohde & Schwarz	FSP 40	2.1, 2.6, 2.7
Spectrum Analyzer	TE 01220	Rohde & Schwarz	ESR7	2.2, 2.3
Pre amplifier	TE 11132	Miteq	AFS42-041001800-28-OP-42	2.1, 2.4, 2.7
Horn antenna	TE 00531	EMCO	3115	2.1, 2.2, 2.3, 2.4, 2.7
Semi Anechoic Room	TE 00861	Comtest	--	2.1, 2.4, 2.6
Biconilog antenna	TE 00967	Chase	CBL6112A	2.6
Pre amplifier	TE 11131	Miteq		2.5



## Cross reference table

<b>Transmitter</b>	
<b>IC RSS-247 Issue 1</b>	<b>FCC 47 CFR Ch. 1 part 15, subpart C (10-1-14 Edition)</b>
§ 5.2.1	§ 15.247 (a) (2)
§ 5.4.4	§ 15.247 (b) (3)
§ 5.2.2	§ 15.247 (e)
§ 5.5	§ 15.247 (d)
<b>IC RSS-Gen Issue 4</b>	<b>FCC 47 CFR Ch. 1 part 15, subpart C (10-1-14 Edition)</b>
§ 4.6.1	--