bre

Laboratory Sound Insulation Testing of Click FlameGuard Dry Lining wall socket boxes

Prepared for: Karl Rawling

Click - Scolmore International Ltd
1 Scolmore Park
Landsberg
Tamworth
Staffs
B79 7XB

19 October 2007

Test report number 240074

UKAS TESTING

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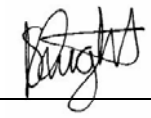
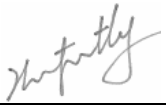
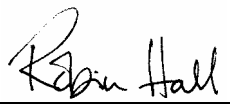
Tested by

Name	Mr S Dwight
Position	Technician
Date	19 October 2007
Signature	

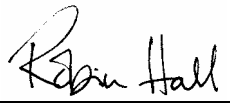
Prepared by

Name	Mr K Jaitly
Position	Technician
Date	19 October 2007
Signature	

Checked by

Name	Dr R Hall
Position	Principal Consultant
Date	19 October 2007
Signature	

Approved on behalf of BRE

Name	Dr R Hall
Position	Principal Consultant
Date	19 October 2007
Signature	

BRE
Garston
WD25 9XX
T + 44 (0) 1923 664000
F + 44 (0) 1923 664010
E enquiries@bre.co.uk
www.bre.co.uk

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Contents

1 Introduction

BRE Acoustics was commissioned by Click - Scolmore International Ltd to carry out airborne sound insulation measurements in the BRE horizontal transmission suite (Building 9), BRE, Garston, Watford, Hertfordshire, WD25 9XX.

This report details the testing outlined in BRE proposal 7059 - 120971.

2 Testing details

2.1 Test dates and personnel

The measurements detailed in this report were made on 08 October 2007 and 09 October 2007 by Mr S Dwight and Mr K Jaitly of BRE Acoustics.

2.2 Test method and applicable standards

Measurement of airborne sound insulation was made in accordance with BS EN ISO 140-3:1995. Single number quantities were calculated in accordance with BS EN ISO 717-1:1997.

BRE Acoustics holds UKAS accreditation for the measurement of sound insulation in the field and the laboratory. The measurements were conducted using the procedures accredited by UKAS.

2.3 Test element installation

The test constructions were installed by BRE.

2.4 Instrumentation

The equipment used to conduct the tests is identified in Table 1.

Table 1 Equipment list

Equipment description	Manufacturer	Type	UKAS identification number
Microphone Calibrator	NOR	1253	01/008
Microphone	GRAS	40AE	02/302, 02/304
Microphone Preamplifier	GRAS	26CA	04/302, 04/304
Microphone Adapter	NOR	1449	06/105, 06/106
Graphic Equaliser	Phonic	PEQ3300	10/001
Real Time Analyser	NOR	840	13/005
Microphone Rotating Boom	NOR	212NA	14/004, 14/005
Loudspeaker	NOR	270H	11/014, 11/016

The gain of the real time analyser was adjusted to give a reading of 124.0 dB 250 Hz using the NOR type 1253 calibrator.

All equipment is calibrated in accordance with BRE procedures, using reference equipment calibrated by a UKAS accredited laboratory.

2.5 Test numbers

Table 2 lists each test element along with its corresponding test number. The construction details for each test element can be found from Table 3 by referring to the test number.

Table 2 Test numbers

Test number	Test element	Source room volume (m^3)	Receive room volume (m^3)	Common area (m^2)
L107-206	Wall	130	115	9.8
L107-207	Wall	130	115	9.8

2.6 Construction details with test numbers

The construction details as provided and confirmed by the client are shown in Table 3. When construction details are provided by a third party, they are checked by BRE where possible.

Table 3 Construction details

Test element	Test number	Construction details
wall	L107-206	• 15 mm standard plasterboard (11kg/m²) screwed to • 12.5 mm Knauf Piano Board (11kg/m²) screwed to • 70 mm Knauf Acoustic 'C' studs (0.7 kg/m) at 625 mm centres with 72 mm Knauf 'U' Channel (0.3 kg/m) at the top and bottom of the partition • 50 mm mineral wool comprising 2 x 25 mm Knauf Crown Acoustic Partition Roll (20.7 kg/m³) between studs • 12.5 mm Knauf Piano Board (11kg/m²) screwed to • 15 mm standard plasterboard (11kg/m²) screwed to studs • all joints taped and skimmed, perimeter sealed
	L107-207	• As test L107-206 with • SIX 2 Gang FlameGuard wall socket boxes (130mm x 70mm x 47mm each), 3 on each side back to back (see figure 2)

2.7 Sound insulation test results

The single number quantities for the sound insulation tests are shown in Table 4. The UKAS test result sheets are included in the appendices.

Table 4 Test results

Test number	R_w (C;C_{tr}) (dB)
L107-206	58 (-3;-9)
L107-207	57 (-2;-8)

2.8 Plans

The position of the 70 mm stud wall in the transmission suite aperture is indicated in Figure 1.

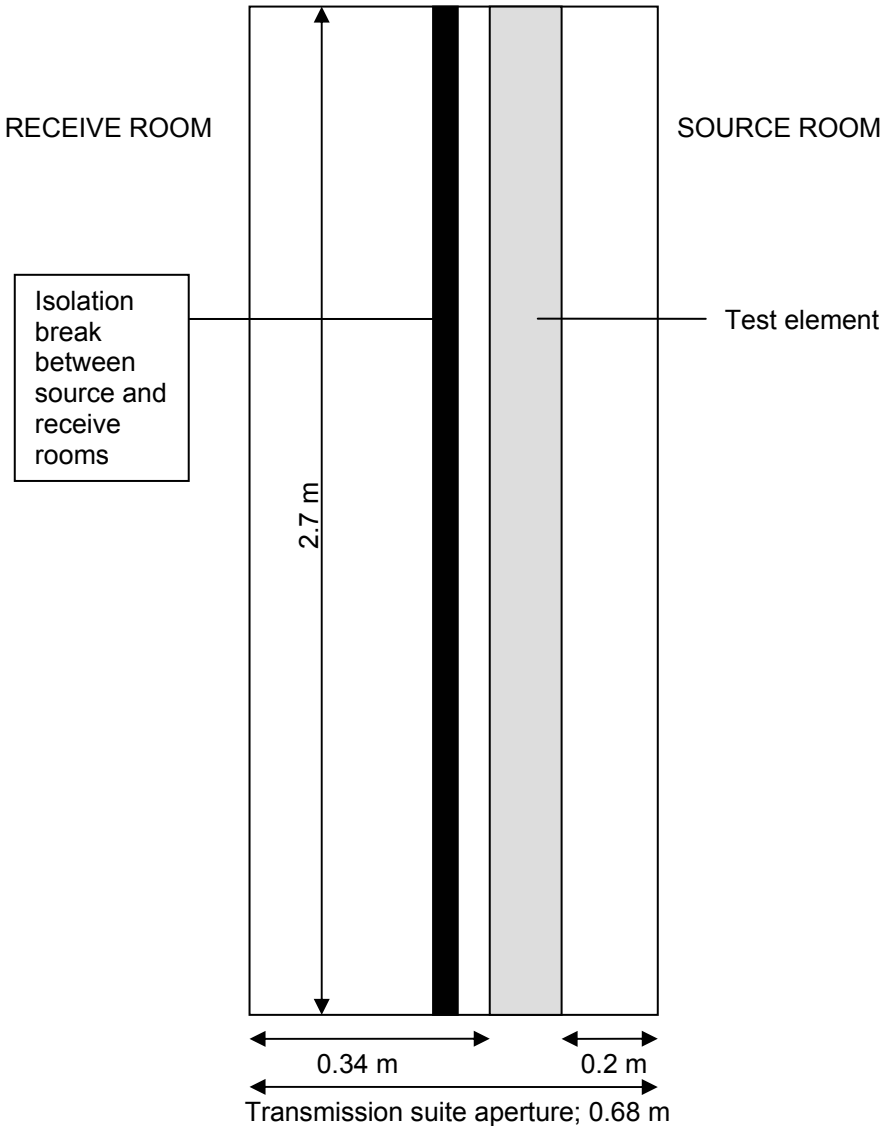

Figure 1 Section through elevation showing the position of the wall in the transmission suite aperture

2.9 Pictures

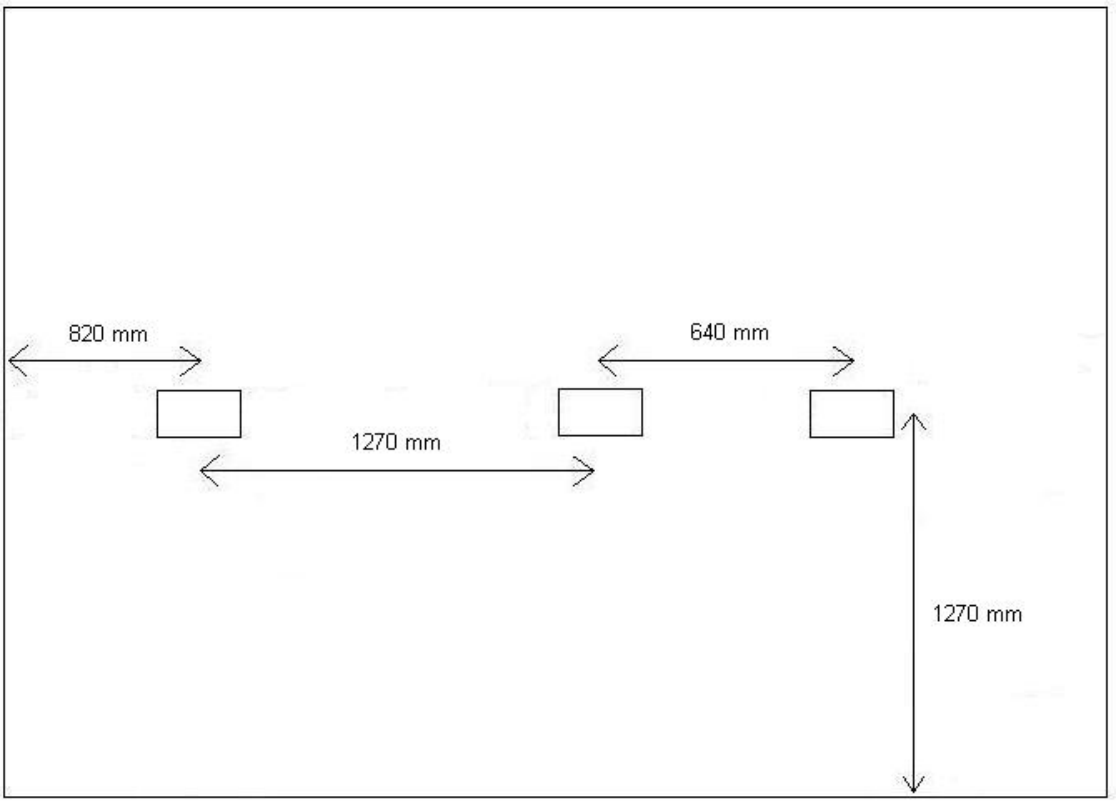

Figure 2 Positions of sockets in wall (source side) as for test L107-207
(Note: Sockets back to back on receive side)

3 Appendices

3.1 UKAS test result sheets

Page number	Test number
12	L107-206
14	L107-207

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Laboratory measurement of airborne sound insulation of building elements
Sound reduction index according to BS EN ISO 140-3:1995
BRE horizontal transmission suite (B9 051-053)

Client: Click - Scolmore International Ltd

Test date: 08/10/2007 **Test number:** L107-206 **Test element:** Wall

Test element area: 9.8 m² **Mass per unit area:** 50 kg/m²

Description:

See table 3 for full construction details

Source room volume: 130 m³ **Air temperature:** 17 ºC

Receive room volume: 115 m³ **Air relative humidity:** 67 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	*R* (dB)	
50	2.54	21.4	79.7	64.3	16.7	
63	1.70	24.3	86.6	71.1	15.1	
80	1.71	25.0	88.8	69.8	18.6	
100	1.34	19.8	91.1	59.2	30.4	
125	1.87	19.5	94.5	55.9	38.6	
160	1.60	14.3	95.4	51.0	43.6	
200	1.64	13.2	97.2	48.5	48.2	
250	1.48	4.2	96.8	47.4	48.3	
315	1.52	3.3	94.4	42.5	51.0	
400	1.48	1.7	96.3	42.1	53.2	
500	1.53	4.2	96.3	42.6	52.7	
630	1.55	3.1	95.3	38.6	55.9	
800	1.47	2.1	94.0	32.9	60.1	
1,000	1.52	1.7	92.9	26.6	65.4	
1,250	1.52	2.9	94.7	24.3	69.5	
1,600	1.52	4.3	95.7	23.8	71.0	
2,000	1.54	3.6	94.1	21.1	72.1	
2,500	1.51	3.8	93.0	27.1	65.0	
3,150	1.45	4.5	91.4	27.1	63.2	
4,000	1.36	5.0	97.6	25.1	71.1	
5,000	1.23	5.4	96.8	18.3	76.7	+

+ Receiving room level adjusted for background

Rating according to BS EN ISO 717-1:1997

R_w **(***C***;***C*$_{tr}$**)** **= 58 (-3;-9) dB**

$C_{50\text{-}3150}$	= -11 dB	$C_{50\text{-}5000}$	= -10 dB	$C_{100\text{-}5000}$	= -2 dB
$C_{tr,50\text{-}3150}$	= -23 dB	$C_{tr,50\text{-}5000}$	= -23 dB	$C_{tr,100\text{-}5000}$	= -9 dB

Evaluation based on laboratory measurement results obtained by an engineering method

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (R_w) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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Laboratory measurement of airborne sound insulation of building elements
Sound reduction index according to BS EN ISO 140-3:1995
BRE horizontal transmission suite (B9 051-053)

Client: Click - Scolmore International Ltd

Test date: 08/10/2007 **Test number:** L107-206 **Test element:** Wall

Test element area: 9.8 m² **Mass per unit area:** 50 kg/m²

Description:

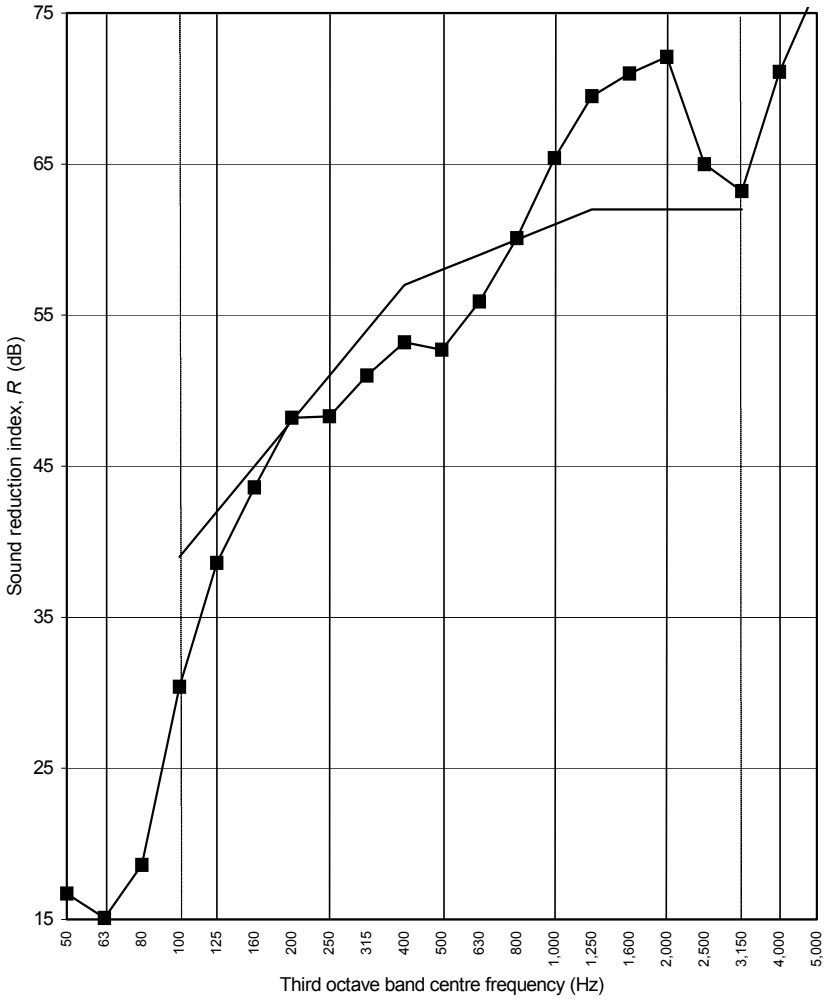
See table 3 for full construction details

Source room volume: 130 m³ **Air temperature:** 17 ºC

Receive room volume: 115 m³ **Air relative humidity:** 67 %

Frequency (Hz)	*R* One-third octave (dB)
50	16.7
63	15.1
80	18.6
100	30.4
125	38.6
160	43.6
200	48.2
250	48.3
315	51.0
400	53.2
500	52.7
630	55.9
800	60.1
1,000	65.4
1,250	69.5
1,600	71.0
2,000	72.1
2,500	65.0
3,150	63.2
4,000	71.1
5,000	76.7 +

+ Receiving room level adjusted for background



Rating according to BS EN ISO 717-1:1997

$R_w (C;C_{tr})$ **= 58 (-3;-9) dB**

$C_{50\text{-}3150}$	= -11 dB	$C_{50\text{-}5000}$	= -10 dB	$C_{100\text{-}5000}$	= -2 dB
$C_{tr,50\text{-}3150}$	= -23 dB	$C_{tr,50\text{-}5000}$	= -23 dB	$C_{tr,100\text{-}5000}$	= -9 dB

Evaluation based on laboratory measurement results obtained by an engineering method

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (R_w) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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Sound reduction index according to BS EN ISO 140-3:1995
BRE horizontal transmission suite (B9 051-053)

Client: Click - Scolmore International Ltd

Test date: 09/10/2007 **Test number:** L107-207 **Test element:** Wall

Test element area: 9.8 m²

Description:

See table 3 for full construction details

Source room volume: 130 m³ **Air temperature:** 17 ºC

Receive room volume: 115 m³ **Air relative humidity:** 70 %

Frequency (Hz)	Reverberation time (s)	Background level (dB)	Source level (dB)	Receive level (dB)	*R* (dB)	
50	2.70	34.3	80.8	66.6	15.8	
63	1.64	29.6	88.5	72.2	15.8	
80	1.57	26.8	88.4	69.4	18.2	
100	1.39	23.6	90.0	57.9	30.8	
125	1.76	23.4	93.7	55.6	37.8	
160	1.57	17.8	94.6	50.3	43.5	
200	1.63	13.8	96.2	47.1	48.5	
250	1.57	3.9	95.8	46.2	48.8	
315	1.55	3.5	93.5	41.4	51.3	
400	1.51	1.8	95.4	41.4	53.0	
500	1.54	4.0	95.4	42.6	52.0	
630	1.49	3.7	94.8	40.2	53.6	
800	1.51	2.3	93.0	35.1	57.0	
1,000	1.50	1.6	92.1	27.4	63.8	
1,250	1.46	3.4	94.0	24.6	68.3	
1,600	1.54	5.2	95.0	26.9	67.2	
2,000	1.53	3.7	93.4	20.5	72.0	
2,500	1.51	3.7	92.3	26.0	65.4	
3,150	1.46	4.3	90.7	26.4	63.2	
4,000	1.37	4.8	97.8	25.5	70.9	
5,000	1.21	5.3	97.0	18.7	76.5	+

+ Receiving room level adjusted for background

Rating according to BS EN ISO 717-1:1997

R_w (C;C_{tr}) = 57 (-2;-8) dB

$C_{50\text{-}3150}$	= -10 dB	$C_{50\text{-}5000}$	= -9 dB	$C_{100\text{-}5000}$	= -1 dB
$C_{tr,50\text{-}3150}$	= -22 dB	$C_{tr,50\text{-}5000}$	= -22 dB	$C_{tr,100\text{-}5000}$	= -8 dB

Evaluation based on laboratory measurement results obtained by an engineering method

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (R_w) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)

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Frequency (Hz)	*R* One-third octave (dB)
50	15.8
63	15.8
80	18.2
100	30.8
125	37.8
160	43.5
200	48.5
250	48.8
315	51.3
400	53.0
500	52.0
630	53.6
800	57.0
1,000	63.8
1,250	68.3
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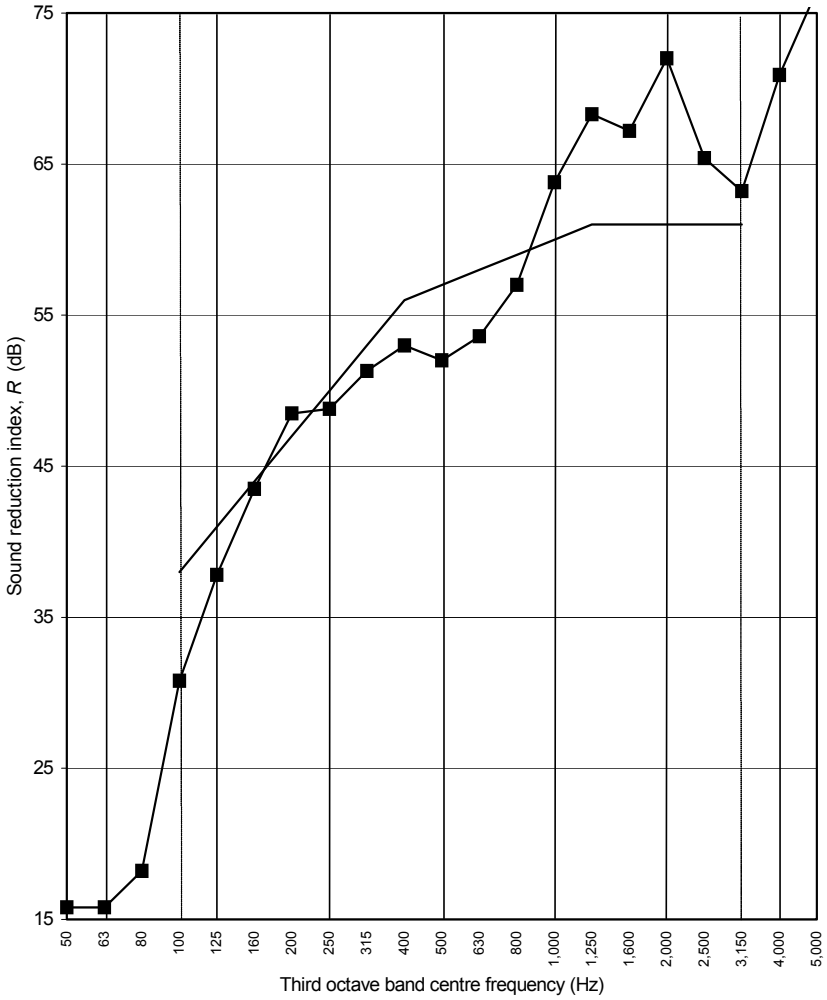

Rating according to BS EN ISO 717-1:1997

$R_w (C;C_{tr})$	**= 57 (-2;-8) dB**	$C_{50\text{-}3150}$	= -10 dB	$C_{50\text{-}5000}$	= -9 dB	$C_{100\text{-}5000}$	= -1 dB
		$C_{tr,50\text{-}3150}$	= -22 dB	$C_{tr,50\text{-}5000}$	= -22 dB	$C_{tr,100\text{-}5000}$	= -8 dB

Evaluation based on laboratory measurement results obtained by an engineering method

Based on the data provided in BS EN 20140-2:1993 it is estimated that the measurement uncertainty should not exceed ±1 dB for the single-number quantity (R_w) and should not exceed the values in Table A1 of BS EN 20140-2:1993 for the data in the individual third octaves (R)