APPLICANT:
Ericsson Radio Systems AB

FCC ID NO.
B5KKRC13149-15

EXHIBIT 12 - COVER SHEET

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APPLICANT:
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DESCRIPTION

2.1033 (c) (2) FCC Identifier: B5KKRC13149-15

This transmitter is a synthesized transmitter operating in the frequency band of 1930 to 1990 MHz. There are 299 Channels available with a channel spacing of 200 kHz This is a constant envelop transmitter using GMSK 0.3 modulation, which is MSK filtered with a Gaussian filter, having a BT product of 0.3. The transmitter is capable of operation in a TDMA (Time Division Multiple Access) system. For each channel there are 8 time slots available, each containing digital speech or data.

(4) Type of Emission: 210KGXW

(5) Frequency range: 1930 to 1990 MHz

(6) Range of Operating Power: This transmitter is designed to supply a maximum nominal power level of 44.9 dBm of power at the antenna connector. The power level can be set at 16 power levels, each with a 2-dB increment. The power levels are labeled P (0) to P (15) where P (0) is the highest power level.

(7) Maximum Power Rating: The maximum power rating under environmental and supply voltage variations is equal to 44.9 dBm plus a power level tolerance of + 1.7 dB. Therefore the maximum output power is 46.6 dBm equal to 45.7 W at the antenna connector of the radio base station.

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(8) Final Amplifier Voltage and Current in normal operation

	P(0)	P(15)
Collector Voltage	25.5 Volt DC	25.5 Volt DC
Collector Current	4.4 Amps DC	0.41 Amps DC

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2.1033 (c)(10) Frequency Stabilizing Circuit Description

The transmitter contains three synthesized oscillators. One gives a 160 MHz signal to the I/Q modulator. The two other generate a 1770 to 1830 MHz signal to the mixer where the modulated signal is upconverted to the transmit frequency. Two oscillators are needed in frequency hopping mode; one is retuning while the other is active.

All three synthesized oscillators have as reference a 13 MHz sinusoidal signal generated in a phase locked loop (PLL) in the TRU. The PLL is locked to a 270.8 kHz signal, which is generated and distributed, to all TRU in the basestation by the DXU (Distribution Switch Unit).

The frequency reference from DXU is generated in a voltage controlled oscillator placed in an oven which is frequency locked to a long term stable oven heated oscillator or as an option to the incoming PCM-link frequency.

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2.1033 (c)(10) Spurious and Harmonic Suppression

Spurious and harmonic suppression is achieved by using two separate bandpass filters (Z3 & Z4) of ceramic type in the exciter. A filter module at the output works like a bandpass filter around the carrier. In addition to these filters, the output signal passes a cavity band pass filter in the combining system.

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2.1033 (c)(10) Limiting Power

The TRU measures the output power at its output connector via a RF-detector and the detected value is used by the power loop control block to steer two variable gain amplifiers between the modulator and the power amplifier.

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2.1033 (c)(10) Digital Modulation

The modulation description is given in PN3389 Air Interface: Volume 1 section 4.

4. Modulation

This chapter defines the theoretical requirements of the modulator, inclusive of the differential encoder. The modulator receives the bits from the encryption unit and produces a RF modulated signal. The information bits are first differentially encoded and then passed to the modulator. The modulation is GMSK (Gaussian Minimum Shift Keying) with a BT product of 0.3.

4.1 Modulation Format

4.1.1 Modulating Bit Rate

The modulating bit rate is 1/T = 1625/6 kb/s (approximately 270.633 kb/s).

4.1.2 Start And Stop Of The Burst

The bits contained within a burst are defined in chapter 2. For the purpose of the modulator specification that follows, the bits entering the differential encoder prior to the first bit of the burst and following the last bit of the burst are consecutive logical ones and are denoted by the term dummy bits which define the start and end points of the useful and active parts of the burst as shown in Figure 4.1. The actual state of these bits is left to the manufacturer's implementation subject to the requirement that all performance specifications of this volume are met. Nothing is specified about the actual phase of the modulator output signal outside of the useful part of the burst. Figure 4.1 depicts the relationship between the active and useful part of the burst, the tail bits and dummy bits for a normal burst. The useful part of the burst lasts for 147 modulating bits.

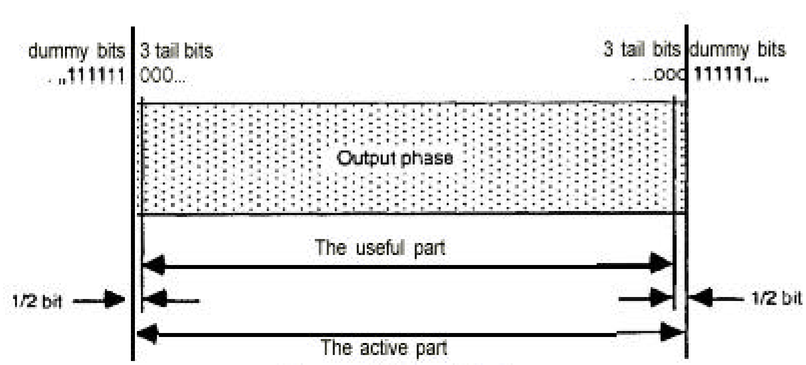

Figure 4.1: Normal Burst

4.1.3 Differential Encoding

Each data value d_i=[0,1] is differentially encoded. The output of the differential encoder is:

$$\hat{d}_i = d_i \oplus d_{i-1}$$

where $\oplus$ denotes modulo 2 addition.

The modulating data value a_i input to the modulator is:

$$a_i = 1 - 2\hat{d}_i$$

Where $a_i \in \{-1,1\}$

4.1.4 Filtering

The modulating data values a_i as represented by Dirac pulses excite a linear filter with impulse response defined by:

$$g(t) = h(t) * \mathrm{rect}\frac{t}{0^{T}}$$

where the function rect(x) is defined by:

$$\mathrm{rect}\frac{t}{0^{T}} = \frac{1}{T} \text{ for } |t| < \frac{T}{2}$$

$$\mathrm{rect}\frac{t}{0^{T}} = 0 \text{ otherwise}$$

and ∗ means convolution. h(t) is defined by:

$$h(t) = \frac{e^{\left(\frac{-t^2}{2s^2T^2}\right)}}{\sqrt{2p}\, sT} \text{ where } s = \frac{\sqrt{\ln(2)}}{2pBT} \text{ and BT=0.3}$$

where B is the 3 dB bandwidth of the filter with impulse response h(t), and T is the duration of one input data bit.

4.1.5 Output Phase

The phase of the modulated signal is:

$$j(t') = \sum_{i} a_i ph \int_{-\infty}^{t'-iT} g(u)du$$

where the modulating index h is l/2 (maximum phase change in radians is π/2 per data interval).
The time reference t' = 0 is the start of the active part of the burst as shown in Figure 4.1. This is also the start of the bit period of bit number 0 (the first tail bit) as defined in chapter 2.

4.1.6 Modulation

The modulated RF carrier, except for start and stop of the TDMA burst may therefore be expressed as:

$$x(t') = \sqrt{\frac{2E_c}{T}} \cos(2pf_0 t' + j(t') + j_0)$$

where E_c is the energy per modulating bit, f_o is the center frequency and φ_o is a random phase and is constant during one burst.