

#### 11.4 Test Result

##### ANT1:

| Channel. | Carrier Frequency Separation [MHz] | Verdict |
|----------|------------------------------------|---------|
| LCH      | 0.499                              | PASS    |
| MCH      | 0.499                              | PASS    |
| HCH      | 0.502                              | PASS    |

##### ANT2:

| Channel. | Carrier Frequency Separation [MHz] | Verdict |
|----------|------------------------------------|---------|
| LCH      | 0.497                              | PASS    |
| MCH      | 0.500                              | PASS    |
| HCH      | 0.503                              | PASS    |

##### ANT3:

| Channel. | Carrier Frequency Separation [MHz] | Verdict |
|----------|------------------------------------|---------|
| LCH      | 0.498                              | PASS    |
| MCH      | 0.501                              | PASS    |
| HCH      | 0.502                              | PASS    |

##### ANT4:

| Channel. | Carrier Frequency Separation [MHz] | Verdict |
|----------|------------------------------------|---------|
| LCH      | 0.499                              | PASS    |
| MCH      | 0.502                              | PASS    |
| HCH      | 0.500                              | PASS    |

##### ANT5:

| Channel. | Carrier Frequency Separation [MHz] | Verdict |
|----------|------------------------------------|---------|
| LCH      | 0.501                              | PASS    |
| MCH      | 0.502                              | PASS    |
| HCH      | 0.500                              | PASS    |

##### ANT6:

| Channel. | Carrier Frequency Separation [MHz] | Verdict |
|----------|------------------------------------|---------|
| LCH      | 0.502                              | PASS    |
| MCH      | 0.501                              | PASS    |
| HCH      | 0.499                              | PASS    |

# Test Graph ANT1:

## Graphs

LCH



MCH



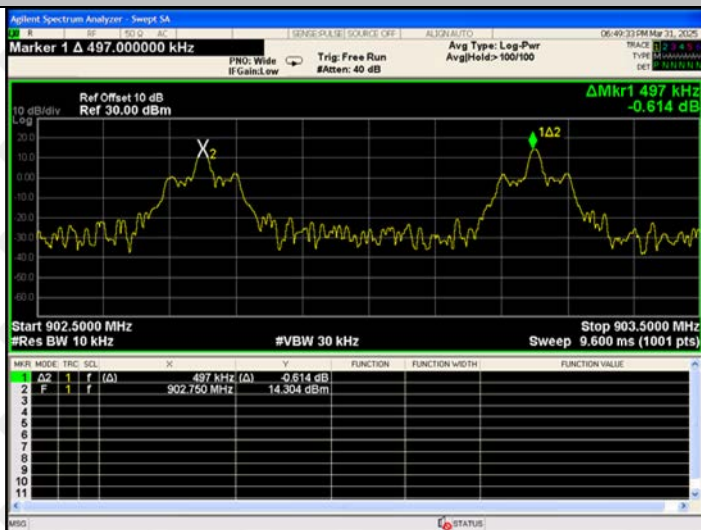
HCH



ANT2:

### Graphs

LCH



MCH



HCH



ANT3:

### Graphs

LCH



MCH



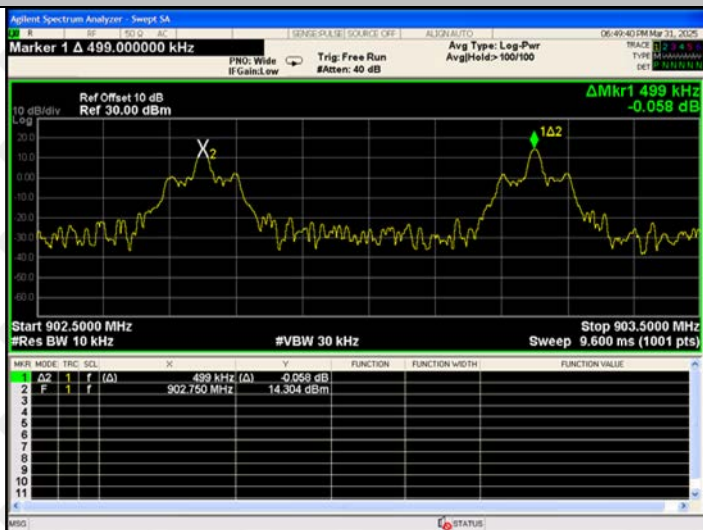
HCH



ANT4:

### Graphs

LCH



MCH



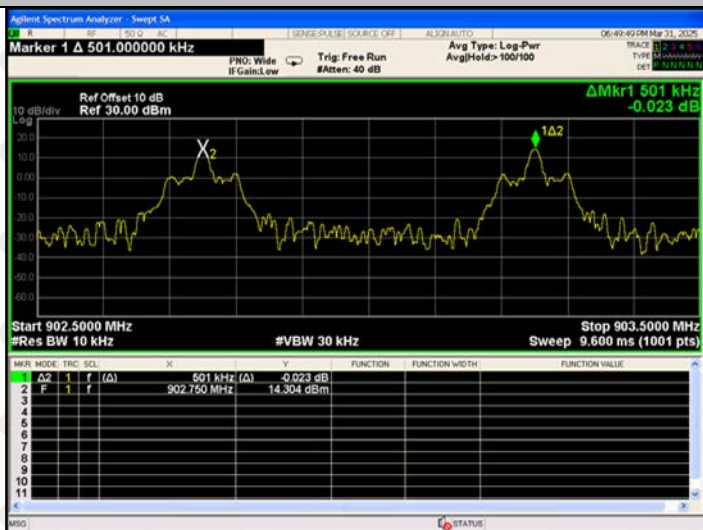
HCH



ANT5:

### Graphs

LCH



MCH



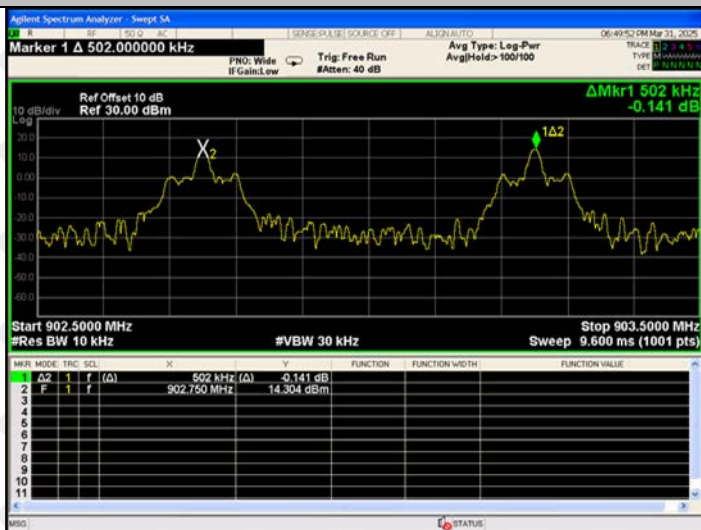
HCH



ANT6:

### Graphs

LCH



MCH

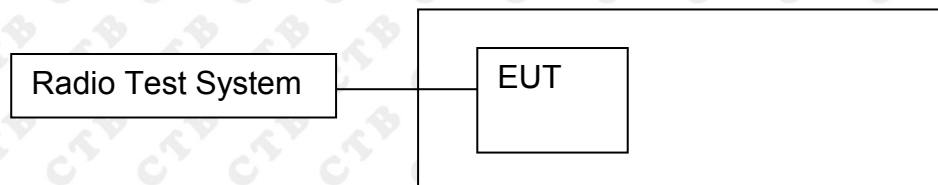


HCH



## 12. HOPPING CHANNEL NUMBER

### 12.1 Block Diagram Of Test Setup



### 12.2 Limit

Frequency hopping systems in the 920-928 MHz band shall use at least 50 channels.

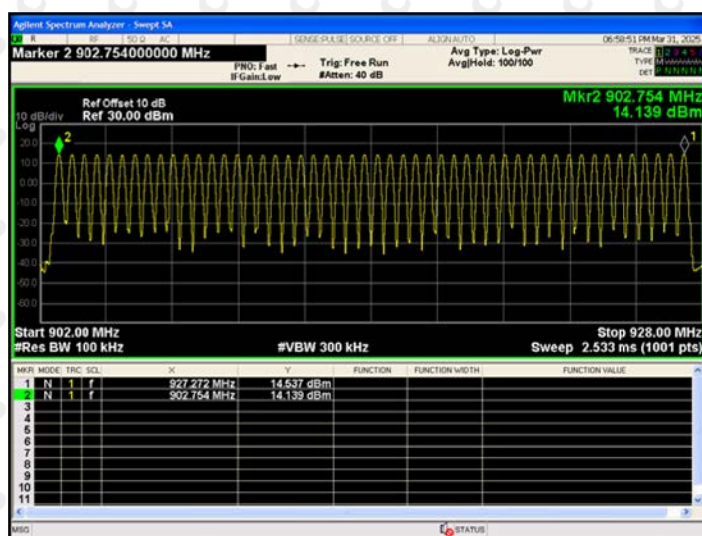
### 12.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

## 12.4 Test Result

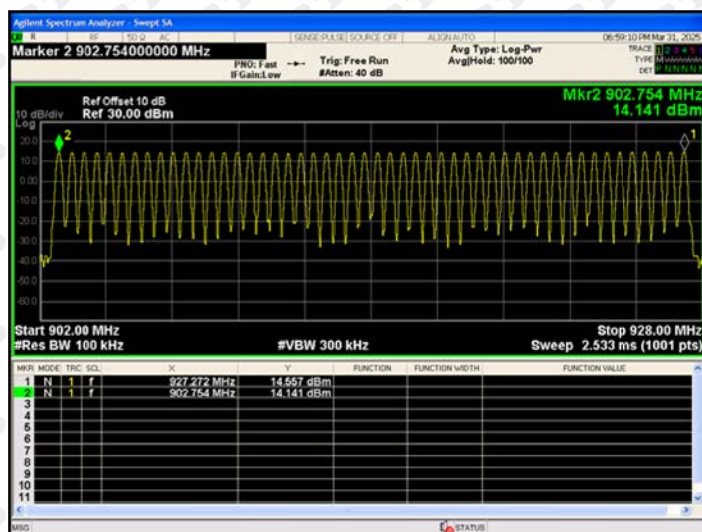
ANT1:

| Mode | Channel. | Number of Hopping Channel | Verdict |
|------|----------|---------------------------|---------|
| ASK  | Hop      | 50                        | PASS    |



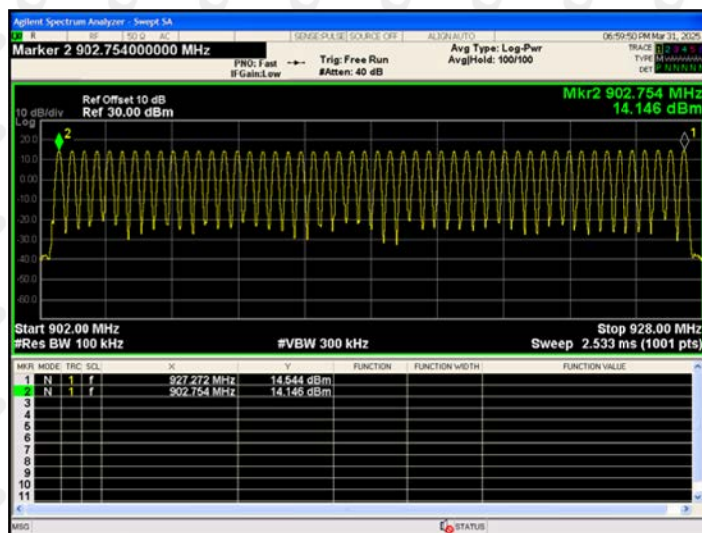
ANT2:

| Mode | Channel. | Number of Hopping Channel | Verdict |
|------|----------|---------------------------|---------|
| ASK  | Hop      | 50                        | PASS    |



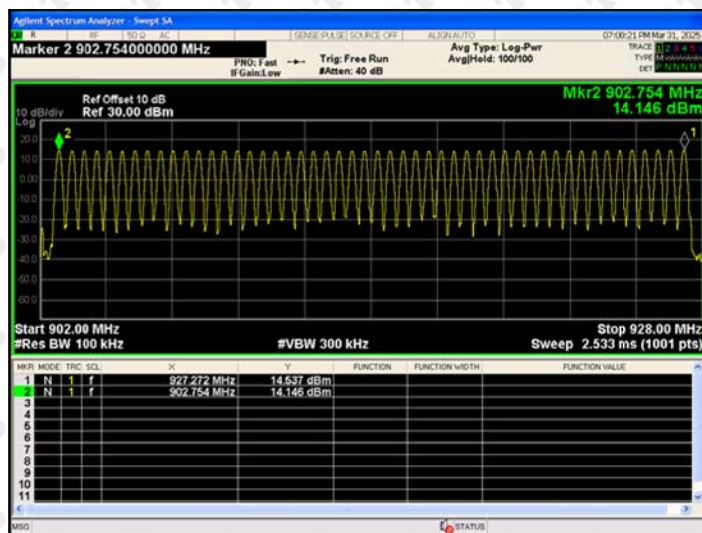
ANT3:

| Mode | Channel. | Number of Hopping Channel | Verdict |
|------|----------|---------------------------|---------|
| ASK  | Hop      | 50                        | PASS    |



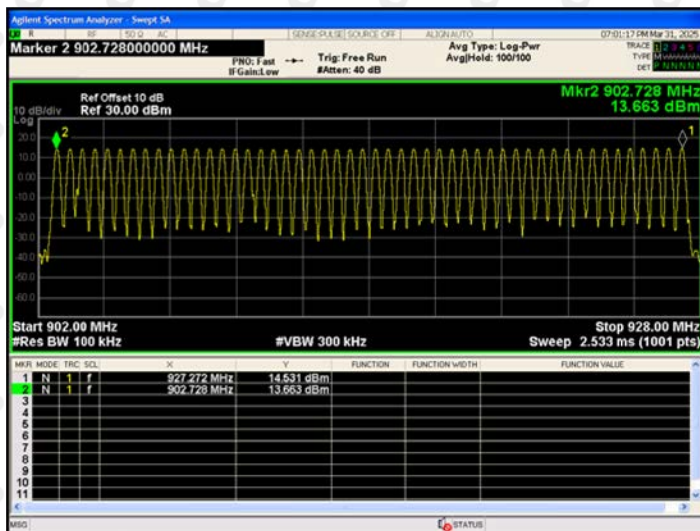
ANT4:

| Mode | Channel. | Number of Hopping Channel | Verdict |
|------|----------|---------------------------|---------|
| ASK  | Hop      | 50                        | PASS    |



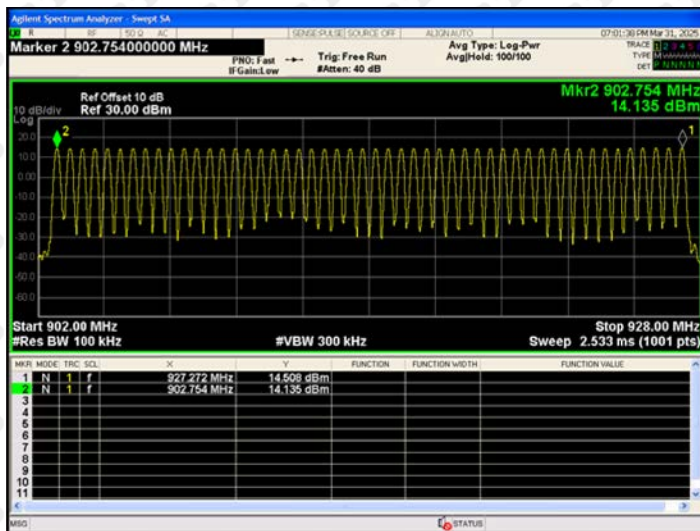
ANT5:

| Mode | Channel. | Number of Hopping Channel | Verdict |
|------|----------|---------------------------|---------|
| ASK  | Hop      | 50                        | PASS    |



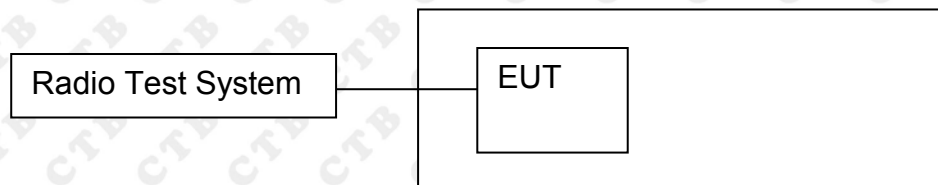
ANT6:

| Mode | Channel. | Number of Hopping Channel | Verdict |
|------|----------|---------------------------|---------|
| ASK  | Hop      | 50                        | PASS    |



### 13. DWELL TIME

#### 13.1 Block Diagram Of Test Setup



#### 13.2 Limit

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

#### 13.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0. Centred on a hopping channel;
3. Set RBW = 1MHz and VBW = 3MHz. Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

#### 13.4 Test Result

ANT1:

| Channel | No. of transmission in 20s(a) | Pulse Time (ms)(b) | Total Dwell Time in 20s (ms) (c) | Limit (ms) | Verdict |
|---------|-------------------------------|--------------------|----------------------------------|------------|---------|
| LCH     | 11                            | 28.00              | 308                              | 400        | PASS    |
| MCH     | 11                            | 25.00              | 275                              | 400        | PASS    |
| HCH     | 11                            | 36.00              | 396                              | 400        | PASS    |

Remark: Total dwell time in 20s, c=(a)\*(b)

ANT2:

| Channel | No. of transmission in 20s(a) | Pulse Time (ms)(b) | Total Dwell Time in 20s (ms) (c) | Limit (ms) | Verdict |
|---------|-------------------------------|--------------------|----------------------------------|------------|---------|
| LCH     | 11                            | 26.00              | 286                              | 400        | PASS    |
| MCH     | 11                            | 35.50              | 390.5                            | 400        | PASS    |
| HCH     | 11                            | 24.50              | 269.5                            | 400        | PASS    |

Remark: Total dwell time in 20s, c=(a)\*(b)

## ANT3:

| Channel | No. of transmission in 20s(a) | Pulse Time (ms)(b) | Total Dwell Time in 20s (ms) (c) | Limit (ms) | Verdict |
|---------|-------------------------------|--------------------|----------------------------------|------------|---------|
| LCH     | 11                            | 28.00              | 308                              | 400        | PASS    |
| MCH     | 12                            | 33.00              | 396                              | 400        | PASS    |
| HCH     | 11                            | 23.00              | 253                              | 400        | PASS    |

Remark: Total dwell time in 20s,  $c=(a)*(b)$

## ANT4:

| Channel | No. of transmission in 20s(a) | Pulse Time (ms)(b) | Total Dwell Time in 20s (ms) (c) | Limit (ms) | Verdict |
|---------|-------------------------------|--------------------|----------------------------------|------------|---------|
| LCH     | 12                            | 23.00              | 276                              | 400        | PASS    |
| MCH     | 12                            | 24.00              | 288                              | 400        | PASS    |
| HCH     | 11                            | 25.00              | 275                              | 400        | PASS    |

Remark: Total dwell time in 20s,  $c=(a)*(b)$

## ANT5:

| Channel | No. of transmission in 20s(a) | Pulse Time (ms)(b) | Total Dwell Time in 20s (ms) (c) | Limit (ms) | Verdict |
|---------|-------------------------------|--------------------|----------------------------------|------------|---------|
| LCH     | 12                            | 27.00              | 324                              | 400        | PASS    |
| MCH     | 12                            | 21.50              | 258                              | 400        | PASS    |
| HCH     | 11                            | 26.50              | 291.5                            | 400        | PASS    |

Remark: Total dwell time in 20s,  $c=(a)*(b)$

## ANT6:

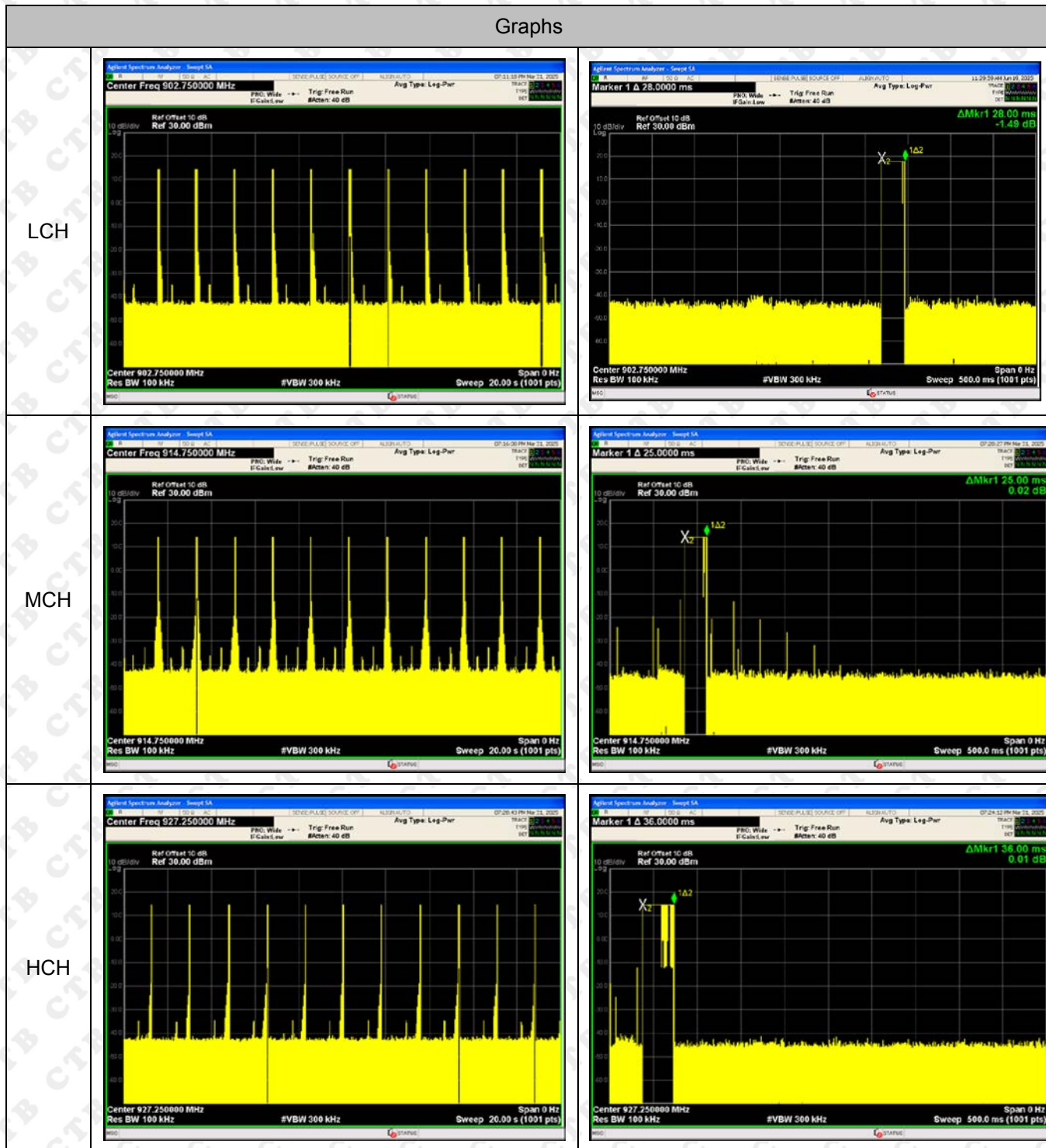
| Channel | No. of transmission in 20s(a) | Pulse Time (ms)(b) | Total Dwell Time in 20s (ms) (c) | Limit (ms) | Verdict |
|---------|-------------------------------|--------------------|----------------------------------|------------|---------|
| LCH     | 12                            | 27.00              | 324                              | 400        | PASS    |
| MCH     | 12                            | 20.50              | 246                              | 400        | PASS    |
| HCH     | 11                            | 21.50              | 263.5                            | 400        | PASS    |

Remark: Total dwell time in 20s,  $c=(a)*(b)$

# Test Graph

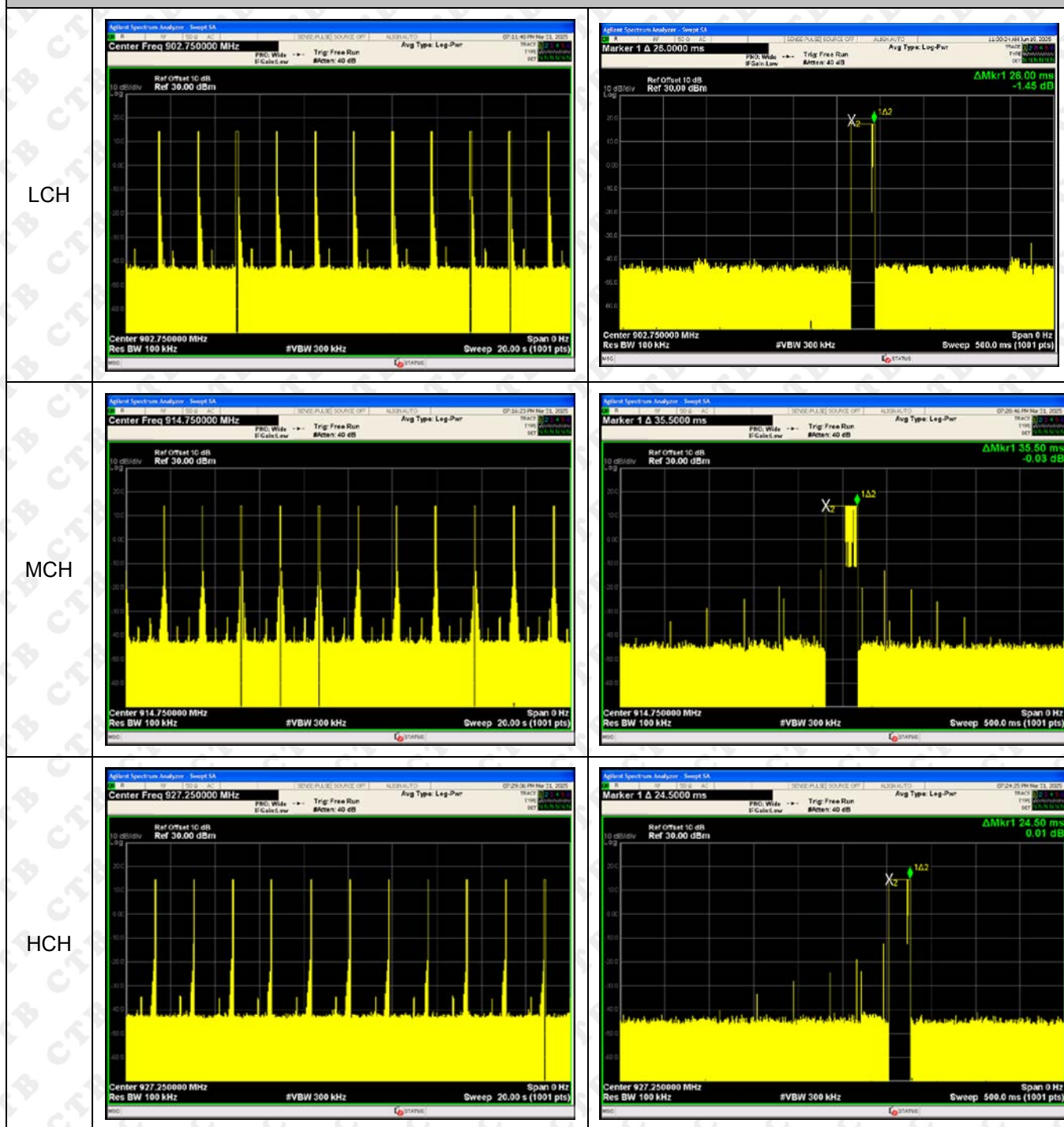
ANT1:

## Graphs



ANT2:

### Graphs



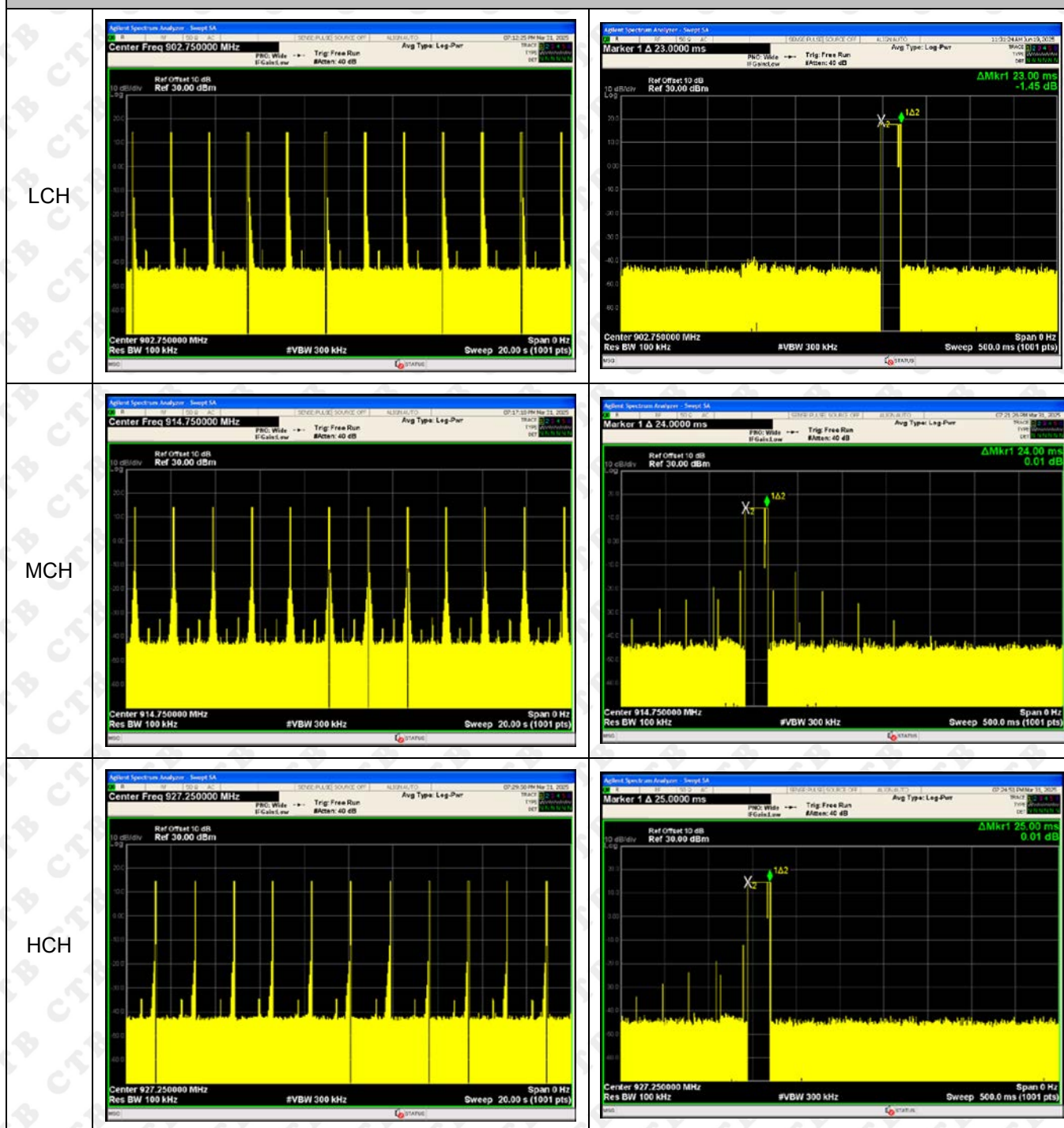
ANT3:

## Graphs



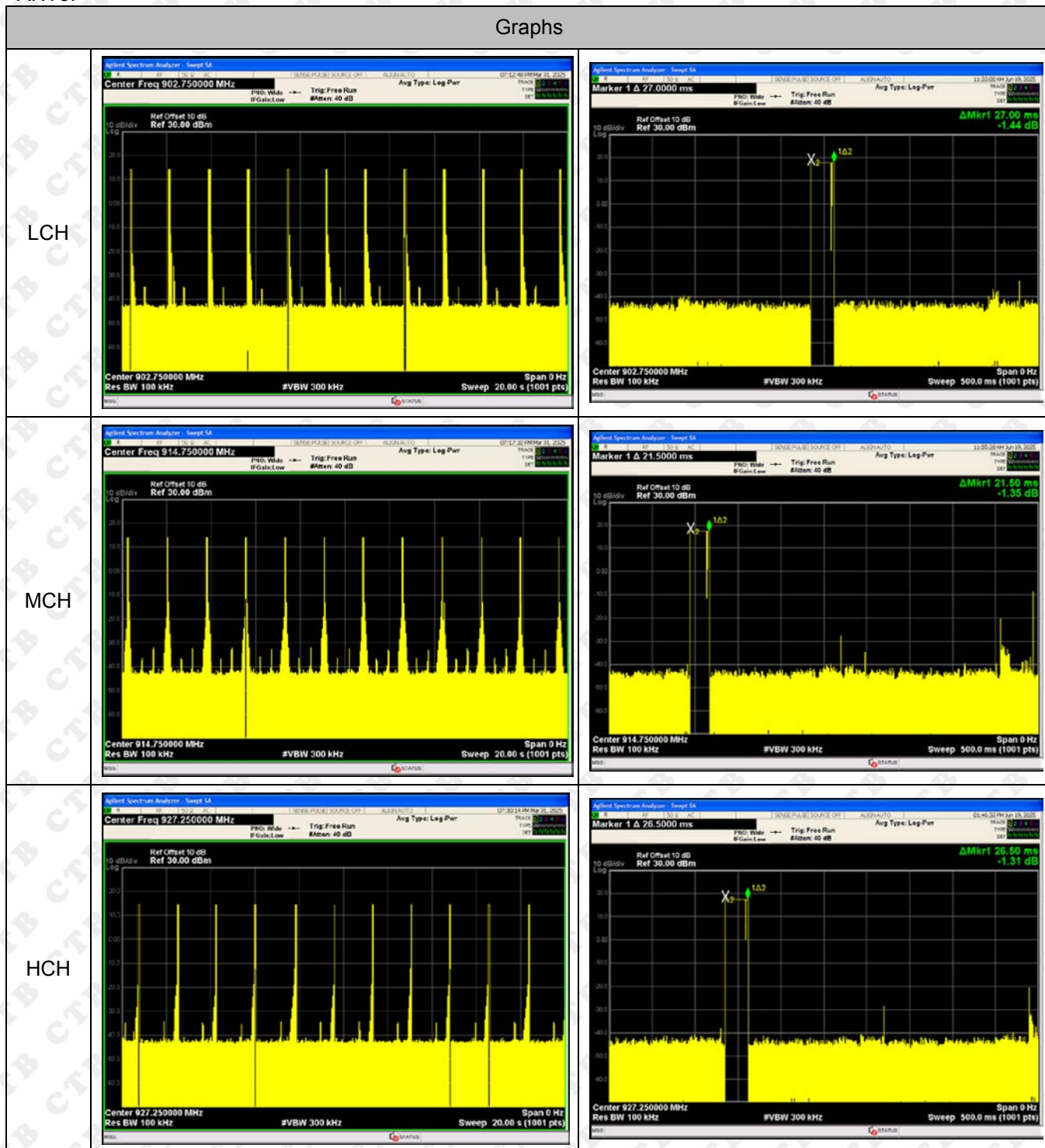
ANT4:

## Graphs



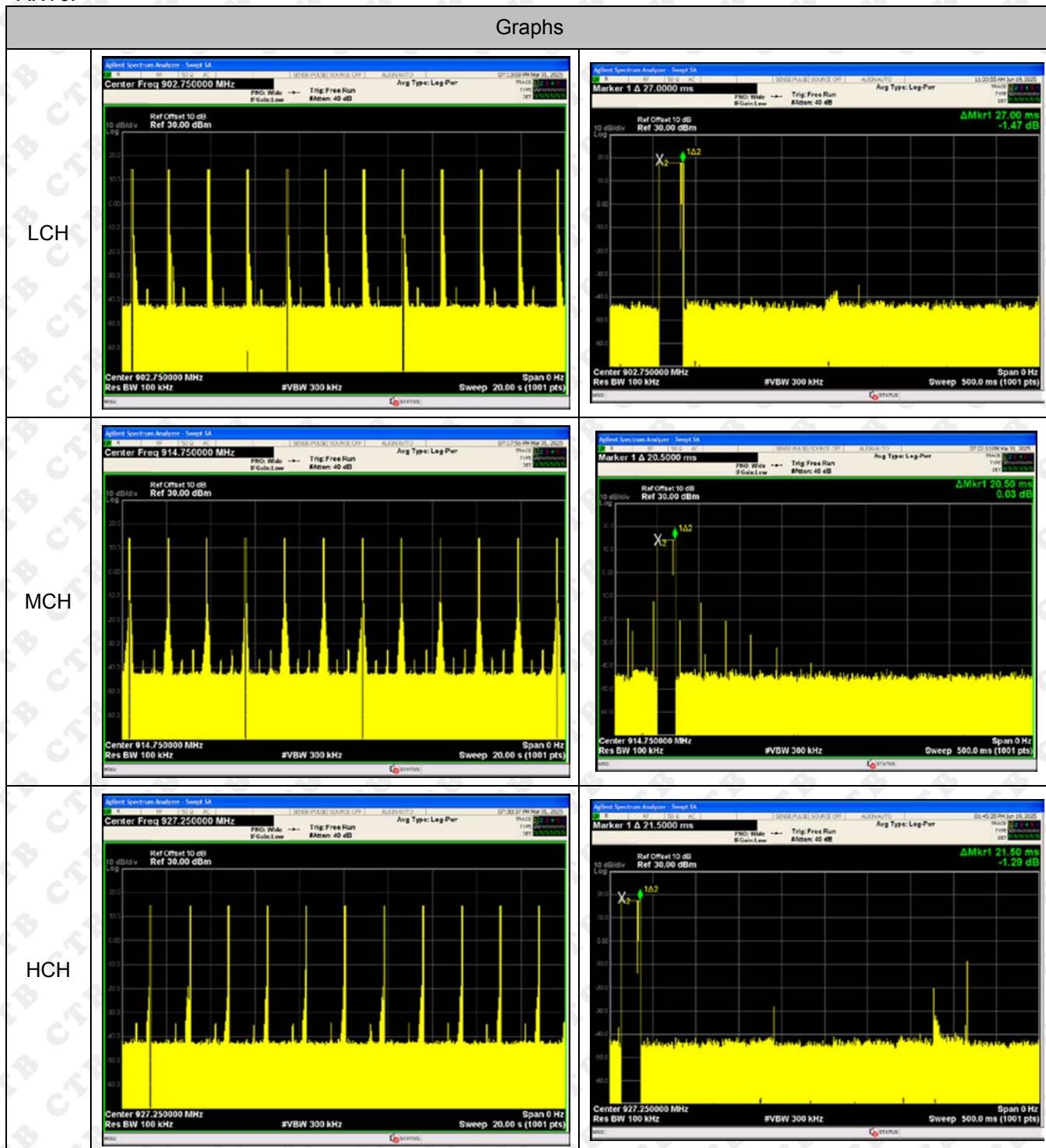
ANT5:

## Graphs



ANT6:

## Graphs



#### 14. ANTENNA REQUIREMENT

##### 15.203 requirement:

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

##### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

##### EUT Antenna:

The antenna is Internal Antenna and no consideration of replacement. The best case gain of the antenna is Ant 1: 10.5dBi; Ant 2: 10.5dBi; Ant 3: 10.5dBi; Ant 4: 10.5dBi; Ant 5: 9dBi; Ant 6: 9dBi.

## 15. EUT TEST SETUP PHOTOGRAPHS

### Radiated Emission

Below 1G



Above 1G



## Conducted emission



\*\*\*\*\* END OF REPORT \*\*\*\*\*