

**Shenzhen Global Test Service Co.,Ltd.**

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT**FCC PART 15.247****Report Reference No.....: GTSR16110085-EDR****FCC ID.....: 2AFAPFK**

Compiled by

(position+printed name+signature)..: File administrators Jimmy Wang

Supervised by

(position+printed name+signature)..: Test Engineer Peter Xiao

Approved by

(position+printed name+signature)..: Manager Sam Wang

Date of issue.....: Dec. 02, 2016

Representative Laboratory Name.: Shenzhen Global Test Service Co.,Ltd.Address: 1F, Building No. 13A, Zhonghaixin Science and Technology City,
No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District,
Shenzhen, Guangdong**Applicant's name.....: ALPHA EXPORT AND IMPORT CO.,LIMITED**

Address: Room 4d,Huashang Block,NO.3,Biezhao Road,Shenzhen,China

Test specificationStandard: **FCC Part 15.247: Operation within the bands 902-928 MHz,
2400-2483.5 MHz and 5725-5850 MHz****Shenzhen Global Test Service Co.,Ltd. All rights reserved.**

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Test item description Mobile Phone

Trade Mark: ALPHARD

Manufacturer: **ALPHA EXPORT AND IMPORT CO.,LIMITED**

Model/Type reference.....: FK1

Listed Models: FK2,FK3,FK4,FK5,FK6,FK7,FK8,FK9,FK10

Modulation Type: GFSK,II/4DQPSK,8DPSK

Operation Frequency.....: From 2402MHz to 2480MHz

Hardware Version: V109_MB_V1.3

Software Version: V1.0

Rating: DC 3.70V

Result.....: **PASS**

TEST REPORT

| | |
|---|---------------|
| Test Report No. : GTSR16110085-EDR | Dec. 02, 2016 |
| | Date of issue |

Equipment under Test : Mobile Phone

Model /Type : FK1

Listed Models : FK2,FK3,FK4,FK5,FK6,FK7,FK8,FK9,FK10

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| | |
|---------------------|-------------|
| Test Result: | PASS |
|---------------------|-------------|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices

[DA 00-705](#): Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

2. SUMMARY

2.1. General Remarks

| | | |
|--------------------------------|---|--------------------|
| Date of receipt of test sample | : | October. 21, 2016 |
| | | |
| Testing commenced on | : | October. 22, 2016 |
| | | |
| Testing concluded on | : | December. 02, 2016 |

2.2. Product Description

| | |
|-----------------------------------|--------------------------------------|
| Name of EUT | Mobile Phone |
| Trade Mark: | ALPHARD |
| Model Number | FK1 |
| List Model: | FK2,FK3,FK4,FK5,FK6,FK7,FK8,FK9,FK10 |
| FCC ID | 2AFAPFK |
| Bluetooth FCC Operation frequency | 2402MHz-2480MHz |
| Bluetooth Modulation | GFSK,8DPSK, π /4DQPSK |
| Bluetooth | BT V3.0+EDR |
| Antenna Type | Internal |
| Antenna gain | -0.69dBi |

2.3. Equipment Under Test

Power supply system utilised

| | | | |
|----------------------|---|---|-----------------------------------|
| Power supply voltage | : | <input type="radio"/> 230V / 50 Hz | <input type="radio"/> 120V / 60Hz |
| | | <input type="radio"/> 12 V DC | <input type="radio"/> 24 V DC |
| | | <input checked="" type="radio"/> Other (specified in blank below) | |

DC 3.70V

2.4. Short description of the Equipment under Test (EUT)

This is a Mobile Phone.

For more details, refer to the user's manual of the EUT.

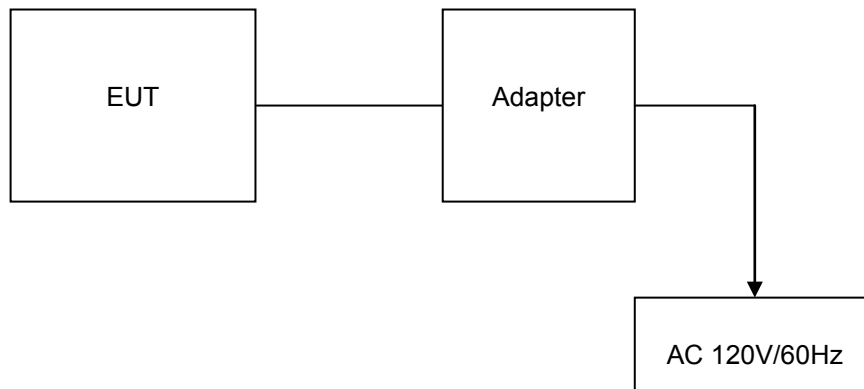
2.5. EUT operation mode

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 79 channels provided to the EUT.

Channel 00/39/78 was selected to test.

| Channel | Frequency(MHz) | Channel | Frequency(MHz) |
|-----------|----------------|-----------|----------------|
| 00 | 2402 | 40 | 2442 |
| 01 | 2403 | 41 | 2443 |
| 02 | 2404 | 42 | 2444 |
| 03 | 2405 | 43 | 2445 |
| 04 | 2406 | 44 | 2446 |
| 05 | 2407 | 45 | 2447 |
| 06 | 2408 | 46 | 2448 |
| 07 | 2409 | 47 | 2449 |
| 08 | 2410 | 48 | 2450 |
| 09 | 2411 | 49 | 2451 |
| 10 | 2412 | 50 | 2452 |
| 11 | 2413 | 51 | 2453 |
| 12 | 2414 | 52 | 2454 |
| 13 | 2415 | 53 | 2455 |
| 14 | 2416 | 54 | 2456 |
| 15 | 2417 | 55 | 2457 |
| 16 | 2418 | 56 | 2458 |
| 17 | 2419 | 57 | 2459 |
| 18 | 2420 | 58 | 2460 |
| 19 | 2421 | 59 | 2461 |
| 20 | 2422 | 60 | 2462 |
| 21 | 2423 | 61 | 2463 |
| 22 | 2424 | 62 | 2464 |
| 23 | 2425 | 63 | 2465 |
| 24 | 2426 | 64 | 2466 |
| 25 | 2427 | 65 | 2467 |
| 26 | 2428 | 66 | 2468 |
| 27 | 2429 | 67 | 2469 |
| 28 | 2430 | 68 | 2470 |
| 29 | 2431 | 69 | 2471 |
| 30 | 2432 | 70 | 2472 |
| 31 | 2433 | 71 | 2473 |
| 32 | 2434 | 72 | 2474 |
| 33 | 2435 | 73 | 2475 |
| 34 | 2436 | 74 | 2476 |
| 35 | 2437 | 75 | 2477 |
| 36 | 2438 | 76 | 2478 |
| 37 | 2439 | 77 | 2479 |
| 38 | 2440 | 78 | 2480 |
| 39 | 2441 | | |

2.6. Block Diagram of Test Setup



Adapter:

Model: NOKOKO-4

Input: 100-240V~50/60Hz 0.5A

Output: 5V DC 1A

◇ Shielded

◆ Unshielded

2.7. Related Submittal(s) / Grant (s)

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

2.8. Modifications

No modifications were implemented to meet testing criteria.

2.9. NOTE

| | Test Standards | Reference Report |
|---------------|----------------------------------|--------------------|
| Bluetooth-EDR | FCC Part 15 Subpart C | GTSR16110085-EDR |
| WLAN | FCC Part 15 Subpart C | GTSR16110085-WLAN |
| GSM | FCC Part 22/24 | GTSR16110085-GSM |
| WCDMA | FCC Part 22/24 | GTSR16110085-WCDMA |
| SAR | ANSI C95.1-1999 47CFR §2.1093 | GTSR16110085-SAR |

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

Shenzhen CTL Testing Technology Co., Ltd.

1/F.-A, Baisha Technology Park, No.3011, Shaheixi Road, Nanshan District, Shenzhen, Guangdong, China

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 964637

Shenzhen Global Test Service Co.,Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 964637, Jul 24, 2015.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2018.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|-----------------------|--------------|
| Temperature: | 15-35 ° C |
| | |
| Humidity: | 30-60 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

3.4. Summary of measurement results

| Test Specification clause | Test case | Test Mode | Test Channel | Recorded In Report | | Pass | Fail | NA | NP | Remark |
|---------------------------|--|--------------------------|---|--------------------------|---|---|--------------------------|-------------------------------------|--------------------------|-------------------------|
| §15.247(b)(4) | Antenna gain | GFSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | GFSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(e) | Power spectral density | -/- | -/- | -/- | -/- | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Not applicable for FHSS |
| §15.247(a)(1) | Carrier Frequency separation | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | GFSK 8DPSK | <input checked="" type="checkbox"/> Middle | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(a)(1) | Number of Hopping channels | GFSK 8DPSK | <input checked="" type="checkbox"/> Full | GFSK 8DPSK | <input checked="" type="checkbox"/> Full | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(a)(1) | Time of Occupancy (dwell time) | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | GFSK 8DPSK | <input checked="" type="checkbox"/> Middle | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(a)(1) | Spectrum bandwidth of a FHSS system 20dB bandwidth | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(b)(1) | Maximum output power | GFSK $\pi/4$ DQPSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | GFSK $\pi/4$ DQPSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(d) | Band edge compliance conducted | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Highest | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.205 | Band edge compliance radiated | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Highest | GFSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(d) | TX spurious emissions conducted | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.247(d) | TX spurious emissions radiated | GFSK 8DPSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | GFSK | <input checked="" type="checkbox"/> Lowest <input checked="" type="checkbox"/> Middle <input checked="" type="checkbox"/> Highest | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.109 | RX spurious emissions radiated | -/- | -/- | -/- | -/- | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.209(a) | TX spurious Emissions radiated < 30 MHz | GFSK | -/- | GFSK | -/- | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |
| §15.107(a) §15.207 | Conducted Emissions < 30 MHz | GFSK | -/- | GFSK | -/- | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | complies |

Remark:

1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed
3. We tested all test mode and recorded worst case in report
4. For $\pi/4$ QPSK its same modulation type with 8-DPSK, and based exploratory test, there is no significant difference of that two types test result, so except output power, all other items final test were only performed with the worse case 8-DPSK and GFSK.

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

| Test | Range | Measurement Uncertainty | Notes |
|-----------------------|------------|-------------------------|-------|
| Radiated Emission | 30~1000MHz | 4.10 dB | (1) |
| Radiated Emission | 1~18GHz | 4.32 dB | (1) |
| Radiated Emission | 18-40GHz | 5.54 dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 3.12 dB | (1) |

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

3.6. Equipments Used during the Test

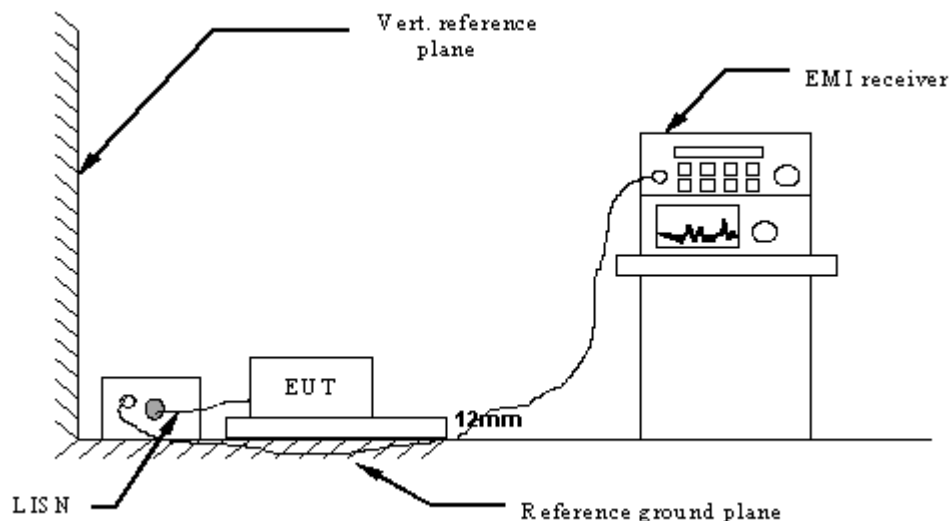
| Test Equipment | Manufacturer | Model No. | Serial No. | Calibration Date | Calibration Due Date |
|----------------------------|----------------------|-----------------------|--------------|------------------|----------------------|
| LISN | R&S | ENV216 | 3560.6550.08 | 2016/05/28 | 2017/05/27 |
| LISN | R&S | ESH2-Z5 | 893606/008 | 2016/05/27 | 2017/05/26 |
| Bilog Antenna | Sunol Sciences Corp. | JB1 | A061713 | 2016/06/02 | 2017/06/01 |
| EMI Test Receiver | R&S | ESCI | 101102 | 2016/06/26 | 2017/06/25 |
| Spectrum Analyzer | Agilent | N9020A | MY48010425 | 2016/06/17 | 2017/06/16 |
| Controller | EM Electronics | Controller EM 1000 | N/A | 2016/05/21 | 2017/05/20 |
| Horn Antenna | Sunol Sciences Corp. | DRH-118 | A062013 | 2016/05/19 | 2017/05/18 |
| Active Loop Antenna | SCHWARZBECK | FMZB1519 | 1519-037 | 2016/05/19 | 2017/05/18 |
| Amplifier | Agilent | 8349B | 3008A02306 | 2016/05/19 | 2017/05/18 |
| Amplifier | Agilent | 8447D | 2944A10176 | 2016/05/19 | 2017/05/18 |
| Temperature/Humidity Meter | Gangxing | CTH-608 | 02 | 2016/05/20 | 2017/05/19 |
| High-Pass Filter | K&L | 9SH10-2700/X12750-O/O | N/A | 2016/05/20 | 2017/05/19 |
| High-Pass Filter | K&L | 41H10-1375/U12750-O/O | N/A | 2016/05/20 | 2017/05/19 |
| RF Cable | HUBER+SUHNER | RG214 | N/A | 2016/05/20 | 2017/05/19 |
| Data acquisition card | Agilent | U2531A | TW53323507 | 2016/05/20 | 2017/05/19 |
| Power Sensor | Agilent | U2021XA | MY5365004 | 2016/05/20 | 2017/05/19 |

Note: 1. The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a floor-standing system, a insulating material is used and is placed on the ground plane as per ANSI C63.10-2013.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2013.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013.
- 4 The EUT received DC 5V power from adapter through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT 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.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

| Frequency range (MHz) | Limit (dBuV) | |
|-----------------------|--------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

TEST RESULTS

Remark: We measured Conducted Emission at GFSK, $\pi/4$ DQPSK and 8DPSK mode in AC 120V/60Hz and 240V/60Hz, the worst case was recorded .

Power supply:

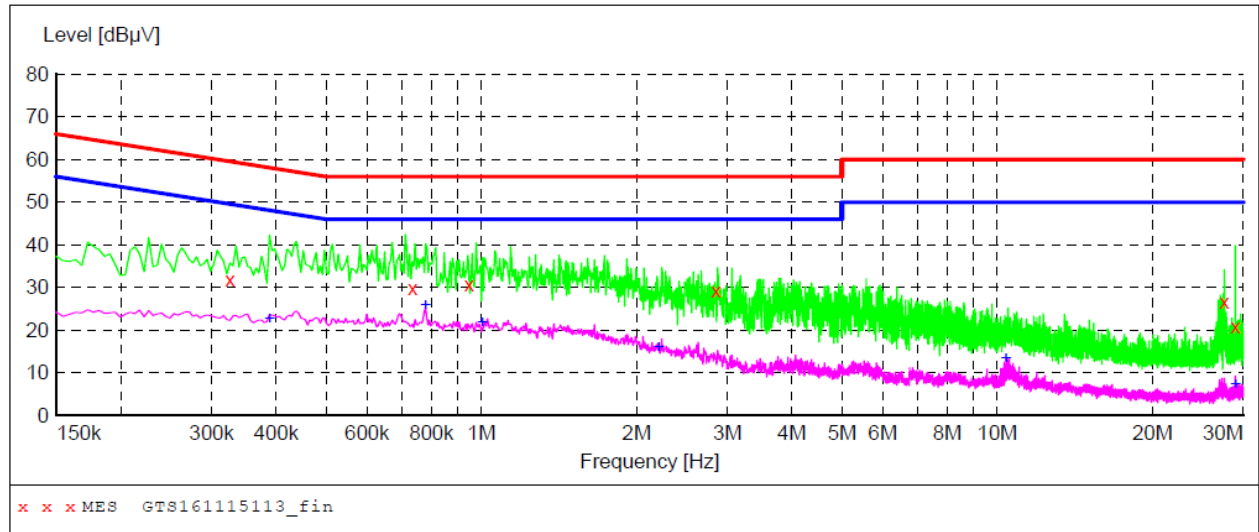
DC 5V from Adapter
AC 120V/60Hz

Polarization

L

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "GTS161115113_fin"**

11/15/2016 2:04PM

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.325500 | 31.80 | 9.9 | 60 | 27.8 | QP | L1 | GND |
| 0.735000 | 29.90 | 9.7 | 56 | 26.1 | QP | L1 | GND |
| 0.946500 | 30.70 | 9.6 | 56 | 25.3 | QP | L1 | GND |
| 2.850000 | 29.10 | 9.5 | 56 | 26.9 | QP | L1 | GND |
| 27.550500 | 26.50 | 6.9 | 60 | 33.5 | QP | L1 | GND |
| 28.986000 | 20.80 | 6.9 | 60 | 39.2 | QP | L1 | GND |

MEASUREMENT RESULT: "GTS161115113_fin2"

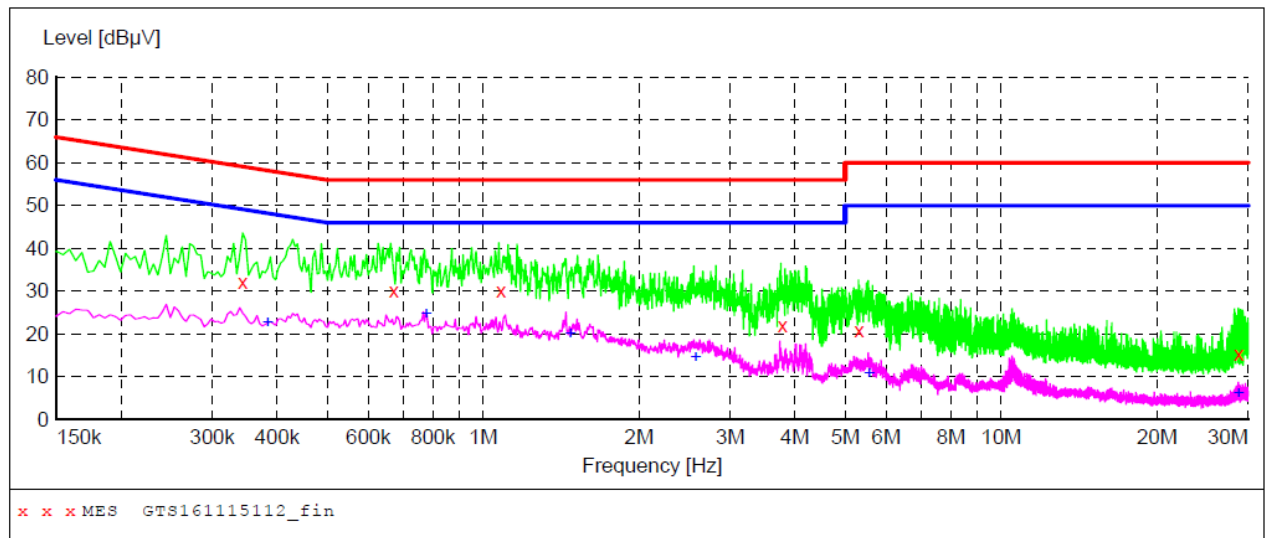
11/15/2016 2:04PM

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.388500 | 22.50 | 9.8 | 48 | 25.6 | AV | L1 | GND |
| 0.780000 | 25.60 | 9.7 | 46 | 20.4 | AV | L1 | GND |
| 1.005000 | 21.60 | 9.6 | 46 | 24.4 | AV | L1 | GND |
| 2.206500 | 16.00 | 9.5 | 46 | 30.0 | AV | L1 | GND |
| 10.410000 | 13.30 | 8.8 | 50 | 36.7 | AV | L1 | GND |
| 28.995000 | 7.20 | 6.9 | 50 | 42.8 | AV | L1 | GND |

| | | | |
|---------------|------------------------------------|--------------|---|
| Power supply: | DC 5V from Adapter AC 120V/60Hz | Polarization | N |
|---------------|------------------------------------|--------------|---|

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "GTS161115112_fin"**

11/15/2016 2:00PM

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.343500 | 32.00 | 9.9 | 59 | 27.1 | QP | N | GND |
| 0.672000 | 30.20 | 9.7 | 56 | 25.8 | QP | N | GND |
| 1.081500 | 30.20 | 9.6 | 56 | 25.8 | QP | N | GND |
| 3.786000 | 21.90 | 9.4 | 56 | 34.1 | QP | N | GND |
| 5.320500 | 20.90 | 9.3 | 60 | 39.1 | QP | N | GND |
| 28.720500 | 15.40 | 6.9 | 60 | 44.6 | QP | N | GND |

MEASUREMENT RESULT: "GTS161115112_fin2"

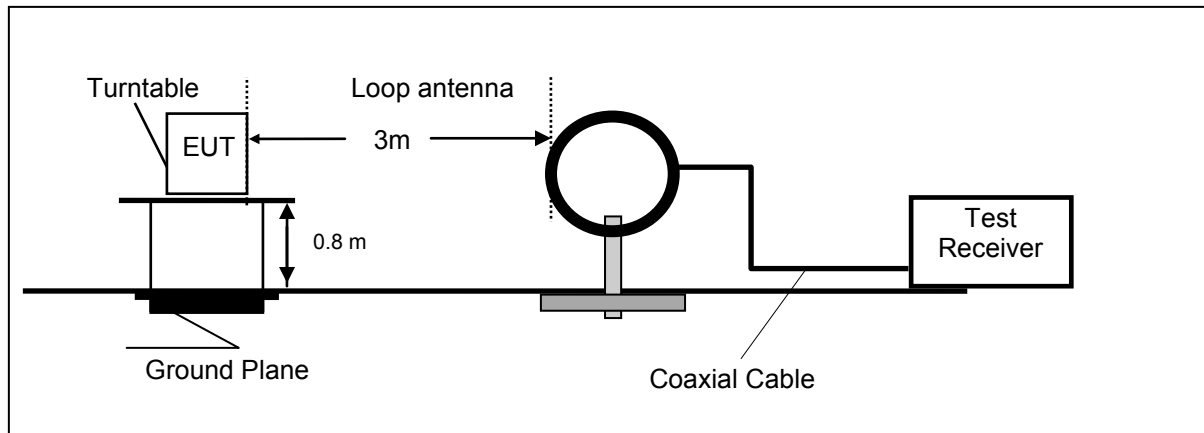
11/15/2016 2:00PM

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Detector | Line | PE |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.384000 | 22.50 | 9.8 | 48 | 25.7 | AV | N | GND |
| 0.775500 | 24.50 | 9.7 | 46 | 21.5 | AV | N | GND |
| 1.473000 | 19.80 | 9.6 | 46 | 26.2 | AV | N | GND |
| 2.575500 | 14.30 | 9.5 | 46 | 31.7 | AV | N | GND |
| 5.568000 | 10.70 | 9.2 | 50 | 39.3 | AV | N | GND |
| 28.725000 | 6.00 | 6.9 | 50 | 44.0 | AV | N | GND |

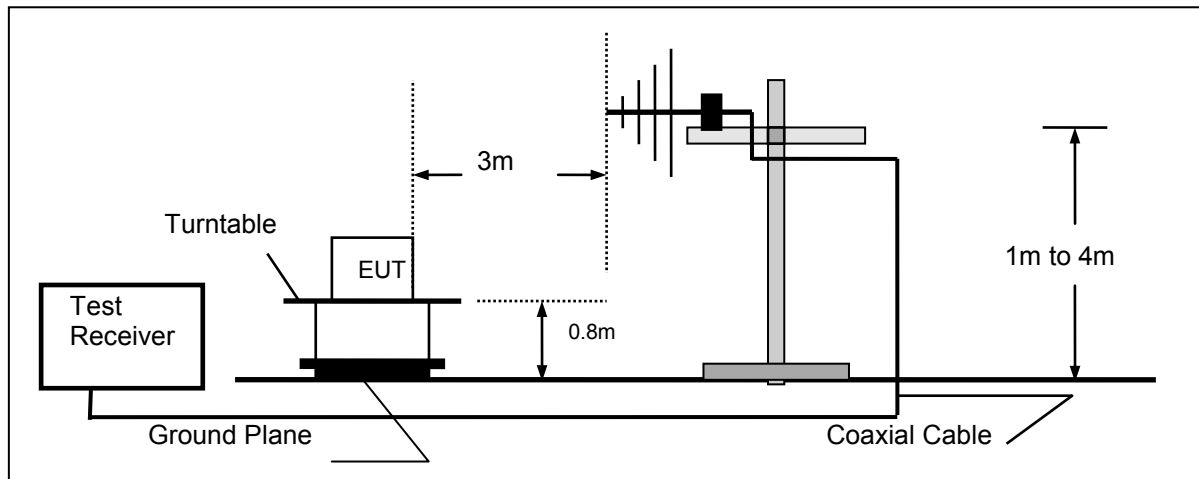
4.2. Radiated Emission

TEST CONFIGURATION

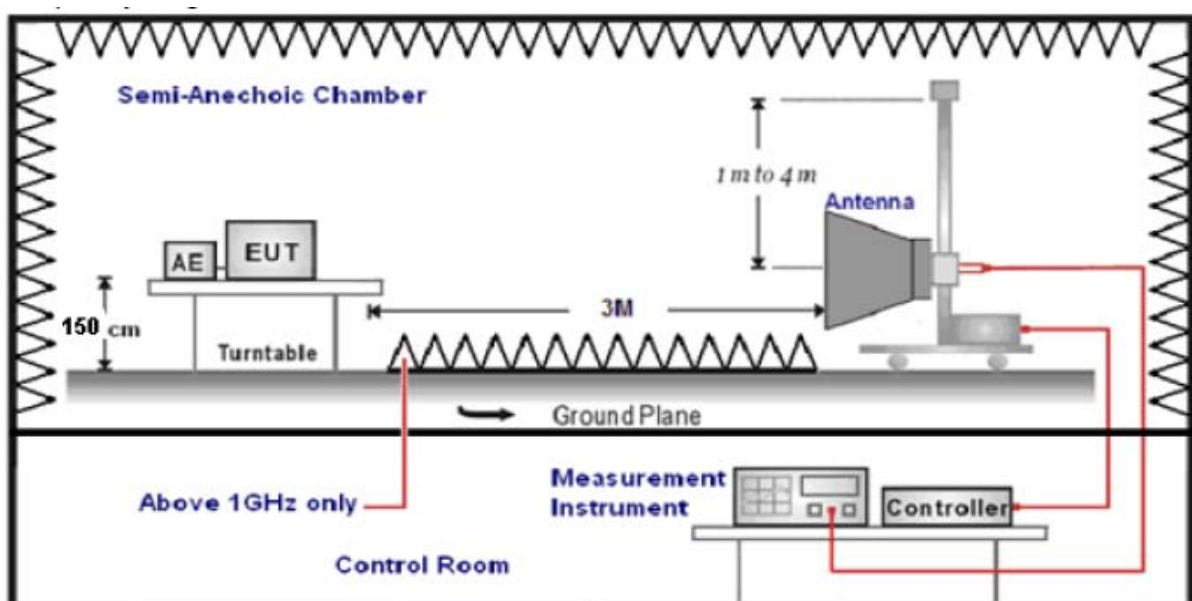
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 12mm above ground plane when testing frequency range 9 KHz –25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

| Test Frequency range | Test Antenna Type | Test Distance |
|----------------------|----------------------------|---------------|
| 9KHz-30MHz | Active Loop Antenna | 3 |
| 30MHz-1GHz | Ultra-Broadband Antenna | 3 |
| 1GHz-18GHz | Double Ridged Horn Antenna | 3 |
| 18GHz-25GHz | Horn Antenna | 1 |

7. Setting test receiver/spectrum as following table states:

| Test Frequency range | Test Receiver/Spectrum Setting | Detector |
|----------------------|---|----------|
| 9KHz-150KHz | RBW=200Hz/VBW=3KHz,Sweep time=Auto | QP |
| 150KHz-30MHz | RBW=9KHz/VBW=100KHz,Sweep time=Auto | QP |
| 30MHz-1GHz | RBW=120KHz/VBW=1000KHz,Sweep time=Auto | QP |
| 1GHz-40GHz | Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto | Peak |

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

| | |
|---------------------------|--|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude | AG = Amplifier Gain |
| AF = Antenna Factor | |

$$\text{Transd}=AF +CL-AG$$

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

| Frequency (MHz) | Distance (Meters) | Radiated (dBµV/m) | Radiated (µV/m) |
|-----------------|-------------------|--|-----------------------|
| 0.009-0.49 | 3 | $20\log(2400/F(\text{KHz}))+40\log(300/3)$ | $2400/F(\text{KHz})$ |
| 0.49-1.705 | 3 | $20\log(24000/F(\text{KHz}))+40\log(30/3)$ | $24000/F(\text{KHz})$ |
| 1.705-30 | 3 | $20\log(30)+40\log(30/3)$ | 30 |
| 30-88 | 3 | 40.0 | 100 |
| 88-216 | 3 | 43.5 | 150 |
| 216-960 | 3 | 46.0 | 200 |
| Above 960 | 3 | 54.0 | 500 |

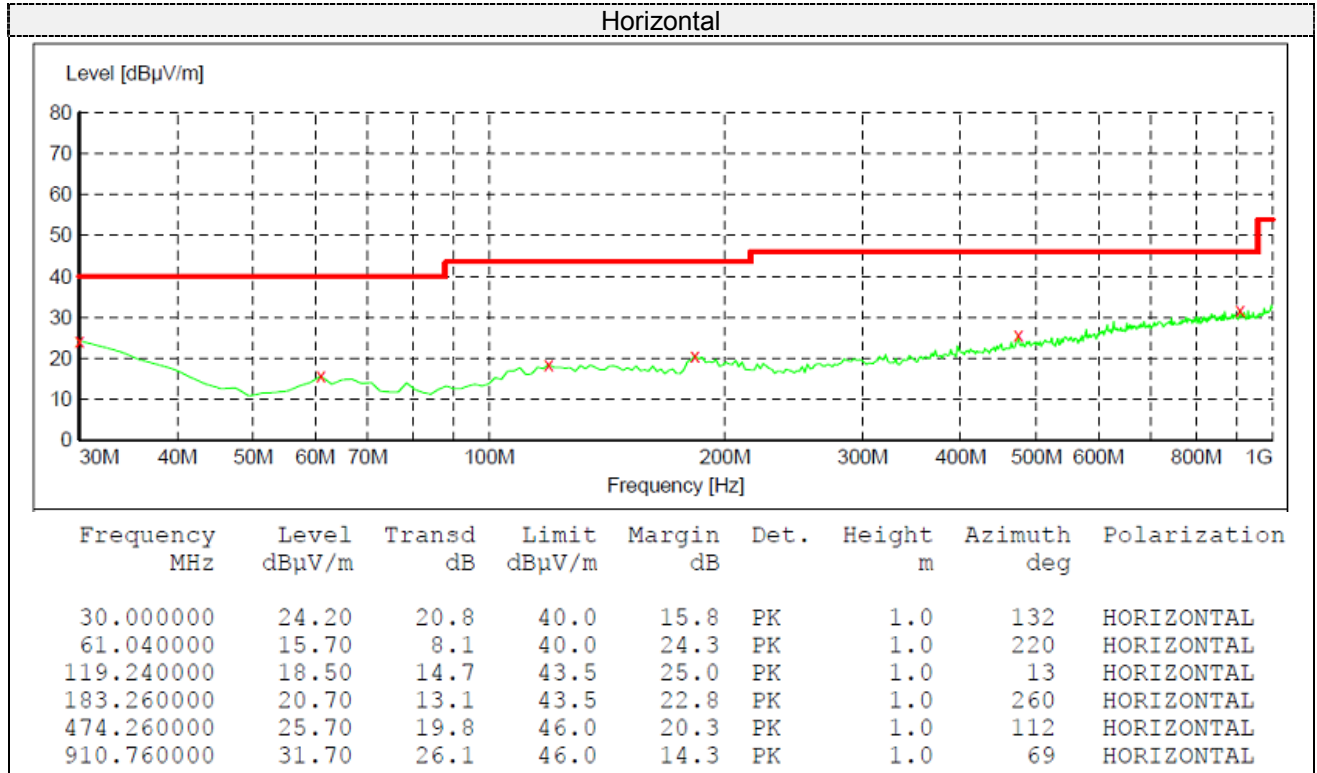
TEST RESULTS

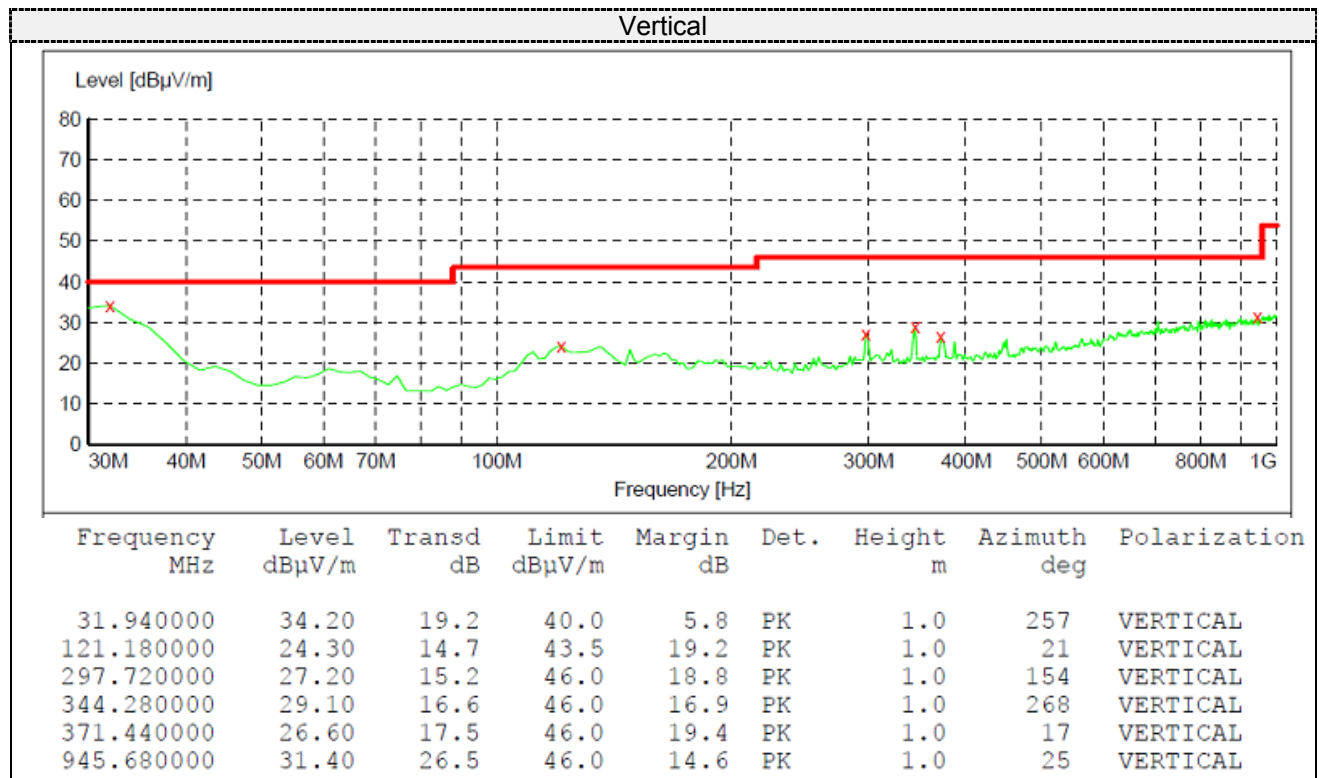
Remark: We measured Radiated Emission at GFSK, $\pi/4$ DQPSK and 8DPSK mode from 9 KHz to 25GHz in AC 120V/60Hz and AC 240V/60Hz and recorded worst case at GFSK mode.

Test site: Shenzhen CTL Testing Technology Co., Ltd

For 9 KHz-30MHz

| Frequency (MHz) | Corrected Reading (dBuV/m)@3m | FCC Limit (dBuV/m) @3m | Margin (dB) | Detector | Result |
|-----------------|-------------------------------|------------------------|-------------|----------|--------|
| 0.38 | 45.90 | 96.01 | 50.11 | QP | PASS |
| 1.55 | 51.50 | 63.80 | 12.30 | QP | PASS |
| 19.68 | 56.62 | 69.54 | 12.92 | QP | PASS |
| 24.62 | 40.60 | 69.54 | 28.94 | QP | PASS |

For 30MHz-1GHz



For 1GHz to 25GHz

[illegible][illegible]

| Frequency(MHz): | | | | 2440 | | | Polarity: | | | HORIZONTAL | | |
|-----------------|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 1 | 4882.00 | 56.30 | PK | 74.00 | 17.70 | 1.00 H | 189 | 54.24 | 30.98 | 7.58 | 36.5 | 2.06 |
| 1 | 4882.00 | 43.27 | AV | 54.00 | 10.73 | 1.00 H | 189 | 41.21 | 30.98 | 7.58 | 36.5 | 2.06 |
| 2 | 7323.00 | 41.61 | PK | 74.00 | 32.39 | 1.00 H | 105 | 30.69 | 37.66 | 8.56 | 35.3 | 10.92 |
| 2 | 7323.00 | -- | AV | -- | -- | -- | -- | -- | -- | -- | -- | -- |

| Frequency(MHz): | | | | 2440 | | | Polarity: | | | VERTICAL | | |
|-----------------|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 1 | 4882.00 | 58.38 | PK | 74.00 | 15.62 | 1.00 V | 93 | 56.32 | 30.98 | 7.58 | 36.5 | 2.06 |
| 1 | 4882.00 | 44.38 | AV | 54.00 | 9.62 | 1.00 V | 93 | 42.32 | 30.98 | 7.58 | 36.5 | 2.06 |
| 2 | 7323.00 | 47.57 | PK | 74.00 | 26.43 | 1.00 V | 178 | 36.65 | 37.66 | 8.56 | 35.3 | 10.92 |
| 2 | 7323.00 | -- | AV | -- | -- | -- | -- | -- | -- | -- | -- | -- |

| Frequency(MHz): | | | | 2480 | | | Polarity: | | | HORIZONTAL | | |
|-----------------|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 1 | 4960.00 | 55.77 | PK | 74.00 | 18.23 | 1.00 H | 154 | 52.70 | 31.47 | 7.80 | 36.2 | 3.07 |
| 1 | 4960.00 | 41.30 | AV | 54.00 | 12.70 | 1.00 H | 154 | 38.23 | 31.47 | 7.80 | 36.2 | 3.07 |
| 2 | 7340.00 | 43.36 | PK | 74.00 | 30.64 | 1.00 H | 257 | 31.62 | 38.32 | 8.72 | 35.3 | 11.74 |
| 2 | 7340.00 | -- | AV | -- | -- | -- | -- | -- | -- | -- | -- | -- |

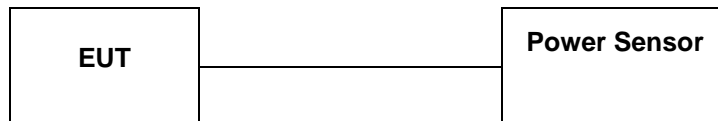
| Frequency(MHz): | | | | 2480 | | | Polarity: | | | VERTICAL | | |
|-----------------|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| No. | Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 1 | 4960.00 | 57.78 | PK | 74.00 | 16.22 | 1.00 V | 230 | 54.71 | 31.47 | 7.80 | -36.2 | 3.07 |
| 1 | 4960.00 | 38.27 | AV | 54.00 | 15.73 | 1.00 V | 230 | 35.20 | 31.47 | 7.80 | -36.2 | 3.07 |
| 2 | 7340.00 | 45.07 | PK | 74.00 | 28.93 | 1.00 V | 126 | 33.33 | 38.32 | 8.72 | -35.3 | 11.74 |
| 2 | 7340.00 | -- | AV | -- | -- | -- | -- | -- | -- | -- | -- | -- |

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to ANSI C63.10:2013 Maximum peak conducted output power for HFSS devices:
 The maximum peak conducted output power may be measured using a broadband peak RF power meter.
 The power meter shall have a video bandwidth that is greater than or equal to the HFSS bandwidth and shall utilize a fast-responding diode detector.

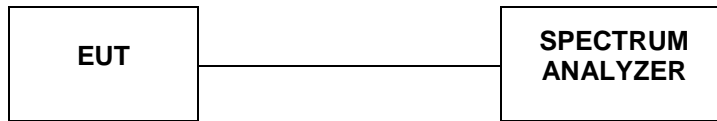
LIMIT

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

TEST RESULTS

| Type | Channel | Peak Output power (dBm) | Average Output power (dBm) | Limit (dBm) | Result |
|---------------|---------|-------------------------|----------------------------|-------------|--------|
| GFSK | 00 | 2.01 | 1.32 | 30 | Pass |
| | 39 | 1.42 | 0.87 | | |
| | 78 | 1.32 | 0.72 | | |
| $\pi/4$ DQPSK | 00 | 1.29 | 0.53 | 21 | Pass |
| | 39 | 0.62 | 0.21 | | |
| | 78 | 0.54 | 0.03 | | |
| 8DPSK | 00 | 1.25 | 0.68 | 21 | Pass |
| | 39 | 0.79 | 0.24 | | |
| | 78 | 0.71 | 0.18 | | |

Note: 1.The test results including the cable lose.

4.4. 20dB Bandwidth**TEST CONFIGURATION****TEST PROCEDURE**

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=30 KHz and VBW=100KHz. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

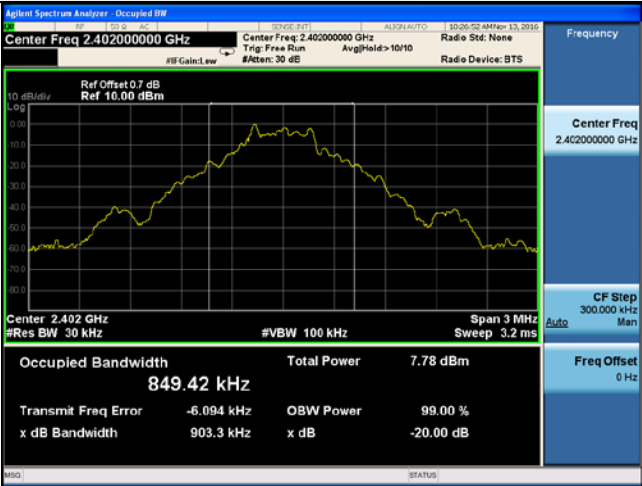
LIMIT

For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

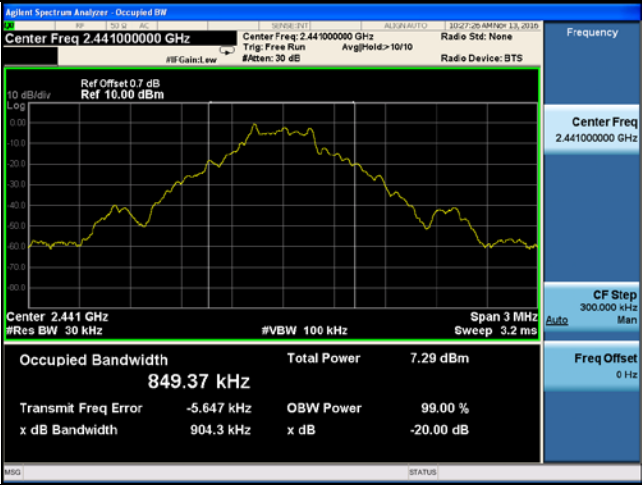
TEST RESULTS

| Modulation | Channel | 20dB bandwidth (MHz) | Result |
|------------|---------|----------------------|--------|
| GFSK | CH00 | 0.9033 | Pass |
| | CH39 | 0.9043 | |
| | CH78 | 0.9040 | |
| 8DPSK | CH00 | 1.157 | |
| | CH39 | 1.155 | |
| | CH78 | 1.154 | |

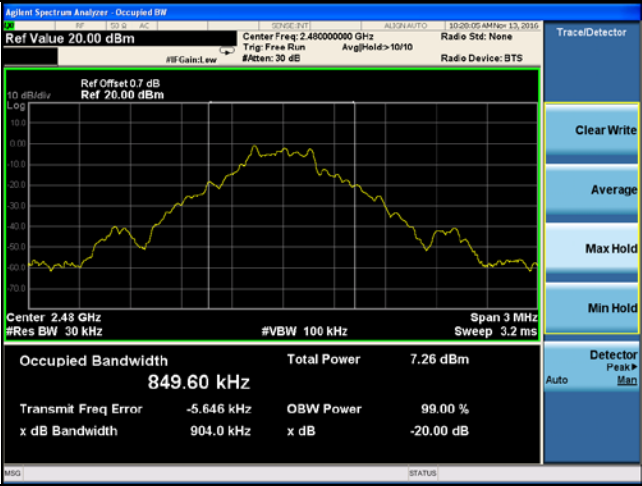
GFSK Modulation



CH00

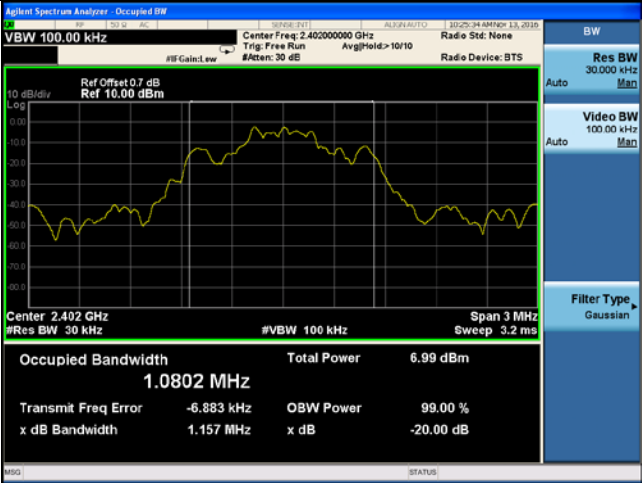


CH39



CH78

8DPSK Modulation



CH00



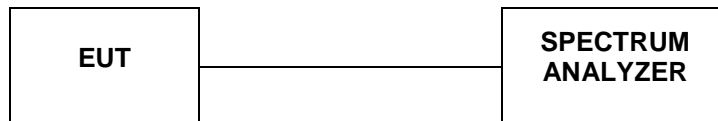
CH39



CH78

4.5. Frequency Separation

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=30 KHz and VBW=100KHz.

LIMIT

According to 15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the $2/3 \times 20\text{dB}$ bandwidth of the hopping channel, whichever is greater.

TEST RESULTS

4.5.1 GFSK Test Mode

| Modulation | Channel | Channel Separation (MHz) | Limit(MHz) | Result |
|------------|---------|--------------------------|------------|--------|
| GFSK | CH38 | 1.000 | 0.904 | Pass |
| | CH39 | | | |
| 8DPSK | CH38 | 1.000 | 1.155 | Pass |
| | CH39 | | | |

Remark: We have tested all mode at high, middle and low channel, and recorded worst case at middle



GFSK



8DPSK

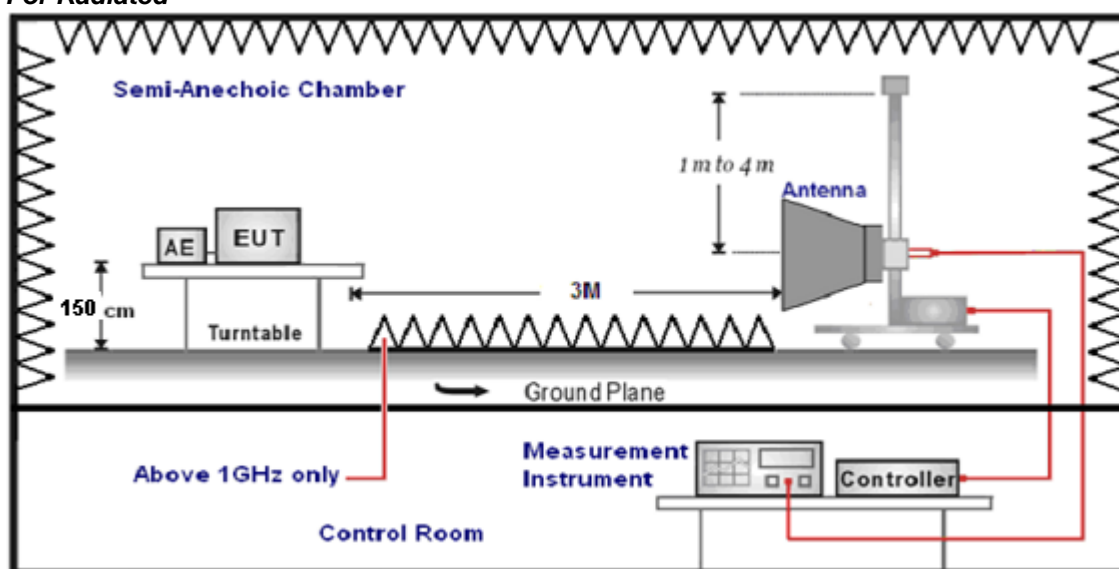
4.6. Band Edge Compliance of RF Emission

TEST REQUIREMENT

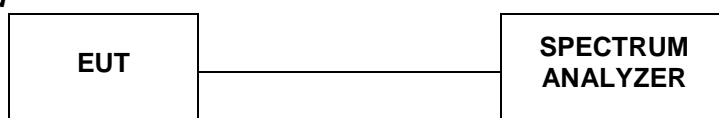
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated 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) (see §15.205(c)).

TEST CONFIGURATION

For Radiated



For Conducted



TEST PROCEDURE

1. The EUT was placed on a turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed..
5. The distance between test antenna and EUT was 3 meter:
6. Setting test receiver/spectrum as following table states:

| Test Frequency range | Test Receiver/Spectrum Setting | Detector |
|----------------------|---|----------|
| 1GHz-40GHz | Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto | Peak |

LIMIT

Below -20dB of the highest emission level in operating band.

Radiated 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)

TEST RESULTS

Remark: we measured all conditions(DH1,DH3,DH5) and recorded worst case at DH1.

4.6.1 For Radiated Bandedge Measurement

Remark: we tested radiated bandedge at both hopping and no-hopping modes,recorded worst case at no-hopping mode

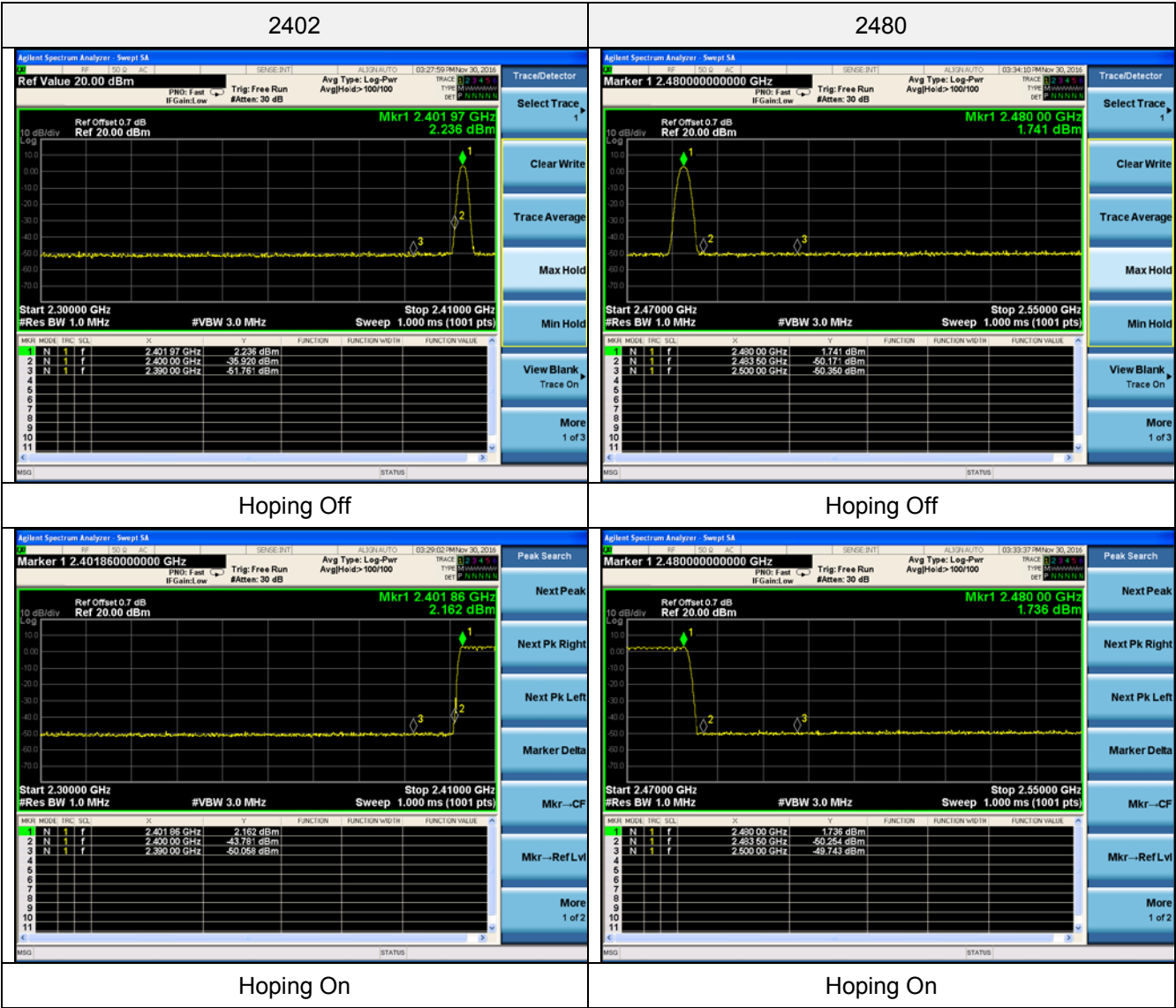
GFSK

| Frequency(MHz): | | | 2402 | | | Polarity: | | | HORIZONTAL | | |
|------------------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 2390.00 | 55.77 | PK | 74.00 | 18.23 | 1.00 | 102 | 61.08 | 27.49 | 3.32 | 36.12 | -5.31 |
| 2390.00 | 39.19 | AV | 54.00 | 14.81 | 1.00 | 102 | 44.50 | 27.49 | 3.32 | 36.12 | -5.31 |
| Frequency(MHz): | | | 2402 | | | Polarity: | | | VERTICAL | | |
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 2390.00 | 54.69 | PK | 74.00 | 19.31 | 1.00 | 143 | 60.00 | 27.49 | 3.32 | 36.12 | -5.31 |
| 2390.00 | 41.40 | AV | 54.00 | 12.60 | 1.00 | 143 | 46.71 | 27.49 | 3.32 | 36.12 | -5.31 |
| Frequency(MHz): | | | 2480 | | | Polarity: | | | HORIZONTAL | | |
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 2483.50 | 54.92 | PK | 74.00 | 19.08 | 1.00 | 178 | 60.64 | 27.45 | 3.38 | 36.55 | -5.72 |
| 2483.50 | 36.29 | AV | 54.00 | 17.71 | 1.00 | 178 | 42.01 | 27.45 | 3.38 | 36.55 | -5.72 |
| Frequency(MHz): | | | 2480 | | | Polarity: | | | VERTICAL | | |
| Frequency (MHz) | Emission Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
| 2483.50 | 58.72 | PK | 74.00 | 15.28 | 1.00 | 203 | 54.87 | 27.45 | 3.38 | 36.55 | -5.72 |
| 2483.50 | 38.59 | AV | 54.00 | 15.41 | 1.00 | 203 | 36.30 | 27.45 | 3.38 | 36.55 | -5.72 |

4.6.2 For Conducted Bandedge Measurement

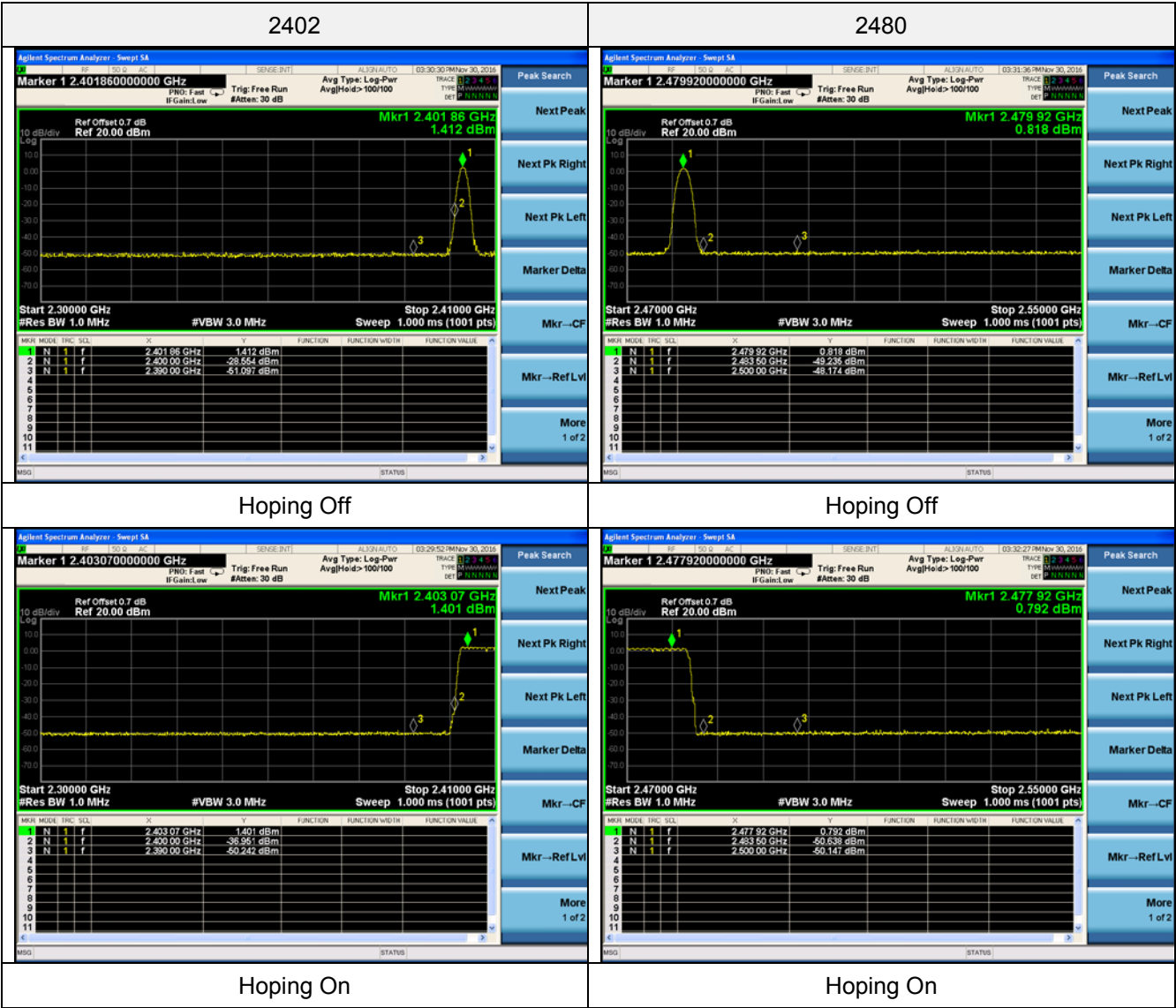
GFSK

| Frequency (MHz) | Delta Peak to Band emission (dBc) | Hopping Mode | Limit (dBc) | Verdict |
|-----------------|-----------------------------------|--------------|-------------|---------|
| 2400.00 | -38.156 | OFF | -20 | PASS |
| 2400.00 | -45.943 | ON | -20 | PASS |
| 2483.50 | -51.912 | OFF | -20 | PASS |
| 2483.50 | -51.990 | ON | -20 | PASS |



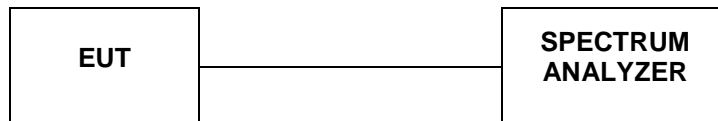
8DPSK

| Frequency (MHz) | Delta Peak to Band emission (dBc) | Hopping Mode | Limit (dBc) | Verdict |
|-----------------|-----------------------------------|--------------|-------------|---------|
| 2400.00 | -29.966 | OFF | -20 | PASS |
| 2400.00 | -38.352 | ON | -20 | PASS |
| 2483.50 | -50.053 | OFF | -20 | PASS |
| 2483.50 | -51.430 | ON | -20 | PASS |



4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

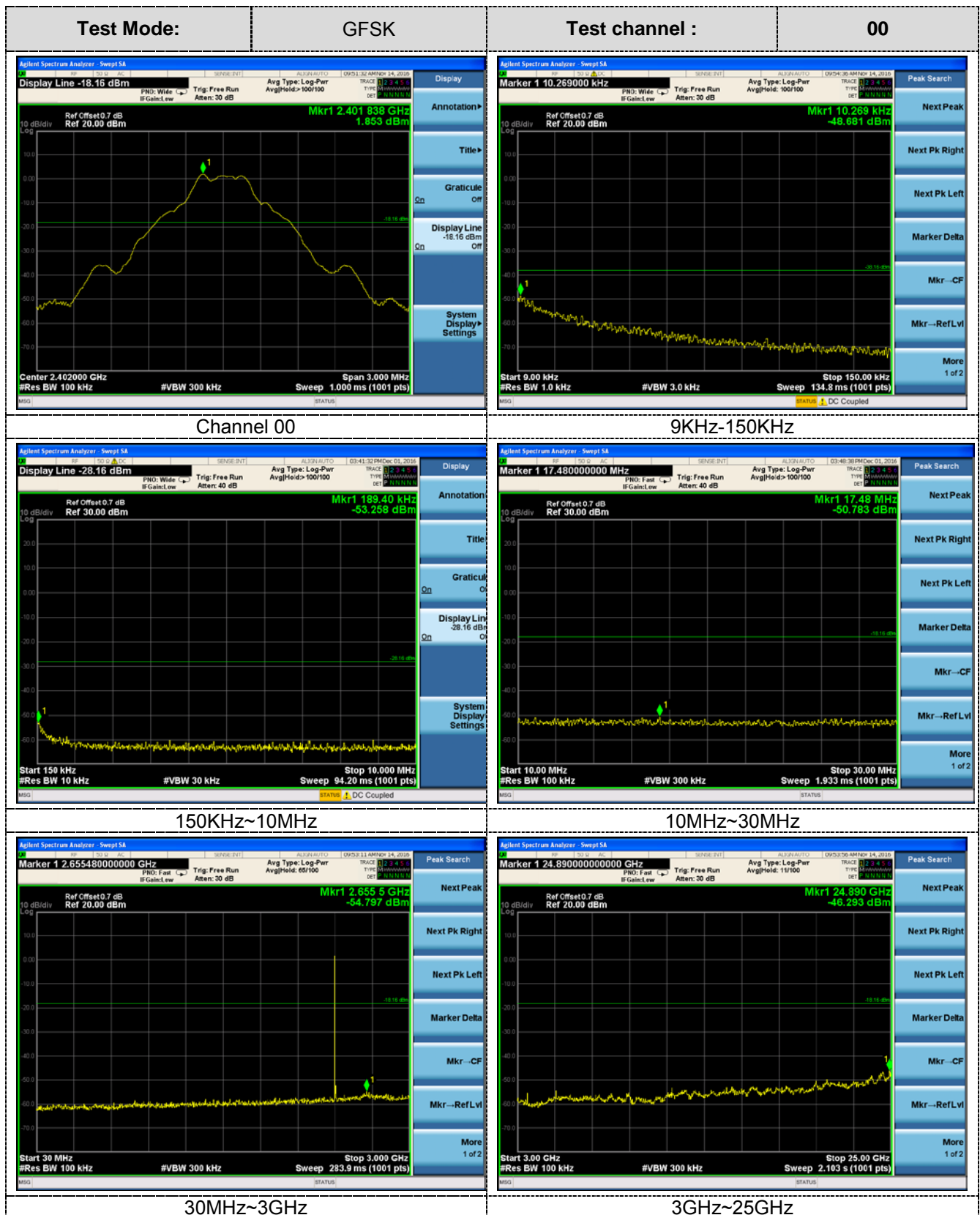
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300KHz to measure the peak field strength, and measure frequency range from 9KHz to 25GHz.

LIMIT

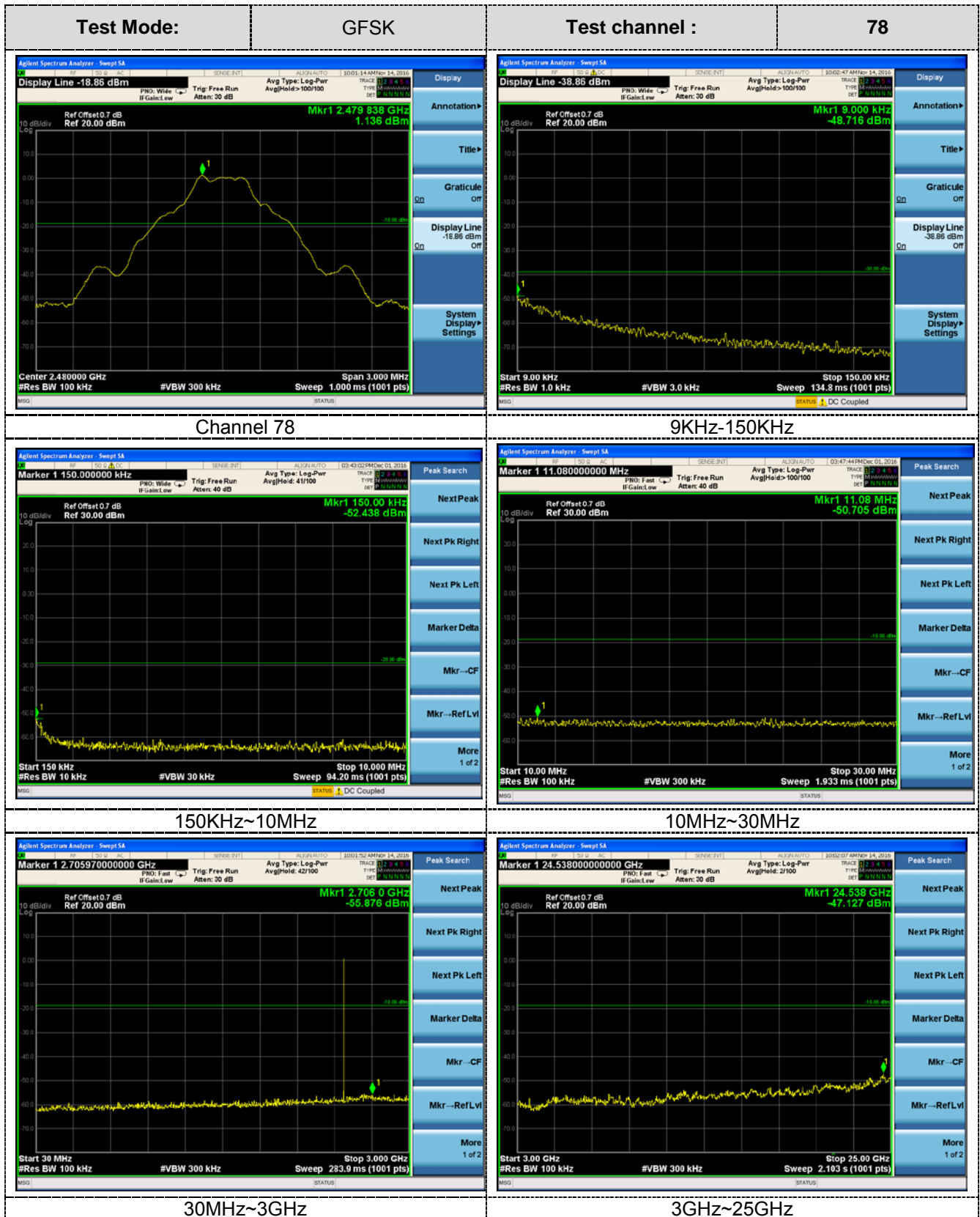
1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

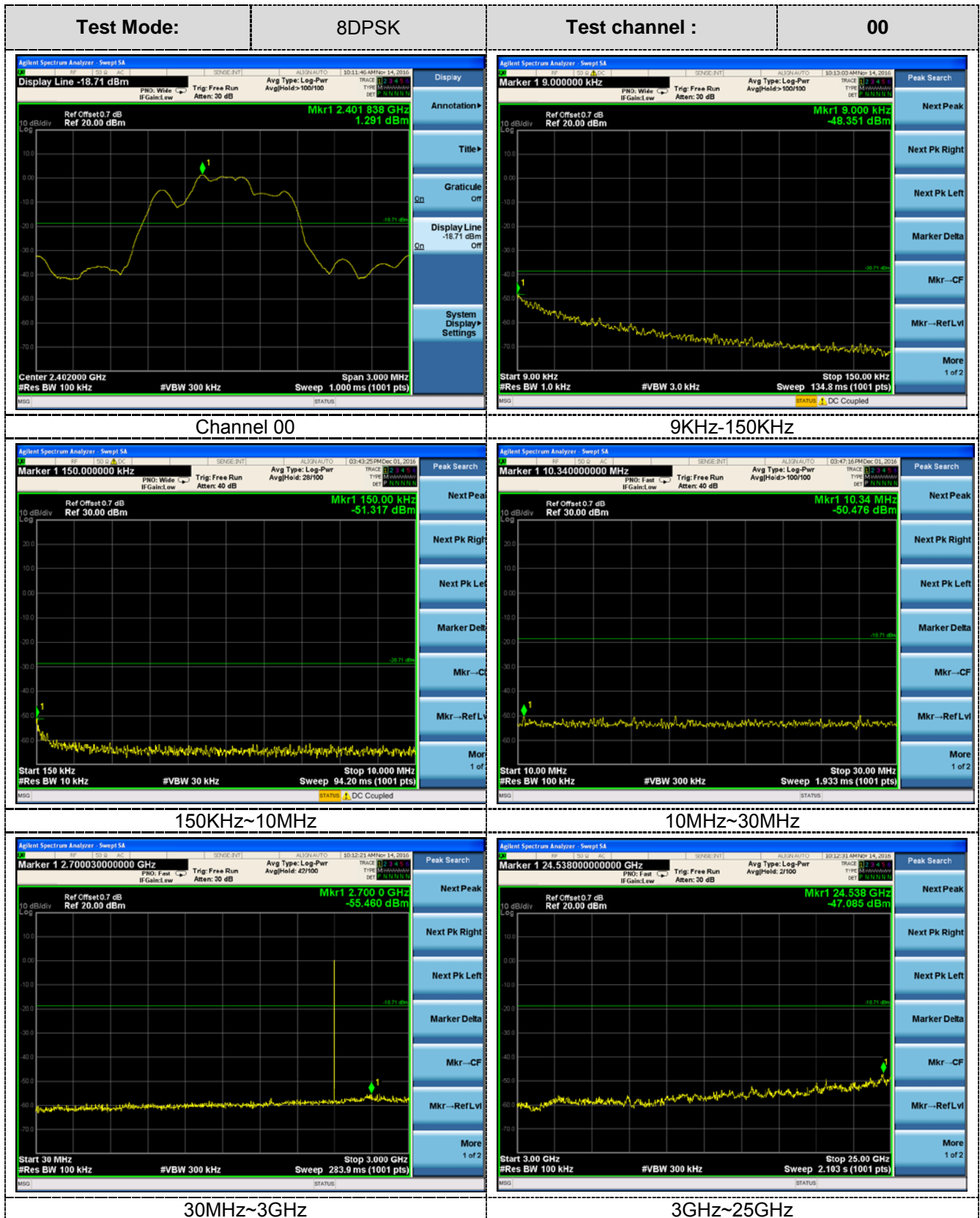
TEST RESULTS

Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.



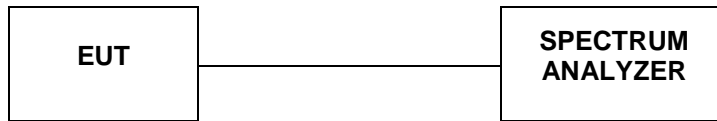










4.8. Number of hopping frequency**TEST CONFIGURATION****TEST PROCEDURE**

The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 2400MHz to 2483.5MHz with RBW=1MHz and VBW=3MHz.

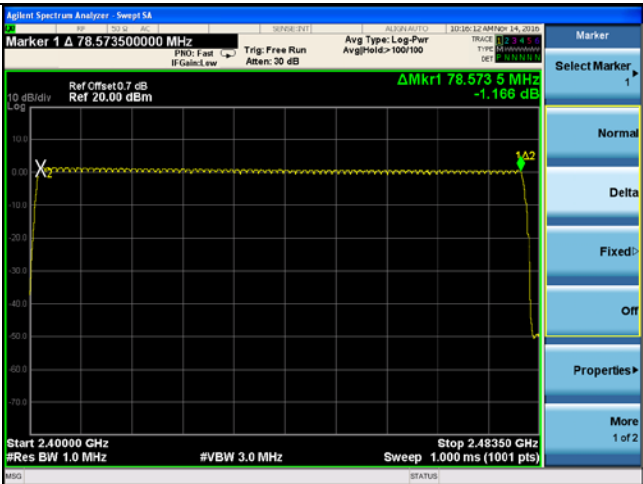
LIMIT

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

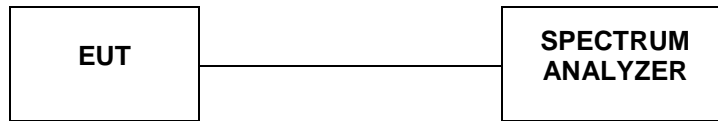
| Modulation | Number of Hopping Channel | Limit | Result |
|------------|---------------------------|-------|--------|
| GFSK | 79 | ≥15 | Pass |
| 8DPSK | 79 | | |



GFSK Modulation



8DPSK Modulation

4.9. Time Of Occupancy(Dwell Time)**TEST CONFIGURATION****TEST PROCEDURE**

The transmitter output was connected to the spectrum analyzer through an attenuator. Set center frequency of spectrum analyzer=operating frequency with RBW=1MHz and VBW=3MHz,Span=0Hz.

LIMIT

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a pe-riod of 0.4 seconds multiplied by the number of hopping channels employed.

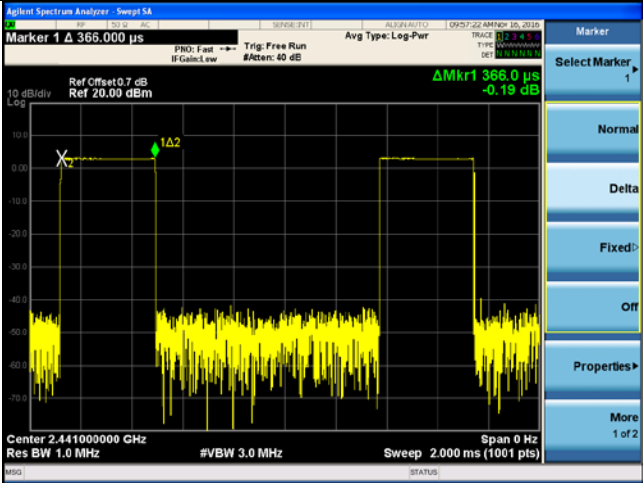
TEST RESULTS

| Modulation | Packet | Pulse time (ms) | Dwell time (second) | Limit (second) | Result |
|------------|--------|-----------------|---------------------|----------------|--------|
| GFSK | DH1 | 0.366 | 0.117 | 0.40 | Pass |
| | DH3 | 1.620 | 0.259 | | |
| | DH5 | 2.872 | 0.306 | | |
| 8DPSK | 3-DH1 | 0.376 | 0.124 | 0.40 | Pass |
| | 3-DH3 | 1.630 | 0.261 | | |
| | 3-DH5 | 2.880 | 0.307 | | |

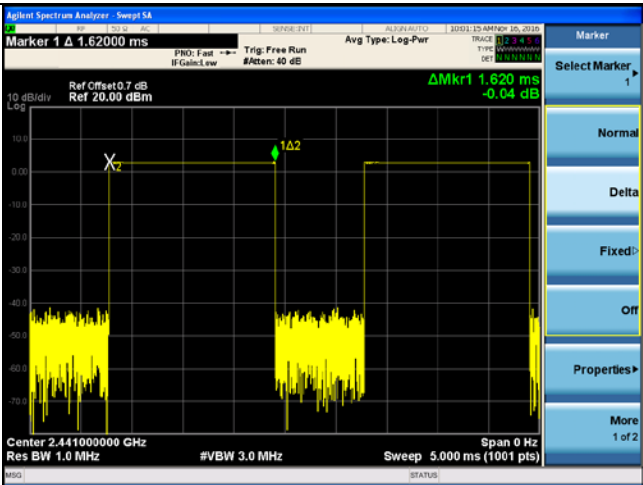
Note:

- We have tested all mode at high,middle and low channel,and recoreded worst case at middle channel.
- $\text{Dwell time} = \text{Pulse time (ms)} \times (1600 \div 2 \div 79) \times 31.6 \text{ Second}$ for DH1, 2-DH1, 3-DH1
 $\text{Dwell time} = \text{Pulse time (ms)} \times (1600 \div 4 \div 79) \times 31.6 \text{ Second}$ for DH3, 2-DH3, 3-DH3
 $\text{Dwell time} = \text{Pulse time (ms)} \times (1600 \div 6 \div 79) \times 31.6 \text{ Second}$ for DH5, 2-DH5, 3-DH5

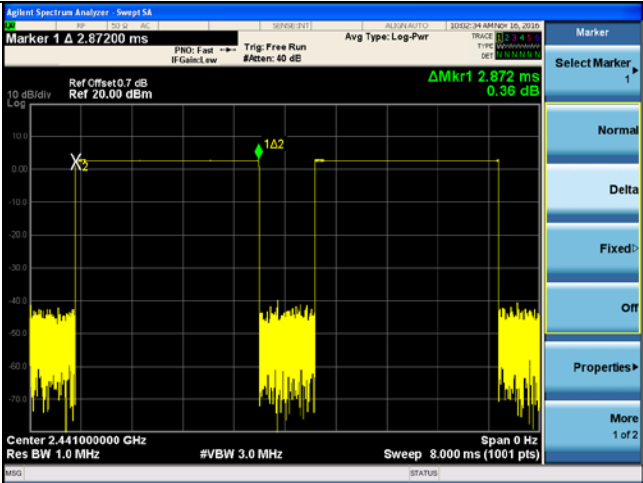
GFSK Modulation



DH1

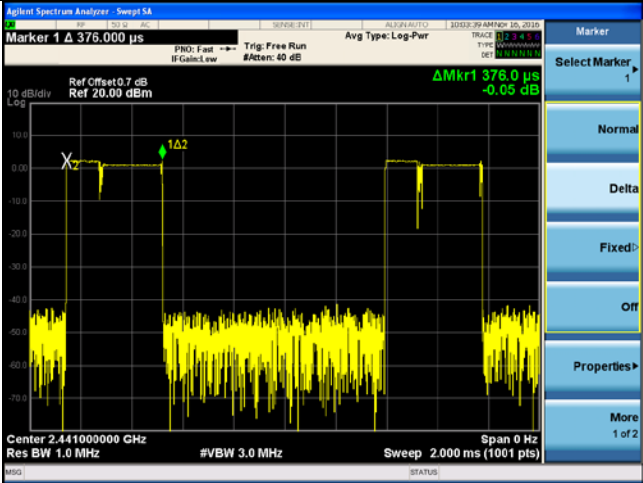


DH3

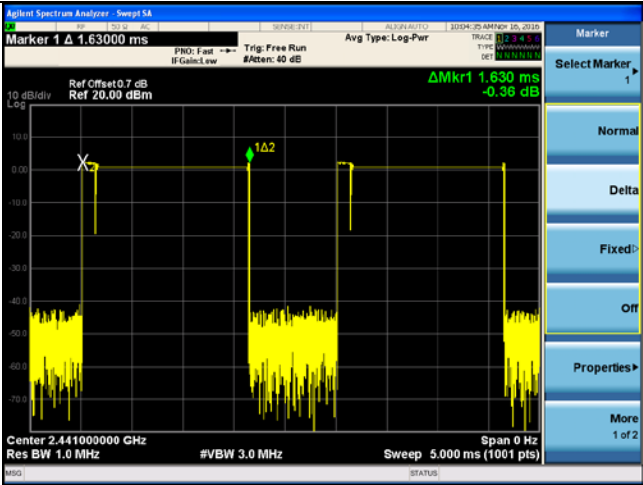


DH5

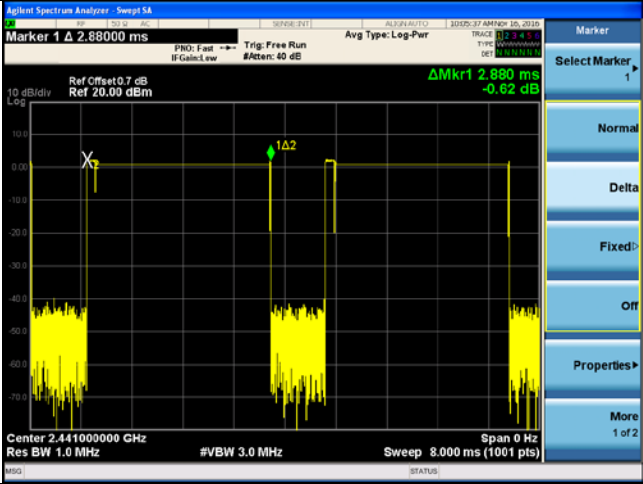
8DPSK Modulation



3-DH1



3-DH3



3-DH5

4.10. Pseudorandom Frequency Hopping Sequence

TEST APPLICABLE

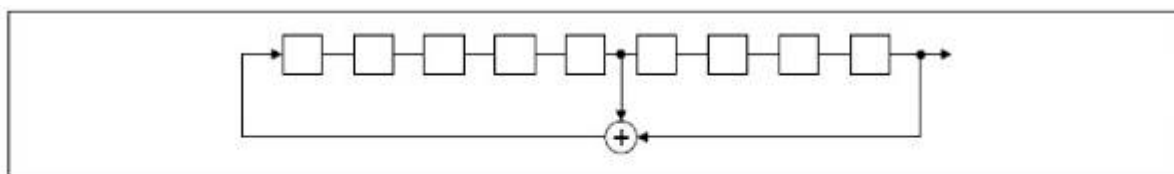
For 47 CFR Part 15C section 15.247 (a)(1) requirement:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence Requirement

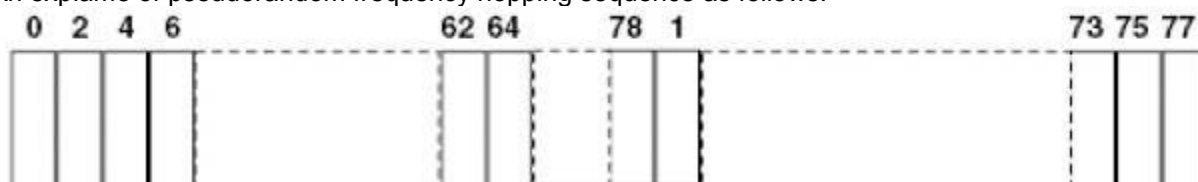
The pseudorandom frequency hopping sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: $2^9 - 1 = 511$ bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of pseudorandom frequency hopping sequence as follows:



Each frequency used equally on the average by each transmitter.

The system receiver has input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shifts frequencies in synchronization with the transmitted signals.

4.11. Antenna Requirement

Standard Applicable

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

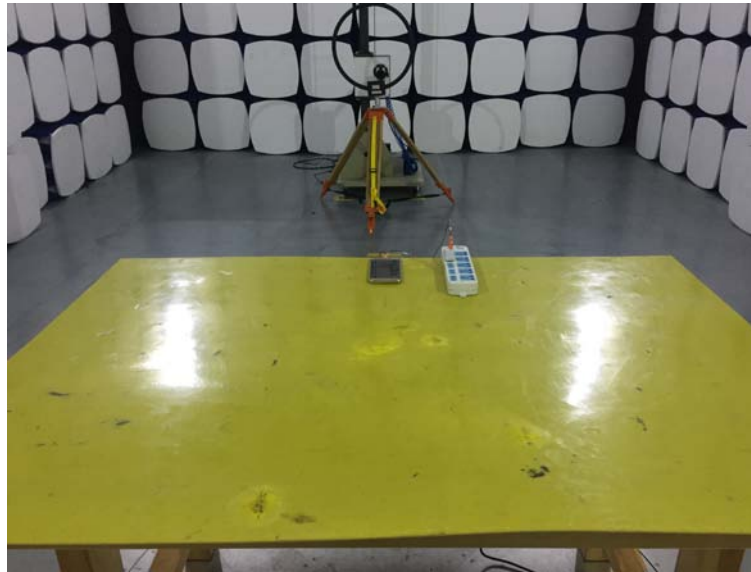
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Antenna Information

The antenna is FPC antenna, The directional gains of antenna used for transmitting is -0.69dBi.



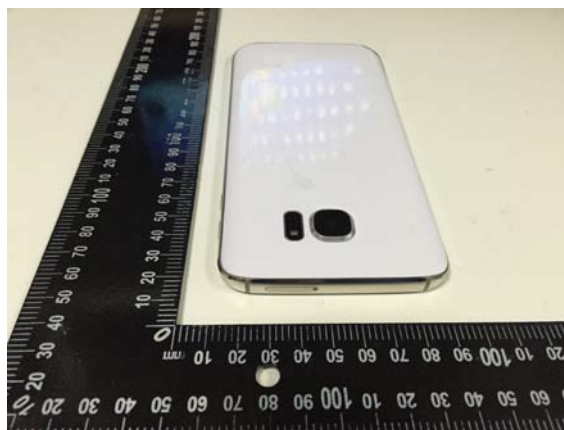
5. Test Setup Photos of the EUT

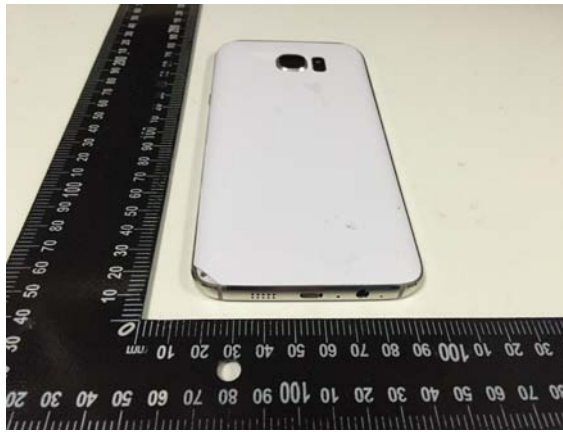




6. External and Internal Photos of the EUT

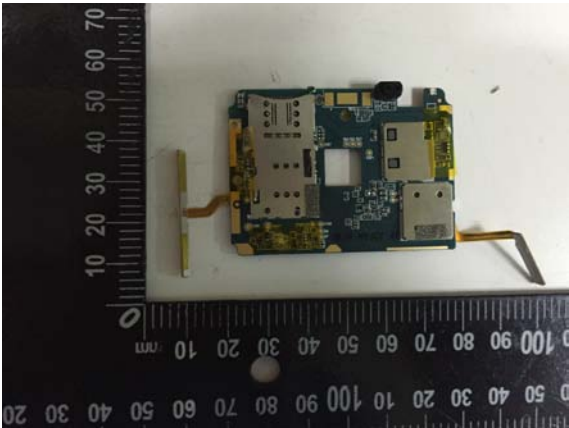
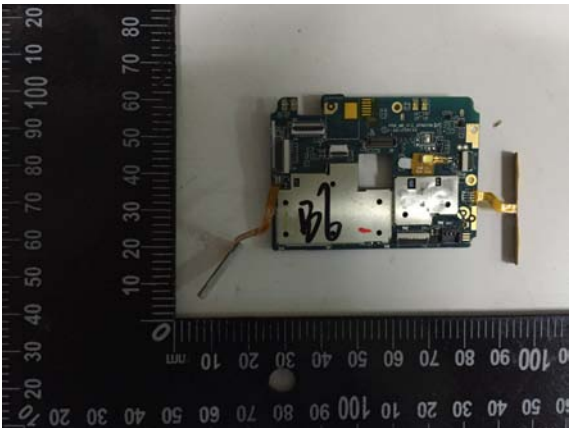
External Photos

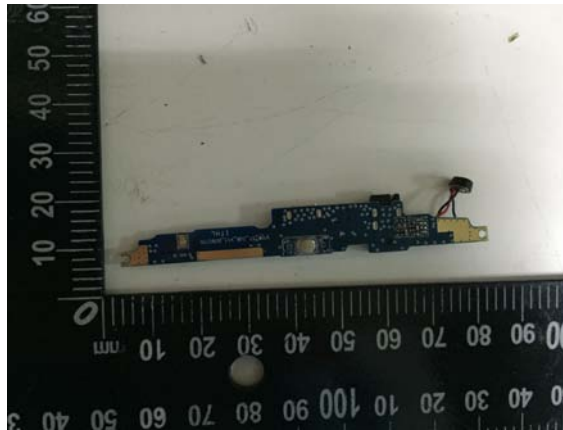
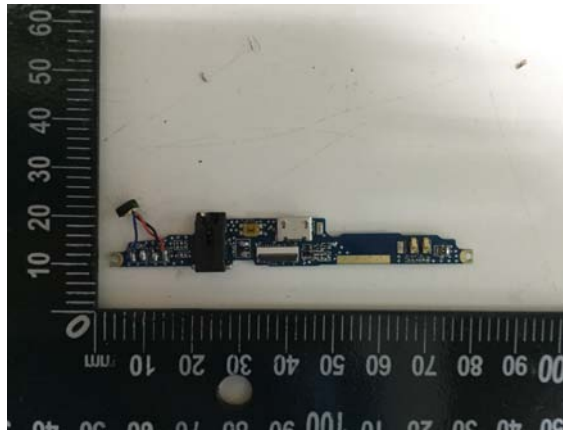




Internal Photos







.....End of Report.....