

**EXHIBIT 3: FCC REQUIRED INFORMATION (PART 2.1033)**

The following information is presented in the content and format requested by the FCC:

**Section 2.911 (d) Qualification Of Engineers**

**Section 2.911 (d): Technical test data shall be signed by the person who performs or supervises the tests. The person signing the test data shall attest to the accuracy of such data. The Commission may require such person to submit a statement showing that he is qualified to make or supervise the required measurements.**

Michael P. Farina is a Member of Technical Staff at Alcatel-Lucent USA, Inc., Murray Hill, NJ, formerly AT&T Bell Laboratories, with 54 years of Professional Experience in Research and Development. He holds a BS in Physics from Upsala College and an MSEE from New Jersey Institute of Technology, and is an alumni member of IEEE and AIP. During the past 23 years, his expertise was focused on RF Engineering and Regulatory Agency EMC compliance and certification, covering Analog, TDMA, CDMA UMTS, and LTE technologies. He has submitted numerous Applications for Certification filings to the FCC covering many product variations and evolutions in each of the five technologies. Previously, he was the Lead Engineer for filing TDMA and UMTS Wireless Base Station products with the FCC. Current focus is now LTE.



Raymond J. Johnson  
Technical Manager  
FCC/EMC Compliance  
Murray Hill, New Jersey

**Section 2.911 (e)(g) Certification of Technical Test Data**

**Section 2.911 (e) The signatures of the applicant and the person certifying the test data shall be made personally by those persons on the original application; copies of such document may be confirmed. Signatures and certifications need not be made under oath.**

**Section 2.911 (g) Signed, as used in this section, means an original handwritten signature; however, the Office of Engineering and Technology may allow signature by any symbol executed or adopted by the applicant with the intent that such symbol be a signature, including symbols formed by computer-generated electronic impulses.**

I hereby certify that the technical test data are the results of tests either performed or supervised by me.

Michael P. Farina  
Member of Technical Staff  
FCC/EMC Compliance  
Murray Hill, New Jersey

**Section 2.1033 (c)(1):**

The full name and mailing address of the manufacturer of the device and the applicant for certification.

**Alcatel-Lucent USA, Inc.  
600-700 Mountain Ave  
Murray Hill, NJ 07974**

**Section 2.1033(c)(2): FCC Identifier AS5ONEBTS-27**

**Section 2.1033(c)(4):**

Type or types of emission: **17M9F9W**

**Section 2.1033(c)(5):** Frequency range **Transmit: 1930 – 1990 MHz**

**Section 2.1033(c)(6):**

Range of operating power values or specific operating power levels, and description of any means provided for variation of operating power.

The RRH2x60-1900 is designed for 2x2MIMO operation with a long term average power at each of the 2 transmit terminals of 60 W (47.8 dBm), with 20 MHz emission band width (BW). Total composite power at the air interface is then 120 W (50.8 dBm). This product supports 3 LTE (Long Term Evolution) modulation schemes: QPSK, 16QAM and 64QAM. Power adjustment is software controlled, using baseband digital scaling to set and adjust voltage variable attenuators in the transceiver.

**Section 2.1033(c)(7):**

Maximum power rating as defined in the applicable part (s) of the rules.

The maximum long term power rating at each transmit antenna terminal (downlink) is 60 Watts (+47.8 dBm).

**Section 2.1033 (c)(8):**

The dc voltages applied to and the dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range.

The overall maximum rated power consumption for the RRH2x60-1900 is 720 W. For a -48 Vdc power source, the maximum input current for the system would be 15 Adc.

**EXHIBIT 3: FCC REQUIRED INFORMATION (PART 2.1033) - continued****Section 2.1033 (c)(9):**

Tune-up procedure over the power range, or at specific operating power levels.

There are no user tune-up features. All tuning is performed by the manufacturer during, and as part of, the manufacturing process.

**Section 2.1033 (c)(10)**

A description of all circuitry and devices for determining and stabilizing frequency.

The carrier frequency (the fundamental frequency) is determined by the up-conversion of digital baseband signals to IF frequencies. Frequency stability of the carrier frequency is achieved with an accuracy better than the rated  $\pm 0.05$  ppm by the use of a stable master oscillator, GPS timing and proprietary phase locked loop (PLL) circuitry.

**Section 2.1033 (c)(10): Description of circuitry and devices for suppression of spurious radiation.**

Spurious emissions radiated from Alcatel-Lucent's wireless RRH2x60-1900 base station transmitter system are suppressed by implementing sound Electromagnetic Compatibility (EMC) design practices extending from the circuit board level to the system level: 1) grounded RF shielding on coaxial cables, 2) grounded RF shielding "cans" mounted on specific circuit elements, 3) effective grounding throughout, and 4) effective transmit bandpass filters to suppress transmitted spurious and harmonic emissions by more than 20 dB below the FCC required limitation.

**Section 2.1033 (c)(10): Description of Circuitry and Devices for Limiting Modulation, and for Limiting Power.**

Modulation limiting is described in the documents that must be held as confidential, which are the same as on file with the FCC under the initial Grant of Equipment Authorization, and therefore it is not necessary to repeat them.

Power control and overdrive protection of each individual RF/Tx output is accomplished by software which controls a microprocessor that sends digital baseband signals to a voltage variable attenuator, which is used for output power adjustment. The transmitter can then be disabled through firmware which sets the RF attenuator to maximum loss and thus disables the final RF amplifier stage.

**EXHIBIT 3: FCC REQUIRED INFORMATION (PART 2.1033) - continued****Section 2.1033 (c)(13): Description of the modulation system.**

The RRH2x60-1900 LTE base station transmitter is designed for QPSK, 16QAM and 64QAM modulation schemes, with an emission designator of 17M9F9W. The modulation process is fully described in the documents that must be held as confidential, which are the same as on file with the FCC under the initial/original Grant of Equipment Authorization, and therefore it is not necessary to repeat them.