

# FCC TEST REPORT

For

**Smart Microwave Oven**

**Model Number: DW221**

**FCC ID: 2BB9RDW221**

**Report Number : WT238001353**

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## Revision History

No	Date	Remark
V1.0	2023.08.09	Initial issue

## TEST REPORT DECLARATION

Applicant : Shenzhen Shuying Technology Co., Ltd  
Address : Room 01, 13th Floor, No. 9988 Shennan District, Shenzhen, China  
Manufacturer : Shenzhen Shuying Technology Co., Ltd  
Address : Room 01, 13th Floor, No. 9988 Shennan District, Shenzhen, China  
EUT Description : Smart Microwave Oven  
Model No. : DW221  
Trade mark :   
  
Serial Number : /  
FCC ID : 2BB9RDW221

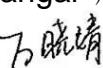
Test Standards:

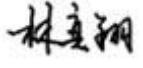
### FCC Part 15 Subpart B

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: Aug.09, 2023

Checked by:   
(Wan Xiaojing 万晓婧) Date: Aug.09, 2023

Approved by:   
(Lin Yixiang 林奕翔) Date: Aug.09, 2023

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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.

The lab will not be liable for any loss or damage resulting for false, inaccurate, inappropriate or incomplete product information provided by the applicant/manufacturer.

### **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.

The Laboratory is registered to perform emission tests with VCCI, and the registration number are C-20048, G20076, R-20077, R-20078 and T-20047.

The Laboratory is Accredited Testing Laboratory of American Association for Laboratory Accreditation (A2LA) and certificate number is 3292.01.

### **2.3. Measurement Uncertainty**

Conducted Emission

9 kHz~150 kHz  $U=3.7$ dB  $k=2$   
150 kHz~30MHz  $U=3.3$ dB  $k=2$

Radiated Emission  
30MHz~1000MHz  $U=4.3$ dB  $k=2$   
1GHz~6GHz  $U=4.6$  dB  $k=2$   
6GHz~40GHz  $U=5.1$ dB  $k=2$

### 3. PRODUCT DESCRIPTION

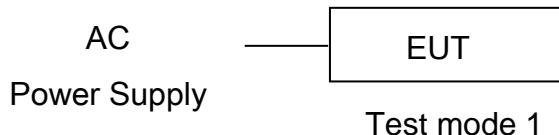
NOTE: The extreme test conditions for temperature and antenna gain were declared by the manufacturer.

#### 3.1. EUT Description

Description	:	Smart Microwave Oven
Manufacturer	:	Shenzhen Shuying Technology Co., Ltd
Model Number	:	DW221
Operating voltage	:	Limit voltage: 90-132Vac Normal voltage: 100-120Vac
Test voltage	:	120Vac/60Hz
Software Version	:	1.3.6
Hardware Version	:	1.0
Frequency	:	LTE Band 5: TX 824MHz~849MHz RX 869MHz~894MHz LTE Band 38: TX 2570MHz~2620MHz RX 2570MHz~2620MHz LTE Band 41: TX 2496MHz~2690MHz TX 2496MHz~2690MHz 2.4G WiFi: 2412MHz~2462MHz 5G WiFi: U-NII 1(5150~5250 MHz) U-NII 2A (5250~5350 MHz) U-NII 2C (5470~5725 MHz) U-NII 3(5725~5850 MHz) BT: 2402MHz~2480MHz
Type(s) of Modulation	:	LTE: QPSK, 16QAM, 64QAM DSSS (DBPSK, DQPSK, CCK) for 802.11b OFDM (BPSK, QPSK, 16QAM, 64QAM) for 802.11a/g/n OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) for 802.11ac Bluetooth: GFSK, pi/4-DQPSK, 8DPSK
Antenna Type	:	LTE: FPC Antenna 2.4G WiFi/5G WiFi/Bluetooth: FPC Antenna LTE Band 5: -5.08 dBi LTE Band 38: 1.72 dBi LTE Band 41: 1.69 dBi 2.4G WiFi: -0.82 dBi BT: -0.82 dBi U-NII 1(5150~5250 MHz): -2.05 dBi U-NII 2A (5250~5350 MHz): -2.96 dBi U-NII 2C (5470~5725 MHz): 1.2 dBi U-NII 3(5725~5825 MHz): 1.0 dBi

Remark: --

### 3.2. Block Diagram of EUT Configuration



### 3.3. Operating Condition of EUT

Test mode 1: LTE band 5 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 2 Support Equipment List

Name	Model No.	S/N	Manufacturer
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### 3.5. Test Conditions

Date of test : Jul.20, 2023- Aug.08, 2023

Date of EUT Receive : Oct.25, 2022

Temperature: 20°C-25°C

Relative Humidity: 47%-58%

### 3.6. Modifications

No modification was made.

## 4. TEST EQUIPMENT USED

Table 3 Test Equipment List

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
SB9058/05	Test Receiver	R&S	ESCI 3	Sep.13,2022	1 Year
SB4357	AMN	R&S	ENN216	Aug.23,2022	1 Year
SB9549	Shielded Room	Albatross	SR	Sep.06,2022	1 Year
SB15044/01	Test Receiver	R&S	ESW8	Sep.13,2022	1 Year
SB18856	Broadband Antenna	SCHWARZBECK	VULB9163	Sep.07,2022	1 Year
SB9422/16	Horn Antenna	R&S	HF907	Mar.16,2023	1 Year
SB20321/02	Spectrum Analyzer	R&S	FSW43	Jan.12,2023	1 Year
SB8501/11	Antenna	R&S	3160-09	Feb.22,2023	3 Years
SB8501/12	Antenna	R&S	3160-10	Feb.22,2023	3 Years
SB8501/16	Pre-Amplifier	R&S	SCU-26	Jan.19,2023	1 Year
SB9059	Pre-Amplifier	R&S	SCU-40	Aug.23,2022	1 Year
SB18844	Semi Anechoic Chamber	Albatross	9x6x6(m)	Mar.20,2023	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 4 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

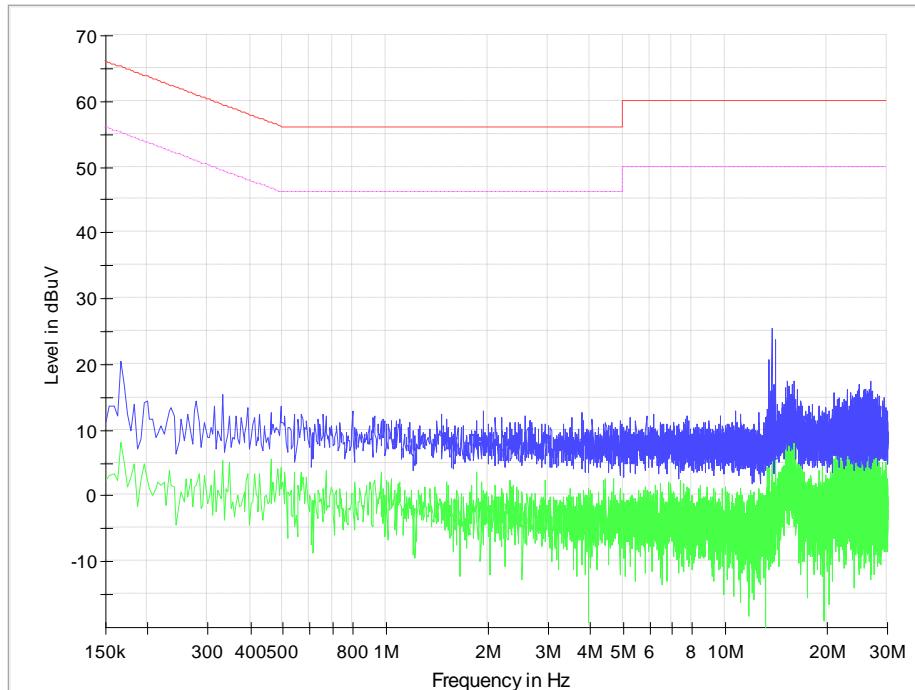
The emissions don't show in below are too low against the limits. Refer to the test curves.

Table 5 Conducted Emission Test Data at mains Port

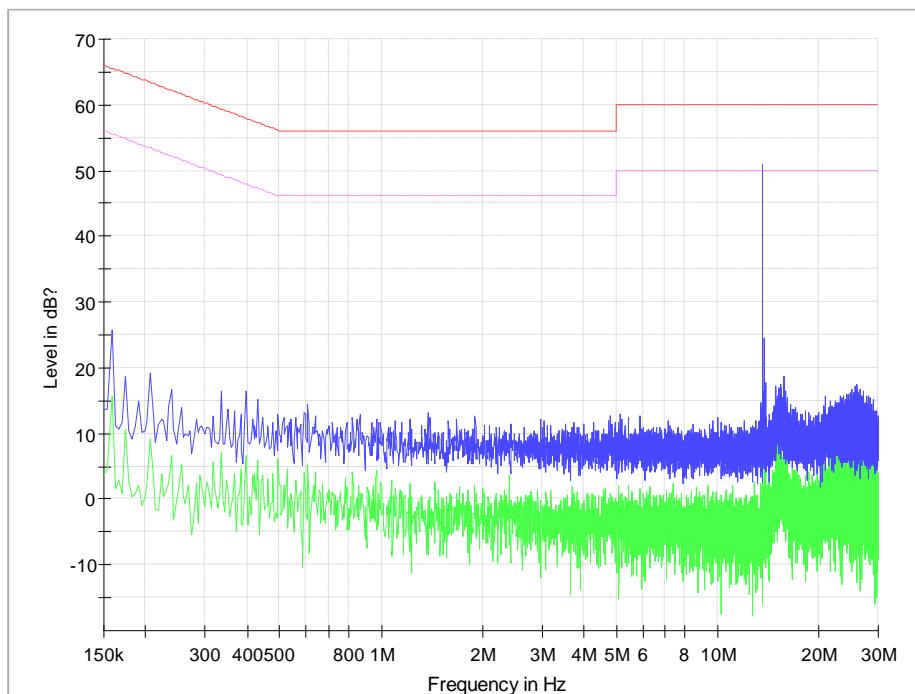
Test mode: 1								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)	Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)
Line	0.166	9.7	6.9	16.6	65.2	-1.3	8.4	55.2
	0.458	9.7	-0.3	9.4	56.7	-5.4	4.3	46.7
	0.278	9.7	0.9	10.6	60.9	-4.6	5.1	50.9
	0.330	9.7	2.2	11.9	59.5	-3.9	5.8	49.5
	0.798	9.8	-1.1	8.7	56	-6.2	3.6	46
	1.934	9.8	-0.6	9.2	56	-5.7	4.1	46
Neutral	0.158	9.7	12.4	22.1	65.6	6.2	15.9	55.6
	0.206	9.7	4.6	14.3	63.4	-1.4	8.3	53.4
	0.334	9.7	3.9	13.6	59.4	-2.6	7.1	49.4
	0.398	9.7	4.0	13.7	57.9	-3.3	6.4	47.9
	0.606	9.8	0.1	9.9	56	-4.7	5.1	46
	2.434	9.9	-2.1	7.8	56	-4.6	5.3	46

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.

## Line



## Neutral



## 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 6 Radiation Emission Test Limit for FCC (Class B)

Frequency	Test distance	Limit dB( $\mu$ V/m)		
		Quasi-peak	Average	Peak
30MHz~88MHz	3m	40		
88MHz~216MHz	3m	43.5		
216MHz~960MHz	3m	46		
960MHz~1000MHz	3m	54		
>1000MHz	3m		54	74

Conditional testing procedure for above 1 GHz :

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705~108	1000
108~500	2000
500~1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

\* 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 x 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 below are too low against the limits. Refer to the test curves.

Table 7 Radiated Emission Test Data

Test mode: 1								
Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dB $\mu$ V/m)	Level (dB $\mu$ V/m)	Polarity (Horizontal/Vertical)	Limits (dB $\mu$ V/m)	Margin (dB)	Note
148.577	1.5	8.2	28.1	37.8	Horizontal	43.5	5.7	QP
162.184	1.5	8.7	27.9	38.1	Horizontal	43.5	5.4	QP
168.016	1.5	8.7	26.5	36.7	Horizontal	43.5	6.8	QP
263.267	1.9	12.1	29.1	43.1	Horizontal	46	2.9	QP
288.537	2.0	12.7	27.1	41.8	Horizontal	46	4.2	QP
383.788	2.4	14.6	21.2	38.2	Horizontal	46	7.8	QP
162.184	1.5	8.7	25.8	36.0	Vertical	43.5	7.5	QP
168.010	1.5	8.7	30.2	40.4	Vertical	43.5	3.1	QP
339.078	2.1	13.3	23.4	38.8	Vertical	46	7.2	QP
348.798	2.3	14.1	24.7	41.1	Vertical	46	4.9	QP
488.758	2.7	16.1	17.1	35.9	Vertical	46	10.1	QP
780.341	3.5	18.8	14.0	36.3	Vertical	46	9.7	QP
1851.703	-40.5	26.9	40.9	27.3	Horizontal	74	46.7	PK
2090.180	-40.4	28.6	43.3	31.5	Horizontal	74	42.5	PK
2635.271	-40.0	29.6	42.8	32.4	Horizontal	74	41.6	PK
3384.770	-38.9	31.7	41.8	34.6	Horizontal	74	39.4	PK
6927.856	-38.1	35.2	41.6	38.7	Horizontal	74	35.3	PK
17012.024	-32.0	42.7	36.9	47.6	Horizontal	74	26.4	PK
1851.703	-40.5	26.9	28.8	15.2	Horizontal	54	38.8	AV
2090.180	-40.4	28.6	29.4	17.6	Horizontal	54	36.4	AV
2635.271	-40.0	29.6	28.6	18.2	Horizontal	54	35.8	AV
3384.770	-38.9	31.7	28.2	21.0	Horizontal	54	33.0	AV
6927.856	-38.1	35.2	31.5	28.6	Horizontal	54	25.4	AV
17012.024	-32.0	42.7	26.2	36.9	Horizontal	54	17.1	AV
2567.134	-39.9	28.6	47.5	36.2	Vertical	74	37.8	PK
2635.271	-40.0	29.6	42.8	32.4	Vertical	74	41.6	PK
6927.856	-38.1	35.2	41.5	38.6	Vertical	74	35.4	PK
15206.413	-34.5	40.8	40.2	46.5	Vertical	74	27.5	PK
17012.024	-32.0	42.7	36.3	47.0	Vertical	74	27.0	PK

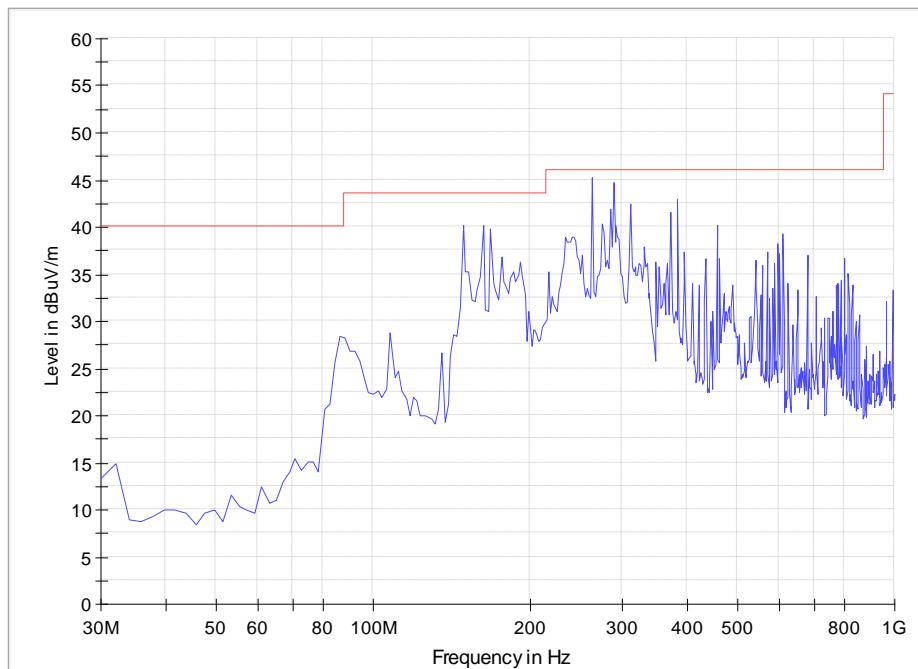
2567.134	-39.9	28.6	29.2	17.9	Vertical	54	36.1	AV
2635.271	-40.0	29.6	27.9	17.5	Vertical	54	36.5	AV
6927.856	-38.1	35.2	31.5	28.6	Vertical	54	25.4	AV
15206.413	-34.5	40.8	26.7	33.0	Vertical	54	21.0	AV
17012.024	-32.0	42.7	26.2	36.9	Vertical	54	17.1	AV
23219.000	-32.7	43.7	39.8	50.8	Horizontal	74	23.2	PK
23329.500	-32.7	43.7	40.4	51.4	Vertical	74	22.6	PK
23219.000	-32.7	43.7	26.2	37.2	Horizontal	54	16.8	AV
23329.500	-32.7	43.7	26.3	37.3	Vertical	54	16.7	AV
38960.050	-32.7	43.7	45.6	56.6	Vertical	74	17.4	PK
39866.350	-32.7	43.7	46.9	57.9	Vertical	74	16.1	PK
38918.650	-32.7	43.7	46.7	57.7	Horizontal	74	16.3	PK
39407.350	-32.7	43.7	46.2	57.2	Horizontal	74	16.8	PK
38960.050	-32.7	43.7	32.9	43.9	Vertical	54	10.1	AV
39866.350	-32.7	43.7	33.6	44.6	Vertical	54	9.4	AV
38918.650	-32.7	43.7	33.0	44.0	Horizontal	54	10.0	AV
39407.350	-32.7	43.7	33.4	44.4	Horizontal	54	9.6	AV

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

30MHz-1GHz

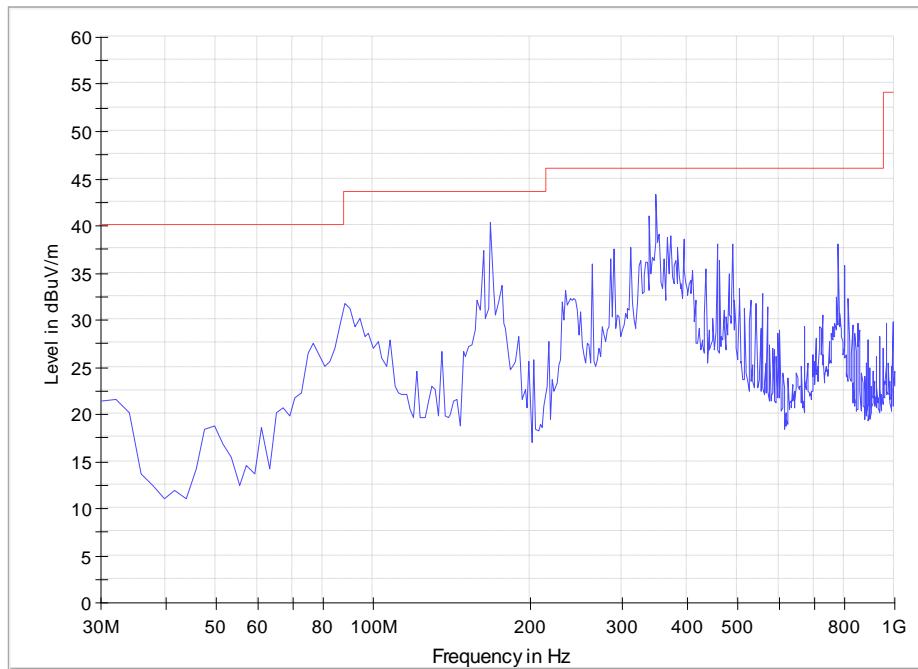
Horizontal

Field strength 30M-1GHz



Vertical

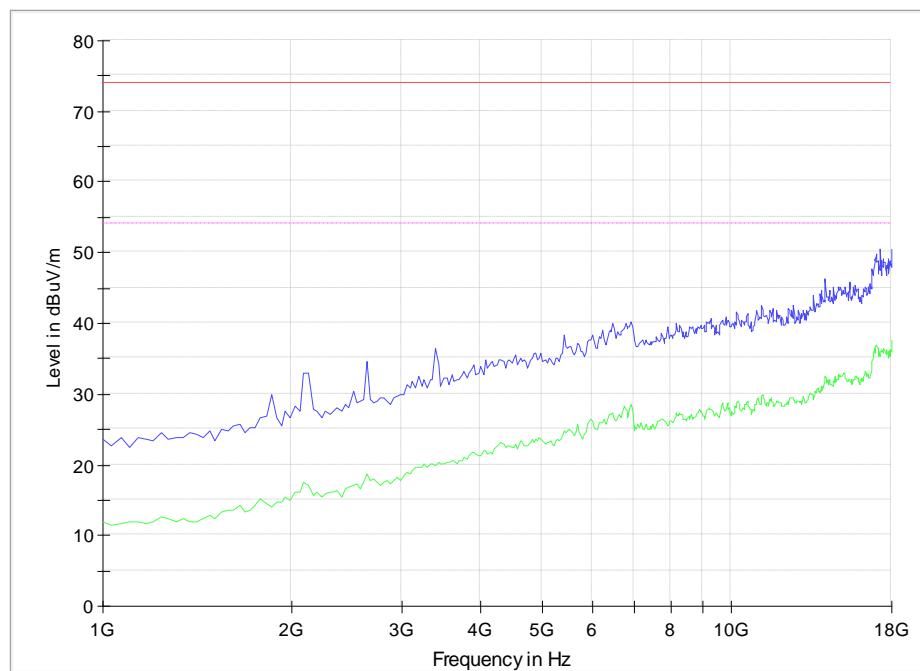
Field strength 30M-1GHz



1GHz-18GHz

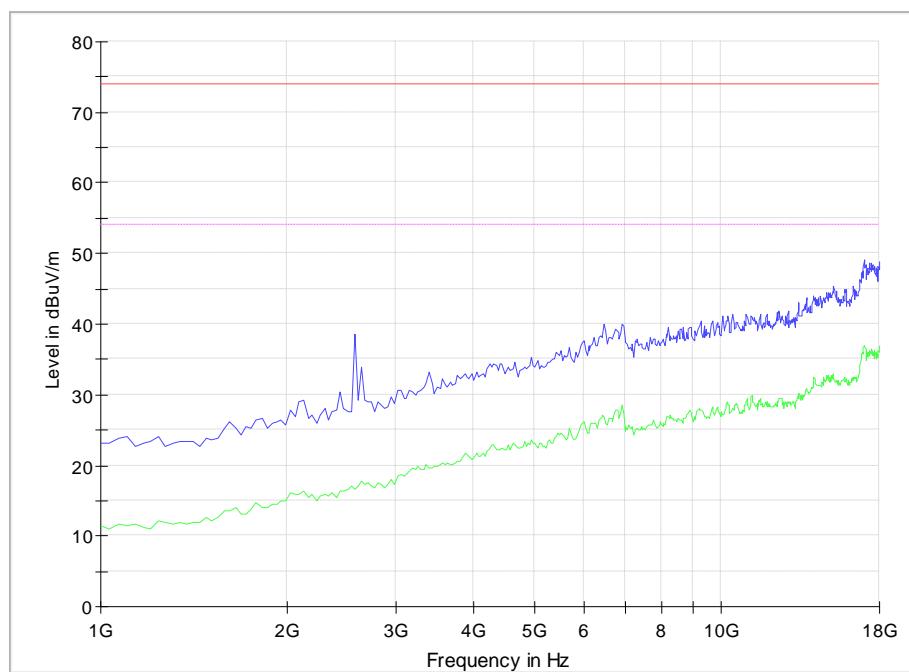
Horizontal

Field strength 1GHz-18GHz



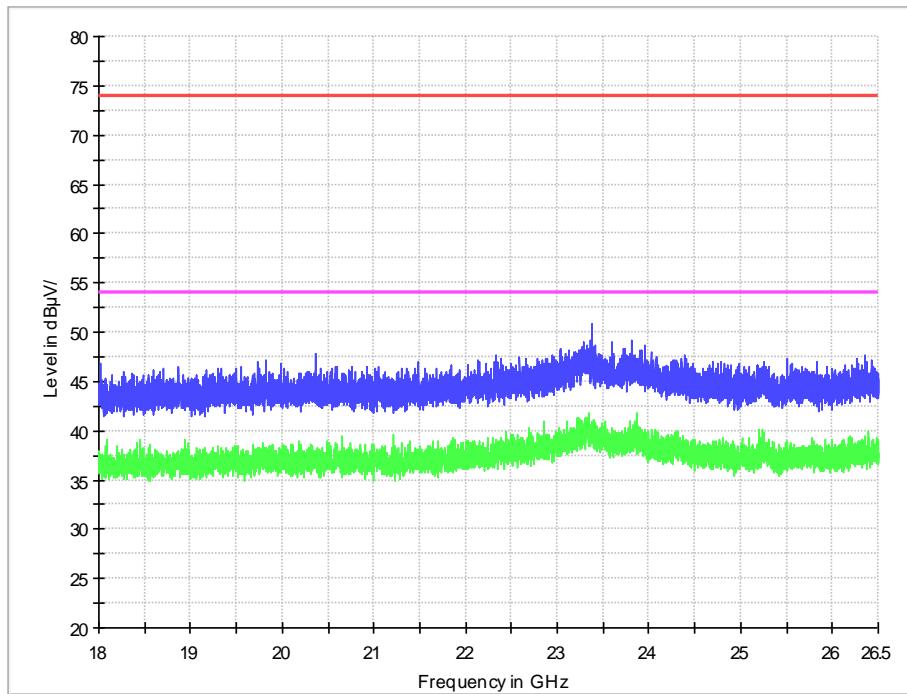
Vertical

Field strength 1GHz-18GHz

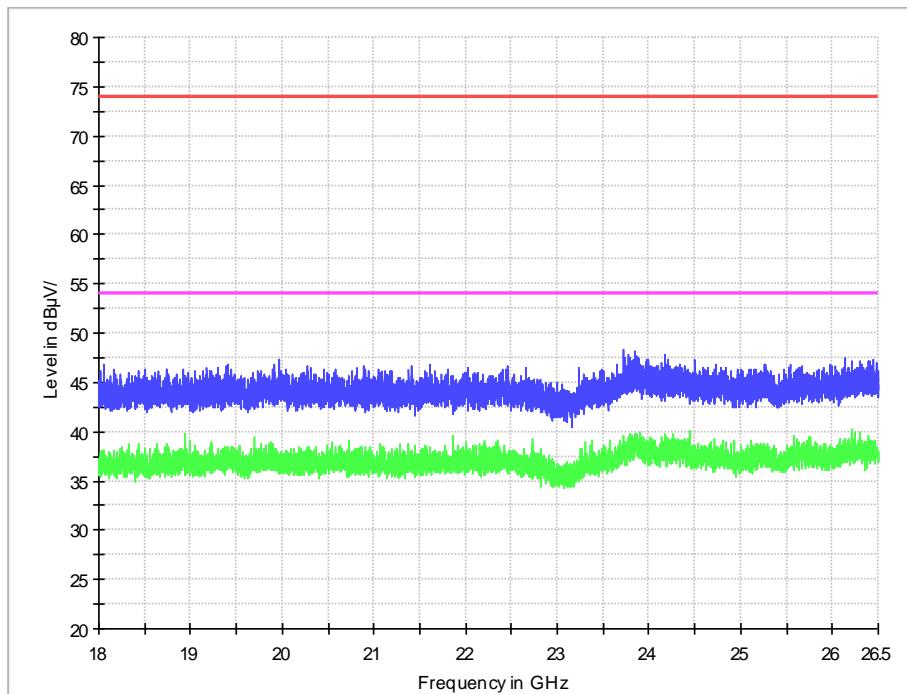


18GHz-26.5GHz

Horizontal

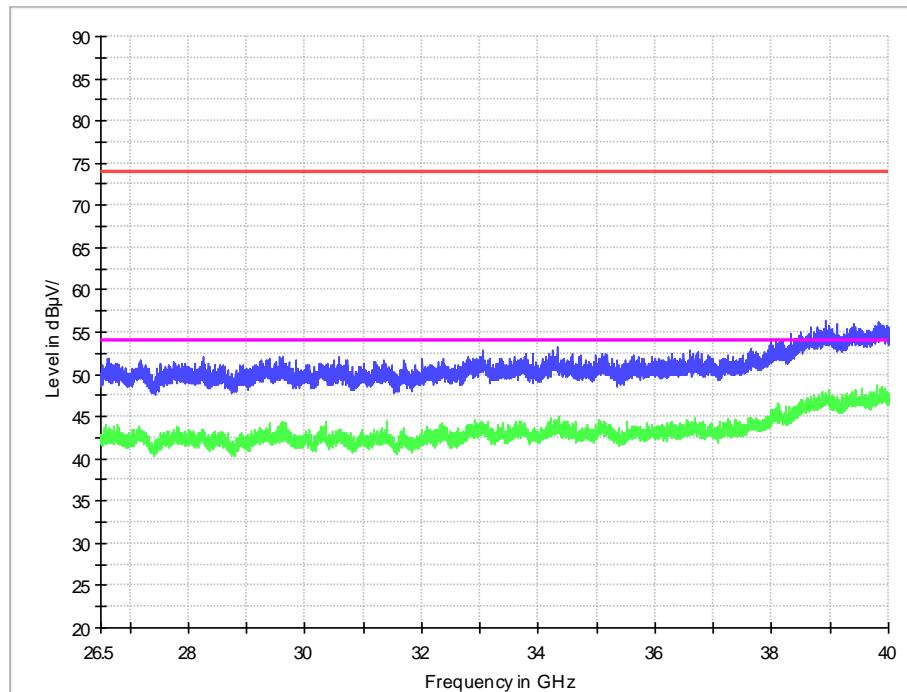


Vertical

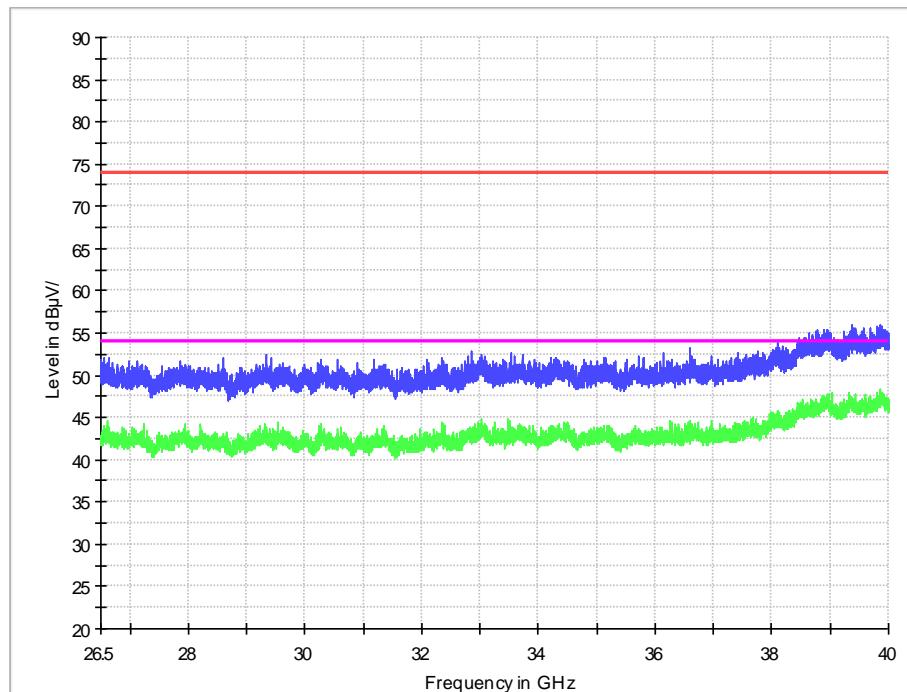


26.5GHz-40GHz

Horizontal



Vertical



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