EMC Laboratory

MMR TRANSCEIVER

Manufactured by Tadiran-Telematics

EMC Test Report

APPENDIX 2

September. 2002

REPARED: D. Lanuel DATE 10/9/02

APPROVED: S. Cohen DATE September 12, 2002

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APPENDIX 2

Test results as composite device operated with *COMPAQ* pocket PC

1. OUT OF BAND RADIATED FIELD STRENGTH MEASUREMENT TEST ACCORDING TO 15.249 & 15.209

Testing Engineer: D.Lanuel **Date** 11/09/02

1.1. General

The test was performed to measure Radiated emission at RX Mode and Out of Band Spurious emissions at TX Mode. The EUT was connected to a Compaq pocket PC.

1.2. Test Results Summary & Conclusions

1.2.1. The EUT was found in compliance with 15.209 & 15.249 Requirements

1.3. Limits of Radiated Interference Field Strength according 15.209

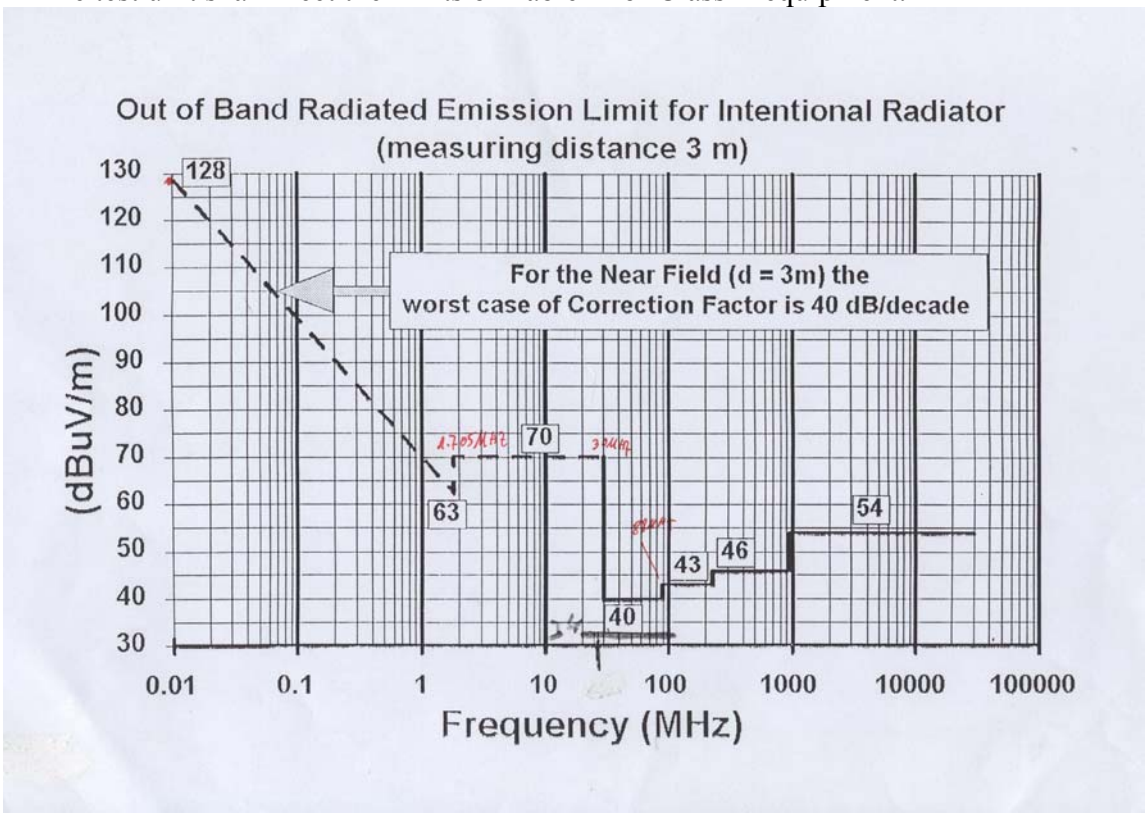
The test unit shall meet the limits of Table 1 for Class B equipment.

Table 1 Limits For Class B equipment

Frequency Range (MHz)	Quasi-peak Limits (dBμV/m)
30 - 88	40
88 - 216	43
216 - 960	46
Above 960	54

1.4. Limits of Radiated Interference Field Strength according 15.209

The test unit shall meet the limits of Table 1 for Class B equipment.



1.5. Test Instrumentation and Equipment

Table RE-A Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8597A	HP	01/08/03
Spectrum Analyzer	8593E	HP	31/01/03
Biconical Antenna	94455-1	ZINGER	10.04.03
Log-Periodic Antenna	AT-1000	AR	10.04.03
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.03
Low Noise Amplifier (1-2GHz)	SMC-09	MITEQ	14.01.03
Low Noise Amplifier (2-6GHz)	MWA-02060-4025	ELISRA	14.01.03
Low Noise Amplifier (6-18GHz)	MWA-06180-4165	ELISRA	06.06.03

1.6. Preliminary Results

Table RE-B-1 Preliminary Test Results for RX Mode 15.107

Mode Of Operation	Antenna Polarization	Frequency Range MHz	Res. BW (kHz)	Plot No.	Compliance Y/N
RX-916.3MHz	Vertical	1000-2000	1000	Plot RE/25	Y
	Horizontal			Plot RE/26	Y
	Vertical	2000-2800		Plot RE/27	Y
	Horizontal			Plot RE/28	Y
	Vertical	2800-6000		Plot RE/29	Y
	Horizontal			Plot RE/30	Y

Table RE-B-2 Preliminary Test Results for TX Mode 15.209

Mode Of Operation	Antenna Polarization	Frequency Range MHz	Res. BW (kHz)	Plot No.	Compliance Y/N
TX-916.3MHz	Vertical	0.009-0.15	0.2	Plot RE/31	Y
	Horizontal	0.15-30	9	Plot RE/32	Y
	Vertical	30-200	120	Plot RE/33	Y
	Horizontal			Plot RE/34	Y
	Vertical	200-902		Plot RE/35	Y
	Horizontal			Plot RE/12	Y
	Vertical	902-928		Plot RE/13	Y
	Horizontal			Plot RE/14	Y
	Vertical	928-1000		Plot RE/15	Y
	Horizontal			Plot RE/16	Y
	Vertical	1000-2000	1000	Plot RE/17	Y
	Horizontal			Plot RE/18	Y
	Vertical	2000-2800		Plot RE/19	Y
	Horizontal			Plot RE/20	Y
	Vertical	2800-6000		Plot RE/21	Y
	Horizontal			Plot RE/22	Y
	Vertical	6000-9200		Plot RE/23	Y
	Horizontal			Plot RE/24	Y

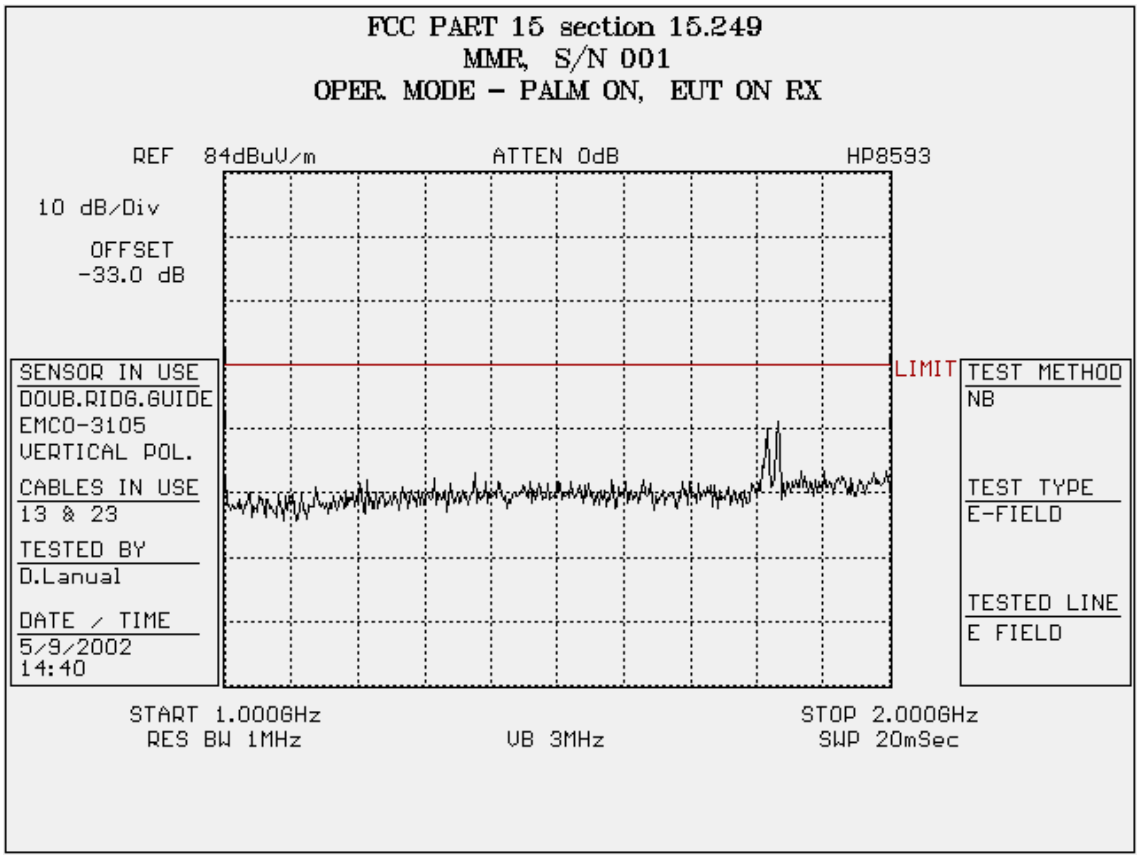
Table RE-E Six Highest Emissions RX Mode 15.107

Mode Of Operation	Freq. (MHz)	Quasi-peak Reading (*) (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity Ver/Hor	Height (m)	Azimuth Angle φ (deg)
RX	1820.0	44.0	54	10	V	1.9	-24

(*) Resolution B/W = 1000 kHz

Table RE-E Six Highest Emissions Spurious TX Mode 15.209

Mode Of Operation	Freq. (MHz)	Quasi-peak Reading (*) (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity Ver/Hor	Height (m)	Azimuth Angle φ (dig)
	303.5	34.0	46.0	12	V	2.3	-23
	704.0	37.0	46.0	9	V	2.2	-24
	845.0	42.7	46.0	3.3	V	2.4	-25
	1300.0	44.0	54.0	10	V	2.0	-23
	1840.0	47.5	54.0	6.5	H	1.9	-25
	3664.0	42.0	54.0	12	V	2.0	-24



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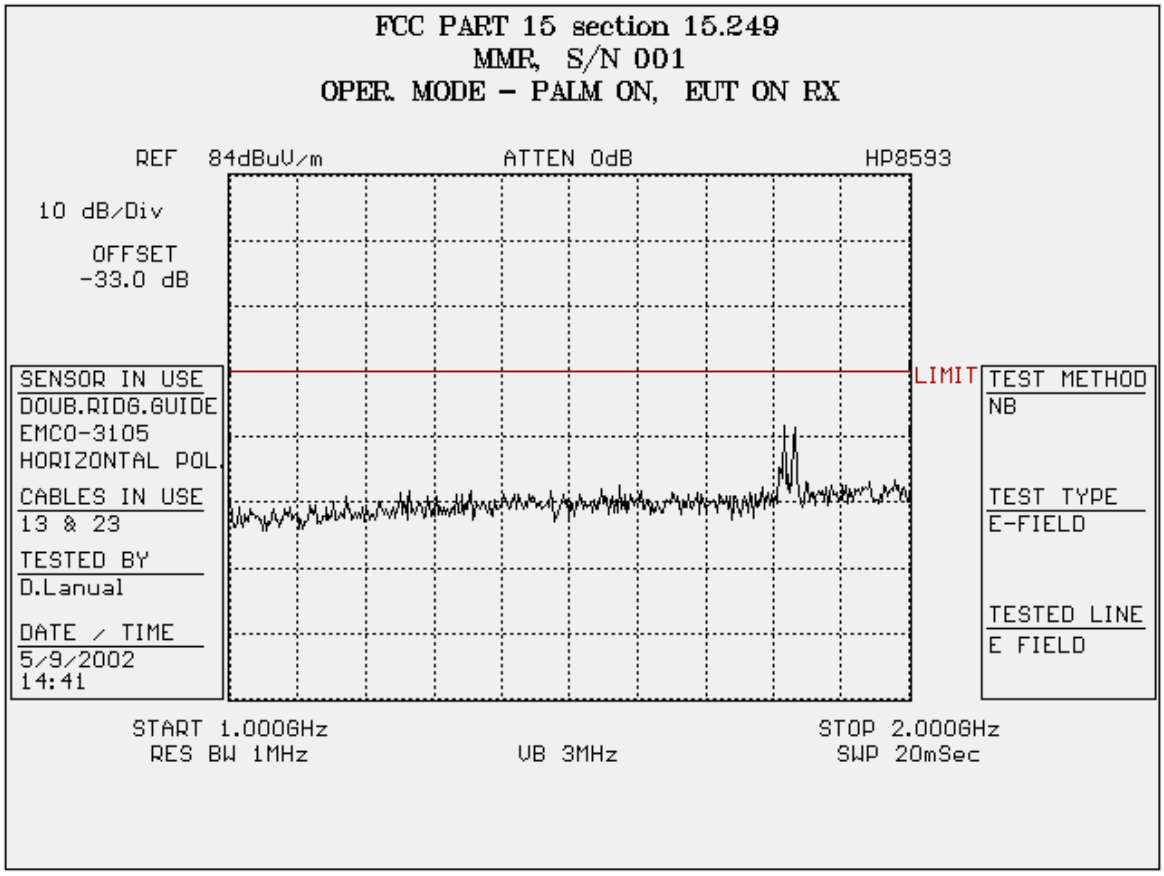

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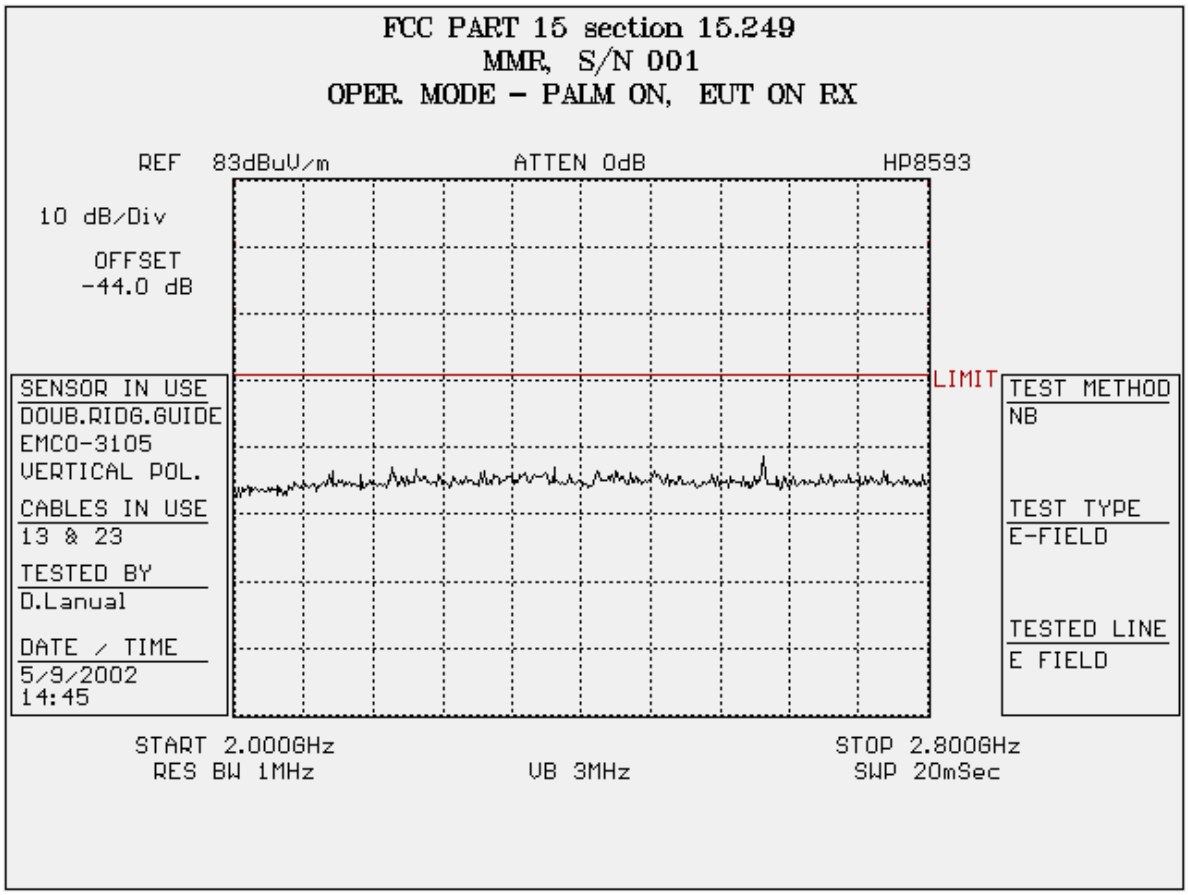

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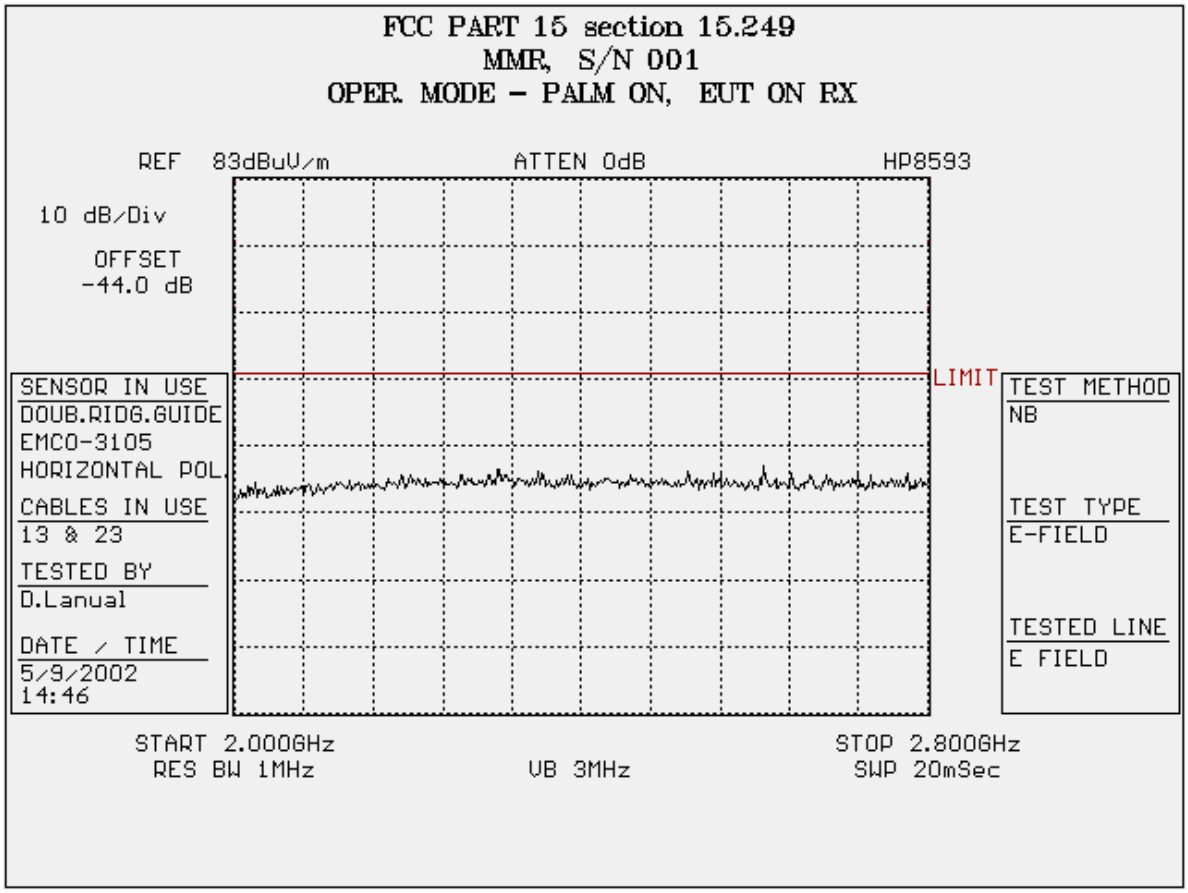

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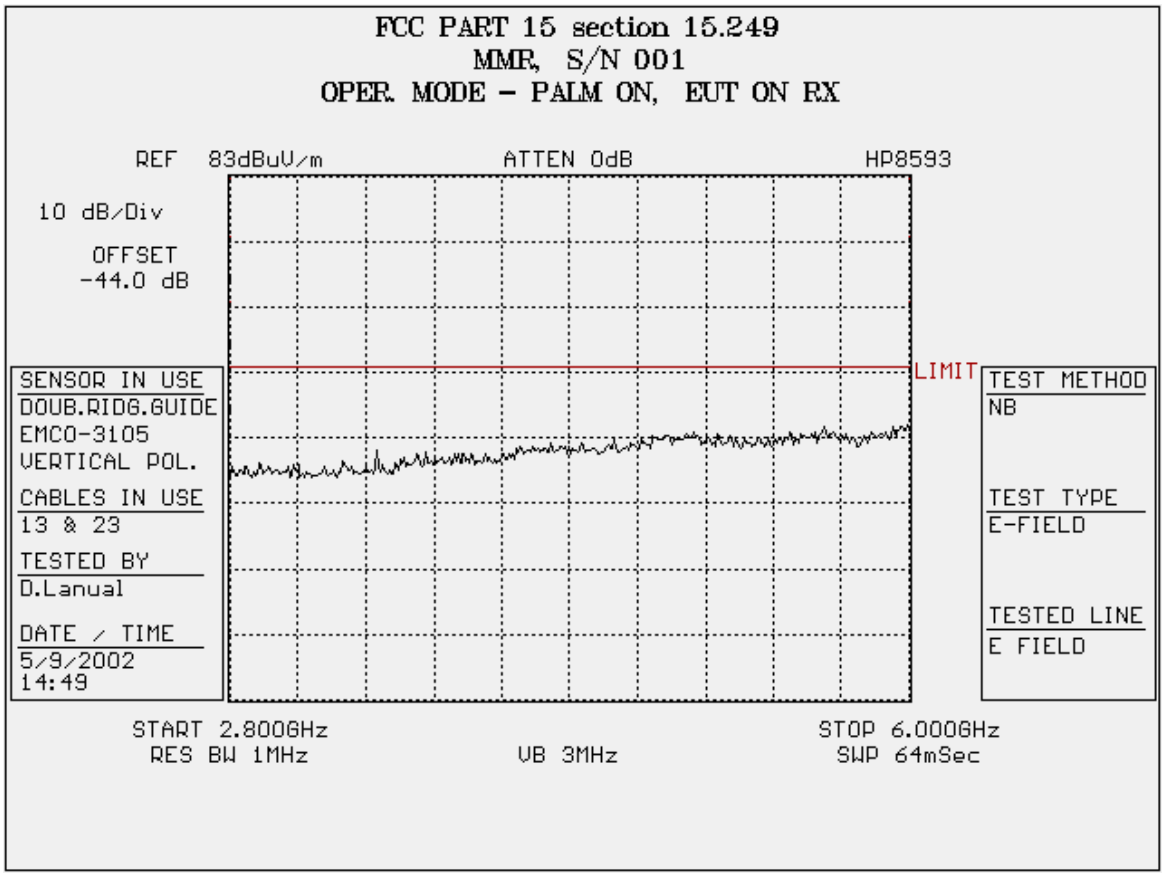

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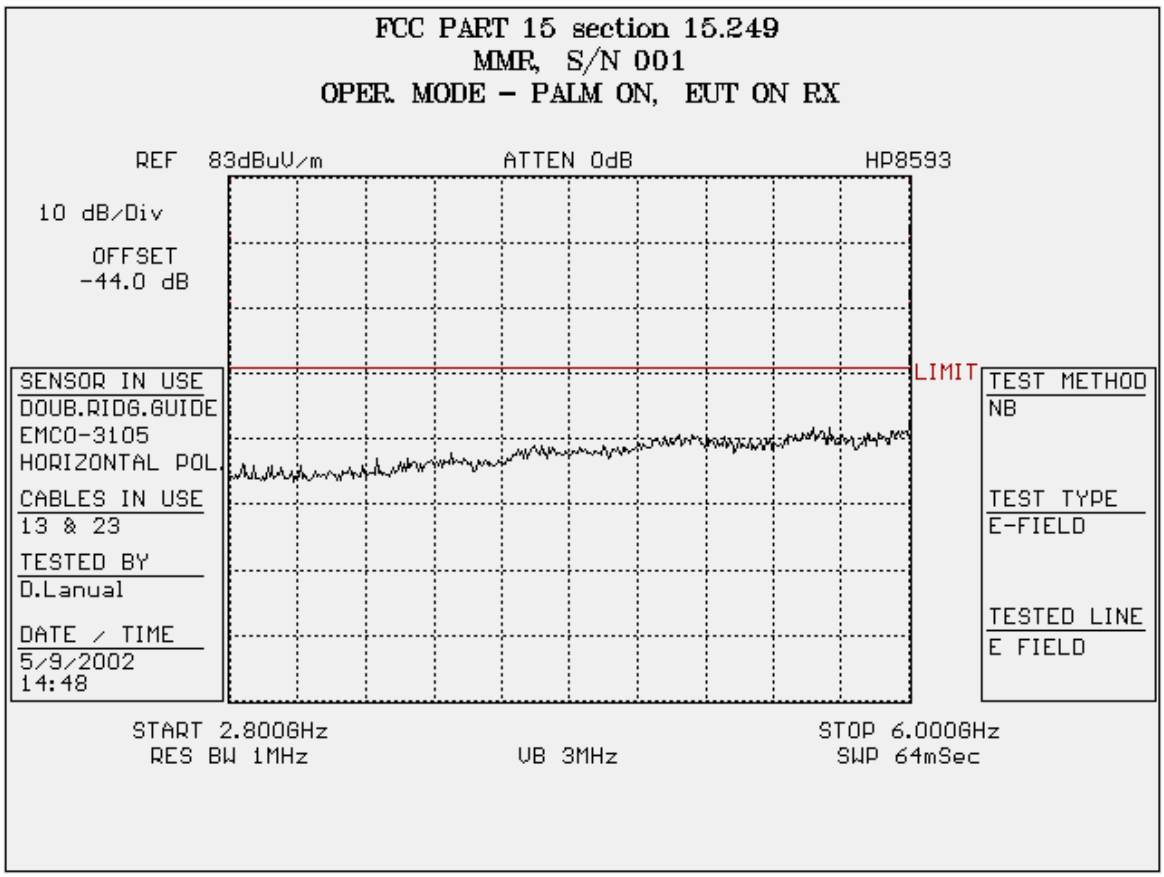

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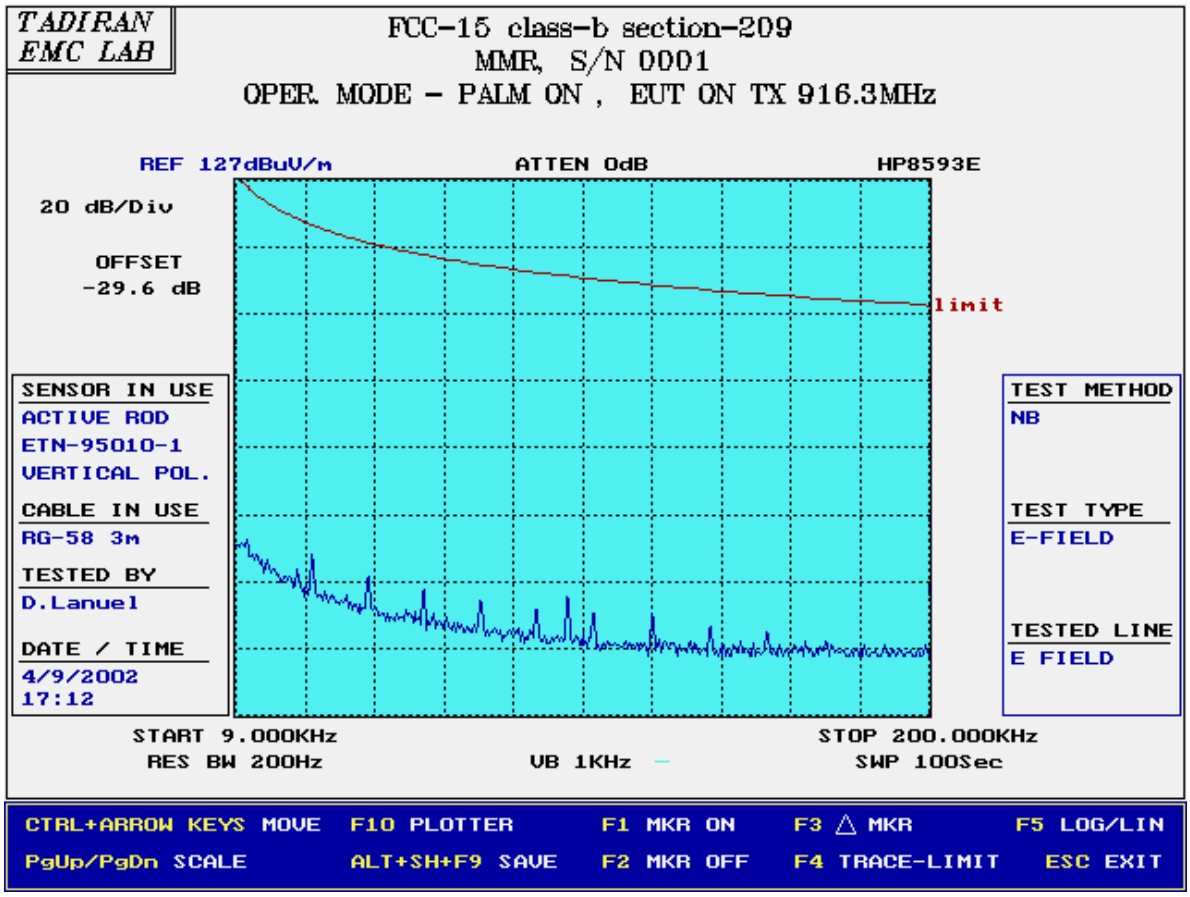

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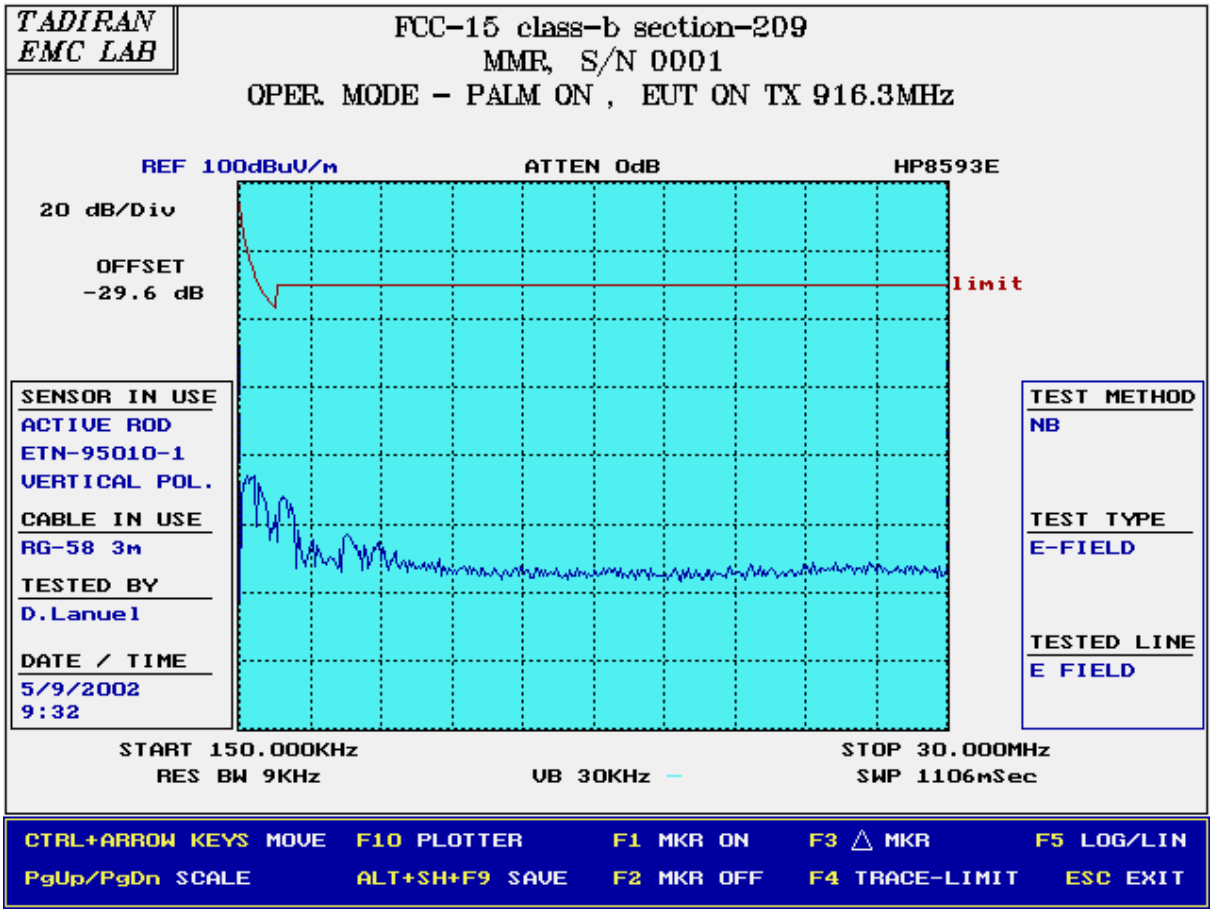

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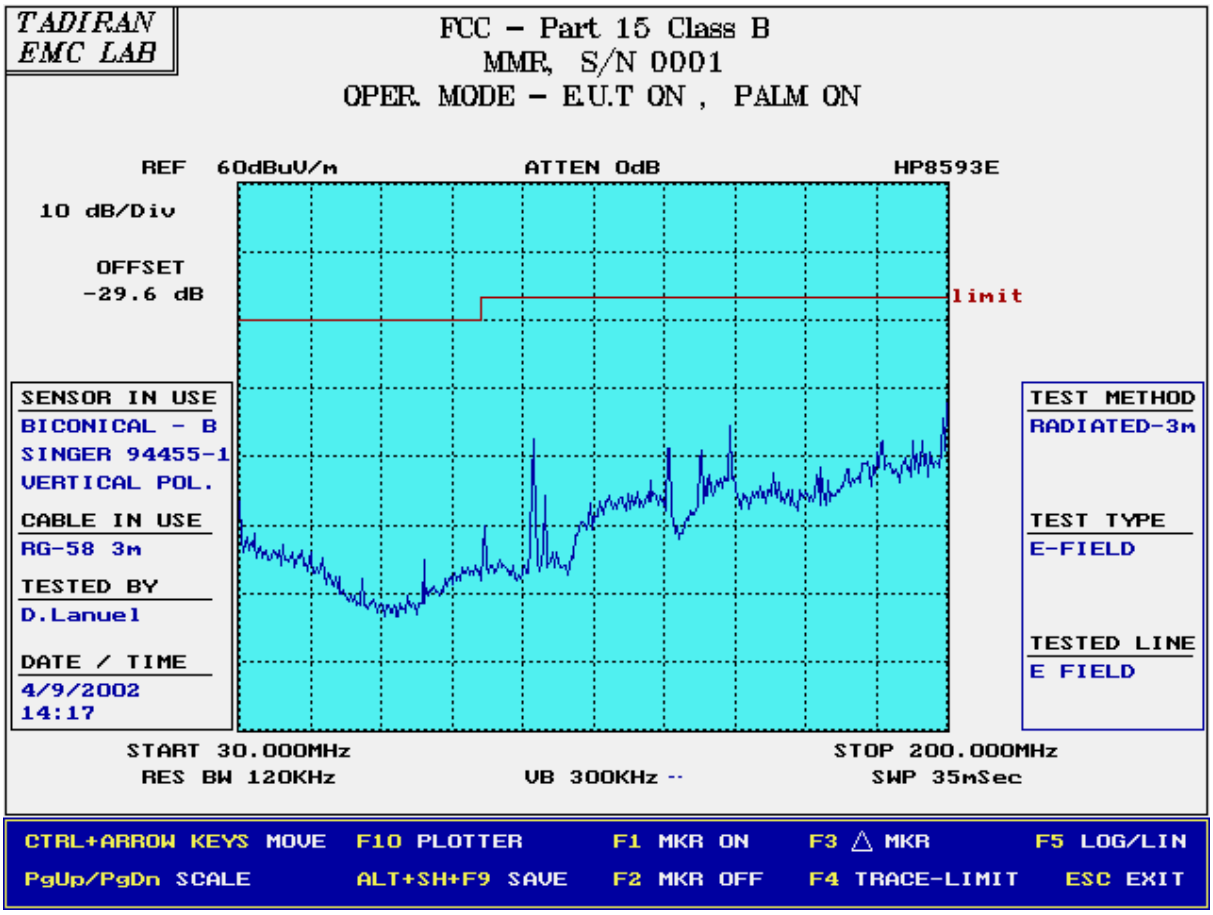

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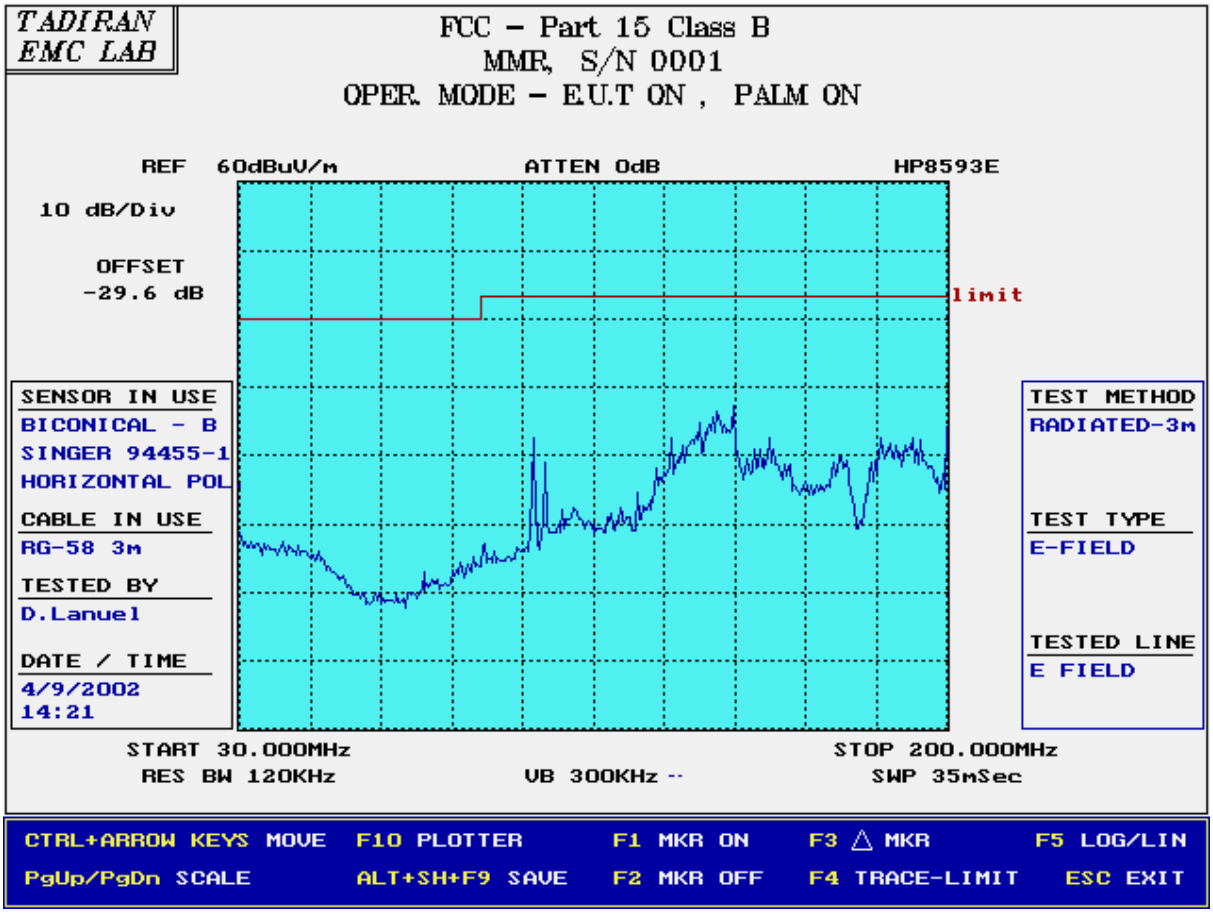

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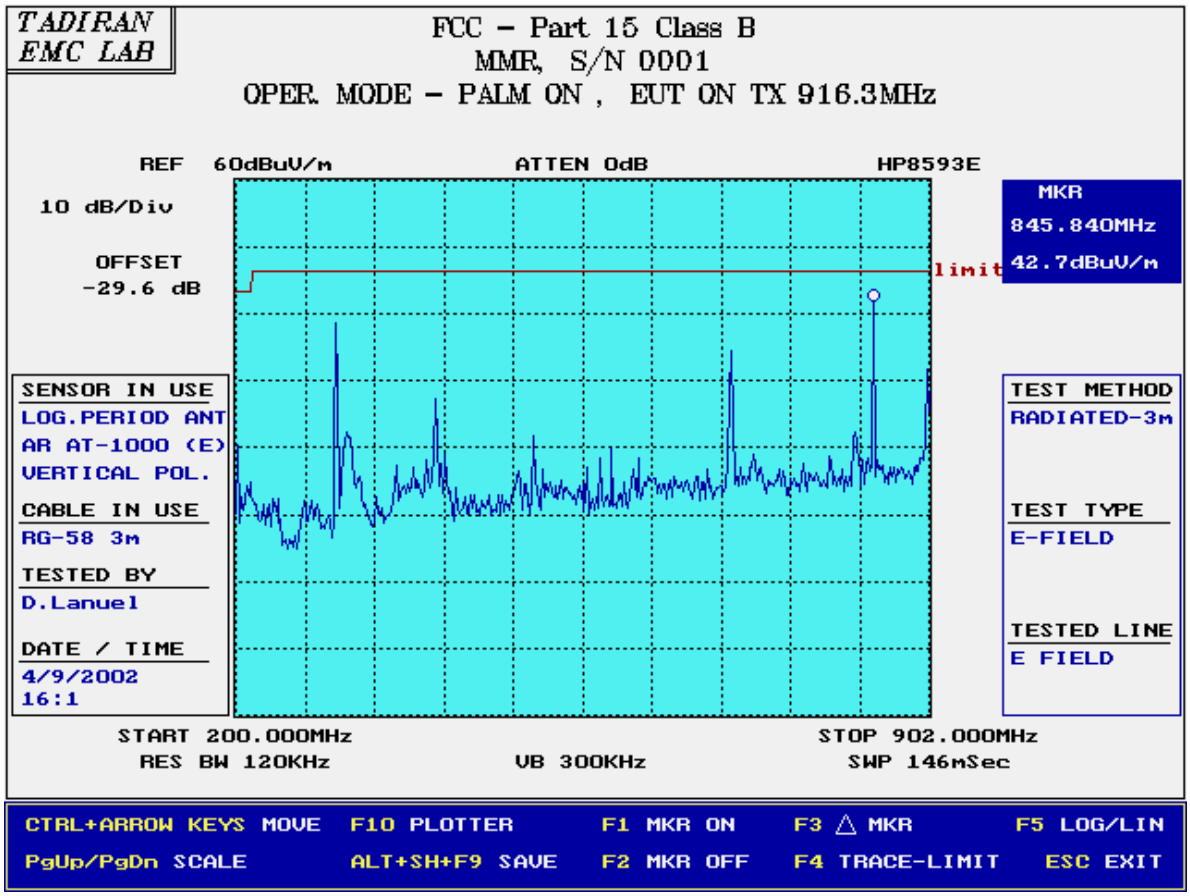

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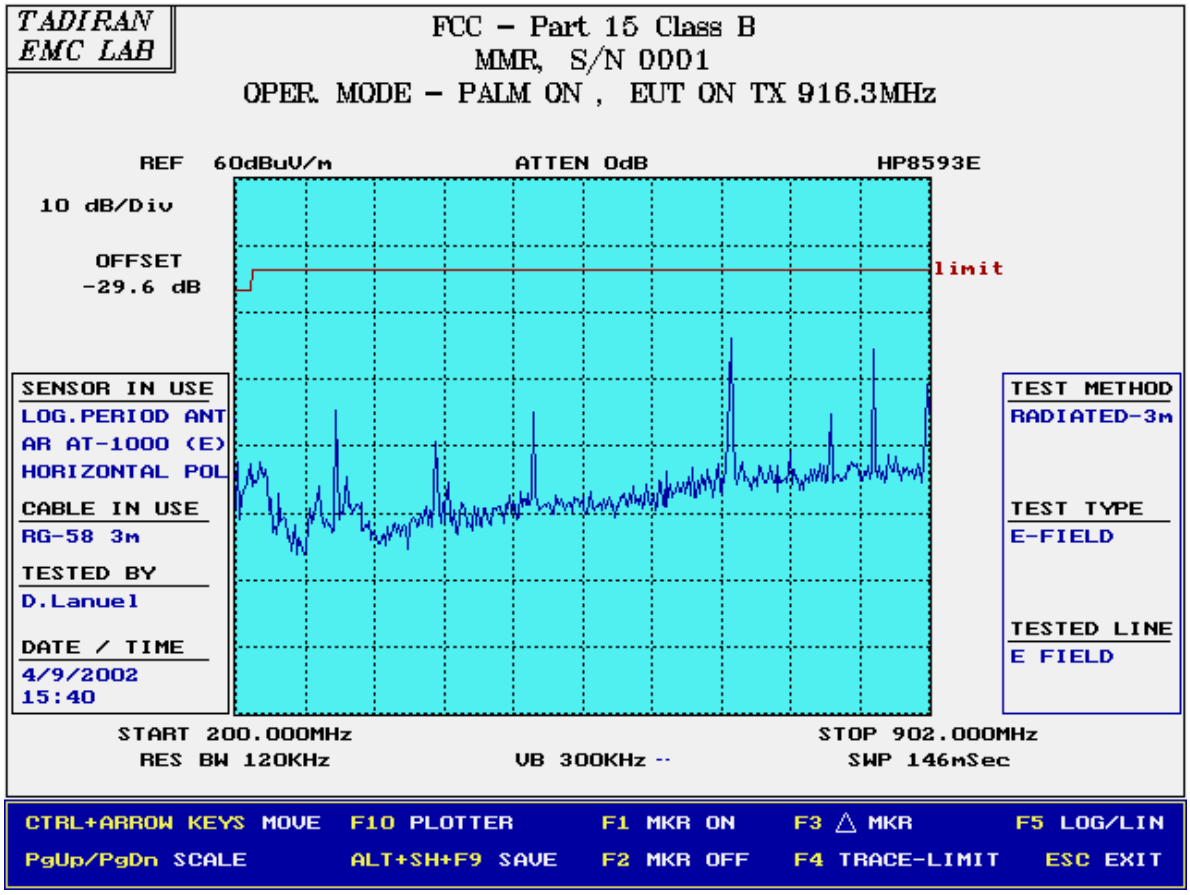

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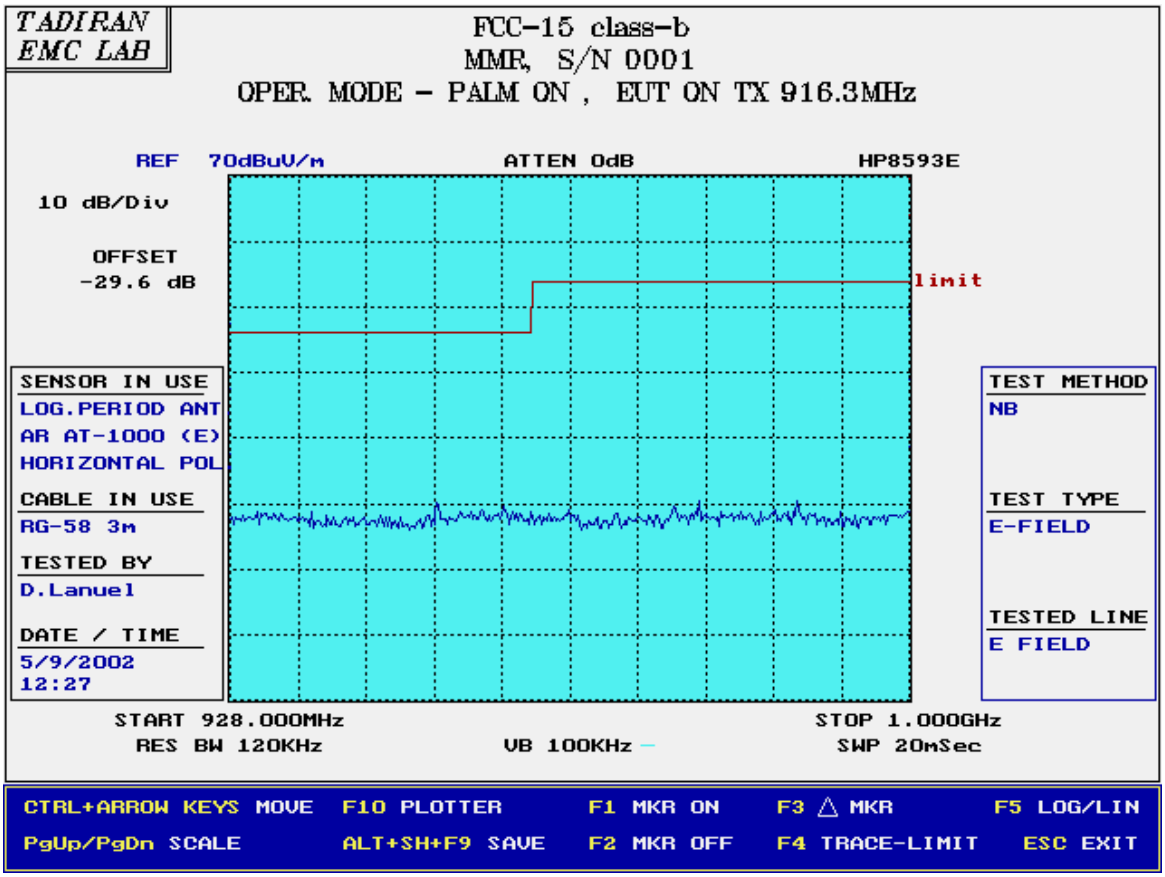

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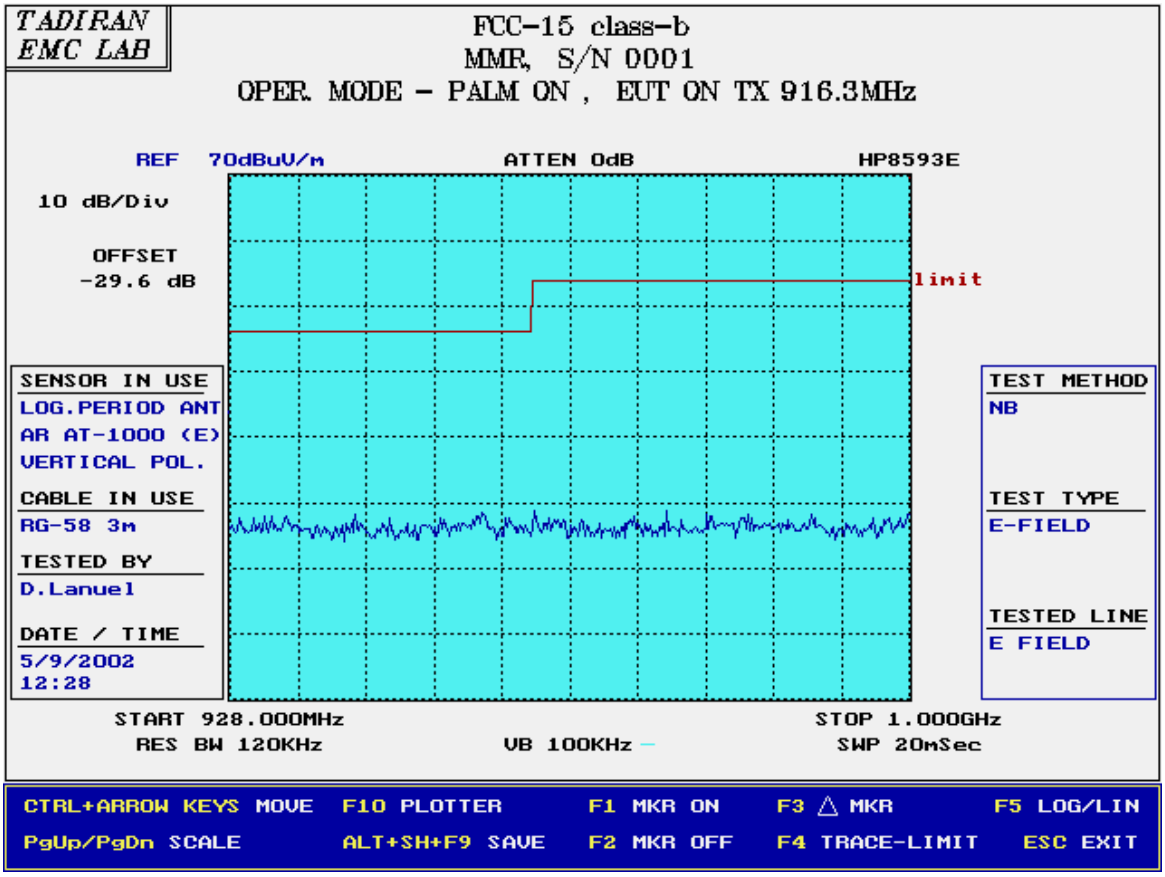

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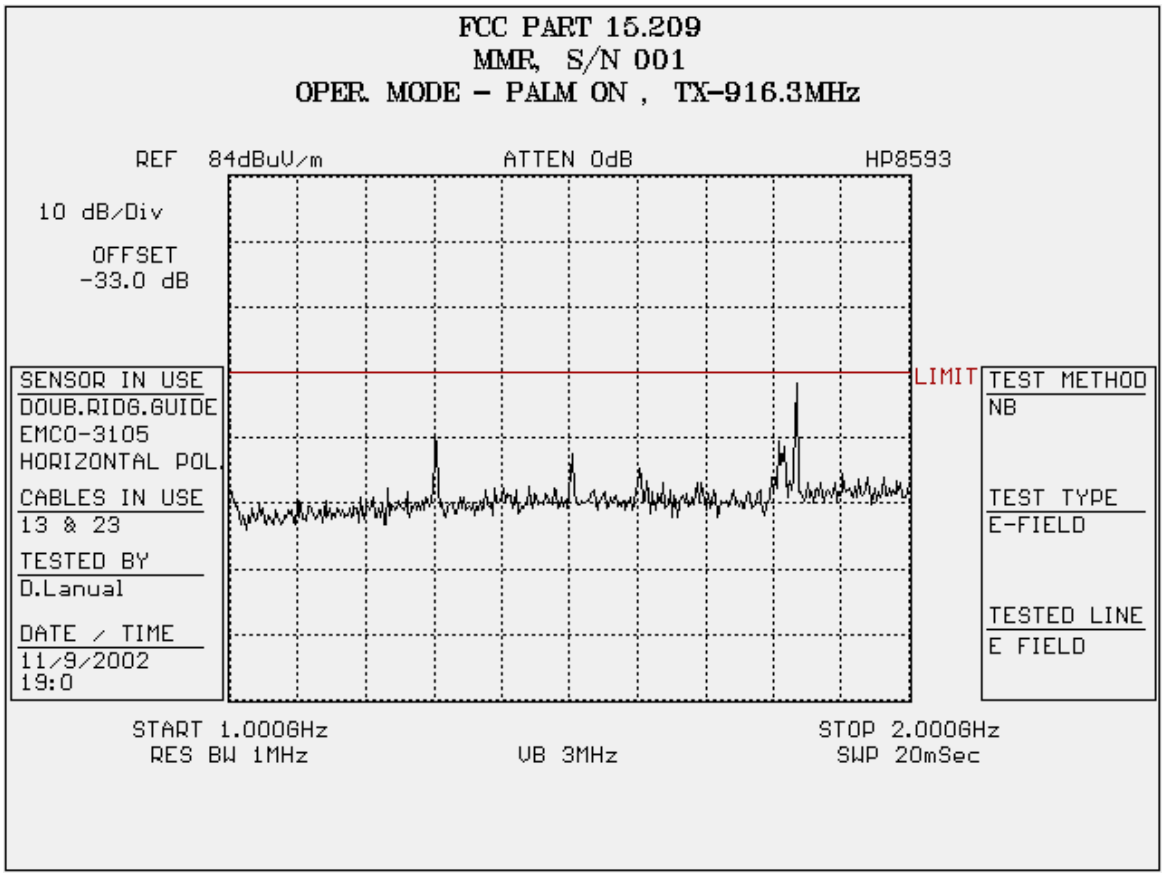

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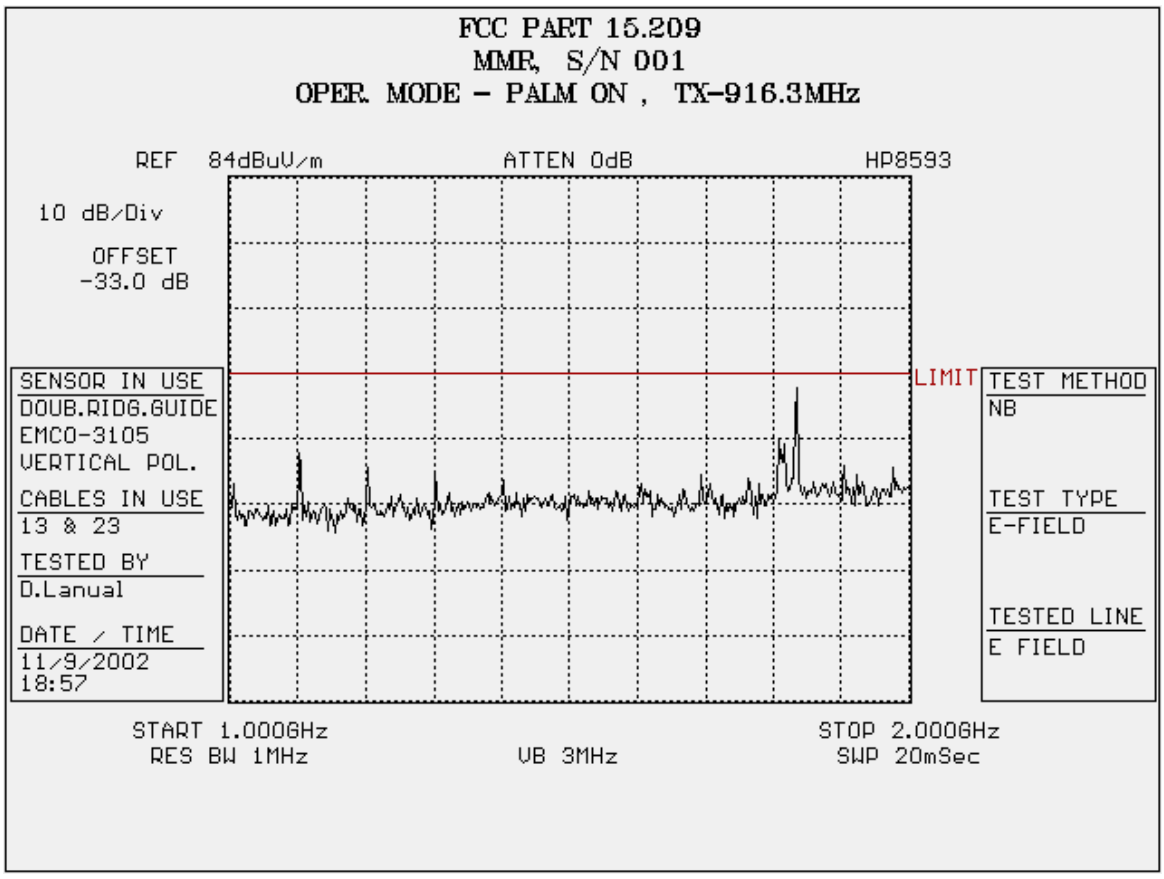

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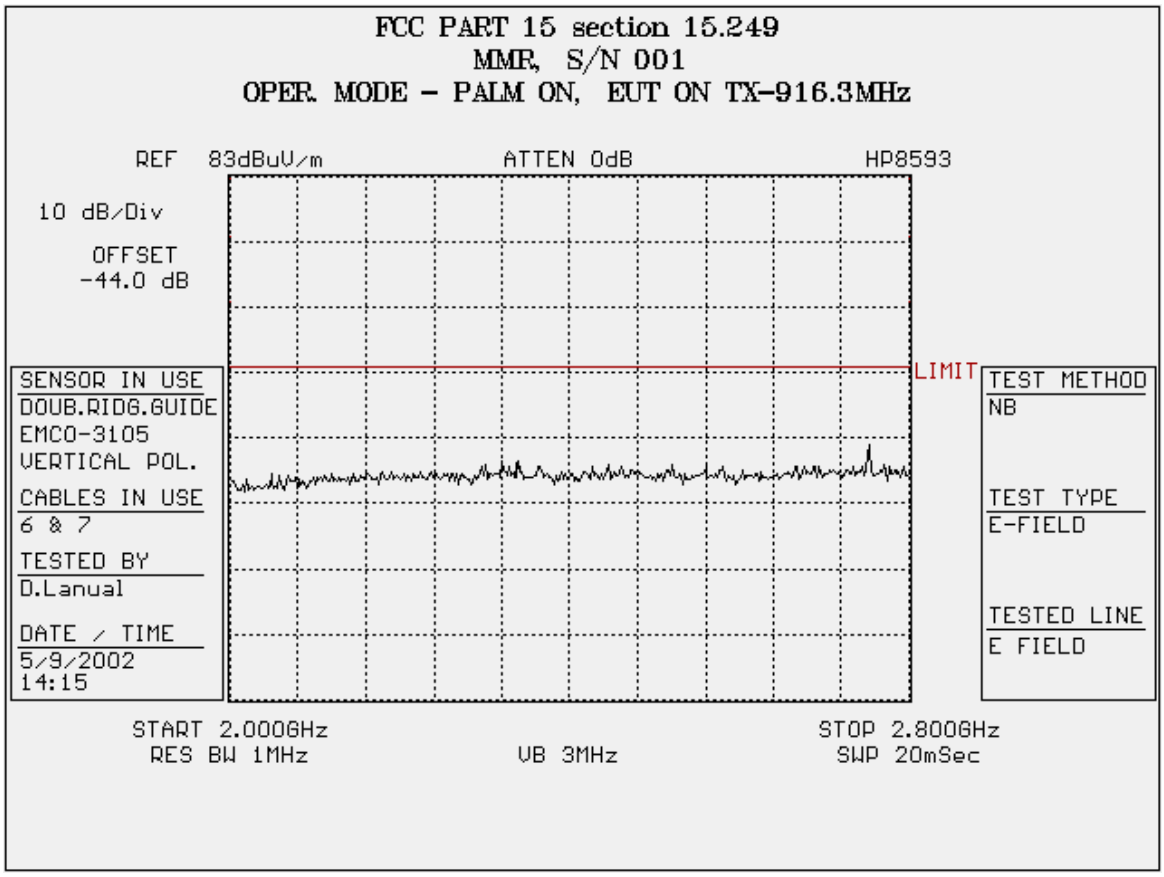

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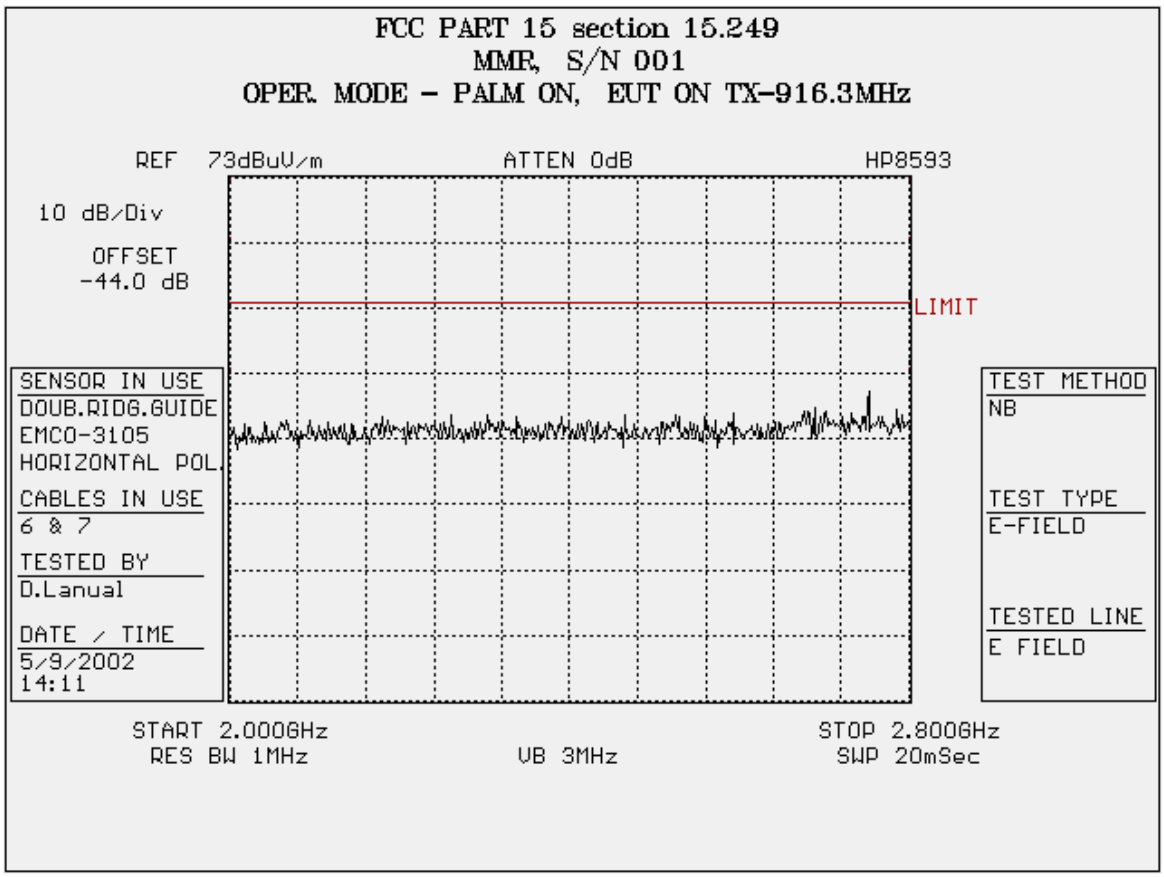

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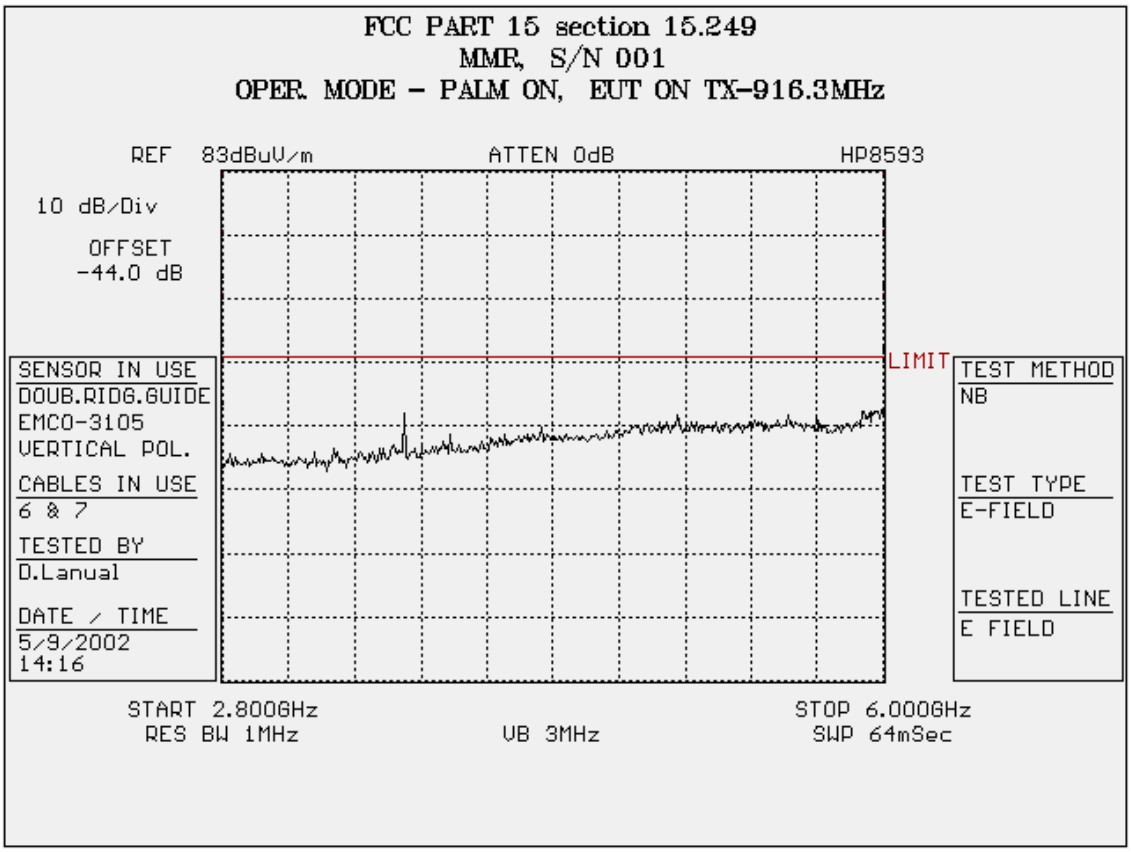

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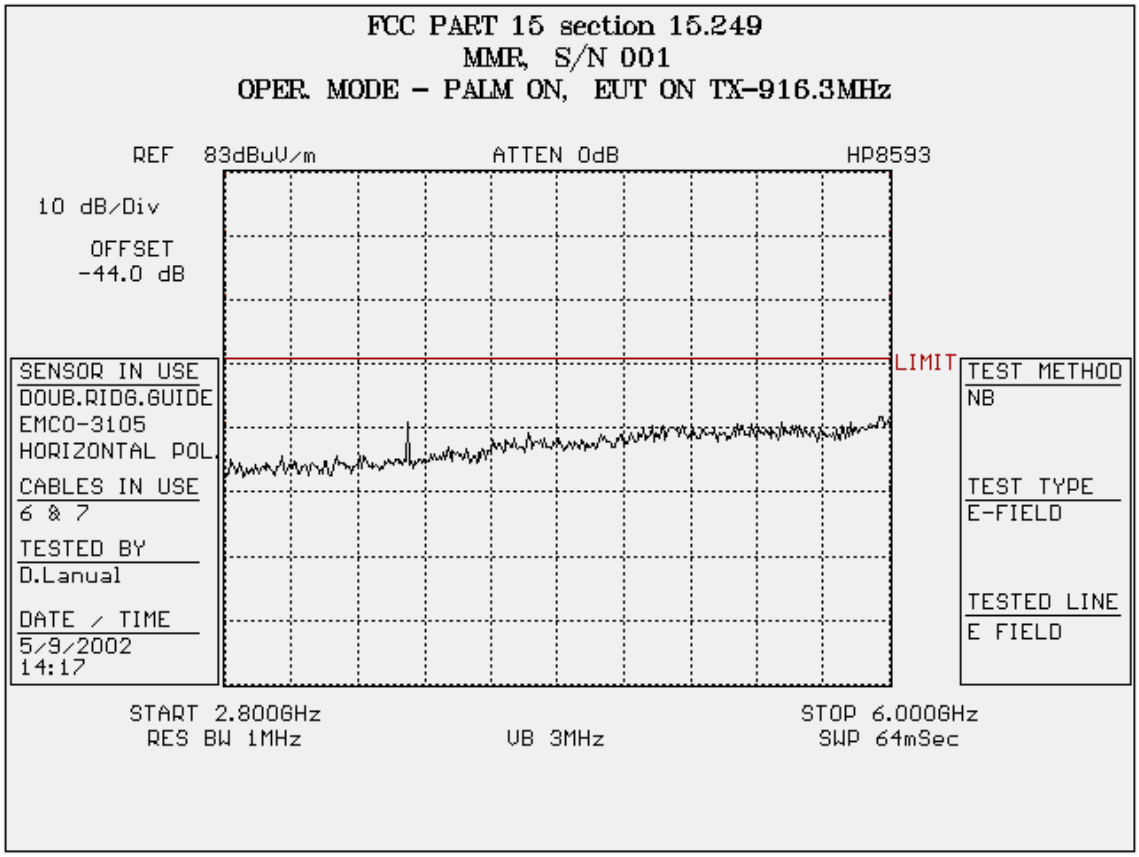

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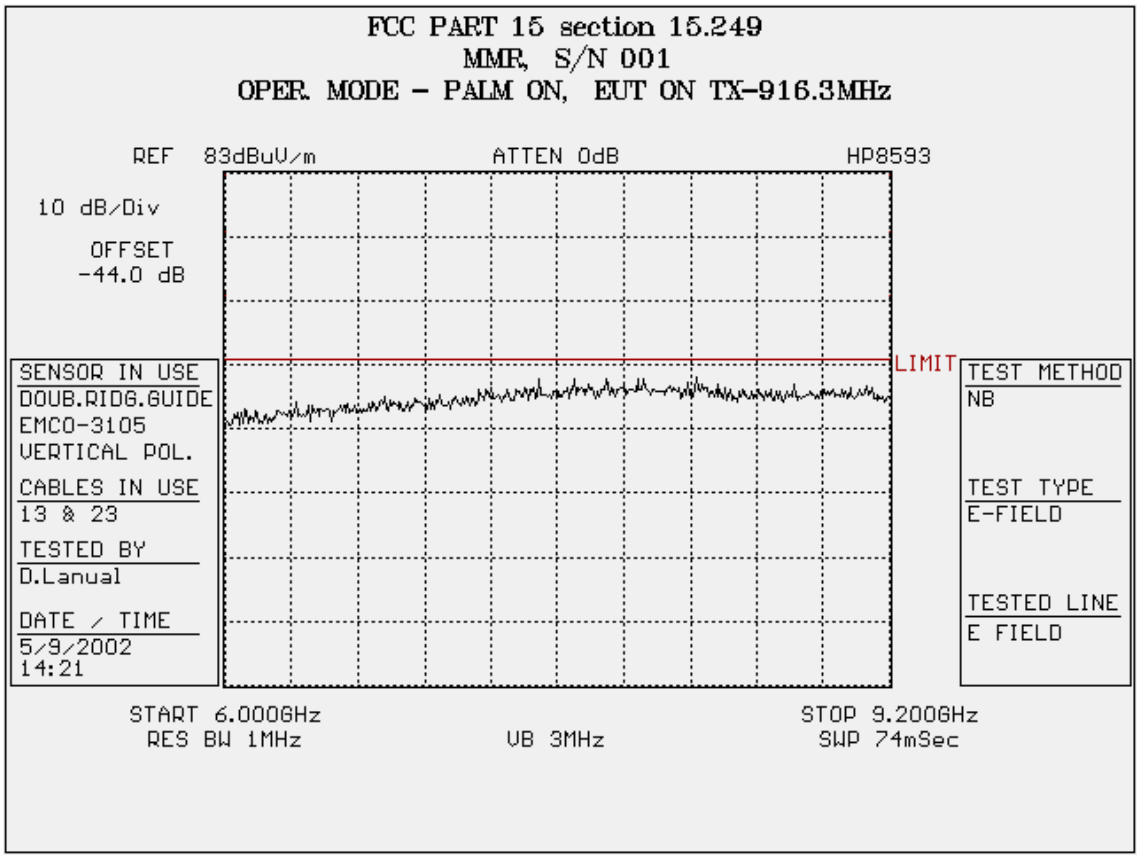

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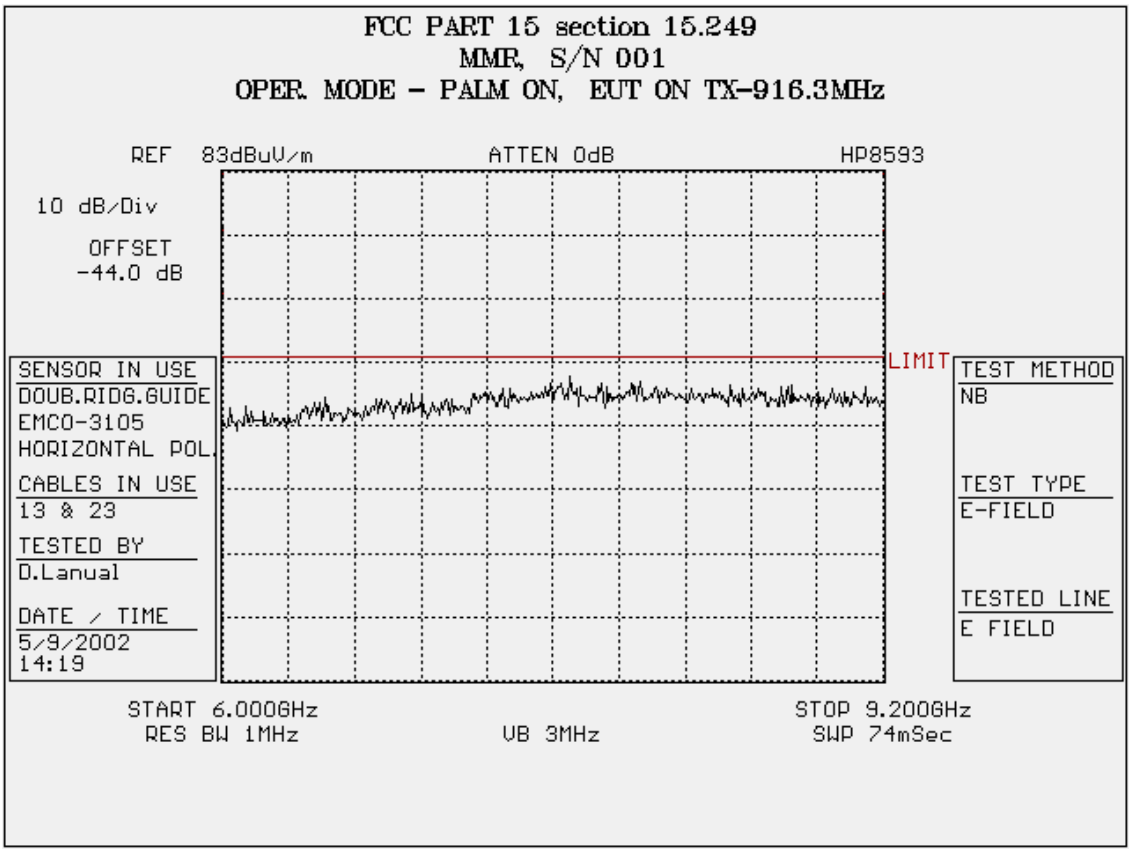


PLOT RE/ 22

2. FINAL RADIATED INTERFERENCE FIELD STRENGTH MEASUREMENT

Testing Engineer: D.Lanuel **Date** 11/09/02

2.1. Test Instrumentation and Equipment

Table RE-A Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Cal.
Spectrum Analyzer	8568B+opt 462	HP	11.12.02
Preselector	85685A	HP	19/8/03
Quasi-Peak Detector	85650	HP	19/8/03
Biconical Antenna, (20 MHz - 200 MHz)	94455-1	Singer	10.04.03
Log-Periodic Antenna, (200-1000MHz)	AT-1000	AR	10.04.03
Computer	PENTIUM	IBM Compatible	N.P.C.R

2.2. Final Test Results

Table RE-F Six Highest Emissions RX Mode 15.107

Mode Of Operation	Freq. (MHz)	Quasi-peak Reading (*) (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity Ver/Hor	Height (m)	Azimuth Angle φ (deg)
RX	**1820**	**44.0**	**54**	**10**	**V**	**2.0**	**-22**

(*) Resolution B/W = 120 kHz

Table RE-G Six Highest Emissions Spurious TX Mode 15.209

Mode Of Operation	Freq. (MHz)	Quasi-peak Reading (*) (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarity Ver/Hor	Height (m)	Azimuth Angle φ (deg)
	303.5	**32.0**	**46.0**	**14**	**V**	**2.0**	**-23**
	704.0	**38.5**	**46.0**	**8.5**	**V**	**2.1**	**-24**
TX	**845.0**	**42.8**	**46.0**	**3.2**	**V**	**2.5**	**-24**
	1300.0	**43.0**	**54.0**	**11**	**V**	**1.9**	**-23**
	1840.0	**46.5**	**54.0**	**7.5**	**H**	**1.7**	**-22**
	3664.0	**40.0**	**54.0**	**14**	**V**	**2.0**	**-24**

(*) Resolution B/W = 120 kHz

3. CONDUCTED EMISSIONS, AC POWER LEADS 110V 60HZ ACCORDING TO FCC 15.207

Frequency Range: **450 kHz – 30 MHz**

Testing Engineer: D.Lanuel **Date : 11/9/02**

3.1. Equipment Under Test Description and Operation

MMR, FAT, S/N 0001 manufactured by TADIRAN-Telematics

3.1.1. Modes of Operation

The MMR was set to Battery Charge at RX Mode and TX Mode the EUT was connected to a Compaq personal PC.

3.1.2. Operating Voltage 110 V, AC 60Hz

3.2. Test Results Summary & Conclusions

The MMR complies with FCC, Part 15.207 conducted emissions requirement.

3.3. **Limits of Conducted Emission at Mains Terminals**

The test unit shall meet the limits of Table 1 for FCC Part 15 Para 15.207 equipment.

Table 1 Limits for intentional radiator according 15.207

Frequency Range MHz	Quasi-peak Limits dBµV
0.45 – 30	48

3.4. **Test Instrumentation and Equipment**

Table CD-A – Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/03
Signal Generator	2017	Marconi	1/06/03
LISN	FCC-LISN-3B	FISCHER	31/08/03

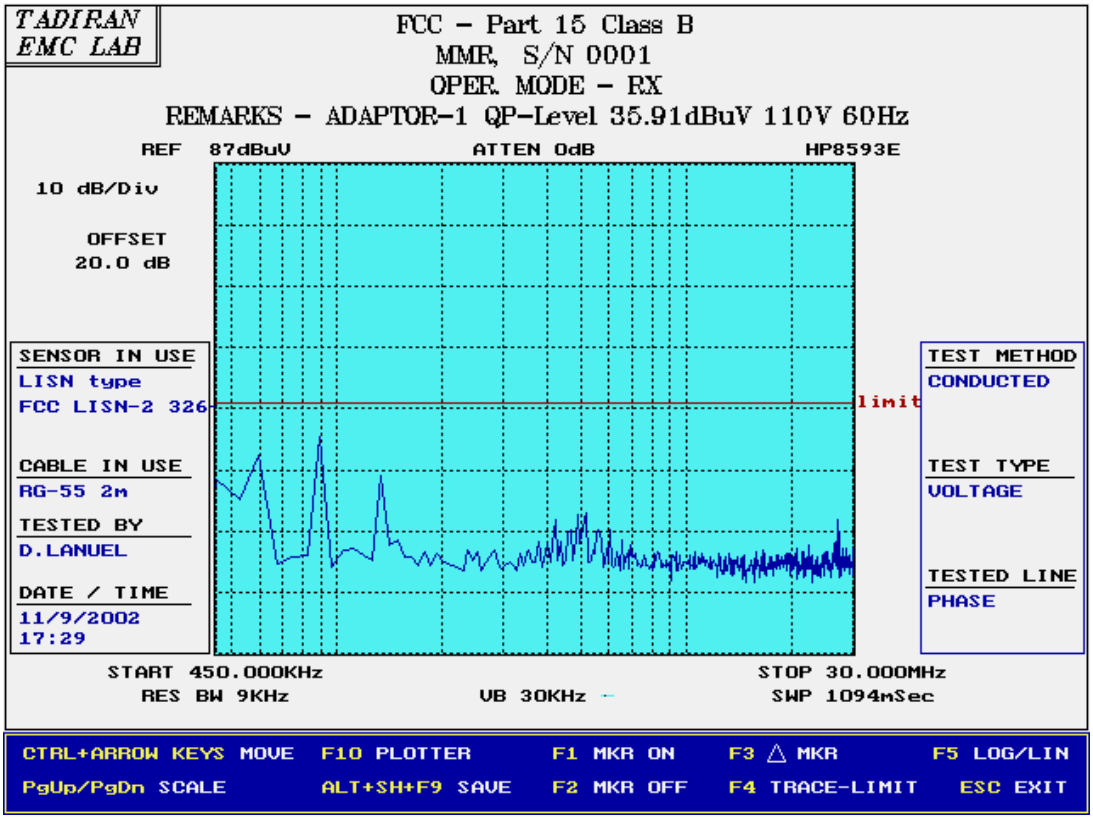
Table CE-C Test Results 110V 60Hz according 15.207

Lead P/N	Mode of Operation	Frequency Range (MHz)	Resolution BW (kHz)	Plot No.	Comply. Y/N
Phase	TX	0.45 – 30	**9**	**CE/ 1**	**Y**
Neutral		0.45 – 30		**CE/ 2**	**Y**
Phase	RX	0.45 – 30	**9**	**CE/ 3**	**Y**
Neutral		0.45 – 30		**CE/ 4**	**Y**

Table CE-D Six Highest Emissions

Lead P/N	Mode of Operation	Freq. (MHz)	Receiver Detector	Reading (dBμV)	Limit (dBμ)	Margin (dB)
PHASE	TX	**0.967**	**QUPEAK**	**35.86**	**48**	**12.2**
Neutral		**1.115**	**QUPEAK**	**36.05**	**48**	**11.95**
PHASE	RX	**0.893**	**QUPEAK**	**35.91**	**48**	**12.09**
Neutral		**0.893**	**QUPEAK**	**40.84**	**48**	**7.16**

(*) Resolution B/W = 9 kHz



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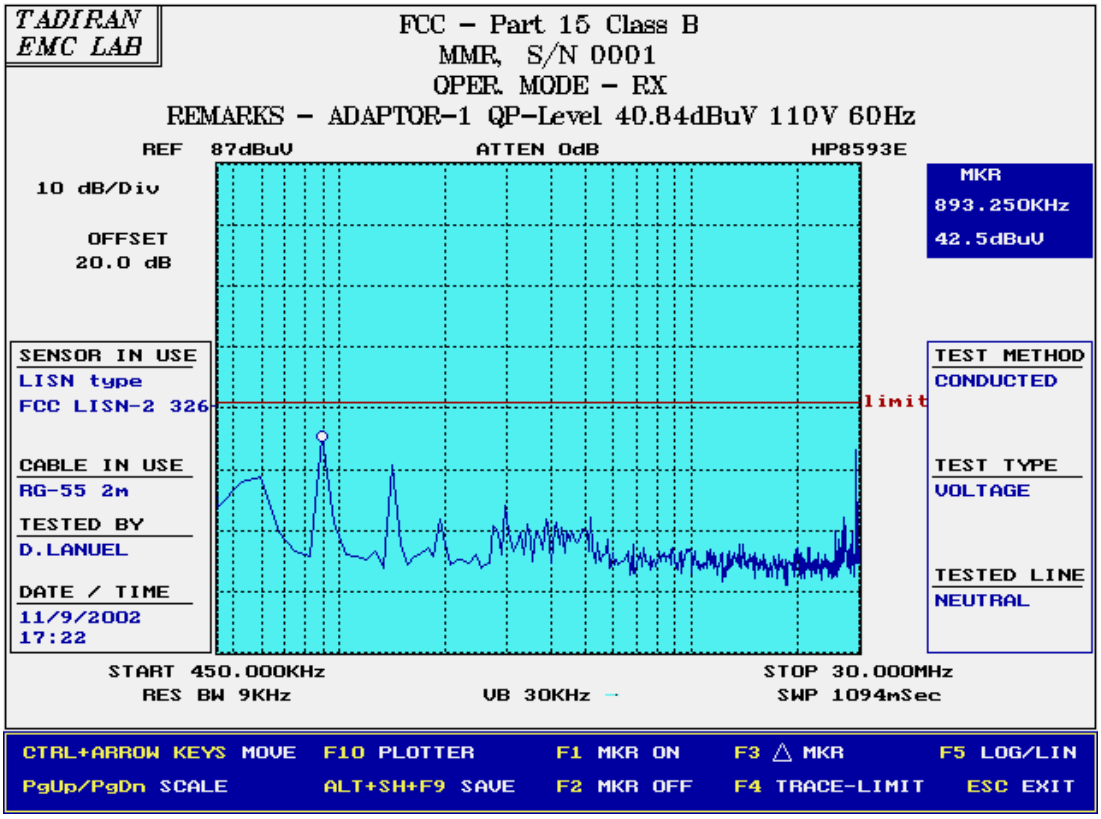

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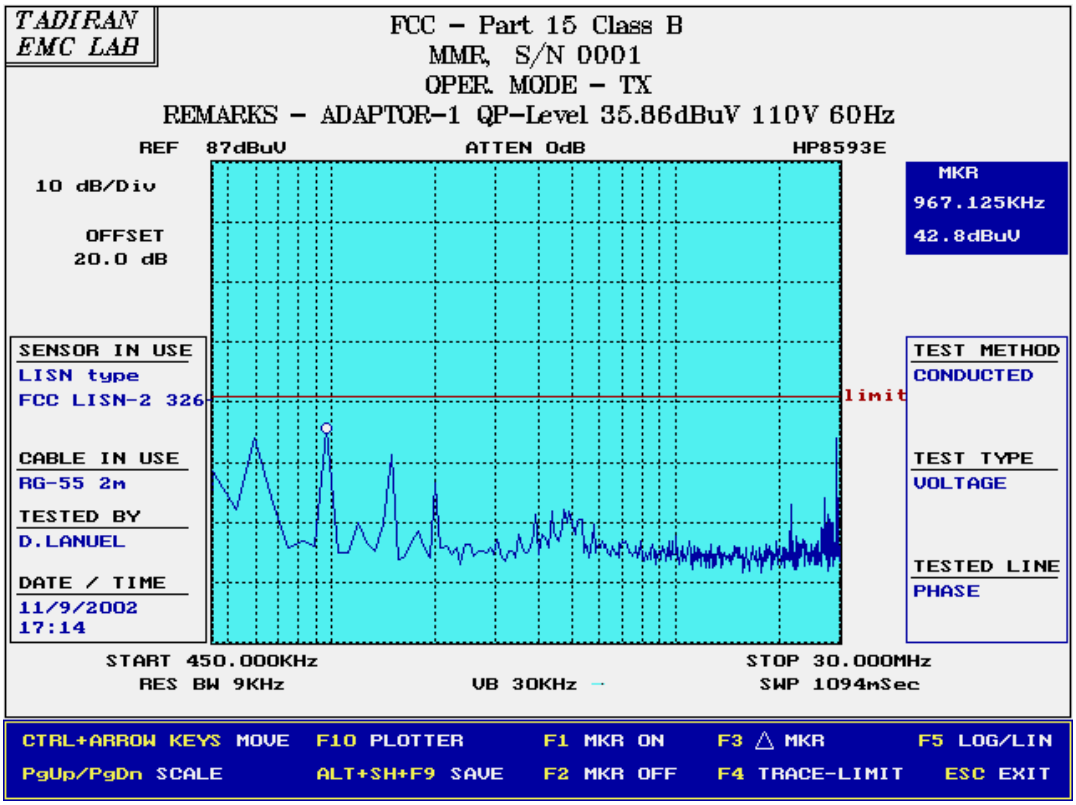

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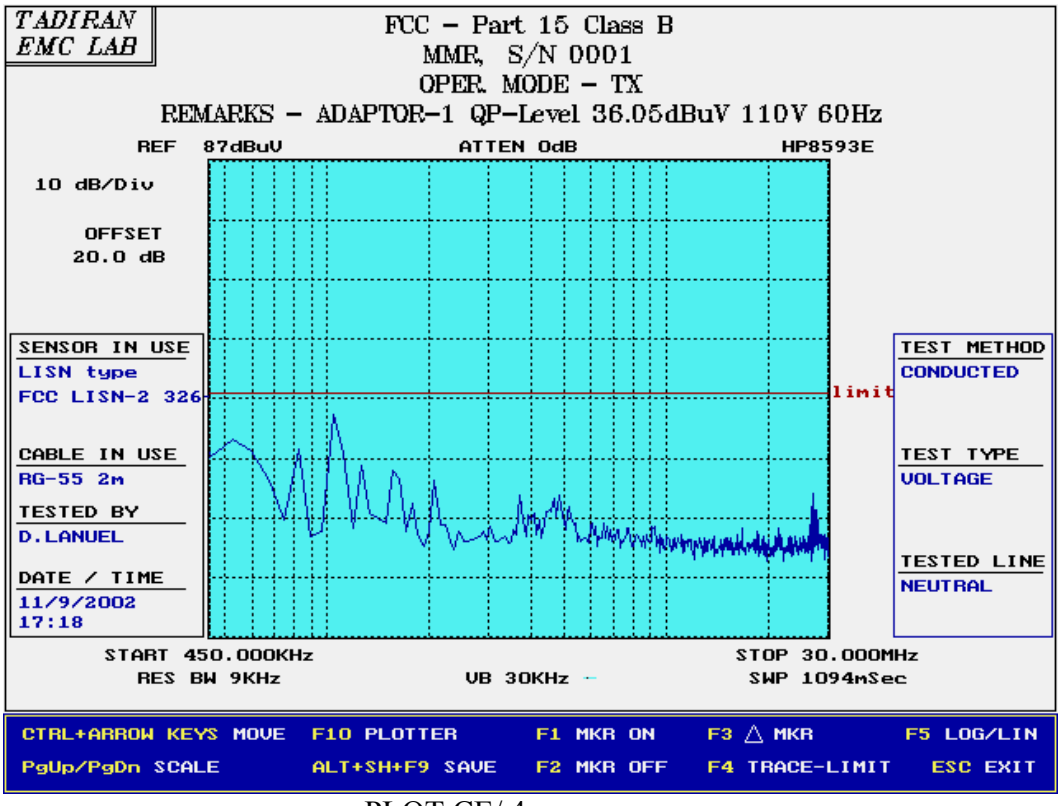

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