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FCC PART 15 SUBPART C TEST REPORT

FCC Part 15.247

Report Reference No...... **CTL1501140132-WB02**

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Date of issue..... Feb. 10, 2015

Test Firm..... **Shenzhen CTL Testing Technology Co., Ltd.**

Address..... Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,
Nanshan District, Shenzhen, China 518055

Applicant's name..... **United Telelinks (Bangalore) Limited**

Address..... NO 39/13, Appareddy palya Main Road, off 7th Main, HAL2nd
stage, Indiranagar 2nd stage, Bangalore, India -560038

Test specification:

Standard FCC Part 15.247: Operation within the bands 902–928 MHz, 2400–
2483.5 MHz, and 5725–5850 MHz.

Master TRF..... Dated 2011-01

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Test item description **handsets**

FCC ID..... **2AD3G-X4009**

Trade Mark N/A

Model/Type reference..... X4009

GSM/WCDMA

Transmit 2G:GSM 850: 824~849MHz, PCS 1900: 1850~1910MHz
3G:WCDMA Band II: 1850-1910MHz,
WCDMA Band V: 824~849MHz

Receive 2G:GSM 850: 869~894MHz, PCS 1900: 1930~1990MHz
3G:WCDMA Band II: 1930~1990MHz,
WCDMA Band V: 869~894MHz

Release Version 2G:R99
3G:Rel-6

| | |
|--------------------------|--|
| Type of modulation | 2G: GMSK for GSM/GPRS 3G: QPSK |
| GPRS Type | Class B |
| GPRS Class | Class 12 |
| GPS | |
| work frequency | 1575.42MHz |
| Type of modulation | BPSK |
| Bluetooth | |
| Work frequency | 2402~2480MHz |
| Version..... | V3.0+EDR, V4.0 |
| Type of modulation | FHSS |
| Data Rate..... | 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps(8DPSK) |
| Wi-Fi | |
| Work frequency | 802.11b/g/n(20MHz): 2412~2462MHz 802.11n(40MHz): 2422~2452MHz |
| Type of modulation | 802.11b DSSS, 802.11g/n: OFDM |
| Data Rate..... | 802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 150 Mbps |
| Antenna Gain | 1.29 dBi for GSM850 and WCDMA Band V 2.27 dBi for PCS1900 and WCDMA Band II 0.84 dBi for Bluetooth and Wi-Fi |
| Antenna type | Internal |
| Result..... | Positive |

TEST REPORT

| | | |
|-------------------|--------------------|--------------------------------|
| Test Report No. : | CTL1501140132-WB02 | Feb. 10, 2015 Date of issue |
|-------------------|--------------------|--------------------------------|

Equipment under Test : handsets

Model /Type : X4009

Applicant : **United Telelinks (Bangalore) Limited**

Address : NO 39/13, Appareddy palya Main Road, off 7th Main, HAL2nd stage, Indiranagar 2nd stage, Bangalore, India -560038

Manufacturer : **NEW EXPLORER TELECOM CO.,LTD**

Address : ROOM 5B, 5TH FLOOR, BLDG.1, FINANCE BASE, NO.8 KEFA RD, NANSHAN, SHENZHEN, CHINA

Test Result according to the standards on page 5:

Positive

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 C63.10-2009:**](#) American National Standard for Testing Unlicensed Wireless Devices

[**KDB Publication No. KDB 558074 D01 v03r02 Guidance on Measurements for Digital Transmission Systems**](#)

[**ANSI C63.4-2009**](#)



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample : Jan. 14, 2015

Testing commenced on : Jan. 14, 2015

Testing concluded on : Feb. 10, 2015

2.2. Equipment Under Test

Power supply system utilised

| | | | |
|---|---|---|-----------------------------------|
| Power supply voltage | : | <input checked="" type="radio"/> 120V / 60 Hz | <input type="radio"/> 115V / 60Hz |
| | | <input type="radio"/> 12 V DC | <input type="radio"/> 24 V DC |
| <input checked="" type="radio"/> Other (specified in blank below) | | | |

DC 3.7V from battery

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

A handsets with UMTS/GSM, Bluetooth, GPS and wifi function.

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

Serial number: Prototype

2.4. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. There are 40 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel .

| | |
|------------------|----------------|
| Frequency Range: | 2400-2483.5MHz |
| Channel number: | 40 channels |
| Modulation type: | GFSK |
| Antenna: | internal |

| Test Channel | Test Frequency |
|----------------|----------------|
| Low Channel | 2402 MHz |
| Middle Channel | 2440 MHz |
| High Channel | 2480 MHz |

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- supplied by the manufacturer
- supplied by the lab

| | | | |
|-----------------------|------------|----------------|-----------|
| <input type="radio"/> | AC adapter | Manufacturer : | MGT |
| | | Model No. : | Strong4.0 |
| <input type="radio"/> | Earphone | Manufacturer : | MGT |
| | | Model No. : | ----- |

2.6. Configuration of Tested System

Fig. 2-1 Configuration of Tested System



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

This submittal(s) (test report) is intended for FCC ID: 2AD3G-X4009 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

1. The EUT have Bluetooth 4.0 functions, The functions of the EUT listed as below:

| | Test Standards | Reference Report |
|-------------|---------------------------------------|--------------------|
| Radio | FCC Part 15 Subpart C (Section15.247) | CTL1501140132-WB01 |
| RF Exposure | FCC Per 47 CFR 2.1093 | CTL1501140132-SAR |

2. The frequency bands used in this EUT are listed as follows:

| | | | | |
|---------------------|-------------|-----------|-----------|-----------|
| Frequency Band(MHz) | 2400-2483.5 | 5150-5350 | 5470-5725 | 5725-5850 |
| Bluetooth 4.0 | √ | — | — | — |

3. The EUT provides one completed transmitter and receiver.

| Modulation Mode | TX Function |
|-----------------|-------------|
| GFSK | 1TX |

2.10. Channel list

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 00 | 2402 | 20 | 2442 |
| 01 | 2404 | 21 | 2444 |
| 02 | 2406 | 22 | 2446 |
| 03 | 2408 | 23 | 2448 |
| 04 | 2410 | 24 | 2450 |
| 05 | 2412 | 25 | 2452 |
| 06 | 2414 | 26 | 2454 |
| 07 | 2416 | 27 | 2456 |
| 08 | 2418 | 28 | 2458 |
| 09 | 2420 | 29 | 2460 |
| 10 | 2422 | 30 | 2462 |
| 11 | 2424 | 31 | 2464 |
| 12 | 2426 | 32 | 2466 |
| 13 | 2428 | 33 | 2468 |
| 14 | 2430 | 34 | 2470 |
| 15 | 2432 | 35 | 2472 |
| 16 | 2434 | 36 | 2474 |
| 17 | 2436 | 37 | 2476 |
| 18 | 2438 | 38 | 2478 |
| 19 | 2440 | 39 | 2480 |

2.11. Mode of Operation

1. The EUT has been tested under normal operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
3. Test Mode: Channel low (2402MHz), mid (2440MHz) and high (2480MHz) with highest data rate are chosen for full testing.

| Test Channel | Test Frequency |
|----------------|----------------|
| Low Channel | 2402 MHz |
| Middle Channel | 2440 MHz |
| High Channel | 2480 MHz |

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055

The sites are constructed in conformance with the requirements of ANSI C6230, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

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. 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 acc. 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 CTL Testing Technology Co., Ltd. quality system acc. 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 CTL laboratory is reported:

| Test | Range | Measurement Uncertainty | Notes |
|-----------------------|------------|-------------------------|-------|
| Radiated Emission | 30~1000MHz | 4.10dB | (1) |
| Radiated Emission | Above 1GHz | 4.32dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 3.20dB | (1) |

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

3.5. Test Description

| FCC PART 15 | | |
|---------------------------------|-------------------------------------|------|
| FCC Part 15.207 | AC Power Conducted Emission | PASS |
| FCC Part 15.247(a)(2) | 6dB Bandwidth | PASS |
| FCC Part 15.247(d) | Spurious RF Conducted Emission | PASS |
| FCC Part 15.247(b) | Maximum Peak Output Power | PASS |
| FCC Part 15.247(e) | Power Spectral Density | PASS |
| FCC Part 15.109/ 15.205/ 15.209 | Radiated Emissions | PASS |
| FCC Part 15.247(d) | Band Edge Compliance of RF Emission | PASS |
| FCC Part 15.203/15.247 (b) | Antenna Requirement | PASS |
| FCC Per 47 CFR 2.1091(b) | MPE Evaluation | PASS |

Remark: The measurement uncertainty is not included in the test result.



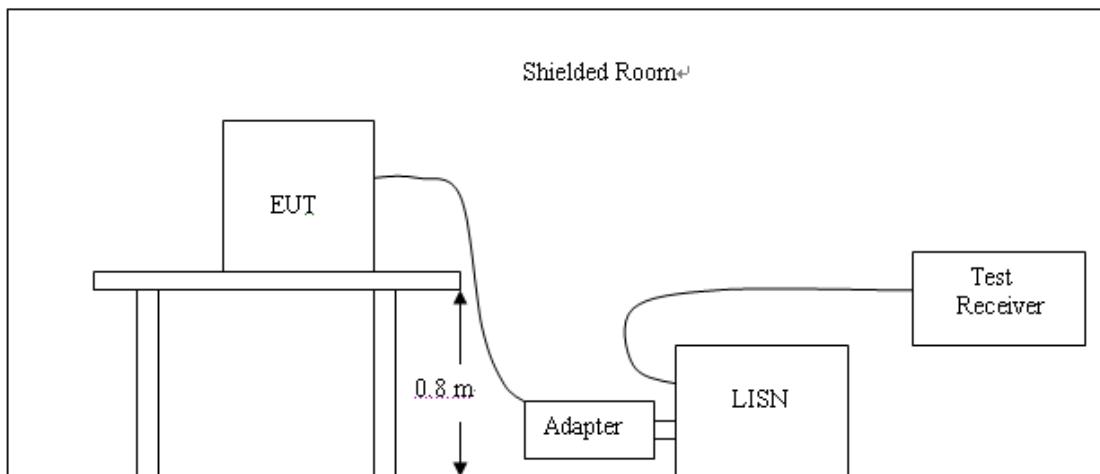
3.6. Equipments Used during the Test

| Test Equipment | Manufacturer | Model No. | Serial No. | Calibration Date | Calibration Due Date |
|----------------------------|----------------------|-----------------------|------------|------------------|----------------------|
| Bilog Antenna | Sunol Sciences Corp. | JB1 | A061713 | 2014/07/12 | 2015/07/11 |
| EMI Test Receiver | R&S | ESCI | 103710 | 2014/07/10 | 2015/07/09 |
| Spectrum Analyzer | Agilent | E4407B | MY45108355 | 2014/07/06 | 2015/07/05 |
| Controller | EM Electronics | Controller EM 1000 | N/A | 2014/07/06 | 2015/07/05 |
| Horn Antenna | Sunol Sciences Corp. | DRH-118 | A062013 | 2014/07/12 | 2015/07/11 |
| Horn Antenna | SCHWARZBECK | BBHA9170 | 1562 | 2014/07/12 | 2015/07/11 |
| Active Loop Antenna | SCHWARZBECK | FMZB1519 | 1519-037 | 2014/07/12 | 2015/07/11 |
| LISN | R&S | ENV216 | 101316 | 2014/07/10 | 2015/07/09 |
| LISN | SCHWARZBECK | NSLK8127 | 8127687 | 2014/07/10 | 2015/07/09 |
| Microwave Preamplifier | HP | 8349B | 3155A00882 | 2014/07/10 | 2015/07/09 |
| Amplifier | HP | 8447D | 3113A07663 | 2014/07/10 | 2015/07/09 |
| Transient Limiter | Com-Power | LIT-153 | 532226 | 2014/07/10 | 2015/07/09 |
| Radio Communication Tester | R&S | CMU200 | 3655A03522 | 2014/07/06 | 2015/07/05 |
| Temperature/Humidity Meter | zhicheng | ZC1-2 | 22522 | 2014/07/10 | 2015/07/09 |
| SIGNAL GENERATOR | HP | 8647A | 3200A00852 | 2014/07/10 | 2015/07/09 |
| Wideband Peak Power Meter | Anritsu | ML2495A | 220.23.35 | 2014/07/06 | 2015/07/05 |
| Power Sensor | Anritsu | MA2411B | 0738552 | 2014/07/06 | 2015/07/05 |
| Climate Chamber | ESPEC | EL-10KA | A20120523 | 2014/07/06 | 2015/07/05 |
| High-Pass Filter | K&L | 9SH10-2700/X12750-O/O | / | 2014/07/06 | 2015/07/05 |
| High-Pass Filter | K&L | 41H10-1375/U12750-O/O | / | 2014/07/06 | 2015/07/05 |
| RF Cable | HUBER+SUHNER | RG214 | / | 2014/07/09 | 2015/07/08 |

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 tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
- 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 DC5V power from the adapter, the adapter received AC120V/60Hz power 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.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

AC Power Conducted Emission Limit

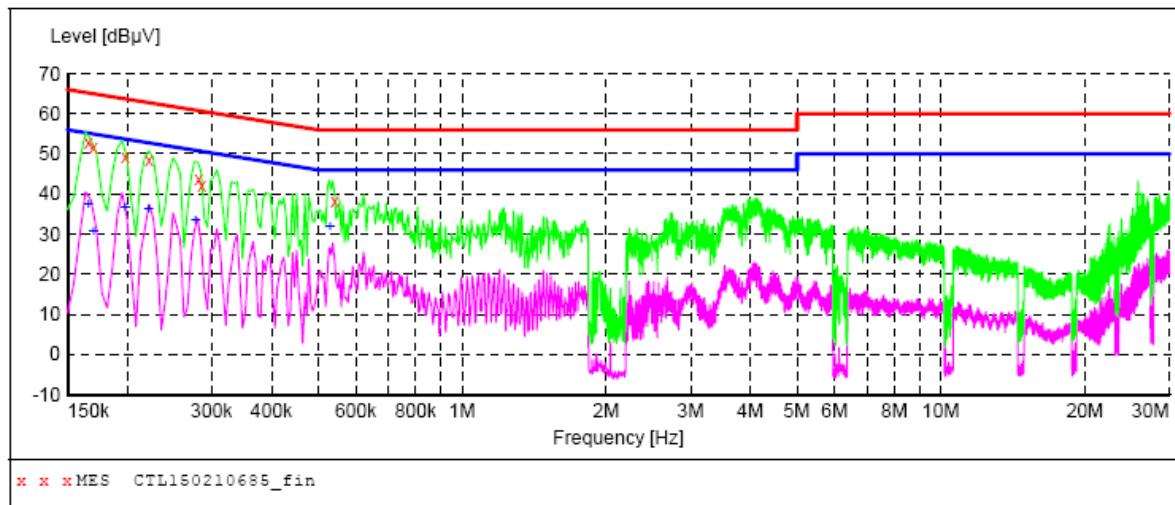
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

| Frequency (MHz) | Maximum RF Line Voltage (dB μ V) | | | |
|--------------------|--------------------------------------|------|---------|--------|
| | CLASS A | | CLASS B | |
| | Q.P. | Ave. | Q.P. | Ave. |
| 0.15 - 0.50 | 79 | 66 | 66-56* | 56-46* |
| 0.50 - 5.00 | 73 | 60 | 56 | 46 |
| 5.00 - 30.0 | 73 | 60 | 60 | 50 |

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

SCAN TABLE: "Voltage (9K-30M) FIN"
Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL150210685_fin"**

2/10/2015 5:09PM

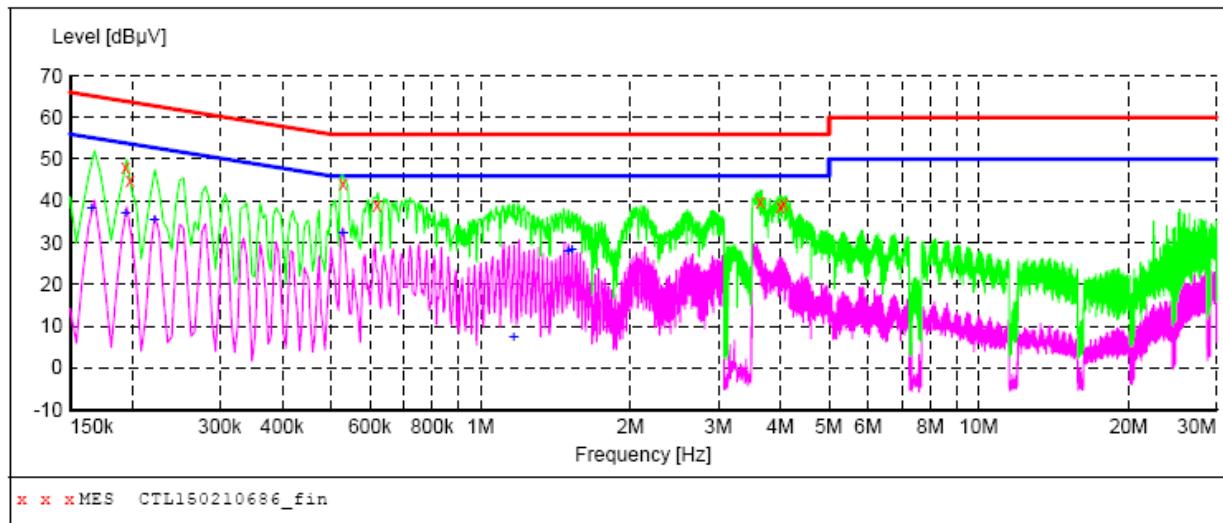
| Frequency MHz | Level dB μ V | Transd dB | Limit dB μ V | Margin dB | Detector | Line | PE |
|------------------|---------------------|--------------|---------------------|--------------|----------|------|-----|
| 0.166000 | 52.70 | 10.2 | 65 | 12.5 | QP | N | GND |
| 0.170000 | 51.50 | 10.2 | 65 | 13.5 | QP | N | GND |
| 0.198000 | 49.30 | 10.2 | 64 | 14.4 | QP | N | GND |
| 0.222000 | 48.40 | 10.2 | 63 | 14.3 | QP | N | GND |
| 0.282000 | 43.60 | 10.2 | 61 | 17.2 | QP | N | GND |
| 0.286000 | 42.20 | 10.2 | 61 | 18.4 | QP | N | GND |

MEASUREMENT RESULT: "CTL150210685_fin2"

2/10/2015 5:09PM

| Frequency MHz | Level dB μ V | Transd dB | Limit dB μ V | Margin dB | Detector | Line | PE |
|------------------|---------------------|--------------|---------------------|--------------|----------|------|-----|
| 0.166000 | 37.20 | 10.2 | 55 | 18.0 | AV | N | GND |
| 0.170000 | 30.70 | 10.2 | 55 | 24.3 | AV | N | GND |
| 0.198000 | 36.70 | 10.2 | 54 | 17.0 | AV | N | GND |
| 0.222000 | 36.00 | 10.2 | 53 | 16.7 | AV | N | GND |
| 0.278000 | 33.50 | 10.2 | 51 | 17.4 | AV | N | GND |
| 0.530000 | 31.70 | 10.2 | 46 | 14.3 | AV | N | GND |

SCAN TABLE: "Voltage (9K-30M) FIN"
 Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL150210686_fin"

2/10/2015 5:13PM

| Frequency MHz | Level dB μ V | Transd dB | Limit dB μ V | Margin dB | Detector | Line | PE |
|------------------|---------------------|--------------|---------------------|--------------|----------|------|-----|
| 0.194000 | 47.90 | 10.2 | 64 | 16.0 | QP | L1 | GND |
| 0.198000 | 44.80 | 10.2 | 64 | 18.9 | QP | L1 | GND |
| 0.530000 | 44.10 | 10.2 | 56 | 11.9 | QP | L1 | GND |
| 0.620000 | 39.00 | 10.2 | 56 | 17.0 | QP | L1 | GND |
| 3.644000 | 39.60 | 10.4 | 56 | 16.4 | QP | L1 | GND |
| 3.998000 | 38.50 | 10.4 | 56 | 17.5 | QP | L1 | GND |

MEASUREMENT RESULT: "CTL150210686_fin2"

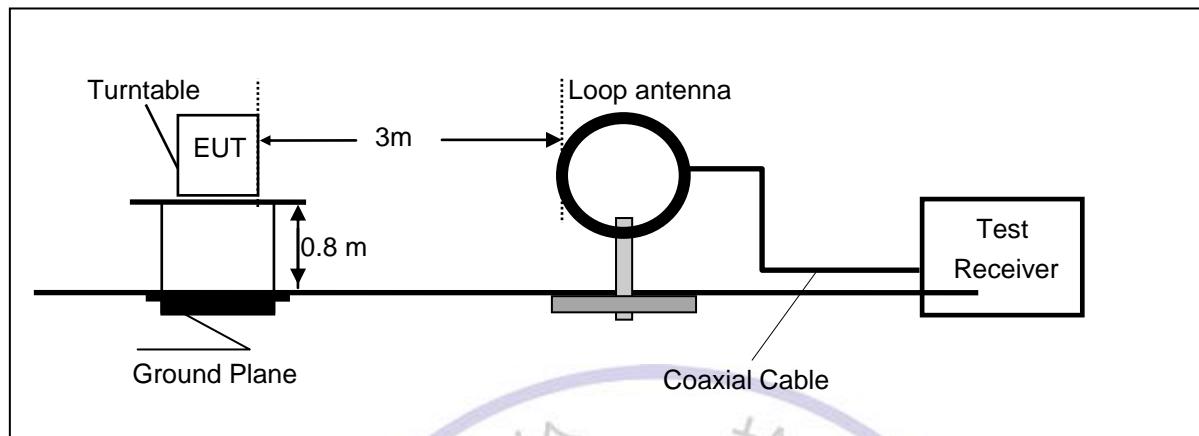
2/10/2015 5:13PM

| Frequency MHz | Level dB μ V | Transd dB | Limit dB μ V | Margin dB | Detector | Line | PE |
|------------------|---------------------|--------------|---------------------|--------------|----------|------|-----|
| 0.166000 | 38.30 | 10.2 | 55 | 16.9 | AV | L1 | GND |
| 0.194000 | 37.10 | 10.2 | 54 | 16.8 | AV | L1 | GND |
| 0.222000 | 35.40 | 10.2 | 53 | 17.3 | AV | L1 | GND |
| 0.530000 | 32.10 | 10.2 | 46 | 13.9 | AV | L1 | GND |
| 1.166000 | 7.40 | 10.3 | 46 | 38.6 | AV | L1 | GND |
| 1.502000 | 27.70 | 10.3 | 46 | 18.3 | AV | L1 | GND |

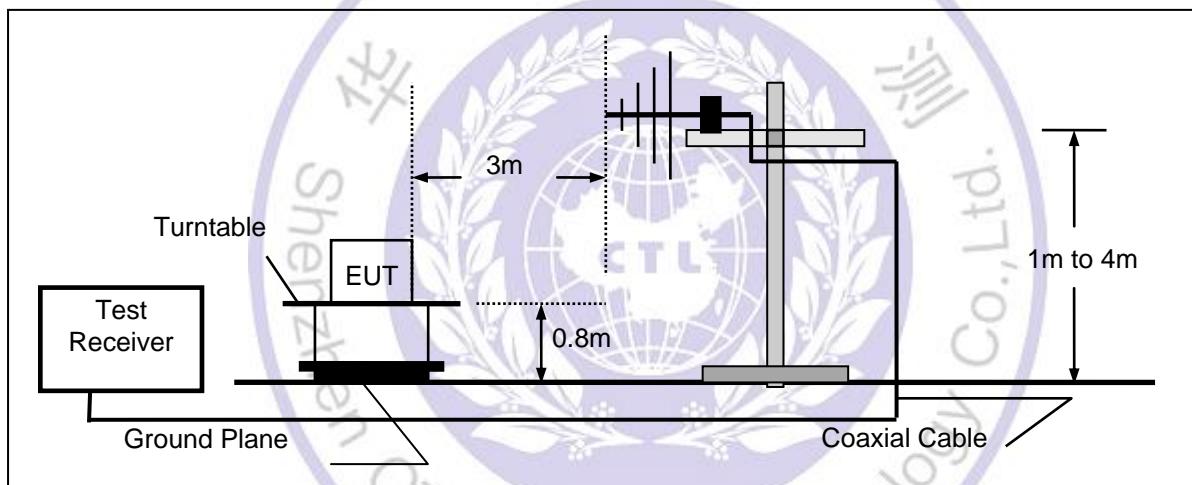
4.2. Radiated Emission

TEST CONFIGURATION

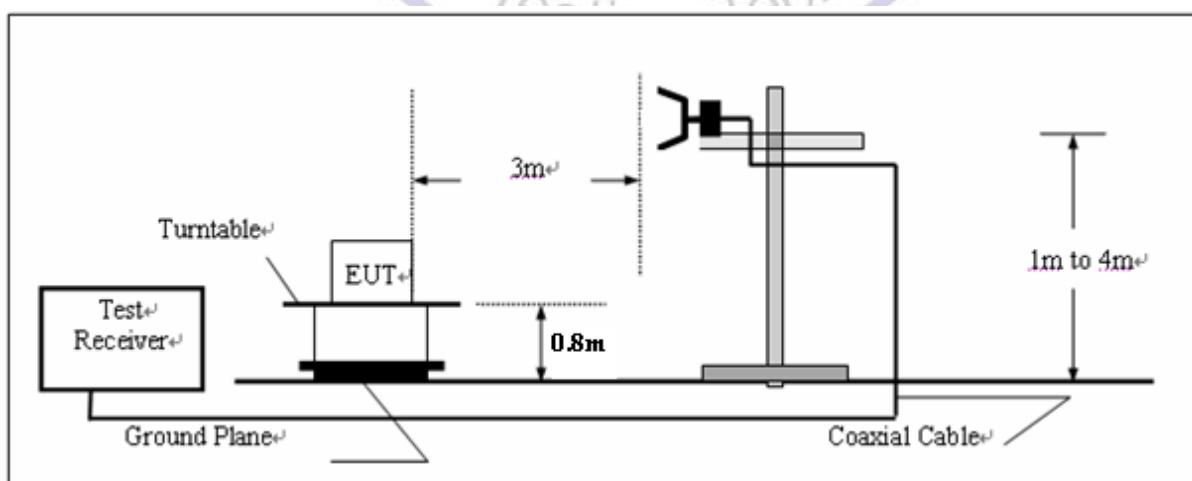
Radiated Emission Test Set-Up
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

- 1 The EUT was placed on a turn table which is 0.8m above ground plane.
- 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 fundamental frequency is 2400-2483.5MHz, So the radiation emissions frequency range were tested from 9KHz to 25GHz.

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 | |

For example

| Frequency (MHz) | FS (dB μ V/m) | RA (dB μ V/m) | AF (dB) | CL (dB) | AG (dB) | Transd (dB) |
|-----------------|-------------------|-------------------|---------|---------|---------|-------------|
| 300.00 | 40 | 58.1 | 12.2 | 1.6 | 31.90 | -18.1 |

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

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 the100kHz bandwidth within the band that contains the highest level of desired power.

| Frequency (MHz) | Distance (Meters) | Radiated (dB μ V/m) | Radiated (μ V/m) |
|-----------------|-------------------|-------------------------|-----------------------|
| 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

| CH | Antenna | Frequency (MHz) | Reading Level (dBuV/m) | Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|---------|-----------------|------------------------|-------------|------------------------|----------------|-------------|----------|
| 0 | H | 2402.1 | 64.5 | 31.2 | 95.7 | Fundamental | / | PK |
| | H | 256.1 | 11.7 | 16.4 | 28.1 | 46 | 17.9 | QP |
| | H | 307.2 | 7.0 | 19.3 | 26.3 | 46 | 19.7 | QP |
| | H | 3252.1 | 59.7 | -16.0 | 43.7 | 54(Note) | 10.3 | PK |
| | V | 4884.5 | 57.9 | -11.7 | 46.2 | 54(Note) | 7.8 | PK |
| | V | 7206.1 | 46.7 | -3.5 | 43.2 | 54(Note) | 10.8 | PK |
| | H | 24000 | 60.5 | -8.9 | 51.6 | 54(Note) | 2.4 | PK |
| 19 | H | 2440.9 | 63.7 | 31.2 | 94.9 | Fundamental | / | PK |
| | H | 283.1 | 17.2 | 18.9 | 36.1 | 46 | 9.9 | QP |
| | H | 307.2 | 4.5 | 20.6 | 25.1 | 46 | 20.9 | QP |
| | H | 3252.5 | 63.6 | -16.0 | 47.6 | 54(Note) | 6.4 | PK |
| | V | 4884.5 | 57.9 | -11.7 | 46.2 | 54(Note) | 7.8 | PK |
| | V | 7323 | 46.8 | -3.0 | 43.8 | 54(Note) | 10.2 | PK |
| | H | 24000 | 60.5 | -8.9 | 51.6 | 54(Note) | 2.4 | PK |
| 39 | H | 2480 | 64.1 | 31.2 | 95.3 | Fundamental | / | PK |
| | H | 241.8 | 16.6 | 14.7 | 31.3 | 46 | 14.7 | QP |
| | H | 371.1 | 9.0 | 18.4 | 27.4 | 46 | 18.6 | QP |
| | H | 3303.5 | 63.5 | -16.2 | 47.3 | 54(Note) | 6.7 | PK |
| | V | 4961 | 58.2 | -11.4 | 46.8 | 54(Note) | 7.2 | PK |
| | V | 7440 | 46.7 | -2.6 | 44.1 | 54(Note) | 9.9 | PK |
| | H | 24000 | 60.5 | -8.9 | 51.6 | 54(Note) | 2.4 | PK |

Note

1: The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

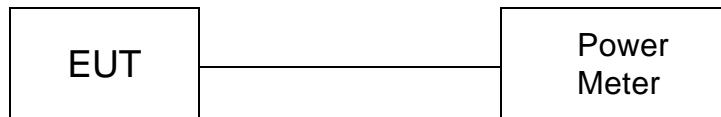
2: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

3: According to FCC Part15.247(d). Radiated emission which don't fall in the restricted bands, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

4. RBW 1MHz VBW 3MHz peak detector for PK value, RMS detector for AV value.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to C63.10 -2009 and KDB 558074 D01 v03r02, The EUT was directly connected to the power meter / spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

Use the wideband power meter to test peak power and record the result.

LIMIT

The Maximum Peak Output Power Measurement limit is 30dBm.

TEST RESULTS

| Channel Frequency (MHz) | Peak Power Output (dBm) | Peak Power Limit (dBm) | Pass / Fail |
|-------------------------|-------------------------|------------------------|-------------|
| 2402 | 0.66 | 30 | PASS |
| 2440 | 0.82 | 30 | PASS |
| 2480 | 1.47 | 30 | PASS |

Note: The test results including the cable loss.

4.4. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

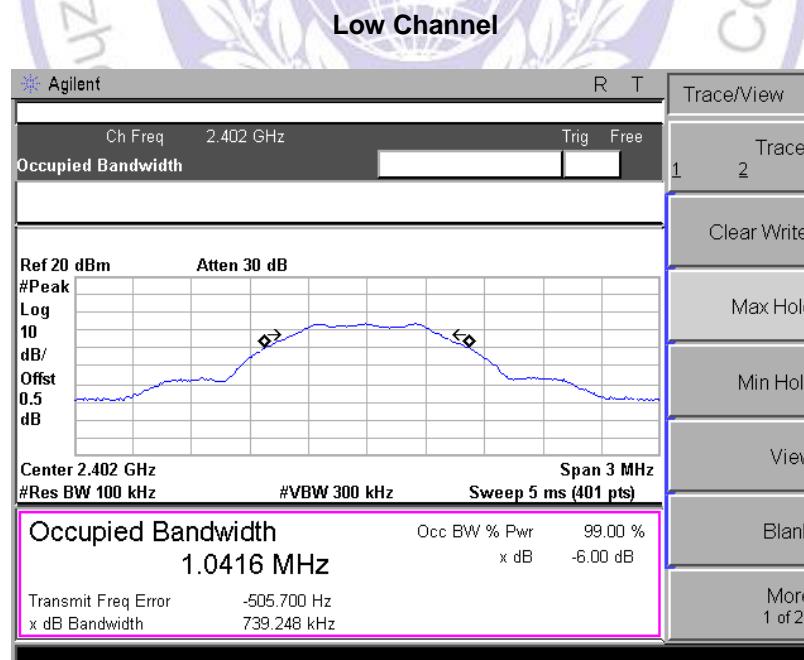
1. The testing follows FCC KDB Publication No. 558074 D01 v03r02 (Measurement Guidelines of DTS).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW. The 6 dB bandwidth must be greater than 500 kHz.
4. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

LIMIT

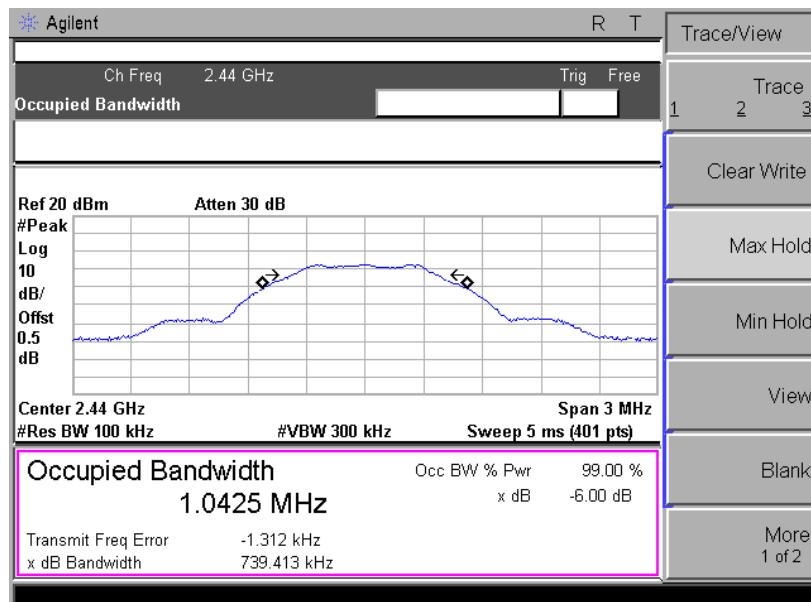
For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST RESULTS

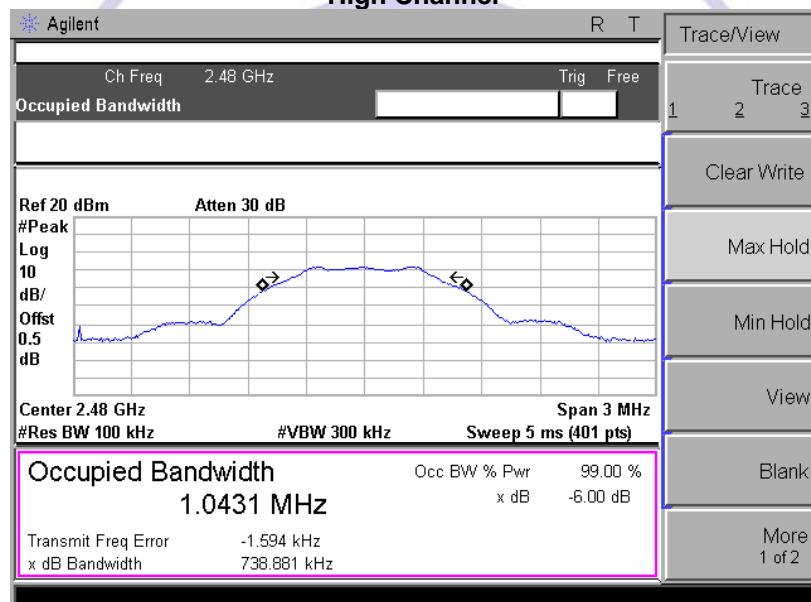
| CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (KHz) | LIMIT (KHz) | PASS/FAIL |
|-------------------------|---------------------|-------------|-----------|
| 2402 | 739.248 | 500 | PASS |
| 2440 | 739.413 | 500 | PASS |
| 2480 | 738.881 | 500 | PASS |



Middle Channel

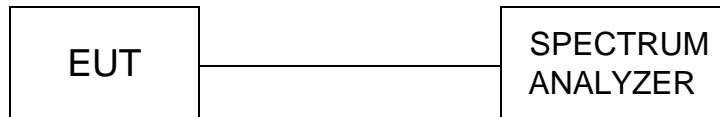


High Channel



4.5. Band Edge

TEST CONFIGURATION



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 and FCC KDB Publication No. 558074 D01 v03r02 (Measurement Guidelines of DTS) 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 VBM= 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100 kHz, to measure the conducted peak band edge.

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

- Span: Set Span for minimum 50 MHz - Reference Level: 110 dB μ V (corrected for gains and losses of test antenna factor, preamp gain and cable loss) - Attenuation: 10 dB
- Sweep Time: Coupled - Resolution Bandwidth: Up to and including 1 GHz = ≥ 100 kHz
- Resolution Bandwidth: Above 1 GHz = 1 MHz - Video Bandwidth: Below 1 GHz = 300 kHz
- Video Bandwidth: Up to and including 1 GHz = ≥ 3 MHz for peak and 10 Hz for average
- Detector: Peak

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.

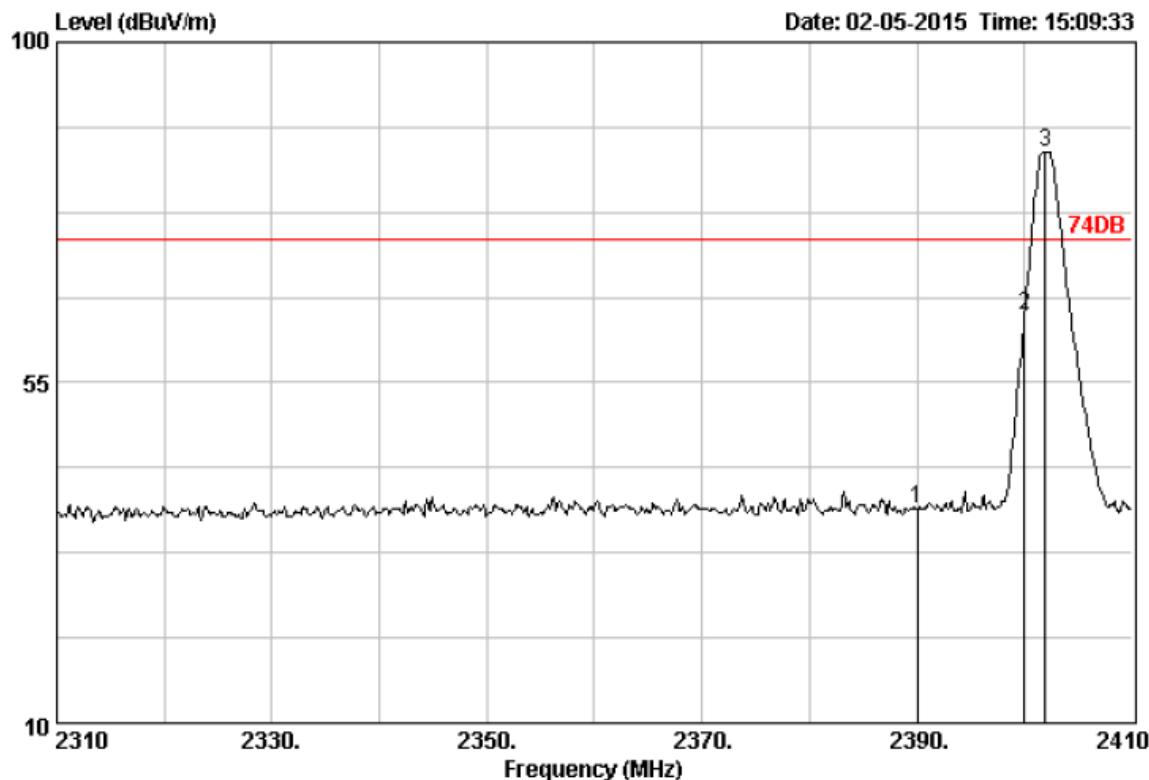
LIMIT

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(see Section 15.205(c)).

| Frequency (MHz) | Limit Average (dB μ V/m) | Limit Peak (dB μ V/m) |
|----------------------------|------------------------------|---------------------------|
| Below 2390 or Above 2483.5 | 54 | 74 |

TEST RESULTS

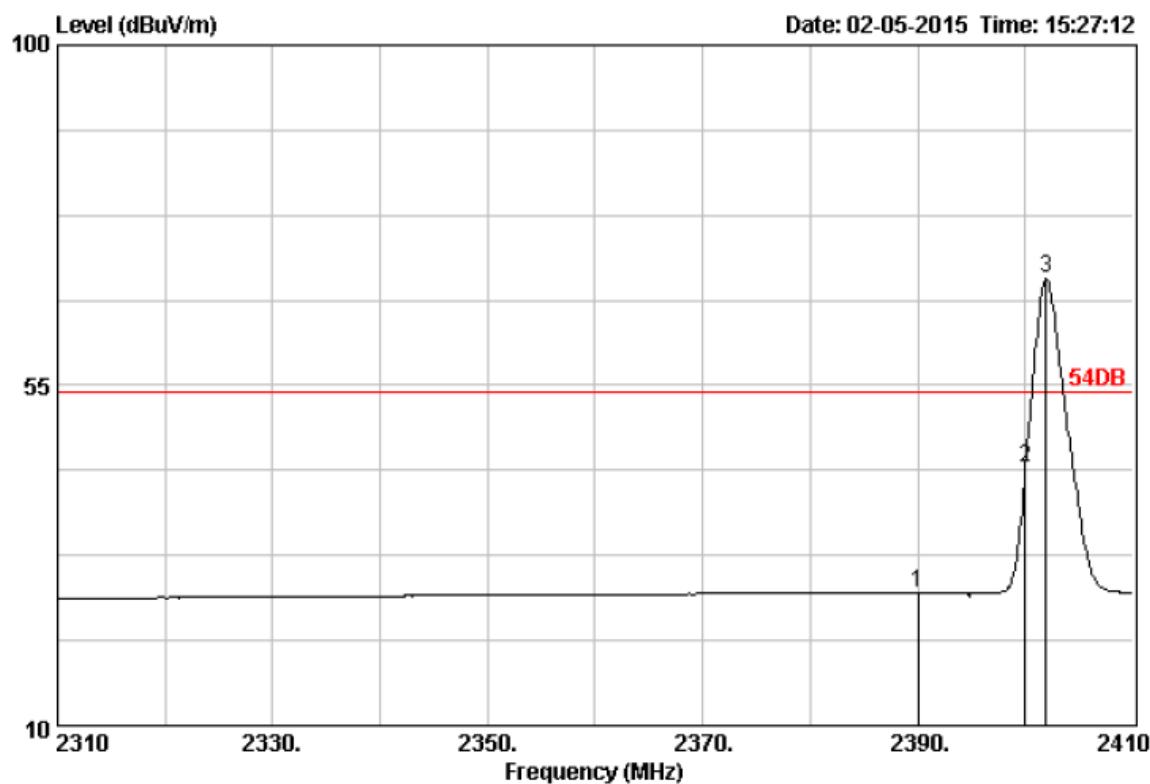
| | |
|-----------------------------------|----------------------|
| Engineer: Nice | Time: 2015/02/05 |
| Site: AC5 | |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: Horn_DRH-118 (1-18GHz) | Polarity: Horizontal |
| EUT: HANDSETS | Power: By Battery |
| Note: Transmit at channel 2402MHz | |



Site no. : 3m Chamber Data no. : 517
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 74DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

| Freq. (MHz) | Ant. Factor (dB) | Cable Loss (dB) | Reading (dBuV) | Emission | | | |
|----------------|------------------------|-----------------------|-------------------|-------------------|--------------------|----------------|--------|
| | | | | Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
| 1 2390.00 | 28.78 | 4.61 | 40.30 | 38.33 | 74.00 | 35.67 | Peak |
| 2 2400.00 | 28.78 | 4.61 | 65.87 | 63.90 | 74.00 | 10.10 | Peak |
| 3 2401.90 | 28.78 | 4.61 | 87.54 | 85.57 | 74.00 | -11.57 | Peak |

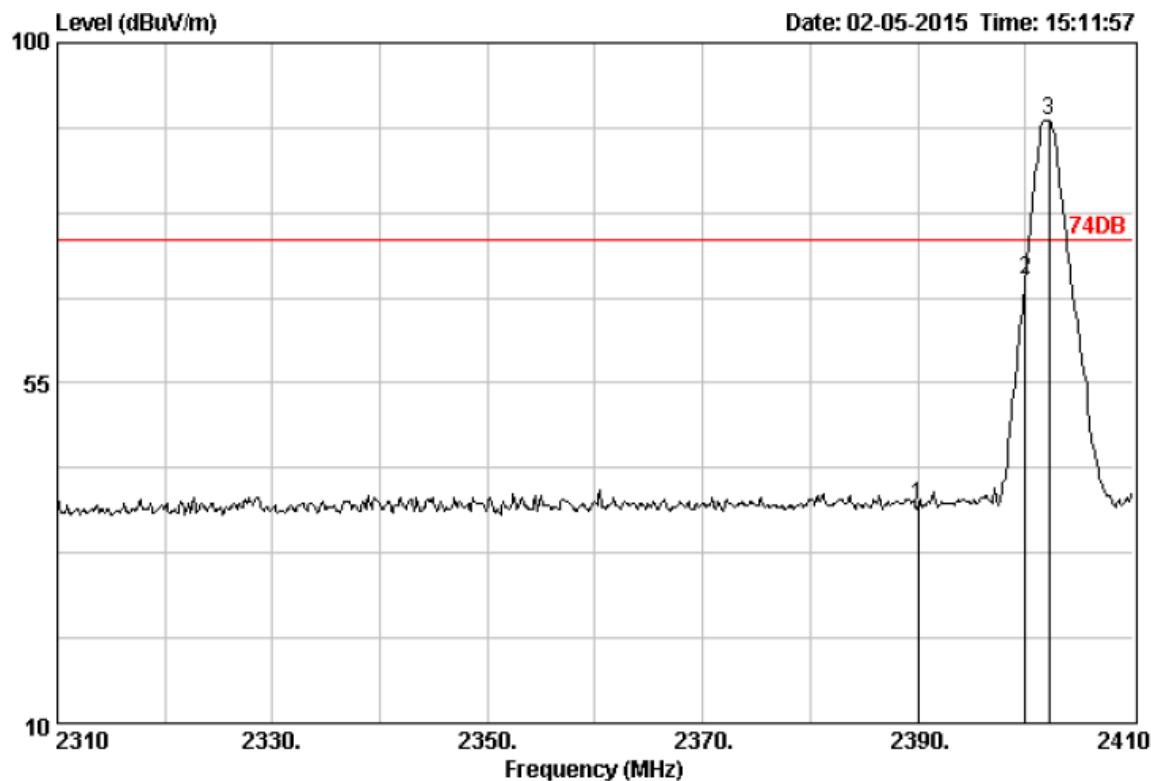
| | |
|-----------------------------------|----------------------|
| Engineer: Nice | |
| Site: AC5 | Time: 2015/02/05 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: Horn_DRH-118 (1-18GHz) | Polarity: Horizontal |
| EUT: HANDSETS | Power: By Battery |
| Note: Transmit at channel 2402MHz | |



Site no. : 3m Chamber Data no. : 520
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 54DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

| Freq. (MHz) | Ant. Factor (dB) | Cable Loss (dB) | Emission | | | | |
|----------------|------------------------|-----------------------|-------------------|-------------------|--------------------|----------------|---------|
| | | | Reading (dBuV) | Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
| <hr/> | | | | | | | |
| 1 2390.00 | 28.78 | 4.61 | 29.53 | 27.56 | 54.00 | 26.44 | Average |
| 2 2400.00 | 28.78 | 4.61 | 46.03 | 44.06 | 54.00 | 9.94 | Average |
| 3 2401.90 | 28.78 | 4.61 | 71.16 | 69.19 | 54.00 | -15.19 | Average |

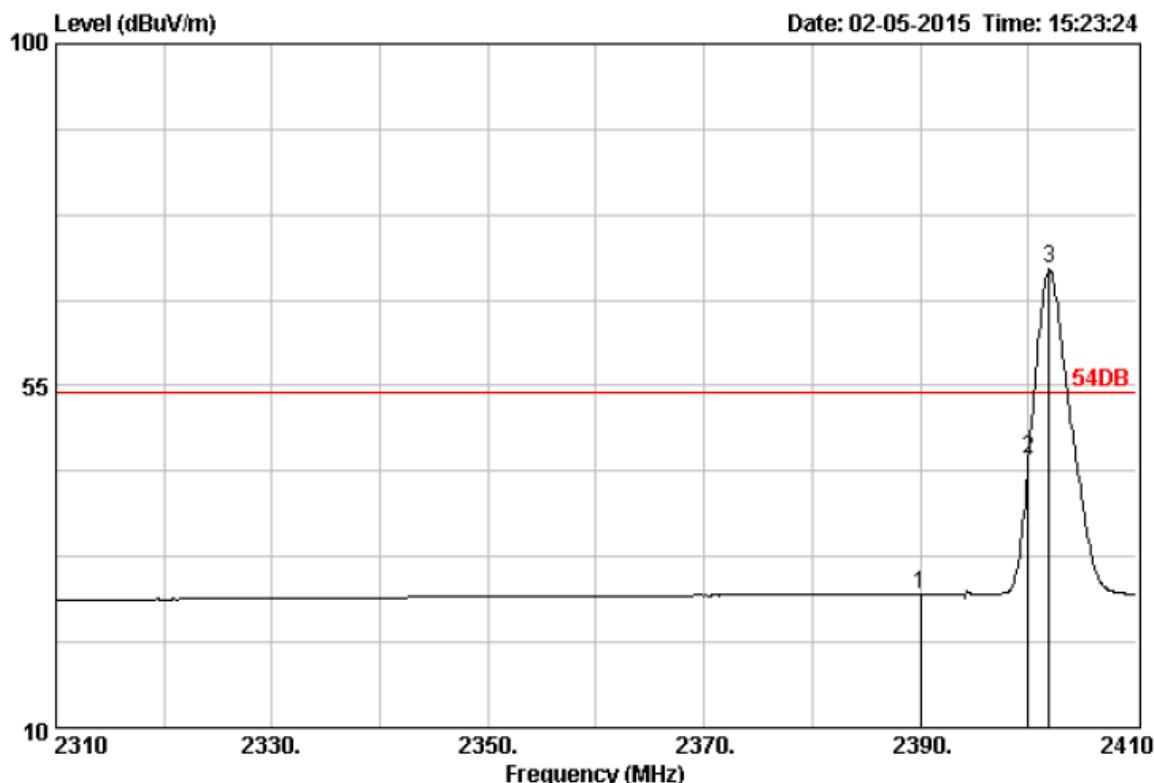
| | |
|-----------------------------------|--------------------|
| Engineer: Nice | |
| Site: AC5 | Time: 2015/02/05 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: Horn_DRH-118 (1-18GHz) | Polarity: Vertical |
| EUT: HANDSETS | Power: By Battery |
| Note: Transmit at channel 2402MHz | |



Site no. : 3m Chamber Data no. : 518
Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
Limit : 74DB
Env. / Ins. : 23°C/54%
Engineer :
EUT :
Power :
M/N :
Test Mode :

| Freq. (MHz) | Factor (dB) | Loss (dB) | Reading (dBuV) | Emission | | | | Remark |
|----------------|----------------|--------------|-------------------|-------------------|--------------------|----------------|------|--------|
| | | | | Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | | |
| 1 2390.00 | 28.78 | 4.61 | 40.73 | 38.76 | 74.00 | 35.24 | Peak | |
| 2 2400.00 | 28.78 | 4.61 | 70.56 | 68.59 | 74.00 | 5.41 | Peak | |
| 3 2402.20 | 28.78 | 4.61 | 91.80 | 89.83 | 74.00 | -15.83 | Peak | |

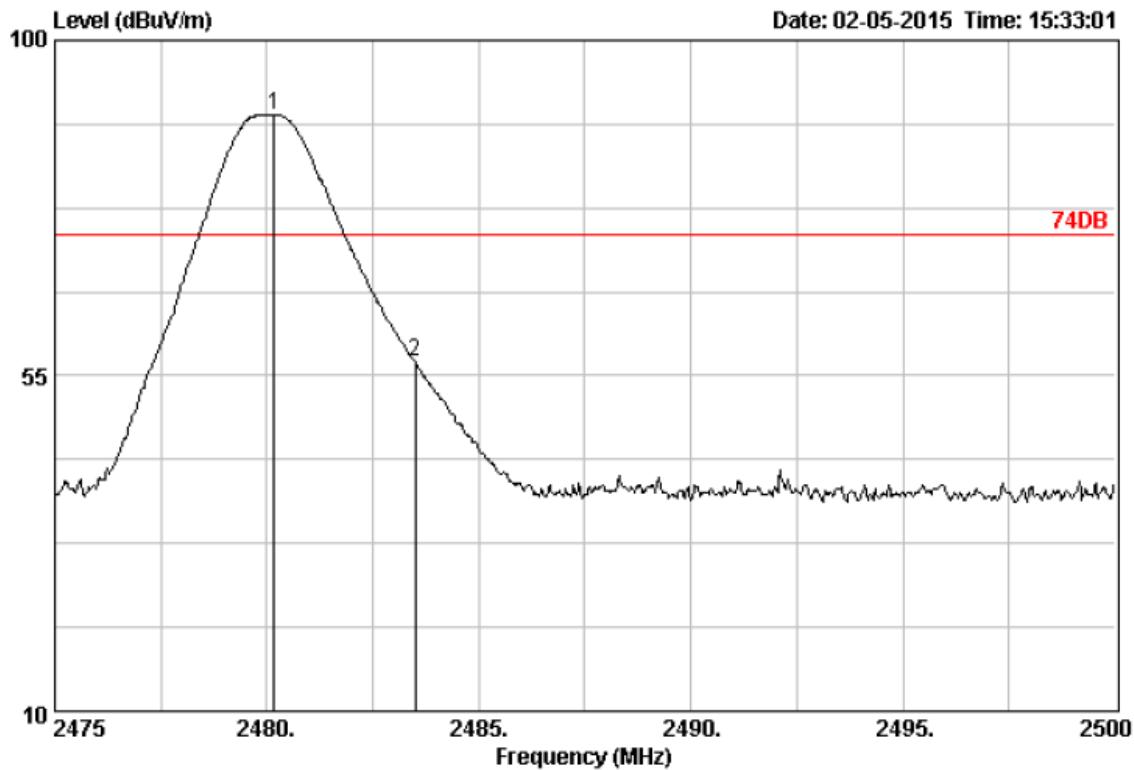
| | |
|-----------------------------------|--------------------|
| Engineer: Nice | |
| Site: AC5 | Time: 2015/02/05 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: Horn_3117_988(1-18GHz) | Polarity: Vertical |
| EUT: HANDSETS | Power: By Battery |
| Note: Transmit at channel 2402MHz | |



Site no. : 3m Chamber Data no. : 519
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 54DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

| Freq. (MHz) | Ant. Factor (dB) | Cable Loss (dB) | Emission | | | | |
|----------------|------------------------|-----------------------|-------------------|-------------------|--------------------|----------------|---------|
| | | | Reading (dBuV) | Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
| <hr/> | | | | | | | |
| 1 2390.00 | 28.78 | 4.61 | 29.52 | 27.55 | 54.00 | 26.45 | Average |
| 2 2400.00 | 28.78 | 4.61 | 47.24 | 45.27 | 54.00 | 8.73 | Average |
| 3 2401.90 | 28.78 | 4.61 | 72.32 | 70.35 | 54.00 | -16.35 | Average |

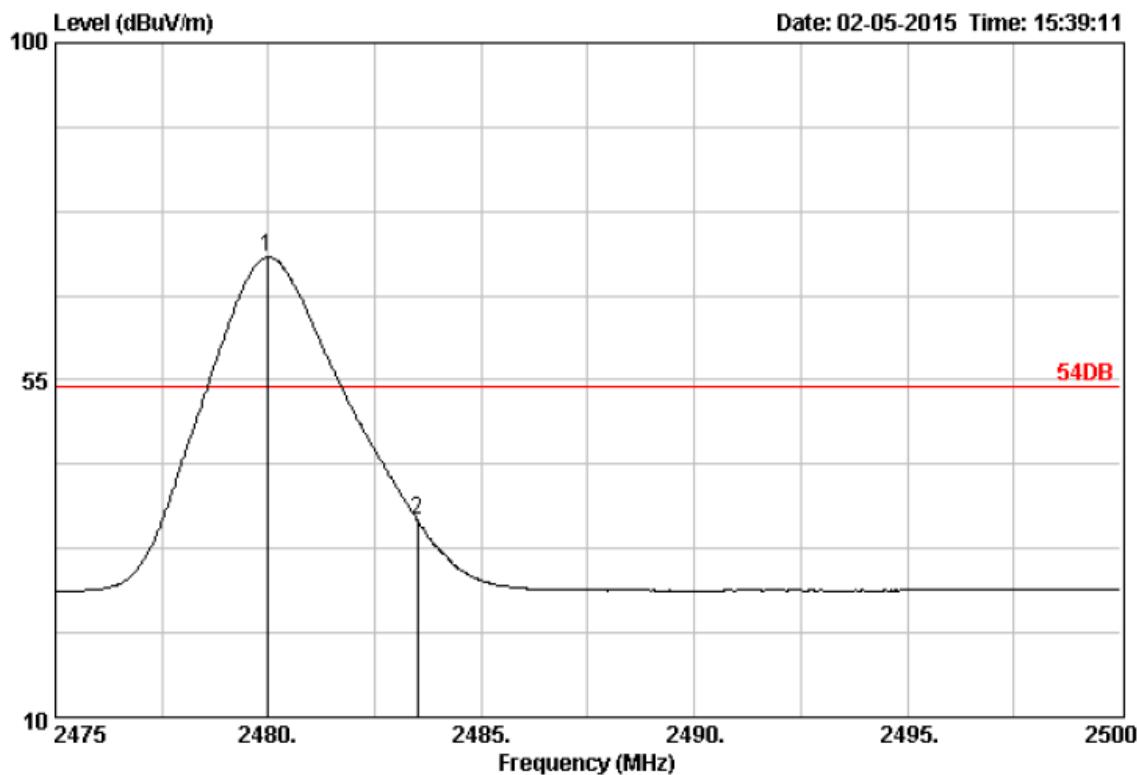
| | |
|-----------------------------------|----------------------|
| Engineer: Nice | |
| Site: AC5 | Time: 2015/02/05 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: Horn_DRH-118 (1-18GHz) | Polarity: Horizontal |
| EUT: HANDSETS | Power: By Battery |
| Note: Transmit at channel 2480MHz | |



Site no. : 3m Chamber Data no. : 523
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 74DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

| Freq. (MHz) | Ant. Factor (dB) | Cable Loss (dB) | Emission | | | | |
|----------------|------------------------|-----------------------|-------------------|-------------------|--------------------|----------------|--------|
| | | | Reading (dBuV) | Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
| <hr/> | | | | | | | |
| 1 2480.18 | 28.93 | 4.70 | 91.77 | 90.02 | 74.00 | -16.02 | Peak |
| 2 2483.50 | 28.93 | 4.70 | 58.56 | 56.81 | 74.00 | 17.19 | Peak |

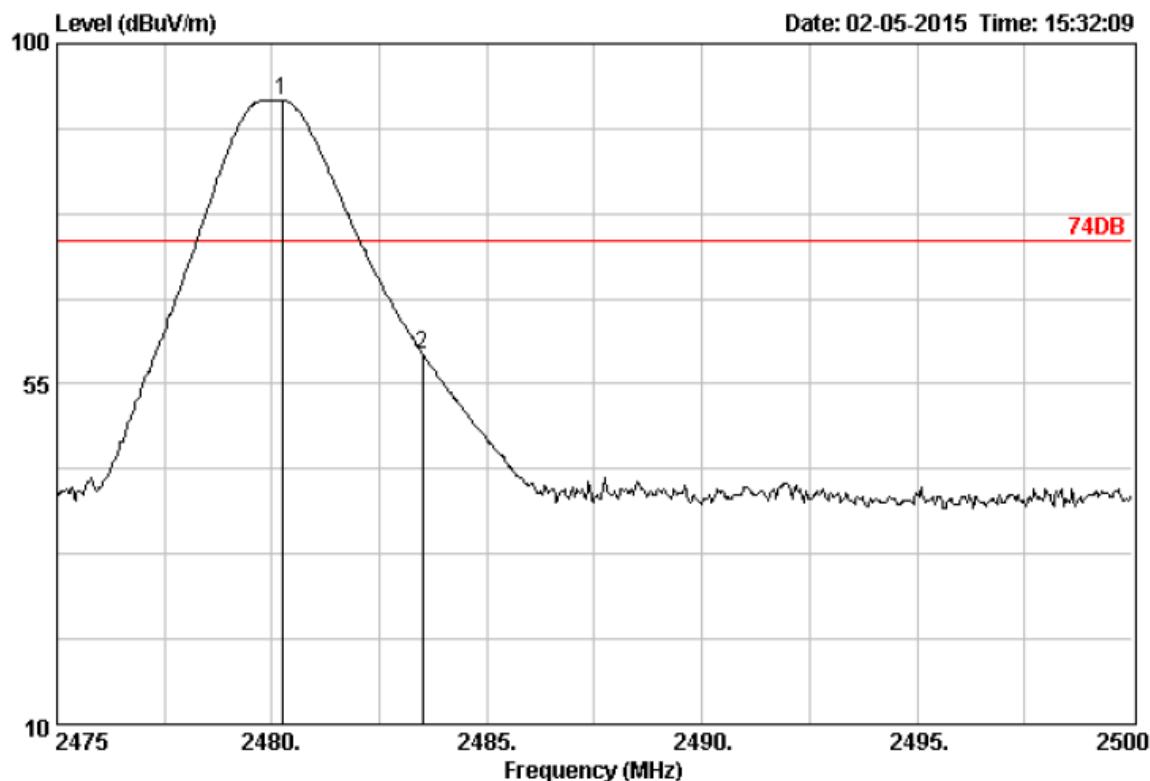
| | |
|-----------------------------------|----------------------|
| Engineer: Nice | |
| Site: AC5 | Time: 2015/02/05 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: Horn_DRH-118 (1-18GHz) | Polarity: Horizontal |
| EUT: HANDSETS | Power: By Battery |
| Note: Transmit at channel 2480MHz | |



Site no. : 3m Chamber Data no. : 525
 Dis. / Ant. : 3m DRH-118 Ant. pol. : HORIZONTAL
 Limit : 54DB
 Env. / Ins. : 23*C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

| Freq. (MHz) | Ant. Factor (dB) | Cable Loss (dB) | Emission | | | | | Remark |
|----------------|------------------------|-----------------------|-------------------|-------------------|--------------------|----------------|---------|--------|
| | | | Reading (dBuV) | Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | | |
| 1 2479.98 | 28.93 | 4.70 | 73.16 | 71.41 | 54.00 | -17.41 | Average | |
| 2 2483.50 | 28.93 | 4.70 | 38.01 | 36.26 | 54.00 | 17.74 | Average | |

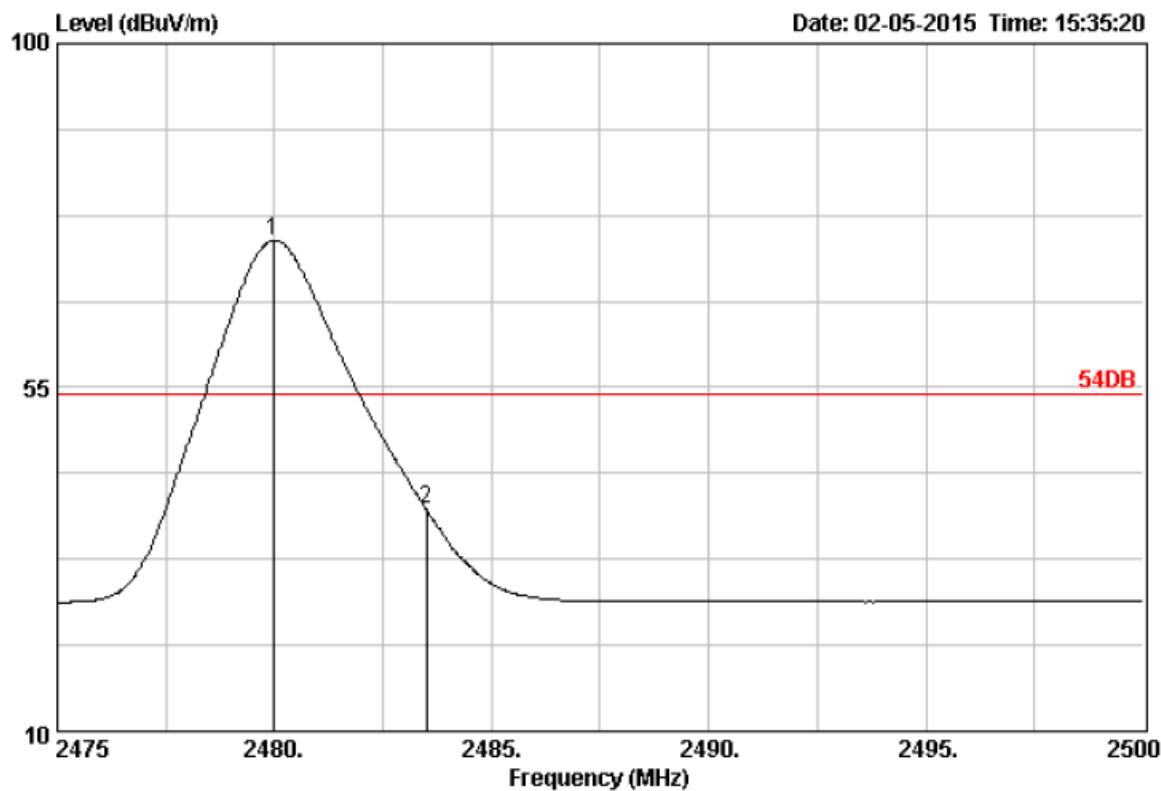
| | |
|-----------------------------------|--------------------|
| Engineer: Nice | |
| Site: AC5 | Time: 2015/02/05 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: Horn_DRH-118 (1-18GHz) | Polarity: Vertical |
| EUT: HANDSETS | Power: By Battery |
| Note: Transmit at channel 2480MHz | |



Site no. : 3m Chamber Data no. : 522
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 74DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

| Freq. (MHz) | Ant. Factor (dB) | Cable Loss (dB) | Reading (dBuV) | Emission | | | |
|----------------|------------------------|-----------------------|-------------------|-------------------|--------------------|----------------|--------|
| | | | | Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
| <hr/> | | | | | | | |
| 1 2480.23 | 28.93 | 4.70 | 94.27 | 92.52 | 74.00 | -18.52 | Peak |
| 2 2483.50 | 28.93 | 4.70 | 60.66 | 58.91 | 74.00 | 15.09 | Peak |

| | |
|-----------------------------------|--------------------|
| Engineer: Nice | |
| Site: AC5 | Time: 2015/02/05 |
| Limit: FCC_Part15.209_RE(3m) | Margin: 0 |
| Probe: Horn_DRH-118 (1-18GHz) | Polarity: Vertical |
| EUT: HANDSETS | Power: By Battery |
| Note: Transmit at channel 2480MHz | |

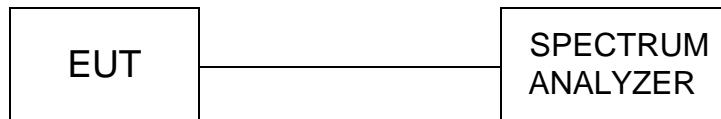


Site no. : 3m Chamber Data no. : 524
 Dis. / Ant. : 3m DRH-118 Ant. pol. : VERTICAL
 Limit : 54DB
 Env. / Ins. : 23°C/54%
 Engineer :
 EUT :
 Power :
 M/N :
 Test Mode :

| Freq. (MHz) | Ant. Factor (dB) | Cable Loss (dB) | Reading (dBuV) | Emission | | | Remark |
|----------------|------------------------|-----------------------|-------------------|-------------------|--------------------|----------------|---------|
| | | | | Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | |
| 1 2479.98 | 28.93 | 4.70 | 76.04 | 74.29 | 54.00 | -20.29 | Average |
| 2 2483.50 | 28.93 | 4.70 | 40.73 | 38.98 | 54.00 | 15.02 | Average |

4.6. Power Spectral Density Measurement

TEST CONFIGURATION



TEST PROCEDURE

The EUT was tested according to KDB 558074 D01 v03r02 for compliance to FCC 47CFR 15.247 requirements.

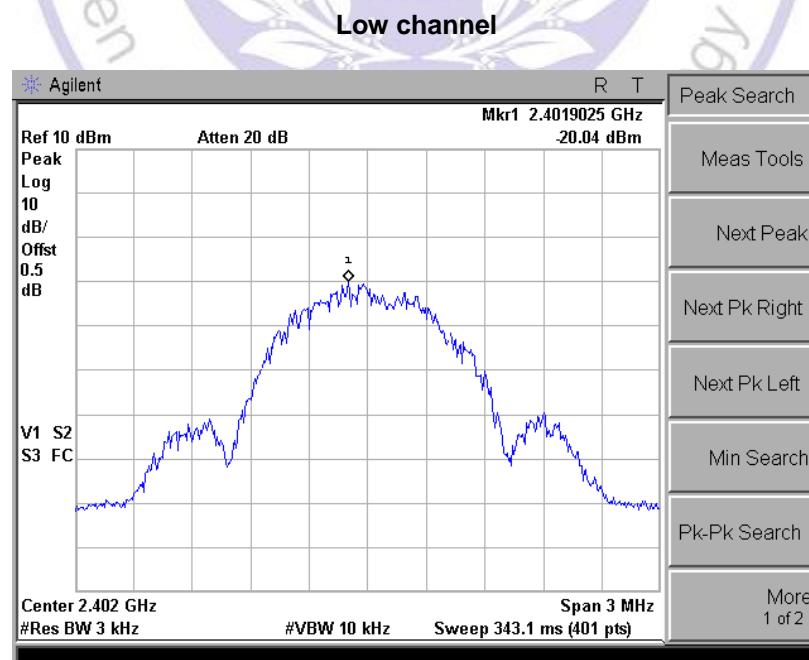
Set RBW= 3 kHz, VBW \geq 10KHz, SPAN to 1.5 times greater than the EBW,.

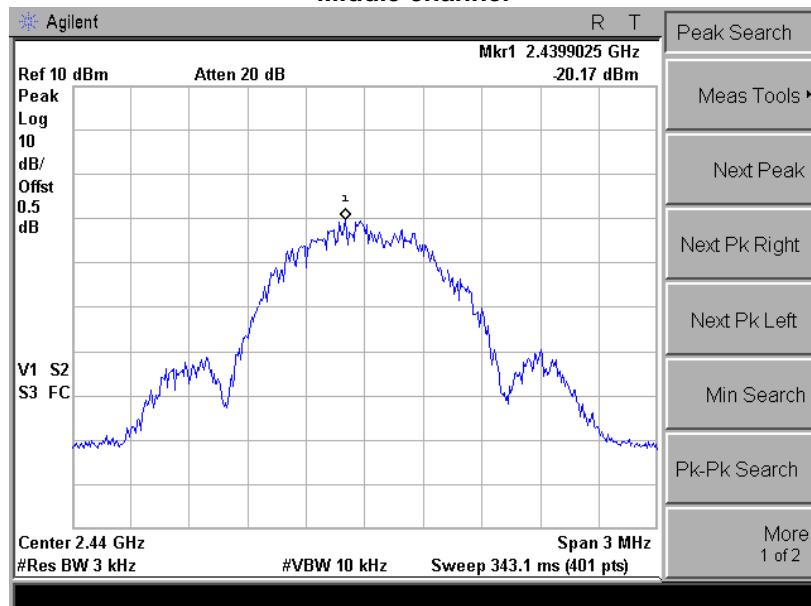
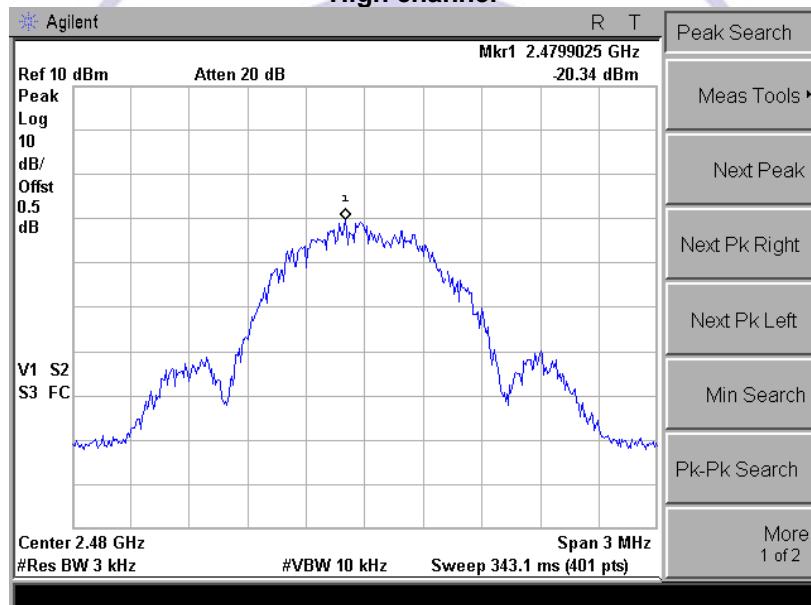
LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST RESULTS

| Modulation Mode | Channel | Channel Frequency (MHz) | PSD (dBm/3KHz) | Maximum limit (dBm/3KHz) | PASS / FAIL |
|-----------------|---------|-------------------------|----------------|--------------------------|-------------|
| GFSK | 1 | 2402 | -20.04 | 8 | PASS |
| | 19 | 2440 | -20.17 | 8 | PASS |
| | 39 | 2480 | -20.34 | 8 | PASS |



Middle channel**High channel**

4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

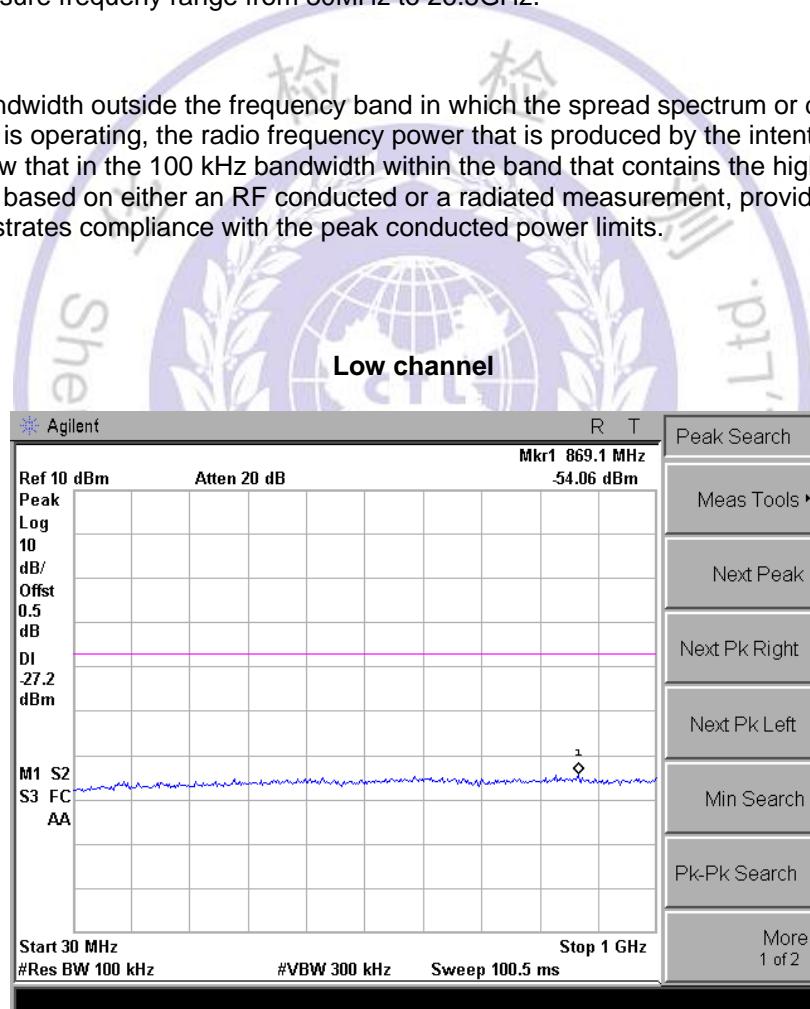
The EUT was tested according to KDB 558074 D01 v03r02 for compliance to FCC 47CFR 15.247 requirements.

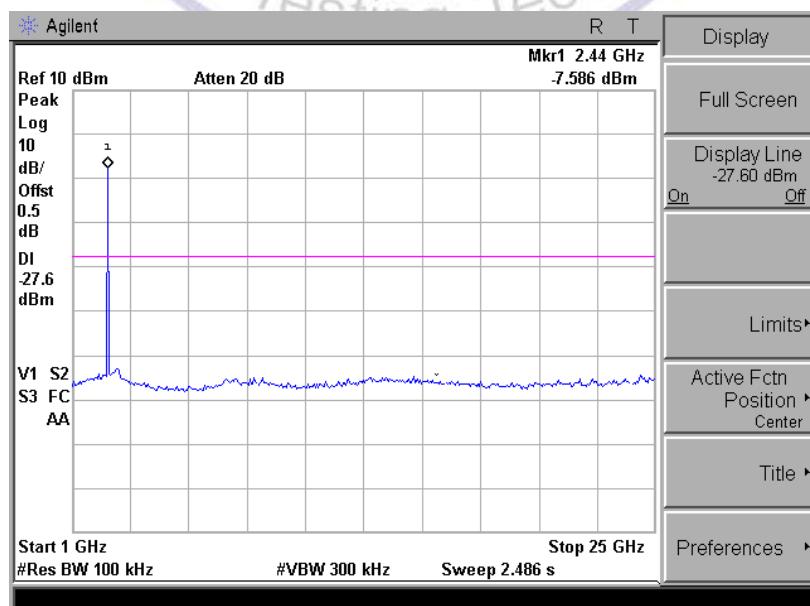
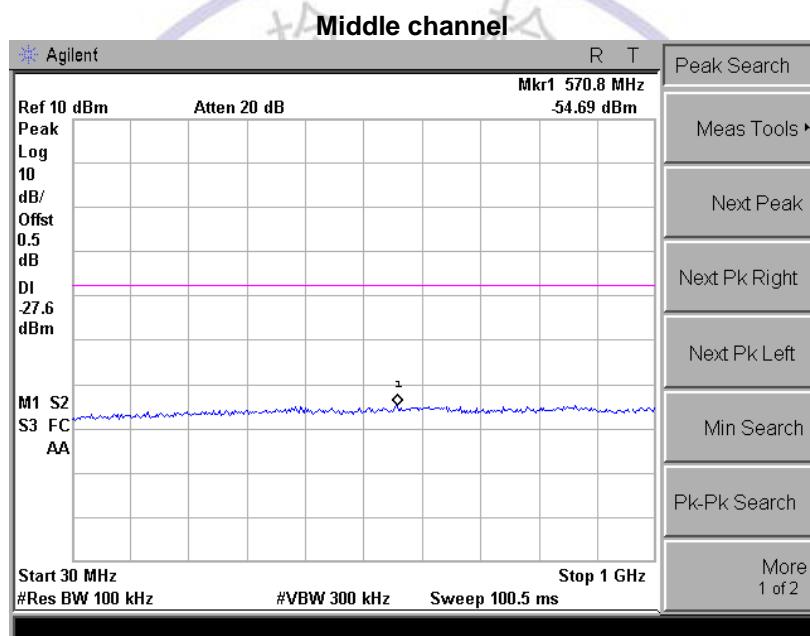
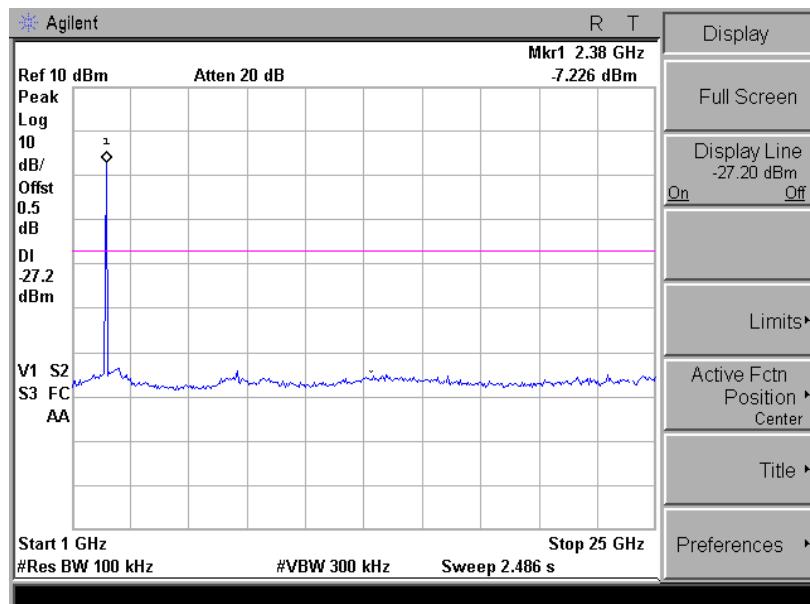
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and measure frequeny range from 30MHz to 26.5GHz.

LIMIT

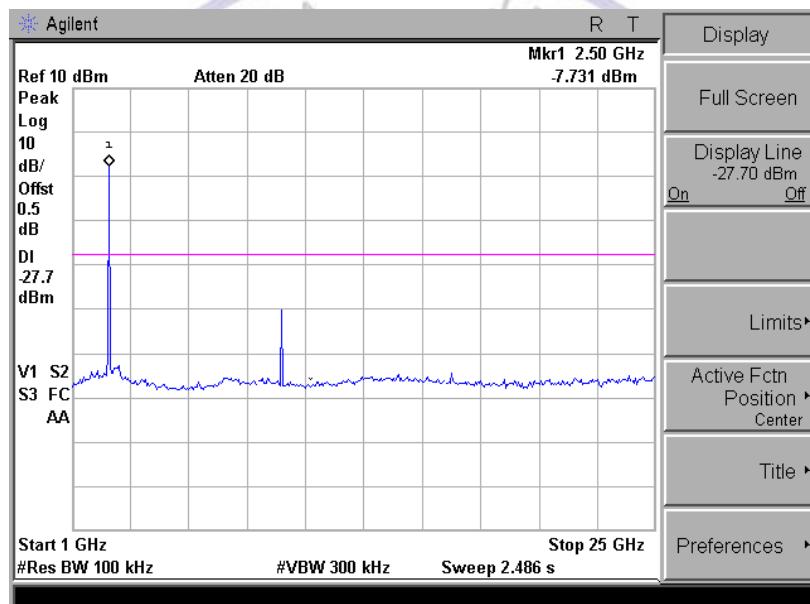
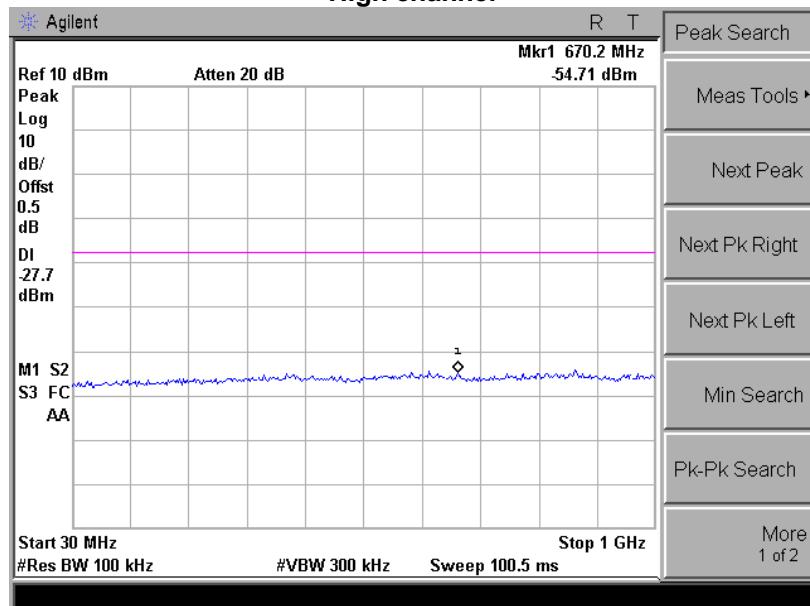
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

TEST RESULTS



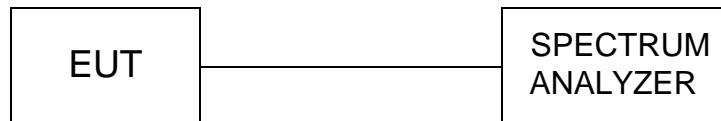


High channel



4.8. Operation Frequency Range of 20dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

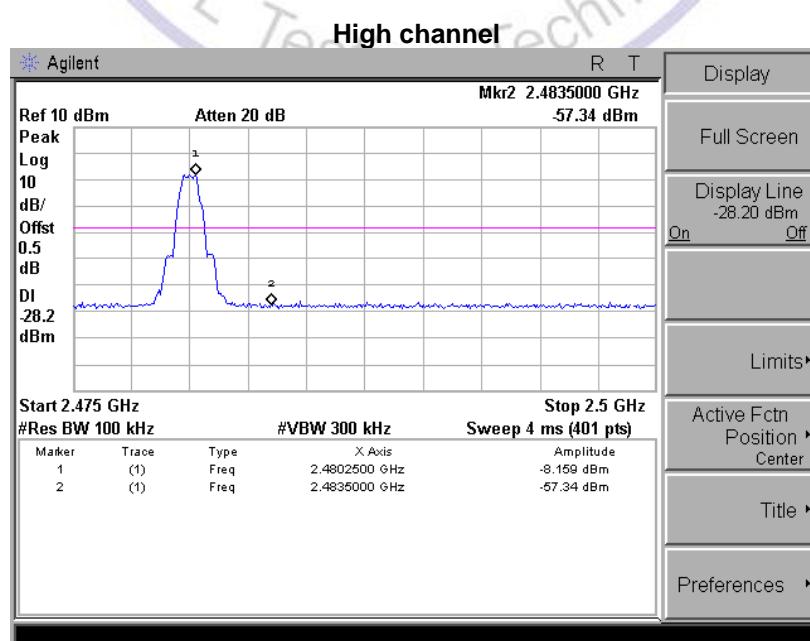
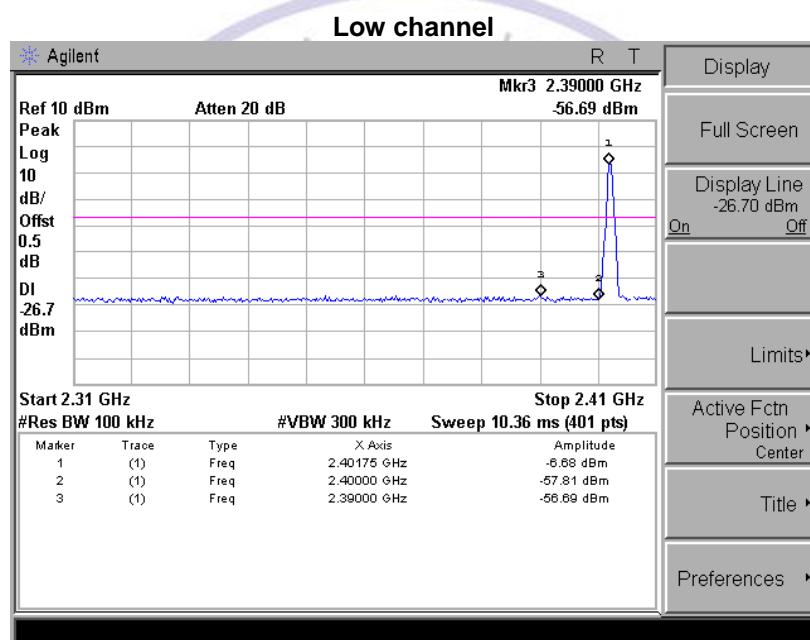
The EUT was tested according to KDB 558074 D01 v03r02 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

LIMIT

20 dB bandwidth of the emission is contained within the operation frequency band.

TEST RESULTS



4.9. Antenna Requirement

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.

Refer to statement below for compliance.

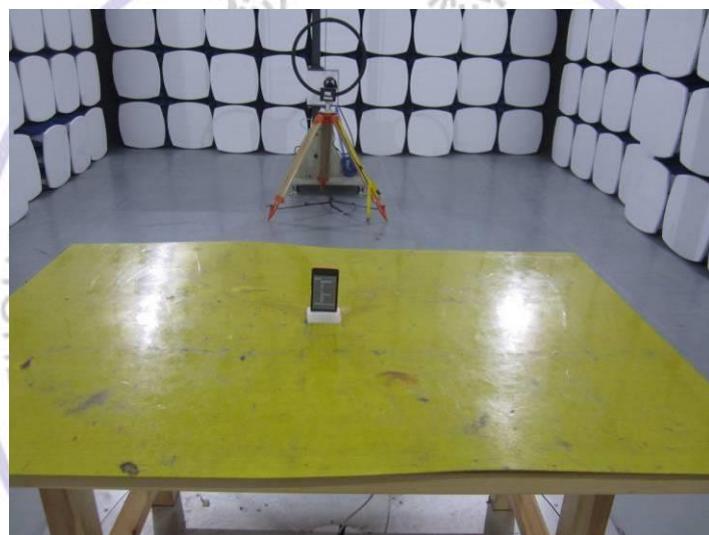
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

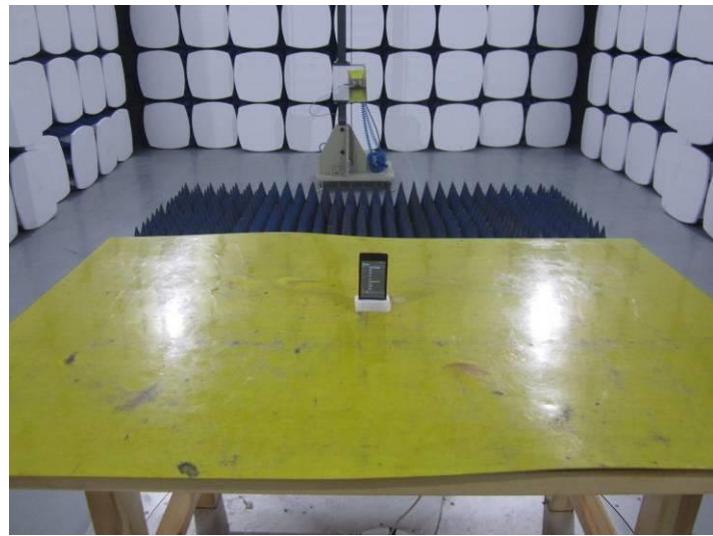
Antenna Connected Construction

The antenna used in this product is a internal Antenna, The directional gains of antenna used for transmitting is 0.84 dBi.



5. Test Setup Photos of the EUT





6. External and Internal Photos of the EUT

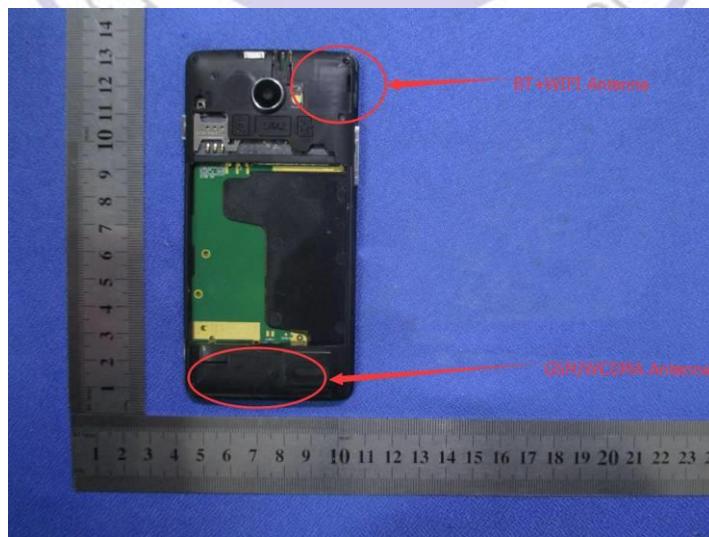
External Photos of EUT

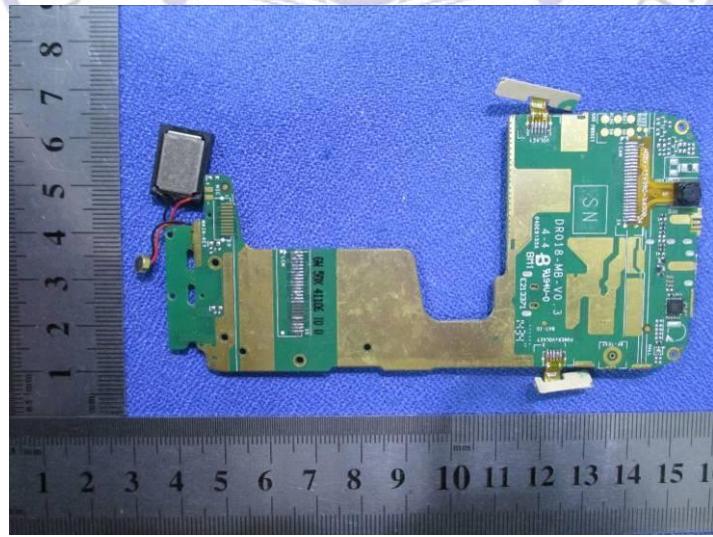
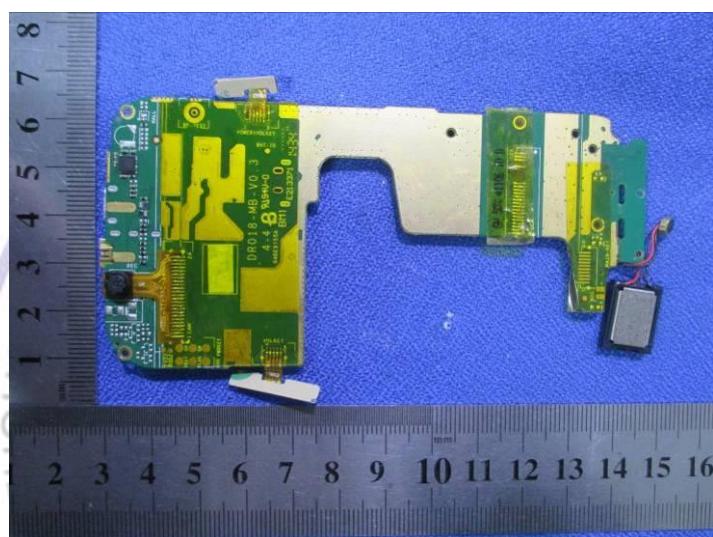


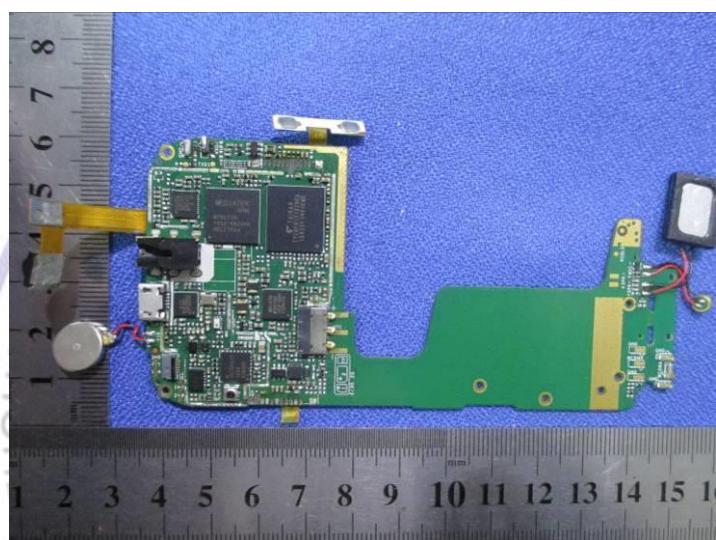
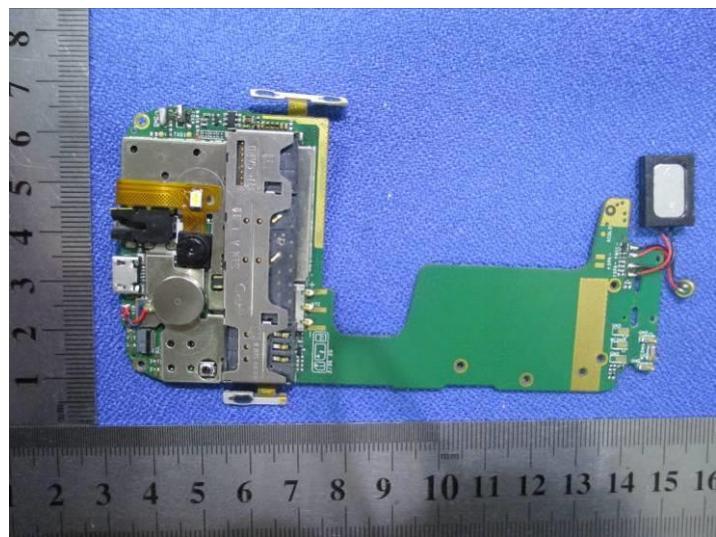




Internal Photos of EUT







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