12. CONDUCTED DISTURBANCE VOLTAGE IN THE FREQUENCY RANGE 0,45 - 30 MHZ

12.1 Operating environment

Temperature: 24 °C
Relative Humidity: 40 %

12.2 Measurement uncertainty

Conducted disturbance voltage, quasi-peak detection: ±2,0 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during operation of the EUT.

Measurement uncertainty is calculated in accordance with EA-4/02-1997.
The measurement uncertainty is given with a confidence of 95%.

12.3 Test equipment and software

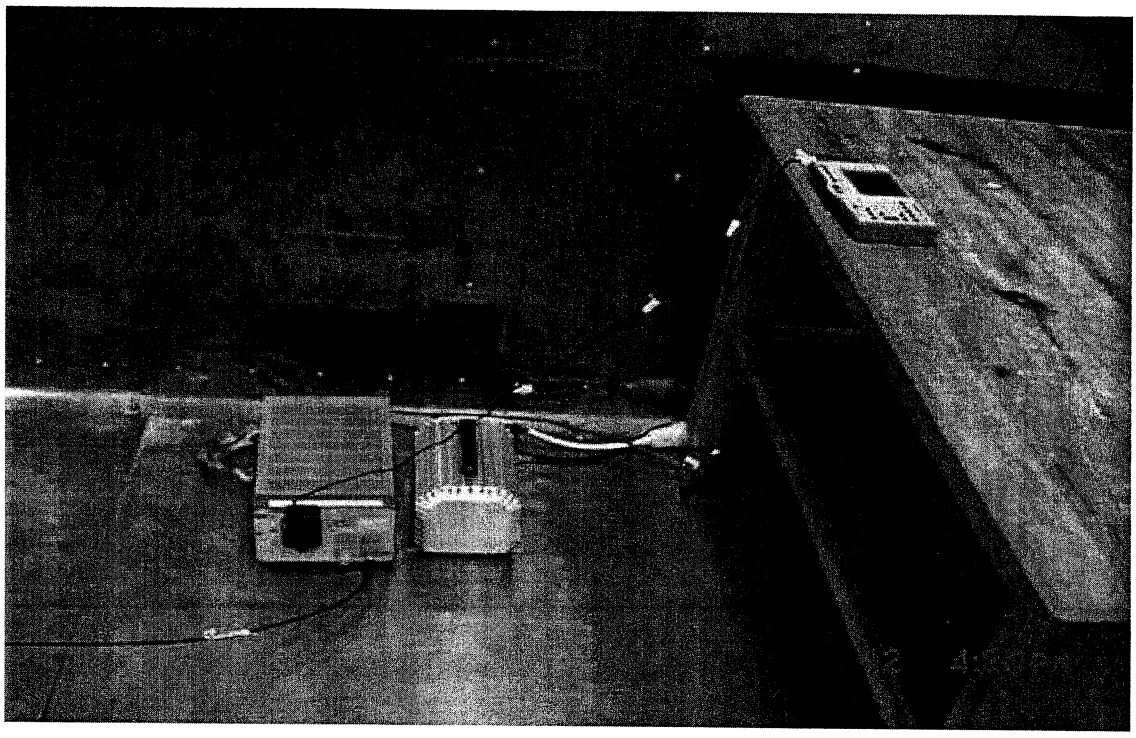
Test site: FCC

Equipment	Manufacturer	Type	SEMKO No.
Measurement receiver	Rohde & Schwarz	ESHS 30	4946
Artificial mains network	Rohde & Schwarz	ESH3-Z5	2727
Transformer	TUFVASSONS	AFM-1500	375

Software: ES-K1 V1.60

12.4 Measurement set-up

The mains terminal disturbance voltage was measured with the equipment under test (EUT) 0,8 m above the ground plane and 0,4 m from the vertical ground plane. The EUT was connected to an artificial mains network (AMN). The AMN was placed on a metallic, grounded floor. Amplitude measurements were performed with a quasi-peak detector. The test set-up photo is given below.

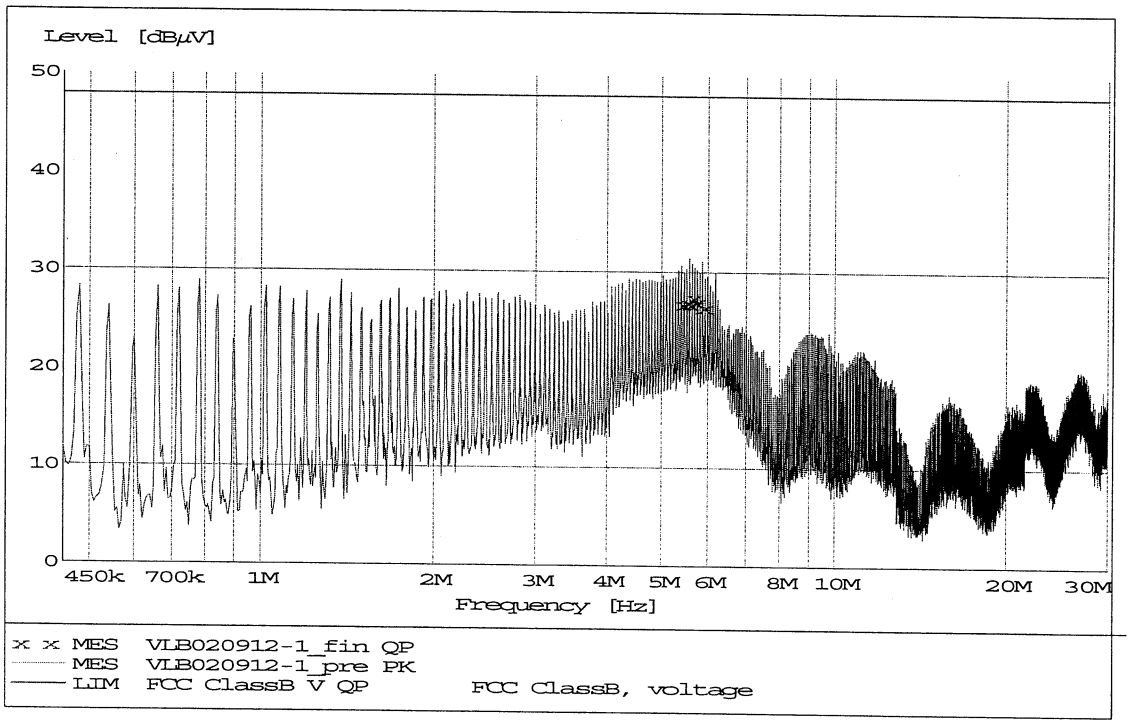


12.5 Test protocol

Date of test: September 12, 2002

Frequency /MHz	Quasi-Peak Disturbance Level /dB(µV)	Quasi-Peak Permitted limit /dB(µV)
5,395	26,8	48
5,515	26,9	48
5,575	26,8	48
5,635	27,4	48
5,695	27,0	48
5,875	26,4	48

An overview sweep performed with a peak detector is shown below.



13. RADIATED SPURIOUS EMISSIONS

13.1 Operating environment

Temperature: 22-23 °C (15 - 35 °C)
Relative Humidity: 49-59 % (20 - 75 %)

13.2 Measurement uncertainty

Radiated disturbance electric field intensity, 30-1000 MHz: ± 4,6 dB
Radiated disturbance electric field intensity, 1000-26000 MHz: ± 6,0 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during operation of the EUT.

Measurement uncertainty is calculated in accordance with EA-4/02-1997.
The measurement uncertainty is given with a confidence of 95%.

13.3 Test equipment and software

Equipment	Manufacturer	Type	SEMKO No.
Software:	R&S	ES-K1, V1.60	
Test site: Semi-anechoic shielded chamber, 10 x 20 x 8,5 m (W x L x H)			-
Spectrum analyser/ Measurement receiver:	R&S	ESAI	2973/2974
Antenna amplifier:	SEMKO		7992/7993
Antenna, bilog:	Chase	CBL6111B	12474
Test site: Bluetooth anechoic shielded chamber, 3,68 x 6,98 x 2,35 m (W x L x H)			12285
Signal analyser:	R&S	FSIQ 40	9192
Preamplifier:	HP	8449B	6685
Antenna:			
Double Ridge Guide Horn:	EMCO	3115	4936
Horn antenna:	EMCO	3160-08	30099
Horn antenna:	EMCO	3160-09	30101

R&S = Rohde & Schwarz
HP = Hewlett Packard

13.4 Measurement set-up

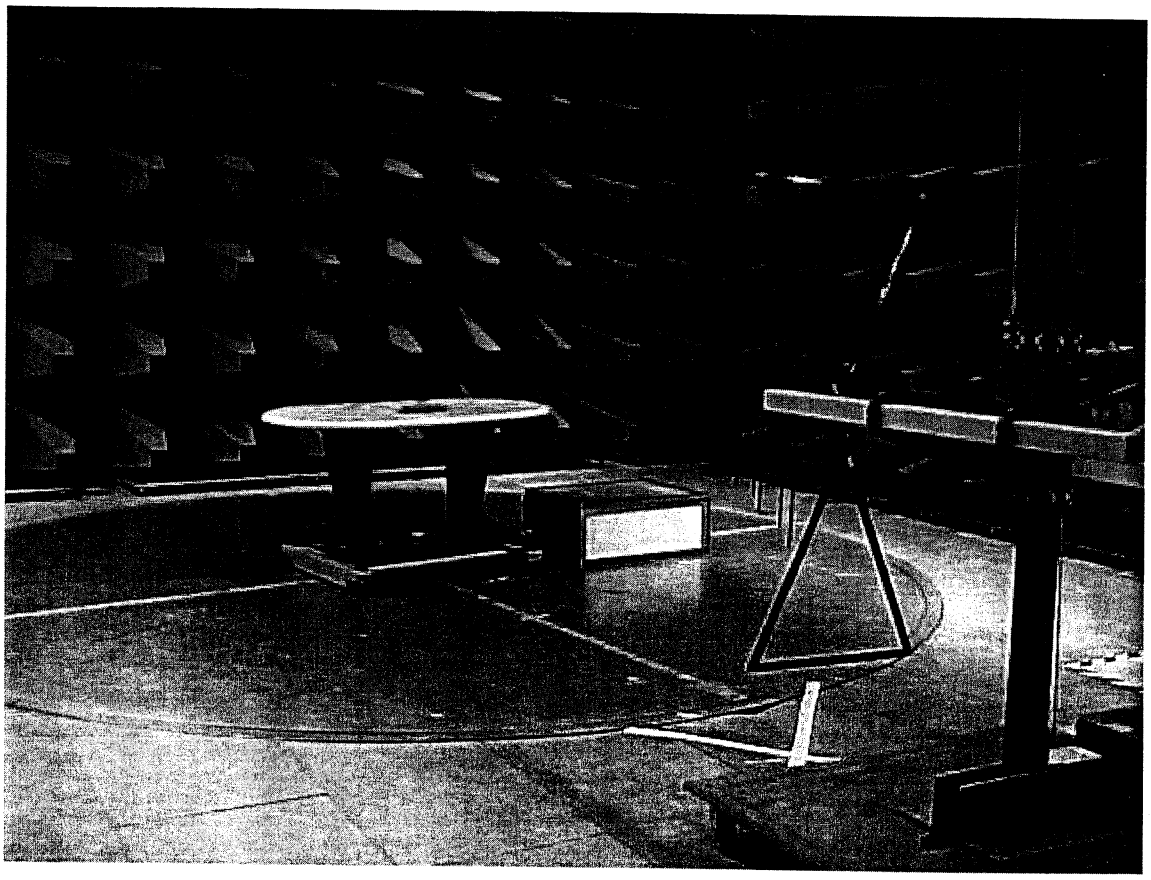
13.4.1 Test site: Semi-anechoic shielded chamber (30 – 1000 MHz)

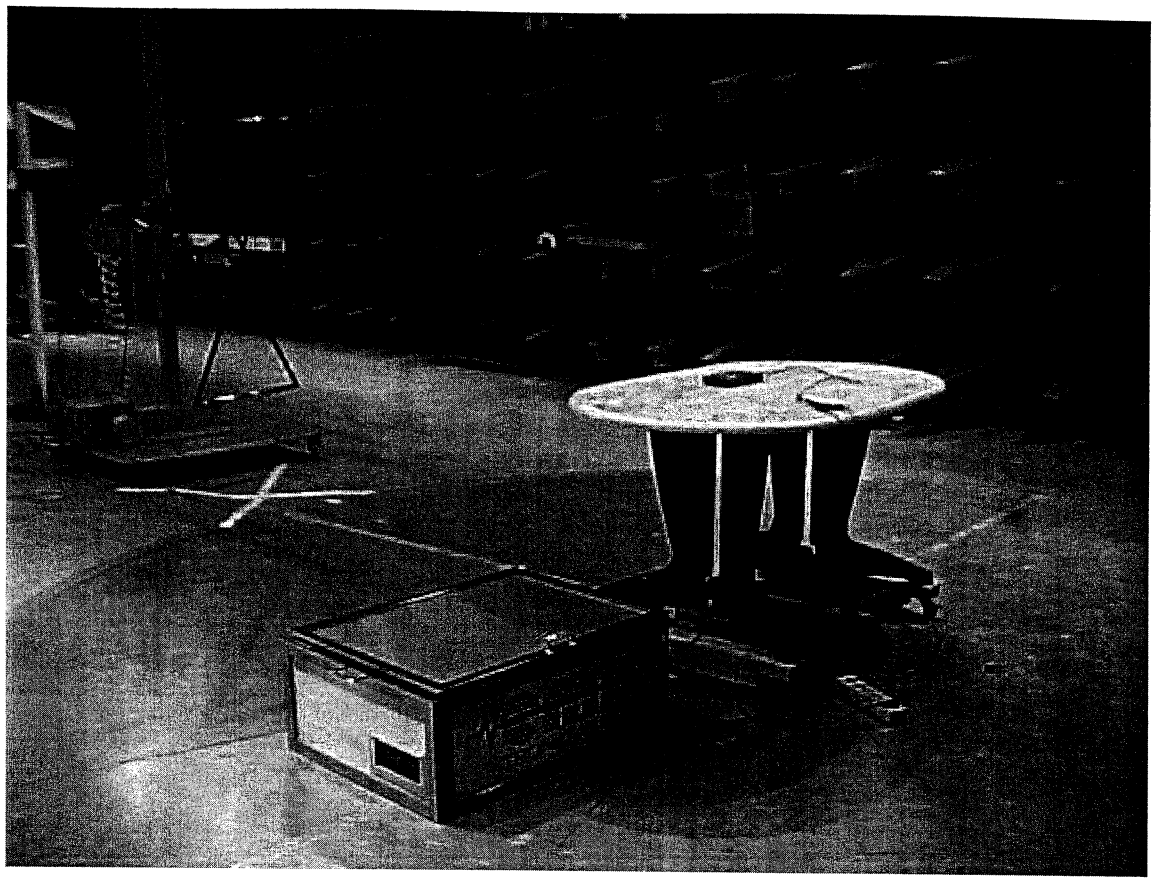
The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 3 m and the EUT was placed on a non-metallic table, 0,8 m above the reference ground plane. The specified test mode was enabled. Test set-up photos are given below.

An overview sweep with peak detection of the electric field intensity was performed with the measurement receiver in max-hold and with the antenna placed 1,5 m, 2,5 m and 3,5 m above the floor. The polarisation was horizontal and vertical. The measurements were repeated with the EUT rotated in 90-degree steps. The peak overview sweeps are found in section 13.5.

For frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration quasi-peak measurements were carried out.

Test set-up in the semi-anechoic shielded chamber





13.4.2 Test site: Bluetooth anechoic shielded chamber (1-26 GHz)

In the Bluetooth anechoic chamber the EUT was placed on a non-metallic table, 1,4 m above the floor. The radiated disturbance electric field intensity was measured at a distance of 3 m. The specified test mode was enabled.

An overview sweep with peak detection of the electric field intensity was performed with the measurement receiver in max-hold and with the antenna placed 1,4 m above the floor. The polarisation was horizontal and vertical. The measurements were repeated with the EUT rotated in 90-degree steps. If necessary, the sweep was repeated with average detection.

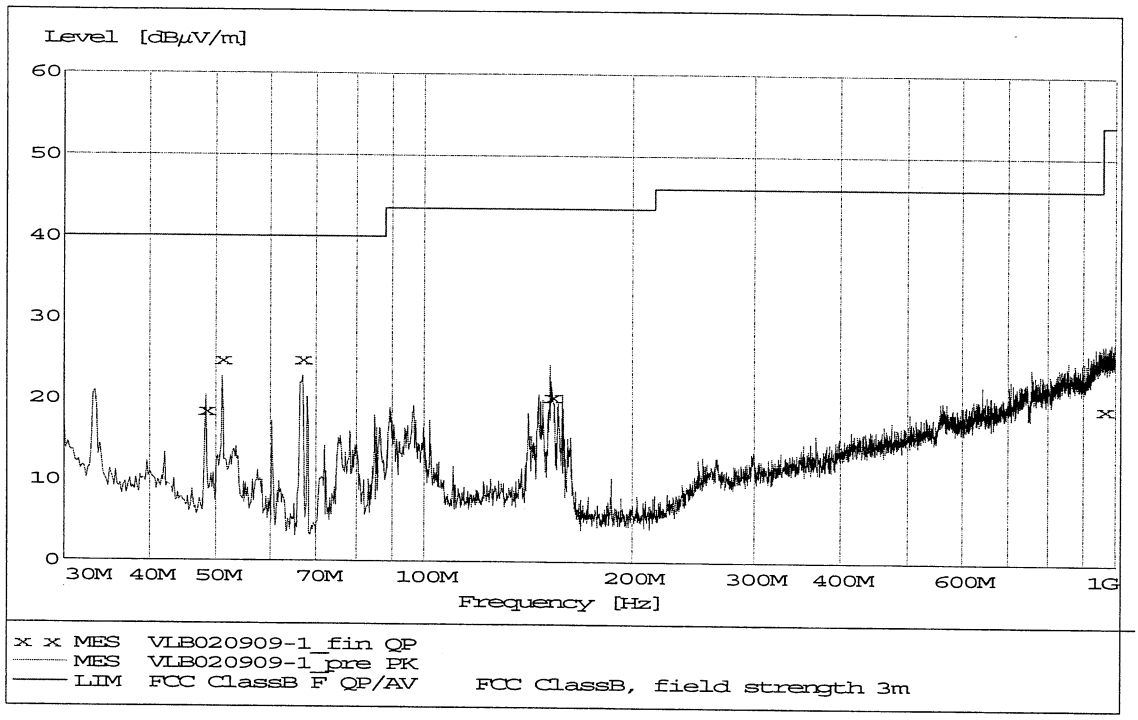
The peak overview sweeps are found in section 13.5.

13.5 Test protocol

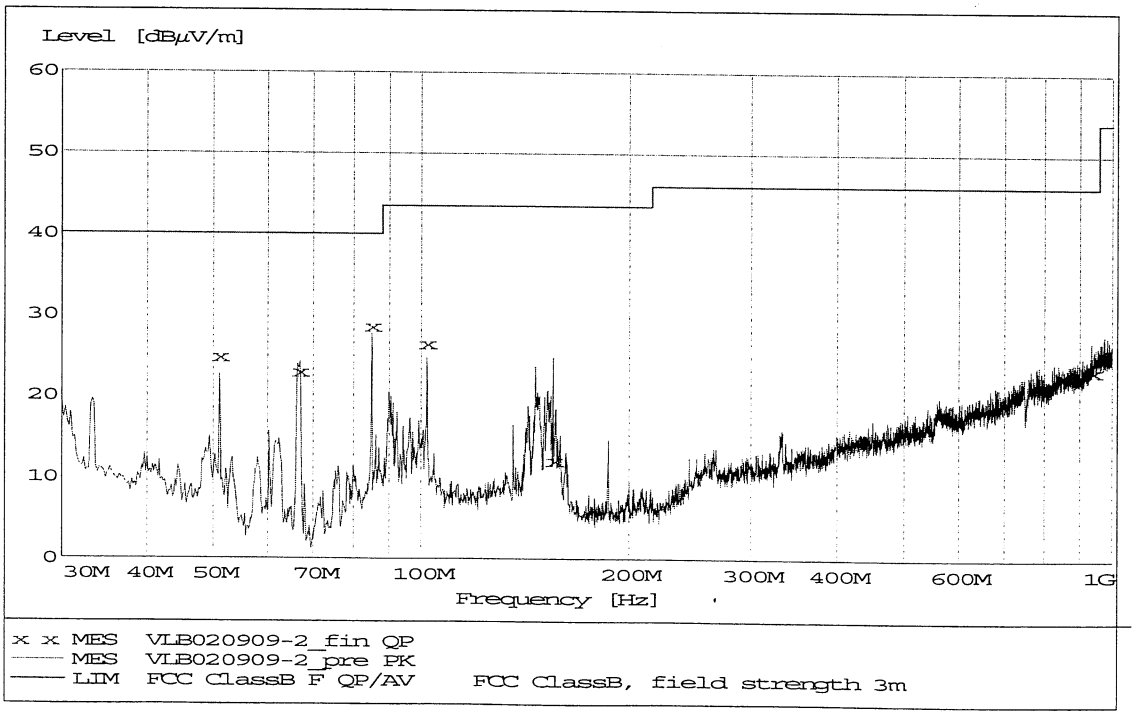
13.5.1 Semi-anechoic shielded chamber

Date of test: September 9, 2002

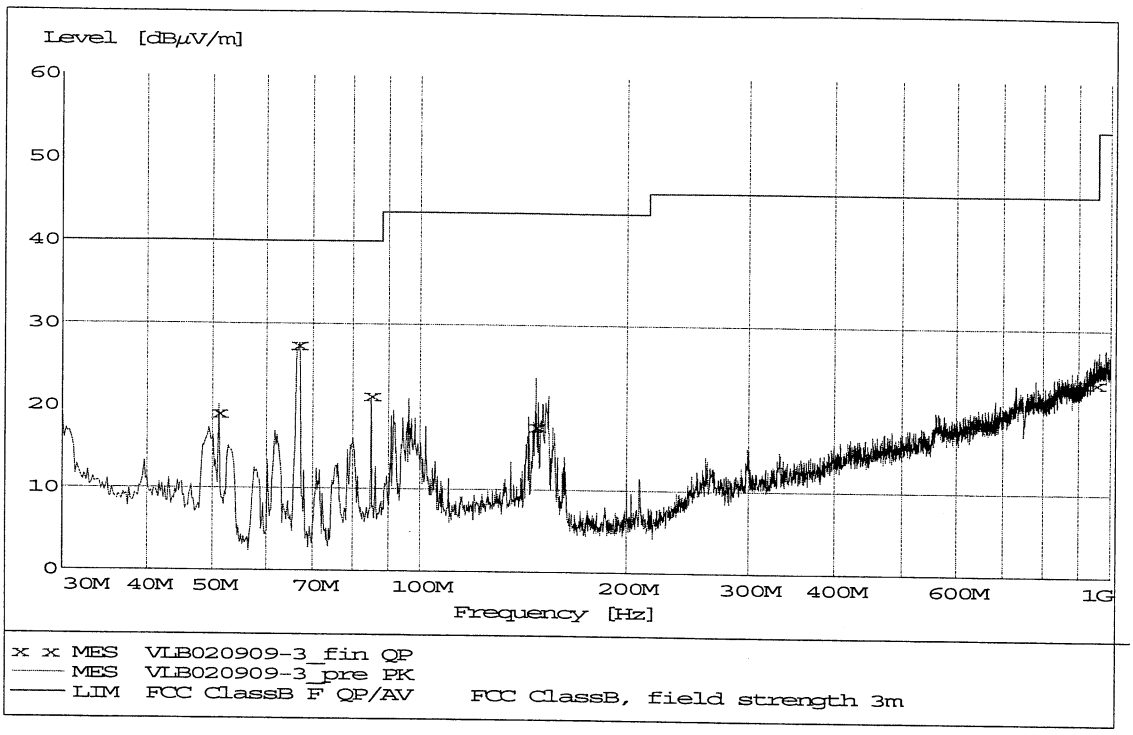
30 – 1000 MHz, max peak at a distance of 3 m on the lower TX channel



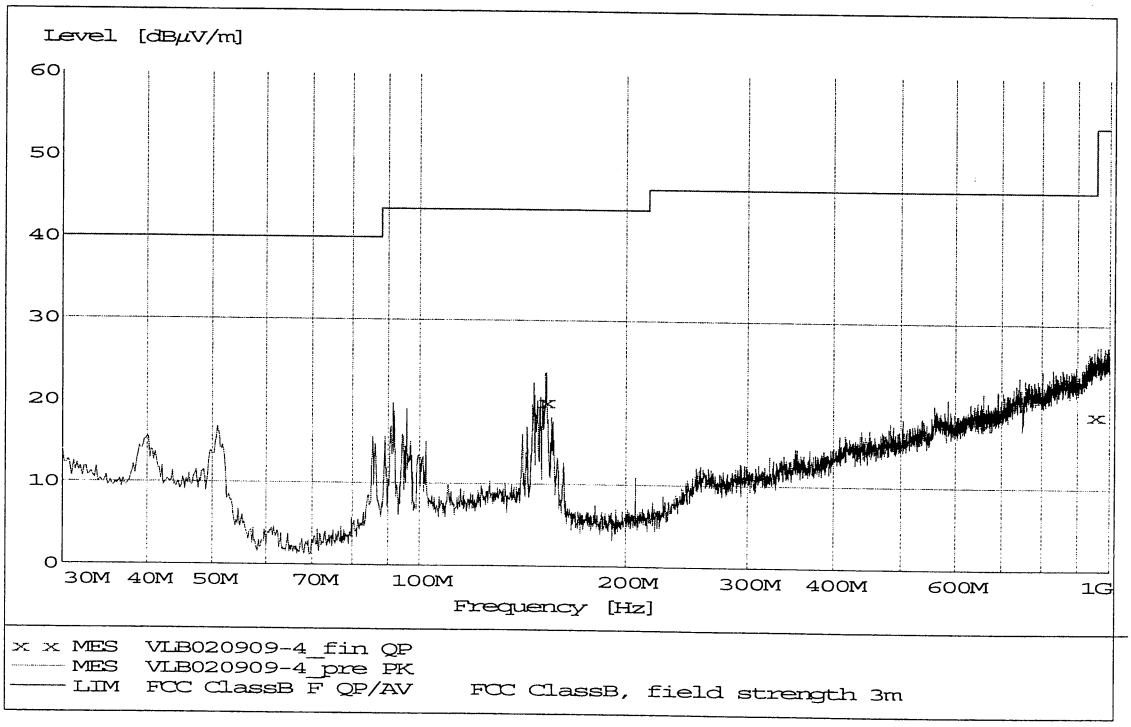
30 – 1000 MHz, max peak at a distance of 3 m on the middle TX channel



30 – 1000 MHz, max peak at a distance of 3 m on the upper TX channel



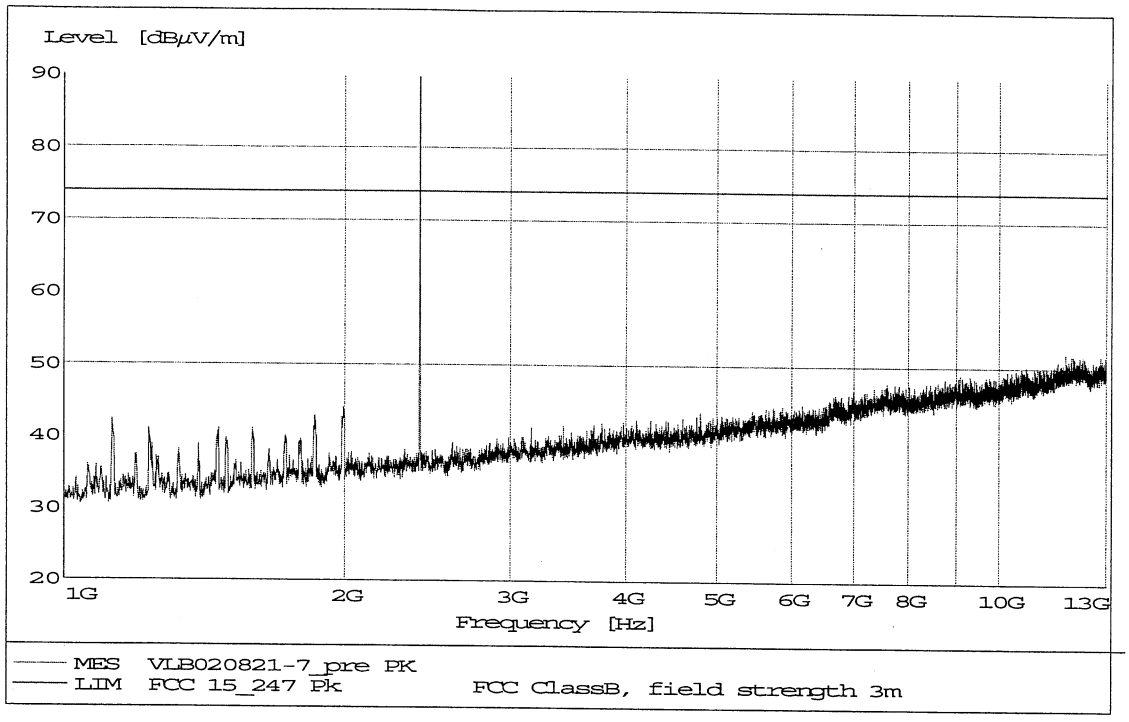
30 – 1000 MHz, max peak at a distance of 3 m in the stand-by mode



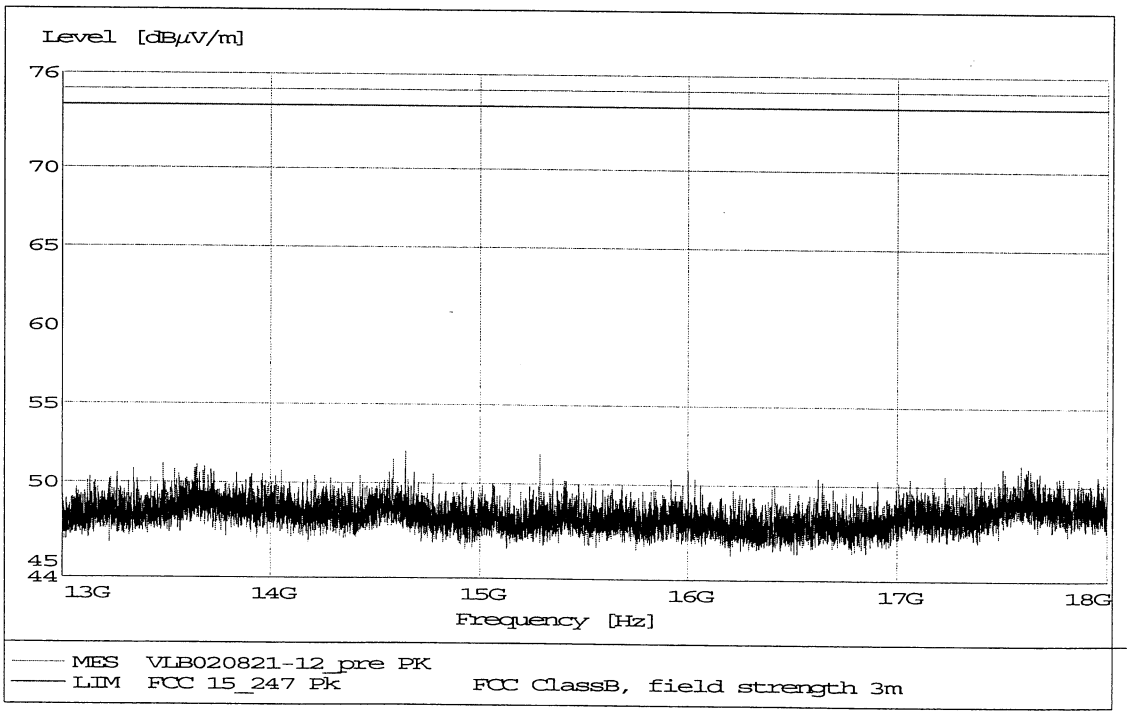
13.5.2 Bluetooth anechoic shielded chamber

Date of test: August 21, 2002

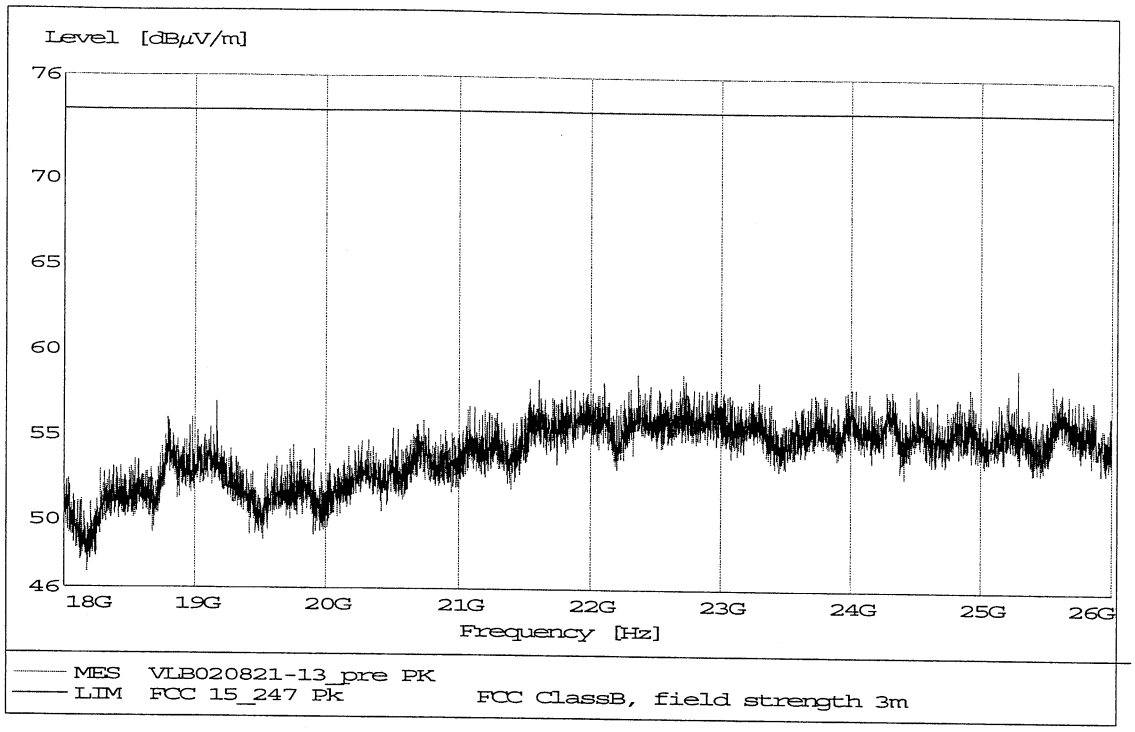
1 – 13 GHz, peak detection at a distance of 3 m; TX mode, lower channel



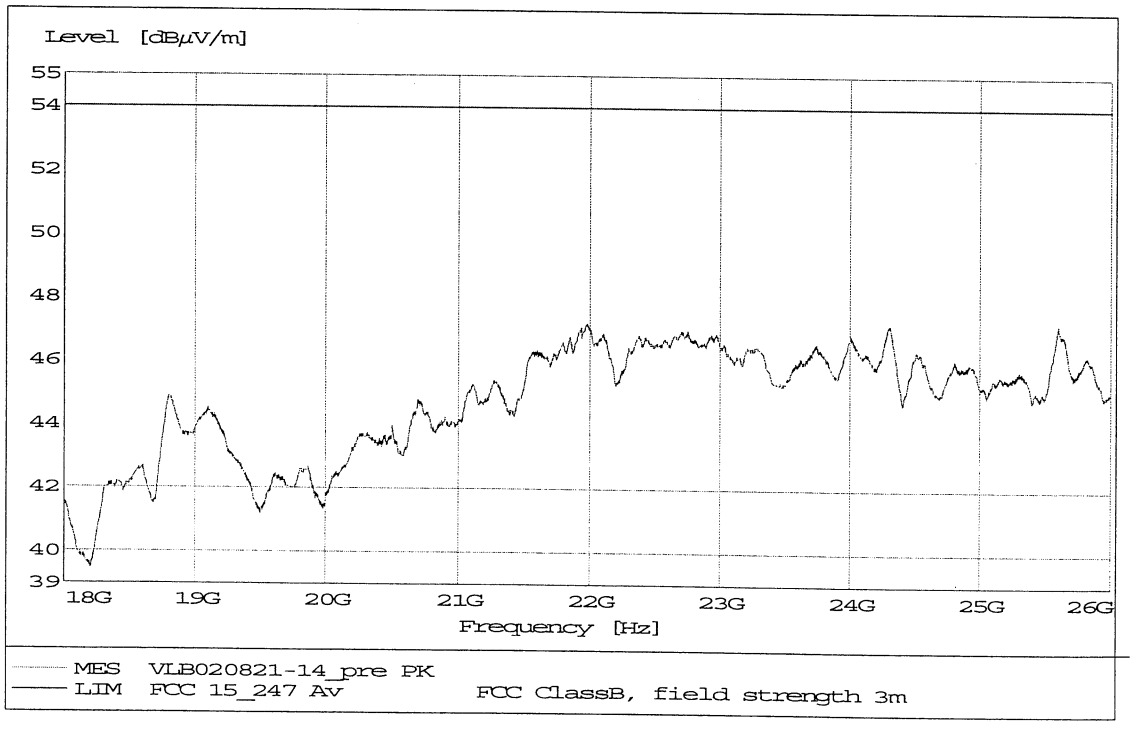
13 – 18 GHz, peak detection at a distance of 3 m; TX mode, lower channel



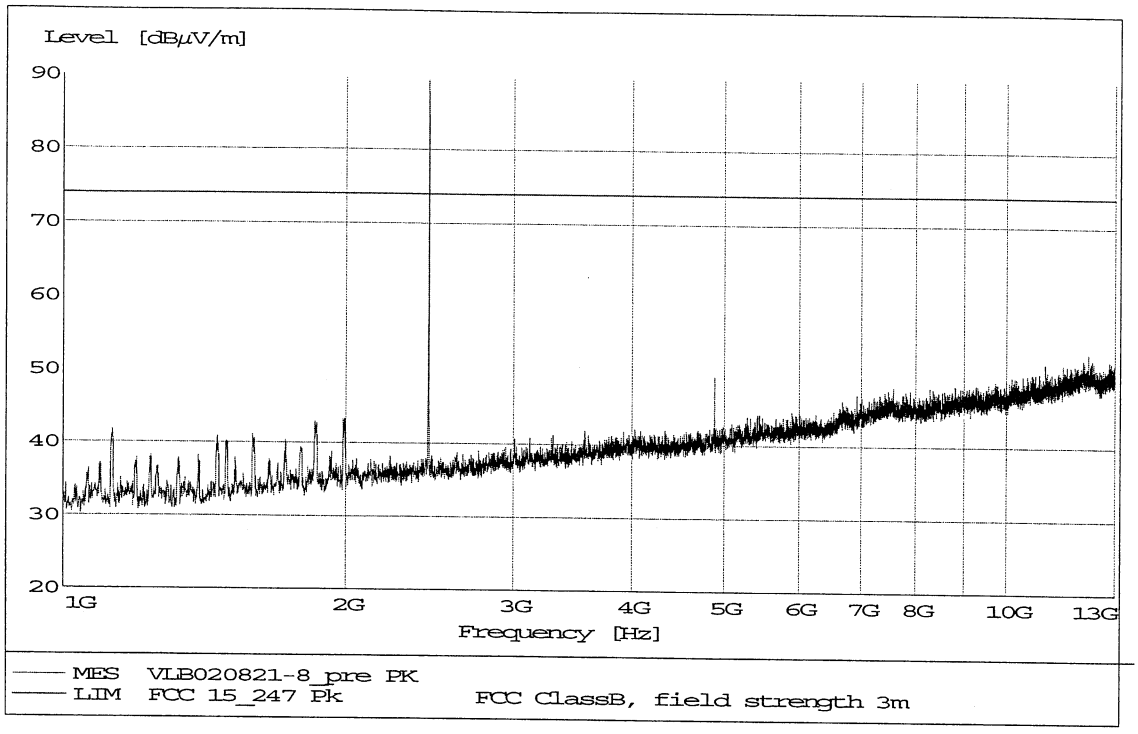
18 – 26 GHz, peak detection at a distance of 3 m; TX mode, lower channel



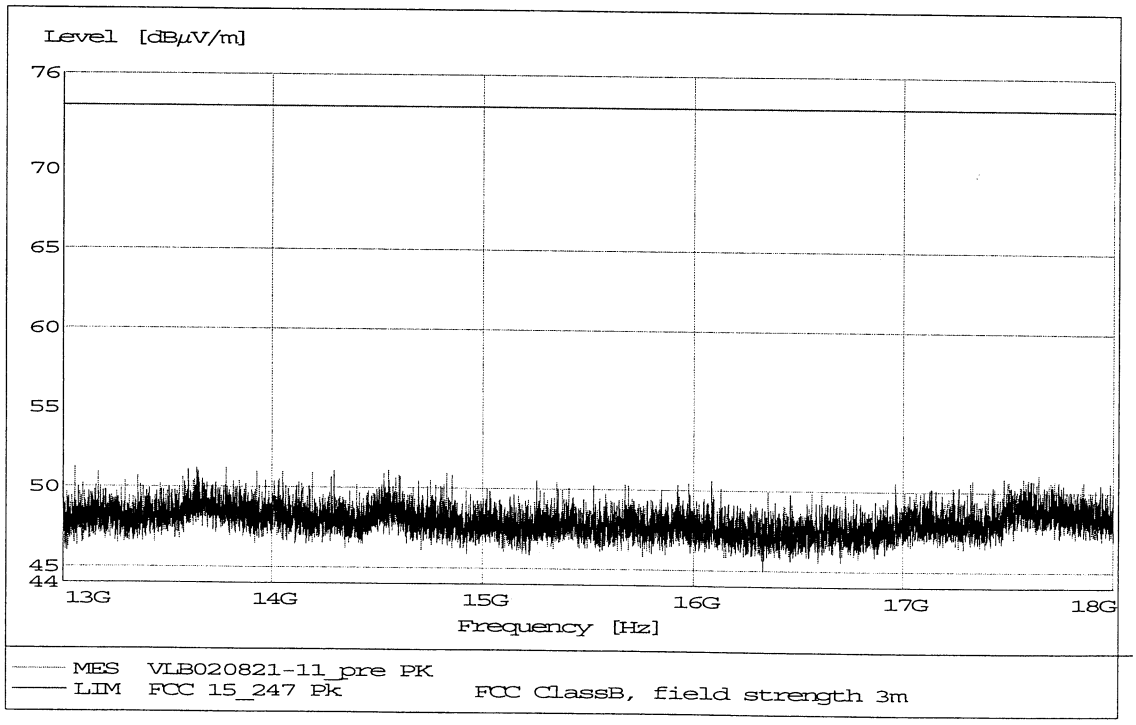
18 – 26 GHz, average detection at a distance of 3 m; TX mode, lower channel



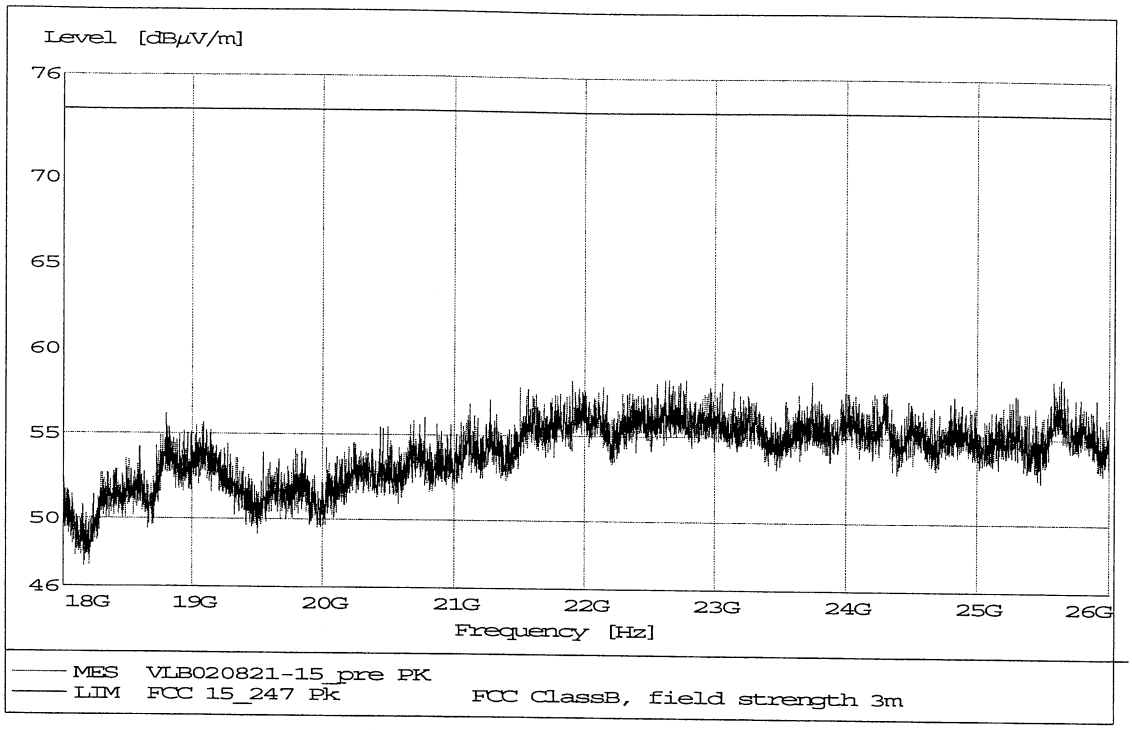
1 – 13 GHz, peak detection at a distance of 3 m; TX mode, middle channel



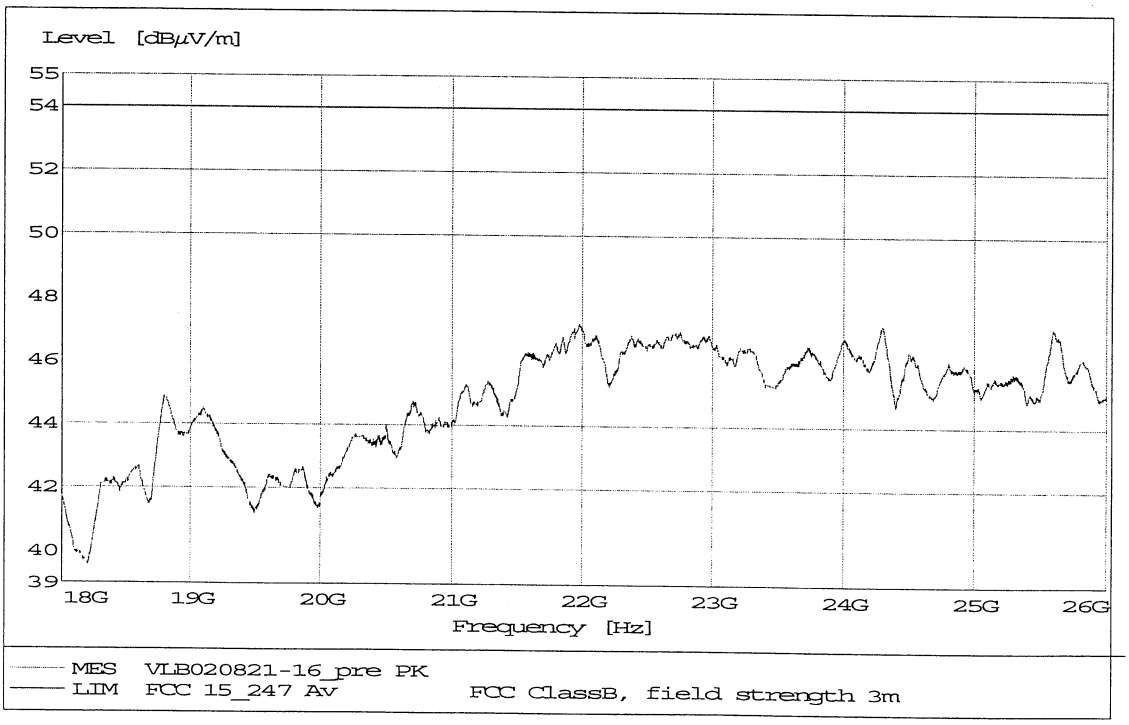
13 – 18 GHz, peak detection at a distance of 3 m; TX mode, middle channel



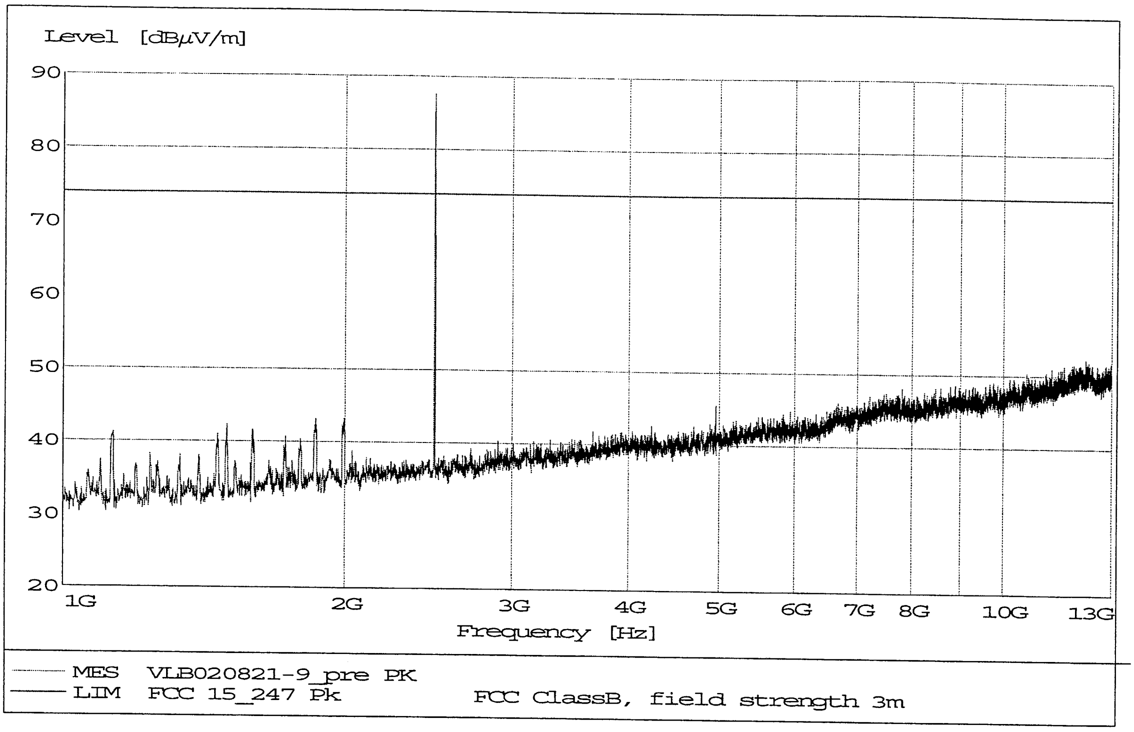
18 – 26 GHz, peak detection at a distance of 3 m; TX mode, middle channel



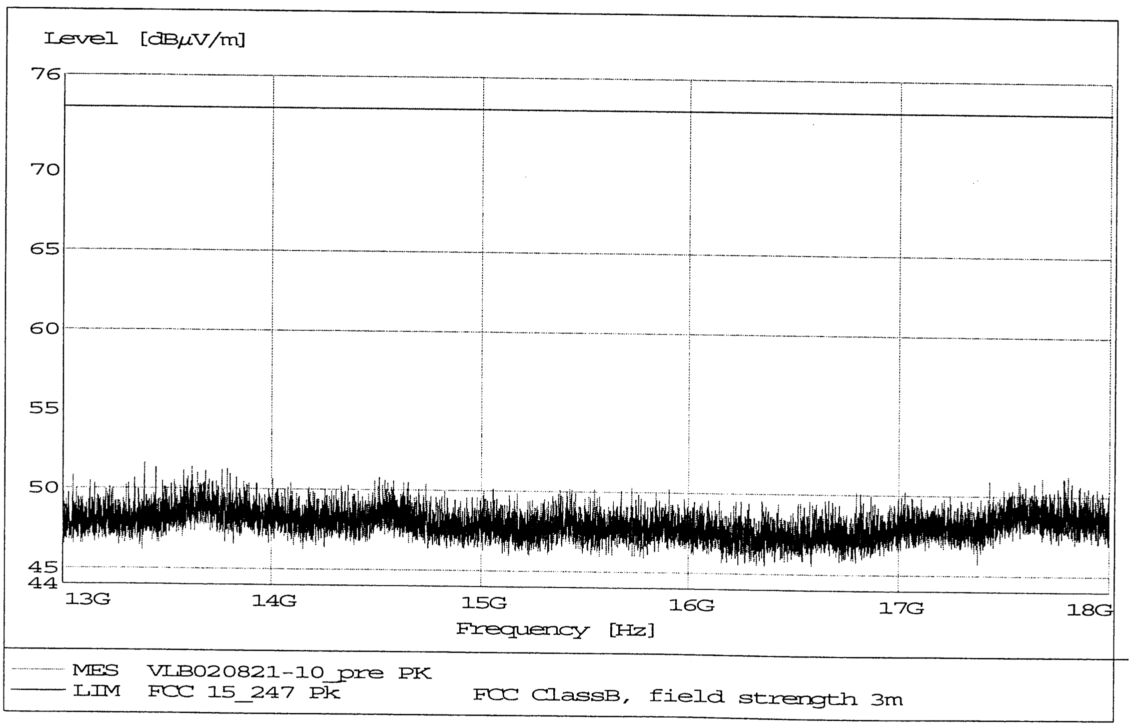
18 – 26 GHz, average detection at a distance of 3 m; TX mode, middle channel



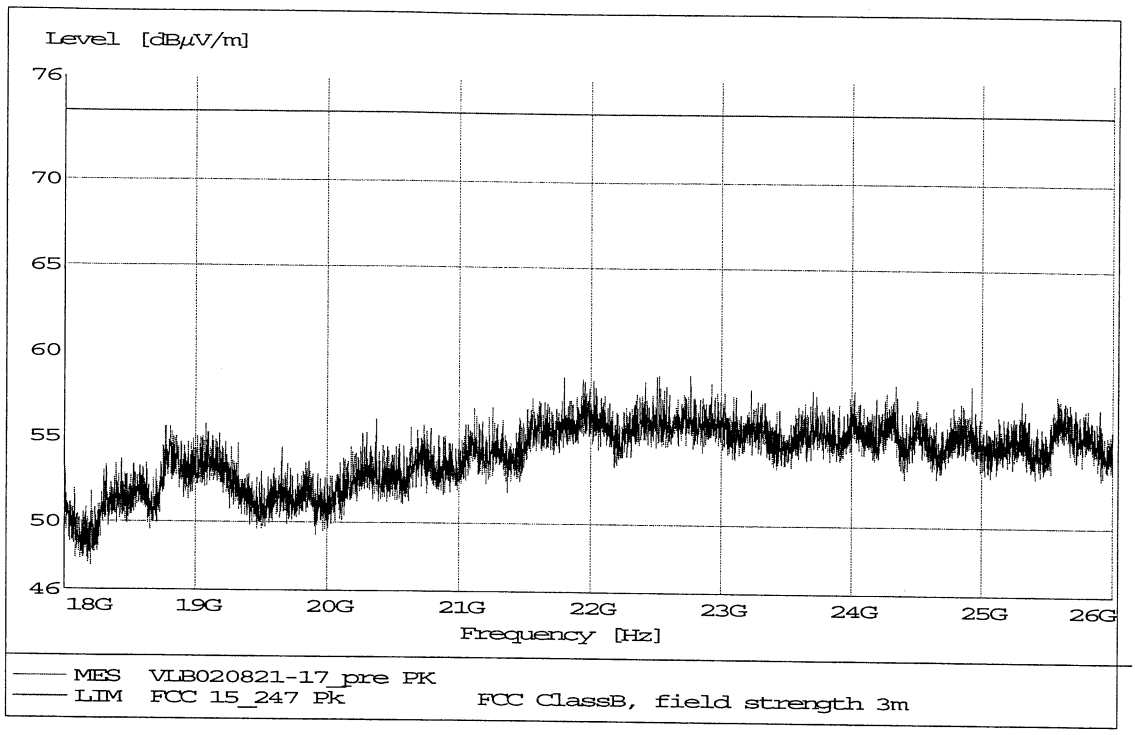
1 – 13 GHz, peak detection at a distance of 3 m; TX mode, upper channel



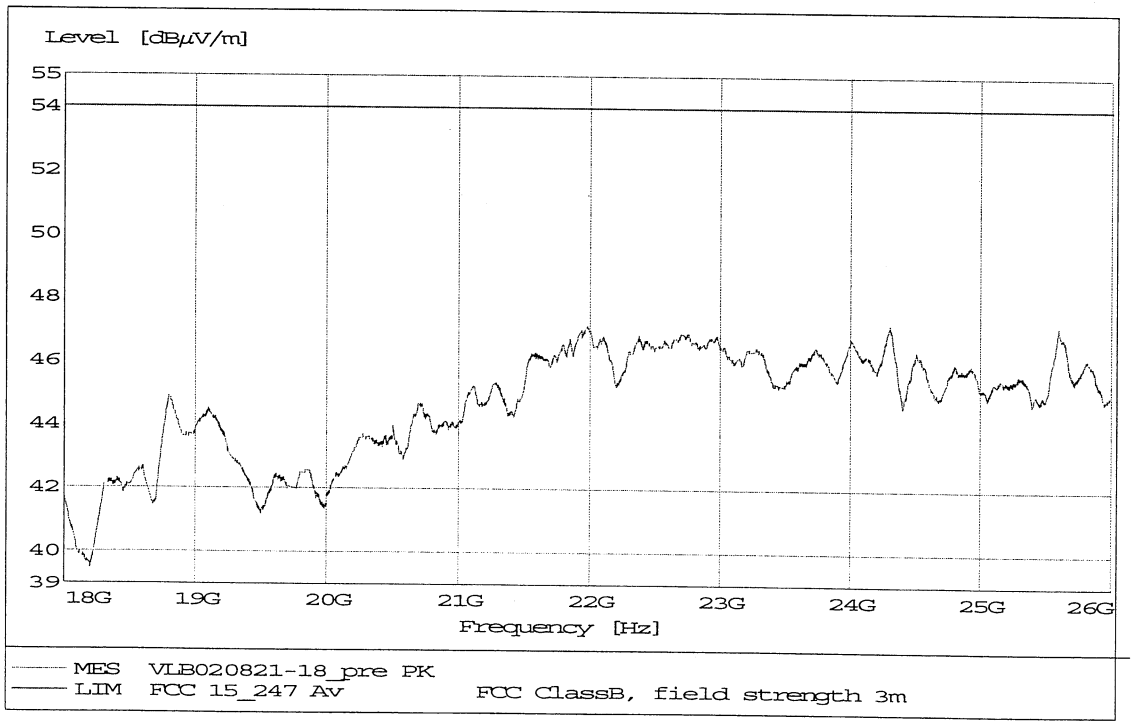
13 – 18 GHz, peak detection at a distance of 3 m; TX mode, upper channel



18 – 26 GHz, peak detection at a distance of 3 m; TX mode, upper channel

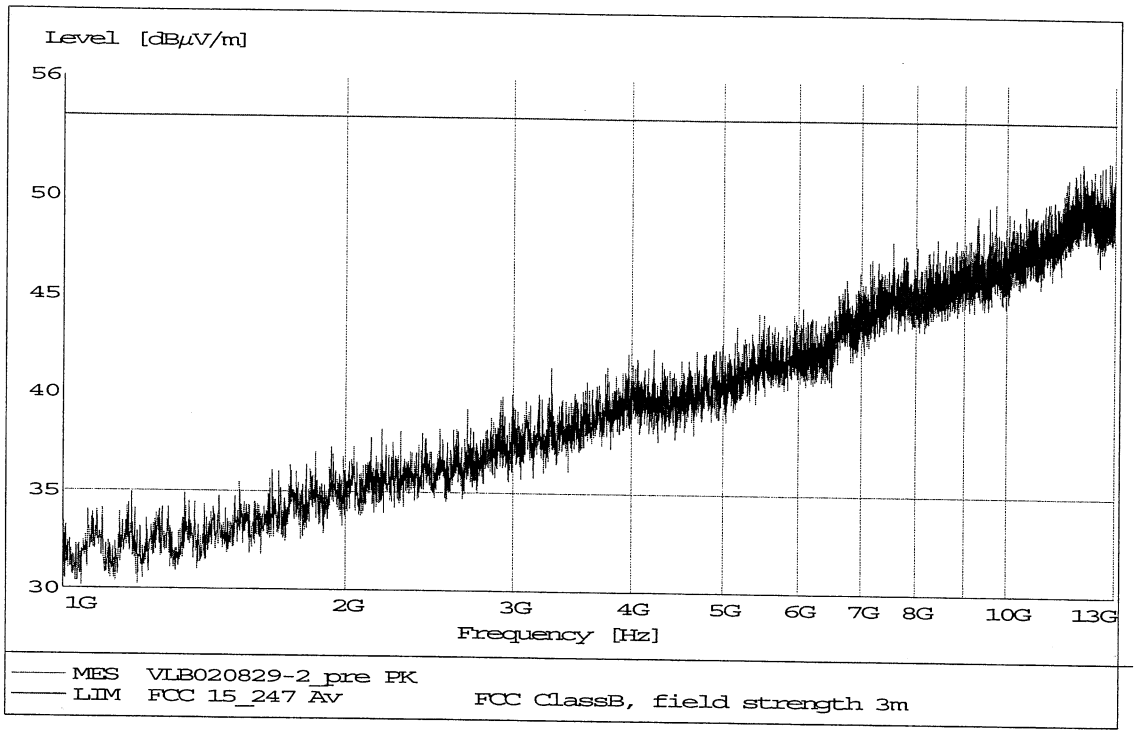


18 – 26 GHz, average detection at a distance of 3 m; TX mode, upper channel



Date of test: August 29, 2002

1 – 13 GHz, peak detection at a distance of 3 m; stand by mode



Field strength of spurious emissions						
Frequency	RBW	Measured level		Limit		Note
[MHz]	[kHz]	Peak [dBµV/m]	QP/AV [dBµV/m]	Peak [dBµV/m]	QP/AV [dBµV/m]	
48,2	120	20	18,5	-	40	
50,8	120	23	24,8	-	40	
66,4	120	28	27,4	-	40	
84,6	120	29	28,6	-	40	
101,6	120	25	26,5	-	43,5	
147,3	120	24	17,7	-	43,5	
152,2	120	24	20,4	-	43,5	
155,0	120	25	12,1	-	43,5	
936,0	120	27	23,5	-	46	
949,0	120	27	23,6	-	46	
950,9	120	27	19,0	-	46	
958,8	120	27	19,3	-	46	
1000 – 13000	1000	< 52	-	74	54	
13000 – 18000	1000	< 52	-	74	54	
18000 – 26000	1000	< 58	< 47	74	54	

Fulfil requirements: Yes