# TEST REPORT

| | | |
|---|---|---|
| **Reference No.** | : | WTS17S1092271-5E V1 |
| **FCC ID** | : | 2AN8L-SMARTVISION2 |
| **Applicant** | : | KAPSYS SAS |
| **Address** | : | Parc Haute Technologie Lot 8, 694, Avenue Maurice Donat, 06250 Mougins, France |
| **Manufacturer** | : | The same as above |
| **Address** | : | The same as above |
| **Product** | : | Smart Phone |
| **Model(s)** | : | SmartVision2, SmartConnect2, KAP12000 |
| **Brand** | : | Kapsys |
| **Standards** | : | FCC CFR47 Part 15 Section 15.225: 2016 |
| **Date of Receipt sample** | : | 2017-10-12 |
| **Date of Test** | : | 2017-10-13 to 2017-11-24 |
| **Date of Issue** | : | 2017-12-13 |
| **Test Result** | : | **Pass** |

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.


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# 2 Laboratories Introduction

**Waltek Services Test Group Ltd.** is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen (CNAS Registration No. L3110, A2LA Certificate Number: 4243.01) and have branches in Foshan (CNAS Registration No. L6478), Dongguan (CNAS Registration No. L9950), Zhongshan, Suzhou (CNAS Registration No. L7754), Ningbo and Hong Kong, Our test capability covered four large fields: safety test. Electronic Magnetic Compatibility(EMC), reliability and energy performance, Chemical test. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

**Waltek Services (Shenzhen) Co., Ltd.**

**A. Accreditations for Conformity Assessment (International)**

| Country/Region | Accreditation Body | Scope | Note |
|---|---|---|---|
| USA | **CNAS (Registration No.: L3110) A2LA (Certificate No.: 4243.01)** | FCC ID \ DOC \ VOC | 1 |
| Canada | | IC ID \ VOC | 2 |
| Japan | | MIC-T \ MIC-R | - |
| Europe | | EMCD \ RED | - |
| Taiwan | | NCC | - |
| Hong Kong | | OFCA | - |
| Australia | | RCM | - |
| India | **International Services** | WPC | - |
| Thailand | | NTC | - |
| Singapore | | IDA | - |

Note:
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.
2. IC Canada Registration No.: 7760A

**B. TCBs and Notify Bodies Recognized Testing Laboratory.**

| Recognized Testing Laboratory of … | Notify body number |
|---|---|

| | |
|---|---|
| TUV Rheinland | Optional. |
| Intertek | |
| TUV SUD | |
| SGS | |
| Phoenix Testlab GmbH | 0700 |
| Element Materials Technology Warwick Ltd | 0891 |
| Timco Engineering, Inc. | 1177 |
| Eurofins Product Service GmbH | 0681 |

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## 3 Revision History

| Test report No. | Date of Receipt sample | Date of Test | Date of Issue | Purpose | Comment | Approved |
|---|---|---|---|---|---|---|
| WTS17S1092271-5E | 2017-10-12 | 2017-10-13 to 2017-11-24 | 2017-11-27 | original | - | Replaced |
| WTS17S1092271-5E V1 | 2017-10-12 | 2017-10-13 to 2017-11-24 | 2017-12-13 | Version 1 | Updated | Valid |

# 4 General Information

## 4.1 General Description of E.U.T.

| | |
|---|---|
| Product Name: | Smart Phone |
| Model No.: | SmartVision2, SmartConnect2, KAP12000 |
| Model Description: | Only the model names are different. |
| GSM Band(s): | GSM 850/900/1800/1900MHz |
| GPRS/EGPRS Class: | 12 |
| WCDMA Band(s): | FDD Band I/II/IV/V/VIII |
| LTE Band(s): | FDD Band 2/4/5/12/17 |
| Wi-Fi Specification: | 2.4G-802.11b/g/n HT20/n HT40 |
| Bluetooth Version: | Bluetooth v4.0 with BLE |
| GPS: | Support |
| NFC: | Support |
| Hardware Version: | 2AN8L-SMARTVISION2 |
| Software Version: | SmartVision2_V006_20170921 |
| Storage Location: | Internal Storage |
| Note: | N/A |

## 4.2 Details of E.U.T.

| | |
|---|---|
| Operation Frequency: | GSM/GPRS/EDGE 850: 824~849MHz<br>PCS/GPRS/EDGE 1900: 1850~1910MHz<br>WCDMA Band II: 1850~1910MHz<br>WCDMA Band V: 824~849MHz<br>WCDMA Band IV:1710~1755MHz<br>LTE Band 2: 1850~1910MHz<br>LTE Band 4: 1710~1755MHz<br>LTE Band 5: 824~849MHz<br>LTE Band 12: 699-716MHz<br>LTE Band 17: 704-716MHz<br>NFC:13.56 MHz<br>WiFi:<br>802.11b/g/n HT20: 2412~2462MHz<br>802.11n HT40: 2422~2452MHz<br>Bluetooth: 2402~2480MHz |
| Max. RF output power: | GSM 850: 32.52dBm<br>PCS1900: 29.76dBm<br>WCDMA Band II: 22.59dBm<br>WCDMA Band V: 22.61dBm<br>WCDMA Band IV: 22.28dBm<br>LTE Band 2: 23.93dBm |

| | |
|---|---|
| | LTE Band 4: 24.42dBm<br>LTE Band 5: 24.36dBm<br>LTE Band 12: 24.44dBm<br>LTE Band 17: 24.47dBm<br>WiFi(2.4G): 9.63dBm<br>Bluetooth: 3.34dBm |
| Type of Modulation: | GSM,GPRS: GMSK<br>EDGE: GMSK, 8PSK<br>WCDMA: BPSK, 16QAM<br>LTE: QPSK, 16QAM<br>WiFi: CCK, OFDM<br>Bluetooth: GFSK, Pi/4 DQPSK, 8DPSK<br>NFC: ASK, 2ASK |
| Antenna installation: | GSM/WCDMA/LTE: internal permanent antenna<br>WiFi/Bluetooth: internal permanent antenna<br>NFC: Loop antenna |
| Antenna Gain: | GSM 850: 0.62dBi<br>PCS1900: -0.15dBi<br>WCDMA Band II: -0.15dBi<br>WCDMA Band V: 0.62dBi<br>WCDMA Band IV: -0.19dBi<br>LTE Band 2: -0.15dBi<br>LTE Band 4: -0.19dBi<br>LTE Band 5: 0.62dBi<br>LTE Band 12: 0.52dBi<br>LTE Band 17: 0.54dBi<br>WiFi(2.4G): 2.4dBi<br>Bluetooth: 2.4dBi |
| Ratings: | Battery DC 3.8V, 2700mAh<br>DC 5V, 1.0A, charging from adapter<br>(Adapter Input: 100-240V~50/60Hz 0.2A) |
| Adapter: | Manufacture: Shenzhen Diasinger Digita.,LTD.<br>Model No.: D31-02051000 |

## 4.3 Channel List

| NFC Test Mode | | |
|---|---|---|
| Channel No. | Channel No. | Frequency (MHz) |
| 0 | 0 | 13.56MHz |

## 4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests; the worst data were recorded and reported.

| Test mode | Lower channel | Middle channel | Upper channel |
|---|---|---|---|
| Transmitting | N/A | 13.56MHz | N/A |

# 5 Test Summary

| Test Items | Test Requirement | Result |
|---|---|---|
| Conducted Emissions | 15.207 | PASS |
| Radiated Emission | 15.205(a)<br>15.209<br>15.225 | PASS |
| Frequency Tolerance | 15.225 | PASS |
| 20dB Bandwidth | 15.215(c) | PASS |
| Antenna Requirement | 15.203 | PASS |
| Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable. | | |

# 6 Equipment Used during Test

## 6.1 Equipments List

| Conducted Emissions Test Site 1# | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Calibration Date** | **Calibration Due Date** |
| 1. | EMI Test Receiver | R&S | ESCI | 100947 | 2017-09-12 | 2018-09-11 |
| 2. | LISN | R&S | ENV216 | 101215 | 2017-09-12 | 2018-09-11 |
| 3. | Cable | Top | TYPE16(3.5M) | - | 2017-09-12 | 2018-09-11 |
| **Conducted Emissions Test Site 2#** | | | | | | |
| **Item** | **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Calibration Date** | **Calibration Due Date** |
| 1. | EMI Test Receiver | R&S | ESCI | 101155 | 2017-09-12 | 2018-09-11 |
| 2. | LISN | SCHWARZBECK | NSLK 8128 | 8128-289 | 2017-09-12 | 2018-09-11 |
| 3. | Limiter | York | MTS-IMP-136 | 261115-001-0024 | 2017-09-12 | 2018-09-11 |
| 4. | Cable | LARGE | RF300 | - | 2017-09-12 | 2018-09-11 |
| **3m Semi-anechoic Chamber for Radiation Emissions Test site 1#** | | | | | | |
| **Item** | **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Calibration Date** | **Calibration Due Date** |
| 1 | Spectrum Analyzer | R&S | FSP | 100091 | 2017-04-29 | 2018-04-28 |
| 2 | Amplifier | Agilent | 8447D | 2944A10178 | 2017-01-13 | 2018-01-12 |
| 3 | Active Loop Antenna | Beijing Dazhi | ZN30900A | 0703 | 2017-10-17 | 2018-10-16 |
| 4 | Trilog Broadband Antenna | SCHWARZBECK | VULB9163 | 33 6 | 2017-04-09 | 2018-04-08 |
| 5 | Coaxial Cable (below 1GHz) | Top | TYPE16(13M) | - | 2017-09-12 | 2018-09-11 |
| 6 | Broad-band Horn Antenna | SCHWARZBECK | BBHA 9120 D | 667 | 2017-04-09 | 2018-04-08 |
| 7 | Broadband Preamplifier | COMPLIANCE DIRECTION | PAP-1G18 | 2004 | 2017-04-13 | 2018-04-12 |
| 8 | Coaxial Cable (above 1GHz) | Top | 1GHz-18GHz | EW02014-7 | 2017-04-13 | 2018-04-12 |
| **3m Semi-anechoic Chamber for Radiation Emissions Test site 2#** | | | | | | |
| **Item** | **Equipment** | **Manufacturer** | **Model No.** | **Serial No** | **Last Calibration Date** | **Calibration Due Date** |
| 1 | Test Receiver | R&S | ESCI | 101296 | 2017-04-13 | 2018-04-12 |
| 2 | Trilog Broadband Antenna | SCHWARZBECK | VULB9160 | 9160-3325 | 2017-04-09 | 2018-04-08 |
| 3 | Amplifier | ANRITSU | MH648A | M43381 | 2017-04-13 | 2018-04-12 |
| 4 | Cable | HUBER+SUHNER | CBL2 | 525178 | 2017-04-13 | 2018-04-12 |

| RF Conducted Testing | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Last Calibration Date** | **Calibration Due Date** |
| 1. | EMC Analyzer (9k~26.5GHz) | Agilent | E7405A | MY45114943 | 2017-09-12 | 2018-09-11 |
| 2. | Spectrum Analyzer (9k-6GHz) | R&S | FSL6 | 100959 | 2017-09-12 | 2018-09-11 |
| 3. | Signal Analyzer (9k~26.5GHz) | Agilent | N9010A | MY50520207 | 2017-09-12 | 2018-09-11 |

## 6.2 Measurement Uncertainty

| Parameter | Uncertainty |
|---|---|
| Radio Frequency | ± 1 x $10^{-6}$ |
| RF Power | ± 1.0 dB |
| RF Power Density | ± 2.2 dB |
| Radiated Spurious Emissions test | ± 5.03 dB (Bilog antenna 30M~1000MHz) |
| | ± 5.47 dB (Horn antenna 1000M~25000MHz) |
| Confidence interval：95%. Confidence factor:k=2 | |

## 6.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

# 7 Conducted Emission

Test Requirement: FCC CFR 47 Part 15 Section 15.207

Test Method: ANSI C63.10:2013

Test Result: PASS

Frequency Range: 150kHz to 30MHz

Class/Severity: Class B

Limit:

| Frequency (MHz) | Limit (dBμV) | |
|---|---|---|
| | Qua i-peak | Average |
| 0.15 to 0.5 | 66 to 5 * | 56 to 46* |
| 0.5 to | 56 | 60 |
| 5 to 30 | 60 | 50 |

## 7.1 E.U.T. Operation

Operating Environment **:**

Temperature: 25.5 °C

Humidity: 51 % RH

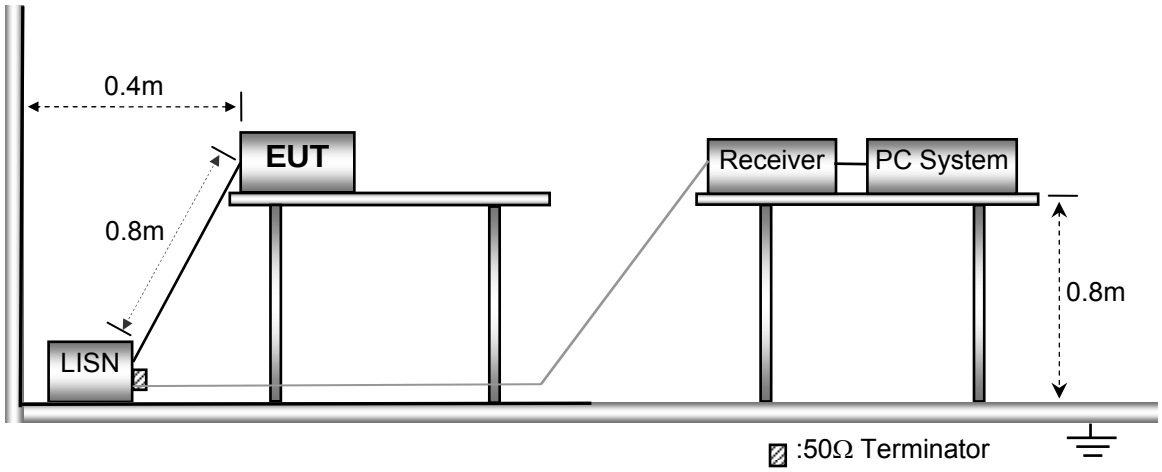
Atmospheric Pressure: 101.2kPa

EUT Operation **:**

The test was performed in transmitting mode, the test data were shown in the report.

## 7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013

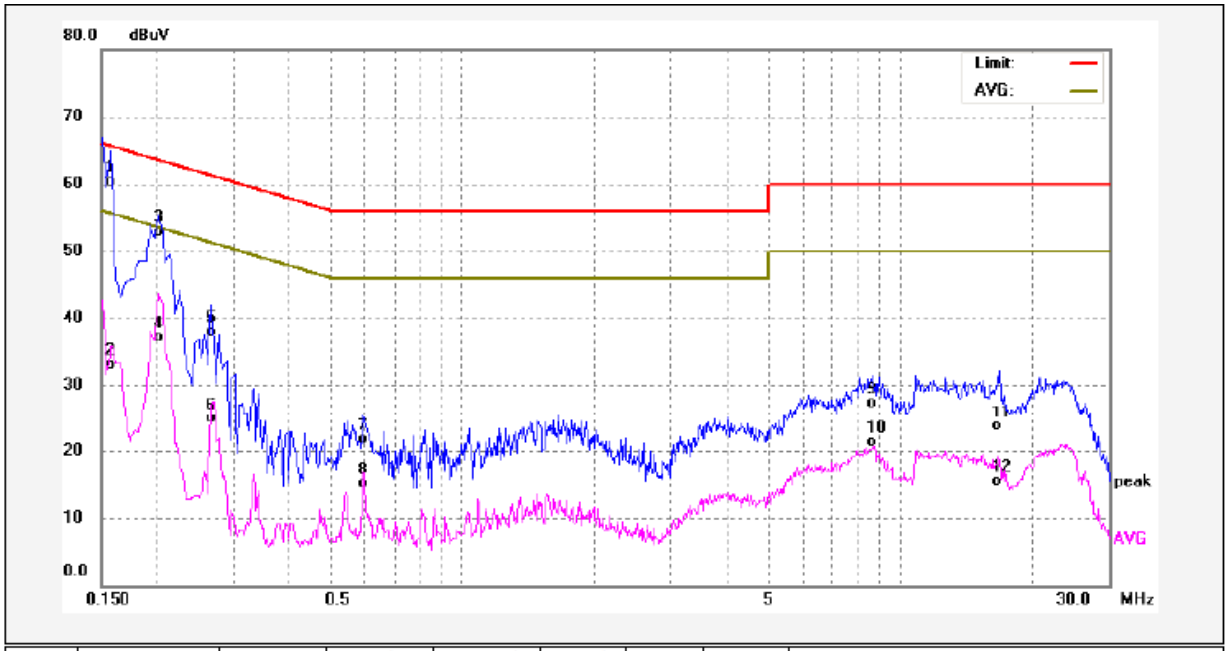



## 7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

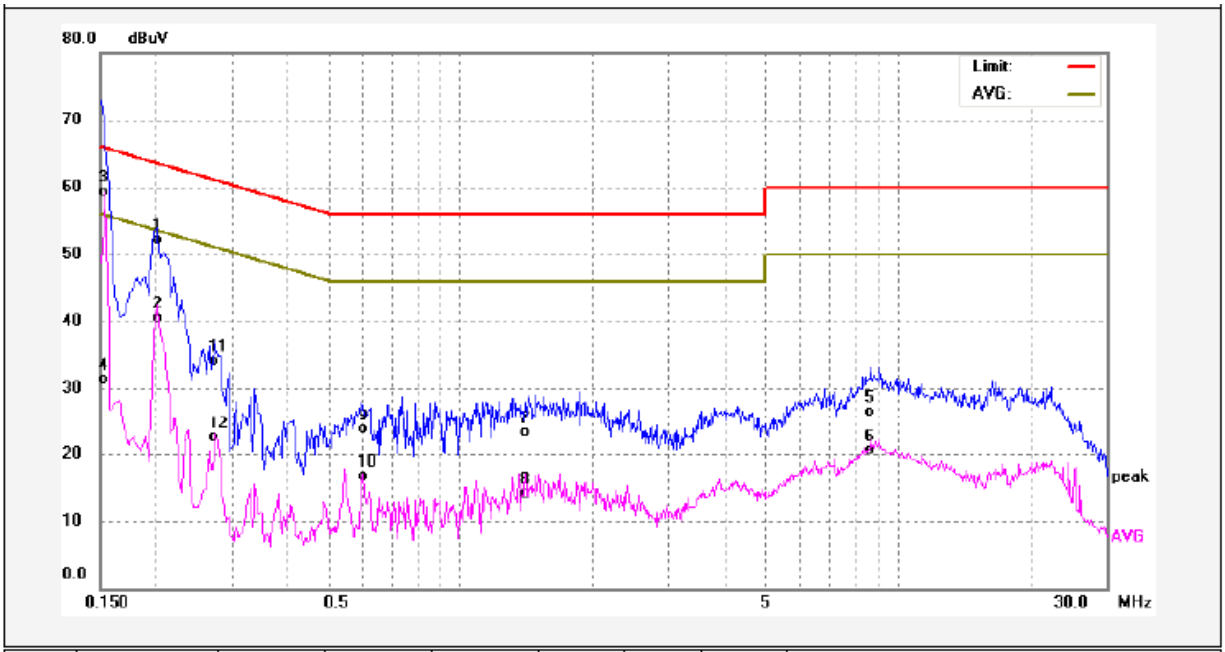
## 7.4 Test Result

Live line:




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.1580 | 50.57 | 9.64 | 60.21 | 65.56 | -5.35 | QP | |
| 2 | 0.1580 | 23.49 | 9.64 | 33.13 | 55.56 | -22.43 | AVG | |
| 3 | 0.2020 | 43.28 | 9.62 | 52.90 | 63.52 | -10.62 | QP | |
| 4 | 0.2020 | 27.52 | 9.62 | 37.14 | 53.52 | -16.38 | AVG | |
| 5 | 0.2660 | 28.31 | 9.64 | 37.95 | 61.24 | -23.29 | QP | |
| 6 | 0.2660 | 15.30 | 9.64 | 24.94 | 51.24 | -26.30 | AVG | |
| 7 | 0.5940 | 12.02 | 9.72 | 21.74 | 56.00 | -34.26 | QP | |
| 8 | 0.5940 | 5.30 | 9.72 | 15.02 | 46.00 | -30.98 | AVG | |
| 9 | 8.6420 | 17.13 | 10.11 | 27.24 | 60.00 | -32.76 | QP | |
| 10 | 8.6420 | 11.15 | 10.11 | 21.26 | 50.00 | -28.74 | AVG | |
| 11 | 16.8540 | 13.44 | 10.28 | 23.72 | 60.00 | -36.28 | QP | |
| 12 | 16.8540 | 5.14 | 10.28 | 15.42 | 50.00 | -34.58 | AVG | |

Neutral line:




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit dBuV | Margin (dB) | Detector | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.2020 | 42.43 | 9.62 | 52.05 | 63.52 | -11.47 | QP | |
| 2 | 0.2020 | 30.87 | 9.62 | 40.49 | 53.52 | -13.03 | AVG | |
| 3 | 0.1548 | 49.64 | 9.64 | 59.28 | 65.73 | -6.45 | QP | |
| 4 | 0.1548 | 21.57 | 9.64 | 31.21 | 55.73 | -24.52 | AVG | |
| 5 | 8.6580 | 16.45 | 10.11 | 26.56 | 60.00 | -33.44 | QP | |
| 6 | 8.6580 | 10.42 | 10.11 | 20.53 | 50.00 | -29.47 | AVG | |
| 7 | 1.4220 | 13.50 | 9.89 | 23.39 | 56.00 | -32.61 | QP | |
| 8 | 1.4220 | 4.22 | 9.89 | 14.11 | 46.00 | -31.89 | AVG | |
| 9 | 0.5940 | 13.89 | 9.72 | 23.61 | 56.00 | -32.39 | QP | |
| 10 | 0.5940 | 7.04 | 9.72 | 16.76 | 46.00 | -29.24 | AVG | |
| 11 | 0.2740 | 24.47 | 9.64 | 34.11 | 60.99 | -26.88 | QP | |
| 12 | 0.2740 | 12.82 | 9.64 | 22.46 | 50.99 | -28.53 | AVG | |

# 8 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209

Test Method: ANSI C63.10

Test Result: PASS

Measurement Distance: 3m

Limit:

| Frequency (MHz) | Field Strength | | Field Strength Limit at 3m Measurement Dist | |
|---|---|---|---|---|
| | uV/m | Distance (m) | uV/m | dBuV/m |
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 | 10000 * 2400/F(kHz) | $20\log^{(2400/F(kHz))} + 80$ |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 | 100 * 24000/F(kHz) | $20\log^{(24000/F(kHz))} + 40$ |
| 1.705 ~ 30 | 30 | 30 | 100 * 30 | $20\log^{(30)} + 40$ |
| 30 ~ 88 | 100 | 3 | 100 | $20\log^{(100)}$ |
| 88 ~ 216 | 150 | 3 | 150 | $20\log^{(150)}$ |
| 216 ~ 960 | 200 | 3 | 200 | $20\log^{(200)}$ |
| Above 960 | 500 | 3 | 500 | $20\log^{(500)}$ |

## 8.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 51.1 % RH

Atmospheric Pressure: 101.2kPa

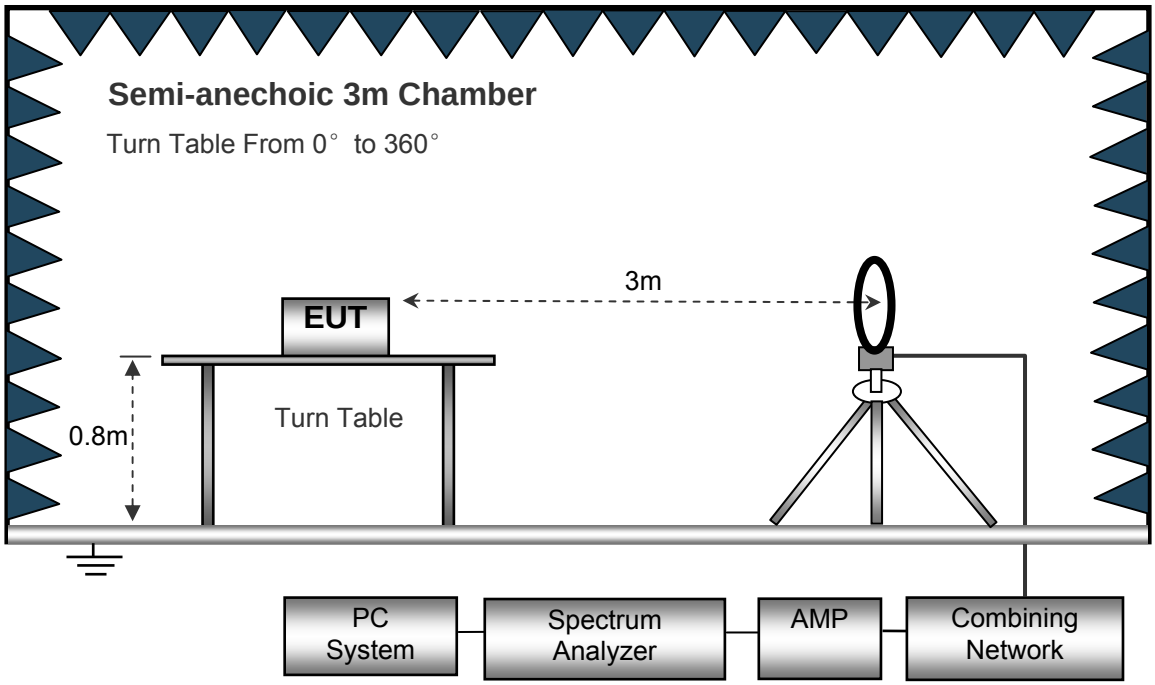
EUT Operation **:**

The test was performed in transmitting mode, the test data were shown in the report.

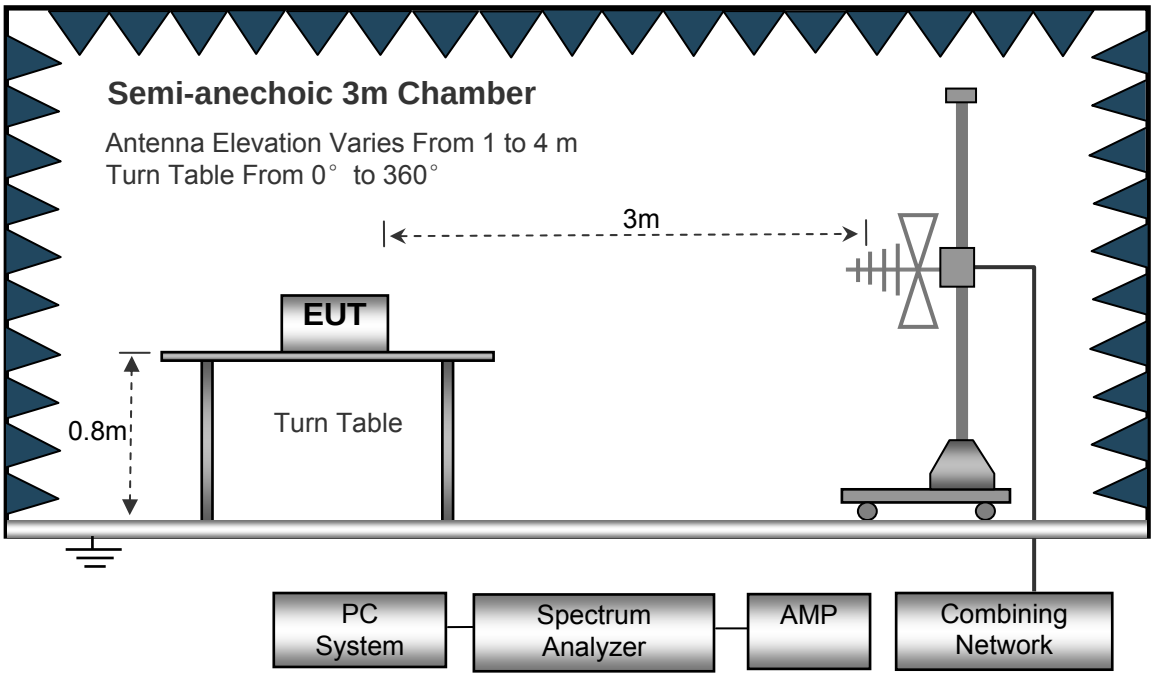
## 8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013

The test setup for emission measurement below 30MHz.




The test setup for emission measurement from 30 MHz to 1 GHz.



## 8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed .....Auto
IF Bandwidth.....10kHz
Video Bandwidth.....10kHz

Resolution Bandwidth.....10kHz

30MHz ~ 1GHz

Sweep Speed .....Auto
Detector .....PK
Resolution Bandwidth.....100kHz
Video Bandwidth.....300kHz

## 8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the Z position. So the data shown was the Z position only.

## 8.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

## 8.6 Summary of Test Results

Test Frequency: 9 kHz ~ 30MHz Note: Correct factor = Cable loss + Antenna factor

| Frequency | Receiver Reading (PK) | Turn table Angle | RX Antenna | | Corrected Factor | Corrected Amplitude (PK) | FCC Part 15.225 | |
|---|---|---|---|---|---|---|---|---|
| | | | Height | Polar | | | Limit | Margin |
| (MHz) | (dBμV) @3m | Degree | (m) | (H/V) | (dB/m) | (dBμV/m) @3m | (dBμV/ m)@3m | (dB) |
| 13.56 | 43.51 | 123 | 1.9 | H | 19.68 | 63.19 | 124 | -60.81 |
| 13.56 | 34.50 | 316 | 1.5 | V | 19.68 | 54.18 | 124 | -69.82 |

| Frequency (MHz) | Receiver Reading | Detector | Correct factor | Extrapolation factor | Measurement results (calculated) | Limits | Margin |
|---|---|---|---|---|---|---|---|
| | dBμV @3m | QP | dB/m | dB | dBμV/m @30m | dBμV/m @30m | dB |
| 4.259 | 32.64 | QP | 20.20 | 40.00 | 12.84 | 29.54 | -16.70 |
| 11.437 | 35.38 | QP | 19.90 | 40.00 | 15.28 | 29.54 | -14.26 |

| Frequency Range (MHz) | Frequency (MHz) | Maximum Reading | Detector | Correct factor | Extrapolation factor | Measurement results (calculated) | Limits | Margin |
|---|---|---|---|---|---|---|---|---|
| | | dBμV @3m | QP | dB/m | dB | dBμV/m @30m | dBμV/m @30m | dB |
| 13.110~ 13.41 | 13.401 | 40.12 | QP | 21.55 | 40 | 21.67 | 40.51 | -18.84 |
| 13.410~ 13.553 | 13.546 | 48.65 | QP | 21.55 | 40 | 30.20 | 50.47 | -20.27 |
| 13.567~ 13.71 | 13.587 | 48.05 | QP | 21.55 | 40 | 29.60 | 50.47 | -20.87 |
| 13.710~ 14.01 | 13.719 | 37.65 | QP | 21.55 | 40 | 19.20 | 40.51 | -21.31 |

**Test Frequency: 30MHz ~ 1GHz**

| Frequency | Receiver Reading | Detector | Turn table Angle | RX Antenna | | Correcte d Factor | Corrected Amplitude | FCC Part 15.225/209/205 | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Height | Polar | | | Limit | Margin |
| (MHz) | (dBμV) @3m | (QP) | Degree | (m) | (H/V) | (dB) | (dBμV/m) @3m | (dBμV/m) @3m | (dB) |
| 32.59 | 31.41 | QP | 150 | 1.2 | H | -14.30 | 17.11 | 40.00 | -22.89 |
| 32.59 | 32.96 | QP | 206 | 2.0 | V | -14.30 | 18.66 | 40.00 | -21.34 |
| 223.45 | 36.12 | QP | 51 | 1.8 | H | -13.58 | 22.54 | 46.00 | -23.46 |
| 223.45 | 40.81 | QP | 117 | 1.6 | V | -13.58 | 27.23 | 46.00 | -18.77 |
| 517.98 | 39.25 | QP | 192 | 1.7 | H | -5.63 | 33.62 | 46.00 | -12.38 |
| 517.98 | 40.13 | QP | 173 | 1.6 | V | -5.63 | 34.50 | 46.00 | -11.50 |

# 9 Frequency Tolerance

Test Requirement: FCC Part15.225

Test Method: ANSI C63.10: 2013

Limit The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

## 9.1 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Centre Frequency = fundamental frequency, RBW=30 Hz, VBW= 100 Hz, Span =3 kHz.
4. Set SPA Max hold. Mark peak.

## 9.2 Test Result

| Power Supply | Temperature (℃) | Measured Frequency (MHz) | Frequency Error | Part 15.225 Limit |
|---|---|---|---|---|
| DC 3.8V | -20 | 13.5612 | 0.0091% | ±0.01% |
| | -10 | 13.5606 | 0.0043% | ±0.01% |
| | 0 | 13.5598 | -0.0018% | ±0.01% |
| | +10 | 13.5595 | -0.0035% | ±0.01% |
| | +20 | 13.5608 | 0.0059% | ±0.01% |
| | +30 | 13.5592 | -0.0058% | ±0.01% |
| | +40 | 13.5593 | -0.0053% | ±0.01% |
| | +50 | 13.5605 | 0.0037% | ±0.01% |
| DC 3.23 V | -20 | 13.5607 | 0.0052% | ±0.01% |
| | -10 | 13.5602 | 0.0016% | ±0.01% |
| | 0 | 13.5597 | -0.0022% | ±0.01% |

| | | | | |
|---|---|---|---|---|
| | +10 | 13.5608 | 0.0061% | ±0.01% |
| | +20 | 13.5609 | 0.0066% | ±0.01% |
| | +30 | 13.5611 | 0.0083% | ±0.01% |
| | +40 | 13.5594 | -0.0044% | ±0.01% |
| | +50 | 13.5609 | 0.0070% | ±0.01% |
| DC4.37V | -20 | 13.5604 | 0.0029% | ±0.01% |
| | -10 | 13.5601 | 0.0076% | ±0.01% |
| | 0 | 13.5596 | -0.0032% | ±0.01% |
| | +10 | 13.5601 | 0.0006% | ±0.01% |
| | +20 | 13.5600 | 0.0001% | ±0.01% |
| | +30 | 13.5593 | -0.0055% | ±0.01% |
| | +40 | 13.5606 | 0.0046% | ±0.01% |
| | +50 | 13.5603 | 0.0024% | ±0.01% |

# 10 20dB Bandwidth

Test Requirement: FCC Part15.215(C)

Test Method: ANSI C63.10: 2013

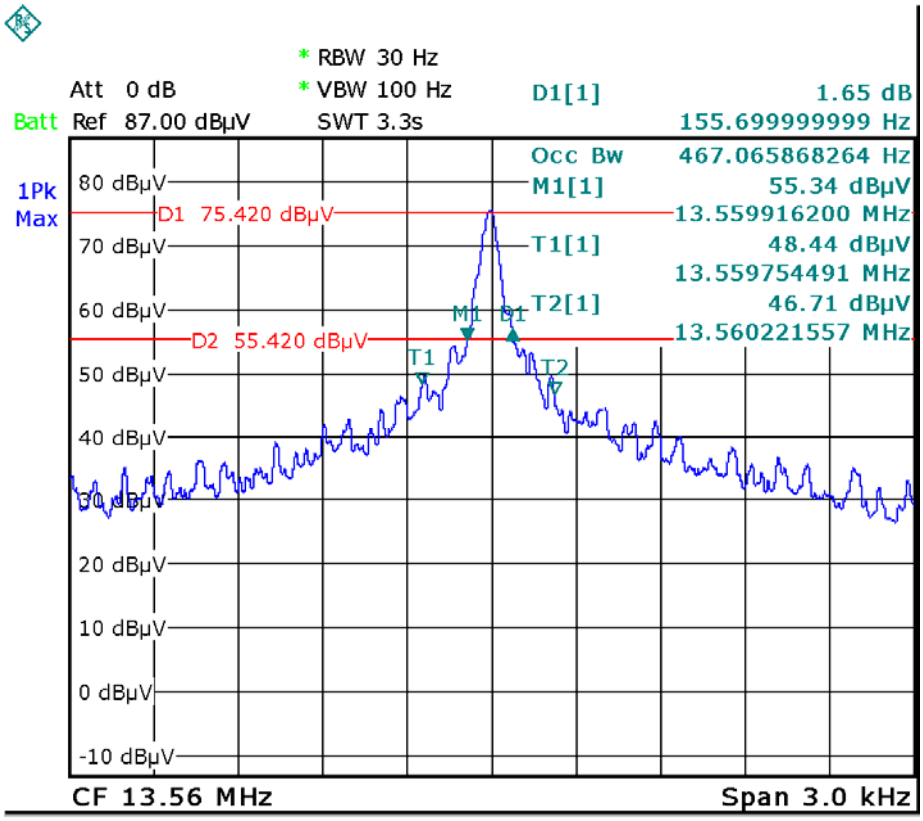
## 10.1 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak mode.
2. 20dB Bandwidth the resolution bandwidth of 30 Hz and the video bandwidth of 100 Hz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

## 10.2 Test Result

| Frequency(MHz) | Bandwidth Emission(Hz) |
|---|---|
| 13.56 | 155.70 |

Test Plot



# 11 Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. This product has an Loop antenna, fulfil the requirement of this section.

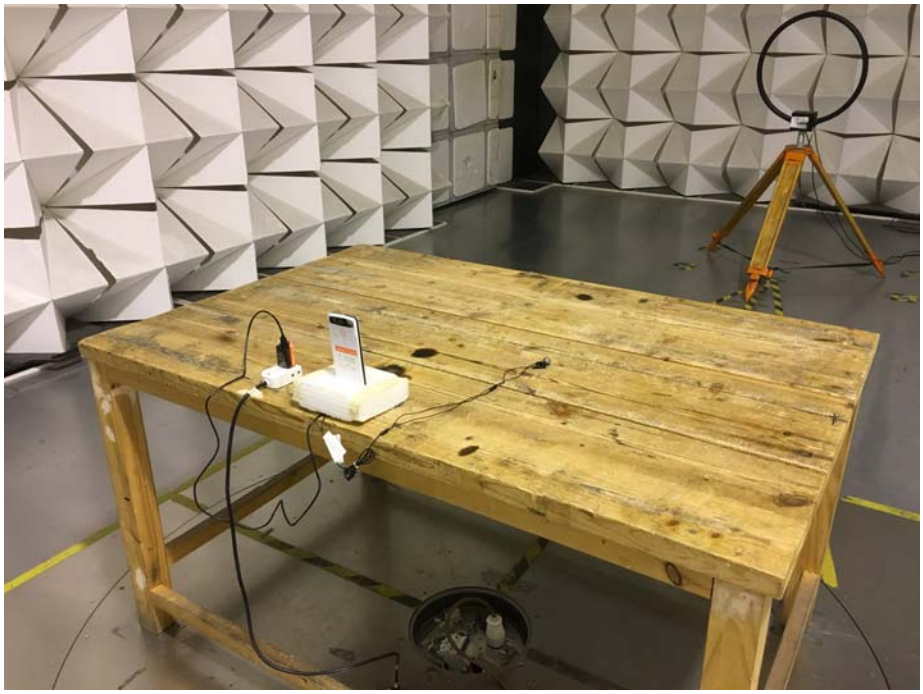
# 12 RF Exposure

Remark: refer to SAR test report: WTS17S1092272E V1.

# 13 Photographs- Test Setup Photos

## 13.1 Photograph – Radiation Emission Test Setup

Test frequency from 9 KHz to 30MHz



Test frequency from 30MHz to 1GHz

## 13.2 Photograph – Conducted Emission Test Setup

# 14 Photographs of EUT.

Note: Please refer to appendix: WTS17S1092271E_Photo.

======End of Report======