



TEST REPORT

No.I21N04067-EMC

for

HMD Global Oy

Smart Phone

Model Name: TA-1446

With

Hardware Version: V01

Software Version: 00WW_0_031

FCC ID: 2AJOTTA-1446

Issued Date: 2022-03-21

Designation Number: CN1210

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

Test Laboratory:

SAICT, Shenzhen Academy of Information and Communications Technology

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen,
Guangdong, P. R. China. 518000.

Tel: +86(0)755-33322000, Fax: +86(0)755-33322001

Email: yewu@saict.ac.cn www.saict.ac.cn



No.I21N04067-EMC

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21N04067-EMC	Rev.0	1st edition	2022-03-21

Note: the latest revision of the test report supersedes all previous version.

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1. SUMMARY OF TEST REPORT

1.1. Test Items

Description	Smart Phone
Model Name	TA-1446
Applicant's name	HMD Global Oy
Manufacturer's Name	HMD Global Oy

1.2. Test Standards

FCC Part 15, Subpart B (10-1-2020 Edition); ANSI C63.4-2014.

1.3. Test Result

Total test 1 items, pass 1 items. Please refer to "6.2 Test Results".

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006
Shennan Road, Futian District, Shenzhen, Guangdong, China

1.5. Project data

Testing Start Date: 2022-03-19

Testing End Date: 2022-03-20

1.6. Signature

Liang Yong

(Prepared this test report)

Zhang Yunzhuan

(Reviewed this test report)

Cao Junfei

(Approved this test report)



2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: HMD Global Oy
Address: Bertel Jungin aukio 9, 02600 Espoo, Finland
Contact: Reza Serafat
Email: reza.serafat@hmdglobal.com
Tel.: +393 31 6272922
Fax: /

2.2. Manufacturer Information

Company Name: HMD Global Oy
Address: Bertel Jungin aukio 9, 02600 Espoo, Finland
Contact: Reza Serafat
Email: reza.serafat@hmdglobal.com
Tel.: +393 31 6272922
Fax: /

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT

(AE)

3.1. About EUT

Description	Smart Phone
Model Name	TA-1446
FCC ID	2AJOTTA-1446
Condition of EUT as received	No obvious damage in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Receive Date
UT01aa	353906800004030	V01	00WW_0_031	2022-02-14

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE

AE ID*	Description
AE1	Battery
AE2	Charger
AE3	USB Cable
AE4	Headset

AE1

Model	GH5781
Manufacturer	Shenzhen Aerospace Electronic Co.,Ltd
Capacity	12400 mAh
Nominal Voltage	3.8 V

AE2-1

Model	A806A-050100U-EU1
Manufacturer	Dongguan Aohai Technology Co., Ltd

AE2-2

Model	A806A-050100U-UK1
Manufacturer	Dongguan Aohai Technology Co., Ltd

AE2-3

Model	A18A-050100U-US2
Manufacturer	Dongguan Aohai Technology Co., Ltd

AE2-4

Model	A103A-050100U-AU2
Manufacturer	Dongguan Aohai Technology Co., Ltd

AE2-5

Model	AD-005E
Manufacturer	Shenzhen Baijunda Electronic Co.,Ltd



AE2-6

Model AD-005X
Manufacturer Shenzhen Baijunda Electronic Co.,Ltd

AE2-7

Model TN-050100B5
Manufacturer Shenzhen Tinno Mobile Technology Corp

AE2-8

Model TN-050100E5
Manufacturer Shenzhen Tinno Mobile Technology Corp

AE3-1

Model MO34B1000100
Manufacturer FKY-QY Electronic Technology Co. Ltd

AE4-1

Model JWEP1199-M01H
Manufacturer JUWEI ELECTRONICS CO.,LTD

*AE ID and AE Label: is used to identify the test sample in the lab internally.

*AE Label: To distinguish the type and number of AE

AE: ancillary equipment

AE2: The circuit boards of model A806A-050100U-EU1 (AE2-1),A806A-050100U-UK1(AE2-2), A18A-050100U-US2(AE2-3)and A103A-050100U-AU2 (AE2-4) are the same.

The circuit boards of model AD-005E (AE2-5)and AD-005X (AE2-6) are the same.

The circuit boards of model TN-050100B5 (AE2-7)and TN-050100E5 (AE2-8) are the same.

3.4. EUT Set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT+AE1+AE2-1+AE3-1+AE4-1	

3.5. General Description

The Equipment Under Test (EUT) is a model of Smart Phone.

It supports GSM 850/900/1800/1900MHz, WCDMA Bands 1/2/4/5/8/, LTE Bands 1/2/3/4/5/7/8/12/13/17/28/66.

It has MP3, Camera, USB memory, Bluetooth, Wi-Fi, FM Receiver and GNSS functions.

It consists of normal options: Battery, Charger USB Cable and Headset.

Manual and specifications of the EUT were provided to fulfill the test.

Samples (EUT+AE) undergoing test were selected by the Client. Relevant information is provided by the client.

Smart Phone TA-1446 manufactured by HMD Global Oy is a variant model based on TA-1471 manufactured by HMD Global Oy for conformance test. According to client's description, the table below shows the difference between model TA-1471 and TA-1446:

Changes	TA-1471	TA-1446
SIM changes	dual SIM	single SIM

According to the declaration of differences by manufacturer, the following tests need to be performed.

NO.	Test item	Operating Mode
1	Radiated Emission	Camera/GSM receiver

Other results are cited from the initial report.

The report number for initial model is I21N04075-EMC.

4. REFERENCE DOCUMENTS

4.1. Reference Documents for Testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices	(10-1-2020 Edition)
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber did not exceed following limits along the EMC testing:

9.10m×6.10m×5.60m (L×W×H)

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω
Normalised site attenuation (NSA)	<±4 dB, 3 m distance, from 30 to 1000 MHz

Shield room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-10000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing:

9.10m×6.10m×5.60m (L×W×H)

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz,>60dB; 1MHz-18000MHz,>90dB
Electrical insulation	>2MΩ
Ground system resistance	<4Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

6. SUMMARY OF TEST RESULTS

6.1. Testing Environment

Normal Temperature: 15~35℃
Relative Humidity: 20~75%
Atmospheric pressure 86~106kPa

6.2. Summary of Measurement Results

Abbreviations used in this clause:	
P	Pass
NA	Not applicable
F	Fail

Items	Test Name	Clause in FCC/IC rules	Section in this report	Verdict
1	Radiated Emission	15.109(a)/ Section 6.2	A.1	P

6.3. Statement

6.3.1 Statements of conformity

This report takes measured values as criterion of test conclusion. The test conclusion meets the limit requirements.

7. MEASUREMENT UNCERTAINTY

Test item	Frequency ranges	Measurement uncertainty
Radiated Emission	30MHz-1GHz	4.86dB(k=2)
	1GHz-18GHz	4.82dB(k=2)

8. MEASURING APPARATUS UTILIZED

No.	Name	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1.	Test Receiver	ESR7	101676	R&S	2022.11.24	1 year
2.	Spectrum Analyzer	FSV40	101192	R&S	2023.01.12	1 year
3.	BiLog Antenna	3142E	0224831	ETS-Lindgren	2024.05.27	3 years
4.	Horn Antenna	3117	00066577	ETS-Lindgren	2022.04.02	3 years
5.	Chamber	FACT3-2.0	1285	ETS-Lindgren	2023.05.29	2 years
6.	Software	EMC32	V10.50.40	R&S	/	/
7.	Universal Radio Communication Tester	CMU200	114545	R&S	2023.01.12	1 year

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission (§15.109(a))

Reference

FCC: Part 15.109(a)

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator at a distance of 3 meters or 1 meter is tested. Tested in accordance with the procedures of ANSI C63.4 -2014, section 8.3. The EUT was placed on a non-conductive table. Below 18GHz the measurement antenna was placed at a distance of 3 meters from the EUT. Above 18GHz the measurement antenna was placed at a distance of 1 meters from the EUT. (According to Part 15.31(f)(1), 1m limit is calculated by extrapolation factor of 20 dB/decade) During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

A.1.2 EUT Operating Mode:

Camera: At the beginning of measurement, the battery is completely discharged. The battery and charger are installed so that the EUT works well and keeping on taking photos.

GSM receiver: The EUT is connected to a charger for charging. The EUT is synchronized to System Simulator (SS), and able to respond to paging messages and incoming call. An established call has been released.

This device contains the receivers which tune and operate between 30MHz-960MHz in the following bands:

GSM850MHz, WCDMA Band5, LTE Band 5, LTE Band 12, LTE Band 13, LTE Band 17.

The EUT was tested while operating in licensed band receiver mode. All licensed band receivers that tune in the range of 30MHz-960MHz, as listed in Section 3.1, are investigated. Only the worst case emissions are reported.

All equipment is placed on the test table top and arranged in a typical configuration in accordance with ANSI C63.4-2014 and manipulated to obtain worst case emissions.

A.1.3 Measurement Limit

Limit from Part 15.109(a)

Frequency range (MHz)	Field strength limit ($\mu\text{V/m}$)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

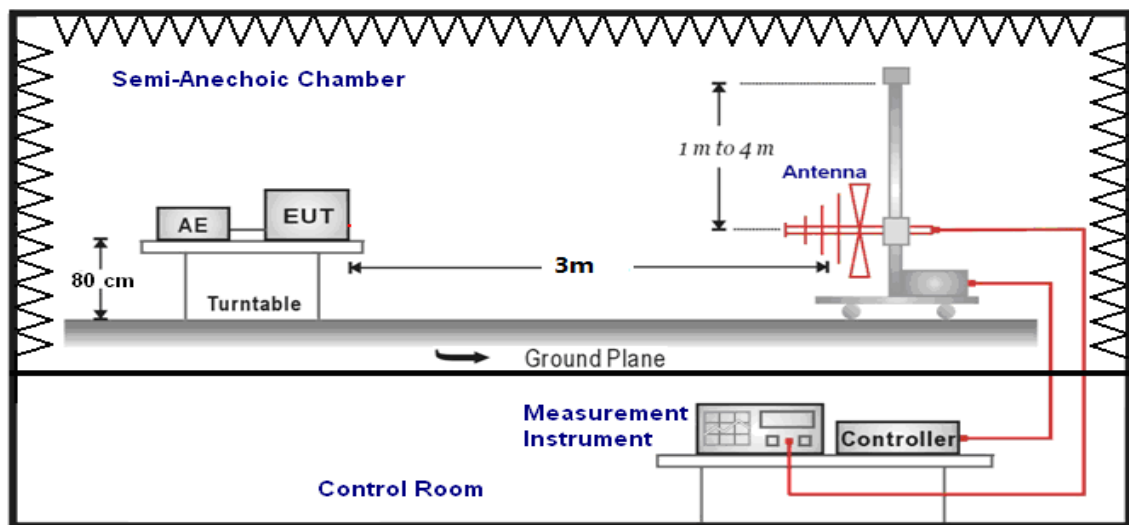
*Note: The original limit is defined at 10m test distance. This limit is calculated according to CISPR requirements.

A.1.4 Test Condition

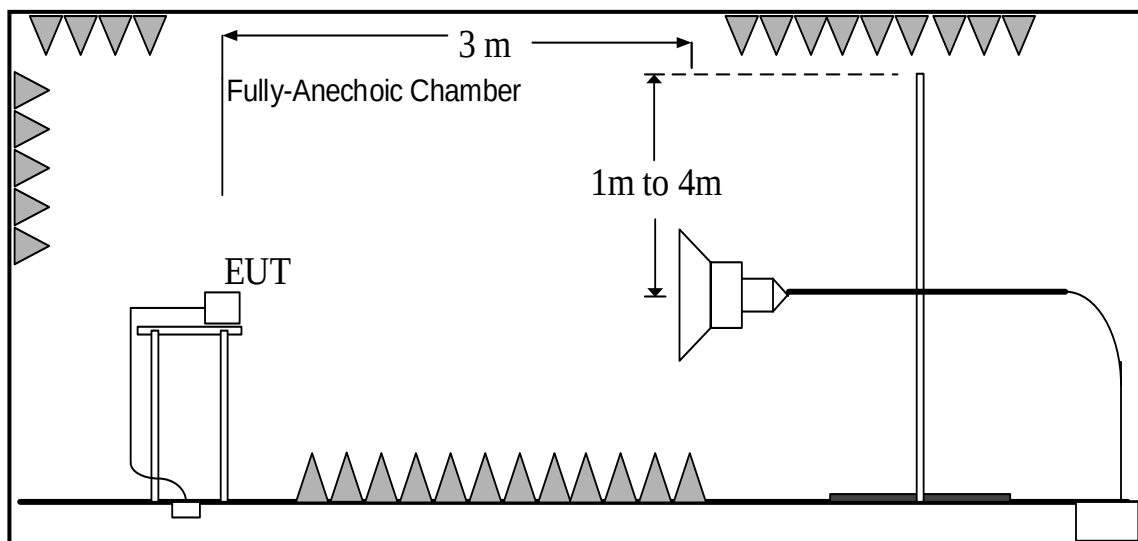
Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz (IF bandwidth)	5
Above 1000	1MHz/3MHz	15

A.1.5 Test set-up:

30MHz-1GHz



1GHz-18GHz



A.1.6 Measurement Results

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss". It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{Rpl} = P_{\text{Mea}} + G_A + G_{PL}$$

Where

G_A : Antenna factor of receive antenna

G_{PL} : Path Loss

P_{Mea} : Measurement result on receiver.

Result: Quasi-Peak (dB μ V/m) / Average (dB μ V/m) / Peak (dB μ V/m)

Note: the result contains vertical part and Horizontal part

Camera

Frequency range (MHz)	Quasi-Peak Limit (dB μ V/m)	Result (dB μ V/m)	Conclusion
		UT01aa/Set.1	
30-88	40.00	See Figure A.1.1.	P
88-216	43.52		
216-960	46.02		
960-1000	54.00		

Frequency range (MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Result (dB μ V/m)	Conclusion
			UT01aa/Set.1	
1000 to 18000	54.00	74.00	See Figure A.1.2.	P

GSM receiver 850MHz

Frequency range (MHz)	Quasi-Peak Limit (dB μ V/m)	Result (dB μ V/m)	Conclusion
		UT01aa/Set.1	
30-88	40.00	See Figure A.1.3.	P
88-216	43.52		
216-960	46.02		
960-1000	54.00		

Frequency range (MHz)	Average Limit (dB μ V/m)	Peak Limit (dB μ V/m)	Result (dB μ V/m)	Conclusion
			UT01aa/Set.1	
1000 to 18000	54.00	74.00	See Figure A.1.4.	P

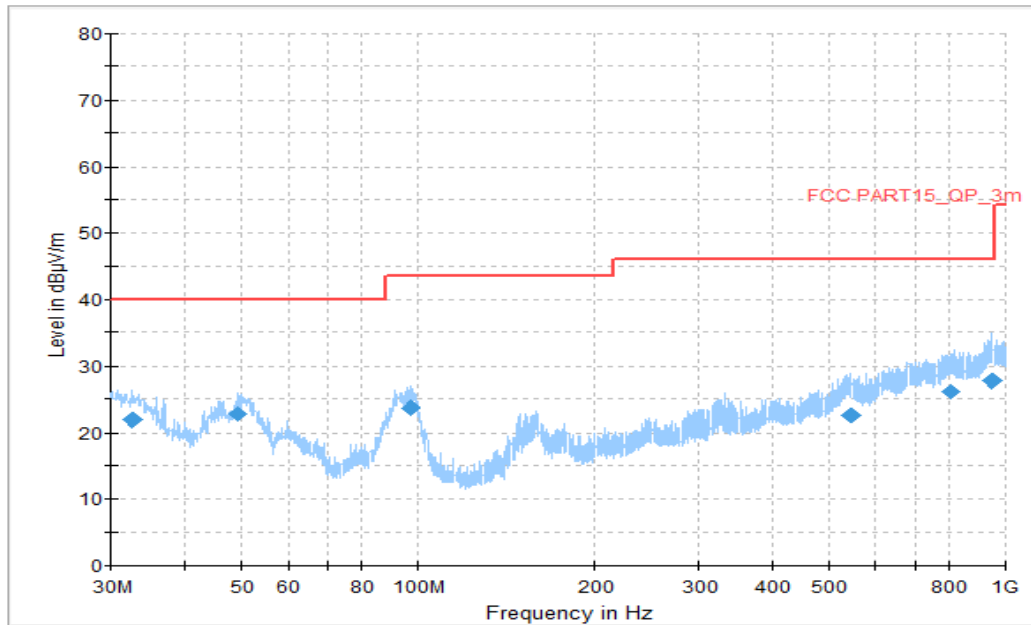


Figure A.1.1. Radiated Emission (Camera, 30MHz to 1GHz)

Final_Results

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	ARpl (dB/m)	P _{Mea} (dBμV)
32.478889	21.91	40.00	18.09	V	-14	35.91
49.292222	22.71	40.00	17.29	V	-22	44.71
97.145556	23.65	43.52	19.87	V	-20	43.65
546.147778	22.52	46.02	23.50	V	-4	26.52
807.724444	26.10	46.02	19.92	V	-1	27.1
947.620000	27.73	46.02	18.29	H	1	26.73

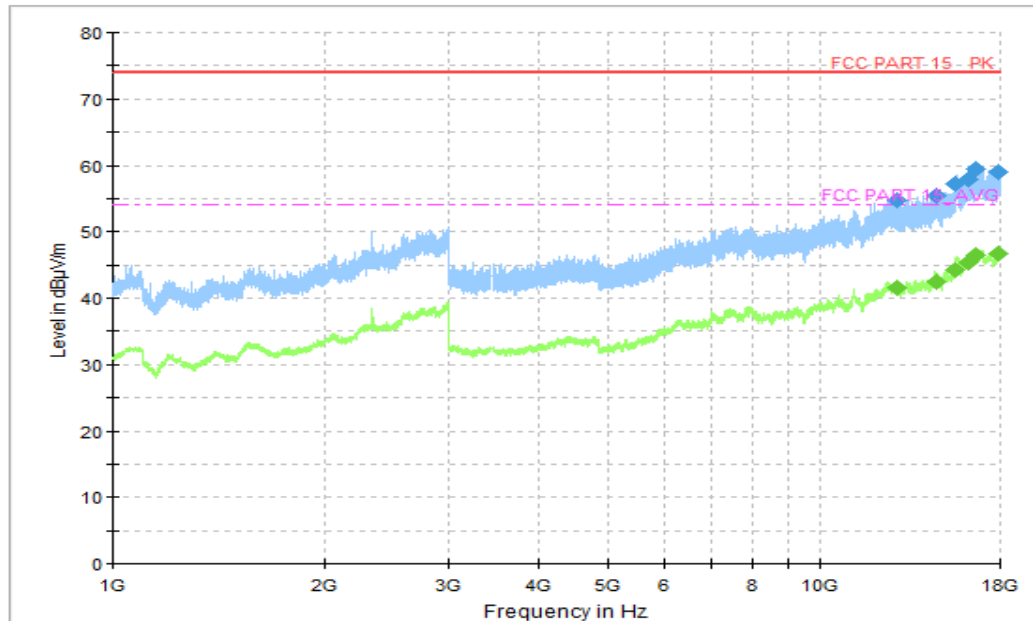


Figure A.1.2. Radiated Emission (Camera, 1GHz to 18GHz)

Final_Results_PK

Frequency(MHz)	Peak (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Polarity	ARpl (dB/m)	P _{Mea} (dBμV)
12891.750000	54.79	74.00	19.21	H	17	37.79
14572.750000	55.53	74.00	18.47	V	18	37.53
15553.500000	57.31	74.00	16.69	V	19	38.31
16270.000000	57.81	74.00	16.19	H	21	36.81
16591.750000	59.50	74.00	14.50	V	22	37.5
17894.250000	58.93	74.00	15.07	V	24	34.93

Final_Results_AVG

Frequency(MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Polarity	ARpl (dB/m)	P _{Mea} (dBμV)
12891.750000	41.57	54.00	12.43	H	17	24.57
14572.750000	42.49	54.00	11.51	V	18	24.49
15553.500000	44.26	54.00	9.74	V	19	25.26
16270.000000	45.39	54.00	8.61	H	21	24.39
16591.750000	46.43	54.00	7.57	V	22	24.43
17894.250000	46.61	54.00	7.39	V	24	22.61

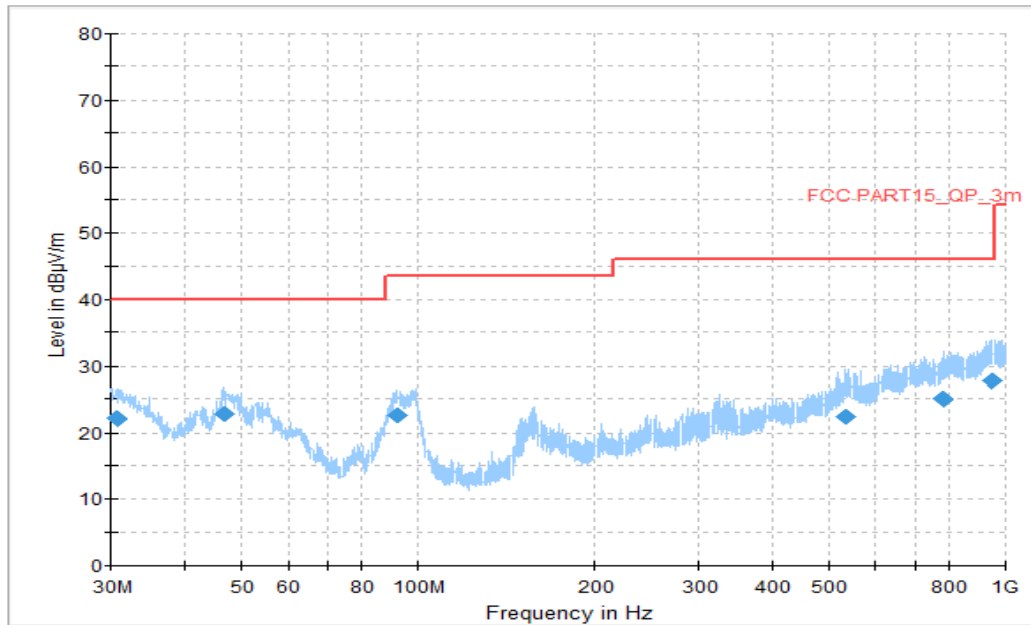


Figure A.1.3. Radiated Emission (GSM receiver 850MHz, 30MHz to 1GHz)
Final_Results

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	ARpl (dB/m)	P _{Mea} (dBμV)
30.754444	22.12	40.00	17.88	V	-13	35.12
46.651667	22.82	40.00	17.18	V	-21	43.82
91.918333	22.63	43.52	20.89	V	-21	43.63
533.052778	22.38	46.02	23.64	H	-4	26.38
781.049444	25.07	46.02	20.95	V	-2	27.07
948.536111	27.72	46.02	18.30	V	1	26.72

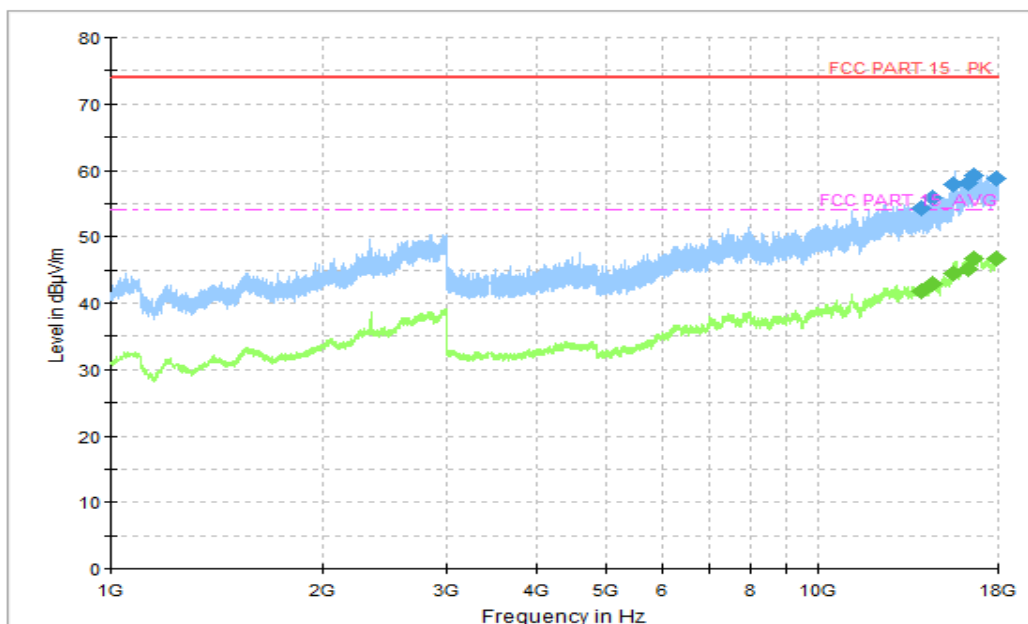


Figure A.1.4. Radiated Emission (GSM receiver 850MHz, 1GHz to 18GHz)

Final_Results_PK

Frequency(MHz)	Peak (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Polarity	ARpl (dB/m)	P _{Mea} (dBμV)
14037.250000	54.40	74.00	19.60	V	17	37.40
14564.750000	55.91	74.00	18.09	V	18	37.91
15577.750000	57.93	74.00	16.07	V	20	37.93
16288.250000	58.15	74.00	15.85	H	21	37.15
16616.750000	59.29	74.00	14.71	V	22	37.29
17895.250000	58.85	74.00	15.15	H	24	34.85

Final_Results_AVG

Frequency(MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin(dB)	Polarity	ARpl (dB/m)	P _{Mea} (dBμV)
14037.250000	41.73	54.00	12.27	V	17	24.73
14564.750000	42.96	54.00	11.04	V	18	24.96
15577.750000	44.47	54.00	9.53	V	20	24.47
16288.250000	45.18	54.00	8.82	H	21	24.18
16616.750000	46.62	54.00	7.38	V	22	24.62
17895.250000	46.63	54.00	7.37	H	24	22.63

END OF REPORT