



# TUA

## ANEXO – MELHORES TÉCNICAS DISPONÍVEIS

BREF - ROM - (Monitoring of Emissions to Air and Water from IED Installations)

No caso do estabelecimento só é relevante a monitorização dos poluentes realizada através de equipamentos de medição e análise que são submetidos

**Nota:** A análise deste documento não dispensa a consulta ao respetivo BREF.

n.º atribuído de acordo com o BREF ou documento Conclusões MTD	
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### MTD PARA INSTALAÇÕES

#### 3.4.4.4 Limit of detection and limit of quantification

3.4.4.4	Any measurement method applied should have an accuracy better than 10 % of the ELV in order to guarantee that the measured value is reliable.
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#### 4.3.2 Continuous measurements

4.3.2.1	<p>Generic EN standards relevant for continuous measurement of air quality:</p> <ul style="list-style-type: none"> <li>EN ISO 9169:2006 Air quality - Definition and determination of concentrations - Part 1: Basic guide for the determination of concentrations by reference to oxygen partial pressure</li> <li>EN 14181:2014 Stationary source emissions - Quality assurance - General principles for the certification of methods and equipment</li> <li>EN 15259:2007 Air quality - Measurement of static pressure drop across a filter</li> <li>EN 15267-1:2009 Air quality - Certification of automated monitoring systems for stationary sources</li> <li>EN 15267-2:2009 Air quality - Certification of automated monitoring systems for stationary sources - Surveillance of the manufacturing process</li> <li>EN 15267-3:2007 Air quality - Certification of automated monitoring systems for stationary sources</li> </ul>
4.3.2.2	<p>Quality assurance</p> <p>EN 14181:2014 describes procedures for the quality assurance of methods and equipment.</p>
4.3.2.3	<p>Measurement/Sampling site, section, plane and position</p>
4.3.2.4 4.3.2.4.2 Methods of certified AMS	<p>Analysis</p> <p>Methods of certified AMS for the most common air pollutants:</p> <ul style="list-style-type: none"> <li><b>Sulphur dioxide (SO<sub>2</sub>)</b> - FTIR, NDIR, NDUV, DOAS</li> <li><b>Ammonia (NH<sub>3</sub>)</b> - FTIR, NDIR with GFC, TDL - IS</li> <li>measuring systems (AMS) for ammonia [ 262, ISO 2016 ].</li> <li><b>Dust</b> - Light attenuation or scattering, triboelectric requirements related to AMS for dust [ 62, CEN 2016 ].</li> <li><b>Hydrogen chloride -(HCl)</b> - FTIR, NDIR with GFC</li> <li>gaseous hydrogen chloride by an automated method including on specific quality assurance requirements.</li> <li><b>Hydrogen fluoride (HF)</b> - FTIR, TDL</li> <li><b>Nitrogen oxides (NO<sub>x</sub>)</b> - Chemiluminescence, FTIR</li> <li><b>Carbon monoxide (CO)</b> - FTIR, NDIR</li> <li><b>Total volatile organic carbon (TVOC)</b> - FID PIDs</li> <li>conditioning [ 231, MCERTS 2016 ].</li> </ul> <p>NB: AAS = atomic absorption spectrometry; DOAS = derivative optical absorption spectrometry.</p>

4.3.2.5	<p>Reference/Standard conditions BAT-AELs as defined in Article 3(13) of the IED re 2010 ]. EN 14181:2014 defines standard conditions as the</p>
4.3.2.6	<p>Data treatment An AMS provides short-term data. The response time is maximum of 200 seconds for particulate matter and HF for which the response time may be as high as EN 14181:2014 defines the response time as the time taken for a change in the value of the input quantity to an AMS until its output quantity is reliably maintained above 90 % (CEN 2014 ). Averaging periods usually vary from 10 to 60 minutes. <u>Most commonly, half-hourly or hourly averages are used.</u></p>
4.3.2.7	<p>Reporting The measurement report usually includes:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> the results of the calibration (QAL2 report) and calibration certificate [EN 14181:2014 ];</li> <li><input type="checkbox"/> the measurement results, including reference conditions (in particular, to allow a full assessment of the daily average);</li> <li><input type="checkbox"/> data related to the daily operating conditions and maintenance (e.g. half-hourly/hourly averages, standardised half-hourly/hourly averages, standardised half-hourly/hourly period);</li> <li><input type="checkbox"/> frequency distribution of the half-hourly/hourly, cumulative frequency distribution;</li> <li><input type="checkbox"/> declaration of measurement results related to specific limits;</li> <li><input type="checkbox"/> indication of the measurement results outside the specified limits;</li> <li><input type="checkbox"/> date and duration of power outages of the AMS;</li> <li><input type="checkbox"/> date and duration of times for testing and maintenance.</li> </ul>

#### 4.3.3 Periodic measurements

4.3.3.2	Quality assurance
4.3.3.3	Measurement objective and measurement plan

4.3.3.10.3 Carbon monoxide	EN 15058:2017 is the standard reference method for carbon monoxide using non-dispersive infrared spectrometry.
4.3.3.10.4 Dust	The SRM for the measurement of dust is EN 1328-23210:2009 allows the simultaneous determination of dust and respirable dust. Measurement ranges and/or measurement limits (LoD) are: Up to 50 mg/m <sup>3</sup> , measurements typically at 5 mg/m <sup>3</sup> . LoD: ~ 0.3 mg/m <sup>3</sup> (dry gases, sampling duration of 10 min).
4.3.3.10.6 Gaseous chlorides/fluorides and HCl/HF	EN 1911:2010 and ISO 15713:2006 are the SRMs for the measurement of gaseous chlorides/fluorides and HCl/HF. Measurements are made by extracting, filtered and passed through absorption solutions (i.e. water).
4.3.3.10.8 Mercury and its compounds	The SRM for the measurement of total mercury is EN 15472:2010.

4.3.3.10.9 Metals and their compounds	EN 14385:2004 specifies the determination of the elements: the metalloids antimony (Sb) and arsenic; chromium (Cr), cobalt (Co), copper (Cu), lead (Pb) and vanadium (V).
4.3.3.10.11 Nitrogen oxides	The SRM for NOX measurements is EN 14792:20 with ozone which reacts with NO to NO2. Measurement ranges and/or measurement limits (large combustion plants; Up to 400 mg/m <sup>3</sup> at waste)
4.3.3.10.14 Sulphur oxides	SOX is defined as the sum of sulphur dioxide (SO <sub>2</sub> ) aerosols (H <sub>2</sub> SO <sub>4</sub> ), expressed as SO <sub>2</sub> . For most installations the dominating sulphur oxide species (i.e. typically > 90%) is SO <sub>2</sub> . The SRM for the measurement of SO <sub>2</sub> is EN 14792.
4.3.3.10.15 Total volatile organic carbon (TVOC)	EN 12619:2013 defines TVOC as the sum of all gases that pass through a gas cleaning system that prevents contamination by particles. These gases are filtered and consequently not measured. <b>EN 12619:2013 - Measurement ranges and/or measurement limits (at reference O<sub>2</sub> concentration.)</b> EN ISO 13199:2012 - Measurement ranges and/or measurement limits (at reference O <sub>2</sub> concentration.)

4.3.3.11 Reference/Standard conditions	The periodic measurement of a pollutant often requires the periodic measurement of oxygen and water vapour for the AMS calibration with the SRM during the Q. Flow rate - EN ISO 16911-1:2013 Oxygen (O <sub>2</sub> ) - EN 14789:2017 - 3 vol-% to 21 vol-% Temperature - No EN or ISO standard available
4.3.3.12 Data treatment	The measurement results are converted to the corrected values. The correction for the oxygen content is usually caused by the combustion air.
4.3.3.13 Reporting	The measurement report should describe, in a traceable manner, to enable the results to be traced back through the measurement process. According to EN 15259:2007, an emission measurement report should contain general information, such as the operator's name, address and telephone number; <input type="checkbox"/> definition of the project by specification of the measured parameter; <input type="checkbox"/> description of the installation and materials handled; <input type="checkbox"/> identification of the measurement site and section; <input type="checkbox"/> identification of the measurement methods and instruments used; <input type="checkbox"/> operating conditions of the production process considered; <input type="checkbox"/> identification of deviations from the measurement conditions; <input type="checkbox"/> reference to how to access and use the original data; <input type="checkbox"/> measurement results and other relevant data necessary for the evaluation of uncertainties; <input type="checkbox"/> calculation procedures, such as the conversion factors; <input type="checkbox"/> presentation of the results.

4.4	<p>Indirect methods</p> <p>Examples of quantitative surrogate parameters may include:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> TVOC instead of individual organic compounds</li> <li><input type="checkbox"/> fuel flow rate and fuel composition to determine</li> <li><input type="checkbox"/> Predictive Emission Monitoring Systems (PEMS)</li> </ul> <p>Examples of qualitative surrogate parameters may include:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> dust instead of individual metals and their compounds</li> <li><input type="checkbox"/> dust instead of PM10 or PM2.5</li> </ul>
4.5	<p>Diffuse emissions</p> <p>EN 15445:2008 Fugitive and diffuse emissions of volatile organic compounds from piping systems</p> <p>EN 15446:2008 Fugitive and diffuse emissions of volatile organic compounds from piping leaks</p> <p>EN 16253:2013 Air quality - Atmospheric measurements of volatile organic compounds (VOC) from fugitive and diffuse sources</p>
4.6	<p>Odour</p> <p>Odour emissions occur in several (agro-)industrial and waste (water) treatment. They can also occur during transport.</p>
4.7	Biomonitoring
4.8	<p>Costs</p> <p>Qualitative information on the costs of monitoring (see also Section 4.3.1) and different frequencies in the case of</p>
Sim	
Não	
Não aplicável	
A implementar	
A avaliar	

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(itions)) Data de adoção: 07/2018 | Versão: 07/2018

entes para o ar, uma vez que o processo de fabrico não produz águas residuais industriais, restringindo-se estas à metodos a controlo metrológico regular e por laboratório acreditado através de métodos diretos e nas condições e

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ro BREF.

**Descrição de acordo com o BREF ou Conclusões MTD**

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appropriate LoD/LoQ in relation to the emission level to be measured. In many cases, the LoD is required to be less than the LoQ and the LoQ is clearly below the ELV.

asurements of emissions to air  
ermination of performance characteristics of an automatic measuring system (ISO 9169:2006)  
ality assurance of automated measuring systems  
inary source emissions - Requirements for measurement sections and sites and for the measurement objective, plan and  
mated measuring systems - Part 1: General principles  
mated measuring systems - Part 2: Initial assessment of the AMS manufacturer's quality management system and post  
mated measuring systems - Part 3: Performance criteria and test procedures for automated measuring systems for

ity assurance levels QAL2 and QAL3 as well as the annual surveillance test (AST) for AMS in operation [ 36, CEN 2014 ].

oint

: pollutants are summarised in Table 4.4:

AS

ISO 17179:2016 specifies the fundamental structure and the most important performance characteristics of automated

effect (i.e. the probe electrification induced by dust particles) - EN 13284-2:2017 defines specific quality assurance [17]. In 2017, no certified AMS was available for the continuous measurement of particle-size distributions.

i, TDL - In 2012, the European Commission issued a mandate to CEN to prepare a new European standard to measure iod

nts [ 250, COM 2012 ].

IR, NDIR, NDUV, DOAS - AMS for measuring NO and NO<sub>2</sub> separately were also available.

are not used for continuous measurements due to the high variability of response factors and to difficulties with sample

D = differential optical absorption spectroscopy; FID = flame ionisation detection; FTIR = Fourier transform infrared

fer to specified reference conditions, but the IED does not provide a definition of the term reference conditions [ 24, EU  
ose conditions to which measured values have to be standardised to verify compliance with ELVs

ime ranges from about 5 seconds up to a  
id gaseous compounds, except for NH<sub>3</sub>, HCl  
jh as 400 seconds [ 66, CEN 2007 ].

time interval between the instant of a sudden  
S and the time from which the value of the  
of the correct value of the input quantity [ 36,

ites, depending on the permit requirements.  
g calculated. In the same way, data from

of the annual surveillance test (AST report) of the AMS as described in EN 14181:2014 (see Section 4.3.2.2.2) [ 36, CEN

onditions (temperature, oxygen, water vapour, pressure) and operating conditions.

//monthly/yearly emissions, it is advisable that the reports contain at least the following data:

d hours indicating normal and other than normal operating conditions;

hourly/hourly averages and validated half-hourly/hourly averages of the specific day (or for any other required averaging

daily and/or monthly averages for the calendar year;

special (operating) conditions, with an indication of the event;

valid calibration range and data related to the validity of the calibration function;

;

enance of the AMS.

(SRM) for the measurement of carbon  
etry (NDIR).

4-1:2017. It is based on isokinetic sampling (see Section 4.3.3.6), filtration with a plane filter, and gravimetry. EN ISO  
n of the concentrations of PM10 and PM2.5 in waste gases.

Under standard conditions, i.e. dry gas, 273.15 K, 101.3 kPa, at the reference O<sub>2</sub> concentration.):

m3;

if 30 min), ~ 2 mg/m<sup>3</sup> (vapour-saturated gases, sampling duration of 30 min) (3)

; used to measure gaseous chlorides and fluorides, respectively. In both cases, a known volume of waste gas is

EN 13211:2001.

mass concentration of the following  
ic (As), as well as the metals cadmium (Cd),  
, manganese (Mn), nickel (Ni), thallium (Tl)

17 which is based on chemiluminescence detection. In the reaction chamber of the analyser, the sampled gas is mixed

Under standard conditions, i.e. dry gas, 273.15 K, 101.3 kPa, at the reference O<sub>2</sub> concentration): Up to 1 300 mg/m<sup>3</sup> at  
te (co-)incineration plants

2), sulphur trioxide (SO<sub>3</sub>) and sulphuric acid  
industrial emission sources, SO<sub>2</sub> is the  
10 %).

11:2017.

gaseous and vaporous organic compounds, expressed as total carbon. The measurement relies on an FID with a sample  
by particles and/or condensation inside the instrument. Hydrocarbons of a higher order, entering the analyser as solids,

**measurement limits - Up to 1 000 mg/m<sup>3</sup> (Under standard conditions, i.e. dry gas, 273.15 K, 101.3 kPa, at the**

measurement limits -From about 70 mg/m<sup>3</sup> to 600 mg/m<sup>3</sup> - Not applicable to combustion processes

uires the simultaneous measurement of reference quantities, also referred to as peripheral parameters. EN standards for pour are available [ 73, CEN 2017 ], [ 74, CEN 2017 ]. Moreover, the measurement of reference quantities is also needed AL2 procedure (see Section 4.3.2.2.2) [ 36, CEN 2014 ].

% (sampling duration of 30 min)

responding standard conditions (see Sections 4.3.2.5 and 4.3.3.11)  
irried out in the case of combustion and incineration processes in order to account for the dilution of the waste gas that is

transparent and traceable way, where and how the measurements were carried out and should also provide sufficient detail  
calculations to the collected raw data and operating conditions.  
rement report includes at least the following information:  
the address of the installation, the name and the address of the testing laboratory;  
easurement objective(s);  
dled;  
;  
apparatus according to individual standards for the measured pollutants and reference quantities;  
uring the measurement, including the waste gas treatment units;  
nt plan;  
data for verification purposes;  
cessary for the interpretation of the results, including the sampling date (hour, day, month and year) and measurement  
of data to specific standard conditions;

ay include the following [ 3, COM 2003 ]:

(see Section 4.3.3.10.15);

the flue-gas flow rate of a furnace (e.g. according to EN ISO 16911-1:2013 [ 254, CEN 2013 ]);

i) which rely on a combination of surrogate parameters (see Section 4.4.1.2).

/ include the following [ 3, COM 2003 ]:

ounds;

common concern to industry sectors - Qualification of fugitive dust sources by reverse dispersion modelling  
common concern to industry sectors - Measurement of fugitive emission of vapours generating from equipment and

ments near ground with active Differential Optical Absorption Spectroscopy (DOAS) - Ambient air and diffuse emission

sectors, such as the intensive rearing of animals, the food industry, the iron and steel industry, the chemical industry,

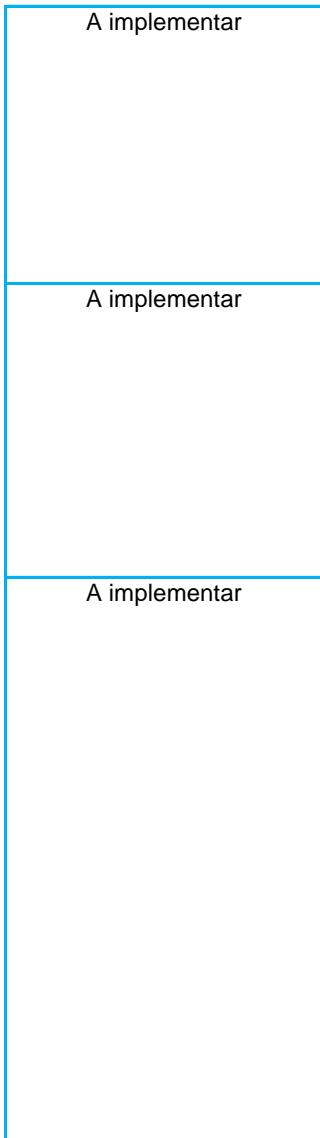
emissions to air is given in several sections of this chapter, for example in relation to different monitoring regimes (see  
e of periodic measurements (see Section 4.3.3.9).

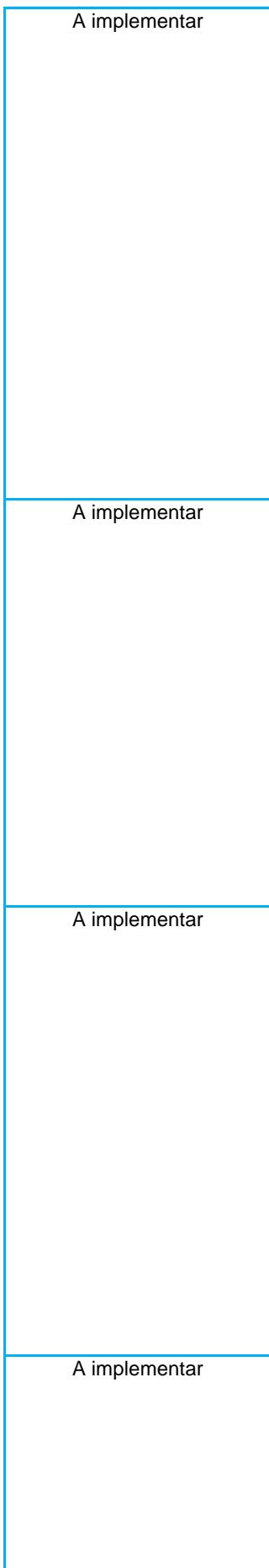
águas residuais domésticas  
estipuladas pela licença ambiental.

MTD implementada?

A implementar











A implementar
A implementar
Não aplicável
A implementar
A implementar

is das instalações sanitárias. Os poluentes emitidos pelas chaminés das fontes fixas são sujeitos a medição contín  
xional.

**Descrição do modo de implementação ou Motivo da não aplicabilidade ou Descrição da técnica alternativa implementada**

Para as fontes fixas associadas aos processos de combustão (forno) condicionantes relativamente ao nível do valor limite diário de emissões, definindo que os valores dos intervalos de confiança a 95% de cada resultado medido não devem ultrapassar as percentagens dos VLE definidas para cada poluente medido, variando de 10% (CO) a 40% (HF). As medições pontuais serão efetuadas por laboratório acreditado que indica no respetivo relatório os métodos de medição e limites de deteção (LD) e limites de quantificação (LQ), incluindo indicação do cumprimento da exigência de LD inferiores ou iguais a 10% dos VLE.

Todos os analisadores serão certificados de acordo com EN 15267-3, dentro de uma gama de certificação adequada aos Valores Limite de Emissão definidos para cada fonte (QAL1), e calibrados adicionalmente no início da operação (QAL2) de acordo com a norma Europeia EN 14181.

O sistema de aquisição e gestão de dados cumprirá os requisitos da EN 17255, Partes 1 a 4.

No projeto , estão refletidas as condições previstas na EN 15259 no que respeita à escolha da seção de amostragem, bem como precauções para garantir que diferentes sistemas de medição não se influenciem, seleção do ponto representativo e algumas considerações sobre as plataformas de trabalho.

Os equipamentos de monitorização contínua serão certificados e verificados anualmente.

Os sistemas de medição em contínuo serão sujeitos a procedimentos de calibração por laboratório especializado acreditado (Annual Surveillance Test (AST) dos Sistemas Automáticos de Medição, através de ensaios com medições paralelas de acordo com a EN14181:2014. De acordo com a EN 14181:2014 é necessário proceder à realização do AST, ensaio este que implica dois tipos de determinações: ensaio de funcionamento anual do AMS e o teste de variabilidade e validade das funções de calibração através de medições paralelas com métodos de referência (SRM).

A monitorização das emissões será assegurada por equipamentos devidamente verificados e recurso a laboratórios acreditados, assegurando o cumprimento de requisitos normativos da EN ISO/IEC 17025:2017. Os laboratórios serão acreditados e com um sistema de gestão da qualidade, que assegure ainda a validação dos métodos, tratamento de dados, a avaliação da incerteza e a comunicação dos resultados e assegura um certo nível de garantia de qualidade dos seus serviços e dos resultados entregues.

Os parâmetros e a frequência de monitorização serão os definidos para cada fonte pelas autoridades competentes aquando da emissão da Licença Ambiental.

Os equipamentos de monitorização contínua serão certificados e verificados anualmente.

Os sistemas de medição em contínuo são sujeitos a procedimentos de calibração por laboratório especializado acreditado (Annual Surveillance Test (AST) dos Sistemas Automáticos de Medição, através de ensaios com medições paralelas de acordo com a EN14181:2014. De acordo com a EN 14181:2014 é necessário proceder à realização do AST, ensaio este que implica dois tipos de determinações: ensaio de funcionamento anual do AMS e o teste de variabilidade e validade das funções de calibração através de medições paralelas com métodos de referência (SRM).

Os valores obtidos das medições contínuas do sistema são guardados automaticamente numa base de dados através de uma aplicação de aquisição e tratamento de dados, sendo possível gerar relatórios de valores médios de um determinado período de tempo (PIB, horário, diário, mensal e anual).

As medições pontuais, com periodicidade estabelecida na da Licença Ambiental são asseguradas por laboratórios acreditados de acordo com a norma EN ISO/IEC 17025:2017, respeitando os requisitos das normas existentes. Os resultados das medições (contínuas e pontuais) normalizados para as condições PTN e corrigidos para um teor volémico de oxigénio em base seca serão devidamente comunicados nos termos do TUA.

As medições pontuais, com periodicidade serão as estabelecidas no TUA e serão asseguradas por laboratórios acreditados de acordo com a norma EN ISO/IEC 17025:2017, respeitando os requisitos das normas existentes aplicáveis. Os ensaios serão realizados por entidades acreditadas.

As medições pontuais, com periodicidade estabelecida no TUA serão asseguradas por laboratórios acreditados de acordo com a norma EN ISO/IEC 17025:2017, respeitando os requisitos das normas existentes aplicáveis.

As medições pontuais, com periodicidade estabelecida no TUA serão asseguradas por laboratórios acreditados de acordo com a norma EN ISO/IEC 17025:2017, respeitando os requisitos das normas existentes aplicáveis.

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Os sistemas de medição em contínuo serão sujeitos a procedimentos de calibração por laboratório especializado acreditado (Annual Surveillance Test (AST) dos Sistemas Automáticos de Medições, através de ensaios com medições paralelas de acordo com a EN14181:2014. De acordo com a EN 14181:2014 é necessário proceder à realização do AST, ensaio este que implica dois tipos de determinações: ensaio de funcionamento anual do AMS e o teste de variabilidade e validade das funções de calibração através de medições paralelas com métodos de referência (SRM).

Os ensaios serão realizados por entidades acreditadas.

Os ensaios serão realizados por entidades acreditadas.

Serão efetuadas correções ao O<sub>2</sub> às emissões conforme legalmente estabelecido e TUA (condições PTN e correção de oxigénio).

Os relatórios dos laboratórios acreditados serão estruturados terão os conteúdos exigidos pela legislação nacional, os quais coincidem com os requisitos referidos pelo BREF ROM.

Os relatórios sobre as emissões contínuas a comunicar à APA seguirão a estrutura definida no TUA

Para a contabilização de algumas emissões anuais necessária para vários reports (p.ex: PRTR) irá recorrer-se inicialmente a métodos indiretos, nomeadamente :

- Parâmetros quantitativos substitutos, como é o caso do COT em vez de COV;
- Balanços de massa e fatores de emissão associados à emissão de poluentes resultantes da combustão (ex: CO2 nos fornos)

No caso das emissões difusas e, em particular para efeito de report (PRTR), irá recorrer-se a métodos indiretos tal como parâmetros quantitativos substitutos e estimativas com base em pressupostos.

Nos primeiros 3 anos de operação serão realizadas pelo menos 1 medição/ano de emissões difusas e com base nos resultados proceder-se-á à reavaliação da metodologia, periodicidade de monitorização e necessidade de melhoria dos STEG.

Todos os valores serão registados em bases de dados que permitam a análise de tendências, a otimização dos processos e a minimização do impacte das emissões difusas ao nível ambiental e de SST.

No âmbito da análise de unidades de conversão de litio ao nível internacional com as características e produtos usados/produzidos pela Aurora Lith, não se identificaram fontes de odores que careçam de um plano de gestão de odores.

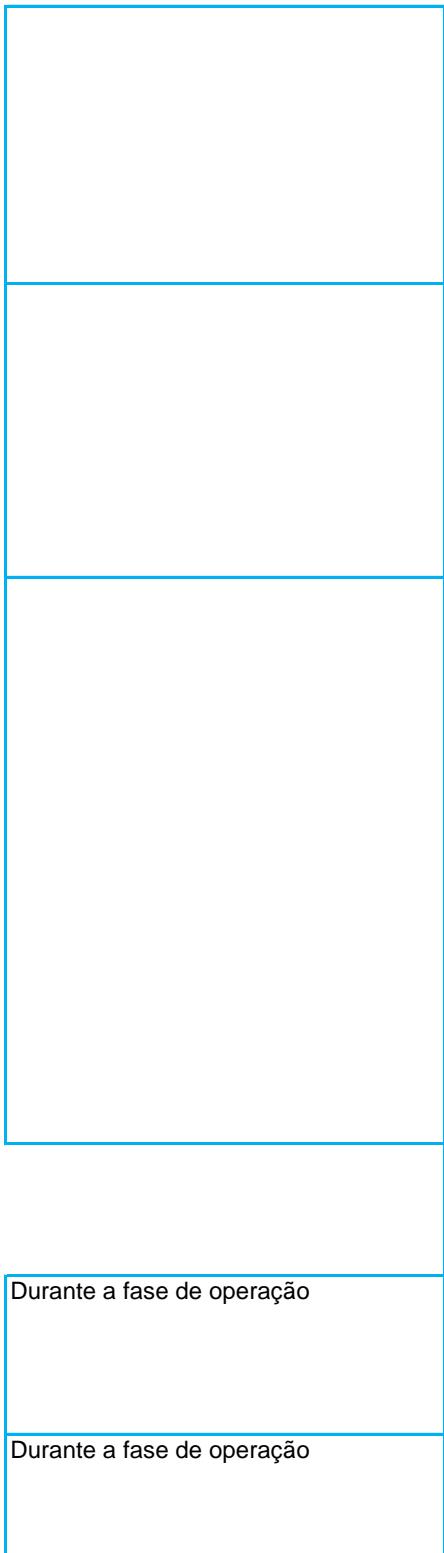
Não obstante, durante o 1º ano de exploração da Unidade e/ou sempre que ocorram alterações significativas com impacte ao nível dos odores, será avaliada a necessidade de desenvolvimento/implementação de um plano de gestão de odores em conformidade com a verificação da sua eventual aplicabilidade.

Cinco anos após o inicio de operação será efetuado o estudo de caracterização ambiental da envolvente seguindo a Os custos com a monitorização das emissões atmosféricas são previstos em orçamento e controlados ao longo do ano. Os custos envolvidos são elevados, uma vez que incluem: equipamentos de medição, condições a assegurar para a realização das medições (manutenção, calibração, acessos, energia, etc), subcontratação de serviços, planeamento e acompanhamento dos trabalhos e dos resultados. Apesar disso, as monitorizações são efetuadas conforme definido no Autocontrolo estabelecido no TUA

■ ua e pontual e a sua medição é

**Calendarização da implementação  
(mês.ano)**

Durante a fase de operação



Durante a fase de operação







































































































































































































































































































































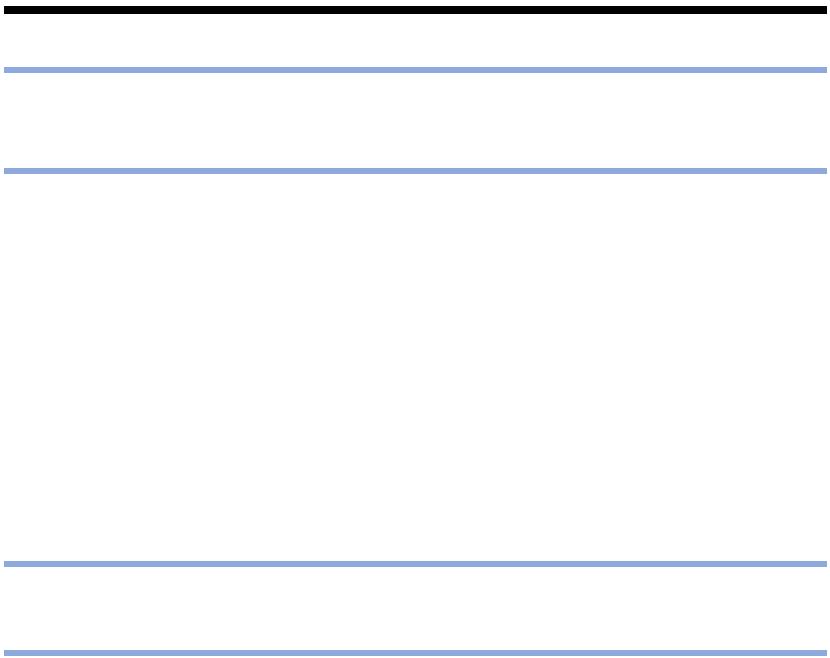














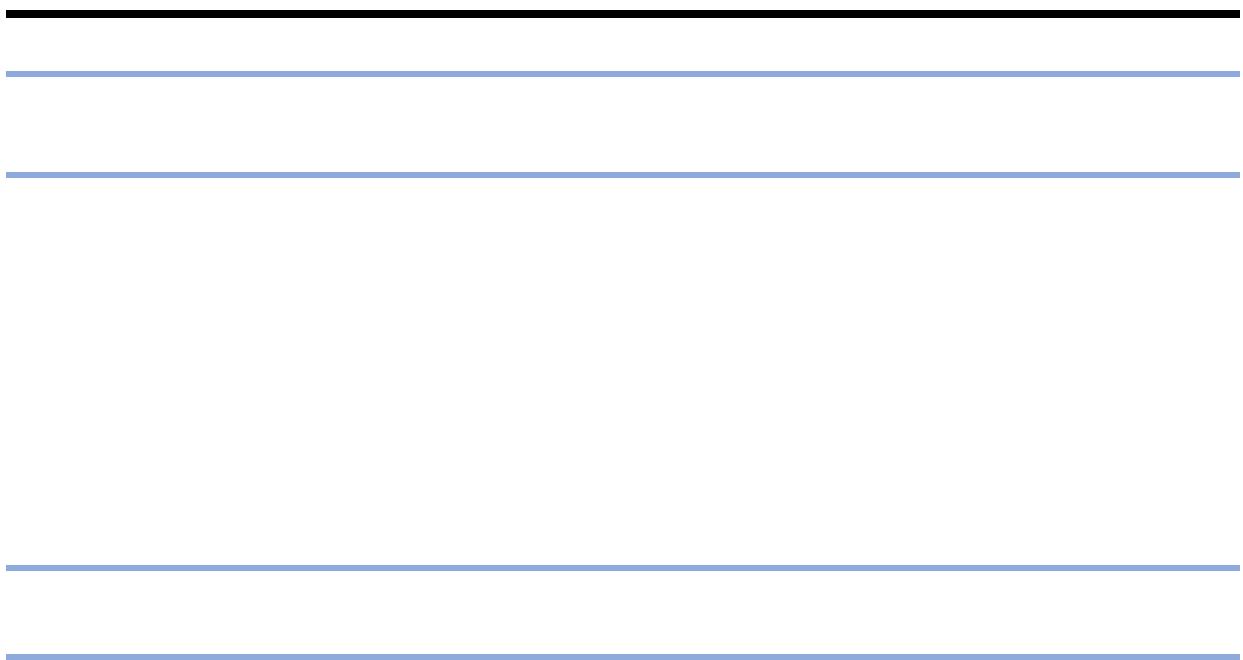














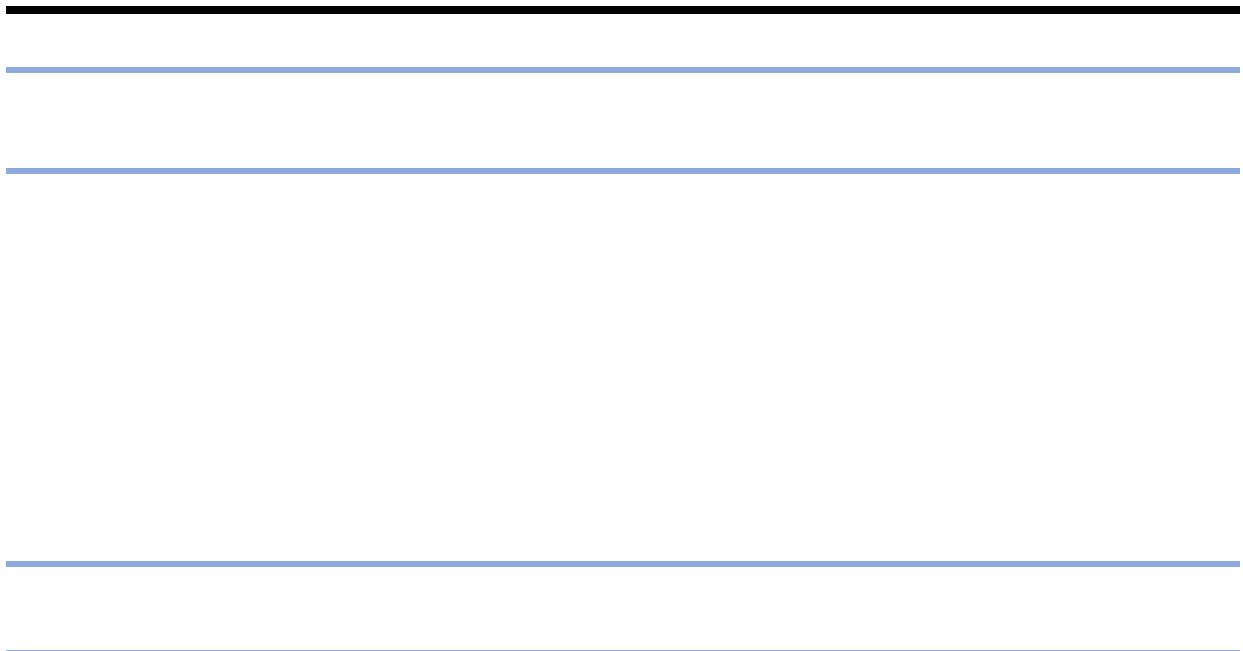














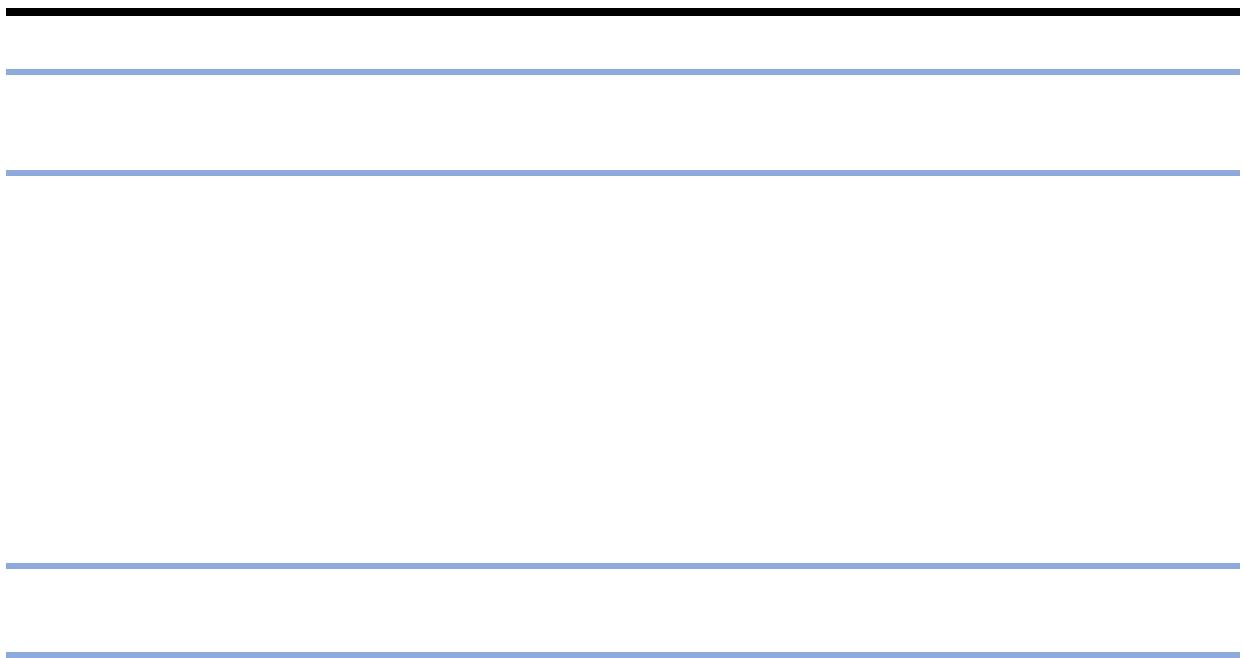














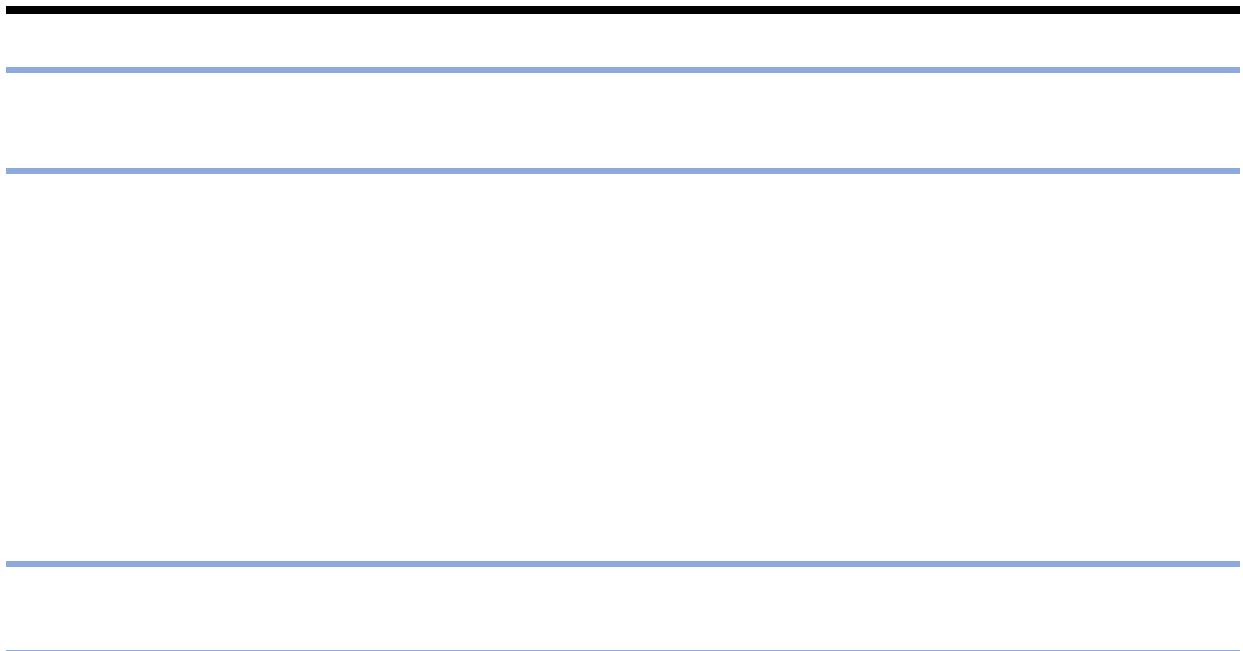














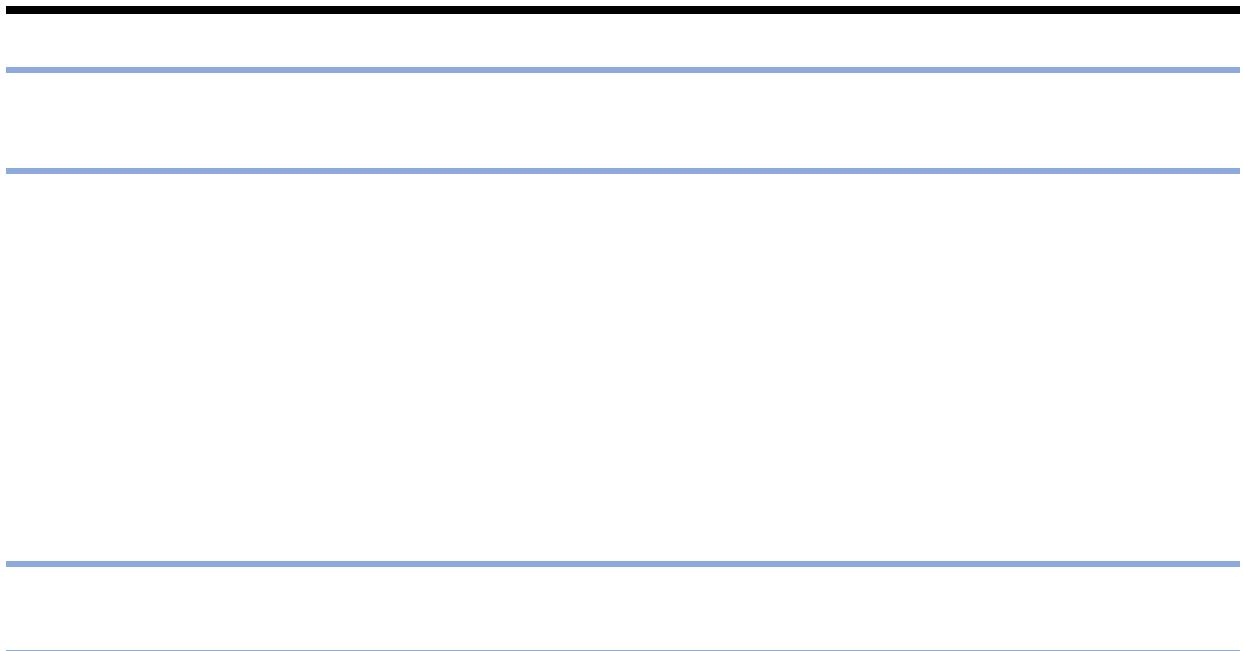














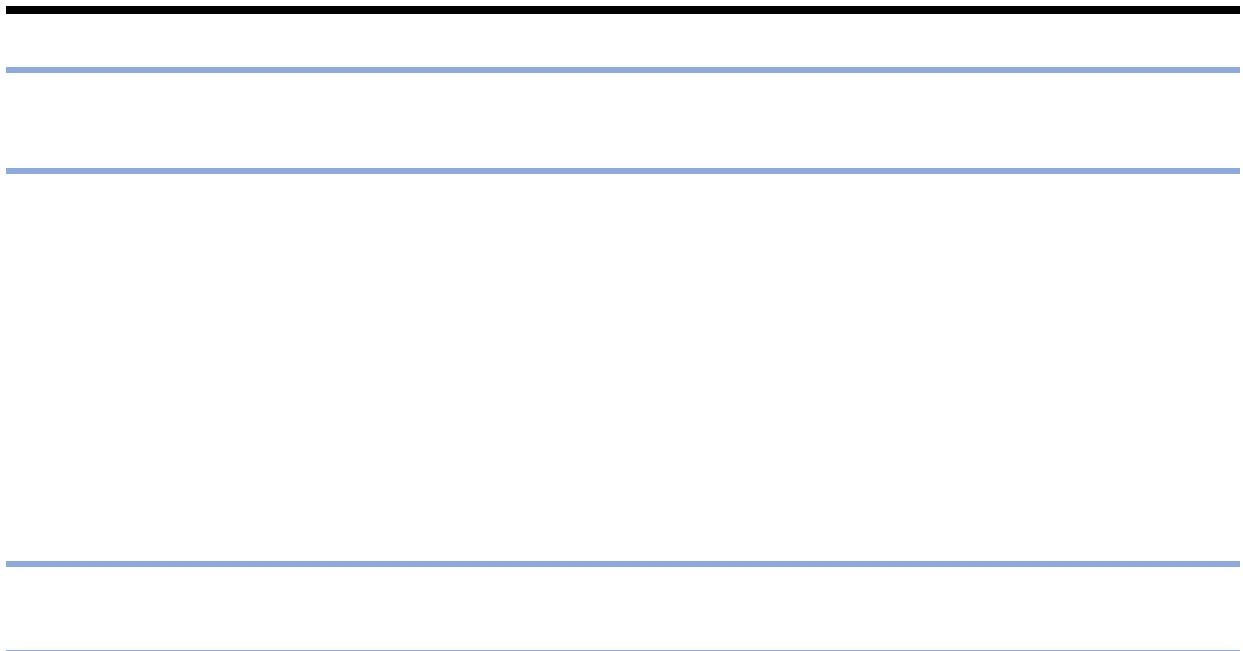














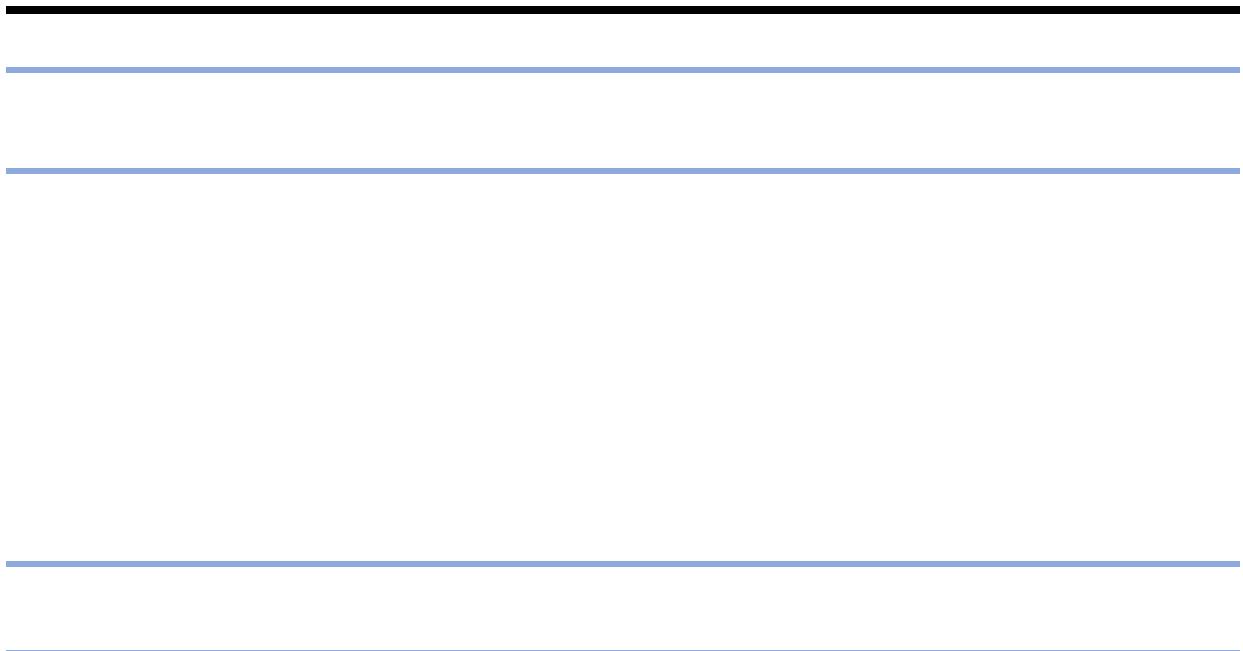














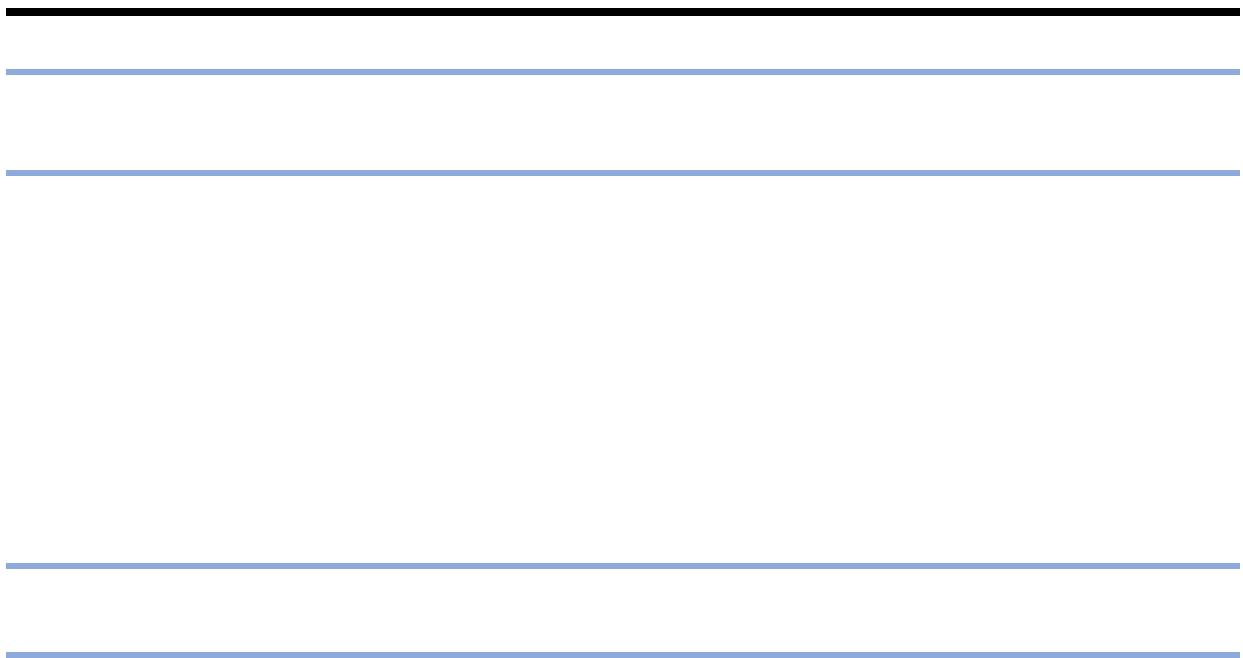














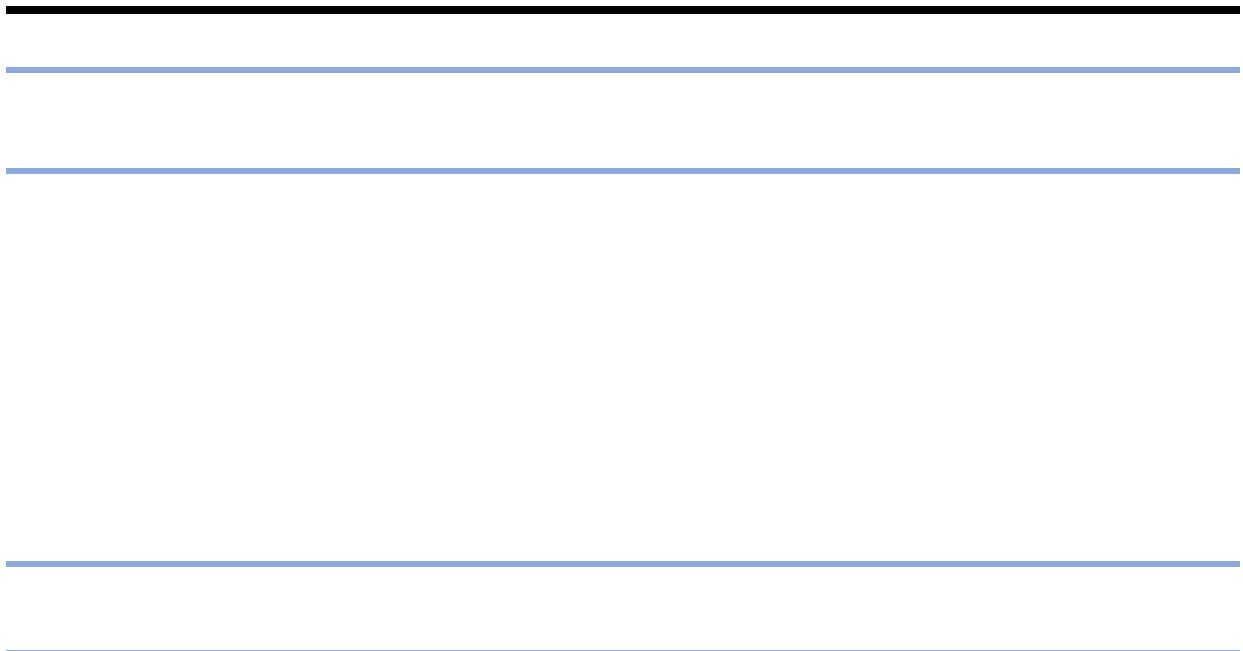














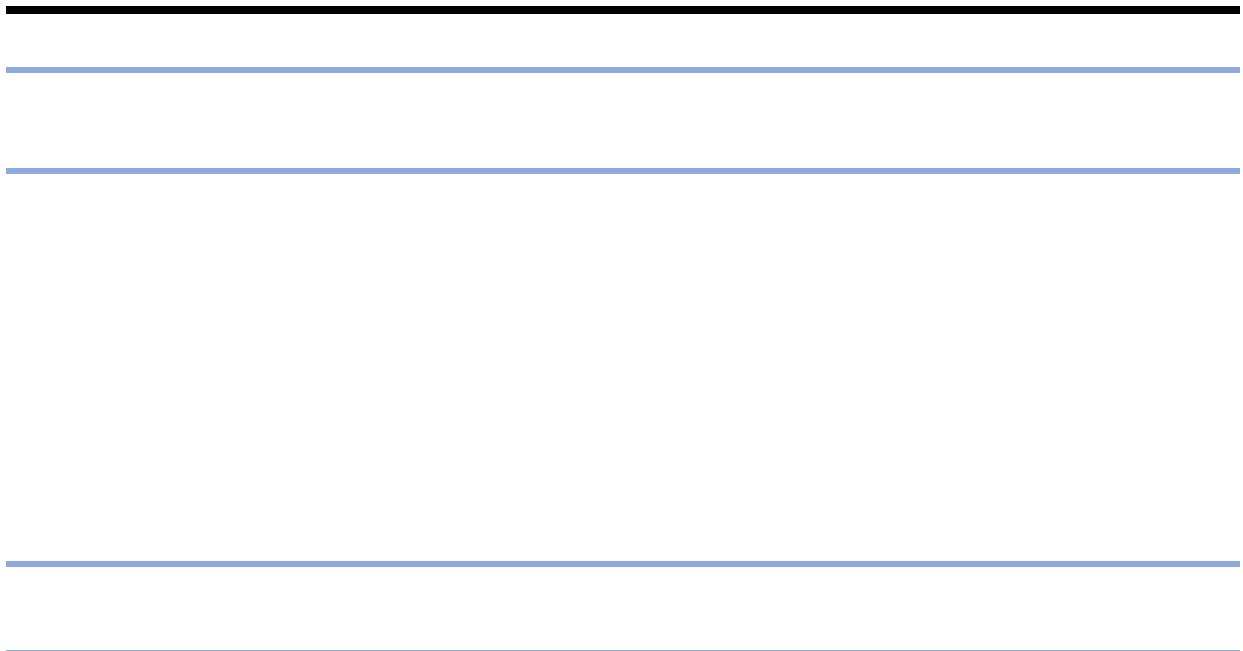














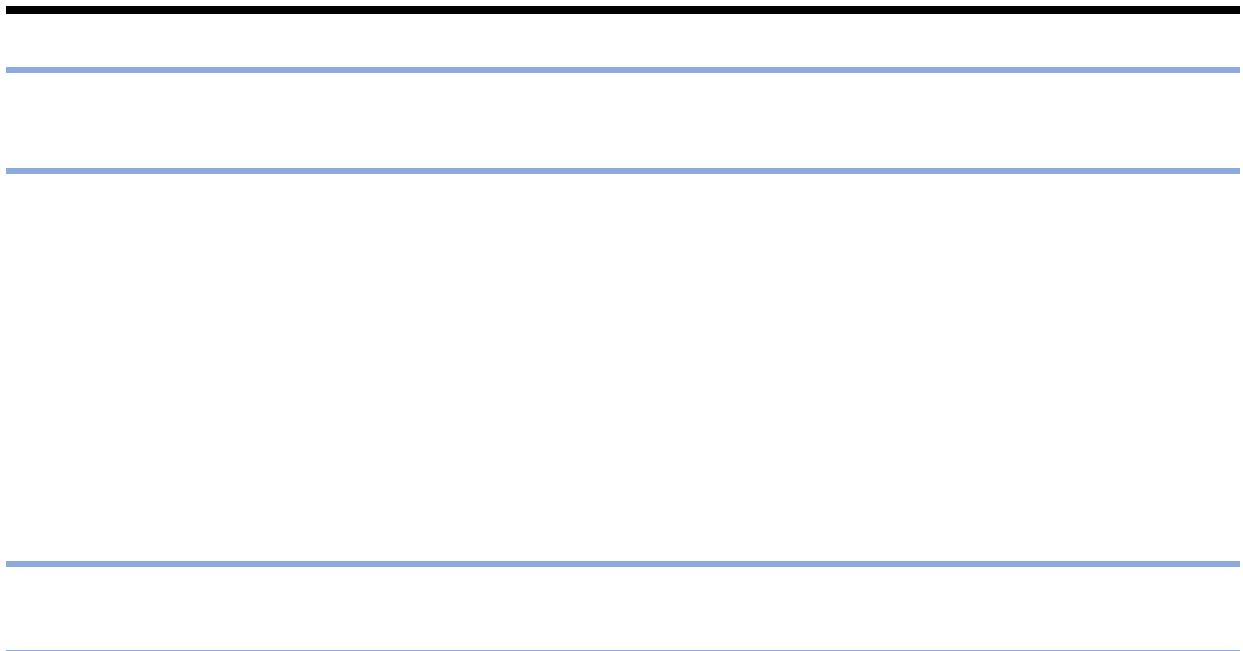














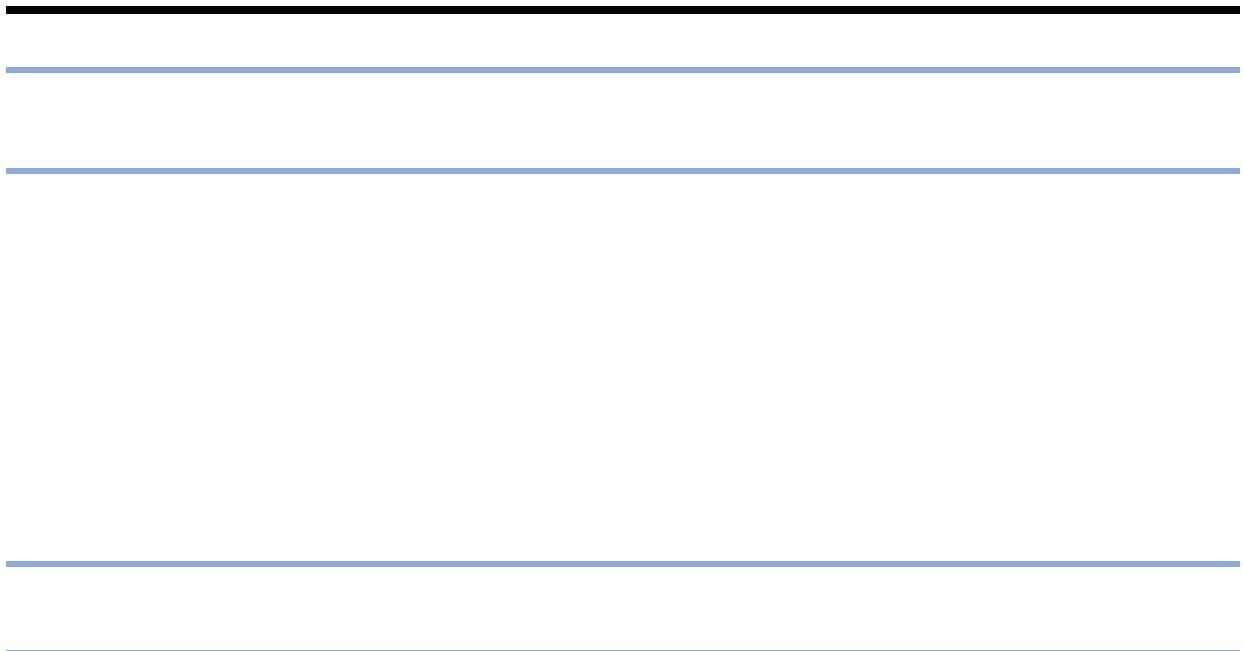














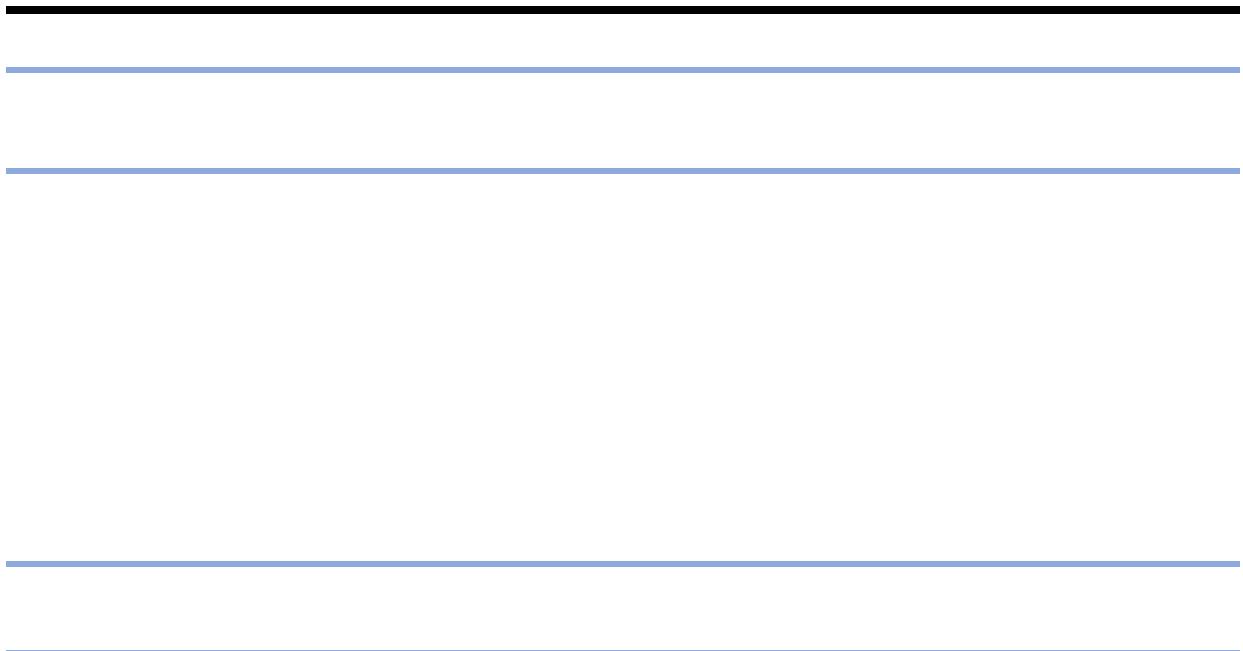














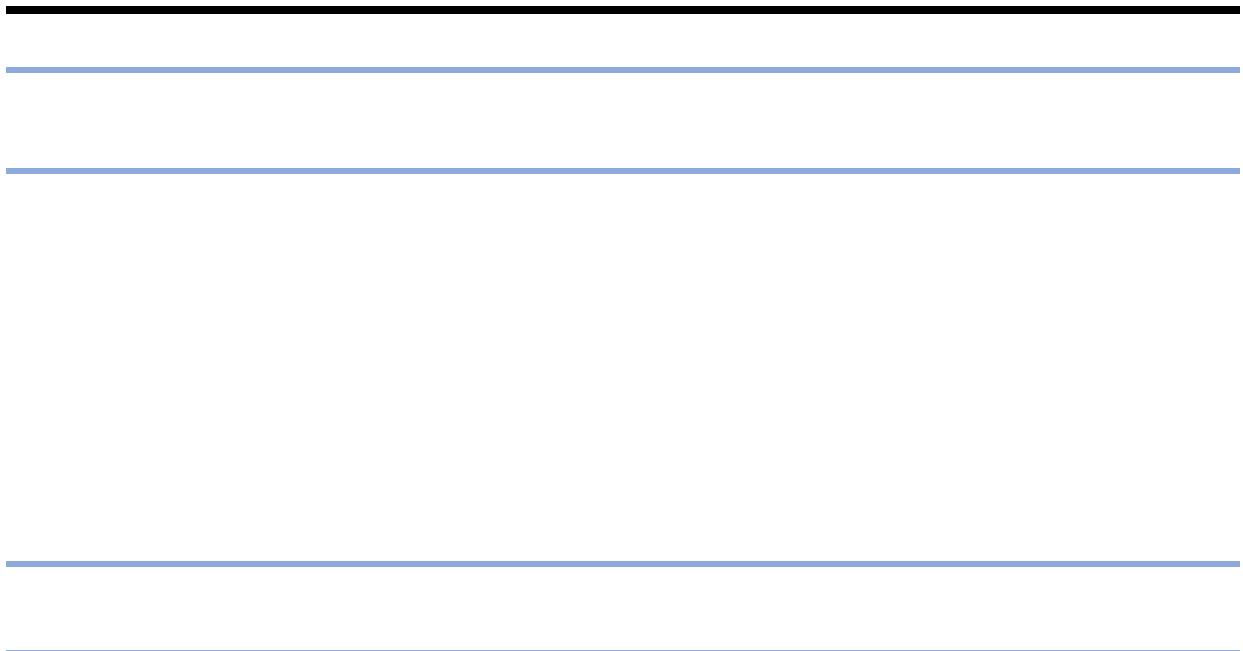














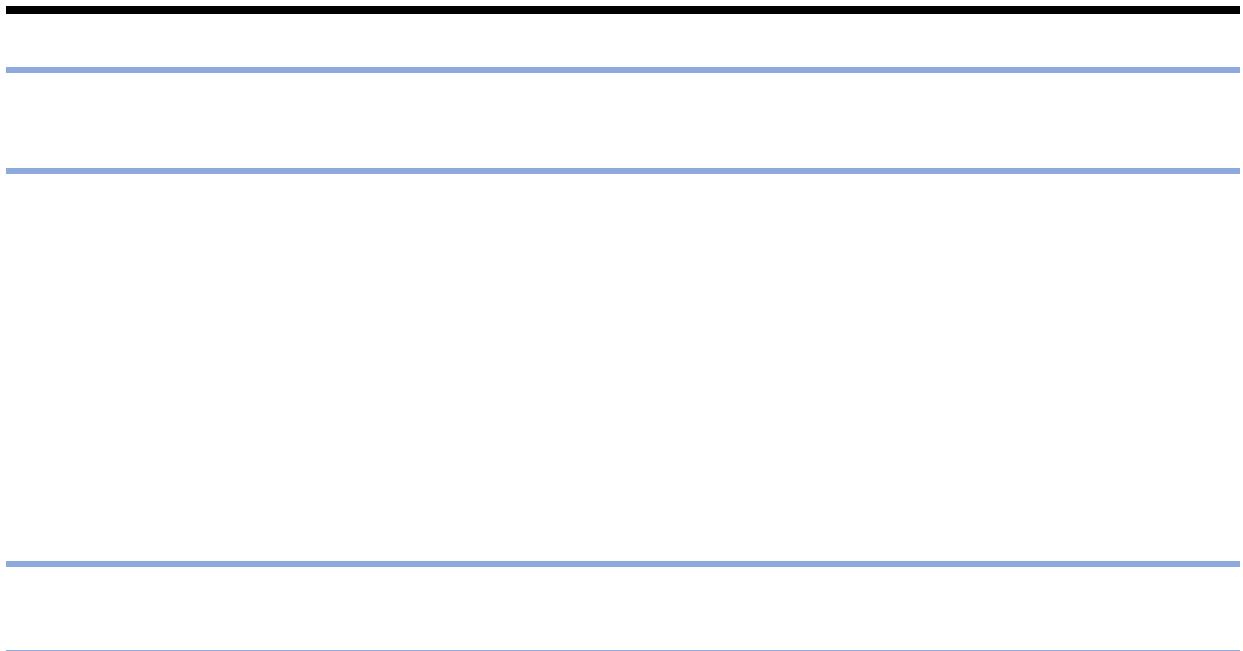














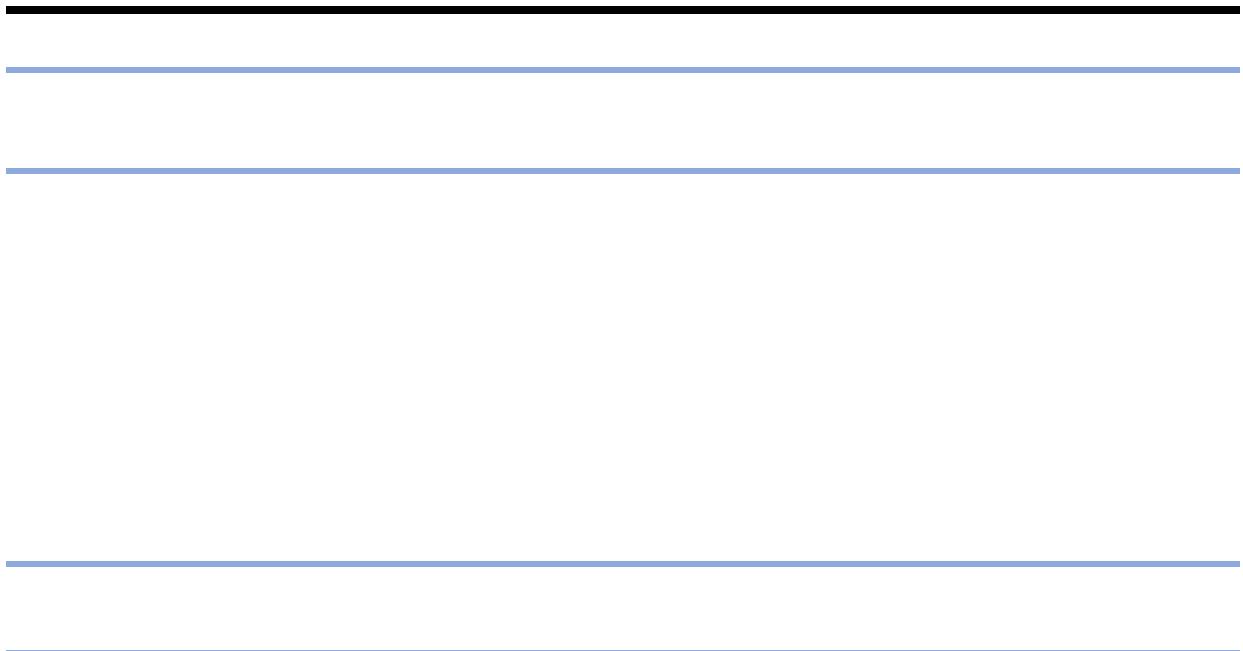














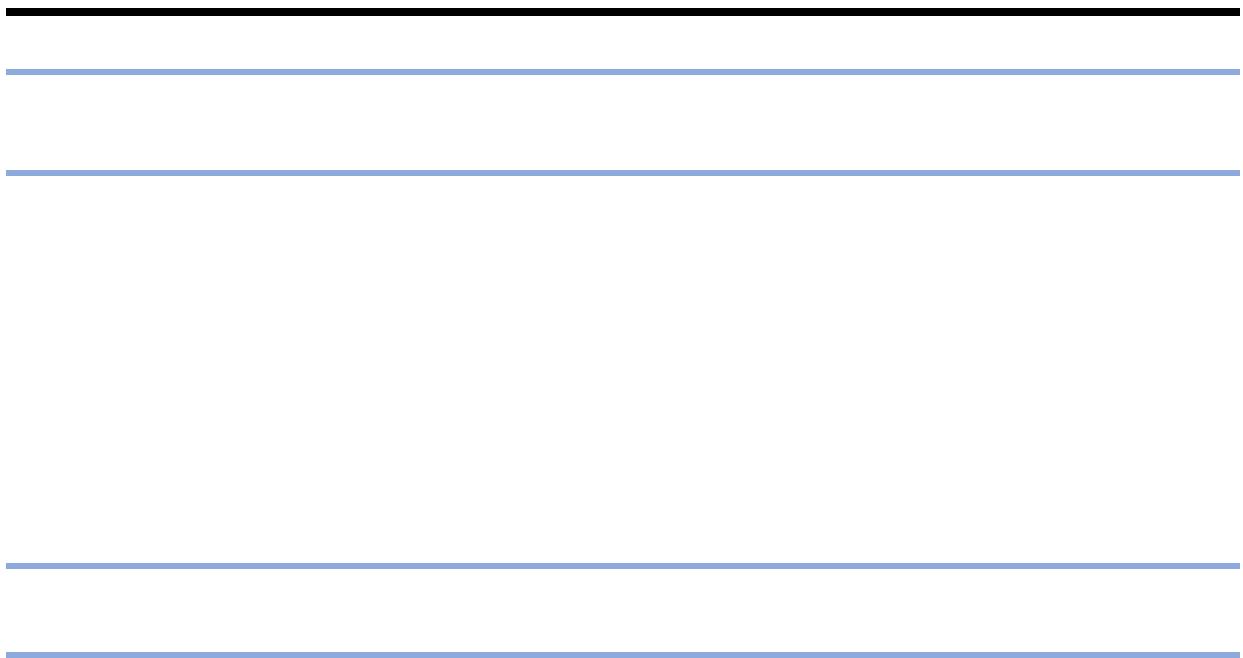














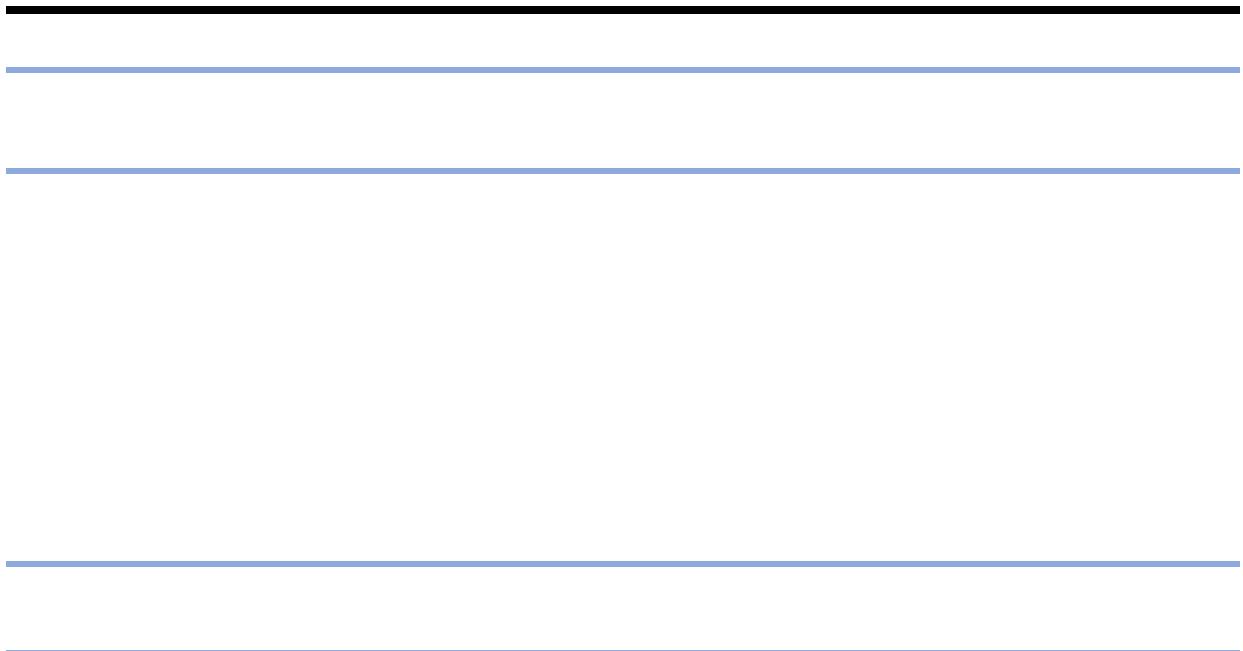














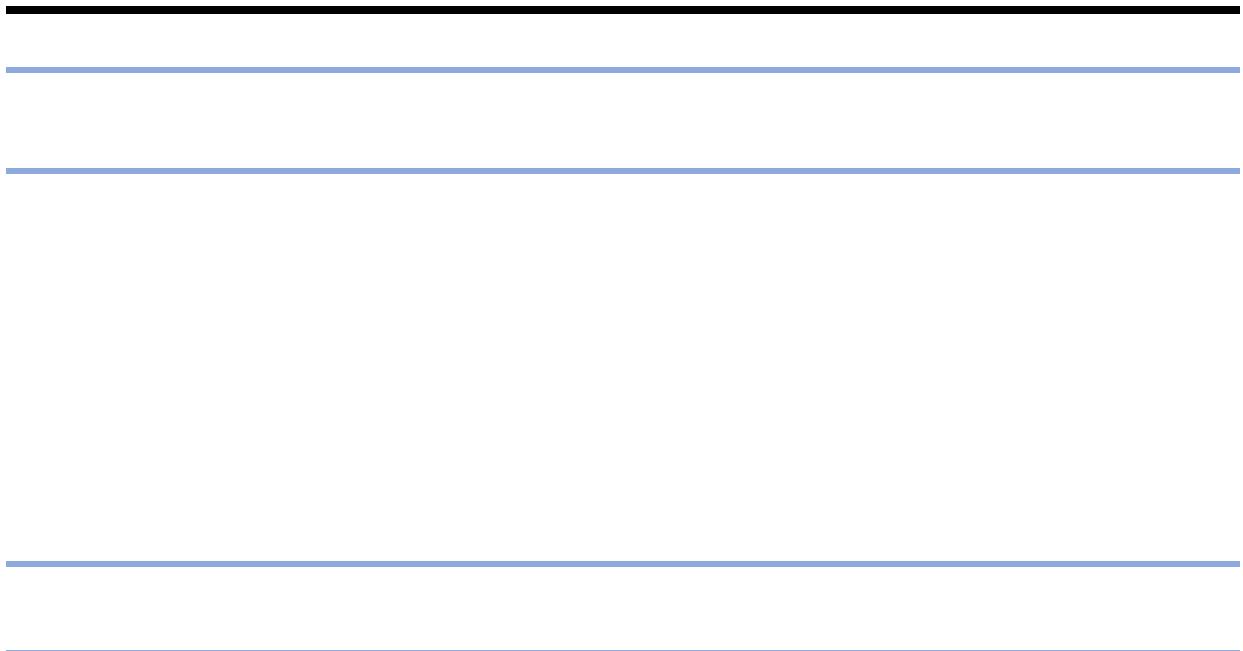














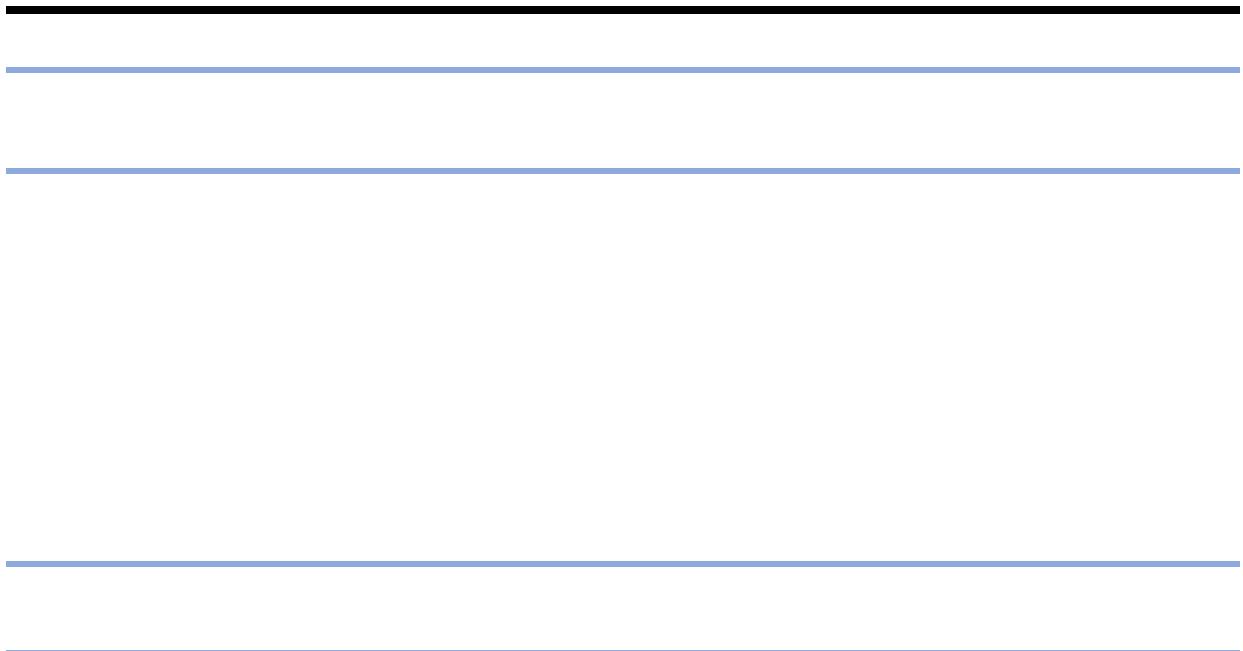














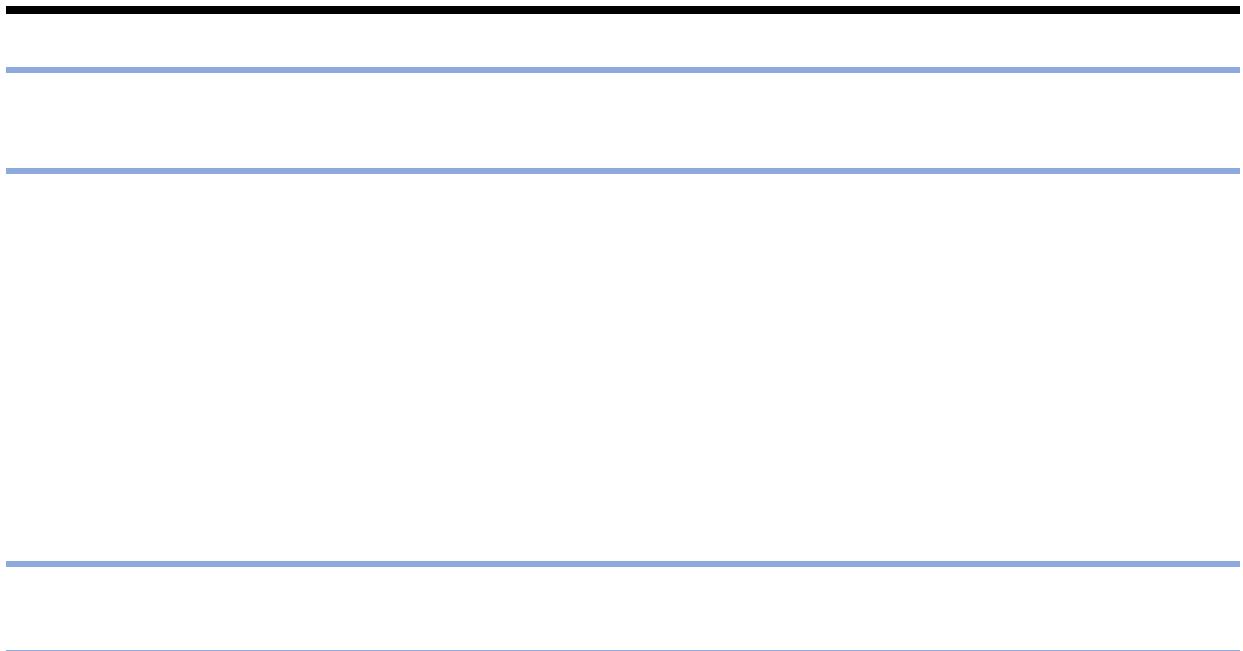














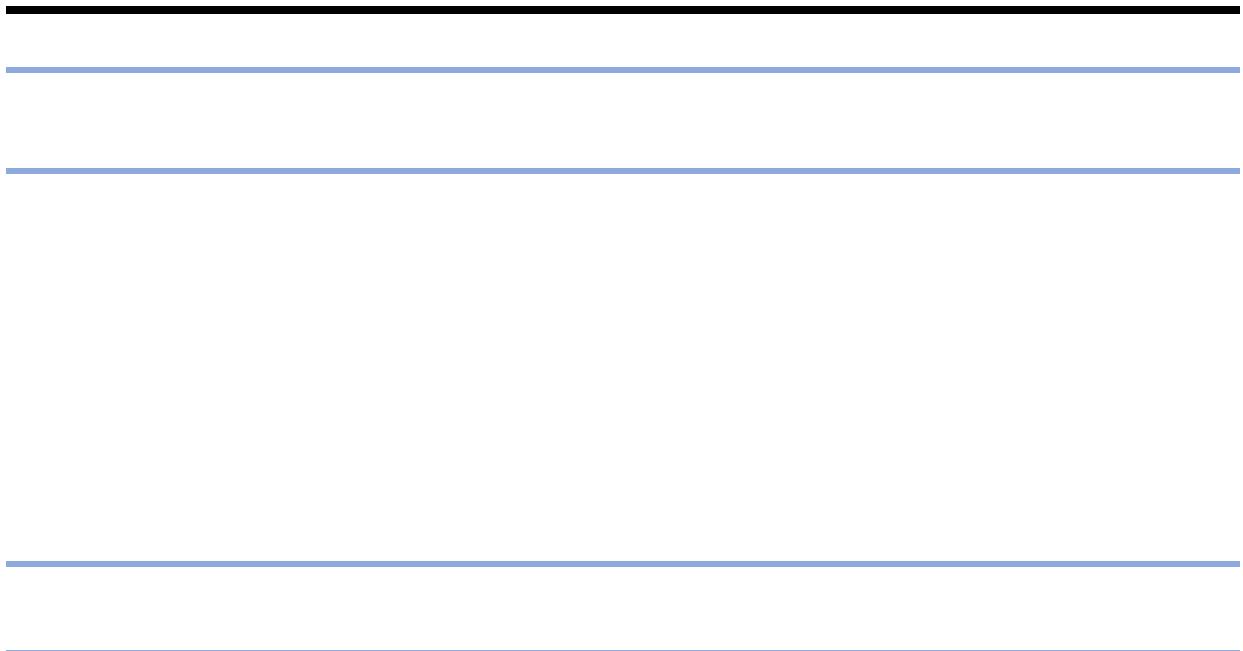














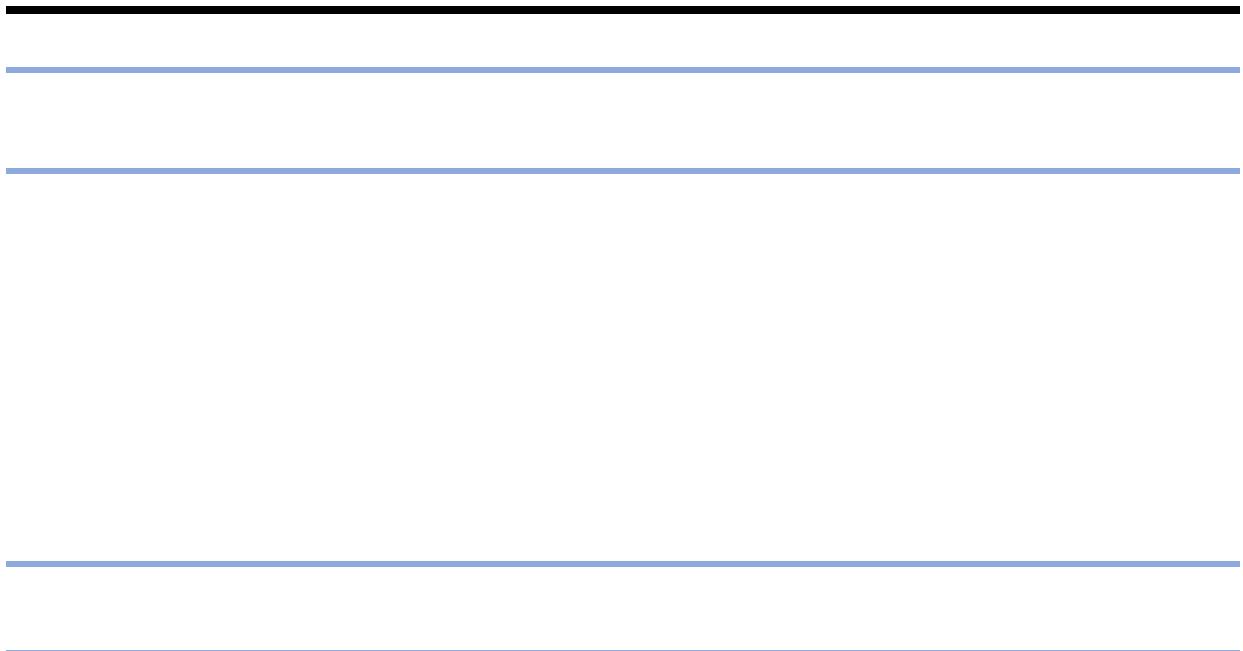














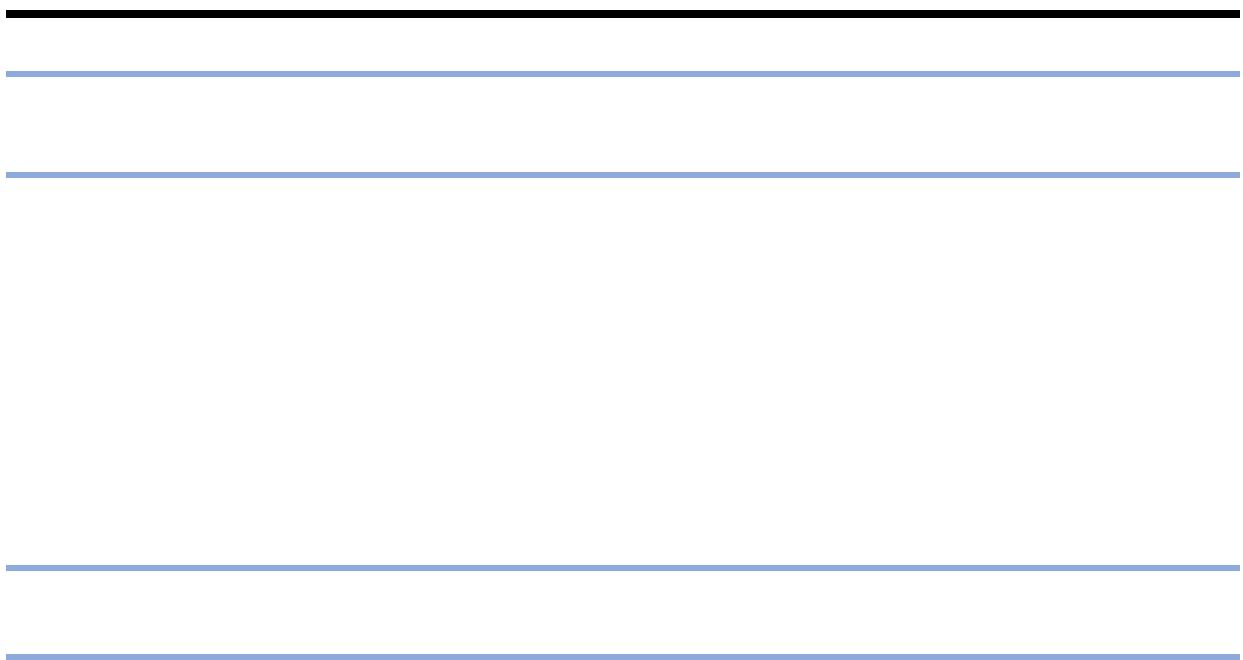














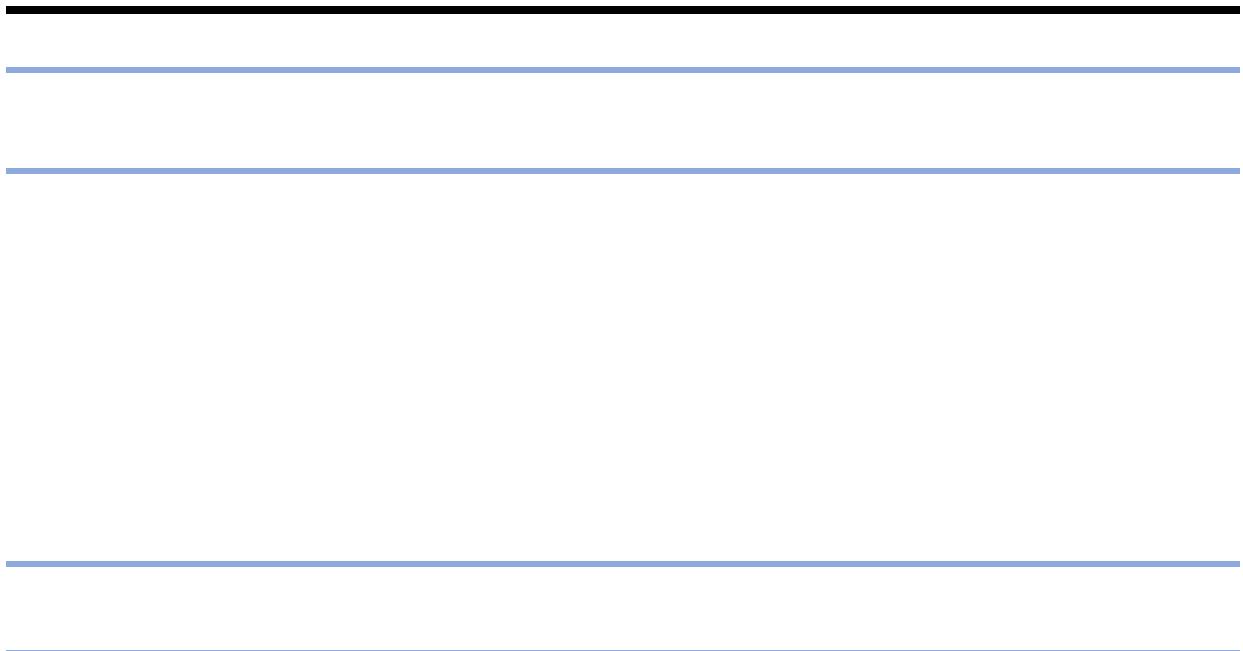














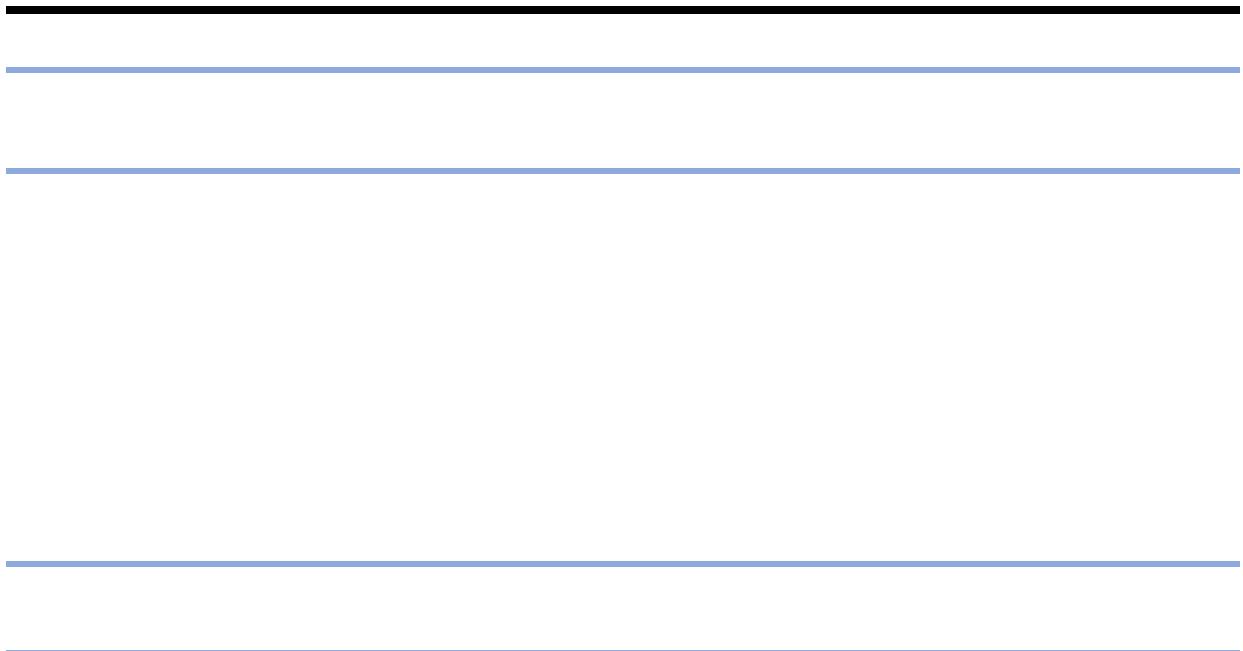














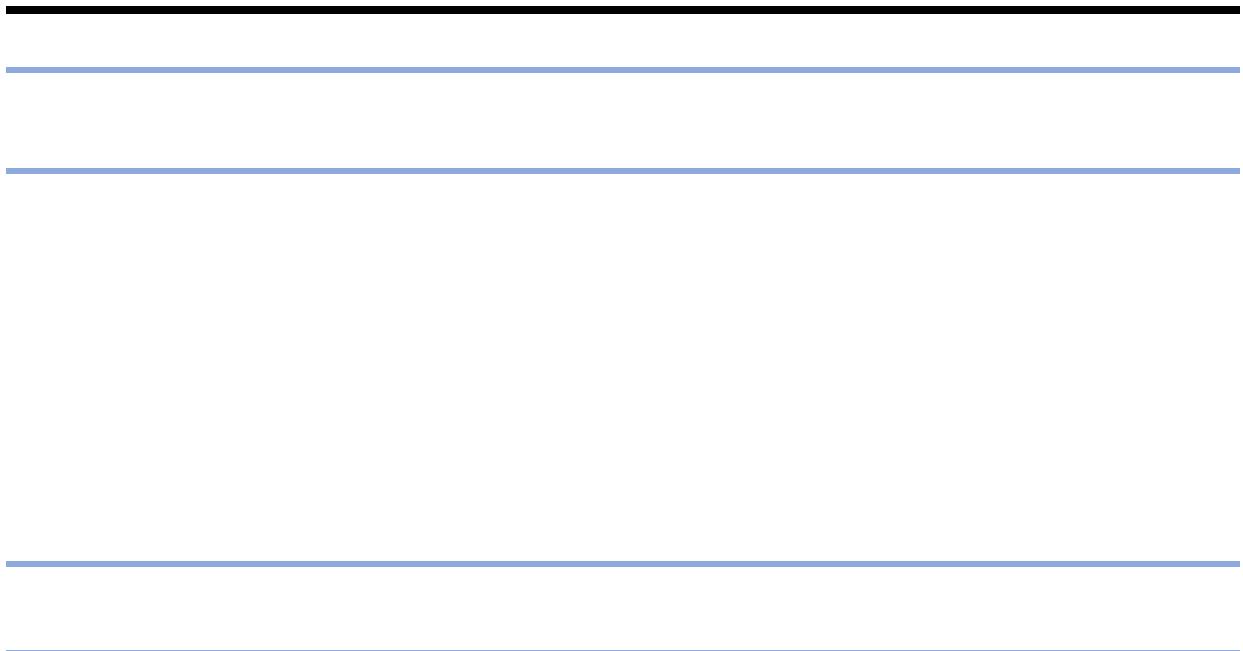














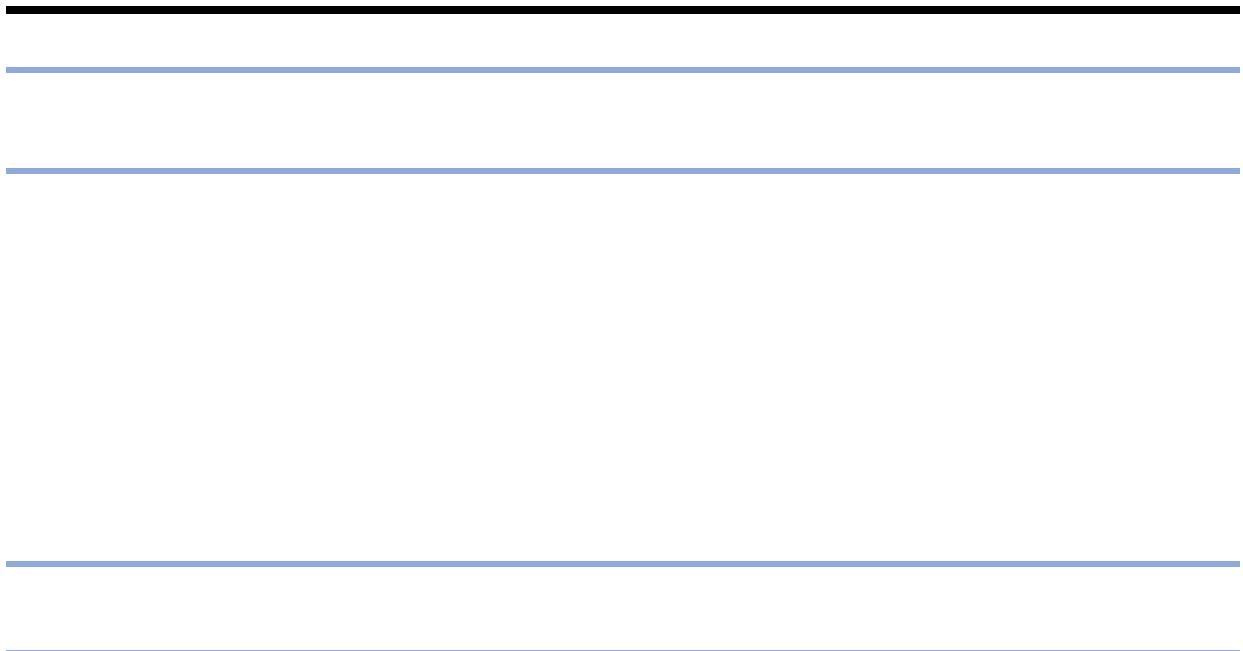














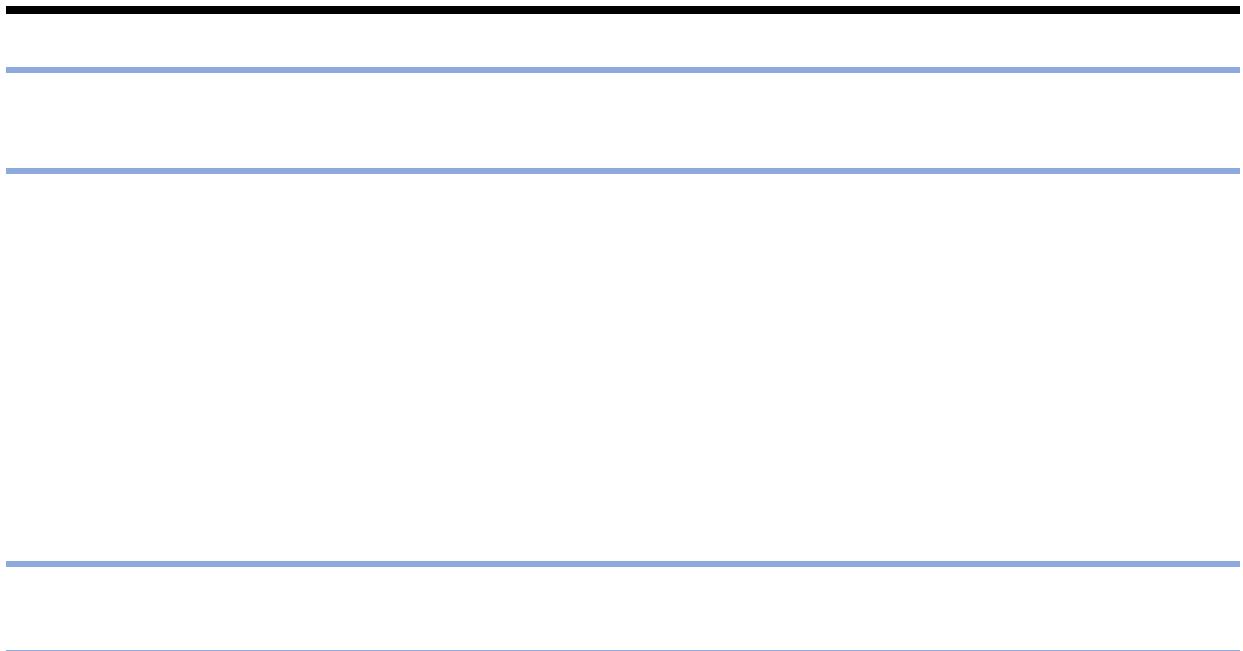














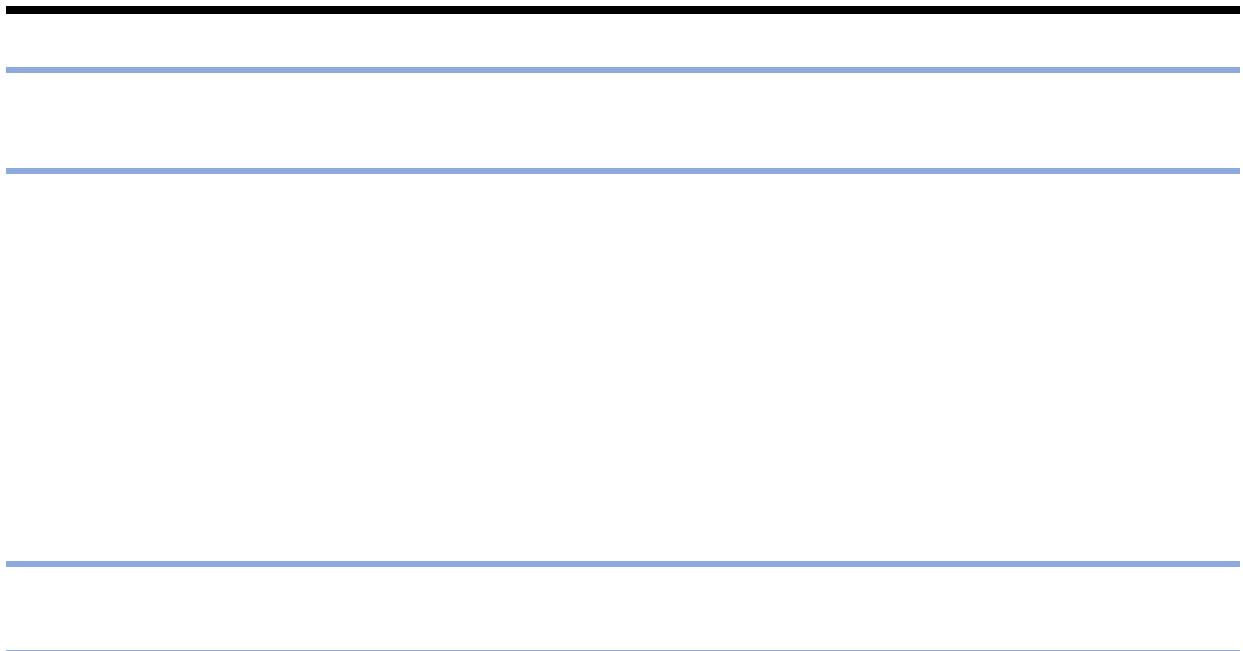














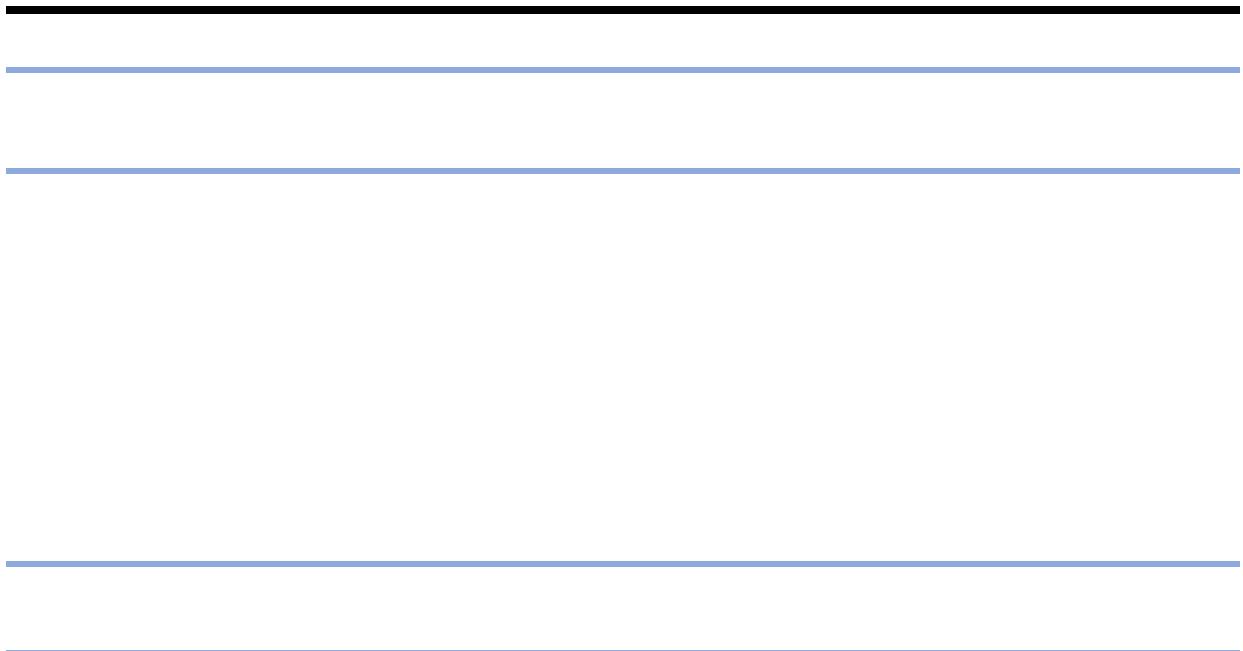














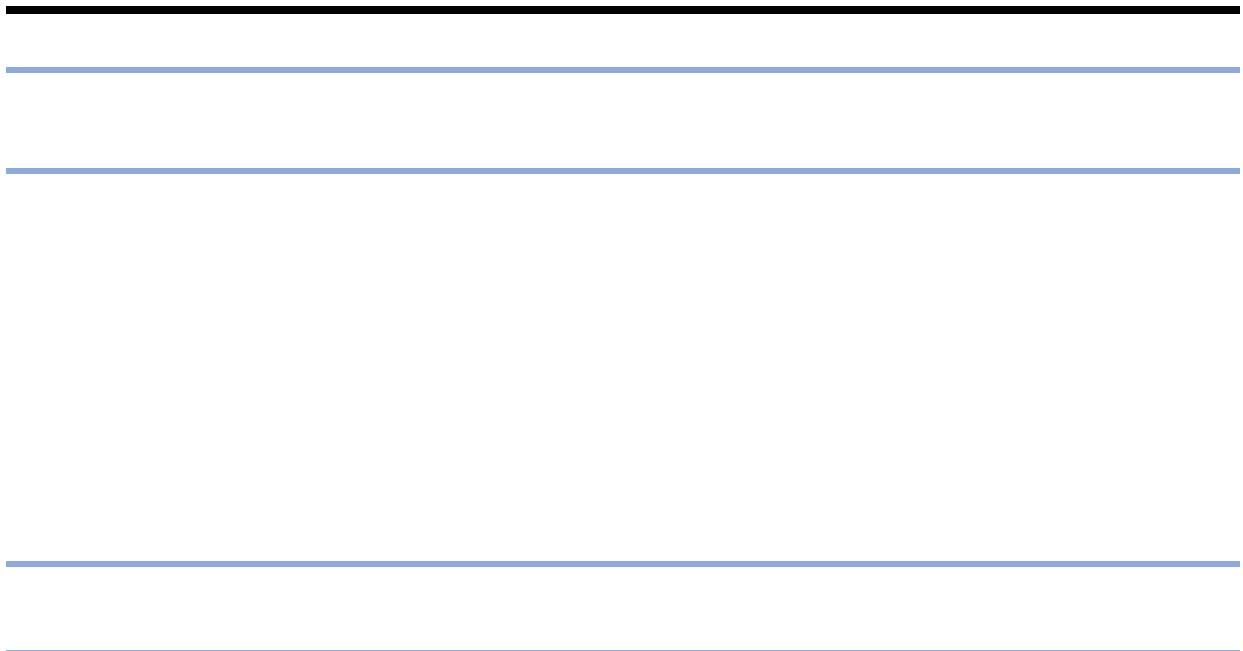














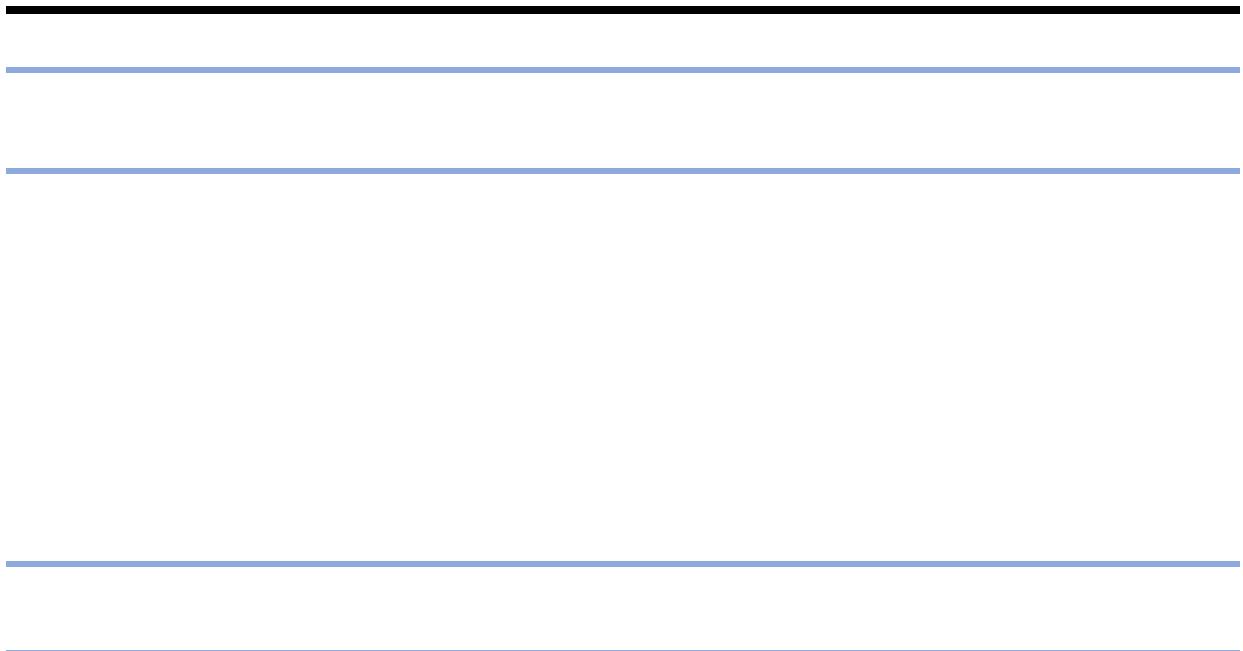














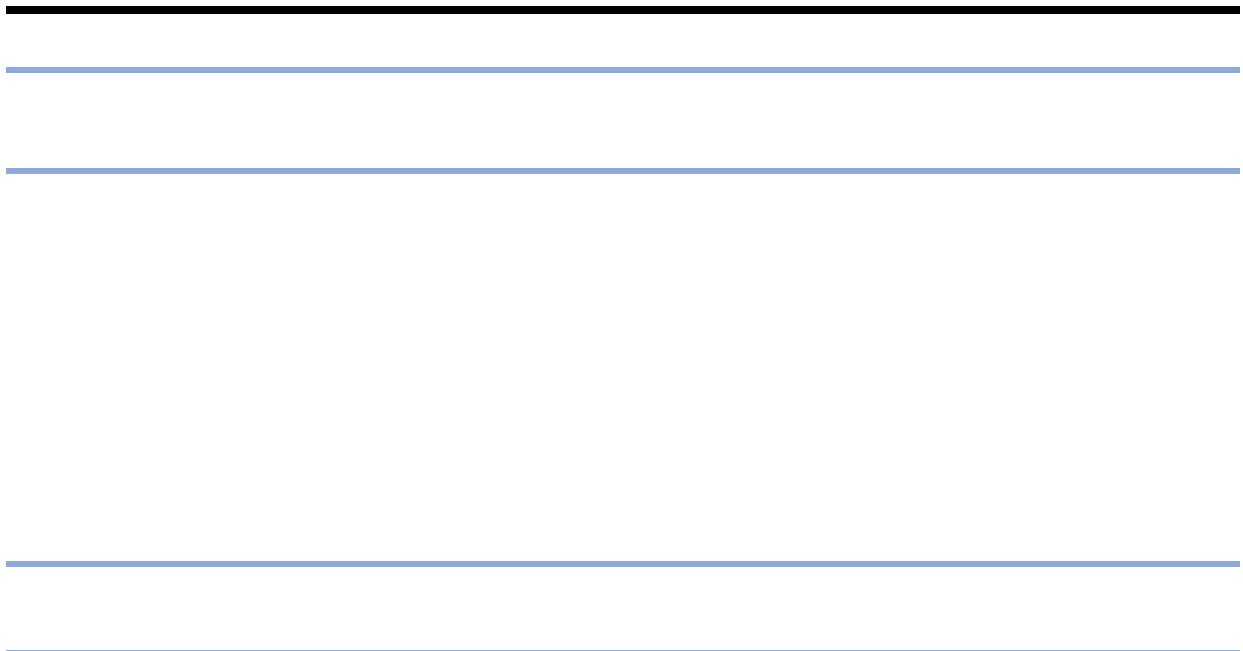














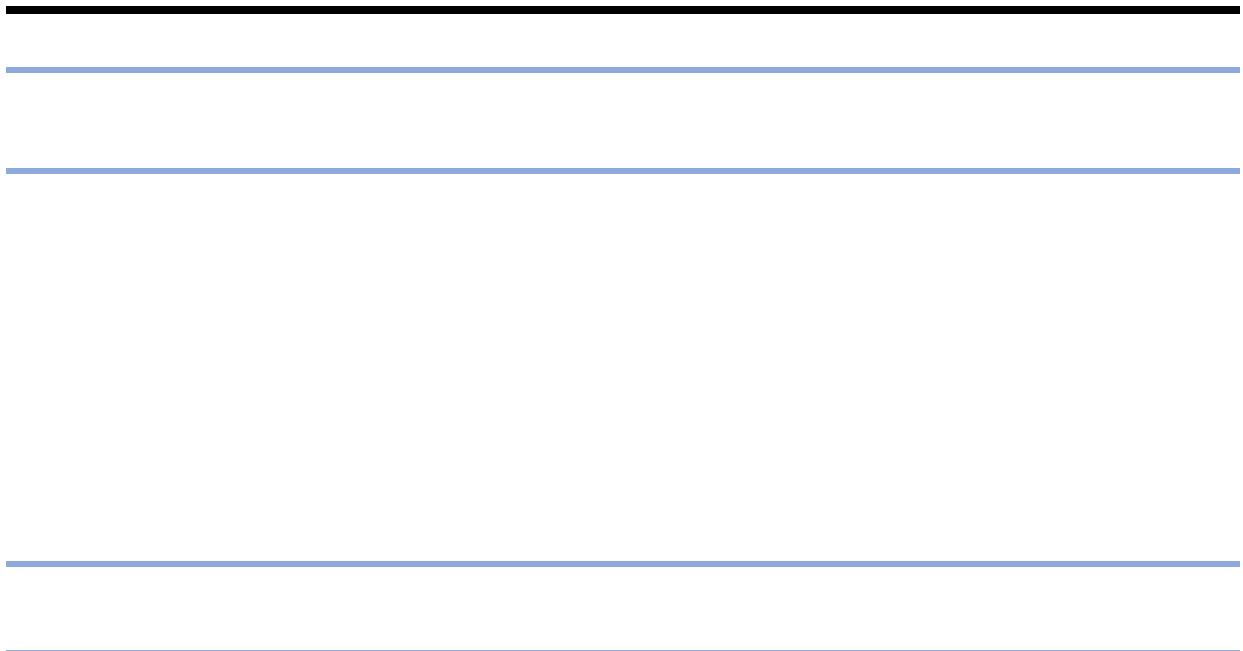














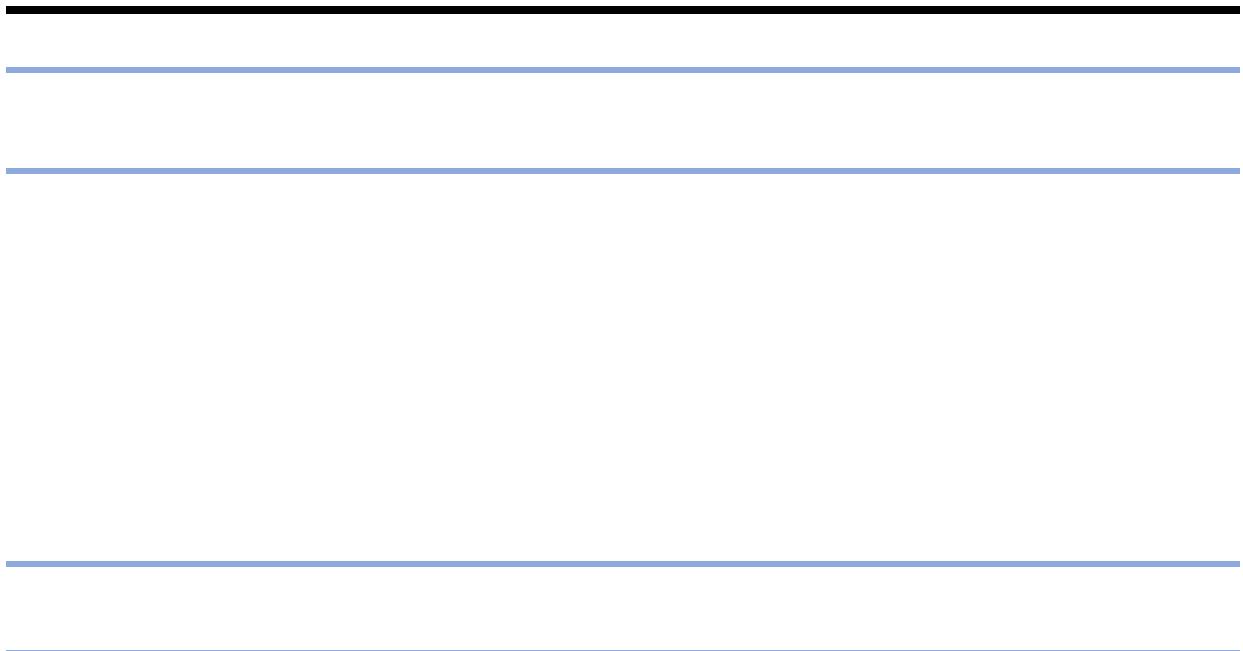














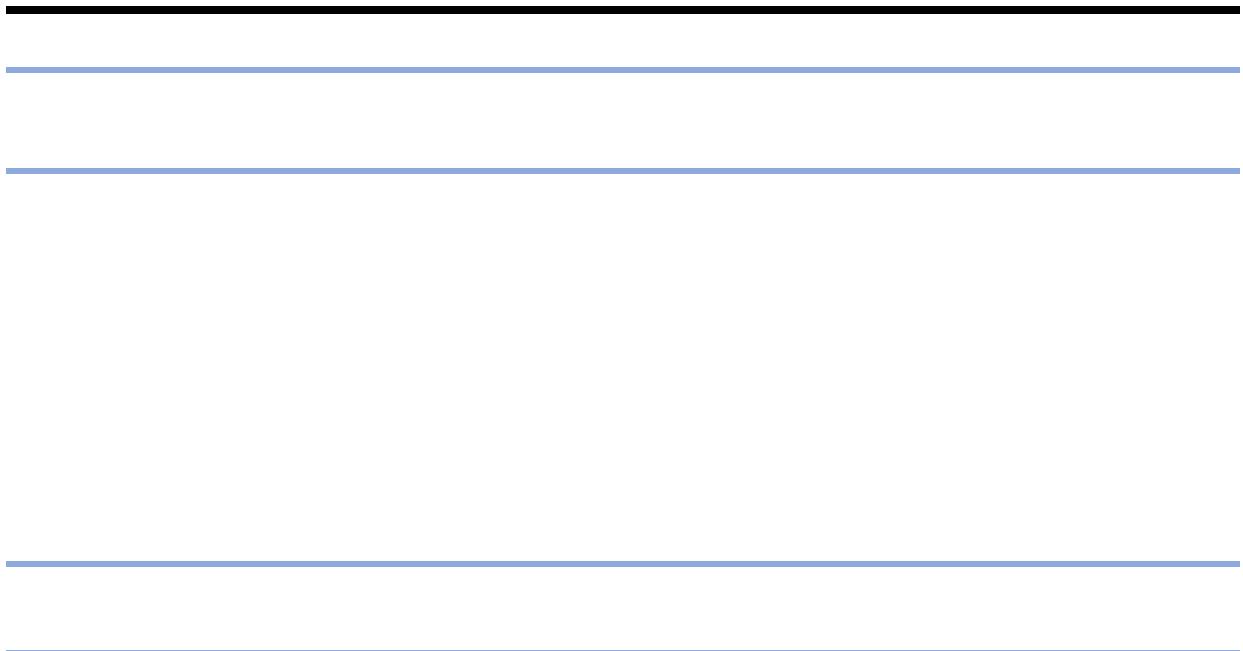














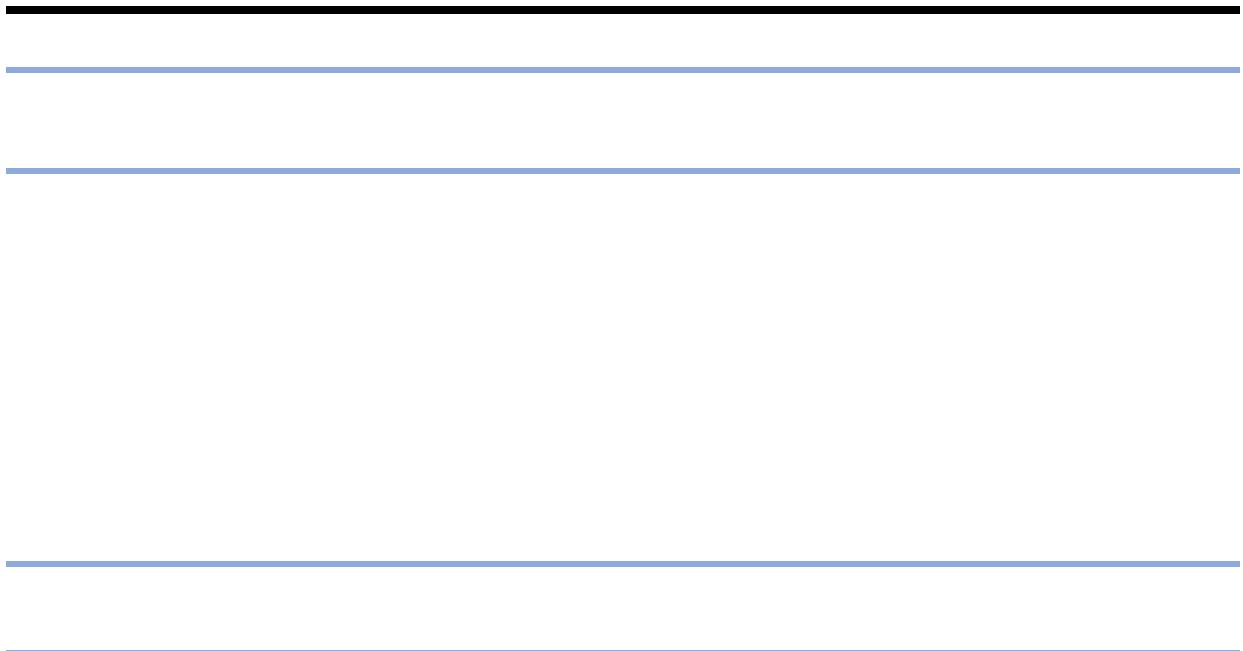














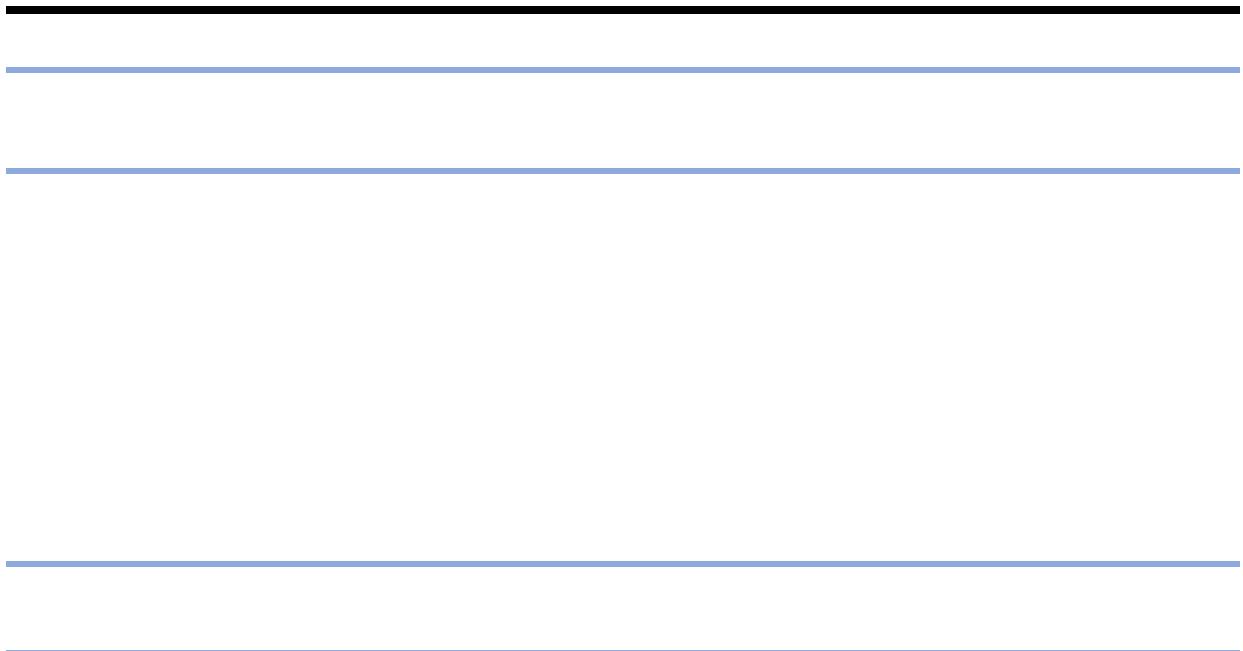














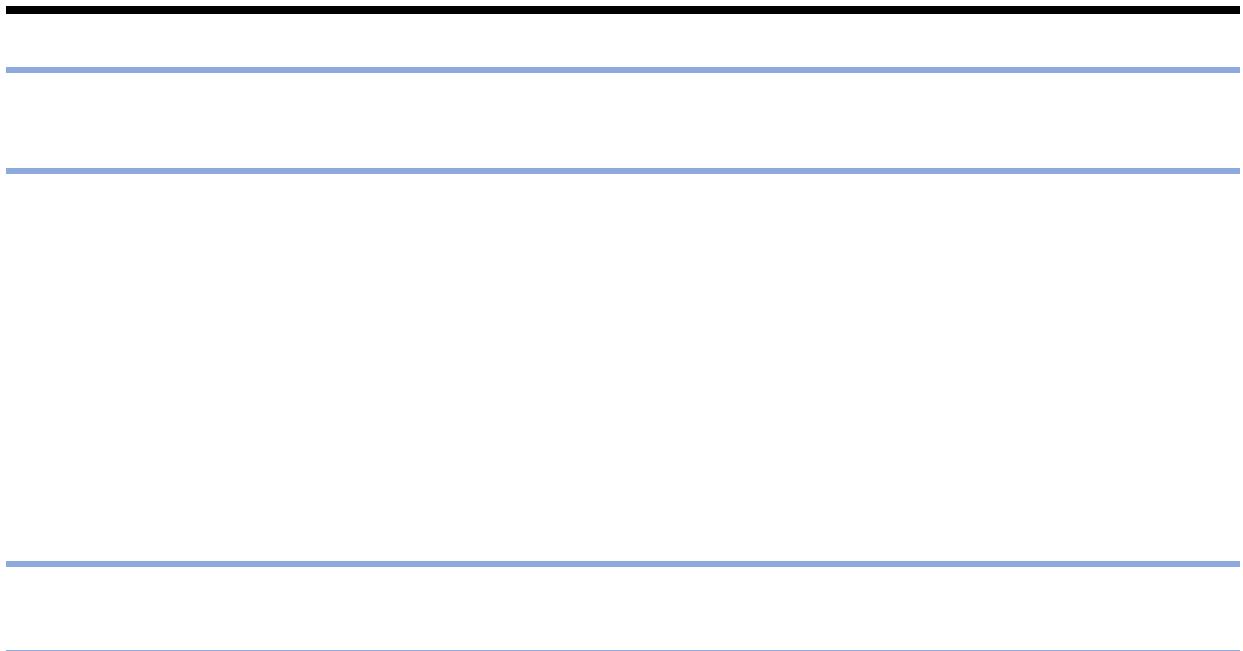














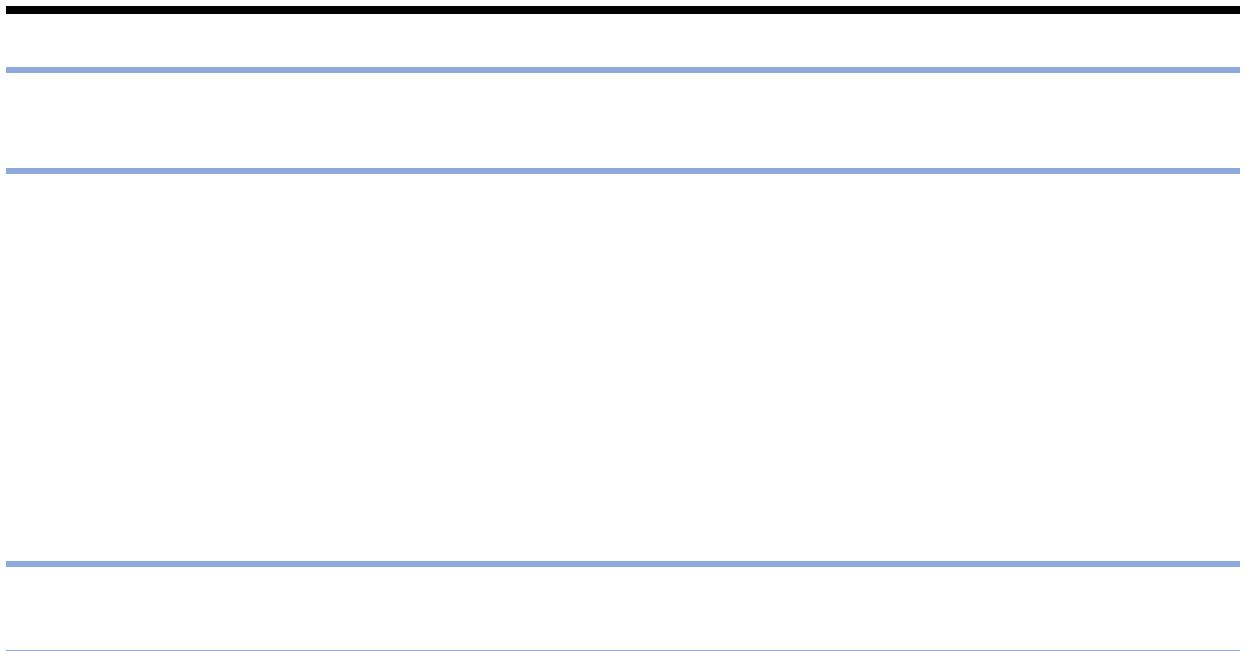














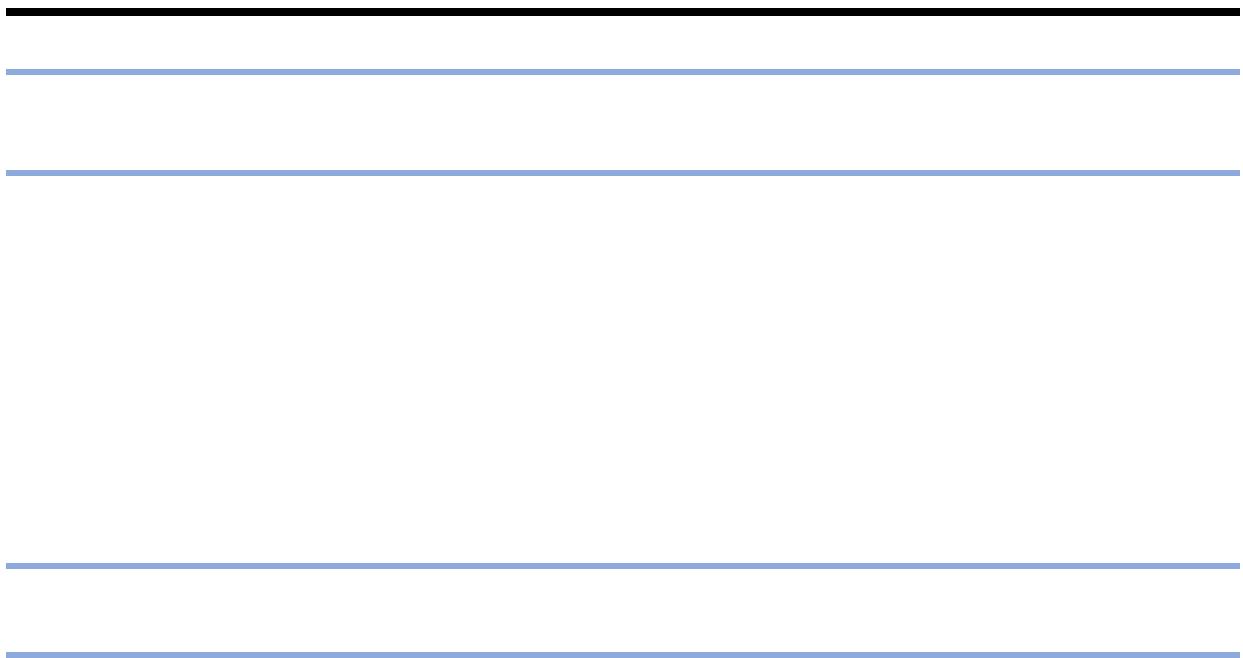














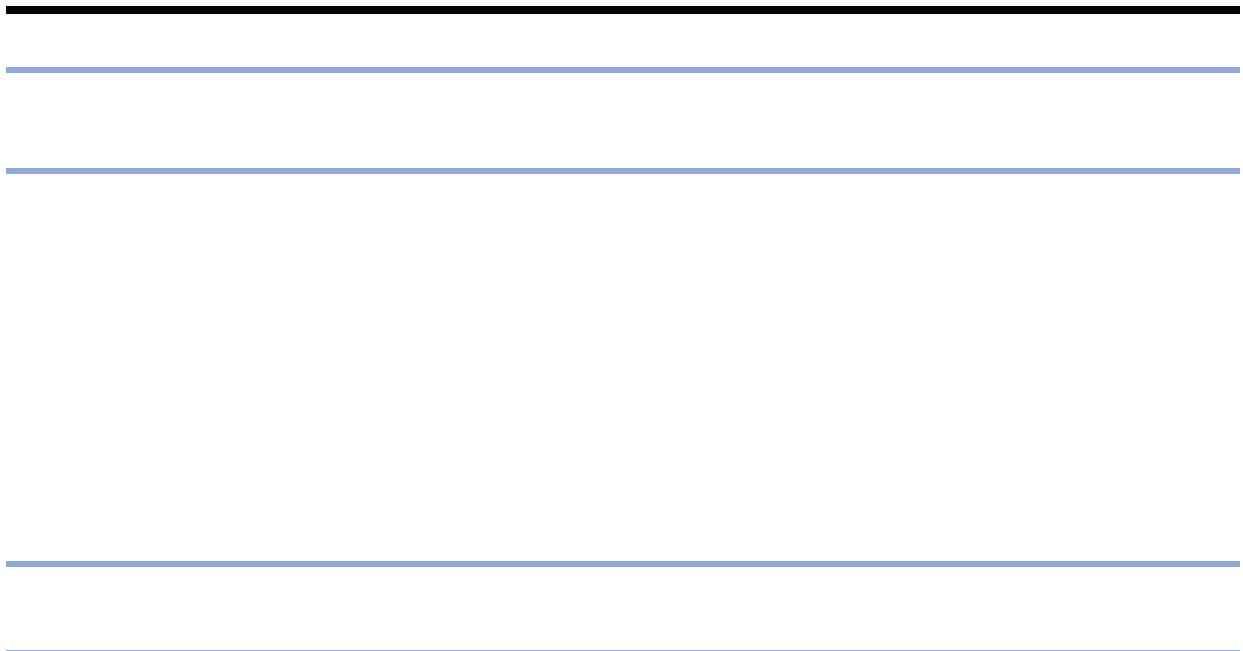














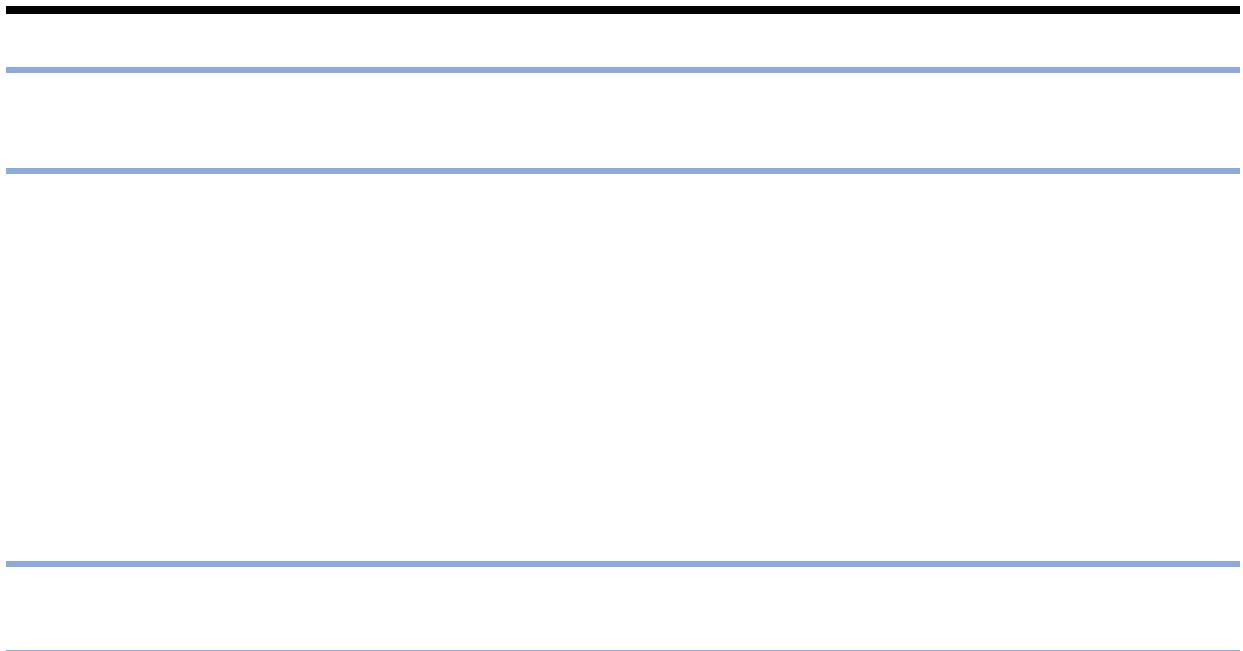














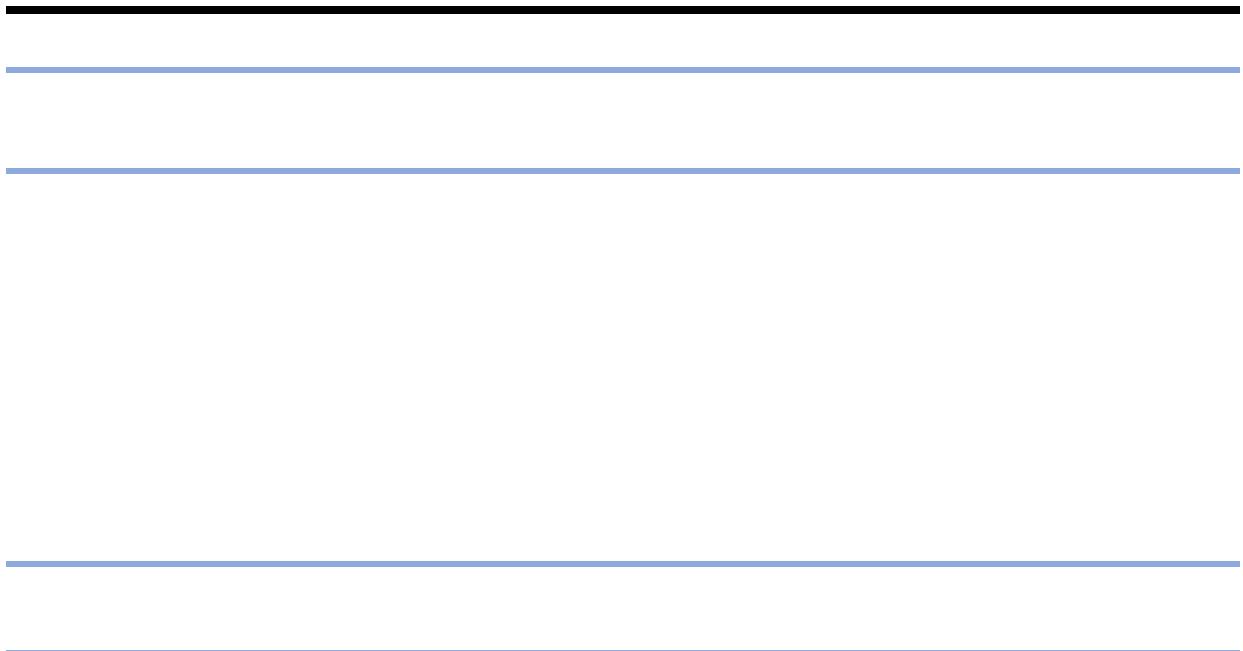














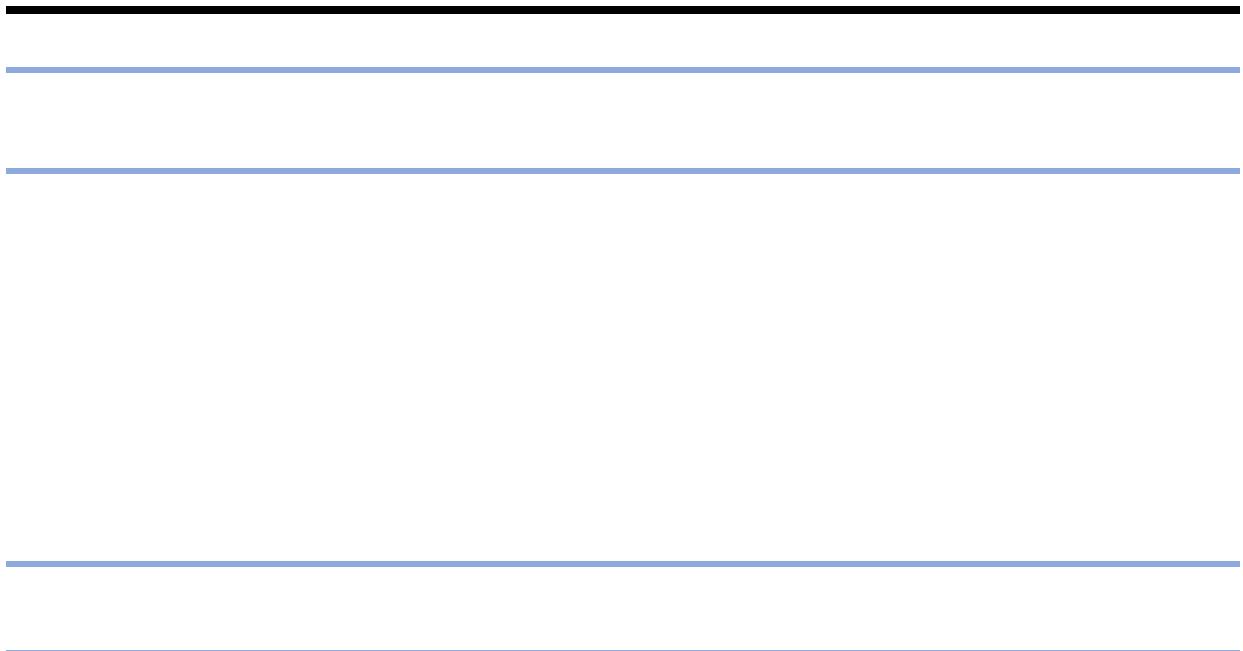














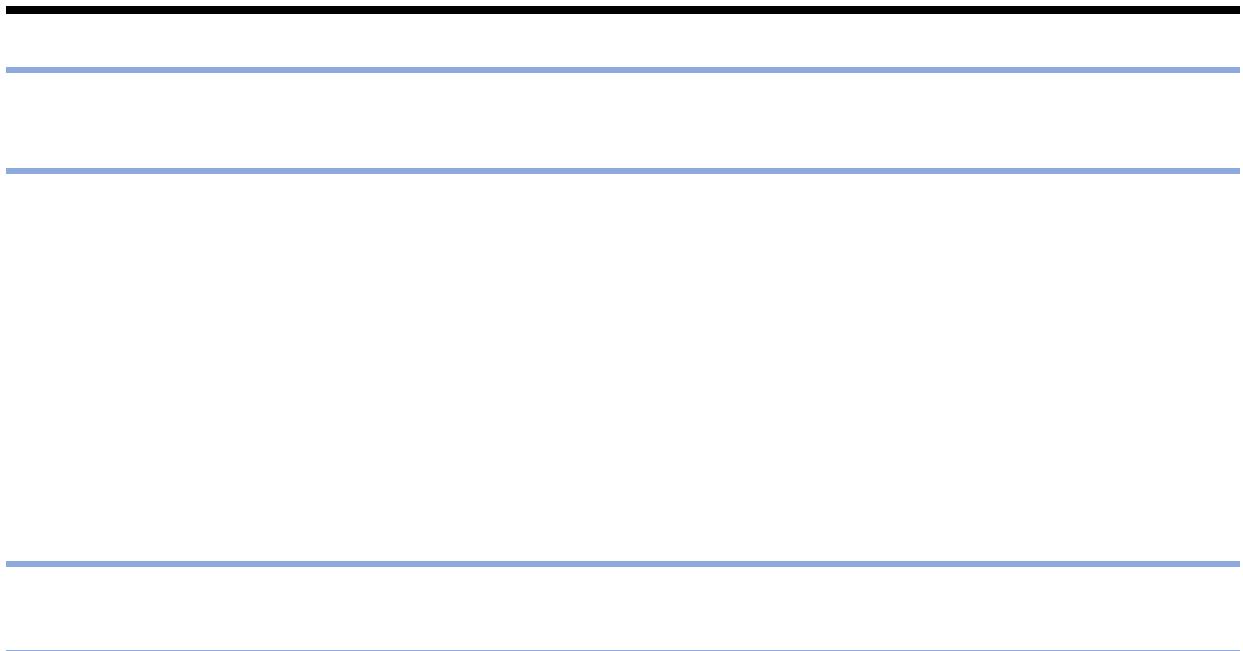














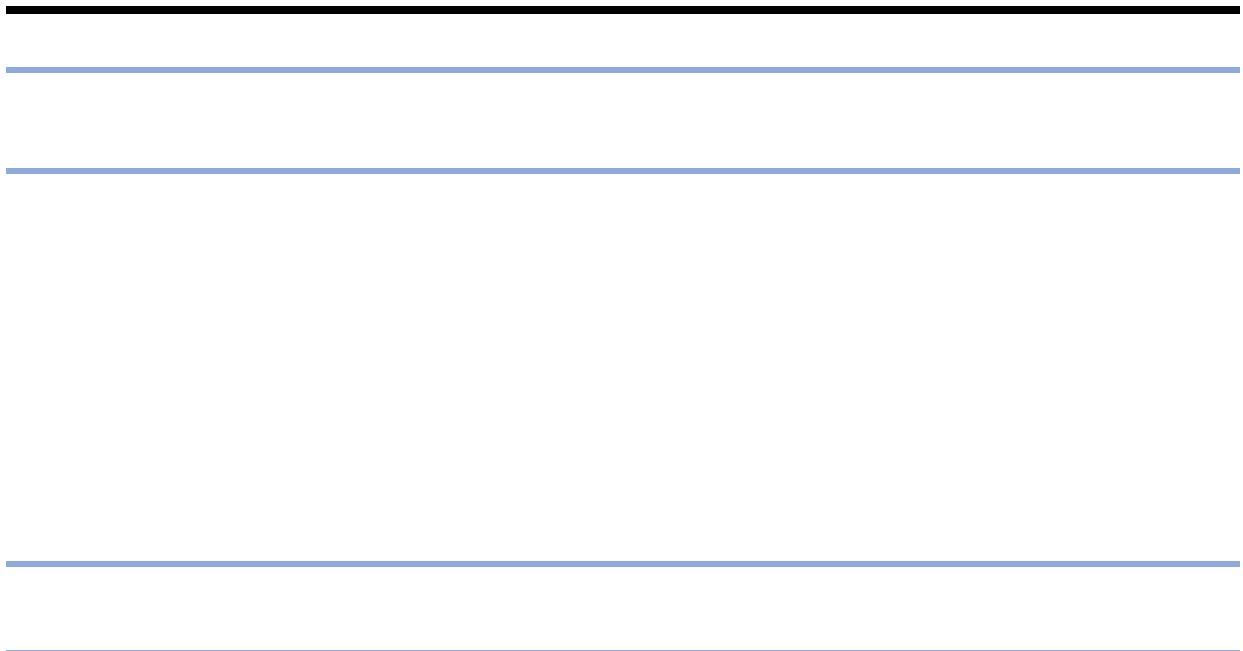














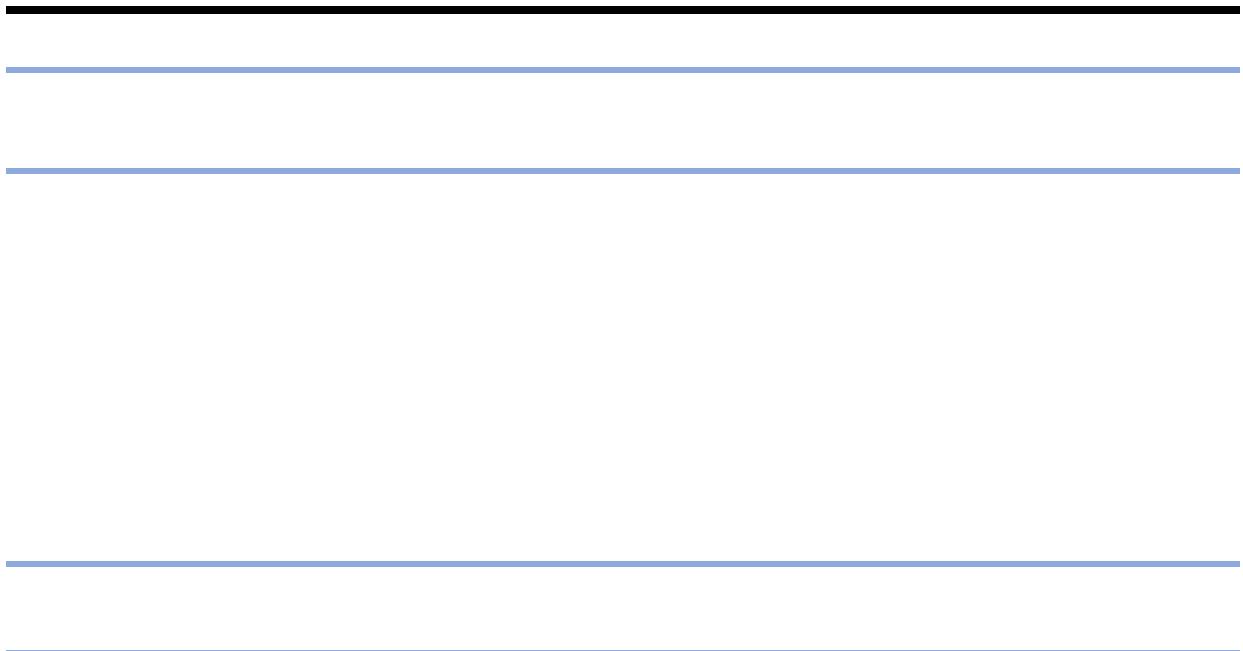














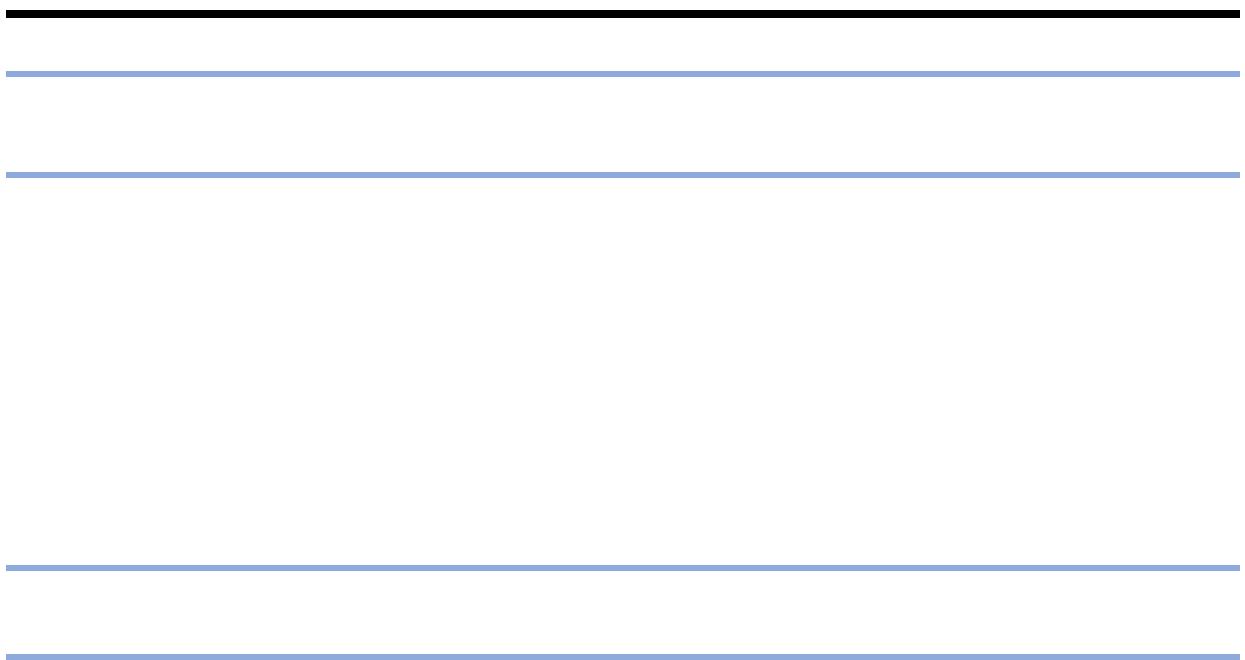














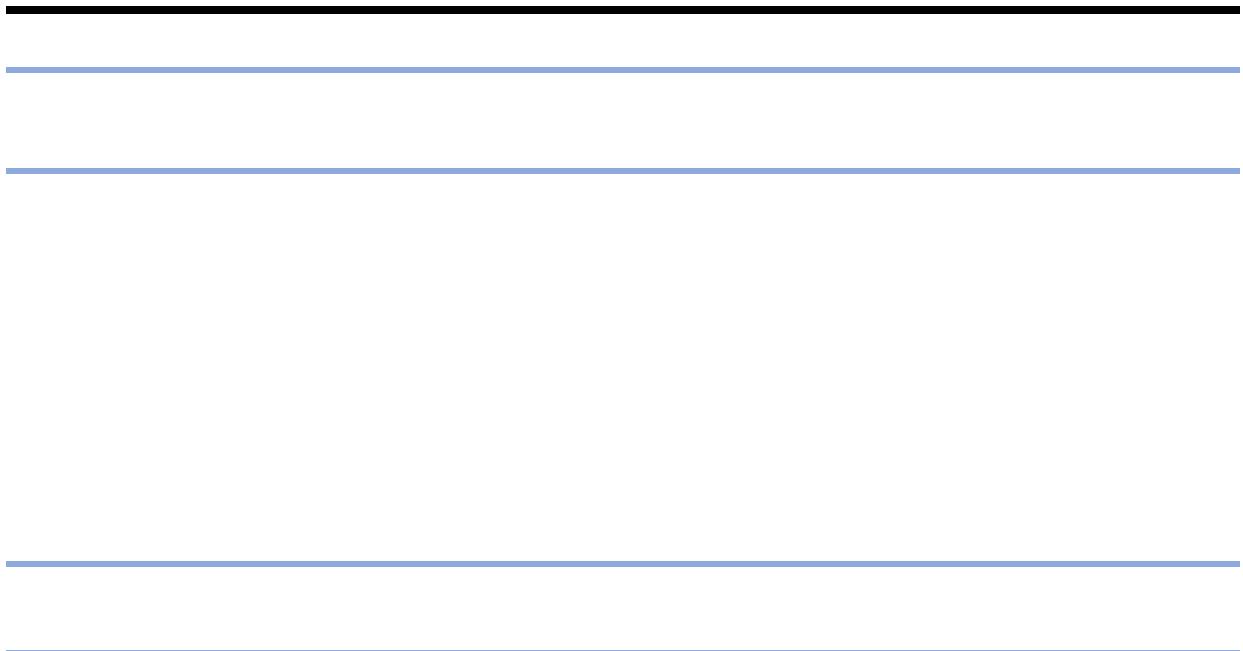














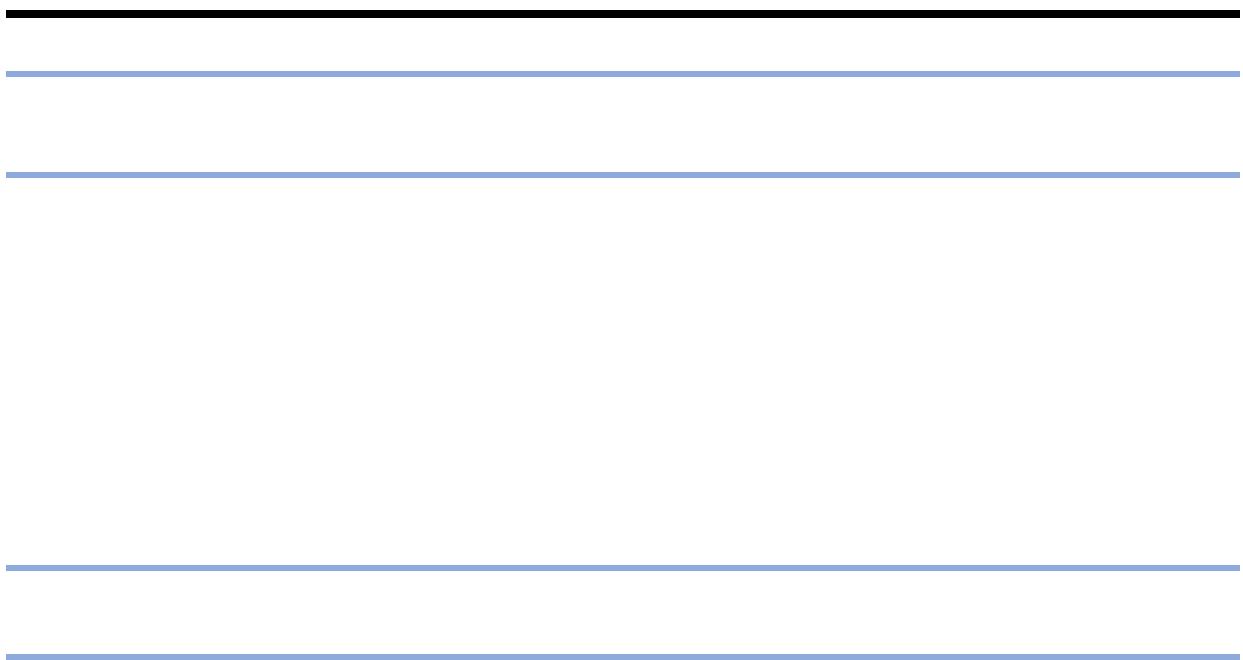














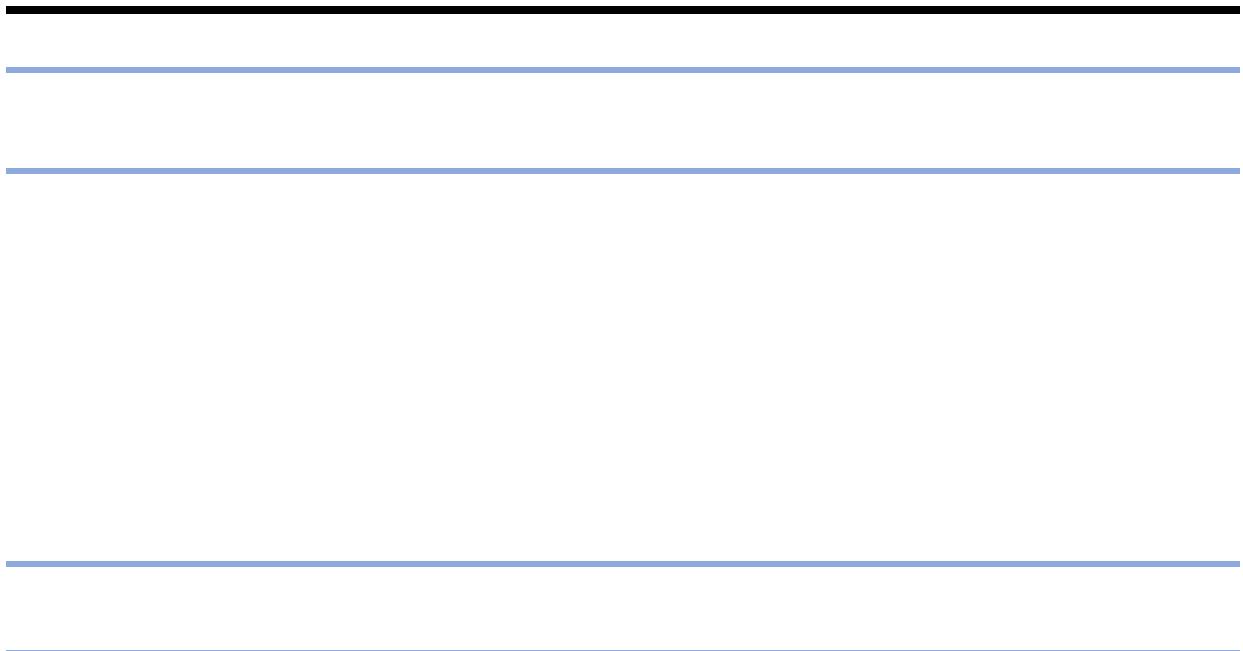














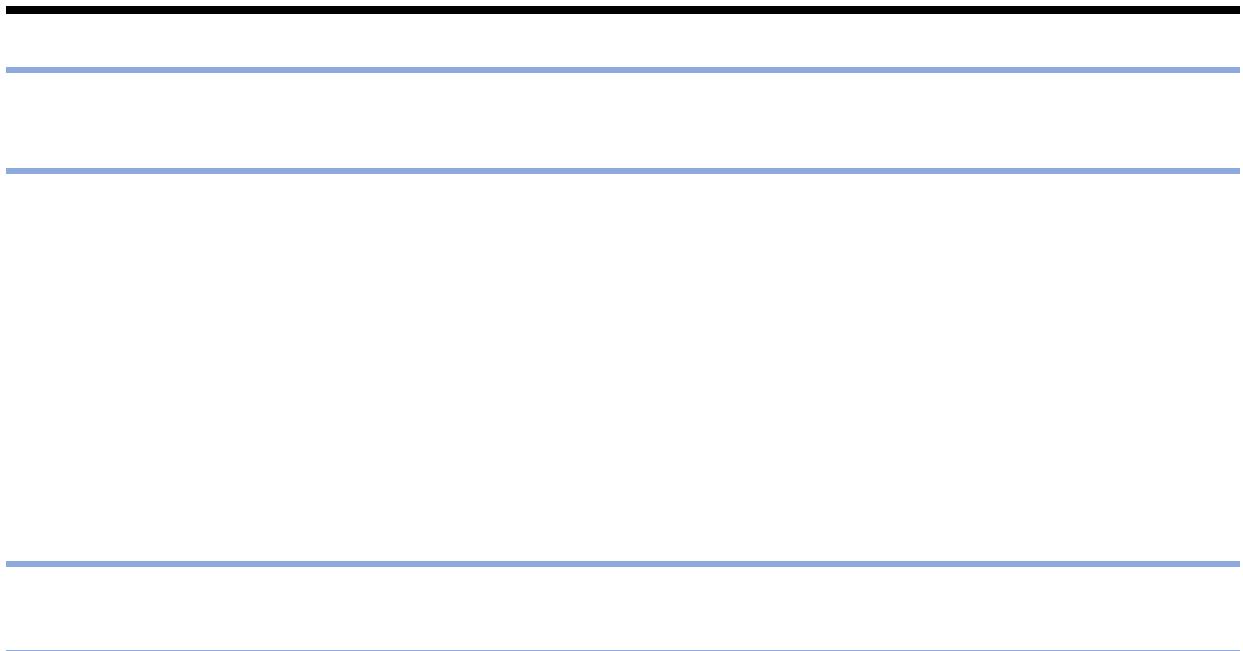














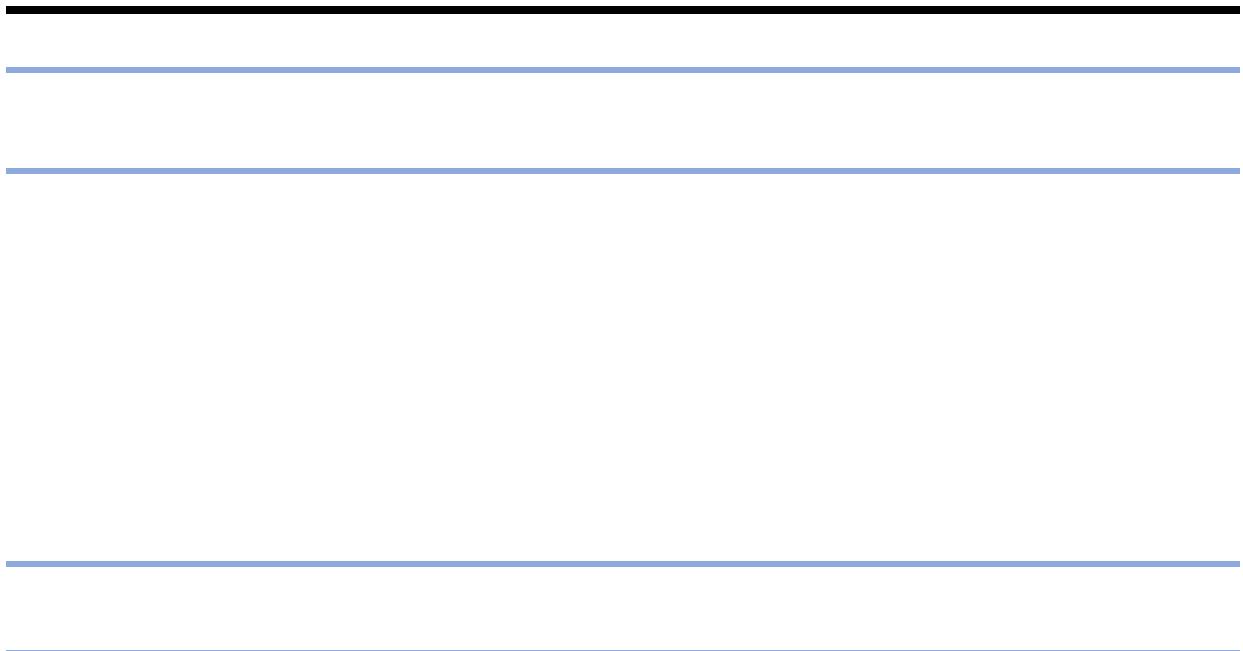














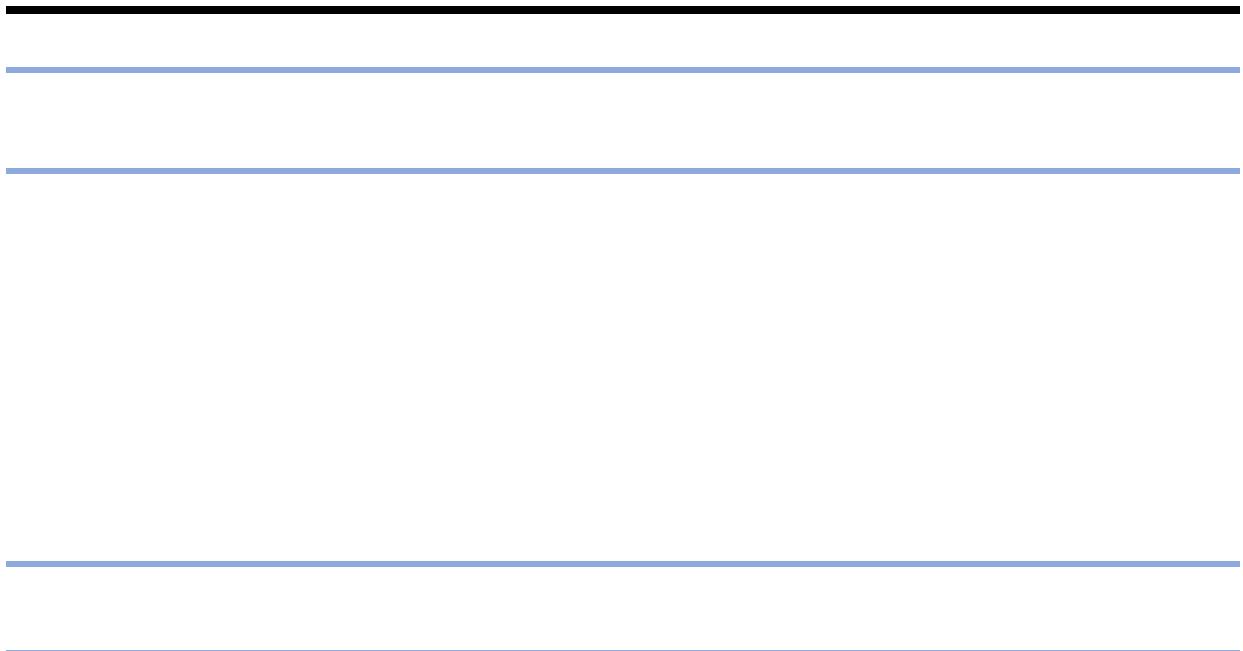














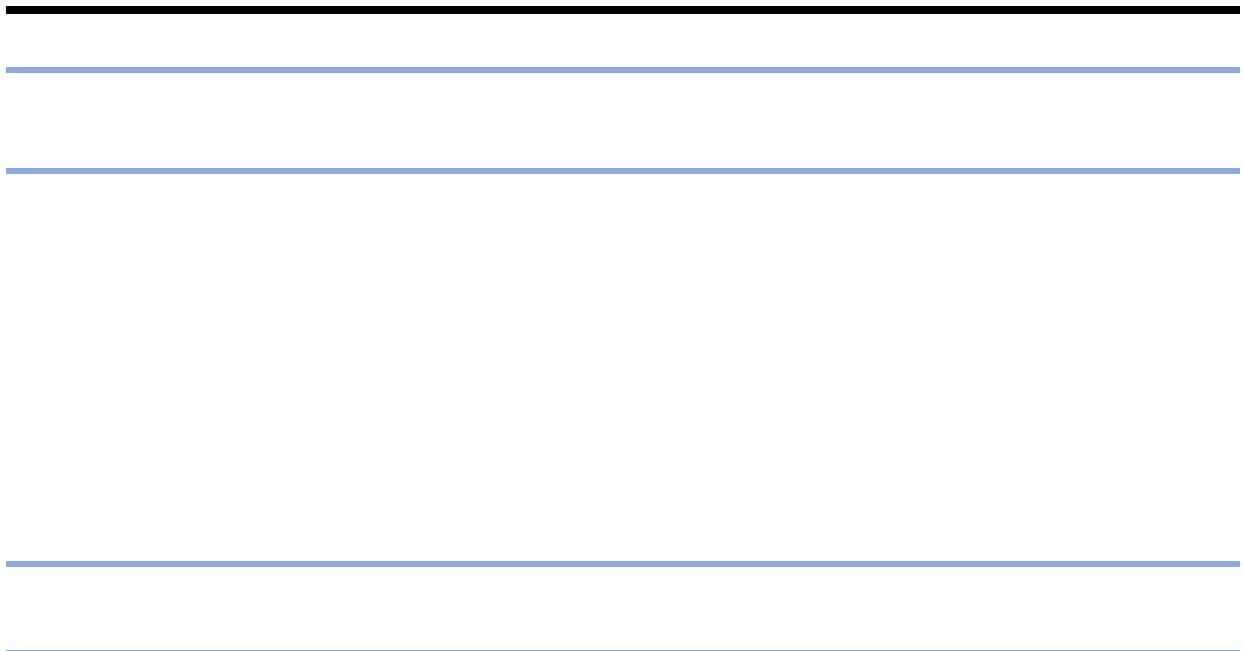














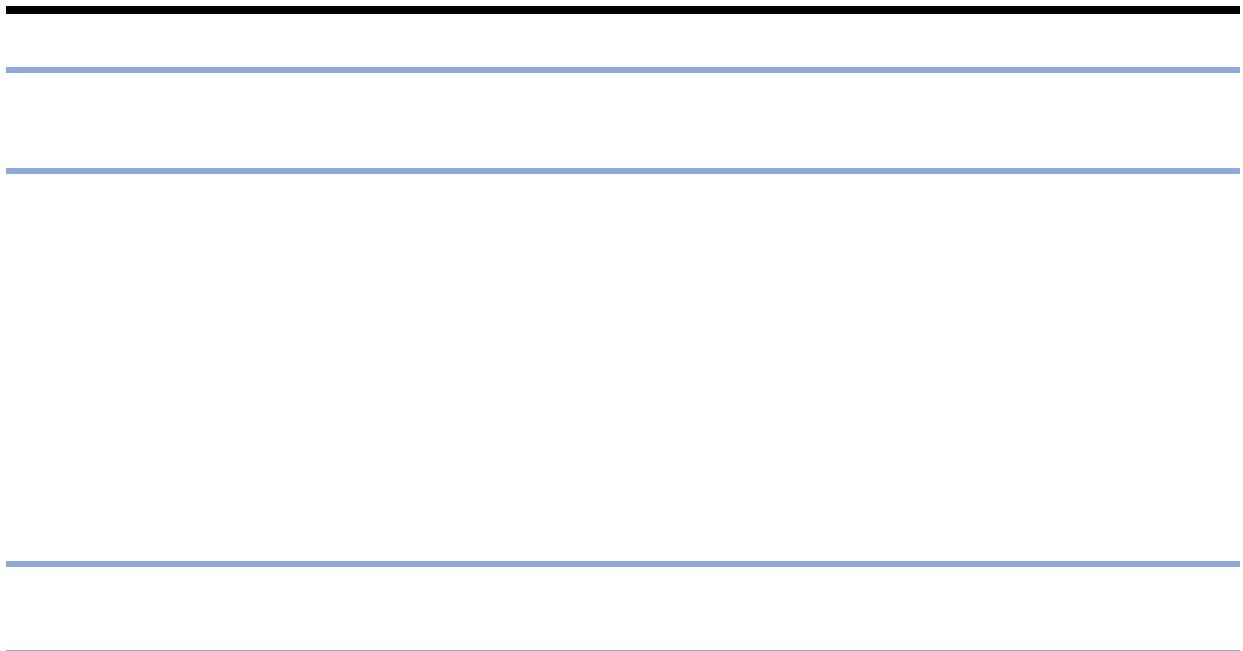














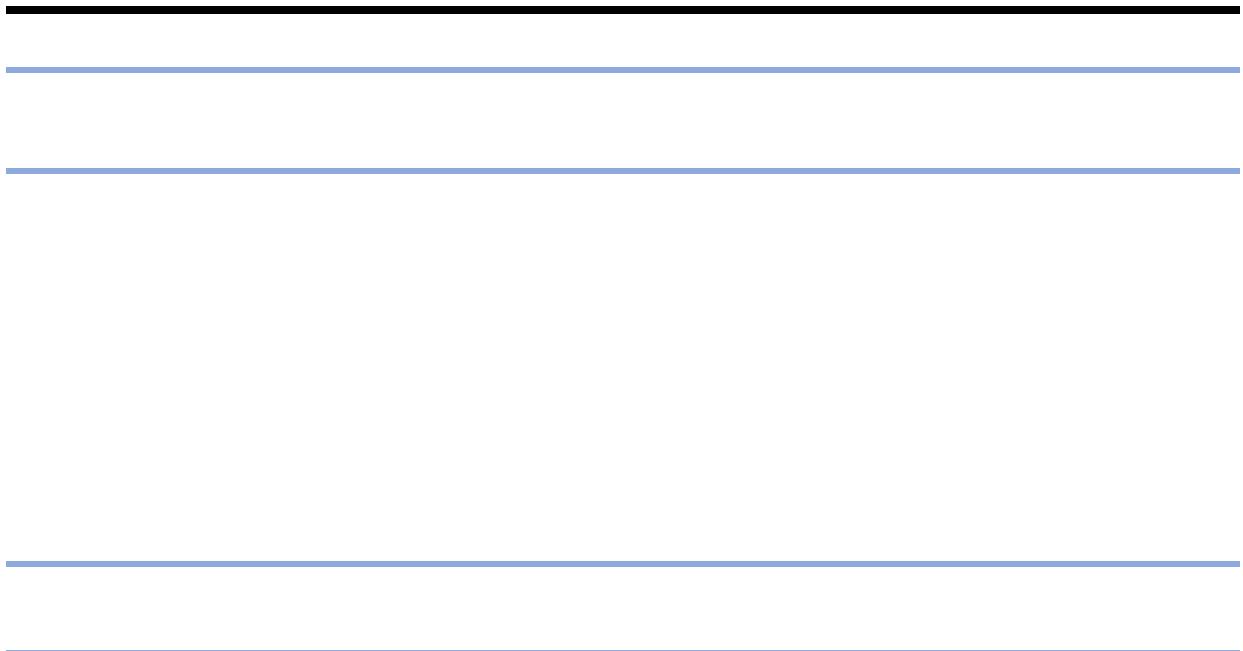














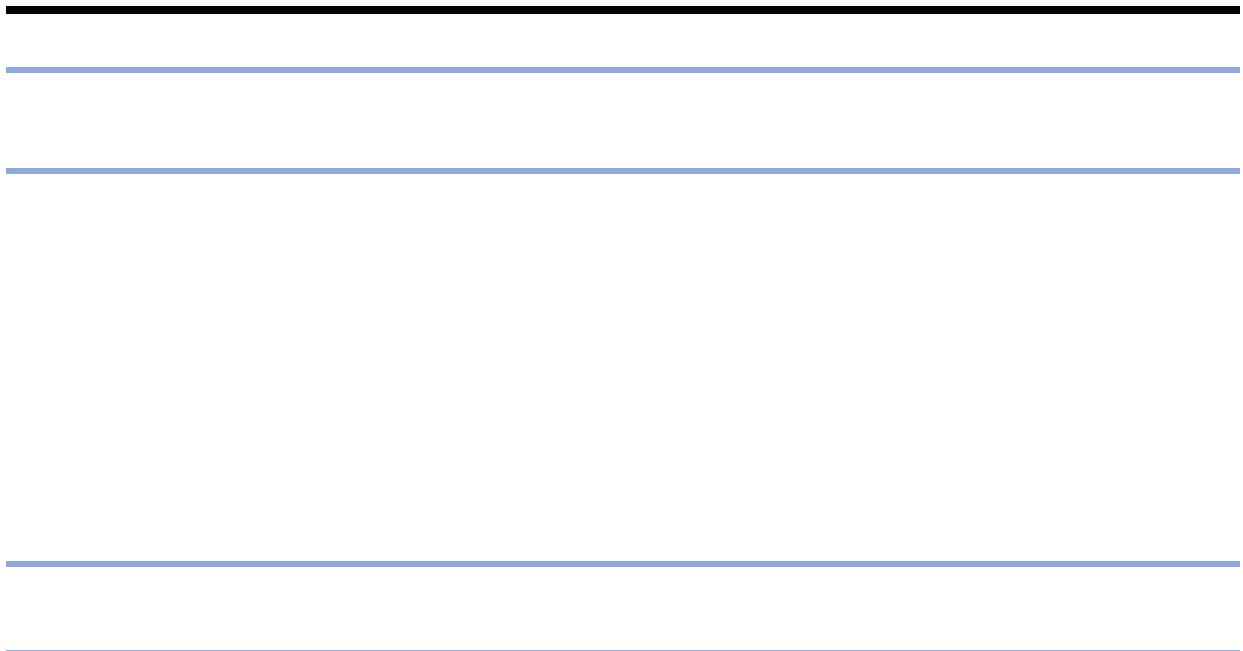














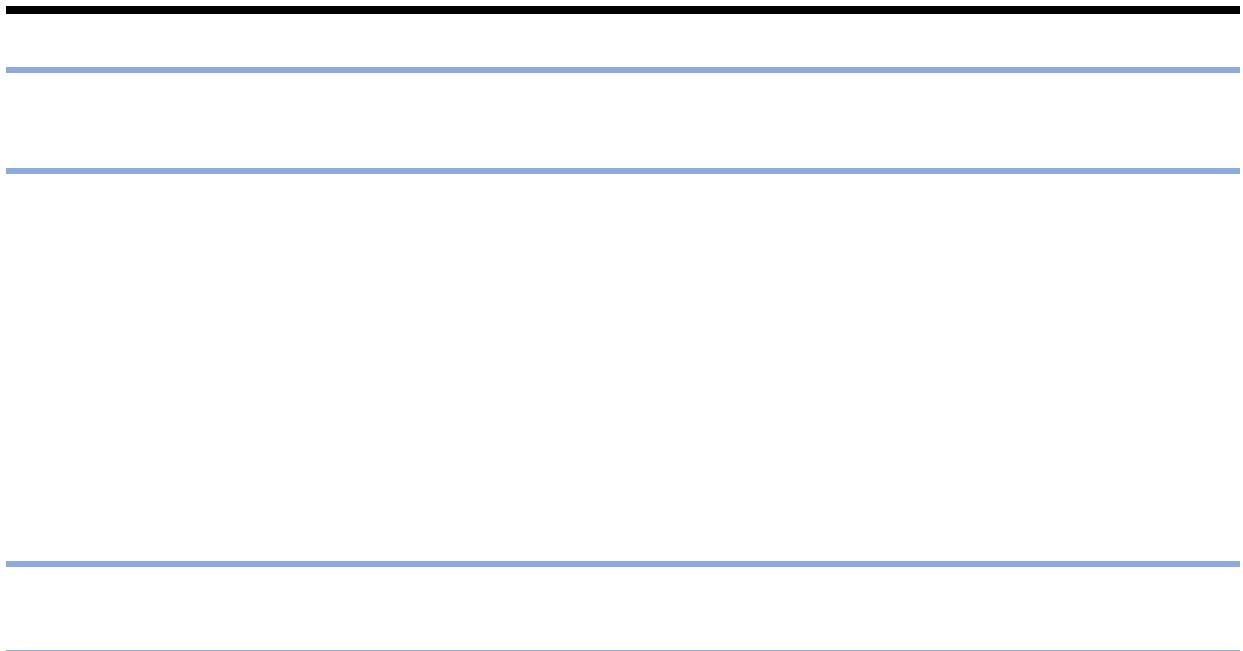














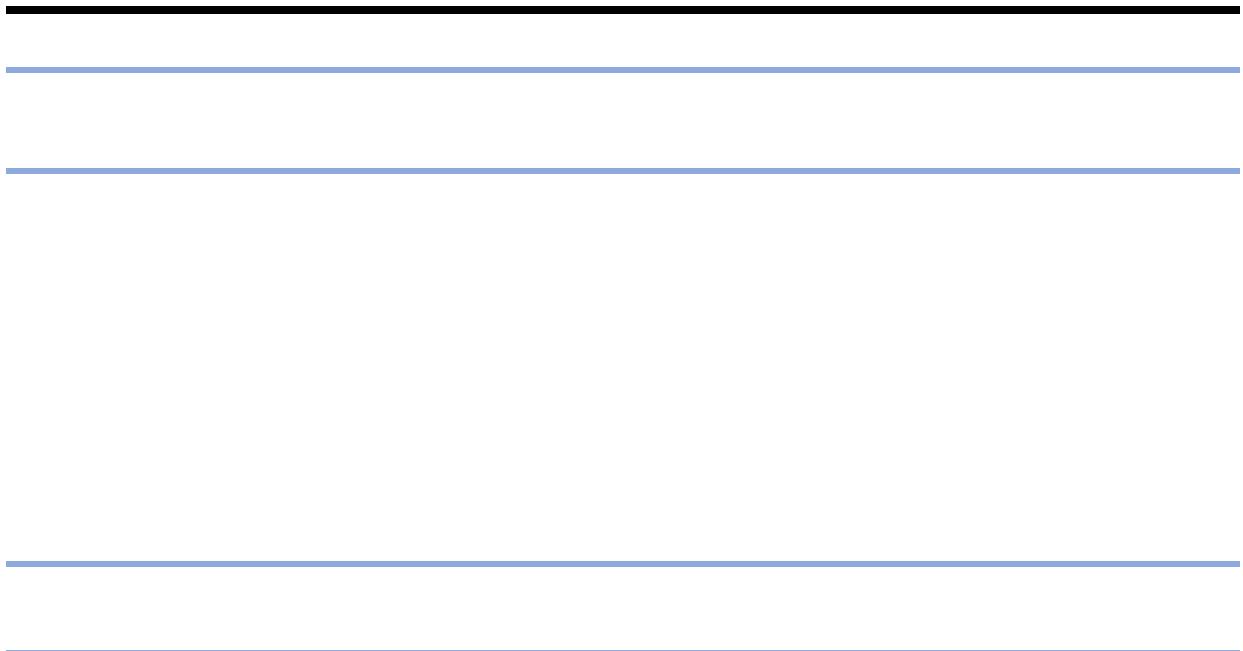














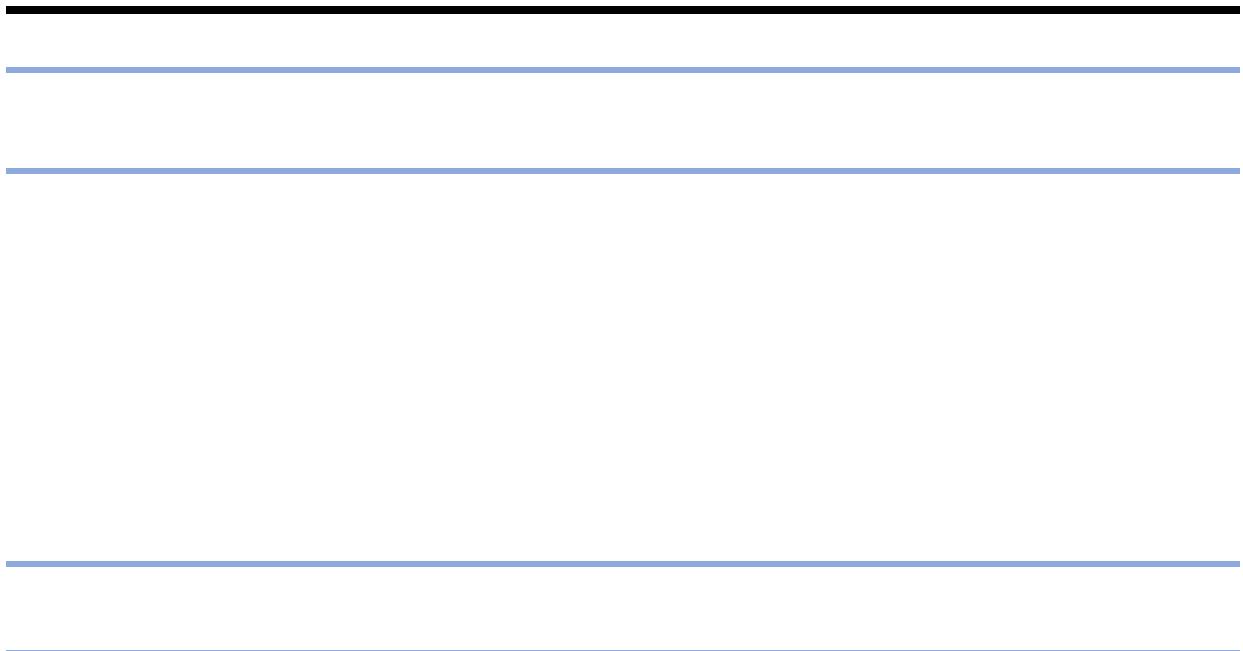














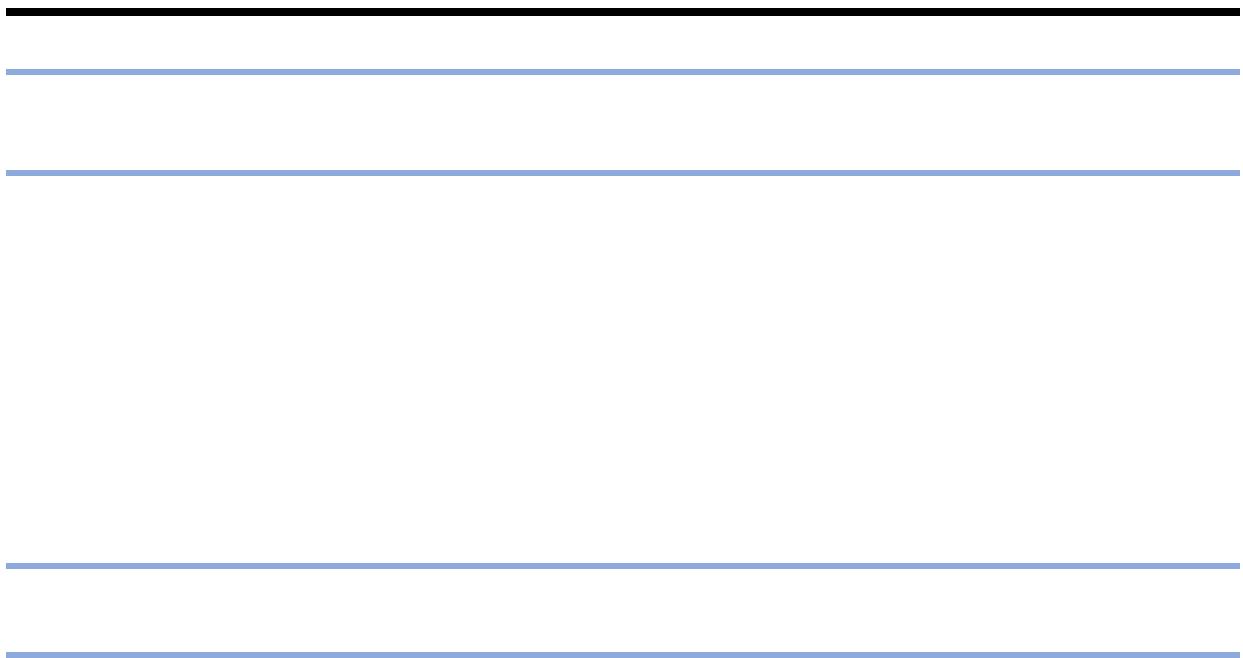














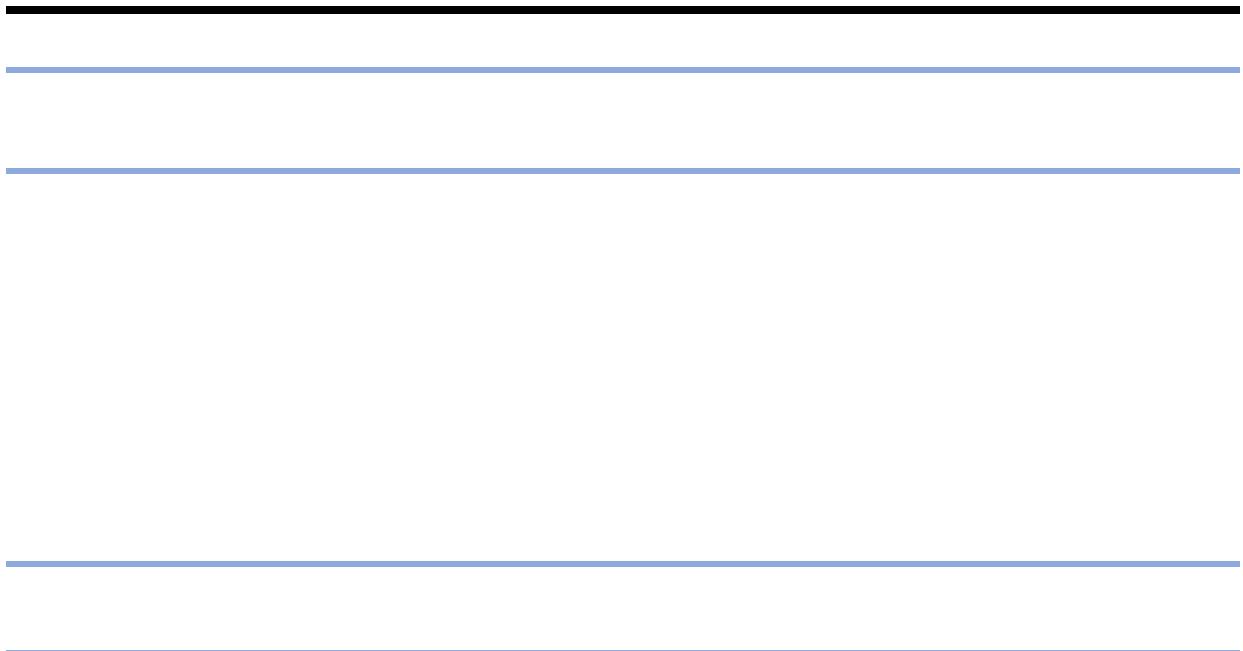














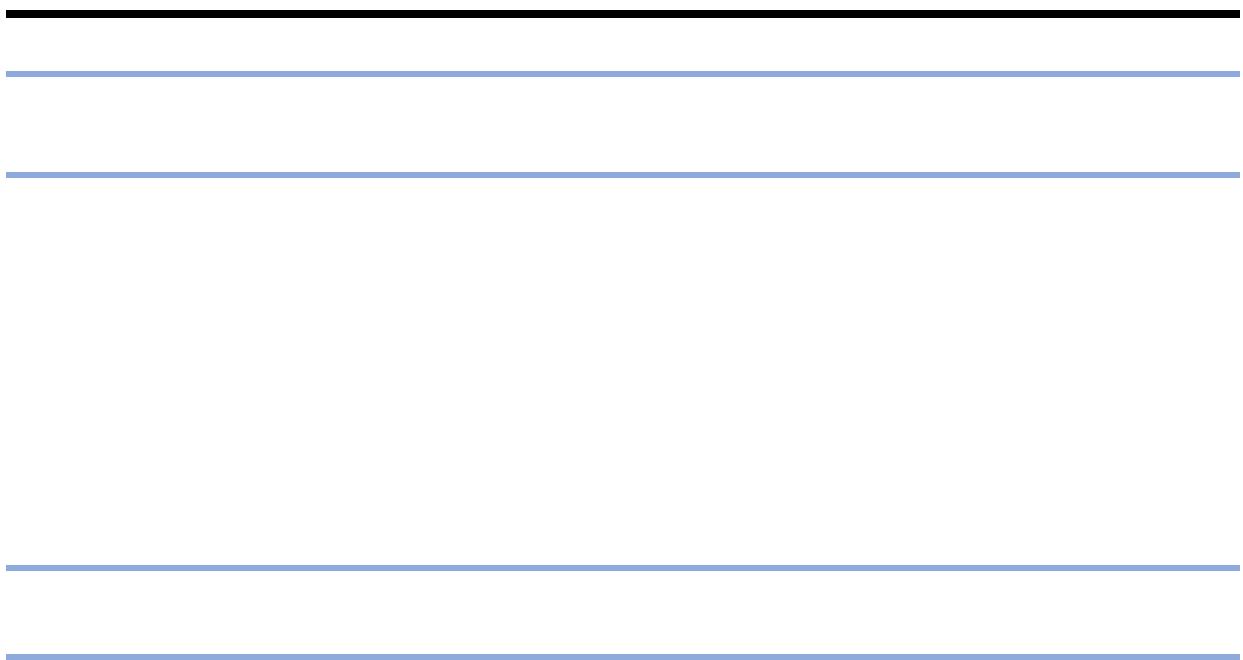














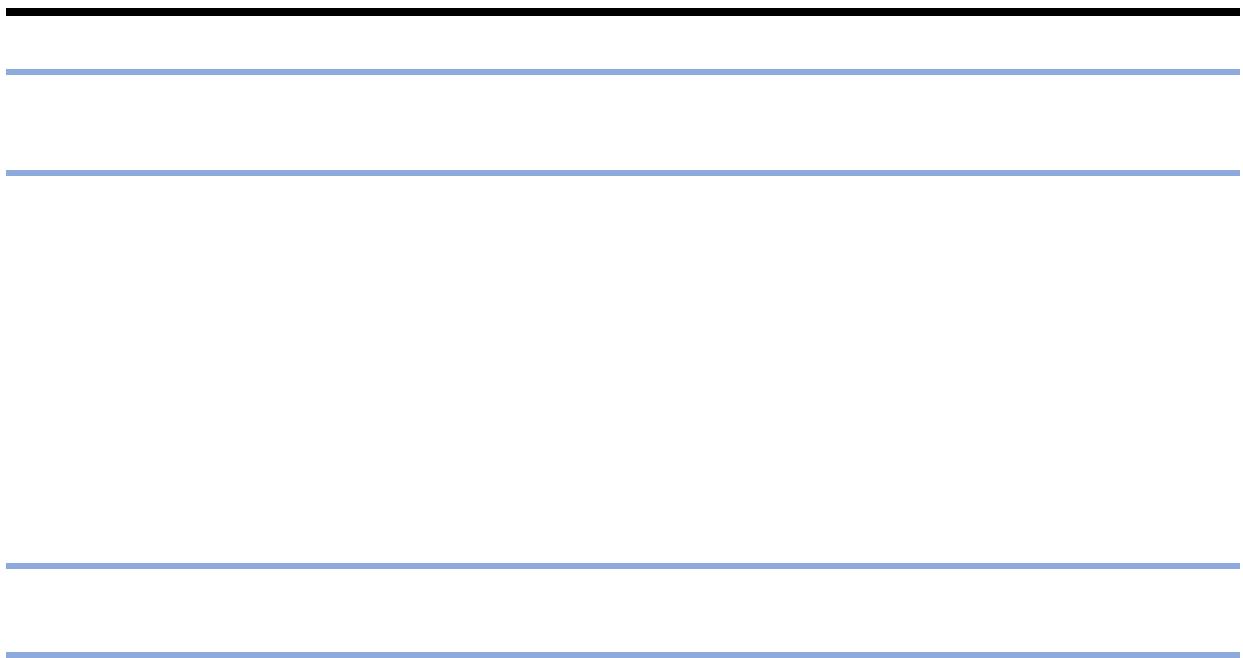














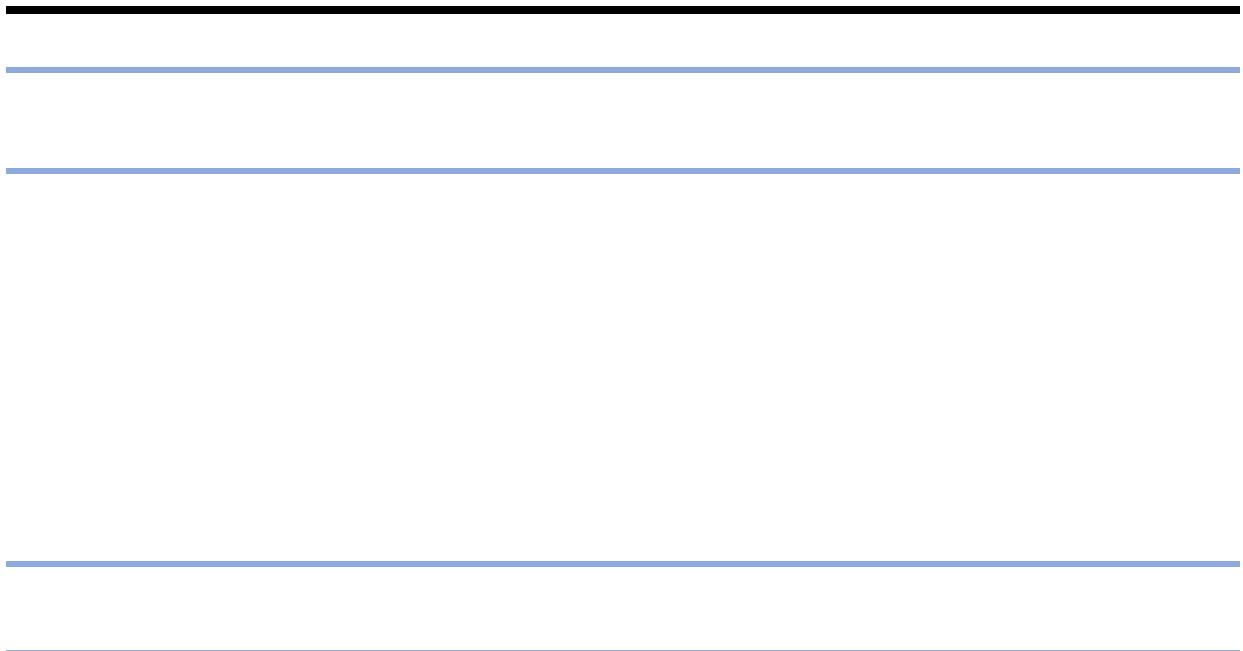














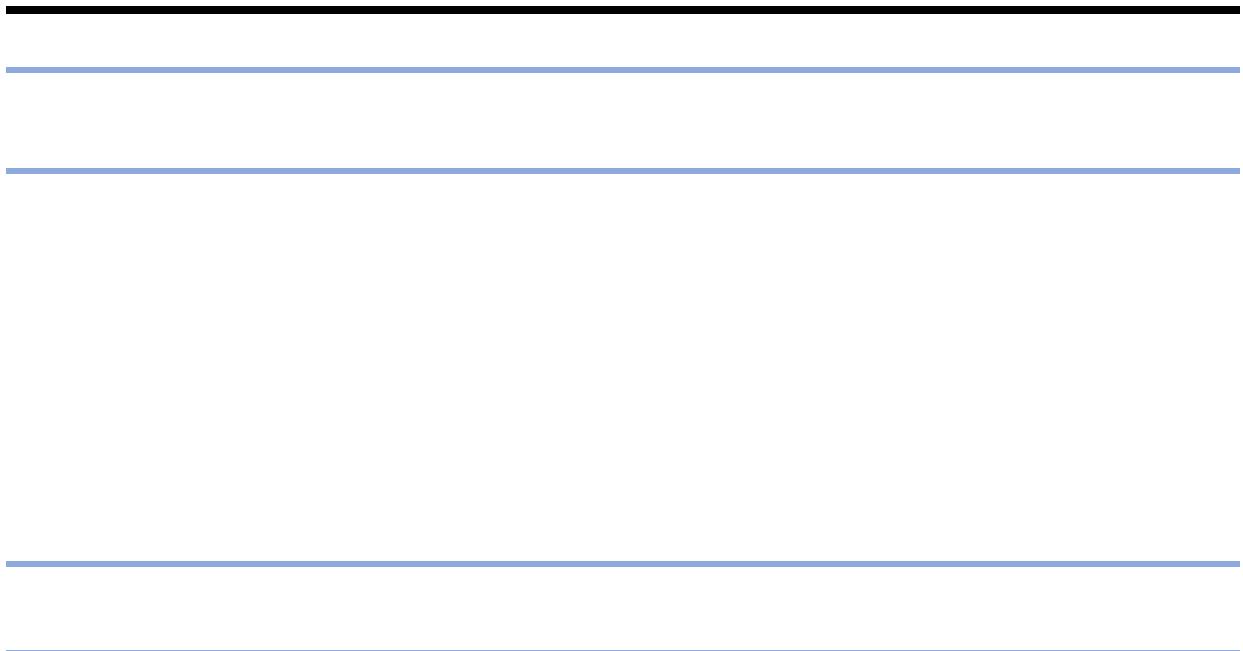














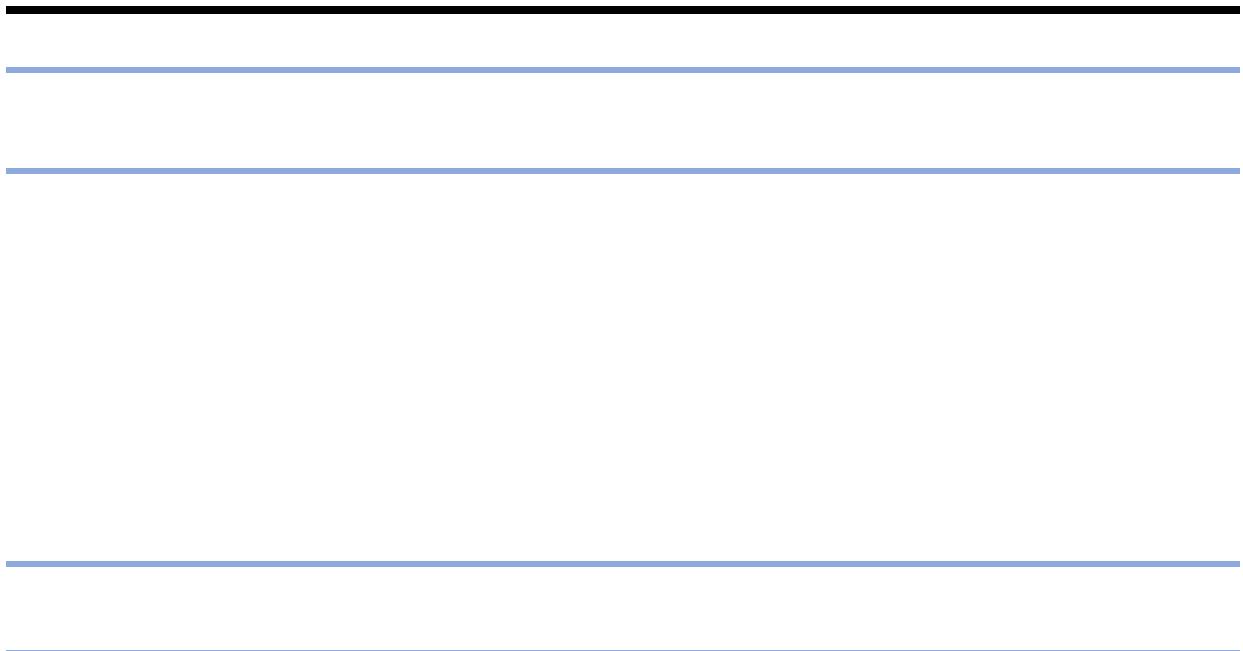














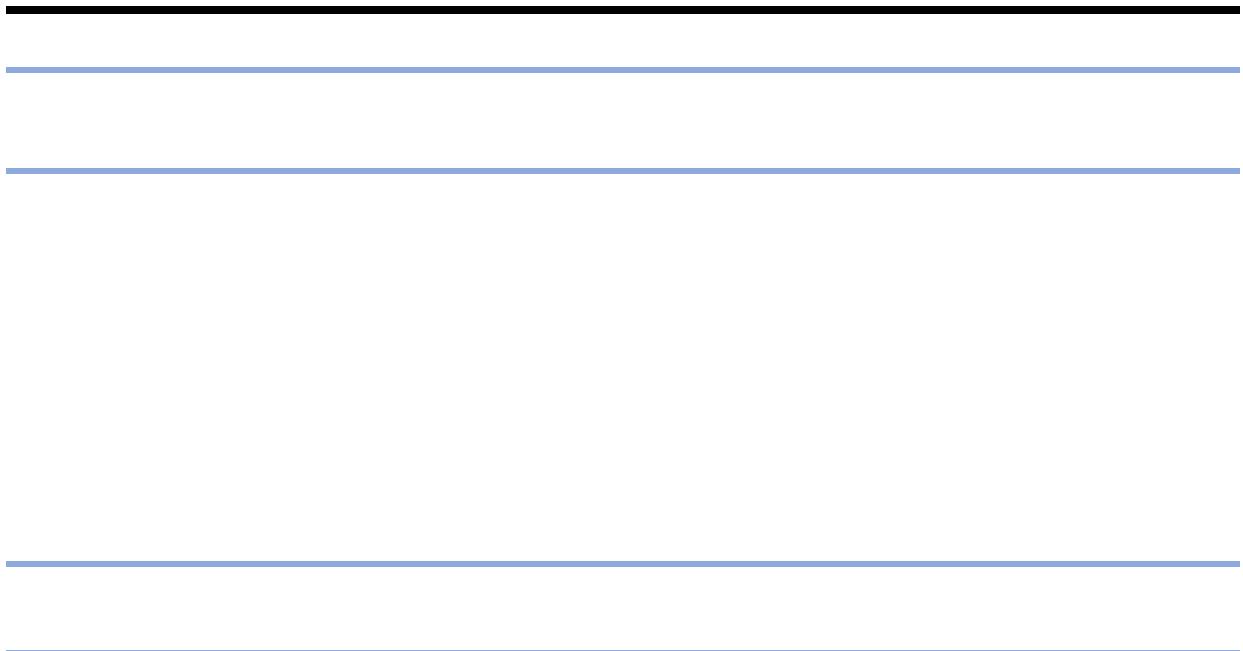














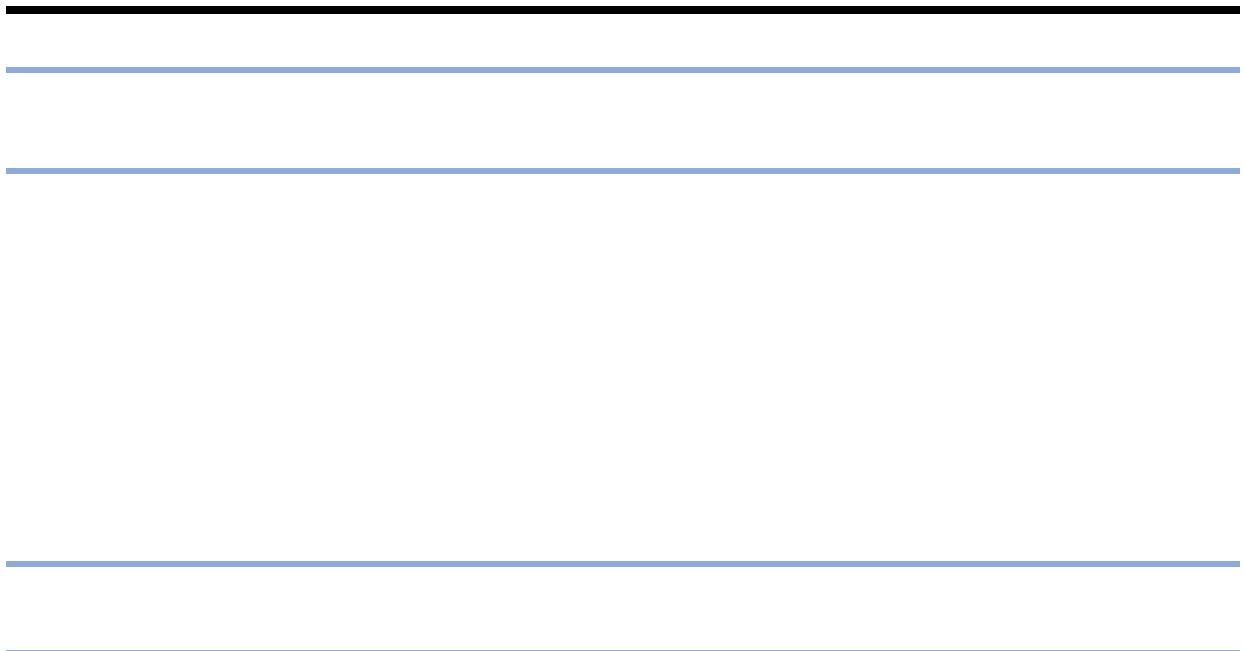














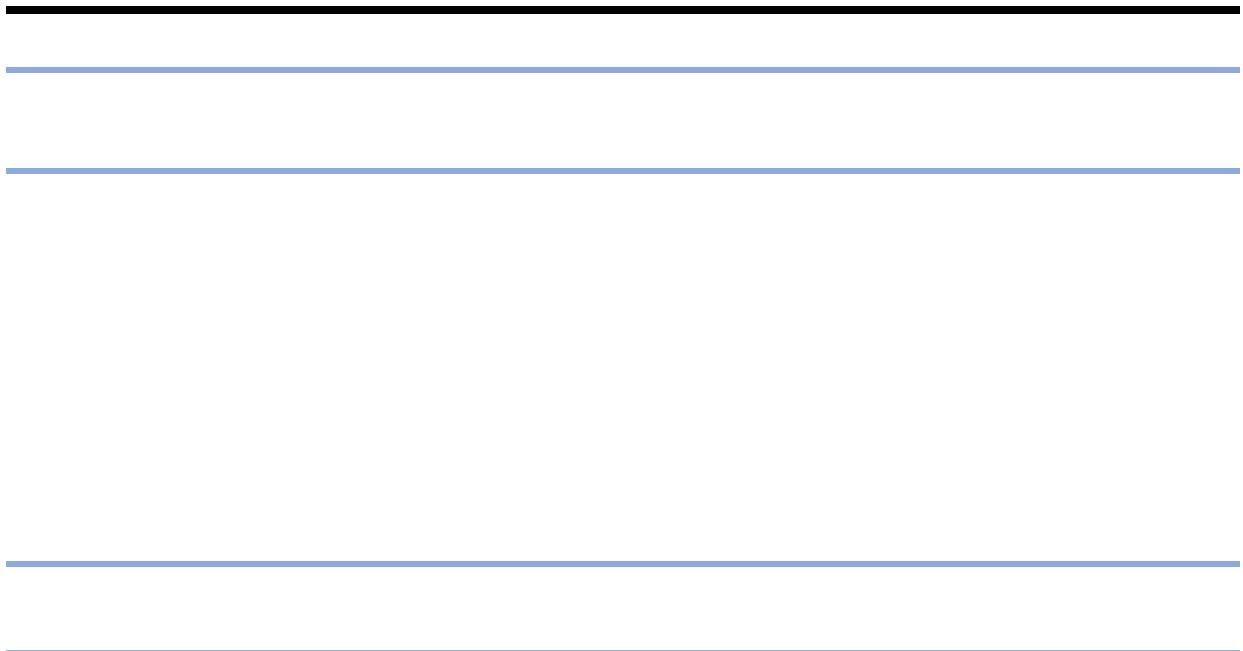














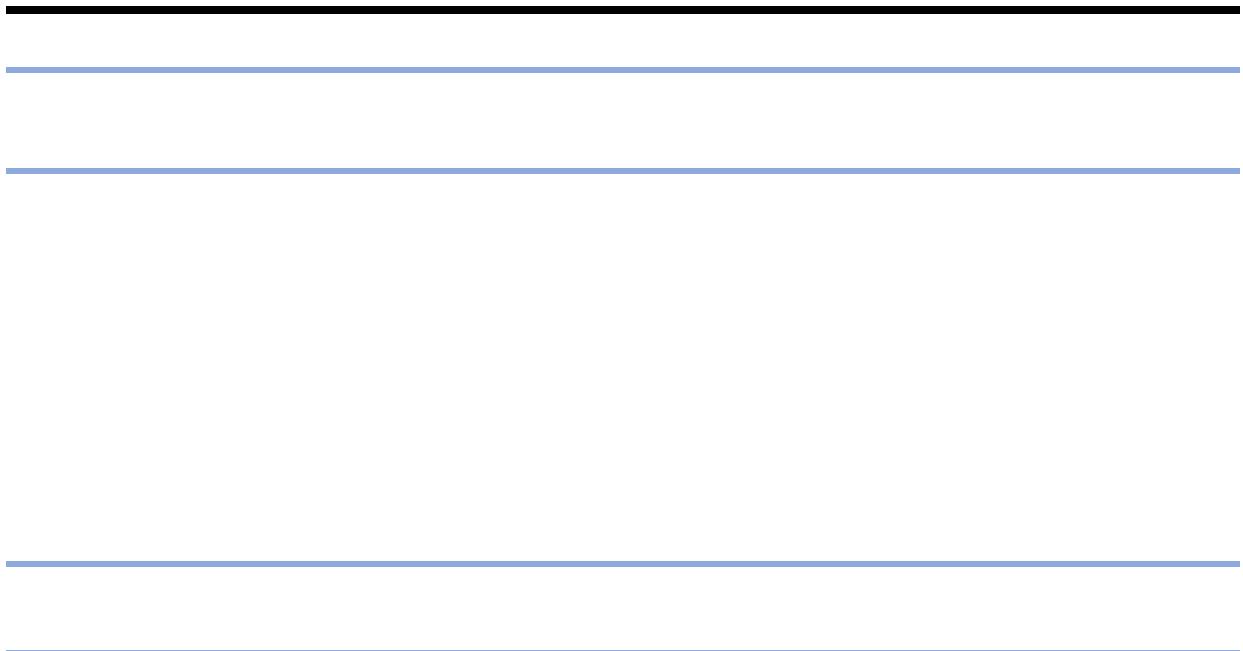














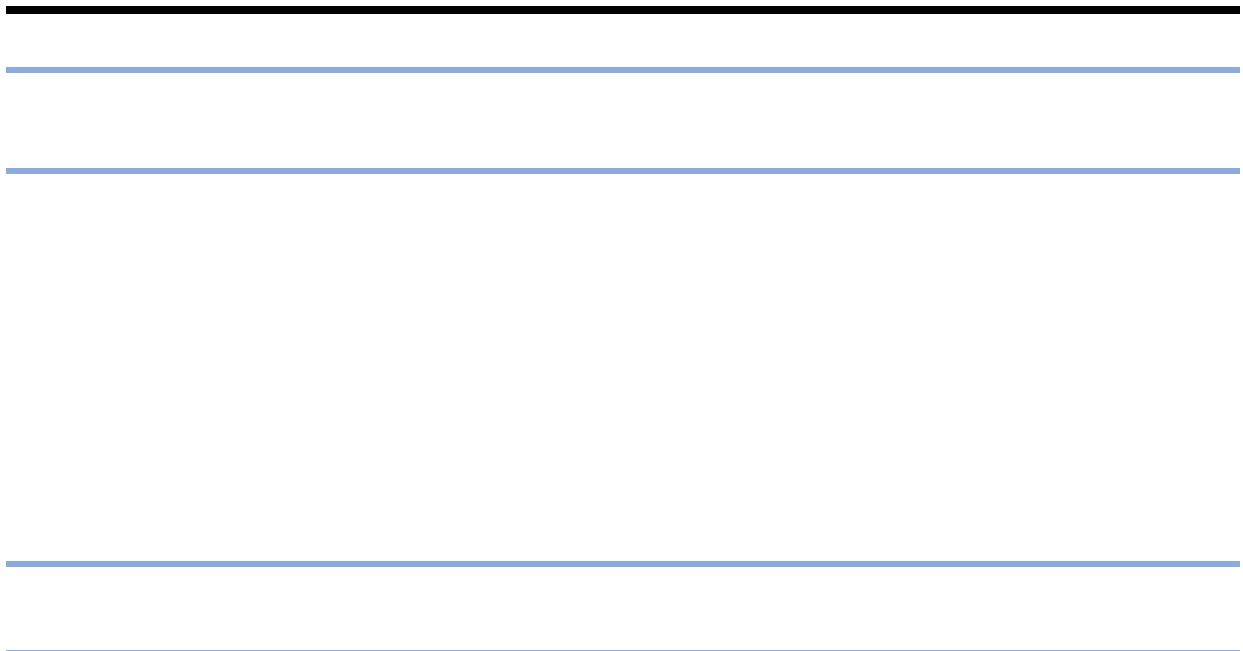














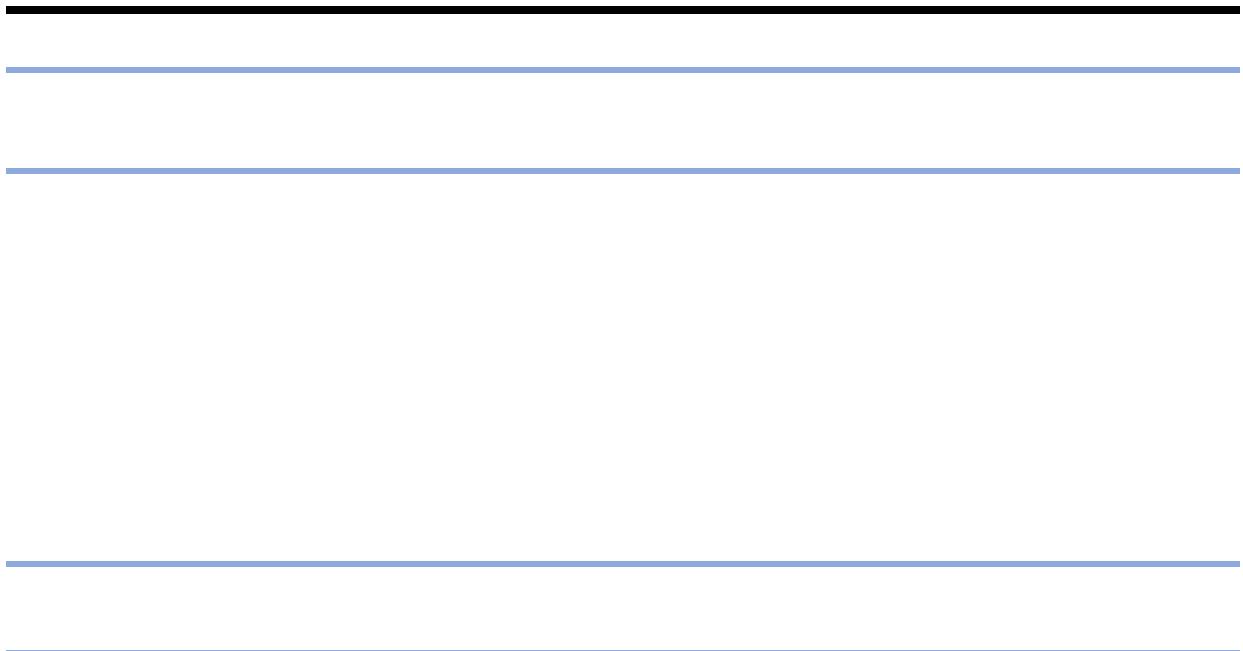














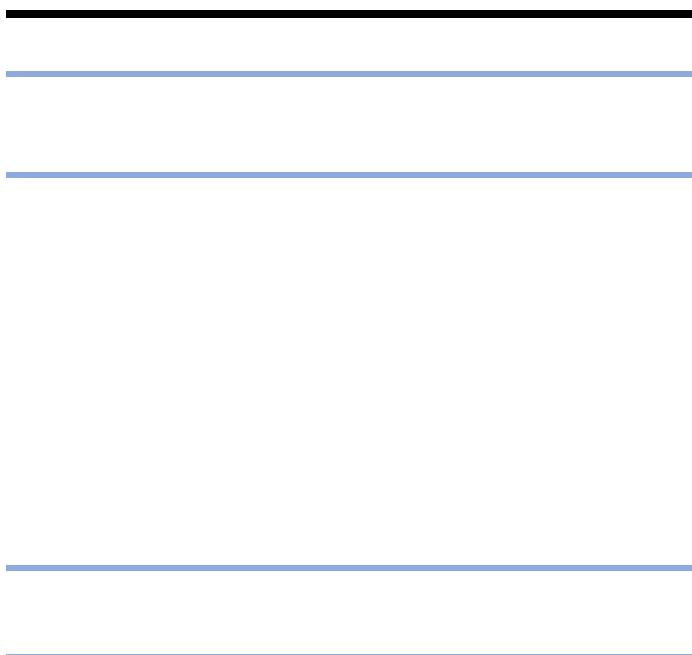














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