



FCC Test Report for
47CFR15, Subpart B for Unintentional Radiators, per Section 101
Equipment authorization of unintentional radiators,
and
47CFR15, Subpart C per Section 209
General Limits for Operation of Intentional Radiators

on
Bentley's 5.8 GHz Microwave Sensor

[FCC ID: LQN2923]

[FCC ID: LQN2924]

Model(s) and Part Numbers:

902923 (Bentley Part No:3W7951177)

902924 (Bentley Part No:3W7951172)

Report No.

20051114-04-Fc15

Judgement

Complies as Tested

Provided for evaluation by

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EN45001 Accredited Compliance Laboratory (RES-GmbH)
Registration number: TTI-P-G 159/98-00 (RES-GmbH)

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PART 1 General

Section 1.1 General Information

Product:	Bentley's 5.8 GHz Microwave Sensor	
Model Number:	902923 (Bentley Part No:3W7951177)	
Model Number:	902924 (Bentley Part No:3W7951172)	
Manufacturer's Name	Connaught Electronics, LTD	
Manufacturer's Address	IDA Industrial Estate, Dunmore Road, Tuam Co, Galway Ireland	
Telephone and Fax Contact	Tel: (011) 353-93-25128 Patrick Denny	Fax : (011) 353-93-25133 Email: dennypatrick@cel.ie
Test Laboratory	ITC Engineering Services, Inc. 9959 Calaveras Road, PO Box 543 Sunol, CA 94586-0543 Email: itcemc@itcemc.com Web Site: http://www.itcemc.com	Tel: +1(925) 862-2944 Fax: +1(925) 862-9013
Test Number	20051114-04	
Report Number	20051114-04-Fc15	
Test Date(s) & Issue Date	November 13 th , and 14 th , 2005	December 1 st , 2005
Test Engineer(s)	Lan Vu, Femi Ojo	
Documentation	George William Brown II	
Test Results	☒ Complies as Tested	☐ Fail
Total Number of Pages	31	

The electromagnetic interference and RF tests, which this report describes, were performed by an independent engineering consultancy firm, ITC Engineering Services, Inc. (ITC), in accordance with the requirements specified in the FCC rules, 47CFR Part 15, Subparts B and C. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications specified in this report for compliance must be implemented in all production units for compliance to be maintained.

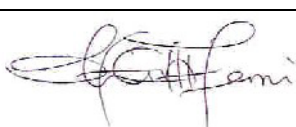
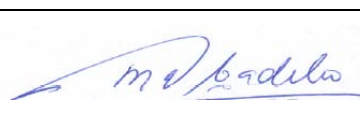
Section 1.2 Tests Performed:

Emissions Requirements:

- OPEN FIELD RADIATED EMISSIONS in accordance with the FCC PART 15 Sub-Part B.

RF Requirements:

- FIELD STRENGTH OF FUNDAMENTAL in accordance with the FCC 47 CFR 15.209.
- HARMONIC EMISSIONS in accordance with the FCC 47 CFR 15.209.
- SPURIOUS EMISSIONS in accordance with the FCC 47 CFR 15.209.

Report generated by	Report reviewed by
	
Femi Ojo,	Michael Gbadebo, P.E, Chief Engineer.
Compliance Engineer	(California License # 11303)

Section 1.3 Declaration/Disclaimer

ITC Engineering Services, Inc. (ITC) reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. ITC Engineering Services, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from ITC Engineering Services, Inc. issued reports.

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ITC Engineering Services, Inc. (ITC) is:

Accepted by the Federal Communications Commission (FCC) for FCC Methods, CISPR Methods and AUSTEL Technical Standards (Ref: NVLAP Lab Code 200172-0)

Approved by the Industry Canada for Telecom Testing

Certified by Rockford Engineering Services GmbH for EMC Testing according to the European EMC Directive 89/336/EEC per EN45001

Certified by Reg. TP for EMC Testing according to the European EMC Directive 89/336/EEC per EN45001 for RES GmbH (DAR-Registration number: TTI-P-G 159/98-00)

Certified by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI) for EMC testing, in accordance with the Regulations for Voluntary Control Measures, Article 8, Registration Numbers - Site 1: C-1582 and R-1497.

PART 1 General (Cont)

Section 1.4 Test Methodology

The electromagnetic interference and RF tests, which this report describes, were performed by an independent engineering consultancy firm, ITC Engineering Services, Inc. (ITC), in accordance with the FCC test procedure ANSI C63.4-2003

Section 1.5 Test Facility

The open area test site, the conducted measurement facility, the semi anechoic chamber and the test equipment used to collect the emissions and RF data is located in Sunol, California, and is fully described in site attenuation report. The approved site attenuation description is on file at the Federal Communications Commission.

Section 1.6 Radio Device Measurement Information

Product Type Model(s)	Bentley's 5.8 GHz Microwave Sensor 902923 (Bentley Part No:3W7951177) 902924 (Bentley Part No:3W7951172)	
Applicant / Manufacturer Address	Connaught Electronics, LTD IDA Industrial Estate, Dunmore Road, Tuam Co, Galway Ireland	
Contact	Patrick Denny Tel: +(011) 353-93-25128	dennypatrick@cel.ie Fax: +(011) 353-93-25133
Total Number of Pages including Appendices	31 Pages	
Test Report File No.	20051114-04-Fc15	

Section 1.7 Measurement Uncertainty

150kHz to 30MHz:		
Combined standard uncertainty uc(y)	± 1.68 dB	Normal
Expanded uncertainty U	± 3.36 dB	Normal (k = 2)
30MHz to 1GHz:		
Combined standard uncertainty uc(y)	± 3.24 dB	Normal
Expanded uncertainty U	± 6.48 dB	Normal (k = 2)
1GHz to 18GHz:		
Combined standard uncertainty uc(y)	± 2.48 dB	Normal
Expanded uncertainty U	± 4.96 dB	Normal (k = 2)
Above 18GHz:		
Radiated emission up to 26 GHz	± 3 dB	
Radiated emission up to 40 GHz	± 3 dB	
Radiated emission up to 75 GHz	± 3 dB	

PART 2 RECEIVER MEASUREMENTS

OPEN FIELD RADIATED EMISSIONS

Section 2.1 Test Specification: 47 CFR PART 15, Sub-Part B

Connaught Electronics, LTD products Bentley 5.8 GHz Microwave Sensor, models 902923 and 902924 or the EUTs as referred to in this report are intentional radiators. The units are similar both in design and functionality. The EUTs were set up at 3 and 10 meters in accordance with the suggested configuration given in FCC Measurement Procedure ANSI C63.4-2003. The measurement instrumentation used was a receiver with bandwidth parameters as stipulated in ANSI C63.4-2003. The EUT, 5.8 GHz Microwave Sensor, was set up on a wooden non-conductive tabletop, 80 cm above the ground reference plane, in an open field. The transmit function was not activated for the tests.

Section 2.2 Test Equipment – Radiated Emissions Tests

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Preamplifier	Hewlett-Packard	8449B	3008A00101	N/A
Preselector	Hewlett-Packard	85685A	2620A00265	12-11-2005
Biconical Antenna	EMCO	3104	9111-4463	01-16-2006
I.p. Ant (200 -1000MHz)	EMCO	3146	2261	01-22-2006
Quasi Peak Adapter	Hewlett-Packard	85650A	2521A00737	12-11-2005
Spectrum Analyzer	Hewlett-Packard	8568B	2841A04315	12-11-2005
Spectrum Analyzer Display	Hewlett-Packard			12-11-2005
Horn. Ant (Below 18GHz)	EMCO	3115	8812-3050	01-19-2006
Horn. Ant (Below 40GHz)	HP	3116	4663	02-18-2006
Spectrum Analyzer	Hewlett-Packard	8565E	3943A01328	03-29-2006

Section 2.3 Support Equipment – Radiated Emissions Tests

Description	Manufacturer	Model No.	Serial No.	Calibration Due
DC Power Supply	BK Precision	1688		n/a
Digital Multimeter	Fluke	16	79510141	December 14, 2005

Section 2.4 Test Procedure – Radiated Emissions Tests

The measurement range investigated was from 30 MHz to 18 GHz due to lack of emissions activity above 5.8GHz. For measurements below 1GHz, the 5.8 GHz Microwave Sensor (the EUT) was set up at 10 meters from the receiving antenna, on an Open Area Test Site (OATS) with the EUT running in a continuous mode. The EUT was rotated 360 degrees azimuth and the search antenna height varied 1 to 4m in order to maximize the emissions. Significant peaks from the EUT were then recorded to determine margin to the limits. For measurements above 1GHz, the EUT was set up at 3 meters from the antenna in a semi-anechoic chamber with the EUT running in a continuous mode. The EUT was rotated 360 degrees azimuth and the search antenna height varied 1 to 4m in order to maximize the emissions. Significant peaks from the EUT were then recorded to determine margin to the limits.

OPEN FIELD RADIATED EMISSIONS (cont)

Section 2.5 Spectrum Analyzer Configuration (during swept frequency scans)

IF Bandwidth.....120 kHz

Measurements below 1000 MHz (unless stated otherwise)

Analyzer Mode (for Peak Measurements) Peak/Log

Resolution Bandwidth 100 kHz

Video Bandwidth..... 100 kHz

Analyzer Mode (for Quasi-Peak Measurements)

Quasi-Peak/Linear Resolution Bandwidth..... 1000 kHz

Video Bandwidth..... 1000 kHz

Measurements above 1000 MHz (unless stated otherwise)

Quasi-Peak Adapter Mode Disabled

Analyzer Mode (for Peak Measurements) Peak

Resolution Bandwidth 1000 kHz

Video Bandwidth..... 1000 kHz

Analyzer Mode (for Average Measurements) Video Filter

Resolution Bandwidth 1000 kHz

Video Bandwidth..... 10 Hz

Section 2.6 Legend and Field Strength Calculation – Radiated Emissions Tests

Detector mode: Peak (P) or Quasi-Peak (QP) or Average (A)

	Polarization	Antenna	Freq Range (MHz)
VB	Vertical	EMCO 3104/sn. 4463 Biconical	30 – 200
HB	Horizontal	EMCO 3104/sn. 4463 Biconical	30 – 200
VL	Vertical	EMCO 3146/sn. 2261 Log Periodic	200 – 1000
HL	Horizontal	EMCO 3146/sn. 2261 Log Periodic	200 – 1000
VH1	Vertical	EMCO 3115/sn. 8812-3050 Horn	Below 18000
HH1	Horizontal	EMCO 3115/sn. 8812-3050 Horn	Below 18000
VH2	Vertical	HP 3116/sn. 4663 Horn	Below 26500
HH2	Horizontal	HP 3116/sn. 4663 Horn	Below 26500
VH4	Vertical	S&D DBD-520 Horn	Below 75000
HH4	Horizontal	S&D DBD-520 Horn	Below 75000

The margin in section 2.6 is calculated as follows:

Margin = Corrected Amplitude – Limit, where Corrected Amplitude = Spectrum Analyzer Amplitude + Cable Loss + Antenna Factor – Pre-Amp Gain.

OPEN FIELD RADIATED EMISSIONS Results

Section 2.7 Administrative and Environmental Details – Radiated Emissions

Test Site:	Test Site 1 - 10m Open Field Radiated Site
Test Site:	Semi-Anechoic Absorber Lined Shielded Room
Test Date:	November 13 th , 2005
Test Engineer:	Femi Ojo
Temperature	72°F & 69.5 F
Humidity	39% & 35%

Section 2.8 Data for Radiated Emissions Measurement up to 1 GHz

The table below shows a summary of the highest amplitudes of the radiated emissions from the equipment under test at various antenna heights, antenna polarization, and EUT orientations.

INDICATED		CORRECTION		CORR	TURNTABLE ANT			CLASS A		CLASS B			
FREQ	AMPL	ANT	CAB	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	FILTER	
MHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	db	MODE	NOTES
32.94	5.9	11.1	1.9	18.9	90	2.5	HB	-	-	30.0	-11.1	P	
40.04	6.1	11.3	2.2	19.6	0	1.0	VB	-	-	30.0	-10.4	P	
50.13	8.8	11.7	2.2	22.7	180	2.0	HB	-	-	30.0	-7.3	P	
65.84	5.8	7.9	2.6	16.3	90	1.0	VB	-	-	30.0	-13.7	P	
110.57	5.6	12.0	3.2	20.9	90	1.0	VB	-	-	33.0	-12.1	P	
117.49	5.2	12.9	3.2	21.4	120	1.0	VB	-	-	33.0	-11.6	P	
132.77	5.6	12.5	3.4	21.5	90	1.0	VB	-	-	33.0	-11.5	P	
149.38	5.8	12.2	3.8	21.8	0	2.0	HB	-	-	33.0	-11.2	P	
203.86	8.9	11.8	3.9	24.5	90	1.0	VL	-	-	33.0	-8.5	P	
204.68	2.5	11.4	3.9	17.8	0	2.0	HL	-	-	33.0	-15.2	P	
220.57	7.9	11.1	3.8	22.8	0	1.0	VL	-	-	36.0	-13.2	P	
408.60	4.0	15.7	6.2	25.9	90	1.0	VL	-	-	36.0	-10.1	P	
440.81	3.6	15.9	6.6	26.1	90	2.0	HL	-	-	36.0	-9.9	P	
444.86	4.3	16.2	6.8	27.3	90	1.0	VL	-	-	36.0	-8.7	P	
558.44	1.5	18.0	8.1	27.6	90	1.0	VL	-	-	36.0	-8.4	P	
573.30	3.1	17.5	8.5	29.1	0	1.0	VL	-	-	36.0	-6.9	P	

No emission of significant level was observed above 573.30MHz thru 1GHz

Test Data Legend

P = Peak

QP = Quasi Peak

The margin is calculated as follows:

Margin = Corrected Amplitude - Limit; where Corrected Amplitude = Amplitude + Cable Loss + Antenna Factor.

Section 2.9 Conclusion

Connaught Electronics, LTD products Bentley 5.8 GHz Microwave Sensor, models 902923 and 902924 meets the requirements of FCC Part 15, Class B for radiated emissions.

Section 2.10 Open Field Radiated Emissions Test Setup Photographs



Figure 1: Open Field Radiated Emissions below 1 GHz (front view)



Figure 2: Open Field Radiated Emissions below 1 GHz (rear view)

OPEN FIELD RADIATED EMISSIONS Results (cont.)

Section 2.11 Administrative and Environmental Details– Radiated Emissions Measurement

Test Date:	November 13 th , 2005
Test Engineer:	Femi Ojo
Temperature	69.5 F
Humidity	35%

Section 2.12 Test Data for Radiated Emissions Measurement above 1 GHz @ 3 meters

The table below shows a summary of the highest amplitudes of the radiated emissions from the equipment under test at various antenna heights, antenna polarization, and EUT orientations.

INDICATED		CORRECTION		CORR	TURNTABLE ANT			CLASS A		CLASS B			
FREQ	AMPL	ANT	CAB	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	FILTER	
MHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	db	MODE	NOTES
1038.0	46.8	24.3	-34.6	36.5	0	1.0	VH	-	-	54.0	-17.5	P	
1040.0	45.6	24.3	-34.6	35.3	90	1.2	HH	-	-	54.0	-18.7	P	
1138.0	49.2	24.4	-34.5	39.1	0	1.0	VH	-	-	54.0	-14.9	P	
1173.0	49.7	24.5	-34.4	39.7	0	1.0	VH	-	-	54.0	-14.3	P	
1184.0	48.7	24.5	-34.4	38.8	90	1.2	HH	-	-	54.0	-15.2	P	
1215.0	46.2	24.6	-34.4	36.4	0	1.0	HH	-	-	54.0	-17.6	P	
1243.0	51.5	24.6	-34.3	41.8	0	1.0	VH	-	-	54.0	-12.2	P	
1244.0	45.5	24.6	-34.3	35.8	90	1.2	HH	-	-	54.0	-18.2	P	
2181.0	44.7	28.0	-32.8	39.9	0	1.0	VH	-	-	54.0	-14.1	P	
2215.0	43.3	28.2	-32.7	38.7	90	1.2	HH	-	-	54.0	-15.3	P	
3642.0	44.2	31.6	-31.2	44.6	0	1.0	VH	-	-	54.0	-9.4	P	
4750.0	45.3	32.8	-29.8	48.3	0	1.0	VH	-	-	54.0	-5.7	P	
5371.0	45.8	34.0	-29.5	50.3	0	1.0	VH	-	-	54.0	-3.7	P	
5765.0	36.3	34.4	-29.2	41.4	0	1.0	VH	-	-	54.0	-12.6	P	1
5799.0	36.2	34.4	-29.2	41.3	90	1.2	HH	-	-	54.0	-12.7	P	2
6857.0	44.0	35.0	-29.1	50.0	90	1.2	HH	-	-	54.0	-4.0	P	
11531.	37.7	39.1	-27.4	49.4	0	1.0	VH	-	-	54.0	-4.6	P	
11531.	36.0	39.2	-27.4	47.8	90	1.2	HH	-	-	54.0	-6.2	P	
17296.	30.5	42.9	-23.9	49.6	0	1.0	VH	-	-	54.0	-4.4	P	

There were no significant emissions above 17.30GHz thru 40GHz.

Test Data Legend

P = Peak

QP = Quasi Peak

The margin is calculated as follows:

Margin = Corrected Amplitude - Limit; where Corrected Amplitude = Amplitude + Cable Loss + Antenna Factor.

Section 2.13 Conclusion

Connaught Electronics, LTD products Bentley 5.8 GHz Microwave Sensor, models 902923 and 902924 meet the requirements of FCC Part 15, Class B for Radiated Emissions.

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Product: Bentley's 5.8 GHz Microwave Sensor
Model Number: 902923 (Bentley Part No:3W7951177),
and 902924 (Bentley Part No:3W7951172)
FCC ID:LQN2923
FCC ID:LQN2924

OPEN FIELD RADIATED EMISSIONS Results (cont.)

Section 2.14 Radiated Emissions Test Setup Photographs



Figure 3: Radiated Emissions above 1 GHz (front view)



Figure 4: Radiated Emissions above 1 GHz (rear view)

PART 3 RF MEASUREMENTS

Test Specification: 47 CFR PART 15, Sub-Part C

Section 3.1 EUT Description:

Connaught Electronics, LTD products Bentley 5.8 GHz Microwave Sensor, models 902923 and 902924 or the EUTs as referred to in this report are intentional radiators. The units are similar both in design and functionality. The EUT comes with an antenna permanently attached. The EUT, was set up on a wooden table, 80cm above the ground reference plane in an anechoic chamber and or on an open field. It was powered and tested in normal mode.

Section 3.2 Test Voltage

Supply Voltage Tested: 13.5VDC

Section 3.3 Support Equipment – RF Measurements

Description	Manufacturer	Model No.	Serial No.	Calibration Due
DC Power Supply	BK Precision	1688		n/a
Digital Multimeter	Fluke	16	79510141	December 14, 2005

Section 3.4 Test Equipment – RF Measurements

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Preamplifier	Hewlett-Packard	8449B	3008A00101	N/A
Preselector	Hewlett-Packard	85685A	2620A00265	12-11-2005
Biconical Antenna	EMCO	3104	9111-4463	01-16-2006
I.p. Ant (200 -1000MHz)	EMCO	3146	2261	01-22-2006
Quasi Peak Adapter	Hewlett-Packard	85650A	2521A00737	12-11-2005
Spectrum Analyzer	Hewlett-Packard	8568B	2841A04315	12-11-2005
Spectrum Analyzer Display	Hewlett-Packard	-	-	12-11-2005
Horn. Ant (Below 18GHz)	EMCO	3115	8812-3050	01-19-2006
Horn. Ant (Below 40GHz)	HP	3116	4663	02-18-2006
Spectrum Analyzer	Hewlett-Packard	8569A	2128A00270	04-23-2006

Section 3.5 Support Equipment

Description	Manufacturer	Model No.	Serial No.	Calibration Due
DC Power Supply	BK Precision	1688		n/a
Digital Multimeter	Fluke	16	79510141	December 14, 2005

Section 3.6 General Test Procedure – RF Tests

For the spurious and harmonics measurements, below 18GHz, the 5.8 GHz Microwave Sensor (the EUT) was set up at a 3 meter distance from the receiving antenna, in a semi-anechoic chamber with the EUT running in a continuous mode. The EUT was rotated 360 degrees azimuth and the search antenna height varied 1 to 4m in order to maximize the emissions. Significant peaks from the EUT were then recorded to determine margin to the limits.

For the field strength measurements of the fundamental frequency, the EUT was setup in an anechoic chamber at a 3 meter distance from the receiving antenna. The EUT was rotated 360 degrees azimuth and the search antenna height varied 1 to 4m in order to maximize the field strength emission of the fundamental. The maximum level of the fundamental emission from the EUT was measured and recorded at optimum antenna and table orientation to determine margin to the limits.

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Product: Bentley's 5.8 GHz Microwave Sensor
Model Number: 902923 (Bentley Part No:3W7951177),
and 902924 (Bentley Part No:3W7951172)
FCC ID:LQN2923
FCC ID:LQN2924

Section 3.7 Spectrum Analyzer Configuration (during swept frequency scans)

IF Bandwidth..... 120 kHz

Measurements below 1000 MHz (unless stated otherwise)

Analyzer Mode (for Peak Measurements) Peak/Log

Resolution Bandwidth..... 100 kHz

Video Bandwidth..... 100 kHz

Analyzer Mode (for Quasi-Peak Measurements)

Quasi-Peak/Linear Resolution Bandwidth..... 1000 kHz

Video Bandwidth..... 1000 kHz

Measurements above 1000 MHz (unless stated otherwise)

Quasi-Peak Adapter Mode Disabled

Analyzer Mode (for Peak Measurements) Peak

Resolution Bandwidth..... 1000 kHz

Video Bandwidth..... 1000 kHz

Analyzer Mode (for Average Measurements) Video Filter

Resolution Bandwidth..... 1000 kHz

Video Bandwidth..... 10 Hz

Section 3.8 Data Table Legend and Field Strength Calculation

Detector mode: Peak (P) or Quasi-Peak (QP) or Average (A)

	Polarization	Antenna	Freq Range (MHz)
VB	Vertical	EMCO 3104/sn 4463 Biconical	30 – 200
HB	Horizontal	EMCO 3104/sn 4463 Biconical	30 – 200
VL	Vertical	EMCO 3146/sn. 2261 Log Periodic	200 – 1000
HL	Horizontal	EMCO 3146/sn. 2261 Log Periodic	200 – 1000
VH1	Vertical	EMCO 3115/sn. 8812-3050 Horn	Below 18000
HH1	Horizontal	EMCO 3115/sn. 8812-3050 Horn	Below 18000
VH2	Vertical	HP 3116/sn. 4663 Horn	Below 26500
HH2	Horizontal	HP 3116/sn. 4663 Horn	Below 26500
VH4	Vertical	S&D DBD-520 Horn	Below 75000
HH4	Horizontal	S&D DBD-520 Horn	Below 75000

Section 3.9 Field Strength Of Fundamental Measurement

The EUT was set up as described above. The measurement instrumentation used was an Analyzer with bandwidth parameters as stipulated in ANSI C63.4-2003.

Section 3.10 Administrative and Environmental Details – Field Strength of Fundamental Measurements

Test Site:	Semi-Anechoic Absorber Lined Shielded Room
Test Date(s):	November 14 th , 2005
Test Engineer(s):	Femi Ojo
Temperature	65.2 F
Humidity	49%

Section 3.11 Test Data – Field Strength of Fundamental)

The measurement plot below represents the maximum worst-case result from the measurement performed in accordance to the requirements of this section.

Field Strength of Fundamental Plot.

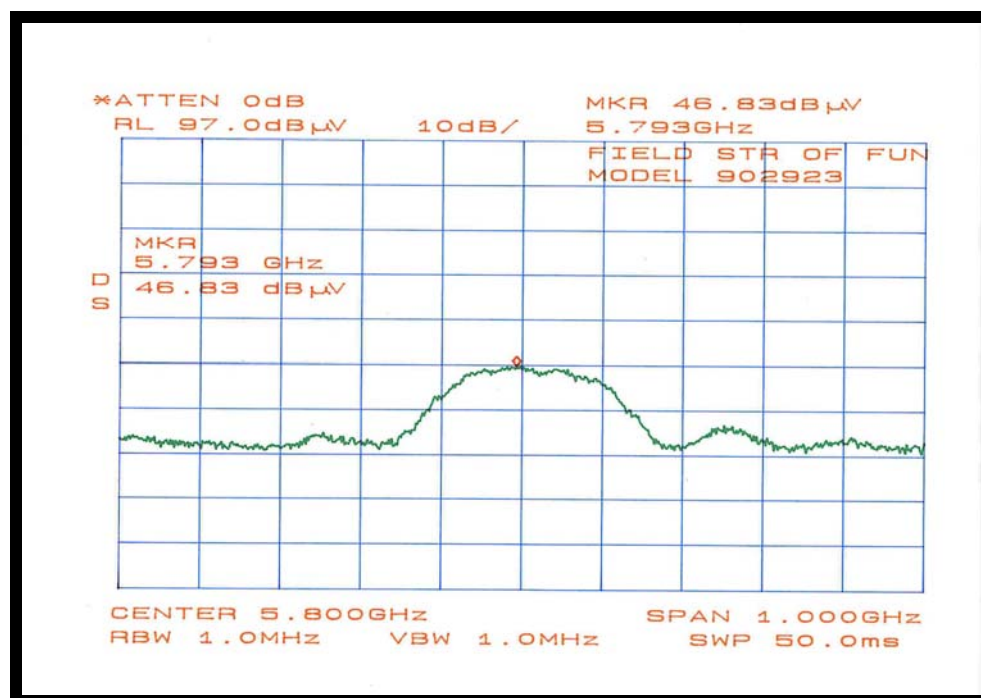


Figure 5: Plot of Field Strength of Fundamental Measurement (Horz)

FIELD STRENGTH OF FUNDAMENTAL (cont.)

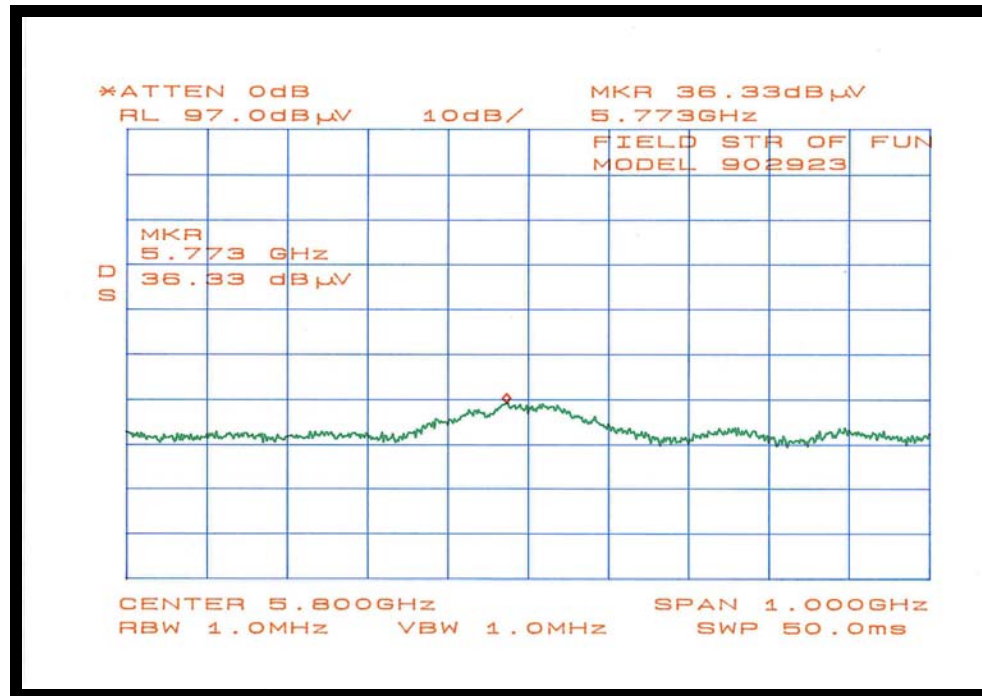


Figure 6: Plot of Field Strength of Fundamental Measurement (Vert)

INDICATED		CORRECTION		CORR	TURNTABLE ANT			CLASS A		CLASS B		
FREQ	AMPL	ANT	CAB / AMP	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	DET
GHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	dB	MODE
5.793	46.83	35.22	-29.3	52.75	90	1.0	HH	-	-	74	-21.25	p
5.773	36.33	34.59	-29.3	41.62	0	1.0	VH	-	-	74	-32.38	p

Field Strength of Fundamental Test Data – Peak Measurement

The margin in Table 12 is calculated as follows:

Margin = Corrected Amplitude – Limit, where Corrected Amplitude = Spectrum Analyzer Amplitude + Cable Loss + Antenna Factor – Pre-Amp Gain.

Test-Data Summary – Peak Measurement:

Center Frequency = 5800 MHz
Peak Level: = 52.75dBμV/m
Peak Limit (15.209) = 74.00dBμV/m (54dBμV/m + 20dB)

Average Level Calculation of Field Strength of Fundamental with Duty Cycle correction.

The duty cycle rating as provided by the manufacturer is 0.83% (or 0.0083) over a 100mSec interval = 0.0083 seconds.

dB (in μV) Duty Cycle Correction	= 0.0083 secs	= 20log(0.0083)	= -41.62dBμV
Pulse Desensitization Factor (PDF)	= -40dB		
Peak Level with PDF	= 52.75 dBμV/m	+ 40dB	= 92.75dBμV/m
Peak Level with Duty Cycle Correction	= 92.75dBμV/m	- 41.62dB	= 51.13dBμV/m

Applicant: Connaught Electronics, LTD

Report No.: 20051114-04-Fc15

Test-Data Summary – Average Measurement:

Center Frequency = 5800 MHz
Average Level: = 51.13dB μ V/m (Calculated).
Average Limit (15.209) = 54.00dB μ V/m

Section 3.12 Conclusion

Bentley's 5.8 GHz Microwave Sensors, 902923 and 902924 meets the requirements of the test reference for Fundamental Frequency Field Strength.

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Product: Bentley's 5.8 GHz Microwave Sensor
 Model Number: 902923 (Bentley Part No:3W7951177),
 and 902924 (Bentley Part No:3W7951172)
 FCC ID:LQN2923
 FCC ID:LQN2924

FIELD STRENGTH OF FUNDAMENTAL (cont.)

Section 3.13 Occupied Bandwidth Measurement

For the measurements, a spectrum analyzer was used. The EUT was measured according to the method specified in ANSI C63.4-2003.

Section 3.14 Administrative Details – Occupied Bandwidth Measurements

Test Site:	Test Site 1 - 3m Open Field Radiated Site
Test Site:	Semi-Anechoic Absorber Lined Shielded Room
Test Date(s):	November 14 th , 2005
Test Engineer(s):	Femi Ojo
Temperature	65.2°F
Humidity	49%

Section 3.15 Test Measurement: Occupied Bandwidth Measurements

The EUT was set up on a wooden non-conductive tabletop, 80 cm above the ground plane of the test location. The EUT running in continuous mode and was rotated 360 degrees azimuth in its x-y-z axis positions. It was also measured in the horizontal polarity. The analyzer was then placed in 'max-hold' mode to record signal level.

Spectrum Analyzer Configuration (during swept frequency scans) – Occupied Bandwidth

Center Frequency 5.800 GHz
Sweep Speed 50 mSecs
RES Bandwidth..... 1000 kHz
Video Bandwidth..... 1000 kHz
Quasi Peak Adapter Mode Bypass
Quasi peak Adapter Bandwidth Disabled

FIELD STRENGTH OF FUNDAMENTAL (cont.)

Section 3.16 Occupied Bandwidth Measurement Plot

The plot and test data below represents the maximum worst-case results from the measurements performed in accordance to the requirements of the standard and extreme test conditions specified at the beginning of this Part.

Spectrum Mask Measurement

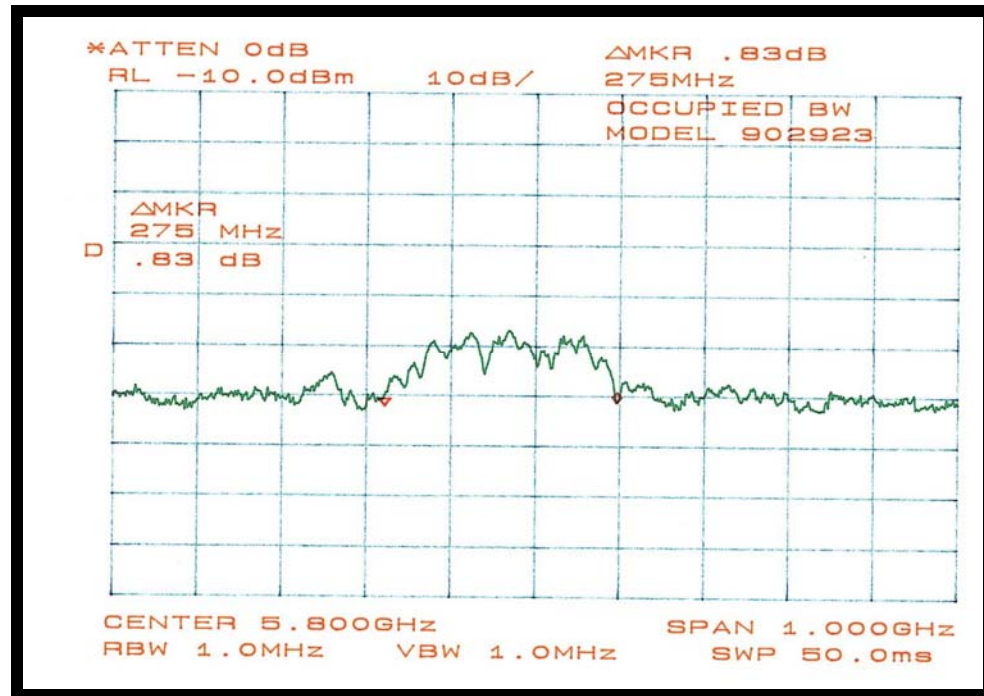


Figure 7: Occupied Bandwidth Plot

Test-Data Summary – Occupied Bandwidth:

Center frequency: 5800 MHz
 Mask Bandwidth: 275 MHz

Occupied Bandwidth Data:

Upper Frequency (F_u)	$=f_0 + 275/2$	$=5800 \text{ MHz} + 137.5$	$=5937.5 \text{ MHz}$
Lower Frequency (f_L)	$=f_0 - 275/2$	$=5800 \text{ MHz} - 137.5$	$=5662.5 \text{ MHz}$

Section 3.17 Measurement Photographs for Field Strength of Fundamental and Occupied Bandwidth



Figure 8 Test Set Up Photos – Field Strength of Fundamental Measurement (Front)



Figure 9 Test Set Up Photos – Field Strength of Fundamental Measurement (Rear)

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Product: Bentley's 5.8 GHz Microwave Sensor
 Model Number: 902923 (Bentley Part No:3W7951177),
 and 902924 (Bentley Part No:3W7951172)
 FCC ID:LQN2923
 FCC ID:LQN2924

Section 3.18 Spurious Emissions, Harmonics, and Emissions in the Restricted Bands.

Test Specification: **FCC PART 15, SECTION 47 CFR 15.205**
FCC PART 15, SECTION 47 CFR 15.209

Test Procedure – Spurious Emissions:

The measurement range investigated was from 30 MHz to 18 GHz due to lack of emissions activity above 5.8GHz. The measurement instrumentation used was an Analyzer with bandwidth parameters as stipulated in ANSI C63.4-2003

Section 3.19 Administrative and Environmental Details– Spurious and Restricted Bands Emissions

Test Site:	Test Site 1 - 10m Open Field Radiated Site
Test Site:	Semi-Anechoic Absorber Lined Shielded Room
Test Date:	November 13 th , 2005
Test Engineer:	Femi Ojo
Temperature	72°F & 69.5 F
Humidity	39% & 35%

Section 3.20 Spectrum Analyzer Configuration (during swept frequency scans) – Spurious and Restricted Emissions

IF Bandwidth.....120 kHz
Measurements below 1000 MHz (unless stated otherwise)
 Analyzer Mode (for Peak Measurements) Peak/Log
 Resolution Bandwidth 100 kHz
 Video Bandwidth..... 100 kHz
 Analyzer Mode (for Quasi-Peak Measurements)
 Ouasi-Peak/Linear Resolution Bandwidth..... 1000 kHz
 Video Bandwidth..... 1000 kHz
Measurements above 1000 MHz (unless stated otherwise)
 Quasi-Peak Adapter Mode Disabled (if available)
 Analyzer Mode (for Peak Measurements) Peak
 Resolution Bandwidth 1000 kHz
 Video Bandwidth..... 1000 kHz
 Analyzer Mode (for Average Measurements) Video Filter
 Resolution Bandwidth 1000 kHz
 Video Bandwidth..... 10 Hz

Section 3.21 Test Details – Spurious and Restricted Bands Emissions

Transmitter	Operating Mode
Limit	47CFR 15.209 (a)

The tables below shows the summary of the highest amplitudes of the spurious RF radiated emissions from the equipment under test.

Section 3.22 Test Data – Spurious and Restricted Bands Emissions below 1GHz

INDICATED		CORRECTION		CORR	TURNTABLE ANT			CLASS A		CLASS B			
FREQ	AMPL	ANT	CAB	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	FILTER	
MHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	db	MODE	NOTES
32.94	5.9	11.1	1.9	18.9	90	2.5	HB	-	-	30.0	-11.1	P	
40.04	6.1	11.3	2.2	19.6	0	1.0	VB	-	-	30.0	-10.4	P	
50.13	8.8	11.7	2.2	22.7	180	2.0	HB	-	-	30.0	-7.3	P	
65.84	5.8	7.9	2.6	16.3	90	1.0	VB	-	-	30.0	-13.7	P	
110.57	5.6	12.0	3.2	20.9	90	1.0	VB	-	-	33.0	-12.1	P	
117.49	5.2	12.9	3.2	21.4	120	1.0	VB	-	-	33.0	-11.6	P	
132.77	5.6	12.5	3.4	21.5	90	1.0	VB	-	-	33.0	-11.5	P	
149.38	5.8	12.2	3.8	21.8	0	2.0	HB	-	-	33.0	-11.2	P	
203.86	8.9	11.8	3.9	24.5	90	1.0	VL	-	-	33.0	-8.5	P	
204.68	2.5	11.4	3.9	17.8	0	2.0	HL	-	-	33.0	-15.2	P	
220.57	7.9	11.1	3.8	22.8	0	1.0	VL	-	-	36.0	-13.2	P	
408.60	4.0	15.7	6.2	25.9	90	1.0	VL	-	-	36.0	-10.1	P	
440.81	3.6	15.9	6.6	26.1	90	2.0	HL	-	-	36.0	-9.9	P	
444.86	4.3	16.2	6.8	27.3	90	1.0	VL	-	-	36.0	-8.7	P	
558.44	1.5	18.0	8.1	27.6	90	1.0	VL	-	-	36.0	-8.4	P	
573.30	3.1	17.5	8.5	29.1	0	1.0	VL	-	-	36.0	-6.9	P	

No emission of significant level was observed above 573.30MHz thru 1GHz

Section 3.23 Test Data for Radiated Emissions Measurement above 1 GHz @ 3 meters

INDICATED		CORRECTION		CORR	TURNTABLE ANT			CLASS A		CLASS B		FILTER	
FREQ	AMPL	ANT	CAB	AMPL	ANG	HT	POL	AMPL	MARG	AMPL	MARG	MODE	NOTES
MHz	dBuV/m	dB	dB	dBuV/m	DEG	m	-	dBuV/m	dB	dBuV/m	db		
1038.0	46.8	24.3	-34.6	36.5	0	1.0	VH	-	-	54.0	-17.5	P	
1040.0	45.6	24.3	-34.6	35.3	90	1.2	HH	-	-	54.0	-18.7	P	
1138.0	49.2	24.4	-34.5	39.1	0	1.0	VH	-	-	54.0	-14.9	P	
1173.0	49.7	24.5	-34.4	39.7	0	1.0	VH	-	-	54.0	-14.3	P	
1184.0	48.7	24.5	-34.4	38.8	90	1.2	HH	-	-	54.0	-15.2	P	
1215.0	46.2	24.6	-34.4	36.4	0	1.0	HH	-	-	54.0	-17.6	P	
1243.0	51.5	24.6	-34.3	41.8	0	1.0	VH	-	-	54.0	-12.2	P	
1244.0	45.5	24.6	-34.3	35.8	90	1.2	HH	-	-	54.0	-18.2	P	
2181.0	44.7	28.0	-32.8	39.9	0	1.0	VH	-	-	54.0	-14.1	P	
2215.0	43.3	28.2	-32.7	38.7	90	1.2	HH	-	-	54.0	-15.3	P	
3642.0	44.2	31.6	-31.2	44.6	0	1.0	VH	-	-	54.0	-9.4	P	
4750.0	45.3	32.8	-29.8	48.3	0	1.0	VH	-	-	54.0	-5.7	P	
5371.0	45.8	34.0	-29.5	50.3	0	1.0	VH	-	-	54.0	-3.7	P	
5765.0	36.3	34.4	-29.2	41.4	0	1.0	VH	-	-	54.0	-12.6	P	1
5799.0	36.2	34.4	-29.2	41.3	90	1.2	HH	-	-	54.0	-12.7	P	2
6857.0	44.0	35.0	-29.1	50.0	90	1.2	HH	-	-	54.0	-4.0	P	
11531.	37.7	39.1	-27.4	49.4	0	1.0	VH	-	-	54.0	-4.6	P	
11531.	36.0	39.2	-27.4	47.8	90	1.2	HH	-	-	54.0	-6.2	P	
17296.	30.5	42.9	-23.9	49.6	0	1.0	VH	-	-	54.0	-4.4	P	

There were no significant emissions above 17.30GHz thru 40GHz.

Section 3.24 Test-Data Summary – Spurious, Harmonics, and Restricted Bands

The margin in Section 3.22 and Section 3.23 is calculated as follows:

Margin = Corrected Amplitude – Limit, where Corrected Amplitude = Spectrum Analyzer Amplitude + Cable Loss + Antenna Factor – Pre-Amp Gain.

Section 3.25 Conclusion

Connaught Electronics, LTD, Bentley's 5.8 GHz Microwave Sensors, models 902923 and 902924 meet the requirements of the test reference for Spurious and Restricted Bands emissions levels specified in the 47CFR15.209

Section 3.26 Test Photographs



Figure 10: Spurious emissions below 1 GHz (front view)



Figure 11: Spurious emissions below 1GHz (rear view)

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 and 902924 (Bentley Part No: 3W7951172)
 FCC ID: LQN2923
 FCC ID: LQN2924



Figure 12: Spurious emission above 1 GHz (front view)



Figure 13: Spurious emission above 1 GHz (rear view)

PART 4 APPENDICES

Section A. EUT Technical Specification

Applicant	Connaught Electronics, Ltd.		
Product Specifications			
Description	5.8GHz Microwave Sensor		
	Frequency Range	5662.5 MHz to 5937.5 MHz	
	Part Number(s)	CEL	902923 902924
	Serial Number(s)	1000000000057268 1000000000054953	
	Central Processor	16LF876A – 1/SO	
	Cable(s)	n/a	
	Peak Output Power	-37.33dBm	
	Mainboard	Manufacturer	CEL
		Model	
		Part Number	152154 Rev 2.0
		Dimension	Approx. 65mm x 59mm
		Connector(s)	One (1) 4-pin, p/n. 4-1393472-9
	Antenna Board	Manufacturer	CEL
		Model	CTX/R 0526
		Part Number	521080
		Dimension	Approx. 23mm x 10mm
		Layers	2-sided
		Antenna	Two (2) 10mm Dual loop, 1mm traces
	Ports	One (1) 4-pin	
	Power Supply(s)	DC Cell	
		Input	13.5Vdc/50mA
		Output	n/a

Section B. EUT Photographs



Figure 14: EUT Top View [Front (902923) sensor and Rear (902924) sensor]



Figure 15: EUT Front View [Front (902923) sensor and Rear (902924) sensor]



Figure 16: EUT Board Mount View

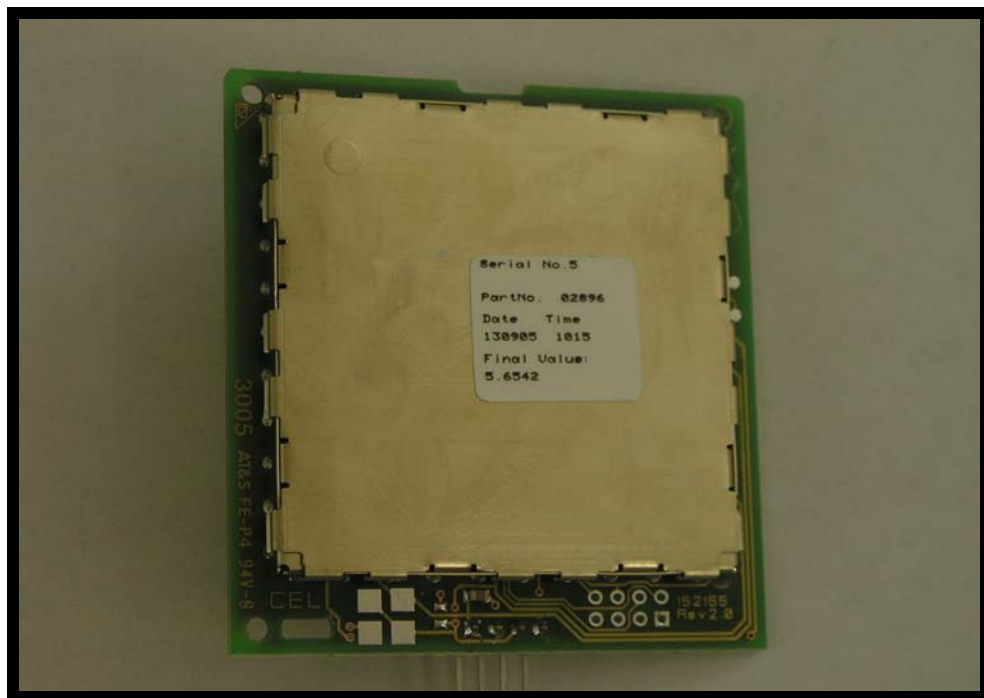


Figure 17: EUT Internal Component View

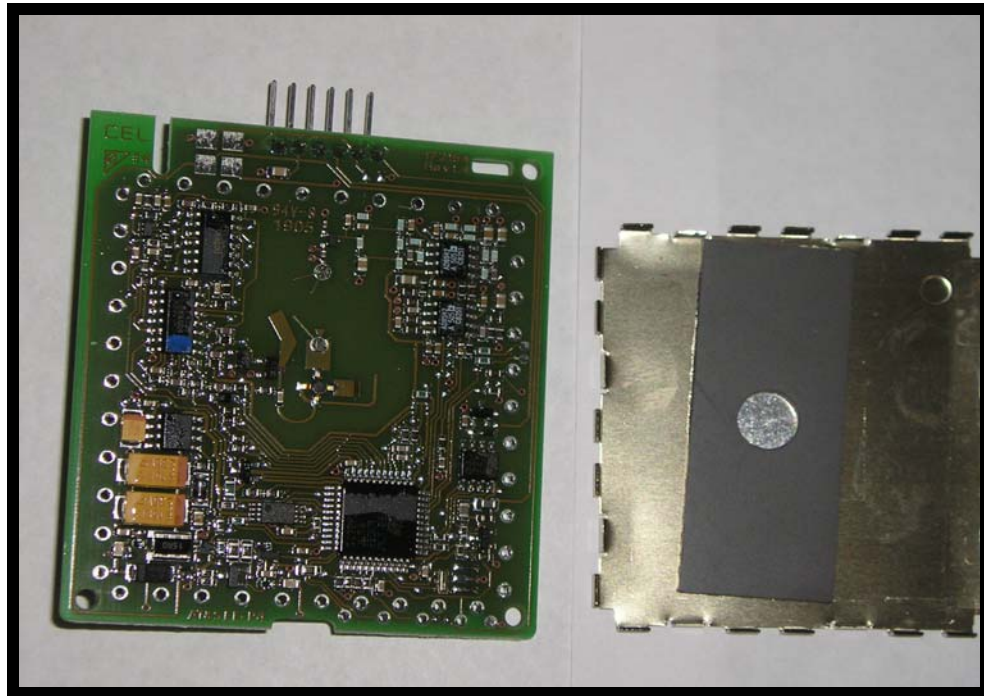


Figure 18: EUT Component Internal View With Shield Off

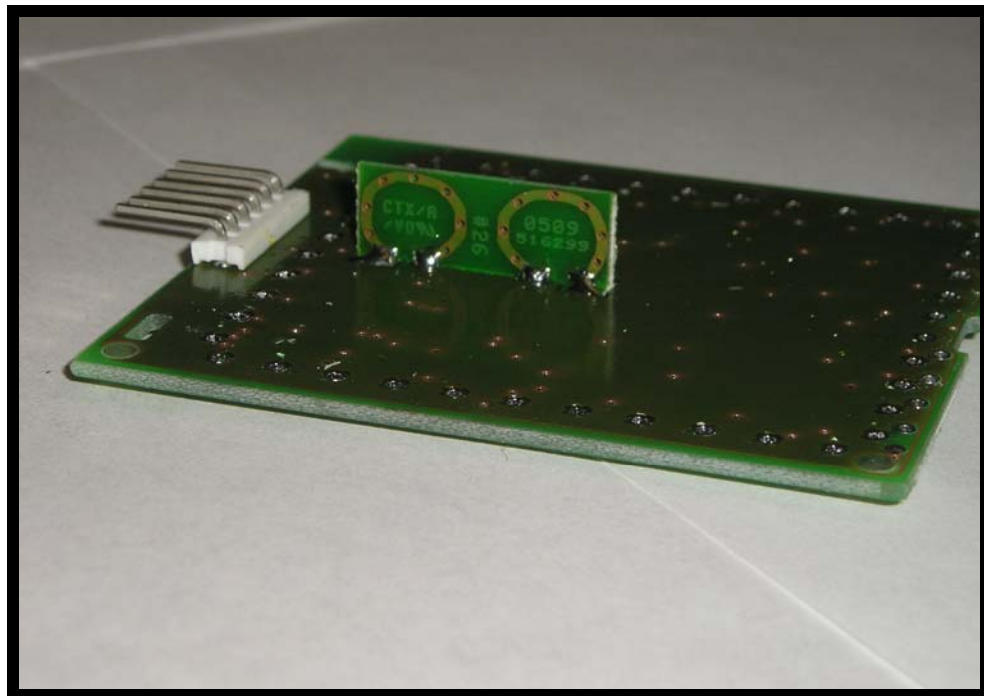


Figure 19: EUT Solder View

Section C. Modification Letter

To Whom It May Concern:

This is to certify that no modifications were necessary for Connaught Electronics, LTD products, Bentley' 5.8 GHz Microwave Sensor, models 902923 and 902924 in order to comply with the requirements of:

FCC Rules and Regulations 47 CFR 15.209

It is the manufacturer's responsibility to ensure that additional production units of the Bentley's 5.8 GHz Microwave Sensor, models, 902923 and 902924 are manufactured with identical electrical and mechanical characteristics. For further information, please contact the manufacturer at:

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