	Testing Services™	Annex B to Hearing Aid Compatil Report for the BlackBerry® Smar		I	Page 1(13)
Author Data	Dates of Test		Report No	FCC ID	
Daoud Attayi	Feb. 17,	June 28, Dec. 17-18, 2012	RTS-6026-1302-03	L6AR	FL110LW

Annex B: Probe and dipole descriptions and calibration certificates

B.2 Dipole calibration certificate

ta Dates of Test			Report No	FCC ID
d Attayi Feb. 17,	June 28, Dec. 1	7-18, 2012	RTS-6026-1302-03	L6ARFL110LW
Calibration Laborator	ry of	KUT GNISS	S Schweizerischer Kalibr	rierdienst
Schmid & Partner		ILAC MRA o Tz	C Service suisse d'étalor	-
Engineering AG Zeughausstrasse 43, 8004 Zuric	ch, Switzerland	Tores Carl	Servizio svizzero di tar S Swiss Calibration Serv	
Accredited by the Swiss Accredit			ditation No.: SCS 108	
The Swiss Accreditation Servic Multilateral Agreement for the r	-			
Client RTS (RIM Test	ing Services)	Cerul	cete No: CD835V3-1011_	Nov11
CALIBRATION O	CERTIFICAT		al al alla de se	
Object	CD835V3 - SN:	1011	A ST ST ST ST ST ST	
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Certificate No: CD835V3-1011_Nov11

Page 1 of 6



Annex B to Hearing Aid Compatibility RF Emissions Test Report for the BlackBerry® Smartphone model RFL111LW

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Page

Author Data Daoud Attavi Dates of Test Feb. 17, June 28, Dec. 17-18, 2012

Document

Report No FCC ID RTS-6026-1302-03 L6ARFL110LW

Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



- S Schweizerischer Kalibrierdienst
- C Service suisse d'étalonnage
 - Servizio svizzero di taratura
 - Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

References

[1] ANSI-C63.19-2007

American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

Methods Applied and Interpretation of Parameters:

- Coordinate System: y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with the standards [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- Measurement Conditions: Further details are available from the hardcopies at the end of the certificate. All
 figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector
 is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a
 directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- Antenna Positioning: The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- Feed Point Impedance and Return Loss: These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminating by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- E-field distribution: E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward
 power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the
 dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D
 maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the
 average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity
 to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value
 represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- H-field distribution: H-field is measured with an isotropic H-field probe with 100mW forward power to the
 antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The
 maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as
 calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the
 feed point.

Certificate No: CD835V3-1011_Nov11

Page 2 of 6

	lesting ervices™	Annex B to Hearing Aid Compatibility Report for the BlackBerry® Smartpho			Page 4(13)
Author Data	Dates of Test		Report No	FCC ID	
Daoud Attayi	Feb. 17, .	June 28, Dec. 17-18, 2012	RTS-6026-1302-03	L6AR	FL110LW

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	HAC Test Arch	
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	
Frequency	835 MHz ± 1 MHz	
input power drift	< 0.05 dB	

Maximum Field values

H-field 10 mm above dipole surface	condition	interpolated maximum
Maximum measured	100 mW input power	0.462 A / m ± 8.2 % (k=2)
E-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured above high end	100 mW input power	161.2 V / m
Maximum measured above low end	100 mW input power	158.2 V / m
Averaged maximum above arm	100 mW input power	159.7 V / m ± 12.8 % (k=2)

Appendix

Antenna Parameters with Head TSL

Frequency	Return Loss	Impedance
800 MHz	14.5 dB	41.1 Ω - 15.0 jΩ
835 MHz	24.4 dB	48.1 Ω + 5.6 jΩ
900 MHz	16.0 dB	56.8 Ω - 15.6 jΩ
950 MHz	17.8 dB	40.7 Ω + 7.2 jΩ
960 MHz	14.6 dB	46.7 Ω + 17.9 jΩ

Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

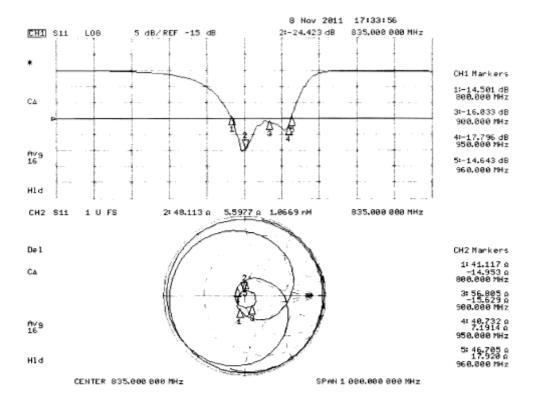
Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Certificate No: CD835V3-1011_Nov11

	Testing Services™	Annex B to Hearing Aid Compatibili Report for the BlackBerry® Smartph			Page 5(13)
Author Data	Dates of Test		Report No	FCC ID	
Daoud Attayi	Feb. 17, .	June 28, Dec. 17-18, 2012	RTS-6026-1302-03	L6AR	FL110LW

Impedance Measurement Plot



Certificate No: CD835V3-1011_Nov11

Page 4 of 6



Feb. 17, June 28, Dec. 17-18, 2012

RTS-6026-1302-03 L6ARFL110LW

DASY4 H-field Result

Date/Time: 08.11.2011 10:14:07

Test Laboratory: SPEAG Lab2

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1011

Communication System: CW; Frequency: 835 MHz Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: RF Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

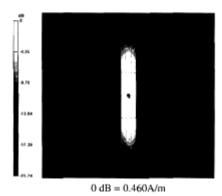
DASY Configuration:

- Probe: H3DV6 SN6065; ; Calibrated: 29.12.2010 •
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 20.04.2011 .
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070 ٠
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634) ٠

Dipole H-Field measurement @ 835MHz/H-Scan - 835MHz d=10mm/Hearing Aid Compatibility Test (41x361x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 0.462 A/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.491 A/m; Power Drift = -0.0027 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB) D 1 11 C 14 1 44

Peak H-field	d in A/m	
Grid 1	Grid 2	Grid 3
0.372	0.396	0.381
M4	M4	M4
Grid 4	Grid 5	Grid 6
0.426	0.462	0.449
M4	M4	M4
Grid 7	Grid 8	Grid 9
0.375	0.410	0.399



Certificate No: CD835V3-1011_Nov11

Page 5 of 6



Feb. 17, June 28, Dec. 17-18, 2012

RTS-6026-1302-03

L6ARFL110LW

DASY4 E-field Result

Date/Time: 08.11.2011 15:05:22

Test Laboratory: SPEAG Lab2

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1011

Communication System: CW; Frequency: 835 MHz Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: RF Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

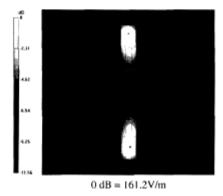
DASY Configuration:

- Probe; ER3DV6 SN2336; ConvF(1, 1, 1); Calibrated: 29.12.2010 •
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 20.04.2011 •
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070 .
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634) ٠

Dipole E-Field measurement @ 835MHz/E-Scan - 835MHz d=10mm/Hearing Aid Compatibility Test (41x361x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 161.2 V/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 119.5 V/m; Power Drift = -7.4e-005 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-fiel	d in V/m	
Grid 1	Grid 2	Grid 3
154.9	161.2	156.1
M4	M4	M4
Grid 4	Grid 5	Grid 6
80.699	88.078	87.550
M4	M4	M4
Grid 7	Grid 8	Grid 9
142.8	158.2	157.7
M4	M4	M4



Certificate No: CD835V3-1011_Nov11

Page 6 of 6

d Attayi Feb. 17,	June 28, Dec. 1	7-18, 2012	Report No RTS-6026-1302-03	FCC ID L6ARFL110LW
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The Swiss Accreditation Servic Multilateral Agreement for the r	-			
Client RTS (RIM Test	ing Services)	Certific	ate No: CD1880V3-1008	Nov11
CALIBRATION O	CERTIFICAT		and the second	the second
Object	CD1880V3 - SN	1008	ing an	2
Calibration procedure(s)	QA CAL-20.v5			¢.
	Calibration proce	edure for dipoles in air		
		Start Start Start		" 14 37
Calibration date:	November 08, 2	011		
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Certificate No: CD1880V3-1008_Nov11

Page 1 of 6



Annex B to Hearing Aid Compatibility RF Emissions Test Report for the BlackBerry® Smartphone model RFL111LW Page

Author Data Daoud Attavi

Dates of Test Feb. 17, June 28, Dec. 17-18, 2012

Document

Report No FCC ID L6ARFL110LW RTS-6026-1302-03

Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



- Schweizerischer Kalibrierdienst s
- Service suisse d'étalonnage с
- Servizio svizzero di taratura s
 - Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

References

[1] ANSI-C63.19-2007

American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

Methods Applied and Interpretation of Parameters:

- Coordinate System: y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with the standards [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- Measurement Conditions: Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- Antenna Positioning: The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- Feed Point Impedance and Return Loss: These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminating by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- E-field distribution: E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- H-field distribution: H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

Certificate No: CD1880V3-1008_Nov11

Page 2 of 6

	lesting ervices™	Annex B to Hearing Aid Compatibility Report for the BlackBerry® Smartpho		I	Page 10(13)
Author Data	Dates of Test		Report No	FCC ID	
Daoud Attayi	Feb. 17, .	June 28, Dec. 17-18, 2012	RTS-6026-1302-03	L6AR	FL110LW

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	HAC Test Arch	
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	
Frequency	1880 MHz ± 1 MHz	
Input power drift	< 0.05 dB	

Maximum Field values

H-field 10 mm above dipole surface	condition	interpolated maximum
Maximum measured	100 mW input power	0.456 A / m ± 8.2 % (k=2)
E-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured above high end	100 mW input power	136.9 V / m
Maximum measured above low end	100 mW input power	133.7 V / m
Averaged maximum above arm	100 mW input power	135.3 V / m ± 12.8 % (k=2)

Appendix

Antenna Parameters with Head TSL

Frequency	Return Loss	Impedance
1730 MHz	27.3 dB	53.1 Ω + 3.2 jΩ
1880 MHz	20.8 dB	51.1 Ω + 9.2 jΩ
1900 MHz	21.7 dB	52.1 Ω + 8.2 jΩ
1950 MHz	28.4 dB	53.0 Ω + 2.5 jΩ
2000 MHz	18.3 dB	43.0 Ω + 9.0 jΩ

Antenna Design and Handling

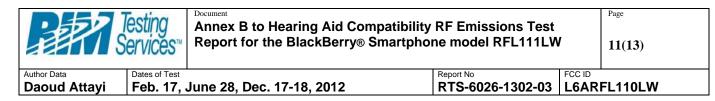
The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

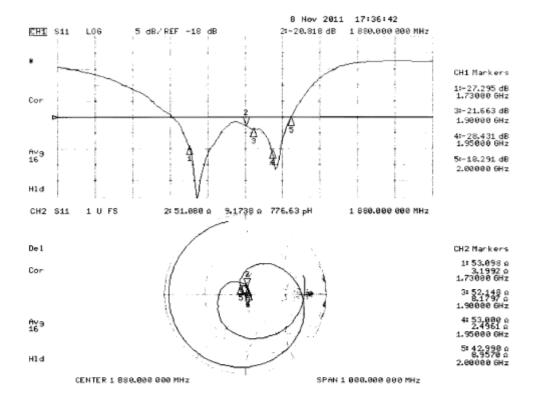
Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

Certificate No: CD1880V3-1008_Nov11



Impedance Measurement Plot



Certificate No: CD1880V3-1008_Nov11

Page 4 of 6



RTS-6026-1302-03

L6ARFL110LW

DASY4 H-field Result

Date/Time: 08.11.2011 10:46:23

Test Laboratory: SPEAG Lab2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN: 1008

Communication System: CW; Frequency: 1880 MHz Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: RF Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

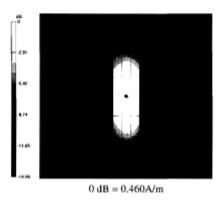
DASY Configuration:

- Probe: H3DV6 SN6065; ; Calibrated: 29.12.2010 •
- Sensor-Surface: (Fix Surface) ٠
- Electronics: DAE4 Sn781; Calibrated: 20.04.2011 •
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole H-Field measurement @ 1880MHz/H-Scan - 1880MHz d=10mm/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 0.456 A/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.482 A/m; Power Drift = -0.0047 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-fiel	d in A/m	
Grid 1	Grid 2	Grid 3
0.387	0.410	0.399
M2	M2	M2
Grid 4	Grid 5	Grid 6
0.427	0.456	0.446
M2	M2	M2
Grid 7	Grid 8	Grid 9
0.389	0.422	0.414
M2	M2	M2



Certificate No: CD1880V3-1008_Nov11

Page 5 of 6



RTS-6026-1302-03

L6ARFL110LW

DASY4 E-field Result

Date/Time: 08.11.2011 14:16:19

Test Laboratory: SPEAG Lab2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN: 1008

Communication System: CW; Frequency: 1880 MHz Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: RF Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

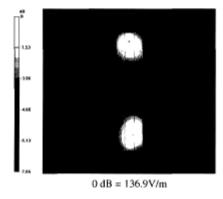
DASY Configuration:

- Probe: ER3DV6 SN2336; ConvF(1, 1, 1); Calibrated: 29.12.2010 •
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 20.04.2011 •
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070 ٠
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634) ٠

Dipole E-Field measurement @ 1880MHz/E-Scan - 1880MHz d=10mm/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 136.9 V/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 139.6 V/m; Power Drift = 0.0093 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-fiel	d in V/m	
Grid 1	Grid 2	Grid 3
131.0	136.9	132.2
M2	M2	M2
Grid 4	Grid 5	Grid 6
79.581	88.112	88.112
M3	M3	M3
Grid 7	Grid 8	Grid 9
119.9	133.7	133.5
M2	M2	M2



Certificate No: CD1880V3-1008_Nov11

Page 6 of 6