Overview of Testing Process for a Test Laboratory

• Step A - Perform Power Measurements on certain 802.11 configurations and channels
• Step B - Determine NIi Bands / Aggregate Bands based on target powers
  ○ Step B₁ - Evaluating UNII 1 or UNII 2A
  ○ Step B₂ - Defining UNII 2C and UNII 3
• Step C - Ordering of 802.11 Test Configurations (SARₘ=₁..₆)
• Step D - Ordering of SAR Test Positions (SARₙ=₁..₆)
• Step E - SAR Test Procedures
  ○ E₁ₐ - Test Position and Required Channels Chart (SARₙ=₁..₆) - Fixed Exposure or unknown antenna coupling
  ○ E₁₈ - Test Position and Required Channels Chart (SARₙ=₁..₆) - Initial test position n=1 definitively determined
  ○ E₂ - Test Configuration Chart (SARₘ=₁..₆)
Step B₁ – Deciding between UNII 1 or UNII 2A

START

Tgt_Pwr₁ ≤ Tgt_Pwr₂ₐ?

No

Measure SARₙᵢ₁

SARₙᵢ₁ > 1.2 W/kg & ΔPₙᵢ₁ + ₂ₐ > 1?

Measure SARₙᵢ₂ₐ

Measure SARₙᵢ₁

Yes

Measure SARₙᵢ₂ₐ

SAR₂ₐ > 1.2 W/kg & ΔPₙᵢ₁ + ₂ₐ > 1?
Step $B_2$—Deciding between UNII 2C and UNII 3

<table>
<thead>
<tr>
<th>Band Gap Channels supported?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAR$_{2C}$</strong></td>
<td>5.49 - 5.725 GHz</td>
</tr>
<tr>
<td><strong>SAR$_3$</strong></td>
<td>5.725 - 5.825 GHz</td>
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</tbody>
</table>

| Yes |
| **SAR$_{2C}$** | 5.49 - 5.6 GHz |
| **SAR$_3$** | 5.65 - 5.825 GHz |
Step C – Deciding on Priority of 802.11 Test “Configurations”

- Order 802.11 “configurations (hence SAR test priorities) are based on:
  1. Highest Target Output Power (i.e. Maximum output power, including tolerances)
  2. Highest Bandwidth
  3. Lowest Data Rate
- These are defined as $SAR_{m=1..M}$ (where $m=1$ denotes the “initial test configuration”)
- Examples: 802.11ac-VHT20 is one configuration. 802.11n-HT20 is another configuration

Step D – Head SAR, Hotspot SAR, UMPC Only- Determine Order of SAR Initial Test Position (ITP)

- When a maximum coupling and initial test position ($n=1$) cannot be definitively established between one or more positions, all positions must be considered SAR $n=1,2,3..N$.
- If it can be conclusively determined, order SAR Test Positions according to priority
  1. Position with closest device-phantom antenna coupling requires the following information:
     ■ Exact Antenna Position with respect to the device and housing
     ■ Antenna Orientation with respect to the device
     ■ Antenna Polarization Pattern with respect to the device
  2. Smallest device to user separation distance
  3. These are defined as SAR $n=1,2,N$
     ■ Examples: Indeterminate Head SAR has $n=1,2,3,4$ (left cheek, left tilt, right cheek, right tilt)
  4. Additional test positions may be required for simultaneous transmission test exclusion per KDB 447498 (Sum SAR, SPLSR)
Step E1A – SAR Test Position / Channel Loop - When coupling is indeterminate or N=1
(For Each NII Band or Aggregated Band determined from Step B)

START

Follow chart E1B

SAR_n → SAR_{n+1}

Measure SAR_{n+1} on Highest Measured Output Channel

Fixed Exposure Condition or indeterminate Initial Test Position n=1?

Yes

SAR_n > 0.8 W/kg?

Yes

No

SAR_n > 0.8 W/kg?

No

No

All Test Positions Measured (i.e. n=N)?

Yes

Complete

No

Measure SAR_n Next Highest Measured Output Channel

SAR ≤ 1.2 W/kg or All Required Channels Evaluated?

Yes

No
Step E₂—Test Configuration Loop (SAR\textsubscript{\textit{m}=1..\textit{M}}) (Start m=1 from Step C)

1. Measure $\text{SAR}_m$ with Position/Channel Procedures (Step E₂)

2. Of the channels with SAR in $\text{SAR}_m \geq 0.8$, Measure SAR in highest output power channel of $\text{SAR}_{m+1}$

3. If $\text{SAR}_m > 1.2 \text{ W/kg}$?
   - Yes, $\text{SAR}_m \rightarrow \text{SAR}_{m+1}$
   - No, $\text{SAR}_m \rightarrow \text{SAR}_{m+1}$

4. If $\text{SAR}_m > 0.8 \text{ W/kg}$?
   - Yes

5. If $\Delta P_{m, m+1} < 0.5 \text{ dB}$ ? (for m measured for SAR)
   - Yes

6. If $\text{SAR}_m \rightarrow \text{SAR}_{m+1}$

7. If No, back to Step 3