G1 retail Labels Product Specification

1 The G1 label family

The imago G1 electronic shelf label family offers high-quality display options, operating with a replaceable battery and thus working without any external power supply. The G1 red family is capable of changing all pixels to black, white or red.

The current line-up has display sizes from 1.6 inch to 7.4 inch. They may be used in landscape and portrait mode and can be customized with changeable front covers.

The performance of the labels (updates per hour) depends on the mode of the access point. In the USA and Canada the AP-2010 usa/canada bundle incl. antenna with limited data efficiency is required (based on the FCC/IC regulation).

Caption	Display Resolution	Density (dpi)	Display Colors	Useable Pages	Active Display Area (mm)	Updates/hour/AP (standard / FCC&IC mode)	Battery lifetime: 5 years with X updates per day
G1 retail 1.6 red NFC	152 x 152	140	b/w/r	4	27.5 x 27.5	7500/4600	1
G1 retail 2.2 red NFC / Bossard 2.2 red NFC	212 x 104	111	b/w/r	4	48 x 24	8500/5000	2
G1 retail 2.6 red NFC	296 x 152	125	b/w/r	4	60 x 31	4000/2600	2
G1 retail 2.7	264 x 176	117	b/w	8	57 x 38	5000/2700	4
G1 retail 2.7 red NFC	264 x 176	117	b/w/r	4	57 x 38	4000/2500	2
G1 retail 4.2 red NFC	400 x 300	120	b/w/r	4	85 x 64	2000/1300	2
G1 retail 4.4	400 x 300	113	b/w	4	90 x 67	3000/1600	4
G1 retail 4.4 red NFC	400 x 300	113	b/w/r	4	90 x 67	2000/1000	2
G1 retail 7.4	480 x 800	126	b/w	12	97 x 162	1000/500	8
G1 retail 7.4 red NFC	480 x 800	126	b/w/r	4	97 x 162	600/300	2

1.1 Key Features

- 2.4 GHz bi-directional MSK proprietary radio
- Radio coverage: up to 25 meters
- Return Signal: yes
- 11 available communication channels
- Ultra-low power consumption
- Customer-replaceable battery
- Full graphical e-Ink display with paper-like readability
- Changeable and customizable front covers
- Super wide viewing angle (nearly 180 degrees)
- Flexible mounting options available
- May be used in landscape and portrait mode
- Fast response time (less than 15 seconds)
- Water resistant
- 128-bit AES encryption with secure key exchange
- Multiple pages support with preloading and fast page switching
- Integrated NFC tag as an option

2 Barcode Information

The labels come with a label ID (which is a unique identifier – just like a MAC address) and this label ID as a barcode on the display (and printed on the back of the label).

The label ID consists of 8 hexadecimal digits (0-9 / A-F). The first 2 digits identify the different label types, shown on the following table:

Caption	Label-ID
Bossard 2.2 red NFC	A4xxxxxx
G1 retail 1.6 red NFC	F1xxxxxx
G1 retail 2.2 red NFC	A5xxxxxx
G1 retail 2.6 red NFC	B6xxxxxx
G1 retail 2.7	B3xxxxxx
G1 retail 2.7 red NFC	B5xxxxxx
G1 retail 4.2 red NFC	C5xxxxxx
G1 retail 4.4	C1xxxxxx
G1 retail 4.4 red NFC	C4xxxxxx
G1 retail 7.4	D1xxxxxx
G1 retail 7.4 red NFC	D3xxxxxx

2.1 Serial Number

Depends on Producer (A)

2.1.1 Producer is 01

Part	Description	Format	Example	Comment	Source
A	Producer	2 alpha	01		Specified by imagotag once for each fab
B	Product family	3 alpha	G1B		Specified by imagotag in the product specification document
C	Product version	3 alpha	301		
D	Product revision	3 alpha	001	Incremented on every change of product specification	
–	Separator	"–"	–		Fixed
E	Internal	1 alpha	B	Internal	Calculated during production
F	Year	1 dec	4	4=2014, 5=2015,...	
G	Week	2 dec	10	Calendar week in current year (01-53)	
H	Weekday	1 dec	3		
I	Internal	5 dec	00060	Continuous Serial Number (Counter)	

Format: AABBBCCCDDD-EFGGHIIIII
Example: 01G1B301001-B410300060

2.1.2   Producer is not 01

Part	Description	Format	Example	Comment	Source
A	Producer	2 alpha	02		Specified by imagotag once for each fab
B	Product family	3 alpha	R22		Specified by imagotag in the product specification document
C	Product version	3 alpha	N01	N = with NFC	Specified by imagotag in the product specification document
D	Product revision	3 alpha	001	Incremented on every change of product specification	Specified by imagotag in the product specification document
–	Separator	"–"	–		Fixed
E	Year	1 alpha	E	E=2014, A=2010, B=2011,..	Calculated during production
F	Week	2 dec	13		Calculated during production
G	Internal	6 dec	000065	Continuous Serial Number (Counter)	Calculated during production

Format: AABBBCCCDDD–EFFGGGGGG
Example: 02G1B302001–E13000065
Note:

- Calendar week date is calculated according to ISO 8601 (see http://en.wikipedia.org/wiki/ISO_week_date)

3 Mechanical Characteristics

3.1 Technical characteristics
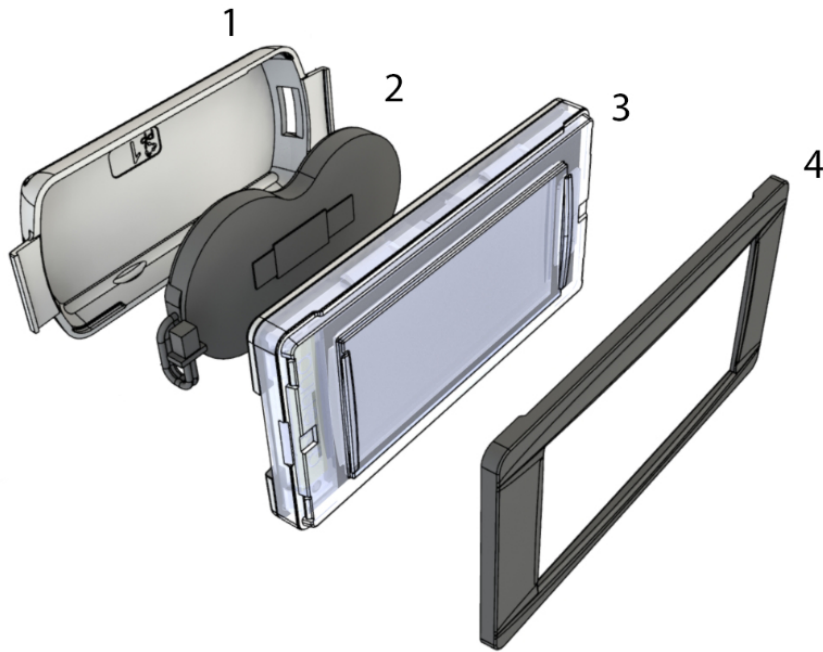
The imago is made of several external parts:

1. Battery Cover including
   a. Label ID
   b. Label ID barcode
   c. S/N
2. Battery pack / Coin cell
3. Main Unit including
   a. Back Cover
   b. PCB
   c. Display
   d. Transparent Front Cover
4. Front Cover Frame
   a. Customizable in design and color
   b. Replaceable

3.1.1 Construction G1 retail 1.6 red
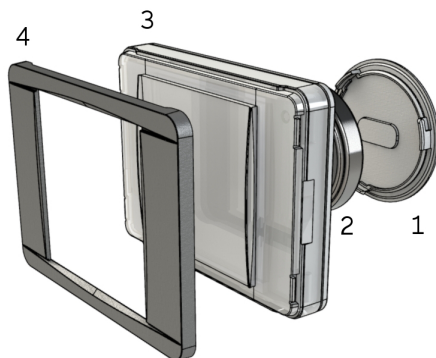
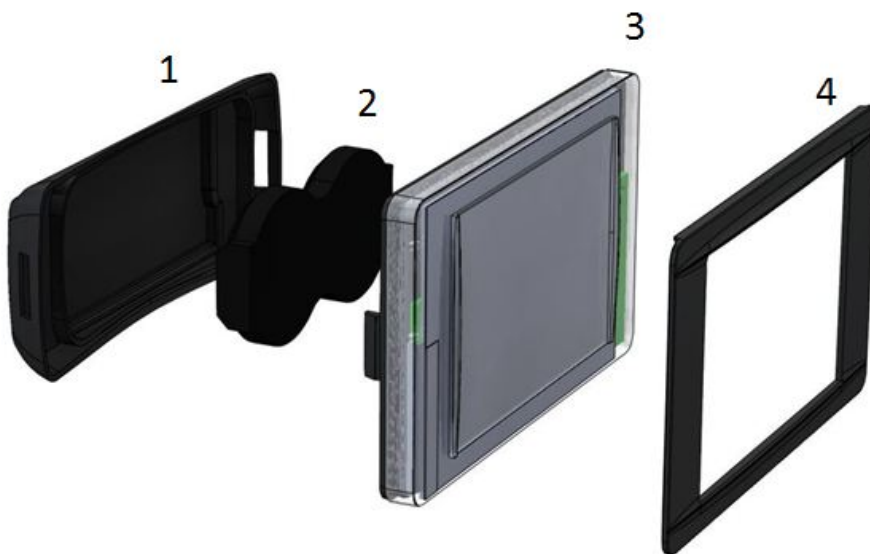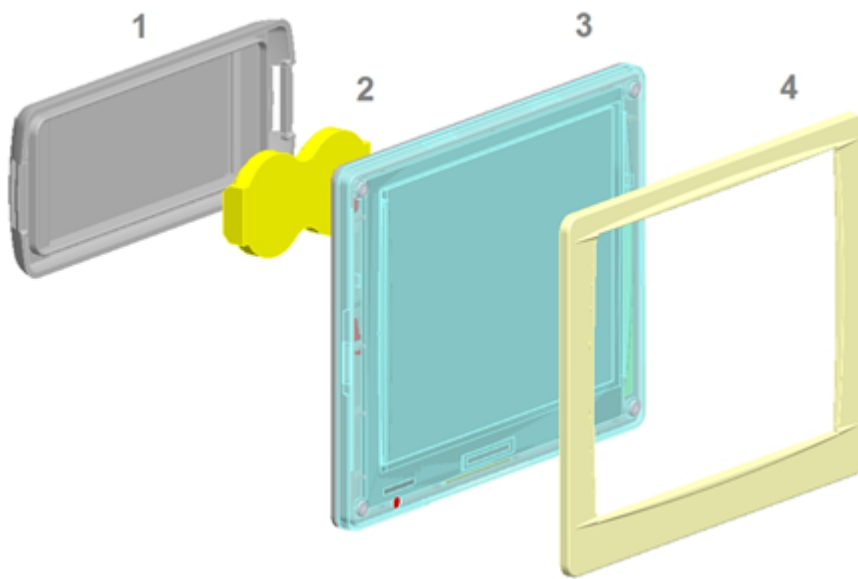### 3.1.2 Construction G1 retail 2.2 red

3.1.3 Construction G1 retail 2.6 (red) and G1 retail 2.7 (red)

3.1.4 Construction G1 retail 4.2 (red) and G1 retail 4.4 (red)

3.1.5 Construction G1 retail 7.4 (red)
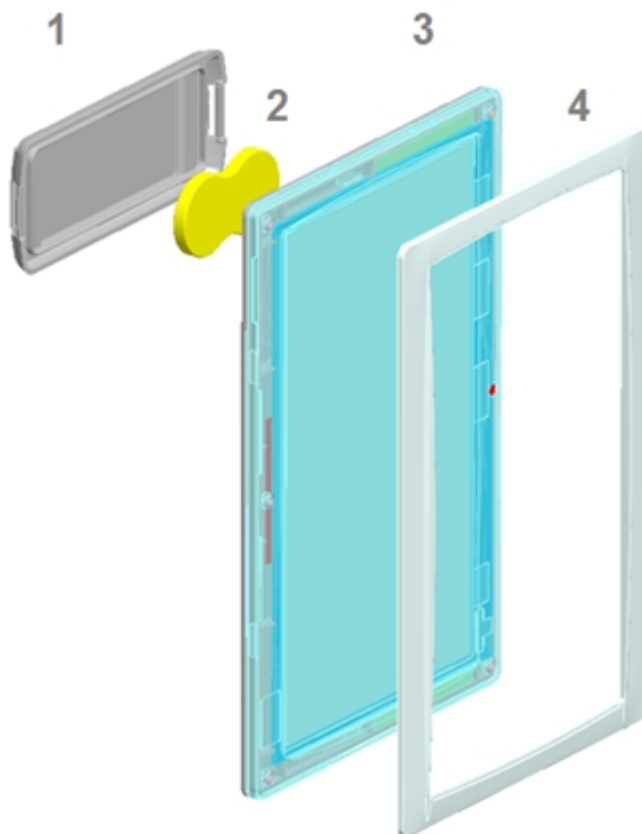
3.2 Mechanical Dimensions

3.2.1 G1 retail 1.6 red

Outline (mm): 49 x 36.8 x 14.8
Weight: 24 g
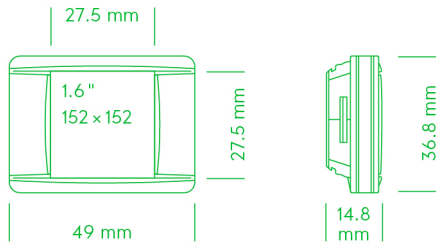
3.2.2 G1 retail 2.2 red

Outline (mm): 72 x 35.8 x 15.5
Weight: 38 g
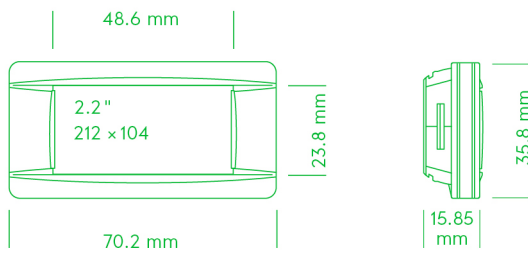
3.2.3 G1 retail 2.6 (red)

Outline (mm): 83.6 x 42.5 x 15.6
Weight: 45 g

60.1 mm

2.6 "
296 × 152

30.7 mm

83.6 mm

42.5 mm

16.3 mm
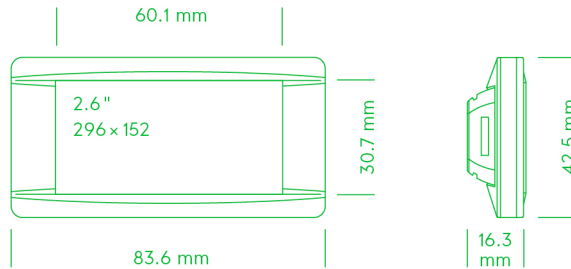
3.2.4 G1 retail 2.7 (red)

Outline (mm): 86.3 x 49.5 x 16.2
Weight: 50 g

57.3 mm

2.7 "
264 × 176 px

38.2 mm

85.7 mm

50 mm

16.6 mm
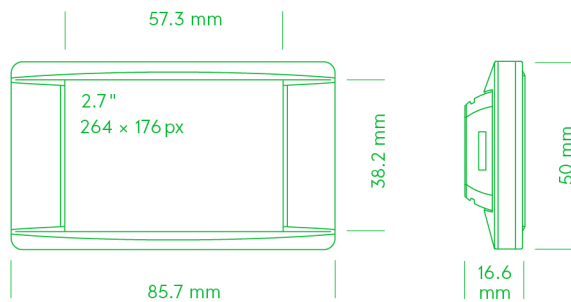
3.2.5 G1 retail 4.2 red

Outline (mm): 114.9 x 88.9 x 17
Weight: 104 g

84.8 mm

4.2"
400 × 300 px

63.6 mm

88.9 mm

114.9 mm

17.4 mm
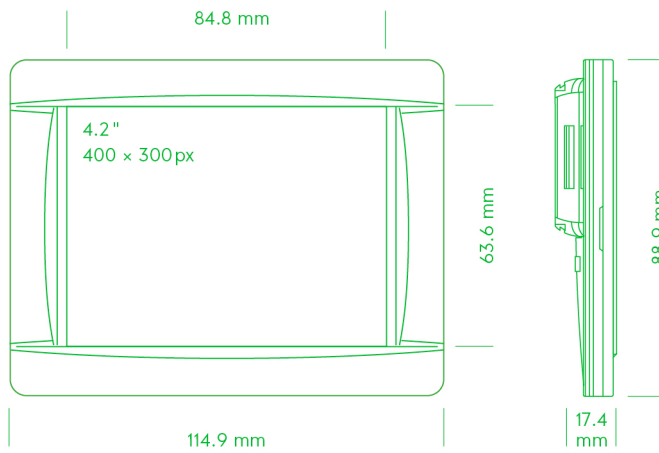
3.2.6 G1 retail 4.4 (red)

Outline (mm): 114.9 x 88.9 x 17
Weight: 104 g

90 mm

4.4"
400 × 300 px

67 mm

88.9 mm

114.9 mm

17.4 mm
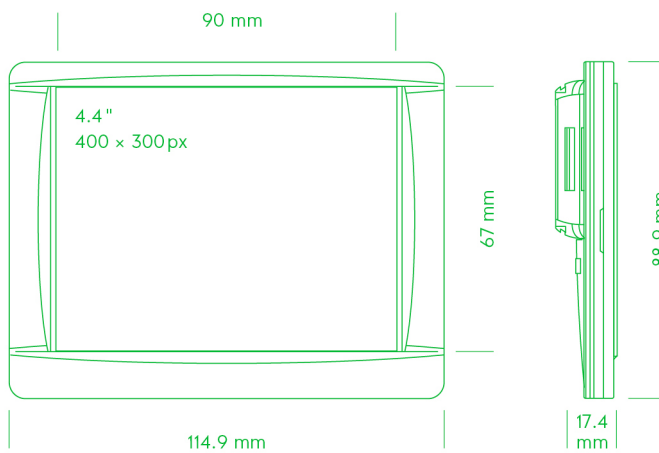
3.2.7 G1 retail 7.4 (red)

Outline (mm): 186.9 x 125.9 x 19.3
Weight: 239 g

161.6 mm

7.4"
800 × 480 px

97 mm

186.9 mm

125.9 mm

19.3 mm
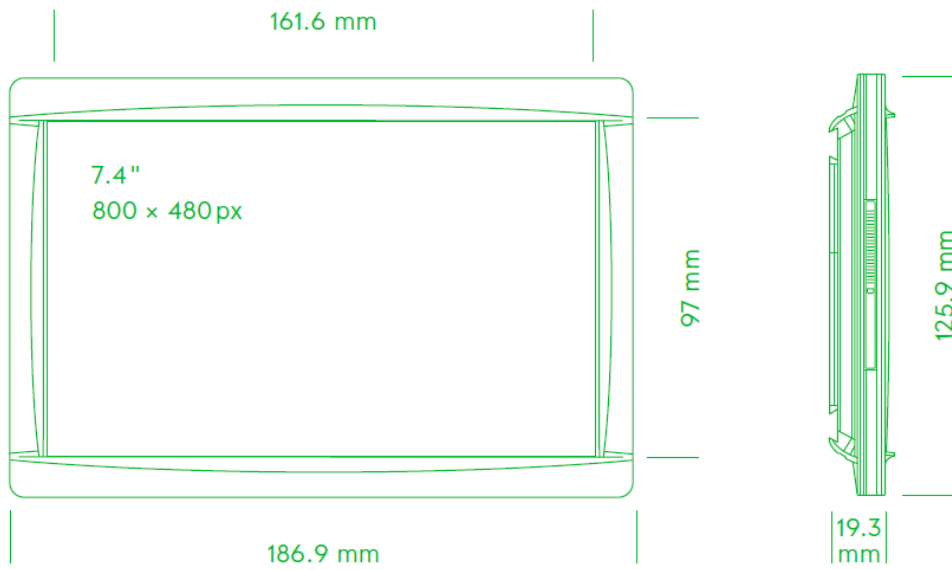
4 Electrical & RF Characteristics

4.1 Power and Current Consumption

The power supply are 1, 2 or 3 cell-button batteries. The following table will give you a short overview about all kinds of labels and their batteries.

Caption	Battery Type	Operating Voltage	Nominal capacity	Battery lifetime 5 years with X updates per day
G1 retail 1.6 red NFC	1 x CR2450	3 V	550 mAh	1
G1 retail 2.2 red NFC / Bossard 2.2 red NFC	2x CR2450	3 V	1100 mAh	2
G1 retail 2.6 red NFC	2x CR2450	3 V	1100 mAh	2
G1 retail 2.7	2x CR2450	3 V	1100 mAh	4
G1 retail 2.7 red NFC	2x CR2450	3 V	1100 mAh	2
G1 retail 4.2 red NFC	3x CR2450	3 V	1650 mAh	2
G1 retail 4.4	2x CR2450	3 V	1100 mAh	4
G1 retail 4.4 red NFC	3x CR2477	3 V	3000 mAh	2
G1 retail 7.4	3x CR2477	3 V	3000 mAh	8
G1 retail 7.4 red NFC	3x CR2477	3 V	3000 mAh	2

Note: battery lifetime can vary depending on the operating conditions of the ESLs (temperature, radio usage etc...) see *Battery lifetime* on page 20

4.2 Transmission power

Each ESL has got a transmission power of ≤ 10 dBm (according to the FCC certification).

5 NFC

All labels can be ordered with the NFC option. Labels with integrated NFC tag can be identified by the nameplate on the back of the label.

FIGURE 1-1: Label with integrated NFC chip

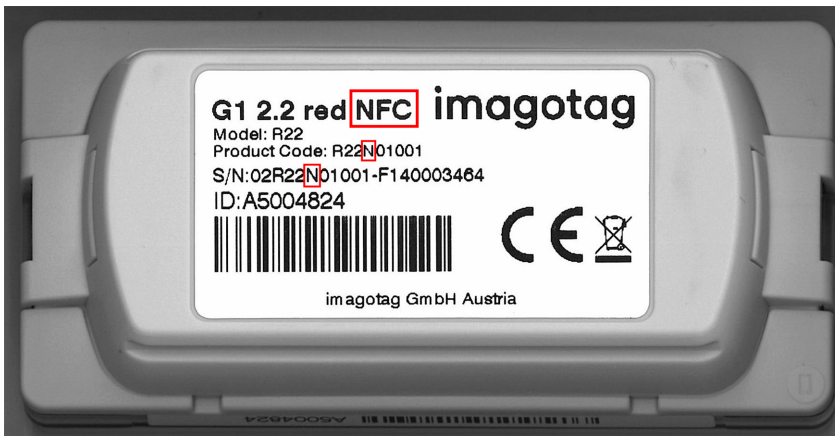## 5.1 Functionality

If you put your NFC reading device on a label with integrated NFC chip, you will be automatically redirected to the following URL:

https://nfc.imagotag.com/<Label-ID> [e.g. https://nfc.imagotag.com/A5004824]

FIGURE 1-2: NFC redirection to nfc.imagotag.com

This URL/information can be used as follows:

You can use if for your own developed application or redirection/forwarding to a specific URI (for demo purposes only).

5.1.1 Application

A mobile application could extract the label ID information from the NFC tag. Based on the label lD, the application could get further details about the matched article and e.g. show this details via push. The required application needs to be developed by the customer.

Example - Digital camera accessories

A customer starts the mobile application and put his/her smartphone next to the label with integrated NFC chip which belongs to a digital camera. The developed application retrieves the product information data from the ESL system and pushes matching accessories for this digital camera model to his/her smartphone.

Example – Recipe information

A customer starts the mobile application and put his/her smartphone next to the label with integrated NFC chip which belongs topasta. The developed application retrieves the product information data from the ESL system and pushes corresponding recipes to his/her smartphone.

5.1.2 Redirection/Forwarding (for demo purposes only)

If you don't want to develop your own application to handel NFC readings there's the possibility to request a redirection for your specific NFC label range to a URI of your choice.

Currently this functionality is just for demo purposes. In future we will provide an service for it.

Example – Customer's website

You have bought a number of NFC tags and want to redirect to its website when reading the tags.

Write an email with your forwarding request (relevant labels, customer, URI) to support@imagotag.com. The support team will manage the request and gives you feedback as soon as the forwarding works.

E.g. Customer XY, G1 retail 2.7 red NFC labels with IDs: B501ABC1, B501B324, forward to http://www.myownwebsite.com

5.2 Ordering Information

Please contact our sales team for ordering information and pricing at sales@imagotag.com.

6 Environmental

6.1 Operating Conditions

Temperature
- black / white labels
    - 0° C to + 45° C
- black / white / red labels
    - 10° C to 40° C
- optimal operating temperature at 21 ° C.

Humidity: 10% to 80% (non-condensing)

6.2 Cleaning Instructions

Clean the electronic label with the help of a damp cloth.
Note: Do not use liquid or aerosol cleaners and keep it away from water.

6.3 Humidity Conditions

Notes:
- High humidity combined with low temperature are not recommended
- Low temperature will reduce the battery lifetime

7 Storage and warehousing

We strongly recommend to observe the following points in order to ensure the best operation, functioning and battery lifetime:

- Storage temperature
  - -10° C to 40° C
  - Optimal operating and storage temperature at 21 ° C
- Humidity
  - 10% to 85% (non-condensing)
- It isn't allowed to operate an imagotag AP-2010, MAP-2014 or LANCOM L-151E/L-322E in the warehouse or in radio coverage area.
  - Permanent connection attempts the label to the access point leading to high battery consumption
- FIFO (First In First Out)
  - Differ on base of the package IDs
- The maximum storage time of labels should not exceed 0.5-1 year

If you not comply with these limits mentioned above, the specified battery runtime can vary.

8 Battery lifetime

For the definition of N update/day following requirements apply to reach the specified lifetime:

- The radio sync quality between labels and access points has to be "PERFECT" or "GOOD".
  - To comply with these specifications, a Site Survey according to imagotag guidelines is necessary.
- The declared number of updates per day is an average value applied on on the specified lifetime.
  - It's not allowed to exceed this number more than 20 updates per day.
- The most of the time the operation temperature of the ESLs has to be 21° C.
- To reach the specified lifetime, the requirements regarding see *Storage and ware-housing* on page 19 also needs to be observed.
- Performing less than specified updates doesn't extend the battery lifetime significantly

9 Battery Replacement

9.1 Audience

Only persons with the following knowledge are allowed to replace the battery:

- Battery
- Electronic assemblies like circuit board
- Compliance of the instructions

9.2 Instructions

- Risk of explosion through incorrect battery replacement.
- Use battery pack exclusive provided from the company imagotag GmbH.
- Keep attention that your hands are dry before you start with the replacement.
- Don't use sharps to open the label.
- Don't use your fingernails to open the label.
- Don't touch the circuit board of the open label.

9.3 Steps

9.3.1 G1 retail 1.6 red

1. Press a coin in the coin slot on the back side of the label (hidden behind the nameplate).
2. Turn the coin with pressure contraclockwise.
3. Take away the battery cover.
4. Take out the coin cell.
5. Put in the new coin cell.
6. Put the battery cover back on the label.
7. Press a coin in the coin slot on the battery cover and turn it clockwise.

9.3.2 All labels except G1 retail 1.6 red

1. G1 retail 2.2 red, G1 retail 2.6 red and G1 retail 2.7 (red): Press both snap-in-mounts of the battery cover (backside of the label) until the battery cover detaches. Afterwards take the battery cover from the label. G1 retail 4.2, G1 retail 4.4 (red) and G1 retail 7.4 (red): Use the imagotag battery cover tool to open the battery cover. Afterwards take the battery cover from the label.
2. Pull the white plug out of the socket, don't pull on the cable.
3. Take out the battery pack.
4. Put in the new battery pack.
5. Push the white plug in the socket.
6. Put the battery cover on the label casing (the arrows have to show to each other)
7. Check if the power status of the label switch to "GOOD" otherwise contact the imagotag support (support@imagotag.com).

We can also provide some battery replacement videos, for more information about that please contact the imagotag support (support@imagotag.com).

10 Reliability Test Items

- High Temperature Operation
- Low Temperature Operation
- High Temperature/Humidity
- Operation
- High Temperature Storage
- Low Temperature Storage
- High Temperature/Humidity
- Storage
- Temperature Shock (Storage)
- Package Drop Test
- Package Random Vibration Test

11 Certifications

11.1 Types

Housing, board and the display are conform with the ROHS Directive

The product meets the EU safety, health and environmental protection requirements and has the approval of CE marking

This device complies with part 15 of the FCC Rules.

Passed all tests according to "FOOD CONTACT" requirements

11.2 Overview

Caption	RoHS	Food Contact	CE	FCC/IC
Bossard 2.2 red NFC	•		•[3]	•
G1 retail 1.6 red NFC	•		•[3]	
G1 retail 2.2 red NFC	•		•[3]	
G1 retail 2.6 red NFC	•		•[3]	•
G1 retail 2.7	•	•	•[2]	•[1]
G1 retail 2.7 red NFC	•	•	•[3]	
G1 retail 4.2 red NFC	•		•[3]	•
G1 retail 4.4	•	•	•[2]	•[1]
G1 retail 4.4 red NFC	•	•	•[3]	
G1 retail 7.4	•		•[2]	•[1]
G1 retail 7.4 red NFC	•		•[3]	

[1]FCC/IC certified since calendar week 9 / year 2015
[2]R&TTE EN 300328 V1.8.1
[3]R&TTE EN 300328 V1.9.1

11.3 Applied Standards

Information Technology Equipment
EN 60950-1/A2:2013
UL 60950-1/A2:2014
CSA CAN/CSA-C22.2 NO.60950-1-07
EMV
EN 301489-17 V2.2.1
R&TTE
EN 300328 V1.8.1 / EN 300328 V1.9.1
Human Exposure to Electromagnetic Fields
EN 62479:2010
Radio international
FCC: 47 CFR Part 15 (USA)
RSS-210 Issue 8 (Canada)

11.4 Declaration

The company imagotag GmbH declares on his own responsibility that the corresponds to the standards mentioned above.

11.4.1 FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate the equipment.

11.4.2 IC

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

12 Packing

12.1 G1 retail 1.6 red

DIMENSIONS				STACKING		QUANTITY	
	LENGTH	WIDTH	HEIGHT				
BOX	445	245	100	LAYER / UNIT	10	SETS / BOX	100
PALLET	1200	800	140	BOXES / LAYER	6	SETS / LAYER	600
UNIT	1200	800	1140	BOXES / UNIT	60	SETS / UNIT	6000

Purchase Unit: 100 labels / box
Minimum Order Quantity: 6000

12.2 G1 retail 2.2 red / Bossard 2.2 red

DIMENSIONS				STACKING		QUANTITY	
	LENGTH	WIDTH	HEIGHT				
BOX	445	245	100	LAYER / UNIT	10	SETS / BOX	100
PALLET	1200	800	140	BOXES / LAYER	6	SETS / LAYER	600
UNIT	1200	800	1140	BOXES / UNIT	60	SETS / UNIT	6000

Purchase Unit: 100 labels / box
Minimum Order Quantity: 6000

12.3 G1 retail 2.6 red

DIMENSIONS				STACKING		QUANTITY	
	LENGTH	WIDTH	HEIGHT				
BOX	400	270	135	LAYER / UNIT	9	SETS / BOX	80
PALLET	1200	800	140	BOXES / LAYER	8	SETS / LAYER	640
UNIT	1200	800	1355	BOXES / UNIT	72	SETS / UNIT	5760

Purchase Unit: 80 labels / box
Minimum Order Quantity: 5760

12.4 G1 retail 2.7 (red)

DIMENSIONS				STACKING		QUANTITY	
	LENGTH	WIDTH	HEIGHT				
BOX	400	270	135	LAYER / UNIT	9	SETS / BOX	80
PALLET	1200	800	140	BOXES / LAYER	8	SETS / LAYER	640
UNIT	1200	800	1355	BOXES / UNIT	72	SETS / UNIT	5760

Purchase Unit: 80 labels / box
Minimum Order Quantity: 5760

12.5 G1 retail 4.2 red

DIMENSIONS				STACKING		QUANTITY	
	LENGTH	WIDTH	HEIGHT				
BOX	400	260	250	LAYER / UNIT	5	SETS / BOX	60
PALLET	1200	800	140	BOXES / LAYER	8	SETS / LAYER	480
UNIT	1200	800	1390	BOXES / UNIT	40	SETS / UNIT	2400

Purchase Unit: 60 labels / box
Minimum Order Quantity: 2400

12.6 G1 retail 4.4 (red)

DIMENSIONS				STACKING		QUANTITY	
	LENGTH	WIDTH	HEIGHT				
BOX	400	260	250	LAYER / UNIT	5	SETS / BOX	60
PALLET	1200	800	140	BOXES / LAYER	8	SETS / LAYER	480
UNIT	1200	800	1390	BOXES / UNIT	40	SETS / UNIT	2400

Purchase Unit: 60 labels / box
Minimum Order Quantity: 2400

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12.7 G1 retail 7.4 (red)

DIMENSIONS				STACKING		QUANTITY	
	LENGTH	WIDTH	HEIGHT				
BOX	570	260	250	LAYER / UNIT	3	SETS / BOX	40
PALLET	1200	800	140	BOXES / LAYER	6	SETS / LAYER	240
UNIT	1200	800	890	BOXES / UNIT	18	SETS / UNIT	720

Purchase Unit: 40 labels / box
Minimum Order Quantity: 720

13   Intended Use

The imagotag G1 electronic shelf label family is exclusively designed to connect to AP-2010 or MAP-2014 of the company imagotag GmbH via radio.

The device may only be used in areas where the environmental conditions be the same as descripted in the chapter see *Environmental* on page 18.

14   Improper Use

Any use that is not mentioned in Section *Intended Use*, shall be deemed to be improper. Any damage which result from improper use, the operator will assumes liability.

The following usage is not allowed:

- Never dismantle the electronic device because except battery there is no component which could be changed by someone who is not qualified.
- Don't drop it.
- Keep it away from water.
- Strictly avoid direct contact with groceries.
- Don't use the electronic device with defective parts.
- Don't use the electronic device with spare parts and accessories which are not examined and approved by the imagotag GmbH.
- Unauthorized changes or modifications to the electronic device and their components without the consent of imagotag GmbH are not allowed.
- Don't heat, recharge or bend battery.
- We take no responsibility for stolen ESLs without encryption.
- Keep away batteries from children.
- Don't throw defective batteries into the dustbin. Give them to a reprocessing company.
- Don't throw electronic device into the dustbin. Give them to a reprocessing company.
- Contact imagotag GmbH for more details about this process.