



LS RESEARCH, LLC
WIRELESS PRODUCT DEVELOPMENT



W66 N220 Commerce Court • Cedarburg, WI 53012 • USA

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www.lsr.com

TEST REPORT #: 313063
LSR Job #: C-1656

Compliance Testing of:
Collector

Test Date(s):
April 24-26, December 18-19, 2013, January 14, 2014

Prepared For:
Bella AG
27096 CR 388
Kersey, CO 80644

In accordance with:
Federal Communications Commission (FCC)
Part 15, Subpart C, Section 15.249
Industry Canada (IC) RSS 210 Annex 2
Transmitters Operating in the
Frequency Band 902 MHz – 928 MHz

This Test Report is issued under the Authority of:
Peter Feilen, EMC Engineer

Signature:

Date: 8/28/14

Test Report Reviewed by:

Michael Hintzke, EMC Engineer

Signature:

Date:

Tested by:

Peter Feilen, EMC Engineer

Signature:

Date: 8/28/14

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EXHIBIT 1. INTRODUCTION

1.1 Scope

References:	FCC Part 15, Subpart C, Section 15.249 and 15.209 FCC Part 2, Section 2.1043 paragraph (b)1. RSS GEN and RSS 210 Annex 2
Title:	FCC : Telecommunication – Code of Federal Regulations, CFR 47, Part 15. IC : Low-power License-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment
Purpose of Test:	To gain FCC and IC Certification Authorization for Low-Power License-Exempt Transmitters.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	<ul style="list-style-type: none">Commercial, Industrial or BusinessResidential

1.2 Normative References

Publication	Title
47 CFR, Parts 0-15 (FCC)	Code of Federal Regulations - Telecommunications
RSS 210	Low-power License-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
CISPR 16-1-1	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus.
CISPR 16-2-1	Specification for radio disturbance and immunity measuring apparatus and methods. Part 201: Conducted disturbance measurement.

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1.3 LS Research, LLC Test Facility

LS Research, LLC is accredited by A2LA (American Association for Laboratory Accreditation) to conform to ISO/IEC 17025, 2005 "General Requirements for the Competence of Calibration and Testing Laboratories".

LS Research, LLC's scope of accreditation includes all test methods listed herein, unless otherwise noted. Accreditation status can be verified at A2LA's web site: www.a2la.org.

1.4 Location of Testing

All testing was performed at LS Research, LLC, W66 N220 Commerce Court, Cedarburg, Wisconsin, 53012 USA, utilizing the facilities listed below, unless otherwise noted.

List of Facilities Located at LS Research, LLC:

- Compact Chamber
- Semi-Anechoic Chamber
- Open Area Test Site (OATS)

1.5 Test Equipment Utilized

A complete list of equipment utilized in testing is provided in Appendix A of this test report. Calibration dates are indicated in Appendix A.

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EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1 CLIENT INFORMATION

Manufacturer Name:	Bella AG
Address:	27906 CR 388 Kersey, CO 80644 United States
Contact Name:	Nick Rettedal

2.2 EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information has been supplied by the applicant.

Product Name:	Collector
Model Number:	Collector
Serial Number:	Engineering Sample

2.3 ASSOCIATED ANTENNA DESCRIPTION

A reversed-gender dipole is used with this product.

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2.4 EUT'S TECHNICAL SPECIFICATIONS

EUT Frequency Range (in MHz)	915-920.8 MHz
Maximum Field Strength at 3 meters	93.95 dBuV/m @ 3m
20 dB Occupied Bandwidth (in kHz)	97 kHz
Type of Modulation	GFSK
Emission Designator	97KF1D
Transmitter Spurious (worst case) at 3 meters	52.7 dBuV/m @ 3660 MHz @ 3m
Frequency Tolerance %, Hz, ppm	Better than 100 ppm
Antenna Information	
Detachable/non-detachable	Detachable
Type	Dipole
Gain (in dBi)	2 dBi
EUT will be operated under FCC Rule Part(s)	15.249
EUT will be operated under RSS Rule Part(s)	RSS 210
Modular Filing	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Portable or Mobile?	Mobile

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2.5 PRODUCT DESCRIPTION

The Collector is meant to receive temperature sample information from a Bolus unit. The collector sits in receive mode waiting to hear a beacon signal from a bolus. When the Collector receives a beacon, it responds with an acknowledgement and returns to receive mode. The bolus unit then transmits a payload to the Collector. After the Collector receives the payload, it pushes the data to an XBee 2.4GHz Zigbee module. The XBee module transmits the payload over the 2.4GHz link to a central gateway. The collector is capable of pushing commands changing the operation of the bolus in its acknowledgement back to the bolus.

The Collector uses a SiLabs 4461 transceiver with GFSK modulation and a 50kbps datarate. The host processor is TI MSP430. The system operates between 915MHz and 921 MHz. Channel spacing is 300 kHz, with 20 channels available for use. Radio crystal frequency is 32 MHz, processor crystal is 32.768 kHz. It uses a loop antenna to transmit and receive. The Collector uses a dipole antenna.

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EXHIBIT 3. EUT OPERATING CONDITIONS & CONFIGURATIONS DURING TESTS

3.1 Test Climate Conditions

Temperature:	20-25° C
Humidity:	30-60 %
Pressure:	645-795 mmHg

3.2 Applicability & Summary of EMC Emission Test Results

FCC and IC Paragraph	Test Requirements	Compliance (yes/no)
FCC : 15.207 IC : RSS GEN sect. 7.2.2	Power Line Conducted Emissions Measurements	Yes
IC : RSS GEN section 4.6.1	20 dB Bandwidth	Yes
FCC : 15.249(A) & 1.1310 IC : RSS 210 A2.9 (a)	Maximum Output Power	Yes
FCC : 1.1307, 1.1310, 2.1091 & 2.1093 IC : RSS 102	RF Exposure Limit	Yes
FCC : 15.249(a) IC : RSS 210 A2.9(a)	Transmitter harmonics	Yes
FCC : 15.249(d), 15.209 & 15.205 IC : RSS 210 A2.9(b),	Transmitter Radiated Emissions	Yes

The digital circuit portion of the EUT has been tested and verified to comply with FCC Part 15, Subpart B, Class B Digital Devices (RSS GEN and RSS 210 of IC) and the associated Radio Receiver has also been tested and found to comply with Part 15, Subpart B – Radio Receivers (RSS GEN and RSS 210 of IC).

3.3 Modifications Incorporated In The EUT For Compliance Purposes

None Yes (explain below)

3.4 Deviations & Exclusions From Test Specifications

None Yes (explain below)

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EXHIBIT 4. DECLARATION OF CONFORMITY

The EUT was found to MEET the requirements as described within the specification of FCC Title 47, CFR Part 15.249, and Industry Canada RSS-210.

If some emissions are seen to be within 3 dB of their respective limits:

As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

LS Research, LLC certifies that the data contained herein was taken under conditions that meet or exceed the requirements of the test specifications. The results in this Test Report apply only to the item(s) tested on the above-specified dates. Any modifications made to the EUT subsequent to the indicated test date(s) will invalidate the data herein, and void this certification.

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EXHIBIT 5. RADIATED EMISSIONS TEST

5.1 Test Setup

The test setup was assembled in accordance with Title 47, CFR FCC Part 15, RSS GEN and ANSI C63.4. The EUT was placed on an 80cm high non-conductive pedestal, centered on a flush mounted 2-meter diameter turntable inside a 3 meter Semi-Anechoic, FCC listed Chamber. The EUT was operated in continuously transmitting modulated mode using power as provided by a battery. The unit has the capability to operate on 2 channels, controllable via PC programming.

The applicable limits apply at a 3 meter distance. The calculations to determine these limits are detailed in the following pages. Please refer to Appendix A for a complete list of test equipment. The test sample was operated on two the standard operating channels: **915 MHz and 920.8 MHz** to comply with FCC Part 15.31(m).

5.2 Test Procedure

Radiated RF measurements were performed on the EUT in a 3 meter Semi-Anechoic, FCC listed Chamber. The frequency range from 30 MHz to 10000 MHz was scanned and investigated. The radiated RF emission levels were manually noted at the various fixed degree settings of azimuth on the turntable and antenna height. The EUT was placed on a non-conductive pedestal in the 3 meter Semi-Anechoic Chamber, with the antenna mast placed such that the antenna was 3 meters from the EUT. The EUT was positioned in three orthogonal positions for the test.

A Biconical Antenna was used to measure emissions from 30 MHz to 300 MHz, and a Log Periodic Antenna was used to measure emissions from 300 MHz to 1000 MHz. A Double-Ridged Waveguide Horn Antenna was used from 1 GHz to 10 GHz.

In the frequency range of 30 MHz to 10 GHz, the maximum radiated RF emissions were found by raising and lowering the antenna between 1 and 4 meters in height. In addition, the polarity of the antenna was switched between horizontal and vertical polarity.

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5.3 Test Equipment Utilized

A list of the test equipment and antennas utilized for the Radiated Emissions test can be found in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. All calibrations of the antennas used were performed at an IEC/ISO 17025 accredited calibration laboratory, traceable to the SI standard. In addition, the Connecting Cables were measured for losses using a calibrated Signal Generator and an EMI Receiver. The resulting correction factors and the cable loss factors from these calibrations were entered into the EMI Receiver database. As a result, the data taken from the EMI Receiver accounts for the antenna correction factor as well as cable loss or other corrections, and can therefore be entered into the database as a corrected meter reading. The EMI Receiver was operated with resolution bandwidths as prescribed in ANSI C63.4.

5.4 Test Results

The EUT was found to **MEET** the Radiated Emissions requirements of Title 47 CFR, FCC Part 15.249 and Canada RSS-210. The frequencies with significant RF signal strength were recorded and plotted as shown in the Data Charts and Graphs.

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5.5 Calculation of Radiated Emissions Limits

Field Strength of Fundamental Frequencies:

The fundamental emissions for an intentional radiator in the 902-928 MHz band, operating under FCC part 15.249 and RSS 210 A2.9 limits must have electric field strength of no greater than 50 mV/m, for the fundamental frequency, when measured at 3 meters, and harmonic field strength of no greater than 500 μ V/m, when measured at 3 meters. Spurious emissions outside the 902-928 MHz band shall be attenuated by at least 50 dB below the level of the fundamental, or meet the limits expressed in FCC part 15.209 under general emission limits.

Field Strength of Fundamental Frequencies is Limited to 50,000 μ V/m, or 94 dB μ V/m.

Field Strength of Harmonic and Spurious Frequencies is Limited by FCC 15.249 a and d

The harmonic limit of -50 dBc with respect to the fundamental limit would be:

$$94 \text{ dB}\mu\text{V/m} - 50 \text{ dB} = 44 \text{ dB}\mu\text{V/m},$$

Note 1: *with the exception of where FCC 15.209 allows for a higher limit to be used.

Frequency (MHz)	3 m Limit (μ V/m)	3 m Limit (dB μ V/m)
902-928	50,000	94.0
30-88 ; 88-216	159	44.0
216-902 ; 928-960	200	46.0* <small>Note 1</small>
960-40,000	500	54.0* <small>Note 1</small>

The following table depicts the general radiated emission limits obtained from Title 47 CFR, part 15.209a, for radiated emissions measurements, including restricted band limits as expressed in 47 CFR, part 15.205.

Frequency (MHz)	3 m Limit (μ V/m)	3 m Limit (dB μ V/m)
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
960-40,000	500	54.0

Sample conversion from field strength μ V/m to dB μ V/m:

$$\text{dB}\mu\text{V/m} = 20 \log_{10} (3\text{m limit})$$

from 30 - 88 MHz for example: $\text{dB}\mu\text{V/m} = 20 \log_{10} (100)$

$$40.0 \text{ dB}\mu\text{V/m} = 20 \log_{10} (100)$$

Note: Limits are conservatively rounded to the nearest tenth of a whole number.

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5.6 Radiated Emissions Test Data Chart
 Measurements of Electromagnetic Radiated Emissions
 Frequency Range Inspected: 30 MHz to 10000 MHz

Manufacturer:	Bella AG						
Date(s) of Test:	June 4, 2013;						
Project Engineer:	Peter Feilen						
Voltage:	120VAC						
Operation Mode:	Continuous TX						
EUT Power:	X	Single Phase 120 VAC				3 Phase	VAC
		Battery				Other:	
EUT Placement:		80cm non-conductive table				10cm Spacers	
EUT Test Location:	X	3 Meter Semi-Anechoic FCC Listed Chamber				3/10m OATS	
Measurements:		Pre-Compliance			Preliminary	X	Final
Detectors Used:	X	Peak		X	Quasi-Peak	X	Average

The following table depicts the level of radiated fundamental:

Frequency (MHz)	Receive Antenna Polarity	EUT Position	Height (m)	Azimuth (0° - 360°)	Peak Field Strength Reading (dBuV/m)	Quasi-Peak Field Strength Reading (dBuV/m)	Quasi-Peak Limit (dBuV/m)	Margin (dB)
915.0	Horizontal	V	1.98	125	94.09	93.95	94.00	0.05
921.0	Horizontal	V	2.04	145	93.88	93.74	94.00	0.26

The following table depicts the level of transmitter spurious emissions:

Frequency (MHz)	Receive Antenna Polarity	EUT Position	Antenna Height (m)	Azimuth (deg)	Peak Field Strength Reading (dBuV/m)	Average Field Strength Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)
3660	Horizontal	SIDE	1.02	21	56.40	52.70	54.00	1.30
3683.5	Horizontal	SIDE	1.01	22	55.40	52.20	54.00	1.80

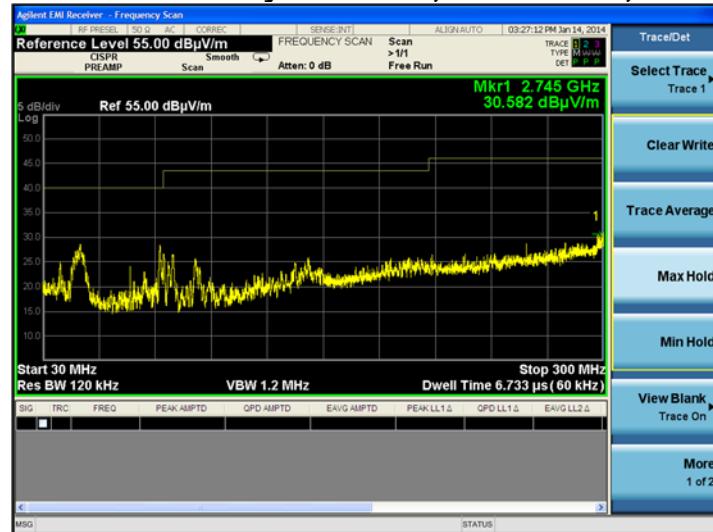
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5.7 Screen Captures - Radiated Emissions Test

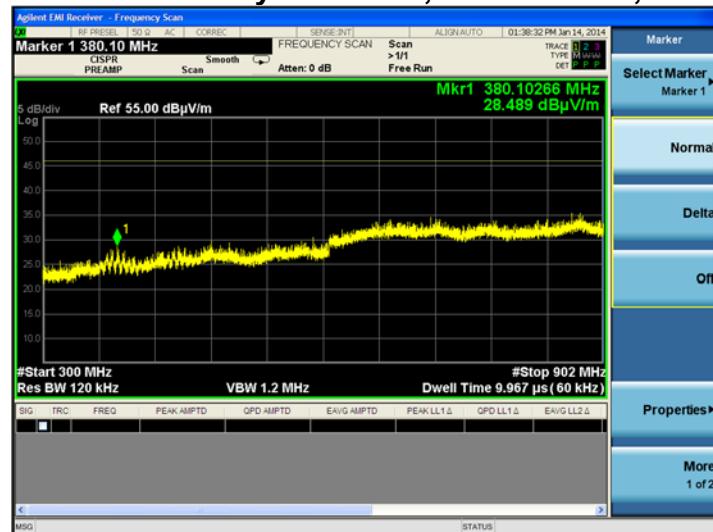
These screen captures represent Peak Emissions. For radiated emission measurements, a Quasi-Peak detector function is utilized when measuring frequencies below 1 GHz, and a peak detector with video averaging is utilized when measuring frequencies above 1 GHz.

The signature scans shown here are from worst-case emissions, as measured on channels low and high, with the sense antenna both in vertical and horizontal polarity for worst case presentations.

Antenna Vertically Polarized, 30-300 MHz, at 3m



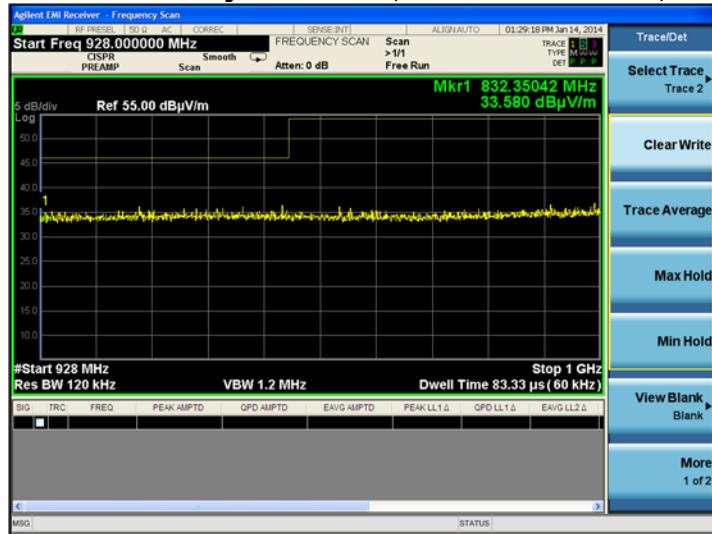
Antenna Vertically Polarized, 300-902 MHz, at 3m



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Screen Captures - Radiated Emissions Testing (continued)

Antenna Vertically Polarized, 928 to 1000 MHz, at 3m



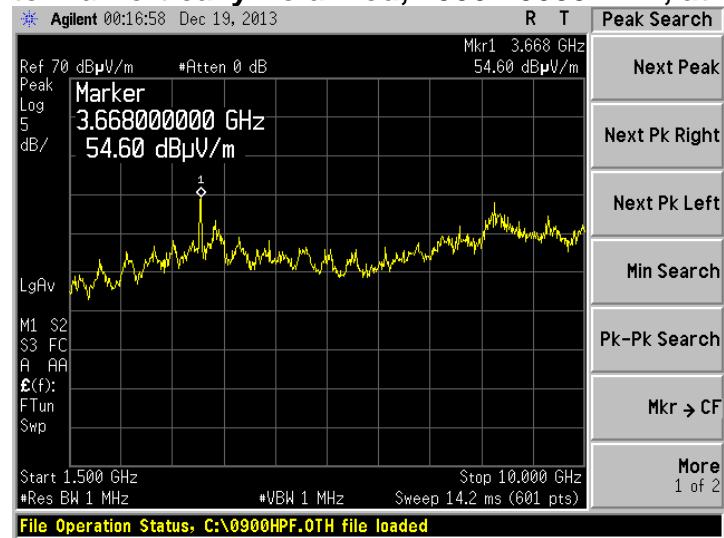
Antenna Vertically Polarized, 1000-1500 MHz, at 1m



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Screen Captures - Radiated Emissions Testing (continued)

Antenna Vertically Polarized, 1500-10000 MHz, at 1m



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EXHIBIT 6. CONDUCTED EMISSIONS TEST, AC POWER LINE:

6.1 Test Setup

The test area and setup are in accordance with ANSI C63.4 and with Title 47 CFR, FCC Part 15, Industry Canada RSS-210 and RSS GEN. The EUT was placed on a non-conductive wooden table, with a height of 80 cm above the reference ground plane. The EUT's power cable was plugged into a 50Ω (ohm) Line Impedance Stabilization Network (LISN). The AC power supply of 120V was provided via an appropriate broadband EMI Filter, and then to the LISN line input. Final readings were then taken and recorded. After the EUT was setup and connected to the LISN, the RF Sampling Port of the LISN was connected to a 10 dB Attenuator-Limiter, and then to EMI receiver System. The EMCO LISN used has the ability to terminate the unused port with a 50Ω (ohm) load when switched to either L1 (line) or L2 (neutral).

6.2 Test Procedure

The EUT was investigated in continuous modulated transmit mode for this portion of the testing. The appropriate frequency range and bandwidths were selected on the EMI Receiver, and measurements were made. The bandwidth used for these measurements is 9 kHz, as specified in CISPR 16-1, Section 1, Table 1, for Quasi-Peak and Average detectors in the frequency range of 150 kHz to 30 MHz. Final readings were then measured and recorded.

6.3 Test Equipment Utilized

A list of the test equipment and accessories utilized for the Conducted Emissions test is provided in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. Calibrations of the LISN and Limiter were performed at an IEC/ISO 17025 accredited calibration laboratory, traceable to the SI standard. All cables are calibrated and checked periodically for conformance. The emissions are measured on the EMI System, which has automatic correction for all factors stored in memory and allows direct readings to be taken.

6.4 Test Results

The EUT was found to **MEET** the Conducted Emission requirements of FCC Part 15.207 and RSS GEN 7.2.2 for Conducted Emissions for an Intentional Radiator. See the Data Charts and Graphs for more details of the test results.

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6.5 FCC Limits of Conducted Emissions at the AC Mains Ports

Frequency Range (MHz)	Class B Limits (dBμV)		Measuring Bandwidth
	Quasi-Peak	Average	
0.150 -0.50 *	66-56	56-46	RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average
0.5 – 5.0	56	46	
5.0 – 30	60	50	

* The limit decreases linearly with the logarithm of the frequency in this range.

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6.6 Conducted Emissions Test Data Chart

Frequency Range inspected: 150 KHz to 30 MHz

Manufacturer:	Bella AG				
Date(s) of Test:	April 24, 2013				
Project Engineer:	Peter Feilen				
Voltage:	12VDC				
Operation Mode:	Transmit and Receive				
Test Location:	X	AC Mains Test area			Chamber
EUT Placed On:	X	40cm from Vertical Ground Plane			10cm Spacers
	X	80cm above Ground Plane			Other:
Measurements:		Pre-Compliance		Preliminary	X Final
Detectors Used:	X	Peak	X	Quasi-Peak	X Average

Frequency (MHz)	Line	Quasi-Peak			Average		
		Q-Peak Reading (dB μ V)	Q-Peak Limit (dB μ V)	Quasi- Peak Margin (dB)	Average Reading (dB μ V)	Average Limit (dB μ V)	Average Margin (dB)
0.192	L1	52.7	63.9	11.3	44.9	53.9	9.1
0.385	L1	51.5	58.2	6.7	42.0	48.2	6.2
0.577	L1	45.2	56.0	10.8	35.0	46.0	11.0
0.770	L1	45.5	56.0	10.5	38.7	46.0	7.3
1.155	L1	45.6	56.0	10.4	38.7	46.0	7.3
0.386	L2	46.5	58.2	11.7	36.9	48.2	11.3
0.578	L2	40.4	56.0	15.6	27.9	46.0	18.1
0.771	L2	41.9	56.0	14.1	32.6	46.0	13.4
1.155	L2	41.9	56.0	14.1	32.6	46.0	13.4

Notes:

- 1) The emissions listed are characteristic of the power supply used, and did not change by the EUT.
- 2) All other emissions were better than 20 dB below the limits.
- 3) The EUT exhibited similar emissions across channels tested.

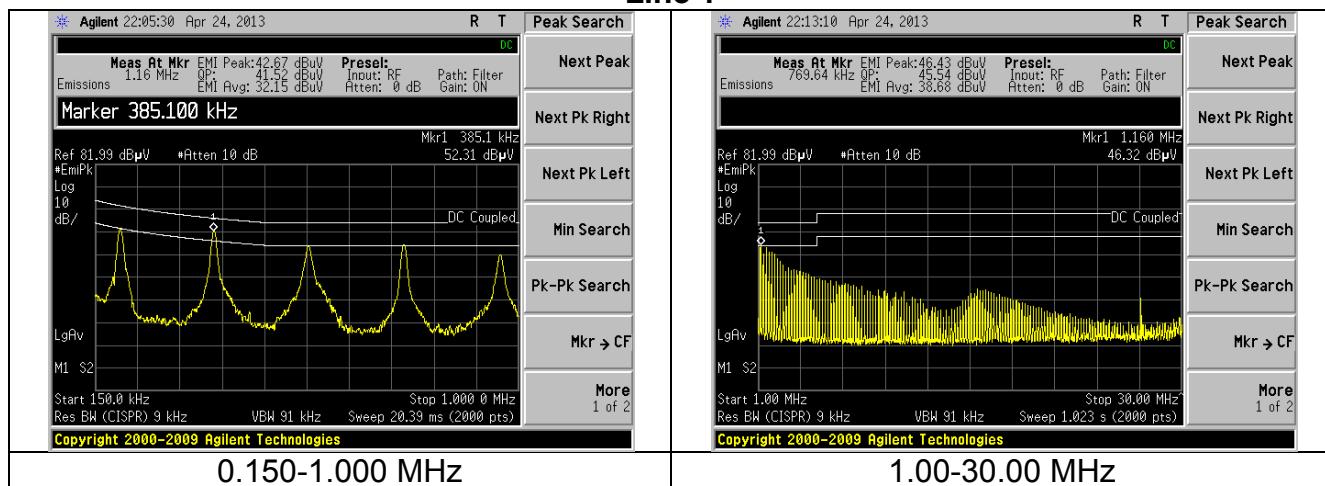
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6.7 Screen Captures – Conducted Emissions Test

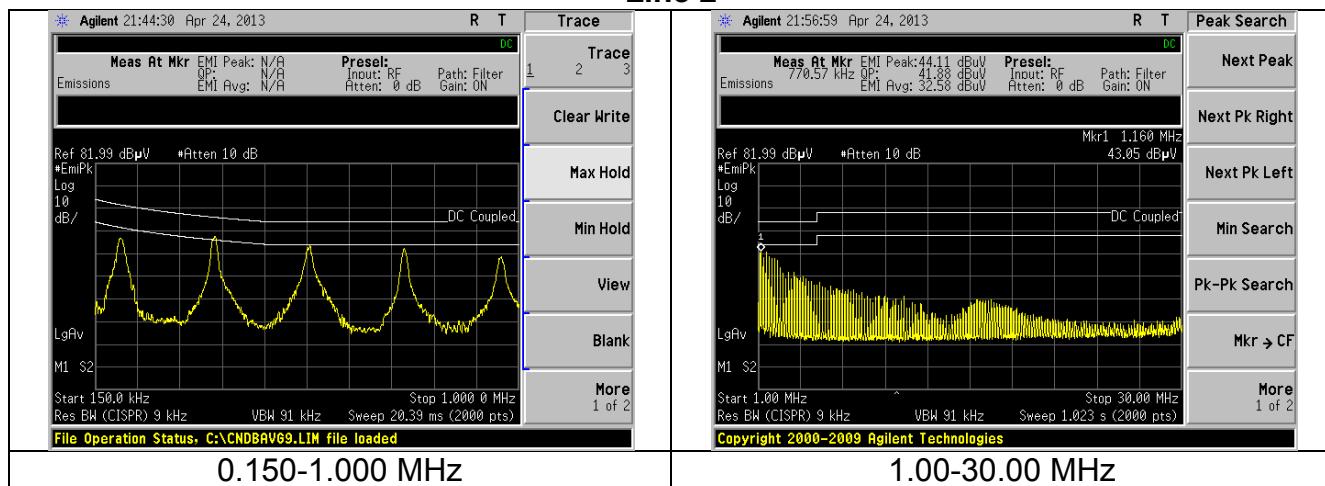
These screen captures represent Peak Emissions. For conducted emission measurements, both a Quasi-Peak detector function and an Average detector function are utilized. The emissions must meet both the Quasi-peak limit and the Average limit as described in 47 CFR 15.207 and RSS GEN 7.2.2 (Table 2).

The signature scans shown here are from channel 902 MHz, chosen as being a good representative of channels.

Line 1



Line 2



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EXHIBIT 7. OCCUPIED BANDWIDTH:

7.1 Limits

There are no limits specified. The occupied bandwidth need only be reported.

7.2 Method of Measurements

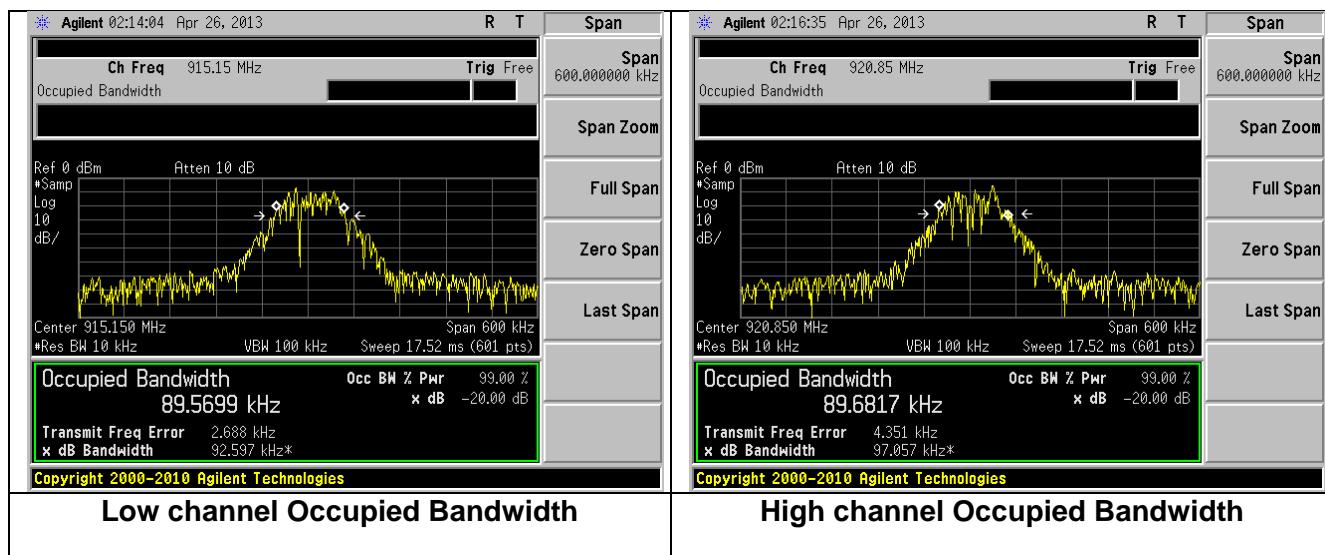
This test was performed radiated in a 3-meter semi-anechoic chamber. The resolution bandwidth was set such that it was greater than the occupied bandwidth. This maximum value for the fundamental was then used as reference for 20dBc.

The resolution bandwidth was then set to a value that was greater than or equal to 1% of the bandwidth. Using the 20dBc marker, the bandwidth was measured.

7.3 Test Data

Center Frequency (MHz)	Measured -20 dBc Occ.Bw (kHz)
915.15	92.6
920.85	97.0

7.4 Screen Captures - Occupied Bandwidth



Prepared For: Bella AG	EUT: Collector	LS Research, LLC
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APPENDIX A - Instrumentation Sheet



Date : 24-Apr-2013

Type Test : Conducted Emissions

Job # : C-1656

Prepared By: _____

Customer : Bella

Quote # : 313063

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960084	LISN - 15A	COM-POWER	LI-215A	191920	2/6/2013	2/6/2014	Active Calibration
2	EE 960156	100kHz-1GHz Analog Signal Generator	Agilent	N5181A	MY49060062	6/30/2012	6/30/2013	Active Calibration
3	EE 960157	3Hz-13.2GHz Spectrum Analyzer	Agilent	E4445A	MY48250225	6/29/2012	6/29/2013	Active Calibration
4	EE 960158	RF Preselector	Agilent	N9039A	MY46520110	6/29/2012	6/29/2013	Active Calibration



Date : 19-Dec-2013

Type Test : Radio

Job # : C-1656

Prepared By: Peter

Customer : Bella

Quote # : 313063

No.	Asset #	Description	Manufacturer	Model #	Serial #	Cal Date	Cal Due Date	Equipment Status
1	EE 960073	Spectrum Analyzer	Agilent	E4446A	US45300564	5/9/2013	5/9/2014	Active Calibration
2	AA 960004	Log Periodic Antenna	EMCO	93146	9512-4276	9/21/2013	9/21/2014	Active Calibration
3	AA 960005	Biconical Antenna	EMCO	93110B	9601-2280	9/21/2013	9/21/2014	Active Calibration
4	EE 960088	8GHz MXE Spectrum Analyzer	Agilent	N9038A	MY51210138	11/19/2013	11/19/2014	Active Calibration
5	AA 960007	Double Ridge Horn Antenna	EMCO	3115	9311-4138	6/10/2013	6/10/2014	Active Calibration
6	EE 960146	Std. Gain Horn Ant. w/preamp	Adv. Micro / EMCO	WLA622-4 / 3160-09	123001	9/24/2013	9/24/2014	Active Calibration

Project Engineer: Peter Faletz

Quality Assurance: LH

Prepared For: Bella AG	EUT: Collector	LS Research, LLC
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APPENDIX B - Test Standards

STANDARD #	DATE	Am. 1	Am. 2
ANSI C63.4	2009		
ANSI C63.10	2009		
FCC 47 CFR, Parts 0-15, 18, 90, 95	2009		
FCC Public Notice DA 00- 1407	2000		
FCC ET Docket # 99-231	2002		
FCC Procedures	2007		
RSS GEN	2007-06		
RSS 210	2007-06		

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APPENDIX C - Uncertainty Statement

This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k=2.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.82 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.88 dB
Radiated Emissions	3-Meter Chamber, Horn Antenna	4.85 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.32 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.63 dB
Absolute Conducted Emissions	Agilent PSA/ESA Series	1.38 dB
AC Line Conducted Emissions	Shielded Room/EMCO LISN	3.20 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	2.05 Volts/Meter
Conducted Immunity	3 Volts level	2.33 V
EFT Burst, Surge, VDI	230 VAC	54.4 V
ESD Immunity	Discharge at 15kV	3200 V
Temperature/Humidity	Thermo-hygrometer	0.64° / 2.88 %RH

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