CEEDA
Certified Energy Efficient Datacenter Award

bcs The Chartered Institute for IT

BRONZE SILVER GOLD

CEEDA Colo
Assessment & Certification Report

V2014-1.1

Gib Telecom Ltd
Mount Pleasant Complex DC 2-6
January 28 2016

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1. Organization and data center overview	
Client details	
Organization name	GibTelecom Ltd
Data center address	Mount Pleasant South Barracks Road Gibraltar
Does the client manage facility?	Yes
Does the client manage IT?	Internal & Network Systems - Yes External Colocation Customers - No
Contact details	
Name	Carl Risso
Role	Senior Data Centre Engineer
Address	Mount Pleasant South Barracks Road Gibraltar
Site telephone number	
Direct line	
Mobile	
Email address	carl.risso@gibtel.com

Data center details	
Site description	Mount Pleasant DC Halls 2-6
Total data center size (m^2)	1866m^2
Total technical floor area (m^2)	Each hall: 212m^2
Number of halls	6
Number of halls assessed	5
Is the facility in a mixed-use building?	No

2. EXECUTIVE SUMMARY

This report is for the assessment of the GIBTEL Mount Pleasant Data Centre,
The data centre consists of 6 halls, although Hall 0/1 has been excluded from this assessment as it is in the process of being decommissioned.

The Data Centre is located in an original telecommunications office building constructed in the 1920-30's, various rooms have been refurbished since 2000 to host equipment, and to the design standards prevailing at the time of refurbishment.

The data centre halls are split over two wings of the building as follows:

North Wing: Hall 4, Hall 5, Hall 2

South Wing: Hall 6, Hall 3,

Hall 0/1 are located in a separate technical building and house 3G Mobile, and Telecommunications transmission equipment. Both halls are outside the scope of this CEEDA assessment, as ongoing migration activities to Hall 6 will see the Hall decommissioned by Q3 2016, however the rooms do operate the lower mandatory EUCoC best practices such as hot/cold aisle, raised inlet temperatures etc., but are uncontained and the air flow has not been secured.

The main building basement areas house UPS systems and battery rooms for all halls, (with the exception of Hall0/1, that have separate rooms within the technical building), although these are split into separate rooms dedicated to each hall.

Each hall can operate completely independently with UPS and AC plant dedicated to each hall, thus complying with the modular approach of the EUCoC and related CEEDA criteria for both power systems (UPS) and cooling (AC/Dry Coolers)

It is clear that GIBTEL are making significant efforts to improve energy consumption across the entire data centre estate and it has embedded sustainability into the heart of its operations.

It was evident to the assessor that the current business model of creating new rooms as required, connecting to separate cooling and power infrastructure that started in 2000 and is ongoing was conceived and built with energy efficiency as a primary factor. The GIBTEL Data Centre is a very good demonstration of the company's dedication to the deployment of energy efficiency best practice within the data centre environment and towards the Groups overall carbon reduction goals.

Evidence was found of a strong commitment to teamwork between the various departments running the data centre, with regular meetings including all departments.

As a colocation provider GIBTEL do not have control over their customers IT systems, but provide consultancy including energy efficiency comparison services to prospective and current customers.

With regard to the physical design of the data centre halls, it is clear that as the hall has been created or refurbished, new energy efficient equipment has been installed, contained

and hot/cold aisle solutions can be found in almost every hall.

The cooling systems are separate infrastructure utilising a DX Emerson CRAC's with external dry coolers, it is recommended that an expert "datacenter cooling consultant" is retained to advise whether there are any options to implement "free" cooling technology/controls. The local "average" temperature and humidity are within the ASHRAE Allowable Zone, and the assessor believes that between 5000 – 6000 hours of Free Cooling may be possible, this is supported by reference to the Green Grid "free cooling maps" available from the Green Grid website at the following URL:

DX Evaporated and Condenser temperatures will be reviewed during the regular maintenance visit in March, but GIBTEL have advised that they are going to contact EMERSON prior to ascertain free cooling options as indicated in the action plans

New Halls are constructed or refurbished as required by customer churn, new energy efficient equipment is purchased and installed as required and a partial load strategy is adopted for low load during migration/transition activities.

At present, reviews of the cooling management system take place as follows: upon service take on activities, the transition between summer/winter and winter/summer and when major changes have occurred in the industry (publication of EUCOC best practices, publication of ASHRAE white papers or via information gained at UK trade shows (Spring and Winter))

The IT equipment intake air temperature is customer specified and ranges from 21° – 23°C, future TCL targets indicate that 24/25°C will be offered in future.

Lighting within the halls is manual, but a satisfactory S.O.P requires 4 hourly checks including turning off lights if not occupied and uses low energy lighting sources.

With regard to monitoring the energy of the facility this is of a standard to be expected where organic growth has occurred, where both the incoming energy and the majority of the IT energy is metered using the building management systems and by manual walk through, however it is recommended, as a priority action plan item, that the proposed acquisition of a DCiM solution is accelerated and implemented as soon as possible, as we understand that this enhancement will further extend the reach, and quality of data acquisition for PUE calculation on a hall by hall basis and for use in a potential service charging model (an optional, but rarely adopted best practice).

The use of thermal imaging systems to determine air leakage is to be highly commended.

The DCiM solution is recommended to be able to capture DC (direct current) energy consumption data from the mobile telecommunications and cable landing (transmission) equipment.

The assessor would like to note that the quality of evidence, and the openness, honesty and transparency provided by the client has been excellent.

In conclusion, the GIBTel Mount Pleasant data centre is an example of a facility that has been designed and is currently operated in accordance with the EUCOC best practices.

The ongoing efforts by facilities and management to fully comply with the EU Code of Conduct and CEEDA are to be applauded.

GIBTel's commitment to energy efficiency and carbon reduction within the data centre environment and beyond is clear to see, and it is refreshing that the performance of the company data centre portfolio is seen as important within senior management.

We fully expect that if the action plan points indicated in the specific sections are adopted it will be possible to recommend the uplift of the award category within a one year time frame, subject to any changes to CEEDA criteria that will occur in Q1 2016 update, that may add additional best practices arising from the EUCoC 2015/2016 revisions, possible changes to ASHRAE environmental recommendations, the publication of the ISO30134 series (PUE/ERF) and EN50600 series that are ratified by the BCS.

3. Certification level recommendation	
Certification level recommendation.	CEEDA COLO SILVER

4. Certification level awarded

This is to certify that GIBTEL MOUNT PLEASANT has attained the level of CEEDA COLO SILVER with a calculated PUE of 1.96 (2015-DEC-13)*

*Calculated PUE means that assessor and client have reviewed and agreed that the available energy consumption data does not meet the full requirements of the Green Grid, but have calculated and determined a PUE figure. This figure excludes the IT energy data from the 3G/4G mobile networks and DC powered network transmission equipment Using this method does not allow a certified PUE figure using the green grid methodology as published, i.e. PUE= X.X L1YC.

Date of Site Visit	December 11-12 2015
Date of Certification	January 28 2016

The certification is valid for two calendar years from the award date and can be used for publicity and marketing purposes in conjunction with the facility for which the award is granted during this period. Outside of this period the award can be used provided the dates of validity are described. A follow-up remote assessment (Progress Assessment) of the impact of the implementation of any action plan points or major changes in the infrastructure and/or operations of the facility will be made one calendar year after the award date.

Date of Progress Assessment	January 2017

5. CEEDA assessment and certification

Certified Energy Efficiency for Data Centers Award (CEEDA)

CEEDA is a globally available and independent certification based against the implementation of a set of discrete energy efficiency criteria within a facility. These criteria are derived from best practices from the EU Code of Conduct for Data Centres (Energy Efficiency, EUCoC), metrics from the Green Grid and contain specifications from sources which include ASHRAE, Energy Star and ETSI. Assessments are performed by BCS-approved assessors and auditors and is developed and delivered by Datacenter Dynamics.

The assessment comprises a cumulative graded framework of these best practice and metric criteria. For compliant facilities, the resulting certification award may be made at ascending levels of: Bronze, Silver and Gold. As the assessment is a cumulative process, to be awarded a Silver level the facility must satisfy all criteria at both Bronze and Silver levels, to attain a Gold level, all criteria must be satisfied at all levels.

Process

The assessment process leading to this report was conducted by independent BCS-approved assessors. In order to enhance the consistency of grading across all assessments performed, the findings of the report are also appraised by a BCS-approved auditor. Details of the assessor and auditor of this facility are available in the appendices. Evidence for the implementation of each of the assessment criteria is gathered by the assessor prior to the facility visit and validated during the visit.

A note on best practices and metrics

Best practices: EU Code of Conduct for Data Centres (EUCoC)

CEEDA is separate from the EUCoC process. Accordingly, EUCoC Participant or Endorser status will not receive recognition within CEEDA and similarly, achieving a CEEDA Award does not guarantee Participant or Endorser status in the EUCoC. More information about the EUCoC can be found at: http://iet.jrc.ec.europa.eu/energyefficiency/ict-codes-conduct/data-centres-energy-efficiency

Metrics: The Green Grid

Metrics used as criteria include those developed by The Green Grid, such as PUE and WUE, definitions of which can be found at: www.thegreengrid.org

6 Data center information
This section summarizes the key descriptive attributes of your facility.

6.1 Mechanical and electrical infrastructure resilience	
Single or multiple levels of resilience available to IT equipment in your facility	
Mechanical infrastructure resilience	
Resilience level (N; N+1; 2N; 2N+1; N+R; Other)	N+1
If “Other”	
Comments	
Electrical infrastructure resilience	
Resilience level (N; N+1; 2N; 2N+1; N+R; Other)	N+1
If “Other”	
Comments	

6.2 Temperature set points	
Your supply or return temperature set points and actual measured temperatures	
Supply or Return air set point? (Return; Supply; N/A)	RETURN
Location of temperature sensors (IT inlet/front of rack; Rear of Rack; IT exhaust; Cold aisle; Hot aisle; CRAC/CRAH return; CRAC/CRAH outlet; Under floor void)	HOT AISLE/CRAC OUTLET/RETURN
Control Type? (Set point; Range)	SET POINT
Upper temperature limit (°C)	24
Lower temperature limit (°C)	22
CRAC/CRAH controls (Individual; Linked to Master; BMS; N/A)	Linked to master

6.3 CRAC/CRAH units	
Are the CRAC/CRAH units in your data center fitted with VFD fan controls? There are potential energy and efficiency benefits to be gained from varying the speed of fans in response to load. A fixed speed fan, including VFD set to a single speed, may be efficient at high to maximum load but will be significantly less efficient at lower loads. Note: this includes active rack exit door cooling.	
VFD controls fitted (Yes; No; N/A)	Yes
VFD active (Yes; No; N/A)	Yes
Observed speed (0-100%)	13%-35%
VFD controls (Manual; Automatic)	AUTOMATIC

6.4 Cooling system	
What kind of cooling system plant do you have in your facility? (Split DX; Local loop DX; Chilled water with dry coolers; Chilled water with cooling towers (wet coolers); Direct air; Glycol cooled DX CRAC; Direct air with DX assist; Direct water to rack exit doors; Direct water to IT equipment; CO2 cooling; Indirect air; N/A)	
Primary	GLYCOL DX
Secondary	
Tertiary	
Other	

6.5 Chilled water system	
What are the set points and controls within your facility?	
Supply set point (°C)	N/A
Return set point (°C)	N/A
VFD Pumps (Yes; No; N/A)	N/A

6.6 DX system	
What is the Coefficient of Performance on the DX units in your facility?	
COP:	4.37

6.7 Humidity controls	
How is humidity controlled in your facility?	
Humidity control type (Locally by each CRAC/CRAH; Centrally via dedicated makeup AHU; Dedicated humidifiers and dehumidifiers; CRAC/CRAHs centrally controlled by BMS; Not actively controlled; Other)	LOCAL CRAC
Humidity control range (% RH)	TBA
CRAC units configured for reheat (Yes; No; N/A)	No
CRAC units configured to re-humidify (Yes; No; N/A)	Yes

6.8 Economizer data	
Details of the economizer systems in your facility.	
Type (Yes; No; N/A)	
Direct air side	N/A
Indirect air side	N/A
Direct water side	N/A
Indirect water side	N/A

Settings	
Total economizer cooling capacity	N/A
Economizer active at ext. temp.	N/A
Estimated full economizer hours	N/A
Estimated partial economizer hours	N/A

6.9 Air flow management	
Details of air containment in your facility. Containment of air in the data center can have a significant impact on energy efficiency. Containment can reduce or prevent remix of supply and return air; can permit the supply temperature to be reduced; can enable the IT intake temperature to be increased with less danger of hot-spots.	
Type of containment (Hot/Cold aisle; Hot/Cold aisle plus blanking and brushes; Fully contained (Hot or Cold); No containment)	Cold Aisle Containment

7. Structure of the assessment criteria

The implementation of the each assessment criteria, drawn from best practices or metrics, is individually assessed from the evidence provided prior to and during the site visit.
Subsequent to the site visit, the assessor may request additional information if required to support the evidence for best practice implementation or methodology application.

Sections 8, 9, and 10 of this document correspond to the criteria grouped within the certification levels Bronze, Silver and Gold. The name, number, corresponding best practice or metric are referenced at the head of each criteria page. The findings of the assessor, details of the evidence supplied and recommendations of both assessor and auditor are recorded. In addition, the levels at which each of the criteria is required are also indicated:

BRONZE	SILVER	GOLD
✓	✓	✓

Section 11 describes the set of Gold+ criteria, for which a commentary is provided, but which fall outside of the certification banding.

In the cases where photographic evidence is required, but where a default no photography policy is in force, assessors may vouch that the best practice was in evidence.

For infrastructure-based best practice criteria, the evidence must be present in 80% or over of the halls assessed. For metric-based criteria, evidence takes the form of the methodology for obtaining the measurements and method of evaluation. All criteria require supporting evidence in the form of internal and, where appropriate, third party documentation.

This document should be used for CEEDA assessments that are based on version 4.05 of the EU Code of Conduct for Data Centres , 2013 best practices. Specific external references for metrics are referenced within the particular criterion in question.

8. BRONZE CRITERIA SUMMARY Attainment: Attained (✓); Partially Attained (P); Not Attained (N); Not Applicable (N/A)			
Assessor summary			
All Bronze best practices have been complied with.			
Auditor summary			
The auditor concurs with the assessor comments.			
Number	Name	Best practice (EUCoC)	Attainment
8.1	Group involvement	3.1.1	✓
8.2	Design effective resilience	3.3.5	✓
8.3	Design – contained hot or cold air	5.1.1	✓
8.4	Rack air flow management – blanking plates	5.1.2	✓
8.5	Design – Raised floor or suspended ceiling height	5.1.9	✓
8.6	Equipment segregation	5.1.10	✓
8.7	Separate environmental zones – colocation provider/MSP	5.1.13	✓
8.8	Review of cooling before IT equipment changes	5.2.3	✓
8.9	Review of cooling strategy	5.2.4	✓

8.10	Review CRAC/AHU Settings	5.2.5	✓
8.11	Effective regular maintenance of cooling plant	5.2.7	✓
8.12	Review and if possible raise target IT equipment intake air temperature	5.3.1	✓
8.13	Review and increase the working humidity range	5.3.2	✓
8.14	Turn off lights	7.1.1	✓
8.15	Low energy lighting	7.1.2	✓
8.16	Incoming energy consumption meter	9.1.1	✓
8.17	IT energy consumption meter	9.1.2	✓
8.18	Continuing professional development	N/A	✓

8.0 Bronze action plan		
Number	**Description**	**Related criteria**
1	DC operations meeting minutes to be taken and retained for recording purposes.	8.1

BRONZE 8.1 Group involvement Best practice 3.1.1	BRONZE	SILVER	GOLD
	✓	✓	✓
Establish an approval board containing representatives from all disciplines (software, IT, M&E). Require the approval of this group for any significant decision to ensure that the impacts of the decision have been properly understood and an effective solution reached. For example, this could include the definition of standard IT hardware lists through considering the M&E implications of different types of hardware. This group could be seen as the functional equivalent of a change board.			
Assessor findings			
Meetings take place weekly for data centre operations, these are not documented but will be formalized in the future, Monthly reports are distributed to senior management team.			
Evidence			
Assessor have viewed monthly management meeting minutes at this site.			
Assessor recommendation			
Best practice is being followed. [Note Bronze Action Plan]			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.2 Design effective resilience Best practice 3.3.5	BRONZE	SILVER	GOLD
	✓	✓	✓
Utilize appropriate levels of resilience at the data center, IT equipment, software and network levels to achieve the required service resilience and availability. High resilience at the physical level is rarely an effective overall solution.			
Assessor findings			
As this is a colocation and hosting site, the resilience is N+1.			
Evidence			
Please refer to design drawings contained in the evidence folder.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.3 Design – contained hot or cold air Best practice 5.1.1	BRONZE	SILVER	GOLD
	✓	✓	✓

There are a number of design concepts whose basic intent is to contain and separate the cold air from the heated return air on the data floor: hot aisle containment; cold aisle containment; contained rack supply, room return, room supply; contained rack return, (including rack chimneys); Contained rack supply, Contained rack return. This action is expected for air cooled facilities over 1kW per square meter power density. Note that the in rack cooling options are only considered to be containment where the entire data floor area is cooled in rack, not in mixed environments where they return cooled air for remix with other air flow. Note that failure to contain air flow results in both a reduction in achievable cooling efficiency and an increase in risk. Changes in IT hardware and IT management tools mean that the air flow and heat output of IT devices is no longer constant and may vary rapidly due to power management and workload allocation tools. This may result in rapid changes to data floor air flow pattern and IT equipment intake temperature which cannot be easily predicted or prevented.

Assessor findings

Hall 0/1 is out of scope as it will be decommissioned in 2016
Halls 2-6 are designed to have contained cold.

Evidence

Please refer to photographic evidence and floor plans in evidence folders.

Assessor recommendation

Best practice has been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

BRONZE 8.4 Rack air flow management – blanking plates Best practice 5.1.2	BRONZE	SILVER	GOLD
	✓	✓	✓
Installation of blanking plates where there is no equipment to reduce hot air re-circulating through gaps in the rack. This reduces air heated by one device being ingested by another device, increasing intake temperature and reducing efficiency.			
Assessor findings			
Blanking plates are in place.			
Evidence			
Please refer to photographs.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.5 Design - raised floor or suspended ceiling height Best practice 5.1.9	BRONZE	SILVER	GOLD
	✓	✓	✓
It is common to use the voids in the raised floor, suspended ceiling or both in a data center to feed cold air to equipment or extract hot air from the equipment. Where they are used, increasing the size of these spaces can reduce fan losses moving the air.			
Assessor findings			
Hall 2/3/4 have restricted slab – ceiling heights due to original building design (3.6M) Hall 5 (4.2M) Hall 6 (3.6M) New builds in building with restricted space will consider the use of in row coolers, rear door cooling or virtual hot aisles			
Evidence			
Please refer to photographs in the evidence folder.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.6 Equipment segregation Best practice 5.1.10	BRONZE	SILVER	GOLD
	✓	✓	✓
Deploy groups of equipment with substantially different environmental requirements and/or equipment airflow direction in a separate area. Where the equipment has different environmental requirements it is preferable to provide separate environmental controls. This objective of this practice is to address the issue of the data center cooling plant settings being constrained by the equipment with the most restrictive environmental range or poor air flow control as this compromises the efficiency of the entire data center. This practice applies to IT, mechanical and electrical equipment installed in the data center.			
Assessor findings			
GibTel have a separate room for transmission and mobile communications equipment (H6). Separate rooms have been built for UPS and Batteries for each hall.			
Evidence			
Please refer to floor plan and assessor photographs in the evidence folder.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

	BRONZE	SILVER	GOLD
BRONZE 8.7 Separate environmental zones (Colocation provider or managed services provider) Best practice 5.1.13	✓	✓	✓

Customers requiring extremely tight environmental control or items such as legacy equipment should not compromise the entire data center for specific items of equipment. Service providers should design in such a way that discrete areas may be offered to customers with additional “close control” cooling equipment in order to match specific requirements this and therefore offer a tighter SLA that would inevitably involve reduced energy efficiency. These legacy equipment support areas may be differentially priced to include the capital and operational (Metered), cost overhead of supporting a less energy efficient legacy environment as an incentive for customers to install IT equipment in more efficient areas and consider the options for more energy efficient delivery of IT services.

Assessor findings

GIBTEL do not have any legacy equipment that requires tighter environmental control, however if required will build out new rooms with the ability to provide closer control.

Evidence

Please refer to client specifications (marketing information), floor plans and photographs in the evidence folder.

Assessor recommendation

Best practice has been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

BRONZE 8.8 Review of cooling before IT equipment changes Best practice 5.2.3	BRONZE	SILVER	GOLD
	✓	✓	✓
The availability of cooling including the placement and flow of vented tiles should be reviewed before each change in IT equipment to optimize the use of cooling resources.			
Assessor findings			
Standard STOC documents force reviews of cooling when new clients take space.			
Evidence			
Please refer to documents contained in the evidence guide.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.9 Review of cooling strategy Best practice 5.2.4	BRONZE	SILVER	GOLD
	✓	✓	✓
Periodically review the IT equipment and cooling deployment against strategy.			
Assessor findings			
Cooling reviews take place annually, as a precursor to the senior management meetings, actions from senior management meetings can impact on local cooling strategy.			
Evidence			
Please refer to senior management meeting minutes and local site minutes.			
Assessor recommendation			
Best practice has been followed, temperatures have been raised from 18°C to 22°C over the last 3 years.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.10 Review CRAC/AHU settings Best practice 5.2.5	BRONZE	SILVER	GOLD
	✓	✓	✓
Ensure that CRAC units in occupied areas have appropriate and consistent temperature and relative humidity settings to avoid units working against each other. For example many CRAC units now have the option to connect their controls and run together when installed in the same area. Care should be taken to understand and avoid any potential new failure modes or single points of failure that may be introduced.			
Assessor findings			
CRAC's operate in a "teamwork" mode and rotate as required on a monthly basis.			
Evidence			
Please refer to O&M manuals for the CRAC teamwork mode contained in the evidence guide.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments, but the auditor suggests that because an analysis of the average temperature in Gibraltar shows no lower temperature than 10C, efficiencies in the cooling system will be enhanced by removing the glycol and replacing it with normal treated water.			

BRONZE 8.11 Effective regular maintenance of cooling plant Best practice 5.2.7	BRONZE	SILVER	GOLD
	✓	✓	✓
Effective regular maintenance of the cooling system in order to conserve or achieve a “like new condition” is essential to maintain the designed cooling efficiency of the data center. Examples include: belt tension; condenser coil fouling (water or air side); evaporator fouling; filter changes.			
Assessor findings			
GibTel use Emerson UK as a maintenance partner for the cooling system.			
Evidence			
The assessor and auditor viewed the maintenance schedules.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

	BRONZE	SILVER	GOLD
BRONZE 8.12 Review and if possible raise target IT equipment intake air temperature Best practice 5.3.1	✓	✓	✓

Data centers should be designed and operated at their highest efficiency to deliver intake air to the IT equipment within the temperature range of 10°C to 35°C (50°F to 95°F). The current, relevant standard is the ASHRAE Class A2 allowable range for data centers operations in this range enables energy savings by reducing or eliminating overcooling. Note that some data centers may contain equipment with legacy environmental ranges as defined in 4.1.2, the maximum temperature for these facilities will be restricted by this equipment until segregation can be achieved as described in 5.1.12. Note that other best practices for airflow management (containment, hot aisle/cold aisle, blanking plates, and sealing leaks) may need to be implemented at the same time to ensure successful operations. Note that some, particularly older, IT equipment may exhibit significant increases in fan power consumption as intake temperature is increased. Validate that your IT equipment will not consume more energy than is saved in the cooling system.

Assessor findings

Reviews of target IT Intake temperate take place on a regular basis

Evidence

Please refer to local management meeting minutes.

Assessor recommendation

Best practice has been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

BRONZE 8.13 Review and increase the working humidity range Best practice 5.3.2	BRONZE	SILVER	GOLD
	✓	✓	✓

Reduce the lower humidity set point(s) of the data center within the ASHRAE Class A2 range (20% relative humidity) to remove de-humidification losses. Review and if practical increase the upper humidity set point(s) of the data floor within the current humidity range of 21°C (69.8°F) dew point and 80% RH to decrease the dehumidification loads within the facility. The current, relevant standard is the ASHRAE Class A2 allowable range for data centers. Note that some data centers may contain equipment with legacy environmental ranges as defined in 4.1.2, the humidity range for these facilities will be restricted by this equipment until segregation can be achieved as described in 5.1.12.

Assessor findings

Reviews of target humidity ranges take place on a regular basis

Evidence

Please refer to local management meeting minutes.

Assessor recommendation

Best practice has been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

BRONZE 8.14 Turn off lights Best practice 7.1.1	BRONZE	SILVER	GOLD
	✓	✓	✓
Lights should be turned off, preferably automatically whenever areas of the building are unoccupied, for example switches which turn off lighting a specified time after manual activation. Motion detector activated lighting is generally sufficient to support security camera systems.			
Assessor findings			
Lighting is manual, Automatic and LED systems are scheduled to be installed in 2016.			
Evidence			
Assessor observed signs and SOP requiring lighting to be turned off once works have been completed in the halls.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.15 Low energy lighting Best practice 7.1.2	BRONZE	SILVER	GOLD
	✓	✓	✓
Low energy lighting systems should be used in the data center.			
Assessor findings			
Some Florescent Bulbs and LEDs are in use.			
Evidence			
Assessor viewed LED Unit packaging, more efficient that T5/8 bulbs.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.16 Incoming energy consumption meter Best practice 9.1.1	BRONZE	SILVER	GOLD
	✓	✓	✓
Install metering equipment capable of measuring the total energy use of the data center, including all power conditioning, distribution and cooling systems. This should be separate from any non-data center building loads. Note that this is required for EUCoC reporting.			
Assessor findings			
Incoming energy meters have been installed by the Utility.			
Evidence			
Please refer to photographic evidence located in the evidence folder.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.17 IT energy consumption meter Best practice 9.1.2	BRONZE	SILVER	GOLD
	✓	✓	✓
Install metering equipment capable of measuring the total energy delivered to IT systems, including power distribution units. This may also include other power feeds where non UPS protected power is delivered to the racks. Note that this is required for EUCoC reporting.			
Assessor findings			
IT energy consumption is measured at the Rack location, using APU Smart power strips at 80% of racks. The remaining 20% before Q2 2016			
Evidence			
Please refer to assessor photographs located in the evidence folder.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

BRONZE 8.18 Continuing professional development (CPD)	BRONZE	SILVER	GOLD
	✓	✓	✓

Evidence of the development and implementation of a CPD policy for maintaining the level and pertinence of knowledge and skills data center management and operations directly relating to energy efficiency. Professional development programs should comprise industry recognized courses or, where delivered internally, should be of equivalent standard and content. Certifying organizations and providers include: CNET, DCProfessional Development, EPI, and BISCI, all which offer various courses on energy efficiency and data center operations. Online courses are also available via DCProfessional Development, RedHat and Marist College.

Assessor findings

GibTel are implementing a company-wide training program.

Evidence

Please refer to documents and certificates located in the evidence folder.

Carl Risso: Certified Data Centre Management Professional CDCMP
(2016) Certified Data Centre Energy Professional (CDCEP®)

Stefan Agripino: Certified Data Centre Technician Professional CDCTP

Christian Figueras: Certified Data Centre Technician Professional CDCTP
Certified Data Centre Management Professional CDCMP

(2016) Certified Data Centre Audit Professional (CDCAP®)

Assessor recommendation

Best practice has been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

9.SILVER CRITERIA SUMMARY Attainment: Attained (✓); Partially Attained (P); Not Attained (N); Not Applicable (N/A)			
Assessor summary			
The majority of Silver best practices are being followed those that are not have action plan comments but do not impede the award of silver at this time.			
Auditor summary			
The auditor concurs with the assessor comments.			
Number	Name	Best practice (EUCoC)	attainment
9.1	Consider the embedded energy in devices	3.2.1	✓
9.2	Lean provisioning of power and cooling	3.3.3	✓
9.3	Rack air flow management – other openings	5.1.3	✓
9.4	Raised floor air flow management	5.1.4	✓
9.5	Design – hot/cold aisle	5.1.8	✓
9.6	Shut down unnecessary cooling equipment	5.2.2	✓
9.7	Review and if possible raise chilled water temperature	5.3.4	✓
9.8	Industrial space	10 - 5.3.6	✓
9.9	Free cooling	5.4.1.X	N

9.10	Modular UPS deployment	6.1.1	✓
9.11	High efficiency UPS	6.1.2	✓
9.12	Use efficient UPS operating modes	6.1.3	✓
9.13	Select a building with sufficient ceiling height	8.1.2	✓
9.14	Facilitate the use of economizers	8.1.3	✓
9.15	Location and orientation of plant equipment	8.1.4	✓
9.16	Minimize direct solar heating	8.1.5	✓
9.17	Locate the data center where waste heat can be reused	8.2.1	N
9.18	Other water sources	8.3.2	✓
9.19	Metering of water consumption	8.3.3	✓

9.0 Silver action plan		
Number	**Description**	**Related criteria**
1	The DX units installed have a free cooling version, Gibtel to ascertain from supplier if these can be converted via upgrade or software control version into free coolers	9.9
2	Gibtel to check with Government of Gibraltar if district heat networks are planned	9.17

	BRONZE	SILVER	GOLD
SILVER 9.1 Consider the embedded energy in devices (Consider future legislation on embodied energy accounting) Best practice 3.2.1		✓	✓
Carry out an audit of existing equipment to maximize any unused existing capability by ensuring that all areas of optimization, consolidation and aggregation are identified prior to new material investment.			
Assessor findings			
There is an asset register in use for infrastructure.			
Evidence			
Please refer to documents contained within the evidence folder.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

	BRONZE	SILVER	GOLD
SILVER 9.2 Lean provisioning of power and cooling for a maximum of 18 months of data floor capacity Best practice 3.3.3		✓	✓

The provisioning of excess power and cooling capacity in the data centre drives substantial fixed losses and is unnecessary. Planning a data center for modular (scalable) expansion and then building out this capacity in a rolling program of deployments is more efficient. This also allows the technology 'generation' of the IT equipment and supporting M&E infrastructure to be matched, improving both efficiency and the ability to respond to business requirements.

Assessor findings

Mount Pleasant has 6 Halls, Hall 0/1 (Telco) is outside the scope as it is being refurbished and equipment being migrated into Hall6. Halls are built as required.
2 new halls are scheduled to be built in 2016/7 at a new city centre building. Outline plans exist to build a number of new halls at Mount Pleasant when required.

Evidence

Please refer to floor plans and Strategy Document.

Assessor recommendation

Best practice has been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.3 Rack air flow management – other openings Best practice 5.1.3	BRONZE	SILVER	GOLD
		✓	✓

Installation of aperture brushes (draught excluders) or cover plates to cover all air leakage opportunities in each rack. This includes: floor openings at the base of the rack: gaps at the sides, top and bottom of the rack between equipment or mounting rails and the perimeter of the rack.

Assessor findings

Rows are fully contained, with butchers curtains, additional air management components are in situ.

Evidence

Please refer to assessor photos contained in the evidence folder.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.4 Raised floor air flow management Best practice 5.1.4	BRONZE	SILVER	GOLD
		✓	✓
Close all unwanted apertures in the raised floor. Review placement and opening factors of vented tiles to reduce bypass. Maintain unbroken rows of cabinets to prevent re-circulated air – where necessary fill with empty fully blanked racks. Managing unbroken rows is especially important in hot and cold aisle environments. Any opening between the aisles will degrade the separation of hot and cold air.			
Assessor findings			
Under floor voids are used for power, extensive work has been undertaken to optimize air flow through the underfloor void.			
Evidence			
Please refer to assessor photographs and floorplans as contained within the evidence folder.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

SILVER 9.5 Design – hot/cold aisle Best practice 5.1.8	BRONZE	SILVER	GOLD
		✓	✓

As the power densities and air flow volumes of IT equipment have increased it has become necessary to ensure that equipment shares an air flow direction, within the rack, in adjacent racks and across aisles. The hot/cold aisle concept aligns equipment air flow to create aisles between racks that are fed cold air from which all of the equipment draws intake air in conjunction with hot aisles with no cold air feed to which all equipment exhausts air.

Assessor findings

Hot/Cold Aisle configuration has been implemented in all halls.

Evidence

Please refer to photographs and floorplans contained in the evidence folder.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.6 Shut down unnecessary cooling equipment Best practice 5.2.2	BRONZE	SILVER	GOLD
		✓	✓

If the facility is not yet fully populated or space has been cleared through consolidation non variable plant such as fixed speed fan CRAC units can be turned off in the empty areas. Note that this should not be applied in cases where operating more plant at lower load is more efficient, e.g. variable speed drive CRAC units.

Assessor findings

CRAC's/Free Cooling system operate in "teamwork" mode and rotate as necessary, equipment in areas with no IT equipment are in low power state.

Evidence

Please refer to "teamwork" O&M manuals, assessor and auditor observed the CRAC's in vacant area in an off/low power state.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.7 Review and if possible raise chilled water temperature Best practice 5.3.4	BRONZE	SILVER	GOLD
		✓	✓

Review and if possible increase the chilled water temperature set points to maximize the use of free cooling economizers and reduce compressor energy consumption. Where a DX system is used the evaporator temperatures should be reviewed. Electronic expansion valves (EEVs) allow better control and permit higher evaporator temperatures than thermostatic expansion valves (TEVs).

Assessor findings

No chilled water systems on site, DX systems fitted with EEVs.

Evidence

Please refer to assessor photographs and screenshots from BMS.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.8 Industrial space Best practice 10 - 5.3.6	BRONZE	SILVER	GOLD
		✓	✓

The data center should be considered as an industrial space, designed built and operate with the single primary objective of delivering high availability IT services reliably and efficiently. This objective should not be compromised by the need for human comfort other than to comply with local statutory requirement and law. Data centers are technical spaces not office space and should therefore only require the control of make-up air volumes and environmental conditions according to sensible warehouse or industrial levels rather than for seated human comfort.

Assessor findings

Data Centre is classed as a technical space.

Evidence

Please refer to GIBTEL COLO marketing information.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

	BRONZE	SILVER	GOLD
SILVER 9.9 Free cooling Best Practice 5.4.1.X		✓	✓

Please note that one of the following practices must be in force for at least >80% of the halls.

Best Practice 5.4.1.1 - Direct air free cooling: External air is used to cool the facility. Chiller systems are present to deal with humidity and high external temperatures if necessary. Exhaust air is re-circulated and mixed with intake air to avoid unnecessary humidification / dehumidification loads.

Best Practice 5.4.1.2 - Indirect air free cooling: Re-circulated air within the facility is primarily passed through a heat exchanger against external air to remove heat to the atmosphere.

Best Practice 5.4.1.3 - Direct water free cooling: Chilled water cooled by the external ambient air via a free cooling coil. This may be achieved by dry (/adiabatic) coolers or by evaporative assistance through spray onto the dry (/adiabatic) coolers.

Best Practice 5.4.1.4 - Indirect water free cooling: Chilled water is cooled by the external ambient conditions via a heat exchanger which is used between the condenser and chilled water circuits. This may be achieved by dry (/adiabatic) coolers, evaporative assistance through spray onto the dry (/adiabatic) coolers or cooling towers.

Assessor findings

DX systems in place, it is unclear if FREE COOLING options have been installed, to be clarified with supplier (EMERSON SYSTEM). [Silver action plan item].

Evidence

Please refer to EMERSON product information contained within the evidence folder.

Assessor recommendation

Best practice has not been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.10 Modular UPS deployment Best practice 6.1.1	BRONZE	SILVER	GOLD
		✓	✓

It is now possible to purchase modular (scalable) UPS systems across a broad range of power delivery capacities. Physical installation, transformers and cabling are prepared to meet the design electrical load of the facility but the sources of inefficiency (such switching units and batteries) are installed, as required, in modular units. This substantially reduces both the capital cost and the fixed overhead losses of these systems. In low power environments these may be frames with plug in modules whilst in larger environments these are more likely to be entire UPS units.

Assessor findings

BORRI UPS have been installed, these units are modular.

Evidence

Please refer to O&M manuals located in the evidence folder.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.11 High efficiency UPS Best practice 6.1.2	BRONZE	SILVER	GOLD
		✓	✓
High efficiency UPS systems should be selected, of any technology including electronic or rotary to meet site requirements.			
Assessor findings			
UPS operates at 93% efficiency across the power curve (95-96% at 50-75% load.			
Evidence			
Please refer to BORRI O&M manuals located in the evidence folder.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

SILVER 9.12 Use efficient UPS operating modes Best practice 6.1.3	BRONZE	SILVER	GOLD
		✓	✓

UPS should be deployed in their most efficient operating modes such as line interactive. Technologies such as rotary and high Voltage DC (direct current) can also show improved efficiency as there is no dual conversion requirement. This is particularly relevant for any UPS system feeding mechanical loads e.g. CRAC fans.

Assessor findings

Colocation site, operating dual conversion mode as per commercial requirements.

Evidence

Verbal statement by DCM.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.13 Select a building with sufficient ceiling height Best practice 8.1.2	BRONZE	SILVER	GOLD
		✓	✓

Insufficient ceiling height will obstruct the use of efficient air cooling technologies such as raised floor, suspended ceiling or ducts in the data center.

Assessor findings

The main building is of 1930's construction, and has undergone significant refurbishment works to allow the installation of 5 IT Halls, slab to ceiling heights are restricted, but have sufficient air flow paths to allow the use of raised floor.

Evidence

Please refer to photographic evidence.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.14 Facilitate the use of economizers Best practice 8.1.3	BRONZE	SILVER	GOLD
		✓	✓
The physical layout of the building should not obstruct the use of economizers (either air or water).			
Assessor findings			
Currently DX cooling solutions are in place (it is unclear whether these have the free cooling options installed), future plans would utilize free cooling for all new builds.			
Evidence			
Please refer to photographs contained within the evidence folder.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

SILVER 9.15 Location and orientation of plant equipment Best practice 8.1.4	BRONZE	SILVER	GOLD
		✓	✓
Cooling equipment, particularly dry or adiabatic coolers should be located in an area of free air movement to avoid trapping it in a local hot spot. Ideally this equipment should also be located in a position on the site where the waste heat does not affect other buildings and create further demand for air conditioning.			
Assessor findings			
3 areas of external plant exist, the first and second are located in basement voids which have restricted air flow paths but are shaded, the third unit (H6) is on an elevated platform adjacent to the car park. The waste heat does not affect the building.			
Evidence			
Please refer to photographs contained in the evidence folder.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

SILVER 9.16 Minimize direct solar heating Best practice 8.1.5	BRONZE	SILVER	GOLD
		✓	✓
Minimize solar heating of the cooled areas of the data center by providing shade or increasing the albedo (reflectivity) of the building through the use of light colored roof and wall surfaces. Shade may be constructed, provided by trees or “green roof” systems.			
Assessor findings			
The main building is 1930’s construction and is painted white, the roof is new and of a slate colour.			
Evidence			
Please refer to the photographs contained within the evidence folder.			
Assessor recommendation			
Best practice is being followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

SILVER 9.17 Locate the Data Centre where waste heat can be reused Best practice 8.2.1	BRONZE	SILVER	GOLD
		✓	✓

Locating the data center where there are available uses for waste heat can save substantial energy. Heat recovery can be used to heat office or industrial space, hydroponic farming and even swimming pools.

Assessor findings

Site is located in Gibraltar, few opportunities for waste heat use exist, but GibTel plan to contact the local government to ascertain whether there are any local district heat system in planning.

Evidence

Verbal statement and EUCOC application action plan item. [Note: Silver Action Plan].

Assessor recommendation

Best practice is partially followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.18 Other water sources Best practice 8.3.2	BRONZE	SILVER	GOLD
		✓	✓

Use of other local non-utility water sources for evaporative cooling or other non-potable purposes may reduce overall energy consumption.

Assessor findings

Rainwater is not captured for evaporative cooling purposes, salt water is used for brown water systems. GibTel plan substantial changes to DC in the next 5 years, free cooling is an option and rainwater capture may be considered.

Evidence

Verbal statement by DCM.

Assessor recommendation

Best practice is not being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

SILVER 9.19 Metering of water consumption Best practice 8.3.3	BRONZE	SILVER	GOLD
		✓	✓

The site should meter water consumption from all sources. The site should seek to use this data to manage and reduce overall water consumption. Note that water consumption cannot be directly compared with energy efficiency (PUE) unless the energy intensity of the water source is understood. Comparing water consumption between buildings is therefore not useful.

Assessor findings

Water is metered but only for fresh water, salt water is used for brown water systems.

Evidence

Please refer to the photographs contained in the evidence folder.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

10. GOLD CRITERIA SUMMARY Attainment: Attained (✓); Partially Attained (P); Not Attained (N); Not Applicable (N/A)			
Assessor summary			
The missing best practices do not allow the award of “Gold”			
Auditor summary			
The auditor concurs with the assessor comments.			
Number	Name	Best Practice (EUCoC)	Attainment
10.1	Design to maximize the part load efficiency once provisioned	3.3.4	✓
10.2	Scalable or modular installation and use of cooling equipment	5.2.1	✓
10.3	Expanded IT equipment inlet environmental conditions	5.3.3	P
10.4	Efficient part load operation	5.4.2.3	✓
10.5	Cooling system operating temperatures	5.4.2.2	✓
10.6	Variable speed drives for compressors, pumps and fans	5.4.2.4	✓
10.7	Select systems which facilitate the use of economizers	5.4.2.5	N
10.8	Variable speed fans - CRACs	5.6.1	✓
10.9	Waste heat re-use	5.7.1	P

10.10	Heat pump assisted waste heat re-use	5.7.2	P
10.11	Locate M&E plant outside the cooled area	8.1.1	✓
10.12	Capture rain water	8.3.1	N
10.13	PDU level metering of IT energy consumption	9.1.5	✓
10.14	PDU level metering of M&E energy consumption	9.1.6	✓
10.15	Row or rack level metering of temperature	9.1.7	✓
10.16	Automated daily readings	9.2.2	P
10.17	Energy and environmental reporting console	9.3.2	P

10.0 Gold action plan		
Number	**Description**	**Related criteria**
1	MMR rooms in main building, use of DX for cooling purposes with network transmission equipment to be reviewed (heat extraction rather than cooling is a better and more efficient option.)	10.3
2	Part load strategy to be formally documented	10.3;10.4
3	GibTel to discuss free cooling options with supplier	10.7

GOLD 10.1 Design to maximize the part load efficiency once provisioned Best practice 3.3.4	BRONZE	SILVER	GOLD
			✓

The design of all areas of the data center should be maximize the achieved efficiency of the facility under partial fill and variable IT electrical load. This is in addition to one off modular provisioning and considers the response of the infrastructure to dynamic loads. For example, appropriately controlled variable frequency (or speed) drive for pumps and fan units.

Assessor findings

Informal Part Loading Strategy exists. [Gold action plan item].

Evidence

Verbal statement by DCM, Part load strategy to be documented.

Assessor recommendation

Best practice has been partially followed.

Auditor recommendation

The auditor concurs with the assessor comments.

GOLD 10.2 Scalable or modular installation and use of cooling equipment Best practice 5.2.1	BRONZE	SILVER	GOLD
			✓
Cooling plant should be installed in a modular fashion allowing operators to shut down unnecessary equipment. This should then be part of the review at each cooling load change. Design to maximize part load efficiency.			
Assessor findings			
DX units have been installed in all halls, these are operating in teamwork mode.			
Evidence			
Please refer to screen shots and photographs contained within the evidence folder.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.3 Expanded IT equipment inlet environmental conditions Best practice 5.3.3	BRONZE	SILVER	GOLD
			✓

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Where appropriate and effective, data centers can be designed and operated within the air inlet temperature and relative humidity ranges of 5°C to 40°C and 5% to 80% RH, non-condensing respectively, and under exceptional conditions up to +45°C as described in ETSI EN 300 019, Class 3.1. Note that using the full range up to 40°C or 45°C will allow for the complete elimination of refrigeration in most climates allowing the operator to eliminate the capital and maintenance cost of the refrigeration plant.

Assessor findings

GibTel have built Hall 6 for their own use, this room can accept higher temperatures as required. MMR rooms are cooled by DX units. [Gold action plan item].

Evidence

Please refer to screen shots and photographs contained within the evidence folder.

Assessor recommendation

Best practice has not been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

GOLD 10.4 Efficient part load operation Best practice 5.4.2.3	BRONZE	SILVER	GOLD
			✓
Optimize the facility for the partial load it will experience for most of operational time rather than max load. E.g. sequence chillers, operate cooling towers with shared load for increased heat exchange area.			
Assessor findings			
Part load strategy is in use but undocumented. [Gold action plan item].			
Evidence			
Verbal statement by DCM.			
Assessor recommendation			
Best practice has been partially followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.5 Cooling system operating temperatures Best practice 5.4.2.2	BRONZE	SILVER	GOLD
			✓

Evaluate the opportunity to decrease condensing temperature or increase evaporating temperature; reducing delta T between these temperatures means less work is required in cooling cycle hence improved efficiency. These temperatures are dependent on required IT equipment intake air temperatures and the quality of air flow management (see Temperature and Humidity Settings).

Assessor findings

Reviews of cooling system operating temperatures take place in 3 ways, the first is during service take on processes, the 2nd via the transition from winter to summer operation, and the 3rd via an annual cooling review triggered by EUCOC best practice publication or Industry white paper updates (i.e. ASHRAE)

Evidence

Please refer to cooling systems testing schedule.

Assessor recommendation

Best practice is being followed.

Auditor recommendation

The auditor concurs with the assessor comments.

GOLD 10.6 Variable speed drives for compressors, pumps and fans Best practice 5.4.2.4	BRONZE	SILVER	GOLD
			✓
Reduced energy consumption for these components in the part load condition where they operate for much of the time. Consider new or retrofit of Electrically Commutated (EC) motors which are significantly more energy efficient than traditional AC motors across a wide range of speeds. In addition to installing variable speed drives it is critical to include the ability to properly control the speed according to demand. It is of limited value to install drives which are manually set at a constant speed or have limited control settings.			
Assessor findings			
All cooling components are fitted with VSD drives.			
Evidence			
Please refer to O&M Manuals.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.7 Select systems which facilitate the use of economizers Best practice 5.4.2.5	BRONZE	SILVER	GOLD
			✓

Cooling designs should be chosen which allow the use of as much “Free Cooling” as is possible according to the physical site constraints, local climatic or regulatory conditions that may be applicable. Select systems which facilitate the use of cooling economizers. In some data centers it may be possible to use air side economizers others may not have sufficient available space and may require a chilled liquid cooling system to allow the effective use of economized cooling.

Assessor findings

Whilst DX units have a free cooling option, it is unclear whether the appropriate software update and condenser units have been supplied [Gold action plan item].
GibTel are to discuss FREE COOLING wiith EMERSON.

Evidence

Please refer to strategy documents, assessor photographs and O&M manuals.

Assessor recommendation

Best practice has not been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

GOLD 10.8 Variable speed fans – CRACs Best practice 5.6.1	BRONZE	SILVER	GOLD
			✓

Many old CRAC units operate fixed speed fans which consume substantial power and obstruct attempts to manage the data floor temperature. Variable speed fans are particularly effective where there is a high level of redundancy in the cooling system, low utilization of the facility or highly variable IT electrical load. These fans may be controlled by factors such as the supply or return air temperature or the chilled air plenum pressure. Note that CRAC units with fixed speed compressors have minimum flow requirements which constrain the minimum operating load and therefore minimum air flow.

Assessor findings

CRAC's are fitted with VSD drives.

Evidence

Please refer to O&M manuals.

Assessor recommendation

Best practice has been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

GOLD 10.9 Waste heat re-use Best practice 5.7.1	BRONZE	SILVER	GOLD
			✓
It may be possible to provide low grade heating to industrial space or to other targets such as adjacent office space fresh air directly from heat rejected from the data center. This can reduce energy use elsewhere.			
Assessor findings			
No opportunities for waste heat locally, due to climatic conditions. However GibTel are to liaise with the Government to ascertain if any district heat systems or reuse opportunities will exist in the future.			
Evidence			
None.			
Assessor recommendation			
Best practice has been partially followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.10 Heat pump assisted waste heat re-use Best practice 5.7.2	BRONZE	SILVER	GOLD
			✓
Where it is not possible to directly re use the waste heat from the data center due to the temperature being too low it can still be economic to use additional heat pumps to raise the temperature to a useful point. This can supply office, district and other heating.			
Assessor findings			
No opportunities for waste heat locally, due to climatic conditions. However GibTel are to liaise with the Government to ascertain if any district heat systems or reuse opportunities will exist in the future.			
Evidence			
None.			
Assessor recommendation			
Best practice has been partially followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.11 Locate M&E plant outside the cooled area Best practice 8.1.1	BRONZE	SILVER	GOLD
			✓
Heat generating Mechanical and Electrical plant such as UPS units should be located outside the cooled areas of the data center wherever possible to reduce the loading on the data center cooling plant.			
Assessor findings			
All MEP plant is located outside the cooled area.			
Evidence			
Please refer to floor layouts.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.12 Capture rain water Best practice 8.3.1	BRONZE	SILVER	GOLD
			✓
Capture and storage of rain water for evaporative cooling or other non-potable purposes may reduce overall energy consumption.			
Assessor findings			
Rainwater is not captured at present, however if a free cooling solution is implemented, consideration will be given to install rainwater capture systems.			
Evidence			
N/A			
Assessor recommendation			
Best practice has not been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.13 PDU level metering of IT energy consumption Best practice 9.1.5	BRONZE	SILVER	GOLD
			✓
Improve visibility of IT energy consumption by metering at the Power Distribution Unit inputs or outputs.			
Assessor findings			
80% of Racks' are fitted with intelligent power strips, energy data is recorded and input in the Nagios BMS/DCIM.			
Evidence			
Please refer to photographs and screen shots from the system.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.14 PDU level metering of mechanical and electrical energy consumption Best practice 9.1.6	BRONZE	SILVER	GOLD
			✓
Improve visibility of data center infrastructure overheads			
Assessor findings			
Meters are fitted to all M&E components and recorded by proprietary system management tools (BORRI/EMERSON), data is captured and input into a locally developed monitoring solutions			
Evidence			
Please refer to the screenshots and photographs of meters contained in the evidence guide.			
Assessor recommendation			
Best practice has been followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.15 Row or rack level metering of temperature Best practice 9.1.7	BRONZE	SILVER	GOLD
			✓

Improve visibility of air supply temperature in existing hot / cold aisle environments with air flow management issues. Note that this is not normally necessary in a contained air flow environment as air temperatures tend to be more stable and better controlled.

Assessor findings

Temperature readings are recorded via high level sensors in both hot and cold aisle, supported by manual sensors and thermal imaging equipment

Evidence

Please refer to screenshots and photographs contained within the evidence folder.

Assessor recommendation

Best practice has been followed.

Auditor recommendation

The auditor concurs with the assessor comments.

GOLD 10.16 Automated daily readings Best practice 9.2.2	BRONZE	SILVER	GOLD
			✓
Automated daily readings enable more effective management of energy use. Supersedes Periodic manual readings.			
Assessor findings			
Whilst data is collected automatically via a pull from the Nagios system, coverage is not sufficient at present and a SE solution is scheduled to be implemented in Q2 2016.			
Evidence			
Please refer to screen shots in the evidence folders.			
Assessor recommendation			
Best practice has been partially followed.			
Auditor recommendation			
The auditor concurs with the assessor comments.			

GOLD 10.17 Energy and environmental reporting console Best practice 9.3.2	BRONZE	SILVER	GOLD
			✓

An automated energy and environmental reporting console to allow M&E staff to monitor the energy use and efficiency of the facility provides enhanced capability. Averaged and instantaneous DCIE or PUE are reported. Supersedes written report.

Assessor findings

There are proprietary monitoring systems for the UPS and AC systems, information is captured and transmitted to an open source locally developed “CHECK MK” system, there are plans to install a SCHNEIDER BMS/DCIM system that records energy and environmental data (via system links).

Evidence

Please refer to screenshots contained within the evidence folder.

Assessor recommendation

Best practice will have been followed once SE solution has been installed Q2 2016.

Auditor recommendation

The auditor concurs with the assessor comments.

11. GOLD+ CRITERIA Attainment: Attained (✓); Partially Attained (P); Not Attained (N); Not Applicable (N/A)			
Assessor summary			
Insufficient best practice have been complied with to award the “plus” criteria			
Auditor summary			
The auditor concurs with the assessor comments.			
Number	Name	Best Practice (EUCoC)	Attainment
11.1	Locate the data center in an area of low ambient temperature	8.2.2	P
11.2	Avoid locating the data center in high ambient humidity areas	8.2.3	P
11.3	Locate near a source of free cooling	8.2.4	N
11.4	Lifecycle analysis	3.2.3	✓
11.5	Direct liquid cooling of IT devices	5.6.4	N
11.6	Co-locate with power source	8.2.5	N
11.7	Integrated IT energy and environmental reporting console	9.3.3	✓

11.0 Gold+ commentary		
Number	**Description**	**Related criteria**
No commentary.		

GOLD+ 11.1 Locate the data center in an area of low ambient temperature Best practice 8.2.2	GOLD+ ✓
Free and economized cooling technologies are more effective in areas of low ambient external temperature and or humidity. Note that most temperature climates including much of Northern, Western and Central Europe present significant opportunity for economized cooling and zero refrigeration.	
Assessor findings	
The site is located at SEA LEVEL on the coast, weather data can be found on this link: **http://www.worldweatheronline.com/gibraltar-weather-averages/gi.aspx**	
Evidence	
Please refer to historical weather data, and design documents	
Assessor recommendation	
N/A, Site is for local customers, best practice not applicable.	
Auditor recommendation	
The auditor concurs with the assessor comments.	

GOLD+
GOLD+ 11.2 Avoid locating the data center in high ambient humidity areas Best practice 8.2.3	✓

Free cooling is particularly impacted by high external humidity as dehumidification becomes necessary, many economizer technologies (such as evaporative cooling) are also less effective.
Assessor findings
The site is located at sea level on the coast, average humidity data can be found on this link:
Evidence
Please refer to average weather data and design statement.
Assessor recommendation
N/A, Site is for local customers, best practice not applicable.
Auditor recommendation
The auditor concurs with the assessor comments.

GOLD+
GOLD+ 11.3 Locate near a source of free cooling Best practice 8.2.4	✓
Locating the data center near a source of free cooling such as a river subject to local environmental regulation.
Assessor findings
The site is not located near to a source of free cooling.
Evidence
None
Assessor recommendation
Best practice has not been followed.
Auditor recommendation
The auditor concurs with the assessor comments.

GOLD+ 11.4 Lifecycle analysis Best practice 3.2.3	GOLD+ ✓
Introduce a plan for Lifecycle Assessment (LCA) in accordance with emerging EU Guidelines and internationally standardized methodology (ISO 14040 ff).	
Assessor findings	
GibTel are planning to adopt LCA for all operations in 2017.	
Evidence	
Verbal statement by DCM (This will be checked upon recertification visit in Dec 2017).	
Assessor recommendation	
Best practice will be followed.	
Auditor recommendation	
The auditor concurs with the assessor comments.	

GOLD+
GOLD+ 11.5 Direct liquid cooling of IT devices (direct to microprocessor or to back of cabinet - conditional on design constraints.) Best practice 5.6.4	✓
Conditional on design constraints. In place of air cooling it is possible to directly liquid cool part or all of some IT devices. This can provide a more efficient thermal circuit and allow the coolant liquid system temperature to be substantially higher, further driving efficiency, allowing for increased or exclusive use of free cooling or heat re use. Note that this practice applies to devices which deliver cooling fluid directly to the heat removal system of the components such as water cooled heat sinks or heat pipes and not the delivery of cooling liquid to an internal mechanical refrigeration plant or in chassis air cooling systems.
Assessor findings
No direct liquid cooled systems are present on site.
Evidence
N/A
Assessor recommendation
N/A
Auditor recommendation
The auditor concurs with the assessor comments.

GOLD+
GOLD+ 11.6 Co-locate with power source Best practice 8.2.5	✓
Locating the data center close to the power generating plant can reduce transmission losses and provide the opportunity to operate sorption chillers from power source waste heat.
Assessor findings
The site in located in Gibraltar, the power station is some distance away, relatively speaking, no power sources in the vicinity. However, GibTel will be reviewing the opportunities for renewable on site generation (solar panels) to offset energy costs.
Evidence
N/A
Assessor recommendation
Best practice may be followed in the future, (check on Dec17 site visit).
Auditor recommendation
The auditor concurs with the assessor comments.

GOLD+
GOLD+ 11.7 Integrated IT energy and environmental reporting console Best practice 9.3.3	✓
An integrated energy and environmental reporting capability in the main IT reporting console allows integrated management of energy use and comparison of IT workload with energy use. Averaged, instantaneous and working range DCIE or PUE are reported and related to IT workload. Supersedes Written Report and Energy and Environmental Reporting Console. This reporting may be enhanced by the integration of effective physical and logical asset and configuration data.
Assessor findings
An integrated IT and energy/environmental console is not present on site, but the proposed SE DCiM solution will follow this best practice in the future.
Evidence
N/A
Assessor recommendation
Best practice has been followed.
Auditor recommendation
The auditor concurs with the assessor comments.

12. Power Usage Effectiveness (PUE)
A comprehensive examination of the metric has been updated and released by the Green Grid: www.thegreengrid.org (PUE: total facility energy use/IT energy use).
Assessor findings
Insufficient data has been captured to calculate a PUE using the green grid methodology, rough calculations (using verified utility meter data (fiscal grade) and partial IT load (not including DC Network/Transmission & DC Mobile Equipment) indicates a PUE of 1.96
Evidence
Please refer to spreadsheet and screenshots detailing the PUE.
Assessor recommendation
PUE calculated at 1.96 (Not verified)
Auditor recommendation
The auditor concurs with the assessor comments.

13. Appendix A: Assessor details	
Company Name	Carbon3IT Ltd
Address	5 The Elms, Station Road, Hatton, Warwickshire, CV35 8XN
URL	www.carbon3it.com
Assessor Name	John Booth
Telephone (fixed)	+44 (0) 1926 843835
Mobile	+44 (0) 7897 780337
Email	john.booth@carbon3it.com

14. Appendix B: Auditor details	
Company Name	Foskett & Associates Ltd
Address	-
URL	-
Auditor Name	Mike Foskett
Telephone (fixed)	-
Mobile	+44 (0) 7580 078419
Email	mike@foskett.co.uk

15. Appendix C: Datacenter Dynamics details	
Head Office	
Address	Datacentre Dynamics Ltd., 102-108 Clifton Street, London EC2A 4HW
URL	www.datacenterdynamics.com
Telephone (fixed)	+44 (0) 20 7426 7811
Email	ceeda-support@datacenterdynamics.com