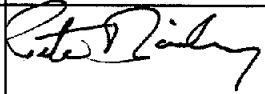


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				CAGE CODE 55939		REV LTR	
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DOCUMENT TYPE ENGINEERING BULLETIN				CLASS A		INITIAL RELEASE DATE 13 FEB 01	
DIVISION AES – BELL RD.		DEPARTMENT NO.		PRODUCT LINE NO. 5111		CONTRACT NO.	
TITLE FCC TYPE ACCEPTANCE REPORT FOR THE SD-700 SATELLITE DATA UNIT, HONEYWELL PART NUMBER 7516118.							
PREPARED BY: P. Bailey		DATE 02/13/01		APPROVED BY TECHNICAL MANAGER C. Dosdall		DATE 02/13/01	
				APPROVED BY PRODUCT LINE DIRECTOR M. McGowan		DATE 02/13/01	
APPROVED FOR SCM		DATE		APPROVED FOR SQA		DATE	
APPROVED BY:		DATE					
REF AWAEB/PSAEB NO. 7516081		CHECKER		PRODUCT DESIGN CHECKER (FOR REF, SPCL CONT PER EPM 1-A-40)		COGNIZANCE OF QE SUPVR (FOR REF, SPCL CONT PER EPM 1-A-40)	
FOR PAGE INDEX, SEE PAGE CR-2. REVISION RECORD FOLLOWS PAGE INDEX. THIS IS AN ELECTRONIC FACSIMILE OF THE CR-1 ON FILE WITH DOCUMENT CONTROL.							
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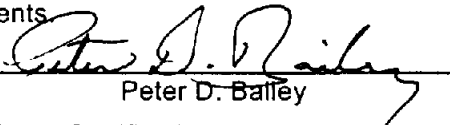
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REV LTR A	TITLE: SD-700 HONEYWELL/RACAL MULTI-CHANNEL SATCOM SYSTEM SATELLITE DATA UNIT 1. INTRODUCTION This report consists of data establishing the conformance of the Honeywell/Racal SD-700 Satellite Data Unit (SDU) to the requirements established by the Federal Communications Commission in its rules and regulations as referenced in Section 2 of this paper. Transmit tests were performed in the two cases where the SD-700 is transmitting with either a 20W High Power Amplifier (HPA) or a 40W HPA as indicated in the report. The SD-700 Satellite Data Unit supports four different equipment configurations or variants: 7-channel SDU with a 115V AC supply 4-channel SDU with a 115V AC supply 7-channel SDU with a 28V DC supply 4-channel SDU with a 28V DC supply The transmit characteristics of all four versions are identical since the RF Module (RFM), which contains the entire transmit chain, is the same for all four variants. The AC or DC variants are realized by changing the Power Supply in the SD-700. Both Power Supplies have been previously tested and qualified with the SD-600, an earlier model currently in production. The 4-channel variant is realized by simply removing one of the Triple Transcoder Modem cards (TTCM). The 7-channel AC version is the baseline configuration and has been chosen as the test SDU reflected in this report. The Honeywell/Racal Multichannel Satcom system (MCS-7000) baseline configuration is a seven channel system comprised of two Line Replaceable Units (LRUs): the SDU, Honeywell part number 7516118-XXXXX and the 20 W or 40W HPA, Honeywell part number 7516251-XXXXX or 7516250-XXXXX respectively. It is a full duplex communication system capable of transmitting and receiving simultaneously any number of modulated carriers up to the channel capabilities of the system. The reference oscillator is located in the SDU. The multichannel power output is rated at 40 watts when a 40W HPA is used and at 20 watts when a 20W HPA is used. The SD700 output by itself is 31.6 mW. This report contains the performance parameters with both HPAs and the Diplexer/LNA (Phase Atlantic Model WGE-0090-00), except as noted in the various test sections of this report. The HPAs were included to demonstrate the overall transmit characteristics of the SDU/HPA transmit line-up. The Diplexer/LNA was used in the testing to include its transmit passband and reject band characteristics. Honeywell has assigned the following model numbers to its system LRUs: SDU – SD700 40W HPA – HP600 20W HPA – HP700		
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	LIST OF ACRONYMS AND ABBREVIATIONS A/D AGC BER BW CCA CCS CF CODEC CS D/A DTMF FL GES HPA IF LNA LO LRU MCS OCXO PLO PSM RFM SDU SIOM SMPM TTCM VHF VIM Analog to Digital Converter Automatic Gain Control Bit Error Rate Bandwidth Circuit Card Assembly Cabin Communication System Center Frequency Coder/Decoder Channel Synthesizer Digital to Analog Converter Dual Tone Multi-Frequency Filter Ground Earth Station High Power Amplifier Intermediate Frequency Low Noise Amplifier Local Oscillator Line Replacement Unit Multichannel Satcom Oven Controlled Crystal Oscillator Phase Locked Oscillator Power Supply Module Radio Frequency Module Satellite Data Unit SDU Input Output Module SDU Main Processor Module Triple Transcoder Modem Very High Frequency Voice Interface Module					
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2. REFERENCES AND ATTACHMENTS 2.1 <u>References</u> Code of Federal Regulations, Title 47 Part 2, Subpart J Part 87, Subpart D FCC Type Acceptance Report for the HP-700 HPA Honeywell P/N 7516251, EB7516254 FCC Type Acceptance Report for the Multi-Channel Satcom System, A72-5111-122 2.2 <u>Attachments</u> 2.2.1 <u>Satellite Data Unit (SDU)</u> <table border="0"> <tr><td>Radio Frequency Module (RFM)</td><td>7516113-904</td></tr> <tr><td>Receiver Card (Rx Assembly)</td><td>7516114-906</td></tr> <tr><td>Transmitter Card (Tx Assembly)</td><td>7516116-905</td></tr> <tr><td>Power Supply Module</td><td>7516359-910</td></tr> <tr><td>Power Supply Power Card</td><td>7516410-903</td></tr> <tr><td>Power Supply Control Card</td><td>7516420-902</td></tr> <tr><td>Main Processor Module (MMPM) Assembly</td><td>81771-DEB</td></tr> <tr><td>Main Processor Module Schematic</td><td>81771-WDEB</td></tr> <tr><td>Input/Output Module (SIOM) Assembly</td><td>81771-DFA</td></tr> <tr><td>Input/Output Module Schematic</td><td>81771-WDFA</td></tr> <tr><td>Triple Transcoder Modem Assembly</td><td>81771-DLC</td></tr> <tr><td>Triple Transcoder Modem Schematic</td><td>81771-WDLC</td></tr> <tr><td>Voice Interface Module Assembly</td><td>81771-DYB</td></tr> <tr><td>Voice Interface Module Schematic</td><td>81771-WDYB</td></tr> <tr><td>Front Panel Display Assembly</td><td>81771-DHA</td></tr> <tr><td>Front Panel Display Schematic</td><td>81771-WDHA</td></tr> <tr><td>Interface Module Card (IFM) Assembly</td><td>81771-DTA</td></tr> <tr><td>Interface Module Card Schematic</td><td>81771-WDTA</td></tr> <tr><td>Mother Board Assembly</td><td>81771-DVC</td></tr> <tr><td>Mother Board Schematic</td><td>81771-WDVC</td></tr> <tr><td>Frequency Reference Oscillator (OCXO) Assembly</td><td>81771-MBE</td></tr> <tr><td>Frequency Reference Oscillator Schematic</td><td>81771-WDME</td></tr> <tr><td>Plate, Identification, Hardware, Software</td><td>7021570-40</td></tr> <tr><td>Integrated Test Specification for Satellite Data Unit (IT)</td><td>IT7516118</td></tr> <tr><td>Internal and External Photographs</td><td></td></tr> <tr><td>System Definition and Installaion Manual (SDIM)</td><td>A15-5111-001-00</td></tr> </table> <u>NOTE:</u> Alignment and calibration procedures are in the IT.						Radio Frequency Module (RFM)	7516113-904	Receiver Card (Rx Assembly)	7516114-906	Transmitter Card (Tx Assembly)	7516116-905	Power Supply Module	7516359-910	Power Supply Power Card	7516410-903	Power Supply Control Card	7516420-902	Main Processor Module (MMPM) Assembly	81771-DEB	Main Processor Module Schematic	81771-WDEB	Input/Output Module (SIOM) Assembly	81771-DFA	Input/Output Module Schematic	81771-WDFA	Triple Transcoder Modem Assembly	81771-DLC	Triple Transcoder Modem Schematic	81771-WDLC	Voice Interface Module Assembly	81771-DYB	Voice Interface Module Schematic	81771-WDYB	Front Panel Display Assembly	81771-DHA	Front Panel Display Schematic	81771-WDHA	Interface Module Card (IFM) Assembly	81771-DTA	Interface Module Card Schematic	81771-WDTA	Mother Board Assembly	81771-DVC	Mother Board Schematic	81771-WDVC	Frequency Reference Oscillator (OCXO) Assembly	81771-MBE	Frequency Reference Oscillator Schematic	81771-WDME	Plate, Identification, Hardware, Software	7021570-40	Integrated Test Specification for Satellite Data Unit (IT)	IT7516118	Internal and External Photographs		System Definition and Installaion Manual (SDIM)	A15-5111-001-00
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	2.2.2 System Description and Installation Manual A15-5111-001-00 3. TEST CERTIFICATION I do hereby certify that to the best of my knowledge the technical test data contained in this report are true and correct and that the SD-700 has been shown to have completely met the cited requirements. SIGNED:  Peter D. Bailey Test Engineer Certification Peter D. Bailey BS Arizona State University, 1969 15 Years Experience in Commercial Avionics 4. GENERAL INFORMATION 4.1 <u>Type Designation</u> The equipment has been designated by Honeywell, Inc., Commercial Electronic Systems, as an SD-700 Satellite Data Unit for use in a Multichannel SATCOM System, MCS-7000. 4.2 <u>Service and Rule for Intended Operation</u> Aeronautical Mobile Satellite Service Part 87, Subpart A 4.3 <u>Description of Equipment</u> 4.3.1 Type of Emission G1W 4.3.2 Frequency Range [MHz] 1626.5 - 1660.5 4.3.3 Power Rating 40 Watts Maximum for MCS-7000 with 40 W HPA. 20 Watts Maximum for MCS-7000 with 20 W HPA. 31.6 mW Maximum for the SD700 alone.				
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	4.3.4 Final Power Amplifier The SDU final stage is a solid state class A Gallium Arsenide Heterojunction Bipolar Transistor amplifier, RF2125 (RF Micro Devices). The 20W HPA final stage is a solid state class AB balanced amplifier using two LYE16350X (PHILIPS) silicon bipolar transistors. The 40W HPA final stage is a solid state class AB balanced amplifier using four LYE16350X (PHILIPS) silicon bipolar transistors. 4.3.5 Reference Oscillator SC cut crystal ovenized oscillator manufactured by CQE. 4.3.6 SDU Transmit Component Functions 4.3.6.1 Radio Frequency Module (RFM) in SDU <table><tr><th>Function</th><th>Component</th><th>Manufacturer</th></tr><tr><td>Quadrature Modulator (Channel 1)</td><td>U63</td><td>TEMIC TELEFUNKEN</td></tr><tr><td>MMIC Amplifier (Channel 1)</td><td>U67</td><td>MINICIRCUITS</td></tr><tr><td>Mixer</td><td>U5</td><td>MINICIRCUITS</td></tr><tr><td>Filter</td><td>FL1</td><td>K&L</td></tr><tr><td>MMIC Amplifier</td><td>U24</td><td>MINICIRCUITS</td></tr><tr><td>MMIC Amplifier</td><td>U26</td><td>MINICIRCUITS</td></tr><tr><td>Mixer</td><td>U28</td><td>PULSAR</td></tr><tr><td>MMIC Amplifier</td><td>U32</td><td>MINICIRCUITS</td></tr><tr><td>MMIC Amplifier</td><td>U37</td><td>MINICIRCUITS</td></tr><tr><td>Amplifier</td><td>U42</td><td>RF MICRO DEVICES</td></tr><tr><td>Filter</td><td>FL2</td><td>TOKO</td></tr></table> All amplifiers in SDU are Class A. Channels 1 - 8 are functionally identical. 4.3.7 Circuit Diagram See attached schematics. 4.3.8 Instruction Book To be supplied as soon as possible. 4.3.9 Tune-up Procedures No field tuning is required. Tuning is done during manufacturing using subassembly test. See Integrated Test Specifications.						Function	Component	Manufacturer	Quadrature Modulator (Channel 1)	U63	TEMIC TELEFUNKEN	MMIC Amplifier (Channel 1)	U67	MINICIRCUITS	Mixer	U5	MINICIRCUITS	Filter	FL1	K&L	MMIC Amplifier	U24	MINICIRCUITS	MMIC Amplifier	U26	MINICIRCUITS	Mixer	U28	PULSAR	MMIC Amplifier	U32	MINICIRCUITS	MMIC Amplifier	U37	MINICIRCUITS	Amplifier	U42	RF MICRO DEVICES	Filter	FL2	TOKO
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	4.3.10Reference Oscillator An oven controlled high stability reference oscillator (Racal part number 81771-MBE located in the Satellite Data Unit) is used as the primary frequency reference for: - Radio Frequency Module Local Oscillators and Synthesized Channel Local Oscillators - Modem Sample Rate Clocks - Voice Codec Bit Rate Clock The crystal oscillator provides good stability versus temperature, power supply voltage and load variations. The output frequency is 10.08 MHz and has sufficient mechanical adjustment range to compensate for ten years of aging. The reference oscillator frequency is sent to the Radio Frequency Module (RFM) where it is buffered and routed to each Modem. The oscillator also outputs a logic signal directly coupled to the SDUs Main Processor Module to indicate the oven temperature stabilization. 4.3.11Frequency Stabilization The channel phase-locked-loop synthesizers and other phase-locked-loop oscillators are all referenced to the single reference oscillator. 4.3.12Modulation Limiting Not applicable. 4.3.13Radiated Interference Suppression The output of the High Power Amplifier in an operating system is fed into the transmit port of an LNA/Diplexer. This device provides greater than 80 dB rejection for out of band signals between 0 MHz to 1585 MHz and greater than 50 dB rejection between 1735 MHz and 12000 MHz. The transmitter chain in the SDU and in the HPA is also bandpass limited. 4.3.14Modulation Method Aviation Binary Phase Shift Keying (A-BPSK) Aviation Quaternary Phase Shift Keying (A-QPSK) (A-BPSK up to 2400 bps, A-QPSK up to 21 kbps). 4.3.14.1Modulation Method - Modulation Carrier The generation of a modulated carrier is achieved using digital signal processing techniques and is converted to an analog RF signal employing Digital-to-Analog conversion techniques. The SDU utilizes two kinds of signals as inputs for transmission. Analog audio or digital data. The analog audio is digitized in the CODEC (Coder/ Decoder) assemblies. The digitized audio or the digital data is then scrambled, interleaved and Forward-Error-Corrected (FEC) before being inputted to the data “modulator”.				
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	4.3.15 Theory of Operation The MCS is able to transmit data and voice information simultaneously in full duplex mode. The power management and frequency selection in this system is controlled by the GES without user assistance. The digital packet data to be transmitted is routed to the SDU main processor assembly, the analog voice to the six codec assemblies of the SDU and the digitized cabin voice is routed to the transcoder circuits of the SDU. The codec performs A/D and D/A conversion coding/decoding on the analog voice, while the transcoder executes coding/decoding functions. The coded data is passed to the processor module of the SDU. After processing each channel of data or voice the information is forwarded to a modem assembly. There are seven modems in the SDU and eight available channels in the SDU's RFM. Modems one through four can be connected to any of the RFM channels one through four. Modems five through seven can be connected to any of the RFM channels five through eight. There is one modem located on the main processor card and three modems on each of two Triple Transcoder Modem (TTCM) cards. The generation of the modulated RF signal begins in the modem assembly in the form of a fully digital complex baseband signal. This signal is then passed to the RFM where it is processed and converted into an analog IF signal. The RFM produces final frequency conversion to the operational L-band frequency region. The Honeywell Multichannel Satcom System is compliant to AERONAUTICAL RADIO INC. (ARINC) CHARACTERISTIC 741 PART 2 paragraph 3.1.4 and 4.1.3. The digital modulator fulfills the functions of the modulator model presented on Figures 8b and 8c of Attachment 2x of ARINC 741 part 2. ARINC 741 Part 2 Figure 8b - Modulator Model ARINC 741 Part 2 Figure 8c - Data Encoder Model 4.3.15.1 Major Functions of the CODEC: Digitize and encode the incoming cockpit or cabin audio, the Cabin Communication System (CCS), or PCM data using the voice coding algorithm specified by the British Telecom 9.6 kbit/sec Speech Codec for Aeronautical Mobile Satellite Communication. Receive encoded audio data arriving from the GES and convert it back to analog audio for routing to the cockpit, or to PCM data. Generate various call progress messages and tones. Decode Dual Tone Multi-Frequency (DTMF) tones as specified in CCITT Recommendations Q.11, Q.16 and Q.23, which have been generated by the telephone handset or a PBX and provide the information to the SDU Main Processor. Monitor and control the state of various interfaces.				
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	4.3.15.2	Major Functions of the Modem	There are seven modems within the SDU. Each modem receives and transmits Signaling Units and Circuit Mode Data Primary Fields to and from the Main Processor Module. Complex baseband I and Q signals are passed to and from the RFM. The receive channel of the Modem performs demodulation and decoding of complex baseband signals received and passed by the RFM. The transmit stages of the modem perform encoding and scrambling operations to provide a complex bandpass signal for the transmit section of the RFM. All inputs and outputs of the modem are in the digital domain.		
	4.3.15.3	Major functions for the Radio Frequency Module:	Downconversion, filtering, and A/D conversion of received signals. AGC functions as commanded by the main processor. Passes baseband signals to the modem. Converts baseband complex signals into RF signals. Performs QAM modulation and Doppler correction. D/A conversion to produce analog IF signals. The SDU contains one RFM. The RFM has one L-band block up/down converter and 8 identical UHF/VHF up/down converters (one per transmit/receive channel). Both the Rx assembly (7516114) and the Tx assembly (7516116) have identical circuitry for four transmit and four receive channels. Block Downconverter (on the 7516114 Rx assembly): The L-band (1525-1559 MHz) signals from the Diplexer/LNA are applied to the receive port of the RFM. The signal passes through a bandpass filter (FL1, center frequency 1542 MHz, 34 MHz bandwidth) which rejects the out of band signals. The signal then passes to a two stage low noise amplifier (LNA, U25, U23) which increases the signal by 35 dB. Included in the LNA section are the block AGC attenuator diodes (CR9 and CR10). If the input signal is large, these diodes will be activated and will reduce the signal by as much as 28 dB. If the signal is small, the diodes have no effect on the signal. The LNA is followed by a 7 dB gain RF amplifier (U24) and mixer (U27) which mixes the 1159.2 MHz PLO with the receive signal to produce a UHF (382.8 MHz mid band) IF. The IF signal goes through a Tx reject low pass filter and is amplified 12 dB by U39 and 20 dB by U40, and sent through an image reject high pass filter. The signal is then split eight ways in the UHF divider. Four channels (5-8) are routed to circuitry on the Rx assembly (7516114). The remaining four channels (1-4) are routed to the Tx assembly (7516116) which contains circuitry for four receive channels. The eight UHF/VHF downconverters are identical, therefore, the following description applies to each of the eight channels generically.		
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REV LTR	The UHF signal goes through a 15 dB pad and a 12 dB gain amplifier stage to provide additional isolation between signals at the splitter outputs. The signal is then mixed with the channel synthesizer frequency (209.575 MHz mid band) to produce a 173.225 MHz IF signal. This signal passes through a SAW filter of 140 kHz bandwidth before going to the channel AGC amplifier which has a gain range of 5-35 dB. The signal is then applied to the quadrature demodulator which downconverts the signal to 168.4 kHz by mixing it with the 173.0566 MHz PLO LO signal as well as producing the I and Q components. Each I and Q product goes through an op amp stage to a switch-cap filter of 26 kHz bandwidth and then a second op amp stage before being applied to the A to D converter. AGC The AGC signal for each RFM channel AGC amplifier is provided by the Main Processor card to the RFM. The digital AGC signal goes through the CPLDs (U18 on the Rx assembly, 7516114, and U22 on the Tx assembly, 7516116) to the DACs (U11 on the Rx assembly and U35 on the Tx assembly) which in turn provide the proper control to each of the eight RFM receive channels. The block AGC signal is similarly produced at the output of the DAC (U11) where it is scaled and temperature compensated before being applied to the block AGC attenuator diodes in the LNA of the block downconverter. VHF Upconversion (on the Tx assembly, 7516116, and Rx assembly, 7516114): The eight VHF upconversions are identical, therefore, the following description applies to each of the eight channels generically. Channels 1-4 originate on the Tx assembly; channels 5-8 on the Rx assembly. The I & Q baseband signals arrive at the quadrature modulator from the main processor card via the CPLD (U72 on the Rx assembly, 7516114, and U77 on the Tx assembly, 7516116) and the DACs (U56 or U73 on the Rx assembly, and U58 or U79 on the Tx assembly). The LO signal to the modulator from the channel synthesizer produces a modulator output in the range of 192.575 MHz to 226.575 MHz, depending on the channel frequency selected, which passes through a low pass filter and a 12 dB MMIC amplifier. The signal then combines with the other seven channels and travels to the Block Upconverter for further up-conversion. Block Upconverter (on the Tx assembly, 7516116): The VHF input to the block upconverter passes through a 4.5 dB attenuator and into a mixer (U5) whose LO power comes from the Doppler synthesizer centered at 163.845 MHz. The mixer output is in the range of 356.42 MHz to 390.42 MHz depending on the channel frequency selected.. Following the mixer is an 8-pole bandpass filter (FL1) centered at 373.42 MHz with a bandwidth of 34 MHz, a 12 dB gain amplifier (U24), a temperature compensation circuit, and an 18 dB gain amplifier (U26). The amplifier feeds the final mixer (U28) where the signal is mixed with an LO frequency of 1270.08 MHz from the Tx PLO to produce the transmit frequency in the range of 1626.5 MHz to 1660.5 MHz. The upconverted signal goes through a preliminary diplexed filter and then through successive RF gain stages of 15 dB (U32), 18dB (U37), and 15 dB (U42), and finally through a bandpass filter (FL2) to the RFM transmit port.			
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REV LTR	Synthesizers: There are basically five synthesizers used in the SDU all of which reside in the RFM. - Channel synthesizer: One per channel, nested dual loop design capable of tuning in 2.5 kHz increments over a 34 MHz range centered at 209.575 MHz. There are four channel synthesizers on each of the Rx and Tx assemblies, 7516114 and 7616116 respectively. Each synthesizer is dedicated simultaneously to both a Tx and Rx channel. - Doppler synthesizer: Cascaded dual loop design capable of tuning in 10 Hz increments over a range of +/- 2180 Hz centered at 163.845 MHz. It is located on the Tx assembly, 7516116. 1270.08 MHz PLO: Fixed frequency, located on the Tx assembly, 7516116. 1159.2 MHz PLO: Fixed frequency, located on the Rx assembly, 7516114. 173.0566 MHz PLO: Fixed frequency, located on the Rx assembly, 7516114. 4.3.15.3.1 The Honeywell MCS system does employ Doppler correction techniques as required by ARINC 741 Part 2 Paragraph 4.1.2. 4.3.15.4 RF Signal Path through HPA 20W HPA: INPUT: 1626.5 MHz to 1660.5 MHz Gain 57 dB ± 1 dB with 0 dB back-off attenuation OUTPUT: 1626.5 MHz to 1660.5 MHz 20 Watts operational (continuous) 40 Watts maximum 40W HPA: INPUT: 1626.5 MHz to 1660.5 MHz Gain 60 dB ± 1 dB with 0 dB back-off attenuation OUTPUT: 1626.5 MHz to 1660.5 MHz 40 Watts operational (continuous) 60 Watts maximum For both the 20 watt and 40 watt HPA, the RF signals in the HPA pass through five stages of class A amplification followed by two stages of class AB amplification. The signals then are routed through an output power detector after which they exit the HPA. The HPA output is connected to the diplexer and antenna subsystem. A description of the 20W HPA circuitry can be found in the previously submitted FCC report, EB7516254. A description of the 40W HPA circuitry can be found in the previously submitted FCC report, A72-5111-122.				
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REV LTR	5. PHOTOGRAPHS The following photographs can be found in PDF files submitted separately from this report. <table><thead><tr><th>Number</th><th>View</th></tr></thead><tbody><tr><td>01</td><td>SD-700 Front showing label</td></tr><tr><td>02</td><td>SD-700 Rear</td></tr><tr><td>03</td><td>SD-700 Front-Right/PSU partially removed</td></tr><tr><td>04</td><td>SD-700 Front-Left/RFM partially removed</td></tr><tr><td>05</td><td>SD-700 Front/Front Plate partially removed</td></tr><tr><td>06</td><td>SD-700 Front/Front Plate removed</td></tr><tr><td>07</td><td>SD-700 Right showing IFM & Motherboard</td></tr><tr><td>08</td><td>SD-700 Left showing IFM & Motherboard</td></tr><tr><td>09</td><td>SD-700 Right showing OCXO</td></tr><tr><td>10</td><td>Front Plate inside</td></tr><tr><td>11</td><td>Triple Transcoder Modem Assembly Side 1</td></tr><tr><td>12</td><td>Triple Transcoder Modem Assembly Side 2</td></tr><tr><td>13</td><td>Main Processor Module Side 1</td></tr><tr><td>14</td><td>Main Processor Module Side 2</td></tr><tr><td>15</td><td>Voice Interface Module</td></tr><tr><td>16</td><td>Input/Output Module</td></tr><tr><td>17</td><td>Power Supply Power Card</td></tr><tr><td>18</td><td>Power Supply Control Card</td></tr><tr><td>19</td><td>RF Module Transmit Card/Side 1</td></tr><tr><td>20</td><td>RF Module Transmit Card/Side 2</td></tr><tr><td>21</td><td>RF Module Receive Card/Side 1</td></tr><tr><td>22</td><td>RF Module Receive Card/Slide 2</td></tr></tbody></table>						Number	View	01	SD-700 Front showing label	02	SD-700 Rear	03	SD-700 Front-Right/PSU partially removed	04	SD-700 Front-Left/RFM partially removed	05	SD-700 Front/Front Plate partially removed	06	SD-700 Front/Front Plate removed	07	SD-700 Right showing IFM & Motherboard	08	SD-700 Left showing IFM & Motherboard	09	SD-700 Right showing OCXO	10	Front Plate inside	11	Triple Transcoder Modem Assembly Side 1	12	Triple Transcoder Modem Assembly Side 2	13	Main Processor Module Side 1	14	Main Processor Module Side 2	15	Voice Interface Module	16	Input/Output Module	17	Power Supply Power Card	18	Power Supply Control Card	19	RF Module Transmit Card/Side 1	20	RF Module Transmit Card/Side 2	21	RF Module Receive Card/Side 1	22	RF Module Receive Card/Slide 2
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6. TEST PROCEDURES AND DATA TEST PROCEDURES AND DATA: TEST NO: 1 1.0 DESCRIPTION OF TEST: Output Power with 20W or 40W HPA 2.0 SPECIFICATIONS: 47 CFR 87.131 47 CFR 2.985a 47 CFR 2.985c 3.0 EQUIPMENT REQUIRED: <table><thead><tr><th></th><th>TYPE</th><th>MANUFACTURER</th><th>MODEL</th><th>SER. NO.</th></tr></thead><tbody><tr><td>A</td><td>High Power Amplifier</td><td>Honeywell</td><td>HP700</td><td>99090157</td></tr><tr><td></td><td></td><td></td><td>HP600</td><td>00061939</td></tr><tr><td>B</td><td>Satellite Data Unit</td><td>Honeywell</td><td>SD700</td><td>00070003</td></tr><tr><td>C</td><td>20 dB Attenuator</td><td>Narda</td><td>766-20</td><td>-</td></tr><tr><td>D</td><td>Spectrum Analyzer</td><td>Hewlett Packard</td><td>8563E</td><td>05409</td></tr><tr><td>E</td><td>Power Meter</td><td>Hewlett Packard</td><td>438A</td><td>55652</td></tr><tr><td>F</td><td>Directional Coupler</td><td>Narda</td><td>3002-20</td><td>02845-</td></tr><tr><td>G</td><td>Terminal (PC)</td><td>Dell w/ Procom</td><td>-</td><td>-</td></tr><tr><td>H</td><td>10 dB Attenuator</td><td>Narda</td><td>765-10</td><td>-</td></tr><tr><td>I</td><td>30 dB Attenuator</td><td>Narda.</td><td>766-30</td><td>-</td></tr><tr><td>J</td><td>Diplexer/LNA</td><td>Phase Atlantic</td><td>WGE-0090-00</td><td>COM9800396</td></tr><tr><td>K</td><td>Plotter</td><td>Hewlett Packard</td><td>7475A</td><td>21242</td></tr></tbody></table>								TYPE	MANUFACTURER	MODEL	SER. NO.	A	High Power Amplifier	Honeywell	HP700	99090157				HP600	00061939	B	Satellite Data Unit	Honeywell	SD700	00070003	C	20 dB Attenuator	Narda	766-20	-	D	Spectrum Analyzer	Hewlett Packard	8563E	05409	E	Power Meter	Hewlett Packard	438A	55652	F	Directional Coupler	Narda	3002-20	02845-	G	Terminal (PC)	Dell w/ Procom	-	-	H	10 dB Attenuator	Narda	765-10	-	I	30 dB Attenuator	Narda.	766-30	-	J	Diplexer/LNA	Phase Atlantic	WGE-0090-00	COM9800396	K	Plotter	Hewlett Packard	7475A	21242
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REV LTR	TEST PROCEDURES AND DATA:	TEST NO: 1
	4.0 BLOCK DIAGRAM OF TEST SETUP: <pre> graph LR G[G] --- B[B] B --- C[C] C --- A[A] A --- J[J] J --- H[H] H --- F[F] F --- I[I] F --- E[E] I --- D[D] D --- K[K] </pre>	

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REV LTR	TEST PROCEDURES AND DATA: TEST NO: 1 5.0 PROCEDURE: 1. Connect the equipment as shown in the block diagram in Section 4.0 of test number 1. 2. Using the terminal, set the SDU back-off attenuator to 0 dB. (This is the nominal back-off setting.) 3. Using the terminal, set the SDU to transmit a CW carrier on channel 1 at 1643.500 MHz. 4. For the 20W HPA, using the terminal set the HPA back-off attenuator to produce 11.2 dBm $\pm$ 0.5 dB level on the power meter. (This level corresponds to 20 W $\pm$ 2.2 W at the HPA RF connector.) Record this reading. 5. For the 40W HPA, using the terminal set the HPA back-off attenuator to produce 14.2 dBm $\pm$ 0.5 dB level on power meter. (This level corresponds to 40 W $\pm$ 5 W at the HPA RF connector.) Record this reading. 6. Using the terminal, set the channel frequency to 1626.500 MHz and record the power reading. 7. Using the terminal, set the channel frequency to 1660.500 MHz and record the power reading. 8. For the 20W HPA, repeat steps 3, 4, 6, and 7 for channel numbers two through eight. 9. For the 40W HPA, repeat steps 3, 5, 6, and 7 for channel numbers two through eight. NOTE 1: The total L-band loss between HPA TX port and the power meter is 31.8 dB. This includes the insertion loss of the diplexer, attenuator, directional coupler, and cable losses. NOTE 2: The primary input power voltage tolerance is 115V $\pm$ 10 percent and the frequency tolerance is 400 Hz $\pm$ 2 percent. 6.0 DATA <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="text-align: left;">FREQUENCY [MHz]</th> <th colspan="8">Transmitted Power With 20W HPA (dBm)</th> </tr> <tr> <th></th> <th>Ch 1</th> <th>CH 2</th> <th>Ch 3</th> <th>Ch 4</th> <th>Ch 5</th> <th>Ch 6</th> <th>Ch 7</th> <th>Ch 8</th> </tr> <tr> <td>1626.500</td> <td>43.0</td> <td>43.0</td> <td>43.2</td> <td>43.0</td> <td>43.2</td> <td>43.2</td> <td>43.1</td> <td>43.1</td> </tr> <tr> <td>1643.500</td> <td>43.0</td> <td>43.0</td> <td>43.1</td> <td>43.1</td> <td>43.0</td> <td>43.1</td> <td>43.0</td> <td>43.1</td> </tr> <tr> <td>1660.500</td> <td>42.0</td> <td>42.1</td> <td>42.0</td> <td>42.1</td> <td>42.1</td> <td>42.0</td> <td>42.2</td> <td>42.1</td> </tr> </table> TEST PERFORMED BY: <u>Pete Bailey</u> DATE: <u>10/2/00</u>	FREQUENCY [MHz]	Transmitted Power With 20W HPA (dBm)									Ch 1	CH 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8	1626.500	43.0	43.0	43.2	43.0	43.2	43.2	43.1	43.1	1643.500	43.0	43.0	43.1	43.1	43.0	43.1	43.0	43.1	1660.500	42.0	42.1	42.0	42.1	42.1	42.0	42.2	42.1
FREQUENCY [MHz]	Transmitted Power With 20W HPA (dBm)																																													
	Ch 1	CH 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8																																						
1626.500	43.0	43.0	43.2	43.0	43.2	43.2	43.1	43.1																																						
1643.500	43.0	43.0	43.1	43.1	43.0	43.1	43.0	43.1																																						
1660.500	42.0	42.1	42.0	42.1	42.1	42.0	42.2	42.1																																						

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TEST PROCEDURES AND DATA: TEST NO: 1																																															
<table><tr><th rowspan="2">FREQUENCY [MHz]</th><th colspan="8">Transmitted Power With 40W HPA (dBm)</th></tr><tr><th>Ch 1</th><th>CH 2</th><th>Ch 3</th><th>Ch 4</th><th>Ch 5</th><th>Ch 6</th><th>Ch 7</th><th>Ch 8</th></tr><tr><td>1626.500</td><td>46.0</td><td>45.9</td><td>46.0</td><td>46.0</td><td>46.2</td><td>46.2</td><td>46.0</td><td>46.0</td></tr><tr><td>1643.500</td><td>46.4</td><td>46.3</td><td>46.3</td><td>46.3</td><td>46.5</td><td>46.3</td><td>46.3</td><td>46.3</td></tr><tr><td>1660.500</td><td>45.8</td><td>45.8</td><td>45.8</td><td>45.9</td><td>46.1</td><td>45.9</td><td>45.9</td><td>45.7</td></tr></table>				FREQUENCY [MHz]	Transmitted Power With 40W HPA (dBm)								Ch 1	CH 2	Ch 3	Ch 4	Ch 5	Ch 6	Ch 7	Ch 8	1626.500	46.0	45.9	46.0	46.0	46.2	46.2	46.0	46.0	1643.500	46.4	46.3	46.3	46.3	46.5	46.3	46.3	46.3	1660.500	45.8	45.8	45.8	45.9	46.1	45.9	45.9	45.7
FREQUENCY [MHz]	Transmitted Power With 40W HPA (dBm)																																														
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1660.500	45.8	45.8	45.8	45.9	46.1	45.9	45.9	45.7																																							
TEST PERFORMED BY: Pete Bailey DATE: 10/2/00																																															
Honeywell	AW/CRITICAL NOTATION																																														
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REV LTR	TEST PROCEDURES AND DATA: TEST NO: 2					
	1.0 DESCRIPTION OF TEST: Frequency Stability (Temperature)					
	2.0 SPECIFICATIONS: 47 CFR 87.133					
	47 CFR 2.995a					
	3.0 EQUIPMENT REQUIRED:					
	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO.</u>		
	A Satellite Data Unit	Honeywell	SD700	0007003		
	B Microwave Counter	Hewlett Packard	5361B	D401084		
	C Terminal (PC)	Dell w/Procom	-			
	4.0 BLOCK DIAGRAM OF TEST SETUP:					
	C A B					
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		SECURITY NOTATION		SUPPLEMENTS		

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			CAGE CODE	55939	
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REV LTR					
	TEST PROCEDURES AND DATA: _____ TEST NO: <u>2</u> 5.0 PROCEDURE: 1. Connect the equipment as shown in the block diagram in Section 4.0 of test number 2. 2. Using the terminal, set the SDU back-off attenuator to 0 dB. (This is the nominal back-off setting.) 3. Using the terminal, set the SDU to transmit a CW carrier on channel 1 at 1643.5 MHz. 4. Measure the output frequency. 5. Repeat steps 3 and 4 with 1626.5 and 1660.5 MHz frequencies selected. 6. The output frequency is to be measured at -55C, -50C, and at 10 degree increments from -50C to +70C. <u>NOTE:</u> Since frequency stability is totally dependent upon the SDU, no HPA was used for this measurement.				
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TEST PROCEDURES AND DATA: TEST NO: 2																																																																		
6.0 DATA																																																																		
<table><tr><th>TEMP [°C]</th><th>MEASURED FREQUENCY WITH 1626.5 MHz SELECTED</th><th>MEASURED FREQUENCY WITH 1643.5 MHz SELECTED</th><th>MEASURED FREQUENCY WITH 1660.5 MHz SELECTED</th></tr><tr><td>-55</td><td>1626500015 Hz</td><td>1643500018 Hz</td><td>1660500021 Hz</td></tr><tr><td>-50</td><td>1626500014 Hz</td><td>1643500018 Hz</td><td>1660500021 Hz</td></tr><tr><td>-40</td><td>1626500014 Hz</td><td>1643500018 Hz</td><td>1660500021 Hz</td></tr><tr><td>-30</td><td>1626500013 Hz</td><td>1643500017 Hz</td><td>1660500021 Hz</td></tr><tr><td>-20</td><td>1626500016 Hz</td><td>1643500018 Hz</td><td>1660500022 Hz</td></tr><tr><td>-10</td><td>1626500015 Hz</td><td>1643500018 Hz</td><td>1660500022 Hz</td></tr><tr><td>0</td><td>1626500015 Hz</td><td>1643500018 Hz</td><td>1660500022 Hz</td></tr><tr><td>+10</td><td>1626500014 Hz</td><td>1643500018 Hz</td><td>1660500021 Hz</td></tr><tr><td>+20</td><td>1626500014 Hz</td><td>1643500018 Hz</td><td>1660500021 Hz</td></tr><tr><td>+30</td><td>1626500014 Hz</td><td>1643500018 Hz</td><td>1660500022 Hz</td></tr><tr><td>+40</td><td>1626500014 Hz</td><td>1643500018 Hz</td><td>1660500022 Hz</td></tr><tr><td>+50</td><td>1626500013 Hz</td><td>1643500017 Hz</td><td>1660500020 Hz</td></tr><tr><td>+60</td><td>1626500013 Hz</td><td>1643500016 Hz</td><td>1660500020 Hz</td></tr><tr><td>+70</td><td>1626500010 Hz</td><td>1643500013 Hz</td><td>1660500016 Hz</td></tr></table>							TEMP [°C]	MEASURED FREQUENCY WITH 1626.5 MHz SELECTED	MEASURED FREQUENCY WITH 1643.5 MHz SELECTED	MEASURED FREQUENCY WITH 1660.5 MHz SELECTED	-55	1626500015 Hz	1643500018 Hz	1660500021 Hz	-50	1626500014 Hz	1643500018 Hz	1660500021 Hz	-40	1626500014 Hz	1643500018 Hz	1660500021 Hz	-30	1626500013 Hz	1643500017 Hz	1660500021 Hz	-20	1626500016 Hz	1643500018 Hz	1660500022 Hz	-10	1626500015 Hz	1643500018 Hz	1660500022 Hz	0	1626500015 Hz	1643500018 Hz	1660500022 Hz	+10	1626500014 Hz	1643500018 Hz	1660500021 Hz	+20	1626500014 Hz	1643500018 Hz	1660500021 Hz	+30	1626500014 Hz	1643500018 Hz	1660500022 Hz	+40	1626500014 Hz	1643500018 Hz	1660500022 Hz	+50	1626500013 Hz	1643500017 Hz	1660500020 Hz	+60	1626500013 Hz	1643500016 Hz	1660500020 Hz	+70	1626500010 Hz	1643500013 Hz	1660500016 Hz
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Maximum deviation: 12 Hz Acceptance limit: 320 Hz																																																																		
TEST PERFORMED BY: Pete Bailey DATE: 10/2/00																																																																		
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REV LTR	TEST PROCEDURES AND DATA: TEST NO: 3					
	1.0 DESCRIPTION OF TEST: Frequency Stability (input power)					
	2.0 SPECIFICATIONS: 47 CFR 87.133					
	47 CFR 2.995a					
	3.0 EQUIPMENT REQUIRED:					
	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO.</u>		
	A Satellite Data Unit	Honeywell	SD700	0007003		
	B Microwave Counter	Hewlett Packard	5361B	D401084		
	C Power Supply	California Instruments	1501TPM	L38383		
	D Terminal (PC)	Dell w/Procom	-			
	4.0 BLOCK DIAGRAM OF TEST SETUP:					
	D A C B					
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REV LTR																																																																										
TEST PROCEDURES AND DATA:		TEST NO: 3																																																																								
5.0 PROCEDURE: Frequency versus input power voltage and frequency: 1. Connect the equipment as shown in the block diagram in Section 4.0 of test number 3. 2. Using the terminal, set the SDU back-off attenuator to 0 dB. (This is the nominal back-off setting.) 3. Using the terminal, set the SDU to transmit a CW carrier on channel 1 at 1643.5 MHz. 4. Measure the output frequency with the input voltages and frequencies shown below. 5. Repeat the procedure for channels two through eight.																																																																										
6.0 DATA																																																																										
<table><tr><th rowspan="2">POWER SUPPLY VOLT. [V_{RMS}]</th><th rowspan="2">POWER SUPPLY FREQ. [Hz]</th><th colspan="4">Transmit Frequency (Hz)</th></tr><tr><th>Channel 1</th><th>Channel 2</th><th>Channel 3</th><th>Channel 4</th></tr><tr><td>103.5</td><td>392</td><td>1643500019</td><td>1643500019</td><td>1643500019</td><td>1643500019</td></tr><tr><td>103.5</td><td>408</td><td>1643500019</td><td>1643500019</td><td>1643500019</td><td>1643500019</td></tr><tr><td>126.5</td><td>392</td><td>1643500019</td><td>1643500019</td><td>1643500019</td><td>1643500019</td></tr><tr><td>126.5</td><td>408</td><td>1643500019</td><td>1643500019</td><td>1643500019</td><td>1643500019</td></tr></table> <table><tr><th rowspan="2">POWER SUPPLY VOLT. [V_{RMS}]</th><th rowspan="2">POWER SUPPLY FREQ. [Hz]</th><th colspan="4">Transmit Frequency (Hz)</th></tr><tr><th>Channel 5</th><th>Channel 6</th><th>Channel 7</th><th>Channel 8</th></tr><tr><td>103.5</td><td>392</td><td>1643500019</td><td>1643500019</td><td>1643500019</td><td>1643500019</td></tr><tr><td>103.5</td><td>408</td><td>1643500019</td><td>1643500019</td><td>1643500019</td><td>1643500019</td></tr><tr><td>126.5</td><td>392</td><td>1643500019</td><td>1643500019</td><td>1643500019</td><td>1643500019</td></tr><tr><td>126.5</td><td>408</td><td>1643500019</td><td>1643500019</td><td>1643500019</td><td>1643500019</td></tr></table>							POWER SUPPLY VOLT. [V _{RMS}]	POWER SUPPLY FREQ. [Hz]	Transmit Frequency (Hz)				Channel 1	Channel 2	Channel 3	Channel 4	103.5	392	1643500019	1643500019	1643500019	1643500019	103.5	408	1643500019	1643500019	1643500019	1643500019	126.5	392	1643500019	1643500019	1643500019	1643500019	126.5	408	1643500019	1643500019	1643500019	1643500019	POWER SUPPLY VOLT. [V _{RMS}]	POWER SUPPLY FREQ. [Hz]	Transmit Frequency (Hz)				Channel 5	Channel 6	Channel 7	Channel 8	103.5	392	1643500019	1643500019	1643500019	1643500019	103.5	408	1643500019	1643500019	1643500019	1643500019	126.5	392	1643500019	1643500019	1643500019	1643500019	126.5	408	1643500019	1643500019	1643500019	1643500019
POWER SUPPLY VOLT. [V _{RMS}]	POWER SUPPLY FREQ. [Hz]	Transmit Frequency (Hz)																																																																								
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TEST PERFORMED BY: Pete BaileyDATE: 10/5/00																																																																										
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REV LTR	TEST PROCEDURES AND DATA: TEST NO: 4 1.0 DESCRIPTION OF TEST: Occupied Bandwidth 2.0 SPECIFICATIONS: 47 CFR 87.1337 47 CFR 2.989 3.0 EQUIPMENT REQUIRED: <table style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 35%; text-align: left;"><u>TYPE</u></th> <th style="width: 25%; text-align: left;"><u>MANUFACTURER</u></th> <th style="width: 20%; text-align: left;"><u>MODEL</u></th> <th style="width: 15%; text-align: left;"><u>SER. NO.</u></th> </tr> </thead> <tbody> <tr> <td>A</td> <td>High Power Amplifier</td> <td>Honeywell</td> <td>HP700</td> <td>99090157</td> </tr> <tr> <td></td> <td></td> <td></td> <td>HP600</td> <td>00061939</td> </tr> <tr> <td>B</td> <td>Satellite Data Unit</td> <td>Honeywell</td> <td>SD700</td> <td>00070003</td> </tr> <tr> <td>C</td> <td>20 dB Attenuator</td> <td>Narda</td> <td>766-20</td> <td>-</td> </tr> <tr> <td>D</td> <td>Spectrum Analyzer</td> <td>Hewlett Packard</td> <td>8563E</td> <td>05409</td> </tr> <tr> <td>E</td> <td>Power Meter</td> <td>Hewlett Packard</td> <td>438A</td> <td>55652</td> </tr> <tr> <td>F</td> <td>Directional Coupler</td> <td>Narda</td> <td>3002-20</td> <td>02845-</td> </tr> <tr> <td>G</td> <td>Terminal (PC)</td> <td>Dell w/ Procom</td> <td>-</td> <td>-</td> </tr> <tr> <td>H</td> <td>10 dB Attenuator</td> <td>Narda</td> <td>765-10</td> <td>-</td> </tr> <tr> <td>I</td> <td>30 dB Attenuator</td> <td>Narda.</td> <td>766-30</td> <td>-</td> </tr> <tr> <td>J</td> <td>Diplexer/LNA</td> <td>Phase Atlantic</td> <td>WGE-0090-00</td> <td>COM9800396</td> </tr> <tr> <td>K</td> <td>Plotter</td> <td>Hewlett Packard</td> <td>7475A</td> <td>21242</td> </tr> </tbody> </table>		<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO.</u>	A	High Power Amplifier	Honeywell	HP700	99090157				HP600	00061939	B	Satellite Data Unit	Honeywell	SD700	00070003	C	20 dB Attenuator	Narda	766-20	-	D	Spectrum Analyzer	Hewlett Packard	8563E	05409	E	Power Meter	Hewlett Packard	438A	55652	F	Directional Coupler	Narda	3002-20	02845-	G	Terminal (PC)	Dell w/ Procom	-	-	H	10 dB Attenuator	Narda	765-10	-	I	30 dB Attenuator	Narda.	766-30	-	J	Diplexer/LNA	Phase Atlantic	WGE-0090-00	COM9800396	K	Plotter	Hewlett Packard	7475A	21242
	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO.</u>																																																														
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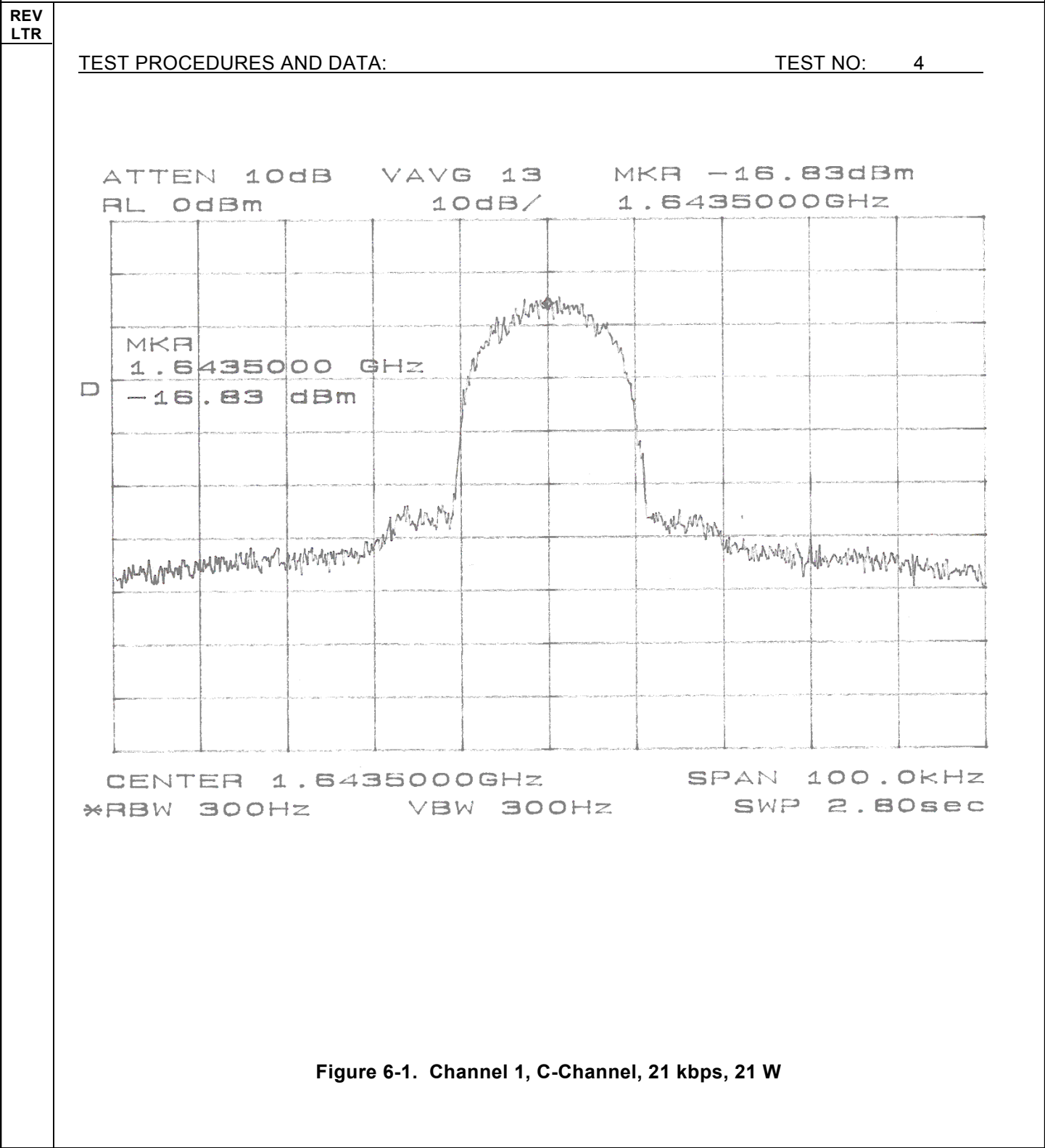
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TEST PROCEDURES AND DATA: TEST NO: 4						
4.0 BLOCK DIAGRAM OF TEST SETUP:						
G B C A J H F I E D K						
Honeywell		AW/CRITICAL NOTATION				
		SECURITY NOTATION		SUPPLEMENTS		22 PAGE

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	SEE THE TITLE PAGE FOR PROPRIETARY AND DATA RIGHTS NOTATIONS.		

REV LTR	TEST PROCEDURES AND DATA: TEST NO: 4 5.0 PROCEDURE: 1. Set the spectrum analyzer as follows for the various channel types. <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="text-align: center;">Channel Type</th> <th style="text-align: center;">Span</th> <th style="text-align: center;">RBW</th> <th style="text-align: center;">VBW</th> <th style="text-align: center;">Vertical Res</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">C21k</td> <td style="text-align: center;">100 kHz</td> <td style="text-align: center;">300 Hz</td> <td style="text-align: center;">300 Hz</td> <td style="text-align: center;">10 dB/</td> </tr> <tr> <td style="text-align: center;">P600</td> <td style="text-align: center;">6 kHz</td> <td style="text-align: center;">30 Hz</td> <td style="text-align: center;">300 Hz</td> <td style="text-align: center;">10 dB/</td> </tr> <tr> <td style="text-align: center;">P1200</td> <td style="text-align: center;">10 kHz</td> <td style="text-align: center;">30 Hz</td> <td style="text-align: center;">300 Hz</td> <td style="text-align: center;">10 dB/</td> </tr> <tr> <td style="text-align: center;">P10.5k</td> <td style="text-align: center;">50 kHz</td> <td style="text-align: center;">300 Hz</td> <td style="text-align: center;">300 Hz</td> <td style="text-align: center;">10 dB/</td> </tr> <tr> <td style="text-align: center;">C8.4k</td> <td style="text-align: center;">50 kHz</td> <td style="text-align: center;">300 Hz</td> <td style="text-align: center;">300 Hz</td> <td style="text-align: center;">10 dB/</td> </tr> </tbody> </table> 2. Connect the equipment a shown in the block diagram in Section 4 of test number 4. 3. Using the terminal set the SDU back-off attenuator to 0 dB. (This is the nominal back-off setting.) 4. Using the terminal set the SDU to transmit a CW carrier on channel 1 at 1643.5 MHz. 5. For the 20W HPA, using the terminal, set the HPA back-off attenuator to produce 11.2 dBm on the power meter. This level equals 20 W at the HPA RF antenna port. 6. For the 40W HPA, using the terminal, set the HPA back-off attenuator to produce 14.2 dBm on the power meter. This level equals 40 W at the HPA RF antenna port. 7. Using the terminal, set the SDU to transmit at 1643.5 MHz for each of the channel types listed in the table above. The C21k channel will yield the widest bandwidth in the transmit spectrum due to the highest bit rate. 8. Capture the spectrum analyzer display for each channel type and with numerical analysis determine the energy distribution. 9. The results of the analysis are shown on the page following the spectrum of the signal. The frequency column indicates the frequency distance from the spectrum center. The Pwr (lower) column lists the amplitude in the lower band (i.e. below the center), while the Pwr (upper) is for the upper band. The Pwr (total) column shows the cumulative power, and the Pwr (in band) column shows the power distribution in percent for the total power in the frequency band. 10. The first five spectrum analyzer plots and tabulated data were taken with the 20W HPA in place, the second five with the 40W HPA in place.	Channel Type	Span	RBW	VBW	Vertical Res	C21k	100 kHz	300 Hz	300 Hz	10 dB/	P600	6 kHz	30 Hz	300 Hz	10 dB/	P1200	10 kHz	30 Hz	300 Hz	10 dB/	P10.5k	50 kHz	300 Hz	300 Hz	10 dB/	C8.4k	50 kHz	300 Hz	300 Hz	10 dB/
Channel Type	Span	RBW	VBW	Vertical Res																											
C21k	100 kHz	300 Hz	300 Hz	10 dB/																											
P600	6 kHz	30 Hz	300 Hz	10 dB/																											
P1200	10 kHz	30 Hz	300 Hz	10 dB/																											
P10.5k	50 kHz	300 Hz	300 Hz	10 dB/																											
C8.4k	50 kHz	300 Hz	300 Hz	10 dB/																											

Honeywell	AW/CRITICAL NOTATION		
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		CAGE CODE	55939	
	SEE THE TITLE PAGE FOR PROPRIETARY AND DATA RIGHTS NOTATIONS.			
REV LTR				
	TEST PROCEDURES AND DATA:TEST NO: 4 Spectrum #1: Channel 1, C-Channel, 21 kbps, 21.0 W Spectrum #2: Channel 1, P-Channel, 600 bps, 21.2 W Spectrum #3: Channel 1, P-Channel, 1.2 kbps, 21.4 W Spectrum #4: Channel 1, P-Channel, 10.5 kbps, 21.6 W Spectrum #5: Channel 1, C-Channel, 8.4 kbps, 21.2 W Spectrum #6: Channel 1, C-Channel, 21 kbps, 44.7 W Spectrum #7: Channel 1, P-Channel, 600 bps, 43.7 W Spectrum #8: Channel 1, P-Channel, 1.2 kbps, 44.3 W Spectrum #9: Channel 1, P-Channel, 10.5 kbps, 45.5 W Spectrum #10: Channel 1, C-Channel, 8.4 kbps, 45.0 W Frequency for all conditions: 1643.5 6.0 DATA The data are presented on the following pages of this test: Limit: 25 kHz			
Honeywell	AW/CRITICAL NOTATION			
	SECURITY NOTATION	SUPPLEMENTS	24 PAGE	



ENGINEERING SPECIFICATION		SECURITY NOTATION		SPEC NO. EB7516219		SEE PAGE INDEX FOR THIS SHEET REV LETTER																																																																																																																																																																																											
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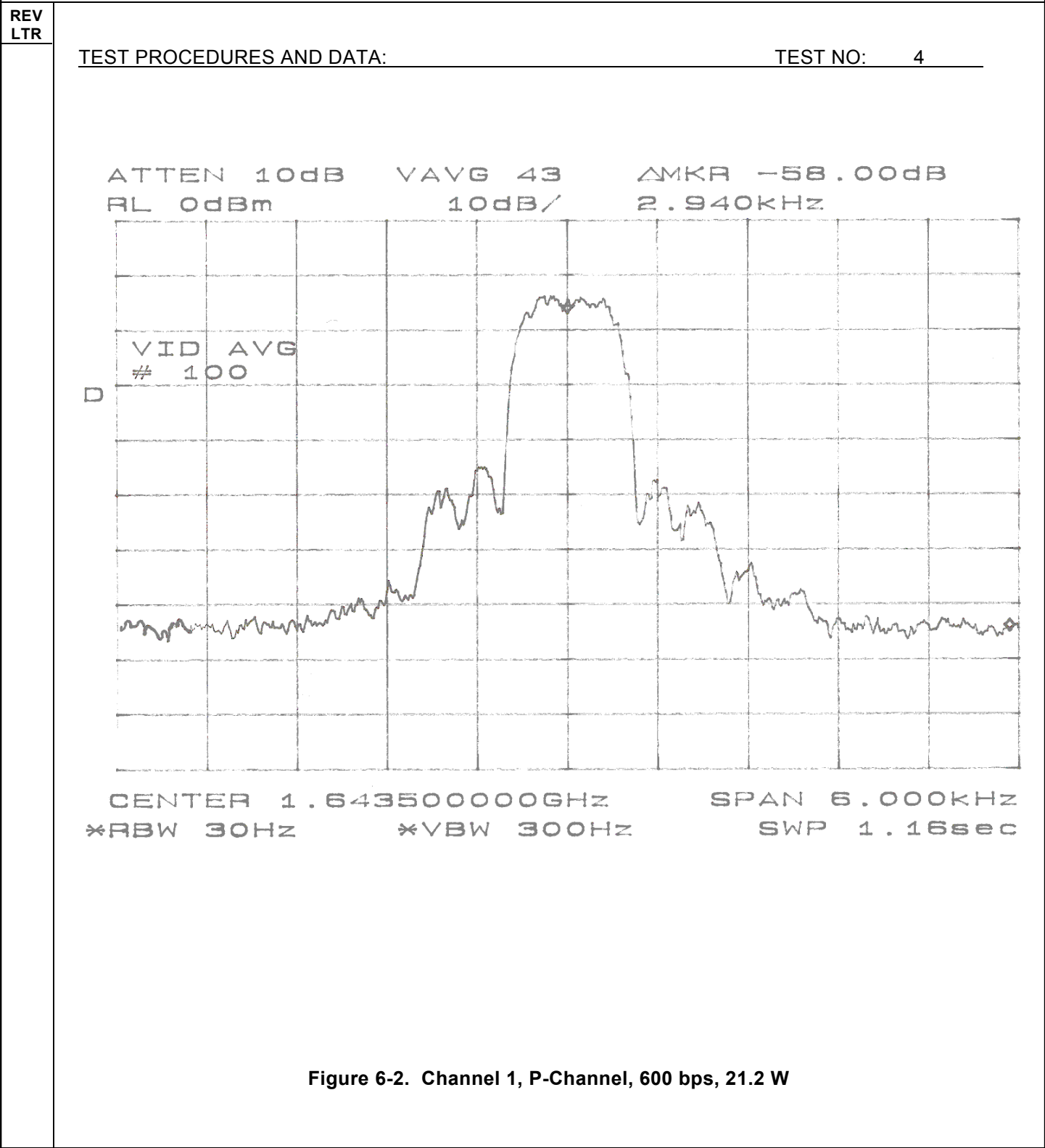
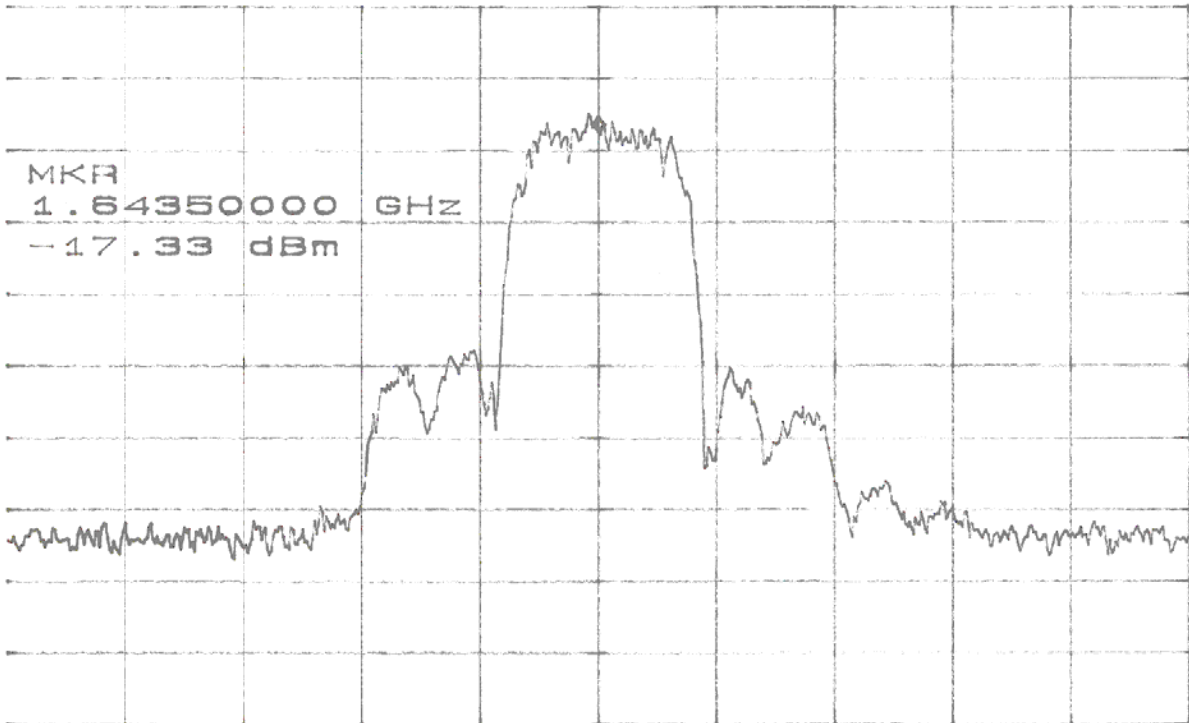


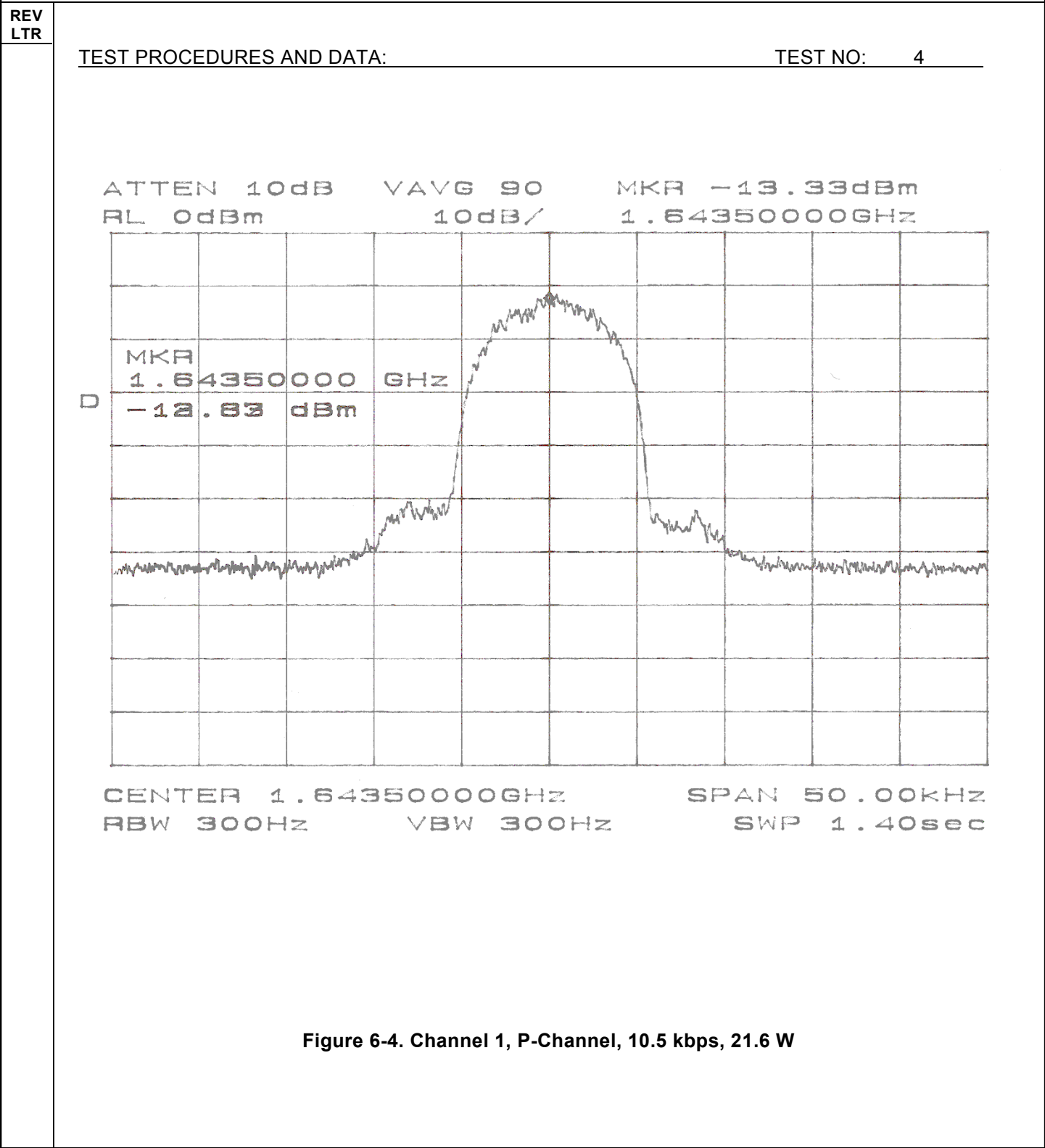
Figure 6-2. Channel 1, P-Channel, 600 bps, 21.2 W

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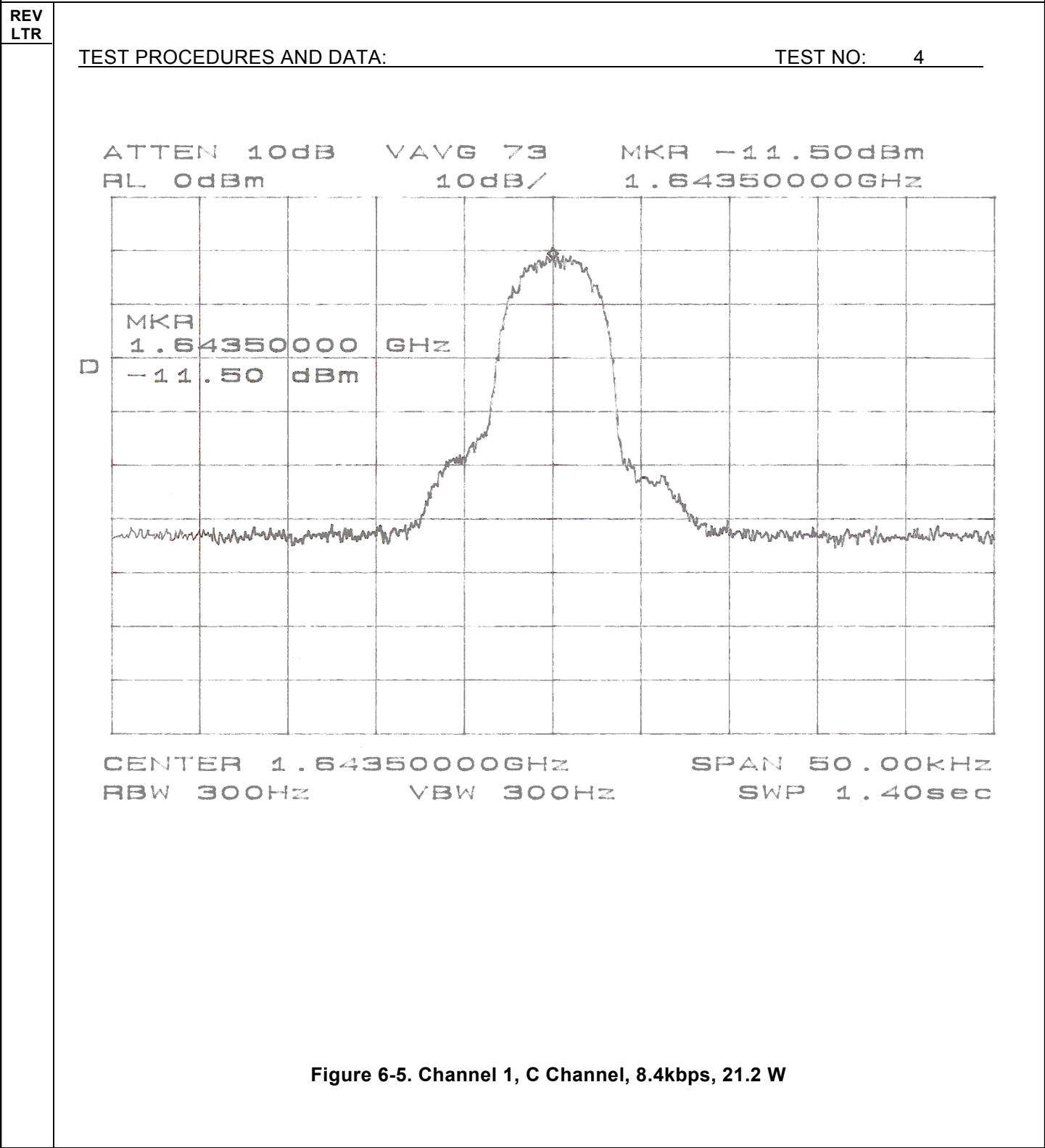
REV LTR	TEST PROCEDURES AND DATA:		TEST NO: 4	
ATTEN 10dB VAVG 34 MKR -17.33dBm RL 0dBm 10dB/ 1.64350000GHz MKR 1.64350000 GHz -17.33 dBm  CENTER 1.64350000GHz SPAN 10.00kHz *RBW 30Hz *VBW 300Hz SWP 1.92sec				
Figure 6-3. Channel 1, P-Channel, 1200 bps, 21.4 W				

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	SECURITY NOTATION	SUPPLEMENTS	29 PAGE

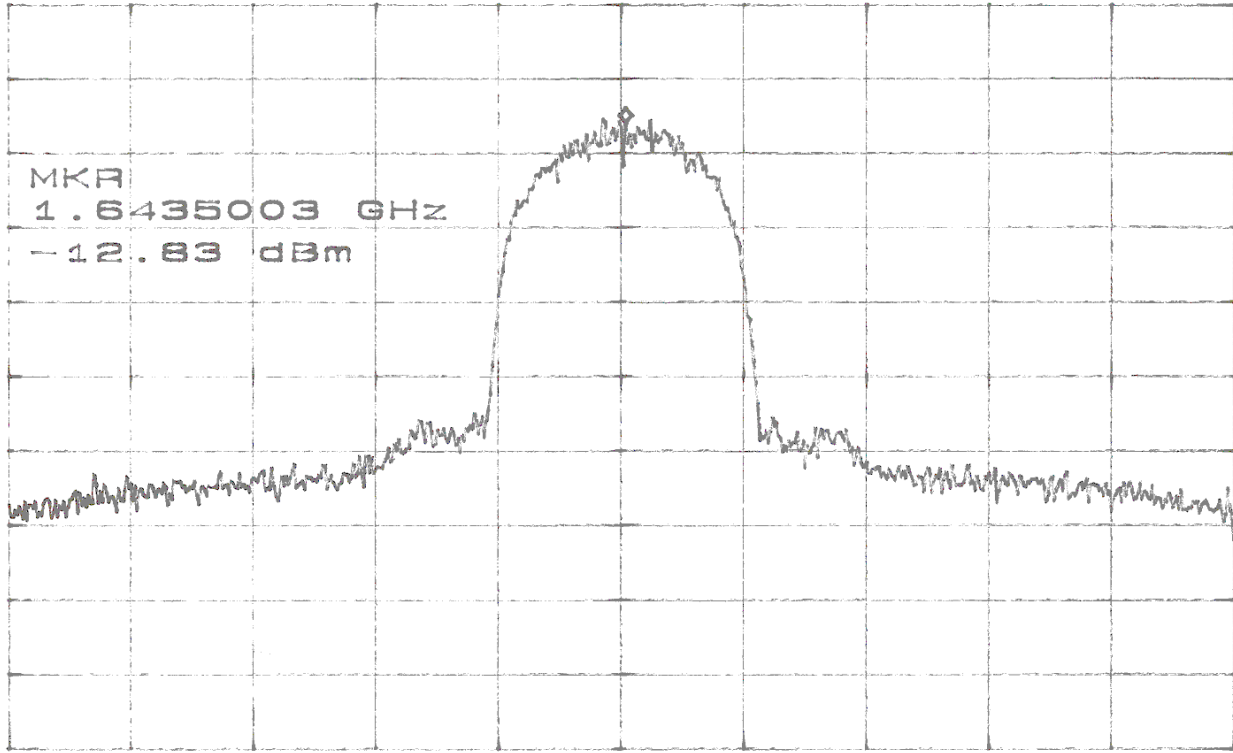
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ENGINEERING SPECIFICATION	SECURITY NOTATION	SPEC NO. EB7516219	SEE PAGE INDEX FOR THIS SHEET REV LETTER
		CAGE CODE 55939	
	SEE THE TITLE PAGE FOR PROPRIETARY AND DATA RIGHTS NOTATIONS.		

REV LTR	TEST PROCEDURES AND DATA:	TEST NO: 4
ATTEN 20dB VAVG 19 MKR -12.83dBm RL 3.0dBm 10dB/ 1.6435003GHz  CENTER 1.6435000GHz SPAN 100.0kHz *RBW 300Hz *VBW 300Hz SWP 2.80sec		
Figure 6-6. Channel 1, C Channel, 21kbps, 44.6 W		

Honeywell	AW/CRITICAL NOTATION		
	SECURITY NOTATION	SUPPLEMENTS	35 PAGE

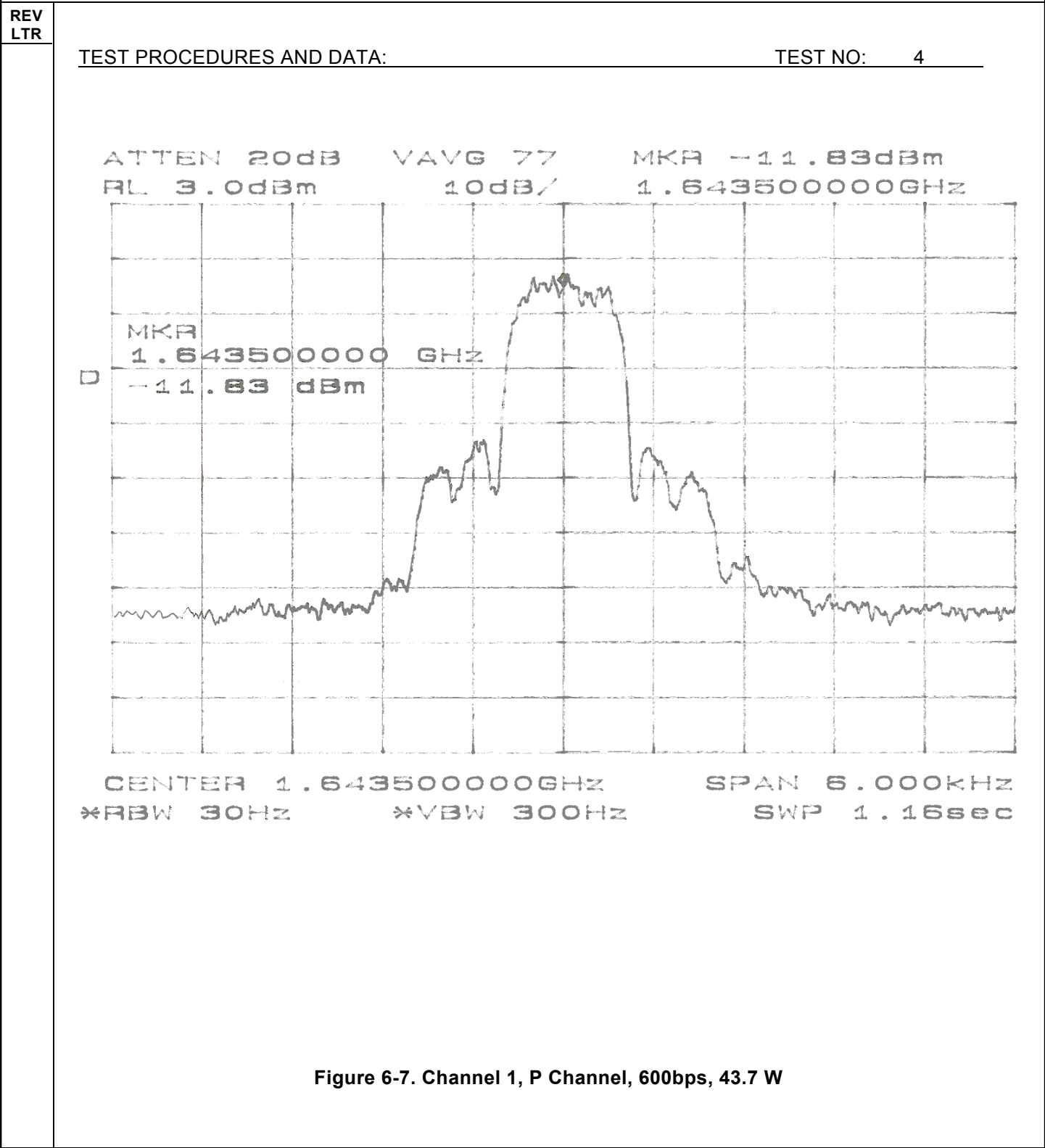
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REV LTR

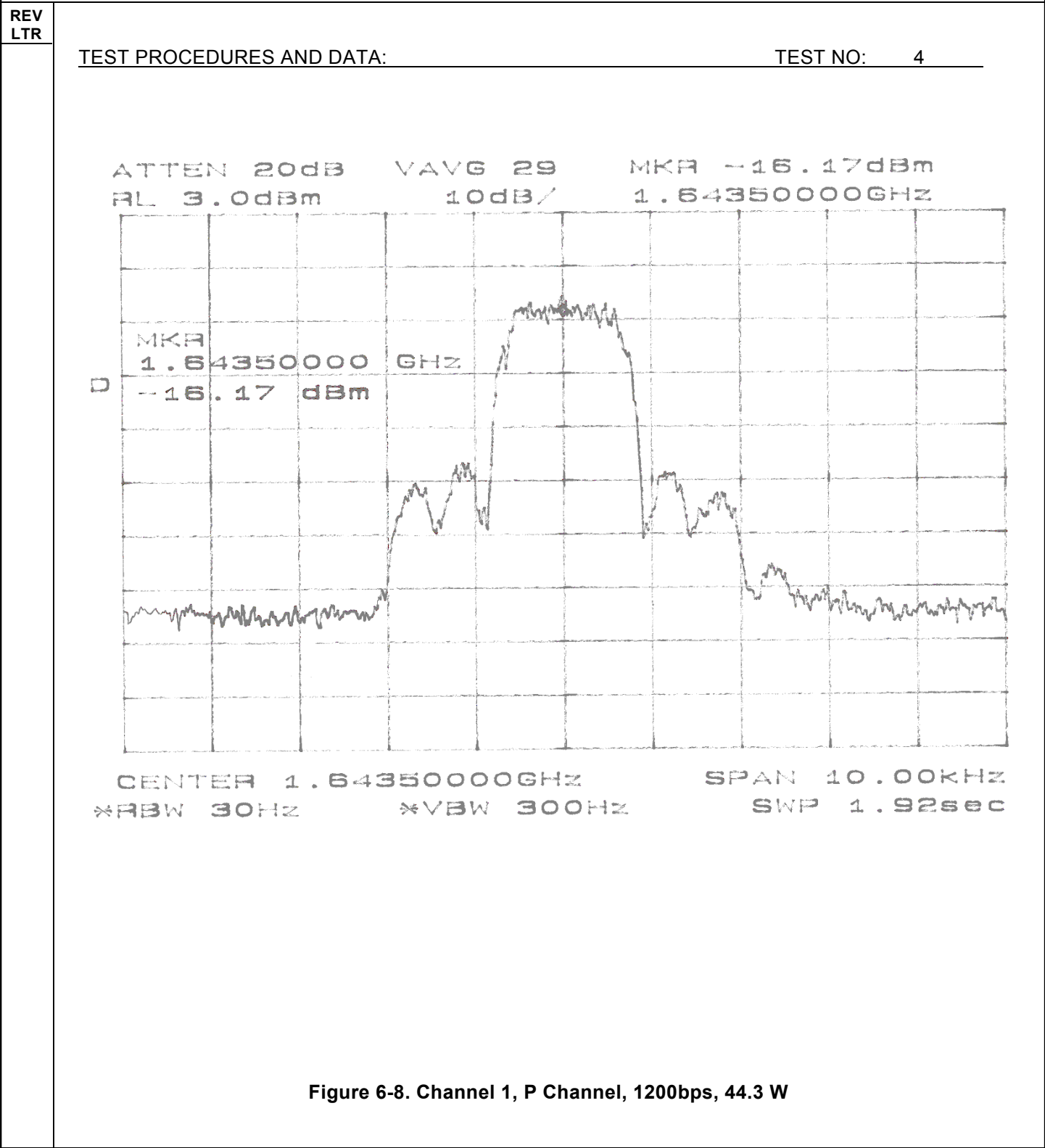
TEST PROCEDURES AND DATA:
TEST NO: 4

Occupied Bandwidth						
Date	10-4-00				40W HPA	
Tester	Bailey				HPA = 44.6W out	
					Chan 1 = C21k	
Freq (+/- kHz)	Pwr (lower) (dBm)	Pwr (upper) (dBm)	Pwr (lower) (mw)	Pwr (upper) (mw)	Pwr (total) (mw)	Pwr (in band) (%)
0	-13.0	N/A	0.0501	0.0000	0.0501	9.58
1	-13.0	-13.2	0.0501	0.0479	0.1481	28.30
2	-13.8	-12.7	0.0417	0.0537	0.2435	46.53
3	-14.0	-14.2	0.0398	0.0380	0.3213	61.40
4	-15.2	-15.0	0.0302	0.0316	0.3831	73.22
5	-15.2	-16.3	0.0302	0.0234	0.4368	83.47
6	-17.7	-17.3	0.0170	0.0186	0.4724	90.27
7	-18.3	-19.3	0.0148	0.0117	0.4989	95.34
8	-20.2	-21.0	0.0095	0.0079	0.5164	98.68
9	-24.0	-27.2	0.0040	0.0019	0.5223	99.81
10	-31.7	-35.8	0.0007	0.0003	0.5232	99.99
11	-48.2	-52.0	0.0000	0.0000	0.5233	99.99
12	-53.8	-51.5	0.0000	0.0000	0.5233	100.00
13	-54.0	-54.0	0.0000	0.0000	0.5233	100.00
14	-52.5	-53.2	0.0000	0.0000	0.5233	100.00
15	-54.5	-54.0	0.0000	0.0000	0.5233	100.00

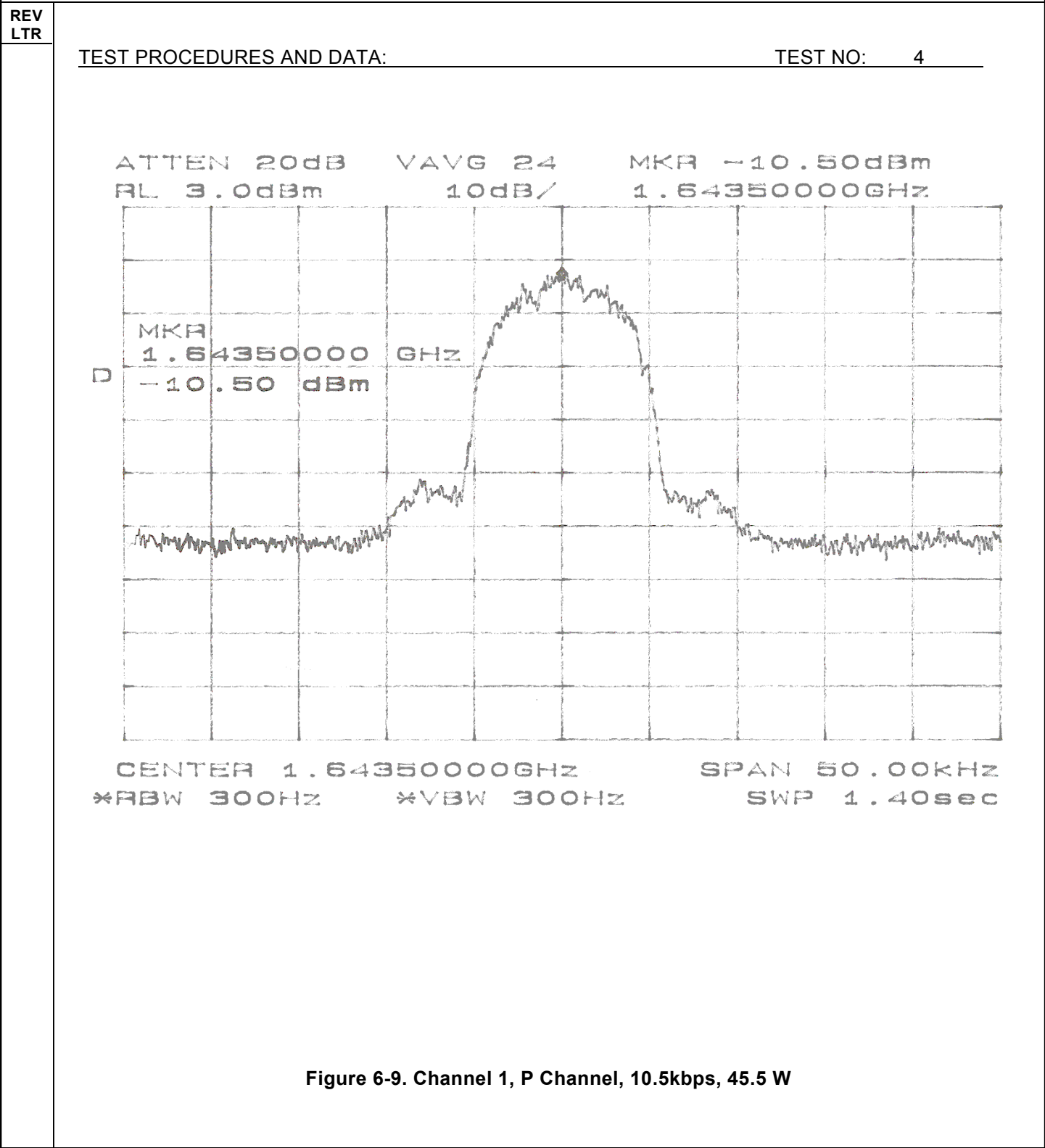
TEST PERFORMED BY: Pete Bailey
DATE: 10/2/00



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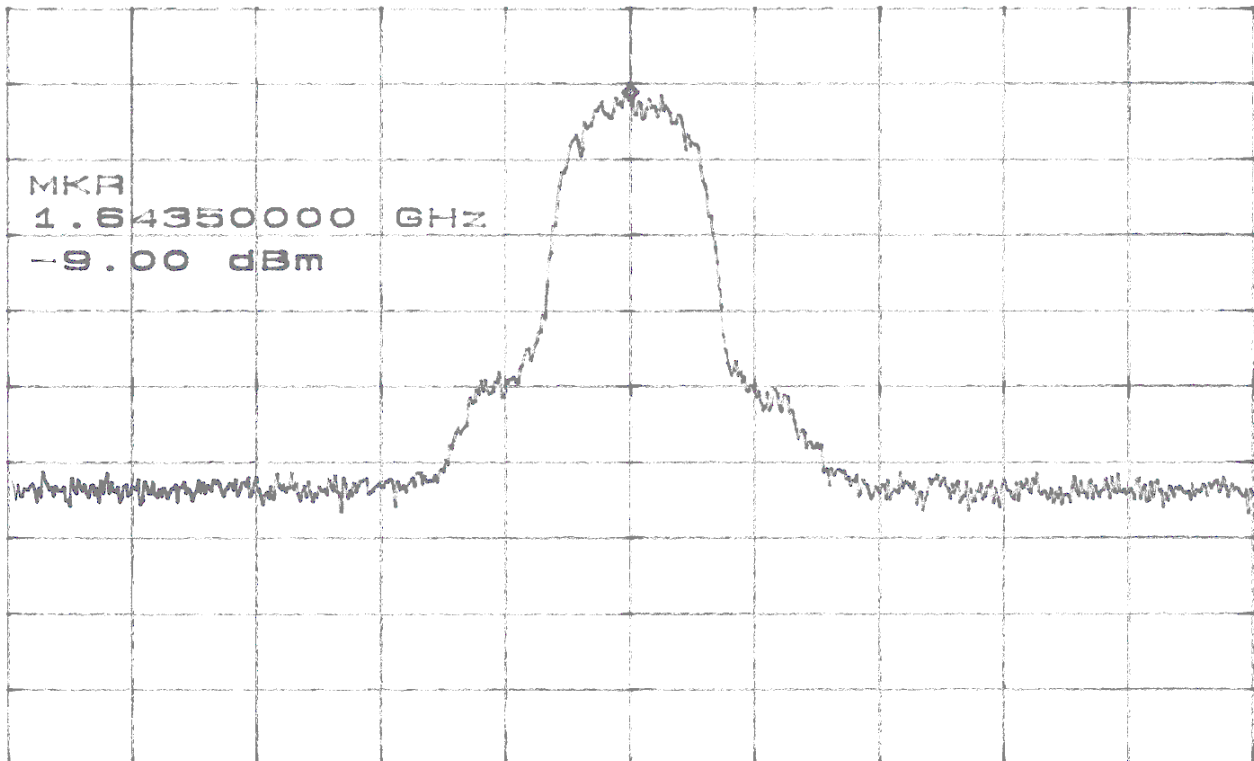


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		CAGE CODE	55939	
	SEE THE TITLE PAGE FOR PROPRIETARY AND DATA RIGHTS NOTATIONS.			

REV LTR	TEST PROCEDURES AND DATA:	TEST NO: 4
	ATTEN 20dB VAVG 26 MKR -9.00dBm RL 3.0dBm 10dB/ 1.643500000GHz D MKR 1.64350000 GHz -9.00 dBm  CENTER 1.643500000GHz SPAN 50.00KHz *RBW 300Hz *VBW 300Hz SWP 1.40sec	
	Figure 6-10. Channel 1, C Channel, 8.4kbps, 45.0 W	

Honeywell	AW/CRITICAL NOTATION		
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REV LTR						
	TEST PROCEDURES AND DATA: TEST NO: 5					
	1.0 DESCRIPTION OF TEST: Conducted Spurious emission (100 kHz and 18 GHz)					
	2.0 SPECIFICATIONS: 47 CFR 87.139					
	47 CFR 2.991					
	47 CFR 2.993					
	3.0 EQUIPMENT REQUIRED:					
	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO.</u>		
	A High Power Amplifier	Honeywell	HP700	99090157		
			HP600	00061939		
	B Satellite Data Unit	Honeywell	SD700	00070003		
	C 20 dB Attenuator	Narda	766-20	-		
	D Spectrum Analyzer	Hewlett Packard	8563E	05409		
	E Power Meter	Hewlett Packard	438A	55652		
	F Directional Coupler	Narda	3002-20	02845-		
	G Terminal (PC)	Dell w/ Procom	-	-		
	H 10 dB Attenuator	Narda	765-10	-		
	I 30 dB Attenuator	Narda.	766-30	-		
	J Diplexer/LNA	Phase Atlantic	WGE-0090-00	COM9800396		
	K Plotter	Hewlett Packard	7475A	21242		
Honeywell		AW/CRITICAL NOTATION				
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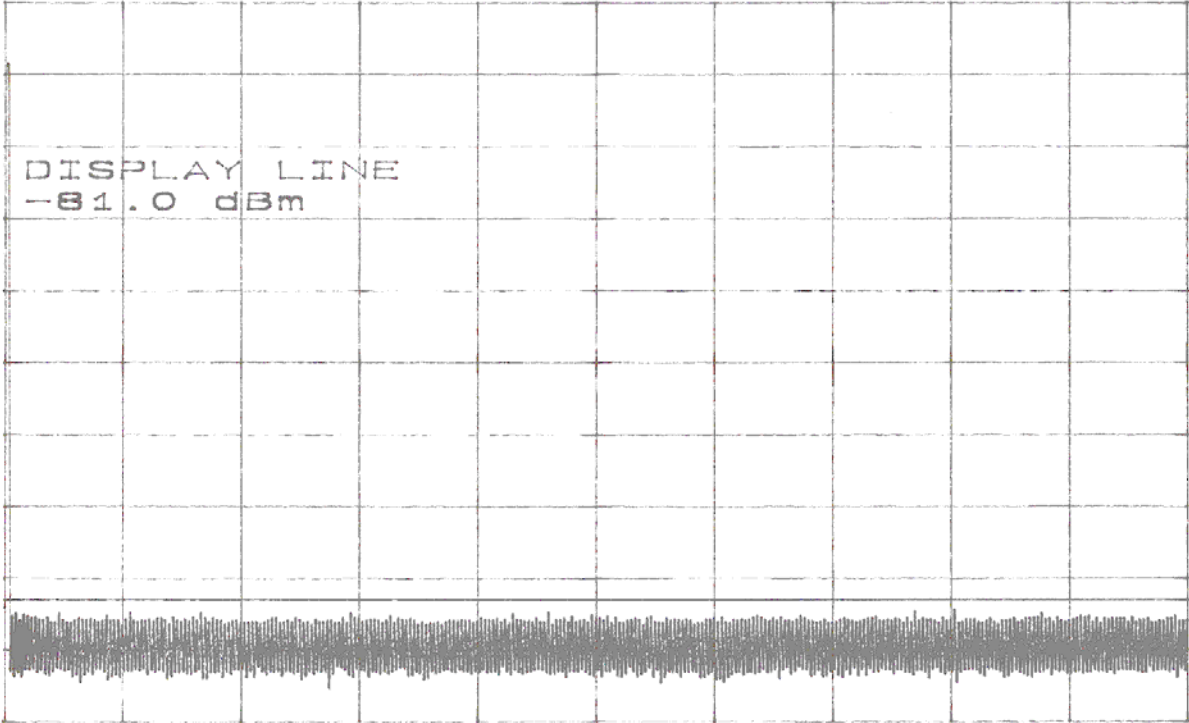
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REV LTR	TEST PROCEDURES AND DATA: TEST NO: 5		
	4.0 BLOCK DIAGRAM OF TEST SETUP: G B C A J H F I E D K		
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REV LTR	TEST PROCEDURES AND DATA: TEST NO: 5 5.0 PROCEDURE: 1. Connect the equipment a shown in block diagram in Section 4.0 of test number 5. 2. Using the terminal, set the SDU back-off attenuator to 0 dB. (This is the nominal back-off setting.) 3. Using the terminal, set the SDU to transmit a C21k modulated carrier on channel 1 at 1643.5 MHz. 4. For the 20W HPA, using the terminal, set the HPA back-off attenuator to produce 11.2 dBm on the power meter. This level equals to 20 W at the HPA RF antenna port. 5. For the 40W HPA, using the terminal, set the HPA back-off attenuator to produce 14.2 dBm on the power meter. This level equals to 40 W at the HPA RF antenna port. 6. For both the 20W and 40W HPA capture each spectrum analyzer display listed below. <table border="1" style="margin: 20px auto; width: 80%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Plot</th> <th>Center (MHz)</th> <th>Span (MHz)</th> <th>RBW (kHz)</th> <th>VBW (kHz)</th> <th>Limit (dBc)</th> </tr> </thead> <tbody> <tr><td>1</td><td>100</td><td>200</td><td>10</td><td>1</td><td>-83</td></tr> <tr><td>2</td><td>300</td><td>200</td><td>10</td><td>1</td><td>-83</td></tr> <tr><td>3</td><td>500</td><td>200</td><td>10</td><td>1</td><td>-83</td></tr> <tr><td>4</td><td>700</td><td>200</td><td>10</td><td>1</td><td>-83</td></tr> <tr><td>5</td><td>900</td><td>200</td><td>10</td><td>1</td><td>-83</td></tr> <tr><td>6</td><td>1100</td><td>500</td><td>10</td><td>1</td><td>-83</td></tr> <tr><td>7</td><td>1310</td><td>500</td><td>10</td><td>1</td><td>-83</td></tr> <tr><td>8</td><td>1542</td><td>35</td><td>10</td><td>1</td><td>-83</td></tr> <tr><td>9</td><td>1615</td><td>120</td><td>100</td><td>3</td><td>-55</td></tr> <tr><td>10</td><td>2000</td><td>800</td><td>1000</td><td>3</td><td>-55</td></tr> <tr><td>11</td><td>4000</td><td>3400</td><td>1000</td><td>3</td><td>-55</td></tr> <tr><td>12</td><td>8700</td><td>6600</td><td>1000</td><td>3</td><td>-55</td></tr> <tr><td>13</td><td>14900</td><td>6200</td><td>300</td><td>3</td><td>-55</td></tr> </tbody> </table> 6.0 DATA The data are presented on the following pages of this test. The reference output power for the 20W HPA is 23.2 watts, for the 40W HPA it is 46.4 watts.	Plot	Center (MHz)	Span (MHz)	RBW (kHz)	VBW (kHz)	Limit (dBc)	1	100	200	10	1	-83	2	300	200	10	1	-83	3	500	200	10	1	-83	4	700	200	10	1	-83	5	900	200	10	1	-83	6	1100	500	10	1	-83	7	1310	500	10	1	-83	8	1542	35	10	1	-83	9	1615	120	100	3	-55	10	2000	800	1000	3	-55	11	4000	3400	1000	3	-55	12	8700	6600	1000	3	-55	13	14900	6200	300	3	-55
Plot	Center (MHz)	Span (MHz)	RBW (kHz)	VBW (kHz)	Limit (dBc)																																																																																
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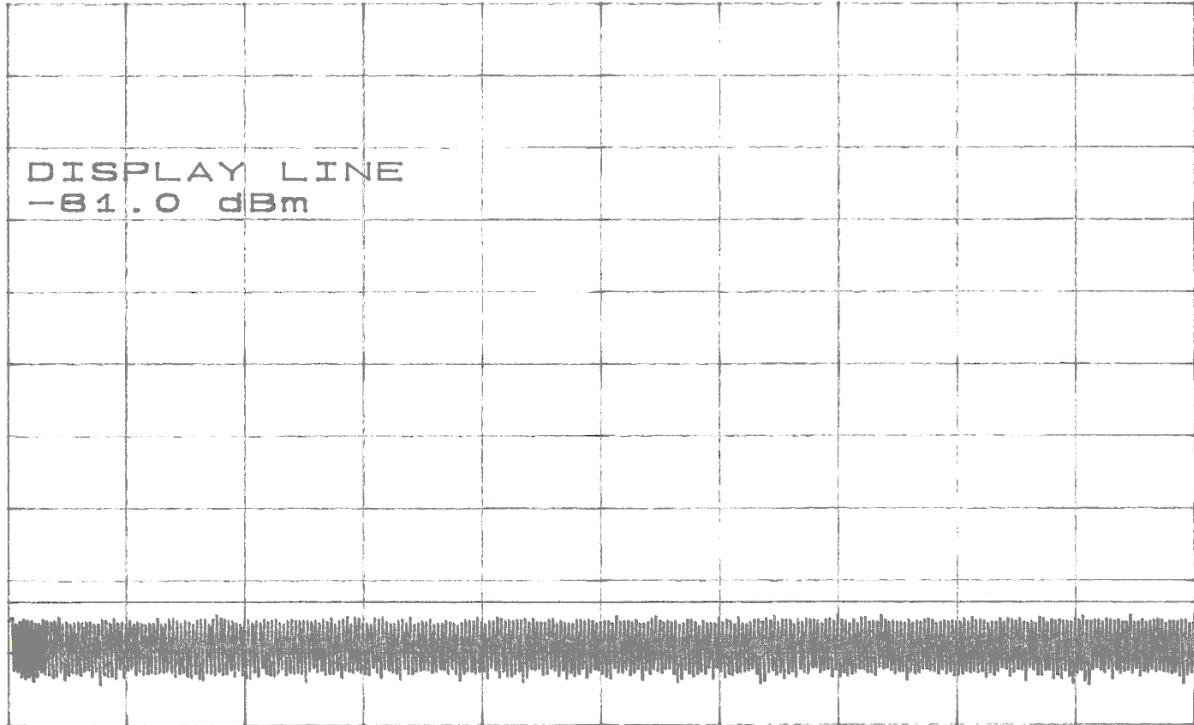
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REV LTR	TEST PROCEDURES AND DATA:				TEST NO: 5			
ATTEN 20dB RL 2.0dBm10dB/ DISPLAY LINE -81.0 dBm  CENTER 100.0MHzSPAN 200.0MHz *RBW 10kHz*VBW 1.0kHzSWP 50.0sec								
Figure 6-11. 20W HPA, 0 to 200 MHz								

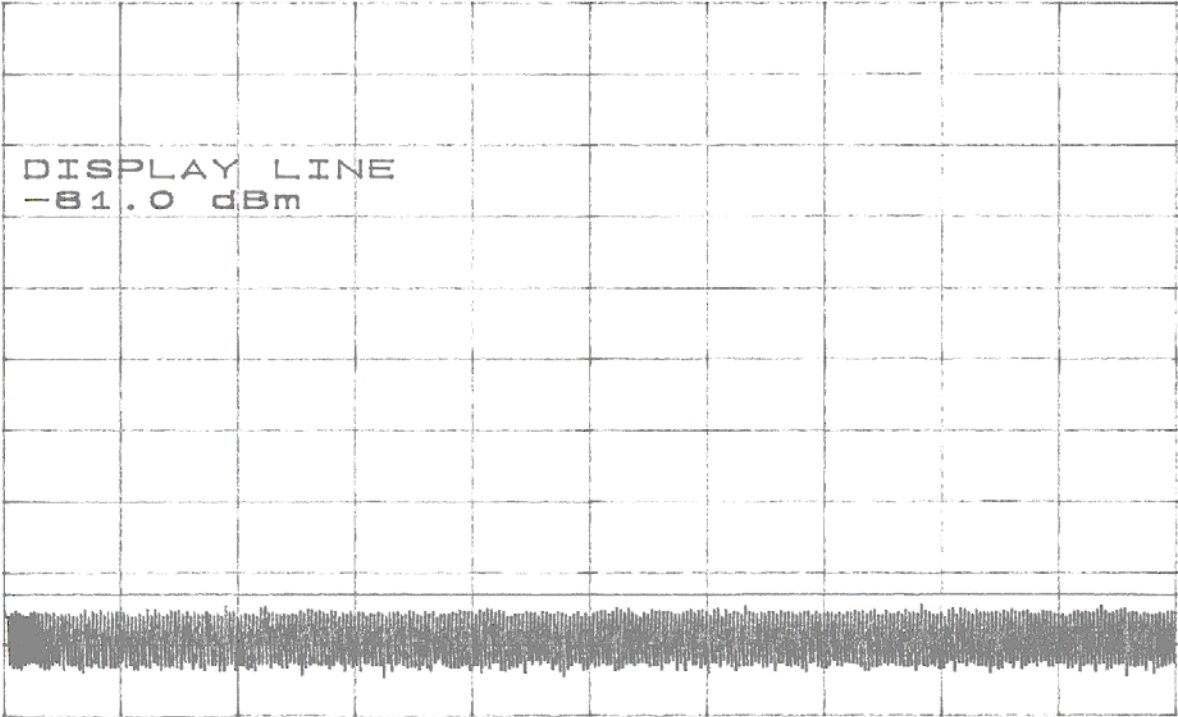
Honeywell	AW/CRITICAL NOTATION		
	SECURITY NOTATION	SUPPLEMENTS	48 PAGE

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REV LTR	TEST PROCEDURES AND DATA:		TEST NO: 5	
ATTEN 20dB RL 2.0dBm10dB/ DISPLAY LINE -81.0 dBm  CENTER 300.0MHzSPAN 200.0MHz *RBW 10kHz*VBW 1.0kHzSWP 50.0sec				
Figure 6-12. 20W HPA, 200 to 400 MHz				

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REV LTR	TEST PROCEDURES AND DATA: _____ TEST NO: 5 ATTEN 20dB RL 2.0dBm 10dB/ DISPLAY LINE -81.0 dBm  CENTER 500.0MHz *RBW 10kHz SPAN 200.0MHz *VBW 1.0kHz SWP 50.0sec
	Figure 6-13. 20W HPA, 400 to 600 MHz

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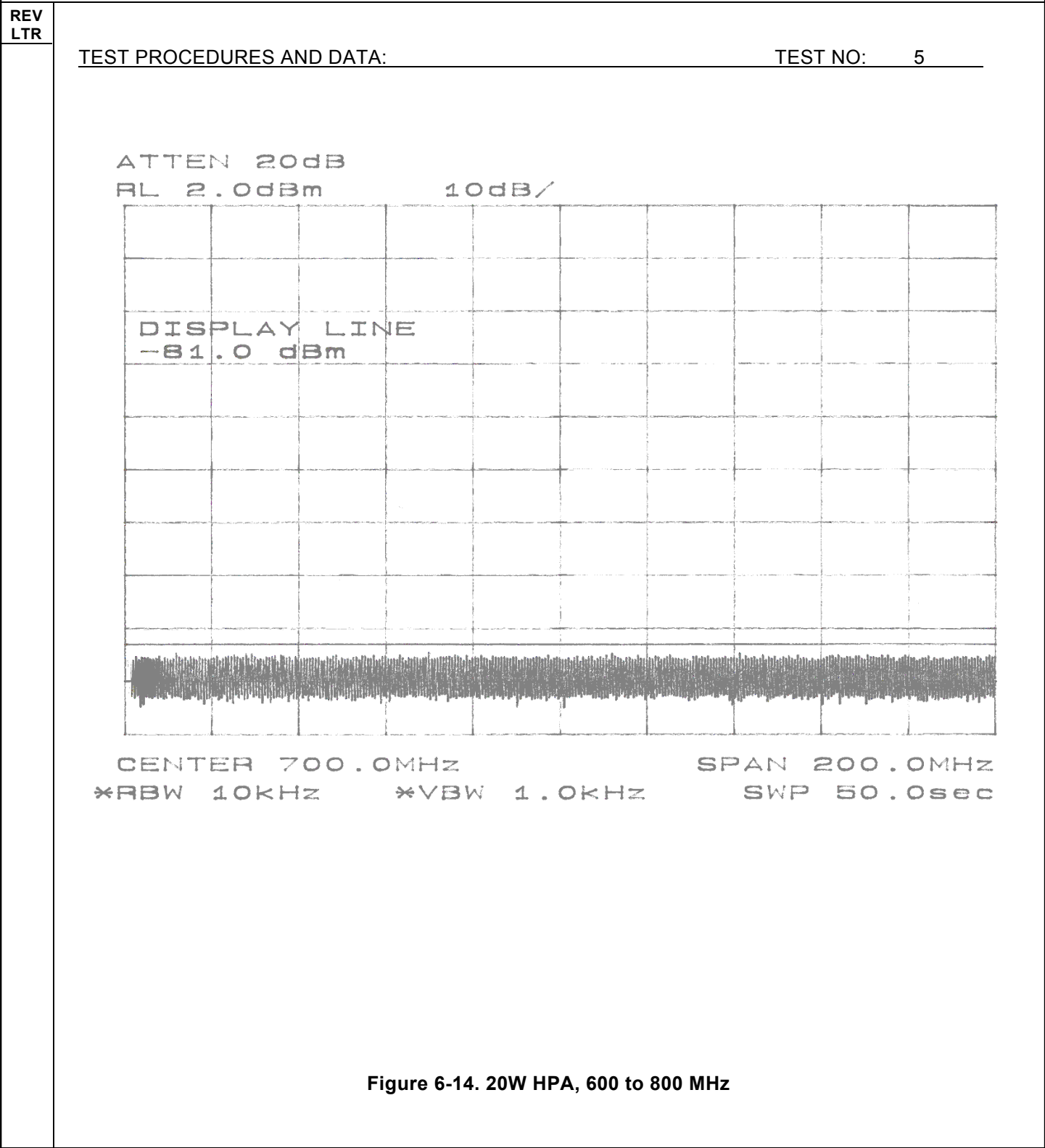
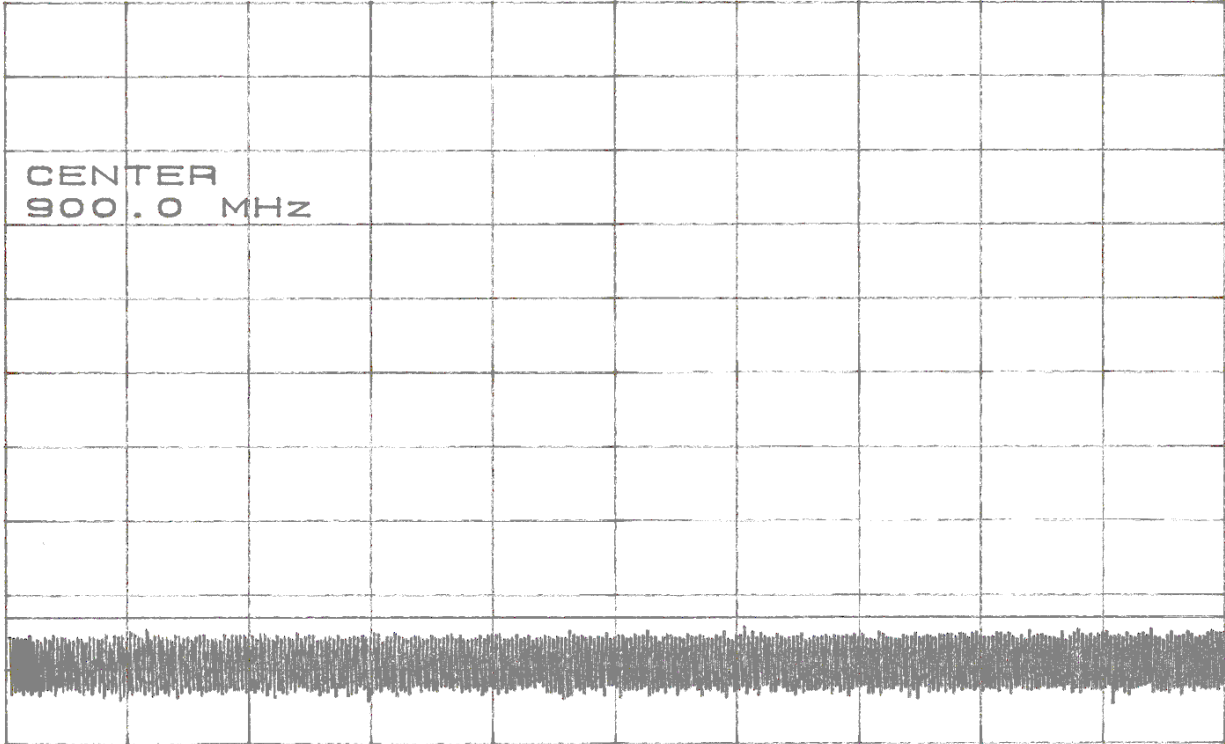


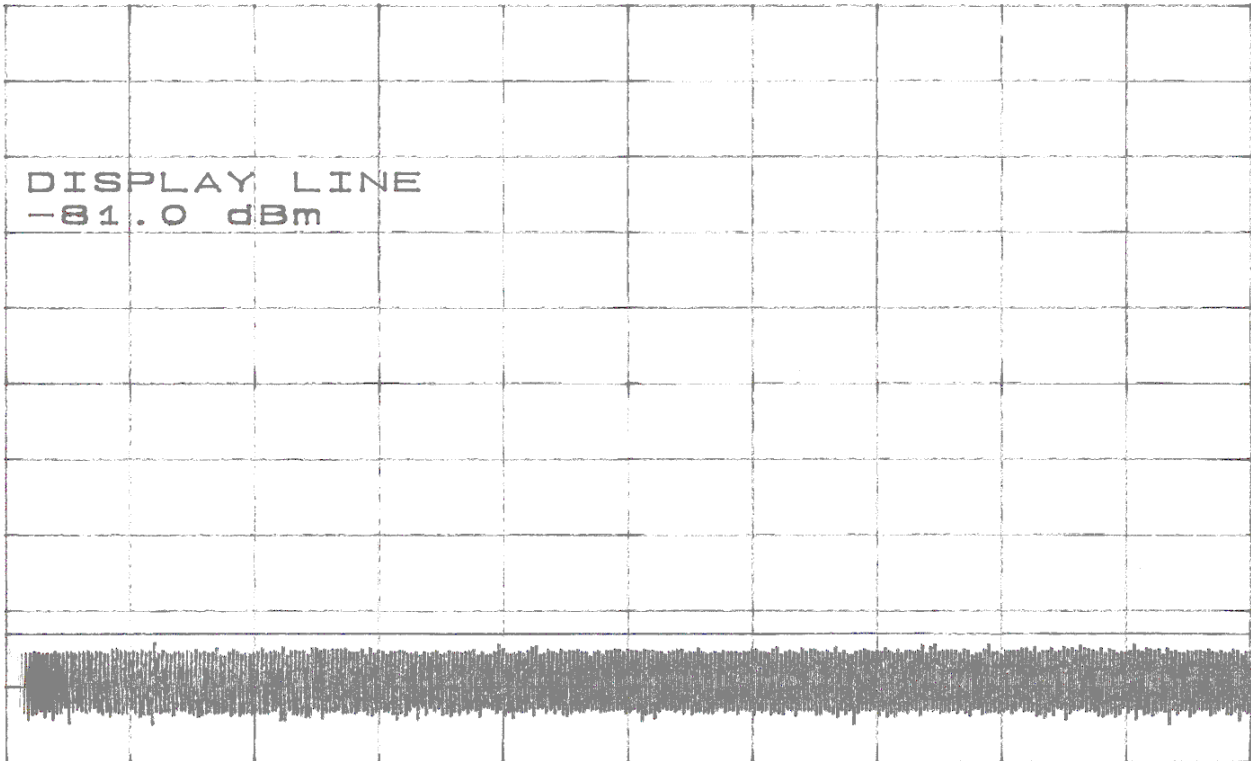
Figure 6-14. 20W HPA, 600 to 800 MHz

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REV LTR	TEST PROCEDURES AND DATA: _____ TEST NO: 5 ATTEN 20dB RL 2.0dBm 10dB/  CENTER 900.0MHz SPAN 200.0MHz *RBW 10kHz *VBW 1.0kHz SWP 50.0sec
	Figure 6-15. 20W HPA, 800 to 1000 MHz

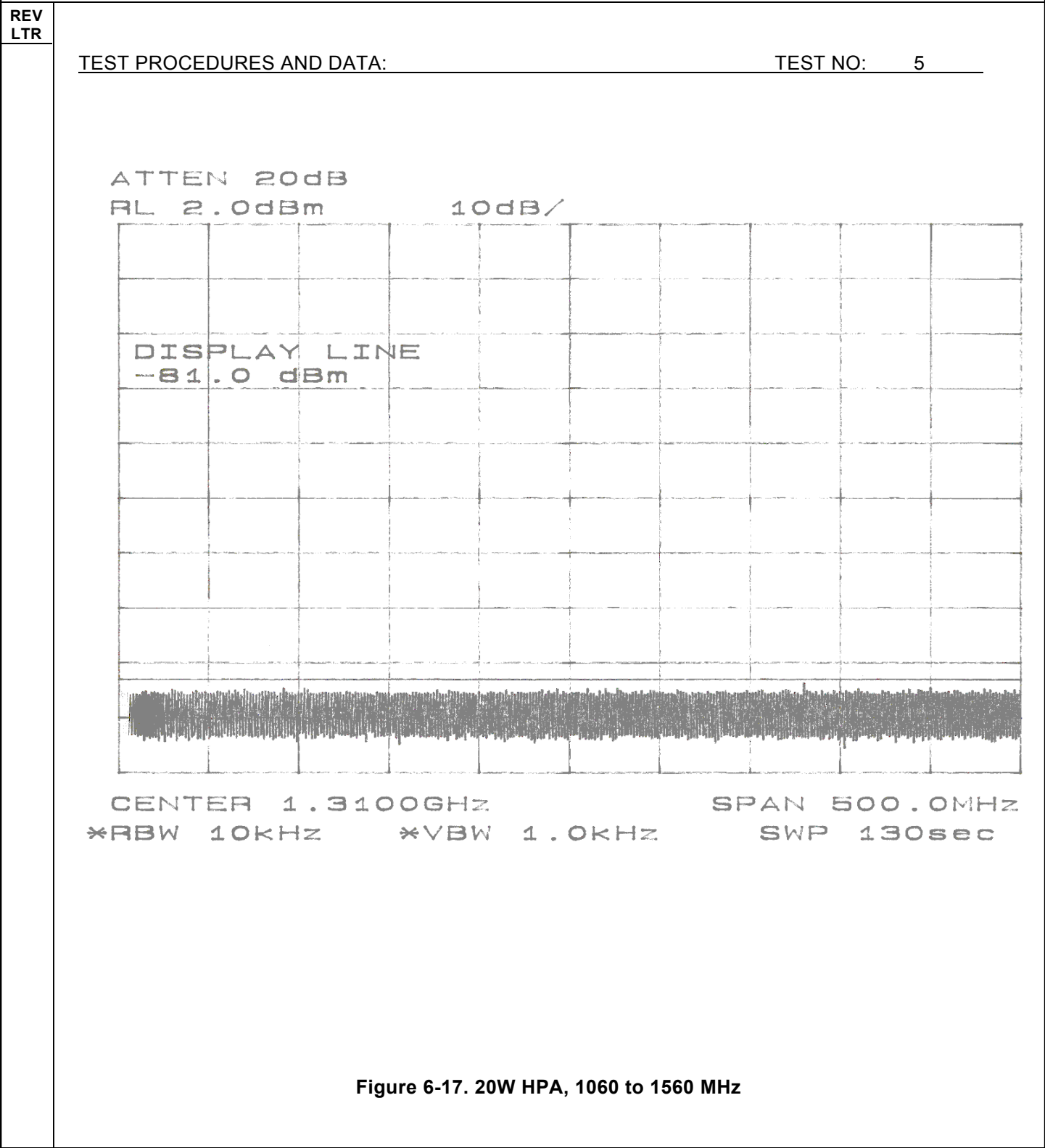
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REV LTR	TEST PROCEDURES AND DATA:		TEST NO: 5
ATTEN 20dB RL 2.0dBm10dB/ DISPLAY LINE -81.0 dBm  CENTER 1.1000GHZSPAN 500.0MHZ *RBW 10KHz*VBW 1.0KHzSWP 130sec			
Figure 6-16. 20W HPA, 850 to 1350 MHz			

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Honeywell	AW/CRITICAL NOTATION		
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