Prüfbericht-Nr.: *Test Report No.*:	**50259361 001**	**Auftrags-Nr.:** *Order No.*:	238105760	Seite 1 von 24 *Page 1 of 24*
Kunden-Referenz-Nr.: *Client Reference No.*:	N/A	**Auftragsdatum:** *Order date*:	20-May-2019	
Auftraggeber: *Client*:	Kingston Technology Company, Inc., 17600 Newhope St, Fountain Valley, CA 92708, USA			
Prüfgegenstand: *Test item*:	Cloud Flight Wireless USB Dongle			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	HXS-HSDG2********** (*= 0-9, A-Z, a-z, - or blank; to indicate different colors, packaging and shipping locations)			
Auftrags-Inhalt: *Order content*:	FCC Part 15C/ISED RSS-247/ Test report			
Prüfgrundlage: *Test specification*:	FCC 47CFR Part 15: Subpart C Section 15.247(DTS) RSS-247 ISSUE 2 FEB 2017			

Wareneingangsdatum: *Date of receipt*:	24-Apr-2019
Prüfmuster-Nr.: *Test sample No.*:	A000934314-001 A000934314-002
Prüfzeitraum: *Testing period*:	27-May-2019 - 31-May-2019
Ort der Prüfung: *Place of testing*:	EMC/RF Laboratory Taipei
Prüflaboratorium: *Testing laboratory*:	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result**:	Pass

geprüft von / *tested by*:

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*
14-Jun-2019	Ryan W. T. Chen / Project Manager	

kontrolliert von / *reviewed by*:

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*
14-Jun-2019	Arvin Ho/Vice General Manager	

Sonstiges / *Other*:

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*:	Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar	5 = mangelhaft N/T = nicht getestet
Legend:	*1 = very good* *P(ass) = passed a.m. test specification(s)*	*2 = good*	*3 = satisfactory* *F(ail) = failed a.m. test specification(s)*	*4 = sufficient* *N/A = not applicable*	*5 = poor* *N/T = not tested*

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT
RESULT: Passed

5.1.2 PEAK OUTPUT POWER
RESULT: Passed

5.1.3 SPURIOUS EMISSION
RESULT: Passed

5.2.1 MAINS CONDUCTED EMISSIONS
RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS
RESULT: Passed

Contents

1. General Remarks 5
1.1 Complementary Materials 5
1.2 Decision Rule of conformity 5
2. Test Sites 6
2.1 Test Laboratory 6
2.2 Test Facility 6
2.3 List of Test and Measurement Instruments 7
2.4 Traceability 8
2.5 Calibration 8
2.6 Measurement Uncertainty 8
3. General Product Information 9
3.1 Product Function and Intended Use 9
3.2 System Details and Ratings 9
3.3 Independent Operation Modes 10
3.4 Noise Generating and Noise Suppressing Parts 10
3.5 Submitted Documents 10
4. Test Set-up and Operation Modes 11
4.1 Principle of Configuration Selection 11
4.2 Test Operation and Test Software 11
4.3 Special Accessories and Auxiliary Equipment 11
4.4 Countermeasures to achieve EMC Compliance 12
4.5 Test Setup Diagram 12
5. Test Results 14
5.1 Transmitter Requirement & Test Suites 14
5.1.1 Antenna Requirement 14
5.1.2 Peak Output Power 15
5.1.3 Spurious Emission 16
5.2 Mains Emissions 17
5.2.1 Mains Conducted Emissions 17
6. Safety Human exposure 18
6.1 Radio Frequency Exposure Compliance 18
6.1.1 Electromagnetic Fields 18

7. PHOTOGRAPHS OF THE TEST SET-UP 19

8. LIST OF TABLES 24

9. LIST OF PHOTOGRAPHS 24

1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix P: Photo Documentation internal view
(File Name: 50259361APPENDIX P)

Appendix D: Test Result of Radiated Emissions
(File Name: 50259361APPENDIX D)

Test Specifications

The following standards were applied.

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.247 RSS-247 Issue 2 Feb 2017 RSS-Gen, Issue 5, April 2018 ANSI C63.10:2013 KDB558074 D01 DTS Meas Guidance v05

1.2 Decision Rule of conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.
Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC RegistrationNo.: 180491
IC Canada Registration No.: 9465A
TAF Accredited NCC Test Lab. No.:3567
TAF ISO17025 Certification effective period: 6th-May-2019 to 05th-May-2022

Testing Laboratory
3567

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manu-facturer	Type	S/N	Last Calibration	Next Calibration
Test Software	Audix	e3	Ver.9	N/A	N/A
EMI Test Receiver	R&S	ESR 7	101549	2018/11/12	2019/11/10
Spectrum Analyzer	R&S	FSV 40	101514	2019/02/07	2020/02/07
EXA Signal Analyzer	KEYSIGHT	N9010A	MY52221334	2018/06/04	2019/06/03
Preamplifier (30MHz -1GHz)	Hewlett Packard	8447D	2944A06641	2018/08/31	2019/08/31
Preamplifier (18 GHz -40 GHz)	EMC Instruments	EMC184045SE	980408	2018/06/08	2019/06/08
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	60649	2018/08/24	2019/08/24
Bilog Antenna	TESEQ	CBL6111D	29804	2018/07/02	2019/07/02
Horn Antenna	ETS-Lindgren	3117	138160	2018/06/01	2019/06/01
Horn Antenna (18GHz~40GHz)	COM-POWER	AH-840	101029	2018/12/22	2019/12/22
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	2018/06/14	2019/06/13
EMI Test Receiver	R&S	ESR 7	101549	2018/11/12	2019/11/10
LISN (1 phase)	R&S	ENV216	101243	2018/06/18	2019/06/17
LISN	R&S	ENV216	101262	2018/06/22	2019/06/21
Spectrum Analyzer	Agilent	N9010A	MY53470241	2018/06/04	2019/06/03
power Meter	Anritsu	ML2495A	1901008	2019/04/29	2020/04/28
Power Sensor	Anritsu	MA2411B	1725269	2019/04/29	2020/04/28

2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.5 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular schedule using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements .

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 0.1 ppm
RF power/RF Exposure(MPE), conducted	± 1.5 dB
RF power density, conducted	± 3 dB
spurious emissions, conducted	± 3 dB
all emissions, radiated	± 6 dB
Temperature	± 1 ºC
Humidity	± 5 %
DC and low frequency voltages	±3 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Wireless adapter. It contains a 2.4GHz compatible chip enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	Cloud Flight Wireless USB Dongle
Type Identification	HXS-HSDG2********** (*= 0-9, A-Z, a-z, - or blank; to indicate different colors, packaging and shipping locations)
Brand Name	HyperX
FCC ID	ZME-CFD
Canada ID	3880B-CFD
Canada HVIN	HXS-HSDG2

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2405.35 - 2477.35MHz
Channel Spacing	2 MHz
Channel number	37
Operation Voltage	3.7 Vdc (USB)
Modulation	Pi/4 DQPSK
Antenna gain	5.5 dBi

3.3 Independent Operation Modes

Basic operation modes are:

A. Transmitting
    1. Low channel
    2. Middle channel
    3. High channel
B. Receiving
C. Standby
D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB interface which makes it possible to control them through a test software installed on a notebook computer.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

The samples were used as follows:
Conducted: A000934314-002
Radiation: A000934314-001

Full test was applied on all test modes, but only worst case was shown

Test Software	VMItest-1.1.6.56

ANT0

Frequency (MHz)	POWER SETTING
2405.53	0x13
2439.35	0x13
2477.35	0x13

ANT1

Frequency (MHz)	POWER SETTING
2405.53	0x10
2439.35	0x10
2477.35	0x10

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

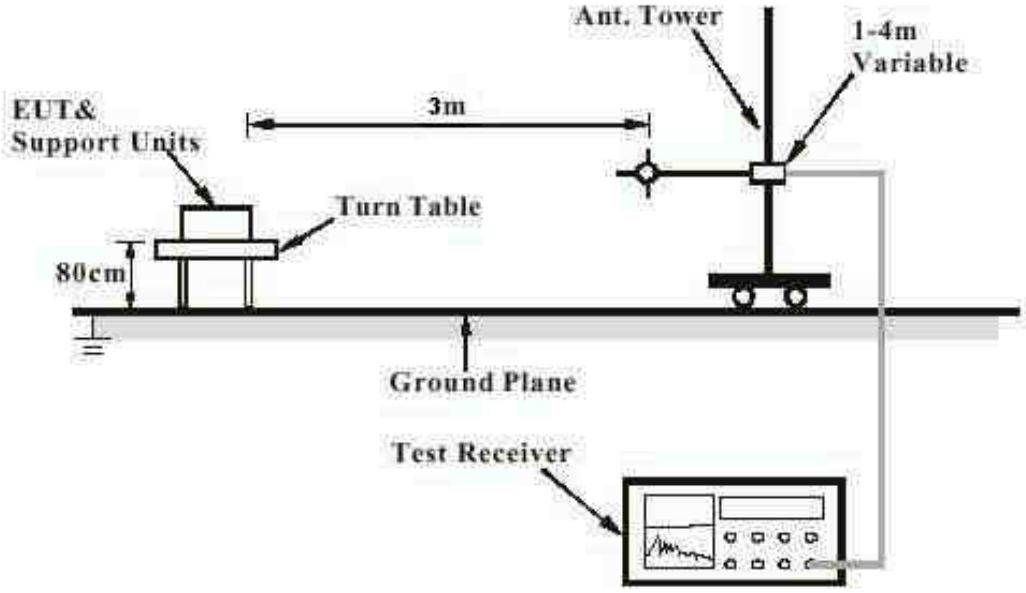
Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

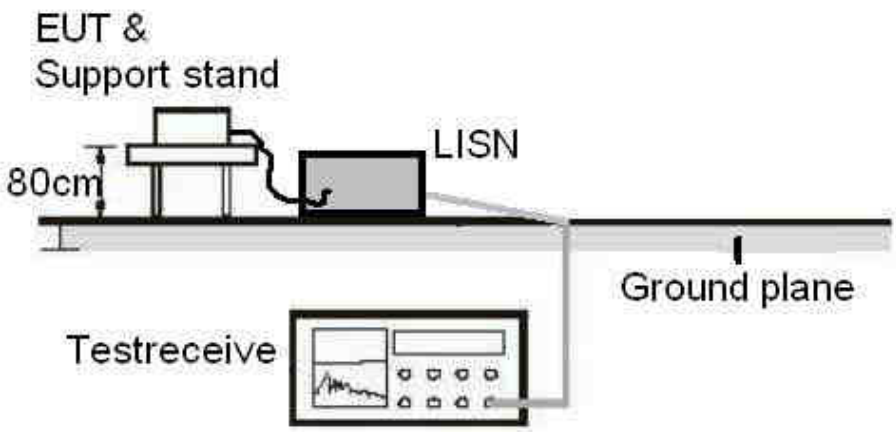
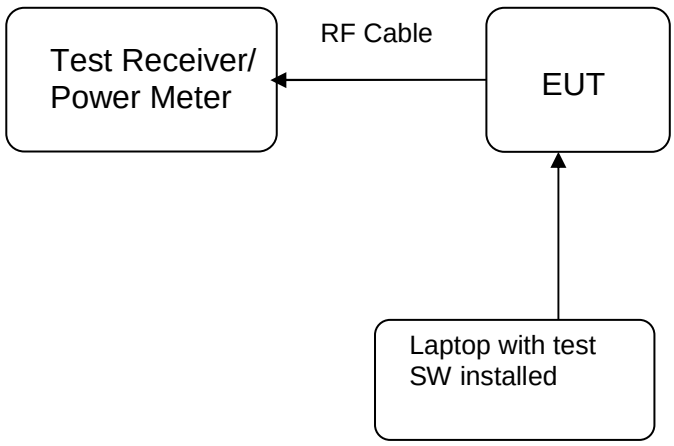


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Test standard	:	FCC Part 15.247(b)(4), Part 15.203 and RSS-Gen 6.8
Requirement	:	use of approved antennas only with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 5.5 dBi. The antenna is a Chip Antenna soldered to the PCB with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Peak Output Power

RESULT: **Passed**

Test standard	:	FCC Part 15.247(b)(3), RSS-247 5.4(d)
Basic standard	:	ANSI C63.10:2013, KDB558074
Limit	:	1 Watt
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A

Ambient temperature	:	20-24 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Table 6: Test result of Peak Output Power

ANT1

Channel	Channel Frequency (MHz)	Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2405.53	1.33	0.00136	1
Middle Channel	2439.35	0.56	0.00114	1
High Channel	2477.35	-0.18	0.00096	1

ANT2

Channel	Channel Frequency (MHz)	Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2405.53	2.15	0.00164	1
Middle Channel	2439.35	1.24	0.00133	1
High Channel	2477.35	-0.02	0.00100	1

Pmax: 1.6406 mW

5.1.3 Spurious Emission

RESULT: **Passed**

Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209, RSS-Gen 8.9 and RSS-Gen 8.10
Basic standard	:	ANSI C63.10: 2013
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-Gen i5, 8.10 (Table 7), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-Gen 5, 8.9 (Table 5 and 6). Emission radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in FCC15.247(d) and RSS-247 i2, 5.5
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, B
Ambient temperature	:	20-24 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Factor (dB/m)=Antenna Factor(dB/m)+Cable loss (dB)

Level(dBuV/m)=Reading(dBuV)+ Factor(dB/m)

Testing was carried out within frequency range 9kHz to the tenth harmonic. For details refer to Appendix D. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Z axis orientation is recorded in this test report.

5.2 Mains Emissions

5.2.1 Mains Conducted Emissions

RESULT: **Passed**

Test standard	:	FCC Part 15.207 FCC Part 15.107 RSS-Gen 8.8
Limits	:	Mains Conducted emissions as defined in above test standards must comply with the mains conducted emission limits specified
Kind of test site	:	Shielded Room

Test setup

Test Channel	:	Normal link
Operation mode	:	Normal link
Ambient temperature	:	20-24 °C
Relative humidity	:	50-65 %
Atmospheric pressure	:	100-103 kPa

Remark: For details refer to Appendix D.

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: **Passed**

Test standard : FCC KDB Publication 447498 D01
RSS-102 issue 5, Table 1

FCC:
Since maximum peak output power of the transmitter is 1.6406 mW < 10mW, hence the EUT is excluded from SAR evaluation according to FCC KDB publication 447498: Mobile Portable RF Exposure

Canada:

Maximum conducted peak power: 1.6406 mW

Antenna Gain: 5.5 dbi -> x 3.548

Maximum EIRP available 5.82 mW

==========
Maximum Power available: 5.82 mW
(higher of EIRP or conducted)

Since maximum output power of the transmitter is 5.82 mW < 7mW at 10mm, hence the EUT is excluded from SAR evaluation according to Table 1 in RSS-102

8. List of Tables

Table 1: Applied Standard and Test Levels 5
Table 2: List of Test and Measurement Equipment 7
Table 3: Emission Measurement Uncertainty.....8
Table 4: Basic Information of EUT 9
Table 5: Technical Specification of EUT 9
Table 6: Test result of Peak Output Power 15

9. List of Photographs

Photograph 1: Set-up for Spurious Emissions (Front View).....19
Photograph 2: Set-up for Spurious Emissions (Back View 1).....20
Photograph 3: Set-up for Spurious Emissions (Back View 2).....20
Photograph 4: Set-up for Spurious Emissions (X axis orientation pre-test).....21
Photograph 5: Set-up for Spurious Emissions (Y axis orientation pre-test).....21
Photograph 6: Set-up for Spurious Emissions (Z axis orientation pre-test).....22
Photograph 7: Set-up for Conducted testing.....22
Photograph 8: Set-up for for Mains Conducted testing Back.....23
Photograph 9: Set-up for for Mains Conducted testing Front.....23