APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

EXHIBIT 15

Section 2.1049 Measurements Required: Occupied Bandwidth

The test results in this exhibit demonstrate that the radiated signal (carrier) can not be over modulated by any Analog signal type used as a modulator input. In this Class II Permissive Change request, it is demonstrated that the Cellular TDMA/Analog Multi Carrier Linear Amplifier (CMCLA), 44WA29, does not degrade or affect the Analog modulated carriers from input to output at the transmit terminal. All Analog modulated carriers in this test are generated by the Cellular TDMA/Analog Dual Radio Module (CDRM), 44WR54, which was previously authorized under AS5CMP-32. The occupied bandwidth measurements were made for three carriers representing the cellular band end frequencies and approximately mid-band: Channels 991 (869.04 MHz), 400 (882.00 MHz) and 799 (893.97 MHz). An A-Band simplex transmit filter was utilized for Channels 991 and 400; a B-Band filter was utilized for Channel 799. The modulating signals applied to each carrier are **1)** Audio alone, **2)** Audio + SAT, **3)** SAT alone and **4)** Wideband Data (WBD).

1) In compliance with Part 2.1049(c)(1), the audio modulating signal utilized was a 2500 Hz tone set at a level 16 dB greater than that necessary to produce 50% modulation. The exact procedure followed was in accordance with IS-138-A, Section 3.4.1.1.2. The audio input power level was first set by a 1004 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. The audio input frequency was then set to 2500 Hz for the occupied bandwidth measurement.

2) Audio + SAT modulation was accomplished by first setting the SAT tone to 6030 Hz, and then adjusting it's power level to provide ± 2 kHz peak frequency deviation (PFD) at the transceiver output terminal. The 2500 Hz audio signal from the preceding test was then added to the SAT and the resulting occupied bandwidth was then measured and recorded.

3) SAT alone, at 6030 Hz, was first input to the transceiver and the level adjusted to provide ± 2 kHz PFD at the transceiver output terminal; then the resulting occupied bandwidth was measured and recorded. The SAT signal was generated within the transceiver and did not utilize the baseband as did the externally input Audio signals.

4) Wideband data (WBD) is generated within the transceiver, at a 10 kb/second pseudo-random bit stream, with the power level set to provide ± 8 kHz PFD at the transmitter output terminal. The resulting occupied bandwidth was then measured and recorded for each of the 3 carriers. Since the WBD signal was generated within the transceiver, it did not utilize the baseband as did the externally input Audio signals.

For each Analog modulated carrier, the output power level was set to provide +30.8 dBm (1.2 Watts) at the transmit antenna terminal. Measurements were made both at the transmit antenna terminal and at the input to the CMCLA to demonstrate that the amplifier does not influence and does not alter the occupied bandwidth. Measurements were first made with the Cellular A-Band simplex transmit bandpass filter at **1)** the lowest settable channel Ch 991 (869.04 MHz) and **2)** at mid-band Ch 400 (882.00 MHz). The third measurement was made with the Cellular B-Band simplex transmit bandpass filter at **3)** the highest settable B-Band channel Ch 799 (893.97 MHz).

MINIMUM STANDARD:

Part 22.917(h) specifies that the spectrum analyzer resolution bandwidth (RBW) be set to 300 Hz. The video bandwidth is typically set to 10 x RBW and the measurement detector set to max hold. The emission limitations are based on attenuation below the unmodulated carrier. Using a variable attenuator, the peak of the unmodulated carrier is first positioned to the top of the spectrum analyzer reticle which is set at 0 dBm as reference, and then modulation is applied. Attenuation below the carrier is then read directly off the 0 dBm to -110 dBm scale.

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

EXHIBIT 15

1,2,3) Emission Limitation Mask for Cellular: Audio alone, Audio + SAT, and SAT alone
In accordance with Part 22.917(b), the emission mask for Audio alone, Audio + SAT, and SAT alone modulation over a 120 kHz frequency span, centered on the 30 kHz carrier is:

Occupied Bandwidth Emission Mask for **Audio, Audio + SAT, SAT**	Displacement from the Carrier Center Frequency in a **120 kHz Span**	Attenuation below the Unmodulated Carrier in a **120 kHz Span**
Part 22.917(b)(1)	20 kHz to 45 kHz	26 dBc
Part 22.917(b)(2)	45 kHz to 60 kHz	60 dBc or 43 + 10 log P(in Watts), whichever is the lesser attenuation
For P = 36 mW	45 kHz to 60 kHz	28.6 dBc

4) Emission Limitation Mask for Cellular: Wideband Data (WBD)
In accordance with Part 22.917(d), the emission mask for **Wideband Data (WBD)** modulation over a 120 kHz frequency span, centered on the 30 kHz carrier is:

Occupied Bandwidth Emission Mask for **Wideband Data**	Displacement from the Carrier Center Frequency in a **120 kHz Span**	Attenuation below the Unmodulated Carrier in a **120 kHz Span**
Part 22.917(d)(1)	20 kHz to 45 kHz	26 dBc
Part 22.917(d)(2)	45 kHz to 60 kHz	45 dBc

RESULTS:

The attached occupied bandwidth plots demonstrate full compliance with the requirements of Part 22.917 for each modulation type. At each test frequency, the carrier was well within the required emission mask. The Cellular TDMA/Analog Multi Carrier Linear Amplifier (CMCLA), 44WA29, demonstrated full compliance with Part 22.917 for occupied bandwidth. The measurements performed are:

Output Plot No.	**Input Plot No.**	**Carrier**
1	2	Ch 991 + Audio at 2500 Hz
3	4	Ch 991 + SAT at 6030 Hz
5	6	Ch 991 + Audio at 2500 Hz + SAT at 6030 Hz
7	8	Ch 991 + WBD at 10 kb/s pseudo-random
9	10	Ch 400 + Audio at 2500 Hz
11	12	Ch 400 + SAT at 6030 Hz
13	14	Ch 400 + Audio at 2500 Hz + SAT at 6030 Hz
15	16	Ch 400 + WBD at 10 kb/s pseudo-random
17	18	Ch 799 + Audio at 2500 Hz
19	20	Ch 799 + SAT at 6030 Hz
21	22	Ch 799 + Audio at 2500 Hz + SAT at 6030 Hz
23	24	Ch 799 + WBD at 10 kb/s pseudo-random

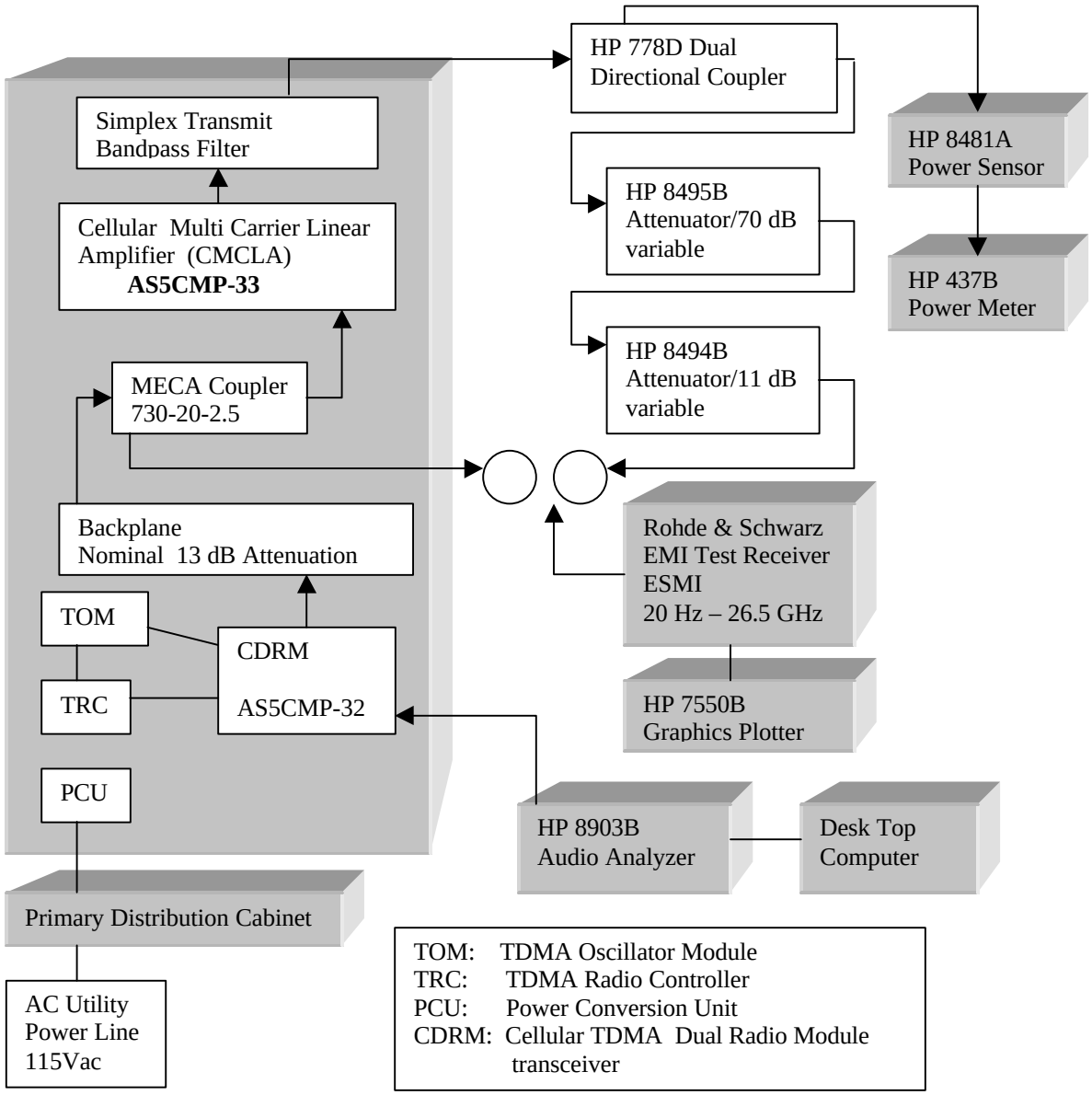
APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

EXHIBIT 15

TEST SET-UP:

Test set-up for measuring the occupied bandwidth of the Cellular TDMA/Analog Multi Carrier Linear Amplifier, in combination with the Cellular TDMA/Analog Dual Radio Module transceiver.

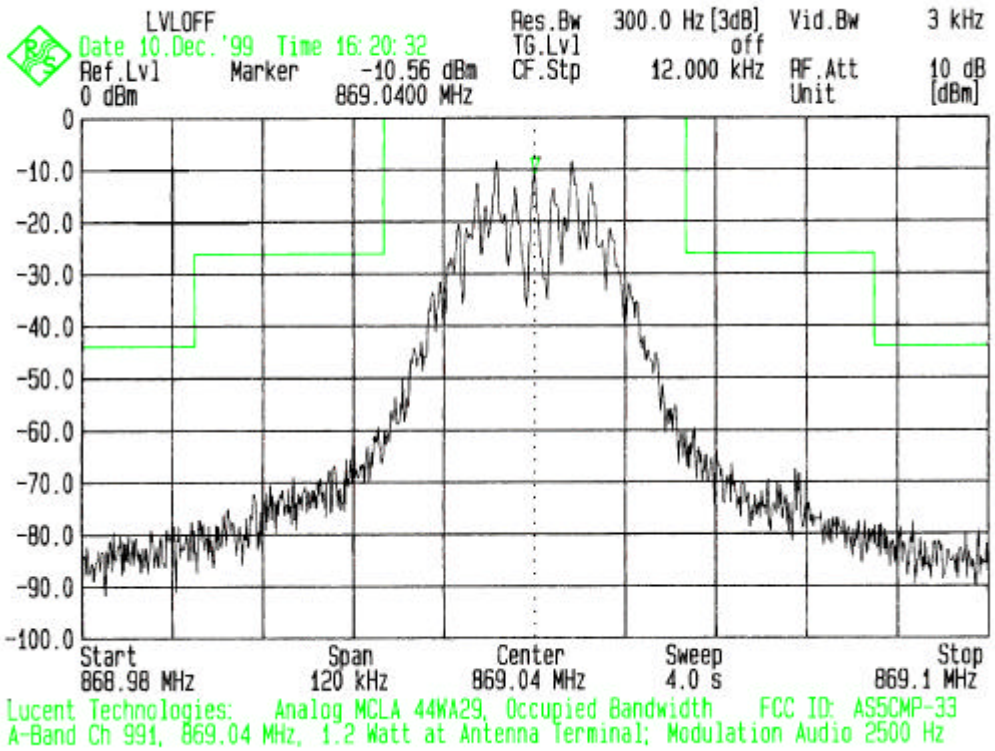
FLEXENT™ Cellular TDMA/Analog Microcell J41698B-1



APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

EXHIBIT 15

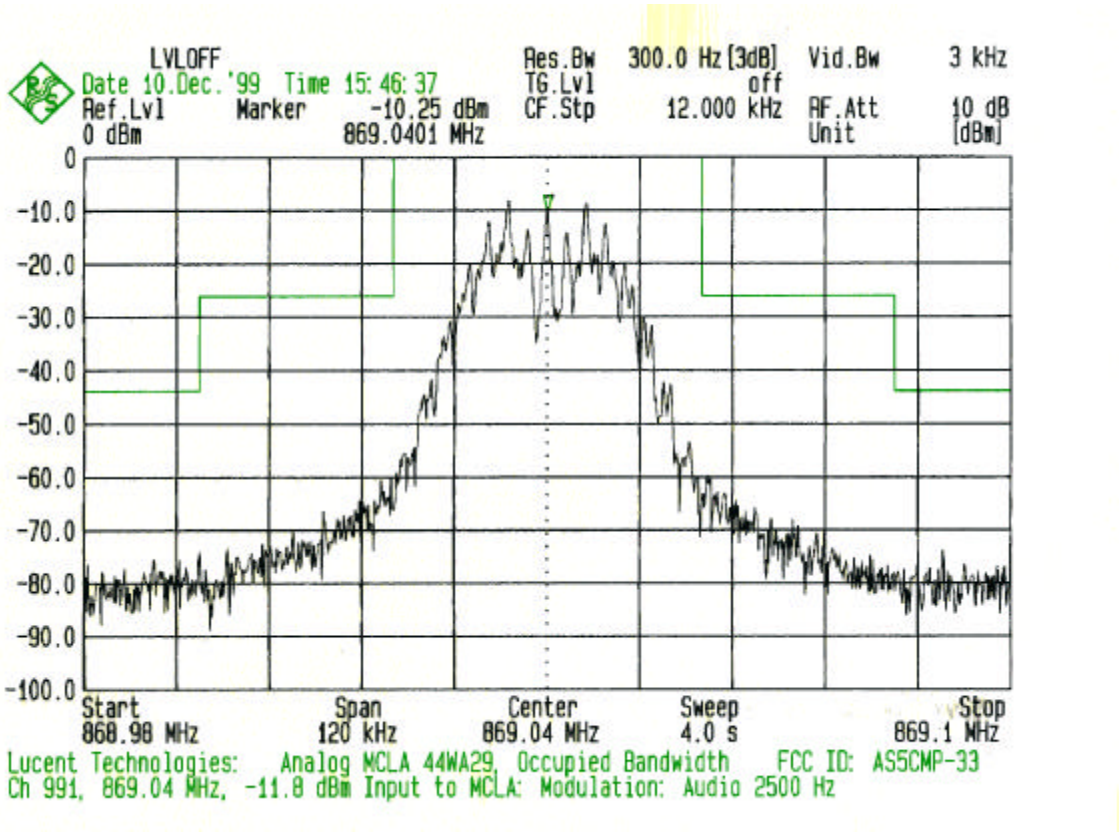
OCCUPIED BANDWIDTH PLOTS:



PLOT # 1
Output: Ch 991 + Audio at 2500 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

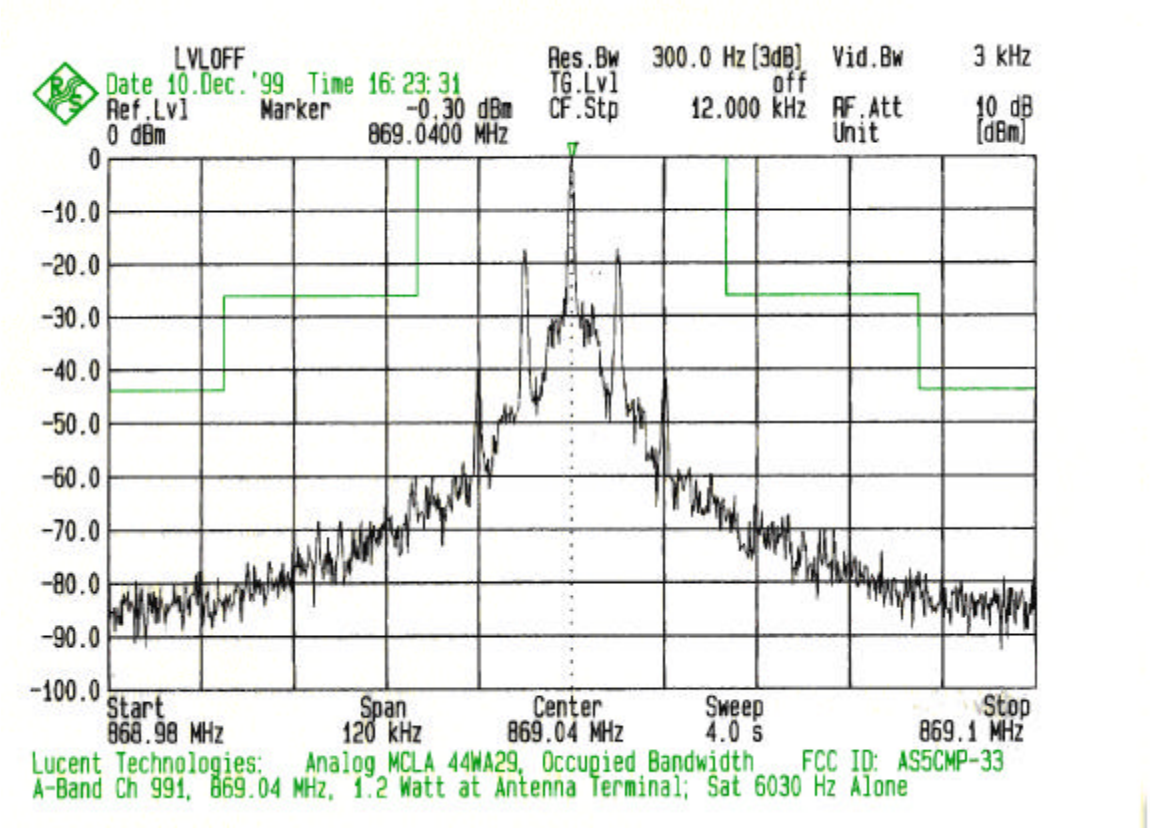
EXHIBIT 15



PLOT # 2
Input: Ch 991 + Audio at 2500 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

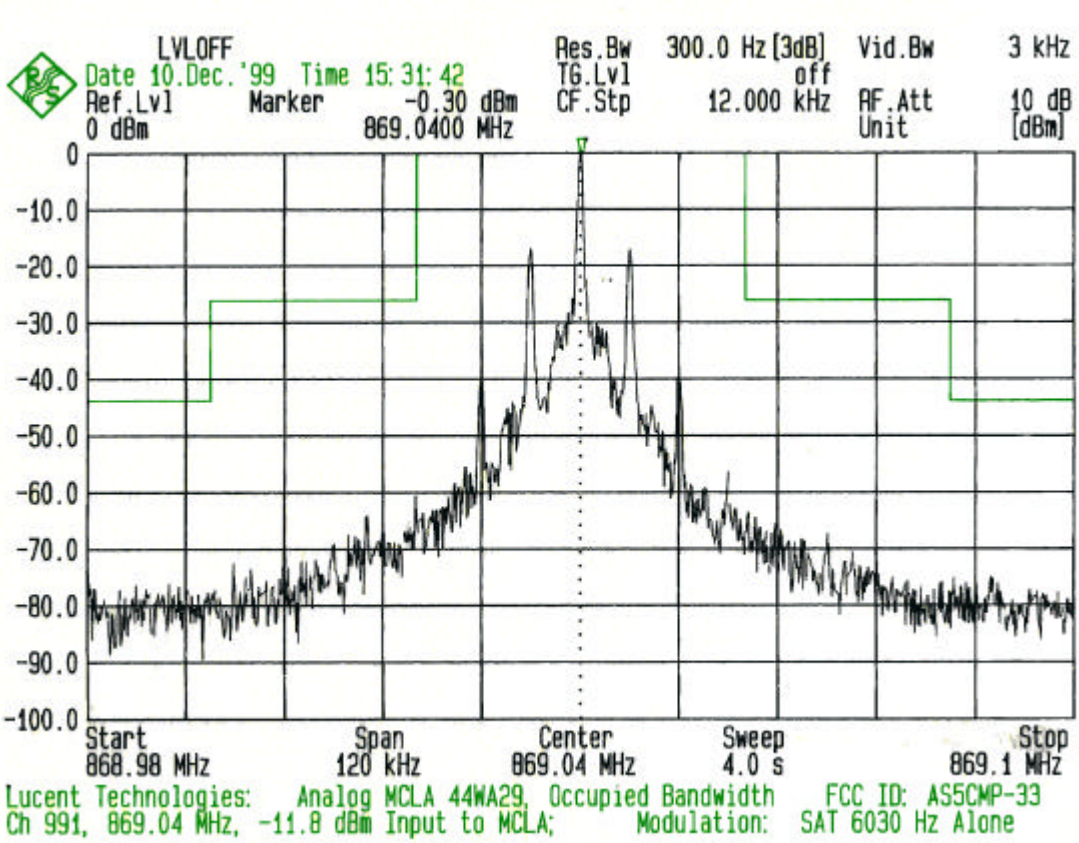
EXHIBIT 15



PLOT # 3
Output: Ch 991 + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

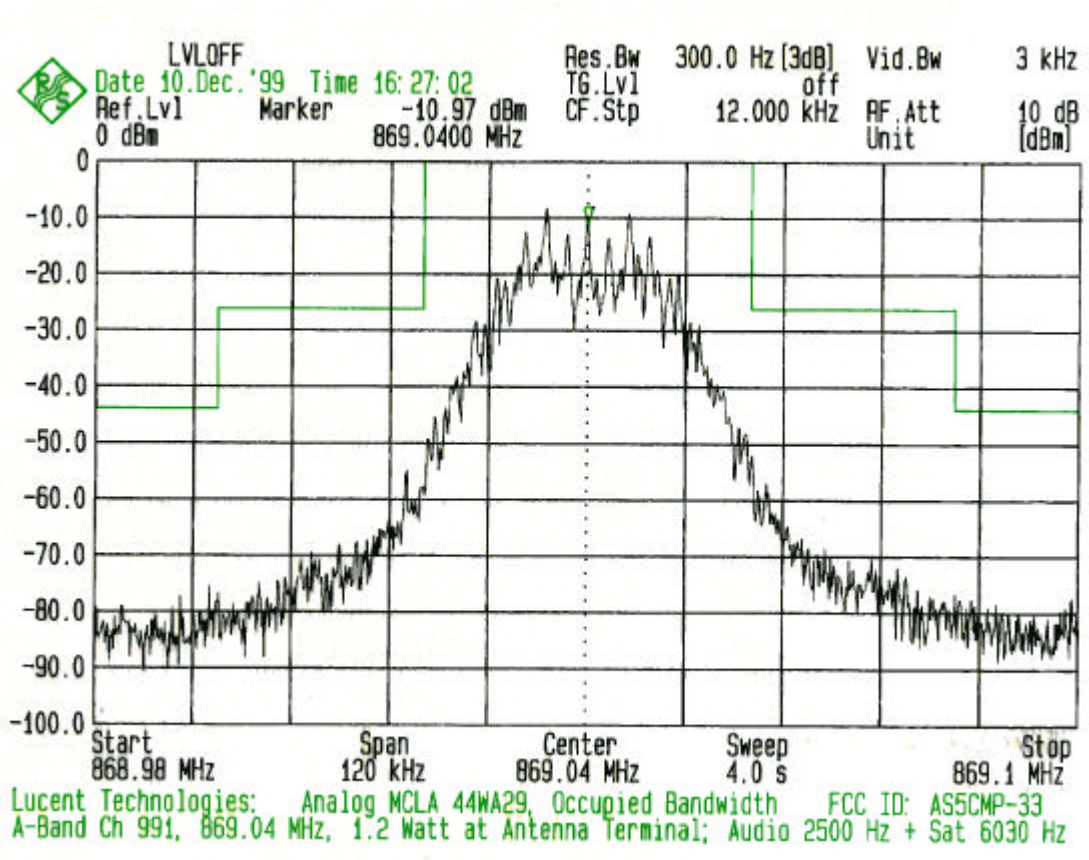
EXHIBIT 15



PLOT # 4
Input: Ch 991 + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

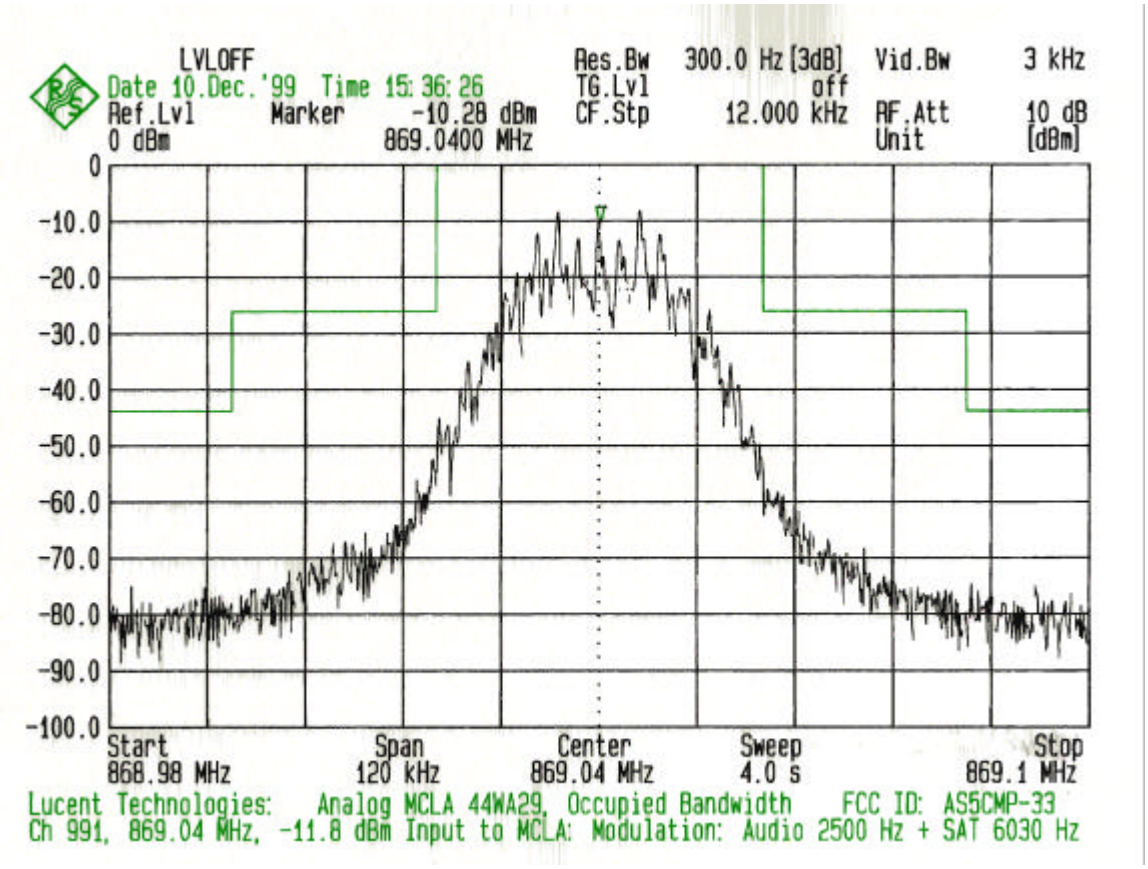
EXHIBIT 15



PLOT # 5
Output: Ch 991 + Audio at 2500 Hz + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

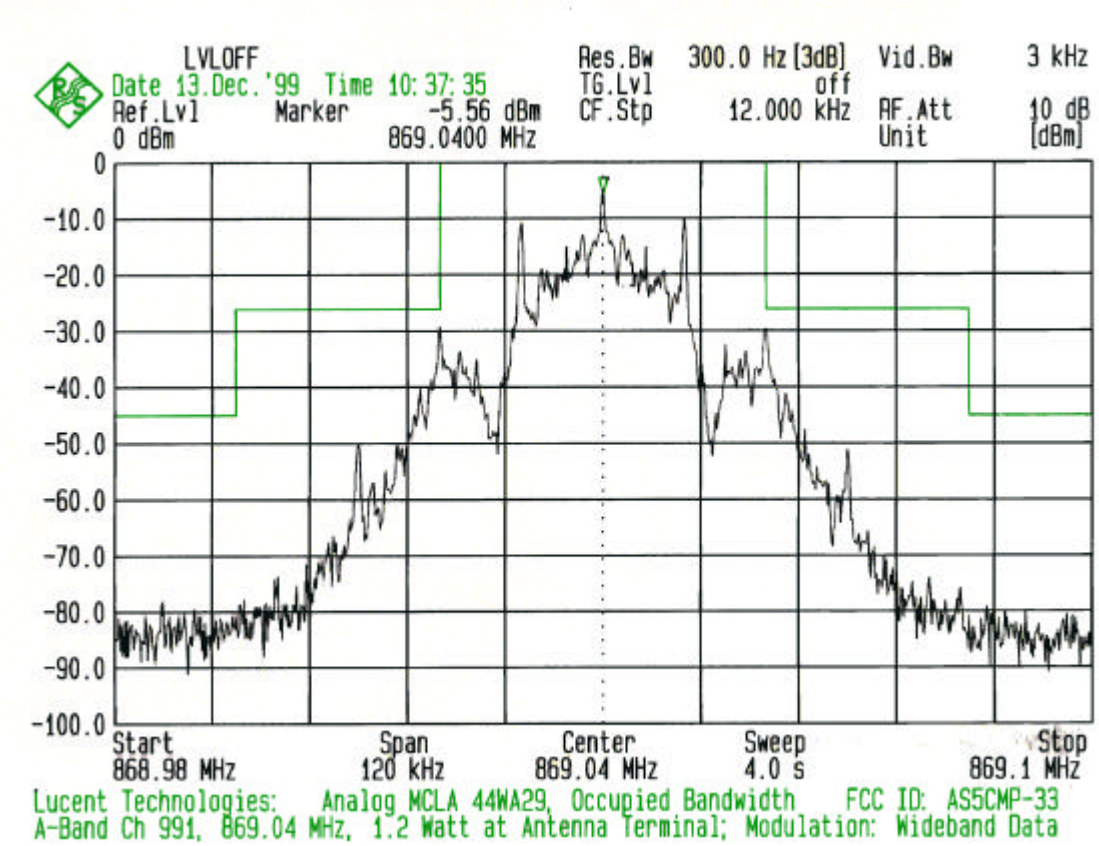
EXHIBIT 15



PLOT # 6
Input: Ch 991 + Audio at 2500 Hz + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

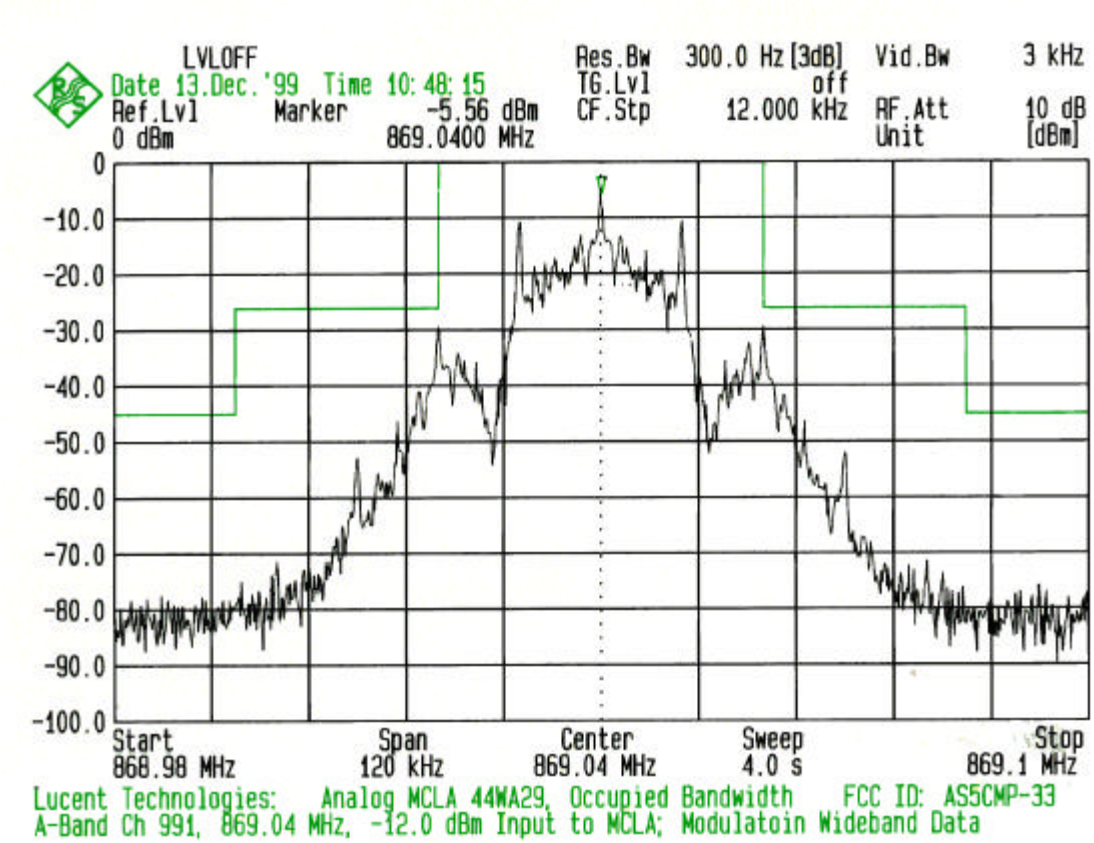
EXHIBIT 15



PLOT # 7
Output: Ch 991 + WBD at 10 kb/s pseudo-random

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

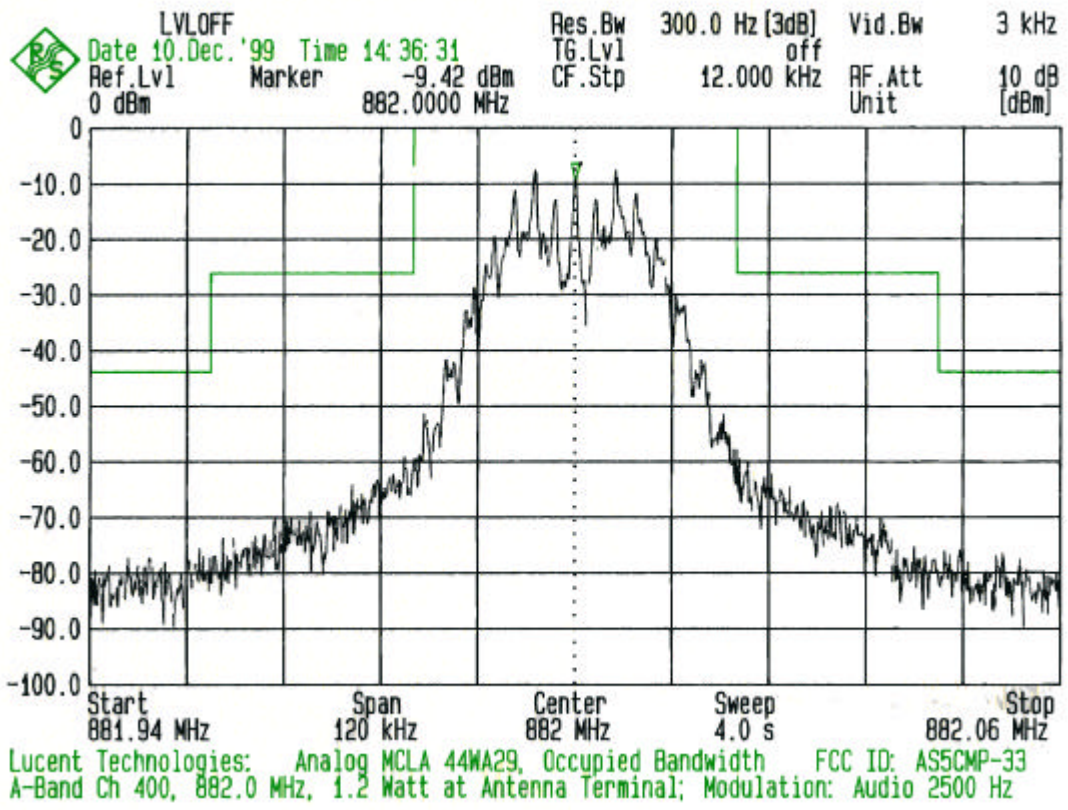
EXHIBIT 15



PLOT # 8
Input: Ch 991 + WBD at 10 kb/s pseudo-random

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

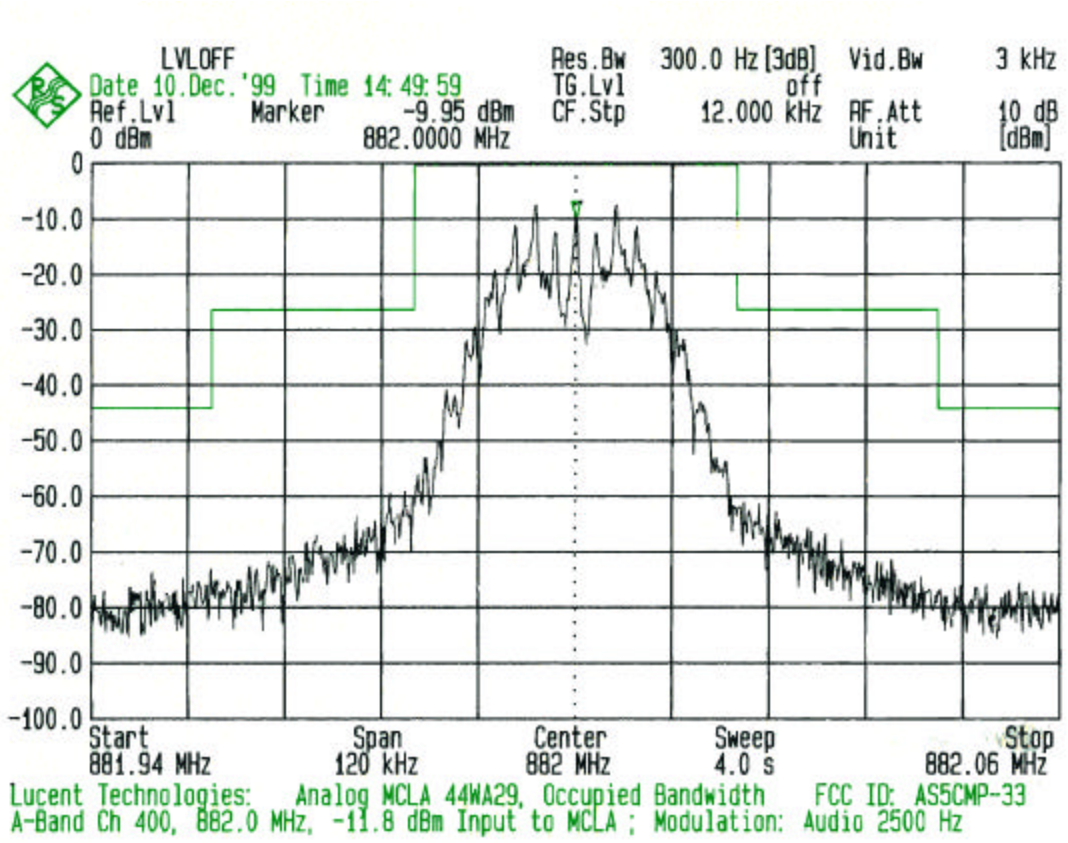
EXHIBIT 15



PLOT # 9
Output: Ch 400 + Audio at 2500 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

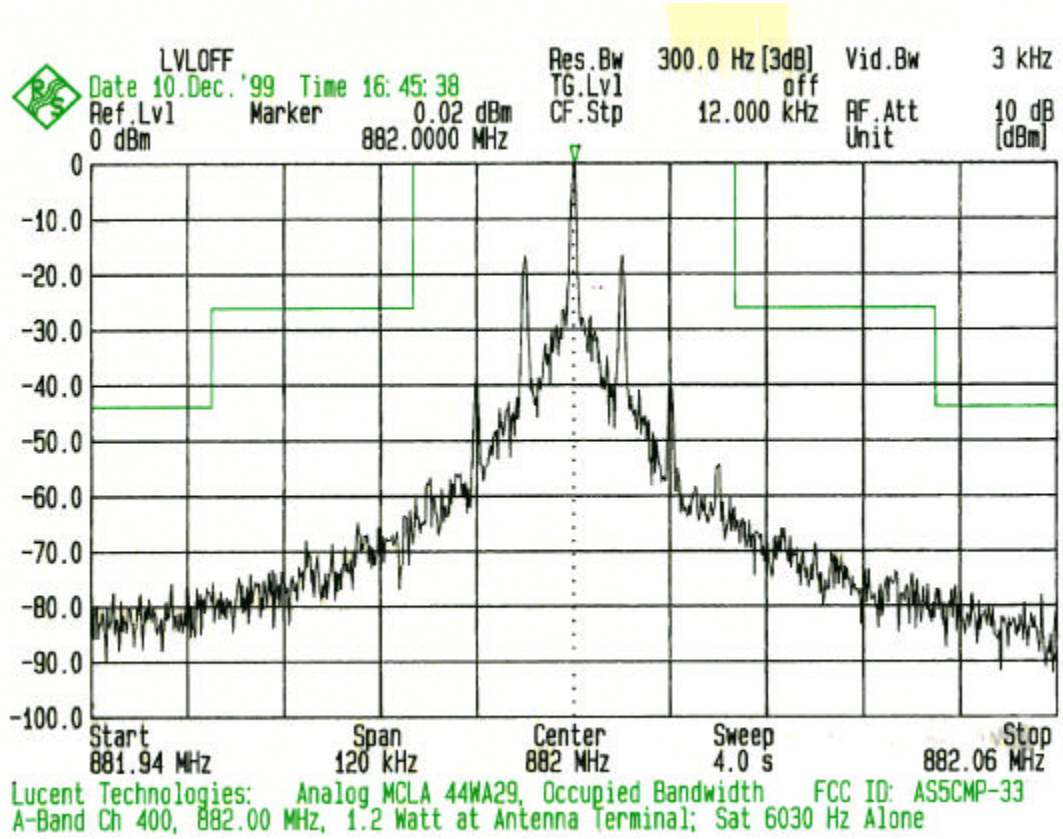
EXHIBIT 15



PLOT # 10
Input: Ch 400 + Audio at 2500 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

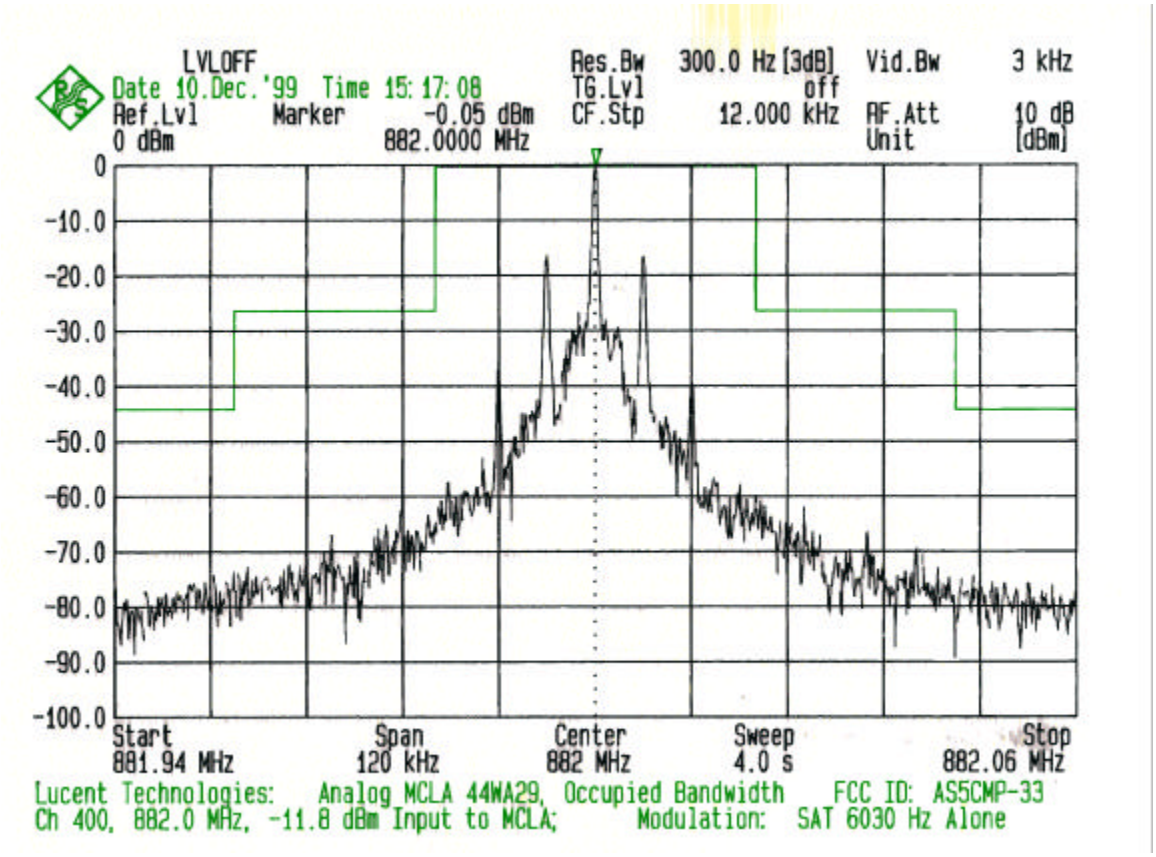
EXHIBIT 15



PLOT # 11
Output: Ch 400 + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

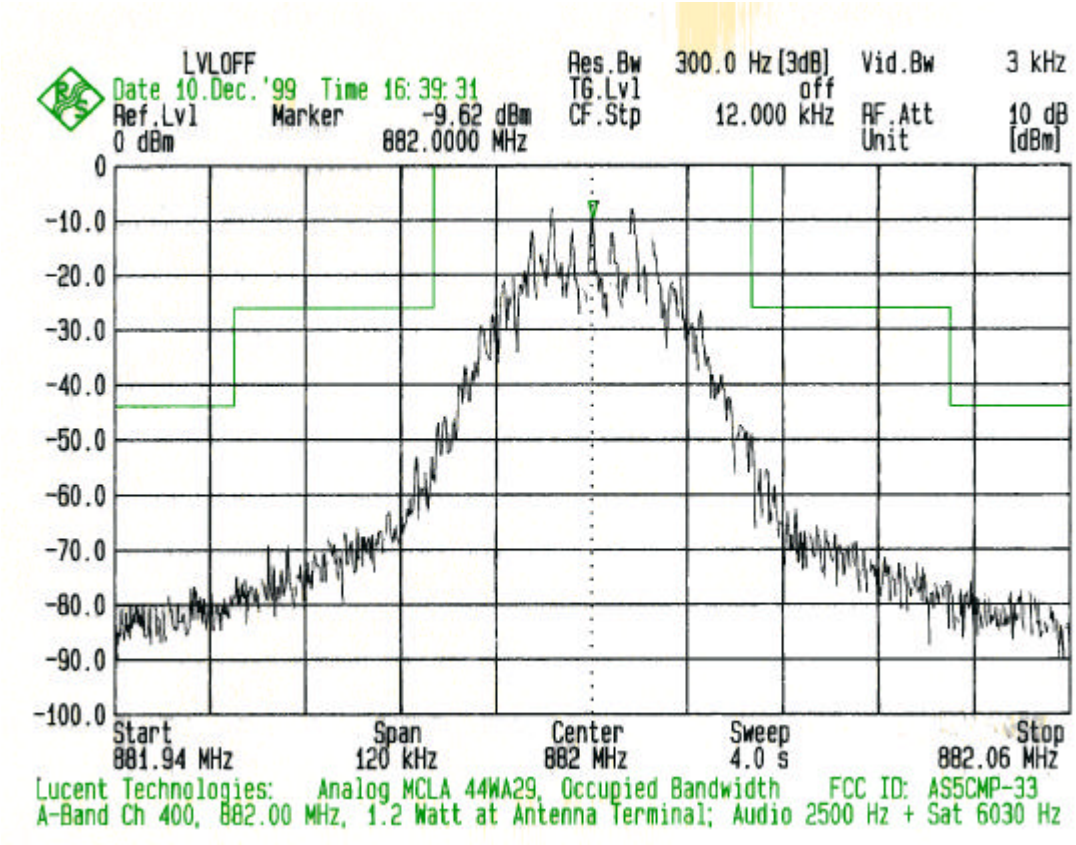
EXHIBIT 15



PLOT # 12
Input: Ch 400 + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

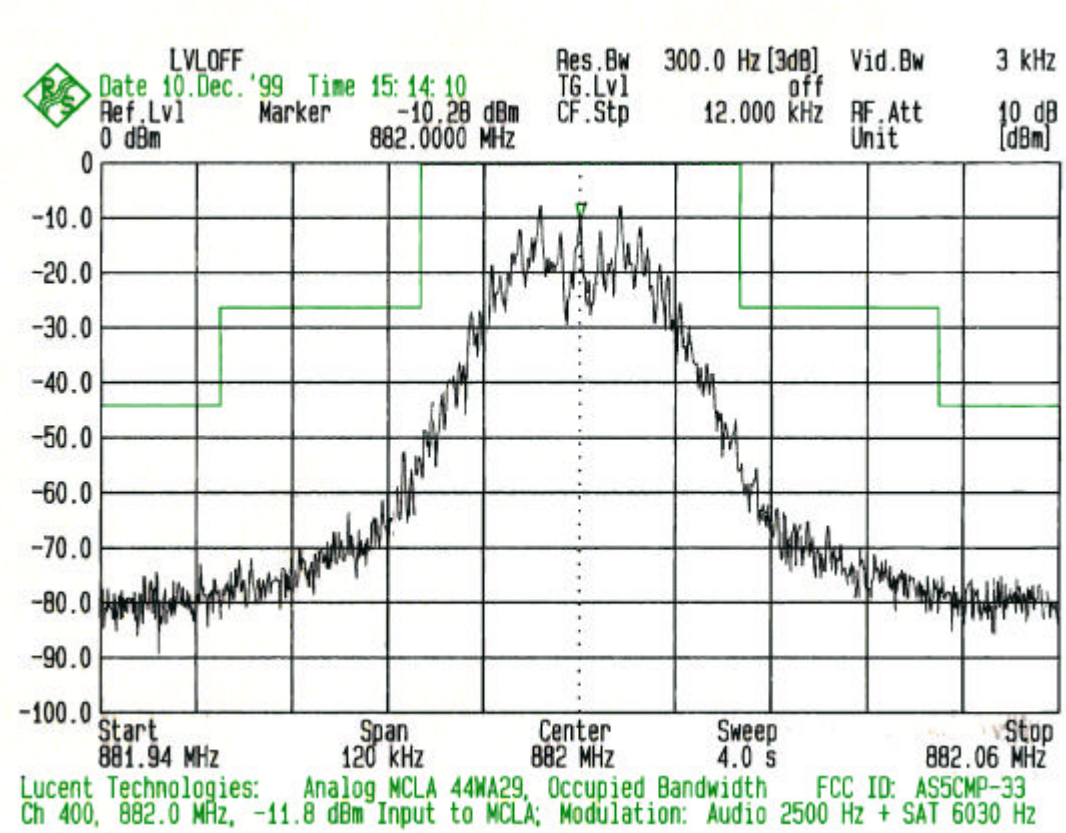
EXHIBIT 15



PLOT # 13
Output: Ch 400 + Audio at 2500 Hz + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

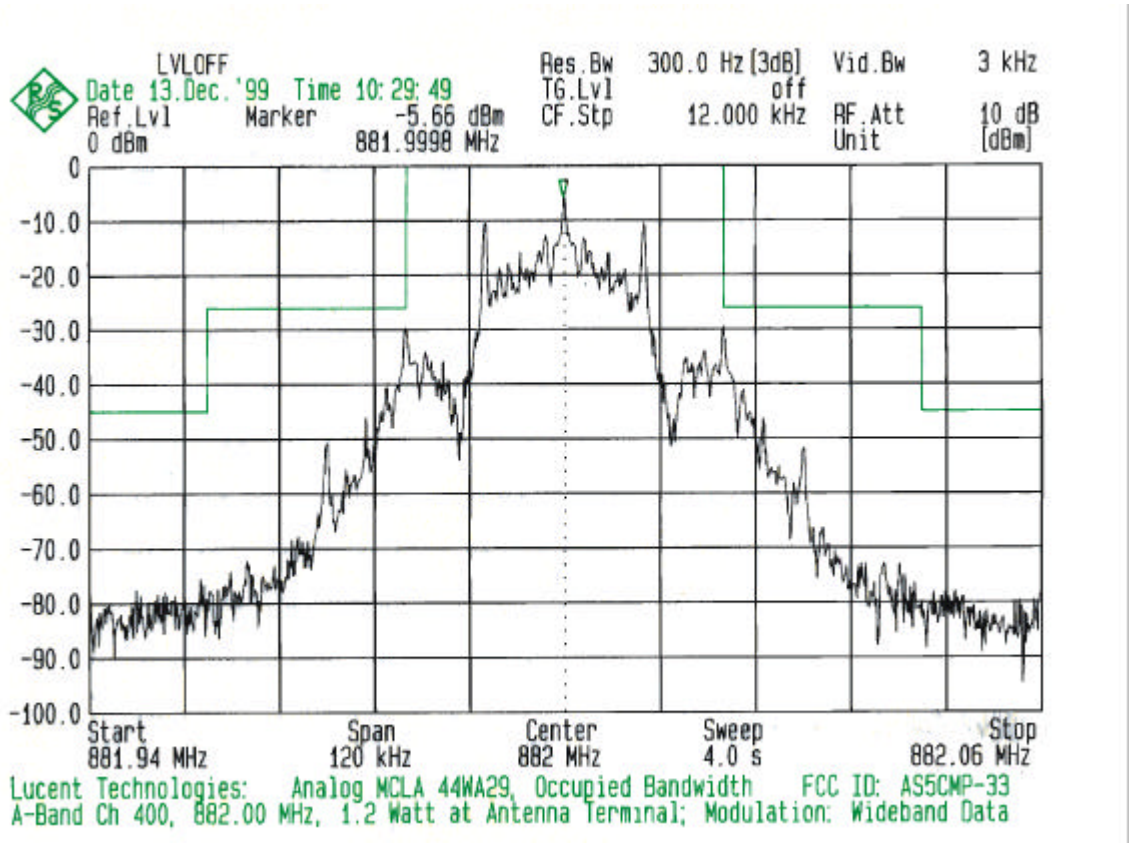
EXHIBIT 15



PLOT # 14
Input: Ch 400 + Audio at 2500 Hz + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

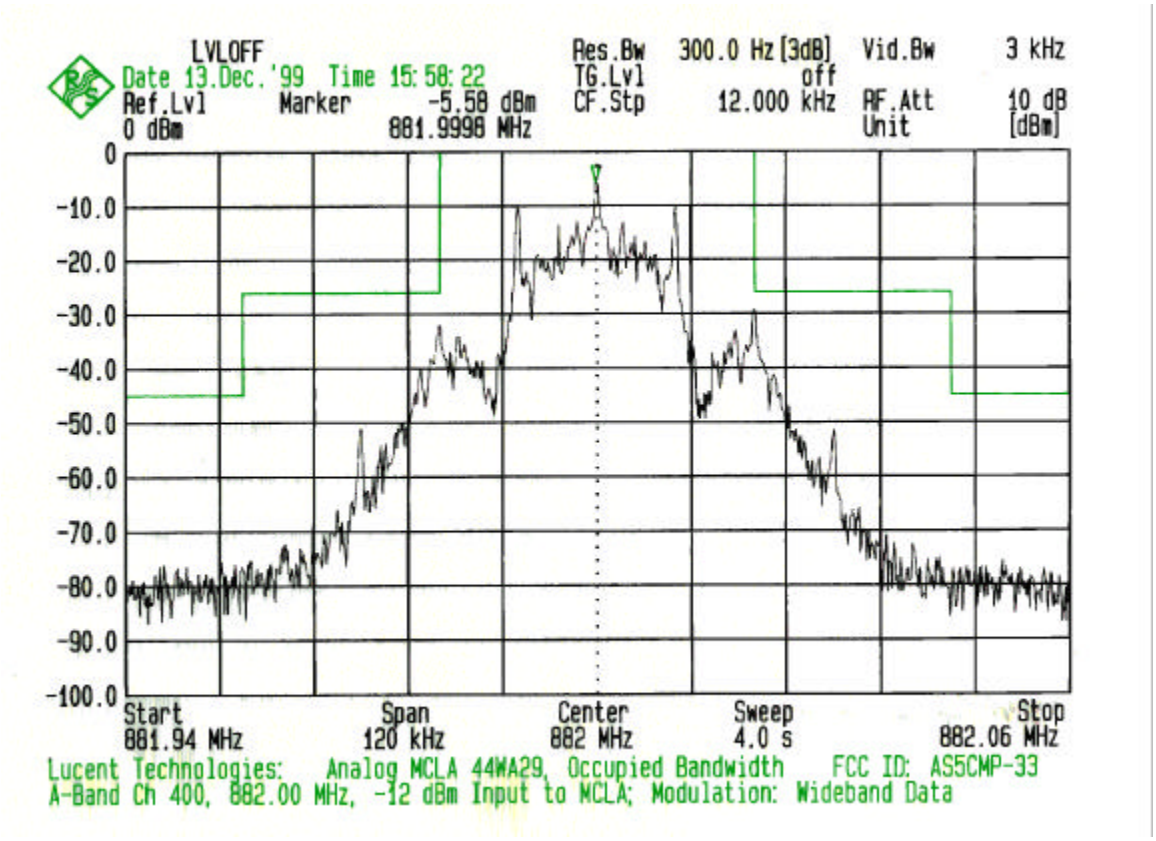
EXHIBIT 15



PLOT # 15
Output: Ch 400 + WBD at 10 kb/s pseudo-random

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

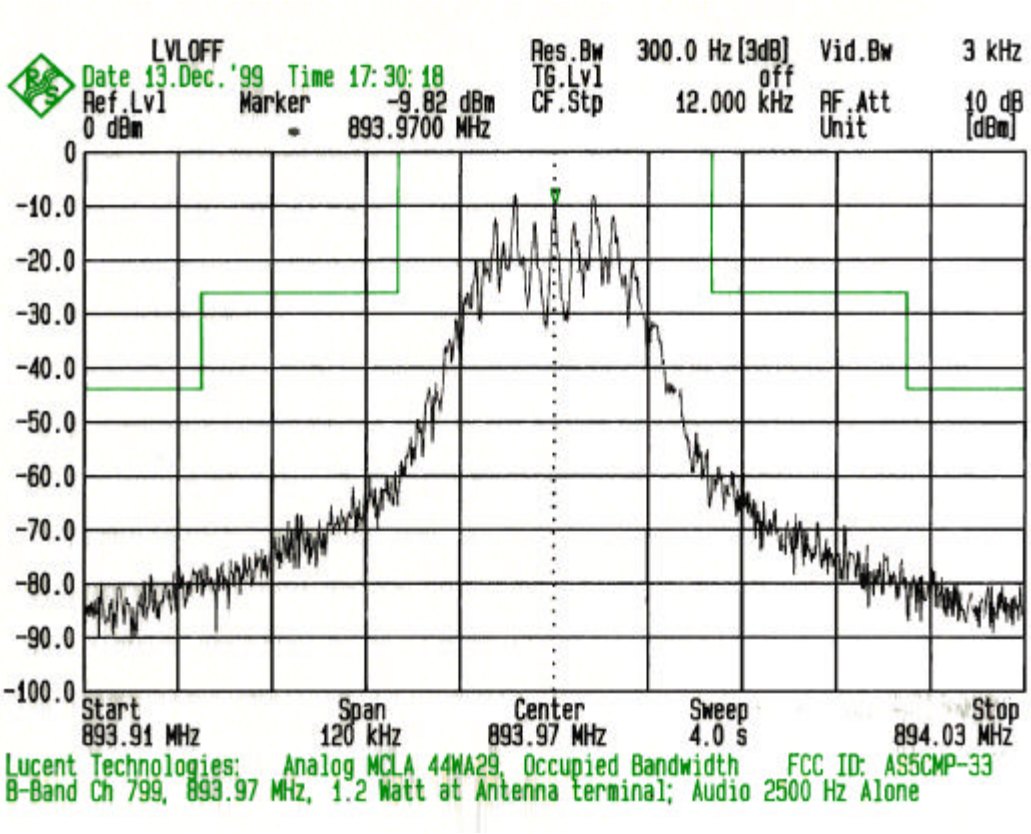
EXHIBIT 15



PLOT # 16
Input: Ch 400 + WBD at 10 kb/s pseudo-random

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

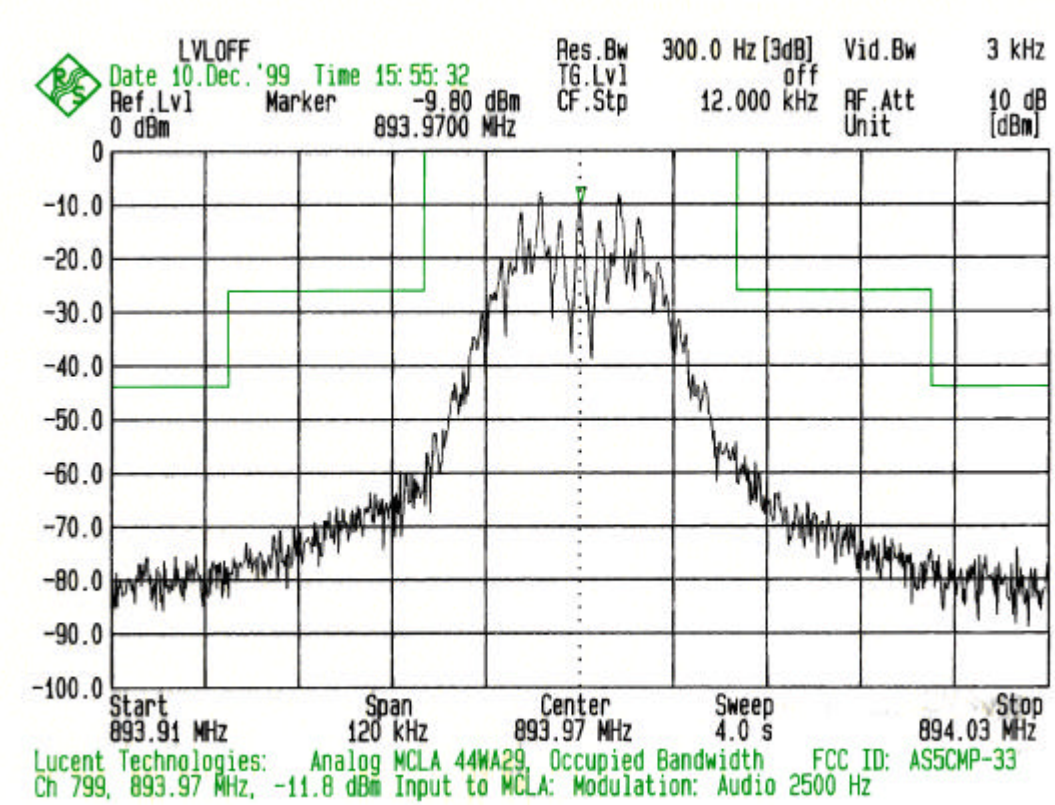
EXHIBIT 15



PLOT # 17
Output: Ch 799 + Audio at 2500 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

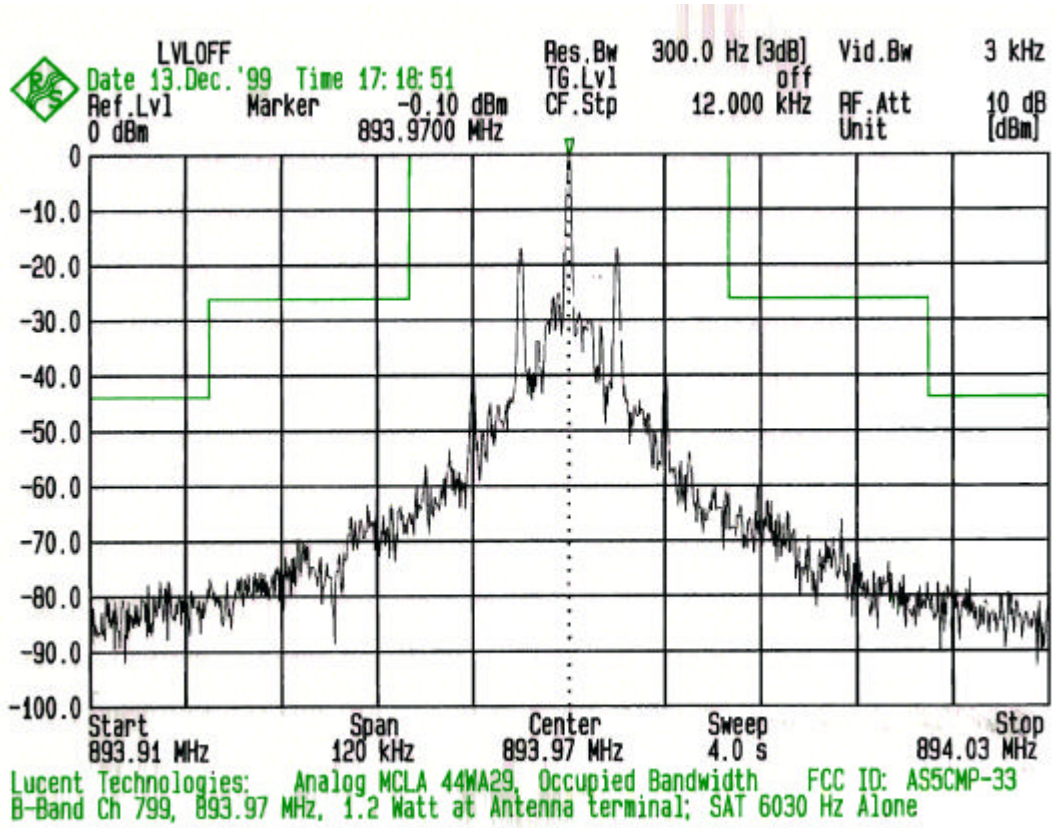
EXHIBIT 15



PLOT # 18
Input: Ch 799 + Audio at 2500 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

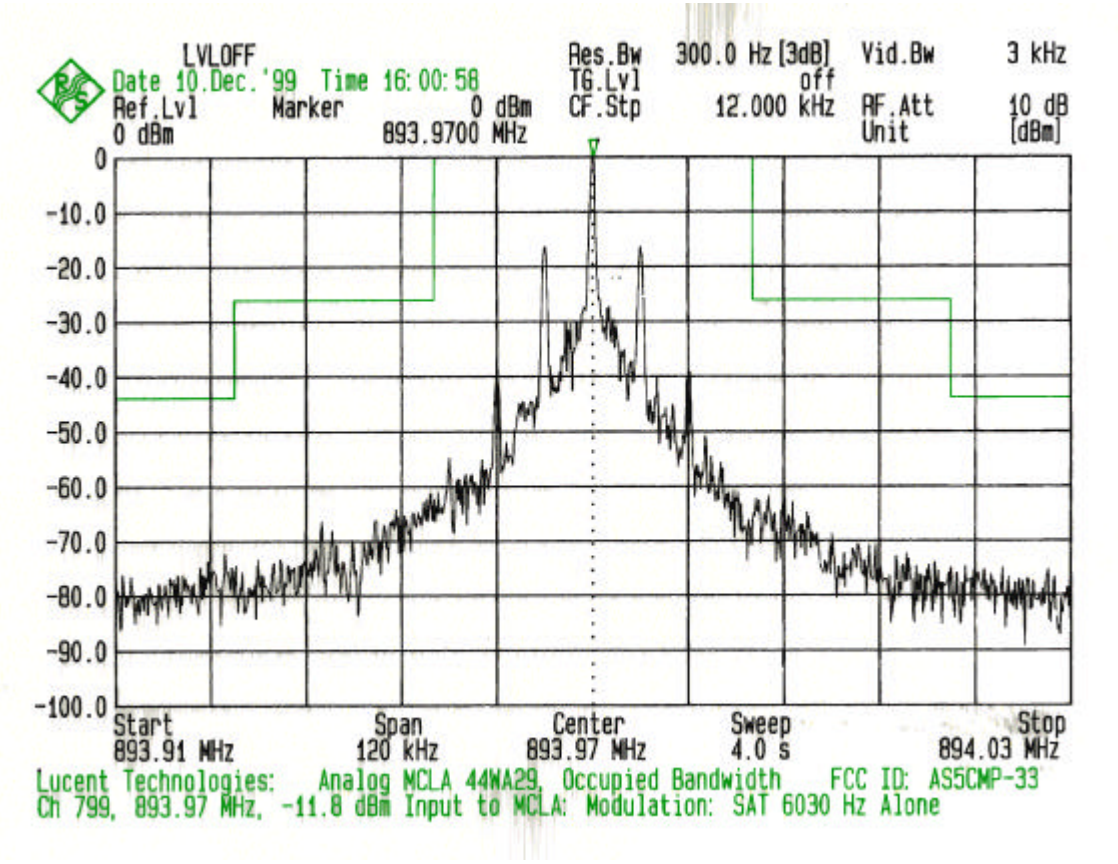
EXHIBIT 15



PLOT # 19
Output: Ch 799 + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

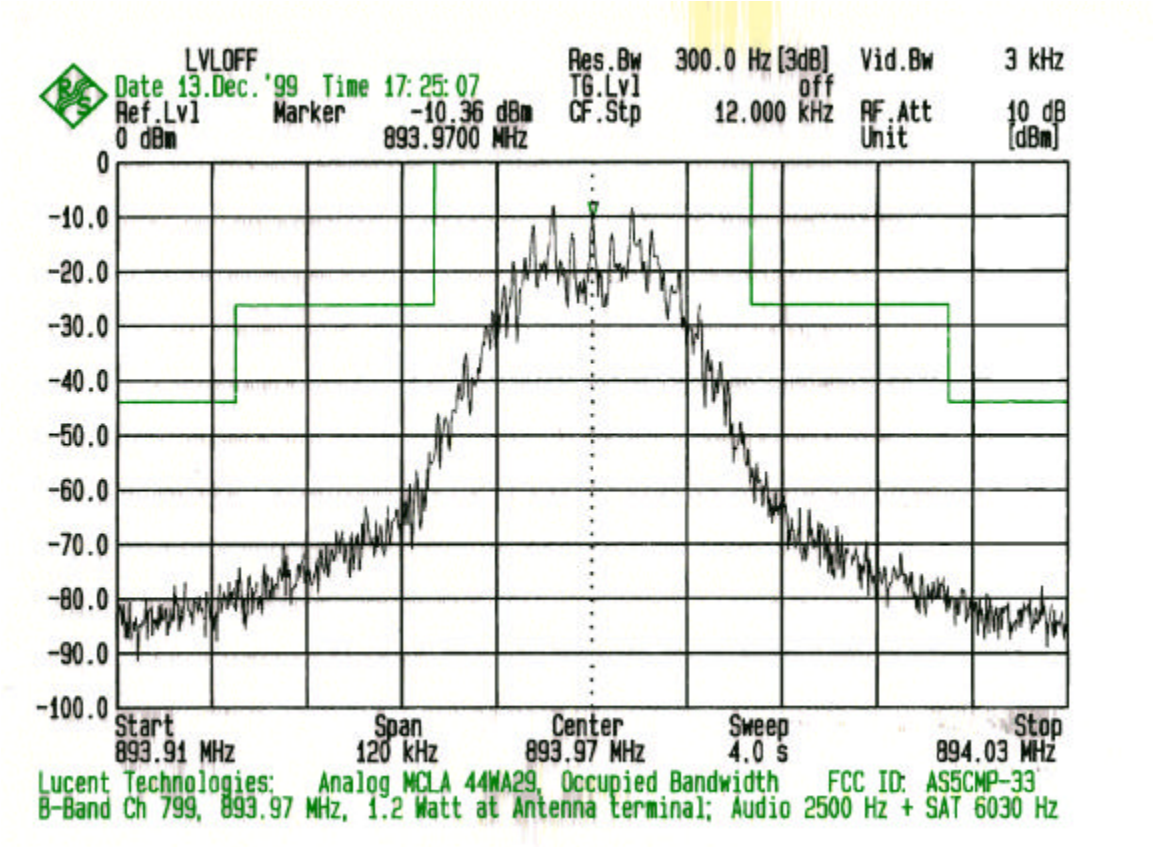
EXHIBIT 15



PLOT # 20
Input: Ch 799 + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

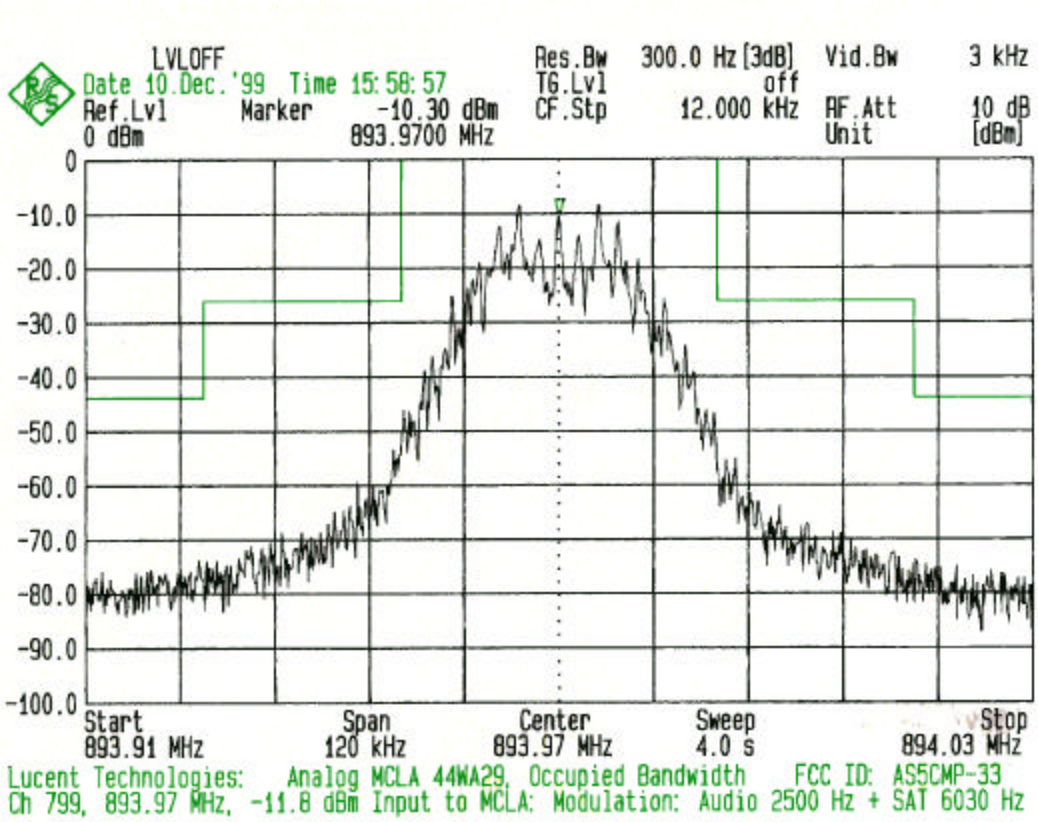
EXHIBIT 15



PLOT # 21
Output: Ch 799 + Audio at 2500 Hz + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

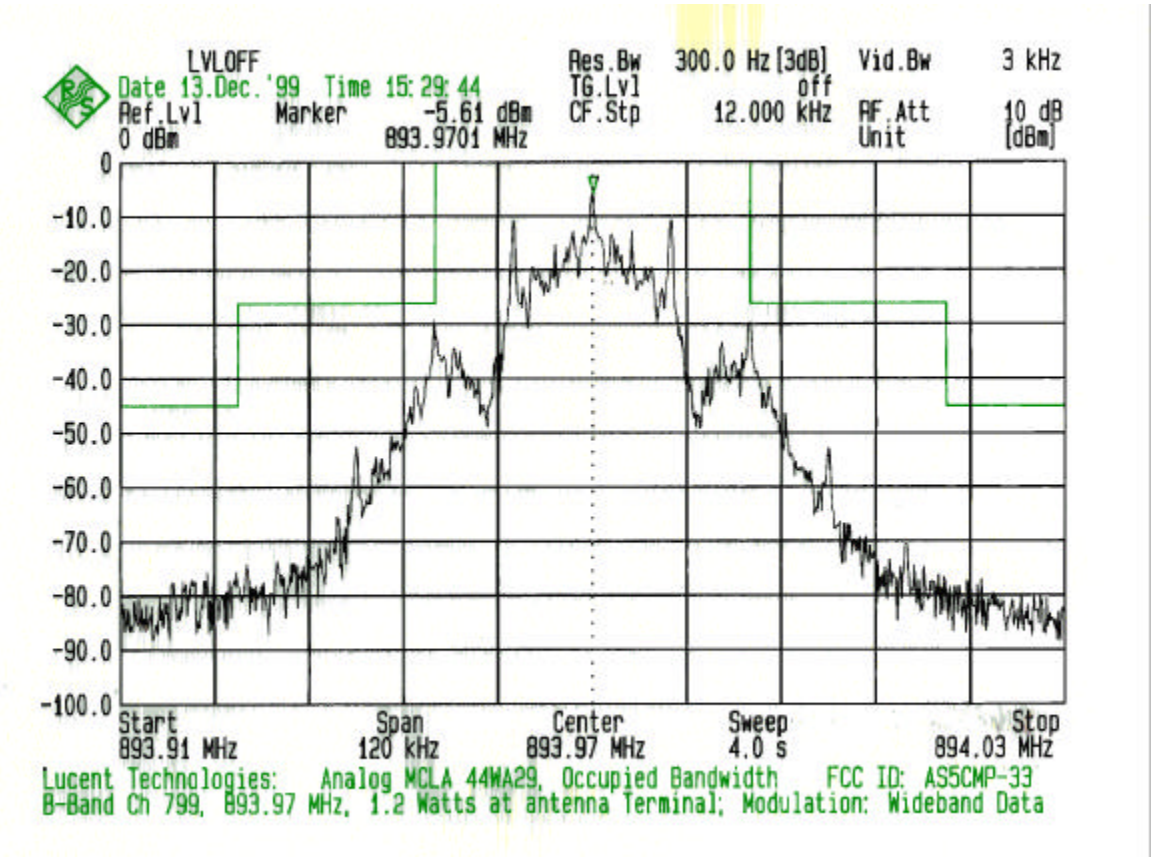
EXHIBIT 15



PLOT # 22
Input: Ch 799 + Audio at 2500 Hz + SAT at 6030 Hz

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

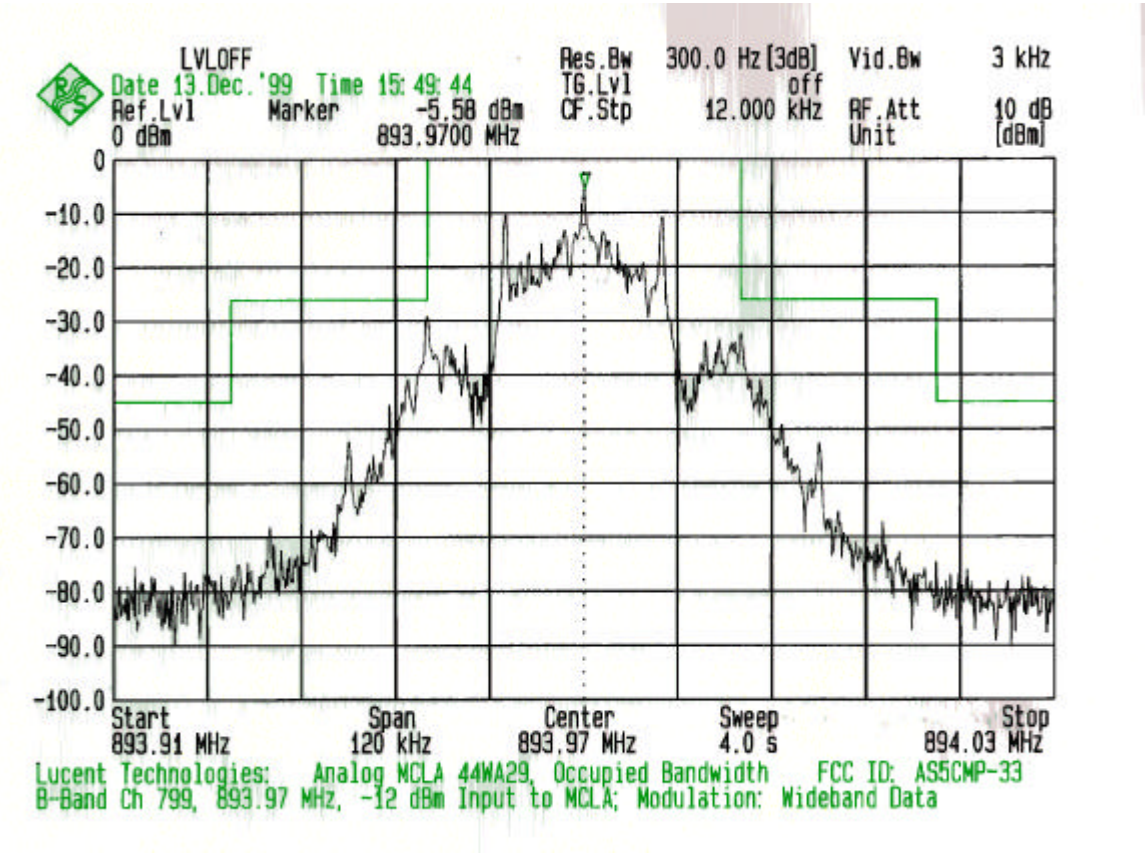
EXHIBIT 15



PLOT # 23
Output: Ch 799 + WBD at 10 kb/s pseudo-random

APPLICANT: Lucent Technologies **FCC ID: AS5CMP-33**

EXHIBIT 15



PLOT # 24
Input: Ch 799 + WBD at 10 kb/s pseudo-random