

Prüfbericht-Nr.: <i>Test Report No.:</i>	50174380 001	Auftrags-Nr.: <i>Order No.:</i>	114078980	Seite 1 von 27 Page 1 of 27	
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	21-Jun-2018		
Auftraggeber: <i>Client:</i>	Kingston Technology Company, Inc. 17600 Newhope St., Fountain Valley, CA, 92708 USA				
Prüfgegenstand: <i>Test item:</i>	HyperX Cloud Stinger Wireless Adapter				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	HXS-HSWA, HXS-HSWA-CSW, HXS-HSWA***** (* = 0-9, A-Z, a-z, - or blank; to indicate different colors, packaging and shipping locations)				
Auftrags-Inhalt: <i>Order content:</i>	FCC Part15C / ISED RSS-210 Test report				
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.249 RSS-210 issue 9 (08-2016) Annex B.10				
Wareneingangsdatum: <i>Date of receipt:</i>	25-Jun-2018				
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000763426-002				
Prüfzeitraum: <i>Testing period:</i>	2-Jul-2018 - 8-Aug-2018				
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Laboratory Taipei				
Prüflaboratorium: <i>Testing laboratory:</i>	TUV Rheinland Taiwan Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
Report date / tested by:			kontrolliert von / reviewed by:		
2018-08-15 Ryan W. T. Chen / Project Manager			2018-08-15 Arvin Ho/Vice General Manager		
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other:					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>			Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable 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. <i>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.</i>					

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.1.2 FIELD STRENGTH OF FUNDAMENTAL

RESULT: Passed

5.1.3 99% BANDWIDTH

RESULT: Passed

5.1.4 SPURIOUS EMISSION

RESULT: Passed

5.2.1 SPURIOUS EMISSION

RESULT: Passed

5.3.1 CONDUCTED EMISSIONS LINE AND NEUTRAL

RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Passed

Contents

1.	GENERAL REMARKS	5
1.1	COMPLEMENTARY MATERIALS.....	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	RATINGS AND SYSTEM DETAILS.....	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
	<i>5.1.1 Antenna Requirement</i>	<i>14</i>
	<i>5.1.2 Field strength of fundamental.....</i>	<i>15</i>
	<i>5.1.3 99% Bandwidth</i>	<i>17</i>
	<i>5.1.4 Spurious Emission</i>	<i>20</i>
5.2	RECEIVER REQUIREMENT	21
	<i>5.2.1 Spurious Emission</i>	<i>21</i>
5.3	MAINS CONDUCTED EMISSIONS	22
	<i>5.3.1 Conducted Emissions Line and Neutral.....</i>	<i>22</i>
6.	SAFETY HUMAN EXPOSURE	23

6.1	RADIO FREQUENCY EXPOSURE COMPLIANCE	23
6.1.1	<i>Electromagnetic Fields.....</i>	<i>23</i>
7.	PHOTOGRAPHS OF THE TEST SET-UP.....	24
8.	LIST OF TABLES	27
9.	LIST OF PHOTOGRAPHS.....	27

1. General Remarks

1.1 Complementary Materials

These attachments are integral parts of this test report.

Appendix P: Photo Documentation

(File Name: 50174380APPENDIX P)

Appendix D: Test Result of Radiated Emissions

(File Name: 50174380APPENDIX D)

Test Specifications

The following standards were applied.

Table 1: Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.249 RSS-210 issue 9 (08-2016) RSS-Gen, Issue 4, November 2014 ANSI C63.10:2013

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.
Taichung Branch Office

No.9, Lane 36, Minsheng Rd., Sec. 3, Daya District,
Taichung City 428
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.
Taipei Office

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

FCC Registration No.: 340738
IC Canada Registration No.: 9465A-1
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2016-Jul-1st to 2019-Jun-30th



Testing Laboratory
0759

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	Farad	EZ_EMC	Ver. TUV3A1	N/A	N/A
EMI Test Receiver	R&S	ESR 7	101549	2017/11/10	2018/11/09
Spectrum Analyzer	R&S	FSV 40	100921	2018/05/02	2019/05/01
EXA Signal Analyzer	KEYSIGHT	N9010A	MY52221334	2018/02/05	2019/02/04
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2017/08/14	2018/08/13
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	2018/01/18	2019/01/17
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	60558	2017/11/21	2018/11/20
Bilog Antenna	TESEQ	CBL6111D	29804	2017/08/18	2018/08/17
Horn Antenna	ETS-Lindgren	3117	201918	2017/08/18	2018/08/17
Horn Antenna (18GHz~40GHz)	COM-POWER	AH-840	101029	2017/11/28	2018/11/27
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	2018/06/14	2019/06/13
EMI Test Receiver	R&S	ESR 7	101549	2017/11/10	2018/11/09
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
Test Software	Agilent	300328 testsystem	V1.9.1	N/A	N/A
Power sensor	Agilent	U2021XA	MY54020001	2018/03/31	2019/03/30

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 by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are ± 3 dB.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
RF power, conducted	± 1.5 dB
Adjacent channel power	± 3 dB
Radiated emission of transmitter, valid up to 26 GHz	± 6 dB
Radiated emission of receiver, valid up to 26 GHz	± 6 dB
Temperature	± 2 °C
Humidity	± 10 %

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 Ratings and System Details

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment	HyperX Cloud Stinger Wireless Adapter
Type Designation	HXS-HSWA, HXS-HSWA-CSW, HXS-HSWA***** (*= 0-9, A-Z, a-z, - or blank; to indicate different colors, packaging and shipping locations)
Brand Name	Kingston
FCC ID	JIC-HSWA
Canada ID	3880A-HSWA
HVIN	HXS-HSWA-CSW

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2403.35 - 2477.35MHz
Channel Spacing	2 MHz
Channel number	38
Operation Voltage	3.7 Vdc
Modulation	Pi/4 DQPSK

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. Receiving
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel

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 emission 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.

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

Test Software	VMltest-1.1.6.56
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4.3 Special Accessories and Auxiliary Equipment

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

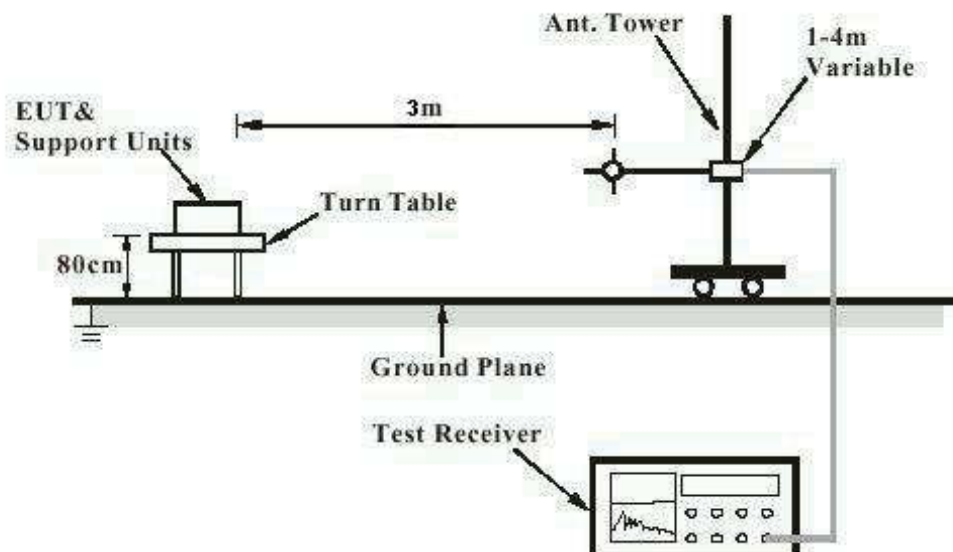
Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

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.

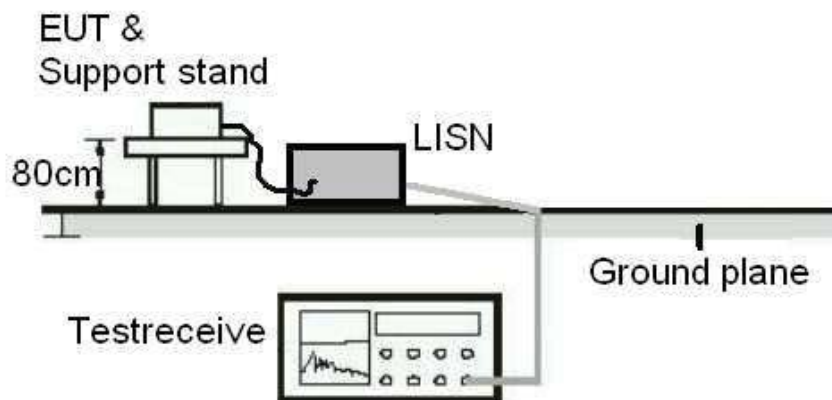
4.5 Test Setup Diagram

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)



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Standard	:	LP0002(2018): 2.2
Requirement	:	Part 15.203 and RSS-Gen 7.1.4 use of approved antennas only

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 Field strength of fundamental

RESULT:**Passed**

Test standard : FCC Part 15.249(a), RSS-210 B.10
LP0002: 3.10.2(2)
Basic standard : ANSI C63.10:2013
Kind of test site : Semi-Anechoic Chamber

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 22-26 °C
Relative humidity : 50-65 %
Atmospheric pressure : 100-103 kPa

In the table below the maximum results found are reported.

For detailed results of all frequencies tested, please Refer to Appendix D.

Table 6: Test result of Field strength of fundamental

TX Frequency (MHz)	Antenna Orientation	Detector Mode	Peak Power Frequency (MHz)	Peak Power Level (dBuV/m)	Limit (dBuV/m)	Result
2403.35	Horizontal	Peak	2403.605	93.91	114.00	PASS
		Average	2403.605	90.43	94.00	PASS
	Vertical	Peak	2403.575	86.32	114.00	PASS
		Average	2403.575	82.76	94.00	PASS
2441.35	Horizontal	Peak	2441.566	95.84	114.00	PASS
		Average	2441.566	92.43	94.00	PASS
	Vertical	Peak	2441.611	87.06	114.00	PASS
		Average	2441.611	83.49	94.00	PASS
2477.35	Horizontal	Peak	2477.554	87.86	114.00	PASS
		Average	2477.554	84.32	94.00	PASS
	Vertical	Peak	2477.122	85.47	114.00	PASS
		Average	2477.122	81.28	94.00	PASS

Remark: For details Refer to Appendix D.

5.1.3 99% Bandwidth**RESULT:****Passed**

Test standard : RSS-Gen
Basic standard : ANSI C63.10:2013
Kind of test site : Semi-Anechoic Chamber

Test setup

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

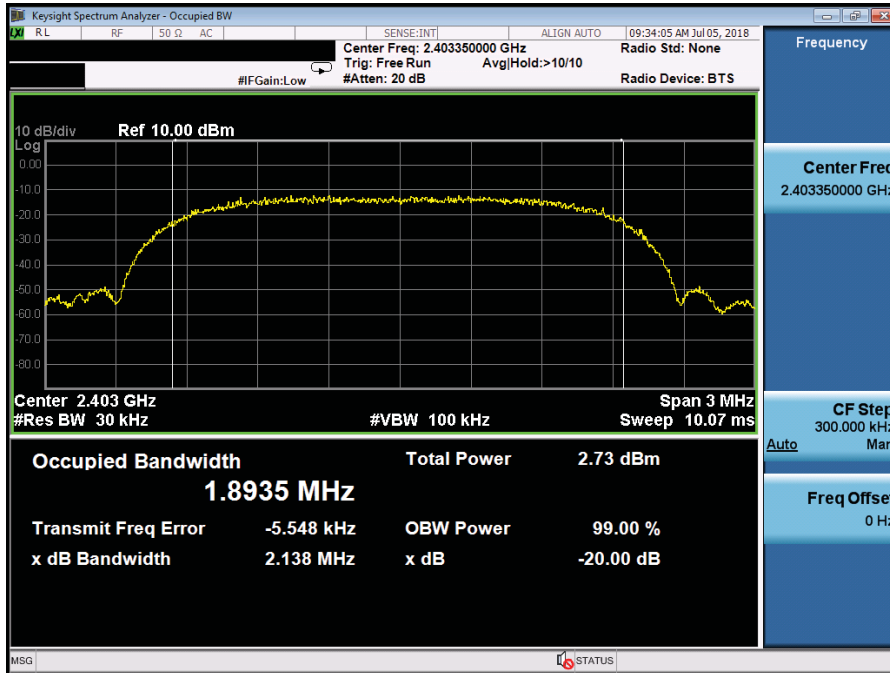
Ambient temperature : 22-26 °C
Relative humidity : 50-65 %
Atmospheric pressure : 100-103 kPa

Table 7: Test result of 99% Bandwidth

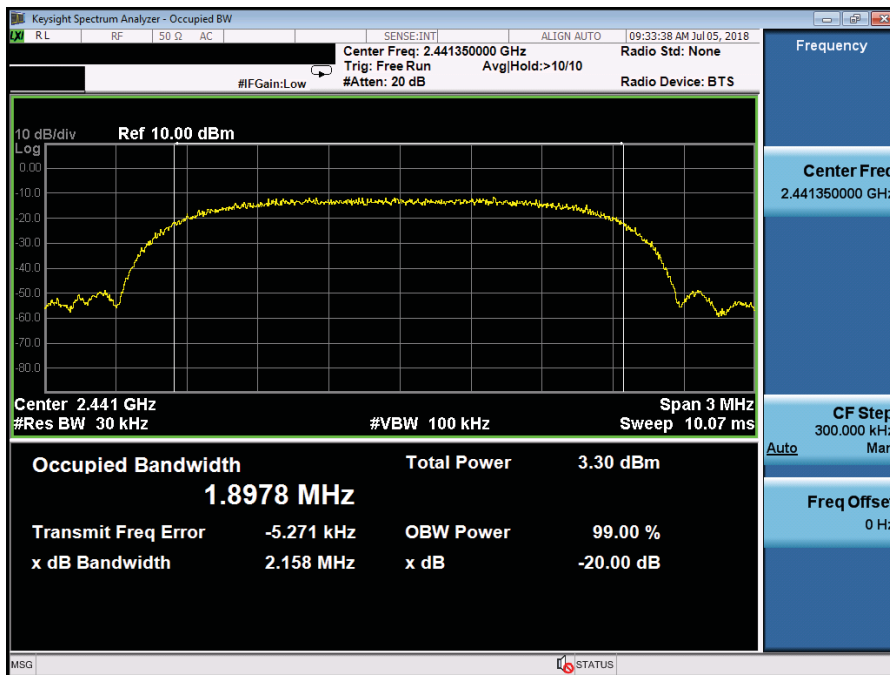
Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2403.35	1.8935
Mid Channel	2441.35	1.8978
High Channel	2477.35	1.9095

Test Plot of 99% Bandwidth

Low Channel



Middle Channel



High Channel


5.1.4 Spurious Emission

RESULT:**Passed**

Test standard	:	FCC part 15.249(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 B.10(b), RSS-Gen 7.2.1 LP0002: 2.8
Basic standard	:	ANSI C63.10:2013
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the radiated emission limits specified in FCC 15.209(a). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) and FCC 15.249(a).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A
Ambient temperature	:	Refer to Appendix D
Relative humidity	:	Refer to Appendix D
Atmospheric pressure	:	100-103 kPa

Remark: Testing was carried out within frequency range 30MHz 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 Axis orientation is recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

5.2 Receiver Requirement

5.2.1 Spurious Emission

RESULT: **Passed**

Test standard	:	FCC part 15.249(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 B.10(b), RSS-Gen 7.2.1
Basic standard	:	LP0002: 2.8
Limits	:	ANSI C63.10:2013
	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the radiated emission limits specified in FCC 15.209(a). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) and FCC 15.249(a).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	B
Ambient temperature	:	Refer to Appendix D
Relative humidity	:	Refer to Appendix D
Atmospheric pressure	:	100-103 kPa

Remark: Testing was carried out within frequency range 30MHz 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 Axis orientation is recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

5.3 Mains Conducted Emissions

5.3.1 Conducted Emissions Line and Neutral

RESULT:**Passed**

Test standard	:	FCC Part 15.207 FCC Part 15.107 RSS-Gen 7.2.4 LP0002: 2.3
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	:	Refer to Appendix D
Relative humidity	:	Refer to Appendix D
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 1FCC:

Since maximum peak output power of the transmitter is 0.077 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: 0.077 mW

Antenna Gain: 2.67 db -> x 1.84

Maximum EIRP available 0.141 mW

=====
Maximum Power available: 0.141 mW
(higher of EIRP or conducted)

Since maximum output power of the transmitter is 0.141 mW < 4mW, 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 Field strength of fundamental.....	16
Table 7: Test result of 99% Bandwidth,.....	17

9. List of Photographs

Photograph 1: Set-up for Radiated Emissions (Front View)	24
Photograph 2: Set-up for Radiated Emissions (Back View 1 TX)	25
Photograph 3: Set-up for Radiated Emissions (Back View 2 TX)	25
Photograph 6: Set-up for for Mains Conducted testing Back.....	26
Photograph 7: Set-up for for Mains Conducted testing Front.....	26