FCC
Product Certification Test Report
for
Lucent Technologies Inc.

PCS Multi-Carrier Radio

MCR-1900

Exhibits 11 - 17

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Exhibit 11: Listing of Required Measurements

SECTION 2.1033(c)(14)

The data required by Section 2.1046 through 2.1057, inclusive, measured in accordance with the procedures set out in Section 2.1041.

RESPONSE:

The lowest clock frequency in the **Flexent OneBTS PCS Modular Cell 4.0** is the 10 MHz rubidium reference oscillator. Conducted spurious measurements were performed over the range of 10 MHz to 20GHz which is above the tenth harmonic of the transmit frequency range.

The following pages include the data required for the Product Certification authorization of the **MCR-1900 / FCC ID: AS5ONEBTS-09**, measured in accordance with the procedures set out in Section 2.1041 of the Rules.

Each required measurement and its corresponding exhibit number are:

Exhibit 12	Section 2.1046	Measurement of Radio Frequency Power Output
Exhibit 13	Section 2.1047	Measurement of Modulation Characteristics
Exhibit 14	Section 2.1049	Measurement of Occupied Bandwidth
Exhibit 15	Section 2.1051	Measurement of Spurious Emissions at Antenna
Exhibit 16	Section 2.1053	Field Strength of Spurious Radiation
Exhibit 17	Section 2.1055	Measurement of Frequency Stability

Exhibit 12: Measurement of Radio Frequency Power Output

SECTION 2.1046

MEASUREMENT OF RADIO FREQUENCY POWER OUTPUT

The test arrangements used to measure the radio frequency power output of the **MCR-1900/ AS5ONEBTS-09** is on the following page. Measurements were made respectively at each frequency where Occupied Bandwidth measurements were performed. The use of the **MCR-1900** requires that the J4 power level be calibrated for the specific channel of use. The test configuration, Figure 12a, allowed the measurement of output power for each channel investigated for Occupied Bandwidth. These included the upper and lower Block edges and at the center channel for each Block.

The **MCR-1900** has a maximum total output power at each of the two RF transmitter ports of 0.01585 Watts (12.0 dBm). The maximum power per carrier for a single carrier is 0.00264 Watts (4.22 dBm) for one to six carriers. The maximum power per carrier for seven, eight, nine, ten and eleven carrier configurations is 0.000226 Watts (3.55 dBm), 0.00198 Watts (2.97 dBm), 0.00176 Watts (2.46 dBm), 0.00159 Watts (2.00 dBm), and 0.00144 Watts (1.59 dBm) respectively. The steady state range of power adjustment at the output is 30 dB. The minimum power is therefore 30 dB below the maximum (-28.41 dBm) for a single carrier across the PCS down-link Band (1930-1990 MHz).

The **MCR-1900** output signal parameters used for testing is defined in Table 12.1 below. For each measurement frequency the channel and power was set in the manner in which the equipment would be installed in actual use. The actual power level necessary for operation is dependant upon a number of factors including number of carriers, operating frequency amplifier gain and filter loss. The spectral performance at that power level for each specific frequency of interest was verified. The attenuation range was also verified. The maximum output power was verified over the PCS down-link Band and is tabulated in Table 12.3. The specific Frequencies, channels and set power level were also documented on each "Occupied Bandwidth" data sheet for the typical integrated product. When operated with a Lucent Technologies transmit power amplifier, the overall integrated transmitter will maintain its rated output power with an accuracy of +2 / -4 dB.

Applied Signal

The applied signal, from a MCR-1900 FCC ID: AS5ONEBTS-09, met the recommended characteristics per **"Table 6.5.2-1 Base Station Test Model, Nominal**" from **3GPP2 C.S0010-0, December 1999,** Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations, as defined below in table 12.1.

Type	Number of Channels	Fraction of Power (Linear)	Fraction of Power (dB)	Comments
Pilot	1	0.1490	-8.3	Walsh 0
Sync	1	0.015/p	-18.3	Walsh 32, always 1/8 rate
Paging	1	0.054	-12.7	Walsh 1, full rate only
Traffic	6	0.13 each	-8.8 each	Variable Walsh Assignments, full rate only

TABLE 12.1 Base Station Test Model, Nominal

Exhibit 12 *continued*

RESULTS:

The **MCR-1900 / AS5ONEBTS-09** was configured in the test setup shown in Figure 12A. When measured at each of the tested PCS channels the **MCR-1900/ AS5ONEBTS-09** delivered a minimum of 0.00264 Watts per carrier (4.22 dBm/carrier) +2/-0 dB for a maximum of six carriers when measured at its output connection.

This **MCR-1900** transmit port output power and the antenna terminal RF transmit power data is recorded on the Occupied Bandwidth Data Sheets for all of the PCS Channels tested and these include the “Left edge”, and “Right Edge” channels for each frequency Band.

The **MCR-1900** maximum transmit power compliance data verified over the PCS down-link band is shown in table 12.3 below. The table shows the channel(s), number of carriers, measured power per carrier, and the total **MCR-1900** transmit power. The compliance status for Occupied Bandwidth and Conducted Spurious Emissions is also shown in tables 12.3 through 12.8.

Exhibit 12 *continued*

Transmit Channel(s)	Number of Carriers	Measured Carrier Power Level	Measured Total Power Level	Occupied Bandwidth	Conducted Spurious Emissions
25	1	+4.22 dBm	+4.22 dBm	Compliant	Compliant
25,50	2	+4.22 dBm	+7.22 dBm	Compliant	Compliant
25,50, 75	3	+4.22 dBm	+8.99 dBm	Compliant	Compliant
25,50, 75, 100	4	+4.22 dBm	+10.24 dBm	Compliant	Compliant
25,50, 75, 100, 125	5	+4.22 dBm	+11.21 dBm	Compliant	Compliant
25,50,75,100,125,150	6	+4.22 dBm	+12.0 dBm	Compliant	Compliant
25,50,75,100,125,150, 175	7	+3.55 dBm	+12.0 dBm	Compliant	Compliant
25,50,75,100,125,150, 175, 200	8	+2.97 dBm	+12.0 dBm	Compliant	Compliant
25,50,75,100,125,150, 175, 200, 225	9	+2.46 dBm	+12.0 dBm	Compliant	Compliant
25,50,75,100,125,150, 175, 200, 225, 250	10	+2.00 dBm	+12.0 dBm	Compliant	Compliant
25,50,75,100, 125,150,175,200, 225,250,275	11	+1.59 dBm	+12.0 dBm	Compliant	Compliant

TABLE 12.3 MCR-1900 Maximum Transmit Power Compliance Data for PCS A Band

Transmit Channel(s)	Number of Carriers	Measured Carrier Power Level	Measured Total Power Level	Occupied Bandwidth	Conducted Spurious Emissions
425	1	+4.22 dBm	+4.22 dBm	Compliant	Compliant
425,450	2	+4.22 dBm	+7.22 dBm	Compliant	Compliant
425,450, 475	3	+4.22 dBm	+8.99 dBm	Compliant	Compliant
425,450, 475, 500	4	+4.22 dBm	+10.24 dBm	Compliant	Compliant
25,50, 75, 500, 525	5	+4.22 dBm	+11.21 dBm	Compliant	Compliant
425,450,475,500,525,550	6	+4.22 dBm	+12.0 dBm	Compliant	Compliant
425,450,475,500,525,550, 575	7	+3.55 dBm	+12.0 dBm	Compliant	Compliant
425,450,475,500,525,550, 575, 600	8	+2.97 dBm	+12.0 dBm	Compliant	Compliant
425,450,475,500,525,550, 575, 600, 625	9	+2.46 dBm	+12.0 dBm	Compliant	Compliant
425,450,475,500,525,550, 575, 600, 625, 650	10	+2.00 dBm	+12.0 dBm	Compliant	Compliant
425,450,475,500, 525,550,575,600, 625,650,675	11	+1.59 dBm	+12.0 dBm	Compliant	Compliant

TABLE 12.4 MCR-1900 Maximum Transmit Power Compliance Data for PCS B Band

Exhibit 12 *continued*

Transmit Channel(s)	Number of Carriers	Measured Carrier Power Level	Measured Total Power Level	Occupied Bandwidth	Conducted Spurious Emissions
925	1	+4.22 dBm	+4.22 dBm	Compliant	Compliant
925,950	2	+4.22 dBm	+7.22 dBm	Compliant	Compliant
925,950, 975	3	+4.22 dBm	+8.99 dBm	Compliant	Compliant
925,950, 975, 1000	4	+4.22 dBm	+10.24 dBm	Compliant	Compliant
925,950, 975, 1000, 1025	5	+4.22 dBm	+11.21 dBm	Compliant	Compliant
925,950,975,1000,1025,1050	6	+4.22 dBm	+12.0 dBm	Compliant	Compliant
925,950,975,1000,1025,1050, 1075	7	+3.55 dBm	+12.0 dBm	Compliant	Compliant
925,950,975,1000,1025,1050, 1075, 1100	8	+2.97 dBm	+12.0 dBm	Compliant	Compliant
925,950,975,1000,1025,1050, 1075, 1100, 1125	9	+2.46 dBm	+12.0 dBm	Compliant	Compliant
925,950,975,1000,1025,1050, 1075, 1100, 1125, 1150	10	+2.00 dBm	+12.0 dBm	Compliant	Compliant
925,950,975,1000, 1025,1050,1075,1100, 1125,1150,1175	11	+1.59 dBm	+12.0 dBm	Compliant	Compliant

TABLE 12.5 MCR-1900 Maximum Transmit Power Compliance Data for PCS C Band

Transmit Channel(s)	Number of Carriers	Measured Carrier Power Level	Measured Total Power Level	Occupied Bandwidth	Conducted Spurious Emissions
325	1	+4.22 dBm	+4.22 dBm	Compliant	Compliant
325, 350	2	+4.22 dBm	+7.22 dBm	Compliant	Compliant
325, 350, 375	3	+4.22 dBm	+8.99 dBm	Compliant	Compliant

TABLE 12.6 MCR-1900 Maximum Transmit Power Compliance Data for PCS D Band

Transmit Channel(s)	Number of Carriers	Measured Carrier Power Level	Measured Total Power Level	Occupied Bandwidth	Conducted Spurious Emissions
725	1	+4.22 dBm	+4.22 dBm	Compliant	Compliant
725, 750	2	+4.22 dBm	+7.22 dBm	Compliant	Compliant
725,750,775	3	+4.22 dBm	+8.99 dBm	Compliant	Compliant

TABLE 12.7 MCR-1900 Maximum Transmit Power Compliance Data for PCS E Band

Exhibit 12 *continued*

Transmit Channel(s)	Number of Carriers	Measured Carrier Power Level	Measured Total Power Level	Occupied Bandwidth	Conducted Spurious Emissions
825	1	+4.22 dBm	+4.22 dBm	Compliant	Compliant
825, 850	2	+4.22 dBm	+7.22 dBm	Compliant	Compliant
825,850,875	3	+4.22 dBm	+8.99 dBm	Compliant	Compliant

TABLE 12.8 MCR-1900 Maximum Transmit Power Compliance Data for PCS F Band

Exhibit 12 *continued*

Measurement Equipment used in Figure 12 For Measurement of RF Power

Equipment	**Description**
Product Frame:	PCS Indoor Flexent OneBTS Modular Cell 4.0 with 6 MCR-1900 transceivers and 12 P2PAM amplifiers
MCR-1900:	PCS Multi-Carrier Radio **(FCC ID: AS5ONEBTS-09)**
P2PAM:	PCS 2 Carrier Linear Amplifier Module **(FCC ID: AS5ONEBTS-06)**
OM 1&2 :	Oscillator Module, 15 MHz Rubidium and Crystal types
Transmit Filter:	PCS Dual Duplex Transmit Filter appropriate for the investigated Blocks
Directional Coupler:	HP 778D and 772D Dual Directional Coupler
Power Meter:	Agilent E4419B EPM Series Power Meter with EPC-E18A Power Sensor or 8481A Power Sensor
Test Cables:	Low loss test cables custom mfg. for Lucent FCC Laboratory
Printer:	HP Model 4500DN Printer
Attenuator, Variable	HP 8494B and 8495B DC-18 GHz digital attenuators
Attenuator, Fixed	Weinschel Corp Low intermod type, DC-18 GHz, various values
Attenuator, Fixed	Weinschel Corp DC-18 GHz, various values
High Pass Filters:	2.5-20 GHz, Custom manufactured for Lucent FCC Laboratory
Low Pass Filters:	10MHz –1.8 GHz, Custom manufactured for Lucent FCC Laboratory
Spectrum Analyzer:	Rohde & Schwarz ESMI EMI Test Receiver or Rohde & Schwarz FSEM Spectrum Analyzer
Code Domain Analyzer	H-P and Agilent E4406A VSA Series Transmitter Tester
Computer Controller:	EG Technology, Custom Mfg for FCC Laboratory, Intel™ Pentium III & IV, 550 and 1600 MHz controllers with TILE ™ software

Exhibit 12 *continued*

Figure 12 RF Power Test Configuration

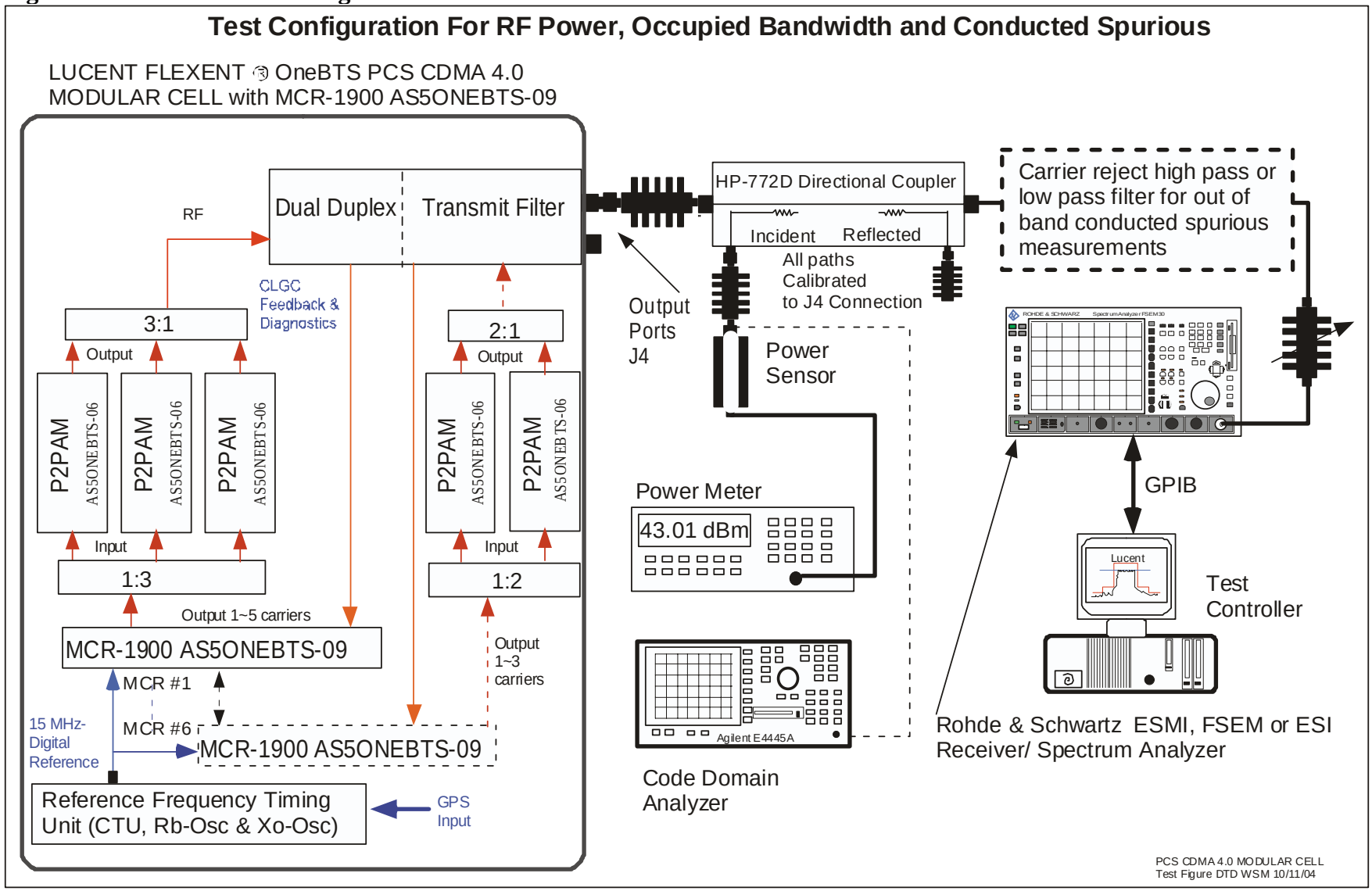

Exhibit 13: Measurement of Modulation Characteristics

SECTION 2.1047

MEASUREMENT OF MODULATION CHARACTERISTICS

The **MCR-1900 / AS5ONEBTS-09** was configured in the test setup shown in Figure 13A. The **MCR-1900** was configured with its pilot channel and the modulation quality measured with a Agilent -E4445A PSA Series Spectrum Analyzer.

Measurements were performed at the PCS Channels shown in table 13.1.

PCS Band	Transmit Channel(s)
A	25, 275
B	425, 675
C	925, 1175
D	325, 375
E	725, 775
F	825, 875

TABLE 13.1 MCR-1900 Channels for Modulation Characteristics Measurement

SECTION 2.1047- Modulation Description

The modulation methods used in CDMA drastically differ from those used in a FM analog system. The methods used in evaluating the PCS Multi-Carrier Radio (MCR-1900) are described in the pertinent standards documents which include **TIA/EIA-97-C** "recommended Minimum performance Standards for Base Stations Supporting Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations" and **3GPP2 C.S0010-0**, December 1999, *Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations*,. The modulation quantify criteria are as follows:

13.1 Modulation Requirements – Section 4.2 of TIA/EIA-97-C and 3GPP2 C.S0010-0

4.2 Modulation Requirements

Waveform quality is tested by measuring the waveform quality ρ, as defined in 6.4.2.1, and code domain power as defined in 6.4.2.2. The range of values for the transmit waveform quality is from 1.0 for a perfect CDMA waveform to 0.0 for a non-CDMA signal. As an example, a base station with a 0.5 dB degradation in its transmit waveform would have a quality, ρ, of $10^{-(0.5/10)} = 0.89$.

13.2 Required Results

Per Section 4.2.2.3 of **3GPP2 C.S0010-0**

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4.2.2.3 Minimum Standard

The normalized cross correlation coefficient, ρ, shall be greater than 0.912 (excess power < 0.4 dB).
The test method and diagrams are shown in Figure 13.

Exhibit 13 *continued*

The applied signal, from a **MCR-1900 FCC ID: AS5ONEBTS-09**, met the recommended characteristics per **"Table 6.5.2-1 Base Station Test Model, Nominal**" from **3GPP2 C.S0010-0, December 1999,** Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations, as defined below in table 13.2.

Type	Number of Channels	Fraction of Power (Linear)	Fraction of Power (dB)	Comments
Pilot	1	0.1490	-8.3	Walsh 0
Sync	1	0.015/p	-18.3	Walsh 32, always 1/8 rate
Paging	1	0.054	-12.7	Walsh 1, full rate only
Traffic	6	0.13 each	-8.8 each	Variable Walsh Assignments, full rate only

TABLE 13.2 Base Station Test Model, Nominal

13.3 Minimum Standard

The normalized cross correlation coefficient, ρ, shall be greater than 0.912 (excess power $\leq$ 0.4 dB).

13.4 Results

For each of the PCS channels tested, the **MCR-1900/ AS5ONEBTS-09** modulation quality factor, Rho (ρ), was measured to be $\geq$ 0.98. The **MCR-1900** transmit signal modulation parameters and constellation for PCS channel 25 is shown in Figure 13B below. The data for channel 25 is representative of the data recorded for the remaining channels listed above and was taken utilizing the Agilent -E4445A PSA Series Spectrum Analyzer. It also verified that the frequency offset is less than (+0.05 PPM) of the frequency assignment.

Exhibit 13 *continued*

Figure 13 Modulation Quality Measurement Test Configuration

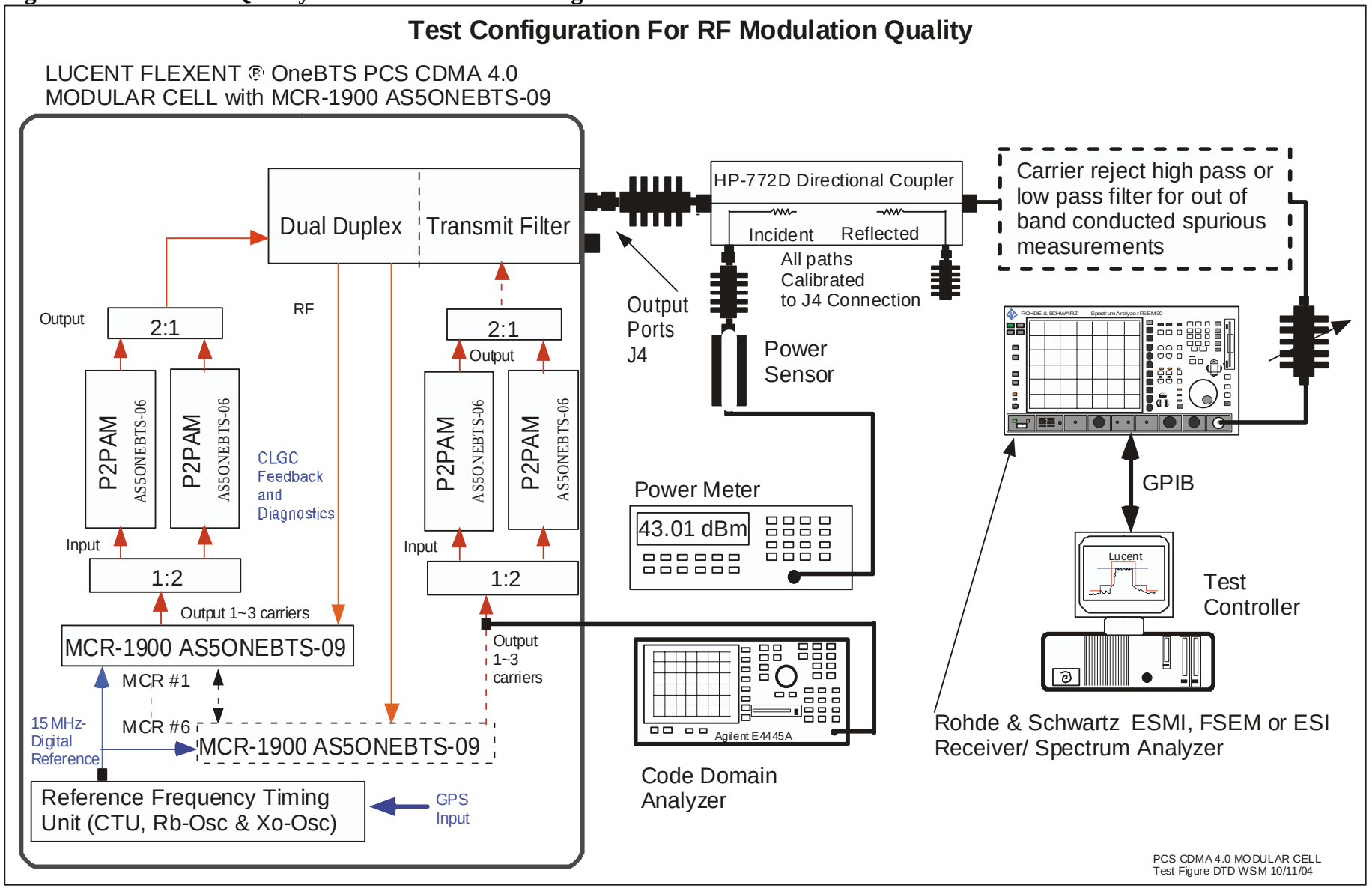

Exhibit 13 *continued*

Figure 13B MCR-1900 Measured Transmit Signal Modulation Parameters for Channel 25

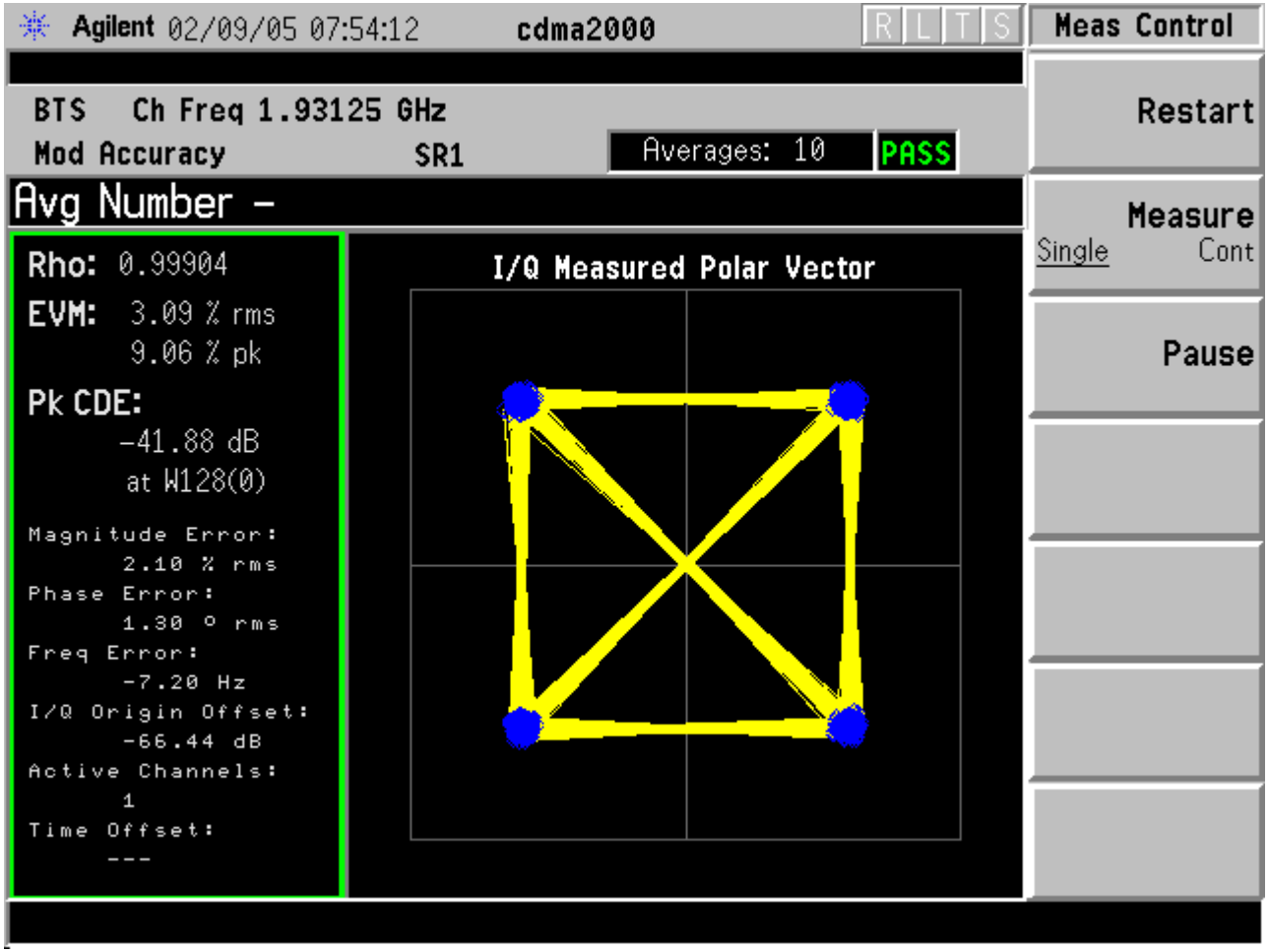

Exhibit 14 Measurement of Occupied Bandwidth

SECTION 2.1049 MEASUREMENT OF OCCUPIED BANDWIDTH

The **MCR-1900** is designed to transmit from one to eleven 1.25 MHz CDMA channels within 15 MHz of total contiguous bandwidth. This exhibit documents the typical unit level performance of the **MCR-1900** when transmitting from one to eleven CDMA carriers and the typical system level performance when transmitting from one to ten CDMA carriers. The base station system level transmit path configuration utilized for this exhibit allows for a maximum of five CDMA carriers at the transmit antenna port in a 7.5 MHz maximum bandwidth. The full 15 MHz bandwidth of the MCR-1900 is demonstrated at the antenna port by utilizing the two MCR-1900 transmitter ports to each transmit five CDMA carriers simultaneously. The first MCR-1900 transmit port is utilized to transmit five CDMA carriers at the left edge of a 15MHz PCS band and the second MCR-1900 transmit port is utilized to transmit five CDMA carriers at the right edge of the same 15MHz PCS band.

The occupied bandwidth of the **MCR-1900 / FCC ID: AS5ONEBTS-09** was measured using a Rohde & Schwarz FSEM-30 Spectrum Analyzer, a PC based instrumentation controller using TILE™ software and calibrated RF equipment. The RF power level was measured and adjusted via the test setup in Figure 14A. The calibrated RF output from the transmitter was reduced (to an amplitude usable by the spectrum analyzer) by using a calibrated broadband attenuator. This attenuation was offset on the display and the signal adjusted to the -16.2 dBc level corresponding to the corrected RF power level for a 30 kHz resolution bandwidth (RBW). This set-point was performed as follows:

The power calibration was individually verified at each carrier using a power meter in the Figure 14A setup. Additionally a power calibration was performed to calibrate the setting of the measured 30 kHz Occupied Bandwidth signal at the –16.2 dBc line and a 3 MHz RBW measurement against the "Top of Mask" limit which corresponds to the output power at an RBW setting of $\geq$ 1.25 MHz. These measurements were performed prior to each Occupied Bandwidth measurement. The signals measured at RBW's of 3 MHz and 30 kHz were plotted and a digital attenuation was adjusted to place the 3 MHz RBW signal at the "Top of Mask". The carrier was measured with a 30 kHz RBW and used the same attenuation. These two graphs are co-plotted and shown in Figure 14C Typical Power Calibration. The utilization of multiple 1.25 MHz carriers requires a power calibration line above the "Top of Mask" limit to reflect the power level generated by greater than 1 carrier in a 3MHz bandwidth. The power calibration line for two carriers is calculated utilizing the following formula:

Power Calibration line = Composite Power Level (i.e. 46.02 dBm for two 20W carriers)

The power calibration line for ≥ three carriers is calculated utilizing the following formula:

Power Calibration Line Level = Composite Power Level - 10*log (Transmit Bandwidth/ Resolution Bandwidth)

The three 1.25 MHz carrier power calibration line is calculated as follows using the above equation:

47.78 dBm (60W) - 10*log (3.75MHz / 3MHz) = 46.81 dBm

This test procedure above calibrates the carrier power to the "Top of Mask" and accurately places the 30 kHz RBW measured carrier at the –16.2 dBc line. This process also documents the carrier power at the specified power level of 20 watts per carrier / 43.01 dBm. A majority of the plots are presented with a 7.5 MHz span and the center frequency of the specific Sub-Block of interest. This allows for ease of comparison of the single, dual and three carrier performance. The remainder of the plots are presented with a 10MHz span for the utilization of five carriers. This data was electronically recorded using the TILE™ software and electronically placed in the Occupied Bandwidth Data Sheets. These sheets contain data for "Left Edge of Block", and "Right Edge of Block" for each PCS frequency Block in the application.

Block Organization and Tests Performed

The FLEXENT PCS Modular cell product line utilizes 15 MHz PCS Block transmit filters (A, B and C) and 5 MHz PCS Block transmit filters (D, E & F). The PCS transmit filters allow for compliance of the measurements performed at the edges of each standard PCS Block.

Filter combination tests were performed for the one, two, three, four, and five carrier operational configurations of the **MCR-1900**. When a second source manufacturer is to be qualified for a granted block, the tests are performed and the source approved via a Class I change to each of the applicable filings.

Exhibit 14 *continued*

Applied Signal

The applied signal, from a MCR-1900 FCC ID: AS5ONEBTS-09, met the recommended characteristics per **"Table 6.5.2-1 Base Station Test Model, Nominal**" from **3GPP2 C.S0010-0, December 1999,** Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations, as defined below.

Type	Number of Channels	Fraction of Power (Linear)	Fraction of Power (dB)	Comments
Pilot	1	0.1490	-8.3	Walsh 0
Sync	1	0.015/p	-18.3	Walsh 32, always 1/8 rate
Paging	1	0.054	-12.7	Walsh 1, full rate only
Traffic	6	0.13 each	-8.8 each	Variable Walsh Assignments, full rate only

TABLE 14.1 Base Station Test Model, Nominal

Measurement Offset

The spectrum analysis output plots shows the peak of the CDMA channel signal 16.19 dB below the Mask reference / "zero dBc line" of the spectrum analyzer for the following reason: For the CDMA system there is no carrier without modulation. Since the CDMA signal is Broadband and 1.25 MHz wide, all measurements performed at narrower resolution bandwidths need be adjusted for the reduction in signal energy. The following relationship was used to provide the correct level for an unmodulated carrier vs. the modulated signal.

$$10*\log(\text{Resolution Bandwidth}/\text{Transmit Bandwidth}) = \text{Signal Offset} \quad (1)$$

For the peak of the 1.25 MHz CDMA signal measured with a RBW of 30 kHz the signal offset is:

$$\text{Signal Offset} = 10*\log(30\text{ kHz}/1.25\text{ MHz}) = -16.19\text{ dB}$$

Limits which are specified as appropriate at a given RBW can be measured and evaluated at other RBW's if the limit is adjusted per equation (1)

Require Levels

The minimum standard presented in 3GPP2 C.S0010-0**, Dec. 1999,** *Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations, Section 4.4.1.3* **was followed for Suppression Inside the Licensee's Frequency Block(s)**

> Signals that are within the base station transmit band of 1930.000 to 1990.000 MHz and are within the specific block(s) allocated to the operator's system, the total conducted spurious emissions in any 30 kHz band greater than 885 kHz from the CDMA channel center frequency shall not exceed a level of -45 dBc….

The Limit in 47 CFR 24.238(a)(b) for emissions in the 1 MHz band immediately outside and adjacent to a licensees frequency block is:

> **Emissions ≤1 MHz outside the Block *when measured with a RBW of 1%* of the emissions Bandwidth shall be attenuated by :**
>
> **-{43+10log (mean power output in watts)} = -13 dBm**

The Limit in 47 CFR 24.238(a) for emissions outside a licensees frequency block is:

> **Emissions >1 MHz outside the Block, *when measured with a RBW of 1 MHz,* shall be attenuated by :**
>
> **-{43+10log (mean power output in watts)} = -13 dBm.**

Measurement at a Resolution Bandwidth of 30 kHz is based on our experience with 47 CFR 24.238 and lacking other guidance.

Exhibit 14 *continued*

Adjusted Levels

The following levels apply when measurements of the above limits are performed with an RBW of 30 kHz. Measurement at a Resolution Bandwidth of 30 kHz is based on our experience with 47 CFR 24.238 and lacking other guidance.

1. On any frequency removed from the carrier center frequency by greater than 885 kHz up to 1.25 MHz - at least 45 decibels below the carrier; and

2. On any frequency removed from the carrier center frequency by greater than 1.25 MHz to 2.25 MHz the level shall not exceed -9.2 dBm/-52.21 dBc when measured in a 30 kHz resolution bandwidth (Note 2 below); and

3. From the edge of the Block to the 10th harmonic of the carrier at least:

   -{43+10log (mean power output in watts)} dBm,

   whichever is the lesser attenuation. For 20 Watts the required level is –71.24 dBc / -28.2 dBm as measured with a 30 kHz resolution bandwidth (see Note 3). This is equal to -13 dBm measured with a 1 MHz resolution bandwidth.

Note 2: The -9.2 dBm/-52.21 dBc level was computed as follows: The limit is specified as

-{43+10log (mean power output in watts) } dB = -13 dBm

When measured in a resolution bandwidth not less than 1% of the signal bandwidth.
Since the carrier is a 1.25 MHz bandwidth signal, the limit is adjusted to

-13 + 10LOG(30kHz/12.5 kHz) dBm = -9.2 dBm / -52.21 dBc

Note 3: The -28.2 dBm / -71.24 dBc level is computed from -13 dBm measured with a 1 MHz resolution bandwidth adjusted by :

-13 + 10LOG(30kHz/1.0 MHz) dBm = -28.2 dBm / -71.21 dBc

Mask Description for Single Carrier

The Mask limits are identical for the left and right side of the PCS Blocks and are as follows.
Figure 14B shows the Mask limit for PCS channel 925 which is the left block edge for Block C and shows limits levels identical for the band edge of the PCS band. The Spectrum Analyzer reference level is set above the Signal Reference to allow for the necessary dynamic range of a three CDMA carrier presentation.

- The top of a typical 43.01 dBm single carrier CDMA signal viewed at a resolution bandwidth of 30 kHz is shown at the 26.81 dBm/ -16.2 dBc line. This line is based on equation 1, and the ratio of the 1.25 MHz bandwidth and the 30 kHz resolution bandwidth of the spectrum analyzer.
- The vertical line from a to b (i.e. a-b) is at 885 kHz from the center of channel 925 (i.e. Fc), per *3GPP2 C.S0010-0*. The horizontal line b-c is 45 dB below the 43.01 dBm/ 0 dBc reference level.
- The vertical line c-d is at 1.25 MHz from the center of the channel.
- The placement of line d-e is derived from evaluation of the signal and 12.5 kHz (1%)resolution bandwidth, using the suggested value in section 24.238 of the rules. The ratio of 30 kHz to 12.5 kHz in equation (1) gives 3.8 dB. Adjusting the tolerance line to reflect this difference puts the -13 dBm limit line at -9.2 dBm or –52.21 dBc below the reference line.
- The vertical line, e-f is at 2.25 MHz from the center of channel 925.
- The horizontal line f-g is drawn at –71.21 dBc below the 0 dBc / 43.01 dBm reference because the rules require a 1 MHz resolution bandwidth for measurements 1 MHz or greater outside the PCS band. Again, equation (1) and the ratio of 1 MHz to 1.25 MHz provides this value. The same logic was used in determining the other block and band edge tolerances.

Exhibit 14 *continued*

Mask Description for Multiple Carrier
The mask for multiple carriers only adjusts the width of the carrier portion of the mask.
For the example given above...with multiple carriers there would be no adjustments made to the "Left Edge of Block" requirements. The specified "Right Edge Limit" is treated as an expansion of the non Block edge corner **bb** to be the required + 885 kHz from the center of the "right most" channel. The "Right Edge of Block" limits were derived consistently.

Measurement
All of the tolerance lines for the output are referenced to the top of the Occupied Bandwidth mask, which is defined as 43.01 dBm/ zero dBc. For all measurements of the **MCR-1900's** Occupied Bandwidth, the output power was measured / adjusted individually to the 20 W level for each carrier and this is the 43.01 dBm value at the 0 dBc reference line.

In order to depict the tolerance lines that are required by Sec 24.238 of the FCC Rules and 3GPP2 C.S0010-0, all measurements were made with a resolution bandwidth of 30 kHz and the limits were adjusted using equation (1). An average detector was employed using minimum of 25 sweeps per trace.

Exhibit 14 *continued*

PCS Block -Channel	Number of carriers	Number of P2PAM's MCA	Test Results Occupied BW
A- 25	1	1&2	Compliant
A-25, 50	2	1&2	Compliant
A- 25, 50, 75	3	2	Compliant
A- 25, 50, 75, 100	4	3	Compliant
A- 25, 50, 75, 100,125	5	3	Compliant
A-275	1	1&2	Compliant
A-250, 275	2	1&2	Compliant
A- 225, 250, 275	3	2	Compliant
A- 200, 225, 250, 275	4	3	Compliant
A- 175,200, 225, 250, 275	5	3	Compliant
B- 425	1	1&2	Compliant
B-425, 450	2	1&2	Compliant
B- 425, 450, 475	3	2	Compliant
B- 425, 450, 475, 500	4	3	Compliant
B- 425, 450, 475, 500,525	5	3	Compliant
B-675	1	1&2	Compliant
B-650, 675	2	1&2	Compliant
B- 625, 650, 675	3	2	Compliant
B- 600, 625, 650, 675	4	3	Compliant
B- 575,600, 625, 650, 675	5	3	Compliant
C- 925	1	1&2	Compliant
C-925, 950	2	1&2	Compliant
C- 925, 950, 975	3	2	Compliant
C- 925, 950, 975, 1000	4	3	Compliant
C- 925, 950, 975, 1000,1025	5	3	Compliant
C-1175	1	1&2	Compliant
C-1150, 1175	2	1&2	Compliant
C- 1125, 1150, 1175	3	2	Compliant
C- 1100, 1125, 1150, 1175	4	3	Compliant
C- 1075,1100, 1125, 1150, 1175	5	3	Compliant

(1) The Single Amplifier configuration supports 1 and 2 carrier transmit configurations. The dual amplifier MCA supports 1, 2 and 3 carrier transmit configurations. The three amplifier MCA supports 4 and 5 carrier transmit configurations.

TABLE 14.2 PCS Occupied Bandwidth Compliance Tabulation

Exhibit 14 *continued*

PCS Block -Channel	Number of carriers	Number of P2PAM's MCA	Test Results Occupied BW
D- 325	1	1&2	Compliant
D-325,350	2	1&2	Compliant
D-350,375	2	1&2	Compliant
D- 325,350,375	3	2	Compliant
E- 725	1	1&2	Compliant
E-725,750	2	1&2	Compliant
E-750,775	2	1&2	Compliant
E- 725,750,775	3	2	Compliant
F- 825	1	1&2	Compliant
F-825,850	2	1&2	Compliant
F-850,875	2	1&2	Compliant
F- 825,850,875	3	2	Compliant

(1) The Single Amplifier configuration supports 1 and 2 carrier transmit configurations. The dual amplifier MCA supports 1, 2 and 3 carrier transmit configurations.

TABLE 14.2 *continued* PCS Occupied Bandwidth Compliance Tabulation

Exhibit 14 *continued*

Presented Results

The Block designation, PCS channels, frequencies and Measured RF Power are tabulated on each plot. The carrier signal at the output of the **MCR-1900** and at the antenna terminal is presented for each frequency/ channel of interest. Plots are provided for Left Edge and Right Edge of each PCS Block evaluated. These frequencies were chosen to show the occupied bandwidth at the edges of each of the PCS Blocks in which this product can be operated, in compliance with Section 24.229 and 24.238 (c) of the Commission code. The data depicting five carriers each for sub-blocks A1/A2 and A3/A5 were transmitted from a single MCR-1900 utilizing both radio transmit ports to demonstrate the 15MHz bandwidth of the MCR at the antenna port. Five A band Left Edge carriers were transmitted from port 1 for theA1/A2 sub-blocks, and five A band Right Edge carriers were transmitted from port 2 for the A3/A5 sub-blocks. The same methodology was utilized for the B band and C band five carrier test configurations. The signal used to show the occupied bandwidth is defined in table 14.1. This is the signal recommended in 3GPP2 C.S0010-0, December 1999, Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations, Paragraph 6.5.2, Test Model for Base Station. The power output level was adjusted to provide the documented value on each chart. Data is also presented depicting the performance of the **MCR-1900** RF transmit output when operating the radio at the specified maximum RF output power (+4.22 dBm per carrier and +12.0 dBm per transmit port) for one, six, and eleven carrier configurations.

RESULTS: The following exhibits illustrate the spectrums investigated and document compliance.

. **Daniel Donohue**

Exhibit 14 *continued* **Test Equipment and Results**

Table 14-2 Equipment used for Measurement of RF Transmit Power, Occupied Bandwidth and Conducted Spurious Emissions

Equipment	Description
Product Frame:	PCS Indoor Flexent OneBTS Modular Cell 4.0 with 6 MCR-1900 transceivers and 12 P2PAM amplifiers
MCR-1900:	PCS Multi-Carrier Radio **(FCC ID: AS5ONEBTS-09)**
P2PAM:	PCS 2 Carrier Linear Amplifier Module **(FCC ID: AS5ONEBTS-06)**
OM 1&2 :	Oscillator Module, 15 MHz Rubidium and Crystal types
Transmit Filter:	PCS Dual Duplex Transmit Filter appropriate for the investigated Blocks
Directional Coupler:	HP 778D and 772D Dual Directional Coupler
Power Meter:	Agilent E4419B EPM Series Power Meter with EPC-E18A Power Sensor or 8481A Power Sensor
Test Cables:	Low loss test cables custom mfg. for Lucent FCC Laboratory
Printer:	HP Model 4500DN Printer
Attenuator, Variable	HP 8494B and 8495B DC-18 GHz digital attenuators
Attenuator, Fixed	Weinschel Corp Low intermod type, DC-18 GHz, various values
Attenuator, Fixed	Weinschel Corp DC-18 GHz, various values
High Pass Filters:	2.5-20 GHz, Custom manufactured for Lucent FCC Laboratory
Low Pass Filters:	10MHz –1.8 GHz, Custom manufactured for Lucent FCC Laboratory
Spectrum Analyzer:	Rohde & Schwarz ESMI EMI Test Receiver or Rohde & Schwarz FSEM Spectrum Analyzer
Code Domain Analyzer	H-P and Agilent E4406A VSA Series Transmitter Tester
Computer Controller:	EG Technology, Custom Mfg for FCC Laboratory, Intel™ Pentium III & IV, 550 and 1600 MHz controllers with TILE ™ software

Exhibit 14 *continued*

Figure 14A Occupied Bandwidth Measurement Test Configuration

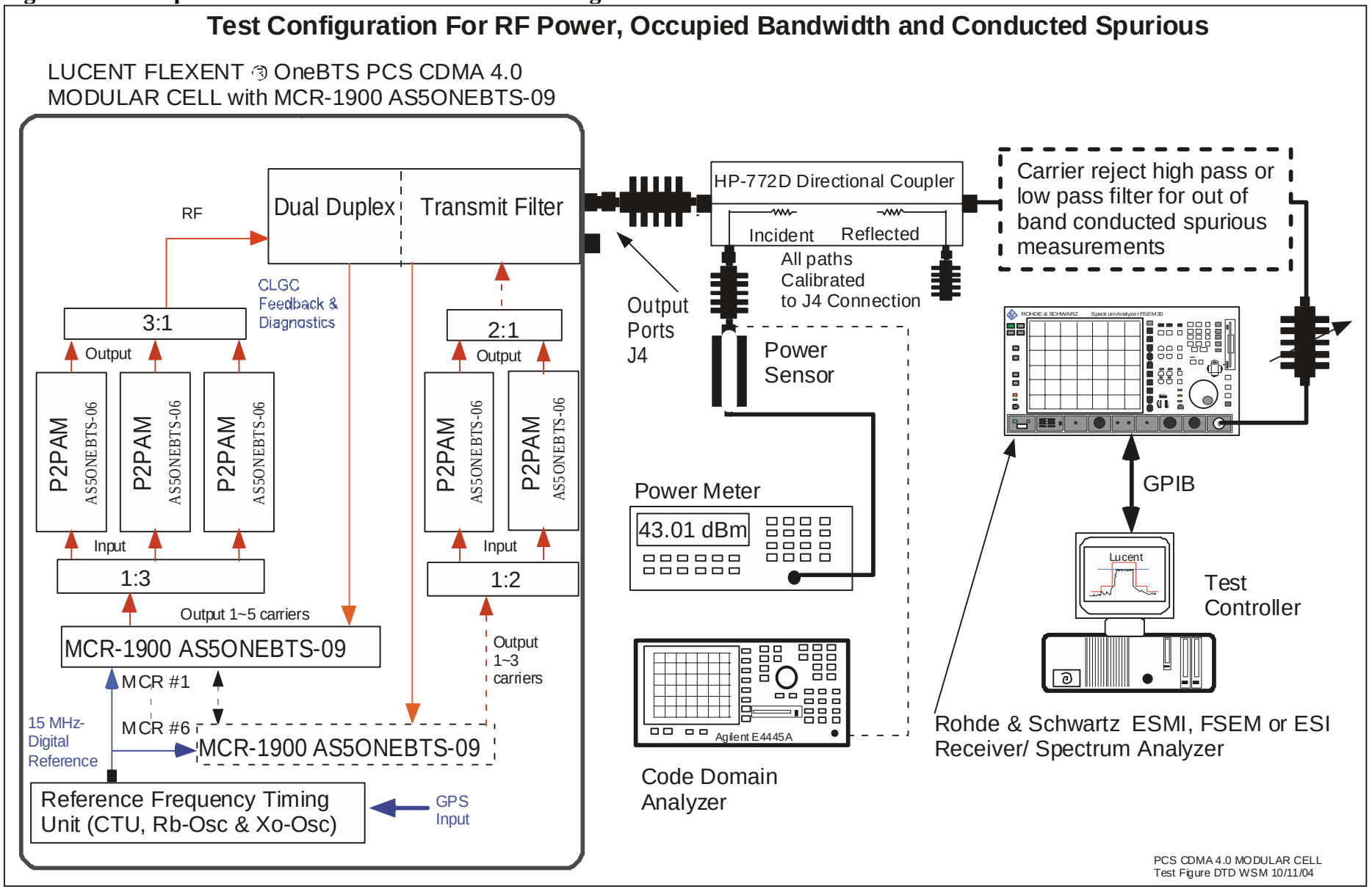

Figure 14B Typical Occupied Bandwidth Mask

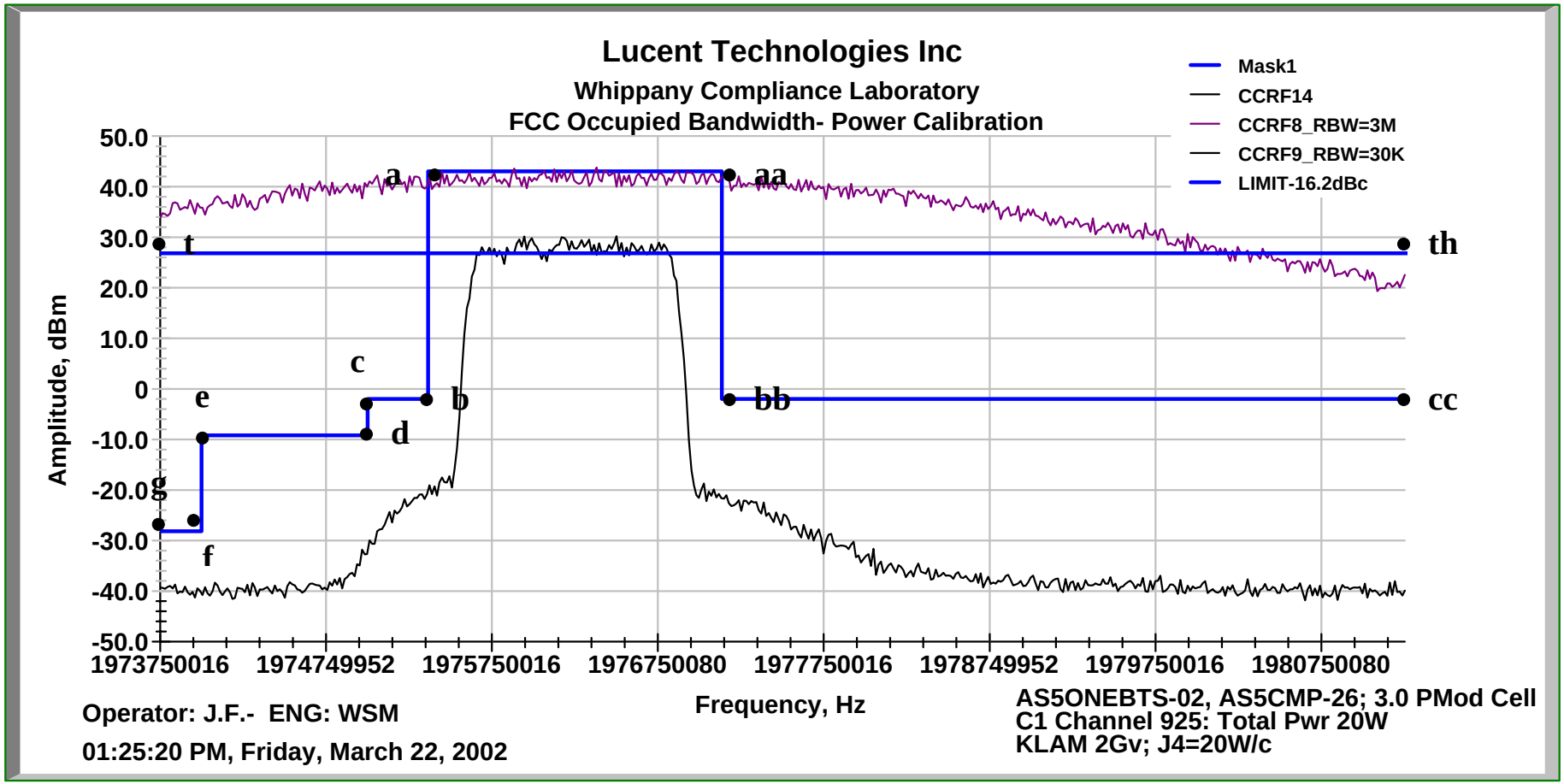

Figure 14C Typical Power Calibration

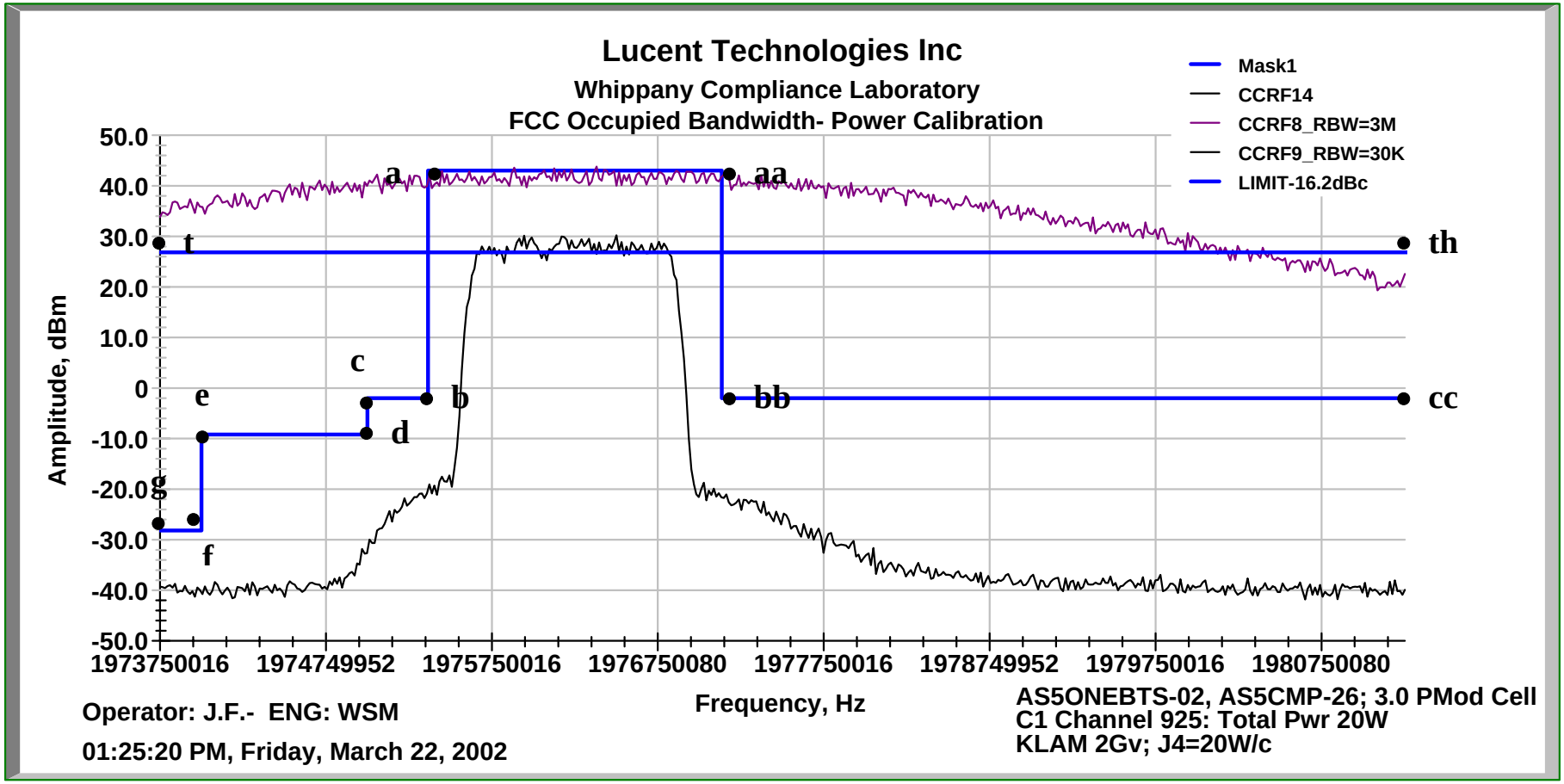

Exhibit 14 *Continued*

FCC
Occupied Bandwidth Data Scans
of
Lucent Technologies Inc.
PCS ONEBTS Modular Cell 4.0
Incorporating
PCS Multi-Carrier Radio (MCR-1900)
Filed under AS5ONEBTS-09
with
PCS 2 Carrier Power Amplifier Module (P2PAM)
FCC ID: AS5ONEBTS-06

Single, Dual, Three, and Five Carrier Configurations

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "A" Band; 1 Carrier Configuration

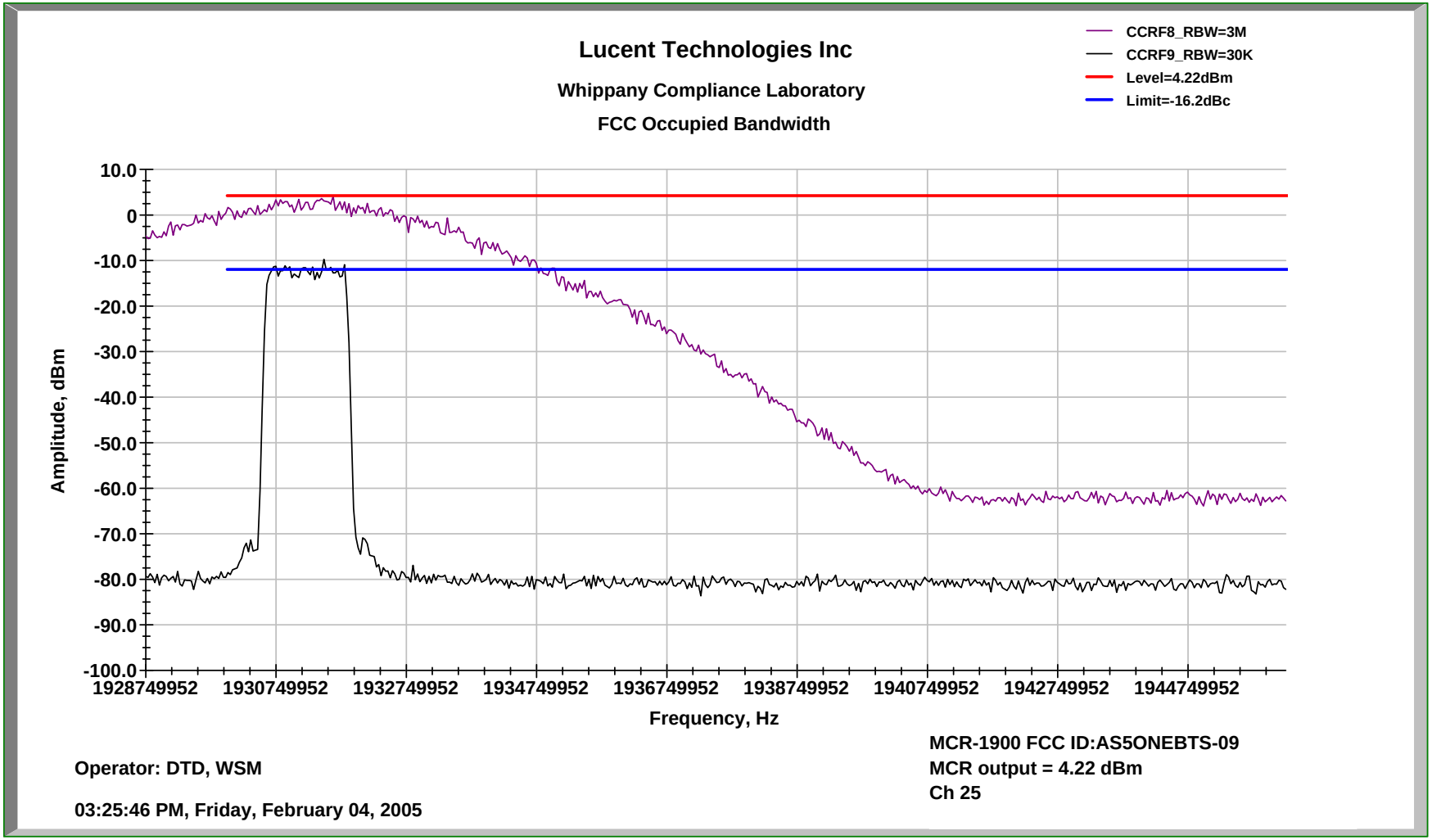

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "A" Band; 6 Carrier Configuration

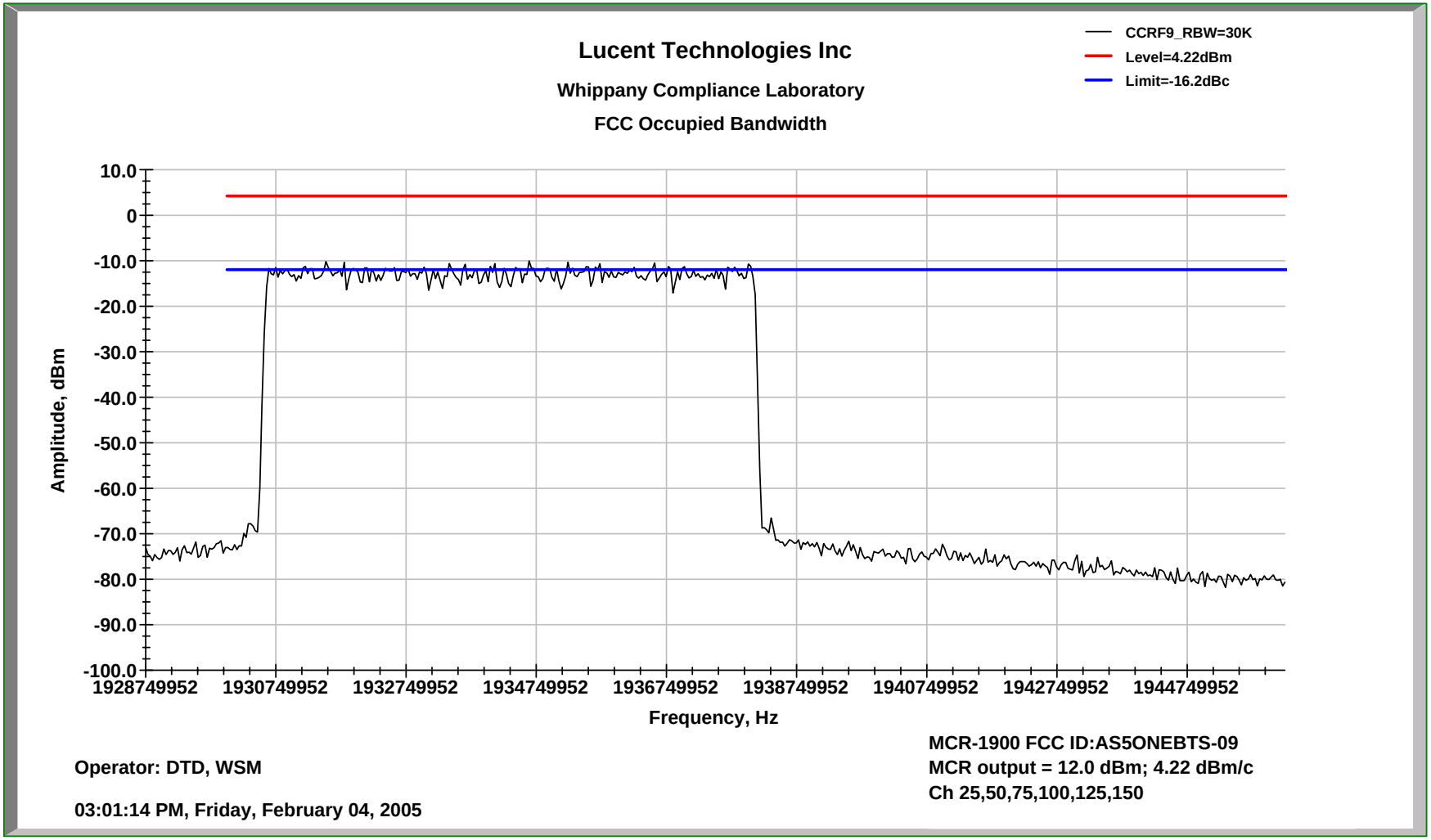

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "A" Band; 11 Carrier Configuration

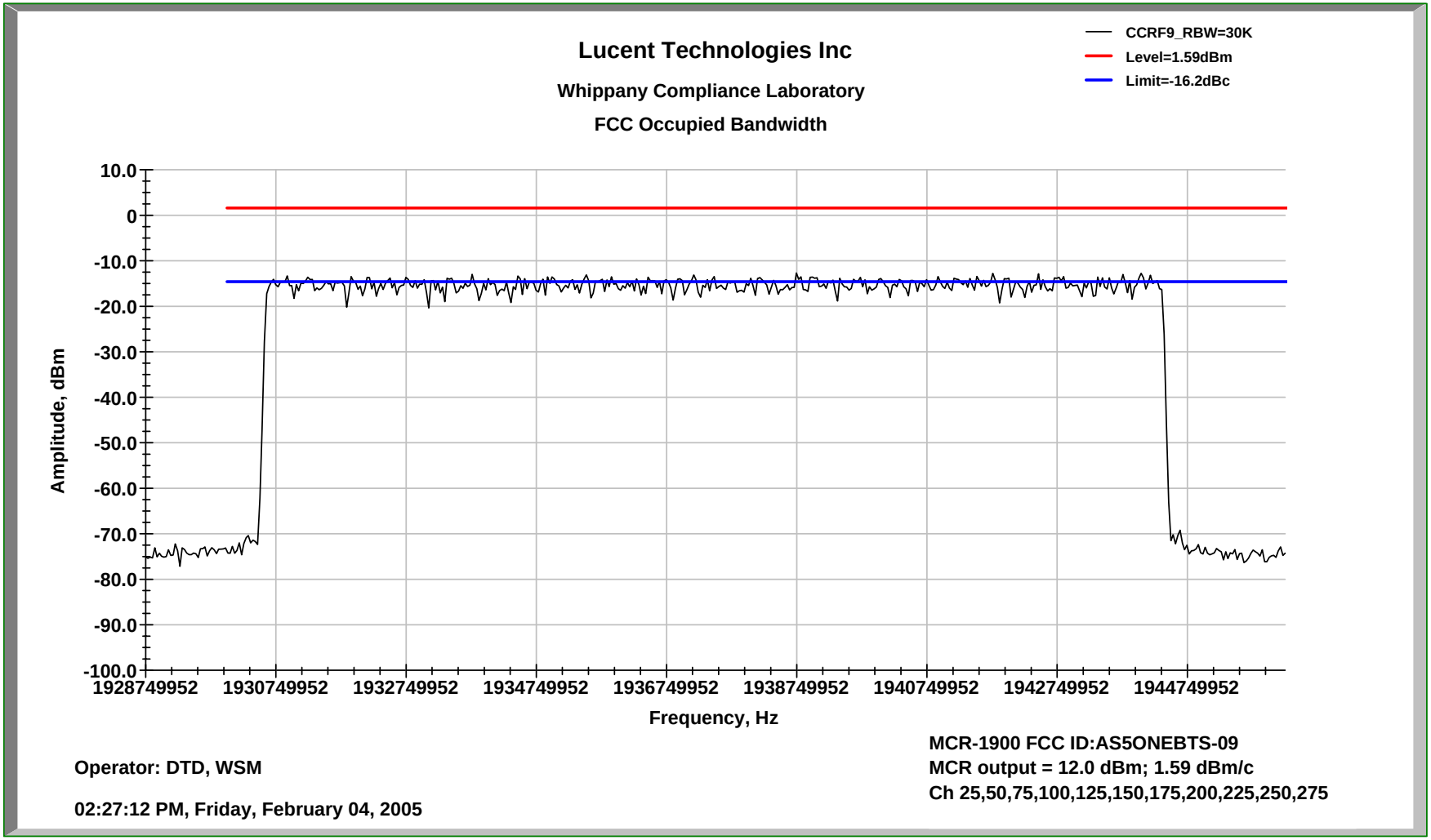

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "B" Band; 1 Carrier Configuration

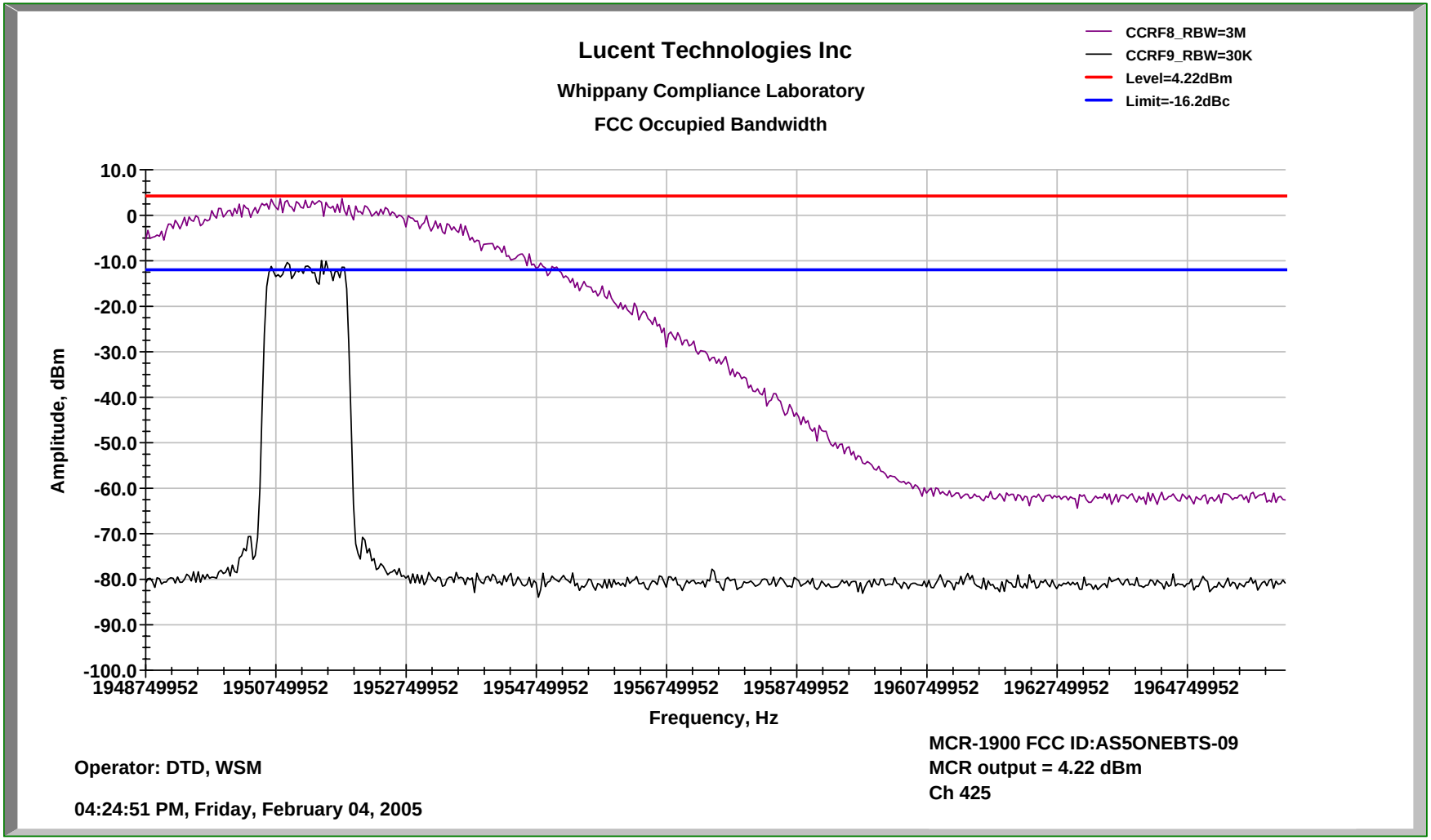

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "B" Band; 6 Carrier Configuration

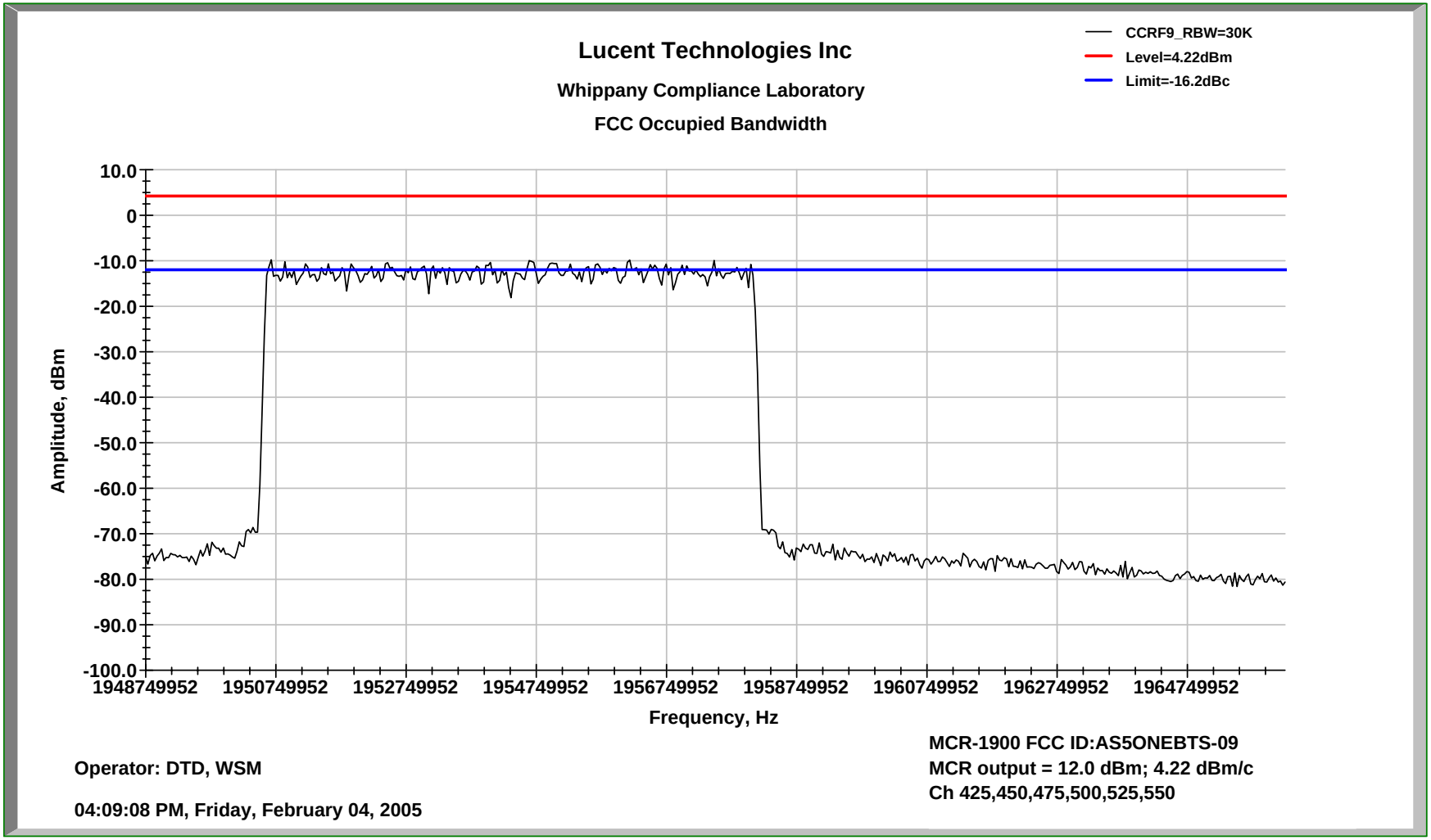

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "B" Band; 11 Carrier Configuration

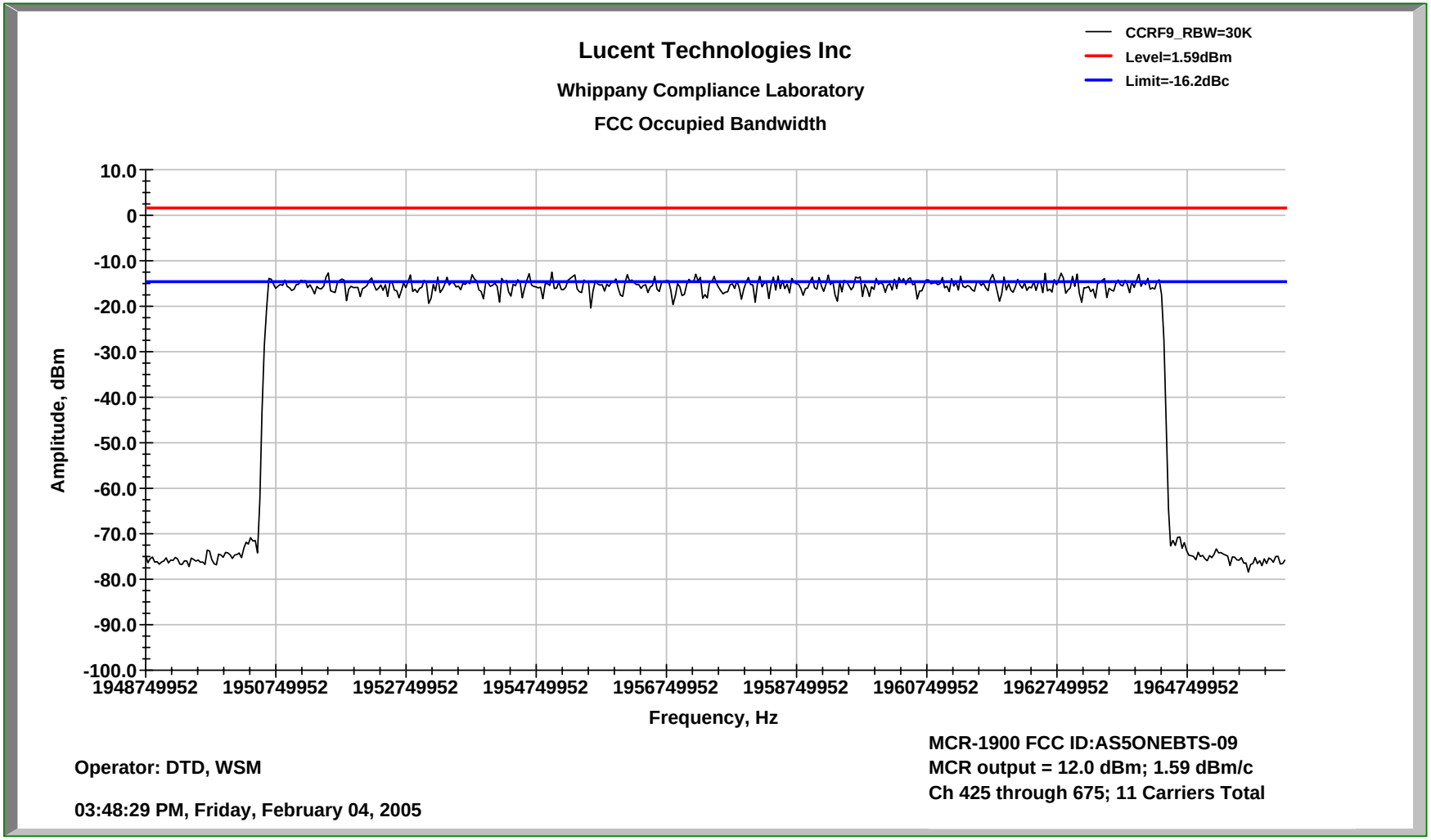

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "C" Band; 1 Carrier Configuration

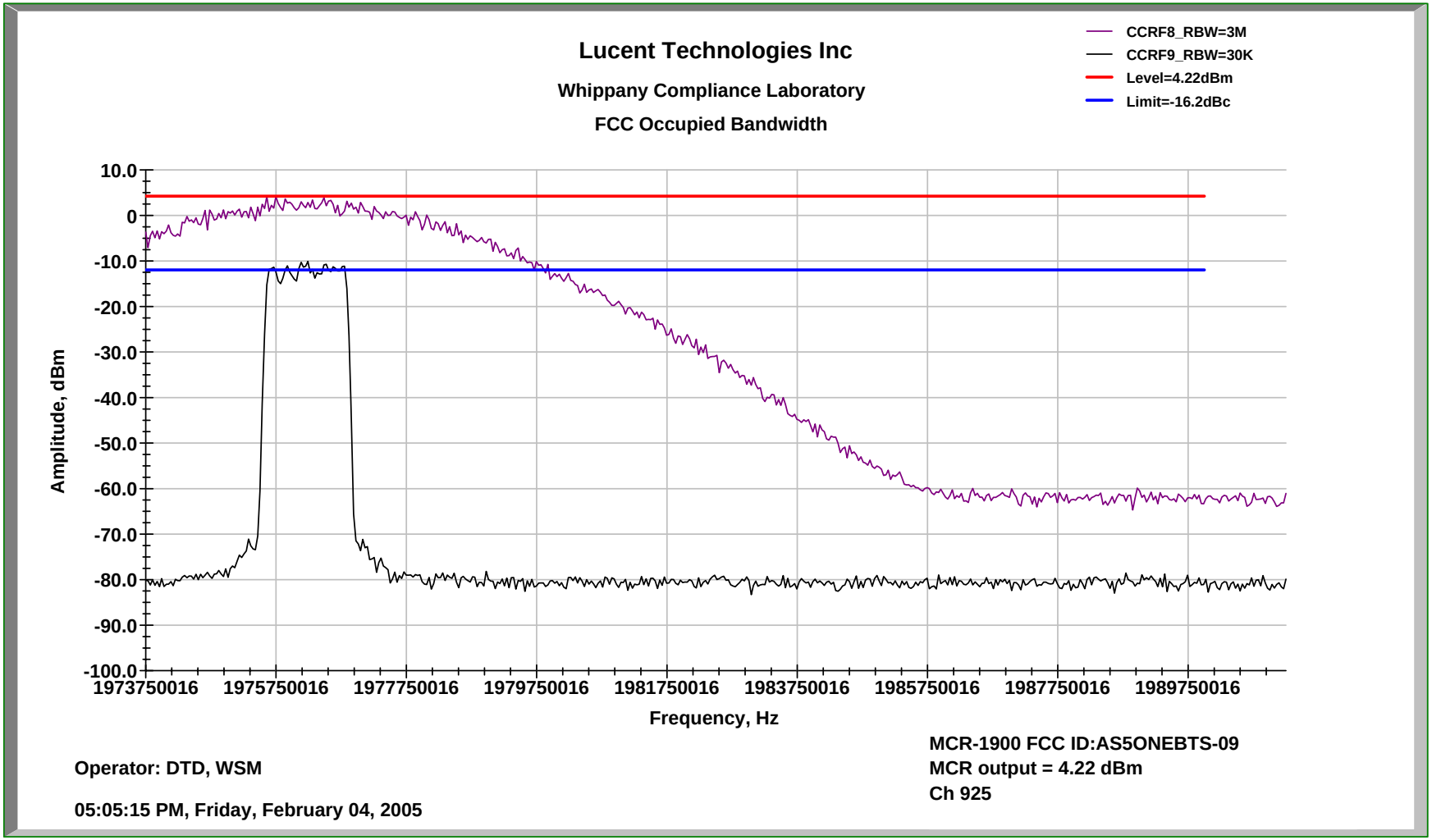

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "C" Band; 6 Carrier Configuration

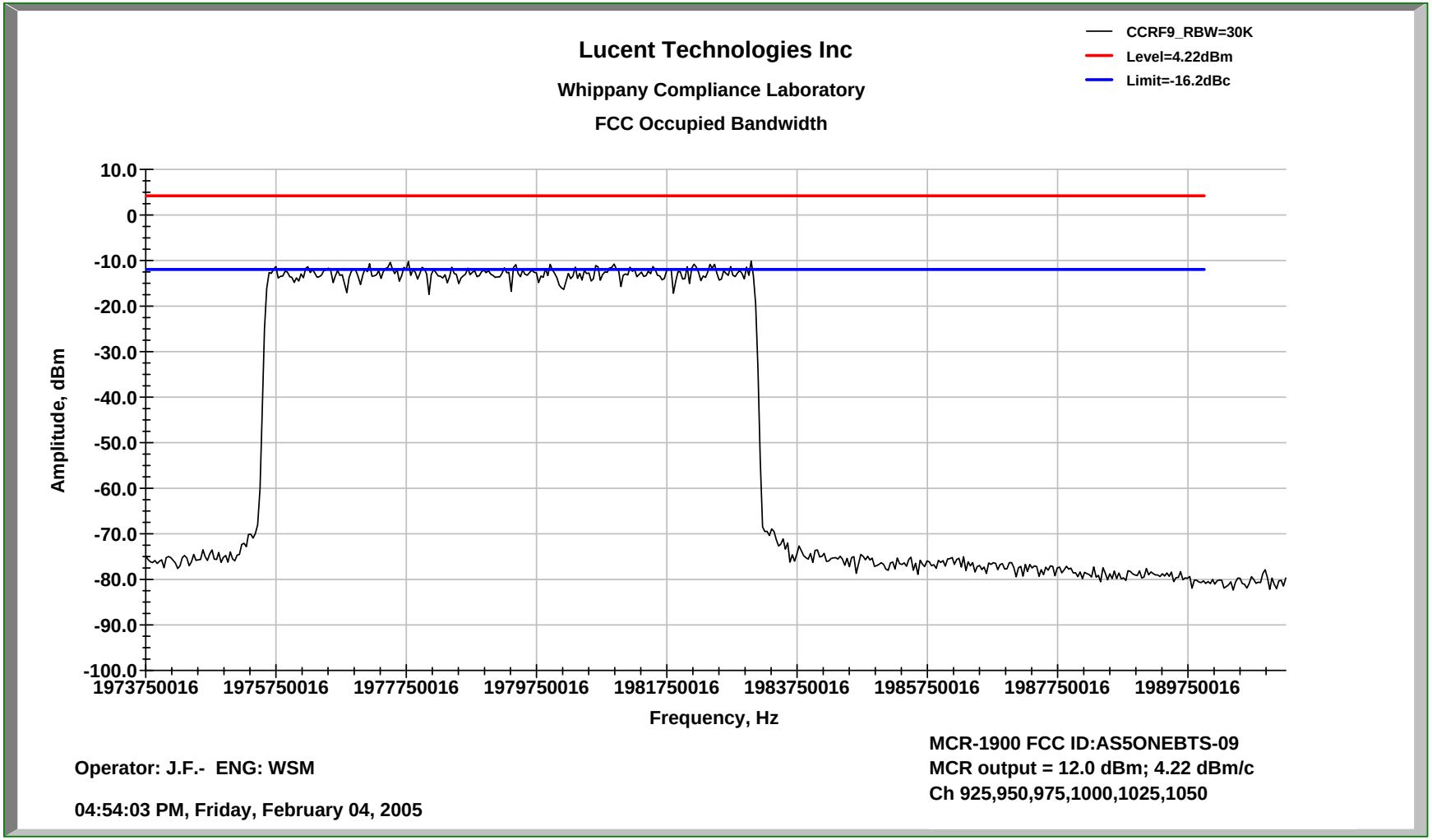

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS "C" Band; 11 Carrier Configuration

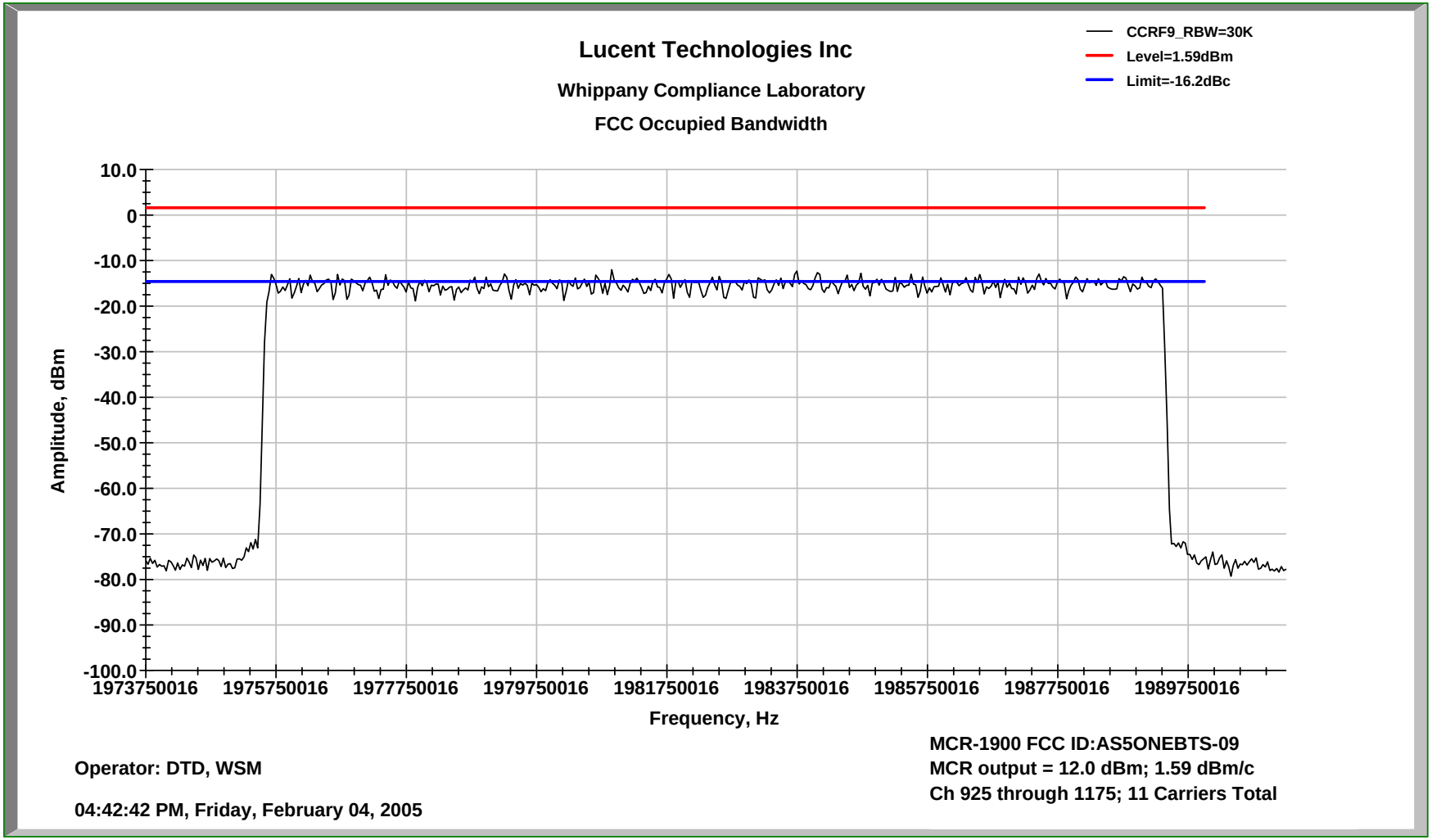

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS A Block, Sub-Block A1, 1 Carrier / 2 P2PAM Configuration

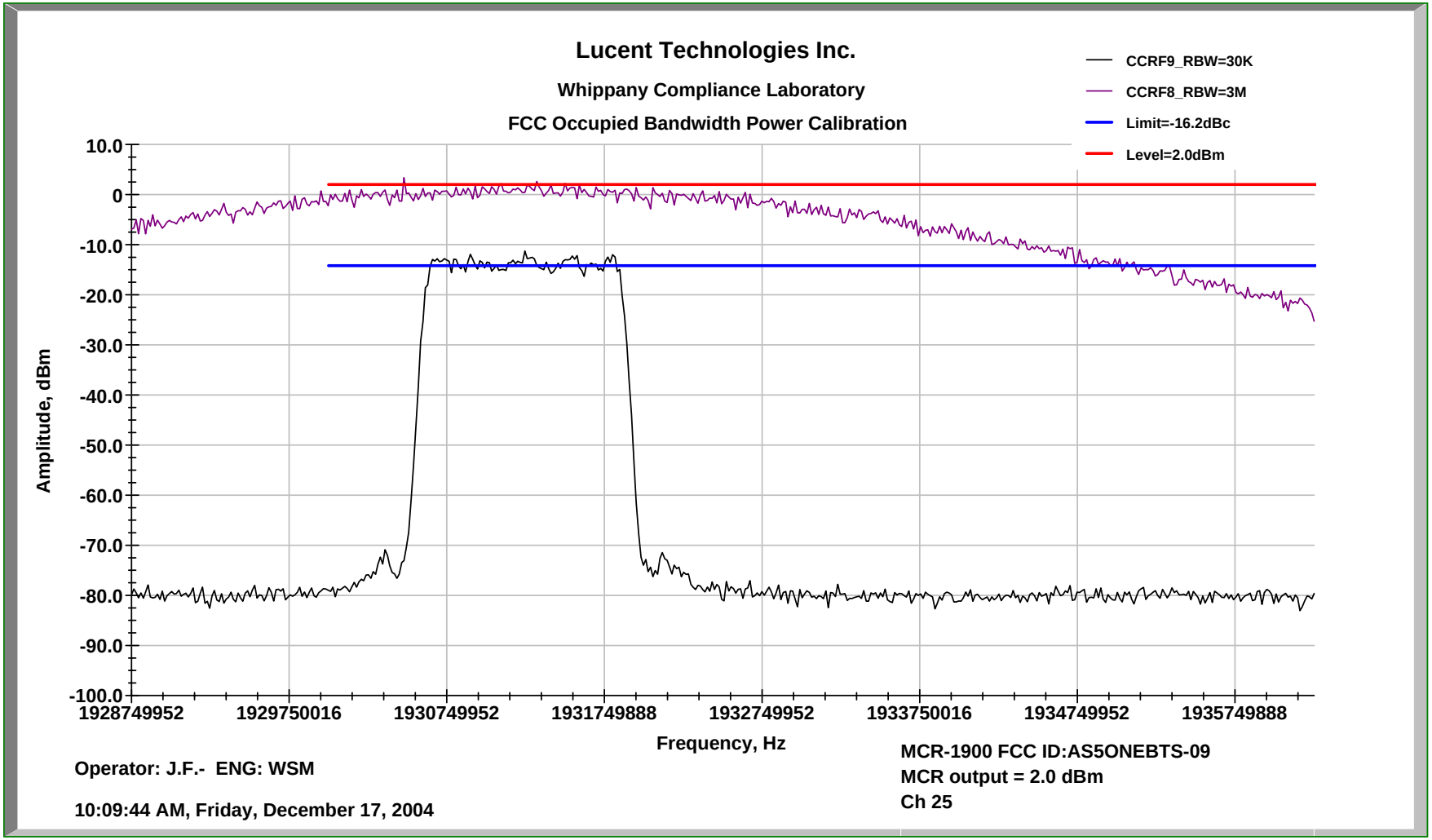

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS A Block, Sub-Block A1, 1 Carrier / 2 P2PAM Configuration

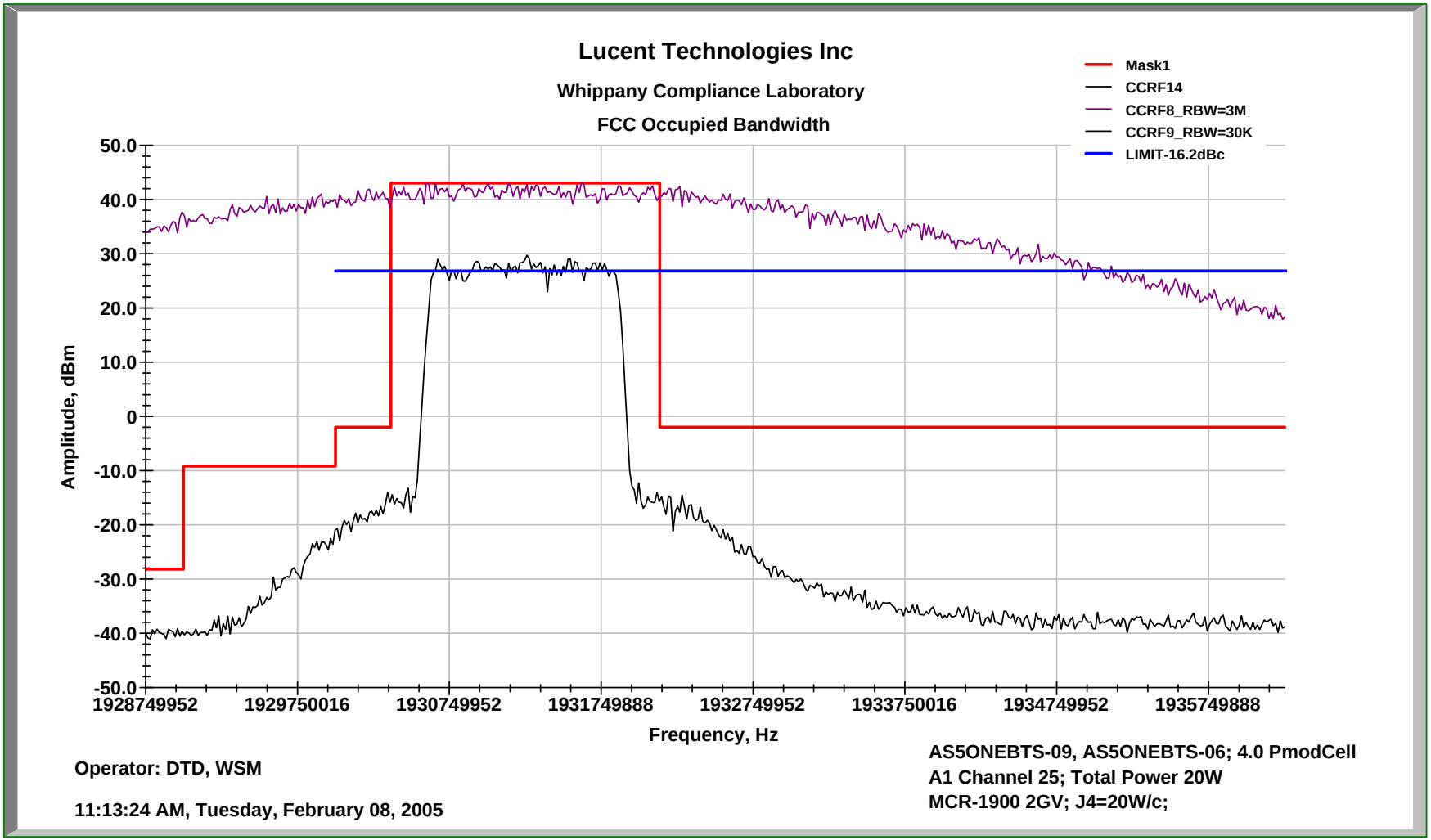

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS A Block, Sub-Block A1, 2 Carrier / 1 P2PAM Configuration

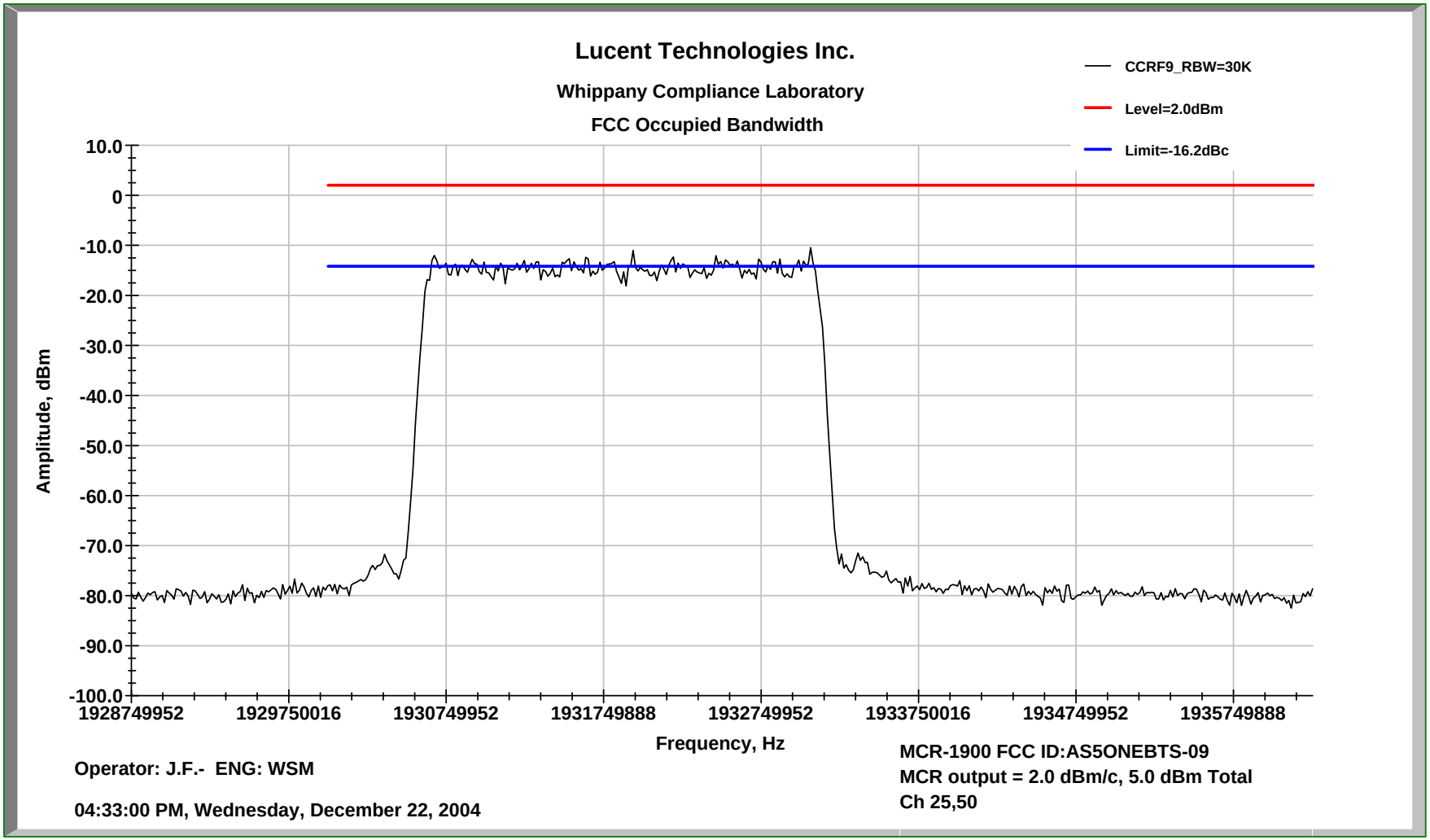

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS A Block, Sub-Block A1, 2 Carrier / 1 P2PAM Configuration

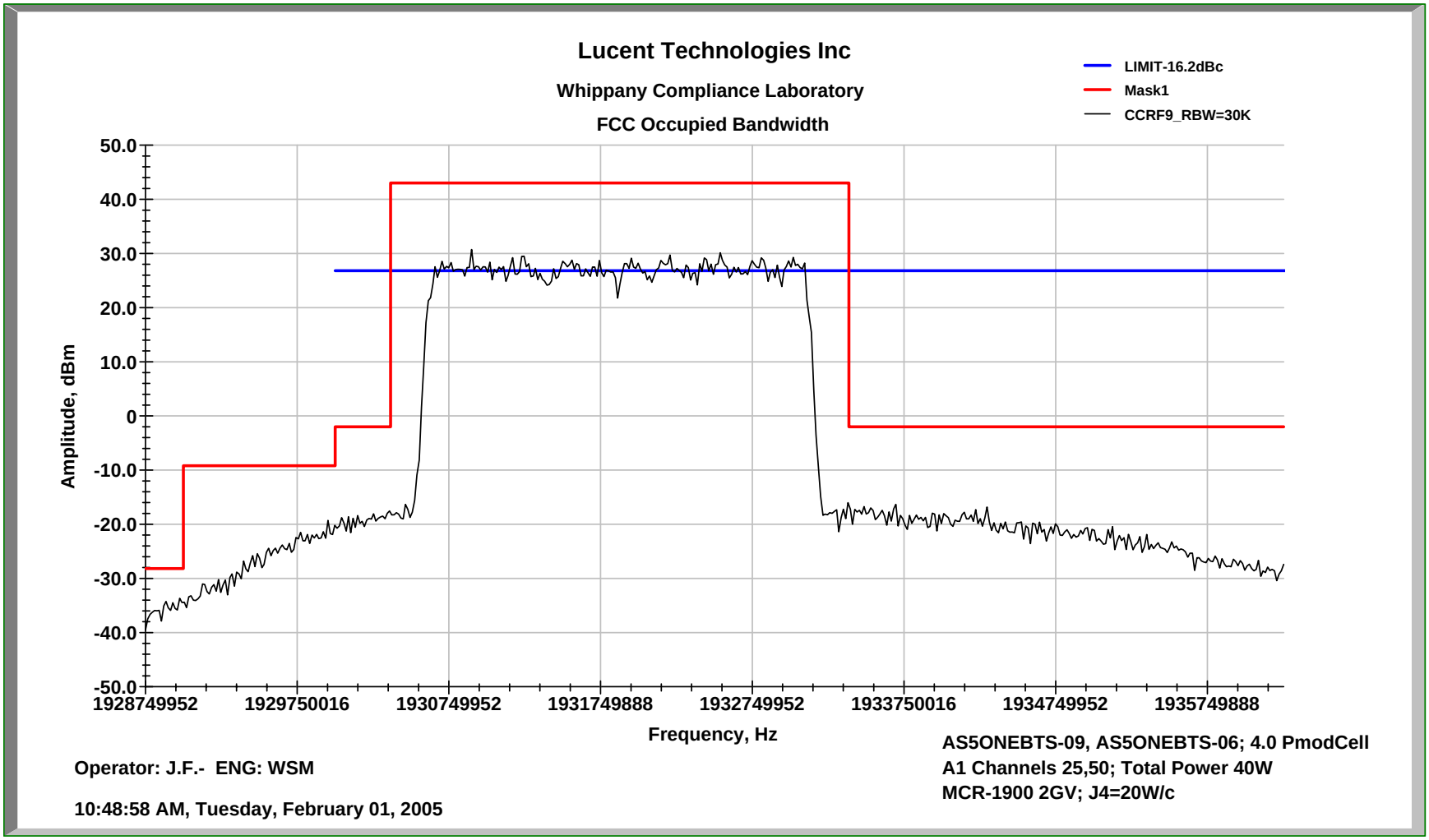

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS A Block, Sub-Block A1, 3 Carrier / 2 P2PAM Configuration

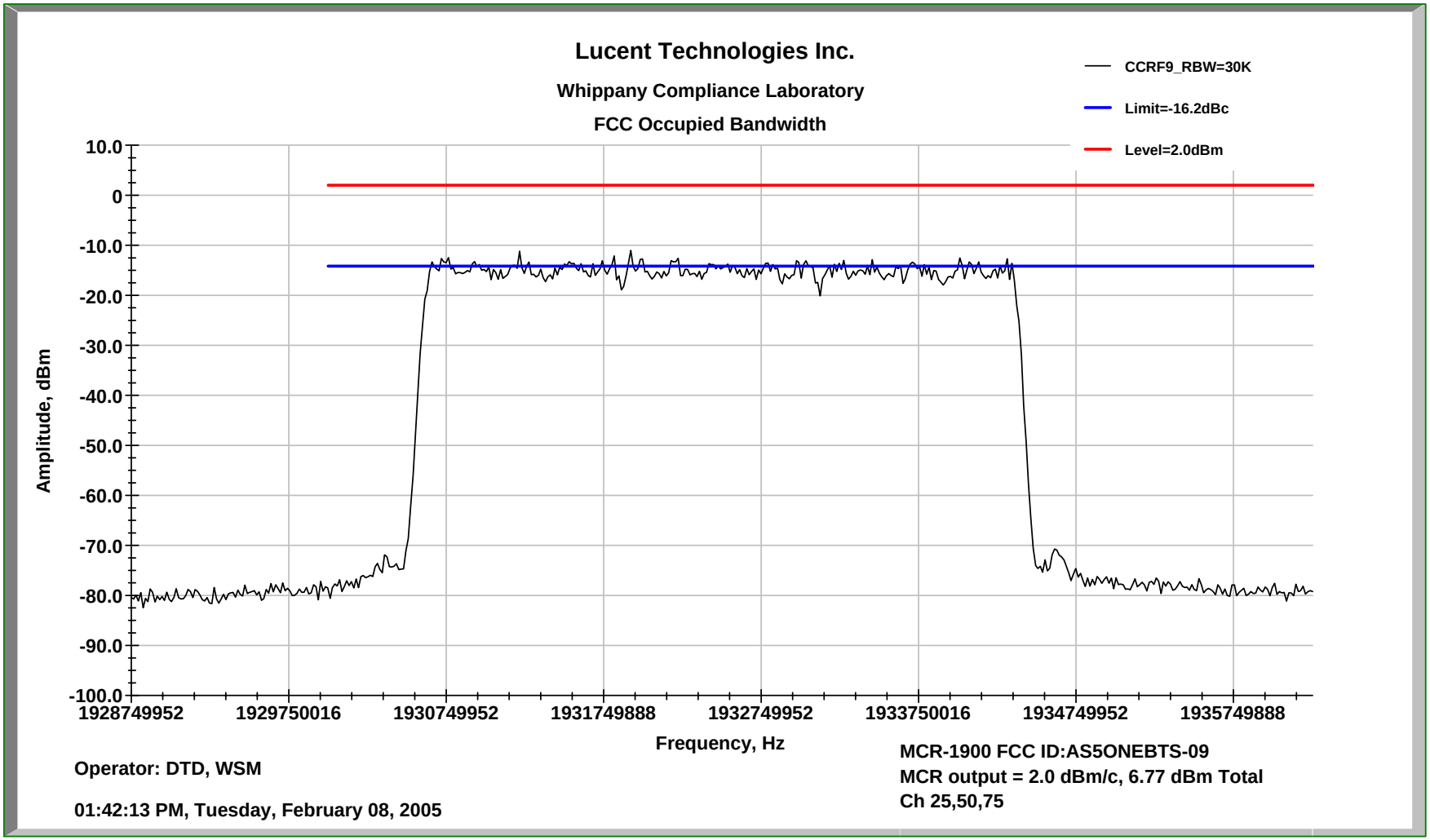

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS A Block, Sub-Block A1, 3 Carrier / 2 P2PAM Configuration

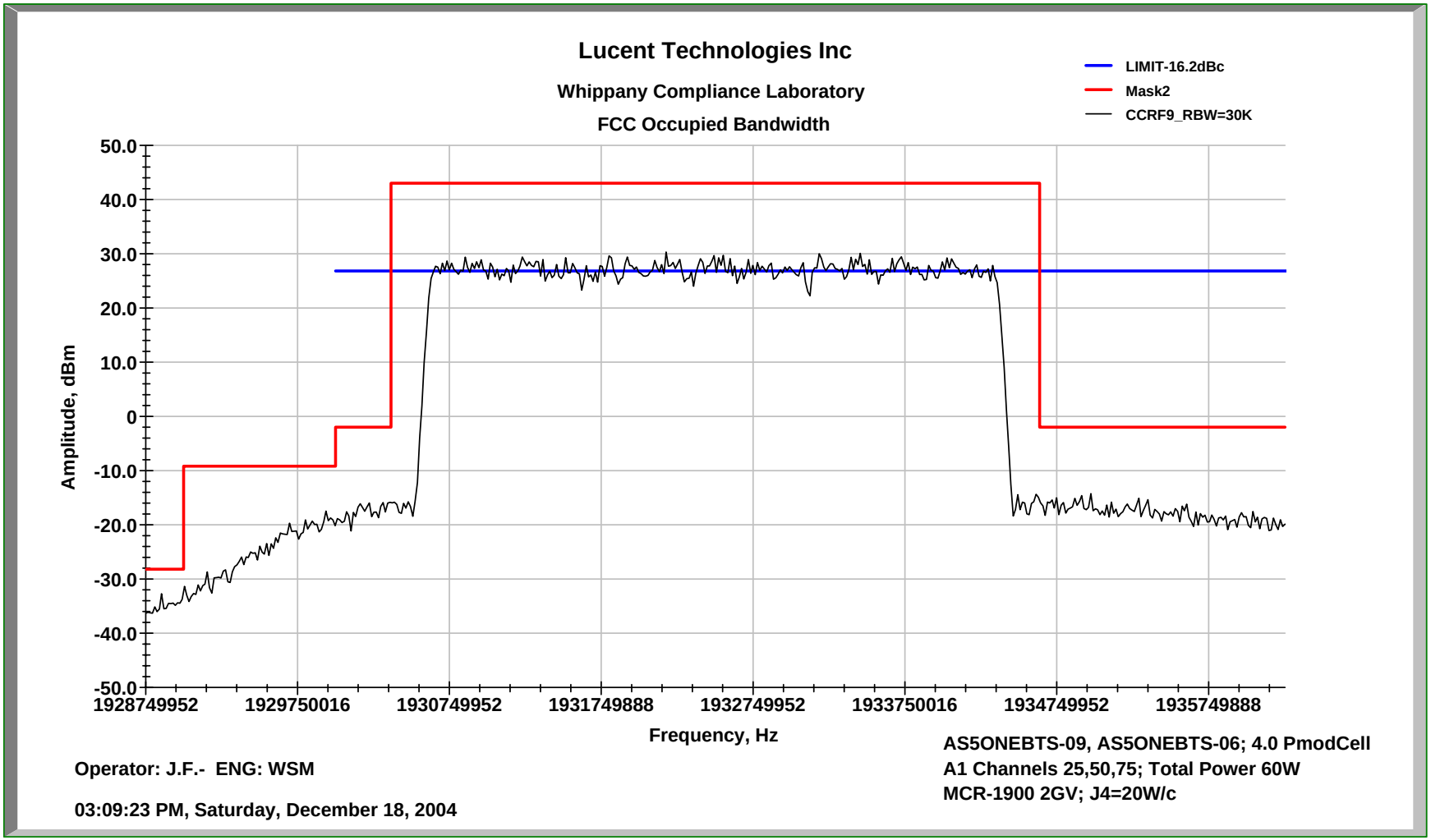

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS A Block, Sub-Block A1/A2, 5 Carrier / 3 P2PAM Configuration

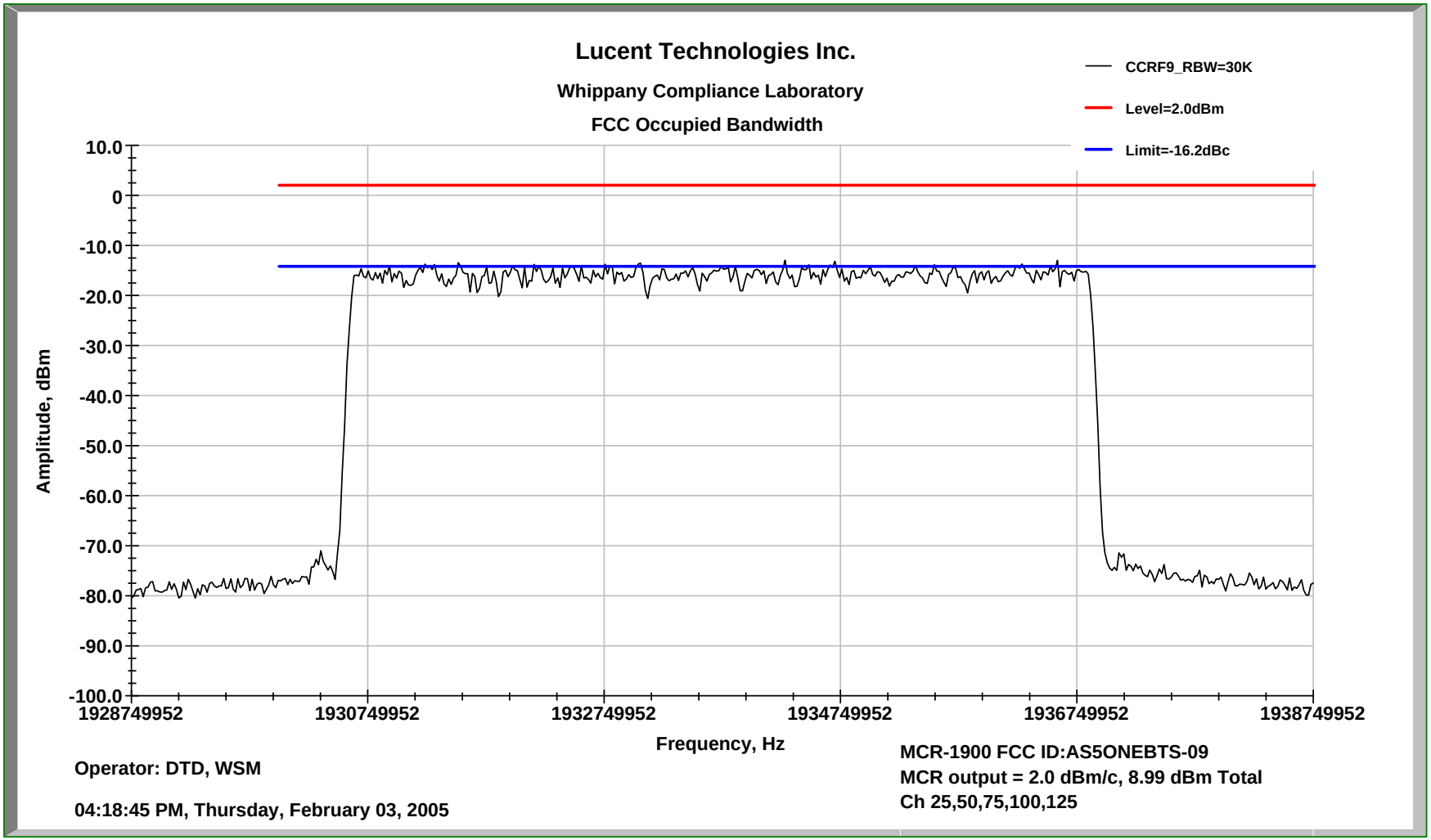

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS A Block, Sub-Block A1/A2, 5 Carrier / 3 P2PAM Configuration

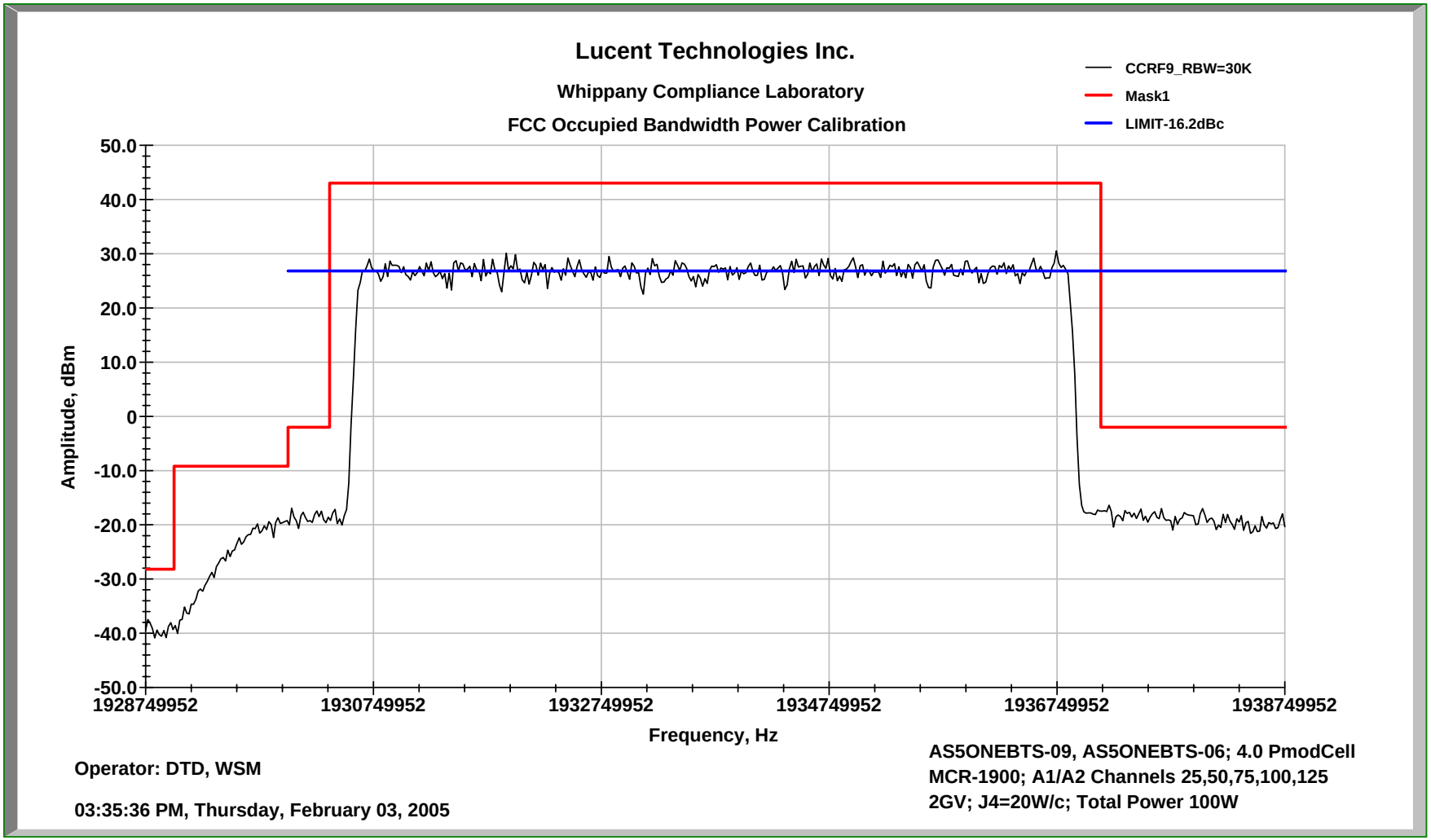

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS A Block, Sub-Block A5, 1 Carrier / 2 P2PAM Configuration

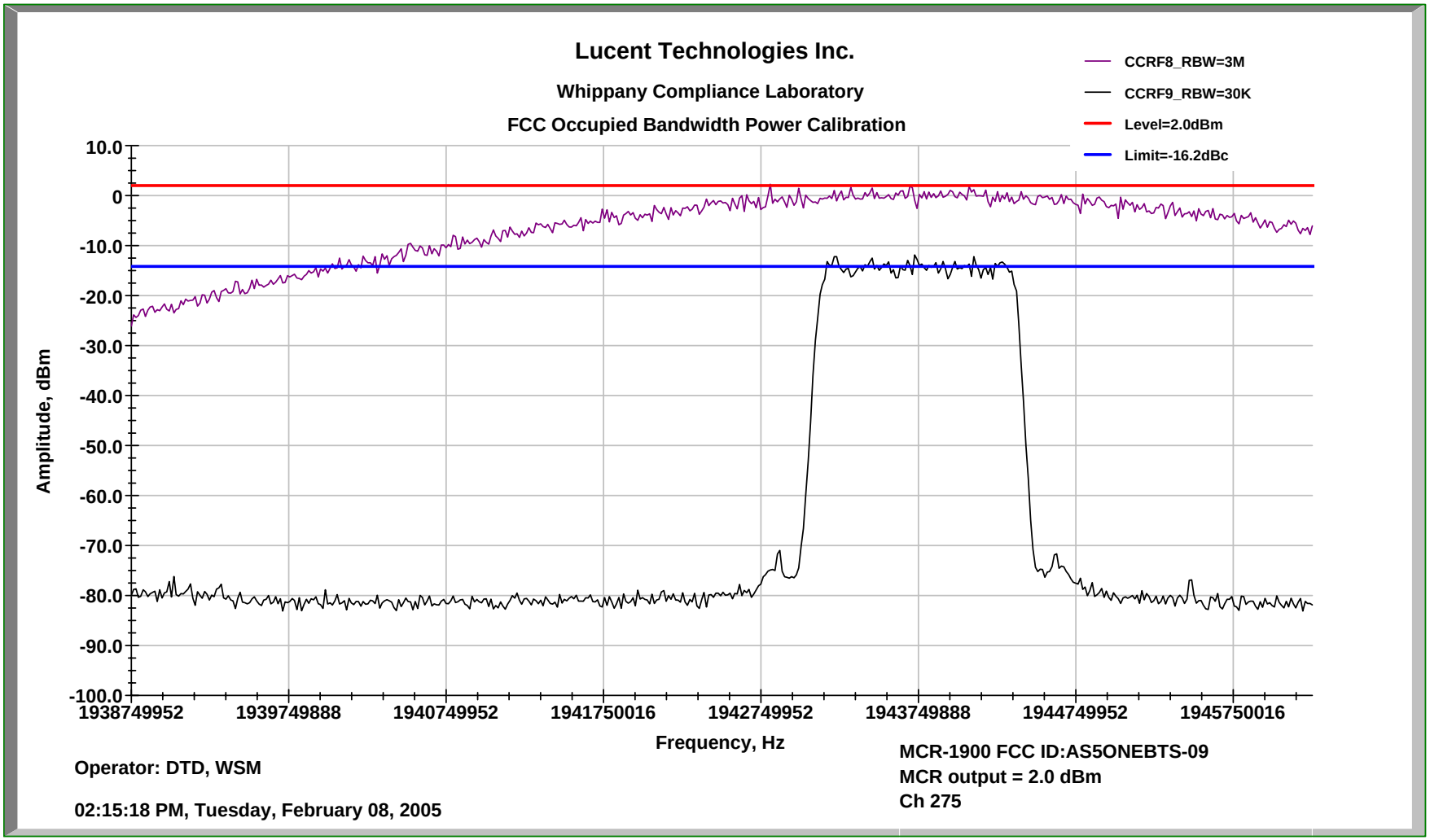

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS A Block, Sub-Block A5, 1 Carrier / 2 P2PAM Configuration

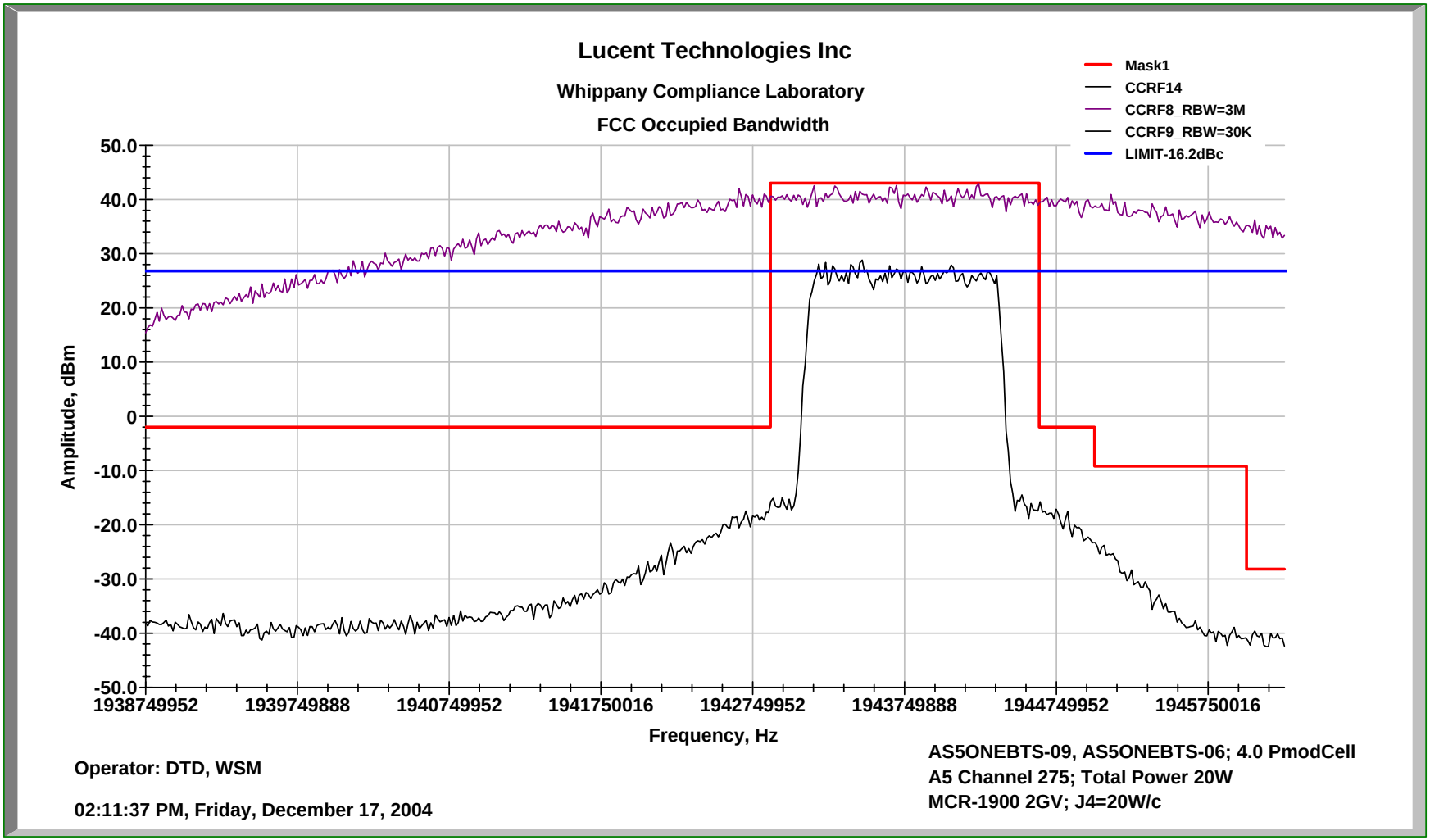

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS A Block, Sub-Block A5, 2 Carrier / 1 P2PAM Configuration

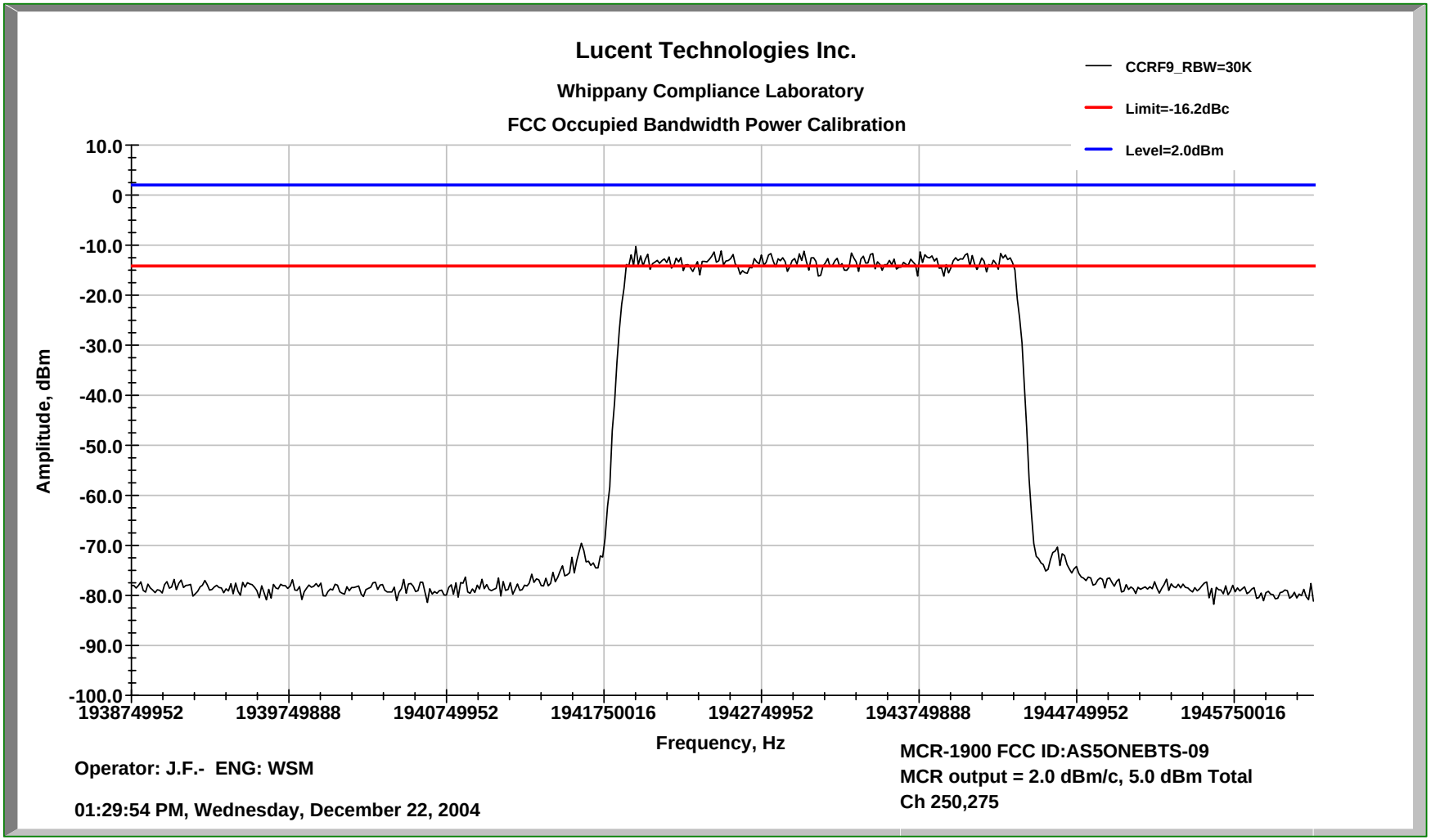

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS A Block, Sub-Block A5, 2 Carrier / 1 P2PAM Configuration

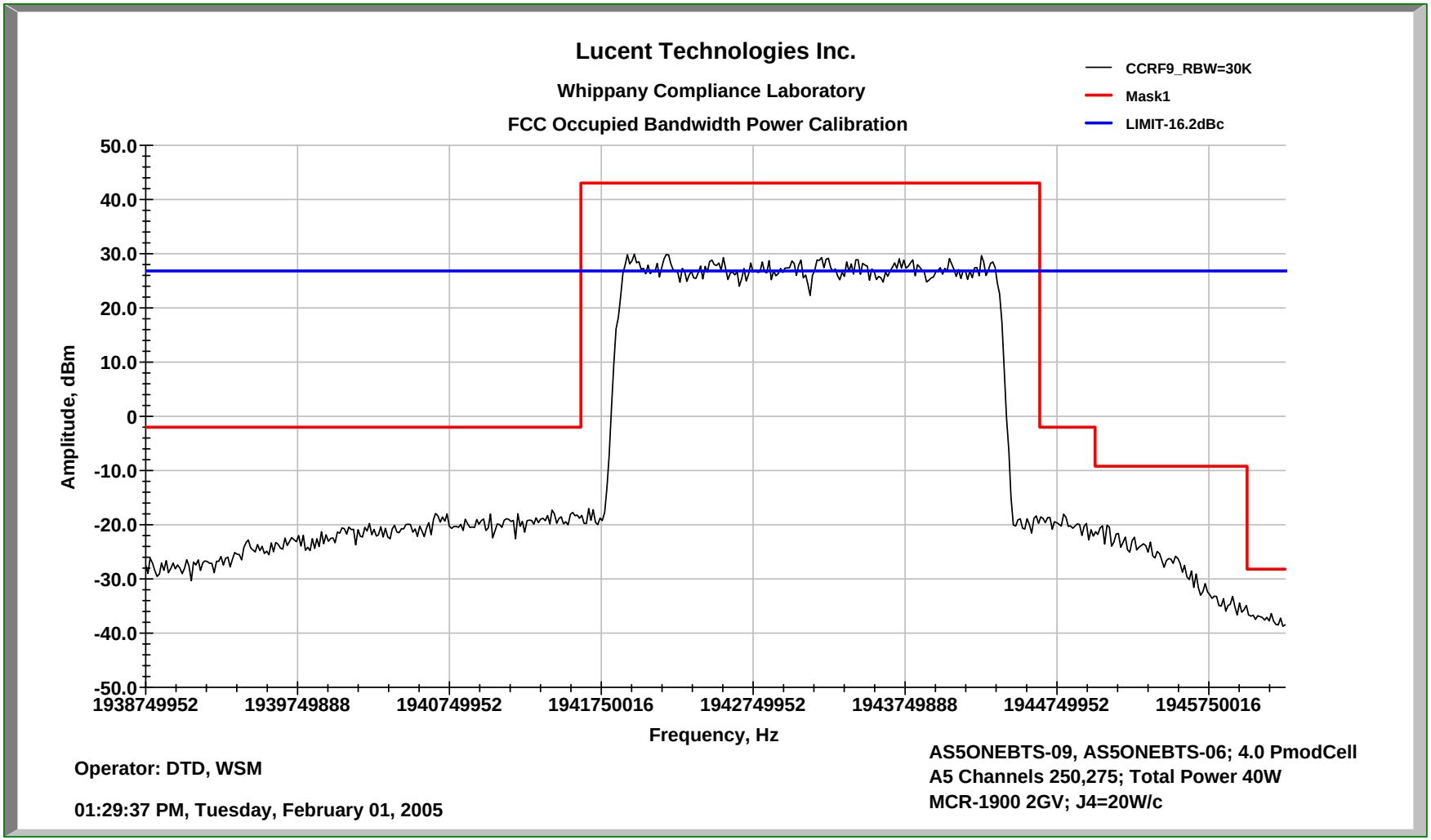

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS A Block, Sub-Block A5, 3 Carrier / 2 P2PAM Configuration

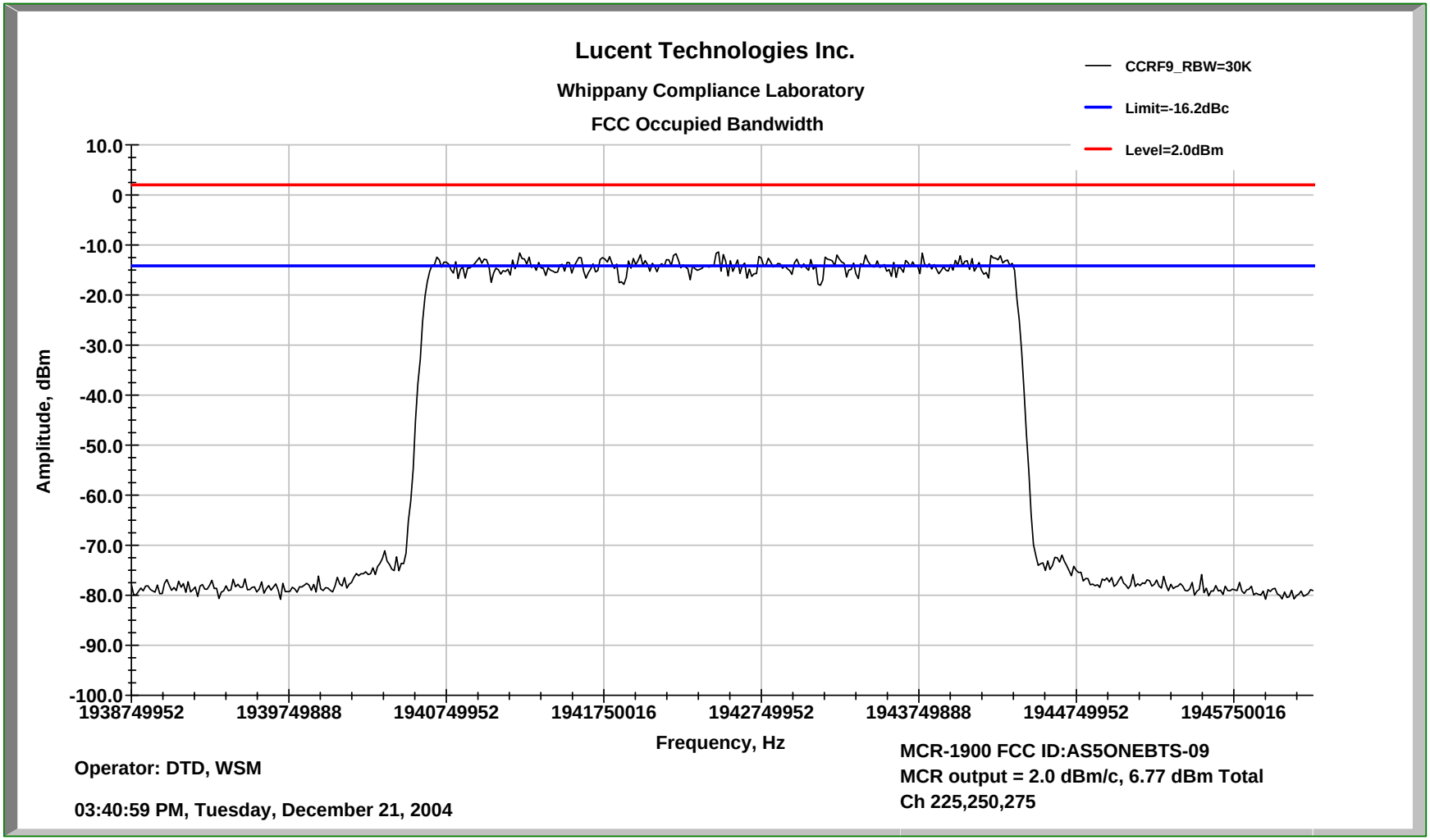

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS A Block, Sub-Block A5, 3 Carrier / 2 P2PAM Configuration

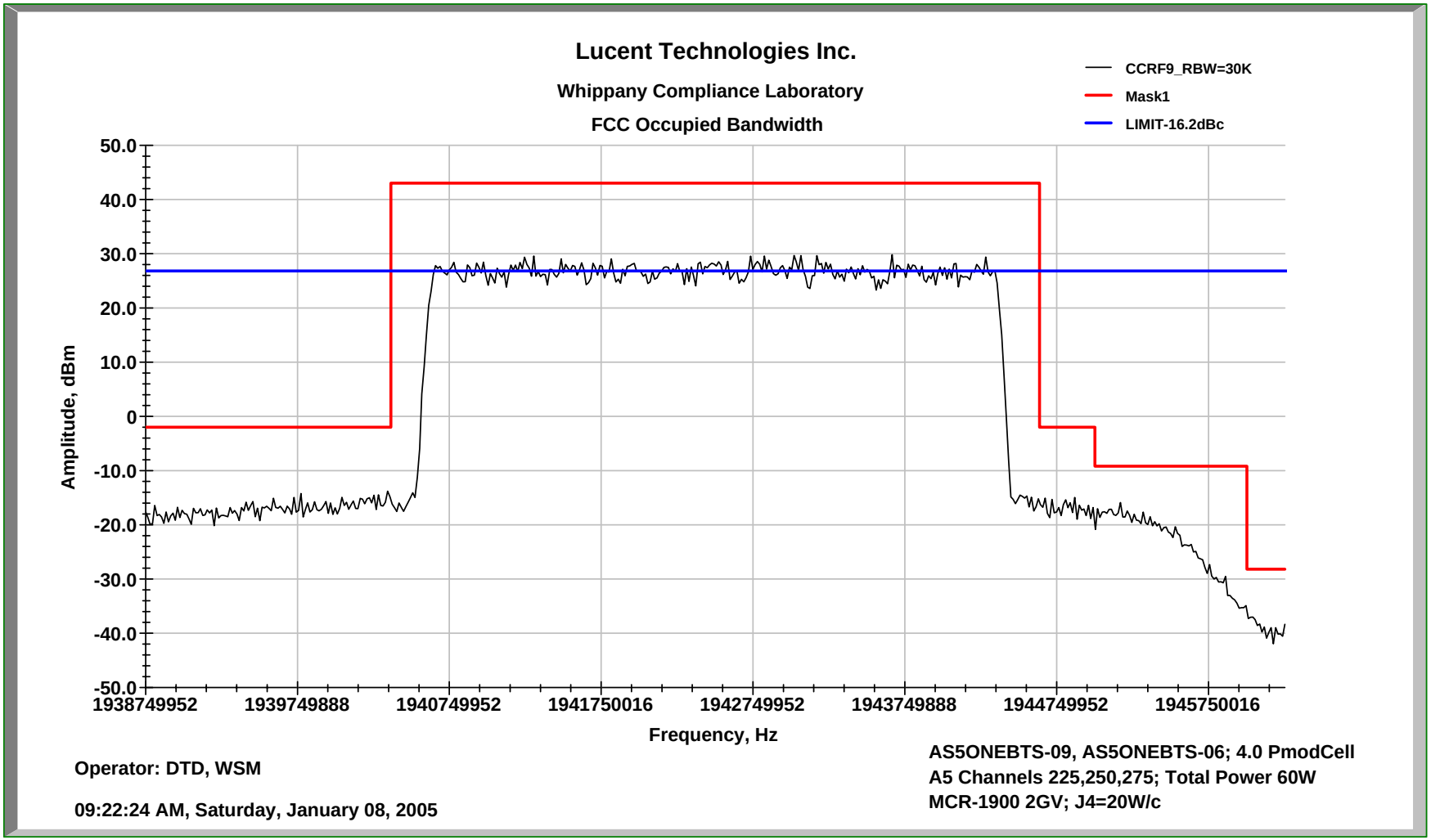

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS A Block, Sub-Block A3/A5, 5 Carrier / 3 P2PAM Configuration

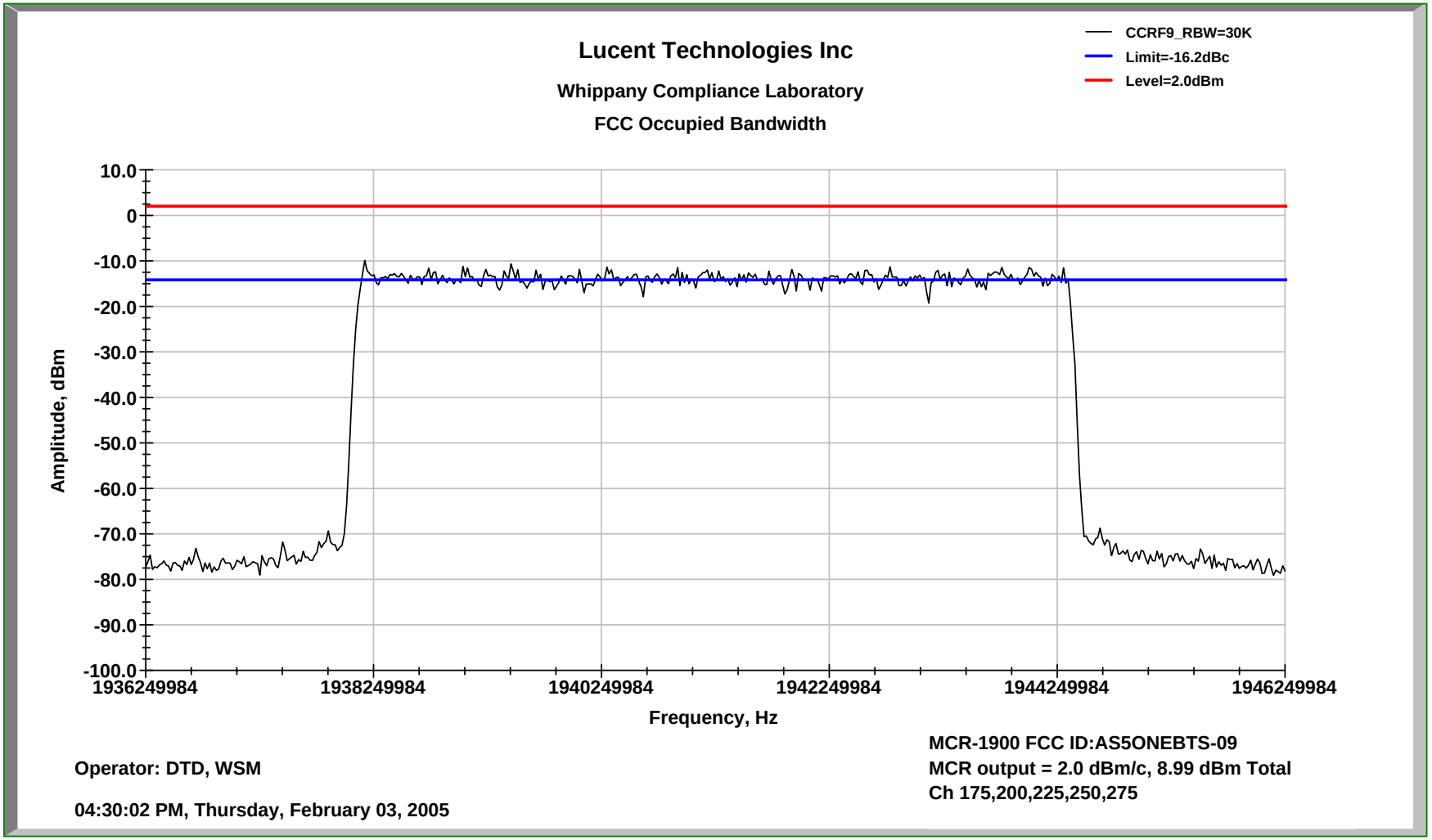

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS A Block, Sub-Block A3/A5, 5 Carrier / 3 P2PAM Configuration

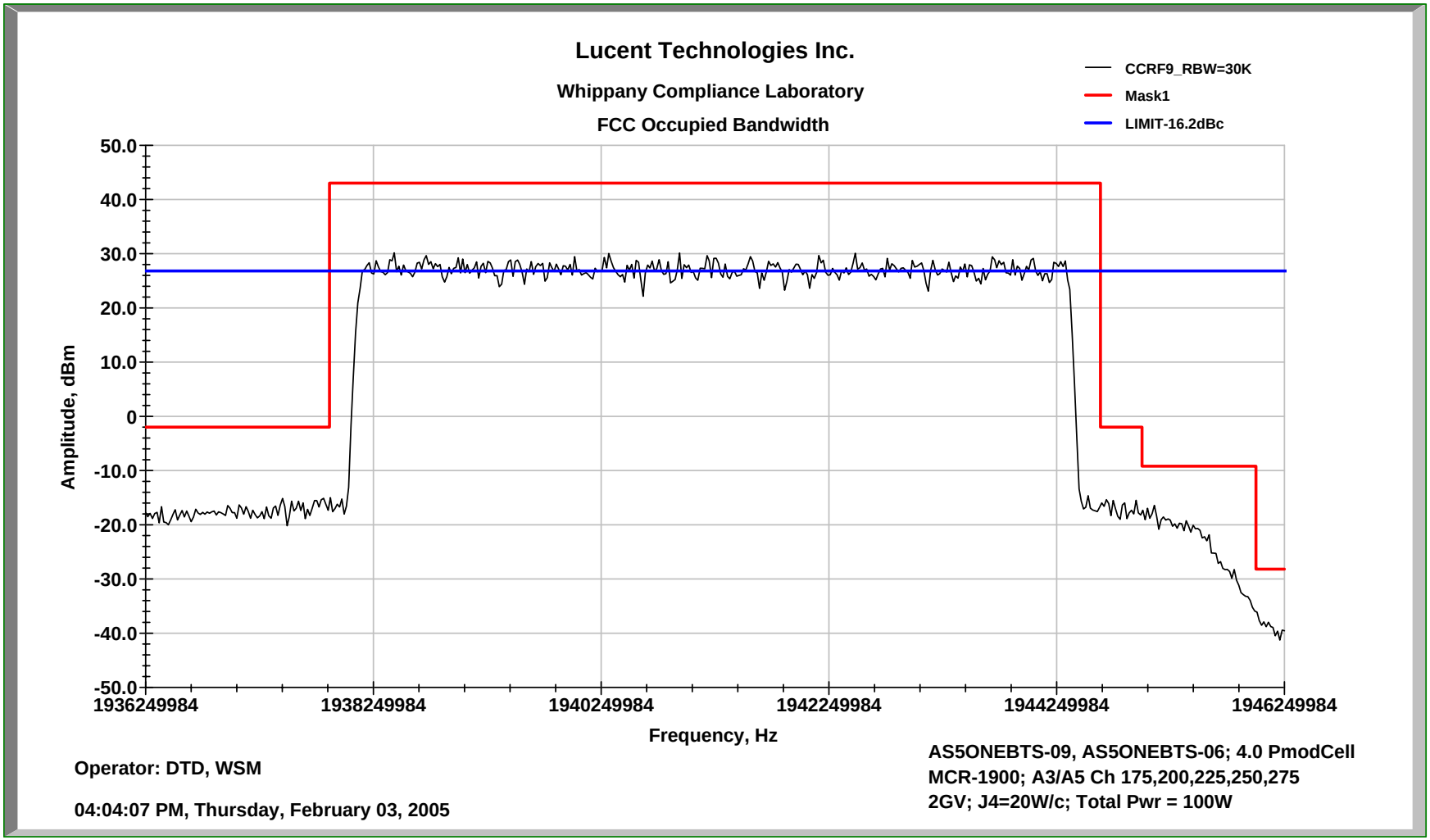

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS B Block, Sub-Block B1/B2, 5 Carrier / 3 P2PAM Configuration

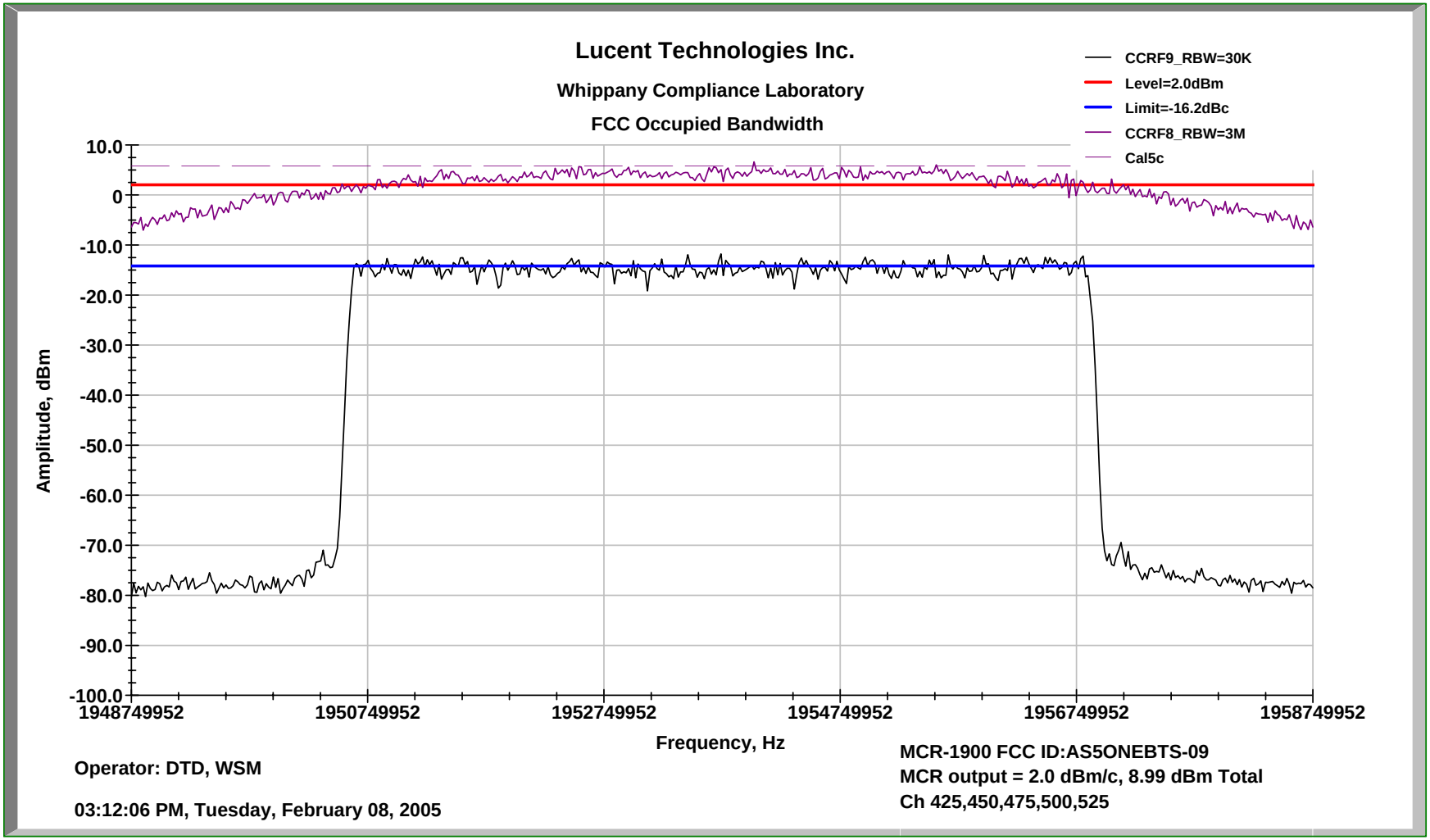

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS B Block, Sub-Block B1/B2, 5 Carrier / 3 P2PAM Configuration

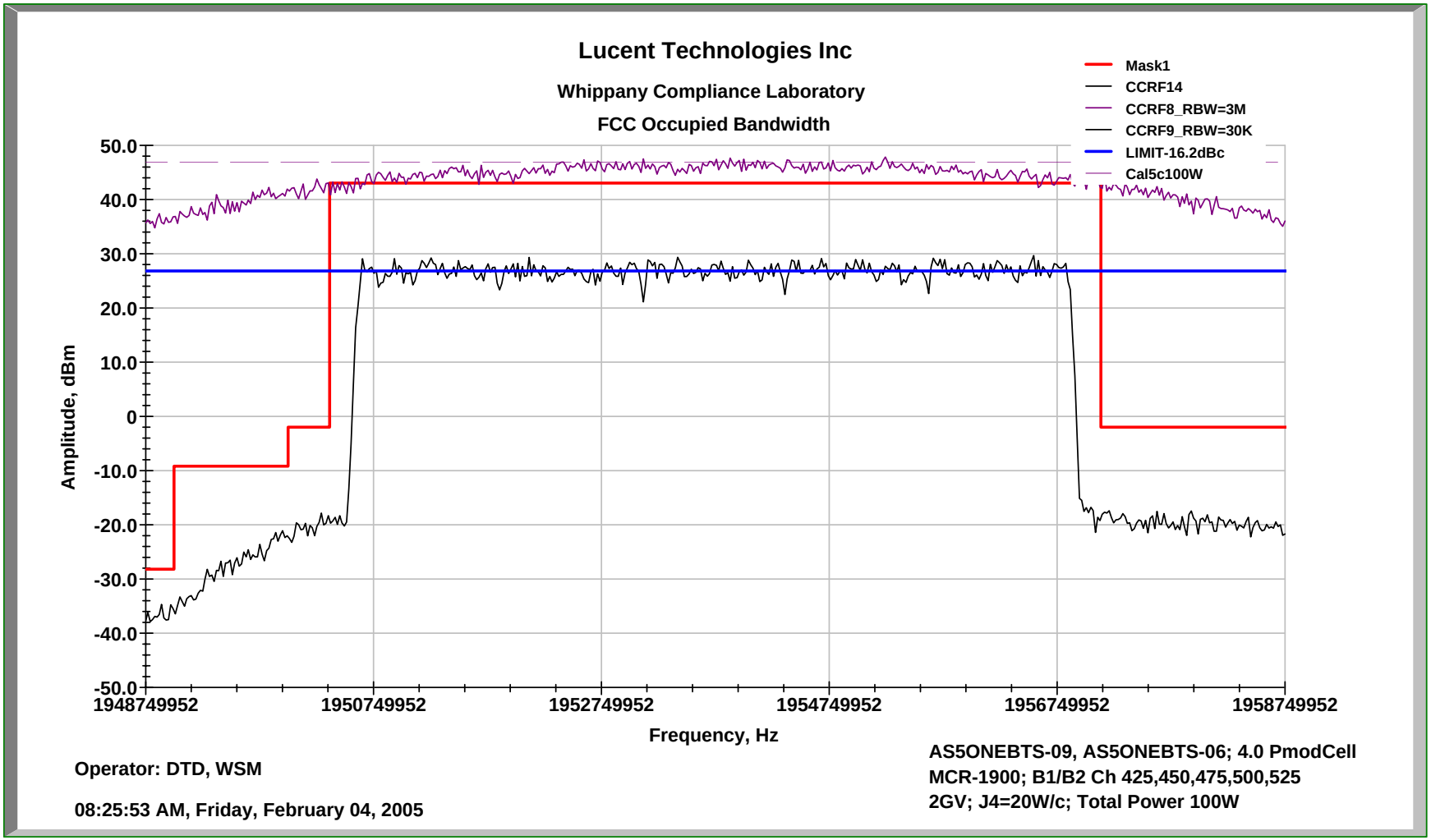

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS B Block, Sub-Block B3/B5, 5 Carrier / 3 P2PAM Configuration

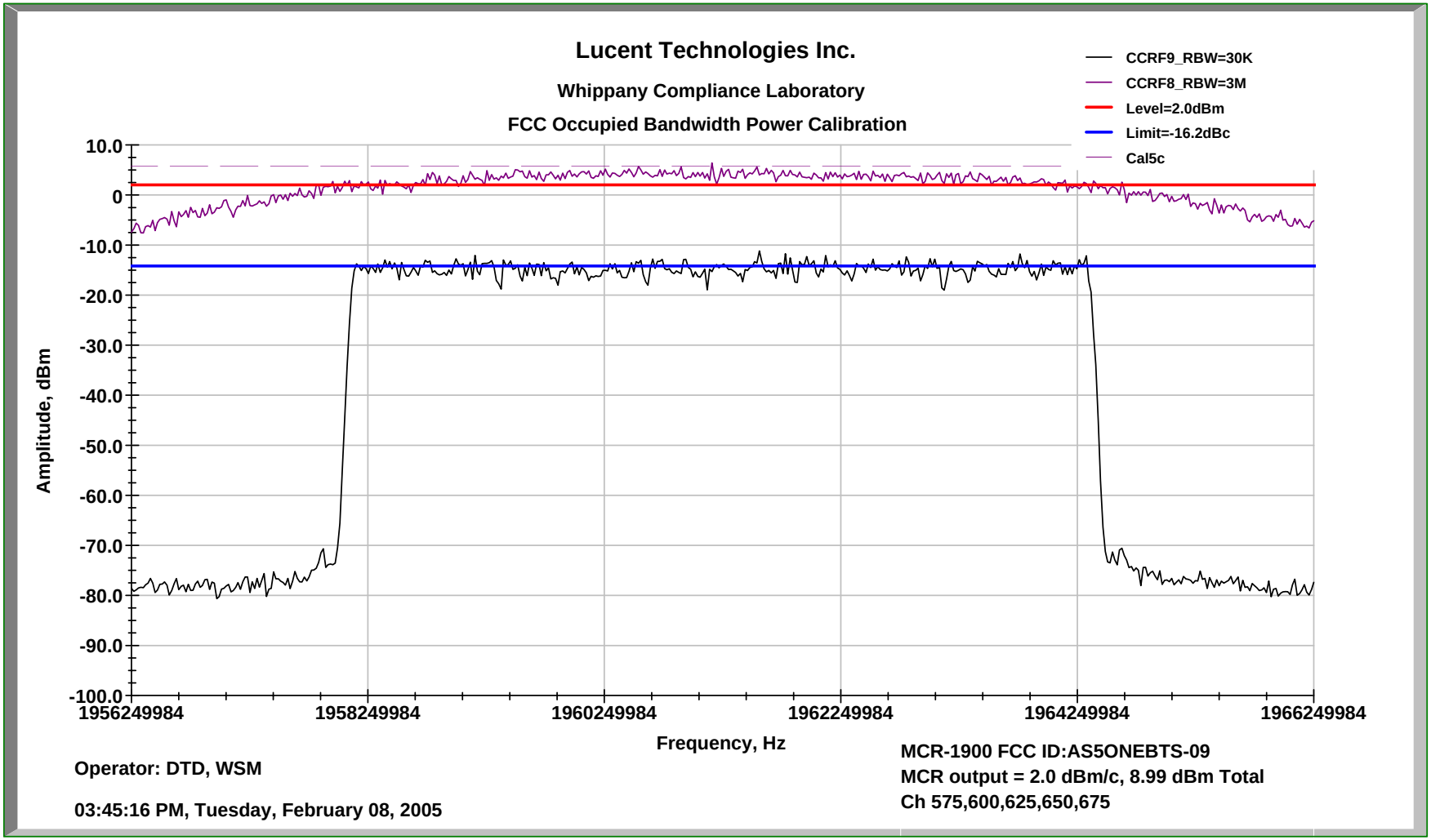

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart - PCS B Block, Sub-Block B3/B5, 5 Carrier / 3 P2PAM Configuration

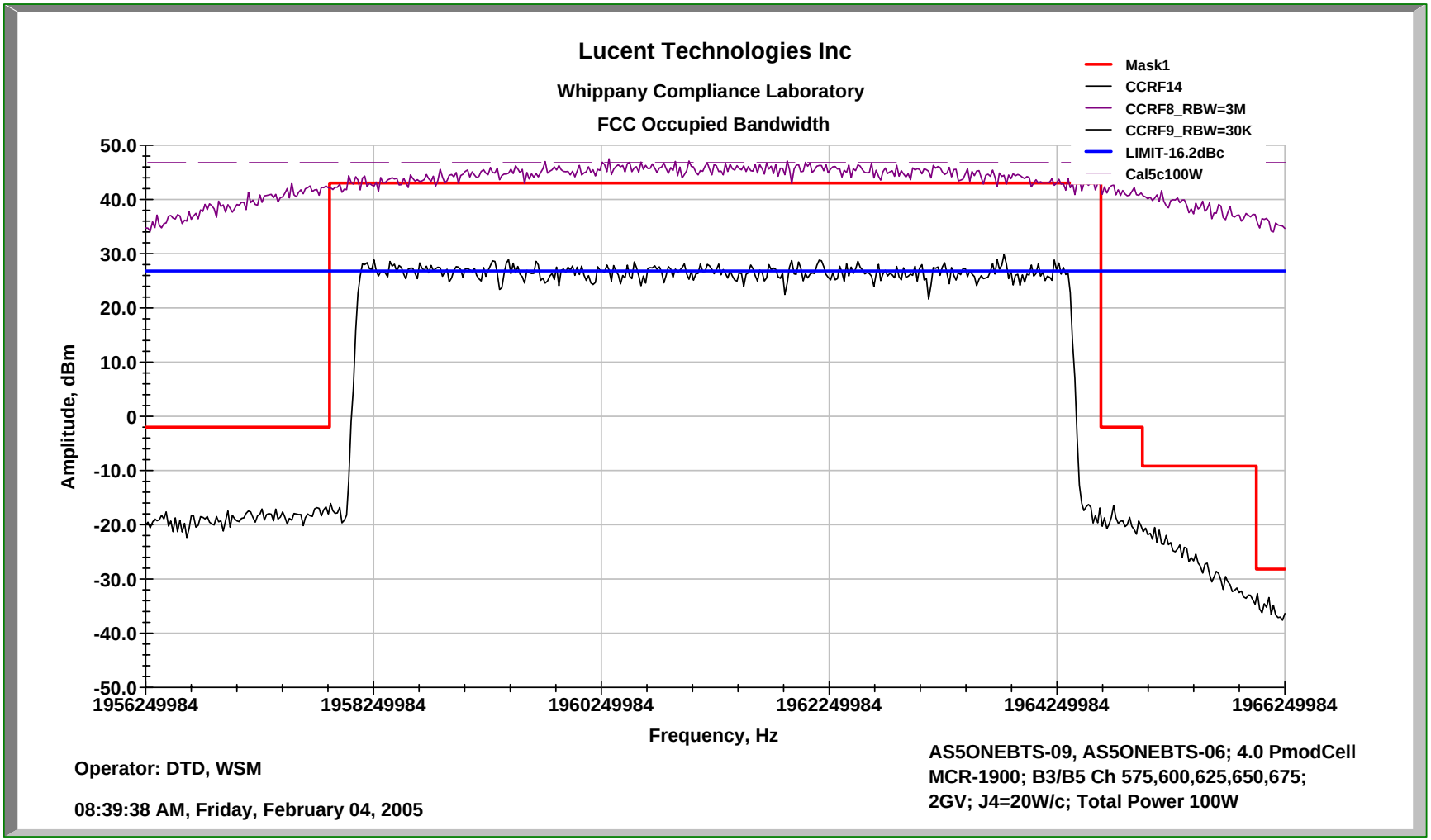

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS C Block, Sub-Block C1/C2, 5 Carrier / 3 P2PAM Configuration

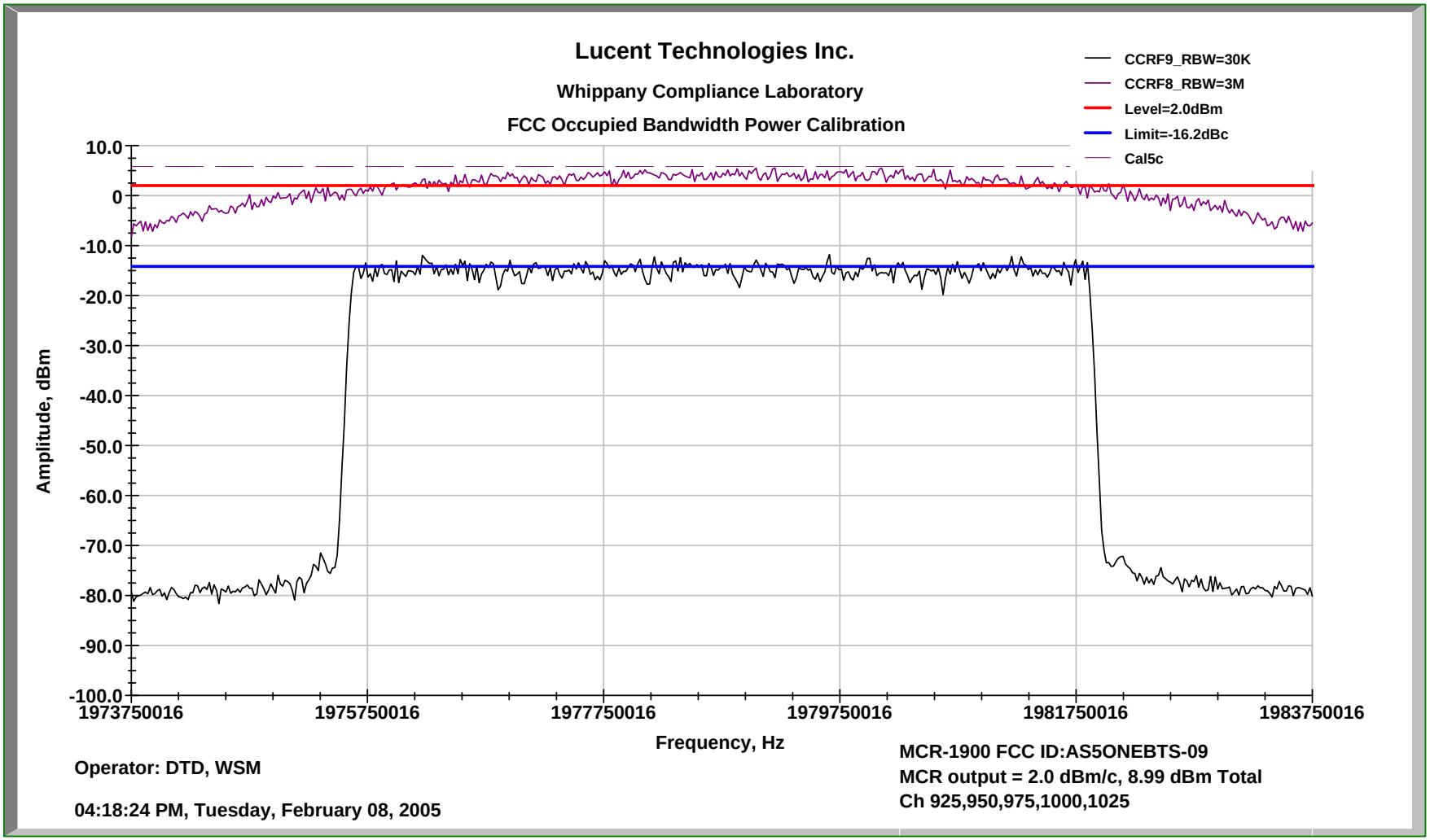

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart- PCS C Block, Sub-Block C1/C2, 5 Carrier / 3 P2PAM Configuration

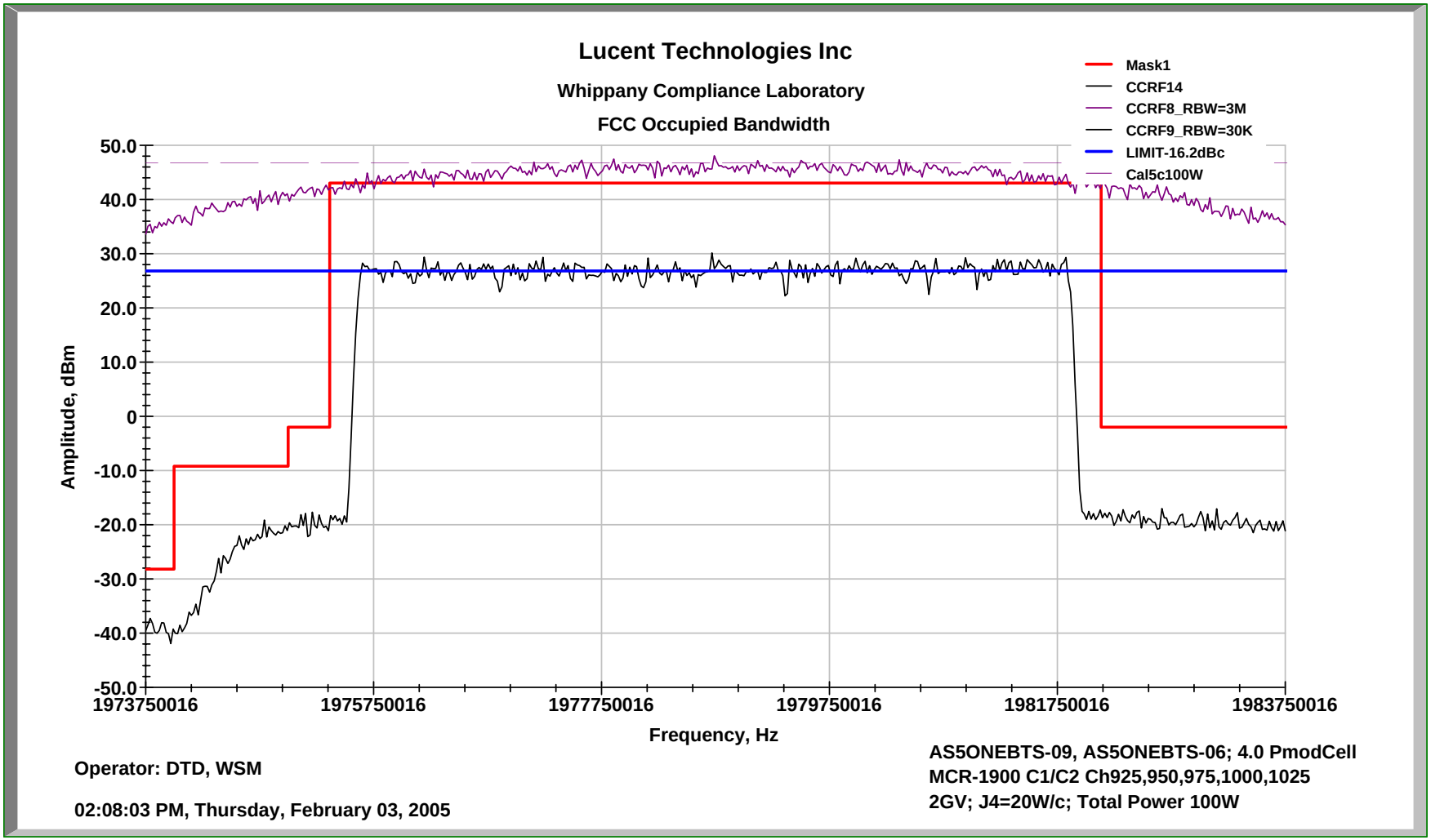

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS C Block, Sub-Block C3/C6, 5 Carrier / 3 P2PAM Configuration

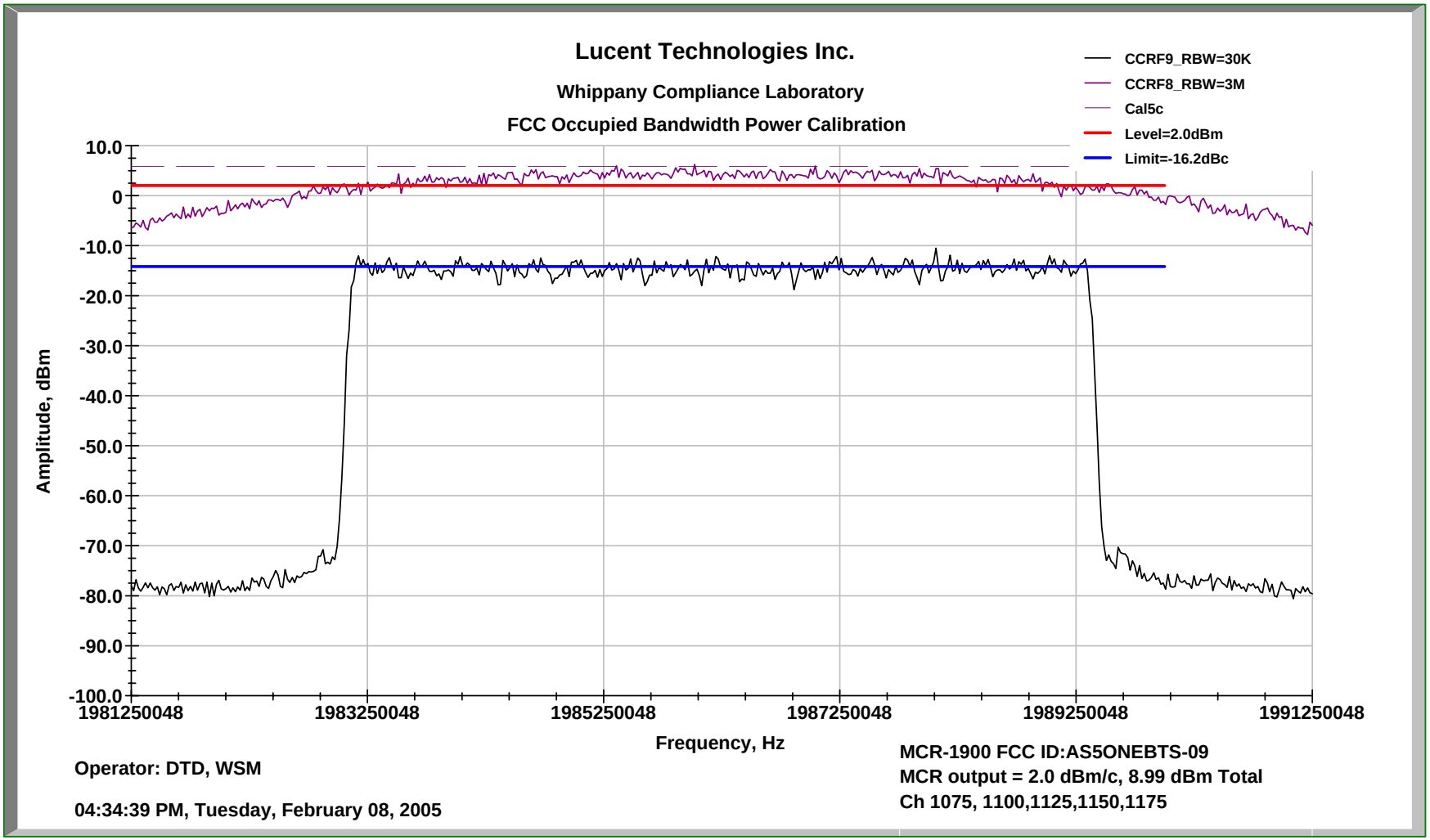

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart- PCS C Block, Sub-Block C3/C6, 5 Carrier / 3 P2PAM Configuration

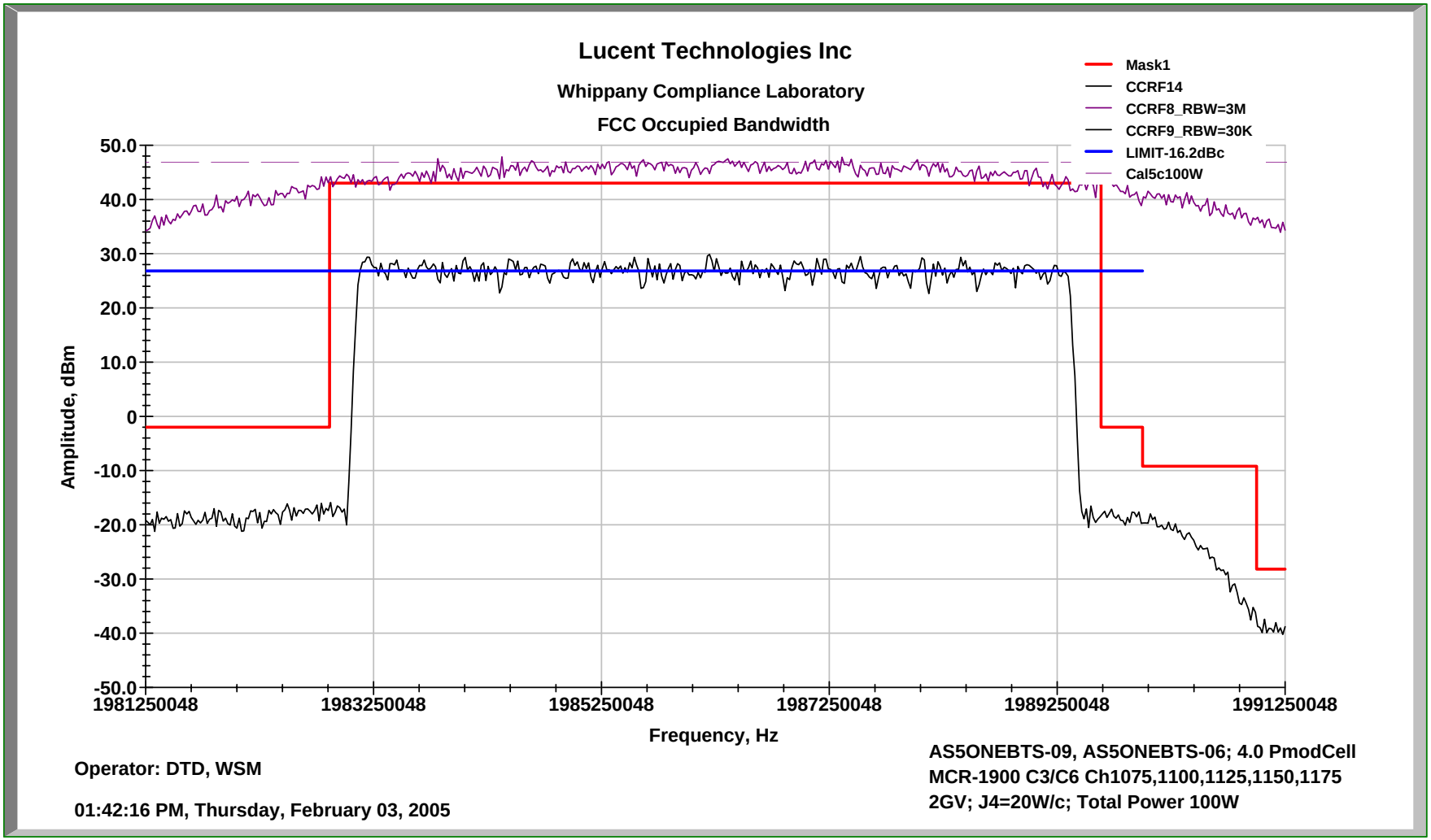

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS D Block, 3 Carrier / 2 P2PAM Configuration

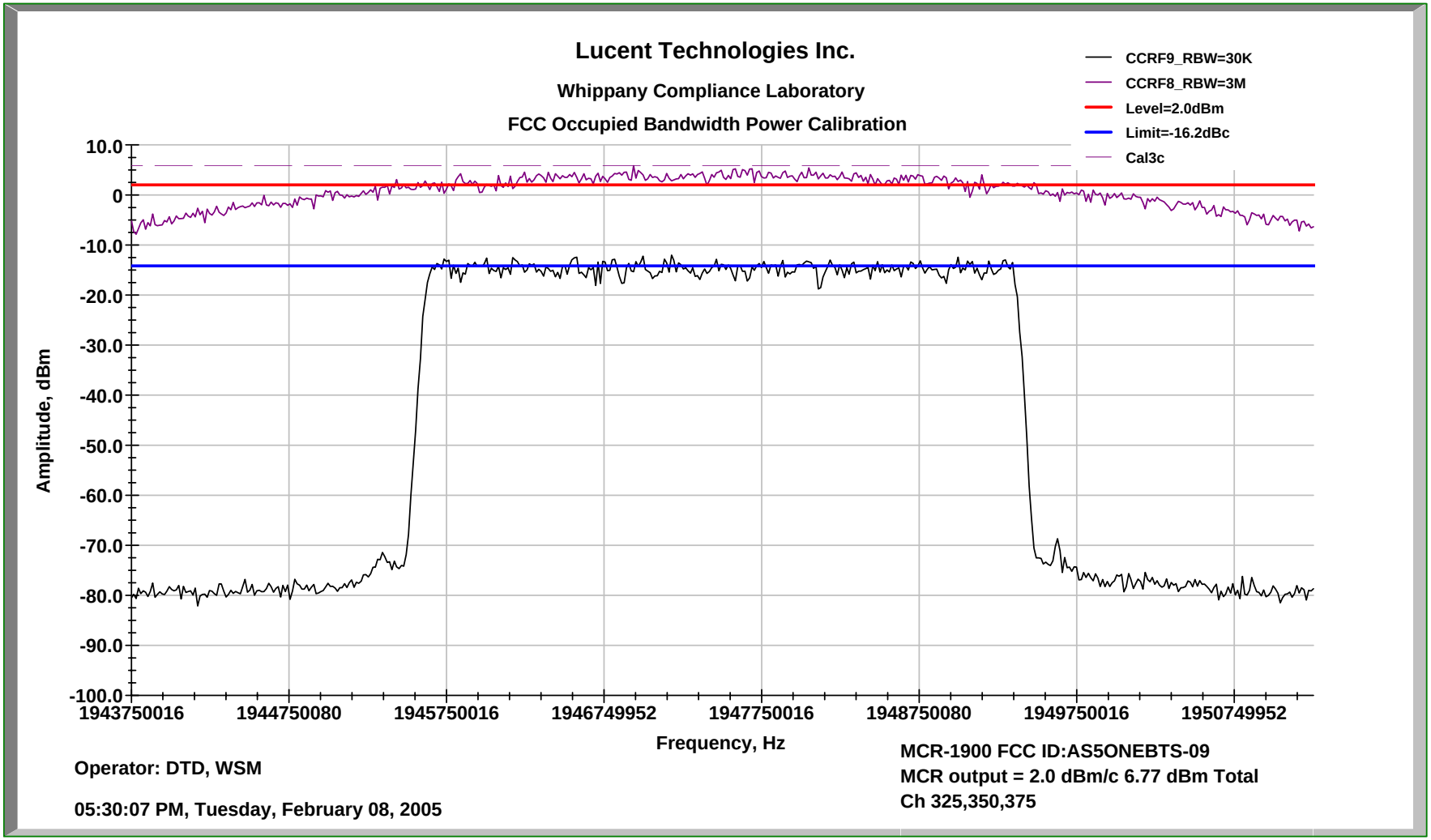

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart- PCS D Block, 3 Carrier / 2 P2PAM Configuration

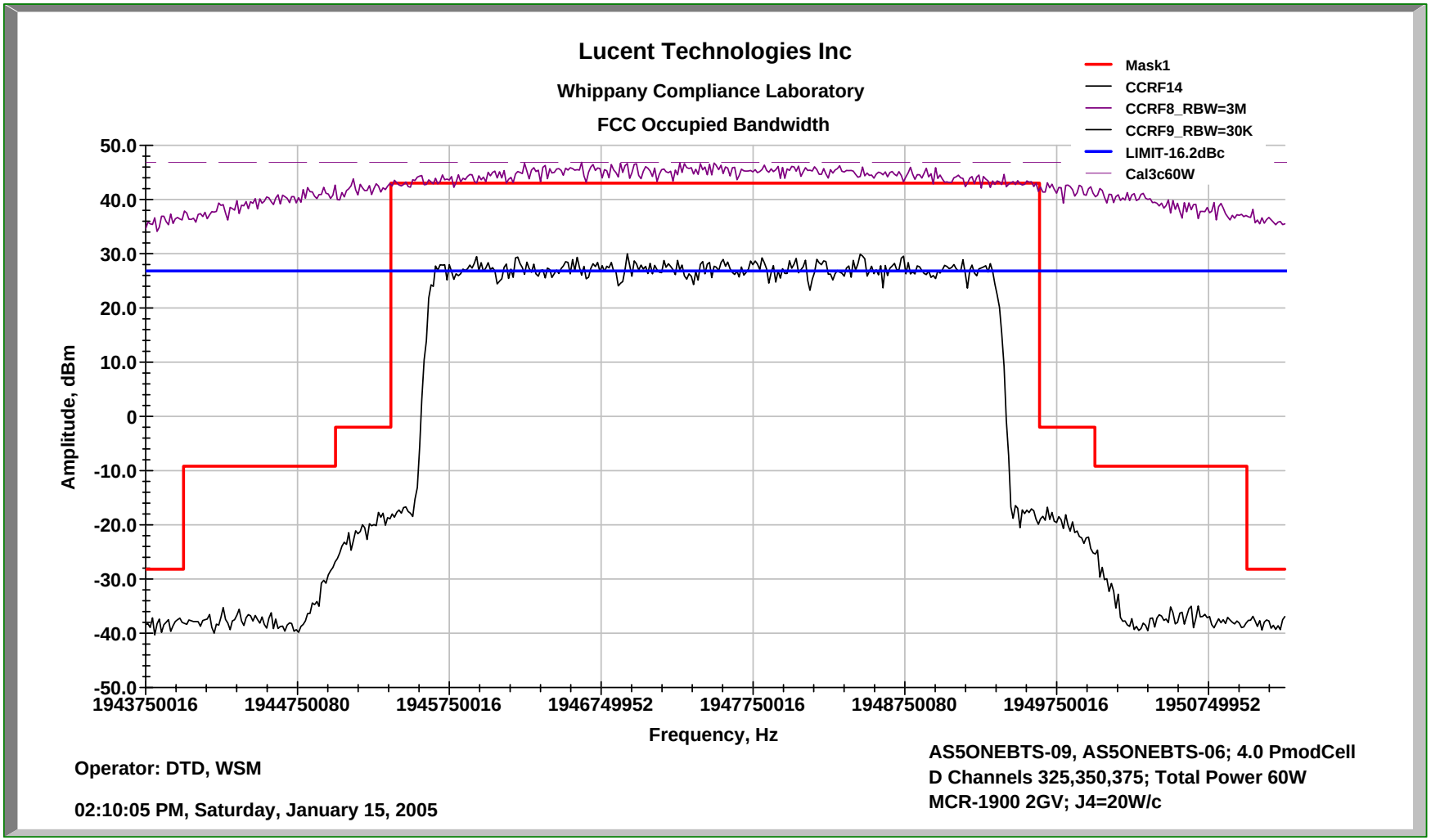

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS E Block, 3 Carrier / 2 P2PAM Configuration

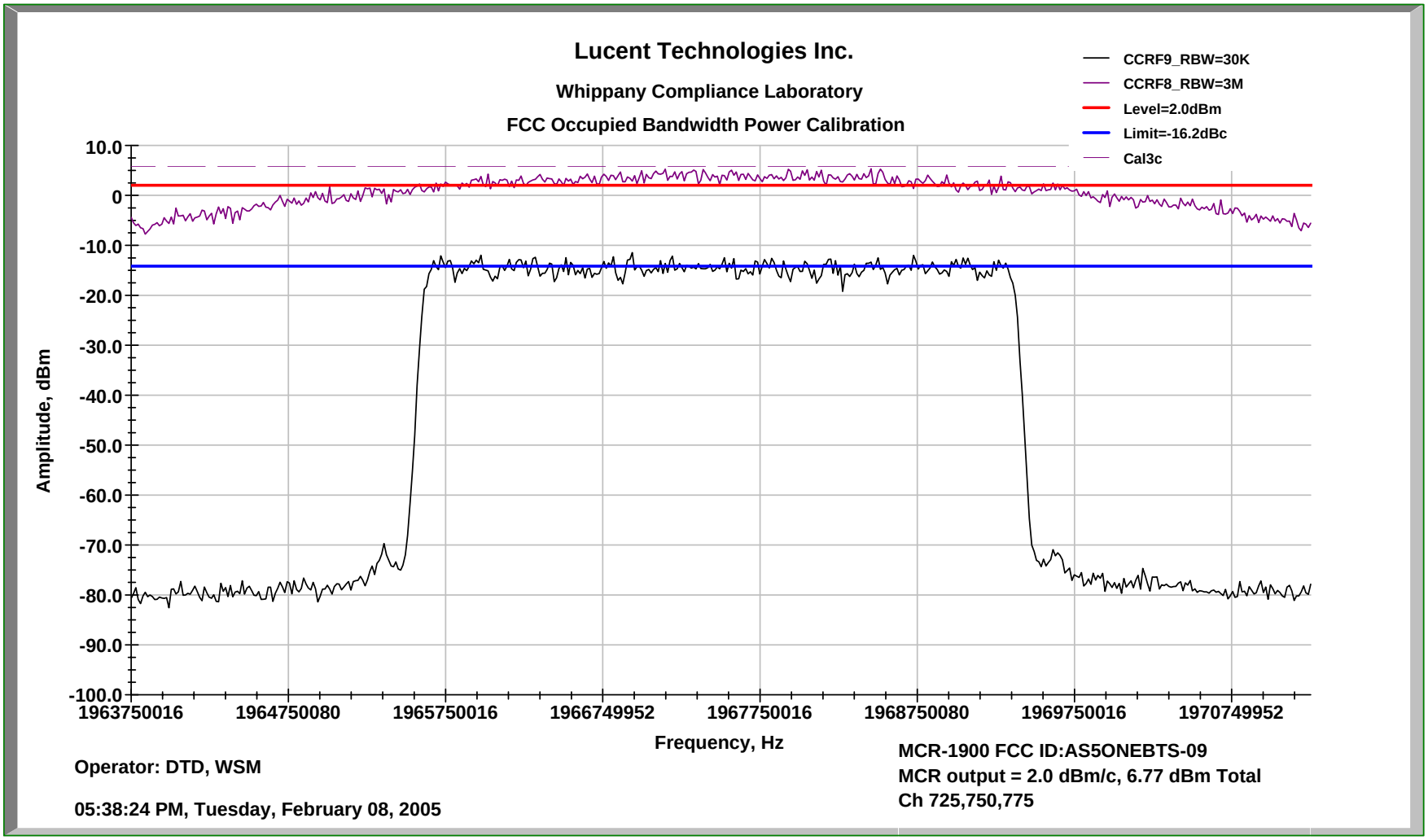

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart- PCS E Block, 3 Carrier / 2 P2PAM Configuration

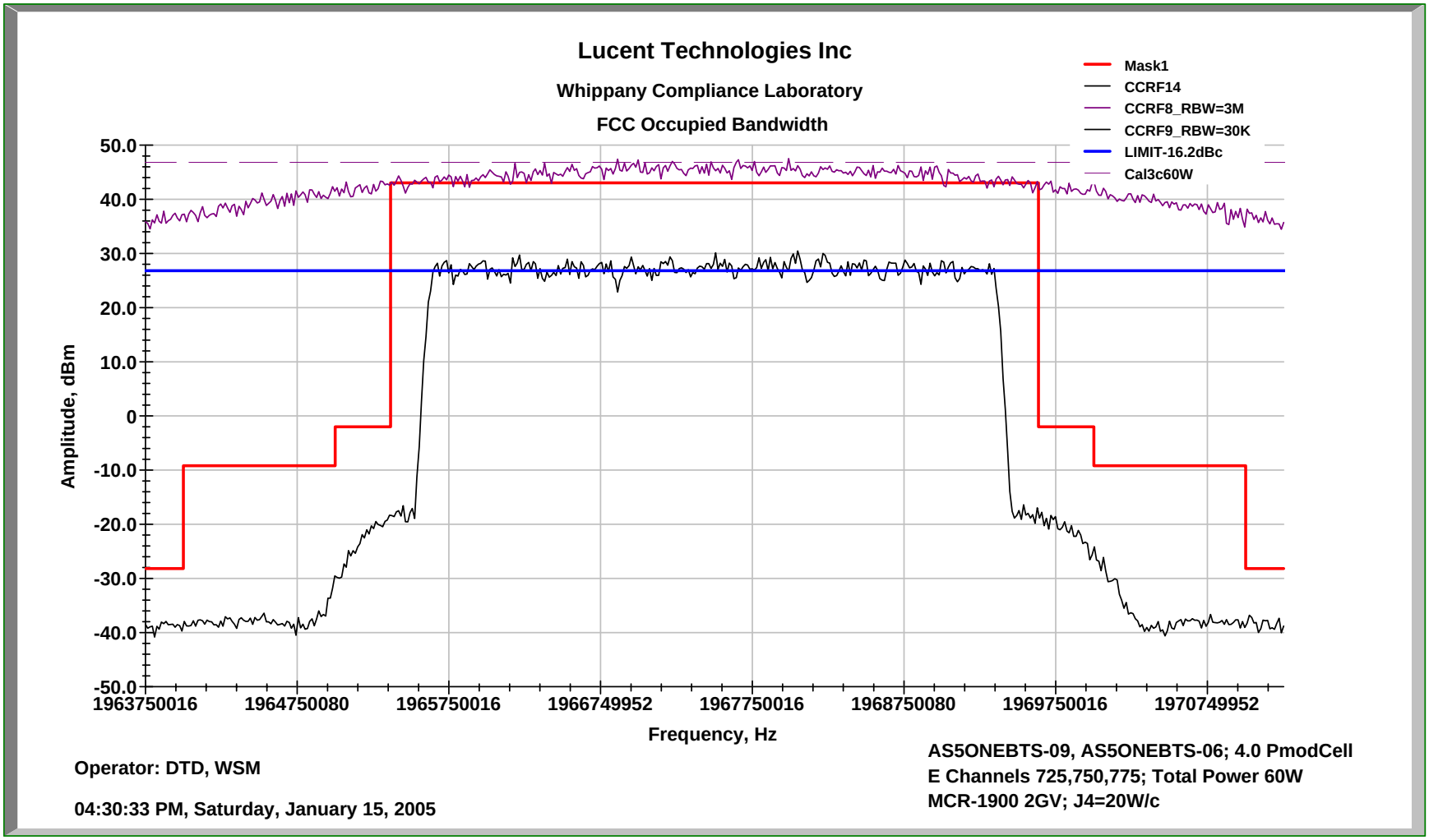

Exhibit 14 *Continued*

FCC Occupied Bandwidth: MCR-1900 Output - PCS F Block, 3 Carrier / 2 P2PAM Configuration

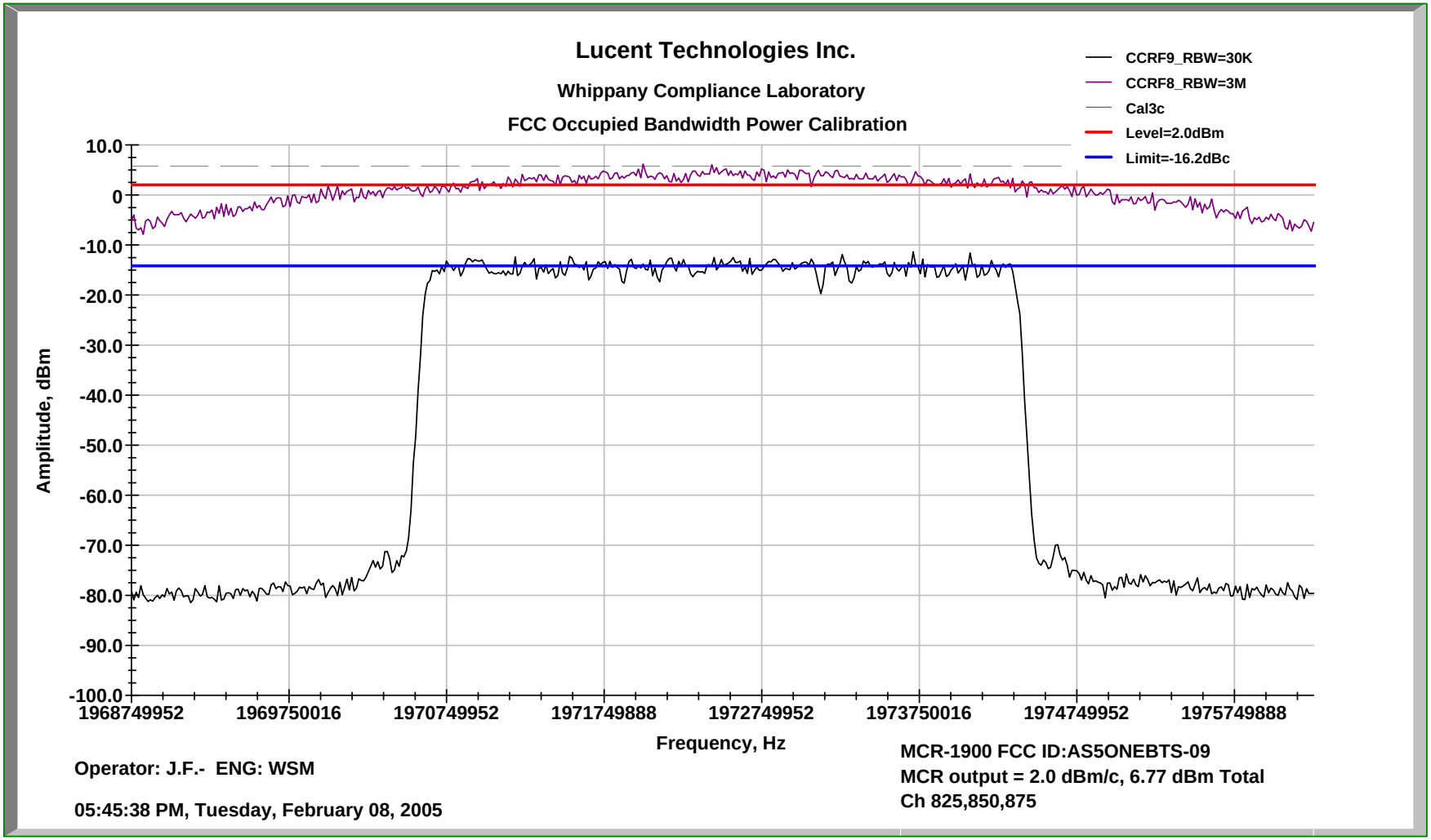

Exhibit 14 *Continued*

FCC Occupied Bandwidth: Output Chart- PCS F Block, 3 Carrier / 2 P2PAM Configuration

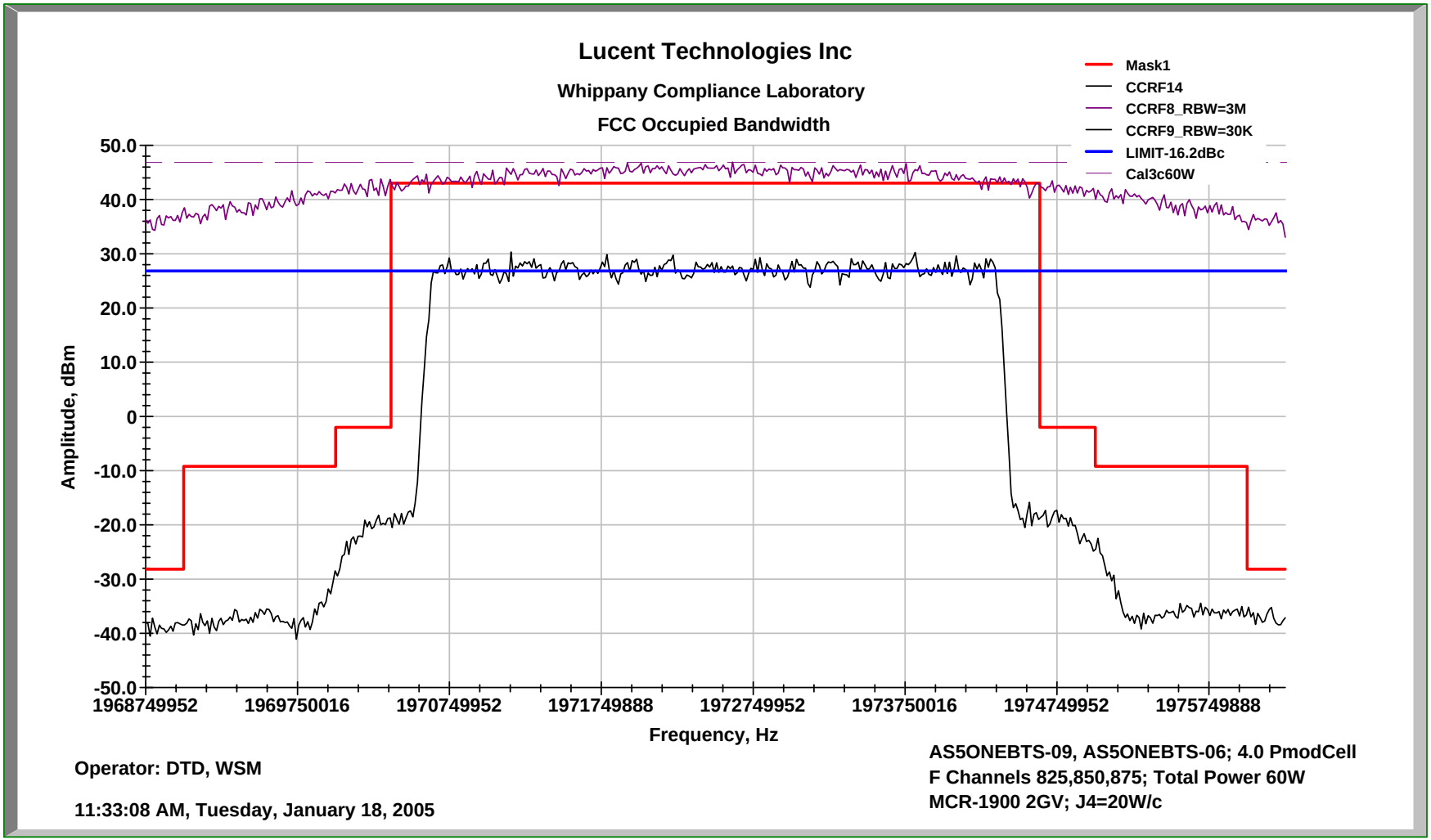

Exhibit 15:

Section 2.1051

Spurious Emissions at Antenna Terminals

Spurious Emissions at the antenna terminals were investigated over the frequency range of 10 MHz to 19.9 GHz which is beyond the 10th harmonic of the carrier frequency. The RF output from the transmitter was reduced, to an amplitude usable by the spectrum analyzer, by use of a broadband attenuator. The complete RF path was calibrated over the 10 MHz-20 GHz range. The RF power level was measured and monitored prior and during the test via the test setup in Figure 15A. The spurious measurements were made using an automated test system. The test system consists of a Rohde & Schwarz FSEM Spectrum Analyzer (or ESMI Test Receiver), a PC based computer test controller, calibrated test hardware and a TILE ™ software program to acquire the test data. This system allows measurement and presentation of the data in an accurate and compact form for FCC review. The volume of collected data is greater than 2 $x10^5$ data points over the frequency range of 10 MHz to 19.9 GHz.

The required emission limitation specified in Section 24.238 of the Code was applied to these tests. Based upon the criterion given in Section 24.238 of the Code and as developed in Exhibit 14, the required emission limit is -13 dBm when measured with a resolution bandwidth of 1 MHz. The measurements of the spurious signals were therefore made using a resolution bandwidth of 1 MHz. All spurious and harmonics of the CDMA Carrier was also shown to be lower than the –13 dBm limit.

The carrier signal shown on these plots was measured at a resolution Bandwidths of 3 MHz. This was done so that the carrier plot correctly and accurately depicts the carrier output power in relation to the spurious signals and the defined limit.

The applied signal met the recommended characteristics per ***3GPP2 C.S0010-0, December 1999, Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations, Paragraph 6.5.2, Test Model for Base Station*** as defined below.

Type	Number of Channels	Fraction of Power (Linear)	Fraction of Power (dB)	Comments
Pilot	1	0.1490	-8.3	Walsh 0
Sync	1	0.015/p	-18.3	Walsh 32, always 1/8 rate
Paging	1	0.054	-12.7	Walsh 1, full rate only
Traffic	6	0.13 each	-8.8 each	Variable Walsh Assignments, full rate only

TABLE 15.1 Base Station Test Model, Nominal

Test Results Summary:

Measurements were performed while transmitting at the upper and lower channels in each PCS Block tested. Measurements were additionally performed for the single, dual, three, four, and five carrier transmit configurations at each PCS block edge, where applicable, for the **MCR-1900** integrated with an external power amplifier, **P2PAM/ FCC ID: AS5ONEBTS-06**. The attached spectral plots are samples that depict compliance for representative single, dual, three, and five carrier transmit configurations utilizing the **MCR-1900** and **P2PAM**. Table 15.2 documents the results of the performed measurements. The performance charts show that there are no harmonics or spurious emissions above the applicable limit of –13 dBm. The attached data plots document the results for single, dual, three, and five carrier test configurations for PCS Band A. Table 15.2 lists the other PCS blocks that were tested and for which data is not attached. The data plots for these PCS

Exhibit 15: *continued*

blocks also show that there are no harmonics or spurious emissions above the applicable limit of –13 dBm, and demonstrates the compliance of the **MCR-1900** when integrated with an external power amplifier, **P2PAM/ FCC ID: AS5ONEBTS-06**. Data is also presented depicting the performance of the **MCR-1900** RF transmit output when operating the radio at the specified maximum RF output power (+4.22 dBm per carrier and +12.0 dBm per transmit port) for PCS Band A.

Exhibit 15: *continued*

PCS Block -Channel	Number of carriers	Number of P2PAM's MCA	Test Results Conducted Spurious
A- 25	1	1&2	Compliant
A-25, 50	2	1&2	Compliant
A- 25, 50, 75	3	2	Compliant
A- 25, 50, 75, 100	4	3	Compliant
A- 25, 50, 75, 100,125	5	3	Compliant
A-275	1	1&2	Compliant
A-250, 275	2	1&2	Compliant
A- 225, 250, 275	3	2	Compliant
A- 200, 225, 250, 275	4	3	Compliant
A- 175,200, 225, 250, 275	5	3	Compliant
B- 425	1	1&2	Compliant
B-425, 450	2	1&2	Compliant
B- 425, 450, 475	3	2	Compliant
B- 425, 450, 475, 500	4	3	Compliant
B- 425, 450, 475, 500,525	5	3	Compliant
B-675	1	1&2	Compliant
B-650, 675	2	1&2	Compliant
B- 625, 650, 675	3	2	Compliant
B- 600, 625, 650, 675	4	3	Compliant
B- 575,600, 625, 650, 675	5	3	Compliant
C- 925	1	1&2	Compliant
C-925, 950	2	1&2	Compliant
C- 925, 950, 975	3	2	Compliant
C- 925, 950, 975, 1000	4	3	Compliant
C- 925, 950, 975, 1000,1025	5	3	Compliant
C-1175	1	1&2	Compliant
C-1150, 1175	2	1&2	Compliant
C- 1125, 1150, 1175	3	2	Compliant
C- 1100, 1125, 1150, 1175	4	3	Compliant
C- 1075,1100, 1125, 1150, 1175	5	3	Compliant

(1) The Single Amplifier configuration supports 1 and 2 carrier transmit configurations. The dual amplifier MCA supports 1, 2 and 3 carrier transmit configurations. The three amplifier MCA supports 4 and 5 carrier transmit configurations.

TABLE 15.2 PCS Conducted Spurious Compliance Tabulation

Exhibit 15: *continued*

PCS Block -Channel	Number of carriers	Number of P2PAM's MCA	Test Results Conducted Spurious
D- 325	1	1&2	Compliant
D-325,350	2	1&2	Compliant
D-350,375	2	1&2	Compliant
D- 325,350,375	3	2	Compliant
E- 725	1	1&2	Compliant
E-725,750	2	1&2	Compliant
E-750,775	2	1&2	Compliant
E- 725,750,775	3	2	Compliant
F- 825	1	1&2	Compliant
F-825,850	2	1&2	Compliant
F-850,875	2	1&2	Compliant
F- 825,850,875	3	2	Compliant

(1) The Single Amplifier configuration supports 1 and 2 carrier transmit configurations. The dual amplifier MCA supports 1, 2 and 3 carrier transmit configurations.

TABLE 15.2 *continued* PCS Conducted Spurious Compliance Tabulation

Conducted Spurious tests on the Receiver antenna terminal additionally documented compliance with the 2 nW requirement of 47CFR Part 15 section 15.111**.**

Exhibit 15

Figure 15A Conducted Spurious Measurement Test Configuration

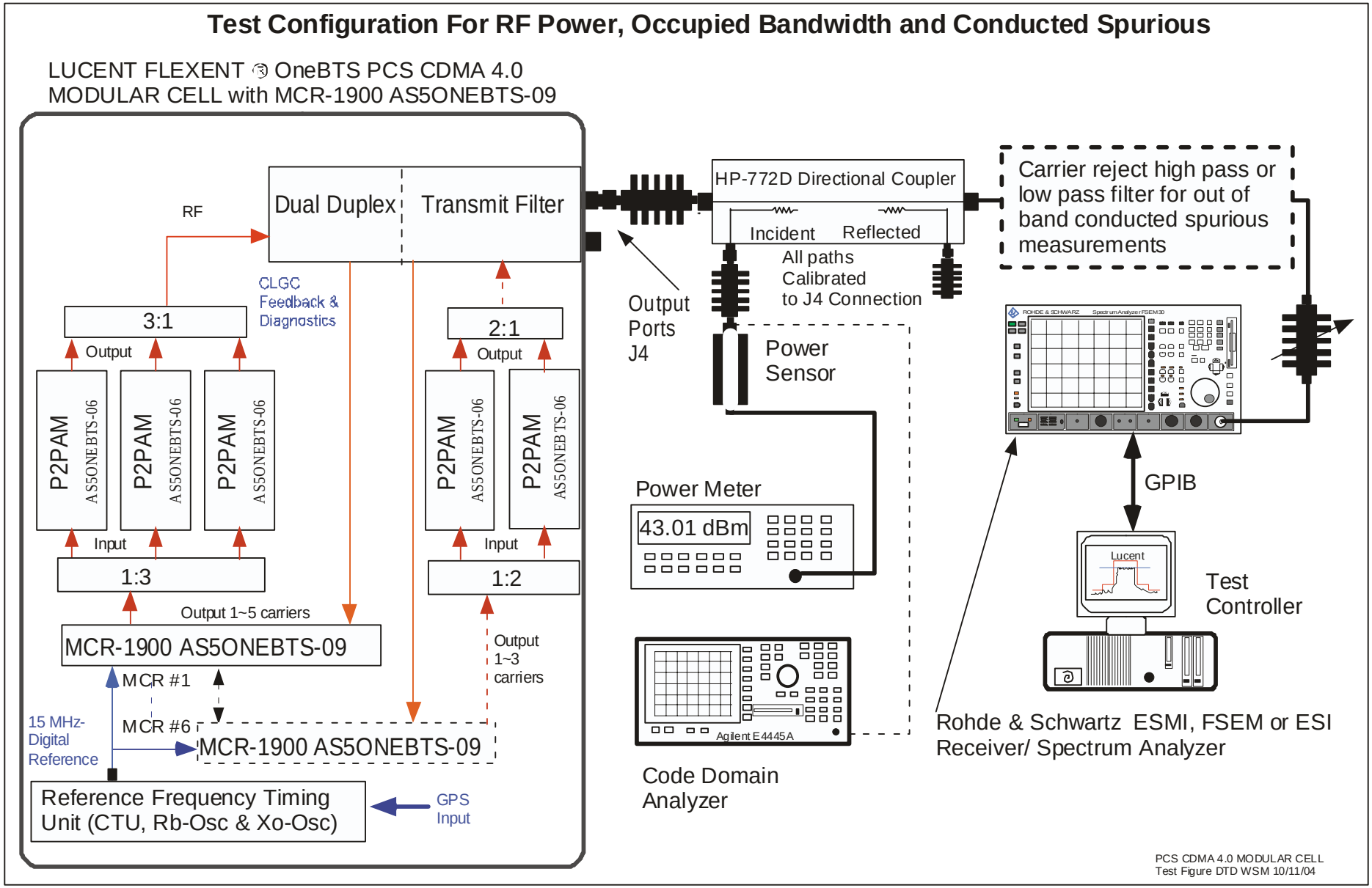

Exhibit 15 ***continued***

FCC Conducted Spurious Data
at
Transmitter Output
for
Lucent Technologies Inc.
PCS ONEBTS Modular Cell 4.0
Incorporating
PCS Multi-Carrier Radio (MCR-1900)
Filed under FCC ID: AS5ONEBTS-09
with
PCS 2 Carrier Power Amplifier Module (P2PAM)
FCC ID: AS5ONEBTS-06

Single, Dual, Three, and Five Carrier Configurations

Exhibit 15 *continued*

MCR-1900 Output, Band A, Sub-Block A1, 1 Carrier Configuration 10 MHz -10GHz

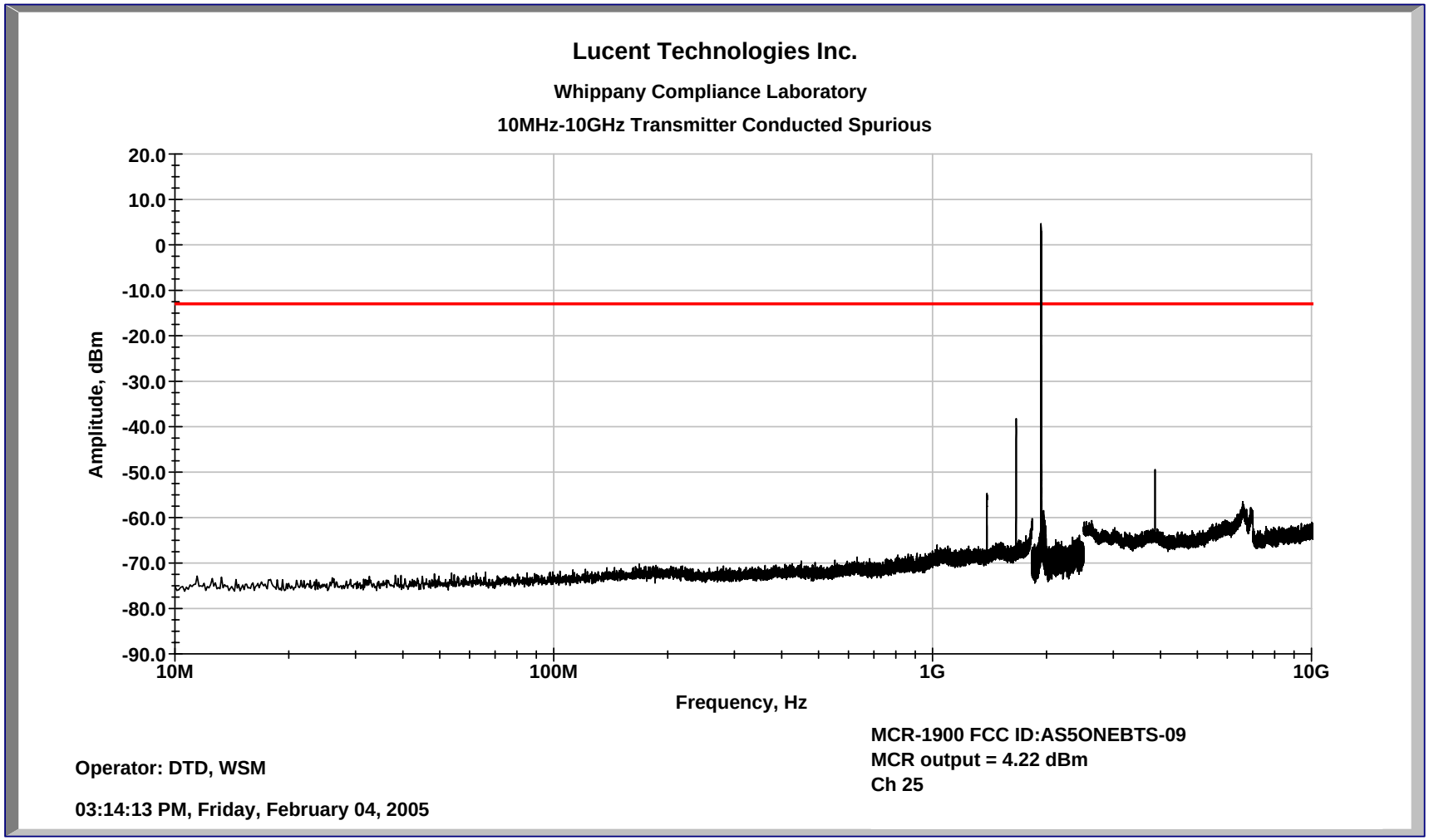

Exhibit 15 *continued*

MCR-1900 Output, Band A, Sub-Block A1, 1 Carrier Configuration 1 GHz –20.0GHz

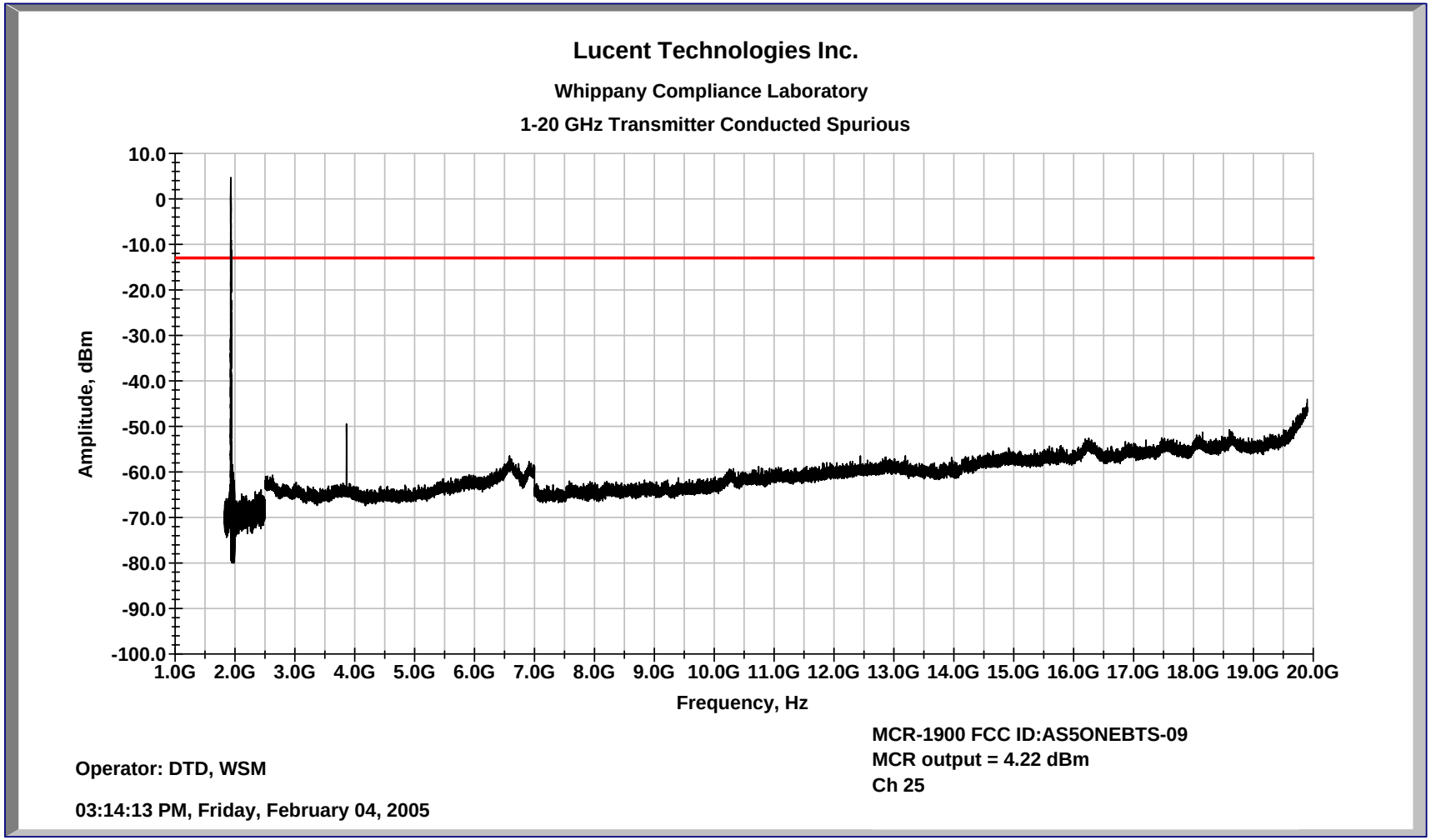

Exhibit 15 *continued*

MCR-1900 Output, Band A, Sub-Block A1/A2, 6 Carrier Configuration 10 MHz -10GHz

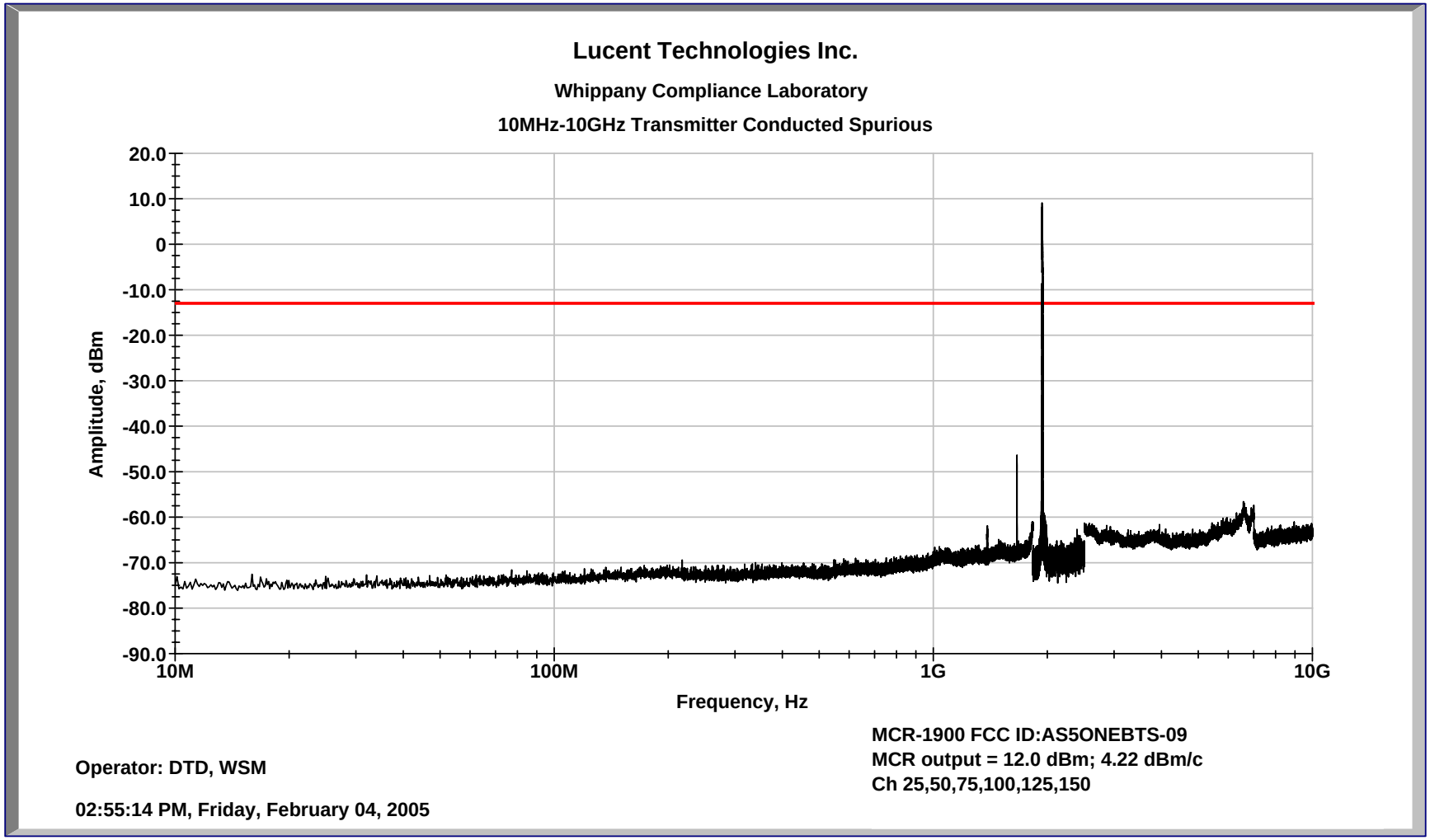

Exhibit 15 *continued*

MCR-1900 Output, Band A, Sub-Block A1/A2, 6 Carrier Configuration 1 GHz -20GHz

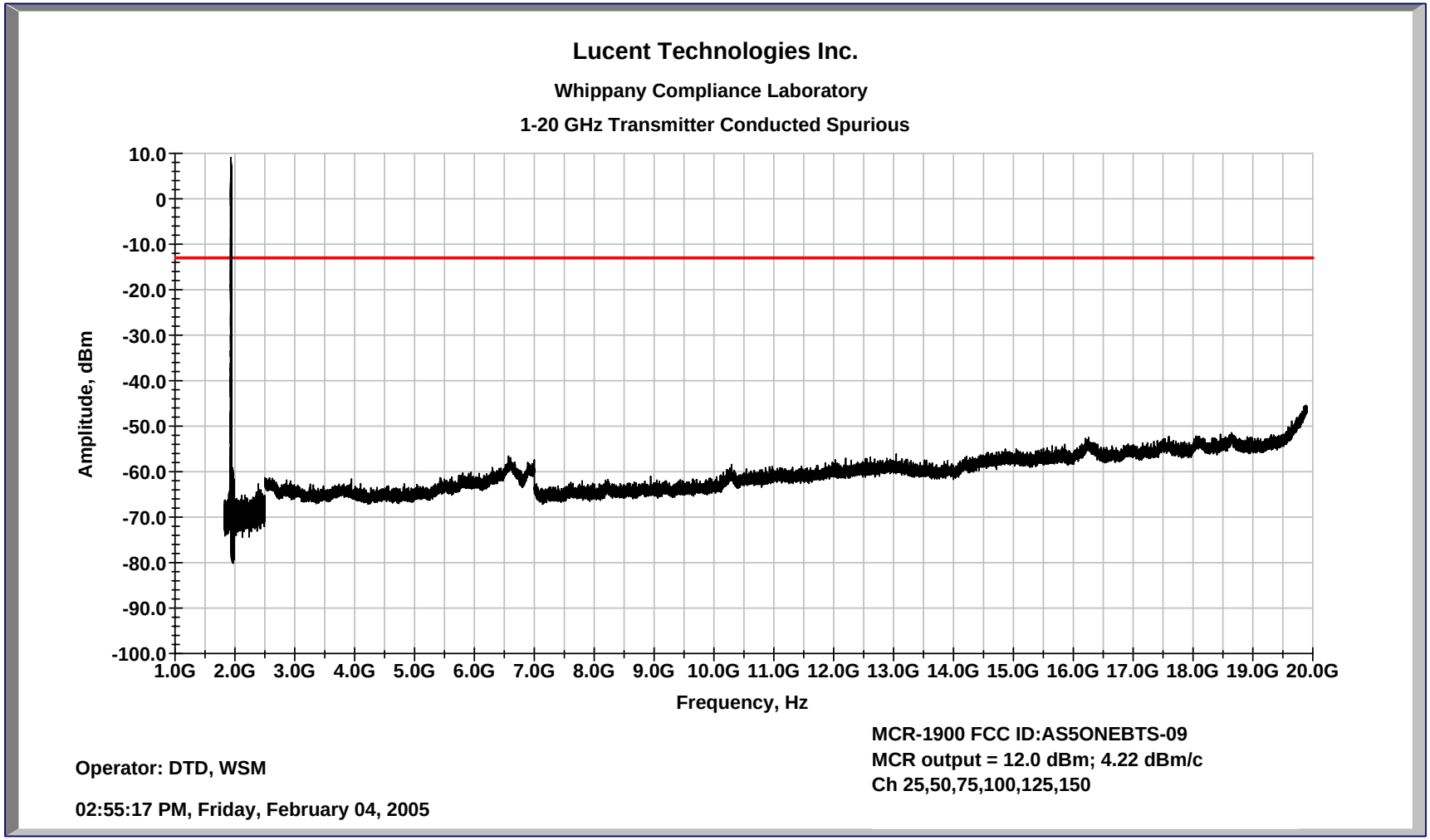

Exhibit 15 *continued*

MCR-1900 Output, Band A, 11 Carrier Configuration 10 MHz -10GHz

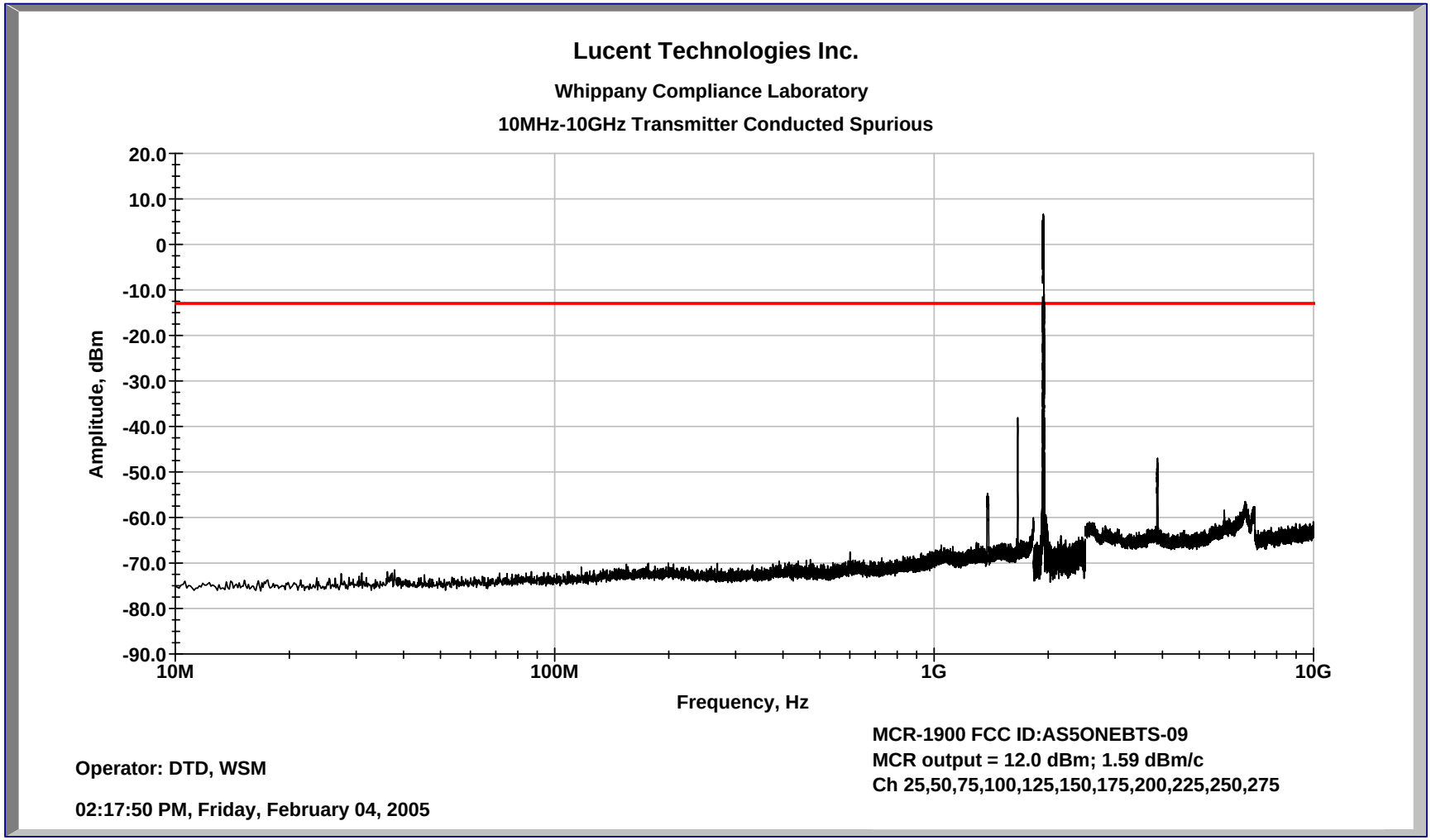

Exhibit 15 *continued*

MCR-1900 Output, Band A, 11 Carrier Configuration 1 GHz -20GHz

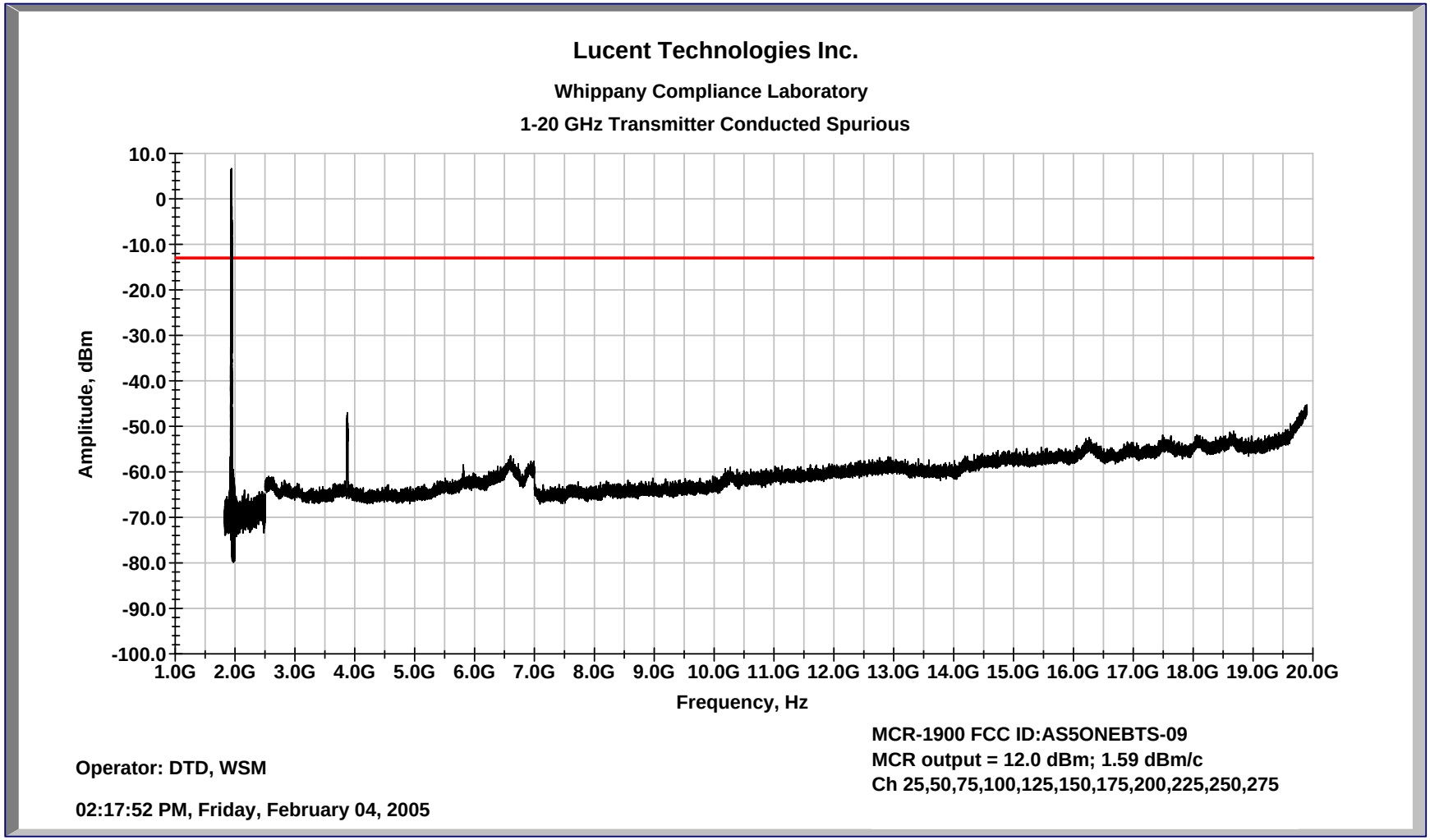

Exhibit 15 *continued*

Band A, Sub-Block A1, 1 Carrier/ 2 P2PAM Configuration 10 MHz -10GHz

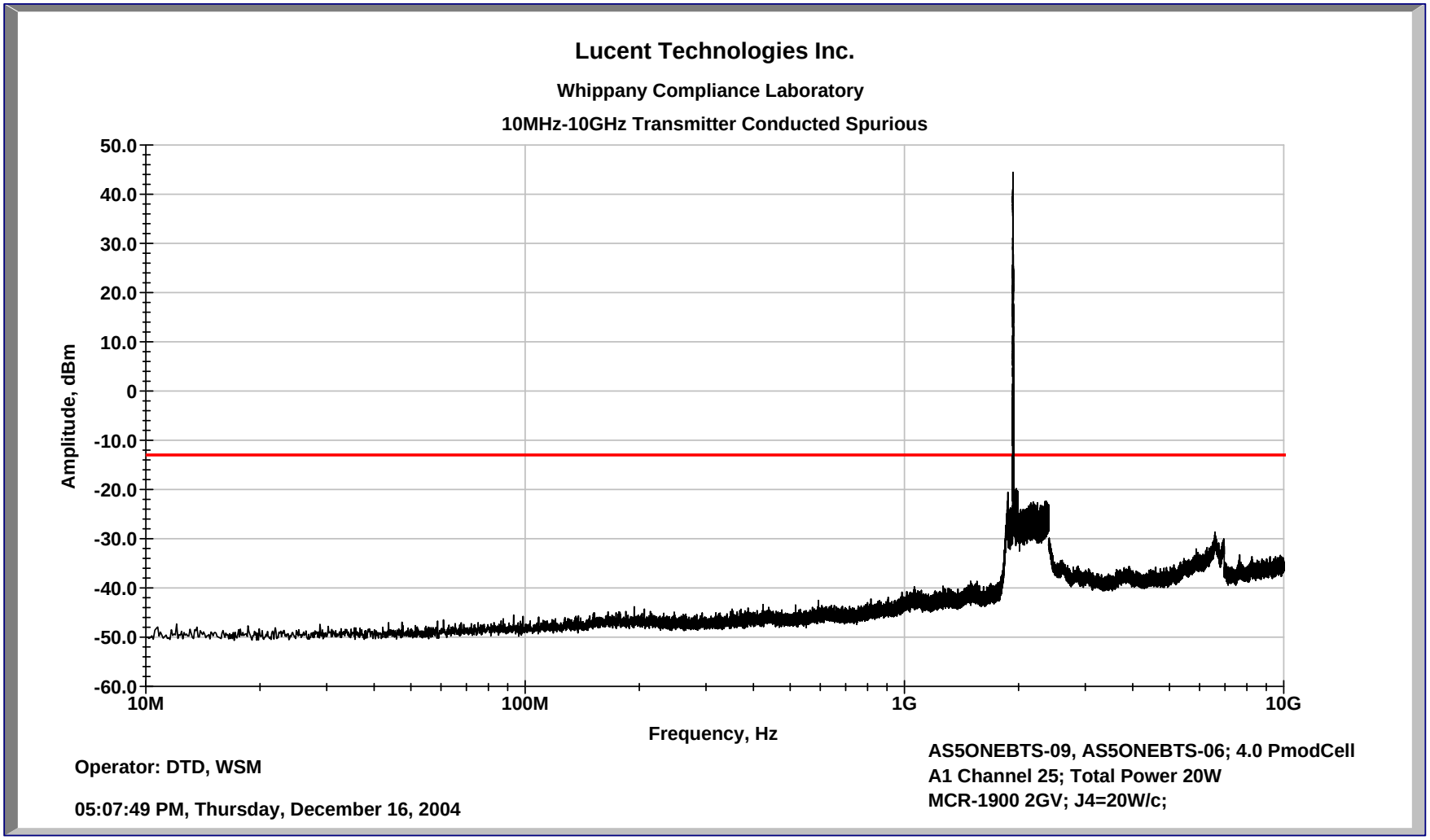

Exhibit 15 *continued*

Band A, Sub-Block A1, 1 Carrier/ 2 P2PAM Configuration 1 GHz -20GHz

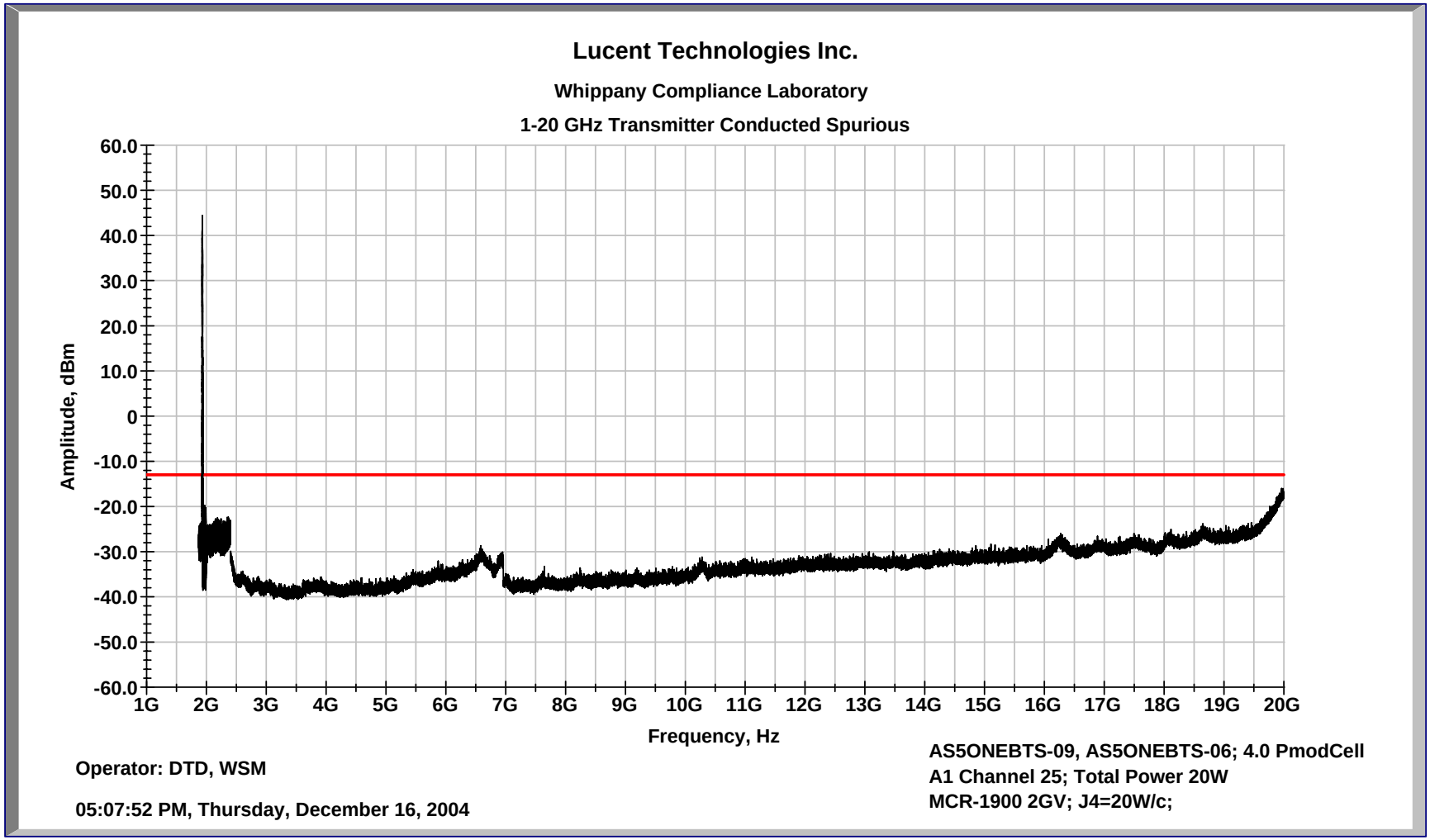

Exhibit 15 *continued*

Band A, Sub-Block A1, 2 Carrier/ 1 P2PAM Configuration 10 MHz -10GHz

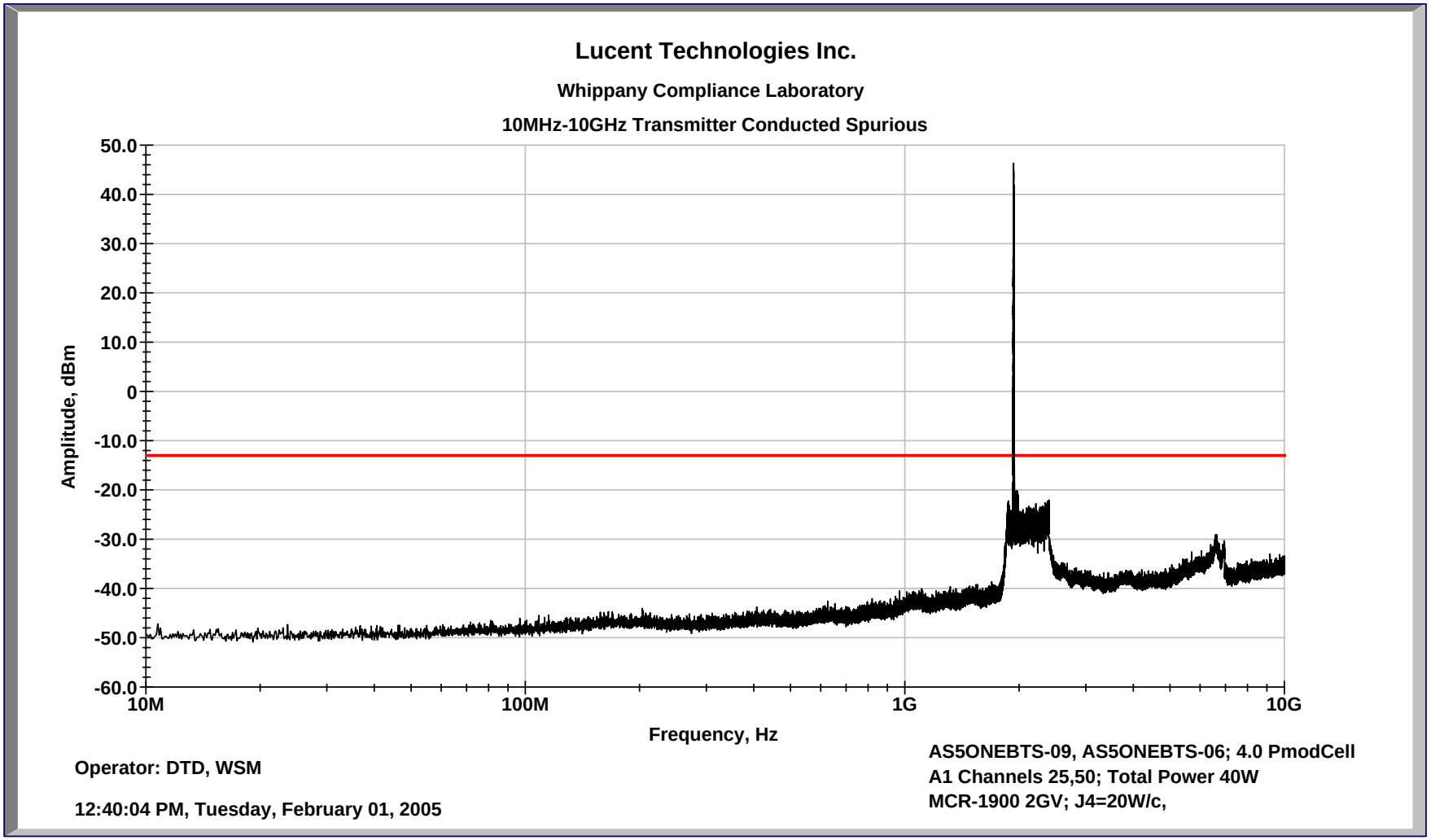

Exhibit 15 *continued*

Band A, Sub-Block A1, 2 Carrier/ 1 P2PAM Configuration 1 GHz -20GHz

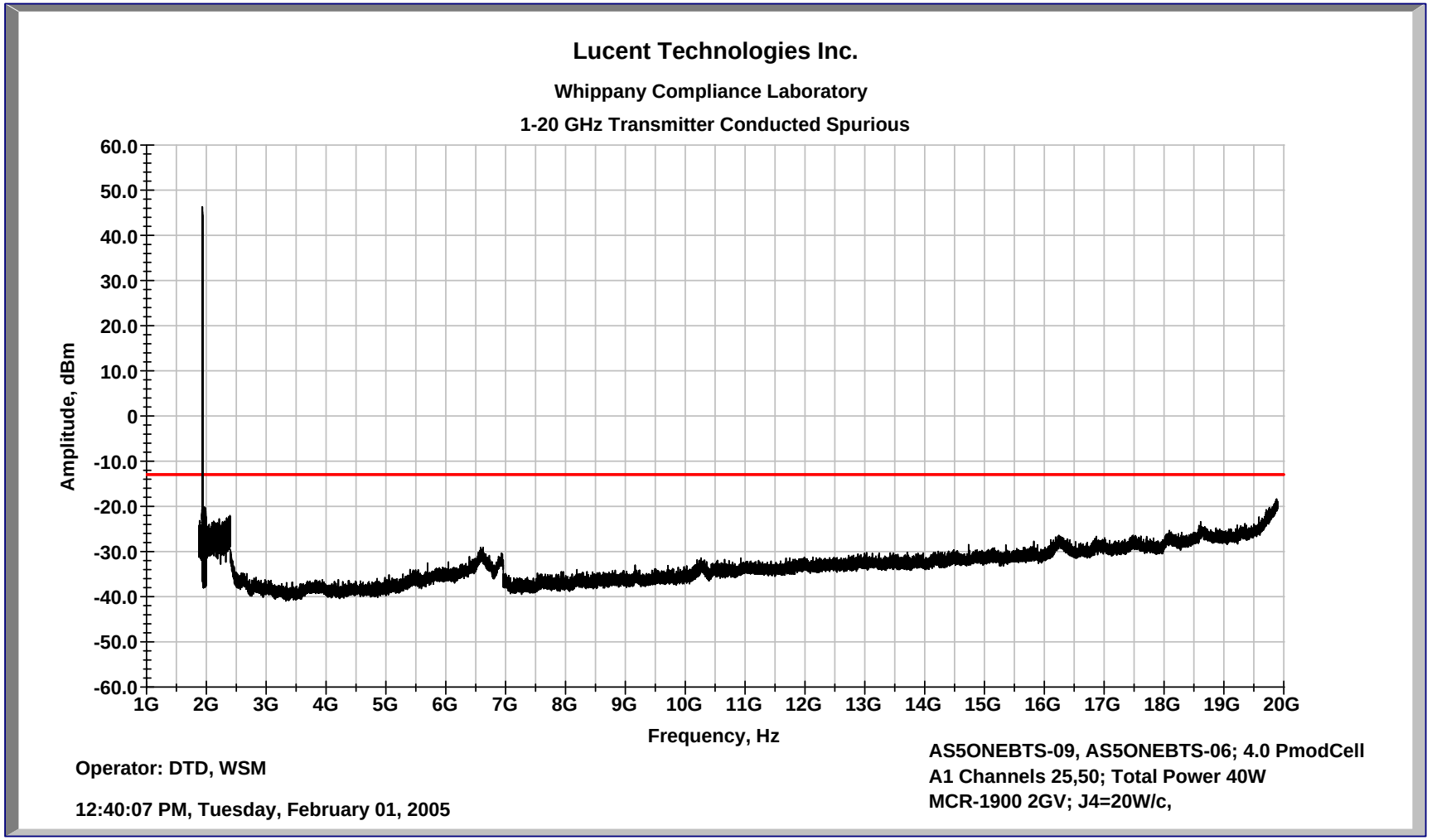

Exhibit 15 *continued*

Band A, Sub-Block A1, 3 Carrier/ 2 P2PAM Configuration 10 MHz -10GHz

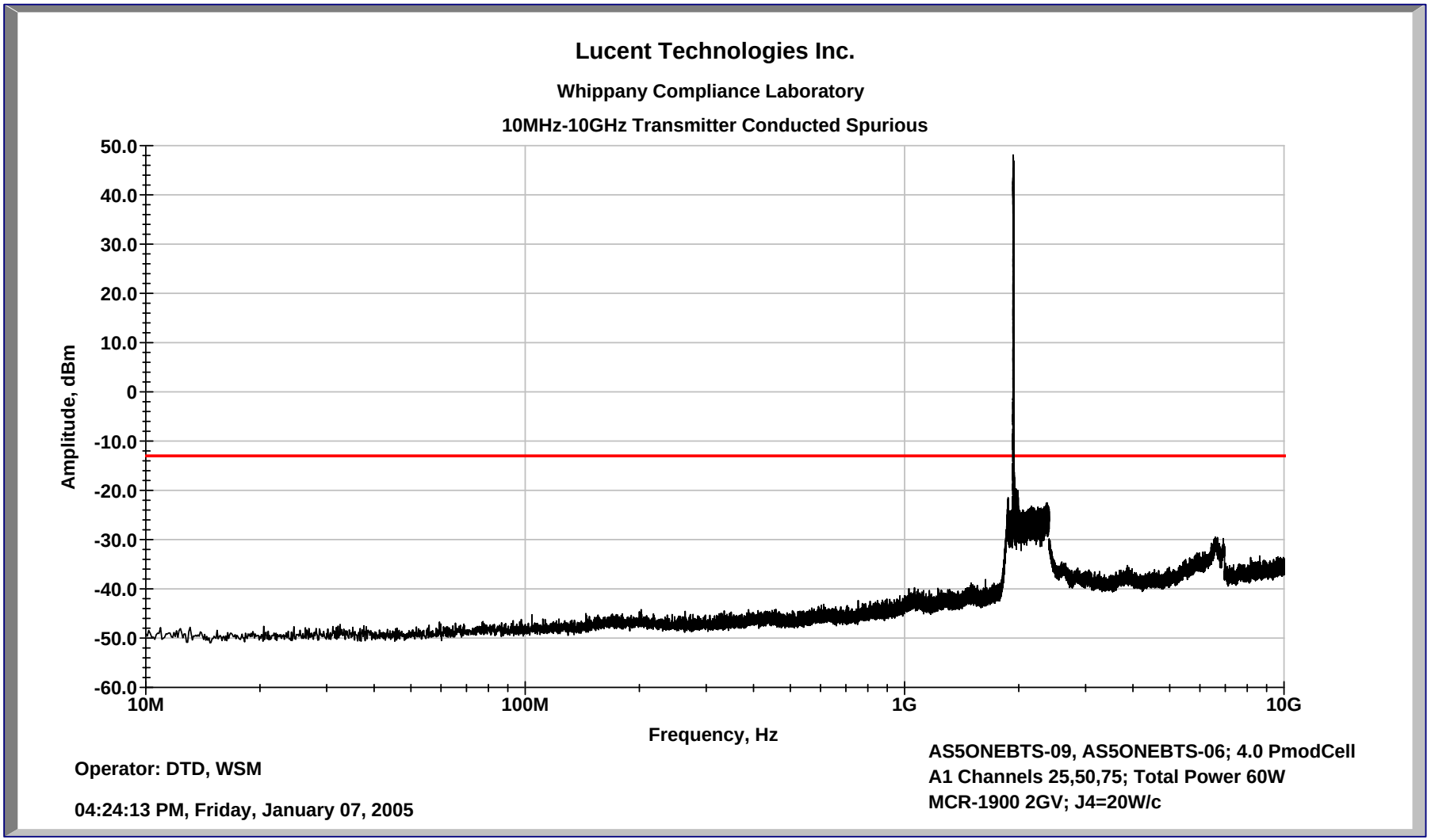

Exhibit 15 *continued*

Band A, Sub-Block A1, 3 Carrier/ 2 P2PAM Configuration 1 GHz -20GHz

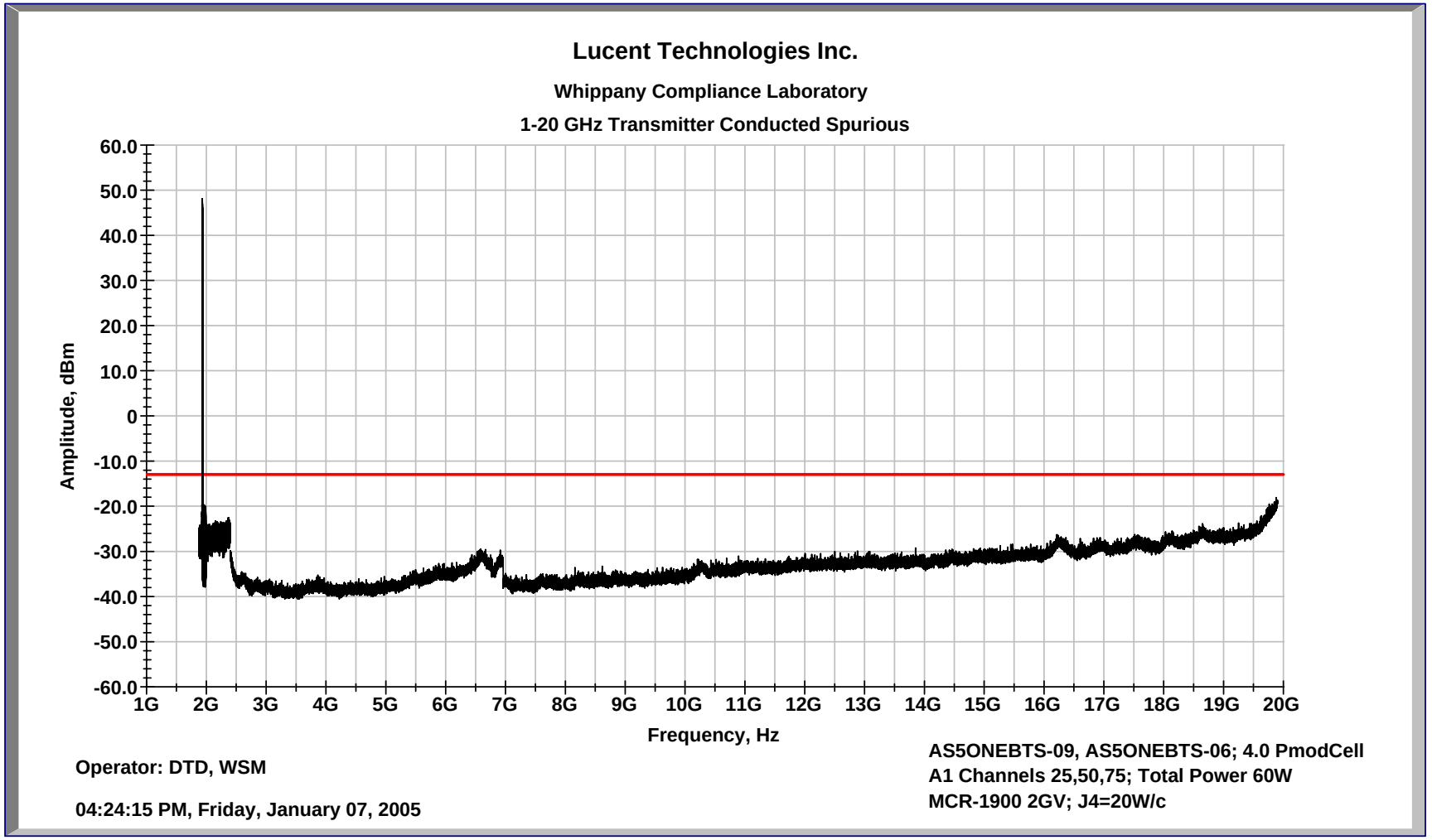

Exhibit 15 *continued*

Band A, Sub-Block A1/A2, 5 Carrier/ 3 P2PAM Configuration 10 MHz -10GHz

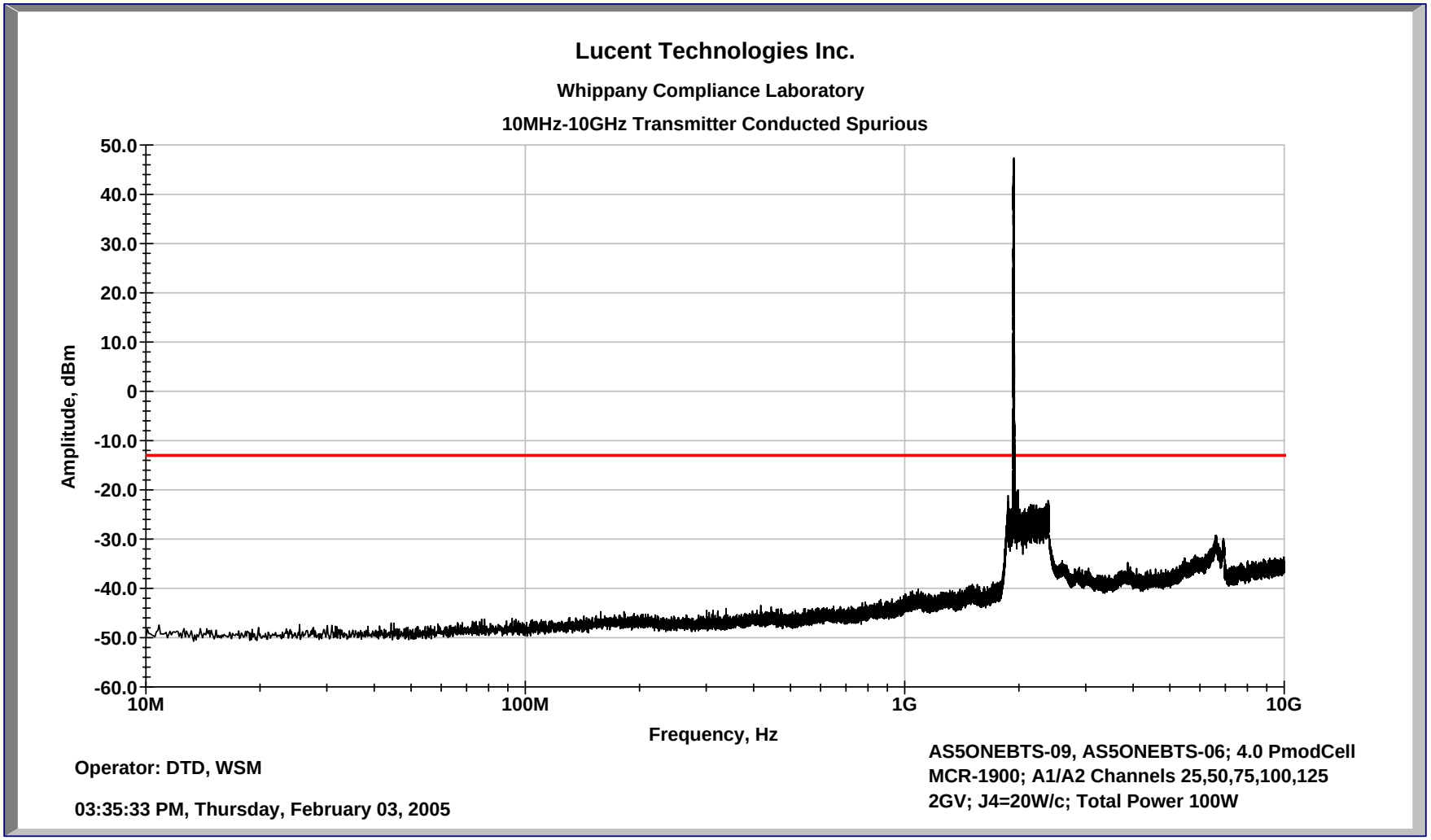

Exhibit 15 *continued*

Band A, Sub-Block A1/A2, 5 Carrier/ 3 P2PAM Configuration 1 GHz -20GHz

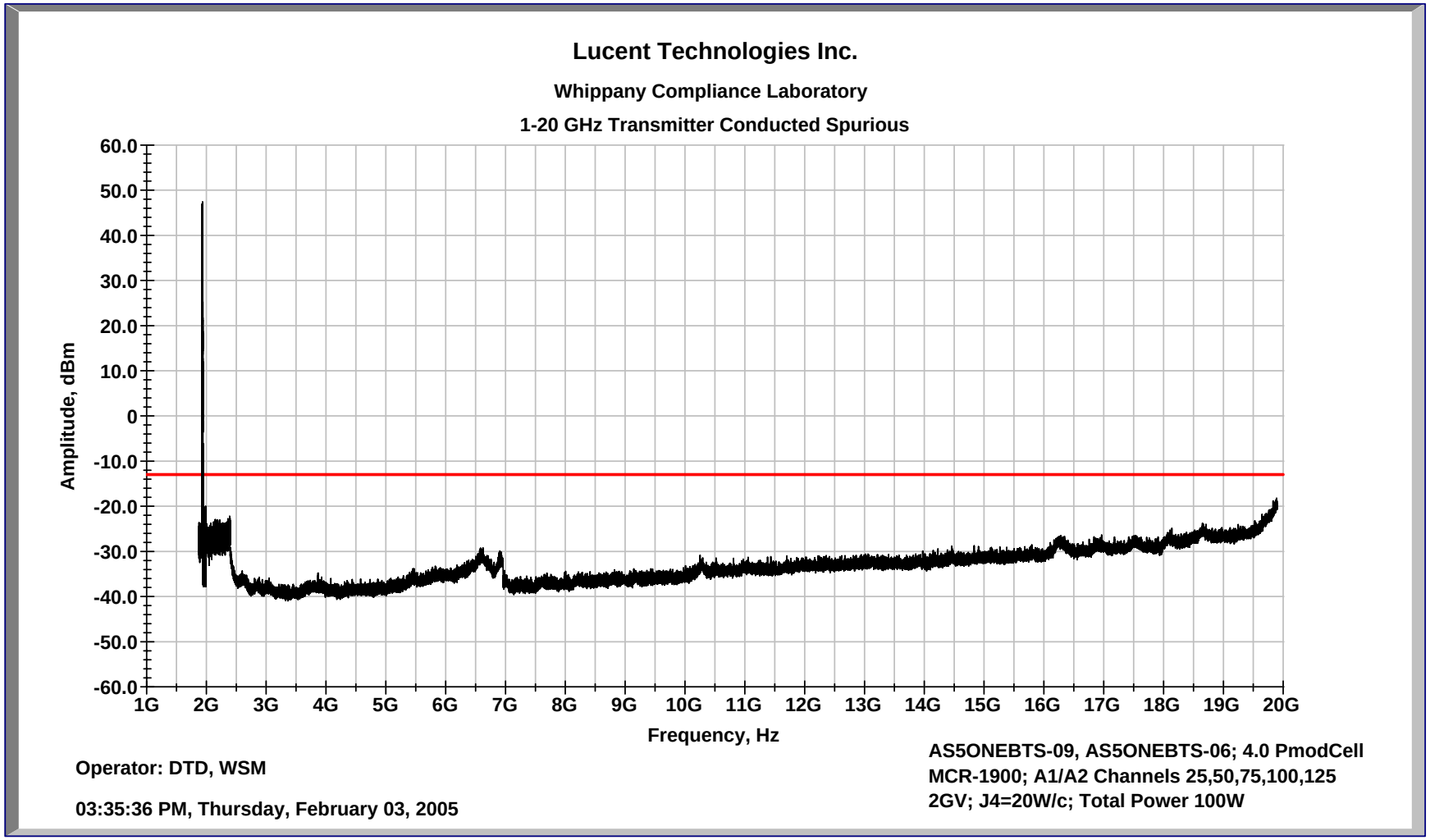

Exhibit 16

SECTION 2.1053 FIELD STRENGTH OF SPURIOUS RADIATION

Field strength measurements of radiated spurious emissions were evaluated in a 3m anechoic pre-compliance chamber and verified as required at the ten meter Open Area Test Site OATS maintained by Lucent Technologies Bell Laboratories FCC Compliance Laboratory in Whippany, New Jersey. A complete description and full measurement data for the site have been placed on file with the Commission.

The **6 MCR1900s** were configured with **12 P2PAMs** and all other associated equipment in a **PCS Indoor FLEXENT ® OneBTS Modular Cell 4.0**. The spectrum from 10 MHz to the tenth harmonic of the carrier was searched for spurious radiation. Measurements were made using both horizontally and vertically polarized broadband antennas. Per FCC regulations, the comparison of out of band spurious emissions directly to the limit is appropriately made using the substitution method. However, when the emissions are more than 20 dB below the specification limit, the use of field strength measurements for compliance determination is acceptable and those emissions are considered not reportable (Section 2.1053 and the FCC Interpretive database for 2.1053). For this case the evaluation of acceptable radiated field strength is as follows.

The calculated emission levels were found by:

$$\text{Pmeas (dBm)} + \text{Cable Loss(dB)} + \text{Antenna Factor(dB)} + 107\ (\text{dB}\mu\text{V/dBm}) - \text{Amplifier Gain (dB)} = \text{Field Strength (dB}\mu\text{V/m)}$$

Section 24.238 and 2.1053 contains the requirements for the levels of spurious radiation as a function of the EIRP of the unmodulated carrier. The reference level for the unmodulated carrier is calculated as the field produced by an isotropic radiator excited by the transmitter output power according to the following relation taken from Reference Data for Radio Engineers, page 27-7, 6th edition, IT&T Corp.

$$E = (120\pi P)^{1/2} = [(30*P)^{1/2}] / R$$

$$20 \log (E*10^{6}) - (43 + 10 \log P) = 71.77 \text{ dB } \mu\text{V/meter}$$

Where: E = Field Intensity in Volts/ meter R = Distance in meters = 10 m
P = Transmitted Power in watts = 20 W/ Carrier

RESULTS:

For this particular test, the field strength of any spurious radiation is required to be less than 71.8 dBμV/meter. Emissions equal to or less than 51.8 dBμV/meter are not reportable and may be verified using field strength measurements. Over the out of band spectrum investigated from 30 MHz to tenth harmonic of the carrier, no reportable spurious emissions were detected. This demonstrates that the **PCS Multi-Carrier Radio (MCR-1900)**, the subject of this application, complies with Sections 2.1053, 24.238 and 2.1057 of the Rules.

Additional testing to 47CFR Part 15 documented compliance with the Class B requirements.

Conducted Spurious tests on the receiver antenna terminal documented compliance with the 2 nW requirement of 47CFR Part 15.

Exhibit 17 Measurement of Frequency Stability

SECTION 2.995 Measurement of Frequency Stability

The following frequency stability test data for the **MCR-1900/ AS5ONEBTS-09** was measured as installed and tested, per Figure 17A, in a **FLEXENT ® OneBTS PCS Outdoor Modular Cell 4.0**. The **PCS Outdoor Modular Cell 4.0** was subjected to the FCC specified temperature range of -30 deg F to +50 deg F while operating at full rated power. Software and hardware controls internal to the **Modular Cell 4.0** will disable the transmitter should either the internal temperatures exceed the maximum range or the frequency stability of the transmitter be compromised.

The frequency stabilization and accuracy of the CDMA signal amplified by the **P2PAM** and measured at the **PCS Outdoor Modular Cell 4.0** J4 connector is a function of the input signal from the **MCR-1900** (**FCC ID: AS5ONEBTS-09**). The Common Timing Unit (**CTU**) provides the time and frequency reference used by the **MCR-1900** (**FCC ID: AS5ONEBTS-09**). The **CTU** is a highly accurate time and frequency unit which relies upon a signal lock of GPS satellite signals to provide the primary discipline of system timing. In the event of loss of GPS lock the Rubidum Reference Oscillator (**OMU-RB**) or the Crystal Oscillator Module (**OMU-XO**) can provides up to eight hours of flywheel operation. The system provides for automatic timing synchronization upon reacquisition of GPS lock. The system is powered by an AC-DC power converter with battery backup to provide immunity to power fluctuations and failures.

RESULTS:

The measured data below is the FCC Frequency Stability Test Results for the **MCR-1900, FCC ID: AS5ONEBTS-09**. The data was recorded at the **PCS Modular Cell 4.0** transmitter output (J4 connector) as required by Sec 2.1055 of the FCC Rules.

This system complies with the frequency stability requirements necessary for **FLEXENT ® OneBTS** system compliance with FCC Rules for frequency stability. The **MCR-1900** is compliant with **FCC Part 2 and 24 rules** when powered by and installed in a Lucent Technologies Inc. **FLEXENT ® OneBTS PCS Modular Cell 4.0**.

The frequency stability for the **CTU, MCR** and **OM** was measured as installed and tested, per Figure 17A, in a **FLEXENT®** Modular Cell. The entire Modular Cell was subjected to the FCC specified environments while operating at full rated power. Both carrier center frequency and reference oscillator deviations were measured. Voltage variance was applied to the DC input of the Modular Cell.

The data provided below documents that the maximum frequency deviation measured for the RF carrier frequency (1957.5 MHz) at the transmit antenna port was +0.00062 ppm (1.21 Hz). The specification for FCC compliance is +/- 0.05 ppm (+/- 97.87 Hz). The maximum frequency deviation measured for the OMU-RB output (15MHz) was +0.00004 ppm (7×10^{-4} Hz). The specification for FCC compliance is +/- 0.05 ppm (+/-0.75 Hz).

The measured data is attached below.

Exhibit 17

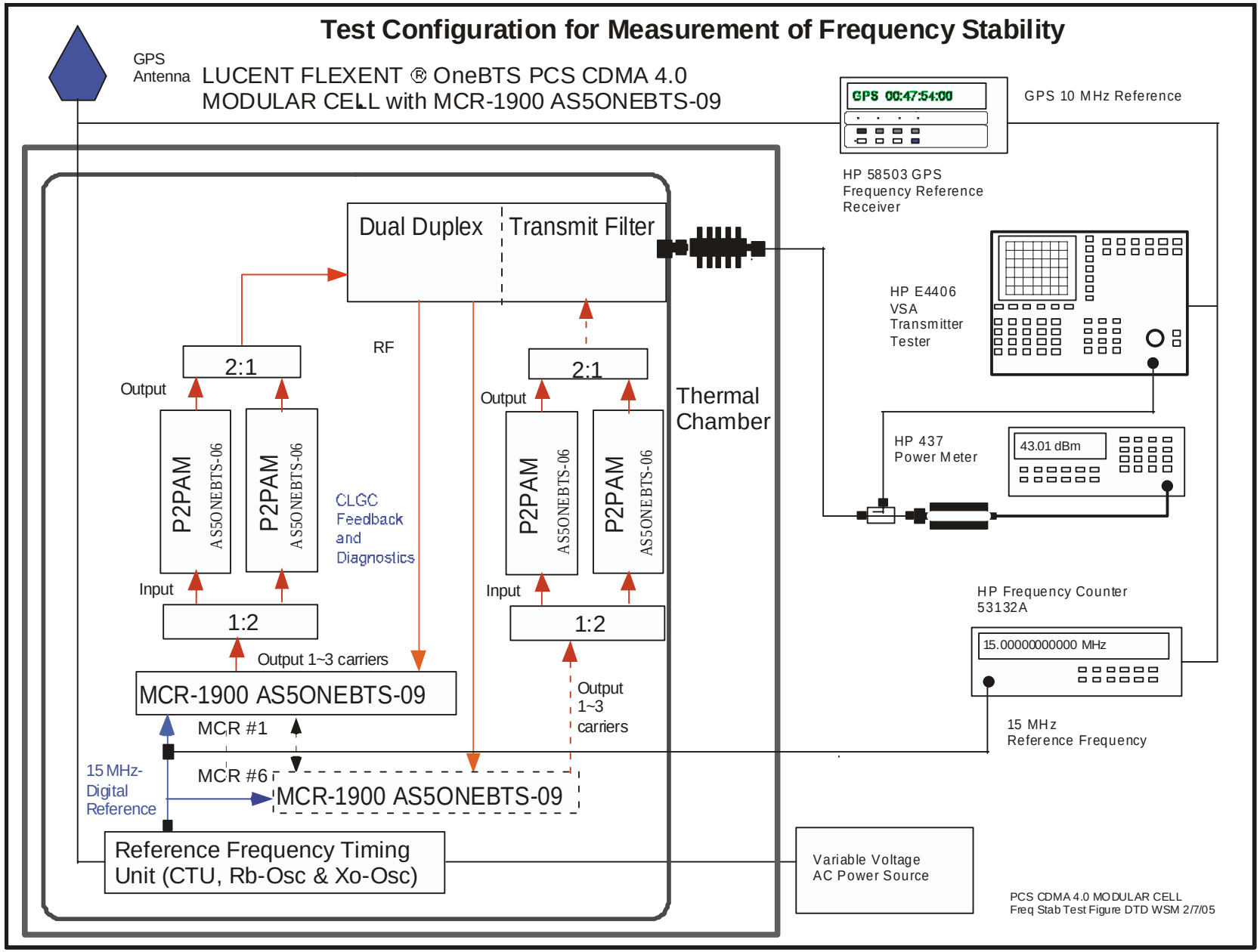
Test Configuration for Measurement of Frequency Stability
GPS Antenna
LUCENT FLEXENT ® OneBTS PCS CDMA 4.0
MODULAR CELL with MCR-1900 AS5ONEBTS-09
GPS 00:47:54:00
GPS 10 MHz Reference
HP 58503 GPS Frequency Reference Receiver
Dual Duplex
Transmit Filter
HP E4406 VSA Transmitter Tester
RF
2:1
2:1
Output
Output
Thermal Chamber
P2PAM AS5ONEBTS-06
P2PAM AS5ONEBTS-06
P2PAM AS5ONEBTS-06
P2PAM AS5ONEBTS-06
CLGC Feedback and Diagnostics
HP 437 Power Meter
43.01 dBm
Input
Input
1:2
1:2
HP Frequency Counter 53132A
15.00000000000 MHz
Output 1~3 carriers
MCR-1900 AS5ONEBTS-09
Output 1~3 carriers
MCR #1
MCR #6
MCR-1900 AS5ONEBTS-09
15 MHz Reference Frequency
15 MHz-Digital Reference
Reference Frequency Timing Unit (CTU, Rb-Osc & Xo-Osc)
Variable Voltage AC Power Source
PCS CDMA 4.0 MODULAR CELL
Freq Stab Test Figure DTD WSM 2/7/05

Exhibit 17 ***continued***

FCC Frequency Stability Data
at
Transmitter Output
for
Lucent Technologies Inc.
PCS ONEBTS Modular Cell 4.0
Incorporating
PCS Multi-Carrier Radio (MCR-1900)
Filed under FCC ID: AS5ONEBTS-09
with
PCS 2 Carrier Power Amplifier Module (P2PAM)
FCC ID: AS5ONEBTS-06

PCS Block Tested: ***B1, PCS Channel 550, 1957.5MHz***

Baseline Measurement at +20°C

Reference and Transmit Frequency Deviation From GPS at +20°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-7	0.53
0.5	3	-0.23
1.0	-7	-0.59
1.5	3	-0.42
2.0	-7	0.21
2.5	3	0.33
3.0	3	-0.35
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +20°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	0.63
0.5	-2	0.82
1.0	-3	-0.75
1.5	-1	0.16
2.0	-2	0.61
2.5	-3	-0.36
3.0	-2	0.21
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +20°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	0.27
0.5	-3	0.02
1.0	-3	0.85
1.5	-2	-026
2.0	-2	0.86
2.5	-2	-0.55
3.0	-3	-0.46
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –30°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	-0.52
0.5	-3	-0.41
1.0	-3	0.32
1.5	-2	1.07
2.0	-2	-0.21
2.5	-3	-0.16
3.0	-3	0.15
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –30°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	-1.05
0.5	-3	-0.61
1.0	-2	0.12
1.5	-2	-0.14
2.0	-3	0.86
2.5	-2	0.25
3.0	-3	0.50
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –30°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	0.36
0.5	-3	0.04
1.0	-2	-0.78
1.5	-3	-0.17
2.0	-3	0.26
2.5	-2	0.58
3.0	-2	-0.35
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –20°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	-0.16
0.5	-2	0.09
1.0	-3	-0.10
1.5	-2	-0.39
2.0	-3	-0.17
2.5	-2	0.56
3.0	-3	0.43
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –20°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	0.18
0.5	-2	-0.16
1.0	-3	0.27
1.5	-3	-0.76
2.0	-2	0.24
2.5	-3	-0.13
3.0	-2	0.37
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –20°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	0.63
0.5	-2	0.38
1.0	-2	-1.06
1.5	-3	0.41
2.0	-2	-0.22
2.5	-3	0.28
3.0	-3	0.52
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –10°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	-0.43
0.5	-2	0.01
1.0	-3	-1.05
1.5	-3	-0.66
2.0	-3	0.41
2.5	-3	0.27
3.0	-3	-0.09
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –10°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	-1.15
0.5	-3	-0.49
1.0	-3	0.14
1.5	-3	0.44
2.0	-3	-0.01
2.5	-3	-1.06
3.0	-3	0.27
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at –10°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	0.28
0.5	-2	-0.42
1.0	-2	0.66
1.5	-3	-0.17
2.0	-3	0.38
2.5	-3	-0.23
3.0	-3	-0.47
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at 0°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	-0.24
0.5	-3	-0.68
1.0	-3	-0.06
1.5	-3	-0.51
2.0	-2	1.01
2.5	-2	0.51
3.0	-3	-0.13
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at 0°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	1.19
0.5	-3	-0.01
1.0	-2	-0.32
1.5	-3	0.48
2.0	-2	-0.19
2.5	-3	0.36
3.0	-3	-0.14
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at 0°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	0.12
0.5	-3	-0.31
1.0	-3	0.09
1.5	-2	-0.87
2.0	-3	-0.63
2.5	-3	-0.22
3.0	-2	0.17
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at+10°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-7	-1.09
0.5	-0	1.08
1.0	-7	-0.67
1.5	3	-0.54
2.0	-7	0.24
2.5	-7	0.76
3.0	3	-0.16
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +10°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	-0.25
0.5	-3	0.70
1.0	-2	-0.04
1.5	-2	1.01
2.0	-3	-0.02
2.5	-3	0.97
3.0	-2	0.54
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +10°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	0.41
0.5	-2	0.18
1.0	-3	-0.54
1.5	-3	-0.82
2.0	-2	0.11
2.5	-2	-0.44
3.0	-3	-1.07
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at+20°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	-0.56
0.5	-3	-0.05
1.0	-2	0.21
1.5	-2	-0.59
2.0	-3	0.05
2.5	-2	-0.43
3.0	-3	0.36
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +20°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	0.12
0.5	-2	-0.67
1.0	-3	-0.33
1.5	-2	0.53
2.0	-3	-0.44
2.5	-3	-0.18
3.0	-2	0.49
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +20°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	-0.12
0.5	-3	1.03
1.0	-3	-0.23
1.5	-3	0.16
2.0	-3	-0.54
2.5	-2	0.21
3.0	-3	-0.35
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at+30°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	1.00
0.5	-2	-0.13
1.0	-2	-0.54
1.5	-2	-0.48
2.0	-2	0.04
2.5	-2	0.52
3.0	-3	-0.26
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +30°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	-0.43
0.5	-3	-0.51
1.0	-3	0.59
1.5	-2	-0.76
2.0	-3	-0.54
2.5	-3	-0.11
3.0	-2	0.22
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +30°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	1.02
0.5	-2	0.56
1.0	-2	-0.22
1.5	-3	0.58
2.0	-3	0.92
2.5	-2	-0.02
3.0	--3	-0.34
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at+40°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	1.10
0.5	-2	0.37
1.0	-3	-0.41
1.5	-3	0.19
2.0	-2	-0.22
2.5	-2	0.82
3.0	-3	-0.02
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +40°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	0.43
0.5	-3	-0.28
1.0	-3	-0.33
1.5	-3	1.01
2.0	-2	-0.36
2.5	-3	-1.02
3.0	-2	0.26
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +40°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	1.00
0.5	-2	-0.05
1.0	-3	-0.20
1.5	-3	0.29
2.0	-3	-0.80
2.5	-2	-0.19
3.0	-2	0.51
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at+50°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	0.88
0.5	-2	-0.11
1.0	-3	-0.01
1.5	-3	-0.72
2.0	-2	0.14
2.5	-3	1.12
3.0	-2	-0.19
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +50°C at 85% of Nominal Voltage, 20.4VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	-0.17
0.5	-2	0.22
1.0	-2	-0.380
1.5	-2	1.01
2.0	-3	-0.26
2.5	-3	0.58
3.0	-2	-0.54
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Reference and Transmit Frequency Deviation From GPS at +50°C at 115% of Nominal Voltage, 27.6VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-2	1.21
0.5	-3	-0.79
1.0	-3	-0.20
1.5	-2	1.01
2.0	-3	-0.26
2.5	-3	-0.47
3.0	-3	0.68
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS

Return to +20C

Reference and Transmit Frequency Deviation From GPS at +20°C at 100% of Nominal Voltage, 24VDC		
Time (minutes)	15 MHz Deviation from GPS ($x10^{-4}$ Hz)	Transmit Carrier Deviation (Hz)
0	-3	1.17
0.5	-3	0.55
1.0	-3	-0.05
1.5	-2	-0.72
2.0	-2	1.04
2.5	-3	0.28
3.0	-3	-0.56
FCC SPECIFICATION	±15.0 MHz(±0.05 ppm) ±0.05ppm = ±0.75Hz	±1957.5 MHz (±0.05ppm) ±0.05ppm = ±97.87Hz
FCC RESULT	PASS	PASS