

**FCC
Product Certification Test Report
for
Lucent Technologies Inc.**

PCS UMTS CDMA Radio

UCR-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 **UCR-1900 / FCC ID: AS5ONEBTS-14**, 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 **UCR-1900/ AS5ONEBTS-14** is on the following page. Measurements were made respectively at each frequency where Occupied Bandwidth measurements were performed. The use of the **UCR-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 **UCR-1900** has a maximum power output at at each of the two RF transmitter ports of 0.0033 Watts (5.2 dBm) for a single carrier, 0.0066 Watts (8.2 dBm) for two carriers (5.2 dBm per carrier), and a maximum power output of 0.010 Watts (+10.0 dBm) for three carriers (5.2 dBm per carrier). The steady state range of power adjustment at the output is 30 dB. The minimum power is therefore 30 dB below the maximum (-24.8 dBm) for a single carrier across the PCS down-link Band of 1930.00-1990. MHz.

The **UCR-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 UCR-1900 FCC ID: AS5ONEBTS-14, 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 **UCR-1900 / AS5ONEBTS-14** was configured in the test setup shown in Figure 12A. When measured at each of the tested PCS channels the **UCR-1900/ AS5ONEBTS-14** delivered a minimum of 0.0033 Watts (5.2 dBm) for a single carrier, 0.0066 Watts (8.2 dBm) for two carriers (5.2 dBm per carrier), and a maximum power output of 0.010 Watts (+10.0 dBm) for three carriers (5.2 dBm per carrier).

This **UCR-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 Block.

The **UCR-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 **UCR-1900** transmit power. The compliance status for Occupied Bandwidth and Conducted Spurious Emissions is also shown in tables 12.3 through 12.8.

Table 12.3 Maximum transmit power compliance data.

PCS Block	UCR Channel	Carrier Frequency	Measured Maximum Power Output from Radio 1 carrier	Measured Maximum Power Output from Radio 2 carrier	Measured Maximum Power Output from Radio 3 carrier	Compliance Status
	#	MHz	dBm	dBm	dBm	Pass/Fail
A1	25	1931.25	6.90	9.70	11.37	Compliant
A1	50	1932.50				Compliant
A1	75	1933.75				Compliant
A5	225	1941.25	6.36	9.23	10.88	Compliant
A5	250	1942.50				Compliant
A5	275	1943.75				Compliant
D	325	1946.25	6.39	9.28	10.96	Compliant
D	350	1947.50				Compliant
D	375	1948.75				Compliant
B1	425	1951.25	6.64	9.57	11.27	Compliant
B1	450	1952.50				Compliant
B1	475	1953.75				Compliant
B5	625	1961.25	7.43	10.34	12.04	Compliant
B5	650	1962.50				Compliant
B5	675	1963.75				Compliant
E	725	1966.25	7.63	10.52	12.16	Compliant
E	750	1967.50				Compliant
E	775	1968.75				Compliant
F	825	1971.25	7.55	10.41	12.04	Compliant
F	850	1972.50				Compliant
F	875	1973.75				Compliant
C1	925	1976.25	7.25	10.08	11.69	Compliant
C1	950	1977.50				Compliant
C1	975	1978.75				Compliant
C6	1125	1986.25	6.54	9.30	11.01	Compliant
C6	1150	1987.50				Compliant
C6	1175	1988.75				Compliant

Exhibit 12 *continued***TABLE 12.3 UCR-1900 Transmit Compliance Data for PCS Blocks**

Measured Transmit Channel(s)	Number of Carriers	PCS Block	Measured Carrier Power Level	Occupied Bandwidth Status	Conducted Spurious Emissions Status
25	1	A	Compliant	Compliant	Compliant
25, 50	2	A	Compliant	Compliant	Compliant
25, 50, 75	3	A	Compliant	Compliant	Compliant
225, 250, 275	3	A	Compliant	Compliant	Compliant
325, 350, 375	3	D	Compliant	Compliant	Compliant
425, 450, 475	3	B	Compliant	Compliant	Compliant
625, 650, 675	3	B	Compliant	Compliant	Compliant
725, 750, 775	3	E	Compliant	Compliant	Compliant
825, 850, 875	3	F	Compliant	Compliant	Compliant
925, 950, 975	3	C	Compliant	Compliant	Compliant
1175	1	C	Compliant	Compliant	Compliant
1150, 1175	2	C	Compliant	Compliant	Compliant
1125, 1150, 1175	3	C	Compliant	Compliant	Compliant

Exhibit 12 *continued***Measurement Equipment used in Figure 12 For Measurement of RF Power**

<u>Equipment</u>	<u>Description</u>
Product Frame:	PCS Indoor Flexent OneBTS Modular Cell 4.0 with 6 UCR-1900 transceivers and either 12 kLAM amplifiers or 12 P2PAM amplifiers
UCR-1900:	PCS UMTS CDMA Radio (FCC ID: AS5ONEBTS-14)
kLAM:	PCS Linear Amplifier Module, model k (FCC ID: AS5ONEBTS-02)
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

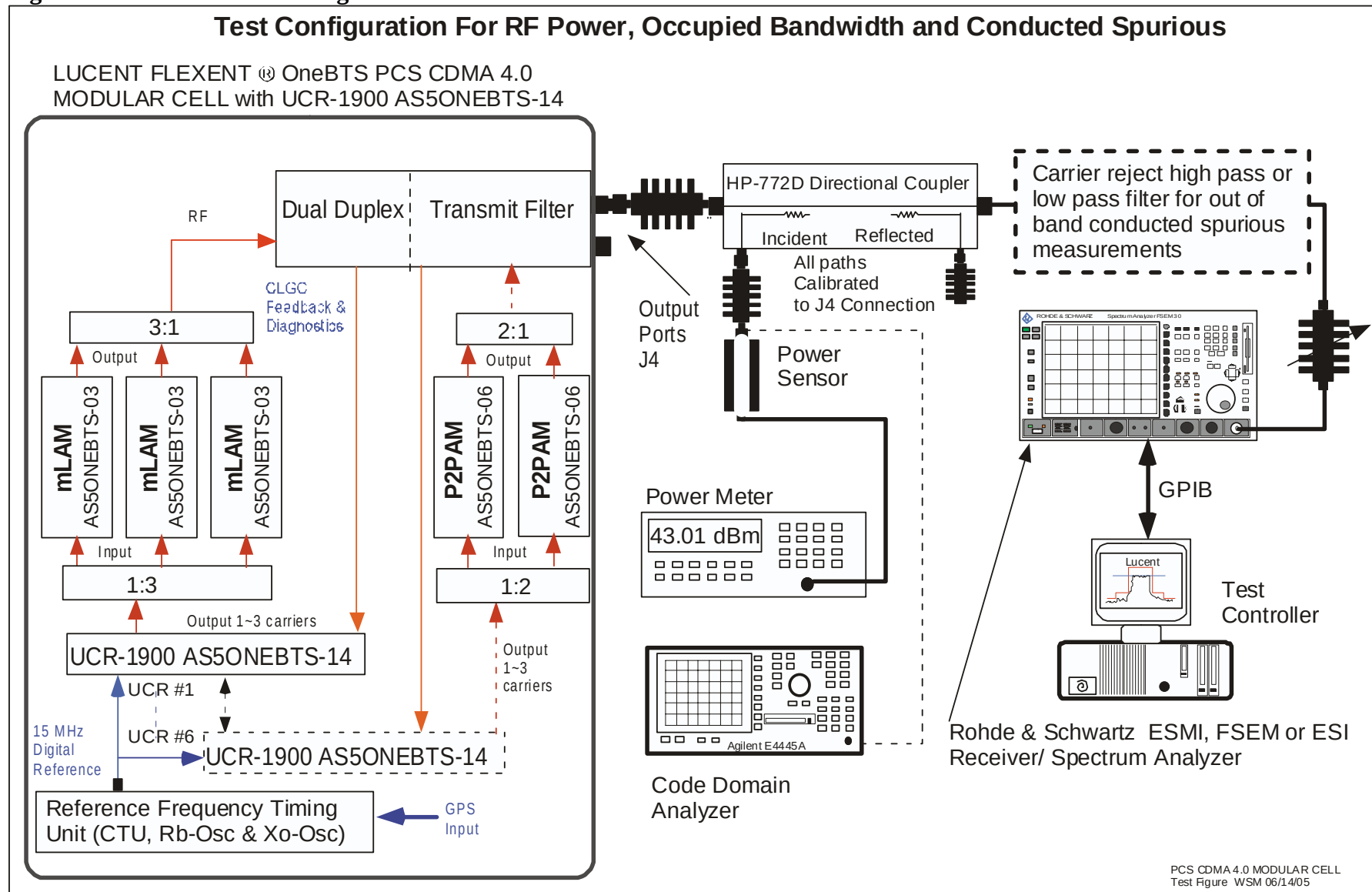


Exhibit 13: Measurement of Modulation Characteristics

SECTION 2.1047

MEASUREMENT OF MODULATION CHARACTERISTICS

The **UCR-1900** / **AS5ONEBTS-14** was configured in the test setup shown in Figure 13A. The **UCR-1900** was configured with its pilot channel and the modulation quality measured with an Agilent -E4406A VSA Series Transmitter Analyzer.

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

PCS Band	Transmit Channel(s)	Measured Rho	Status
A	25	0.99641	Compliant
D	325	0.99626	Compliant
B	425	0.99638	Compliant
E	725	0.99655	Compliant
F	825	0.99634	Compliant
C	1175	0.99619	Compliant

TABLE 13.1 UCR-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 UMTS CDMA Radio (UCR-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**

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 **UCR-1900 FCC ID: AS5ONEBTS-14**, 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 ≤ 0.4 dB).

13.4 Results

For each of the PCS channels tested, the **UCR-1900/ AS5ONEBTS-14** modulation quality factor, Rho (ρ), was measured to be ≥ 0.996 . The **UCR-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 -E4406A VSA Series Transmitter 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

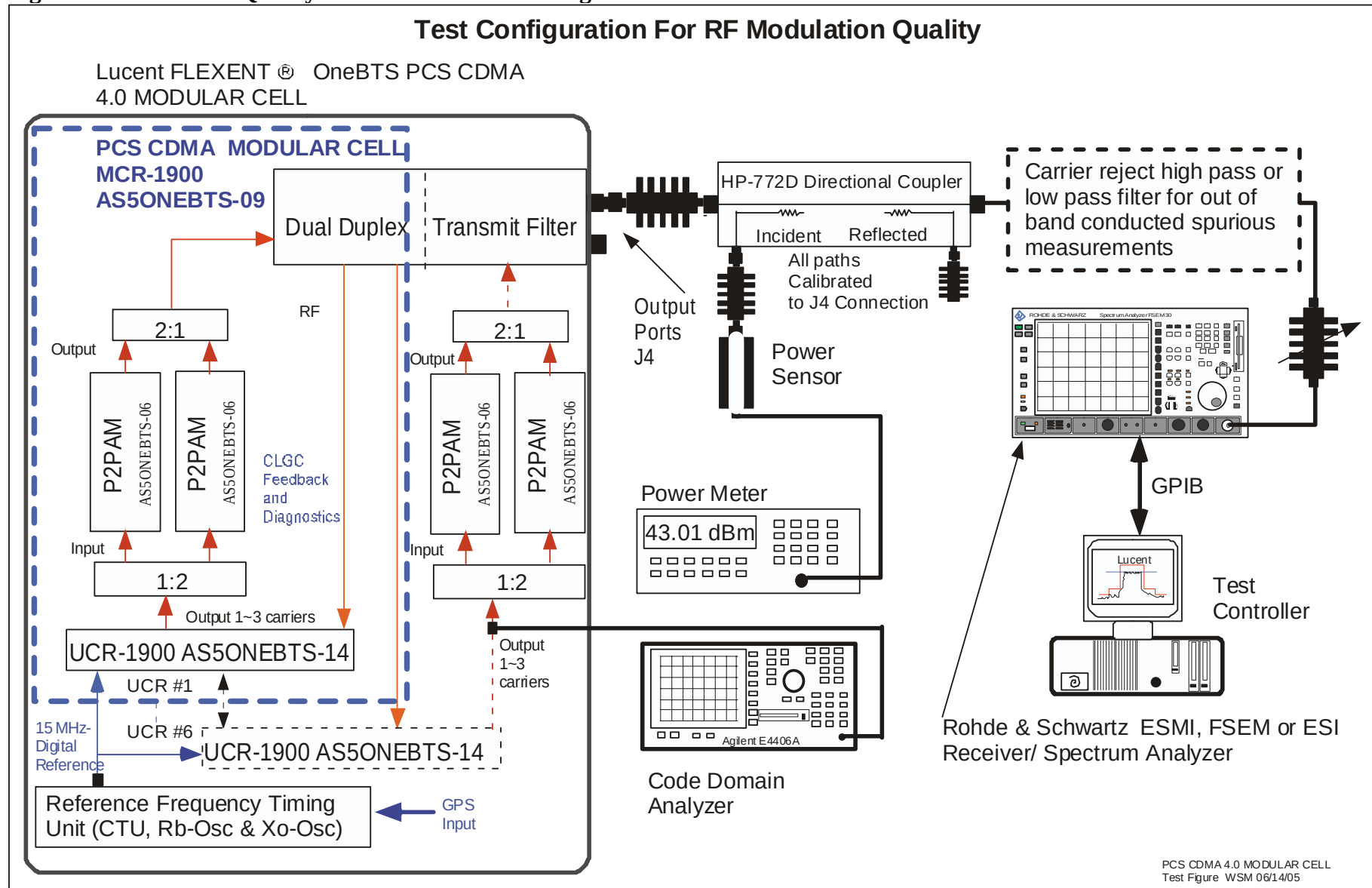


Exhibit 13 continued

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

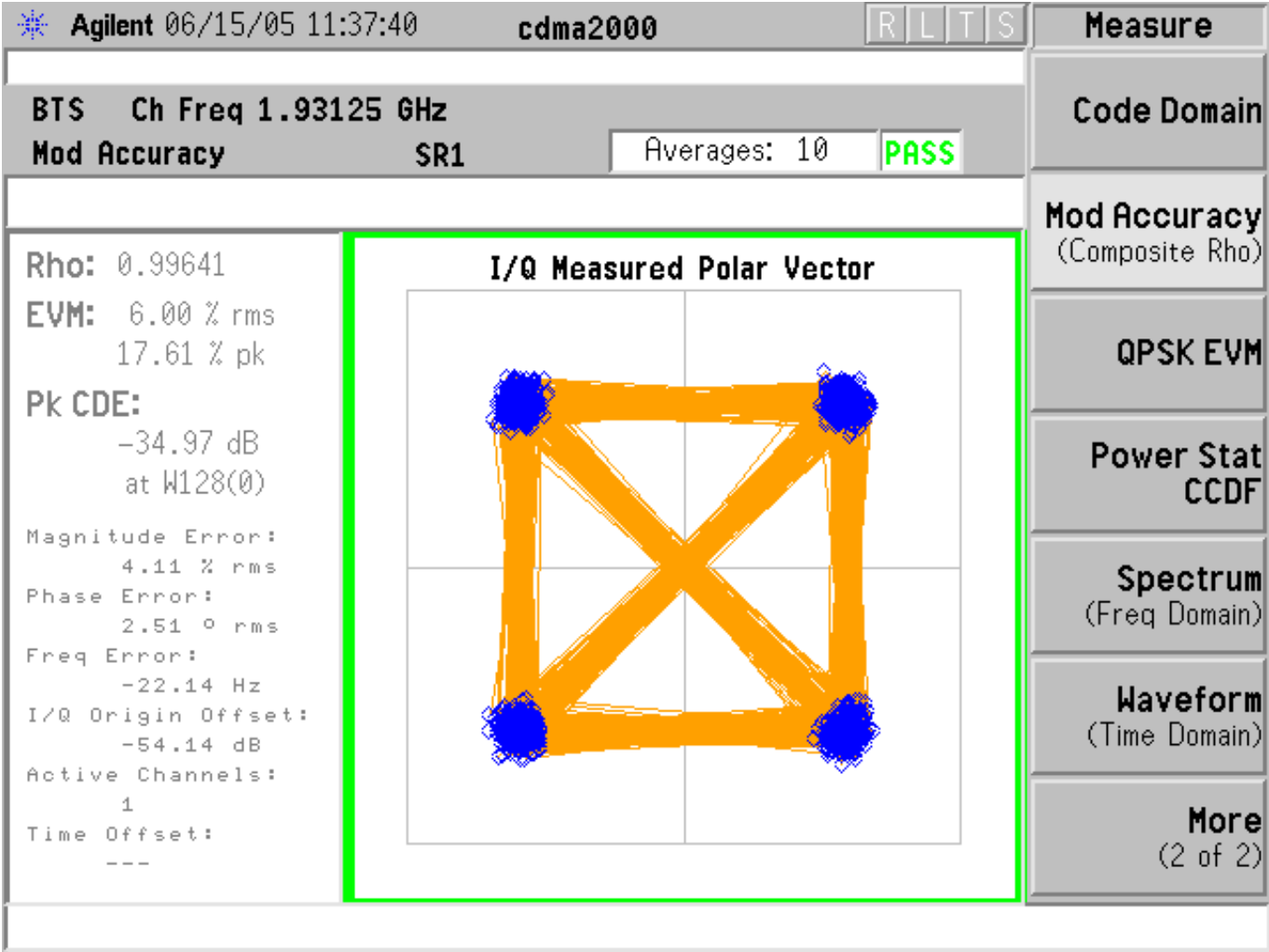


Exhibit 14 Measurement of Occupied Bandwidth

SECTION 2.1049 MEASUREMENT OF OCCUPIED BANDWIDTH

The **UCR-1900** is designed to transmit from one to three 1.25 MHz CDMA channels within 3.75 MHz of total contiguous bandwidth. This exhibit documents the typical unit level performance of the **UCR-1900** when transmitting from one to three CDMA carriers and the typical system level performance at the J4 Transmitter output port.

The occupied bandwidth of the **UCR-1900 / FCC ID: AS5ONEBTS-14** 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 ≥ 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 $\geq$ three carriers is calculated utilizing the following formula:

Power Calibration Line Level = Composite Power Level - $10 \cdot \log(\text{Transmit Bandwidth} / \text{Resolution Bandwidth})$

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

$$47.78 \text{ dBm (60W)} - 10 \cdot \log(3.75\text{MHz} / 3\text{MHz}) = 46.81 \text{ dBm}$$

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 either 5 MHz narrowband or 15 MHz Block transmit filters. The 15 MHz Block transmit filters are used for PCS Blocks A, B and C while the 5 MHz PCS Block transmit filters are appropriate for PCS Blocks 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 and three carrier operational configurations of the **UCR-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 UCR-1900 FCC ID: AS5ONEBTS-14, 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.

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

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

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

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 licensee's frequency block is:

Emissions ≤ 1 MHz outside the Block when measured with a RBW of 1% of the emissions Bandwidth shall be attenuated by :

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

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

Emissions > 1 MHz outside the Block, when measured with a RBW of 1 MHz, shall be attenuated by :

$$-\{43 + 10 \log (\text{mean power output in watts})\} = -13 \text{ dBm.}$$

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:

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

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

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

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

$$-13 + 10\text{LOG}(30\text{kHz}/12.5 \text{ kHz}) \text{ dBm} = -9.2 \text{ dBm} / -52.21 \text{ dBc}$$

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

$$-13 + 10\text{LOG}(30\text{kHz}/1.0 \text{ MHz}) \text{ dBm} = -28.2 \text{ dBm} / -71.21 \text{ dBc}$$

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 **UCR-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	PCS -Channels	Number of carriers	Amplifier Type	# of amplifiers in MCA	Test Results Occupied BW
A	25	1	kLAM	1	Compliant
A	25, 50	2	kLAM	2	Compliant
A	25, 50, 75	3	kLAM	3	Compliant
D	325, 350, 375	3	kLAM	3	Compliant
B	425, 450, 475	3	kLAM	3	Compliant
B	625, 650, 675	3	kLAM	3	Compliant
E	725,750,775	3	kLAM	3	Compliant
F	825, 850, 875	3	kLAM	3	Compliant
C	925, 950, 975	3	kLAM	3	Compliant
C	1175	1	kLAM	1	Compliant
C	1150, 1175	2	kLAM	2	Compliant
C	1125, 1150, 1175	3	kLAM	3	Compliant

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

TABLE 14.2 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 **UCR-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 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 **UCR-1900** RF transmit output when operating the radio at the specified maximum RF output power (+5.2 dBm per carrier and +10.0 dBm maximum per transmit port) for one, two and three carrier configurations.

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

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Exhibit 14 *continued***Test Equipment and Results****Table 14-2 Equipment used for Measurement of RF Transmit Power, Occupied Bandwidth and Conducted Spurious Emissions**

<u>Equipment</u>	<u>Description</u>
Product Frame:	PCS Indoor Flexent OneBTS Modular Cell 4.0 with 6 UCR-1900 transceivers and either 12 kLAM amplifiers or 12 P2PAM amplifiers
UCR-1900:	PCS UMTS CDMA Radio (FCC ID: AS5ONEBTS-14)
kLAM:	PCS Linear Amplifier Module, model k (FCC ID: AS5ONEBTS-02)
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

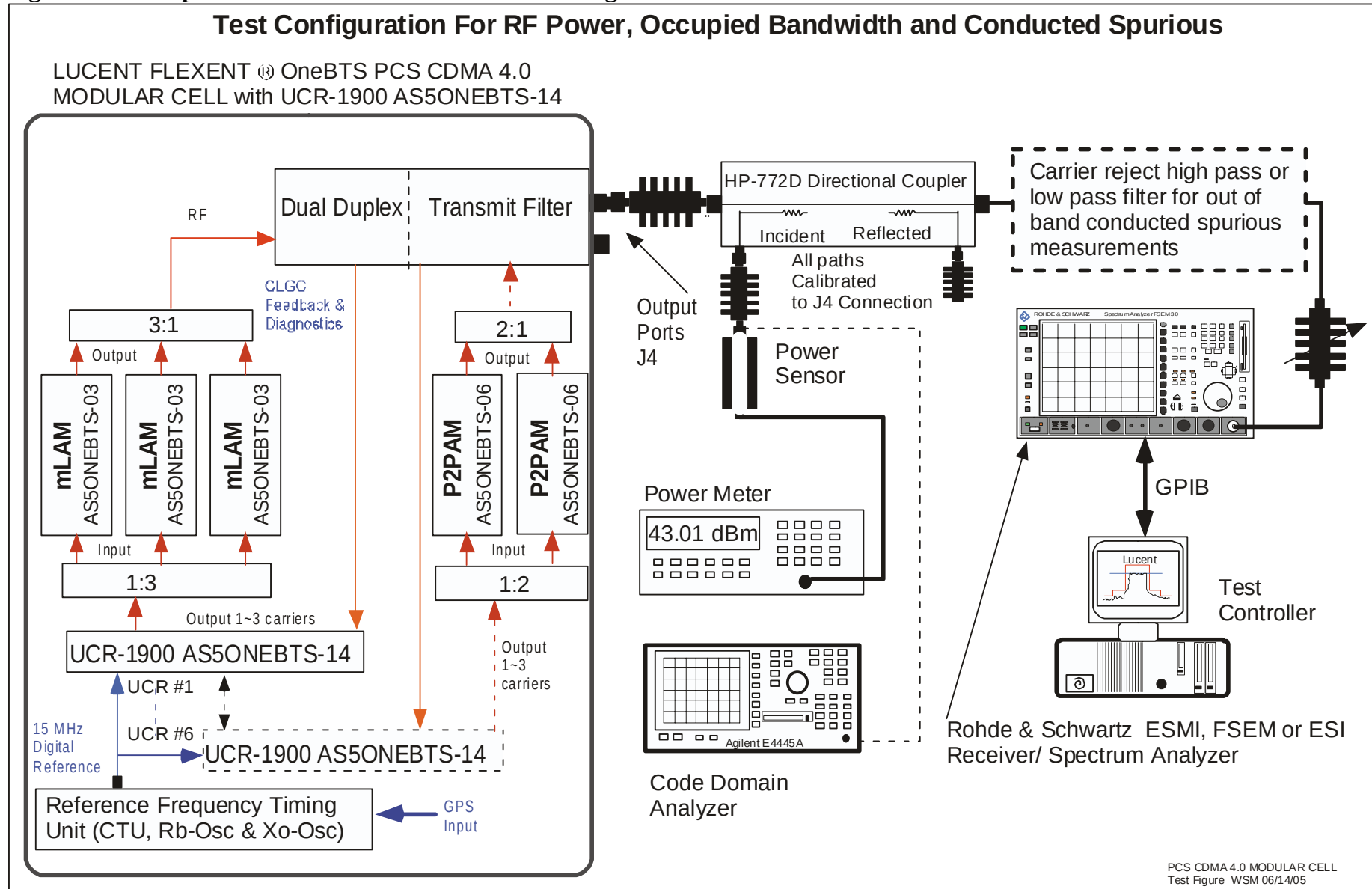
Exhibit 14 continued**Figure 14A Occupied Bandwidth Measurement Test Configuration**

Figure 14B Typical Occupied Bandwidth Mask

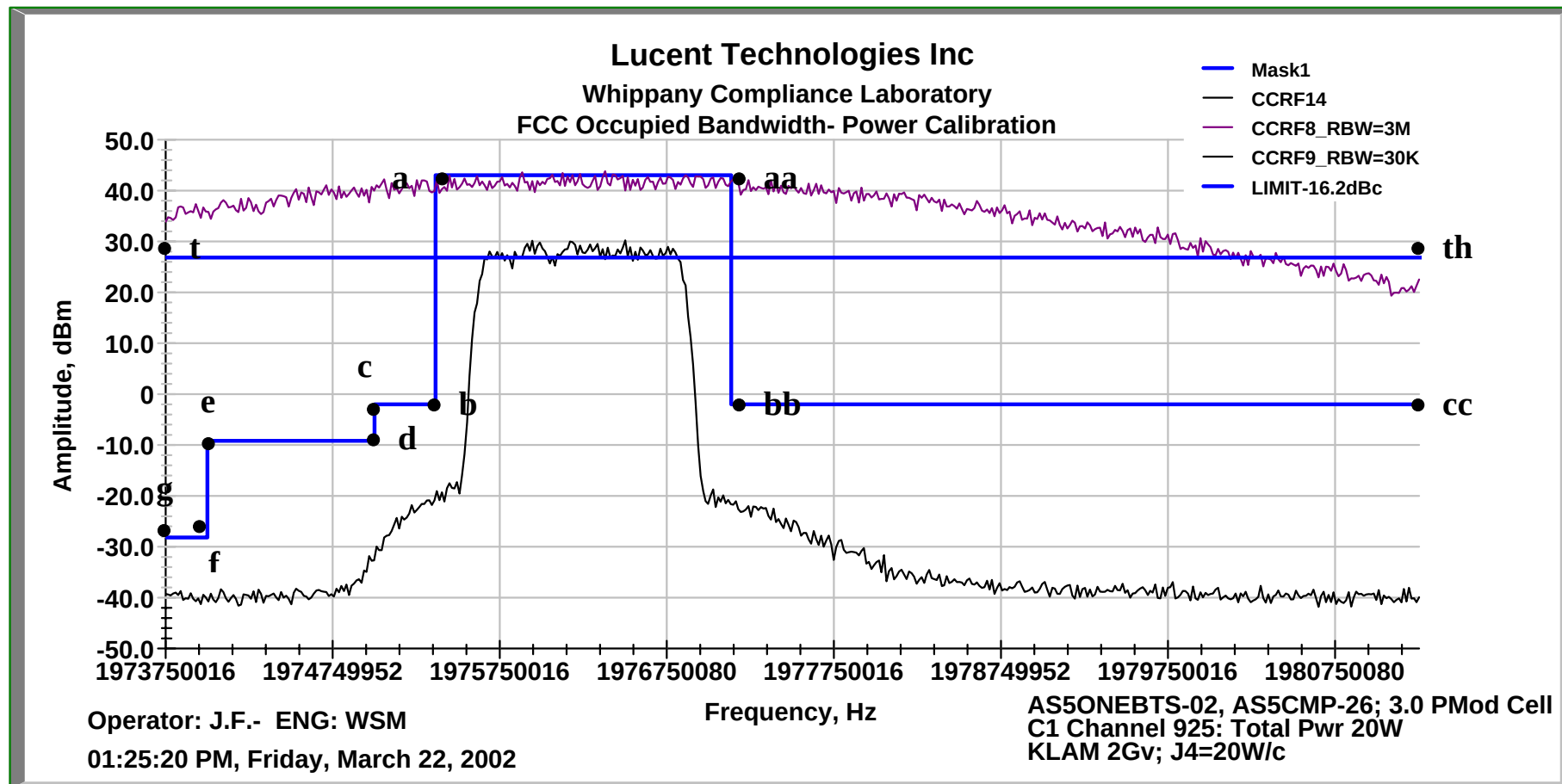


Figure 14C Typical Power Calibration

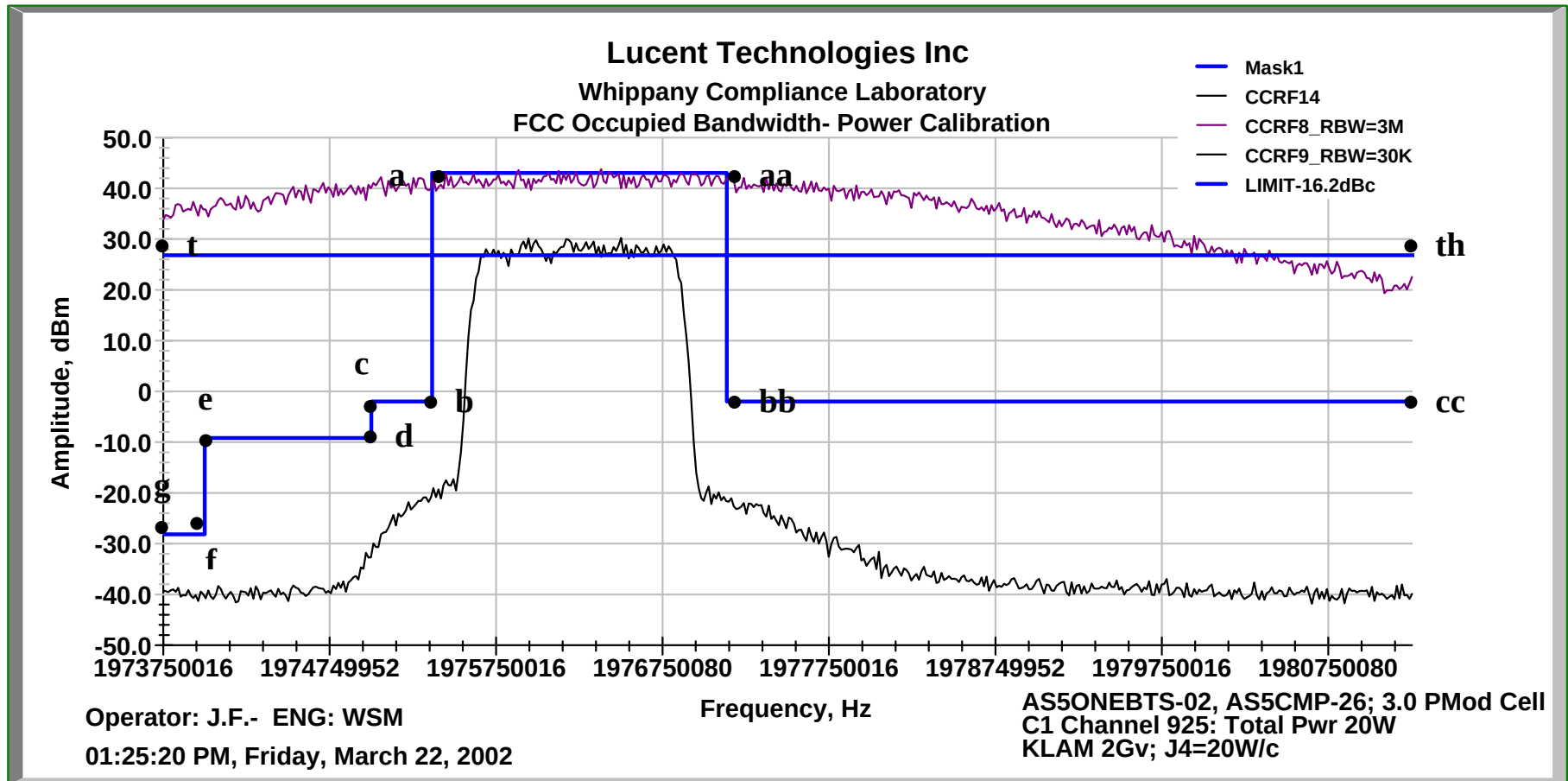


Exhibit 14 *Continued*

**Radio output
and
Transmitter Output
Occupied Bandwidth Data
for
Lucent Technologies Inc.
FLEXENT PCS CDMA Modular Cell
with
UMTS CDMA Radio UCR-1900 BNJ27C
To be filed under
FCC ID: AS5ONEBTS-14**

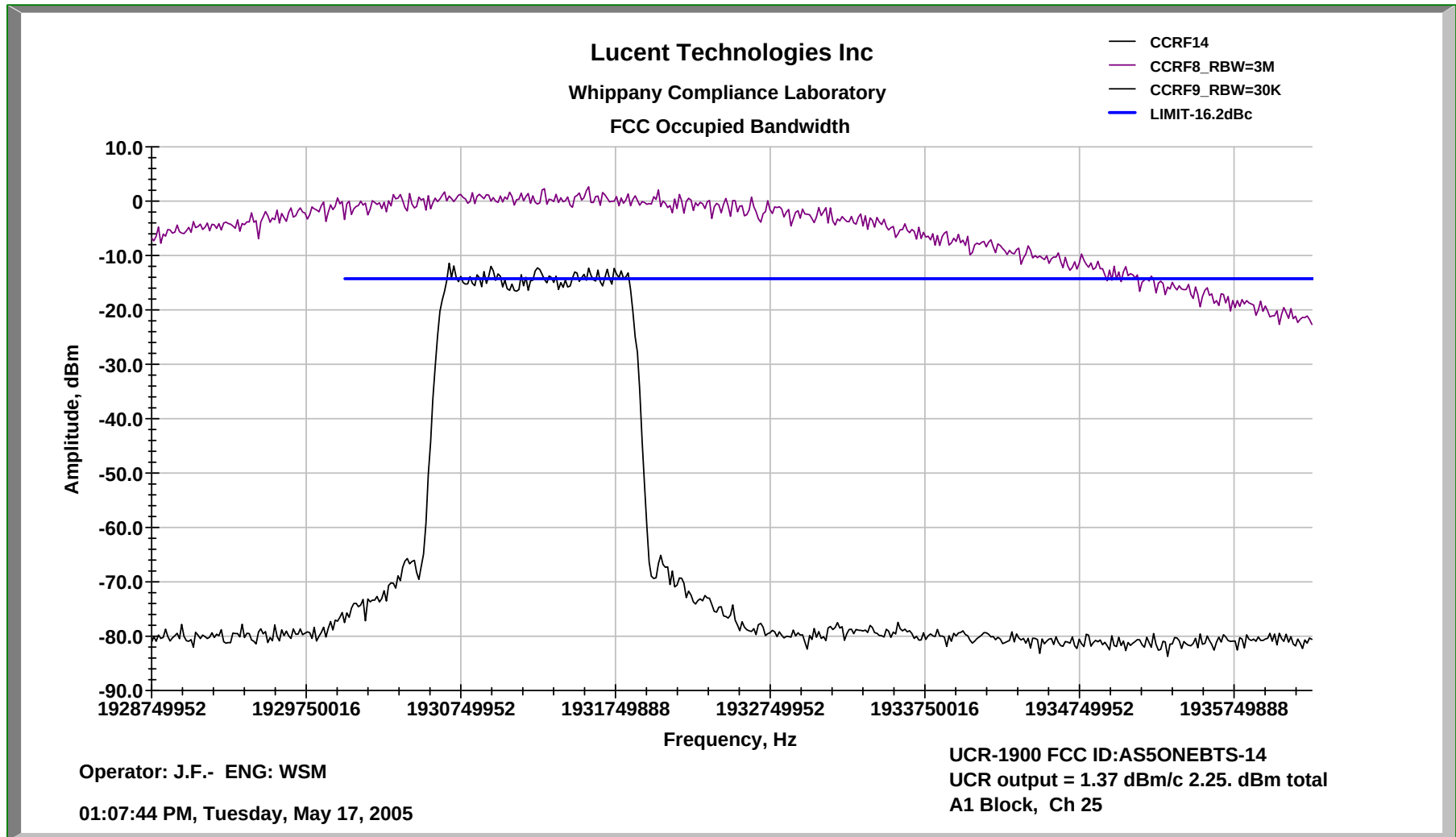
Occupied Bandwidth

1c

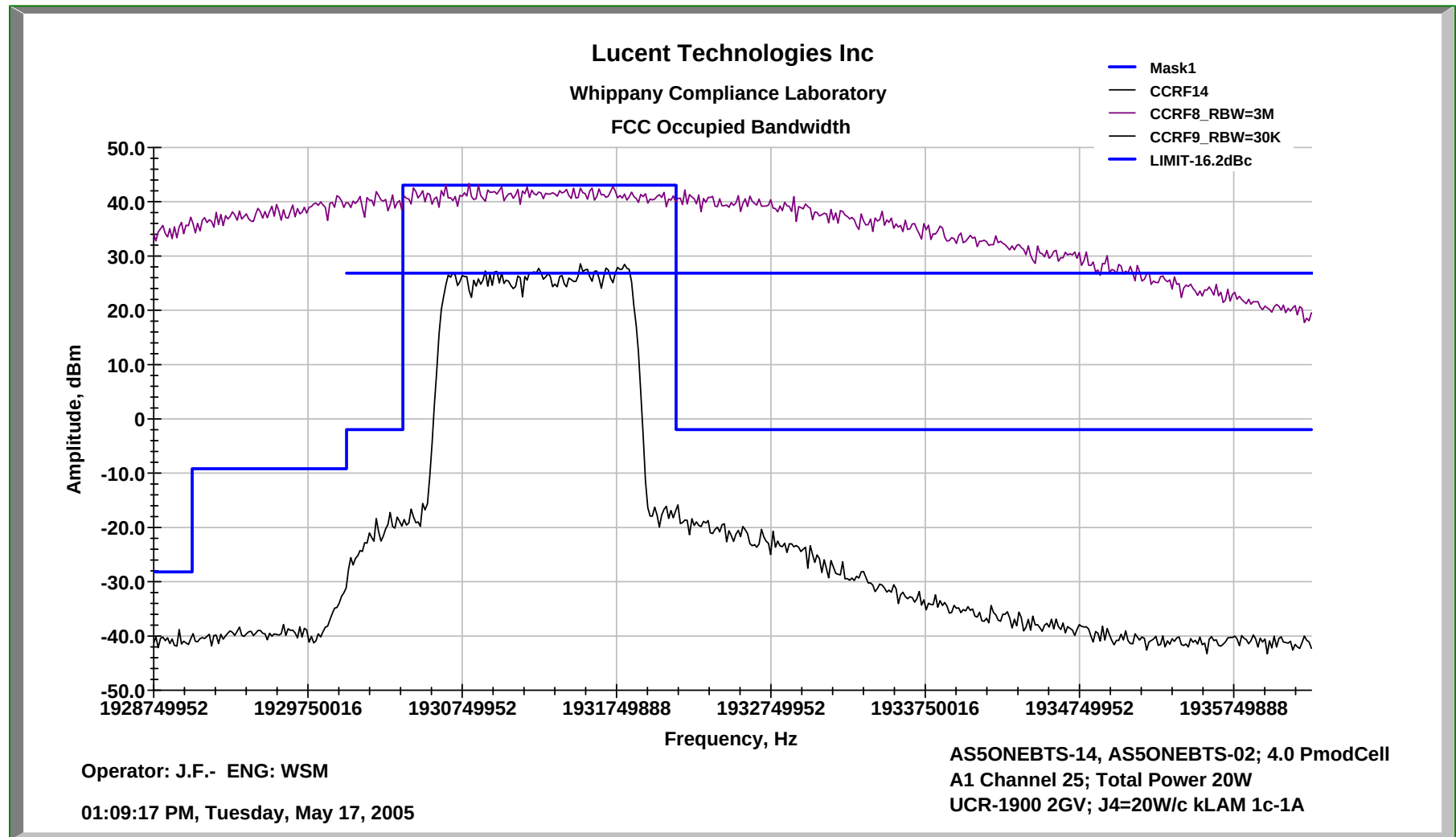
A Block, Left side

Channel 25

Radio Output



Occupied Bandwidth 1c A Block, Left side Channel 25 Transmitter Output



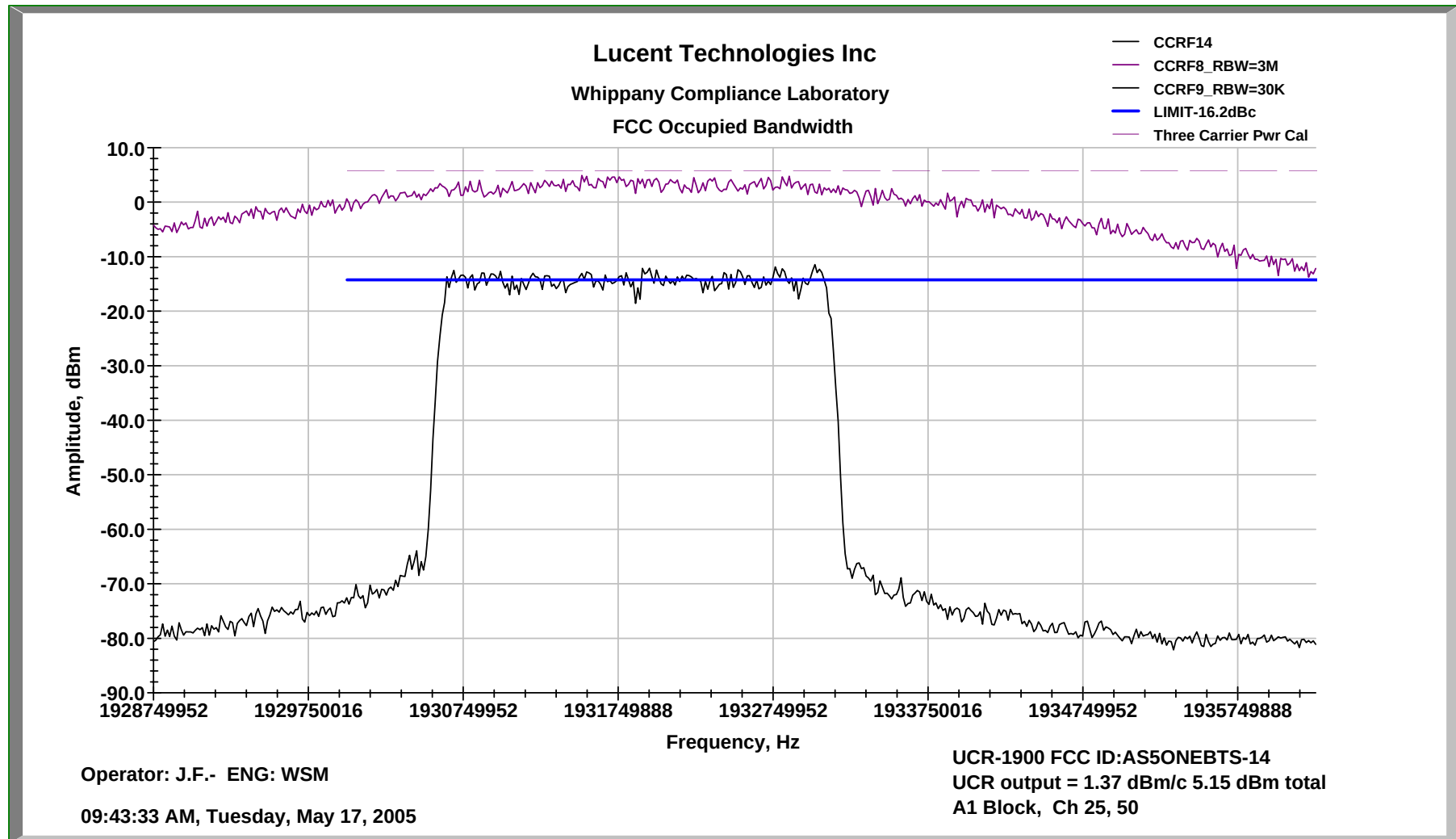
Occupied Bandwidth

2c

A Block, Left side

Channels 25, 50

Radio Output



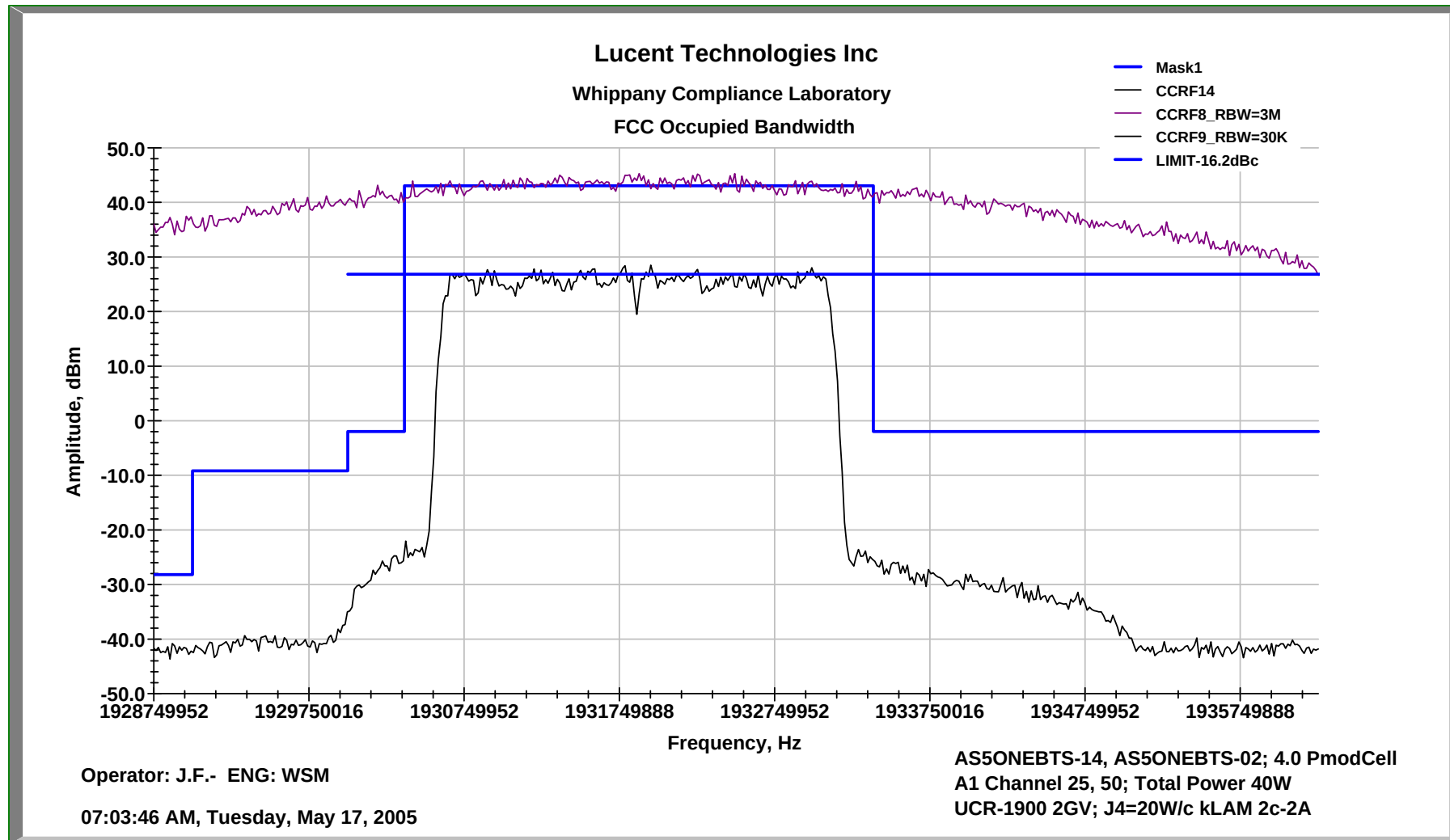
Occupied Bandwidth

2c

A Block, Left side

Channels 25, 50

Transmitter Output



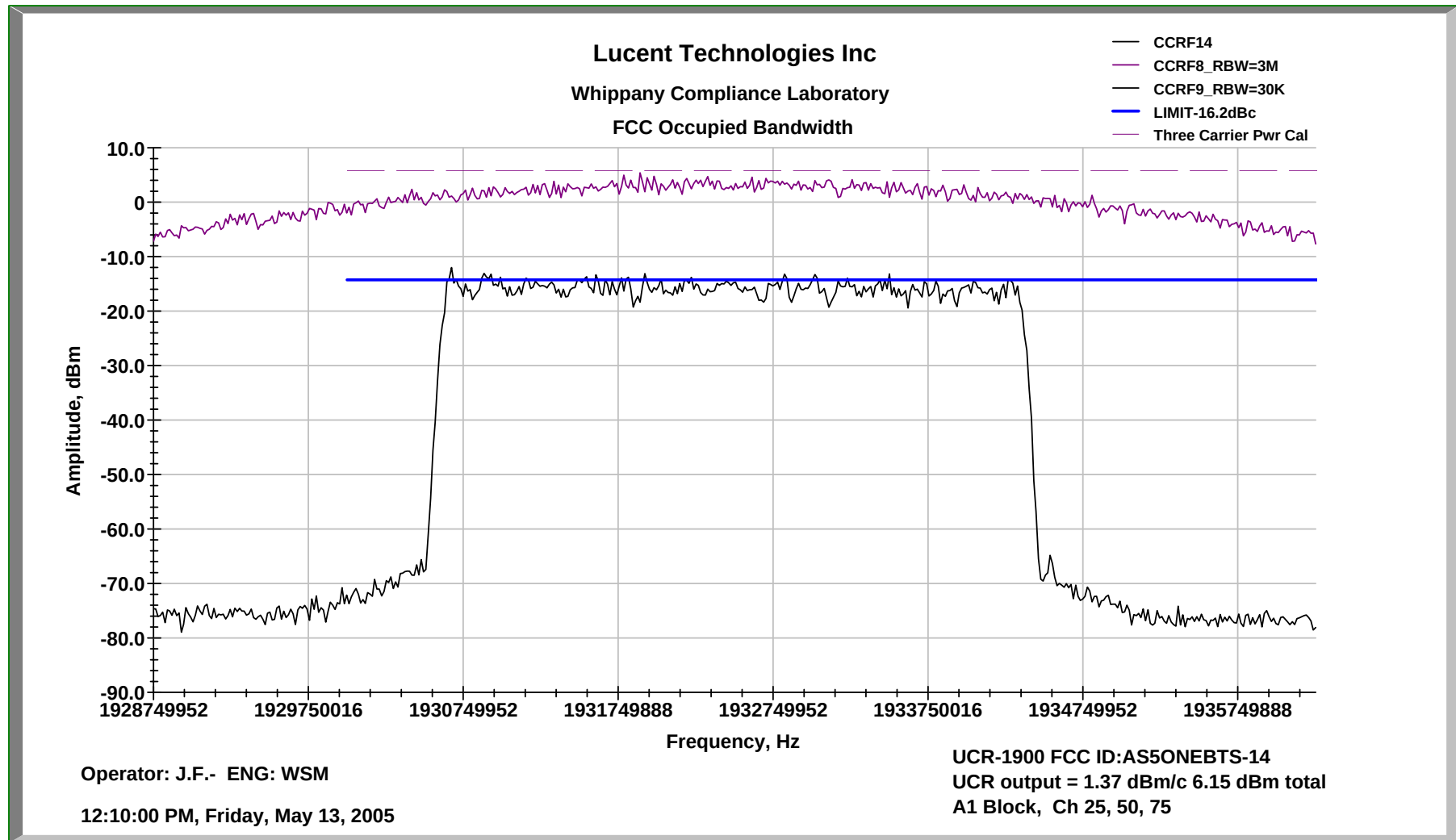
Occupied Bandwidth

3c

A Block, Left side

Channels 25, 50, 75

Radio Output



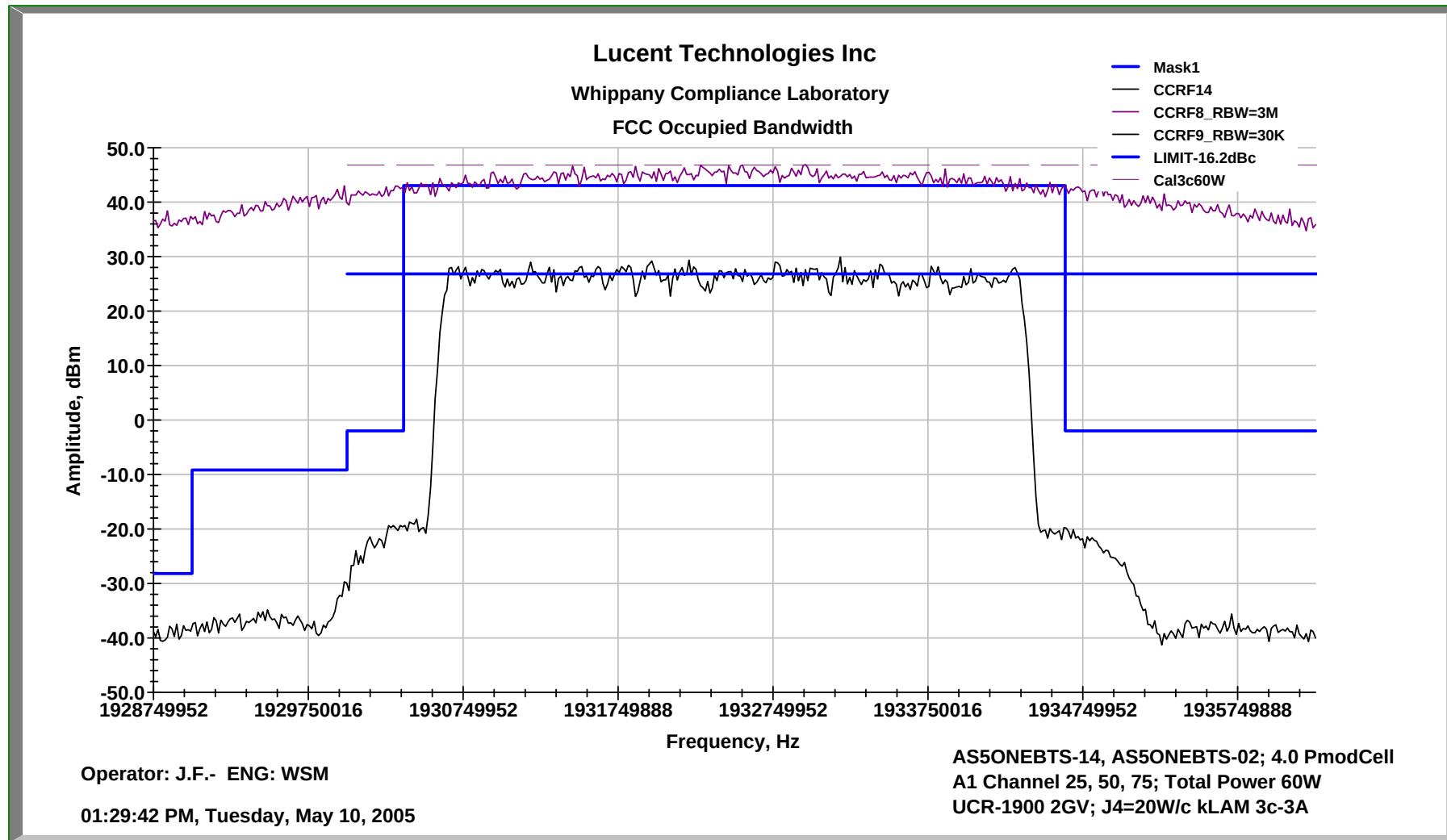
Occupied Bandwidth

3c

A Block, Right side

Channels 25, 50, 75

Transmitter Output



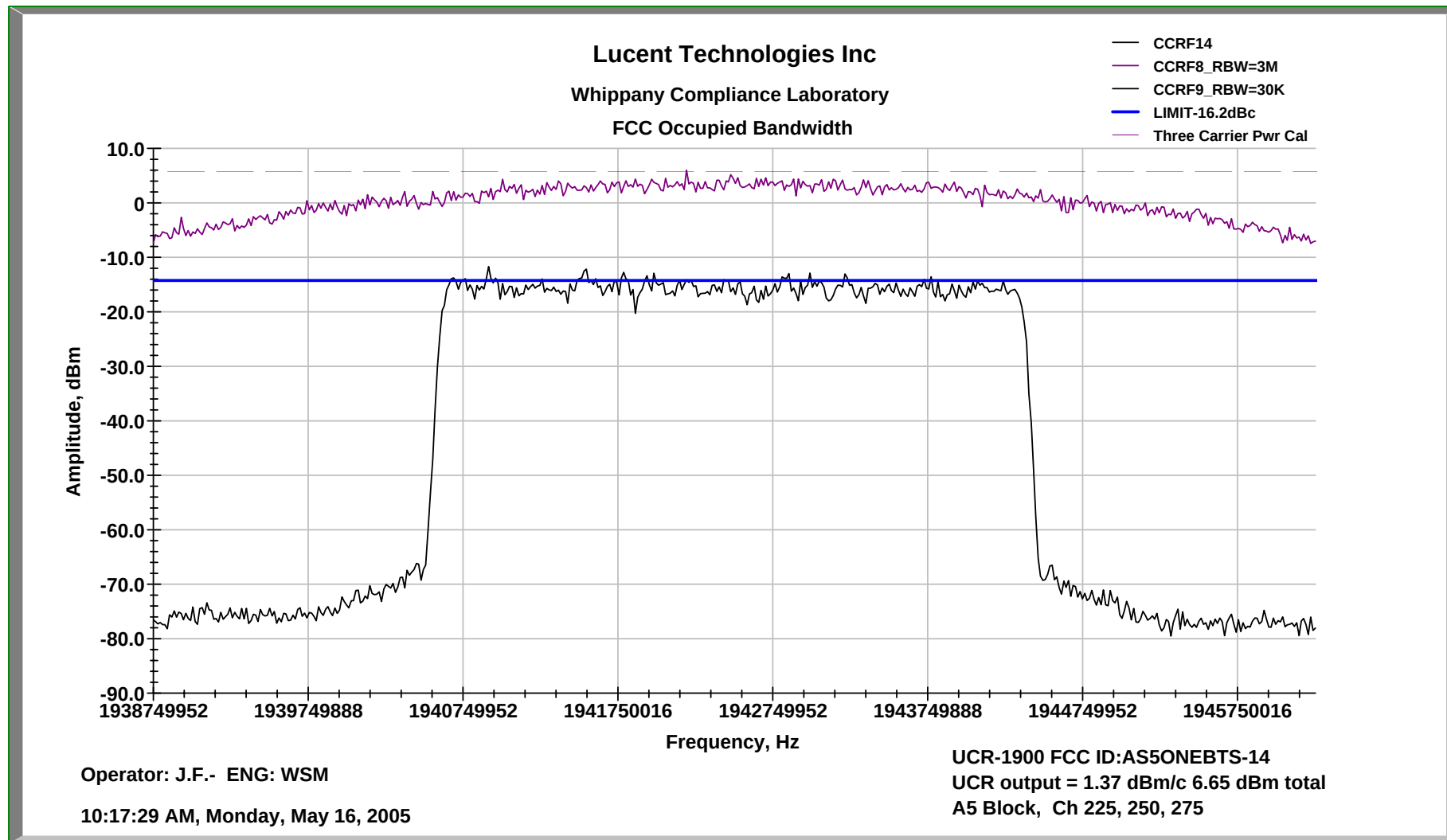
Occupied Bandwidth

3c

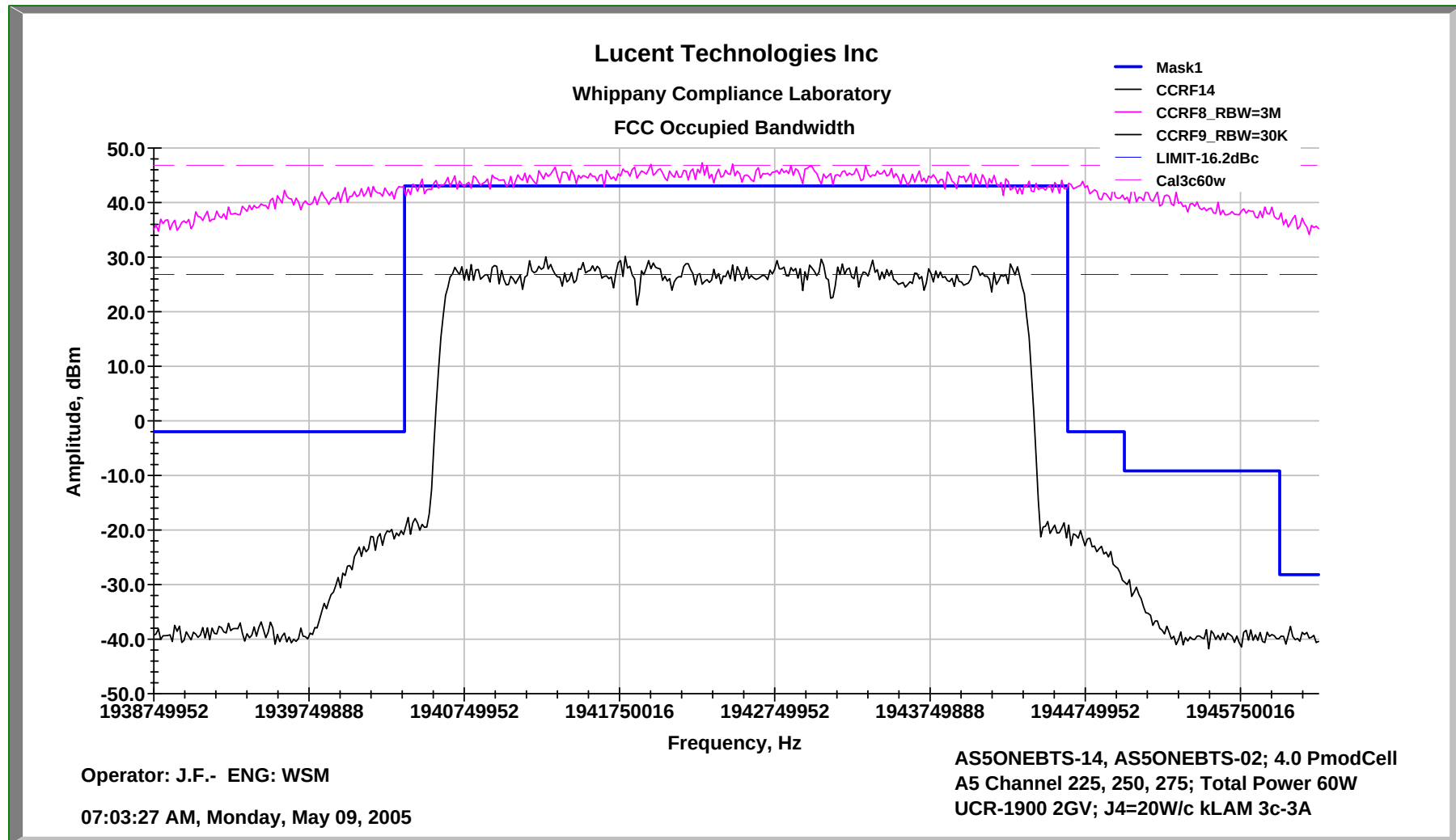
A Block, Right side

Channels 225, 250, 275

Radio Output



Occupied Bandwidth **3c** **A Block, Right side** **Channels** **225, 250, 275** **Transmitter Output**



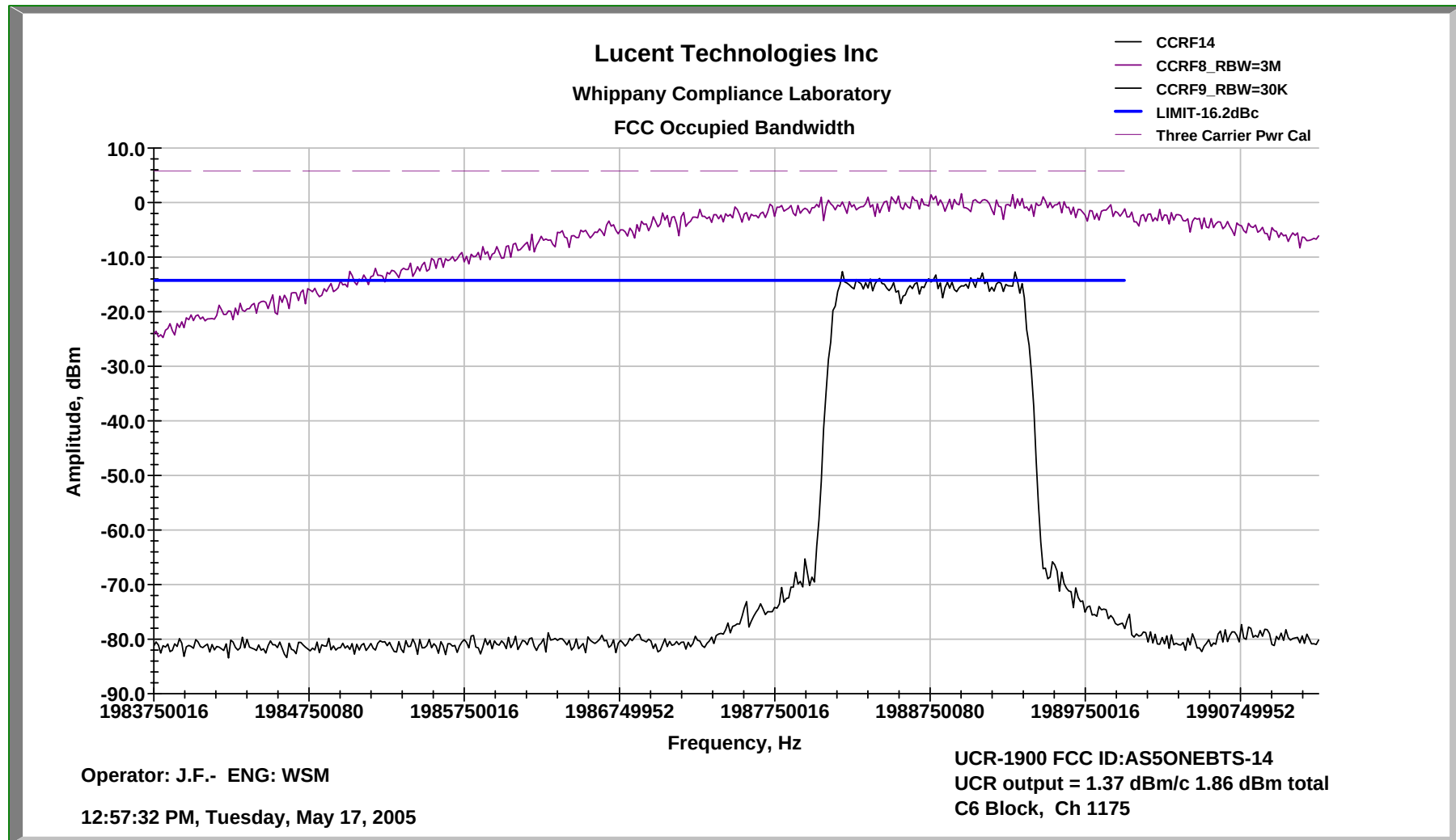
Occupied Bandwidth

1c

C Block, Right side

Channel 1175

Radio Output



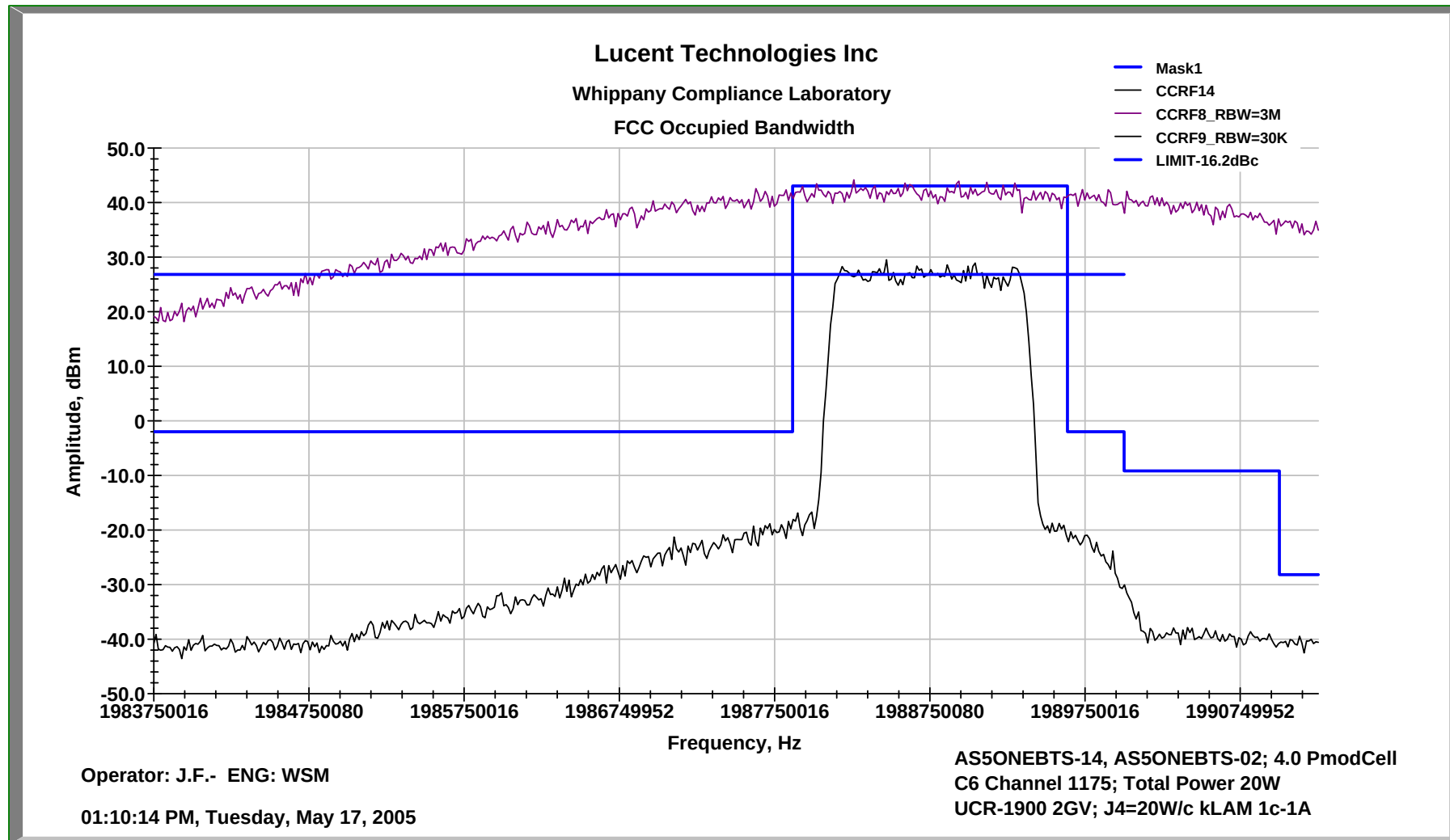
Occupied Bandwidth

1c

C Block, Right side

Channel 1175

Transmitter Output



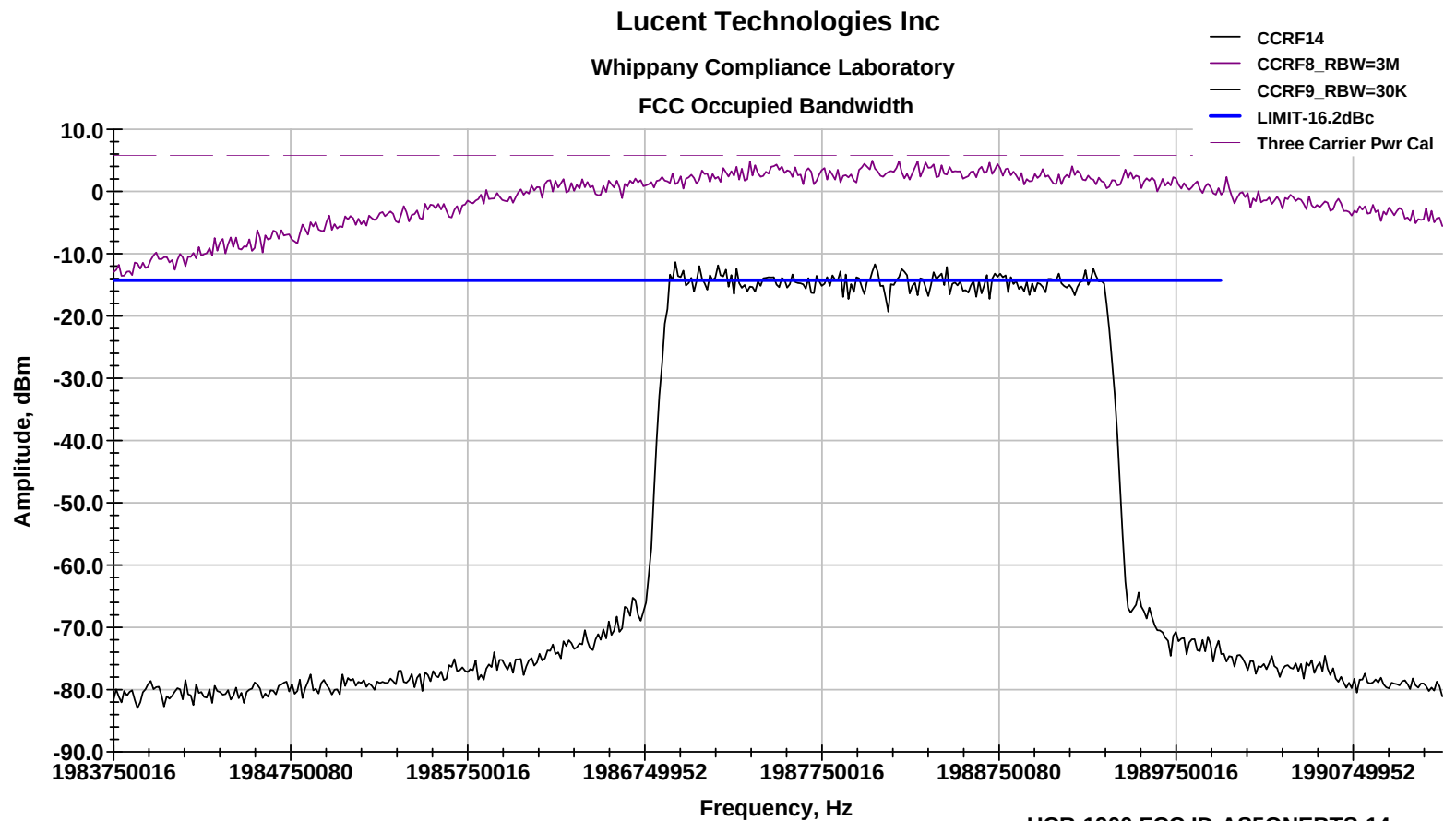
Occupied Bandwidth

2c

C Block, Right side

Channel 1150, 1175

Radio Output



Operator: J.F.- ENG: WSM

09:32:17 AM, Tuesday, May 17, 2005

UCR-1900 FCC ID:AS5ONEBTS-14
UCR output = 1.37 dBm/c 4.86 dBm total
C6 Block, Ch 1150, 1175

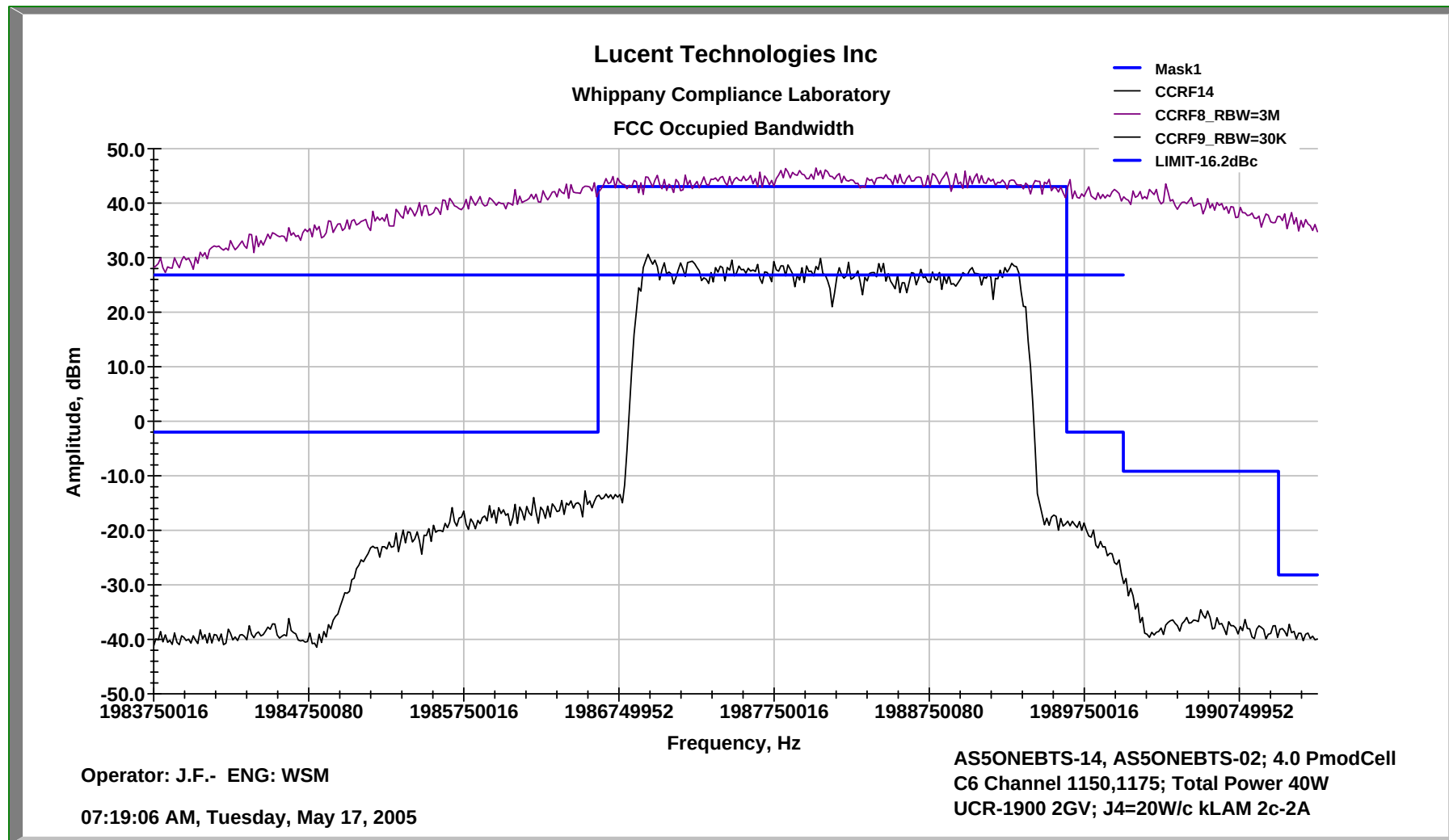
Occupied Bandwidth

2c

C Block, Right side

Channel 1150, 1175

Transmitter Output



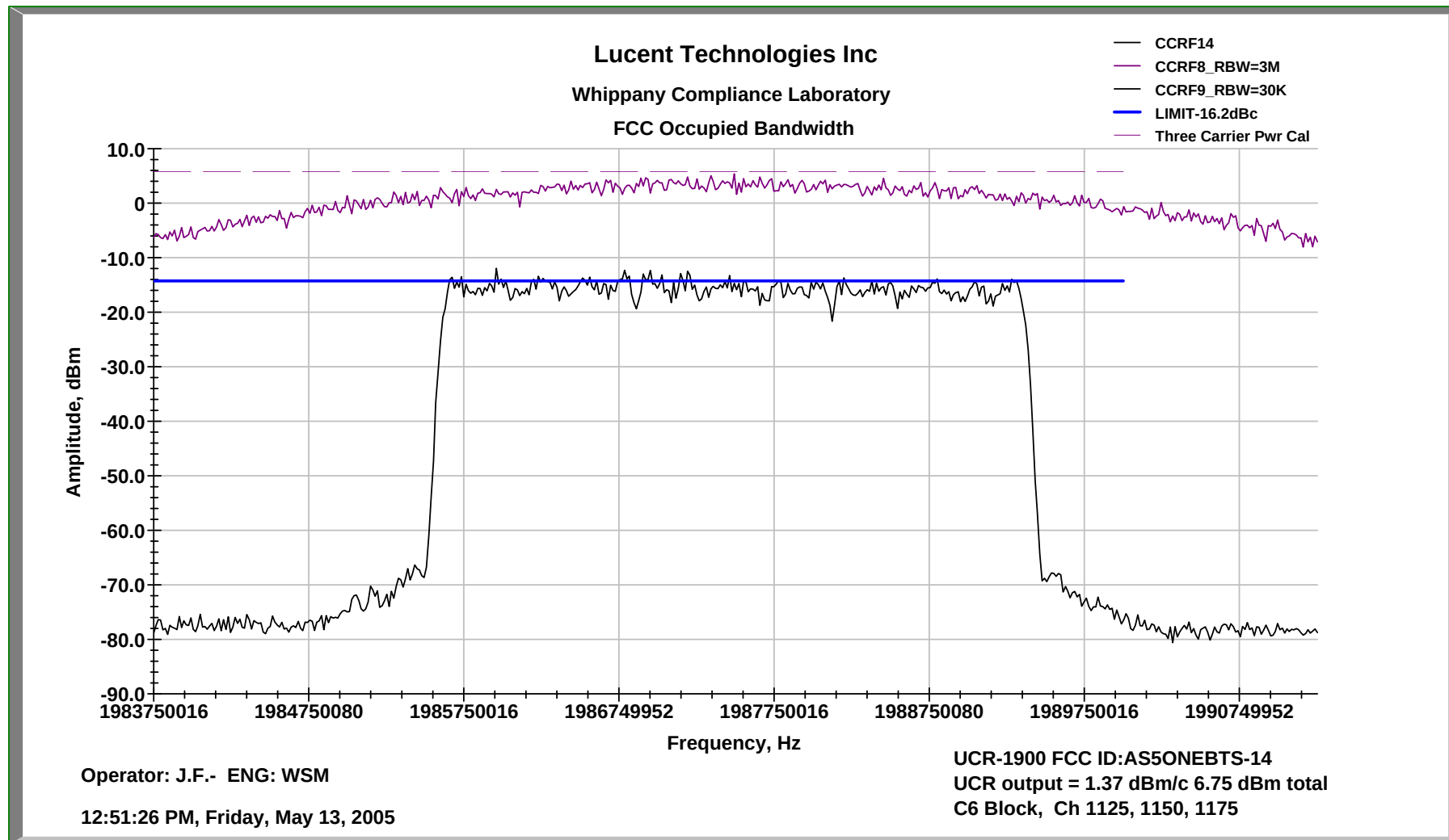
Occupied Bandwidth

3c

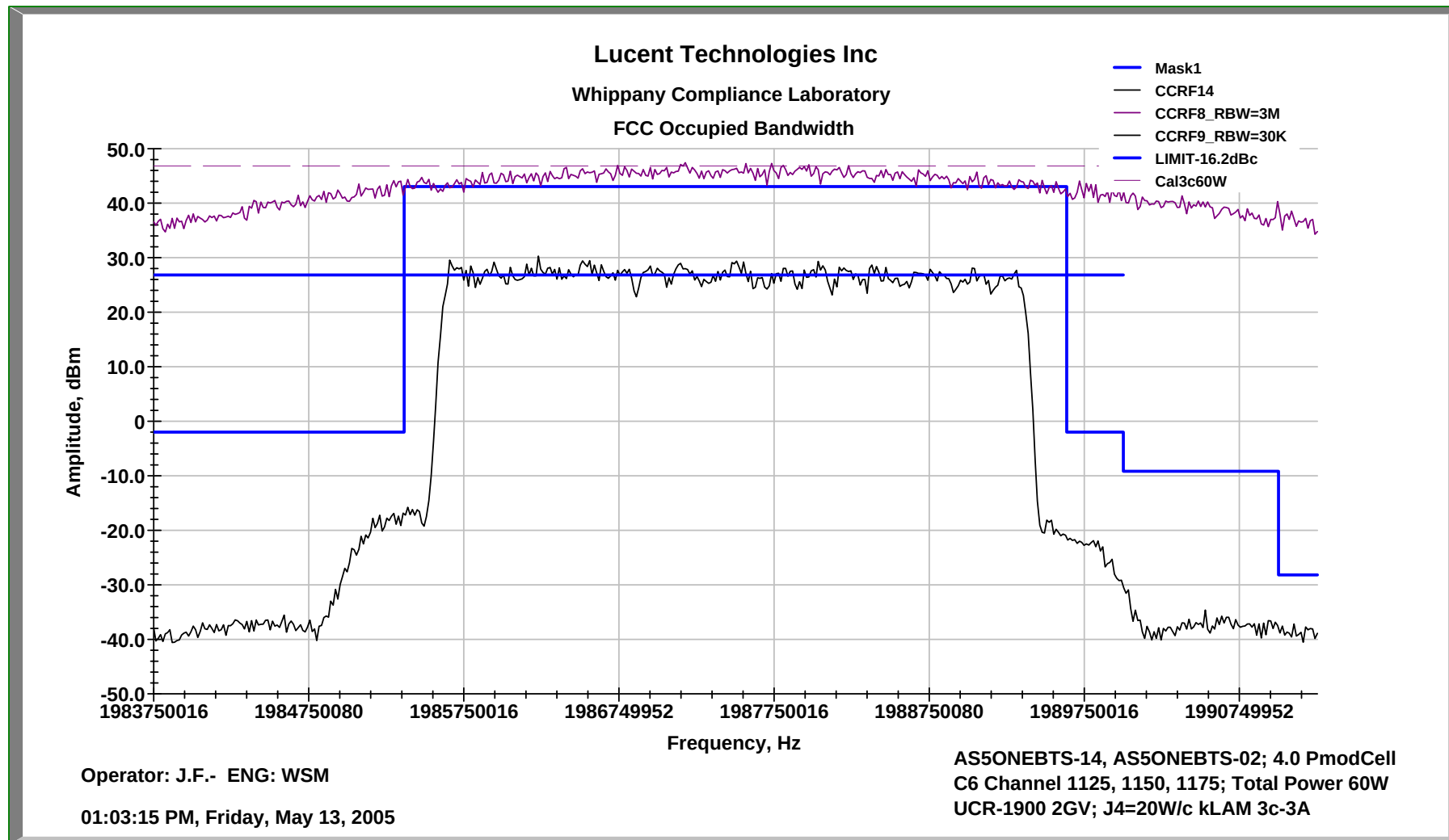
C Block, Right side

Channel 1125, 1150, 1175

Radio Output



Occupied Bandwidth 3c C Block, Right side Channel 1125, 1150, 1175 Transmitter Output



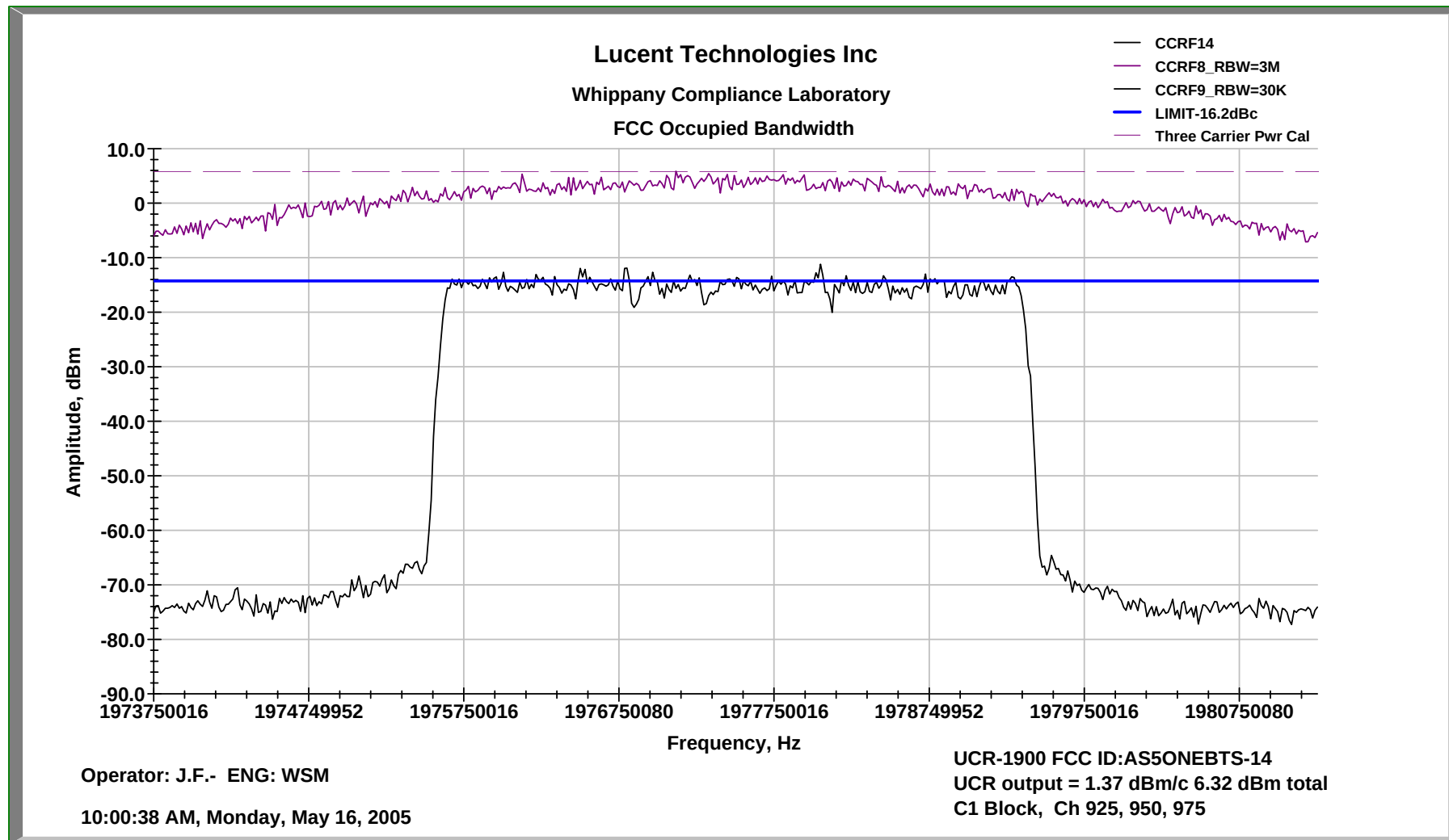
Occupied Bandwidth

3c

C Block, Left side

Channel 925, 950, 975

Radio Output

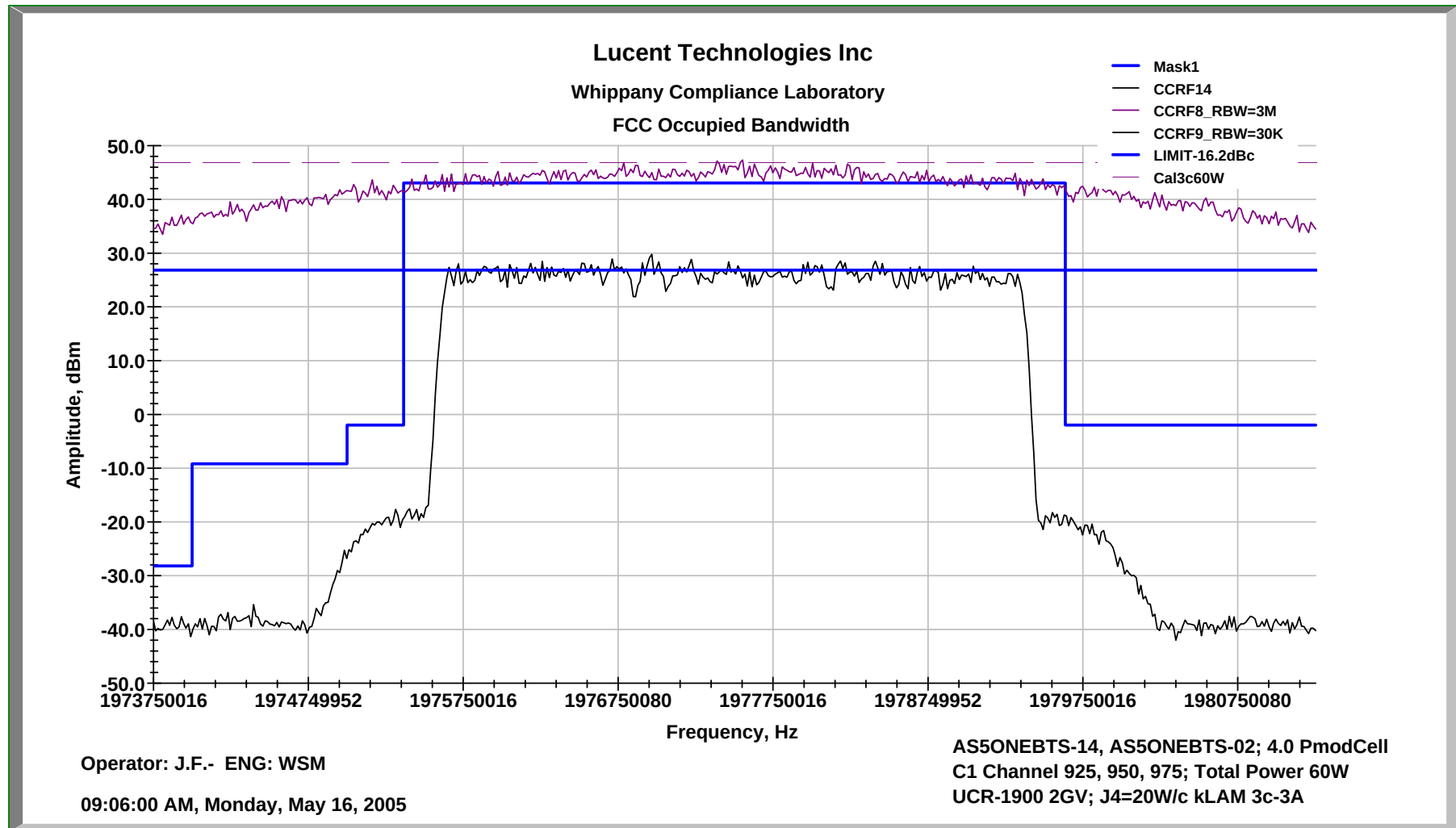


Occupied Bandwidth 3c

C Block, Left side

Channel 925, 950, 975

Transmitter Output



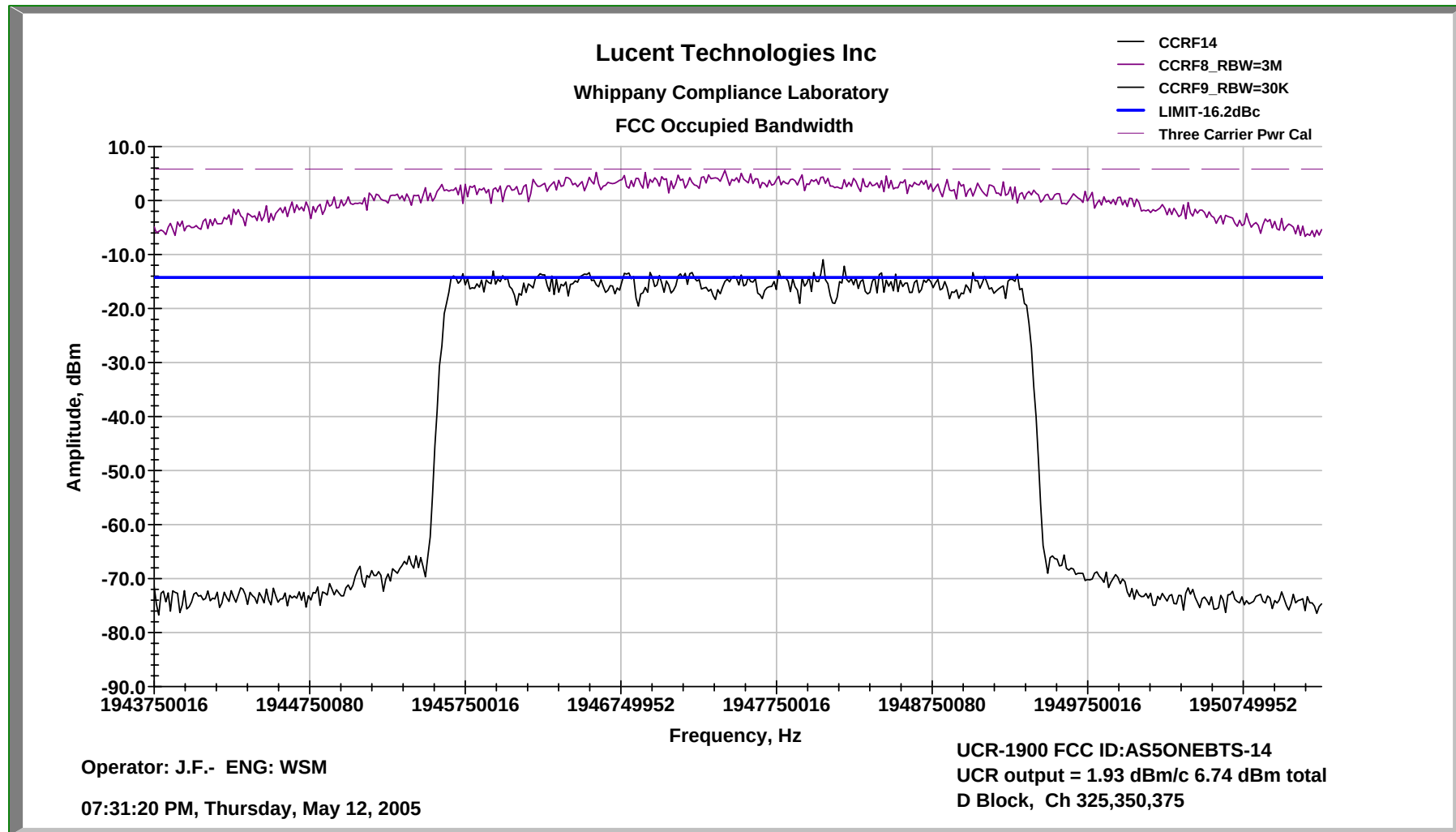
Occupied Bandwidth

3c

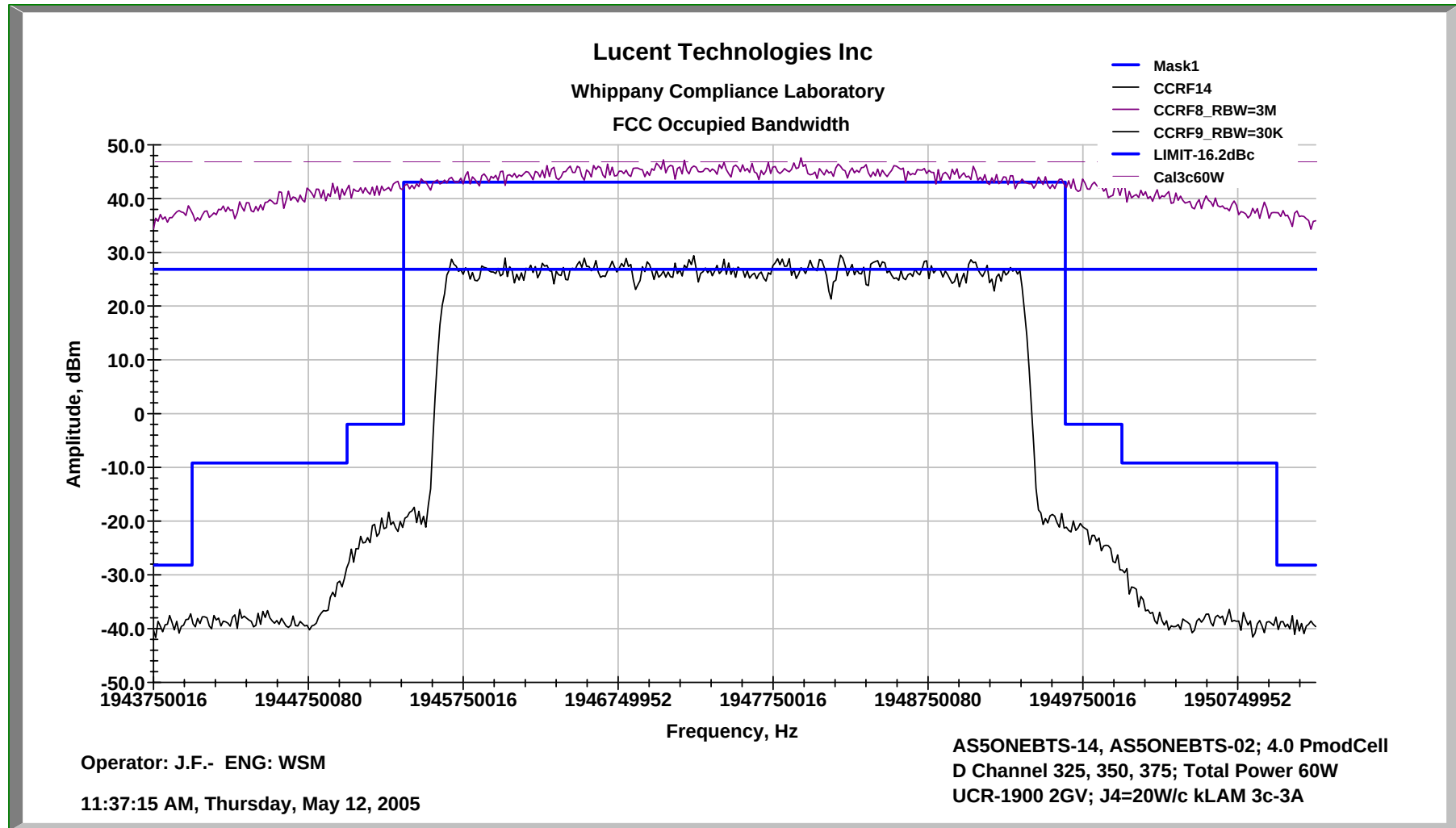
D Block, Both sides

Channel 325, 350, 375

Radio Output



Occupied Bandwidth 3c D Block, Both sides Channel 325, 350, 375 Transmitter Output



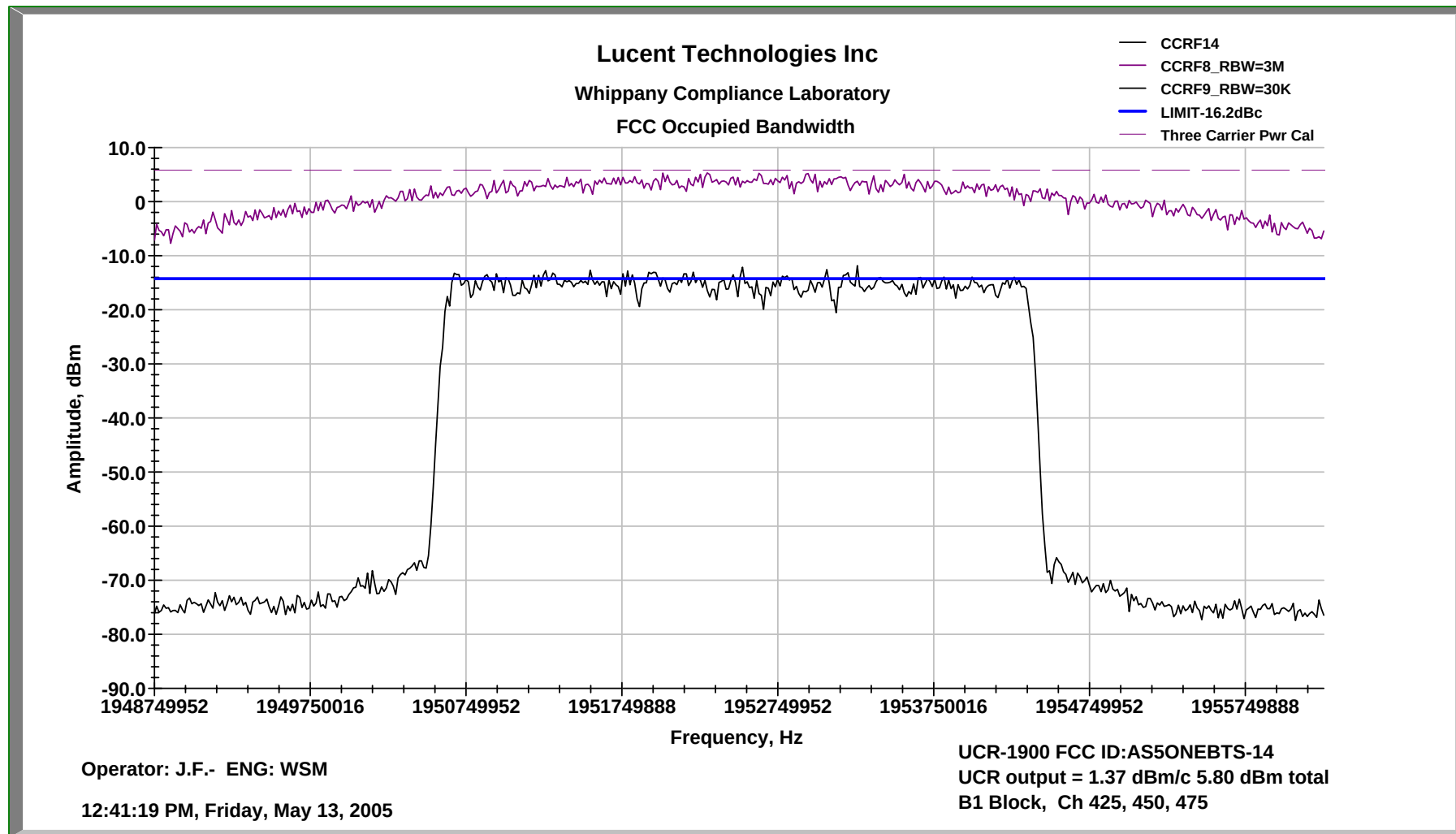
Occupied Bandwidth

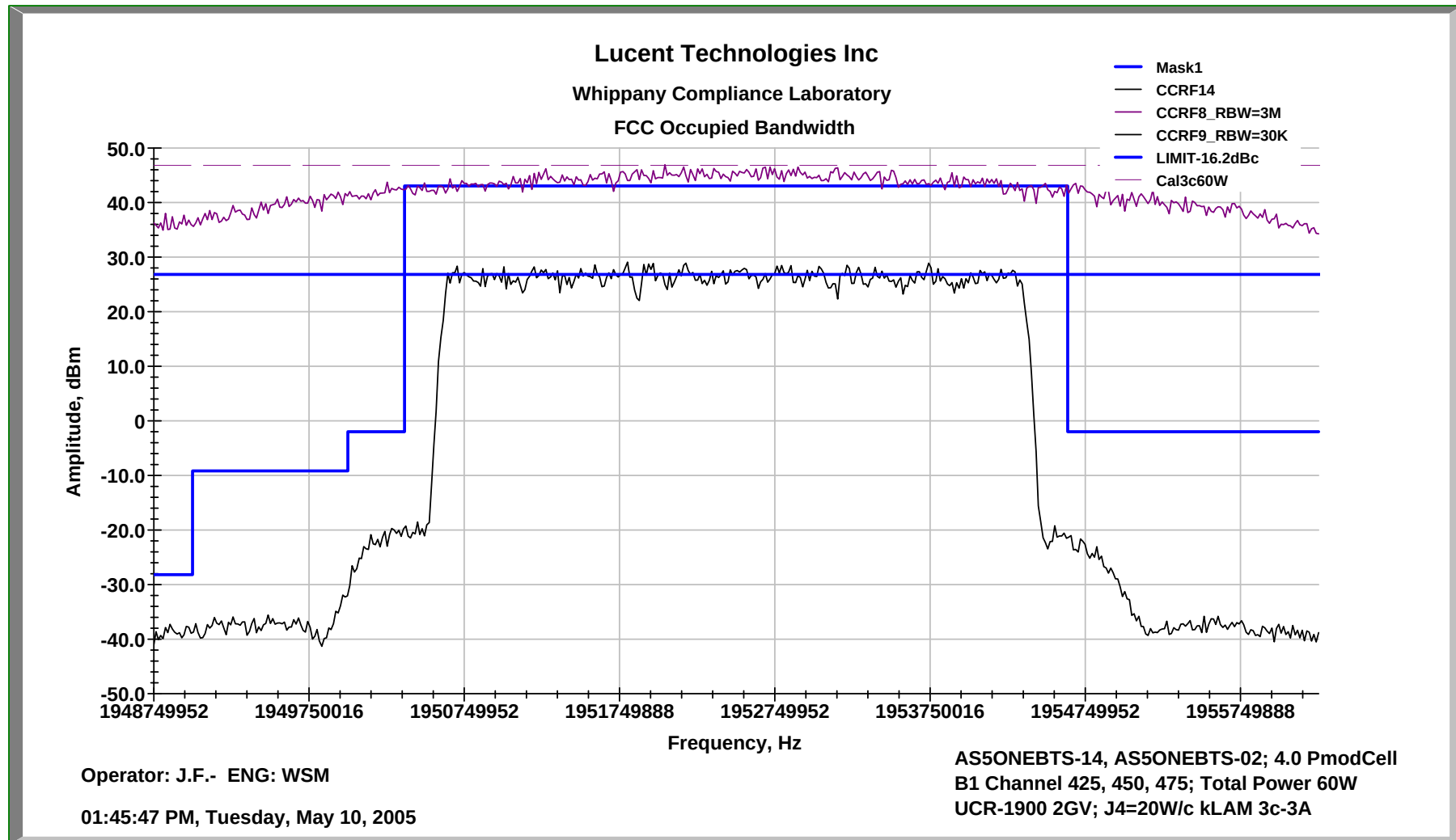
3c

B Block, Left side

Channel 425, 450, 475

Radio Output



Occupied Bandwidth**3c****B Block, Left side****Channel 425, 450, 475****Transmitter Output**

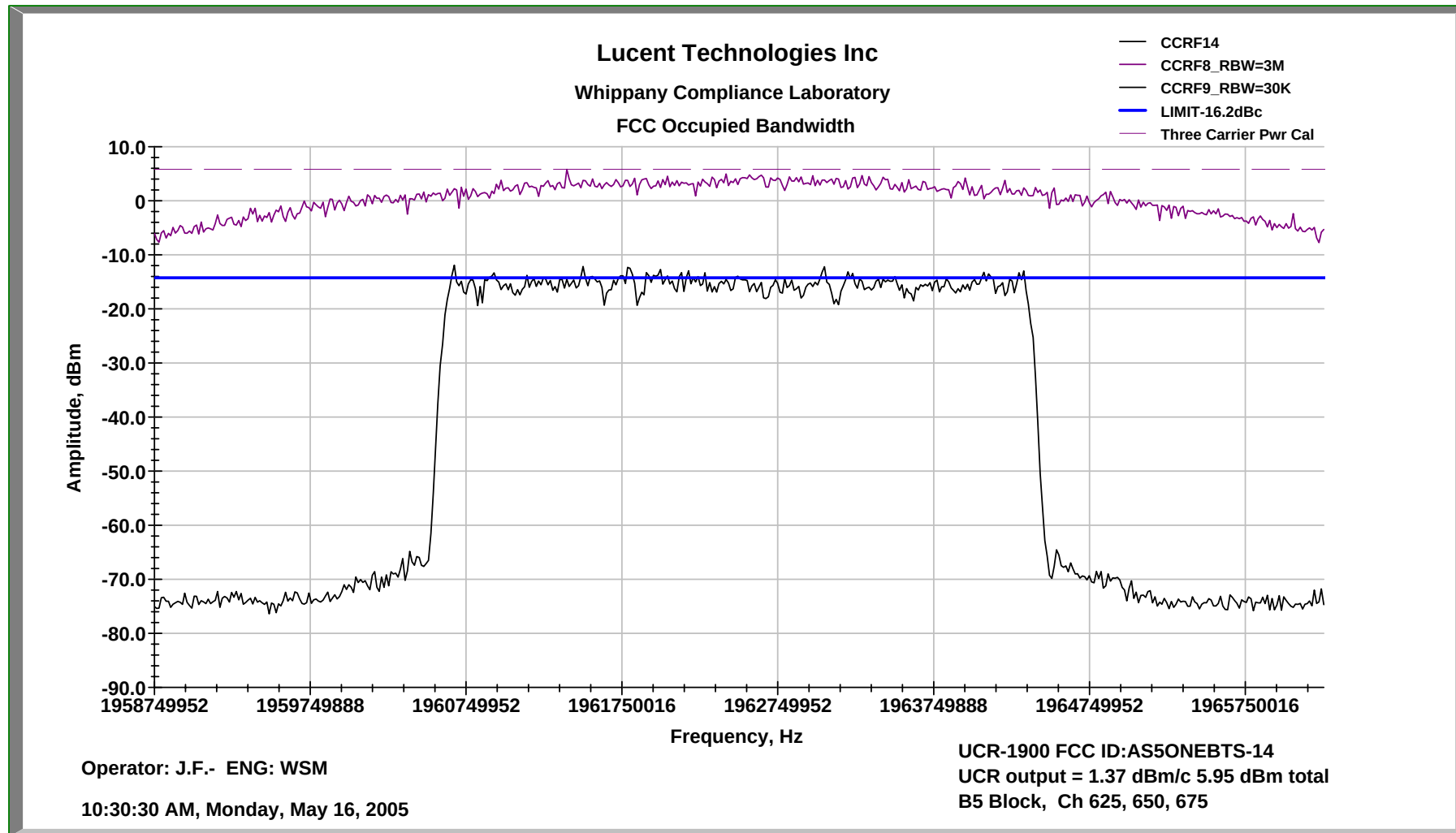
Occupied Bandwidth

3c

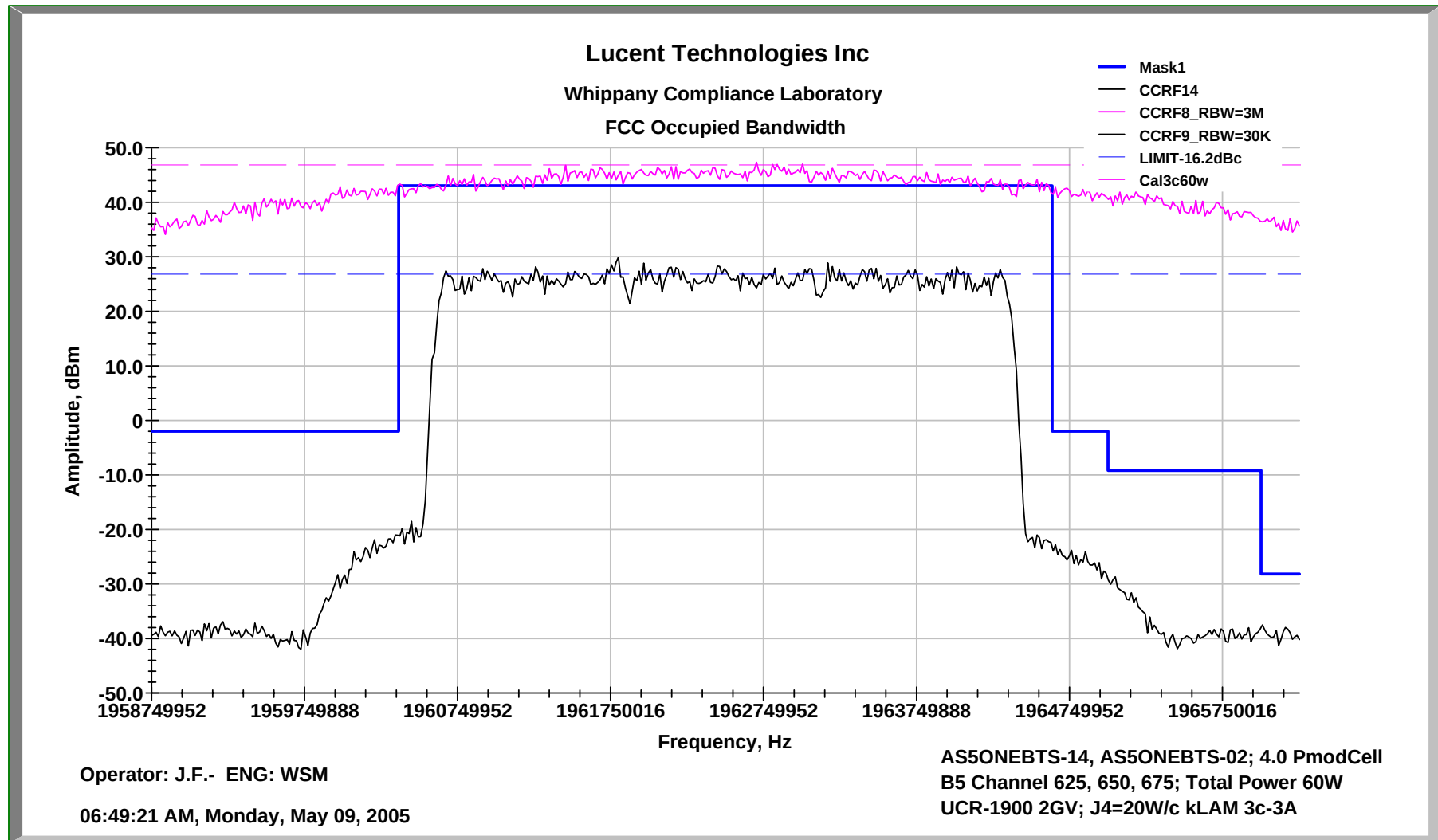
B Block, Right side

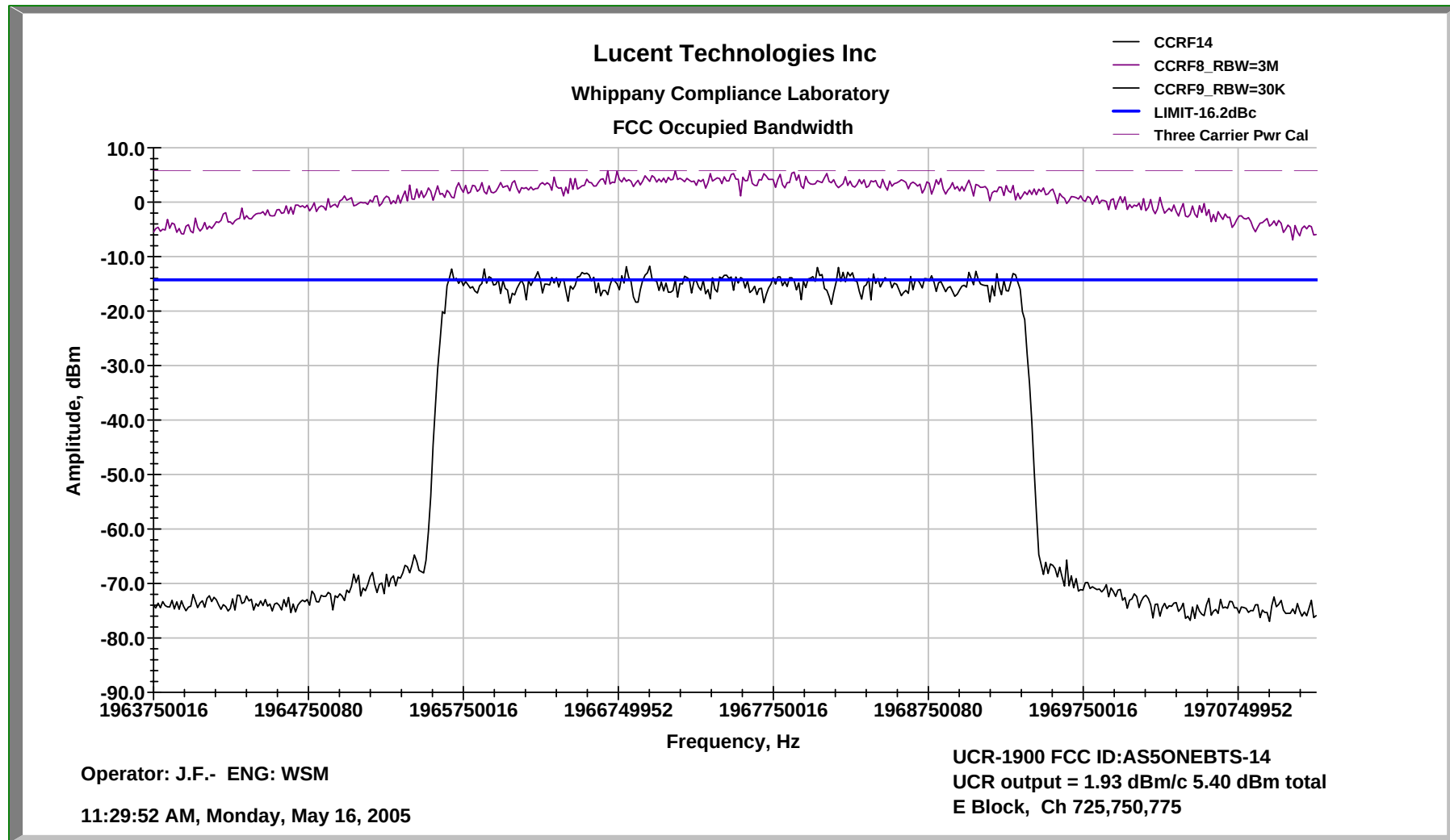
Channel 625, 650, 675

Radio Output

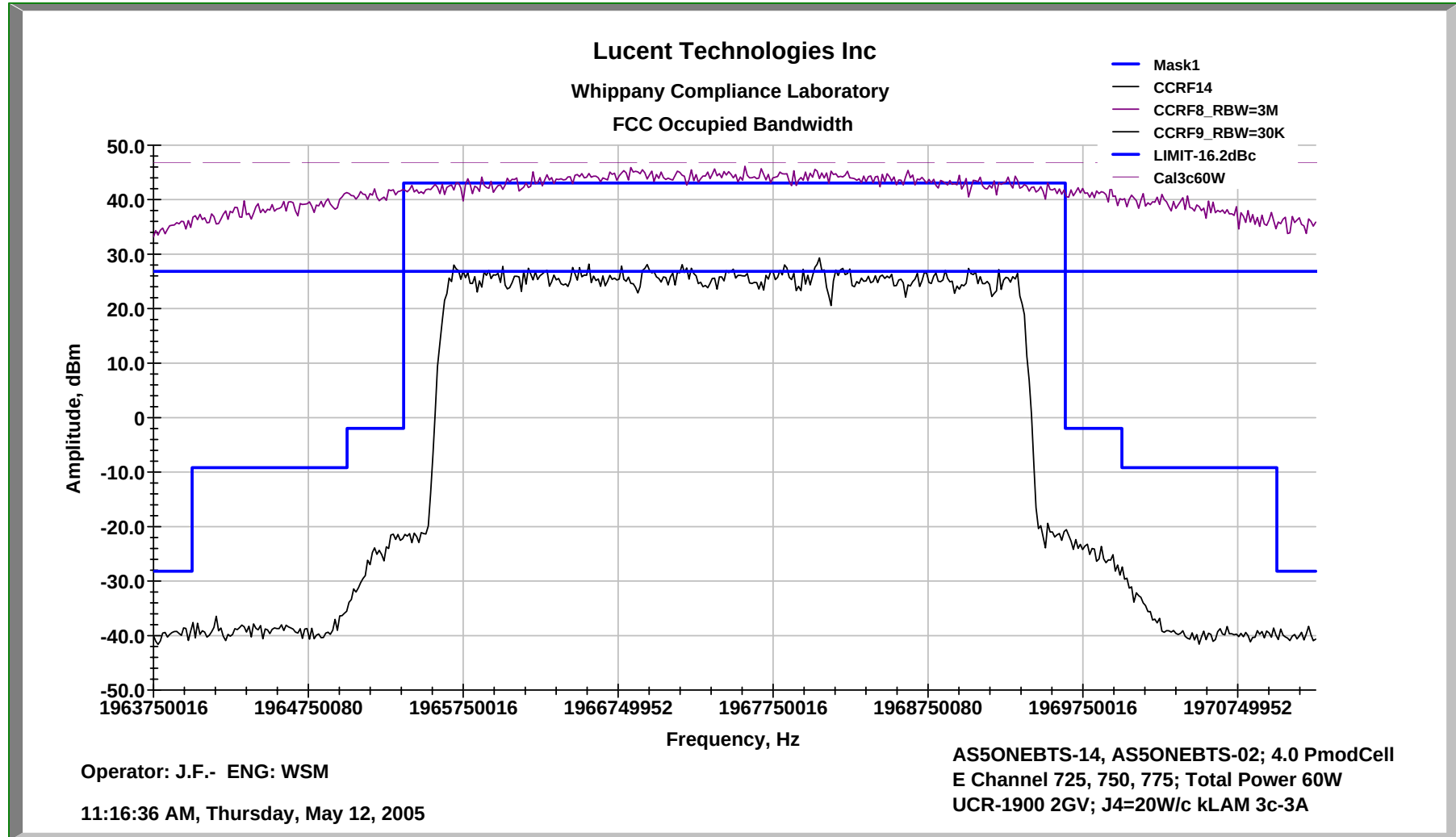


Occupied Bandwidth 3c B Block, Right side Channel 625, 650, 675 Transmitter Output



Occupied Bandwidth**3c****E Block, Both sides****Channel 725, 750, 775****Radio Output**

Occupied Bandwidth 3c E Block, Both sides Channel 725, 750, 775 Transmitter Output



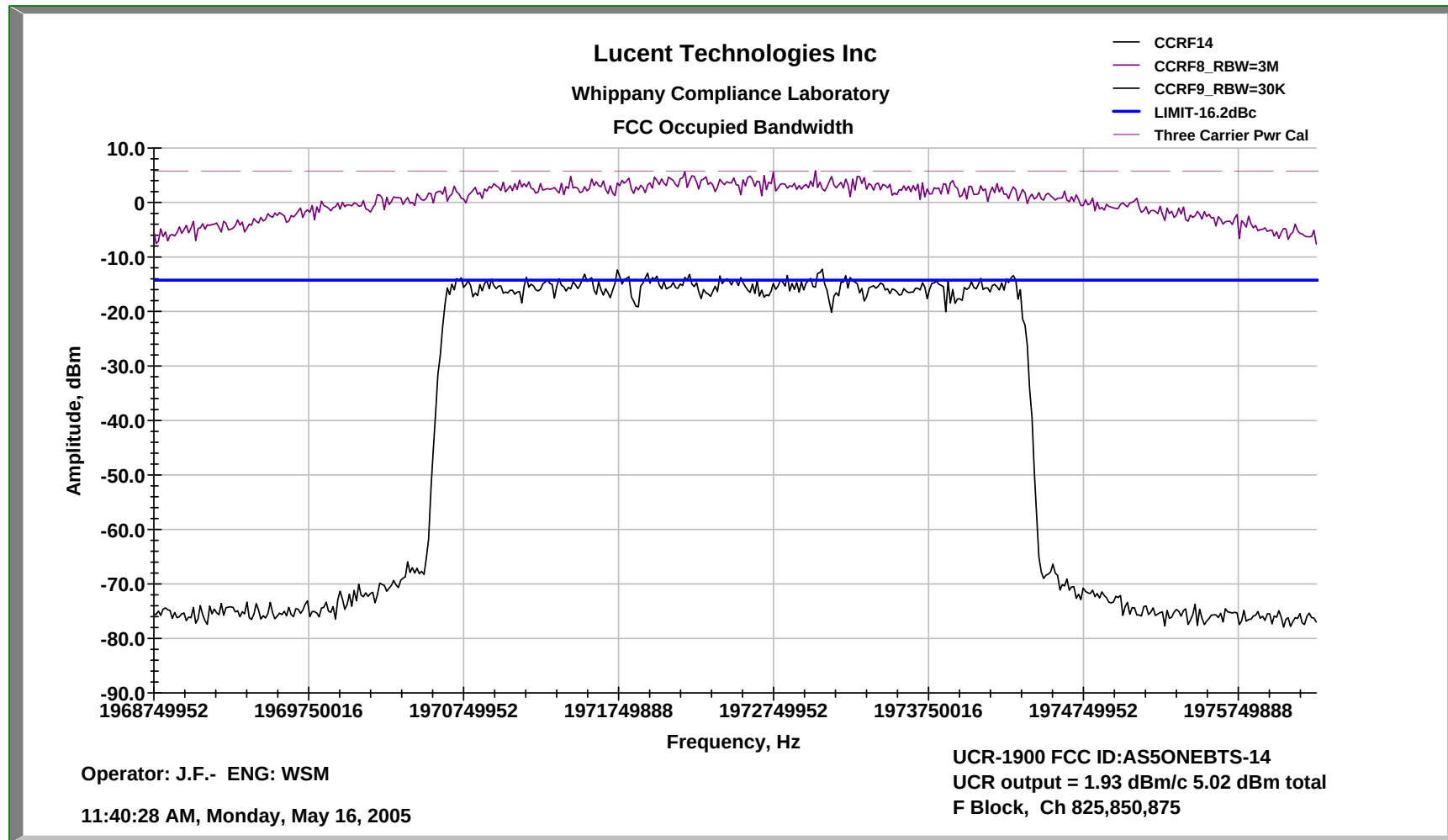
Occupied Bandwidth

3c

F Block, Both sides

Channel 825, 850, 875

Radio Output



Occupied Bandwidth

3c

F Block, Both sides

Channel 825, 850, 875

Transmitter Output

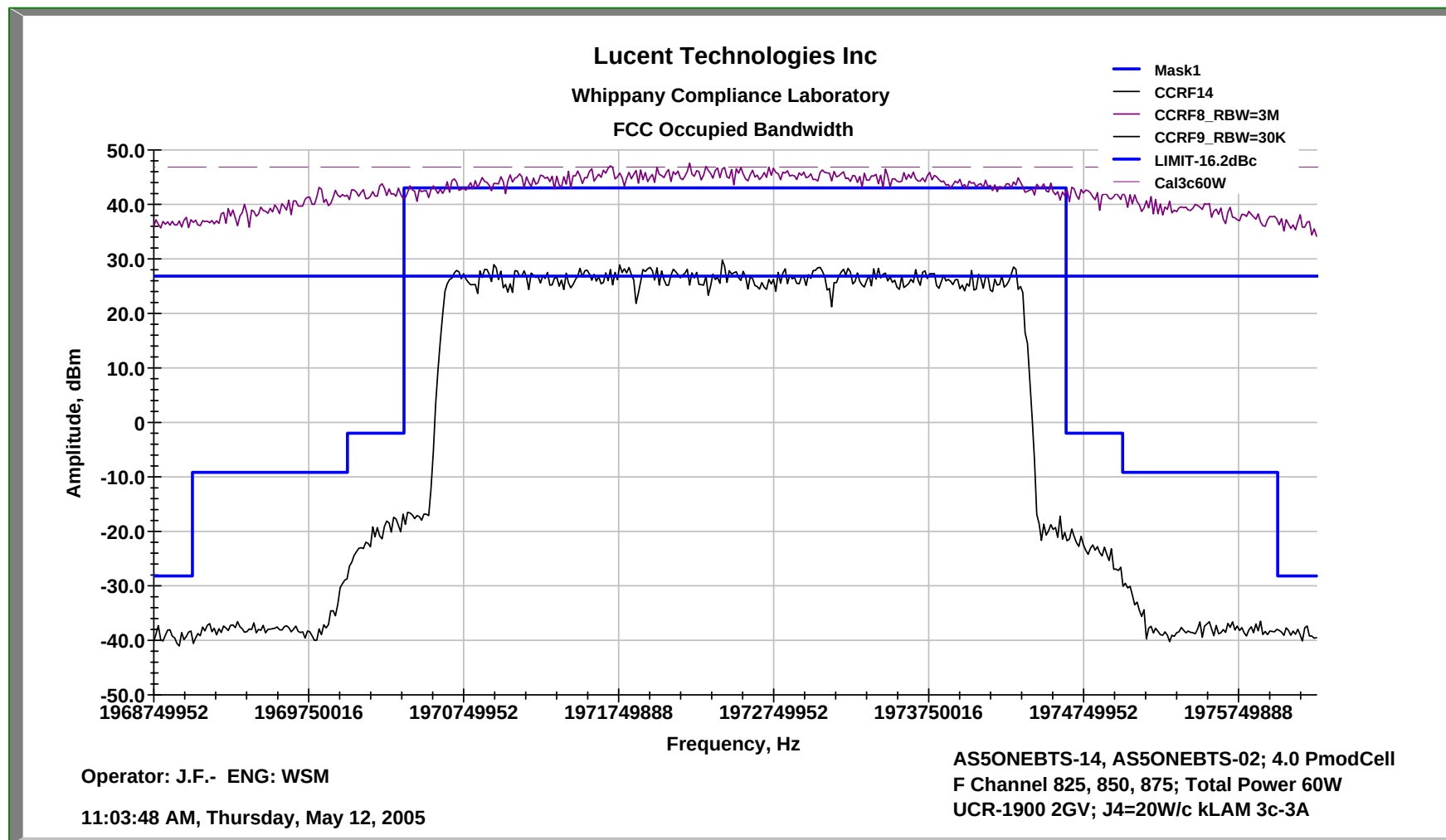


Exhibit 15:**Section 2.1051****Spurious Emissions at Antenna Terminals**

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 2×10^5 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	0.149	-8.3	Walsh 0
Sync	1	0.015/p	-18.3	Walsh 32, always 1/8 rate
Paging	1	0.054	-12.7	Walsh1, 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:

The **UCR-1900** was integrated with a typical Lucent Technologies external power amplifier, **kLAM FCC ID AS5ONEBTS-02** in a PCS Modular Cell 4.0 MacroCell indoor Frame. Conducted Spurious Emissions measurements were performed while transmitting at the upper and lower channels in each PCS Block as required by FCC rules. Measurements were performed for the single, dual and three carrier transmit configurations and for the worst case three carrier configurations at each PCS block edge. Data was recorded at the radio output and at the transmitter antenna connection terminal and the results of the performed measurements are reported in Table 15.2. The attached data plots document the results for the three carrier test configurations for PCS Blocks A and C. Table 15.2 lists the other PCS blocks that were tested and for which data was recorded. The plots show that there are no harmonics or spurious emissions above the applicable limit of -13 dBm. 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: *continued*

PCS - Block	PCS -Channels	Number of carriers	Amplifier Type	# of amplifiers in MCA	Test Results Conducted Spurious at Radio Output Connection	Test Results Conducted Spurious at Antenna Connection
A	25	1	kLAM	1	Compliant	Compliant
A	25, 50	2	kLAM	2	Compliant	Compliant
A	25, 50, 75	3	kLAM	3	Compliant	Compliant
D	325, 350, 375	3	kLAM	3	Compliant	Compliant
B	425, 450, 475	3	kLAM	3	Compliant	Compliant
B	625, 650, 675	3	kLAM	3	Compliant	Compliant
E	725,750,775	3	kLAM	3	Compliant	Compliant
F	825, 850, 875	3	kLAM	3	Compliant	Compliant
C	925, 950, 975	3	kLAM	3	Compliant	Compliant
C	1175	1	kLAM	1	Compliant	Compliant
C	1150, 1175	2	kLAM	2	Compliant	Compliant
C	1125, 1150, 1175	3	kLAM	3	Compliant	Compliant

(1) The Single Amplifier configuration supports 1 and 2 carrier transmit configurations. The three amplifier kLAM-MCA and dual amplifier P2PAM-MCA supports 1, 2 and 3 carrier transmit configurations.

TABLE 15.2 PCS Conducted Spurious Compliance Tabulation

Exhibit 15

Figure 15A Conducted Spurious Measurement Test Configuration

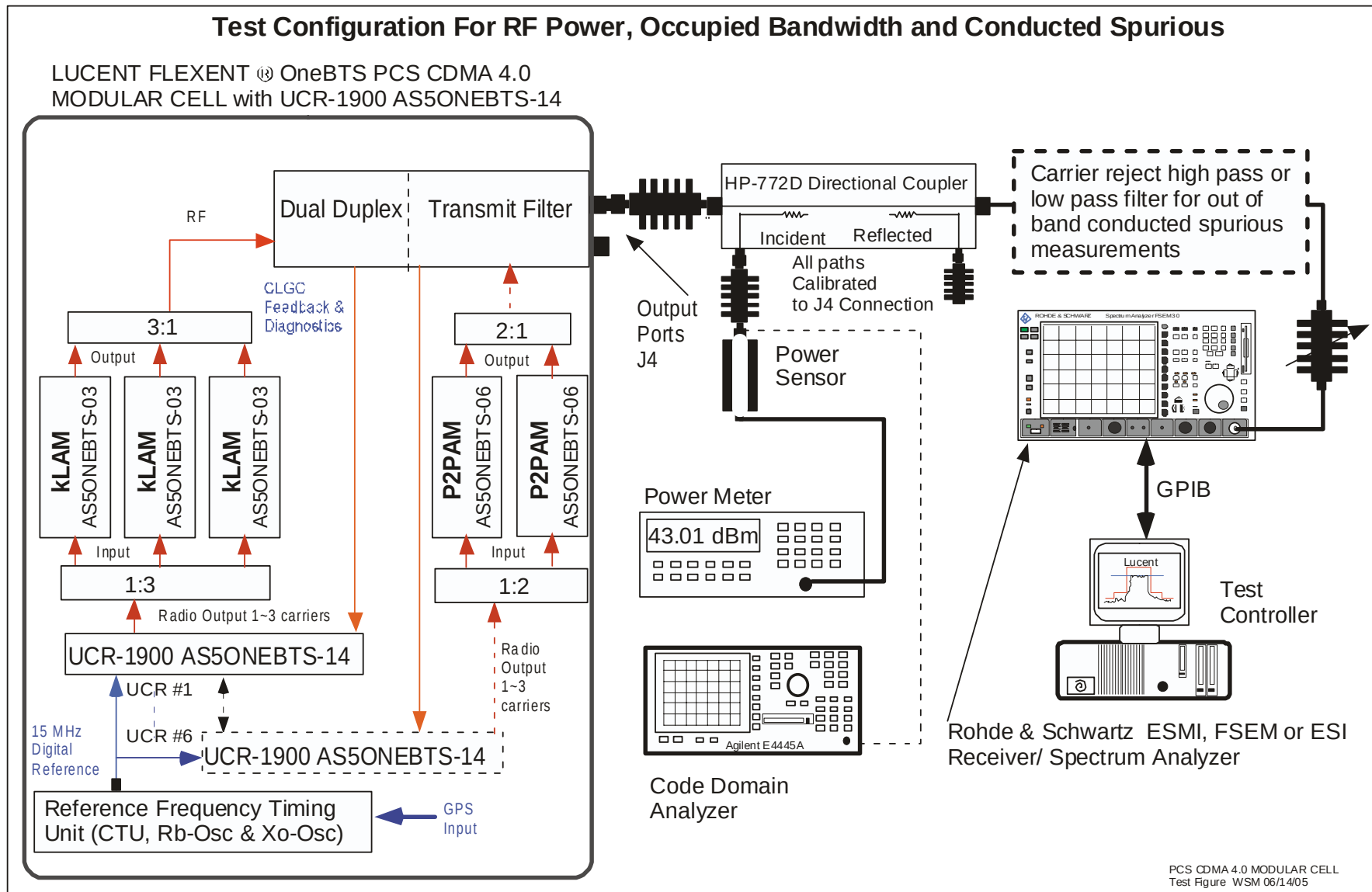
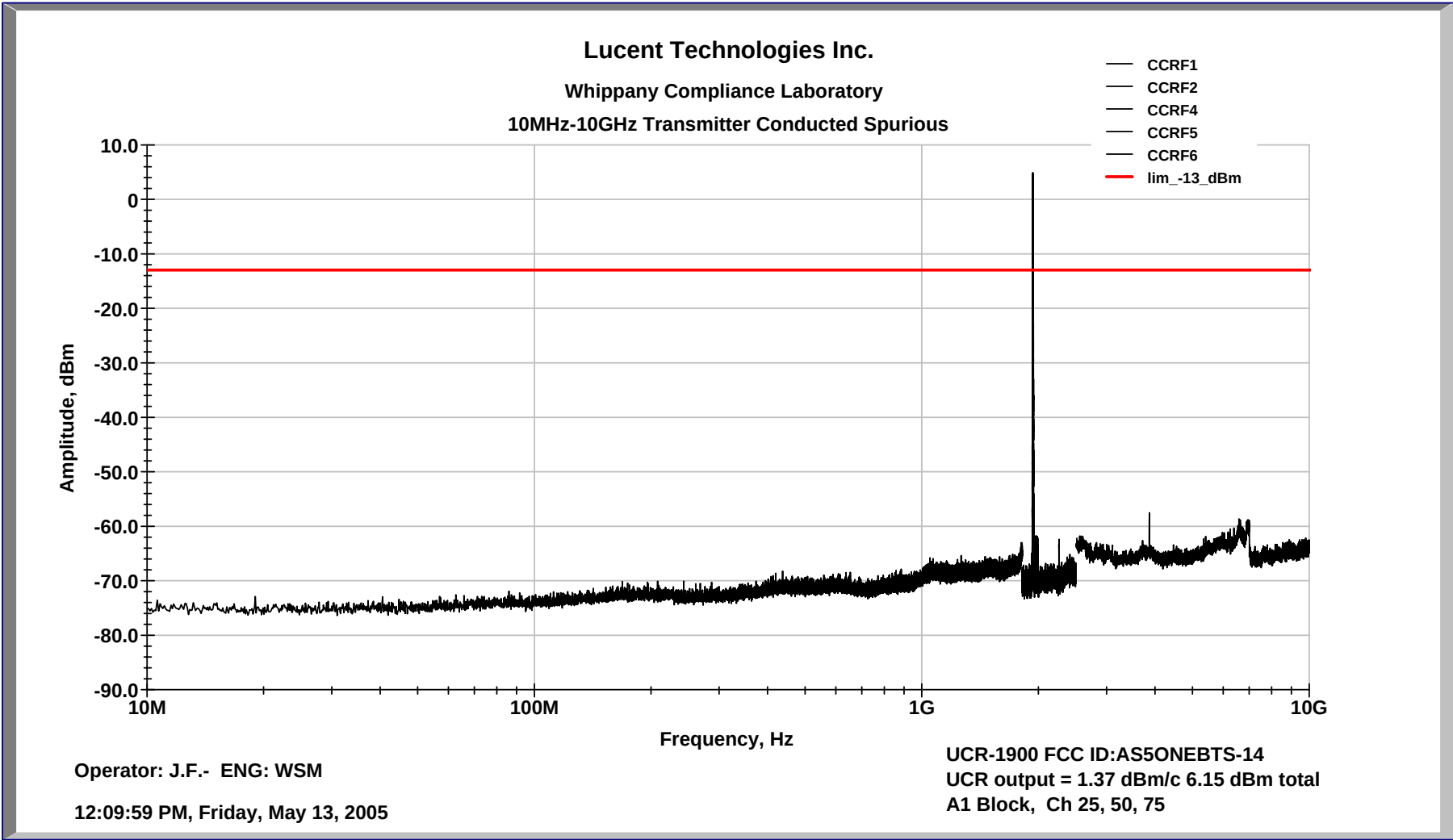


Exhibit 15 *continued*

**Conducted Spurious Data
at
Radio output
and
Transmitter Output**

Conducted Spurious 3c A Block, Left side Channels 25, 50, 75 Radio Output



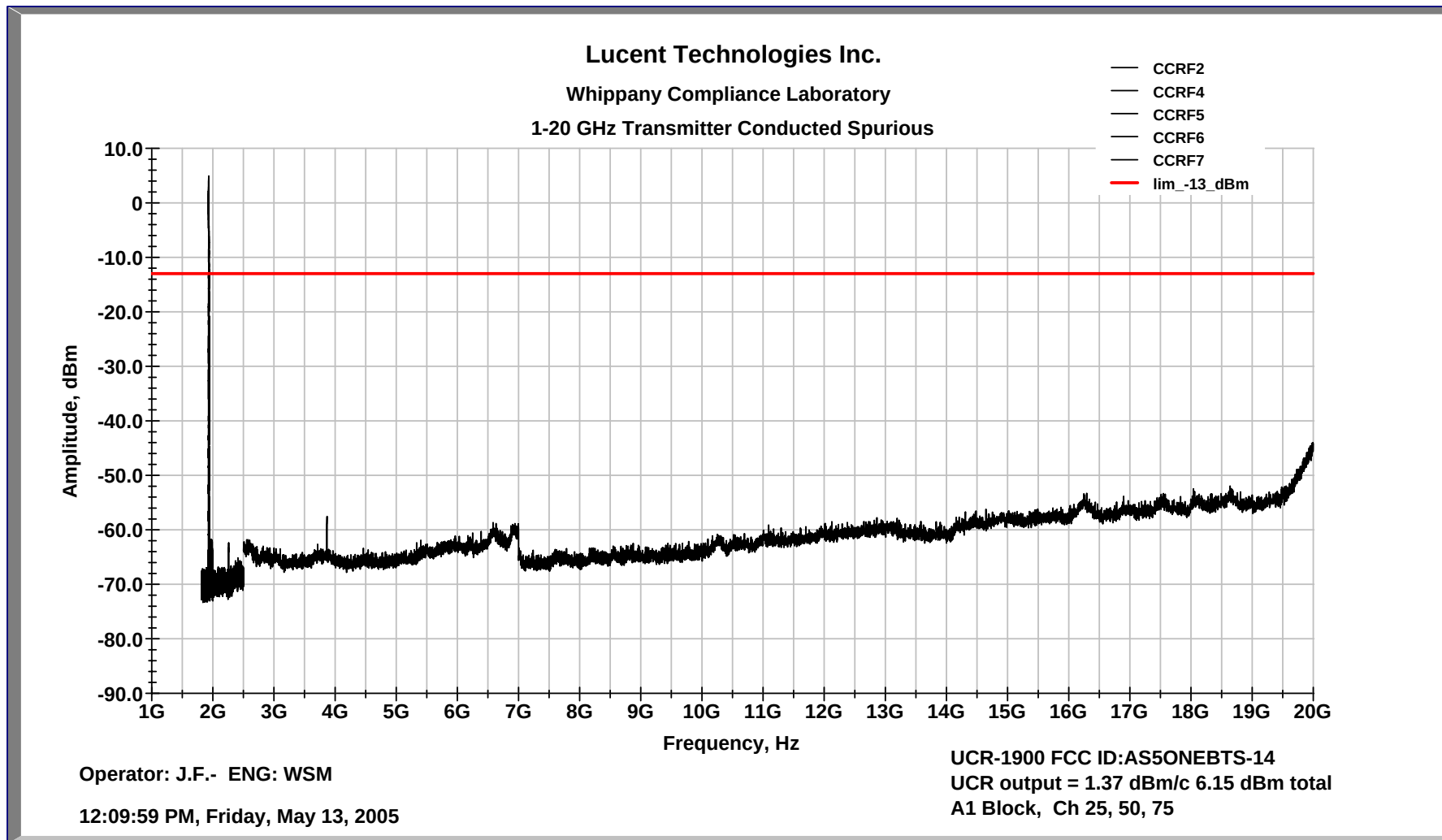
Conducted Spurious

3c

A Block, Left side

Channels 25, 50, 75

Radio Output



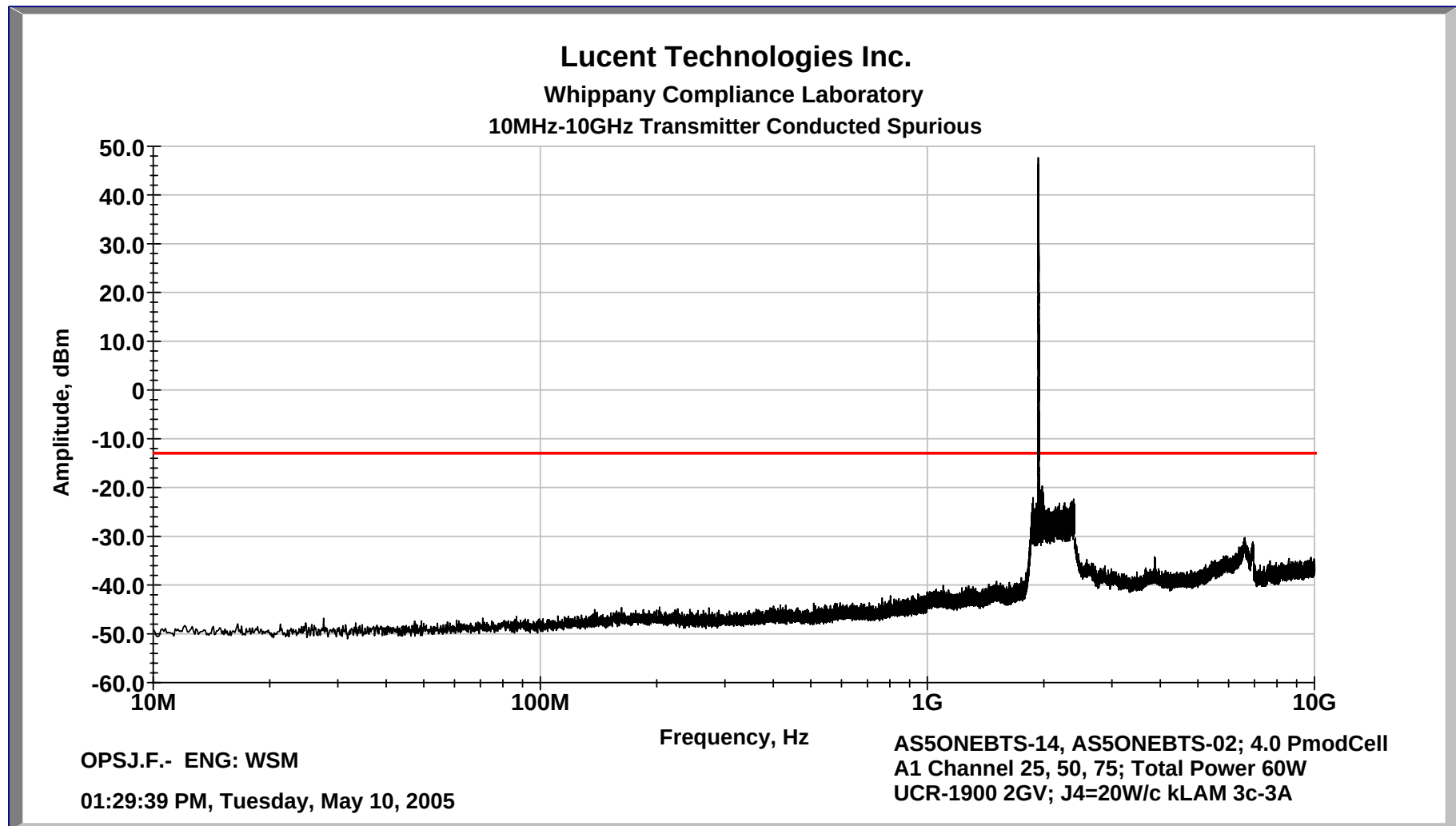
Conducted Spurious

3c

A Block, Left side

Channels 25, 50, 75

Transmitter Output



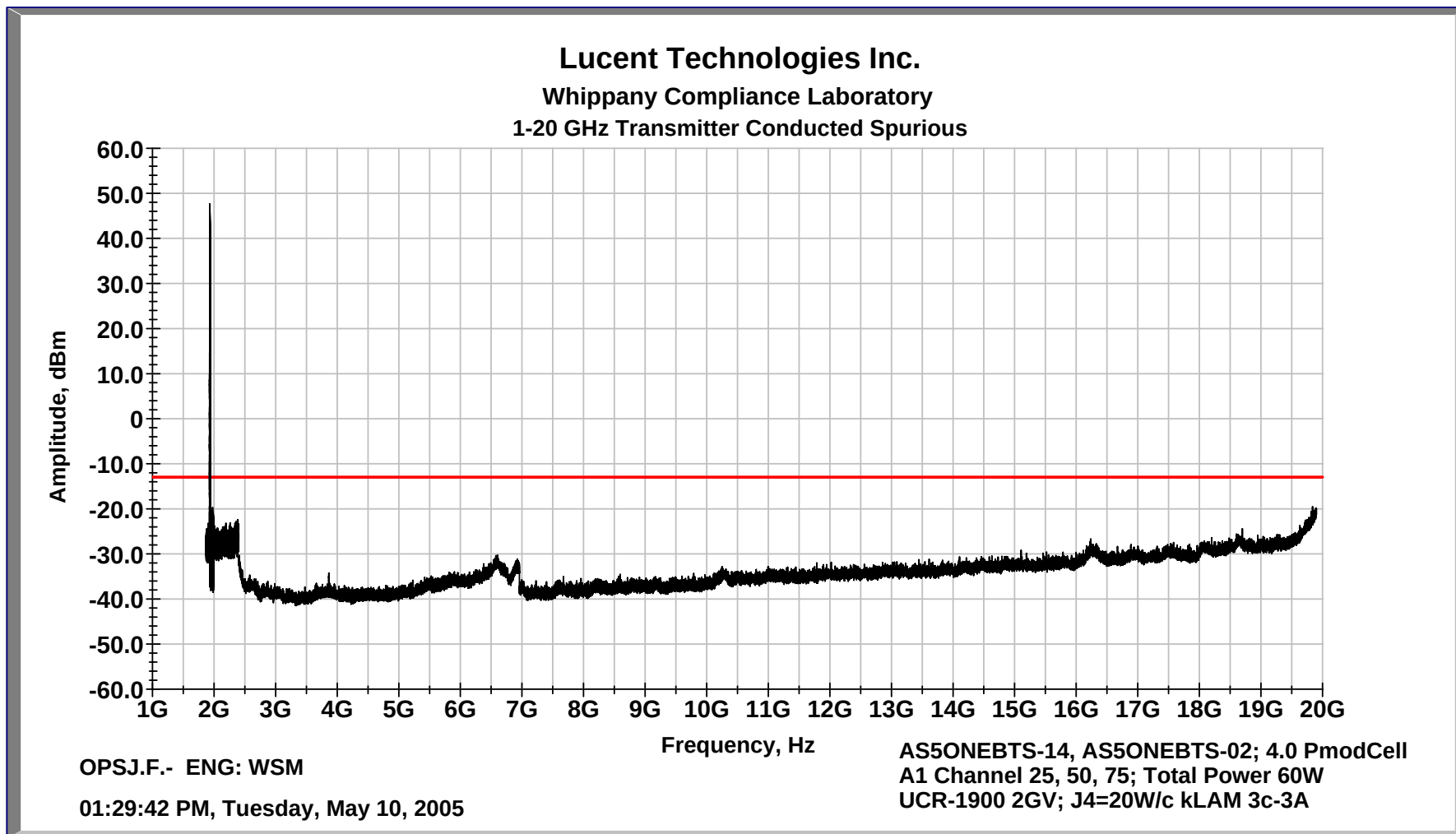
Conducted Spurious

3c

A Block, Left side

Channels 25, 50, 75

Transmitter Output

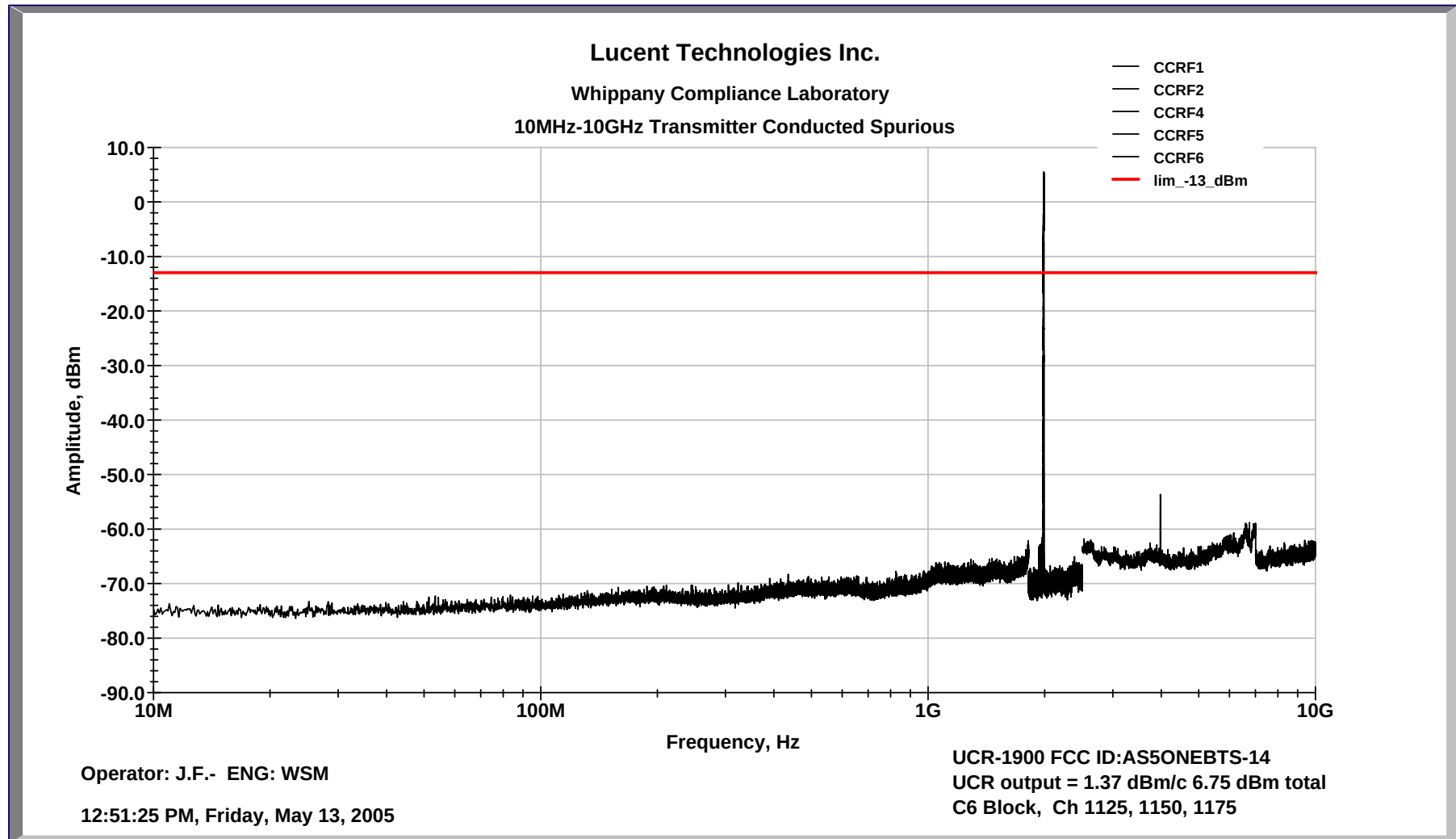


Conducted Spurious

3c

C Block, Right side

Channel 1125, 1150, 1175 Radio Output



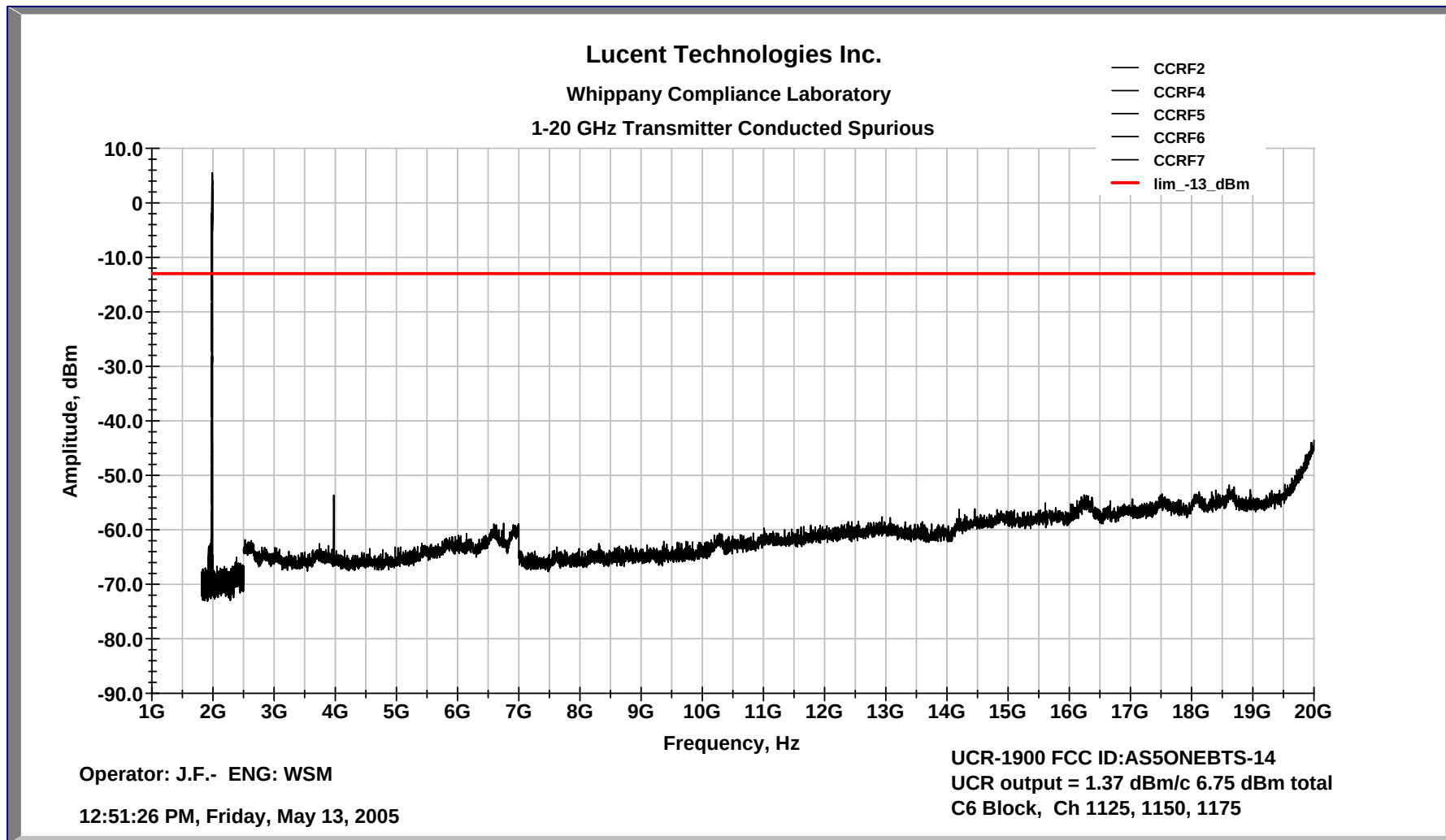
Conducted Spurious

3c

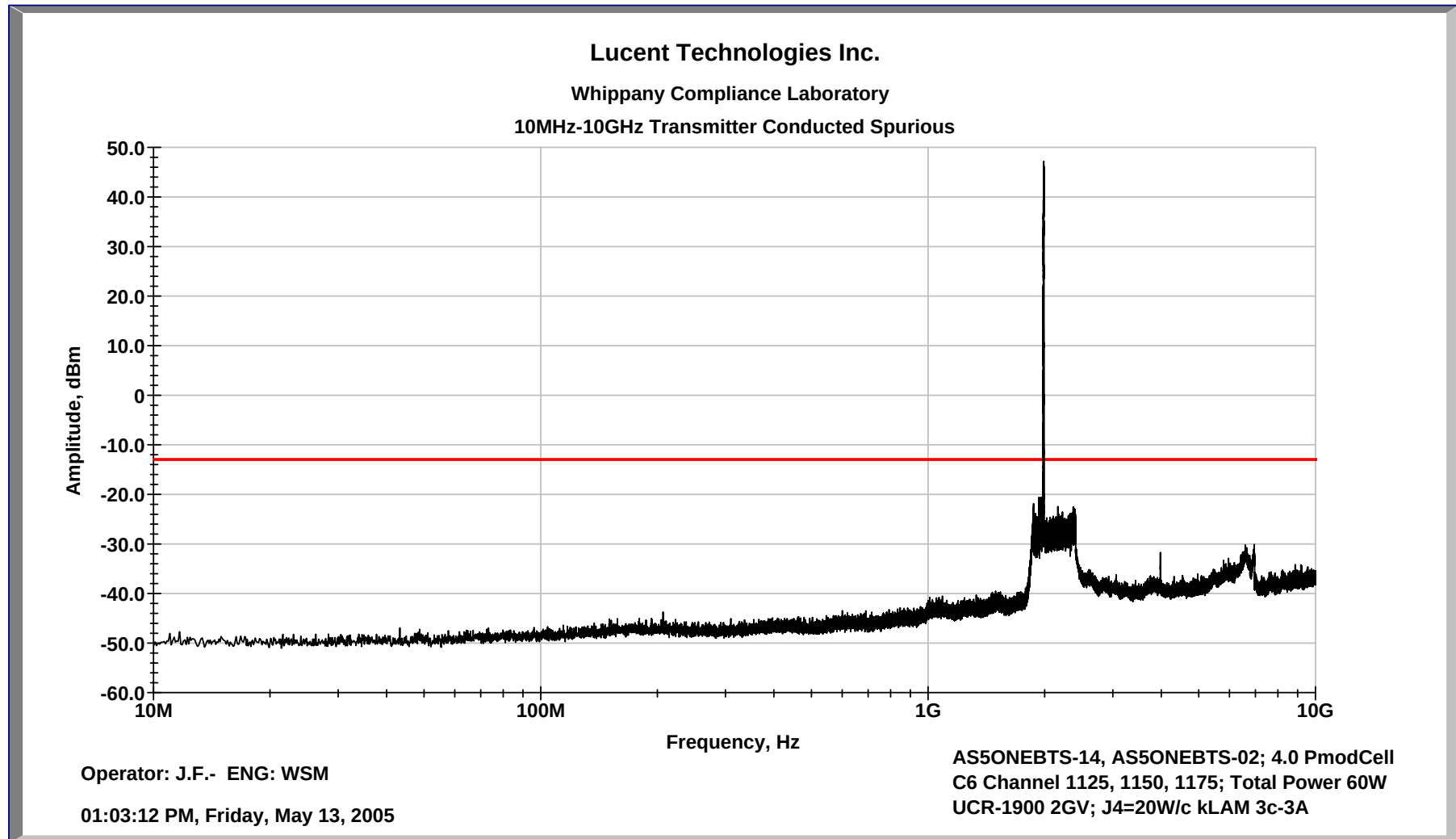
C Block, Right side

Channel 1125, 1150, 1175

Radio Output



Conducted Spurious 3c C Block, Right side Channel 1125, 1150, 1175 Transmitter Output



Conducted Spurious 3c C Block, Right side Channel 1125, 1150, 1175 Transmitter Output

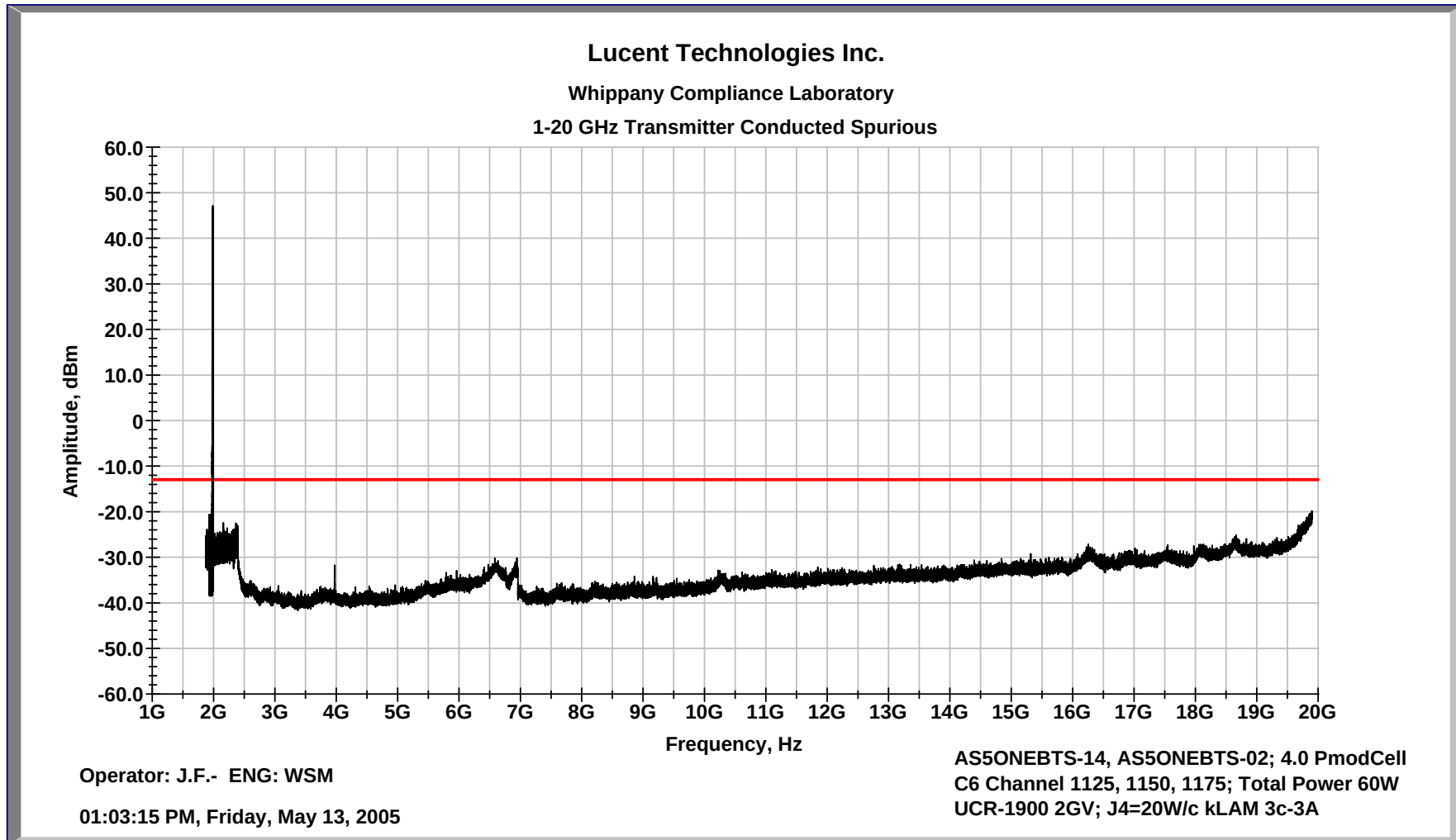


Exhibit 16**SECTION 2.1053 FIELD STRENGTH OF SPURIOUS RADIATION**

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 UCR-1900s** 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:

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

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.

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

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

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 UMTS-CDMA Radio (UCR-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 **UCR-1900/ AS5ONEBTS-14** 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 -40 deg C to +50 deg C 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 **UCR-1900 (FCC ID: AS5ONEBTS-14)**. The Common Timing Unit (**CTU**) provides the time and frequency reference used by the **UCR-1900 (FCC ID: AS5ONEBTS-14)**. 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 Rubidium 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 **UCR-1900, FCC ID: AS5ONEBTS-14**. The data was recorded at the output of the **UCR-1900** 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 **UCR-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, UCR** 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. 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 (1952.5 MHz) was -0.00306 ppm (-5.96 Hz). The specification for FCC compliance is +/- 0.05 ppm (+/- 97.62 Hz).

The measured data is attached below.

Exhibit 17

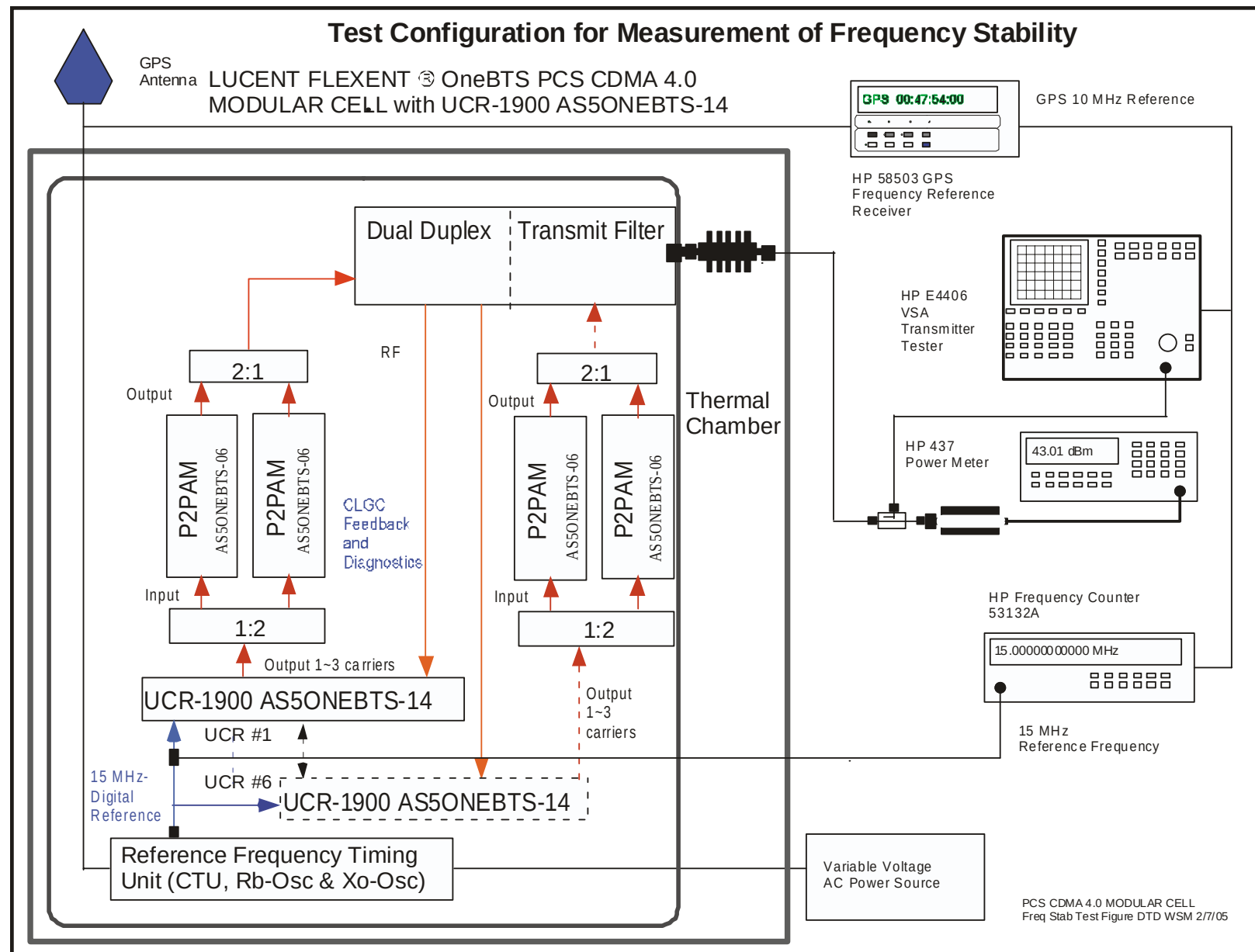


Exhibit 17 continued

**FCC Frequency Stability Data
at
Transmitter Output
for
Lucent Technologies Inc.
PCS ONEBTS Modular Cell 4.0
Incorporating
PCS UMTS CDMA Radio (UCR-1900)
Filed under FCC ID: AS5ONEBTS-14**

FREQUENCY STABILITY – PCS UCR-1900

Center Frequency = 1952.500 MHz

Baseline 20 deg C Variation with Voltage

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	1.2056765556	Pass	20.0	20.4
0.50	0.4719807506	Pass	20.0	20.4
1.00	0.3704145253	Pass	20.0	20.4
1.50	1.6638014317	Pass	20.0	20.4
2.00	0.7096825838	Pass	20.0	20.4
2.50	0.4424666762	Pass	20.0	20.4
3.00	1.7411065102	Pass	20.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	1.1731364727	Pass	20.0	24.0
0.50	-1.0400178432	Pass	20.0	24.0
1.00	0.6851533651	Pass	20.0	24.0
1.50	1.6508980989	Pass	20.0	24.0
2.00	1.5605819225	Pass	20.0	24.0
2.50	0.5815432668	Pass	20.0	24.0
3.00	-0.2334398329	Pass	20.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	1.1840324402	Pass	20.0	27.6
0.50	2.3761911392	Pass	20.0	27.6
1.00	1.8285514116	Pass	20.0	27.6
1.50	0.6766300797	Pass	20.0	27.6
2.00	0.6355705261	Pass	20.0	27.6
2.50	1.4835201502	Pass	20.0	27.6
3.00	-0.0183165763	Pass	20.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = -40 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	0.6048143510	Pass	-40.0	20.4
0.50	-1.1028770210	Pass	-40.0	20.4
1.00	1.1571946140	Pass	-40.0	20.4
1.50	-0.6482813360	Pass	-40.0	20.4
2.00	2.4476900100	Pass	-40.0	20.4
2.50	0.5223784450	Pass	-40.0	20.4
3.00	0.1173176470	Pass	-40.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	0.7639499310	Pass	-40.0	24.0
0.50	-0.2497441170	Pass	-40.0	24.0
1.00	0.6584269400	Pass	-40.0	24.0
1.50	-0.1624208840	Pass	-40.0	24.0
2.00	0.4079411330	Pass	-40.0	24.0
2.50	-1.5506653790	Pass	-40.0	24.0
3.00	0.8584733010	Pass	-40.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	1.6762250660	Pass	-40.0	27.6
0.50	0.3073034290	Pass	-40.0	27.6
1.00	1.9053046700	Pass	-40.0	27.6
1.50	1.7476428750	Pass	-40.0	27.6
2.00	0.9191172720	Pass	-40.0	27.6
2.50	1.6658910510	Pass	-40.0	27.6
3.00	0.7576495410	Pass	-40.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = -30 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	1.3546931740	Pass	-30.0	20.4
0.50	0.2461553360	Pass	-30.0	20.4
1.00	-0.4221310020	Pass	-30.0	20.4
1.50	-1.7130929230	Pass	-30.0	20.4
2.00	0.8779348130	Pass	-30.0	20.4
2.50	0.3247356710	Pass	-30.0	20.4
3.00	1.5433275700	Pass	-30.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	2.3609914780	Pass	-30.0	24.0
0.50	0.9313240050	Pass	-30.0	24.0
1.00	-0.8335947990	Pass	-30.0	24.0
1.50	0.7511820200	Pass	-30.0	24.0
2.00	0.1395800860	Pass	-30.0	24.0
2.50	0.8252326850	Pass	-30.0	24.0
3.00	-1.9879188540	Pass	-30.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	0.3115636410	Pass	-30.0	27.6
0.50	1.7330687050	Pass	-30.0	27.6
1.00	2.1250872610	Pass	-30.0	27.6
1.50	-1.7983381750	Pass	-30.0	27.6
2.00	0.7920788530	Pass	-30.0	27.6
2.50	-0.3762009740	Pass	-30.0	27.6
3.00	0.3015142980	Pass	-30.0	27.6

FREQUENCY STABILITY – PCS UCR-1900

Center Frequency = 1952.500 MHz

Temperature = -20 deg C and Variation with Voltage

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	1.3746844530	Pass	-20.0	20.4
0.50	0.3725204770	Pass	-20.0	20.4
1.00	-0.2671074570	Pass	-20.0	20.4
1.50	-0.7021540400	Pass	-20.0	20.4
2.00	0.7712742690	Pass	-20.0	20.4
2.50	1.5688910480	Pass	-20.0	20.4
3.00	0.7163872720	Pass	-20.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	2.1634109020	Pass	-20.0	24.0
0.50	-4.0396327970	Pass	-20.0	24.0
1.00	-1.0071330070	Pass	-20.0	24.0
1.50	-2.6425168510	Pass	-20.0	24.0
2.00	0.4971019330	Pass	-20.0	24.0
2.50	0.6316615340	Pass	-20.0	24.0
3.00	0.5844979290	Pass	-20.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	1.9229463340	Pass	-20.0	27.6
0.50	0.8326639530	Pass	-20.0	27.6
1.00	0.8280345200	Pass	-20.0	27.6
1.50	0.3984051940	Pass	-20.0	27.6
2.00	-0.7748662230	Pass	-20.0	27.6
2.50	0.8130697610	Pass	-20.0	27.6
3.00	0.8802095650	Pass	-20.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = -10 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	0.1124870780	Pass	-10.0	20.4
0.50	-1.2299786810	Pass	-10.0	20.4
1.00	3.5561206340	Pass	-10.0	20.4
1.50	-0.0390401480	Pass	-10.0	20.4
2.00	1.7727708820	Pass	-10.0	20.4
2.50	2.3140072820	Pass	-10.0	20.4
3.00	-0.2773267630	Pass	-10.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	-0.7601597910	Pass	-10.0	24.0
0.50	1.4935933350	Pass	-10.0	24.0
1.00	0.8141158220	Pass	-10.0	24.0
1.50	0.7488543990	Pass	-10.0	24.0
2.00	3.0130431650	Pass	-10.0	24.0
2.50	-1.2950669530	Pass	-10.0	24.0
3.00	0.0428438780	Pass	-10.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	0.7738224270	Pass	-10.0	27.6
0.50	-2.6851980690	Pass	-10.0	27.6
1.00	-0.7528718110	Pass	-10.0	27.6
1.50	3.6743259430	Pass	-10.0	27.6
2.00	0.9417251350	Pass	-10.0	27.6
2.50	4.0381727220	Pass	-10.0	27.6
3.00	-0.0254303810	Pass	-10.0	27.6

FREQUENCY STABILITY – PCS UCR-1900

Center Frequency = 1952.500 MHz

Temperature = 0 deg C and Variation with Voltage

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	1.5784331560	Pass	0.0	20.4
0.50	-0.2268588840	Pass	0.0	20.4
1.00	2.7301790710	Pass	0.0	20.4
1.50	0.1046584250	Pass	0.0	20.4
2.00	1.2935876850	Pass	0.0	20.4
2.50	-0.8866256480	Pass	0.0	20.4
3.00	2.1575834750	Pass	0.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	1.7496845720	Pass	0.0	24.0
0.50	0.0312323180	Pass	0.0	24.0
1.00	-4.6911830900	Pass	0.0	24.0
1.50	0.4348419900	Pass	0.0	24.0
2.00	0.7530727390	Pass	0.0	24.0
2.50	0.5173808930	Pass	0.0	24.0
3.00	4.0539078710	Pass	0.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	1.0804215670	Pass	0.0	27.6
0.50	0.4851034280	Pass	0.0	27.6
1.00	1.9461917880	Pass	0.0	27.6
1.50	0.4913001950	Pass	0.0	27.6
2.00	0.9221203330	Pass	0.0	27.6
2.50	0.0281829830	Pass	0.0	27.6
3.00	0.5130752330	Pass	0.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = 10 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	-0.5750131011	Pass	10.0	20.4
0.50	0.2792162001	Pass	10.0	20.4
1.00	-1.7481346130	Pass	10.0	20.4
1.50	0.0952811986	Pass	10.0	20.4
2.00	1.4140993357	Pass	10.0	20.4
2.50	1.3640452623	Pass	10.0	20.4
3.00	2.6026499271	Pass	10.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	3.0298960209	Pass	10.0	24.0
0.50	2.0130033493	Pass	10.0	24.0
1.00	0.2628332078	Pass	10.0	24.0
1.50	1.8490521908	Pass	10.0	24.0
2.00	-0.7309134603	Pass	10.0	24.0
2.50	0.1542956829	Pass	10.0	24.0
3.00	-3.7043359280	Pass	10.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	0.1753257066	Pass	10.0	27.6
0.50	0.3295435309	Pass	10.0	27.6
1.00	-2.1877672672	Pass	10.0	27.6
1.50	1.2307246923	Pass	10.0	27.6
2.00	-0.8248277307	Pass	10.0	27.6
2.50	-0.6178485751	Pass	10.0	27.6
3.00	-0.8561754227	Pass	10.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = 20 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	-0.0344339535	Pass	20.0	20.4
0.50	-5.9678077698	Pass	20.0	20.4
1.00	3.1221773624	Pass	20.0	20.4
1.50	1.3097724915	Pass	20.0	20.4
2.00	-0.6613247991	Pass	20.0	20.4
2.50	1.1965552568	Pass	20.0	20.4
3.00	-0.9437814355	Pass	20.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	©	(VDC)
0.00	-0.6818025708	Pass	20.0	24.0
0.50	-1.0547119379	Pass	20.0	24.0
1.00	2.0031673908	Pass	20.0	24.0
1.50	1.9138923883	Pass	20.0	24.0
2.00	0.8346832395	Pass	20.0	24.0
2.50	0.4873476028	Pass	20.0	24.0
3.00	1.8514565229	Pass	20.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	2.5261125565	Pass	20.0	27.6
0.50	0.7137041688	Pass	20.0	27.6
1.00	-0.6458431482	Pass	20.0	27.6
1.50	0.1682553738	Pass	20.0	27.6
2.00	0.6477255225	Pass	20.0	27.6
2.50	1.3805735111	Pass	20.0	27.6
3.00	-0.7110826969	Pass	20.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = 30 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	1.3848487139	Pass	30.0	20.4
0.50	0.2131098807	Pass	30.0	20.4
1.00	0.6498811245	Pass	30.0	20.4
1.50	2.5507645607	Pass	30.0	20.4
2.00	0.5192966461	Pass	30.0	20.4
2.50	0.7210581899	Pass	30.0	20.4
3.00	1.5143958330	Pass	30.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	-0.4250217676	Pass	30.0	24.0
0.50	2.4989469051	Pass	30.0	24.0
1.00	2.2190842628	Pass	30.0	24.0
1.50	1.4737118483	Pass	30.0	24.0
2.00	-0.4227994084	Pass	30.0	24.0
2.50	3.9060599804	Pass	30.0	24.0
3.00	0.1296476424	Pass	30.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	-0.6920911670	Pass	30.0	27.6
0.50	2.1984674931	Pass	30.0	27.6
1.00	3.5700912476	Pass	30.0	27.6
1.50	1.2128112316	Pass	30.0	27.6
2.00	-0.8728237152	Pass	30.0	27.6
2.50	1.9213221073	Pass	30.0	27.6
3.00	0.6039278507	Pass	30.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = 40 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	1.5287835598	Pass	40.0	20.4
0.50	0.0706045926	Pass	40.0	20.4
1.00	-0.1956496537	Pass	40.0	20.4
1.50	0.9152110219	Pass	40.0	20.4
2.00	-0.3043352365	Pass	40.0	20.4
2.50	0.1484166682	Pass	40.0	20.4
3.00	1.1775635481	Pass	40.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	0.9614543915	Pass	40.0	24.0
0.50	0.6867737770	Pass	40.0	24.0
1.00	-1.3320081234	Pass	40.0	24.0
1.50	1.6925566196	Pass	40.0	24.0
2.00	0.7110589147	Pass	40.0	24.0
2.50	-0.5553306937	Pass	40.0	24.0
3.00	1.7587697506	Pass	40.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	°C	(VDC)
0.00	2.0979938507	Pass	40.0	27.6
0.50	0.0849582776	Pass	40.0	27.6
1.00	-1.3650587797	Pass	40.0	27.6
1.50	0.5092814565	Pass	40.0	27.6
2.00	0.4069449306	Pass	40.0	27.6
2.50	1.8874284029	Pass	40.0	27.6
3.00	1.5344388485	Pass	40.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = 50 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	2.2246043682	Pass	50.0	20.4
0.50	2.9894473553	Pass	50.0	20.4
1.00	1.5576372147	Pass	50.0	20.4
1.50	0.7533920407	Pass	50.0	20.4
2.00	2.2959666252	Pass	50.0	20.4
2.50	1.2490756512	Pass	50.0	20.4
3.00	0.9452291727	Pass	50.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	1.1833258867	Pass	50.0	24.0
0.50	1.1340639591	Pass	50.0	24.0
1.00	0.6838367581	Pass	50.0	24.0
1.50	2.6495916843	Pass	50.0	24.0
2.00	1.2204481363	Pass	50.0	24.0
2.50	1.0527442694	Pass	50.0	24.0
3.00	3.4723801613	Pass	50.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	1.6668254137	Pass	50.0	27.6
0.50	2.0177679062	Pass	50.0	27.6
1.00	0.5341456532	Pass	50.0	27.6
1.50	1.7017899752	Pass	50.0	27.6
2.00	3.2185475826	Pass	50.0	27.6
2.50	0.9319205284	Pass	50.0	27.6
3.00	-1.0066260099	Pass	50.0	27.6

FREQUENCY STABILITY – PCS UCR-1900**Center Frequency = 1952.500 MHz****Temperature = 20 deg C and Variation with Voltage**

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	-0.4767393770	Pass	20.0	20.4
0.50	-1.2412557600	Pass	20.0	20.4
1.00	1.0028640030	Pass	20.0	20.4
1.50	0.7879483100	Pass	20.0	20.4
2.00	0.1344378740	Pass	20.0	20.4
2.50	1.3282773490	Pass	20.0	20.4
3.00	0.2950144710	Pass	20.0	20.4

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	©	(VDC)
0.00	1.0520037410	Pass	20.0	24.0
0.50	0.2820426520	Pass	20.0	24.0
1.00	0.9387238620	Pass	20.0	24.0
1.50	1.5126615760	Pass	20.0	24.0
2.00	-1.1026852130	Pass	20.0	24.0
2.50	0.7281231280	Pass	20.0	24.0
3.00	1.5998017790	Pass	20.0	24.0

	Radio Transmit	Pass/Fail Criteria		
Time	Carrier Deviation	+/-0.05 ppm = 97.625 Hz	Temperature	Voltage
(Minutes)	(Hz)	Status	(C)	(VDC)
0.00	-0.1472645850	Pass	20.0	27.6
0.50	1.6285346750	Pass	20.0	27.6
1.00	1.1457165480	Pass	20.0	27.6
1.50	0.7713302970	Pass	20.0	27.6
2.00	0.3801930840	Pass	20.0	27.6
2.50	3.5513534550	Pass	20.0	27.6
3.00	-0.4470370110	Pass	20.0	27.6