



FCC RADIO TEST REPORT

FCC ID : B94HNC05CTKR
Equipment : Convertible PC
Brand Name : HP
Model Name : HSN-C05C
Applicant : HP Inc.
3390 East Harmony Road, Fort Collins,
Colorado, United States 80528
Standard : 47 CFR Part 2, 96

The product was received on Mar. 31, 2020 and testing was started from Apr. 27, 2020 and completed on May 16, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this partial report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

| Report No. | Version | Description | Issued Date |
|--------------|---------|---|---------------|
| FG030918-03F | 01 | Initial issue of report | Jun. 19, 2020 |
| FG030918-03F | 02 | Revise applicant information | Jun. 29, 2020 |
| FG030918-03F | 03 | 1. Remove test Photo and manufacturer information 2. Adding module information | Jul. 01, 2020 |
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Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items | Result (PASS/FAIL) | Remark |
|---------------|-------------------|---|--------------------|--|
| - | §2.1046 | Conducted Output Power | - | See Note |
| - | §96.41 | Peak-to-Average Ratio | - | See Note |
| - | §96.41 | Effective Isotropic Radiated Power | - | See Note |
| | | Power Density | - | See Note |
| - | §2.1049 §96.41 | Occupied Bandwidth | - | See Note |
| - | §2.1051 §96.41 | Conducted Band Edge Measurement | - | See Note |
| - | §2.1051 §96.41 | Conducted Spurious Emission | - | See Note |
| - | §2.1055 | Frequency Stability for Temperature & Voltage | - | See Note |
| 3.4 | §2.1051 §96.41 | Radiated Spurious Emission | Pass | Under limit 8.27 dB at 28408.000 MHz |

Note: The module (Model: T99W175) makes no difference after verifying output power, this report reuses test data from the module report.

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Yimin Ho



1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE/5G NR, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, NFC, and GNSS.

| Product Specification subjective to this standard | |
|---|---|
| WWAN Module | Brand Name: FOXCONN Model Name: T99W175 |
| Antenna Type | WWAN <Ant. 1>: PIFA Antenna <Ant. 2>: PIFA Antenna (Rx Only) <Ant. 3>: PIFA Antenna <Ant. 4>: PIFA Antenna (Rx Only) WLAN <Ant. 1>: PIFA Antenna <Ant. 2>: PIFA Antenna Bluetooth: PIFA Antenna GPS/Glonass/BDS/Galileo: PIFA Antenna NFC: Loop Antenna |

| WWAN Antenna Information NB Mode | | | |
|---|----------------------|--------------|-------------------------------|
| Antenna Part Number | Manufacture | Antenna Type | Peak Gain (dBi) |
| Tx1 Antenna WA-P-LTE15-02-003 (DC33002DU00) | INPAQ Corporation | PIFA | 824-849MHz -0.77 dBi (peak) |
| | | | 880-915MHz -0.92 dBi (peak) |
| | | | 1710-1785MHz 0.56 dBi (peak) |
| | | | 1850-1910MHz 1.28 dBi (peak) |
| | | | 1920-1980MHz 0.7 dBi (peak) |
| | | | 704-716MHz -2.03 dBi (peak) |
| | | | 746-756MHz -0.33 dBi (peak) |
| | | | 777-787MHz 0.44 dBi (peak) |
| | | | 832-862MHz -0.84 dBi (peak) |
| | | | 1710-1755MHz 0.67 dBi (peak) |
| | | | 2500-2570MHz -0.31 dBi (peak) |
| | | | 2570-2620MHz 0.21 dBi (peak) |
| MIMO3 Antenna WA-P-LTE16-02-002 (DC33002DU30) | INPAQ Corporation | PIFA | 2300-2400MHz -0.27 dBi (peak) |
| | | | 1930-1990MHz 0.73 dBi (peak) |
| | | | 2110-2170MHz 1.3 dBi (peak) |
| | | | 2132-2155MHz 0.78 dBi (peak) |
| | | | 2300-2400MHz 1.17 dBi (peak) |



| WWAN Antenna Information TB Mode | | | |
|---|----------------------|--------------|-------------------------------|
| Antenna Part Number | Manufacture | Antenna Type | Peak Gain (dBi) |
| Tx1 Antenna WA-P-LTE15-02-003 (DC33002DU00) | INPAQ Corporation | PIFA | 824-849MHz -2.79 dBi (peak) |
| | | | 880-915MHz -2.16 dBi (peak) |
| | | | 1710-1785MHz -1.2 dBi (peak) |
| | | | 1850-1910MHz -1.69 dBi (peak) |
| | | | 1920-1980MHz -1.5 dBi (peak) |
| | | | 704-716MHz -4.27 dBi (peak) |
| | | | 746-756MHz -4.65 dBi (peak) |
| | | | 777-787MHz -4.36 dBi (peak) |
| | | | 832-862MHz -2.15 dBi (peak) |
| | | | 1710-1755MHz -1.19 dBi (peak) |
| | | | 2500-2570MHz 0.16 dBi (peak) |
| | | | 2570-2620MHz 0.17 dBi (peak) |
| MIMO3 Antenna WA-P-LTE16-02-002 (DC33002DU30) | INPAQ Corporation | PIFA | 2300-2400MHz -1.81 dBi (peak) |
| | | | 1930-1990MHz -2 dBi (peak) |
| | | | 2110-2170MHz -1.69 dBi (peak) |
| | | | 2132-2155MHz -1.69 dBi (peak) |
| | | | 2300-2400MHz 2.82 dBi (peak) |

1.2 Modification of EUT

No modifications are made to the EUT during all test items.



1.3 Testing Location

| | |
|---------------------------|---|
| Test Site | SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory |
| Test Site Location | No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855 |
| Test Site No. | Sporton Site No. 03CH12-HY |
| Test Engineer | Jack Cheng, Lance Chiang and Chuan Chu |
| Temperature | 19~22°C |
| Relative Humidity | 52~60% |

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW0007

1.4 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ FCC 47 CFR Part 2, 96
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 940660 D01 Part 96 CBRS Eqpt v01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2 Test Configuration of Equipment Under Test

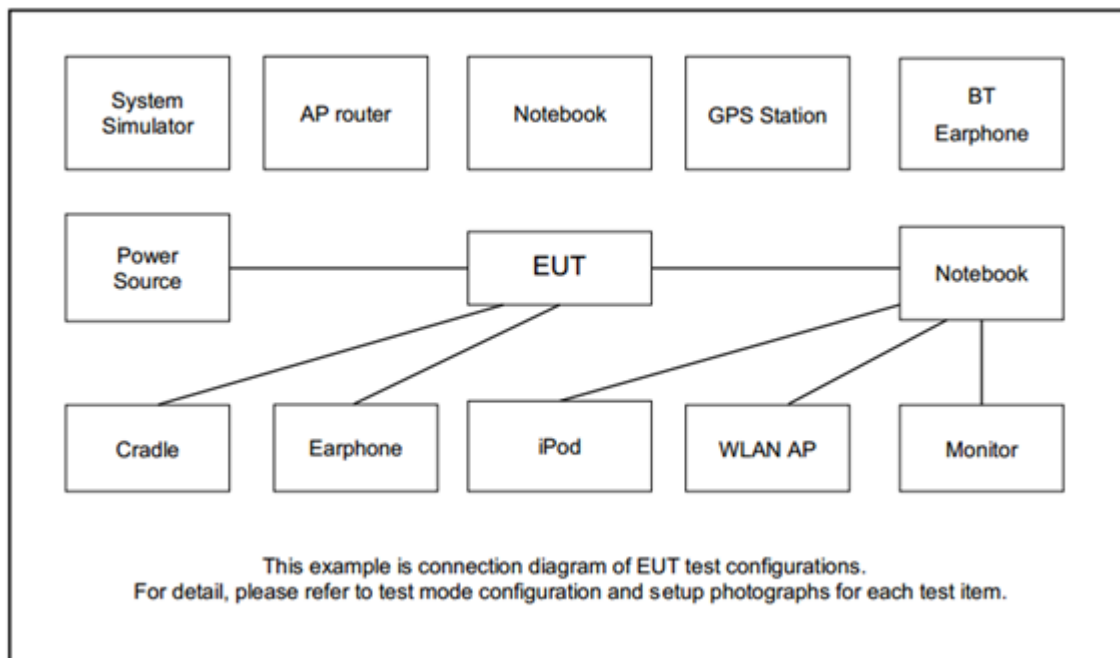
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in Tablet Mode (three orthogonal panels, X, Y, Z) and Notebook Mode. The worst cases (Y plane) were recorded in this report.

| Test Items | Band | Bandwidth (MHz) | | | | | | Modulation | | | RB # | | | Test Channel | | |
|----------------------------|---|-----------------|---|---|----|----|----|------------|-------|-------|------|------|------|--------------|---|---|
| | | 1.4 | 3 | 5 | 10 | 15 | 20 | QPSK | 16QAM | 64QAM | 1 | Half | Full | L | M | H |
| Radiated Spurious Emission | 48 | - | - | | | | v | v | | | v | | | v | v | v |
| Remark | <ol style="list-style-type: none"> The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. | | | | | | | | | | | | | | | |

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

| Item | Equipment | Trade Name | Model No. | FCC ID | Data Cable | Power Cord |
|------|------------------|------------|-----------|--------------|------------------|-------------------|
| 1. | System Simulator | Anritsu | MT8821C | N/A | N/A | Unshielded, 1.8 m |
| 2. | iPod Earphone | Apple | N/A | Verification | Unshielded, 1.0m | N/A |



2.4 Frequency List of Low/Middle/High Channels

| LTE Band 48 Channel and Frequency List | | | | |
|--|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 55340 | 55990 | 56640 |
| | Frequency | 3560.0 | 3625.0 | 3690.0 |
| 15 | Channel | 55315 | 55990 | 56665 |
| | Frequency | 3557.5 | 3625.0 | 3692.5 |
| 10 | Channel | 55290 | 55990 | 56690 |
| | Frequency | 3555.0 | 3625.0 | 3695.0 |
| 5 | Channel | 55265 | 55990 | 56715 |
| | Frequency | 3552.5 | 3625.0 | 3697.5 |

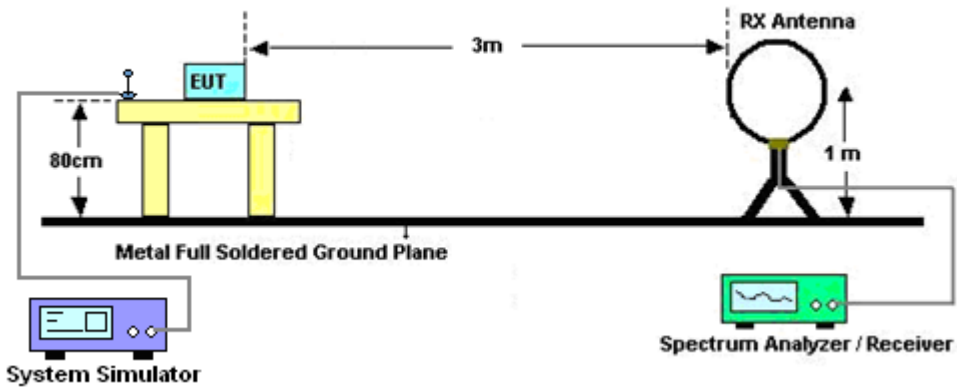
3 Radiated Test Items

3.1 Measuring Instruments

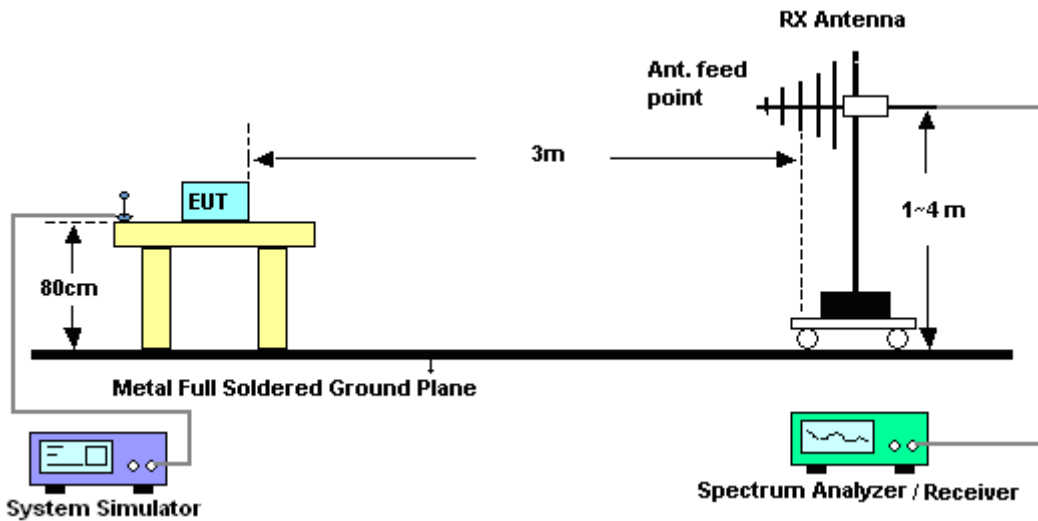
See list of measuring instruments of this test report.

3.2 Test Setup

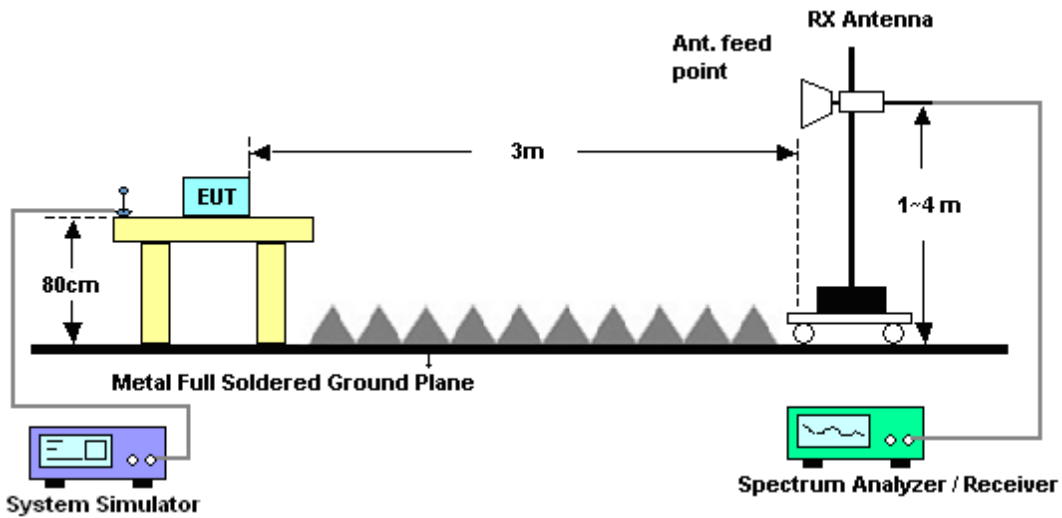
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.3 Test Result of Radiated Test

Please refer to Appendix A.

Note:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



3.4 Radiated Spurious Emission

3.4.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least -40dBm / MHz. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.4.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
ERP (dBm) = EIRP - 2.15
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
The limit line is -40dBm/MHz



4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-------------------------|--------------------|-----------------------------------|-----------------|----------------------------------|------------------|--------------------------------|---------------|--------------------------|
| Loop Antenna | Rohde & Schwarz | HFH2-Z2 | 100315 | 9 kHz~30 MHz | Dec. 26, 2019 | Apr. 27, 2020~ May 16, 2020 | Dec. 25, 2020 | Radiation (03CH12-HY) |
| Bilog Antenna | TESEQ | CBL 6111D & 00800N1D01 N-06 | 37059 & 01 | 30MHz~1GHz | Oct. 12, 2019 | Apr. 27, 2020~ May 16, 2020 | Oct. 11, 2020 | Radiation (03CH12-HY) |
| Horn Antenna | SCHWARZBE CK | BBHA 9120D | 9120D-132 8 | 1GHz ~ 18GHz | Nov. 14, 2019 | Apr. 27, 2020~ May 16, 2020 | Nov. 13, 2020 | Radiation (03CH12-HY) |
| Horn Antenna | SCHWARZBE CK | BBHA 9120D | 9120D-152 2 | 1GHz ~ 18GHz | Sep. 19, 2019 | Apr. 27, 2020~ May 16, 2020 | Sep. 18, 2020 | Radiation (03CH12-HY) |
| SHF-EHF Horn Antenna | SCHWARZBE CK | BBHA 9170 | BBHA9170 584 | 18GHz ~ 40GHz | Dec. 10, 2019 | Apr. 27, 2020~ May 16, 2020 | Dec. 09, 2020 | Radiation (03CH12-HY) |
| SHF-EHF Horn Antenna | SCHWARZBE CK | BBHA 9170 | BBHA9170 980 | 18GHz ~ 40GHz | Jan. 10, 2019 | Apr. 27, 2020~ May 16, 2020 | Jan. 09, 2021 | Radiation (03CH12-HY) |
| Preamplifier | COM-POWER | PA-103 | 161075 | 10MHz~1GHz | Mar. 25, 2020 | Apr. 27, 2020~ May 16, 2020 | Mar. 24, 2021 | Radiation (03CH12-HY) |
| Preamplifier | Jet-Power | JPA00101800 -30-10P | 160118000 2 | 1GHz~18GHz | Feb. 07, 2020 | Apr. 27, 2020~ May 16, 2020 | Feb. 06, 2021 | Radiation (03CH12-HY) |
| Preamplifier | EMEC | EM18G40G | 060715 | 18GHz ~ 40GHz | Dec. 13, 2019 | Apr. 27, 2020~ May 16, 2020 | Dec. 12, 2020 | Radiation (03CH12-HY) |
| Preamplifier | Keysight | 83017A | MY532701 48 | 1GHz~26.5GHz | Dec. 20, 2019 | Apr. 27, 2020~ May 16, 2020 | Dec. 19, 2020 | Radiation (03CH12-HY) |
| Signal Analyzer | Agilent | N9010A | MY534701 18 | 10Hz~44GHz | Mar. 12, 2020 | Apr. 27, 2020~ May 16, 2020 | Mar. 11, 2021 | Radiation (03CH12-HY) |
| Signal Generator | Rohde & Schwarz | SMB100A | 101107 | 100kHz~40GHz | Aug. 27, 2019 | Apr. 27, 2020~ May 16, 2020 | Aug. 26, 2020 | Radiation (03CH12-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 126E | 0058/126E | 30M-18G | Dec. 12, 2019 | Apr. 27, 2020~ May 16, 2020 | Dec. 11, 2020 | Radiation (03CH12-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 102 | 505134/2 | 30M~40GHz | Feb. 25, 2020 | Apr. 27, 2020~ May 16, 2020 | Feb. 24, 2021 | Radiation (03CH12-HY) |
| RF Cable | HUBER + SUHNER | SUCOFLEX 102 | 800740/2 | 30M~40GHz | Feb. 25, 2020 | Apr. 27, 2020~ May 16, 2020 | Feb. 24, 2021 | Radiation (03CH12-HY) |
| Controller | EMEC | EM1000 | N/A | Control Turn table & Ant Mast | N/A | Apr. 27, 2020~ May 16, 2020 | N/A | Radiation (03CH12-HY) |
| Antenna Mast | EMEC | AM-BS-4500- B | N/A | 1m~4m | N/A | Apr. 27, 2020~ May 16, 2020 | N/A | Radiation (03CH12-HY) |
| Turn Table | EMEC | TT2000 | N/A | 0~360 Degree | N/A | Apr. 27, 2020~ May 16, 2020 | N/A | Radiation (03CH12-HY) |
| Software | Audix | E3 6.2009-8-24 | RK-000989 | N/A | N/A | Apr. 27, 2020~ May 16, 2020 | N/A | Radiation (03CH12-HY) |



5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 3.24 |
|---|------|

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 3.62 |
|---|------|

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$) | 4.06 |
|---|------|



Appendix A. Test Results of Radiated Test

LTE Band 48

| LTE Band 48 / 20MHz / QPSK | | | | | | | | | |
|----------------------------|-------------------|-------------|---------------|-------------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Over Limit (dB) | SPA Reading (dBm) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| Lowest | 7100 | -51.14 | -40 | -11.14 | -53.11 | -61.11 | 1.77 | 11.74 | H |
| | 10655 | -55.56 | -40 | -15.56 | -57.84 | -63.99 | 2.47 | 10.90 | H |
| | 14205 | -56.79 | -40 | -16.79 | -63.85 | -65.63 | 2.87 | 11.71 | H |
| | 21306 | -52.65 | -40 | -12.65 | -74.51 | -69.37 | 1.98 | 18.70 | H |
| | 24857 | -51.59 | -40 | -11.59 | -76.25 | -67.60 | 2.07 | 18.07 | H |
| | 28408 | -50.01 | -40 | -10.01 | -75.53 | -67.25 | 2.32 | 19.56 | H |
| | 7100 | -53.64 | -40 | -13.64 | -55.22 | -63.61 | 1.77 | 11.74 | V |
| | 10655 | -57.55 | -40 | -17.55 | -59.57 | -65.98 | 2.47 | 10.90 | V |
| | 14205 | -57.01 | -40 | -17.01 | -63.79 | -65.85 | 2.87 | 11.71 | V |
| | 21306 | -52.41 | -40 | -12.41 | -74.13 | -69.13 | 1.98 | 18.70 | V |
| | 24857 | -50.01 | -40 | -10.01 | -75.88 | -66.02 | 2.07 | 18.07 | V |
| | 28408 | -48.27 | -40 | -8.27 | -75.61 | -65.51 | 2.32 | 19.56 | V |
| Middle | 7230 | -52.50 | -40 | -12.50 | -54.87 | -62.19 | 1.84 | 11.53 | H |
| | 10850 | -58.33 | -40 | -18.33 | -60.66 | -66.66 | 2.57 | 10.90 | H |
| | 14462 | -57.75 | -40 | -17.75 | -65.02 | -65.99 | 2.85 | 11.09 | H |
| | 18080 | -53.68 | -40 | -13.68 | -71.79 | -69.91 | 1.76 | 17.98 | H |
| | 21696 | -53.00 | -40 | -13.00 | -74.52 | -69.79 | 1.99 | 18.78 | H |
| | 25312 | -50.76 | -40 | -10.76 | -75.92 | -67.36 | 2.14 | 18.74 | H |
| | 7230 | -50.96 | -40 | -10.96 | -53.07 | -60.65 | 1.84 | 11.53 | V |
| | 10850 | -58.98 | -40 | -18.98 | -61.1 | -67.31 | 2.57 | 10.90 | V |
| | 14462 | -58.08 | -40 | -18.08 | -64.53 | -66.32 | 2.85 | 11.09 | V |
| | 18080 | -54.45 | -40 | -14.45 | -71.63 | -70.68 | 1.76 | 17.98 | V |
| | 21696 | -53.40 | -40 | -13.40 | -74.91 | -70.19 | 1.99 | 18.78 | V |
| | 25312 | -49.15 | -40 | -9.15 | -75.57 | -65.75 | 2.14 | 18.74 | V |
| Highest | 7360 | -58.63 | -40 | -18.63 | -60.97 | -68.04 | 1.91 | 11.32 | H |
| | 11045 | -57.19 | -40 | -17.19 | -59.67 | -65.51 | 2.63 | 10.95 | H |
| | 14724 | -57.24 | -40 | -17.24 | -66.08 | -66.04 | 2.91 | 11.72 | H |
| | 18405 | -53.88 | -40 | -13.88 | -72.2 | -69.93 | 1.87 | 17.92 | H |
| | 22086 | -51.92 | -40 | -11.92 | -74.09 | -68.71 | 2.08 | 18.87 | H |
| | 25767 | -50.38 | -40 | -10.38 | -78.28 | -67.40 | 2.03 | 19.05 | H |
| | 7360 | -58.74 | -40 | -18.74 | -60.89 | -68.15 | 1.91 | 11.32 | V |
| | 11045 | -58.41 | -40 | -18.41 | -60.72 | -66.73 | 2.63 | 10.95 | V |
| | 14724 | -59.16 | -40 | -19.16 | -66.33 | -67.96 | 2.91 | 11.72 | V |
| | 18405 | -54.43 | -40 | -14.43 | -71.87 | -70.48 | 1.87 | 17.92 | V |
| | 22086 | -52.06 | -40 | -12.06 | -74.23 | -68.85 | 2.08 | 18.87 | V |
| | 25767 | -49.02 | -40 | -9.02 | -76.2 | -66.04 | 2.03 | 19.05 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

—————THE END—————