

| | | | | |
|---|---|--|-----------------------------|--|
| Prüfbericht-Nr.: <i>Test Report No.:</i> | 50083712 001 | Auftrags-Nr.: <i>Order No.:</i> | 114064405 | Seite 1 von 29 <i>Page 1 of 29</i> |
| Kunden-Referenz-Nr.: <i>Client Reference No.:</i> | N/A | Auftragsdatum: <i>Order date:</i> | 24-Apr-2017 | |
| Auftraggeber: <i>Client:</i> | Dongguan Meiloon Acoustic Equipments Co., Ltd., 77, Yuanlin Road Fenghuanggang Ind Estate, Tangxia Town, 523727 Dongguan City, Guangdong Province, China. | | | |
| Prüfgegenstand: <i>Test item:</i> | Universal Rear Speaker Kit (Transmitter) | | | |
| Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i> | NS-HURSK18 | | | |
| Auftrags-Inhalt: <i>Order content:</i> | FCC Part15E & RSS-247 | | | |
| Prüfgrundlage: <i>Test specification:</i> | FCC 47CFR Part 15: Subpart E Section 15.407 RSS-247 (02-2017) | | | |
| Wareneingangsdatum: <i>Date of receipt:</i> | 05-May-2017 | | | |
| Prüfmuster-Nr.: <i>Test sample No.:</i> | A000536206-001 | | | |
| Prüfzeitraum: <i>Testing period:</i> | 17-May-2017 - 18-May-2017 | | | |
| Ort der Prüfung: <i>Place of testing:</i> | EMC 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: | | |
| 2017-07-25 Amy S.R.Hsu /Engineer | | 2017-07-25 Rene Charton/Senior Project 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 | | | | |
| <p>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></p> | | | | |

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 SPURIOUS EMISSION

RESULT: Passed

5.1.6 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: 50083712APPENDIX P)

Appendix D: Test Result of Radiated Emissions
(File Name: 50083712APPENDIX D)

Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

Table 1: Applied Standard and Test Levels

| Radio |
|--|
| FCC CFR47 Part 15 Subpart E RSS-247 Issue 2 (Feb 2017) RSS-Gen, Issue 4, November 2014 ANSI C63.10:2013 FCC KDB-789033 FCC KDB-662911 D01 FCC KDB-644545 |

2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

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

2.2 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 | ESR7 | 101062 | 2016/09/12 | 2017/09/12 |
| Spectrum Analyzer | R&S | FSV 40 | 100921 | 2017/05/02 | 2018/05/02 |
| Spectrum Analyzer | Agilent | N9010A | MY53470241 | 2016/05/25 | 2017/05/25 |
| Preamplifier (30MHz -1GHz) | HP | 8447F | 2805A03335 | 2016/07/29 | 2017/07/29 |
| Preamplifier (18 GHz -40 GHz) | COM-POWER | PAM-840 | 461257 | 2016/12/01 | 2017/12/01 |
| Pre-Amplifier (1GHz~18GHz) | EM Electronics | EM01G18G | 060558 | 2016/11/17 | 2017/11/17 |
| Bilog Antenna | TESEQ | CBL6111D | 29804 | 2016/06/23 | 2017/06/23 |
| Horn Antenna | ETS-Lindgren | 3117 | 201918 | 2016/08/12 | 2017/08/12 |
| Horn Antenna (18GHz~40GHz) | COM-POWER | AH840 | 101029 | 2016/10/11 | 2017/10/11 |
| Loop Antenna | Schwarzbeck | FMZB 1513 | 1513-076 | 2016/05/11 | 2017/05/24 |
| EMI Test Receiver | R&S | ESCI7 | 100797 | 2016/12/30 | 2017/12/30 |
| Temp. & Humid. Chamber | Giant Force | GCT-099-40-S | MAF0103-007 | 2015/07/13 | 2017/07/12 |
| LISN (1 phase) | R&S | ENV216 | 101243 | 2016/06/02 | 2017/06/02 |
| LISN | R&S | ENV216 | 101262 | 2016/06/16 | 2017/06/16 |
| Test Software | Audix | e3 | Ver. 9 | N/A | N/A |
| Power sensor | Agilent | U2021XA | MY54020001 | 2017/03/08 | 2018/03/07 |

2.3 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.

2.4 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.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

Table 3: Emission Measurement Uncertainty

| Parameter | Uncertainty |
|--|--------------------------------|
| Radio Frequency | $\pm 1 \times 10^{-7}$ |
| RF power, conducted | $\pm 1.5 \text{ dB}$ |
| Adjacent channel power | $\pm 3 \text{ dB}$ |
| Radiated emission of transmitter, valid up to 40 GHz | $\pm 6 \text{ dB}$ |
| Radiated emission of receiver, valid up to 40 GHz | $\pm 6 \text{ dB}$ |
| Temperature | $\pm 2 \text{ }^\circ\text{C}$ |
| Humidity | $\pm 10 \%$ |

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Universal Rear Speaker Kit (Transmitter). It contains a 5.8G wireless compatible module 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 | Universal Rear Speaker Kit (Transmitter) |
| Type Designation | NS-HURSK18 |
| Canada ID | 21761-NSHURSK |
| Canada HVIN | NS-HURSK18 |
| FCC ID | 2AJAANSHURSK |

Table 5: Technical Specification of EUT

| Technical Specification | Value |
|-------------------------|--------------------------------------|
| Operating Frequencies | 5740-5840MHz |
| Channel Spacing | 5MHz |
| Channel number | 21 |
| Operation Voltage | INPUT : AC 100 - 240V, OUTPUT :DC 5V |
| Modulation | GFSK |
| Antenna gain | 2.85 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

- Bill of Material
- PCB Layout
- Photo Document
- Technical Description
- Circuit Diagram
- Instruction Manual
- Rating Label

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 RS232 to 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:

(TX)

Conducted: A000536206-001

Radiation: A000536206-001

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

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

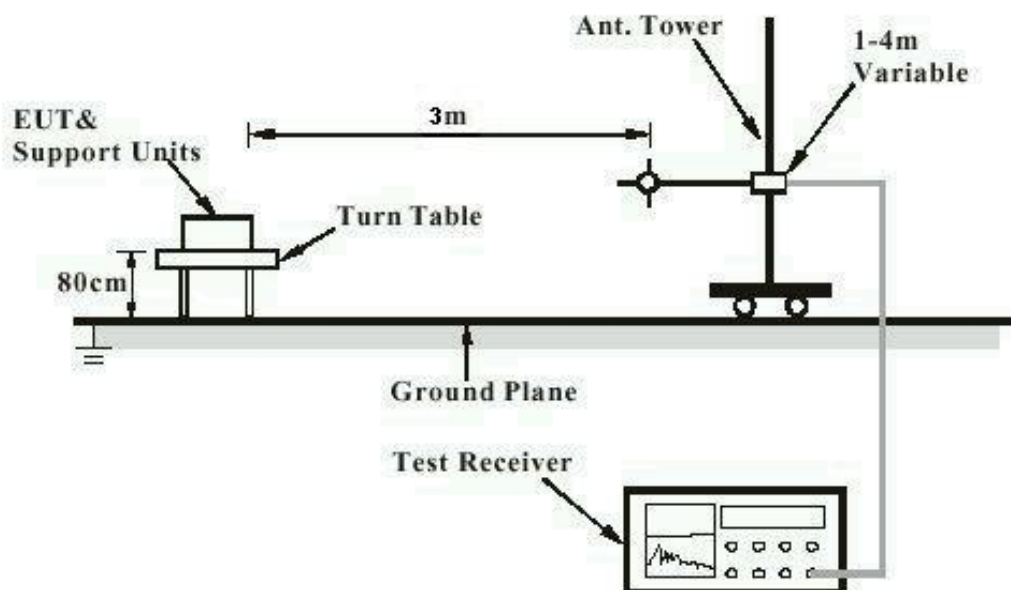


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

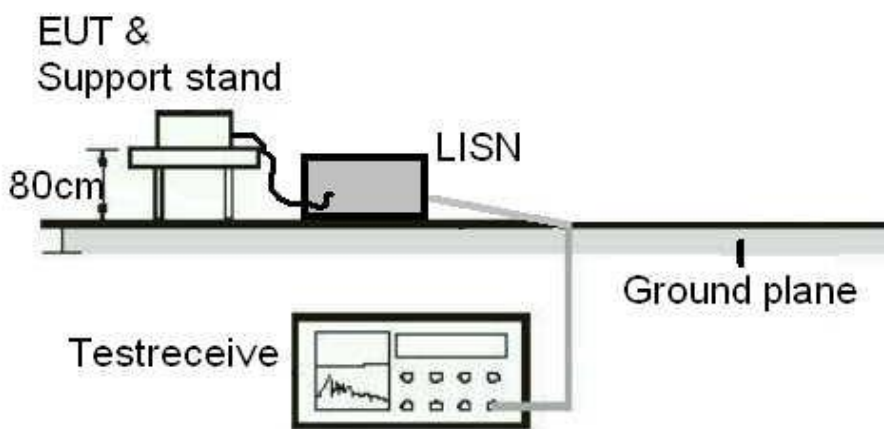
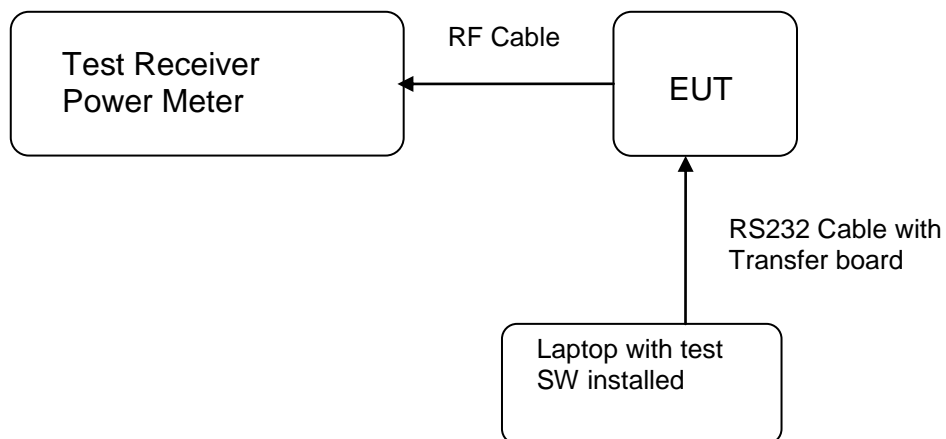


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

| | | |
|---------------|---|--|
| Test standard | : | LP0002(2016): 3.10.1, (3) FCC Part 15.407(a), Part 15.203 and RSS- Gen 7.1.4 |
| Limit | : | the use of antennas with directional gains that do not exceed 6 dBi |

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 2.85 dBi dBi. 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 15.407(a)(1),(5)
 RSS-247 6.2.1, 6.2.4
 Kind of test site : Shielded room

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 6: Test result of Peak Output Power

| Channel | Channel Frequency (MHz) | Output Power | | Limit (W) |
|----------------|-------------------------|--------------|--------|-----------|
| | | (dBm) | (W) | |
| Low Channel | 5740 | 15.85 | 0.0384 | 1 |
| Middle Channel | 5775 | 15.69 | 0.0371 | 1 |
| High Channel | 5840 | 16.33 | 0.0429 | 1 |

5.1.3 6dB Bandwidth and 99% Bandwidth

RESULT:
Passed

Test standard : FCC Part 15.407(a), RSS-247 6.2.1
 Kind of test site : Shielded room

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 6dB Bandwidth

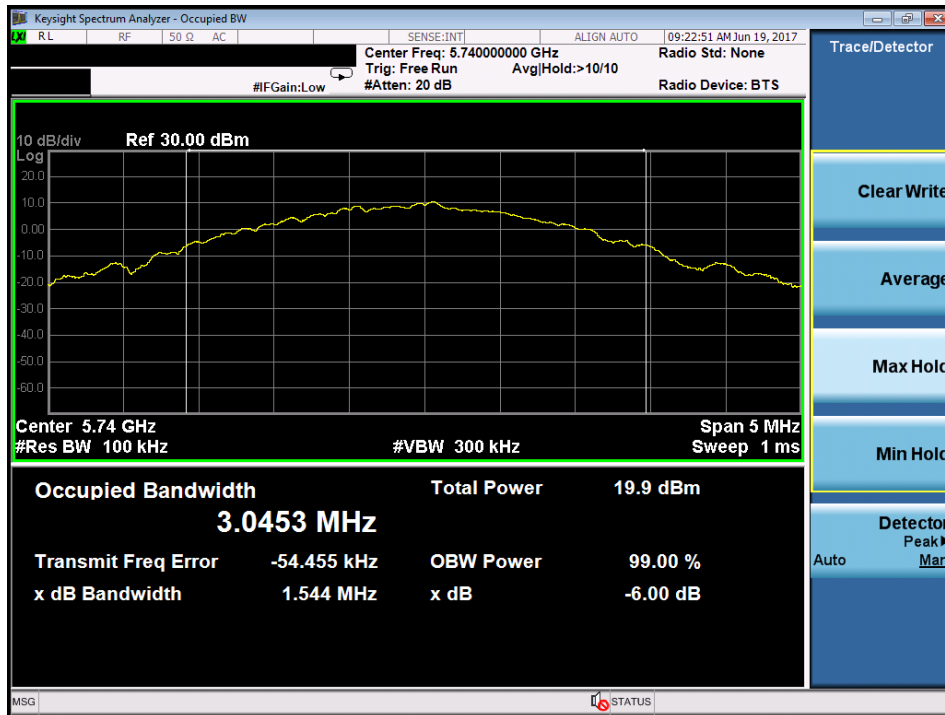
| Channel | Channel Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Result |
|--------------|-------------------------|---------------------|-------------|--------|
| Low Channel | 5740 | 1.544 | 0.5 | Pass |
| Mid Channel | 5775 | 1.610 | 0.5 | Pass |
| High Channel | 5840 | 1.687 | 0.5 | Pass |

Table 8: Test result of 99% Bandwidth

| Channel | Channel Frequency (MHz) | 99% Bandwidth (kHz) |
|-------------|-------------------------|---------------------|
| Low Channel | 5775 | 3035.3 |

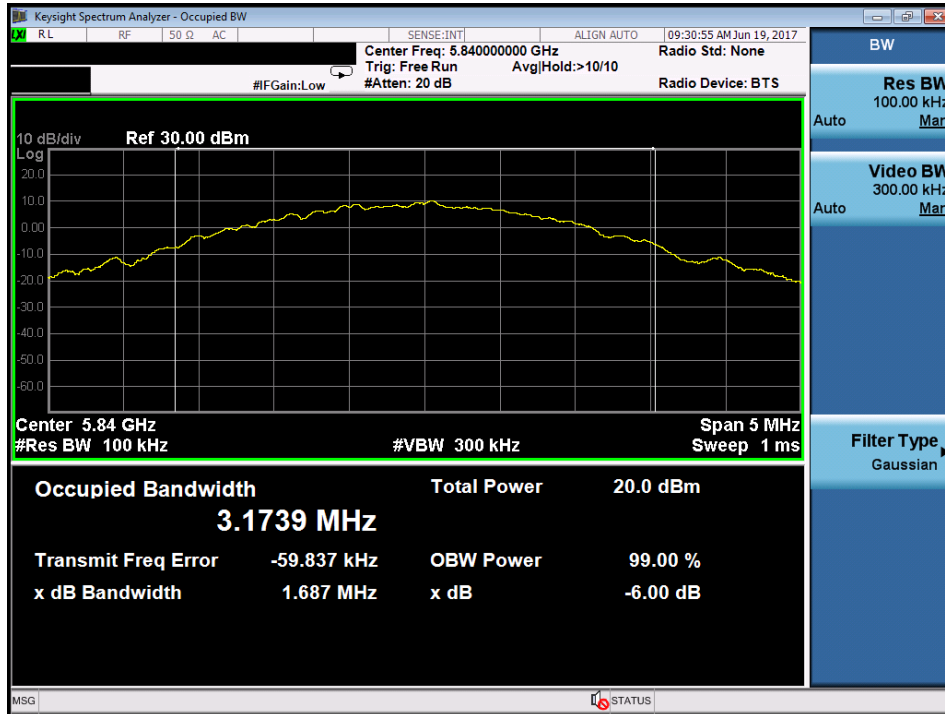
Test Plot of 6dB Bandwidth

Low Channel



Middle Channel



High Channel

Test Plot of 99% Bandwidth
Middle Channel


5.1.4 Power Density

RESULT:**Passed**Test standard : FCC Part 15.407(a)(1),(5)
RSS-247 6.2.1, 6.2.4

Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High

Operation Mode : A

Ambient temperature : 22-26 °C

Relative humidity : 50-65%

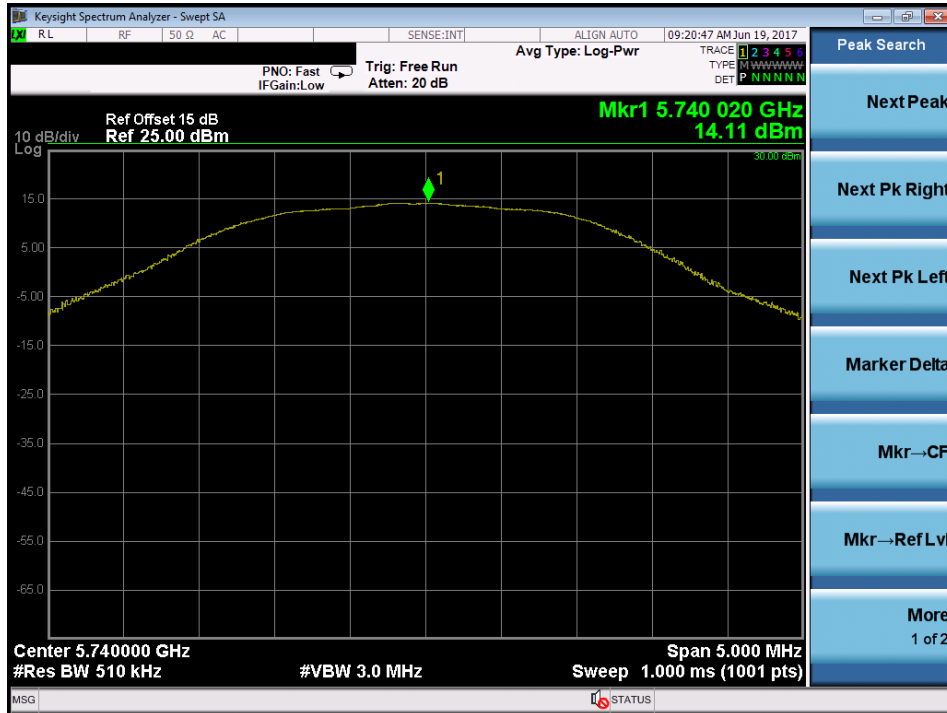
Atmospheric pressure : 100-103 kPa

Table 9: Test result of Power Density

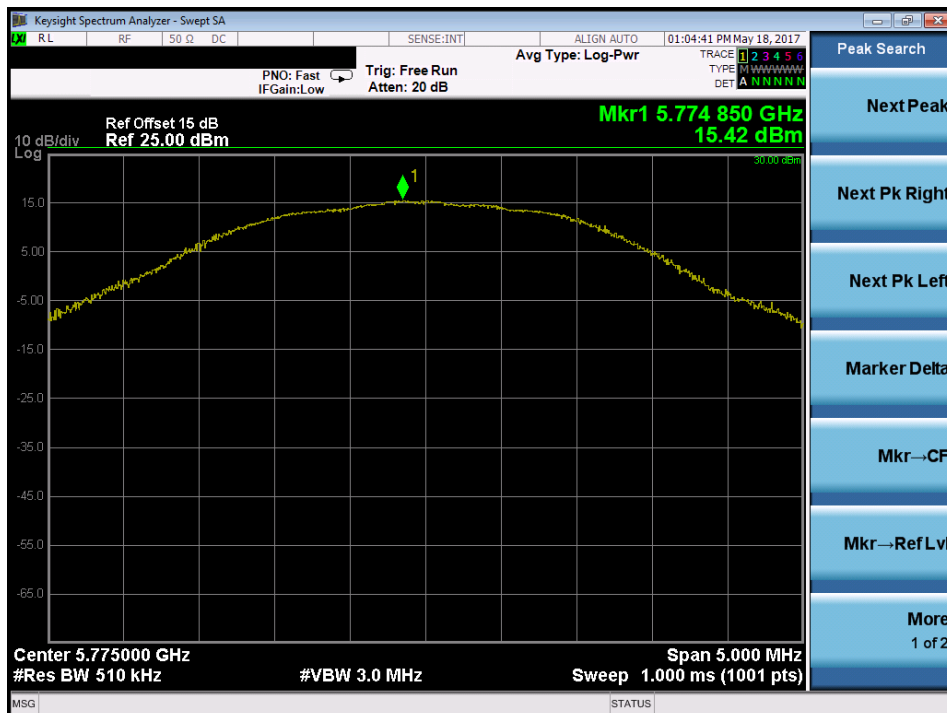
| Channel | Channel Frequency (MHz) | Power Density | Limit |
|----------------|-------------------------|---------------|-------|
| | | (dBm) | (dBm) |
| Low Channel | 5740 | 14.11 | 30 |
| Middle Channel | 5775 | 15.42 | 30 |
| High Channel | 5840 | 13.40 | 30 |

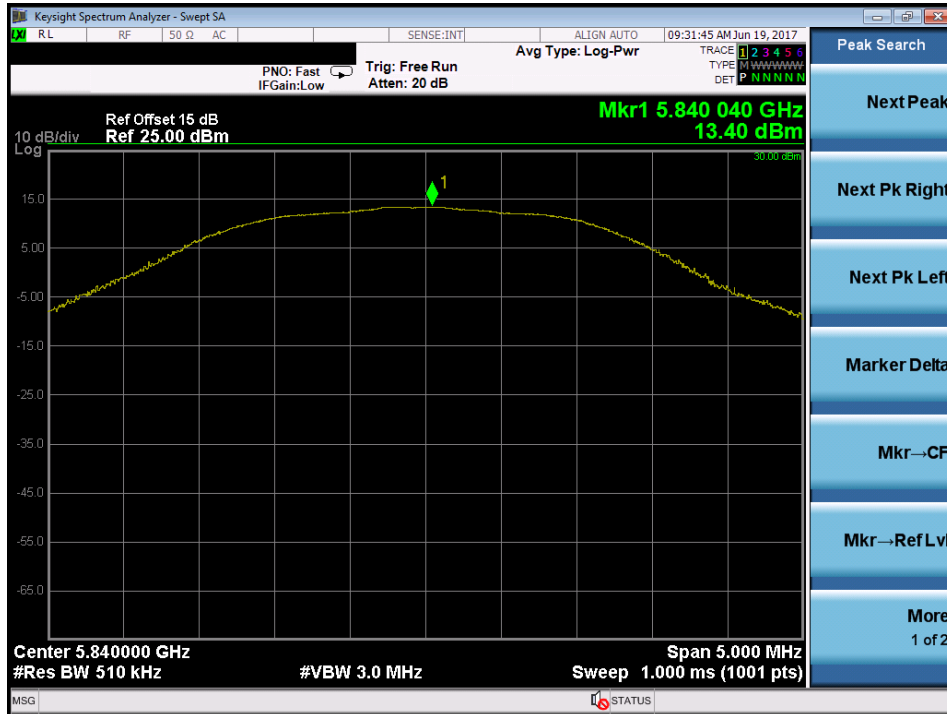
Test Plot of Power Density

Low Channel



Middle Channel



High Channel


5.1.5 Spurious Emission

RESULT:**Passed**

| | | |
|-------------------|---|--|
| Test standard | : | FCC 15.205, FCC 15.209, RSS-247, and RSS-Gen 7.2.1 |
| Basic standard | : | ANSI C63.10: 2009 |
| Limits | : | Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) and RSS-210 2.7 (Table 1), must comply with the radiated emission limits specified in FCC 15.209(a) and RSS-210 2.7 (Table 2 and 3). 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), RSS-210 2.7 (Table 2 and 3) and RSS-210 A2.9(a). |
| Kind of test site | : | 3m Semi-Anechoic Chamber |

Test setup

| | | |
|----------------|---|-------------------|
| Test Channel | : | Low/ Middle/ High |
| Operation mode | : | A, B |

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 X Axis orientation is the worst-case and recorded in this test report.

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5.1.6 Mains Conducted Emissions

RESULT:**Passed**

Test standard : FCC Part 15.207
FCC Part 15.107
RSS-Gen 8.8
LP0002: 2.3

Limits : Mains Conducted emissions as defined in
above standards

Kind of test site : Shielded Room

Test setup

Test Channel : Middle
Operation mode : A

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 v05

Separation distance is more than 20 cm, thus mobile device exposure limits can be applied

Maximum Exposure:

| | |
|------------------------|--------------------------|
| Power to Antenna (mW) | 42.953 mW |
| Power to Antenna (dBm) | 16.3 dBm |
| Antenna Gain | 2.85 dBi |
| Power+Ant Gain | 82.8 mW |
| Distance | 20 cm |
| S= | 0.016 mW/cm ² |

Limit FCC:

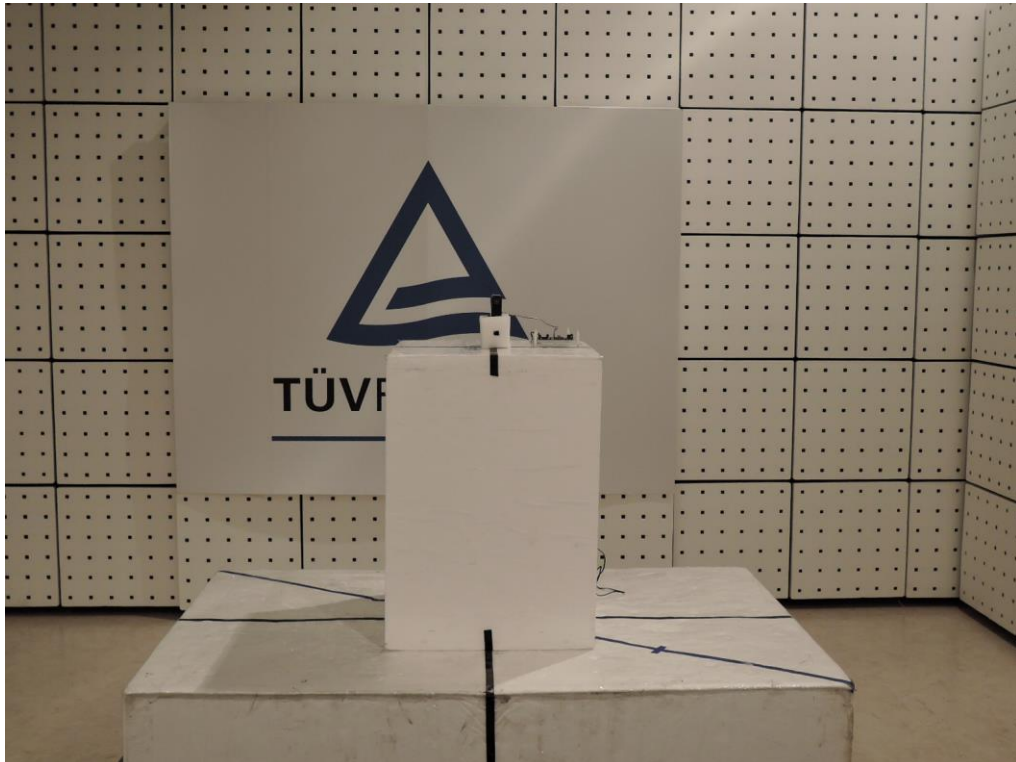
| | |
|-------------------------|--|
| 0.3-1.34 MHz | (100) mW/cm ² |
| 1.34-30 MHz | (180/f ²) mW/cm ² |
| 30-300 MHz | 0.2 mW/cm ² |
| 300-1500 MHz | f/1500 mW/cm ² |
| 1500-100,000 MHz | 1.0 mW/cm² |

Limit Canada: $0.02619f^{0.6834}$
8W/m² @ 5 GHz

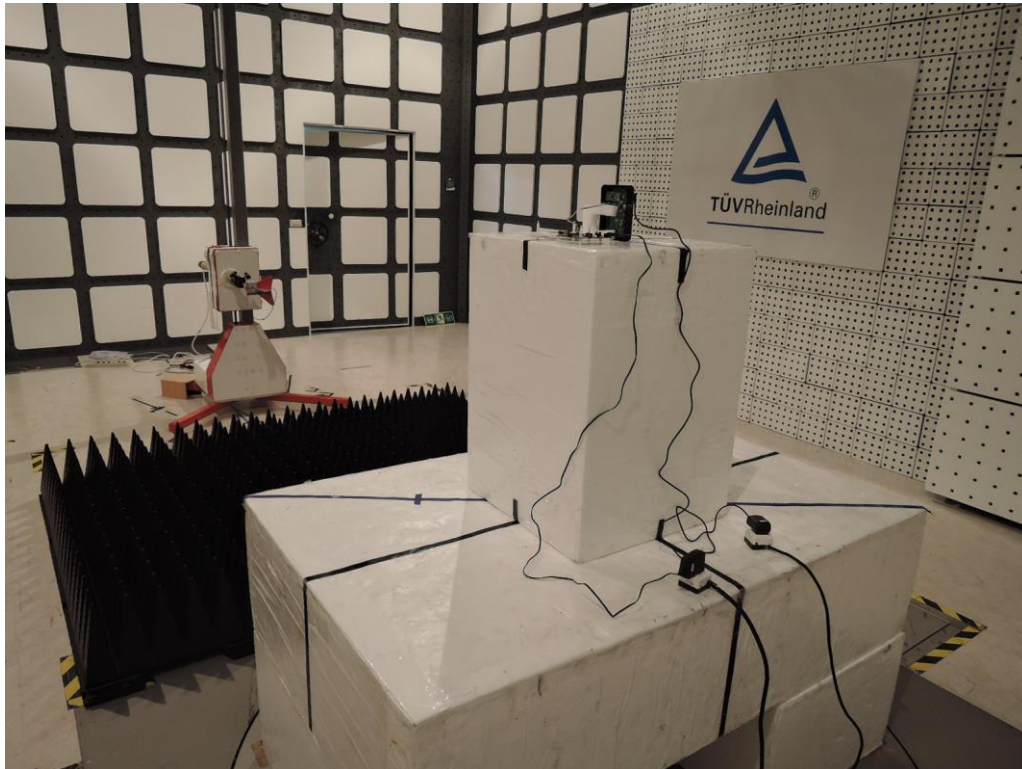
---End---

7. Photographs of the Test Set-Up

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



Photograph 2: Set-up for Spurious Emissions (Back View 1)



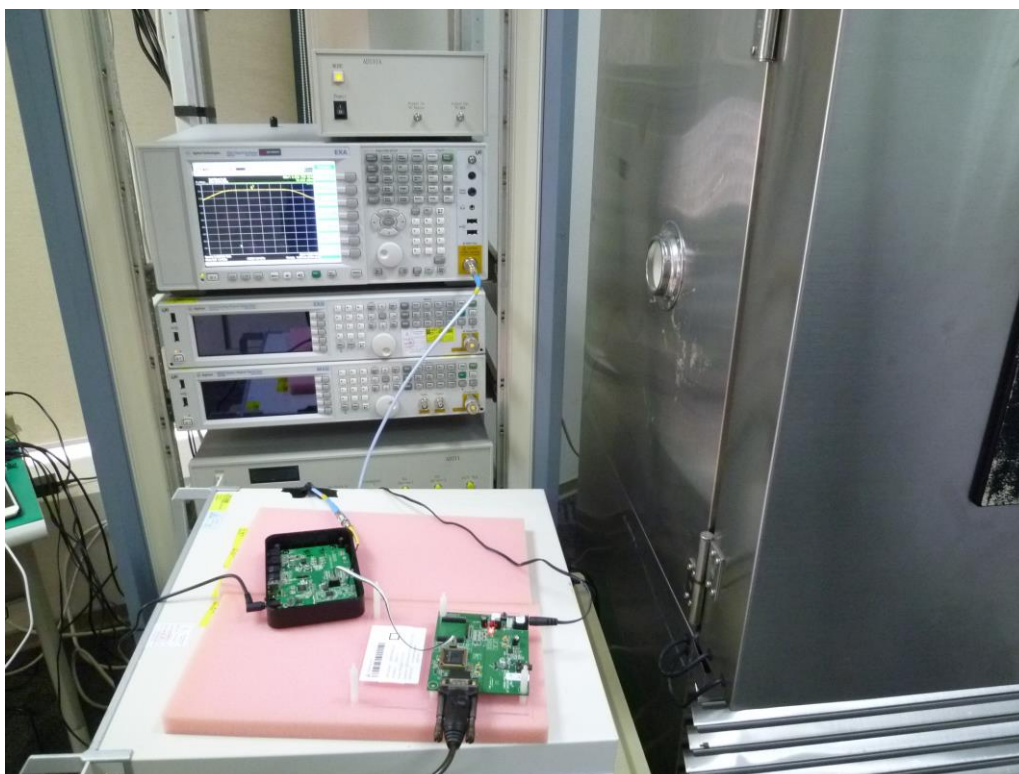
Photograph 3: Set-up for Spurious Emissions (Back View 2)



Photograph 4: Set-up for Spurious Emissions (Back View 3)



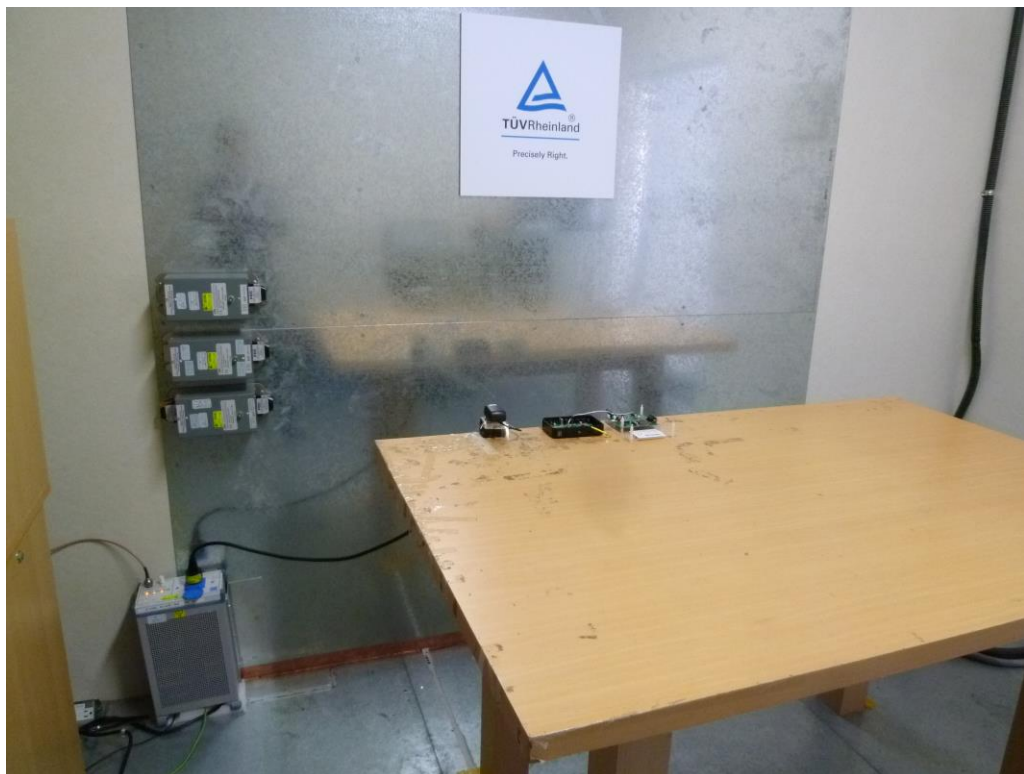
Photograph 5: Set-up for Conducted testing



Photograph 6: Set-up for for Mains Conducted testing Back



Photograph 7: Set-up for for Mains Conducted testing Front



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