



EMC EMISSIONS - TEST REPORT (Full)

Test Report No. **BC300358-1** Issue Date: **Fri 26/Sep/2003**

Model / Serial No. **RS320-60 & RS320-45 / SN: 001 & 002**

Product Type **ISO Compatible RFID Stick Reader With Integral Battery**

Client **Allflex**

Manufacturer **Allflex**

License holder **Allflex**

Address **2820 Wilderness Place, Suite A**

Boulder, CO 80301

Test Criteria Applied **FCC CFR47 Part 15.209**
Test Result **PASS**

Test Project Number **BC300358-1** RADIO FREQUENCY DEVICES
References
Total Pages
Including
Appendices: **29**

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Robert Cresswell

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Approved By : Robert Cresswell

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Lab Code: 200624-0



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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 $\pm 2.30\text{dB}$ and for Radiated Emissions is calculated to be $\pm 3.60\text{dB}$ in the frequency range of 30MHz – 200MHz and $\pm 3.38\text{dB}$ in the frequency range of 200MHz – 1000MHz.

EUT Received Date: 17-Sep-2003

Testing Start Date: 17-Sep-2003

Testing End Date: 18-Sep-2003

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. ICES-003
5. RSS-210

Emission Test Results:

Conducted Emissions, Powerline - 15.207/CISPR 22 CLASS B

Test Result

Minimum limit margin -12.6 dB at 23.60 MHz
 Maximum limit exceeding dB at MHz

Remarks: _____

Radiated Emissions (Electric Field) - Part 15.209 <30MHz

Test Result

Minimum limit margin -26.7 dB at 1.210 MHz
 Maximum limit exceeding dB at MHz

Remarks: Worst case margin across both units

Radiated Emissions (Electric Field) - Part 15.209 >30MHz/CISPR 22 Class B

Test Result

Minimum limit margin -12.7 dB at 1000 MHz
 Maximum limit exceeding dB at MHz

Remarks: Highest Frequency tested is 1000MHz because of a higher board processor speed

GENERAL REMARKS:

FCC Part 15.207: Testing was performed utilizing the 60cm unit for the fact hat the power supply and all the circuitry is identical. Therefore, testing the 45cm unit is not needed.

FCC Part 15.209 <30MHz: The Intentional Radio Emissions was tested on both units per FCC CFR47 Part 15.209 <30MHz for the fact that there is 6 inches conductor length greater.

FCC Part 12.209 >30MHz: The unintentional emissions was tested with the 60cm unit for the fact that the 2 units are identical except for 6 inches of additional length between the PBC and antenna.

Modifications required to pass: None

Test Specification Deviations: Additions to or Exclusions from: None

Test-setup photo(s):
Conducted Emissions



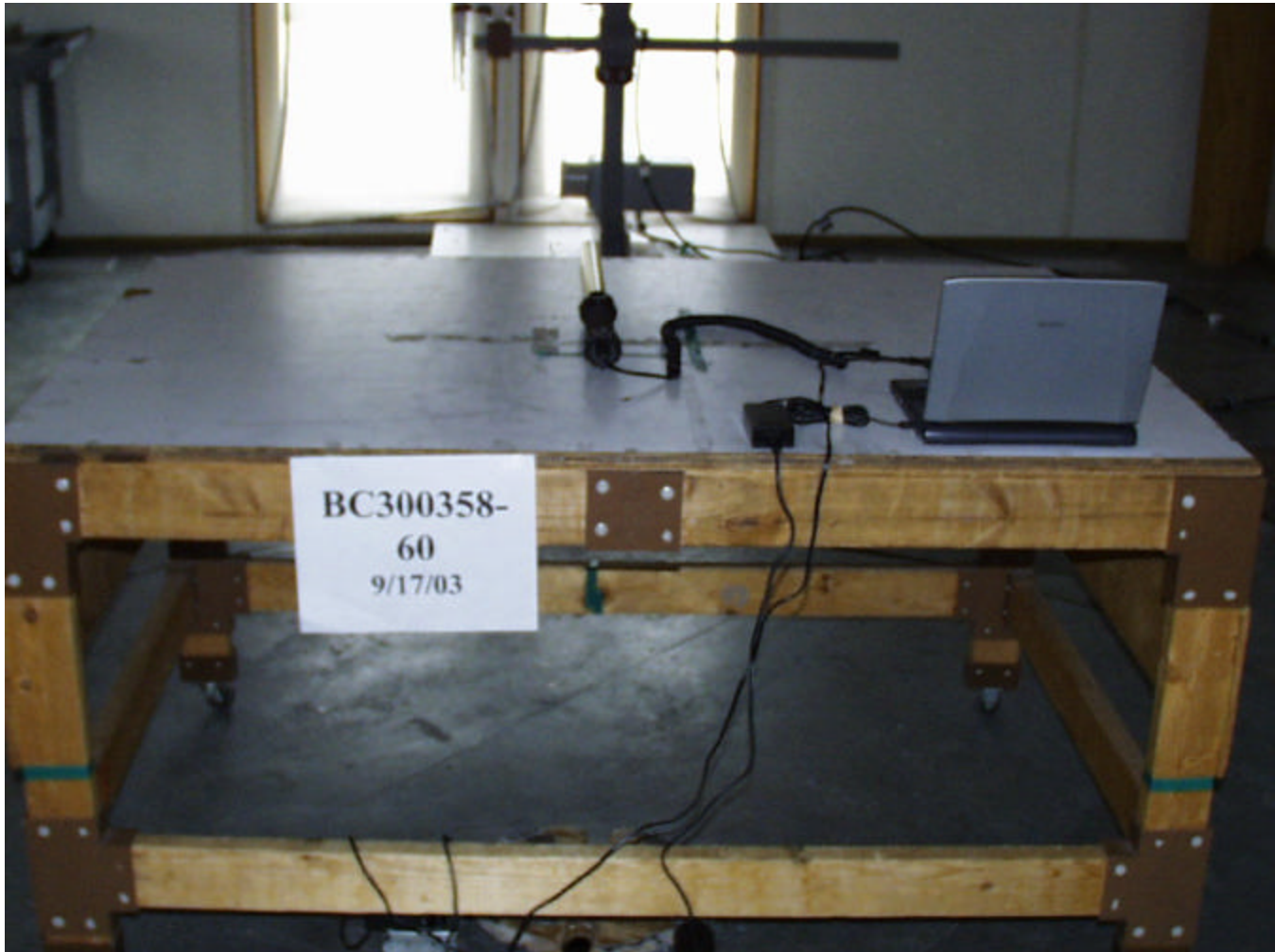
Test-setup photo(s):
Conducted Emissions



Test-setup photo(s):
Unintentional Radiated Emissions



Test-setup photo(s):
Unintentional Radiated Emissions



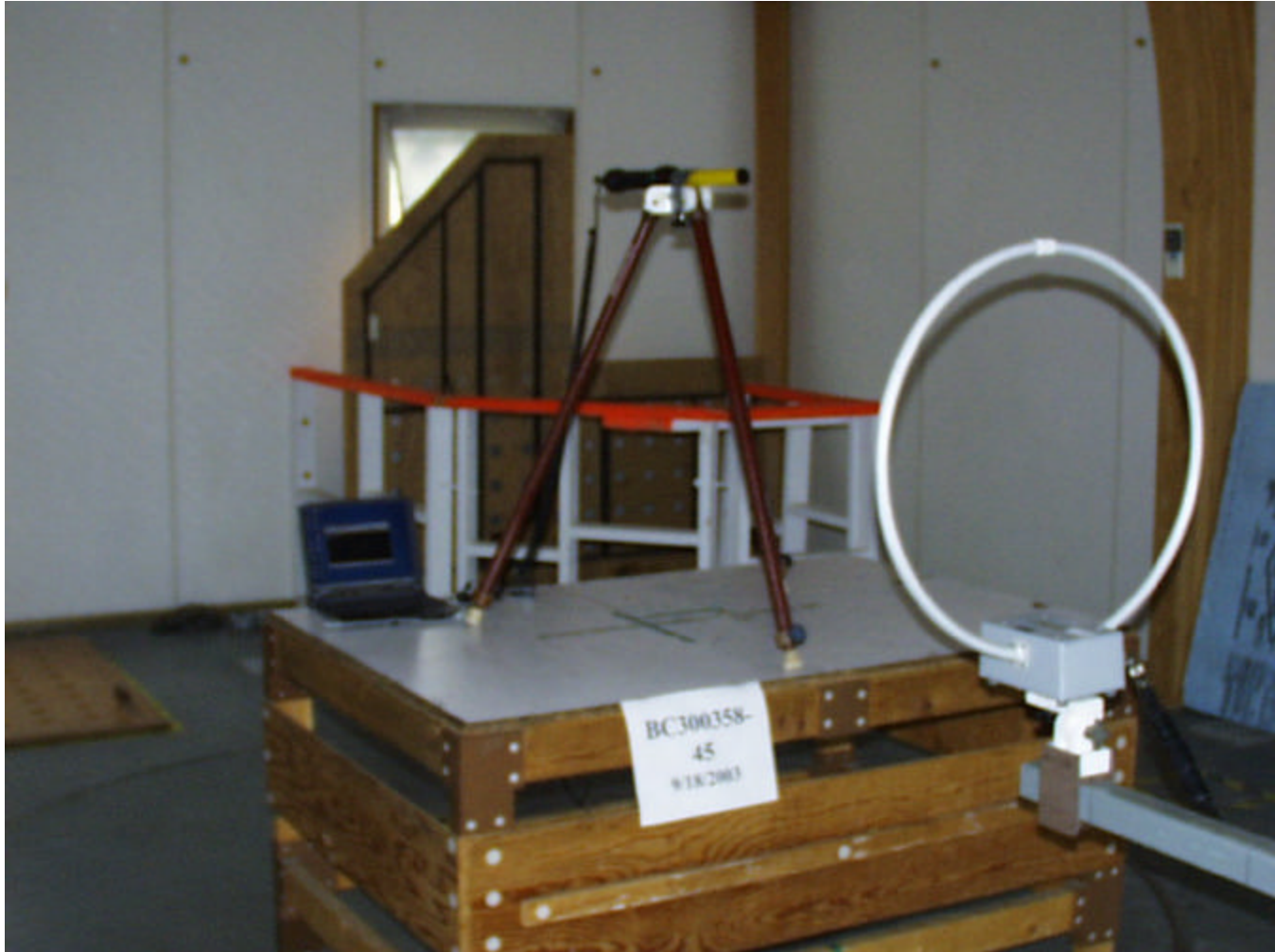
Test-setup photo(s):
Intentional Radiated Emissions (60cm device)



Test-setup photo(s):
Intentional Radiated Emissions (60cm device)



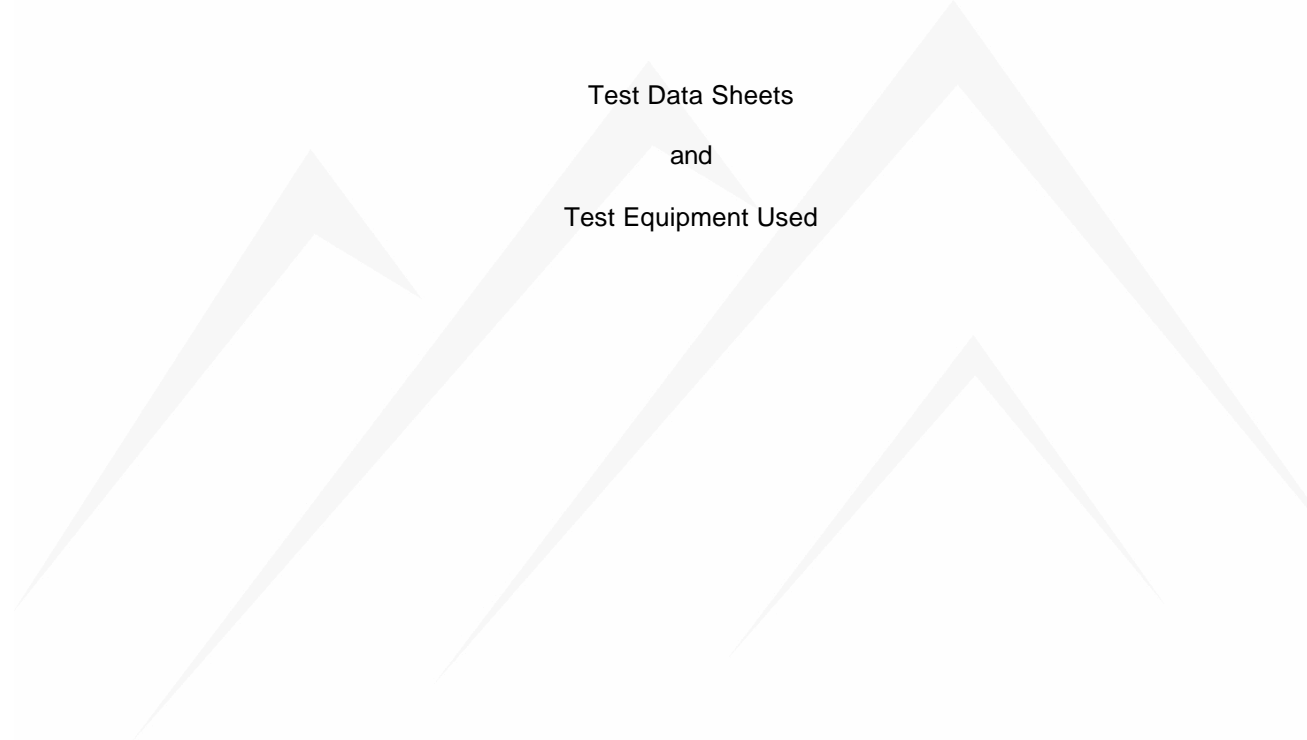
Test-setup photo(s):
Intentional Radiated Emissions (45cm device)



Test-setup photo(s):
Intentional Radiated Emissions (60cm Device)



Appendix A



Test Data Sheets
and
Test Equipment Used

Conducted Electromagnetic Emissions

Test Report #: **BC300358-60 Run 03** Test Area: Pinewood Site 1 Cond
 Test Method: EN55022 Test Date: 18-Sep-2003
 EUT Model #: RS320-60 EUT Power: 110 VAC 60 Hz
 EUT Serial #: 002
 Manufacturer: Allflex

Temperature: 17 °C
 Relative Humidity: 40 %
 Air Pressure: 81 kPa
 Page: 1 of 2

EUT Description: RFID Stick Reader
 Notes: ISO Compatible RFID Stick Reader With Integral Battery
 Pack and LCD readout

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

The EUT is in data exchange mode powered by 12 VDC

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		EN55022 B QP	EN55022 B Avg
0.150	26.9 Qp	0.1 / 0.0 / -10.0	37.0	Line 1	-29.0	N/A
0.150	19.3 Av	0.1 / 0.0 / -10.0	29.4	Line 1	N/A	-26.6
0.184	20.6 Qp	0.1 / 0.0 / -10.0	30.7	Line 1	-33.6	N/A
0.184	9.3 Av	0.1 / 0.0 / -10.0	19.4	Line 1	N/A	-34.9
0.261	24.7 Qp	0.1 / 0.0 / -10.0	34.8	Line 1	-26.6	N/A
23.60	24.7 Av	1.0 / 1.7 / -10.0	37.4	Line 1	N/A	-12.6
23.60	25.0 Qp	1.0 / 1.7 / -10.0	37.7	Line 1	-22.3	N/A
0.660	22.8 Qp	0.1 / 0.0 / -10.0	33.0	Line 1	-23.0	N/A
0.660	22.5 Av	0.1 / 0.0 / -10.0	32.7	Line 1	N/A	-13.3
0.990	21.9 Qp	0.2 / 0.0 / -10.0	32.1	Line 1	-23.9	N/A
0.990	21.7 Av	0.2 / 0.0 / -10.0	31.9	Line 1	N/A	-14.1
0.261	20.8 Av	0.1 / 0.0 / -10.0	30.9	Line 1	N/A	-20.5
30.00	4.6 Qp	1.2 / 2.2 / -10.0	18.0	Line 1	-42.0	N/A
30.00	1.2 Qp	1.2 / 2.2 / -10.0	14.6	Line 1	-45.4	N/A
0.150	31.5 Qp	0.1 / 0.0 / -10.0	41.6	Neutral	-24.4	N/A
0.150	30.0 Av	0.1 / 0.0 / -10.0	40.1	Neutral	N/A	-15.9
0.184	30.0 Av	0.1 / 0.0 / -10.0	40.1	Neutral	N/A	-14.2
0.184	31.0 Qp	0.1 / 0.0 / -10.0	41.1	Neutral	-23.2	N/A
0.261	29.0 Qp	0.1 / 0.0 / -10.0	39.1	Neutral	-22.3	N/A
0.261	28.3 Av	0.1 / 0.0 / -10.0	38.4	Neutral	N/A	-13.0
0.662	21.3 Qp	0.1 / 0.0 / -10.0	31.5	Neutral	-24.5	N/A
0.662	21.1 Av	0.1 / 0.0 / -10.0	31.3	Neutral	N/A	-14.7
0.992	20.4 Qp	0.2 / 0.0 / -10.0	30.6	Neutral	-25.4	N/A
0.992	20.0 Av	0.2 / 0.0 / -10.0	30.2	Neutral	N/A	-15.8
14.00	5.0 Qp	0.7 / 0.8 / -10.0	16.5	Neutral	-43.5	N/A
14.00	1.4 Qp	0.7 / 0.8 / -10.0	12.9	Neutral	-47.1	N/A

Conducted Electromagnetic Emissions

Test Report #: BC300358-60 Run 03 Test Area: Pinewood Site 1 Cond
 Test Method: EN55022 Test Date: 18-Sep-2003
 EUT Model #: RS320-60 EUT Power: 110 VAC 60 Hz
 EUT Serial #: 002
 Manufacturer: Allflex

Temperature: 17 °C
 Relative Humidity: 40 %
 Air Pressure: 81 kPa
 Page: 2 of 2

EUT Description: RFID Stick Reader

Notes: ISO Compatible RFID Stick Reader With Integral Battery
Pack and LCD readout

The EUT is in data exchange mode powered by 12 VDC

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

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		EN55022 B QP	EN55022 B Avg
***** Measurement Summary *****						
23.60	24.7 Av	1.0 / 1.7 / -10.0	37.4	Line 1	N/A	-12.6
0.261	28.3 Av	0.1 / 0.0 / -10.0	38.4	Neutral	N/A	-13.0
0.660	22.5 Av	0.1 / 0.0 / -10.0	32.7	Line 1	N/A	-13.3
0.990	21.7 Av	0.2 / 0.0 / -10.0	31.9	Line 1	N/A	-14.1
0.184	30.0 Av	0.1 / 0.0 / -10.0	40.1	Neutral	N/A	-14.2
0.150	30.0 Av	0.1 / 0.0 / -10.0	40.1	Neutral	N/A	-15.9
30.00	4.6 Qp	1.2 / 2.2 / -10.0	18.0	Line 1	-42.0	N/A
14.00	5.0 Qp	0.7 / 0.8 / -10.0	16.5	Neutral	-43.5	N/A

Radiated Electromagnetic Emissions

Test Report #: BC300358-60 Run 01 Test Area: Pinewood Site 1 (10m)
 Test Method: EN55022 Test Date: 17-Sep-2003
 EUT Model #: RS320-60 EUT Power: 12VDC
 EUT Serial #: 001
 Manufacturer: Allflex
 EUT Description: ISO Compatible RFID Stick Reader With Integral Battery
 Notes: EUT is in a non - scan data exchange mode.

Temperature: 22 °C
 Relative Humidity: 26 %
 Air Pressure: 79.6 kPa
 Page: 1 of 3

Level Key	
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)	(m) (DEG)	EN55022 B	N/A
Bicon Antenna, Vertical, 0 degrees						
No emissions detected						
90 degrees						
No emissions detected						
180 degrees						
No emissions detected						
270 degrees						
No emissions detected						
The following reading is a noise floor measurement for reference only						
30.03	21.9 Pk	0.9 / 13.1 / 28.3	7.5	V / 1.0 / 270.0	-22.5	N/A
Changing to Horizontal polarization						
0 degrees						
90 degrees						
No emissions detected						
180 degrees						
No emissions detected						
270 degrees						
No emissions detected						
Changing to the Log Periodic Antenna, Horiz.						
0 degrees						
No emissions detected						
90 degrees						
No emissions detected						

Radiated Electromagnetic Emissions

Test Report #: BC300358-60 Run 01 Test Area: Pinewood Site 1 (10m)
 Test Method: EN55022 Test Date: 17-Sep-2003
 EUT Model #: RS320-60 EUT Power: 12VDC
 EUT Serial #: 001
 Manufacturer: Allflex
 EUT Description: ISO Compatible RFID Stick Reader With Integral Battery
 Notes: EUT is in a non - scan data exchange mode.

Temperature: 22 °C
 Relative Humidity: 26 %
 Air Pressure: 79.6 kPa
 Page: 2 of 3

Level Key	
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)	(m) (DEG)	EN55022 B	N/A
180 degrees						
No emissions detected						
270 degrees						
No emissions detected						
Changing to Vertical						
0 degrees						
No emissions detected						
90 degrees						
No emissions detected						
180 degrees						
No emissions detected						
270 degrees						
No emissions detected						
The following reading is a noise floor measurement for reference only						
1000.00	21.4 Qp	6.0 / 24.4 / 27.4	24.3	V / 2.0 / 0.0	-12.7	N/A
End of run.						

Radiated Electromagnetic Emissions

Test Report #: BC300358-60 Run 01 Test Area: Pinewood Site 1 (10m)
 Test Method: EN55022 Test Date: 17-Sep-2003
 EUT Model #: RS320-60 EUT Power: 12VDC
 EUT Serial #: 001
 Manufacturer: Allflex
 EUT Description: ISO Compatible RFID Stick Reader With Integral Battery
 Notes: EUT is in a non - scan data exchange mode.

Temperature: 22 °C
 Relative Humidity: 26 %
 Air Pressure: 79.6 kPa
 Page: 3 of 3

Level Key	
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)	(m) (DEG)	EN55022 B	N/A
***** Measurement Summary *****						
1000.00	21.4 Qp	6.0 / 24.4 / 27.4	24.3	V / 2.0 / 0.0	-12.7	N/A
30.03	21.9 Pk	0.9 / 13.1 / 28.3	7.5	V / 1.0 / 270.0	-22.5	N/A

Intentional Emission per FCC CFR47 Part 15.209<30MHz

45CM Unit

Radiated Electromagnetic Emissions

Test Report #: **BC300358-45 Run 03**
 Test Method: **FCC CFR47 Part 15.209 <30M**
 EUT Model #: **RS320-45**
 EUT Serial #: **002**
 Manufacturer: **Allflex**

Test Area: **Pinewood Site 1 (3m)**
 Test Date: **17-Sep-2003**
 EUT Power: **12 VDC**

Temperature: **22** °C
 Relative Humidity: **26** %
 Air Pressure: **79.6** kPa
 Page: **1** of **1**

EUT Description: **ISO Compatible RFID Stick Reader With Integral Battery**

Notes: **EUT is in a non - scan data exchange mode.**

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

FREQ	LEVEL	CABLE / ANT / PREAMP	Final Corrected	POL / HGT / AZ	Measured Site Roll-off per Decade	Final	Limit @ applicable distance	DELTA 300m	DELTA 30m
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV)	(dBuV)	(dB)	(dB)
0.134	103.2 Qp	0.1 / 10.5 / 0.0	113.8	V / 1.5 / 0.0	116.4	-2.6	25.1	-27.7	N/A
0.134	96.8 Av	0.1 / 10.5 / 0.0	107.4	V / 1.5 / 0.0	116.4	-9	25.1	-34.1	N/A
0.268	35.2 Qp	0.1 / 10.5 / 0.0	45.8	V / 1.5 / 0.0	116.4	-70.6	19.0	-89.6	N/A
0.268	34.8 Av	0.1 / 10.5 / 0.0	45.4	V / 1.5 / 0.0	116.4	-71	19.0	-90.0	N/A
0.403	57.8 Qp	0.2 / 10.2 / 0.0	68.2	V / 1.5 / 0.0	116.4	-48.2	15.5	-63.7	N/A
0.403	55.6 Av	0.2 / 10.2 / 0.0	66.0	V / 1.5 / 0.0	116.4	-50.4	15.5	-65.9	N/A
0.537	20.4 Qp	0.2 / 10.4 / 0.0	30.9	V / 1.5 / 0.0	58.2	-27.3	33.0	N/A	-60.3
0.805	33.4 Qp	0.3 / 10.0 / 0.0	43.6	V / 1.5 / 0.0	58.2	-14.6	29.5	N/A	-44.1
0.940	41.6 Qp	0.3 / 10.3 / 0.0	52.1	V / 1.5 / 0.0	58.2	-6.1	28.2	N/A	-34.2
1.07	31.7 Qp	0.3 / 10.4 / 0.0	42.3	V / 1.5 / 0.0	58.2	-15.9	25.9	N/A	-42.9
1.21	38.9 Qp	0.3 / 10.4 / 0.0	49.6	V / 1.5 / 0.0	58.2	-8.6	25.1	N/A	-34.5
1.61	27.5 Qp	0.3 / 10.3 / 0.0	38.1	V / 1.5 / 0.0	58.2	-20.1	24.3	N/A	-43.6
1.74	35.2 Qp	0.3 / 10.3 / 0.0	45.8	V / 1.5 / 0.0	58.2	-12.4	29.5	N/A	-41.9
2.01	35.8 Qp	0.3 / 10.2 / 0.0	46.3	V / 1.5 / 0.0	58.2	-11.9	29.5	N/A	-41.4
2.28	28.9 Qp	0.3 / 10.3 / 0.0	39.5	V / 1.5 / 0.0	58.2	-18.7	29.5	N/A	-48.2
2.55	26.6 Qp	0.3 / 10.3 / 0.0	37.2	V / 1.5 / 0.0	58.2	-21	29.5	N/A	-50.5
2.82	24.5 Qp	0.3 / 10.4 / 0.0	35.2	V / 1.5 / 0.0	58.2	-23	29.5	N/A	-52.5
3.09	23.6 Qp	0.3 / 10.4 / 0.0	34.3	V / 1.5 / 0.0	58.2	-23.9	29.5	N/A	-53.4
3.36	22.4 Qp	0.3 / 10.3 / 0.0	33.0	V / 1.5 / 0.0	58.2	-25.2	29.5	N/A	-54.7
3.62	21.6 Qp	0.3 / 10.3 / 0.0	32.2	V / 1.5 / 0.0	58.2	-26	29.5	N/A	-55.5
3.89	19.6 Qp	0.3 / 10.2 / 0.0	30.1	V / 1.5 / 0.0	58.2	-28.1	29.5	N/A	-57.6
5.23	15.7 Qp	0.3 / 10.3 / 0.0	26.3	V / 1.5 / 0.0	58.2	-31.9	29.5	N/A	-61.4
7.59	20.2 Qp	0.4 / 10.4 / 0.0	31.0	V / 1.5 / 0.0	58.2	-27.2	29.5	N/A	-56.7
No other emissions observed through 30MHz									

Intentional Emission per FCC CFR47 Part 15.209<30MHz

60CM Unit

Radiated Electromagnetic Emissions

Test Report #: **BC300358-60 Run 03** Test Area: Pinewood Site 1 (3m)
 Test Method: FCC CFR47 Part 15.209 <30M Test Date: 17-Sep-2003
 EUT Model #: RS320-60 EUT Power: 12 VDC
 EUT Serial #: 001
 Manufacturer: Allflex

Temperature: 22 °C
 Relative Humidity: 26 %
 Air Pressure: 79.6 kPa
 Page: 1 of 2

EUT Description: ISO Compatible RFID Stick Reader With Integral Battery

Notes: EUT is in a non - scan data exchange mode.

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

FREQ	LEVEL	CABLE / ANT / PREAMP	Final Corrected	POL / HGT / AZ	Measured Site Roll-off per Decade	Final	Limit @ applicable distance	DELTA 300m	DELTA 30m
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV)	(dBuV)	(dB)	(dB)
0.134	103.6 Qp	0.1 / 10.5 / 0.0	114.2	V / 1.0 / 0.0	116.4	-2.2	25.1	-27.3	N/A
0.134	103.9 Av	0.1 / 10.5 / 0.0	114.5	V / 1.0 / 0.0	116.4	-1.9	25.1	-27.0	N/A
0.268	37.5 Qp	0.1 / 10.5 / 0.0	48.1	V / 1.0 / 0.0	116.4	-68.3	19.0	-87.3	N/A
0.269	33.6 Av	0.1 / 10.5 / 0.0	44.3	V / 1.0 / 0.0	116.4	-72.1	19.0	-91.1	N/A
0.402	59.2 Qp	0.2 / 10.2 / 0.0	69.6	V / 1.3 / 0.0	116.4	-46.8	15.5	-62.3	N/A
0.402	59.9 Av	0.2 / 10.2 / 0.0	70.3	V / 1.3 / 0.0	116.4	-46.1	15.5	-61.6	N/A
0.535	32.4 Qp	0.2 / 10.4 / 0.0	42.9	V / 1.3 / 0.0	58.2	-15.3	33.0	N/A	-48.3
0.804	38.6 Qp	0.3 / 10.0 / 0.0	48.9	V / 1.3 / 0.0	58.2	-9.3	29.5	N/A	-38.8
0.938	43.6 Qp	0.3 / 10.3 / 0.0	54.2	V / 1.3 / 0.0	58.2	-4	28.2	N/A	-32.2
1.21	46.7 Qp	0.3 / 10.4 / 0.0	57.4	V / 1.3 / 0.0	58.2	-0.8	25.9	N/A	-26.7
1.34	35.1 Qp	0.3 / 10.3 / 0.0	45.7	V / 1.3 / 0.0	58.2	-12.5	25.1	N/A	-37.6
1.47	41.1 Qp	0.3 / 10.3 / 0.0	51.7	V / 1.3 / 0.0	58.2	-6.5	24.3	N/A	-30.8
1.74	26.3 Qp	0.3 / 10.3 / 0.0	36.9	V / 1.3 / 0.0	58.2	-21.3	29.5	N/A	-50.8
2.01	35.4 Qp	0.3 / 10.2 / 0.0	45.9	V / 1.3 / 0.0	58.2	-12.3	29.5	N/A	-41.8
2.15	19.1 Qp	0.3 / 10.2 / 0.0	29.6	V / 1.3 / 0.0	58.2	-28.6	29.5	N/A	-58.1
2.28	28.8 Qp	0.3 / 10.3 / 0.0	39.3	V / 1.3 / 0.0	58.2	-18.9	29.5	N/A	-48.4
2.55	23.9 Qp	0.3 / 10.3 / 0.0	34.6	V / 1.3 / 0.0	58.2	-23.6	29.5	N/A	-53.1
2.82	24.9 Qp	0.3 / 10.4 / 0.0	35.6	V / 1.3 / 0.0	58.2	-22.6	29.5	N/A	-52.1
3.09	23.7 Qp	0.3 / 10.4 / 0.0	34.4	V / 1.3 / 0.0	58.2	-23.8	29.5	N/A	-53.3
3.35	22.4 Qp	0.3 / 10.3 / 0.0	33.0	V / 1.2 / 0.0	58.2	-25.2	29.5	N/A	-54.7
3.62	20.4 Qp	0.3 / 10.3 / 0.0	31.0	V / 1.2 / 0.0	58.2	-27.2	29.5	N/A	-56.7
3.89	19.1 Qp	0.3 / 10.2 / 0.0	29.7	V / 1.2 / 0.0	58.2	-28.5	29.5	N/A	-58.0
4.16	18.3 Qp	0.3 / 10.2 / 0.0	28.8	V / 1.2 / 0.0	58.2	-29.4	29.5	N/A	-58.9
4.43	17.4 Qp	0.3 / 10.2 / 0.0	28.0	V / 1.2 / 0.0	58.2	-30.2	29.5	N/A	-59.7
4.70	16.6 Qp	0.3 / 10.3 / 0.0	27.3	V / 1.2 / 0.0	58.2	-30.9	29.5	N/A	-60.4
4.96	15.9 Qp	0.3 / 10.3 / 0.0	26.5	V / 1.2 / 0.0	58.2	-31.7	29.5	N/A	-61.2
5.23	15.1 Qp	0.3 / 10.3 / 0.0	25.7	V / 1.2 / 0.0	58.2	-32.5	29.5	N/A	-62.0
5.50	14.7 Qp	0.3 / 10.2 / 0.0	25.3	V / 1.2 / 0.0	58.2	-32.9	29.5	N/A	-62.4
5.77	14.0 Qp	0.3 / 10.2 / 0.0	24.6	V / 1.2 / 0.0	58.2	-33.6	29.5	N/A	-63.1
6.04	13.6 Qp	0.4 / 10.2 / 0.0	24.1	V / 1.2 / 0.0	58.2	-34.1	29.5	N/A	-63.6

Radiated Electromagnetic Emissions

Test Report #: **BC300358-60 Run 03**
 Test Method: FCC CFR47 Part 15.209 <30M
 EUT Model #: RS320-60
 EUT Serial #: 001
 Manufacturer: Allflex
 EUT Description: ISO Compatible RFID Stick Reader With Integral Battery
 Notes: EUT is in a non - scan data exchange mode.

Test Area: Pinewood Site 1 (3m)
 Test Date: 17-Sep-2003
 EUT Power: 12 VDC

Temperature: 22 °C
 Relative Humidity: 26 %
 Air Pressure: 79.6 kPa
 Page: 2 of 2

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

FREQ	LEVEL	CABLE / ANT / PREAMP	Final Corrected	POL / HGT / AZ	Measured Site Roll-off per Decade	Final	Limit @ applicable distance	DELTA 300m	DELTA 30m
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV)	(dBuV)	(dB)	(dB)
6.31	12.9 Qp	0.4 / 10.3 / 0.0	23.5	V / 1.2 / 0.0	58.2	-34.7	29.5	N/A	-64.2
6.58	12.6 Qp	0.4 / 10.3 / 0.0	23.2	V / 1.2 / 0.0	58.2	-35	29.5	N/A	-64.5
6.84	12.1 Qp	0.4 / 10.4 / 0.0	22.8	V / 1.2 / 0.0	58.2	-35.4	29.5	N/A	-64.9
7.11	11.6 Qp	0.4 / 10.4 / 0.0	22.4	V / 1.2 / 0.0	58.2	-35.8	29.5	N/A	-65.3

Project Report

End Date: 9/23/2003

Technician Dennis King

Project: BC300358

Capital Asset ID	Manufacturer	Model #	Serial #	Description	Test Performed	Cal Date	Cal Due
95	Hewlett-Packard	11947A	3107A01975	Transient Limiter	C Conducted	2/1/2003	2/1/2004
190	SOLAR	8028-50-TS-24- BNC	8305122	LISN (10 kHz - 30 MHz)	C Conducted Emissions	3/3/2003	3/3/2004
191	SOLAR	8028-50-TS-24- BNC	8305121	LISN	C Conducted Emissions	3/3/2003	3/3/2004
192	RHODE & SCHWARZ	ESH2-Z5	830364/002	LISN 50 ohm/50uH 3 line (1kHz - 30 MHz)	C Conducted Emissions	3/4/2003	3/4/2004
199	RHODE & SCHWARZ	ESH3	872318/036	Low Frequency Receiver (9 kHz - 30 MHz)	C Conducted Emissions	10/31/2002	10/31/2003
3	Hewlett-Packard	85650A	2811A01300	Q.P Adapter	R Radiated Emissions	10/21/2002	10/21/2003
138	EMC TEST SYSTEMS	3109	3142	Biconical Antenna 30-3000MHz	R Radiated Emissions	9/30/2002	9/30/2003
195	EMCO	6502	9205-2738	Magnetic loop	R Radiated Emissions	3/5/2003	3/5/2004
209	Hewlett-Packard	85662A	2403A08749	Display Section	R Radiated Emissions	10/21/2002	10/21/2003
210	Hewlett-Packard	8566B	2410A00154	Spectrum Analyzer (dc-22 GHz)	R Radiated Emissions	10/21/2002	10/21/2003
217	EMCO	3146	9203-3376	Log Periodic Antenna	R Radiated Emissions	9/11/2002	10/11/2003
248	Hewlett-Packard	8447F	3113A05545	9 kHz- 1.3GHz Pre Amp	R Radiated Emissions	6/5/2003	6/5/2004

Appendix B

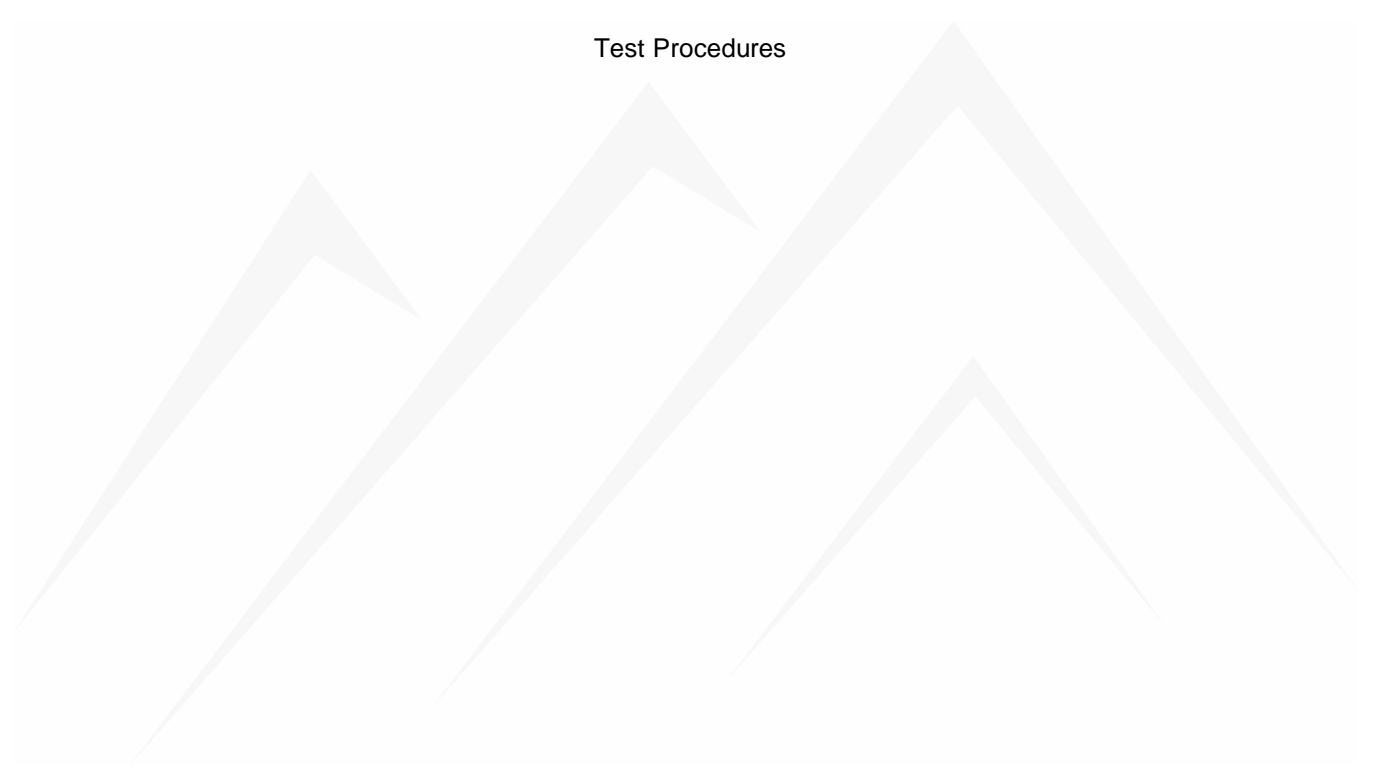
Test Plan
and
Constructional Data Form
To be supplied by Customer

Appendix C

Measurement Protocol

And

Test Procedures



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 its 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 dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the applicable limit.

To convert between dB μ V and μ V, the following conversions apply:

- $\text{dB}\mu\text{V} = 20(\log \mu\text{V})$
- $\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$

RADIATED EMISSIONS

The final level, expressed in dB μ V/m, is arrived at by taking the reading from the spectrum analyzer (Level dB μ V) 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 dB μ V:

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

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."

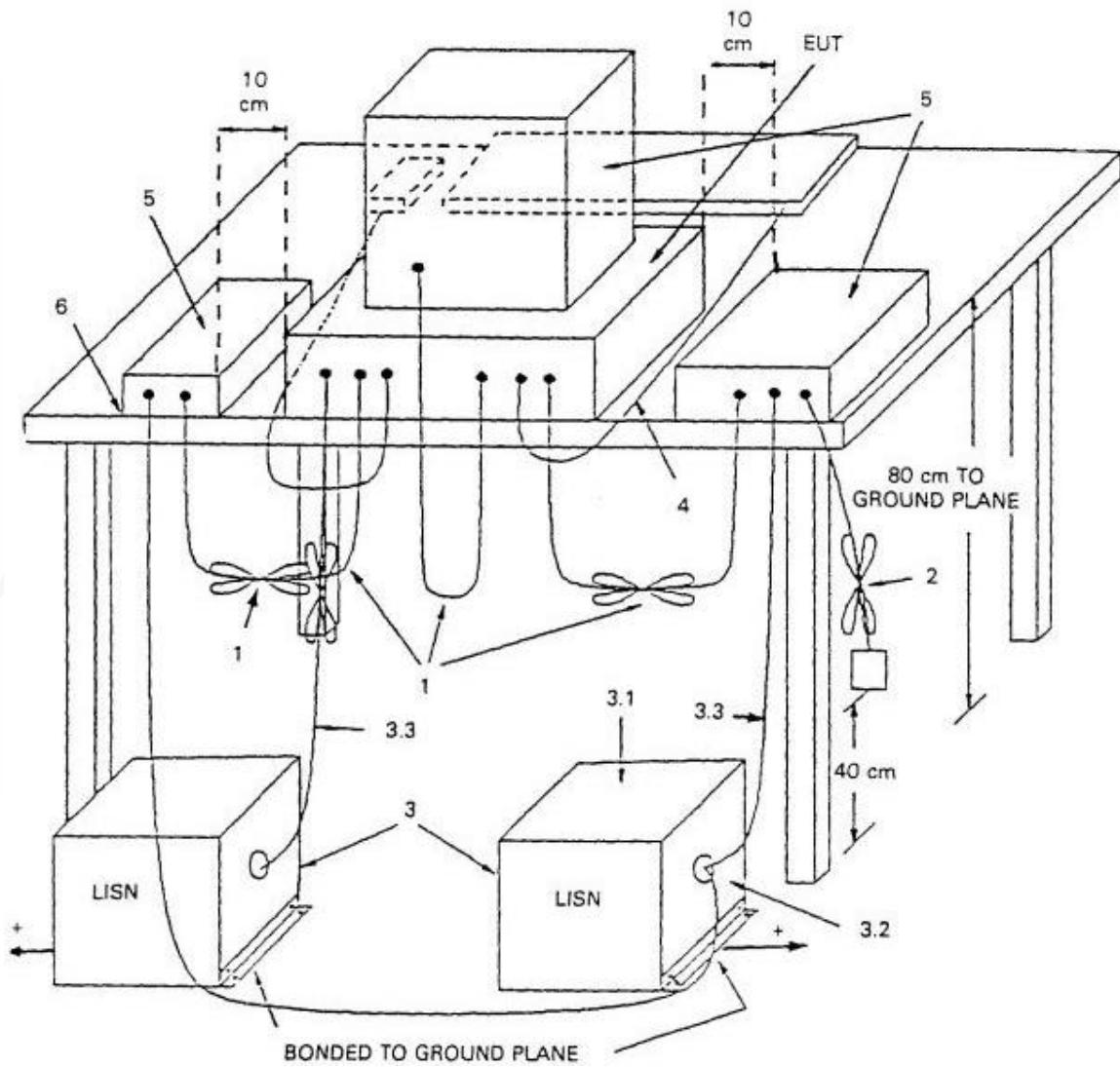
Conducted Emissions

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 μ H (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.

Conducted Emissions Diagram:



Radiated Emissions Diagram:

