
FCC Test Report

Report No.: AGC00B110103F2

FCC ID : ZEATSN43B

PRODUCT DESIGNATION : Portable scanner

BRAND NAME : N/A

TEST MODEL : TSN43B

CLIENT : Sky Light Digital Limited

DATE OF ISSUE : Mar.23, 2011

STANDARD(S) : FCC Part 15 Rules

Attestation of Global Compliance Co., Ltd.

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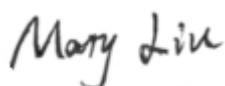
VERIFICATION OF COMPLIANCE

| | |
|---------------------|--|
| Applicant | Sky Light Digital Limited Rm.1009 Kwong Sang Hong Centre,151-153 Hoi Bun Road,Kwun Tong,Kowloon,Hong Kong |
| Manufacturer | Sky Light Electronic(ShenZhen)Limited No.6 Building,JinBi Industrial Area,HuangTian,BaoAn,Shenzhen,China. |
| Product Designation | Portable scanner |
| Brand Name | N/A |
| Model Name | TSN43B,TSN44B,TSN45B,TSN46B |
| Model difference | The above models all the same except for appearance color. |
| FCC ID | ZEATSN43B |
| Report Number | AGC00B110103F2 |
| Date of Test | Mar.16, 2011 to Mar.23, 2011 |

WE HEREBY CERTIFY THAT:

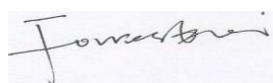
The above equipment was tested by Attestation of Global Compliance Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.247.

Checked By:



Mary Liu Mar.23, 2011

Authorized By



Forrest Lei Mar.23, 2011

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

The EUT is a **Portable scanner** designed as an “Communication Device”. It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

| | |
|---------------------|---|
| Operation Frequency | 2.402 GHz to 2.480GHz |
| Rated Output Power | Bluetooth (1Mbps) 1.89dBm Bluetooth EDR (2Mbps) 1.74dBm Bluetooth EDR(3Mbps) 1.79 dBm |
| Modulation | GFSK, $\pi/4$ -DQPSK, 8-DPSK |
| Number of channels | 79 |
| Antenna Designation | Integrated Antenna |
| Antenna Gain | 0.83dBi |
| Power Supply | DC4.2V by battery or USB Operated |

1.2 TABLE OF CARRIER FREQUENCIES

| Frequency Band | Channel Number | Frequency |
|----------------|----------------|-----------|
| 2400~2483.5MHZ | 0 | 2402MHZ |
| | 1 | 2403MHZ |
| | : | : |
| | 38 | 2440 MHZ |
| | 39 | 2441 MHZ |
| | 40 | 2442 MHZ |
| | : | : |
| | 77 | 2479 MHZ |
| | 78 | 2480 MHZ |

1.3 RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1MHZ, In every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection(e.g. single or multislots packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

1.4 EXAMPLE OF A HOPPING SEQUENCE IN DATA MODE

Example of a 79 hopping sequence in data mode:

40,21,44,23,42,53,46,55,48,33,52,35,50,65,54,67
56,37,60,39,58,69,62,71,64,25,68,27,66,57,70,59
72,29,76,31,74,61,78,63,01,41,05,43,03,73,07,75
09,45,13,47,11,77,15,00,64,49,66,53,68,02,70,06
01,51,03,55,05,04

1.5 EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:
1 LAP/UAP of the master of the connection

2 Internal master clock

The LAP(lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP(upper address part) are the 24MSB's of the 48BD_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronisation with other units only offset are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about One day(23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire.

LAP(24 bits),4LSB's(4bits)(Input 1) and the 27MSB's of the clock(Input 2) are used. With this input values different mathematical procedures(permuations, additions, XOR-operations)are performed to generate te

Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behaviour:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended.

The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer(and it Cannot be shorter)than the minimum resolution of the clock(312.5us). The hopping sequence will always Differ from the first one.

1.6 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: ZEATSN43B** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

1.7 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.8 TEST FACILITY

All measurement facilities used to collect the measurement data are located at
Attestation of Global Compliance Co., Ltd.
1F., No.2 Building, Huafeng No.1 Technical Industrial Park, Sanwei, Xixiang, Baoan District, Shenzhen
The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003.
FCC register No.: 259865

1.9 SPECIAL ACCESSORIES

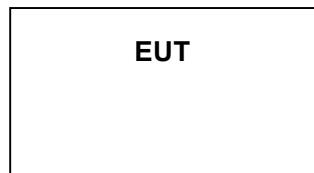
Not available for this EUT intended for grant.

1.10 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1 CONFIGURATION OF TESTED SYSTEM



2.2 EQUIPMENT USED IN TESTED SYSTEM

| Item | Equipment | Mfr/Brand | Model/Type No. | FCC ID |
|------|------------------|-----------|----------------|-----------|
| 1 | Portable scanner | N/A | TSN43B | ZEATSN43B |

3. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|-----------|-----------------------------|-----------|
| §15.207 | Conduction Emission | Compliant |
| §15.209 | Radiated Emission | Compliant |
| §15.247 | Maximum Output Power | Compliant |
| §15.247 | 20 dB Bandwidth | Compliant |
| §15.247 | Band Edges | Compliant |
| §15.247 | Spurious Emission | Compliant |
| §15.247 | Frequency Separation | Compliant |
| §15.247 | Number of Hopping Frequency | Compliant |
| §15.247 | Time of Occupancy | Compliant |

4. DESCRIPTION OF TEST MODES

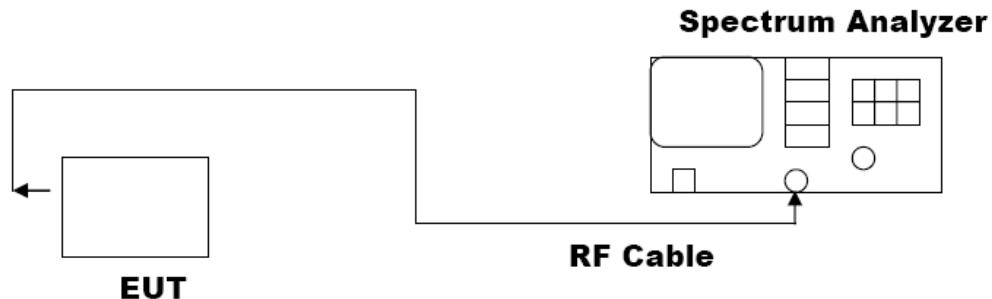
1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency individually.
2. The EUT stays in continuous transmitting mode on the operation frequency being set.

5 MAXIMUM OUTPUT POWER

5.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set SPA Centre Frequency = Operation Frequency, RBW= 3 MHz,
VBW= 3 MHz.
5. Set SPA Trace 1 Max hold, then View.

5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



5.3 MEASUREMENT EQUIPMENT USED

| Description | Manufacturer | Model | SERIAL NUMBER | Cal. Date | Cal. Due |
|-----------------------|-------------------|-------------|---------------|------------|------------|
| Spectrum Analyzer | Agilent | E4440A | N/A | 06/29/2010 | 06/28/2011 |
| Amplifier | EM | EM30180 | 0607030 | 06/29/2010 | 06/28/2011 |
| Horn Antenna | EM | EM-AH-10180 | N/A | 06/29/2010 | 06/28/2011 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | N/A | 06/29/2010 | 06/28/2011 |
| Amplifier | EM | EM30180 | N/A | 06/29/2010 | 06/28/2011 |
| Biological Antenna | A.H. Systems Inc. | SAS-521-4 | N/A | 06/29/2010 | 06/28/2011 |
| Loop Antenna | Daze | ZN30900N | SEL0097 | 06/29/2010 | 06/28/2011 |
| Isolation Transformer | LETEAC | LTBK | -- | 06/29/2010 | 06/28/2011 |

5.4 LIMITS AND MEASUREMENT RESULT

| 1MBPS LIMITS AND MEASUREMENT RESULT | | | |
|--|-----------------|----------------------------|--------------|
| Frequency (GHz) | Result (dBm) | Applicable Limits (dBm) | Pass or Fail |
| 2.402 | 1.89 | 30 | Pass |
| 2.441 | 1.57 | 30 | Pass |
| 2.480 | 1.68 | 30 | Pass |

| 2MBPS LIMITS AND MEASUREMENT RESULT | | | |
|--|-----------------|----------------------------|--------------|
| Frequency (GHz) | Result (dBm) | Applicable Limits (dBm) | Pass or Fail |
| 2.402 | 1.74 | 30 | Pass |
| 2.441 | 1.69 | 30 | Pass |
| 2.480 | 1.58 | 30 | Pass |

| 3MBPS LIMITS AND MEASUREMENT RESULT | | | |
|--|-----------------|----------------------------|--------------|
| Frequency (GHz) | Result (dBm) | Applicable Limits (dBm) | Pass or Fail |
| 2.402 | 1.55 | 30 | Pass |
| 2.441 | 1.49 | 30 | Pass |
| 2.480 | 1.79 | 30 | Pass |

6 20 DB BANDWIDTH

6.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz,
VBW= 100 KHz.
4. Set SPA Trace 1 Max hold, then View.

6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The Same as described in Section 5.2

6.3 MEASUREMENT EQUIPMENT USED

The same as described in Section 5.3

6.4 LIMITS AND MEASUREMENT RESULTS

| BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT | | | |
|---|--------------------|-------|----------|
| Applicable Limits | Measurement Result | | |
| | Test Data (MHz) | | Criteria |
| -- | Low Channel | 0.957 | PASS |
| | Middle Channel | 0.960 | PASS |
| | High Channel | 0.969 | PASS |

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

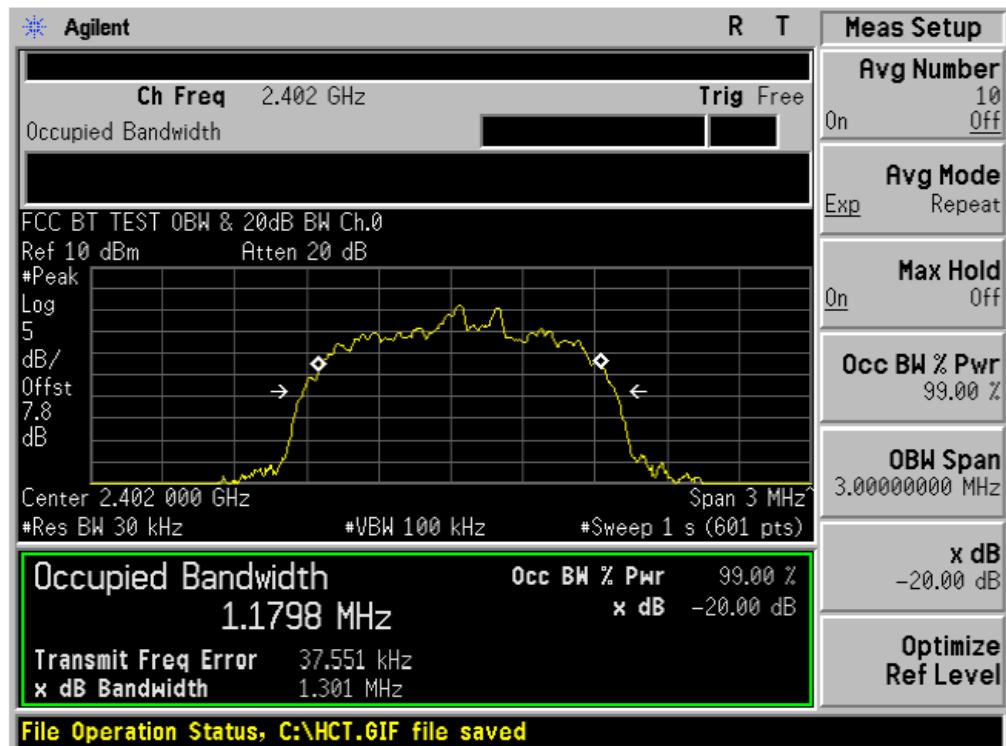


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

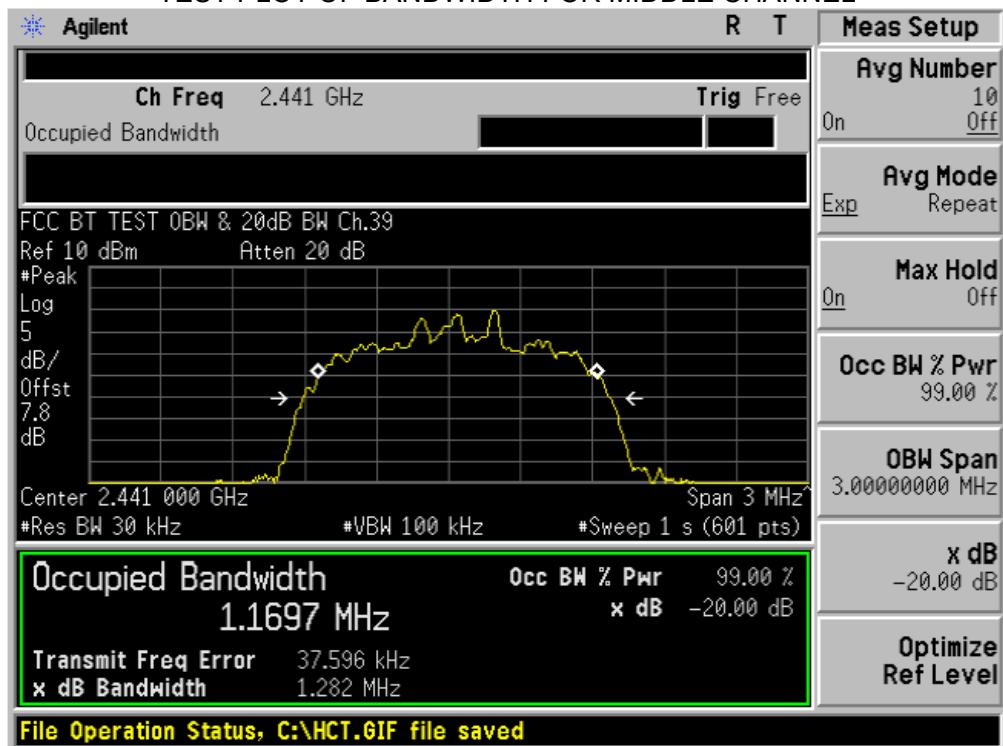


| BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT | | | |
|---|--------------------|----------|------|
| Applicable Limits | Measurement Result | | |
| | Test Data (MHz) | Criteria | |
| -- | Low Channel | 1.301 | PASS |
| | Middle Channel | 1.282 | PASS |
| | High Channel | 1.300 | PASS |

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

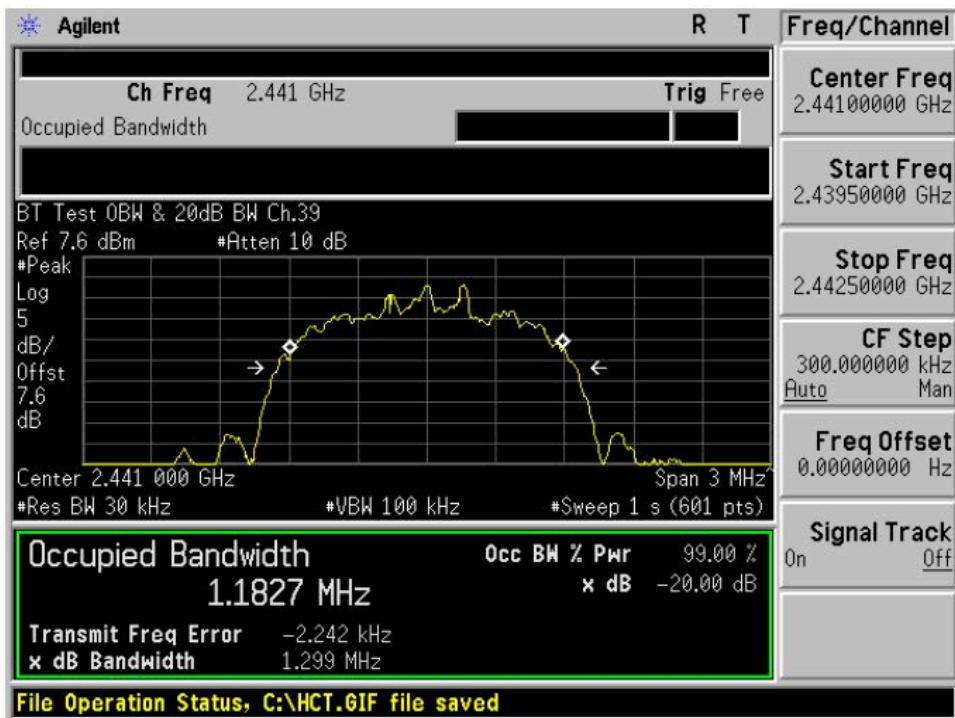


| BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT | | | |
|---|--------------------|-------|----------|
| Applicable Limits | Measurement Result | | |
| | Test Data (MHz) | | Criteria |
| -- | Low Channel | 1.3 | PASS |
| | Middle Channel | 1.299 | PASS |
| | High Channel | 1.298 | PASS |

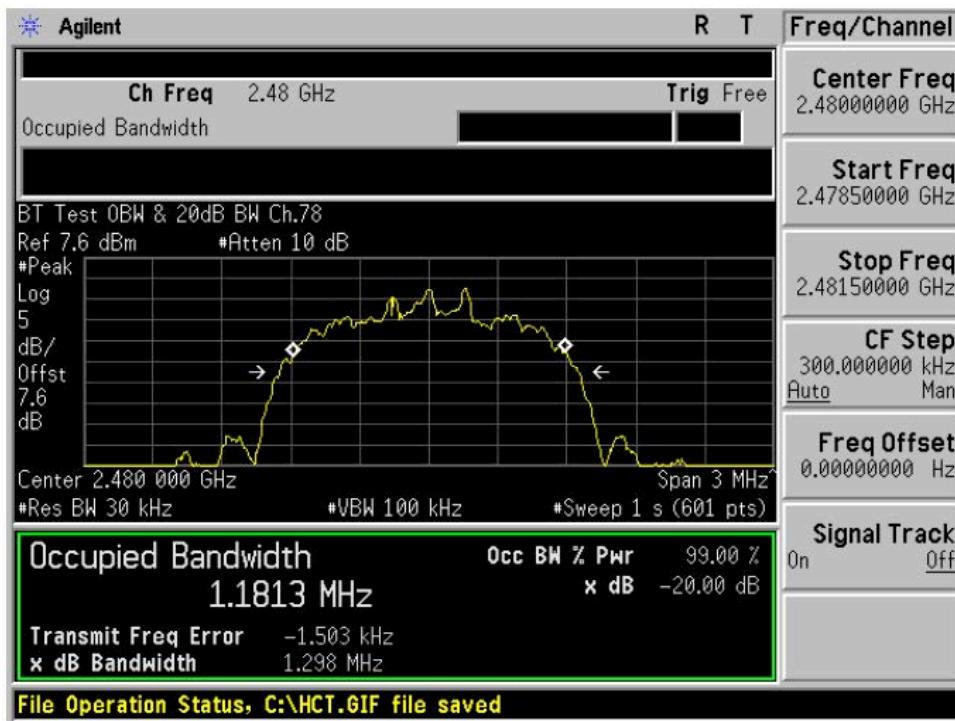
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

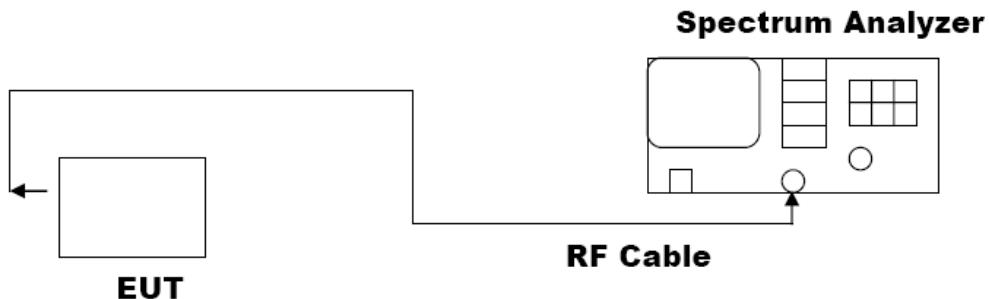


7. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY (N/A)

7.1 MEASUREMENT PROCEDURE

- (1). The EUT was placed on a turn table which is 0.8m above ground plane.
- (2). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (3). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (4). Set SPA Centre Frequency = Operation Frequency, RBW= 3 KHz,
VBW= 10 KHz., Sweep time= Auto
- (5). Set SPA Trace 1 Max hold, then View.

7.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



7.3 MEASUREMENT EQUIPMENT USED

| SHIELDING ROOM | | | | | |
|-------------------|---------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Spectrum Analyzer | Agilent | E4440A | N/A | 06/29/2010 | 06/28/2011 |

7.4 LIMITS AND MEASUREMENT RESULT

| LIMITS AND MEASUREMENT RESULT | | | |
|-------------------------------|----------------------|----|----------|
| Applicable Limits | Measurement Result | | |
| | Test Data (dBm/3KHz) | | Criteria |
| 8 dBm / 3KHz | Low Channel | -- | -- |
| | Middle Channel | -- | -- |
| | High Channel | -- | -- |

8. OUT OF BAND EMISSION

8.1 MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz,
VBW= 100 KHz.
4. Set SPA Trace 1 Max hold, then View.

8.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The Same as described in section 5.2

1. Conducted test setup
2. Radiated Emission test Setup below 1GHz and Above 1GHz

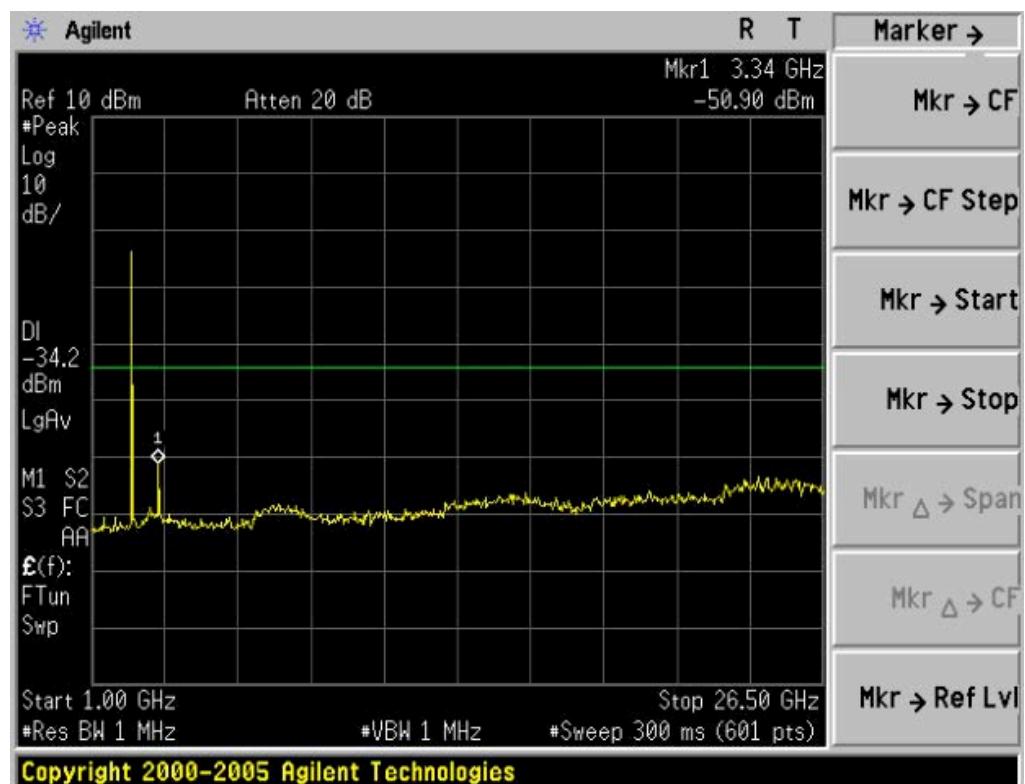
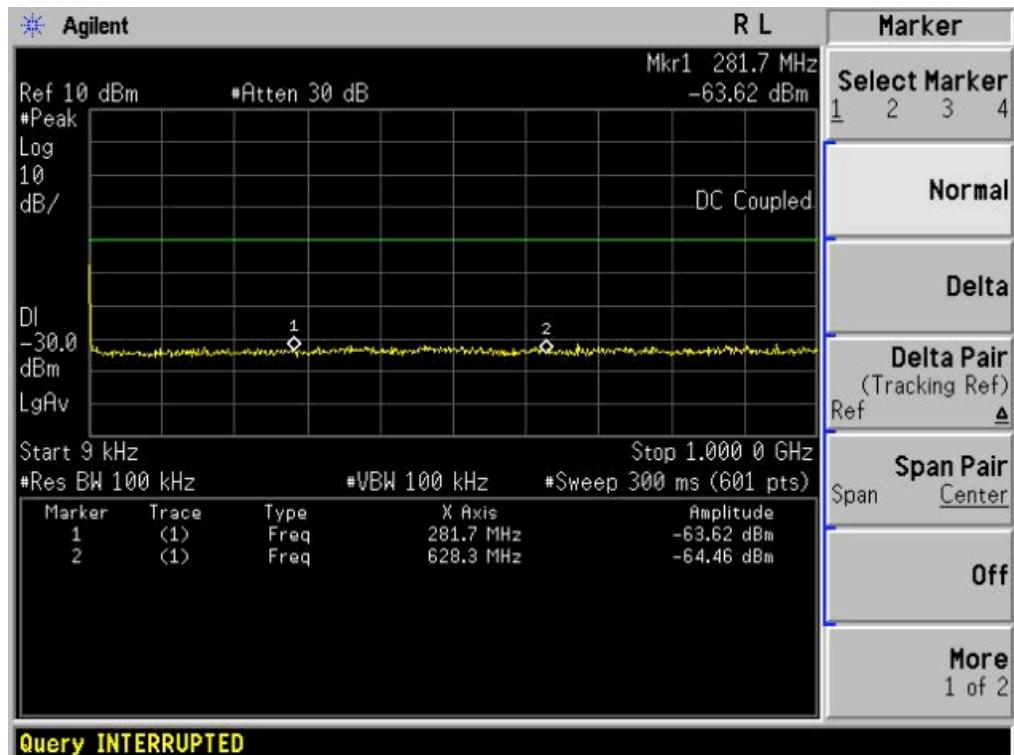
8.3 MEASUREMENT EQUIPMENT USED

The Same as described in section 5.3

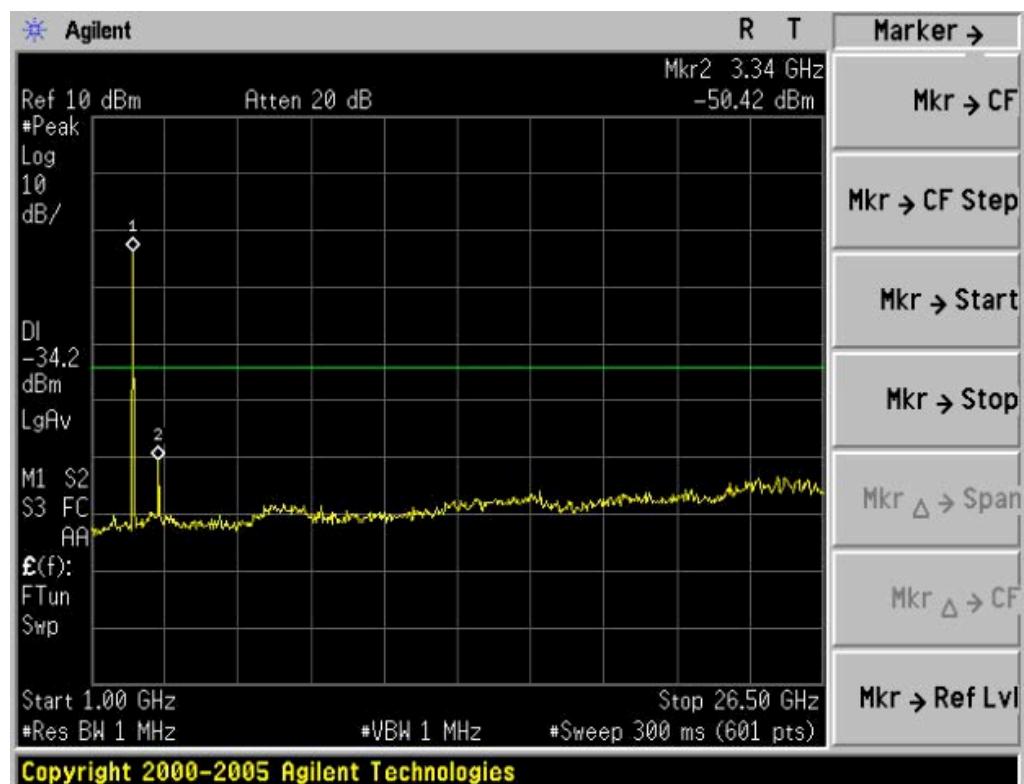
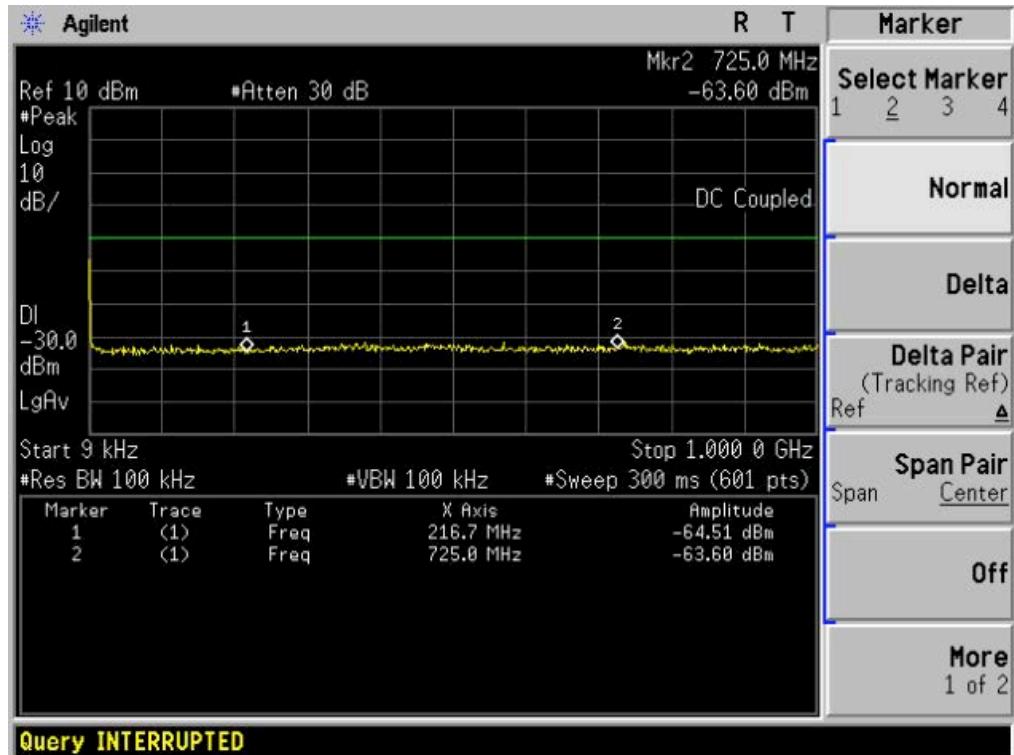
8.4 LIMITS AND MEASUREMENT RESULT

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

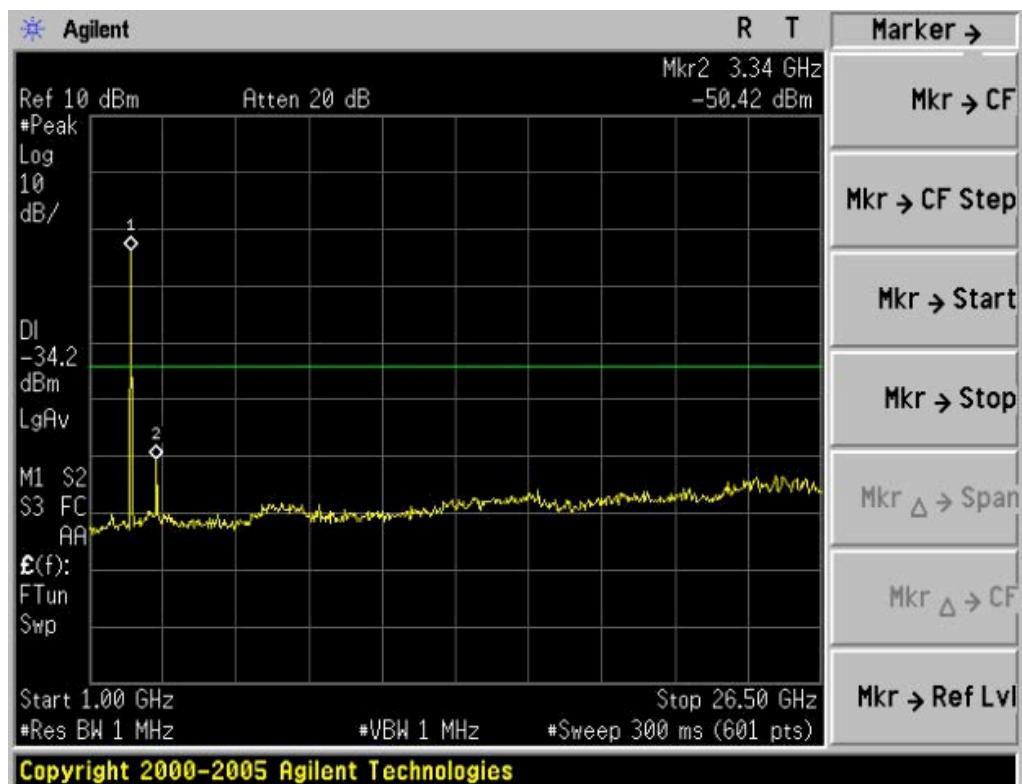
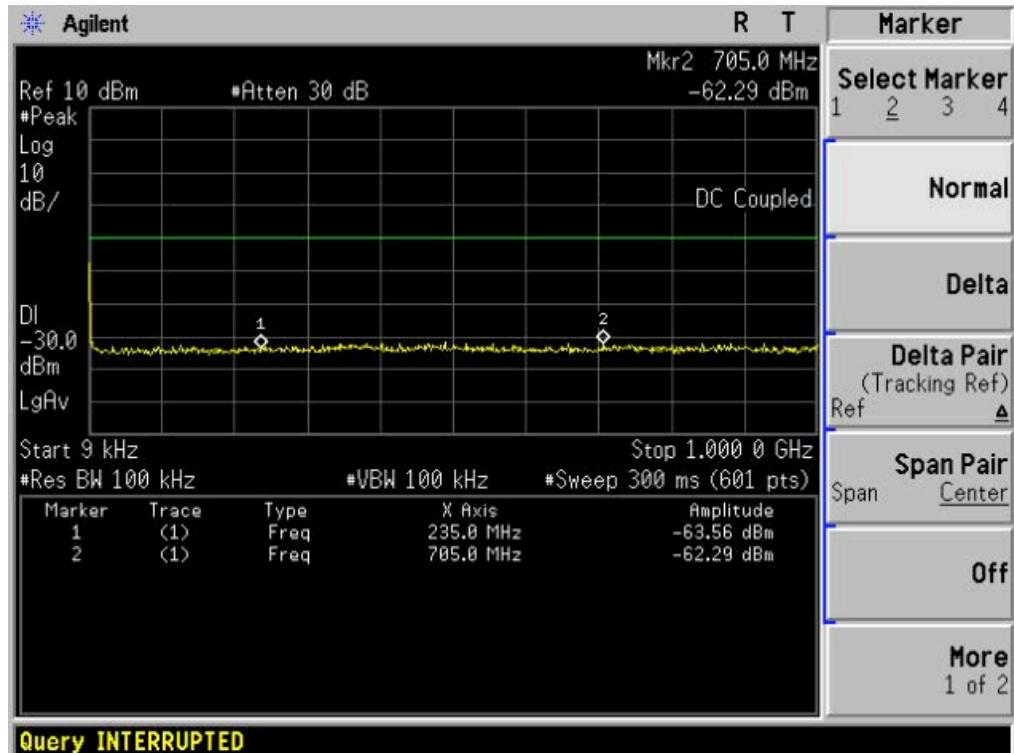
TEST PLOT OF OUT OF BAND EMISSIONS FOR LOW CHANNEL(1Mbps)



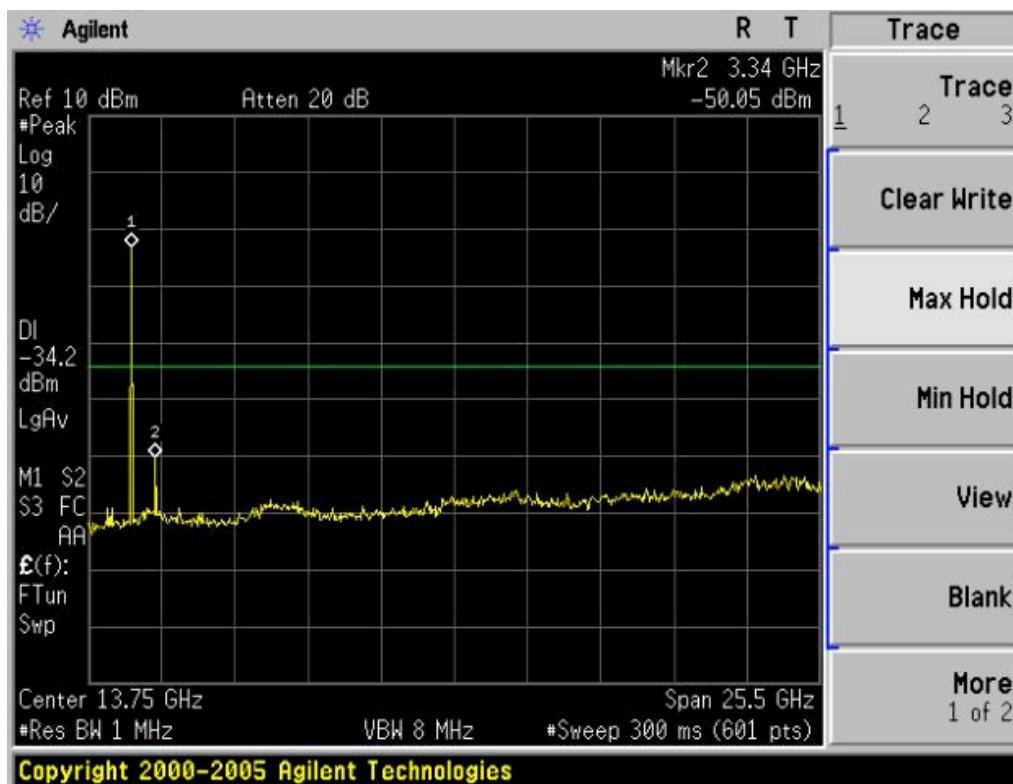
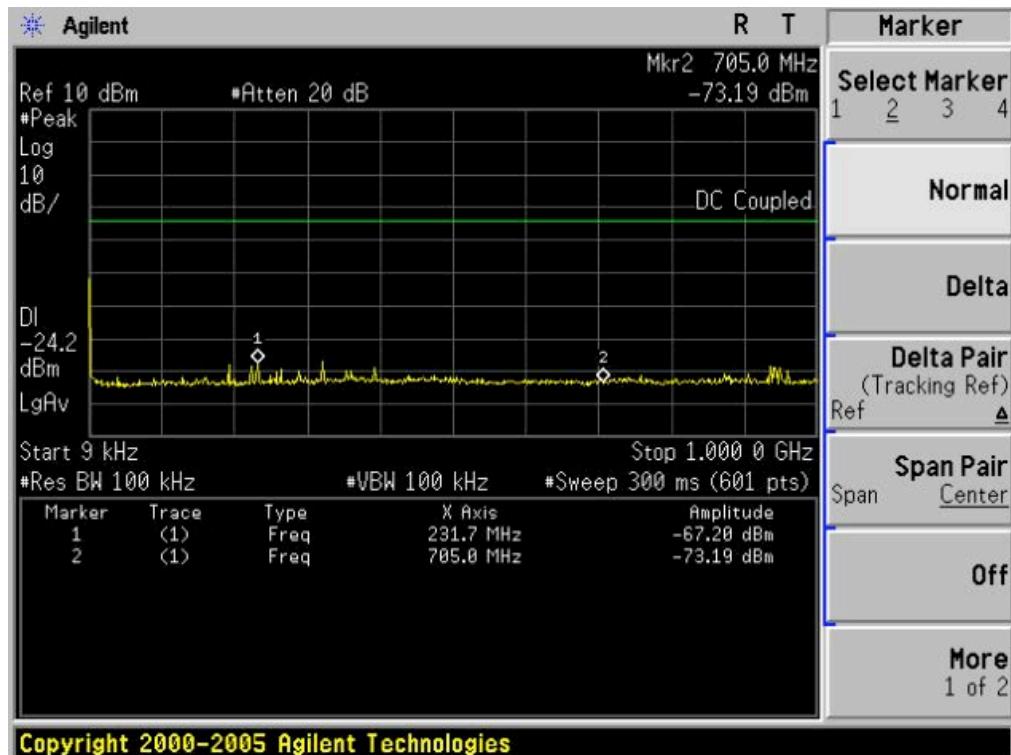
TEST PLOT OF OUT OF BAND EMISSIONS FOR MIDDLE CHANNEL (1Mbps)



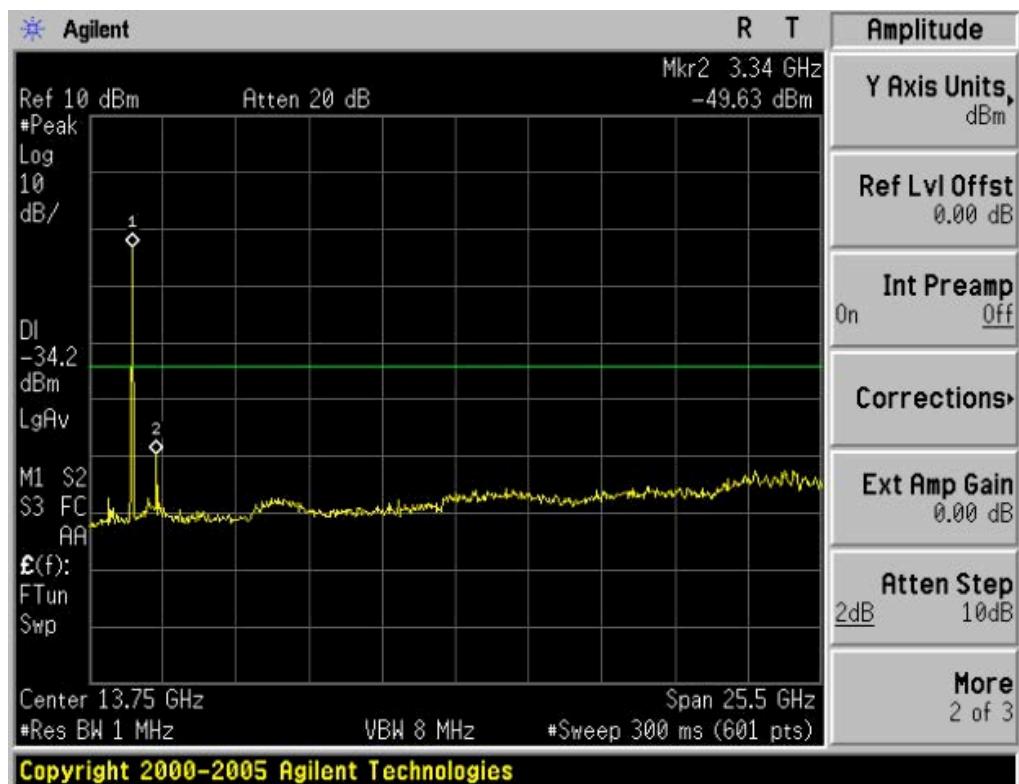
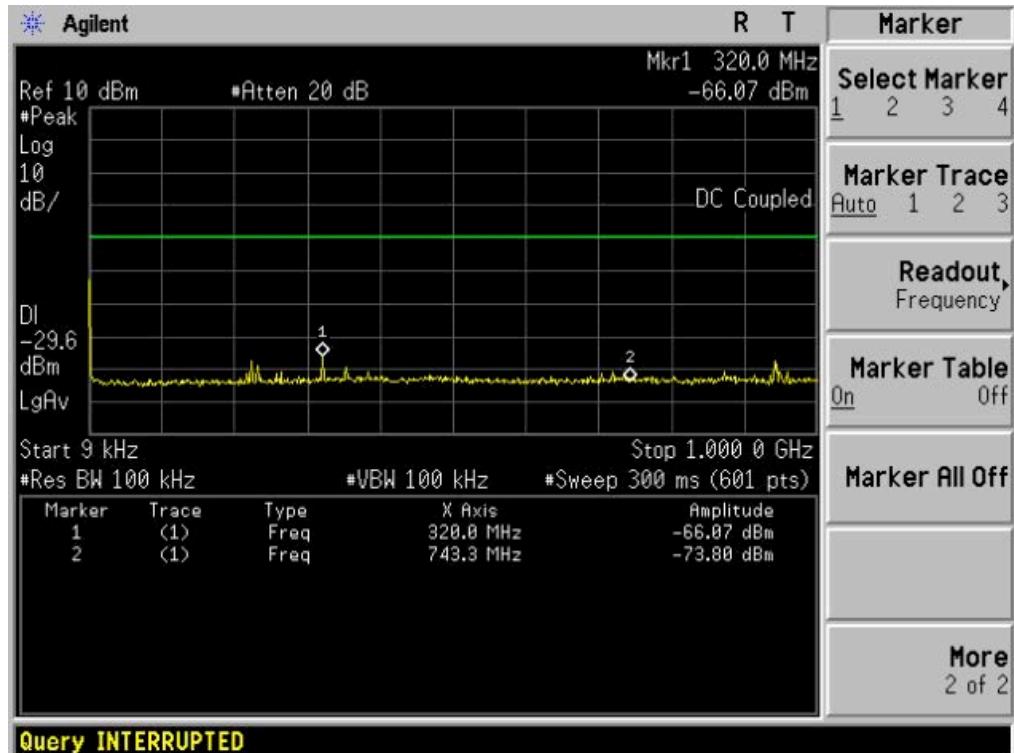
TEST PLOT OF OUT OF BAND EMISSIONS FOR HIGH CHANNEL(1Mbps)



TEST PLOT OF OUT OF BAND EMISSIONS FOR HIGH CHANNEL(2Mbps)



TEST PLOT OF OUT OF BAND EMISSIONS FOR HIGH CHANNEL(3Mbps)



RADIATED EMISSION BELOW 30MHZ

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

RADIATED EMISSION BELOW 1GHZ

| | | | |
|-------------|------------------|-------------------|--------|
| EUT | Portable scanner | Model Name | TSN43B |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | DC4.2V |
| Test Mode | BT2402MHZ | Modulation | GFSK |

| Freq. (MHZ) | Ant.Pol. H/V | Detector (PK/QP) | Reading (dBuV) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------------|-----------------|---------------------|-------------------|----------------|--------------------|-------------------|----------------|
| 42.77 | H | Peak | 15.02 | 15.33 | 30.35 | 40 | -9.65 |
| 124.78 | H | Peak | 16.03 | 14.11 | 30.14 | 43.5 | -13.36 |
| 175.02 | H | Peak | 10.97 | 15.66 | 26.63 | 43.5 | -16.87 |
| 421.74 | H | Peak | 12.85 | 18.74 | 31.95 | 46 | -14.05 |
| 640.89 | H | Peak | 9.36 | 26.02 | 35.38 | 46 | -10.62 |
| 917.25 | H | Peak | 8.48 | 25.14 | 33.62 | 46 | -12.38 |
| <hr/> | | | | | | | |
| 56.25 | V | Peak | 15.45 | 10.25 | 25.70 | 40 | -14.30 |
| 78.03 | V | Peak | 18.25 | 10.74 | 28.99 | 40 | -11.01 |
| 132.78 | V | Peak | 19.62 | 13.88 | 33.50 | 43.5 | -10.00 |
| 174.00 | V | Peak | 13.47 | 18.76 | 32.23 | 43.5 | -11.27 |
| 725.12 | V | Peak | 6.87 | 25.33 | 32.20 | 46 | -13.80 |
| 940.28 | V | Peak | 5.02 | 27.02 | 32.04 | 46 | -13.96 |

| | | | |
|-----------|------------------|-------------------|--------|
| EUT | Portable scanner | Model Name | TSN43B |
| | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | DC4.2V |
| Test Mode | BT2441MHZ | Modulation | GFSK |

| Freq. (MHZ) | Ant.Pol. H/V | Detector (PK/QP) | Reading (dBuV) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------------|-----------------|---------------------|-------------------|----------------|--------------------|-------------------|----------------|
| -- | H | Peak | -- | -- | -- | -- | -- |
| -- | H | Peak | -- | -- | -- | -- | -- |
| -- | V | Peak | -- | -- | -- | -- | -- |
| -- | V | Peak | -- | -- | -- | -- | -- |

| | | | |
|-------------|------------------|-------------------|--------|
| EUT | Portable scanner | Model Name | TSN43B |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | DC4.2V |
| Test Mode | BT2480MHZ | Modulation | GFSK |

| Freq. (MHZ) | Ant.Pol. H/V | Detector (PK/QP) | Reading (dBuV) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------------|-----------------|---------------------|-------------------|----------------|--------------------|-------------------|----------------|
| -- | H | Peak | -- | -- | -- | -- | -- |
| -- | H | Peak | -- | -- | -- | -- | -- |
| -- | V | Peak | -- | -- | -- | -- | -- |
| -- | V | Peak | -- | -- | -- | -- | -- |

| | | | |
|-------------|---------------------|-------------------|--------------------------|
| EUT | Portable scanner | Model Name | TSN43B |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | DC4.2V |
| Test Mode | BT2402/2441/2480MHZ | Modulation | $\pi/4$ -DQPSK 8-DPSK |

| Freq. (MHZ) | Ant.Pol. H/V | Detector (PK/QP) | Reading (dBuV) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------------|-----------------|---------------------|-------------------|----------------|--------------------|-------------------|----------------|
| -- | H | Peak | -- | -- | -- | -- | -- |
| -- | H | Peak | -- | -- | -- | -- | -- |
| -- | V | Peak | -- | -- | -- | -- | -- |
| -- | V | Peak | -- | -- | -- | -- | -- |

Note: "--"means the mode at least have 20dB margin.

RADIATED EMISSION ABOVE 1GHZ

| | | | | | | | |
|-------------|---------------------|--|--|-------------------|--------|--|--|
| EUT | Portable scanner | | | Model Name | TSN43B | | |
| Temperature | 25° C | | | Relative Humidity | 55.4% | | |
| Pressure | 960hPa | | | Test Voltage | DC4.2V | | |
| Test Mode | BT2402/2441/2480MHZ | | | Modulation | GFSK | | |

| Freq. (MHZ) | Ant.Pol. H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Factor (dB) | Result | | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin |
|----------------|-----------------|---------------------------|-------------------------|----------------|------------------|----------------|---------------------------|-------------------------|--------|
| | | | | | Peak (dBuV/m) | AV (dBuV/m) | | | |
| -- | H | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | H | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | V | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | V | -- | -- | -- | -- | -- | -- | -- | -- |

| | | | | | | | |
|-------------|---------------------|--|--|-------------------|--------------------------|--|--|
| EUT | Portable scanner | | | Model Name | TSN43B | | |
| Temperature | 25° C | | | Relative Humidity | 55.4% | | |
| Pressure | 960hPa | | | Test Voltage | DC4.2V | | |
| Test Mode | BT2402/2441/2480MHZ | | | Modulation | $\pi/4$ -DQPSK 8-DPSK | | |

| Freq. (MHZ) | Ant.Pol. H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Factor (dB) | Result | | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin |
|----------------|-----------------|---------------------------|-------------------------|----------------|------------------|----------------|---------------------------|-------------------------|--------|
| | | | | | Peak (dBuV/m) | AV (dBuV/m) | | | |
| -- | H | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | H | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | V | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | V | -- | -- | -- | -- | -- | -- | -- | -- |

Note: This Handheld EUT was tested in 3 orthogonal positions and the worst-case data was presented.

Note: "--" means the mode at least have 20dB margin.

9 BAND EDGE EMISSION

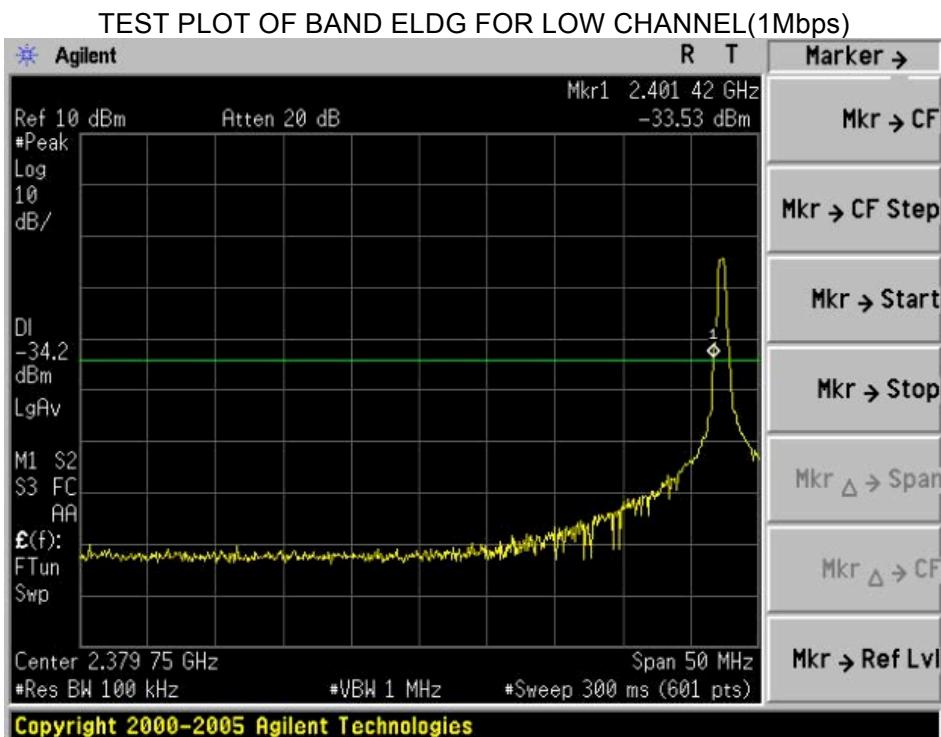
9.1 MEASUREMENT PROCEDURE

1. Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency = Operation Frequency, RBW= 100kHz,
3. The band edges was measured and recorded.

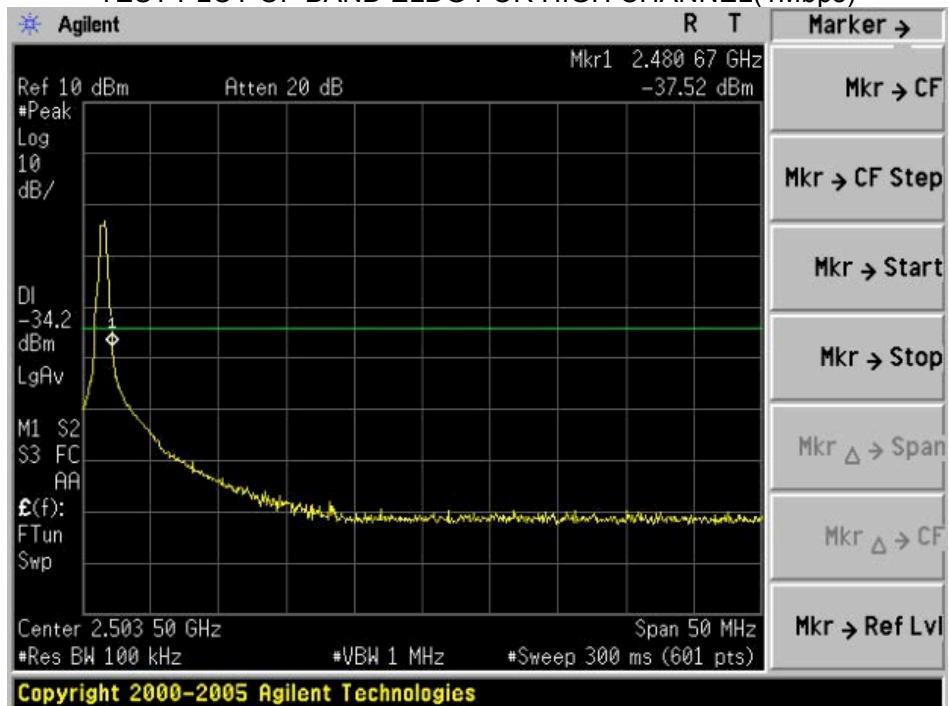
9.2 TEST SET-UP

The Same as described in section 5.2

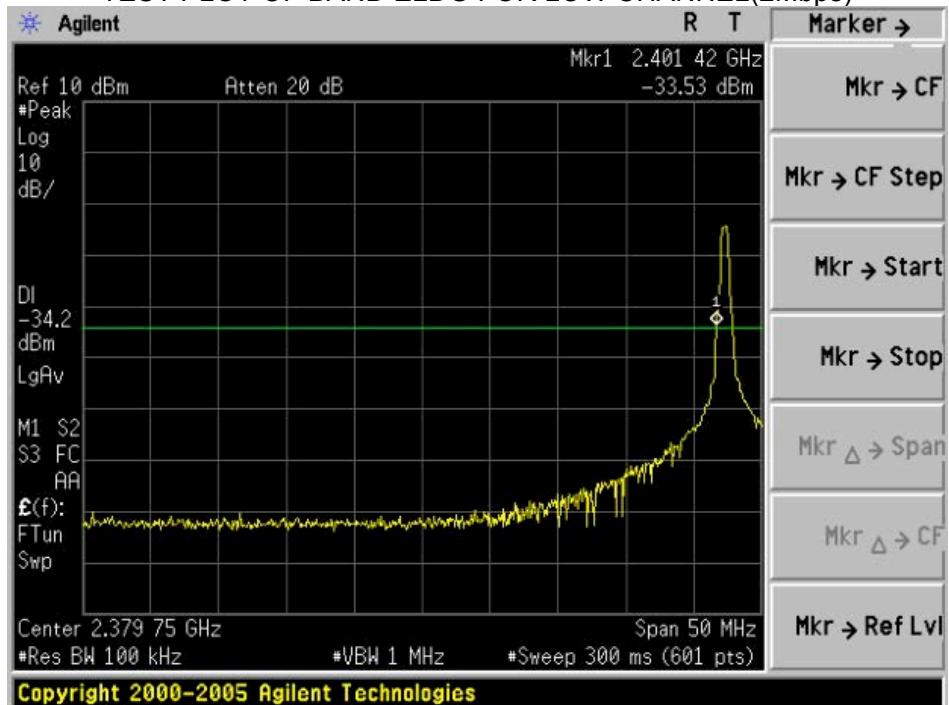
9.3 TEST RESULT



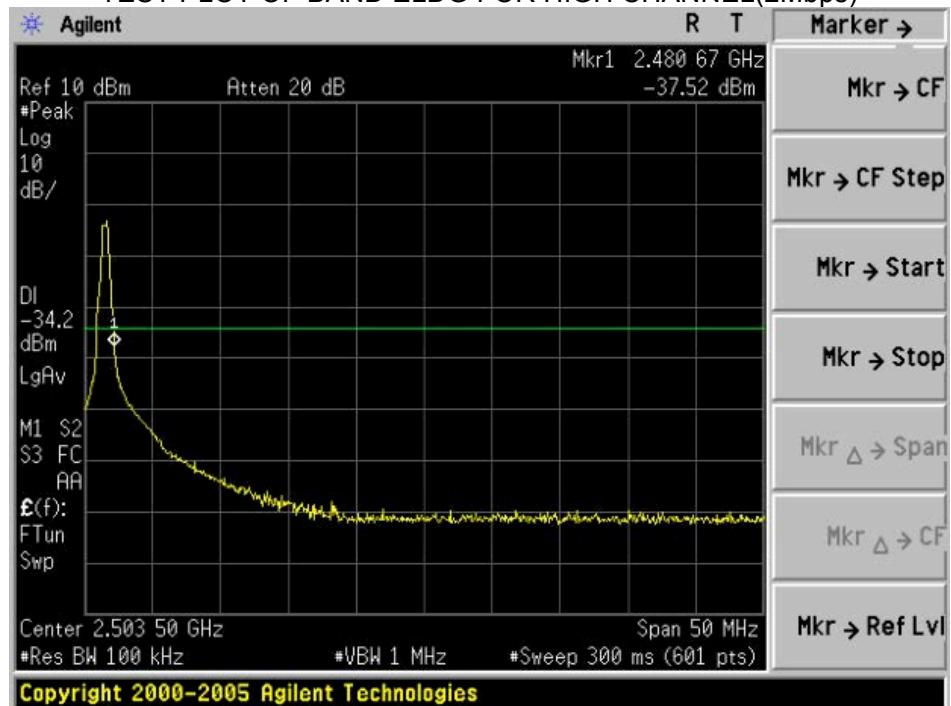
TEST PLOT OF BAND ELDG FOR HIGH CHANNEL(1Mbps)



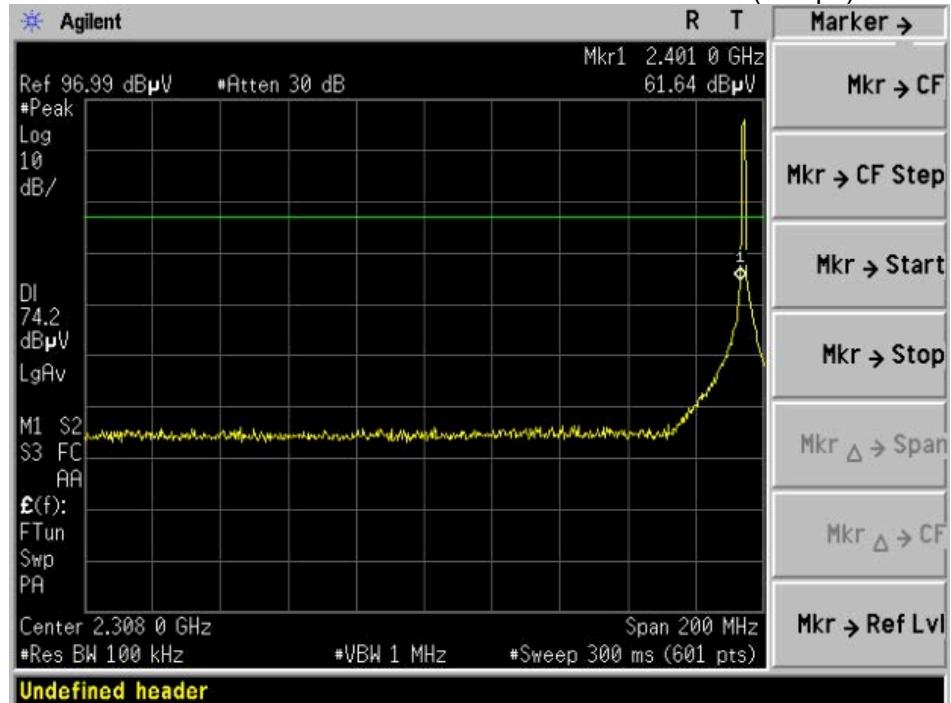
TEST PLOT OF BAND ELDG FOR LOW CHANNEL(2Mbps)



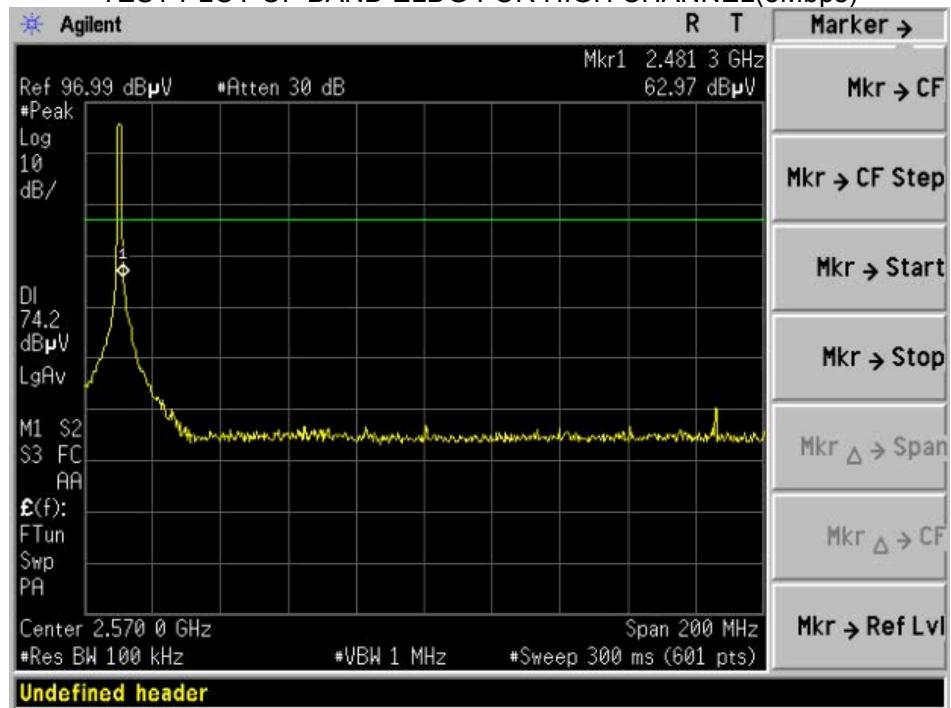
TEST PLOT OF BAND ELDG FOR HIGH CHANNEL(2Mbps)



TEST PLOT OF BAND ELDG FOR LOW CHANNEL(3Mbps)



TEST PLOT OF BAND ELDG FOR HIGH CHANNEL(3Mbps)



| | | | |
|-------------|------------------|-------------------|---------------------------|
| EUT | Portable scanner | Model Name | TSN43B |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | DC4.2V |
| Test Mode | BT2402MHZ | Modulation | GFSK,π /4-DQPSK 8-DPSK |

| Freq. (MHZ) | Ant.Pol. H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Factor (dB) | Result | | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin |
|----------------|-----------------|---------------------------|-------------------------|----------------|------------------|----------------|---------------------------|-------------------------|--------|
| | | | | | Peak (dBuV/m) | AV (dBuV/m) | | | |
| -- | H | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | H | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | V | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | V | -- | -- | -- | -- | -- | -- | -- | -- |

| | | | |
|-------------|------------------|-------------------|---------------------------|
| EUT | Portable scanner | Model Name | TSN43B |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | DC4.2V |
| Test Mode | BT2480MHZ | Modulation | GFSK,π /4-DQPSK 8-DPSK |

| Freq. (MHZ) | Ant.Pol. H/V | Peak Reading (dBuV) | AV Reading (dBuV) | Factor (dB) | Result | | Peak Limit (dBuV/m) | AV Limit (dBuV/m) | Margin |
|----------------|-----------------|---------------------------|-------------------------|----------------|------------------|----------------|---------------------------|-------------------------|--------|
| | | | | | Peak (dBuV/m) | AV (dBuV/m) | | | |
| -- | H | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | H | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | V | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | V | -- | -- | -- | -- | -- | -- | -- | -- |

Note: "--"means other frequencies at least have 20dB margin.

The other modulation modes comply with standard requirement and at least have 20dB margin.

10 NUMBER OF HOPPING FREQUENCY

10.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz
4. Set the Spectrum Analyzer as RBW = 100KHZ

10.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2

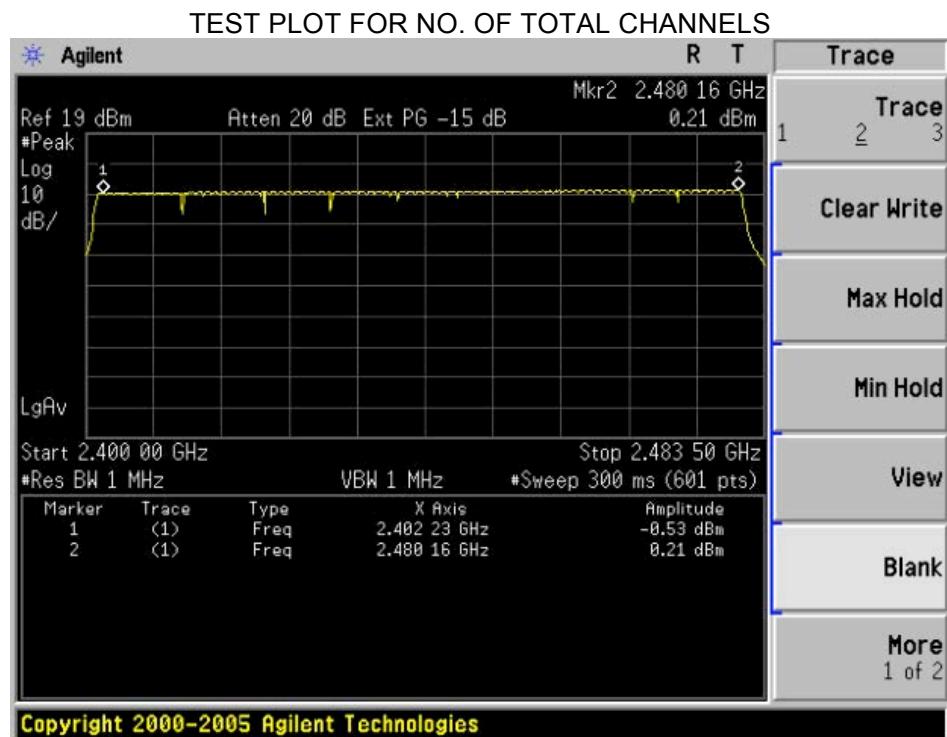
1. Conducted Method.

10.3 MEASUREMENT EQUIPMENT USED

The Same as described in section 5.3

10.4 LIMITS AND MEASUREMENT RESULT

| TOTAL NO. OF HOPPING CHANNEL | LIMIT (NO. OF CH) | MEASUREMENT (NO. OF CH) | RESULT |
|------------------------------|-------------------|-------------------------|--------|
| | >=15 | 79 | PASS |



11 TIME OF OCCUPANCY (DWELL TIME)

11.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set center frequency of spectrum analyzer = Operating frequency
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0 Hz,

11.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2
Conducted Method

11.3 MEASUREMENT EQUIPMENT USED

The same as described in section 5.3

11.4 LIMITS AND MEASUREMENT RESULT

Bluetooth 1Mbps Test Result

| Channel | Time of Pulse for DH5 (ms) | Period Time (s) | Sweep Time (ms) | Limit (ms) |
|---------|----------------------------|-----------------|-----------------|------------|
| Low | 2.90 | 31.6 | 309.33 | 400 |
| Middle | 2.86 | 31.6 | 305.07 | 400 |
| High | 2.88 | 31.6 | 307.20 | 400 |

Low Channel Time

$2.90 * (1600/6) / 79 * 31.6 = 309.33\text{ms}$

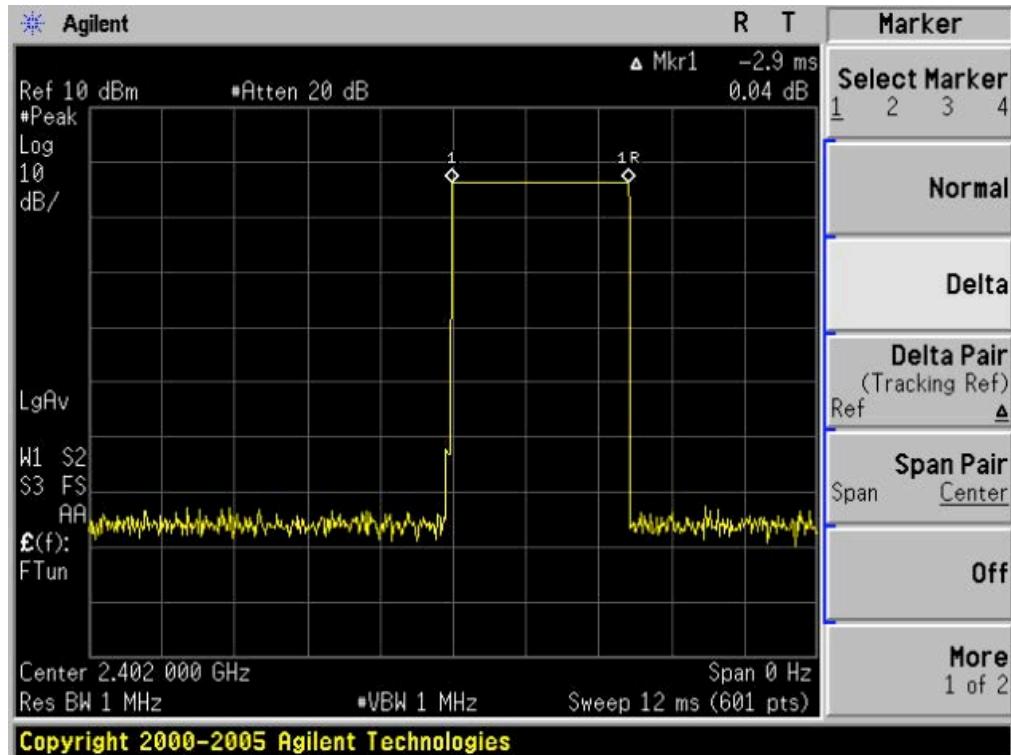
Middle Channel Time

$2.86 * (1600/6) / 79 * 31.6 = 305.07\text{ms}$

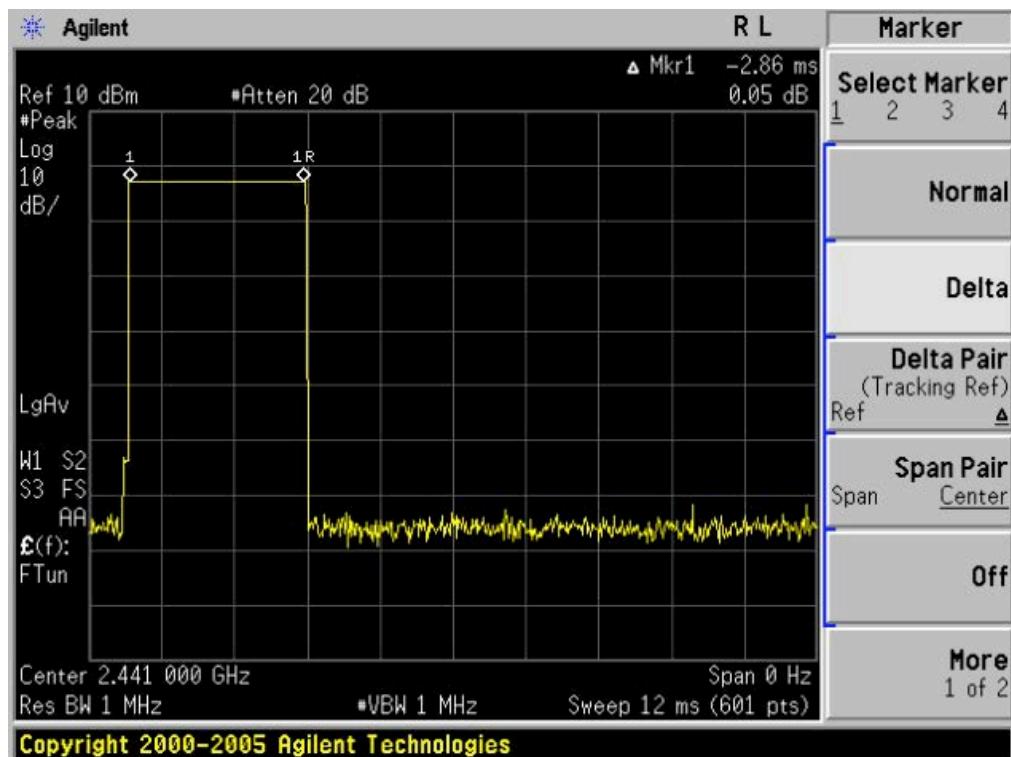
High Channel Time

$2.88 * (1600/6) / 79 * 31.6 = 307.20\text{ms}$

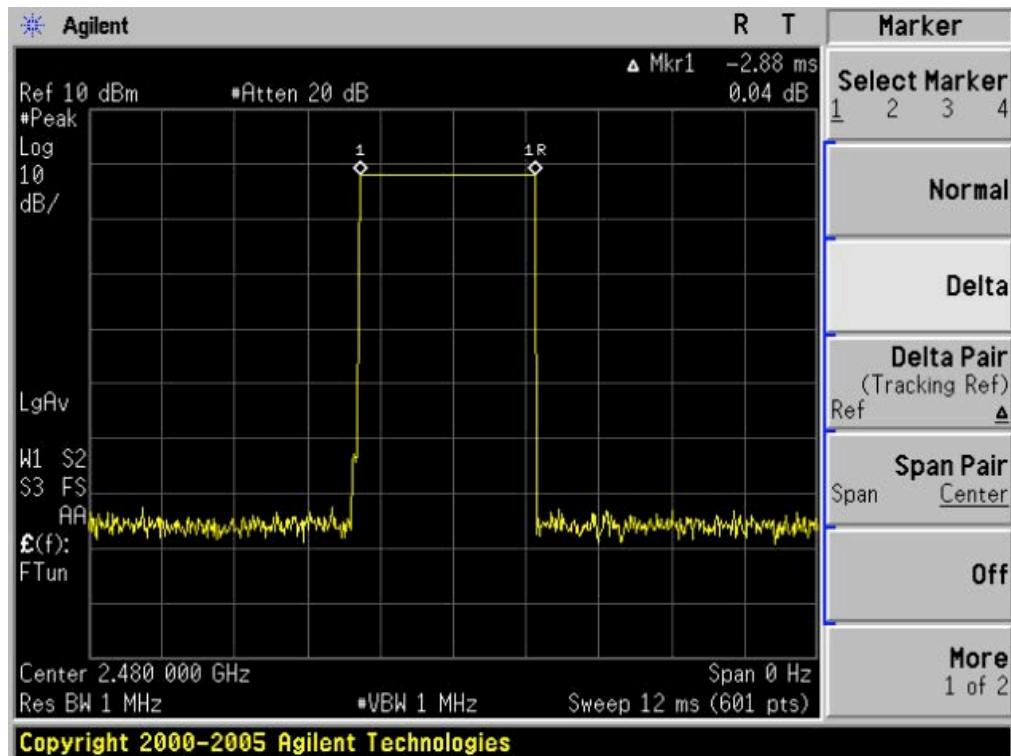
TEST PLOT OF LOW CHANNEL



TEST PLOT OF MIDDLE CHANNEL



TEST PLOT OF HIGH CHANNEL



Bluetooth 2Mbps Test Result

| Channel | Time of Pulse for DH5 (ms) | Period Time (s) | Sweep Time (ms) | Limit (ms) |
|---------|----------------------------|-----------------|-----------------|------------|
| Low | 2.92 | 31.6 | 311.47 | 400 |
| Middle | 2.88 | 31.6 | 307.20 | 400 |
| High | 2.893 | 31.6 | 308.59 | 400 |

Low Channel Time

$$2.92 * (1600/6) / 79 * 31.6 = 311.47 \text{ ms}$$

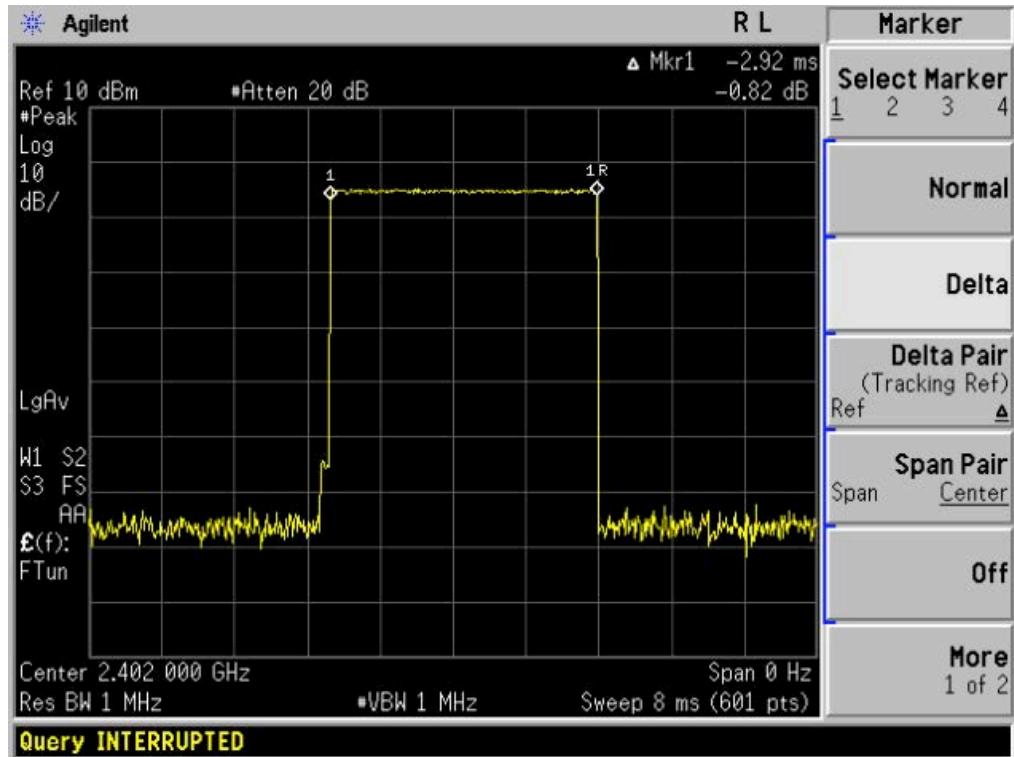
Middle Channel Time

$$2.88 * (1600/6) / 79 * 31.6 = 307.20 \text{ ms}$$

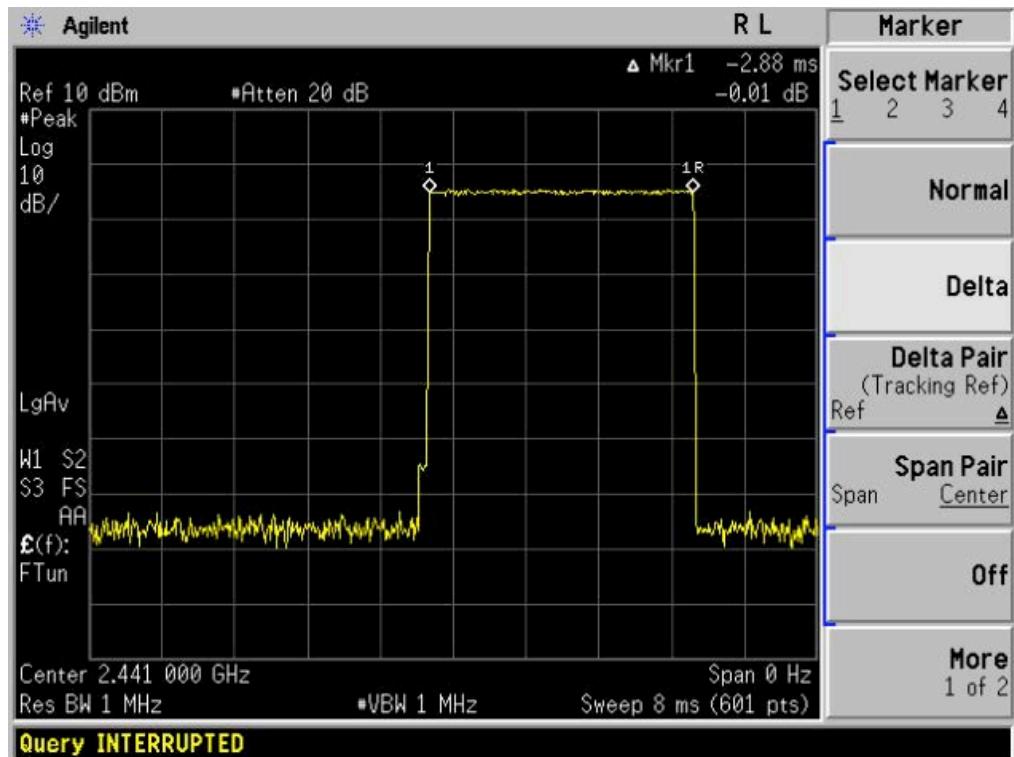
High Channel Time

$$2.893 * (1600/6) / 79 * 31.6 = 308.59 \text{ ms}$$

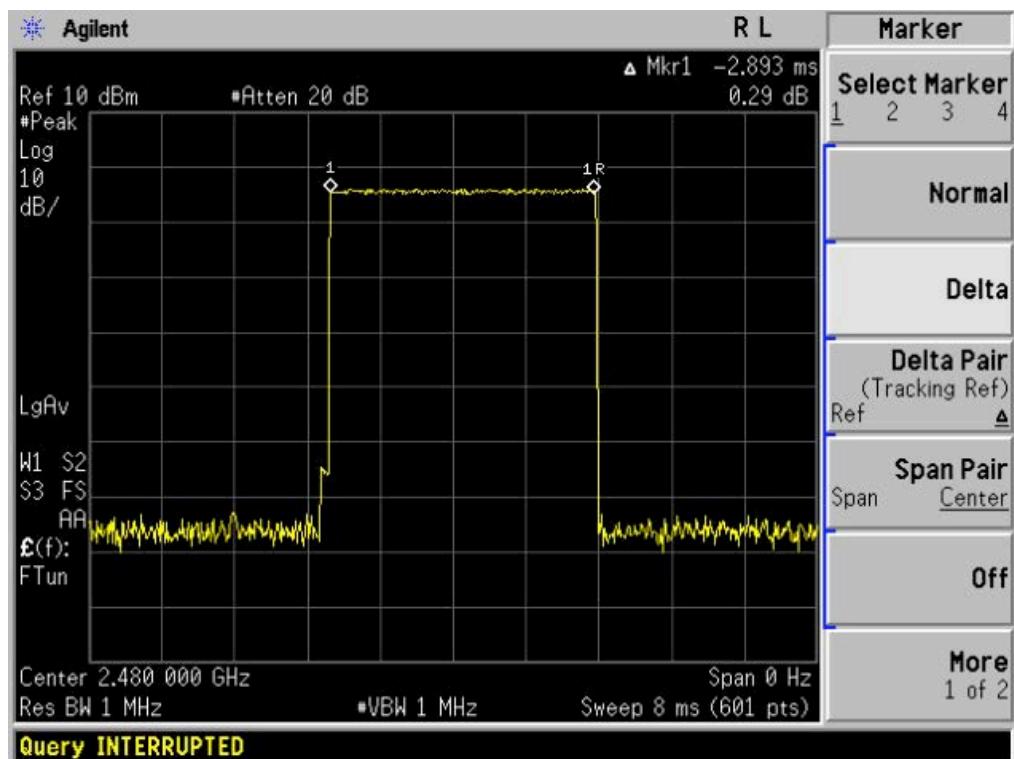
TEST PLOT OF LOW CHANNEL



TEST PLOT OF MIDDLE CHANNEL



TEST PLOT OF HIGH CHANNEL



Bluetooth 3Mbps Test Result

| Channel | Time of Pulse for DH5 (ms) | Period Time (s) | Sweep Time (ms) | Limit (ms) |
|---------|----------------------------|-----------------|-----------------|------------|
| Low | 2.905 | 31.6 | 309.87 | 400 |
| Middle | 2.905 | 31.6 | 309.87 | 400 |
| High | 2.917 | 31.6 | 311.15 | 400 |

Low Channel Time

$$2.905 * (1600/6) / 79 * 31.6 = 309.87 \text{ ms}$$

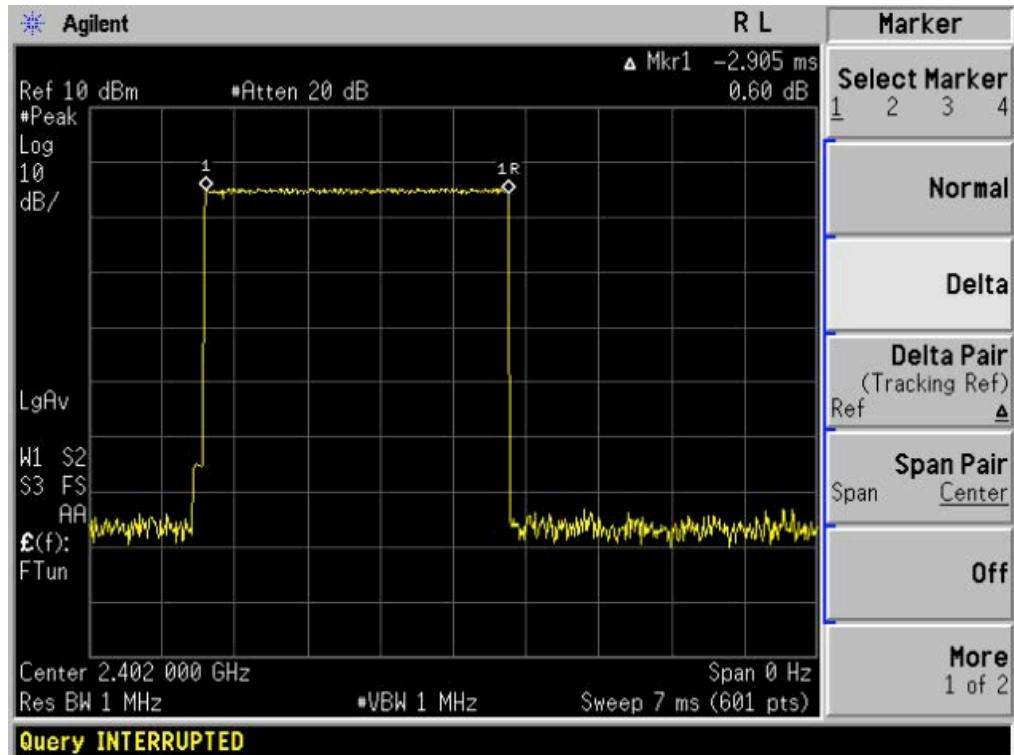
Middle Channel Time

$$2.905 * (1600/6) / 79 * 31.6 = 309.87 \text{ ms}$$

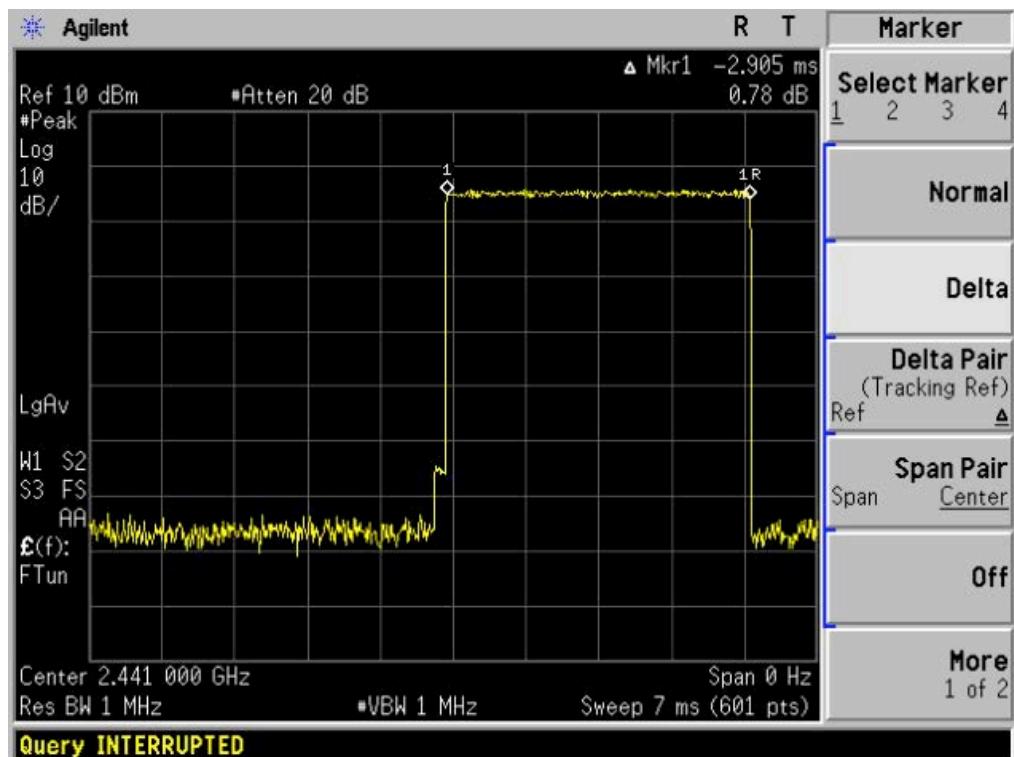
High Channel Time

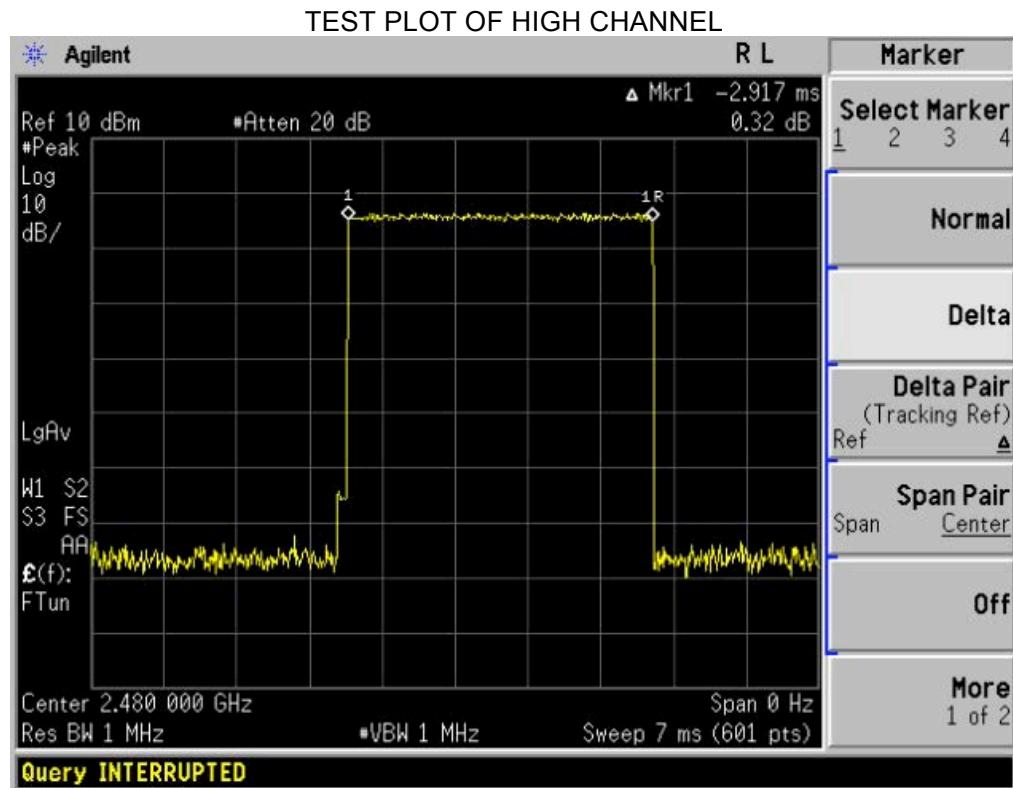
$$2.917 * (1600/6) / 79 * 31.6 = 311.15 \text{ ms}$$

TEST PLOT OF LOW CHANNEL



TEST PLOT OF MIDDLE CHANNEL





12. FREQUENCY SEPARATION

12.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set center frequency of spectrum analyzer = Middle of Operating frequency
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 5 MHz,

12.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2

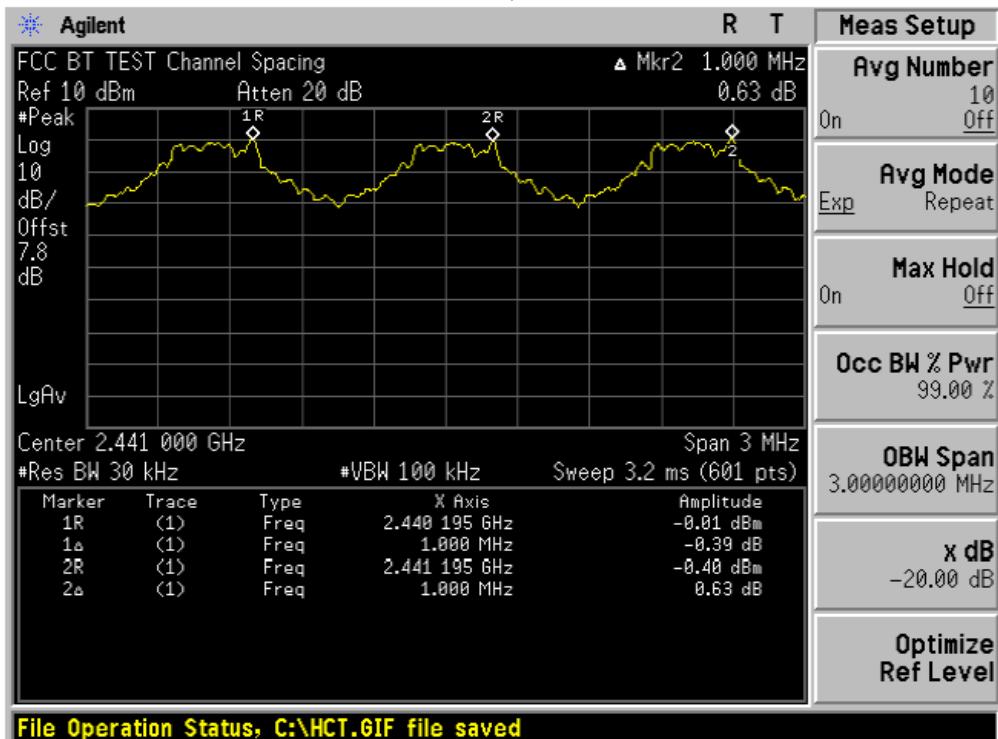
12.3 MEASUREMENT EQUIPMENT USED

The same as described in section 5.3

12.4 LIMITS AND MEASUREMENT RESULT

| BLUETOOTH 1MBPS TEST RESULT | | | |
|-----------------------------|--------------------|-----------------------------|--------|
| CHANNEL | CHANNEL SEPARATION | LIMIT | RESULT |
| | KHz | KHz | |
| CH00-CH01 | 1000 | >=25 KHz or 2/3 20 dB BW | Pass |

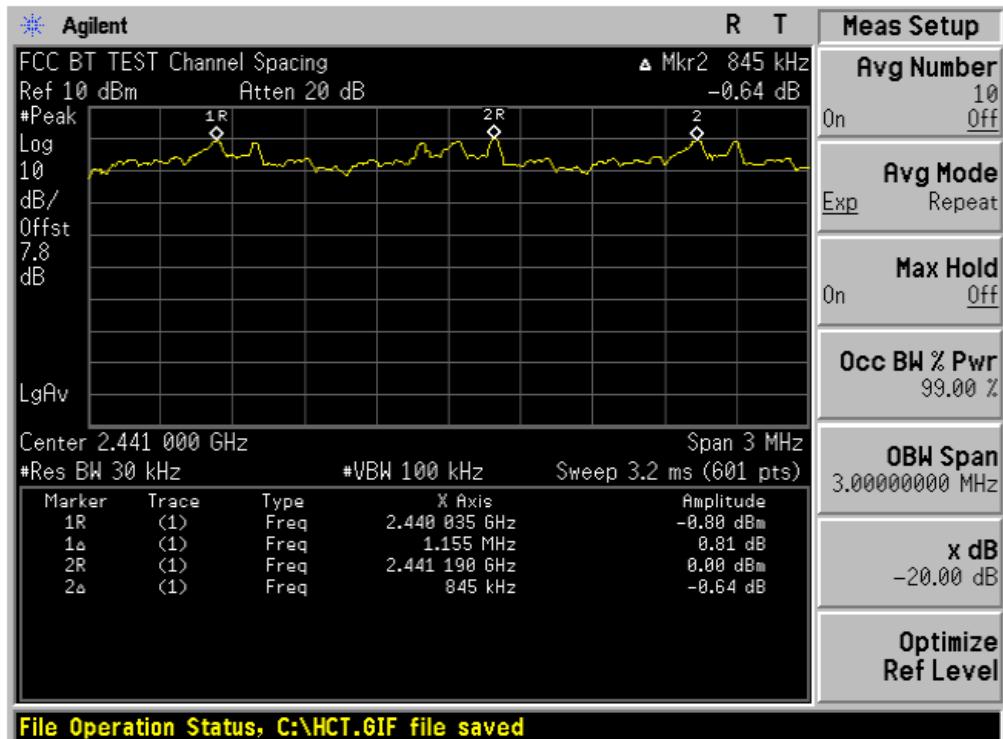
TEST PLOT FOR FREQUENCY SEPARATION



BLUETOOTH 2MBPS TEST RESULT

| CHANNEL | CHANNEL SEPARATION | LIMIT | RESULT |
|-----------|-----------------------|-----------------------------|--------|
| | KHz | KHz | |
| CH00-CH01 | 1155 | >=25 KHz or 2/3 20 dB BW | Pass |

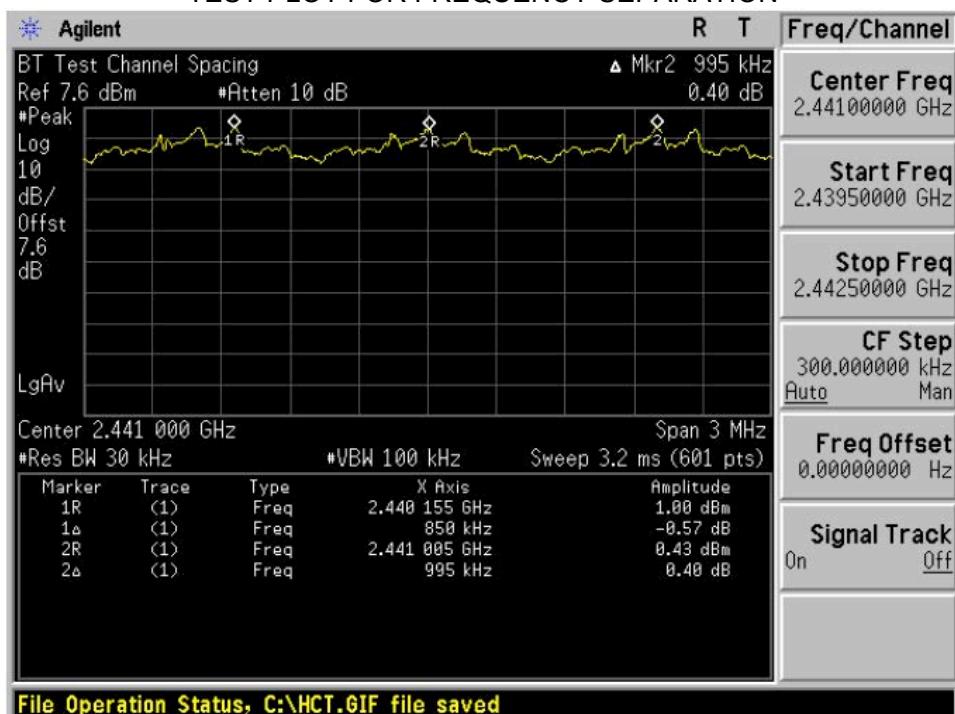
TEST PLOT FOR FREQUENCY SEPARATION



TEST PLOT FOR FREQUENCY SEPARATION

| CHANNEL | CHANNEL SEPARATION | LIMIT | RESULT |
|-----------|-----------------------|-----------------------------|--------|
| | KHz | KHz | |
| CH00-CH01 | 995 | >=25 KHz or 2/3 20 dB BW | Pass |

TEST PLOT FOR FREQUENCY SEPARATION



13 FCC LINE CONDUCTED EMISSION TEST

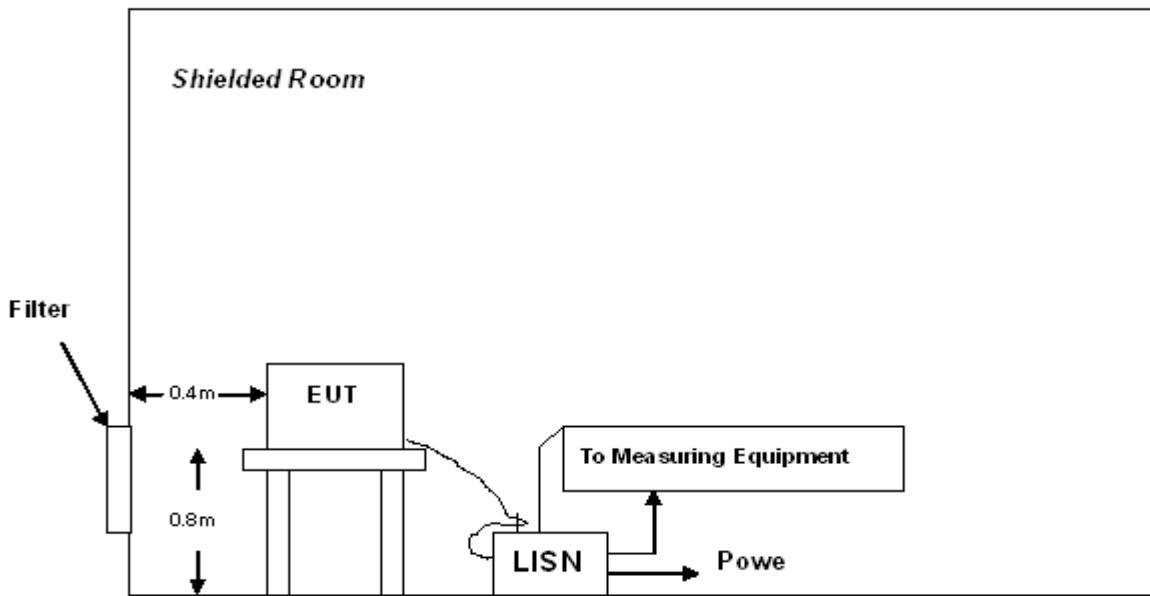
13.1 LIMITS OF LINE CONDUCTED EMISSION TEST

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

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

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

13.2 BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



A: Powered through filter

13.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) All support equipments received AC120V power from a LISN, if any.
- 5) The EUT received DC4.5V by adapter and adapter received AC120V from LISN.
- 6) The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

| Preliminary Line Conducted Emission Test | | | | |
|--|------------|-------------------|---------------|-------------------------------------|
| Frequency Range Investigated | | 150 KHz TO 30 MHz | | |
| Mode of operation | Date | Report No. | Data# | Worst Mode |
| Charging | 03/21/2011 | AGC00B110103F2 | TSN43B-1(L,N) | <input checked="" type="checkbox"/> |

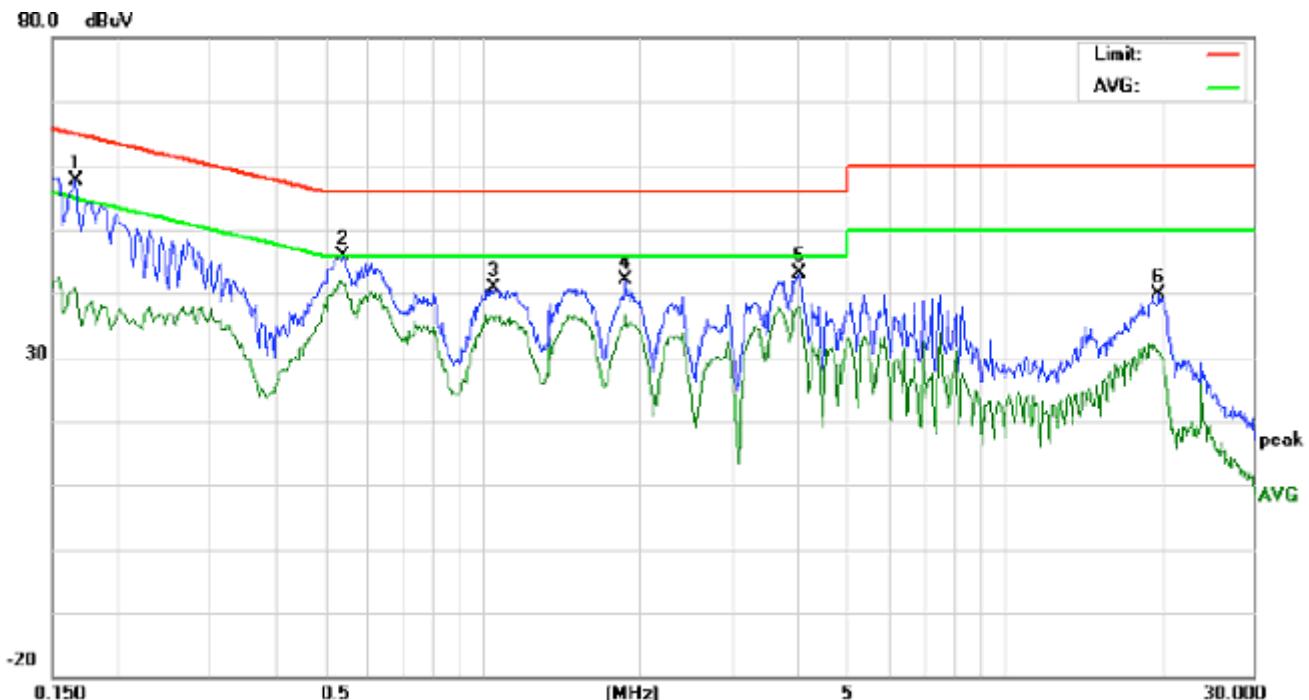
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

13.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

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

13.5 TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L



Site: Conduction Phase: *L1* Temperature: 26

Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 60 %

EUT: Portable scanner

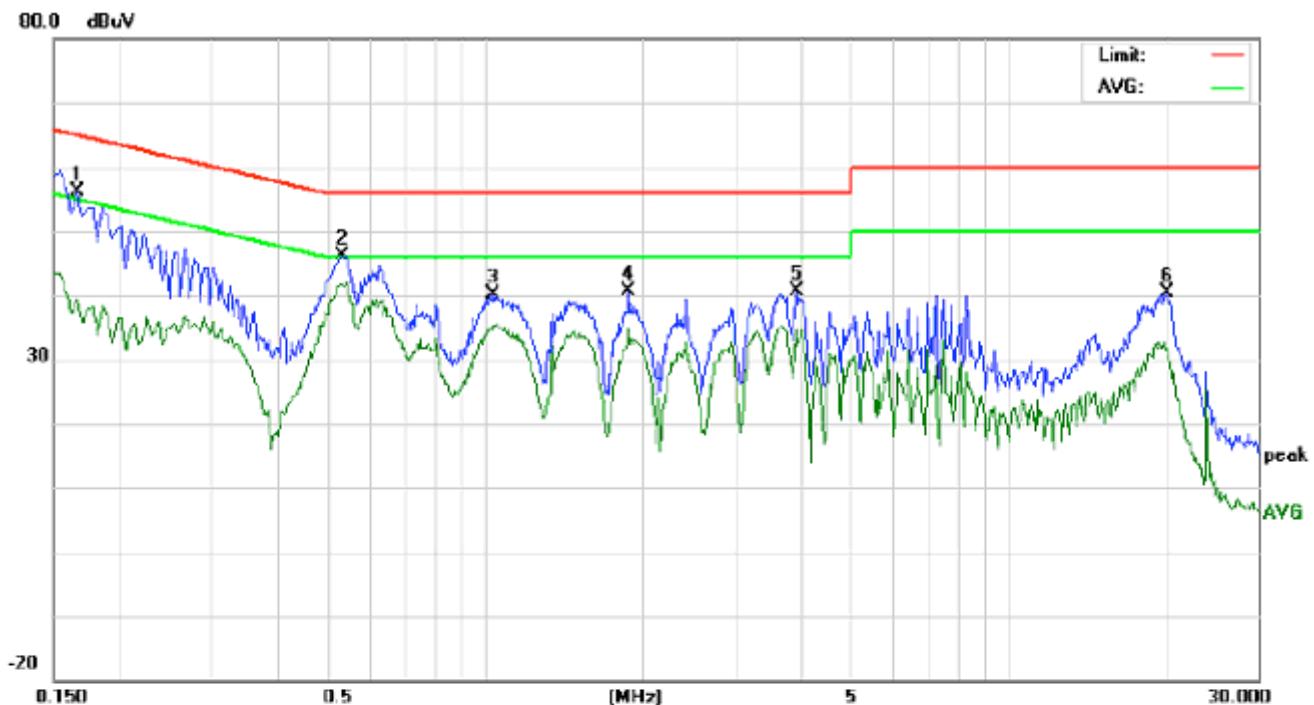
M/N: TSN43B

Mode:CHARGING

Note:

| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|-----|----------------|-------------------------|----|-------|-------------------|-----------------------|----|-------|-----------------|-------|----------------|--------|-----|---------|
| | | Peak | QP | AVG | | Peak | QP | AVG | QP | AVG | QP | AVG | | |
| 1 | 0.1660 | 47.43 | | 30.82 | 10.18 | 57.61 | | 41.00 | 65.15 | 55.15 | -7.54 | -14.15 | P | |
| 2 | 0.5420 | 35.48 | | 31.05 | 10.36 | 45.84 | | 41.41 | 56.00 | 46.00 | -10.16 | -4.59 | P | |
| 3 | 1.0500 | 30.40 | | 25.69 | 10.37 | 40.77 | | 36.06 | 56.00 | 46.00 | -15.23 | -9.94 | P | |
| 4 | 1.8820 | 31.80 | | 26.48 | 10.26 | 42.06 | | 36.74 | 56.00 | 46.00 | -13.94 | -9.26 | P | |
| 5 | 4.0580 | 32.82 | | 27.48 | 10.40 | 43.22 | | 37.88 | 56.00 | 46.00 | -12.78 | -8.12 | P | |
| 6 | 19.7540 | 29.74 | | 20.82 | 10.11 | 39.85 | | 30.93 | 60.00 | 50.00 | -20.15 | -19.07 | P | |

Line Conducted Emission Test Line 2-N



Site: Conduction Phase: **N** Temperature: 26
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 60 %
 EUT: Portable scanner
 M/N: TSN43B
 Mode: CHARGING
 Note:

| No. | Freq. (MHz) | Reading Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|-----|----------------|-------------------------|----|-------|----------------|-----------------------|------|-------|-----------------|-------|----------------|--------|-----|---------|
| | | Peak | QP | AVG | | dB | Peak | QP | AVG | QP | AVG | QP | AVG | |
| 1 | 0.1660 | 46.00 | | 29.31 | 10.18 | 56.18 | | 39.49 | 65.15 | 55.15 | -8.97 | -15.66 | P | |
| 2 | 0.5340 | 35.66 | | 31.15 | 10.37 | 46.03 | | 41.52 | 56.00 | 46.00 | -9.97 | -4.48 | P | |
| 3 | 1.0380 | 29.73 | | 24.60 | 10.37 | 40.10 | | 34.97 | 56.00 | 46.00 | -15.90 | -11.03 | P | |
| 4 | 1.8820 | 30.31 | | 24.57 | 10.26 | 40.57 | | 34.83 | 56.00 | 46.00 | -15.43 | -11.17 | P | |
| 5 | 3.9460 | 30.07 | | 21.72 | 10.44 | 40.51 | | 32.16 | 56.00 | 46.00 | -15.49 | -13.84 | P | |
| 6 | 20.0980 | 30.26 | | 21.03 | 10.11 | 40.37 | | 31.14 | 60.00 | 50.00 | -19.63 | -18.86 | P | |

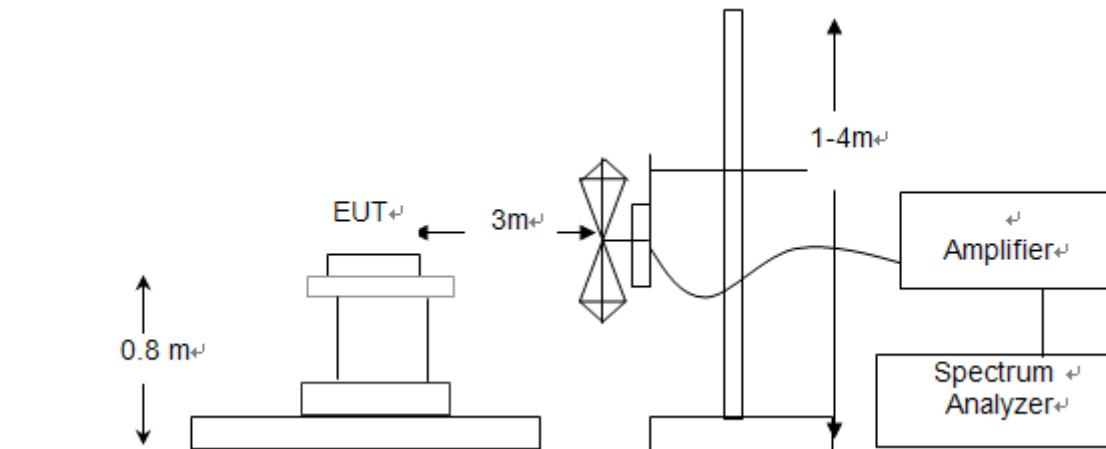
14 FCC RADIATED EMISSION TEST

14.1 LIMITS OF RADIATED EMISSION TEST

| Frequency (MHz) | Distance (m) | Maximum Field Strength Limit (dBuV/m/ Q.P.) |
|-----------------|--------------|---|
| 30~88 | 3 | 40.0 |
| 88~216 | 3 | 43.5 |
| 216~960 | 3 | 46.0 |
| Above 960 | 3 | 54.0 |

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

14.2 BLOCK DIAGRAM OF RADIATED EMISSION TEST



14.3 PRELIMINARY PROCEDURE OF RADIATED EMISSION TEST

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used).
- 2) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 3) The EUT received DC 4.5V power by battery.
- 4) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 5) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 6) The test mode was scanned during the preliminary test.

Then, the EUT and cable(s) configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for final testing.

| Preliminary Radiated Emission Test | | | | |
|------------------------------------|------------|----------------|---------------|-------------------------------------|
| Frequency Range Investigated | | 30MHZ~1GHZ | | |
| Mode of operation | Date | Report No. | Data# | Worst Mode |
| Bluetooth | 03/21/2011 | AGC00B110103F2 | TSN43B-0(H,V) | <input checked="" type="checkbox"/> |

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

14.4 FINAL PROCEDURE OF RADIATED EMISSION TEST

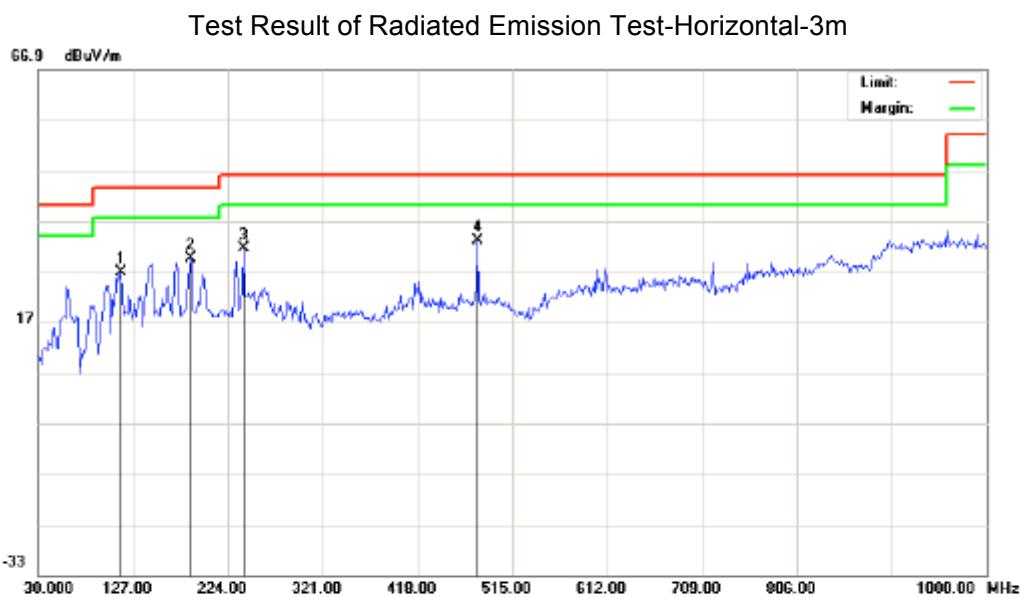
EUT and support equipment were set up on the turntable as per step 6 of the preliminary test.

The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P/Peak. reading is presented.

The test data of the worst case condition(s) was reported on the Summary Data page.

14.5 TEST RESULT OF RADIATED EMISSION TEST



| | | |
|---------------------------------|---------------------------------|-----------------|
| Site: site #1 | Polarization: Horizontal | Temperature: 26 |
| Limit: FCC Class B 3M Radiation | Power: DC4.5V | Humidity: 60 % |
| EUT: Portable scanner | Distance: 3m | |
| M/N: TSN43B | | |
| Mode:Bluetooth | | |
| Note: | | |

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna | Table | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|---------|--------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | Height | Degree | |
| 1 | | 114.0667 | 11.70 | 15.09 | 26.79 | 43.50 | -16.71 | peak | | | |
| 2 | | 185.2000 | 13.60 | 15.96 | 29.56 | 43.50 | -13.94 | peak | | | |
| 3 | | 240.1667 | 14.30 | 17.23 | 31.53 | 46.00 | -14.47 | peak | | | |
| 4 | * | 479.4333 | 11.39 | 21.87 | 33.06 | 46.00 | -12.94 | peak | | | |

Test Result of Radiated Emission Test-Vertical-3m



Site: site #1 Polarization: **Vertical** Temperature: 26
Limit: FCC Class B 3M Radiation Power: DC4.5V Humidity: 60 %
EUT: Portable scanner Distance: 3m
M/N: TSN43B
Mode: Bluetooth
Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 180.3500 | 15.34 | 18.66 | 34.00 | 43.50 | -9.50 | peak | | | |
| 2 | | 479.4333 | 11.93 | 21.67 | 33.60 | 46.00 | -12.40 | peak | | | |
| 3 | | 595.8333 | 9.47 | 24.87 | 34.34 | 46.00 | -11.66 | peak | | | |
| 4 | | 720.3167 | 6.48 | 26.15 | 32.63 | 46.00 | -13.37 | peak | | | |

APPENDIX I
PHOTOGRAPHS OF THE EUT

WHOLE VIEW OF SAMPLE



TOP VIEW OF SAMPLE



BOTTOM VIEW OF SAMPLE



LEFT VIEW OF SAMPLE



RIGHT VIEW OF SAMPLE



FRONT VIEW OF SAMPLE



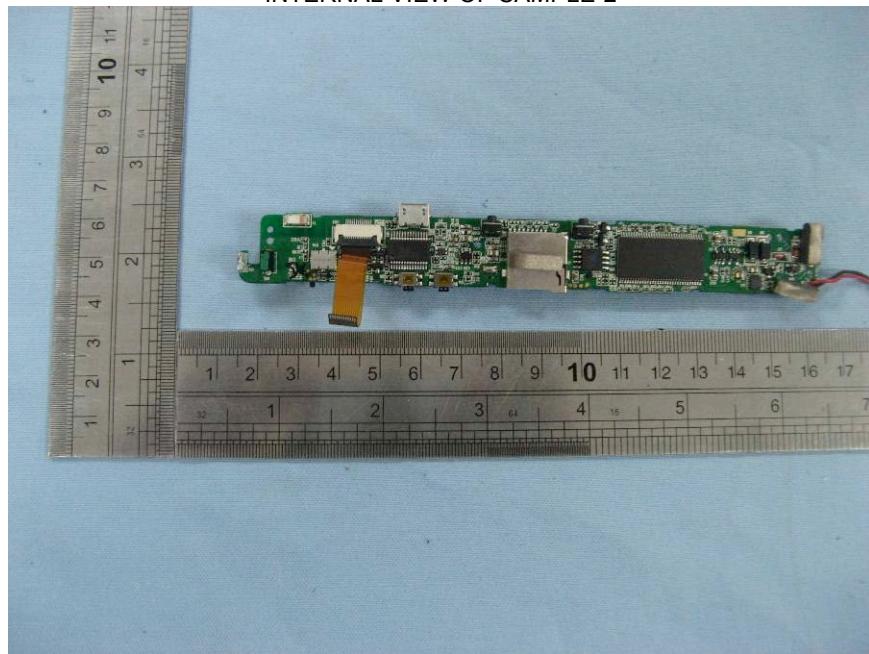
BACK VEIW OF SAMPLE



INTERNAL VIEW OF SAMPLE-1



INTERNAL VIEW OF SAMPLE-2

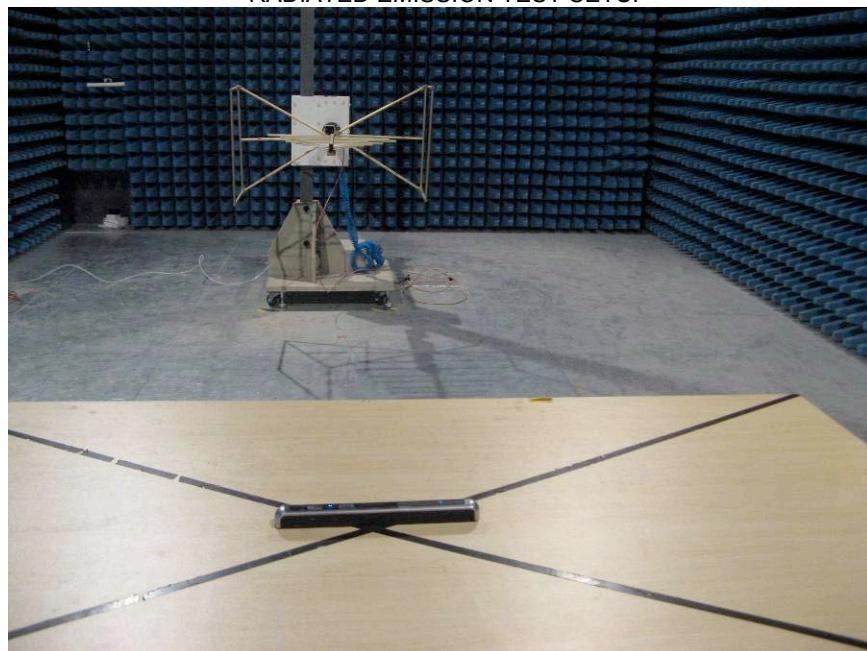


APPENDIX II
PHOTOGRAPHS OF THE TEST SETUP

LINE CONDUCTED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP



----END OF REPORT----