

FCC REPORT (GSM)

Applicant: HMD global Oy
Address of Applicant: Bertel Jungin aukio 9, 02600 Espoo, Finland

Equipment Under Test (EUT)

Product Name: Smart Phone
Model No.: TA-1370
Trade mark: NOKIA

FCC ID: 2AJOTTA-1370

Applicable standards: FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 22 Subpart H
FCC CFR Title 47 Part 24 Subpart E

Date of sample receipt: 19 Aug., 2021

Date of Test: 20 Aug., to 28 Aug., 2021

Date of report issued: 30 Aug., 2021

Test Result: PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the JYT product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2. Version

Version No.	Date	Description
00	30 Aug., 2021	Original

This application for FCC ID: 2AJOTTA-1370 is reusing data from the application for a variant of device 2AJOTTA-1390. The two devices have identical internal printed circuit board layouts, have a common design and components, where 2AJOTTA-1370 differ only in the depopulation of components for the purposes of removing some frequency bands and dimension for antenna 4.

Therefore in this report only the radiated spurious emissions for ant4 was full retested, and other antennas done spot check.

Tested by: Mike.ou **Date:** 30 Aug., 2021
Test Engineer

Reviewed by: Winner Zhang **Date:** 30 Aug., 2021
Project Engineer

3. Contents

	Page
1. COVER PAGE	1
2. VERSION	2
3. CONTENTS	3
4. TEST SUMMARY	4
5. GENERAL INFORMATION	5
5.1 CLIENT INFORMATION.....	5
5.2 GENERAL DESCRIPTION OF E.U.T.....	5
5.3 TEST ENVIRONMENT AND MODE	7
5.4 DESCRIPTION OF TEST AUXILIARY EQUIPMENT.....	7
5.5 ADDITIONS TO, DEVIATIONS, OR EXCLUSIONS FROM THE METHOD.....	7
5.6 MEASUREMENT UNCERTAINTY.....	7
5.7 LABORATORY FACILITY.....	7
5.8 LABORATORY LOCATION	8
5.9 TEST INSTRUMENTS LIST.....	8
6. TEST RESULTS	9
6.1 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT.....	9
7. TEST SETUP PHOTO	13
8. EUT CONSTRUCTIONAL DETAILS	13

4. Test Summary

Test Item	Section in CFR 47	Result
RF Output Power Effective Radiated Power and Effective Isotropic Radiated Power	Part 2.1046 Part 22.913 (a)(5) Part 24.232 (c)	Refer to the report: SRTC2021-9004(F)- 21082802(A)
Peak-to-Average Power Ratio	Part 24.232 (d)	Refer to the report: SRTC2021-9004(F)- 21082802(A)
Occupied Bandwidth	Part 2.1049	Refer to the report: SRTC2021-9004(F)- 21082802(A)
Emission Bandwidth	Part 2.1049	Refer to the report: SRTC2021-9004(F)- 21082802(A)
Spurious Emissions at antenna terminals	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	Refer to the report: SRTC2021-9004(F)- 21082802(A)
Band Edges Compliance	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	Refer to the report: SRTC2021-9004(F)- 21082802(A)
Field strength of spurious radiation	Part 22.917 (a) Part 24.238 (a)	Pass
Frequency stability	Part 22.355 Part 24.235 Part 2.1055)	Refer to the report: SRTC2021-9004(F)- 21082802(A)
Remark: 1. Pass: The EUT complies with the essential requirements in the standard. 2. The report: SRTC2021-9004(F)-21082802(A), issued by The State Radio_monitoring_center Testing Center.		
Test Method:	ANSI/TIA-603-E-2016 ANSI C63.26-2015	

5. General Information

5.1 Client Information

Applicant:	HMD global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland
Manufacturer/ Factory:	HMD global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland

5.2 General Description of E.U.T.

Product Name:	Smart Phone
Model No.:	TA-1370
Operation Frequency range:	GSM 850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz
Modulation type:	<input checked="" type="checkbox"/> Voice(GMSK) <input checked="" type="checkbox"/> GPRS(GMSK) <input checked="" type="checkbox"/> EGPRS(GMSK, 8PSK)
Antenna type:	Internal Antenna
Antenna gain:	GSM 850: -3.46 dBi(declare by Applicant) PCS 1900: -2.87 dBi(declare by Applicant)
Power supply:	Rechargeable Lithium ion Polymer Battery DC3.85V, 4.85Ah
AC adapter:	<p>Adapter 1: Model: TN-050200U3, TN-050200E3, TN-050200C3A Input: AC100-240V, 50/60Hz, 0.35A Output: DC 5.0V, 2.0A 10.0W Note: Only the pins are different between different models</p> <p>Adapter 2: Model: TN-050200U3, TN-050200A3, TN-050200C3A Input: AC100-240V, 50/60Hz, 0.35A Output: DC 5.0V, 2.0A 10.0W Note: Only the pins are different between different models</p> <p>Adapter 3: Model: AD-010A, AD-010X Input: AC100-240V, 50/60Hz, 0.35A Output: DC 5.0V, 2.0A 10.0W Note: Only the pins are different between different models</p>
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency List:

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
129	824.40	513	1850.40
....
189	836.40	660	1879.80
190	836.60	661	1880.00
191	836.80	662	1880.20
...
250	848.60	809	1909.60
251	848.80	810	1909.80

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

GSM850			PCS1900		
Channel		Frequency(MHz)	Channel		Frequency(MHz)
Lowest	128	824.20	Lowest	512	1850.20
Middle	190	836.60	Middle	661	1880.00
Highest	251	848.80	Highest	810	1909.80

5.3 Test environment and mode

Operating Environment:	
Temperature:	Normal: 15°C ~ 35°C, Extreme: -30°C ~ +50°C
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 3.85Vdc, Extreme: Low 3.4 Vdc, High 4.4 Vdc
Test mode:	
GSM mode	Keep the EUT communication with simulated station in GSM mode
GPRS mode	Keep the EUT communication with simulated station in GPRS mode
EGPRS mode	Keep the EUT communication with simulated station in EGPRS mode
Remark: The EUT has been tested under continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for these modes. Just the worst case position (H mode) shown in report.	

5.4 Description of Test Auxiliary Equipment

Test Equipment	Manufacturer	Model No.	Serial No.
Simulated Station	Rohde & Schwarz	CMW500	140493

5.5 Additions to, deviations, or exclusions from the method

No

5.6 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Radiated Emission (9kHz ~ 30MHz) (3m SAC)	±3.13 dB
Radiated Emission (30MHz ~ 1000MHz) (3m SAC)	±4.45 dB
Radiated Emission (1GHz ~ 18GHz) (3m SAC)	±5.34 dB
Radiated Emission (18GHz ~ 40GHz) (3m SAC)	±5.34 dB

Note: The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.26-2015. All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

5.7 Laboratory Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● FCC - Designation No.: CN1211 JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551. ● ISED – CAB identifier.: CN0021 The 3m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1. ● A2LA - Registration No.: 4346.01 This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf
--

5.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
 Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
 Tel: +86-755-23118282, Fax: +86-755-23116366
 Email: info-JYTee@lets.com, Website: <http://www.ccis-cb.com>

5.9 Test Instruments list

Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Management Number	Cal.Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	WXJ001-1	01-19-2021	01-18-2024
BiConiLog Antenna	SCHWARZBECK	VULB9163	WXJ002	03-03-2021	03-02-2022
Biconical Antenna	SCHWARZBECK	VUBA9117	WXJ002-1	06-20-2021	06-19-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	WXJ002-2	03-03-2021	03-02-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	WXJ002-3	06-18-2021	06-17-2022
Loop Antenna	SCHWARZBECK	FMZB 1519 B	WXJ002-4	03-07-2021	03-06-2022
Pre-amplifier (30MHz ~ 1GHz)	HP	8447D	WXG001-2	03-07-2021	03-06-2022
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXG001-3	03-07-2021	03-06-2022
Pre-amplifier (18GHz ~ 40GHz)	RF System	TRLA-180400G45B	WXG001-9	03-07-2021	03-06-2022
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	03-03-2021	03-02-2022
Spectrum analyzer	Rohde & Schwarz	FSP30	WXJ004	03-03-2021	03-02-2022
Spectrum Analyzer	KEYSIGHT	N9010B	WXJ004-2	11-27-2020	11-26-2021
Signal Generator	Agilent	N5173B	WXJ006-7	03-25-2021	03-24-2022
Simulated Station	Rohde & Schwarz	CMW500	WXJ008-3	06-17-2021	06-16-2022
Coaxial Cable (30MHz ~ 1GHz)	JYT	JYT3M-1G-NN-8M	WXG001-4	03-07-2021	03-06-2022
Coaxial Cable (1GHz ~ 18GHz)	JYT	JYT3M-18G-NN-8M	WXG001-5	03-07-2021	03-06-2022
Coaxial Cable (9kHz ~ 30MHz)	JYT	JYT3M-1G-BB-5M	WXG001-6	03-07-2021	03-06-2022
Coaxial Cable (1GHz ~ 18GHz)	JYT	JYT3M-40G-SS-8M	WXG001-7	03-07-2021	03-06-2022
RF Switch Unit	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		

6. Test results

6.1 Field strength of spurious radiation measurement

Test Requirement:	FCC part 22.917(a), FCC part 24.238(a)
Limit:	-13dBm
Test setup:	<p>Below 1GHz</p> <p>Above 1GHz</p>
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter camber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. 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. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. $ERP / EIRP = S.G. \text{ output (dBm) + Antenna Gain(dB/dBi) - Cable Loss (dB)}$
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

Measurement Data (worst case):

GSM850					
Test Channel = Low Channel					
Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Polarity
1001.5001	21.23	-65.74	-13.00	52.74	Horizontal
1523.1262	21.96	-67.03	-13.00	54.03	Horizontal
2472.7736	32.24	-53.34	-13.00	40.34	Horizontal
3534.4767	52.82	-62.38	-13.00	49.38	Horizontal
5690.9345	49.36	-57.54	-13.00	44.54	Horizontal
9998.5999	46.55	-51.69	-13.00	38.69	Horizontal
1000.0000	21.45	-65.46	-13.00	52.46	Vertical
1938.8469	25.00	-62.95	-13.00	49.95	Vertical
2976.5988	22.03	-60.96	-13.00	47.96	Vertical
5161.7081	50.14	-59.23	-13.00	46.23	Vertical
7972.3486	48.18	-53.74	-13.00	40.74	Vertical
9554.7777	46.82	-51.88	-13.00	38.88	Vertical

Remark: The emission levels of below 1 GHz are lower than the limit 20dB and not show in test report.

GSM850					
Test Channel = Middle Channel					
Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Polarity
1005.0003	21.57	-65.54	-13.00	52.54	Horizontal
1867.5434	21.72	-66.82	-13.00	53.82	Horizontal
2985.6993	21.95	-60.99	-13.00	47.99	Horizontal
3925.7963	51.26	-62.57	-13.00	49.57	Horizontal
6882.3941	49.08	-55.44	-13.00	42.44	Horizontal
9994.3997	46.23	-52.01	-13.00	39.01	Horizontal
1000.9000	21.23	-65.72	-13.00	52.72	Vertical
1507.2254	22.13	-66.71	-13.00	53.71	Vertical
2265.1633	22.07	-64.34	-13.00	51.34	Vertical
2995.3998	21.84	-61.05	-13.00	48.05	Vertical
6470.0735	48.44	-56.86	-13.00	43.86	Vertical
9572.6286	46.54	-51.97	-13.00	38.97	Vertical

Remark: The emission levels of below 1 GHz are lower than the limit 20dB and not show in test report.

GSM850					
Test Channel = High Channel					
Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Polarity
1003.5002	21.32	-65.73	-13.00	52.73	Horizontal
1667.2334	21.45	-67.60	-13.00	54.60	Horizontal
2971.2986	22.05	-60.97	-13.00	47.97	Horizontal
3936.2968	51.35	-62.47	-13.00	49.47	Horizontal
7468.6734	48.55	-53.74	-13.00	40.74	Horizontal
9364.0182	46.78	-51.93	-13.00	38.93	Horizontal
1001.4001	21.22	-65.75	-13.00	52.75	Vertical
1565.6283	21.81	-67.51	-13.00	54.51	Vertical
2986.6993	22.06	-60.88	-13.00	47.88	Vertical
4418.6209	51.46	-60.73	-13.00	47.73	Vertical
7361.5681	48.74	-54.22	-13.00	41.22	Vertical
9991.2496	45.91	-52.32	-13.00	39.32	Vertical

Remark: The emission levels of below 1 GHz are lower than the limit 20dB and not show in test report.

PCS1900					
Test Channel = Low Channel					
Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Polarity
1026.5033	20.62	-50.26	-13.00	37.26	Horizontal
2141.8927	20.87	-47.27	-13.00	34.27	Horizontal
2939.4924	21.09	-43.66	-13.00	30.66	Horizontal
5550.8775	62.66	-45.23	-13.00	32.23	Horizontal
11130.4065	45.81	-49.95	-13.00	36.95	Horizontal
17928.7464	46.26	-46.64	-13.00	33.64	Horizontal
1027.2534	20.60	-50.27	-13.00	37.27	Vertical
2279.1599	21.05	-46.70	-13.00	33.70	Vertical
3000.0000	21.07	-43.38	-13.00	30.38	Vertical
5550.8775	61.44	-46.45	-13.00	33.45	Vertical
9240.3120	46.75	-51.86	-13.00	38.86	Vertical
17947.4974	46.38	-46.46	-13.00	33.46	Vertical

Remark:

- The emission levels of below 1 GHz are lower than the limit 20dB and not show in test report.
- Quote FCC ID: 2AJOTTA-1390 report.

PCS1900					
Test Channel = Middle Channel					
Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Polarity
1007.0009	20.91	-50.26	-13.00	37.26	Horizontal
2286.9109	20.91	-46.74	-13.00	33.74	Horizontal
2929.2412	21.18	-43.54	-13.00	30.54	Horizontal
5640.1320	61.06	-46.46	-13.00	33.46	Horizontal
9576.3288	45.88	-52.59	-13.00	39.59	Horizontal
17992.4996	46.91	-46.81	-13.00	33.81	Horizontal
1040.7551	20.64	-50.13	-13.00	37.13	Vertical
2250.1563	21.03	-46.61	-13.00	33.61	Vertical
2998.2498	21.04	-43.47	-13.00	30.47	Vertical
5640.1320	63.50	-44.02	-13.00	31.02	Vertical
10653.3827	46.90	-49.97	-13.00	36.97	Vertical
17757.7379	47.44	-47.30	-13.00	34.30	Vertical

Remark:

- The emission levels of below 1 GHz are lower than the limit 20dB and not show in test report.
- Quote FCC ID: 2AJOTTA-1390 report

PCS1900					
Test Channel = High Channel					
Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Polarity
1029.0036	20.67	-50.18	-13.00	37.18	Horizontal
1528.3160	20.20	-49.68	-13.00	36.68	Horizontal
2998.4998	20.60	-43.90	-13.00	30.90	Horizontal
4429.5715	51.07	-61.04	-13.00	48.04	Horizontal
9520.8260	46.83	-51.87	-13.00	38.87	Horizontal
17996.9999	47.24	-46.58	-13.00	33.58	Horizontal
1027.7535	20.73	-50.14	-13.00	37.14	Vertical
1721.5902	20.69	-49.45	-13.00	36.45	Vertical
2999.4999	20.91	-43.56	-13.00	30.56	Vertical
4482.0741	50.87	-60.96	-13.00	47.96	Vertical
9001.8001	47.20	-51.73	-13.00	38.73	Vertical
17985.7493	47.35	-46.23	-13.00	33.23	Vertical

Remark:

- The emission levels of below 1 GHz are lower than the limit 20dB and not show in test report.
- Quoting the FCC ID: 2AJOTTA-1390 report, it is found that this channel is the worst mode, retest the data.

7. Test Setup Photo

Reference to the test setup photos: PCE-Test Setup Photo

8. EUT Constructional Details

Reference to the External Photo and Internal Photo

-----End of report-----