# FCC TEST REPORT

# (BLUETOOTH/DTS)

| | |
|---|---|
| **REPORT NO.:** | RF140808E04-2 |
| **MODEL NO.:** | QCNFA324 |
| **FCC ID:** | PPD-QCNFA324 |
| **IC:** | 4104A-QCNFA324 |
| **RECEIVED:** | Aug. 08, 2014 |
| **TESTED:** | Aug. 27 to Oct. 16, 2014 |
| **ISSUED:** | Oct. 23, 2014 |

| | |
|---|---|
| **APPLICANT:** | Qualcomm Atheros, Inc. |
| **ADDRESS:** | 1700 Technology Drive, San Jose, CA 95110 |

| | |
|---|---|
| **ISSUED BY:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory |
| **LAB ADDRESS:** | No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C. |
| **TEST LOCATION (1):** | No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, Taiwan, R.O.C. |
| **TEST LOCATION (2):** | No.49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, Taiwan, R.O.C. |

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| RF140808E04-2 | Original release | Oct. 23, 2014 |

# 1 CERTIFICATION

| | |
|---|---|
| **PRODUCT :** | 2x2 802.11A/B/G/N/AC WiFi + Bluetooth Module |
| **BRAND NAME :** | Qualcomm Atheros |
| **MODEL NO. :** | QCNFA324 |
| **TEST SAMPLE :** | R&D SAMPLE |
| **APPLICANT :** | Qualcomm Atheros, Inc. |
| **TESTED DATE :** | Aug. 27 to Oct. 16, 2014 |
| **STANDARDS :** | **FCC Part 15, Subpart C (Section 15.247)** |
| | ANSI C63.10-2009 |
| | Canada RSS-210 Issue 8 (2010-12) |
| | Canada RSS-Gen Issue 3 (2010-12) |

The above equipment (Model: QCNFA324) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : _____ , **DATE:** Oct. 23, 2014

( Claire Kuan, Specialist )

**APPROVED BY** : _____ , **DATE:** Oct. 23, 2014

( May Chen, Manager )

# 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

**For BT-EDR mode:**

| APPLIED STANDARD: FCC Part 15, Subpart C; RSS-210; RSS-Gen | | | | |
|---|---|---|---|---|
| STANDARD SECTION | | TEST TYPE AND LIMIT | RESULT | REMARK |
| FCC Part 15 | RSS-Gen RSS-210 | | | |
| 15.207 | RSS-Gen 7.2.4 | AC Power Conducted Emission | PASS | Meet the requirement of limit. Minimum passing margin is -22.42dB at 0.15781MHz. |
| 15.247(a)(1)(iii) | RSS-210 A8.1(b) | Number of Hopping Frequency Used | PASS | Meet the requirement of limit. |
| 15.247(a)(1)(iii) | RSS-210 A8.1(d) | Dwell Time on Each Channel | PASS | Meet the requirement of limit. |
| 15.247(a)(1) | RSS-210 A8.1(d) | 1. Hopping Channel Separation<br>2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System | PASS | Meet the requirement of limit. |
| 15.247(b) | RSS-210 A8.4(2) | Maximum Peak Output Power | PASS | Meet the requirement of limit. |
| 15.247(d) | RSS-210 A8.5 | Transmitter Radiated Emissions | PASS | Meet the requirement of limit. Minimum passing margin is -5.1dB at 87.62MHz. |
| 15.247(d) | RSS-210 A8.5 | Conducted Out-Band Emission Measurement | PASS | Meet the requirement of limit. |
| - | RSS-Gen 4.6 | Occupied Bandwidth Measurement | - | Meet the requirement. |
| 15.203 | - | Antenna Requirement | PASS | Antenna connector is IPEX not a standard connector. |

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

**For BT-LE mode:**

| APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) ; RSS-210; RSS-Gen | | | | |
|---|---|---|---|---|
| STANDARD SECTION | | TEST TYPE | RESULT | REMARK |
| FCC Part 15 | RSS-Gen | | | |
| 15.207 | RSS-Gen 7.2.4 | AC Power Conducted Emission | PASS | Meet the requirement of limit. Minimum passing margin is -15.91dB at 0.20078MHz |
| 15.247(d)<br>15.209 | RSS-210 A8.5 | Radiated Emissions | PASS | Meet the requirement of limit. Minimum passing margin is -7.3dB at 31.50MHz & 87.04MHz |
| 15.247(d) | RSS-210 A8.5 | Band Edge Measurement | PASS | Meet the requirement of limit. |
| 15.247(a)(2) | RSS-210 A8.2 (a) | 6dB bandwidth | PASS | Meet the requirement of limit. |
| 15.247(b) | RSS-210 A8.2 (4) | Conducted power | PASS | Meet the requirement of limit. |
| 15.247(e) | RSS-210 A8.2 (b) | Power Spectral Density | PASS | Meet the requirement of limit. |
| - | RSS-Gen 4.6 | Occupied Bandwidth Measurement | - | Meet the requirement |
| 15.203 | - | Antenna Requirement | PASS | Antenna connector is IPEX not a standard connector. |

## 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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

| Measurement | Value |
|---|---|
| Conducted emissions | 2.86 dB |
| Radiated emissions (30MHz-1GHz) | 5.37 dB |
| Radiated emissions (1GHz -6GHz) | 3.65 dB |
| Radiated emissions (6GHz -18GHz) | 3.88 dB |
| Radiated emissions (18GHz -40GHz) | 4.11 dB |

# 3 GENERAL INFORMATION

## 3.1 GENERAL DESCRIPTION OF EUT(BLUETOOTH/DTS)

| | |
|---|---|
| **PRODUCT** | 2x2 802.11A/B/G/N/AC WiFi + Bluetooth Module |
| **MODEL NO.** | QCNFA324 |
| **POWER SUPPLY** | 3.3Vdc from host equipment |
| **MODULATION TYPE** | GFSK, π/4-DQPSK, 8DPSK for FHSS<br>16QAM, QPSK, BPSK for OFDM<br>GFSK for DTS |
| **MODULATION TECHNOLOGY** | FHSS, OFDM, DTS |
| **DATE RATE** | Up to 3Mbps for BT-EDR mode<br>Up to 24Mbps for BT-HS mode<br>Up to 1Mbps for BT-LE mode |
| **FREQUENCY RANGE** | BT-EDR, BT-LE mode: 2402MHz ~ 2480MHz<br>BT-HS mode: 2412MHz ~ 2462MHz |
| **NUMBER OF CHANNEL** | BT-EDR mode: 79<br>BT-HS mode: 11<br>BT-LE mode: 40 |
| **MAX. OUTPUT POWER** | BT-EDR mode: 14.555mW<br>BT-LE mode: 1.972mW |
| **ANTENNA TYPE** | Please see NOTE |
| **DATA CABLE** | NA |
| **I/O PORTS** | Refer to user's manual |
| **ASSOCIATED DEVICES** | NA |

**NOTE:**

1. There are Bluetooth technology and WLAN technology used for the EUT.
2. The EUT support multiple function, therefore the WLAN OFDM will be cover BT OFDM (low power) scenario.
3. QCNFA324 supports two digital interfaces (USB and UART) for Bluetooth digital end data communication. The Bluetooth RF end is exactly same in both implementations.

| Variant No. | Interface |
|---|---|
| SKU #1 | USB interface for BT |
| SKU #2 | UART interface for BT |
| From the above Variants, SKU #1 was selected as representative model for the test and its data was recorded in this report. | |

4. Spurious Emission (conducted & radiated emission) of the simultaneous operation (WiFi <5GHz> & Bluetooth) have been evaluated and no non-compliance found. The detail combinations of transmitters / frequencies / modes as below table

| Mode | Available Channel | Tested Channel | Modulation Technology |
|---|---|---|---|
| 5 GHz (802.11a) + Bluetooth (GFSK) | 149 to 165 | 165 | OFDM |
| | 0 to 78 | 0 | FHSS |

5. 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 ANTENNA

The antenna gain was declared by client; please refer to the following table:

| Antenna set 1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Transmitter Circuit | Brand | Model | Antenna Type | 2.4GHz Gain with cable loss (dBi) | 5GHz Gain with cable loss (dBi) | 2.4GHz Cable Loss (dBi) | 5G Cable Loss (dBi) | Connector Type | Cable Length (mm) |
| Chain (0) | WNC | 81-EBJ15.005 | PIFA | 3.62 | Band 1&2: 3.08<br>Band 3: 4.76<br>Band 4: 4.76 | 1.15 | Band 1&2:1.70<br>Band 3: 1.74<br>Band 4: 1.79 | IPEX | 300 |
| Chain (1) | WNC | 81-EBJ15.005 | PIFA | 3.62 | Band 1&2: 3.08<br>Band 3: 4.76<br>Band 4: 4.76 | 1.15 | Band 1&2:1.70<br>Band 3: 1.74<br>Band 4: 1.79 | IPEX | 300 |
| Antenna set 2 | | | | | | | | | |
| Transmitter Circuit | Brand | Model | Antenna Type | 2.4GHz Gain with cable loss (dBi) | 5GHz Gain with cable loss (dBi) | | Cable Loss (dBi) | Connector Type | Cable Length (mm) |
| Chain (0) | Tongda | T-543-8201044-A (Ant 1) | PIFA | 3.572 | Band 1&2: 3.002<br>Band 3: 4.546<br>Band 4: 4.416 | | NA | IPEX | 77 |
| Chain (1) | Tongda | T-543-8201044-A (Ant 2) | PIFA | 3.325 | Band 1&2: 2.942<br>Band 3: 4.622<br>Band 4: 4.586 | | NA | IPEX | 71 |

Note: 1. Above antenna gains of antenna are Total (H+V).
2. All of antenna can be application for WLAN and Bluetooth.

## 3.3 DESCRIPTION OF TEST MODES

79 channels are provided for BT-EDR mode

| 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 | 2432 | 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 | | |

40 channels are provided for BT-LE mode:

| CHANNEL | FREQ. (MHZ) | CHANNEL | FREQ. (MHZ) | CHANNEL | FREQ. (MHZ) | CHANNEL | FREQ. (MHZ) |
|---|---|---|---|---|---|---|---|
| 0 | 2402 | 10 | 2422 | 20 | 2442 | 30 | 2462 |
| 1 | 2404 | 11 | 2424 | 21 | 2444 | 31 | 2464 |
| 2 | 2406 | 12 | 2426 | 22 | 2446 | 32 | 2466 |
| 3 | 2408 | 13 | 2428 | 23 | 2448 | 33 | 2468 |
| 4 | 2410 | 14 | 2430 | 24 | 2450 | 34 | 2470 |
| 5 | 2412 | 15 | 2432 | 25 | 2452 | 35 | 2472 |
| 6 | 2414 | 16 | 2434 | 26 | 2454 | 36 | 2474 |
| 7 | 2416 | 17 | 2436 | 27 | 2456 | 37 | 2476 |
| 8 | 2418 | 18 | 2438 | 28 | 2458 | 38 | 2478 |
| 9 | 2420 | 19 | 2440 | 29 | 2460 | 39 | 2480 |

## 3.4 TEST MODE APPLICABLITY AND TESTED CHANNEL DETAIL:

**For BT-EDR mode:**

| EUT CONFIGURE MODE | APPLICABLE TO | | | | | DESCRIPTION |
|---|---|---|---|---|---|---|
| | PLC | RE < 1G | RE ≥ 1G | APCM | OB | |
| 1 | √ | √ | √ | √ | √ | Antenna set 1 |
| 2 | - | √ | √ | - | - | Antenna set 2 |

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

**RE ≥ 1G:** Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

**OB:** Conducted Out-Band Emission Measurement

Note 1. "-"means no effect.

2. Mode 1, the EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane.**

3. Mode 2, the EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane.**

**Power Line Conducted Emission Test:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| Available Channel | Tested Channel | Modulation Type | Packet Type |
|---|---|---|---|
| 0 to 78 | 78 | GFSK | DH5 |

**Radiated Emission Test (Below 1 GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| Available Channel | Tested Channel | Modulation Type | Packet Type |
|---|---|---|---|
| 0 to 78 | 78 | GFSK | DH5 |

**Radiated Emission Test (Above 1 GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| Available Channel | Tested Channel | Modulation Type | Packet Type |
|---|---|---|---|
| 0 to 78 | 0, 39, 78 | GFSK | DH5 |
| 0 to 78 | 0, 39, 78 | 8DPSK | 3DH5 |

**Antenna Port Conducted Measurement:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| Available Channel | Tested Channel | Modulation Type | Packet Type |
|---|---|---|---|
| 0 to 78 | 0, 39, 78 | GFSK | DH5 |
| 0 to 78 | 0, 39, 78 | 8DPSK | 3DH5 |

**Conducted Out-Band Measurement:**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| Available Channel | Tested Channel | Modulation Type | Packet Type |
|---|---|---|---|
| 0 to 78 | 0, 78 | GFSK | DH5 |
| 0 to 78 | 0, 78 | 8DPSK | 3DH5 |

**TEST CONDITION:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER (SYSTEM) | TESTED BY |
|---|---|---|---|
| PLC | 30deg. C,70%RH | 120Vac, 60Hz | Mike Hsieh |
| RE<1G | 19deg. C, 65%RH | 120Vac, 60Hz | Andy Ho |
| RE≥1G | 24deg. C, 68%RH | 120Vac, 60Hz | Andy Ho |
| APCM | 25deg. C, 60%RH | 120Vac, 60Hz | James Chan |
| OB | 25deg. C, 60%RH | 120Vac, 60Hz | James Chan |

## For BT-LE mode:

| EUT CONFIGURE MODE | APPLICABLE TO | | | | | DESCRIPTION |
|---|---|---|---|---|---|---|
| | PLC | RE < 1G | RE ≥ 1G | APCM | OB | |
| 1 | √ | √ | √ | √ | √ | Antenna set 1 |
| 2 | - | √ | √ | - | - | Antenna set 2 |

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

**RE ≥ 1G:** Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

**OB:** Conducted Out-Band Emission Measurement

Note 1. "-"means no effect.

2. Mode 1, the EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane.**

3. Mode 2, the EUT's antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane.**

### POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|
| BT-LE | 0 to 39 | 19 | GFSK | 1 |

### RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|
| BT-LE | 0 to 39 | 19 | GFSK | 1 |

### RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|
| BT-LE | 0 to 39 | 0, 19, 39 | GFSK | 1 |

## ANTENNA PORT CONDUCTED MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|
| BT-LE | 0 to 39 | 0, 19, 39 | GFSK | 1 |

## CONDUCTED OUT-BAND EMISSION MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|
| BT-LE | 0 to 39 | 0, 19, 39 | GFSK | 1 |

## TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER (SYSTEM) | TESTED BY |
|---|---|---|---|
| PLC | 30deg. C,70%RH | 120Vac, 60Hz | Mike Hsieh |
| RE<1G | 19deg. C, 65%RH | 120Vac, 60Hz | Andy Ho |
| RE≥1G | 20deg. C, 63%RH | 120Vac, 60Hz | Andy Ho |
| APCM | 25deg. C, 60%RH | 120Vac, 60Hz | James Chan |
| OB | 25deg. C, 60%RH | 120Vac, 60Hz | James Chan |

## 3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

**FCC Part 15, Subpart C (Section 15.247)**

**ANSI C63.10-2009**

**Canada RSS-210 Issue 8 (2010-12)**

**Canada RSS-Gen Issue 3 (2010-12)**

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

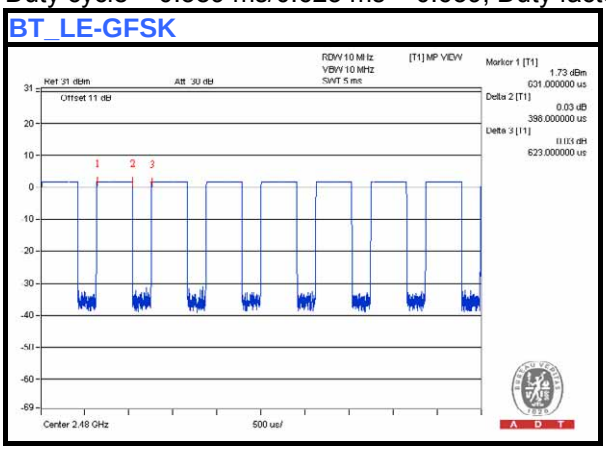
## 3.6 DUTY CYCLE OF TEST SIGNAL

Duty cycle of test signal is < 98 %, duty factor shall be considered.

**For BT_LE-GFSK:**

Duty cycle = 0.389 ms/0.623 ms = 0.639, Duty factor = 10 * log( 1/0.639) = 1.9

**BT_LE-GFSK**

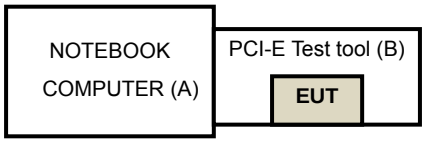


## 3.7 DESCRIPTION OF SUPPORT UNITS

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 | Remark |
|---|---|---|---|---|---|---|
| A | NOTEBOOK COMPUTER | DELL | E6420 | H62T3R1 | FCC DoC | Provided by Lab |
| B | PCI-E Test tool | Qualcomm Atheros | NA | NA | NA | Supplied by Client |

## 3.8 CONFIGURATION OF SYSTEM UNDER TEST



# 4 TEST PROCEDURES AND RESULTS(BT-EDR)

## 4.1 MAXIMUM PEAK OUTPUT POWER

### 4.1.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Limit is 125mW.

### 4.1.2 INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

### 4.1.3 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 3MHz RBW and 10 MHz VBW.

d. Measure the captured power within the band and recording the plot.

e. Repeat above procedures until all frequencies required were complete.

### 4.1.4 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 CONDITION

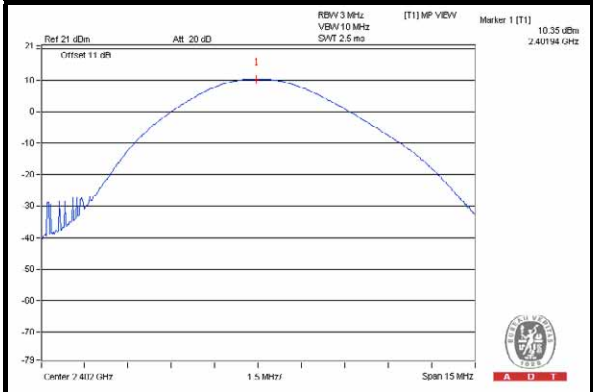
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

## 4.1.7 TEST RESULTS

| CHANNEL | FREQUENCY (MHz) | OUTPUT POWER (mW) | | OUTPUT POWER (dBm) | | POWER LIMIT (mW) | PASS / FAIL |
|---|---|---|---|---|---|---|---|
| | | GFSK | 8DPSK | GFSK | 8DPSK | | |
| 0 | 2402 | 10.839 | 11.776 | 10.35 | 10.71 | 125 | PASS |
| 39 | 2441 | 13.428 | 11.143 | 11.28 | 10.47 | 125 | PASS |
| 78 | 2480 | 14.555 | 9.572 | 11.63 | 9.81 | 125 | PASS |

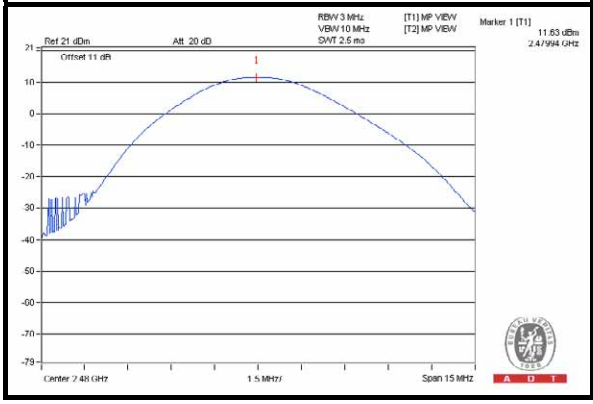
**For GFSK**

**CH0**



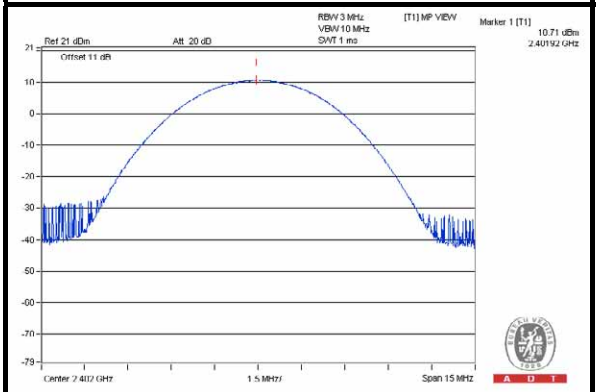

**CH39**


**CH78**

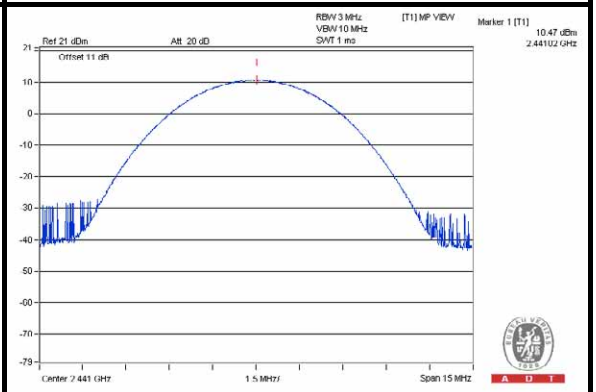


## For 8DPSK

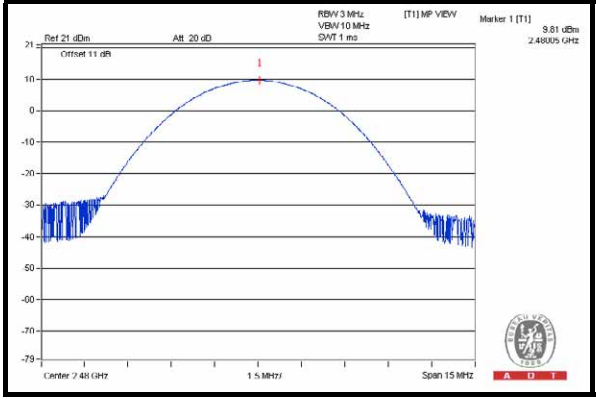
**CH0**




**CH39**




**CH78**



## 4.2 AVERAGE OUTPUT POWER

### 4.2.1 FOR REFERENCE.

### 4.2.2 INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| Power Meter Anritsu | ML2495A | 1014008 | Apr. 30, 2014 | Apr. 29, 2015 |
| Power Sensor Anritsu | MA2411B | 0917122 | Apr. 30, 2014 | Apr. 29, 2015 |

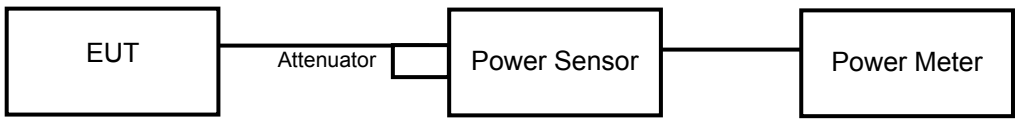
**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

### 4.2.3 TEST PROCEDURES

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the peak power level.

### 4.2.4 TEST SETUP




### 4.2.5 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

## 4.2.6 TEST RESULTS

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER OUTPUT (dBm) | |
|---|---|---|---|
| | | GFSK | 8DPSK |
| 0 | 2402 | 10.14 | 9.20 |
| 39 | 2441 | 11.18 | 8.93 |
| 78 | 2480 | 11.55 | 8.35 |

## 4.3 CHANNEL BANDWIDTH

### 4.3.1 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 shell be a minimum limit for the hopping channel separation.

### 4.3.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

### 4.3.3 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.

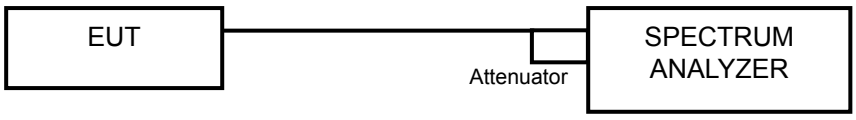
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.

d. Repeat above procedures until all frequencies measured were complete.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.3.5 TEST SETUP




### 4.3.6 EUT OPERATING CONDITION

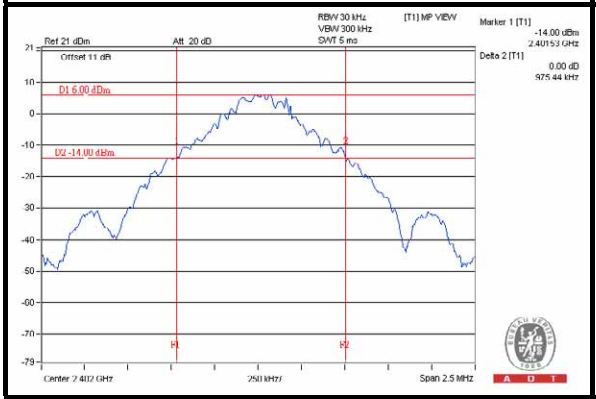
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

## 4.3.7 TEST RESULTS

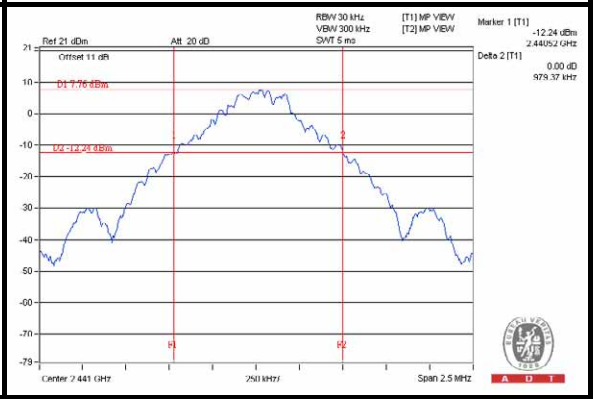
| CHANNEL | FREQUENCY (MHz) | 20dB BANDWIDTH (MHz) | |
|---|---|---|---|
| | | GFSK | 8DPSK |
| 0 | 2402 | 0.97 | 1.31 |
| 39 | 2441 | 0.97 | 1.30 |
| 78 | 2480 | 0.95 | 1.30 |

**For GFSK**

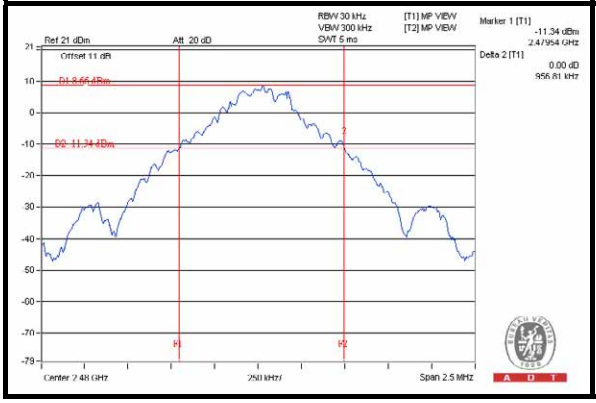
**CH0**




**CH39**

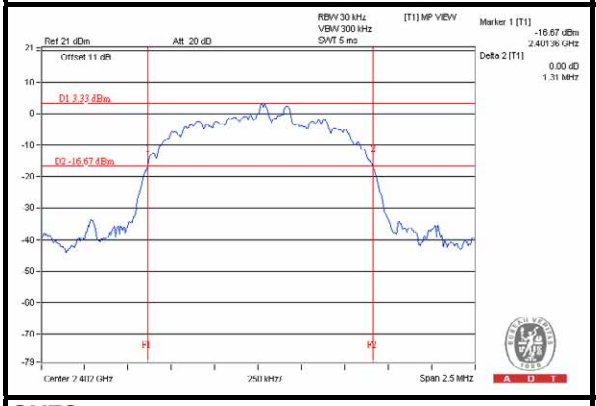



**CH78**

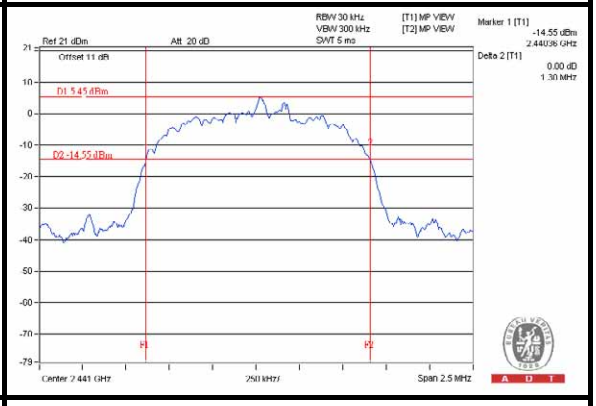


## For 8DPSK

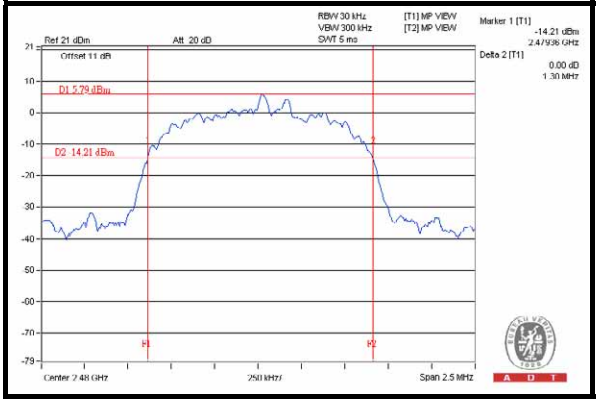
**CH0**




**CH39**




**CH78**



## 4.4 OCCUPIED BANDWIDTH MEASUREMENT

### 4.4.1 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

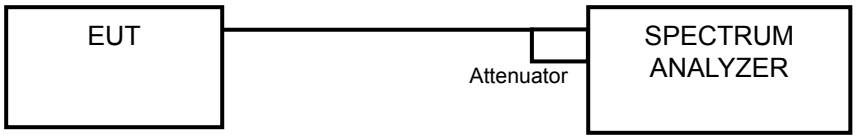
### 4.4.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 300 kHz VBW. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

### 4.4.3 DEVIATION FROM TEST STANDARD

No deviation

### 4.4.4 TEST SETUP




### 4.4.5 EUT OPERATING CONDITION

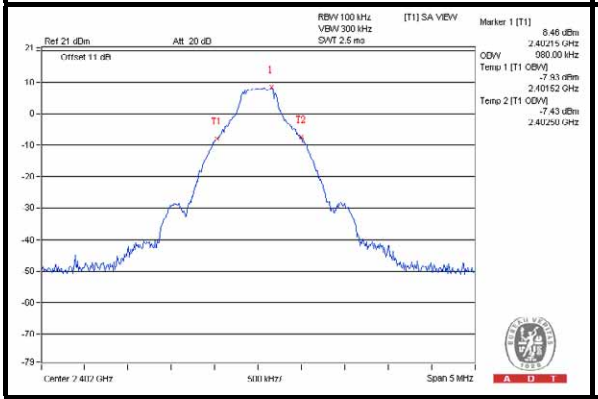
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 4.4.6 TEST RESULTS

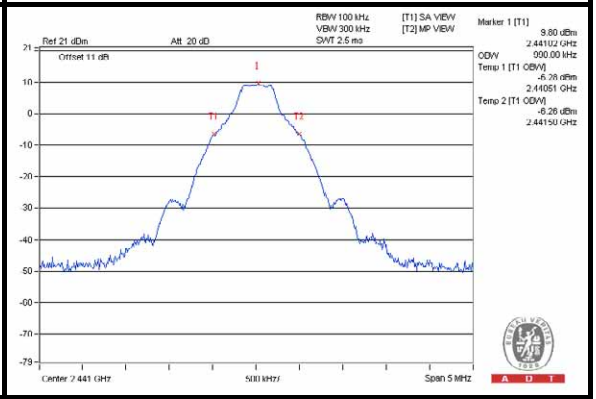
| CHANNEL | FREQUENCY (MHz) | OCCUPIED BANDWIDTH (MHz) | |
|---|---|---|---|
| | | GFSK | 8DPSK |
| 0 | 2402 | 0.98 | 1.21 |
| 39 | 2441 | 0.99 | 1.23 |
| 78 | 2480 | 0.99 | 1.23 |

**For GFSK**

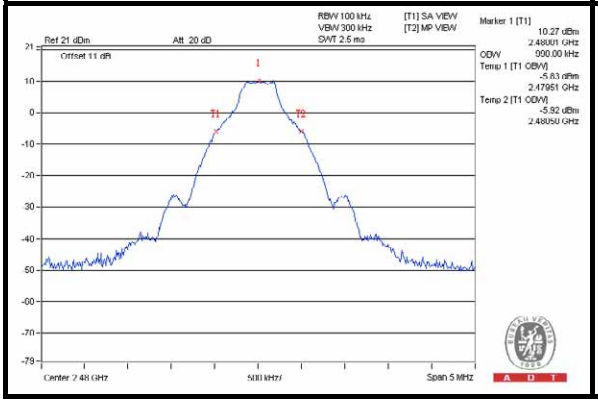
**CH0**




**CH39**

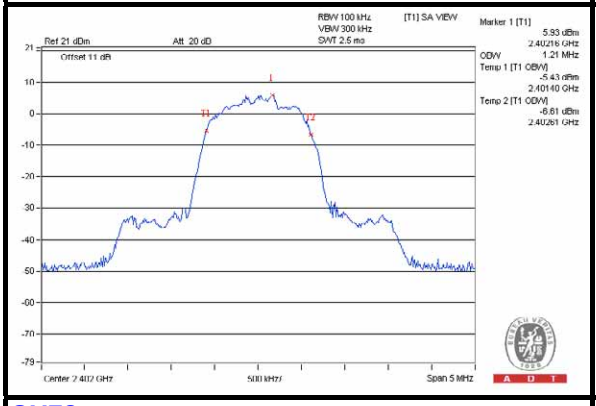



**CH78**

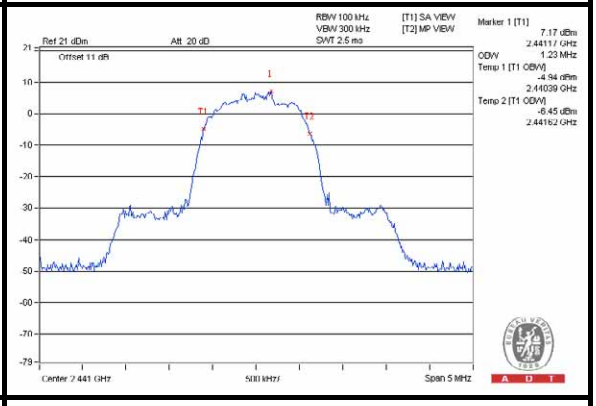


## For 8DPSK

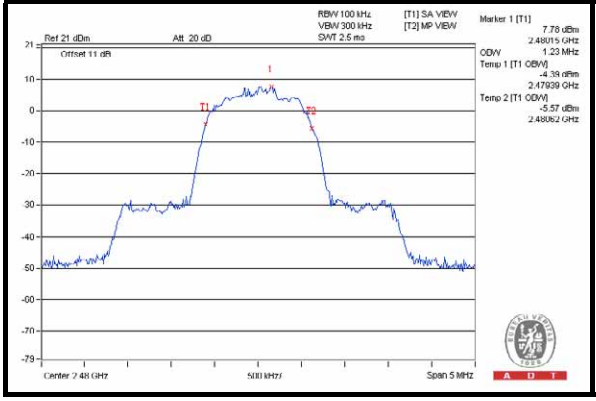
**CH0**




**CH39**




**CH78**



## 4.5 HOPPING CHANNEL SEPARATION

### 4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

### 4.5.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

### 4.5.3 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.

c. By using the MaxHold function record the separation of two adjacent channels.

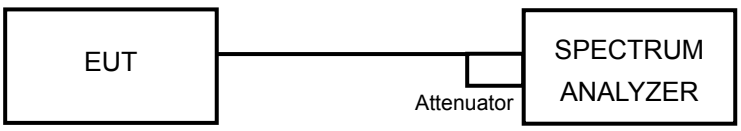
d. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.

e. Repeat above procedures until all frequencies measured were complete.

### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.5.5 TEST SETUP



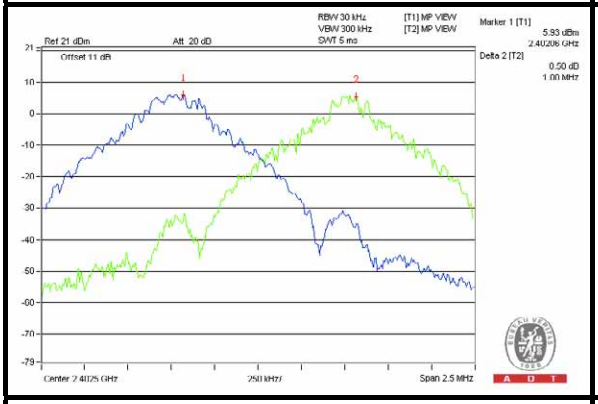
## 4.5.6 TEST RESULTS

| CHANNEL | FREQUENCY (MHz) | ADJACENT CHANNEL SEPARATION (MHz) | | 20dB BANDWIDTH (MHz) | | MINIMUM LIMIT (MHz) | | PASS / FAIL |
|---|---|---|---|---|---|---|---|---|
| | | GFSK | 8DPSK | GFSK | 8DPSK | GFSK | 8DPSK | |
| 0 | 2402 | 1.00 | 1.01 | 0.97 | 1.31 | 0.65 | 0.88 | PASS |
| 39 | 2441 | 1.00 | 1.00 | 0.97 | 1.30 | 0.65 | 0.87 | PASS |
| 78 | 2480 | 1.00 | 1.00 | 0.95 | 1.30 | 0.64 | 0.87 | PASS |

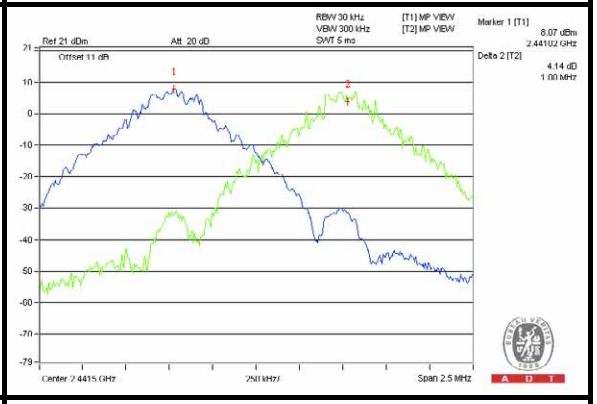
**NOTE:** The minimum limit is two-third 20dB bandwidth.

**For GFSK**

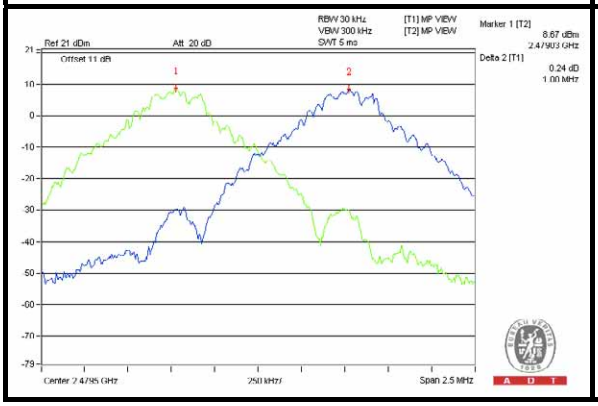
**CH0**




**CH39**

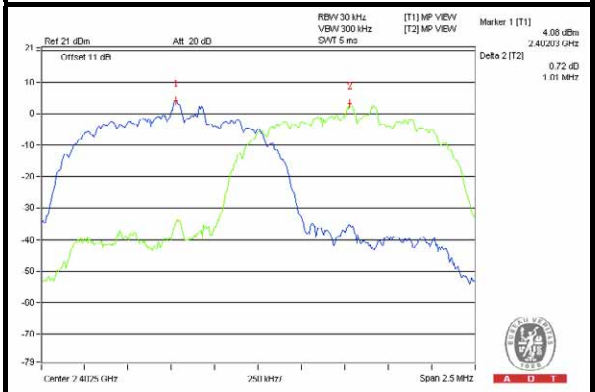



**CH78**

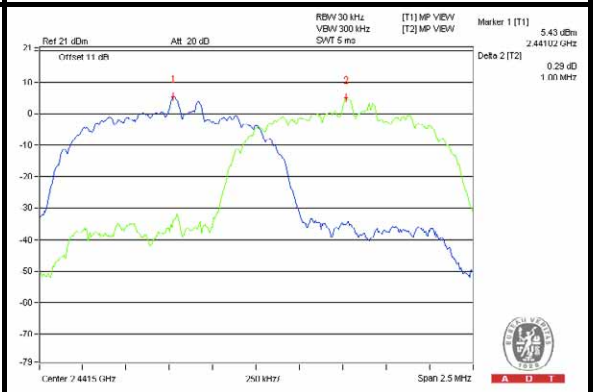


## For 8DPSK

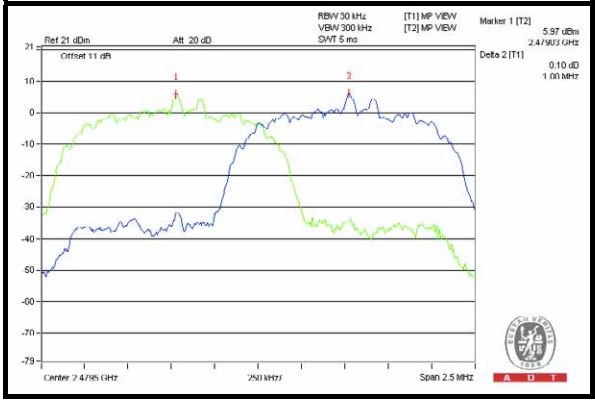
**CH0**




**CH39**




**CH78**



## 4.6 NUMBER OF HOPPING FREQUENCY USED

### 4.6.1 LIMIT OF HOPPING FREQUENCY USED

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

### 4.6.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

### 4.6.3 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.

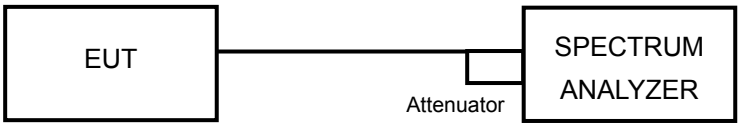
d. Set the SA on View mode and then plot the result on SA screen.

e. Repeat above procedures until all frequencies measured were complete.

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

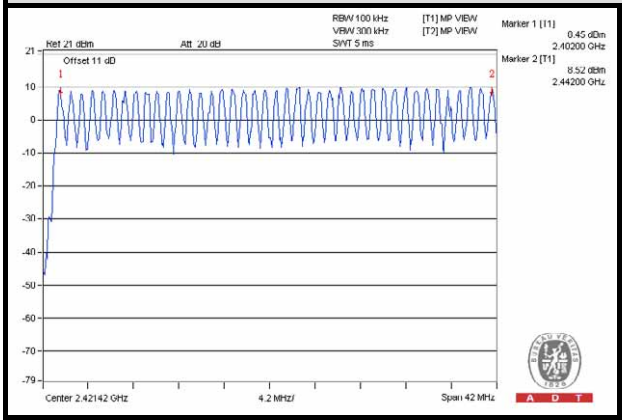
## 4.6.5 TEST SETUP

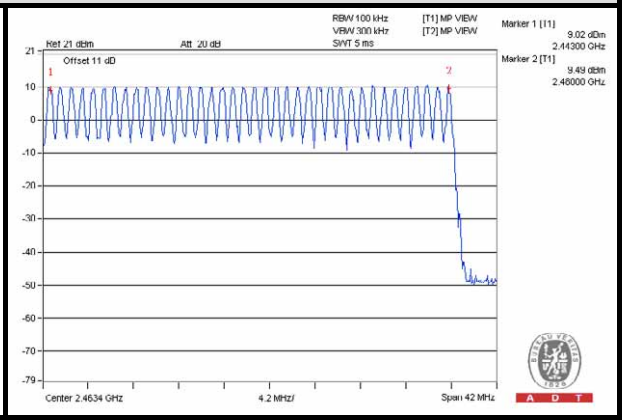



## 4.6.6 TEST RESULTS

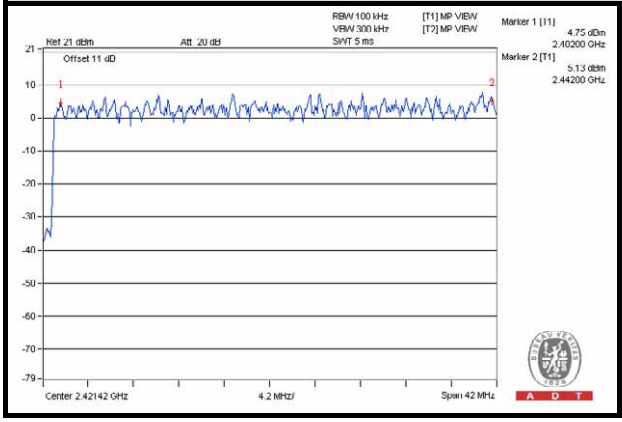
There are 79 hopping frequencies in the hopping mode. Please refer to next pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.

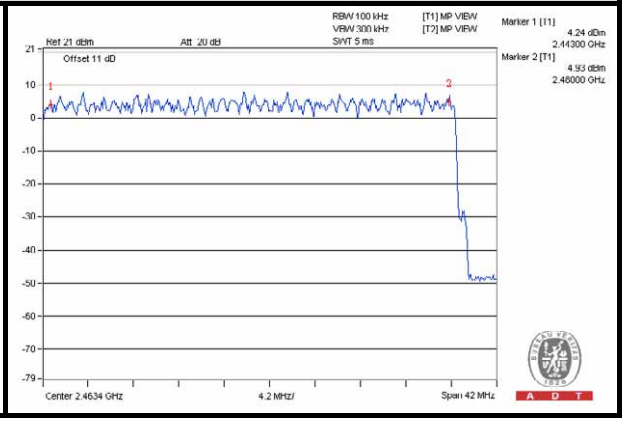
**GFSK**




**8DPSK**



## 4.7 DWELL TIME ON EACH CHANNEL

### 4.7.1 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.

### 4.7.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

### 4.7.3 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 be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.

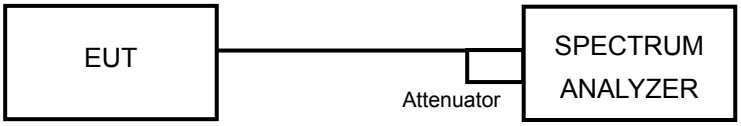
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.

e. Repeat above procedures until all different time-slot modes have been completed.

### 4.7.4 DEVIATION FROM TEST STANDARD

No deviation

## 4.7.5 TEST SETUP



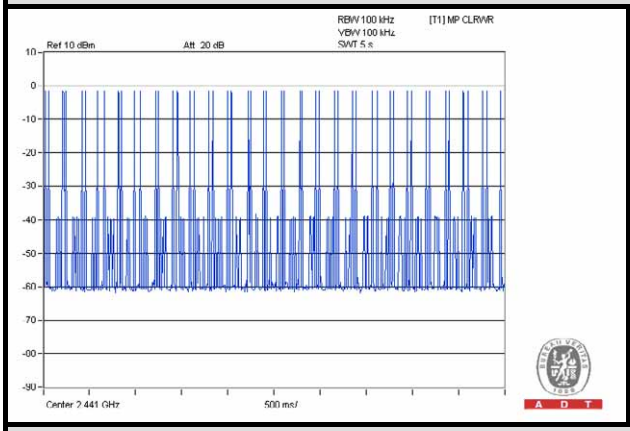
## 4.7.6 TEST RESULTS

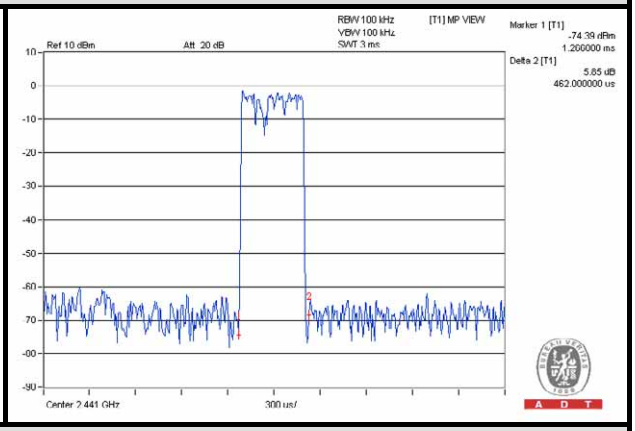
**For GFSK:**

| Mode | Number of transmission in a 31.6 (79Hopping*0.4) | Length of transmission time (msec) | Result (msec) | Limit (msec) |
|---|---|---|---|---|
| DH1 | 51 (times / 5 sec) *6.32=322.32 times | 0.462 | 148.91 | 400 |
| DH3 | 26 (times / 5 sec) *6.32=164.32 times | 1.69 | 277.7 | 400 |
| DH5 | 17 (times / 5 sec) *6.32=107.44 times | 3.024 | 324.9 | 400 |

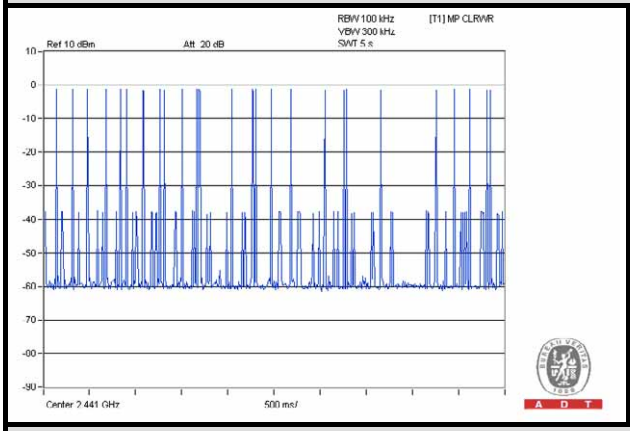
**NOTE:** Test plots of the transmitting time slot are shown on next page.

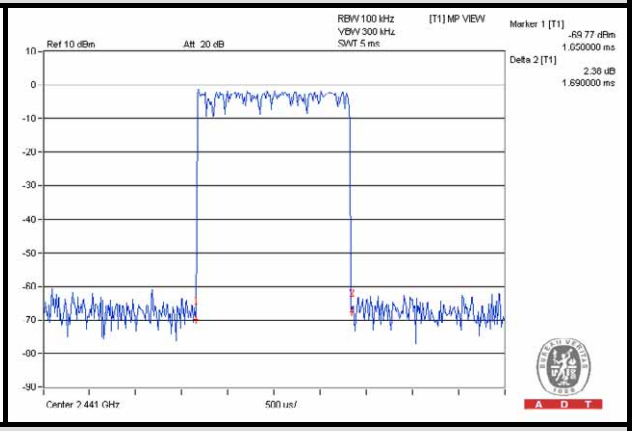
**DH1**


RBW 100 kHz
VBW 100 kHz
SWT 5 s
[T1] MP CLRWR
Ref 10 dBm
Att 20 dB
Center 2.441 GHz
500 ms/

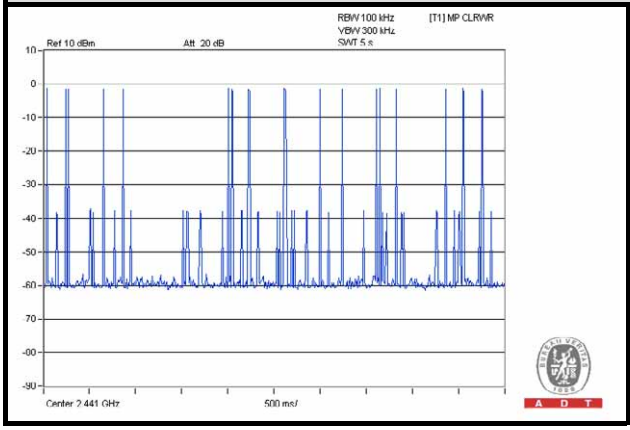

RBW 100 kHz
VBW 100 kHz
SWT 3 ms
[T1] MP VIEW
Ref 10 dBm
Att 20 dB
Marker 1 [T1]
-74.39 dBm
1.260000 ms
Delta 2 [T1]
5.85 dB
462.000000 us
Center 2.441 GHz
300 us/

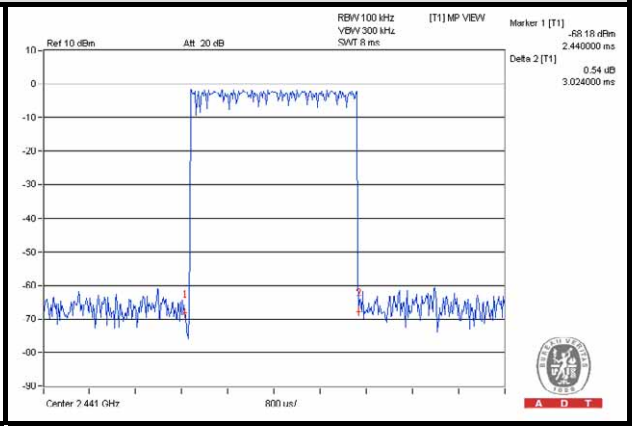
**DH3**


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Ref 10 dBm
Att 20 dB
Center 2.441 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Ref 10 dBm
Att 20 dB
Marker 1 [T1]
-69.77 dBm
1.650000 ms
Delta 2 [T1]
2.36 dB
1.690000 ms
Center 2.441 GHz
500 us/

**DH5**


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Ref 10 dBm
Att 20 dB
Center 2.441 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 8 ms
[T1] MP VIEW
Ref 10 dBm
Att 20 dB
Marker 1 [T1]
-68.18 dBm
2.440000 ms
Delta 2 [T1]
0.54 dB
3.024000 ms
Center 2.441 GHz
800 us/

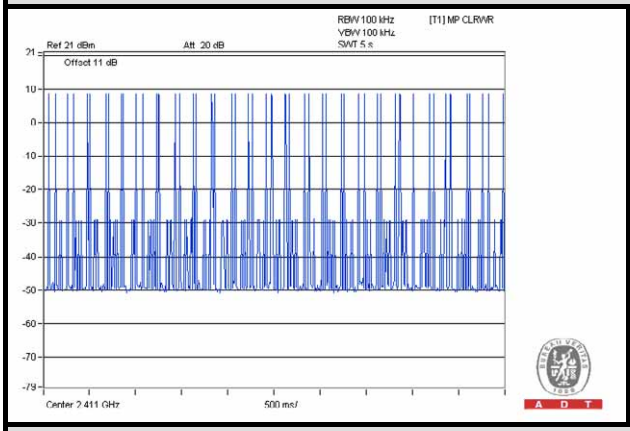
**For GFSK(AFH):**

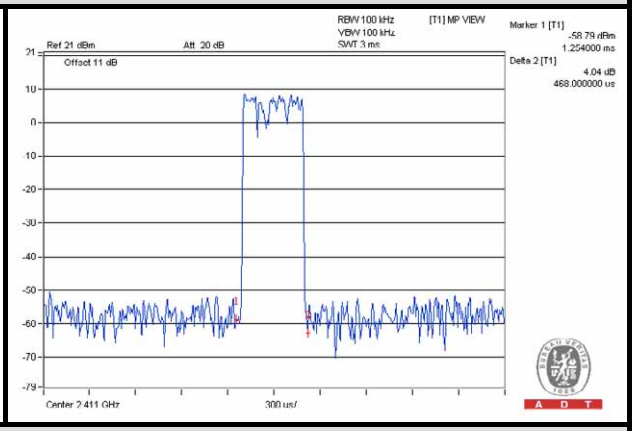
| Mode | Number of transmission in a 8 (20Hopping*0.4) | Length of transmission time (msec) | Result (msec) | Limit (msec) |
|---|---|---|---|---|
| DH1 | 50 (times / 5 sec) *1.6=80 times | 0.468 | 37.44 | 400 |
| DH3 | 25 (times / 5 sec) *1.6=40 times | 1.69 | 67.6 | 400 |
| DH5 | 17 (times / 5 sec) *1.6=27.2 times | 3.024 | 82.253 | 400 |

**NOTE:**

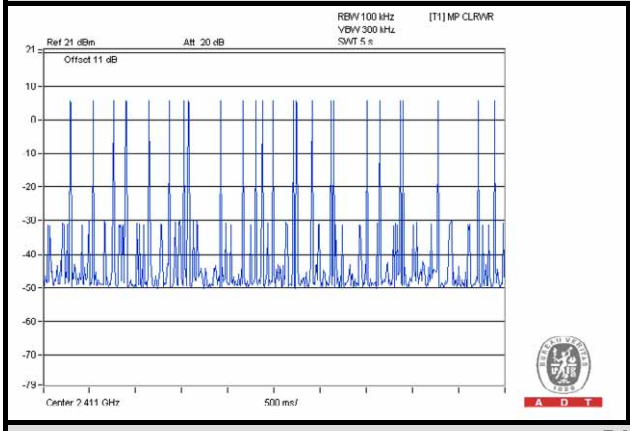
1. Test plots of the transmitting time slot are shown on next page.
2. Minimum number of hopping channels for AFH is 20 channels.

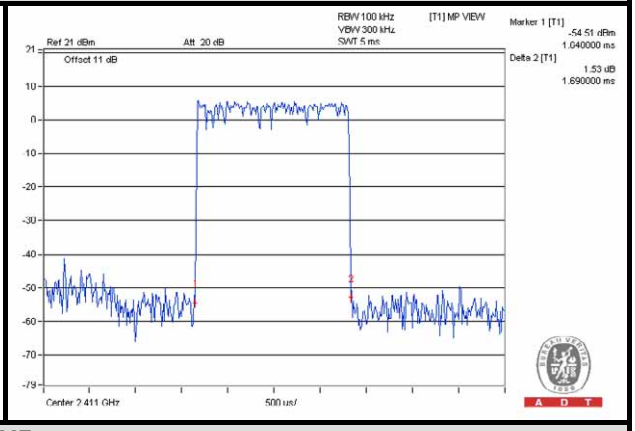
## DH1


RBW 100 kHz
VBW 100 kHz
SWT 5 s
[T1] MP CLRWR
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
500 ms/

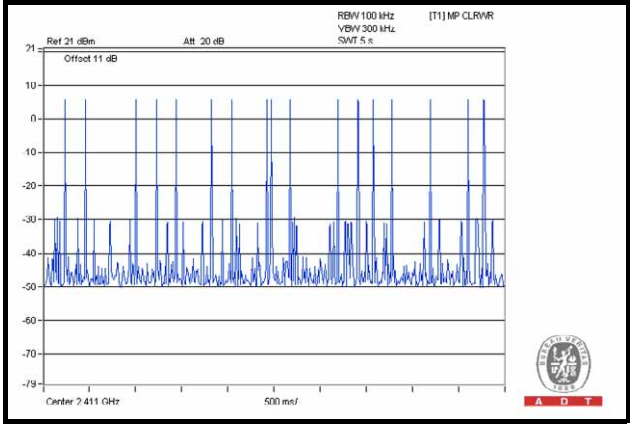

RBW 100 kHz
VBW 100 kHz
SWT 3 ms
[T1] MP VIEW
Marker 1 [T1]
-58.79 dBm
1.254000 ms
Delta 2 [T1]
4.04 dB
468.000000 us
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
300 us/

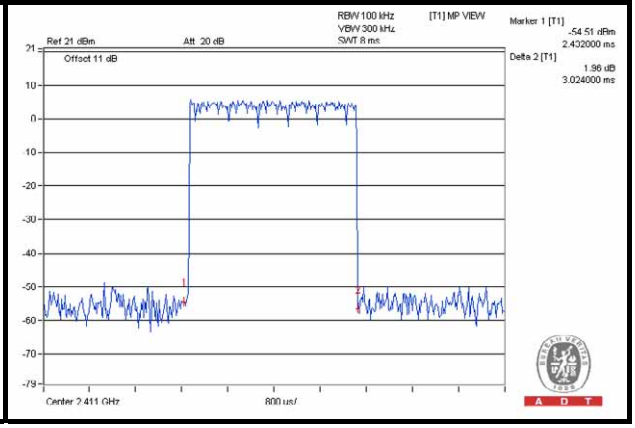
## DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Marker 1 [T1]
-54.51 dBm
1.040000 ms
Delta 2 [T1]
1.53 dB
1.690000 ms
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
500 us/

## DH5

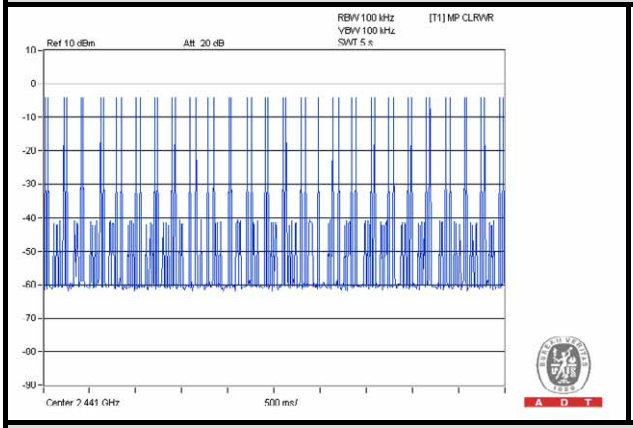
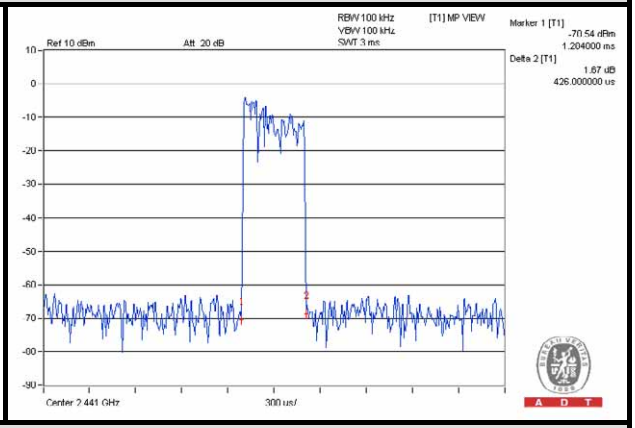
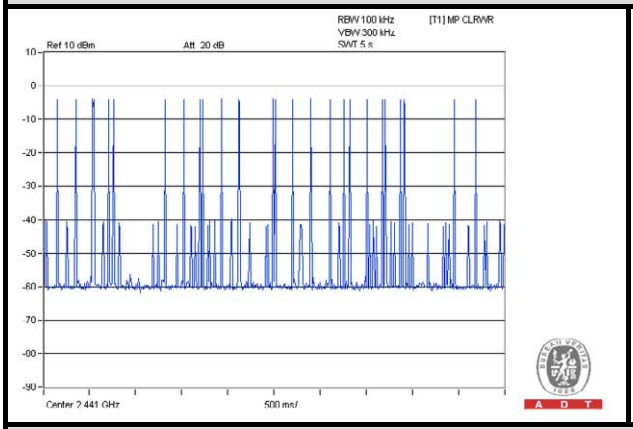
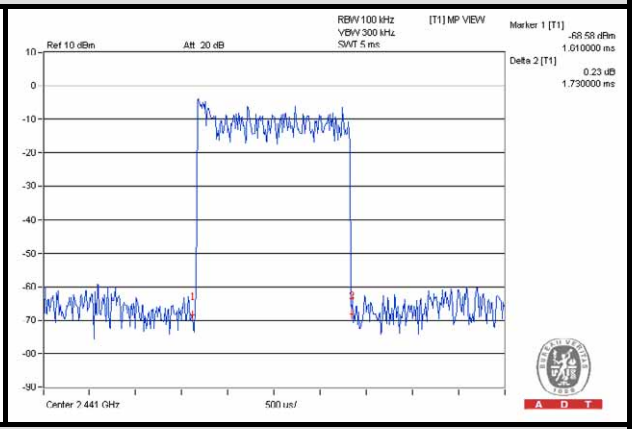
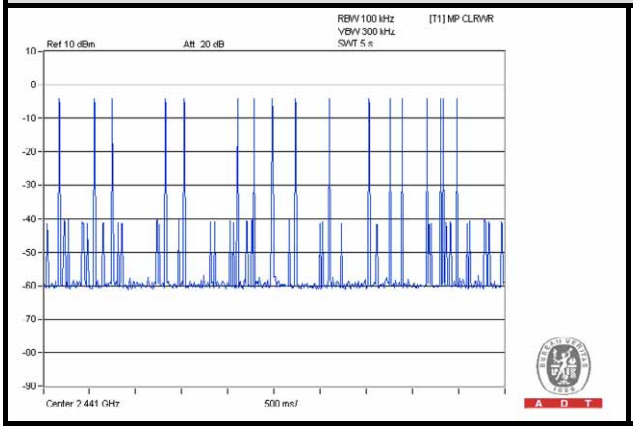
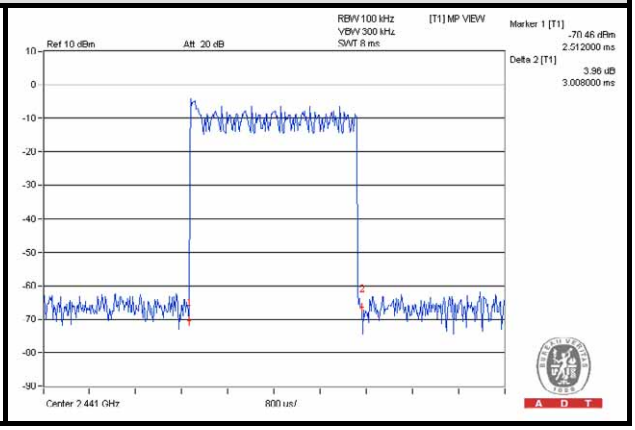

RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 8 ms
[T1] MP VIEW
Marker 1 [T1]
-54.51 dBm
2.432000 ms
Delta 2 [T1]
1.96 dB
3.024000 ms
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
800 us/

**For 8DPSK:**

| Mode | Number of transmission in a 31.6 (79Hopping*0.4) | Length of transmission time (msec) | Result (msec) | Limit (msec) |
|---|---|---|---|---|
| DH1 | 51 times / 5 sec) *6.32=322.32 times | 0.426 | 137.31 | 400 |
| DH3 | 26 (times / 5 sec) *6.32=164.32 times | 1.73 | 284.27 | 400 |
| DH5 | 17 (times / 5 sec) *6.32=107.44 times | 3.008 | 323.18 | 400 |

**NOTE:** Test plots of the transmitting time slot are shown on next page.

| 3DH1 | |
|---|---|
|  |  |
| **3DH3** | |
|  |  |
| **3DH5** | |
|  |  |

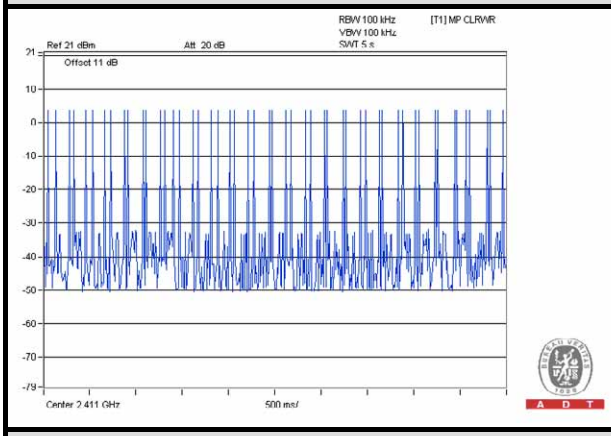
**For 8DPSK(AFH):**

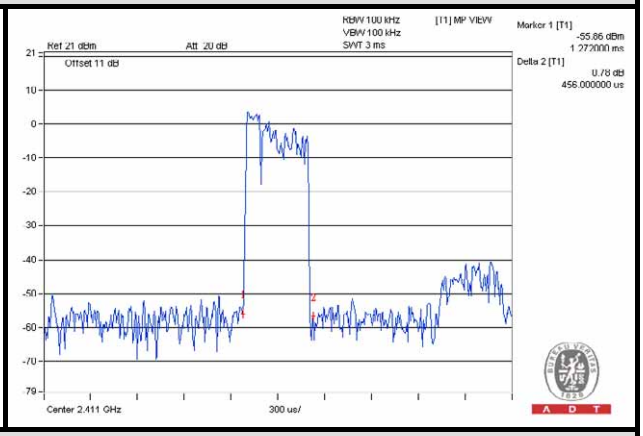
| Mode | Number of transmission in a 8 (20Hopping*0.4) | Length of transmission time (msec) | Result (msec) | Limit (msec) |
|---|---|---|---|---|
| DH1 | 50 (times / 5 sec) *1.6=80 times | 0.456 | 37.21 | 400 |
| DH3 | 25 (times / 5 sec) *1.6=40 times | 1.73 | 69.2 | 400 |
| DH5 | 17 (times / 5 sec) *1.6=27.2 times | 2.976 | 80.947 | 400 |

**NOTE:**

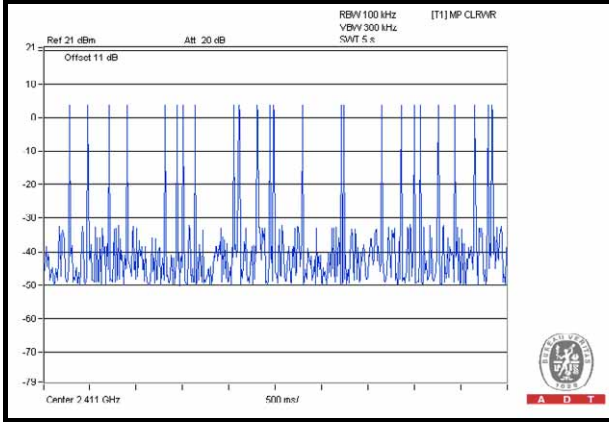
1. Test plots of the transmitting time slot are shown on next page.
2. Minimum number of hopping channels for AFH is 20 channels.

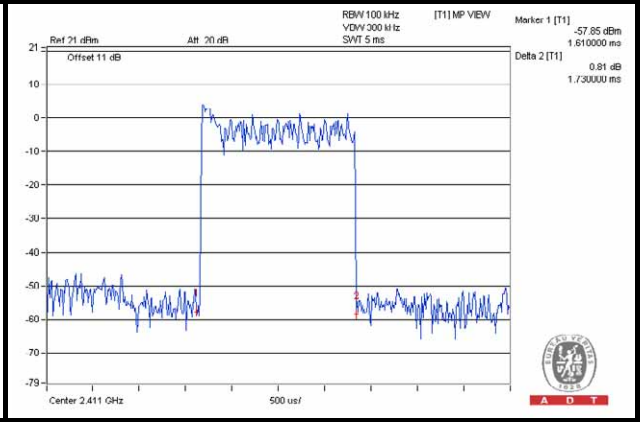
## DH1


RBW 100 kHz
VBW 100 kHz
SWT 5 s
[T1] MP CLRWR
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
500 ms/

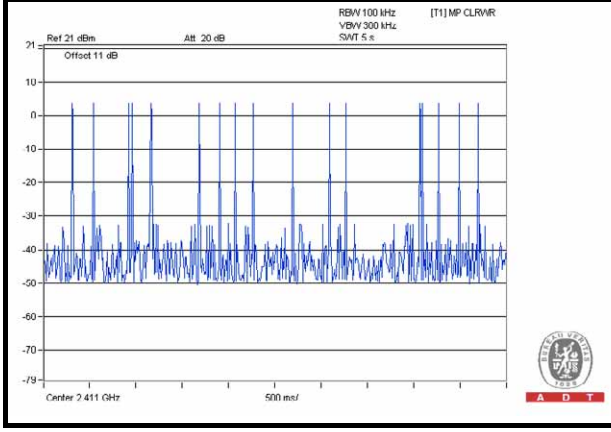

RBW 100 kHz
VBW 100 kHz
SWT 3 ms
[T1] MP VIEW
Marker 1 [T1]
-55.86 dBm
1.272000 ms
Delta 2 [T1]
0.78 dB
456.000000 us
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
300 us/

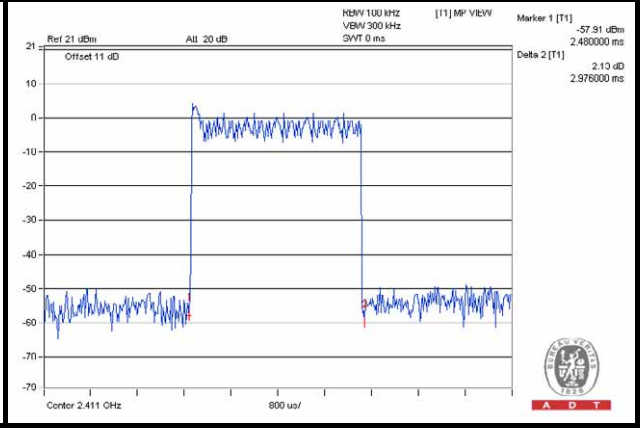
## DH3


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 5 ms
[T1] MP VIEW
Marker 1 [T1]
-57.85 dBm
1.610000 ms
Delta 2 [T1]
0.81 dB
1.730000 ms
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
500 us/

## DH5


RBW 100 kHz
VBW 300 kHz
SWT 5 s
[T1] MP CLRWR
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
500 ms/


RBW 100 kHz
VBW 300 kHz
SWT 0 ms
[T1] MP VIEW
Marker 1 [T1]
-57.91 dBm
2.480000 ms
Delta 2 [T1]
2.13 dB
2.976000 ms
Ref 21 dBm
Att 20 dB
Offset 11 dB
Center 2.411 GHz
800 us/

## 4.8 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 4.8.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz RBW).

### 4.8.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

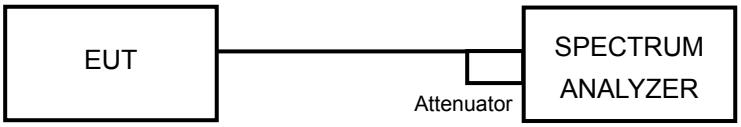
### 4.8.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set RBW a of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

### 4.8.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.8.1 TEST SETUP




### 4.8.5 EUT OPERATING CONDITION

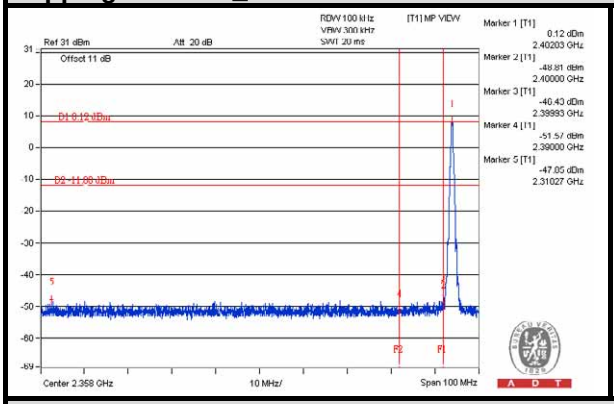
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

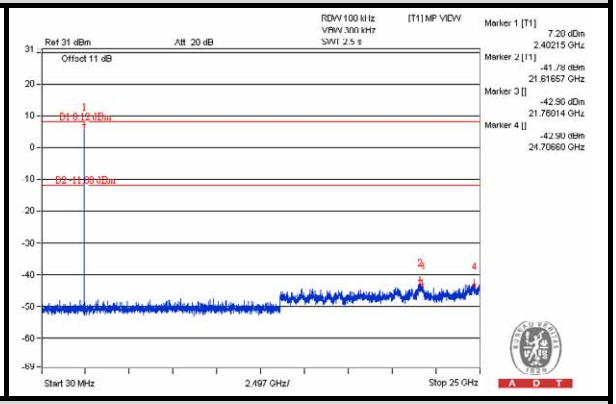
### 4.8.6 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

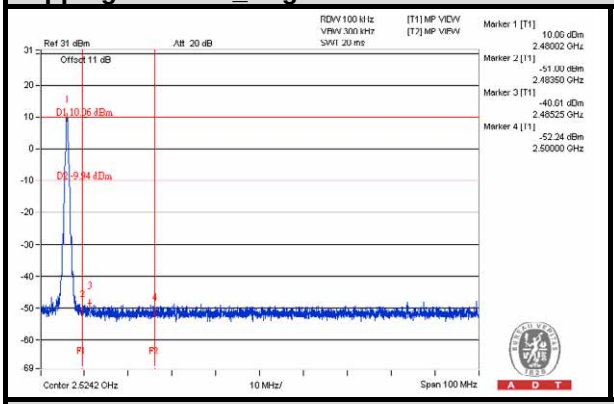
## For GFSK

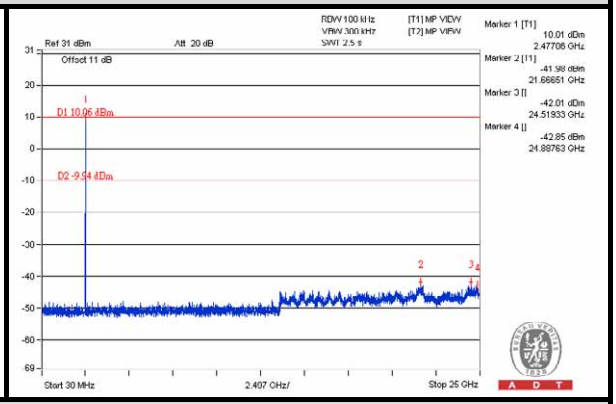
### Hopping disabled_ Low Channel



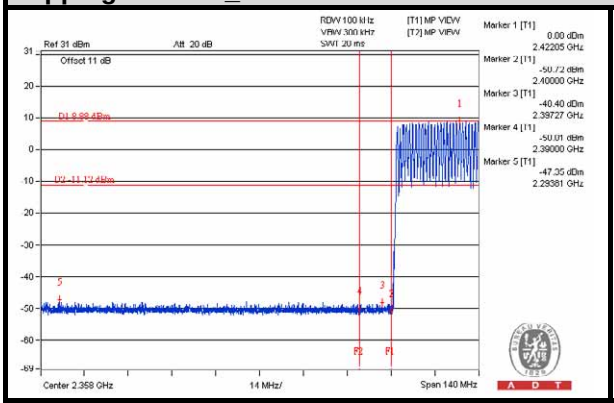



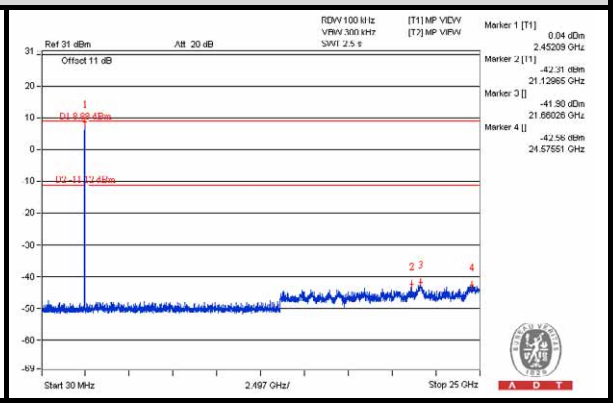

### Hopping disabled_ High Channel



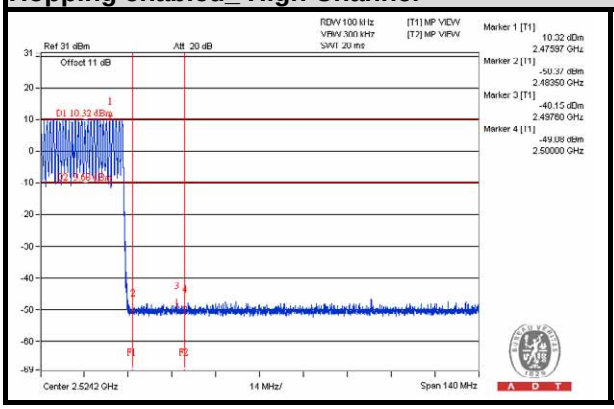



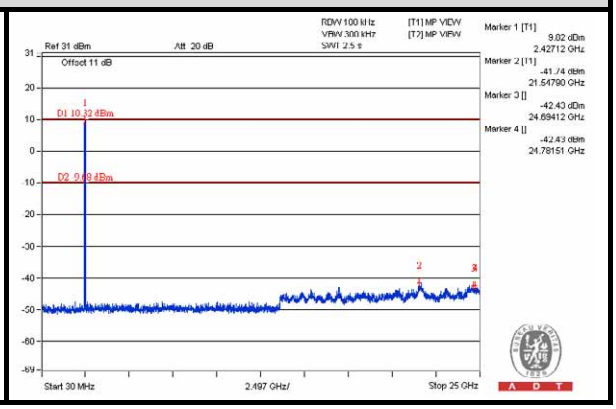

### Hopping enabled_ Low Channel



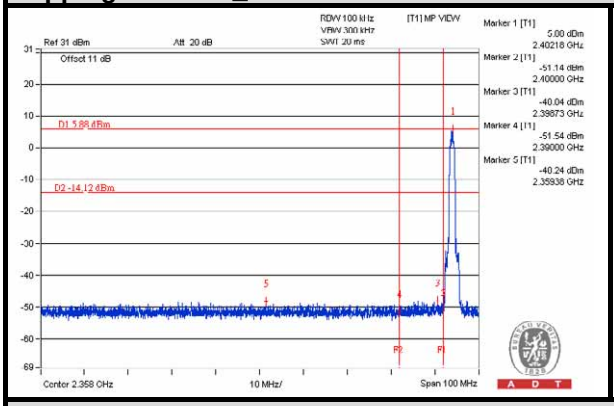

### Hopping enabled_ High Channel

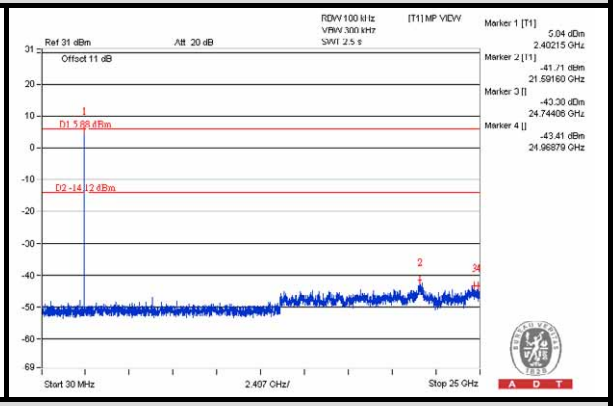


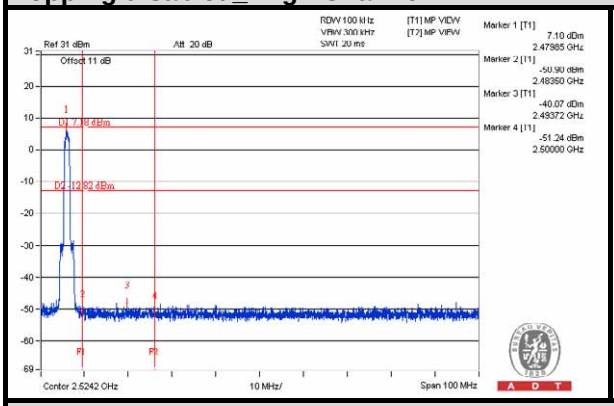
## For 8DPSK

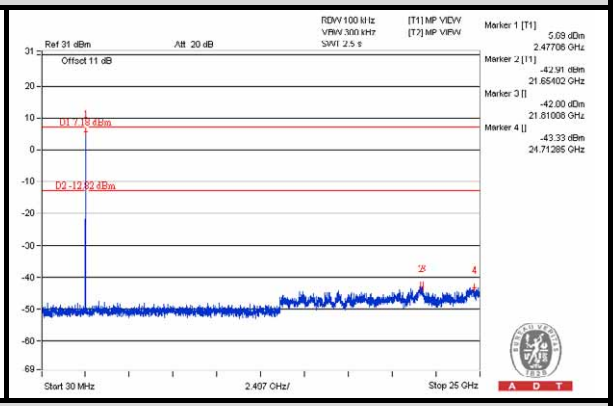
### Hopping disabled_ Low Channel



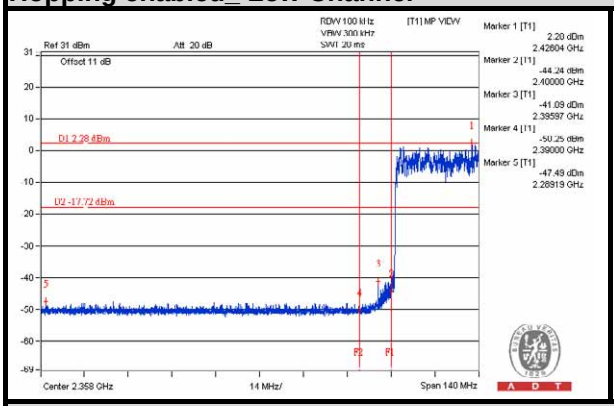



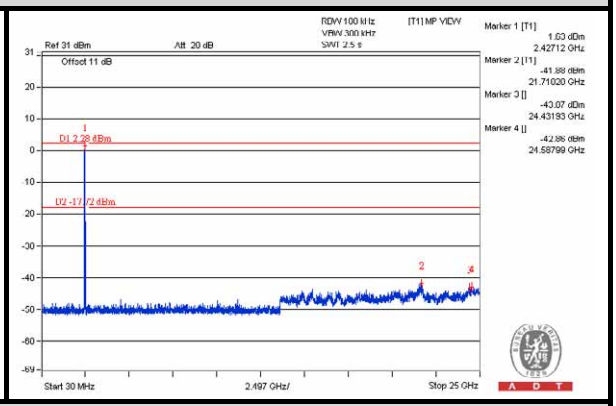

### Hopping disabled_ High Channel



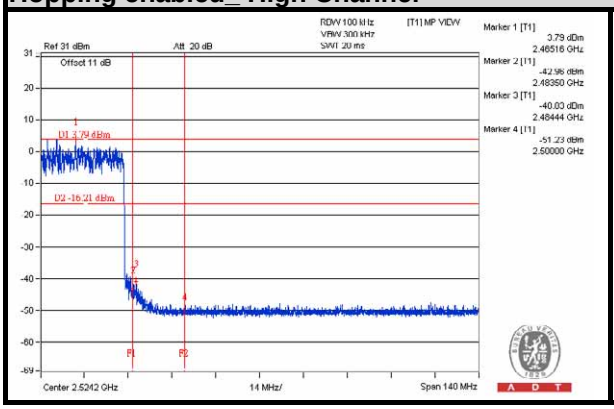



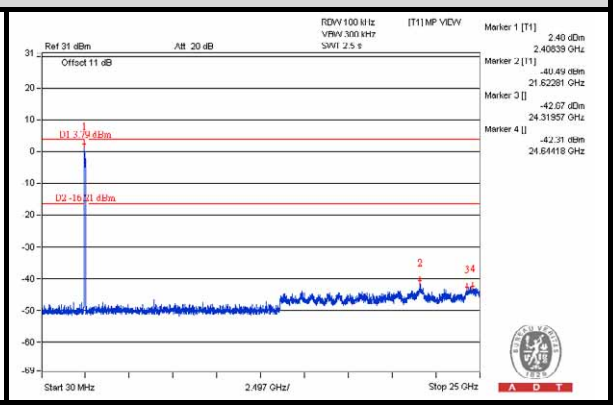

### Hopping enabled_ Low Channel




### Hopping enabled_ High Channel



## 4.9 RADIATED EMISSION MEASUREMENT

### 4.9.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| 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 (dBuV/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.

## 4.9.2 TEST INSTRUMENTS

**For below 1GHz test:**

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| MXE EMI Receiver Agilent | N9038A | MY51210105 | July 21, 2014 | July 20,2015 |
| Pre-Amplifier Mini-Circuits | ZFL-1000VH2 B | AMP-ZFL-03 | Nov. 13, 2013 | Nov. 12, 2014 |
| Trilog Broadband Antenna SCHWARZBECK | VULB 9168 | 9168-360 | Feb. 26, 2014 | Feb. 25, 2015 |
| RF Cable | NA | CHGCAB_001 | Oct. 05, 2013 | Oct. 04, 2014 |
| Horn_Antenna AISI | AIH.8018 | 0000320091110 | Aug. 27, 2014 | Aug. 26, 2015 |
| Pre-Amplifier Agilent | 8449B | 3008A02578 | June 24, 2014 | June 23, 2015 |
| RF Cable | NA | 131205<br>131214<br>SNMY23684/4 | Jan. 17, 2014 | Jan. 16, 2015 |
| Spectrum Analyzer R&S | FSV40 | 100964 | July 05, 2014 | July 04, 2015 |
| Pre-Amplifier SPACEK LABS | SLKKa-48-6 | 9K16 | Nov. 13, 2013 | Nov. 12, 2014 |
| Horn_Antenna SCHWARZBECK | BBHA 9170 | 9170-424 | Aug. 26, 2014 | Aug. 25, 2015 |
| RF Cable | NA | RF104-121<br>RF104-204 | Dec. 12, 2013 | Dec. 11, 2014 |
| Antenna Tower & Turn Table CT | NA | NA | NA | NA |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Aug. 27, 2014

**For above 1GHz test:**

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| MXE EMI Receiver Agilent | N9038A | MY51210105 | July 21, 2014 | July 20,2015 |
| Pre-Amplifier Mini-Circuits | ZFL-1000VH2 B | AMP-ZFL-03 | Nov. 13, 2013 | Nov. 12, 2014 |
| Trilog Broadband Antenna SCHWARZBECK | VULB 9168 | 9168-360 | Feb. 26, 2014 | Feb. 25, 2015 |
| RF Cable | NA | CHGCAB_001 | Oct. 04, 2014 | Oct. 03, 2015 |
| Horn_Antenna AISI | AIH.8018 | 0000320091110 | Aug. 27, 2014 | Aug. 26, 2015 |
| Pre-Amplifier Agilent | 8449B | 3008A02578 | June 24, 2014 | June 23, 2015 |
| RF Cable | NA | 131205<br>131214<br>SNMY23684/4 | Jan. 17, 2014 | Jan. 16, 2015 |
| Spectrum Analyzer R&S | FSV40 | 100964 | July 05, 2014 | July 04, 2015 |
| Pre-Amplifier SPACEK LABS | SLKKa-48-6 | 9K16 | Nov. 13, 2013 | Nov. 12, 2014 |
| Horn_Antenna SCHWARZBECK | BBHA 9170 | 9170-424 | Aug. 26, 2014 | Aug. 25, 2015 |
| RF Cable | NA | RF104-121<br>RF104-204 | Dec. 12, 2013 | Dec. 11, 2014 |
| Antenna Tower & Turn Table CT | NA | NA | NA | NA |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Oct. 16, 2014

### 4.9.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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 height of antenna 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

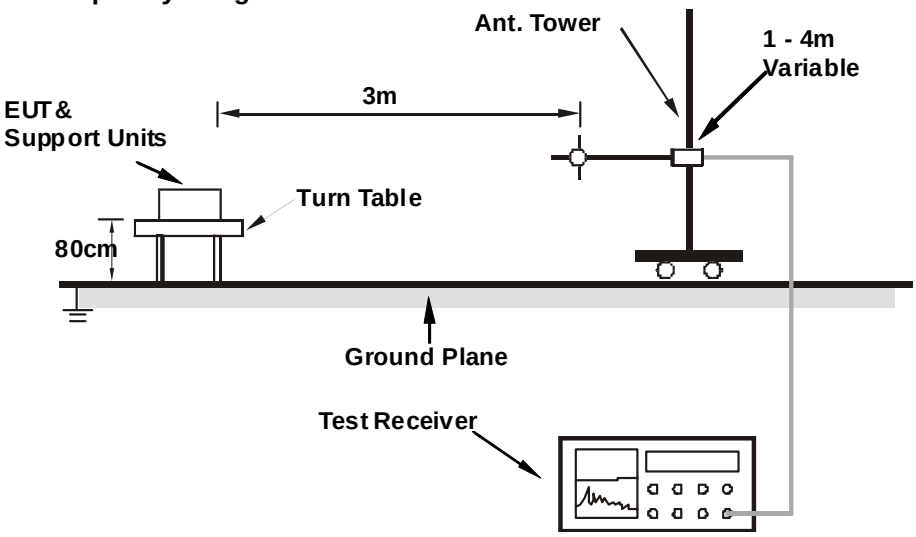
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 1MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

### 4.9.4 DEVIATION FROM TEST STANDARD

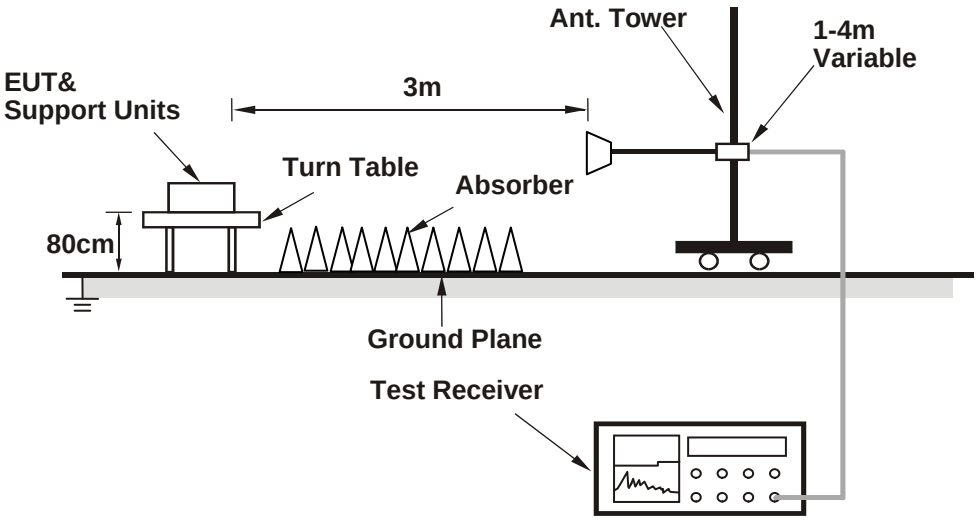
No deviation

## 4.9.5 TEST SETUP

**<Frequency Range below 1GHz>**




**<Frequency Range above 1GHz>**




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

### 4.9.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “QCRT Version3.0 29.0” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

## 4.9.7 TEST RESULTS(MODE 1)

**BELOW 1GHz WORST-CASE DATA**

**BT_GFSK**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 78 | **DETECTOR FUNCTION** | Quasi-Peak (QP) |
| **FREQUENCY RANGE** | 30MHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| **1** | **87.62** | **34.9 QP** | **40.0** | **-5.1** | **2.00 H** | **113** | **53.93** | **-19.05** |
| 2 | 123.65 | 30.8 QP | 43.5 | -12.7 | 2.00 H | 176 | 45.76 | -14.96 |
| 3 | 166.04 | 30.0 QP | 43.5 | -13.5 | 1.50 H | 64 | 43.48 | -13.49 |
| 4 | 330.26 | 35.3 QP | 46.0 | -10.7 | 1.00 H | 360 | 46.77 | -11.47 |
| 5 | 663.85 | 32.9 QP | 46.0 | -13.1 | 1.00 H | 111 | 36.92 | -4.03 |
| 6 | 940.54 | 32.3 QP | 46.0 | -13.8 | 2.00 H | 360 | 31.40 | 0.85 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 32.96 | 33.7 QP | 40.0 | -6.3 | 1.00 V | 360 | 48.10 | -14.41 |
| 2 | 85.73 | 32.6 QP | 40.0 | -7.4 | 1.00 V | 45 | 51.57 | -19.00 |
| 3 | 166.04 | 32.1 QP | 43.5 | -11.4 | 1.00 V | 265 | 45.56 | -13.49 |
| 4 | 335.70 | 34.7 QP | 46.0 | -11.4 | 1.50 V | 132 | 46.00 | -11.35 |
| 5 | 666.47 | 34.8 QP | 46.0 | -11.2 | 1.00 V | 284 | 38.79 | -3.99 |
| 6 | 940.68 | 30.8 QP | 46.0 | -15.2 | 1.50 V | 360 | 29.97 | 0.86 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

## ABOVE 1GHz DATA

### BT_GFSK

| CHANNEL | TX Channel 0 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 47.1 PK | 74.0 | -26.9 | 1.06 H | 315 | 49.57 | -2.47 |
| 2 | 2390.00 | 35.1 AV | 54.0 | -18.9 | 1.06 H | 315 | 37.57 | -2.47 |
| 3 | *2402.00 | 99.8 PK | | | 1.06 H | 315 | 102.21 | -2.41 |
| 4 | *2402.00 | 98.4 AV | | | 1.06 H | 315 | 100.81 | -2.41 |
| 5 | 4804.00 | 46.1 PK | 74.0 | -27.9 | 1.02 H | 76 | 40.48 | 5.62 |
| 6 | 4804.00 | 33.9 AV | 54.0 | -20.1 | 1.02 H | 76 | 28.28 | 5.62 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 51.6 PK | 74.0 | -22.4 | 1.16 V | 91 | 54.07 | -2.47 |
| 2 | 2390.00 | 35.5 AV | 54.0 | -18.5 | 1.16 V | 91 | 37.97 | -2.47 |
| 3 | *2402.00 | 102.8 PK | | | 1.16 V | 91 | 105.21 | -2.41 |
| 4 | *2402.00 | 101.4 AV | | | 1.16 V | 91 | 103.81 | -2.41 |
| 5 | 4804.00 | 46.5 PK | 74.0 | -27.5 | 1.04 V | 189 | 40.88 | 5.62 |
| 6 | 4804.00 | 34.2 AV | 54.0 | -19.8 | 1.04 V | 189 | 28.58 | 5.62 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2441.00 | 100.3 PK | | | 1.17 H | 305 | 102.54 | -2.24 |
| 2 | *2441.00 | 99.4 AV | | | 1.17 H | 305 | 101.64 | -2.24 |
| 3 | 4882.00 | 46.2 PK | 74.0 | -27.8 | 1.03 H | 103 | 40.26 | 5.94 |
| 4 | 4882.00 | 34.1 AV | 54.0 | -19.9 | 1.03 H | 103 | 28.16 | 5.94 |
| 5 | 7323.00 | 53.6 PK | 74.0 | -20.4 | 1.05 H | 306 | 40.42 | 13.18 |
| 6 | 7323.00 | 42.1 AV | 54.0 | -11.9 | 1.05 H | 306 | 28.92 | 13.18 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2441.00 | 103.0 PK | | | 1.08 V | 306 | 105.24 | -2.24 |
| 2 | *2441.00 | 101.9 AV | | | 1.08 V | 306 | 104.14 | -2.24 |
| 3 | 4882.00 | 47.6 PK | 74.0 | -26.4 | 1.01 V | 175 | 41.66 | 5.94 |
| 4 | 4882.00 | 35.4 AV | 54.0 | -18.6 | 1.01 V | 175 | 29.46 | 5.94 |
| 5 | 7323.00 | 53.7 PK | 74.0 | -20.3 | 1.02 V | 19 | 40.52 | 13.18 |
| 6 | 7323.00 | 41.4 AV | 54.0 | -12.6 | 1.02 V | 19 | 28.22 | 13.18 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 100.3 PK | | | 1.01 H | 315 | 102.36 | -2.06 |
| 2 | *2480.00 | 98.4 AV | | | 1.01 H | 315 | 100.46 | -2.06 |
| 3 | 2483.50 | 49.7 PK | 74.0 | -24.3 | 1.01 H | 315 | 51.73 | -2.03 |
| 4 | 2483.50 | 33.4 AV | 54.0 | -20.6 | 1.01 H | 315 | 35.43 | -2.03 |
| 5 | 4960.00 | 46.4 PK | 74.0 | -27.6 | 1.00 H | 100 | 40.14 | 6.26 |
| 6 | 4960.00 | 34.1 AV | 54.0 | -19.9 | 1.00 H | 100 | 27.84 | 6.26 |
| 7 | 7440.00 | 54.4 PK | 74.0 | -19.6 | 1.00 H | 305 | 41.27 | 13.13 |
| 8 | 7440.00 | 41.8 AV | 54.0 | -12.2 | 1.00 H | 305 | 28.67 | 13.13 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 103.1 PK | | | 1.06 V | 107 | 105.16 | -2.06 |
| 2 | *2480.00 | 102.4 AV | | | 1.06 V | 107 | 104.46 | -2.06 |
| 3 | 2483.50 | 53.2 PK | 74.0 | -20.8 | 1.06 V | 107 | 55.23 | -2.03 |
| 4 | 2483.50 | 34.2 AV | 54.0 | -19.8 | 1.06 V | 107 | 36.23 | -2.03 |
| 5 | 4960.00 | 47.8 PK | 74.0 | -26.2 | 1.01 V | 186 | 41.54 | 6.26 |
| 6 | 4960.00 | 35.7 AV | 54.0 | -18.3 | 1.01 V | 186 | 29.44 | 6.26 |
| 7 | 7440.00 | 54.2 PK | 74.0 | -19.8 | 1.09 V | 14 | 41.07 | 13.13 |
| 8 | 7440.00 | 41.8 AV | 54.0 | -12.2 | 1.09 V | 14 | 28.67 | 13.13 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

## BT_8DPSK

| CHANNEL | TX Channel 0 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 45.7 PK | 74.0 | -28.3 | 1.01 H | 314 | 48.17 | -2.47 |
| 2 | 2390.00 | 32.5 AV | 54.0 | -21.5 | 1.01 H | 314 | 34.97 | -2.47 |
| 3 | *2402.00 | 95.7 PK | | | 1.01 H | 314 | 98.11 | -2.41 |
| 4 | *2402.00 | 94.3 AV | | | 1.01 H | 314 | 96.71 | -2.41 |
| 5 | 4804.00 | 45.0 PK | 74.0 | -29.0 | 1.01 H | 77 | 39.38 | 5.62 |
| 6 | 4804.00 | 32.6 AV | 54.0 | -21.4 | 1.01 H | 77 | 26.98 | 5.62 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 45.8 PK | 74.0 | -28.2 | 1.16 V | 320 | 48.27 | -2.47 |
| 2 | 2390.00 | 32.7 AV | 54.0 | -21.3 | 1.16 V | 320 | 35.17 | -2.47 |
| 3 | *2402.00 | 100.5 PK | | | 1.16 V | 320 | 102.91 | -2.41 |
| 4 | *2402.00 | 99.4 AV | | | 1.16 V | 320 | 101.81 | -2.41 |
| 5 | 4804.00 | 47.3 PK | 74.0 | -26.7 | 1.01 V | 156 | 41.68 | 5.62 |
| 6 | 4804.00 | 35.2 AV | 54.0 | -18.8 | 1.01 V | 156 | 29.58 | 5.62 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2441.00 | 96.9 PK | | | 1.03 H | 314 | 99.14 | -2.24 |
| 2 | *2441.00 | 95.4 AV | | | 1.03 H | 314 | 97.64 | -2.24 |
| 3 | 4882.00 | 45.9 PK | 74.0 | -28.1 | 1.05 H | 72 | 39.96 | 5.94 |
| 4 | 4882.00 | 33.6 AV | 54.0 | -20.4 | 1.05 H | 72 | 27.66 | 5.94 |
| 5 | 7323.00 | 53.3 PK | 74.0 | -20.7 | 1.07 H | 287 | 40.12 | 13.18 |
| 6 | 7323.00 | 40.9 AV | 54.0 | -13.1 | 1.07 H | 287 | 27.72 | 13.18 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2441.00 | 101.4 PK | | | 1.13 V | 91 | 103.64 | -2.24 |
| 2 | *2441.00 | 100.3 AV | | | 1.13 V | 91 | 102.54 | -2.24 |
| 3 | 4882.00 | 48.0 PK | 74.0 | -26.0 | 1.03 V | 161 | 42.06 | 5.94 |
| 4 | 4882.00 | 35.9 AV | 54.0 | -18.1 | 1.03 V | 161 | 29.96 | 5.94 |
| 5 | 7323.00 | 52.8 PK | 74.0 | -21.2 | 1.07 V | 21 | 39.62 | 13.18 |
| 6 | 7323.00 | 40.5 AV | 54.0 | -13.5 | 1.07 V | 21 | 27.32 | 13.18 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 97.7 PK | | | 1.02 H | 316 | 99.76 | -2.06 |
| 2 | *2480.00 | 96.3 AV | | | 1.02 H | 316 | 98.36 | -2.06 |
| 3 | 2483.50 | 45.0 PK | 74.0 | -29.0 | 1.02 H | 316 | 47.03 | -2.03 |
| 4 | 2483.50 | 32.4 AV | 54.0 | -21.6 | 1.02 H | 316 | 34.43 | -2.03 |
| 5 | 4960.00 | 46.1 PK | 74.0 | -27.9 | 1.04 H | 97 | 39.84 | 6.26 |
| 6 | 4960.00 | 33.7 AV | 54.0 | -20.3 | 1.04 H | 97 | 27.44 | 6.26 |
| 7 | 7440.00 | 54.0 PK | 74.0 | -20.0 | 1.06 H | 298 | 40.87 | 13.13 |
| 8 | 7440.00 | 41.4 AV | 54.0 | -12.6 | 1.06 H | 298 | 28.27 | 13.13 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 102.0 PK | | | 1.13 V | 319 | 104.06 | -2.06 |
| 2 | *2480.00 | 101.4 AV | | | 1.13 V | 319 | 103.46 | -2.06 |
| 3 | 2483.50 | 45.4 PK | 74.0 | -28.6 | 1.13 V | 319 | 47.43 | -2.03 |
| 4 | 2483.50 | 32.5 AV | 54.0 | -21.5 | 1.13 V | 319 | 34.53 | -2.03 |
| 5 | 4960.00 | 48.0 PK | 74.0 | -26.0 | 1.03 V | 176 | 41.74 | 6.26 |
| 6 | 4960.00 | 35.5 AV | 54.0 | -18.5 | 1.03 V | 176 | 29.24 | 6.26 |
| 7 | 7440.00 | 52.8 PK | 74.0 | -21.2 | 1.12 V | 19 | 39.67 | 13.13 |
| 8 | 7440.00 | 40.3 AV | 54.0 | -13.7 | 1.12 V | 19 | 27.17 | 13.13 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

## 4.9.8 TEST RESULTS(MODE 2)

**BELOW 1GHz WORST-CASE DATA**

**BT_GFSK**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 78 | **DETECTOR FUNCTION** | Quasi-Peak (QP) |
| **FREQUENCY RANGE** | 30MHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 89.41 | 33.3 QP | 43.5 | -10.2 | 1.50 H | 236 | 52.41 | -19.12 |
| 2 | 166.00 | 30.7 QP | 43.5 | -12.8 | 1.50 H | 215 | 44.17 | -13.49 |
| 3 | 255.09 | 37.9 QP | 46.0 | -8.1 | 1.00 H | 126 | 51.99 | -14.12 |
| 4 | 328.43 | 37.4 QP | 46.0 | -8.6 | 1.00 H | 139 | 48.89 | -11.49 |
| 5 | 666.51 | 36.1 QP | 46.0 | -9.9 | 1.00 H | 196 | 40.09 | -3.99 |
| 6 | 945.82 | 35.7 QP | 46.0 | -10.3 | 1.50 H | 256 | 34.71 | 0.96 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 32.96 | 33.7 QP | 40.0 | -6.3 | 1.00 V | 360 | 48.10 | -14.41 |
| 2 | 85.73 | 32.6 QP | 40.0 | -7.4 | 1.00 V | 45 | 51.57 | -19.00 |
| 3 | 166.04 | 32.1 QP | 43.5 | -11.4 | 1.00 V | 265 | 45.56 | -13.49 |
| 4 | 335.70 | 34.7 QP | 46.0 | -11.4 | 1.50 V | 132 | 46.00 | -11.35 |
| 5 | 666.47 | 34.8 QP | 46.0 | -11.2 | 1.00 V | 284 | 38.79 | -3.99 |
| 6 | 940.68 | 30.8 QP | 46.0 | -15.2 | 1.50 V | 360 | 29.97 | 0.86 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

## ABOVE 1GHz DATA

### BT_GFSK

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 0 | **DETECTOR FUNCTION** | Peak (PK) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 46.5 PK | 74.0 | -27.5 | 1.05 H | 84 | 48.97 | -2.47 |
| 2 | 2390.00 | 33.2 AV | 54.0 | -20.8 | 1.05 H | 84 | 35.67 | -2.47 |
| 3 | *2402.00 | 104.0 PK | | | 1.05 H | 84 | 106.41 | -2.41 |
| 4 | *2402.00 | 73.9 AV | | | 1.05 H | 84 | 76.31 | -2.41 |
| 5 | 4804.00 | 48.8 PK | 74.0 | -25.2 | 1.40 H | 284 | 43.18 | 5.62 |
| 6 | 4804.00 | 36.6 AV | 54.0 | -17.4 | 1.40 H | 284 | 30.98 | 5.62 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 46.7 PK | 74.0 | -27.3 | 1.53 V | 267 | 49.17 | -2.47 |
| 2 | 2390.00 | 34.7 AV | 54.0 | -19.3 | 1.53 V | 267 | 37.17 | -2.47 |
| 3 | *2402.00 | 109.3 PK | | | 1.53 V | 267 | 111.71 | -2.41 |
| 4 | *2402.00 | 108.3 AV | | | 1.53 V | 267 | 110.71 | -2.41 |
| 5 | 4804.00 | 49.6 PK | 74.0 | -24.4 | 1.09 V | 24 | 43.98 | 5.62 |
| 6 | 4804.00 | 37.4 AV | 54.0 | -16.6 | 1.09 V | 24 | 31.78 | 5.62 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2441.00 | 103.5 PK | | | 1.02 H | 115 | 105.74 | -2.24 |
| 2 | *2441.00 | 101.4 AV | | | 1.02 H | 115 | 103.64 | -2.24 |
| 3 | 4882.00 | 49.2 PK | 74.0 | -24.8 | 1.43 H | 292 | 43.26 | 5.94 |
| 4 | 4882.00 | 36.6 AV | 54.0 | -17.4 | 1.43 H | 292 | 30.66 | 5.94 |
| 5 | 7323.00 | 54.4 PK | 74.0 | -19.6 | 1.06 H | 161 | 41.22 | 13.18 |
| 6 | 7323.00 | 38.6 AV | 54.0 | -15.4 | 1.06 H | 161 | 25.42 | 13.18 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2441.00 | 110.4 PK | | | 1.01 V | 265 | 112.64 | -2.24 |
| 2 | *2441.00 | 109.1 AV | | | 1.01 V | 265 | 111.34 | -2.24 |
| 3 | 4882.00 | 49.5 PK | 74.0 | -24.5 | 1.04 V | 12 | 43.56 | 5.94 |
| 4 | 4882.00 | 37.3 AV | 54.0 | -16.7 | 1.04 V | 12 | 31.36 | 5.94 |
| 5 | 7323.00 | 55.2 PK | 74.0 | -18.8 | 1.05 V | 243 | 42.02 | 13.18 |
| 6 | 7323.00 | 39.2 AV | 54.0 | -14.8 | 1.05 V | 243 | 26.02 | 13.18 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 107.3 PK | | | 1.29 H | 117 | 109.36 | -2.06 |
| 2 | *2480.00 | 105.7 AV | | | 1.29 H | 117 | 107.76 | -2.06 |
| 3 | 2483.50 | 53.9 PK | 74.0 | -20.1 | 1.29 H | 117 | 55.93 | -2.03 |
| 4 | 2483.50 | 36.9 AV | 54.0 | -17.1 | 1.29 H | 117 | 38.93 | -2.03 |
| 5 | 4960.00 | 48.8 PK | 74.0 | -25.2 | 1.39 H | 294 | 42.54 | 6.26 |
| 6 | 4960.00 | 36.2 AV | 54.0 | -17.8 | 1.39 H | 294 | 29.94 | 6.26 |
| 7 | 7440.00 | 54.4 PK | 74.0 | -19.6 | 1.00 H | 149 | 41.27 | 13.13 |
| 8 | 7440.00 | 41.6 AV | 54.0 | -12.4 | 1.00 H | 149 | 28.47 | 13.13 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 111.0 PK | | | 1.49 V | 260 | 113.06 | -2.06 |
| 2 | *2480.00 | 110.2 AV | | | 1.49 V | 260 | 112.26 | -2.06 |
| 3 | 2483.50 | 63.7 PK | 74.0 | -10.3 | 1.47 V | 265 | 65.73 | -2.03 |
| 4 | 2483.50 | 46.1 AV | 54.0 | -7.9 | 1.47 V | 265 | 48.13 | -2.03 |
| 5 | 4960.00 | 49.8 PK | 74.0 | -24.2 | 1.00 V | 7 | 43.54 | 6.26 |
| 6 | 4960.00 | 37.8 AV | 54.0 | -16.2 | 1.00 V | 7 | 31.54 | 6.26 |
| 7 | 7440.00 | 55.3 PK | 74.0 | -18.7 | 1.06 V | 228 | 42.17 | 13.13 |
| 8 | 7440.00 | 43.4 AV | 54.0 | -10.6 | 1.06 V | 228 | 30.27 | 13.13 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

## BT_8DPSK

| CHANNEL | TX Channel 0 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 48.7 PK | 74.0 | -25.3 | 1.35 H | 114 | 51.17 | -2.47 |
| 2 | 2390.00 | 33.4 AV | 54.0 | -20.6 | 1.35 H | 114 | 35.87 | -2.47 |
| 3 | *2402.00 | 103.2 PK | | | 1.35 H | 114 | 105.61 | -2.41 |
| 4 | *2402.00 | 101.7 AV | | | 1.35 H | 114 | 104.11 | -2.41 |
| 5 | 4804.00 | 46.9 PK | 74.0 | -27.1 | 1.54 H | 277 | 41.28 | 5.62 |
| 6 | 4804.00 | 34.6 AV | 54.0 | -19.4 | 1.54 H | 277 | 28.98 | 5.62 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 53.3 PK | 74.0 | -20.7 | 1.53 V | 262 | 55.77 | -2.47 |
| 2 | 2390.00 | 34.4 AV | 54.0 | -19.6 | 1.53 V | 262 | 36.87 | -2.47 |
| 3 | *2402.00 | 107.1 PK | | | 1.53 V | 262 | 109.51 | -2.41 |
| 4 | *2402.00 | 106.4 AV | | | 1.53 V | 262 | 108.81 | -2.41 |
| 5 | 4804.00 | 48.4 PK | 74.0 | -25.6 | 1.01 V | 348 | 42.78 | 5.62 |
| 6 | 4804.00 | 36.1 AV | 54.0 | -17.9 | 1.01 V | 348 | 30.48 | 5.62 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2441.00 | 103.8 PK | | | 1.33 H | 115 | 106.04 | -2.24 |
| 2 | *2441.00 | 102.4 AV | | | 1.33 H | 115 | 104.64 | -2.24 |
| 3 | 4882.00 | 47.2 PK | 74.0 | -26.8 | 1.49 H | 272 | 41.26 | 5.94 |
| 4 | 4882.00 | 34.9 AV | 54.0 | -19.1 | 1.49 H | 272 | 28.96 | 5.94 |
| 5 | 7323.00 | 54.3 PK | 74.0 | -19.7 | 1.01 H | 273 | 41.12 | 13.18 |
| 6 | 7323.00 | 42.7 AV | 54.0 | -11.3 | 1.01 H | 273 | 29.52 | 13.18 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2441.00 | 107.8 PK | | | 1.24 V | 260 | 110.04 | -2.24 |
| 2 | *2441.00 | 106.1 AV | | | 1.24 V | 260 | 108.34 | -2.24 |
| 3 | 4882.00 | 48.1 PK | 74.0 | -25.9 | 1.03 V | 343 | 42.16 | 5.94 |
| 4 | 4882.00 | 36.1 AV | 54.0 | -17.9 | 1.03 V | 343 | 30.16 | 5.94 |
| 5 | 7323.00 | 53.4 PK | 74.0 | -20.6 | 1.01 V | 350 | 40.22 | 13.18 |
| 6 | 7323.00 | 41.8 AV | 54.0 | -12.2 | 1.01 V | 350 | 28.62 | 13.18 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 78 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 104.6 PK | | | 1.28 H | 118 | 106.66 | -2.06 |
| 2 | *2480.00 | 103.2 AV | | | 1.28 H | 118 | 105.26 | -2.06 |
| 3 | 2483.50 | 53.9 PK | 74.0 | -20.1 | 1.28 H | 118 | 55.93 | -2.03 |
| 4 | 2483.50 | 36.0 AV | 54.0 | -18.0 | 1.28 H | 118 | 38.03 | -2.03 |
| 5 | 4960.00 | 47.0 PK | 74.0 | -27.0 | 1.45 H | 286 | 40.74 | 6.26 |
| 6 | 4960.00 | 35.0 AV | 54.0 | -19.0 | 1.45 H | 286 | 28.74 | 6.26 |
| 7 | 7440.00 | 54.7 PK | 74.0 | -19.3 | 1.03 H | 272 | 41.57 | 13.13 |
| 8 | 7440.00 | 42.1 AV | 54.0 | -11.9 | 1.03 H | 272 | 28.97 | 13.13 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 106.8 PK | | | 1.49 V | 260 | 108.86 | -2.06 |
| 2 | *2480.00 | 105.4 AV | | | 1.49 V | 260 | 107.46 | -2.06 |
| 3 | 2483.50 | 58.2 PK | 74.0 | -15.8 | 1.49 V | 260 | 60.23 | -2.03 |
| 4 | 2483.50 | 40.9 AV | 54.0 | -13.1 | 1.49 V | 260 | 42.93 | -2.03 |
| 5 | 4960.00 | 48.3 PK | 74.0 | -25.7 | 1.02 V | 351 | 42.04 | 6.26 |
| 6 | 4960.00 | 36.3 AV | 54.0 | -17.7 | 1.02 V | 351 | 30.04 | 6.26 |
| 7 | 7440.00 | 53.9 PK | 74.0 | -20.1 | 1.00 V | 339 | 40.77 | 13.13 |
| 8 | 7440.00 | 41.6 AV | 54.0 | -12.4 | 1.00 V | 339 | 28.47 | 13.13 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

## 4.10 CONDUCTED EMISSION MEASUREMENT

### 4.10.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5<br>0.5-5<br>5-30 | 66 to 56<br>56<br>60 | 56 to 46<br>46<br>50 |

**NOTE**:

1. The lower limit shall apply at the transition frequencies.
2. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 4.10.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESCS 30 | 100375 | Apr. 29, 2014 | Apr. 28, 2015 |
| Line-Impedance Stabilization Network (for EUT)<br>SCHWARZBECK | NSLK-8127 | 8127-522 | Sep. 15, 2014 | Sep. 14, 2015 |
| Line-Impedance Stabilization Network (for Peripheral)<br>ROHDE & SCHWARZ | ENV216 | 100071 | Nov. 13, 2013 | Nov. 12, 2014 |
| RF Cable<br>(JYEBAO) | 5DFB | COCCAB-001 | Mar. 10 , 2014 | Mar. 09, 2015 |
| 50 ohms Terminator | N/A | EMC-03 | Sep. 22, 2014 | Sep. 21, 2015 |
| 50 ohms Terminator | N/A | EMC-02 | Oct. 01, 2013 | Sep. 30, 2014 |
| Software<br>ADT | BV ADT_Cond_V7.3.7.3 | NA | NA | NA |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Sep. 24, 2014

## 4.10.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

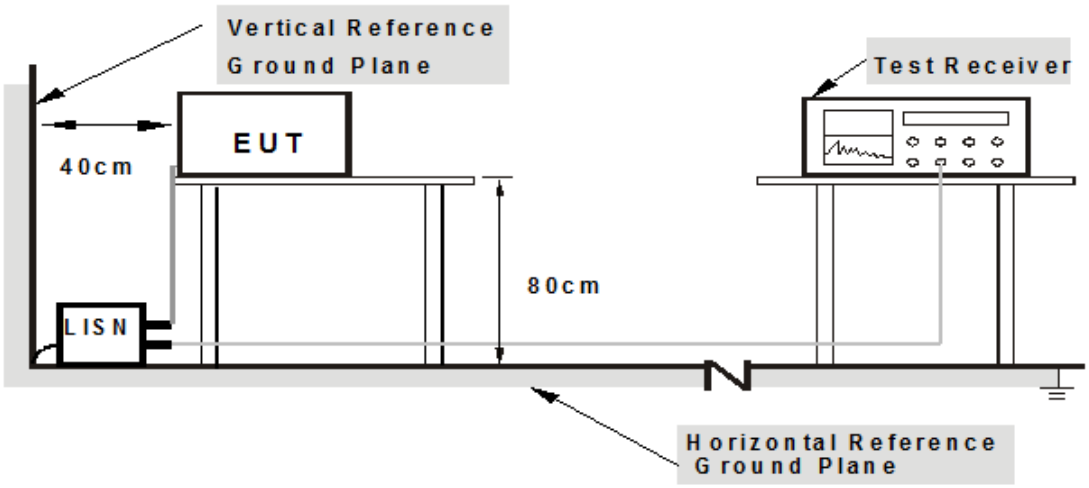
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit – 20dB) were not recorded.

**NOTE:** The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

## 4.10.4 DEVIATION FROM TEST STANDARD

No deviation

## 4.10.5 TEST SETUP




Note: 1.Support units were connected to second LISN.

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

## 4.10.6 EUT OPERATING CONDITIONS

Same as Item 4.8.6

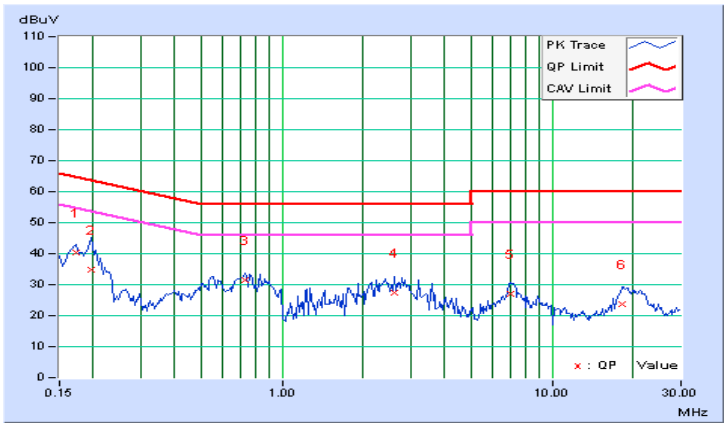
## 4.10.7 TEST RESULTS

| PHASE | Line (L) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|

| No | Freq. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.17344 | 0.07 | 40.30 | 27.65 | 40.37 | 27.72 | 64.79 | 54.79 | -24.43 | -27.08 |
| 2 | 0.19687 | 0.07 | 34.88 | 10.76 | 34.95 | 10.83 | 63.74 | 53.74 | -28.79 | -42.91 |
| 3 | 0.72813 | 0.11 | 31.40 | 22.86 | 31.51 | 22.97 | 56.00 | 46.00 | -24.49 | -23.03 |
| 4 | 2.61328 | 0.20 | 27.06 | 19.86 | 27.26 | 20.06 | 56.00 | 46.00 | -28.74 | -25.94 |
| 5 | 7.02344 | 0.36 | 26.52 | 18.62 | 26.88 | 18.98 | 60.00 | 50.00 | -33.12 | -31.02 |
| 6 | 18.19531 | 0.67 | 23.16 | 16.86 | 23.83 | 17.53 | 60.00 | 50.00 | -36.17 | -32.47 |

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

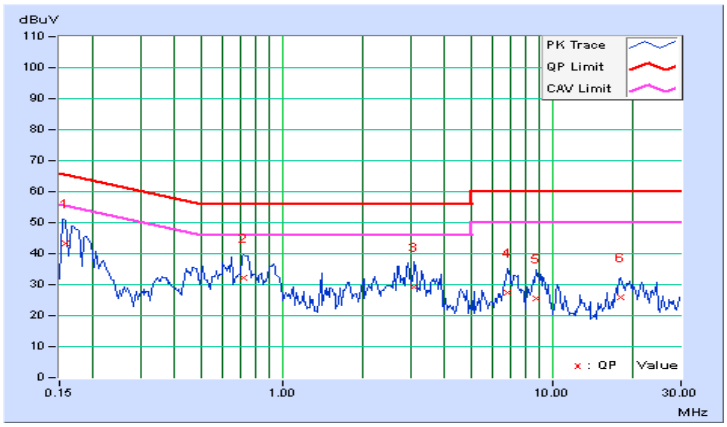


| PHASE | Neutral (N) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|

| No | Freq. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| **1** | **0.15781** | **0.07** | **43.08** | **18.93** | **43.15** | **19.00** | **65.58** | **55.58** | **-22.42** | **-36.57** |
| 2 | 0.72422 | 0.11 | 32.24 | 19.41 | 32.35 | 19.52 | 56.00 | 46.00 | -23.65 | -26.48 |
| 3 | 3.07422 | 0.22 | 29.15 | 20.17 | 29.37 | 20.39 | 56.00 | 46.00 | -26.63 | -25.61 |
| 4 | 6.87109 | 0.35 | 26.96 | 17.78 | 27.31 | 18.13 | 60.00 | 50.00 | -32.69 | -31.87 |
| 5 | 8.77344 | 0.41 | 24.97 | 16.30 | 25.38 | 16.71 | 60.00 | 50.00 | -34.62 | -33.29 |
| 6 | 17.97266 | 0.65 | 25.40 | 17.88 | 26.05 | 18.53 | 60.00 | 50.00 | -33.95 | -31.47 |

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



# 5 TEST TYPES AND RESULTS (DTS)

## 5.1 CONDUCTED OUTPUT POWER MEASUREMENT

### 5.1.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

### 5.1.2 INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| Power meter Anritsu | ML2495A | 1014008 | Apr. 30, 2014 | Apr. 29, 2015 |
| Power sensor Anritsu | MA2411B | 0917122 | Apr. 30, 2014 | Apr. 29, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

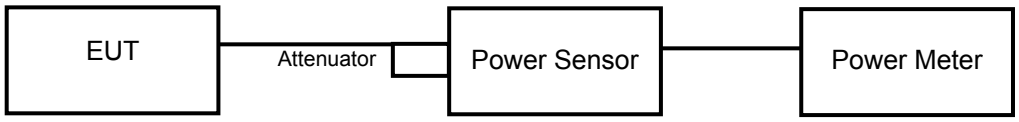
### 5.1.3 TEST PROCEDURES

The peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the peak power level.

### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.5 TEST SETUP




### 5.1.6 EUT OPERATING CONDITIONS

The software (QCRT Version3.0 29.0) provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

## 5.1.7 TEST RESULTS

**FOR PEAK POWER**

**BT_LE-GFSK**

| CHANNEL | FREQUENCY (MHz) | PEAK POWER (mW) | PEAK POWER (dBm) | LIMIT (dBm) | PASS/FAIL |
|---|---|---|---|---|---|
| 0 | 2402 | 1.871 | 2.72 | 30 | PASS |
| 19 | 2440 | 1.972 | 2.95 | 30 | PASS |
| 39 | 2480 | 1.959 | 2.92 | 30 | PASS |

**FOR AVERAGE POWER**

**BT_LE-GFSK**

| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---|---|---|---|
| 0 | 2402 | 1.807 | 2.57 |
| 19 | 2440 | 1.910 | 2.81 |
| 39 | 2480 | 1.892 | 2.77 |

## 5.2 POWER SPECTRAL DENSITY MEASUREMENT

### 5.2.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 5.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100964 | July 05, 2014 | July 04, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

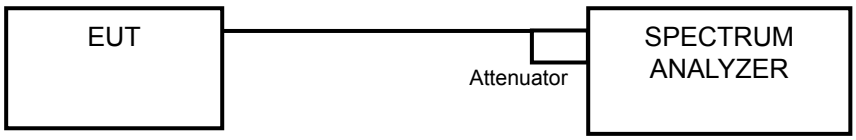
### 5.2.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

### 5.2.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.2.5 TEST SETUP




### 5.2.6 EUT OPERATING CONDITION

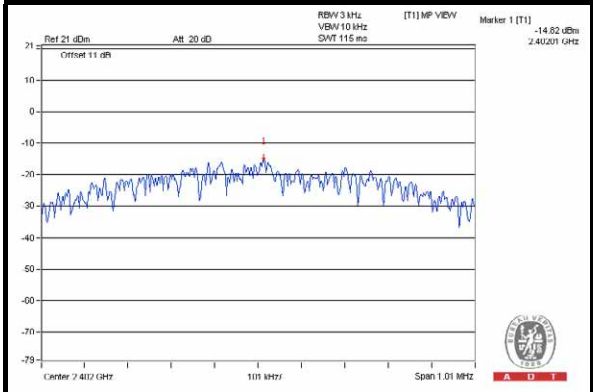
Same as Item 5.1.6

## 5.2.7 TEST RESULTS

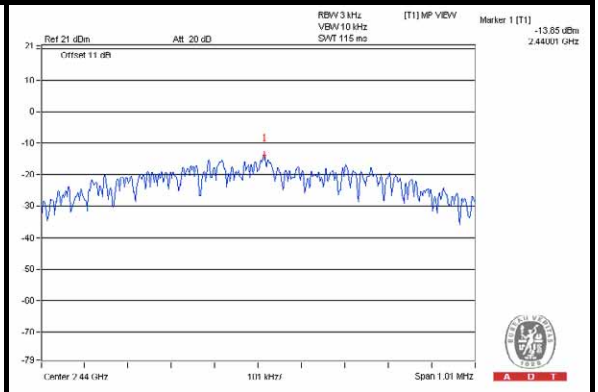
**BT_LE-GFSK**

| Channel | FREQUENCY (MHz) | PSD (dBm) | Limit (dBm) | PASS /FAIL |
|---|---|---|---|---|
| 0 | 2402 | -14.82 | 8 | PASS |
| 19 | 2440 | -13.85 | 8 | PASS |
| 39 | 2480 | -12.91 | 8 | PASS |

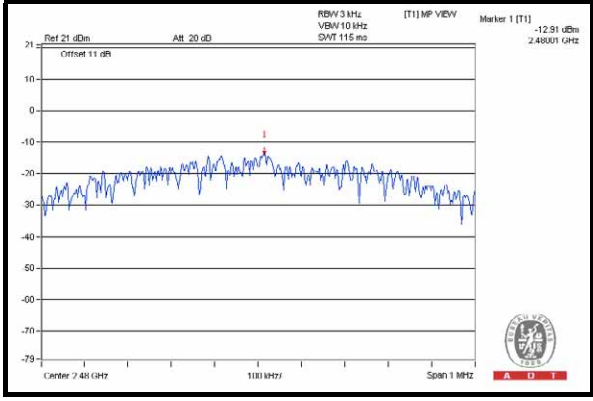
**CH0**




**CH19**




**CH39**



## 5.3 6dB BANDWIDTH MEASUREMENT

### 5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 5.3.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

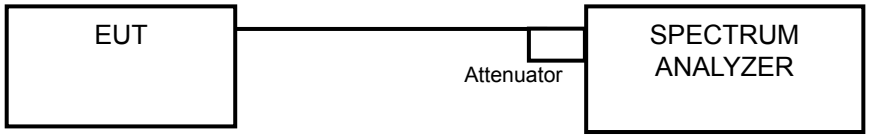
### 5.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

### 5.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.3.5 TEST SETUP




### 5.3.6 EUT OPERATING CONDITIONS

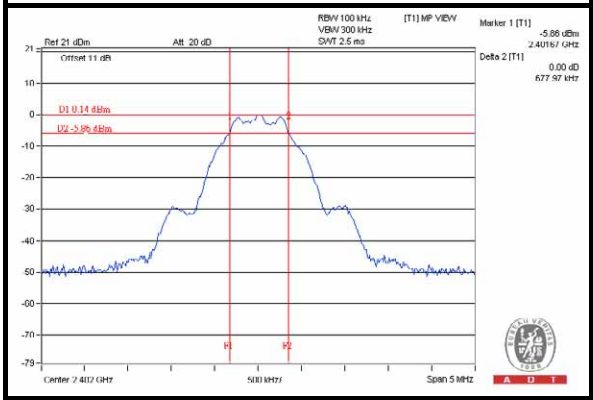
Same as Item 5.1.6

## 5.3.7 TEST RESULTS

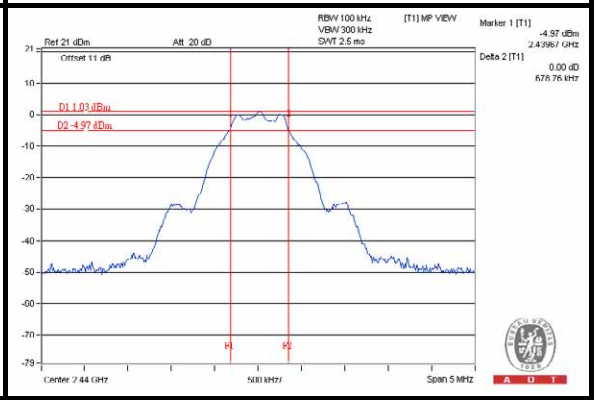
### BT_LE-GFSK

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) |
|---|---|---|
| 0 | 2402 | 0.68 |
| 19 | 2440 | 0.68 |
| 39 | 2480 | 0.67 |

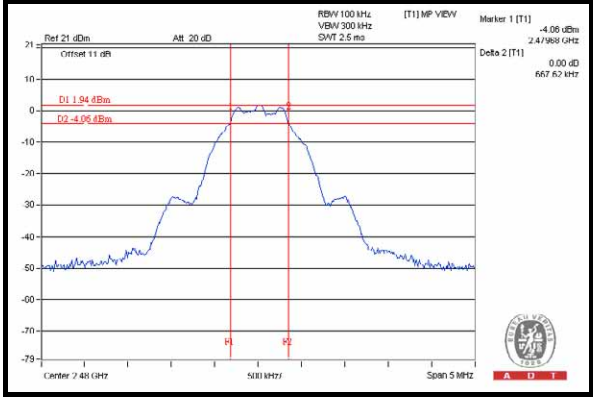
**CH0**




**CH19**




**CH39**



## 5.4 OCCUPIED BANDWIDTH MEASUREMENT

### 5.4.1 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

### 5.4.2 TEST PROCEDURE

1. Set RBW ≥ 1% of the emission bandwidth.
2. Set the VBW > 3 × RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Record the 99% emission bandwidth.

### 5.4.3 TEST SETUP


### 5.4.4 EUT OPERATING CONDITIONS

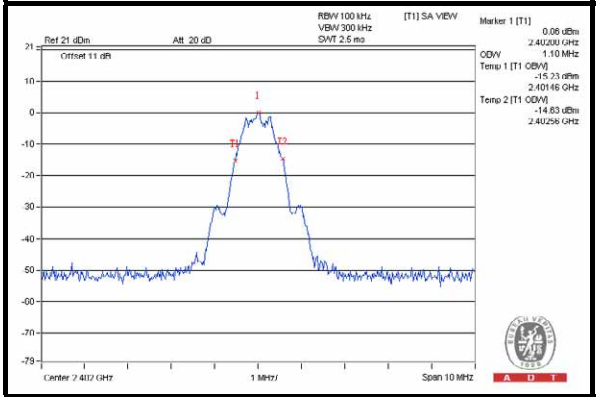
Same as Item 4.1.6

## 5.4.5 TEST RESULTS

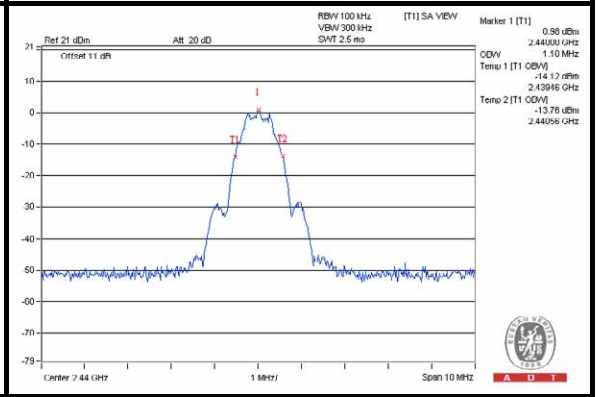
**BT_LE-GFSK**

| CHANNEL | CHANNEL FREQUENCY (MHz) | OCCUPIED BANDWIDTH (MHz) |
|---|---|---|
| 0 | 2402 | 1.10 |
| 19 | 2440 | 1.10 |
| 39 | 2480 | 1.10 |

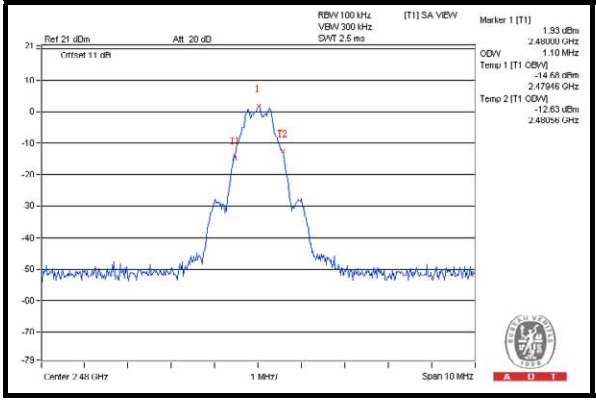
**CH0**




**CH19**




**CH39**



## 5.5 CONDUCTED OUT-BAND EMISSION MEASUREMENT

### 5.5.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 5.5.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| SPECTRUM ANALYZER R&S | FSV 40 | 100060 | May 08, 2014 | May 07, 2015 |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Oct. 15, 2014

### 5.5.3 TEST PROCEDURE

**Measurement Procedure - Reference Level**

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

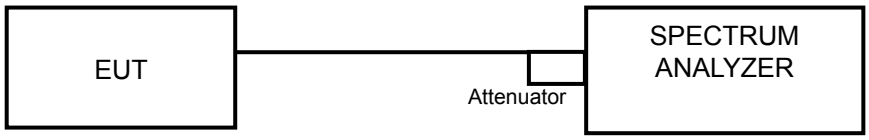
**Measurement Procedure –Unwanted Emission Level**

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

### 5.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.5.5 EUT OPERATING CONDITION

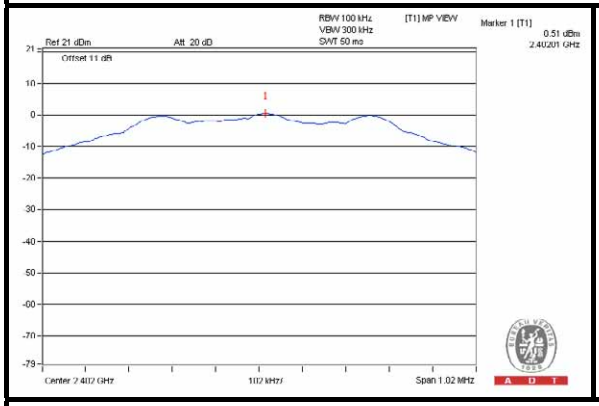


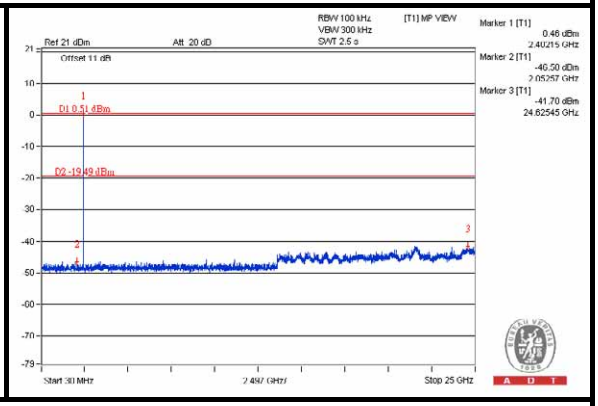

### 5.5.6 TEST RESULTS

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

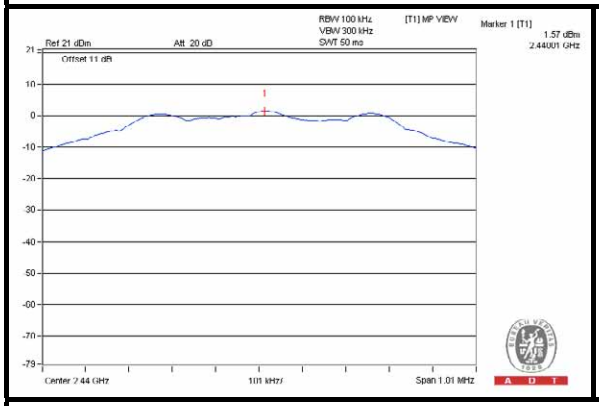
## BT_LE-GFSK

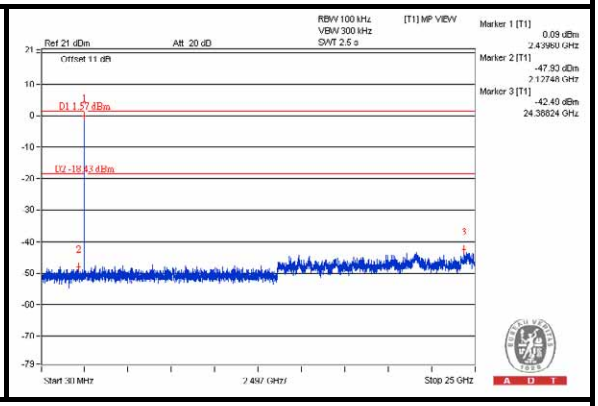
### CH 0



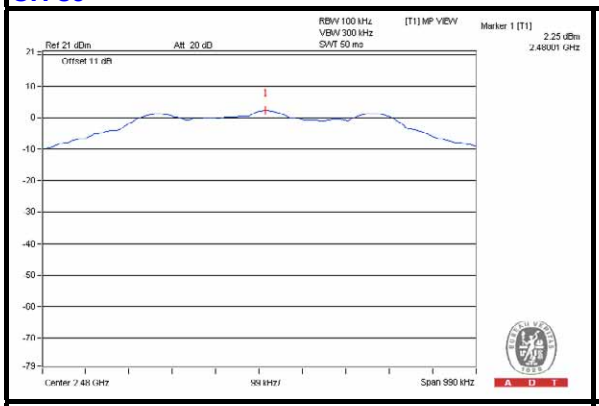



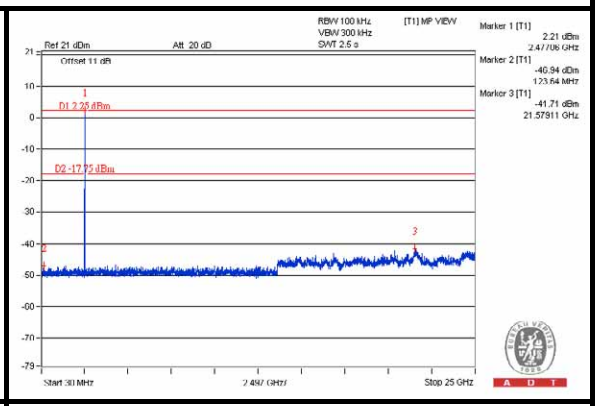

### CH 19



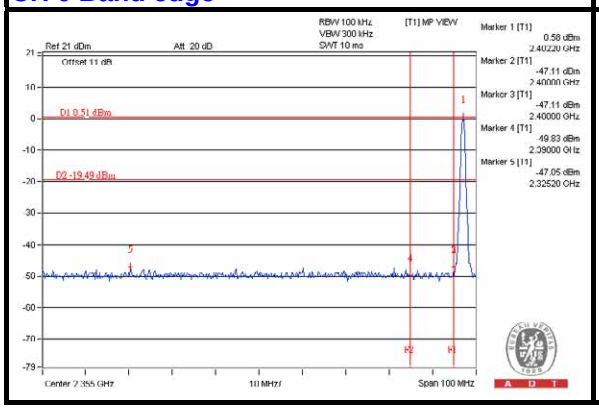




### CH 39

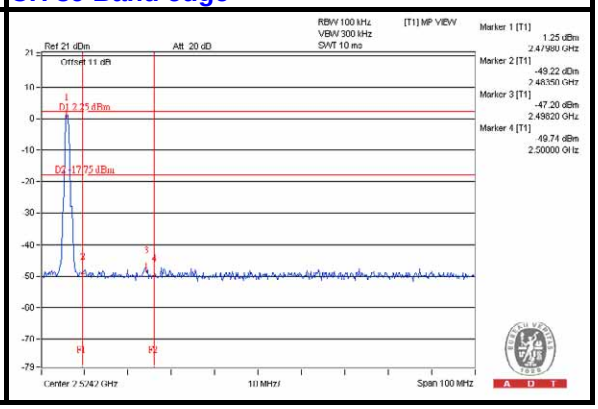



### CH 0 Band edge




### CH 39 Band edge



## 5.6 UNWANTED EMISSION MEASUREMENT(RADIATED VERSUS CONDUCTED)

### 5.6.1 LIMITS OF UNWANTED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| 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 (dBuV/m) = 20 log Emission level (uV/m).
3. 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.

## 5.6.2 TEST INSTRUMENTS

**For below 1GHz test:**

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| MXE EMI Receiver Agilent | N9038A | MY51210105 | July 21, 2014 | July 20,2015 |
| Pre-Amplifier Mini-Circuits | ZFL-1000VH2 B | AMP-ZFL-03 | Nov. 13, 2013 | Nov. 12, 2014 |
| Trilog Broadband Antenna SCHWARZBECK | VULB 9168 | 9168-360 | Feb. 26, 2014 | Feb. 25, 2015 |
| RF Cable | NA | CHGCAB_001 | Oct. 05, 2013 | Oct. 04, 2014 |
| Horn_Antenna AISI | AIH.8018 | 0000320091110 | Aug. 27, 2014 | Aug. 26, 2015 |
| Pre-Amplifier Agilent | 8449B | 3008A02578 | June 24, 2014 | June 23, 2015 |
| RF Cable | NA | 131205<br>131214<br>SNMY23684/4 | Jan. 17, 2014 | Jan. 16, 2015 |
| Spectrum Analyzer R&S | FSV40 | 100964 | July 05, 2014 | July 04, 2015 |
| Pre-Amplifier SPACEK LABS | SLKKa-48-6 | 9K16 | Nov. 13, 2013 | Nov. 12, 2014 |
| Horn_Antenna SCHWARZBECK | BBHA 9170 | 9170-424 | Aug. 26, 2014 | Aug. 25, 2015 |
| RF Cable | NA | RF104-121<br>RF104-204 | Dec. 12, 2013 | Dec. 11, 2014 |
| Antenna Tower & Turn Table CT | NA | NA | NA | NA |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Aug. 27, 2014

**For above 1GHz test:**

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| MXE EMI Receiver Agilent | N9038A | MY51210105 | July 21, 2014 | July 20,2015 |
| Pre-Amplifier Mini-Circuits | ZFL-1000VH2 B | AMP-ZFL-03 | Nov. 13, 2013 | Nov. 12, 2014 |
| Trilog Broadband Antenna SCHWARZBECK | VULB 9168 | 9168-360 | Feb. 26, 2014 | Feb. 25, 2015 |
| RF Cable | NA | CHGCAB_001 | Oct. 04, 2014 | Oct. 03, 2015 |
| Horn_Antenna AISI | AIH.8018 | 0000320091110 | Aug. 27, 2014 | Aug. 26, 2015 |
| Pre-Amplifier Agilent | 8449B | 3008A02578 | June 24, 2014 | June 23, 2015 |
| RF Cable | NA | 131205<br>131214<br>SNMY23684/4 | Jan. 17, 2014 | Jan. 16, 2015 |
| Spectrum Analyzer R&S | FSV40 | 100964 | July 05, 2014 | July 04, 2015 |
| Pre-Amplifier SPACEK LABS | SLKKa-48-6 | 9K16 | Nov. 13, 2013 | Nov. 12, 2014 |
| Horn_Antenna SCHWARZBECK | BBHA 9170 | 9170-424 | Aug. 26, 2014 | Aug. 25, 2015 |
| RF Cable | NA | RF104-121<br>RF104-204 | Dec. 12, 2013 | Dec. 11, 2014 |
| Antenna Tower & Turn Table CT | NA | NA | NA | NA |

**Note:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Oct. 16, 2014

### 5.6.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. 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 height of antenna 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

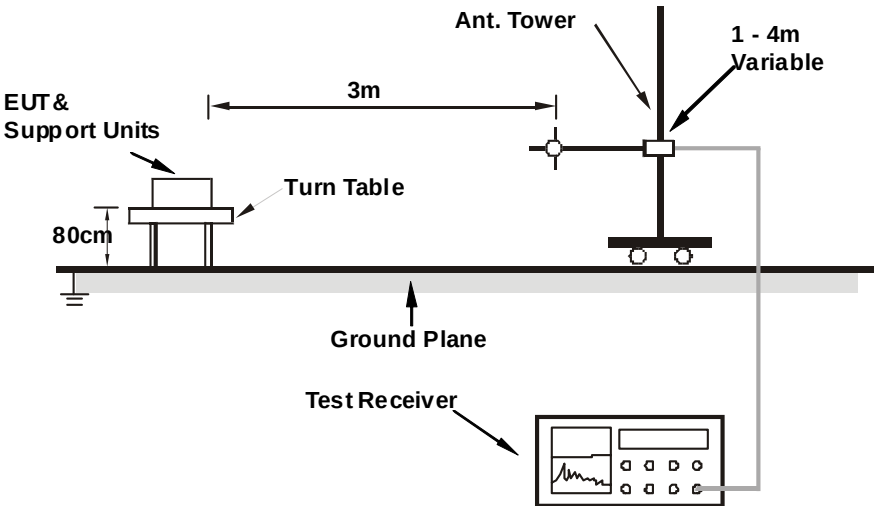
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

### 5.6.4 DEVIATION FROM TEST STANDARD

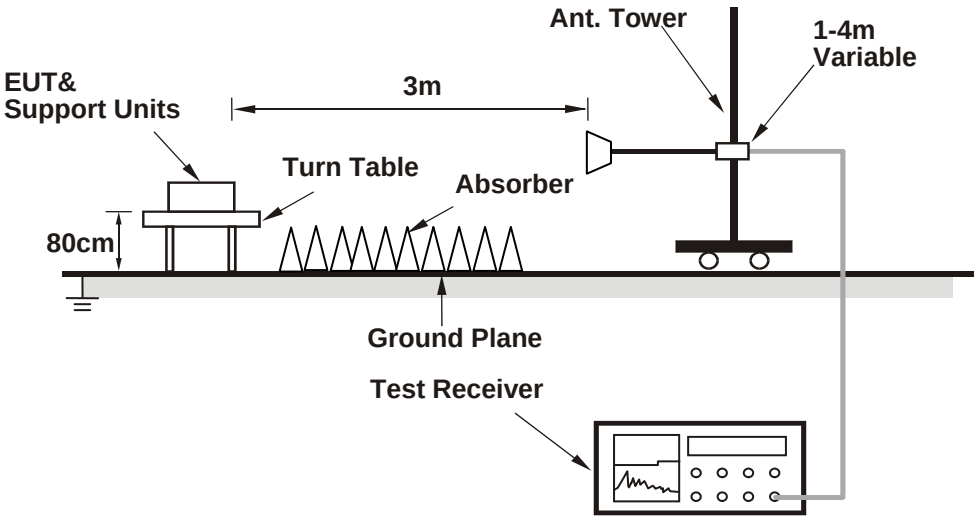
No deviation

## 5.6.5 TEST SETUP

**<Frequency Range below 1GHz>**




**<Frequency Range above 1GHz>**




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

### 5.6.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “QCRT Version3.0 29.0” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

## 5.6.7 TEST RESULTS(MODE 1)

**BELOW 1GHz WORST-CASE DATA**

**BT_LE-GFSK**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 19 | **DETECTOR FUNCTION** | Quasi-Peak (QP) |
| **FREQUENCY RANGE** | 30MHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 89.41 | 33.4 QP | 43.5 | -10.2 | 2.00 H | 100 | 52.47 | -19.12 |
| 2 | 165.99 | 29.7 QP | 43.5 | -13.8 | 1.50 H | 38 | 43.19 | -13.49 |
| 3 | 255.09 | 37.9 QP | 46.0 | -8.1 | 1.50 H | 98 | 52.05 | -14.12 |
| 4 | 328.42 | 35.4 QP | 46.0 | -10.6 | 1.00 H | 360 | 46.92 | -11.49 |
| 5 | 666.51 | 34.0 QP | 46.0 | -12.0 | 1.00 H | 123 | 37.95 | -3.99 |
| 6 | 945.83 | 33.7 QP | 46.0 | -12.3 | 1.50 H | 310 | 32.71 | 0.96 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| **1** | **31.50** | **32.7 QP** | **40.0** | **-7.3** | **1.50 V** | **360** | **47.26** | **-14.52** |
| **2** | **87.04** | **32.7 QP** | **40.0** | **-7.3** | **1.00 V** | **51** | **51.74** | **-19.05** |
| 3 | 166.04 | 32.0 QP | 43.5 | -11.5 | 1.00 V | 270 | 45.45 | -13.49 |
| 4 | 331.38 | 33.9 QP | 46.0 | -12.1 | 1.50 V | 157 | 45.31 | -11.45 |
| 5 | 666.51 | 34.0 QP | 46.0 | -12.0 | 2.00 V | 267 | 37.97 | -3.99 |
| 6 | 940.59 | 31.2 QP | 46.0 | -14.8 | 1.00 V | 76 | 30.37 | 0.85 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

## ABOVE 1GHz DATA

### BT_LE-GFSK

| CHANNEL | TX Channel 0 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 45.4 PK | 74.0 | -28.6 | 1.56 H | 325 | 47.87 | -2.47 |
| 2 | 2390.00 | 34.6 AV | 54.0 | -19.4 | 1.56 H | 325 | 37.07 | -2.47 |
| 3 | *2402.00 | 92.5 PK | | | 1.56 H | 325 | 94.91 | -2.41 |
| 4 | *2402.00 | 87.4 AV | | | 1.56 H | 325 | 89.81 | -2.41 |
| 5 | 4804.00 | 44.2 PK | 74.0 | -29.8 | 1.00 H | 104 | 38.58 | 5.62 |
| 6 | 4804.00 | 14.8 AV | 54.0 | -39.2 | 1.00 H | 104 | 9.18 | 5.62 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 45.6 PK | 74.0 | -28.4 | 1.77 V | 15 | 48.07 | -2.47 |
| 2 | 2390.00 | 34.8 AV | 54.0 | -19.2 | 1.77 V | 15 | 37.27 | -2.47 |
| 3 | *2402.00 | 95.1 PK | | | 1.77 V | 15 | 97.51 | -2.41 |
| 4 | *2402.00 | 90.6 AV | | | 1.77 V | 15 | 93.01 | -2.41 |
| 5 | 4804.00 | 47.0 PK | 74.0 | -27.0 | 1.01 V | 186 | 41.38 | 5.62 |
| 6 | 4804.00 | 17.9 AV | 54.0 | -36.1 | 1.01 V | 186 | 12.28 | 5.62 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 19 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2440.00 | 93.2 PK | | | 1.54 H | 307 | 95.44 | -2.24 |
| 2 | *2440.00 | 87.1 AV | | | 1.54 H | 307 | 89.34 | -2.24 |
| 3 | 4880.00 | 44.8 PK | 74.0 | -29.2 | 1.04 H | 88 | 38.86 | 5.94 |
| 4 | 4880.00 | 14.8 AV | 54.0 | -39.2 | 1.04 H | 88 | 8.86 | 5.94 |
| 5 | 7320.00 | 54.0 PK | 74.0 | -20.0 | 1.00 H | 283 | 40.81 | 13.19 |
| 6 | 7320.00 | 24.4 AV | 54.0 | -29.6 | 1.00 H | 283 | 11.21 | 13.19 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2440.00 | 95.6 PK | | | 1.14 V | 327 | 97.84 | -2.24 |
| 2 | *2440.00 | 91.0 AV | | | 1.14 V | 327 | 93.24 | -2.24 |
| 3 | 4880.00 | 47.7 PK | 74.0 | -26.3 | 1.04 V | 187 | 41.76 | 5.94 |
| 4 | 4880.00 | 18.1 AV | 54.0 | -35.9 | 1.04 V | 187 | 12.16 | 5.94 |
| 5 | 7320.00 | 53.7 PK | 74.0 | -20.3 | 1.14 V | 21 | 40.51 | 13.19 |
| 6 | 7320.00 | 23.1 AV | 54.0 | -30.9 | 1.14 V | 21 | 9.91 | 13.19 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 93.3 PK | | | 1.19 H | 306 | 95.36 | -2.06 |
| 2 | *2480.00 | 87.7 AV | | | 1.19 H | 306 | 89.76 | -2.06 |
| 3 | 2483.50 | 45.2 PK | 74.0 | -28.8 | 1.19 H | 306 | 47.23 | -2.03 |
| 4 | 2483.50 | 34.0 AV | 54.0 | -20.0 | 1.19 H | 306 | 36.03 | -2.03 |
| 5 | 4960.00 | 45.7 PK | 74.0 | -28.3 | 1.06 H | 103 | 39.44 | 6.26 |
| 6 | 4960.00 | 15.8 AV | 54.0 | -38.2 | 1.06 H | 103 | 9.54 | 6.26 |
| 7 | 7440.00 | 53.9 PK | 74.0 | -20.1 | 1.03 H | 297 | 40.77 | 13.13 |
| 8 | 7440.00 | 24.1 AV | 54.0 | -29.9 | 1.03 H | 297 | 10.97 | 13.13 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 95.9 PK | | | 1.67 V | 90 | 97.96 | -2.06 |
| 2 | *2480.00 | 92.1 AV | | | 1.67 V | 90 | 94.16 | -2.06 |
| 3 | 2483.50 | 45.8 PK | 74.0 | -28.2 | 1.67 V | 90 | 47.83 | -2.03 |
| 4 | 2483.50 | 34.5 AV | 54.0 | -19.5 | 1.67 V | 90 | 36.53 | -2.03 |
| 5 | 4960.00 | 48.2 PK | 74.0 | -25.8 | 1.03 V | 185 | 41.94 | 6.26 |
| 6 | 4960.00 | 18.3 AV | 54.0 | -35.7 | 1.03 V | 185 | 12.04 | 6.26 |
| 7 | 7440.00 | 53.5 PK | 74.0 | -20.5 | 1.15 V | 12 | 40.37 | 13.13 |
| 8 | 7440.00 | 23.1 AV | 54.0 | -30.9 | 1.15 V | 12 | 9.97 | 13.13 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

## 5.6.8 TEST RESULTS(MODE 2)

**BELOW 1GHz WORST-CASE DATA**

**BT_LE-GFSK**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 19 | **DETECTOR FUNCTION** | Quasi-Peak (QP) |
| **FREQUENCY RANGE** | 30MHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 89.41 | 33.4 QP | 43.5 | -10.1 | 2.00 H | 100 | 52.52 | -19.12 |
| 2 | 165.99 | 29.7 QP | 43.5 | -13.8 | 1.50 H | 38 | 43.21 | -13.49 |
| 3 | 255.09 | 37.9 QP | 46.0 | -8.1 | 1.50 H | 98 | 52.02 | -14.12 |
| 4 | 328.42 | 35.5 QP | 46.0 | -10.6 | 1.00 H | 360 | 46.94 | -11.49 |
| 5 | 666.50 | 33.9 QP | 46.0 | -12.1 | 1.00 H | 123 | 37.89 | -3.99 |
| 6 | 945.83 | 33.7 QP | 46.0 | -12.3 | 1.50 H | 310 | 32.76 | 0.96 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| **1** | **31.50** | **32.7 QP** | **40.0** | **-7.3** | **1.50 V** | **360** | **47.22** | **-14.52** |
| **2** | **87.04** | **32.7 QP** | **40.0** | **-7.3** | **1.00 V** | **51** | **51.74** | **-19.05** |
| 3 | 166.01 | 31.9 QP | 43.5 | -11.6 | 1.00 V | 270 | 45.39 | -13.49 |
| 4 | 331.38 | 33.9 QP | 46.0 | -12.1 | 1.50 V | 157 | 45.37 | -11.45 |
| 5 | 666.51 | 33.9 QP | 46.0 | -12.1 | 2.00 V | 267 | 37.89 | -3.99 |
| 6 | 940.59 | 31.3 QP | 46.0 | -14.7 | 1.00 V | 76 | 30.47 | 0.85 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

## ABOVE 1GHz DATA

## BT_LE-GFSK

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 0 | **DETECTOR FUNCTION** | Peak (PK) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 45.8 PK | 74.0 | -28.2 | 1.34 H | 115 | 48.27 | -2.47 |
| 2 | 2390.00 | 34.2 AV | 54.0 | -19.8 | 1.34 H | 115 | 36.67 | -2.47 |
| 3 | *2402.00 | 97.8 PK | | | 1.34 H | 115 | 100.21 | -2.41 |
| 4 | *2402.00 | 94.4 AV | | | 1.34 H | 115 | 96.81 | -2.41 |
| 5 | 4804.00 | 46.4 PK | 74.0 | -27.6 | 1.02 H | 214 | 40.78 | 5.62 |
| 6 | 4804.00 | 36.3 AV | 54.0 | -17.7 | 1.02 H | 214 | 30.68 | 5.62 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 46.2 PK | 74.0 | -27.8 | 1.55 V | 259 | 48.67 | -2.47 |
| 2 | 2390.00 | 35.0 AV | 54.0 | -19.0 | 1.55 V | 259 | 37.47 | -2.47 |
| 3 | *2402.00 | 100.9 PK | | | 1.55 V | 259 | 103.31 | -2.41 |
| 4 | *2402.00 | 98.2 AV | | | 1.55 V | 259 | 100.61 | -2.41 |
| 5 | 4804.00 | 47.1 PK | 74.0 | -26.9 | 1.48 V | 94 | 41.48 | 5.62 |
| 6 | 4804.00 | 36.7 AV | 54.0 | -17.3 | 1.48 V | 94 | 31.08 | 5.62 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 19 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2440.00 | 98.5 PK | | | 1.34 H | 115 | 100.74 | -2.24 |
| 2 | *2440.00 | 95.2 AV | | | 1.34 H | 115 | 97.44 | -2.24 |
| 3 | 4880.00 | 46.7 PK | 74.0 | -27.3 | 1.03 H | 210 | 40.76 | 5.94 |
| 4 | 4880.00 | 36.6 AV | 54.0 | -17.4 | 1.03 H | 210 | 30.66 | 5.94 |
| 5 | 7320.00 | 55.0 PK | 74.0 | -19.0 | 1.02 H | 138 | 41.81 | 13.19 |
| 6 | 7320.00 | 43.1 AV | 54.0 | -10.9 | 1.02 H | 138 | 29.91 | 13.19 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2440.00 | 102.3 PK | | | 1.00 V | 265 | 104.54 | -2.24 |
| 2 | *2440.00 | 100.1 AV | | | 1.00 V | 265 | 102.34 | -2.24 |
| 3 | 4880.00 | 46.8 PK | 74.0 | -27.2 | 1.53 V | 86 | 40.86 | 5.94 |
| 4 | 4880.00 | 36.3 AV | 54.0 | -17.7 | 1.53 V | 86 | 30.36 | 5.94 |
| 5 | 7320.00 | 54.7 PK | 74.0 | -19.3 | 1.05 V | 234 | 41.51 | 13.19 |
| 6 | 7320.00 | 43.2 AV | 54.0 | -10.8 | 1.05 V | 234 | 30.01 | 13.19 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

| CHANNEL | TX Channel 39 | DETECTOR FUNCTION | Peak (PK) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 99.2 PK | | | 1.29 H | 115 | 101.26 | -2.06 |
| 2 | *2480.00 | 96.0 AV | | | 1.29 H | 115 | 98.06 | -2.06 |
| 3 | 2483.50 | 48.1 PK | 74.0 | -25.9 | 1.29 H | 115 | 50.13 | -2.03 |
| 4 | 2483.50 | 35.0 AV | 54.0 | -19.0 | 1.29 H | 115 | 37.03 | -2.03 |
| 5 | 4960.00 | 46.4 PK | 74.0 | -27.6 | 1.00 H | 221 | 40.14 | 6.26 |
| 6 | 4960.00 | 36.3 AV | 54.0 | -17.7 | 1.00 H | 221 | 30.04 | 6.26 |
| 7 | 7440.00 | 54.4 PK | 74.0 | -19.6 | 1.00 H | 149 | 41.27 | 13.13 |
| 8 | 7440.00 | 42.6 AV | 54.0 | -11.4 | 1.00 H | 149 | 29.47 | 13.13 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2480.00 | 102.2 PK | | | 1.49 V | 260 | 104.26 | -2.06 |
| 2 | *2480.00 | 99.9 AV | | | 1.49 V | 260 | 101.96 | -2.06 |
| 3 | 2483.50 | 51.7 PK | 74.0 | -22.3 | 1.49 V | 260 | 53.73 | -2.03 |
| 4 | 2483.50 | 36.0 AV | 54.0 | -18.0 | 1.49 V | 260 | 38.03 | -2.03 |
| 5 | 4960.00 | 46.9 PK | 74.0 | -27.1 | 1.55 V | 73 | 40.64 | 6.26 |
| 6 | 4960.00 | 36.5 AV | 54.0 | -17.5 | 1.55 V | 73 | 30.24 | 6.26 |
| 7 | 7440.00 | 54.5 PK | 74.0 | -19.5 | 1.00 V | 223 | 41.37 | 13.13 |
| 8 | 7440.00 | 42.8 AV | 54.0 | -11.2 | 1.00 V | 223 | 29.67 | 13.13 |

**REMARKS:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

## 5.7 AC POWER LINE CONDUCTED EMISSION MEASUREMENT

### 5.7.1 LIMITS OF AC POWER LINE CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5<br>0.5-5<br>5-30 | 66 to 56<br>56<br>60 | 56 to 46<br>46<br>50 |

**NOTE**: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 5.7.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESCS 30 | 100375 | Apr. 29, 2014 | Apr. 28, 2015 |
| Line-Impedance Stabilization Network (for EUT)<br>SCHWARZBECK | NSLK-8127 | 8127-522 | Sep. 15, 2014 | Sep. 14, 2015 |
| Line-Impedance Stabilization Network (for Peripheral)<br>ROHDE & SCHWARZ | ENV216 | 100071 | Nov. 13, 2013 | Nov. 12, 2014 |
| RF Cable<br>(JYEBAO) | 5DFB | COCCAB-001 | Mar. 10 , 2014 | Mar. 09, 2015 |
| 50 ohms Terminator | N/A | EMC-03 | Sep. 22, 2014 | Sep. 21, 2015 |
| 50 ohms Terminator | N/A | EMC-02 | Oct. 01, 2013 | Sep. 30, 2014 |
| Software<br>ADT | BV ADT_Cond_V7.3.7.3 | NA | NA | NA |

**Note:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Sep. 24, 2014

### 5.7.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

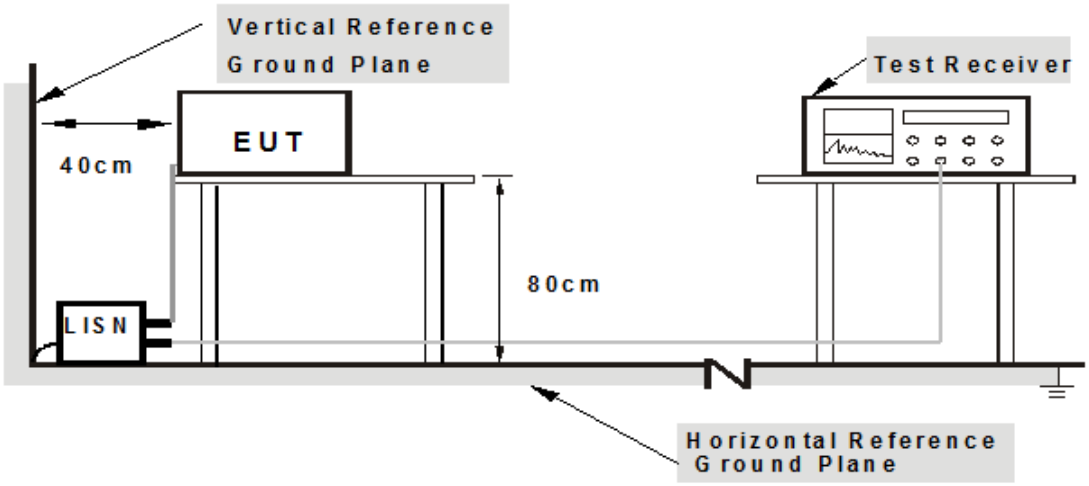
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

**NOTE:** The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

### 5.7.4 DEVIATION FROM TEST STANDARD

No deviation

## 5.7.5 TEST SETUP




Note: 1.Support units were connected to second LISN.

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

## 5.7.6 EUT OPERATING CONDITIONS

Same as Item 5.5.6

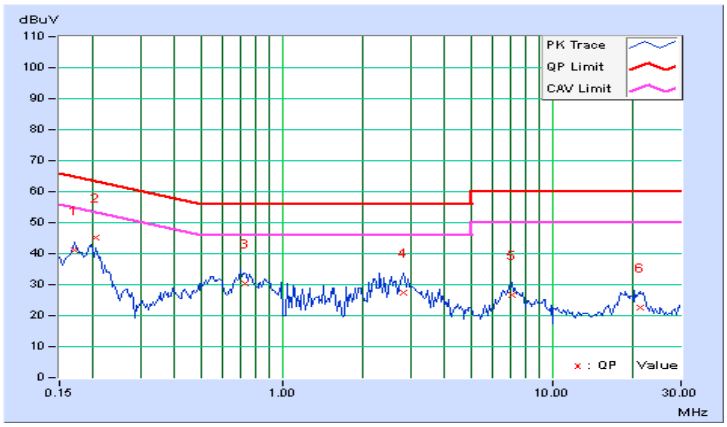
## 5.7.7 TEST RESULTS

| PHASE | Line (L) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|

| No | Freq. | Corr. Factor | Reading Value [dB (uV)] | | Emission Level [dB (uV)] | | Limit [dB (uV)] | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.16953 | 0.07 | 41.19 | 28.11 | 41.26 | 28.18 | 64.98 | 54.98 | -23.73 | -26.81 |
| 2 | 0.20469 | 0.07 | 45.14 | 27.38 | 45.21 | 27.45 | 63.42 | 53.42 | -18.21 | -25.97 |
| 3 | 0.72603 | 0.11 | 30.39 | 20.98 | 30.50 | 21.09 | 56.00 | 46.00 | -25.50 | -24.91 |
| 4 | 2.82031 | 0.21 | 27.34 | 20.13 | 27.55 | 20.34 | 56.00 | 46.00 | -28.45 | -25.66 |
| 5 | 7.08203 | 0.36 | 26.18 | 18.50 | 26.54 | 18.86 | 60.00 | 50.00 | -33.46 | -31.14 |
| 6 | 21.12891 | 0.74 | 21.76 | 13.90 | 22.50 | 14.64 | 60.00 | 50.00 | -37.50 | -35.36 |

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

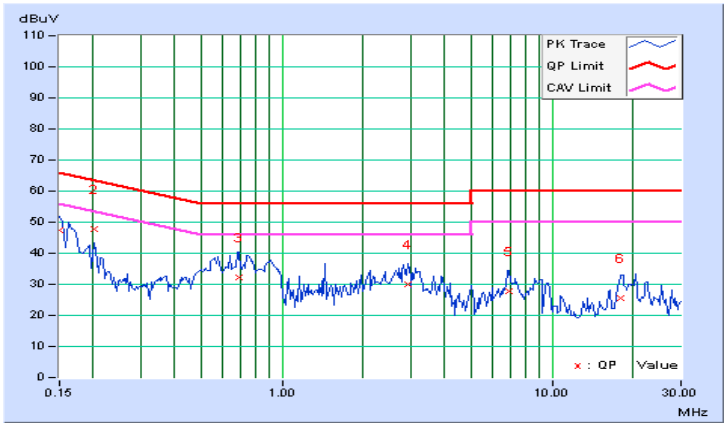


| PHASE | Neutral (N) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|

| | Freq. | Corr. | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| No | | Factor | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 0.08 | 47.33 | 26.80 | 47.41 | 26.88 | 66.00 | 56.00 | -18.59 | -29.12 |
| **2** | **0.20078** | **0.07** | **47.60** | **21.07** | **47.67** | **21.14** | **63.58** | **53.58** | **-15.91** | **-32.44** |
| 3 | 0.68906 | 0.11 | 31.96 | 18.94 | 32.07 | 19.05 | 56.00 | 46.00 | -23.93 | -26.95 |
| 4 | 2.94141 | 0.22 | 29.60 | 20.56 | 29.82 | 20.78 | 56.00 | 46.00 | -26.18 | -25.22 |
| 5 | 6.95703 | 0.35 | 27.59 | 18.87 | 27.94 | 19.22 | 60.00 | 50.00 | -32.06 | -30.78 |
| 6 | 17.95313 | 0.65 | 24.96 | 17.57 | 25.61 | 18.22 | 60.00 | 50.00 | -34.39 | -31.78 |

**REMARKS:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



# 6 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

# 7 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following: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The address and road map of all our labs can be found in our web site also.

# 8 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

**--- END ---**