INTERNATIONAL APPROVALS LABORATORIES

EMC EMISSIONS - TEST REPORT (Full)

Test Report No.	**BC400275-1b**	Issue Date:	**October 30, 2004**
Model / Serial No.	**MN:DC RF Smoke Module / SN: 108**		
Product Type	**DC RF smoke detector**		
Client	**Kidde Safety**		
Manufacturer	**Kidde Safety**		
License holder	**Kidde Safety**		
Address	**4980 Centennial Blvd**		
	Colorado Springs, CO 80919		
Test Criteria Applied	**FCC CFR47 Part 15.231**		
Test Result	**PASS**		Title 47 CFR 15.231: RADIO FREQUENCY DEVICES operating in the frequency range of 40.66-40.70MHz and above 70MHz (including 15.205, 15.207, 15.209 where applicable)
Test Project Number	**BC400275-1**		
References			
Total Pages Including Appendices:	35		

Reviewed By : Todd Seeley

Approved By : Bob Cresswell

International Approval Laboratories and its professional staff hold government and professional organization certifications and are members of IEEE, NVLAP, and VCCI.

NVLAP Lab Code: 200624-0

Accredited

DIRECTORY

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The measurement uncertainty for Conducted Emissions in the frequency range of 150kHz – 30MHz is calculated to be ±2.30dB and for Radiated Emissions is calculated to be ±3.60dB in the frequency range of 30MHz – 200MHz and ±3.38dB in the frequency range of 200MHz – 1000MHz.

EUT Received Date: 6-June-2004

Testing Start Date: 6-June-2004

Testing End Date: 29-October-2004

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The tests were performed according to following regulations:

1. FCC CFR47 Part 15.205
2. FCC CFR47 Part 15.207
3. FCC CFR47 Part 15.209
4. FCC CFR47 Part 15.231
5. ICES-003

Emission Test Results:

Conducted Emissions, Powerline (15.207) - Not Applicable

Test Result

Minimum limit margin N/A dB at N/A MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: EUT is battery operated.

Radiated Emissions (15.209) / 15.231(b)(3) - PASS

Test Result

Minimum limit margin -5.3 dB at 423.69 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks:

Radiated Emissions (15.205) / 15.231(b)(2) - PASS

Test Result

Minimum limit margin -17.80 dB at 1303.17 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks:

Radiated Emissions 15.231(a)(1)&(2) - PASS

Test Result

Remarks: Required measurement for manually and automatic operated transmitter equipment. <5 Sec. after activation, See General Remarks.

Radiated Emissions 15.231(b)(1) - PASS

Test Result

Minimum limit margin -1.14 dB at 434.36 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: Measurements were taken utilizing the methods dictated by Part 15.35 for averaging pulsed emissions and for limiting peak emissions

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Radiated Emissions 15.231(c) - Pass

Test Result

Remarks: Devices operated within the frequency band of 70 – 900MHz: **-20dBc Bandwidth** maximum of 0.25% of the center frequency

Devices operated within the frequency band of >900MHz: **-20dBc Bandwidth** maximum of 0.50% of the center frequency

Radiated Emissions 15.231(d) - Not Applicable

Test Result

Remarks: Devices operated within the frequency band of 40.66 – 40.70MHz: **-20dBc Bandwidth** maximum of 0.01% of the center frequency as measured through the temp range of -20 to +50 deg. C, and at 85 - 115% of the nominal supply voltage at 20 deg. C "a new battery would be used in cases where the device is powered from a battery"

Radiated Emissions 15.231(e) - Not Applicable

Test Result

Minimum limit margin	00.00 dB	at	0000.00 MHz
Maximum limit exceeding	_____ dB	at	_____ MHz

Remarks: Measurements were taken utilizing the methods dictated by Part 15.35 for averaging pulsed emissions and for limiting peak emissions

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GENERAL REMARKS:

The following remarks are to be considered as "where applicable" and are taken into account while completing any FCC/IC/ETSI radio tests at International Approvals Laboratories, LLC.

Testing was performed in 3 different orthogonal axis to determine the worst case emissions from the device. The worst case emissions measurements are shown in this report.

FCC CFR47 Part 15.31: Measurement Standards: In any case where the device is powered off a battery, a fresh battery was used during test. In cases where the device is powered off an AC supply, voltage was varied per Part 15.31 to find worst case emissions.

FCC CFR47 Part 15.35: Measurement Detector Functions and Bandwidths: FCC Part 15.35 was utilized when performing the measurements within this report.

In any case where the device is powered off a battery, a fresh battery was used durring test. In cases where the device is powered off an AC supply, voltage was veried per Part 15.31 to find worst case emissions.

The actual test distance for the FCC Part 15.209 testing was conducted at 10m for the fact that the device was being tested to EN55022 Class B from 30 MHz to 1000 MHz (meets/exceeds the FCC Part 15.209 & 109B limits) The data is automatically extrapolated back to the FCC 3m limits and measurements are corrected to better show the compliance to FCC requirements and reduce confusion. A correction factor of 10.54dB is used in cases of 30MHz and up for a difference between 10m and 3m measurement distances. All measurements that are lesser than 30MHz where applicable are accompanied with the fall of measurements and calculations to support the interpolation.

The EUT requires a minimum of 10 seconds when manually activated to communicate with its host. In CFR47 part 15.231 (a), the EUT must stop transmitting within 5 seconds of manual or automatic activation. To meet both the requirements in 15.231 and the minimum time required for the EUT to communicate with its host, the manufacture has received approval from the FCC to start transmitting when manually activated, shut off within the required 5 seconds and then start again automatically for another period of less than 5 seconds. See plot on page 24.

The photos in the report show a June testing date. However, the actual final testing was completed in October, 2004 (setup remained the same).

Modifications required to pass:

The value of the power set resistors; R2 was changed from 26.7k to 47.5k to maximize output power.

Test Specification Deviations: **NONE**

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Required Information In Accordance to FCC CFR 47 Part 2.1033:

Rule Part 11, 15 & 18 Devices	*Other Rule Part Devices*	*Description*	*Comments*
2.1033(b)(1)	**2.1033(c)(1)**	*Manu. Contact*	See Page 1 of this report
2.1033(b)(2)	**2.1033(c)(2)**	*FCC Identifier*	
2.1033(b)(3)	**2.1033(c)(3)**	*Users Manual to include Operating, installation*	Attached as Exhibit
	2.1033(c)(4)	*Emissions Designator per 2.*	
	2.1033(c)(5)	*Frequency Range*	Not Applicable to Part 15 Devcies
	2.1033(c)(6)	*Power range and controls*	Not Applicable to Part 15 Devcies
	2.1033(c)(7)	*Maximum power ouput rating*	Not Applicable to Part 15 Devcies
	2.1033(c)(8)	*DC Voltage and Current suplying final RF stages*	Not Applicable to Part 15 Devcies
2.1033(b)(3)	**2.1033(c)(9)**	*Tune –up procedure*	Please refer to the users manual for applicability
2.1033(b)(4&5)	**2.1033(c)(10)**	*Complete Circuit Diagrams and circuit operation description*	Attached as Exhibit
2.1033(b)(7)	**2.1033(c)(11)**	*Photographs/drawings of the identification label & its location on the device*	Attached as Exhibit
2.1033(b)(7)	**2.1033(c)(12)**	*Photographs of the external and internal surfaces, and construction*	Attached as Exhibit
	2.1033(c)(13)	*Digital Modulation*	Not Applicable
2.1033(b)(6)	**2.1033(c)(14)**	*Report of Measurement Data Required by 2.1046 – 2.1057*	See Data Below (This report consists of the testing required under Part 15.231)
2.1033(b)(8)		*Description of publicly available support equipment used during test*	Refer to Exhibit B of this report (Client Test Plan)
2.1033(b)(9)		*Statement of Autorization to Part 15.37 of CFR47*	The equipment herein is being authorized in accordance to 15.37 of the CFR47 Rules.
2.1033(b)(10)		*Direct Sequence Spread Spectrum Devices (DSSS)*	Exhibit of compliance to 15.247(e)
2.1033(b)(10)		*Frequency Hopping Devices*	Exhibit of compliance to 15.247(a)(1)
2.1033(b)(11)		*Scanning receiver construction*	Exhibit stating compliance to construction in accordance to 15.121.
15.31	**15.31**	*Trans mitter Supply Voltage*	Testing herein was completed in accordance to FCC CFR47 Part 15.31

Exhibits Including (where applicable):

1. Users Manual
2. Operation Description
3. Block Diagram
4. Report of Measurement
5. External & Internal Photographs
6. Schematic
7. Parts List
8. Tuning Procedure (if applicable)
9. Test Setup Photograph
10. Label Drawings and or Photograpghs
11. Description of Support Equipment (where Applicable)

Required Information in Accordance to Industry Canada Regulations (In addition to the above):

Information Required	*Description*	*Comments*
Modulation Type	(i.e. ASK, NON, FSK, DSSS, FHSS, etc.)	
Emissions Designator	Per TRC-49	
In Country Representative	Contact Information	
99% Bandwidth Measurement	Per RSS-210	

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Test-setup photo(s):
Conducted Emissions

Not Applicable
Battery Powered

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Test-setup photo(s):
Radiated Intentional Emissions

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Test-setup photo(s):
Radiated Intentional Emissions

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Test-setup photo(s):
Radiated Unintentional Emissions

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Test-setup photo(s):
Radiated Unintentional Emissions

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Appendix A

Test Data Sheets

and

Test Equipment Used

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Part 15.231 (b)(1) or (e)

Field Strength Emissions from Intentional Radiators

&

Part 15.231 (b)(2) / 15.205

Restricted Bands of Operation

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Field Strength Measurements
Fundamental and Spurious of the Transmitter

Test Report #:	**BC400275**	Test Area:	Pinewood Site 1 (3m)	Temperature:	20.6 °C
Test Method:	FCC CFR47 Part 15.231/205	Test Date:	10-Oct-2004	Relative Humidity:	35 %
EUT Model #:	DC RF Smoke Module	EUT Power:	4.5 VDC Battery	Air Pressure:	80 kPa
EUT Serial #:	108			Page:	
Manufacturer:	Kidde Safety				
EUT Description:	DC RF smoke detector				
Notes:					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit	DELTA
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m) 15.231(b)-15.205	(dB)
The following duty cycle was declared by the manufacturer.								
Duty Cycle = active / 100ms. = 25%								
Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions.								
The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.231 emissions and delta limits were calculated as follows:								
Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission								
The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.205 and 15.231 and the emission/limit delta was calculated.								
the DTCF is calculated as follows $20*\log_{10}$(duty cycle in 100mS) "not to exceed 20dB"								
Part 15.231 (b) and 15.205 Respectively								
EUT was measured in 3 orthogonal axis and placed in the worst cast axis for the following measurements.								
434.36	73.5 Pk	2.2 / 16.0 / 0.0	91.7	V / 1.2 / 169.0	-12	79.7	80.84	-1.14
434.37	65.8 Pk	2.2 / 16.0 / 0.0	84.1	H / 2.0 / 167.0	-12	72.1	80.84	-8.74
2nd - 10th Harmonics								
868.77	60.2 Pk	2.2 / 21.7 / 28.2	55.9	V / 1.2 / 357.0	-12	43.9	60.84	-16.94
868.77	57.1 Pk	2.2 / 21.7 / 28.2	52.9	H / 1.1 / 357.0	-12	40.9	60.84	-19.94
1303.17	56.8 Pk	2.6 / 26.2 / 37.4	48.2	H / 2.0 / 0.0	-12	36.2	54	-17.80
1303.15	56.2 Pk	2.6 / 26.2 / 37.4	47.6	V / 1.1 / 91.9	-12	35.6	54	-18.40
1737.52	52.7 Pk	3.0 / 27.9 / 37.2	46.5	V / 1.0 / 312.0	-12	34.5	60.84	-26.34
1737.55	55.9 Pk	3.0 / 27.9 / 37.2	49.7	H / 1.8 / 0.0	-12	37.7	60.84	-23.14
2171.92	49.0 Pk	3.5 / 29.6 / 37.8	44.3	H / 1.4 / 10.0	-12	32.3	60.84	-28.54
2171.94	46.5 Pk	3.5 / 29.6 / 37.8	41.9	V / 1.2 / 10.0	-12	29.9	60.84	-30.94
2606.34	35.4 Pk	4.1 / 30.8 / 37.7	32.6	V / 1.0 / 0.0	-12	20.6	60.84	-40.24
2606.34	30.9 Pk	4.1 / 30.8 / 37.7	28.2	H / 1.0 / 0.0	-12	16.2	60.84	-44.64
3040.75	30.5 Pk	4.6 / 31.8 / 37.5	29.4	H / 1.0 / 0.0	-12	17.4	60.84	-43.44
3040.74	44.8 Pk	4.6 / 31.8 / 37.5	43.6	V / 1.0 / 206.0	-12	31.6	60.84	-29.24
3475.14	46.2 Pk	4.8 / 32.7 / 37.8	45.9	V / 1.2 / 310.0	-12	33.9	60.84	-26.94
3475.14	29.7 Pk	4.8 / 32.7 / 37.8	29.4	H / 1.0 / 0.0	-12	17.4	60.84	-43.44
3909.56	35.2 Pk	5.5 / 34.1 / 37.7	37.1	H / 1.0 / 0.0	-12	25.1	54	-28.90
3909.55	30.6 Pk	5.5 / 34.1 / 37.7	32.5	V / 1.0 / 0.0	-12	20.5	54	-33.50
4344.02	31.5 Pk	6.3 / 33.8 / 38.6	33	V / 1.0 / 0.0	-12	21	54	-33.00
4344.01	33.6 Qp	6.3 / 33.8 / 38.6	35.1	H / 1.0 / 0.0	-12	23.1	54	-30.90

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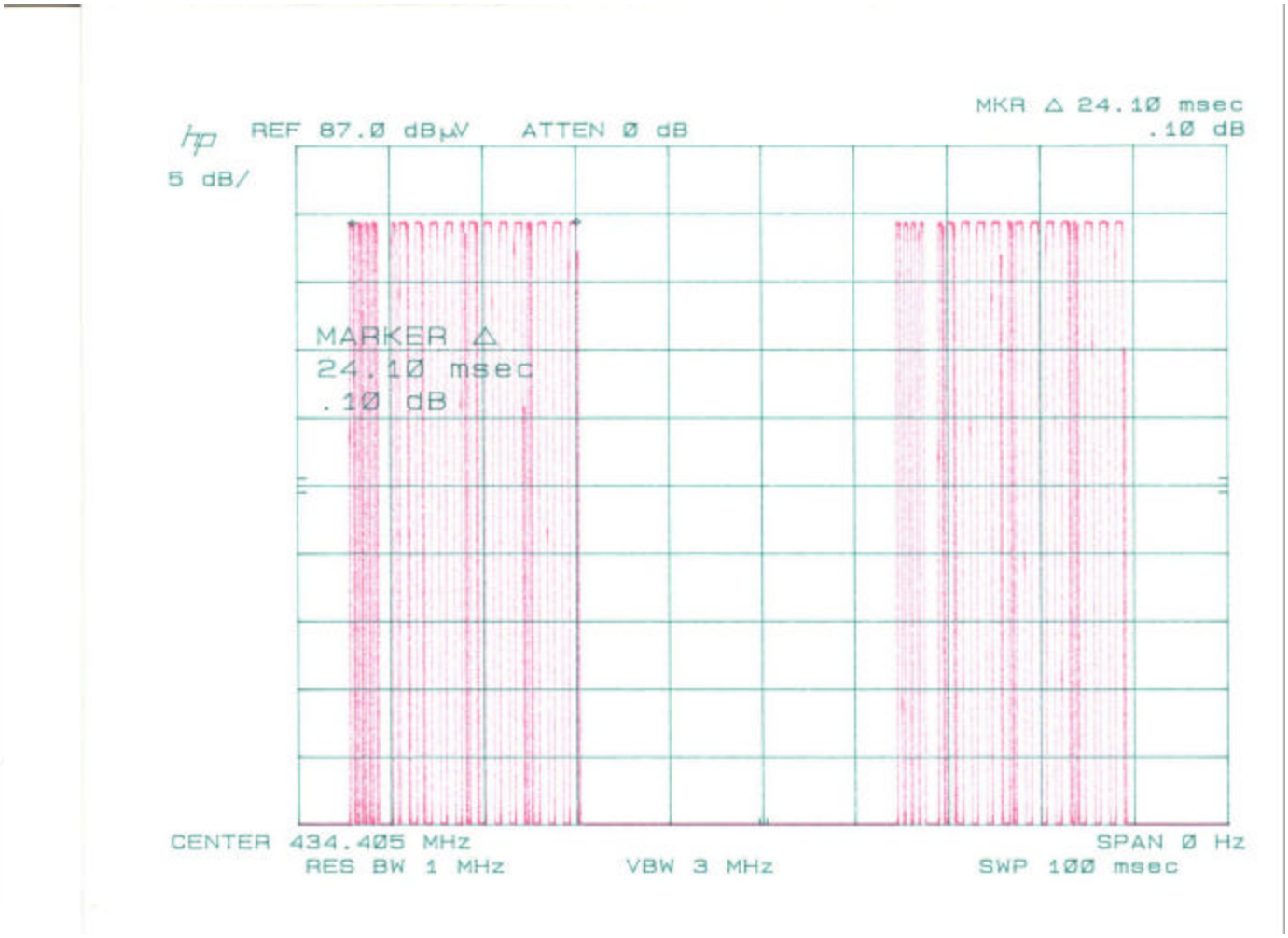
Duty Cycle Correction Factor Justification

The following plot was taken to verify the actual Duty Cycle as specified in the FCC CFR47 Rules and was utilized to perform the DCCF adjustment for averaging emissions allowed in FCC CFR47 Part 15.35.



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Part 15.231 (b)(3) / 15.209

Spurious and Unintentional Emissions

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Radiated Electromagnetic Unintentional Emissions

Test Report #:	**BC400275 Run 04**	Test Area:	Pinewood Site 1 (3m)	Temperature:	20.6	°C
Test Method:	FCC pt. 15.209	Test Date:	10-Oct-2004	Relative Humidity:	30	%
EUT Model #:	See Notes	EUT Power:	See Notes	Air Pressure:	80	kPa
EUT Serial #:	See Notes					
Manufacturer:	Kidde					
EUT Description:	See Notes					

Notes: AC/DC RF sound module 120 VAC / 60 Hz
DC RF smoke module 4.5 VDC battery
AC/DC RF smoke module 120 VAC / 60 Hz

Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
No emissions found: 4 to 4.4 GHz Horizontal.						
Noise floor.						
4400.00	32.4 Av	6.4 / 33.7 / 39.0	33.5	H / 1.0 / 0.0	N/A	-20.5
No emissions found: 4 to 4.4 GHz Vertical.						
Noise floor.						
4000.00	31.0 Av	5.7 / 34.4 / 38.7	32.4	V / 1.0 / 0.0	N/A	-21.6
1271.04	41.5 Av	2.6 / 26.0 / 37.4	32.7	V / 1.0 / 0.0	N/A	-21.3
1271.04	41.2 Av	2.6 / 26.0 / 37.4	32.4	V / 1.0 / 90.0	N/A	-21.6
1271.04	48.8 Av	2.6 / 26.0 / 37.4	40.0	V / 1.0 / 180.0	N/A	-14.0
No higher emissions found: 1 to 4 GHz Vertical.						
Noise floor.						
4000.00	32.1 Av	5.7 / 34.4 / 37.6	34.6	V / 1.0 / 270.0	N/A	-19.4
The following was maximized between 1 and 4 GHz.						
1271.04	50.0 Av	2.6 / 26.0 / 37.4	41.2	V / 1.0 / 280.0	N/A	-12.8
Switched to Horizontal.						
1271.04	41.5 Av	2.6 / 26.0 / 37.4	32.7	H / 1.0 / 0.0	N/A	-21.3
1271.04	44.4 Av	2.6 / 26.0 / 37.4	35.5	H / 1.0 / 90.0	N/A	-18.5
1271.04	44.2 Av	2.6 / 26.0 / 37.4	35.4	H / 1.0 / 180.0	N/A	-18.6
1271.04	42.6 Av	2.6 / 26.0 / 37.4	33.8	H / 1.0 / 270.0	N/A	-20.2

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Radiated Electromagnetic Unintentional Emissions

Test Report #:	**BC400275 Run 04**	Test Area:	Pinewood Site 1 (3m)	Temperature:	20.6	°C
Test Method:	FCC pt. 15.209	Test Date:	10-Oct-2004	Relative Humidity:	30	%
EUT Model #:	See Notes	EUT Power:	See Notes	Air Pressure:	80	kPa
EUT Serial #:	See Notes					
Manufacturer:	Kidde					
EUT Description:	See Notes					

Notes: AC/DC RF sound module 120 VAC / 60 Hz
DC RF smoke module 4.5 VDC battery
AC/DC RF smoke module 120 VAC / 60 Hz

Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dbuV)	(m) (DEG)	15.209 <30MHz	15.209 >30MHz
No other emissions found: 1 to 4 GHz Horizontal.						
Noise floor.						
3500.00	32.5 Av	4.8 / 32.8 / 37.8	32.3	H / 1.0 / 270.0	N/A	-21.7
The following was maixmized between 1 and 4 GHz.						
1271.04	50.6 Av	2.6 / 26.0 / 37.4	41.8	H / 1.0 / 282.0	N/A	-12.2
36.92	39.2 Qp	0.7 / 12.3 / 28.3	23.9	V / 1.0 / 0.0	N/A	-16.1
39.50	39.2 Qp	0.7 / 12.1 / 28.3	23.7	V / 1.0 / 0.0	N/A	-16.3
41.02	42.5 Qp	0.7 / 12.0 / 28.3	27.0	V / 1.0 / 0.0	N/A	-13.0
44.10	42.7 Qp	0.7 / 11.5 / 28.3	26.7	V / 1.0 / 0.0	N/A	-13.3
45.12	45.2 Qp	0.8 / 11.4 / 28.3	29.1	V / 1.0 / 0.0	N/A	-10.9
46.63	46.2 Qp	0.8 / 11.0 / 28.3	29.7	V / 1.0 / 0.0	N/A	-10.3
49.84	46.5 Qp	0.8 / 10.6 / 28.3	29.7	V / 1.0 / 0.0	N/A	-10.3
53.29	40.0 Qp	0.8 / 10.0 / 28.3	22.5	V / 1.0 / 0.0	N/A	-17.5
80.79	35.4 Qp	0.9 / 7.5 / 28.2	15.6	V / 1.0 / 0.0	N/A	-24.4
147.38	33.9 Qp	1.2 / 12.8 / 27.8	20.1	V / 1.0 / 0.0	N/A	-23.4
36.92	40.7 Qp	0.7 / 12.3 / 28.3	25.3	V / 1.0 / 90.0	N/A	-14.7
39.50	40.0 Qp	0.7 / 12.1 / 28.3	24.5	V / 1.0 / 90.0	N/A	-15.5
41.02	42.9 Qp	0.7 / 12.0 / 28.3	27.4	V / 1.0 / 90.0	N/A	-12.6
44.10	43.4 Qp	0.7 / 11.5 / 28.3	27.3	V / 1.0 / 90.0	N/A	-12.7
53.29	40.3 Qp	0.8 / 10.0 / 28.3	22.8	V / 1.0 / 90.0	N/A	-17.2
86.61	40.0 Qp	0.9 / 7.9 / 28.1	20.7	V / 1.0 / 90.0	N/A	-19.3
39.50	39.8 Qp	0.7 / 12.1 / 28.3	24.3	V / 1.0 / 180.0	N/A	-15.7
41.02	43.5 Qp	0.7 / 12.0 / 28.3	27.9	V / 1.0 / 180.0	N/A	-12.1
44.10	44.6 Qp	0.7 / 11.5 / 28.3	28.5	V / 1.0 / 180.0	N/A	-11.5

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Radiated Electromagnetic Unintentional Emissions

Test Report #:	**BC400275 Run 04**	Test Area:	Pinewood Site 1 (3m)	Temperature:	20.6	°C
Test Method:	FCC pt. 15.209	Test Date:	10-Oct-2004	Relative Humidity:	30	%
EUT Model #:	See Notes	EUT Power:	See Notes	Air Pressure:	80	kPa
EUT Serial #:	See Notes					
Manufacturer:	Kidde					
EUT Description:	See Notes					

Notes: AC/DC RF sound module 120 VAC / 60 Hz
DC RF smoke module 4.5 VDC battery
AC/DC RF smoke module 120 VAC / 60 Hz

Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
45.12	45.8 Qp	0.8 / 11.4 / 28.3	29.7	V / 1.0 / 180.0	N/A	-10.3
46.93	47.1 Qp	0.8 / 11.0 / 28.3	30.6	V / 1.0 / 180.0	N/A	-9.4
53.29	41.2 Qp	0.8 / 10.0 / 28.3	23.7	V / 1.0 / 180.0	N/A	-16.3
147.38	34.4 Qp	1.2 / 12.8 / 27.8	20.6	V / 1.0 / 180.0	N/A	-22.9
39.50	40.1 Qp	0.7 / 12.1 / 28.3	24.6	V / 1.0 / 270.0	N/A	-15.4
44.10	45.4 Qp	0.7 / 11.5 / 28.3	29.3	V / 1.0 / 270.0	N/A	-10.7
45.12	47.1 Qp	0.8 / 11.4 / 28.3	31.0	V / 1.0 / 270.0	N/A	-9.0
46.93	47.7 Qp	0.8 / 11.0 / 28.3	31.2	V / 1.0 / 270.0	N/A	-8.8
53.29	41.6 Qp	0.8 / 10.0 / 28.3	24.1	V / 1.0 / 270.0	N/A	-15.9
147.38	38.2 Qp	1.2 / 12.8 / 27.8	24.4	V / 1.0 / 270.0	N/A	-19.1
The following were maximized between 30 and 200 MHz.						
46.93	47.8 Qp	0.8 / 11.0 / 28.3	31.2	V / 1.0 / 227.0	N/A	-8.8
45.12	48.4 Qp	0.8 / 11.4 / 28.3	32.3	V / 1.0 / 226.0	N/A	-7.7
No higher emissions found: 0Deg, Horizontal.						
No higher emissions found: 90Deg, Horizontal.						
No higher emissions found: 180Deg, Horizontal.						
No higher emissions found: 270Deg, Horizontal.						
Noise floor.						
30.00	22.1 Qp	0.6 / 13.2 / 28.3	7.5	H / 2.0 / 270.0	-42.0	-32.5
195.00	23.1 Qp	1.4 / 13.8 / 27.6	10.8	H / 2.0 / 270.0	N/A	-32.7

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Radiated Electromagnetic Unintentional Emissions

Test Report #:	**BC400275 Run 04**	Test Area:	Pinewood Site 1 (3m)	Temperature:	20.6	°C
Test Method:	FCC pt. 15.209	Test Date:	10-Oct-2004	Relative Humidity:	30	%
EUT Model #:	See Notes	EUT Power:	See Notes	Air Pressure:	80	kPa
EUT Serial #:	See Notes					
Manufacturer:	Kidde					
EUT Description:	See Notes					

Notes: AC/DC RF sound module 120 VAC / 60 Hz
DC RF smoke module 4.5 VDC battery
AC/DC RF smoke module 120 VAC / 60 Hz

Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
423.69	40.3 Qp	2.2 / 15.7 / 28.1	30.1	V / 1.0 / 0.0	N/A	-15.9
847.38	24.0 Qp	2.2 / 22.0 / 28.5	19.7	V / 1.0 / 0.0	N/A	-26.3
423.69	40.7 Qp	2.2 / 15.7 / 28.1	30.6	V / 1.0 / 90.0	N/A	-15.4
847.38	28.1 Qp	2.2 / 22.0 / 28.5	23.8	V / 1.0 / 90.0	N/A	-22.2
423.69	49.2 Qp	2.2 / 15.7 / 28.1	39.0	V / 1.0 / 180.0	N/A	-7.0
847.38	28.4 Qp	2.2 / 22.0 / 28.5	24.1	V / 1.0 / 270.0	N/A	-21.9
The following were maximized between 200 and 1000 MHz.						
847.38	32.1 Qp	2.2 / 22.0 / 28.5	27.8	V / 1.2 / 45.0	N/A	-18.2
423.69	50.8 Qp	2.2 / 15.7 / 28.1	40.7	V / 1.3 / 163.0	N/A	-5.3
Cables were maximized.						
423.69	41.8 Qp	2.2 / 15.7 / 28.1	31.6	H / 1.0 / 0.0	N/A	-14.4
847.38	24.6 Qp	2.2 / 22.0 / 28.5	20.3	H / 1.0 / 0.0	N/A	-25.7
260.66	22.8 Qp	1.8 / 12.4 / 27.2	9.7	H / 1.0 / 0.0	N/A	-36.3
260.66	23.2 Qp	1.8 / 12.4 / 27.2	10.1	H / 1.0 / 90.0	N/A	-35.9
423.69	37.9 Qp	2.2 / 15.7 / 28.1	27.7	H / 1.0 / 90.0	N/A	-18.3
847.38	23.8 Qp	2.2 / 22.0 / 28.5	19.5	H / 1.0 / 90.0	N/A	-26.5
423.69	41.9 Qp	2.2 / 15.7 / 28.1	31.8	H / 1.0 / 180.0	N/A	-14.2
847.38	23.4 Qp	2.2 / 22.0 / 28.5	19.1	H / 1.0 / 180.0	N/A	-26.9

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Radiated Electromagnetic Unintentional Emissions

Test Report #:	**BC400275 Run 04**	Test Area:	Pinewood Site 1 (3m)	Temperature:	20.6	°C
Test Method:	FCC pt. 15.209	Test Date:	10-Oct-2004	Relative Humidity:	30	%
EUT Model #:	See Notes	EUT Power:	See Notes	Air Pressure:	80	kPa
EUT Serial #:	See Notes					
Manufacturer:	Kidde					
EUT Description:	See Notes					

Notes: AC/DC RF sound module 120 VAC / 60 Hz
DC RF smoke module 4.5 VDC battery
AC/DC RF smoke module 120 VAC / 60 Hz

Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
260.66	23.4 Qp	1.8 / 12.4 / 27.2	10.4	H / 1.0 / 270.0	N/A	-35.6
847.38	27.3 Qp	2.2 / 22.0 / 28.5	23.0	H / 1.0 / 270.0	N/A	-23.0
The following were maximized between 200 and 1000 MHz.						
847.38	28.1 Qp	2.2 / 22.0 / 28.5	23.8	H / 1.0 / 335.0	N/A	-22.2
423.69	44.9 Qp	2.2 / 15.7 / 28.1	34.7	H / 2.0 / 156.0	N/A	-11.3
260.66	26.9 Qp	1.8 / 12.4 / 27.2	13.8	H / 1.2 / 10.0	N/A	-32.2
No emissions found: 4 to 30 MHz Vertical.						
Noise floor.						
4.00	32.6 Qp	0.3 / -5.8 / 0.0	27.1	V / 1.0 / 10.0	-22.4	N/A
No emissions found: 4 to 30 MHz Horizontal.						
Noise floor.						
20.02	8.3 Qp	0.5 / -7.3 / 0.0	1.5	H / 1.0 / 10.0	-48.0	N/A

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Radiated Electromagnetic Unintentional Emissions

Test Report #:	**BC400275 Run 04**	Test Area:	Pinewood Site 1 (3m)	Temperature:	20.6	°C
Test Method:	FCC pt. 15.209	Test Date:	10-Oct-2004	Relative Humidity:	30	%
EUT Model #:	See Notes	EUT Power:	See Notes	Air Pressure:	80	kPa
EUT Serial #:	See Notes					
Manufacturer:	Kidde					
EUT Description:	See Notes					

Notes: AC/DC RF sound module 120 VAC / 60 Hz
DC RF smoke module 4.5 VDC battery
AC/DC RF smoke module 120 VAC / 60 Hz

Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dbuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209 <30MHz	DELTA2 (dB) 15.209 >30MHz
********** Measurement Summary **********						
4400.00	32.4 Av	6.4 / 33.7 / 39.0	33.5	H / 1.0 / 0.0	N/A	-20.5
4000.00	32.1 Av	5.7 / 34.4 / 37.6	34.6	V / 1.0 / 270.0	N/A	-19.4
3500.00	32.5 Av	4.8 / 32.8 / 37.8	32.3	H / 1.0 / 270.0	N/A	-21.7
1271.04	50.6 Av	2.6 / 26.0 / 37.4	41.8	H / 1.0 / 282.0	N/A	-12.2
847.38	32.1 Qp	2.2 / 22.0 / 28.5	27.8	V / 1.2 / 45.0	N/A	-18.2
423.69	50.8 Qp	2.2 / 15.7 / 28.1	40.7	V / 1.3 / 163.0	N/A	-5.3
260.66	26.9 Qp	1.8 / 12.4 / 27.2	13.8	H / 1.2 / 10.0	N/A	-32.2
195.00	23.1 Qp	1.4 / 13.8 / 27.6	10.8	H / 2.0 / 270.0	N/A	-32.7
147.38	38.2 Qp	1.2 / 12.8 / 27.8	24.4	V / 1.0 / 270.0	N/A	-19.1
86.61	40.0 Qp	0.9 / 7.9 / 28.1	20.7	V / 1.0 / 90.0	N/A	-19.3
80.79	35.4 Qp	0.9 / 7.5 / 28.2	15.6	V / 1.0 / 0.0	N/A	-24.4
53.29	41.6 Qp	0.8 / 10.0 / 28.3	24.1	V / 1.0 / 270.0	N/A	-15.9
49.84	46.5 Qp	0.8 / 10.6 / 28.3	29.7	V / 1.0 / 0.0	N/A	-10.3
46.93	47.8 Qp	0.8 / 11.0 / 28.3	31.2	V / 1.0 / 227.0	N/A	-8.8
46.63	46.2 Qp	0.8 / 11.0 / 28.3	29.7	V / 1.0 / 0.0	N/A	-10.3
45.12	48.4 Qp	0.8 / 11.4 / 28.3	32.3	V / 1.0 / 226.0	N/A	-7.7
44.10	45.4 Qp	0.7 / 11.5 / 28.3	29.3	V / 1.0 / 270.0	N/A	-10.7
41.02	43.5 Qp	0.7 / 12.0 / 28.3	27.9	V / 1.0 / 180.0	N/A	-12.1
39.50	40.1 Qp	0.7 / 12.1 / 28.3	24.6	V / 1.0 / 270.0	N/A	-15.4
36.92	40.7 Qp	0.7 / 12.3 / 28.3	25.3	V / 1.0 / 90.0	N/A	-14.7
30.00	22.1 Qp	0.6 / 13.2 / 28.3	7.5	H / 2.0 / 270.0	-42.0	-32.5
20.02	8.3 Qp	0.5 / -7.3 / 0.0	1.5	H / 1.0 / 10.0	-48.0	N/A
4.00	32.6 Qp	0.3 / -5.8 / 0.0	27.1	V / 1.0 / 10.0	-22.4	N/A

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Part 15.231 (a) (1) & (2)

Manual and Automate shutoff
within 5 seconds

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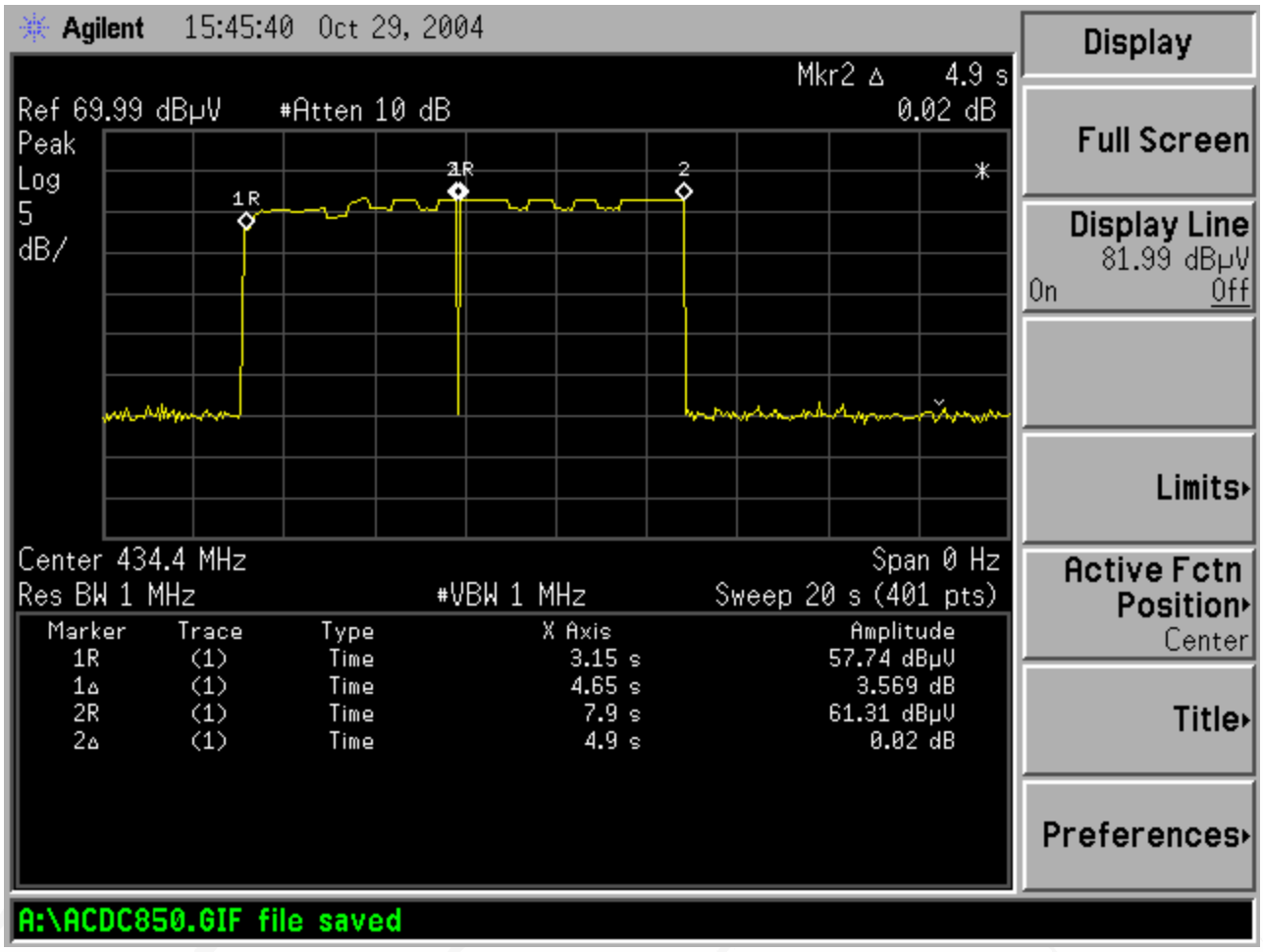

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Part 15.231 (c) and/or (d)

Stability over Temperature and Voltage
-20dBc Bandwidth

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-20dB Bandwidth Measurement

Test Report #:	**BC400275**	Test Area:	Pinewood Site 1 (3m)	Temperature:	25.5	°C
Test Method:	FCC CFR47 Part 15.231(c)	Test Date:	10-Oct-2004	Relative Humidity:	31	%
EUT Model #:	DC RF Smoke Module	EUT Power:	4.5 VDC Battery	Air Pressure:	80	kPa
EUT Serial #:	108					
Manufacturer:	Kidde Safety					
EUT Description:	DC RF smoke detector					

Notes: Measurements were taken in accordance to FCC CFR47 Part 15.231(c).
-20dBc Bandwidth Section (c) the RBW was set at a minimum 0f 10 kHz as per
ANSI C63.4 – 2001 13.1.7

-20dBc Bandwidth Section (c)

Resolution Bandwidth Utilized	Bandwidth Measured -20dBc	Bandwidth Limit 0.25% or 0.50% of The Fundamental Carrier Freq.	DELTA from Bandwidth Limit to Fundamental Carrier Freq.
(kHz)	(HZ)	(Hz)	(Hz)
100	394,000	1,056,000	662,000

The following Measurements and Tables are only applicable for radio devices operating in the 40.66 – 40.70 Band

Temperature Stability Section (d)
N/A

Voltage Stability Section (d)
N/A

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Equipment Utilized During Test

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Project Report

Begin Date: **End Date:** 10/10/2004 10/10/2004

Technician Karen Parker **Project:** BC400275

Capital Asset ID	Manufacturer	Model #	Serial #	Description	Test Performed	Service Type	Service Date	Service Due
192	RHODE & SCHWARZ	ESH2-Z5	830364/002	LISN 50 ohm/50uH 3 line (1kHz - 30 MHz)	C Conducted Emissions	For Ver	3/8/2004	3/8/2005
198	Hewlett-Packard	11947A	3107A01984	Transient Limiter	C Conducted Emissions	For Ver	9/30/2004	9/30/2005
199	RHODE & SCHWARZ	ESH3	872318/036	Low Frequency Receiver (9 kHz - 30 MHz)	C Conducted Emissions	For Cal	11/10/2003	11/10/2004
6	Hewlett-Packard	8594E	3223A00145	Spectrum Analyzer	R Radiated Emissions	For Cal	1/16/2004	1/16/2005
138	EMC TEST SYSTEMS	3109	3142	Biconical Antenna 30-300MHz	R Radiated Emissions	For Cal	10/3/2004	10/3/2005
171	Hewlett-Packard	85662A	1928A01169	Spectrum Analyzer - Display Section	R Radiated Emissions	For Cal	1/21/2004	1/21/2005
172	Hewlett-Packard	8566B	2430A00759	Spectrum Analyzer	R Radiated Emissions	For Cal	1/21/2004	1/21/2005
187	EMCO	3115	9205-3886	Horn Antenna 1-18GHz	R Radiated Emissions	For Cal	10/6/2004	10/6/2005
203	Avantek	AFT97-8434-10F	1007	RF Pre-Amplifier (4-8 GHz)	R Radiated Emissions	For Ver	4/7/2004	4/7/2005
202	Avantek	AWT-18037	1002	RF Pre-Amplifier (8-18 GHz)	R Radiated Emissions	For Ver	4/7/2004	4/7/2005
213	Mini-Circuits Lab	ZHL-42	N052792-2	Amplifier	R Radiated Emissions	For Ver	6/20/2004	6/20/2005
217	EMCO	3146	9203-3376	Log Periodic Antenna	R Radiated Emissions	For Cal	10/3/2004	10/3/2005
248	Hewlett-Packard	8447F	3113A05545	9 kHz- 1.3GHz Pre Amp	R Radiated Emissions	For Ver	6/5/2004	6/5/2005
165	RHODE & SCHWARZ	HFH2Z2	880669/042	Loop Antenna (polarad)	R Radiated Emissions	For Cal	11/3/2003	11/3/2004

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Appendix B

Test Plan

and

Constructional Data Form

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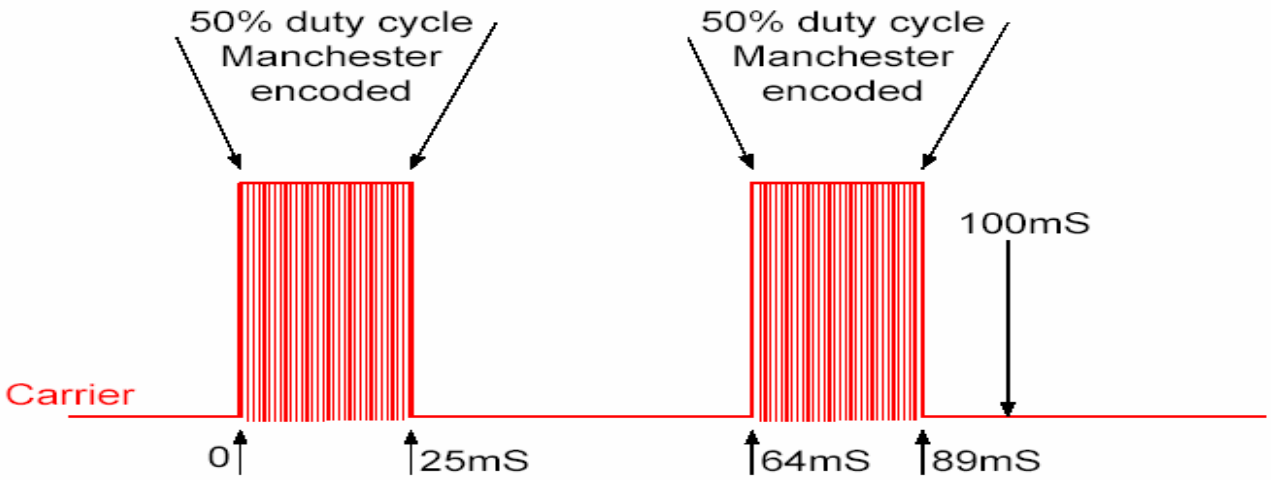
The following graph has been supplied by the customer.

Carrier duty cycle
AC/DC RF Smoke, DC RF Smoke, AC/DC RF Sounder
8 June 2004



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Appendix C

Measurement Protocol

And

Test Procedures

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MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in ANSI C63.4 & CNS13438.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dBµV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the applicable limit.

To convert between dBµV and µV, the following conversions apply:

- dBµV = 20(log µV)
- µV = Inverse log(dBµV/20)

RADIATED EMISSIONS

The final level, expressed in dBµV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBµV) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has the applicable limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment B. The amplifier gain is automatically accounted for by using an analyzer offset.

Example: At a Test Frequency of 30 MHz, with a peak reading on the spectrum analyzer or measuring receiver of 14 dBmV:

Measured Level	+	Transducer & Cable Loss factor	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dBµV/m)		
14.0		**14.9**		**28.9**	**40.0**		**28.9**		**-11.1**

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DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω/50 µH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 22GHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

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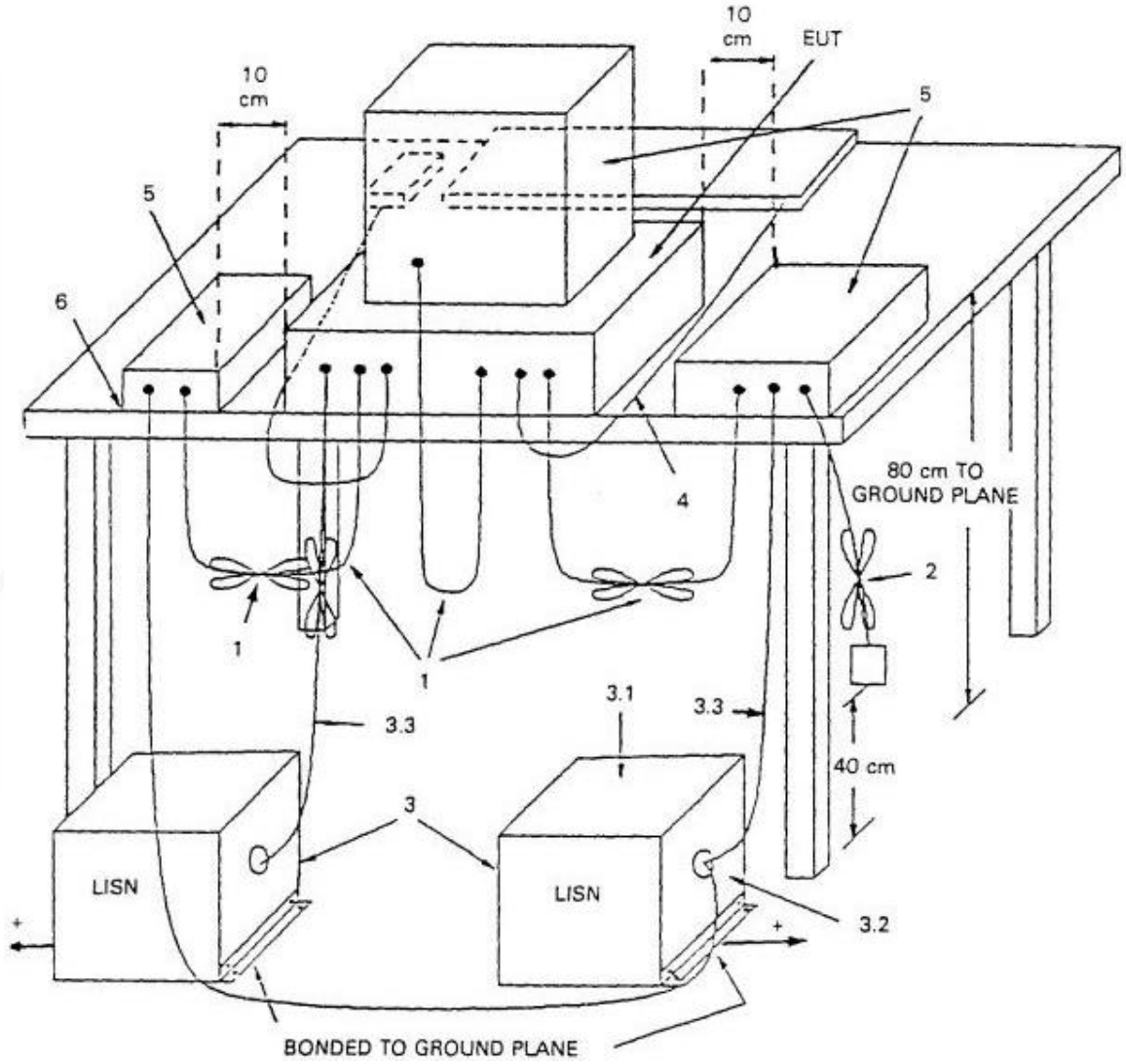
Conducted Emissions Diagram:



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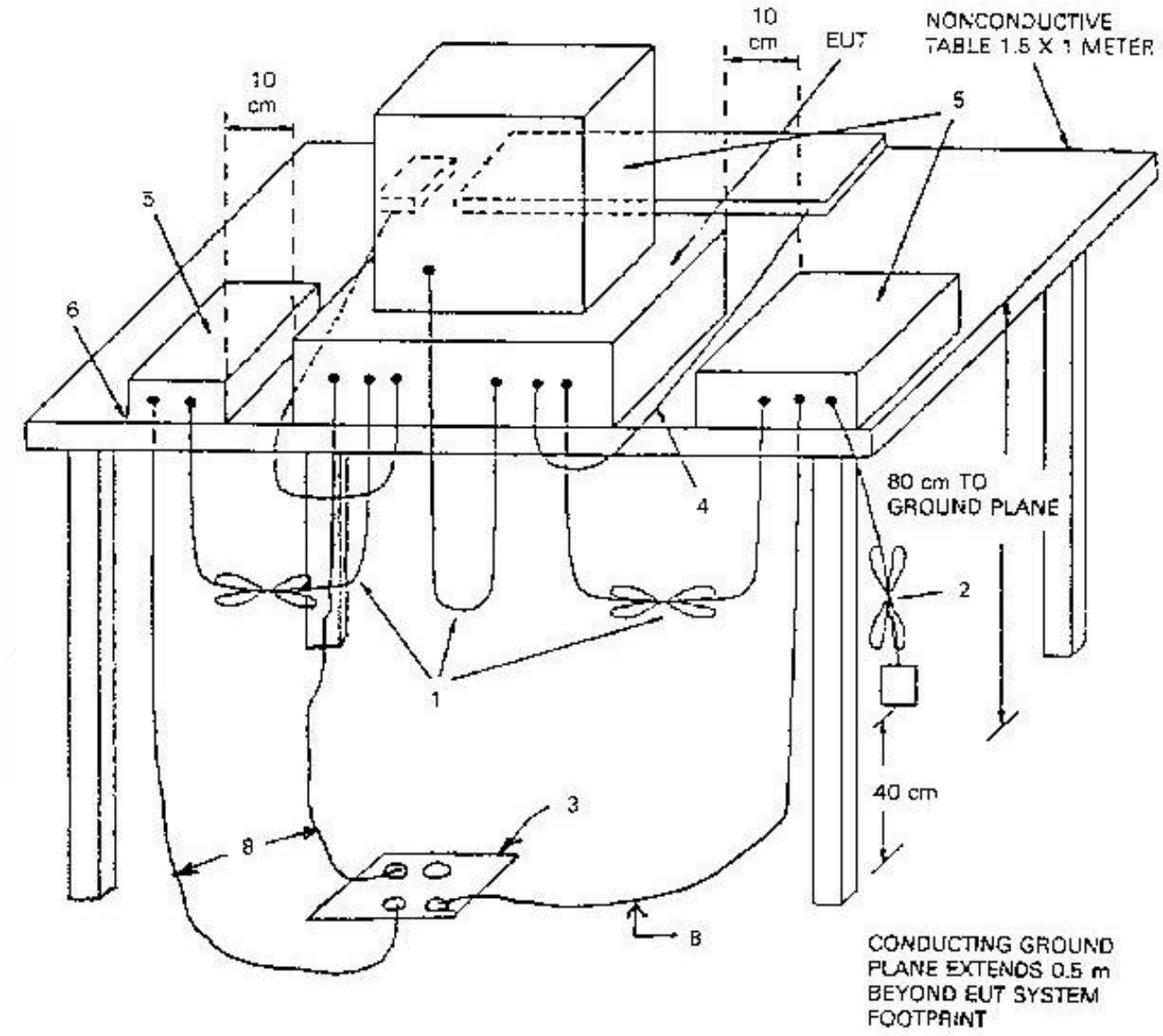
Radiated Emissions Diagram:



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