Module 3: Product Description

Appendix 3.1.2-3: Testing report for Charger - 47 CFR FCC Part 15B

In this appendix the following two EMC testing reports are provided:

- Amended test report issued on 29 May 2019
- Initial test report issued on 01 November 2018

Confidentiality Statement

Data and information contained in this document are considered to constitute trade secrets and confidential commercial information, and the legal protections provided to such trade secrets and confidential information are hereby claimed under the applicable provisions of United States law. No part of this document may be publicly disclosed without the written consent of Philip Morris International.

Report on the EMC Testing of:

TOBACCO HEATING SYSTEM

Model(s): Refer to Product Information

In accordance with
FCC 47 CFR Part 15B

PSB Singapore

Add value.
Inspire trust.

Prepared for:
Philip Morris Products S.A.
Quai Jeanrenaud 3, 2000 Neuchâtel
Switzerland

COMMERCIAL-IN-CONFIDENCE

Document Number: 7191208112-EEC19/03 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	(b) (6)	29 May 2019	(b) (6)
Authorised Signatory		27 May 2019	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD PSB document control rules.

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with the mentioned standard(s).

TÜV SÜD PSB

ilac-MRA Accredited Laboratory SAC-SINGLAS

LA-2007-0380-A	LA-2007-0385-E	The results reported herein have been performed in accordance with the terms of accreditation under the Singapore Accreditation Council. Inspections/Calibrations/Tests marked "Not SAC-SINGLAS Accredited" in this Report are not included in the SAC-SINGLAS Accreditation Schedule for our inspection body/laboratory.
LA-2007-0381-F	LA-2007-0386-C	
LA-2007-0382-B	LA-2010-0464-D	
LA-2007-0383-G	LA-2018-0702-B	
LA-2007-0384-G	LA-2018-0703-G	

Laboratory:
TÜV SÜD PSB Pte. Ltd.
No.1 Science Park Drive
Singapore 118221

Phone : +65-6885 1333
Fax : +65-6776 8670
E-mail: enquiries@tuv-sud-psb.sg
www.tuv-sud-psb.sg
Co. Reg : 199002667R

Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
1 Science Park Drive, #02-01
Singapore 118221

PSB Singapore

Contents

1 Report Summary 3

1.1 Report Modification Record 3
1.2 Introduction 4
1.3 Brief Summary of Results 5
1.4 Product Information 6
1.5 Deviations from the Standard 8
1.6 EUT Modification Record 8
1.7 Test Location(s) 8
1.8 Test Facilities Registrations 9
1.9 Supporting Equipment 9

2 Test Details 10

2.1 Conducted Emissions at Mains Terminals 10
2.2 Radiated Emissions 15

3 Photographs 23

4 Test Equipment 29

5 Measurement Uncertainty 30

End of the Test Report 32

PSB Singapore

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	29 May 2019

PSB Singapore

1.2 Introduction

Applicant	:	Philip Morris Products S.A. Quai Jeanrenaud 3, 2000 Neuchâtel, Switzerland
Manufacturer	:	Philip Morris Products S.A. Quai Jeanrenaud 3, 2000 Neuchâtel, Switzerland
Factory	:	**(b) (4)**
Trademark		IQOS
Model Number(s)	:	Refer to test summary note 2
Serial Number(s)	:	Refer to test summary note 2
Number of Samples Tested	:	Refer to test summary note 2
Test Sample(s) Condition	:	Good
Quotation Reference	:	5190293
Test Specification/Issue/Date	:	FCC 47 CFR 15B
Test Sample(s) Received Date	:	12 Apr 2019
Start of Test	:	17 Apr 2019
Finish of Test	:	30 Apr 2019

PSB Singapore

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with the specifications as shown below.

Specification Clause	Test Description	Result	Comments/Base Standard
FCC 47 CFR 15B			
15.107	Conducted Emissions at Mains Terminals (Class B)	Pass	ANSI C63.4: 2014
15.109	Radiated Emissions (Class B)	Pass	ANSI C63.4: 2014

Notes

1. IQOS Holder A1404 results to be referred to Test Report 7191194758-03.

2. Pre-scan was performed for all AC Power Adaptor, Pocket Charger and Holder as shown below and the worst emission configuration was selected for final measurement for conducted emission tests and radiated emission tests,

Description		Models	Serial Number
(b) (4)	Holder	A1406	SOYZ EV1 4G1 0418
Aucopo Holder		A1406	SOYZ EV1 1G2 0036
(b) (4)	Pocket Charger	A1504	T8DB AEA TM2 J1V0
(b) (4)	Pocket Charger	A1504	TQY3 G6H STB E3A3
(b) (4)	Pocket Charger	A1504	T961 LR9 57B C83T
(b) (4)	AC Power Adaptor	S21A20	81920724736_S
	AC Power Adaptor	S21A22	72931305135_S
	AC Power Adaptor	S21A23	70140899137
	AC Power Adaptor	S21A25	80510126739_S
	AC Power Adaptor	S21A27	80260672234_S
	AC Power Adaptor	S52A21	81540431934_S
(b) (4)	AC Power Adaptor	S21A20	81930184910_P
	AC Power Adaptor	S21A22	91351343410_P
	AC Power Adaptor	S21A23	91415820710_P
	AC Power Adaptor	S21A25	81810141304_P
	AC Power Adaptor	S21A27	82030003304_P
	AC Power Adaptor	S52A21	82920015010_P
(b) (4)	AC Power Adaptor	S21A20	82110004902_K
	AC Power Adaptor	S21A22	91460000301_K
	AC Power Adaptor	S21A23	91460000601_K
	AC Power Adaptor	S21A25	82110000801_K
	AC Power Adaptor	S21A27	74130008602_K
	AC Power Adaptor	S52A21	91460001201_K
(b) (4)	USB Type C Cable	Nil	Nil
(b) (4)	USB Type C Cable	Nil	Nil
(b) (4)	USB Type C Cable	Nil	Nil

1.4 Product Information

1.4.1 Technical Description

Description	:	The Equipment Under Test (EUT) is a **TOBACCO HEATING SYSTEM (IQOS 3).** It consists of i. IQOS Holder A1404 ii. IQOS Holder A1406 iii. IQOS Pocket Charger A1504 iv. IQOS AC Power Adaptor S21A20, S21A22, S21A23, S21A25, S21A27, S52A21
Microprocessor	:	**(b) (4)**
Operating Frequency	:	Holder – **(b) (4)** Charger –
Clock / Oscillator Frequency	:	Holder – Charger – Charger BLE –
Modulation	:	**(b) (4)**
Antenna Gain	:	**(b) (4)**
Port / Connectors	:	USB-Type C
Rated Power / Accessories	:	i. IQOS Holder Model A1404 Output 5VDC; 1.6A ii. IQOS Holder Model A1406 Output 5VDC; 1.6A iii. IQOS Pocket Charger Model A1504 Output 5VDC; 2.0A iv. IQOS AC Power Adaptor Rated output: 5VDC; 2A

PSB Singapore

1.4.2 Test Configuration and Modes of Operation

Test Configurations					
Worst Conducted Emissions Test Configurations					
Configuration	**Adaptor**		**Charger**	**Cable**	**Holder**
1	**(b) (4)**	S52A21	**(b) (4)**		--
2		S52A21			Aucopo
Worst Radiated Emissions Test Configurations					
Configuration	**Adaptor**		**Charger**	**Cable**	**Holder**
3	--		--	--	Aucopo
4	**(b) (4)**	S52A21	**(b) (4)**		--
5		S52A21			Aucopo

Mode(s)	Description
1. Holder Turned ON	The EUT was exercised in the mode(s) throughout the test(s).
2. Charging Pocket Charger with AC Power Adaptor, BLE connected	
3. Charging Pocket Charger (Holder inserted) with AC Power Adaptor, BLE connected	

1.4.3 Performance Criteria and Monitoring Methods

Not Applicable.

PSB Singapore

1.5 Deviations from the Standard

Nil.

1.6 EUT Modification Record

No modifications were made.

1.7 Test Location(s)

TÜV SÜD PSB Pte Ltd
Electrical & Electronics Centre (EEC), Product Services,
No. 1 Science Park Drive, Singapore 118221

PSB Singapore

1.8 Test Facilities Registrations

Requirements	Registration Numbers
FCC	994109 (Test Firm Registration Number) SG0002 (Designation Number)
ISED	SGAP01 (CAB Identifier) Science Park 2932I-1 (3m and 10m Semi-Anechoic Chamber) International Business Park 2932N-1 (10m Semi-Anechoic Chamber)
VCCI	Science Park R-1335 (10m ANC) C-2306 (C.E @ Lab 3) T-1471 (Telecom Ports @ Lab 3) International Business Park R-3324 (10m ANC), G-203 (10mANC) C-4933 (C.E @ CEIBP) T-2403 (Telecom Ports @ CEIBP)
BSMI	SL2-IS-E-6001R *[CNS-13803 (ISM Equipment)]* SL2-IN-E-6001R *[CNS-13438 (IT Equipment)]* SL2-R1/R2-E-6001R *[CNS-13439 (Broadcast Receivers)]* SL2-A1-E-6001R *[CNS-13783-1 (Household Appliances)]* SL2-L1-E-6001R *[CNS-14115 (Lighting Equipment)]*
SABS	SABS/A-LAB/0029/2018

1.9 Supporting Equipment

Equipment Description (Including Brand Name)	Model, Serial & FCC ID Number	Cable Description (List Length, Type & Purpose)
Mobile Phone (Samsung S7)	M/N: SM-G930FD S/N: R58H54E71QH FCC ID: DoC	NA

PSB Singapore

2 Test Details

2.1 Conducted Emissions at Mains Terminals

2.1.1 Test Limits

AC Mains Port (Class B)

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-peak (Q-P)	Average (AV)
0.15 - 0.5	66 – 56 *	56 – 46 *
0.5 - 5.0	56	46
5.0 - 30.0	60	50
* Decreasing linearly with the logarithm of the frequency		

PSB Singapore

2.1.2 Test Setup

2.1.2.1 The EUT and supporting equipment were set up in accordance with the requirements of the standard as shown in the setup photos.

2.1.2.2 The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.

2.1.2.3 The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.

2.1.2.4 All other supporting equipment were powered separately from another LISN.

2.1.3 Test Method

2.1.3.1 The EUT was switched on and allowed to warm up to its normal operating condition.

2.1.3.2 A scan was made on the NEUTRAL line over the required frequency range using an EMI test receiver.

2.1.3.3 High peaks, relative to the limit line, were then selected.

2.1.3.4 The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 9kHz. Both Quasi-peak and Average measurements were made.

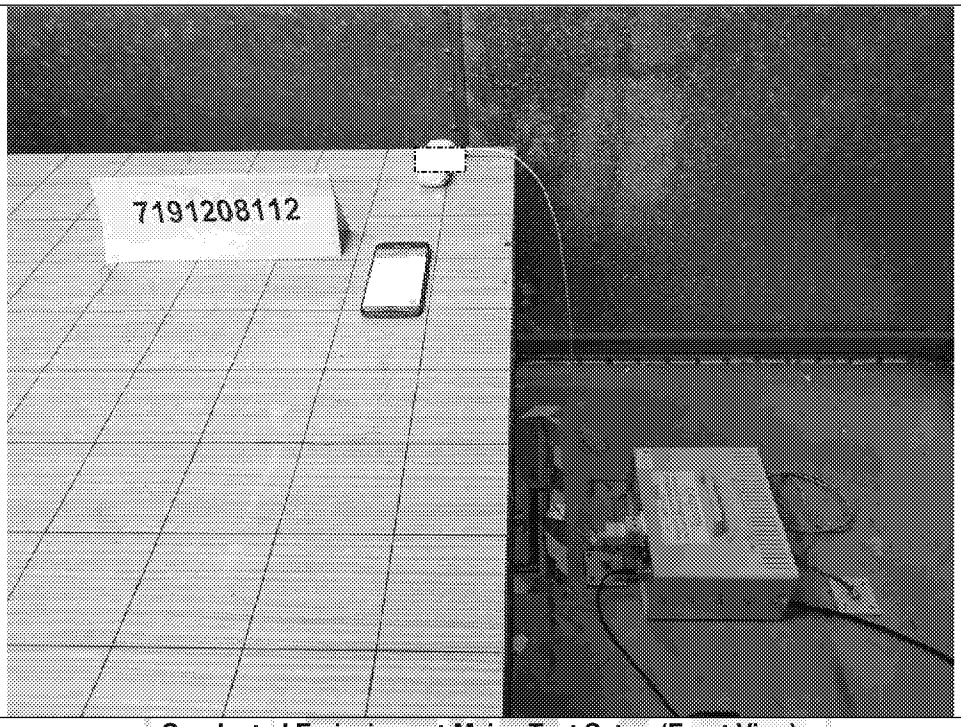
2.1.3.5 The measurements were then repeated for the LIVE line.

Sample Calculation Example

At 20 MHz	Q-P limit (Class B) = 60.0 dBμV
Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.2 dB	
Q-P reading obtained directly from EMI Receiver = 40.0 dBμV (Calibrated for system losses)	
Therefore, Q-P margin = 60.0 - 40.0 = 20.0	i.e. 20.0 dB below Q-P limit

PSB Singapore

2.1.4 Test Setup Photographs



Conducted Emissions at Mains Test Setup (Front View)



Conducted Emissions at Mains Test Setup (Rear View)

PSB Singapore

2.1.5 Test Results

The detailed of the test results are shown below.

Operating Mode	Charging Pocket Charger with AC Power Adaptor, BLE connected	Temperature	24°C
Test Input Power	120V 60Hz	Relative Humidity	56%
Line Under Test	AC Mains	Atmospheric Pressure	1030mbar
Class	B	Tested By	Chang Wai Kit Lim Kay Tak
Test Configuration	1	Test Date	24 - 25 Apr 2019

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line
0.1709	52.9	64.9	12.0	38.8	54.9	16.1	Live
0.6760	44.0	56.0	12.0	29.3	46.0	16.7	Neutral
0.8301	46.0	56.0	10.0	33.2	46.0	12.8	Neutral
1.0072	45.5	56.0	10.5	32.3	46.0	13.7	Neutral
1.1758	45.0	56.0	11.0	32.4	46.0	13.6	Neutral
1.2656	44.6	56.0	11.4	31.7	46.0	14.3	Neutral

Operating Mode	Charging Pocket Charger (Holder inserted) with AC Power Adaptor, BLE connected	Temperature	24°C
Test Input Power	120V 60Hz	Relative Humidity	56%
Line Under Test	AC Mains	Atmospheric Pressure	1030mbar
Class	B	Tested By	(b) (6)
Test Configuration	2	Test Date	24 - 25 Apr 2019

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line
0.5482	45.0	56.0	11.0	31.8	46.0	14.2	Neutral
0.8060	45.2	56.0	10.8	33.1	46.0	12.9	Neutral
0.9852	45.3	56.0	10.7	32.8	46.0	13.2	Neutral
1.0850	45.5	56.0	10.5	31.4	46.0	14.6	Neutral
1.1624	46.3	56.0	9.7	33.6	46.0	12.4	Neutral
1.2581	44.8	56.0	11.2	31.6	46.0	14.4	Neutral

Notes

1.	All possible modes of operation were investigated from 150kHz to 30MHz. Only the worst-case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2.	A "positive margin" indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative margin" indicates a FAIL.
3.	EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings: 150kHz - 30MHz RBW: 9kHz VBW: 30kHz

PSB Singapore

2.2 Radiated Emissions

2.2.1 Test Limits

Class B

Frequency Range (MHz)	Quasi-Peak Limits (dBµV/m) @ 3m
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0*
* Above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.	

PSB Singapore

2.2.2 Test Setup

2.2.2.1 The EUT and supporting equipment were set up in accordance with the requirements of the standard as shown in the setup photos.

2.2.2.2 The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.

2.2.2.3 The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

2.2.3 Test Method

2.2.3.1 The EUT was switched on and allowed to warm up to its normal operating condition.

2.2.3.2 A pre-scan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the pre-scan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.

2.2.3.3 The test was carried out at the selected frequency points obtained from the pre-scan. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:

a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
b. The EUT was then rotated to the direction that gave the maximum emission.
c. Finally, the antenna height was adjusted to the height that gave the maximum emission.

2.2.3.4 A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.

2.2.3.5 The measurements were repeated for the next frequency point, until all selected frequency points were measured.

Sample Calculation Example

At 300 MHz	Q-P limit (Class B) = 37.0 dBμV/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB Q-P reading obtained directly from EMI Receiver = 31.0 dBμV/m (Calibrated level including antenna factors & cable losses)	
Therefore, Q-P margin = 37.0 - 31.0 = 6.0	i.e. 6.0 dB below Q-P limit

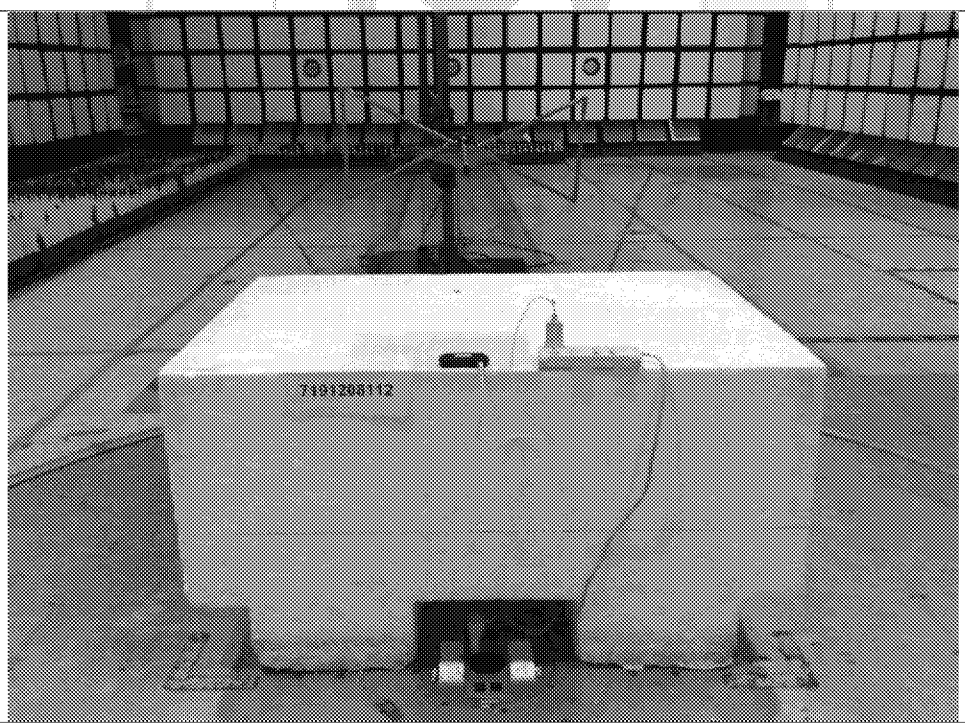
PSB Singapore

2.2.4 Test Setup Photographs

30MHz – 1GHz Test Setup



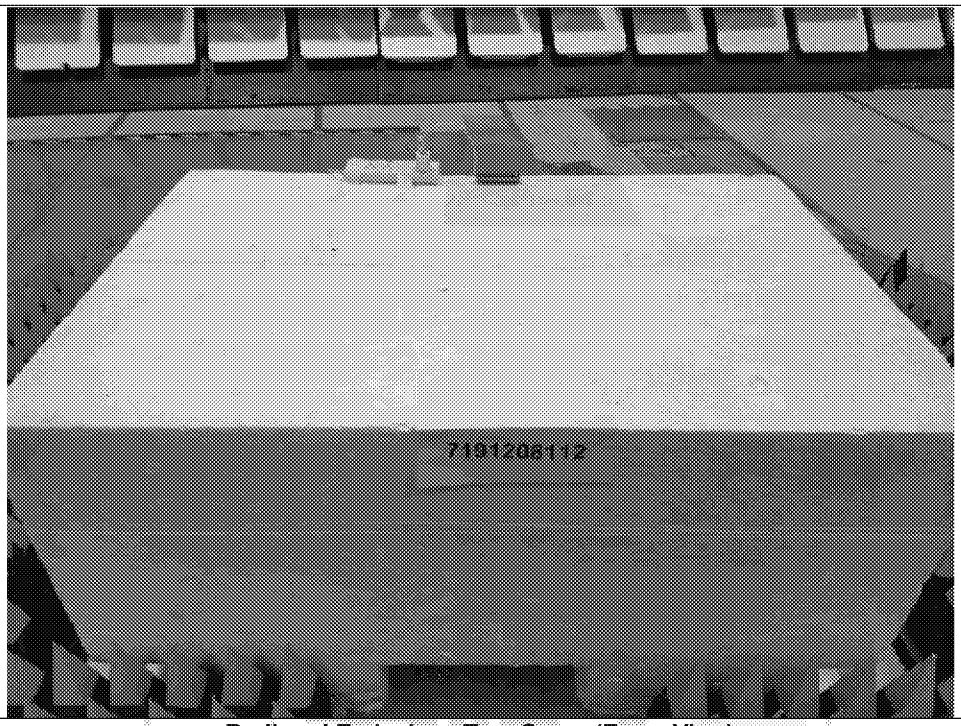
Radiated Emissions Test Setup (Front View)



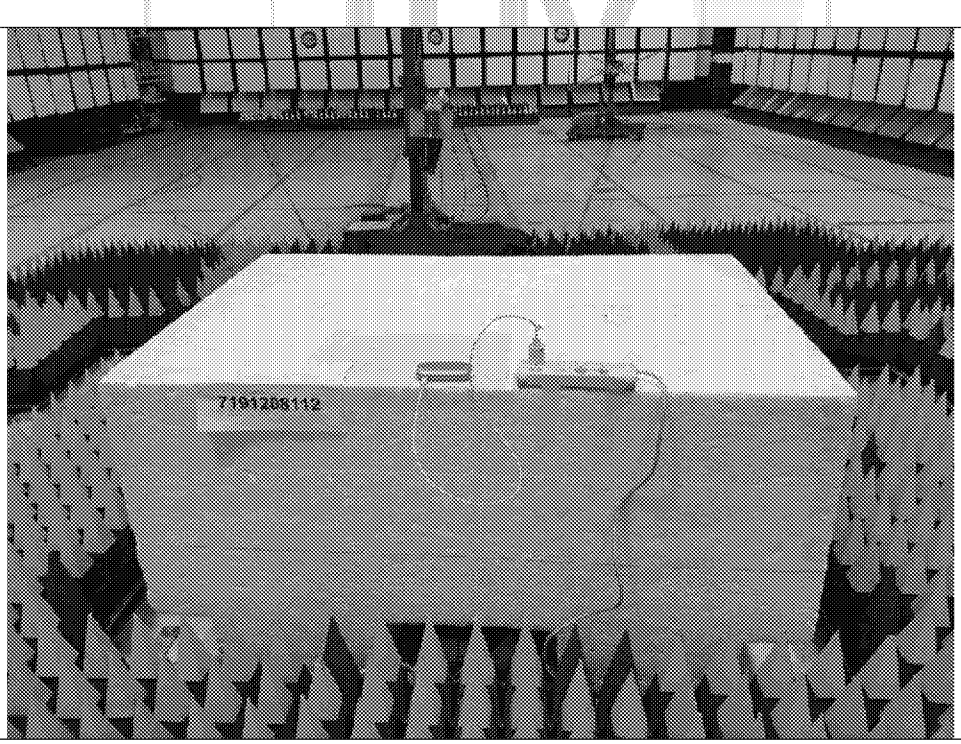
Radiated Emissions Test Setup (Rear View)

PSB Singapore

1GHz – 25GHz Test Setup



Radiated Emissions Test Setup (Front View)



Radiated Emissions Test Setup (Rear View)

PSB Singapore

2.2.5 Test Results

The detailed of the test results are shown below.

Operating Mode	Holder Turn On	Temperature	24°C
Test Input Power	Battery operated	Relative Humidity	60%
Test Distance	3m (30MHz – 1GHz) 3m (>1GHz – 25GHz)	Atmospheric Pressure	1030mbar
Class	B	Test Date	17 – 30 Apr 2019
Configuration	3	Tested By	(b) (6)

Emissions from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Limit (dBµV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Polarisation (H/V)
30.2940	24.8	40.0	15.2	198	63	V
46.3610	23.2	40.0	16.8	100	259	V
55.7660	18.2	40.0	21.8	100	117	V
90.4470	21.6	43.5	21.9	300	136	H
96.3260	21.1	43.5	22.4	400	99	H
139.9220	19.3	43.5	24.2	400	238	V

Emissions above 1GHz - 25GHz

Freq (GHz)	Peak Value (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	AV Value (dBµV/m)	AV Limit (dBµV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)
1.4398	33.4	74.0	40.6	25.0	54.0	29.0	250	107	V
1.4994	33.3	74.0	40.7	25.3	54.0	28.7	300	149	V
2.2670	34.8	74.0	39.2	26.8	54.0	27.2	150	313	V
3.1886	37.7	74.0	36.3	29.5	54.0	24.5	200	259	H
4.1340	39.4	74.0	34.6	30.6	54.0	23.4	150	192	V
4.7880	40.3	74.0	33.7	31.2	54.0	22.8	350	210	H

PSB Singapore

Operating Mode	Charging Pocket Charger with AC Power Adaptor, BLE connected	Temperature	24°C
Test Input Power	120V 60Hz	Relative Humidity	60%
Test Distance	3m (30MHz – 1GHz) 3m (>1GHz – 25GHz)	Atmospheric Pressure	1030mbar
Class	B	Test Date	17 – 30 Apr 2019
Configuration	4	Tested By	(b) (6)

Emissions from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Limit (dBµV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Polarisation (H/V)
47.8580	11.1	40.0	28.9	100	75	V
56.9140	13.8	40.0	26.2	134	120	V
58.7660	12.6	40.0	27.4	120	88	V
61.7170	13.0	40.0	27.0	111	86	V
66.0030	10.1	40.0	29.9	109	160	V
98.9790	23.2	43.5	20.3	100	291	V

Emissions above 1GHz - 25GHz

Freq (GHz)	Peak Value (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	AV Value (dBµV/m)	AV Limit (dBµV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)
1.4393	33.1	74.0	40.9	23.6	54.0	30.4	200.0	197	V
1.4797	33.9	74.0	40.1	24.4	54.0	29.6	200.0	153	V
2.9998	38.5	74.0	35.5	28.9	54.0	25.1	250.0	133	H
4.9016	41.0	74.0	33.0	35.0	54.0	19.0	200.0	138	V
9.6408	46.5	74.0	27.5	45.0	54.0	9.0	250.0	109	V
9.7262	46.6	74.0	27.4	41.5	54.0	12.5	250.0	242	V

PSB Singapore

Operating Mode	Charging Pocket Charger (Holder inserted) with AC Power Adaptor, BLE connected	Temperature	24°C
Test Input Power	120V 60Hz	Relative Humidity	60%
Test Distance	3m (30MHz – 1GHz) 3m (>1GHz – 25GHz)	Atmospheric Pressure	1030mbar
Class	B	Test Date	17 – 30 Apr 2019
Configuration	5	Tested By	(b) (6)

Emissions from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Limit (dBµV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Polarisation (H/V)
30.2200	21.3	40.0	18.7	123	19	V
36.5960	20.4	40.0	19.6	105	73	V
44.6700	21.7	40.0	18.3	100	245	V
52.6840	20.7	40.0	19.3	123	247	V
53.4130	21.7	40.0	18.3	100	250	V
383.5980	31.0	46.0	15.0	100	338	H

Emissions above 1GHz - 25GHz

Freq (GHz)	Peak Value (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	AV Value (dBµV/m)	AV Limit (dBµV/m)	AV Margin (dB)	Height (cm)	Azimuth (Degrees)	Pol (H/V)
1.0111	33.0	74.0	41.0	25.2	54.0	28.8	300.0	29	H
1.4797	33.3	74.0	40.7	24.1	54.0	29.9	200.0	102	V
2.2448	35.8	74.0	38.2	26.4	54.0	27.6	250.0	75	V
3.0366	37.4	74.0	36.6	29.0	54.0	25.0	300.0	130	H
4.1052	38.6	74.0	35.4	30.7	54.0	23.3	350.0	223	V
5.0980	39.9	74.0	34.1	32.8	54.0	21.2	350.0	220	V

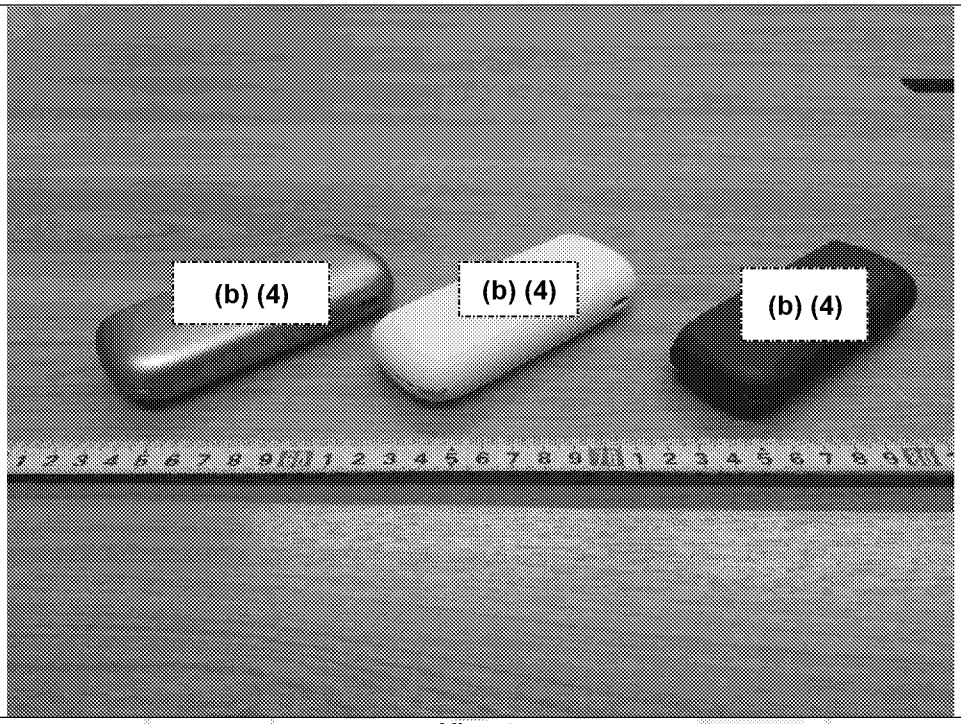
Notes

1.	All possible modes of operation were investigated. Only the worst-case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2.	A "positive margin" indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative margin" indicates a FAIL.
3.	EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings: 30MHz - 1GHz RBW: 120kHz VBW: 1MHz 1GHz – 6GHz RBW: 1MHz VBW: 3MHz
4.	The highest frequency of internal sources of the EUT is above 1GHz, as such, the measurement was made up to 5th harmonic of the highest frequency or 40GHz whichever is lower.

PSB Singapore

3 Photographs

IQOS Pocket Charger A1504
From Left to Right: (b) (4) Charger, (b) (4) Pocket Charger, (b) (4) Pocket Charger



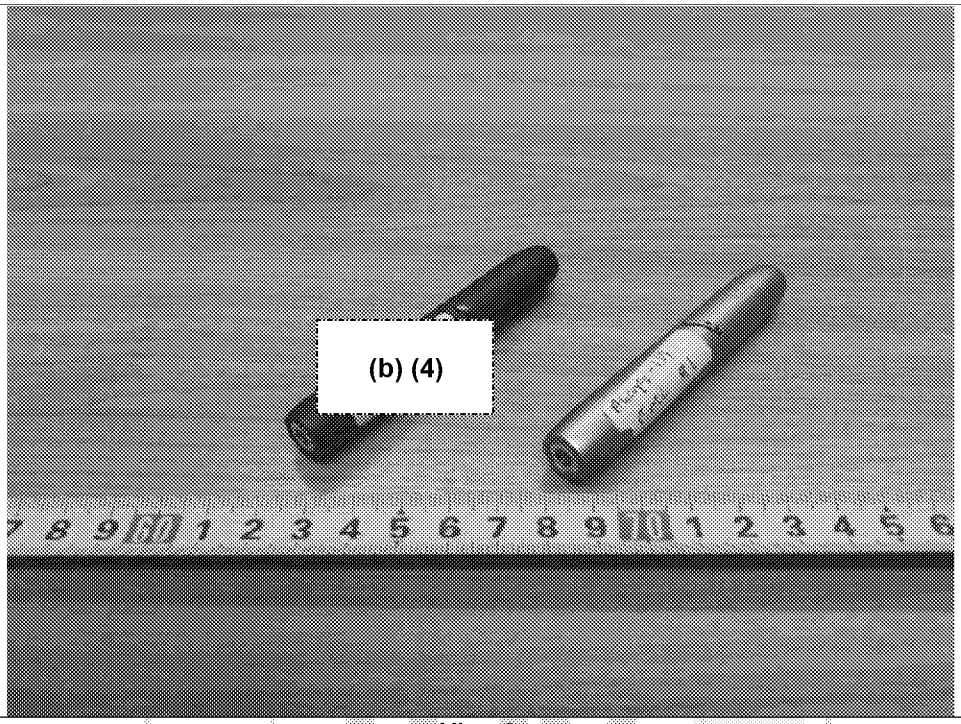
View 1



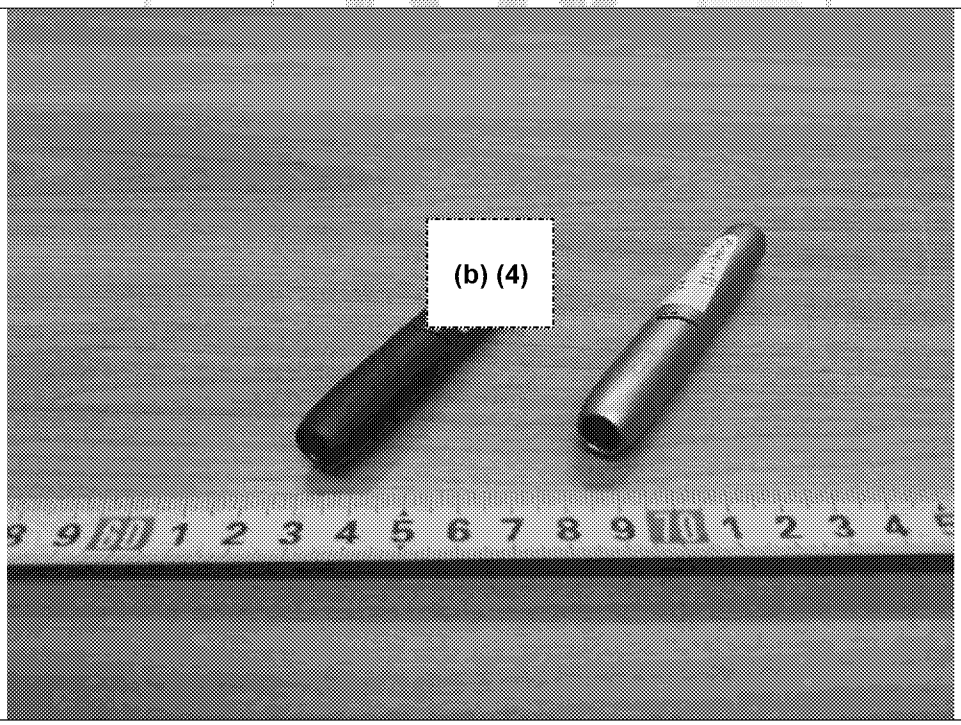
ew 2

PSB Singapore

IQOS Holder A1406
From Left to Right: (b) (4), Aucopo Holder



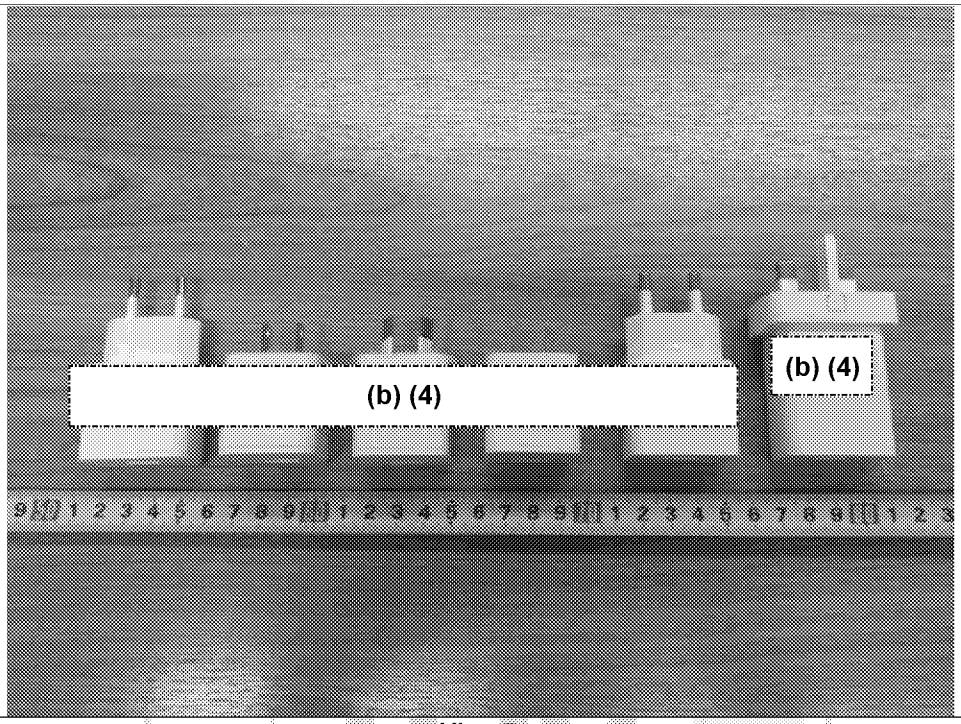
View 3



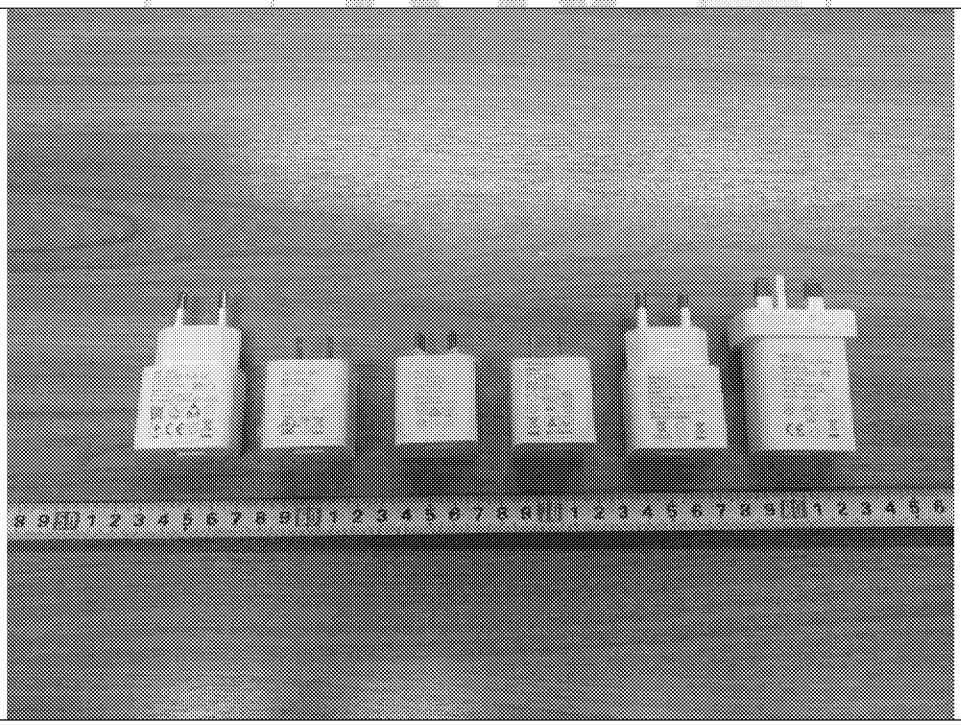
View 4

PSB Singapore

(b) (4) AC Adaptors
From Left to Right: S21A20, S21A22, S21A23, S21A25, S21A27, S52A21



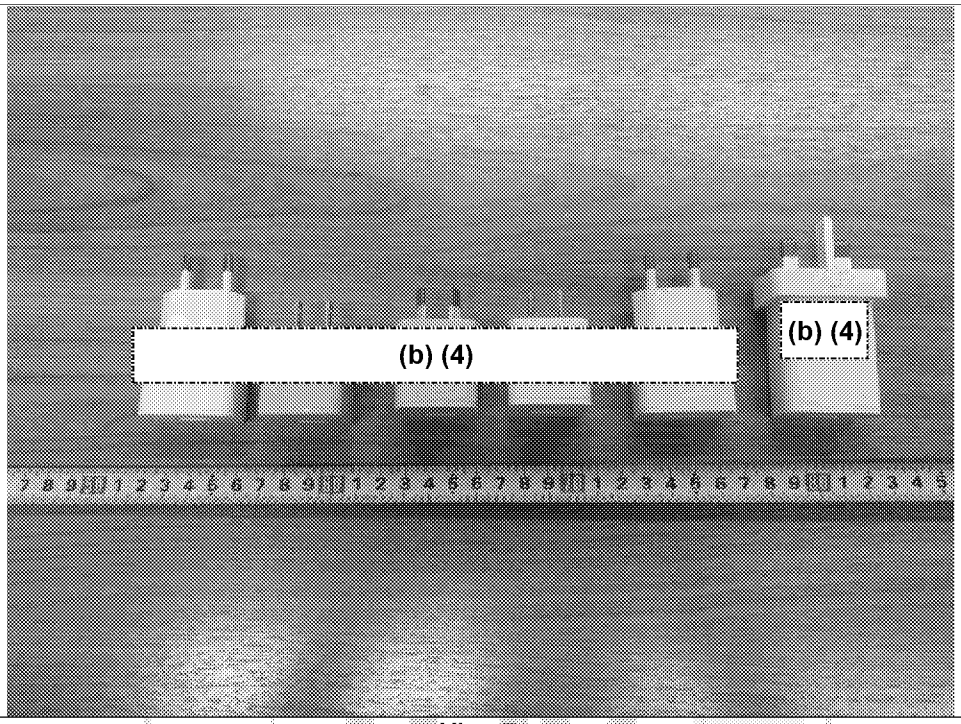
View 5



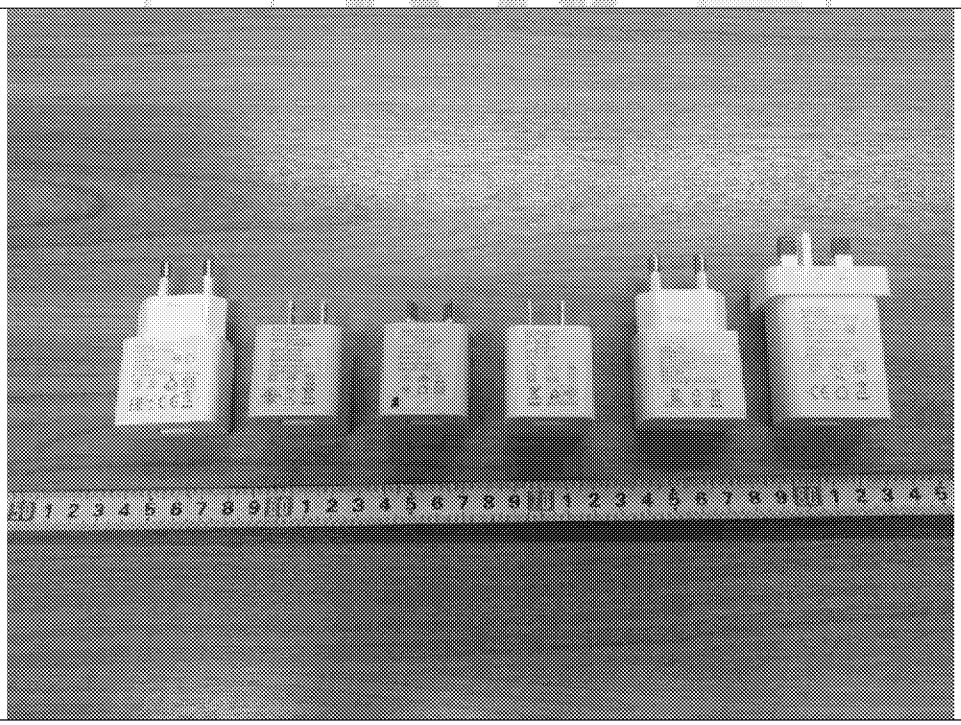
View 6

PSB Singapore

(b) (4) AC Adaptors
From Left to Right: S21A20, S21A22, S21A23, S21A25, S21A27, S52A21



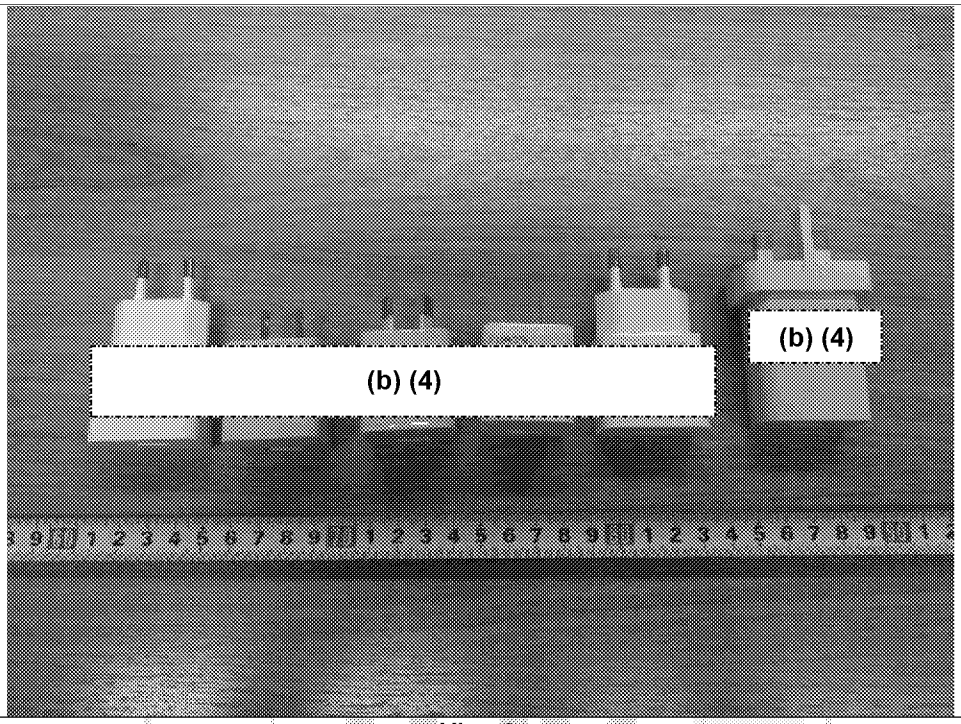
View 7



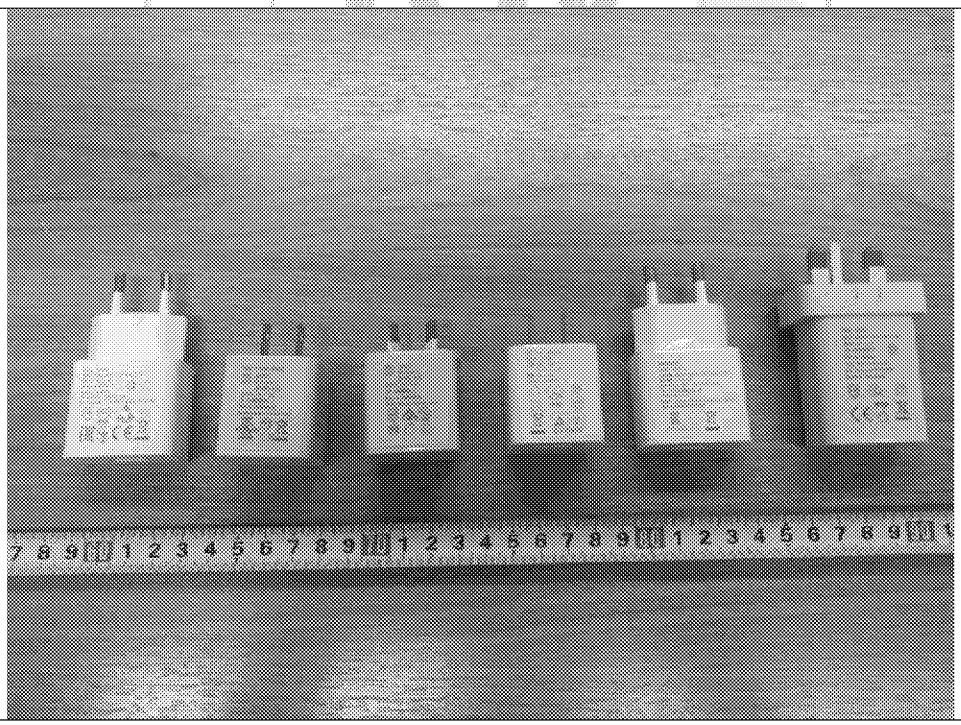
View 8

PSB Singapore

(b) (4) AC Adaptors
From Left to Right: S21A20, S21A22, S21A23, S21A25, S21A27, S52A21



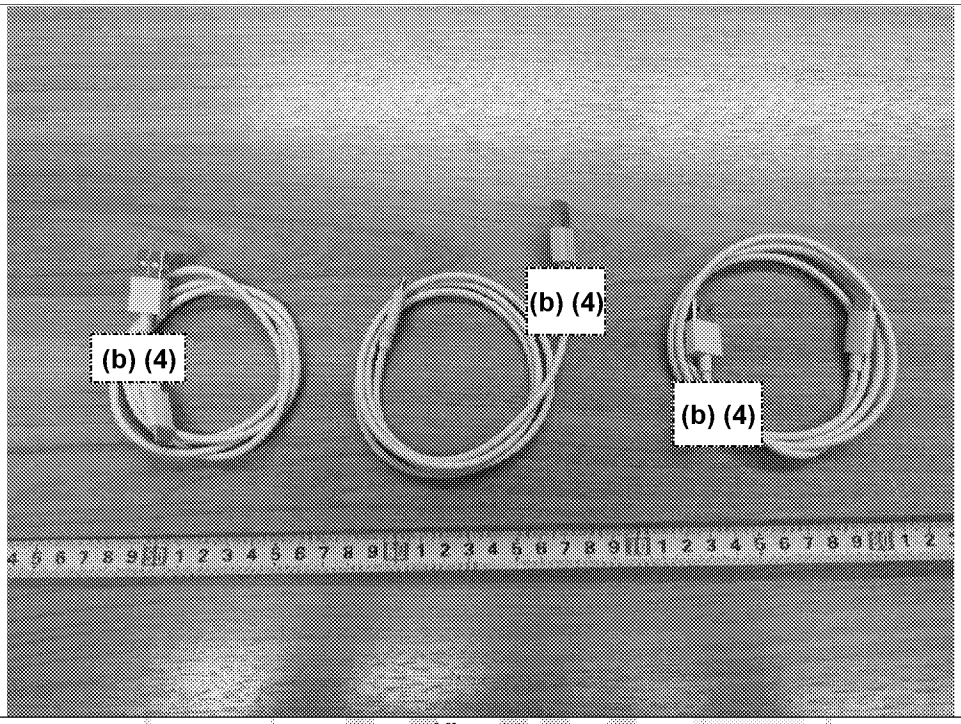
View 9



View 10

PSB Singapore

USB Cables
From Left to Right: (b) (4)



View 11

PSB Singapore

4 Test Equipment

Instrument	Model	S/No	Cal Due Date
Conducted Emissions at Mains Terminals			
Schaffner EMI Receiver	SMR4503	40	14 May 2019
Agilent EMC Analyzer	E7403A	US41160166	06 Jul 2019
Schaffner LISN 2-Line V-Network	NNB41	04/10151	03 Mar 2020
Radiated Emissions			
R&S EMI Test Receiver	ESU 40	1302.6005k40-100355-wq	07 Sep 2019
Schaffner Bilog Antenna	CBL6112B	2597	27 Mar 2020
ETS Horn Antenna	3115	0003-6088	01 Mar 2020
ETS Horn Antenna	3116	0004-2474	07 Jan 2020
Com-Power Preamplifier	PAM-103	441158	18 Jul 2019
R&S Preamplifier	SCU18	102191	15 Jan 2020
Agilent Preamplifier	8449D	3008A02305	28 Sep 2019

PSB Singapore

5 Measurement Uncertainty

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2.

Test Name	Measurement Uncertainty
Conducted Emissions at Mains Terminals	9kHz to 30MHz, ±2.4dB
Radiated Emissions	30MHz to 1GHz @ 10m, ±4.0dB 30MHz to 1GHz @ 3m, ±5.6dB >1GHz to 40GHz @3m, ±4.9dB

PSB Singapore

Please note that this Report is issued under the following terms :

1. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.

2. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. TÜV SÜD PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

3. Nothing in this report shall be interpreted to mean that TÜV SÜD PSB has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.

4. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to TÜV SÜD PSB or to the report or results furnished by TÜV SÜD PSB in any advertisements or sales promotion.

5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.

July 2011

PSB Singapore

End of the Test Report

Report on the EMC Testing of:

Tobacco Heating System

Model(s): IQOS 3

In accordance with FCC 47 CFR Part 15B

PSB Singapore

Add value.
Inspire trust.

Prepared for:
Philip Morris Products S.A.
Quai Jeanrenaud 3, 2000 Neuchâtel,
Switzerland

COMMERCIAL-IN-CONFIDENCE

Document Number: 7191194758-EEC18/03 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	(b) (6)	01 Nov 2018	(b) (6)
Authorised Signatory	(b) (6)	30 Oct 2018	(b) (6)

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD PSB document control rules.

(b) (6)

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with the mentioned standard(s).

Laboratory:
TÜV SÜD PSB Pte. Ltd.
No.1 Science Park Drive
Singapore 118221

Phone : +65-6885 1333
Fax : +65-6776 8670
E-mail: enquiries@tuv-sud-psb.sg
www.tuv-sud-psb.sg
Co. Reg : 199002667R

Regional Head Office:
TÜV SÜD Asia Pacific Pte. Ltd.
1 Science Park Drive, #02-01
Singapore 118221

PSB Singapore

Contents

1 Report Summary 3

1.1 Report Modification Record 3
1.2 Introduction 4
1.3 Brief Summary of Results 5
1.4 Product Information 6
1.5 Deviations from the Standard 7
1.6 EUT Modification Record 7
1.7 Test Location(s) 7
1.8 Test Facilities Registrations 8
1.9 Supporting Equipment 8

2 Test Details 9

2.1 Conducted Emissions at Mains Terminals 9
2.2 Radiated Emissions 14

3 Photographs 19

4 Test Equipment 23

5 Measurement Uncertainty 24

End of the Test Report 26

PSB Singapore

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	01 Nov 2018

PSB Singapore

1.2 Introduction

Applicant	:	Philip Morris Products S.A.. Quai Jeanrenaud 3, 2000 Neuchâtel, Switzerland
Manufacturer	:	Same as applicant
Factory	:	**(b) (4)**
Trade Mark		IQOS
Model Number(s)	:	1. A1404 (Holder) 2. A1504 (Pocket Charger) 3. AC Power Adaptor (S21A20) 4. USB Cable
Serial Number(s)	:	1. A1404 (Holder) – IQOS3 H A2.0_0239 2. A1504 (Pocket Charger) – IQOS PC A2.0_0112 3. AC Power Adaptor – 81920714536_S 4. USB Cable - Nil
Number of Samples Tested	:	X01
Test Sample(s) Condition	:	Good
Quotation Reference	:	5134045
Test Specification/Issue/Date	:	FCC 47 CFR 15B
Test Sample(s) Received Date	:	09 Oct 2018
Start of Test	:	23 Oct 2018
Finish of Test	:	23 Oct 2018

PSB Singapore

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with the specifications as shown below.

Specification Clause	Test Description	Result	Comments/Base Standard
FCC 47 CFR 15B			
15.107	Conducted Emissions at Mains Terminals (Class B)	Pass	ANSI C63.4: 2014
15.109	Radiated Emissions (Class B)	Pass	ANSI C63.4: 2014

Notes

1. Nil

PSB Singapore

1.4 Product Information

1.4.1 Technical Description

Description	:	The Equipment Under Test (EUT) is a **TOBACCO HEATING SYSTEM (IQOS 3).** It consists of i. IQOS Holder A1404 ii. IQOS Pocket Charger A1504 iii. IQOS AC Power Adaptor S21A20
Microprocessor	:	**(b) (4)**
Operating Frequency	:	Holder – **(b) (4)** Charger –
Clock / Oscillator Frequency	:	Holder – **(b) (4)** Charger – **(b) (4)** Charger BLE – **(b) (4)**
Modulation	:	**(b) (4)**
Antenna Gain	:	**(b) (4)**
Port / Connectors	:	USB-Type C
Accessories / Rated Output	:	i. IQOS Holder Model A1404 Output 5VDC; 1.6A ii. IQOS Pocket Charger Model A1504 Output 5VDC, 2.0A iii. IQOS AC Power Adaptor Rated output: 5VDC; 2A

1.4.2 Test Configuration and Modes of Operation

Mode(s)	Description
1. Charging Pocket Charger with AC Power Adaptor, BLE connected	The EUT was exercised in the mode(s) throughout the test(s).
2. Charging Pocket Charger (Holder inserted) with AC Power Adaptor, BLE connected	

PSB Singapore

1.4.3 Performance Criteria and Monitoring Methods

Not Applicable.

1.5 Deviations from the Standard

Nil.

1.6 EUT Modification Record

No modifications were made.

1.7 Test Location(s)

TÜV SÜD PSB Pte Ltd
Electrical & Electronics Centre (EEC), Product Services,
13 International Business Park #01-01, Singapore 609932

PSB Singapore

1.8 Test Facilities Registrations

Requirements	Registration Numbers
FCC	994109 (Test Firm Registration Number) SG0002 (Designation Number)
ISED	Science Park 2932I-1 (3m and 10m Semi-Anechoic Chamber) International Business Park 2932N-1 (10m Semi-Anechoic Chamber)
VCCI	Science Park R-1335 (10m ANC), G-29 (10m ANC) C-2306 (C.E @ Lab 3) T-1471 (Telecom Ports @ Lab 3) International Business Park R-3324 (10m ANC), G-203 (10mANC) C-4933 (C.E @ CEIBP) T-2403 (Telecom Ports @ CEIBP)
BSMI	SL2-IS-E-6001R [CNS-13803 (ISM Equipment)] SL2-IN-E-6001R [CNS-13438 (IT Equipment)] SL2-R1/R2-E-6001R [CNS-13439 (Broadcast Receivers)] SL2-A1-E-6001R [CNS-13783-1 (Household Appliances)] SL2-L1-E-6001R [CNS-14115 (Lighting Equipment)]
SABS	SABS/A-LAB/0029/2018

1.9 Supporting Equipment

Equipment Description (Including Brand Name)	Model, Serial & FCC ID Number	Cable Description (List Length, Type & Purpose)
Mobile Phone (Samsung S7)	M/N: SM-G930FD S/N: R58H54E71QH FCC ID: DoC	NA
AC Travel Power Adapter (Samsung)	M/N: ETA0U71XWE S/N: RT4F722FS/A-E FCC ID: Nil	1.0m (Unshielded, USB to Micro USB cable)

PSB Singapore

2 Test Details

2.1 Conducted Emissions at Mains Terminals

2.1.1 Test Limits

AC Mains Port (Class B)

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-peak (Q-P)	Average (AV)
0.15 - 0.5	66 – 56 *	56 – 46 *
0.5 - 5.0	56	46
5.0 - 30.0	60	50
* Decreasing linearly with the logarithm of the frequency		

PSB Singapore

2.1.2 Test Setup

2.1.2.1 The EUT and supporting equipment were set up in accordance with the requirements of the standard as shown in the setup photos.

2.1.2.2 The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.

2.1.2.3 The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.

2.1.2.4 All other supporting equipment were powered separately from another LISN.

2.1.3 Test Method

2.1.3.1 The EUT was switched on and allowed to warm up to its normal operating condition.

2.1.3.2 A scan was made on the NEUTRAL line over the required frequency range using an EMI test receiver.

2.1.3.3 High peaks, relative to the limit line, were then selected.

2.1.3.4 The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 9kHz. Both Quasi-peak and Average measurements were made.

2.1.3.5 The measurements were then repeated for the LIVE line.

Sample Calculation Example

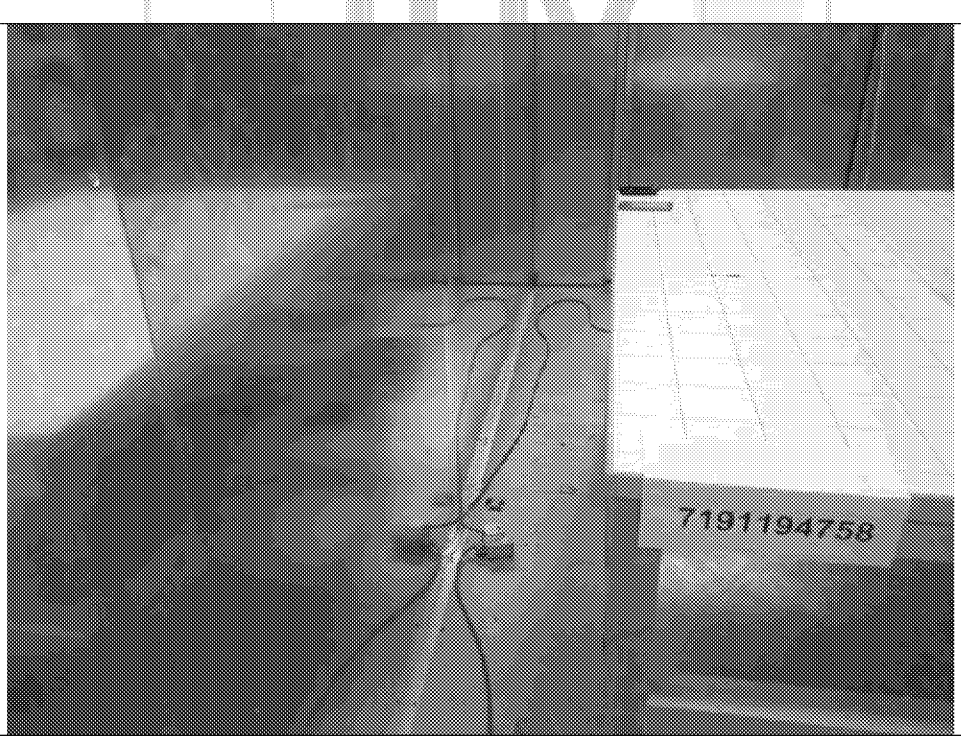
At 20 MHz	Q-P limit (Class B) = 60.0 dBμV
Transducer factor of LISN, pulse limiter & cable loss at 20 MHz = 11.2 dB	
Q-P reading obtained directly from EMI Receiver = 40.0 dBμV (Calibrated for system losses)	
Therefore, Q-P margin = 60.0 - 40.0 = 20.0	i.e. 20.0 dB below Q-P limit

PSB Singapore

2.1.4 Test Setup Photographs



Conducted Emissions at Mains Test Setup (Front View)



Conducted Emissions at Mains Test Setup (Rear View)

PSB Singapore

2.1.5 Test Results

The detailed of the test results are shown below.

Operating Mode	Charging Pocket Charger (Holder inserted) with AC Power Adaptor, BLE connected	Temperature	20°C
Test Input Power	120V 60Hz	Relative Humidity	42%
Line Under Test	AC Mains	Atmospheric Pressure	1027mbar
Class	B	Tested By	Kelvin Cheng
		Test Date	23 Oct 2018

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line
0.2598	46.0	61.4	15.4	34.3	51.4	17.1	Neutral
0.6689	40.3	56.0	15.7	29.7	46.0	16.3	Neutral
1.8359	37.3	56.0	18.7	27.2	46.0	18.8	Live
11.3781	41.3	60.0	18.7	30.0	50.0	20.0	Neutral
12.8295	42.8	60.0	17.2	31.9	50.0	18.1	Live
18.0532	47.1	60.0	12.9	35.9	50.0	14.1	Live

Operating Mode	Charging Pocket Charger with AC Power Adaptor, BLE connected	Temperature	20°C
Test Input Power	120V 60Hz	Relative Humidity	42%
Line Under Test	AC Mains	Atmospheric Pressure	1027mbar
Class	B	Tested By	Kelvin Cheng
		Test Date	23 Oct 2018

Frequency (MHz)	Q-P Value (dBµV)	Q-P Limit (dBµV)	Q-P Margin (dB)	AV Value (dBµV)	AV Limit (dBµV)	AV Margin (dB)	Line
0.7667	44.9	56.0	11.1	34.5	46.0	11.5	Live
0.8425	41.8	56.0	14.2	30.2	46.0	15.8	Neutral
1.4312	35.1	56.0	20.9	22.7	46.0	23.3	Neutral
1.9720	37.4	56.0	18.6	33.4	46.0	12.6	Live
3.8627	35.1	56.0	20.9	26.1	46.0	19.9	Live
11.4988	40.4	60.0	19.6	30.0	50.0	20.0	Live

PSB Singapore

Notes

1.	All possible modes of operation were investigated from 150kHz to 30MHz. Only the worst-case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2.	A "positive margin" indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative margin" indicates a FAIL.
3.	EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings: 150kHz - 30MHz RBW: 9kHz VBW: 30kHz

PSB Singapore

2.2 Radiated Emissions

2.2.1 Test Limits

Class B

Frequency Range (MHz)	Quasi-Peak Limits (dBµV/m) @ 3m
30 - 88	40.0
88 - 216	43.5
216 - 960	46.0
Above 960	54.0*
* Above 1GHz, average detector was used. A peak limit of 20dB above the average limit does apply.	

Class B *(CISPR 22 Radiated Emission Limits)*

Frequency Range (MHz)	Quasi-Peak Limits (dBµV/m) @ 10m
30 - 230	30
230 - 1000	37
Note : At transition frequency, lower limit applies.	

PSB Singapore

2.2.2 Test Setup

2.2.2.1 The EUT and supporting equipment were set up in accordance with the requirements of the standard as shown in the setup photos.

2.2.2.2 The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the turntable.

2.2.2.3 The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary.

2.2.3 Test Method

2.2.3.1 The EUT was switched on and allowed to warm up to its normal operating condition.

2.2.3.2 A pre-scan was carried out to pick the worst emission frequencies from the EUT. For EUT which is a portable device, the pre-scan was carried out by rotating the EUT through three orthogonal axes to determine which altitude and equipment arrangement produces such emissions.

2.2.3.3 The test was carried out at the selected frequency points obtained from the pre-scan. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:

a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
b. The EUT was then rotated to the direction that gave the maximum emission.
c. Finally, the antenna height was adjusted to the height that gave the maximum emission.

2.2.3.4 A Quasi-peak measurement was made for that frequency point if it was less than or equal to 1GHz. For frequency point that above 1GHz, both Peak and Average measurements were carried out.

2.2.3.5 The measurements were repeated for the next frequency point, until all selected frequency points were measured.

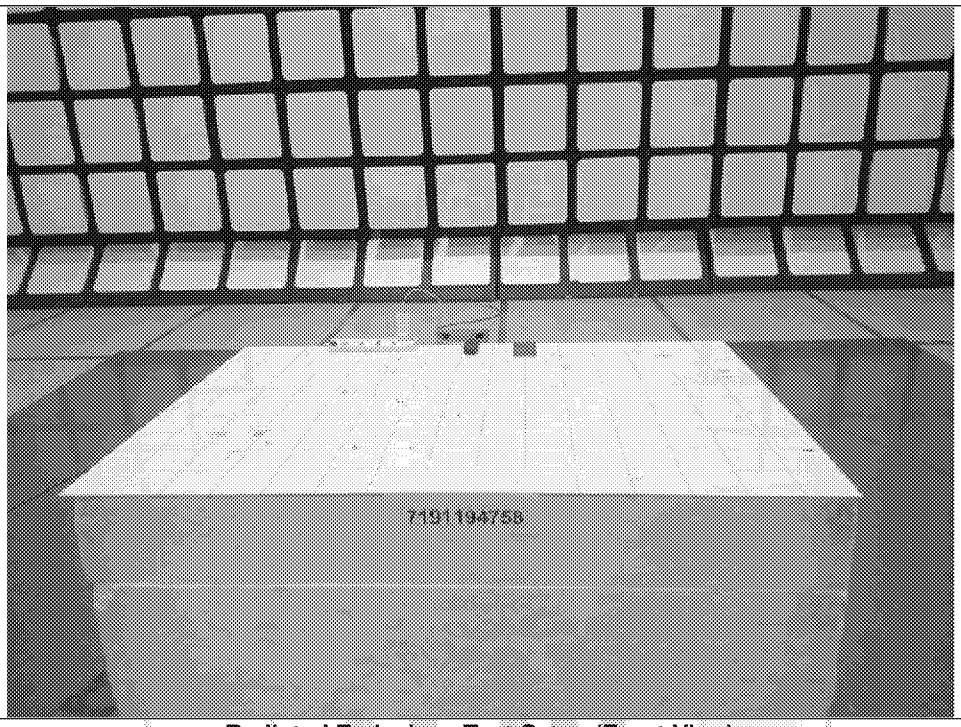
Sample Calculation Example

At 300 MHz	Q-P limit (Class B) = 37.0 dBμV/m
Log-periodic antenna factor & cable loss at 300 MHz = 18.5 dB Q-P reading obtained directly from EMI Receiver = 31.0 dBμV/m (Calibrated level including antenna factors & cable losses)	
Therefore, Q-P margin = 37.0 - 31.0 = 6.0	i.e. 6.0 dB below Q-P limit

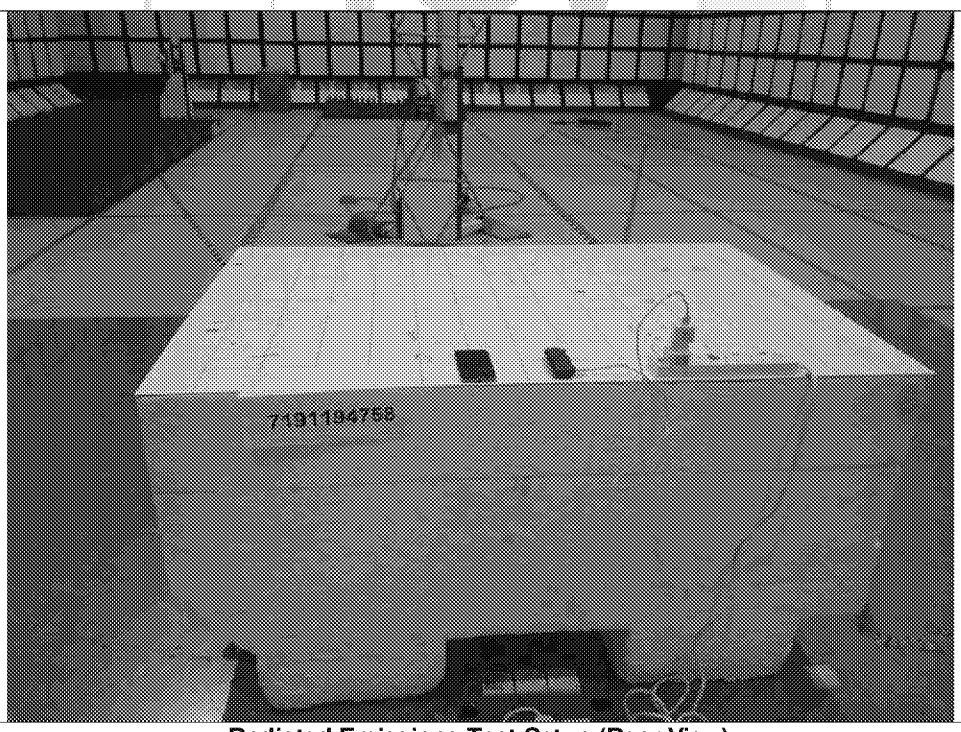
PSB Singapore

2.2.4 Test Setup Photographs

30MHz – 1GHz Test Setup



Radiated Emissions Test Setup (Front View)



Radiated Emissions Test Setup (Rear View)

PSB Singapore

2.2.5 Test Results

The detailed of the test results are shown below.

Operating Mode	Charging Pocket Charger (Holder inserted) with AC Power Adaptor, BLE connected	Temperature	22°C
Test Input Power	120V 60Hz	Relative Humidity	44%
Test Distance	3m (30MHz – 1GHz)	Atmospheric Pressure	1030mbar
Class	B	Tested By	Kelvin Cheng
		Test Date	23 Oct 2018

Emissions from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Limit (dBµV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Polarisation (H/V)
34.1600	32.9	40.0	7.1	100	164	V
82.9050	27.0	40.0	13.0	260	190	V
192.5750	39.8	43.5	3.7	101	0	V
299.4260	35.9	46.0	10.1	100	0	H
351.8240	26.4	46.0	19.6	101	200	V
412.9230	29.1	46.0	16.9	100	30	V

Operating Mode	Charging Pocket Charger with AC Power Adaptor, BLE connected	Temperature	22°C
Test Input Power	120V 60Hz	Relative Humidity	44%
Test Distance	3m (30MHz – 1GHz)	Atmospheric Pressure	1030mbar
Class	B	Tested By	Kelvin Cheng
		Test Date	23 Oct 2018

Emissions from 30MHz – 1GHz

Frequency (MHz)	Q-P Value (dBµV/m)	Q-P Limit (dBµV/m)	Q-P Margin (dB)	Height (cm)	Azimuth (Degrees)	Polarisation (H/V)
33.8460	31.2	40.0	8.8	101	275	V
60.6330	22.9	40.0	17.1	101	347	V
82.9210	28.9	40.0	11.1	101	160	V
168.6980	30.7	43.5	12.8	101	219	H
224.9990	21.6	46.0	24.4	227	123	H
257.5590	18.3	46.0	27.7	101	60	V

Notes

1.	All possible modes of operation were investigated. Only the worst-case emissions measured, using the correct CISPR detectors, are reported. All other emissions were relatively insignificant.
2.	A "positive margin" indicates a PASS as it refers to the margin present below the limit line at the particular frequency. Conversely, a "negative margin" indicates a FAIL.
3.	EMI receiver Resolution Bandwidth (RBW) and Video Bandwidth (VBW) settings: 30MHz - 1GHz RBW: 120kHz VBW: 1MHz 1GHz – 6GHz RBW: 1MHz VBW: 3MHz
4.	The highest frequency of internal sources of the EUT is less than 108MHz, as such the measurement was made up to 1GHz.

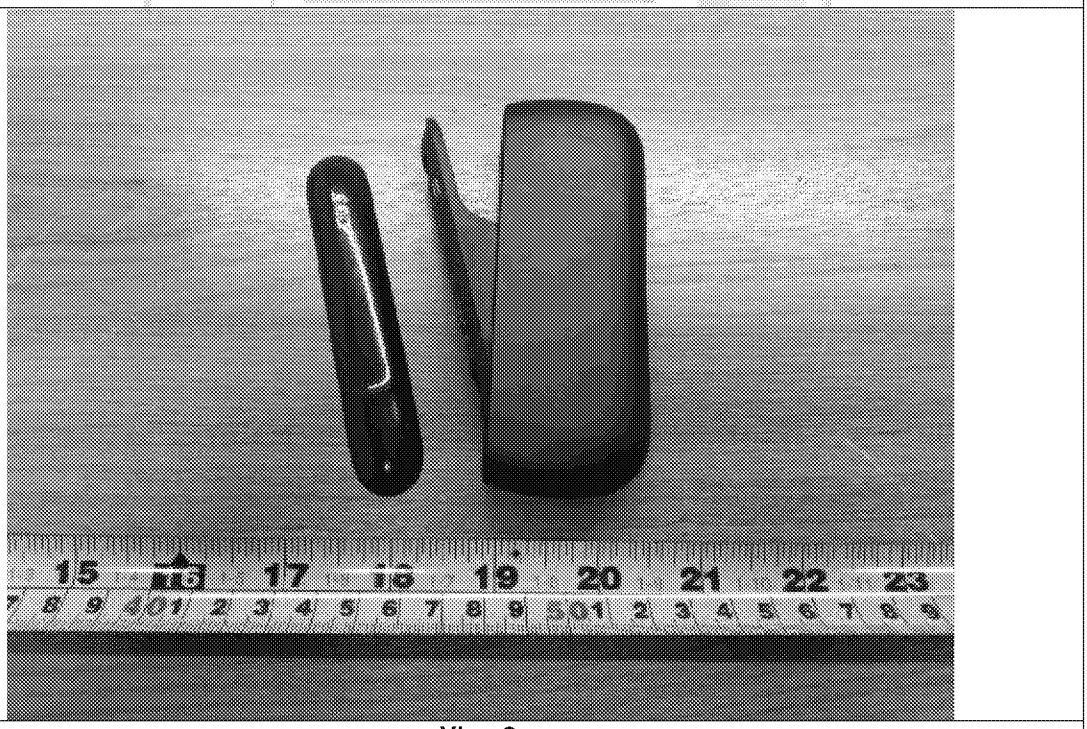
PSB Singapore

3 Photographs

IQOS Pocket Charger A1504



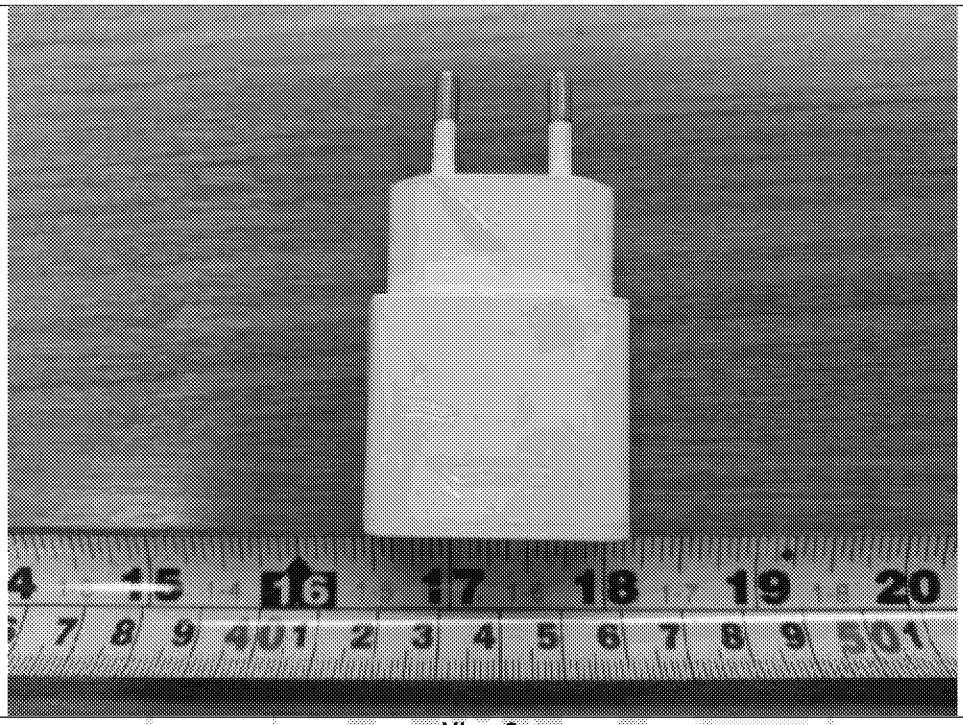
View 1



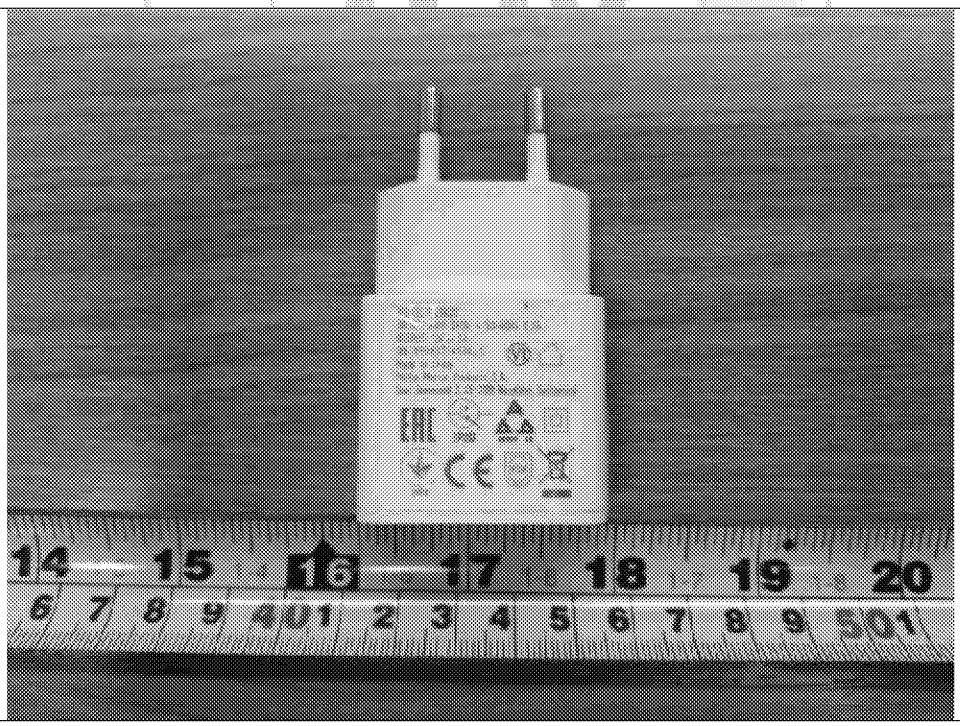
View 2

PSB Singapore

IQOS AC Power Adaptor



View 3



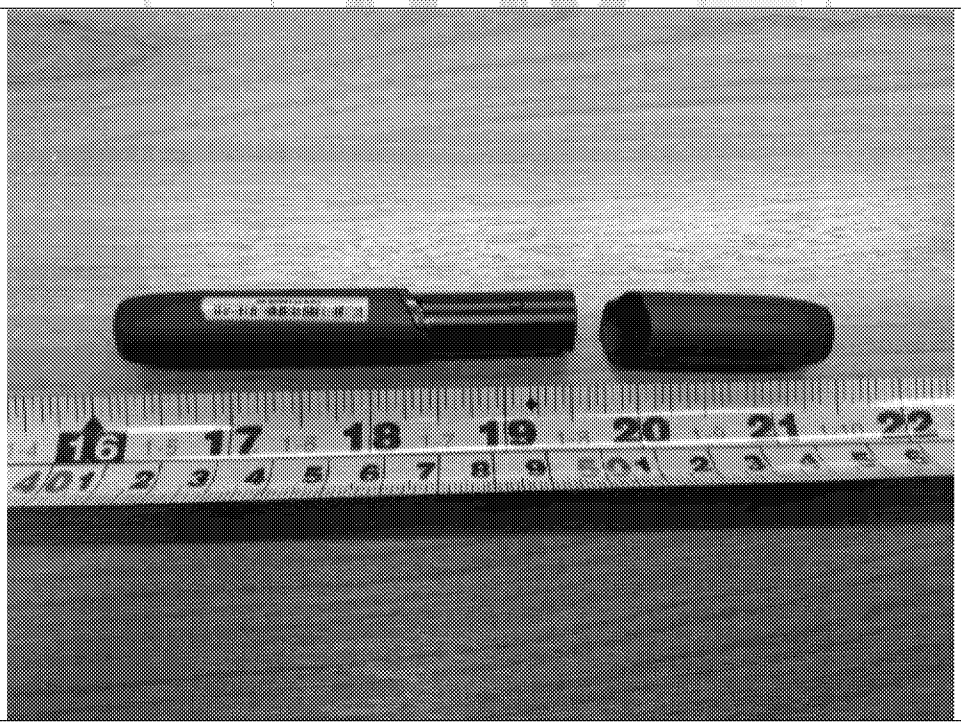
View 4

PSB Singapore

IQOS Holder A1404



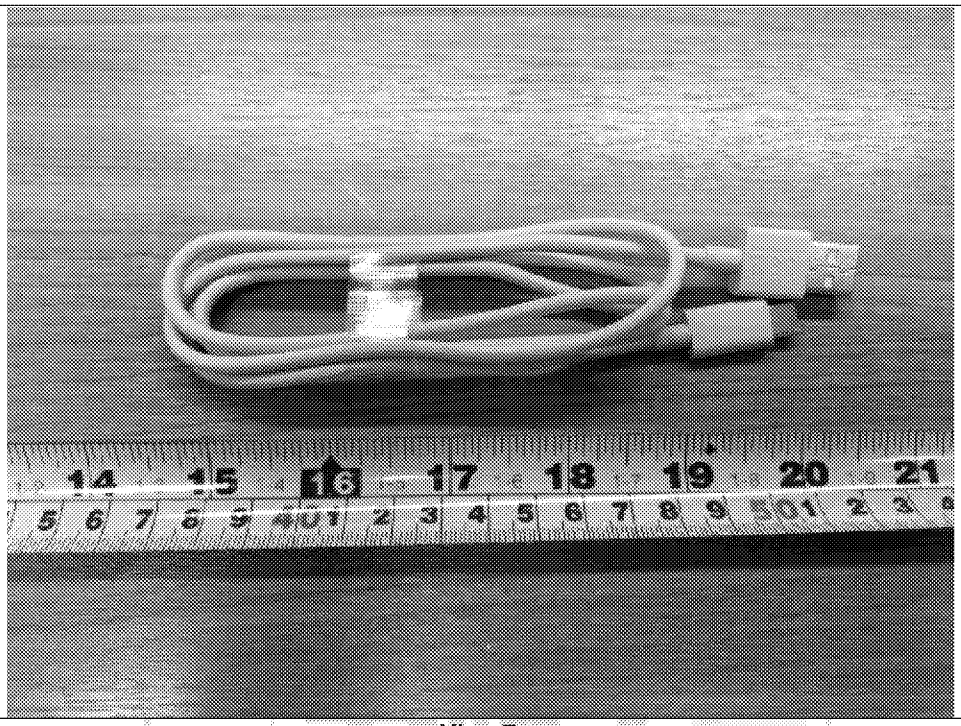
View 5



View 6

PSB Singapore

USB cable



View 7

PSB Singapore

4 Test Equipment

Instrument	Model	S/No	Cal Due Date
Conducted Emissions at Mains Terminals			
Rohde & Schwarz EMI Test Receiver (9kHz - 3GHz)	ESCI	100477	13 May 2019
Schaffner LISN 2-Line V-Network	NNB41	04/10151	01 Feb 2019
Radiated Emissions			
Rohde & Schwarz EMI Test Receiver	ESW	101661	06 Dec 2018
Sonoma Preamplifier	310N	270640	10 Jul 2019
TDK RF Solutions Hybrid Log Periodic Antenna	HLP-3003C	130745	31 Oct 2018

5 Measurement Uncertainty

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2.

Test Name	Measurement Uncertainty
Conducted Emissions at Mains Terminals	9kHz to 30MHz, ±2.1dB
Radiated Emissions	30MHz to 1GHz, ±3.8dB >1GHz to 40GHz, ±4.5dB

PSB Singapore

Please note that this Report is issued under the following terms :

1. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way "guarantees" the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.

2. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. TÜV SÜD PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

3. Nothing in this report shall be interpreted to mean that TÜV SÜD PSB has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.

4. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to TÜV SÜD PSB or to the report or results furnished by TÜV SÜD PSB in any advertisements or sales promotion.

5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.

July 2011

PSB Singapore

End of the Test Report