

# FCC TEST REPORT

For

**WCDMA/GPRS Module**

**Model Number: N51**

**FCC ID: PJ7-1712**

**Report Number : WT198006829**

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Inspection  
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## TEST REPORT DECLARATION

Applicant : Shenzhen Neoway Technology Co.,Ltd.  
Address : 4F-2#, Lianjian Science&Industry Park, Huarong Road,  
Dalang, Longhua District, Shenzhen City, Guangdong  
Province, P.R.China  
Manufacturer : Shenzhen Neoway Technology Co.,Ltd.  
Address : 4F-2#, Lianjian Science&Industry Park, Huarong Road,  
Dalang, Longhua District, Shenzhen City, Guangdong  
Province, P.R.China  
EUT Description : WCDMA/GPRS Module  
Model No. : N51  
Trade mark : Neoway  
Serial Number : /  
FCC ID : PJ7-1712

Test Standards:

### FCC Part 15 Subpart B 15.107, 15.109 (2018)

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Project Engineer:	 (Zhou Fangai 周芳媛)	Date:	<u>Dec.24, 2019</u>
Checked by:	 (Lin Yixiang 林奕翔)	Date:	<u>Dec.24, 2019</u>
Approved by:	 (Lin Bin 林斌)	Date:	<u>Dec.24, 2019</u>

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## 1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
Conducted Emission	15.107	Pass
Radiation Emission	15.109	Pass

Remark: "N/A" means "Not applicable."

## 2. GENERAL INFORMATION

### 2.1. Report information

This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

### 2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.

The Laboratory is Accredited Testing Laboratory of FCC with Designation number CN1165 and Site registration number 582918.

The Laboratory is registered to perform emission tests with Innovation, Science and Economic Development (ISED), and the registration number is 11177A.

### 2.3. Measurement Uncertainty

Conducted Emission  
9 kHz~30MHz 2.9dB

Radiated Emission  
30MHz~1000MHz 5.1dB  
1GHz~6GHz 5.04dB  
6GHz~18GHz 5.54dB

### 3. PRODUCT DESCRIPTION

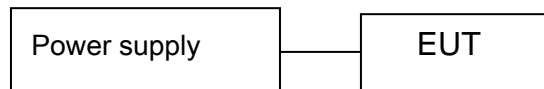
#### 3.1.EUT Description

Table 2 Specification of the Equipment under Test

Product Type:	WCDMA/GPRS Module
Hardware Version:	1712-V1.0
Software Version :	N51WW_E2F368_BZ_V003B
FCC-ID:	PJ7-1712
Frequency:	GSM850:TX 824MHz~849MHz    RX 869MHz~894MHz PCS1900: TX 1850MHZ~1910MHZ RX 1930MHz~1990MHz WCDMA 850: TX 824MHz~849MHz    RX 869MHz~894MHz WCDMA 1900:TX 1850MHZ~1910MHZ RX 1930MHz~1990MHz
Type(s) of Modulation:	GSM:GMSK WCDMA:QPSK
Antenna Type:	GSM/WCDM: Glue stick antenna 824MHz~849MHz:1dBi 1850MHZ~1910MHZ: 1dBi
Operating voltage:	DC Power: 3.3V(Low),3.8V(Normal),4.3V(Max)

Remark: --

### 3.2. Block Diagram of EUT Configuration



Setup of test

### 3.3. Operating Condition of EUT

Test mode 1: Adapter +turn on the EUT

Test mode 2: Adapter+ GSM 850 Idle

Test mode 3: Adapter+ WCDMA 850 Idle

EUT has more than one typical operation, only the worst test mode will be recorded in this report.

The Radiated emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission (X plane).

### 3.4. Support Equipment List

Table 3 Support Equipment List

Name	Model No.	S/N	Manufacturer
Adapter	HJ-0503000	--	Shenzhen huajin electronics co. LTD

### 3.5. Test Conditions

Date of test : Nov.29, 2019- Dec.24, 2019

Date of EUT Receive : Nov.27, 2019

Temperature: 20°C-24 °C

Relative Humidity: 34%-47%

### 3.6. Modifications

No modification was made.

## 4. TEST EQUIPMENT USED

### 4.1. Test Equipment Used to Measure Conducted Emission

Table 4 Conducted Emission Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB3319	EMI Test Receiver	R&S	ESCS30	Nov.11,2019	1 Year
SB4357	AMN	R&S	ENV216	Aug.27,2019	1 Year

### 4.2. Test Equipment Used to Measure Radiated Emission

Table 5 Radiated Emission Test Equipment

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB3436	Test Receiver	R&S	ESI26	Nov.07,2019	1 Year
SB3345	Loop Antenna	Schwarzbeck	FMZB1516-113	Feb.20,2019	1 Year
SB3955	Broadband Antenna	Schwarzbeck	VULB9163	May.31,2019	1 Year
SB13958	Horn Antenna	R&S	HF907	May.09,2019	1 Year



## 5. CONDUCTED EMISSION TEST

### 5.1. Test Standard and Limit

#### 5.1.1. Test Standard

FCC Part 15: Section 15.107

#### 5.1.2. Test Limit

Table 6 Conducted Emission Test Limit (Class B)

Frequency	Power Port limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15MHz ~ 0.5MHz	66~56*	56~46*
0.5MHz ~ 5 MHz	56	46
5 MHz ~ 30MHz	60	50

\* Decreasing linearly with logarithm of the frequency

### 5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver is used to test the emissions from both sides of AC line. The bandwidth of EMI test receiver is set at 9kHz.

### 5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

### 5.4. Test Data

The emissions don't show in following result tables are more than 20dB below the limits, the test curves are shown in the next page.

Table 7 Conducted Emission Test Data at mains Port

Model No.: N51								
Test mode: 1								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)
Line	0.150	9.7	2.5	12.2	66	-11.6	-1.9	56
	0.486	9.7	8.1	17.8	56.2	-5.6	4.1	46.2
	0.598	9.8	8.2	18.0	56	-7.2	2.6	46
	0.742	9.8	10.0	19.8	56	-5.9	3.9	46
	10.856	9.9	5.1	15.0	60	-10.8	-0.9	50
	14.180	9.9	9.5	19.4	60	-7.8	2.1	50
Neutral	0.186	9.7	3.5	13.2	64.2	-7.9	1.8	54.2
	0.342	9.7	-4.1	5.6	59.2	-20.2	-10.5	49.2
	0.546	9.8	-3.1	6.7	56	-18.8	-9.0	46
	0.762	9.8	3.8	13.6	56	-12.8	-3.0	46
	14.048	9.9	5.2	15.1	60	-9.0	0.9	50
	14.784	9.9	4.6	14.5	60	-9.2	0.7	50

Table 8 Conducted Emission Test Data at mains Port

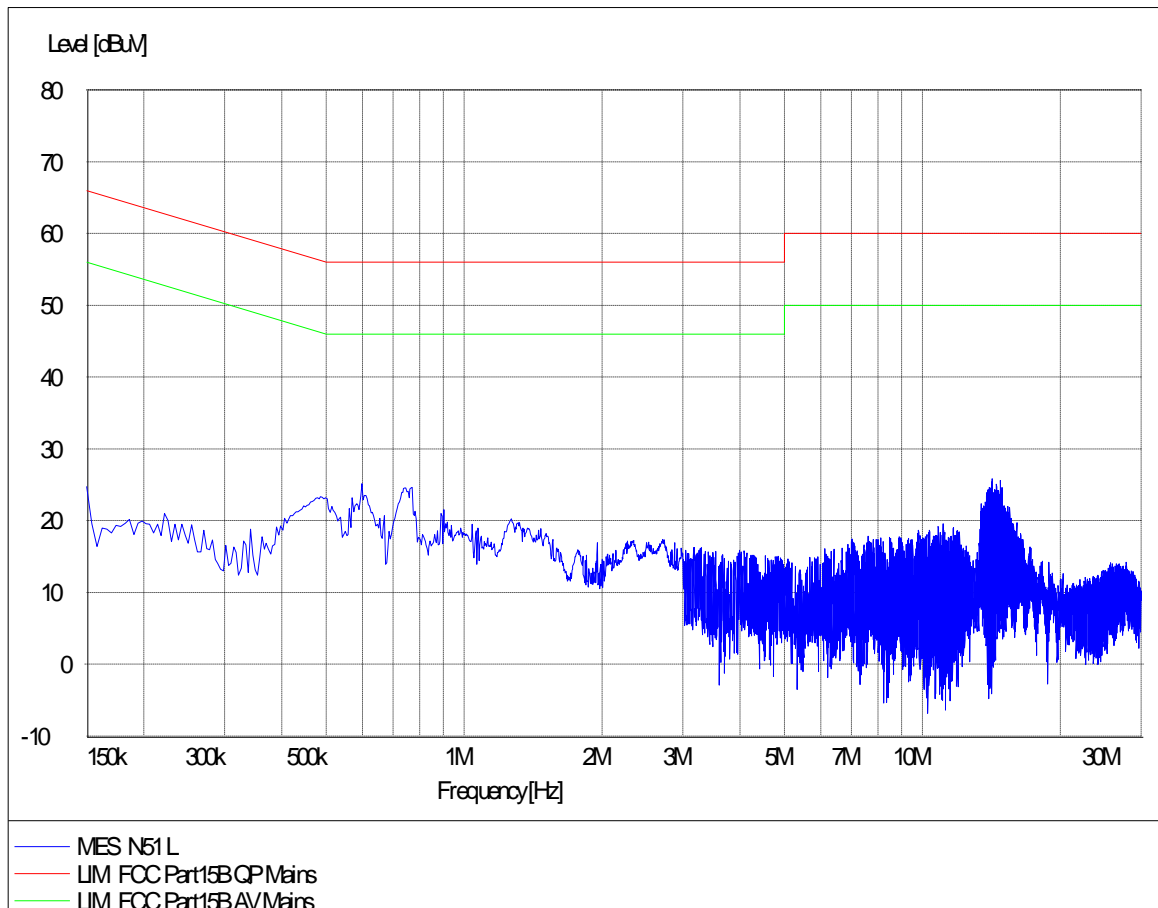
Model No.: N51								
Test mode: 2								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)
Line	0.330	9.7	6.1	15.8	59.5	-4.1	5.6	49.5
	0.482	9.7	12.7	22.4	56.3	-1.2	8.5	46.3
	0.742	9.8	14.2	24.0	56	-0.2	9.6	46
	1.370	9.8	8.3	18.1	56	-3.9	5.9	46
	13.680	9.9	15.7	25.6	60	0.2	10.1	50
	24.616	10.2	9.1	19.3	60	-0.8	9.4	50
Neutral	0.486	9.7	9.1	18.8	56.2	-3.3	6.4	46.2
	0.614	9.8	7.9	17.7	56	-4.9	4.9	46
	0.746	9.8	10.1	19.9	56	-5.3	4.5	46
	2.970	9.9	0.2	10.1	56	-6.7	3.2	46
	13.560	9.9	11.5	21.4	60	0.3	10.2	50
	24.512	10.2	6.6	16.8	60	-2.4	7.8	50

REMARKS: 1. Emission level (dB $\mu$ V) = Read Value (dB $\mu$ V) + Correction Factor (dB)

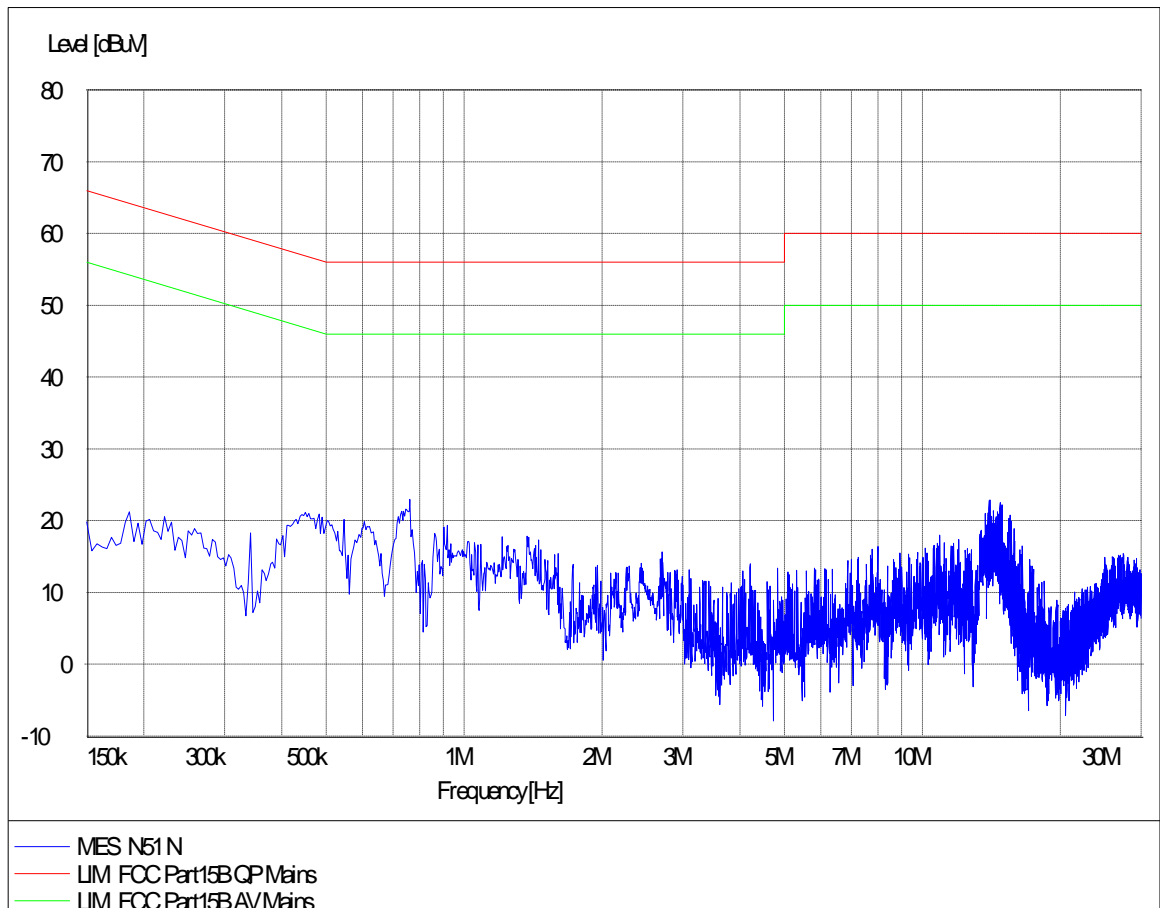
2. Correction Factor (dB) = LISN Factor (dB) + Cable Factor (dB) + Limiter Factor (dB)

3. The other emission levels were more than 20dB below the limits.

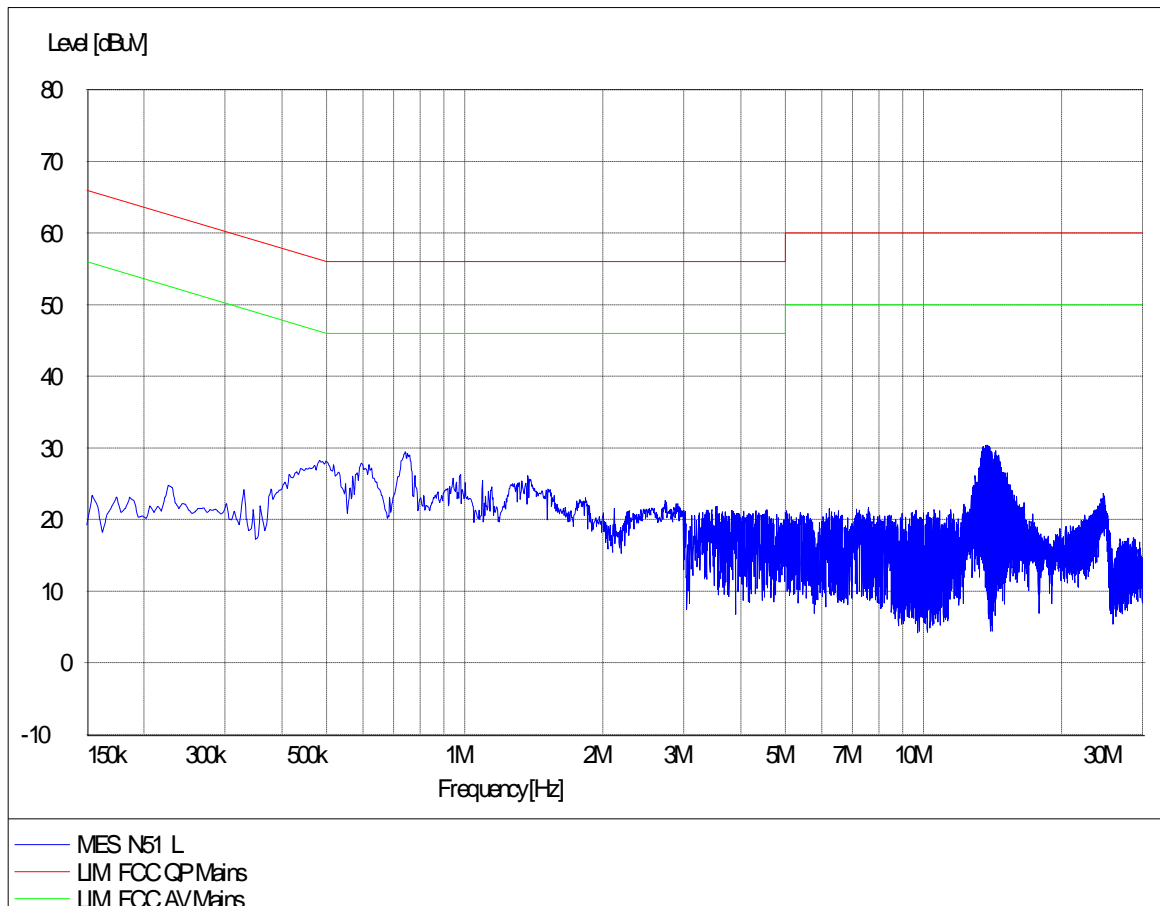
EUT: N51  
Operating Condition: Test mode 1  
Test Specification: L  
Test Voltage: AC120V/60Hz



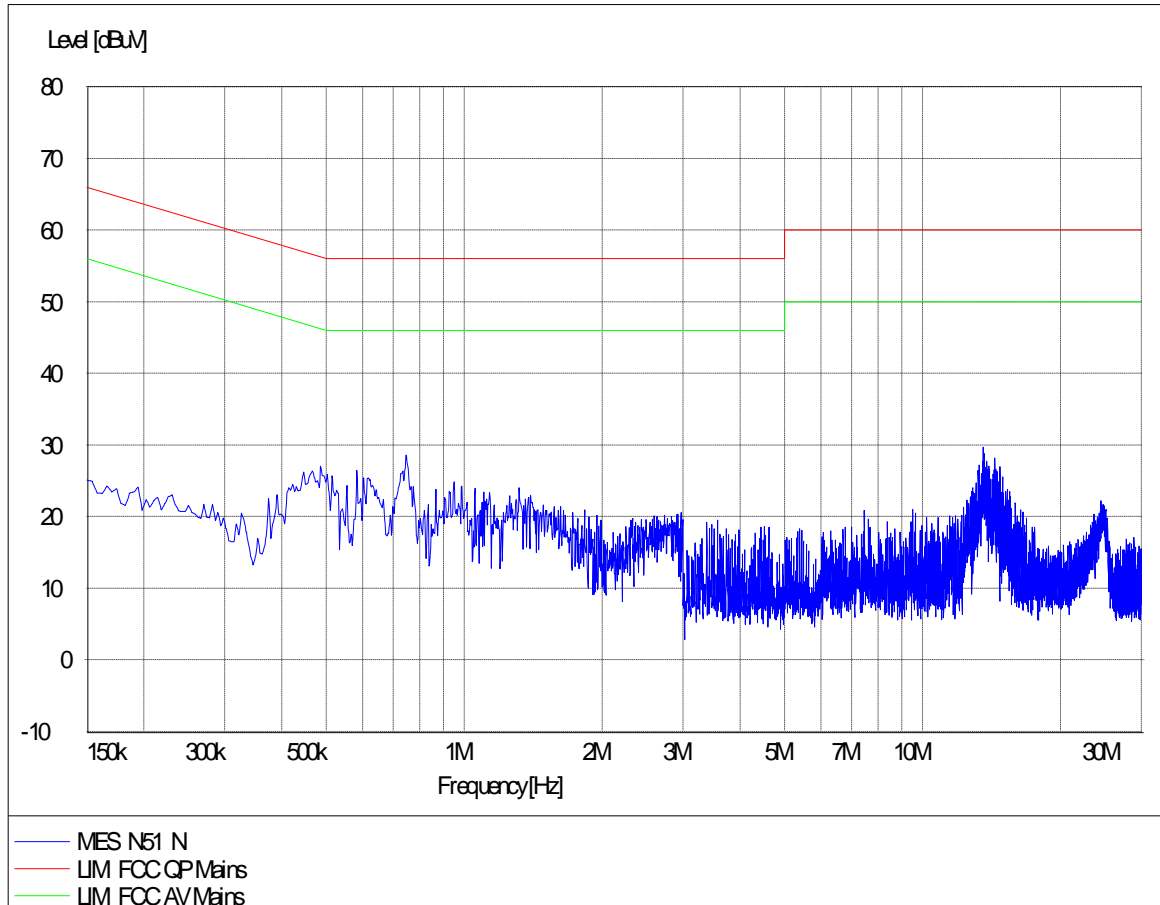
EUT: N51  
Operating Condition: Test mode 1  
Test Specification: N  
Test Voltage: AC120V/60Hz



EUT: N51  
Operating Condition: Test mode 2  
Test Specification: L  
Test Voltage: AC120V/60Hz



EUT: N51  
Operating Condition: Test mode 2  
Test Specification: N  
Test Voltage: AC120V/60Hz



## 6. RADIATION EMISSION TEST

### 6.1. Test Standard and Limit

#### 6.1.1. Test Standard

FCC Part 15: Section 15.109

#### 6.1.2. Test Limit

Table 9 Radiation Emission Test Limit for FCC (Class B) (9 kHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Table 10 Radiation Emission Test Limit for FCC (Class B) (Above 1G)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

\* The lower limit shall apply at the transition frequency.

\* The test distance is 3m.

### 6.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set **3 meters** away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

RBW = 100 kHz (less than or equal to 1 GHz); 1 MHz (above 1 GHz)

VBW  $\geq 3 \times$  RBW

Detector = Peak & Quasi-Peak (frequency range 30 MHz to 1 GHz);

Peak & Average (frequency range above 1 GHz);

Changing VBW to 10 Hz for average measurement

The use of a higher-than-specified video bandwidth produces a conservative measurement result.

### 6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal

application. The detailed information refers to test picture.

#### 6.4. Test Data

The emissions don't show in following result tables are more than 20dB below the limits, the test curves are shown in the next page.

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Table 11 Radiated Emission Test Data

Model No.: N51 Test mode: 1								
Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBμV/m)	Level (dBμV/m)	Polarity (H/V)	Limit (dBμV/m)	Margin (dB)	Note
30.610	0.6	12.3	21.4	34.3	V	40	5.7	QP
43.630	0.7	13.6	12.7	27.0	V	40	13.0	QP
53.326	0.7	13.3	10.7	24.7	V	40	15.3	QP
68.877	0.9	10.7	15.4	27.0	V	40	13.0	QP
158.296	1.4	8.3	14.8	24.5	V	43.5	19.0	QP
208.837	1.7	10.6	17.8	30.1	V	43.5	13.4	QP
30.560	0.6	12.3	19.3	32.2	H	40	7.8	QP
72.765	1.0	8.7	17.1	26.8	H	40	13.2	QP
148.577	1.5	10.5	14.5	26.5	H	43.5	17.0	QP
206.893	1.7	10.6	17.0	29.3	H	43.5	14.2	QP
224.388	1.8	11.2	16.1	29.1	H	46	16.9	QP
267.154	1.9	12.1	13.0	27.0	H	46	19.0	QP

Table 12 Radiated Emission Test Data

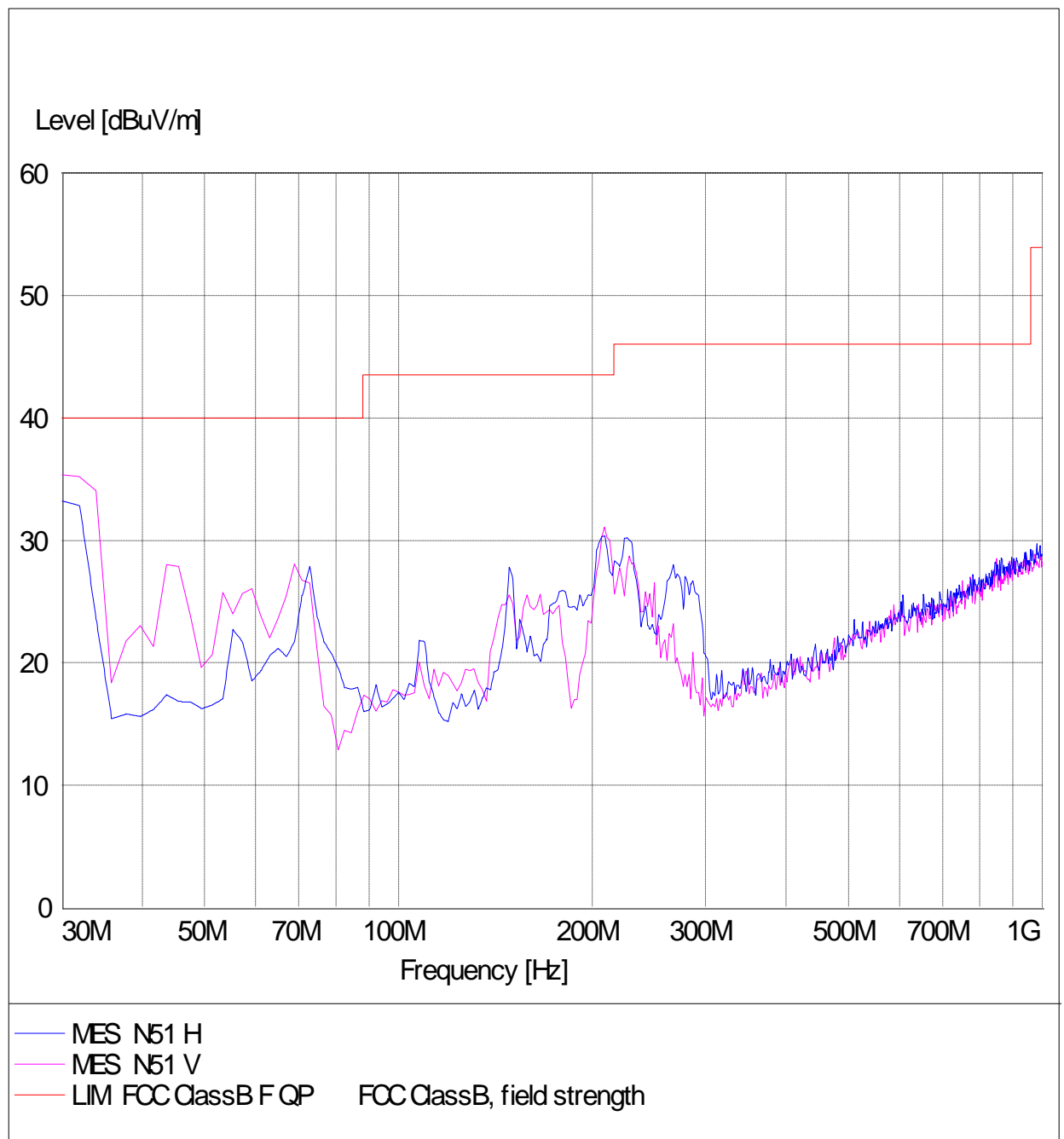
Model No.: N51 Test mode: 2								
Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dBμV/m)	Level (dBμV/m)	Polarity (H/V)	Limit (dBμV/m)	Margin (dB)	Note
31.943	0.6	12.3	19.5	32.4	V	40	7.6	QP
53.326	0.7	13.3	12.8	26.8	V	40	13.2	QP
80.541	0.9	8.5	19.3	28.7	V	40	11.3	QP
119.418	1.3	12.3	13.3	26.9	V	43.5	16.6	QP
169.959	1.5	8.7	16.1	26.3	V	43.5	17.2	QP
197.174	1.7	10.6	13.1	25.4	V	43.5	18.1	QP
30.150	0.6	12.3	8.5	21.4	H	40	18.6	QP
55.270	0.8	13.0	5.9	19.7	H	40	20.3	QP
119.148	1.3	12.3	5.3	18.9	H	43.5	24.6	QP
156.350	1.4	8.3	11.8	21.5	H	43.5	22.0	QP
179.670	1.6	9.0	10.0	20.6	H	43.5	22.9	QP
286.593	2.0	12.7	6.7	21.4	H	46	24.6	QP

Emission level (dBuV)=Read Value(dBuV/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)



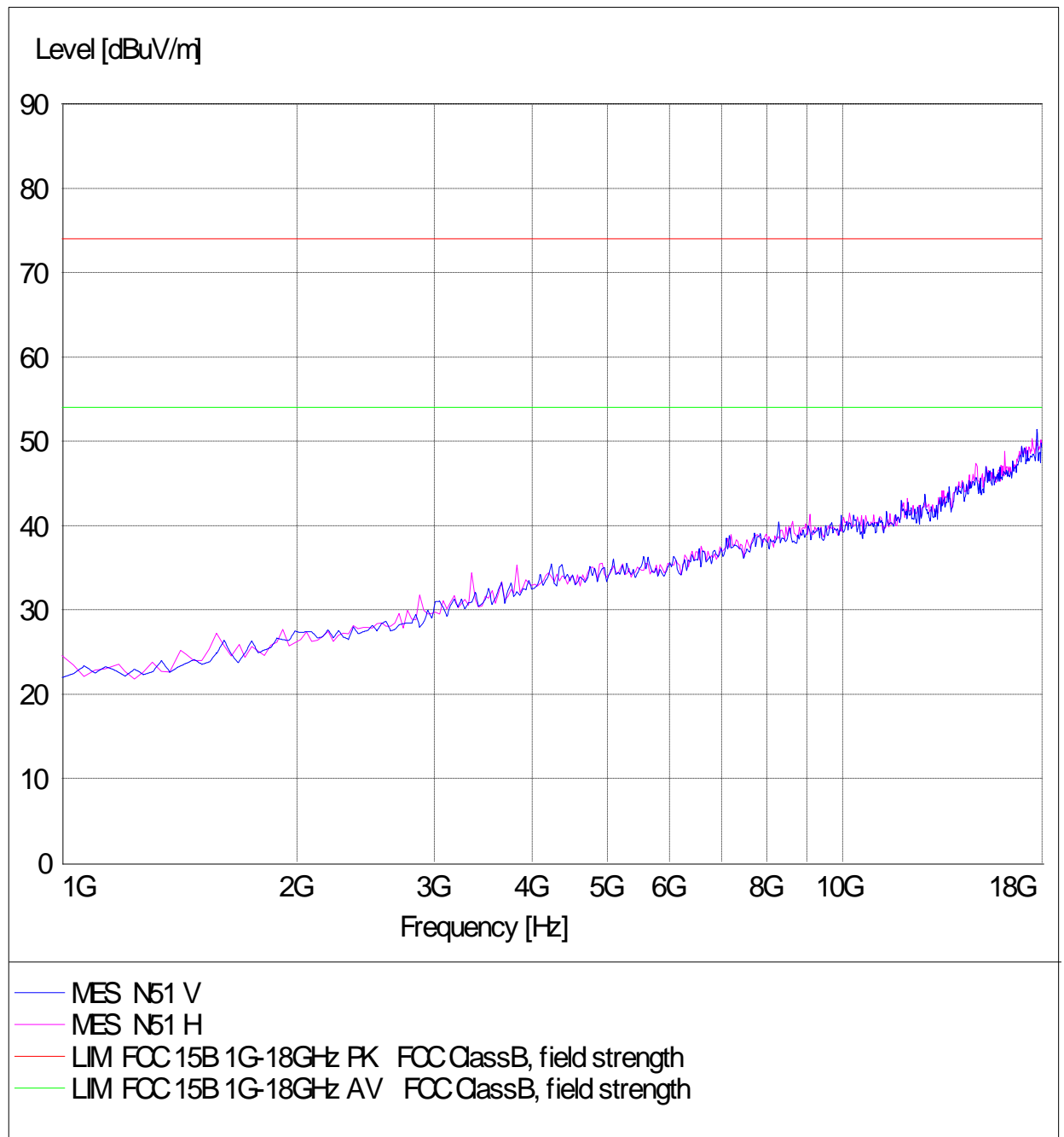
## Radiated Emission

EUT Name: N51  
Operating Condition: Test Mode 1  
Test site: SMQ NETC EMC Lab.3m Chamber  
Antenna Position: Horizontal & Vertical  
Test Voltage: AC120V/60Hz



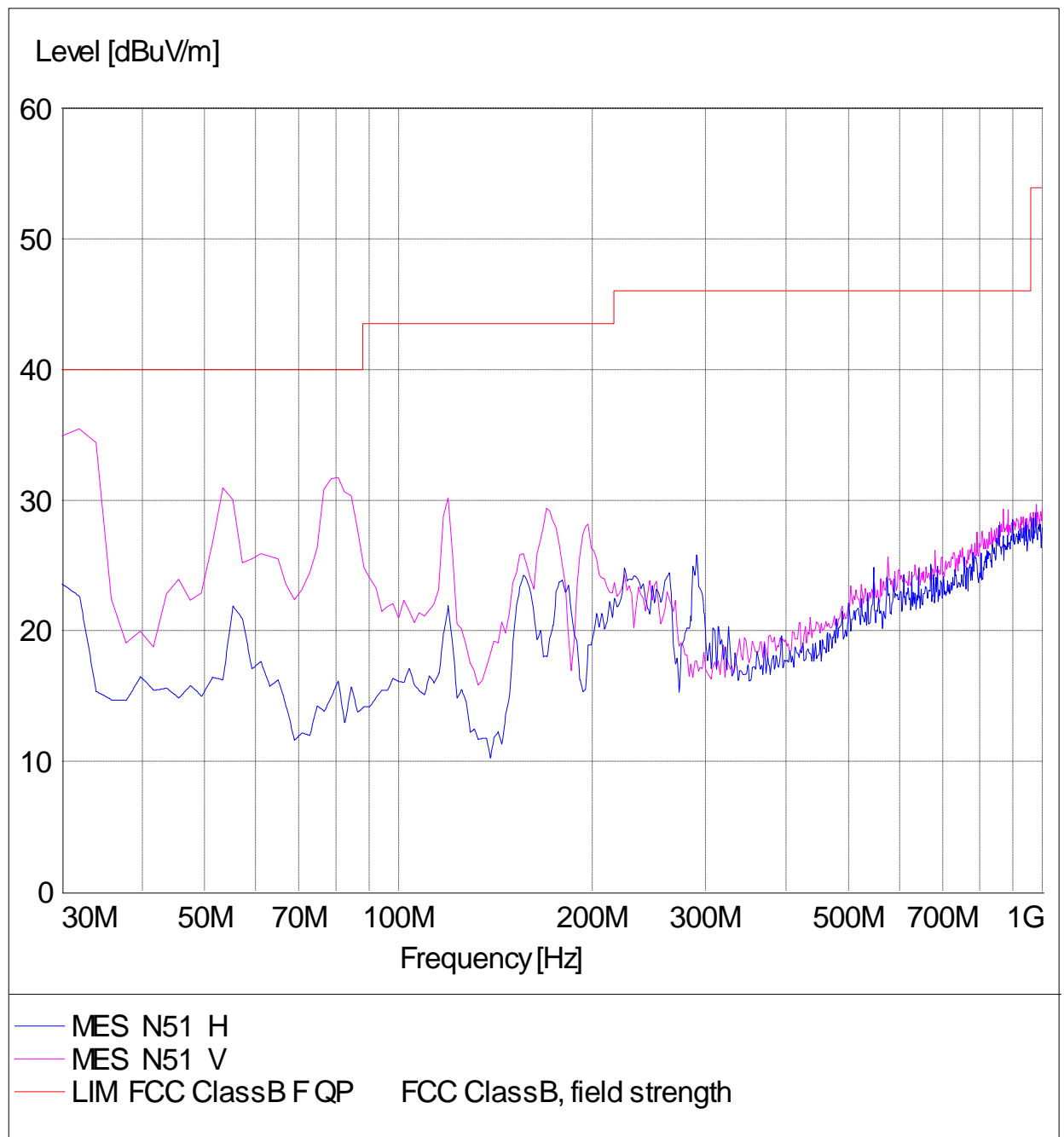
## Radiated Emission

EUT Name: N51  
Operating Condition: Test Mode 1  
Test site: SMQ NETC EMC Lab.3m Chamber  
Antenna Position: Vertical & Horizontal  
Test Voltage: AC120V/60Hz



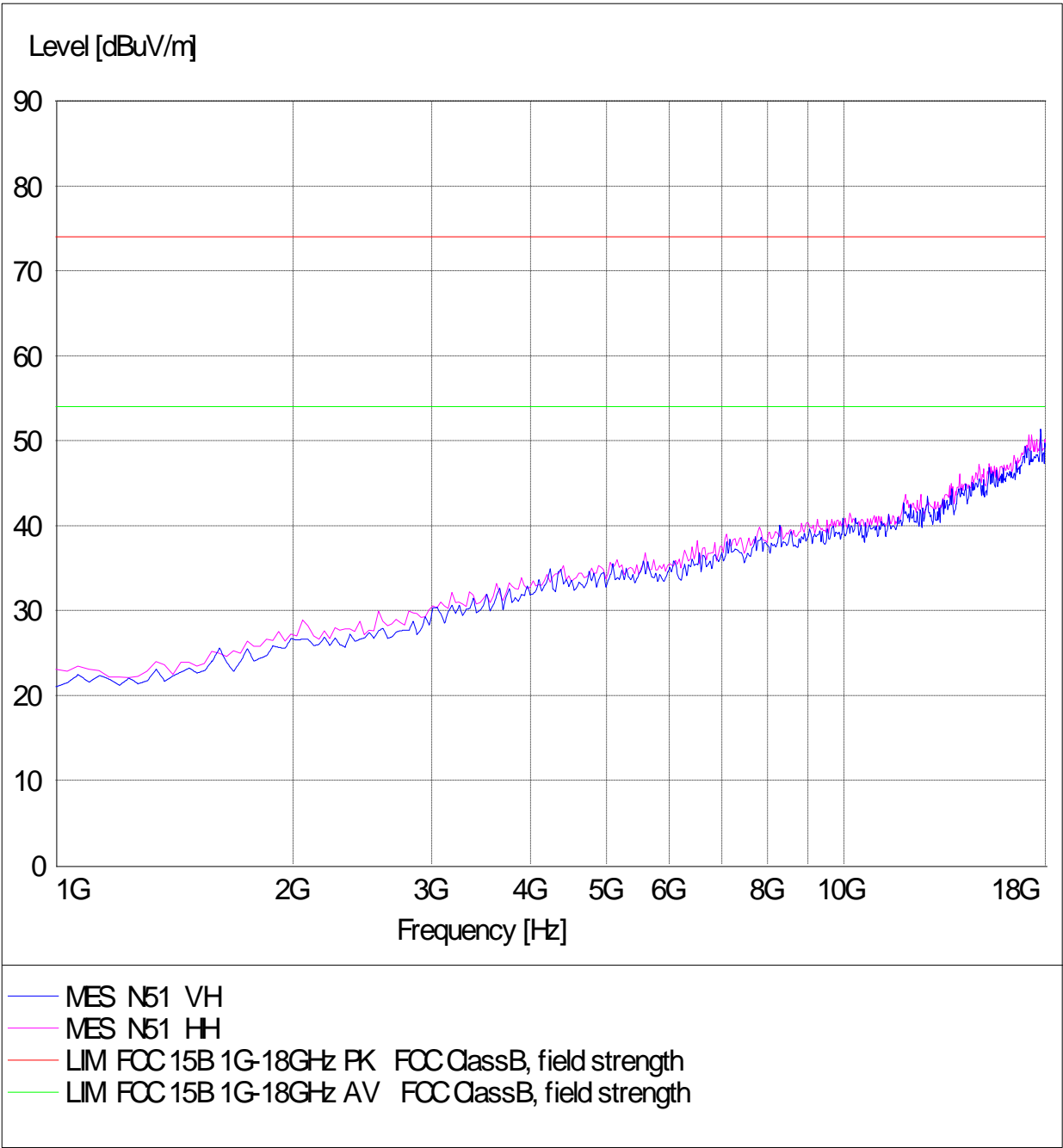
## Radiated Emission

EUT Name: N51  
Operating Condition: Test Mode 2  
Test site: SMQ NETC EMC Lab.3m Chamber  
Antenna Position: Horizontal & Vertical  
Test Voltage: AC120V/60Hz



**Radiated Emission**

EUT Name: N51  
Operating Condition: Test Mode 2  
Test site: SMQ NETC EMC Lab.3m Chamber  
Antenna Position: Vertical & Horizontal  
Test Voltage: AC120V/60Hz



-----End of Report -----