



# Power Measurement Overview: Part 27 WCS Rule Changes

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April 5<sup>th</sup>, 2011



# Part 27 WCS Rule Changes

- Part 27 rules applicable to the Wireless Communications Service (WCS) have been revised:
  - Specified in WCS/SDARS Report and Order FCC 10-82
  - Became effective on Sept 1<sup>st</sup>, 2010
  - Petitions for reconsideration are still pending
- Changes effecting compliance measurements:
  - 27.50(a) includes new limits on WCS power and duty cycle
  - 27.53(a) includes a new WCS out-of-band emissions mask



# WCS Authorized Frequencies and Band Plan

- §27.5(a) The following frequencies are available for the WCS in the 2305-2320 MHz and 2345-2360 MHz bands:
  - Two paired channel blocks available on MEA<sup>1</sup> basis:
    - Block A: 2305-2310 MHz (A1) and 2350-2355 MHz (A2)
    - Block B: 2310-2315 MHz (B1) and 2355-2360 MHz (B2)
  - Two unpaired channel blocks available on REAG<sup>1</sup> basis:
    - Block C: 2315-2320 MHz
    - Block D: 2345-2350 MHz

<sup>1</sup> MEA: Major Economic Area; REAG: Regional Economic Area Groupings; See 27.6(a) for more information



## §27.50(a) Power and Duty Cycle Limits

### ● §27.50(a)(1) Base and Fixed WCS Stations

- Base and Fixed stations operating in blocks A or B:
  - Average EIRP  $\leq$  2000 watts (63 dBm) in any 5-MHz and  $\leq$  400 watts (56 dBm) in any 1-MHz
  - PAPR  $\leq$  13 dB
- Base and Fixed stations operating in blocks C or D:
  - Peak EIRP  $\leq$  2000 watts (63 dBm) in 5-MHz
  - FDD operations restricted to blocks A2, B2 and/or D



## §27.50(a) Power and Duty Cycle Limits (continued)

### ● §27.50(a)(2) Fixed Customer Premises Equipment (CPE) Stations

- Peak EIRP  $\leq$  20 watts (43 dBm) in 5-MHz
- Automatic transmit power control required
- Outdoor antenna prohibited if average EIRP  $\leq$  2 watts (33 dBm) in 5 MHz
- Maximum D.C.  $\leq$  38% for TDD operations.
- Maximum D.C.  $\leq$  25% for FDD operations in blocks A1 and B1
- Maximum D.C.  $\leq$  12.5% for FDD operations in block C



## §27.50(a) Power and Duty Cycle Limits (continued)

### ● §27.50(a)(3) Mobile and Portable Stations

- Not permitted in the 2317.5-2320.0 MHz or 2345.0-2347.5 MHz portions of the C and D blocks
- For stations operating in 2305.0-2317.5 MHz and/or 2347.5-2360.0 MHz
  - Average EIRP  $\leq$  250 milliwatts (24 dBm) in 5-MHz and 50 milliwatts (17 dBm) in any 1-MHz
- Power averaging not to include transmitter off time
- Automatic transmit power control required



## §27.50(a) Power and Duty Cycle Limits (continued)

### ● Mobile and Portable Stations (continued)

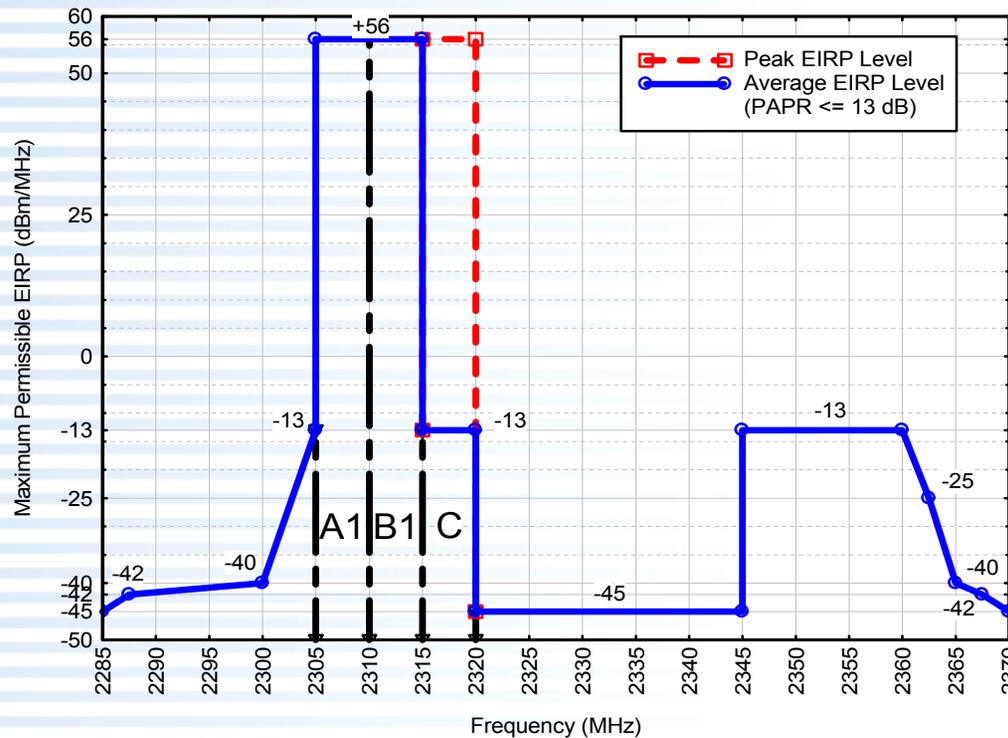
- FDD operations restricted to blocks A1, B1, and the authorized portion of C (2305-2317.5 MHz)
- Maximum D.C.  $\leq$  38% for TDD operations
- Maximum D.C.  $\leq$  25% for FDD operations in blocks A1 and B1 (2305-2315 MHz)
- Maximum D.C.  $\leq$  12.5% for FDD operations in authorized portion of block C (2315-2317.5 MHz)



# §27.53(a) WCS Emission Limits

- Fixed and Base Stations operating in 2305-2320 MHz

Emission Mask for WCS Fixed Transmitter Operating in 2305-2320 MHz Band (TDD Only)

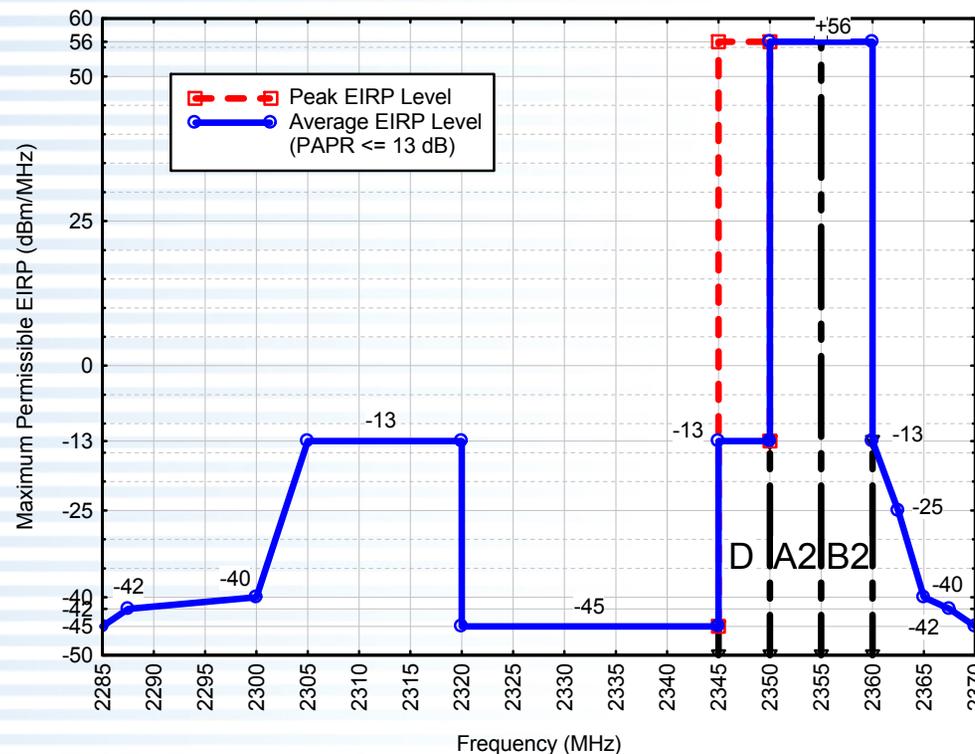




# §27.53(a) WCS Emission Limits (continued)

- Fixed and Base Stations operating in 2345-2360 MHz

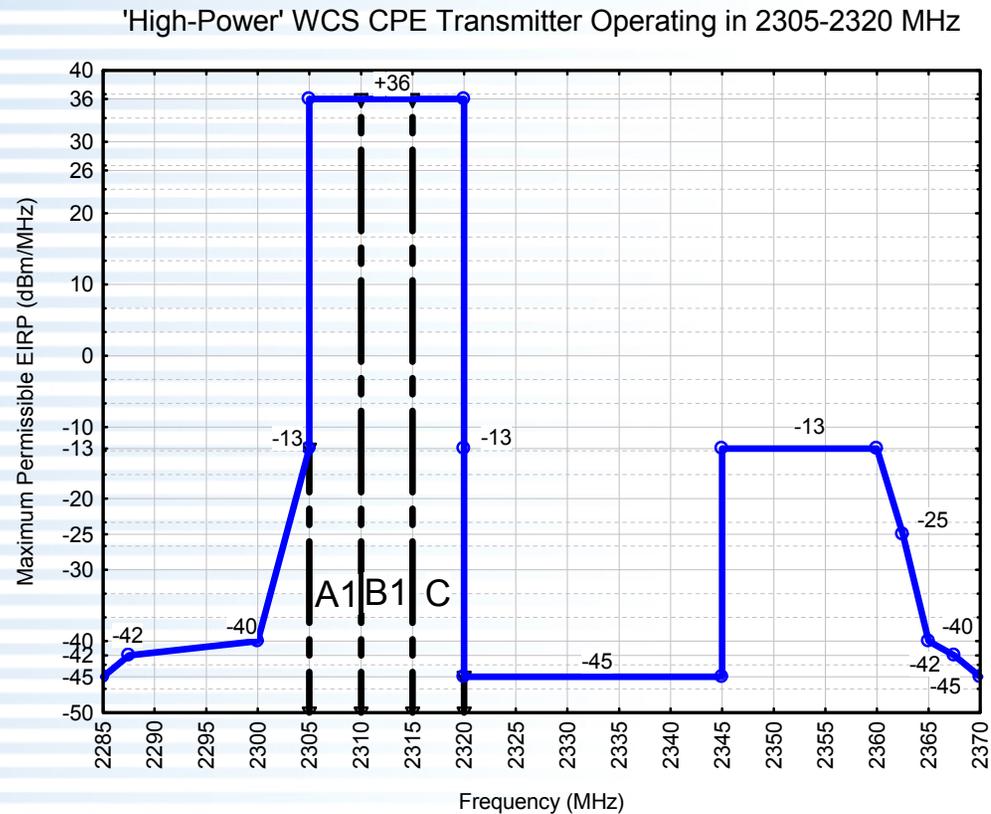
Emission Mask for WCS Fixed Transmitter Operating in 2345-2360 MHz Band (FDD and TDD)





# §27.53(a) WCS Emission Limits (continued)

- Fixed “high power” (Avg EIRP > 2 watts (33 dBm) in 5-MHz) CPE Stations operating in 2305-2320 MHz

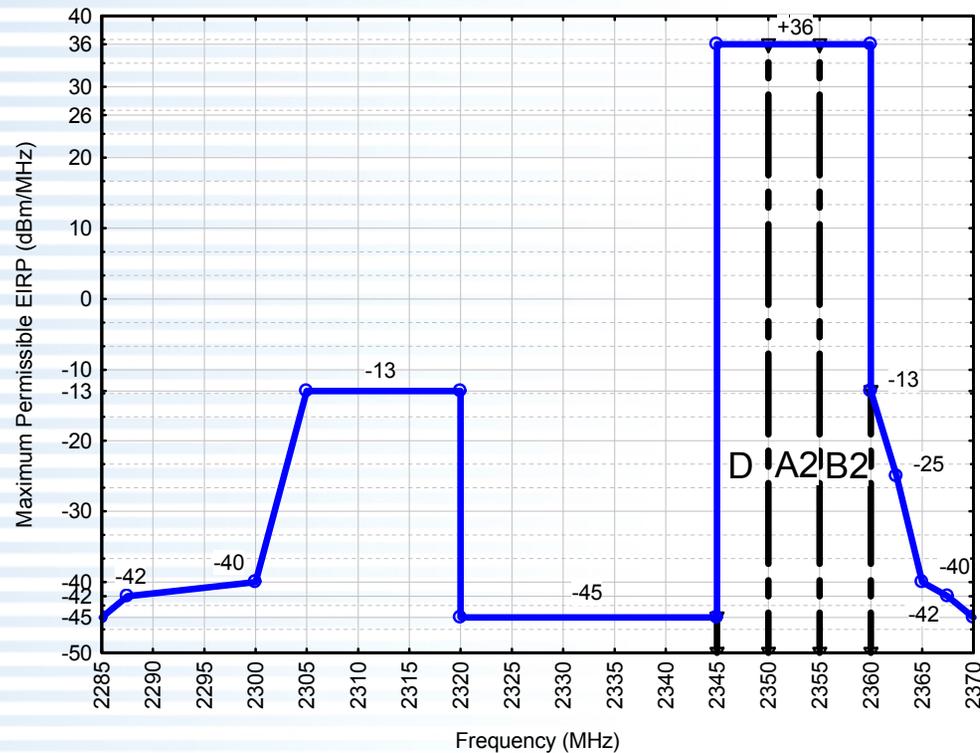




# §27.53(a) WCS Emission Limits (continued)

- Fixed “high power” (Avg EIRP > 2 watts (33 dBm) in 5-MHz) CPE Stations operating in 2345-2360 MHz

'High-Power' WCS CPE Transmitter Operating in 2345-2360 MHz

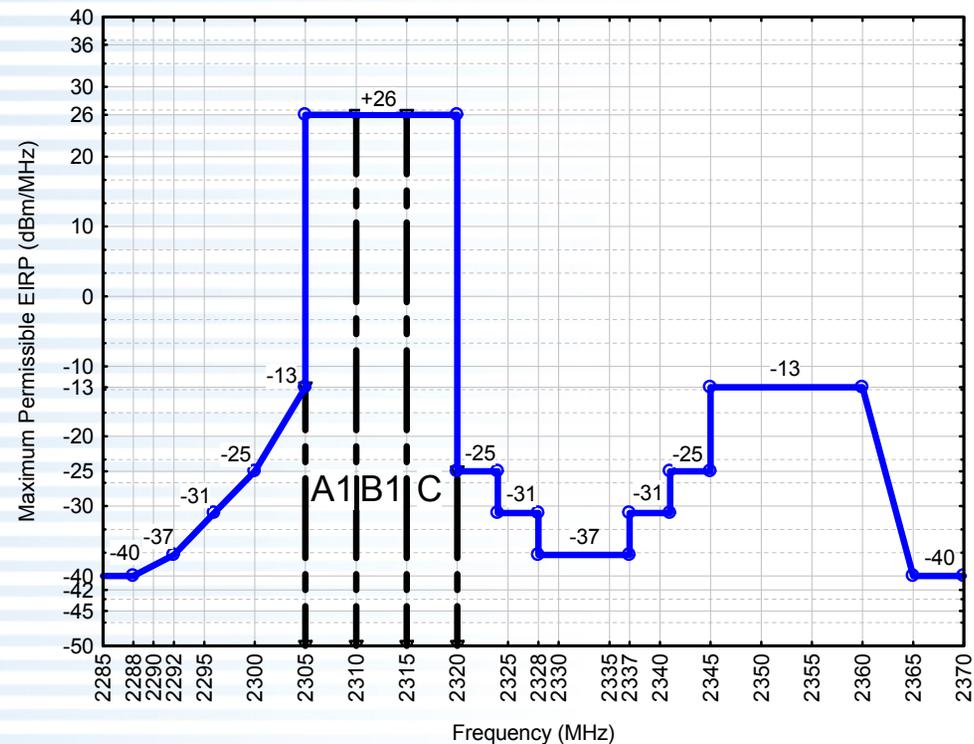




# §27.53(a) WCS Emission Limits (continued)

- Fixed “low power” (Avg EIRP  $\leq$  2 watts (33 dBm) in 5-MHz) CPE Stations operating in 2305-2320 MHz

'Low-Power' WCS CPE Transmitter Operating in 2305-2320 MHz

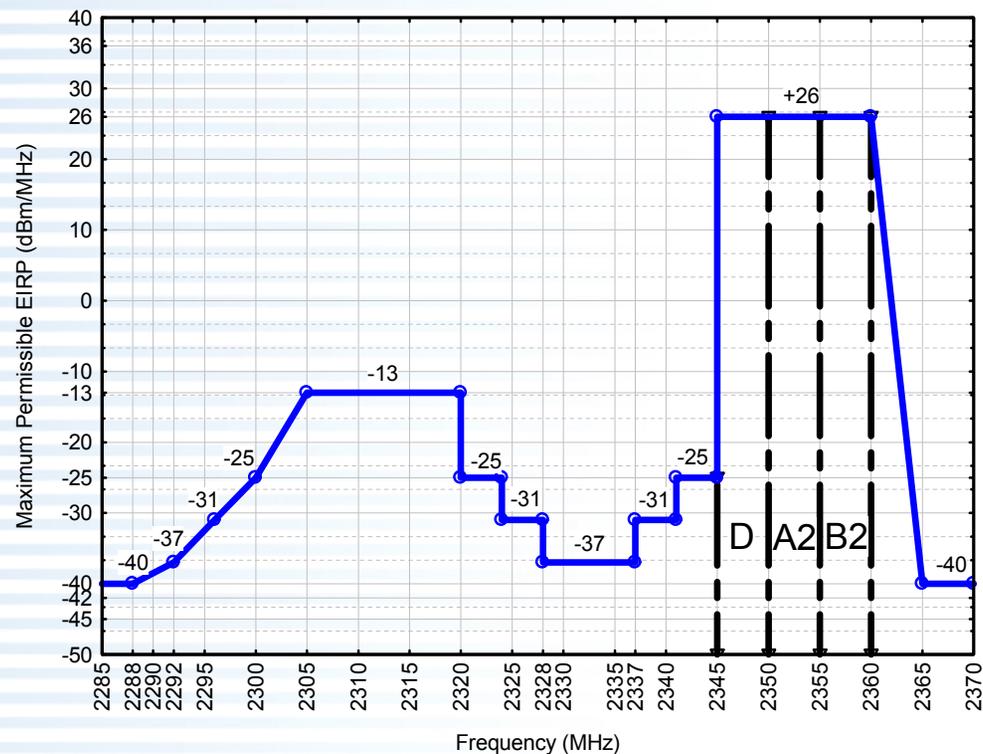




## §27.53(a) WCS Emission Limits (continued)

- Fixed “low power” (Avg EIRP  $\leq$  2 watts (33 dBm) in 5-MHz) CPE Stations operating in 2345-2360 MHz

'Low-Power' WCS CPE Transmitter Operating in 2345-2360 MHz

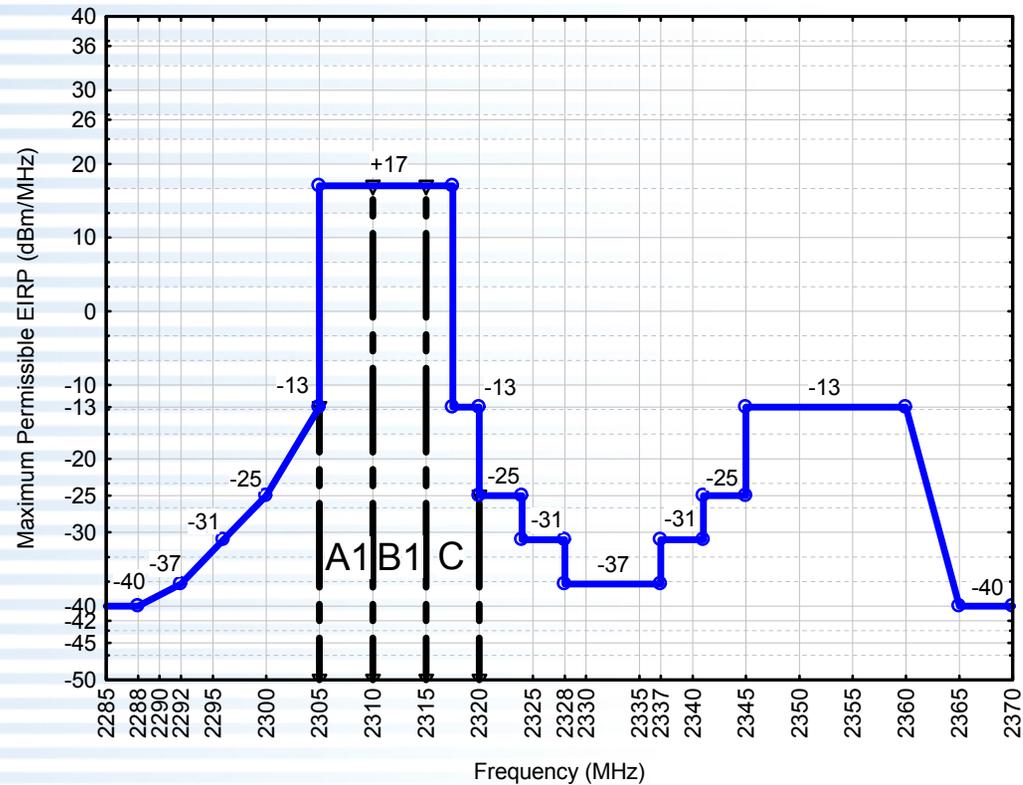




# §27.53(a) WCS Emission Limits (continued)

- Mobile and Portable WCS Stations operating in 2305.0-2317.5 MHz

Mobile or Portable WCS Transmitter Operating in 2305-2317.5 MHz

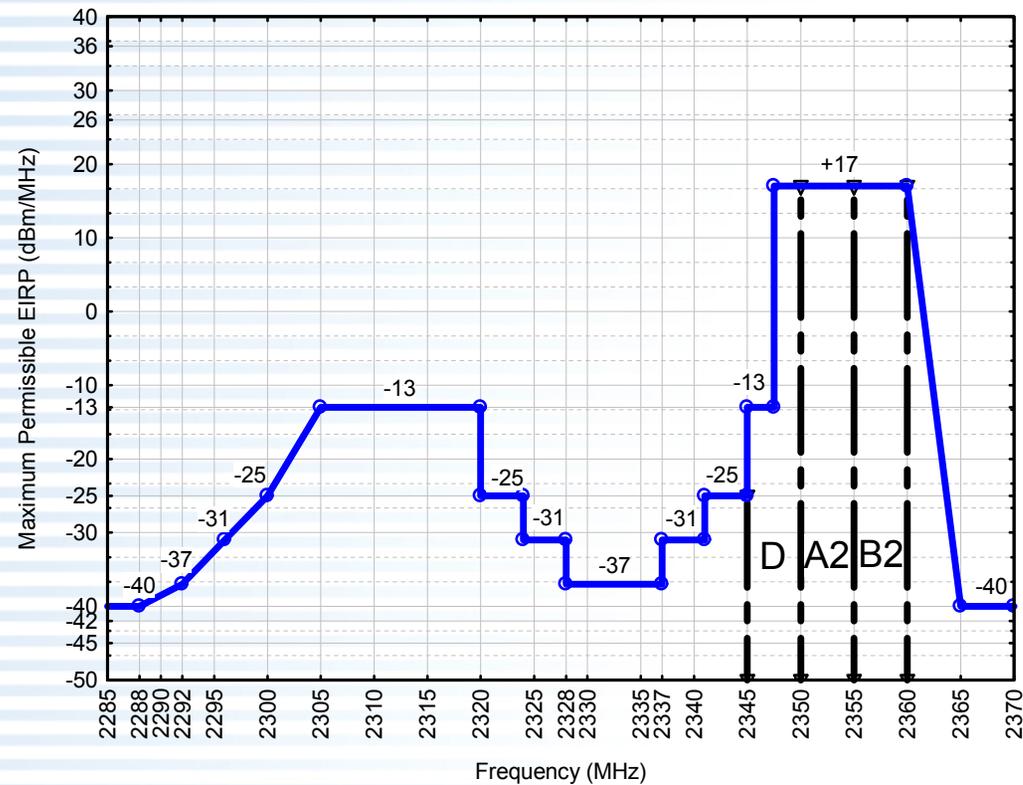




# §27.53(a) WCS Emission Limits (continued)

- Mobile and Portable WCS Stations operating in 2347.5-2360.0 MHz

Mobile or Portable WCS Transmitter Operating in 2347.5-2360 MHz





# Compliance Measurement Procedures

- WCS applications subject to Permit-But-Ask (PBA) policy requirements
- Standardized measurement procedures for demonstrating compliance to EMC requirements are under development
  - KDB 971168 applicable to power measurements
  - KDB 412172 applicable to EIRP determination



# Compliance Measurement Procedures (continued)

- A WCS PBA filing shall include at minimum:
  - A comprehensive operational description including the type of modulation/access technology utilized (e.g., WiMax, LTE, etc.)
  - All power measurement data, including a complete test description
  - The EIRP levels determined from the measured power data, including calculations and assumptions, demonstrating compliance to the applicable limits



# Compliance Measurement Procedures (continued)

- PBA filing requirements (continued)
  - The maximum duty cycle and how it was determined and verified
    - Duty cycle defined in R&O as the percentage of a transmission frame that a WCS user device uses to transmit uplink information to the base station (*i.e.*, the “on time” of a WCS user device’s transmitter in a given transmission frame)
  - A description of the transmit power control mechanism where applicable
- Additional information related to RF exposure considerations may also be required



# Questions and Answers

**Thanks!**