ANSI C63.12 History

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C63.12 Ancient History (1987)

- First issue approved December 2, 1983
- Published as a 1984 document by the IEEE
- Based on 1977 draft that was prepared due to the increasing interference that occurred during the 1970’s with the proliferation of all forms of consumer and commercial electronic devices
- It is a “Recommended Practice” which is informational only and fully voluntary
- Second edition published December 31, 1987 in response to changes in both domestic and international EMC regulations and in response to the greatly increased awareness about EMC and improved receivers and measuring techniques embodied in various CISPR, FCC, and ANSI C63® documents
C63.12 Ancient History (1987)

- Used internationally recognized studies of the existing ambient noise levels over the frequency range of 200 kHz to 200 MHz as the basis for protecting the then-current background noise levels from further contamination.
- Refers to both Industrial/Commercial and Residential/Domestic protection environments.
- Set the measuring distance at 10 m for residential/domestic and 30 m for commercial/industrial environments.
- Covered 10 kHz to 10 GHz with suggested radiated emission guidelines.
- Covered 10 kHz to 30 MHz with suggested conducted emission guidelines.
C63.12 Ancient History (1987)

- Had radiated limits for both Quasi-peak and Average detectors
- Covered allocation of emissions for large systems comprised of many frames or building blocks of apparatus based on the power feeding the system; this unique approach is not used anywhere else
- Briefly mentioned both conducted and radiated Immunity/Susceptibility for the frequency range of 10 kHz to 10 GHz
- Radiated immunity levels were 1 V/m for “Normal”, 6 V/m for “High” and 30 V/m for “Severe” environments
- Document was relatively unstructured compared to current ANSI C63® publications as it was intended as additional information on limit selection if there were no regulatory obligation
C63.12 Modern? History (1999)

- Approved December 14, 1999
- Reissued in response to changes in international emission requirements and in military immunity techniques and requirements
- Considered interference to other than pure radio systems for the first time
- Revised immunity requirements were 1 V/m for “Low”, 3 V/m for “Normal”, 10 V/m for “High” and “X” for “Severe” environments
- Added requirements for “Fast Transients and Surges”, “Electrostatic Discharge” (ESD), and “Voltage Dips”
- Referenced IEC Documents current as of 1999.
# C63.12 Modern? History (1999)

## Table 7—Generic Immunity Limits

<table>
<thead>
<tr>
<th>Frequency of time char.</th>
<th>Limits residential environment</th>
<th>Limits industrial environment</th>
<th>Limits severe environment</th>
<th>Performance degradation criteria</th>
<th>Test method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiated H-field&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Pulse</td>
<td>—</td>
<td>—</td>
<td>100 A/m</td>
<td>A)</td>
</tr>
<tr>
<td>Radiated H-field&lt;sup&gt;b&lt;/sup&gt;</td>
<td>57 to 63 Hz</td>
<td>3 A/m&lt;sup&gt;c&lt;/sup&gt;</td>
<td>30 A/m</td>
<td>—</td>
<td>A)</td>
</tr>
<tr>
<td>Radiated E-field</td>
<td>10 MHz to 2.5 GHz 80% mod. 1 kHz</td>
<td>3 V/m&lt;sup&gt;e&lt;/sup&gt; (unmod.)</td>
<td>10 V/m&lt;sup&gt;e&lt;/sup&gt;</td>
<td>200 V/m</td>
<td>A)</td>
</tr>
<tr>
<td>ESD</td>
<td>Electrostatic discharge</td>
<td>4 kV contact 8 kV air</td>
<td>4 kV contact 8 kV air</td>
<td>6 kV contact 15 kV air</td>
<td>B)</td>
</tr>
<tr>
<td>Voltage dips&lt;sup&gt;h,i&lt;/sup&gt;</td>
<td>1/2 period 6 periods</td>
<td>30% reduction 60% reduction</td>
<td>30% reduction 60% reduction</td>
<td>30% reduction 60% reduction</td>
<td>B) for 1/2 period C) for 6 periods</td>
</tr>
<tr>
<td>Voltage interruption</td>
<td>300 periods</td>
<td>&gt;95% reduction</td>
<td>&gt;95% reduction</td>
<td>&gt;95% reduction</td>
<td>C)</td>
</tr>
<tr>
<td>Surge common mode&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.2/50 (8/20) 10/700&lt;sup&gt;k&lt;/sup&gt; μs</td>
<td>±2 kV&lt;sup&gt;d&lt;/sup&gt;</td>
<td>±4 kV&lt;sup&gt;m&lt;/sup&gt;</td>
<td>6 kV</td>
<td>B)</td>
</tr>
<tr>
<td>Surge differential mode&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.2/50 (8/20) μs</td>
<td>±1 kV&lt;sup&gt;d&lt;/sup&gt;</td>
<td>±2 kV&lt;sup&gt;m&lt;/sup&gt;</td>
<td>3 kV</td>
<td>B)</td>
</tr>
<tr>
<td>Fast transients power-port</td>
<td>5/50 ns 5 kHz rep rate</td>
<td>±1 kV</td>
<td>±2 kV</td>
<td>2 kV</td>
<td>B)</td>
</tr>
<tr>
<td>Fast transients signal port</td>
<td>5/50 ns 5 kHz rep rate</td>
<td>±0.5 kV&lt;sup&gt;o&lt;/sup&gt;</td>
<td>±2 kV&lt;sup&gt;p&lt;/sup&gt;</td>
<td>1 kV&lt;sup&gt;o&lt;/sup&gt;</td>
<td>B)</td>
</tr>
<tr>
<td>Radio frequency common mode, 1 kHz, 80% AM&lt;sup&gt;i&lt;/sup&gt;</td>
<td>150 kHz to X MHz&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3 V (rms)&lt;sup&gt;e&lt;/sup&gt;, 150 Ω source impedance</td>
<td>10 V (rms)&lt;sup&gt;e&lt;/sup&gt;, 150 Ω source impedance</td>
<td>30 V (rms)&lt;sup&gt;e&lt;/sup&gt;, 150 Ω source impedance</td>
<td>A)</td>
</tr>
</tbody>
</table>

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<sup>a</sup> Performance degradation criteria include: A) Residual requirements, B) Functional failure, C) Evaluation of data.

<sup>b</sup> Radiated H-field: Includes magnetic and electric field components.

<sup>c</sup> A/m: Amperes per meter.

<sup>d</sup> Frequency range: For electromagnetic interference (EMI) analysis.

<sup>e</sup> V/m: Volts per meter.

<sup>f</sup> ESD: Electrostatic discharge.

<sup>g</sup> IEC 61000-4-3: International Standard for Electromagnetic Compatibility (EMC).

<sup>h</sup> Voltage dips: Voltage variations due to short duration interruptions.

<sup>i</sup> IEC 61000-4-11: International Standard for Power Quality.

<sup>k</sup> 10/700 μs: Time constant for impulse waves.

<sup>m</sup> kV: Kilovolts.

<sup>n</sup> IEC 61000-4-5: Standard for Power Quality.

<sup>p</sup> kV: Kilovolts.

<sup>q</sup> 150 Ω source impedance: Common mode impedance for power lines.

<sup>r</sup> IEC 61000-4-6: International Standard for Power Quality.

<sup>s</sup> C5114: International Standard for Communication Systems.

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C63.12 (1999) + Future

- 1999 edition will be reaffirmed by C63® in 2009
- Will be in effect for 10 more years unless there is interest to amend and a working group formed to do the work
- Any volunteers? If so, contact the secretary at: m.kipness@ieee.org or the author