
FCC Test Report

Report No.: AGC08464170601FE08

FCC ID : 2AMWETK1000

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : Smart Phone

BRAND NAME : TOKIE, TeamVOX

MODEL NAME : TK1000, TVX887

CLIENT : Shenzhen Ruishi Innovation & Technology Co., Ltd.

DATE OF ISSUE : July 11, 2017

STANDARD(S) : FCC Part 15.247

TEST PROCEDURE(S) : KDB 558074 D01 DTS Meas Guidance v04

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0 | / | July 11, 2017 | Valid | Original Report |

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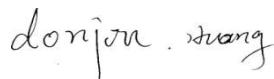
1. VERIFICATION OF COMPLIANCE

| | |
|---------------------------------|--|
| Applicant | Shenzhen Ruishi Innovation & Technology Co., Ltd. |
| Address | B407, Wanhai Building, No. 1031 NanHai Blvd, Nanshan District, Shenzhen |
| Manufacturer | Shenzhen Ruishi Innovation & Technology Co., Ltd. |
| Address | B407, Wanhai Building, No. 1031 NanHai Blvd, Nanshan District, Shenzhen |
| Product Designation | Smart Phone |
| Brand Name | TOKIE, TeamVOX |
| Test Model | TK1000 |
| Series Model | TVX887 |
| Differences Description | a) All the same except for brand name and model name, the corresponding relationship are as follow: b) TOKIE is corresponding TK1000 ; TeamVOX is corresponding TVX887 ; |
| Date of test | June 16, 2017~July 10, 2017 |
| Deviation | None |
| Condition of Test Sample | Normal |
| Report Template | AGCRT-US-BLE/RF |

WE HEREBY CERTIFY THAT:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Tested By



Donjon Huang(Huang
Dongyang)

July 10, 2017

Reviewed By



Bart Xie(Xie Xiaobin)

July 11, 2017

Approved By



Solger Zhang(Zhang Hongyi)
Authorized Officer

July 11, 2017

2.GENERAL INFORMATION

2.1 PRODUCT DESCRIPTION

The EUT is designed as "Smart Phone ". It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

| | |
|---------------------|--|
| Operation Frequency | 2.402 GHz to 2.480GHz |
| Bluetooth Version | V4.0 |
| Modulation | GFSK |
| Number of channels | 40 Channel(37 Hopping Channel,3 advertising Channel) |
| Antenna Designation | Integrated Antenna |
| Antenna Gain | 0.6dBi |
| Hardware Version | R887-MB-V2.3 |
| Software Version | R887b-V002-US-20160309 |
| Power Supply | DC3.8V by Built-in Li-ion Battery |

2.2 RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2AMWETK1000** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.3 TEST METHODOLOGY

All measurements contained in this report were conducted with KDB 558074, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions. The EUT was tested in all three orthogonal planes and the worse case was showed.

2.4 TEST FACILITY

| | |
|----------------------|---|
| Site | Dongguan Precise Testing Service Co., Ltd. |
| Location | Building D, Baoding Technology Park, Guangming Road 2, Dongcheng District, Dongguan, Guangdong, China, |
| FCC Registration No. | 371540 |
| Description | The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.10:2013. |

2.5 SPECIAL ACCESSORIES

Refer to section 2.2.

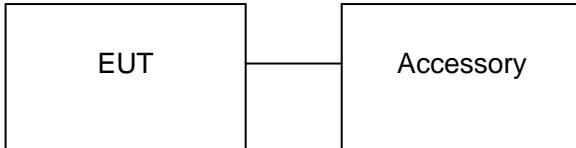
2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. SYSTEM TEST CONFIGURATION

3.1 CONFIGURATION OF TESTED SYSTEM

Configuration:



3.2 EQUIPMENT USED IN TESTED SYSTEM

| Item | Equipment | Model No. | ID or Specification | Remark |
|------|-------------|---------------|---------------------|-----------|
| 1 | Smart Phone | TK1000 | FCC ID: 2AMWETK1000 | EUT |
| 2 | Adapter | D31-01052000 | DC 5.0V/2 | Accessory |
| 3 | Battery | TK1000,TVX887 | DC3.8V/ 3600mAh | Accessory |
| 4 | USB Cable | N/A | N/A | Accessory |

ALL TEST EQUIPMENT LIST

FOR RADIATED EMISSION TEST (BELOW 1GHZ)

| Radiated Emission Test Site | | | | | |
|-------------------------------------|-----------------|--------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 3, 2016 | July 2, 2017 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 2, 2017 | July 1, 2018 |
| Trilog Broadband Antenna (25M-1GHz) | SCHWARZBECK | VULB9160 | 9160-3355 | July 3, 2016 | July 2, 2017 |
| Trilog Broadband Antenna (25M-1GHz) | SCHWARZBECK | VULB9160 | 9160-3355 | July 2, 2017 | July 1, 2018 |
| Signal Amplifier | SCHWARZBECK | BBV 9475 | 9745-0013 | July 3, 2016 | July 2, 2017 |
| Signal Amplifier | SCHWARZBECK | BBV 9475 | 9745-0013 | July 2, 2017 | July 1, 2018 |
| RF Cable | SCHWARZBECK | AK9515E | 96221 | July 3, 2016 | July 2, 2017 |
| RF Cable | SCHWARZBECK | AK9515E | 96221 | July 2, 2017 | July 1, 2018 |
| 3m Anechoic Chamber | CHENGYU | 966 | PTS-001 | June 2, 2017 | June 1, 2018 |
| MULTI-DEVICE Positioning Controller | Max-Full | MF-7802 | MF780208339 | N/A | N/A |
| Active loop antenna | Schwarzbeck | FMZB1519 | 1519-038 | June 5, 2016 | June 4, 2018 |

| | | | | | |
|-------------------|---------|---------|------------|--------------|--------------|
| (9K-30MHz) | | | | | |
| Spectrum analyzer | Agilent | E4407B | MY46185649 | June 2, 2017 | June 1, 2018 |
| Power Probe | R&S | NRP-Z23 | 100323 | July 24,2016 | July 23,2017 |
| RF attenuator | N/A | RFA20db | 68 | N/A | N/A |

FOR RADIATED EMISSION TEST (1GHZ ABOVE)

| Radiated Emission Test Site | | | | | |
|-------------------------------------|-----------------|--------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 3, 2016 | July 2, 2017 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 2, 2017 | July 1, 2018 |
| Horn Antenna (1G-18GHz) | SCHWARZBECK | BBHA9120D | 9120D-1246 | July 10, 2016 | July 9, 2018 |
| Spectrum Analyzer | Agilent | E4411B | MY4511453 | July 3, 2016 | July 2, 2017 |
| Spectrum Analyzer | Agilent | E4411B | MY4511453 | July 2, 2017 | July 1, 2018 |
| Signal Amplifier | SCHWARZBECK | BBV 9718 | 9718-269 | July 6, 2016 | July 5, 2017 |
| Signal Amplifier | SCHWARZBECK | BBV 9718 | 9718-269 | July 2, 2017 | July 1, 2018 |
| RF Cable | SCHWARZBECK | AK9515H | 96220 | July 7, 2016 | July 6, 2017 |
| RF Cable | SCHWARZBECK | AK9515H | 96220 | July 2, 2017 | July 1, 2018 |
| 3m Anechoic Chamber | CHENGYU | 966 | PTS-001 | June 2, 2017 | June 1, 2018 |
| MULTI-DEVICE Positioning Controller | Max-Full | MF-7802 | MF780208339 | N/A | N/A |
| Horn Ant (18G-40GHz) | Schwarzbeck | BBHA 9170 | 9170-181 | June 5, 2016 | June 4, 2018 |
| Power Probe | R&S | NRP-Z23 | 100323 | July 24,2016 | July 23,2017 |
| RF attenuator | N/A | RFA20db | 68 | N/A | N/A |

| Conducted Emission Test Site | | | | | |
|--------------------------------|-----------------|--------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 3, 2016 | July 2, 2017 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 2, 2017 | July 1, 2018 |
| Artificial Mains Network | Narda | L2-16B | 000WX31025 | July 7, 2016 | July 6, 2017 |
| Artificial Mains Network | Narda | L2-16B | 000WX31025 | July 2, 2017 | July 1, 2018 |
| Artificial Mains Network (AUX) | Narda | L2-16B | 000WX31026 | July 7, 2016 | July 6, 2017 |
| Artificial Mains Network (AUX) | Narda | L2-16B | 000WX31026 | July 2, 2017 | July 1, 2018 |

| | | | | | |
|---------------|-------------|---------|---------|--------------|--------------|
| RF Cable | SCHWARZBECK | AK9515E | 96222 | July 3, 2016 | July 2, 2017 |
| RF Cable | SCHWARZBECK | AK9515E | 96222 | July 2, 2017 | July 1, 2018 |
| Shielded Room | CHENGYU | 843 | PTS-002 | June 2,2017 | June 1,2018 |

| Conducted Emission Test Site | | | | | |
|--------------------------------|-----------------|--------------|---------------|------------------|-----------------|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 3, 2016 | July 2, 2017 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101417 | July 2, 2017 | July 1, 2018 |
| Artificial Mains Network | Narda | L2-16B | 000WX31025 | July 7, 2016 | July 6, 2017 |
| Artificial Mains Network | Narda | L2-16B | 000WX31025 | July 2, 2017 | July 1, 2018 |
| Artificial Mains Network (AUX) | Narda | L2-16B | 000WX31026 | July 7, 2016 | July 6, 2017 |
| Artificial Mains Network (AUX) | Narda | L2-16B | 000WX31026 | July 2, 2017 | July 1, 2018 |
| RF Cable | SCHWARZBECK | AK9515E | 96222 | July 3, 2016 | July 2, 2017 |
| RF Cable | SCHWARZBECK | AK9515E | 96222 | July 2, 2017 | July 1, 2018 |
| Shielded Room | CHENGYU | 843 | PTS-002 | June 2,2017 | June 1,2018 |

4. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|-----------------------|---|-----------|
| § 15.203 | Antenna Requirement | Compliant |
| §15.209 §15.247(d) | Radiated Emission | Compliant |
| §15.247(d) | Band Edges | Compliant |
| §15.247 | 6 dB Bandwidth | Compliant |
| §15.247(b) | Conducted Power | Compliant |
| §15.247(e) | Maximum Conducted Output Power SPECTRAL Density | Compliant |
| §15.207 | Line Conduction Emission | Compliant |
| §15.207 | Conduction Emission | Compliant |

5. DESCRIPTION OF TEST MODES

The EUT has been operated in three modulations: GFSK independently.

| NO. | TEST MODE DESCRIPTION |
|-----|-----------------------|
| 1 | Low channel TX |
| 2 | Middle channel TX |
| 3 | High channel TX |
| 4 | Normal Operating (BT) |

Note:

1. All the test modes can be supply by Built-in Li-ion battery, only the result of the worst case was recorded in the report if no any records.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. Eut is operating at its maximum duty cycle>or equal 98%

6. ANTENNA REQUIREMENT

6.1. STANDARD APPLICABLE

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

6.2. TEST RESULT

This product has a permanent antenna, fulfill the requirement of this section.

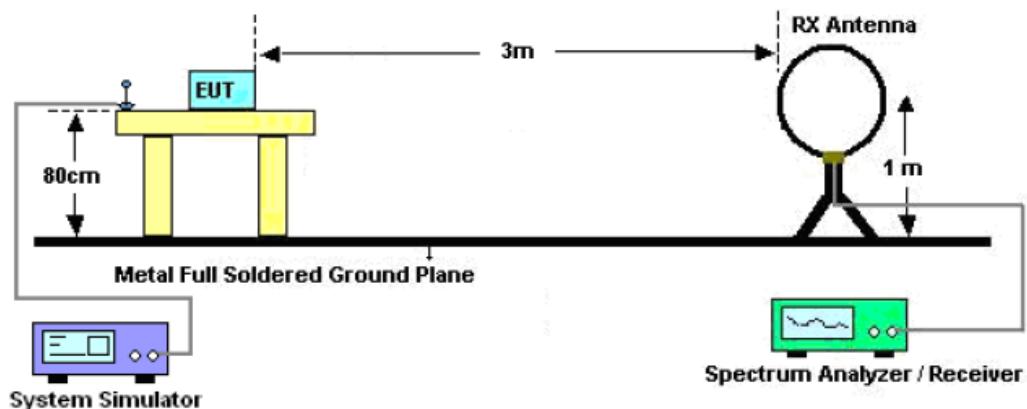
7. RADIATED EMISSION

7.1 MEASUREMENT PROCEDURE

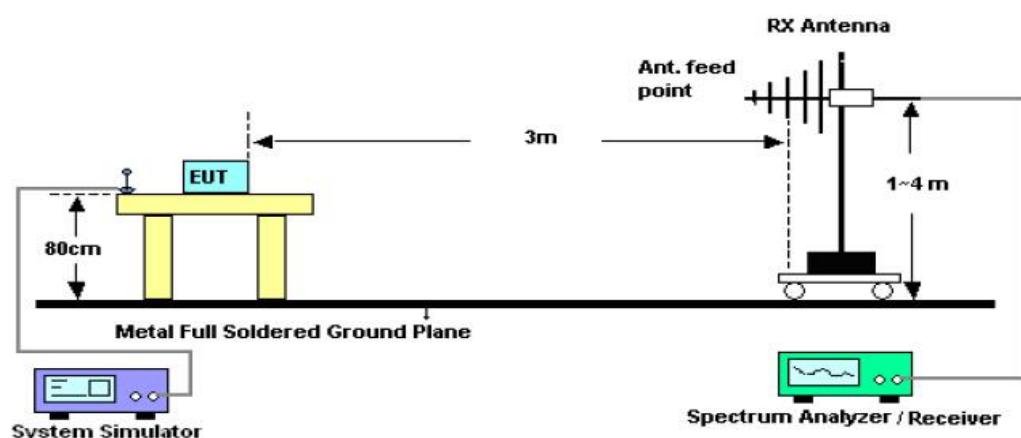
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

7.2 TEST SETUP

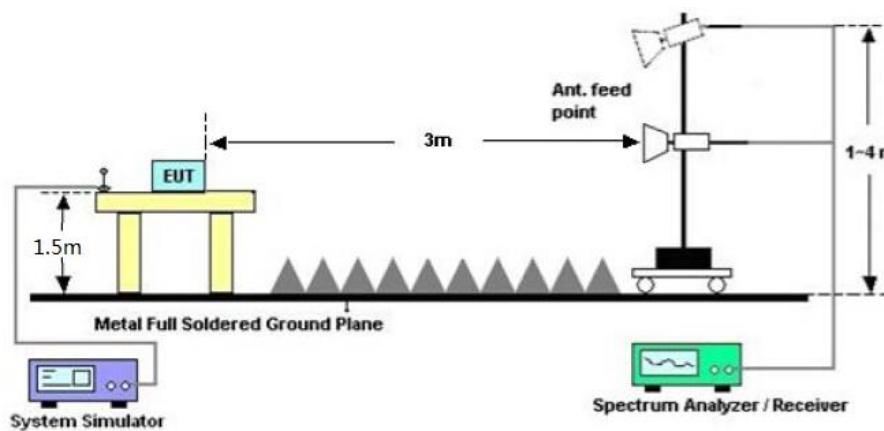
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



7.3 LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note: All modes were tested For restricted band radiated emission,
the test records reported below are the worst result compared to other modes.

7.4 TEST RESULT

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ
 RADIATED EMISSION TEST- (30MHZ-1GHZ) -HORIZONTAL

66.9 dBuV/m



| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | ! | 99.5167 | 27.51 | 10.00 | 37.51 | 43.50 | -5.99 | peak | | | |
| 2 | * | 201.3667 | 25.88 | 11.86 | 37.74 | 43.50 | -5.76 | peak | | | |
| 3 | | 293.5167 | 23.59 | 14.31 | 37.90 | 46.00 | -8.10 | peak | | | |
| 4 | | 343.6333 | 14.63 | 18.32 | 32.95 | 46.00 | -13.05 | peak | | | |
| 5 | | 573.2000 | 6.95 | 23.06 | 30.01 | 46.00 | -15.99 | peak | | | |
| 6 | | 686.3667 | 4.47 | 24.82 | 29.29 | 46.00 | -16.71 | peak | | | |

RESULT: PASS

RADIATED EMISSION TEST- (30MHZ-1GHZ) -VERTICAL



| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 41.3167 | 26.40 | 8.81 | 35.21 | 40.00 | -4.79 | peak | | | |
| 2 | ! | 117.3000 | 32.46 | 5.52 | 37.98 | 43.50 | -5.52 | peak | | | |
| 3 | ! | 191.6667 | 27.52 | 11.11 | 38.63 | 43.50 | -4.87 | peak | | | |
| 4 | | 267.6500 | 22.19 | 14.43 | 36.62 | 46.00 | -9.38 | peak | | | |
| 5 | | 414.7667 | 11.99 | 19.52 | 31.51 | 46.00 | -14.49 | peak | | | |
| 6 | | 558.6500 | 5.59 | 22.52 | 28.11 | 46.00 | -17.89 | peak | | | |

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.
 2. The "Factor" value can be calculated automatically by software of measurement system.
 3. All test modes for different EUT are pre-tested. The worst mode (GFSK Low channel) for the worst EUT recorded in the report.

RADIATED EMISSION ABOVE 1GHZ

| Frequency (MHz) | Meter Reading (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type | Comment |
|-------------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|------------------|------------|
| | | | | | | | |
| Low Channel (2402 MHz) | | | | | | | |
| 4804 | 40.67 | 10.44 | 51.11 | 74 | -22.89 | Pk | Horizontal |
| 4804 | 28.93 | 10.44 | 39.37 | 54 | -14.63 | AV | Horizontal |
| 7206 | 39.74 | 12.39 | 52.13 | 74 | -21.87 | pk | Horizontal |
| 7206 | 28.39 | 12.39 | 40.78 | 54 | -13.22 | AV | Horizontal |
| 4804 | 43.82 | 10.4 | 54.22 | 74 | -19.78 | Pk | Vertical |
| 4804 | 27.93 | 10.4 | 38.33 | 54 | -15.67 | AV | Vertical |
| 7206 | 40.33 | 12.75 | 53.08 | 74 | -20.92 | Pk | Vertical |
| 7206 | 27.74 | 12.75 | 40.49 | 54 | -13.51 | AV | Vertical |
| Mid Channel (2440 MHz) | | | | | | | |
| 4880 | 40.58 | 10.4 | 50.98 | 74 | -23.02 | Pk | Horizontal |
| 4880 | 30.30 | 10.4 | 40.70 | 54 | -13.30 | AV | Horizontal |
| 7320 | 40.12 | 12.75 | 52.87 | 74 | -21.13 | Pk | Horizontal |
| 7320 | 30.48 | 12.75 | 43.23 | 54 | -10.77 | AV | Horizontal |
| 4880 | 43.27 | 10.39 | 53.66 | 74 | -20.34 | Pk | Vertical |
| 4880 | 28.30 | 10.44 | 38.74 | 54 | -15.26 | AV | Vertical |
| 7320 | 40.14 | 12.68 | 52.82 | 74 | -21.18 | Pk | Vertical |
| 7320 | 31.01 | 12.68 | 43.69 | 54 | -10.31 | AV | Vertical |
| High Channel (2480 MHz) | | | | | | | |
| 4960 | 42.48 | 10.39 | 52.87 | 74 | -21.13 | pk | Horizontal |
| 4960 | 30.17 | 10.39 | 40.56 | 54 | -13.44 | AV | Horizontal |
| 7440 | 39.48 | 12.68 | 52.16 | 74 | -21.84 | pk | Horizontal |
| 7440 | 27.80 | 12.68 | 40.48 | 54 | -13.52 | AV | Horizontal |
| 4960 | 42.81 | 10.39 | 53.20 | 74 | -20.80 | pk | Vertical |
| 4960 | 29.75 | 10.39 | 40.14 | 54 | -13.86 | AV | Vertical |
| 7440 | 40.61 | 12.68 | 53.29 | 74 | -20.71 | pk | Vertical |
| 7440 | 28.96 | 12.68 | 41.64 | 54 | -12.36 | AV | Vertical |

RESULT: PASS

Note: 1~25GHz scan with GFSK. No recording in the test report at least have 20dB margin.

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Meter Reading + Factor

Margin = Emission - Leve Limit

8. BAND EDGE EMISSION

8.1. MEASUREMENT PROCEDURE

1) Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

2) Conducted Emissions at the band edge

a) The transmitter output was connected to the spectrum analyzer

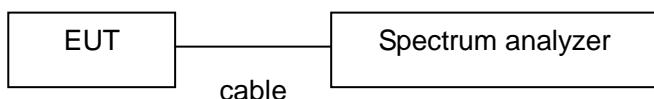
b) Set RBW=100kHz, VBW=300kHz

c) Suitable frequency span including 100kHz bandwidth from band edge

8.2. TEST SET-UP

Radiated same as 6.2

Conducted set up



8.3. Radiated Test Result

| Frequency (MHz) | Meter Reading (dB μ V) | Factor (dB) | Emission Level (dB μ V/m) | Limits (dB μ V/m) | Margin (dB) | Detector Type | Comment |
|-------------------------|----------------------------------|----------------|-------------------------------------|--------------------------|----------------|------------------|------------|
| | | | | | | | |
| Low Channel (2402 MHz) | | | | | | | |
| 2399.9 | 65.95 | -13 | 52.95 | 74 | -21.05 | peak | Horizontal |
| 2399.9 | 54.81 | -13 | 41.81 | 54 | -12.19 | AVG | Horizontal |
| 2400 | 65.48 | -12.99 | 52.49 | 74 | -21.51 | peak | Horizontal |
| 2400 | 53.60 | -12.99 | 40.61 | 54 | -13.39 | AVG | Horizontal |
| 2399.9 | 64.52 | -12.97 | 51.55 | 74 | -22.45 | peak | Vertical |
| 2399.9 | 54.77 | -12.97 | 41.80 | 54 | -12.20 | AVG | Vertical |
| 2400 | 66.54 | -12.94 | 53.60 | 74 | -20.40 | peak | Vertical |
| 2400 | 53.61 | -12.94 | 40.67 | 54 | -13.33 | AVG | Vertical |
| High Channel (2480 MHz) | | | | | | | |
| 2483.5 | 64.83 | -12.78 | 52.05 | 74 | -21.95 | peak | Horizontal |
| 2483.5 | 56.70 | -12.78 | 43.92 | 54 | -10.08 | AVG | Horizontal |
| 2483.6 | 65.78 | -12.77 | 53.01 | 74 | -20.99 | peak | Horizontal |
| 2483.6 | 53.84 | -12.77 | 41.07 | 54 | -12.93 | AVG | Horizontal |
| 2483.5 | 65.70 | -12.76 | 52.94 | 74 | -21.06 | peak | Vertical |
| 2483.5 | 53.82 | -12.76 | 41.06 | 54 | -12.94 | AVG | Vertical |
| 2483.6 | 65.88 | -12.72 | 53.16 | 74 | -20.84 | peak | Vertical |
| 2483.6 | 55.28 | -12.72 | 42.56 | 54 | -11.44 | AVG | Vertical |

RESULT: PASS

Note: Factor=Antenna Factor + Cable loss - Amplifier gain,

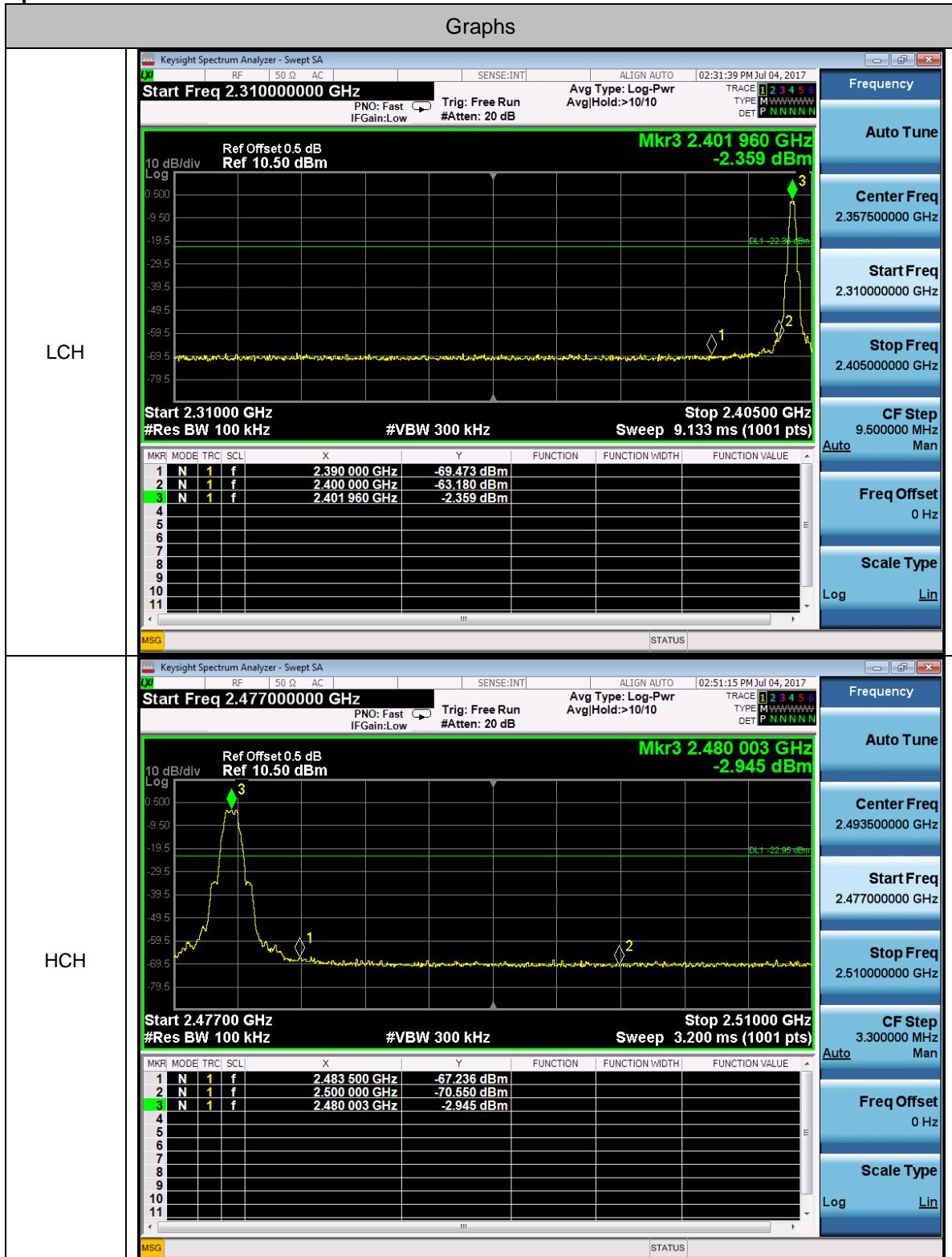
Emission Level = Meter Reading + Factor

Margin= Emission Level -Limit.

The "Factor" value can be calculated automatically by software of measurement system.

8.4. Conducted Test Result

Test Graph



9. 6DB BANDWIDTH

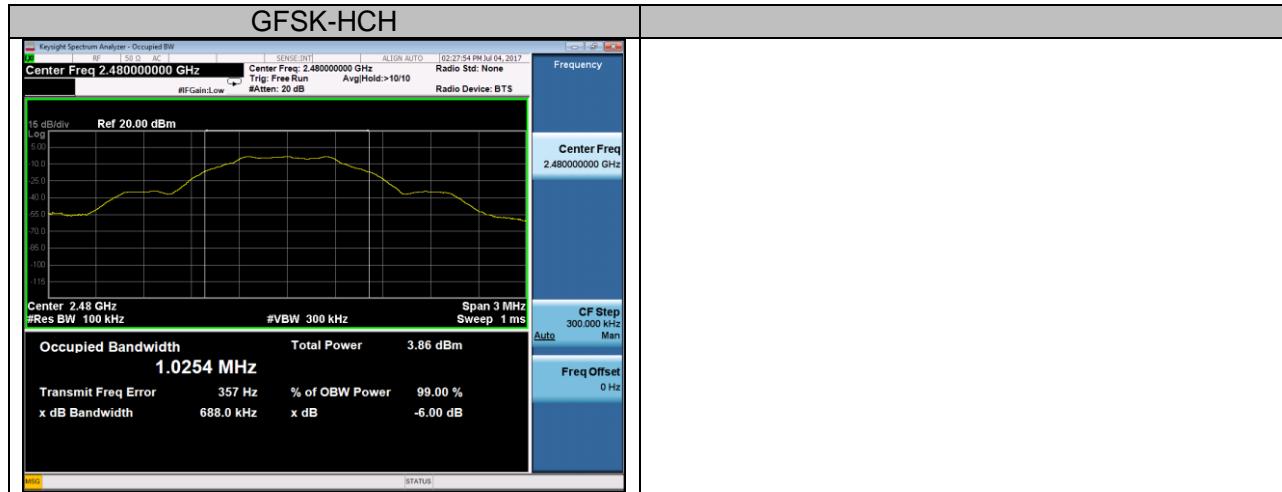
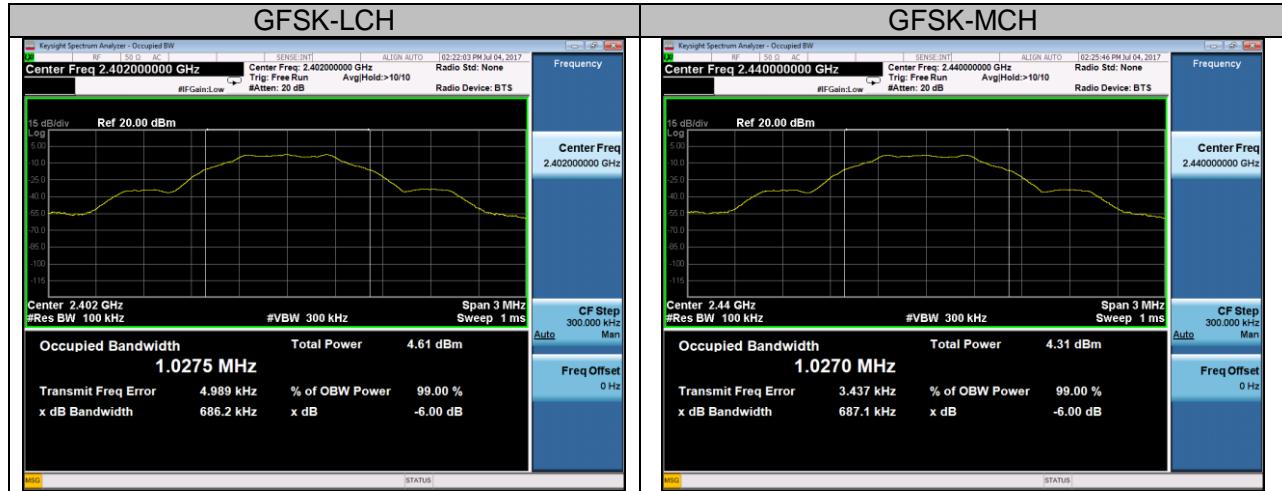
9.1. TEST PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW \geq RBW.
4. Set SPA Trace 1 Max hold, then View.

9.2. SUMMARY OF TEST RESULTS/PLOTS

| Mode | Channel | 6dB Bandwidth [KHz] | Verdict |
|------|---------|---------------------|---------|
| BLE | LCH | 686.2 | PASS |
| BLE | MCH | 687.1 | PASS |
| BLE | HCH | 688.0 | PASS |

Test Graph



10. CONDUCTED OUTPUT POWER

10.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, middle and the bottom operation frequency individually.

3. Use the following spectrum analyzer settings:

Set the RBW \geq DTS bandwidth

Set the VBW \geq 3 x RBW

Set the span \geq 3 x RBW

Detector = peak

Sweep time = auto couple

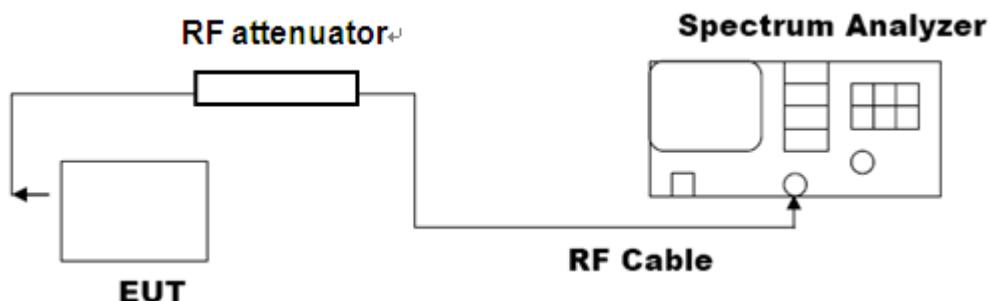
Trace mode = max hold

4. Allow the trace to stabilize. Use peak marker function to determine the peak amplitude level

5. Record the result form the Spectrum Analyzer.

Note: The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

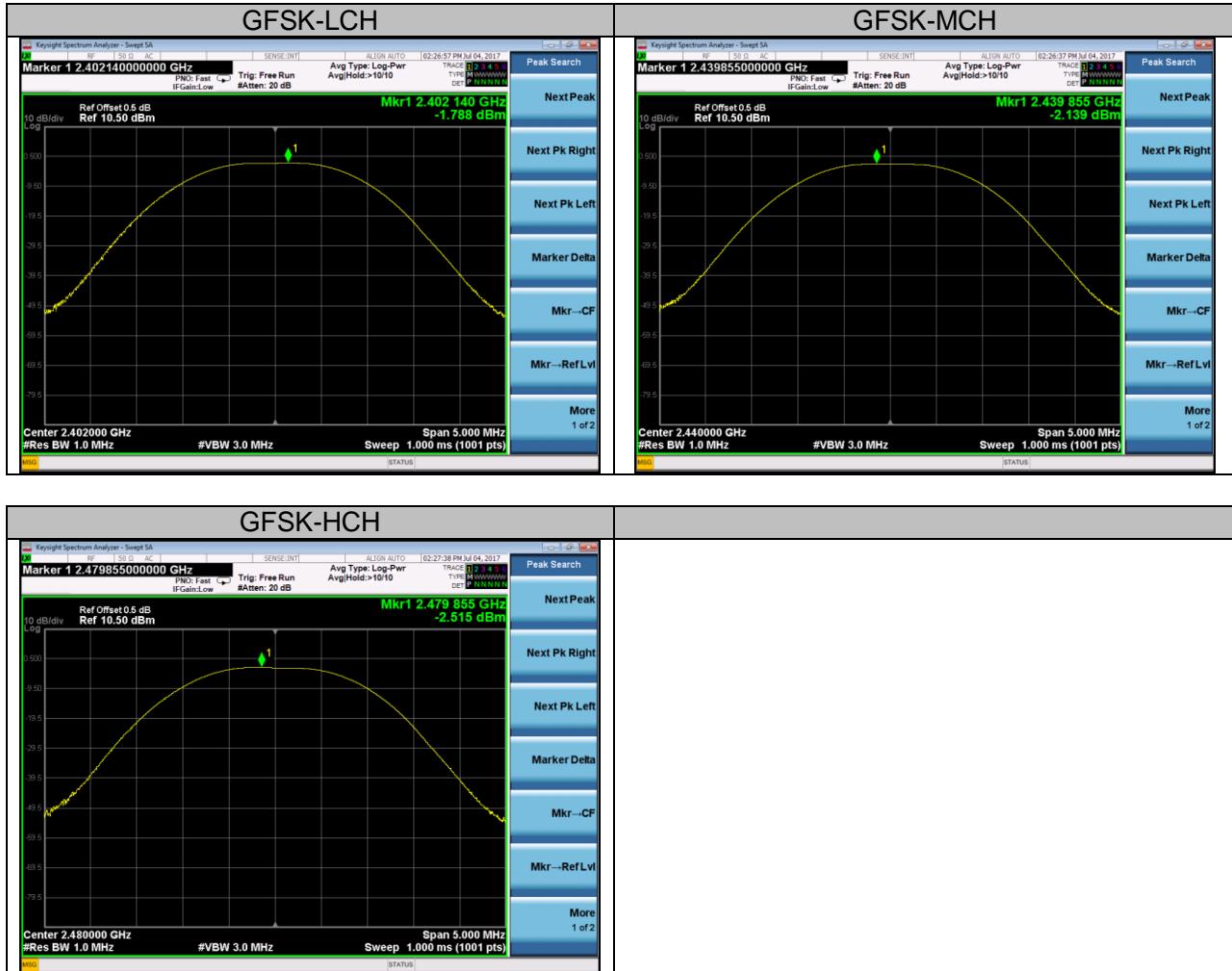
10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



10.3. LIMITS AND MEASUREMENT RESULT

| Channel | Peak Power (dBm) | Applicable Limits (dBm) | Pass/Fail |
|----------------|------------------|-------------------------|-----------|
| Low Channel | -1.788 | 30 | Pass |
| Middle Channel | -2.139 | 30 | Pass |
| High Channel | -2.515 | 30 | Pass |

Test Graph



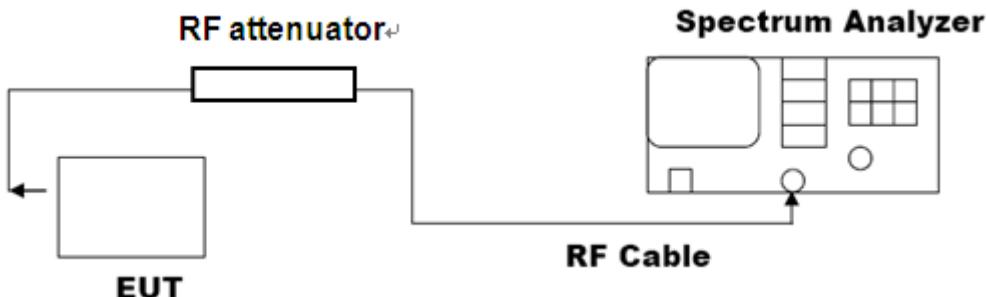
11. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

11.1 MEASUREMENT PROCEDURE

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

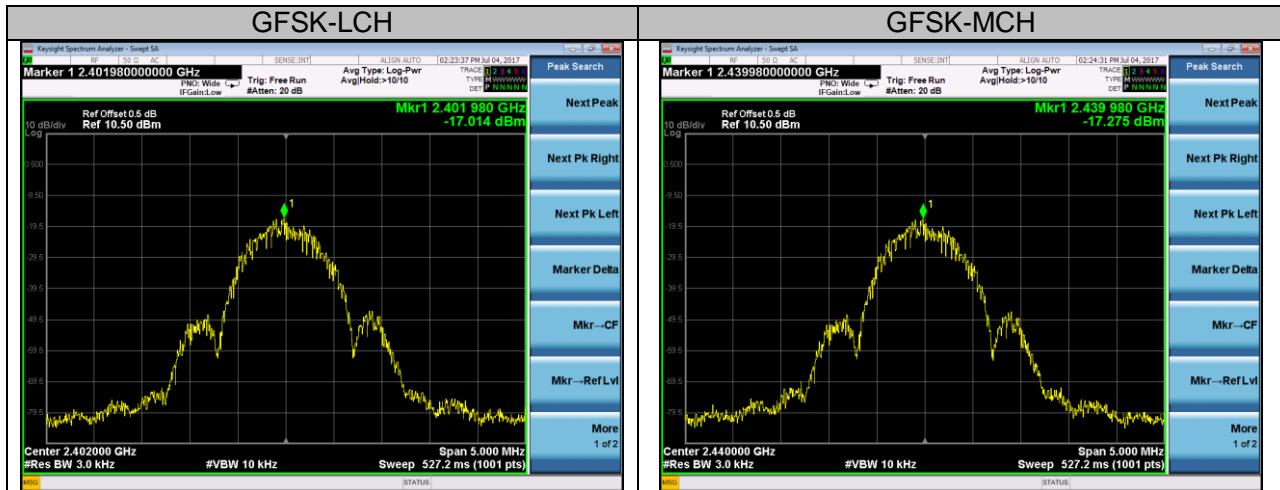
11.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



11.3 LIMITS AND MEASUREMENT RESULT

| Mode | Channel | PSD [dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|------|---------|----------------|-----------------|---------|
| BLE | LCH | -17.014 | 8 | PASS |
| BLE | MCH | -17.275 | 8 | PASS |
| BLE | HCH | -17.675 | 8 | PASS |

Test Graph





12. FCC LINE CONDUCTED EMISSION TEST

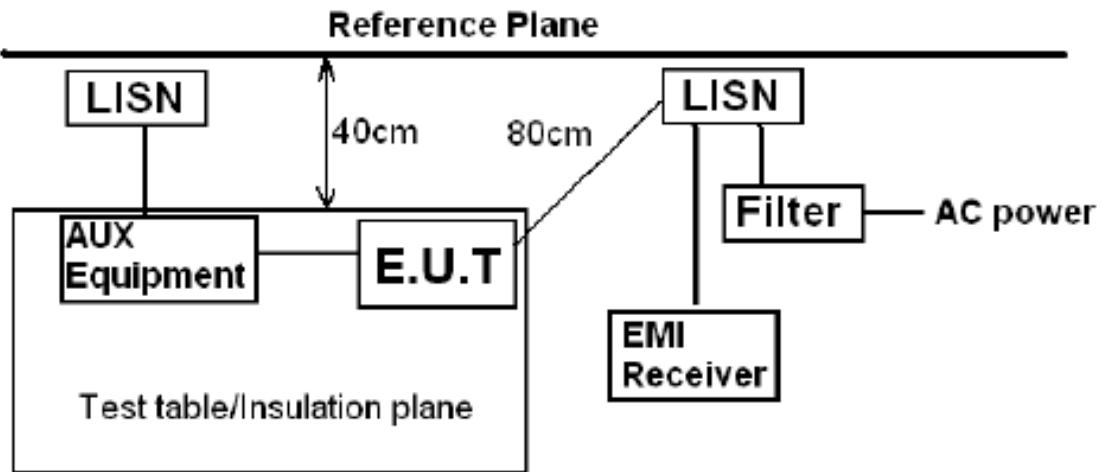
12.1 LIMITS

| Frequency | Maximum RF Line Voltage | |
|---------------|-------------------------|----------------|
| | Q.P. (dBuV) | Average (dBuV) |
| 150kHz~500kHz | 66-56 | 56-46 |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

****Note:** 1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

12.2 TEST SETUP



Remark:

E.U.T: Equipment Under Test

LISN: Line Impedance Stabilization Network

Test table height=0.8m

12.3 PRELIMINARY PROCEDURE

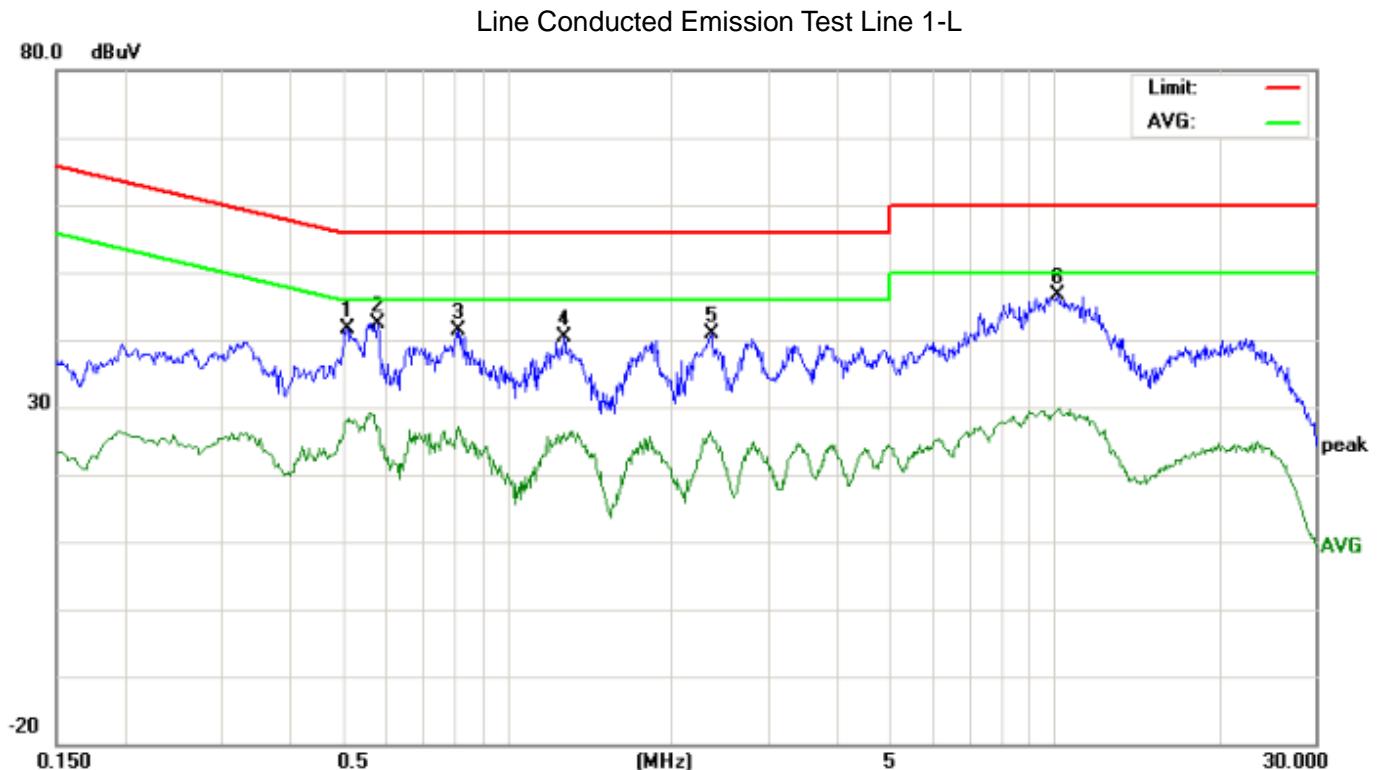
- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.10.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4) All support equipments received AC120V/60Hz power from a LISN, if any.
- 5) The EUT received power by adapter which received power by a LISN.
- 6) The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4 FINAL TEST PROCEDURE

- 10) EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 11) 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 12) 3) The test data of the worst case condition(s) was reported on the Summary Data page.

12.5 TEST RESULT OF POWER LINE



| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|-----|----------------|-------------------------|----|-------|-------------------|-----------------------|----|-------|-----------------|-------|----------------|--------|-----|---------|
| | | Peak | QP | Avg | | Peak | QP | Avg | QP | Avg | QP | Avg | | |
| 1 | 0.5100 | 31.35 | | 17.54 | 10.39 | 41.74 | | 27.93 | 56.00 | 46.00 | -14.26 | -18.07 | P | |
| 2 | 0.5819 | 26.44 | | 12.89 | 10.33 | 36.77 | | 23.22 | 56.00 | 46.00 | -19.23 | -22.78 | P | |
| 3 | 0.8139 | 31.18 | | 16.94 | 10.30 | 41.48 | | 27.24 | 56.00 | 46.00 | -14.52 | -18.76 | P | |
| 4 | 1.2700 | 29.88 | | 15.62 | 10.38 | 40.26 | | 26.00 | 56.00 | 46.00 | -15.74 | -20.00 | P | |
| 5 | 2.3699 | 30.46 | | 14.89 | 10.38 | 40.84 | | 25.27 | 56.00 | 46.00 | -15.16 | -20.73 | P | |
| 6 | 10.1339 | 36.41 | | 19.61 | 10.09 | 46.50 | | 29.70 | 60.00 | 50.00 | -13.50 | -20.30 | P | |

Line Conducted Emission Test Line 1-N



| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|-----|----------------|-------------------------|----|-------|-------------------|-----------------------|----|-------|-----------------|-------|----------------|--------|-----|---------|
| | | Peak | QP | AVG | | Peak | QP | AVG | QP | AVG | QP | AVG | | |
| 1 | 0.4460 | 33.06 | | 16.57 | 10.36 | 43.42 | | 26.93 | 56.95 | 46.95 | -13.53 | -20.02 | P | |
| 2 | 0.5620 | 36.68 | | 20.68 | 10.34 | 47.02 | | 31.02 | 56.00 | 46.00 | -8.98 | -14.98 | P | |
| 3 | 0.8100 | 35.52 | | 21.97 | 10.29 | 45.81 | | 32.26 | 56.00 | 46.00 | -10.19 | -13.74 | P | |
| 4 | 1.3260 | 34.12 | | 17.04 | 10.38 | 44.50 | | 27.42 | 56.00 | 46.00 | -11.50 | -18.58 | P | |
| 5 | 1.7740 | 32.41 | | 18.14 | 10.29 | 42.70 | | 28.43 | 56.00 | 46.00 | -13.30 | -17.57 | P | |
| 6 | 10.4018 | 34.57 | | 19.04 | 10.09 | 44.66 | | 29.13 | 60.00 | 50.00 | -15.34 | -20.87 | P | |

13. CONDUCTED SPURIOUS EMISSION

13.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
3. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
RBW = 100 kHz; VBW \geq RBW; Sweep = auto; Detector function = peak.
4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to DA000705 for compliance to FCC 47CFR 15.247 requirements. Owing to satisfy the requirements of the number of measurement points, we set the RBW=1MHz, VBW $>$ RBW, scan up through 10th harmonic, and consider the tested results as the worst case, if the tested results conform to the requirement, we can deem that the real tested results(set the RBW=100KHz, VBW $>$ RBW) are conform to the requirement.

13.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2

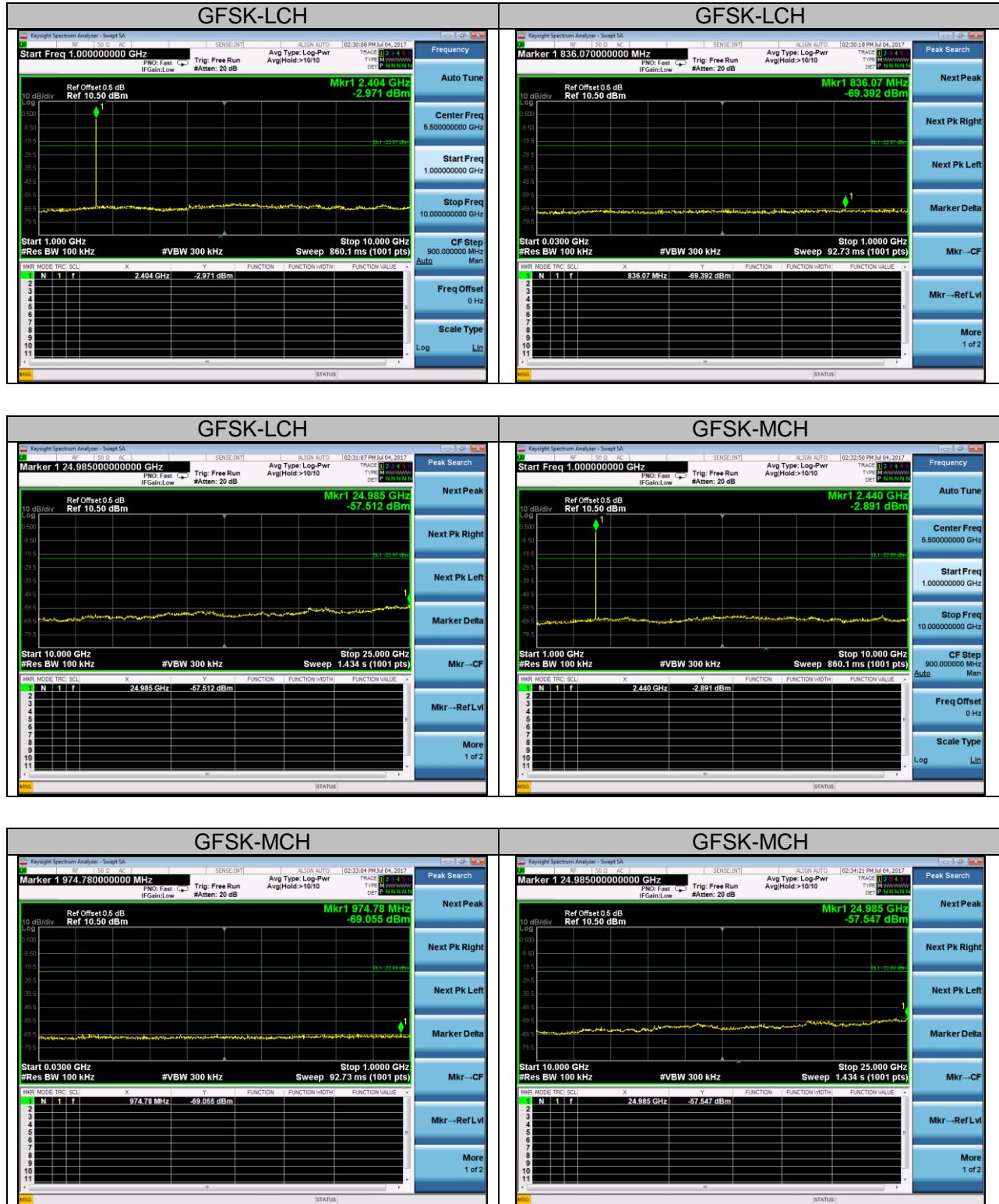
13.3. MEASUREMENT EQUIPMENT USED

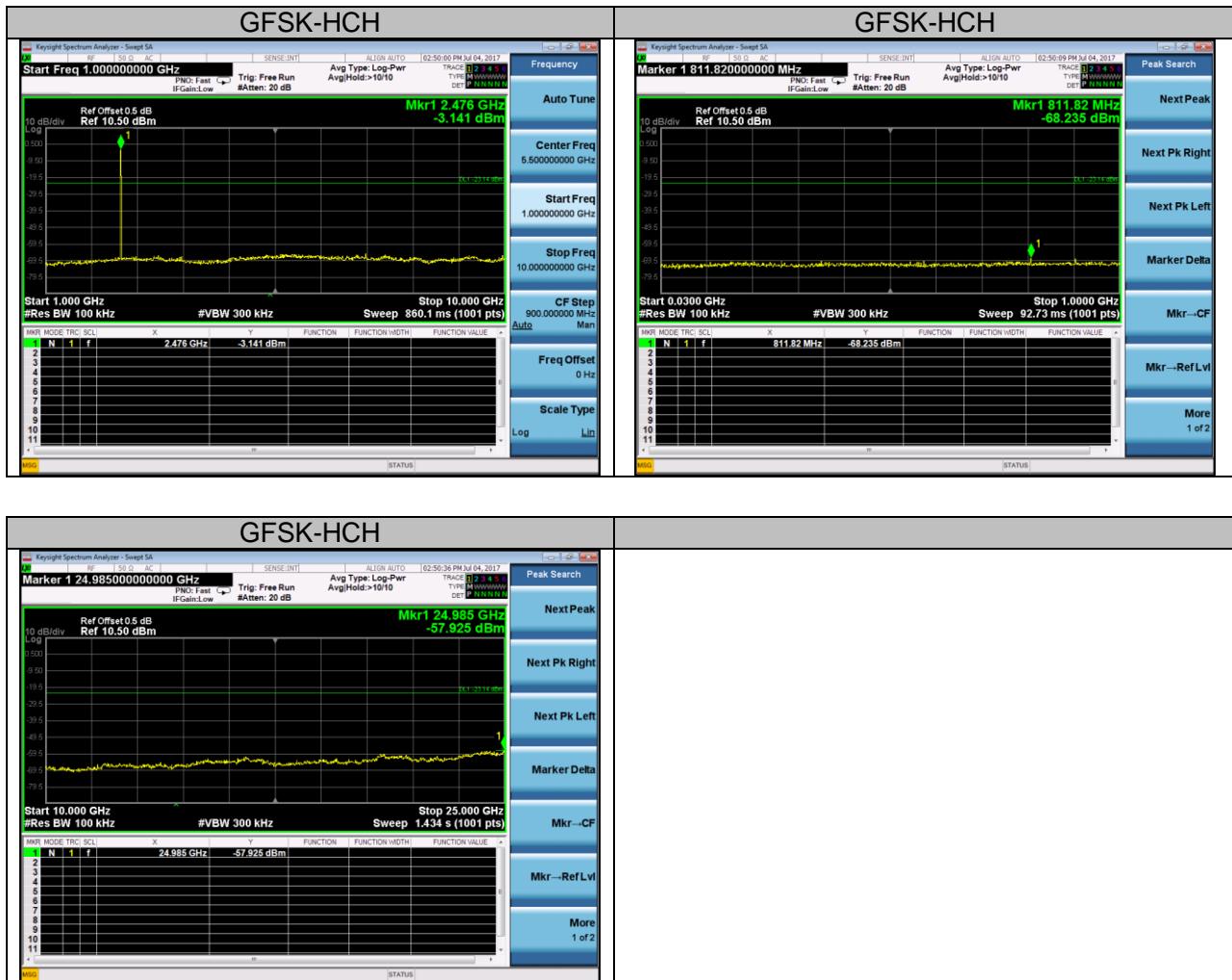
The same as described in section 6

13.4. LIMITS AND MEASUREMENT RESULT

| LIMITS AND MEASUREMENT RESULT | | |
|---|--|----------|
| Applicable Limits | Measurement Result | |
| | Test Data | Criteria |
| In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a)) | At least -20dBc than the limit Specified on the BOTTOM Channel | PASS |
| | At least -20dBc than the limit Specified on the TOP Channel | PASS |

Test Graph



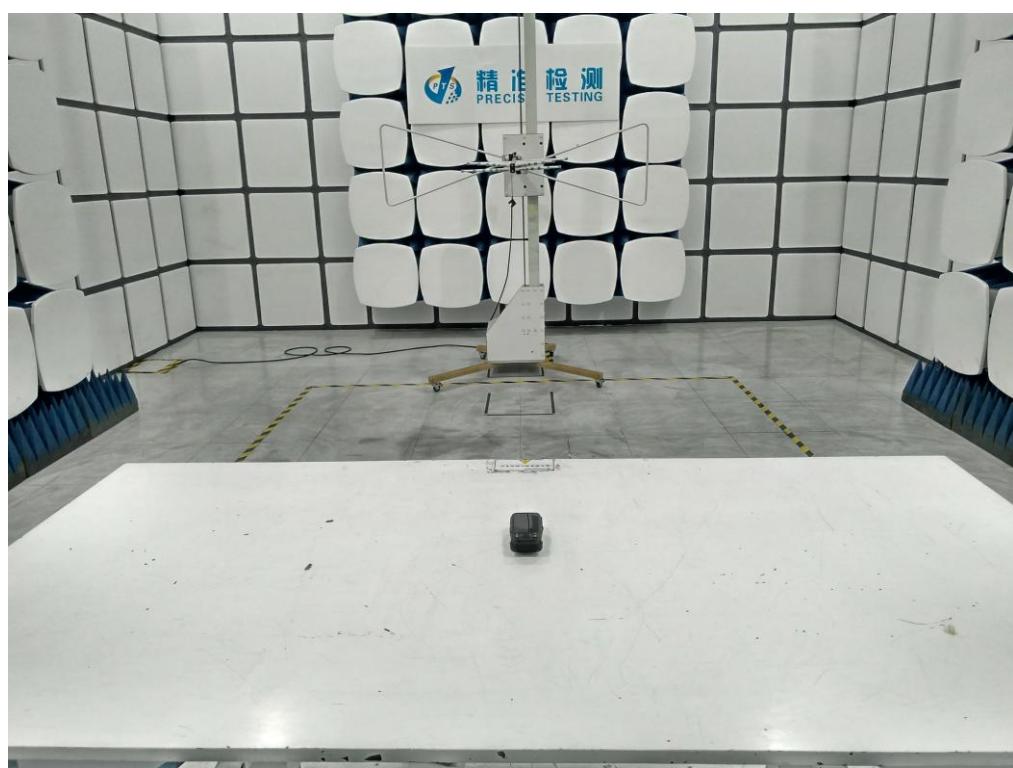


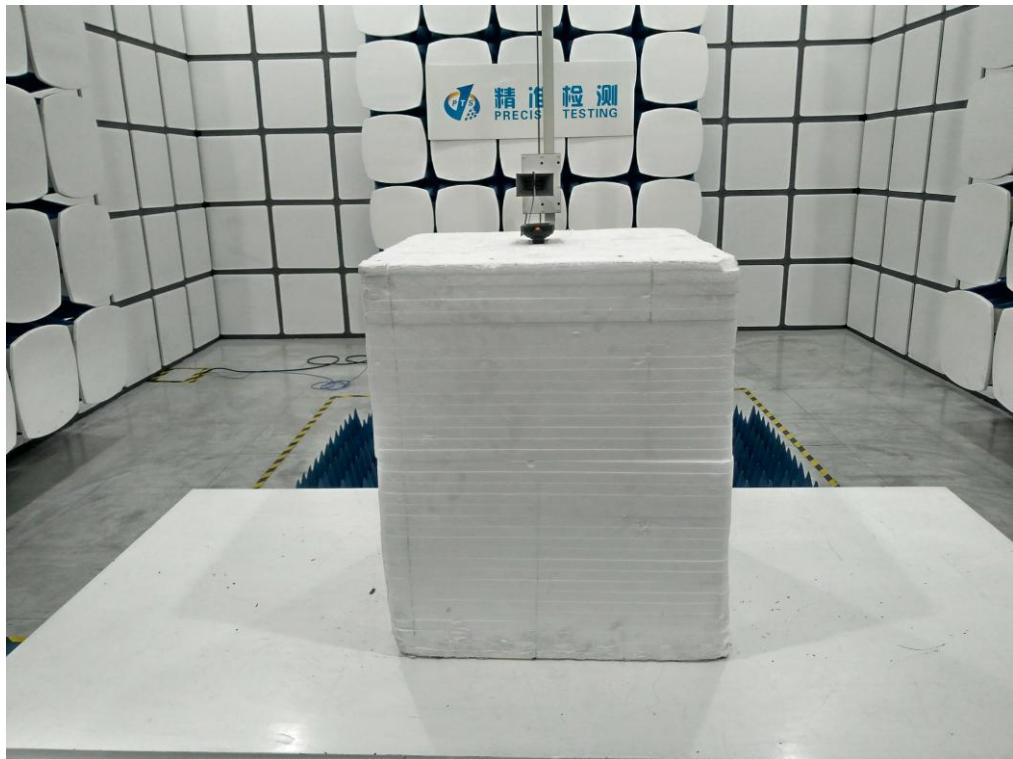
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

LINE CONDUCTED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP





----END OF REPORT----