

Report No.:**31652438.003***Page 1 of 28*

Electromagnetic Compatibility Test Report

Tested to: FCC Part 15C, and ANSI C63.10

On

LOCALIZER

Model:

HB100



**34 Walden St, #753
Concord MA 01742 USA**

Prepared by:

TUV Rheinland of North America, Inc.

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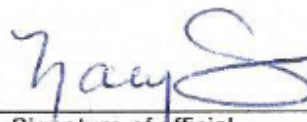
Manufacturer's statement - attestation

The manufacturer; HEALTH BEACONS INC. as the responsible party for the equipment tested, hereby affirms:

- a) That he has reviewed and concurs that the test shown in this report are reflective of the operational characteristics of the device for which certification is sought;
- b) That the device in this test report will be representative of production units;
- c) That all changes (in hardware and software/firmware) to the subject device will be reviewed.
- d) That any changes impacting the attributes, functionality or operational characteristics documented in this report will be communicated to the body responsible for approving (certifying) the subject equipment.

Nancy Confrey

Printed name of official



Signature of official

34 Walden St, #753
Concord MA 01742 USA

Address

27 August 2012

Date

978 287 4635

Telephone number

nconfrey@healthbeacons.com

Email address of official

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Client:	HEALTH BEACONS INC. 34 Walden St, #753 Concord MA 01742 USA		Nancy Confrey 978 287 4635 / 978 246 6019 nconfrey@healthbeacons.com	
Identification:	LOCALIZER	Serial No.:	081622744	
Test item:	HB100	Date tested:	21 September 2016	
Testing location:	TUV Rheinland of North America 762 Park Avenue Youngsville, NC 27596-9470 U.S.A.		Tel: (919) 554-3668 Fax: (919) 554-3542	
Test specification:	Emissions: FCC Part 15, Subpart C: FCC Part 15.209(a) FCC Parts 15.207(a)			
Test Result	The above product was found to be Compliant to the above test standard(s)			
tested by: Mark Ryan		reviewed by: Robert Richards		
 28 August 2012, Signature		 13 December 2016, Signature		
Other Aspects:	None			
Abbreviations: OK, Pass, Compliant, Complies = passed Fail, Not Compliant, Does Not Comply = failed N/A = not applicable				
 90552 and 100881	 Testing Cert #3331.05		Industry Canada 2932H-1 and 2932H-2	

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1 General Information

1.1 Scope

This report is intended to document the status of conformance with the requirements based on the results of testing performed on 21 September 2016 on the LOCALIZER, Model No. HB100, manufactured by HEALTH BEACONS INC. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT (Equipment Under Test) in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Revision History

Revision	Date	Description of Revision
--	1 Dec. 2016	Initial Release
1	2 Dec. 2016	Removed block diagram and other items considered to be confidential.
2	13 Dec. 2016	Corrected typos

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1.4 Summary of Test Results

1.4 Summary of Test Results							
Applicant	HEALTH BEACONS INC. 34 Walden St, #753 Concord MA 01742 USA		Tel	978 287 4635	Contact	Nancy Confrey	
			Fax	978 246 6019	e-mail	nconfrey@healthbeacons.com	
Description		LOCALIZER	Model		HB100		
Serial Number		081622744	Test Voltage/Freq.		3 V DC AA batteries		
Test Date Completed:		21 September 2016	Test Engineer		Mark Ryan		
Standards		Description	Severity Level or Limit			Worst-case Values	Test Result
FCC Part 15, Subpart C Standard		Radio Frequency Devices- Subpart C: Intentional Radiators	See called out parts below			See Below	Complies
FCC Part 15.209(a)		Radiated Emission limits; General Requirements	Below Limits			17.85µV/m at 300m	Complies
FCC Parts 15.207(a)		Conducted Emissions on AC Mains in transmit mode	NA, NA			EUT is battery operated	Complies

2 Laboratory Information

2.1 Accreditations and Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America located at 762 Park Avenue, Youngsville, NC 27596-9470 is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 90552 and 100881). The laboratory scope of accreditation includes: Title 47 CFR Part 15, and 18. The accreditation is updated every 3 years.

2.1.2 ILAC / A2LA

The laboratory has been assessed and accredited by A2LA in accordance with ISO Standard 17025:2005 (Certificate Number: 3331.05, Master Code: 134288). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Innovation, Science and Economic Development Canada

Registration No.: 2932H-1 The OATS has been accepted by ISED to perform testing to 3 and to 10 meters, based on the test procedures described in ANSI C63.4:2014.

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Registration No.: 2932H-2 The 5 meter chamber has been accepted by ISED to perform testing to 3 meters, based on the test procedures described in ANSI C63.4:2014.

2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland at the 762 Park Ave. Youngsville, N.C 27596 address has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Laboratory Registration No: A-0034).

2.1.5 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dB μ V)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

$$25 \text{ dB}\mu\text{V/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dB}\mu\text{V/m}$$

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2.2 Measurement Uncertainty Emissions

Total uncertainty

Band 1 uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution divisor	Dependency multiplier	Unit conver'n divisor	Std uncertainty	
		+x	-x				+u(Hz)	-u(Hz)
Time base	Time base drift (1x10-9 = 0.001ppm)	0.05	0.05	Rectangular	1.73	1.00	0.03	0.03
Counter	Counter (±20pHz/Hz+0.6Hz)	0.60	0.60	Rectangular	1.73	1.00	0.35	0.35
Temp	Ambient temperature uncertainty	1.00	1.00	Rectangular	1.73	1.12	0.65	0.65
Combined (RSS) Standard Uncertainty (U _c):							0.73	0.73
Expanded Uncertainty (U ₉₅):							1.44	1.44

Band 2 uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution divisor	Dependency multiplier	Unit conver'n divisor	Std uncertainty	
		+x	-x				+u(Hz)	-u(Hz)
Time base	Time base drift (1x10-9 = 0.001ppm)	0.92	0.92	Rectangular	1.73	1.00	0.53	0.53
Counter	Counter (±20pHz/Hz+0.6Hz)	0.62	0.62	Rectangular	1.73	1.00	0.36	0.36
Temp	Ambient temperature uncertainty	1.00	1.00	Rectangular	1.73	1.12	0.65	0.65
Combined (RSS) Standard Uncertainty (U _c):							0.91	0.91
Expanded Uncertainty (U ₉₅):							1.78	1.78

Band 3 uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution divisor	Dependency multiplier	Unit conver'n divisor	Std uncertainty	
		+x	-x				+u(Hz)	-u(Hz)
Time base	Time base drift (1x10-9 = 0.001ppm)	2.45	2.45	Rectangular	1.73	1.00	1.41	1.41
Counter	Counter (±20pHz/Hz+0.6Hz)	0.65	0.65	Rectangular	1.73	1.00	0.37	0.37
Temp	Ambient temperature uncertainty	1.00	1.00	Rectangular	1.73	1.12	0.65	0.65
Combined (RSS) Standard Uncertainty (U _c):							1.60	1.60
Expanded Uncertainty (U ₉₅):							3.13	3.13

Total uncertainty (all bands)

Combined (RSS) Standard Uncertainty (U _c):	1.98	1.98
Expanded Uncertainty (U ₉₅):	3.88	3.88

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2.2.1 Total Carrier Power Measurement Uncertainty

Total uncertainty

Power meter & sensor

Symbol	Source of uncertainty	Uncertainty value		Distribution	divisor	Dependency	multiplier	Unit conver'n	divisor	Std uncertainty	
		+x	-x							+u(dB)	-u(dB)
Meter ref	Power meter reference level	1.500	1.500	Rectangular	1.732	1.000		23.000		0.038	0.038
Cal fact	Cal factor uncert	2.300	2.300	Rectangular	1.732	1.000		23.000		0.058	0.058
Range err	Range to range change error	0.500	0.500	Rectangular	1.732	1.000		23.000		0.013	0.013
Meter lin	Power meter linearity	0.500	0.500	Rectangular	1.732	1.000		23.000		0.013	0.013
	Mismatch when calibrating	0.022	0.022		1.000	1.000		1.000		0.022	0.022
					1.000	1.000		1.000		0.000	0.000
Combined (RSS) Standard Uncertainty (u_{c1}):										0.074	0.074

Uncertainty when measuring atten/cable

Symbol	Source of uncertainty	Uncertainty value		Distribution	divisor	Dependency	multiplier	Unit conver'n	divisor	Std uncertainty	
		+x	-x							+u(dB)	-u(dB)
	Measurement uncertainty	0.175	0.175		1.000	1.000		1.000		0.175	0.175
Range err	Range to range change error	0.500	0.500	Rectangular	1.732	1.000		23.000		0.013	0.013
Meter lin	Power meter linearity	0.500	0.500	Rectangular	1.732	1.000		23.000		0.013	0.013
Combined (RSS) Standard Uncertainty (u_{c2}):										0.175	0.175

Carrier power measurement

Symbol	Source of uncertainty	Uncertainty value		Distribution	divisor	Dependency	multiplier	Unit conver'n	divisor	Std uncertainty	
		+x	-x							+u(dB)	-u(dB)
	Mismatch during power measurement	0.643	0.643		1.000	1.000		1.000		0.643	0.643
Atten PI	Attenuator power influence	0.750	0.750	Rectangular	1.732	1.000		1.000		0.433	0.433
Temp	Temperature uncertainty	1.000	1.000	Rectangular	1.732	4.176		23.000		0.105	0.105
Supply	Supply uncertainty	0.100	0.100	Rectangular	1.732	10.440		23.000		0.026	0.026
Random	Random uncertainty (see note in section 6.4.7, Part 1)	0.010	0.010	Normal	1.000	1.000		1.000		0.010	0.010
Time duty	Time duty cycle	2.000	2.000	Normal	1.000	1.000		23.000		0.087	0.087
					1.000	1.000		1.000		0.000	0.000
Combined (RSS) Standard Uncertainty (u_{c3}):										0.788	0.788

Total uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution	divisor	Dependency	multiplier	Unit conver'n	divisor	Std uncertainty	
		+u or x	-u or x							+u(dB)	-u(dB)
Uc1	Power meter & sensor	0.074	0.074		1.000	1.000		1.000		0.074	0.074
Uc2	Uncertainty when measuring atten/cable	0.175	0.175		1.000	1.000		1.000		0.175	0.175
Uc3	Carrier power measurement	0.788	0.788		1.000	1.000		1.000		0.788	0.788
					1.000	1.000		1.000		0.000	0.000
Combined (RSS) Standard Uncertainty (U_c):										0.810	0.810
Expanded Uncertainty (U_{95}):										1.588	1.588

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2.2.2 Total Adjacent channel power Measurement Uncertainty

Total uncertainty

Total relative RF level uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution divisor	Dependency multiplier	Unit conversion divisor	Std uncertainty	
		+x	-x				+u(dB)	-u(dB)
Filter pwr bw	Filter power bw	0.200	0.200	Rectangular	1.732	1.000	0.115	0.115
Relative acc	Relative accuracy	0.500	0.500	Rectangular	1.732	1.000	0.289	0.289
Random	Random uncertainty (see note in section 6.4.7 , Part 1)	0.110	0.110	Normal	1.000	1.000	0.110	0.110
Deviation	Deviation uncertainty	30.000	30.000	Rectangular	1.732	0.054	0.041	0.041
6dB pt unc	Uncertainty of 6dB point	0.075	0.075	Rectangular	1.732	15.524	0.672	0.672
					1.000	0.000	0.000	0.000
					1.000	1.000	0.000	0.000
					1.000	1.000	0.000	0.000
					1.000	1.000	0.000	0.000
Combined (RSS) Standard Uncertainty (u_c):							0.750	0.750
Expanded Uncertainty (U_{95}):							1.470	1.470

2.2.3 Total Conducted Spurious Emissions Measurement Uncertainty

Total uncertainty

Total uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution divisor	Dependency multiplier	Unit conversion divisor	Std uncertainty	
		+x	-x				+u(dB)	-u(dB)
	Total Mismatch EUT to Spectrum Anal.	1.01	1.01		1.00	1.00	1.01	1.01
	Total Mismatch cal of Spectrum Analyzer	0.30	0.30		1.00	1.00	0.30	0.30
SA Cal ref	Spec. Ana. Cal output reference level	0.30	0.30	Rectangular	1.73	1.00	0.17	0.17
SA freq res.	Spec. Ana. frequency response	2.50	2.50	Rectangular	1.73	1.00	1.44	1.44
SA BW Sw	Spec. Ana. Bandwidth switching	0.50	0.50	Rectangular	1.73	1.00	0.29	0.29
SA Log Fid	Spec. Ana. Log fidelity	1.50	1.50	Rectangular	1.73	1.00	0.87	0.87
Supply Volt	Supply voltage uncertainty	0.10	0.10	Rectangular	1.73	10.44	0.03	0.03
Fitr loss unc	Filter loss uncertainty	0.15	0.15	Rectangular	1.73	1.00	0.09	0.09
Atten unc	Attenuator loss uncertainty	0.15	0.15	Rectangular	1.73	1.00	0.09	0.09
SA i/p att sv	SA atten switching uncertainty	0.20	0.20	Rectangular	1.73	1.00	0.12	0.12
Att pwr coef	Attenuator power coefficient	0.30	0.30	Rectangular	1.73	1.00	0.17	0.17
Cable	Measurement cable loss uncert	0.20	0.20	Normal	1.00	1.00	0.20	0.20
Rnd	Random contribution (see note in section 6.4.7 , Part 1)	0.20	0.20	Normal	1.00	1.00	0.20	0.20
Combined (RSS) Standard Uncertainty (u_c):							2.05	2.05
Expanded Uncertainty (U_{95}):							4.01	4.01

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2.2.4 Total Frequency Deviation Measurement Uncertainty

Total uncertainty

Total deviation uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution divisor		Dependency multiplier	Unit conver'n divider	Std uncertainty	
		+x	-x					+u(%)	-u(%)
Dev Unc	Deviation uncertainty	1.00	1.00	Rectangular	1.73	1.00	1.00	0.58	0.58
Last Digit	+/- last digit of deviation meter display	0.25	0.25	Rectangular	1.73	1.00	1.00	0.14	0.14
Res mod	Residual modulation	0.50	0.50	Rectangular	1.73	1.00	1.00	0.29	0.29
Rand unc	Random uncertainty (see note in section 6.4.7 , Part 1)	0.00	0.00	Normal	1.00	1.00	1.00	0.00	0.00
Combined (RSS) Standard Uncertainty (u_c):								0.66	0.66
Expanded Uncertainty (U_{95}):								1.30	1.30

2.2.5 Total Response Measurement Uncertainty

Deviation uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution divisor		Dependency multiplier	Unit conver'n divider	Std uncertainty	
		+x	-x					+u(%)	-u(%)
Dev Unc	Deviation uncertainty	1.00	1.00	Rectangular	1.732	1.00	1.00	0.58	0.58
AF Osc	AF oscillator uncertainty	0.70	0.70	Rectangular	1.732	1.00	1.00	0.40	0.40
AC volt mtr	AC Volt meter uncertainty	4.00	4.00	Rectangular	1.732	1.00	1.00	2.31	2.31
AF gain unc	AF gain uncertainty	2.00	2.00	Rectangular	1.732	1.00	1.00	1.15	1.15
Rand unc	Random uncertainty (see note in section 6.4.7 , Part 1)	0.00	0.00	Normal	1.000	1.00	1.00	0.00	0.00
Combined (RSS) Standard Uncertainty (u_{c1}):								2.68	2.68

Total uncertainty

Symbol	Source of uncertainty	Uncertainty value		Distribution divisor		Dependency multiplier	Unit conver'n divider	Std uncertainty	
		+u or x	-u or x					+u(dB)	-u(dB)
Uc1	Deviation uncertainty	2.68	2.68		1.000	1.00	11.50	0.23	0.23
					1.000	1.00	1.00	0.00	0.00
					1.000	1.00	1.00	0.00	0.00
					1.000	1.00	1.00	0.00	0.00
Combined (RSS) Standard Uncertainty (U_c):								0.23	0.23
Expanded Uncertainty (U_{95}):								0.46	0.46

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2.3 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

2.4 Software Used

Manufacturer	Name	Version
Quantum Change/EMC Systems LLC.	Tile	3.2U
TUV	Alt "R"	1
TUV	Alt "C"	1

2.5 Measurement Equipment Used

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
Radiated Emissions (5 Meter Chamber)					
Receiver, EMI	Rohde & Schwarz	ESIB40	100043	19-Aug-15	19-Aug-16
Receiver, EMI	Rohde & Schwarz	ESCI 7	100917	19-Aug-15	19-Aug-16
Spectrum Analyzer	Agilent Tec.	E7405A	US39440161	18-Aug-15	18-Aug-16
Amplifier, preamp	Agilent Technologies	8449B	3008A01480	20-Aug-15	20-Aug-17
Antenna Loop	EMCO	6502	3336	17-Dec-15	17-Dec-17
Ant. BiconiLog	Chase	CBL6140A	1108	06-Oct-15	06-Oct-17
Antenna Horn 1-18GHz	EMCO	3115	2236	18-Nov-15	18-Nov-17
Antenna Horn 18-26.5 GHz	ATM	42-442-6/cal	G181104-01	31-Dec-14	31-Dec-16
Cable, Coax	MicroCaox	MKR300C-0-0-1200-500500	002	20-Aug-15	20-Aug-16
Cable, Coax	MicroCaox	MKR300C-0-1968-500310	005	20-Aug-15	20-Aug-16
Cable, Coax	MicroCaox	UFB29C-1-5905-50U-50U	009	20-Aug-15	20-Aug-16
Cable, Coax	Andrew	FSJ1-50A	045	20-Aug-15	20-Aug-16
General Laboratory Equipment					
Meter, Multi	Fluke	179	90580752	17-Aug-15	17-Aug-16
Meter, Temp/Humid/Barom	ExTech	SD700	Q677933	21-Dec-15	21-Dec-17
Meter, Temp/Humid/Barom	ExTech	SD700	Q677942	21-Dec-15	21-Dec-17

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3 Product Information

3.1 Product Description

Refer to section 6.1.3 of this report

3.2 Equipment Modifications

No modifications were needed to bring product into compliance.

3.3 Equivalent Models

None.

3.4 Test Plan

The EUT product information, test configuration, mode of operation, test types, test procedures, test levels, pass/failure criteria, in this report were carried out per the product test plan located in Appendix A of this report

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4 Radiated emissions

Emissions from an intentional radiator shall not exceed the field strength levels as specified in part 15.209 or RSS-210 A.2.

4.1 FCC Parts 15.209, RSS-GEN Table 5 – Fundamental and Spurious Emissions

Results	Complies (as tested per this report)					Date	12 September 2016		
Standard	FCC Parts 15.205, 15.209, 15.215(c) and RSS-GEN Table 5								
Product Model	HB100				Serial#	081622744			
Test Set-up	Tested in a 5m Semi Anechoic chamber, placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane on a turn-table.								
EUT Powered By	3 VDC	Temp	78° F	Humidity	37%	Pressure	1005 mbar		
Perf. Criteria	(Below Limit)			Perf. Verification		Readings Under Limit			
Mod. to EUT	None			Test Performed By		Mark Ryan			

4.1.1 Test Procedure

All testing was performed in accordance with 47 CFR Part 15, ANSI C63.10:2013, RSS-GEN Issue 4. These test methods are listed under the laboratory's A2LA Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.1.2 Deviations

None.

4.1.3 Final Test

All final radiated and spurious emissions measurements were below (in compliance) the limits.

The worst –case emissions are shown below.

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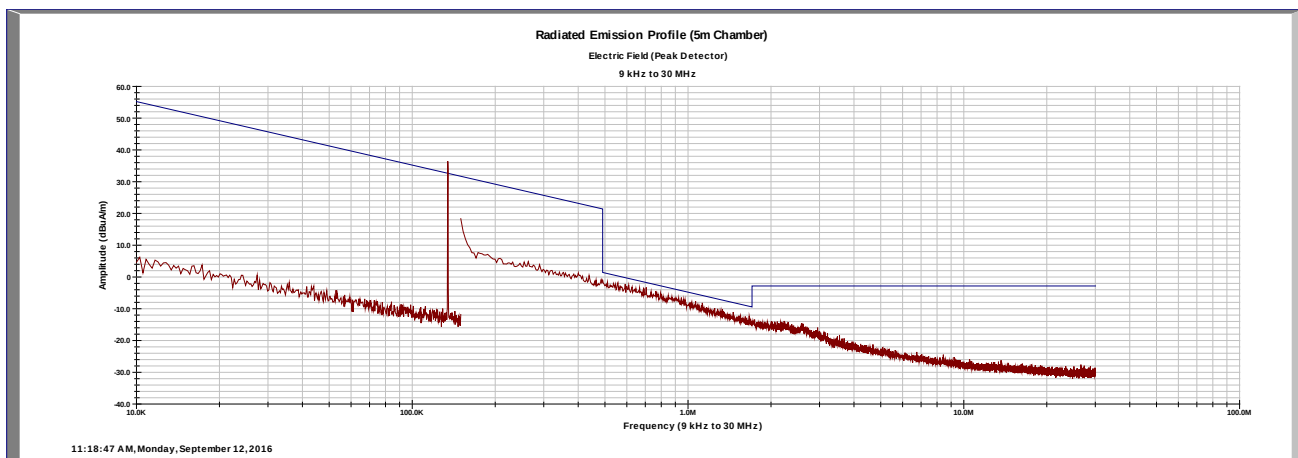
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4.1.1 Final Graphs and Tabulated Data

Emission Freq (MHz)	ANT Polar (P/p)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuA/m)
Frequency using Loop :								
O 1	(EUT Standing up)							
0.13	P	1.0	0	75.30	0.00	0.04	-39.40	35.94
0.13	p	1.0	90	72.08	0.00	0.04	-39.40	32.73
O 2	(on long side)							
0.13	P	1.0	0	75.78	0.00	0.04	-39.40	36.42
0.13	p	1.0	90	72.20	0.00	0.04	-39.40	32.84
O 3	(EUT Flat on table)							
0.13	P	1.0	133	63.34	0.00	0.04	-39.40	23.98
0.13	p	1.0	0	38.39	0.00	0.04	-39.40	-0.97
Frequency using Pencil Probe :								
O 1	(EUT Vertical)							
0.13	H	1.0	336	50.80	0.00	0.04	-39.40	11.44
0.13	H	1.0	0	28.10	0.00	0.04	-39.40	-11.26
O 2	(on long side)							
0.13	H	1.0	90	61.66	0.00	0.04	-39.40	22.30
0.13	H	1.0	0	57.99	0.00	0.04	-39.40	18.63

Note: Antenna Polarity is defined as: **P = Parallel**, and **p = perpendicular**
 EUT is 80cm on table measured at 3m, Antenna at 1m height

EUT Loop Antenna – Parallel to measuring loop antenna:



See Section 4.1.2 of this report for the emissions at distance calculation of the transmitter.

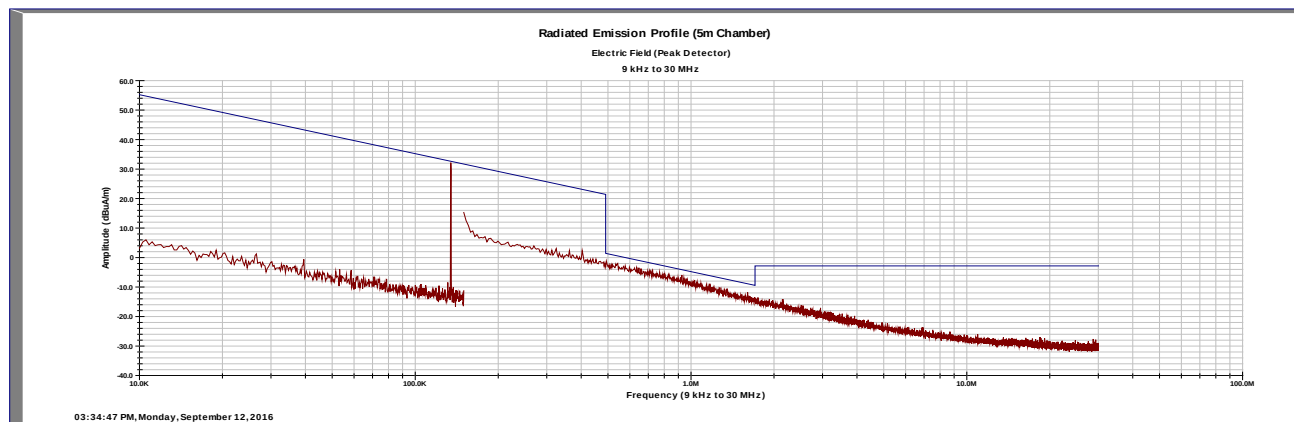
The test results contained in this report refer exclusively to the product(s) presented for testing. No liability may be assumed for models or products not referred to herein. This test report may not be published or duplicated in part without permission of the testing body. This test report by itself does not constitute authorization for the use of any TÜV Rheinland test mark. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA.

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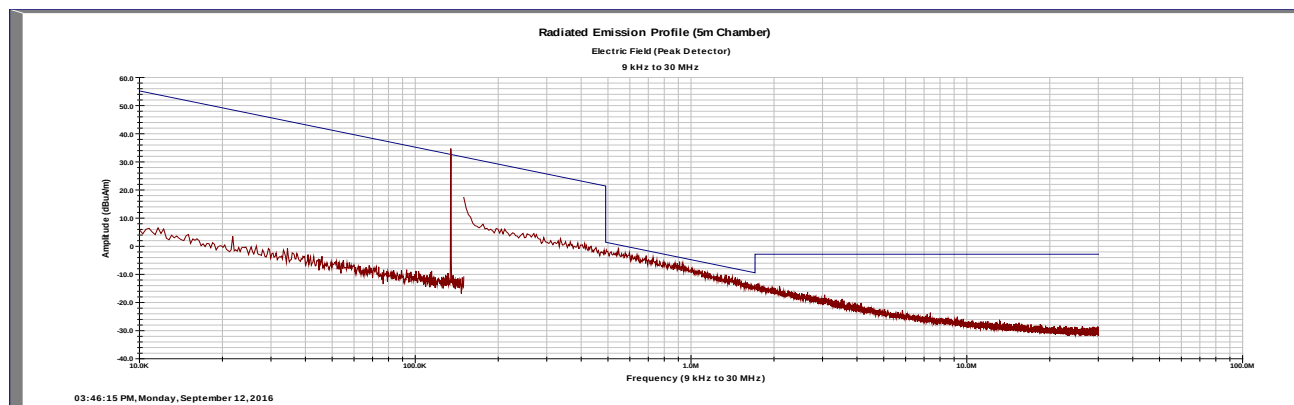
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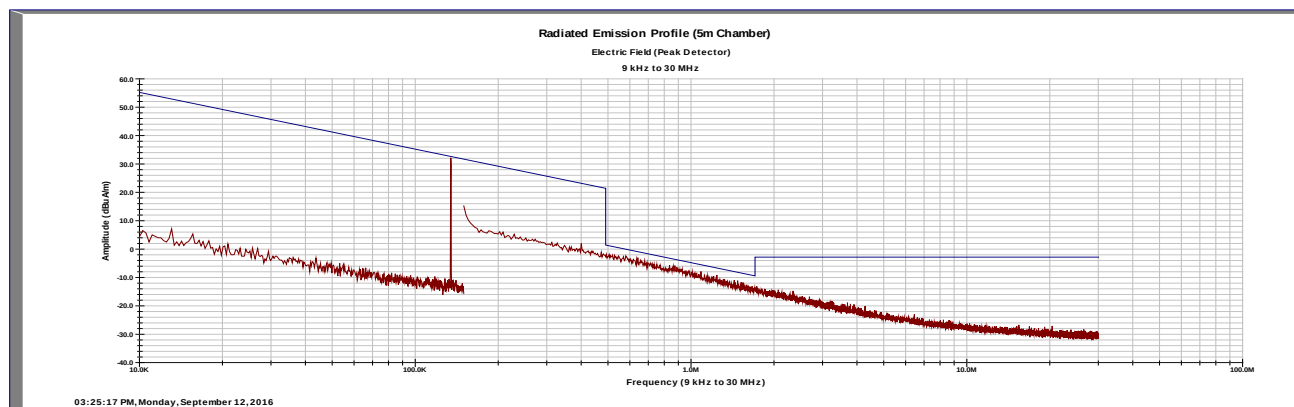
Loop Antenna – Perpendicular to measuring loop antenna:



Pencil Probe - Parallel to measuring loop antenna::



Pencil Probe - Perpendicular to measuring loop antenna:



Other than the fundamental frequency, No measurable emissions were found.

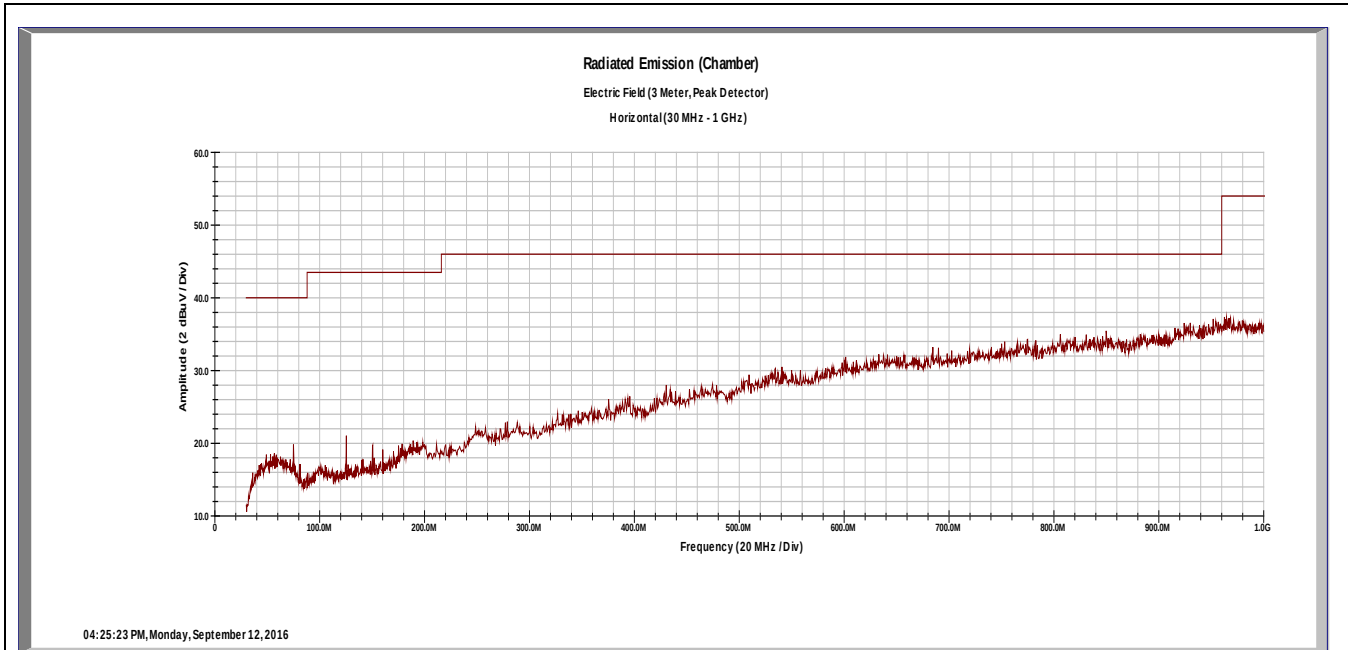
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Radiated Emissions – FCC & ISED
Horizontal



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)

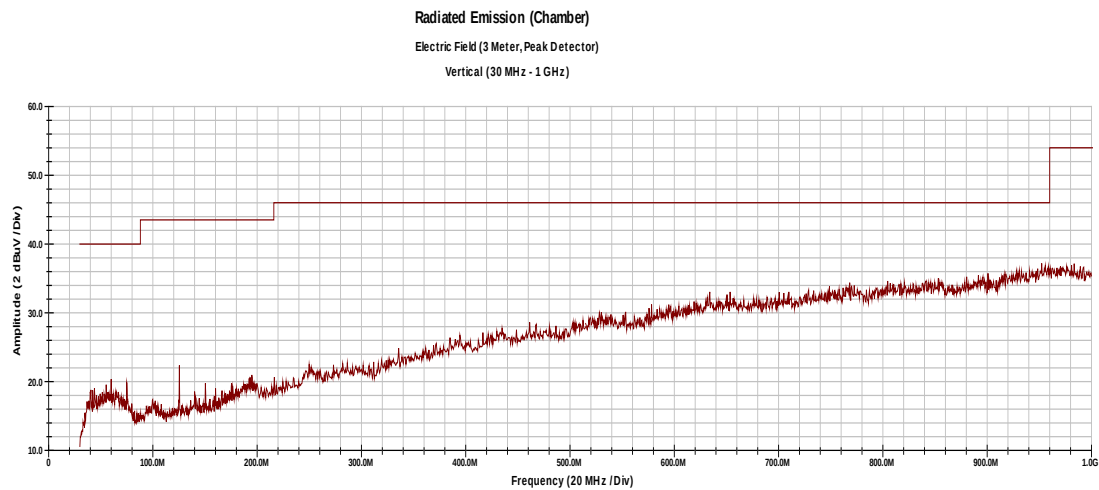
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ±

Notes: Using the Loop antenna on the EUT.

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Radiated Emissions - FCC & ISED

Vertical



04:28:49 PM, Monday, September 12, 2016

[illegible]
$$\text{Spec Margin} = \text{E-Field Value} - \text{Limit}, \quad \text{E-Field Value} = \text{FIM Value} - \text{Amp Gain} + \text{Cable Loss} + \text{ANT Factor}$$

Notes: Using the Loop antenna on the EUT.

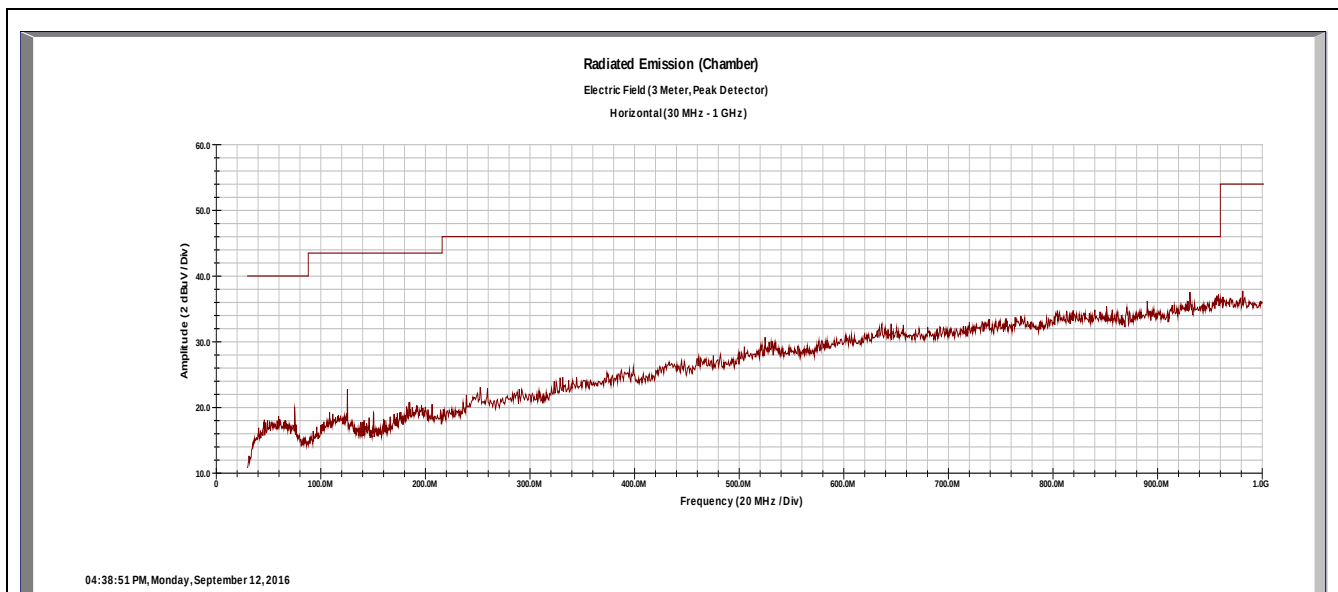
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Radiated Emissions – FCC & ISED
Horizontal



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
113.24	H	1.7	0	4.56	0.00	1.22	11.10	16.88	43.50	-26.62

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: Using the Pencil Probe on the EUT.

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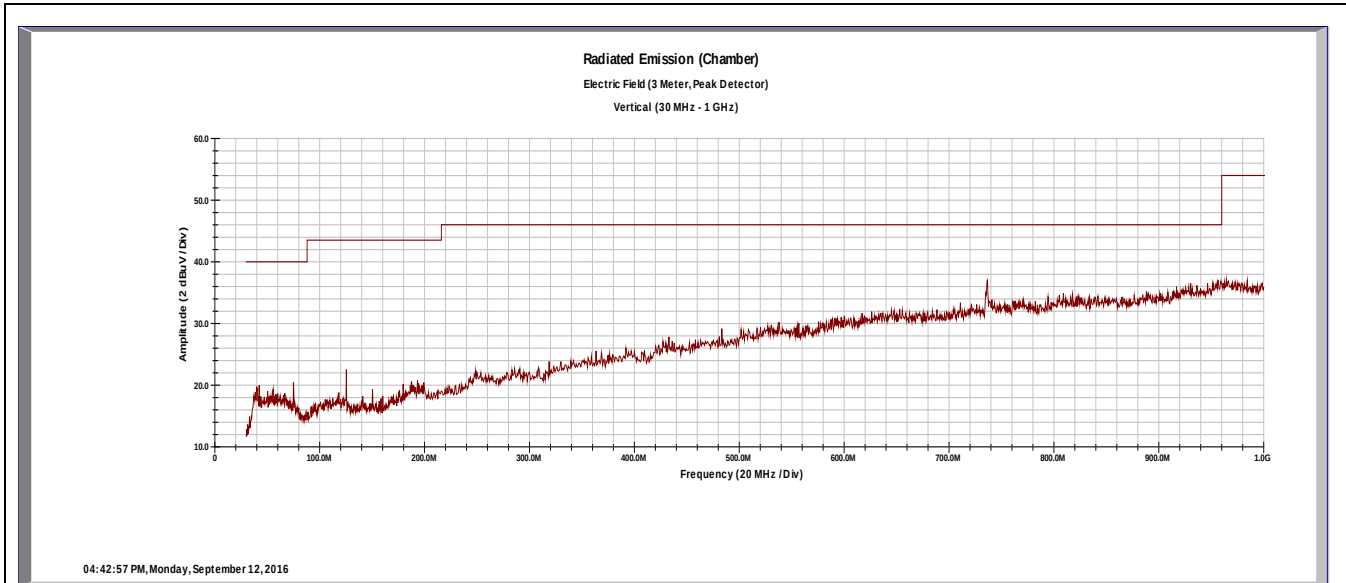
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Radiated Emissions – FCC & ISCED

Vertical



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
115.00	V	1.3	133	1.44	0.00	1.22	11.10	13.77	43.50	-29.73
736.00	V	1.1	68	2.71	0.00	3.15	25.30	31.16	46.00	-14.84

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor

Notes: Using the Pencil Probe on the EUT.

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4.1.1 Measurements at distance; extrapolation calculation:

Dist (m)	Measured Level (dBμV/m)	Coax Attn (dB)	Antenna correction Factor (dB)	Corrected Level (dBμA/m)	Corrected Level (dBμV/m)	FCC & ISED Limit (dBμV/m)	Δ to Limit (dB)	Corrected Level (μV/m)	FCC & ISED Limit (μV/m)	Δ to Limit (μV)
3	75.95	0.30	-39.4	36.85	88.35	NA	NA	NA	NA	NA
10	49.00	0.30	-39.4	9.90	61.40	NA	NA	NA	NA	NA
20	29.35	0.30	-39.4	-9.75	41.75	NA	NA	NA	NA	NA
30	16.57	0.30	-39.4	-22.53	28.97	NA	NA	NA	NA	NA
300	4.5E-06	0.30	-39.4	-39.40	12.10	25.03	-12.93	4.03	17.85	-13.82

Notes: The **Green** values were measured. The **Blue** Values were extrapolated.

The received emissions at 30m were unmeasurable. This value was extrapolated.

The Antenna Correction Factor includes the conversion from dBμV to dBμA.

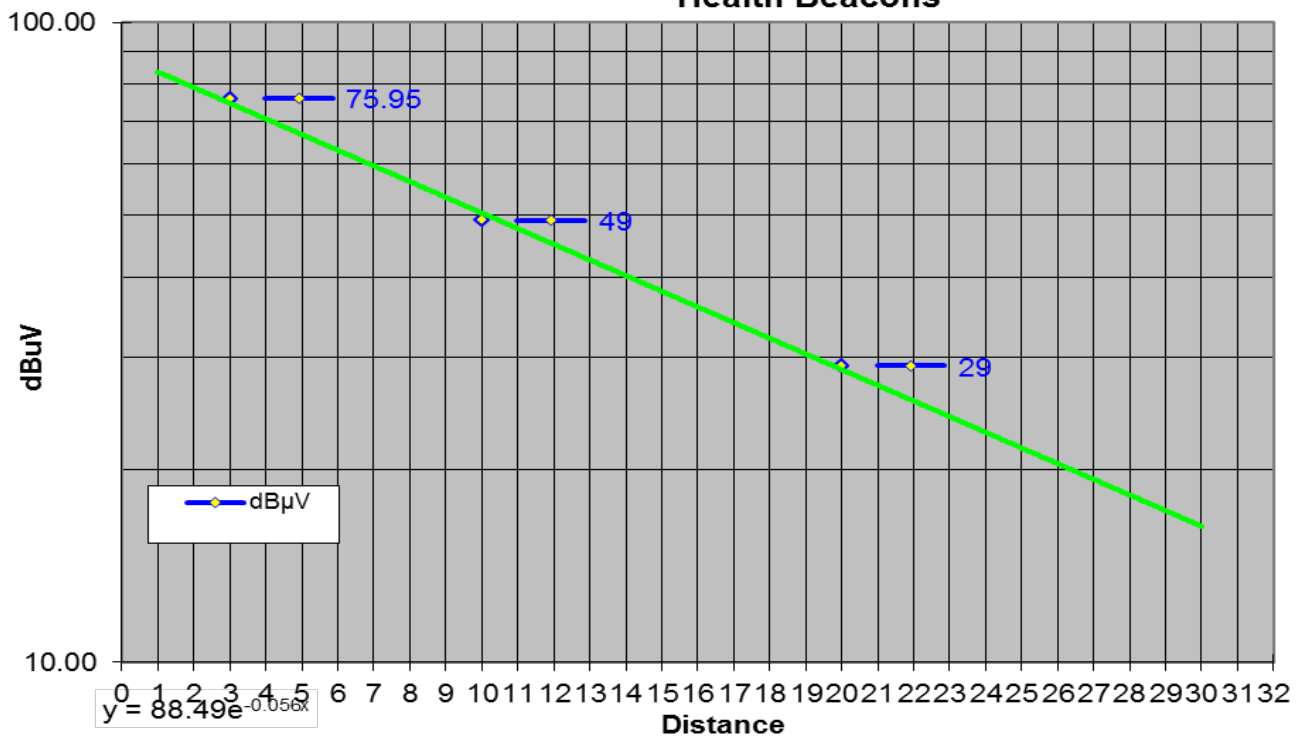
Add 51.5dB to convert the corrected dBμA level to the corrected dBuV/m level.

Per FCC Part 15.31(f)(2), the multi-point extrapolation method was used to determine the value at 300m.

The EUT transmits in CW mode, so the Peak, Quasi-Peak and Average values are within 0.1 dB of each other.

Extrapolation Calculation:

Loop Antenna - Magnetic Field 134.5 kHz signal Health Beacons



Extrapolation formula: $y = 88.49e^{-0.056x}$, where x = distance (m) and y = extrapolated value in dBμV/m.

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4.2 FCC 15.207(a) Conducted Emissions on AC Mains

This test measures the electromagnet levels of spurious signals generated by the EUT on the AC power line that may affect the performance of other nearby electronic equipment.

4.2.1 Over View of Test

Results	NA				Date	NA	
Standard	FCC Parts 15.207(a)						
Product Model	ProxPad			Serial#	NA		
Test Set-up	Tested in shielded room. EUT placed on table, see test plans for details						
EUT Powered By	3 VDC Battery	Temp	-	Humidity	-	Pressure	-
Frequency Range	150 kHz – 30 MHz						
Perf. Criteria	(Below Limit)	Perf. Verification		Readings Under Limit for L1 & Neutral			
Mod. to EUT	None	Test Performed By		Mark Ryan			

4.2.1 Test Procedure

Conducted and FCC emissions tests were performed using the procedures of ANSI C63.4:2009 including methods for signal maximizations and EUT configuration. The frequency range from NA was investigated for conducted emissions.

EUT was placed 80cm above a ground plane, using procedures specified in ANSI C63.4.

Worst-case emissions shown; EUT in transmit mode with AC power module.

4.2.2 Deviations

The EUT is operated by two AA alkaline batteries only. There is no provisions of connection to the AC Mains.

4.2.3 Final Test

EUT is battery operated only. This test is not applicable.

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4.3 20dB Bandwidth

The -20 dBc bandwidth measurement is for the purpose of the Emission designator.

4.3.1 Test Over View

Results	Complies (as tested per this report)					Date	29 June 2012	
Standard	FCC Part 15C							
Product Model	LOCALIZER				Serial#	081622744		
Test Set-up	Direct Measurement from antenna port							
EUT Powered By	3 VDC batteries	Temp	78° F	Humidity	36%	Pressure	993 mbar	
Perf. Criteria	(Below Limit)			Perf. Verification		Readings Under Limit		
Mod. to EUT	None			Test Performed By		Mark Ryan		

4.3.2 Test Procedure

Using the procedures of RSS-GEN section 4.6.1, the 10 Hz resolution bandwidth is 1% of the 1 kHz span. The 30 Hz video bandwidth is 3 times that of the resolution bandwidth.

4.3.3 Deviations

There were no deviations from the test methodology listed in the test plan for the Electrical Fast transients (EFT) Immunity test.

4.3.4 Final Results

The measured 99% bandwidth is: 96.2 Hz.

The Designation of Necessary Bandwidth per TRC-43 would be: 96H2

The EUT met the performance criteria requirement as specified in the test plan of this report and in the standards.

4.3.5 Final Data

EUT Antenna	-20dBc Bandwidth
Internal Loop	24 Hz
Pencil Probe	24 Hz

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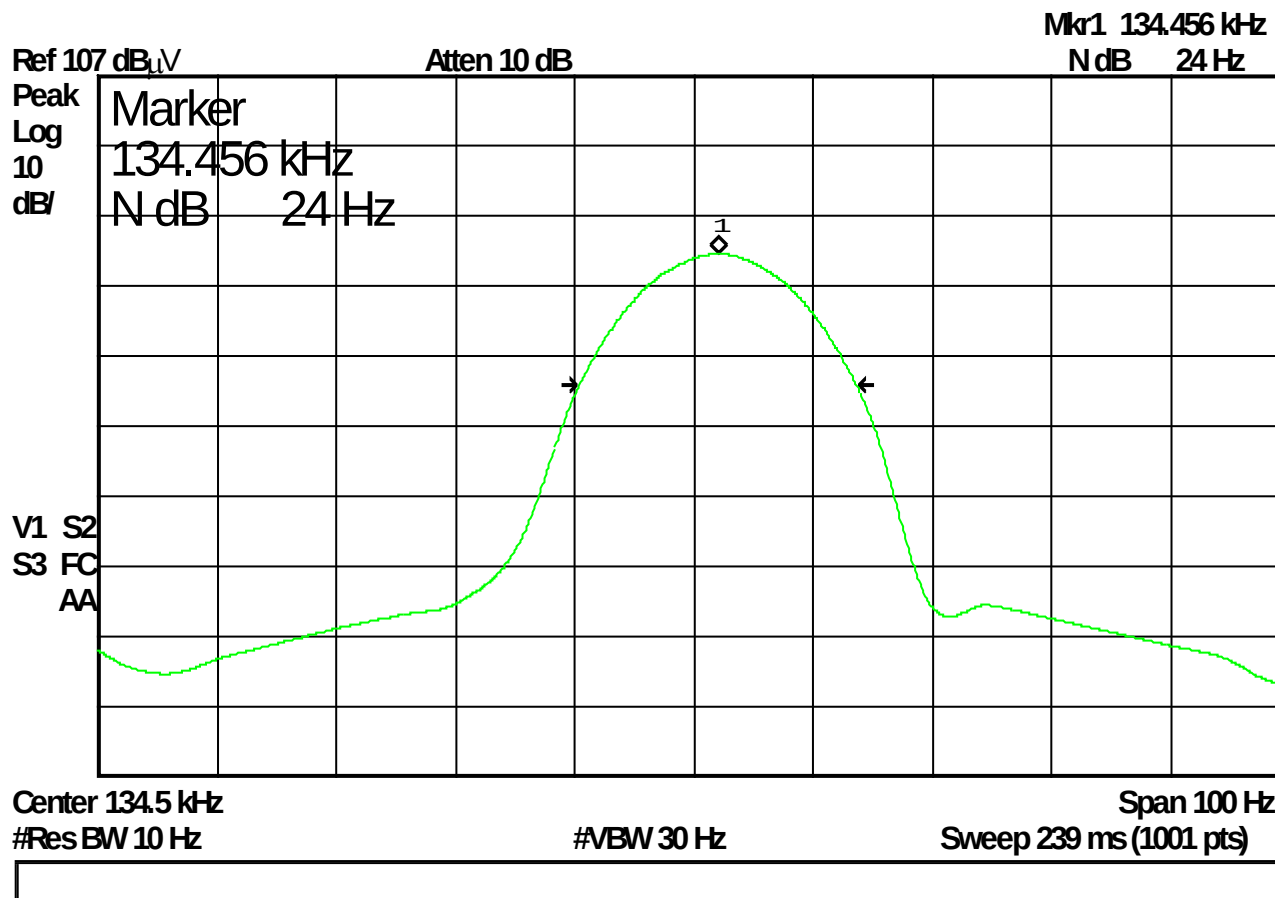
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EUT Loop Antenna:

Agilent 14:00:42 Sep 21



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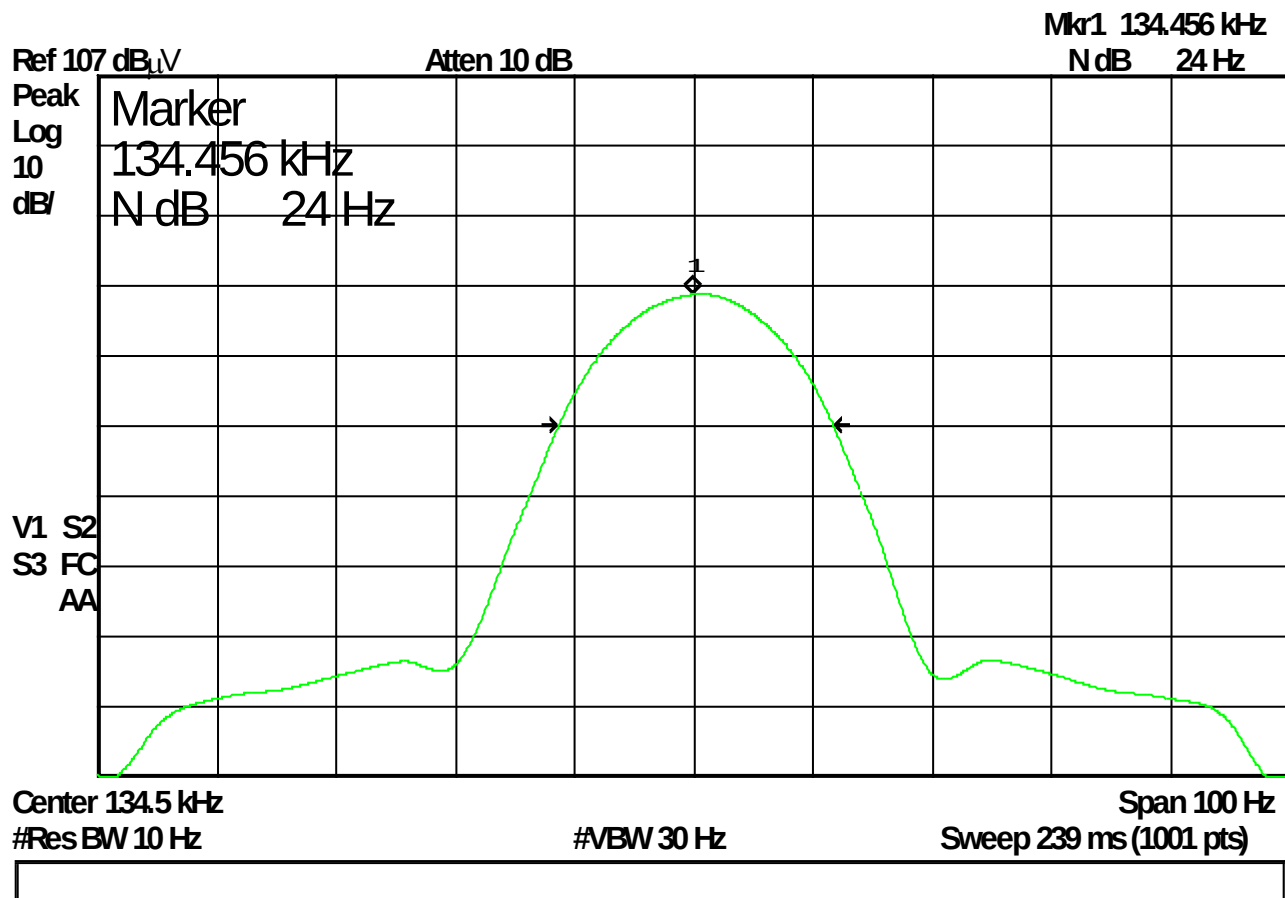
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EUT Pencil Probe:

Agilent 14:02:20 Sep 21



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Appendix A

5 Test Plan

This test report is intended to follow this test plan outlined here in unless otherwise stated in this report. The following test plan will give details on product information, standards to be used, test set ups and refer to TUV test procedures. The test procedures will give the steps to be taken when performing the stated test. The product information below came via client, product manual, product itself and or the internet.

5.1 General Information

Client	HEALTH BEACONS INC.
Address 1	34 Walden St, #753
Address 2	Concord MA 01742 USA
Contact Person	Nancy Confrey
Telephone	978 287 4635
Fax	978 246 6019
e-mail	nconfrey@healthbeacons.com

5.1.1 Product Name

HB100

5.1.2 Type of Product

LOCALIZER

5.1.1 Equipment Under Test (EUT) Description

The LOCALIZER is a low frequency (134kHz) RFID reader that estimates the distance from the reader to an RFID tag that has been implanted in a body. It is generally used for Breast surgery.

The LOCALIZER is handheld, and operated from a battery consisting of 2 replaceable AA cells.

There are two modes of operation.

1. Using the integrated aircore coil (Loop Probe) the surgeon can locate the tag prior to cutting the skin.
2. A sterile pencil probe accessory can be used to probe within the surgical wound.

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The operating modes are mutually exclusive. If the pencil probe is plugged in it is selected, but then the operator may switch back and forth between probes. The coil in either probe is driven by a 3V rectangular wave to resonance. The Aircore coil is intended for longer range operation (60mm) and has slightly higher excitation current than is used with the pencil probe. Once a Tag is detected, an audio tone increases in pitch and amplitude as the probe gets closer to the tag. The distance estimate in millimeters is displayed in large numerals. The relative signal strength is displayed as a Bar graph. When the tag is close enough, the Tag ID number is displayed. The battery level is displayed.

5.2 General Product Information

Size	H	2.4 cm	W	7.2 cm	L	18 cm
Weight	0.2 kg		Fork-Lift Needed		No	
Notes						

Product environmental operating conditions:

5 to 30° C - Operating temperature range.

15 to 93% - Operating humidity range. Non condensing

70 to 102kPa - Operating pressure range.

5.2.1 Electrical Power Information

Name	Type	Voltage		Frequency	Current Output	Notes
		min	max			
AA Alkaline cells	DC	2.0	5.5	DC	150 mA	
Notes						

5.2.2 Testing Preparation

2 AA cells should be inserted as shown. The only user controls are:

- Audio Volume
- Display brightness
- Probe select
- On/Off.

5.2.3 EUT Clock/Oscillator Frequencies

☒	Less than 108MHz	FCC – scan up to 1GHz
☐	Less than 500MHz	FCC – scan up to 2GHz
☐	Less than 1000MHz	FCC – scan up to 5GHz
☐	Greater then 1000MHz	FCC – scan up to 5th Harmonic or 40GHz

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5.2.4 Non - Electrical Support Equipment

Item	N
Tag Holder test fixture	Attached to pencil probe when shipped
Tag Holder test fixture for LOOP probe	Can be held in place by hand or with rubber band for testing

5.2.5 EUT Equipment/Cabling Information

EUT Port	Connected To	Location	Cable Type		
			Length	Shielded	Bead
Pencil probe	Pencil probe socket	Above display adjacent to loop.	900 mm	No	no

5.3 EUT Test Program

Uses standard Firmware: Scanning for Tag, reading Tag distance.

5.3.1 Monitoring of EUT during Testing

Observer should watch the display.

5.4 EUT Configuration

5.4.1 Description

Configuration	Description
1. Using Loop probe	
2. Using Pencil Probe	
Notes	All configurations are the same except as noted above

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