

EMI - TEST REPORT

- FCC Part 15B -

Test Report No. : T38935-00-02TK 27. November 2014

Date of issue

Type / Model Name : One Touch Select Plus Flex

Product Description: Blood glucose meter with Bluetooth 4.0 Low Energy

Applicant: Lifescan Scotland Ltd.

Address : Beechwood Park North

INVERNESS, IV2 3ED, SCOTLAND

Manufacturer: Lifescan, Division of Cilag GmbH International

Address : Gubelstrasse 34

6300 ZUG, SWITZERLAND

Licence holder : Lifescan, Division of Cilag GmbH International

Address : Gubelstrasse 34

6300 ZUG, SWITZERLAND

Test Result according to the standards listed in clause 1 test standards:

POSITIVE





The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.



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Attachment A as separate supplement



1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart A - General (September, 2013)

Part 15, Subpart A, Section 15.31 Measurement standards

Part 15, Subpart A, Section 15.33 Frequency range of radiated measurements

Part 15, Subpart A, Section 15.35 Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15 Subpart B - Unintentional Radiators (September, 2013)

Part 15, Subpart B, Section 15.107 AC Line conducted emission

☐ Class A device ☐ Class B device

Part 15, Subpart B, Section 15.109 Radiated emission, general requirements

Part 15, Subpart B, Section 15.111 Antenna power conduction

ANSI C63.4: 2009 Methods of Measurement of Radio-Noise Emissions from Low-

Voltage Electrical and Electronic Equipment in the Range of 9 kHz

to 40 GHz.

CISPR 16-4-2: 2011 Uncertainty in EMC measurement

EN 55016-4-2: 2011

CISPR 22: 2008 EN 55022: 2010

Information technology equipment



2 SUMMARY

2 OOMMANI	
2.1 General remarks None	
2.2 Final assessment	
The equipment under test fulfills the	e EMI requirements cited in clause 1 test standards.
Date of receipt of test sample	: acc. to storage records
Testing commenced on	: 12 November 2014
Testing concluded on	: 19 November 2014
Checked by:	Tested by:
Klaus Gegenfurtner Teamleader Radio	



3 EQUIPMENT UNDER TEST

- 3.1 Photo documentation of the EUT see Attachment A
- 3.2 Power supply system utilised

Power supply voltage : 3.0 V DC (Battery powered)

3.3 Short description of the equipment under test (EUT)

The EUT is a Bluetooth 4.0 Low Energy system. The EUT is compatible with the standard 802.15.1. It supports the 2.4 GHz frequency band. A single PCB antenna is used within the system. The modulation used by the EUT is GFSK with a data rate of 1000 kbits which means worst case for testing. The EUT has a special firmware that allows enabling a permanent advertising mode with three advertising channels. The output power is set to -4 dBm by firmware and cannot be changed during tests. The EUT has only one integrated antenna, no temporary connector and no external antenna can be connected. The EUT is run with a 3.0V coin cell battery. Further there is a USB connector that allows data transmission to a PC. An active USB connection prohibits wireless transmission.

Number of tested samples: Serial number:	1 G2GRJ012
EUT operation mode: The equipment under test wa	s operated during the measurement under the following conditions:
- USB data connection to con	npanion device (Laptop computer)
-	
-	
EUT configuration: (The CDF filled by the application)	ant can be viewed at the test laboratory.)
The following peripheral device	ces and interface cables were connected during the measurements:
- Laptop	Model : Toshiba TECRA A11-127
- <u>N/A</u>	Model :
- <u>N/A</u>	Model :

Model: _-

N/A



4 TEST ENVIRONMENT

4.1 Address of the test laboratory

CSA Group Bayern GmbH Ohmstrasse 1-4 94342 STRASSKIRCHEN GERMANY

4.2 Environmental conditions

During the measurement	ine environmenta	i conditions were	within the listed	i ranges:

Temperature: 15-35 °C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor k=2. The true value is located in the corresponding interval with a probability of 95 % The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 11.2003 "Uncertainties, statistics and limit modelling — Uncertainty in EMC measurements" and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.



4.4 Measurement protocol for FCC

4.4.1 General information

4.4.1.1 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.4.2 Details of test procedures

4.4.2.1 General standard information

In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

4.4.3 Conducted emission

4.4.3.1 Description of measurement

The final level, expressed in $dB_{\mu}V$, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit or to the CISPR limit.

To convert between $dB\mu V$ and μV , the following conversions apply:

$$dB\mu V = 20*log(\mu V)$$

 $\mu V = 10^{(dB\mu V/20)}$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50 Ω / 50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.



4.4.4 Radiated emission (electrical field 30 MHz - 1 GHz)

4.4.4.1 Description of measurement

Spurious emission from the EUT is measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is established in accordance with ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the centre in a serpentine fashion so that they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. The antenna is positioned in horizontal polarisation and is repeated vertically. To locate maximum emission from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees.

The final level in $dB\mu V/m$ is calculated by add the antenna correction factor and cable loss factor (dB) on the reading from the EMI receiver (dB μV). The FCC or CISPR limit is subtracted from this result in order to provide the delta to limit listed in the measurement protocol.

Example:

Frequency	Reading level	+	Correction Factor	=	Level	-	CISPR Limit	=	Delta
(MHz)	(dBµV)		(dB/m)		(dBµV/m)		(dBµV/m)		(dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

4.4.5 Radiated emission (electrical field 1 GHz - 40 GHz)

4.4.5.1 Description of measurement

Radiated emission from the EUT are measured in the frequency range 1 GHz up to the maximum frequency as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 metre non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is following set out in ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the centre in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. Measurements are made in both the horizontal and vertical polarization planes in a fully anechoic room using a spectrum analyser set to max peak detector function and a resolution 1 MHz and video bandwidth 3 MHz for peak and 10 Hz for average measurement. The conditions determined as worst case will then be used for the final measurements. When the EUT is larger than the beam width of the measuring antenna it will be moved over the surface for the four sides of the equipment. Where appropriate, the test distance may be reduced in order to detect emission under better uncertainty and is calculated to the specified test distance.

4.5 Determination of worst case measurement conditions

Measurements have been made in all three orthogonal axes and the settings of the EUT were changed to locate at which position and at what setting of the EUT produce the maximum of the emission.

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5 TEST CONDITIONS AND RESULTS

5.1 Conducted emission

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up

Note: Photo documentation of the test setup can be viewed in Attachment B

5.1.3 Applicable standard

According to FCC Part 15, Section 15.107(a):

Except for Class A devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the given limits.



5.1.4 Description of Measurement

The measurements are performed following the procedures set out in ANSI C63.4. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emission are re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin -13.5 dB at 14.100 MHz.

Limit according to FCC Part 15, Section 15.107(a):

Frequency of emission	Conducted limit (dBµV)				
(MHz)	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

The requirements are FULFILLED.

Domorko	For detailed test result please refer to following test protocols
Remarks:	For detailed test result blease refer to following test protocols



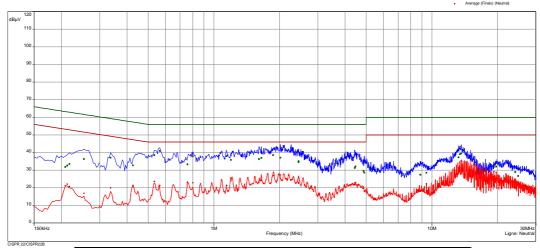
5.1.6 Test protocol

File No.:	T38935-00-02TK	Result	
Operation mode:	USB data connection to PC		
Tested by:	Tobias Kammerer		
Location:	Shielded Room 2	Date:	14.11.2014 08:36:39
Remarks:	Neutral		



Meas.Avg (Neutral)

QuasiPeak (Finals) (Neutral)



freq	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(μV)	dB	dB	dΒ(μV)	dB	dB	
0.209	9	32.0	-31.3	63.3	21.3	-32.0	53.3	Neutral
0.213	9	32.7	-30.4	63.1	22.2	-30.9	53.1	Neutral
0.218	9	33.6	-29.4	62.9	20.8	-32.2	52.9	Neutral
0.254	9	36.3	-25.3	61.6	16.9	-34.8	51.6	Neutral
0.336	10	37.1	-22.2	59.3	20.0	-29.3	49.3	Neutral
0.426	10	32.8	-24.6	57.3	21.0	-26.3	47.3	Neutral
0.534	10	38.5	-17.5	56.0	23.7	-22.3	46.0	Neutral
0.566	10	41.0	-15.0	56.0	21.3	-24.8	46.0	Neutral
0.758	11	33.3	-22.7	56.0	23.1	-22.9	46.0	Neutral
0.803	11	38.0	-18.1	56.0	22.9	-23.1	46.0	Neutral
1.145	11	38.0	-18.0	56.0	21.4	-24.6	46.0	Neutral
1.199	11	35.9	-20.1	56.0	25.4	-20.6	46.0	Neutral
1.610	12	36.4	-19.6	56.0	23.3	-22.7	46.0	Neutral
1.650	12	37.0	-19.0	56.0	24.2	-21.8	46.0	Neutral
1.871	12	38.6	-17.4	56.0	27.0	-19.0	46.0	Neutral
2.019	12	37.1	-18.9	56.0	27.3	-18.7	46.0	Neutral
2.445	13	34.7	-21.3	56.0	23.0	-23.0	46.0	Neutral
2.450	13	35.1	-20.9	56.0	22.7	-23.3	46.0	Neutral
4.430	13	31.3	-24.7	56.0	21.7	-24.3	46.0	Neutral
4.461	13	32.1	-23.9	56.0	23.0	-23.0	46.0	Neutral
4.854	14	29.7	-26.4	56.0	19.9	-26.1	46.0	Neutral
4.899	14	28.7	-27.4	56.0	18.2	-27.8	46.0	Neutral
8.855	14	27.5	-32.5	60.0	18.5	-31.5	50.0	Neutral
9.431	14	28.5	-31.5	60.0	22.4	-27.7	50.0	Neutral
13.241	15	37.3	-22.7	60.0	31.5	-18.5	50.0	Neutral
13.430	15	39.2	-20.8	60.0	34.6	-15.4	50.0	Neutral
13.623	15	39.5	-20.5	60.0	35.5	-14.5	50.0	Neutral
15.050	15	38.0	-22.0	60.0	35.7	-14.3	50.0	Neutral
19.241	16	31.9	-28.1	60.0	29.2	-20.8	50.0	Neutral
19.718	16	32.2	-27.9	60.0	28.8	-21.3	50.0	Neutral
24.101	16	29.0	-31.0	60.0	24.9	-25.2	50.0	Neutral
24.866	16	26.8	-33.2	60.0	22.9	-27.1	50.0	Neutral

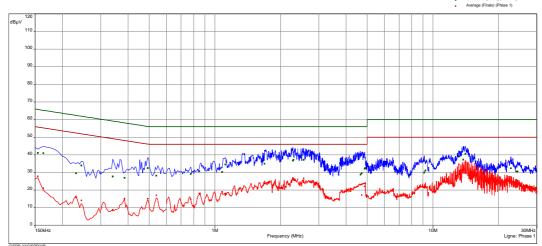


File No.:	T38935-00-02TK	Result	
Operation mode:	USB data connection to PC		
Tested by:	Tobias Kammerer		
Location:	Shielded Room 2	Date:	14.11.2014 08:36:39
Remarks:	Phase1		

CISPR 22/CISPR22 - Class B - Average:
CISPR 22/CISPR22 - Class B - QPeak/
Meas-Peak (Phase 1)

Meas.Avg (Phase 1)

OurselPeak (Finals) (Phase 1)



freq	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(μV)	dB	dB	dB(μV)	dB	dB	
0.155	1	41.1	-24.6	65.8	27.9	-27.9	55.8	Phase 1
0.164	1	41.0	-24.3	65.3	21.2	-34.1	55.3	Phase 1
0.231	1	29.6	-32.9	62.4	15.8	-36.6	52.4	Phase 1
0.245	1	34.0	-28.0	61.9	14.2	-37.7	51.9	Phase 1
0.341	2	27.8	-31.4	59.2	9.0	-40.2	49.2	Phase 1
0.386	2	27.0	-31.2	58.2	15.3	-32.9	48.2	Phase 1
0.494	2	32.6	-23.5	56.1	15.1	-31.0	46.1	Phase 1
0.539	2	28.3	-27.8	56.0	17.1	-28.9	46.0	Phase 1
0.776	3	29.2	-26.8	56.0	14.8	-31.2	46.0	Phase 1
0.848	3	30.7	-25.4	56.0	18.2	-27.8	46.0	Phase 1
1.082	3	30.4	-25.7	56.0	19.1	-26.9	46.0	Phase 1
1.118	3	34.6	-21.4	56.0	18.2	-27.8	46.0	Phase 1
1.691	4	35.0	-21.0	56.0	23.6	-22.4	46.0	Phase 1
2.280	4	36.8	-19.2	56.0	26.9	-19.1	46.0	Phase 1
2.294	4	37.2	-18.8	56.0	26.5	-19.5	46.0	Phase 1
2.558	5	37.2	-18.8	56.0	26.8	-19.2	46.0	Phase 1
4.655	5	28.8	-27.2	56.0	23.2	-22.8	46.0	Phase 1
4.718	5	29.6	-26.4	56.0	17.3	-28.8	46.0	Phase 1
4.868	6	32.2	-23.8	56.0	22.1	-23.9	46.0	Phase 1
4.895	6	32.5	-23.5	56.0	23.8	-22.2	46.0	Phase 1
9.120	6	30.0	-30.0	60.0	21.3	-28.7	50.0	Phase 1
9.237	6	31.1	-28.9	60.0	22.9	-27.1	50.0	Phase 1
13.146	7	39.2	-20.9	60.0	34.6	-15.4	50.0	Phase 1
13.790	7	37.4	-22.7	60.0	29.8	-20.2	50.0	Phase 1
14.100	7	40.6	-19.4	60.0	36.5	-13.5	50.0	Phase 1
19.241	8	31.9	-28.2	60.0	29.8	-20.2	50.0	Phase 1
22.769	8	32.4	-27.6	60.0	27.6	-22.4	50.0	Phase 1
24.101	8	30.7	-29.3	60.0	25.9	-24.1	50.0	Phase 1
24.420	8	30.6	-29.4	60.0	25.5	-24.5	50.0	Phase 1



5.2 Radiated emission

For test instruments and accessories used see section 6 Part SER 2, SER 3.

5.2.1 Description of the test location

Test location: OATS 1

Test location: Anechoic chamber 1

Test distance: 3 m

5.2.2 Photo documentation of the test setup

Note: Photo documentation of the test setup can be viewed in Attachment B

5.2.3 Applicable standard

According to FCC Part 15B, Section 15.109 (a):

Except for Class A digital devices, the field strength of radiated emission from unintentional radiators at a distance of 3 m shall not exceed the given limit.

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5.2.4 Description of Measurement

The radiated emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarized antennas. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.4, Item 8 and 12. In the frequency range above 1 GHz a spectrum analyser is used. If the emission level in peak mode complies with the average limit, testing is stopped and peak values will be reported, otherwise, the emission is measured in average mode again and both are reported. The EUT is measured in RX continuous mode under normal conditions.

Instrument settings:

30 MHz – 1000 MHz: RBW: 120 kHz 1000 MHz – 6 GHz RBW: 1 MHz

5.2.5 Test result

f < 1 GHz

Frequency (MHz)	L: QP (dBµV)	L: AV (dBµV)	Bandwidth (kHz)	Correct. (dB)	L: QP (dBµV)	L: AV (dBµV)	Limit (dBµV)	Delta (dB)
120.00	12.9	-	120	11.7	24.6	-	43.5	-18.9
240.00	9.5	-	120	13.3	22.8	-	46.0	-23.2
250.00	9.9	-	120	14.0	23.9	-	46.0	-22.2
265.13	10.4	-	120	14.5	24.9	-	46.0	-21.1
359.99	5.3	-	120	17.9	23.2	-	46.0	-22.8
393.79	10.4	-	120	18.8	29.2	1	46.0	-16.8

f > 1 GHz

Frequency	L: PK	L: AV	Bandwidth	Correct.	L: PK	L: AV	Limit	Delta
(MHz)	(dBµV)	(dBµV)	(kHz)	(dB)	(dBµV)	(dBµV)	(dBµV)	(dB)
3363.00	58.6	-	1000	-6.9	51.7	-	54.0	-2.3

Limit according to FCC Part 15B, Section 15.109(a):

Frequency (MHz)	Limit (µV/m)	Limit (dBµV/m)		
30 - 88	100	40		
88 - 216	150	43.5		
216 - 960	200	46		
Above 960	500	54		

The requirements are FULFILLED.

Remarks: The measurement is performed according to FCC Part 15A, Section 15.33(b), up to the

5th harmonic.

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6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	ESHS 30	02-02/03-05-002	17/07/2015	17/07/2014		
	ESH 2 - Z 5	02-02/20-05-004	18/10/2015	18/10/2013	02/03/2015	02/09/2014
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155	07/07/2005	07/07/2005	12/03/2015	12/09/2014
SER 2	ESVS 30	02-02/03-05-006	03/07/2015	03/07/2014		
	VULB 9168	02-02/24-05-005	08/04/2015	08/04/2014	04/03/2015	04/09/2014
	S10162-B	02-02/50-05-031				
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
SER 3	AFS4-00100600-13-10P-4	02-02/17-13-001				
SEK 3			07/05/2015	07/05/2014		
	3117	02-02/24-05-009	07/05/2015	07/05/2014		
	SF104/11SMA/11N/1500MM					
	SF104/11SMA/11N/1500MM	02-02/50-13-013				

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