

**Testing strategy for compliance with
remote gambling and software technical
standards: responses**

April 2016

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1 Introduction

1.1 In December 2015, the Gambling Commission (the Commission) published its [consultation](#) on the *Testing strategy for compliance with remote gambling and software technical standards* (the testing strategy). We intend to update the strategy to:

- ensure that gambling is conducted in a fair and open way
- ensure the strategy reflects industry and international best practice
- deliver an effective and proportionate regulatory framework
- align our requirements with those of other regulators (where appropriate)
- set out a minimum standard of testing for games and software updates.

1.2 The consultation ended on 11 February 2016, and we would like to thank all the organisations and individuals who responded to this consultation or took part in stakeholder meetings.

1.3 This response sets out the Commission's final position based on the responses to our consultation. It does not purport to describe all of the responses in detail but sets out the key issues identified during the consultation period and explains the changes the Commission has made as a result. An updated testing strategy with the changes outlined here is due to be published in May 2016.

2 General revisions

2.1 We have made a number of general revisions to the strategy to ensure the guidance remains up to date as well as more succinct. We would first like to draw attention to a number of changes that did not require explicit consultation, but are mentioned here for reference. The revisions highlighted in this section are applicable throughout the strategy wherever they occur:

- Where appropriate, terminology has been updated to ensure requirements remain clear and relevant. For example, we intend to limit reference to *level 3 testing*, which had been used to illustrate the testing requirements that *transitional games*¹ had to meet. The deadline for transitional games ended on 31 October 2015 and all games offered to customers in Great Britain must be tested to the standards set out within the revised strategy. Guidance on transitional licensing arrangements has also been removed from the revised strategy.
- We have added additional guidance on the Multi-Jurisdictional Testing Framework (MJTF). The aim of the MJTF is to develop a common set of games testing standards that will be recognised by all participating jurisdictions (currently Alderney, Denmark, Isle of Man and Great Britain). Phase one of the MJTF is available on the [IAGR](#) website, it covers the operations of external testing laboratories and the testing of random number generators (RNG) used in online gambling. Phase two (game testing standards) is in draft stage and is being trialled at present. To assist operators based in multiple jurisdictions and reduce testing duplication we support the MJTF initiative and will recognise testing performed to that standard for our compliance assurance purposes.
- We aim to simplify the testing strategy by adding a summary at the beginning of the document which will capture the key principles and requirements of our approach.
- We intend to set out some of the more detailed technical aspects (eg RTP monitoring) in separate guidance documents, which we will link to from the strategy.

¹ Prior to the implementation of the Remote Act in November 2014 many games had not been tested to the Commission's RTS requirements. We adopted different levels of testing (levels 1-3) as a means to illustrate our own testing requirements (level 3) and introduced transitional arrangements to allow licensees time to ensure games were tested up to the required level. The 12 month transitional period ended on 31 October 2015.

- We intend to publish a glossary of terms. The terminology used in games testing is varied and a single term can have different meanings when applied across a broad spectrum of stakeholders. The glossary will provide further clarity on the definition we have attached to a particular term or concept.
- We intend to publish our consultation on the [Remote gambling and software technical standards](#) (RTS) in the autumn. We expect that certain aspects of the strategy (eg RTS examples provided in Table 5) will need to be updated to reflect any changes to the RTS. These amendments will form part of the RTS consultation and we will notify stakeholders when the updated strategy has been published.
- A procedural plan detailing the process for submitting test report; quarterly PML sign-offs of game records; and annual audit submissions via the eServices portal will be added to the strategy document prior to implementation in the first half of 2017. Further details; including the planned implementation dates for the new annual audit requirement, are set out in Section 10 and Section 13 of this document.

3 Consultation

Summary

- 3.1** The consultation document sets out the Commission's proposed changes to the *Testing strategy for compliance with remote gambling and software technical standards*
- 3.2** The Commission received 20 responses, which included operators, software suppliers and test houses. The breakdown of respondents by category can be seen at Section 14 of this document.
- 3.3** We are grateful for all responses received. This document aims to reflect the views expressed but does not intend to describe all of the responses in detail.

Role of stakeholder meetings

- 3.4** The Commission held two workshop meetings with stakeholders including industry, software suppliers, test houses other interested parties to explore the main issues. These were prior to the release of the consultation and during the consultation. Both workshops improved the consultation process in ironing out any misunderstandings and preventing issues that may otherwise have derailed the process. We will aim to hold similar workshops for future consultations, in particular the upcoming remote technical standards consultation.

4 General risk and compliance assurance activities (table 5 of the current testing strategy)

Consultation proposals

- 4.1** Our approach in defining which aspects of a game require external testing versus what can be solely tested in-house is based on how visible compliance is to determine and what level of impact it has on player fairness. Generally speaking, independent testing is required where both player fairness and compliance is hard to visually confirm by looking at and playing a game (eg whether the game rules (maths) have been correctly implemented within the software, or if the RNG serving the game is fair).
- 4.2** Table 5 uses a colour coded table to outline those aspects of the RTS that require independent testing and those which can be tested in-house (providing internal development, testing and release procedures adhere to the good practice indicators as outlined in Section 6 of the testing strategy). The consultation sought views on whether Table 5 was clear in its current format or whether changes were needed. We proposed to reduce the current three colour codes to two, indicating those areas which can be tested in-house (shaded green) and those that require external compliance assurance (shaded red).

Consultation question

Q1. To what extent do you agree or disagree with our proposed amendments to Table 5?

Respondents' views

- 4.3** Responses to this proposal were largely positive and it was generally agreed that a two-coloured system will help improve clarity on testing requirements and associated risk. One respondent suggested that the proposed changes relating to major/minor updates should be incorporated into Table 5, which also sets out as the criteria for internal and external testing. It was proposed that Table 5 should reference all aspects of the RTS to provide additional clarification as to those standards that require external testing.
- 4.4** A number of respondents requested that the final draft of Table 5 be circulated to stakeholders prior to the publication of the revised strategy.

The Commission's position

- 4.5** We propose to simplify Table 5 by removing the yellow shaded risks and instead use green and red shading to illustrate the areas that can and cannot be tested in-house. Previously the yellow shaded areas denoted medium risk elements, however the actual compliance assurance for both green and yellow was the same (that is they could be tested in-house providing the operator adheres to the good practice as outlined in Section 6 of the testing strategy).
- 4.6** Two areas previously designated as yellow that will be upgraded to red (external testing required) include RTS 5 and RTS 7E. RTS 5 requires operators to ensure that game software is performing as set out in the rules made available to players. This links closely to live RTP monitoring – an area, as we proposed in the consultation, which will be reviewed as part of the new annual game testing audit requirement². This is therefore an area where external assurance is required to demonstrate compliance and therefore it will be categorised as red.

² External assurance will only apply to a subset of remote gaming operators. See Section 11 of this document for further details of the annual games testing audit requirement

- 4.7** RTS 7E deals with how clear the game outcomes are to a player. This is an important area of player fairness that is best assessed as part of the external game testing where the tester has access to game mechanics/software code and game designs, the rules as explained to players, and can see how the game client (channel) reflects gameplay to the player. In practice it is something currently assessed as part of testing to ascertain the overall integration of the game engine, client, and platform and would be tested as part of the channel assessment.
- 4.8** We have noted the request to incorporate the list of major/minor updates into Table 5. However, the areas set out in Table 5 are graded based on the level of associated risk, which is in turn determined by the *visibility* of compliance and *impact* of any non-compliance. Whether an update is major or minor is determined by whether or not the change could impact games fairness. Whilst both sections seek to define whether a feature will require external testing we consider the narrative underpinning these requirements to be separate. In the interest of clarity we consider it appropriate for Table 5 and the list of major/minor updates to be distinct sections within the revised strategy.
- 4.9** As proposed, the revised Table 5 will refer to all standards set out within the RTS. Following further consultation with stakeholders, we have agreed to make the revised draft of Table 5 available on request, prior to the publication of the revised strategy in May 2016.

5 Testing requirements (major/minor updates)

Consultation proposals

- 5.1** The previous strategy required licensees to retest all updates that affect game fairness, critical files or relevant digital signatures. This requirement captured updates that might affect critical files (and therefore digital signatures) but have no impact on the outcome or fairness of the game. We proposed that the testing and certification process would be streamlined so as to create more flexibility and allow for reliance on in-house testing of minor game updates.
- 5.2** This proposal did not affect the requirement for operators to submit software for external testing for all new games (or updates to existing games when changes affect game fairness) and to submit the test reports to us prior to release. However, where the existing requirements do apply, we proposed to streamline the game details and test report submission process for operators through our new eServices solution (further details provided in Section 2, 10 and 13 of this document).
- 5.3** We consulted on the adoption of a standard set of definitions of major and minor updates, in which a major update would be defined as *any software update which may affect the fairness of a game*. The definitions of both major and minor updates were set out in Table 1 of the consultation document. These definitions are supported by a non-exhaustive list of examples of major and minor updates. The table will be included in the revised strategy to assist operators when making their internal assessments as to whether an update constitutes a major or minor change.

Consultation questions

- Q2. To what extent do you agree or disagree with our proposal to enable licensed operators to carry out minor updates without the need for external testing?
- Q3. To what extent do you agree or disagree with the suggested definition of major updates?
- Q4. Are there any other examples of major updates which you think should be included in Table 1?
- Q5. Are there any other minor updates which you think should be included in Table 1?
- Q6. Do you have any further comments concerning the proposals on major/minor updates?

Respondents' views

- 5.4** All respondents agreed with the proposal for minor updates to be rolled-out without the need for external retesting. The risk of introducing unfairness during these updates could be adequately mitigated by existing internal development, testing and release processes, all of which could be reviewed annually by independent test houses. The approach was considered to be “sensible”, “proportionate”, “risk based” and in line with the requirements adopted in other jurisdictions. Respondents agreed that the revised approach would help reduce costs and free up resources for other areas, such as improving user experience. The proposal to define a major update as *any change affecting game fairness* was described as “reasonable”, “logical” and “clear”. One respondent felt that the term *game logic* should be used in place of *game rules*, as the latter could be mistaken for changes affecting player-facing messaging and artwork.
- 5.5** There were a number of requests for additional major/minor update examples; some respondents provided their own suggestions for consideration. A scenario was raised in which changes to symbols, artwork and/or rules might alter the appearance of a game, to the extent that not only would it need retesting but also re-named as a new game. It was queried whether improvements to player facing game rules, such as in the help files, constituted a major update.
- 5.6** Respondents noted the difficulty in identifying all possible types of major/minor updates and suggested that the examples set out in the revised strategy be reviewed on a periodic basis. It was proposed that, where there is uncertainty, operators should be given greater discretion to determine whether an update is major or minor. It was suggested that where a licensee is unclear on the classification of the update, the decision should be made in conjunction with an approved test house.
- 5.7** It was noted that where games have been developed using a database table (as opposed to hardcoded software) to store critical aspects such as the prize table or symbol distribution that scripts could be developed during original game certification. These scripts can export and digitally sign the contents of prize tables. The script can also be executed at a later date, the signatures compared to the original game or update signature and any changes logged for the purposes of the annual audit.

The Commission's position

- 5.8** The revised strategy will formalise the position that minor updates will not require external retesting. A major update will be defined as *any change affecting game fairness*. Licensees will be expected to maintain a log of all updates, all major changes will be subject to external retesting. Minor changes can rely on in-house testing but will be subject to an *annual game testing audit* carried out by a Commission approved test house. The audit will also independently assess a licensee's in-house development, testing and release processes. Since publishing the consultation document the Commission has re-defined and reduced the scope of licensees that will require the annual audit. Further details of the revised scope are provided in Section 10 of this document.
- 5.9** We note the concern in using the term *game rules*, to describe issues affecting game logic. We have found that the term *game rules* is used interchangeably within the industry to refer to game logic and/or player facing rules. We therefore intend to publish a glossary of key terms (eg game logic, game flow, rules) and will ensure that, where relevant, the term *rules to player* is used to refer to player facing messaging and artwork. In general, changes made to player facing rules would be considered minor.
- 5.10** We aim to develop further guidance in relation to new games, specifically the circumstances in which alterations made to a game's appearance (eg a game's design and/or name) trigger the need for a new test report to be submitted. Our approach is to ensure that there is a clear linkage between the game details set out within the test report and the actual name/design of the live game. Testing in such cases will be limited to a subset of changes, and the costs would therefore be lower than those associated with testing an entirely new product.
- 5.11** The non-exhaustive list of major/minor examples will be refined based on the comments received during the consultation. The list will be reviewed and, if necessary, updated, though we would expect operators to consult their test house if uncertain as to whether a change is major or minor.
- 5.12** Where games utilise database tables to store critical game design information we would expect adequate security is in place to protect those tables from accidental and malicious updates. Where games utilise this type of design, the scope of the annual game testing audit would assess the adequacy of controls in place to:
- prevent incorrect configuration of games
 - prevent unauthorised table updates, and
 - maintain an audit trail of changes to the database tables.

We do not propose to specify exactly how this is done or prescribe exact controls as they will differ according to system designs and operational procedures.

6 Gambling platform/RNG changes

Consultation proposals

- 6.1** Along with changes to individual games we sought feedback for the level of testing required when an update is made to the underlying remote gaming system (RGS) or RNG, which could affect hundreds of games served by a single RNG or residing on an RGS. In this scenario, retesting all games would not be proportionate. Instead, we proposed that a representative sample of the games is retested to ensure the update to the gaming system, or RNG change, has not affected their operation. We do not propose to define the sample size within the revised strategy, although we expect it to be wide enough to include each game type and generation. Licensed operators, in consultation with test houses, should decide what constitutes a suitable representation on a case-by-case basis.

Consultation question

Q7. To what extent do you agree or disagree with our proposal that a representative sample of games is tested following an update to an RGS or RNG?

Respondents' views

- 6.2** The majority of respondents agreed with the proposal, noting that the approach was in line with the international standards on auditing. Overall, it was agreed that licensees, in conjunction with test houses, were best placed to determine the size of the representative sample. Some respondents noted that a specified sample size could mitigate the risk of a “race to the bottom” in which test houses reduce the volume of games tested to gain a competitive advantage. Clarification was sought as to whether RGS updates that do not affect game fairness would still require external testing. There was a request for the Commission to provide definitive guidance as to the type of RGS updates that would trigger retesting.
- 6.3** A number of responses considered the scope of the sample testing, including whether testing should take into account different game types and generations (genre) or be restricted to RNG functionality or games with similar characteristics. It was also suggested that where a change to a RNG affects hundreds of games, testing should focus on the approved RNG range. A few respondents asked for clarification as to timescale in which the Commission would expect sample testing to be carried out. It was proposed that details of the sample testing could be captured in a single test report; removing the need for multiple submissions to the Commission.
- 6.4** Respondents asked that the strategy provides additional guidance in relation to integration testing and the circumstances in which the RNG can be tested independent of the actual games. It was noted that guidance provided by other jurisdictions helps clarify the circumstances in which integration and games testing is required. One respondent expressed concern that testing a representative sample of games would duplicate the work and cost of the testing conducted prior to an RNG and RGS change.

The Commission's position

6.5 We note the request for further guidance concerning the circumstances in which a change to RGS would trigger the need for retesting. We do not intend to capture the numerous environmental changes that have no impact on the game fairness, such as:

- patches in operating systems (eg Oracle, Linux)
- most back office changes (eg player management, bonus handling)
- most frontend changes (eg player registration, website layout).

However, some changes to the RNG or RGS can negatively affect game fairness even though the game itself has not changed. This is because underlying processes and functionality relied upon by the game may have been altered. How developers of gambling software design, build and evolve their products differs greatly depending not only on their development ethos but also on the technology used. Therefore it is not practical for us to define what type of RNG or RGS change would require some level of integration testing with a sample of hosted games, nor the size of the sample.

6.6 As is proposed in the responses, we would consider it to be both acceptable and practical to capture details of sample testing in a single test report. We would expect testing to have been completed prior to launching the updated RNG or RGS.

6.7 We expect the sample to be wide enough to include each game type and generation (and not be restricted to RNG functionality or games with similar characteristics). The nature and size of the representative sample should be decided by licensees in conjunction with an approved test house.

6.8 We have always maintained that testing of games should be performed in an environment that reflects the intended live environment. It is accepted practice that an element of integration testing is required where updates are made to plug-in parts of an overall system. In our view the requirement for sample testing formalises what we would expect in a way that is not disproportionate.

7 New channel testing

Consultation proposals

7.1 We proposed that the revised strategy would clarify testing requirements for the roll-out of existing games onto new channels. For example, where a game originally released with a flash game client is then redeveloped in HTML 5 or as a native mobile app, the new channel will require independent external testing. Although some new channels do not require the game engine to be modified, there are sufficient customer fairness risks accompanying the release of a new channel to warrant external assurance. Recent examples of game software faults reported to us show that bugs are often limited to a particular channel despite the fact the game engine has not changed. The burden imposed from the testing of new channels is minimal as it is only a subset of the tests that would be conducted for a new game.

7.2 A new section on channel testing will be included within the revised strategy. We proposed to use the operating system for which the channel is developed to distinguish between channels, for example iOS, Android, Windows and HTML. Where a version is designed to work on a variety of devices or browsers, we proposed that testing should be of the most commonly used devices and browsers and that these should be identified within the test report.

Consultation questions

- Q8. To what extent do you agree or disagree with our proposal to add a new section on *new channel testing* to the testing strategy?
- Q9. To what extent do you agree or disagree with our proposal to focus on the operating system to identify those channels that require testing?

Respondents' views

- 7.3** Respondents were supportive of the inclusion of a *new channel testing* section in the revised strategy, on the basis that it would help clarify the existing requirements concerning game/update release across multiple platforms. A number of respondents asked for clarification on what a *subset* of testing for new channels to an existing game would look like.
- 7.4** Overall, the proposal that testing is carried out on the most commonly used devices and browsers received a positive response. There was a suggestion that the revised strategy include further guidance setting out the circumstances in which testing would be required eg changes to code; screen size and orientation. It was proposed that operators should be permitted to send screenshots to test houses where changes have been made to a game's graphics.
- 7.5** There were differing views as to whether *operating system* should be used to distinguish different channels. A number of respondents highlighted that that the operating system alone would not be the most appropriate identifier for a channel as some technologies can operate across multiple systems and devices (eg HTML and Javascript can operate on Android, IOS, Windows). Clarification was also sought as to whether games would need to be retested for updated versions of third party operating systems. For example would games originally tested for android or IOS version X need to be retested when Google or Apple update their operating system to version X+1.

The Commission's position

- 7.6** As proposed we will include a new section on the testing required for new channels (game clients) for existing games. This will provide clarity to an area which previously generated numerous enquiries. It is also in line with the direction of travel of the IAGR MJTF work, which expects new game clients to be externally tested.
- 7.7** The subset of tests for a new channel generally only relate to the player display aspects of a game, such as a manual test to see how the game client plays and displays results, and a review of the communications between the client and the game engine to confirm it has adequate security and integrity. The game design maths and implementation, RNG scaling and mapping and most of the source code for the game engine would not require any retesting as these are generally not updated for a new channel. This means the actual testing involved for a new channel to an existing and previously tested game is likely to be 10-30% of a new game's testing effort.
- 7.8** We won't require games to be externally retested when third party operating systems and browsers are updated, we would expect the operator's own testing to confirm satisfactory performance of existing games when new client browser versions and operating systems are released (note this is different to updates for the RGS or RNG, which underpins the game engine. Such updates may require games to be retested as per gambling platform / RNG changes in Section 5 above).

7.9 In line with consultation feedback, we will not just focus on the operating system to define a new channel but rather a combination of operating system and client technology (eg HTML 5 is not an operating system but a programming language / technology). We will therefore accommodate operating system / device type agnostic technologies, such as HTML 5, and classify that as one channel.

8 Live dealer studios

Consultation proposals

- 8.1** The primary fairness focus in the strategy is on the pre-release testing of gambling software and does not address the fairness assurance of live dealer operations, in which fairness is controlled by people, physical equipment and processes etc. However, we are aware that many live dealers are also licensed in other jurisdictions where annual audits are required. Given the defined scope of a live dealer operation, the consultation document proposed that audits performed for other jurisdictions should suffice for our assurance requirements.
- 8.2** For ongoing fairness assurance of live dealer operations, we propose to accept an independent audit previously conducted for another jurisdiction. If none exists, we will require an independent audit against similar live dealer standards, for example those of Alderney or the Isle of Man. We will set out proposals for what we mean by “similar standards” when we consult on updates to the RTS in autumn 2016.

Consultation questions

- Q10. To what extent do you agree or disagree with our proposal to recognise live dealer audits previously conducted for and accepted by another jurisdiction?
- Q11. If a live dealer is not already subject to audit, what standards should we consider adopting for our live dealer audit requirements?

Respondents' views

- 8.3** The proposal to recognise a cross-jurisdictional standard for live dealer audits was considered to be a sensible solution that would help reduce economic pressures and, potentially, reinforce cooperative working between jurisdictions. It was noted that there is a degree of variation in jurisdictional requirements, though specific reference was made to the robustness of standards used in Isle of Man, Alderney and Denmark.
- 8.4** In relation to Question 11, the audit processes adopted in the Isle of Man, Denmark and Alderney were cited as the most commonly used by respondents. One respondent asked whether licensees would be expected to set out responsibility for the audit within their contractual arrangements where the provision of live dealer is out-sourced to a third party. It was also proposed that the audit should take into account the live or actual output of table and devices by analyses of operational or transactional data (eg analysis of wheel outcomes for a specific roulette wheel, cards dealt).

The Commission's position

- 8.5** The revised strategy will not seek to specify adherence to a specific set of jurisdictional standards. However, where live studios have not been audited, one will need to be carried out against standards similar to those of other jurisdictions, the proposals for which will be set out in the forthcoming review of the RTS.
- 8.6** In the event that live dealer provision is out-sourced, responsibility for the audit will form part of the business agreement between the licensee and third party.
- 8.7** Whilst it would appear that analyses of operational and transactional data, if available, is a reasonably simple procedure and would encourage such practice, we do not intend to mandate this approach within the revised strategy or RTS.

9 Live return to player (RTP) monitoring - identification of potential game faults in operation

Consultation proposals

- 9.1** Game fairness assurance in the current strategy is delivered, primarily, through pre-release testing by an approved test house. There is also high level technical requirement (RTS 5A), that operators continue to ensure gambling offered by them is fair and that games continue to perform correctly. With the central record of gaming transactions held by remote operators there are opportunities for licensees to readily measure the actual performance of games and compare this to the game's design and published RTP to ensure fair gambling.
- 9.2** The main form of monitoring proposed will be to calculate the *actual* RTP and compare that figure against the *expected* (advertised) RTP³. It is a backend function to be performed on the aggregated transactional game data.
- 9.3** The [consultation](#) provides a more detailed description of the proposals, however to summarise we consulted on:
- making RTP performance monitoring (an explicit) mandatory requirement
 - whether measurements should take into account the volatility of the game so accurate tolerance ranges can be calculated
 - how often the measurements should be taken, either based on the volume of play or a periodic timeframe
 - ensuring the measurements are not so aggregated that it might mask errors at a lower level, such as with one particular channel or bet level
 - whether there should be a requirement to display the actual game RTP as measured to players
 - where the responsibility for monitoring should reside in multi-party (B2B) arrangements
 - the need to consider player complaints on game fairness and adequately investigate them.

³ If the mathematical design of a game results in a theoretical RTP of 95% then a simple calculation performed using the 'win' and 'turnover' amounts generated by the game will yield the actual RTP% (win / turnover).

Consultation questions

- Q12. To what extent do you agree or disagree with our proposal to include a requirement in the testing strategy that operators must monitor the ongoing performance of games?
- Q13. To what extent do you agree or disagree with our proposal that each channel for a game is independently monitored?
- Q14. To what extent do you agree or disagree with our proposal that a game's volatility is taken into account to refine the acceptable tolerance?
- Q15. To what extent do you agree or disagree with our proposal that RTP monitoring should be based on volume of gameplay?
- Q16. To what extent do you agree or disagree with our proposal that RTP monitoring should be conducted at a granular level (eg monitoring the results of each bet level)?
- Q17. To what extent do you agree or disagree with our proposal that operators should be required to display a game's RTP?
- Q18. Are there any additional requirements for third party responsibility in this area?
- Q19. Do you have any further comments about the proposals on RTP monitoring?

Respondents' views

- 9.4** All respondents agreed with the proposal that licensees should monitor the ongoing performance of games. Effective performance monitoring was considered to be essential for enabling licensees to meet the fair and open licensing objective. There was some suggestion that the revised strategy should provide additional detail as to the processes operators should have in place, how monitoring should be reported and tracked and clarification as to what would constitute a "critical value". It was further suggested that the strategy should set out the need for an audit trail of configurations, such as file controls and database entries that influence game rules and mathematics.
- 9.5** We were asked to expand on our expectations concerning the monitoring responsibilities of B2Bs and B2Cs. Some respondents felt that the legal aspects of monitoring should be agreed between operators and suppliers on an individual basis, and would vary based on the specific business arrangement. There was a general acceptance that B2Cs would be able to monitor performance on a transactional level but would not have access to the aggregated data held on the game network. For example, a B2C would not be able to account for variations in RTP for networked games, which might have resulted from an operator on the same network paying out for a jackpot win. It was suggested that the entity that holds the aggregated data, generally the platform provider, should provide the operator with sufficient tools to monitor RTP.
- 9.6** One respondent referred to the need for a "multi-level" approach to game performance monitoring. A scenario was cited in which operators would monitor game performance and consult the software provider in the event that issues have been identified. We were also asked to take into account another scenario where a B2B supplier uses a third party RGS platform to provide the B2C operator and does not therefore have the capability for RTP monitoring.

- 9.7** There were varying responses to the proposal that each channel for a game is independently monitored. It was noted that this approach would help to “pin-point” variations in RTP whilst also allowing non-RTP related performance issues to be identified. However, a number of respondents indicated that where different channels shared the same code (eg HTML) monitoring each channel separately would be of little benefit as the game delivery is identical across channels. In another instance it was suggested that where channels access the same game engine then “the channel of the client should be tracked in a manner similar to a stake”. There was some concern that monitoring individual delivery channels would reduce the volume of data available thus limiting the overall effectiveness of RTP monitoring. It was suggested licensees use their own discretion and implement aggregated monitoring where there is limited gameplay on a certain channel and where the same progressive jackpot is available over a number of channels. Clarification was sought as to the nature of the term “independently monitored” and whether this entailed using a third party to monitor each channel.
- 9.8** Respondents were broadly in agreement with proposal that the game volatility should be taken into account to refine the acceptable tolerance. The general consensus was that, given the impact of volatility on game performance, careful monitoring will provide assurance that the RTP is within acceptable ranges (based on number of games played). One respondent highlighted that effective volatility measures will allow tolerance and performance to be measured regardless of gameplay. Others suggested that monitoring should be over an extended period so as to remove volatility as an influencing factor. Some respondents suggested that the volatility should be stated in the design documentation and test reports so the parameters can be included in the monitoring.
- 9.9** Whilst the proposal that RTP should be based on volume of gameplay was widely supported, some respondents pointed out that that it was possible to obtain useful observations from smaller amounts of data. There was some concern as to the resource implications of having to keep “close tabs” on games, and some respondents requested that the revised strategy specified a threshold for volume of play. Another respondent noted that defining a threshold could be difficult as the volatility of RTP measurements will be affected by player volume. Clarification was sought as to whether monitoring should include games with lower volumes of play (but which have higher levels of volatility). Other respondents suggested that monitoring should occur regardless of gameplay and that effective volatility profiling during pre-release testing (such as is required in some overseas jurisdictions) will allow comparisons to be made for even relatively small volumes.
- 9.10** A number of respondents agreed that monitoring RTP at a granular level would be a useful means of identifying “root deficiencies” and deliver “more accurate” RTP measurement results. Other respondents indicated that monitoring at bet level would be ineffective due to a reduction in data samples, which would impair the accuracy of stake level analyses. In some cases it was felt that combined monitoring based on larger volumes of play would offer more reliable and accurate insight into potential issues. There was also some concern related to the resources involved in conducting stake level testing and whether this would outweigh “the valued derived”. For example, it was noted that certain games offer players a choice of lines in addition to the bet multiplier, which would make the process of gathering actual RTP for each individual bet particularly onerous. Monitoring should therefore only be required if the theoretical RTP is different for individual bet levels. Some respondents suggested that sampling “normalized data” will still highlight any issues at a single bet level. One respondent commented that licensees be given an extended period of six to twelve months to implement the proposal.
- 9.11** Overall respondents saw little value in the proposal that, in addition to the existing requirement to display the expected RTP, games display actual RTP to players. The general consensus was that displaying actual RTP could have the adverse impact of drawing customers onto games displaying high levels of RTP (or indeed ones with low RTP that are considered “ripe” for pay-outs) and lead to harmful gambling behaviour.

Respondents cited the conclusions of NatCen's *Understanding of Return to Player Messages* report, which highlighted player misconceptions in relation to RTP. On the other hand, it was noted that the display of actual RTP was a requirement in other jurisdictions and could ensure greater transparency provided that players have access to sufficient information (eg how RTP is effected by volume of play and the difference between actual RTP and theoretical RTP).

- 9.12** Concern was expressed that displaying actual RTP for “hundreds or thousands of games” would be unnecessarily cumbersome. It was noted that operators often use multiple RTP’s for the same game, which could lead to further confusion on the part of the player.

The Commission’s position

- 9.13** As proposed we will formalise requirements to monitor the live performance of games using RTP measurements. Volatility is vital to these calculations regardless of volume of play and will be a key parameter to include when establishing the monitoring framework for each licensee. Given the detailed technical nature of how monitoring could be conducted we will create a high level requirement in the testing strategy with links to lower level guidance to cover the expected approach, noting that operators may use different methods if warranted.
- 9.14** Measurement frequency should be based on the volume of play (calculated based either on the number of games or amount of turnover) as to rely on, for example, one measurement per month will not account for particularly popular games which will accrue a high volume of play in a short time. Wherever possible measurements should be an automatic backend process that would raise alerts if actual measurements are outside the expected tolerance. One acceptable method would be to setup daily measurements based on the last 30 days of play (or other set volume(s)), in this way measurements are performed over a rolling volume of play.
- 9.15** We do not intend on restricting the combination of measurements that operators may wish to use, such as on the complete aggregated game level as well as at the channel and bet level. Indeed given the data resides in database tables and can be interrogated in any number of ways it would be feasible that multiple concurrent measurements could be performed over the data to provide a more accurate measurement that could pinpoint any areas of deficiency. Adopting a multi-layered approach will generally improve the likelihood that issues will be identified, including those that may have not been considered during pre-testing. The intended aim is to ensure appropriate levels of monitoring are used that do not mask potential lower level problems.
- 9.16** In multiparty arrangements where one B2B hosts a game on behalf of numerous B2Cs the aggregated data is usually held with the B2B and they are best placed to perform the measurements. It would make sense to have effective monitoring in place at the source, particularly as an individual B2C would only have access to the data for their customer base rather than the entire transactions for that game. However, this would not preclude the individual B2Cs from monitoring their own customer’s gaming activity. Rather, we would consider this collaborative approach to reflect good practice and many B2Cs already routinely do look for potential fraud and overpayments. In any case we would expect the individual party’s responsibilities to be defined in contractual arrangements.
- 9.17** The responses mostly rejected the need to display the actual RTP to players and we cannot see sufficient reason to require it at this stage. However where operators choose to do so voluntarily it must be accompanied by contextual information so as not to feed player myths about how games of chance work. For example, games marketed as ‘hot’ or ‘cold’ have the potential to mislead players into thinking certain products are ‘ripe’ for payout. We would expect licensees to avoid using terminology that might lead players to the view that the likelihood of payout can be predetermined.

9.18 Complaints from customers, particularly higher than normal levels for a given game, should be considered against the actual performance of games. It would not be sufficient to discount customer game fairness complaints on the basis that the games have been tested so they must therefore be fair. In many cases it is the customers who can highlight deficiencies so we would expect procedures to be in place to ensure escalated complaints are appropriately investigated to verify the player’s actual play against the game’s overall actual and theoretical play.

10 In-house development, testing and release – good practice

Consultation proposals

- 10.1** Allowing greater flexibility to make minor changes in-house without external retesting places more responsibility on the operator to ensure that adequate internal and independent testing is taking place. Section 6 of the current strategy emphasises key aspects of the development, testing and change control processes as providing evidence of good practice in games development, testing and release. We propose to retain the current specification of good practice set out in Section 6 and extend it to include further guidance on the change-management controls that licensed operators should have in place. The revised Section 6 of the updated strategy will form the basis of the annual games testing audit for licensees who develop, test and release gambling software. They will need to evidence that they have sufficient controls in place.
- 10.2** The good practice indicators cover a broad range of changes and system updates (eg changes to customer transaction records; game integration). We will therefore continue to require and expect *all* operators to adhere to the good practice indicators (Section 6 of the current strategy) and supply the information promptly if requested. The system controls set out in Section 6 of the testing strategy are likely to already be in place in well-run software development companies. They are also required as part of the ISO 27001 certification and so should be familiar to licensed operators. We propose that independent compliance assurance for game developers will be provided through annual audits conducted by one of our approved test houses (Section 11 below).

Consultation questions

Q20. To what extent do you agree or disagree with proposed changes to Section 6 of the testing strategy?

Q21. Do you have any further comments about the proposed amendments to Section 6?

Respondents’ views

- 10.3** The majority of responses received in relation to the proposed changes to Section 6 were supportive of the proposals. The changes were considered to be “proportionate”, in line with other jurisdictional requirements, and conducive to streamlining the testing requirements. Some respondents felt that the revised good practice descriptors would provide “enhanced understanding” of the Commission’s expectations while there were also requests to provide more detailed examples. A number of respondents indicated that the revised standards were in line with their existing controls and procedures. It was suggested that Section 6 provide further guidance in relation to “automated testing”, which reduces the reliance on staff input for certain stages of game development.

- 10.4** One respondent expressed concern at what was perceived to be the removal of requirements to separate development and testing responsibilities and to maintain testing and change control when migrating or upgrading software. It was also suggested that the standards be adopted to accommodate licensees that do not assign specific roles to staff (eg where individuals cover multiple development/testing functions) or where it was considered beneficial to allow all staff to have “read access” to platform code. In one case it was suggested that the Commission maintain a register of operators that meet good practice requirements, which would serve to provide assurance to operators on the status of certain suppliers/developers.

The Commission’s position

- 10.5** The revised good practice indicators will retain the need for separation between development and testing processes (see Table 2 of the consultation document) however we will amend it to cater for the agile software development methodology, which often puts testers and developers in the same team to perform their unique functions collaboratively as newer versions are developed. Whilst we accept that organisational structures will vary, we would expect licensees to adhere to the minimum requirements set out in Section 6 of the testing strategy. Adherence to Section 6 will form part of the annual games testing audit for those in scope.
- 10.6** We expect licensees to undertake their own due diligence with regards to ensuring games are tested to the required standards. We do not therefore think it would be appropriate or practical for the Commission to supply a list of operators that have declared adherence to the good practice indicators set out in Section 6.

11 Annual games testing audit

Consultation proposals

- 11.1** To retain assurance that games are appropriately tested and deployed in the live environment, we proposed that certain holders of gambling software, remote bingo, casino or virtual betting operating licences undergo an annual audit by one of our approved test houses. Licensees who update games will be expected to submit details of all minor updates in their annual audit. The audit will also confirm that licensed operators have adhered to required change controls; provide a snapshot of available games and confirm operators have in place effective RTP monitoring processes. In order to avoid all audits being conducted within a similar period, and therefore putting pressure on test houses, we propose to group operators into four separate pools and stagger the submission dates into quarterly blocks.
- 11.2** The consultation document proposed that where an operator does not develop or update games in-house, the annual audit will focus primarily on whether the operator has adhered to the required change controls (Section 6). We have since reviewed this position and will propose that the annual games testing audit requirement will apply only to certain holders of gambling software, remote bingo, casino or virtual betting operating licences that develop or update games. This will mean that it will mostly be limited to the game content aggregators and those who develop games, update them and procure the required pre-release external testing.
- 11.3** The consultation sought views on whether the revised testing strategy should specify the size of the sample to be used in audit. We propose this should be based on a sliding scale where the sample is determined by the volume of games that an operator has developed/updated.

Consultation questions

Q22. To what extent do you agree or disagree with our proposal to introduce an annual audit to monitor compliance with the testing requirements and good practice?

Q23. To what extent do you agree or disagree with our proposals about the scope of the annual audit?

Respondents' views

- 11.4** The proposal to introduce an annual games testing audit was broadly supported. Clarification was sought as to whether audits carried out in other jurisdictions would satisfy the Commission's requirements and exempt licensees from the new audit requirement. There was some concern that the new audit requirement would duplicate the existing annual security audit and it was queried whether both could be combined into a single audit. Clarification was also sought in a number of other areas including:
- whether the costs of the new audit aligned with the intended benefits for industry customers
 - whether a professional services firm could complete the B2C (non-technical) audit
 - whether the audit needed to be carried out on-site or remotely
 - If the Commission intends to provide a defined set of auditable measures (eg change management process)
 - how audit findings should be recorded and in what format
 - the Commission's expectations in dealing with "areas of improvement".
- 11.5** Some of the respondents sought clarification as to the scope of the audit, particularly in relation to the B2C audit. It was suggested that the scope of the audit and the sample of minor updates should be defined by the operator in conjunction with the test house, and that the Commission has the option to broaden the audit scope based on issues reported through key events. One respondent requested that the audit should not review compliance against ISO standards due to the financial burden on smaller companies. The requirement that test houses provide independent verification of games made available on websites was also queried. It was felt that the existing arrangement in which the Commission is notified prior to the release of new games satisfies this requirement, further the Commission is able to make reactive requests for licensees to submit a test reports if it is concerned about a particular game.
- 11.6** In general, it was considered that the audit should focus on those operators who are responsible for game testing and development. It was suggested that the audit should also focus on all game changes (ie not just those made to critical files) and the updates were classified according to level of risk. The Commission was asked to clarify the audit requirements in the event that testing is carried out by multiple test houses. It was felt that using a different test house for game testing and annual audit could prove difficult.
- 11.7** The proposal to stagger annual audit dates throughout the year was, overall, considered to be the most preferable approach. A number of respondents requested that the proposed two week audit submission window be extended to a period of four weeks to allow more time to resolve any unforeseen issues prior to submission. It was also suggested that licensees are given greater discretion to choose their submission pool so as to align their submission period with those of other jurisdictions. It was proposed that the submission period be aligned with the submission dates of regulatory returns and annual security audits. Respondents agreed that the test house could submit the annual audit on the operator's behalf, but that submission was ultimately the responsibility of the licensee. It was also proposed that an operator's first audit should cover 12 months *or* the period from which the requirement came into effect (which for the first pool of submissions will be less than 12 months).

The Commission's position

- 11.8** The requirement for an annual games testing audit will apply to licensees that hold a gambling software licence *and* a remote bingo, casino or virtual betting operating licence. Generally this will include those operators that have assumed responsibility for games testing (eg from a software supplier or content developer). Operators that do not hold a gambling software licence will be exempt from the annual games testing audit requirement. We will, however, expect all licensees to seek assurance that games and updates have been tested in accordance with the testing strategy prior to release. The scope of the audit has been refined and will apply to all licensees that meet the requirement. The audit must be carried out by a Commission approved test house and will:
- check a randomly selected sample of minor updates (to confirm that they did not require external testing)
 - confirm that licensed operators have adhered to required change controls (applicable elements as updated in Section 6 of the revised testing strategy, see Table 2 of the consultation document)
 - confirm the list of games made available to customers served in reliance of a Commission licence
 - confirm operators have in place effective RTP monitoring processes.
- 11.9** The audit will offer assurance that operators have adhered to the testing requirements and have sufficient performance monitoring controls in place. Experience from other jurisdictions has shown that these audits can effectively be conducted remotely by the test labs based on a combination of electronic change log review, source code comparison and remote login. In order to properly assess game updates it would be expected that the original test lab that performed the testing would check the updates as they will have a better understanding of the game and its code. Where an operator uses multiple test houses multiple audits will be required – the sample of games tested in each will be a matter for the licensee to determine in conjunction with the test house.
- 11.10** The requirements set out above set the minimum scope of the audit. We might broaden the scope in certain cases to address specific concerns (eg evidence of non-compliance with other aspects of the RTS/LCCP). Licensees might also request that the test house consider additional areas not set out within the minimum audit scope. Where issues are identified by the audit these may be corrected by operators, however the identified and corrected issues must still be included in the final audit report to the Commission. We would expect the audit report to be accompanied with a pro-forma detailing the audit's findings (eg a tick-box list to indicate areas that have passed/failed). We are considering the merits of publishing a template pro-forma for test houses to adopt.
- 11.11** The audit submission dates will be staggered in order to avoid all audits being performed within a similar period and therefore putting pressure on test houses. We are considering the practical implications of enabling licensees to choose their preferred submission pool and will contact those licence holders that will fall within scope for the annual audit in due course. However, we cannot guarantee the allocation of the preferred audit period if one particular submission pool is oversubscribed.
- 11.12** There are no plans to align the annual games test audit requirements with audits undertaken in other jurisdictions, though this has been noted this as an area for future development. We may be able to accommodate certain requests to allow one audit to cover multiple jurisdictions requirements, though would expect licensees to make mutual arrangements to facilitate this given that games offered in each jurisdiction might differ.

- 11.13** The ISO 27001 information security standards as contained in the RTS and audited under the annual security audit focus on complete gambling systems and operations in order to assess an organisation's Information Security Management System (ISMS). Whereas the new games testing audit focuses on compliance with the Section 6 best practice indicators in the development, testing and release of gambling software and can only be carried out by approved test houses that also performed the original game testing and understand the specialised area of games testing. The games testing audit also assesses the RTP performance monitoring processes. While there are some similarities between the two audits they are focused on quite different areas and performed by auditors with a different skillset (testing games of chance is quite distinct from auditing an organisation's ISMS) and for this reason the one audit couldn't be used for both purposes. However, we are aware that many test houses offer separate information security audit services and could therefore conduct both audits in the one visit. The introduction of the games testing audit will enable operators to launch minor updates without the need for external testing. We therefore consider, and the industry has confirmed, the net effect to be a streamlining of the existing requirements and a reduction in regulatory burden.
- 11.14** There are no current plans to align the annual games testing audit and annual security audit submission dates. However, we intend to keep this under review as part of a wider piece of work in which will consider the Commission's information requirements and submission dates.
- 11.15** Submissions will be made via the eServices portal and development work is taking place to ensure our systems can effectively manage the submission process. Completion of this work is scheduled for the first half of 2017 and we will provide licensees with sufficient notice of the planned implementation date. The current dispensation for minor updates was implemented in August 2015 on the basis that licensees maintained sufficient change log documentation, which will be independently reviewed when the annual games testing audits take effect. We therefore expect the first round of audits to cover a period of 12 months regardless of the date that the requirement comes into force. We have, however, agreed to extend the submission window following the end of the audit to four weeks (from the proposed two week period).
- 11.16** Whilst we will accept reports submitted directly by the test house, we agree that it is the licensed operator's responsibility to ensure that the report is submitted to us within the agreed timescales.

12 Regulatory impact

Consultation question

Q25. Are there any other potential regulatory impacts of the proposals in this document that we have not identified?

Respondents' views

- 12.1** The following points were raised in relation to the proposed eServices development work:
- The eServices solution should include suitable access privileges for users so that it is possible for an operator to limit who within their organisation can amend the records. This would also help licensees to better track changes made to eServices records
 - It is expected that the solution will have strong user access management, given the commercial sensitivity of the data

- The industry should be engaged as part of the development process to ensure that the system delivers the desired outcomes for both the Commission and licensees
- The eServices solution will help with the efficiency of this audit process.

12.2 There was a request that we develop clear parameters for an annual audit that can be accepted by multiple jurisdictions. One licensee suggested that the annual audit include holders of a gambling software licence on the basis that changes rolled out by software suppliers could contain bugs that affect game performance. In relation to RTP monitoring, one operator suggested that the Commission provide further evidence as to how the proposals would afford greater protection to customers (and the impact on licensees).

12.3 There was a consistency error in the consultation document in relation to the audit submission deadline. Table 4 (*Audit submission deadlines*) required the annual games testing audit to be submitted on the second Monday of the month whilst paragraph 3.44 stated that *there will be a period of four weeks from the end of the submission date to complete and submit the annual audit to [the Commission]*.

The Commission's position

12.4 We note the points made in relation to the eServices development and would like to trial new eServices system with a small number of operators. We will give plenty of notice prior to launching the new facility – which we expect will be in the first half of 2017.

12.5 As highlighted above, there are no current plans to align the annual games test audit requirements with audits undertaken in other jurisdictions. The audit will apply to licensees that hold a gambling software licence in addition to a remote bingo, casino or virtual betting operating licences. This will generally be those operators that have accepted responsibility for testing on behalf of a third party supplier.

12.6 The added consumer protection afforded by RTP monitoring was outlined in the consultation proposals and section 9 of this response. However to summarise, RTP monitoring is seen as something that should already be performed however recent incidents in the field demonstrate there are deficiencies leaving players exposed to unfair games for extended periods. Erroneous games will occasionally evade testing and the additional step of monitoring the actual performance of games should improve the detection of such errors in a timely manner. The imposition on operators should be minimal

- it should already be in place, this proposal makes the level of player protection consistent between operators;
- the data required to perform this measurement resides in central repositories that are easy to analyse;
- many of our licensees will also operate in other jurisdictions, some of which already have this as a formal requirement.

12.7 We have noted the typo made in relation to paragraph 3.44 of the consultation document. As set out in paragraph 12.3 above, the submission period has been extended to four weeks (from the proposed two week period).

13 Implementation timetable

13.1 The *Licence conditions and codes of practice* require that licensees must comply with the Commission's technical standards and with requirements set by the Commission relating to the timing and procedure for testing. The majority of changes to the testing strategy reinforce existing requirements or make explicit measures that will already exist within well-run businesses. Indeed, the proposals concerning major/minor updates were introduced in

August 2015 when we granted a temporary dispensation to external retesting for minor game updates pending the outcome of this consultation. Compliance with the procedures for testing as outlined in the updated testing strategy will be expected for any new products or major updates to existing products.

- 13.2** We accept that implementing processes to monitor live RTP (and update any contractual arrangements as required) may take some time where this practice has not been implemented. We will therefore require the processes be in place for RTP monitoring by 1 September 2016. The regular submission of remote games information (RGI) and the annual games testing audit will be implemented in the first half of 2017 to coincide with completion of the necessary IT development work. In the meantime licensees will be expected to maintain and make available upon request sufficient RGI records and change log documentation, which will be independently reviewed when annual games testing audits take effect.
- 13.3** There are a number of technical and logistical issues that will need to be resolved prior to implementation of the annual games testing audit, such as grouping licensees into one of four submission pools. The remote gaming sector has a complex structure with numerous businesses often holding multiple trading names and gaming platforms. There has also been a high level of mergers and acquisitions in the sector, which alters the landscape. We will therefore be writing out to operators that we expect will fall within scope of the annual audit requirement. It is anticipated that further industry engagement during the summer will enable us to refine our list of licensees that fall into scope.

Table 1- Implementation dates

Requirement	Implementation date
RTP monitoring (eg independent channel monitoring, monitoring of individual bet-levels)	1 September 2016
Additional areas within Section 6	1 September 2016
Annual games testing audit and resumption of remote games information regular submissions*	First half 2017, operators will be written to in advance.
All other requirements	Immediately.

* Please note that we may be requesting RGI records and change log documentation on an ad hoc basis to inform us of the market.

14 List of respondents

List of respondents	Category
1 Bell-Fruit Group Limited	Licensed operator
2 Betfair	Licensed operator
3 Betway Limited	Licensed operator
4 ElectraWorks Limited (Bwin)	Licensed operator
5 eCOGRA (eGaming Compliance Services Limited)	Test house
6 Edict egaming GmbH	Licensed operator
7 Gala Coral Group	Licensed operator
8 GLI	Test house
9 Greentube Alderney Ltd.	Licensed operator
10 High 5 Games, LLC	Licensed operator
11 InTouch Games Ltd.	Licensed operator
12 NetEnt	Licensed operator
13 NMI Metrology & Gaming Ltd	Test house
14 Paddy Power Betfair	Licensed operator
15 Playtech plc	Licensed operator
16 Remote Gambling Association	Trade association
17 Scientific Games Corporation	Licensed operator
18 SQS Group Ltd	Test house
19 Tombola (International) Plc	Licensed operator
20 William Hill	Licensed operator

Gambling Commission April 2016

The Gambling Commission regulates gambling in the public interest. It does so by keeping crime out of gambling, by ensuring that gambling is conducted fairly and openly, and by protecting children and vulnerable people from being harmed or exploited by gambling. The Commission also provides independent advice to government on gambling in Britain.

For further information or to register your interest in the Commission please visit our website at: www.gamblingcommission.gov.uk

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