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# TEST REPORT For FCC

| | | |
|---|---|---|
| Test Report No. | : | 2011070070 |
| Date of Issue | : | July 22, 2011 |
| FCC ID | : | U5MSPP-R300 |
| Model/Type No. | : | SPP-R300 |
| Kind of Product | : | Mobile Printer |
| Applicant | : | BIXOLON Co., Ltd. |
| Applicant Address | : | A-502~508, Digital Empire Bldg., 980-3, Yeongtong-dong, Yeongtong-gu, Suwon-shi, Gyeonggi-do 443-813, REPUBLIC OF KOREA |
| Manufacturer | : | BIXOLON Co., Ltd. |
| Manufacturer Address | : | A-502~508, Digital Empire Bldg., 980-3, Yeongtong-dong, Yeongtong-gu, Suwon-shi, Gyeonggi-do 443-813, REPUBLIC OF KOREA |
| Contact Person | : | Hyun-suk Son / Assistant Manager |
| Telephone | : | +82-31-218-5582 |
| Received Date | : | June 06, 2011 |
| Test period | : | Start : June 06, 2011 End : July 07, 2011 |

The test results presented in this report relate only to the object tested.

*Tested by*

Y. T. Lee

Young-taek Lee
Test Engineer
Date: July 22, 2011

*Reviewed by*

Y. J. Park

Young-Joon, Park
Technical Manager
Date: July 22, 2011

# REPORT REVISION HISTORY

| Date | Revision | Page No |
|---|---|---|
| July 22, 2011 | Issued (2011070070) | All |
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# 1.0 General Product Description

| | |
|---|---|
| Equipment model name | : SPP-R300 |
| Serial number | : Prototype |
| EUT condition | : Pre-production, not damaged |
| Antenna type | : Chip antenna Gain -0.04 dBi |
| Frequency Range | : 2402 MHz - 2480 MHz |
| RF power | : 0.646 dBm Peak Conducted (GFSK)<br>: 2.745 dBm Peak Conducted (8-DPSK) |
| Type of Modulation | : Frequency Hopping Spread Spectrum |
| Number of channels | : 79 |
| Channel Spacing | : 1MHz |
| Channel Access Protocol | : Frequency Hopping |
| Type of Modulation | : GFSK(1Mbps), DQPSK(2Mbps), 8-DPSK(3Mbps) |
| Power Source | : Lithium-ion Battery Pack(Rechargeable battery)<br>7.4 Vdc/2600 mAh |

## 1.1 Tested Frequency

| | LOW | MID | HIGH |
|---|---|---|---|
| **Frequency (MHz)** | 2402 | 2441 | 2480 |

## 1.2 Tested Mode

- 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.

| Tested Ch | Modulation Technology | Modulation Type | Packet Type |
|---|---|---|---|
| Low, Mid, High | FHSS | GFSK | DH 5 |
| Low, Mid, High | FHSS | 8-DPSK | 3DH 5 |

## 1.3 Model Differences

Not applicable

## 1.4 Device Modifications

The following modifications were necessary for compliance:

Not applicable

## 1.5 Peripheral Devices

| Device | Manufacturer | Model No. | Serial No. |
|---|---|---|---|
| Battery Charger (for EUT) | BridgePower Corp. | BL607080085600NK | K 1105000624 |
| Personal Computer | Samsung Electronics Co,. Ltd. | DB-A150 | ZMSI96BSB00124E |
| LCD Monitor | Lite-On Technology Corp. | VS17 | CNN5130QMC |
| Keyboard (PS/2 type) | Samsung Electronics Co,. Ltd. | SEM-DT35 | 33008106 |
| Mouse (USB type) | INTECH ELECTRONICS CORP.,SHEN ZHEN ZHI | 3D-510 | - |
| Notebook Computer | Samsung Electronics Co,.Ltd. | NY-R60Y | Z9GJ93GS302109B |

## 1.6 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

## 1.7 Test Facility

The measurement facility is located at 386-1, Ho-dong, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-100, Korea.

## 1.8 Laboratory Accreditations and Listings

| Country | Agency | Scope of Accreditation | Logo |
|---|---|---|---|
| USA | **FCC** | 3 & 10 meter Open Area Test Sites and one conducted site to perform FCC Part 15/18 measurements. | 805871 |
| JAPAN | **VCCI** | 10 meter Open Area Test Site and one conducted site. | R-948, C-986 T-1843 |
| KOREA | **KCC** | EMI (10 meter Open Area Test Site and two conducted sites)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | No. 51, KR0025 |
| International | **KOLAS** | EMC | |

## 2.0 Summary of tests

| FCC Part Section(s) | Parameter | Limit | Test Condition | Status (note 1) |
|---|---|---|---|---|
| 15.247(a) | Carrier Frequency Separation | > 25 kHz | Conducted | C |
| 15.247(a) | Number of Hopping Frequencies | > 15 hops | | C |
| 15.247(a) | 20 dB Bandwidth | NA | | C |
| 15.247 | Dwell Time | < 0.4 seconds | | C |
| 15.247(b) | Transmitter Output Power | < 0.125 Watts | | C |
| 15.247(d) | Conducted Spurious emission | > 20 dBc | | C |
| 15.247(d) | Band Edge | > 20 dBc | | C |
| 15.209 | Field Strength of Harmonics | 15.209(a) | Radiated | C |
| 15.207 | AC Conducted Emissions | 15.207(a) | Line Conducted | C |

*Note 1*: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

*Note 2*: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:
- FCC Part 15.247, ANSI C63.4-2003

# 2.1 Transmitter Requirements

## 2.1.1 Carrier Frequency Separation

### Test Location
RF Test Room

### Test Procedures

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function enabled.
After the trace being stable, the reading value between the peaks of the adjacent channels using the marker-delta function was recorded as the measurement results.

The spectrum analyzer is set to:
Span = 3 MHz (wide enough to capture the peaks of two adjacent channels)
RBW = 30 kHz (≥ 1% of the span) Sweep = auto
VBW = 30 kHz (≥ RBW) Detector function = peak
Trace = max hold

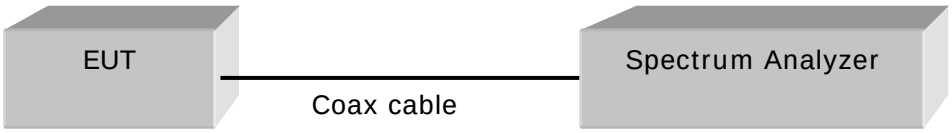



Figure 1 : Measurement setup for the carrier frequency separation

### Limit
§15.247(a)(1) Frequency hopping system operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-third of 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### Test Results

**Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

| Channel | Adjacent Hopping Channel Separation (kHz) | Two-third of 20dB bandwidth (kHz) | Minimum Bandwidth (kHz) | Result |
|---|---|---|---|---|
| 2441MHz | 990 | 623.3 | 25 | Complies |

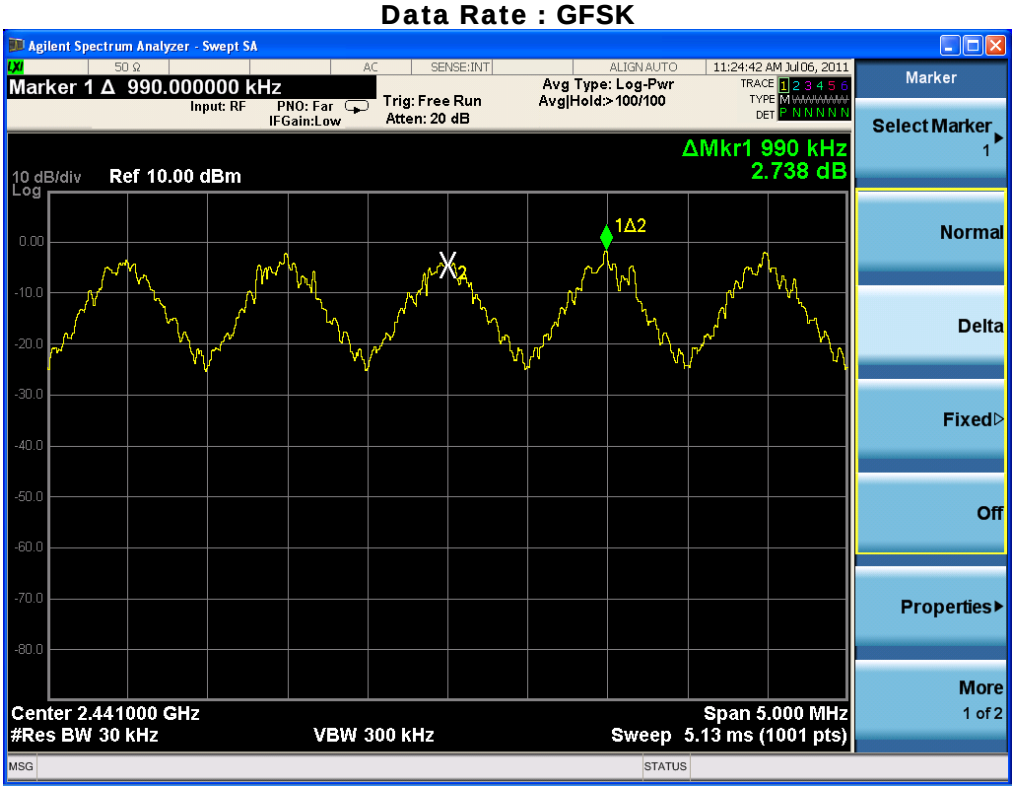
**Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)**

| Channel | Adjacent Hopping Channel Separation (kHz) | Two-third of 20dB bandwidth (kHz) | Minimum Bandwidth (kHz) | Result |
|---|---|---|---|---|
| 2441MHz | 995 | 836.7 | 25 | Complies |

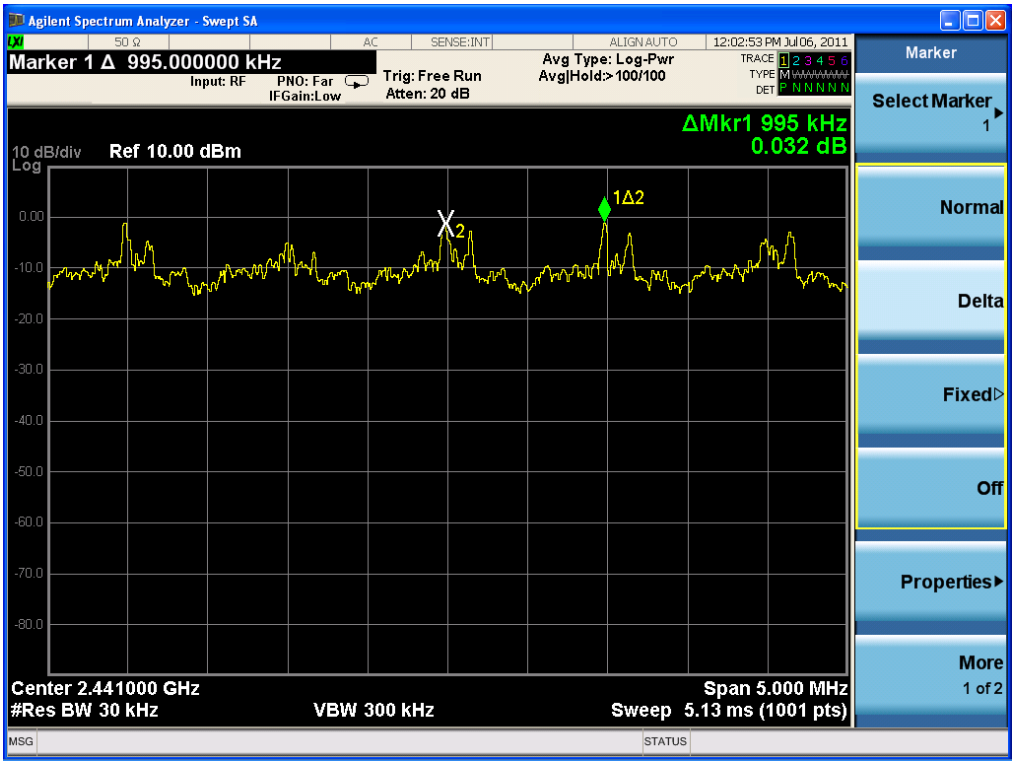
See next pages for actual measured spectrum plots.

## Carrier Frequency Separation

### Data Rate : GFSK




### Data Rate : 8-DPSK



## 2.1.2 Number of Hopping Frequencies

### Test Location

RF Test Room

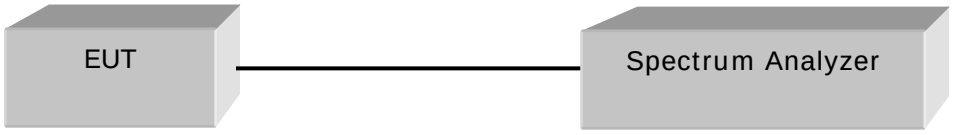
### Test Procedures

The number of hopping frequencies was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function enabled.

The spectrum analyzer is set to:

Frequency range 1: Start = 2389.5 MHz, Stop = 2439.5 MHz
2: Start = 2439.5 MHz, Stop = 2489.5 MHz

Span = 50 MHz
RBW = 300 kHz (≥ 1% of the span) Sweep = auto
VBW = 300 kHz (≥ RBW) Detector function = peak
Trace = max hold




### Limit

§15.247(a)(1)(iii) For frequency hopping system operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies.

### Test Results

**Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

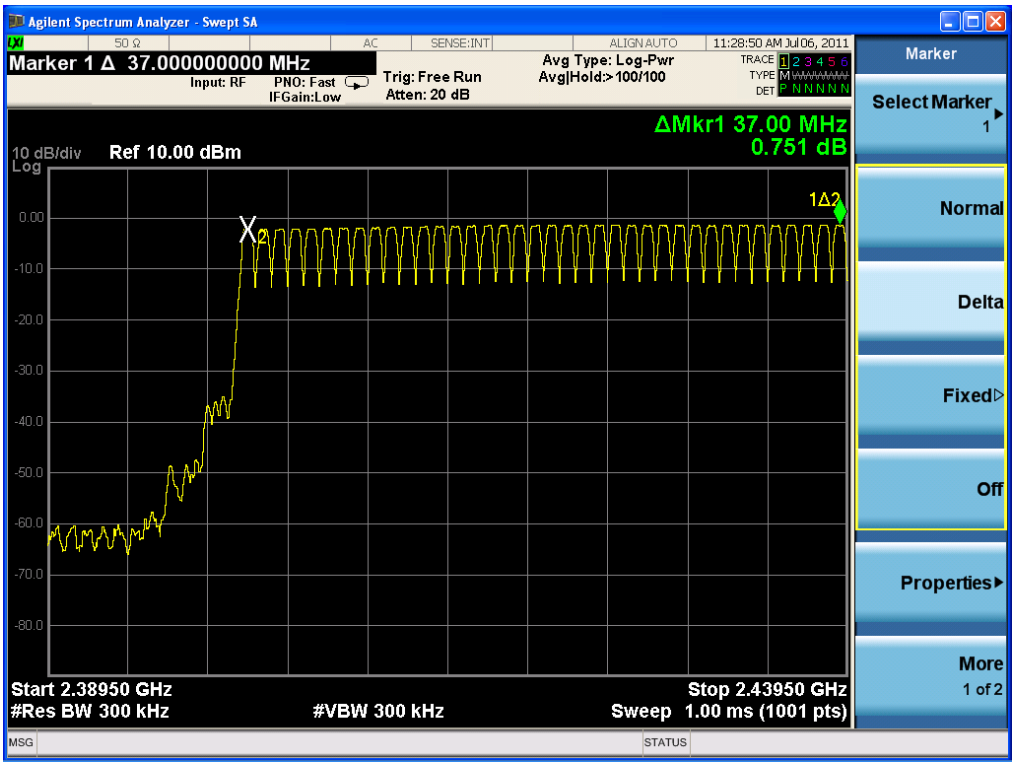
| Total number of Hopping Channels | Result |
|---|---|
| 79 | Complies |

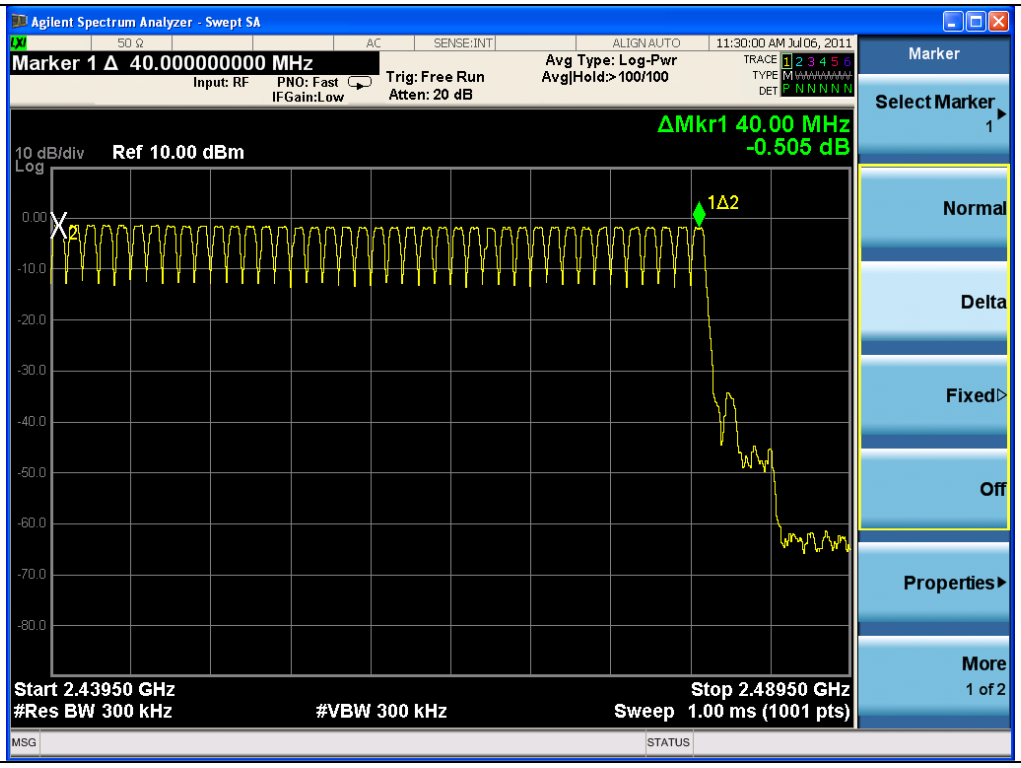
**Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)**

| Total number of Hopping Channels | Result |
|---|---|
| 79 | Complies |

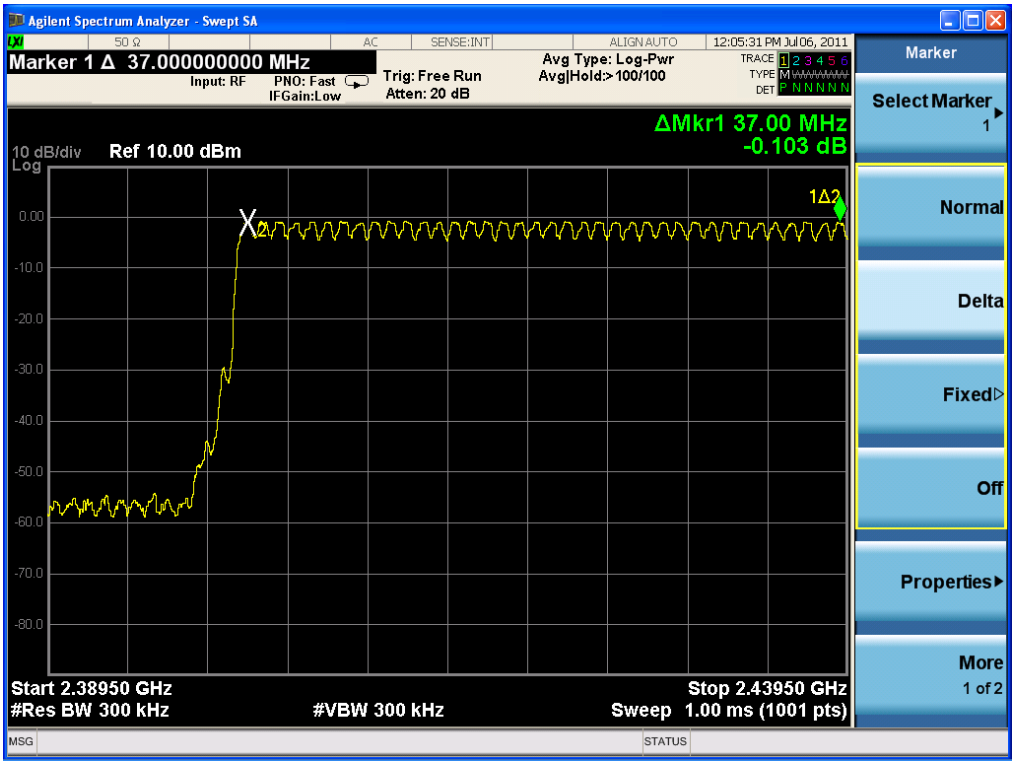
See next pages for actual measured spectrum plots.

## Number of Hopping Frequencies(GFSK)



## Number of Hopping Frequencies(8-DPSK)



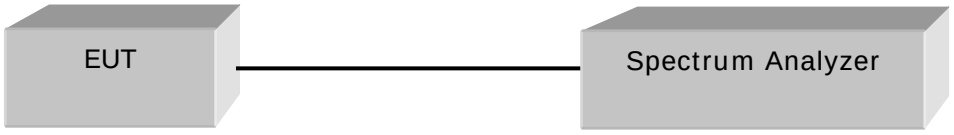

## 2.1.3 20 dB bandwidth

### Test Location
RF Test Room

### Test Procedures

The bandwidth at 20 dB below the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.
After the trace being stable, Use the marker-to peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:
Center frequency = the highest, middle and the lowest channels
Span = 2 MHz (approximately 2 or 3 times of the 20 dB bandwidth)
RBW = 30 kHz (≥ 1% of the span) Sweep = auto
VBW = 30 kHz (≥ RBW) Detector function = peak
Trace = max hold




### Limit

Limit : N/A

## Test Results

**Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

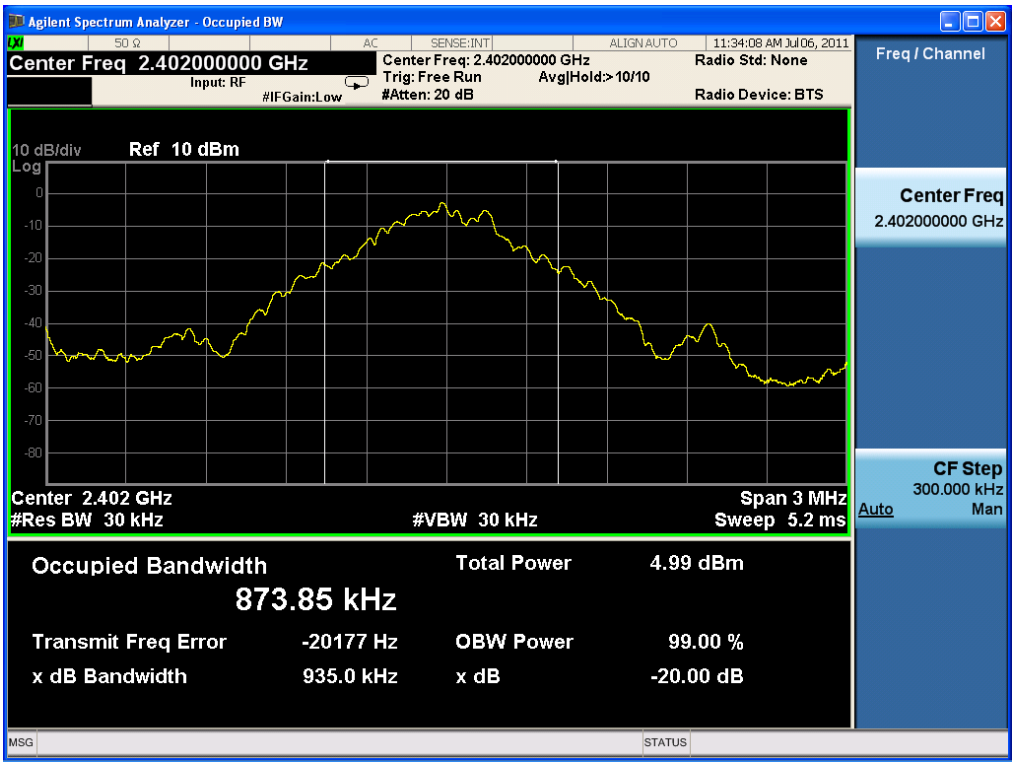
| Frequency (MHz) | Channel Number. | Measured Bandwidth (MHz) | Result |
|---|---|---|---|
| 2402 | 0 | 0.9350 | Complies |
| 2441 | 39 | 0.9348 | Complies |
| 2480 | 78 | 0.9345 | Complies |

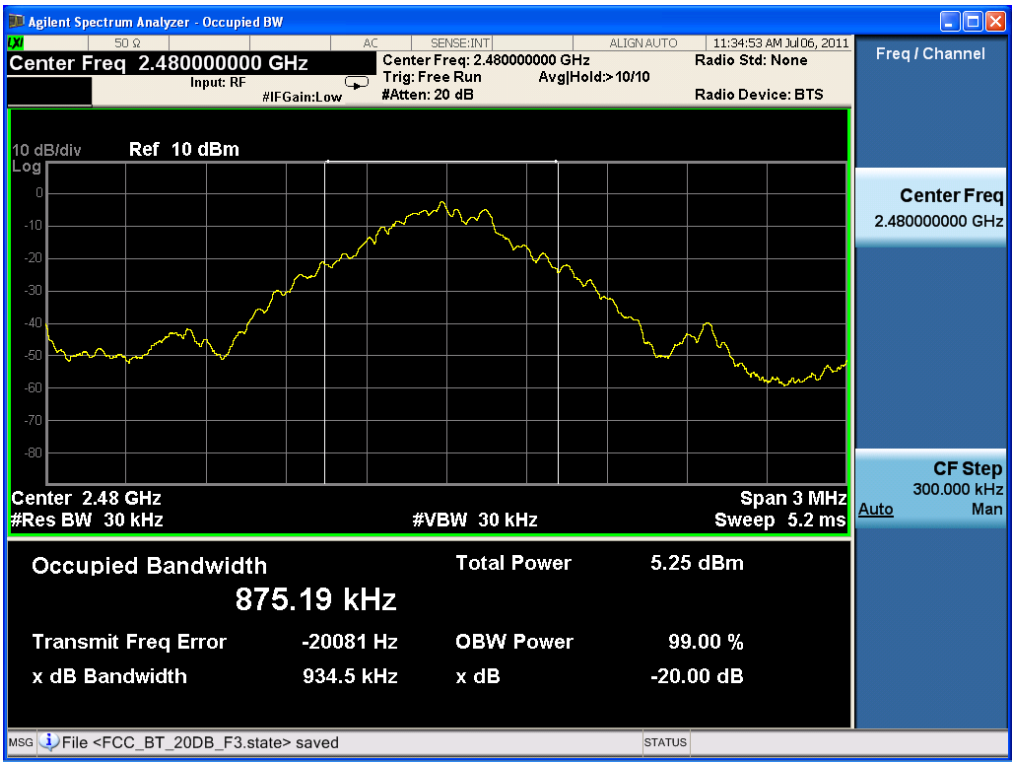
**Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)**

| Frequency (MHz) | Channel Number. | Measured Bandwidth (MHz) | Result |
|---|---|---|---|
| 2402 | 0 | 1.255 | Complies |
| 2441 | 39 | 1.254 | Complies |
| 2480 | 78 | 1.254 | Complies |

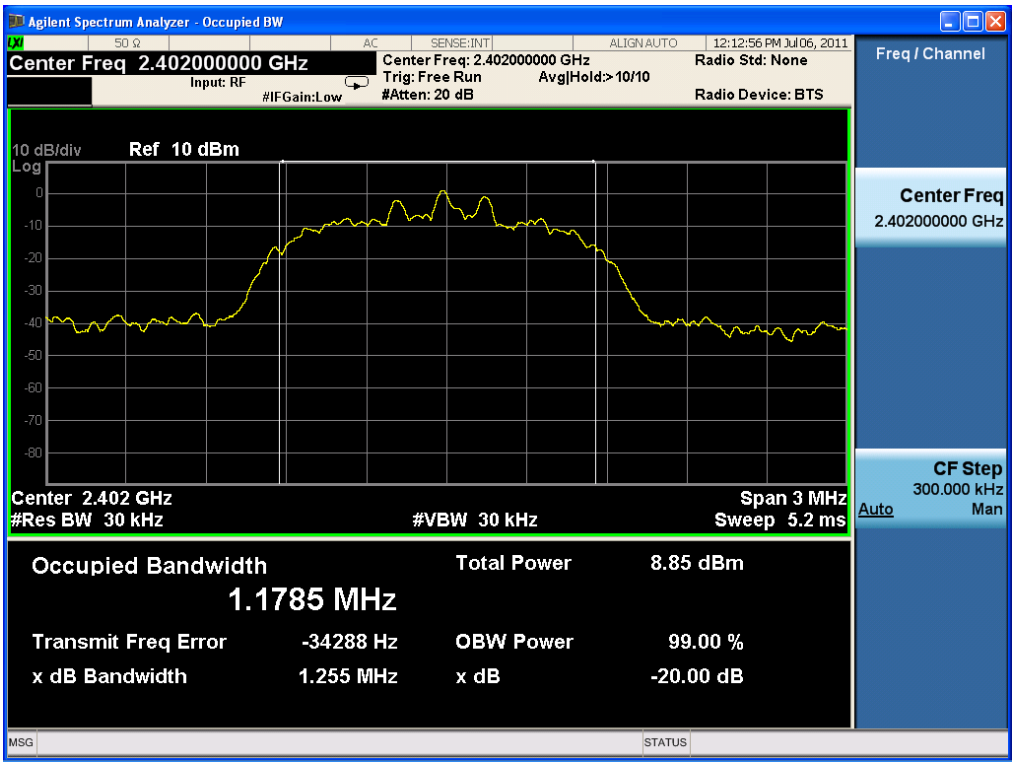
See next pages for actual measured spectrum plots.

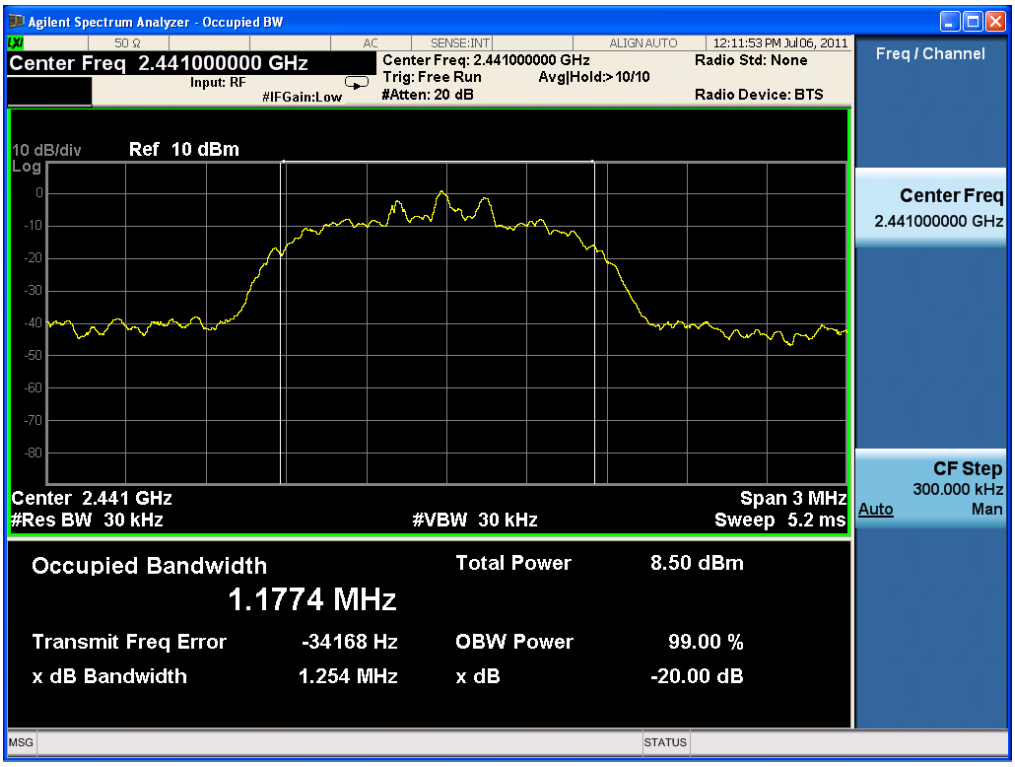
## 20 dB Bandwidth - GFSK

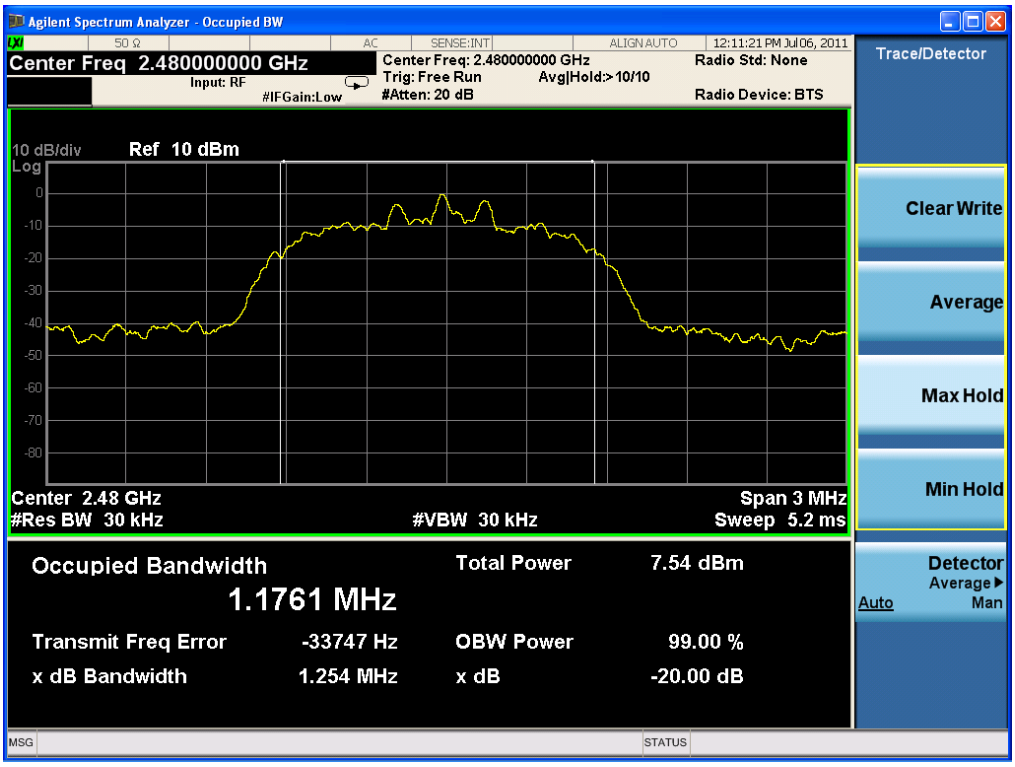


## 20 dB Bandwidth – 8-DPSK





## 2.1.4 Time of Occupancy (Dwell Time)

### Test Location

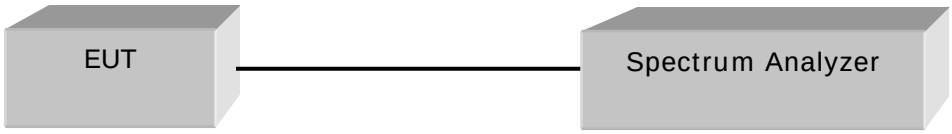
RF Test Room

### Test Procedures

The dwell time was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function enabled.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument 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.
3. Adjust the center frequency of spectrum analyzer on any frequency be measured and set spectrum analyzer to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.
6. The SPP-R300 has 3 type of payload, DH1, DH3, DH5. The hopping rate is 1600 per second.

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
Span = zero
RBW = 1 MHz Trace = max hold
VBW = 1 MHz (≥ RBW) Detector function = peak
Sweep = as necessary to capture the entire dwell time per hopping channel




### Limit

§15.247(a)(1)(iii) For frequency hopping system operating in 2400-2483.5 MHz band, 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.

## Test Results

Time of occupancy on the TX channel in 31.6 sec = time domain slot length × hop rate ÷ number of hop per channel × 31.6

**Test mode : GFSK**

| Channel Frequency (MHz) | Packet Type | Dwell Time (ms) | Test Results | |
|---|---|---|---|---|
| | | | Time of occupancy on the TX channel in 31.6sec (ms) | Result |
| 2441 | DH 1 | 0.395 | 126.40 | Complies |
| | DH 3 | 1.653 | 264.48 | Complies |
| | DH 5 | 2.893 | 309.33 | Complies |

DH1 Dwell time = 0.395 ms × (1600÷2) ÷ 79 × 31.6 = 126.40 ms
DH3 Dwell time = 1.653 ms × (1600÷4) ÷ 79 × 31.6 = 264.48 ms
DH5 Dwell time = 2.893 ms × (1600÷6) ÷ 79 × 31.6 = 308.59 ms

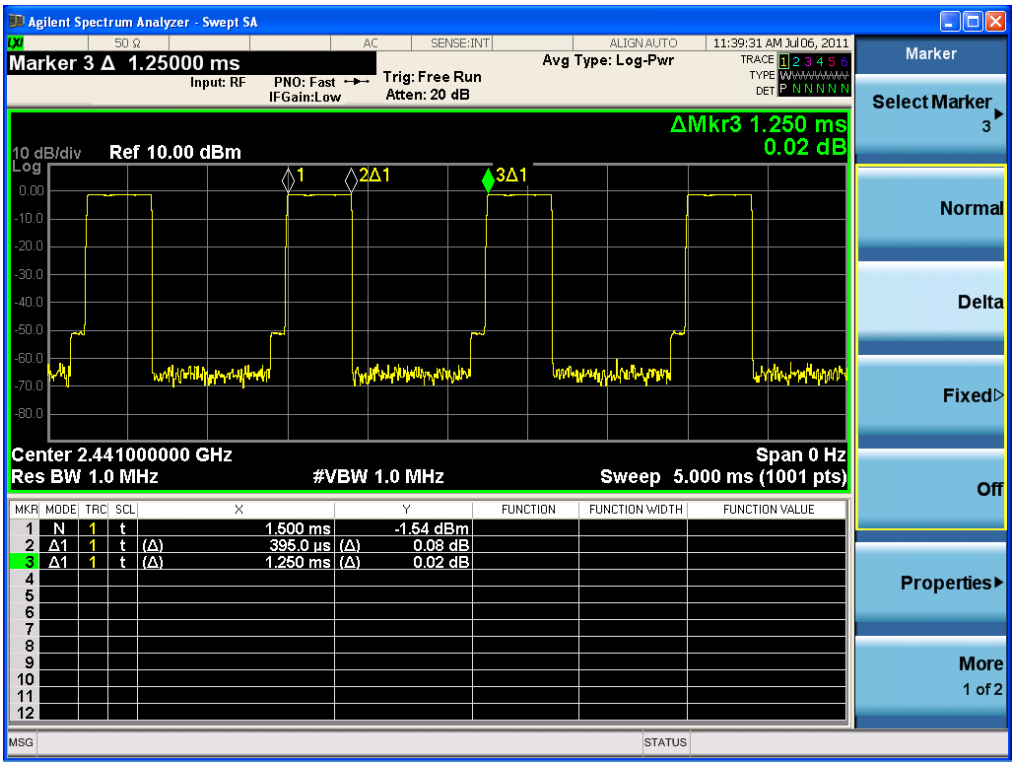
**Test mode : 8-DPSK**

| Channel Frequency (MHz) | Packet Type | Dwell Time (ms) | Test Results | |
|---|---|---|---|---|
| | | | Time of occupancy on the TX channel in 31.6sec (ms) | Result |
| 2441 | 3DH 1 | 0.410 | 131.20 | Complies |
| | 3DH 3 | 1.653 | 264.48 | Complies |
| | 3DH 5 | 2.903 | 309.65 | Complies |

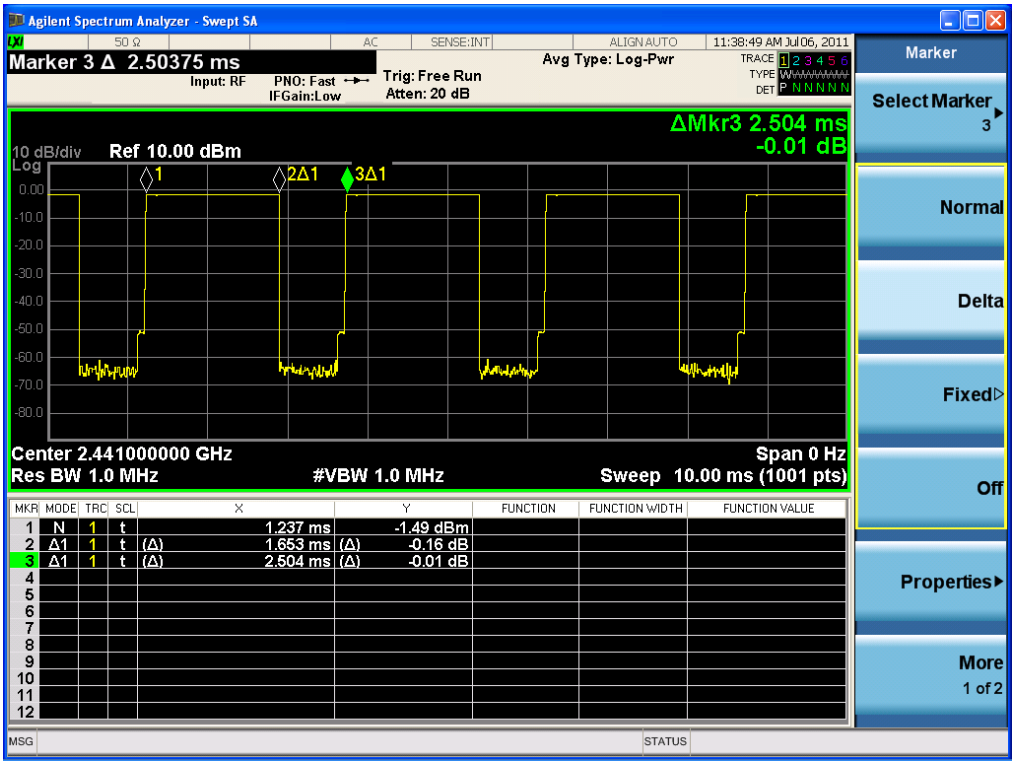
3DH1 Dwell time = 0.410 ms × (1600÷2) ÷ 79 × 31.6 = 131.20 ms
3DH3 Dwell time = 1.653 ms × (1600÷4) ÷ 79 × 31.6 = 264.48 ms
3DH5 Dwell time = 2.903 ms × (1600÷6) ÷ 79 × 31.6 = 309.65 ms

See next pages for actual measured spectrum plots.

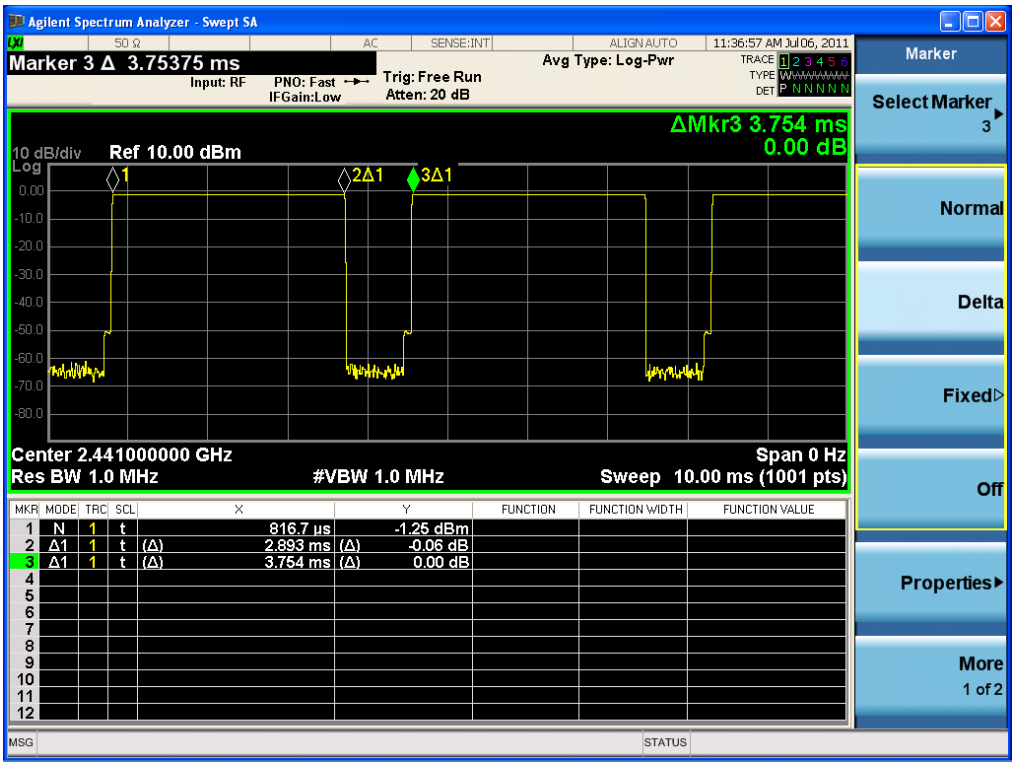
## Time of Occupancy for PACKET Type DH1(GFSK)



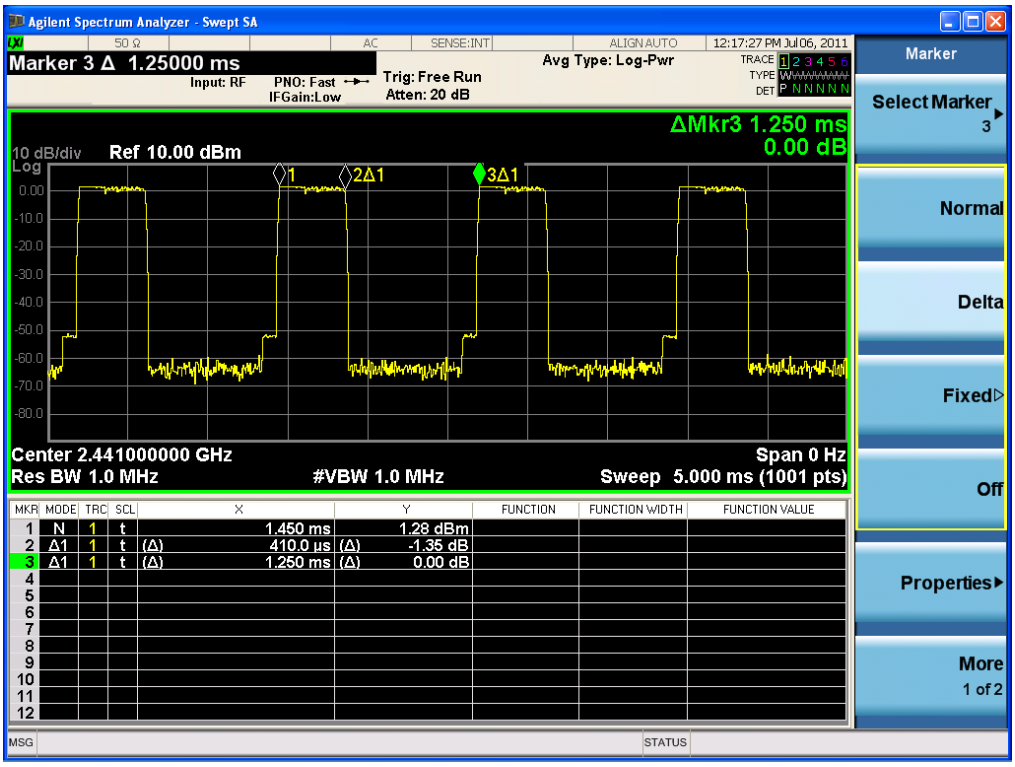

## Time of Occupancy for PACKET Type DH3(GFSK)



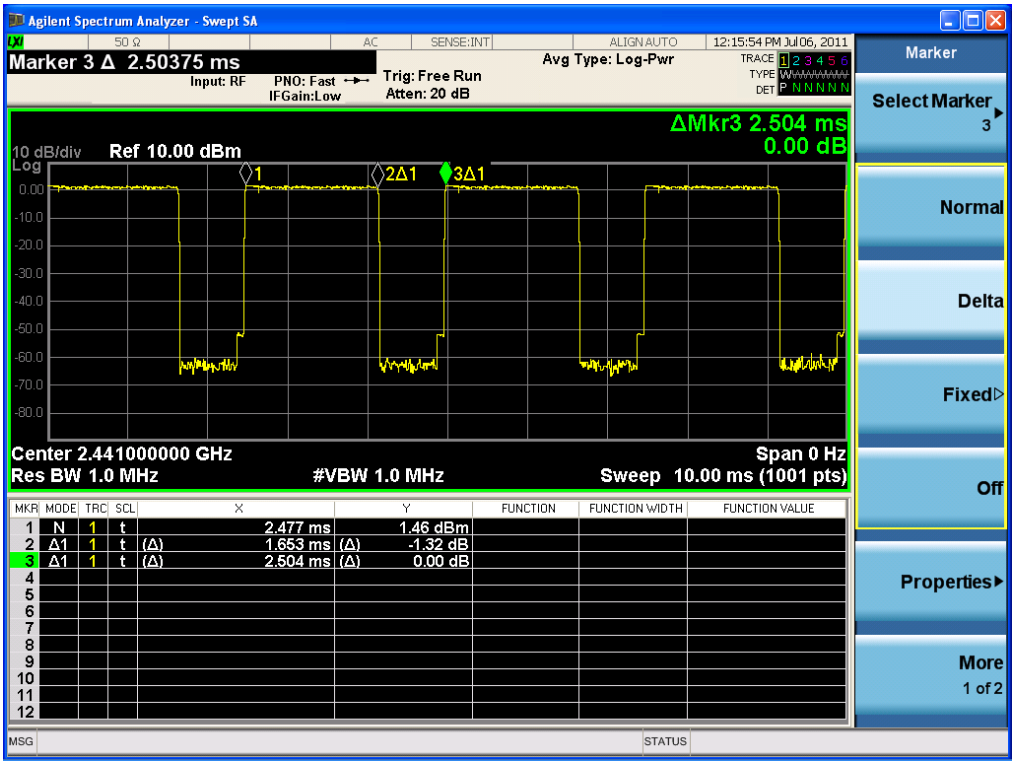
## Time of Occupancy for PACKET Type DH5(GFSK)



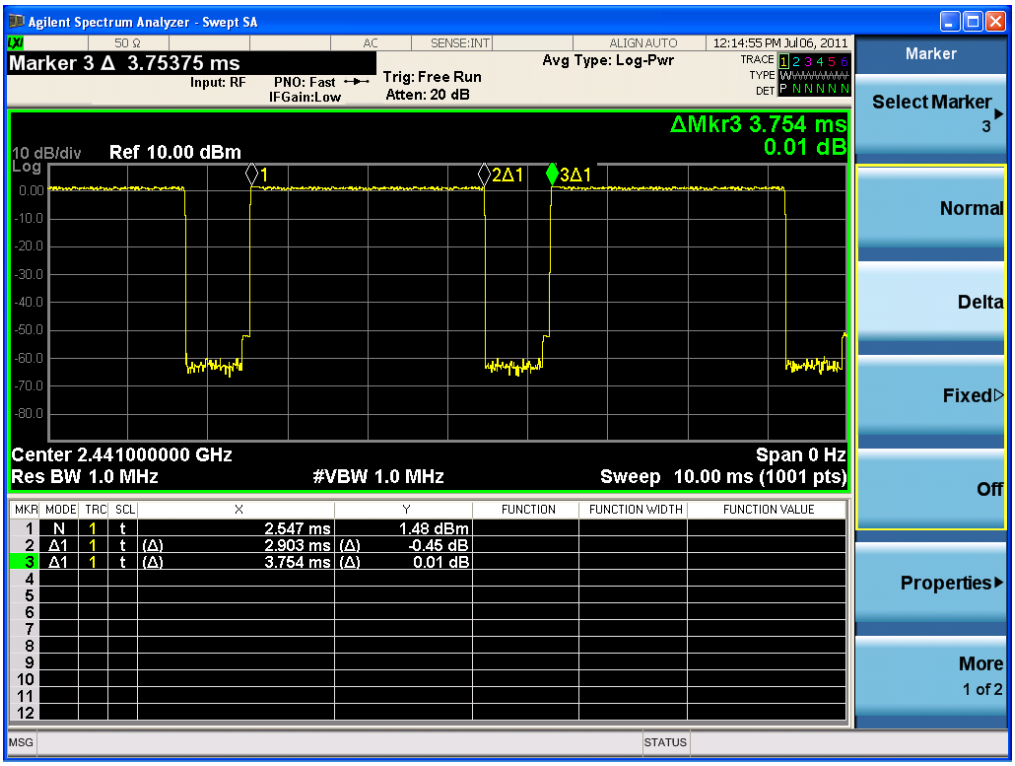
## Time of Occupancy for PACKET Type 3DH1(8-DPSK)




## Time of Occupancy for PACKET Type 3DH3(8-DPSK)



## Time of Occupancy for PACKET Type 3DH5(8-DPSK)



## 2.1.5 Maximum peak Conducted Output Power

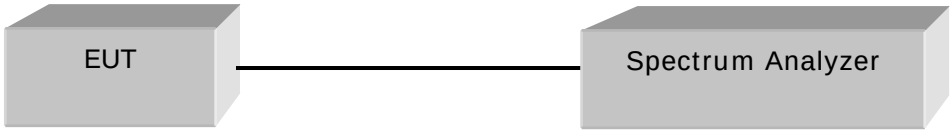
### Test Location

RF Test Room

### Test Procedures

The maximum peak conducted output power was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function disabled at the highest, middle and the lowest available channels.

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
Span = 5 MHz (approximately 5 times of the 20 dB bandwidth)
RBW = 1 MHz (greater than the 20 dB bandwidth of the emission being measured)
VBW = 1 MHz (≥ RBW) Detector function = peak
Trace = max hold Sweep = auto




### Limit

§5.247(b)(1) The Maximum Peak Output Power Measurement is 0.125 Watts for frequency hopping system operating in 2400-2483.5 MHz employing at least 15 Hopping channels.

### Test Results

**Test mode : GPSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

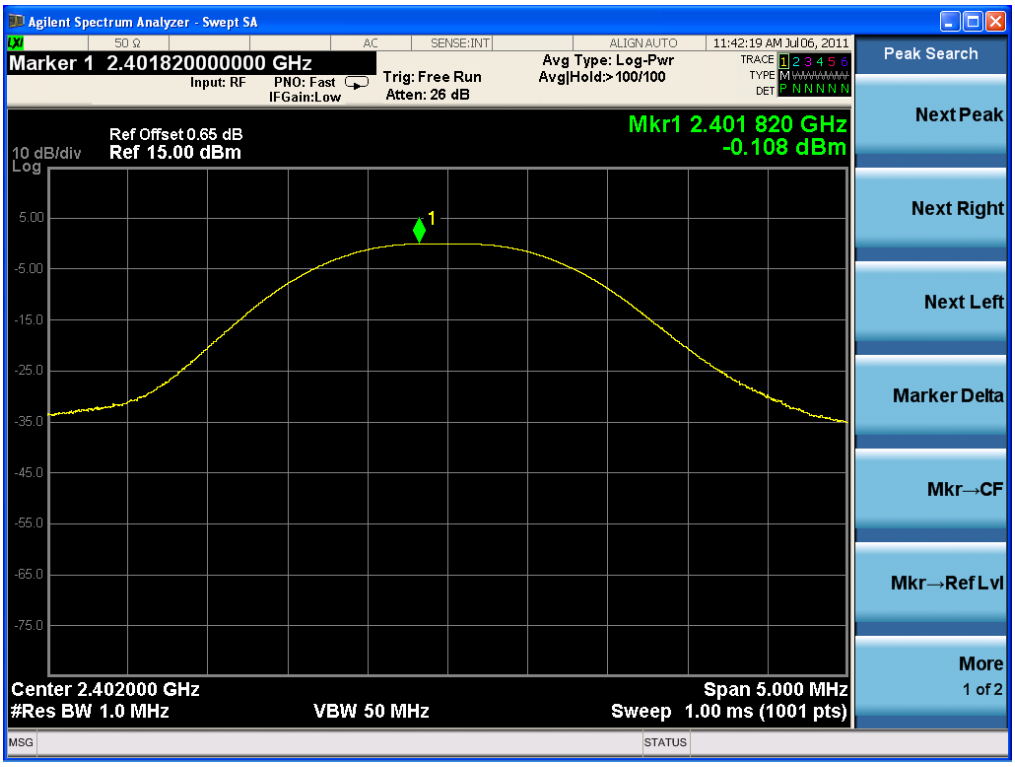
| Frequency (MHz) | Channel No. | Peak output power(dBm) | Peak output power(mW) | Result |
|---|---|---|---|---|
| 2402 | 0 | -0.108 | 0.975 | Complies |
| 2441 | 39 | 0.646 | 1.160 | Complies |
| 2480 | 78 | 0.317 | 1.076 | Complies |

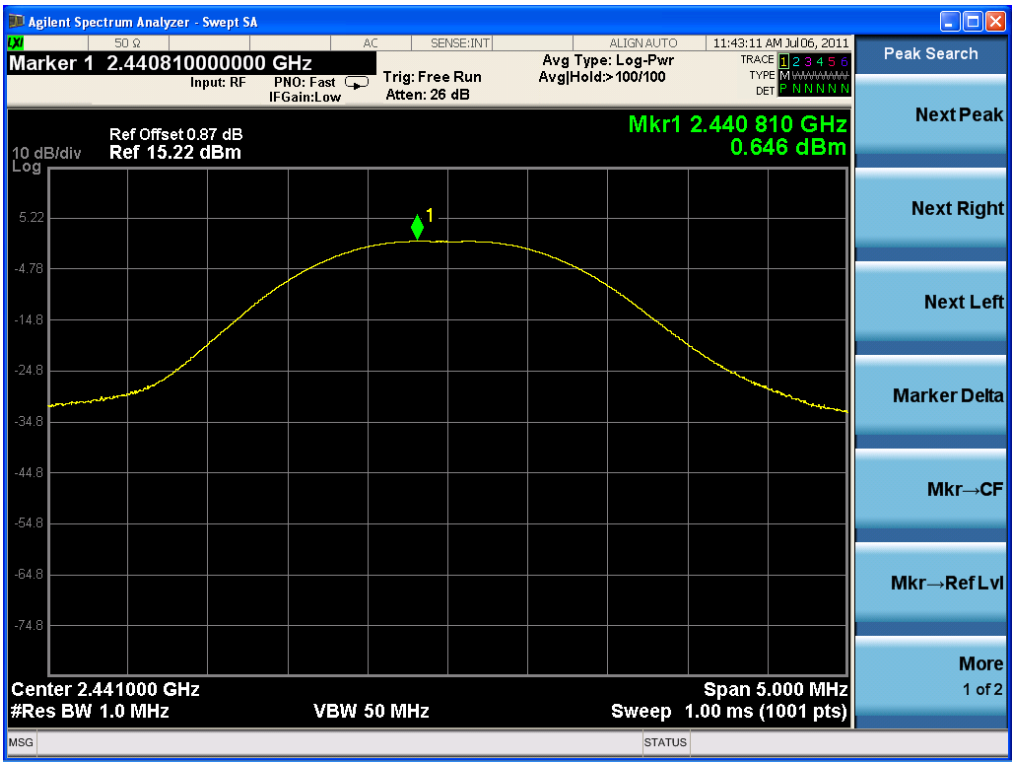
**Test mode : 8-DPSK, CFG PKT Packet Type : 31 Packet Size : 1021(3DH5)**

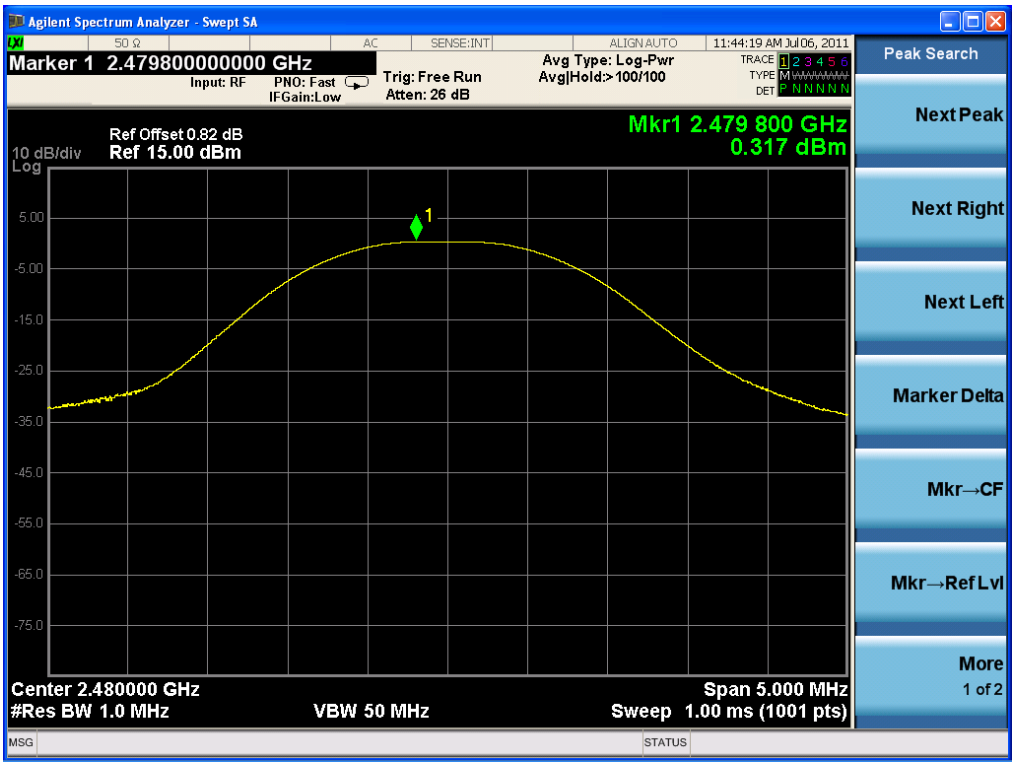
| Frequency (MHz) | Channel No. | Peak output power(dBm) | Peak output power(mW) | Result |
|---|---|---|---|---|
| 2402 | 0 | 2.657 | 1.844 | Complies |
| 2441 | 39 | 2.745 | 1.881 | Complies |
| 2480 | 78 | 1.686 | 1.474 | Complies |

See next pages for actual measured spectrum plots.

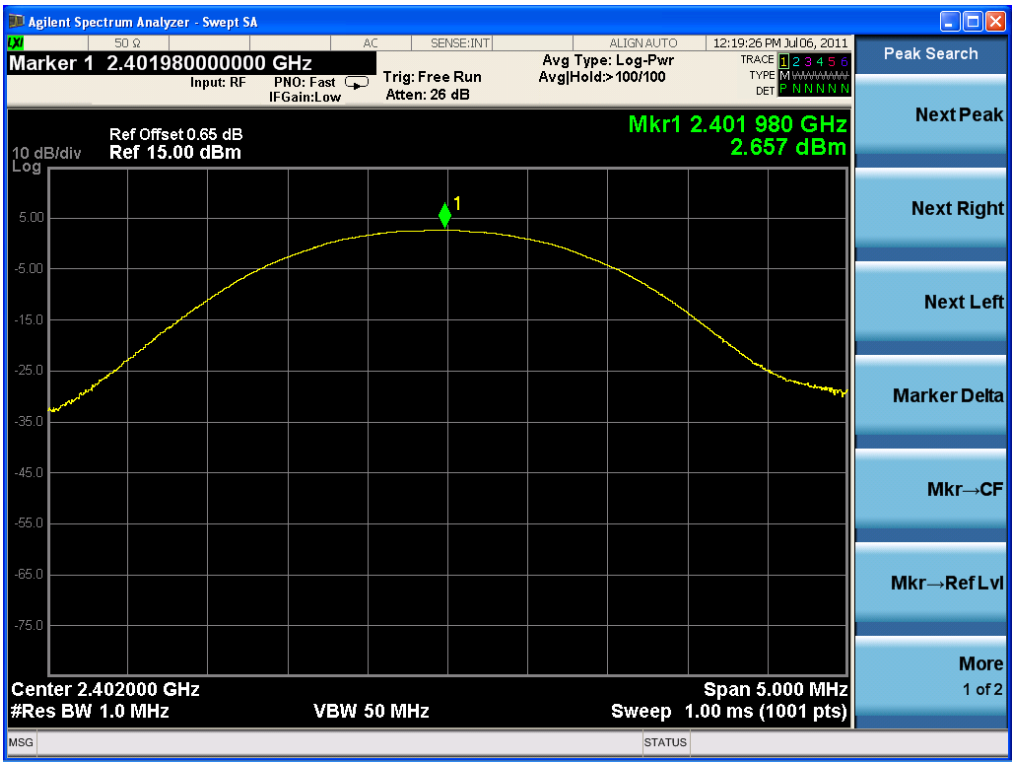
## Maximum peak Conducted Output Power - GFSK

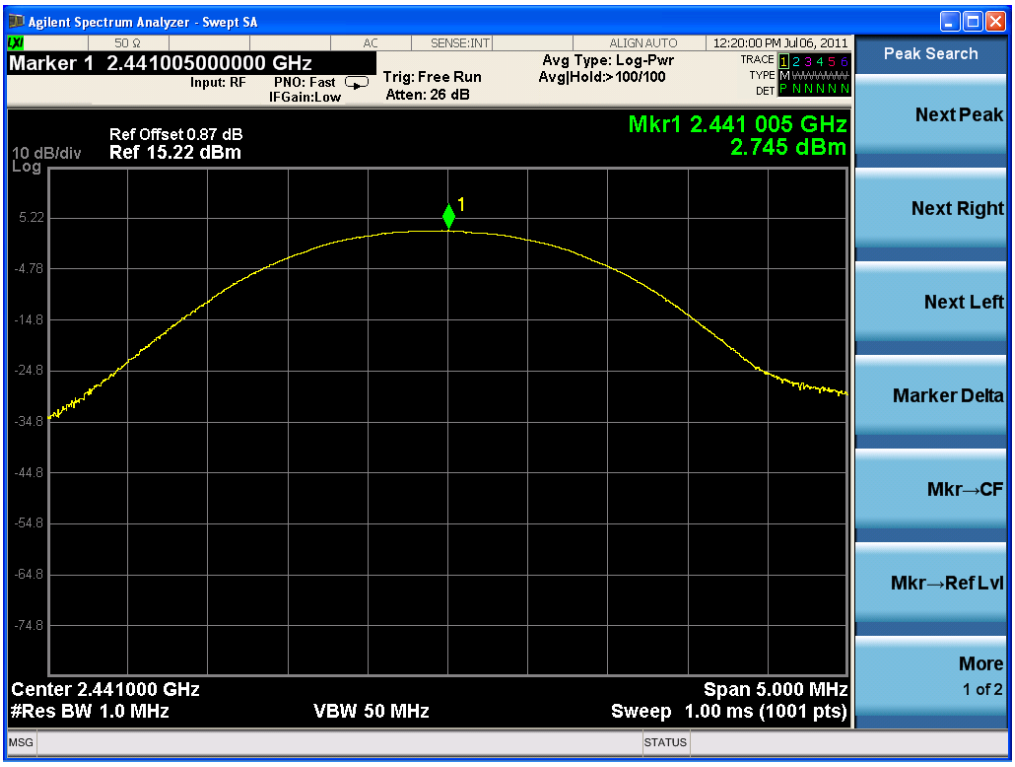


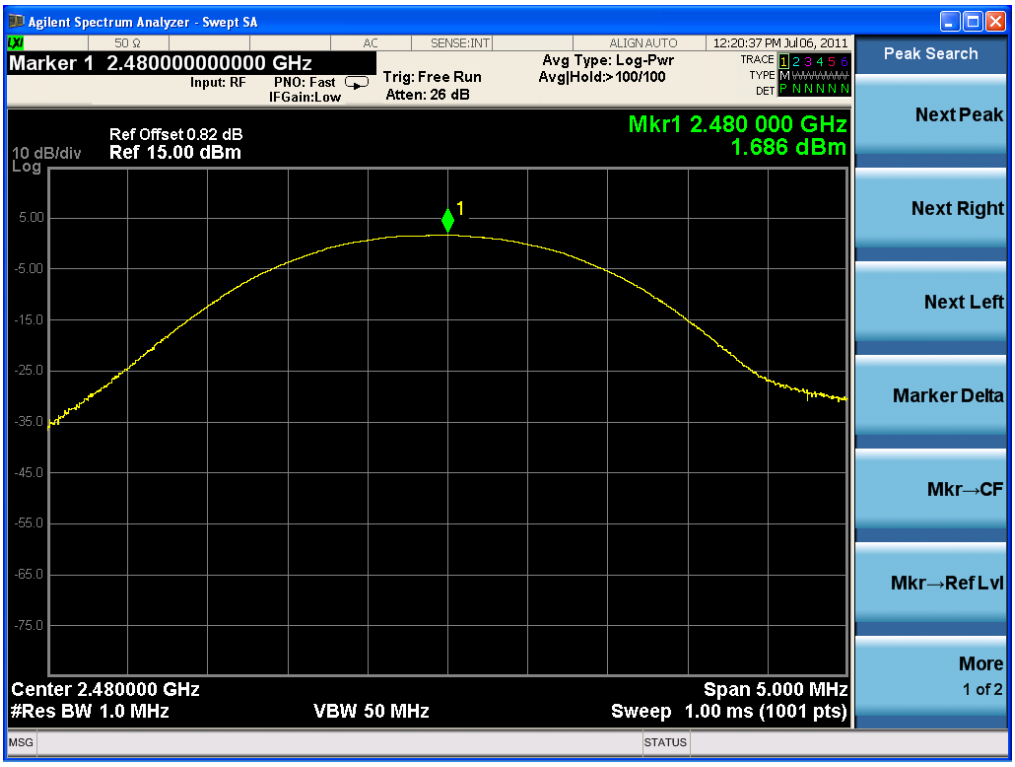





## Maximum peak Conducted Output Power - 8-DPSK





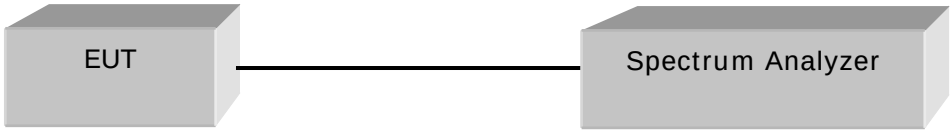
## 2.1.6 Band-edge

### Test Location
RF Test Room

### Test Procedures

The bandwidth at 20 dB down from the highest inband spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT has its hopping function disabled at the highest, middle and the lowest available channels.

The spectrum analyzer is set to:
Center frequency = the highest, middle, and the lowest channels
RBW = 100 kHz
VBW = 100 kHz (≥ RBW)
Span = 10 MHz
Detector function = peak
Trace = max hold
Sweep = auto




### Limit

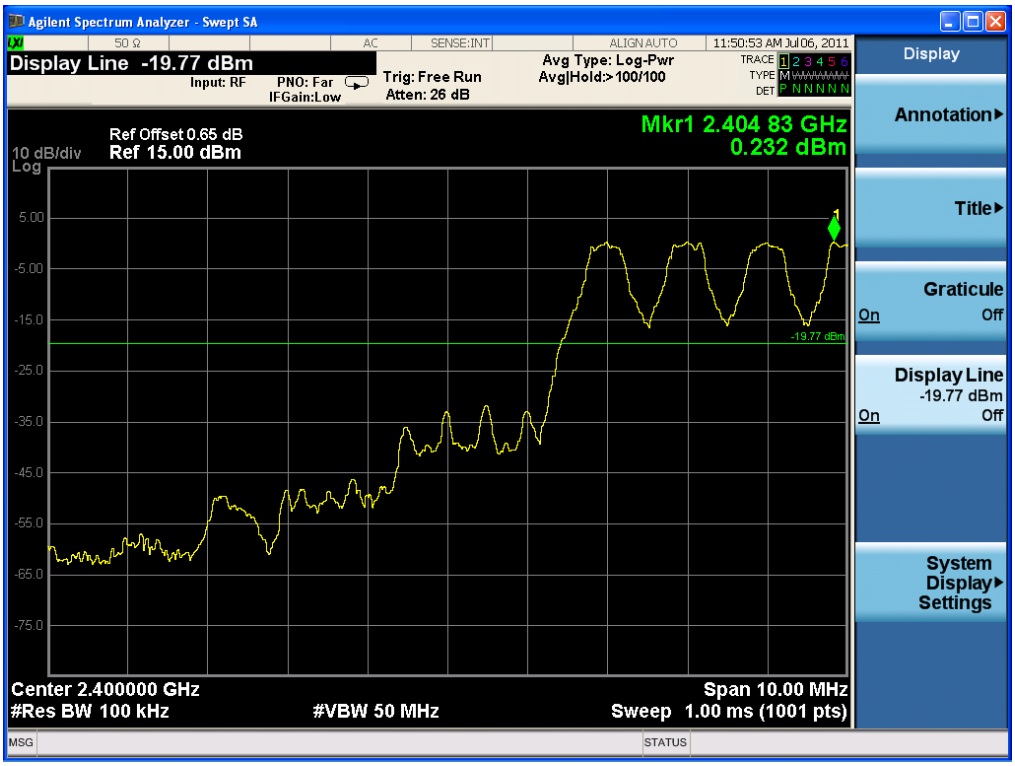
> 20 dBc

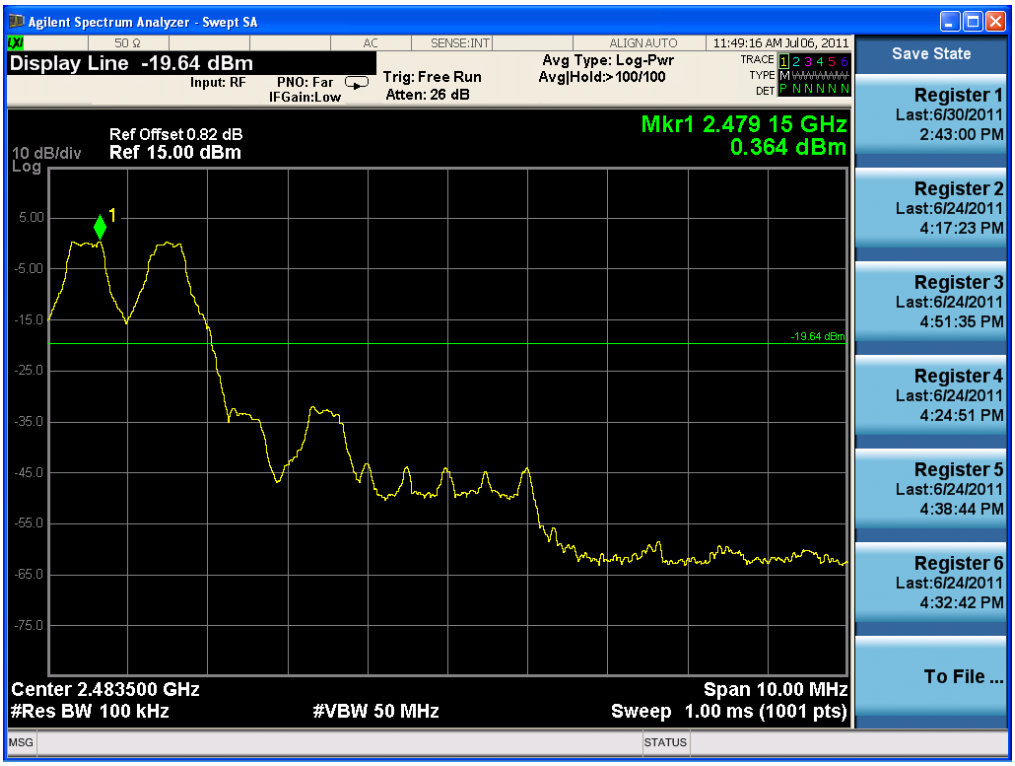
### Test Results

All conducted emission in any 100 kHz bandwidth outside of the spectrum band was at least 20 dB lower than the highest level of the inband spectral density.
Therefore the applying equipment meets the requirement.

See next pages for actual measured spectrum plots.

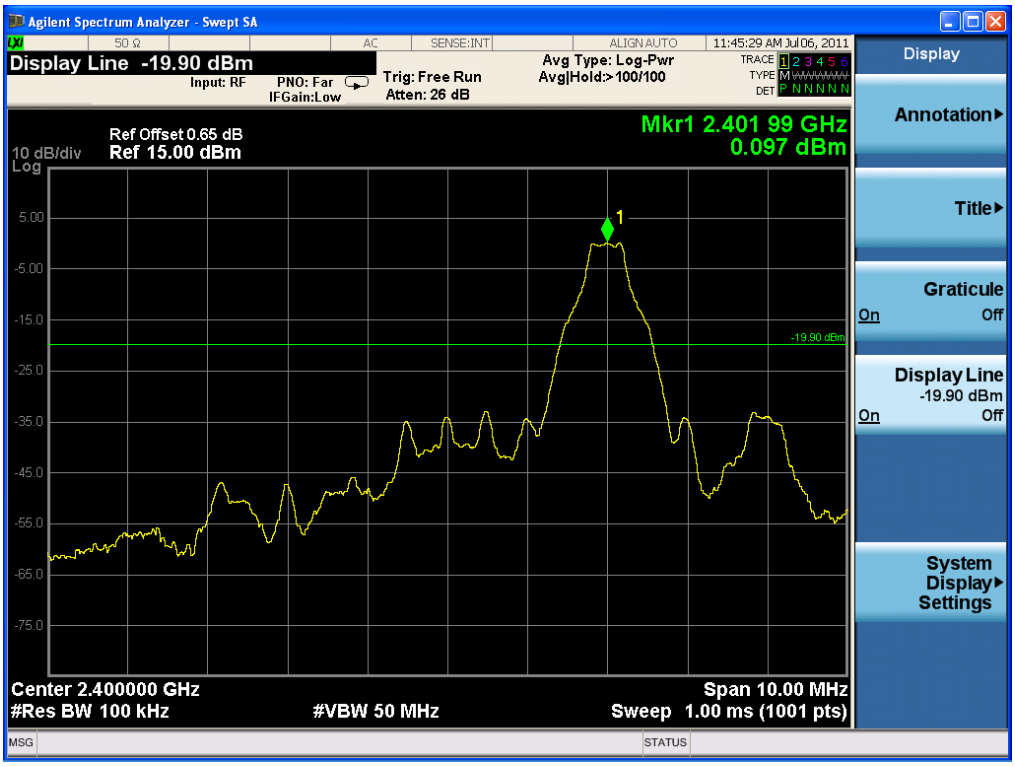
## Band – edge (with Hopping) - GFSK



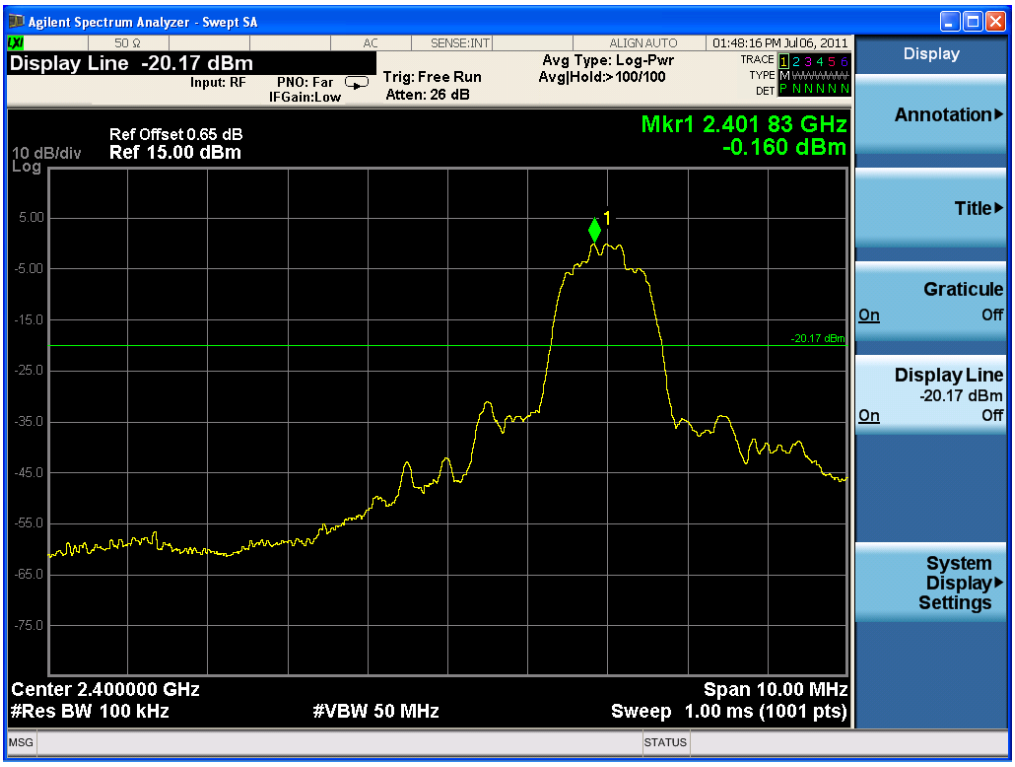



## Band – edge (with Hopping) - 8-DPSK

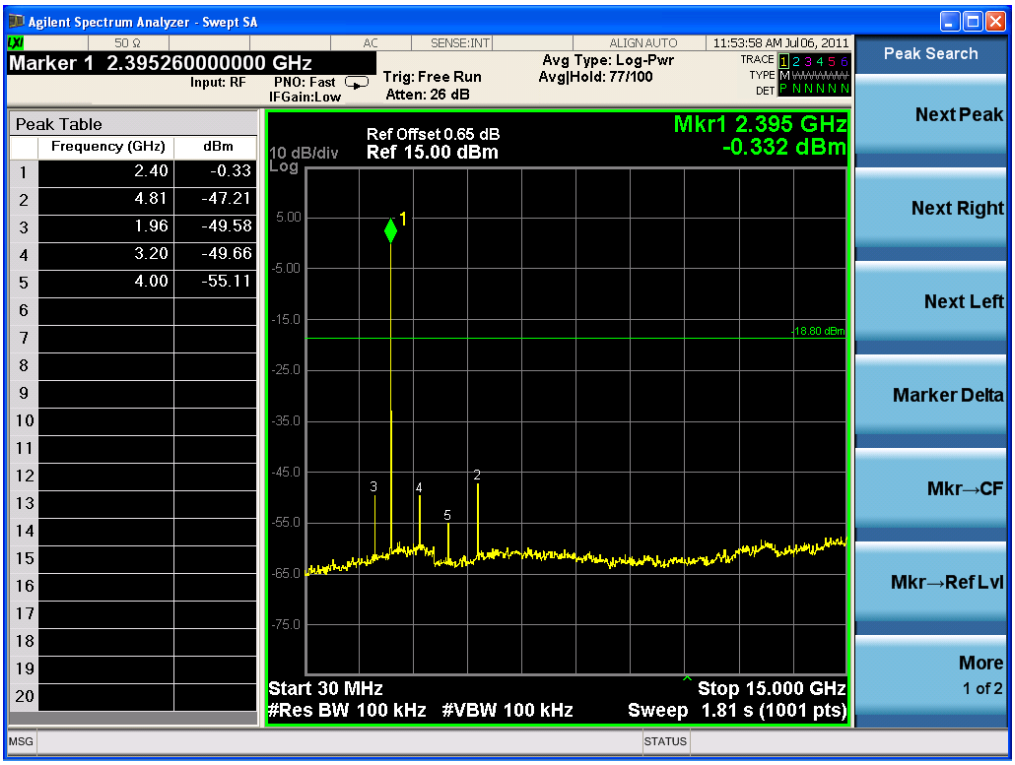

## Band – edge (without Hopping) - GFSK

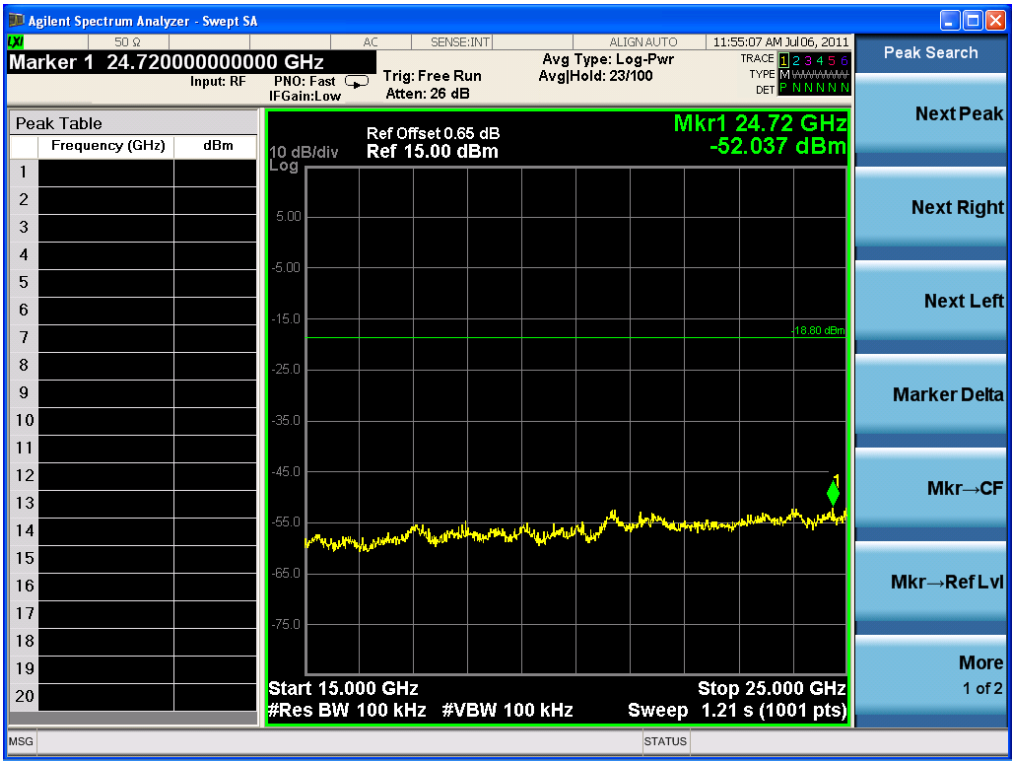



## Band – edge (without Hopping) - 8-DPSK

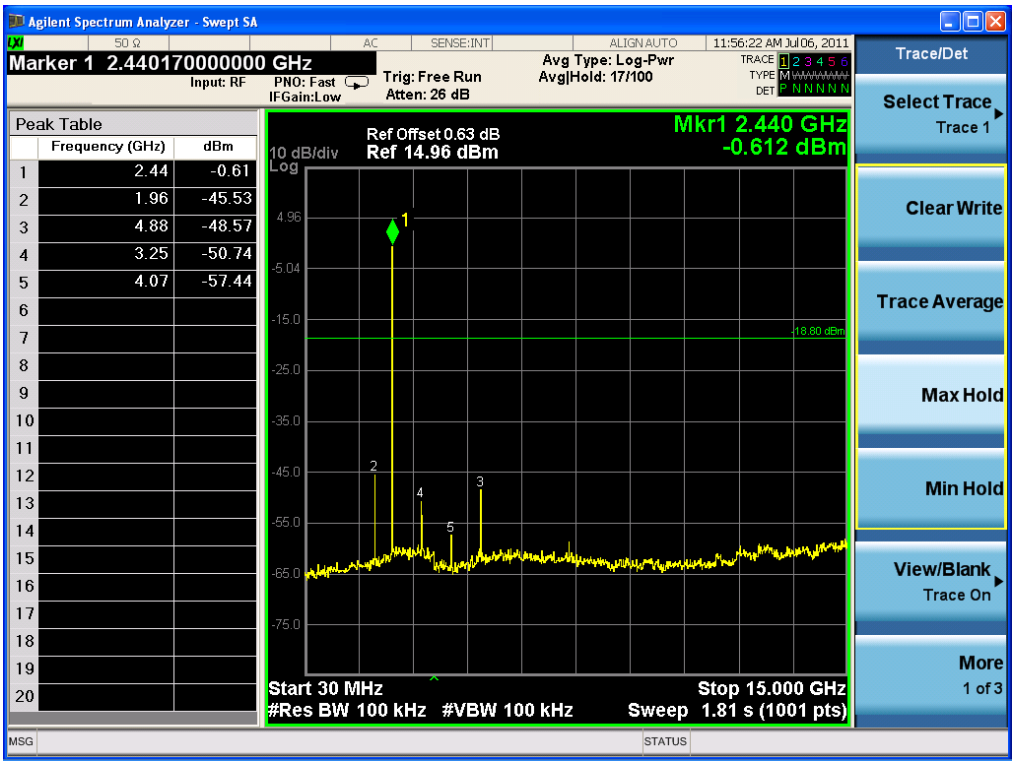


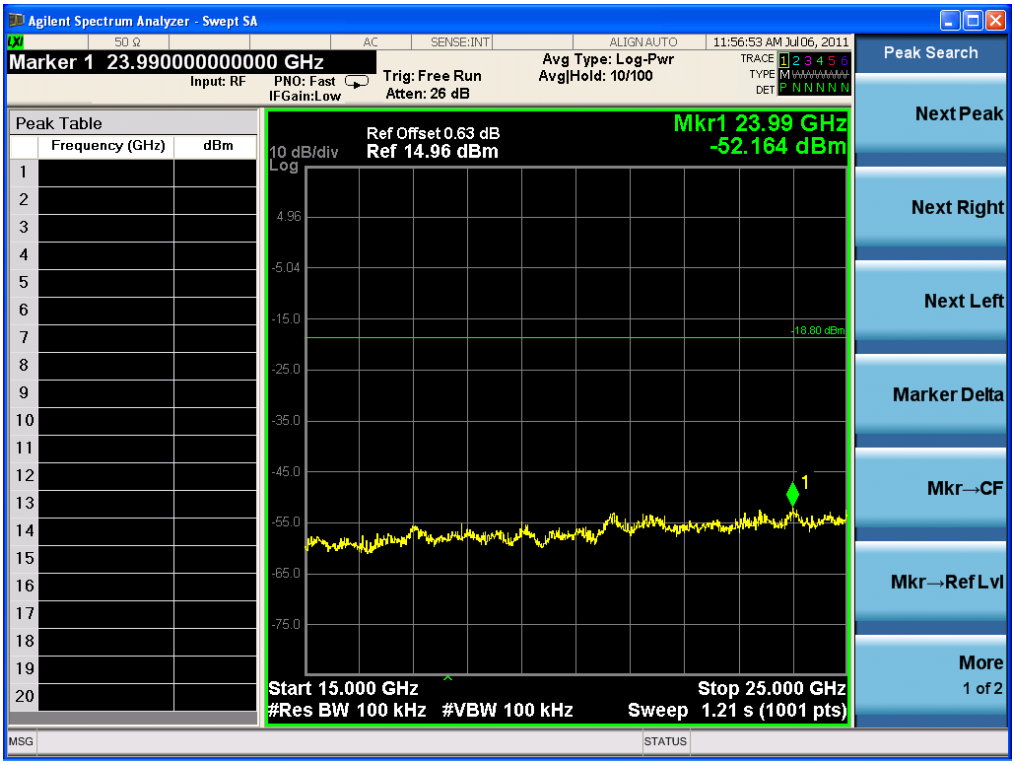

**Band – edge (at 20 dB blow) – Low channel**
**Frequency Range = 30 MHz ~ 10th harmonic**
**(GFSK : Worst-Case)**



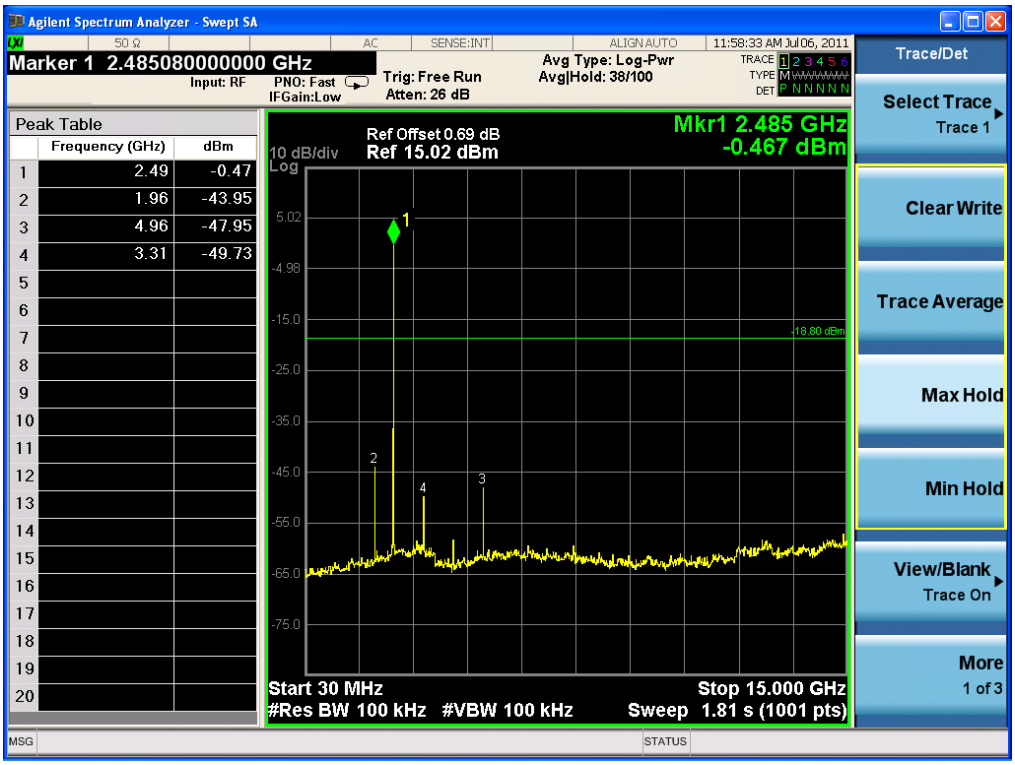



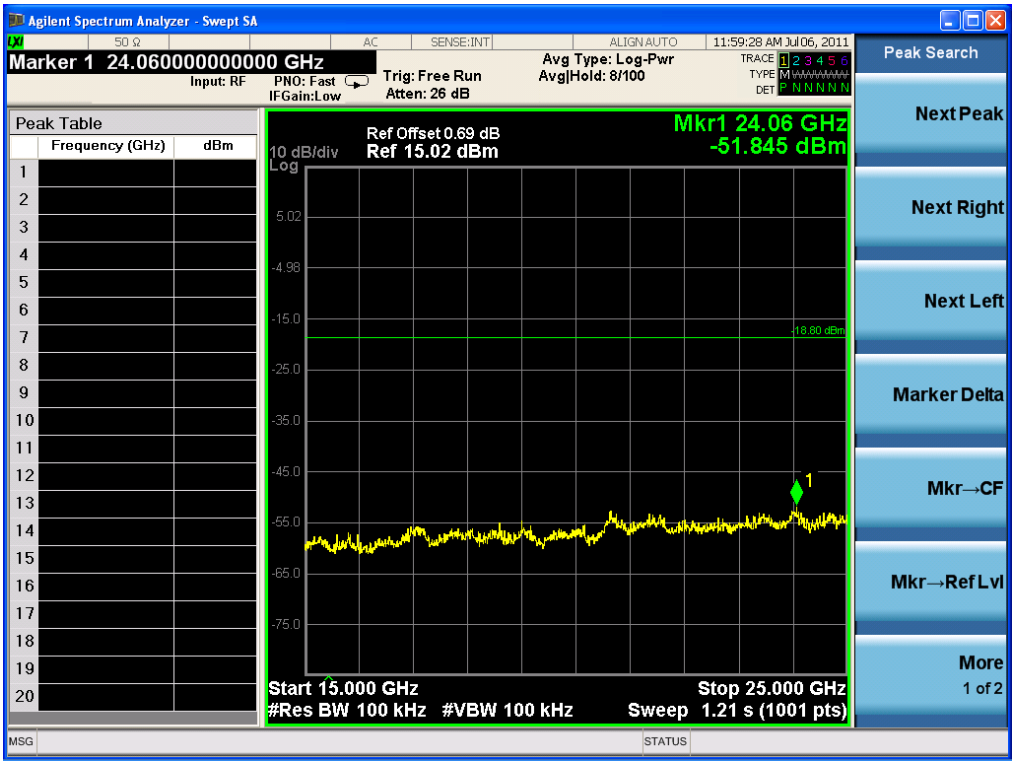
**Band – edge (at 20 dB blow) – Mid channel**
**Frequency Range = 30 MHz ~ 10th harmonic**
**(GFSK : Worst-Case)**



## Band – edge (at 20 dB blow) – High channel
## Frequency Range = 30 MHz ~ 10th harmonic
## (GFSK : Worst-Case)



## 2.1.7 Field Strength of Emissions

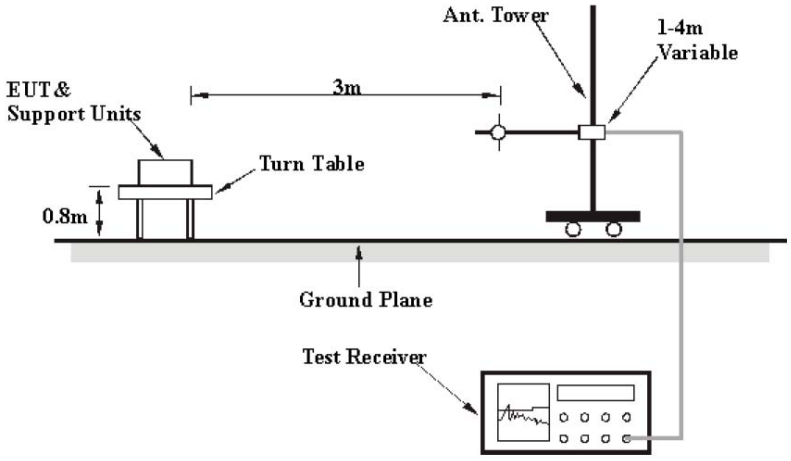
### Test Location

☒ Testing was performed at a test distance of 3 meter Open Area Test Site

### Test Procedures

The height of the measuring antenna was varied between 1 to 4 m and the table was rotated a full revolution in order to obtain maximum values of the electric field intensity. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

The spectrum analyzer is set to:
Center frequency = the worst channel
Frequency Range =30 MHz ~ 10th harmonic
RBW = 120 kHz (30 MHz ~ 1 GHz) VBW ≥ RBW
= 1 MHz (1 GHz ~ 10th harmonic)
Span = 100 MHz Detector function = Quasi-peak
Trace = max hold




### Limit

- **15.209(a)**

| Frequency(MHz) | Field Strength uV/m@3m | Field Strength dBuV/m@3m |
|---|---|---|
| 30-88 | 100** | 40 |
| 88-216 | 150** | 43.5 |
| 216-960 | 200** | 46 |
| Above 960 | 500 | 54 |

** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

## Test Results

**Test mode : Hopping(GFSK), CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

| EUT | Mobile Printer | Measurement Detail | |
|---|---|---|---|
| Model | SPP-R300 | Frequency Range | Below 1000MHz |
| Test mode | GFSK (Worst case) | Detector function | Quasi-Peak |

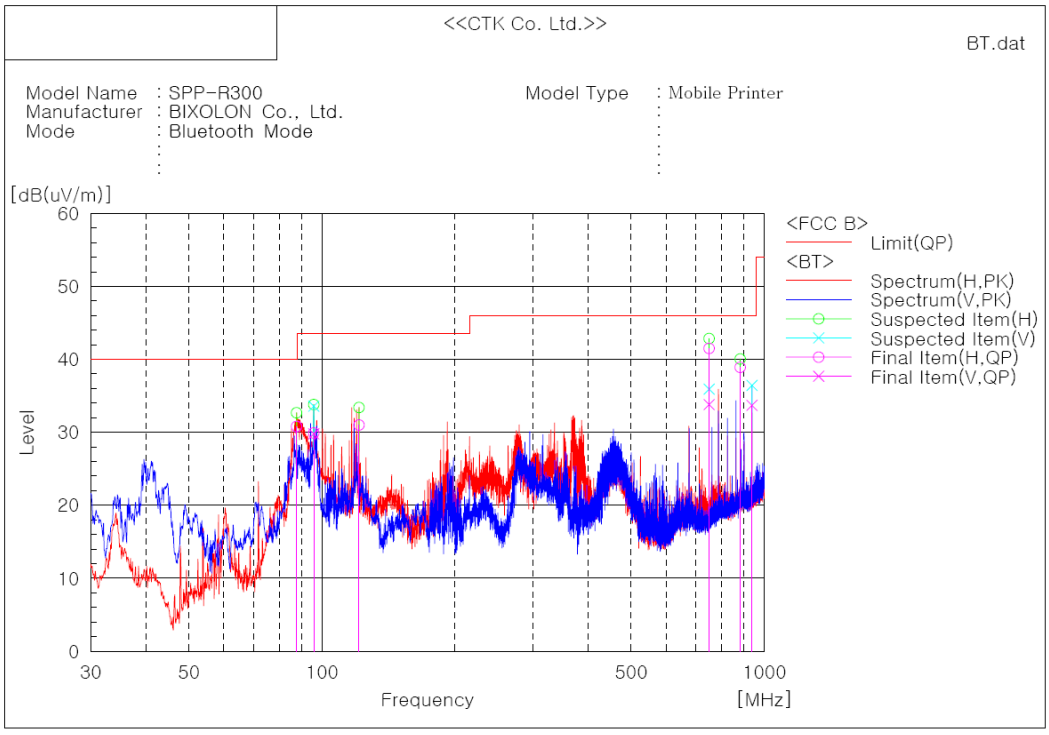
The requirements are:

☒ Complies

| Frequency (MHz) | Measured Data (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|
| 750.104 | 41.5 | 4.5 | Quasi-peak |

## Test Data

**Remark** :
1. The field strength of spurious emission was measured in the following position: EUT stand-up position(Z axis), lie-down position(X,Y axis). The worst emission was found in stand-up position(Z axis) and the worst case was recorded.




Final Result

| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 87.594 | H | 50.3 | -19.5 | 30.8 | 40.0 | 9.2 | 305.0 | 290.0 |
| 2 | 95.839 | H | 48.8 | -18.9 | 29.9 | 43.5 | 13.6 | 305.0 | 103.0 |
| 3 | 95.839 | V | 48.7 | -18.9 | 29.8 | 43.5 | 13.7 | 100.0 | 294.0 |
| 4 | 121.301 | H | 48.6 | -17.6 | 31.0 | 43.5 | 12.5 | 400.0 | 0.0 |
| 5 | 750.104 | H | 46.1 | -4.6 | 41.5 | 46.0 | 4.5 | 100.0 | 118.0 |
| 6 | 750.104 | V | 38.4 | -4.6 | 33.8 | 46.0 | 12.2 | 100.0 | 0.0 |
| 7 | 882.266 | H | 40.5 | -1.6 | 38.9 | 46.0 | 7.1 | 208.0 | 107.0 |
| 8 | 937.677 | V | 34.3 | -0.6 | 33.7 | 46.0 | 12.3 | 100.0 | 0.0 |

## Test Results

**Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

| | | | |
|---|---|---|---|
| EUT | Mobile Printer | Measurement Detail | |
| Model | SPP-R300 | Frequency Range | 1-25GHz |
| Channel | Channel 0 | Detector function | Peak |
| Test Mode | GFSK (Worst case) | | |

## Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

| Frequency (MHz) | Measured Data (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|
| 4804.00 | 49.3 / 62.3 | 4.7 / 11.7 | Average / Peak |

## Test Data

| Frequency [MHz] | Reading [dBuV/m] AV / Peak | | Pol. | Height [m] | Correction Factor | | | Limits [dBuV/m] AV / Peak | | Result [dBuV/m] AV / Peak | | Margin [dB] AV / Peak | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Antenna | Amp. Gain | Cable | | | | | | |
| 4804.00 | 40.1 | 53.1 | H | 1.2 | 32.7 | 34.9 | 11.4 | 54.0 | 74.0 | 49.3 | 62.3 | 4.7 | 11.7 |

## Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

| Frequency [MHz] | Reading [dBuV/m] | Pol. | Height [m] | Correction Factor | | | Limits [dBuV/m] | Result [dBuV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Antenna | Amp. Gain | Cable | | | |
| No emissions were detected at a level greater than 20dB below limit. | | | | | | | | | |

## Test Results

**Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

| | | | |
|---|---|---|---|
| EUT | Mobile Printer | Measurement Detail | |
| Model | SPP-R300 | Frequency Range | 1-25GHz |
| Channel | Channel 39 | Detector function | Peak |
| Test Mode | GFSK (Worst case) | | |

## Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

| Frequency (MHz) | Measured Data (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|
| 4882.00 | 46.6 / 59.7 | 7.4 / 14.3 | Average / Peak |

## Test Data

| Frequency [MHz] | Reading [dBuV/m] AV / Peak | | Pol. | Height [m] | Correction Factor Antenna | Amp. Gain | Cable | Limits [dBuV/m] AV / Peak | | Result [dBuV/m] AV / Peak | | Margin [dB] AV / Peak | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4882.00 | 37.4 | 50.5 | V | 1.0 | 32.7 | 34.9 | 11.4 | 54.0 | 74.0 | 46.6 | 59.7 | 7.4 | 14.3 |

## Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

| Frequency [MHz] | Reading [dBuV/m] | Pol. | Height [m] | Correction Factor Antenna | Amp. Gain | Cable | Limits [dBuV/m] | Result [dBuV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| No emissions were detected at a level greater than 20dB below limit. | | | | | | | | | |

## Test Results

**Test mode : GFSK, CFG PKT Packet Type : 15 Packet Size : 339(DH5)**

| | | | |
|---|---|---|---|
| EUT | Mobile Printer | Measurement Detail | |
| Model | SPP-R300 | Frequency Range | 1-25GHz |
| Channel | Channel 78 | Detector function | Peak |
| Test Mode | GFSK (Worst case) | | |

## Remarks

We have tested three mode (X, Y, Z). The worst mode (X axis) for final test.

The requirements are:

☒ Complies

| Frequency (MHz) | Measured Data (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|
| 4960 | 50.4 / 63.2 | 3.6 / 10.8 | Average / Peak |

## Test Data

| Frequency [MHz] | Reading [dBuV/m] AV / Peak | | Pol. | Height [m] | Correction Factor | | | Limits [dBuV/m] AV / Peak | | Result [dBuV/m] AV / Peak | | Margin [dB] AV / Peak | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Antenna | Amp. Gain | Cable | | | | | | |
| 4960.00 | 41.2 | 54.0 | V | 1.1 | 32.7 | 34.9 | 11.4 | 54.0 | 74.0 | 50.4 | 63.2 | 3.6 | 10.8 |

## Restricted band edge test data

Measured frequency range : 2310-2390 MHz, 2483.5-2500 MHz

| Frequency [MHz] | Reading [dBuV/m] AV / Peak | | Pol. | Height [m] | Correction Factor | | | Limits [dBuV/m] AV / Peak | | Result [dBuV/m] AV / Peak | | Margin [dB] AV / Peak | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Antenna | Amp. Gain | Cable | | | | | | |
| 2483.50 | 36.7 | 46.5 | V | 1.1 | 28.2 | 35.3 | 7.4 | 54.0 | 74.0 | 37.0 | 46.8 | 17.0 | 27.2 |

## 2.1.8 AC Conducted Emissions

### Test Location
Shielded Room

### Frequency Range of Measurement
150 kHz to 30 MHz

### Instrument Settings
IF Band Width: 9 kHz

### Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.
Amplitude measurements were performed with a quasi-peak detector and an average detector.

### Limit

- **15.207(a)**

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

* Decreases with the logarithm of the frequency.

### Test Results
The requirements are:

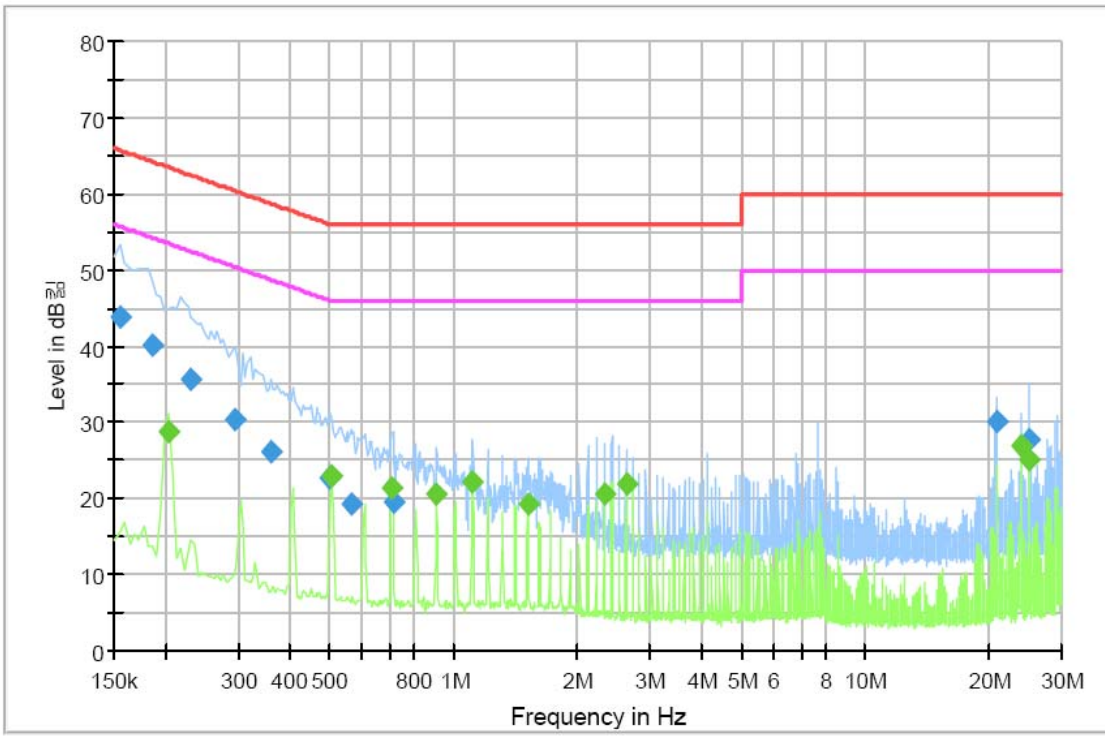
☒ Complies

**Test mode : Hopping(GFSK), CFG PKT Packet Type : 15, Packet Size : 339(DH5), Hopping mode**

| Frequency (MHz) | Measured Data (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|
| 0.204 | 34.6 | 18.8 | Average |

## Test Data

[HOT]



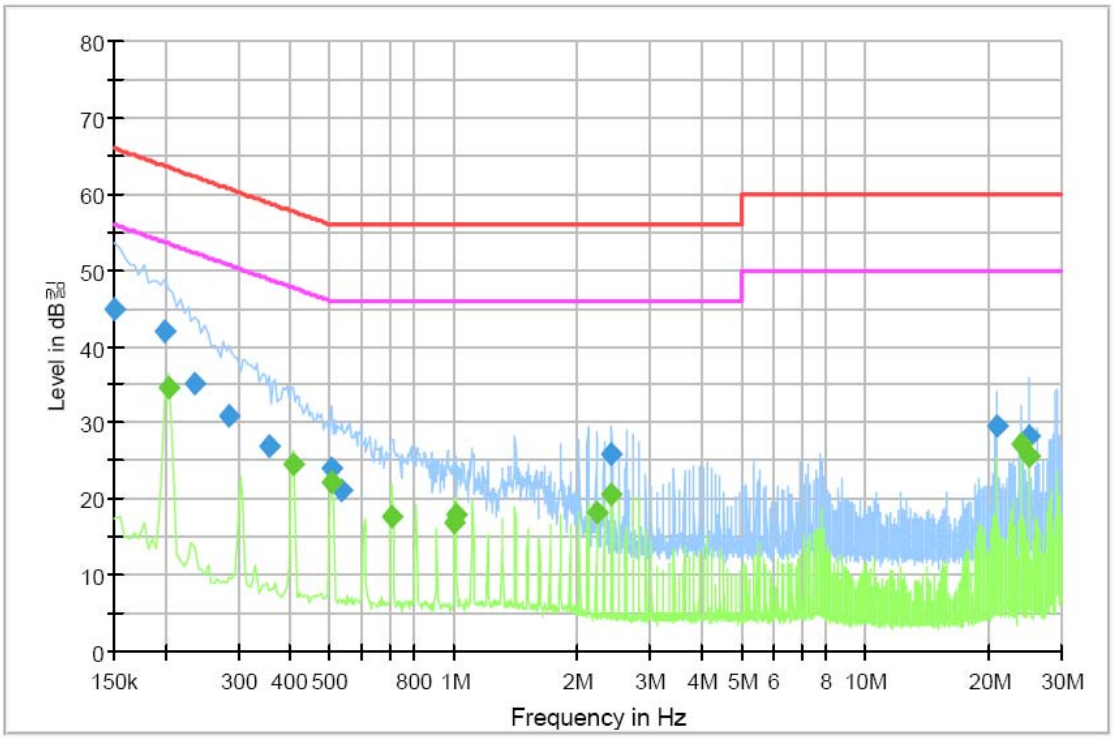

## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|---|
| 0.154500 | 43.9 | 1000.0 | 9.000 | On | L1 | 10.0 | 21.9 | 65.8 |
| 0.186000 | 40.0 | 1000.0 | 9.000 | On | L1 | 10.1 | 24.2 | 64.2 |
| 0.231000 | 35.6 | 1000.0 | 9.000 | On | L1 | 10.0 | 26.8 | 62.4 |
| 0.294000 | 30.3 | 1000.0 | 9.000 | On | L1 | 10.1 | 30.1 | 60.4 |
| 0.361500 | 26.2 | 1000.0 | 9.000 | On | L1 | 10.2 | 32.5 | 58.7 |
| 0.501000 | 22.8 | 1000.0 | 9.000 | On | L1 | 10.2 | 33.2 | 56.0 |
| 0.564000 | 19.2 | 1000.0 | 9.000 | On | L1 | 10.2 | 36.8 | 56.0 |
| 0.712500 | 19.6 | 1000.0 | 9.000 | On | L1 | 10.1 | 36.4 | 56.0 |
| 20.854500 | 30.0 | 1000.0 | 9.000 | On | L1 | 9.9 | 30.0 | 60.0 |
| 25.048500 | 27.8 | 1000.0 | 9.000 | On | L1 | 10.0 | 32.2 | 60.0 |

## Final Result 2

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|---|
| 0.204000 | 28.9 | 1000.0 | 9.000 | On | L1 | 10.0 | 24.5 | 53.4 |
| 0.505500 | 23.0 | 1000.0 | 9.000 | On | L1 | 10.2 | 23.0 | 46.0 |
| 0.708000 | 21.3 | 1000.0 | 9.000 | On | L1 | 10.1 | 24.7 | 46.0 |
| 0.910500 | 20.7 | 1000.0 | 9.000 | On | L1 | 10.0 | 25.3 | 46.0 |
| 1.113000 | 22.2 | 1000.0 | 9.000 | On | L1 | 10.0 | 23.8 | 46.0 |
| 1.518000 | 19.3 | 1000.0 | 9.000 | On | L1 | 9.9 | 26.7 | 46.0 |
| 2.328000 | 20.7 | 1000.0 | 9.000 | On | L1 | 9.9 | 25.3 | 46.0 |
| 2.629500 | 21.9 | 1000.0 | 9.000 | On | L1 | 9.9 | 24.1 | 46.0 |
| 23.959500 | 26.9 | 1000.0 | 9.000 | On | L1 | 10.0 | 23.1 | 50.0 |
| 25.026000 | 25.0 | 1000.0 | 9.000 | On | L1 | 10.0 | 25.0 | 50.0 |

**[NEUTRAL]**




## Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|---|
| 0.150000 | 44.9 | 1000.0 | 9.000 | On | N | 9.7 | 21.1 | 66.0 |
| 0.199500 | 41.9 | 1000.0 | 9.000 | On | N | 9.9 | 21.7 | 63.6 |
| 0.235500 | 35.1 | 1000.0 | 9.000 | On | N | 10.0 | 27.2 | 62.3 |
| 0.285000 | 31.0 | 1000.0 | 9.000 | On | N | 10.0 | 29.7 | 60.7 |
| 0.357000 | 26.9 | 1000.0 | 9.000 | On | N | 10.1 | 31.9 | 58.8 |
| 0.505500 | 24.1 | 1000.0 | 9.000 | On | N | 10.2 | 31.9 | 56.0 |
| 0.537000 | 21.0 | 1000.0 | 9.000 | On | N | 10.2 | 35.0 | 56.0 |
| 2.427000 | 25.9 | 1000.0 | 9.000 | On | N | 9.9 | 30.1 | 56.0 |
| 20.836500 | 29.6 | 1000.0 | 9.000 | On | N | 10.0 | 30.4 | 60.0 |
| 24.994500 | 28.3 | 1000.0 | 9.000 | On | N | 10.1 | 31.7 | 60.0 |

## Final Result 2

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|---|
| 0.204000 | 34.6 | 1000.0 | 9.000 | On | N | 9.9 | 18.8 | 53.4 |
| 0.406500 | 24.5 | 1000.0 | 9.000 | On | N | 10.2 | 23.2 | 47.7 |
| 0.505500 | 22.1 | 1000.0 | 9.000 | On | N | 10.2 | 23.9 | 46.0 |
| 0.708000 | 17.8 | 1000.0 | 9.000 | On | N | 10.1 | 28.2 | 46.0 |
| 1.009500 | 16.8 | 1000.0 | 9.000 | On | N | 10.0 | 29.2 | 46.0 |
| 1.014000 | 18.0 | 1000.0 | 9.000 | On | N | 10.0 | 28.0 | 46.0 |
| 2.224500 | 18.1 | 1000.0 | 9.000 | On | N | 9.9 | 27.9 | 46.0 |
| 2.427000 | 20.6 | 1000.0 | 9.000 | On | N | 9.9 | 25.4 | 46.0 |
| 23.959500 | 27.3 | 1000.0 | 9.000 | On | N | 10.1 | 22.7 | 50.0 |
| 25.026000 | 25.6 | 1000.0 | 9.000 | On | N | 10.1 | 24.4 | 50.0 |

# APPENDIX A – Test Equipment Used For Tests

| | Name of Equipment | Manufacturer | Model No. | Serial No. | Due Date |
|---|---|---|---|---|---|
| 1 | Signal Analyzer | Agilent | N9020A | MY48011598 | 2011-11-12 |
| 2 | Spectrum Analyzer | Rohde & Schwarz | FSP-30 | 100994 | 2011-11-12 |
| 3 | EMI Test Receiver | Rohde & Schwarz | ESVS30 | 826638/008 | 2012-07-07 |
| 4 | ULTRA Broadband Antenna | Rohde & Schwarz | HL562 | 361324/014 | 2011-11-18 |
| 5 | LOOP ANTENNA | EMCO | 6502 | 9107-2652 | 2012-10-29 |
| 6 | Attenuator | HP | 8498A | 1801A06913 | 2011-11-15 |
| 7 | EPM Series Power Meter | HP | E4418A | GB38272734 | 2011-11-12 |
| 8 | Power Sensor | HP | 8487A | 3318A03524 | 2012-07-07 |
| 9 | Audio Analyzer | HP | 8903B | 2747A03432 | 2011-11-12 |
| 10 | ESG-D Series Signal Generator | Agilent | E4432B | US40054094 | 2011-11-12 |
| 11 | SYNTHESIZED SWEEPER | HP | 8341B | 2819A01563 | 2011-11-12 |
| 12 | Modulation Analyzer | HP | 8901B | 3438A05228 | 2011-11-16 |
| 13 | Attenuator | HP | 8494A | 3308A33351 | 2011-11-15 |
| 14 | Temp&Humi Chamber | Kunpoong | JT-TH-556-1 | 9QE5-002 | 2012-11-14 |
| 15 | DC POWER SUPPLY | Agilent | E3632A | MY40011638 | 2011-11-12 |
| 16 | EMC Analyzer | Agilent | E7405A | MY45110859 | 2012-02-11 |
| 17 | Horn Antenna | ETS-Lindgren | 3115 | 00078894 | 2013-03-22 |
| 18 | Horn Antenna | ETS-Lindgren | 3115 | 00078895 | 2013-03-22 |
| 19 | Dipole Antenna | SCHWARZBECK | VHA 9103 | VHA91032557 | 2011-09-18 |
| 20 | Dipole Antenna | SCHWARZBECK | UHA 9105 | UHA91052417 | 2011-09-18 |
| 21 | OPT H64 AMPLIFIER | HP | 8447F | 3113A06814 | 2012-03-31 |
| 22 | PREAMPLIFIER | Agilent | 8449B | 3008A02307 | 2011-11-16 |
| 23 | Radio Communication Tester | Rohde & Schwarz | CMU200 | 106765 | 2012-02-09 |
| 24 | LISN | Rohde & Schwarz | ESH3-Z5 | 100207 | 2011-11-15 |
| 25 | LISN | Rohde & Schwarz | ENV216 | 101151 | 2012-03-09 |
| 26 | DC POWER SUPPLY | Agilent | E3632A | MY40011638 | 2011-11-12 |
| 27 | EMI Test Receiver | Rohde & Schwarz | ESCI3 | 100032 | 2012-02-09 |