

FCC TEST REPORT

For

Mobile Phone

Model Number: CPH2541, A302OP

FCC ID: R9C-AC078

Report Number : WT238000444

Test Laboratory : Shenzhen Academy of Metrology and Quality
Inspection
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Revision History

No	Date	Remark
V1.0	2023.04.19	Initial issue

TEST REPORT DECLARATION

Applicant : Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address : NO.18 Haibin Road, Wusha Village, Chang'an Town,
Dongguan City, Guangdong, China
Manufacturer : Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address : NO.18 Haibin Road, Wusha Village, Chang'an Town,
Dongguan City, Guangdong, China
EUT Description : Mobile Phone
Model No. : CPH2541, A302OP
Trade mark : OPPO
Serial Number : /
FCC ID : R9C-AC078

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.


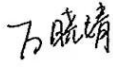
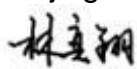
Project Engineer:	 _____ (Zhou Fangai 周芳媛)	Date:	<u>Apr.19, 2023</u>
Checked by:	 _____ (Wan Xiaojing 万晓婧)	Date:	<u>Apr.19, 2023</u>
Approved by:	 _____ (Lin Yixiang 林奕翔)	Date:	<u>Apr.19, 2023</u>

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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.

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

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 $U=3.7\text{dB}$ $k=2$
150 kHz~30MHz $U=3.3\text{dB}$ $k=2$

Radiated Emission

30MHz~1000MHz $U=4.3\text{dB}$ $k=2$
1GHz~6GHz $U=4.6\text{ dB}$ $k=2$
6GHz~40GHz $U=5.1\text{dB}$ $k=2$

3. PRODUCT DESCRIPTION

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

3.1. EUT Description

Description : Mobile Phone

Manufacturer : Guangdong OPPO Mobile Telecommunications Corp., Ltd.

Model Number : CPH2541, A302OP

Operating voltage : DC7.0V (Low)/DC7.82V (Normal)/DC8.7V (Max)

Test voltage : AC 120V/60Hz

Software Version : ColorOS V13.1

Hardware Version : 11

Frequency : GSM850: TX 824MHz~849MHz
RX 869MHz~894MHz
PCS1900: TX 1850MHz~1910MHz
RX 1930MHz~1990MHz
WCDMA Band V: TX 824MHz~849MHz
RX 869MHz~894MHz
WCDMA Band IV: TX 1710MHz~1755MHz
RX 2110MHz~2155MHz
WCDMA Band II: TX 1850MHz~1910MHz
RX 1930MHz~1990MHz
LTE Band 2: TX 1850MHz~1910MHz
RX 1930MHz~1990MHz
LTE Band 4: TX 1710MHz~1755MHz
RX 2110MHz~2155MHz
LTE Band 5: TX 824MHz~849MHz
RX 869MHz~894MHz
LTE Band 7: TX 2500MHz~2570MHz
RX 2620MHz~2690MHz
LTE Band 12: TX 699MHz~716MHz
RX 729MHz~746MHz
LTE Band 17: TX 704MHz~716MHz
RX 734MHz~746MHz
LTE Band 26: TX 814MHz~849MHz
RX 859MHz~894MHz
LTE Band 38: TX 2570MHz~2620MHz
RX 2570MHz~2620MHz
LTE Band 41: TX 2496MHz~2690MHz
RX 2535MHz~2655MHz
CA_41C: TX 2496MHz~2690MHz
RX 2496MHz~2690MHz

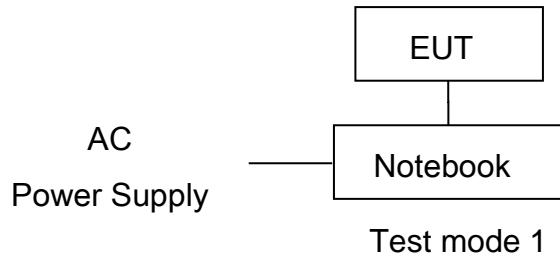
2.4WiFi:2412MHz~2462MHz
 5WiFi: U-NII 1(5150~5250 MHz)
 U-NII 2A (5250~5350 MHz)
 U-NII 2C (5470~5725 MHz)
 U-NII 3(5725~5850 MHz)
 BT:2402MHz~2480MHz
 NFC:13.56MHz
 Type(s) of : GSM850/PCS1900: GMSK 8PSK
 Modulation : WCDMA: QPSK
 LTE: QPSK, 16QAM, 64QAM
 DSSS (DBPSK, DQPSK, CCK) for 802.11b
 OFDM (BPSK, QPSK, 16QAM, 64QAM) for 802.11a/g/n
 OFDM (BPSK, QPSK, 16QAM, 64QAM,256QAM) for
 802.11ac
 Bluetooth: GFSK, pi/4-DQPSK, 8DPSK
 NFC: ASK
 Antenna Type : GSM/WCDMA/LTE: Fixed Internal Antenna
 WLAN/Bluetooth: Fixed Internal Antenna
 GSM850:Ant0: -4.8 dBi, Ant1: -3.7 dBi
 PCS1900: Ant4: -1 dBi
 WCDMA Band V: Ant0: -4.8 dBi, Ant1: -3.7 dBi
 WCDMA Band IV: Ant3: -1.4 dBi, Ant4: -1.4 dBi,
 WCDMA Band II: Ant3: -0.8 dBi, Ant4: -1 dBi
 LTE Band 2: Ant3: -0.8 dBi, Ant4: -1 dBi
 LTE Band 4: Ant3: -1.4 dBi, Ant4: -1.4 dBi
 LTE Band 5: Ant0: -4.8 dBi, Ant1: -3.7dBi
 LTE Band 7: Ant3: -0.4 dBi, Ant4: -0.8 dBi
 LTE Band 12: Ant0: -5.7 dBi, Ant1: -4.1 dBi
 LTE Band 17: Ant0: -5.7 dBi, Ant1: -4.1 dBi
 LTE Band 26: Ant0: -4.8 dBi, Ant1: -3.7 dBi
 LTE Band 38: Ant3: -0.4 dBi, Ant4: -0.8 dBi
 LTE Band 41: Ant3: -0.4 dBi, Ant4: -0.8 dBi, Ant5: -0.8 dBi
 CA_41C: Ant3: -0.4 dBi, Ant4: -0.8 dBi, Ant5: -0.8 dBi
 2.4G WiFi: IFA Ant9: 0.5 dBi, Ant10: -0.5 dBi
 5G WiFi: IFA
 U-NII 1(5150~5250 MHz) Ant9: -0.5 dBi, Ant10: 2.5 dBi
 U-NII 2A (5250~5350 MHz) Ant9: 1 dBi, Ant10: 2.5 dBi
 U-NII 2C (5470~5725 MHz) Ant9: 1.5 dBi, Ant10: 2 dBi
 U-NII 3(5725~5825 MHz) Ant9: 1 dBi, Ant10: 1 dBi
 BT: IFA 0.5 dBi
 NFC: FPC Antenna

Remark: 1. The difference between product of CPH2541 and A302OP as below:
 Different model names for different clients.

Except listings above, all of the model's circuit theory, electrical design and Critical Components are the same. Unless otherwise specified, the model CPH2541 was chosen as the representative model to perform all the tests.

2. There are two adapters, only the worst data of VCBAJAH (1#) shown in this report.

3.2. Block Diagram of EUT Configuration



3.3. Operating Condition of EUT

Test mode 1: Connected to a pc and data transmission.

Test mode 2: Adapter+ GSM 850 Idle

Test mode 3: Adapter+ WCDMA Band V Idle

Test mode 4: Adapter+ LTE band 5 Idle

Test mode 5: Adapter+ LTE band 12 Idle

Test mode 6: Adapter+ LTE band 17 Idle

Test mode 7: Adapter+ LTE band 26 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
Adapter 1# for EUT	VCBAJAJH	---	HUIZHOU GOLDEN LAKE INDUSTRIAL CO., LTD.
Adapter 2# for EUT	VCB8JAUH	---	HUIZHOU GOLDEN LAKE INDUSTRIAL CO., LTD.
Rechargeable Li-ion Polymer Battery for EUT	BLP997	---	SUNWODA Electronic Co.,Ltd.
USB for EUT	DL129	---	---
Notebook	HP ProBook 440 G6	---	HP

3.5. Test Conditions

Date of test : Mar.27, 2023- Mar.31, 2023

Date of EUT Receive : Mar.14, 2023

Temperature: 23°C

Relative Humidity: 50%-60%

3.6. Modifications

No modification was made.

4. TEST EQUIPMENT USED

Table 3 Test Equipment List

No.	Equipment	Manufacturer	Model No.	LAST CALIB	Period
Conducted Emission					
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
Radiated Emission					
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	Apr.08,2022	1 Year
SB20321/02	Spectrum Analyzer	R&S	FSW43	Jan.12,2023	1 Year
SB8501/11	Antenna	R&S	3160-09	Mar.09,2020	3 Years
SB8501/12	Antenna	R&S	3160-10	Mar.17,2020	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	9×6×6(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 μ 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

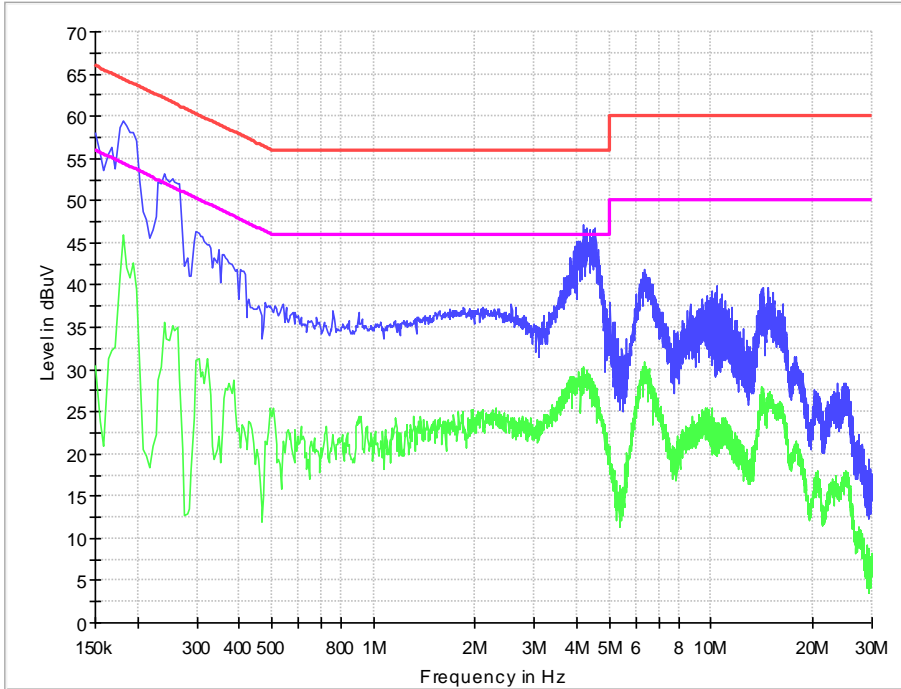
The emissions don't show in below are too low against the limits. Refer to the test curves.

Table 5 Conducted Emission Test Data at mains Port

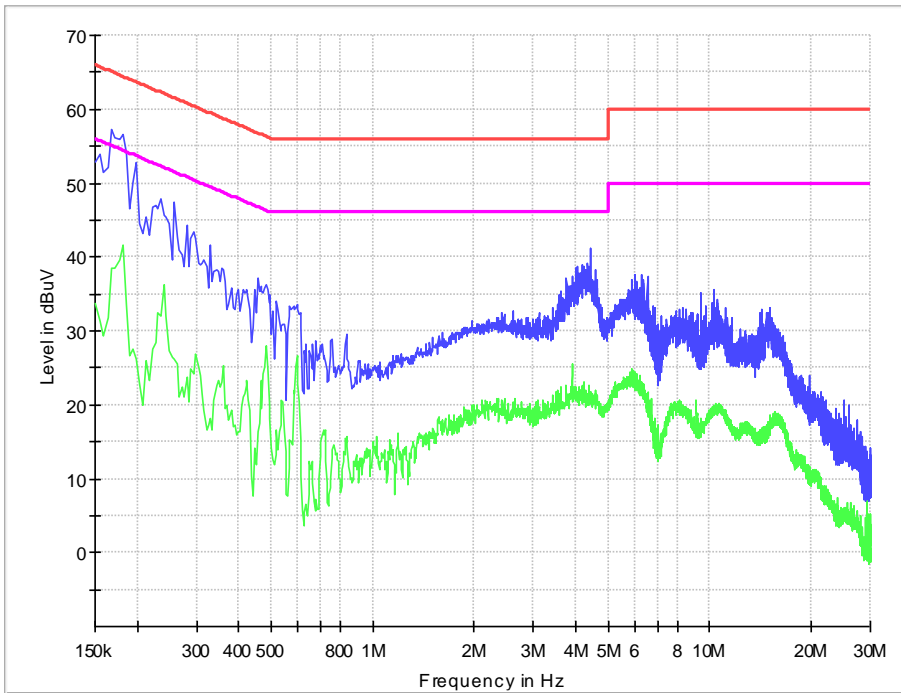
Test mode: 1								
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
Line	0.181	9.7	46.4	56.1	64.4	35.3	45.0	54.4
	0.240	9.7	38.9	48.6	62.1	23.9	33.6	52.1
	0.303	9.7	32.7	42.4	60.2	23.1	32.8	50.2
	0.361	9.7	28.5	38.2	58.7	18.4	28.1	48.7
	0.411	9.7	24.6	34.3	57.6	12.2	21.9	47.6
	4.182	9.9	30.2	40.1	56	20.5	30.4	46
Neutral	0.181	9.7	38.7	48.4	64.4	22.0	31.7	54.4
	0.199	9.7	29.8	39.5	63.7	17.2	26.9	53.7
	0.294	9.7	23.6	33.3	60.4	11.2	20.9	50.4
	0.235	9.7	29.3	39.0	62.3	16.6	26.3	52.3
	0.595	9.8	20.7	30.5	56	16.1	25.9	46
	4.434	9.9	21.6	31.5	56	11.8	21.7	46

- REMARKS: 1. Emission level (dBuV) =Read Value (dBuV) + 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(μ 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

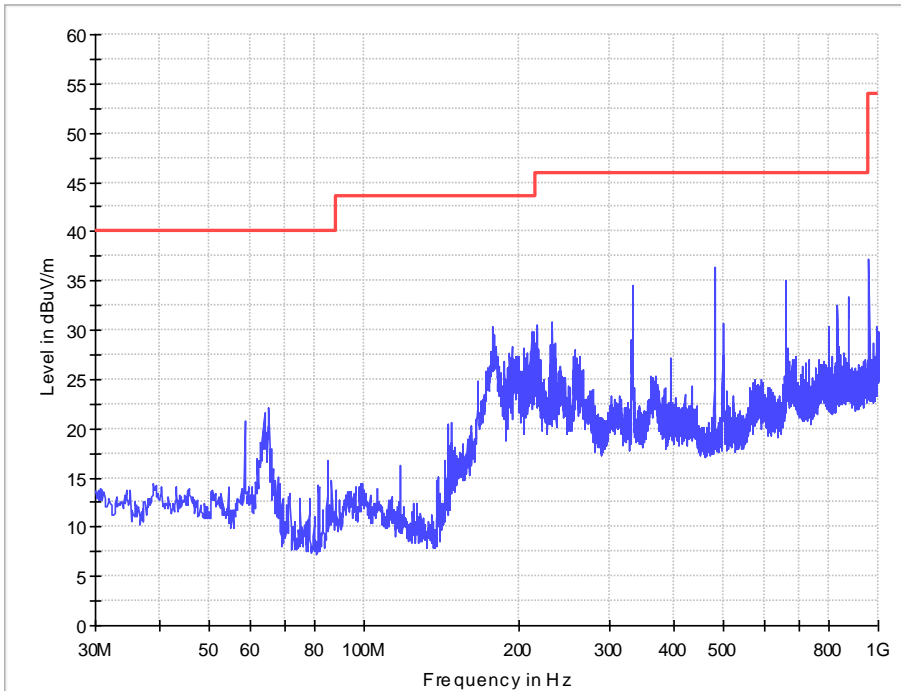
Test mode: 1								
Frequency (MHz)	Cable Loss +preamp (dB)	Antenna Factor (dB)	Reading (dB μ V/m)	Level (dB μ V/m)	Polarity (Horizontal/Vertical)	Limits (dB μ V/m)	Margin (dB)	Note
83.108	1.0	8.5	13.3	22.8	Vertical	40	17.2	QP
166.285	1.5	8.7	15.9	26.1	Vertical	43.5	17.4	QP
239.520	1.9	11.2	16.4	29.5	Vertical	46	16.5	QP
479.959	2.6	15.6	17.3	35.5	Vertical	46	10.5	QP
831.705	3.7	20.1	11.4	35.2	Vertical	46	10.8	QP
960.109	3.9	21.1	7.8	32.8	Vertical	54	21.2	QP
65.284	0.9	10.7	10.4	22.0	Horizontal	40	18.0	QP
177.440	1.5	9.0	17.0	27.5	Horizontal	43.5	16.0	QP
333.246	2.1	13.3	16.2	31.6	Horizontal	46	14.4	QP
479.959	2.6	15.6	15.1	33.3	Horizontal	46	12.7	QP
662.561	3.1	18.5	10.5	32.1	Horizontal	46	13.9	QP
960.109	3.9	21.1	9.3	34.3	Horizontal	54	19.7	QP
1329.800	-40.8	24.3	71.4	54.9	Vertical	74	19.1	PK
1991.100	-40.4	26.9	67.6	54.1	Vertical	74	19.9	PK
16320.400	-33.7	41.4	45.5	53.2	Vertical	74	20.8	PK
1293.800	-40.9	24.3	66.8	50.2	Horizontal	74	23.8	PK
2662.600	-39.6	29.6	59.0	49.0	Horizontal	74	25.0	PK
16789.600	-32.8	42.0	45.7	54.9	Horizontal	74	19.1	PK
1329.800	-40.8	24.3	49.6	33.1	Vertical	54	20.9	AV
1991.100	-40.4	26.9	43.5	30.0	Vertical	54	24.0	AV
16320.400	-33.7	41.4	31.2	38.9	Vertical	54	15.1	AV
1293.800	-40.9	24.3	46.7	30.1	Horizontal	54	23.9	AV
2662.600	-39.6	29.6	38.0	28.0	Horizontal	54	26.0	AV
16789.600	-32.8	42.0	29.3	38.5	Horizontal	54	15.5	AV
23328.650	-32.7	43.7	41.8	52.8	Vertical	74	21.2	PK
23322.700	-32.7	43.7	40.6	51.6	Horizontal	74	22.4	PK
23328.650	-32.7	43.7	27.3	38.3	Vertical	54	15.7	AV
23322.700	-32.7	43.7	27.2	38.2	Horizontal	54	15.8	AV
38886.250	-32.7	43.7	44.7	55.7	Horizontal	74	18.3	PK

39385.750	-32.7	43.7	42.9	53.9	Horizontal	74	20.1	PK
38920.000	-32.7	43.7	44.6	55.6	Vertical	74	18.4	PK
39816.400	-32.7	43.7	43.8	54.8	Vertical	74	19.2	PK
38886.250	-32.7	43.7	30.4	41.4	Horizontal	54	12.6	AV
39385.750	-32.7	43.7	30.0	41.0	Horizontal	54	13.0	AV
38920.000	-32.7	43.7	30.6	41.6	Vertical	54	12.4	AV
39816.400	-32.7	43.7	30.3	41.3	Vertical	54	12.7	AV

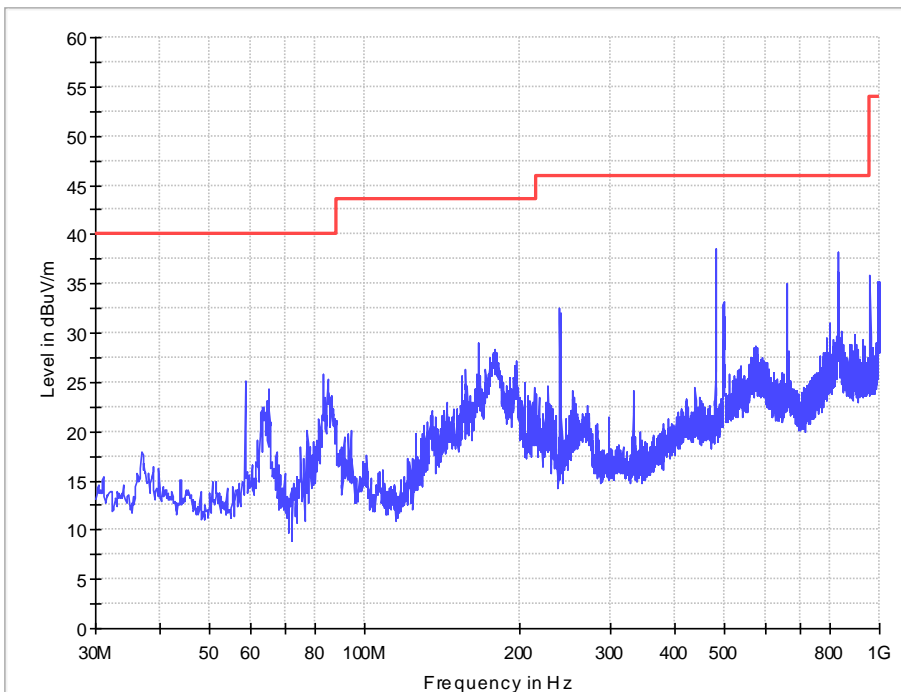
Emission level (dBuV)=Read Value(dBuV/m) + Antenna Factor(dB)+ Cable Loss +preamp(dB)

30MHz-1GHz

Horizontal

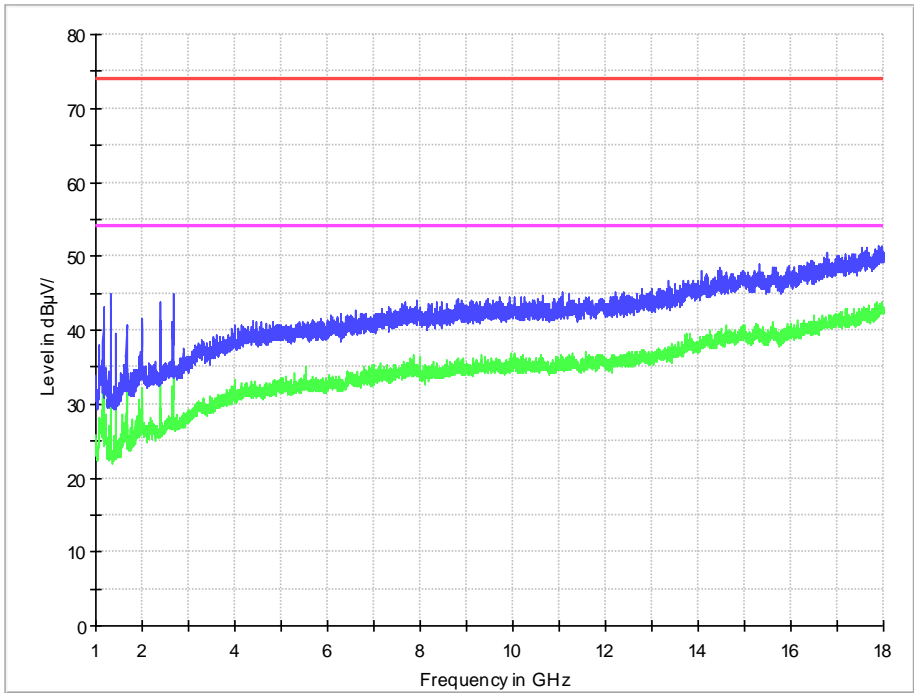


Vertical

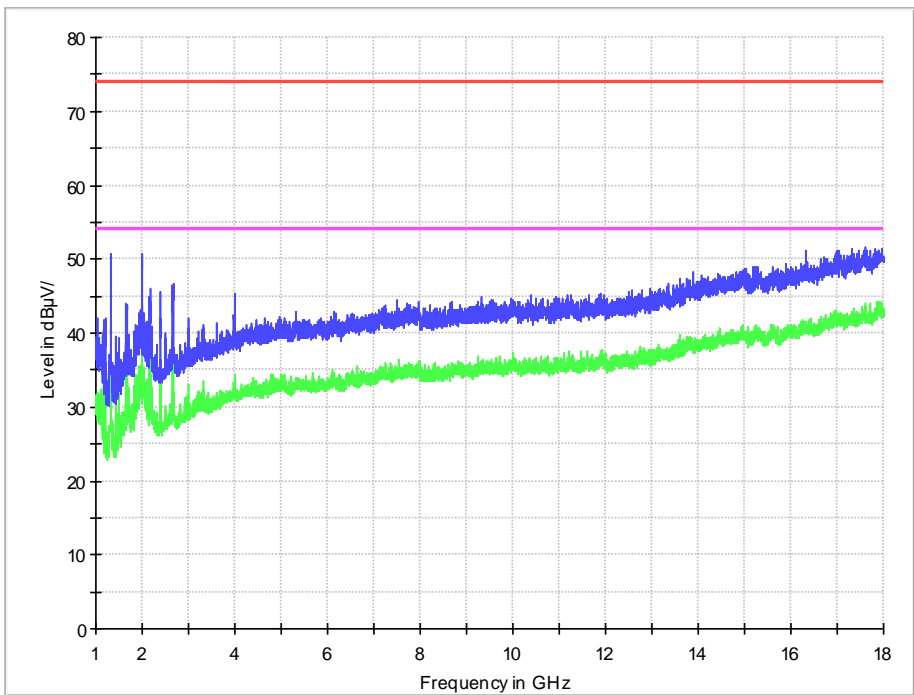


1GHz-18GHz

Horizontal

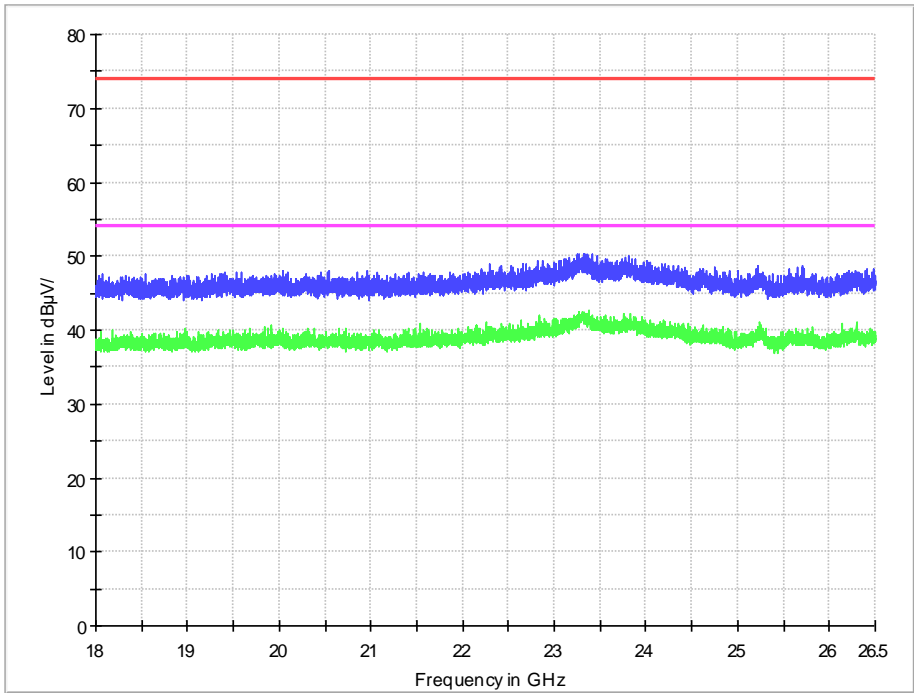


Vertical

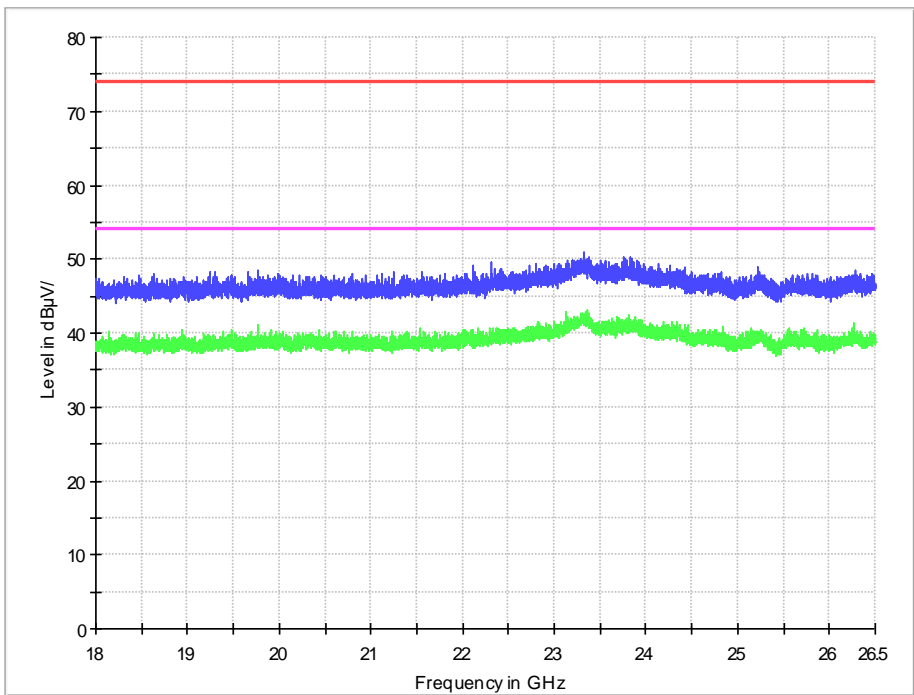


18GHz-26.5GHz

Horizontal

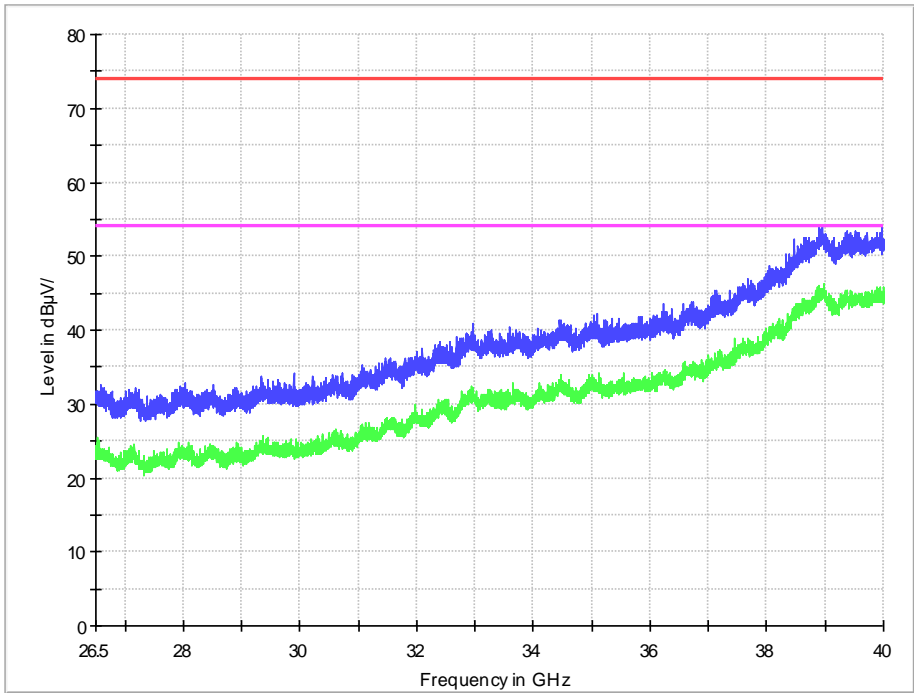


Vertical

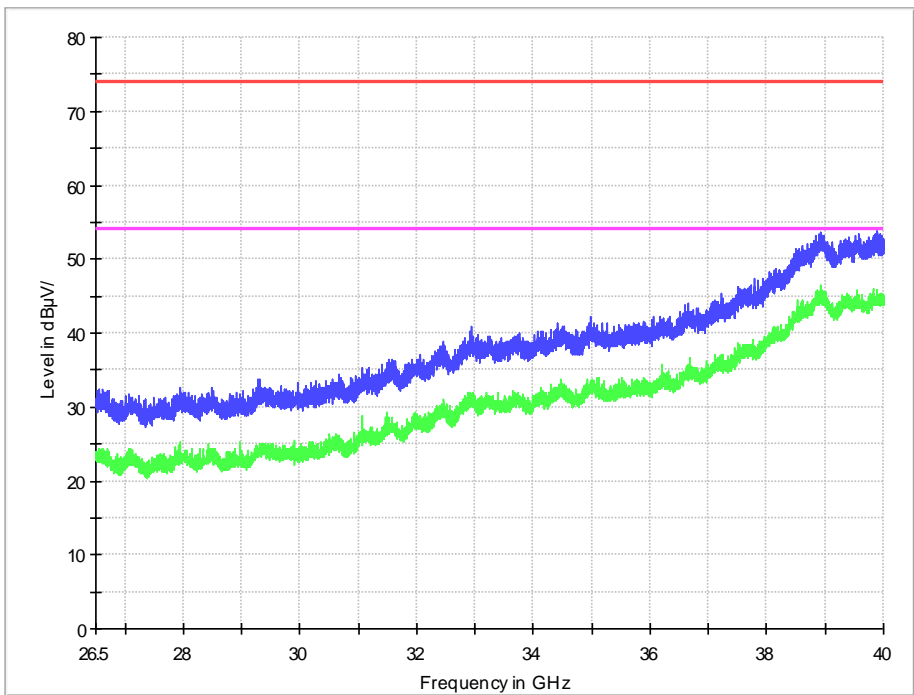


26.5GHz-40GHz

Horizontal



Vertical



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