

Prüfbericht-Nr.: <i>Test Report No.:</i>	50313903 001	Auftrags-Nr.: <i>Order No.:</i>	238111324	Seite 1 von 34 <i>Page 1 of 34</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	21-Oct-2019	
Auftraggeber: <i>Client:</i>	Kingston Technology Company, Inc., 17600 Newhope St, Fountain Valley, CA 92708, USA			
Prüfgegenstand: <i>Test item:</i>	HyperX Cloud Stinger Core 7.1 Wireless Headset			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	CS002			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C/ ISED RSS-247 Test report			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247(DTS) ISED RSS-247 ISSUE 2 FEB 2017			
Wareneingangsdatum: <i>Date of receipt:</i>	30-Jul-2019			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A001011214-002 A001011214-003			
Prüfzeitraum: <i>Testing period:</i>	25-Oct-2019-12-Nov-2019			
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			
geprüft von / tested by:		kontrolliert von / reviewed by:		
				
2019-11-29	Mars Y.J. Lin / Project Engineer	2019-11-29	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>
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 P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
5 = mangelhaft N/T = nicht getestet 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. <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 PEAK OUTPUT POWER

RESULT: Passed

5.1.3 6dB BANDWIDTH AND 99% BANDWIDTH

RESULT: Passed

5.1.4 POWER DENSITY

RESULT: Passed

5.1.5 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100kHz BANDWIDTH

RESULT: Passed

5.1.6 SPURIOUS EMISSION

RESULT: Passed

5.2.1 MAINS CONDUCTED EMISSIONS

RESULT: Passed

6.1.1 ELECTROMAGNETIC FIELDS

RESULT: Passed

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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: 50313903 001 APPENDIX P)

Appendix D: Test Result of Radiated Emissions
(File Name: 50313903 001 APPENDIX D)

Test Specificationsa

The following standards were applied.

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.247 ISED RSS-247 Issue 2 Feb 2017 ISED 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.

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 Registration No.: 180491
IC Canada Registration No.: 9465A

No. 458-18, Sec 2, Fenliao., Linkou Dist.
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 226631
IC Canada Registration No.: 25563

TAF Accredited NCC Test Lab. No.:3567
TAF ISO17025 Certification effective period: 6th-May-2019 to 05th-May-2022



2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	R&S	FSV40	101507	2019/2/6	2020/2/6
Pre-Amplifier	R&S	SCU08F1	08320042	2019/5/9	2020/5/8
Pre-Amplifier	R&S	SCU-18F	180114	2019/5/9	2020/5/8
Pre-Amplifier	R&S	SCU-18F	180115	2019/5/9	2020/5/8
Pre-Amplifier	R&S	SCU40A	100497	2019/5/9	2020/5/8
Pre-Amplifier	R&S	SCU40A	100498	2019/5/9	2020/5/8
Bilog Antenna	SCHWARZBECK	VUBA-9117	393	2019/3/15	2020/3/14
Trilog Antenna	SCHWARZBECK	VULB-9162	247	2019/3/15	2020/3/14
Horn Antenna	ETS-Lindgren	3117	00218927	2018/12/18	2019/12/18
Loop Antenna	EMCI	LPA600	287	2018/12/20	2019/12/19
Test Software	Audix	e3	Ver. 9	N/A	N/A
Test Cable	Timesmicrowave	HF-290	W11.01	2019/6/12	2020/6/11
Test Cable	Timesmicrowave	HF-290	W11.02	2019/6/12	2020/6/11
Test Cable	Timesmicrowave	HF-290	W12.01	2019/6/12	2020/6/11
Test Cable	Timesmicrowave	HF-290	W12.02	2019/6/12	2020/6/11
Test Cable	Timesmicrowave	HF-290	W140	2019/6/12	2020/6/11
Test Cable	JUNFLON	MWX221	1812S583	2019/6/20	2020/6/19
Test Cable	JUNFLON	N/A	J12J102453-00-1	2019/6/20	2020/6/19
Test Cable	JUNFLON	N/A	J12J102453-00-2	2019/6/20	2020/6/19
Spectrum Analyzer	R&S	FSV40	101513	2019/2/8	2020/2/8
Thermo Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-010	2019/2/1	2020/2/1
Signal Generator	R&S	SMB100A03	181335	2019/1/23	2020/1/23
Power Meter	Anritsu	ML2495A	1901008	2019/4/29	2020/4/28
Power Sensor	Anritsu	MA2411B	1725269	2019/4/29	2020/4/28

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 °C
Humidity	± 5 %
DC and low frequency voltages	± 3 %

3. General Product Information

3.1 Product Function and Intended Use

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

3.2 System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	HyperX Cloud Stinger Core 7.1 Wireless Headset
Type Identification	CS002
FCC ID	JIC-CS002
Canada ID	3880A-CS002
Canada HVIN	CS002

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	2405.35 - 2477.35MHz
Channel Spacing	2 MHz
Channel number	37
Operation Voltage	5 Vdc
Modulation	PI/4 DQPSK
Antenna gain	2.46 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:

A001011214-002

A001011214-003

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

Test Software	
VMIttest-1.1.6.56	
Frequency	Setting
2405.35	0X08
2439.35	0X08
2477.35	0X08

4.3 Special Accessories and Auxiliary Equipment

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

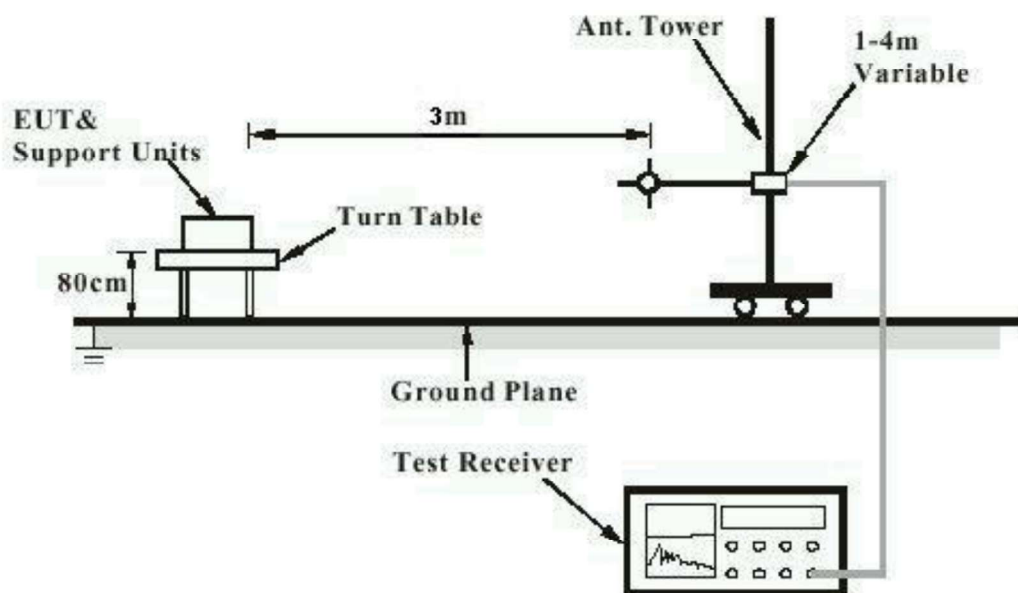
Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

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)

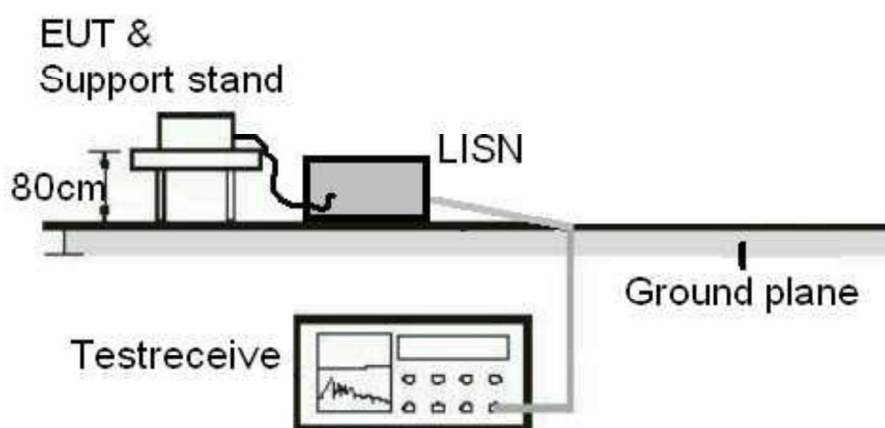
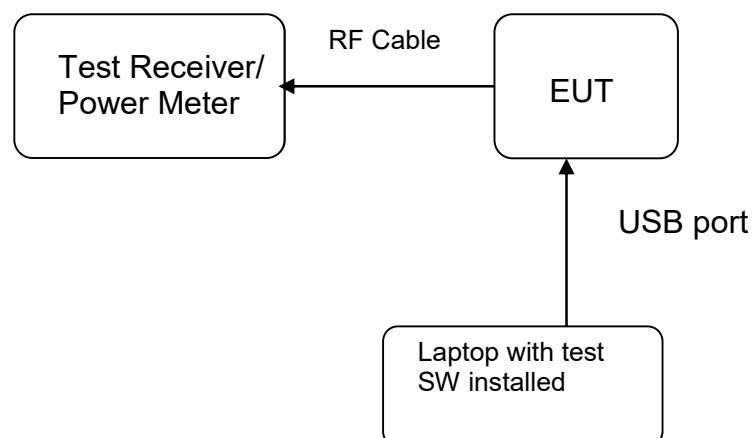


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



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 ISSED
ISSED 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 2.46dBi. The antenna is a printed PCB trace 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), ISSED 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
 Test Lab : Linkou

 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		Average Output power (W)	Limit (W)
		(dBm)	(W)		
Low Channel	2405.35	1.77	0.00150	0.00089	1
Middle Channel	2439.35	1.45	0.00140	0.00081	1
High Channel	2477.35	0.97	0.00125	0.00072	1

ANT2

Channel	Channel Frequency (MHz)	Output Power		Average Output power (W)	Limit (W)
		(dBm)	(W)		
Low Channel	2405.35	2.19	0.00166	0.00098	1
Middle Channel	2439.35	1.6	0.00145	0.00085	1
High Channel	2477.35	1.03	0.00127	0.00072	1

Pmax: 1.66 mW
 Avgmax: 0.8913 mW

5.1.3 6dB Bandwidth and 99% Bandwidth

RESULT:
Passed

Test standard : FCC Part 15.247(a)(2), ISED RSS-247 5.2(a)
 ISED RSS-Gen (Issue 5)
 Basic standard : ANSI C63.10:2013, KDB558074
 Kind of test site : Shielded room

Test setup

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

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

Table 7: Test result of 6dB Bandwidth

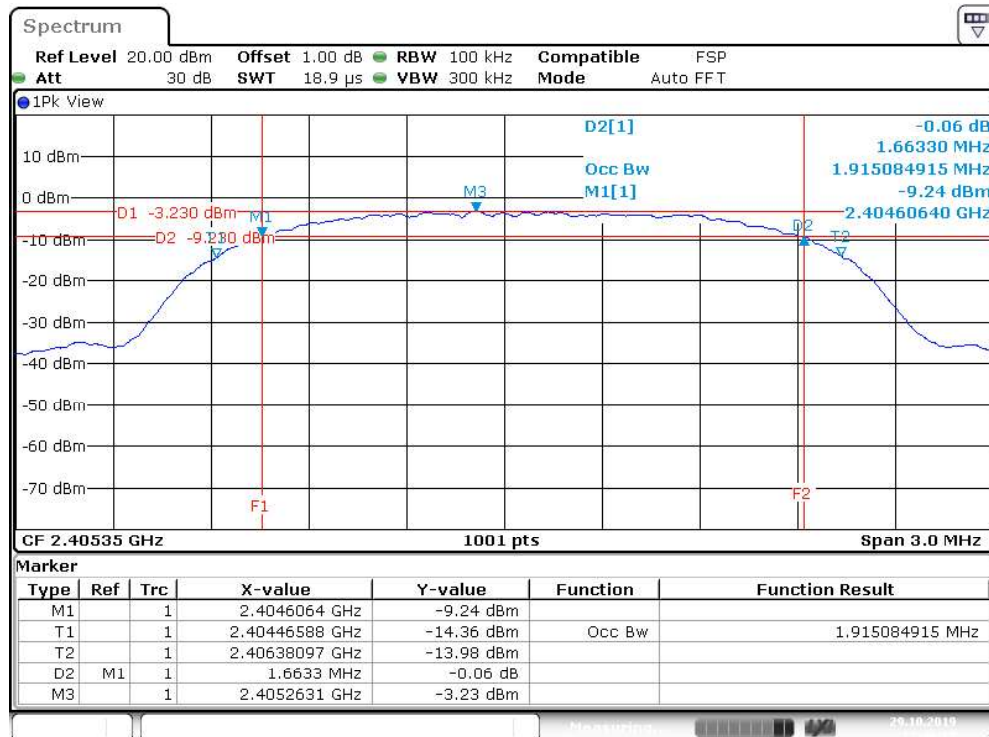
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (kHz)	Result
Low Channel	2405.35	1.6633	>500	Pass
Mid Channel	2439.35	1.6543	>500	Pass
High Channel	2477.35	1.6513	>500	Pass

Table 8: Test result of 99% Bandwidth

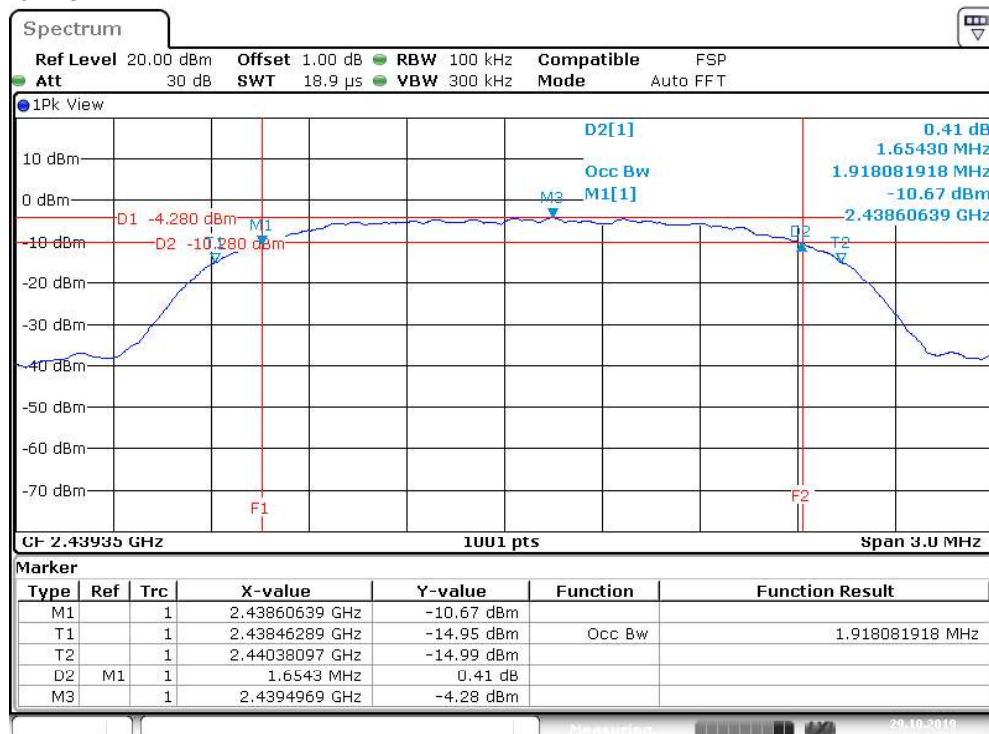
Channel	Channel Frequency (MHz)	99% Bandwidth (MHz)
Low Channel	2405.35	1.915
Mid Channel	2439.35	1.918
High Channel	2477.35	1.918

Test Plot of 6dB & 99% Bandwidth

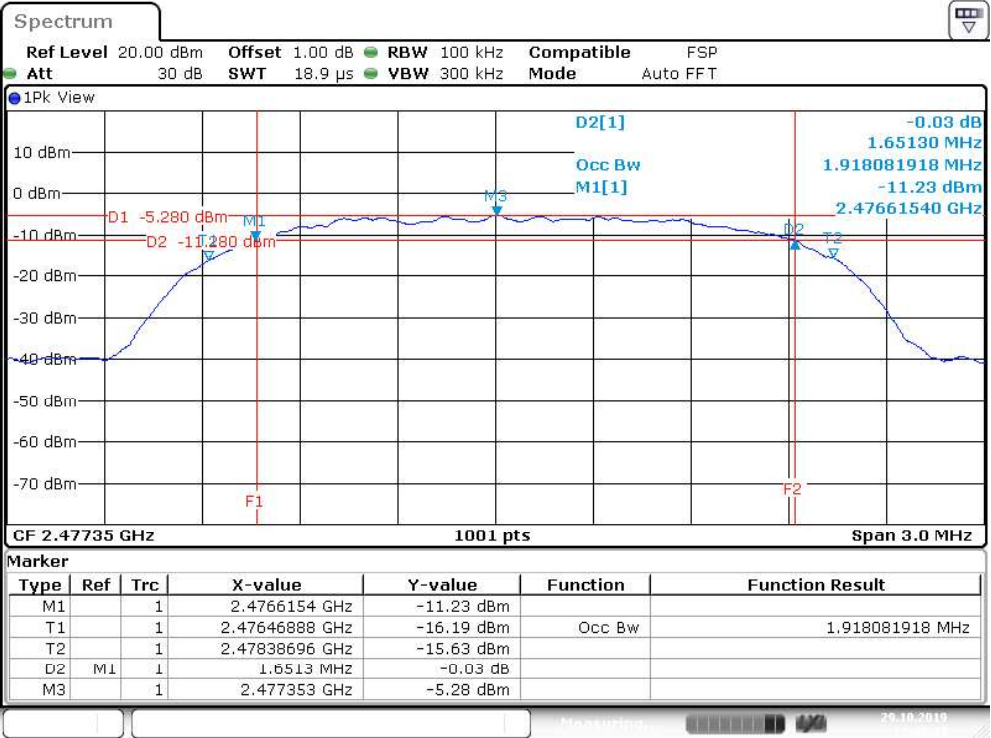
Low Channel



Middle Channel



High Channel



5.1.4 Power Density

RESULT:**Passed**

Test standard : FCC Part 15.247(e) , ISSED RSS-247 5.2(b)
Basic standard : ANSI C63.10:2013, KDB558074
Kind of test site : Shielded room

Test setup

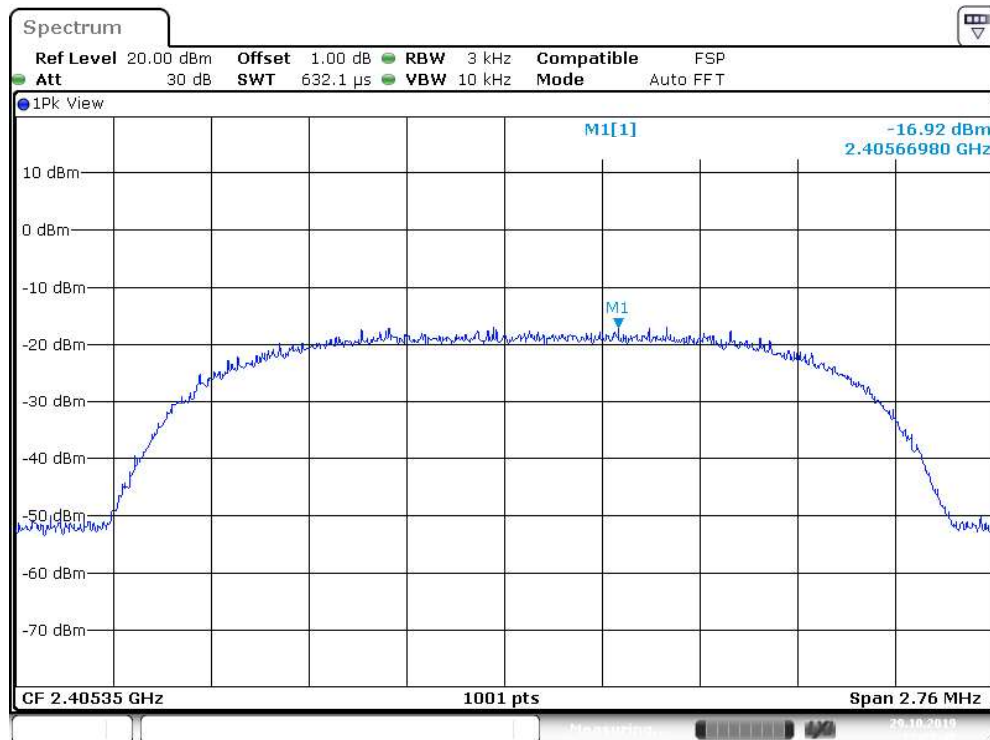
Test Channel : Low/ Middle/ High
Operation Mode : A
Test Lab : Linkou
Ambient temperature : 20-24°C
Relative humidity : 50-65%
Atmospheric pressure : 100-103 kPa

Table 9: Test result of Power Density

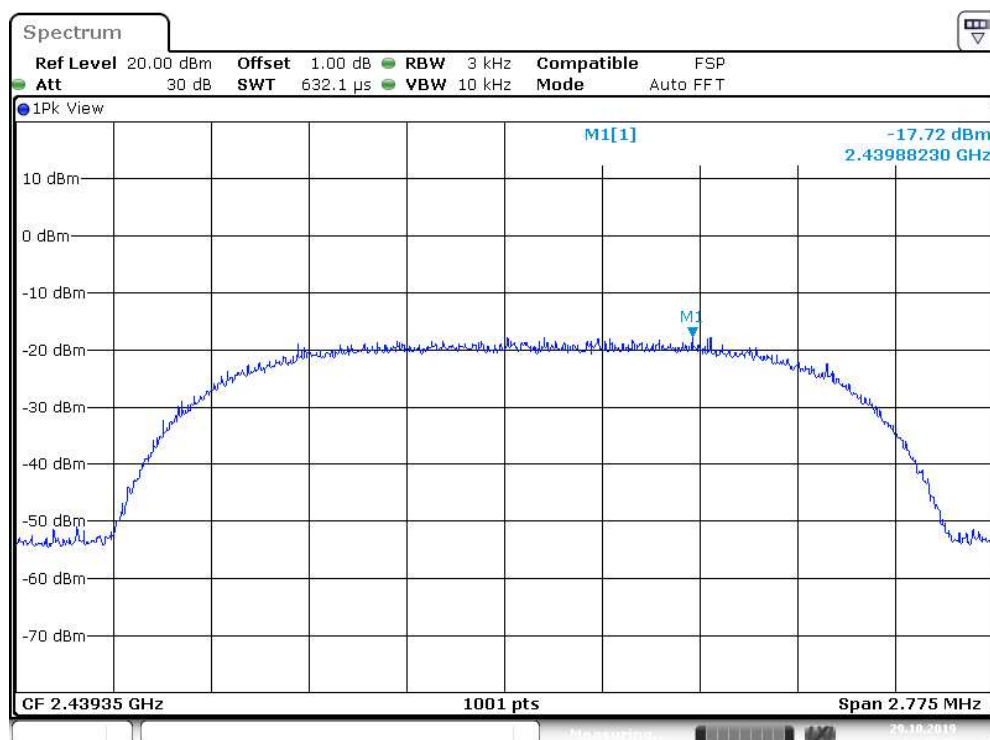
Channel	Channel Frequency (MHz)	Power Density	Limit
		(dBm)	(dBm)
Low Channel	2405.35	-16.92	8
Middle Channel	2439.35	-17.72	8
High Channel	2477.35	-17.40	8

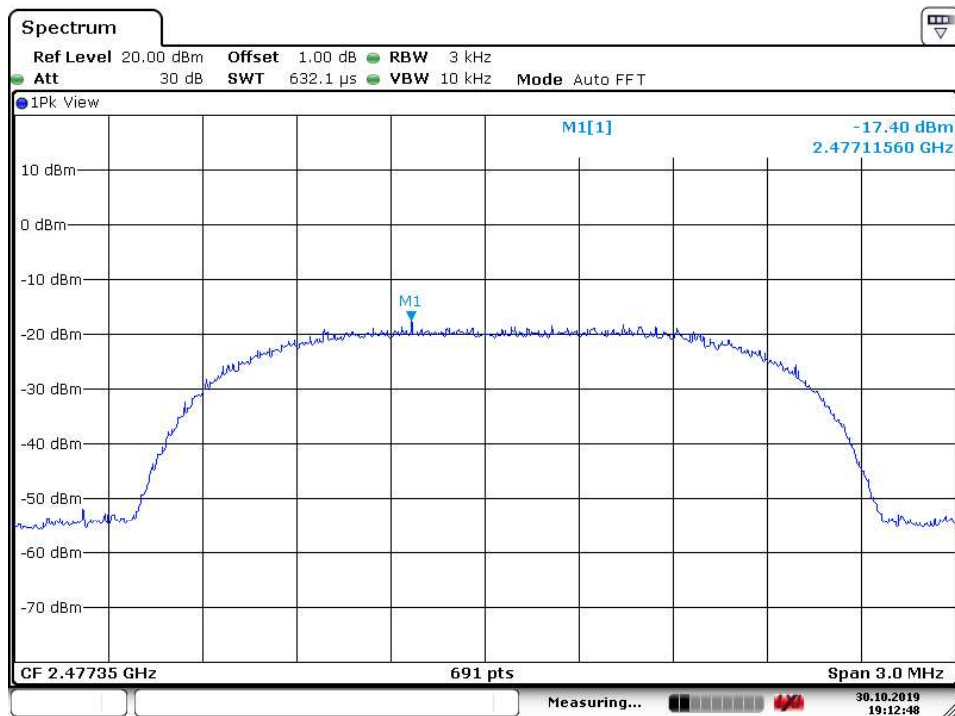
Test Plot of Power Density

Low Channel



Middle Channel



High Channel


Date: 30.OCT.2019 19:12:48

5.1.5 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth

RESULT:**Passed**

Test standard	:	FCC part 15.247(d), ISED RSS-247 5.5
Basic standard	:	ANSI C63.10:2013, KDB558074
Limit	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power)
Kind of test site	:	Shielded room

Test setup

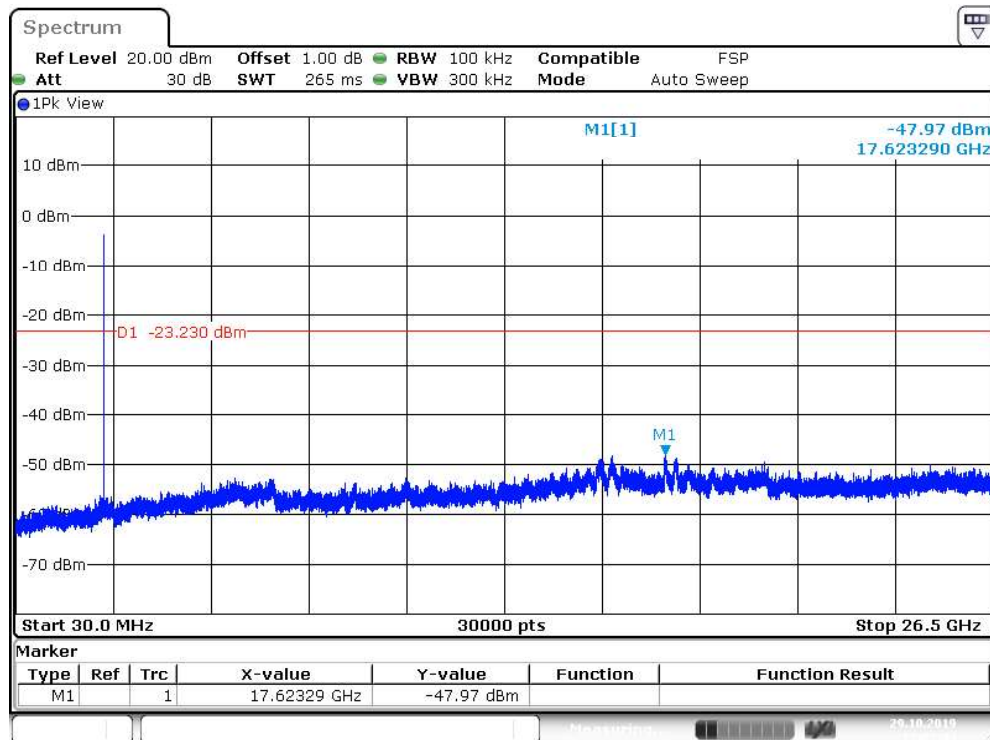
Test Channel	:	Low/ Middle/ High for Conducted Spurious Emissions Low/ High for Frequency Band Edge
Operation Mode	:	A
Test Lab	:	Linkou
Ambient temperature	:	20-24°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achieved as well.

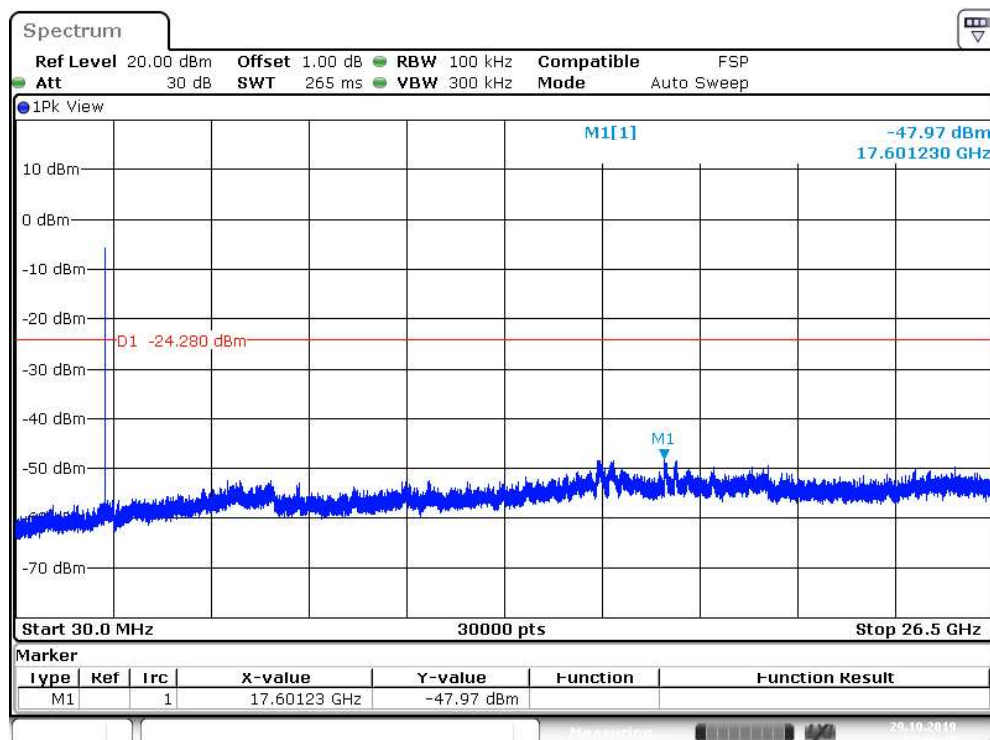
Due to the small size of the RF circuit and that there are no inductive components of significant size connected to the antenna port, 9kHz to 30MHz frequency range is not tested based on technical judgment.

Test Plot 100kHz Conducted Emissions

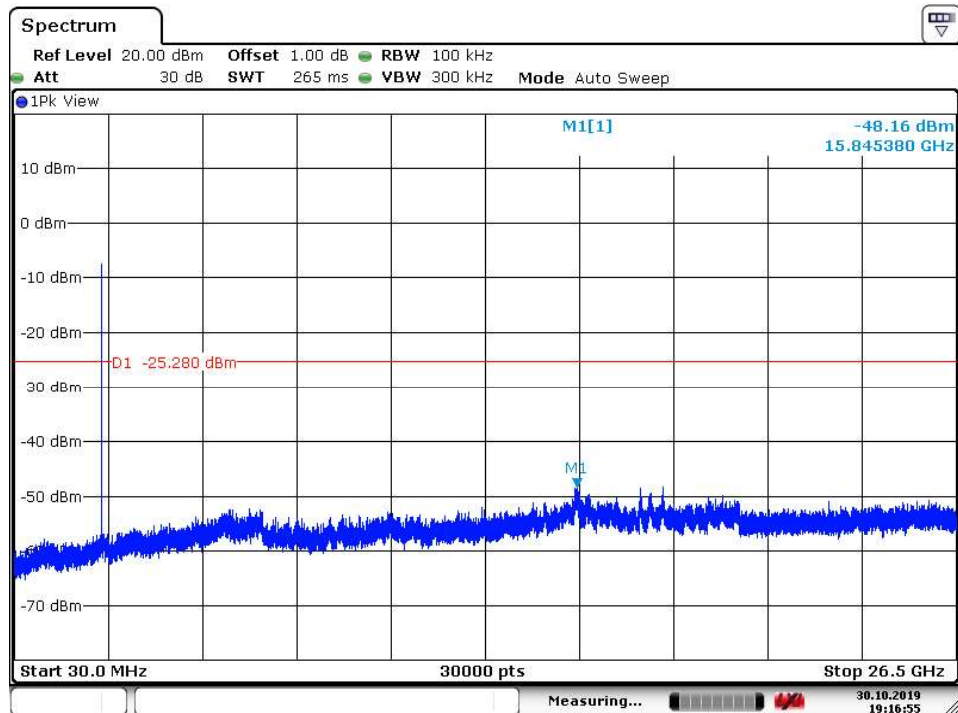
Low Channel



Middle Channel



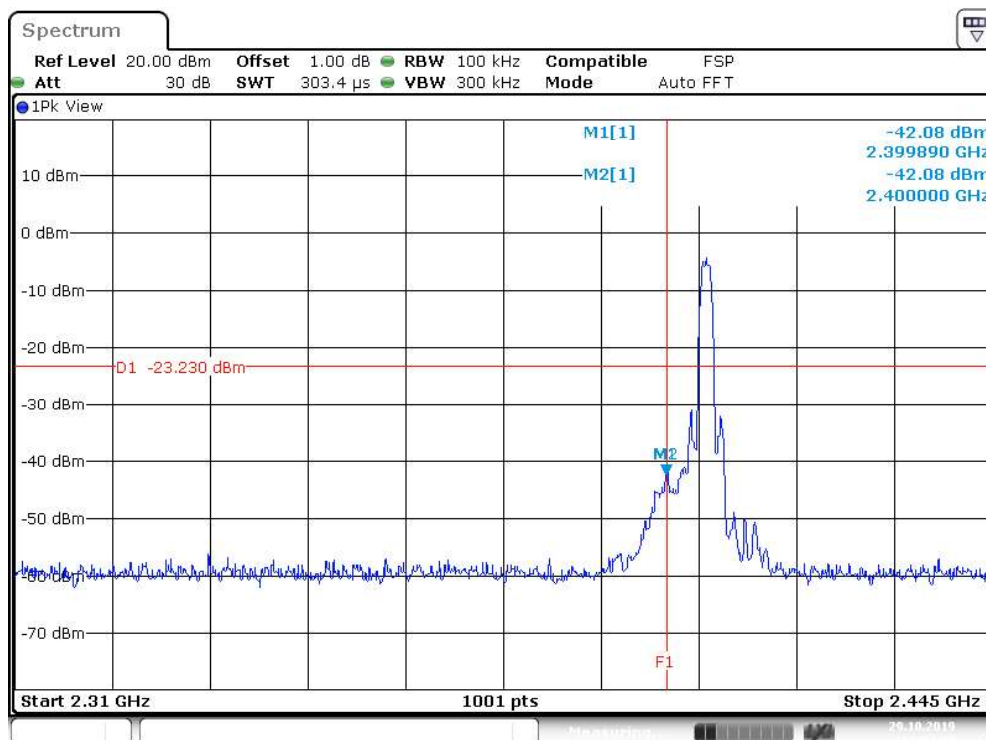
High Channel



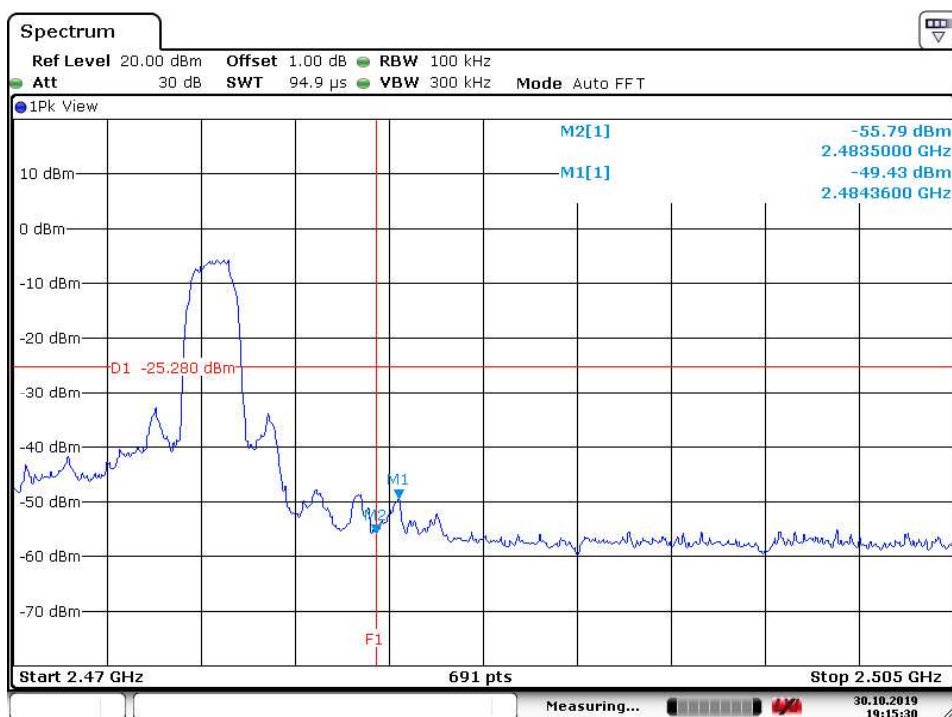
Date: 30.OCT.2019 19:16:56

Test Plot 100kHz RBW of Band Edge

Low Channel



High Channel



5.1.6 Spurious Emission

RESULT:**Passed**

Test standard : FCC part 15.247(d), FCC 15.205, FCC 15.209 and ISEDRSS-Gen 8.9 and ISED 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 ISED RSS-Gen i5, 8.10 (Table 7), must comply with the radiated emission limits specified in FCC 15.209(a) and ISED 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 ISED RSS-247 i2, 5.5

Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Test Channel : Low/ Middle/ High

Operation mode : A

Test Lab : Linkou

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)

For details refer to Appendix D.

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 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 ISED 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
Test Lab	:	Songshan
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
ISED RSS-102 issue 5, Table 1

FCC:

Since maximum average output power of the transmitter is $0.98 \text{ mW} < 10 \text{ mW}$, hence the EUT is excluded from SAR evaluation according to FCC KDB publication 447498: Mobile Portable RF Exposure

Canada:

Maximum conducted average power: 0.98 mW

Antenna Gain: 2.459 dBi -> $\times 1.762$

Maximum EIRP available 1.726 mW

=====
Maximum Power available: 1.726 mW
(higher of EIRP or conducted)

Since maximum output power of the transmitter is $1.726 \text{ mW} < 4 \text{ mW}$ at 5mm, hence the EUT is excluded from SAR evaluation according to Table 1 in RSS-102

7. Photographs of the Test Set-Up

Photograph 1: Set-up for Spurious Emissions (Front View 1)



Photograph 2: Set-up for Spurious Emissions (Front View 2)



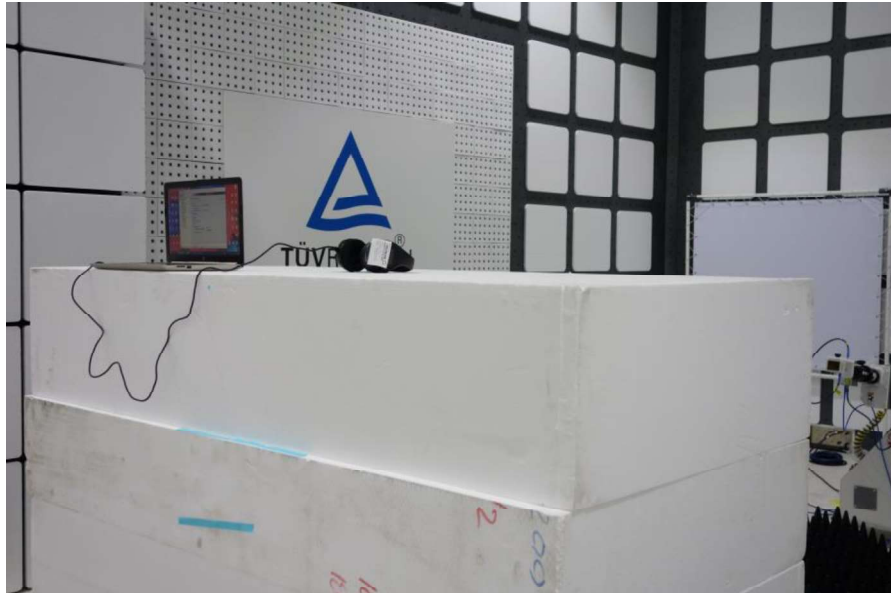
Photograph 3: Set-up for Spurious Emissions (Back View 1)



Photograph 4: Set-up for Spurious Emissions (Back View 2)



Photograph 5: Set-up for Spurious Emissions (Back View 3)



Photograph 6: Set-up for Spurious Emissions (Back View 4)



Photograph 7: Set-up for Conducted testing



Photograph 8: Set-up for Mains Conducted testing Back



Photograph 9: Set-up for Mains Conducted testing Front



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