Engineering Report 34651-1

Shielding Effectiveness Test

for

The Williams Brothers Corp. of America

Prepared by

Jenelle S. Gullickson, Lead Technical Writer

Approved by

Christopher J. Busch, EMI Department Manager

Revision history

Revision	Total pages	Date	Description
--	25	March 10, 2026	Original

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Section **Page**

1.0 Administrative data

Prepared for	The Williams Brothers Corp. of America 1330 Progress Drive Front Royal, VA 22630				
Attention	Marcus Williams				
Test performed	Shielding Effectiveness Test				
Test facility	Element Materials Technology 7780 Technology Drive Melbourne, FL 32904				
Item(s) tested	Access Doors				
Model number(s)	BASIC 300	DWAL 412-HD	GP 100	DW-405 PHANTOM	WB DC-SS 900
Serial number(s)	SE1	SE2	SE3	SE4	SE5
Primary specification(s)	ASTM D4935 (IEE-299 1997)				
PO number	10460				
Purchase date	2/19/2026				
Element report number	34651-1				
Project start date	2/7/2026				
Project completion date	3/6/2026				
Report completion date	3/10/2026				
As received	This document describes procedures and results of testing performed to the specification(s) and/or requirement(s) detailed herein. The results described in this report relate only to the specific items as received and tested.				
Decision rule	Based upon the type of testing being categorized as CAT I (Quantitative or Semi-Quantitative) as defined in A2LA's P103 Policy on Estimating Measurement Uncertainty for Testing Laboratories, decision rules are not required.				

2.0 Instrumentation, procedure, and results

2.1 Instrumentation

All instrumentation is calibrated regularly by instruments directly traceable to the National Institute of Standards and Technology, and in accordance with *ANSI/NCSL Z540.1, ANSI/NCSL Z540.3-2006,* and *ISO/IEC 17025: 2017*.

Table 2-1: Instrumentation list

Element asset	Description	Manufacturer	Model Number	Last Calibration	Due Calibration	Range
428	Antenna	Emco	3106	1/7/2025	1/7/2027	200 MHz to 1 GHz
1015	Amplifier	EIN	603L	N/A	N/A	800 kHz to 1 GHz
1034	Antenna	Electro Metrics	EM-6960	9/16/2025	9/16/2027	200 MHz to 2 GHz
1035	Antenna	A.H. Systems	SAS-540	12/17/2025	12/17/2027	20 MHz to 330 MHz
1161	Antenna	Electro Metrics	RGA-180	8/6/2025	8/6/2027	1 GHz to 18 GHz
1169	Antenna	A.H. Systems	SAS-571	7/8/2025	7/8/2027	1 GHz to 18 GHz
1394	Signal Generator	Rohde & Schwarz	SMB100A	11/5/2024	10/26/2026	100 kHz to 20 GHz
1498	Power Meter	Amplifier Research	PM2003	9/15/2025	9/15/2026	10 kHz to 40 GHz
1503	Power Sensor	Amplifier Research	PH2005	9/15/2025	9/15/2026	500 kHz to 18 GHz
1504	Spectrum Analyzer	Agilent	E7405A	1/8/2026	1/8/2027	9 kHz to 26.5 GHz
1505	Antenna	A.H. Systems	SAS-543	N/A	N/A	20 MHz to 300 MHz
PRB-002	Laser Power Field Probe	Amplifier Research	AMPL-F7040-NR	1/30/2025	1/30/2027	2 MHz to 40 GHz

2.2 Procedure

Shielding effectiveness measurements were conducted in accordance with ASTM D4935 (IEE-299 1997). Refer to Appendix A for test details.

2.3 Results

Upon completion of testing, measurement data was provided to the customer. The customer is to determine the results of testing. Refer to Appendix A for summary data, figures, and photographs.

The test units were returned to The Williams Brothers Corp. of America.

Appendix A: Shielding Effectiveness

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
Project number	34651	**Specification**	ASTM D4935 (IEE-299 1997)		
DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

Equipment under test information

Description	Model number	Serial number
Access Door	BASIC 300	SE1
Access Door	DWAL 412-HD	SE2
Access Door	GP 100	SE3
Access Door	DW-405 PHANTOM	SE4
Access Door	WB DC-SS 900	SE5

Equipment list — X = within calibration dates, N/A = calibration not necessary

Element ID no.	Equipment description	Cal?	Element ID no.	Equipment description	Cal?
1394	Signal generator	X	1498	Power meter	X
1504	Spectrum analyzer	X	1169	Antenna	X
1034	Antenna	X	1161	Antenna	X
1035	Antenna	X	428	Antenna	X
1505	Antenna	N/A	PRB-002	Field probe	X
1015	Amplifier	N/A	1503	Power sensor	X

Shielding Effectiveness Test results

Frequency range	Antenna polarity	Number of frequency steps	Door tested	6 dB bandwidth	Result	Notes
80 MHz to 18 GHz	Vertical	113	BASIC 300	100 Hz	Information only	Figure A-1
80 MHz to 18 GHz	Horizontal	113	BASIC 300	100 Hz	Information only	Figure A-2
80 MHz to 18 GHz	Vertical	113	DWAL 412-HD	100 Hz	Information only	Figure A-3
80 MHz to 18 GHz	Horizontal	113	DWAL 412-HD	100 Hz	Information only	Figure A-4
80 MHz to 18 GHz	Vertical	113	GP 100	100 Hz	Information only	Figure A-5
80 MHz to 18 GHz	Horizontal	113	GP 100	100 Hz	Information only	Figure A-6
80 MHz to 18 GHz	Vertical	113	DW-405 PHANTOM	100 Hz	Information only	Figure A-7
80 MHz to 18 GHz	Horizontal	113	DW-405 PHANTOM	100 Hz	Information only	Figure A-8
80 MHz to 18 GHz	Vertical	113	WB DC-SS 900	100 Hz	Information only	Figure A-9
80 MHz to 18 GHz	Horizontal	113	WB DC-SS 900	100 Hz	Information only	Figure A-10

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
Project number	34651	**Specification**	ASTM D4935 (IEE-299 1997)		
DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

Photograph A-1: EUT identification, BASIC 300

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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Photograph A-2: EUT identification, DWAL 412-HD

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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Photograph A-3: EUT identification, GP 100

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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Photograph A-4: EUT identification, DW-405 PHANTOM

element

Data sheet

Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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Photograph A-5: EUT identification, WB DC-SS 900

element

Data sheet
Shielding Effectiveness

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Photograph A-6: Test setup, transmit antenna location

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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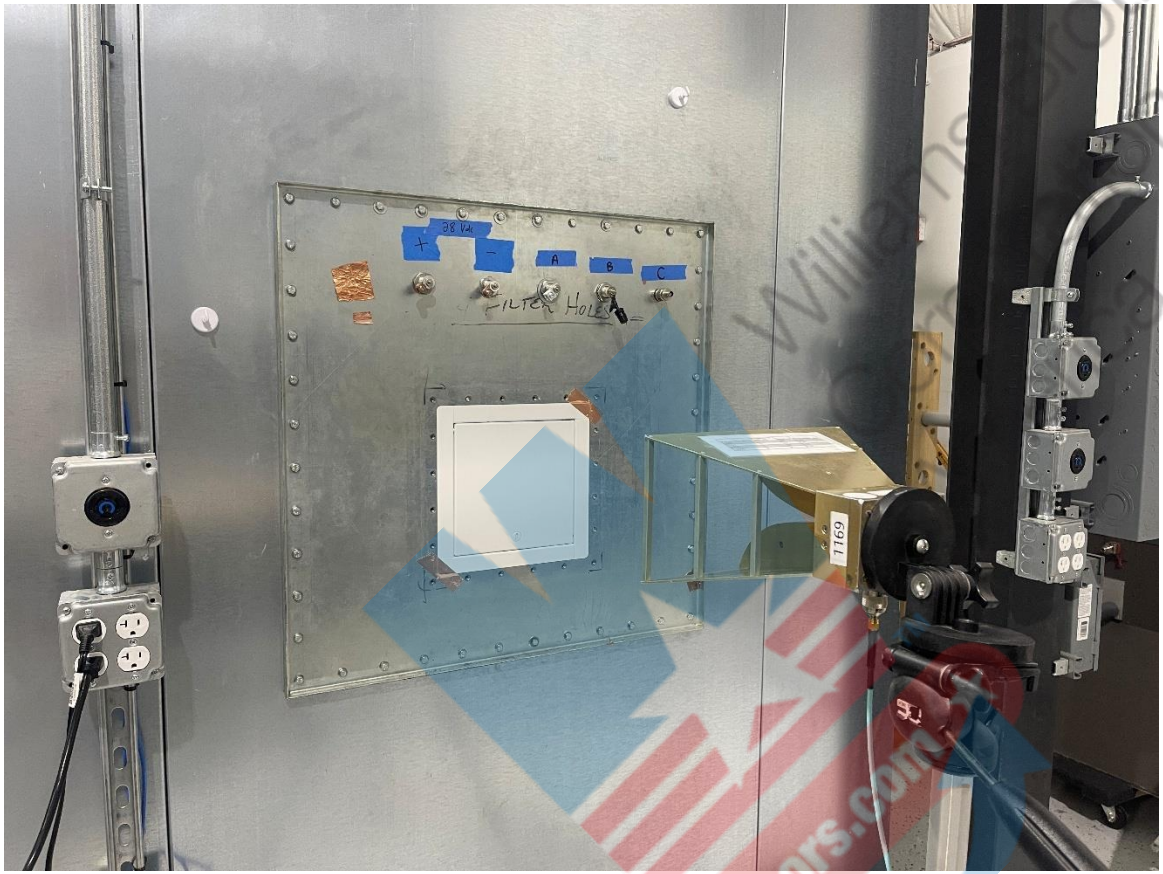
DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1



Photograph A-7: Test setup, receive antenna location

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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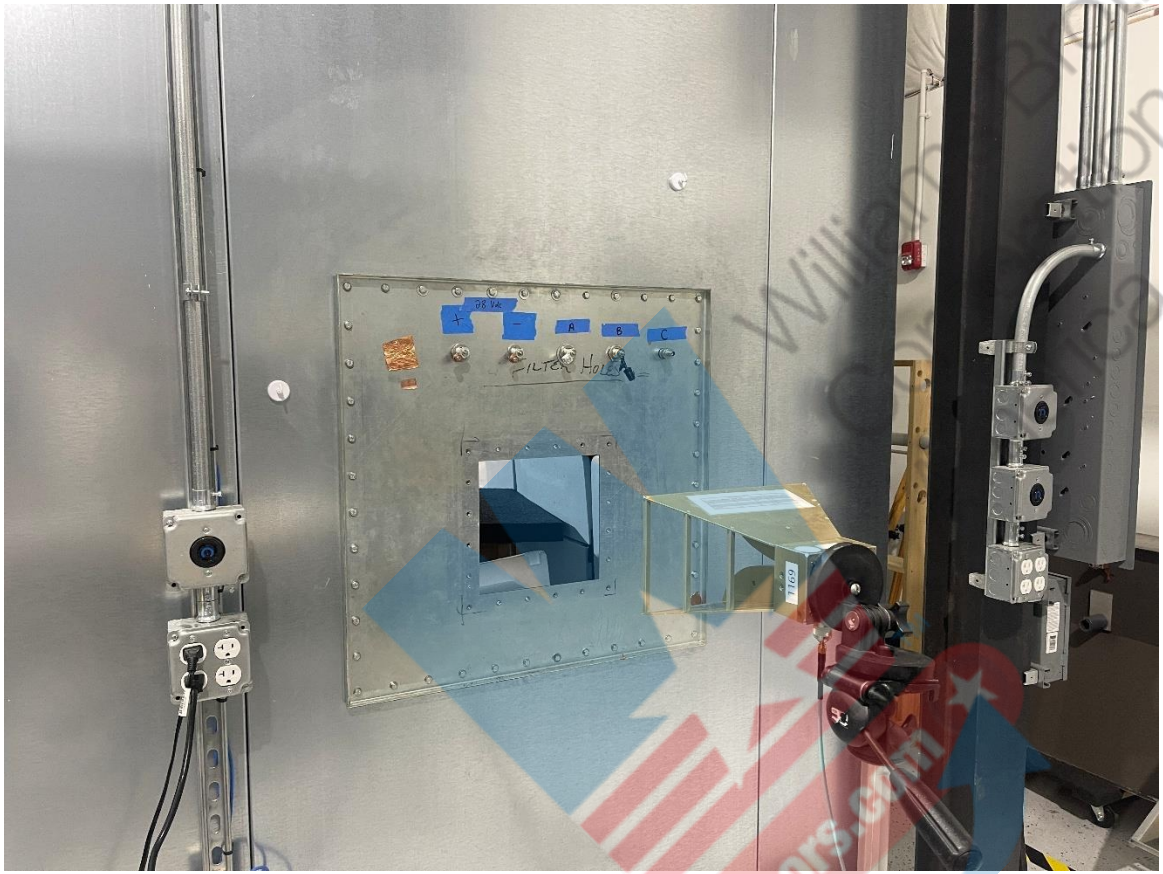
DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1



Photograph A-8: Test setup, empty window

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

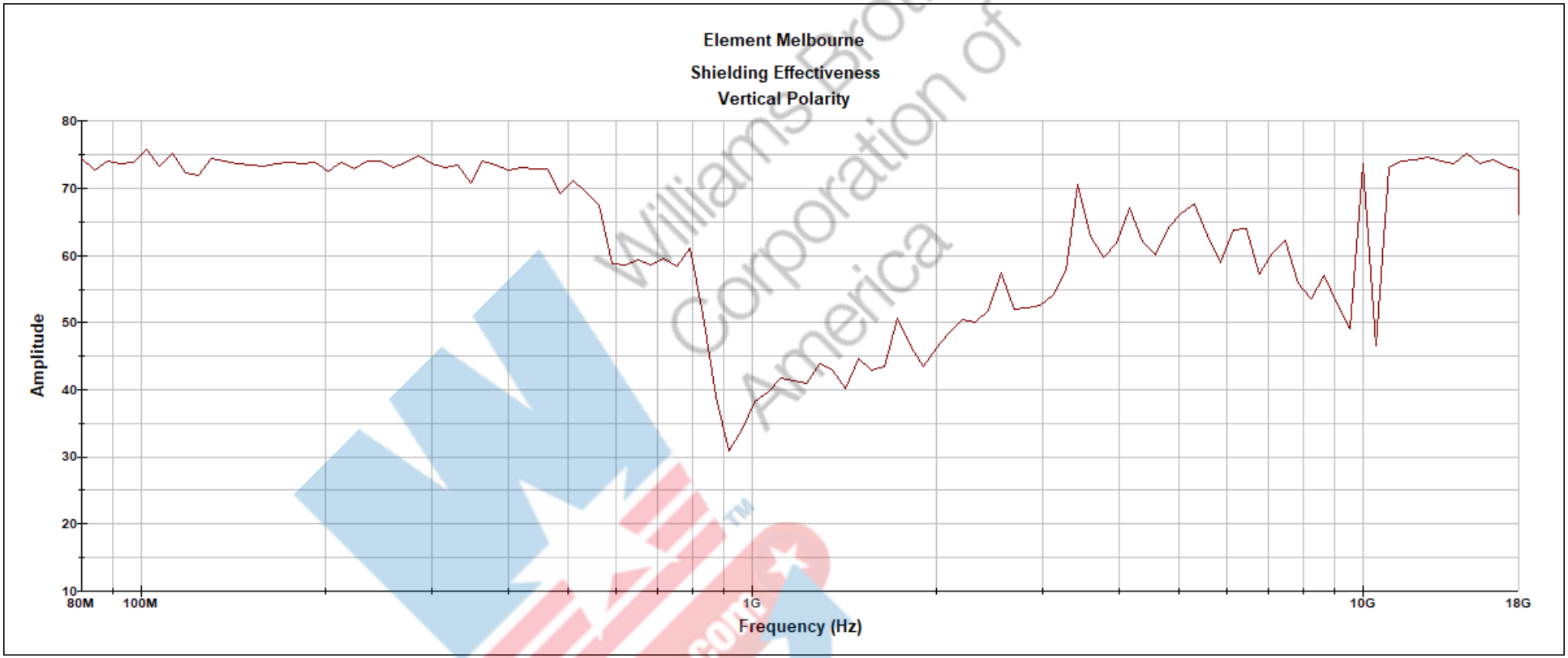

Figure A-1: 80 MHz to 18 MHz, BASIC 300, vertical

Red trace = shielding effectiveness (dB)

element

Data sheet
Shielding Effectiveness

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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

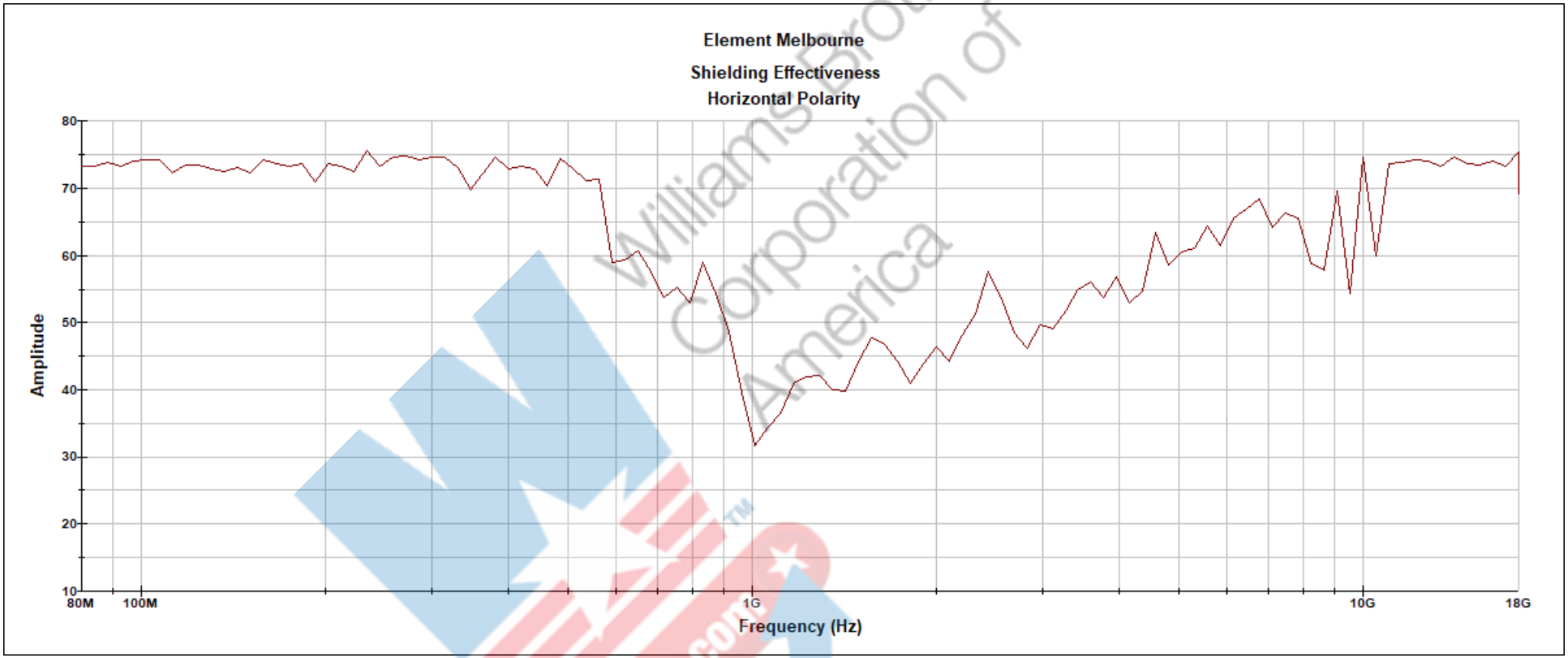

Figure A-2: 80 MHz to 18 MHz, BASIC 300, horizontal

Red trace = shielding effectiveness (dB)

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

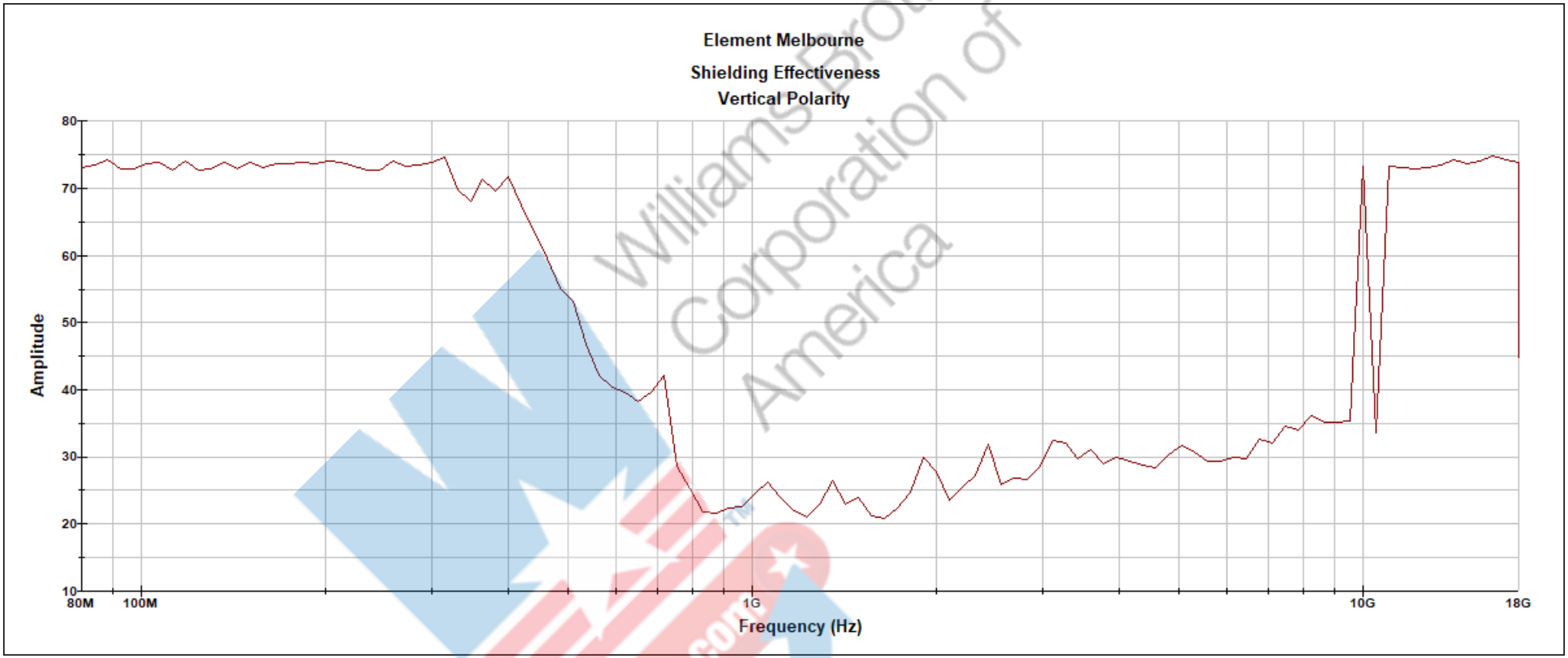

Figure A-3: 80 MHz to 18 MHz, DWAL 412-HD, vertical

Red trace = shielding effectiveness (dB)

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

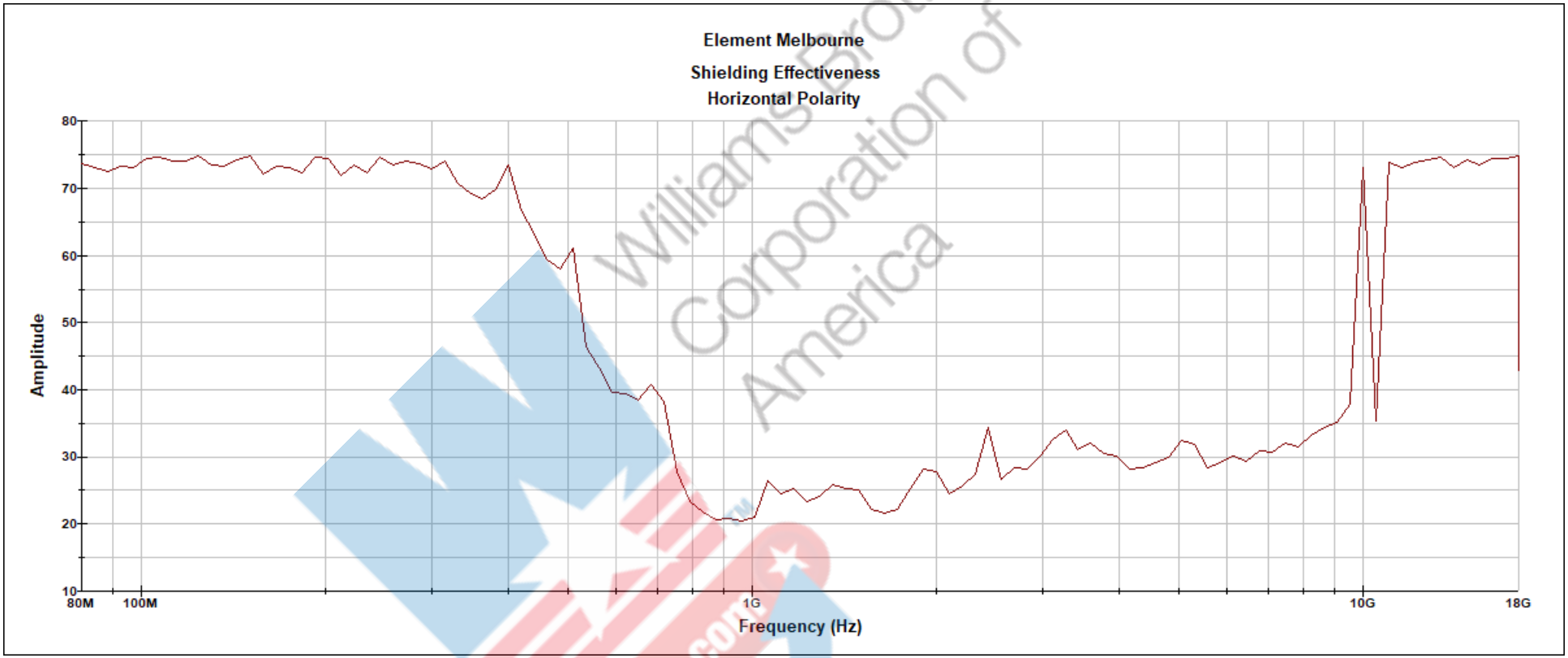

Figure A-4: 80 MHz to 18 MHz, DWAL 412-HD, horizontal

Red trace = shielding effectiveness (dB)

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

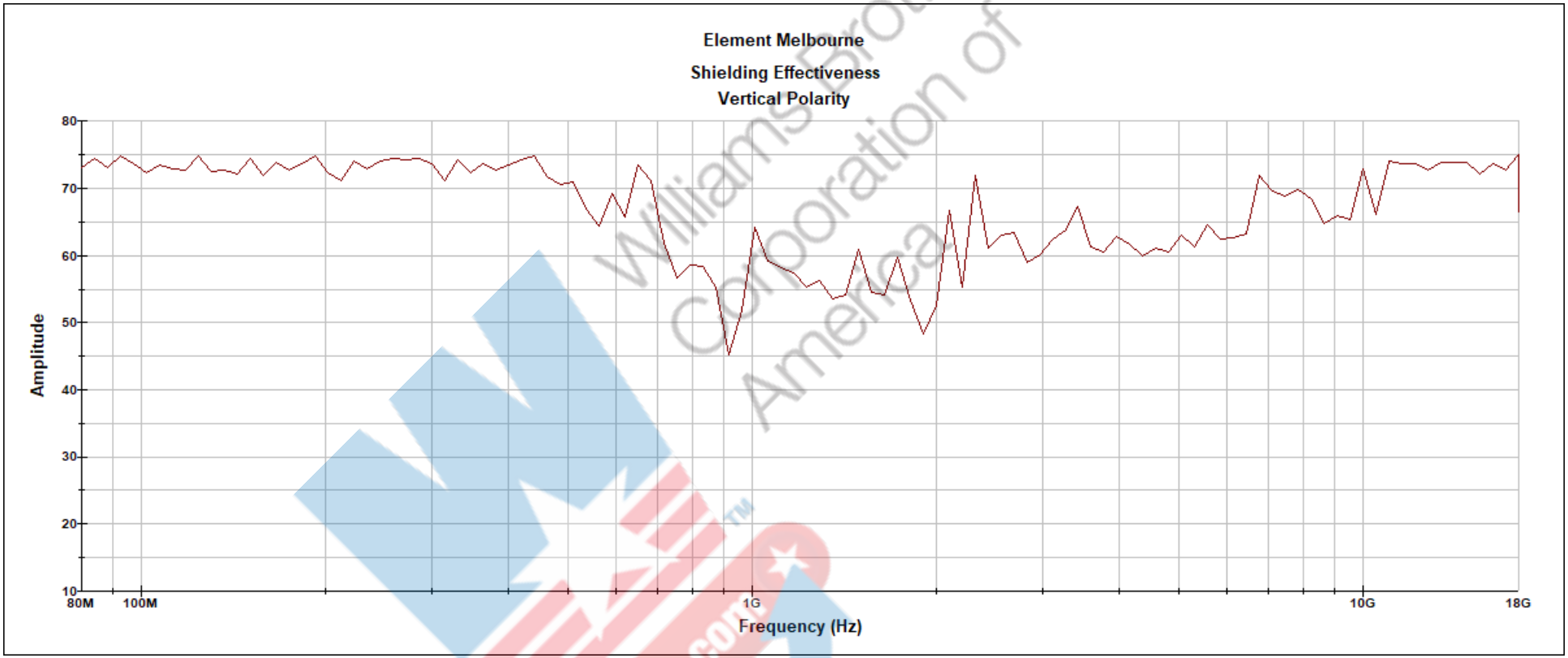

Figure A-5: 80 MHz to 18 MHz, GP 100, vertical

Red trace = shielding effectiveness (dB)

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

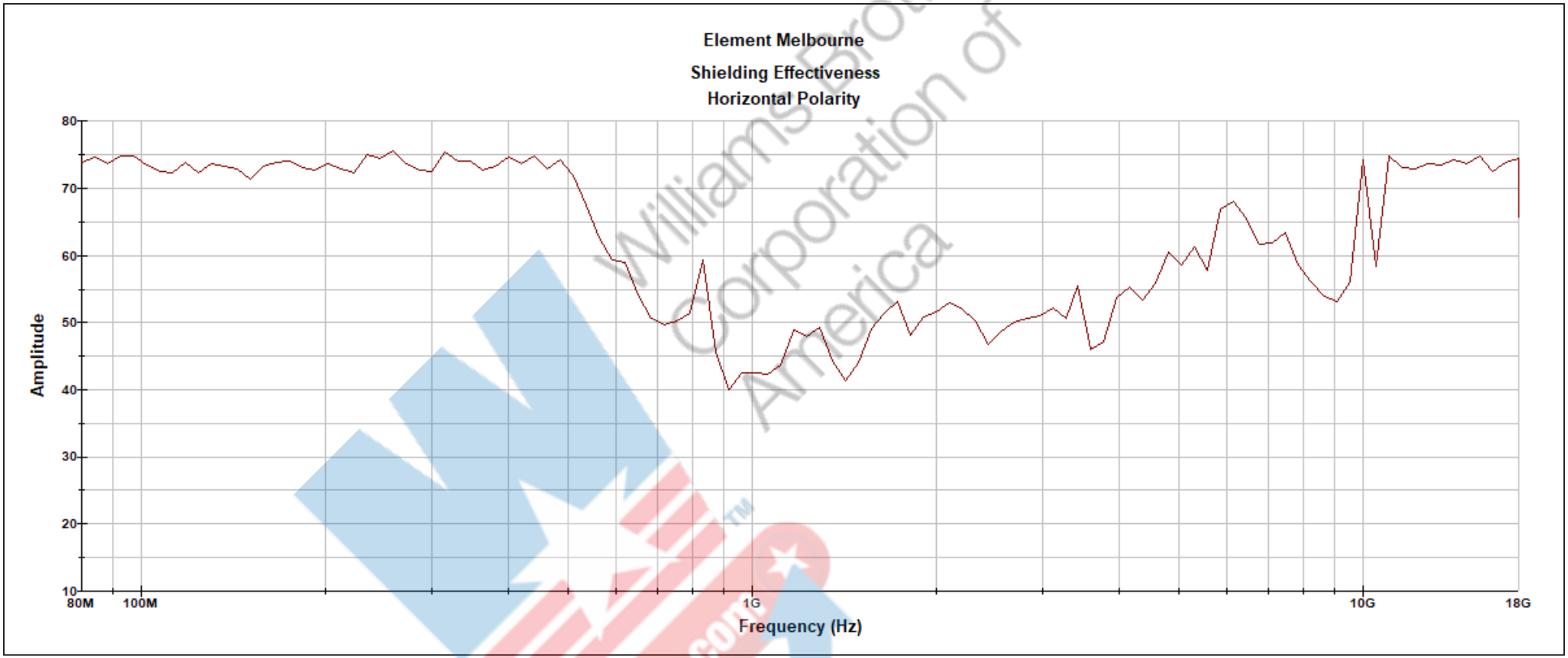

Figure A-6: 80 MHz to 18 MHz, GP 100, horizontal

Red trace = shielding effectiveness (dB)

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

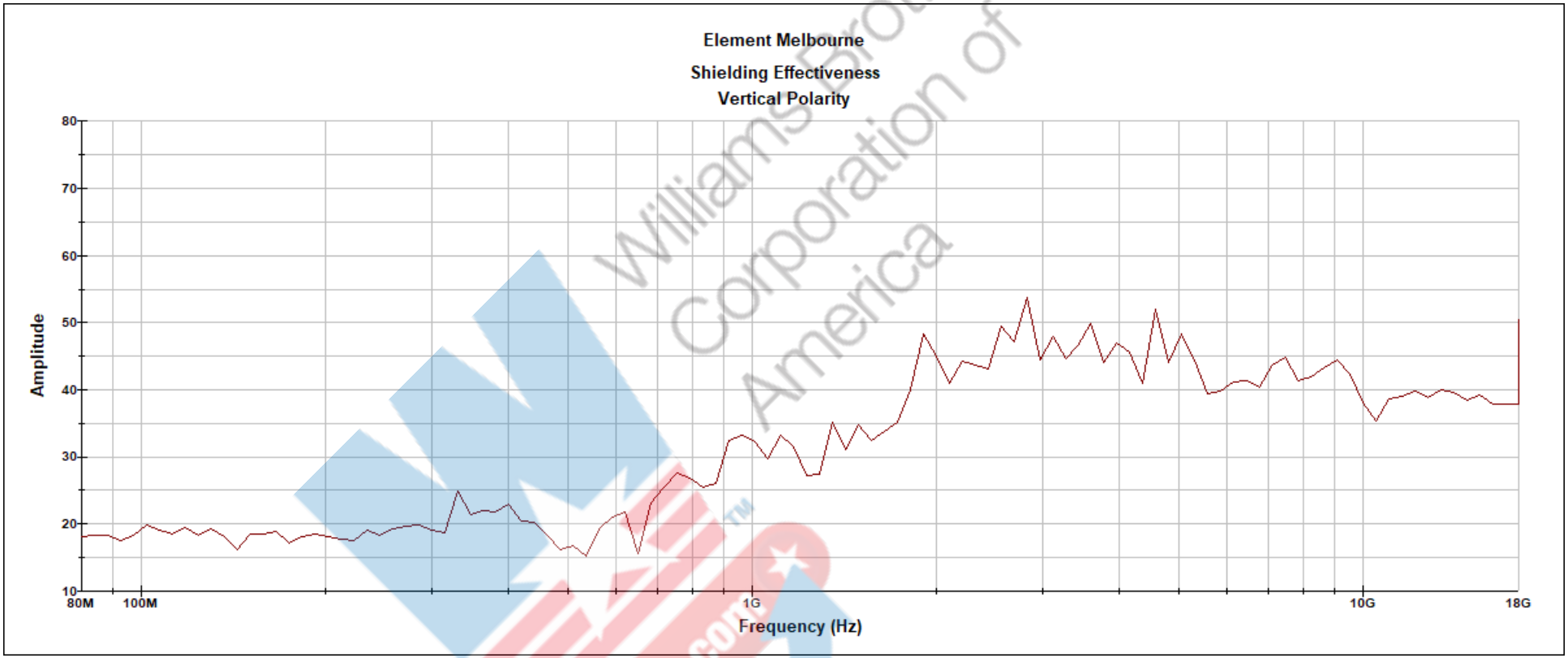

Figure A-7: 80 MHz to 18 MHz, DW-405 PHANTOM, vertical

Red trace = shielding effectiveness (dB)

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

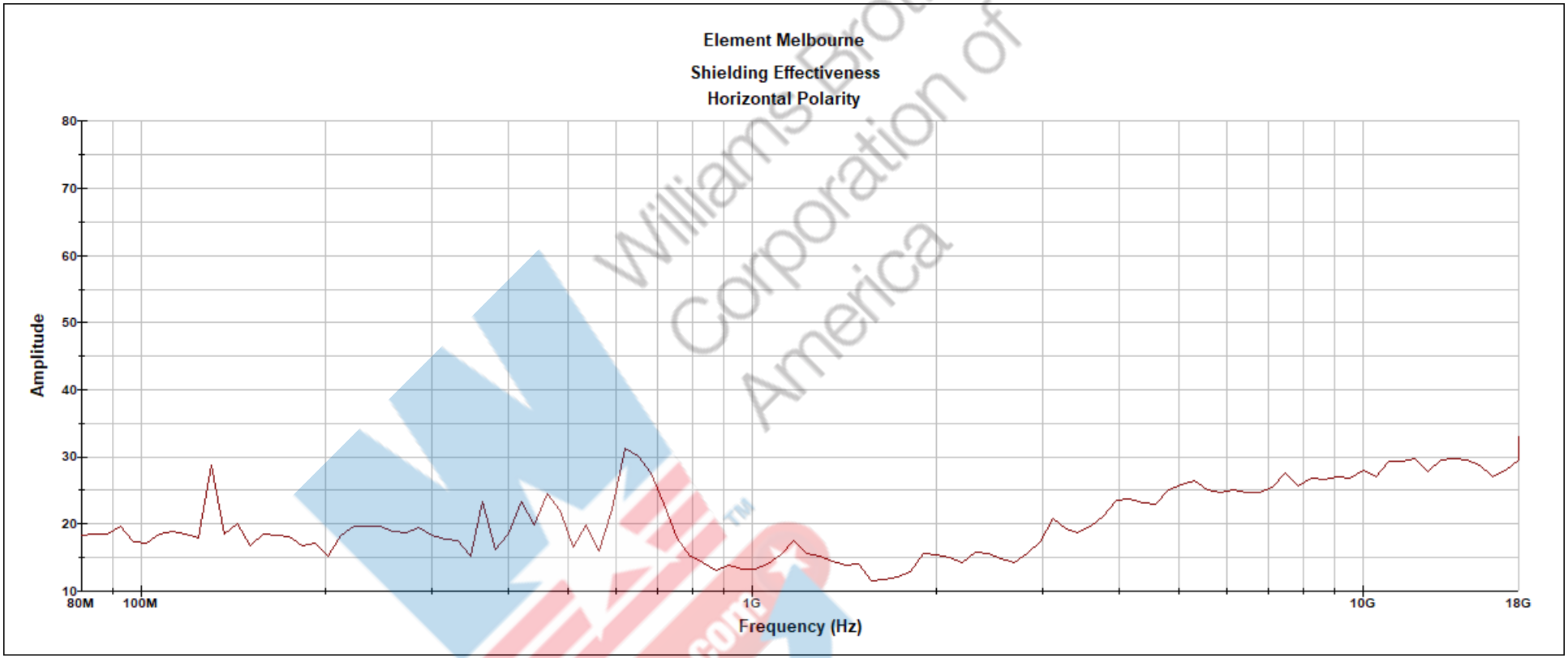

Figure A-8: 80 MHz to 18 MHz, DW-405 PHANTOM, horizontal

Red trace = shielding effectiveness (dB)

element

Data sheet
Shielding Effectiveness

Company name	The Williams Brothers Corp of America	**Performed by**	MLY	**Reviewed by**	CJB
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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

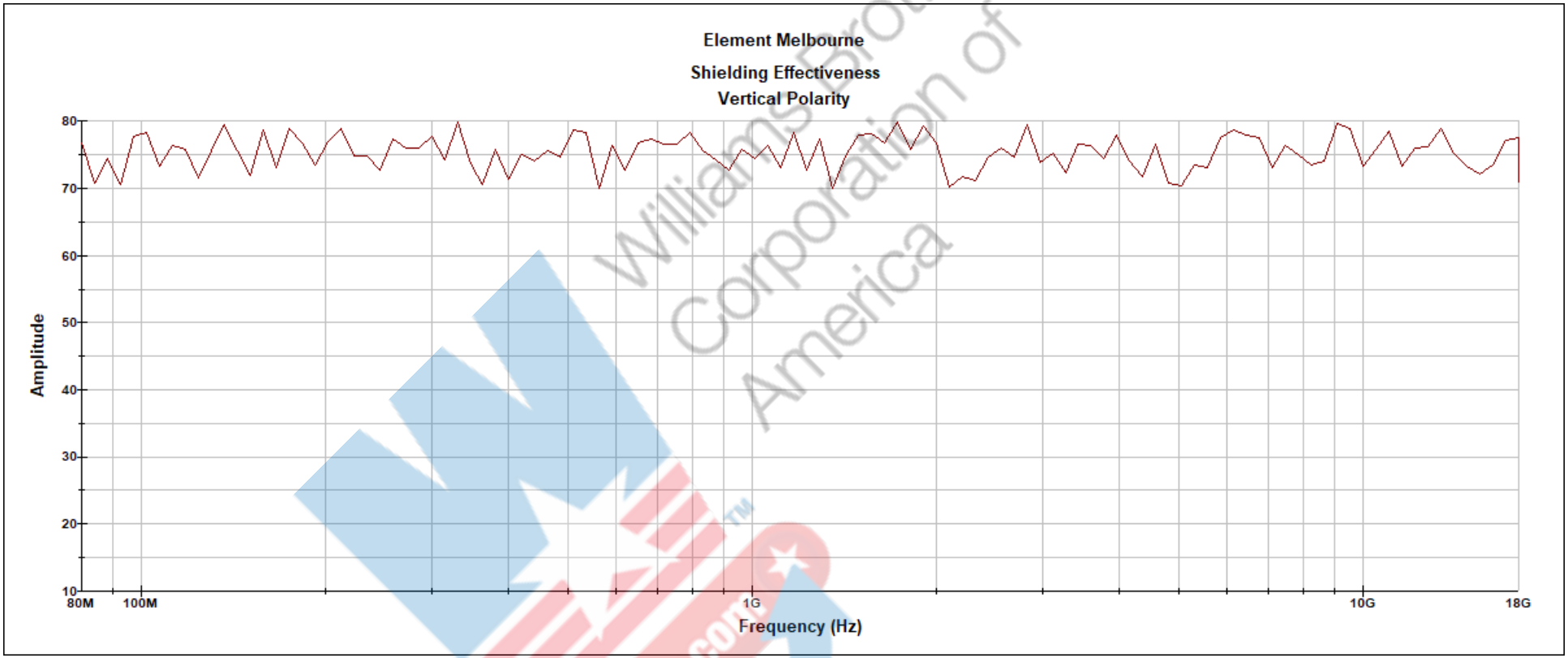

Figure A-9: 80 MHz to 18 MHz, WB DC-SS 900, vertical

Red trace = shielding effectiveness (dB)

Data sheet
Shielding Effectiveness

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DUT description	Access Door	**Test date(s)**	2/7/2026 to 3/6/2026	**Location**	Chamber 1

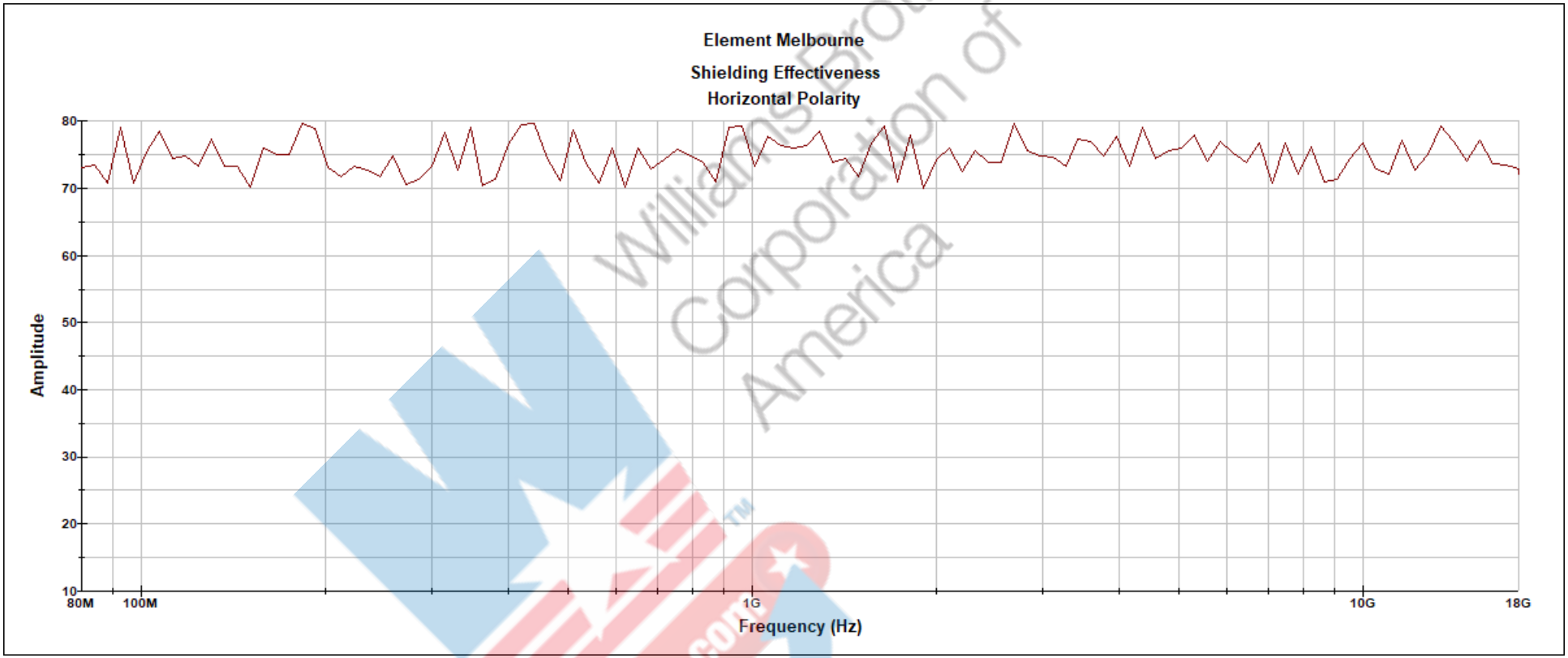

Figure A-10: 80 MHz to 18 MHz, WB DC-SS 900, horizontal

Red trace = shielding effectiveness (dB)