



FCC RADIO TEST REPORT

FCC ID: 2AMP8MultispeQ

Product: MultispeQ

Trade Name: MultispeQ

Model Name: MULTISPEQ 1.0,

Serial Model: N/A

Report No.: POCE17062033NRF

Prepared for

PHOTOSYNQ

325 East Grand River Ave, STE 318, East Lansing, Michigan 48864, USA

Prepared by

Shenzhen POCE Technology Co.,Ltd.

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TEST RESULT CERTIFICATION

Applicant's name : PHOTOSYNQ
Address : 325 East Grand River Ave, STE 318, East Lansing,
Michigan 48864, USA

Manufacture's Name..... : PHOTOSYNQ
Address : 325 East Grand River Ave, STE 318, East Lansing,
Michigan 48864, USA

Product description

Product name : MultispeQ
Standards : FCC Part15.247

Test procedure ANSI C63.10-2013

This device described above has been tested by POCE, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test :
Date (s) of performance of tests : 20 June 2017 ~ 02 July 2017
Date of Issue : 02 July 2017
Test Result : **Pass**

Testing Engineer :


(Ken Li)

Technical Manager :


(Jimmy Yao)

Authorized Signatory :


(Terry Yang)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 (15.247) , Subpart C | | | |
|---------------------------------|-----------------------------|----------|--------|
| Standard Section | Test Item | Judgment | Remark |
| 15.207 | Conducted Emission | PASS | |
| 15.247(a)(1) | Hopping Channel Separation | PASS | |
| 15.247(b)(1) | Peak Output Power | PASS | |
| 15.247(c) | Radiated Spurious Emission | PASS | |
| 15.247(d) | Conducted spurious Emission | PASS | |
| 15.247(a)(iii) | Number of Hopping Frequency | PASS | |
| 15.247(a)(iii) | Dwell Time | PASS | |
| 15.247(a)(1) | Bandwidth | PASS | |
| 15.205 | Band Edge Emission | PASS | |
| 15.203 | Antenna Requirement | PASS | |

1.1 TEST FACILITY

Shenzhen POCE Technology Co.,Ltd.

Add. : Room 502, Bldg. 1, Xinghua Garden, Baoan Road Xixiang, Baoan District, Shenzhen, China

FCC Registered No.: 222278

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

| No. | Item | Uncertainty |
|-----|------------------------------|---------------------------|
| 1 | Conducted Emission Test | $\pm 1.38\text{dB}$ |
| 2 | RF power,conducted | $\pm 0.16\text{dB}$ |
| 3 | Spurious emissions,conducted | $\pm 0.21\text{dB}$ |
| 4 | All emissions,radiated(<1G) | $\pm 4.68\text{dB}$ |
| 5 | All emissions,radiated(>1G) | $\pm 4.89\text{dB}$ |
| 6 | Temperature | $\pm 0.5^{\circ}\text{C}$ |
| 7 | Humidity | $\pm 2\%$ |

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

| | |
|------------------------|--|
| Equipment | MultispeQ |
| Trade Name | MultispeQ |
| Model Name | MULTISPEQ 1.0 |
| Serial Model | N/A |
| Model Difference | All the same, Only model name is different. |
| Product Description | The EUT is a MultispeQ |
| | Operation Frequency: 2402~2480 MHz |
| | Modulation Type: BT(1Mbps): GFSK BT EDR(2Mbps): $\pi/4$ -DQPSK BT EDR(3Mbps): 8-DPSK |
| | Bit Rate of Transmitter 1Mbps/2Mbps/3Mbps |
| | Number Of Channel 79 CH |
| | Antenna Designation: Please see Note 3. |
| | Output Power(Conducted): BT(1Mbps): 7.337dBm BT EDR(2Mbps): 6.125dBm BT EDR(3Mbps): 6.562dBm |
| | Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual. |
| Channel List | Please refer to the Note 2. |
| Adapter | AC 100V~240V 50/60Hz |
| Battery | DC 3.7V |
| Connecting I/O Port(s) | Please refer to the User's Manual |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.

| Channel List | | | | | |
|--------------|-----------------|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 00 | 2402 | 27 | 2429 | 54 | 2456 |
| 01 | 2403 | 28 | 2430 | 55 | 2457 |
| 02 | 2404 | 29 | 2431 | 56 | 2458 |
| 03 | 2405 | 30 | 2432 | 57 | 2459 |
| 04 | 2406 | 31 | 2433 | 58 | 2460 |
| 05 | 2407 | 32 | 2434 | 59 | 2461 |
| 06 | 2408 | 33 | 2435 | 60 | 2462 |
| 07 | 2409 | 34 | 2436 | 61 | 2463 |
| 08 | 2410 | 35 | 2437 | 62 | 2464 |
| 09 | 2411 | 36 | 2438 | 63 | 2465 |
| 10 | 2412 | 37 | 2439 | 64 | 2466 |
| 11 | 2413 | 38 | 2440 | 65 | 2467 |
| 12 | 2414 | 39 | 2441 | 66 | 2468 |
| 13 | 2415 | 40 | 2442 | 67 | 2469 |
| 14 | 2416 | 41 | 2443 | 68 | 2470 |
| 15 | 2417 | 42 | 2444 | 69 | 2471 |
| 16 | 2418 | 43 | 2445 | 70 | 2472 |
| 17 | 2419 | 44 | 2446 | 71 | 2473 |
| 18 | 2420 | 45 | 2447 | 72 | 2474 |
| 19 | 2421 | 46 | 2448 | 73 | 2475 |
| 20 | 2422 | 47 | 2449 | 74 | 2476 |
| 21 | 2423 | 48 | 2450 | 75 | 2477 |
| 22 | 2424 | 49 | 2451 | 76 | 2478 |
| 23 | 2425 | 50 | 2452 | 77 | 2479 |
| 24 | 2426 | 51 | 2453 | 78 | 2480 |
| 25 | 2427 | 52 | 2454 | | |
| 26 | 2428 | 53 | 2455 | | |

- 3.

Table for Filed Antenna

| Ant | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | NOTE |
|-----|-------|------------|--------------|-----------|------------|------------|
| 1 | N/A | N/A | PCB Antenna | NA | 1.0 | BT Antenna |

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|--------------|-------------|
| Mode 1 | CH00 |
| Mode 2 | CH39 |
| Mode 3 | CH78 |
| Mode 4 | BT Link |

| For Conducted Emission | |
|------------------------|-------------|
| Final Test Mode | Description |
| Mode 4 | BT Link |

| For Radiated Emission | |
|-----------------------|-------------|
| Final Test Mode | Description |
| Mode 1 | CH00 |
| Mode 2 | CH39 |
| Mode 3 | CH78 |

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The EUT use new battery.
- (3) The data rate was set in 1Mbps for radiated emission due to the highest RF output power.

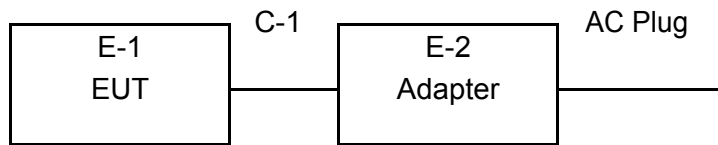
2.3 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

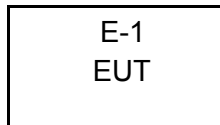
| Test software Version | Test program: Broadcom | | |
|-------------------------------|------------------------|----------|----------|
| Frequency | 2402 MHz | 2441 MHz | 2480 MHz |
| Parameters(1Mbps/2Mbps/3Mbps) | DEF | DEF | DEF |

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission:



Radiated Emission:



2.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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.

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|-----------|-----------|----------------|------------|------|
| E-1 | MultispeQ | MultispeQ | MULTISPEQ 1.0 | / | EUT |
| E-2 | Adapter | Multia | 08K8202 | N/A | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| C-1 | USB Cable | NO | 80cm | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (2) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
|------|--------------------|--------------|-------------|--------------|------------------|------------------|--------------------|
| 1 | Spectrum Analyzer | Agilent | E4407B | MY45108040 | 2016.09.06 | 2017.09.05 | 1 year |
| 2 | Test Receiver | R&S | ESPI | 101318 | 2016.09.07 | 2017.09.06 | 1 year |
| 3 | Bilog Antenna | TESEQ | CBL6111D | 31216 | 2016.09.06 | 2017.09.05 | 1 year |
| 4 | 50Ω Coaxial Switch | Anritsu | MP59B | 6200264416 | 2016.09.07 | 2017.09.06 | 1 year |
| 5 | Spectrum Analyzer | ADVANTES T | R3132 | 150900201 | 2016.09.07 | 2017.09.06 | 1 year |
| 6 | Horn Antenna | EM | EM-AH-10180 | 2011071402 | 2016.09.06 | 2017.09.05 | 1 year |
| 7 | Horn Ant | Schwarzbeck | BBHA 9170 | 9170-181 | 2016.09.06 | 2017.09.05 | 1 year |
| 8 | Amplifier | EM | EM-30180 | 060538 | 2016.12.22 | 2017.12.21 | 1 year |
| 9 | Loop Antenna | ARA | PLA-1030/B | 1029 | 2016.09.08 | 2017.09.07 | 1 year |
| 10 | Power Meter | R&S | NRVS | 100696 | 2016.09.06 | 2017.09.05 | 1 year |
| 11 | Power Sensor | R&S | URV5-Z4 | 0395.1619.05 | 2016.09.06 | 2017.09.05 | 1 year |
| 12 | Signal Analyzer | Agilent | N9020A | MY49100060 | 2016.09.06 | 2017.09.05 | 1 year |

Conduction Test equipment

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
|------|-----------------------|--------------|----------|------------|------------------|------------------|--------------------|
| 1 | Test Receiver | R&S | ESCI | 101160 | 2016.09.06 | 2017.09.05 | 1 year |
| 2 | LISN | R&S | ENV216 | 101313 | 2016.08.24 | 2017.08.23 | 1 year |
| 3 | LISN | EMCO | 3816/2 | 00042990 | 2016.08.24 | 2017.08.23 | 1 year |
| 4 | 50Ω Coaxial Switch | Anritsu | MP59B | 6200264417 | 2016.09.07 | 2017.09.06 | 1 year |
| 5 | Passive Voltage Probe | R&S | ESH2-Z3 | 100196 | 2016.09.07 | 2017.09.06 | 1 year |
| 6 | Absorbing clamp | R&S | MOS-21 | 100423 | 2016.09.08 | 2017.09.07 | 1 year |

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

| FREQUENCY (MHz) | Class A (dBuV) | | Class B (dBuV) | | Standard |
|-----------------|----------------|---------|----------------|-----------|----------|
| | Quasi-peak | Average | Quasi-peak | Average | |
| 0.15 -0.5 | 79.00 | 66.00 | 66 - 56 * | 56 - 46 * | CISPR |
| 0.50 -5.0 | 73.00 | 60.00 | 56.00 | 46.00 | CISPR |
| 5.0 -30.0 | 73.00 | 60.00 | 60.00 | 50.00 | CISPR |

| | | | | | |
|-----------|-------|-------|-----------|-----------|-----|
| 0.15 -0.5 | 79.00 | 66.00 | 66 - 56 * | 56 - 46 * | FCC |
| 0.50 -5.0 | 73.00 | 60.00 | 56.00 | 46.00 | FCC |
| 5.0 -30.0 | 73.00 | 60.00 | 60.00 | 50.00 | FCC |

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---------------------|----------|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

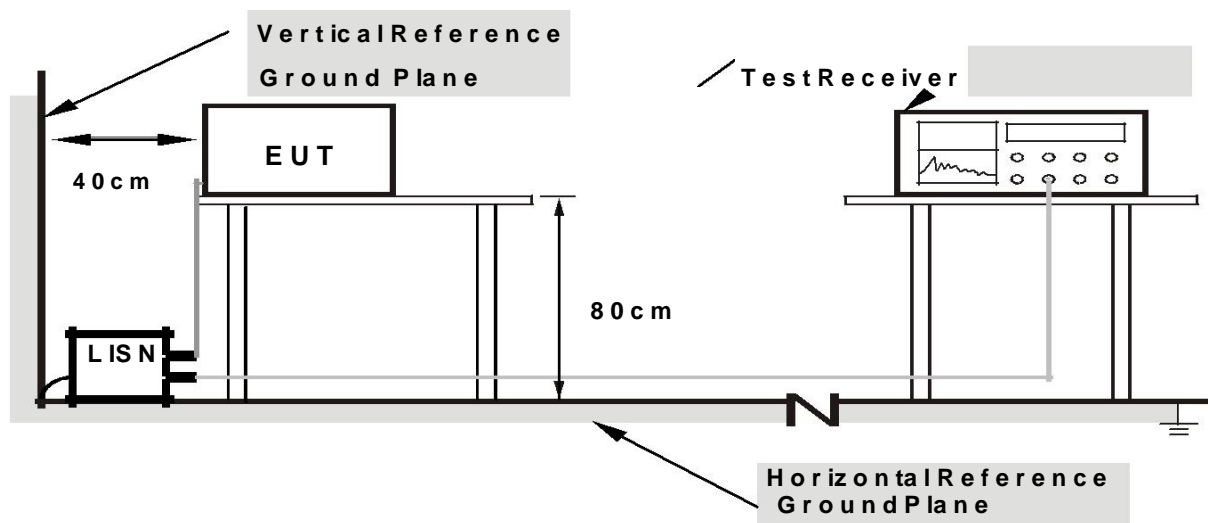
3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



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

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

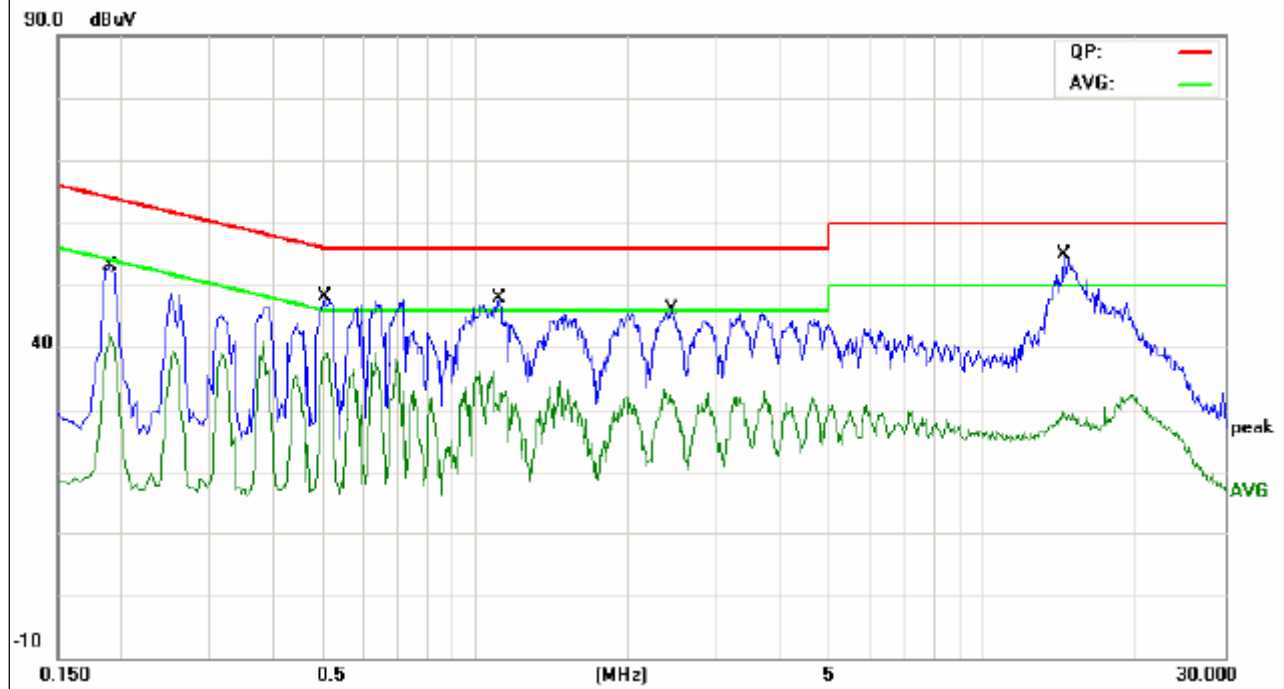
3.1.6 TEST RESULTS

| | | | |
|----------------|--------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010hPa | Phase : | L |
| Test Voltage : | AC 120V/60Hz | Test Mode: | Mode 4 |

| Frequency | Reading Level | Correct Factor | Measure-ment | Limits | Margin | Detector Type |
|-----------|---------------|----------------|--------------|--------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV) | (dBμV) | (dB) | |
| 0.1900 | 36.87 | 10.00 | 46.87 | 64.03 | -17.16 | QP |
| 0.1900 | 31.16 | 10.00 | 41.16 | 54.03 | -12.87 | AVG |
| 0.5060 | 34.63 | 10.02 | 44.65 | 56.00 | -11.35 | QP |
| 0.5060 | 28.61 | 10.02 | 38.63 | 46.00 | -7.37 | AVG |
| 1.1140 | 30.67 | 10.06 | 40.73 | 56.00 | -15.27 | QP |
| 1.1140 | 19.17 | 10.06 | 29.23 | 46.00 | -16.77 | AVG |
| 2.4380 | 28.88 | 10.05 | 38.93 | 56.00 | -17.07 | QP |
| 2.4380 | 20.14 | 10.05 | 30.19 | 46.00 | -15.81 | AVG |
| 14.4820 | 34.15 | 10.25 | 44.40 | 60.00 | -15.60 | QP |
| 14.4820 | 16.25 | 10.25 | 26.50 | 50.00 | -23.50 | AVG |

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



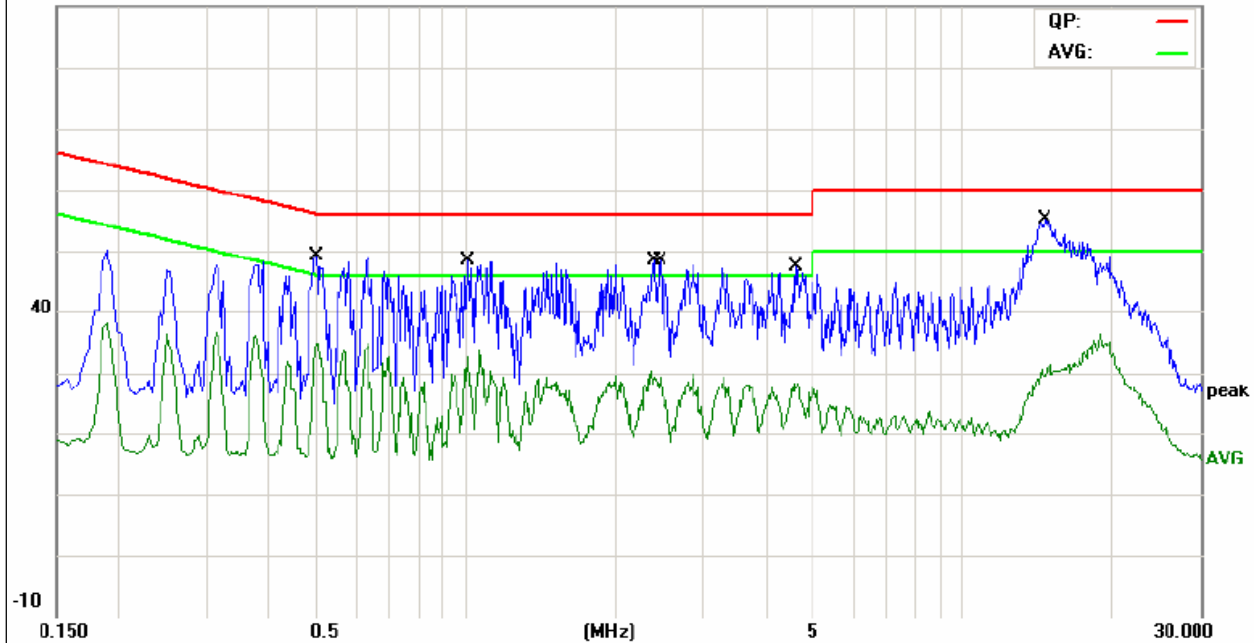
| | | | |
|----------------|--------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010hPa | Phase : | N |
| Test Voltage : | AC 120V/60Hz | Test Mode: | Mode 4 |

| Frequency (MHz) | Reading Level (dBμV) | Correct Factor (dB) | Measure-ment (dBμV) | Limits (dBμV) | Margin (dB) | Detector Type |
|--------------------|-------------------------|------------------------|------------------------|------------------|----------------|---------------|
| 0.5020 | 33.19 | 10.02 | 43.21 | 56.00 | -12.79 | QP |
| 0.5020 | 24.57 | 10.02 | 34.59 | 46.00 | -11.41 | AVG |
| 1.0100 | 30.88 | 10.06 | 40.94 | 56.00 | -15.06 | QP |
| 1.0100 | 20.01 | 10.06 | 30.07 | 46.00 | -15.93 | AVG |
| 2.3900 | 27.30 | 10.05 | 37.35 | 56.00 | -18.65 | QP |
| 2.3900 | 16.10 | 10.05 | 26.15 | 46.00 | -19.85 | AVG |
| 2.4539 | 27.03 | 10.04 | 37.07 | 56.00 | -18.93 | QP |
| 2.4539 | 15.21 | 10.04 | 25.25 | 46.00 | -20.75 | AVG |
| 4.6140 | 28.47 | 9.97 | 38.44 | 56.00 | -17.56 | QP |
| 4.6140 | 16.89 | 9.97 | 26.86 | 46.00 | -19.14 | AVG |

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

90.0 dBμV



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (FREQUENCY RANGE 9KHZ-1000MHZ)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed. (unintentional radiator)

| Frequencies (MHz) | Field Strength (micorvolts/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 |

The following table is the setting of the receiver

| Spectrum Parameter | Setting |
|---------------------------------------|--|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average |

| Receiver Parameter | Setting |
|------------------------|----------------------------------|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

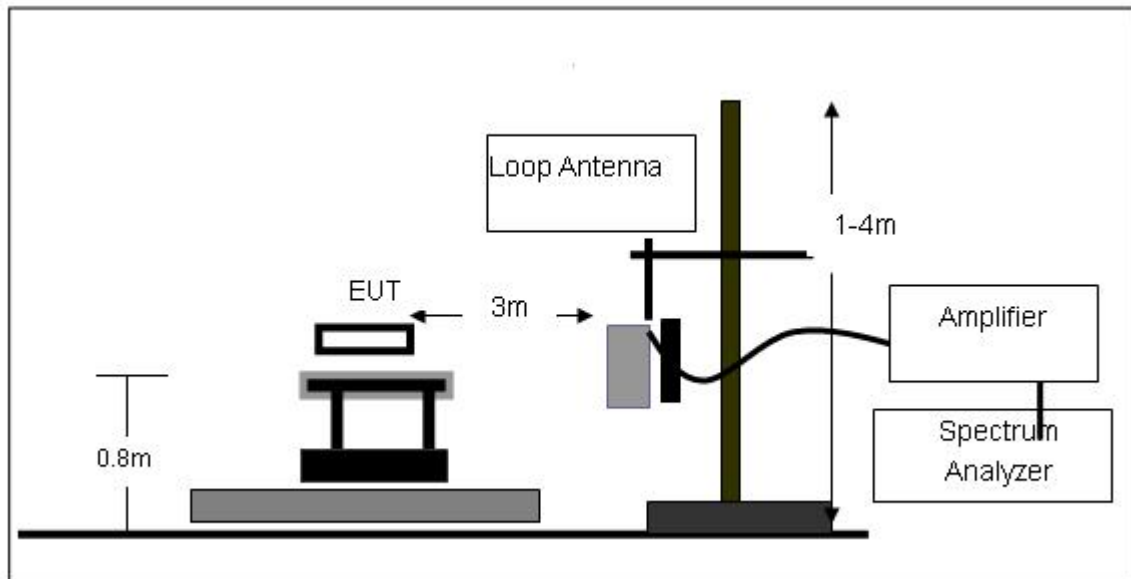
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

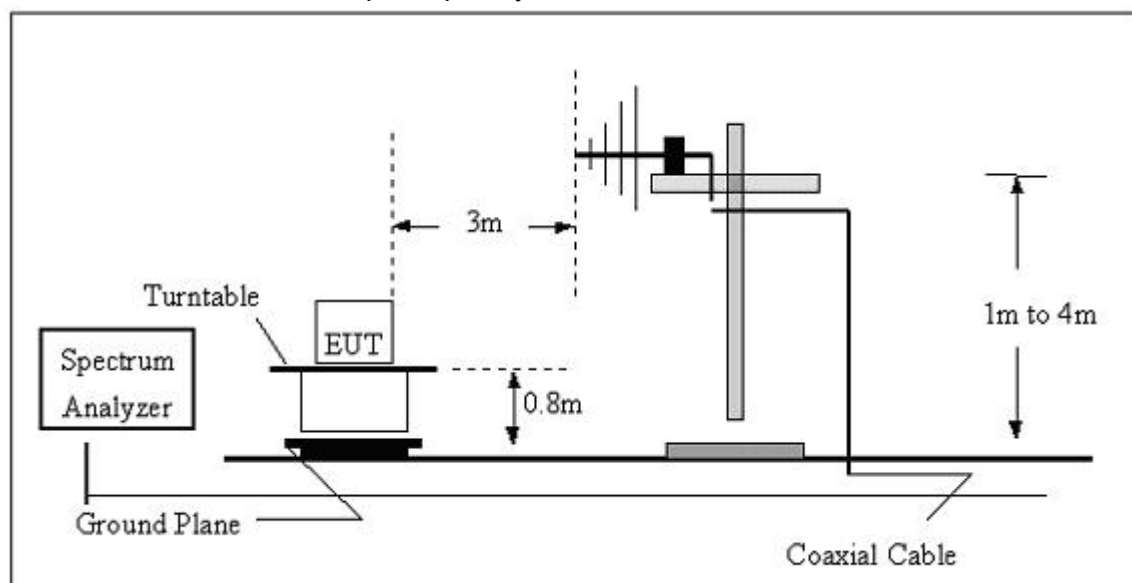
No deviation

3.2.4 TEST SETUP

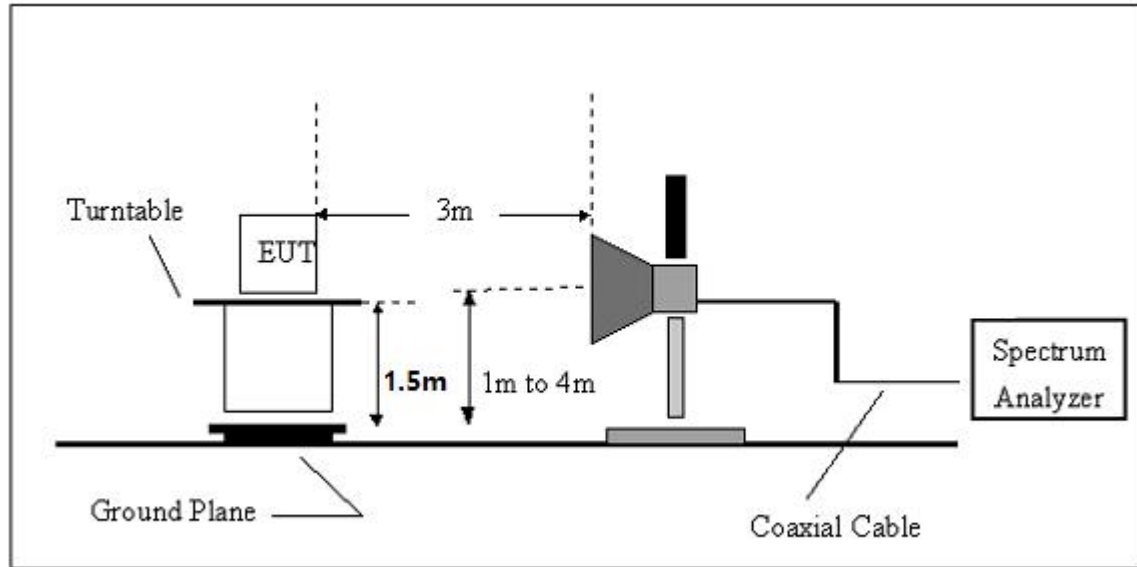
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BELOW 30 MHZ)

| | | | |
|----------------|--------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 20 °C | Relative Humidity: | 48% |
| Pressure: | 1010 hPa | Polarization : | --- |
| Test Voltage : | DC 3.7V by battery | | |
| Test Mode : | TX | | |

| Freq. (MHz) | Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | State P/F |
|----------------|---------------------|-------------------|----------------|--------------|
| -- | -- | -- | -- | PASS |
| -- | -- | -- | -- | PASS |

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (30MHZ-1GHZ)

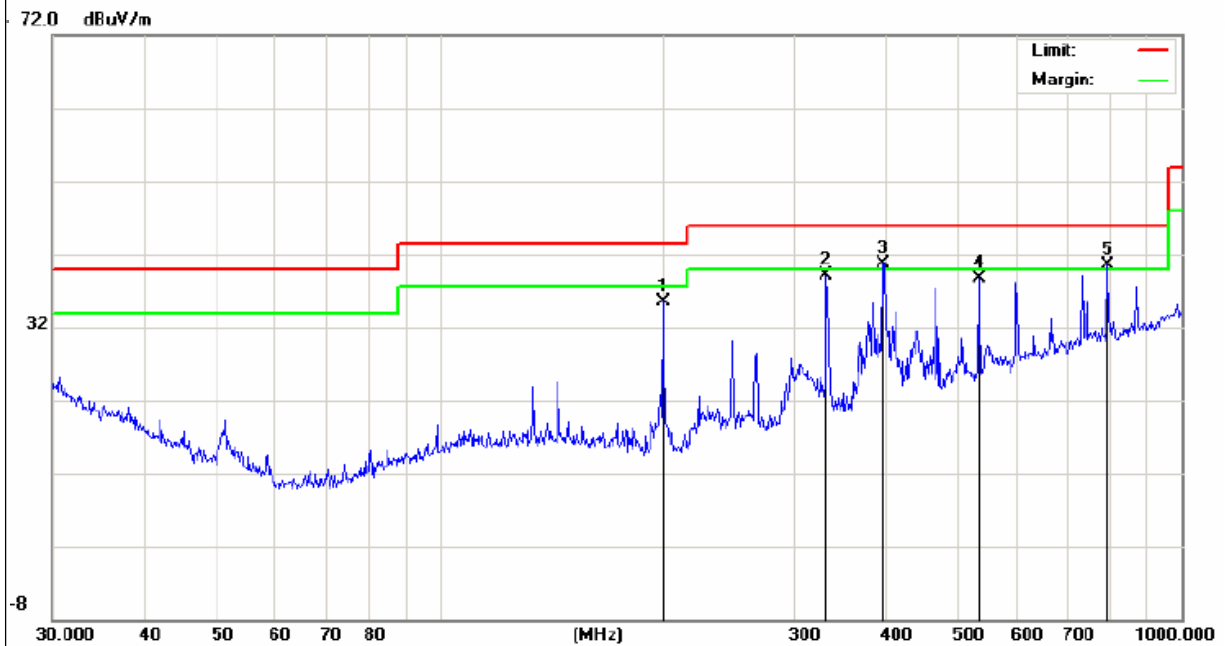
| | | | |
|----------------|--------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 20 °C | Relative Humidity: | 48% |
| Pressure: | 1010 hPa | Polarization : | Horizontal |
| Test Voltage : | DC 3.7V by battery | | |
| Test Mode : | TX | | |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 199.2855 | 26.88 | 8.71 | 35.59 | 43.5 | -7.91 | QP |
| 331.3546 | 24.23 | 14.97 | 39.2 | 46 | -6.8 | QP |
| 394.8543 | 23.77 | 17.03 | 40.8 | 46 | -5.2 | QP |
| 531.9633 | 18.85 | 19.76 | 38.61 | 46 | -7.39 | QP |
| 793.3958 | 16.51 | 23.91 | 40.42 | 46 | -5.58 | QP |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Factor added by measurement software automatically.



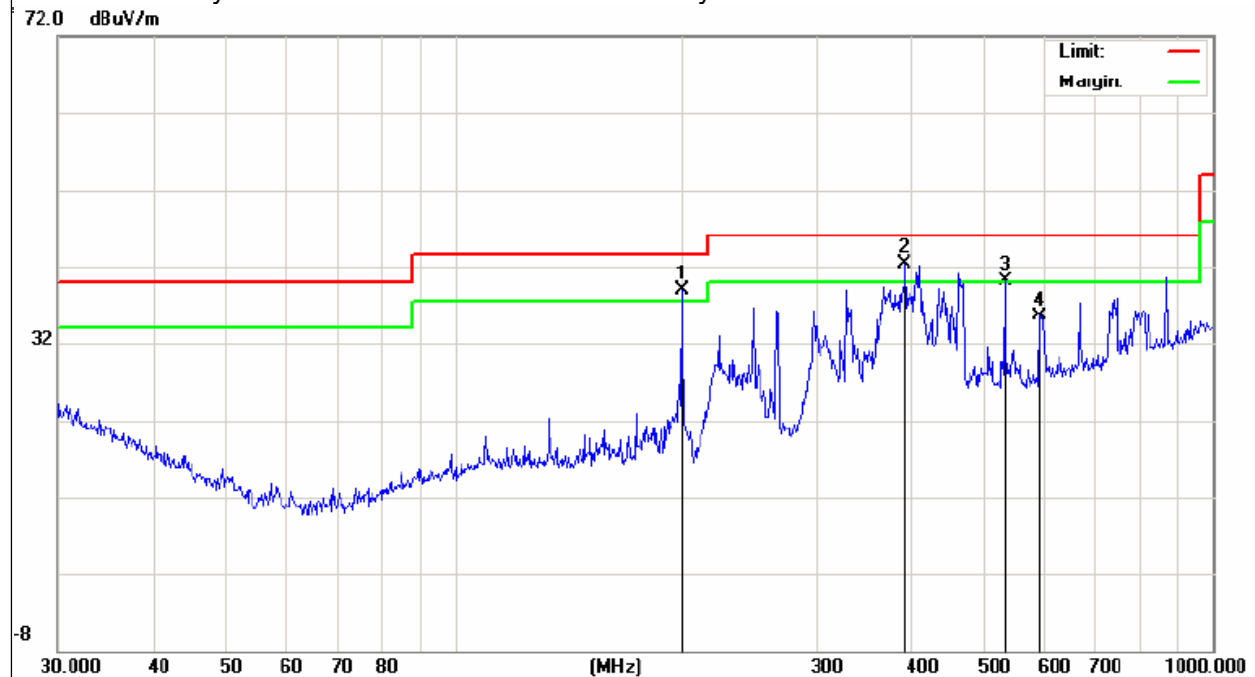
| | | | |
|----------------|--------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 20 °C | Relative Humidity: | 48% |
| Pressure: | 1010 hPa | Polarization : | Vertical |
| Test Voltage : | DC 3.7V by battery | | |
| Test Mode : | TX | | |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| | | | | | | |
| 199.2855 | 30.12 | 8.71 | 38.83 | 43.5 | -4.67 | QP |
| 392.0951 | 25.41 | 16.93 | 42.34 | 46 | -3.66 | QP |
| 531.9633 | 20.35 | 19.76 | 40.11 | 46 | -5.89 | QP |
| 590.9737 | 14.71 | 20.79 | 35.5 | 46 | -10.5 | QP |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Factor added by measurement software automatically.



3.2.8 TEST RESULTS (1G-25GHZ)

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type | Comment |
|-------------------------|-------------------------|----------------|----------------------------|--------------------|----------------|------------------|------------|
| Low Channel (2402 MHz) | | | | | | | |
| 4804.20 | 67.34 | -3.62 | 63.72 | 74 | -10.28 | PK | Vertical |
| 4804.22 | 47.30 | -3.62 | 43.68 | 54 | -10.32 | AV | Vertical |
| 7206.13 | 62.88 | -0.9 | 61.98 | 74 | -12.02 | PK | Vertical |
| 7206.12 | 42.23 | -0.9 | 41.33 | 54 | -12.67 | AV | Vertical |
| 4804.00 | 62.76 | -3.65 | 59.11 | 74 | -14.89 | PK | Horizontal |
| 4803.99 | 45.39 | -3.65 | 41.74 | 54 | -12.26 | AV | Horizontal |
| Mid Channel (2441 MHz) | | | | | | | |
| 4882.09 | 65.57 | -3.65 | 61.92 | 74 | -12.08 | PK | Vertical |
| 4882.07 | 50.22 | -3.65 | 46.57 | 54 | -7.43 | AV | Vertical |
| 7323.21 | 61.47 | -0.84 | 60.63 | 74 | -13.37 | PK | Vertical |
| 7323.21 | 45.09 | -0.84 | 44.25 | 54 | -9.75 | AV | Vertical |
| 4882.18 | 62.14 | -3.68 | 58.46 | 74 | -15.54 | PK | Horizontal |
| 4882.14 | 45.75 | -3.68 | 42.07 | 54 | -11.93 | AV | Horizontal |
| High Channel (2480 MHz) | | | | | | | |
| 4960.25 | 61.80 | -3.59 | 58.21 | 74 | -15.79 | PK | Vertical |
| 4960.30 | 46.37 | -3.59 | 42.78 | 54 | -11.22 | AV | Vertical |
| 7440.33 | 61.79 | -0.83 | 60.96 | 74 | -13.04 | PK | Vertical |
| 7440.30 | 46.18 | -0.83 | 45.35 | 54 | -8.65 | AV | Vertical |
| 4960.32 | 61.77 | -3.59 | 58.18 | 74 | -15.82 | PK | Horizontal |
| 4960.31 | 46.14 | -3.59 | 42.55 | 54 | -11.45 | AV | Horizontal |

Note: 1) Scan with GFSK, $\pi/4$ -DQPSK, 8DPSK, the worst case is GFSK

Mode 2) Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Meter Reading + Factor

Margin = Limit - Emission Level

Radiated band edge :

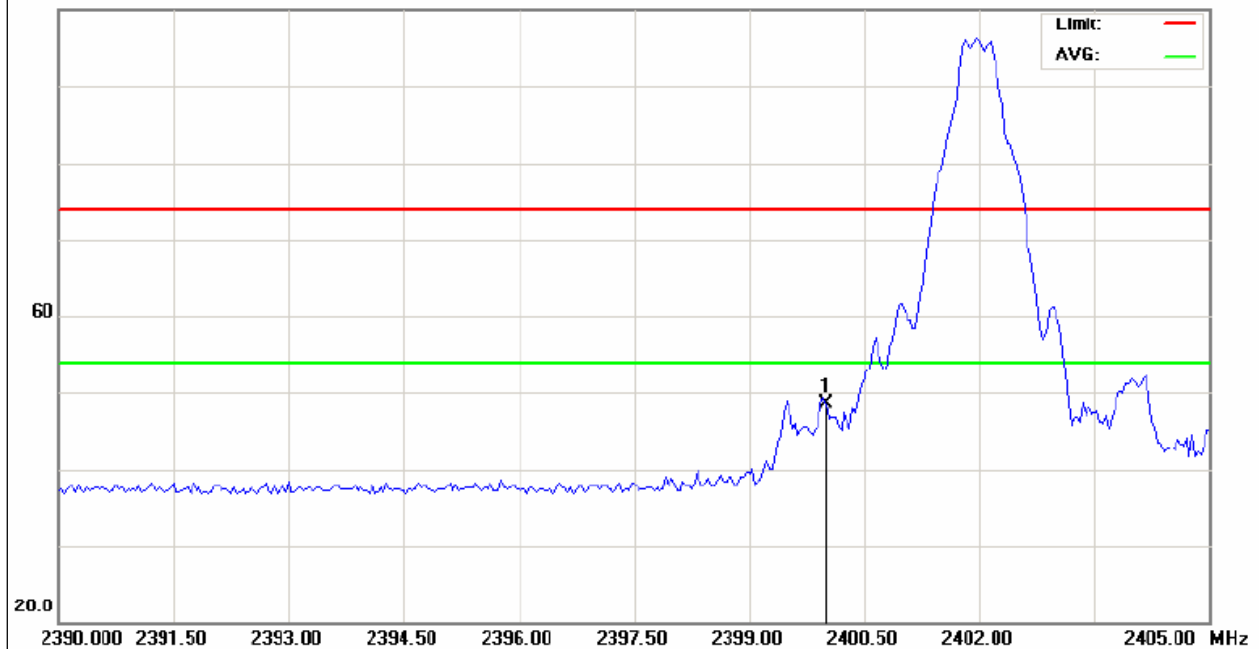
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | 120V/60Hz |
| Test Mode : | TX /2402MHz-1Mbps | Polarization : | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 2400 | 61.57 | -12.99 | 48.58 | 74 | -25.42 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m

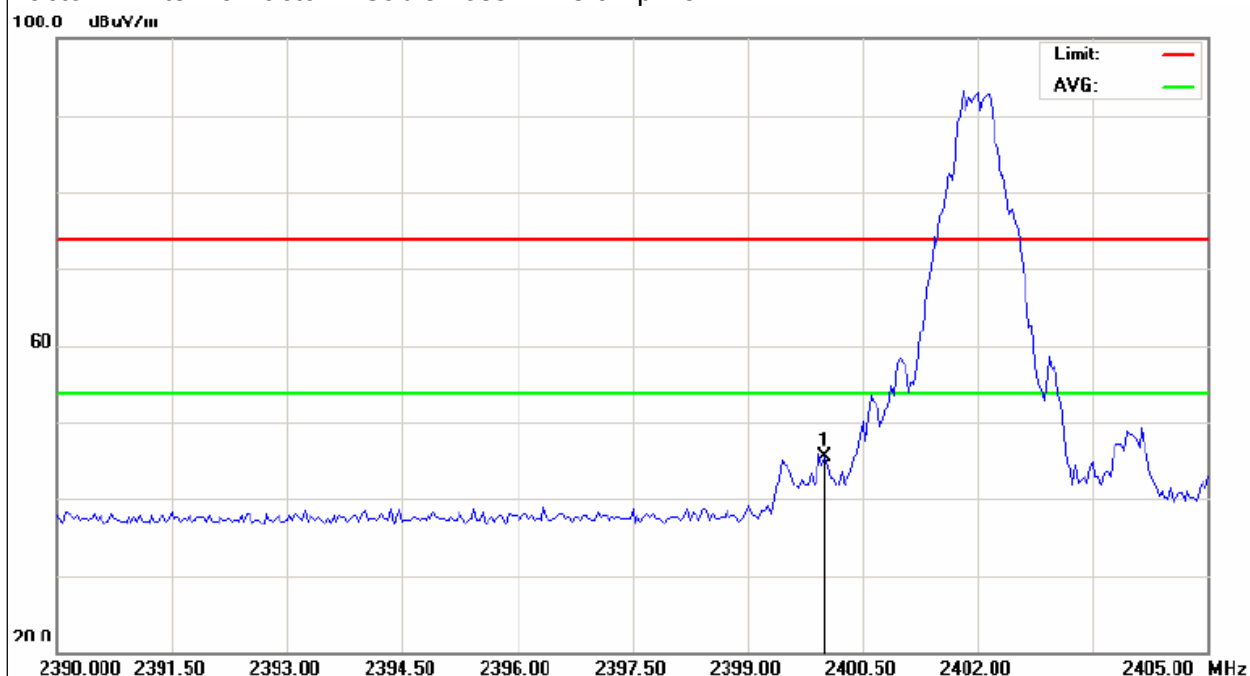


| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2402MHz-1Mbps | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2400 | 58.5 | -12.99 | 45.51 | 74 | -28.49 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



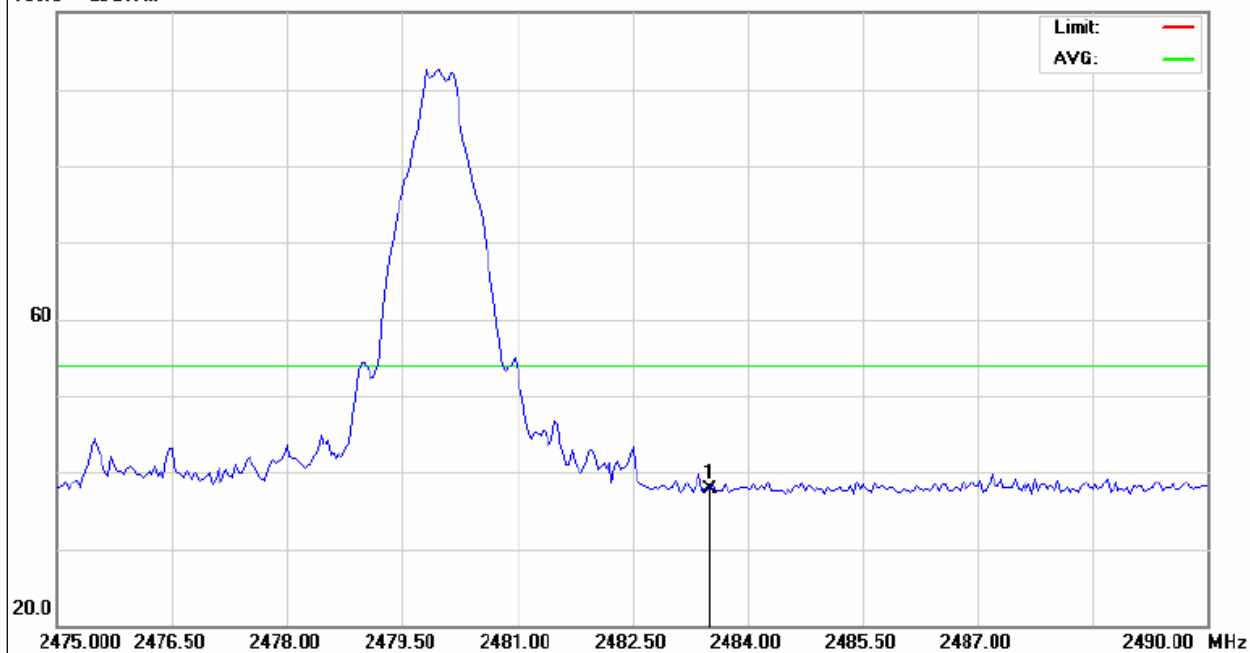
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2480MHz-1Mbps | Polarization : | Vertical |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 2483.5 | 50.58 | -12.78 | 37.8 | 74 | -36.2 | |
| | | | | | | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m



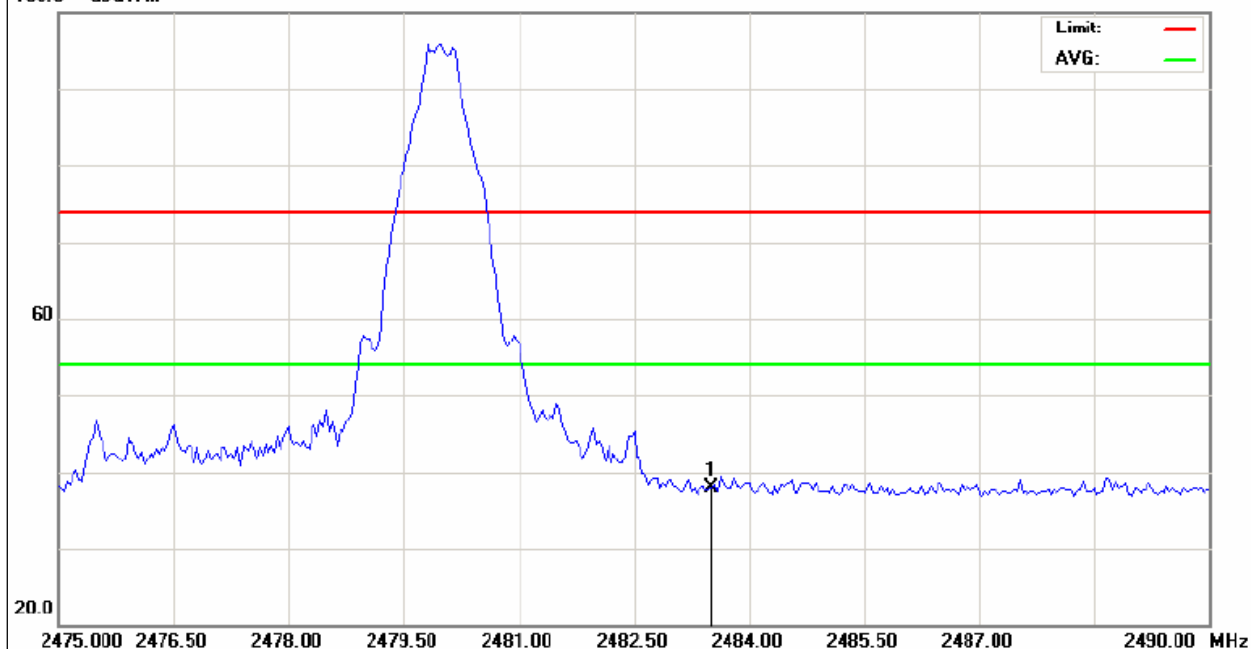
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2480MHz-1Mbps | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 50.86 | -12.78 | 38.08 | 74 | -35.92 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m



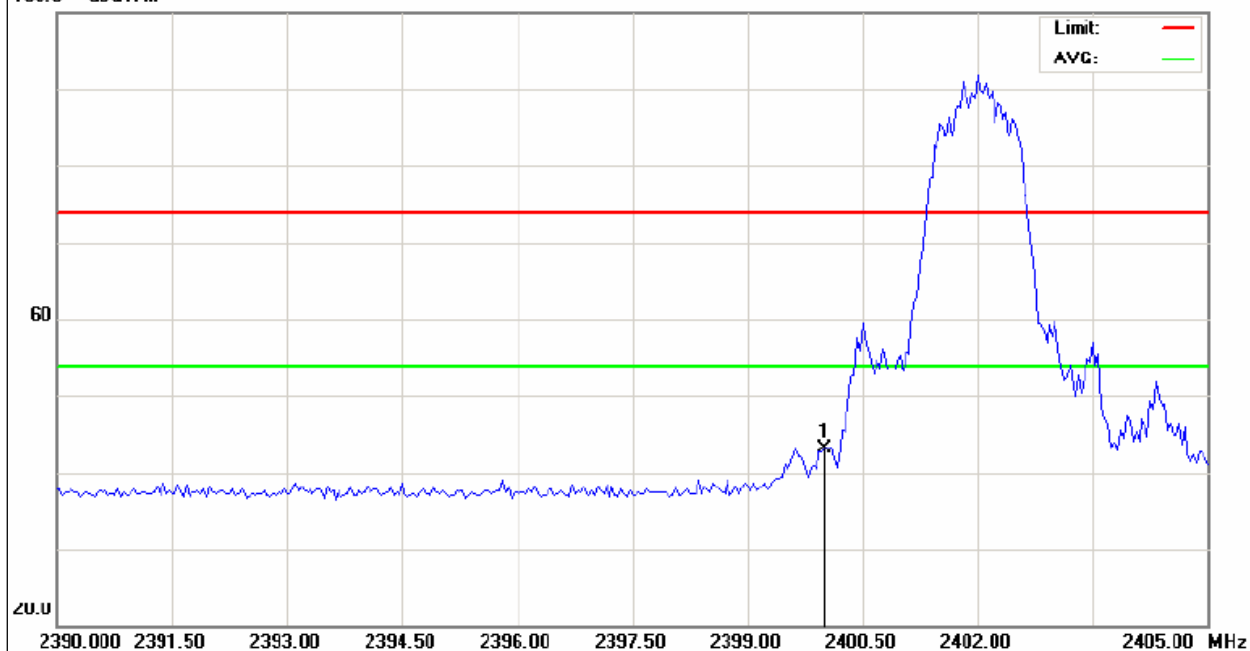
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2402MHz-2Mbps | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2400 | 56.14 | -12.99 | 43.15 | 74 | -30.85 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m

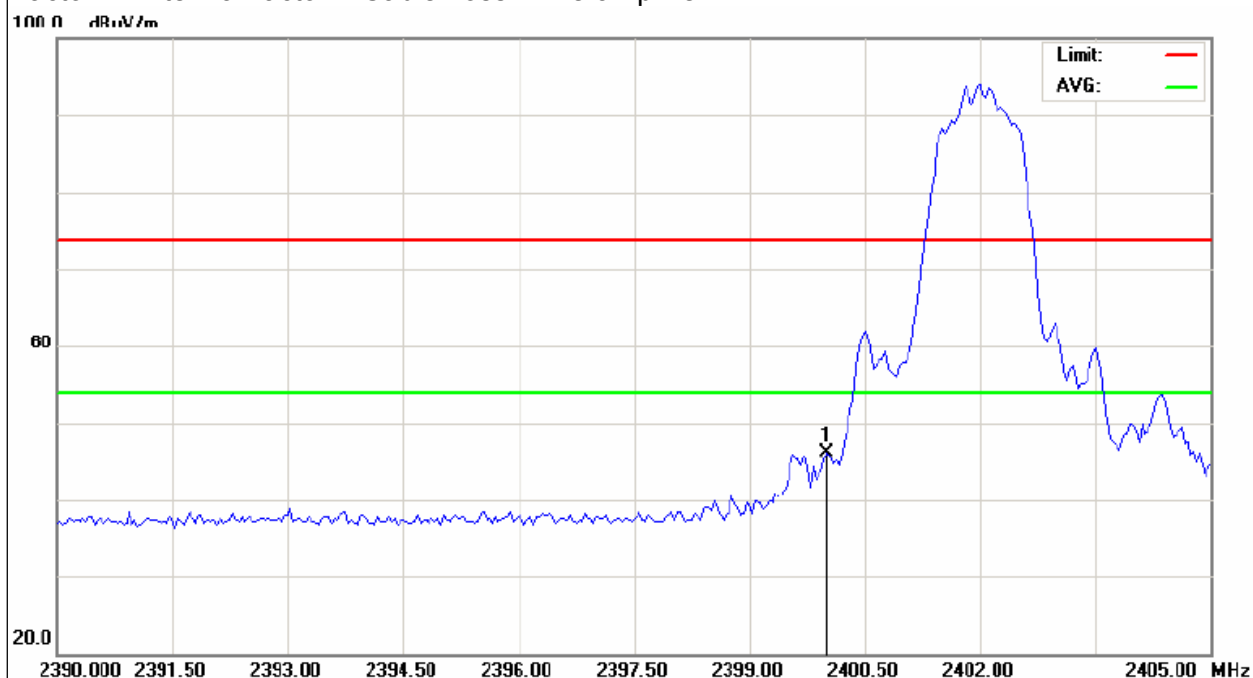


| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2402MHz-2Mbps | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2400 | 59.26 | -12.99 | 46.27 | 74 | -27.73 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



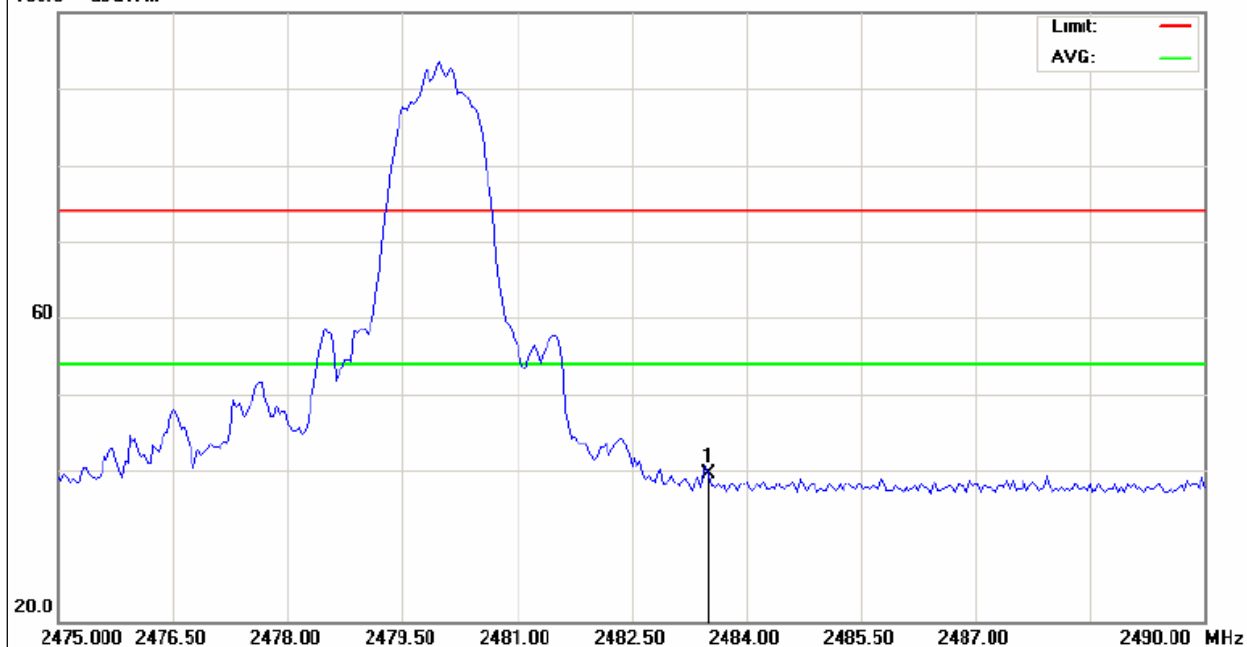
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2480MHz-2Mbps | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 52.2 | -12.78 | 39.42 | 74 | -34.58 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m



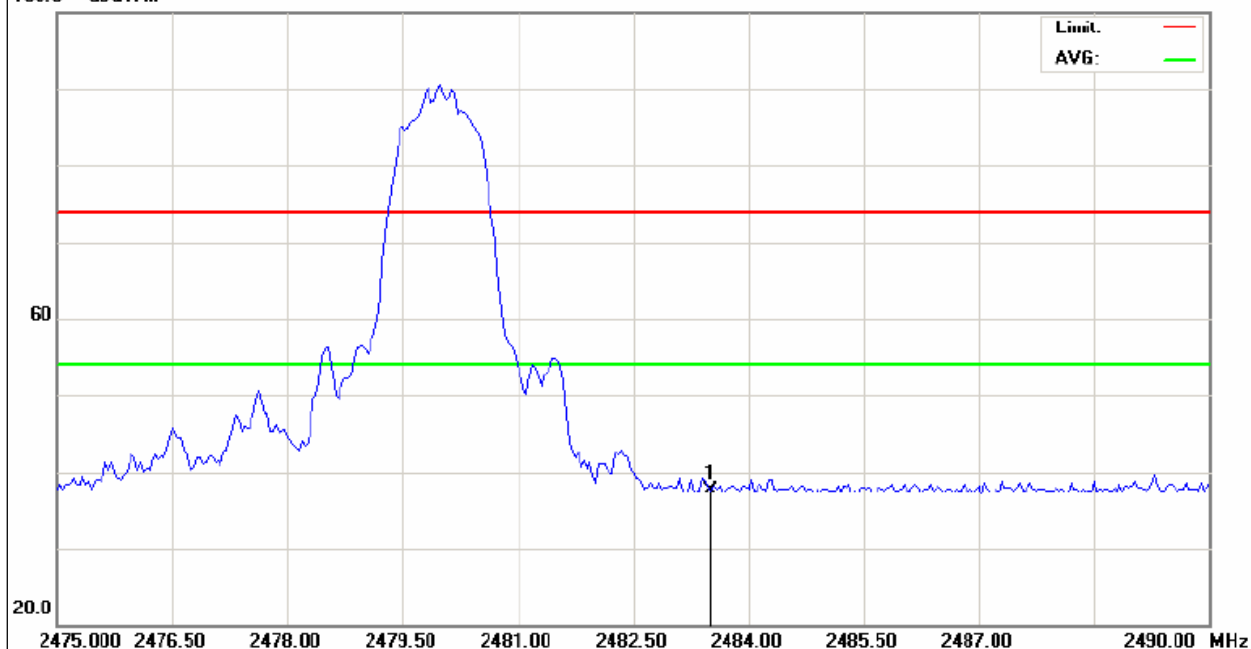
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2480MHz-2Mbps | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 50.58 | -12.78 | 37.8 | 74 | -36.2 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m



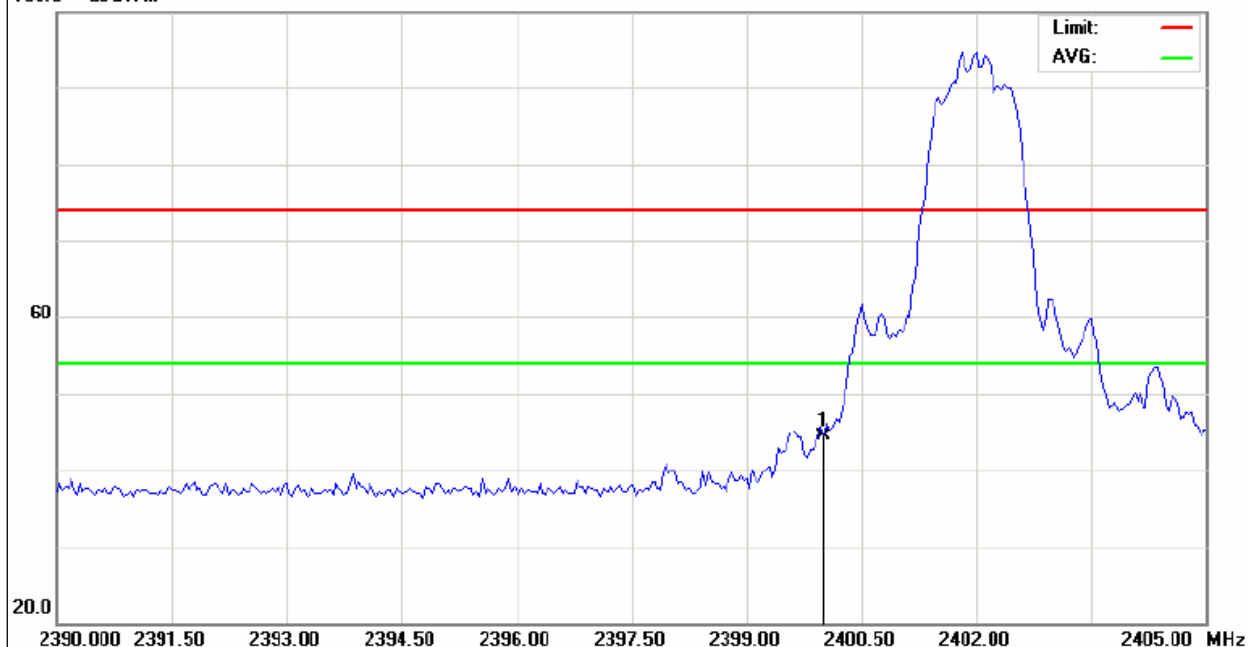
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2402MHz-3Mbps | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2400 | 57.51 | -12.99 | 44.52 | 74 | -29.48 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m



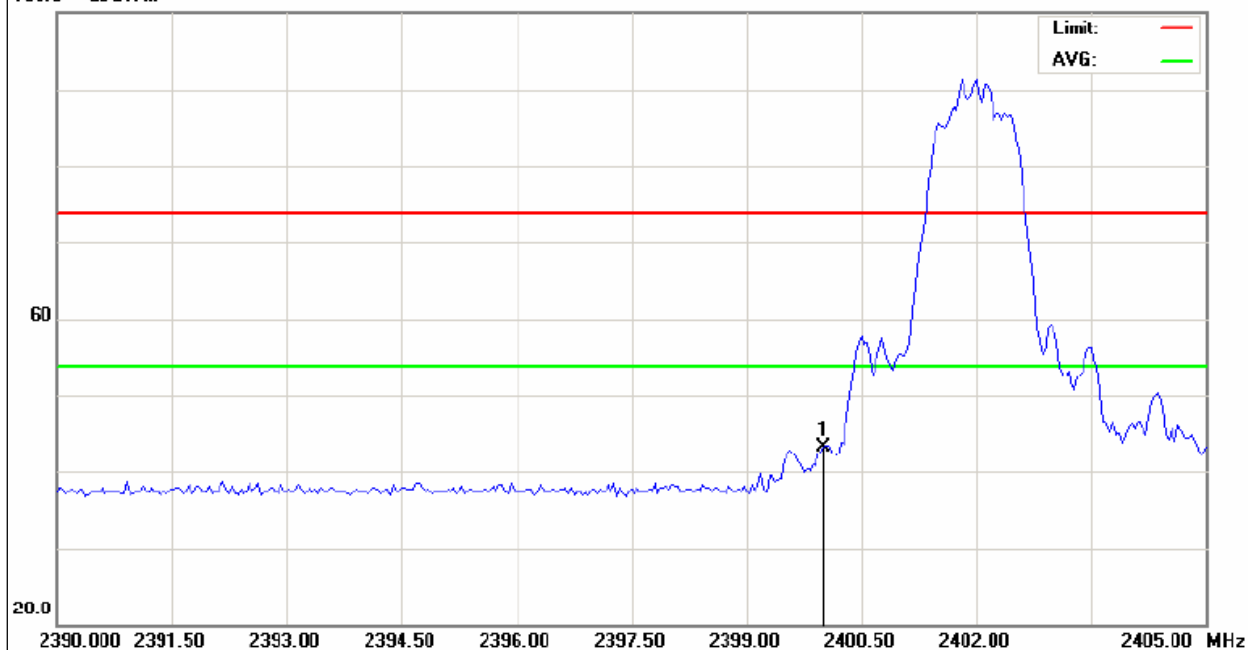
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2402MHz-3Mbps | Polarization : | Horizontal |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2400 | 56.27 | -12.99 | 43.28 | 74 | -30.72 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m



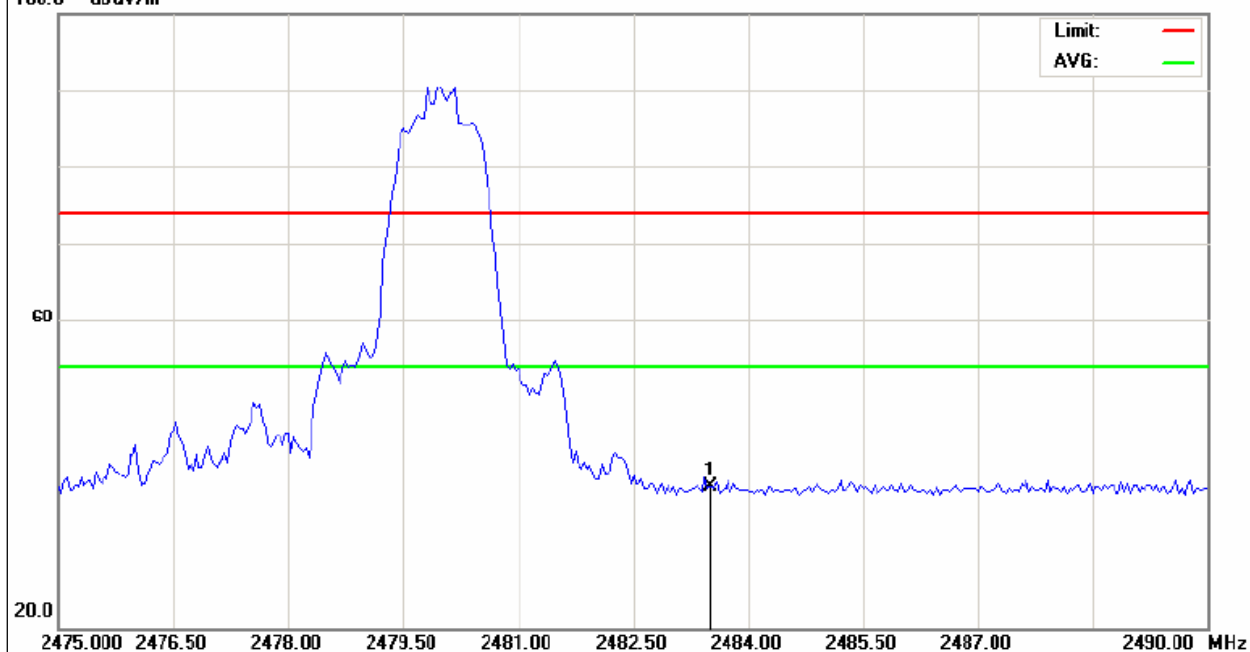
| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2480MHz-3Mbps | Polarization : | Vertical |

| Frequency | Meter Reading | Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|--------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2483.5 | 51.18 | -12.78 | 38.4 | 74 | -35.6 | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

100.0 dBμV/m

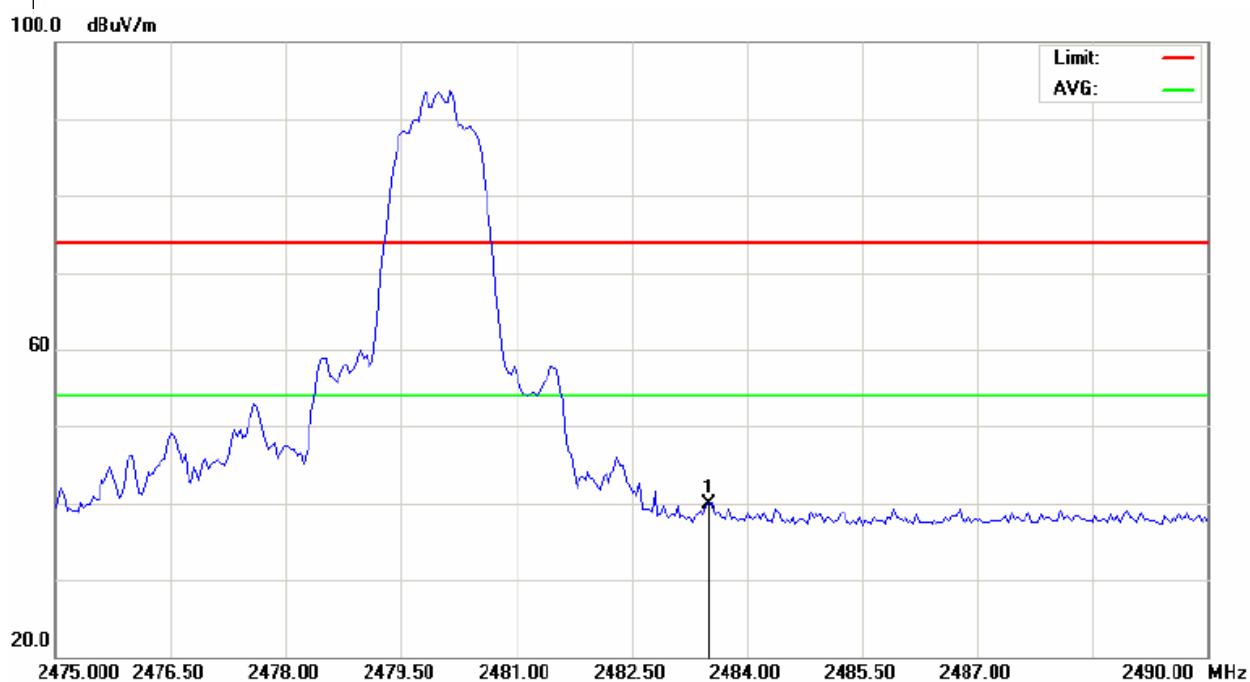


| | | | |
|--------------|-------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 26 °C | Relative Humidity: | 54% |
| Pressure: | 1010 hPa | Test Voltage : | AC 120V/60Hz |
| Test Mode : | TX /2480MHz-3Mbps | Polarization : | Horizontal |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|---------------|
| 2483.5 | 52.71 | -12.78 | 39.93 | 74 | -34.07 | |
| | | | | | | peak |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



NOTE:

- 1.The result (PK) less than AV limite,No need shown AV result.
- 2.Hopping enabled and disabled have evaluated,and the worst data was reported

4. NUMBER OF HOPPING CHANNEL

4.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|---------------------------|-----------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 (a)(1)(iii) | Number of Hopping Channel | ≥ 15 | 2400-2483.5 | PASS |

| Spectrum Parameters | Setting |
|---------------------|-----------------------------------|
| Attenuation | Auto |
| Span Frequency | = the frequency band of operation |
| RB | $RBW \geq 1\%$ of the span |
| VB | $VBW \geq RBW$ |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : $RBW = 1\text{MHz}$, $VBW = 1\text{MHz}$, Sweep time = Auto.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



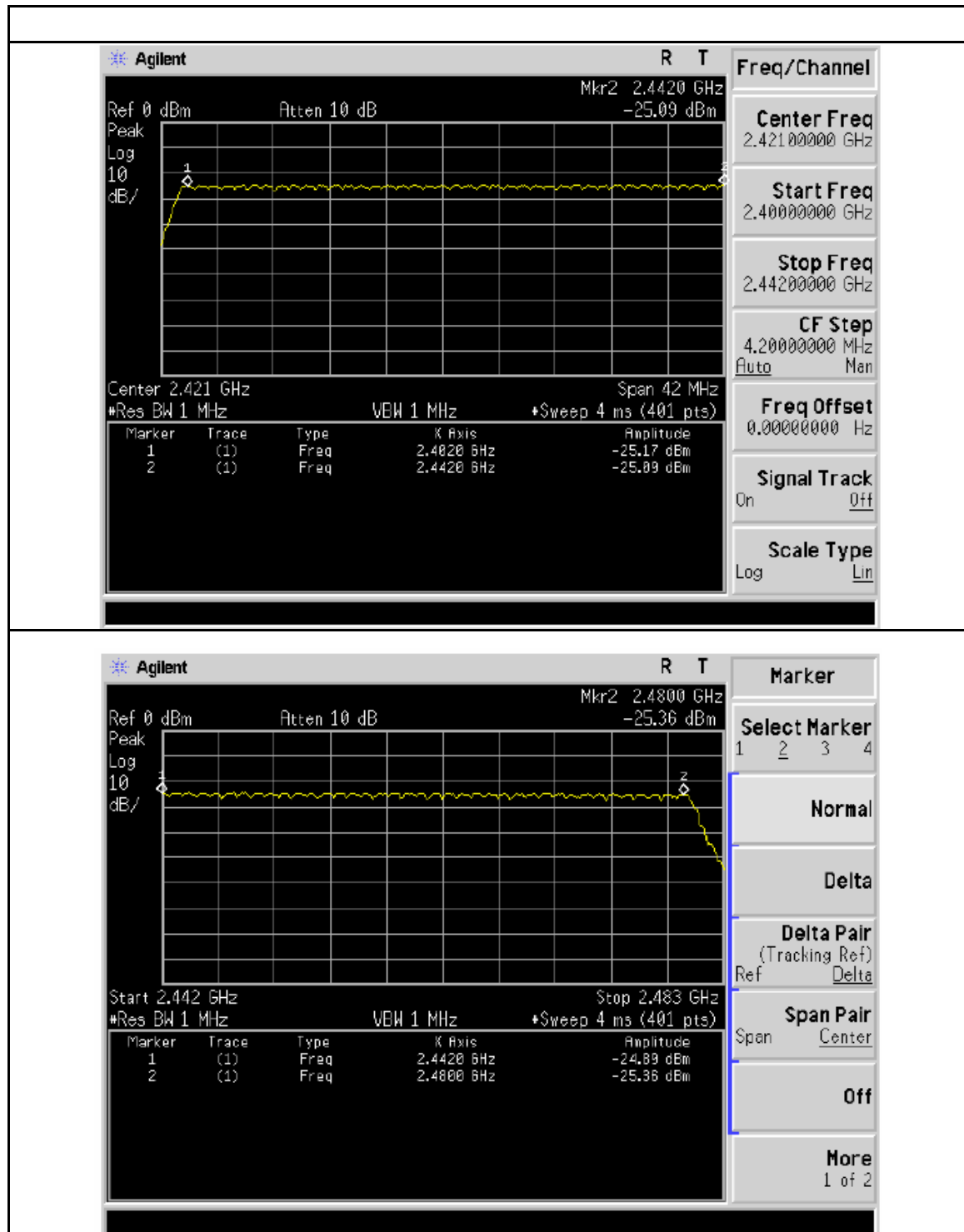
4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

| | | | |
|--------------|--------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1015 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | Hopping Mode | | |

| | |
|---------------------------|----|
| Number of Hopping Channel | 79 |
|---------------------------|----|



5. AVERAGE TIME OF OCCUPANCY

5.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|---------------------------|--------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 (a)(1)(iii) | Average Time of Occupancy | 0.4sec | 2400-2483.5 | PASS |

5.1.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- Set the EUT for DH5, DH3 and DH1 packet transmitting.
- Measure the maximum time duration of one single pulse.
- A Period Time = (channel number)*0.4
DH1 Time Slot: Reading * (1600/2)*31.6/(channel number)
DH3 Time Slot: Reading * (1600/4)*31.6/(channel number)
DH5 Time Slot: Reading * (1600/6)*31.6/(channel number)

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



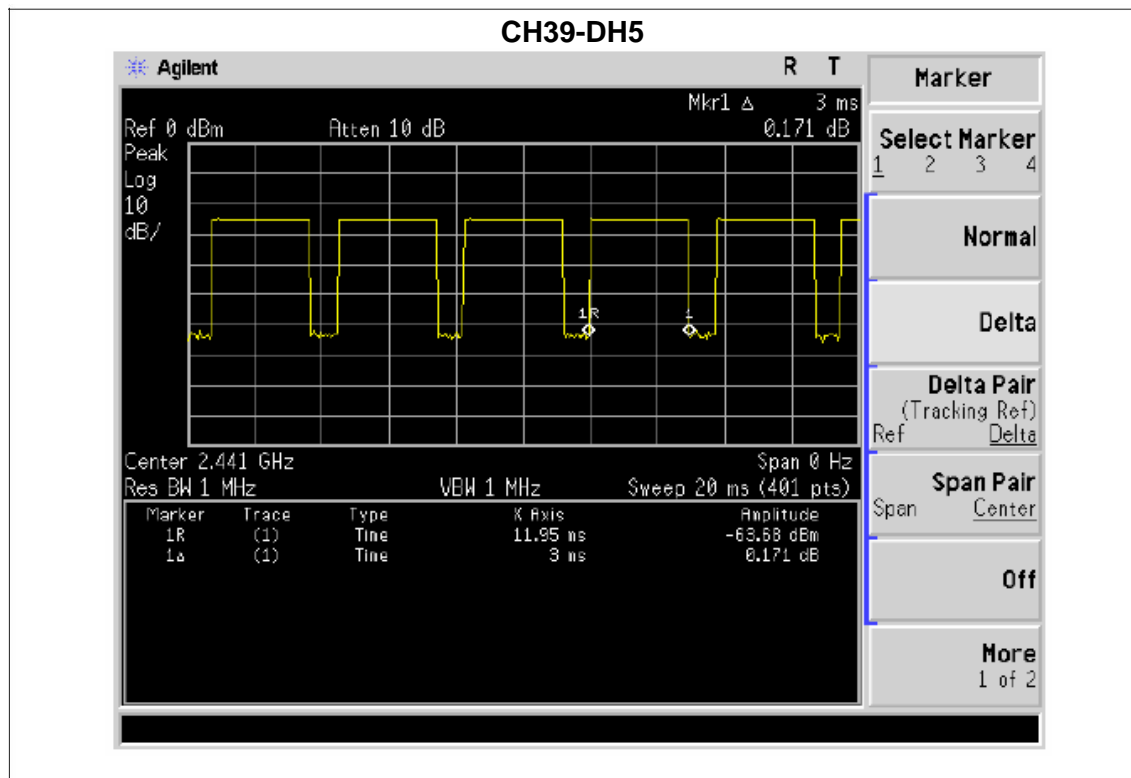
5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

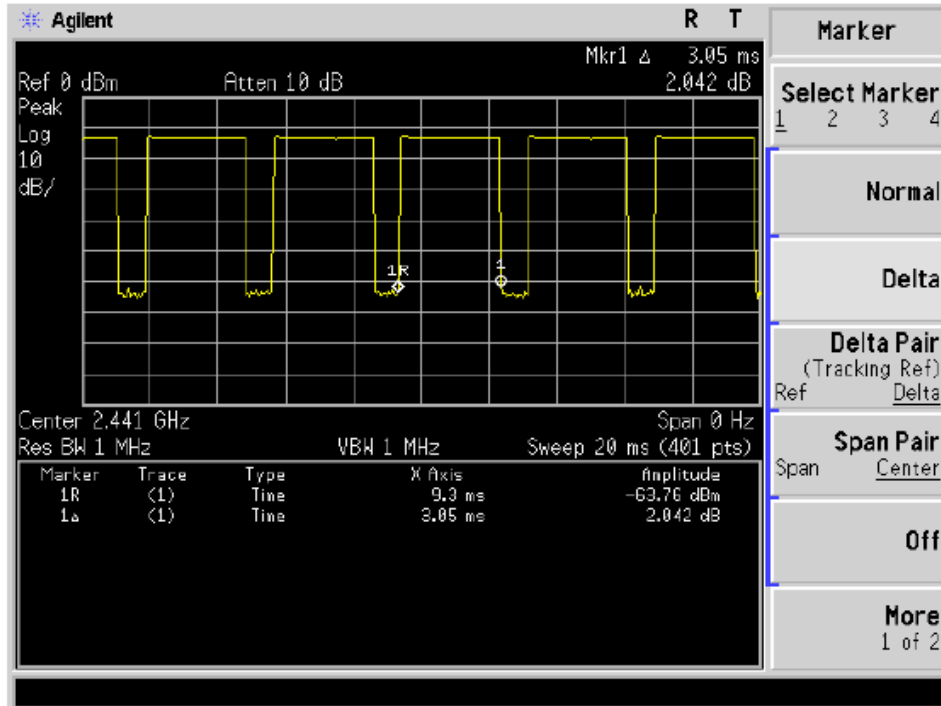
5.1.5 TEST RESULTS

| | | | |
|--------------|---------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH39-DH5 ,2DH5,3DH5 | | |

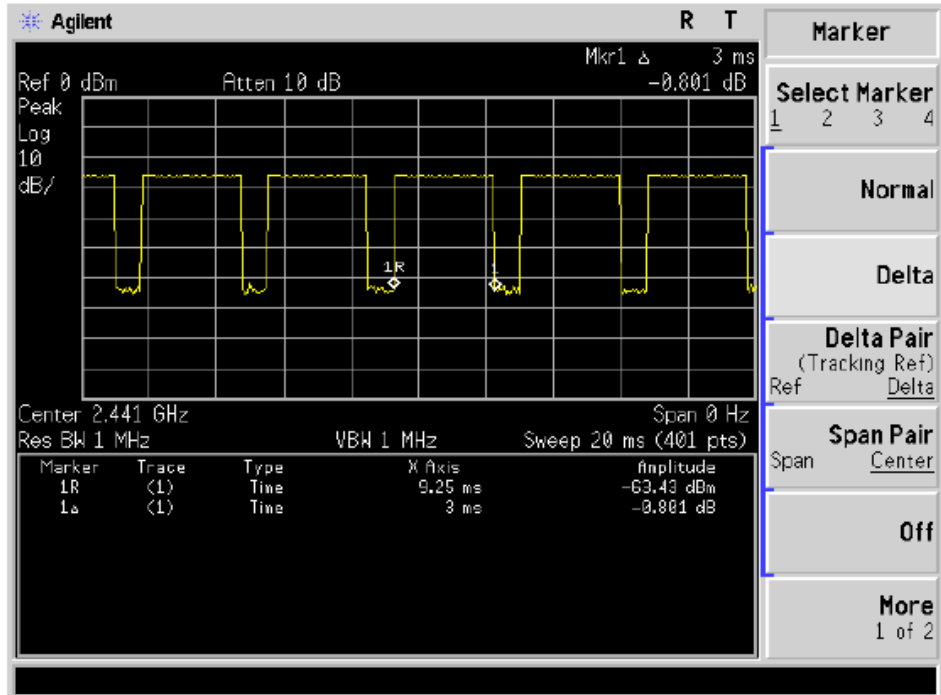
| Data Packet | Frequency | Pulse Duration (ms) | Dwell Time (s) | Limits (s) |
|-------------|-----------|---------------------|----------------|------------|
| DH5 | 2441 MHz | 3.00 | 0.32 | 0.4 |
| 2DH5 | 2441 MHz | 3.05 | 0.33 | 0.4 |
| 3DH5 | 2441 MHz | 3.00 | 0.32 | 0.4 |



CH39-2DH5

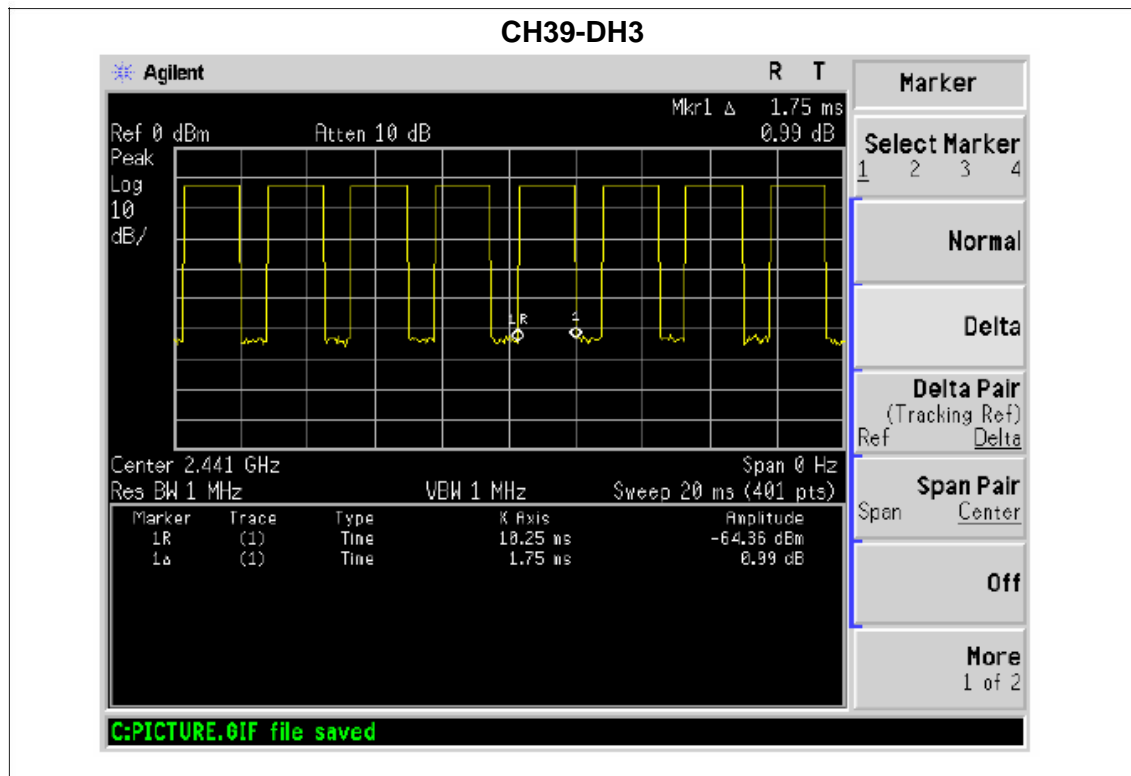


CH39-3DH5

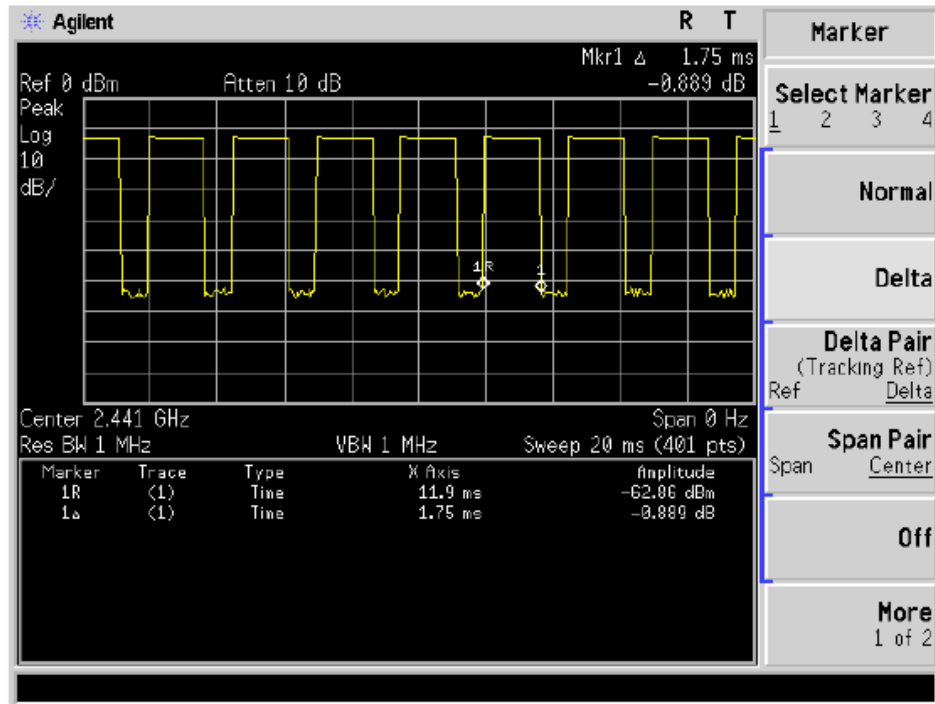


| | | | |
|--------------|--------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH39-DH3,2DH3,3DH3 | | |

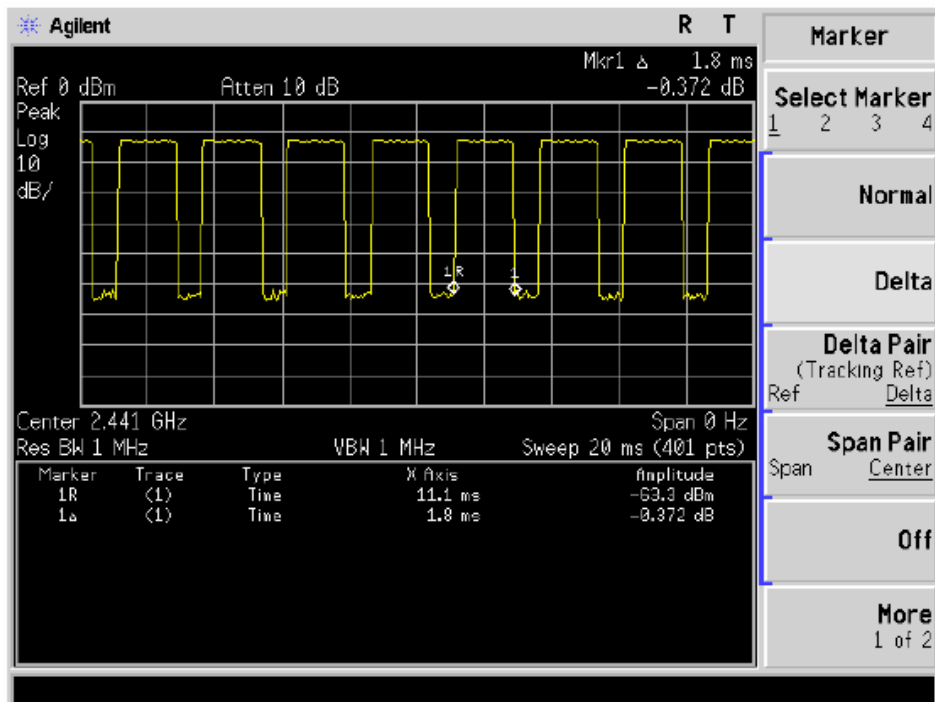
| Data Packet | Frequency | Pulse Duration (ms) | Dwell Time (s) | Limits (s) |
|-------------|-----------|---------------------|----------------|------------|
| DH3 | 2441 MHz | 1.75 | 0.28 | 0.4 |
| 2DH3 | 2441 MHz | 1.75 | 0.28 | 0.4 |
| 3DH3 | 2441 MHz | 1.80 | 0.29 | 0.4 |



CH39-2DH3

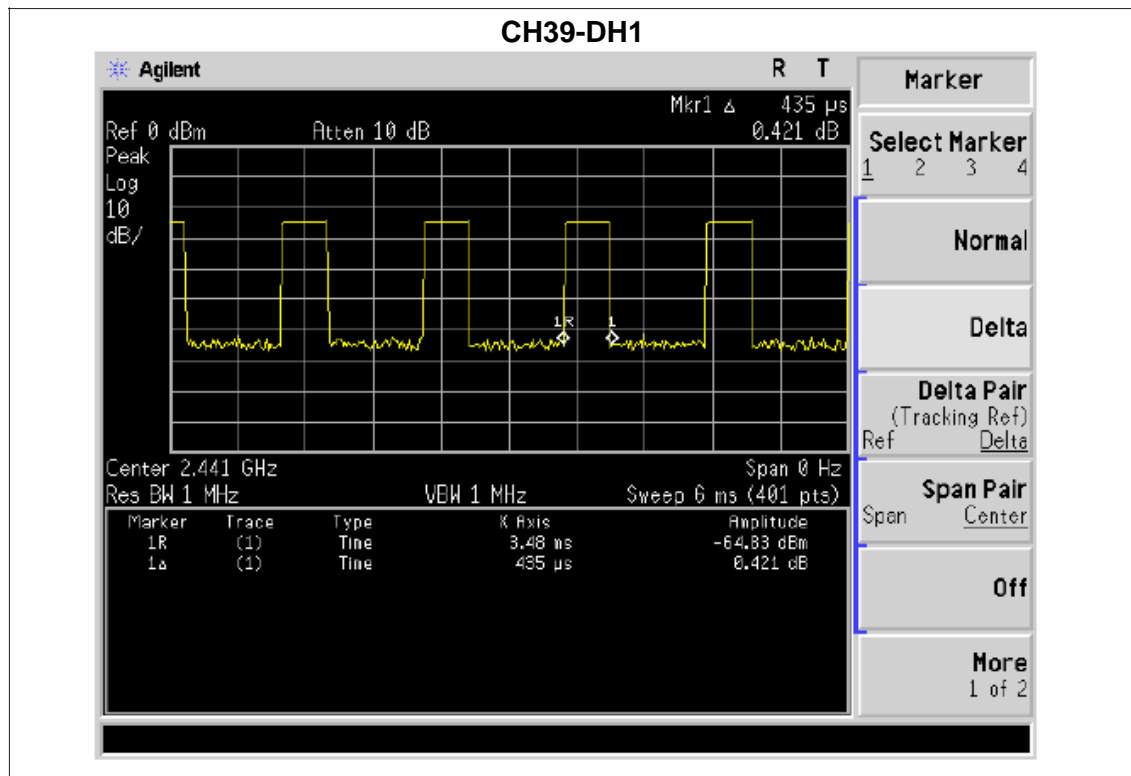


CH39-3DH3

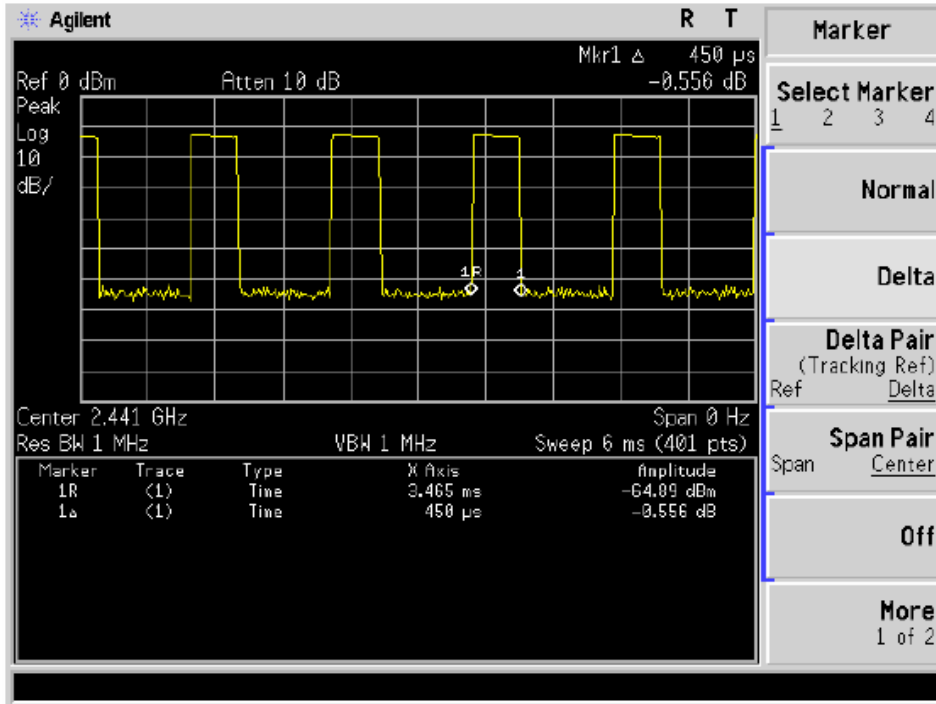


| | | | |
|--------------|--------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH39-DH1,2DH1,3DH1 | | |

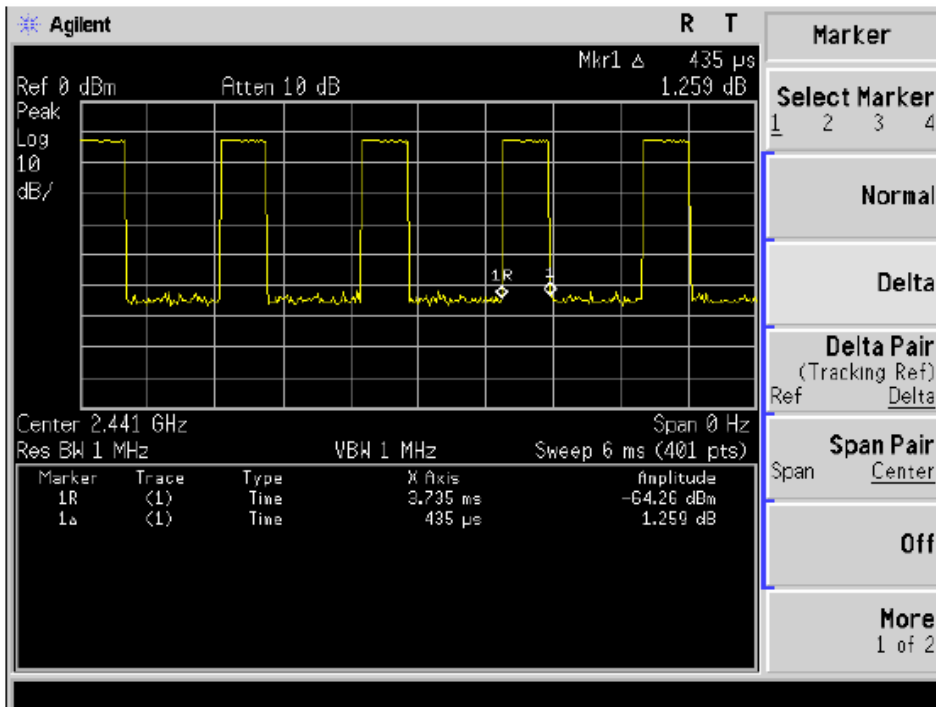
| Data Packet | Frequency | Pulse Duration (ms) | Dwell Time (s) | Limits (s) |
|-------------|-----------|---------------------|----------------|------------|
| DH1 | 2441 MHz | 0.435 | 0.14 | 0.4 |
| 2DH1 | 2441 MHz | 0.450 | 0.14 | 0.4 |
| 3DH1 | 2441 MHz | 0.435 | 0.14 | 0.4 |



CH39-2DH1



CH39-3DH1



6. HOPPING CHANNEL SEPARATION MEASUREMENT

6.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

| Spectrum Parameter | Setting |
|--------------------|---|
| Attenuation | Auto |
| Span Frequency | > Measurement Bandwidth or Channel Separation |
| RB | 100 kHz (Channel Separation) |
| VB | 300 kHz (Channel Separation) |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

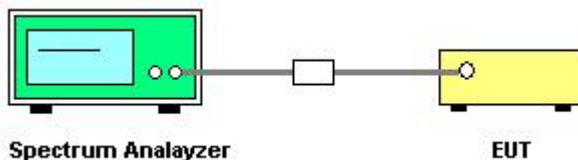
6.1.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

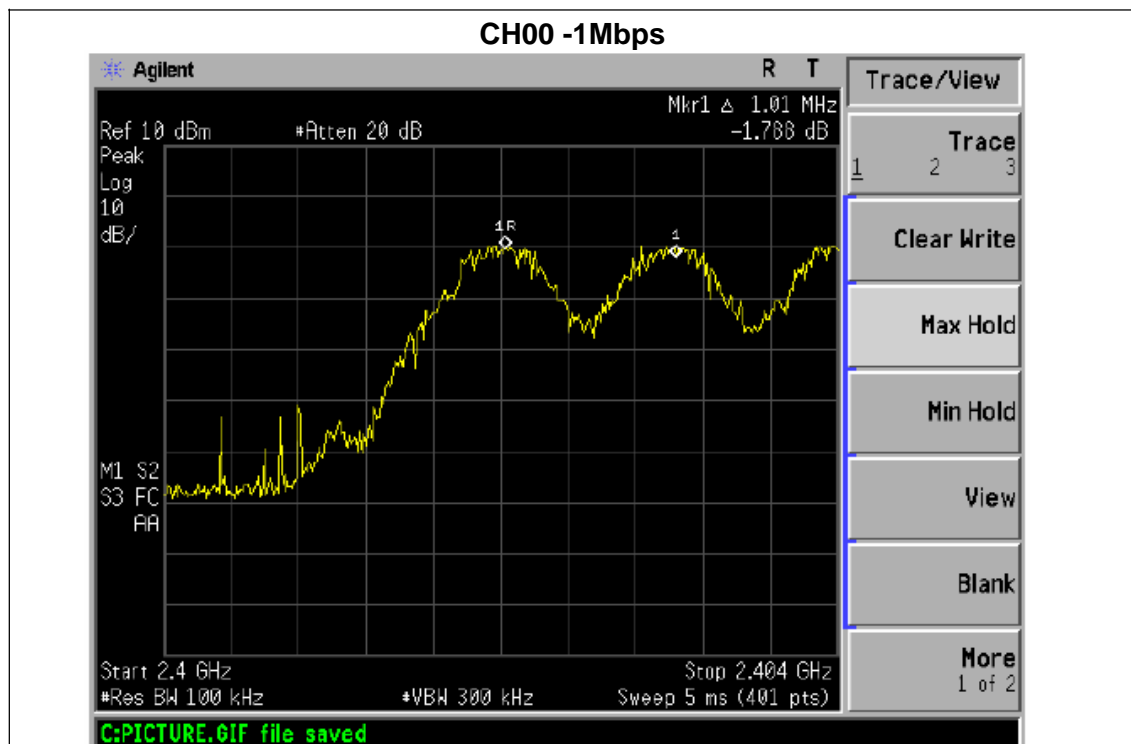
The EUT was programmed to be in continuously transmitting mode.

6.1.5 TEST RESULTS

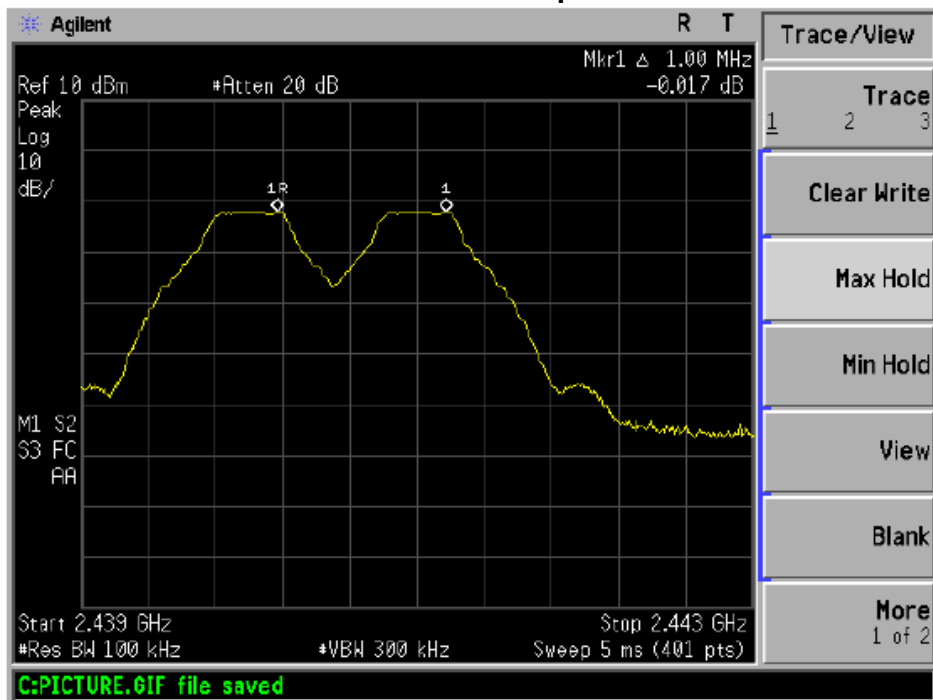
| | | | |
|--------------|--------------------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH00 / CH39 /CH78 (1Mbps Mode) | | |

| Frequency | Ch. Separation (MHz) | Result |
|-----------|----------------------|----------|
| 2402 MHz | 1.01 | Complies |
| 2441 MHz | 1.00 | Complies |
| 2480 MHz | 1.00 | Complies |

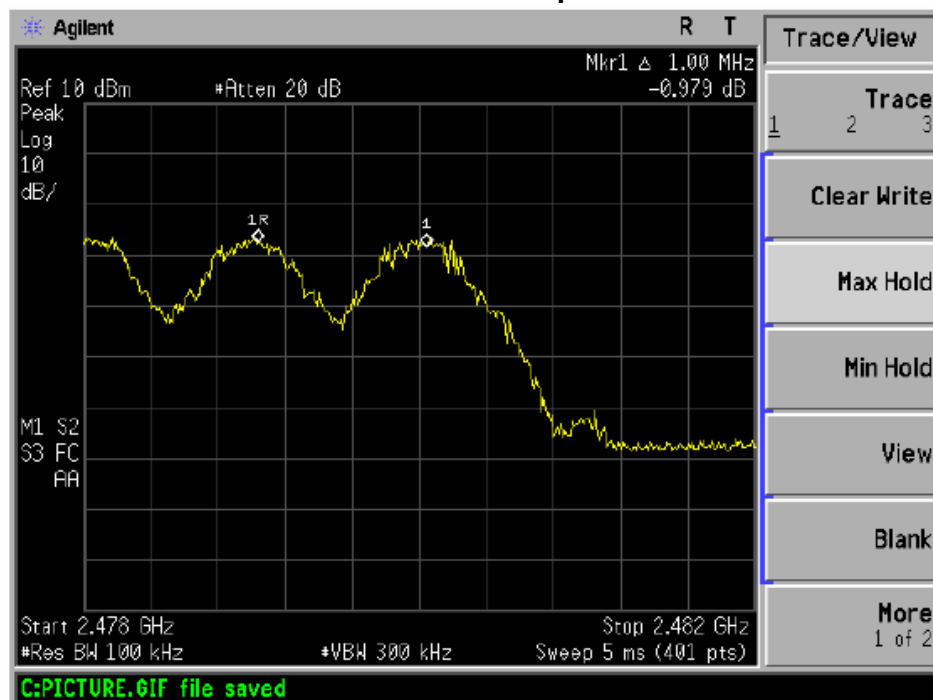
Ch. Separation Limits: > 20dB bandwidth



CH39 -1Mbps



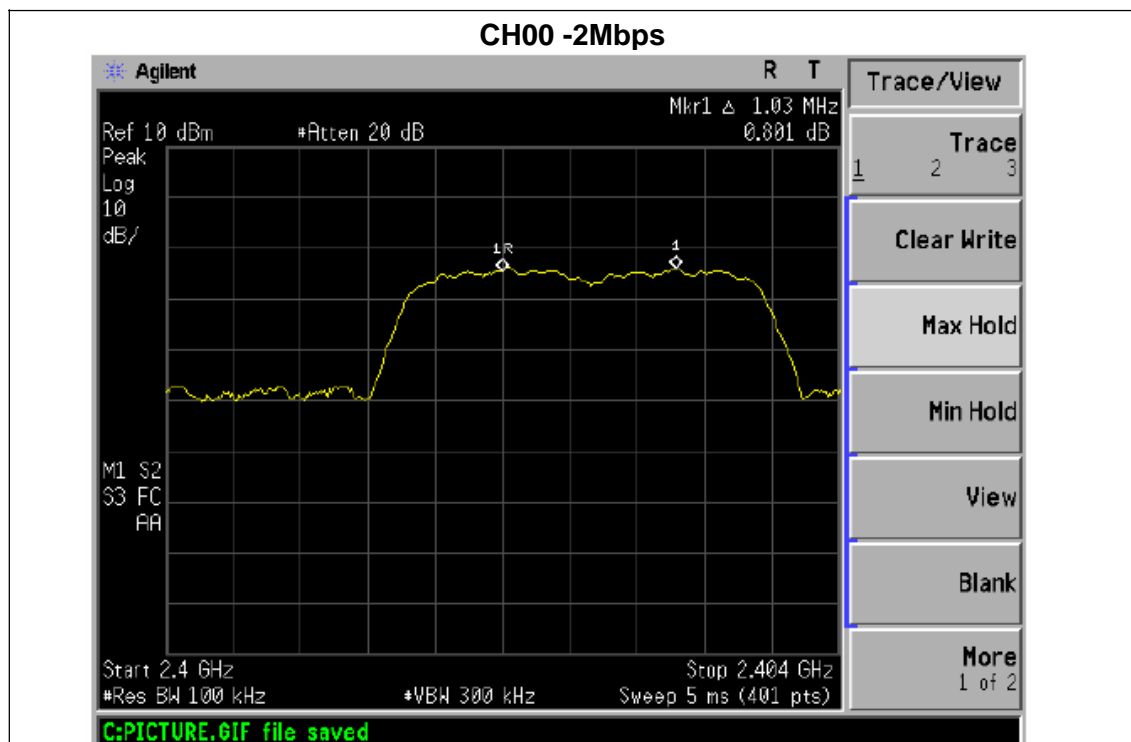
CH78 -1Mbps



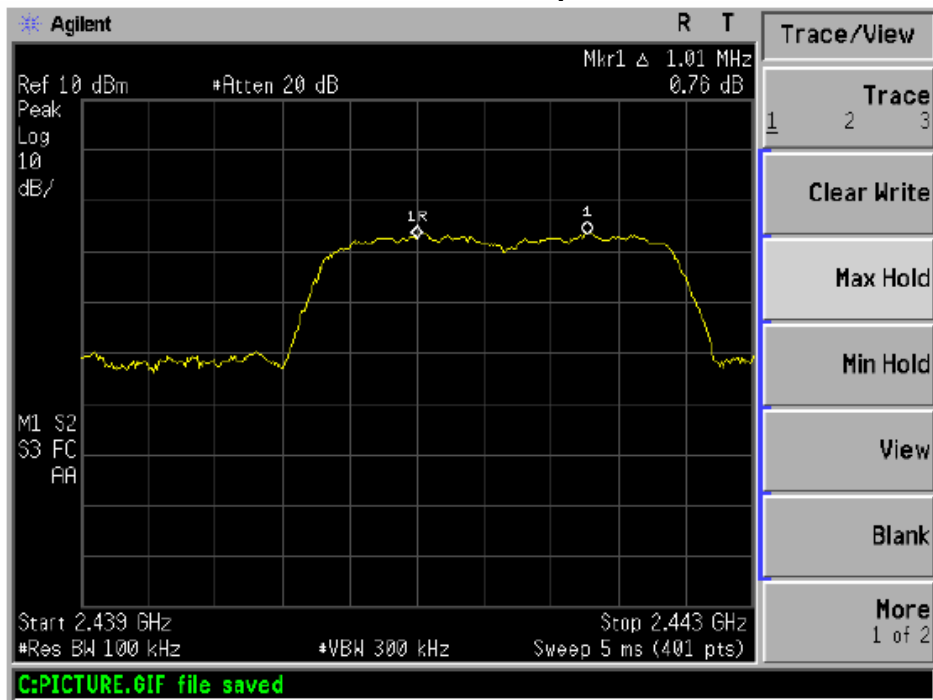
| | | | |
|--------------|--------------------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH00 / CH39 /CH78 (2Mbps Mode) | | |

| Frequency | Ch. Separation (MHz) | Result |
|-----------|----------------------|----------|
| 2402 MHz | 1.03 | Complies |
| 2441 MHz | 1.01 | Complies |
| 2480 MHz | 1.04 | Complies |

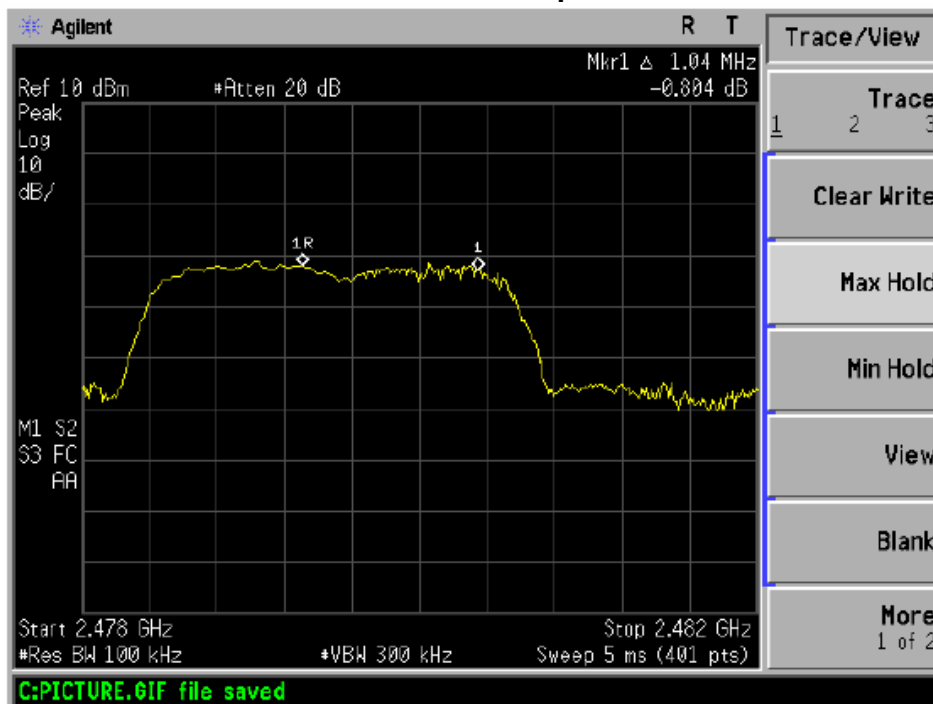
Ch. Separation Limits: >2/3 of 20dB bandwidth



CH39 -2Mbps



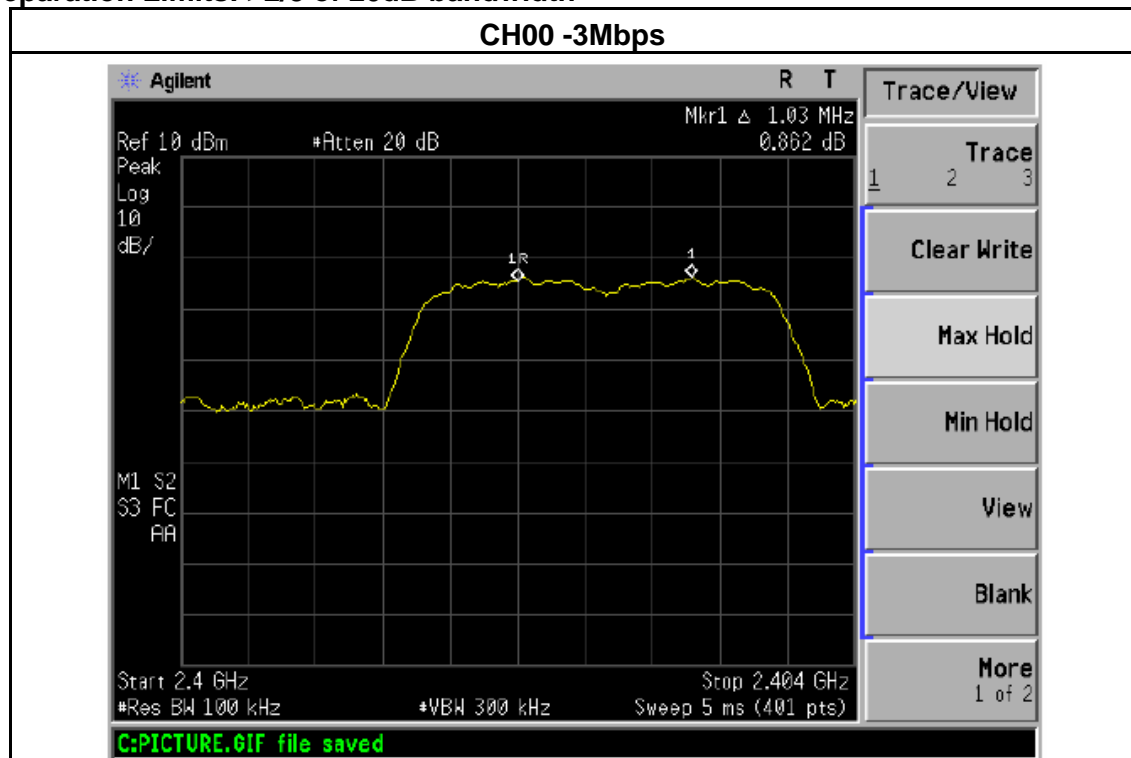
CH78 -2Mbps



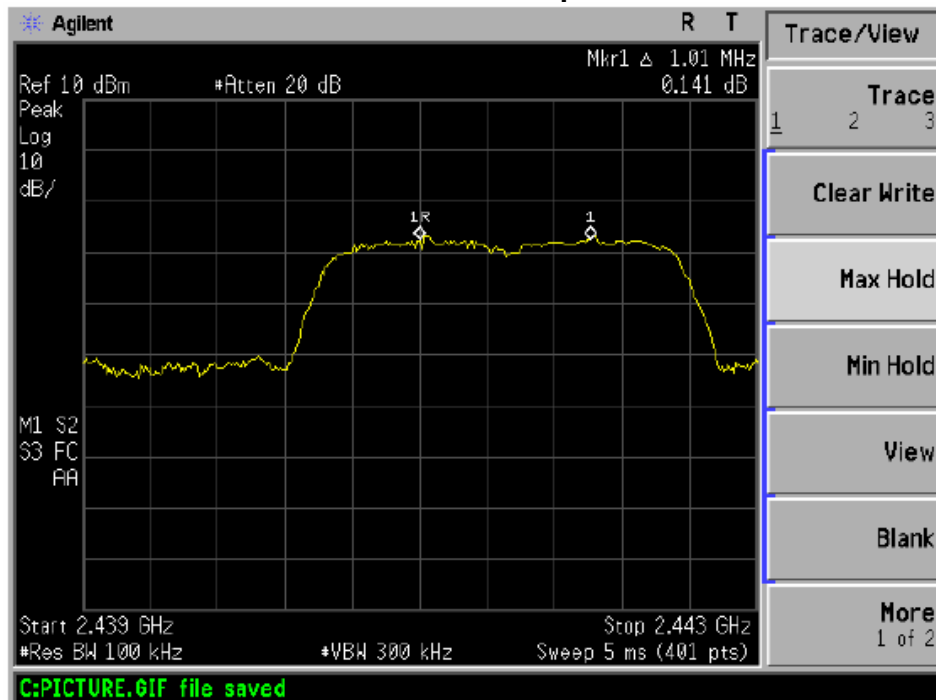
| | | | |
|--------------|--------------------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH00 / CH39 /CH78 (3Mbps Mode) | | |

| Frequency | Ch. Separation (MHz) | Result |
|-----------|----------------------|----------|
| 2402 MHz | 1.03 | Complies |
| 2441 MHz | 1.01 | Complies |
| 2480 MHz | 1.04 | Complies |

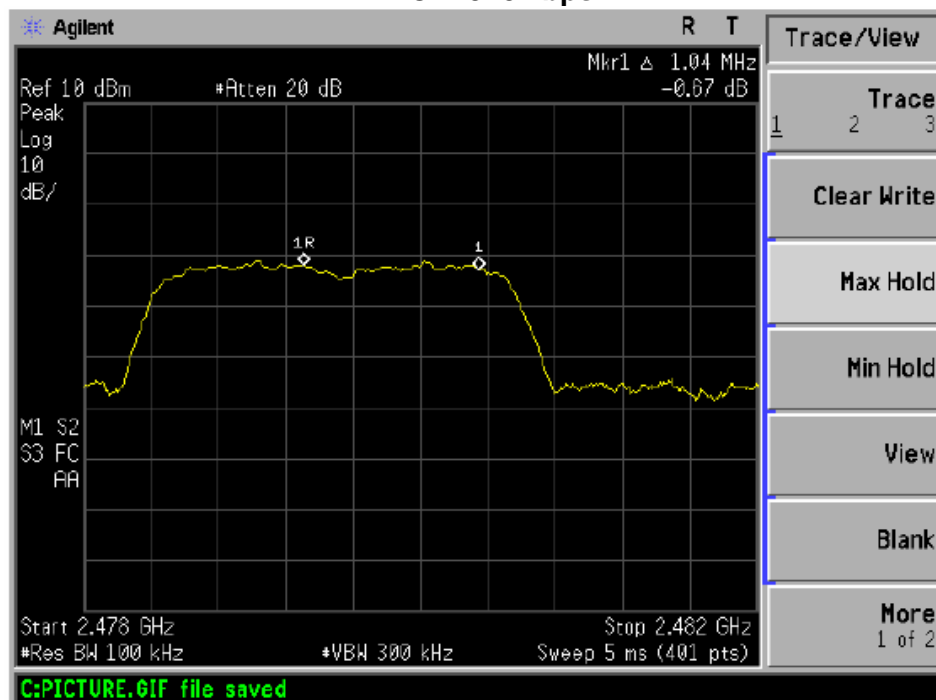
Ch. Separation Limits: >2/3 of 20dB bandwidth



CH39 -3Mbps



CH78 -3Mbps



7. BANDWIDTH TEST

7.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|-----------|------------------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 (a)(1) | Bandwidth | (20dB bandwidth) | 2400-2483.5 | PASS |

| Spectrum Parameter | Setting |
|--------------------|---|
| Attenuation | Auto |
| Span Frequency | > Measurement Bandwidth or Channel Separation |
| RB | 30 kHz |
| VB | 100 kHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

7.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



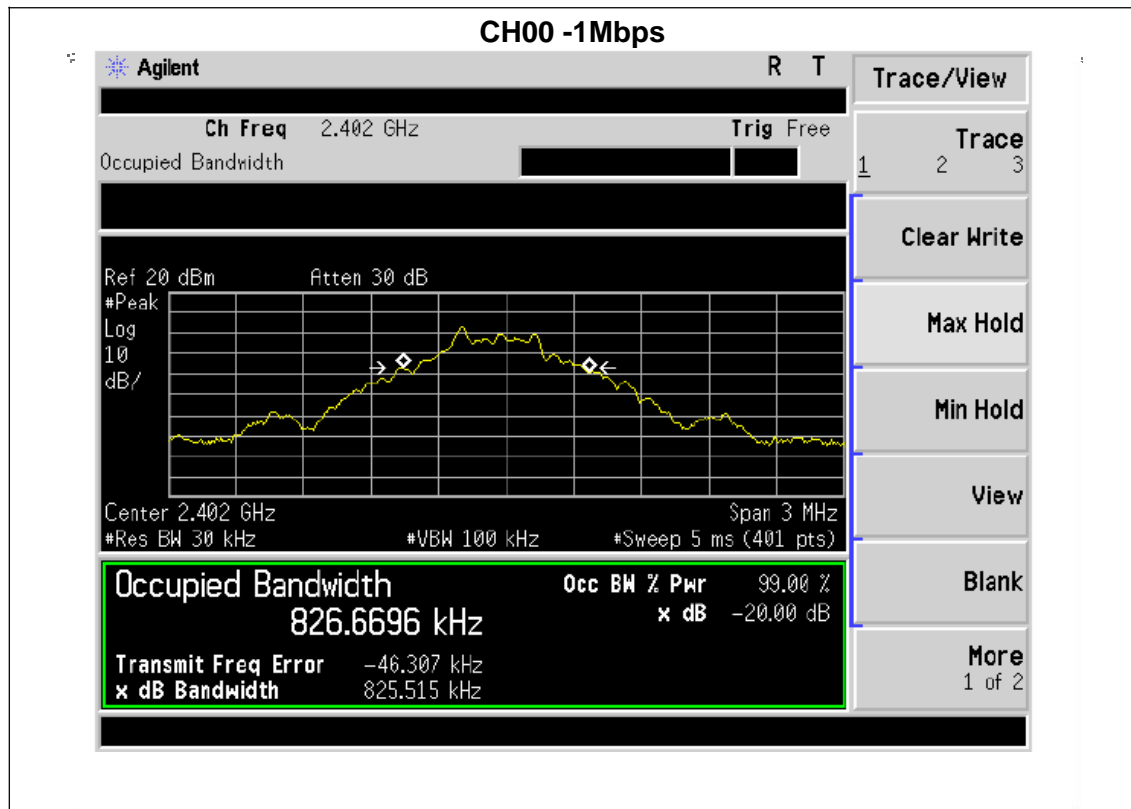
7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

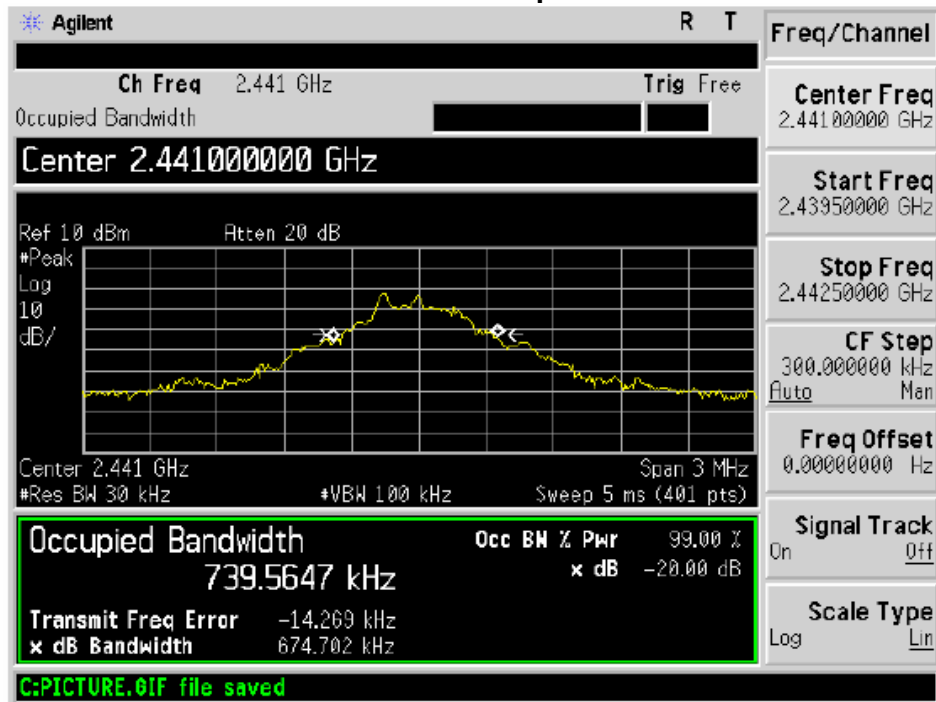
7.1.5 TEST RESULTS

| | | | |
|--------------|-------------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH00 / CH39 /C78(1Mbps) | | |

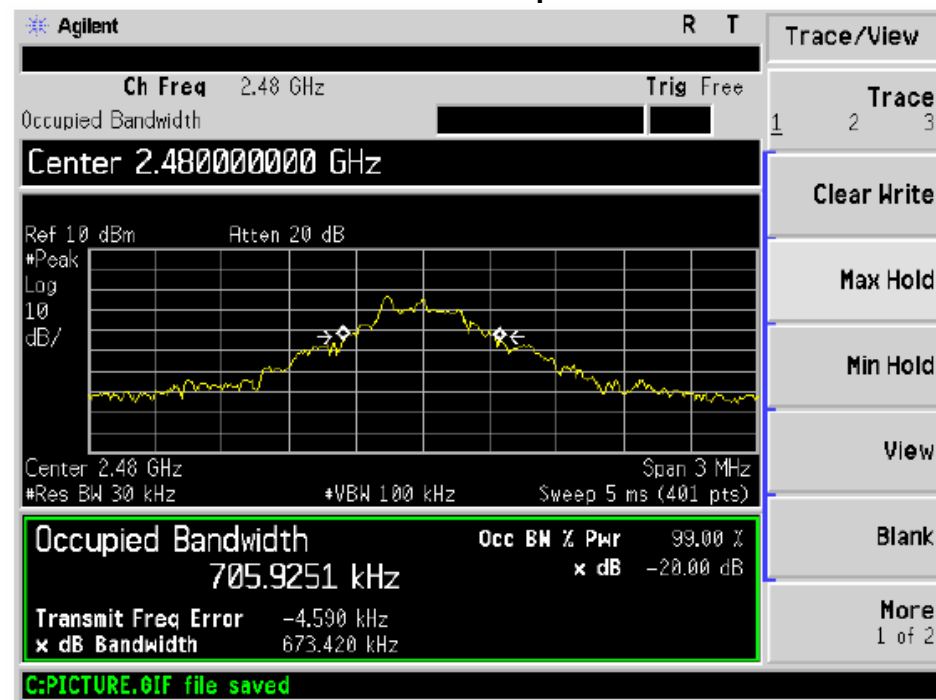
| Frequency | 20dB Bandwidth (MHz) | Result |
|-----------|----------------------|-------------|
| 2402 MHz | 825.515 | PASS |
| 2441 MHz | 674.702 | PASS |
| 2480 MHz | 673.420 | PASS |



CH39 -1Mbps

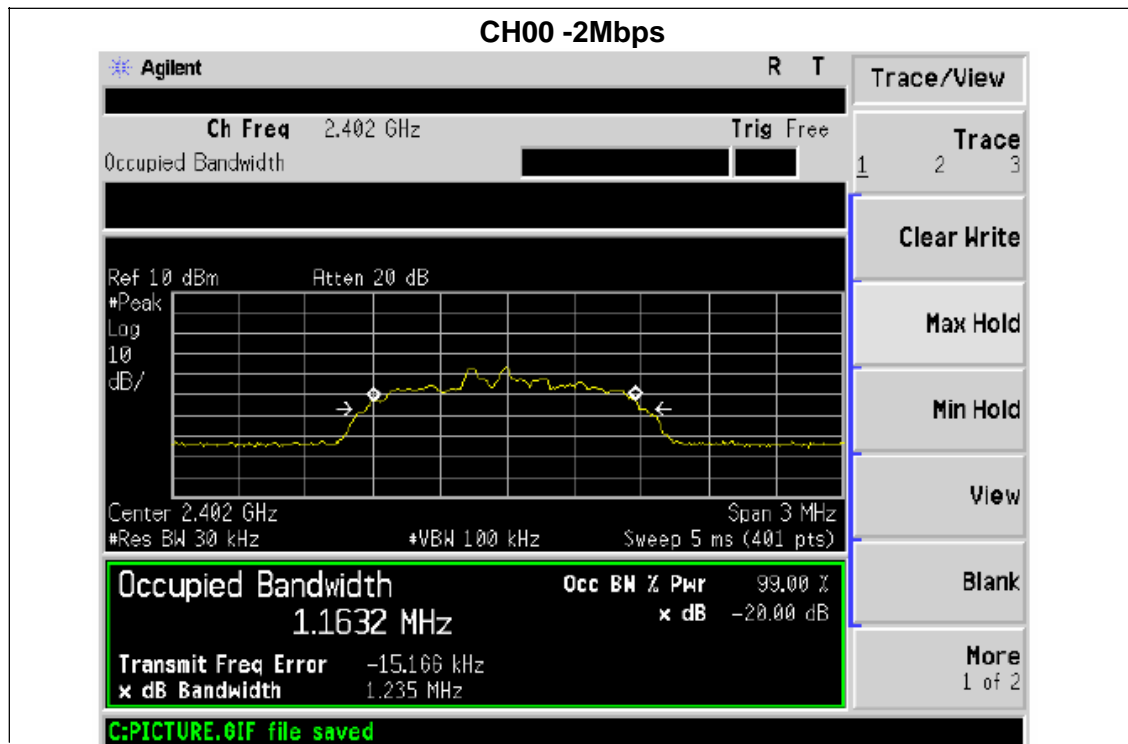


CH78 -1Mbps

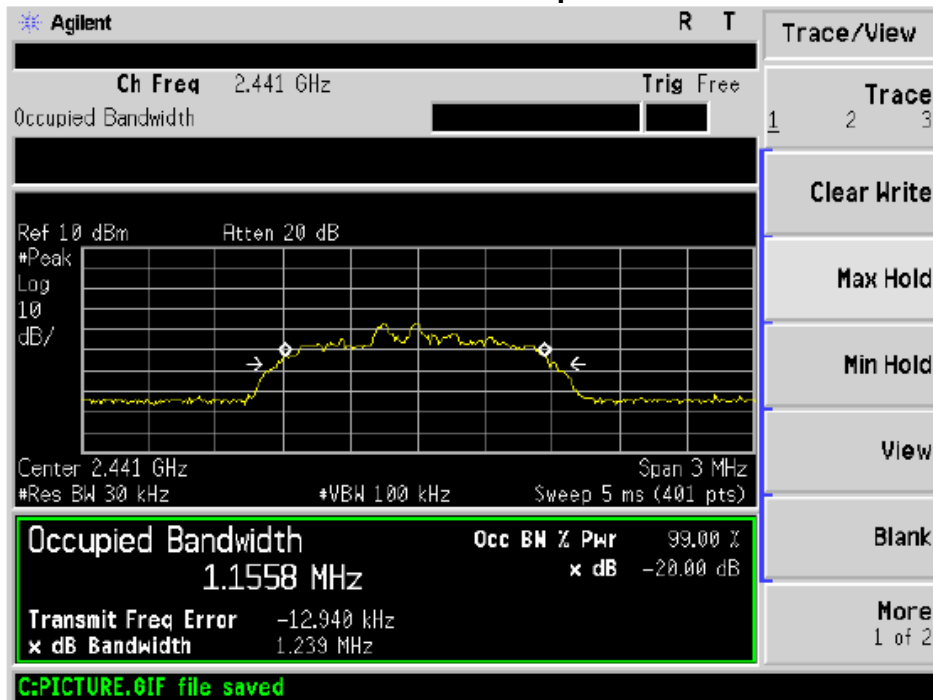


| | | | |
|--------------|-------------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH00 / CH39 /C78(2Mbps) | | |

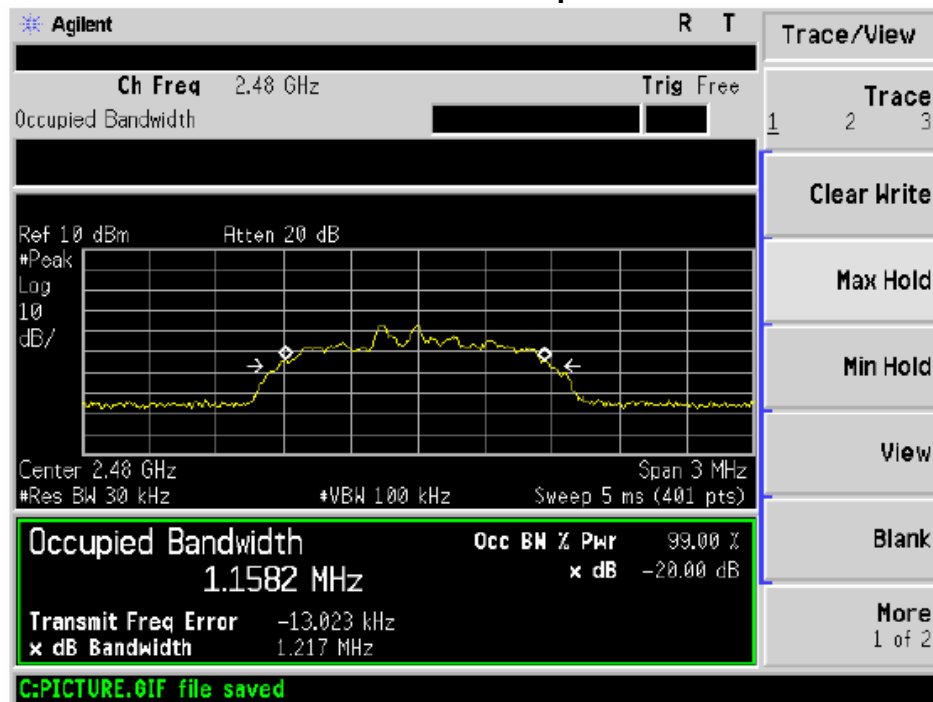
| Frequency | 20dB Bandwidth (MHz) | Result |
|-----------|----------------------|--------|
| 2402 MHz | 1.235 | PASS |
| 2441 MHz | 1.239 | PASS |
| 2480 MHz | 1.217 | PASS |



CH39 -2Mbps

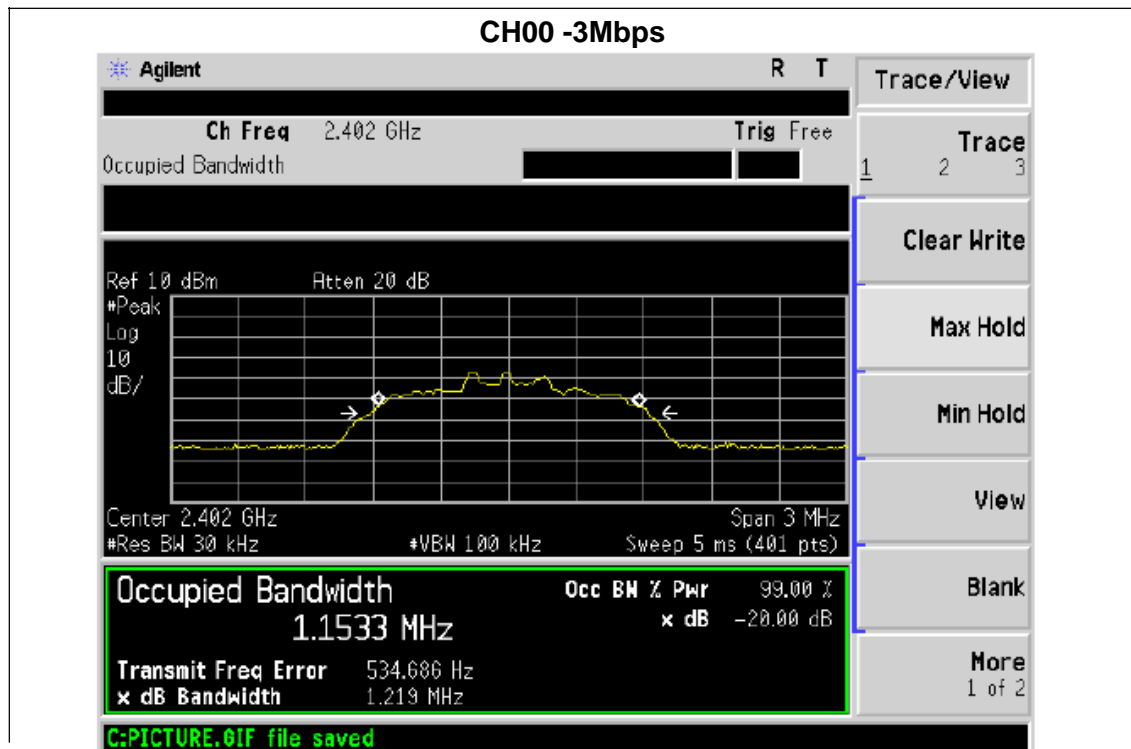


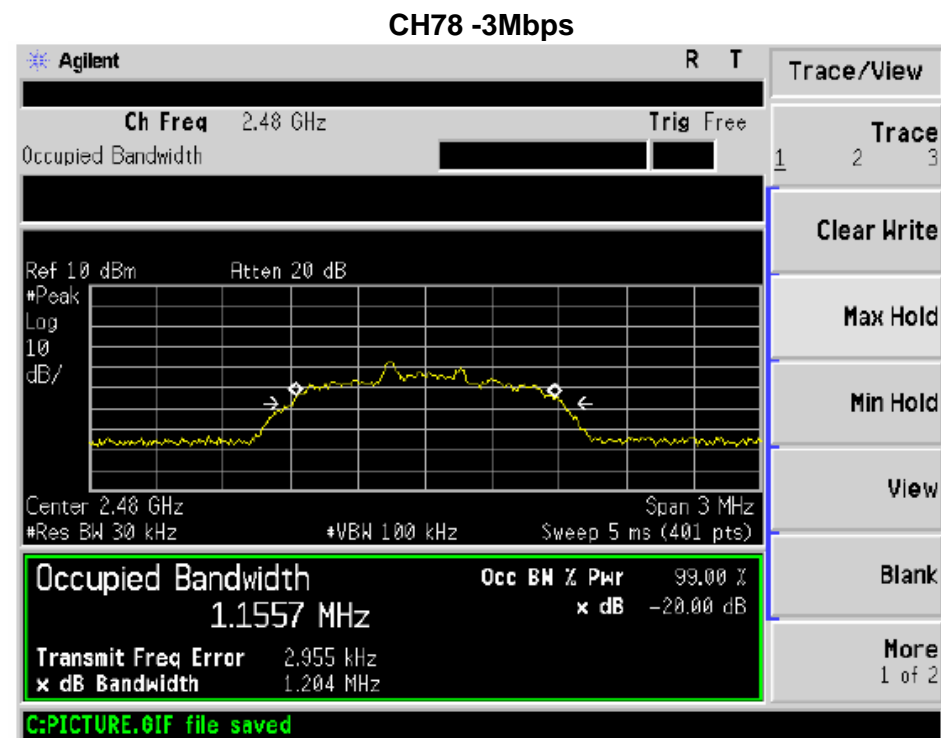
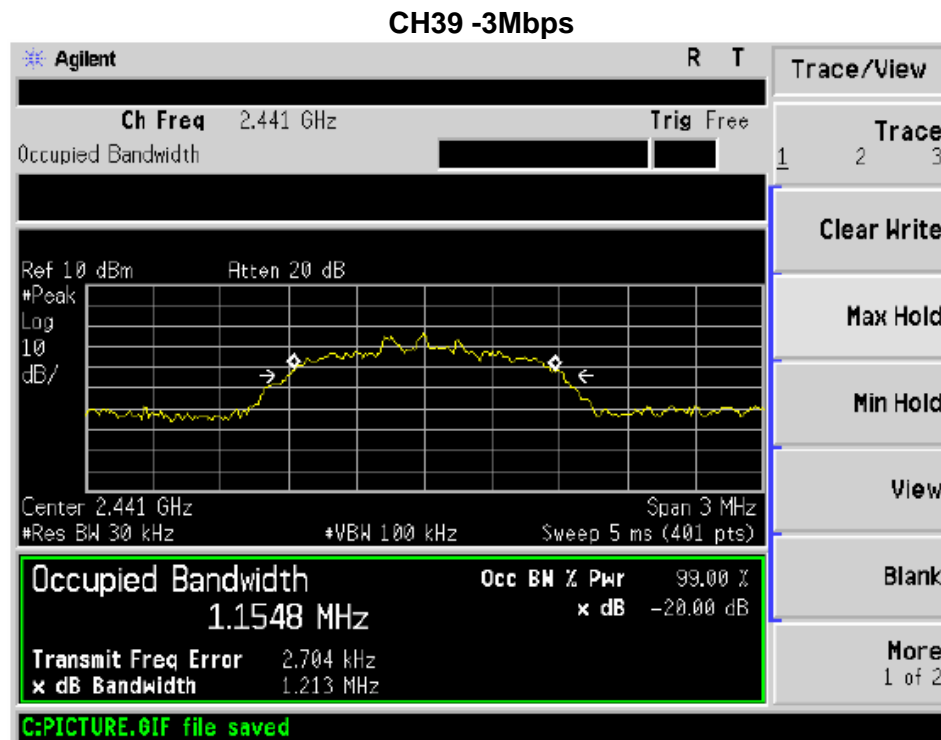
CH78 -2Mbps



| | | | |
|--------------|-------------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH00 / CH39 /C78(3Mbps) | | |

| Frequency | 20dB Bandwidth (MHz) | Result |
|-----------|----------------------|--------|
| 2402 MHz | 1.219 | PASS |
| 2441 MHz | 1.213 | PASS |
| 2480 MHz | 1.204 | PASS |





8. PEAK OUTPUT POWER TEST

8.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|-------------------|----------------------|-----------------------|--------|
| Section | Test Item | Limit | Frequency Range (MHz) | Result |
| 15.247 (b)(i) | Peak Output Power | 30dbm or 20.96dBm | 2400-2483.5 | PASS |

8.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b.
 - Spectrum Setting : RBW > the 20 dB bandwidth of the emission being measured
 - Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
 - VBW \geq RBW
 - Sweep = auto
 - Detector function =
 - peak Trace = max hold

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



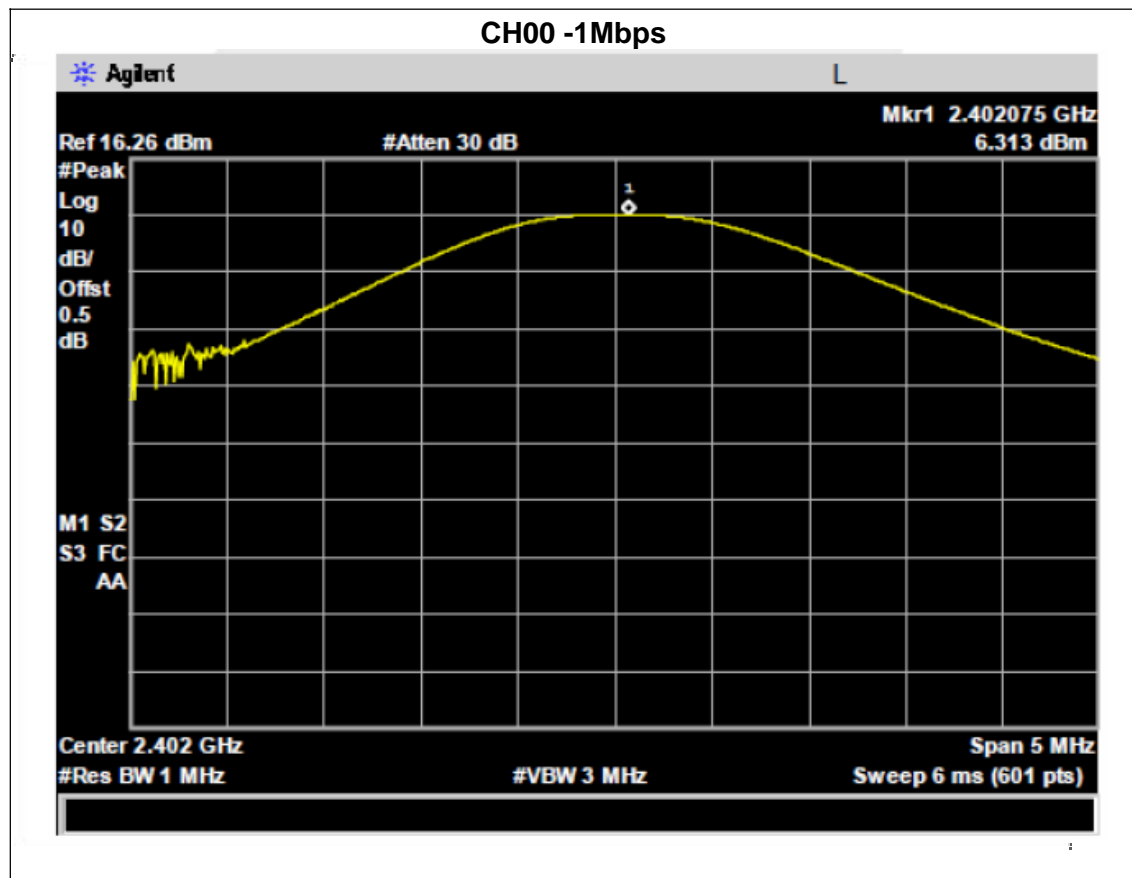
8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

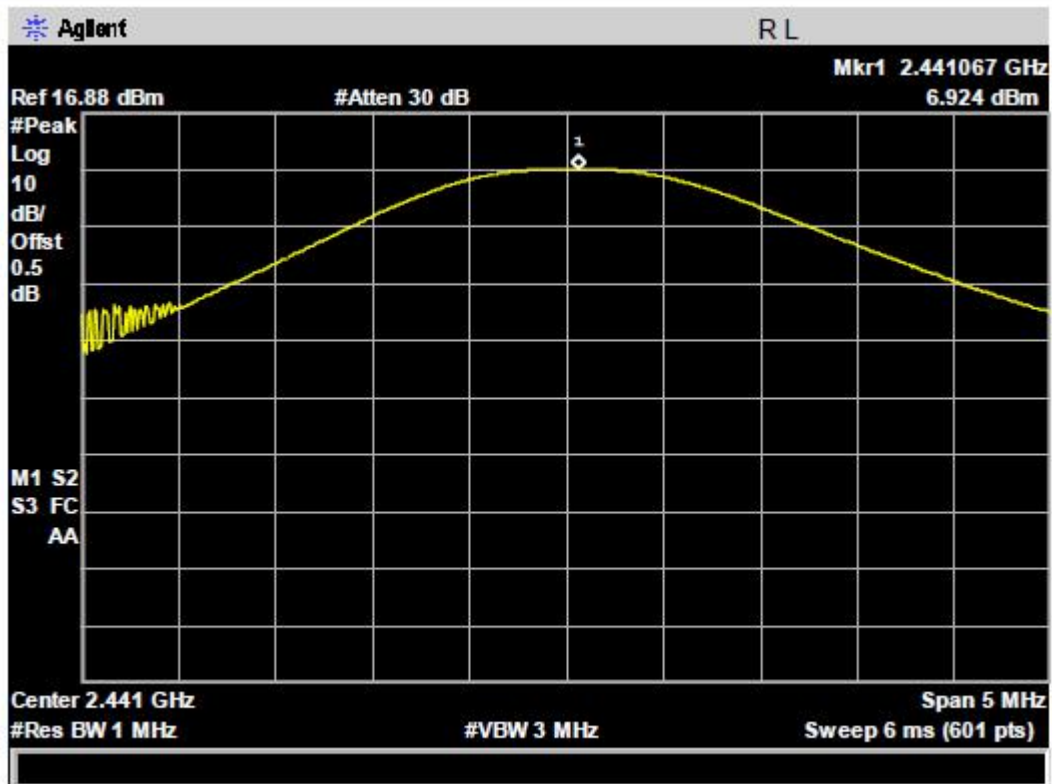
8.1.5 TEST RESULTS

| | | | |
|--------------|-------------------------------------|--------------------|---------------|
| EUT: | MultispeQ | Model Name : | MULTISPEQ 1.0 |
| Temperature: | 25 °C | Relative Humidity: | 60% |
| Pressure: | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH00/ CH39 /CH78 (1M/2M/3Mbps Mode) | | |

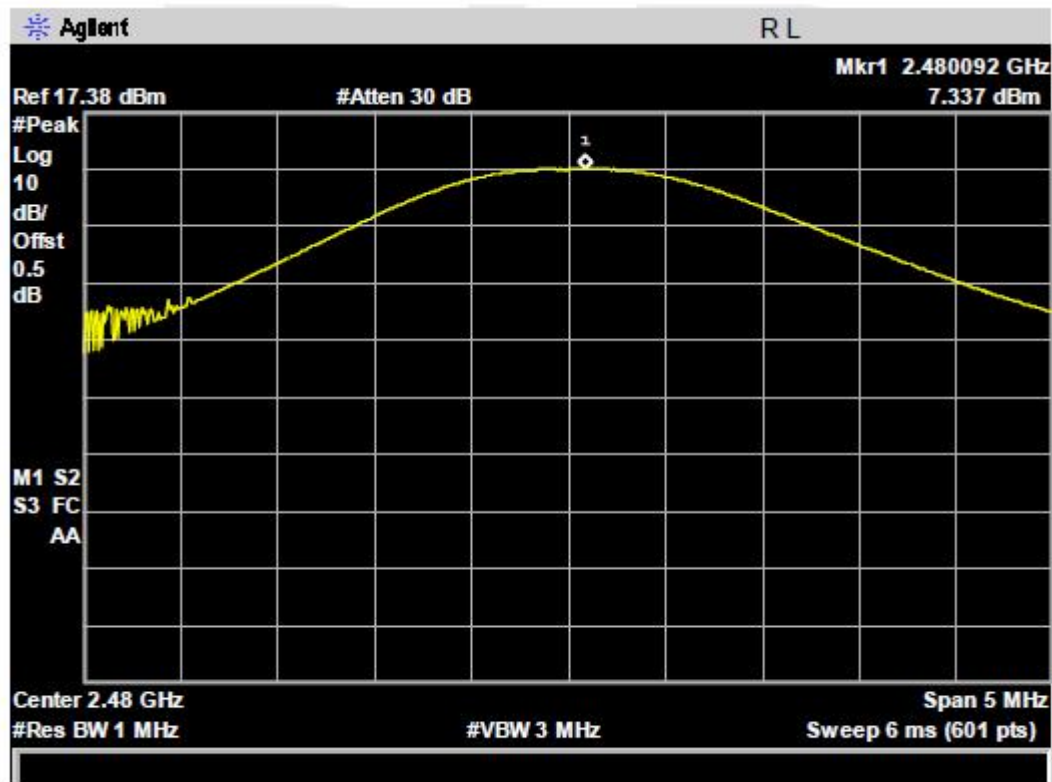
| 1Mbps | | | |
|--------------|-----------------|-------------------------|-------------|
| Test Channel | Frequency (MHz) | Peak Output Power (dBm) | LIMIT (dBm) |
| CH00 | 2402 | 6.313 | 20.96 |
| CH39 | 2441 | 6.924 | 20.96 |
| CH78 | 2480 | 7.337 | 20.96 |
| 2Mbps | | | |
| CH00 | 2402 | 5.049 | 20.96 |
| CH39 | 2441 | 5.682 | 20.96 |
| CH78 | 2480 | 6.125 | 20.96 |
| 3Mbps | | | |
| CH00 | 2402 | 5.646 | 20.96 |
| CH39 | 2441 | 6.271 | 20.96 |
| CH78 | 2480 | 6.562 | 20.96 |

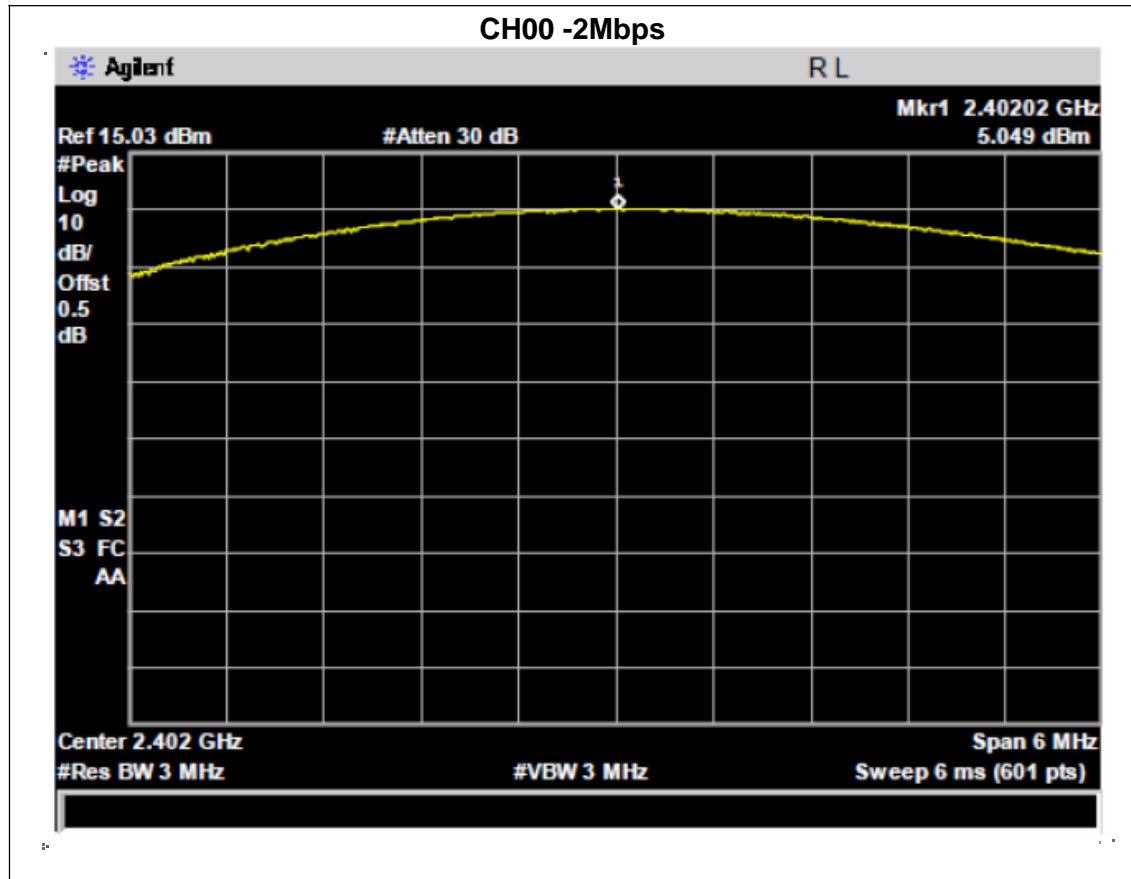


CH39 -1Mbps

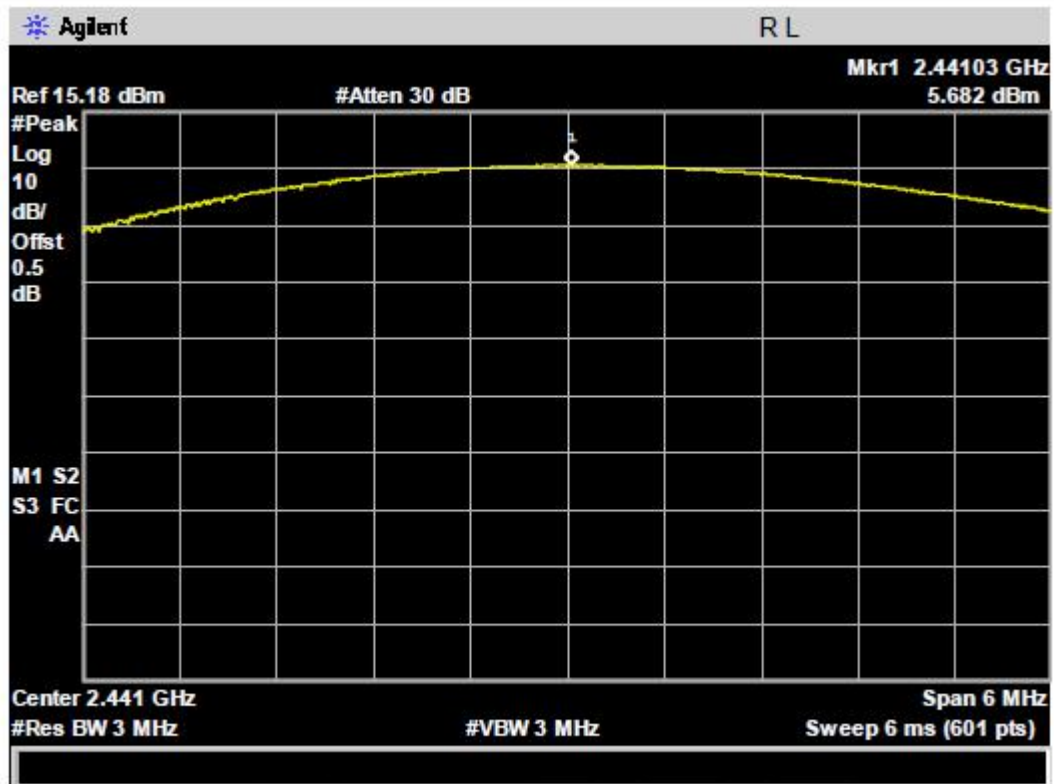


CH78 -1Mbps

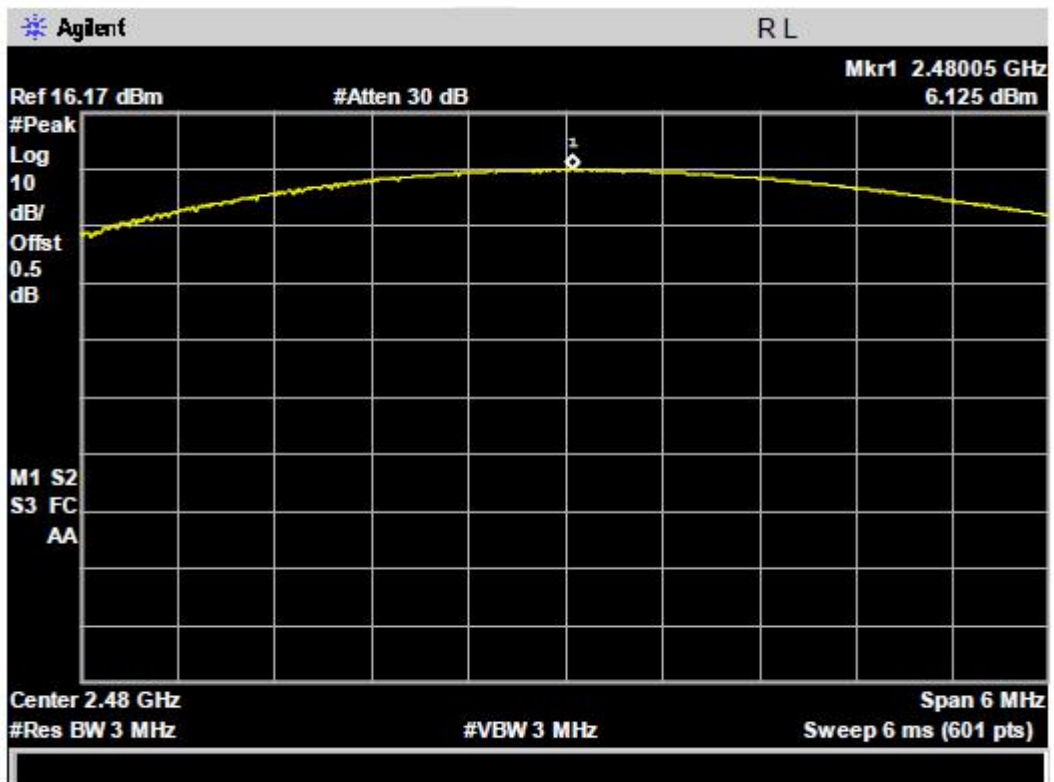


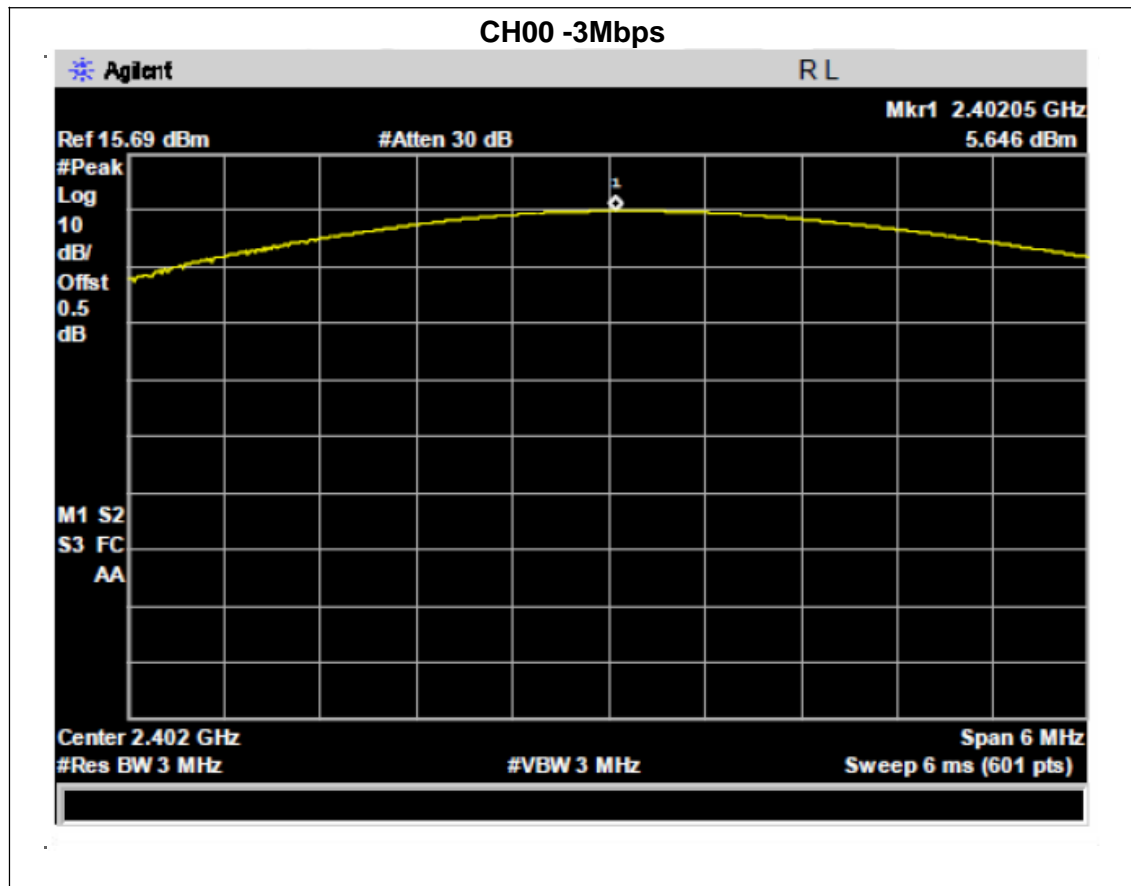


CH39 -2Mbps

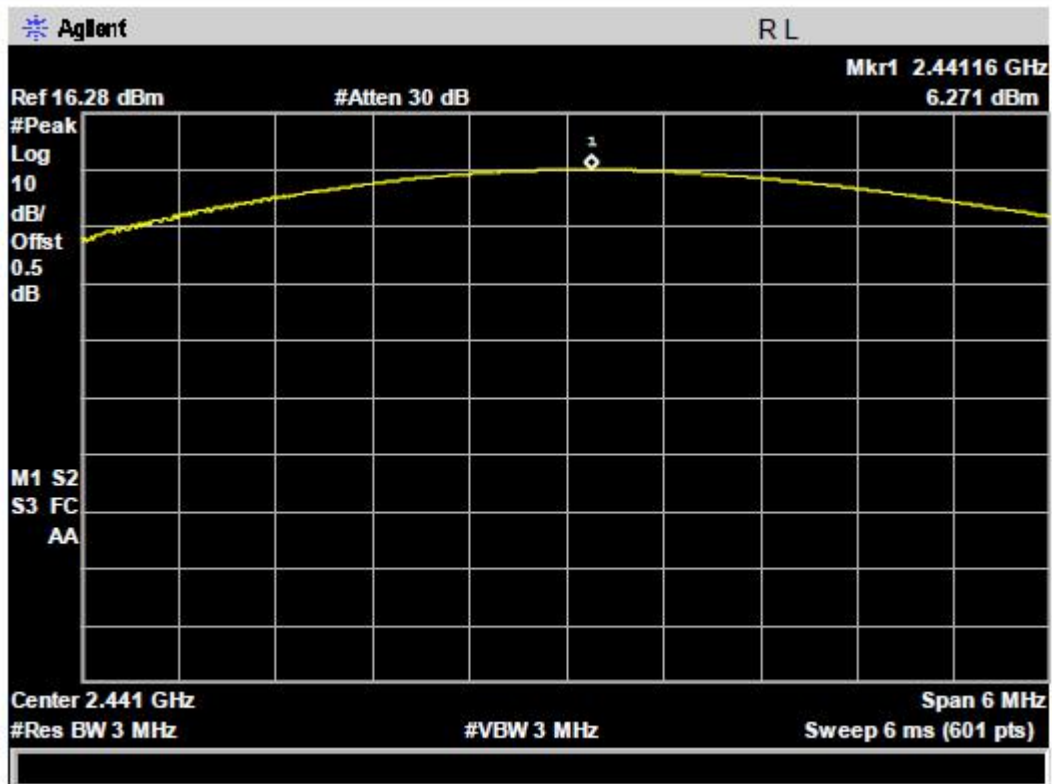


CH78 -2Mbps

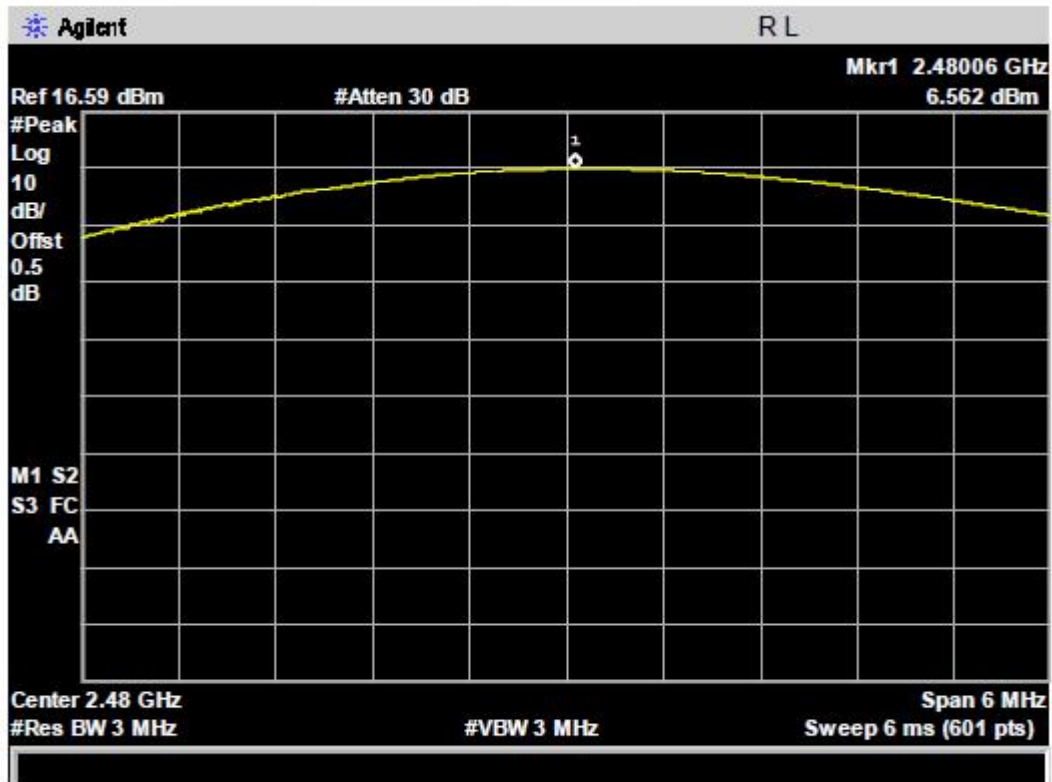




CH39 -3Mbps



CH78 -3Mbps



9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

9.2 EUT ANTENNA

The EUT antenna is PCB antenna. It comply with the standard requirement.

10.CONDUCTED SPURIOUS EMISSIONS

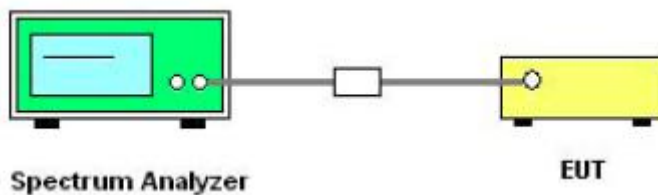
10.1 REQUIREMENT

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

10.2 TEST PROCEDURE

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

10.3 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

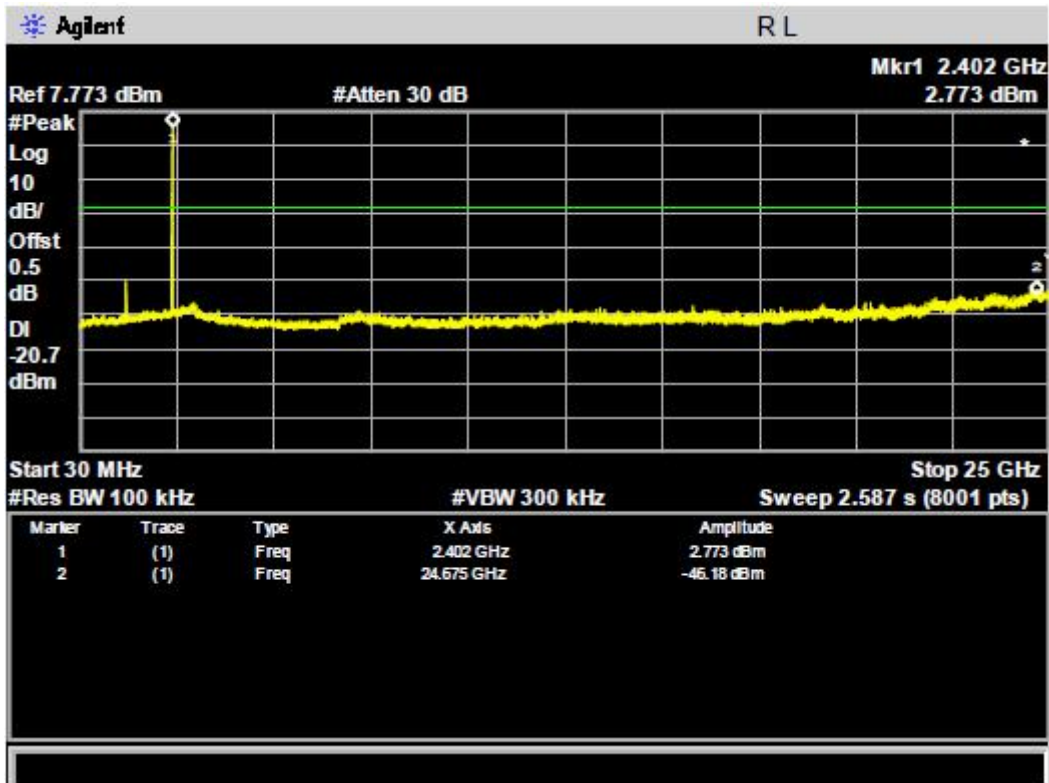
10.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

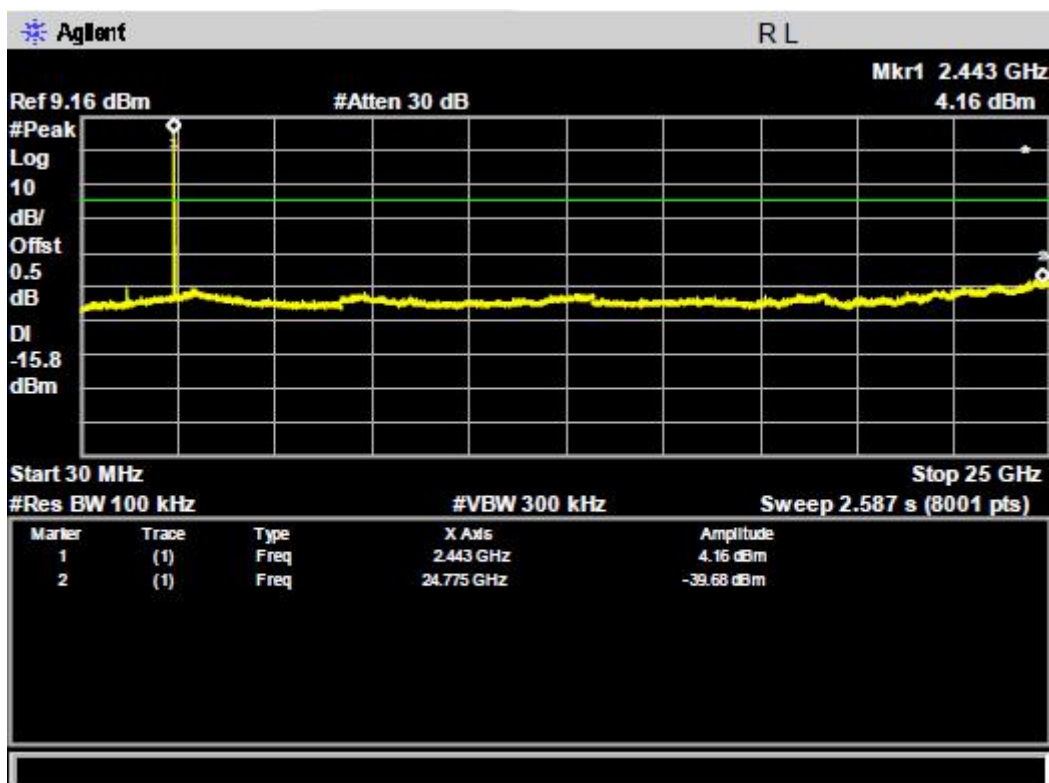
10.5 TEST RESULTS

1Mbps:

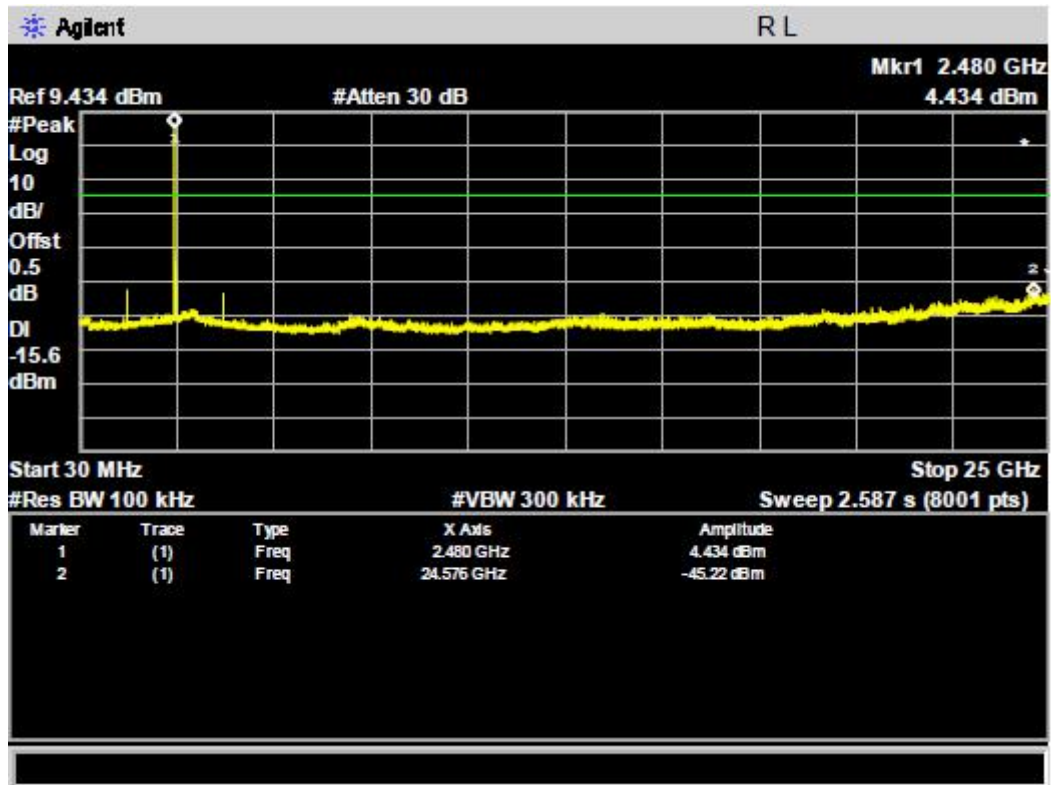
CH0



CH 39

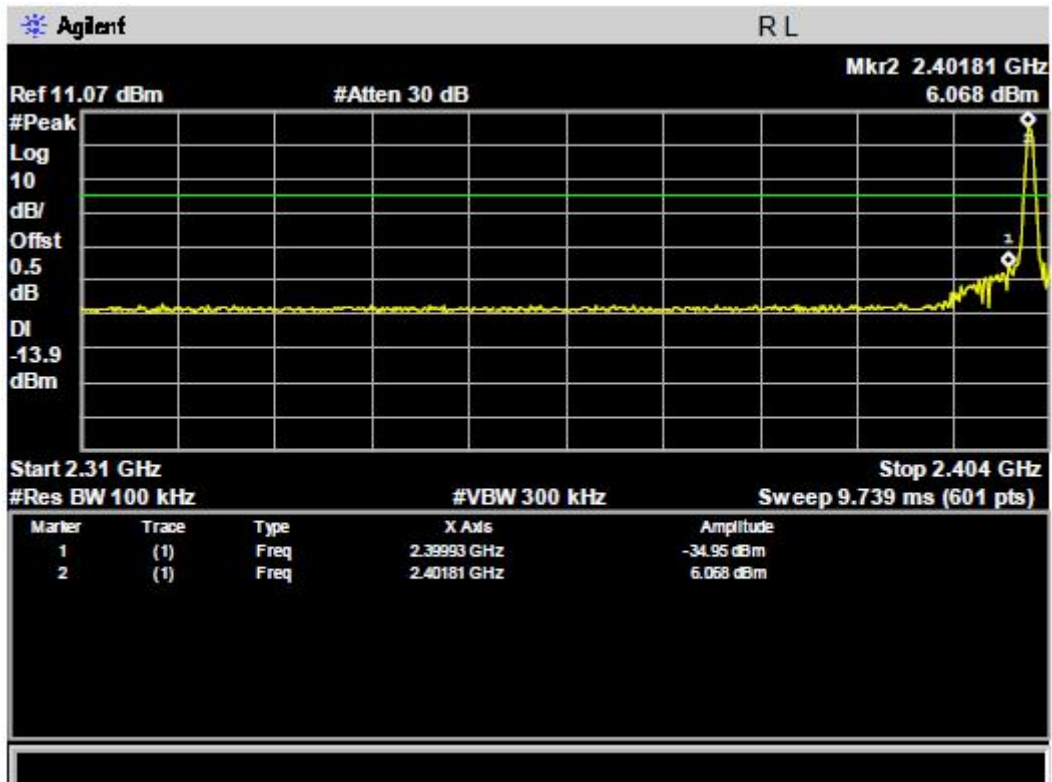


CH78

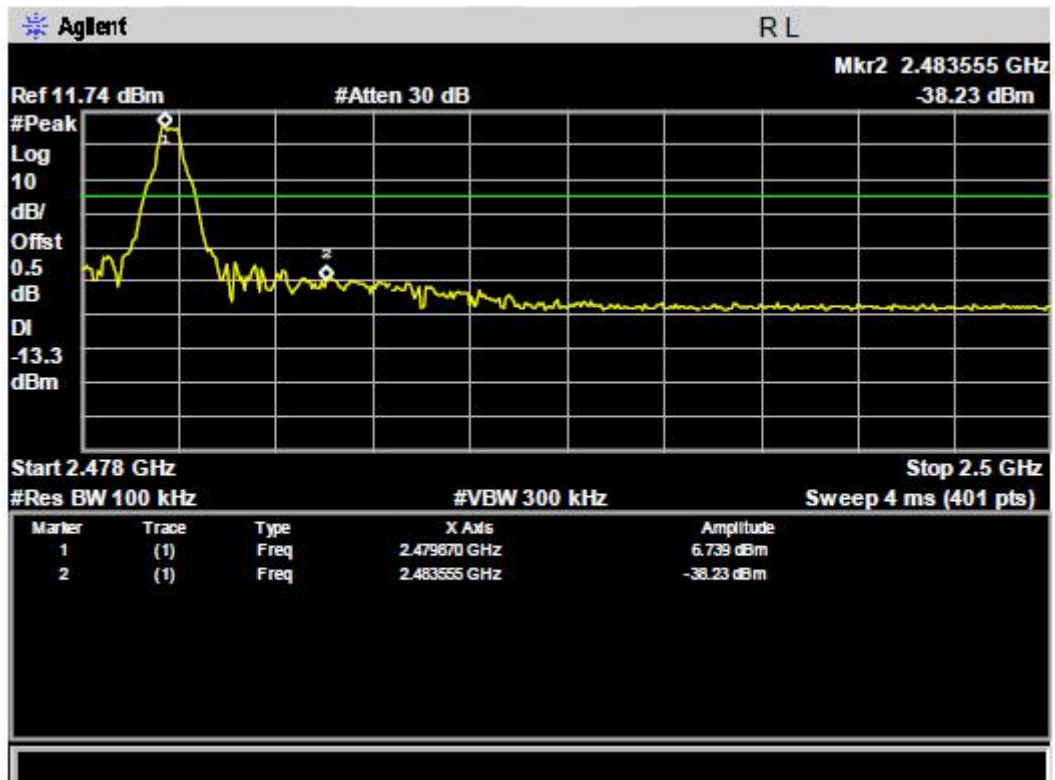


For Band Edge:

CH0

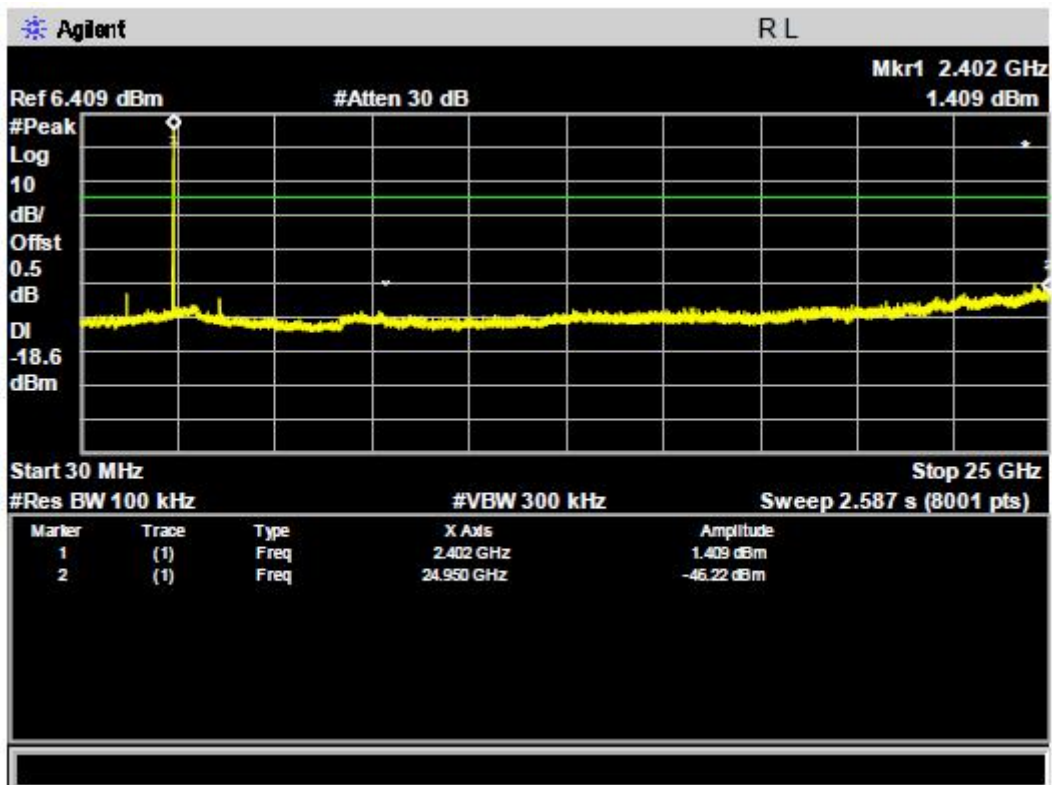


CH78

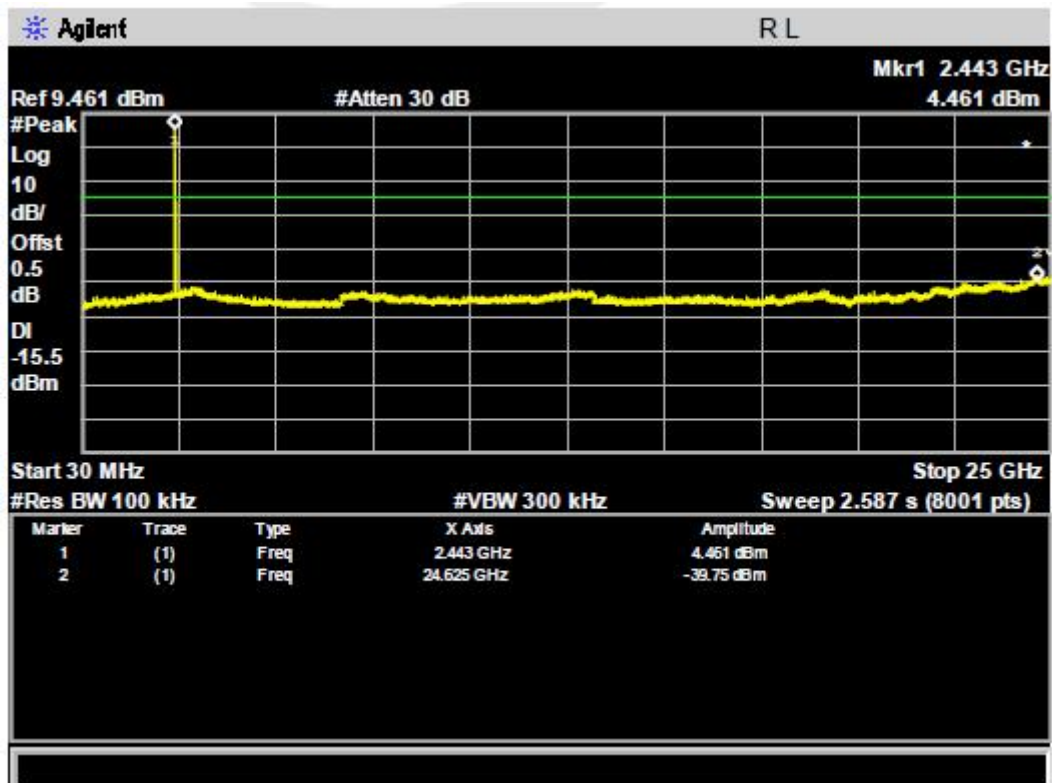


2Mbps:

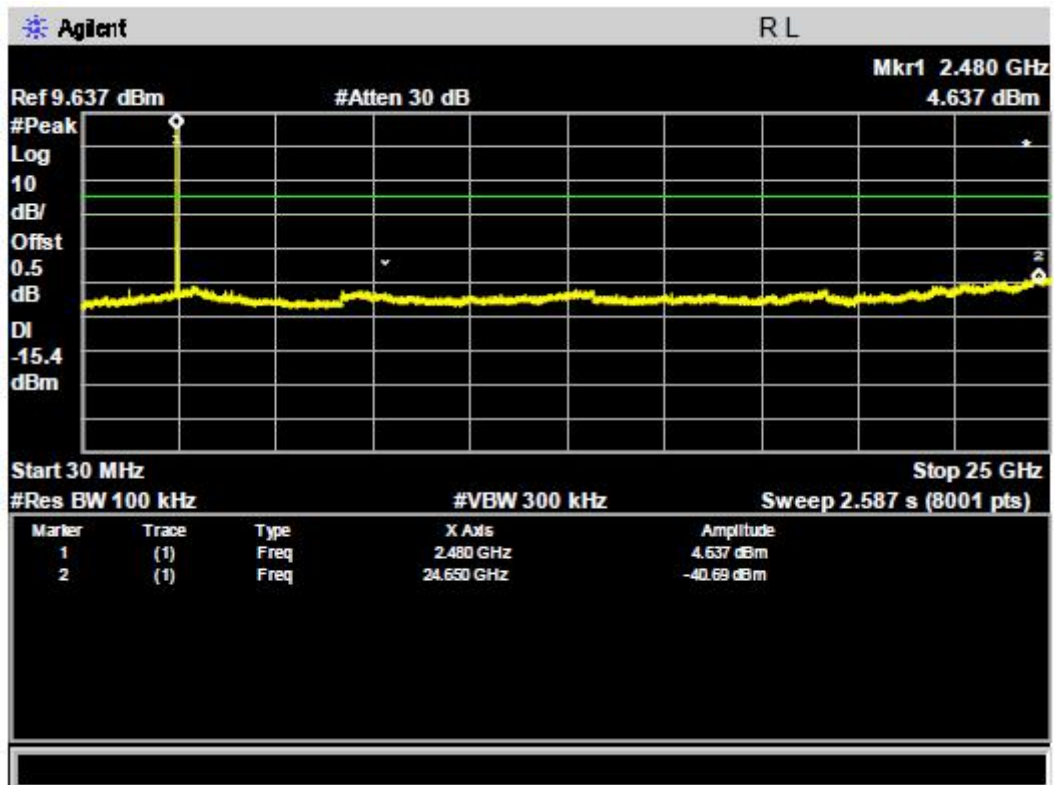
CH0



Ch39

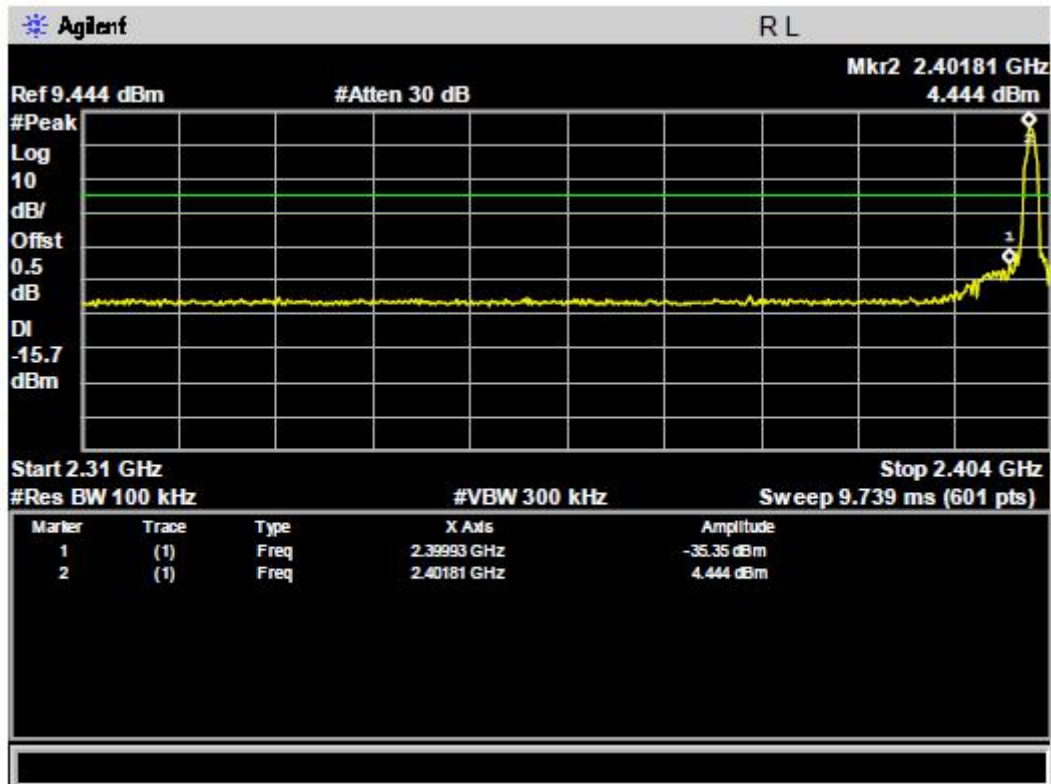


Ch78

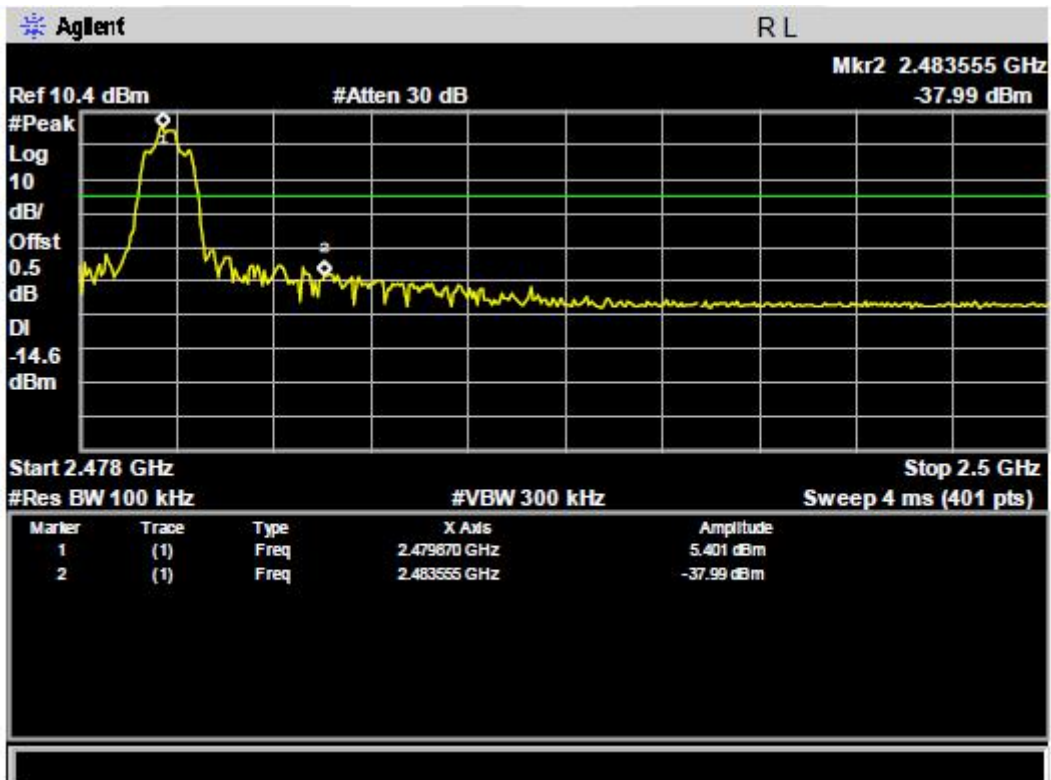


For Band Edge:

CH0

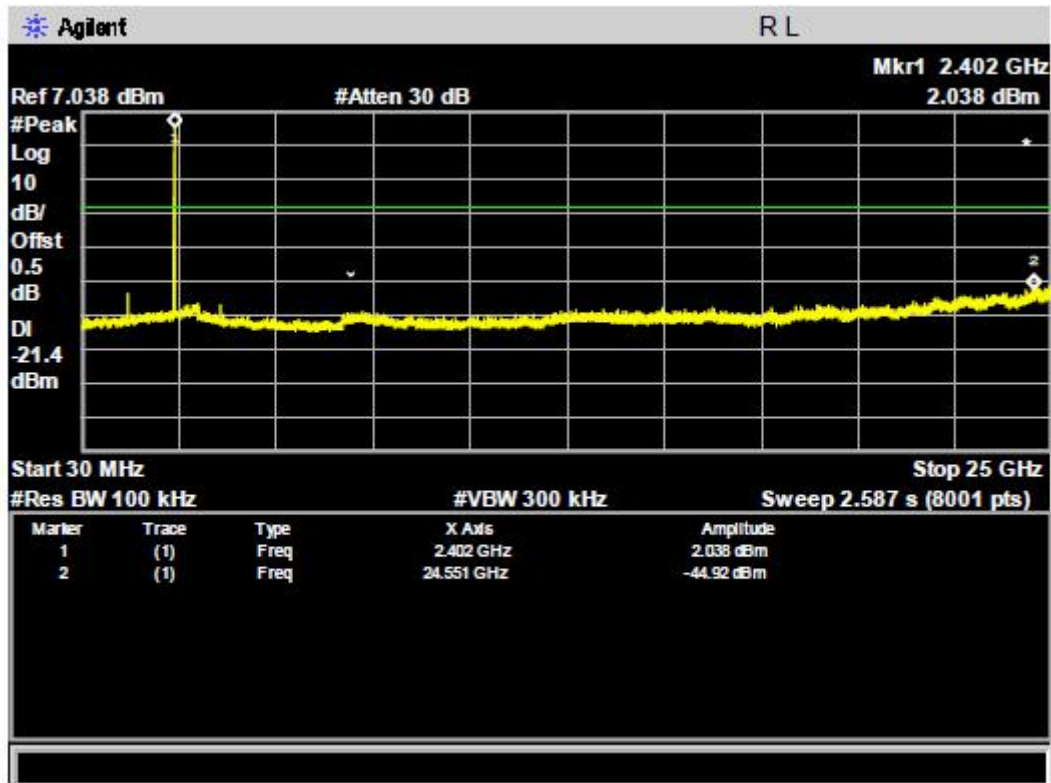


CH78

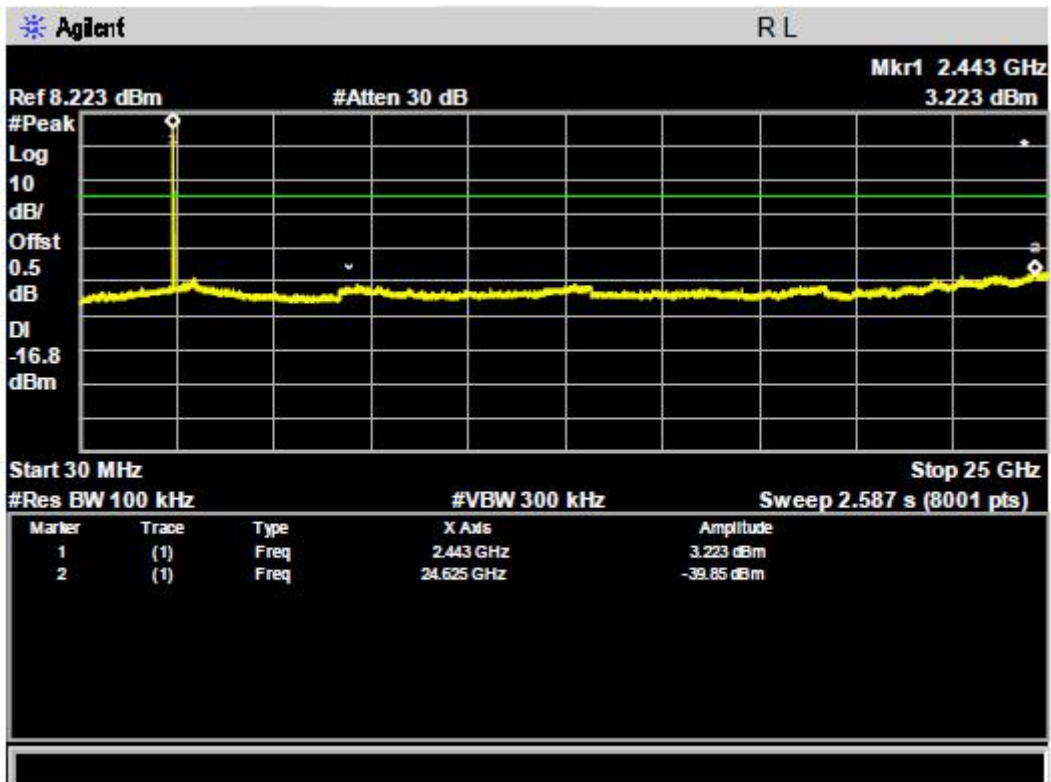


3Mbps:

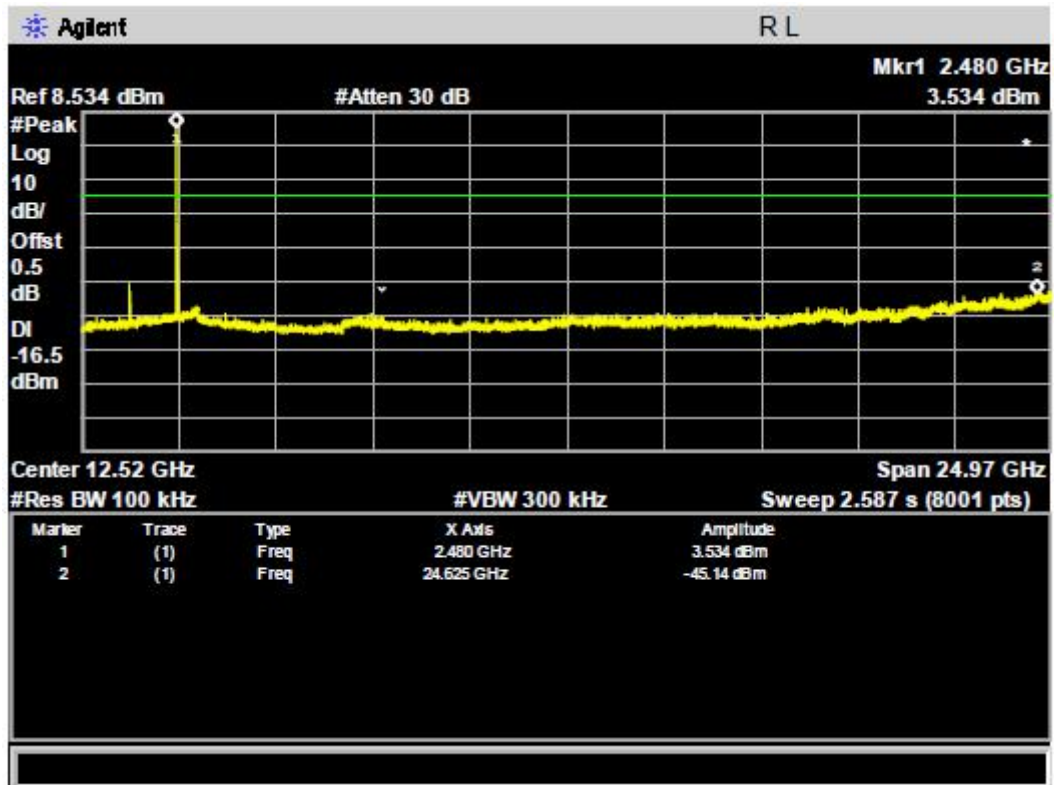
CH0



CH39

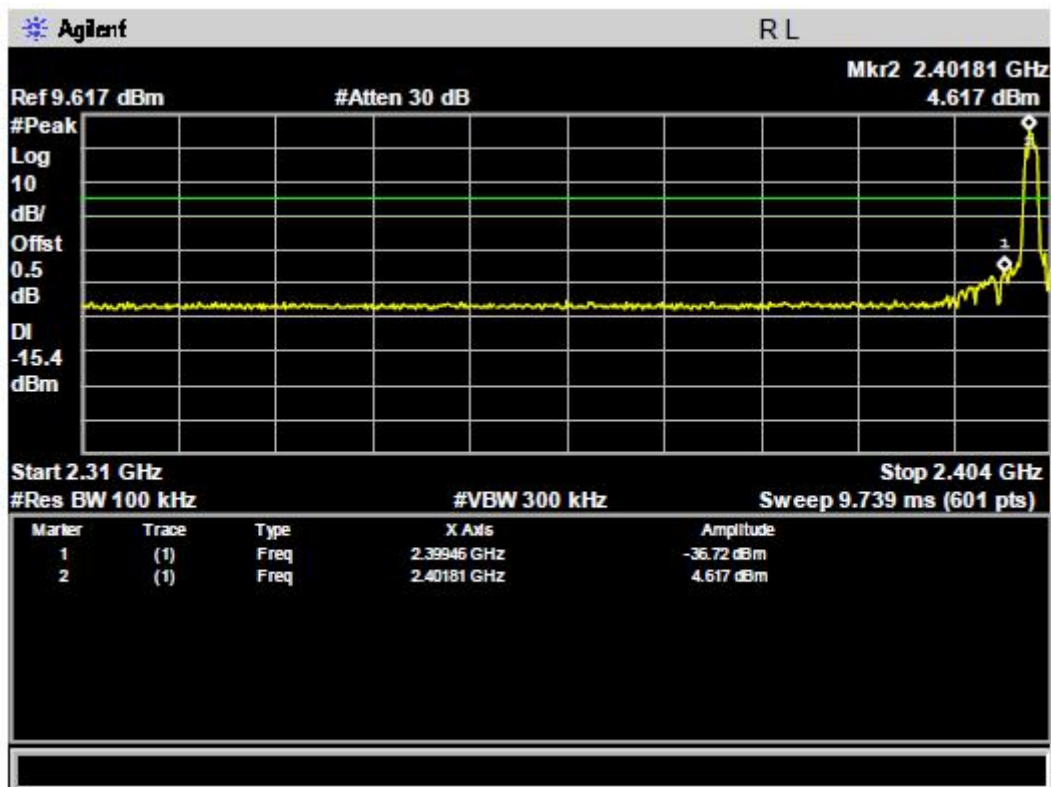


CH78



For Band Edge

CH0



CH78

