





Test report

Product / EUT: Type designation: Tested type: FCC-ID:	iP1 Sma iP1 Sma	oorting gun rtSystem rtSystem - Watch RTIW1A (pendir		
EUT authorization:	==	Certification Verification		Declaration of Conformity Class II Permissive Change
Production level: S/N: Manufacturer:	10/2013 n/a Armatix Feringas 85774 U	GmbH		
Test remit:	in accore §15.207	es 47 CFR Part dance with the p 7; 15.209; 15.2 63.4-2003 – 01,	orocedure 49(a)	part C – Intentional radiators es given in
The standards were:		kept*		
*Remark:		Validation not c according:	overed b	e accredited scope y the accredited scope equirements partly proceeded
Applicant:	Armatix Feringas 85774 L			
EUT- Date of arrival: Test ID: Date(s) of test:	2013-10 PRK43_0 2013-10		D-23	
Burgrieden, 2014-05-23 Released by:		Principal engine	eer - Chris	stian Vogelmann







Test laboratory: EMCE GmbH

Ingenieurbüro für EMV-Prüfungen und Schaltungsentwicklung

Untere Wiesen 1 / 88483 Burgrieden / Germany

DAkkS-Registration No.: D-PL-12122-01-01 CAB-Registration No.: BnetzA-CAB-02/21-01/1

FCC-Registration No.: 219415

Responsible inspector: Mr. Hauser

EMCE GmbH

Ingenieurbüro für EMV-Prüfungen und Schaltungsentwicklung

Contact person: Manfred Weinzierl / Armatix GmbH

EUT-

Description: The iW1 SmartSystem consists of a sporting gun enabled with a

RF ID signal generated by a dedicated watch and an USB stick provided for data transfer between sportive gun and a PC

system.

Voltage supply: Internal - 3VDC (CR2032 battery)

Frequency list: 32.768kHz; 916.50MHz

Temperature range: $-20^{\circ}\text{C} \text{ to } +70^{\circ}\text{C}$

Approximate size: (LxWxH) / mm - 57x40x13mm

Supplied /

used equipment:

Designation	Туре	Manufacturer	S/N
Battery	CR2032	VARTA	n/a







Configuration:	As-delivered con Modified* *	dition*	
Cable designation	Туре	Length	Remarks
Antenna:	Antenna requirement acconstance Internal antenna Permanently atta Antenna with uni	C	
Remarks:	n/a		

State of revision:

Source document	New Document	Date / Reviser	Modifications
AXK45_02	AXK45a02	2014-04-15	Change of the FCC ID Bandwidth plot inserted (pages 19 and 20)
AXK45a02	AXK45b02	2014-05-21	Bandwidth plot extended by -20dB bandwidth corner frequencies. Power supply documented as internal source.







Test equipment list of EMCE GmbH:

Inv No.	Designation	Туре	Manufacturer	S/N	Calibration: Interval /valid until
001	Test receiver	ESS 5Hz - 1000MHz	Rohde & Schwarz	833776/008 Firmware: Main: 1.21 OTP: 02.01	1 Year(s)/ 2013-11-26
003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007	1 Year(s)/ 2014-02-14
004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003	1 Year(s)/ 2014-02-14
006	LISN	NNBM 8125	Schwarzbeck	8125371	1 Year(s)/ 2014-04-16
007	Absorbing clamp	MDS 21	Schwarzbeck	942436	1 Year(s)/ 2014-07-04
800	Loop antenna 9kHz-30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002	3 Year(s)/ 2013-11-03
009	Antenna 30-300MHz	VHBA9123 / BBA9106	Schwarzbeck	435	3 Year(s)/ 2015-08-28
010	Antenna 250-1200MHz	UHALP 9108A	Schwarzbeck	108	2 Year(s)/ 2014-07-24
011	Antenna 30-300MHz	VHBA9123 / BBA9106	Schwarzbeck	0403/94	2 Year(s)/ 2014-07-23
012	Antenna 250-1200MHz	UHALP 9108A	Schwarzbeck	166	3 Year(s)/ 2015-08-29
013	Antenna 9kHz-30MHz	Ø 1.5m	EMCE GmbH		1 Year(s)/ 2014-08-31
014	OATS	3m	EMCE GmbH		3 Year(s)/ 2014-09-30
015	OATS	10m	EMCE GmbH		3 Year(s)/ 2014-09-30
020	Coupling clamp	IP4A	Haefely	082672-13	1 Year(s)/ 2014-08-31
022	ESD-Gun	NSG 435	Schaffner	577	1 Year(s)/ 2014-06-18
024	RF-Generator	SMY01	Rohde & Schwarz	844146/046	2 Year(s)/ 2015-10-07
025	Current clamp BCI	F-120-2	FCC	47	1 Year(s)/ 2014-08-31
026	Coupling device network	CDN 801-M3-25	FCC	92	1 Year(s)/ 2014-08-31
030	Coupling device network	CDN 801-S1/ 9pol. DSUB	EMCE GmbH		1 Year(s)/ 2014-08-31





DAKKS

Deutsche
Akkreditierungsstelle
D-PL-12122-01-01

Akkreditiertes Prüflabor Accredited Test Laboratory

Inv No.	Designation	Туре	Manufacturer	S/N	Calibration: Interval /valid until
031	Coupling device network	CDN 801-S1/ 9pol. DSUB	EMCE GmbH		1 Year(s)/ 2014-08-31
032	RF Power Amplifier	75A250	Amplifier Research	22789	1 Year(s)/ 2014-08-31
033	Coupling device network	CDN-AF2	EMCE GmbH		1 Year(s)/ 2014-08-31
034	Coupling device CDN-AF2 EMCE GmbH network		1 Year(s)/ 2014-08-31		
035	3-phase coupling device network	CDN-1000-45	EMC-Partner	086	3 Year(s)/ 2015-12-06
036	Coupling device network	CDN 801-M5-25	EMCE GmbH		1 Year(s)/ 2014-08-31
037	Coupling device network	CDN 801-S1	EMCE GmbH		1 Year(s)/ 2014-08-31
038	Helmholtz coil	lmxlm	EMCE GmbH		1 Year(s)/ 2014-08-31
039	Helmholtz coil	1 m x 1 m	EMCE GmbH		1 Year(s)/ 2014-08-31
040	Current transformer		EMCE GmbH		1 Year(s)/ 2014-08-31
041	Loop antenna shielded	HZ-10 0816.2511.02	Rohde & Schwarz	849788/0020	3 Year(s)/ 2013-11-02
042	AC-Source/ Analyser/ Norm impedance	EMV D 5000/PAS	Spitzenberger+ Spies	A2747 00/0 0501 A2747 07/00501 (ARS16/3)	2 Year(s)/ 2015-04-22
043	Receiver	3DH/E Fieldmeter ESM-100	Maschek	971521	3 Year(s)/ 2014-01-28
044	CDN	CN-U	EMC-Partner	86	1 Year(s)/ 2014-08-31
045	CDN	DN-HF	EMC-Partner	86	1 Year(s)/ 2014-08-31
046	CDN	DN-LF2	EMC-Partner	86	1 Year(s)/ 2014-08-31
047	CDN	DN-LF1	EMC-Partner	86	1 Year(s)/ 2014-08-31
050	Data Acquisition/ Switch Unit	Agilent 34970A	Agilent Technologies	MY41019453	3 Year(s)/ 2016-02-25
051	20 Channel Multiplexer	Agilent 34901A	Agilent Technologies	MY41013531	3 Year(s)/ 2016-02-23





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Inv No.	Designation	Туре	Manufacturer	S/N	Calibration: Interval /valid until
054	Helmholtz coil	1.25 m x 1.25 m	EMCE GmbH		1 Year(s)/ 2014-08-31
055	Helmholtz coil	1.25 m x 1.25 m	EMCE GmbH		1 Year(s)/ 2014-08-31
057	Field probe	HI-6005	Holaday	34274	1 Year(s)/ 2013-12-12
058	Receiver	ESIB 40	Rohde & Schwarz	100200/ Firmware 4.35	1 Year(s)/ 2014-08-08
059	Logper. antenna	HL050	Rohde & Schwarz	100006	2 Year(s)/ 2015-01-15
062	Semi anechoic chamber #2	13.0m x 7.0m x 5.0m	EMC-Technik & Consulting GmbH		1 Year(s)/ 2014-06-30
067	LISN	ESH2-Z5	Rohde&Schwarz	872460/043	1 Year(s)/ 2014-03-13
068	LISN	ESH2-Z5	Rohde&Schwarz	872460/042	1 Year(s)/ 2014-04-05
070	Pulse limiter + 10dB Attenuator	ESH3-Z2	Rohde&Schwarz	357.8810.52	1 Year(s)/ 2014-08-31
073	Absorbing clamp	MDS21	Schwarzbeck	881757	1 Year(s)/ 2014-05-13
074	Synthesizer signal generator	SMX	Rohde&Schwarz	5SM02675	2 Year(s)/ 2015-04-15
107	Distortion generator	CAR-TESTER II	HILO-TEST	20073238	1 Year(s)/ 2014-08-31
115	Strip line 50 Ohm		EMCE GmbH		1 Year(s)/ 2014-08-31
116	Vertical rod antenna	VAMP 9243	Schwarzbeck	9243-205	1 Year(s)/ 2013-11-09
117	LISN	ESH3-Z6	Rohde & Schwarz	100521	1 Year(s)/ 2014-04-16
118	Current Probe	F-52	Fischer Customs Communication, Inc.	08398	1 Year(s)/ 2014-08-31
119	10V Insertion Unit 50 Ohm	URV5-Z2	Rohde & Schwarz	100911	2 Year(s)/ 2015-06-17
122	Power Meter	NRVS	Rohde & Schwarz	833430 / 0017	2 Year(s)/ 2015-06-12
123	Directional coupler	BDC 0100- 50/500	BONN Elektronik	087261	1 Year(s)/ 2014-08-31
127	Function/ Arbitrary Waveform Generator	Agilent 33220A	Agilent Technologies	MY44026679	3 Year(s)/ 2015-12-18
128	Signal Generator	SMF100A	Rohde & Schwarz	100137	2 Year(s)/ 2014-08-21



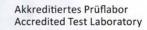


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Inv No.	Designation	Туре	Manufacturer	S/N	Calibration: Interval /valid until
129	ESD-Gun	P 30N	EM TEST GmbH	V1012106114	3 Year(s)/ 2016-07-03
130	Microwave- LogPer- Antenna	STLP 9149	Schwarzbeck Mess-Elektronik		5 Year(s)/ 2015-06-29
131	Coupling network	M3/AC	Dr. Hubert GmbH	A3052006	1 Year(s)/ 2014-08-31
132	LF-Amplifier	A1110-05	Dr. Hubert GmbH	111A1110	1 Year(s)/ 2014-08-31
134	10 V Insertion Unit 50 Ohm	URV5-Z2	Rohde & Schwarz	101025	1 Year(s)/ 2014-07-03
136	Directional coupler	BDC 0842-40/200	Bonn Elektronik	108082	1 Year(s)/ 2014-08-31
138	Microwave Biconical Broadband Antenna	SBA 9119	Schwarzbeck Mess-Elektronik	9119-058	3 Year(s)/ 2014-01-26
140	Burst/Surge- Generator	Transient 3000	EMC-Partner	TRA3000 F-S 1277	1 Year(s)/ 2013-12-06
142	Coupling / Decoupling Network for Burst and Surge	CNI 503 B7.4	EM TEST GmbH	V1125109869	1 Year(s)/ 2014-01-25
143	Ultra-Compact Simulator	UCS 500 N7	EM TEST AG	V1125109868	1 Year(s)/ 2014-01-23
147	10-V-insertion unit 50 Ohm	URV5-Z2	Rohde & Schwarz	101049	1 Year(s)/ 2013-12-13
151	DSO Infiniium 600 MHz	DSO9064A	Agilent Technologies	MY52090137	2 Year(s)/ 2014-09-19
154	Capacitive voltage clamp	CDN 500	Teseq GmbH	656	3 Year(s)/ 2015-03-08
155	ISN T400A	ISN T400A	Teseq GmbH	26541	3 Year(s)/ 2015-07-19
157	Power Amplifier	CBA1G-1000	Teseq	T44166	1 Year(s)/ 2014-08-14
159	Function/Arbitrary Waveform Generator	Agilent 33220A	Agilent Technologies	MY44058563	3 Year(s)/ 2015-12-19
163	Power Sensor	NRV-Z4	Rohde&Schwarz	100575	1 Year(s)/ 2014-02-25
174	LISN	ESH3-Z6	Rohde & Schwarz	101003	3 Year(s)/ 2016-05-15
175	EMI TestReceiver	ESR7	Rohde & Schwarz	101108	2 Year(s)/ 2014-06-17
997	EMC Software	EMC32 Vers. 8.53.0	Rohde& Schwarz	n/a	









Scope:

1 E	EMC-	Test(s)		9
			ding 47 CFR Part 15 Subpart C - 10/2013	
			al voltage according	
		47 CF	R Part 15 Subpart C - 10/2013	9
		1.1.2 Radio	disturbances according	
		47 CF	R Part 15 Subpart C - 10/2013	10
		1.1.2.1	Test set up	11
		1.1.2.2	Test – intentional radiation	16
		1.1.2.3	Test – radiated emission general requirements	21
2	Sumn	narv		24





- 1 EMC-Test(s)
- 1.1 Emission according 47 CFR Part 15 Subpart C 10/2013
 - 1.1.1 Terminal voltage according47 CFR Part 15 Subpart C 10/2013

Full compliance
Precompliance
Test not requested*
Test not carried out*

* The device is battery powered, no external leads.







1.1.2 Radio disturbances according 47 CFR Part 15 Subpart C - 10/2013

\boxtimes	Full compliance
	Precompliance
	Test not requested*
	Test not carried out*
*	

Test location

InvNo.	Designation	Type (LxWxH)	Manufacturer	Location
504	Shielded room #1	6.4 x 4.0 x 2.3m	Frankonia EMV- Messsysteme GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
588	Shielded room #2	8.3/5.8 x 5.5/2.9 x 3.4m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
584	Shielded room #3	3.6 x 3.6 x 2.5m	Siemens AG	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
061	Semi anechoic chamber #1	4.0 x 4.0 x 3.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
062	Semi anechoic chamber #2	13.5 x 6.1 x 5.5m	EMC-Technik & Consulting GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
014	OATS	3m – Test distance	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
015	OATS	10m – Test distance	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
066	OATS	30m – Test distance	EMCE GmbH	EMCE GmbH Untere Wiesen 1 88483 Burgrieden
	Alternative test site			

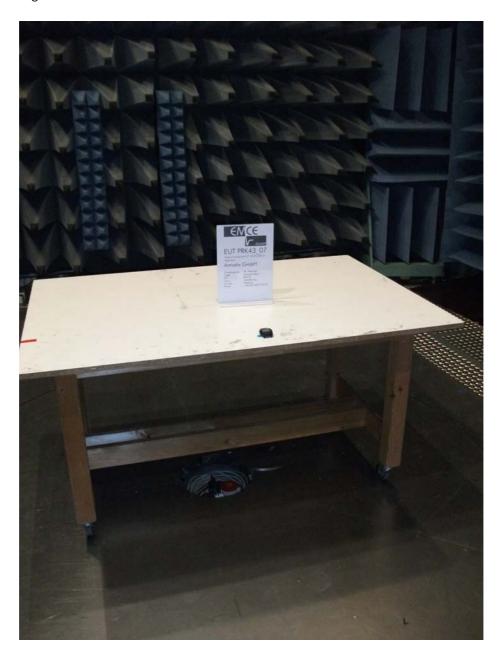
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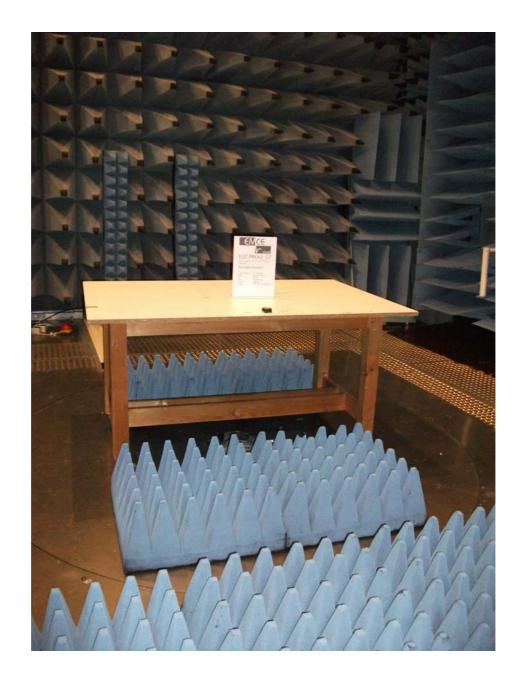


1.1.2.1 <u>Test set up</u>

According ANSI C63.4-2003















AXK45b02







Used test equipment

	InvNo.	Designation	Туре	Manufacturer	S/N
	001	Test receiver	ESS 5Hz - 1000 MHz	Rohde & Schwarz	833776/008
	003	LISN 1	ESH3-Z5	Rohde & Schwarz	835268/007
	004	LISN 2	ESH3-Z5	Rohde & Schwarz	835268/003
	005	LISN 3	NNB 4/32T	Rolf Heine HF-Technik	4/32T-96015
	006	LISN	NNBM 8125	Schwarzbeck	8125371
	007	Absorbing clamp	MDS 21	Schwarzbeck	942436
	800	Antenna 9kHz – 30MHz	HFH2-Z2	Rohde & Schwarz	835776/0002
	009	Antenna 30 – 300MHz	VHBA9123 / BBA9106	Schwarzbeck	435
	010	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	108
	011	Antenna 30 – 300MHz	VHBA9123 / BBA9106	Schwarzbeck	0408/94
	012	Antenna 250 -1200MHz	UHALP 9108A	Schwarzbeck	166
	013	Antenna 9kHz – 30 MHz	Loop antenna 1.5m Ø	EMCE GmbH	
	025	Current clamp BCI	F-120-2	FCC	47
	041	HZ-10	Shielded coil	Rohde & Schwarz	849788/020
	042	AC-Source / Analyser / Norm impedance	EMV D5000/PAS	Spitzenberger + Spies	A274700/ 0 0501
\square	058	Test receiver	ESIB 40	Rohde & Schwarz	100200
	059	Logper. Antenna	HL050	Rohde & Schwarz	100006
	060	HF coupling clamp	KEMA 801	Schaffner	20808
	063	Logper. Antenna	HL023 A2	Rohde & Schwarz	_
	067	LISN 5	ESH2-Z5	Rohde & Schwarz	0872460/043
	068	LISN 4	ESH2-Z5	Rohde & Schwarz	0872460/042
	073	Absorbing clamp	MDS 21	Schwarzbeck	881757
	116	Vertical rod antenna	VAMP 9243	Schwarzbeck	9243-205

All used test equipment are checked resp. calibrated periodically.

Test equipment was checked and complied to the requirements

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Test / Measurement uncertainty

The measurement uncertainty in the test met the guideline of CISPR16-4-2 or better.

Measurement uncertainty of the radiated emission with an extended coverage factor of k=2:

Frequency Measurement uncertainty

9kHz – 30MHz on request 30MHz - 300MHz 4.4dB 300MHz – 1GHz 3.4dB 1GHz – 18GHz on request







1.1.2.2 <u>Test – intentional radiation</u>

Regulation		
47 CFR Part 15 Subpart C	C - 10/2013 9kHz - 30MHz 30MHz - 1000MHz Section 15.249 – Fundamental frequer	☐ 150kHz – 1GHz ☐ 1 – 18GHz ncy and harmonics
Limits:	Section 15.209	Section 15.249
Test distance:		☐ 5m ☐ 30m
Operation mode		
EUT arrangement: Power supply: Rated voltage variation:	☐ Tabletop☐ Internal☐ 85%	Floor standing 240V/60Hz 115%
ISM-Frequencies: Fundamental frequency:	MHz 916.50 MHz	MHzMHz
Continuous operation pro permanently.	vided by a test software w	hile transmitting data
Environmental conditions		
Temperature: Humidity: Air pressure:	15 - 35 °C 30 - 60 % 860 - 1060 hPa	
Environmental conditions	during the test:	kept not kept





Test - / Measurement procedure

Measurements are made with a receiver according CISPR guidelines. At a pre-test in the shielded room the required frequency range is scanned in an automatically operation. If the emanation is closer than 6dB to the limits or more, the receiver will stop and measure the exact value with quasipeak detector. The frequency, the maximum reading and the limit will be printed out. The determined, disturbing frequencies are re-tested in an OATS measurement.

Test result		
Limit for rac	liated fundamental:	kept not kept
Limit for radiated harmonics:		kept not kept
	diated frequencies outside cy bands others than harmonics:	kept not kept kept according Section 15.209 not kept according Section 15.209
Remarks:	Harmonics below the limit with generally not listed. For frequencies outside the frec emissions – general requiremen	•
Protocol sco	оре	
□ D R □ D B	eadings - Antenna horizontal polarized iagram - Antenna horizontal polarized eadings - Antenna vertical polarized. iagram - Antenna vertical polarized. andwidth plot – Frequency response vs recompliance measurement(s).	







Field strength - Fundamental

Frequency /	Max. field	Max. field	Limit – QP	Margin –	Antenna
MHz	strength –	strength –	/	QP/	polarization
	Peak /	QP/	dBµV/m	dB	
	dBµV/m	dBµV/m			
916.52	74.5	73.5	94.0	20.5	Vertical
916.52	68.5	67.5	94.0	26.5	Horizontal

Field strength - Harmonics

Frequency / MHz	Max. field strength – Peak / dBµV/m	Max. field strength – AV / dBµV/m	Limit – AV / dBµV/m	Margin – AV / dB	Antenna polarization
1833.0	59.4	41.2	54.0	12.8	Vertical
2749.5	48.0	38.5	54.0	15.5	Horizontal
3666.0	51.4	40.0	54.0	14.0	Vertical
4582.5	56.7	44.7	54.0	9.3	Vertical
5499.0	59.3	48.1	54.0	5.9	Vertical

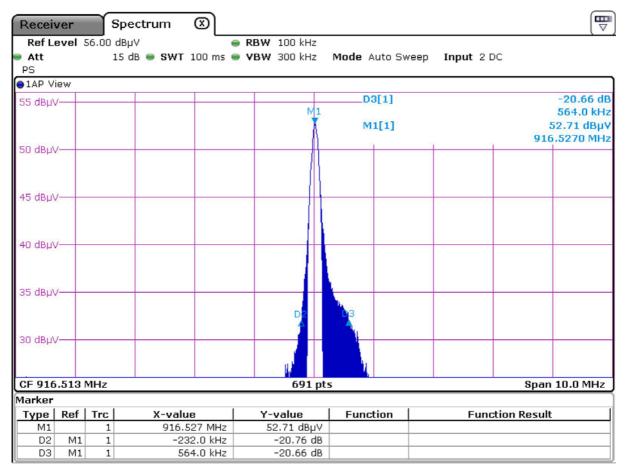
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Bandwidth - informative



EMCE GmbH 88483 Burgrieden/Germany www.emce-gmbh.de

Applicant: Armatix GmbH EUT: PRK43_07; Smart Watch

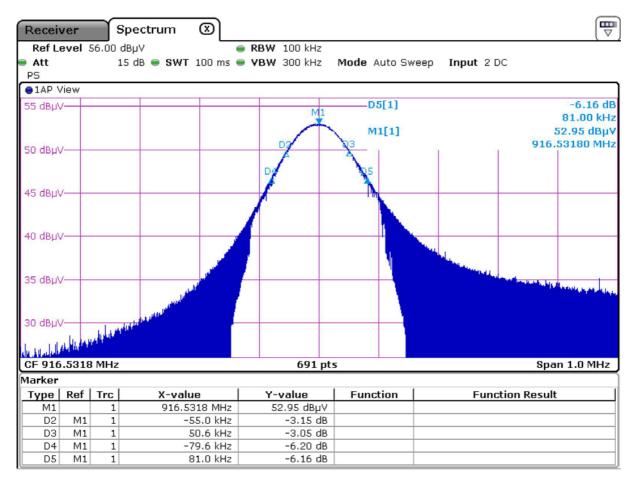
Occupied BW file: AXL16_03

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EMCE GmbH 88483 Burgrieden/Germany www.emce-gmbh.de

Applicant: Armatix GmbH

EUT:PRK43_07; Smart Watch

Occupied BW file: AXL16 04



Regulation





1.1.2.3 <u>Test – radiated emission general requirements</u>

47 CFR Part 15 Subpart (C - 10/2013 ☑ Section 15.205 [9kh ☑ Section 15.209 [9kh	
	Exception bands Section 15.249 – Fundamental freque	ncy and harmonics
Limits:	Section 15.209*	
Test distance:		☐ 5m ☐ 30m
* The limits for frequencies below 30N 40 dB/decade - (+40*log(measureme	IHz were corrected for a closer measur	ring distance by using an extrapolation factor of
Operation mode		
EUT arrangement: Power supply: Rated voltage variation:	∑ Tabletop ∑ Internal □ 85%	☐ Floor standing ☐ Internal ☐ 115%
ISM-Frequencies: Fundamental frequency:	☐ _MHz ☑ 916.50MHz	MHzMHz
Continuous operation pro	ovided by a test software v	vhile transmitting data







Environmental conditions

Temperature:	15 - 35 °C	
Humidity:	30 - 60 %	
Air pressure:	860 - 1060 hPa	
Environmental conditions (during the test:	kept not kept

Test - / Measurement procedure

Measurements are made with a receiver according CISPR guidelines. Frequencies equal or below 1000MHz are tested with quasi-peak detector and related bandwidths. Except for the frequency bands 9-90kHz and 110-490kHz an average detector is employed. Average detector is also used for frequencies above 1000MHz with a related bandwidth of 1MHz. At a pre-test in the shielded room the required frequency range is scanned in an automatically operation with peak detector. If the emanation is closer than 6dB to the limits or more, the receiver will retest the exact value with quasipeak or average detector. The determined frequencies are re-tested in an OATS measurement.







Watch

Readings - Antenna horizontal polarized [0.09-1000MHz]

No results

Readings - Antenna vertical polarized [0.09-1000MHz]

No result

Readings - Antenna vertical polarized [1-10 GHz]

Frequency	Field strength - PK	Field strength - AV	Limit AV	Margin	Antenna- Height	Antenna- Polarization	Turn Table- Position
GHz	dBμV/m	dBμV/m	dBμV/m	dB	m	hor./ver.	Degree
1.833	59.4	41.2	54.0	12.8	1.0	V	352

Readings - Antenna horizontal polarized [1-10 GHz]

No results

Test report 2013-10-23







2 **Summary**

Regulation	Class / Test level	Result	Remark(s)
FCC Rules CFR 47 Part 15			
Subpart C			
Terminal voltage	Section		n. r.
[0.15-30MHz]	15.207		
Radiated emissions – general	Section	Limits kept	
requirements	15.209		
[0.009-30MHz]			
[30-1000MHz] [1-10GHz]			
Radiated emissions – intentional	Section	Limits kept	
radiators	15.249		
Fundamental frequency			
[902-928MHz]			
Harmonics			
N* fundamental frequency			
[N= 211]			

n. r. – not relevant

Burgrieden, 2014-05-23

Report generated by:

Acceptance inspector – Peter Hauser