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## **Appendix for GSM 850**

**Applicant: Howen Technologies Co., Ltd.**

**Address: Room 2001 & 2004, Building 2A, Shenzhen International  
Innovation Valley, Dashi 1st Road, Nanshan District, Shenzhen,  
China**

**Product Name: Mobile Digital Video Recorder**

**Model: Hero-ME41-02, Hero-ME35-04, Hero-ME35-08, Hero-ME36-  
04, Hero-ME36-06, Hero-ME37-04, Hero-ME40-04, Hero-ME41-03,  
Hero-ME41-04, Hero-ME41-08, Hero-MA80-08**

**FCC ID: 2AGBD-HERO-ME41-02**

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## 1. Conducted Output Power

### 1.1 Test Result

#### 1.1.1 GSM850

| Band: GSM850 |         |            |                 |                       |         |
|--------------|---------|------------|-----------------|-----------------------|---------|
| ENV          | Mode    |            | Frequency (MHz) | Conducted Power (dBm) | Verdict |
|              | Network | Subset     |                 |                       |         |
| NTNV         | GPRS    | 1 TX Slot  | 824.2           | 32.86                 | Pass    |
|              |         | 2 TX Slots | 824.2           | 32.56                 | Pass    |
|              |         | 3 TX Slots | 824.2           | 32.87                 | Pass    |
|              |         | 4 TX Slots | 824.2           | 32.90                 | Pass    |
|              |         | 1 TX Slot  | 836.6           | 33.21                 | Pass    |
|              |         | 2 TX Slots | 836.6           | 32.82                 | Pass    |
|              |         | 3 TX Slots | 836.6           | 30.29                 | Pass    |
|              |         | 4 TX Slots | 836.6           | 29.00                 | Pass    |
|              |         | 1 TX Slot  | 848.8           | <b>33.39</b>          | Pass    |
|              |         | 2 TX Slots | 848.8           | 32.81                 | Pass    |
|              |         | 3 TX Slots | 848.8           | 30.23                 | Pass    |
|              |         | 4 TX Slots | 848.8           | 28.98                 | Pass    |
|              | EGPRS   | 1 TX Slot  | 824.2           | 27.95                 | Pass    |
|              |         | 2 TX Slots | 824.2           | 26.71                 | Pass    |
|              |         | 3 TX Slots | 824.2           | 26.60                 | Pass    |
|              |         | 4 TX Slots | 824.2           | 25.33                 | Pass    |
|              |         | 1 TX Slot  | 836.6           | 27.71                 | Pass    |
|              |         | 2 TX Slots | 836.6           | 27.93                 | Pass    |
|              |         | 3 TX Slots | 836.6           | 24.34                 | Pass    |
|              |         | 4 TX Slots | 836.6           | 22.92                 | Pass    |
|              |         | 1 TX Slot  | 848.8           | 27.58                 | Pass    |
|              |         | 2 TX Slots | 848.8           | 26.43                 | Pass    |
|              |         | 3 TX Slots | 848.8           | 25.31                 | Pass    |
|              |         | 4 TX Slots | 848.8           | 22.91                 | Pass    |

## 2. Frequency Stability

### 2.1 Test Result

#### 2.1.1 GSM850

| Band: GSM850 |                 |            |               |                  |                       |             |         |
|--------------|-----------------|------------|---------------|------------------|-----------------------|-------------|---------|
| Network      | Frequency (MHz) | Temp. (°C) | Voltage (VDC) | Freq. Error (Hz) | Freq. vs. Rated (ppm) |             | Verdict |
|              |                 |            |               |                  | Result                | Limit       |         |
| GPRS         | 824.2           | 20         | 3.27          | 13.269           | 0.0161                | -2.5 to 2.5 | Pass    |
|              |                 |            | 3.85          | 9.879            | 0.0120                | -2.5 to 2.5 | Pass    |
|              |                 |            | 4.43          | 10.557           | 0.0128                | -2.5 to 2.5 | Pass    |
|              |                 | -40        | 3.85          | 9.750            | 0.0118                | -2.5 to 2.5 | Pass    |
|              |                 | -30        | 3.85          | 9.427            | 0.0114                | -2.5 to 2.5 | Pass    |
|              |                 | -20        | 3.85          | 8.039            | 0.0098                | -2.5 to 2.5 | Pass    |
|              |                 | -10        | 3.85          | 10.299           | 0.0125                | -2.5 to 2.5 | Pass    |
|              |                 | 0          | 3.85          | 8.104            | 0.0098                | -2.5 to 2.5 | Pass    |
|              |                 | 10         | 3.85          | 8.136            | 0.0099                | -2.5 to 2.5 | Pass    |
|              |                 | 30         | 3.85          | 11.526           | 0.0140                | -2.5 to 2.5 | Pass    |

|       |       |     |      |        |        |             |      |
|-------|-------|-----|------|--------|--------|-------------|------|
|       |       | 40  | 3.85 | 9.331  | 0.0113 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.85 | 8.685  | 0.0105 | -2.5 to 2.5 | Pass |
|       |       | 60  | 3.85 | 10.009 | 0.0121 | -2.5 to 2.5 | Pass |
|       |       | 70  | 3.85 | 9.492  | 0.0115 | -2.5 to 2.5 | Pass |
|       | 836.6 | 20  | 3.27 | 9.460  | 0.0113 | -2.5 to 2.5 | Pass |
|       |       |     | 3.85 | 11.752 | 0.0140 | -2.5 to 2.5 | Pass |
|       |       |     | 4.43 | 12.333 | 0.0147 | -2.5 to 2.5 | Pass |
|       |       | -40 | 3.85 | 12.785 | 0.0153 | -2.5 to 2.5 | Pass |
|       |       | -30 | 3.85 | 11.591 | 0.0139 | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.85 | 9.395  | 0.0112 | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.85 | 12.333 | 0.0147 | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.85 | 10.299 | 0.0123 | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.85 | 10.428 | 0.0125 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.85 | 11.752 | 0.0140 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.85 | 11.784 | 0.0141 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.85 | 11.397 | 0.0136 | -2.5 to 2.5 | Pass |
|       |       | 60  | 3.85 | 10.977 | 0.0131 | -2.5 to 2.5 | Pass |
|       |       | 70  | 3.85 | 11.235 | 0.0134 | -2.5 to 2.5 | Pass |
|       | 848.8 | 20  | 3.27 | 11.558 | 0.0136 | -2.5 to 2.5 | Pass |
|       |       |     | 3.85 | 13.980 | 0.0165 | -2.5 to 2.5 | Pass |
|       |       |     | 4.43 | 11.300 | 0.0133 | -2.5 to 2.5 | Pass |
|       |       | -40 | 3.85 | 12.269 | 0.0145 | -2.5 to 2.5 | Pass |
|       |       | -30 | 3.85 | 11.429 | 0.0135 | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.85 | 12.139 | 0.0143 | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.85 | 11.558 | 0.0136 | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.85 | 11.009 | 0.0130 | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.85 | 13.528 | 0.0159 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.85 | 11.268 | 0.0133 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.85 | 10.138 | 0.0119 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.85 | 12.398 | 0.0146 | -2.5 to 2.5 | Pass |
|       |       | 60  | 3.85 | 9.783  | 0.0115 | -2.5 to 2.5 | Pass |
|       |       | 70  | 3.85 | 10.654 | 0.0126 | -2.5 to 2.5 | Pass |
| EGPRS | 824.2 | 20  | 3.27 | 14.464 | 0.0175 | -2.5 to 2.5 | Pass |
|       |       |     | 3.85 | 14.077 | 0.0171 | -2.5 to 2.5 | Pass |
|       |       |     | 4.43 | 12.075 | 0.0147 | -2.5 to 2.5 | Pass |
|       |       | -40 | 3.85 | 11.849 | 0.0144 | -2.5 to 2.5 | Pass |
|       |       | -30 | 3.85 | 14.496 | 0.0176 | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.85 | 13.108 | 0.0159 | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.85 | 13.786 | 0.0167 | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.85 | 13.205 | 0.0160 | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.85 | 12.333 | 0.0150 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.85 | 11.009 | 0.0134 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.85 | 11.365 | 0.0138 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.85 | 12.204 | 0.0148 | -2.5 to 2.5 | Pass |
|       |       | 60  | 3.85 | 13.689 | 0.0166 | -2.5 to 2.5 | Pass |
|       |       | 70  | 3.85 | 14.303 | 0.0174 | -2.5 to 2.5 | Pass |
|       | 836.6 | 20  | 3.27 | 11.978 | 0.0143 | -2.5 to 2.5 | Pass |
|       |       |     | 3.85 | 14.335 | 0.0171 | -2.5 to 2.5 | Pass |
|       |       |     | 4.43 | 13.851 | 0.0166 | -2.5 to 2.5 | Pass |
|       |       | -40 | 3.85 | 12.139 | 0.0145 | -2.5 to 2.5 | Pass |
|       |       | -30 | 3.85 | 12.591 | 0.0151 | -2.5 to 2.5 | Pass |
|       |       | -20 | 3.85 | 11.332 | 0.0135 | -2.5 to 2.5 | Pass |
|       |       | -10 | 3.85 | 11.687 | 0.0140 | -2.5 to 2.5 | Pass |
|       |       | 0   | 3.85 | 13.043 | 0.0156 | -2.5 to 2.5 | Pass |
|       |       | 10  | 3.85 | 12.979 | 0.0155 | -2.5 to 2.5 | Pass |
|       |       | 30  | 3.85 | 13.011 | 0.0156 | -2.5 to 2.5 | Pass |
|       |       | 40  | 3.85 | 11.623 | 0.0139 | -2.5 to 2.5 | Pass |
|       |       | 50  | 3.85 | 10.202 | 0.0122 | -2.5 to 2.5 | Pass |
|       |       | 60  | 3.85 | 11.332 | 0.0135 | -2.5 to 2.5 | Pass |

|  |       |     |      |        |        |             |      |
|--|-------|-----|------|--------|--------|-------------|------|
|  | 848.8 | 70  | 3.85 | 12.914 | 0.0154 | -2.5 to 2.5 | Pass |
|  |       | 20  | 3.27 | 10.493 | 0.0124 | -2.5 to 2.5 | Pass |
|  |       |     | 3.85 | 10.751 | 0.0127 | -2.5 to 2.5 | Pass |
|  |       |     | 4.43 | 10.138 | 0.0119 | -2.5 to 2.5 | Pass |
|  |       |     |      |        |        |             |      |
|  |       | -40 | 3.85 | 10.783 | 0.0127 | -2.5 to 2.5 | Pass |
|  |       | -30 | 3.85 | 10.073 | 0.0119 | -2.5 to 2.5 | Pass |
|  |       | -20 | 3.85 | 11.849 | 0.0140 | -2.5 to 2.5 | Pass |
|  |       | -10 | 3.85 | 11.655 | 0.0137 | -2.5 to 2.5 | Pass |
|  |       | 0   | 3.85 | 12.269 | 0.0145 | -2.5 to 2.5 | Pass |
|  |       | 10  | 3.85 | 12.882 | 0.0152 | -2.5 to 2.5 | Pass |
|  |       | 30  | 3.85 | 12.301 | 0.0145 | -2.5 to 2.5 | Pass |
|  |       | 40  | 3.85 | 11.332 | 0.0134 | -2.5 to 2.5 | Pass |
|  |       | 50  | 3.85 | 9.879  | 0.0116 | -2.5 to 2.5 | Pass |
|  |       | 60  | 3.85 | 8.039  | 0.0095 | -2.5 to 2.5 | Pass |
|  |       | 70  | 3.85 | 10.557 | 0.0124 | -2.5 to 2.5 | Pass |

### 3. 99% & 26dB Bandwidth

#### 3.1 Test Result

##### 3.1.1 GSM850\_OBW

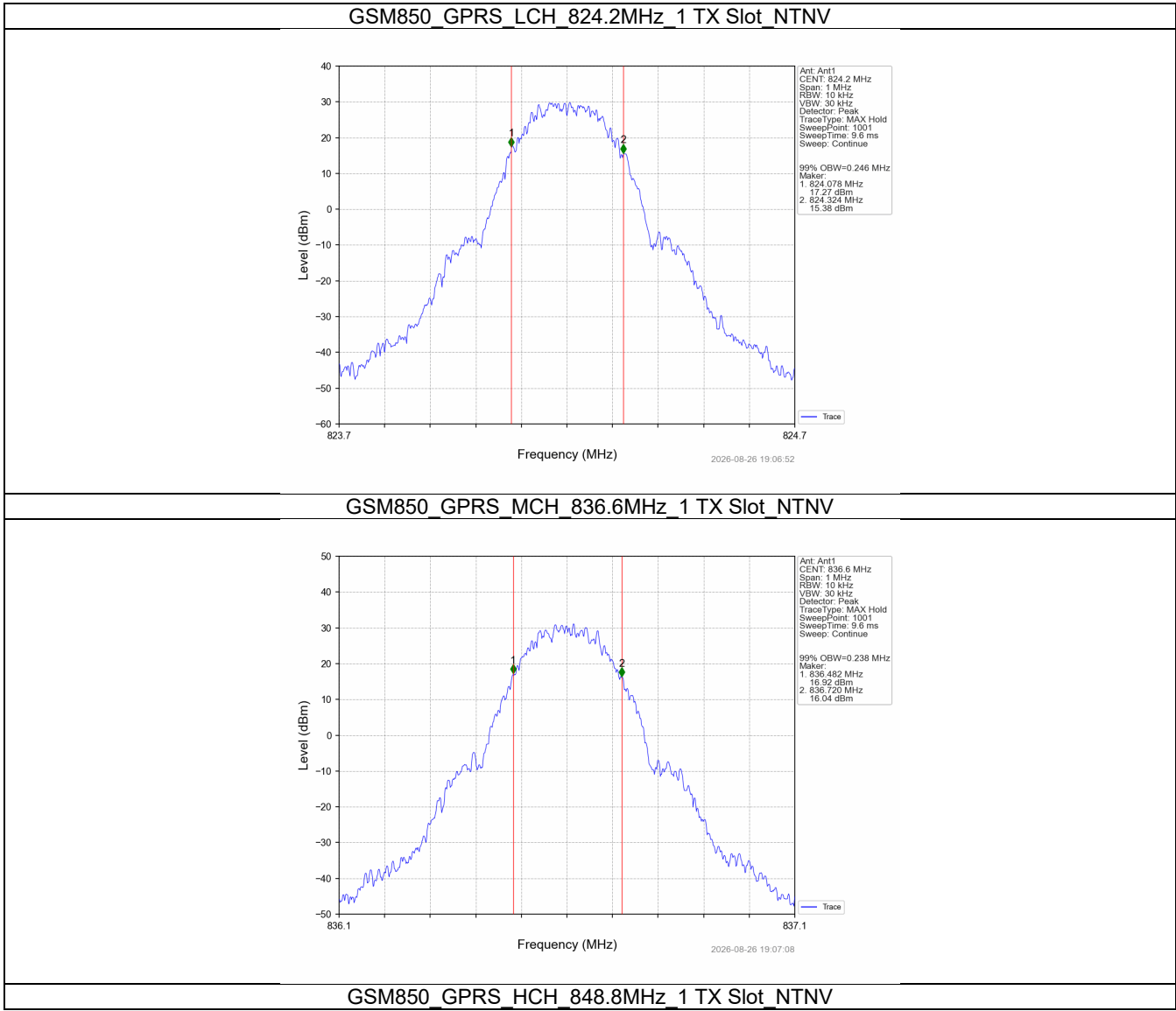
| Band: GSM850 |         |           |                 |                              |       |         |
|--------------|---------|-----------|-----------------|------------------------------|-------|---------|
| ENV          | Mode    |           | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |       | Verdict |
|              | Network | Subset    |                 | Result                       | Limit |         |
| NTNV         | GPRS    | 1 TX Slot | 824.2           | 0.246                        | /     | Pass    |
|              |         |           | 836.6           | 0.238                        | /     | Pass    |
|              |         |           | 848.8           | 0.241                        | /     | Pass    |
|              | EGPRS   | 1 TX Slot | 824.2           | 0.246                        | /     | Pass    |
|              |         |           | 836.6           | 0.236                        | /     | Pass    |
|              |         |           | 848.8           | 0.240                        | /     | Pass    |

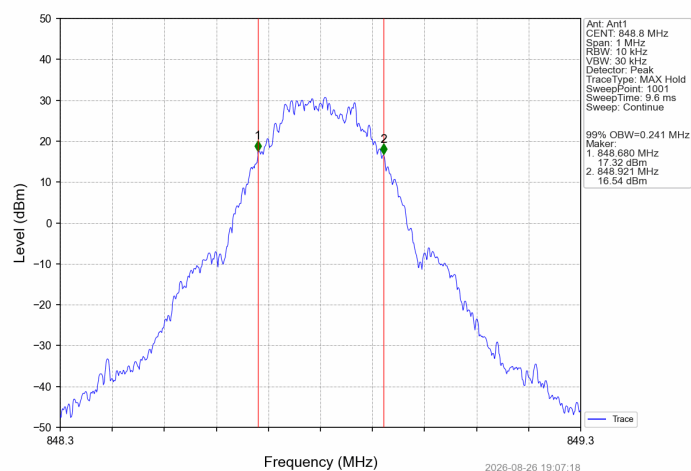
##### 3.1.2 GSM850\_XDB

| Band: GSM850 |         |           |                 |                      |       |         |
|--------------|---------|-----------|-----------------|----------------------|-------|---------|
| ENV          | Mode    |           | Frequency (MHz) | 26dB Bandwidth (MHz) |       | Verdict |
|              | Network | Subset    |                 | Result               | Limit |         |
| NTNV         | GPRS    | 1 TX Slot | 824.2           | 0.320                | /     | Pass    |
|              |         |           | 836.6           | 0.319                | /     | Pass    |
|              |         |           | 848.8           | 0.312                | /     | Pass    |
|              | EGPRS   | 1 TX Slot | 824.2           | 0.317                | /     | Pass    |
|              |         |           | 836.6           | 0.301                | /     | Pass    |
|              |         |           | 848.8           | 0.298                | /     | Pass    |

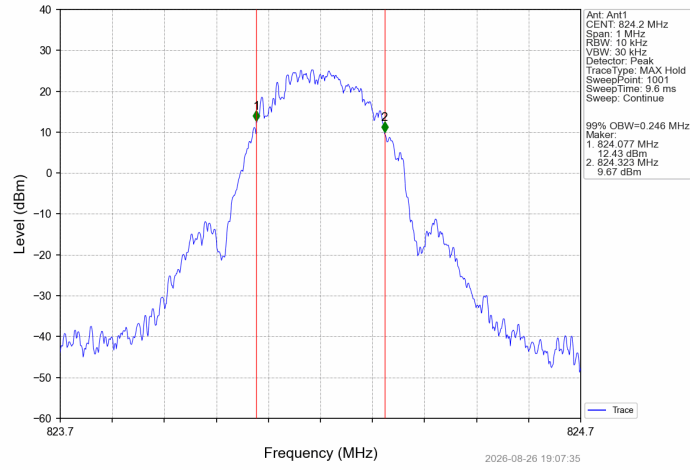
3.2 Test Graph

3.2.1 GSM850\_OBW

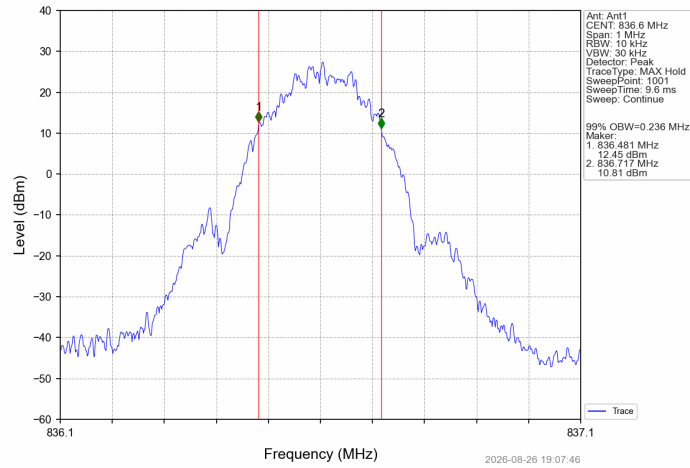




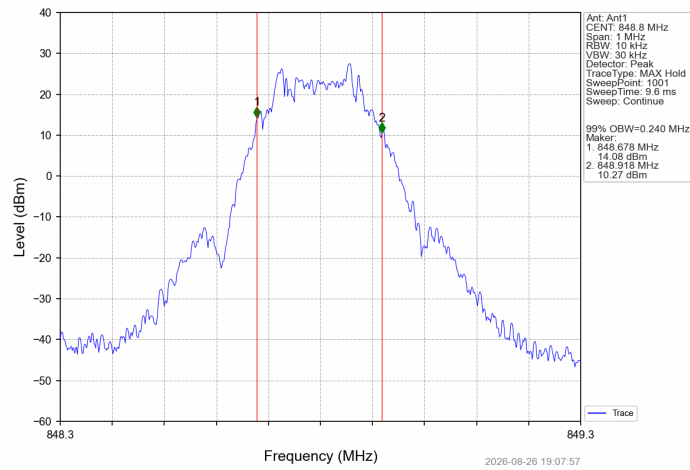
### GSM850\_EGPRS\_LCH\_824.2MHz\_1 TX Slot\_NTNV



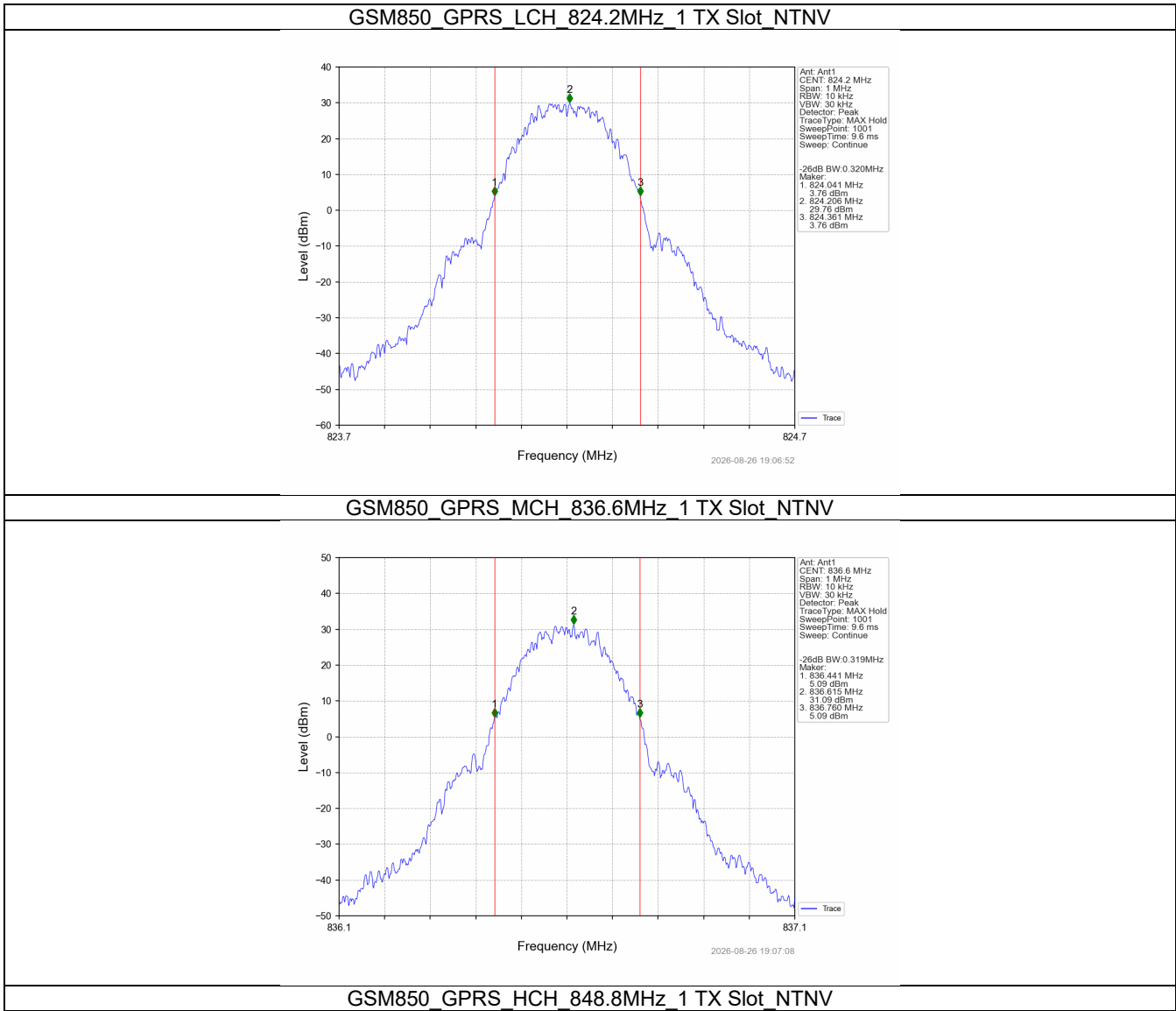
### GSM850\_EGPRS\_MCH\_836.6MHz\_1 TX Slot\_NTNV

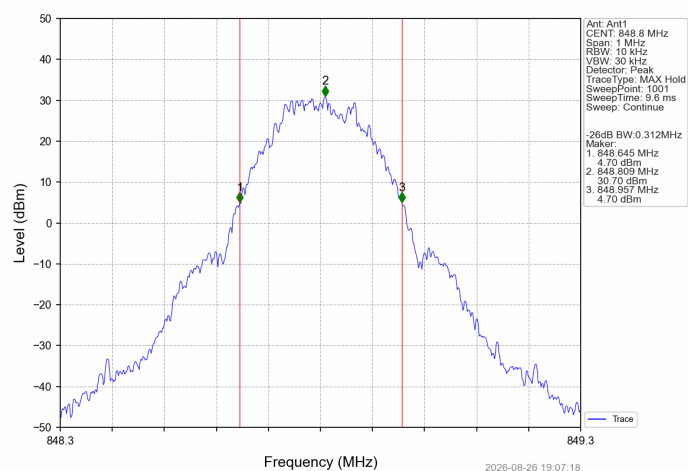


### GSM850\_EGPRS\_HCH\_848.8MHz\_1 TX Slot\_NTNV

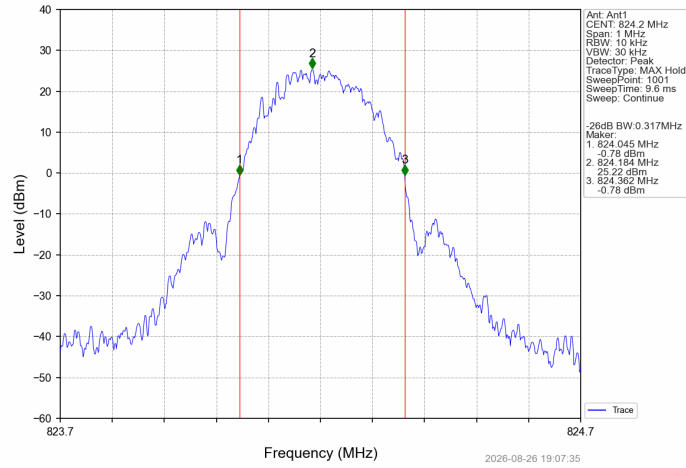


3.2.2 GSM850\_XDB

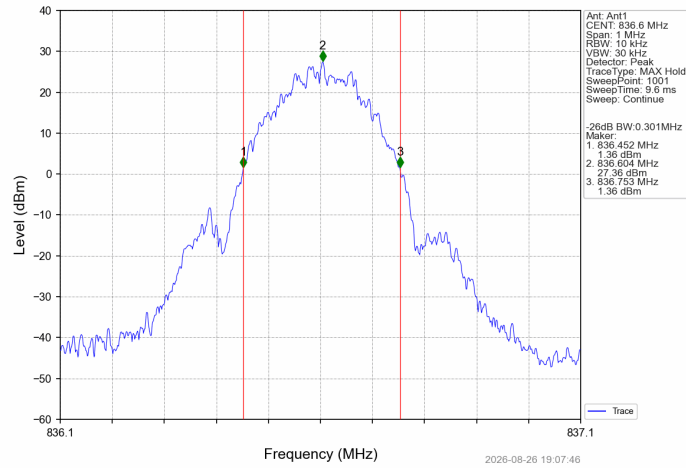




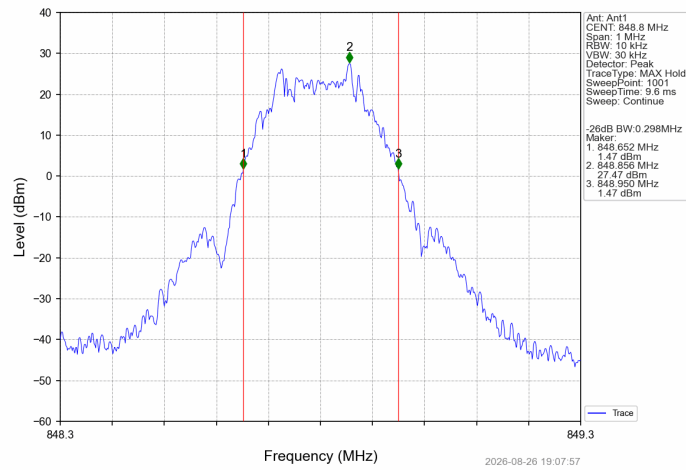
### GSM850\_EGPRS\_LCH\_824.2MHz\_1 TX Slot\_NTNV



### GSM850\_EGPRS\_MCH\_836.6MHz\_1 TX Slot\_NTNV



### GSM850\_EGPRS\_HCH\_848.8MHz\_1 TX Slot\_NTNV



## 4. Peak-Average Ratio

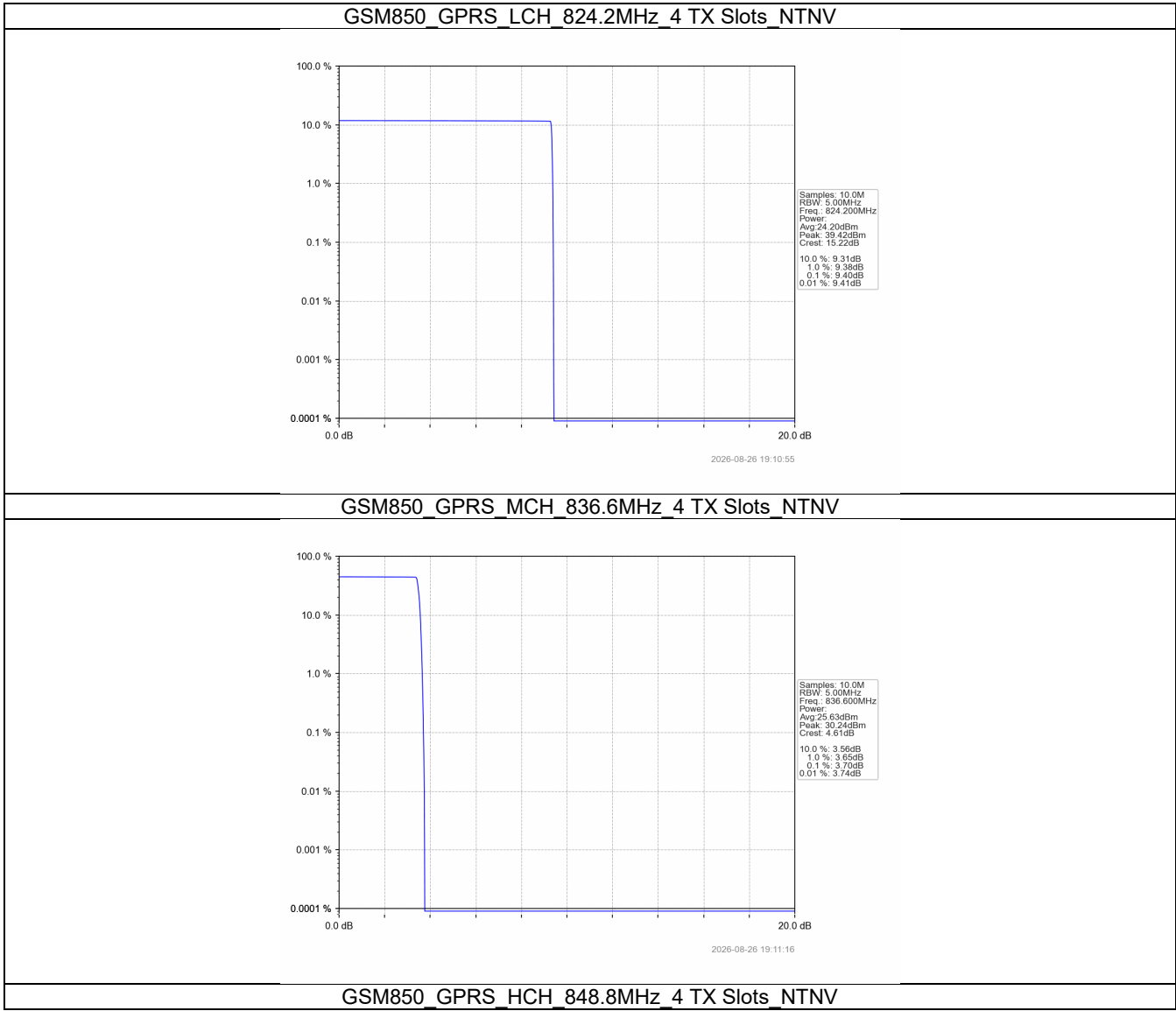
### 4.1 Test Result

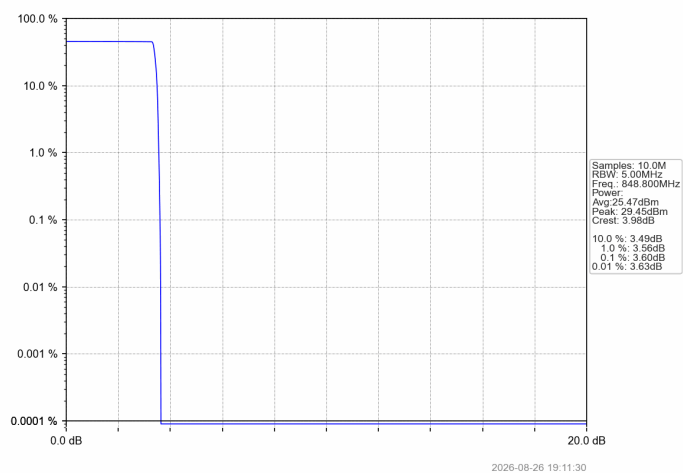
#### 4.1.1 GSM850

| Band: GSM850 |         |            |                    |                         |       |         |
|--------------|---------|------------|--------------------|-------------------------|-------|---------|
| ENV          | Mode    |            | Frequency<br>(MHz) | Peak-Average Ratio (dB) |       | Verdict |
|              | Network | Subset     |                    | Result                  | Limit |         |
| NTNV         | GPRS    | 4 TX Slots | 824.2              | 9.40                    | <=13  | Pass    |
|              |         |            | 836.6              | 3.70                    | <=13  | Pass    |
|              |         |            | 848.8              | 3.60                    | <=13  | Pass    |
|              | EGPRS   | 4 TX Slots | 824.2              | 10.16                   | <=13  | Pass    |
|              |         |            | 836.6              | 10.07                   | <=13  | Pass    |
|              |         |            | 848.8              | 9.69                    | <=13  | Pass    |

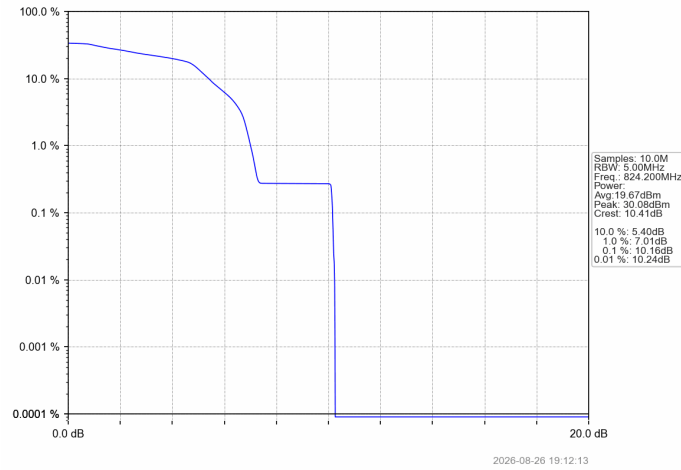
4.2 Test Graph

4.2.1 GSM850

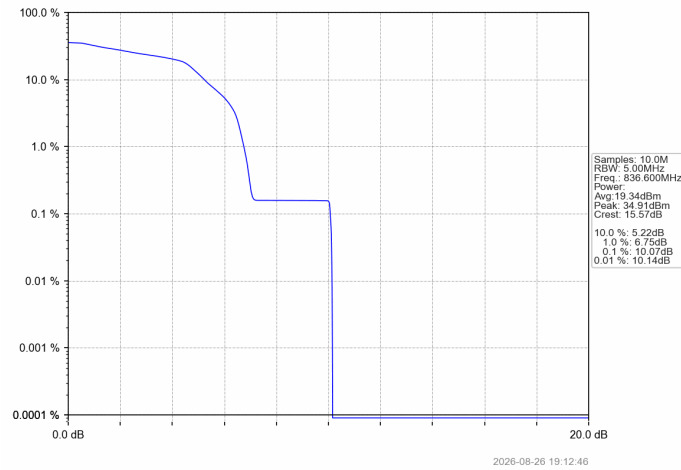




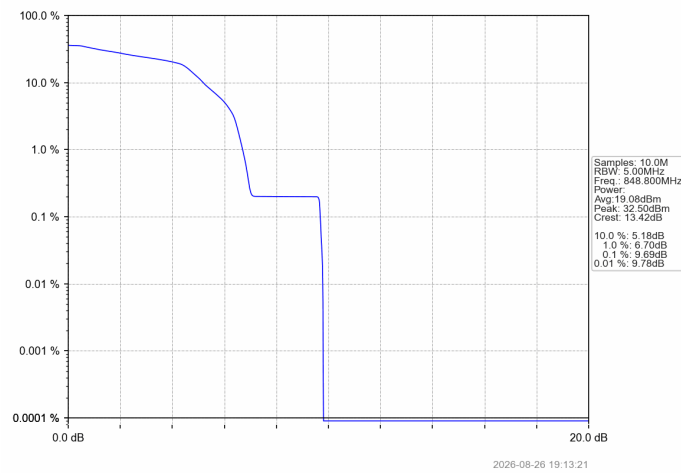
### GSM850\_EGPRS\_LCH\_824.2MHz\_4 TX Slots\_NTNV



### GSM850\_EGPRS\_MCH\_836.6MHz\_4 TX Slots\_NTNV



### GSM850\_EGPRS\_HCH\_848.8MHz\_4 TX Slots\_NTNV



## 5. Spurious Emission and Band Edge

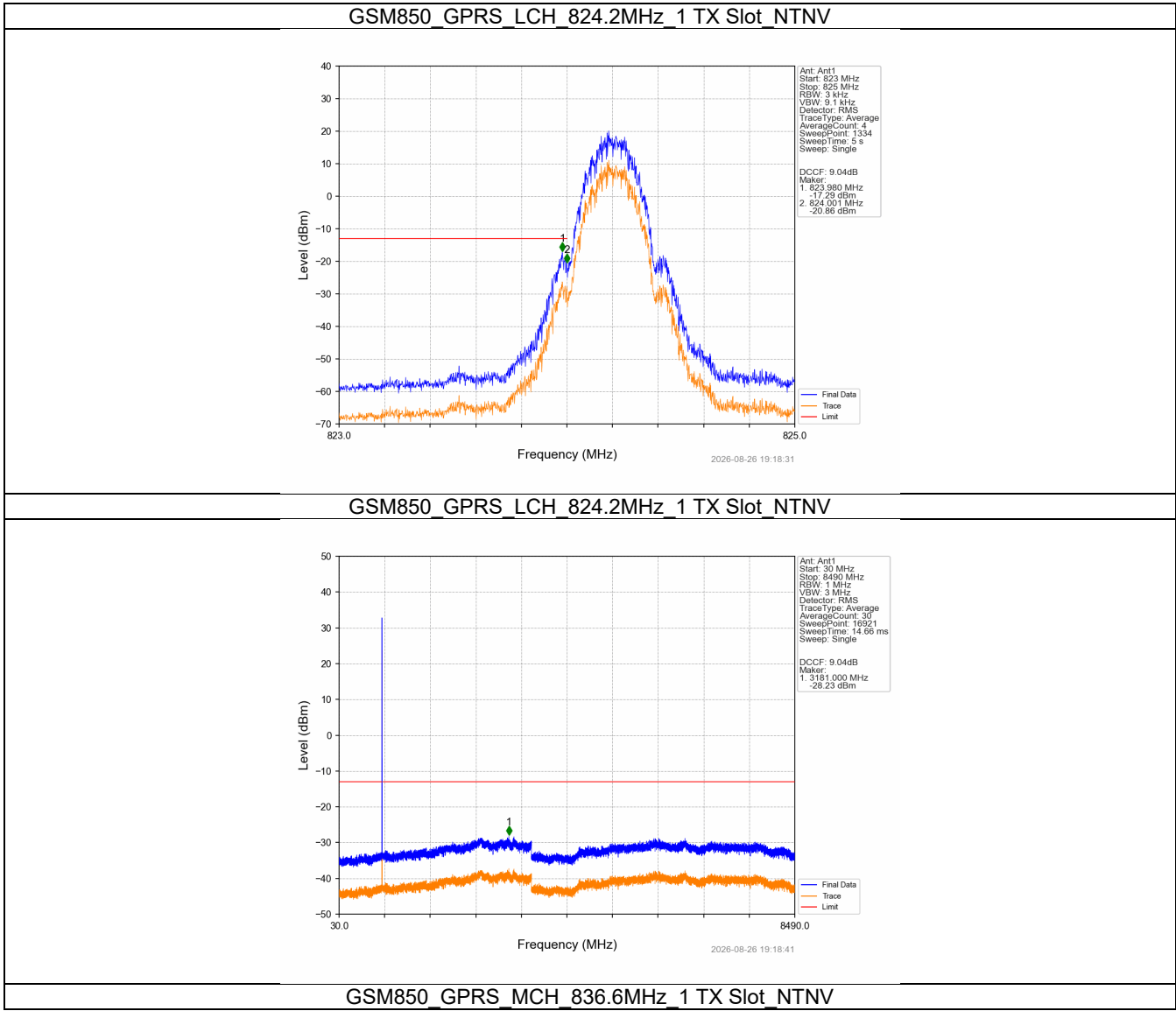
### 5.1 Test Result

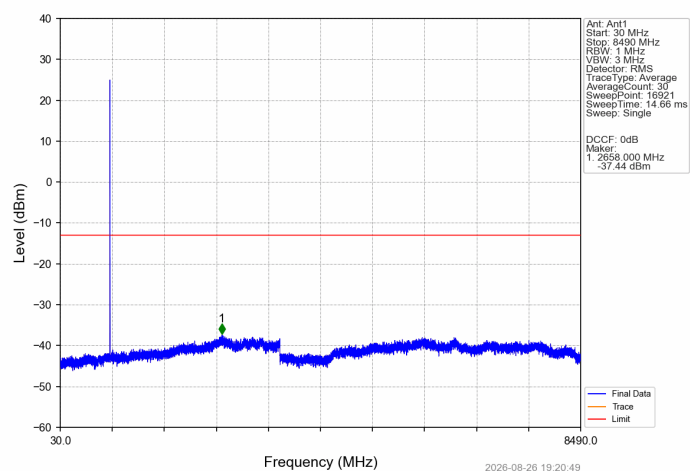
#### 5.1.1 GSM850

| Band: GSM850 |         |           |                    |                     |       |         |
|--------------|---------|-----------|--------------------|---------------------|-------|---------|
| ENV          | Mode    |           | Frequency<br>(MHz) | Spurious Emission   |       | Verdict |
|              | Network | Subset    |                    | Result              | Limit |         |
| NTNV         | GPRS    | 1 TX Slot | 824.2              | Refer To Test Graph |       | Pass    |
|              |         |           | 836.6              | Refer To Test Graph |       | Pass    |
|              |         |           | 848.8              | Refer To Test Graph |       | Pass    |
|              | EGPRS   | 1 TX Slot | 824.2              | Refer To Test Graph |       | Pass    |
|              |         |           | 836.6              | Refer To Test Graph |       | Pass    |
|              |         |           | 848.8              | Refer To Test Graph |       | Pass    |

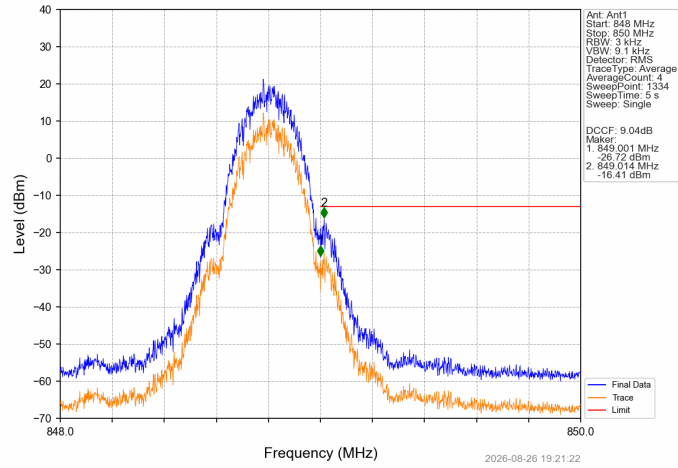
5.2 Test Graph

5.2.1 GSM850

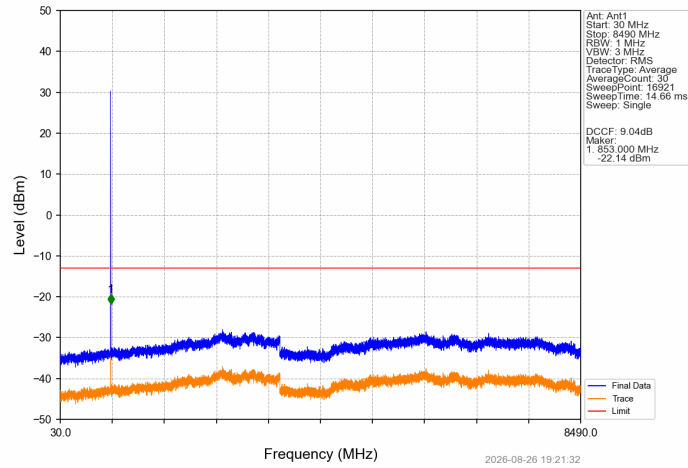




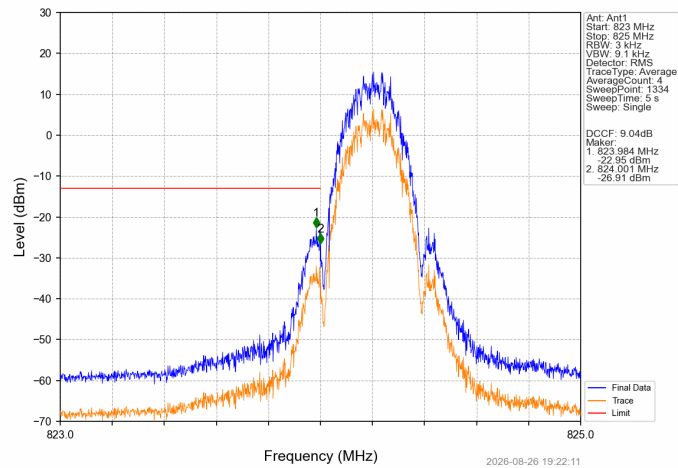
### GSM850\_GPRS\_HCH\_848.8MHz\_1 TX Slot\_NTNV



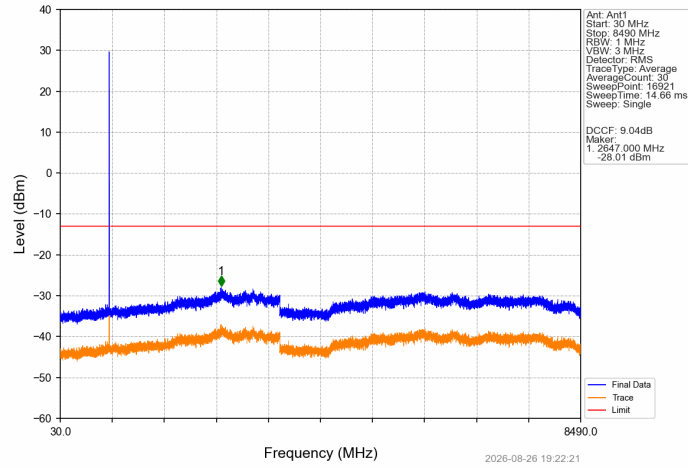
### GSM850\_GPRS\_HCH\_848.8MHz\_1 TX Slot\_NTNV



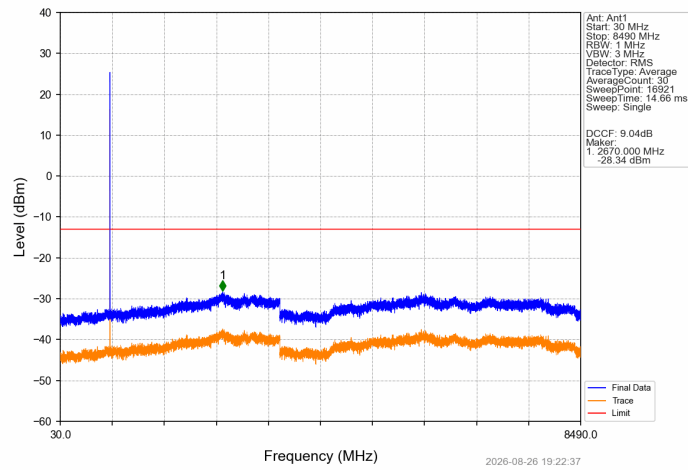
### GSM850\_EGPRS\_LCH\_824.2MHz\_1 TX Slot\_NTNV



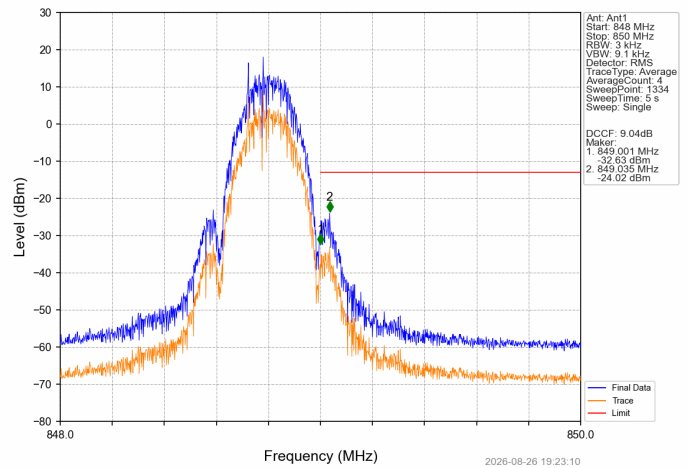
### GSM850\_EGPRS\_LCH\_824.2MHz\_1 TX Slot\_NTNV



### GSM850\_EGPRS\_MCH\_836.6MHz\_1 TX Slot\_NTNV



### GSM850\_EGPRS\_HCH\_848.8MHz\_1 TX Slot\_NTNV



GSM850\_EGPRS\_HCH\_848.8MHz\_1 TX Slot\_NTNV

