Test Report

FINAS
Finnish Accreditation Service
T004 (EN ISO/IEC 17025)

INTENTIONAL RADIATOR TESTS ACCORDING TO FCC PART 15 C AND ISED CANADA REQUIREMENTS

Equipment Under Test:	Wireless Heat Sensor
Model:	SGS1030
Manufacturer:	Innohome Oy Itsehallintokuja 4 FI-02600 ESPOO FINLAND
Customer:	Innohome Oy Itsehallintokuja 4 FI-02600 ESPOO FINLAND
FCC Rule Part: IC Rule Part:	15.231: 2017 RSS-210 Issue 9, 2017 RSS-GEN Issue 5, 2018

Date: 8 August 2019
Issued by:
Pekka Kälviäinen
Testing Engineer

Date: 8 August 2019
Checked by:
Rauno Repo
Testing Engineer

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GENERAL REMARKS

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. This document cannot be reproduced except in full, without prior approval of the Company.

RELEASE HISTORY

Version	Changes	Issued
1.0	Initial release	4 September 2018
2.0	IC number added, 20 dB bandwidth type error corrected	8 August 2019

PRODUCT DESCRIPTION

Equipment Under Test (EUT)

Wireless Heat Sensor	
Host Model:	SGS1030
RF module inside host:	CMOSTEK CMT2110A
Serial no:	-
FCC ID:	2AG2GSGS1030
IC:	21029-SGS1030

Description of the EUT

Detecting device for stove guard. The EUT transmits heartbeat signals and alarm signals for stove guard. The EUT is normally installed above stove.

Classification of the device

Fixed device	☐
Mobile Device (Human body distance > 20cm)	☒
Portable Device (Human body distance < 20cm)	☐

Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

Ratings and declarations

Operating Frequency Range (OFR):	315 MHz
Channels:	1
Channel separation:	-
99% Channel bandwidth:	282.051 kHz
Radiated power:	avg 74.50 dBµV/m, peak 76.61 dBµV/m
Modulation:	OOK

Power Supply

Operating voltage:	3.0 VDC, CR2032 Lithium battery

Mechanical Size of the EUT

Height: 18 mm	Width:38 mm	Length: 92 mm

Samples

During the tests the EUT was configured to transmit its sequence every 500 ms which differs from normal operation. Normally device transmits heartbeat signal every 12 hour.

Peripherals

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SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.231(b) / RSS-210 A.1.2	Field Strength of the Fundamental Signal	**PASS**
§15.209(a), §15.231(b) / RSS-GEN, RSS-210 A.1.2	Field Strength of Spurious Emissions	**PASS**
§15.231(c)	20 dB Bandwidth	**PASS**
RSS-210 A.1.3	99% Occupied Bandwidth	**PASS**
§15.231(a) / RSS-210 A.1.3	Periodic Operation and Dwell Time	**PASS**

EUT Test Conditions During Testing

The EUT was tested with new batteries with three orthogonal positions. The EUT was placed on a table 80/150 cm from the ground floor while its front cover was facing upwards.

Test Facility

☐	Testing Location / address: FCC registration number: **90598**	SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND
☒	Testing Location / address: FCC registration number: **178986** Industry Canada registration number: **8708A-2**	SGS Fimko Ltd Karakaarenkuja 4 FI-02610, ESPOO FINLAND

TEST RESULTS

Field Strength of the Fundamental Signal

Standard:	ANSI C63.10	(2013)
Tested by:	PKA	
Date:	29 August 2018	
Temperature:	20 °C	
Humidity:	50 % RH	
Measurement uncertainty	± 4.51 dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.231(b)
RSS-210 A.1.2

The radiated emission measurements were done within a semi anechoic screened chamber. The EUT was placed on a table 0.8 m above the reflecting ground plane.The measurement distance was 3 meters. The highest fundamental signal was determined during measurements by rotating the turntable and adjusting the antenna height. The measurements were done in horizontal and vertical antenna polarizations.

Results:

Highest Fundamental Signal Strength

Frequency (MHz)	MaxPeak (dBµV/m)	Duty-cycle Correction Factor (dB)	Calculated Average (dBµV/m)	Limit Average (dBµV/m)	Limit Peak (dBµV/m)	Result
314.980	76.61	-3.11	73.50	75.62	95.62	**PASS**

Average value is calculated using duty-cycle correction factor described in ANSI C63.10 clause 7.5.

Correction factor equation:
$\delta(dB) = 20 \log (\Delta)$, where Δ is duty-cycle

Δ = 69.872 ms / 100 ms x 100% = 69.872 %
20 log (0.69872) dB = -3.114 dB

The maximum inspection interval for the duty-cycle correction is 100 ms and since the EUT normally transmits every 12 hour, the 100 ms interval is used.

Duty-cycle is measured as another test and is included in this report.

Field strength of Spurious Emissions 0.009 – 4000 MHz

Standard:	ANSI C63.10	(2013)
Tested by:	PKA	
Date:	29 August 2018	
Humidity:	20 °C	
Temperature:	50 % RH	
Measurement uncertainty	± 4.51 dB	Level of confidence 95 % (k = 2)

FCC Rule: §15.209(a), §15.231(b)
RSS-GEN, RSS-210 A.1.2

The radiated emission measurements were done within a semi anechoic screened chamber. The EUT was placed on a table 0.8 m above the reflecting ground plane.The measurement distance was 3 meters. The highest emission signal was determined during measurements by rotating the turntable and adjusting the antenna height. The measurements were done in horizontal and vertical antenna polarizations. Floor absorbers and 1.5 m table was used for measurements over 1 GHz.

15.209 limits:

Frequency range [MHz]	Limit [µV/m]	Limit [dBµV/m]	Detector
30 - 80	100	40.0	Quasi-peak
88 - 216	150	43.5	Quasi-peak
216 - 960	200	46.0	Quasi-peak
960 - 1000	500	53.9	Quasi-peak
Above 1000	500	53.9	Average
Above 1000	5000	73.9	Peak

Table 1: Peak field strength of spurious emissions

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Polarization	Corr. (dB)	Margin (dB)	QP/Peak Limit (dBµV/m)
629.925	**37.0**	**1000.0**	**120.000**	**H**	**24.3**	**9.0**	**46.0**

99 % Occupied Bandwidth and 20 dB Bandwidth

Standard:	ANSI C63.10	(2013)
Tested by:	PKA	
Date:	8 August 2018	
Humidity:	20 °C	
Temperature:	50 % RH	
Measurement uncertainty	± 2.87 dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.231(c)
RSS-210 A.1.3

Bandwidth was measured within a semi anechoic screened chamber. The EUT was placed on a table 0.8 m above the reflecting ground plane. The measurement distance was 3 meters. Limit is 0.25% of the devices operating frequency.

Measurement type	Measured Bandwidth (kHz)	Limit (kHz)	Result
99 %	282.051	787.5	**PASS**
20 dB	133.013	787.5	**PASS**

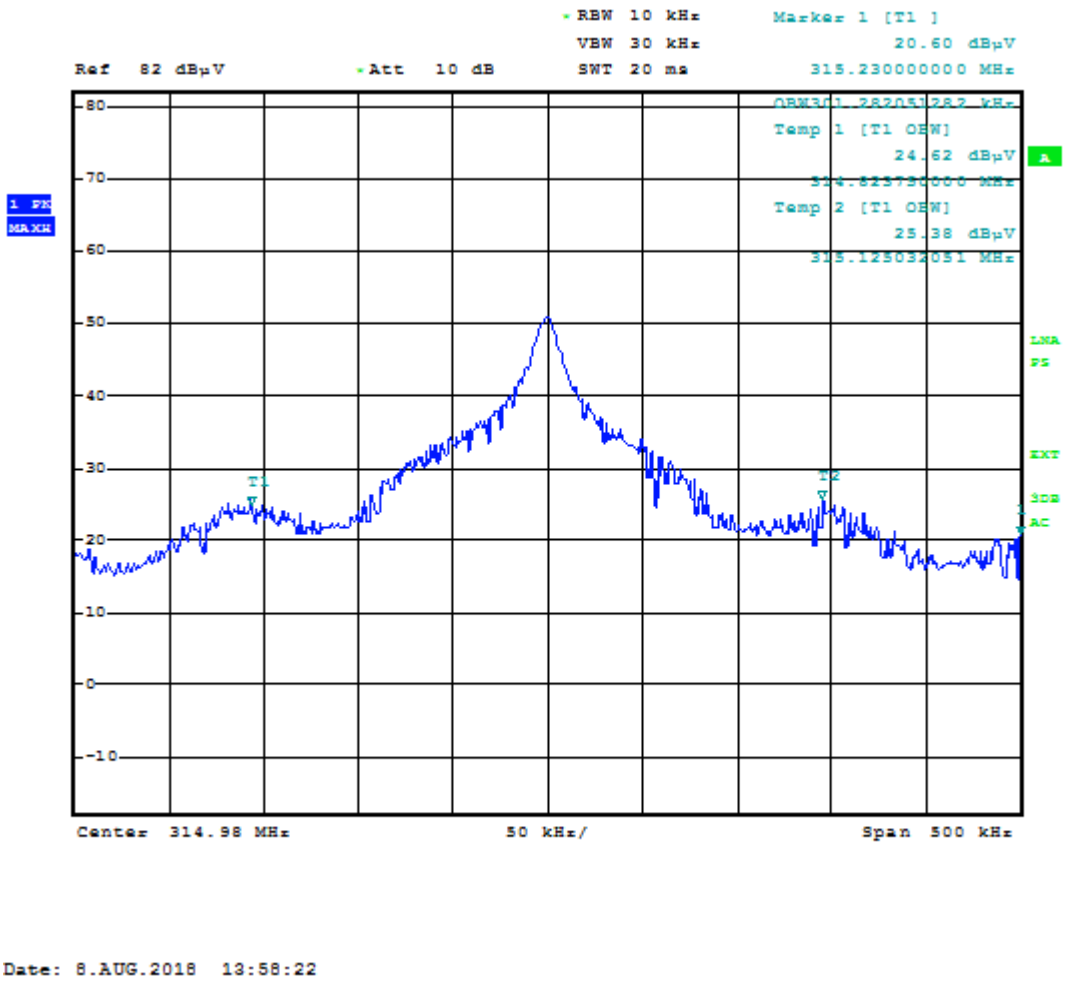

Figure 1. Screen capture of the 99 % OBW

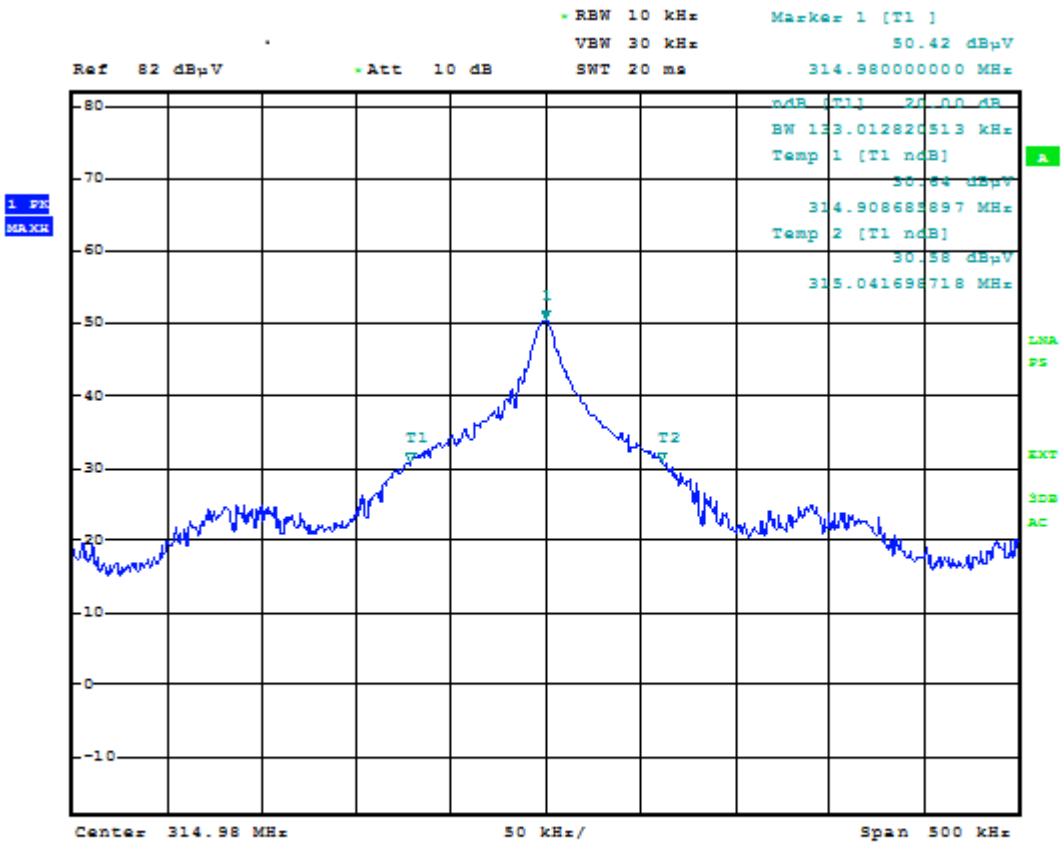

Figure 2. Screen capture of the 20 dB BW

Periodic Operation and Dwell Time

Standard:	ANSI C63.10	(2013)
Tested by:	PKA	
Date:	8 August 2018	
Humidity:	20 °C	
Temperature:	50 % RH	
Measurement uncertainty	± 500ns	Level of confidence 95 % (k = 2)

FCC Rule: §15.231(a)
RSS-210 A.1.2

Signal parameters were measured within a semi anechoic screened chamber. The EUT was placed on a table 0.8 m above the reflecting ground plane. The measurement distance was 3 meters.

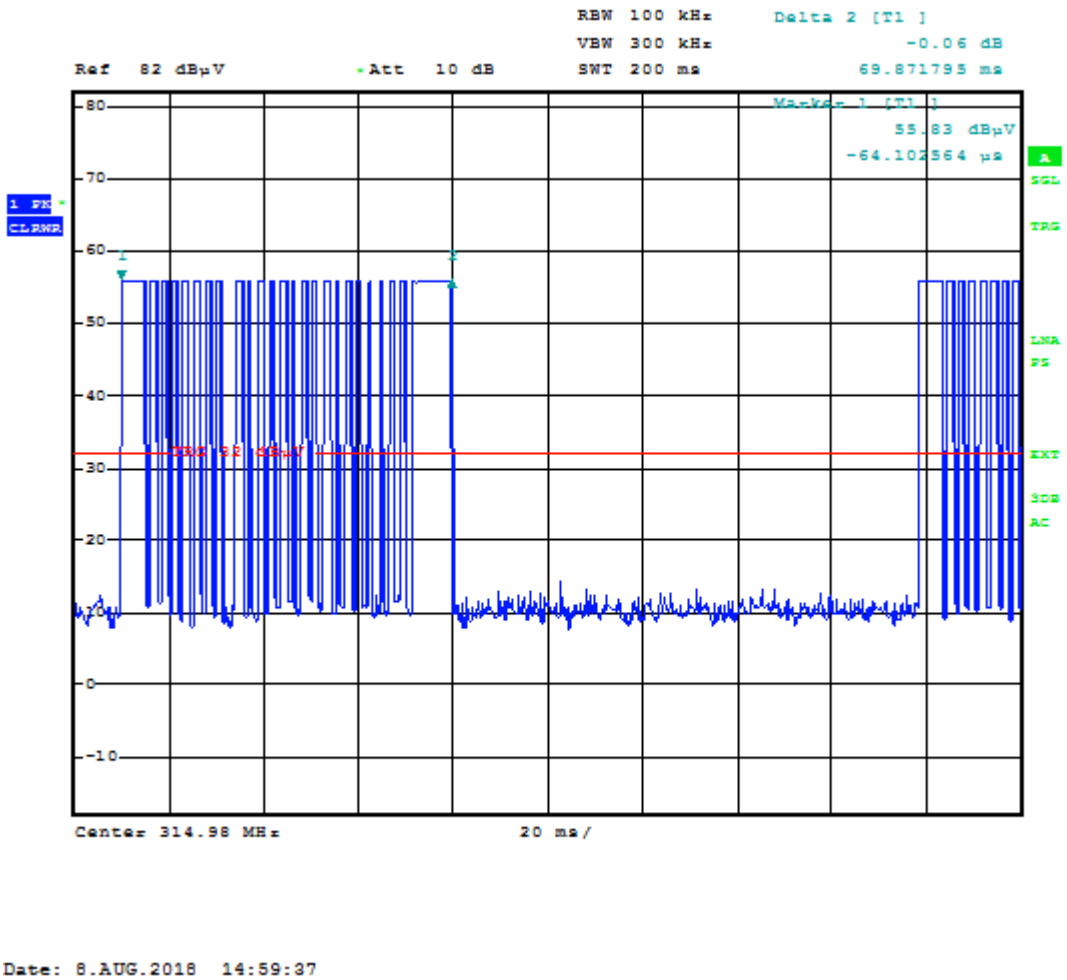

Figure 3. Transmission sequence of the EUT

Total length of the transmission burst is **69.872 ms.** (small caps were not included to calculations)

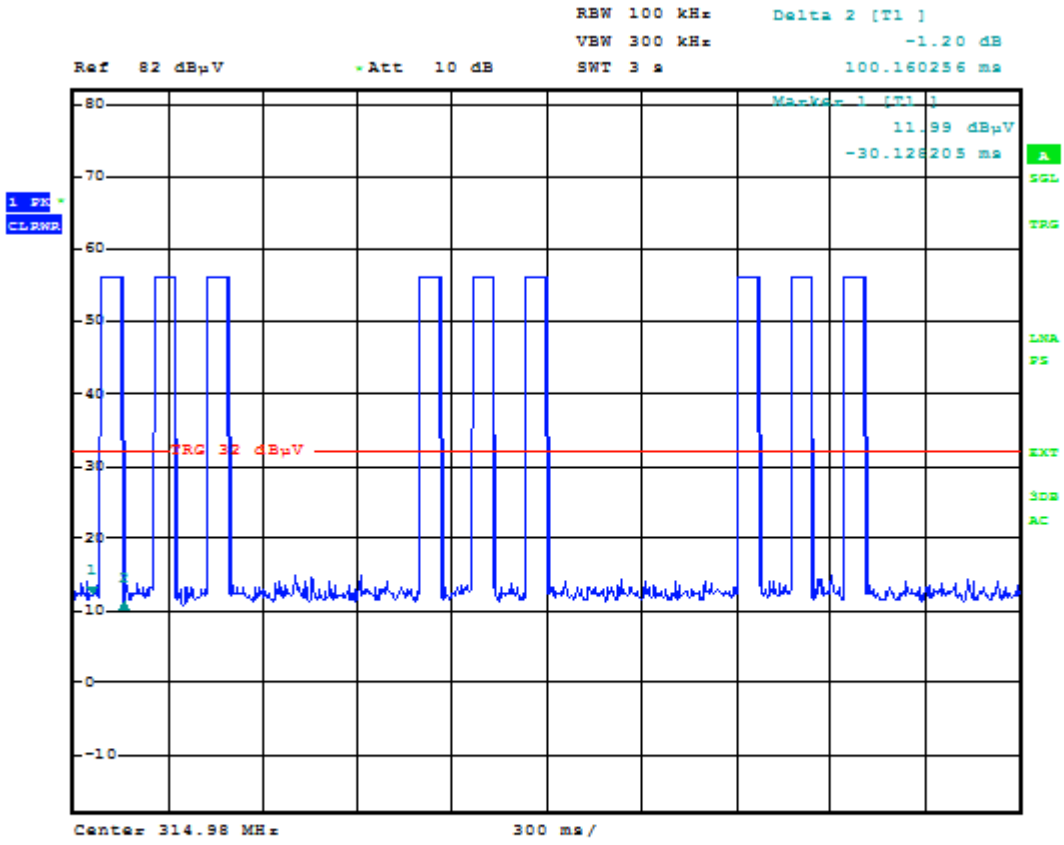

Figure 4. Transmission sequence of the EUT (special configuration provided for the tests)

Normally device transmits every 12 hour as declared by the manufacturer.
Graph shows that time between start of the first pulse and start of the second pulse is **600 ms.**

TEST EQUIPMENT

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU 26	inv:8453	2018-06-27	2019-06-27
PREAMPLIFIER	CIAO	CA118-3123	inv:10278	2017-11-16	2018-11-16
FILTER	WAINWRIGHT	HP, WHK0.6/13G-10SS	inv:9562	2017-03-01	2019-03-01
ANTENNA	ROHDE & SCHWARZ	HFH2-Z2 , 335.4711.52	inv:8013	2016-08-29	2018-08-29
ANTENNA	SCHWARZBECK	VULB 9168	inv:8911	2016-10-25	2018-10-25
ANTENNA	EMCO	3117	inv:7293	2018-03-14	2020-03-14
TURNTABLE	MATURO	DS430 UPGRADED	inv:10182	-	-
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	-	-
ANTENNA MAST	MATURO	TAM 4.0E	inv:10181	-	-