FCC ID: 9900RB

Test Report

Alcatel 9900 LMDS Base Station

This is a summary of the test measurements performed on the Alcatel 9900 LMDS Base Station transmitter as required for type certification under FCC Part 101.

Also included are measurements required for conformance with FCC Part 15 as a Class A unintentional radiator.

Part 2.1045 - RF Power Output

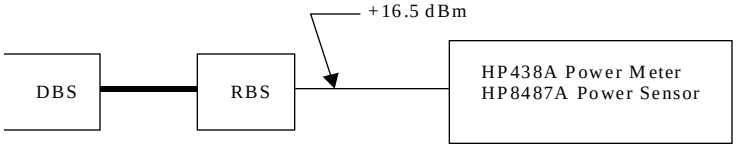
The Alcatel 9900 Base Station is made of two separate assemblies, an indoor Digital Base Station (DBS) and an outdoor Radio Base Station (RBS). The RBS uses internal circuitry to maintain a constant programmed transmitter output power. Losses generated in the cable between the RBS and the DBS are compensated for in the RBS.

DC power for the RBS is supplied from the DBS through the connecting cable. Internal regulator circuits in the RBS generate the required bias currents and voltages for the transmitter devices. No operator adjustments are required other than to program the desired RBS output level.

The RBS uses an integral 90° sector antenna. The transmitter power was measured with the antenna removed and a WR-28 to coaxial transition installed in its place. The transmitter power was then measured using an HP438A Power Meter with an HP8487A Power sensor.

RBS part number:	3CC10871AB
Type design:	solid state
RBS DC Power:	+55 VDC nominal 31 W nominal DC power
Gain:	10 to 31 dB
Output Power:	+7 to +17 dBm (nominal programmable output level) +16.5 dBm (measured output when programmed for maximum power)
Antenna Gain:	15 dB
EIRP:	1.4 W

Test Setup:



Part 2.1047 - Modulation Characteristics

The minimum attenuation limits for the modulated spectrum are defined in 101.111 (a)(2)(ii) by the following equation for frequencies removed from the center frequency by 50 to 250 percent of the authorized bandwidth:

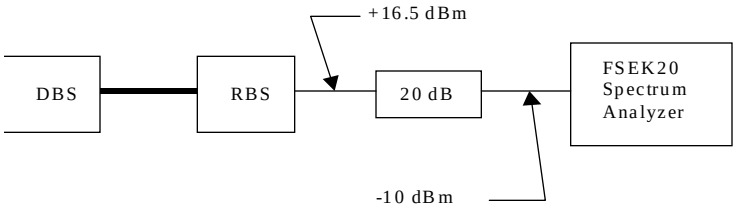
$$A = 11 + 0.4(P-50) + 10\log(B).$$

Maximum required attenuation is 56 dB. Measurements are to be made using a 1 MHz resolution bandwidth.

The authorized bandwidth for the Base Station is the lower LMDS block from 27500 to 28350 MHz. This is an 850 MHz channel centered at 27295 MHz and translates into an attenuation mask defined by the following points:

Frequency (MHz)	Percent	Attenuation (dB)
26862	-250	56
27160	-90	56
27500	-50	40
28350	50	40
28690	90	56
28988	250	56

Test Setup:



The RBS transmitter was set to its maximum nominal output and measured at the antenna output using the HP power meter as +16.5 dBm. The transmit spectrum was then measured with a Rhode&Schwarz FSEK20 spectrum analyzer using the power into the spectrum analyzer (including measurement cable losses) as the reference level. The Base Station operates on center frequencies between 28020 and 28335 MHz. The measurement results for each end of the operating range are shown in Exhibit 1 and Exhibit 2. Expanded measurements at the upper band edge are shown in Exhibit 3. The Base Station does not operate near the lower band edge.

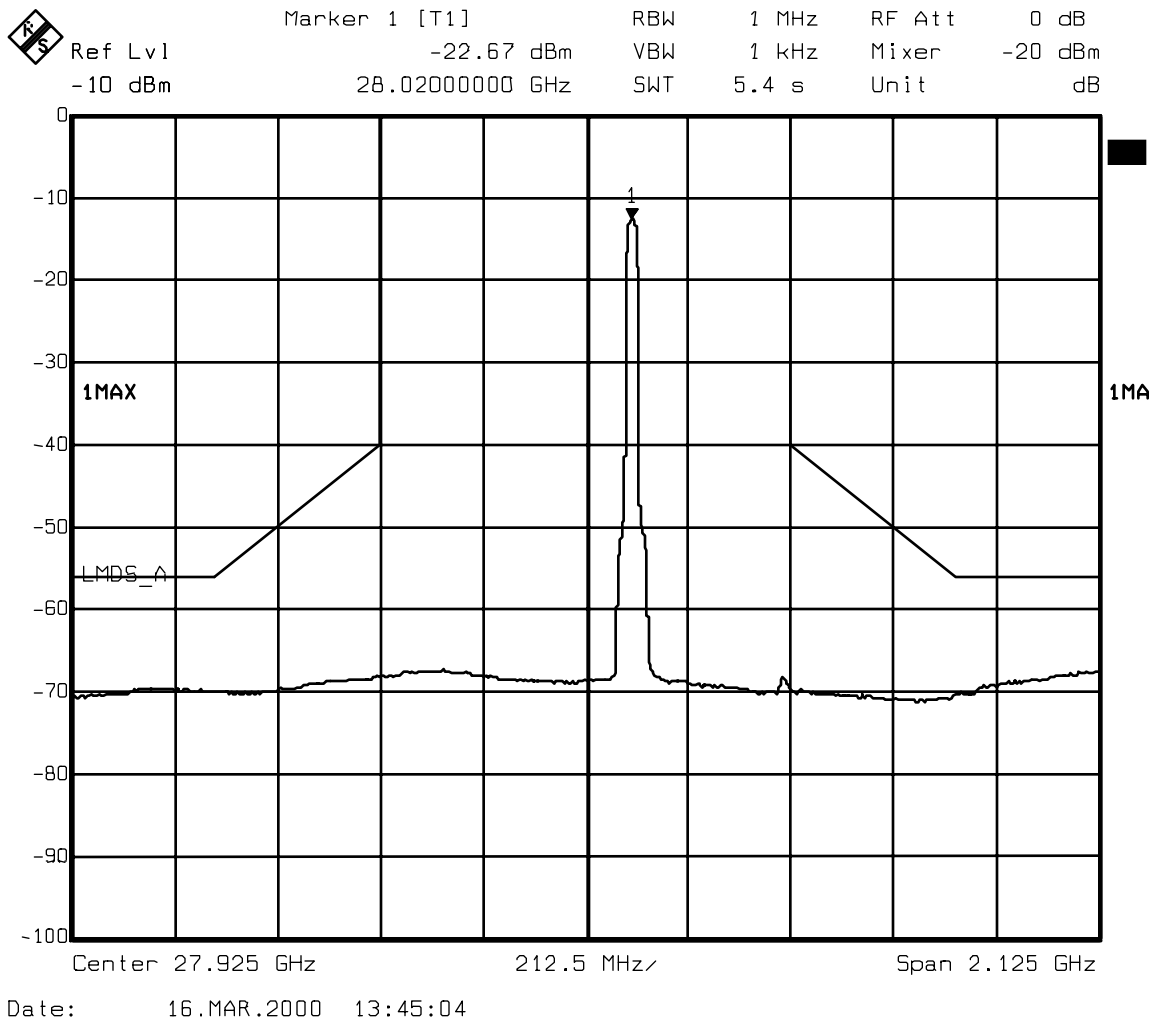


Exhibit 1 - Modulation Characteristics at 28020 MHz

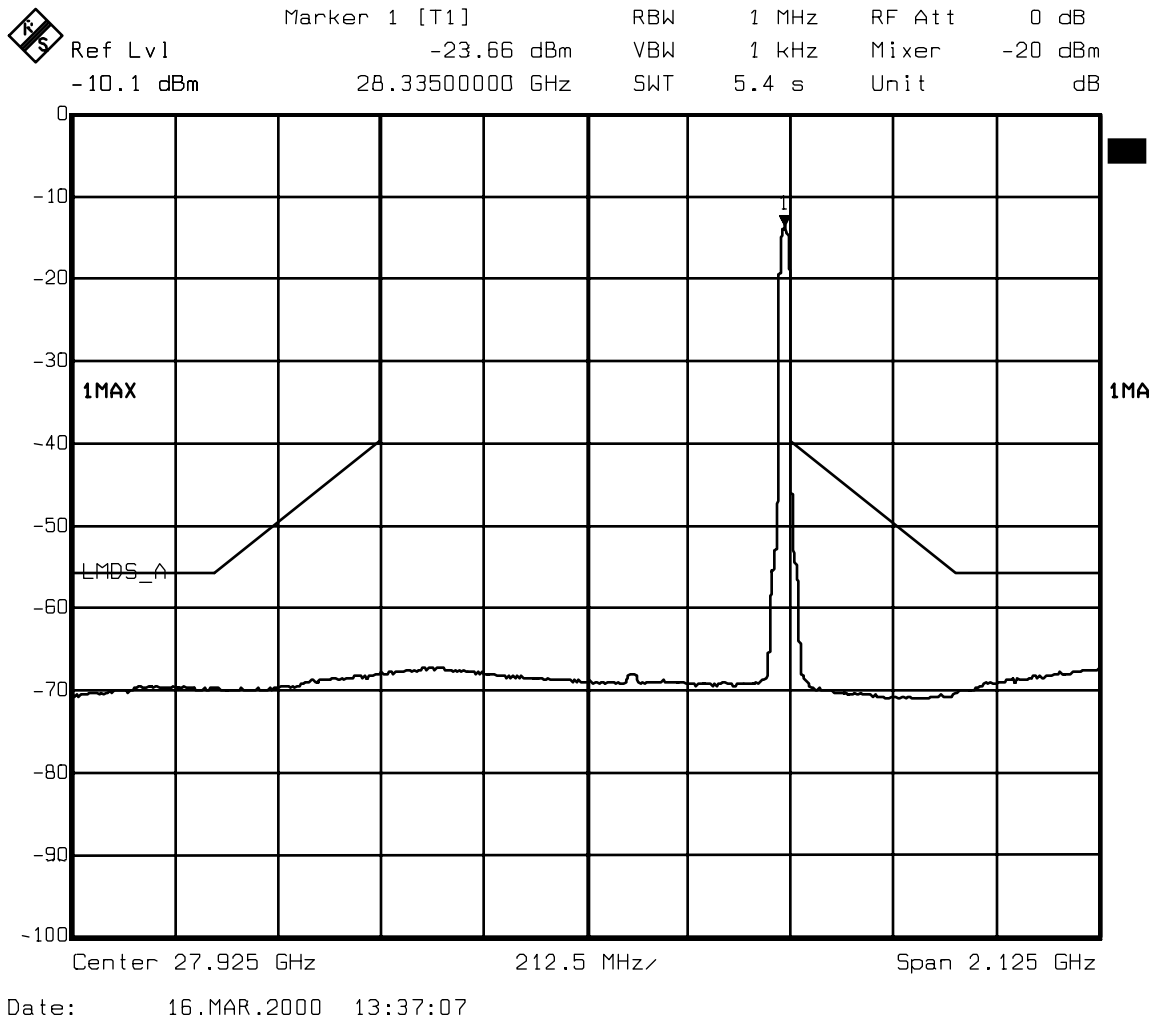


Exhibit 2 - Modulation Characteristics at 28335 MHz

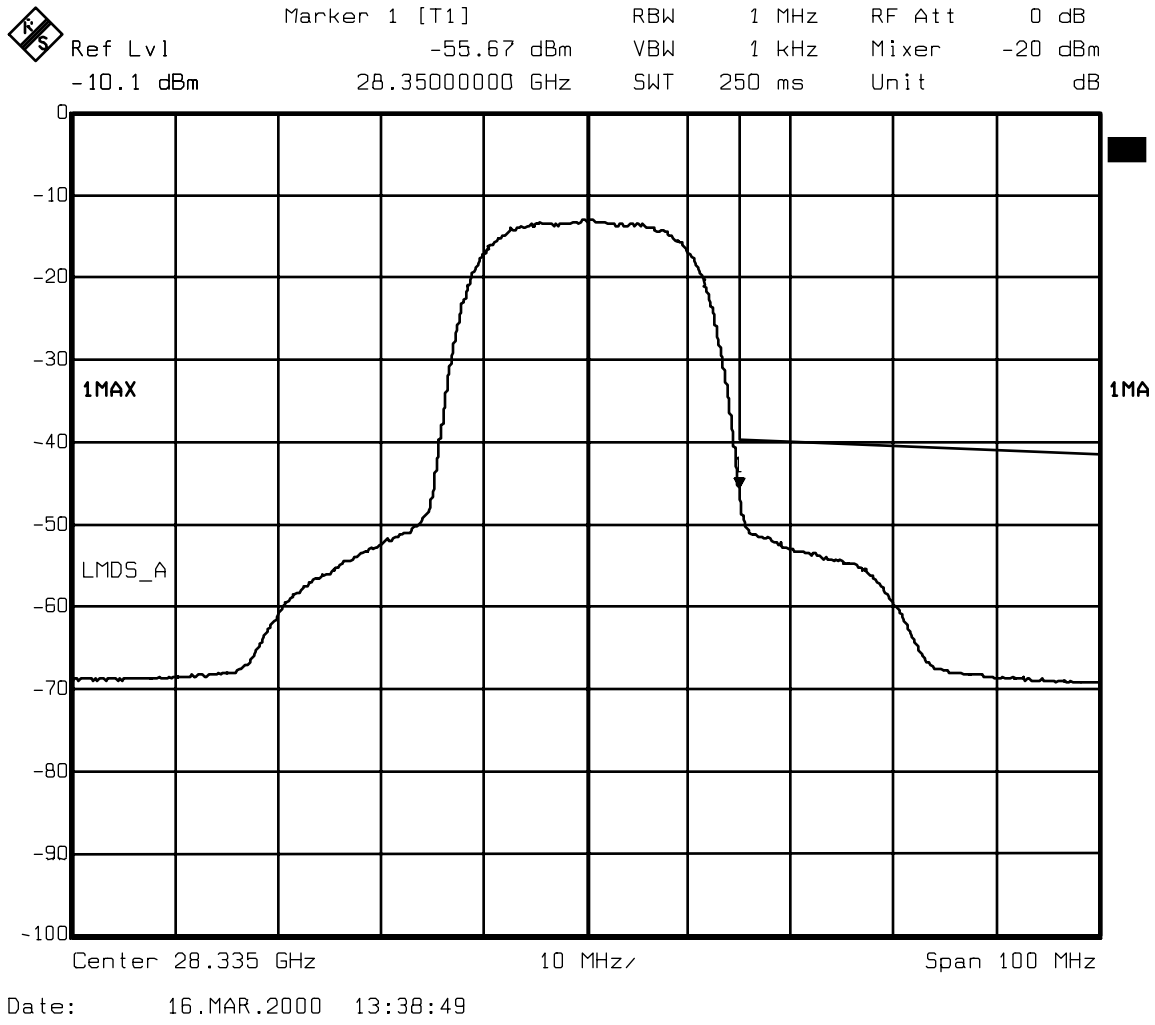


Exhibit 3 - Expanded Modulation Characteristics at 28335 MHz

Part 2.1049 - Occupied Bandwidth

The FSEK20 Spectrum Analyzer has the capability to calculate occupied bandwidth from a measured spectrum. The analyzer was set up to measure 99% bandwidth, resulting in the measurement of 23.63 MHz as shown in Exhibit 4.

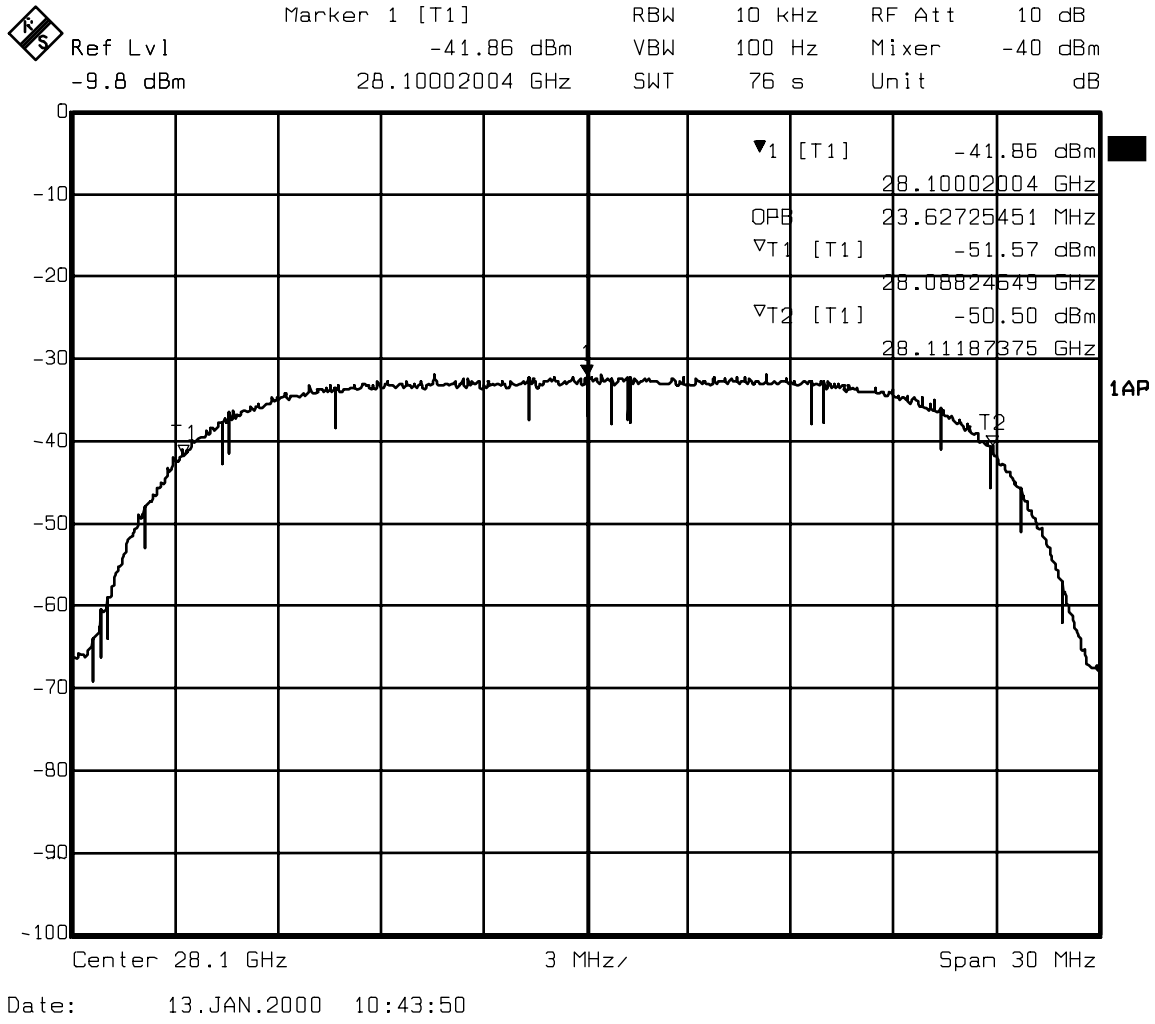


Exhibit 4 - Occupied Bandwidth

Part 2.1051 - Emissions at the Antenna Port

Emissions below 26862 MHz and above 28988 MHz are required by Part 101.111 (a)(2)(iii) to be attenuated from the transmitter output power by 43 + 10log(Power in watts) decibels. For a +17 dBm transmit power, this results in an attenuation of 30 dB.

The RBS transmitter was set to its maximum nominal output and measured at the antenna output using the HP power meter as +16.5 dBm. The transmit spectrum was then measured with a Rhode&Schwarz FSEK20 spectrum analyzer using the power into the spectrum analyzer (including measurement cable losses) as the reference level. Measurements are to be made using a 4 kHz resolution bandwidth. Since this is not a standard spectrum analyzer bandwidth, a resolution bandwidth of 3 kHz was used with the reference level offset by -1 dB.

Measurement results are shown in Exhibit 5. No significant spurious signals were found.

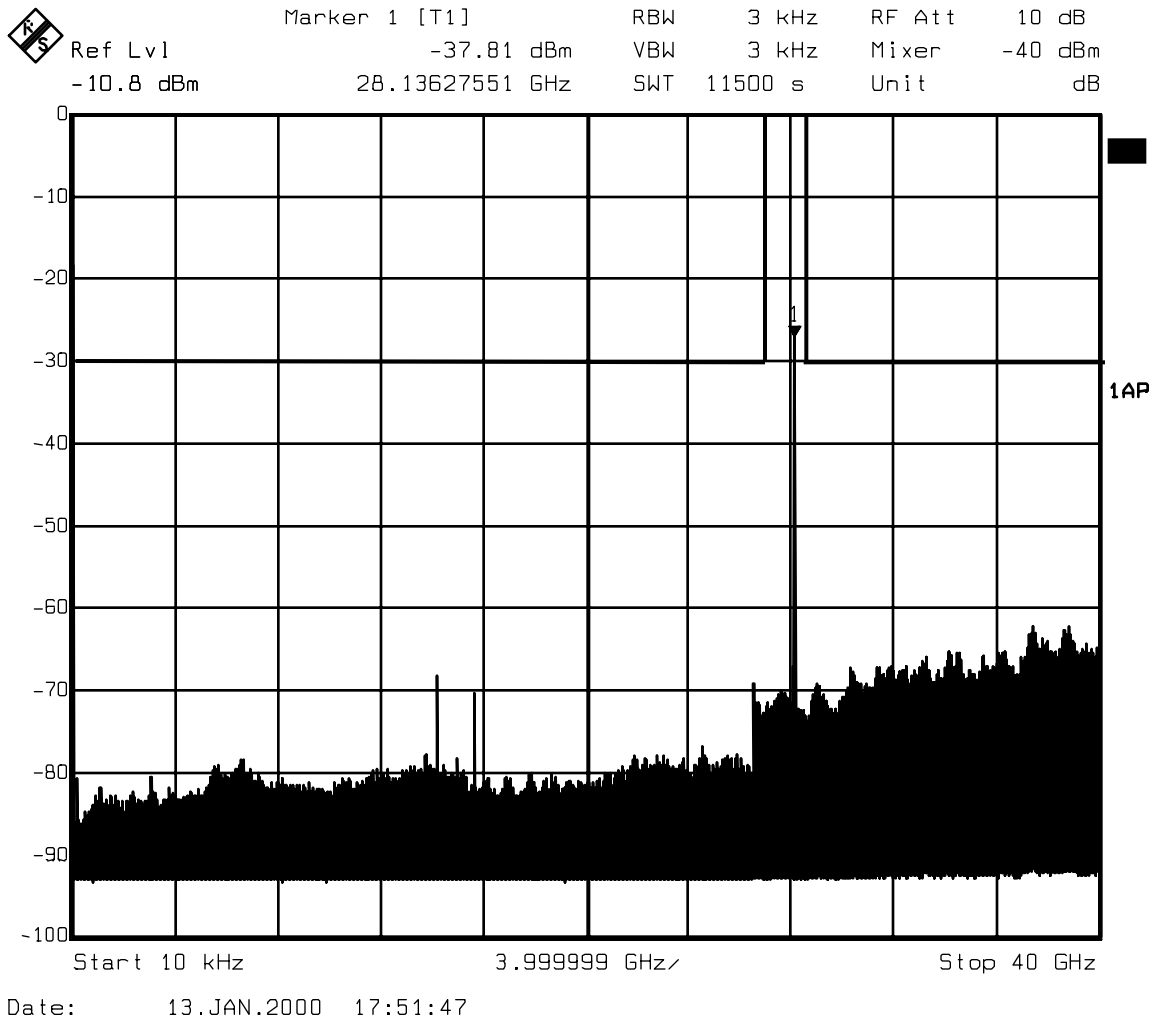


Exhibit 5 - Emissions at the Antenna Port

Part 2.1053/15.109 - Field Strength of Spurious Radiation

Measurements for spurious radiation were taken as part of the CISPR testing performed by CETECOM ICT Services. These results are shown in Exhibit 6, Exhibit 7, and Exhibit 8.

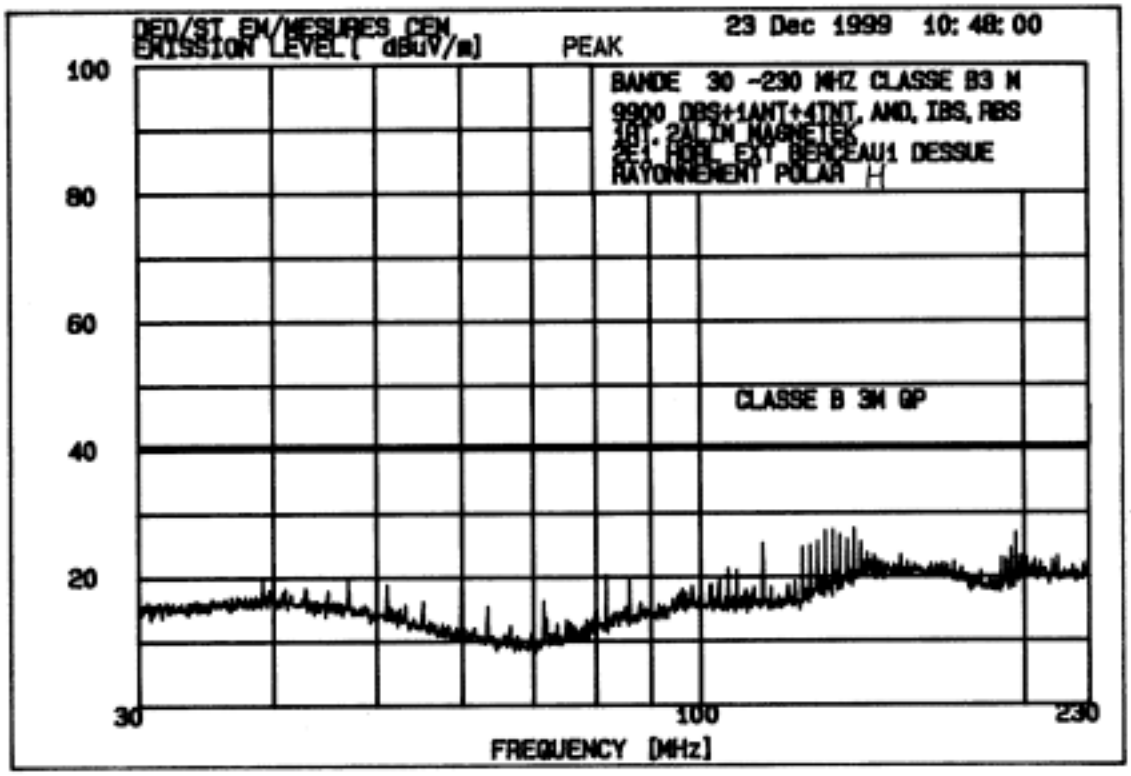


Exhibit 6 - Spurious Radiation (horizontal)

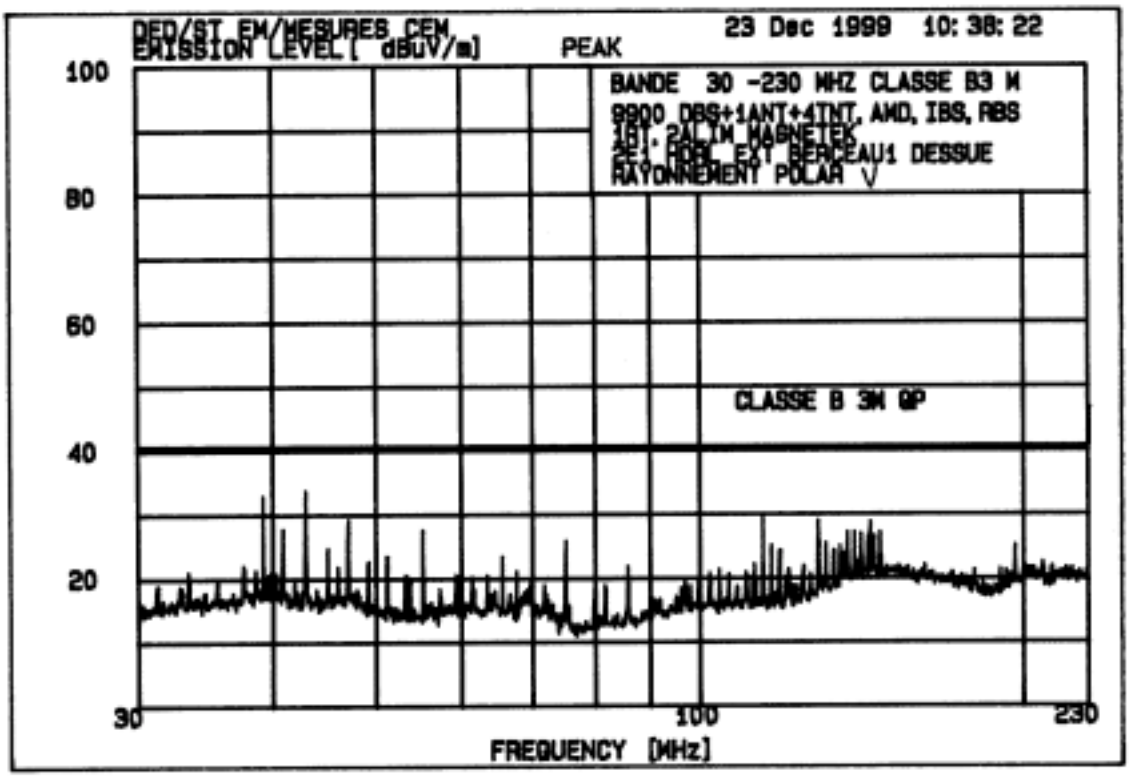


Exhibit 7 - Spurious Radiation (vertical)

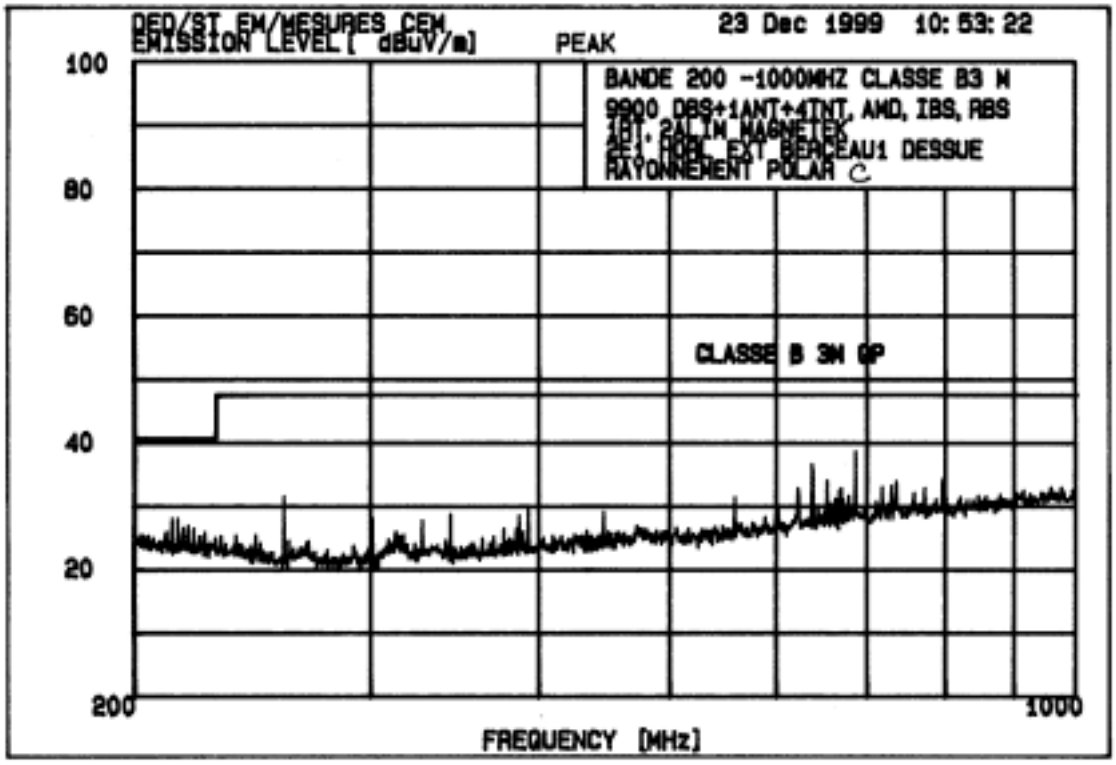


Exhibit 8 - Spurious Radiation (circular)

Part 2.1055 - Frequency Stability

The RBS uses an ovenized crystal controlled oscillator to synthesize the frequencies required for IF/RF conversion.

The RBS local oscillator frequency has a +/-8 ppm stability when operated over a temperature range of -33° to +55° C. The test unit transmit frequency was measured using the Rhode&Schwarz FSEK20 spectrum analyzer (equipped with a high stability time base that provides a measurement accuracy specified to be better than 0.1 ppm). The frequency was measured by monitoring the residual LO signal with the modulation removed. The results are shown in Exhibit 9.

The base station transmitter is turned off whenever the RBS loses communication with the DBS or when the frequency synthesizers are out-of-lock. This prevents the base station from transmitting at the wrong frequency.

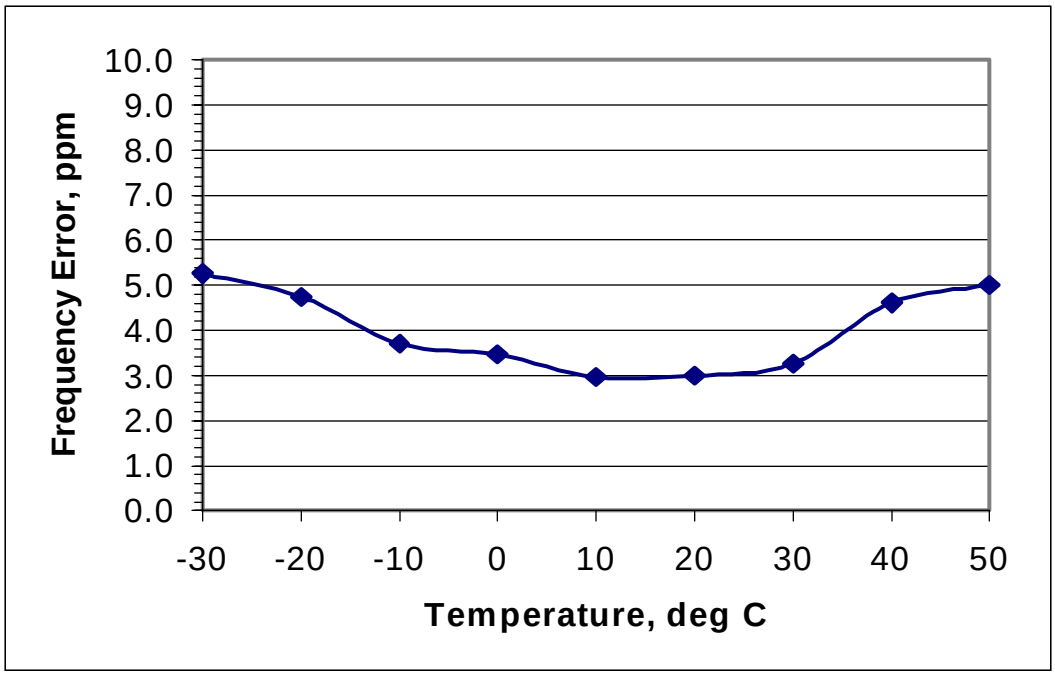


Exhibit 9 - RF Frequency Stability

All frequency determining circuits are powered by internal voltage regulators. Changes in the primary power supplied to the DBS and RBS have no effect on frequency of operation.

Part 15.107 - DC Power Conducted Emissions

The 9900 DBS uses a -48V DC power supply manufactured by Magnetek.

Measurements for conducted emissions were taken as part of the CISPR testing performed by CETECOM ICT Services. These results are shown in Exhibit 10 and Exhibit 11.

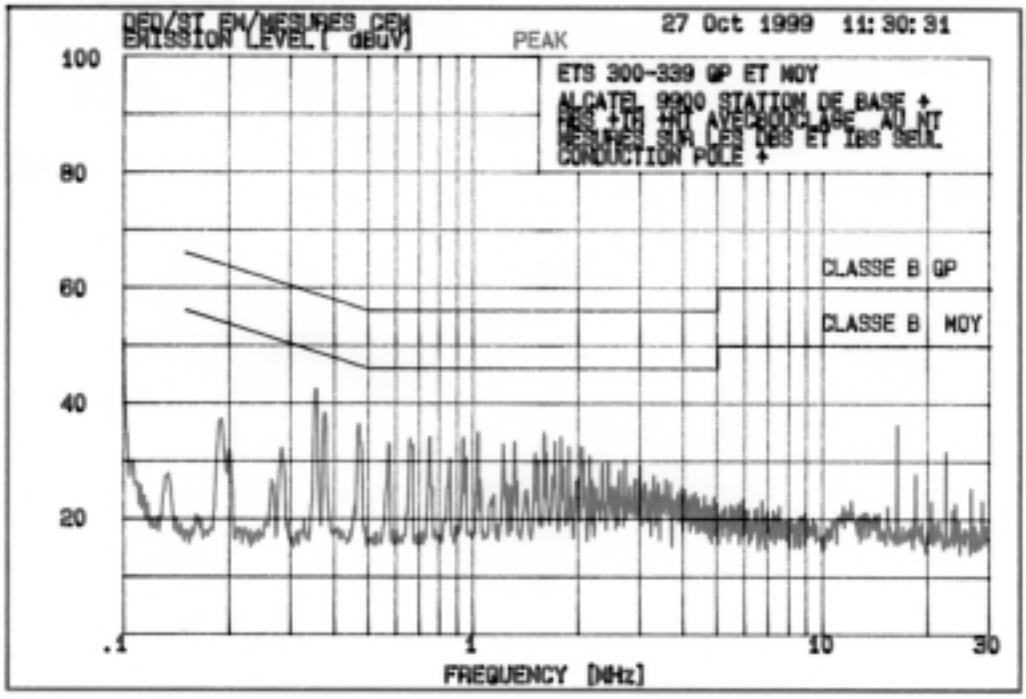


Exhibit 10 - Conducted Emissions on Positive Conductor

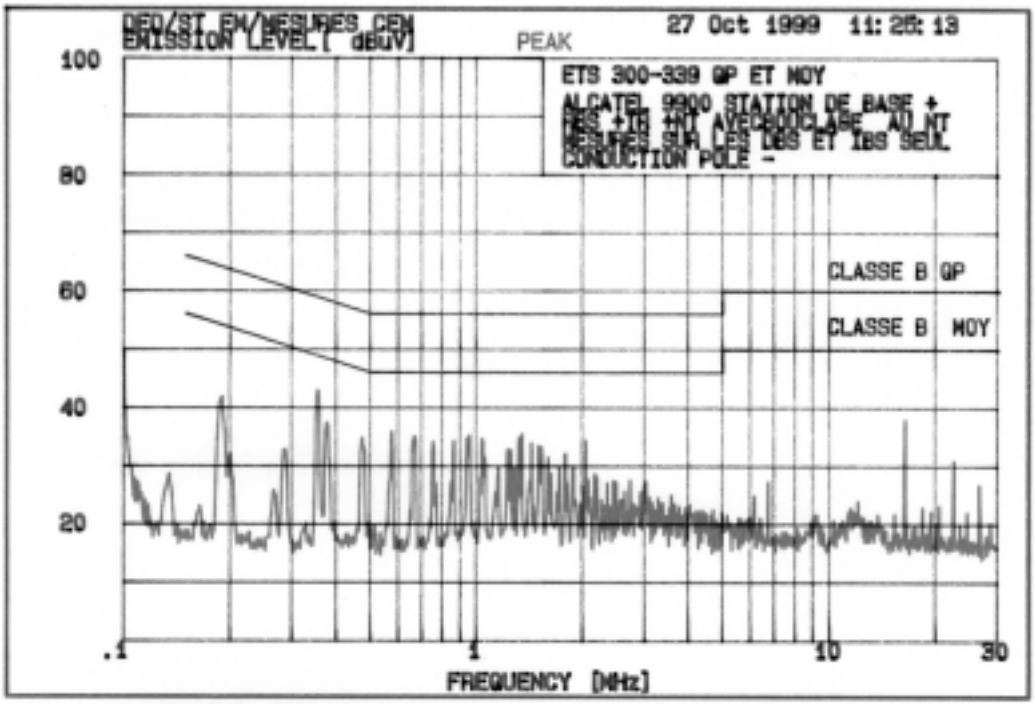


Exhibit 11 - Conducted Emissions on Negative Conductor