



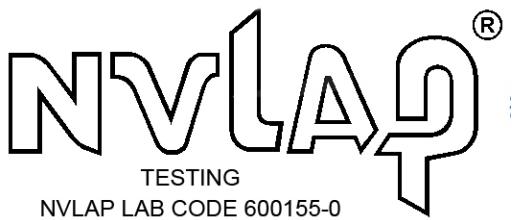
FCC RF Test Report

APPLICANT : HMD Global Oy
EQUIPMENT : GSM/WCDMA/LTE Mobile Phone
BRAND NAME : Nokia
MODEL NAME : TA-1080
FCC ID : 2AJOTTA-1080
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

This is a data re-used report which is only valid together with the original test report. The product was received on Oct. 29, 2018 and testing was completed on Nov. 15, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Approved by: James Huang / Manager



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TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant.....	5
1.2 Manufacturer	5
1.3 Product Feature of Equipment Under Test	5
1.4 Product Specification of Equipment Under Test	6
1.5 Modification of EUT	6
1.6 Re-use of Measured Data	7
1.7 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator	8
1.8 Testing Location	9
1.9 Applicable Standards	9
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST.....	10
2.1 Test Mode.....	10
2.2 Connection Diagram of Test System	11
2.3 Support Unit used in test configuration	11
2.4 Frequency List of Low/Middle/High Channels.....	12
3 CONDUCTED TEST RESULT.....	13
3.1 Measuring Instruments.....	13
3.2 Conducted Output Power and ERP/EIRP	13
4 RADIATED TEST ITEMS	14
4.1 Measuring Instruments.....	14
4.2 Test Setup	14
4.3 Test Result of Radiated Test.....	14
4.4 Field Strength of Spurious Radiation Measurement	15
5 LIST OF MEASURING EQUIPMENT	16
6 UNCERTAINTY OF EVALUATION	17
APPENDIX A. TEST RESULTS OF CONDUCTED TEST	
APPENDIX B. TEST RESULTS OF RADIATED TEST	
APPENDIX C. TEST SETUP PHOTOGRAPHS	
APPENDIX D. REFERENCE REPORT	



REVISION HISTORY



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	1
	§22.913(a)(5)	Effective Radiated Power	< 7 Watts	PASS	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
-	§24.232(d)	Peak-to-Average Ratio	< 13 dB	PASS	1
-	§2.1049	Occupied Bandwidth	Reporting Only	PASS	1
-	§2.1051 §22.917(a) §24.238(a)	Band Edge Measurement	< 43+10log10(P[Watts])	PASS	1
-	§2.1051 §22.917(a) §24.238(a)	Conducted Emission	< 43+10log10(P[Watts])	PASS	1
-	§2.1055 §22.355	Frequency Stability for Temperature & Voltage	< 2.5 ppm for Part 22	PASS	1
	§2.1055 §24.235		Within Authorized Band		
4.4	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	Under limit 31.01 dB at 5640.00 MHz
Remark 1: Test items are performed on original report which can be referred to Sporton report number FG832104A.					



1 General Description

1.1 Applicant

HMD Global Oy

Bertel Jungin aukio 9, 02600 Espoo, Finland

1.2 Manufacturer

HMD Global Oy

Bertel Jungin aukio 9, 02600 Espoo, Finland

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	GSM/WCDMA/LTE Mobile Phone
Brand Name	Nokia
Model Name	TA-1080
FCC ID	2AJOTTA-1080
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 Bluetooth BR/EDR/LE
IMEI Code	Radiation: 359013091652008/3590139091732008 for 22H 359013091652032/3590139091732032 for 24E
HW Version	HW0511
SW Version	000C_0_390
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	GSM/GPRS/EDGE: 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz WCDMA: Band V: 826.4 MHz ~ 846.6 MHz
Rx Frequency	GSM/GPRS/EDGE: 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz WCDMA: Band V: 871.4 MHz ~ 891.6 MHz
Antenna Type	PIFA Antenna
Antenna Gain	Cellular Band: -4.00 dBi PCS Band: -2.50 dBi
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA : BPSK (Uplink) HSDPA/DC-HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM(uplink is not supported) DC-HSDPA : 64QAM

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Re-use of Measured Data

1.6.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: TA-1080, FCC ID: 2AJOTTA-1080) is electrically identical to the reference device (Model: TA-1084, FCC ID: 2AJOTTA-1084) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 484596 D01.

1.6.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration.

The re-used RF data includes the following bands provided in Appendix A (Sportun RF Report No. FG832104A for the reference device Model: TA-1084, FCC ID: 2AJOTTA-1084).

1.6.3 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test	Report Title/Section
PCE (2G/3G)	2AJOTTA-1084	Part22H.24E (FG832104A)	All sections applicable except ERP/EIRP and RSE
PCE (LTE)	2AJOTTA-1084	Part22H. 27M (FG832104B)	All sections applicable except ERP/EIRP and RSE

1.6.4 Spot Check Verification Data Section

In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for the following test items, the test result were consistent with FCC ID: 2AJOTTA-1084.

Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.

Test Item	Mode	2AJOTTA-1084 Worst Result	2AJOTTA-1080 Worst Result	Difference (dB)
Average Conducted Power (dBm)	GSM 850	32.67	32.34	-0.33
	GSM 1900	30.10	30.44	0.34
	WCDMA Band V	23.21	23.44	0.23
	LTE Band 5	23.21	23.40	0.19
	LTE Band 7	22.70	23.29	0.59
	LTE Band 38	22.95	23.25	0.30



1.7 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP(W)
Part 22	GSM850 GSM	GMSK	0.4159
Part 22	GSM850 EDGE class 8	8PSK	0.1102
Part 22	WCDMA Band V RMC 12.2Kbps	BPSK	0.0536
Part 24	GSM1900 GSM	GMSK	0.6223
Part 24	GSM1900 EDGE class 8	8PSK	0.2183



1.8 Testing Location

Sportun Lab is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0).

Test Site	Sportun International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL : 86-512-57900158 FAX : 86-512-57900958		
Test Site No.	Sportun Site No.	FCC designation No.	FCC Test Firm Registration No.
	03CH04-KS 03CH05-KS	CN5013	630927

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 22(H), 24(E)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

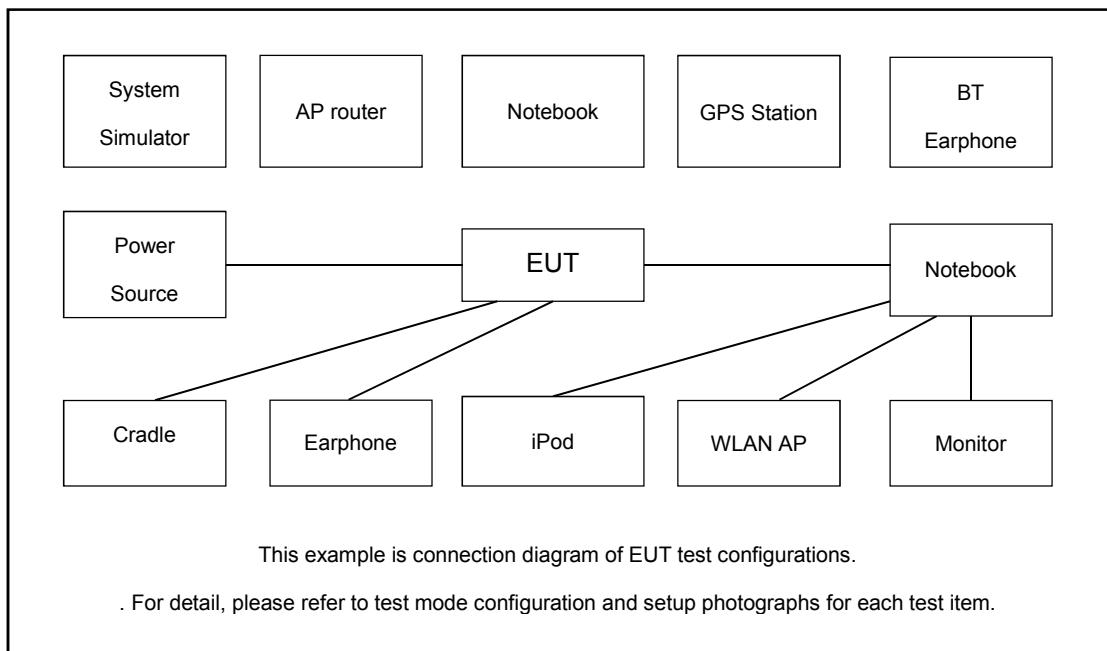
1. 30 MHz to 10th harmonic for GSM850 and WCDMA Band V.
2. 30 MHz to 10th harmonic for GSM1900.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes	
Band	Radiated TCs
GSM 850	<ul style="list-style-type: none">■ GSM Link■ EDGE class 8 Link
GSM 1900	<ul style="list-style-type: none">■ GSM Link■ EDGE class 8 Link
WCDMA Band V	<ul style="list-style-type: none">■ RMC 12.2Kbps Link

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritus	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m



2.4 Frequency List of Low/Middle/High Channels

Frequency List				
Band	Channel/Frequency(MHz)	Lowest	Middle	Highest
GSM850	Channel	128	189	251
	Frequency	824.2	836.4	848.8
WCDMA Band V	Channel	4132	4182	4233
	Frequency	826.4	836.4	846.6
GSM1900	Channel	512	661	810
	Frequency	1850.2	1880.0	1909.8



3 Conducted Test Result

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Conducted Output Power and ERP/EIRP

3.2.1 Description of the Conducted Output Power and ERP/EIRP

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for GSM850 and WCDMA Band V.

The EIRP of mobile transmitters must not exceed 2 Watts for GSM1900.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

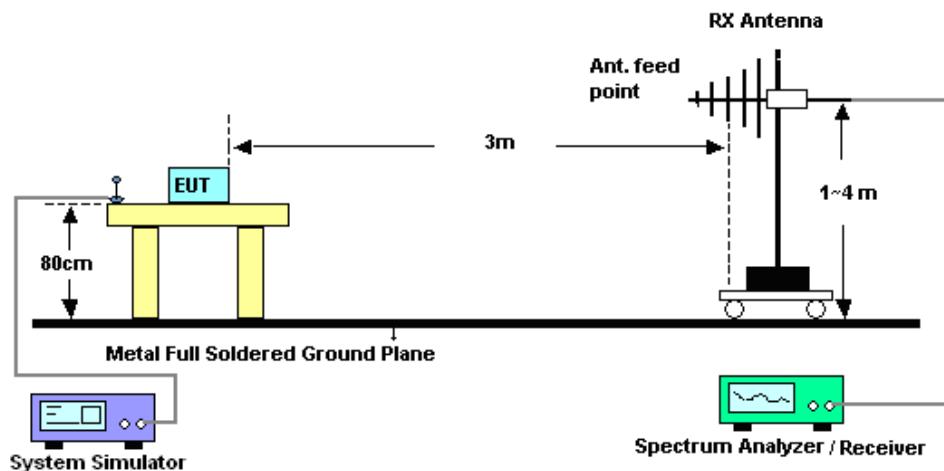
4 Radiated Test Items

4.1 Measuring Instruments

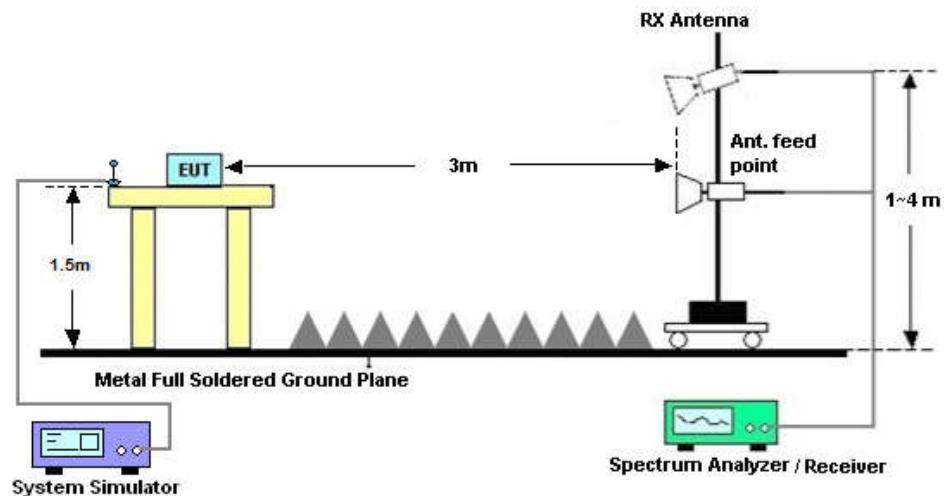
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.



4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44GHz	Oct. 09, 2018	Nov. 15, 2018	Oct. 08, 2019	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Jan. 29, 2018	Nov. 15, 2018	Jan 28, 2019	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1648	1GHz~18GHz	Dec. 16, 2017	Nov. 15, 2018	Dec 15, 2018	Radiation (03CH04-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 07, 2018	Nov. 15, 2018	Feb. 06, 2019	Radiation (03CH04-KS)
Amplifier	Burgeon	BPA-530	102219	0.01MHz ~3000MHz	Dec. 16, 2017	Nov. 15, 2018	Dec 15, 2018	Radiation (03CH04-KS)
Amplifier	MITEQ	TTA1840-35 -HG	2014749	18~40GHz	Feb. 08, 2018	Nov. 15, 2018	Feb. 07, 2019	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P	2025788	1Ghz-18Ghz	Apr.17.2018	Nov. 15, 2018	Apr. 16,2019	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Dec. 16, 2017	Nov. 15, 2018	Dec. 15, 2018	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Nov. 15, 2018	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Nov. 15, 2018	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Nov. 15, 2018	NCR	Radiation (03CH04-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44GHz	Apr. 17, 2018	Nov. 15, 2018	Apr. 16, 2019	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Jun. 12, 2018	Nov. 15, 2018	Jun. 11, 2019	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 21, 2018	Nov. 15, 2018	Jan. 20, 2019	Radiation (03CH05-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 07, 2018	Nov. 15, 2018	Feb. 06, 2019	Radiation (03CH05-KS)
Amplifier	com-power	PA-103A	161069	1MHz ~1000MHz / 32 dB	Apr. 17, 2018	Nov. 15, 2018	Apr. 16, 2019	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P	2025788	1Ghz-18Ghz	Apr.17, 2018	Nov. 15, 2018	Apr.16, 2019	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Apr.18, 2018	Nov. 15, 2018	Apr.17, 2019	Radiation (03CH05-KS)
Amplifier	MITEQ	TTA1840-35 -HG	1887435	18~40GHz	Feb. 08, 2018	Nov. 15, 2018	Feb. 07, 2019	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Nov. 15, 2018	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Nov. 15, 2018	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Nov. 15, 2018	NCR	Radiation (03CH05-KS)

NCR: No Calibration Required



6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz) for 03CH04-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.3dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz) for 03CH04-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz) for 03CH04-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.8dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz) for 03CH05-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.5dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz) for 03CH05-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.0dB
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz) for 03CH05-KS

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.0dB
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Appendix A. Test Results of Conducted Test

ERP/EIRP

GSM850 ($G_T - L_C = -4.00 \text{ dBi}$)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.4	848.8
	32.24	32.26	32.34
Conducted Power (dBm)	1.6749	1.6827	1.7140
Conducted Power (Watts)	26.09	26.11	26.19
ERP(dBm)	0.4064	0.4083	0.4159
ERP(Watts)			

EDGE850 ($G_T - L_C = -4.00 \text{ dBi}$)			
Channel	128	189	251
	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.4	848.8
	26.54	26.54	26.57
Conducted Power (dBm)	0.4508	0.4508	0.4539
Conducted Power (Watts)	20.39	20.39	20.42
ERP(dBm)	0.1094	0.1094	0.1102
ERP(Watts)			



GSM1900 ($G_T - L_c = -2.50 \text{ dBi}$)			
Channel	512	661	810
	(Low)	(Mid)	(High)
Frequency (MHz)	1850.2	1880	1909.8
	30.28	30.44	30.40
Conducted Power (dBm)	1.0666	1.1066	1.0965
EIRP(dBm)	27.78	27.94	27.90
EIRP(Watts)	0.5998	0.6223	0.6166

EDGE1900 ($G_T - L_c = -2.50 \text{ dBi}$)			
Channel	512	661	810
	(Low)	(Mid)	(High)
Frequency (MHz)	1850.2	1880	1909.8
	25.81	25.81	25.89
Conducted Power (dBm)	0.3811	0.3811	0.3882
EIRP(dBm)	23.31	23.31	23.39
EIRP(Watts)	0.2143	0.2143	0.2183

WCDMA Band V ($G_T - L_c = -4.00 \text{ dBi}$)			
Channel	4132	4182	4233
	(Low)	(Mid)	(High)
Frequency (MHz)	826.4	836.4	846.6
	23.35	23.44	23.36
Conducted Power (dBm)	0.2163	0.2208	0.2168
ERP(dBm)	17.20	17.29	17.21
ERP(Watts)	0.0525	0.0536	0.0526



Radiated Spurious Emission

GSM850 (GSM)								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-57.78	-13	-44.78	-60.11	1.21	5.68	H
	2509.2	-50.31	-13	-37.31	-52.42	1.54	5.80	H
	3345	-59.76	-13	-46.76	-63.76	1.73	7.88	H
	1672	-60.71	-13	-47.71	-63.04	1.21	5.68	V
	2509.2	-54.52	-13	-41.52	-56.63	1.54	5.80	V
	3345	-60.24	-13	-47.24	-64.24	1.73	7.88	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

GSM850 (EDGE class 8)								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-63.52	-13	-50.52	-65.85	1.21	5.68	H
	2509.2	-61.25	-13	-48.25	-63.36	1.54	5.80	H
	3345	-59.91	-13	-46.91	-63.91	1.73	7.88	H
	1672	-65.02	-13	-52.02	-67.35	1.21	5.68	V
	2509.2	-60.38	-13	-47.38	-62.49	1.54	5.80	V
	3345	-60.20	-13	-47.20	-64.20	1.73	7.88	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



GSM1900 (GSM)								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3759	-57.72	-13	-44.72	-69.98	2.64	14.90	H
	5640	-44.01	-13	-31.01	-55.87	2.94	14.80	H
	7521	-51.65	-13	-38.65	-61.42	3.39	13.16	H
	3759	-58.21	-13	-45.21	-70.47	2.64	14.90	V
	5640	-48.04	-13	-35.04	-59.90	2.94	14.80	V
	7521	-51.09	-13	-38.09	-60.86	3.39	13.16	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

GSM1900 (EDGE class 8)								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	3759	-58.69	-13	-45.69	-70.95	2.64	14.90	H
	5640	-55.43	-13	-42.43	-67.29	2.94	14.80	H
	7521	-51.84	-13	-38.84	-61.61	3.39	13.16	H
	3759	-58.45	-13	-45.45	-70.71	2.64	14.90	V
	5640	-55.80	-13	-42.80	-67.66	2.94	14.80	V
	7521	-51.42	-13	-38.42	-61.19	3.39	13.16	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

WCDMA Band V(RMC 12.2Kbps)								
Channel	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	1672	-66.03	-13	-53.03	-68.36	1.21	5.68	H
	2509.2	-59.29	-13	-46.29	-61.40	1.54	5.80	H
	3345	-60.07	-13	-47.07	-64.07	1.73	7.88	H
	1672	-65.89	-13	-52.89	-68.22	1.21	5.68	V
	2509.2	-61.21	-13	-48.21	-63.32	1.54	5.80	V
	3345	-59.96	-13	-46.96	-63.96	1.73	7.88	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



Appendix D. Reference Report

Please refer to Sporton report number FG832104A which is issued separately.