



Augmented Reality (AR) Advertising Measurement Guidelines 1.0

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The growing adoption of AR advertising lacks standardized measurement practices, creating challenges such as fragmented data interpretation, inaccurate performance assessment, and limited cross-platform measurement. To address these issues and foster industry growth, the industry must collaborate to establish consistent AR ad measurement guidelines.

These guidelines have been developed by the IAB AR Advertising Measurement Guidelines Task Force, a joint effort between the Interactive Advertising Bureau (IAB) and the Media Rating Council (MRC).

Objective of the AR Advertising Measurement Guidelines Task Force:

The core mission of the IAB Augmented Reality (AR) Advertising Measurement Guidelines Task Force, operating under the IAB Experience Center, is to establish and release comprehensive measurement guidelines for augmented reality advertising. These guidelines aim to create a tailored measurement framework that can be embraced by both advertisers and publishers, specifically for AR ads within digital environments.

Company Participants

Athletic Greens	Gamesight	Oracle Advertising	The Weather
Cubiq	GroupM US	Pixelate	Company
DeepAR.ai	Integral Ad Science	Publicis Media	UB Media (Ulta Beauty)
Dow Jones & Company (Wall Street Journal)	Magna Global	Smaato	Uber
Epsilon	Monster Energy	Snap Inc.	
	NBCUniversal	SuperAwesome	
	Niantic	TelevisaUnivision	

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All references to measurement standards and guidelines in this document are available at <https://mediaratingcouncil.org/standards-and-guidelines>

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1. Scope and Applicability of These Guidelines

The Augmented Reality (AR) Advertising Measurement Guidelines are intended to cover digital ad activity associated with world-facing, self-facing, and AR filter (pre-capture and post-capture) experiences in digital environments (including social media platforms, in-game and e-commerce in desktop web AR, mobile web, and in-app operating environments). This includes applicable devices such as desktop/PC, mobile (smartphone, tablet, e-reader, etc.), wearables, and heads-up displays (HUD). Other emerging devices (such as smart mirrors, interactive digital displays, projectors, etc.) are not specifically considered in these guidelines, but may be considered in future versions.

These guidelines cover AR ad placements served by an ad server with a corresponding ad session and excludes advergames or branded experiences.

These guidelines cover AR formats including:

- Rewarded AR ads
- Virtual try-ons
- Dynamic experiences masks
- Interactive world views
- Interactive 3D objects
- Portals/gateways
- Static filters

This document does not cover fully immersive virtual reality (VR) experiences nor measurement of non-digital ad activity related to packaging, print/static placements or QR codes, or out-of-home (OOH) placements prior to digital device interaction, but do cover digital portal/gateway activity after exposure to such placements using included digital devices. Subsequent guidelines may address these areas.

This document is principally applicable to those organizations involved in the AR industry, and is intended as a guide to accepted practices, as developed by IAB and MRC. In addition, AR advertising planners and buyers can use this document to assist in determining the quality of measurement.

A Note on Materiality: Matters in this document which reference “significant” or “material” are generally considered to meet this threshold when they meet or exceed 5% of reported activity—therefore, items in question that meet or exceed 5% (individually or in aggregate) are considered material. For extremely high volume campaigns, thresholds can be lowered as individual entity impact may be significant at lower than 5%—auditors and measurement entities shall discuss exceptions to the 5% threshold during the audit process and base these judgments on objective criteria.

The general 5% threshold specified above may be modified by a measurement organization in select unusual circumstances (when supported by empirical evidence and judgment), but documentation must be retained by the measurement organization and available to auditors. Additionally, measurement organizations may use relative materiality thresholds (5%) in conjunction with absolute dollar values (empirically supported) or alternative statistical measures such as standard deviation to further reduce instances of classifying statistically insignificant matters as material.

2. Glossary

AR Game: A playable AR experience such as a mini-game.

AR Ad Impression (AR Impression): The measurement of responses from an ad delivery system to an ad request, which is filtered for invalid traffic and is recorded at a point as late as possible in the process of delivery of the creative. The ad must be loaded within an AR session and at minimum begin to render in order to count it as a valid ad Impression.

AR Measurement Organization: An organization responsible for measuring and reporting AR ad and media activity such as a platform or third party.

AR Session: Measured from the start of the AR experience (installed if applicable, open, and initialized with opt-in camera enabled) to the end-time of the experience (when camera is disabled or the ad is closed), as long as the measurement organization does not encounter inactivity (idle time) exceeding predetermined thresholds.

AR Viewable Impression: The measurement of an ad when greater than or equal to 50% of the pixels (intended creative) in the advertisement were visible from the user's perspective or on the device screen on a fully downloaded (where necessary), opened, initialized application or software, and with opt-in camera enabled on the viewable space of the device for at least one continuous second post ad render for display and two continuous seconds post ad render for video.

Click-To-Play: A feature that requires a click on an ad before that ad is played.

Desktop Web AR: A web technology that allows AR functionality within a web browser.

Dynamic Experience Mask: An AR experience where a dynamic (interactable or able to be modified by a trigger action or event) AR element or effect is applied to a user's self-facing view or face.

Engaged Duration: The time or duration where the user is actively engaging or "playing" with AR elements after a trigger action or event occurs.

Engaged Rate: The number of impressions or viewable impressions where a trigger action or event occurred.

Engaged-Through Conversion: When a user engages or interacts with an ad as measured by a trigger action or event and later converts as a direct result.

Heads-Up Display (HUD): Any transparent display that presents data without requiring users to look away from their usual viewpoints.

Interactive 3D Object: An interactive real-time 3D graphics experience representing an object, character, or environment.

Portals/Gateways: A virtual space that can be viewed in an augmented reality environment.

Rewarded AR Ads: AR ad experiences which use a camera to immerse users within branded content in the real-world around them.

Self/Face Effect: An AR experience where a user’s self-facing view or face can be modified in some way with AR elements or effects. This can be static or dynamic.

Self-Facing Camera or View (Self-Facing View): A camera experience which opens facing the user and superimposes an AR image on the user’s face and/or surroundings.

Static Filter: An AR experience where a static (non-dynamic) AR element or effect is applied to a user’s self-facing view or face.

Trigger: Some action or event that initiates an AR experience, such as (but not limited to) tapping or dragging an area of the user’s camera, moving the user’s camera to a specific area of their environment, face, or body, an expression or movement, or environmental conditions such as the weather or time of day.

Virtual Try-Ons: A product or creative can be applied to part of a user’s body or face.

Visualization: A product or creative can be visualized as part of a user’s world view.

Wearables: Devices that project an overlay of graphics onto the environment around a user through glasses or a headset.

World Effect: A user’s world view can be modified in some way with AR elements or effects.

World-Facing Camera or View (World View): A camera experience which superimposes an AR image within a user’s environment.

3. Measurement Definitions and Other Metrics

3.1. Ad Impressions

An AR advertising impression is the measurement of an advertising occurrence within an AR experience (as part of an AR session as defined below) delivered to a client-user (device). The advertising occurrences should meet or exceed the minimum requirements summarized below and be filtered for invalid activity (discussed later in this document) where applicable.

Note: Static display and video ads that do not have AR aspects or features, but are present in AR experiences, can be measured discretely and should be measured in a manner consistent with *Display and Video Impression Measurement Guidelines*, **but distinguished from AR impressions**.

The physical attributes (ad unit, placement dimensions, format, and/or position) of the advertisement and the placement of the advertisement within the AR experience should be fully disclosed to the extent possible on a standardized basis by the measurement organization as part of initiating the campaign with the advertising agency or buyer.

The measurement organization should have sufficient business rules and controls to ensure there is no significant known faulting information that would affect measurement and to determine:

- That the measurement application within or external to the AR experience (if separate) or hardware was functioning as designed during any measured AR ad session (i.e., no significant bugs or errors that would materially impact or inhibit measurement were identified), and
- That the AR experience was functioning as designed during any measured session (i.e., no significant bugs or errors that would materially impact user experience as well as rendering of ads were identified).

AR transaction records, which contain evidence of advertising delivery, can be derived and transmitted to the measurement organization: (1) on a real-time basis during the AR experience, (2) in batched groups that are transmitted periodically during an AR experience, or (3) first stored during offline AR experiences and later transmitted during subsequent online sessions of the applicable user device, if appropriate authentication and minimum timing from the experience to data collection is present. To consider an ad impression valid, the timing of the delivered ad must be included within the campaign reporting period considering the predetermined billing cycle.

An AR session is measured from the start of the AR experience (installed if applicable, open and initialized with opt-in camera enabled) to the end time of the experience (when camera is disabled or the ad is closed), as long as the measurement organization does not encounter inactivity (idle time) exceeding predetermined thresholds discussed further below, which will terminate the session. Sessions deemed to meet predetermined inactivity thresholds should be excluded from additional contributions to measurement such as impressions, viewability, completion metrics, etc. **AR impressions and subsequent**

AR ad activity measurement must occur within an AR session. Ad activity outside an AR session is not considered AR ad activity. Measurement organizations should clearly define and track relevant events with timestamps to support AR session measurement and determination such as the following (as examples):

- Start camera
- Stop camera
- User activity start
- User activity stop
- User interaction start
- User interaction stop

These guidelines encourage the adoption of features by AR publisher application developers to allow for activity information to be provided to ad contexts during insertion such as via the IAB Tech Lab's Open Measurement Software Development Kit (OMSDK).

The measurement organization should have the ability to segregate AR impressions for reporting by individual ad units upon customer request. Ads which consist of multiple connected elements (e.g., where the same ad is duplicated on multiple surfaces) can be considered as one unit for purposes of measurement, where supported, however distinct ad units should be measured and reported separately. Reporting impressions based on the segregation of ad units is not required under these guidelines. However, this ability is likely to become increasingly important in the analysis of the performance of event-based ads and creative segmentation in reporting is encouraged. Segregated reporting of ad activity by platform or environment and format is required. To that end, these guidelines encourage further industry efforts to standardize consistent inventory type signals to differentiate AR placements in bid requests and measurers are encouraged to consider and use these signals in reporting where available.

The following details are key components of the ad impression measurement guidelines:

3.1.1. General Impression Counting

An AR impression is the measurement of responses from an ad delivery system to an ad request, which is filtered for invalid traffic and is recorded at a point as late as possible in the process of delivery of the creative. **The ad must be loaded within an AR session (as defined above)** and at minimum begin to render in order to count it as a valid ad Impression.

In the context of the guidance above, "loaded" means the logical creative file has been transmitted and received at the client-side (user device). "Begin-to-render" refers to when the asset has loaded in the AR session and the client has attached the ad creative to the screen/window for display and begun processing the ad for output.

In those instances where an event within an AR session must occur before an ad can be delivered (i.e., a user must interact with an object in order for the ad to be delivered), measurement of such events must occur first in order for a valid impression to be counted. Measurement of such events

should consider the requirements in the *Click Measurement Guidelines*. This is distinct from general AR ad placement where a user must only initiate an AR session for an ad request to be generated or for an ad to be served.

A valid AR impression may only be counted when an ad counter receives and responds to a request for a tracking asset from a client. The count must happen after the initiation of retrieval of underlying content and only when ad content has been loaded and at minimum begins to render. Ads that are not confirmed as meeting these requirements (do not load and begin to render) cannot be counted as AR impressions.

The measurement organization should have sufficient controls to determine that:

- The AR application or software itself (or measurement assets within it) was functioning as intended during the session by examining data received for completeness or signs of corruption. Sessions and ad impression metrics associated with “faulted” conditions (situations of functionality issues with the application, errors, or non-working conditions that materially impact measurement) should be tracked and segregated from fully functioning sessions and impression metrics.

There will necessarily be some slight differences among measurers in the precise moment when rendering is measured as a qualification for ad impressions. The requirements above mean that the ad content must have been loaded at the client-side and at minimum have begun to render into the user interface or device such that an opportunity for the ad to be visible has been created (also referred to as ad injection or execution). Measurement of begin to render should include logical components necessary to display the ad, but does not necessarily include logical elements that are not essential (such as other tracking elements). It does not require any portion of the ad to be visible or displayed on screen.

There may be certain situations where load and render events are captured, but an ad has not actually begun to render (due to measurement artifacts separate from invalid traffic (IVT)). Measurement organizations should disclose this as a general limitation and periodically study the incidence and the impact of this.

Alternatively, measurement organizations may choose to meet the begin to render requirements for AR impressions by measuring the point at which an ad is displayed or partially visible or a certain time it is visible. It should be noted that this is a conservative approach that may understate the number of ad impressions actually rendered. Likewise, measurement organizations should disclose this as a general limitation and periodically study the incidence and the impact of this.

3.1.2. Video Ad Impression Counting

In AR experiences, there may be video ads without AR aspects or features, video ads with AR aspects, or features for the entirety of the video and video ads that do not have AR aspects or features for a portion of the video and do have these aspects or features for other portions. These placements should be distinguished in measurement and reporting.

For measurement of any of the above video ads in AR experiences, the requirements within the *Digital Video Impression Measurement Guidelines* should be met. This includes the begin to render counting requirements discussed above for AR impressions, and the video-specific requirement whereby a video impression must be counted after the initiation of the ad stream, post-buffering, as opposed to the linked digital video content itself. Specifically, measurement should not occur when the buffer is initiated; it should occur when the ad itself begins to render on the user's screen (begins to play). For AR environments, as video renders in a succession of frames that are painted to a loaded part of the AR environment or user interface (UI), the video impression requirement is met by determining that the first frame of the video creative has been decoded and attached to a loaded part of the AR environment or UI.

Further, in order to count an impression for AR video ads, these must be part of a valid AR session as defined above, with confirmation that AR aspects or features have been enabled or begun.

3.1.3. Other Considerations for Impression Counting

Ad Exposures During Inactivity (Idle) Periods

An AR session is measured from the start of the AR experience (installed if applicable, open, and initialized with opt-in camera enabled) to the end time of the experience (when camera is disabled or the ad is closed, as long as the measurement organization does not encounter inactivity (idle time) exceeding predetermined thresholds, which will terminate the session. Sessions deemed to meet predetermined inactivity thresholds should be excluded from additional contributions to measurement such as impressions, viewability, completion metrics, etc. **AR impressions and subsequent AR ad activity measurement must occur within an AR session (as defined above). Ad activity outside an AR session is not considered AR ad activity.** Measurement organizations should clearly define and track relevant events with timestamps to support AR session measurement and determination such as the following (as examples):

- Start camera
- Stop camera
- User activity start
- User activity stop
- User interaction start
- User interaction stop

These guidelines encourage the adoption of features by AR publisher application developers to allow for activity information to be provided to ad contexts during insertion such as via the IAB Tech Lab's Open Measurement Software Development Kit (OMSDK).

In all cases, inactivity rules applied must be empirically supported, documented, and disclosed as well as periodically studied and adjusted where applicable. These inactivity rules may vary based on the type of AR experience; for instance, some AR experiences are designed for long periods of inactivity (such as experiences that involve waiting rooms or where AR experience objectives

may warrant legitimate inactivity whereby a user is still present), in which case a longer inactivity threshold may be more appropriate. Ad activity inclusive of impressions should not be included during AR sessions that exceed predefined inactivity thresholds (these should not be included and removed as invalid traffic but excluded altogether).

Further, inactivity may have differing levels of impact depending on ad type. For instance, AR ads that also require a user to move or interact with them to appear may not be generated when a user is inactive and as a result, the impact of inactivity on static ad measurement in these instances may be diminished. However, AR ads that may be generated or appear without user activity may be more materially impacted by periods of inactivity (i.e., dynamic ad placements). Measurement organizations should consider studying the impact of inactivity by ad type and incorporate this into the inactivity thresholds applied.

The AR advertising environment generally allows for a greater range of options for determining user activity than are available in traditional online environments, and these should be leveraged in making inactivity determinations. Inactivity rules may be based on application idle, which is generally defined by the application developer based on time since last interaction and can result in an application running in the background or being inactive. Device idle or power state should also be considered for inactivity rules and may be user configurable.

Presence of Audio

As current technological limitations make it difficult for a measurer to detect the presence of unmuted audio in all situations (while player audio may be more readily detectable, device or hardware muting detection may present challenges), detection of audio is not currently a requirement for AR impression measurement. However, we encourage the development of a technological or other solution to device or hardware limitations so that audio may be considered. Also, we strongly encourage, but do not currently require, that the presence of audio be a consideration in measuring duration in those situations where it is feasible to do so today and further encourage measurement and reporting of other audio-based metrics (such as average audible duration or audible completion).

Measurement organizations are encouraged to separately report duration that is audible (non-mute or non-zero) for device/hardware volume. Measurement organizations should separately report and consider duration that is audible for player volume where known. As part of the consideration of audio in digital video measurement, measurement organizations are encouraged to study the further development of technology or methodology to better determine device audio state and incorporate this into measurement.

In addition, there may be emerging aspects of audio within AR experiences such as “audio bugs” or other audio creatives with AR components that will require further study and additional guidance with future iterations of these guidelines. For the time being, audio creatives in AR experiences should be measured in a manner consistent with the Digital Audio Measurement Standards where applicable.

Other Considerations From Existing Guidance

Other existing key concepts and guidance around measurement of Impressions should be considered and followed where applicable, as detailed in previously issued measurement guidelines. These include:

- Client-initiated counting
- Pre-fetch and pre-render treatment (not valid ad impressions)
- Auto-refresh
- Progressive download and connection speed considerations
- Measurement and reporting of auto-play ads
- Cache busting techniques
- Ad blocking
- Ad stitching or server-side ad insertion (SSAI)
- Disclosure of material internal traffic

3.2. Viewability

AR viewable impressions are counted when the following criteria are met (**within an AR session as defined above**):

- Pixel Requirement:
 - Greater than or equal to 50% of the pixels (intended creative; see additional note below) in the advertisement were visible from the user's perspective or on the device screen;
 - On a fully downloaded (where necessary), opened, initialized application or software; and
 - With opt-in camera enabled on the viewable space of the device.
- Time Requirement: The time the pixel requirement is met was greater than or equal to one continuous second for display or static creatives inclusive of AR ads, post ad render (impression measurement).

Note on pixels: The term "pixel" is used above and throughout this Guideline for consistency with existing viewability terminology across various digital formats. However, for the explicit purpose of AR, it means the intended creative or the creative element with respect to creative dimensions and device/screen resolution. In situations where the AR creative is 100% onscreen by design (such as a filter or lens), if appropriately measured and established, this can satisfy the pixel requirement, but the time requirement must still be met to establish the viewable condition.

In addition, viewable determination also requires the following considerations:

- Minimum ad size
- Ad angle relative to screen
- Occlusion determination
- Impaired visibility

Furthermore, there may be instances within an AR session where a user comes across a branded object or element, where the brand's logo may be placed on one side or one area or subset of the object and the measurement provider or buyer seeks to measure viewability for a specific aspect or area of the creative. **In these situations, viewability measurement can be based on the area designated as the "area of interest" and standard viewability requirements as described above should be followed for that specific area. The area of interest can be established by the platform based on empirical support and consistently applied as well as disclosed to the measurement user/buyer. However, ad sizes should be considered and must be reasonable (with respect to the ability to identify the ad) and standardized to the extent possible. Small, barely visible or invisible ad delivery or illogical (non-industry standard) ad sizes such as 0x0 and 1x1, should be considered by measurement organizations as part of general invalid traffic (GIVT) filtration processes, as described below.**

The above actions—determining pixel requirement, determining time requirement—should be performed in that specific order when measuring viewability of an ad. In other words, satisfying the minimum pixel requirement should precede the measurement of the time duration. For example, the clock starts on determining whether the ad meets the one continuous second time requirement only when the ad is determined to have met the 50% pixel threshold. For counting AR viewable impressions, the above minimum criteria should be met along with the additional AR considerations for viewability measurement as further discussed below.

The time requirement for viewability determination is not necessarily the first second of the ad; any unduplicated content of the ad comprising one (1) continuous second qualifies in this regard. If an ad becomes non-visible (falls below the on-screen pixel criteria) before the viewability criteria is met, the time counter starts again once visibility is reestablished (time is not cumulative for initial viewability determination) but can be cumulative for viewable time once viewability criteria are fully met.

Note: In situations where custom time or pixel thresholds above the minimum criteria are used in classifying an impression as viewable, such parameters should be clearly disclosed and labeled in reporting (including a means to note user configured parameters in reporting). Custom viewability reporting above minimum thresholds must be in addition to standard viewability reporting, not in lieu of it. Impressions that do not meet the minimum time and/or pixel thresholds herein must not be reported as viewable impressions.

Other Notes Related to Viewable Impression Measurement

1. In all cases a viewable impression must also meet pre existing criteria for a valid impression, for example, counted based on client-initiated signals, filtered for invalid activity, etc. These are over and above the viewable criteria. In other words, a viewable impression cannot be reported without a corresponding impression first being measured and reported.
2. Each valid viewable impression originates from a valid impression. In no case should viewable impressions exceed rendered impressions counted on a campaign. There can never be a qualified counted viewable impression that does not tie to a valid impression and there is a maximum of a one-to-one correspondence between impressions and viewable impressions. In other words, there cannot be more viewable impressions reported than impressions.
3. Once an ad qualifies as a valid viewable impression, it should only be counted as one viewable impression within that user session, regardless of subsequent exposures. It should not be counted again as an additional viewable impression, even if the user moves completely away from the ad and then moves back to it so it again qualifies as viewable. In other words, there cannot be multiple viewable impressions reported for a single impression. This additional exposure may contribute to the total time the ad is in view, but only the original viewable impression should be counted. Replays for the same user may be reported as a separate metric (while replays are not required to be reported, where reported they must be reported separately).

3.2.1. User Interaction Considerations

If the measurer determines that there is a strong AR user interaction with the ad, then the ad may optionally be counted as viewable even if it does not meet the pixel and time criteria noted above. In this context, a legitimate tap or click within an ad (i.e., it satisfies the requirements for counting a click, based on the *Click Measurement Guidelines*, may constitute a “strong user interaction” that would result in a mobile viewable impression (given the nature of mobile environments which may involve more frequent and inadvertent interaction, clicks or taps to minimize or close ads as a proxy for viewability should be supported empirically); but a swipe alone (for example, a swipe for horizontal or vertical scroll in a feed environment), without compelling empirical support of user intent, generally would not be considered a strong user interaction with the ad that would serve as a proxy for viewability. A swipe or flip within the space of an ad unit for certain rich media and larger format or full-screen creatives may represent strong user interaction when empirically defensible (demonstrating support for user intent to interact) as a reasonable proxy for viewability by the measurer.

A tap or click that initiates a click-to-play video ad would not, in itself, be considered a user interaction that satisfies this criteria, as a valid video impression should not be counted as served until after the initiation of the stream, post-buffering (measurement should not occur when the buffer is initiated, rather measurement should occur when the ad itself begins to appear on the user’s browser as specified by *Click Measurement Guidelines*). Only subsequent clicks after initiation of a click-to-play video are eligible for consideration of user interaction for purposes of viewability measurement.

Specific user interactions that will satisfy the requirement of a “strong user interaction” should be appropriate to the advertisement and the environment in which it appears, they should be empirically defensible as reasonable proxies for viewability, and each type of qualifying user interaction should be fully disclosed by the measurement organization. In addition, the number of viewable impressions that result from application of a user interaction rule (rather than the 50% of pixels/one continuous second rule) should be segregated for reporting purposes.

3.2.2. Requirements for AR Video Advertising Viewable Impressions

A video or dynamic ad that meets the criteria of 50% of the ad’s pixels on an in-focus (visible space of ad) fully downloaded (where necessary), opened, initialized application or software, with opt-in camera enabled on the viewable space of the device can be counted as a viewable video (or dynamic ad) impression if it meets the following time criterion (**within an AR session as defined above**):

Video or Dynamic Ad Time Requirement: To qualify for counting as a viewable video ad impression, two continuous seconds of the video advertisement must play, meeting the same pixel requirement necessary for a viewable static or display ad. This required time is not necessarily the first two seconds of the video ad; any unduplicated content of the ad comprising two continuous seconds qualifies in this regard.

The time requirement for viewability determination is not necessarily the first two seconds of the ad; any unduplicated content of the ad comprising two continuous seconds qualifies in this regard. If an ad becomes non-visible (falls below the onscreen pixel criteria) before the viewability criteria is met, the time counter starts again once visibility is reestablished (time is not cumulative for initial viewability determination) but can be cumulative for viewable time once viewability criteria are fully met.

3.2.3. Minimum Ad Size

The ad must be a minimum of 1.5% of screen coverage to be considered viewable. The 1.5% should represent the total coverage of the visible portion of the ad relative to the screen real estate. In other words, an ad that is 2% of a user’s screen that is 50% in view (or where 50% of the ad’s real estate is obstructed) would not be considered meeting the 1.5% minimum requirement as only it only represents 1% of the screen real estate. **This threshold was based on requirements stipulated as part of the *Intrinsic In-Game Measurement Guidelines* and is applied herein for consistency. Measurement organizations may use alternative, more conservative, thresholds with periodic empirical support and clear disclosure to measurement users. Future iterations of these guidelines may involve further study and adjustment of this threshold as measurement of AR specific ad types evolves.**

If the scaling of an ad (including responsive ads) is determined to be material in nature, the pixel percentage calculation used to determine the ad’s viewable status should be based on the pixel (intended creative) area of the ad after scaling. Further study is encouraged to determine what is a minimally acceptable percentage of original display size that is appropriate for acceptable legibility

and viewability qualification for future iterations of these guidelines. Sampling of pixels making up an ad to extrapolate viewable conditions is permitted with empirical support to validate that these approaches maintain measurement accuracy.

3.2.4. Ad Angle Relative to Screen

In instances where the ad angle can be measured for X, Y, and Z coordinates discretely, an ad angle no greater than 55 degrees for any one coordinate (on an absolute basis) relative to the screen is recommended in order for a viewable impression to be valid, although measurement organizations may use different thresholds as long as those are empirically supported. When measuring an angle, measurement should be conducted from the most center point of the portion of the ad that is on the screen or the center of the surface that is being measured, with zero degrees representing an ad facing the screen, 180 degrees representing an ad facing away from the screen, and 90 degrees representing a state in between. This threshold was based on requirements stipulated as part of the *Intrinsic In-Game Measurement Guidelines* and is applied here for consistency.

However, it's important to note that a critical objective of measuring ad angle is to determine the extent to which the ad appears distorted or compressed to the user, and whether this distortion or compression affects the opportunity to see the creative. The extent of this distortion or compression may vary depending on the environment or creative type, and measurement organizations may find further complexity in measuring ad angle for all coordinates.

For example, an ad angle of less than 55 degrees relative to the screen for more than one axis at a time (i.e., 50-degree angle on the X and Y coordinates) may result in significant distortion or compression that affects the opportunity to see the creative. Due to these potential variables, measurement organizations may set different thresholds based on a combination of axes to determine the point in which the ad angle, or ad distortion or compression, have reached a point where the creative no longer has the opportunity to be seen. Any differential thresholds set to determine this must be empirically supported and documented as well as periodically studied and adjusted where applicable. Future updates of these guidelines may seek to standardize more complex and discrete combined ad angle and rotational minimum requirements based on further study.

Additionally, measurement organizations should differentially consider non-uniform or uneven ad surfaces/objects for calculating angle and determining distortion, as the angle may change depending on the point or perspective of measurement. In these instances, measurement providers may measure angle on an uneven surface/object by separating the ad into approximate pieces and measuring each piece separately, although other approaches may be permissible as long as they are empirically supported and documented.

Finally, measurement organizations should also consider prevailing industry guidance related to out of home (OOH) measurement related to ad angle and opportunity to see including the exposure zone requirements of the *MRC Digital Place-Based Audience Measurement Standards*.

3.2.5. Occlusion Determination

Occlusion represents an instance where the AR ad unit is blocked from view either totally or partially during an AR session and therefore the user's opportunity to see the creative is diminished. This includes UI occlusion. Occlusion involves blocking a portion or all of a creative by another object or system alert and is distinct from considering the area of a creative that is onscreen and visible (pixels).

Measurement organizations are encouraged to specifically identify and segregate viewability diagnostic metrics such as viewable and non-viewable conditions due to occlusion for reporting purposes. Additionally, occlusion must be considered in the measurement of viewable impressions and ads that are determined to be occluded to the point where less than 50% of the creative is visible should not be counted as viewable. Use of occlusion rules, specific rules where used and related limitations of occlusion measurement should be disclosed and supported by empirical analysis related to impact on viewability determination.

3.2.6. Impaired Visibility Considerations

Measurement organizations should consider different aspects that may impair the creative's visibility such as low lighting, opacity, contrast with background or other objects, shading, and the effect of moving particles (that may create partial occlusion but are distinct from single object occlusion) whereby these conditions may diminish the opportunity to see the creative.

These aspects or conditions may manifest in color accuracy issues or material deviations from the original color properties of the creative (what was intended in terms of color replication). In those instances where these conditions exist to the extent they prevent the opportunity to see the creative, a viewable impression should not be counted. Measurement organizations may develop techniques and thresholds to measure these conditions inclusive of efforts to measure color accuracy or deviations, and these should be empirically supported and documented, as well as periodically studied and adjusted where applicable.

When measuring viewability for transparent ads, measurement and consideration of color accuracy may not be relevant and is not required in these cases. However, there may be instances where an ad is shown backwards or seen through a reflection. In these cases, these ads should not be counted as viewable.

While these guidelines do not recommend specific thresholds or techniques to account for the above conditions, given disparate environments and approaches, further research and evaluation of measurement approaches may result in future updates of these guidelines to consider more specific requirements.

3.2.7. AR Viewability Polling

To promote consistency across measurers, the following guidance for measurement polling or snapshots of observations for determining AR viewability of an ad are required:

- 200 milliseconds (ms) for both display and video ads

This frequency equates to five and ten consecutive positive observations for an AR viewable impression for display and video, respectively. The measurer is not required to store all of these observations.

While polling at a higher frequency is allowed, if a measurement organization can empirically validate that polling at a less frequent interval than every 200 ms (including the use of backoff polling, or differential and less frequent polling for certain environments, content, and viewability conditions) will result in no material differences in its viewable impression counts, this less frequent interval is allowable for AR viewable impression measurement. If a measurer chooses to poll for AR viewability at a less frequent interval than 200 ms or use backoff (such as in situations where ads are not yet eligible for viewability consideration or in order to conserve battery or preserve the user experience), the support for this approach must be revalidated on at least an annual basis, and this practice must be prominently disclosed.

In addition, measurement organizations with the capability to monitor state changes (or certain event-based techniques) may use this approach in lieu of the above polling requirements, until such time as a state change is recognized (at which time they should either poll at the above stated frequencies at minimum or continue to use state change events throughout the entirety of monitoring the viewability condition with support that the events monitored are adequate to meet the required conditions to measure a viewable impression). Measurement organizations that use this approach should clearly disclose this.

The AR environment may be highly dynamic, where a user's movement within an AR Session may be at a speed that leads to certain signals or snapshots within a second to return a "non-viewable" state due to partial occlusions, while the opportunity to see the creative is materially continuous (such as viewing a creative through a fence while moving). As this may lead to a risk of understating viewable impressions due to the lack of consecutive signals returning a "viewable" state, measurement organizations may use a majority of signals or observations within a second approach for measuring AR viewability. **Under this approach, as long as measurement organizations conduct viewability polling every 200 ms, they may count an impression as viewable when at least three out of five polling signals have returned a "viewable" state within a second. Measurement organizations opting for this majority of signals approach must empirically support that this measurement technique will not materially impact the accuracy of viewability measurement by creating systematic overcount. Additionally, support for using this approach must be retained and reviewed on a periodic basis, and this practice must be prominently disclosed. It is expected that this polling exception may not be immediately applicable to current AR experiences.**

If a measurer uses a supported polling approach less frequent than 200 ms as described above, viewability determination must be based on consecutive events and cannot use a majority approach. Further, once the viewable condition is established, viewable duration may be incremented on a non-consecutive, sub-second basis, regardless of polling approach.

The MRC is aware that different polling frequencies and approaches can cause measurement differences between providers so materiality considerations when assessing impacts or justification for polling differences will be stringently applied.

3.2.8. Ad vs. Ad Container Measurement and Measurement of Branded Elements

Viewable impression measurers generally measure the viewability of an ad based on the ad itself. However, some measurers who do not tag the ad determine ad viewability by measuring the ad container in which the ad appears. Viewability measurement based on the ad container involves an inference that that ad in fact appeared within the container in its intended format. While measurement based on the ad itself is generally preferable whenever possible, ad container-based measurement is also acceptable, but it should be supported by evidence that viewability measurement based on the container rather than the ad does not result in material counting differences, or in inaccurate viewability determinations because of the mis-sizing or scaling of ads (including responsive ads) that appear within the container. Such empirical analyses should be conducted periodically for continuing support of this approach.

If the scaling of an ad (including responsive ads) is determined to be material in nature, the pixel percentage calculation used to determine the ad's viewable status should be based on the pixel (intended creative) area of the ad after scaling.

3.2.9. Measurement of Multiple Ad Units

Certain ad campaign buys may be done on the basis of viewability measurement across multiple ad units. In such instances, viewability rules sometimes have been applied inconsistently. For instance, for certain buys, in which multiple ads for the same product appear on the same screen at the same time, there have been cases where measurers required all ads to be viewable in order to count the multi-ad unit as "viewable." Under this approach, a buy that involves three separate ads may have been considered not viewable even if two of the three ads qualified as viewable when independently measured.

In a case where the viewability of multiple ad units is required under the terms of a buy, each ad should be measured independently for viewability, and reported independently for viewability, regardless of whether the terms of the campaign specify that more than one (or all) of the multiple units must be viewable; the campaign terms should not influence the reporting of each unit. Terms and conditions may dictate the basis on which the units might be monetized (for example, payment is made by the advertiser only if all ad units in a multi-unit buy meet the requirements for a viewable impression), but each unit should still be measured and reported independently.

3.2.10. Other Viewability Considerations

Other existing key concepts and guidance around measurement of viewability should be considered and followed, where applicable, as detailed in previously issued *Viewable Impression Measurement Guidelines*. These include:

- Requirements for reporting viewable impressions
- Extrapolations or assumptions used to determine the viewable status of an ad
- Pre-bid viewability determination
- Communication and discrepancy resolution for reported viewability metrics
- Viewability security considerations
- Mean and median viewable time

Further Study and Reconciliation of Viewability Within AR

After issuance of these updated guidelines, there may be value in further studying the different methods used for measuring viewability within AR, and reconciling measurement across measurers as this can inform any necessary updates that may be needed for the current guideline. The MRC and IAB intend to consider the need to perform reconciliation exercises as warranted to either update or add specificity to future iterations of these guidelines as necessary.

3.3. Invalid Traffic

Invalid traffic (IVT) is defined generally as traffic or associated media activity (metrics associated to ad and content measurement including audience, impressions, and derivative metrics such as viewable impressions, clicks, etc.) that does not meet certain quality or completeness criteria, or otherwise does not represent legitimate traffic that should be included in measurement counts. Among the reasons why traffic may be deemed invalid is a result of non-human traffic (spiders, bots, etc.) or activity designed to provide IVT. IVT does not include general editing such as cleaning, removal of corrupt or incomplete traffic, or deduplicating traffic due to processing or timing artifacts unless evidence is present to suggest such edited traffic is generated by one or more of the techniques discussed below.

The MRC *Invalid Traffic Detection and Filtration Standards Addendum (IVT Standards)* is applicable and should be considered for all existing digital measurement metrics, including AR metrics, subject to audit by MRC auditors and establishes two categories of IVT. The first, referred to as general invalid traffic (GIVT), consists of traffic identified through routine means of filtration executed through application of lists or with other standardized parameter checks. The second category, referred to as sophisticated invalid traffic (SIVT), consists of more difficult to detect situations that require advanced analytics, multipoint corroboration/coordination, significant human intervention, etc., to analyze and identify.

All MRC-accredited digital measurement organizations, including organizations that measure IVT within AR environments, must apply GIVT detection processes as specified within the *IVT Standards*. Application of SIVT detection processes are strongly encouraged. In cases where the measurement organization solely applies GIVT detection processes for a campaign, buyer organizations are encouraged to consider

adding a capability including SIVT processes through a third-party or alternate method. Accreditation of any digital measurement (including AR measurement) requires the organization to apply GIVT detection techniques as is compliant with the *IVT Standards*; GIVT techniques or procedures are not separately accredited. SIVT detection functionality is eligible for independent accreditation.

All applicable GIVT areas discussed within the *IVT Standards* as well as below are required to be adequately covered at minimum and SIVT accreditation requires effective coverage of all applicable categories and techniques discussed in the standards and below—ad hoc or incomplete coverage is considered insufficiently compliant with the *IVT Standards*.

NOTE: The following sections represent excerpts of MRC's IVT Standards that are presented here for emphasis in AR environments and consideration for AR measurement organizations, but do not contain any additional requirements over and above those stipulated in MRC's IVT Standards.

3.3.1. General Invalid Traffic Areas

Known GIVT must be removed from monetized counts and metrics and is subject to industry communication requirements specified in the *IVT Standards*. GIVT must be excluded, where possible, from ancillary processes that impact monetization such as goal setting, targeting, frequency capping, etc.

All measurement providers seeking accreditation for AR measurement are required to have adequate coverage in all GIVT areas described below, where applicable, and guidance provided within the *IVT Standards* for each of these areas must be followed. For AR measurement specifically, there are additional considerations within each of the GIVT areas, and these are described below.

3.3.2. Data Center Traffic

Virtual private network (VPN), IP masking, and data center/proxy traffic may be prevalent within AR environments and this may represent legitimate traffic that should not be filtered as IVT. Filtered data center traffic must be known and identified IVT and measurement organizations are required to empirically support identification of IVT or filters as well as to analyze and minimize false negatives/positives resulting from them. Any data center traffic unable to be labeled as legitimate or IVT must be considered as “unknown” traffic when calculating an IVT decision rate, as further discussed below.

3.3.3. Robots and Spiders

The presence of robots and spiders may not be relevant within the AR environment when within a native environment but is technically possible and may grow over time. As such, the requirements for filtration of robots and spiders as delineated in the *IVT Standards* should be followed where applicable.

Within AR, there may be other tools available for detecting robots and spiders such as anti-bot and anti-cheat solutions; however, these may be more applicable within SIVT filtration. Furthermore, there may be more sophisticated perpetrators in this area, and these should be addressed as part of SIVT filtration as well.

3.3.4. Activity-Based Filtration

Activity-based filtration techniques should be applied by AR measurement providers, and as discussed in the *IVT Standards* these should be based on transaction-level data and parameters from campaign or application data, and traffic should be removed when thresholds are met for the following evaluation criteria:

- Continuous full coverage of monetized traffic
- Speed of transactions
- Repeat transactions
- Interval testing
- Outlier identification
- Missing values, missing user agents (UA) where applicable, etc. (Note: IAB Tech Lab has issued user agent guidance which should be followed, where applicable)
- Transaction protocol verification

Thresholds used for activity-based filtration within each of the above criteria should be supported by empirical research and must be periodically reviewed. Furthermore, these thresholds should be defined specifically for the AR advertising environment as well as further within desktop web, mobile application, and wearables/heads-up displays (further guidance regarding setting of thresholds and parameters is provided below).

3.3.5. Non-Browser User Agent Headers and Unknown Browsers

Although some AR devices may provide consistent graphics processing unit (GPU) information, and native platforms may have unique user-agent (UA) patterns, there is currently a lack of standardization of UAs within the AR industry. In addition to this challenge, it may be difficult to control users' ability to change the UA on the HTTP request, adding an additional challenge to this environment.

While guidance provided within the *IVT Standards* for this area should be followed where applicable, there is a need for the industry to discuss the potential standardization of UAs within the AR industry, at minimum for illogical UA checks or in an effort to reduce false positive flags (incorrectly flagged legitimate UAs). To the extent this industry development progresses, AR measurement organizations should use standardized fields in IVT considerations where available.

3.3.6. Pre-Fetch, Pre-Render, and Invalid Placements

Guidance within the *IVT Standards* related to pre-fetch, pre-render, and invalid placements is applicable to the AR environment and should be followed where applicable.

As discussed above within the ad impressions section of these guidelines, the ad must be loaded and at minimum begin to render in order to count it as a valid ad impression. As such, pre-fetch or pre-render traffic does not meet the requirements to be counted as ad impressions and should

therefore be removed from gross impression counts as well as from net of GIVT (further guidance on IVT reporting is provided within these guidelines and such guidance should be followed for AR measurement where applicable).

Furthermore, as discussed above within the viewability section of these guidelines, ad sizes should be considered when measuring viewability and these must be reasonable and standardized to the extent possible. Small, barely visible, or invisible ad delivery or illogical (non-industry standard) ad sizes such as 0x0 and 1x1 should be considered by measurement providers as part of GIVT filtration processes.

3.3.7. Non-Rendering Capabilities

Guidance within the *IVT Standards* related to sessions or traffic without the capability to render or display images as determined at the client side should be followed for AR measurement where applicable.

For native applications, AR measurement providers may be able to evaluate GPU and hardware configurations for illogical values to detect non-rendering sources. However, in general the availability of signals to detect non-rendering sources may be largely driven by the specific AR environment as well as the ability for measurement providers to receive the appropriate signals.

3.3.8. Sophisticated Invalid Traffic Areas

The application of SIVT detection procedures is not required but is strongly encouraged and therefore some measurement organizations may not apply these advanced techniques. Additionally, some subcomponents of SIVT involve specific metric types, such as clicks and viewable impressions. Measurement organizations may have varying levels of coverage of these metrics and as such, certain aspects of SIVT may not be applicable to their measurement.

The resulting reported filtered metrics derived from a measurement organization's SIVT detection methods can be accredited, assuming they can be verified, described in an understandable manner without damaging the ability for these methods to be effective and the overall effectiveness and coverage can be established across all required areas. SIVT is required for audience and outcomes measurement accreditation, including within AR environments.

The following are key examples of SIVT categories which consist of more difficult to detect situations that require advanced analytics, multi-point corroboration/coordination, significant human intervention, etc., to analyze and identify. Specifically related to AR environments, the areas below should be considered where applicable. For example, most of these areas will be applicable for desktop AR, web, and mobile application-based AR experiences; however, several of these may not be applicable in native AR environments.

- Automated browsing/playing from a dedicated device: Known automation systems (e.g., monitoring/testing), emulators, custom automation software, and tools;

- Within AR environments, developers may have a specific incentive to protect the AR environment from these risks, as these instances could negatively affect the user experience. There may also be anti-bot and anti-cheat tools that can be used to mitigate this risk, and these should be considered where relevant.
- Automated browsing/playing from a non-dedicated device: Infected and hijacked devices (and sessions within) as well as incentivized automated activity;
- Incentivized human invalid activity: Self-directed activity to benefit self or harm others and directed activity;
- Manipulated activity: Forced new browser window opening, forced tab opening, forced mobile application install (mobile re-direct), forced clicking behavior, tricking users to click/accidental clicks, clickjacking (UI redress attack), and hijacked measurement events;
- Falsified measurement events: Visit, impression, viewable impression, click, location (specific to location falsification aimed at generating invalid ad activity, but not necessarily including validation of exact location for targeting purposes), referrer, consent string, conversion attribution, and user attribute spoofing, as well as SSAI spoofing where applicable to a measurement organization;
- Domain and app misrepresentation: App ID spoofing, domain laundering, and falsified domain/site location;
- AR environments may provide measurement providers with the necessary signals to identify such instances and these should be considered and used where applicable.
- Bots and spiders or other crawlers masquerading as legitimate users detected via sophisticated means (this does not include non-player characters (NPCs) as these instances are not expected to manifest as actual AR sessions generating ad activity);
- Hijacked ad tags and creatives (specific to ads);
- Hidden/stacked/covered/transparent/invisible or otherwise intentionally obfuscated ad serving such as Z-order stacking, banner stuffing, transparent ads, and background cycling and pop-under with auto-close (specific to ads; while it is expected AR QA efforts may mitigate this occurrence, to the extent present even in error, ad activity associated to these placements should be considered SIVT);
- Invalid proxy traffic (originating from an intermediary proxy device that exists to manipulate traffic counts or create/pass-on invalid traffic or otherwise failing to meet protocol validation);
- Adware and malware that conduct deceptive actions including ad injection and unauthorized overlays;
- Incentivized manipulation of measurement (invalid incentivized promotion of an entity, without its knowledge or permission such as shilling or for purposes of manipulating measurement—excludes cases where the entity paying for the incentive is the entity being promoted, but still subject to sourced traffic disclosure requirements discussed in the IVT standards);
- Misappropriated (pirated or stolen) content (where used to purposefully falsify traffic at a material level);

- Cookie stuffing, recycling, or harvesting (inserting, deleting, or misattributing cookies thereby manipulating or falsifying prior activity of users); and
- Differentiating valid and invalid traffic when originating from the same or similar source in certain closely intermingled circumstances.

We expect SIVT perpetrators to change and evolve their techniques to become more sophisticated within the AR environment as this channel grows, and as such, MRC intends to revisit the above SIVT areas in the future in order to provide further examples that may specifically impact the AR environment. MRC may do this as part of planned *IVT Standards* updates efforts as warranted.

3.3.9. General Invalid Traffic Considerations

Risk Assessment

A periodic risk assessment (at least annually for both GIVT and SIVT as applicable) for the measurement organization shall be performed in conjunction with assessing the sufficiency of internal control objectives and resulting internal controls, as delineated within the *IVT Standards*. The results of such periodic risk assessments will be tied to controls. This will include assessments of the continued relevance and effectiveness of IVT procedures, in addition to ongoing analyses of accuracy and the identification/internal reporting of false positives and negatives. Where applicable, especially for public entities, these internal controls and the resulting processes can be coordinated with other related controls to maintain regulatory compliances (such as public company accountability compliance (e.g., Sarbanes-Oxley requirements) and other protection measures such as content piracy protection. Specialized accreditation focused on audience measurement or ad traffic measurement shall also consider these processes.

Periodic IVT risk assessments must be performed considering each specific relevant platform (i.e., desktop AR, web vs. mobile application vs. wearable/heads-up display) and if the measurement organization measures within an AR environment, this must be conducted for that environment specifically and discretely as well as within desktop/web, application, and console environments within AR. Measurement organizations are also encouraged to be differentiated by or include other pertinent traffic segmentation such as video vs. display, geography, or client type (e.g., managed-service vs. self-service, etc.) as applicable. Results of risk assessments must be directly tied to discrete controls for each platform and segmentation. If a measurement organization believes platforms or traffic segmentations demonstrate similar risk profiles and should be assessed as a group, this should be supported by auditable demonstrable evidence.

Decision Rate

In addition to taking steps to secure and protect measurement tags and assets, measurement organizations must actively report IVT “decision rates” (or an alternate and descriptive name) or situations where insufficient signals are collected to make an IVT decision. Details regarding the calculation of the decision rate are contained within the *IVT Standards*.

This decision rate shall be computed as recorded impressions where the vendor was able to collect sufficient information and signals as designed/intended to be collected and used to make an IVT determination, divided by the total number of Impressions (or respective transactions, if applied to something other than impressions) intended for measurement and reporting by the same measurement organization. Impressions without sufficient information to make an IVT decision must be reported as such and must not contribute to IVT metrics or rates. Decision rates can be reported on both the basis of tracked ads and impressions, but it is not expected that downstream metrics such as viewability would include impressions without sufficient information to make a GIVT decision (differential GIVT and SIVT reporting of decision rates for downstream metrics is permissible). The decision rate shall also be reported by media type and environment (desktop, web, mobile application, wearable/heads-up display, etc.), with differential and discrete consideration of AR environments, and shall be presented for GIVT and SIVT distinctly if different. MRC may consider decision rates, much like viewability measured rates, when making accreditation decisions based on benchmarking across audited vendors.

Further, measurement organizations must differentiate between degrees of detection capabilities (when a decision can be made or when varying tags such as SDKs, scripts, or pixel tags are applied and differential signals are collected) and empirically support the effectiveness of each across environments. Limitations of each technique (such as instances where certain normally collected and used fields are not available) shall be actively disclosed and quantified to client users where applicable and appropriate and considering reverse engineering concerns. In situations where differential detection capabilities are present and vendors may not be able to make a full IVT decision, this traffic must be reported as unknown and not included in the numerator of the decision for purposes of IVT reporting and not assumed to be valid or invalid unless supported to be without material false positives or negatives.

The data fields required to consider an impression recorded where the measurement organization was able to collect sufficient information and signals as designed/intended to be collected and used to make an IVT determination may vary depending on methodology and environment but must be empirically supported and demonstrable through auditable evidence.

If a measurement organization has a decision rate of 100% across all measured traffic, this can be generally disclosed in reference materials without the need for discrete reporting, with appropriate support. It is not necessarily always desired or required to have 100% signal collection to have effective IVT defenses and the decision rate is designed to be informational to users of measurement data. It is important that steps are taken to educate users related to this metric and its meaningfulness. There is also a risk of assisting bad actors by highlighting lack of coverage of certain properties or inventory types and as a result, reporting of decision rates should be limited to users of reported data that have been subject to Business Partner Qualification as defined in the *IVT Standards*.

Specific Thresholds and Considerations for AR

The risks and techniques perpetuated in AR experiences may exhibit differential characteristics when compared to those employed in other environments. Moreover, IVT detection assets used in other environments may not be available, function, or widely adopted within AR experiences (i.e.,

JavaScript, cookies, etc.). As such, measurement providers performing IVT detection and filtration in AR experiences must consider this environment discretely in risk assessments (as discussed above). Such consideration must not only be with the intent of assessing differential risks, but also to determine whether corresponding controls are relevant in this environment. Additionally, GIVT thresholds and parameters should also be differentially and discretely considered for the AR experience.

AR SIVT detection techniques must also consider this environment differentially and discretely and shall include (but not be limited to) where known:

- Detection measures and capabilities at various application or AR session stages.
- Fraud types, models, risks, or incentives specific to this environment.
- Whether specific types of AR inventory are priced at a premium and may draw more focus or risk for potential IVT generation.
- Relative sophistication of potential IVT schemes required in this environment, as it might involve techniques that could be more difficult to detect.
- Susceptibility of apps or AR hardware to transmission interception; the encryption and security protocols of these transmissions (or lack thereof) may drive increased risk and may warrant consideration by measurement organizations.
- To the extent that IVT and measurement detection assets (such as JavaScript, Flash, or cookies) or other techniques deployed in other environments do not function within AR, measurement organizations should consider additional assets or telemetry to serve as compensating controls and to cover detection gaps.
- Presence of proxy traffic or routing artifacts that may obfuscate origination information or limit the granularity of data collected for purposes of IVT determination.

Other IVT Considerations From Existing Guidance

Other existing key concepts and guidance around IVT should be considered and followed, where applicable, as detailed in previously issued *IVT Standards*. These include:

- Business partner qualification
- Organizational functional areas
- Sourced or purchased traffic
- Upfront IVT techniques

3.4. User Attribution and Audience

Audience measurement and associated user attribution processes for AR should adhere to the requirements of the *MRC Digital Audience-Based Measurement Standards* including viewability and SIVT requirements as well as the *Audience Reach Measurement Guidelines* where applicable.

However, there are certain aspects of AR environments that are unique regarding audience measurement that should also be considered. Specifically, while mobile activity may involve individual users per session and device, wearable and heads-up display AR activity may involve multiple users per session and device. Whereas online multiplayer instances may involve separately measurable devices and sessions, local multiplayer instances may not be as straightforward to measure.

Generally, it is permissible to count more than one session and resulting ad occurrences when multiple users are present, but this likely requires additional signals related to the presence of multiple input devices such as multiplayer, split screen, and shared AR mode instances and/or player IDs, accounts, or logins. To the extent these signals are present, they should be used in determining multiple sessions and users per AR instance for distinct ad measurement and to distinguish this from multiple ad instances for the same session and user (requirements for establishing sessions and measuring ad activity within them are included within these guidelines as well as related *Impression Measurement Guidelines* where applicable). Further, local multiplayer instances for turn-based AR experiences or where input devices are shared should also be considered and accounted for. These guidelines encourage further industry efforts to standardize consistent input device and multiplayer signals for use by AR measurers. Establishing consistent signals for multiple users is important for audience measurement, but also when considering IVT and activity-based filtration as discussed above.

In addition, consistent with the *MRC Digital Audience-Based Measurement Standards*, efforts must be made to establish the presence of a user when measuring audience. For example, the AR context should be considered in that waiting rooms that do not require user presence or passive/non-interactive cut scenes may be less likely to have active user sessions or users may be more likely to leave the room even though ads may be present. These situations should be considered along with the guidance related to inactivity detailed previously in these guidelines.

Finally, beyond establishing audience and the presence of users, there may be unique aspects of AR measurement when attempting to attribute characteristics to a user. These include the presence of multiple users regardless of whether the AR session is multiplayer or during a single session of a turn-based multiplayer AR experience. Multiple users may still be present in a room and exposed to AR experiences inclusive of ads when another user is actively experiencing a single-user session or their turn. These multiple users may not reside in the household where the AR experience occurs and the AR content may not always be the best predictor of the user type present. While similar conditions exist in legacy media such as TV and existing approaches to capture this audience should be considered, further research is likely required to determine approaches to properly account for the presence and attention of multiple users during a single AR session when measuring audience and attributing users.

3.5. Performance

3.5.1. Engagement and Interaction

AR experiences can be immersive and highly engaging. As such, measurement of engagement and interaction in AR experiences is extremely important, both to further evaluate advertising delivery and to begin to understand performance of ads with respect to outcomes.

This section covers engagement and interaction metrics after the AR session has been established and an impression is measured (all engagement and interaction ad metrics should correspond to an impression). As engagement and interaction implies the presence of a user, we recommend relevant aspects of the *MRC Digital Audience-Based Measurement Standards* should be considered, including establishing the presence of a user in some fashion, filtering activity to the highest degree possible (SIVT, as discussed in previous sections), and establishing viewability either via the pixel and time requirements or strong user interaction discussed above.

Beyond this, engagement and interaction can be considered as part of standard metrics consistent with traditional digital media, and unique AR metrics.

3.5.2. Standard Engagement and Interaction Metrics

Traditional digital measures of engagement and interaction are relevant to AR experiences and may be measured and reported in a manner consistent with existing measurement guidelines and standards. These include the following:

- Time spent/duration, viewable time spent/duration, completion, and attention (*Digital Video Impression Measurement Guidelines, Viewable Ad Impression Measurement Guidelines, and Outcomes and Data Quality Standards*)
- Touch/Click/Tap/Swipe (*Click Measurement Guidelines, Outcomes and Data Quality Standards*)
- Share/Save/Earned media (*Social Media Measurement Guidelines*)
- Download (*Mobile Application Advertising Measurement Guidelines*)

3.5.3. Unique AR Engagement and Interaction Metrics

Beyond traditional measures of engagement and interaction, metrics unique to AR experiences may be considered for measurement for each AR experience. AR experiences can be categorized into (but not limited to) the following broad groups:

- **Virtual try-ons:** A product or creative can be applied to part of a user's body or face.
- **Visualization:** A product or creative can be visualized as part of a user's world view.
- **World effect:** A user's world view can be modified in some way with AR elements or effects.
- **Self/Face effect:** A user's self-facing view or face can be modified in some way with AR elements or effects.
- **AR game:** A playable AR experience such as a mini-game.

Each of these AR experiences are generally initiated by a user trigger, whereby some action or event initiates the experience such as (but not limited to) the following: tapping or dragging an area of the user's camera; moving the user's camera to a specific area of their environment, face, or body; an expression or movement; or environmental conditions such as the weather or time of day. These triggers may be measured as specific engagement and interaction attributes for each AR creative as well as for various elements and products within a creative or campaign. Further, it is encouraged

to quantify the number of impressions or viewable impressions where a trigger or engagement (interaction/engagement/trigger rates) occurred and the engaged duration where the user is actively interacting or playing with AR elements. While the definition of these triggers, rates, and the resulting engaged duration may vary by platform, they should be clearly defined for measurement users, empirically supported and applied consistently within platform activity.

Further, it is important to consider the performance of an AR creative or campaign relative to other creatives and campaigns within each AR experience. In other words, the number, duration, and depth of engagement and interaction attributes may vary between AR experiences (e.g., AR games may naturally involve more interaction over a shorter period of time as compared to a virtual try-on) and as a result, AR creatives and campaigns should be benchmarked within their respective AR experience category. In addition, there may be limitations to AR experiences such as time bounds, that limit the potential engagement or interaction. These should be considered when comparing and benchmarking interaction/engagement/trigger rates and engaged duration as failure to do so may introduce bias.

Finally, interaction/engagement/trigger rates and engaged duration should be benchmarked by platforms and while it may be useful to compare across platforms, consider relative performance within platforms due to unique conditions, experiences, and user behaviors.

As more product development happens with the AR format, like the ability to dynamically serve a variety of products for consumers to browse through in one paid impression of AR, the physical interactions related to browsing, like swiping through a catalog or clicking on varying points of interest and other interactions, future research and study regarding relevant engagement and interaction attributes and related metrics is recommended.

3.5.4. Outcomes

Measurement of conversions, attribution approaches and other outcomes measures such as lift, sentiment, awareness and loyalty applied to AR are encouraged to be consistent with and adhere to the *Outcomes and Data Quality Standards*. While this document does not provide incremental guidance for measurement of outcomes in AR, it should be noted that AR experiences may have different effects on outcomes measures and the interactive and immersive nature of them should be distinctly considered. It is encouraged that AR contributions to outcomes measures be differentially considered from standard digital activity including when considering application of attribution windows and assignment of weight (through empirical support) and the engagement and interaction attributes discussed above should be considered in addition to traditional digital measures such as clicks and viewability.

Further, while standard digital conversion approaches such as click-through and view-through conversion may be used and applied to AR, it is encouraged that engaged-through conversion also be considered, with its own unique attribution window considered in conversion attribution frameworks in order to account for the litany of engagement and interaction attributes unique to AR as discussed above.

3.6. Other Measurement Considerations

Significant measurement limitations such as limitations associated with technology platforms, hardware and/or software versions, or operational failures or errors should be fully disclosed by the AR measurement organization. To the extent limitations are known up front, these should be fully disclosed in advance of negotiating the advertising campaign. Any other measurement errors noted by the AR measurement organization should be disclosed to buyers if they impact greater than 5% of reported counts, including if the error was discovered post campaign, within one calendar quarter.

Aggregation methods used to collect and summarize records of AR activity from a client-user and across client-users for a reporting period should be specified and fully disclosed, as well as the definition of an AR session as these may be configurable by developers. Reasonable internal controls should be present to prevent the loss, duplication, or unintended alteration of AR activity. The nature of the data captured for AR records (specific fields with descriptions) should be disclosed.

Editing, ascription, attribution, or other data adjustment techniques should be specified and fully disclosed. Where applicable, valid ad impression counts subject to significant levels of adjustment (sourced from the AR measurement organization and not user activity directly) should be segregated from non-adjusted counts for reporting purposes.

Other measurement limitations that may be present during AR experiences such as abandonment, pop-up blockers, modified browser attributes, cached activity, etc., should be fully disclosed where applicable.

Software Development Kits (SDKs) and Other External Inputs

Robust quality control for onboarding SDK users, updating, and version control must be present. In SDK-oriented measurement environments, the measurement organization should have sufficient confidence that controls are maintained for the SDK functionality, including proper and appropriate engagement triggers and events. Development of this confidence can encompass periodic review and/or testing.

An API approach may involve the use of a third party (or first party) that is responsible for implementation and ultimately delivering the inputs into measurement. In any case, measurers are required to conduct robust quality control procedures to onboard, vet, and periodically review the use of external inputs into measurement. Such quality control procedures should include (but not be limited to) executing scripts in external library environments or in coordination with AR developer engines to verify appropriate and accurate implementation both during onboarding and periodically on an ongoing basis. Use of API libraries and a process for validating the analysis of data collected through an API for publishers or providers using standard agreed upon APIs is strongly encouraged. Providers of APIs may choose to have their functionality and API inputs centrally validated/examined to provide assurance to their measurement users. This approach could significantly reduce (but not eliminate) the testing required by measurement users.

4. Auditing Guidelines

General

Third-party independent auditing is strongly encouraged for all AR ad-serving applications used in the buying and selling process.

Auditing AR advertising measurement is recommended to include both the counting methods and processing/controls employed, as follows:

1. **Counting methods:** Independent verification of activity for a defined period. Counting method procedures generally include a basic process review and risk analysis to understand the measurement methods, analytical review, transaction authentication, validation of any relevant filtering procedures used, and measurement recalculations. Activity audits can be executed at the campaign level, verifying the activity associated with a specific ad creative being delivered for performance measurement purposes.
2. **Processes/Controls:** Examination of the internal controls surrounding the ad delivery, recording, and measurement process. Process auditing includes examination of the adequacy of site or ad server applied filtration techniques, if applicable.

Although audit reports can be issued as infrequently as once per year, some audit testing should extend to more than one period during the year to assure internal controls are maintained. Audit reports should clearly state the periods covered by the underlying audit testing and the period covered by the resulting certification.

5. General Reporting Parameters

In order to provide for more standardization in AR advertising measurement reporting, the following general reporting parameters are recommended:

Day: 12:00 midnight to 12:00 midnight

Time zone: Full and prominent disclosure of the time zone used to produce the measurement report is required. In addition, all reported data should be made available to users based on standardized time zone time periods (in addition to any others that measurement organization may deem appropriate) to allow users to make comparisons across web sites and properties from a common standard of time reference.

Week: Monday through Sunday

Week parts: Monday-Friday, Monday-Sunday, Saturday, Sunday, Saturday-Sunday

Month: Three reporting methods are suggested: 1) TV broadcast month definition—in this definition, the month begins on the Monday of the week containing the first full weekend of the month; 2) four week periods (13 per year), consistent with media planning for other media; or 3) a calendar month (for financial reporting purposes, a month is defined as a calendar month).

Other reporting periods are permissible based on campaign windows and other aspects deemed appropriate by measurement organizations and measurement users.

6. Disclosure Guidance

An organization's methodology for accumulating AR measurements should be fully described and accessible to users of the data.

Specifically, the nature of AR measurements, the methods of sampling used (if applicable), data collection methods employed, data editing procedures or other types of data adjustment or projection, calculation explanations, reporting standards (if applicable), reliability of results (if applicable), and limitations of the data should be included in the disclosure.

Following are examples of the types of information that should be disclosed:

Nature of AR Measurements

- Title of the AR application(s) included in the measurement
- Name of measurement report
- Type of measurements reported
 - Time periods included
 - Days included
 - Basis for measurement
 - Geographic areas
 - Significant sub-groupings of data
- Formats of reported data
- Special promotions impacting measurements
- Nature of auditing applied and directions for access to audit report
- Sampling/Projections used (if applicable)
 - Explanation of projections methods

Data Collection Methods Employed

- Method of data collection
 - Logging method
 - Logging frequency
 - Logging capture point
- Types of Data Collected
 - Contents of log files
- Contacts with users (if applicable)
- Research on accuracy of basic data

- Latency estimates
- Rate of response (if applicable)
- Editing or data adjustment procedures
 - Checking records for completeness
 - Consistency checks
 - Accuracy checks
 - Rules for handling inconsistencies
 - Circumstances for discarding data
 - Handling of Partial Data Records
 - Ascription procedures
 - Computation of Reported Results
 - Description of how estimates are calculated
 - Illustrations are desirable
 - Weighting techniques (if applicable)
 - Verification or quality control checks in data processing operations
 - Pre-release quality controls
 - Reprocessing of error correction rules

Reporting Standards

- Requirements for inclusion in reports based on minimum activity levels

Reliability of Results

- Sampling error (if applicable)

Limitations on Data Use

- Non-sampling error
- Errors or unusual conditions noted in reporting period
- Limitations of measurement

7. References

Access all measurement standards and guidelines mentioned in this document, as well as any recently updated documents, by visiting the MRC website at: <https://mediaratingcouncil.org/standards-and-guidelines>

This website serves as a comprehensive resource hub to the latest industry standards and guidelines for digital advertising.

8. Who We Are

Interactive Advertising Bureau (IAB)

The Interactive Advertising Bureau empowers the media and marketing industries to thrive in the digital economy. Its membership comprises more than 700 leading media companies, brands, agencies, and the technology firms responsible for selling, delivering, and optimizing digital ad marketing campaigns. The trade group fields critical research on interactive advertising, while also educating brands, agencies, and the wider business community on the importance of digital marketing. In affiliation with the IAB Tech Lab, IAB develops technical standards and solutions. IAB is committed to professional development and elevating the knowledge, skills, expertise, and diversity of the workforce across the industry. Through the work of its public policy office in Washington, D.C., the trade association advocates for its members and promotes the value of the interactive advertising industry to legislators and policymakers. Founded in 1996, IAB is headquartered in New York City.

About the IAB Experience Center

The IAB Experience Center focuses on emerging platforms and evolving consumer behaviors to help the industry understand and reach the new media consumer—future-proofing and how to reach the audiences of tomorrow, innovation-focused buy and sell-side conversations, and big picture discussions about the implications of technological and consumer shifts for the digital media industry.

Media Rating Council (MRC)

The Media Rating Council is a non-profit industry association established in 1963 comprised of leading television, radio, print and digital media companies, as well as advertisers, advertising agencies and trade associations, whose goal is to ensure measurement services that are valid, reliable, and effective. Measurement services desiring MRC accreditation are required to disclose to their customers all methodological aspects of their service; comply with the MRC *Minimum Standards for Media Rating Research* as well as other applicable industry measurement guidelines; and submit to MRC-designed audits to authenticate and illuminate their procedures. In addition, the MRC membership actively pursues research issues they consider priorities in an effort to improve the quality of research in the marketplace. Additional information about MRC can be found at www.mediaratingcouncil.org.

9. Contacts

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