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Technical Report No. 09-005

EMI Evaluation of the XG Technology, BSN250 to FCC Part 15, Section 15.247, "Operation within the band of 902 – 928 MHz", Conducted and Radiated Emission Requirements

Performed: 7, 14 &19 January 2009

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1. INTRODUCTION

This document reports the FCC compliance results for the XG Technology, Inc.'s BSN250. The system is an XMAX VOIP base station for transmission and reception of voice over IP within the ISM band of 902 to 928 MHz using an XG proprietary physical layer technology. The unit, with maximum operating clock frequency of 1.3 GHz consists of three sectors offering a total of 18 available channels. The BSN250 was evaluated for compliance to the FCC CFR-47, Part 15, Section 15.247 conducted and radiated emission requirements in receiving and transmitting modes. For the test, all 18 channels were operating simultaneously. The results apply only to the specific items of equipment, configurations and procedures supplied to the Florida Atlantic University EMI R&D Laboratory as reported in this document.

2. OBJECTIVE

This evaluation was performed to verify conformance of the XG Technology, BSN250 module to the U.S. Federal Communications Commission (FCC), Code of Federal Regulations (CFR), Title 47 - Telecommunication, FCC Part 15 Subpart C- Intentional Radiators, Section 15.247, "Operation within the bands 902-928 MHz" conducted and radiated emission requirements.

3. CONCLUSION

The XG Technology, BSN250 unit met the FCC, Part 15 Subpart B, Section 15.247, "Operation within the band of 902-928 MHz", conducted and radiated emission requirements as described in the following pages, provided that:

1. the digital chassis of the system was sealed properly with copper tape,
2. 28A3851-0A2 & 27A3851-0A2 Stewart ferrites clamps were put on the LDS cables connecting the digital chassis to the RF chassis, respectively, with two extra ferrites on the 6th cable (Photographs 1-4).

TEST PROCEDURES AND RESULTS

4.1 TEST PROCEDURES

The measurement techniques identified in the measurement procedure of ANSI C63.4-2003 *"American National Standard of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"* were followed as close as practical during this evaluation. Complete details and specific procedures used are discussed in the respective test result sections.

4.2 CONDUCTED EMISSIONS TEST RESULTS

4.2.1 CONDUCTED POWERLINE EMISSIONS

The XG Technology, BSN250 unit was evaluated for conducted emission requirements for both receiving and transmitting modes of operation. The data was transmitted and received correctly as confirmed by the XG Technology Engineer. Photographs 1 and 2 show the setup used during the evaluations.

The system was installed in the FAU EMI Research facilities conducted emissions shielded enclosure, on the floor, 40 centimeters from the rear wall. The device was then plugged into a Line Impedance Stabilization Network (LISN) EMCO Model No.3825/2R Serial No. 1095.

Conducted power line emissions were measured on both the phase and neutral lines with reference to earth ground, over the specified 150 kHz to 30 MHz range on a Hewlett Packard HP 8566B Spectrum Analyzer operated in the peak detection mode, in conjunction with HP 85685A Preselector, with a bandwidth of 9 kHz obtained through the HP 85650A Quasi Peak Adapter.

Figures 1 and 2 show the conducted emissions on both the phase and neutral lines measured in the receiver peak detection mode.

Photographs 1 & 2: Conducted Emission Setup

4.2.1.1 RECEIVING MODE

Figure 1 presents the results for the system evaluated in the receiving mode.

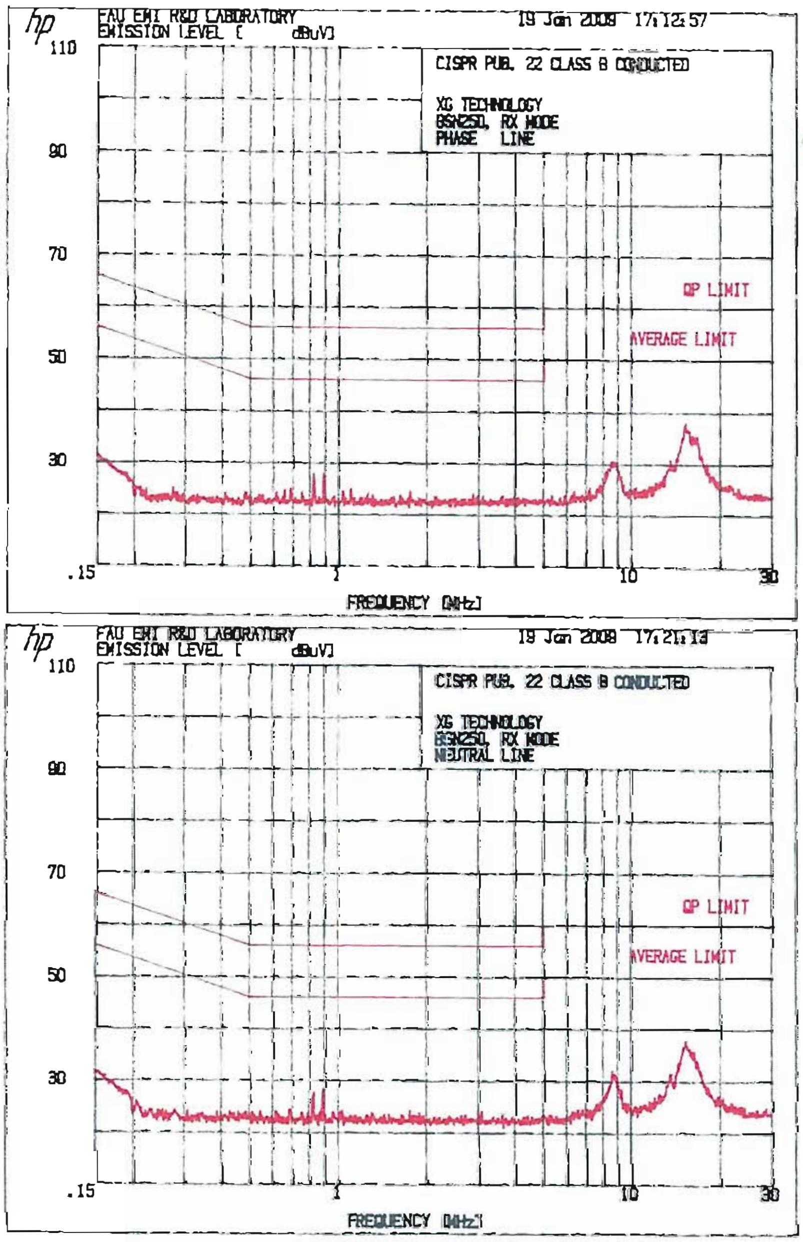


Figure 1: Phase and Neutral Conducted Emissions

4.2.1.2 TRANSMITTING MODE

Figure 2 presents the results for the unit evaluated in the transmitting mode.

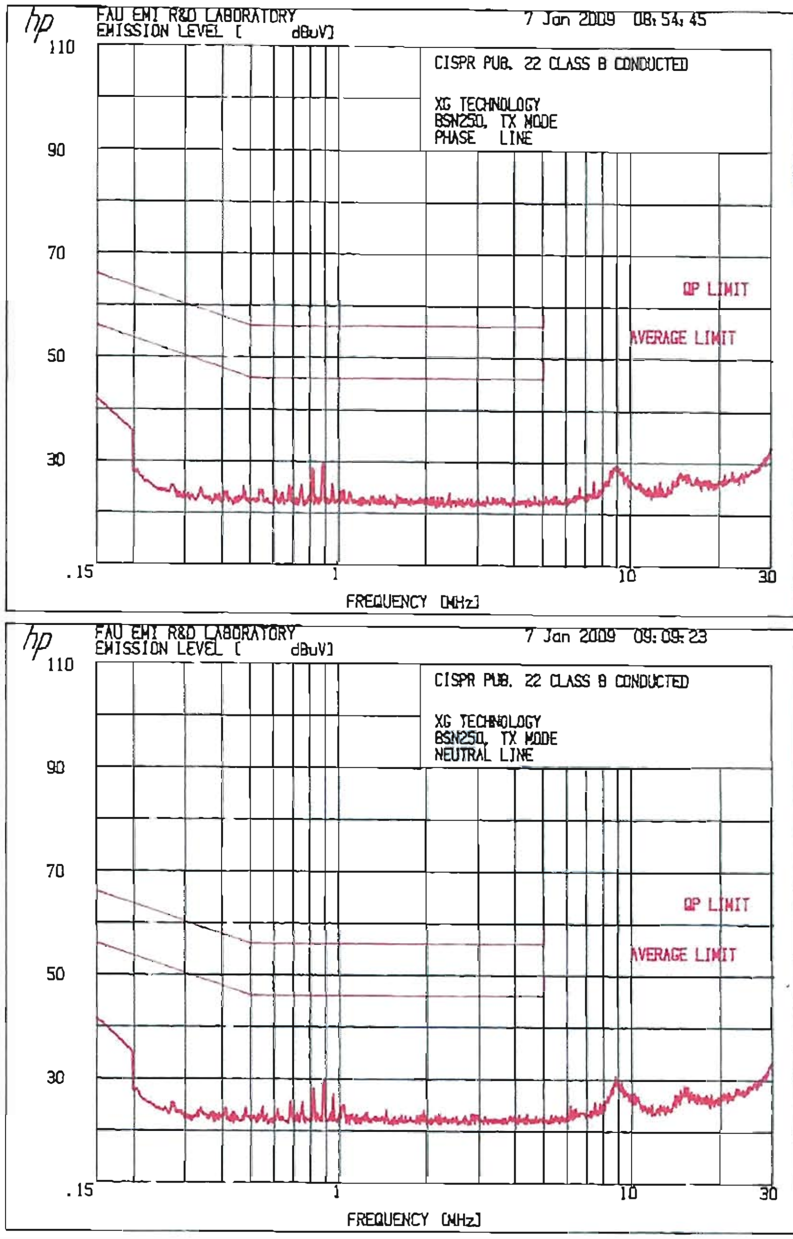


Figure 2: Phase and Neutral Conducted Emissions

From the above figures, there are no emissions that exceeded or were within 5 dB of the limit. Hence, there are no values to report on Table 1.

Line Tested	Frequency (kHz)	Peak Value (dBµV)	QP Value (dBµV)	Average Value (dBµV)	Avg. Limit (dBµV)	Margin to Avg. Limit (dB)*
Phase						
Neutral						

Table 1: Conducted Emission Peak Measurement

*Margin to Avg. Limit (dB) = Avg. Limit (dBµV) – the measured value (either Peak, Quasi-Peak or Average Value) in dBµV

On both the phase and neutral lines, the emissions did not exceed the limits for both receiving and transmitting modes of operation. Hence, the system is in compliance.

4.3 RADIATED EMISSIONS TEST RESULTS

4.3.1 UNINTENTIONAL RADIATED EMISSIONS

The XG Technology, BSN250 unit was setup on the ground plane turntable of the Semi-Anechoic test site, as shown in Photographs 3 & 4. The magnetic mount antennas were extended up to the edges of the ground turntable. The BSN250 unit was powered through the 110V/60 Hz AC power line. The unit was evaluated for radiated emissions under FCC Part 15.209 for receiving and transmitting conditions.

An EMCO, Model 3104, S/N 299988A, Broadband Biconical antenna was installed on an EMCO pneumatically controlled antenna mast at a distance of 3 meters from the system. The 30 MHz to 200 MHz frequency range was automatically scanned on the HP 8566B Spectrum analyzer (SA) that was operated in the peak detector mode with a bandwidth of 120 kHz obtained through the HP 85650A Quasi Peak Adapter. It should be noted that the RES BW and VBW of the spectrum analyzer must be set to 1 MHz for the Quasi Peak Adaptor to provide a 120 kHz bandwidth correctly. Hence, in the figures, RES BW and VBW are still indicated as 1 MHz.

After setting the SA to operate between 30-200 MHz, the max hold switch on the SA was pressed. The Biconical antenna was set to horizontal polarization and at 1-m above the floor. The turntable was then rotated 360 degrees. After a full revolution, the turntable was rotated back to the previously noted azimuth angles where the higher E-fields occurred, and the antenna was then scanned from 1 to 4 meters high at those angles in order to determine the height that will provide to highest amplitude. The antenna was moved back to the location where the highest amplitude was observed and the turn table was rotated again 360°. The maximum value was plotted and presented herein. The antenna was then turned to measure the vertical polarized E-field and the above procedure was repeated.

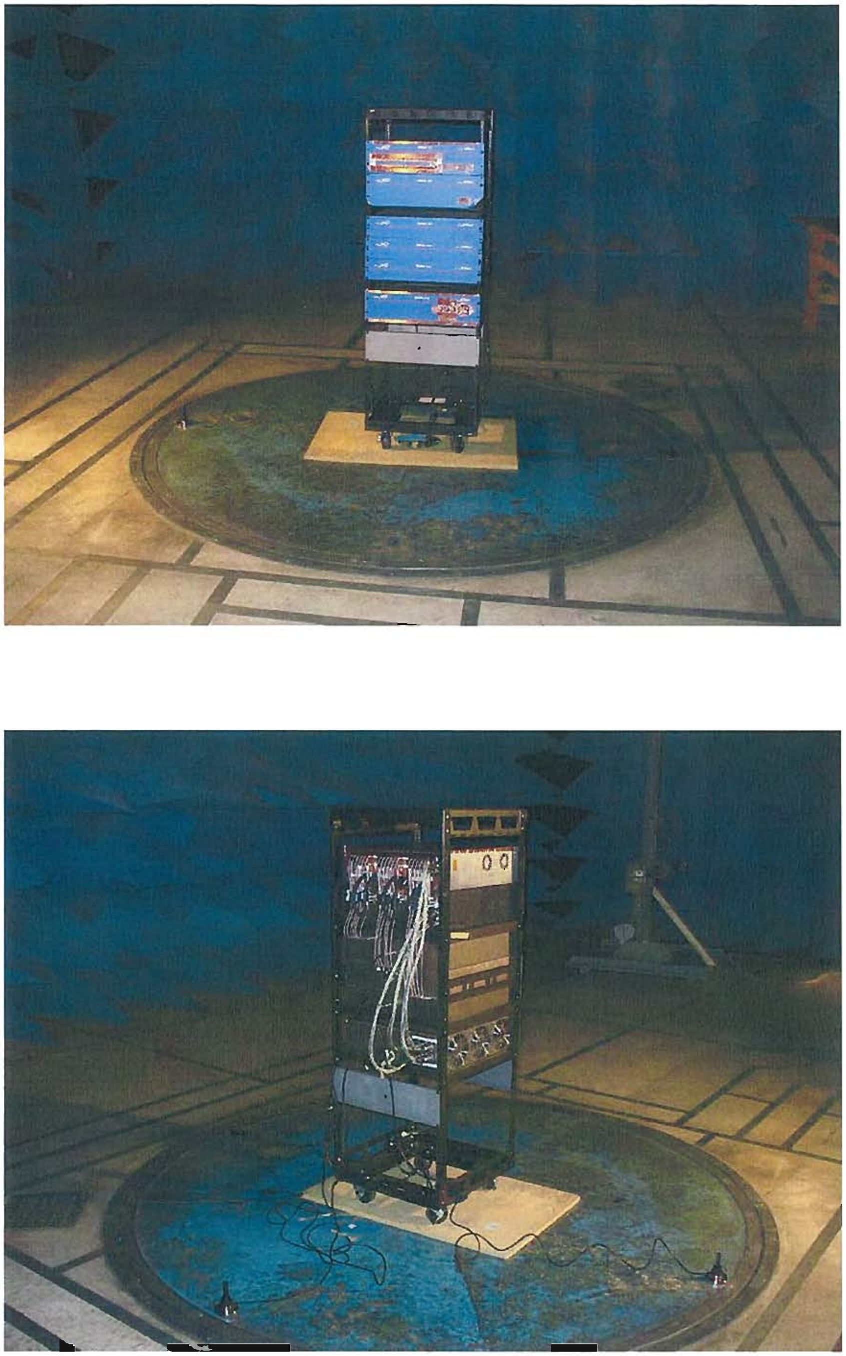
For the 200-1000 MHz band, a Log Periodic antenna (EMCO 3146) was installed and the SA was set to operate between 200-1000 MHz. To collect data, the above procedure was then repeated.

For the measurements above 1GHz, an EMCO 3115 double rigged horn antenna and a microwave pre-amplifier were installed at the receiver. The RES BW and VBW of SA were left on the 1 MHz setting and the bypass instrument function of the HP 85650A Quasi Peak Adapter was enabled. To collect the data, the procedure previously described was repeated again.

Figures 3-40 show the worse case radiated emissions of both configurations, for this evaluation, independent of azimuth or antenna height. The E-field is calculated using antenna factor, cable loss, and amplifier gain based on the following equation:

E (dBμV/m) = SA reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

To prevent an amplifier and receiver overload, a Trilithic notch filter 7NM867/122-X1-AA was installed at the receiver below 3 GHz. Above 3GHz, the notch filter was replaced by a Mini-Circuit VHF^{+} 3100 high pass filter.



Photographs 3 & 4: Radiated Emission Setup

4.3.1.1 RECEIVING MODE

Figures 3-18 present the results for the BSN250 module set to the receiving mode.

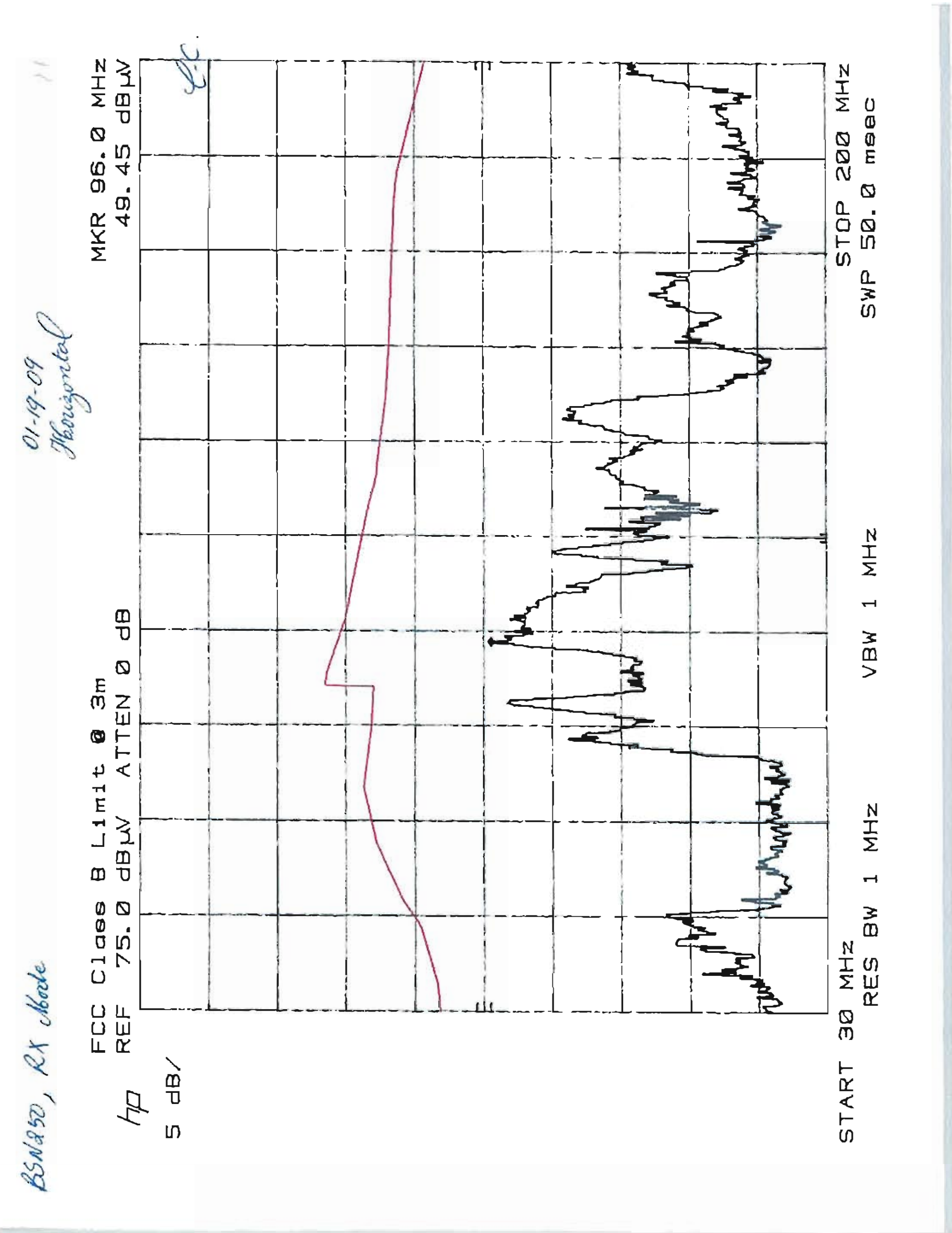


FIGURE 3: Radiated Emission 30 – 200 MHz Horizontal Polarization

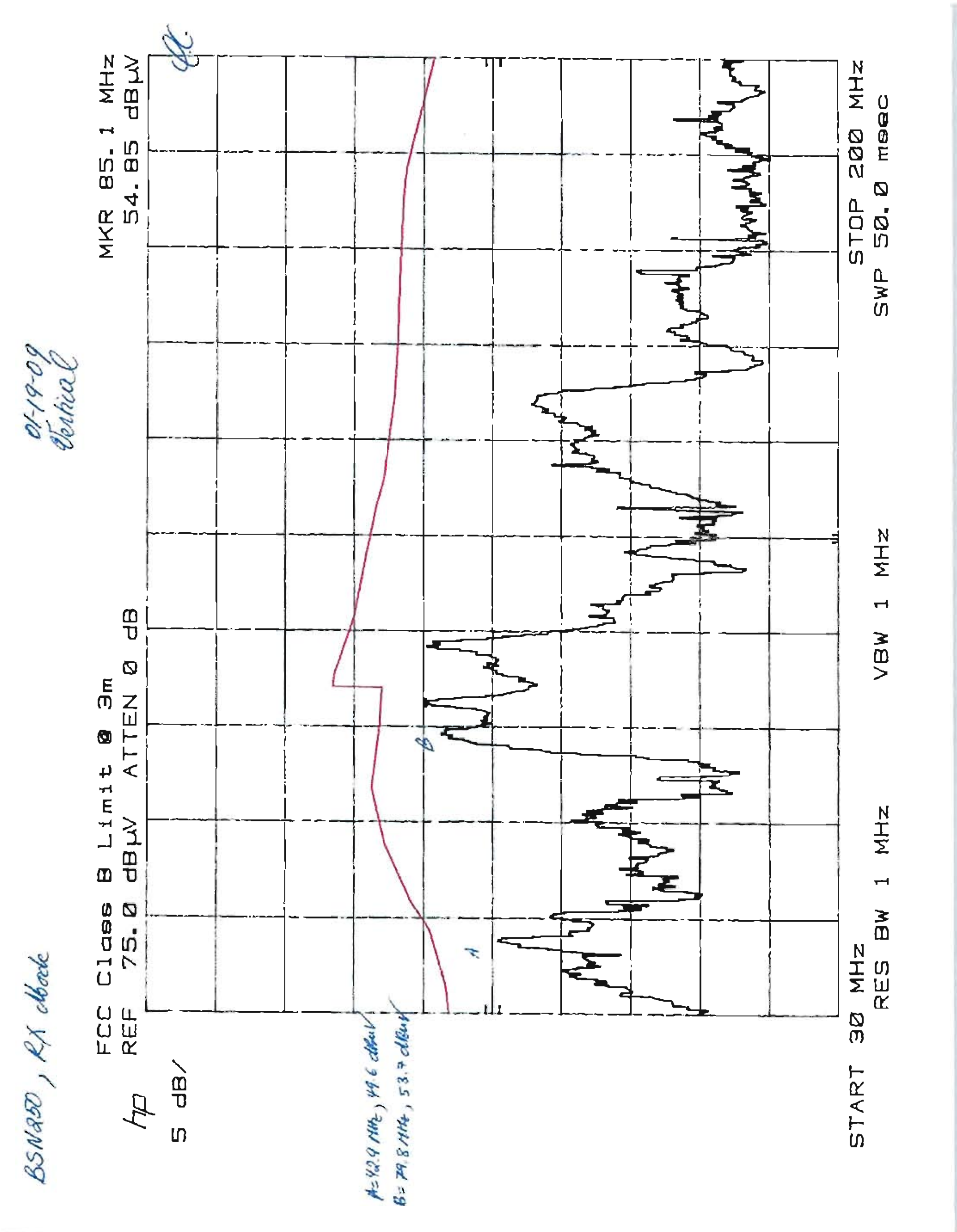


FIGURE 4: Radiated Emission 30 – 200 MHz Vertical Polarization

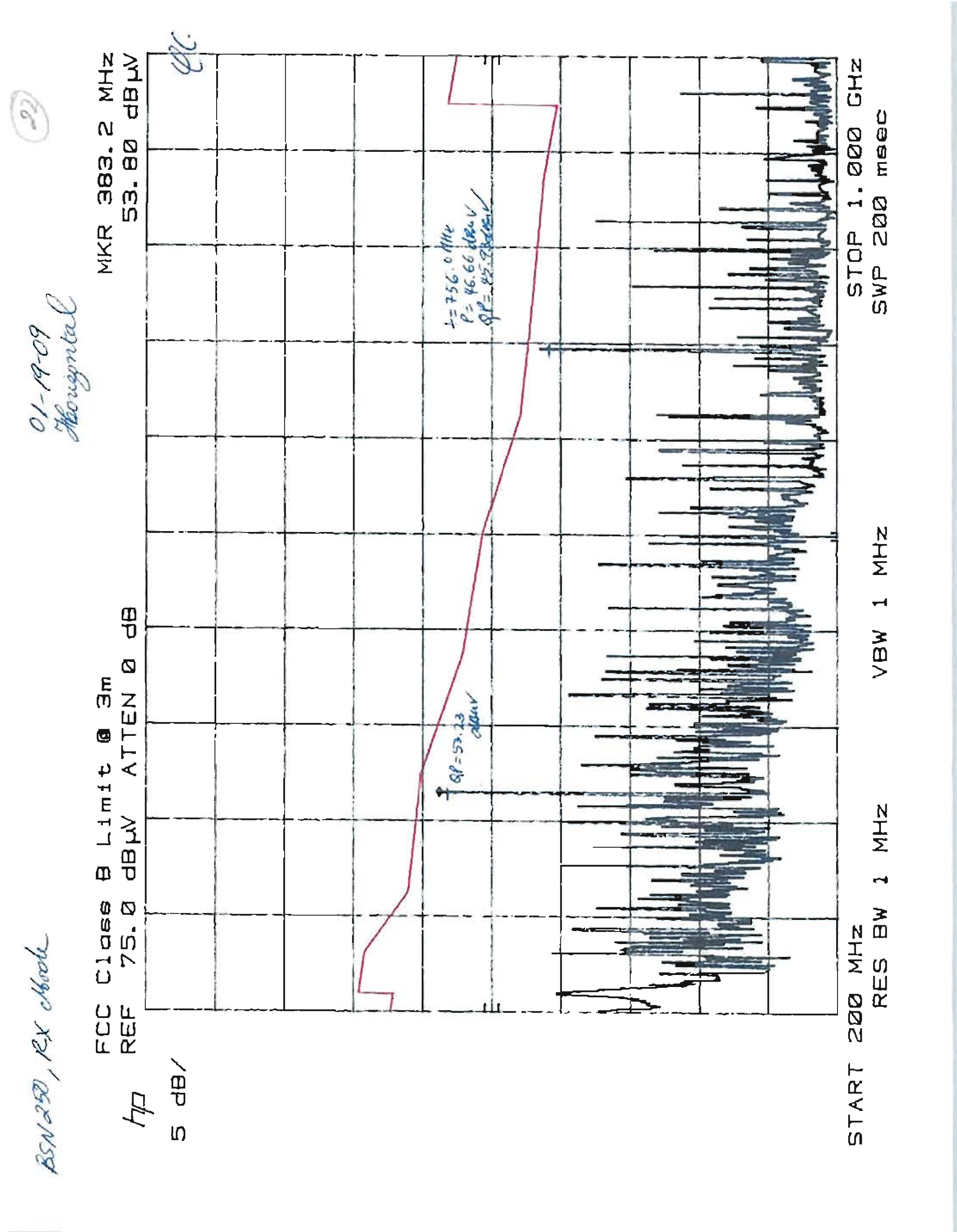


FIGURE 5: Radiated Emission 200 MHz – 1 GHz Horizontal Polarization

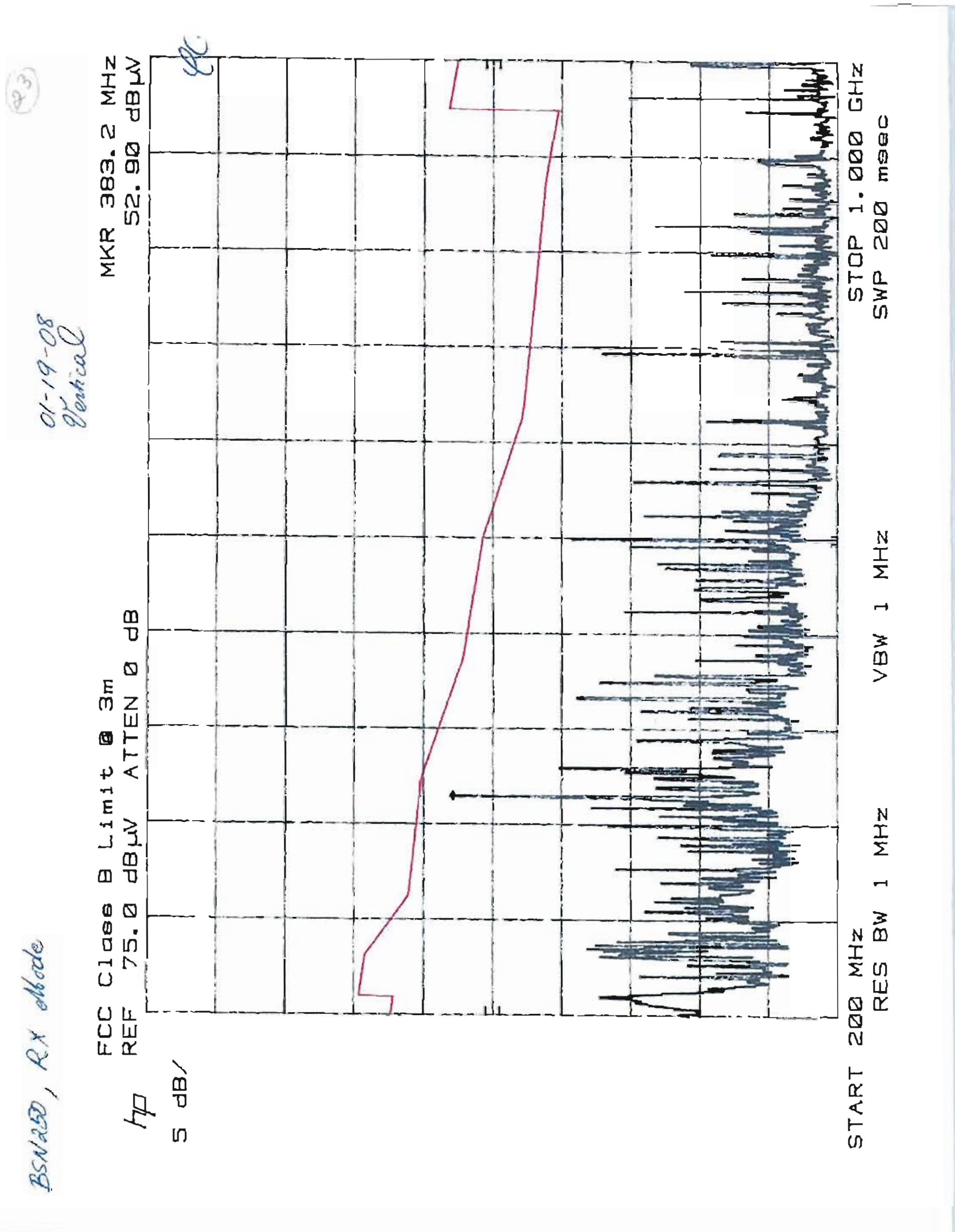


FIGURE 6: Radiated Emission 200 MHz – 1 GHz Vertical Polarization

Since the maximum operating clock frequency is 1.3 GHz, the unit was evaluated up to 7 GHz.

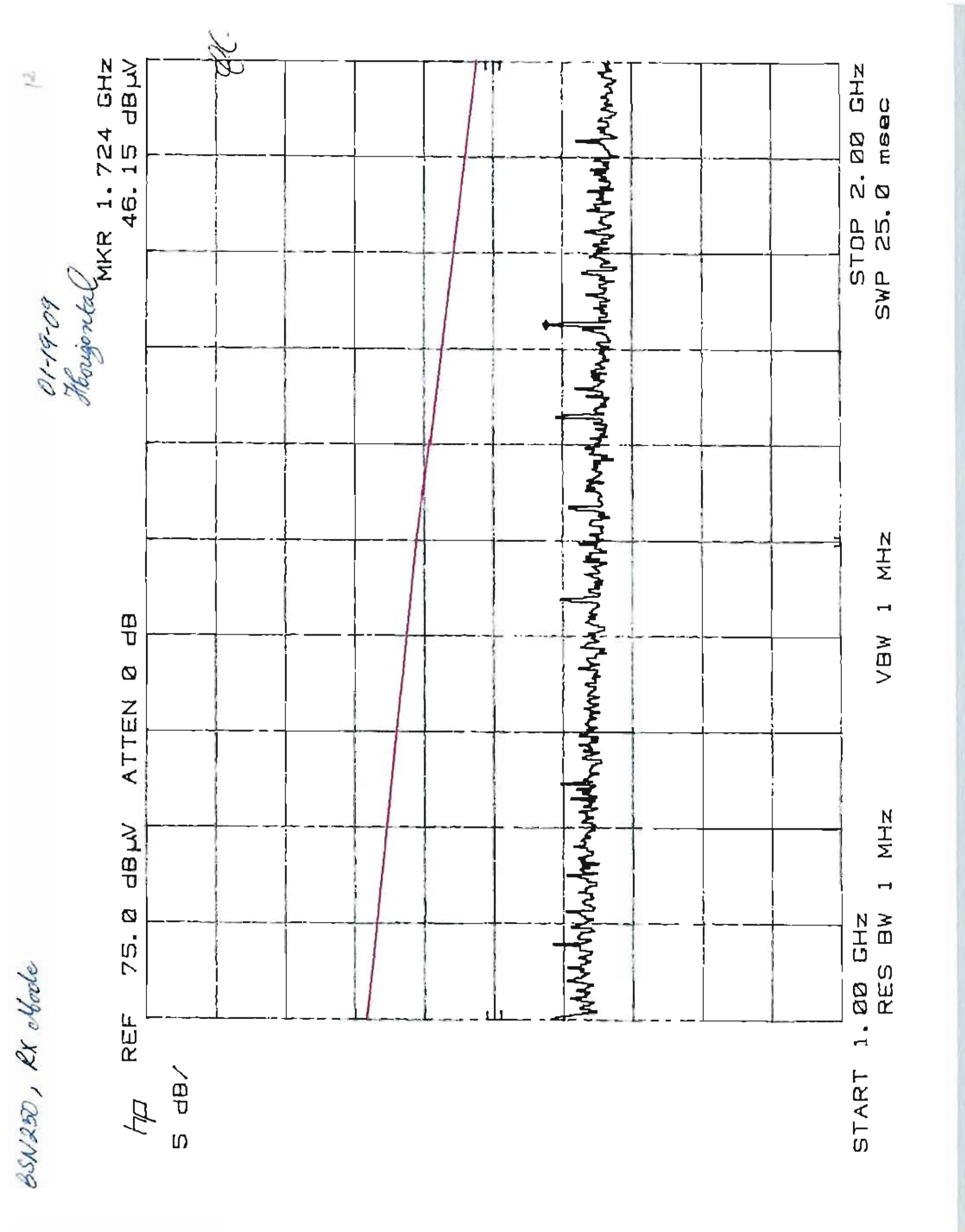


FIGURE 7: Radiated Emission 1 GHz – 2 GHz Horizontal Polarization

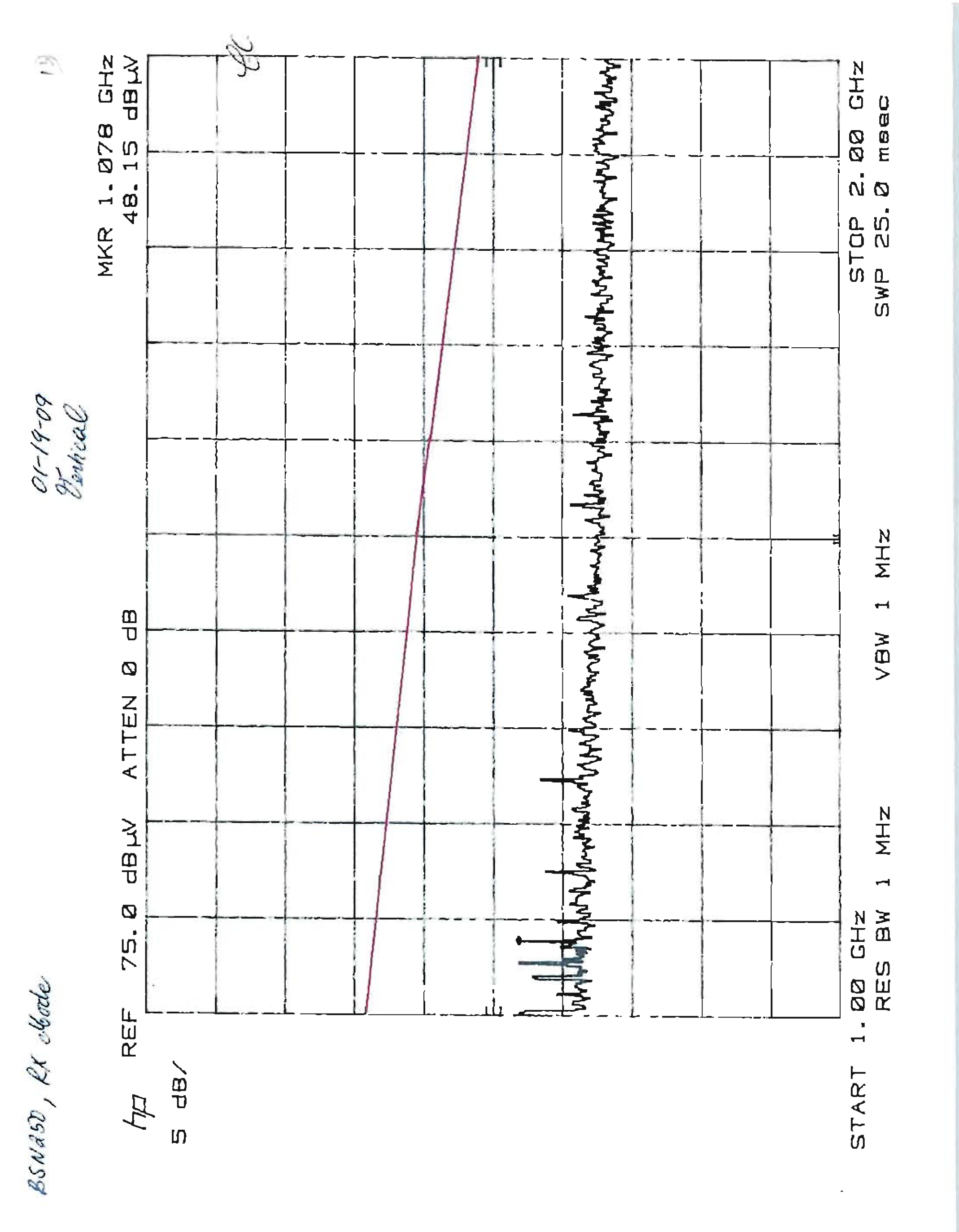


FIGURE 8: Radiated Emission 1 GHz – 2 GHz Vertical Polarization

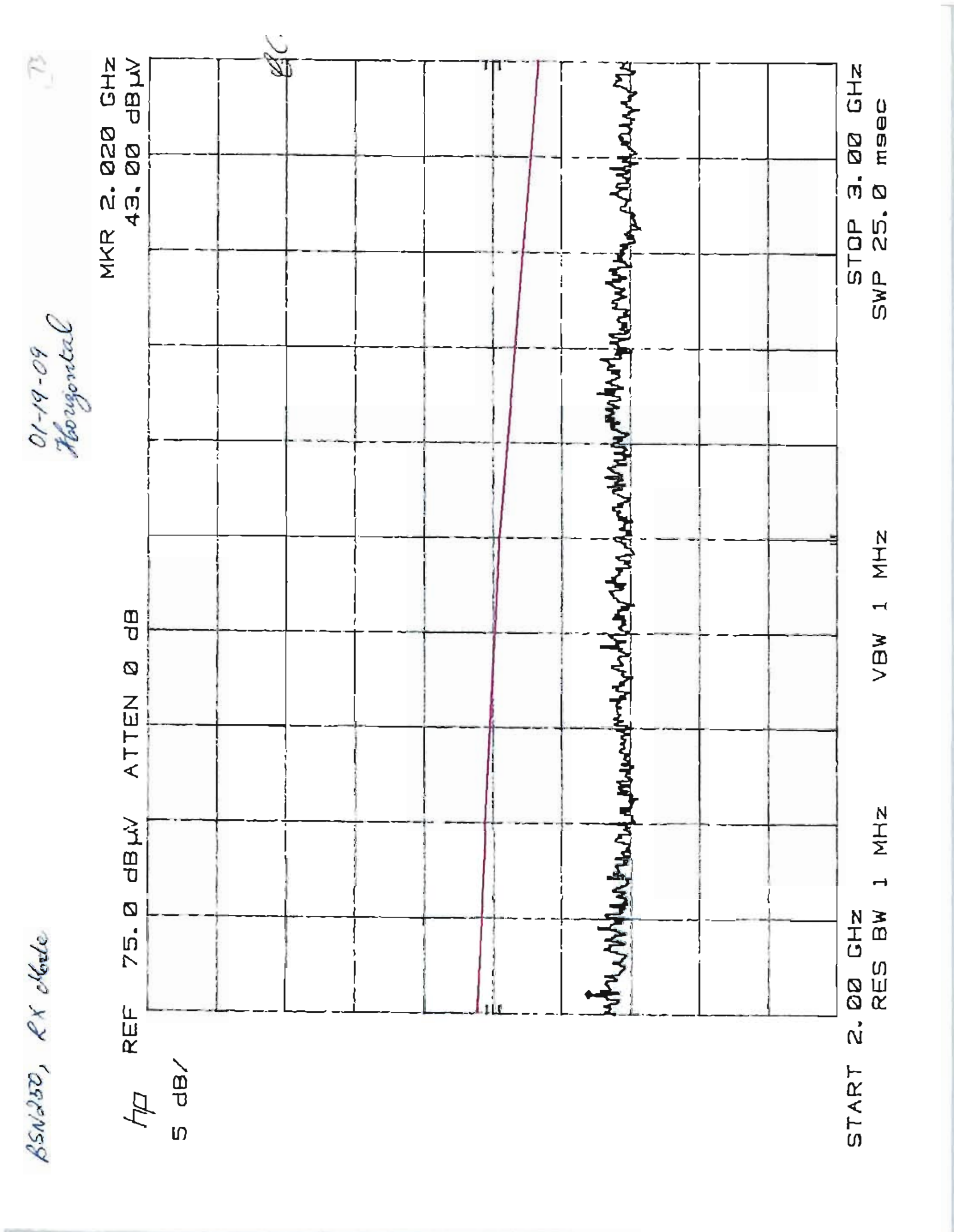


FIGURE 9: Radiated Emission 2 GHz – 3 GHz Horizontal Polarization

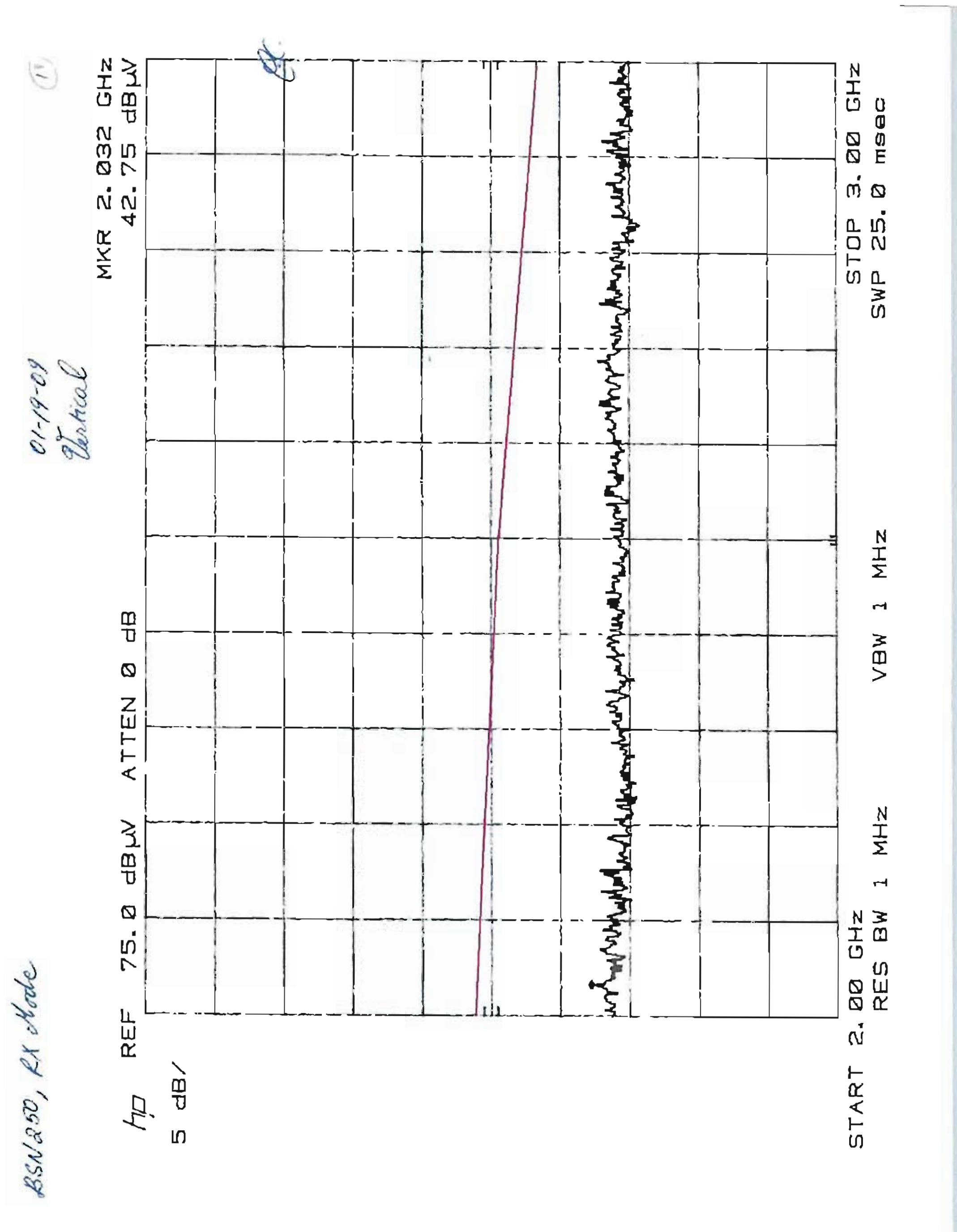


FIGURE 10: Radiated Emission 2 GHz – 3 GHz Vertical Polarization

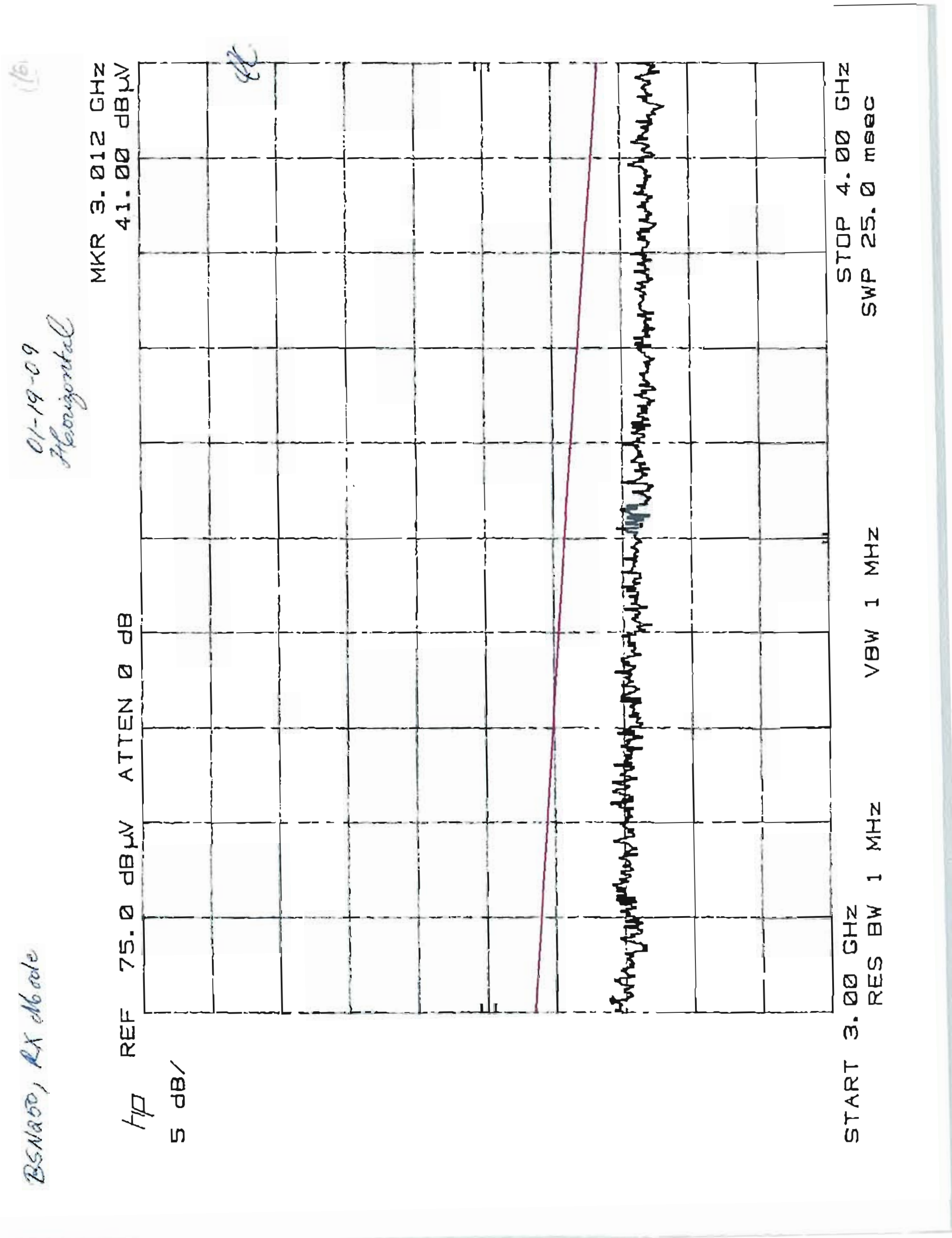


FIGURE 11: Radiated Emission 3 GHz – 4 GHz Horizontal Polarization

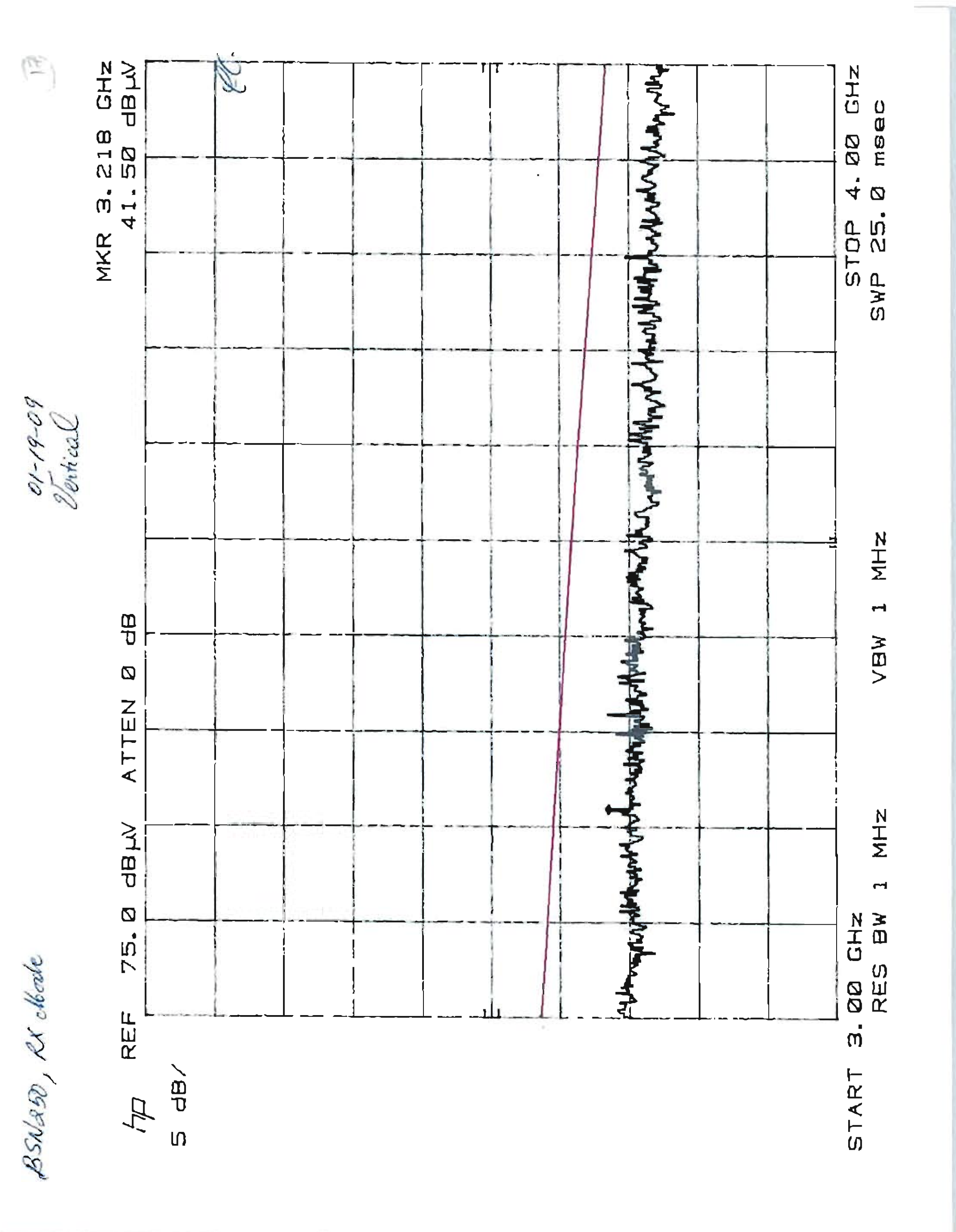


FIGURE 12: Radiated Emission 3 GHz – 4 GHz Vertical Polarization

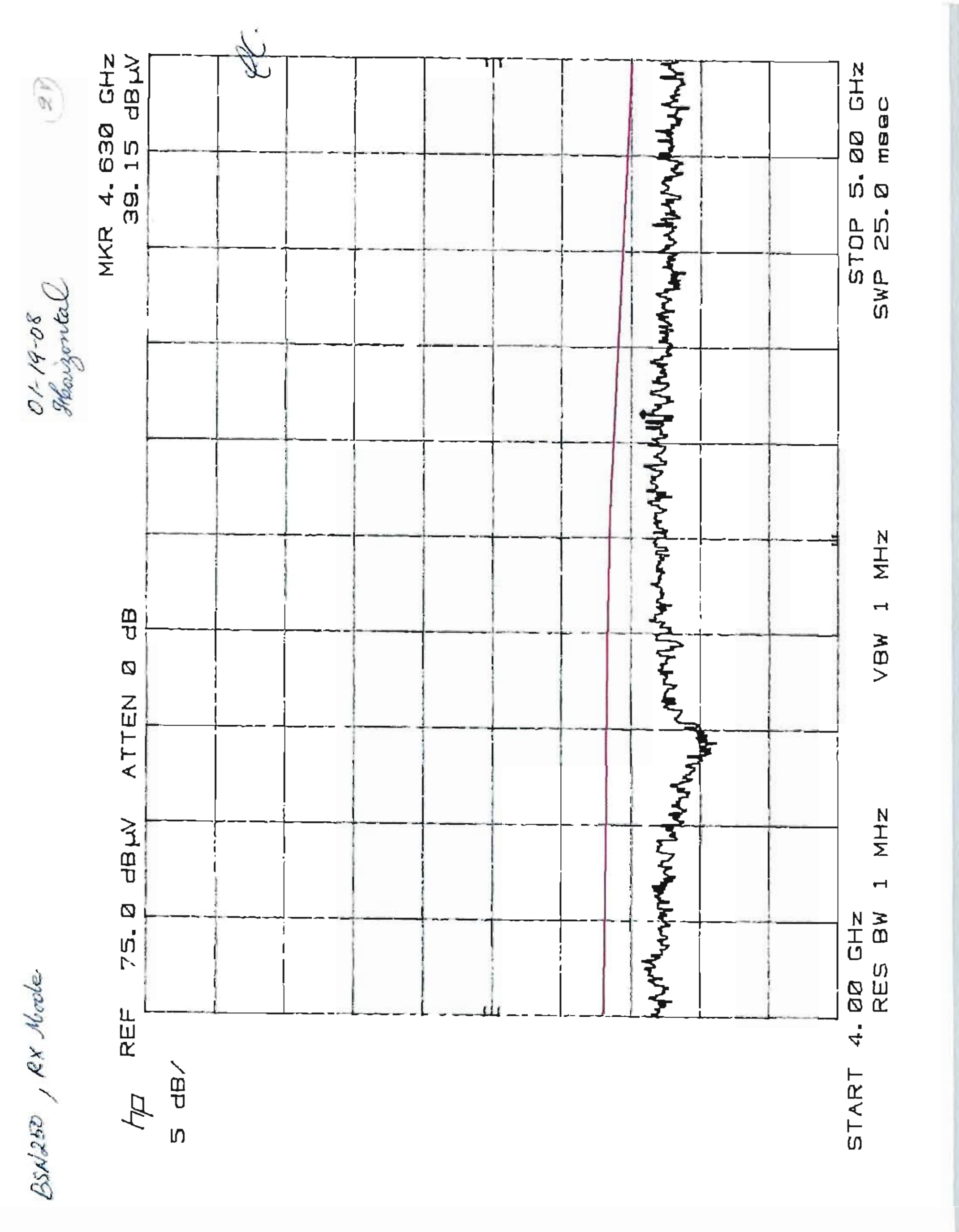


FIGURE 13: Radiated Emission 4 GHz – 5 GHz Horizontal Polarization

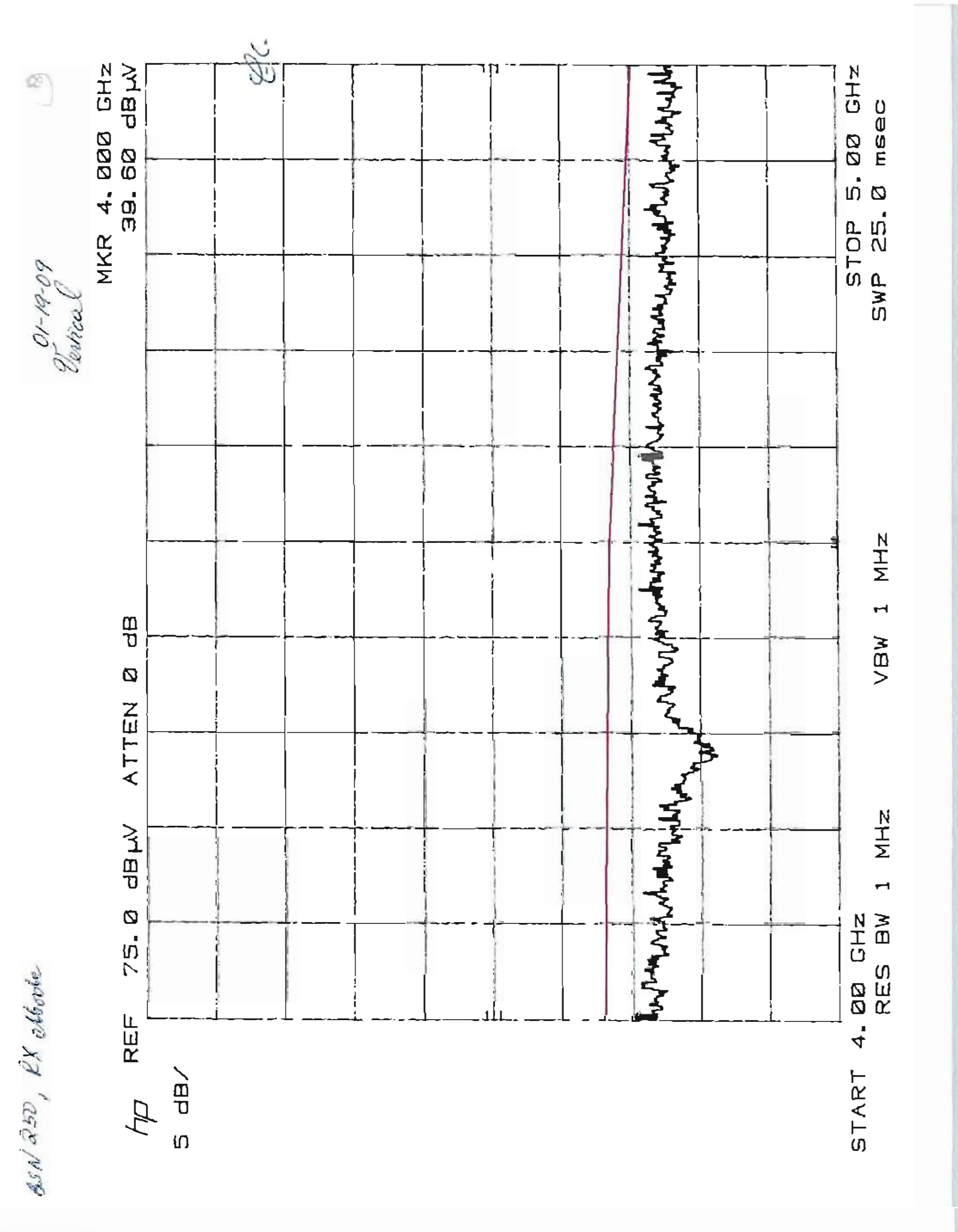


FIGURE 14: Radiated Emission 4 GHz – 5 GHz Vertical Polarization

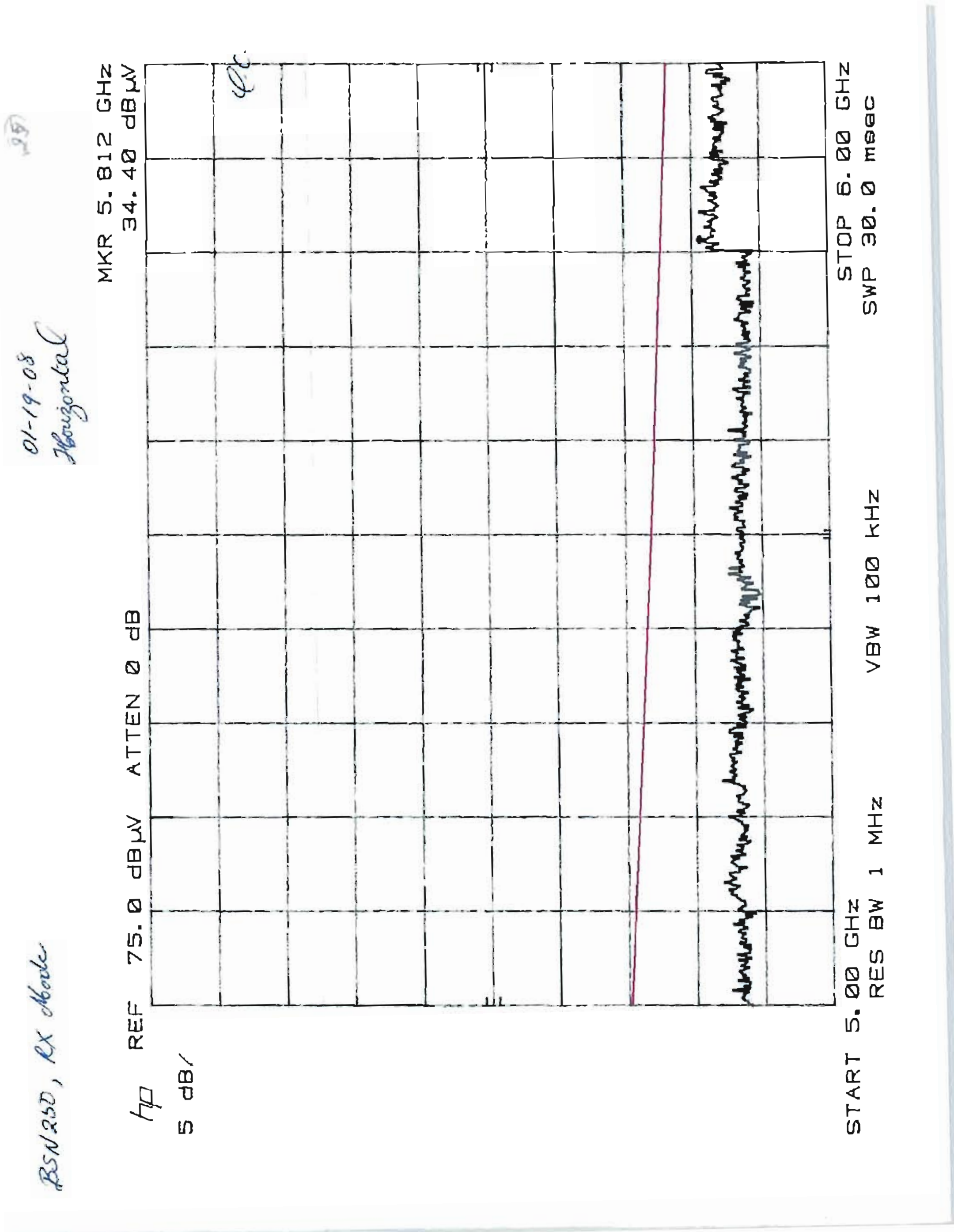


FIGURE 15: Radiated Emission 5 GHz – 6 GHz Horizontal Polarization

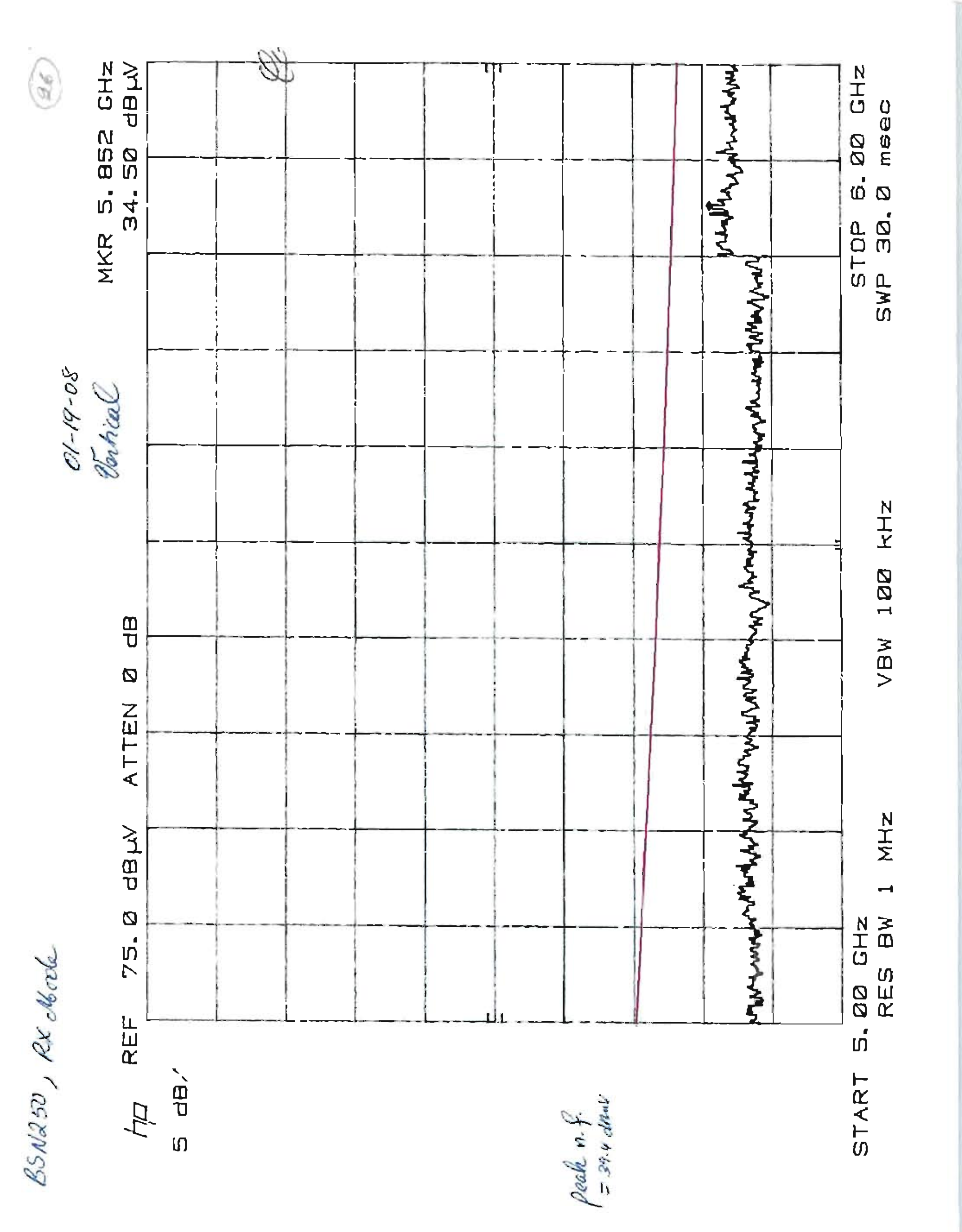


FIGURE 16: Radiated Emission 5 GHz – 6 GHz Vertical Polarization

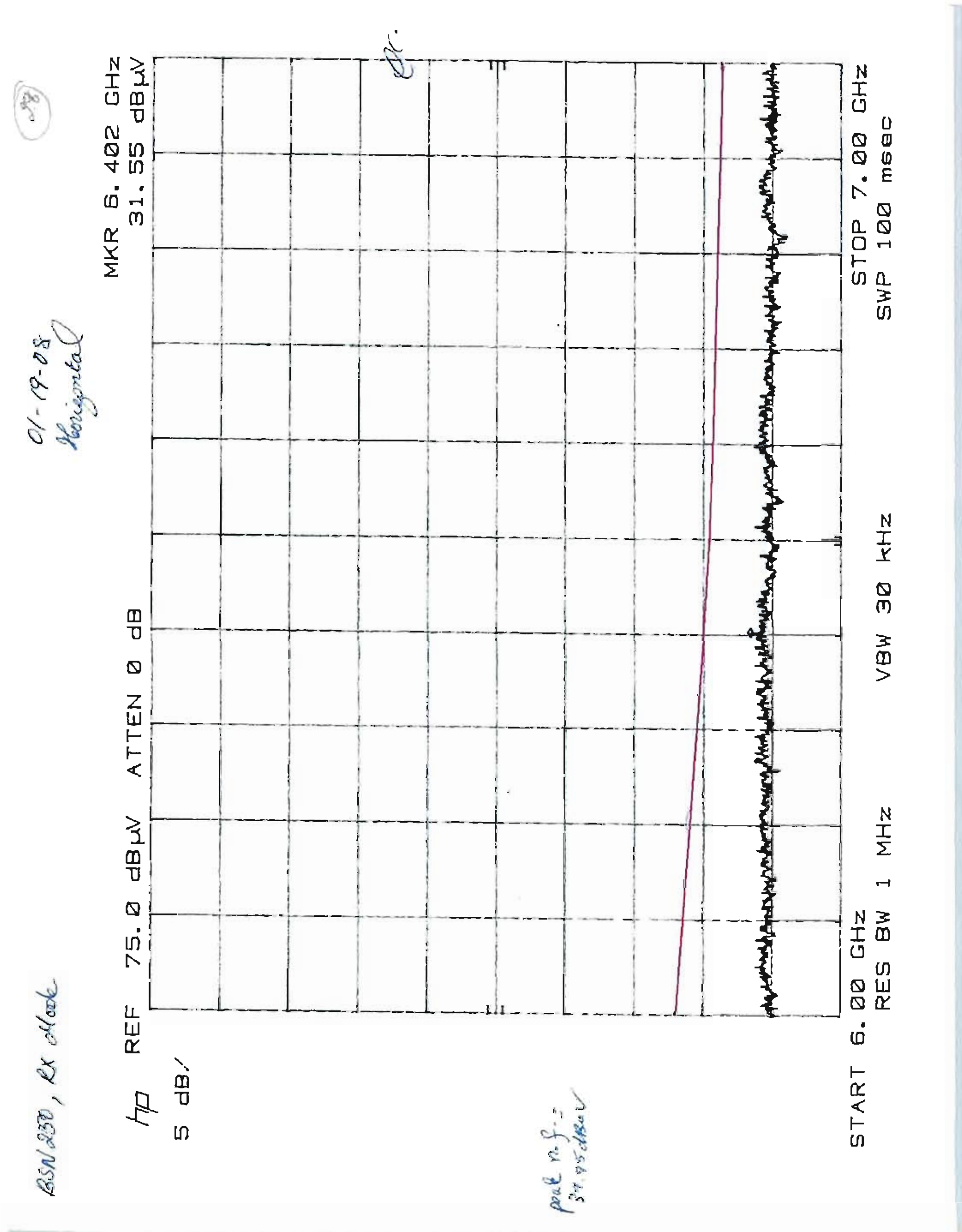


FIGURE 17: Radiated Emission 6 GHz – 7 GHz Horizontal Polarization

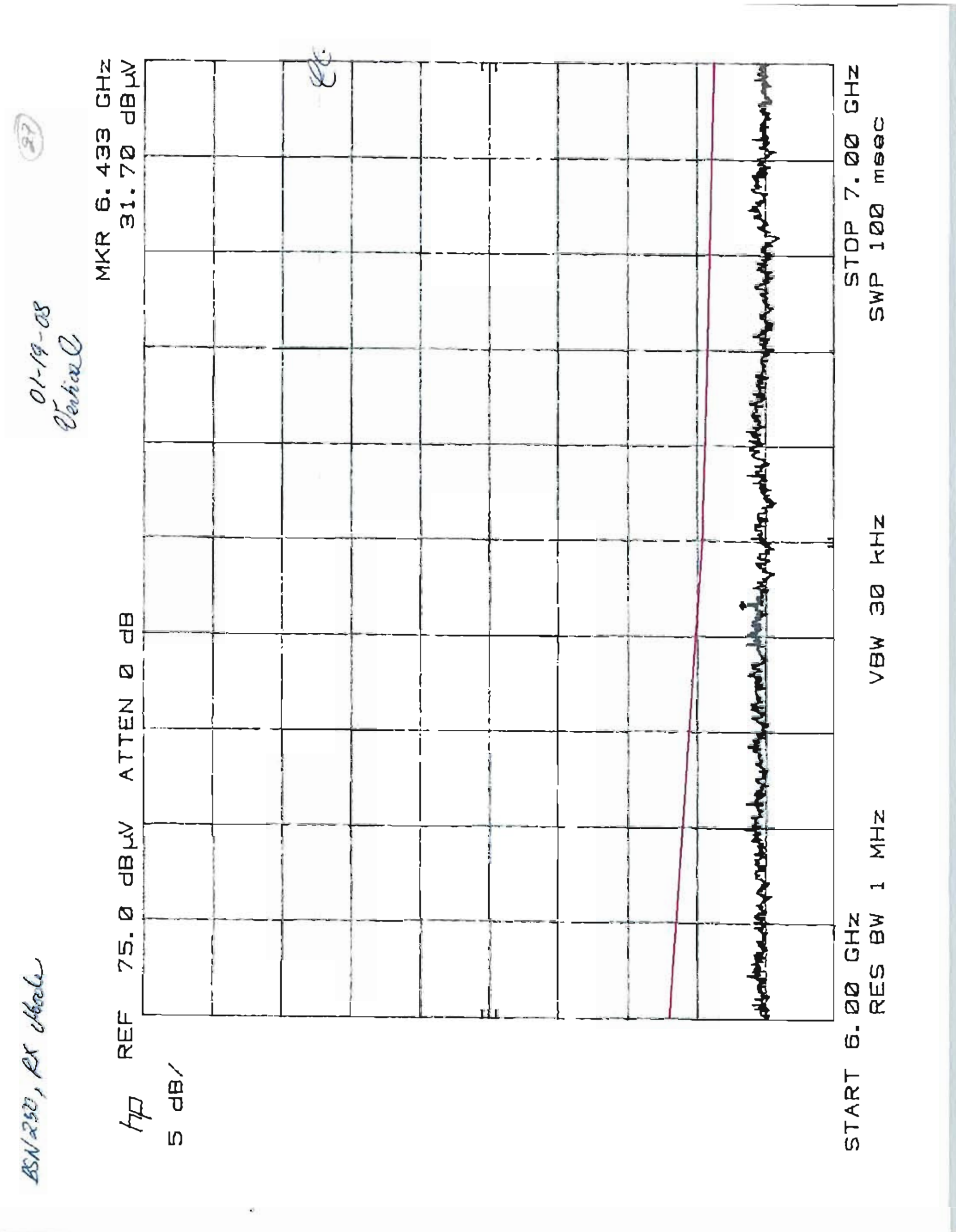


FIGURE 18: Radiated Emission 6 GHz – 7 GHz Horizontal Polarization

From Figures 3-18, the unintentional peak emissions that exceeded or were within 5 dB of the limit are reported in Table 2.

Figure No.	Frequency (MHz)	Measured Peak (dBµV)	Quasi Peak or Average (dBµV)	Correction Factor (dB/m)	Peak Field* (dBµV/m)	FCC Limit (dBµV/m)	Margin to limit (dB)
4	42.9	49.6		14.30	35.30	40.00	4.70
	79.8	53.7		18.16	35.54	40.00	4.46
	85.1	54.85		18.02	36.83	40.00	3.17
5	383.2	53.8	53.23	9.21	44.02	46.00	1.98
	756.0	46.66	45.93	1.30	44.63	46.00	1.37
	862.0	42.7		0.40	42.30	46.00	3.70
6	383.2	52.9		9.21	43.69	46.00	2.31
	756.0	42.4		1.30	41.10	46.00	4.90
11	3,890.0	39.1		-11.37	50.47	54.00	3.53
12	3,800.0	40.2		-10.91	51.11	54.00	2.89
13	4,630.0	39.15		-12.71	51.86	54.00	2.14
14	4,000.0	39.6		-11.97	51.57	54.00	2.43
15	5,812.0	34.4		-16.62	51.02	54.00	2.98
16	5,852.0	34.5		-16.71	51.21	54.00	2.79
17	6,402.0	39.95	31.55	-18.80	50.35	54.00	3.65
18	6,433.0	40	31.7	-18.95	50.65	54.00	3.35

Table 2: Peak Measurement Results

* Peak field (dBµV/m) = the measured value (either Peak, Quasi Peak or Average) in dBµV - Correction Factor (dB/m)

It can be seen from the previous figures that the unintentional radiated emissions are below limit. Hence the unit is in compliance.

4.3.1.2 TRANSMITTING MODE

Figures 19 to 40 present the results for the BSN250 unit evaluated in the transmitting mode with 7NM867/122-X1-AA Trilithic and VHF+ 3100 Mini-Circuit filters at the receiver to attenuate the RF signal transmitted by the module within the frequency band of 902 to 928 MHz below and above 3 GHz, respectively. It should be noted from Figures 21-22 that the TX signal could still be measured despite the notch filter in the receiving system.

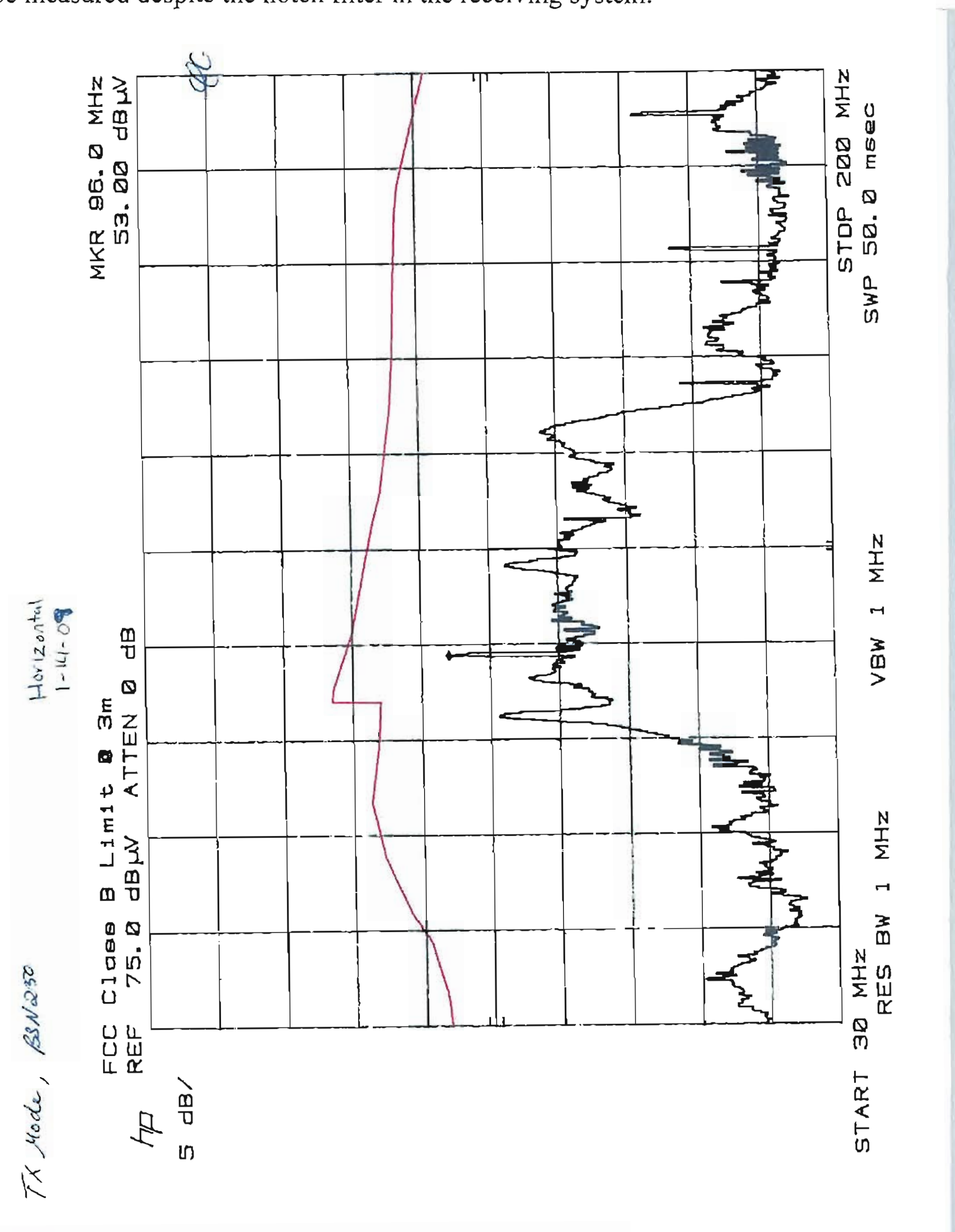


FIGURE 19: Radiated Emission 30 – 200 MHz Horizontal Polarization

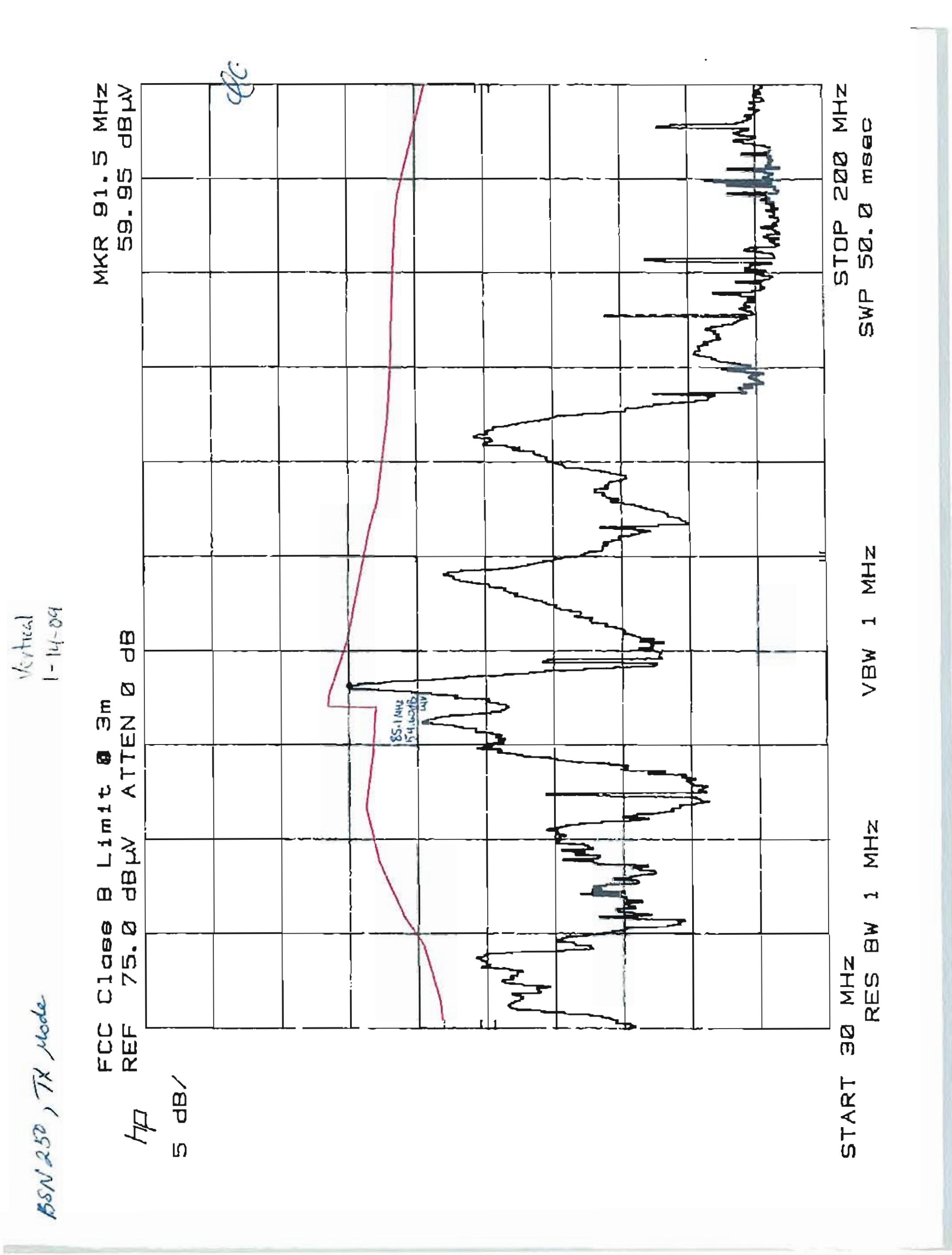


FIGURE 20: Radiated Emission 30 – 200 MHz Vertical Polarization

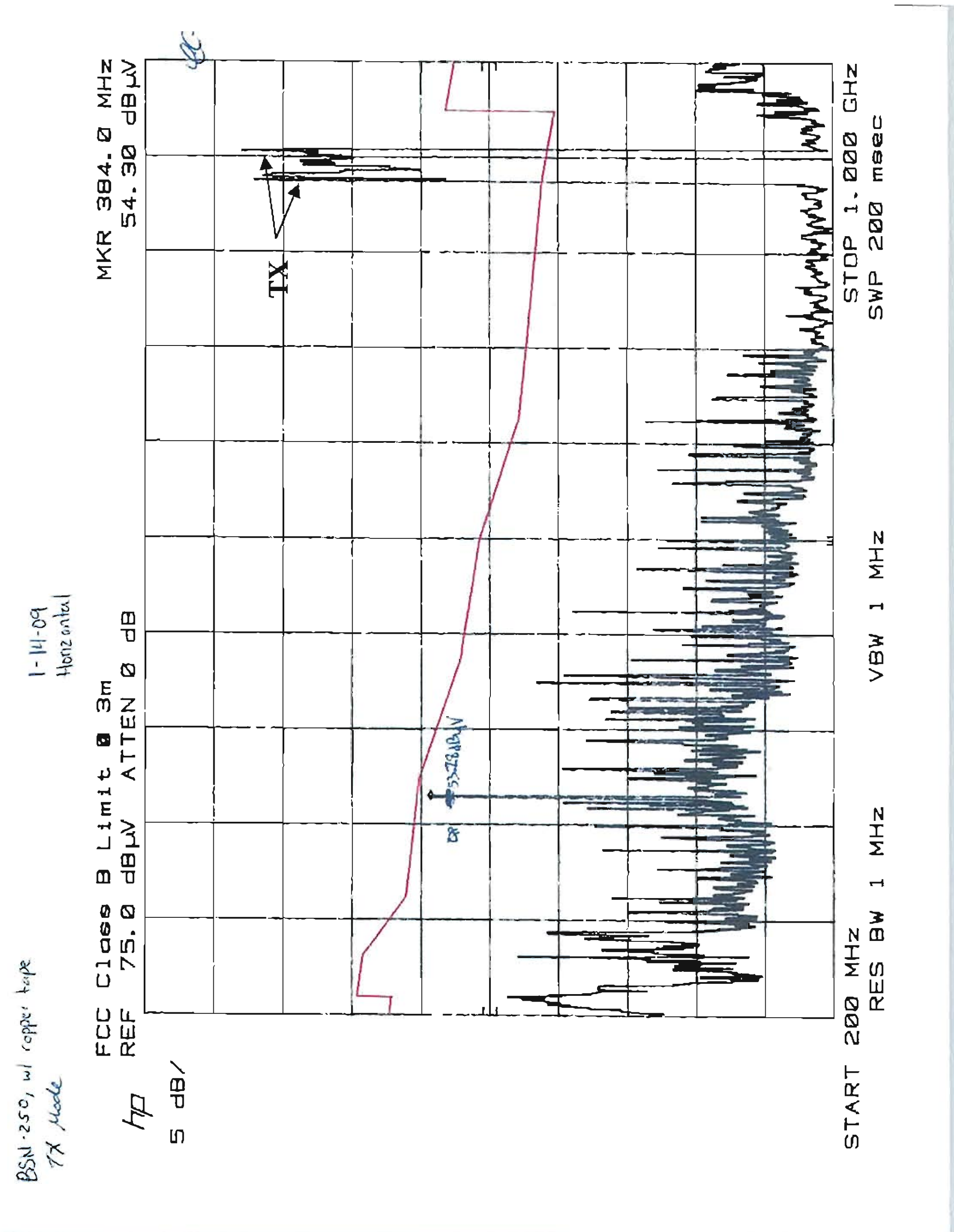


FIGURE 21: Radiated Emission 200 MHz – 1 GHz Horizontal Polarization

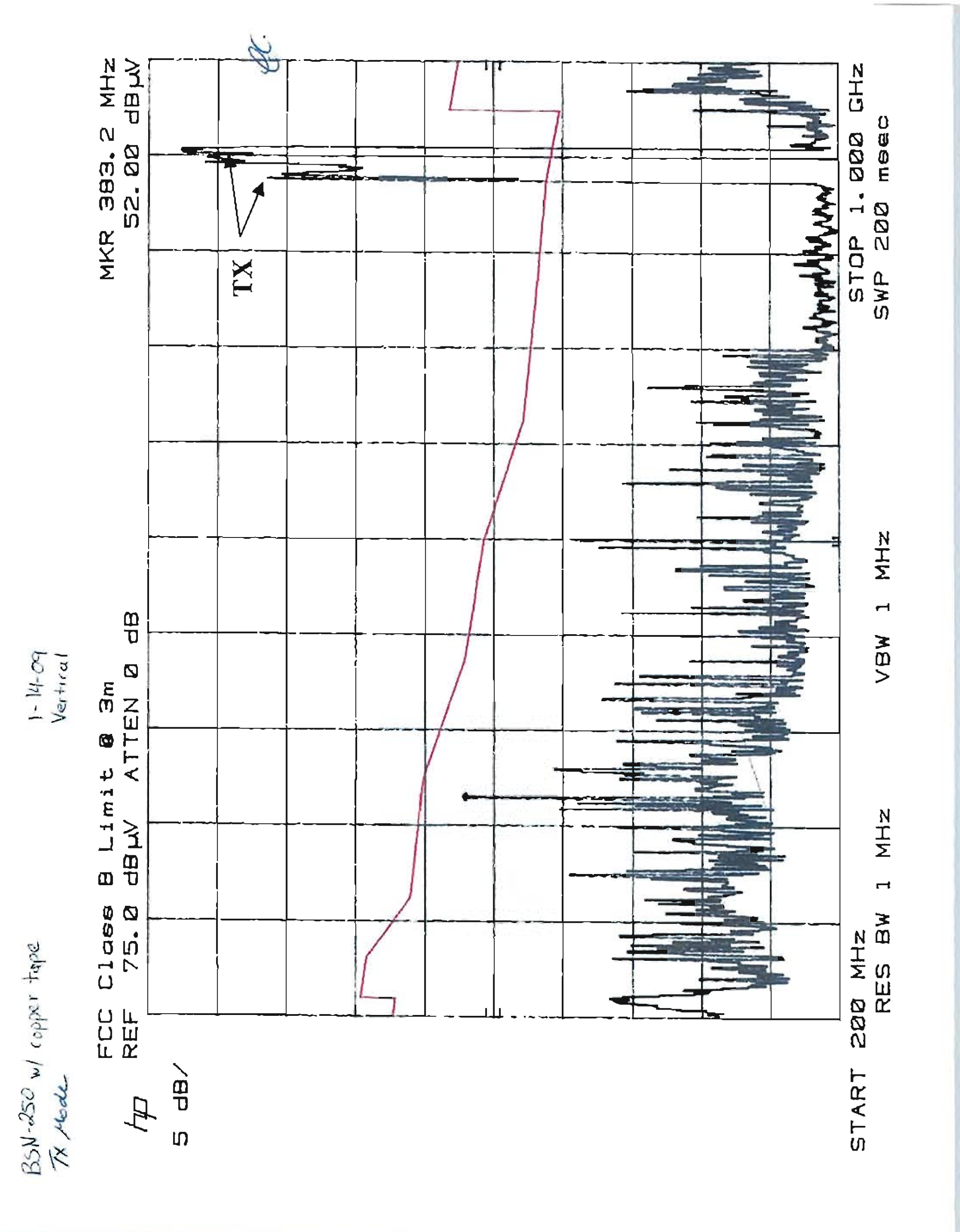


FIGURE 22: Radiated Emission 200 MHz – 1 GHz Vertical Polarization

The BSN250 was evaluated up to the 9.5 GHz, corresponding to 10th harmonic of the TX frequency.

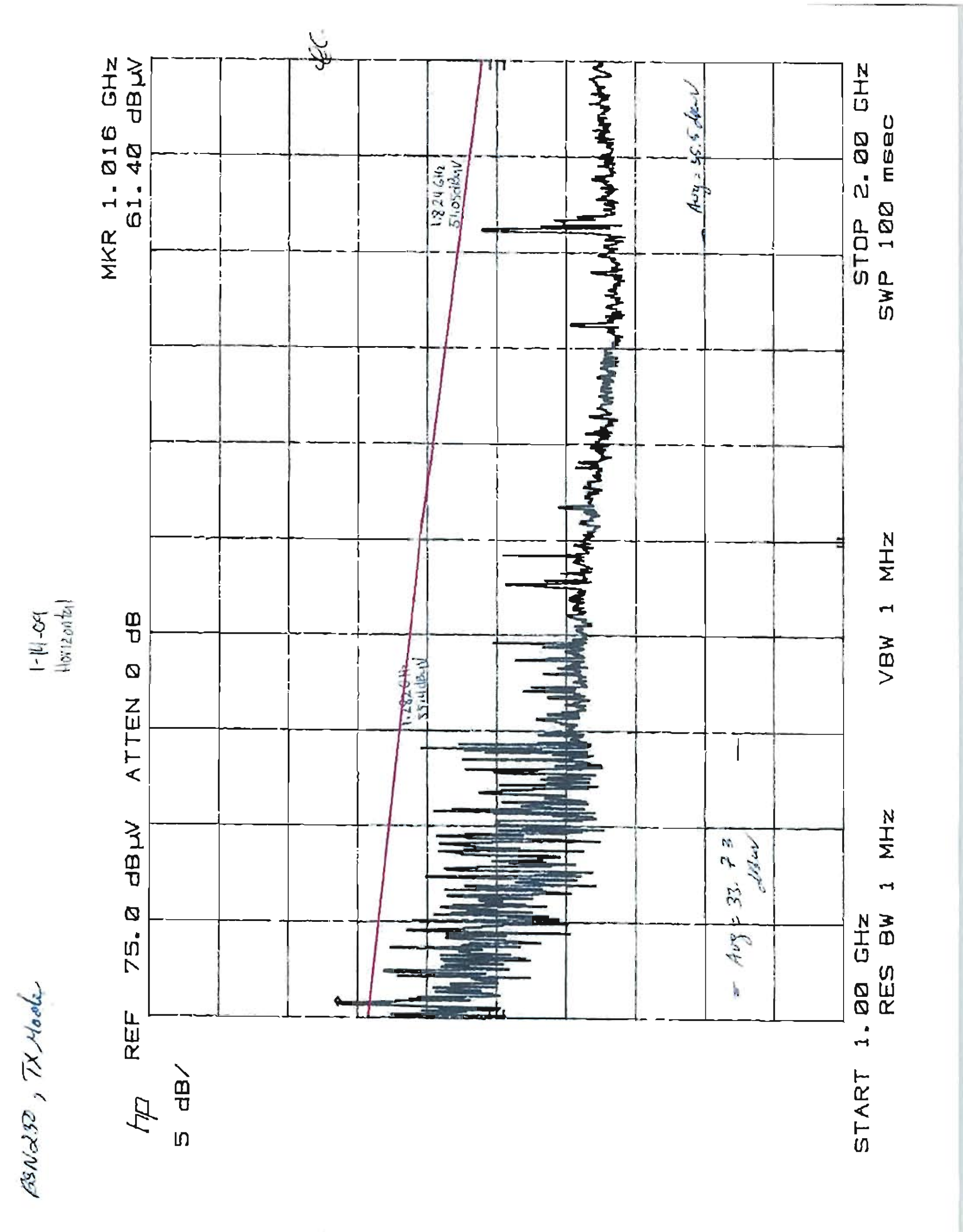


FIGURE 23: Radiated Emission 1 GHz – 2 GHz Horizontal Polarization

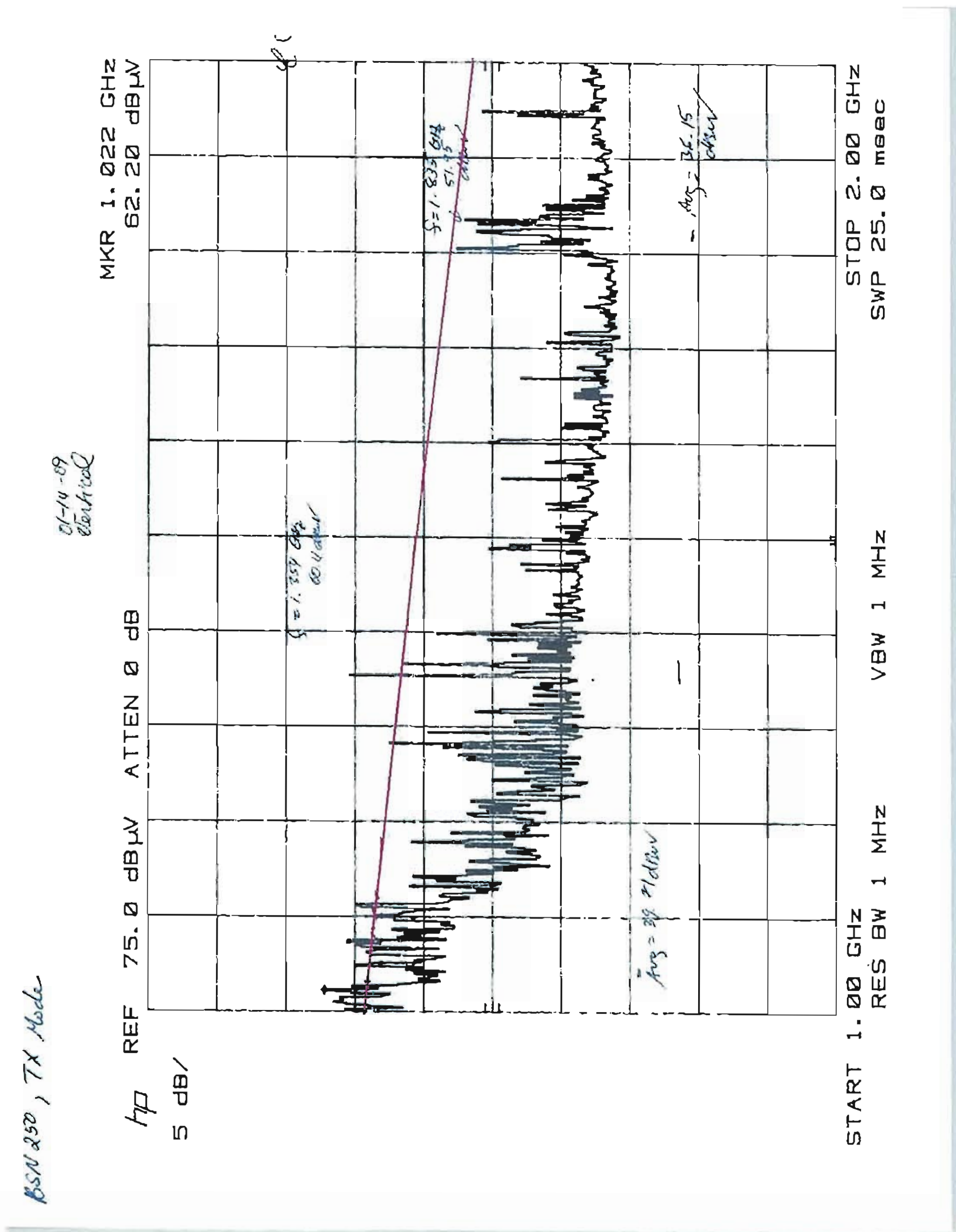


FIGURE 24: Radiated Emission 1 GHz – 2 GHz Vertical Polarization

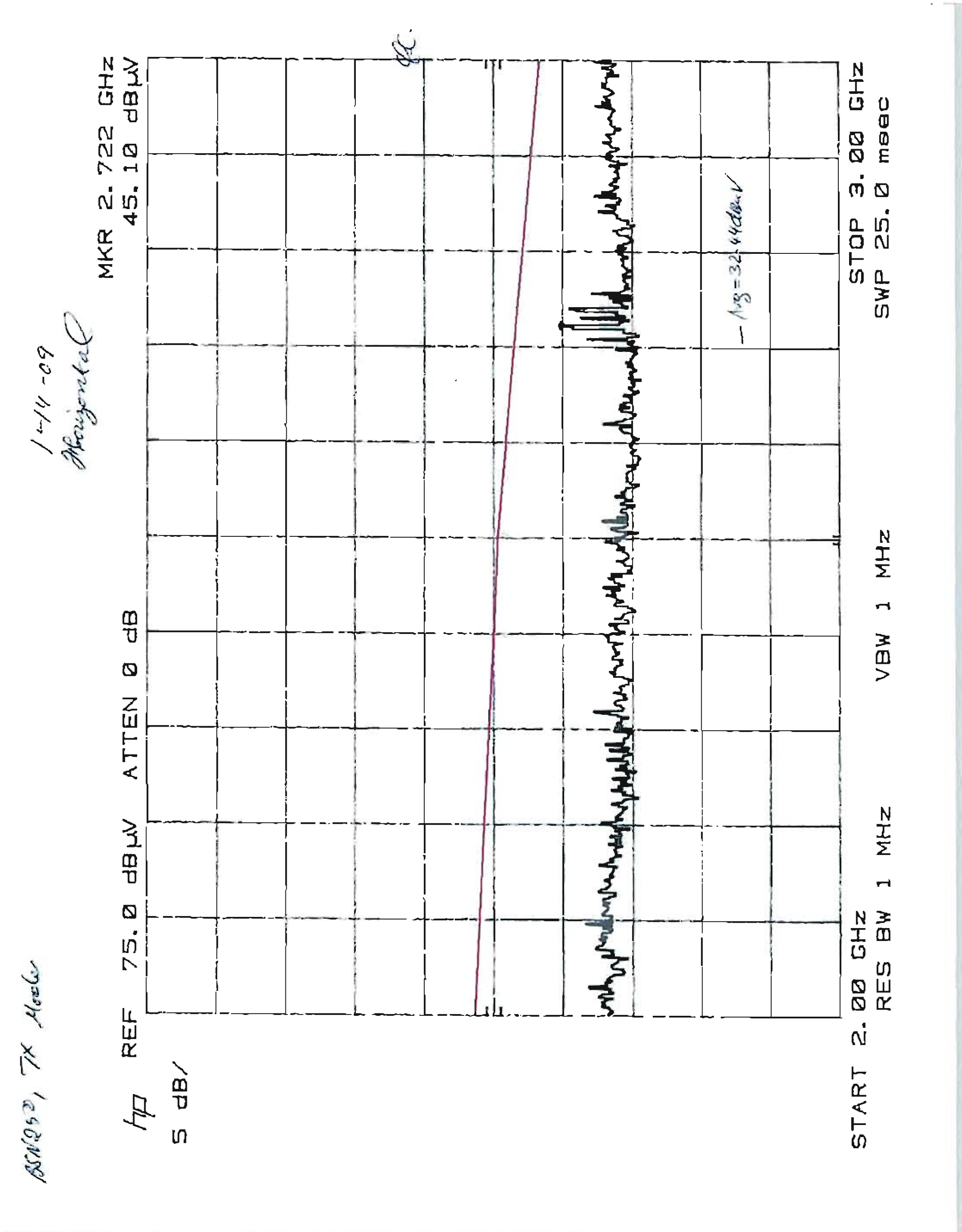


FIGURE 25: Radiated Emission 2 GHz – 3 GHz Horizontal Polarization

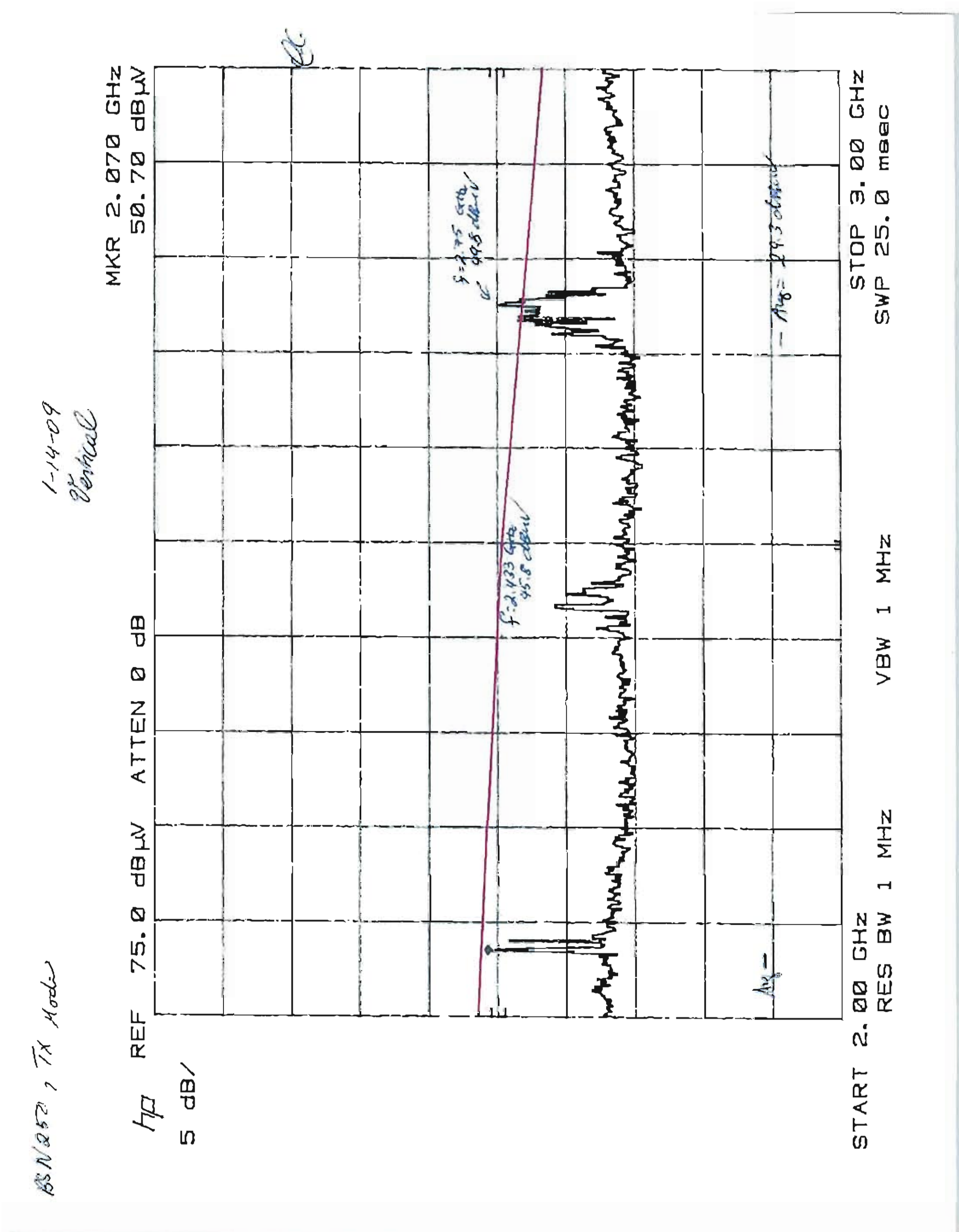


FIGURE 26: Radiated Emission 2 GHz – 3 GHz Vertical Polarization

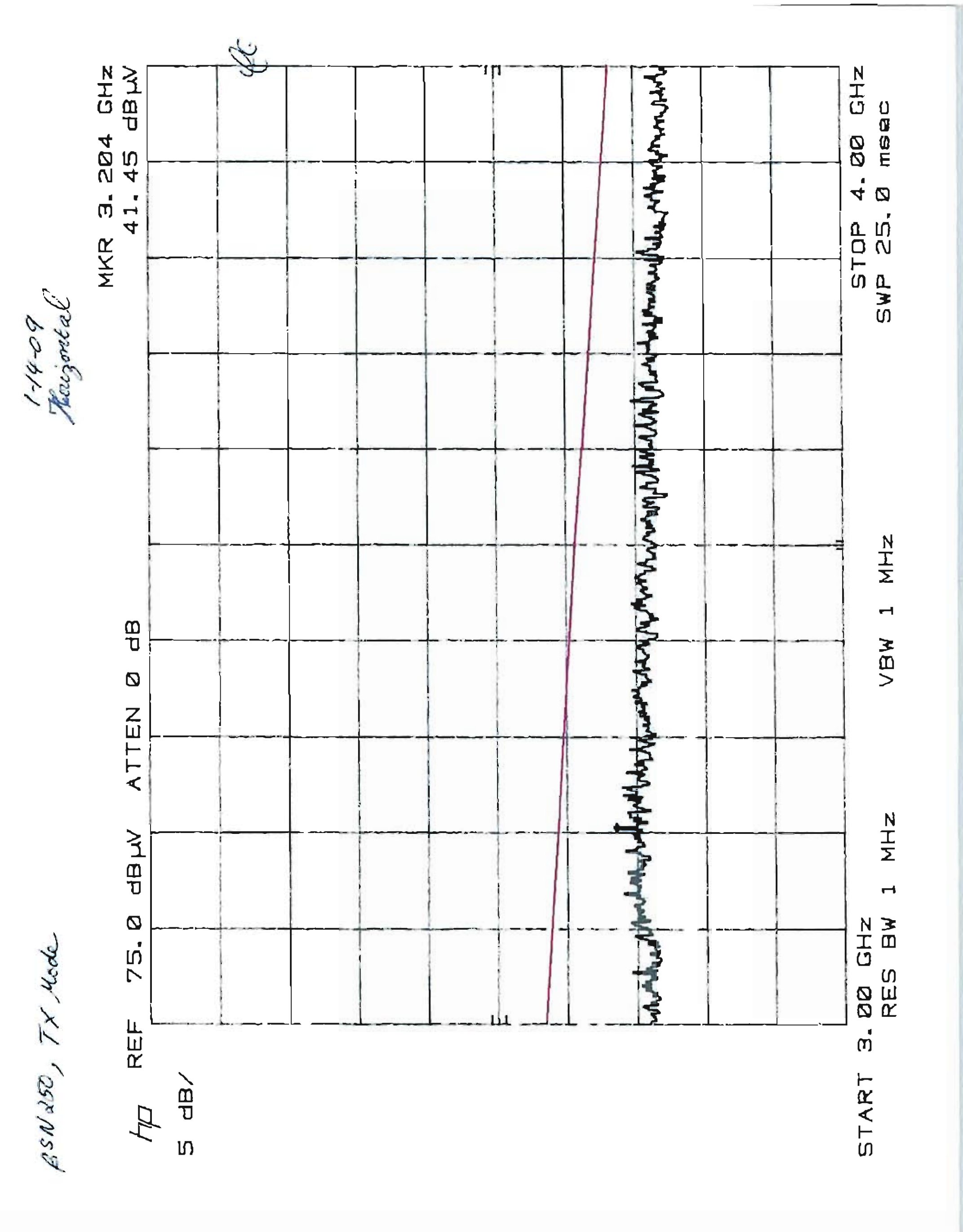


FIGURE 27: Radiated Emission 3 GHz – 4 GHz Horizontal Polarization

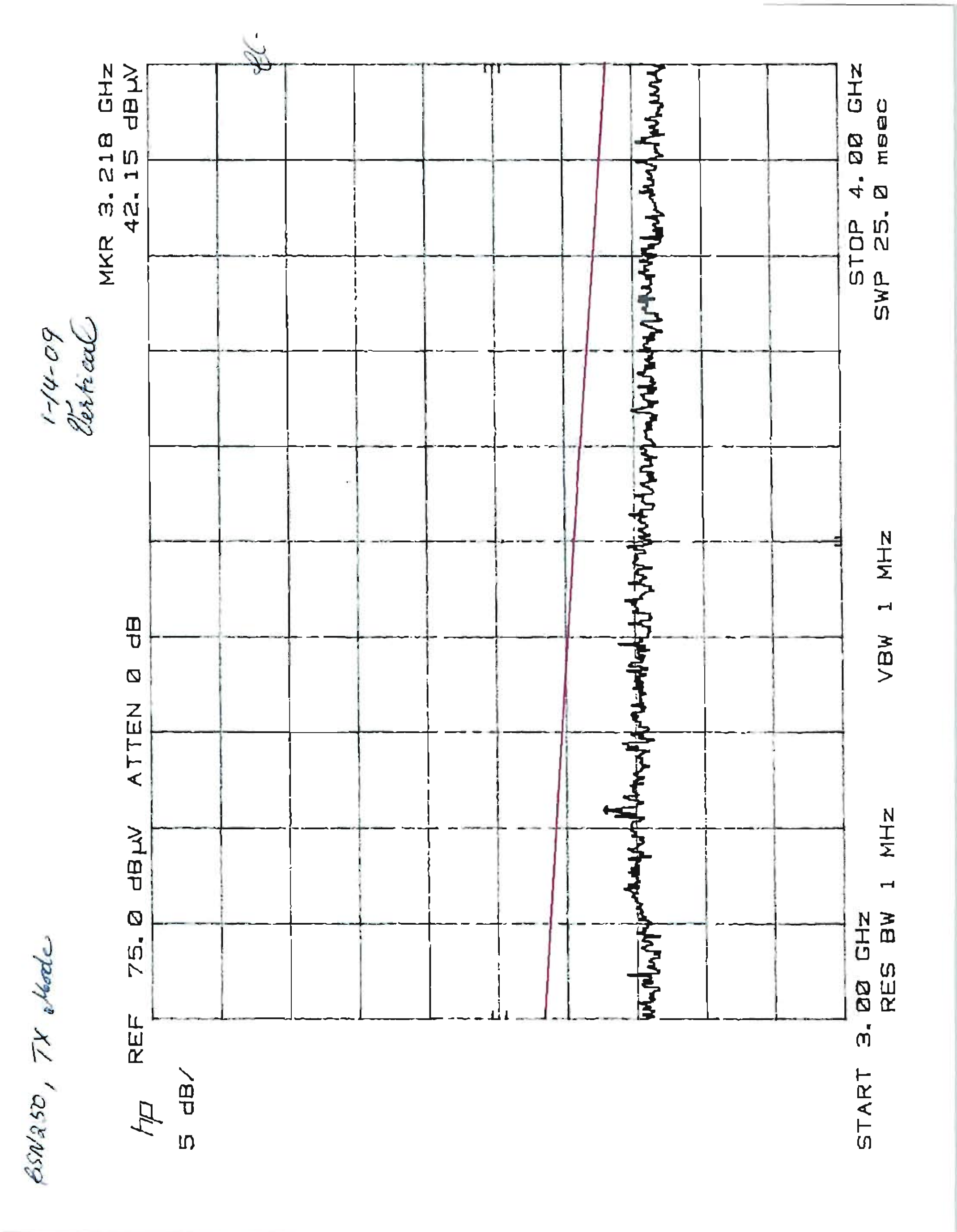


FIGURE 28: Radiated Emission 3 GHz – 4 GHz Vertical Polarization

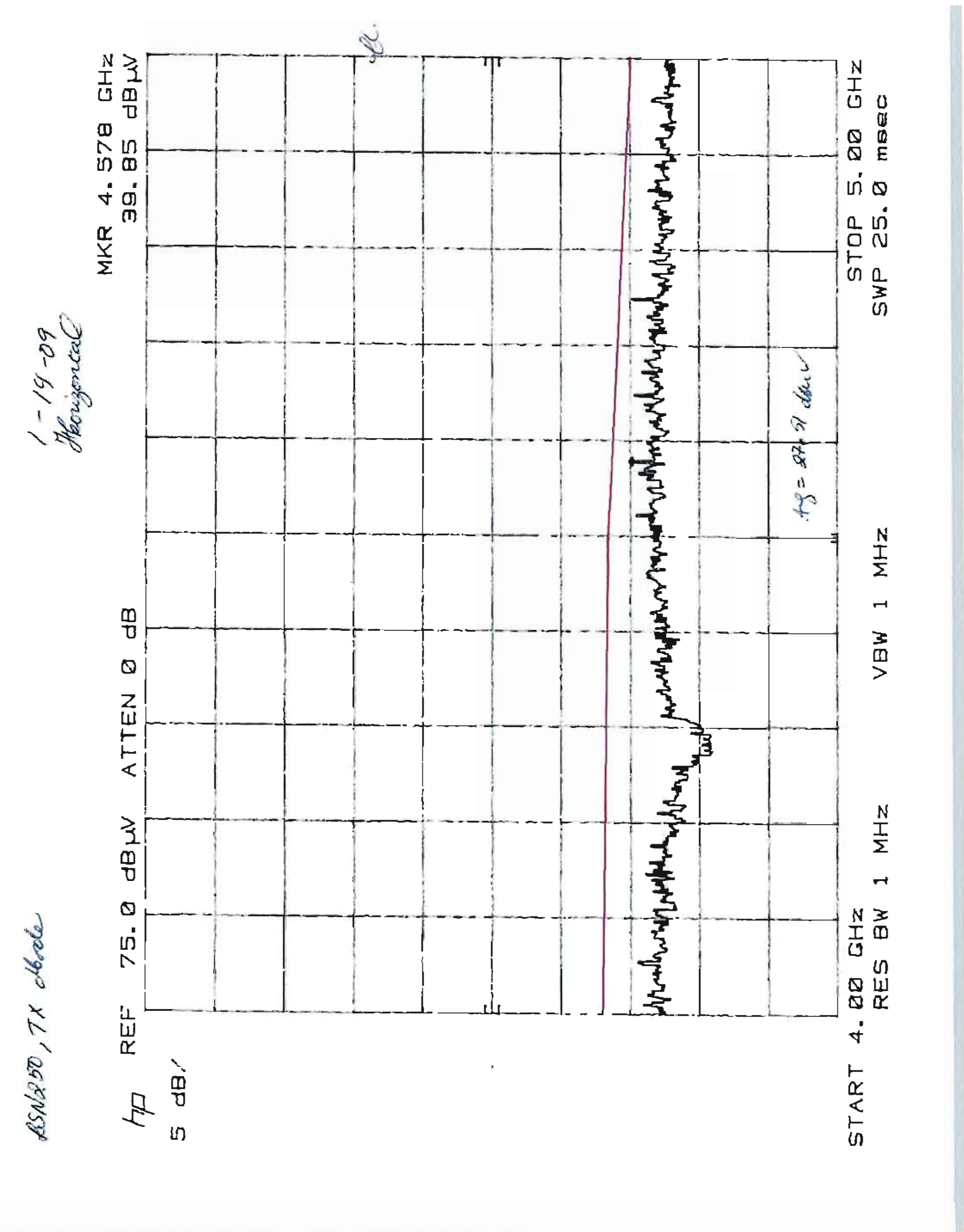


FIGURE 29: Radiated Emission 4 GHz – 5 GHz Horizontal Polarization

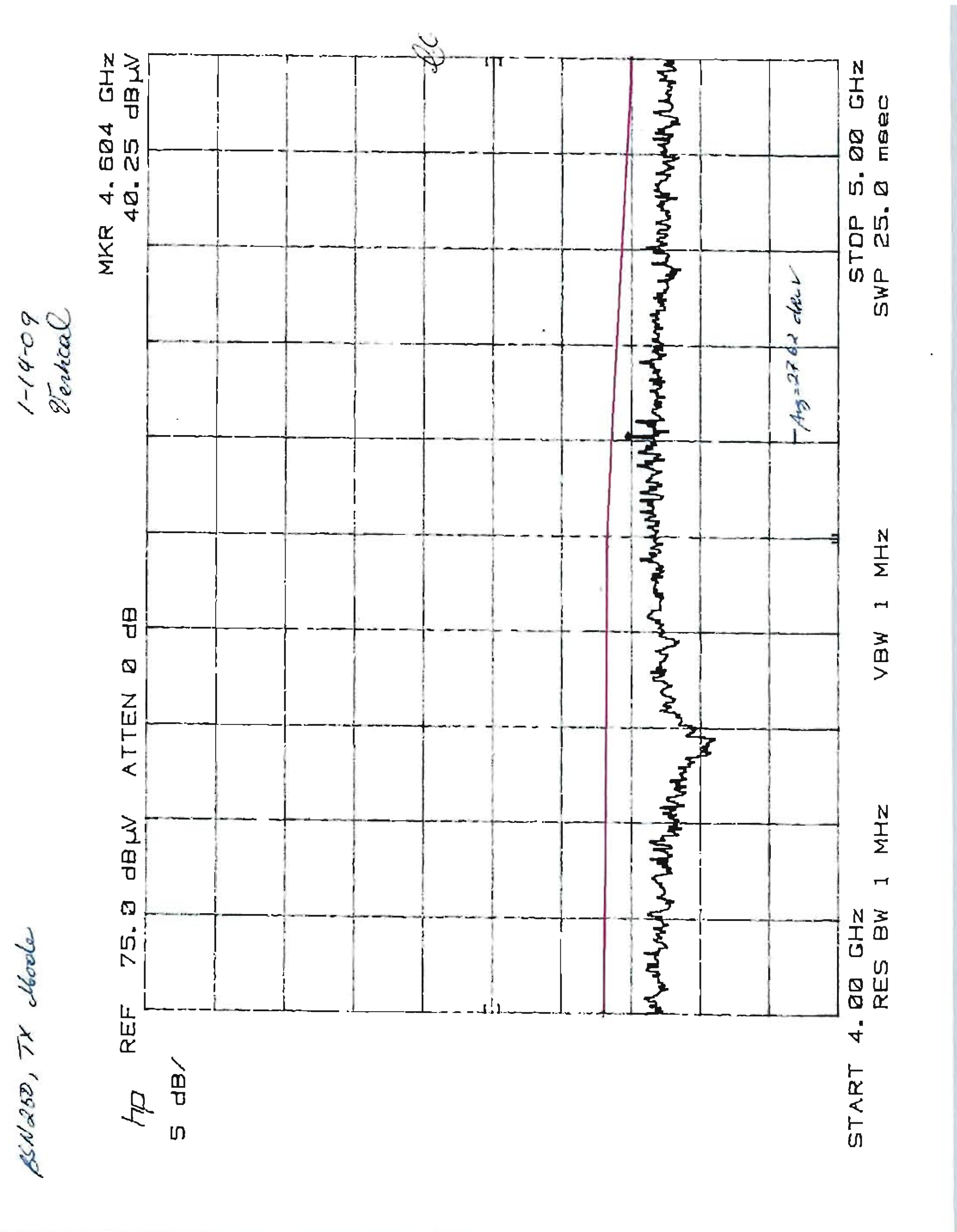


FIGURE 30: Radiated Emission 4 GHz – 5 GHz Vertical Polarization

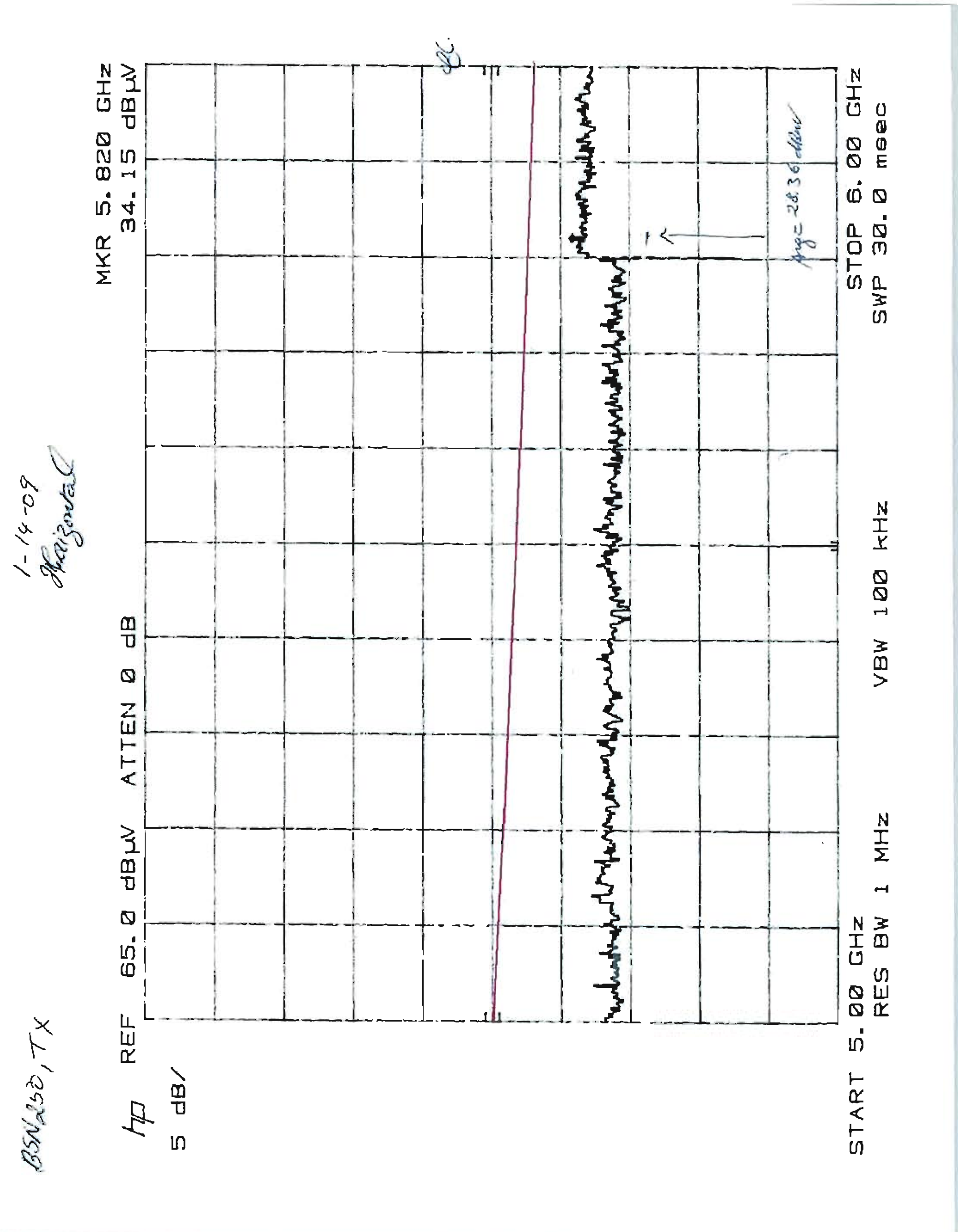


FIGURE 31: Radiated Emission 5 GHz – 6 GHz Horizontal Polarization

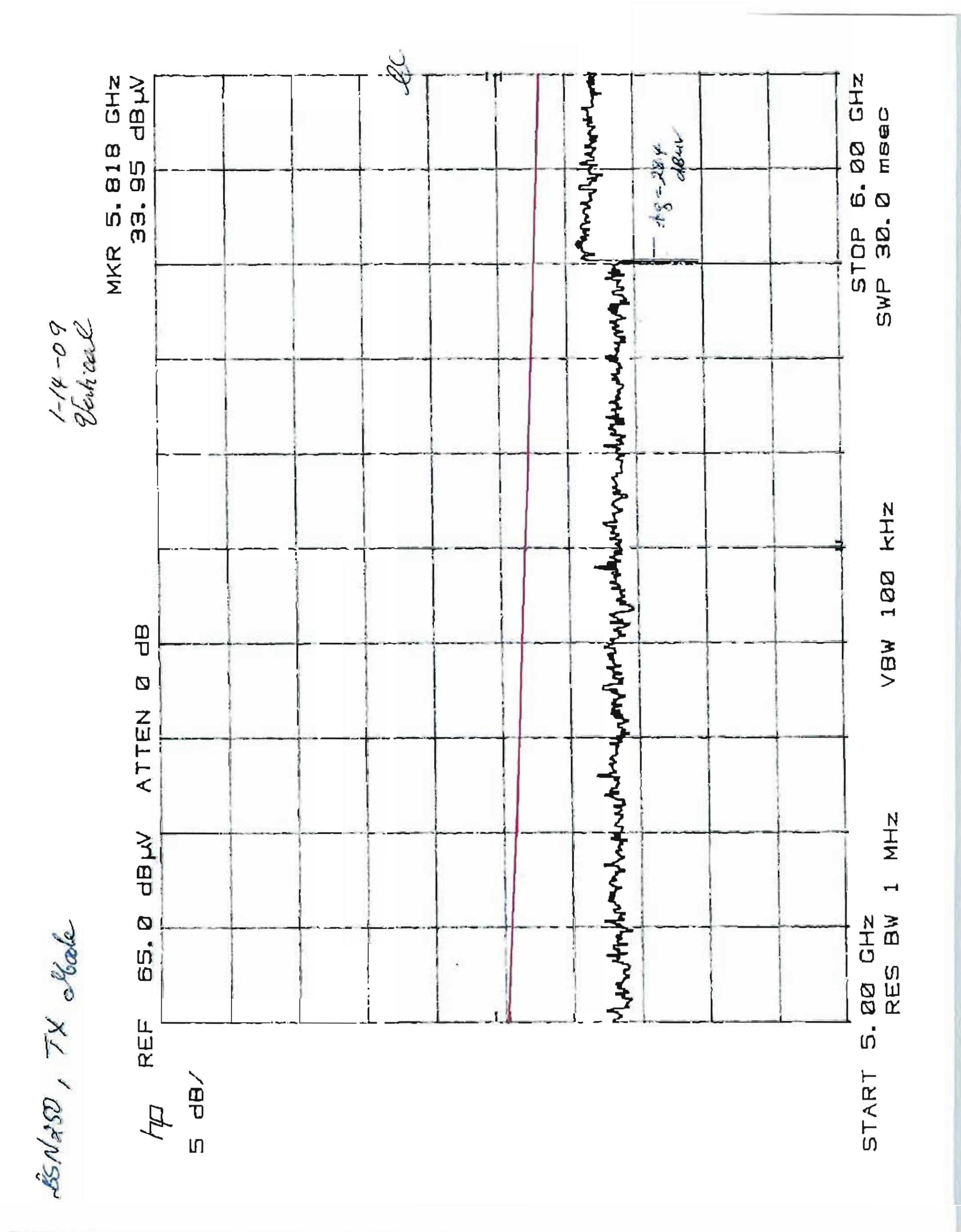


FIGURE 32: Radiated Emission 5 GHz – 6 GHz Vertical Polarization

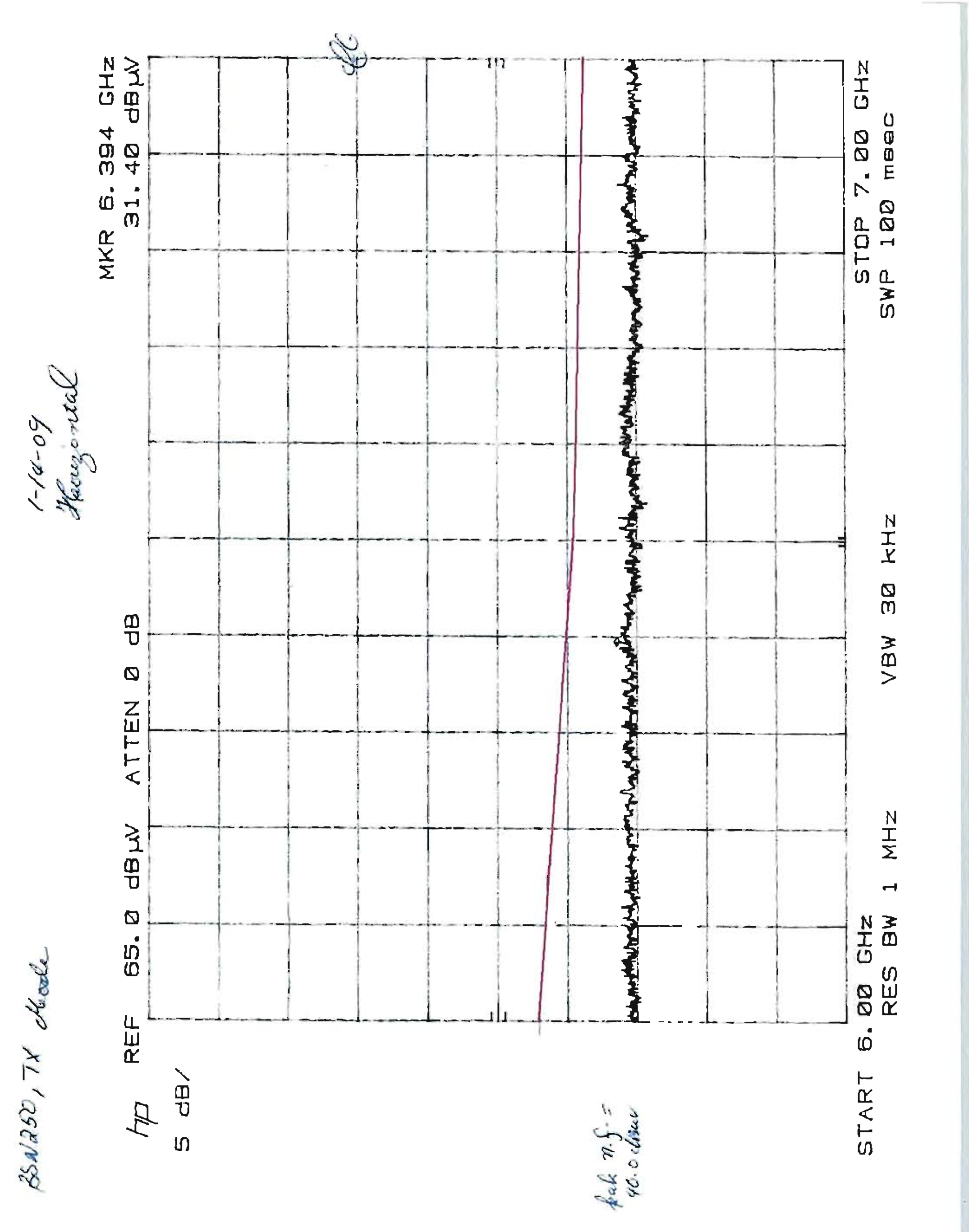


FIGURE 33: Radiated Emission 6 GHz – 7 GHz Horizontal Polarization

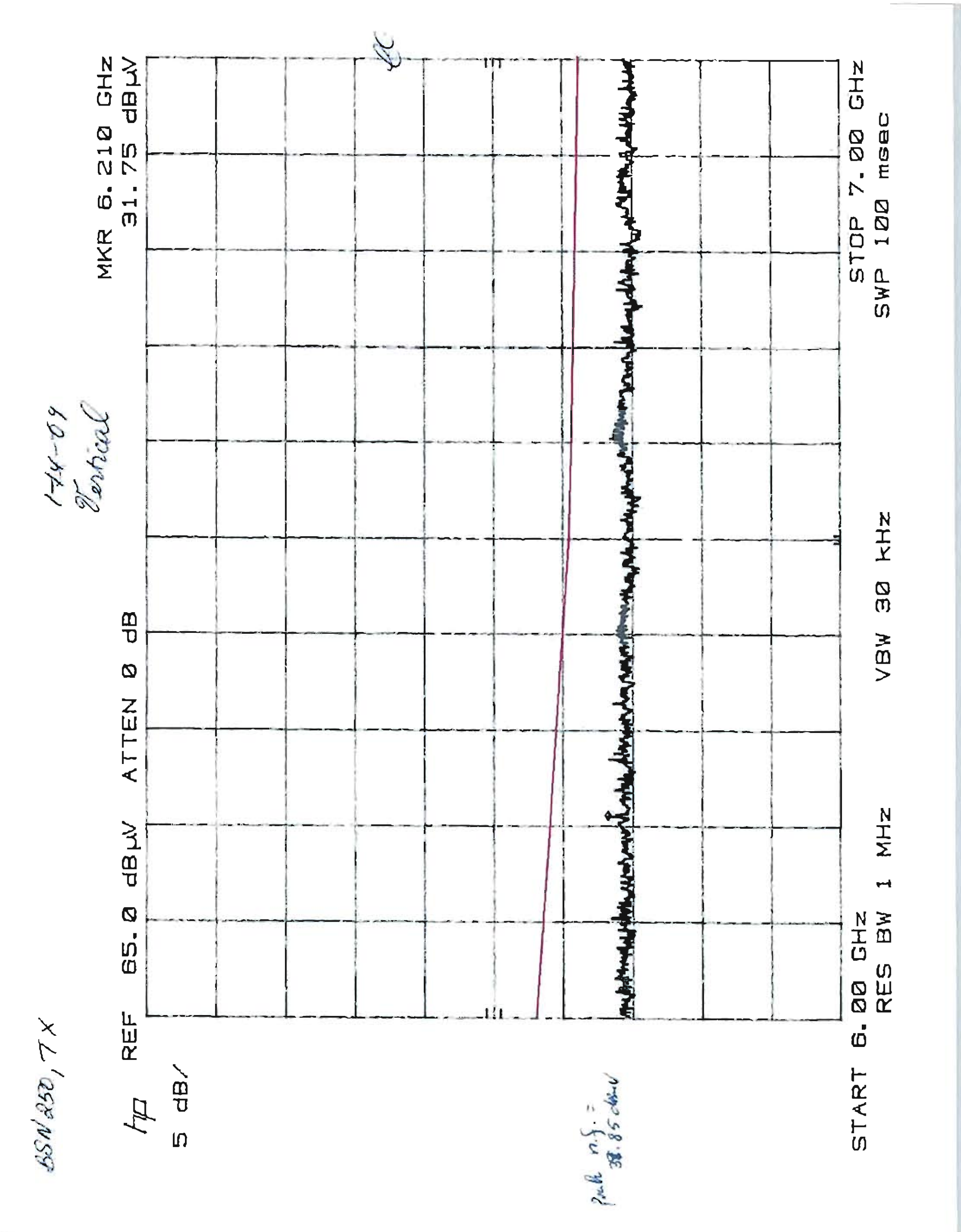


FIGURE 34: Radiated Emission 6 GHz – 7 GHz Vertical Polarization

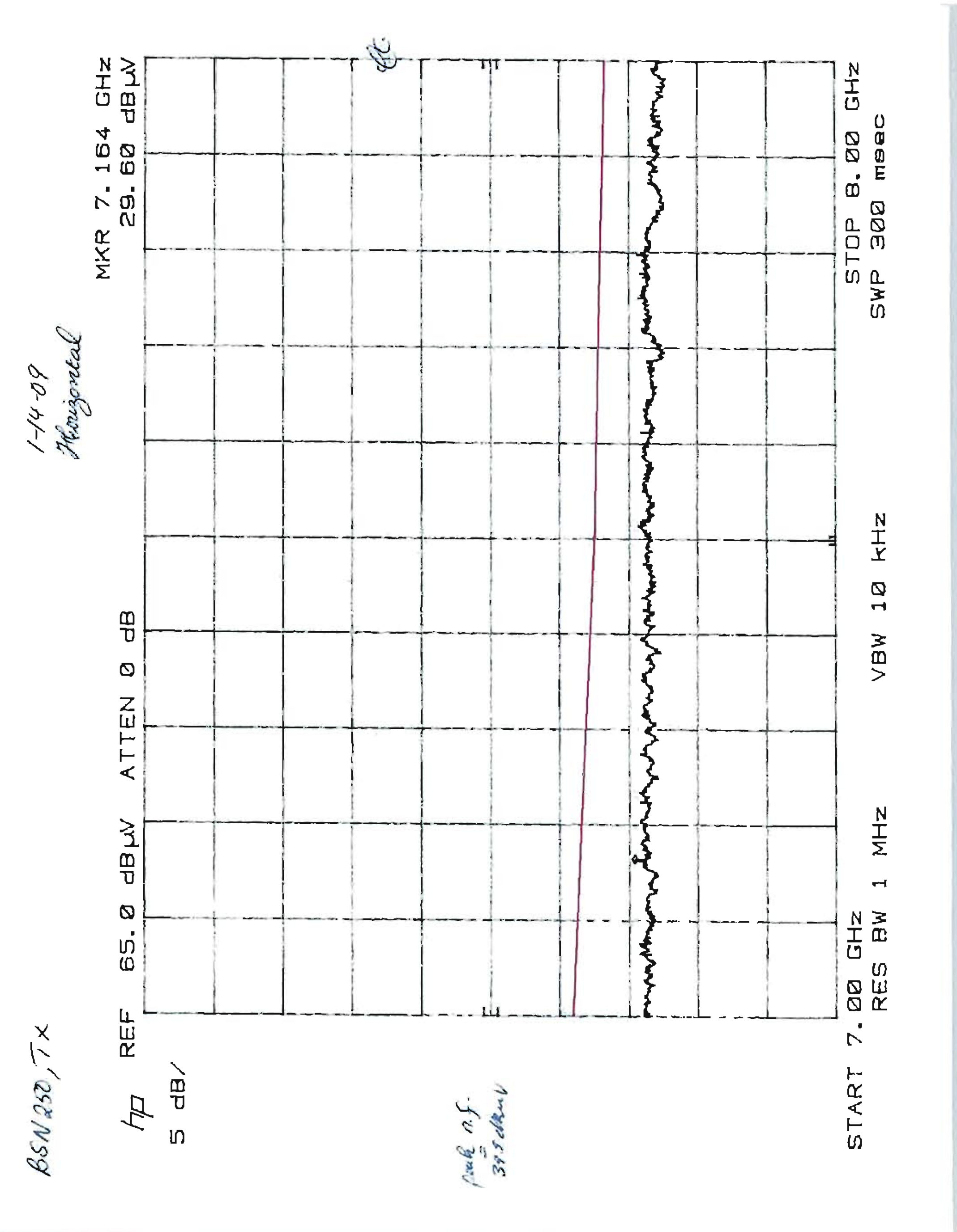


FIGURE 35: Radiated Emission 7 GHz – 8 GHz Horizontal Polarization

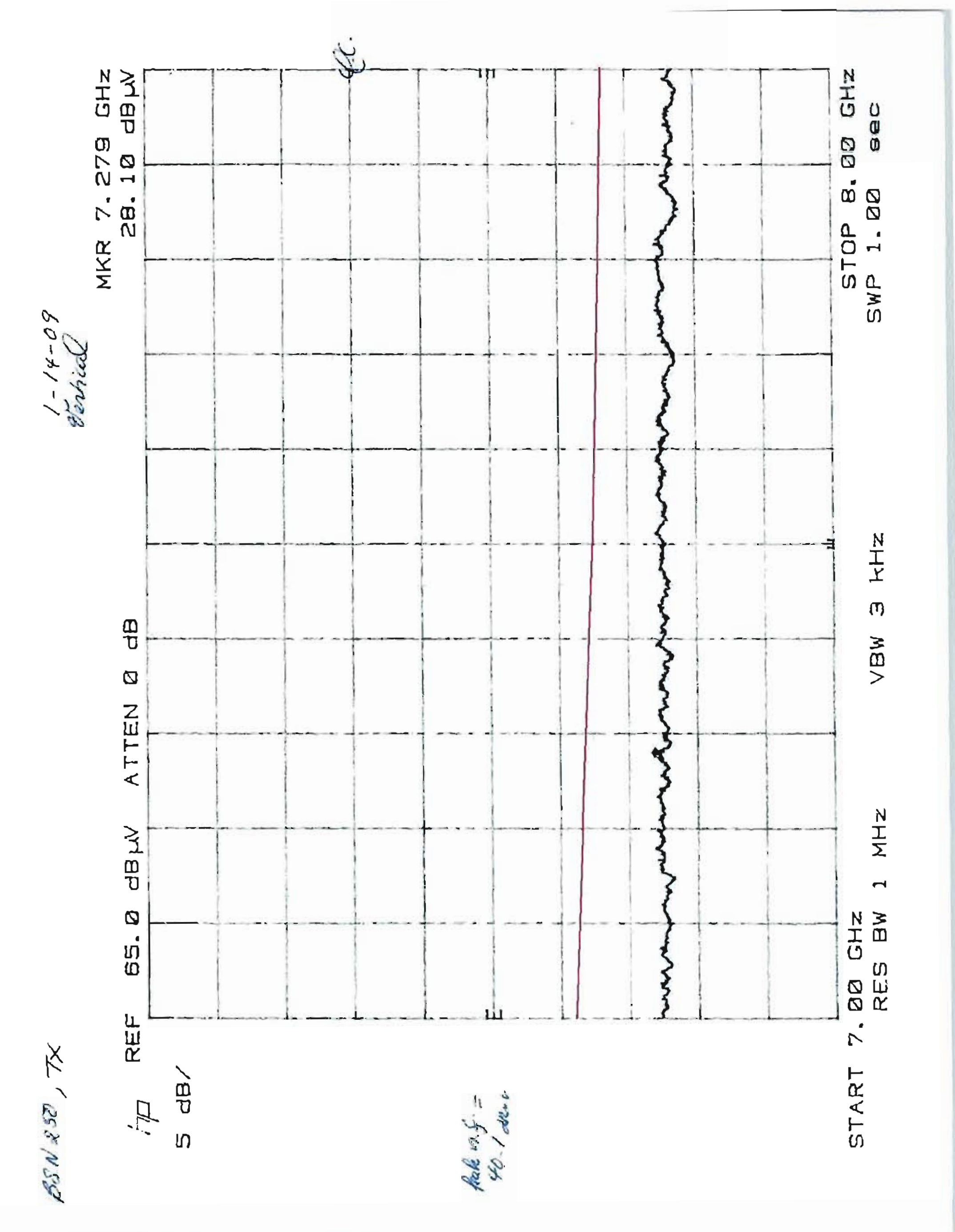


FIGURE 36: Radiated Emission 7 GHz – 8 GHz Vertical Polarization

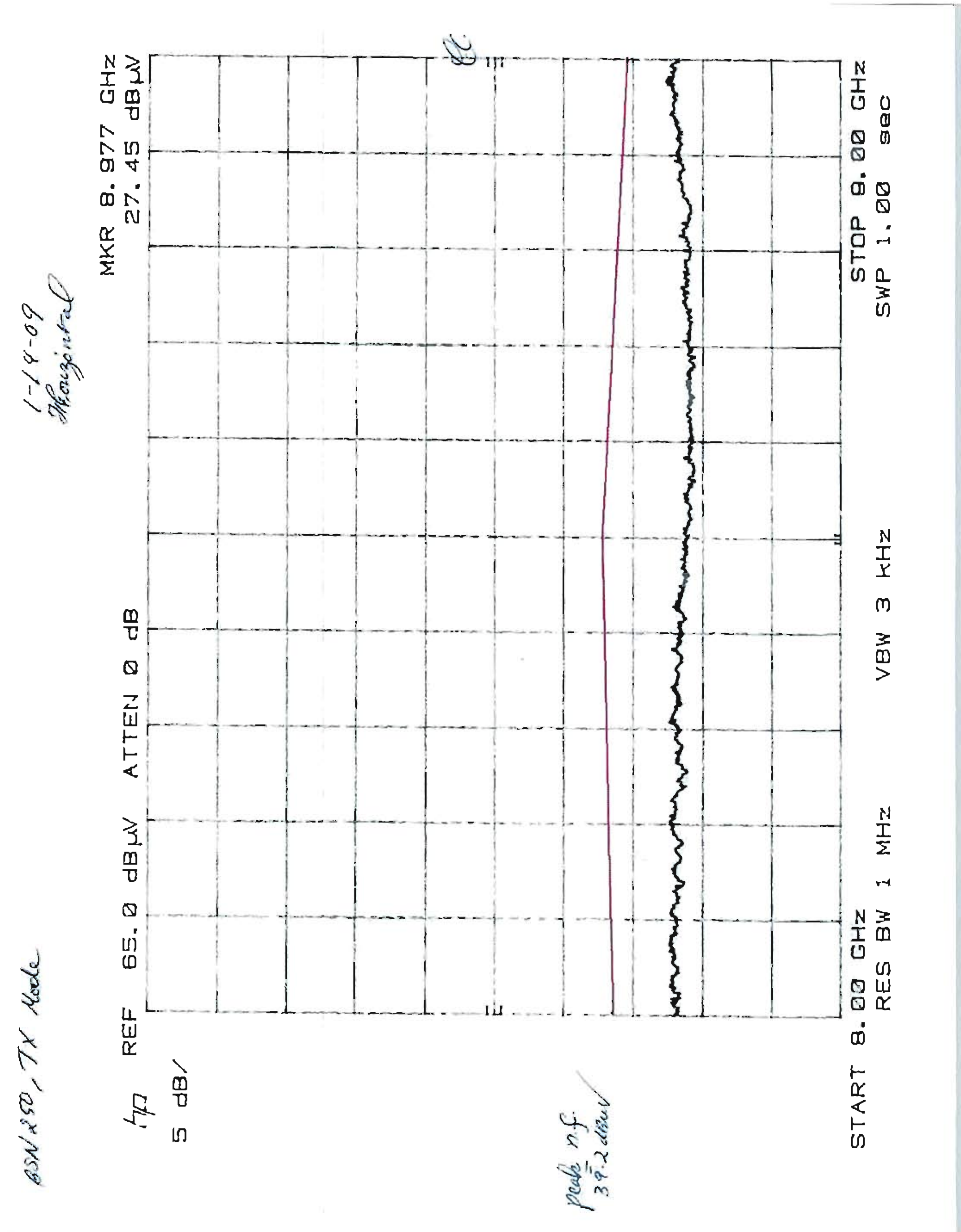


FIGURE 37: Radiated Emission 8 GHz – 9 GHz Horizontal Polarization

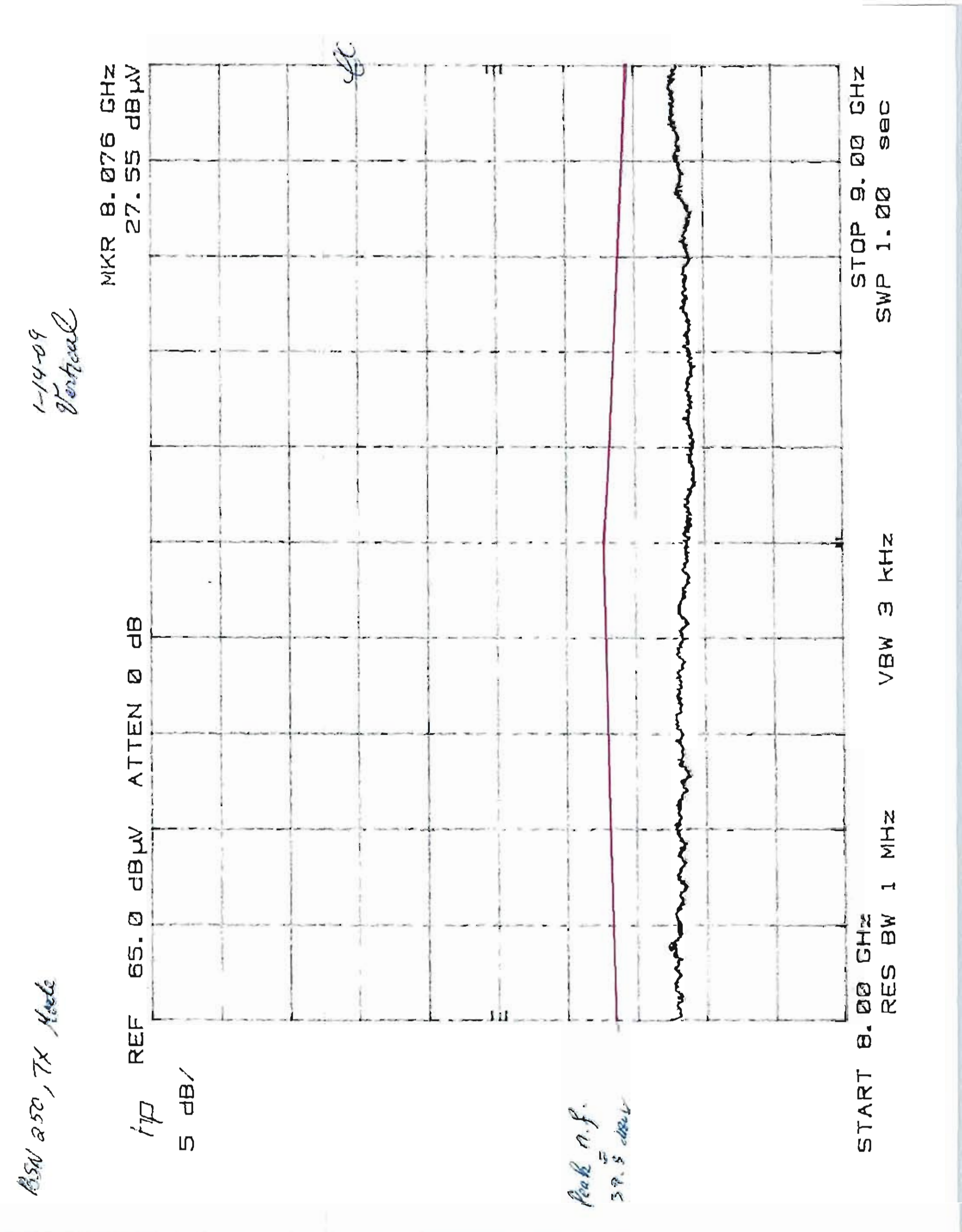


FIGURE 38: Radiated Emission 8 GHz – 9 GHz Vertical Polarization

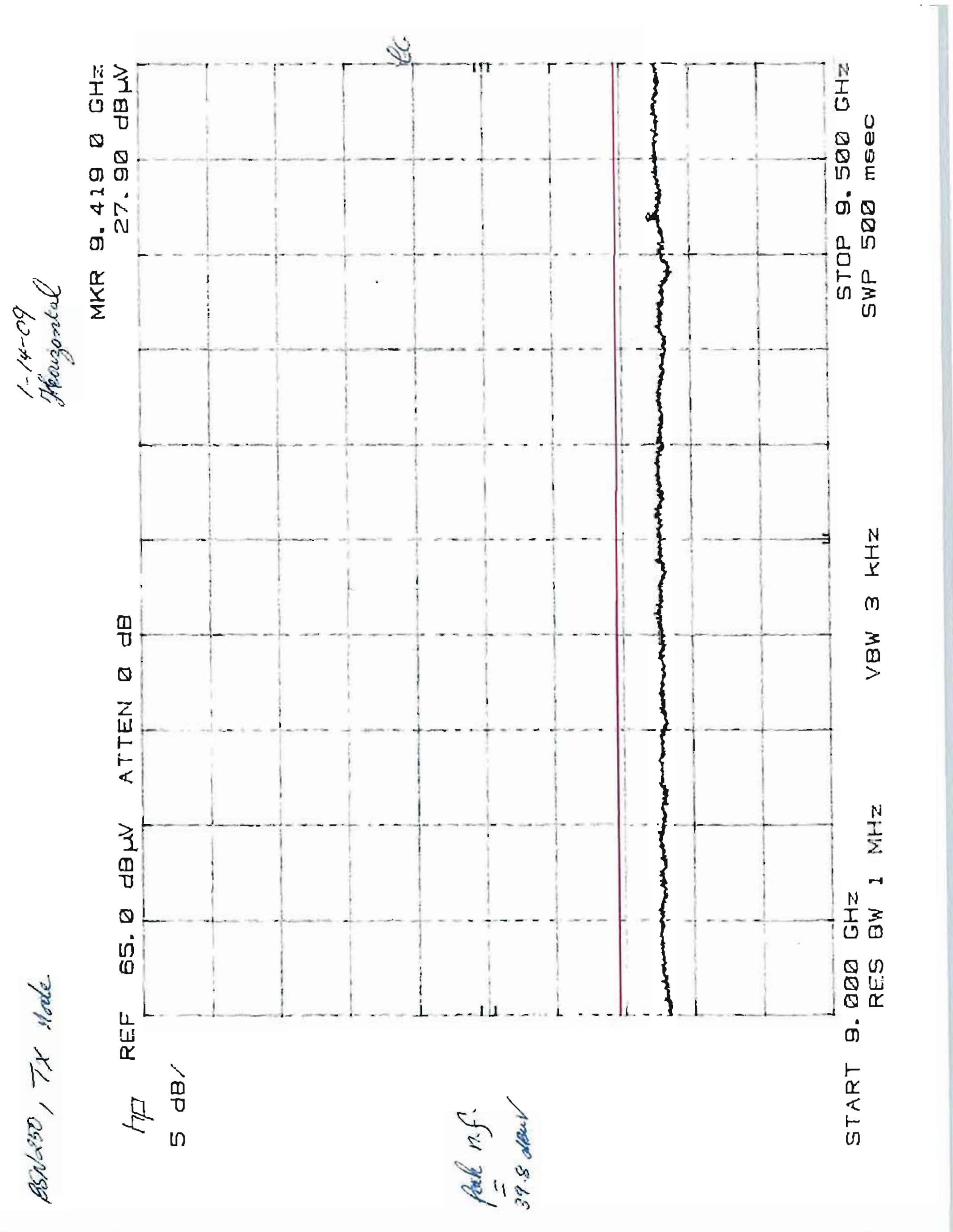


FIGURE 39: Radiated Emission 9 GHz – 9.5 GHz Horizontal Polarization

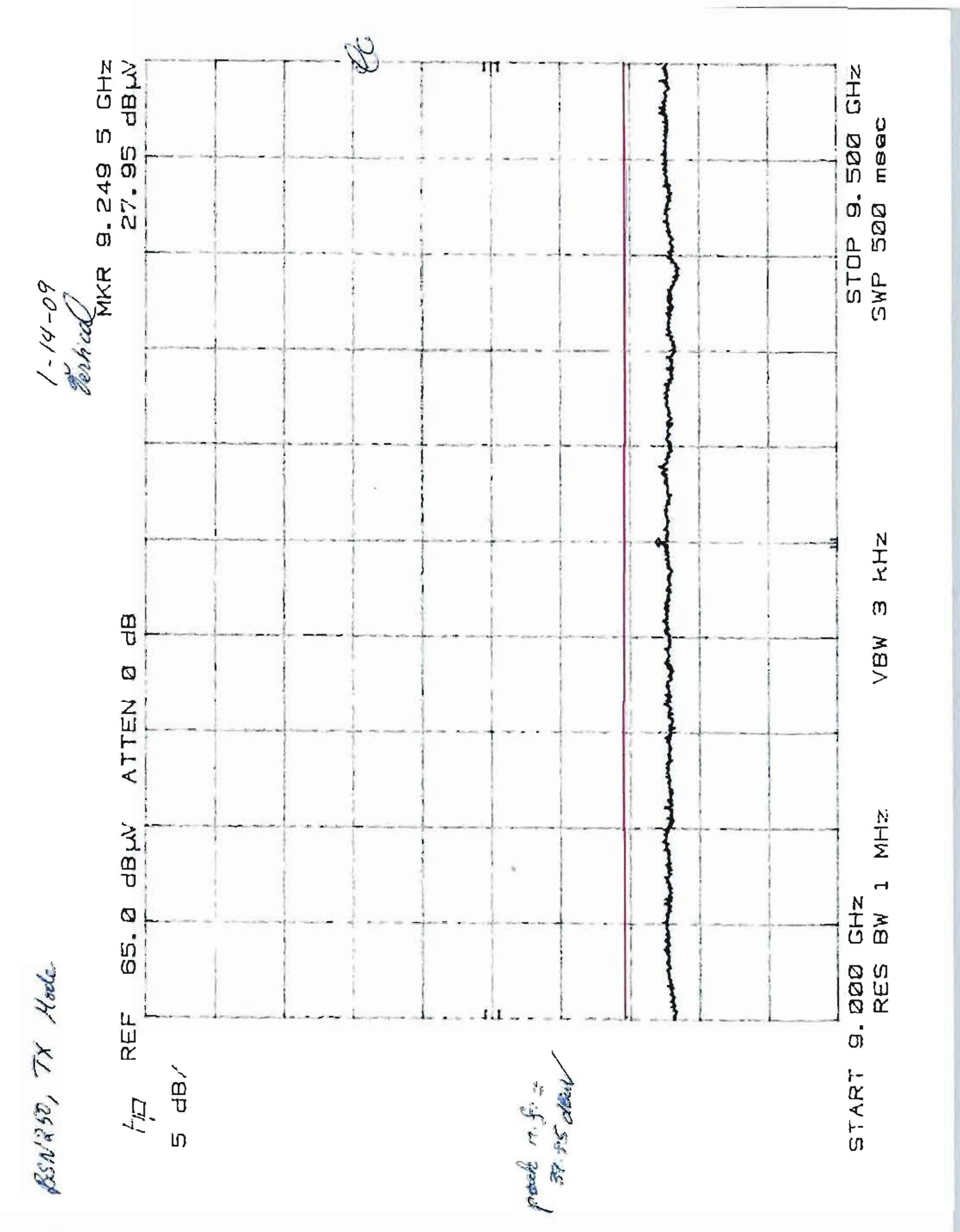


FIGURE 40: Radiated Emission 9 GHz – 9.5 GHz Vertical Polarization

From Figures 19-40, the unintentional peak emissions that exceeded or were within 5 dB of the limit are reported in Table 3. Note that the peak emissions at 915 MHz from Figures 21 and 22 represent the intentional RF signal transmitted by the module, attenuated by the 7NM867/122-X1-AA band reject Trilithic filter. Therefore, these values are not reported in Table 3.

Figure No.	Frequency (MHz)	Measured Peak (dBµV)	Quasi Peak or Average (dBµV)	Correction Factor (dB/m)	Peak Field* (dBµV/m)	FCC Limit (dBµV/m)	Margin to limit (dB)
20	85.1	54.6		18.02	36.58	40.00	3.42
	91.5	59.95		17.68	42.27	43.50	1.23
21	384	54.3	53.28	9.20	44.08	46.00	1.92
22	383.2	52		9.21	42.79	46.00	3.21
23	1,061	61.4	33.73	4.59	29.14	54.00	24.86
	1,282	55.4	33.7	3.25	30.45	54.00	23.55
	1,824	51.05	35.5	-0.74	36.24	54.00	17.76
24	1,022	62.2	39.71	4.81	34.90	54.00	19.10
	1,282	55.2	33.5	3.25	30.25	54.00	23.75
	1,354	60.4	37.5	2.76	34.74	54.00	19.26
	1,835	51.95	36.15	-0.83	36.98	54.00	17.02
	1,950	50.7	36	-1.89	37.89	54.00	16.11
25	2,722	45.1	32.44	-5.46	37.90	54.00	16.10
26	2,070	50.7	33.5	-2.64	36.14	54.00	17.86
	2,433	45.8		-4.02	49.82	54.00	4.18
	2,750	49.8	29.3	-5.62	34.92	54.00	19.08
27	3,204	41.45		-8.05	49.50	54.00	4.50
	3,810	39.7		-10.96	50.66	54.00	3.34
28	3,218	42.15		-8.12	50.27	54.00	3.73
	3,900	39.7		-11.42	51.12	54.00	2.88
29	4,578	39.85	27.51	-12.53	40.04	54.00	13.96
	4,700	39.8	31.2	-12.95	44.15	54.00	9.85
30	4,604	40.25	27.62	-12.62	40.24	54.00	13.76
31	5,820	34.15	28.36	-16.64	45.00	54.00	9.00
32	5,818	33.95	28.4	-16.63	45.03	54.00	8.97
33	6,394	40	31.4	-18.76	50.16	54.00	3.84
34	6,210	39.85	31.75	-17.93	49.68	54.00	4.32
35	7,164	39.9	29.6	-20.58	50.18	54.00	3.82
36	7,279	40.1	28.1	-20.91	49.01	54.00	4.99
37	8,977	39.2	27.45	-23.56	51.01	54.00	2.99
38	8,076	39.3	27.55	-22.19	49.74	54.00	4.26
39	9,419	39.8	27.9	-23.72	51.62	54.00	2.38
40	9,249	39.75	27.95	-23.70	51.65	54.00	2.35

Table 3: Peak Measurement Results

* Peak field (dBµV/m) = the measured value (either Peak, Quasi Peak or Average) in dBµV - Correction Factor (dB/m)

From the previous figures that the unintentional radiated emissions are below limit. Hence the unit is in compliance.

OUTPUT POWER, BANDWIDTH AND POWER SPECTRAL DENSITY
4.3.2.1 MAXIMUM OUTPUT POWER MEASUREMENTS

The maximum output power at each antenna port of the XG Technology BSN250 unit was measured using the HP 8566B spectrum analyzer (SA) on the peak detector mode. The "bypass" instrument function of the HP 85650A Quasi-Peak Adapter was activated and RBW and VBW were set to 1 MHz and 3 MHz respectively. The output port for the BSN250 antenna was connected to SA in series with a 20 dB Narda attenuator.

[redacted]

Photographs 5 and 6: Power, bandwidth and PSD Measurement Setup

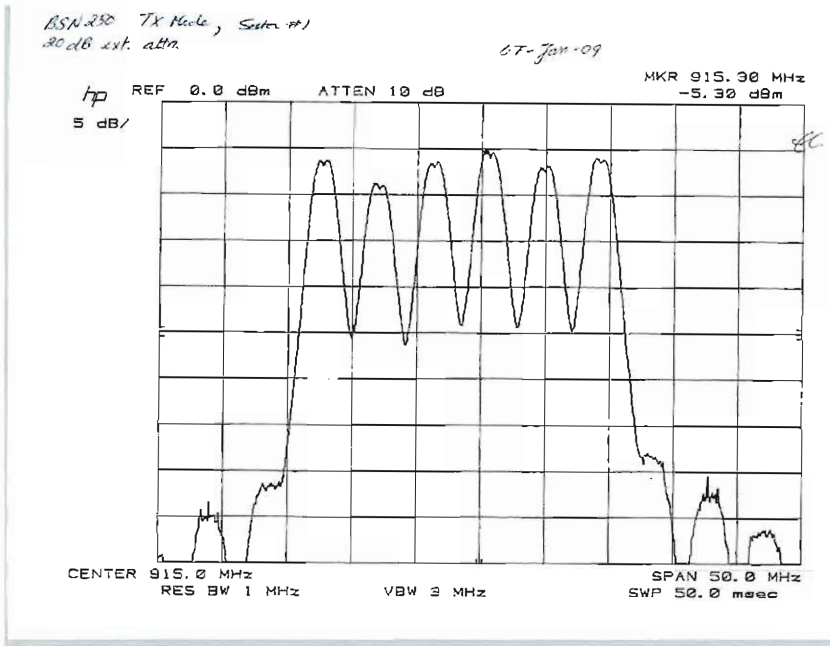


Figure 41: Peak Power Measurement Results (Sector 1)

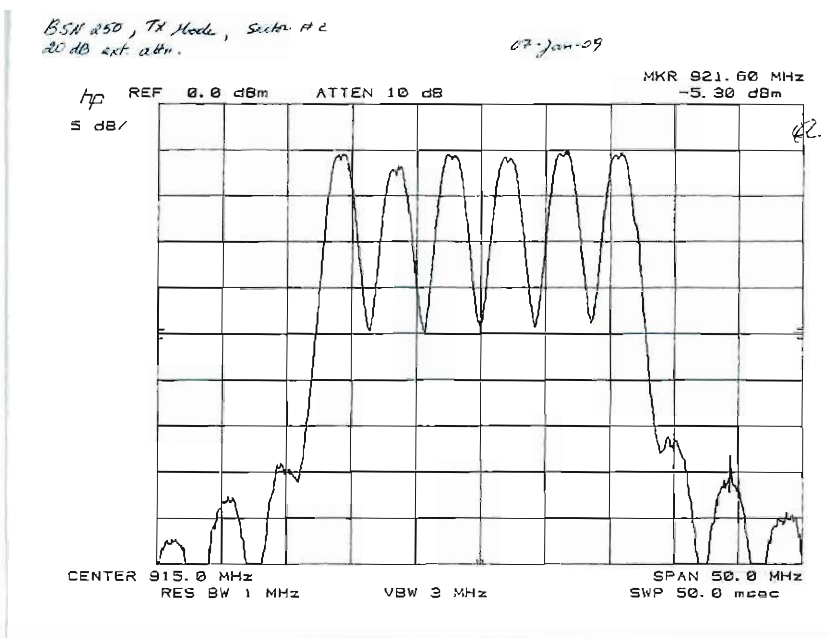


Figure 42: Peak Power Measurement Results (Sector 2)

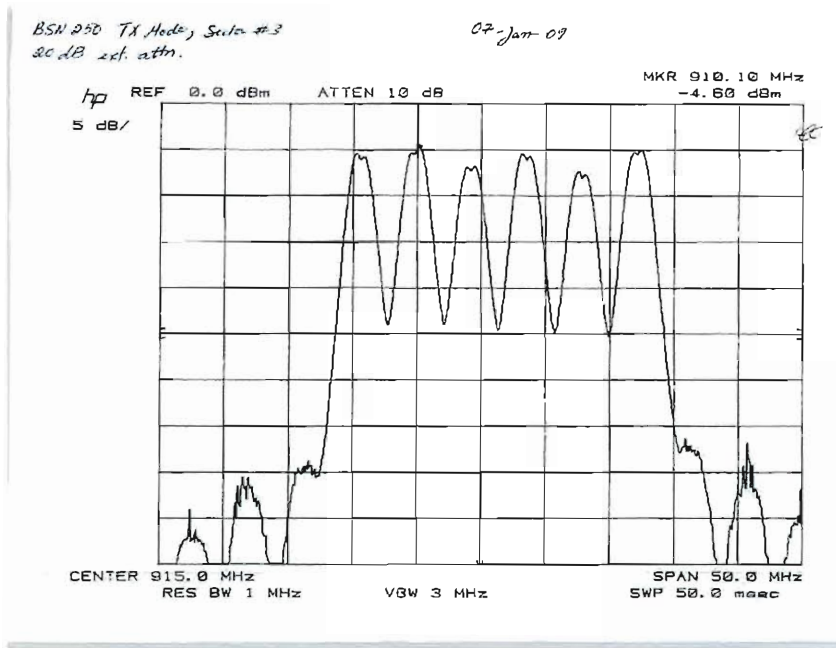


Figure 43: Peak Power Measurement Results (Sector 3)

Table 4 lists the power levels computed at each antenna port, where the corrected power is given by the relation:

* Corrected Power (dBm) = SA Reading (dBm) + External Attenuation (dB) + Cable Loss (dB)

Sector No.	Channel No.	Frequency (MHz)	SA Reading (dBm)	External Attenuation (dB)	Cable Loss (dB)	Corrected Power (dBm)	Corrected Power (mW)
1	10	915.3	-5.3	20	1.1	15.8	38.02
	16	823.9	-5.95	20	1.1	15.15	32.73
2	2	904.35	-5.5	20	1.1	15.6	36.31
	14	921.6	-5.3	20	1.1	15.8	38.02
3	6	910.1	-4.6	20	1.1	16.5	44.67
	18	927.3	-4.95	20	1.1	16.15	41.21

Table 4: Peak Power Measurement

It can be seen from the data above that the calculated maximum peak output power is 16.5 dBm, corresponding to 44.67 milliwatts, which is lower than the 1 watt limit. Hence, the device meets the maximum output power requirements of Section 15.247.

4.3.2.2 OCCUPIED BANDWIDTH

The 6-dB Occupied Bandwidth was measured for one channel per sector using the setup depicted in photographs 5 & 6. Channels 10, 2 and 18 of sectors 1, 2 and 3 were selected as the lower, mid-band and upper frequencies of the ISM band of 902 – 928 MHz, respectively. The resolution bandwidth and the span of SA were reduced to 100 kHz and 2 MHz, respectively. The measurement configuration and procedures were undertaken as per the guidelines presented in the FCC procedures for the measurement of digital transmission systems operating under 15.247.

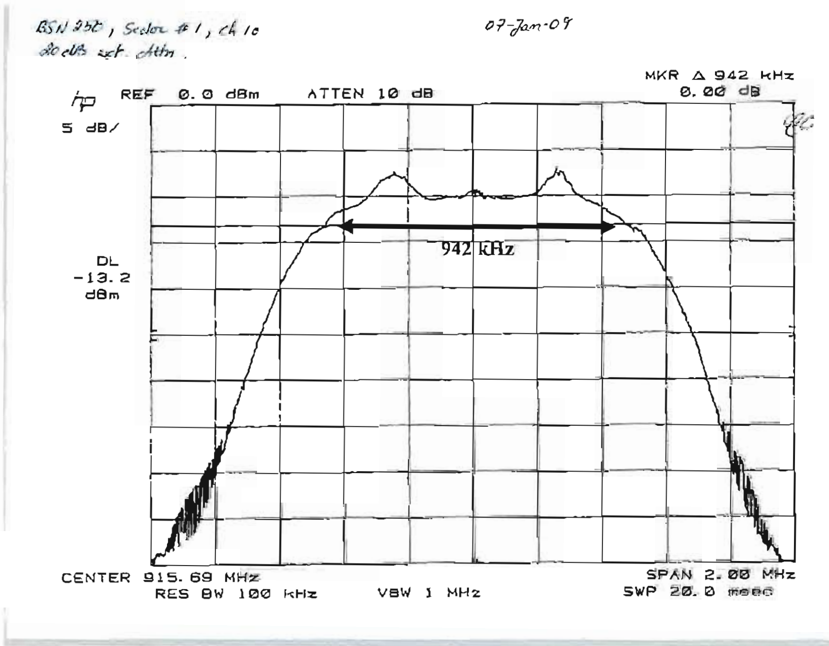


Figure 44: Occupied Bandwidth Results (Sector 1, Channel 10)

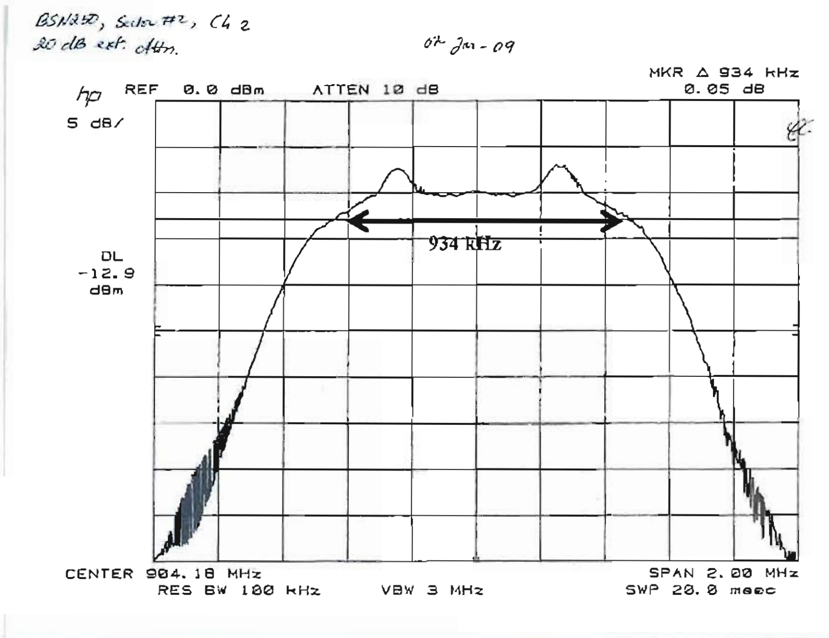


Figure 45: Occupied Bandwidth Results (Sector 2, Channel 2)

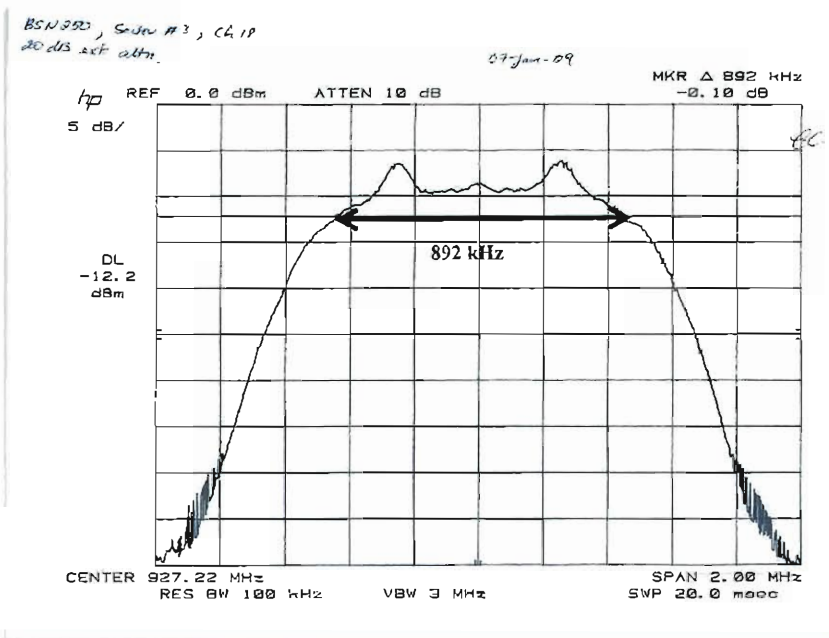


Figure 46: Occupied Bandwidth Results (Sector 3, Channel 18)

Sector No.	1	2	3
Channel No.	10	2	18
Frequency (MHz)	915.3	904.35	927.3
6-dB BW (kHz)	942	934	892

Table 5: Occupied Bandwidth Measurements

The 6 dB bandwidth of the XG Technology BSN250 unit was measured to be a minimum of 892 kHz, hence meeting the minimum bandwidth requirement of 500 kHz.

4.3.2.3 POWER SPECTRAL DENSITY

The power spectral density of the XG Technology BSN250 was measured on the HP 8566B spectrum analyzer on the peak detector mode while the "bypass" instrument function of the HP 85650A Quasi-Peak Adapter was activated. The PSD was measured for one channel per sector using the setup depicted in photographs 5 &6. Channels 10, 2 and 18 of sector 1, 2, 3 respectively were selected as the lower, mid-band and upper frequencies of the ISM band of 902 – 928 MHz. The resolution bandwidth was reduced to 3 kHz and the span to 300 KHz. The sweep time was set to 100 seconds to meet the specification of PSD Option 1 of the FCC guideline for "*Measurement of Digital Transmission Systems Operating under Section 15.247*", i.e., Sweep time = span / 3 kHz.

Figures 47 to 49 show the results for the measurements.

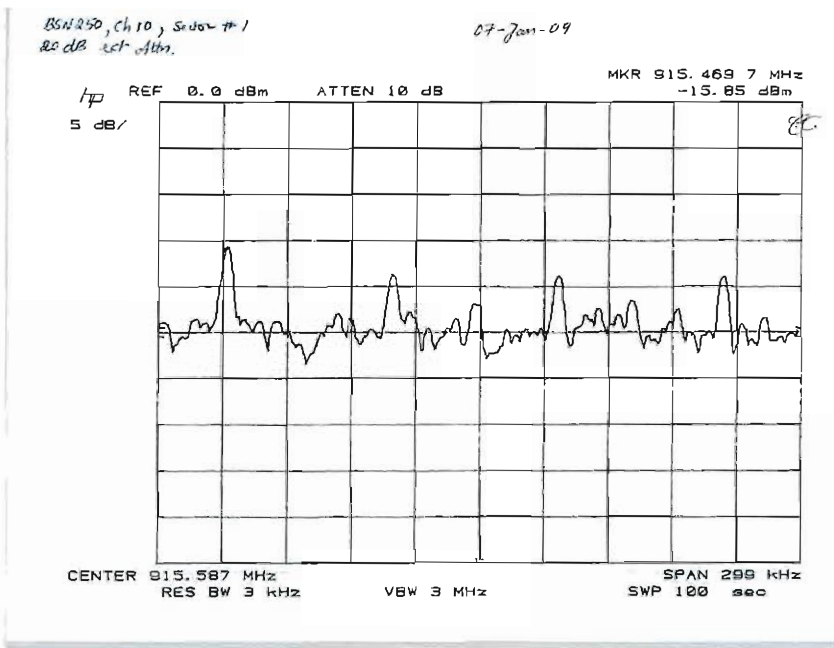


Figure 47: PSD Measurement Results (Sector 1, Channel 10)

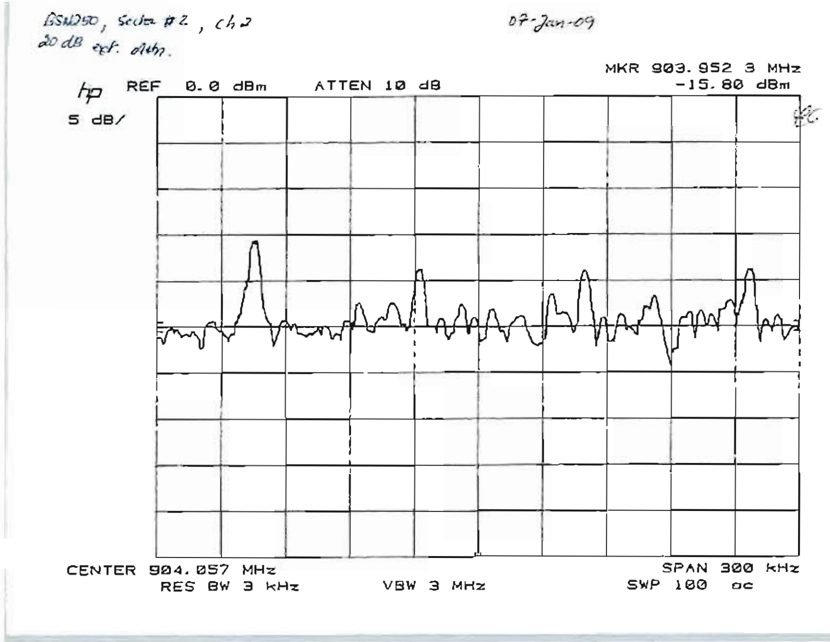


Figure 48: PSD Measurement Results (Sector 2, Channel 2)

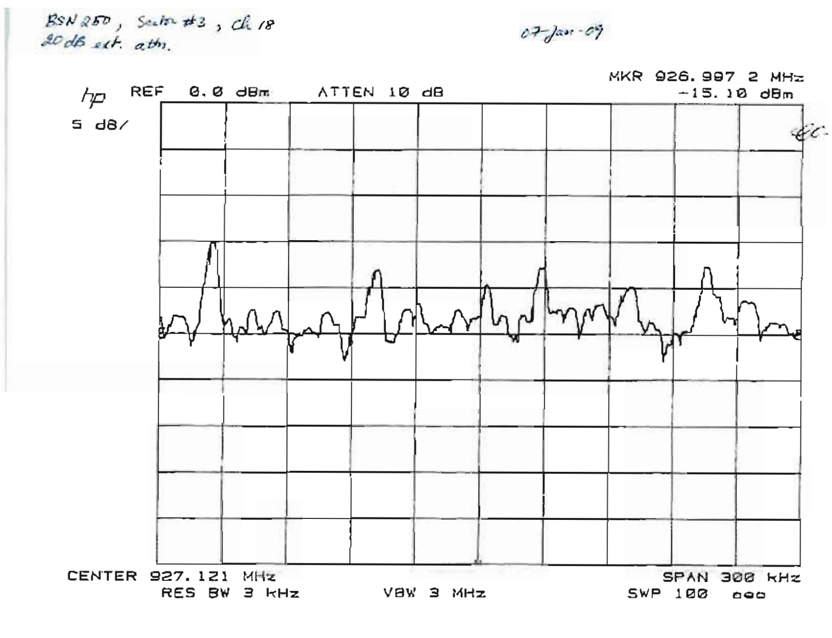


Figure 49: PSD Measurement Results (Sector 3, Channel 18)

The corrected values of the PSD are provided in Table 6 where:

Corrected PSD (dBm) = SA Reading (dBm) + External Attenuation (dB) + Cable Loss (dB)

Sector No.	Channel No.	Frequency (MHz)	SA Reading (dBm)	External Attenuation (dB)	Cable Loss (dB)	Corrected PSD (dBm)	FCC Limit (dBm)	Margin to Limit (dB)
1	10	915.3	-15.85	20	1.1	5.25	8.0	2.75
2	2	904.35	-15.8	20	1.1	5.30	8.0	2.70
3	18	927.3	-15.1	20	1.1	6.00	8.0	2.00

Table 6: PSD Peak Measurements

It can be seen from Figures 47 to 49 and Table 6 that the power spectral density did not exceed the 8 dBm limit. Hence the unit meets the power spectral density requirements as per Section 15.247.

MAJOR TEST EQUIPMENT

FAU EMI R&D LABORATORY TEST EQUIPMENT						
Equipment Type	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval (Years)
Spectrum Analyzer	Hewlett Packard	RF Section	8566B	2403A06381	Aug-07-08	2
Spectrum Analyzer	Hewlett Packard	Display	85662A	2407A06381	Aug-07-08	2
Spectrum Analyzer	Hewlett Packard	Quasi Peak Adapter	85650A	2430A00559	Aug-07-08	2
RF Preselector	Hewlett Packard	Preselector	85685A	2510A00151	Mar-4-08	2
LISN	EMCO	Line Impedance Stabilization Network	3825/2R	1095	June-28-07	2
Antenna	EMCO	Biconical	3108	2147	May-5-08	2
Antenna	EMCO	Log Periodic	3146	1385	May-5-08	2
Amplifier	Hewlett Packard	Amplifier	8447D	2443A03952	02-Jan-09	2
Amplifier	Hewlett Packard	Microwave Amplifier	83017A	3123A00324	02-Jan-09	2

TEST FACILITY

EMI Research and Development Laboratory
Department of Electrical Engineering
Florida Atlantic University
Boca Raton, Florida 33431
(561) 361-4390

A2LA Certification No. 2129.01
FCC Registration: 90599
Industry of Canada: IC46405-4076

Description	The 3m semi-anechoic chamber and Power Line Conducted Spurious Voltage test setup are constructed and calibrated to meet the FCC requirements of Section 2.948, as well as Industry Canada RSS 212 Issue 1.
Site Filing	A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046, and with the Industry Canada, Certification and Engineering Bureau, 3701 Carling Ave., Building 94, P.O. Box 11490, Station "H", Ottawa Ontario, K2H 8S2.
Instrument	All measuring equipment is in accord with ANSI C63.4 and CISPR 22 requirements.

End of Report