**TSG-RAN meeting #9** **RP-000476**
**Hawaii, USA, 20-22 September 2000**

**Title:** **ARIB's comment on the ITU document 8F/TEMP/33-E**
**To:** **TSG-RAN**
**Cc:** **TSG-T**
**Agenda item:** **5.5, 4.2**
**Source:** **ARIB**
**Document for:** **Information**

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ARIB has reviewed Document 8F/TEMP/33-E WORKING DOCUMENT TOWARD PRELIMINARY DRAFT NEW RECOMMENDATION - HANDLING OF MEASUREMENT UNCERTAINTY FOR [THE TERRESTRIAL COMPONENT OF] IMT-2000 [1] from ITU-R WP 8F. ARIB is now glad to express that ARIB agrees on the recommendation described in the document and fundamentally on the modification on Recommendation 2 which had been proposed by 3GPP TSG RAN WG4 in R4-000707 [3].

On the other hand, ARIB recognises that some wording should be refined as seen in the document [2] that will be further refined and submitted from ARIB to ITU-R as a response to ITU-R liaison for the ITU-R WP8F #3 meeting to be held in October 2000. This is because it seems necessary to state that Test System measurement uncertainty consists of test measurement equipment uncertainty and uncertainty of measurement system such as mismatch, and so on. Particularly, in order to keep consistency in using the terminology of "measurement uncertainty", it is explicitly described in Definitions that "measurement uncertainty" is defined as measurement test equipment uncertainty plus uncertainty of measurement system.

In addition, the format of the chapter of Recommendation has been modified to be in line with the description rule of ITU-R. The document [2] is attached for reference.

In addition to the above, ARIB would like to ask both TSG-RAN and TSG-T to set an adequate time frame for the completion of specifying measurement uncertainty values because its late completion may jeopardise the global circulation of IMT-2000 terminals, although it is unclear when it will start happening.

**Reference**

[1] Document 8F/TEMP/33-E: WORKING DOCUMENT TOWARD PRELIMINARY DRAFT NEW RECOMMENDATION - HANDLING OF MEASUREMENT UNCERTAINTY FOR [THE TERRESTRIAL COMPONENT OF] IMT-2000, WP 8F, ITU-R

[2] Contribution document to WP 8F, ITU-R:Modification to WORKING DOCUMENT TOWARD PRELIMINARY DRAFT NEW RECOMMENDATION - HANDLING OF MEASUREMENT UNCERTAINTY FOR [THE TERRESTRIAL COMPONENT OF] IMT-2000

[3] CSELT, TSGR4#13(00)0707, Proposed answer to ITU-R WP 8F on the handling of measurement uncertainties

**ATTACHMENT**

**Modification to**
WORKING DOCUMENT TOWARD PRELIMINARY DRAFT NEW RECOMMENDATION
**HANDLING OF MEASUREMENT UNCERTAINTY FOR [THE TERRESTRIAL COMPONENT OF] IMT-2000**

## 1. Introduction

It has been seen that there are substantial differences as to how measurement uncertainty is understood and handled by the regulatory organisations in each region. This will prevent global circulation of IMT-2000 equipment, particularly the user equipment (UE), though it is defined as a key feature of IMT-2000 by Recommendation ITU-R M.1457, DETAILED SPECIFICATIONS OF THE RADIO INTERFACE OF IMT-2000. In order to solve this problem, it is essentially important to achieve a common global understanding for how to handle measurement uncertainty.

## 2. Scope

This draft new Recommendation identifies how measurement uncertainty in the IMT-2000 [terrestrial component] should be handled, based on the practical understanding and treatment on the issue put in place by each region.

## 3. Related Recommendation

The existing IMT-2000 Recommendation that is considered to be relevant to the development of this particular Recommendation is as follows;
ITU-R M.1457 - DETAILED SPECIFICATIONS OF THE RADIO INTERFACE OF IMT-2000.

## 4. Definitions

**Measurement uncertainty:** Error in measurement associated with one or a combination of measurement methods and measurement equipment to be used in measurement test bench when apparatus is to be tested for conformance; normally measurement uncertainty consists of measurement test equipment uncertainty plus uncertainty of measurement system

**Core specification value:** Value defined in the core specification

**Test limit:** Threshold considered in a test to assess compliance of the device; it might also be relaxed or tightened compared to the corresponding core specification value but not precluding such case that test limit is identical with core specification value

**‘Never fail a good DUT (Device Under Test)’ principle:** Measurement results are compared with test limits tolerating failures up to the measurement uncertainty (i.e., the DUT is considered to pass if the measurement result is within the test limits + tolerance up to measurement uncertainties).

**‘Shared Risk’ principle:** Measurement results are compared with test limits (i.e., the DUT is considered to pass if the measurement result is within the test limits).

## 5. Recommendation

The ITU Radiocommunication Assembly,

*considering,*

a) that Recommendation ITU-R M.1457, DETAILED SPECIFICATIONS OF THE RADIO INTERFACE OF IMT-2000 defines global circulation as a key feature of IMT-2000;

b) that it is reasonable to allow in practice some measurement uncertainty in the measurement method, measurement equipment and measurement test bench when apparatus is to be tested from a regulatory viewpoint;

c) that apparatus that is manufactured in a country and passes conformance test based on regulation of this country may not be well accepted by the regulator of another country, not due to actual inadequacy of the equipment but because of difference in the concepts employed for handling measurement uncertainty;

d) that a common global understanding of how to handle measurement uncertainty, in conjunction with how that is incorporated into pertinent specifications, is necessary to facilitate global circulation;

e) that from a technical perspective, in a case that the measurement uncertainty can be reasonably defined, the following three methods lead to the same result (see Annex 1):

- "Never fail a good DUT" principle applied to a test limit equals to the core specification value, where core specification value and measurement uncertainty are separately defined
- "Shared risk" principle applied to a test limit calculated by relaxing the core specification value by measurement uncertainty, where core specification value and measurement uncertainty are separately defined
- "Shared risk" principle applied to a test limit which equals to the core specification value that includes measurement uncertainty

*recommends*

1 that maximum allowable measurement uncertainty should be defined as a unique and consistent value associated with one or a combination of measurement methods and measurement equipment to be used in measurement test bench to the largest extent that current technology allows, when apparatus for IMT-2000 [terrestrial component] is to be tested for conformance;

2 that in order to be consistent with industry practise, the shared risk principle should be used for all tests and that it may be decided to relax the core specification value by a certain relaxation value that should be evaluated on a case per case basis taking into account different factors such as Test System measurement uncertainty (test equipment uncertainty, mismatch, and so on), and criticality for system performance;

3 that it should be clearly indicated where the relaxation value is specified;

4 that in case that the measurement uncertainty can not be reasonably and clearly defined, "Shared risk" principle should be applied to core specification value without any relaxation.

## Annex 1[1]
## Examples of two criteria using "Never fail a good DUT" and "Shared Risk" principles

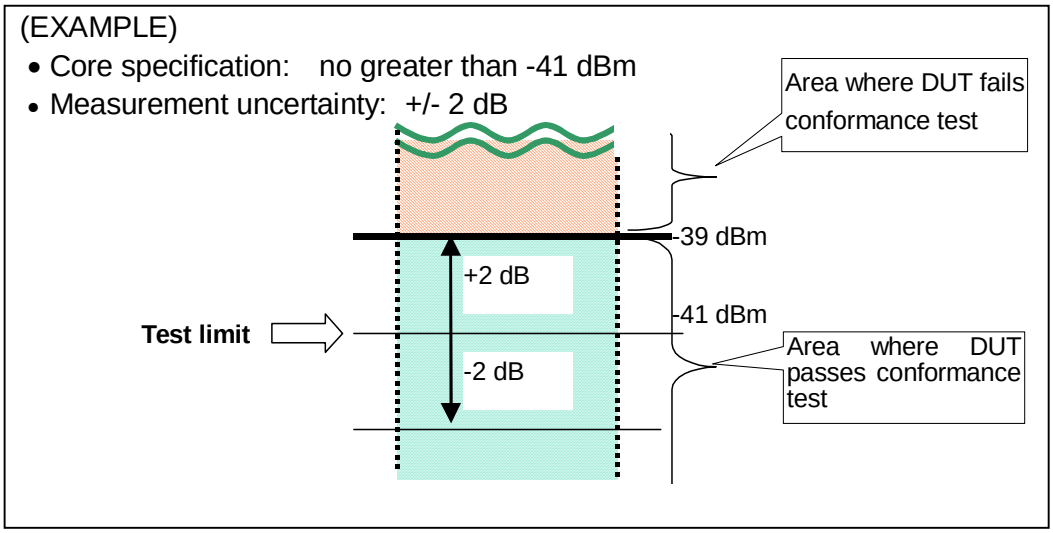


FIGURE 1: "NEVER FAIL A GOOD DUT" PRINCIPLE WHERE CORE SPECIFICATION VALUE AND MEASUREMENT UNCERTAINTY ARE SEPARATELY DEFINED

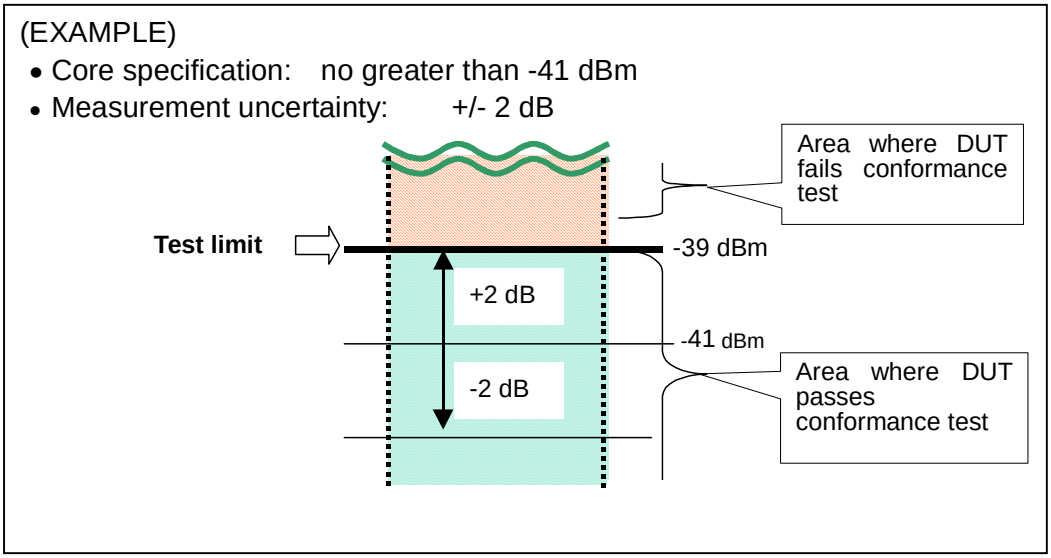


FIGURE 2: APPLICATION OF "SHARED RISK" PRINCIPLE WHERE TEST LIMIT IS CALCULATED BY RELAXING THE CORE SPECIFICATION VALUE BY MEASUREMENT UNCERTAINTY (WHEN CORE SPECIFICATION VALUE AND MEASUREMENT UNCERTAINTY ARE SEPARATELY DEFINED)

[1] The confidence level is not considered in this Recommendation.

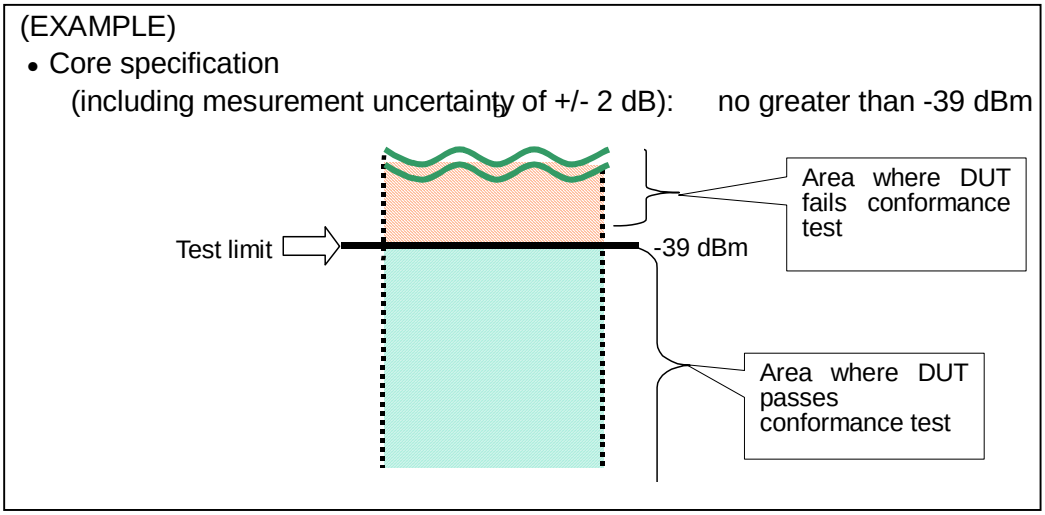


FIGURE 3: APPLICATION OF "SHARED RISK" PRINCIPLE WHERE THE TEST LIMIT IS THE CORE SPECIFICATION VALUE THAT INCLUDES MEASUREMENT UNCERTAINTY