

Test Report



INTENTIONAL RADIATOR TESTS ACCORDING TO FCC PART 15 C and INDUSTRY CANADA REQUIREMENTS

Equipment Under Test: Heart Rate Belt (Low Energy Bluetooth)

Suunto Oy Valimotie 7

FINLAND

FI-01510 VANTAA

Marketing Name: SUUNTO MOVESENSE

Manufacturer: Suunto Oy Valimotie 7 FI-01510 VANTAA FINLAND

Customer:

FCC Rule Part: IC Rule Part:

KDB:

15.247: 2013 RSS-210, Issue 8, 2010 RSS-GEN Issue 3, 2010 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (April 9, 2013)

Date:

September 16, 2013

Date:

September 16, 2013

Checked by:

1.Hda

Ari Honkala Product Line Manager

Issued by:

Rauno Repo Testing Engineer

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Equipment Under Test (EUT)

Heart Rate Belt	
Marketing Name:	MOVESENSE
Serial Number:	-

The EUT is a heart rate belt using Low Energy Bluetooth.

Several samples were used in tests. There were separate units for each channel (low, mid and high) and for conductive measurements there were units with SMA antenna port connectors and wires for external power source.

Classification of the device

Fixed device	
Mobile Device (Human body distance > 20cm)	
Portable Device (Human body distance < 20cm)	\bowtie

Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing

Ratings and declarations

Low Energy Bluetooth:	
Operating Frequency Range (OFR):	2402 – 2480 MHz
Channels:	40
Channel separation:	2 MHz
Conducted power:	-1.84 dBm
Transmission technique:	Digital transmission
Modulation:	V4.0 single mode
Integrated antenna gain:	-2.7 dBi max

Power Supply

-Internal battery CR2025.

-Conductive measurements were tested with an external precision laboratory power source



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SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.207(a) / RSS-GEN 7.2.2	Conducted Emissions on Power Supply Lines	N/A*
§15.247(b)(3) / RSS-210 8.4	Maximum Peak Conducted Output Power	PASS
§15.247(a)(2) / RSS-210 A8.2	6 dB Bandwidth	PASS
RSS-GEN 4.6.1	99 % Occupied Bandwidth	PASS
§15.247(d) / RSS-210 A8.5	100 kHz Bandwidth of Frequency Band Edges and	PASS
	Conducted Spurious Emissions	
§15.209(a), §15.247(d) / RSS-210 A8.5	Radiated Emissions Within The Restricted Bands	PASS
§15.109 / RSS-GEN 7.2.3.2	Unintentional Radiated Emissions	PASS

* The EUT is a battery operated device.

EUT Test Conditions during Testing

The EUT was operating in the wanted channel and was modulated in continuous transmit mode during all the tests.

Following channels were used during the tests:

Channel	Frequency/ MHz
LOW (CH 0)	2402
MID (CH 19)	2440
HIGH (CH 39)	2480

Test Facility

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



Maximum Peak Conducted Output Power

Standard:	ANSI C63.10	(2009)
Tested by:	RRE	
Date:	13.9.2013	
Temperature:	22 °C	
Humidity:	48 % RH	
Measurement uncertainty	\pm 2.87dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.247(b) (1)

For frequency hopping systems operating in the 2400-2483.5 MHz band employing less than 75 hopping channels the limit is 0.125 watts (=20.969 dBm). Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

Results:

Channel	Conducted Power [dBm]	Limit [dBm]	Margin [dBm]	Result
Low	-3.30	20.969	24.27	PASS
Mid	-2.63	20.969	23.33	PASS
High	-1.84	20.969	22.81	PASS



Maximum Peak Conducted Output Power

Spectrur	n								
Ref Level Att TDF	2.50 dBm 10 dB	SWT 1.9 µ	e RBW s e VBW	1 MHz 3 MHz Mo	ode Auto F	FT			
🔵 1Pk Max	1.0	122.	-1		135				
0 dBm			5	M1	N	11[1]		2.40	-3.30 dBm L77860 GHz
-10 dBm—									
-20.dBm-	2	1			0	-			
-30 dBm—	-				<i></i>				
-40 dBm—	2		0	Ċ.	0	-	-		2
-50 dBm—	5.4		3	62		×	3		
-60 dBm—									
-70 dBm—	5. <u>1</u> .		3	2		<u>.</u>	3		
-80 dBm—		-					1		
-90 dBm—					1.2. 				
CF 2.402	⊥ GHz			691	. pts			Spa	an 3.0 MHz
)(Me	asuring		444	13.09.2013 10:04:26

Date: 13.SEP.2013 10:04:27



Ref Level 2 Att TDF	50 dBm 10 dB	SWT 1.9 μ	e RBW	1 MHz 3 MHz Mode	Auto FFT		5.1
1Pk Max	12			(4)			
) dBm				VI MI	M1[1]		-2.63 dBr 2.43978730 GH
-10 dBm							
20 dBm	~	5	0				
30 dBm			-				
40 dBm		2	Ç.				
50 dBm		5				2	
60 dBm							
70 dBm							
80 dBm		-	·				
90 dBm		5					
CF 2.44 GHz				691 pts			Span 3.0 MHz

Date: 13.SEP.2013 10:20:12

Figure 2. Channel MID.

Maximum Peak Conducted Output Power



Spectrum	ר					
Ref Level 2.50 Att TDF)dBm 10 dB SWT ;	<mark>⊜ RBW</mark> 1 № 1.9 µs ⊖ VBW 3 №	1Hz 1Hz Mode A	uto FFT		
∋1Pk Max	127	14. L. L.	1214			
0 dBm	-		MI	M1[1]		-1.84 dBm 2.47996090 GHz
-10 dBm						
-30 dBm						
-40 dBm			~			
-50 dBm	5 C		c		3	
-60 dBm			0			
-70 dBm	> C			×.	5	
-80 dBm			Ċ			
-90 dBm	5				2	
CF 2.48 GHz			691 pts			Span 3.0 MHz
]	Measuring	and the lost we we are the	13.09.2013 11:45:13

Date: 13.SEP.2013 11:45:14

Figure 3. Channel HIGH.



Transmitter Radiated Emissions 30 MHz to 26.5 GHz

ANSI C63.10	(2009)
RRE	
11. – 12.9.2013	
20 - 21 °C	
56 - 57 % RH	
± 4.51 dB	Level of confidence 95 $\%$ (k = 2)
	ANSI C63.10 RRE 11. – 12.9.2013 20 - 21 °C 56 - 57 % RH ± 4.51 dB

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

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, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. 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).

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



Test results





FCC Part 15 Class B Electric Field Strength 3 m QP.LimitLine Preview Result 1V-PK+ Preview Result 1H-PK+

Figure 4. Measured curve with peak-detector. Channel LOW.

Final measurements from the worst frequencies

FCC Part 15 Class B Spurious Emission 30-1000MHz 3m



FCC Part 15 Class B Electric Field Strength 3 m QP.LimitLine Preview Result 1V-PK+ Preview Result 1H-PK+

Figure 5. Measured curve with peak-detector. Channel MID.

Final measurements from the worst frequencies



FCC Part 15 Class B Spurious Emission 30-1000MHz 3m



FCC Part 15 Class B Electric Field Strength 3 m QP.LimitLine Preview Result 1V-PK+ Preview Result 1H-PK+

Figure 6. Measured curve with peak-detector. Channel HIGH.

Final measurements from the worst frequencies





FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)



Figure 7. Measured curve with peak- and average detector. Channel LOW.



FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

FCC Part 15 Class B Electric Field Strength 3 m PK.LimitLine
 Preview Result 1-PK+
 Final Result 1-PK+

FCC Part 15 Class B Electric Field Strength 3 m AV.LimitLine
Preview Result 2-AVG
Final Result 2-AVG

Figure 8. Low channel band edge.



Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time 15x(ms)	Bandwidth (kHz)	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2332.275000	55.8	1000.0	1000.000	106.0	V	206.0	3.9	18.1	73.9	
2389.575000	59.9	1000.0	1000.000	100.0	V	181.0	4.4	14.0	73.9	
2389.600000	59.9	1000.0	1000.000	100.0	V	181.0	4.4	14.0	73.9	

Table 2. Final Average results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time 15x(ms)	Bandwidth (kHz)	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/ m)	Comment
2386.000000	29.8	1000.0	1000.000	162.0	V	181.0	4.3	24.1	53.9	





FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)





Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time 15x(ms)	Bandwidth (kHz)	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2337.675000	56.0	1000.0	1000.000	100.0	V	278.0	3.9	17.9	73.9	
2395.375000	59.9	1000.0	1000.000	198.0	V	181.0	4.4	14.0	73.9	

Table 3. Final Max Peak results.

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Radiated Emission Test





Figure 10. Measured curve with peak- and average detector. Channel HIGH.



FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

FCC Part 15 Class B Electric Field Strength 3 m PK.LimitLine Preview Result 1-PK+ Final Result 1-PK+ FCC Part 15 Class B Electric Field Strength 3 m AV.LimitLine Preview Result 2-AVG Final Result 2-AVG

Figure 11. High channel band edge.



Final measurements from the worst frequencies

Table 4. Final Max Peak results.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time 15x(ms)	Bandwidth (kHz)	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/ m)	Comment
2493.100000	56.7	1000.0	1000.000	155.0	V	180.0	4.9	17.2	73.9	
2499.525000	60.4	1000.0	1000.000	187.0	V	241.0	4.9	13.5	73.9	
2570.775000	61.0	1000.0	1000.000	207.0	V	60.0	5.1	12.9	73.9	

Table 5. Final Average results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time 15x(ms)	Bandwidth (kHz)	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/ m)	Comment
2483.500000	32.0	1000.0	1000.000	190.0	V	180.0	4.8	21.9	53.9	



FCC Part 15 Class B Spurious Emission 4-18GHz 3m



FCC Part 15 Class B Electric Field Strength 3 m PK.LimitLine Preview Result 1-PK+ FCC Part 15 Class B Electric Field Strength 3 m AV.LimitLine Preview Result 2-AVG

Figure 12. Measured curve with peak- and average detector. Channel LOW.

Final measurements from the worst frequencies

FCC Part 15 Class B Spurious Emission 4-18GHz 3m



Figure 13. Measured curve with peak- and average detector. Channel MID.

Final measurements from the worst frequencies





FCC Part 15 Class B Spurious Emission 4-18GHz 3m



FCC Part 15 Class B Electric Field Strength 3 m PK.LimitLine Preview Result 1-PK+ FCC Part 15 Class B Electric Field Strength 3 m AV.LimitLine Preview Result 2-AVG

Figure 14. Measured curve with peak- and average detector. Channel HIGH.

Final measurements from the worst frequencies





FCC Part 15 Class B Electric Field Strength 3 m PK.LimitLine Preview Result 1-PK+ FCC Part 15 Class B Electric Field Strength 3 m AV.LimitLine Preview Result 2-AVG

Figure 15. Measured curve with peak- and average detector. Channel LOW.

Final measurements from the worst frequencies

FCC Part 15 Class B Spurious Emission 18-26.5GHz 3m



Figure 16. Measured curve with peak- and average detector. Channel MID.

Final measurements from the worst frequencies

FCC Part 15 Class B Spurious Emission 18-26.5GHz 3m



Figure 17. Measured curve with peak- and average detector. Channel HIGH.

Final measurements from the worst frequencies



Standard:	ANSI C63.10	(2009)
Tested by:	RRE	
Date:	13.9.2013	
Temperature:	22 °C	
Humidity:	48 % RH	

FCC Rule: 15.247 (d)

Ref Leve Att TDF	l 2.50 dBm 10 dB	SWT 948	e RBV .1 μs e VBV	♥ 100 kHz ♥ 300 kHz	Mode Aut	O FFT			
🔵 1Pk Max	1:0	25	25	2	29 9	8	5.8	4	10)
0 dBm		2		6			5		2
-10 dBm—									
-20 dBm—	-D1 -23,890	dBm							2
-30 dBm—	01 20.000								
-40 dBm—			0	5			-		s (
-50 dBm—	i			~	<u>.</u>				
-60 dBm—									1
-70 dBm-	Janlin montain	ahrenowing	Jundalyan	monture	munderwork	Commen and der	humantahalar	mohiteman	werning
-80 dBm—									
-90 dBm—		5			4 <u>0</u> 10		2		F1
Start 30.) MHz	I		691	nts			Sto	n 1.0 GHz

Date: 13.SEP.2013 09:12:57





Spectrur	n										
Ref Level Att TDF	2.5	0 dBm 10 dB	SWT	948.1 µ	e RB	W 100 kH: W 300 kH:	2 2 Mode A	Auto FFT			in an
●1Pk Max	10.			141			135				
0 dBm						61	19	0		3	
-10 dBm—				-							
-20 dBm—	-D1	-22.600	dBm								
-30 dBm—											
-40 dBm—	36		P	0			~				
-50 dBm—			7					- <u>-</u>	14. 		
-60 dBm—			-				0				
-70 dBm-	Miner	munh	www.	mound	h-"diathingh	Whiteward	water here have been as	udrantaniado	Andrewanter	mound	hantrobundershow
-80 dBm—		1211		0.00	1994 - 20						
-90 dBm—	-		5							*	
Start 30.0) MH	z	I			6	91 pts				Stop 1.0 GHz
							-) M	leasuring			13.09.2013 10:32:22

Date: 13.SEP.2013 10:32:22





Date: 13.SEP.2013 11:19:54

Figure 20. High channel conductive emission 30 MHz to 1000 MHz.



Spectru	m								
Ref Leve Att TDF	l 2.50 dBm 10 dB	SWT 19 µ	RBW 1 s VBW 3	.00 kHz 100 kHz M	ode Auto F	FT			1. v 18
😑 1Pk Max	10	10.			21				
0 dBm				6	M	12[1]			-50.1/ajdBm
-10 dBm—					M	1[1]	1	2.3	9900.58 GHz -3.87 dBm 020000 GHz
-20 dBm—	D1 -22 800	dBro	13	5.	5	2		_	$\left(\right)$
-30 dBm—	01 -23.090	UDIN							
-40 dBm—	-	2	0	5	S	5			
-50 dBm-		L		<u>م</u>	Sa M	M2			
-60 dBm—				alando					-
-70 dBm—		2		-					
-80 dBm—			2	. 1	к.) — — — — — — — — — — — — — — — — — — —				-
-90 dBm—		5					F1	- X-	
CE 2 397	5 GHz			691	nts			Sna	n 10 0 MHz
				071	Mea	asuring		• •	13.09.2013 09:10:42

Date: 13.SEP.2013 09:10:42





Date: 13.SEP.2013 11:17:55

Figure 22. High channel conductive emission at high band edge.



Spect	rum										₽
Ref Le Att TDF	ivel 2	2.50 dBm 10 dB	● R SWT 40 ms ● V	RBW 100 kHz /BW 300 kHz	Mode	Auto Sweep	Ő.				
⊖1Pk M	lax		20	12							
				12		M4[1]				-50.02	dBm
-10 dBr	n		·		6	M1[1]			4	-26.05	GHZ
10 001	9					witti				2.45010	GHz
-20 dBr	n –		JP		8				1	1	-
20 40-		1 -23,890	dBm	-							
-30 UBI	0			M1	8	2	2				
-40 dBr	n		MB						-		
										M	4
-50 dBr	n										
-60 dBr	n——		/	4	-						_
-	C5		Contractor (Contractor)	and the second second			herenne	www.	houseman	mont	um
w.7.Q.dBr	D	adoo contractores d	had a second second	- and contraction of	1000						
-80 dBr											
00 00.											
F <mark>1</mark> 0 dBr	n		6 (J	6	8		-		3	-	
Ptaut 1		1-1		60	1 ntc		10		C+	00 5 0 4	211-2
Markor	GF	12		09	i pis				31	op 3.0 v	
Tyne	Ref		Stimulus	Response	1	Function	1	Eun	ction Resu	lt	1
M1	Ref	1	2.4501 GHz	z -36.85 d	Bm	Function		- an	ccion Resu		
M2	1	1	2.3864 GHz	z -43.57 d	lBm						
MЗ		1	2.3343 GHz	z -44.66 d	lBm 🛛						
M4		1	4.80608 GHz	z -50.02 d	IBm						
)[]				Measuring	j 🚺	and the loss we are less to	-	13.09.201 09:15:5	3

Date: 13.SEP.2013 09:15:53





Date: 13.SEP.2013 10:25:53

Figure 24. Mid channel conductive emission 1 GHz to 5 GHz.



Spect	rum						
Ref Le Att TDF	vel 2	.50 dBm 10 dB	● RBV SWT 40 ms ● VBV	¥ 100 kHz ¥ 300 kHz Mod	e Auto Sweep		
🖯 1Pk M	ax		x	13			
					M5[1]		-36.67 dBm
10 d0m							2.45586 GHz
-10 080					M1[1]		-38.37 dBm
-20 dBm		1 -21 870	dBm		1		2,36900 GHZ
		1 21.070	dom.				
-30 dBm) <u> </u>		MS	MI			
-40 dBm	n			13			
			N				M2
-50 dBr	1						
-60 dBm							
-00 001	1			La serre sono con	Section States	and the second second	en in a la manager
~70.dBg	2-and and	NL-NL-NL-WWWWW	www.anew.anew.anda.ml	Ma hulling ward ward	warmen and the second	an warmen and the second	
00 10							
-80 aBN	<u>ا</u> ر						
-90 dBm	1—						
Start 1	.0 GH	z	a) 50	691 pts			Stop 5.0 GHz
Marker							
Туре	Ref	Trc	Stimulus	Response	Function	Fui	nction Result
M1		1	2.589 GHz	-38.37 dBm			
M2		1	2 5137 CHz	-43.20 UBIN			
M4	1	1	2.47323 GHz	-48,33 dBm			
M5		1	2.45586 GHz	-36.67 dBm			
)(Measuring		13.09.2013 11:22:12

Date: 13.SEP.2013 11:22:12

Figure 25. High channel conductive emission 1 GHz to 5 GHz.



Spectrur	n								
Ref Level Att TDF	2.50 dBm 10 dB	SWT 100	e RBW	100 kHz 300 kHz	Mode Auto	Sweep			
●1Pk Max	1	100			111				
0 dBm		2			M	1[1]		-	56.08 dBm 7.2070 GHz
-10 dBm—		-	-						:
-20 dBm—			8	5					
-30 dBm—	-23.890	uBin							
-40 dBm—		1	0	5.					
-50 dBm—		M1							
-60 dBm—			6		r the subsect	Hur, at	M. William all M.	1. Mr. month	montered
differentiation	www.when.	Junter	werninghand	pharmet dearry	an and a more a	the second of			
-70 dBm—		2							
-80 dBm—									-
_90 dBm— <mark>F1</mark>	2	5			1		*		
Start 5.0	GHz	1	1	691	pts		I	Stop	15.0 GHz
					Mea	suring		444	13.09.2013 09:17:20

Date: 13.SEP.2013 09:17:20





Date: 13.SEP.2013 10:30:25

Figure 27. Mid channel conductive emission 5 GHz to 15 GHz.



Ref Level 2.50	dBm	■ RBW 100	l kHz				
TDF	U GB SWI 100	ms 👄 VBW 300	IKHZ Mode Au	ito Sweep			
) 1Pk Max	1995		124				
0 dBm		5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0	-M1[1]			58.86 dBn 7.4380 GH
-10 dBm							2
-20 dBm-01 -2	21.870_dBm						
-30 dBm							
-40 dBm			~	~			-
-50 dBm	1.000						
-60 dBm	Mil V 10	A but in the	and brandhermon	why which any any of	Marchanger	-	www.hun
-70 dBm	U U ··· Winney	and a second of a			30251 LD94	0 0.12	
-80 dBm							-
-90 dBm							
Start 5.0 GHz			691 pts			Stop	15.0 GHz
			1	1easuring		- MA	(3.09.2013 11:32:30

Figure 28. High channel conductive emission 5 GHz to 15 GHz.



Spectru	n								
Ref Level Att TDF	l 2.50 dBm 10 dB	SWT 115	e RBW ms e VBW	100 kHz 300 kHz	Mode Auto	Sweep			
●1Pk Max	Test 1	59.	64.C		111				
0 dBm			0		M	1[1]		1	-60.59 dBm 5.0000 GHz
-10 dBm—		1							
-20 dBm—	D1 02.000	dBro		5.					
-30 dBm—	01 -23,090	ubiii							
-40 dBm—		-	0	5.					
-50 dBm—		<u>.</u>		÷	o				
Leo deman	on hor une war	muchul	- Aument	munderally	- and a way were	have a brindlag	and the application	understan	manner
-70 dBm—		-							
-80 dBm—	-	-			0				
-90 dBm—	1	5							
Start 15.0) GHz	1	1	691	pts		1	Stop	26.5 GHz
					Mea	suring		444	13.09.2013 09:21:47

Date: 13.SEP.2013 09:21:47





Date: 13.SEP.2013 10:31:45

Figure 30. Mid channel conductive emission 15 GHz to 26.5 GHz.



Spectrun	n]								
Ref Level Att TDF	2.50 dBm 10 dB	SWT 115	e RBW ms e VBW	100 kHz 300 kHz	Mode Auto	Sweep			7.1 .1
1Pk Max	a)	~	5A		10				
0 dBm					M	1[1]		1	61.72 dBm 5.0000 GHz
-10 dBm—									-
-20 dBm—	D1 -21.870	dBm		5. 5.					
-30 dBm—									
-40 dBm—		9	3	5					-
-50 dBm—		5			<u>.</u>				
Lepudent.	and withour with	Inour bur was	and the property and	water and the second state of the second state	anice which is the solution	ustration the	and which does not	Holand a sol quelles	undalman under
-70 dBm—		e		<u>.</u>	<u>2</u>				
-80 dBm—			-						
-90 dBm—					14				
Start 15.0	GHz			691	pts			Stor	26.5 GHz
)()				Mea	suring			13.09.2013 11:33:20 /

Figure 31. High channel conductive emission 15 GHz to 26.5 GHz.

Date: 13.SEP.2013 11:33:21



6 dB Bandwidth of the Channel

6 dB Bandwidth of the Channel

Standard:	ANSI C63.10	(2009)
Tested by:	RRE	. ,
Date:	13.9.2013	
Temperature:	22 °C	
Humidity:	48 % RH	

FCC Rule: 15.247 (a) (2)

Table 6. 6 dB bandwidth test results

Channel	6 dB BW [kHz]	Result	Minimum limit [kHz]
Low	535.5	PASS	
Mid	535.5	PASS	500
High	535.5	PASS	



Date: 13.SEP.2013 09:04:07

Figure 32. Low channel 6 dB bandwidth.

6 dB Bandwidth of the Channel





Date: 13.SEP.2013 10:44:41





Date: 13.SEP.2013 11:35:41

Figure 34. High channel 6 dB bandwidth.

Power Spectral Density

Power Spectral Density

Standard:	ANSI C63.10	(2009)
Tested by:	RRE	, , , , , , , , , , , , , , , , , , ,
Date:	13.9.2013	
Temperature:	22 °C	
Humidity:	48 % RH	

FCC Rule: 15.247 (e)

 Table 7. Power Spectral Density Results.

Channel	PSD [dBm/3 kHz]	Result	Maximum limit [dBm/3 kHz]
Low	-13.27	PASS	
Mid	-13.65	PASS	+8.00
High	-12.80	PASS	



Date: 13.SEP.2013 09:29:53

Figure 35. Low channel Power Spectral Density.

Power Spectral Density





Date: 13.SEP.2013 10:47:18





Date: 13.SEP.2013 11:42:09

Figure 37. High channel Power Spectral Density.



99% Occupied Power Bandwidth

99% Occupied Power Bandwidth

Standard:	RSS-GEN	(2010)
Tested by:	RRE	, , , , , , , , , , , , , , , , , , ,
Date:	13.9.2013	
Temperature:	22 °C	
Humidity:	48 % RH	

RSS-GEN 4.7.

Table 8. 99% Occupied Power Bandwidth results.

Channel	99% BW [MHz]	Limit	Result
Low	0.998552821997	-	PASS
Mid	0.984081041968	-	PASS
High	0.984081041968	-	PASS



Figure 38. Low channel 99% Occupied Power Bandwidth.

SGS



Date: 13.SEP.2013 10:52:41





Date: 13.SEP.2013 11:03:56



99% Occupied Power Bandwidth



List of Test Equipment

LIST OF TEST EQUIPMENT

Manu	facturer	Туре	Serial no	Inv. no
ROH	DE & SCHWARZ			
	Signal Analyzer EMI Test receiver Test software	FSV40 ESU 26 EMC32	101068 100185 -	9093 8453 -
DAVI	S			
	Weather station	Vantage Pro	-	5297
EMC	D			
	Antenna (1 - 18 GHz)	3117	29617	7293
ETS-I	LINDGREN			
	Antenna (18 GHz – 26 GHz)	3160-09	28535	7294
SCHV	VARZBECK			
	Antenna (30 MHz - 1 GHz)	VULB 9168	9168-503	8911
HEW	LETT- PACKARD			
	Microwave amplifier	83017A	-	5226
HUBE	ER-SUHNER			
	Attenuator 10dB	6810.17B	-	-
DEIS	EL			
	Antenna mast Turntable	MA 240 DS 430	240/455 -	7896 -
WAIN	WRIGHT			
	High Pass Filter	WHKX	10	8267

All used measurement equipment was calibrated (if required).