



FCC TEST REPORT

REPORT NO.: 070208FIA01

MODEL NO.: AU500

RECEIVED: Feb. 12, 2007

TESTED: Feb. 12 ~ Mar. 10, 2007

ISSUED: Mar. 10, 2007

APPLICANT: Austar technology (Hang zhou) Co., Ltd.

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V 1.0



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1. CERTIFICATION

PRODUCT: Bluetooth Car kit

MODEL NO.: AU500

BRAND NAME: Austar

APPLICANT: Austar technology (Hang zhou) Co., Ltd.

TESTED: Feb. 12 ~ Mar. 10, 2007

TEST ITEM: Engineering Sample

STANDARDS: FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-2003

We, **ADT (Shanghai) Corporation**, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

TECHNICAL ACCEPTANCE : *Bright Tong* , **DATE:** MAR. 10, 2007
Bright Tong
Engineering Supervisor

APPROVED BY :  , **DATE:** MAR. 10, 2007
Wallace Pan
Director of Operations

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC Part 15, Subpart C | | | |
|--|---|--------|--|
| STANDARD SECTION | TEST TYPE AND LIMIT | RESULT | REMARK |
| 15.207 | AC Power Conducted Emission | N/A | |
| 15.247(a)(1) (iii) | Number of Hopping Frequency Used Spec.: At least 15 channels | PASS | Meet the requirement of limit. |
| 15.247(a)(1) (iii) | Dwell Time on Each Channel Spec.: Max. 0.4 second within 31.6 second | PASS | Meet the requirement of limit. |
| 15.247(a)(1) | 1. Hopping Channel Separation Spec. : Min. 25 kHz or two-thirds of 20 dB bandwidth, whichever is greater 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System | PASS | Meet the requirement of limit. |
| 15.247(b) | Maximum Peak Output Power Spec.: max. 1W | PASS | Meet the requirement of limit. |
| 15.247(d) | Transmitter Radiated Emissions Spec.: Table 15.209 | PASS | Meet the requirement of limit. Minimum passing margin is -0.52dB at 55.75MHz. |
| 15.247(d) | Band Edge Measurement | PASS | Meet the requirement of limit. |

Note: If the Frequency Hopping System operating in 2400-2483.5 MHz band and the output power less than 125mW. The hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20dB bandwidth of hopping channel, whichever is greater.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

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

| MEASUREMENT | FREQUENCY | UNCERTAINTY |
|---------------------|-----------------|-------------|
| Conducted emissions | 9kHz ~ 30MHz | 2.44 dB |
| Radiated emissions | 30MHz ~ 200MHz | 3.73 dB |
| | 200MHz ~1000MHz | 3.74 dB |
| | 1GHz ~ 18GHz | 2.20 dB |
| | 18GHz ~ 40GHz | 1.88 dB |

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

| | |
|-------------------------------|---|
| PRODUCT | Bluetooth Car kit |
| MODEL NO. | AU500 |
| POWER SUPPLY | 12Vdc from battery |
| POWER ADAPTER SUPPLIED | Cable out: 1.5m, non-shielded, non-detachable |
| MODULATION TYPE | GFSK |
| RADIO TECHNOLOGY | FHSS |
| TRANSFER RATE | 3Mbps |
| FREQUENCY RANGE | 2400 ~ 2483.5 MHz |
| NUMBER OF CHANNEL | 79 |
| OUTPUT POWER | 1.276mW |
| ANTENNA TYPE | Printed |
| ANTENNA GAIN | -10dBi |
| DATA CABLE | N/A |
| I/O PORTS | Refer to user's manual |
| ASSOCIATED DEVICES | N/A |

NOTE: The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

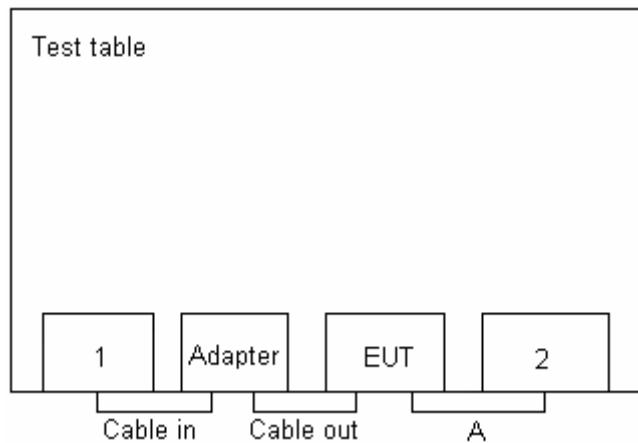
3.2 DESCRIPTION OF TEST MODES

79 channels are provided to this EUT:

| CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) | CHANNEL | FREQ. (MHz) |
|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
| 0 | 2402 | 20 | 2422 | 40 | 2442 | 60 | 2462 |
| 1 | 2403 | 21 | 2423 | 41 | 2443 | 61 | 2463 |
| 2 | 2404 | 22 | 2424 | 42 | 2444 | 62 | 2464 |
| 3 | 2405 | 23 | 2425 | 43 | 2445 | 63 | 2465 |
| 4 | 2406 | 24 | 2426 | 44 | 2446 | 64 | 2466 |
| 5 | 2407 | 25 | 2427 | 45 | 2447 | 65 | 2467 |
| 6 | 2408 | 26 | 2428 | 46 | 2448 | 66 | 2468 |
| 7 | 2409 | 27 | 2429 | 47 | 2449 | 67 | 2469 |
| 8 | 2410 | 28 | 2430 | 48 | 2450 | 68 | 2470 |
| 9 | 2411 | 29 | 2431 | 49 | 2451 | 69 | 2471 |
| 10 | 2412 | 30 | 2431 | 50 | 2452 | 70 | 2472 |
| 11 | 2413 | 31 | 2433 | 51 | 2453 | 71 | 2473 |
| 12 | 2414 | 32 | 2434 | 52 | 2454 | 72 | 2474 |
| 13 | 2415 | 33 | 2435 | 53 | 2455 | 73 | 2475 |
| 14 | 2416 | 34 | 2436 | 54 | 2456 | 74 | 2476 |
| 15 | 2417 | 35 | 2437 | 55 | 2457 | 75 | 2477 |
| 16 | 2418 | 36 | 2438 | 56 | 2458 | 76 | 2478 |
| 17 | 2419 | 37 | 2439 | 57 | 2459 | 77 | 2479 |
| 18 | 2420 | 38 | 2440 | 58 | 2460 | 78 | 2480 |
| 19 | 2421 | 39 | 2441 | 59 | 2461 | | |

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

For test mode A



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT CONFIGURE MODE | Applicable to | | | | | | | Description |
|--------------------|---------------|----|-----|------|----|----|----|--------------------------|
| | DT | CB | HCS | MPOP | BM | CE | RE | |
| A | √ | √ | √ | √ | √ | -- | √ | Powered by 12Vdc adapter |

Where

DT: Dwell Time on Each Channel**CB:** Cannel Bandwidth**HCS:** Hopping Channel Separation**MPOP:** Maximum Peak Output Power**BM:** Band edge Measurement**RE:** Radiated Emission

DWELL TIME ON EACH CHANNEL:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and X.Y.Z. axis.
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE | AXIS |
|--------------------|-------------------|----------------|-----------------------|-----------------|-----------|------|
| A | 0 ~ 78 | 0, 39, 78 | FHSS | GFSK | 3Mbps | X |

CHANNEL BANDWIDTH:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and X.Y.Z. axis.
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE | AXIS |
|--------------------|-------------------|----------------|-----------------------|-----------------|-----------|------|
| A | 0 ~ 78 | 0, 39, 78 | FHSS | GFSK | 3Mbps | X |

HOPPING CHANNEL SEPARATION

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and X.Y.Z. axis.
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE | AXIS |
|--------------------|-------------------|----------------|-----------------------|-----------------|-----------|------|
| A | 0 ~ 78 | 0, 39, 78 | FHSS | GFSK | 3Mbps | X |


MAXIMUM PEAK OUTPUT POWER

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and X.Y.Z. axis.
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE | AXIS |
|--------------------|-------------------|----------------|-----------------------|-----------------|-----------|------|
| A | 0 ~ 78 | 0, 39, 78 | FHSS | GFSK | 3Mbps | X |

BANDEDGE MEASUREMENT:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and X.Y.Z. axis..
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE | AXIS |
|--------------------|-------------------|----------------|-----------------------|-----------------|-----------|------|
| A | 0 ~ 78 | 0, 78 | FHSS | GFSK | 3Mbps | X |

RADIATED EMISSION TEST:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, packet types and X.Y.Z. axis.
- Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE | AXIS |
|--------------------|-------------------|----------------|-----------------------|-----------------|-----------|------|
| A | 0 ~ 78 | 0, 39, 78 | FHSS | GFSK | 3Mbps | X |

3.2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Bluetooth Car kit. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C. (15.247)

ANSI C63.4- 2003

All test items have been performed and recorded as per the above standards.

3.2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|-----|----------|-------|-----------|------------|--------|
| 1 | Battery | KOBA | MF78-550 | N/A | N/A |
| 2 | Earphone | N/A | N/A | N/A | N/A |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|---|
| A | 1m non-shielded earphone line. |

Note: 0.5m non-shielded input power cable was used during the test.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| FREQUENCIES (MHz) | FIELD STRENGTH (microvolts/meter) | MEASUREMENT DISTANCE (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB_uV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|--|-------------------|------------|------------------|
| Test Receiver ROHDE & SCHWARZ | ESCS30 | E1R1001 | Apr. 19, 2007 |
| BILOG Antenna SCHWARZBECK | VULB9168 | E1A1001 | Sept. 26, 2007 |
| Preamplifier Agilent | 8447D | E1A2001 | Jan. 27, 2008 |
| Preamplifier Agilent | 8449B | E1A2002 | Jan. 27, 2008 |
| Double Ridged Broadband Horn Antenna Schwarzbeck | BBHA 9120D | E1A1002 | Feb. 15, 2008 |
| Spectrum Analyzer Agilent | E4403B | E1S1001 | Jan. 13, 2008 |
| Signal Analyzer ROHDE & SCHWARZ | FSP | E1S1002 | May. 16, 2007 |
| Software ADT | ADT_Radiated_V7.5 | N/A | N/A |

- NOTE:**
1. The calibration interval of the above test instruments is 12 months.
 2. “*” = These equipment are used for the final measurement.
 3. The horn antenna and Agilent preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The Spectrum Analyzer (model: FSP) and RF signal cable (SERIAL: E1CBH16&E1CBH20) are used only for the measurement of emission frequency above 1GHz if tested.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

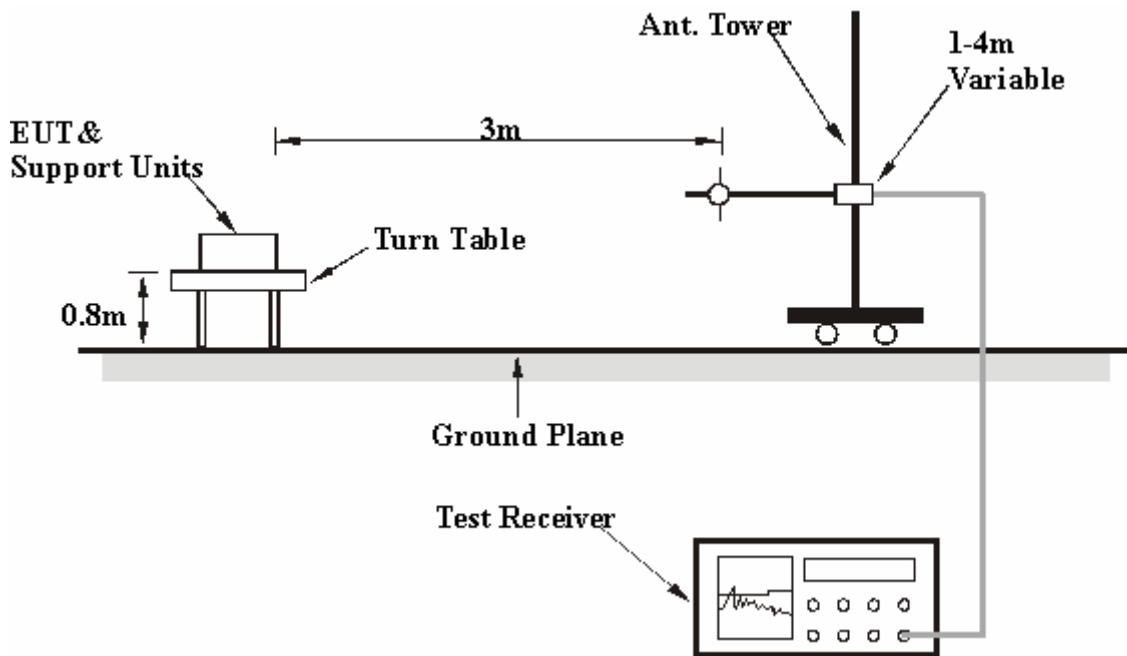
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

Below 1 GHz: Normal operation (hopping according to its hoplist).

Above 1 GHz: Continuously transmitting with modulation on a certain channel that can be set by the software (with typical data input as the modulation source).

4.1.7 TEST RESULTS

Below 1 GHz Worst Case

| EUT | Bluetooth Car kit | MEASUREMENT DETAIL | | |
|------------------------|-------------------|---------------------------------|--|--------------------------|
| MODEL | AU500 | FREQUENCY RANGE | | Below 1000MHz |
| CHANNEL | Channel 0 | DETECTOR FUNCTION | | Quasi-Peak |
| MODULATION TYPE | GFSK | ENVIRONMENTAL CONDITIONS | | 20deg. C, 60%RH, 1001hPa |
| TEST MODE | A | INPUT POWER | | 12Vdc from battery |
| TESTED BY | Jeffrey | | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---------------|-----------|----------------|-----------------|--------------|-----------|----------|-----------|
| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower cm | Table deg |
| 1 | 200.06 | 12.95 | 18.50 | 31.45 | 43.50 | -12.05 | 150.00 | 228.00 |
| 2 | 225.06 | 14.19 | 18.75 | 32.95 | 46.00 | -13.05 | 157.00 | 211.00 |
| 3 | 325.09 | 17.14 | 27.27 | 44.41 | 46.00 | -1.59 | 112.00 | 318.00 |
| 4 | 400.11 | 18.64 | 10.00 | 28.64 | 46.00 | -17.36 | 99.00 | 34.00 |
| 5 | 425.12 | 19.48 | 19.03 | 38.51 | 46.00 | -7.49 | 100.00 | 224.00 |
| 6 | 450.12 | 20.12 | 19.47 | 39.59 | 46.00 | -6.41 | 100.00 | 44.00 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---------------|--------------|----------------|-----------------|--------------|--------------|--------------|--------------|
| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower cm | Table deg |
| 1 | 55.75 | 15.07 | 24.41 | 39.48 | 40.00 | -0.52 | 99.00 | 97.00 |
| 2 | 150.82 | 16.98 | -1.60 | 15.38 | 43.50 | -28.12 | 99.00 | 287.00 |
| 3 | 225.06 | 14.19 | 7.23 | 21.43 | 46.00 | -24.57 | 99.00 | 192.00 |
| 4 | 325.09 | 17.14 | 9.99 | 27.13 | 46.00 | -18.87 | 99.00 | 221.00 |
| 5 | 475.13 | 20.51 | 0.83 | 21.34 | 46.00 | -24.66 | 99.00 | 133.00 |
| 6 | 755.08 | 25.39 | -8.40 | 16.99 | 46.00 | -29.01 | 99.00 | 218.00 |

- 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).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

Above 1 GHz

| EUT | | Bluetooth Car kit | MEASUREMENT DETAIL | | | |
|------------------------|--|-------------------|---------------------------------|--|-----------------------------|--|
| MODEL | | AU500 | FREQUENCY RANGE | | Above 1GHz | |
| CHANNEL | | Channel 0 | DETECTOR FUNCTION | | Peak (PK) Average (AV) | |
| MODULATION TYPE | | GFSK | ENVIRONMENTAL CONDITIONS | | 20deg. C, 60%RH, 1001hPa | |
| TEST MODE | | A | INPUT POWER | | 12Vdc from battery | |
| TESTED BY | | Bright | | | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---------------|-----------|----------------|-----------------|--------------|-----------|----------|-----------|
| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower cm | Table deg |
| 1 | 4803.58 PK | 37.74 | 29.02 | 66.76 | 74.00 | -7.24 | 100.00 | 119.00 |
| 1 | 4803.58 AV | 37.74 | 9.02 | 46.76 | 54.00 | -7.24 | 100.00 | 119.00 |
| 2 | 7206.00 PK | 45.18 | 10.35 | 55.53 | 74.00 | -18.47 | 100.00 | 226.00 |
| 2 | 7206.00 AV | 45.18 | -9.65 | 35.53 | 54.00 | -18.47 | 100.00 | 226.00 |
| 3 | 9608.00 PK | 47.91 | 8.34 | 56.25 | 74.00 | -17.75 | 100.00 | 345.00 |
| 3 | 9608.00 AV | 47.91 | -11.66 | 36.25 | 54.00 | -17.75 | 100.00 | 345.00 |
| 4 | 12010.00 PK | 49.05 | 9.80 | 58.85 | 74.00 | -15.15 | 100.00 | 12.00 |
| 4 | 12010.00 AV | 49.05 | -10.20 | 38.85 | 54.00 | -15.15 | 100.00 | 12.00 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---------------|-----------|----------------|-----------------|--------------|-----------|----------|-----------|
| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower cm | Table deg |
| 1 | 4803.62 PK | 37.74 | 25.05 | 62.79 | 74.00 | -11.21 | 100.00 | 164.00 |
| 1 | 4803.62 AV | 37.74 | 5.05 | 42.79 | 54.00 | -11.21 | 100.00 | 164.00 |
| 2 | 7206.00 PK | 45.18 | 10.12 | 55.30 | 74.00 | -18.70 | 100.00 | 3.00 |
| 2 | 7206.00 AV | 45.18 | -9.88 | 35.30 | 54.00 | -18.70 | 100.00 | 3.00 |
| 3 | 9608.00 PK | 47.91 | 9.19 | 57.10 | 74.00 | -16.90 | 100.00 | 119.00 |
| 3 | 9608.00 AV | 47.91 | -10.81 | 37.10 | 54.00 | -16.90 | 100.00 | 119.00 |
| 4 | 12010.00 PK | 49.05 | 10.29 | 59.33 | 74.00 | -14.67 | 100.00 | 48.00 |
| 4 | 12010.00 AV | 49.05 | -9.71 | 39.33 | 54.00 | -14.67 | 100.00 | 48.00 |

- 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).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle is equal to: $20\log(3.125/100) = -30 \text{ dB}$
 6. Average value = peak reading – 20dB.

| EUT | | Bluetooth Car kit | MEASUREMENT DETAIL | | | |
|-----------------|------------|-------------------|--------------------|--------------------------|-----------------------------|--|
| MODEL | AU500 | | | FREQUENCY RANGE | Above 1GHz | |
| CHANNEL | Channel 39 | | | DETECTOR FUNCTION | Peak (PK) Average (AV) | |
| MODULATION TYPE | GFSK | | | ENVIRONMENTAL CONDITIONS | 20deg. C, 60%RH, 1001hPa | |
| TEST MODE | A | | | INPUT POWER | 12Vdc from adapter | |
| TESTED BY | Bright | | | | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---------------|-----------|----------------|-----------------|--------------|-----------|----------|-----------|
| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower cm | Table deg |
| 1 | 4882.34 PK | 38.03 | 32.79 | 70.82 | 74.00 | -3.18 | 100.00 | 331.00 |
| 1 | 4882.34 AV | 38.03 | 12.79 | 50.82 | 54.00 | -3.18 | 100.00 | 331.00 |
| 2 | 7323.00 PK | 45.26 | 11.43 | 56.69 | 74.00 | -17.31 | 100.00 | 246.00 |
| 2 | 7323.00 AV | 45.26 | -8.57 | 36.69 | 54.00 | -17.31 | 100.00 | 246.00 |
| 3 | 9764.00 PK | 48.32 | 7.97 | 56.29 | 74.00 | -17.71 | 100.00 | 184.00 |
| 3 | 9764.00 AV | 48.32 | -12.03 | 36.29 | 54.00 | -17.71 | 100.00 | 184.00 |
| 4 | 12205.00 PK | 49.16 | 9.34 | 58.50 | 74.00 | -15.50 | 100.00 | 16.00 |
| 4 | 12205.00 AV | 49.16 | -10.66 | 38.50 | 54.00 | -15.50 | 100.00 | 16.00 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---------------|-----------|----------------|-----------------|--------------|-----------|----------|-----------|
| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower cm | Table deg |
| 1 | 4882.34 PK | 38.03 | 32.52 | 70.56 | 74.00 | -3.44 | 100.00 | 216.00 |
| 1 | 4882.34 AV | 38.03 | 12.52 | 50.56 | 54.00 | -3.44 | 100.00 | 216.00 |
| 2 | 7323.00 PK | 45.26 | 10.88 | 56.14 | 74.00 | -17.86 | 100.00 | 334.00 |
| 2 | 7323.00 AV | 45.26 | -9.12 | 36.14 | 54.00 | -17.86 | 100.00 | 334.00 |
| 3 | 9764.00 PK | 48.32 | 8.91 | 57.23 | 74.00 | -16.77 | 100.00 | 298.00 |
| 3 | 9764.00 AV | 48.32 | -11.09 | 37.23 | 54.00 | -16.77 | 100.00 | 298.00 |
| 4 | 12205.00 PK | 49.16 | 9.44 | 58.60 | 74.00 | -15.40 | 100.00 | 29.00 |
| 4 | 12205.00 AV | 49.16 | -10.56 | 38.60 | 54.00 | -15.40 | 100.00 | 29.00 |

- 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).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Based upon bluetooth theory the transmitter is on $0.625 * 5$ per 296.25 ms per channel. Therefore, the duty cycle is equal to: $20\log(3.125/100) = -30$ dB
 6. Average value = peak reading – 20dB.

| EUT | | Bluetooth Car kit | MEASUREMENT DETAIL | | | |
|-----------------|------------|-------------------|--------------------------|--|-----------------------------|--|
| MODEL | AU500 | | FREQUENCY RANGE | | Above 1GHz | |
| CHANNEL | Channel 78 | | DETECTOR FUNCTION | | Peak (PK) Average (AV) | |
| MODULATION TYPE | GFSK | | ENVIRONMENTAL CONDITIONS | | 20deg. C, 60%RH, 1001hPa | |
| TEST MODE | A | | INPUT POWER | | 12Vdc from adapter | |
| TESTED BY | Bright | | | | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---------------|-----------|----------------|-----------------|--------------|-----------|----------|-----------|
| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower cm | Table deg |
| 1* | 2483.50 PK | 32.76 | 18.49 | 51.25 | 74.00 | -22.75 | 100.00 | 220.00 |
| 1* | 2483.50 AV | 32.76 | -1.51 | 31.25 | 54.00 | -22.75 | 100.00 | 220.00 |
| 2 | 4959.66 PK | 38.31 | 33.10 | 71.42 | 74.00 | -2.58 | 100.00 | 331.00 |
| 2 | 4959.66 AV | 38.31 | 13.10 | 51.42 | 54.00 | -2.58 | 100.00 | 331.00 |
| 3 | 7440.00 PK | 45.20 | 9.68 | 54.88 | 74.00 | -19.12 | 100.00 | 44.00 |
| 3 | 7440.00 AV | 45.20 | -10.32 | 34.88 | 54.00 | -19.12 | 100.00 | 44.00 |
| 4 | 9920.00 PK | 48.53 | 8.92 | 57.45 | 74.00 | -16.55 | 100.00 | 16.00 |
| 4 | 9920.00 AV | 48.53 | -11.08 | 37.45 | 54.00 | -16.55 | 100.00 | 16.00 |
| 5 | 12400.00 PK | 49.27 | 9.08 | 58.35 | 74.00 | -15.65 | 100.00 | 115.00 |
| 5 | 12400.00 AV | 49.27 | -10.92 | 38.35 | 54.00 | -15.65 | 100.00 | 115.00 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---------------|-----------|----------------|-----------------|--------------|-----------|----------|-----------|
| No. | Frequency MHz | Factor dB | Reading dBuV/m | Emission dBuV/m | Limit dBuV/m | Margin dB | Tower cm | Table deg |
| 1* | 2483.50 PK | 32.76 | 18.23 | 50.99 | 74.00 | -23.01 | 100.00 | 222.00 |
| 1* | 2483.50 AV | 32.76 | -1.77 | 30.99 | 54.00 | -23.01 | 100.00 | 222.00 |
| 2 | 4959.66 PK | 38.31 | 32.21 | 70.52 | 74.00 | -3.48 | 100.00 | 179.00 |
| 2 | 4959.66 AV | 38.31 | 12.21 | 50.52 | 54.00 | -3.48 | 100.00 | 179.00 |
| 3 | 7440.00 PK | 45.20 | 9.04 | 54.24 | 74.00 | -19.76 | 100.00 | 164.00 |
| 3 | 7440.00 AV | 45.20 | -10.96 | 34.24 | 54.00 | -19.76 | 100.00 | 164.00 |
| 4 | 9920.00 PK | 48.53 | 9.16 | 57.70 | 74.00 | -16.30 | 100.00 | 113.00 |
| 4 | 9920.00 AV | 48.53 | -10.84 | 37.70 | 54.00 | -16.30 | 100.00 | 113.00 |
| 5 | 12400.00 PK | 49.27 | 9.65 | 58.92 | 74.00 | -15.08 | 100.00 | 79.00 |
| 5 | 12400.00 AV | 49.27 | -10.35 | 38.92 | 54.00 | -15.08 | 100.00 | 79.00 |

- 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).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. Based upon bluetooth theory the transmitter is on 0.625 * 5 per 296.25 ms per channel. Therefore, the duty cycle is equal to: $20\log(3.125/100) = -30$ dB
 6. Average value = peak reading – 20dB.

4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 channels frequencies, and should be equally spaced.

4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---|-----------|------------|------------------|
| Spectrum Analyzer ROHDE & SCHWARZ | FSP | E1S1002 | May. 15, 2007 |

NOTE: The calibration interval of the above test instruments is 12 months.

4.2.3 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
- d. Set the SA on View mode and then plot the result on SA screen.
- e. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP

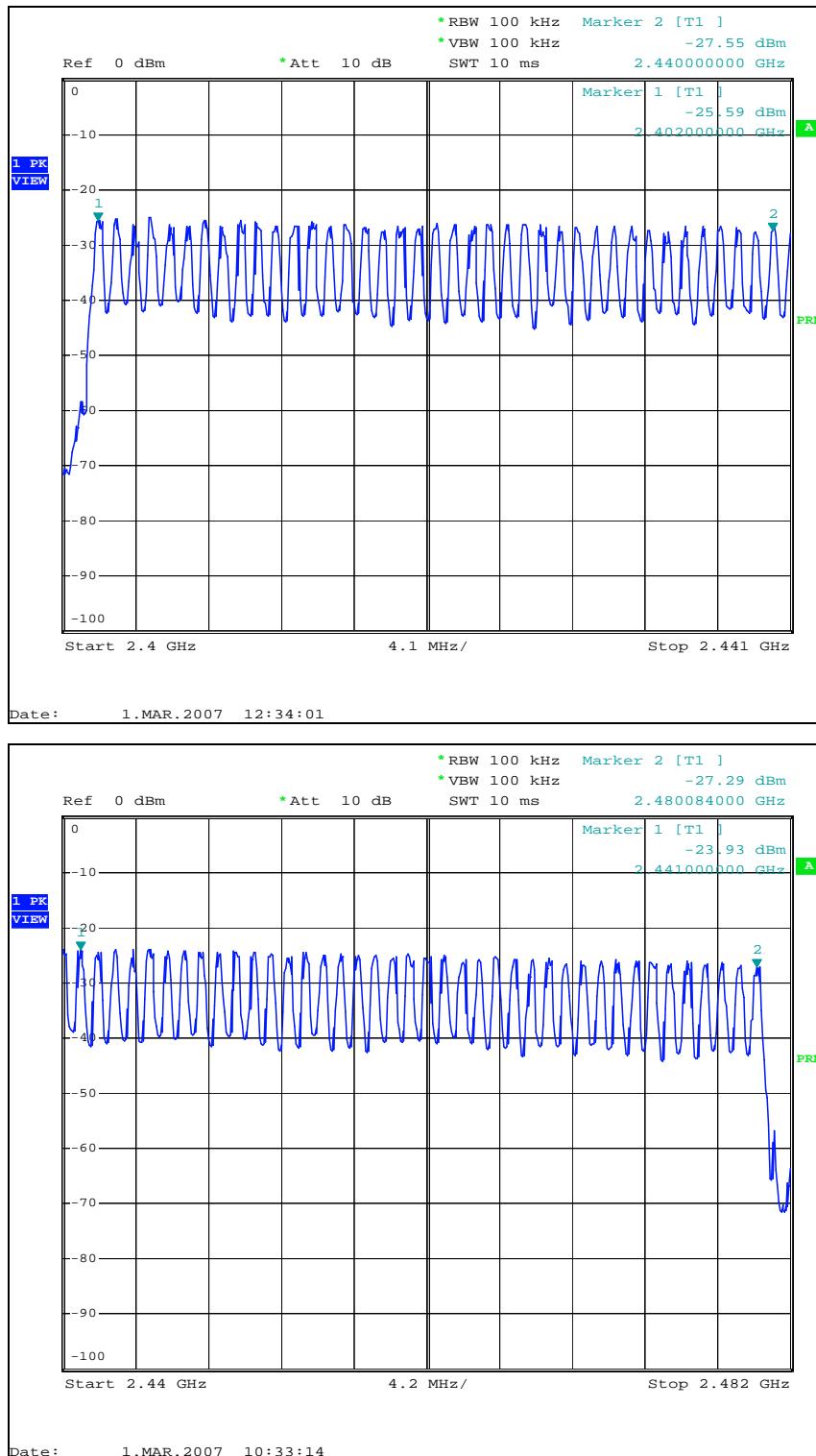


4.2.6 EUT OPERATING CONDITIONS

Normal operation (Hopping according to its hoplist).

4.2.7 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. On the plots, it shows that the hopping frequencies are equally spaced.



4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

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

4.3.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---------------------------------------|-----------|------------|------------------|
| *Spectrum Analyzer ROHDE & SCHWARZ | FSP | E1S1002 | May. 15, 2007 |

NOTES: The calibration interval of the above test instruments is 12 months.

4.3.3 TEST PROCEDURES

- a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- c. Adjust the center frequency of SA on any frequency to be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- e. Repeat above procedures until all different time-slot modes have been completed.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

Normal operation (Hopping according to its hoplist).

4.3.7 TEST RESULTS

| | | | |
|------------------------|--------------------|---------------------------------|--------------------------|
| EUT | Bluetooth Car kit | MODEL | AU500 |
| MODULATION TYPE | GFSK | ENVIRONMENTAL CONDITIONS | 20deg. C, 60%RH, 1001Hpa |
| INPUT POWER | 12Vdc from battery | TESTED BY | Bright |

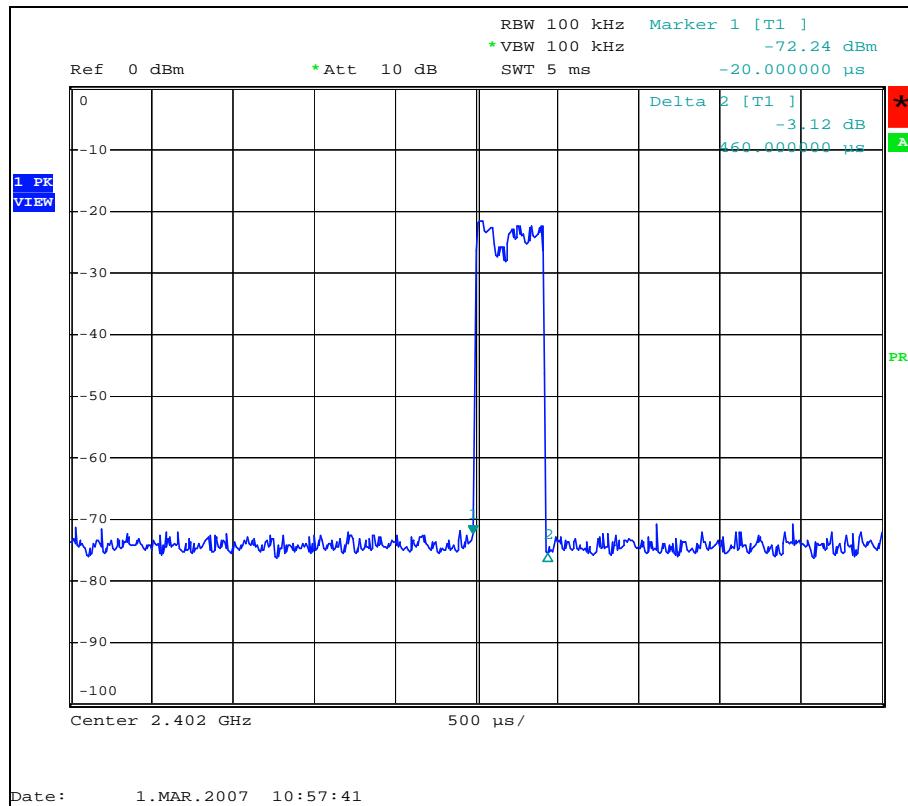
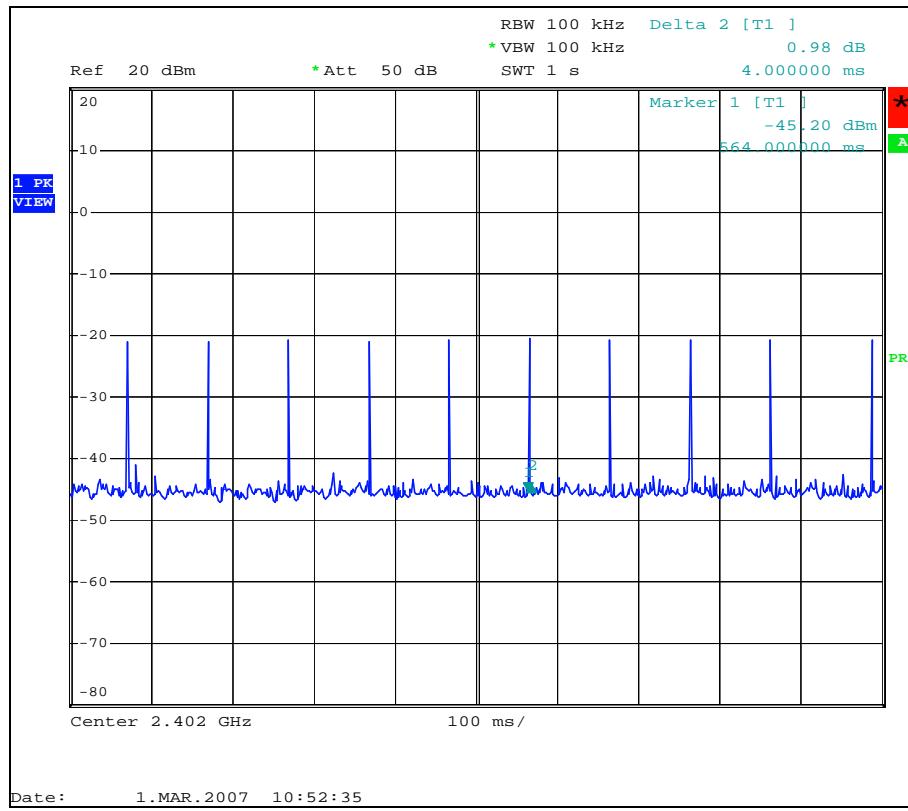
| MODE | NUMBER OF TRANSMISSION IN A 31.6 (79HOPPING * 0.4) | LENGTH OF TRANSMISSION TIME (msec) | RESULT (msec) | LIMIT (msec) |
|-------------|---|---|----------------------|---------------------|
| CH0 | 10(times/1sec)*31.6=316 times | 0.460 | 145.36 | 400 |
| CH39 | 10(times/1sec)*31.6=316 times | 0.460 | 145.36 | 400 |
| CH78 | 10(times/1sec)*31.6=316 times | 0.460 | 145.36 | 400 |

NOTE: Test plots of the transmitting time slot are shown on next 3 pages.

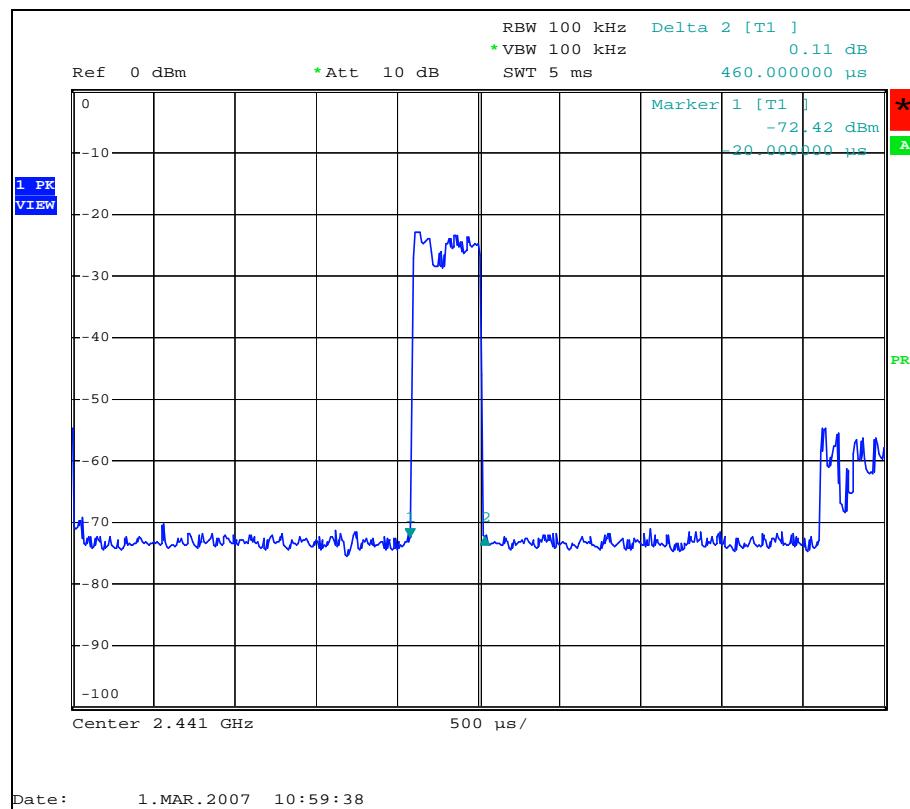
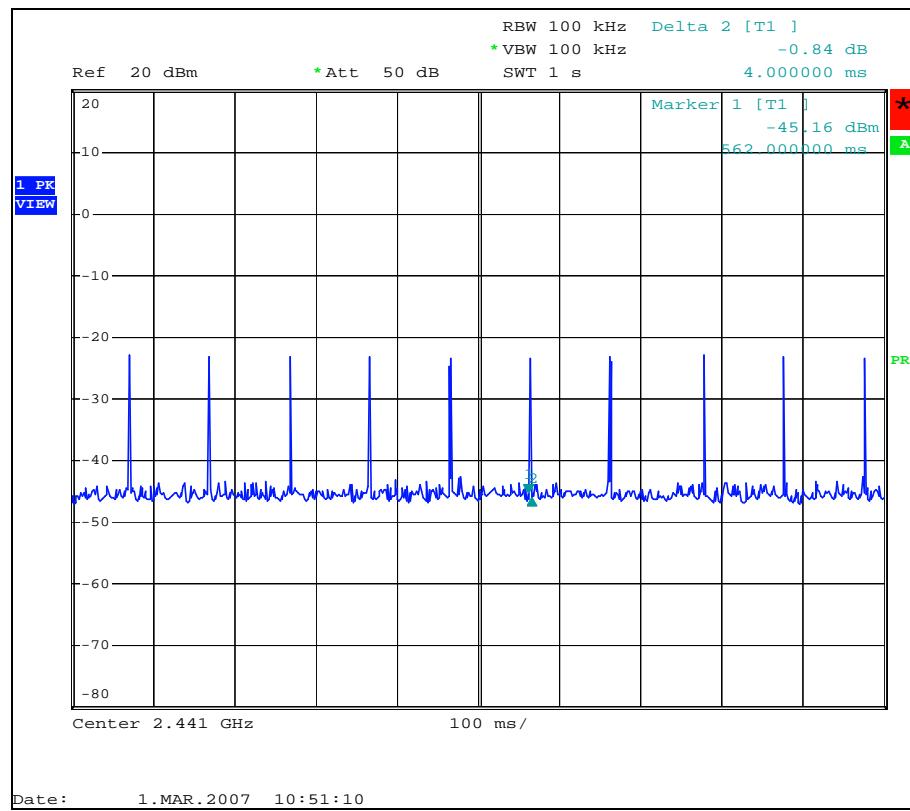
FCC ID: U37AU500



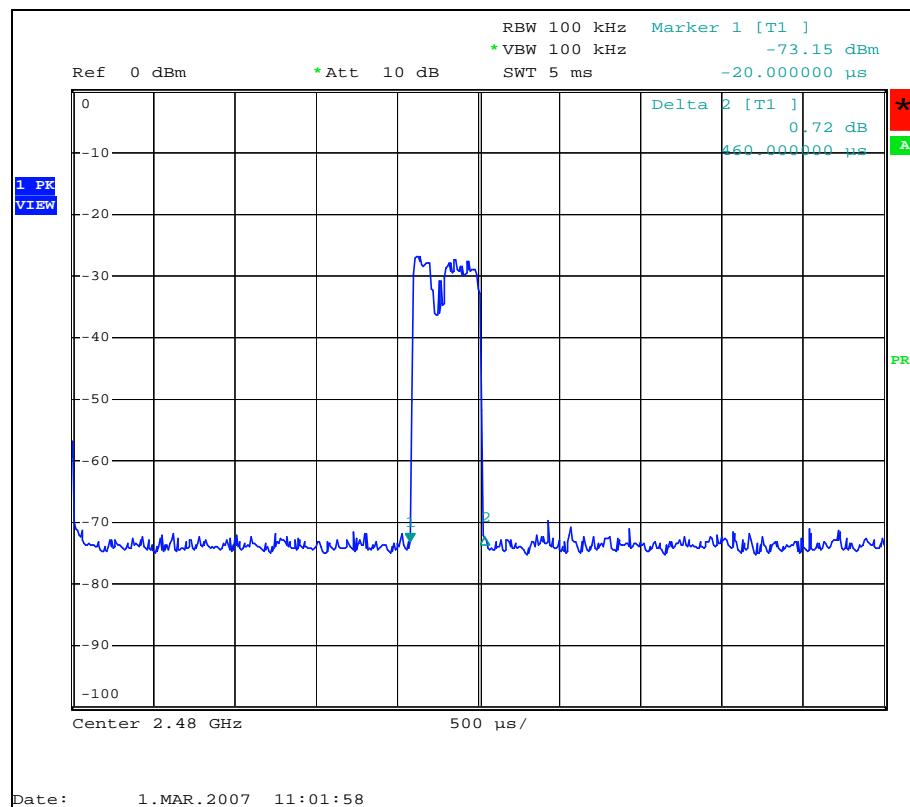
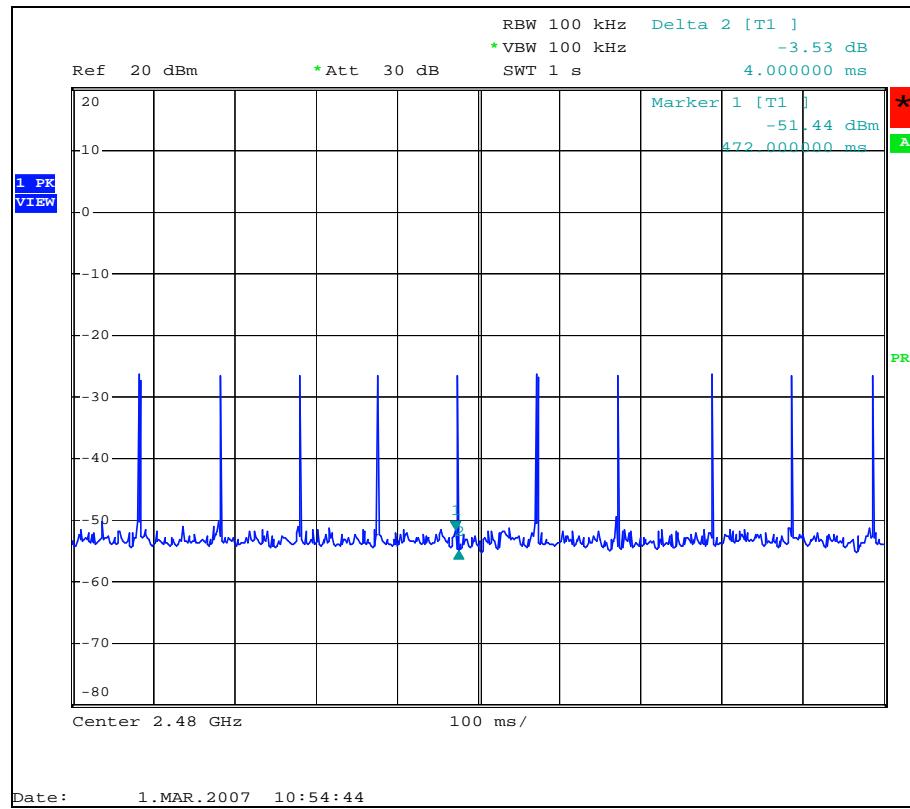
CH0



CH39



CH78



4.4 CHANNEL BANDWIDTH

4.4.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5MHz, If the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

4.4.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|--------------------------------------|-----------|------------|------------------|
| Spectrum Analyzer ROHDE & SCHWARZ | FSP | E1S1002 | May. 15, 2007 |

NOTE: The calibration interval of the above test instruments is 12 months.

4.4.3 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITION

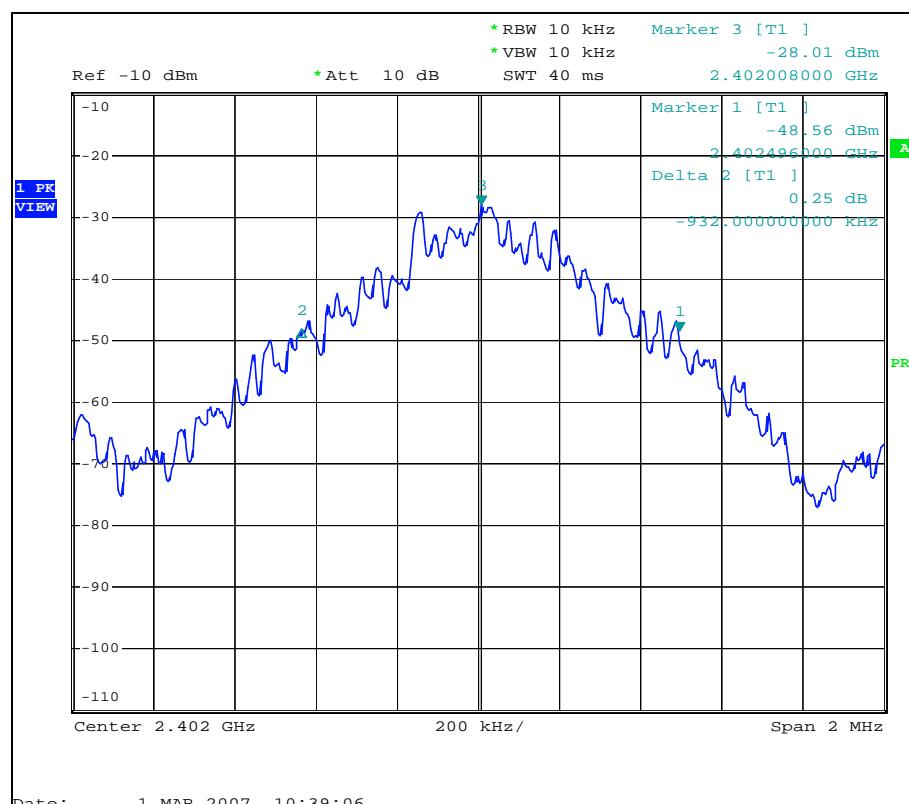
Continuously transmitting with modulation on a certain channel that can be set by the software (with typical data input as the modulation source).

4.4.7 TEST RESULTS

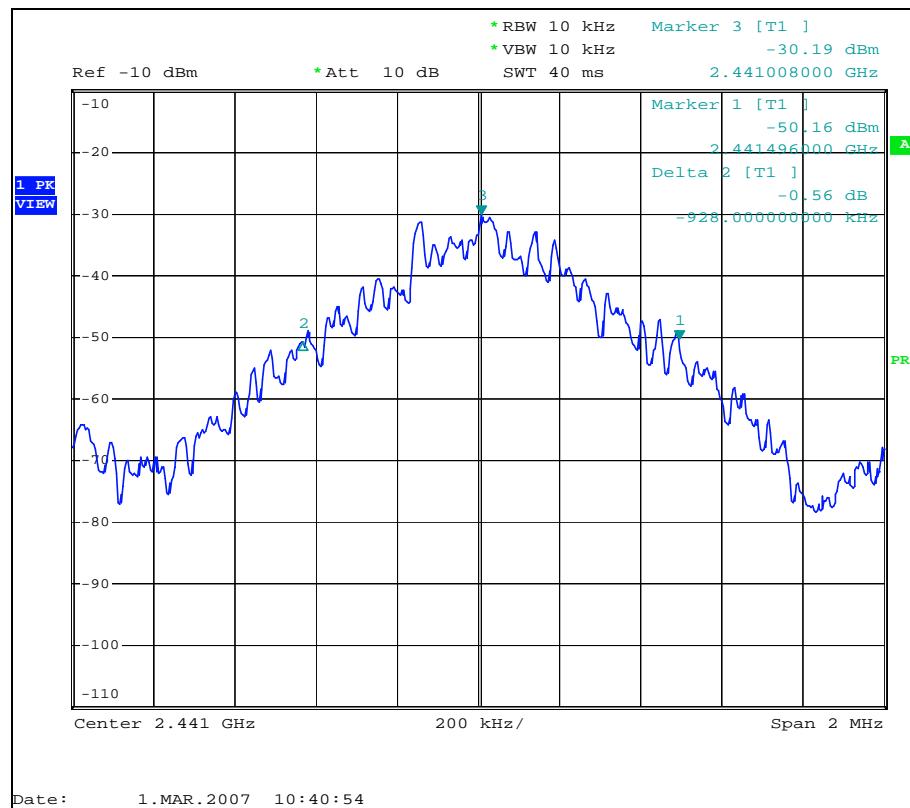
| | | | |
|------------------------|--------------------|---------------------------------|--------------------------|
| EUT | Bluetooth Car kit | MODEL | AU500 |
| MODULATION TYPE | GFSK | ENVIRONMENTAL CONDITIONS | 20deg. C, 60%RH, 1001Hpa |
| INPUT POWER | 12Vdc from battery | TESTED BY | Bright |

| CHANNEL | CHANNEL FREQUENCY (MHz) | 20dB BANDWIDTH (MHz) |
|---------|-------------------------|----------------------|
| 0 | 2402 | 0.932 |
| 39 | 2441 | 0.928 |
| 78 | 2480 | 0.932 |

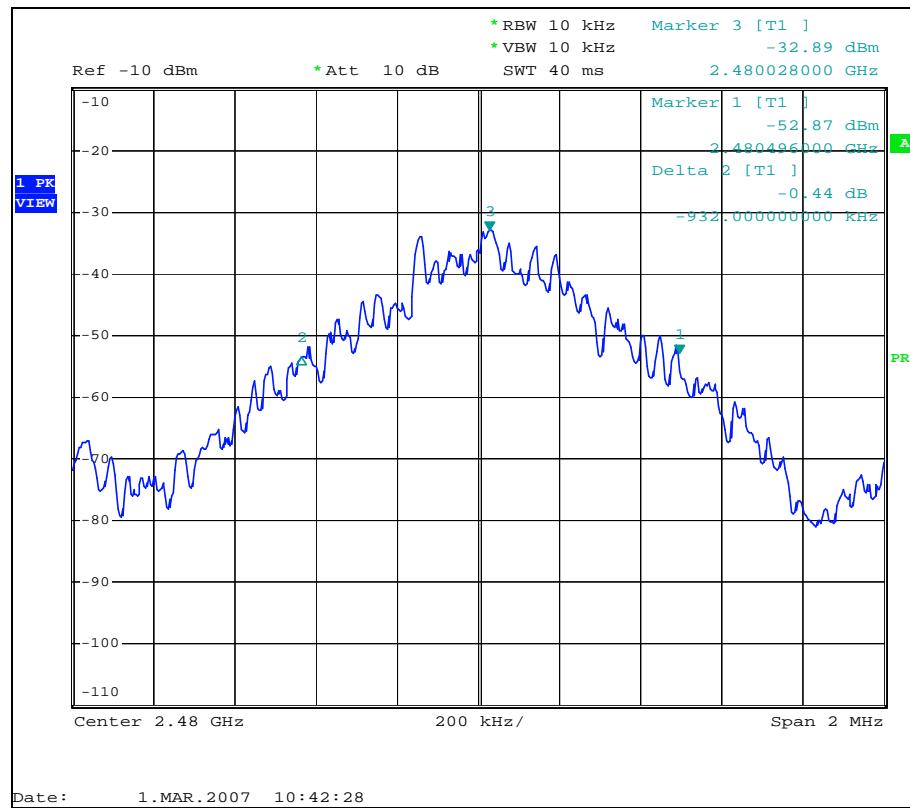
CH0



CH39



CH78



4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25 kHz or two-third of 20dB hopping channel bandwidth (whichever is greater).

4.5.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|--------------------------------------|-----------|------------|------------------|
| Spectrum Analyzer ROHDE & SCHWARZ | FSP | E1S1002 | May. 15, 2007 |

NOTES: The calibration interval of the above test instruments is 12 months.

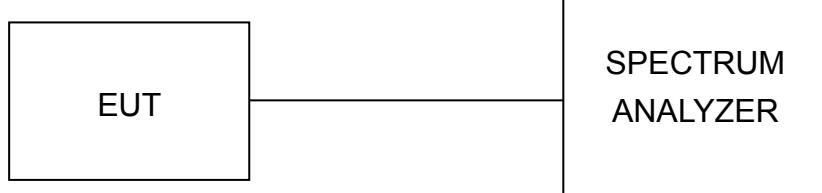
4.5.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

Normal operation (Hopping according to its hoplist).

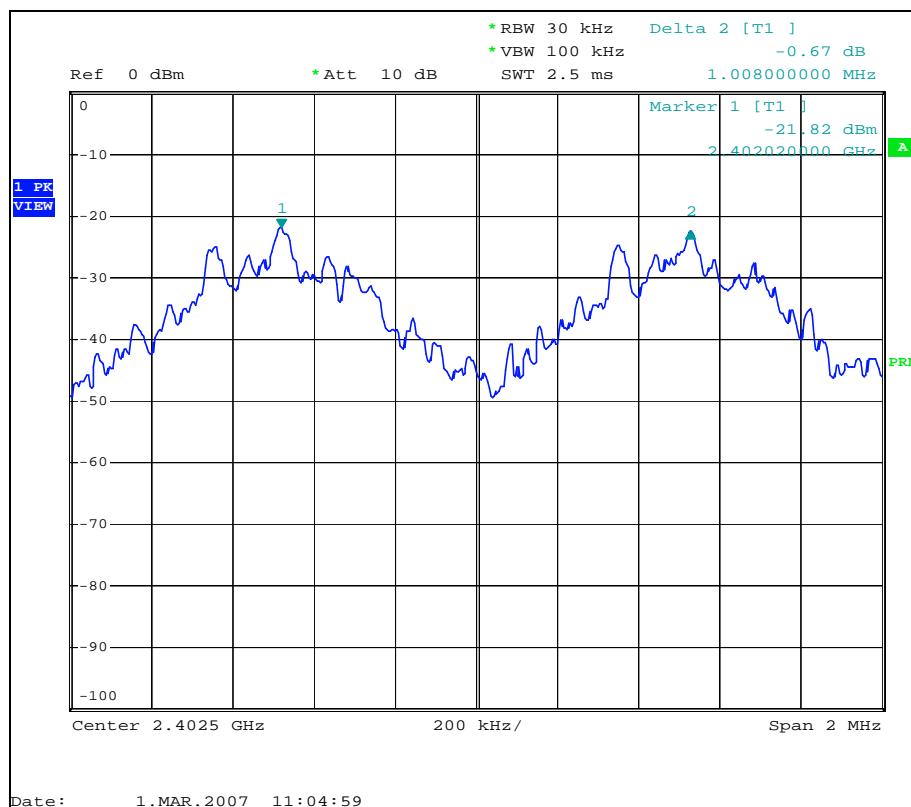
4.5.7 TEST RESULTS

| | | | |
|------------------------|--------------------|---------------------------------|--------------------------|
| EUT | Bluetooth Car kit | MODEL | AU500 |
| MODULATION TYPE | GFSK | ENVIRONMENTAL CONDITIONS | 20deg. C, 60%RH, 1001Hpa |
| INPUT POWER | 12Vdc from battery | TESTED BY | Bright |

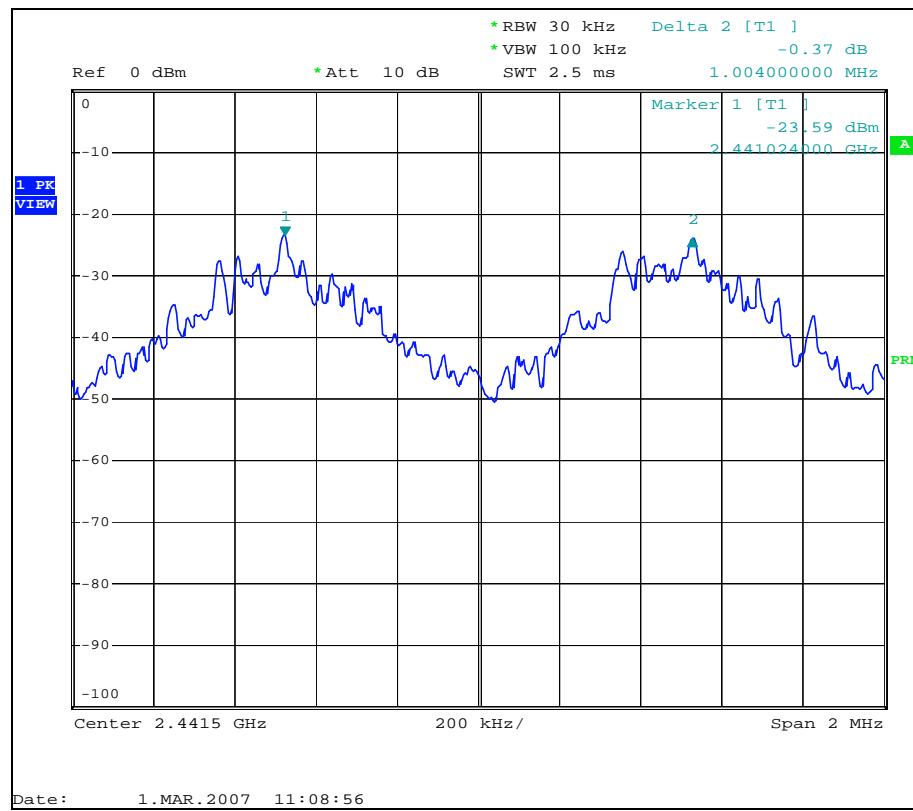
| CHANNEL | FREQUENCY (MHz) | ADJACENT CHANNEL SEPARATION (MHz) | 20dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|-----------------------------------|----------------------|---------------------|-------------|
| 0 | 2402 | 1.008 | 0.932 | 0.621 | pass |
| 39 | 2441 | 1.004 | 0.928 | 0.619 | pass |
| 78 | 2480 | 1.004 | 0.932 | 0.621 | pass |

NOTE: The minimum limit is two-third of 20dB bandwidth.

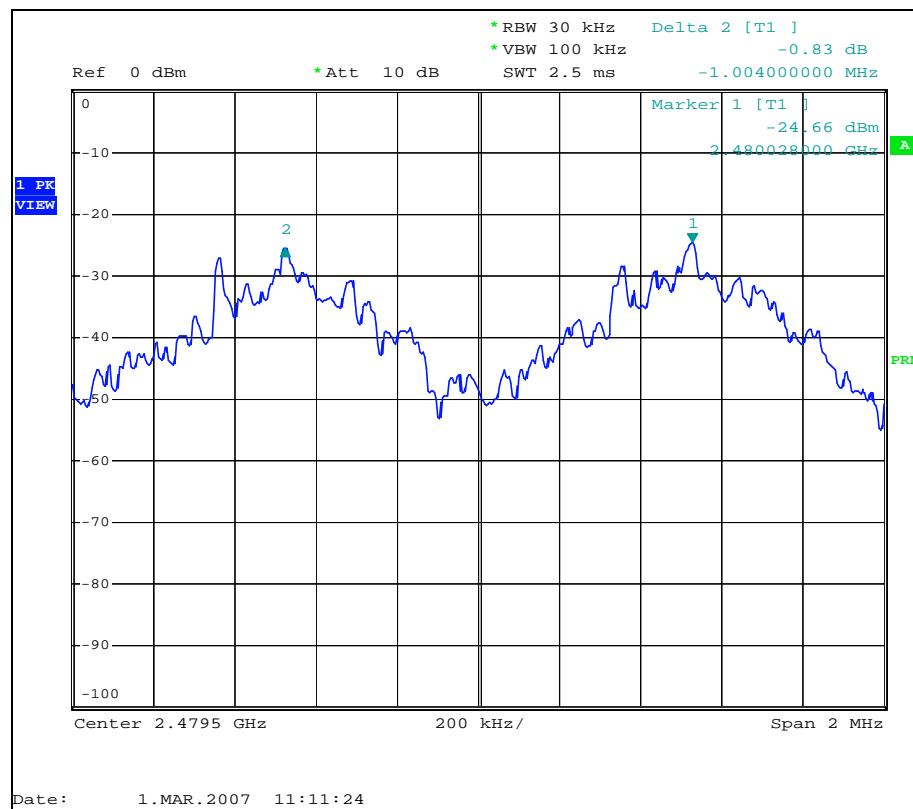
CH0



CH39



CH78



4.6 MAXIMUM PEAK OUTPUT POWER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 1W.

4.6.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|---------------------------------------|-----------|------------|------------------|
| *Spectrum Analyzer ROHDE & SCHWARZ | FSP | E1S1002 | May. 15, 2007 |

NOTE: The calibration interval of the above test instruments is 12 months.

4.6.3 TEST PROCEDURES

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 1 MHz RBW and 3 MHz VBW.
- d. Measure the captured power within the band and recording the plot.
- e. Repeat above procedures until all frequencies required were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation.

4.6.5 TEST SETUP



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

4.6.6 EUT OPERATING CONDITION

Continuously transmitting with modulation on a certain channel that can be set by the software (with typical data input as the modulation source).

FCC ID: U37AU500



4.6.7 TEST RESULTS

| | | | |
|------------------------|--------------------|---------------------------------|--------------------------|
| EUT | Bluetooth Car kit | MODEL | AU500 |
| MODULATION TYPE | GFSK | ENVIRONMENTAL CONDITIONS | 20deg. C, 60%RH, 1001Hpa |
| INPUT POWER | 12Vdc from battery | TESTED BY | Bright |

| CHANNEL | CHANNEL FREQUENCY (MHz) | PEAK POWER OUTPUT (dBm) | PEAK POWER LIMIT (dBm) | PASS/FAIL |
|----------------|--------------------------------|--------------------------------|-------------------------------|------------------|
| 0 | 2402 | 1.06 | 30 | PASS |
| 39 | 2441 | 0.54 | 30 | PASS |
| 78 | 2480 | -1.17 | 30 | PASS |

4.7 BAND EDGES MEASUREMENT

4.7.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band.

4.7.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED UNTIL |
|--------------------------------------|-----------|------------|------------------|
| Spectrum Analyzer ROHDE & SCHWARZ | FSP | E1S1002 | May. 15, 2007 |

NOTES: The calibration interval of the above test instruments is 12 months.

4.7.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer with suitable frequency span including bandwidth from band edge. The band edges was measured and recorded.

4.7.4 DEVIATION FROM TEST STANDARD

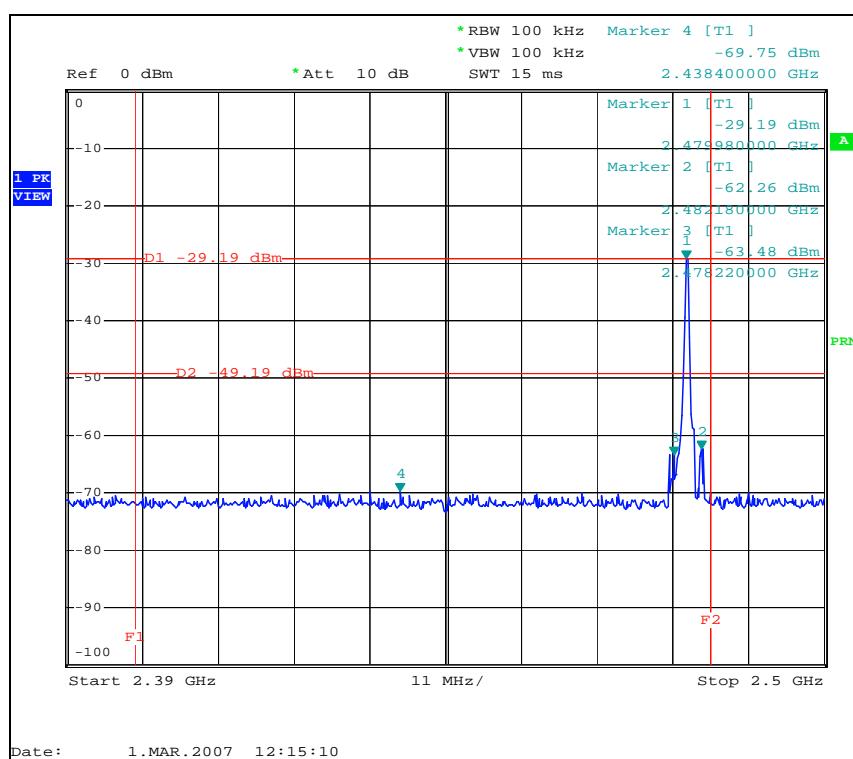
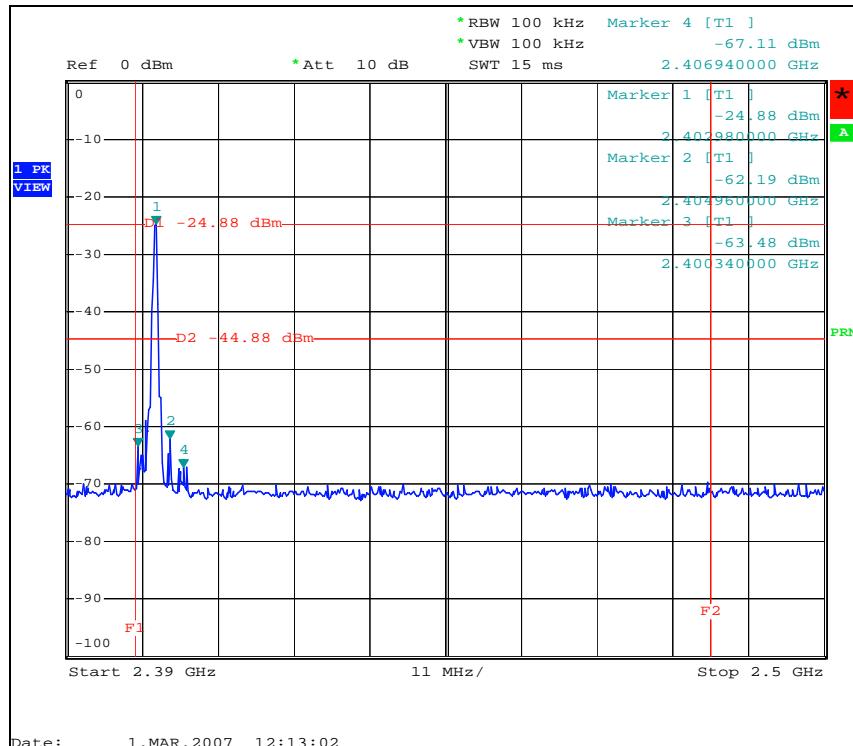
No deviation.

4.7.5 EUT OPERATING CONDITION

Continuously transmitting with modulation on a certain channel that can be set by the software (with typical data input as the modulation source).

4.7.6 TEST RESULTS

The spectrum plots are attached on the following 2 images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).



4.8 ANTENNA REQUIREMENT

4.8.1 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 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.8.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is printed on PCB without antenna connector. The maximum gain of this antenna is -10 dBi.

5. INFORMATION ON THE TESTING LABORATORY

We, ADT (Shanghai) Corp., was founded in 2003 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratory is accredited and approved by the following approval agencies according to ISO / IEC 17025 (2005).

The client should not use it to claim product endorsement by CNLS, A2LA, or any government agency.

| | |
|--------|-----------|
| Japan | VCCI |
| USA | FCC, A2LA |
| Norway | DNV |
| China | CNAS |



Copies of accreditation certificates of our laboratory obtained from approval agencies can be downloaded from our web site: www.cnadt.com

If you have any comments, please feel free to contact us at the following:

ADT (Shanghai) Corporation

TEL :86-21-6465-9091

Fax : 86-21-6465-9092

Email: service@adt-sh.com

Web Site: www.cnadt.com

APPENDIX-A

MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.