

Test Report



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

Equipment Under Test: Elevator Performance Monitor

Model: KONE Connection 120

Trademark:



Applicant: Kone Corporation
Kartanontie 1
FI-00330 Helsinki
FINLAND

Manufacturer: Kone Corporation
Kartanontie 1
FI-00330 Helsinki
FINLAND

FCC Rule Part: FCC Part 15 Subpart C (15.31), 2016
FCC Part 22 Subpart H (22.917), 2016

ISED Rule Part: RSS-247, Issue 2, 2017
RSS-GEN Issue 4, 2014
RSS-132 Issue 3, 2013

Date: 7 November 2017

Issued by:

A blue ink signature of Mikko Halonen.

Mikko Halonen
Testing Engineer

Date: 7 November 2017

Checked by:

A blue ink signature of Rauno Repo.

Rauno Repo
Testing Engineer

Table of Contents

PRODUCT DESCRIPTION	3
Equipment Under Test (EUT)	3
Description of the EUT	3
Bluetooth Smart Module/Chip Information:	3
Cellular Module/Chip Information:	3
Power Supply	4
Mechanical Size of the EUT	4
GENERAL REMARKS.....	5
Disclaimer	5
SUMMARY OF TESTING.....	6
EUT Test Conditions during Testing	6
TEST RESULTS.....	7
Conducted Emissions In The Frequency Range 150 kHz - 30 MHz.....	7
Transmitter Radiated Spurious Emissions 30 - 26500 MHz	9
Out of Band Emissions for Cellular Equipment 30 MHz to 8500 MHz	12
TEST EQUIPMENT	13

Equipment Under Test (EUT)

Elevator Performance Monitor:

Trade mark:



Model: KONE Connection 120

Serial no: -

FCC ID Number: 2ALQBKC120

IC ID Number: 4228A-KC120

The highest internal frequency source is 535 MHz.

Description of the EUT

AnyLift is an Elevator Performance Monitor that collects data of the elevator's performance. It is a device that works independently from elevator electrification and measures elevator performance through its sensors. The device is installed on the elevator car roof regardless of the elevator manufacturer and is powered by separately approved AC/DC power source.

Two radio chips are used for communication:

Bluetooth Smart Module/Chip Information:

Manufacturer: LS Research
Model No: TiWi-uB2 Bluetooth Smart
FCC ID : TFB-BT1
ISED Cert. No : 5969A-BT1

Cellular Module/Chip Information:

Manufacturer: Gemalto M2M GmbH
Model No: EHS6
FCC ID : QIPEHS6
ISED Cert. No : 7830A-EHS6

Classification of the device

Fixed device	<input type="checkbox"/>
Mobile Device (Human body distance > 20cm)	<input type="checkbox"/>
Portable Device (Human body distance < 20cm)	<input checked="" type="checkbox"/>

Antenna Types

Radio type:	Bluetooth
Antenna Type & model:	Johansson Technology 2450AT43B100E
Antenna Gain (dBi):	1.3 dBi
Integral/external/removable:	Integral antenna

Radio type:	Cellular
Antenna Type & model:	Delock 88451
Antenna Gain (dBi):	4.0 dBi
Integral/external/removable:	Integral antenna

The distance between the antennas is less than 20 cm.

Modifications Incorporated in the EUT

No modifications.

Power Supply

Supply voltage: 9 - 36 VDC

Rated current: 1000 mA

Powered by separate AC/DC power supply

AC/DC power supply:

input:

Rated voltage:	100-240V
Rated frequency:	50-60Hz
Rated current:	0.5A

output:

Rated voltage:	12V
Rated frequency:	DC
Rated current:	1.5A

Tests were performed with 115 VAC / 60 Hz.

Mechanical Size of the EUT

Dimensions (W x H x L): 132.2 mm x 22.4 mm x 130.0 mm

Disclaimer

This document is issued by the Company under its General Conditions of service accessible at [http://www.sgs.com/terms and conditions.htm](http://www.sgs.com/terms_and_conditions.htm). attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

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.

Summary of Testing

SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.207(a) / RSS-GEN 8.8	Conducted Emissions on Power Supply Lines	PASS
§15.209(a), §15.247(d) / RSS-247 5.5	Transmitter Radiated Spurious Emissions	PASS
§2.1053, §22.917(a) / RSS-GEN 6.13, RSS-132 5.5	Out of Band Emissions for Cellular Equipment	PASS

EUT Test Conditions during Testing

Both modules of the EUT were set to continues transmission mode using the maximum transmit power. Both modules were operating simultaneously (BT high channel and GSM 850 channel 190 or WCDMA II channel 9400).

Test Facility

Testing Laboratory / address: FCC registration number: 904175	SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND
Test Site:	Kara5m

TEST RESULTS

Conducted Emissions In The Frequency Range 150 kHz - 30 MHz

Standard: ANSI C63.10 (2013)
Tested by: JSU
Date: 2 June 2017
Temperature: 21 °C
Humidity: 29 % RH
Barometric pressure: 998 hPa
Measurement uncertainty: ± 2.9 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.207 (a)
RSS-GEN 8.8

Conducted disturbance voltage was measured with an artificial main network from 150 kHz to 30 MHz with 4.5 kHz steps and a resolution bandwidth of 9 kHz. Measurements were carried out with peak and average detectors.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Conducted Emissions on Power Supply Lines

Conducted Emission Mains FCC Part 15 Class B with ENV216

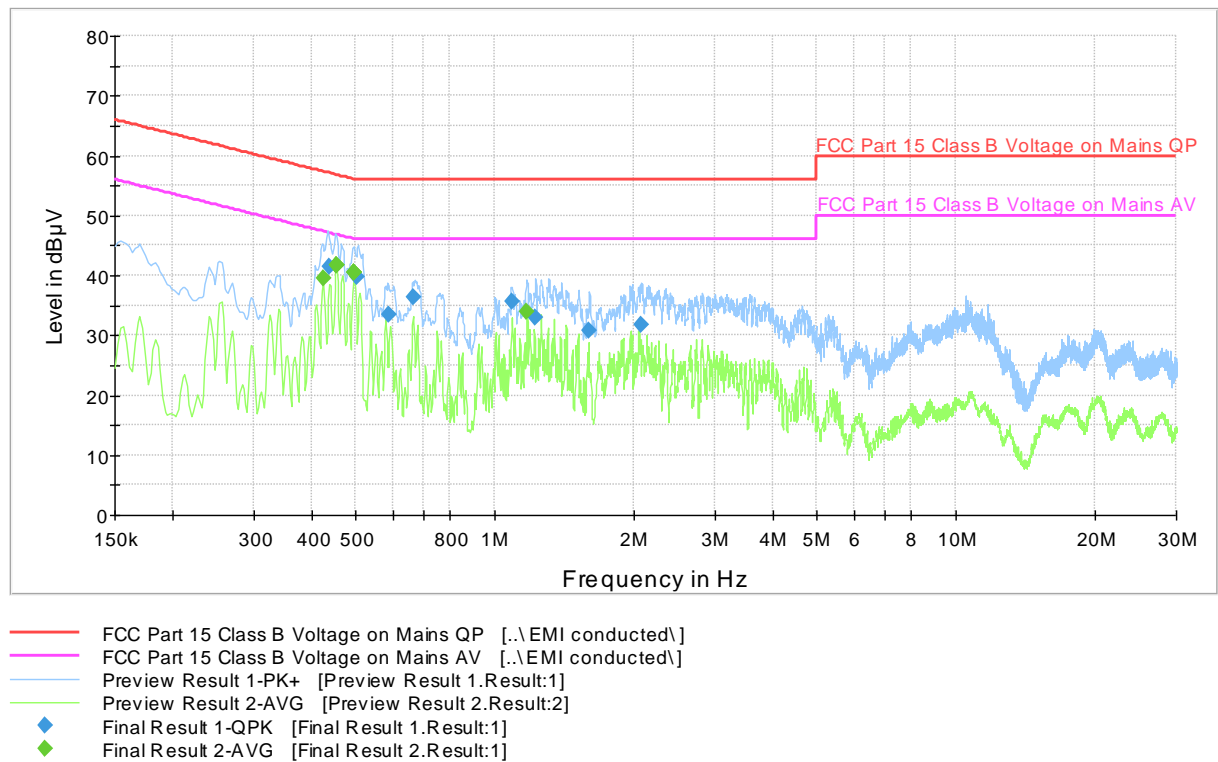


Figure 1: The results with peak- and average detector (GSM 850 and BT high channel emitting).

Table 1: Final QuasiPeak measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.439000	41.4	1000.0	9.000	N	10.3	15.7	57.1	-
0.504000	39.7	1000.0	9.000	L1	10.1	16.3	56.0	-
0.588000	33.6	1000.0	9.000	L1	10.1	22.4	56.0	-
0.664500	36.5	1000.0	9.000	L1	10.1	19.5	56.0	-
1.087250	35.7	1000.0	9.000	L1	10.0	20.3	56.0	-
1.222750	33.0	1000.0	9.000	L1	9.9	23.0	56.0	-
1.604750	30.9	1000.0	9.000	N	10.4	25.1	56.0	-
2.074750	31.8	1000.0	9.000	N	10.4	24.2	56.0	-

Table 2. Final Average measurements from the worst frequencies

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.425000	39.4	1000.0	9.000	L1	10.1	8.0	47.3	-
0.452500	41.6	1000.0	9.000	L1	10.1	5.2	46.8	-
0.452750	41.7	1000.0	9.000	L1	10.1	5.1	46.8	-
0.453250	41.7	1000.0	9.000	L1	10.1	5.2	46.8	-
0.495250	40.5	1000.0	9.000	L1	10.1	5.6	46.1	-
0.495500	40.5	1000.0	9.000	L1	10.1	5.5	46.1	-
0.496000	40.5	1000.0	9.000	L1	10.1	5.6	46.1	-
1.176000	33.9	1000.0	9.000	L1	9.9	12.1	46.0	-

The correction factor in the final result table contains the sum of the transducers (transient limiter + cables).
 The result value is the measured value corrected with the correction factor.

Transmitter Radiated Spurious Emissions

Transmitter Radiated Spurious Emissions 30 - 26500 MHz

Standard: ANSI C63.10 (2013)
Tested by: JSU / MIH
Date: 27 March – 2 November 2017
Temperature: 23 ± 3 °C
Humidity: 20 - 60 % RH
Measurement uncertainty: ± 4.51 dB Level of confidence 95 % ($k = 2$)

FCC Rule: 15.247(d), 15.209(a)

RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency range [MHz]	Limit [μ V/m]	Limit [dB μ V/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

Transmitter Radiated Spurious Emissions

Results

Table 3. Final QuasiPeak results (30 to 1000 MHz, GSM 850 and BT high channel transmitting)

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
125.005000	21.9	1000.0	120.000	100.0	V	27.0	13.3	21.6	43.5	-
240.015000	28.6	1000.0	120.000	100.0	V	252.0	13.6	17.4	46.0	-
260.015000	26.3	1000.0	120.000	100.0	H	153.0	14.2	19.7	46.0	-
311.985000	30.9	1000.0	120.000	100.0	H	156.0	16.2	15.1	46.0	-
363.655000	34.0	1000.0	120.000	100.0	H	127.0	17.3	29.8	46.0	-
416.005000	27.2	1000.0	120.000	100.0	H	131.0	18.7	18.8	46.0	-
468.015000	23.7	1000.0	120.000	100.0	H	150.0	19.9	22.3	46.0	-
627.695000	41.3	1000.0	120.000	100.0	V	167.0	23.5	4.7	46.0	-
720.005000	40.6	1000.0	120.000	100.0	V	10.0	24.7	5.4	46.0	-
875.995000	35.1	1000.0	120.000	100.0	V	320.0	26.9	10.9	46.0	-
924.015000	30.2	1000.0	120.000	100.0	H	195.0	27.9	15.8	46.0	-

Table 4. Final Peak results (1 to 26.5 GHz, GSM 850 and BT high channel transmitting)

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2492.100000	51.8	1000.0	1000.000	278.0	V	186.0	16.1	22.1	73.9	edge
3762.425000	57.5	1000.0	1000.000	150.0	V	281.0	18.0	16.4	73.9	-
4959.700000	62.0	1000.0	1000.000	206.0	V	155.0	8.3	11.9	73.9	-
17359.000000	54.1	1000.0	1000.000	150.0	V	170.0	28.4	19.8	73.9	-

Table 5. Final Average results (1 to 26.5 GHz, GSM 850 and BT high channel transmitting)

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2491.900000	37.8	1000.0	1000.000	341.0	V	10.0	16.1	16.1	53.9	edge
3761.825000	45.9	1000.0	1000.000	150.0	V	283.0	18.0	8.0	53.9	-
4959.900000	42.0	1000.0	1000.000	206.0	V	155.0	8.3	11.9	53.9	*
14880.600000	41.2	1000.0	1000.000	150.0	V	39.0	22.5	12.7	53.9	-
17358.800000	43.1	1000.0	1000.000	166.0	V	166.0	28.4	10.8	53.9	-

* Average result for the 2nd BT harmonic is calculated using the peak value with the duty cycle (10%) correction as described in ANSI63.10 clause 7.5:

$$62.0 \text{ dBuV/m} - 20 \text{ dB} = 42.0 \text{ dBuV/m}$$

Table 6. Final QuasiPeak results (30 to 1000 MHz, WCDMA II and BT high channel transmitting)

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
119.995000	34.9	1000.0	120.000	100.0	V	165.0	12.4	8.6	43.5	-
240.035000	38.8	1000.0	120.000	100.0	V	90.0	13.2	7.2	46.0	-
270.285000	15.0	1000.0	120.000	120.0	V	211.0	14.4	31.0	46.0	-
330.215000	18.7	1000.0	120.000	100.0	H	88.0	16.1	27.3	46.0	-
390.355000	17.9	1000.0	120.000	100.0	H	105.0	17.6	28.1	46.0	-
449.755000	18.1	1000.0	120.000	120.0	H	10.0	19.2	27.9	46.0	-
510.485000	18.8	1000.0	120.000	171.0	V	197.0	20.5	27.2	46.0	-
569.995000	19.9	1000.0	120.000	100.0	H	202.0	21.7	26.1	46.0	-
629.845000	21.4	1000.0	120.000	397.0	V	208.0	23.1	24.6	46.0	-
689.655000	22.1	1000.0	120.000	190.0	V	126.0	23.9	23.9	46.0	-
119.995000	34.9	1000.0	120.000	100.0	V	165.0	12.4	8.6	43.5	-

Transmitter Radiated Spurious Emissions

Table 7. Final Peak results (1 to 26.5 GHz, WCDMA II and BT high channel transmitting)

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
3762.450000	53.5	1000.0	1000.000	179.0	V	339.0	6.9	20.4	73.9	-
4960.150000	61.6	1000.0	1000.000	218.0	V	161.0	8.1	12.3	73.9	-
14880.65000	51.5	1000.0	1000.000	150.0	V	323.0	22.1	22.4	73.9	-
17358.67500	52.7	1000.0	1000.000	150.0	V	176.0	26.8	21.2	73.9	-

Table 8. Final Average results (1 to 26.5 GHz, WCDMA II and BT high channel transmitting)

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
3761.800000	44.4	1000.0	1000.000	179.0	V	335.0	6.9	9.5	53.9	-
4960.025000	39.4	1000.0	1000.000	217.0	V	157.0	8.1	14.5	53.9	*
14879.20000	42.6	1000.0	1000.000	150.0	V	322.0	22.1	11.3	53.9	-
17358.70000	44.6	1000.0	1000.000	150.0	V	180.0	26.8	9.3	53.9	-

* Average result for the 2nd BT harmonic is calculated using the peak value with the duty cycle (10%) correction as described in ANSI63.10 clause 7.5:

$$59.4 \text{ dBuV/m} - 20 \text{ dB} = 39.4 \text{ dBuV/m}$$

Out of Band Emissions for Cellular Equipment 30 MHz to 8500 MHz

Standard:	ANSI C63.10	(2013)
Tested by:	EHA / MIH	
Date:	30 June – 2 November 2017	
Temperature:	23 ± 3 °C	
Humidity:	20 - 60 % RH	
Measurement uncertainty:	± 4.51 dB	Level of confidence 95 % (k = 2)

FCC Rule: Part 2.1053, Part 22.917(a)**ICED: RSS-GEN 6.13, RSS-132 5.5**

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P \text{ watts})$ dB.

Both modules of the EUT were set to continuous transmission mode using the maximum transmit power. Both modules were operating simultaneously. GSM 850 and WCDMA II bands tested with Bluetooth in high channel.

Results:

Pre measurements were made at the frequency range 30 MHz to 8500 MHz at a distance of 3 m. No final measurements were made because there were no transmission emissions near the limit (-13 dBm). Margins were more than 20 dB to the limit.

TEST EQUIPMENT

Test Equipment

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
AMONITORING ANTENNA	A.H. SYSTEMS	SAS-200/518	inv:7873	-	-
SPECTRUM ANALYZER	AGILENT	E7405A	inv:9746	2016-01-07	2018-01-07
RF SIGNAL GENERATOR	ANRITSU	MG3694B	inv:9753	2015-10-13	2017-10-13
PREAMPLIFIER	CIAO	CA118-3123	inv:10278	2016-11-28	2017-11-28
ANTENNA	EMCO	3117	inv:7293	2016-03-16	2018-03-06
ANTENNA	EMCO	3160-09	inv:7294	2017-03-16	2018-03-16
TURNTABLE	MATURO	DS430 UPGRADED	inv:10182	-	-
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	-	-
ANTENNA MAST	MATURO	TAM 4.0E	inv:10181	-	-
BLUETOOTH TEST SET	ROHDE & SCHWARZ	CMU200	inv:9237	2013-02-27	-
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU 26	inv:8453	2016-07-10	2017-07-10
ANTENNA	SCHWARZBECK	VULB 9168	inv:8911	2016-10-25	2018-10-25
HIGH PASS FILTER	WAINWRIGHT	WHKX4.0/18G-10SS	inv:10403	2017-03-01	2019-03-01
ULTRA STABLE NOTCH FILTER	WAINWRIGHT	WRCT 836.6-0.5/50-8SS	sn:1	-	-
COMMUNICATION ANALYZER	ANRITSU	MT8815B	inv:8026	-	-
ATT SMAM/F 50 Ω 18 GHZ 10 DB 1 W	HUBER&SUHNER	6610.19.AA	inv:10392	2017-07-31	2018-07-31
LISN	ROHDE & SCHWARZ	ENV216	inv:9611	2017-02-23	2018-02-23
POWER SUPPLY	CALIFORNIA INSTR.	5001 iX Series II	inv:7826	-	-