

## FCC/IC - TEST REPORT

Report Number : **60.790.15.023.02R** Date of Issue: 2015-09-30

Model : **FOCUS86, FOCUS86-W, FOCUS86-B, FOCUS86T**

Product Type : **WiFi Home Video Camera**

Applicant : **Binatone Electronics International Limited**

Address : **Floor 23A, 9 Des Voeux Road West, Sheung Wan, Hong Kong.**

Production Facility : **TATUNG COMPANY**

Address : **22 Chungshan N. Rd. 3<sup>rd</sup> Sec. Taipei 104 Taiwan.**

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including  
Appendices : 42

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## 2 Details about the Test Laboratory

### Details about the Test Laboratory

#### Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
Building 12&13, Zhiheng Wisdomland Business Park,  
Nantou Checkpoint Road 2, Nanshan District,  
Shenzhen City, 518052,  
P. R. China

Telephone: 86 755 8828 6998  
Fax: 86 755 8828 5299

### 3 Description of the Equipment Under Test

|                            |                                                                                                          |
|----------------------------|----------------------------------------------------------------------------------------------------------|
| Product:                   | WiFi Home Video Camera                                                                                   |
| Model no.:                 | FOCUS86                                                                                                  |
| Listed Models:             | FOCUS86-B, FOCUS86-W, FOCUS86T                                                                           |
| FCC ID:                    | VLJ-FOCUS86                                                                                              |
| IC:                        | 4522A-FOCUS86                                                                                            |
| Options and accessories:   | AC/DC Adapter, Mobile Phone                                                                              |
| Rating:                    | DC5V, 1000mA powered by AC/DC power adaptor                                                              |
| RF Transmission Frequency: | 2402MHz – 2480 MHz                                                                                       |
| No. of Operated Channel:   | 40                                                                                                       |
| Modulation:                | GFSK                                                                                                     |
| Antenna Type:              | Integral                                                                                                 |
| Antenna Gain:              | 0 dBi                                                                                                    |
| Description of the EUT:    | The Equipment Under Test (EUT) is a Camera of Wireless Monitoring System, which include of a FHSS Module |

| Channel list (MHz) |      |    |      |    |      |    |      |
|--------------------|------|----|------|----|------|----|------|
| CH                 | MHz  | CH | MHz  | CH | MHz  | CH | MHz  |
| 1                  | 2402 | 11 | 2422 | 21 | 2442 | 31 | 2462 |
| 2                  | 2404 | 12 | 2424 | 22 | 2444 | 32 | 2464 |
| 3                  | 2406 | 13 | 2426 | 23 | 2446 | 33 | 2466 |
| 4                  | 2408 | 14 | 2428 | 24 | 2448 | 34 | 2468 |
| 5                  | 2410 | 15 | 2430 | 25 | 2450 | 35 | 2470 |
| 6                  | 2412 | 16 | 2432 | 26 | 2452 | 36 | 2472 |
| 7                  | 2414 | 17 | 2434 | 27 | 2454 | 37 | 2474 |
| 8                  | 2416 | 18 | 2436 | 28 | 2456 | 38 | 2476 |
| 9                  | 2418 | 19 | 2438 | 29 | 2458 | 39 | 2478 |
| 10                 | 2420 | 20 | 2440 | 30 | 2460 | 40 | 2480 |



## 4 Summary of Test Standards

| Test Standards                             |                                                                                                                                              |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| FCC Part 15 Subpart C<br>10-1-2014 Edition | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators                                                                       |
| RSS-Gen Issue 4<br>November 2014           | General Requirements for the Certification of Radio<br>Apparatus                                                                             |
| RSS-247 Issue 1<br>May 2015                | RSS-247 – Digital Transmission Systems (DTSS), Frequency<br>Hopping systems (FHSs) and License-exempt Local Area<br>Network (LE-LAN) Devices |

All the test methods were according to Public Notice DA 00-705 -Frequency Hopper Spread Spectrum Test Procedure released by FCC on March 30, 2000 and C63.10 (2013).

## 5 Summary of Test Results

| Technical Requirements                           |                                          |                                             |            |             |
|--------------------------------------------------|------------------------------------------|---------------------------------------------|------------|-------------|
| FCC Part 15 Subpart C, RSS-Gen, RSS-247, RSS-102 |                                          |                                             |            |             |
| Test Condition                                   |                                          |                                             | Test Site  | Test Result |
| §15.207                                          | RSS-Gen<br>Section 8.8                   | Conducted emission AC power port            | Site 1     | Pass        |
| §15.247(b)(1)                                    | RSS-247<br>Section 5.4(2)                | Conducted peak output power                 | Site 1     | Pass        |
| §15.247(a)(2)                                    | RSS-247<br>Section 5.2(1)                | 6dB bandwidth                               | ---        | N/A         |
| §15.247(a)(1)                                    | RSS-247<br>Section 5.1(1)                | 20dB bandwidth                              | Site 1     | Pass        |
| §15.247(a)(1)                                    | RSS-247<br>Section 5.1(2)                | Carrier frequency separation                | Site 1     | Pass        |
| §15.247(a)(1)(iii)                               | RSS-247<br>Section 5.1(4)                | Number of hopping frequencies               | Site 1     | Pass        |
| §15.247(a)(1)(iii)                               | RSS-247<br>Section 5.1(4)                | Dwell Time                                  | Site 1     | Pass        |
| §15.247(e)                                       | RSS-247<br>Section 5.2(2)                | Power spectral density*                     | ---        | N/A         |
| §15.247(d)                                       | RSS-247<br>Section 5.5                   | Spurious RF conducted emissions             | Site 1     | Pass        |
| §15.247(d)                                       | RSS-247<br>Section 5                     | Band edge                                   | Site 1     | Pass        |
| §15.247(d) &<br>§15.209 &                        | RSS-247<br>Section 5.5 &<br>RSS-Gen 6.13 | Spurious radiated emissions for transmitter | Site 1     | Pass        |
| §15.203                                          | RSS-Gen 8.3                              | Antenna requirement                         | See note 1 | Pass        |

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a patch antenna, which gain is 0 dBi. In accordance to §15.203 and RSS-Gen 8.3 , It is considered sufficiently to comply with the provisions of this section.

Note 3: The data shown on the report are the worst case result.

## 6 General Remarks

### Remarks

This submittal(s) (test report) is intended for FCC ID: VLJ-FOCUS86, IC: 4522A-FOCUS86 complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules and RSS-247.

As per Client Declaration, the circuit design, PCB Layout, shielding and interfaces of FOCUS86 are identical for Listed Models of above table, only the Cosmetic are different. So we use the FOCUS86 as a representative model.

### SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: 2015-08-25

Testing Start Date: 2015-08-25

Testing End Date: 2015-09-30

TÜV SÜD HONG KONG LTD.

Prepared by:

Reviewed by:



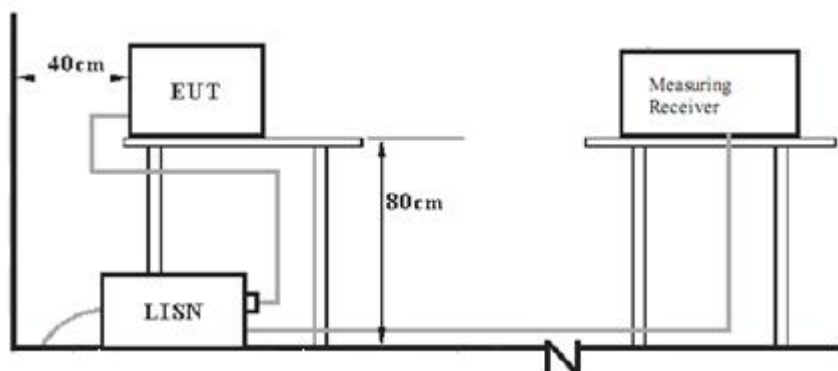
Alan Xiong  
Project Engineer



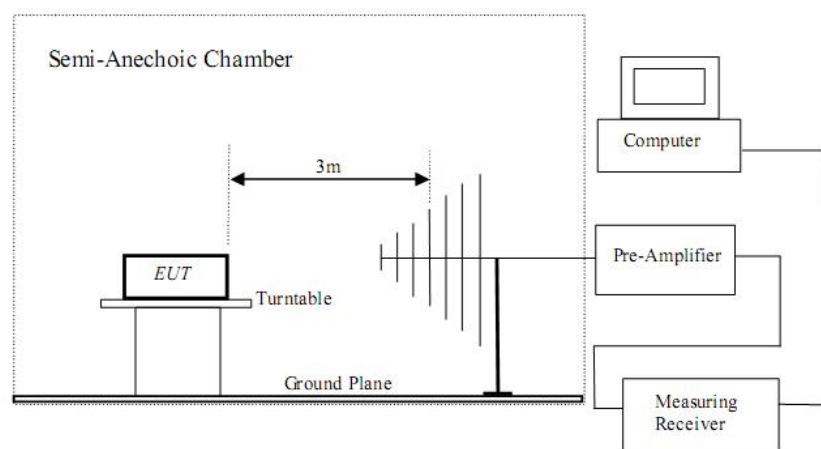
John Zhi  
Project Manager

## 7 Test Setups

### 7.1 AC Power Line Conducted Emission test setups



### 7.2 Radiated test setups



### 7.3 Conducted RF test setups



## 8 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION            | MANUFACTURER   | MODEL NO.(SHIELD) | S/N(LENGTH) |
|------------------------|----------------|-------------------|-------------|
| WiFi Home Video Camera | TATUNG COMPANY | FOCUS86           | ---         |

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

## 9 Technical Requirement

### 9.1 Conducted Emission

#### Test Method

1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

#### Limit

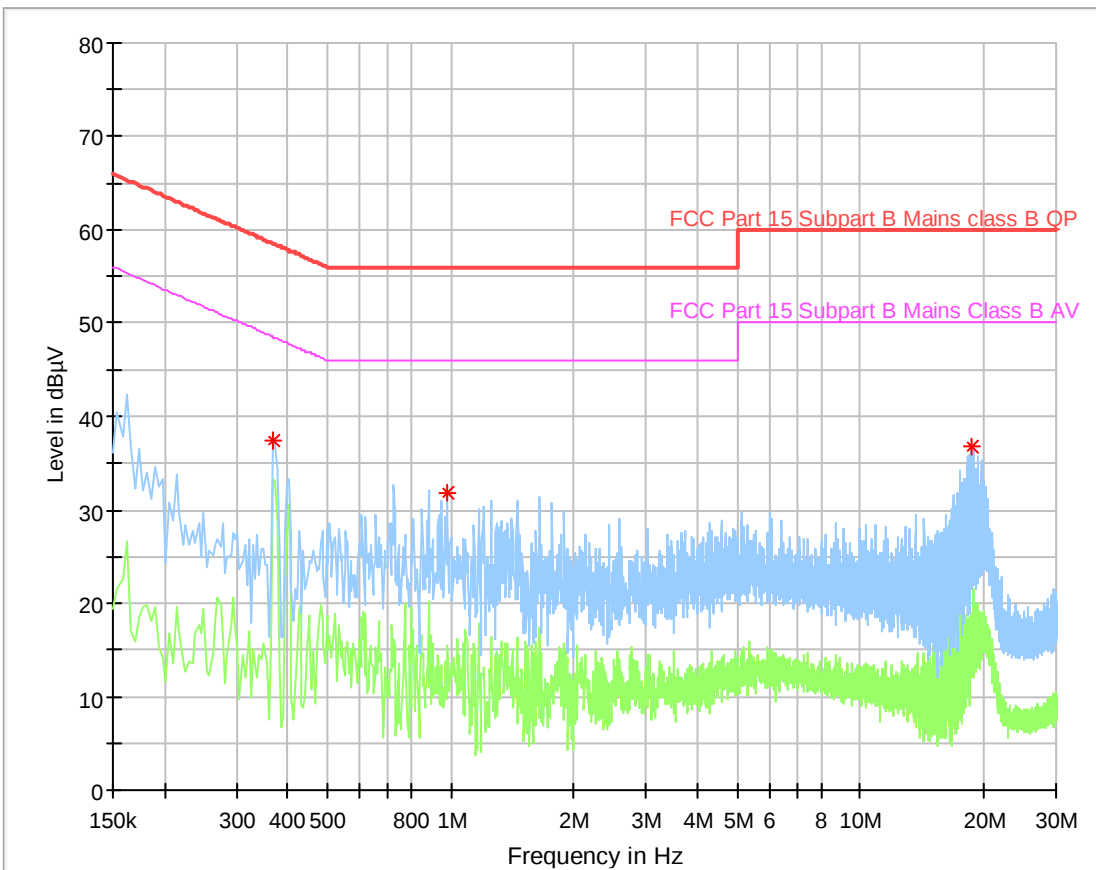
| Frequency<br>MHz | QP Limit<br>dB $\mu$ V | AV Limit<br>dB $\mu$ V |
|------------------|------------------------|------------------------|
| 0.150-0.500      | 66-56*                 | 56-46*                 |
| 0.500-5          | 56                     | 46                     |
| 5-30             | 60                     | 50                     |

Decreasing linearly with logarithm of the frequency

# Conducted Emission

Product Type : WiFi Home Video Camera  
M/N : FOCUS86  
Operating Condition : Transmitting mode  
Test Specification : FCC part 15 Section 15.207 Class B  
RSS-GEN Issue 4 section 8.8  
Comment : ---

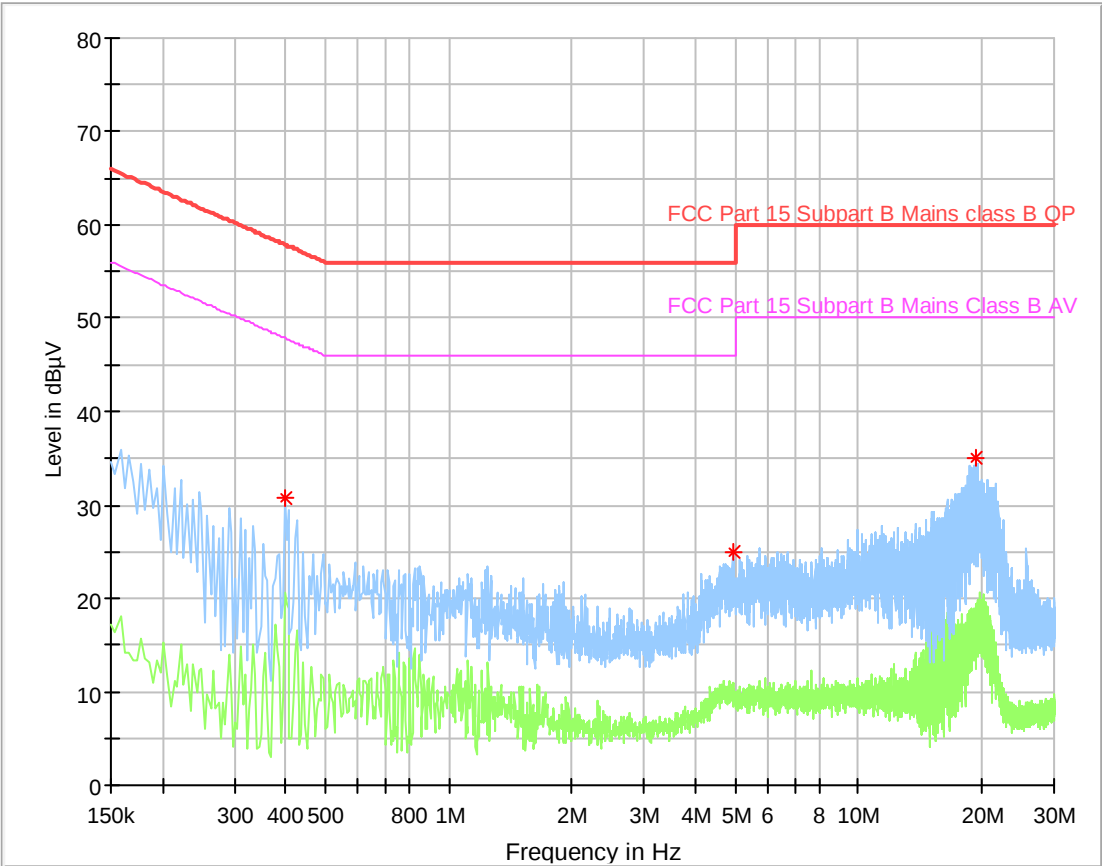
## Phase L (Adaptor Model: S005ANU0500100)



| Frequency (MHz) | MaxPeak (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|-----------------|----------------|--------------|-------------|------|------------|
| 0.370000        | 37.42          | 58.50        | 21.08       | L1   | 10.2       |
| 0.982000        | 31.74          | 56.00        | 24.26       | L1   | 9.8        |
| 18.750000       | 36.82          | 60.00        | 23.18       | L1   | 10.1       |



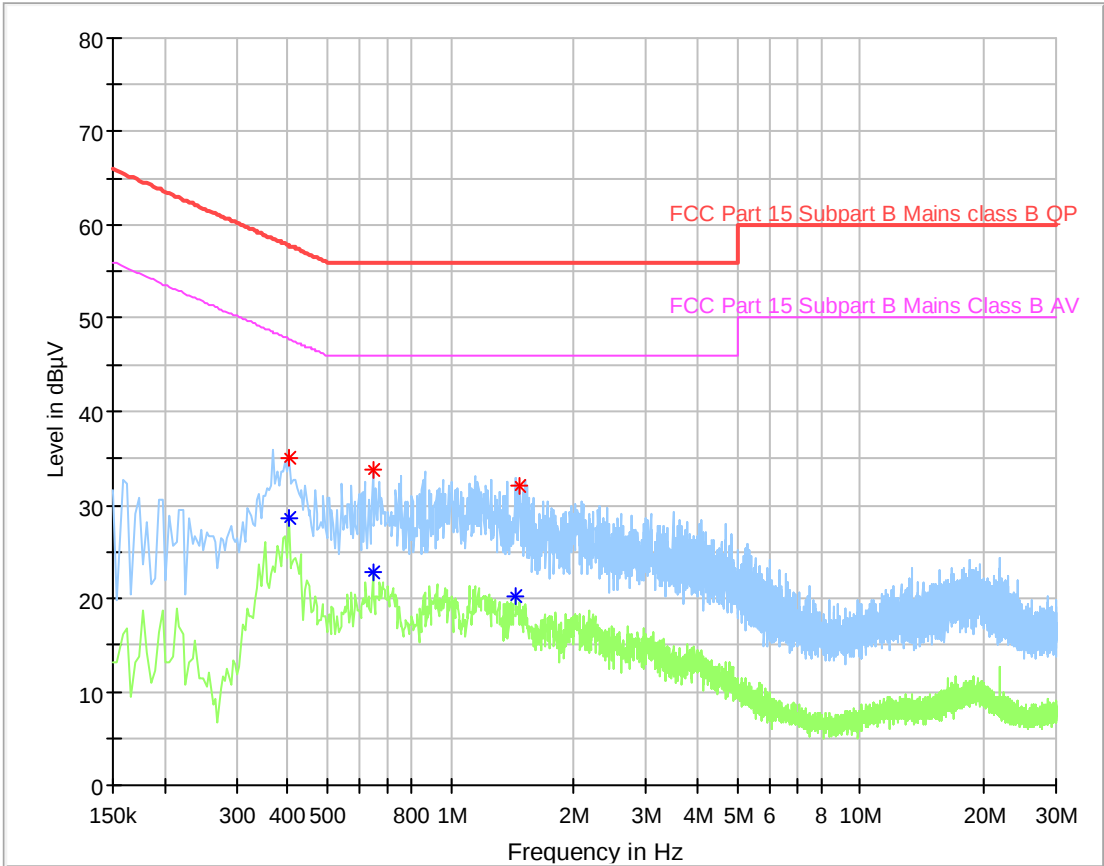
Phase N  
(Adaptor Model: S005ANU0500100)



| Frequency (MHz) | MaxPeak (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|-----------------|----------------|--------------|-------------|------|------------|
| 0.398000        | 30.81          | 57.90        | 27.08       | N    | 10.1       |
| 4.934000        | 24.99          | 56.00        | 31.01       | N    | 9.8        |
| 19.318000       | 35.11          | 60.00        | 24.89       | N    | 10.1       |

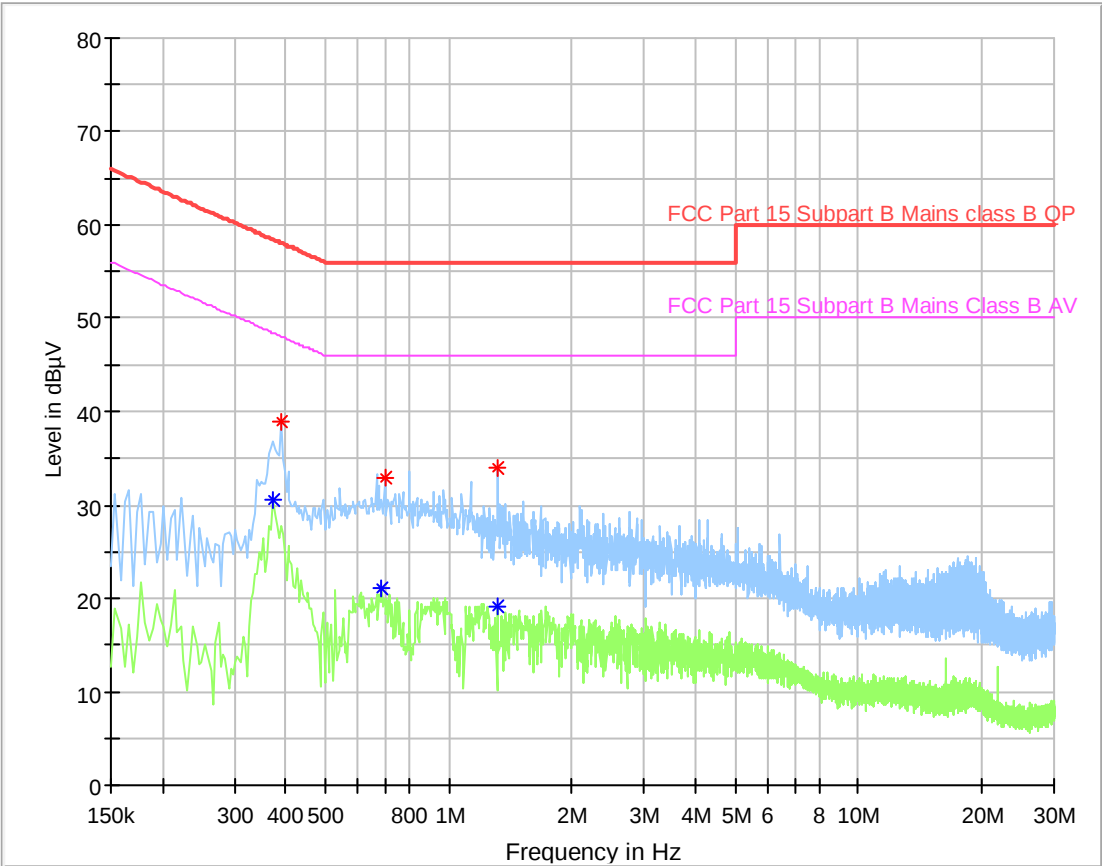


Phase L  
(Adaptor Model: S006AKU0500100)



| Frequency (MHz) | MaxPeak (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|-----------------|----------------|--------------|-------------|------|------------|
| 0.402000        | ---            | 47.81        | 19.22       | L1   | 10.1       |
| 0.402000        | 35.01          | 57.81        | 22.80       | L1   | 10.1       |
| 0.646000        | ---            | 46.00        | 23.17       | L1   | 10.0       |
| 0.646000        | 33.75          | 56.00        | 22.25       | L1   | 10.0       |
| 1.438000        | ---            | 46.00        | 25.79       | L1   | 9.8        |
| 1.478000        | 31.98          | 56.00        | 24.02       | L1   | 9.8        |

Phase N  
(Adaptor Model: S006AKU0500100)



| Frequency (MHz) | MaxPeak (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|-----------------|----------------|--------------|-------------|------|------------|
| 0.374000        | ---            | 48.41        | 17.92       | N    | 10.1       |
| 0.390000        | 38.86          | 58.06        | 19.20       | N    | 10.1       |
| 0.686000        | ---            | 46.00        | 24.86       | N    | 9.9        |
| 0.698000        | 33.00          | 56.00        | 23.00       | N    | 9.9        |
| 1.318000        | ---            | 46.00        | 26.81       | N    | 9.8        |
| 1.318000        | 34.03          | 56.00        | 21.97       | N    | 9.8        |

## 9.2 Conducted peak output power

### Test Method

1. Use the following spectrum analyzer settings:  
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel  
RBW > the 20 dB bandwidth of the emission being measured, VBW ≥ RBW,  
Sweep = auto, Detector function = peak, Trace = max hold
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

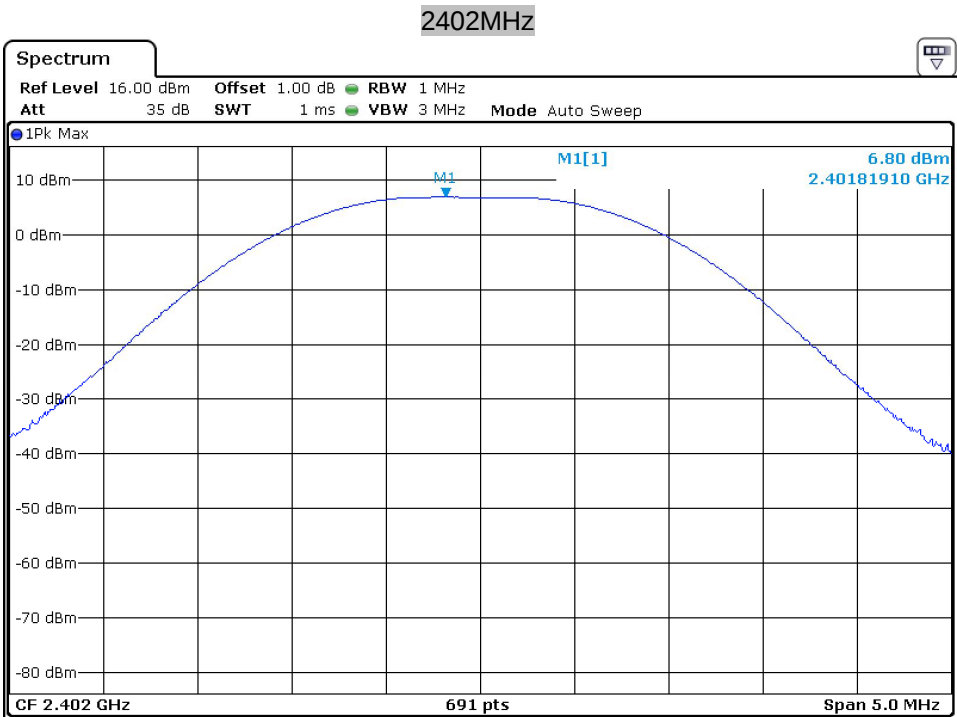
### Limits

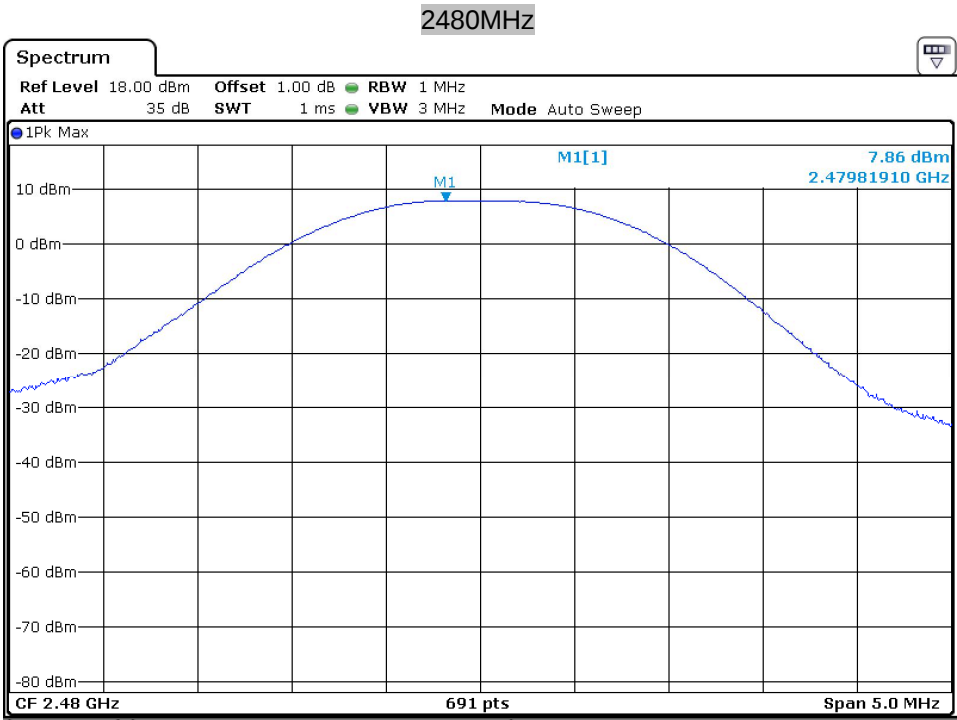
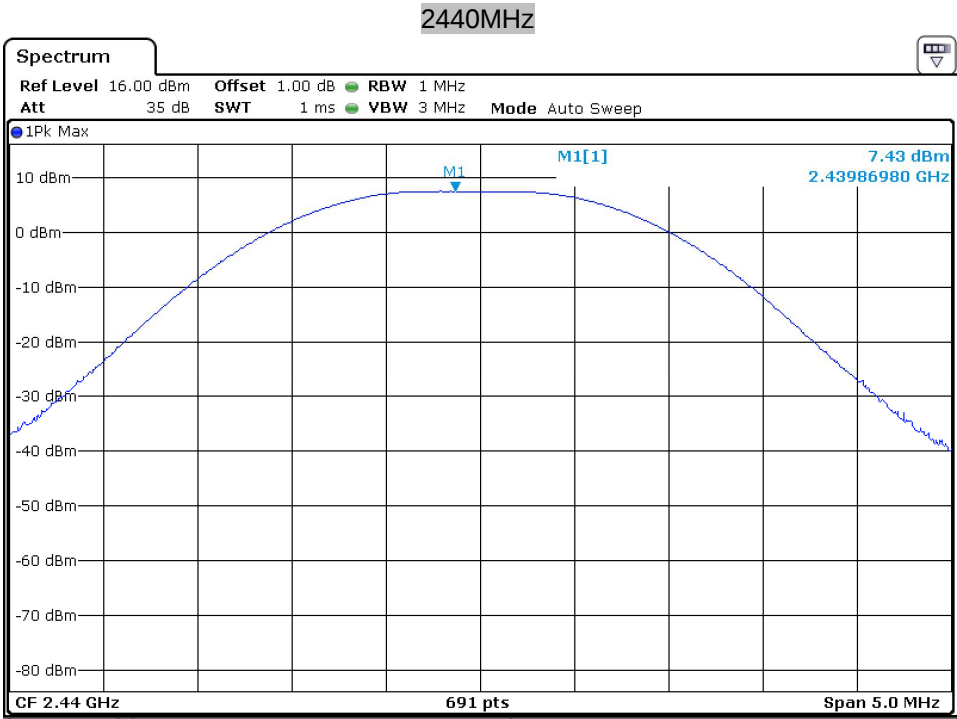
| Frequency Range<br>MHz | Limit<br>W | Limit<br>dBm |
|------------------------|------------|--------------|
| 2400-2483.5            | ≤0.125     | ≤21          |



Conducted peak output power

| Test Result            |                |        |
|------------------------|----------------|--------|
| Frequency              | Conducted Peak | Result |
| MHz                    | Output Power   |        |
|                        | dBm            |        |
| Low channel 2402MHz    | 6.80           | Pass   |
| Middle channel 2440MHz | 7.43           | Pass   |
| High channel 2480MHz   | 7.86           | Pass   |







**9.3 20 dB bandwidth**

**Test Method**

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- 3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- 4. Repeat above procedures until all frequencies measured were complete.

**Limit**

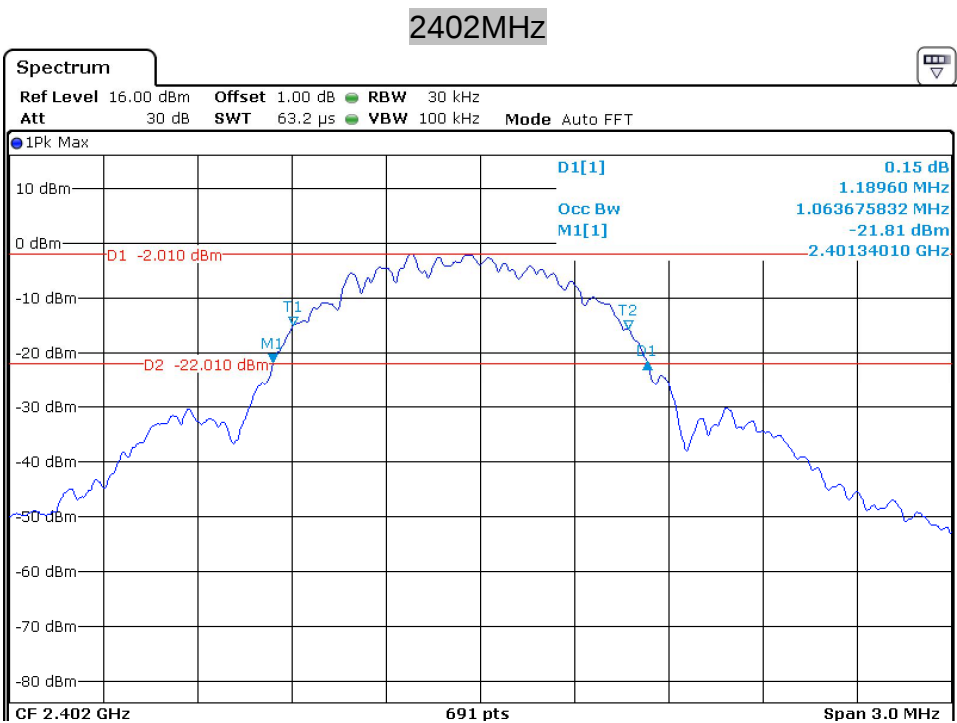
Limit [kHz]

N/A



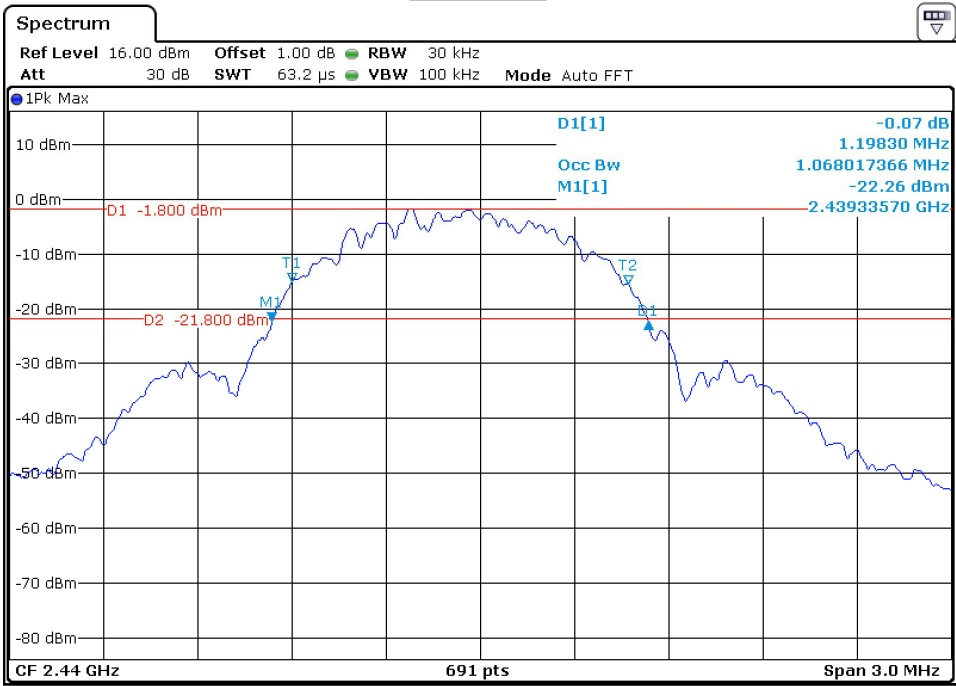
20 dB bandwidth and 99% Occupied Bandwidth

| Frequency | 20 dB Bandwidth | Result |
|-----------|-----------------|--------|
| MHz       | MHz             |        |
| 2402      | 1.190           | Pass   |
| 2440      | 1.190           | Pass   |
| 2480      | 1.010           | Pass   |

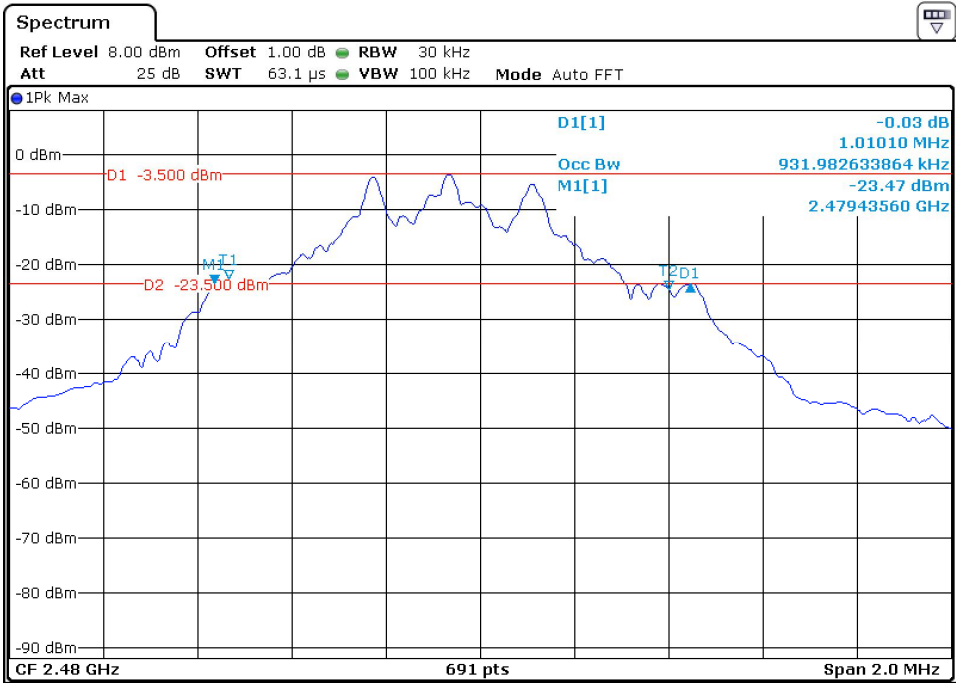




2440MHz



2480MHz



## 9.4 Carrier Frequency Separation

### Test Method

1. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peaks of two adjacent channels,  $RBW \geq 1\%$  of the span,  $VBW \geq RBW$ , Sweep = auto, Detector function = peak
2. By using the Max-Hold function record the separation of two adjacent channels.
3. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function.
4. Repeat above procedures until all frequencies measured were complete.

### Limit

Limit  
kHz

---

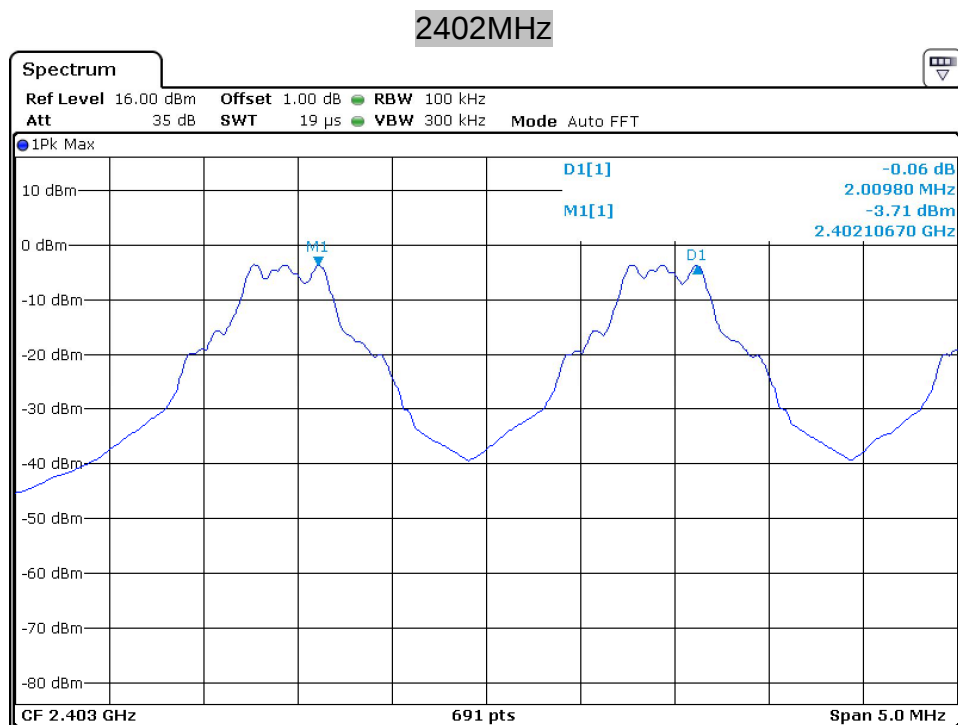
$\geq 25\text{kHz}$  or  $2/3$  of the 20 dB bandwidth which is greater

## Carrier Frequency Separation

Test result: The measurement was performed with the typical configuration (normal hopping status), here GFSK modulation mode was used to show compliance.

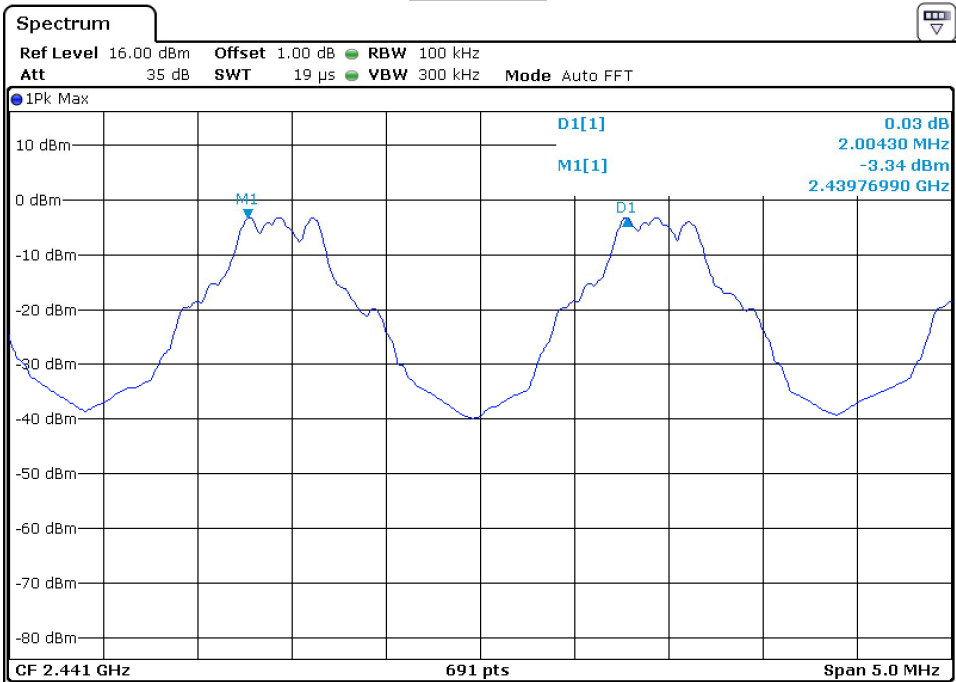
### GFSK Modulation test result

| Frequency<br>MHz | Carrier Frequency Separation<br>MHz | Result |
|------------------|-------------------------------------|--------|
| 2402             | 2.00                                | Pass   |
| 2440             | 2.00                                | Pass   |
| 2479             | 2.01                                | Pass   |

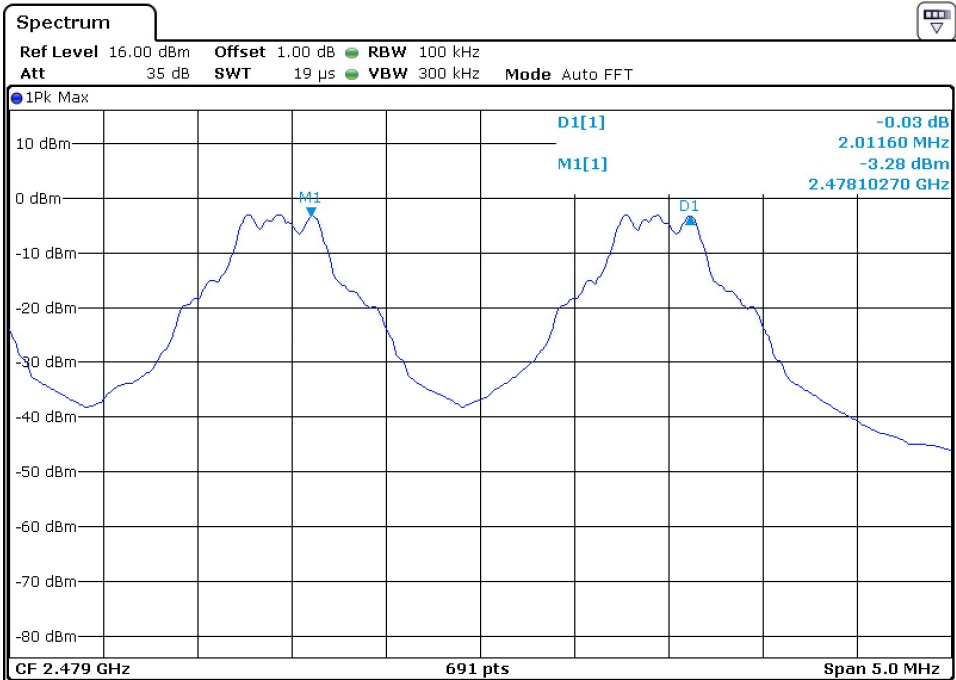




2440MHz



2480MHz



## 9.5 Number of hopping frequencies

### Test Method

1. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peaks of two adjacent channels, RBW  $\geq$  1% of the span, VBW  $\geq$  RBW, Sweep = auto, Detector function = peak
2. Set the spectrum analyzer on Max-Hold Mode, and then keep the EUT in hopping mode.
3. Record all the signals from each channel until each one has been recorded.
4. Repeat above procedures until all frequencies measured were complete.

### Limit

Limit  
number

---

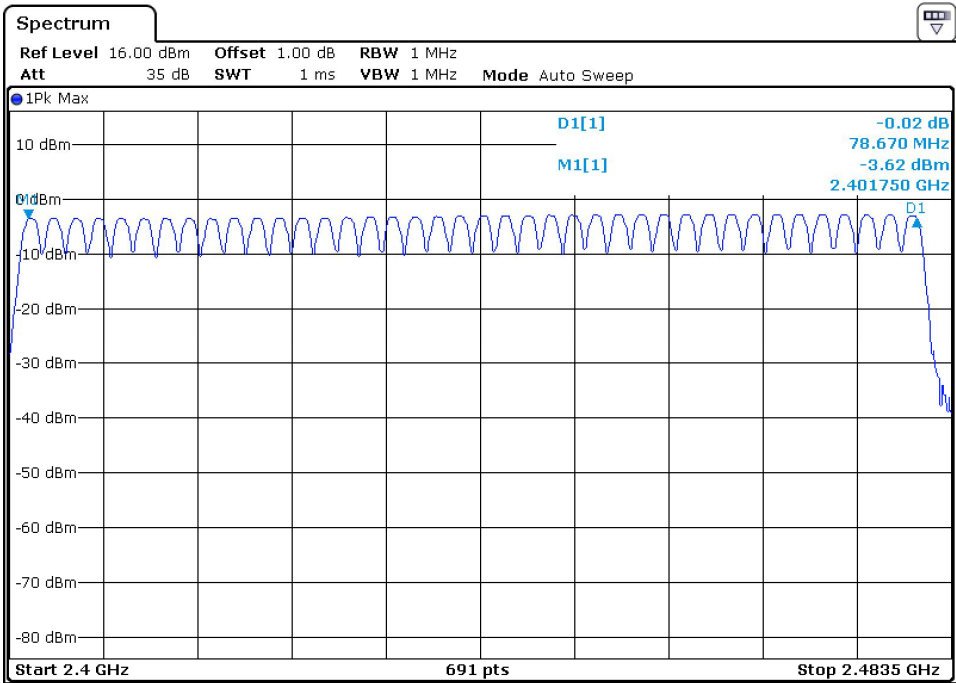
$\geq 15$



Number of hopping frequencies

Test result: The measurement was performed with the typical configuration (normal hopping status , here GFSK modulation mode was used to show compliance.

| Number of hopping frequencies | Result |
|-------------------------------|--------|
| 40                            | Pass   |



## 9.6 Dwell Time

### Test Method

1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable.  
Equipment mode: Spectrum analyzer
2. RBW: 1MHz; VBW: 1MHz; SPAN: Zero Span
3. Adjust the center frequency of spectrum analyzer on any frequency be measured.
4. Measure the Dwell Time by spectrum analyzer Marker function.
5. Repeat above procedures until all frequencies measured were complete.

### Limit

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

## Dwell Time

### Dwell time

Each transmission only 40 channels will be used.

Observe time = 40 channels  $\times$  0.4s = 16s

There are 38 pulses within 1s

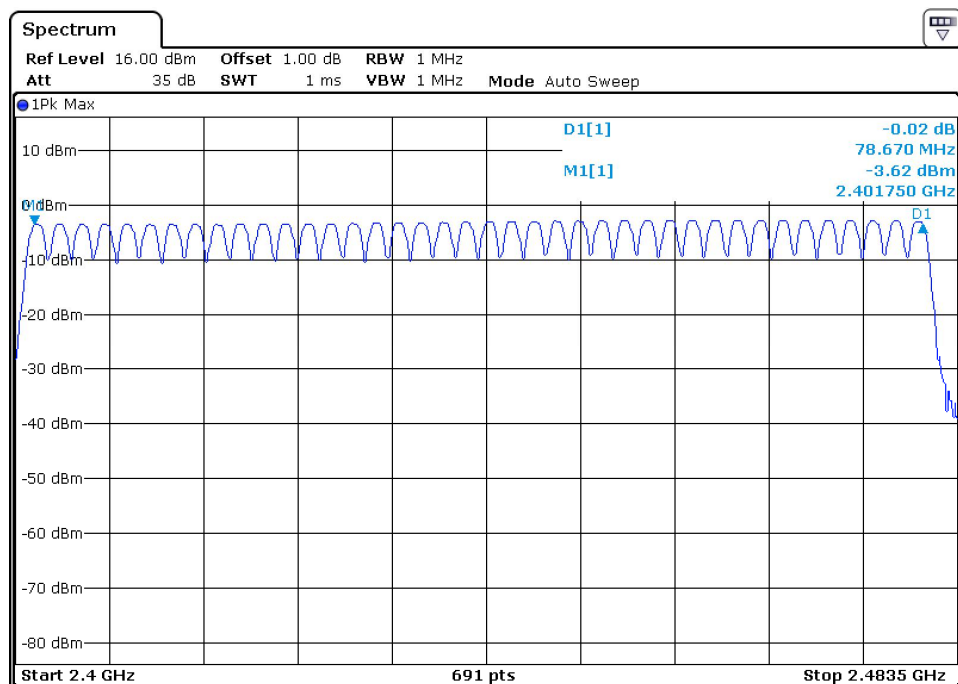
And one set of pulses = 170us

Therefore, the average channel occupancy times (ms)

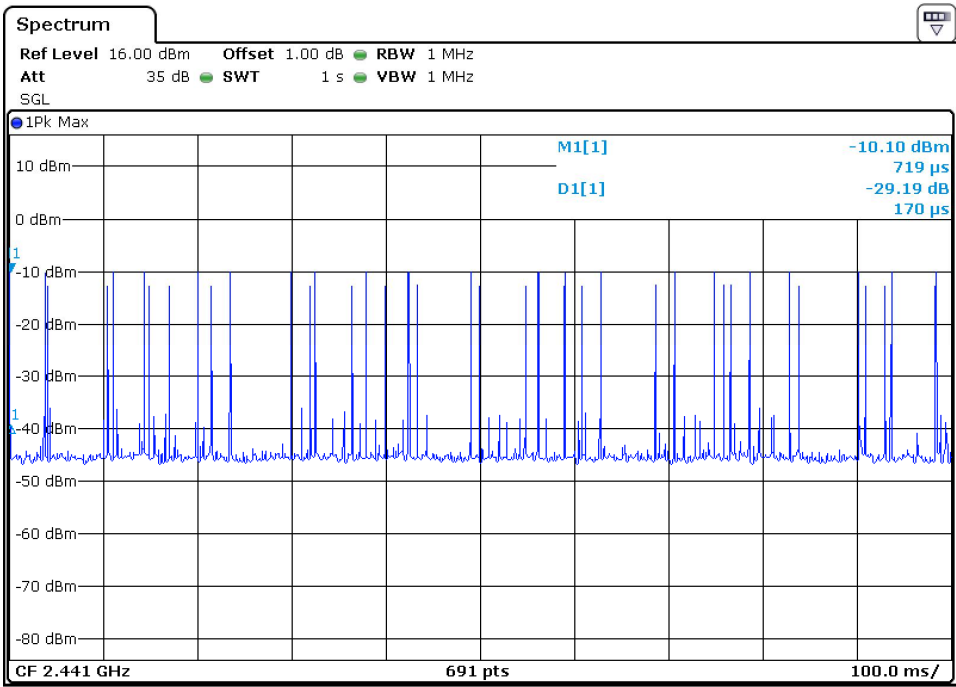
$$= 170\mu\text{s} \times 38 \times 16$$

So, total transmitting time is 0.103s. (<0.4s).

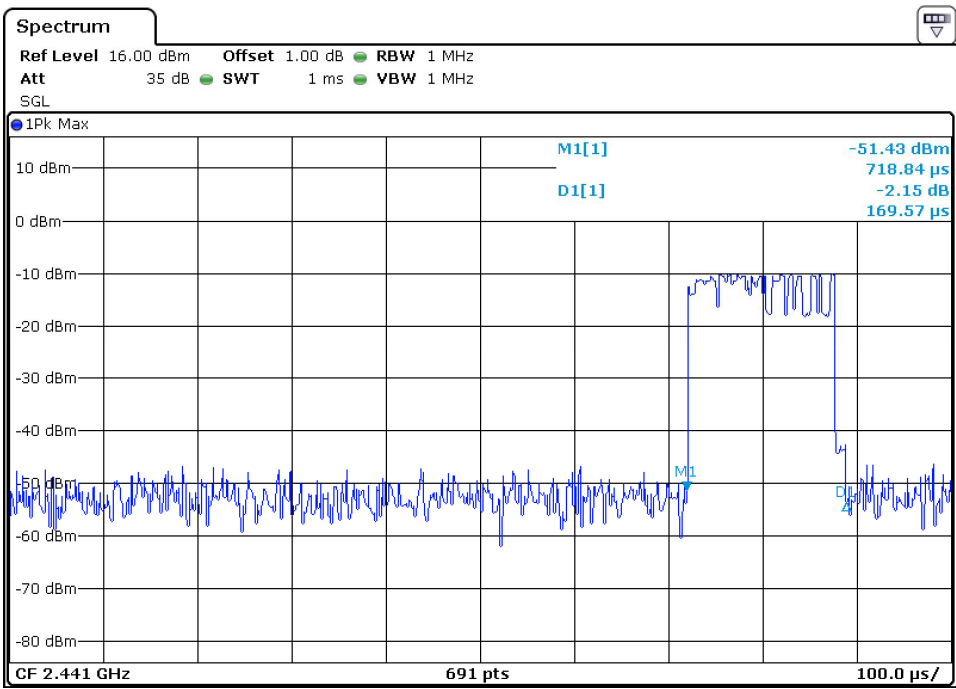
Result data graph shows total 23 channels are used.



Result data graph shows total 38 pulses with 1s.



Result data graph zooms into detail, one pulse period is 170us.



**9.7 Spurious RF conducted emissions**

**Test Method**

- 1. Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10<sup>th</sup> harmonic. Typically, several plots are required to cover this entire span.  
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
- 3. The level displayed must comply with the limit specified in this Section. Submit these plots.
- 4. Repeat above procedures until all frequencies measured were complete.

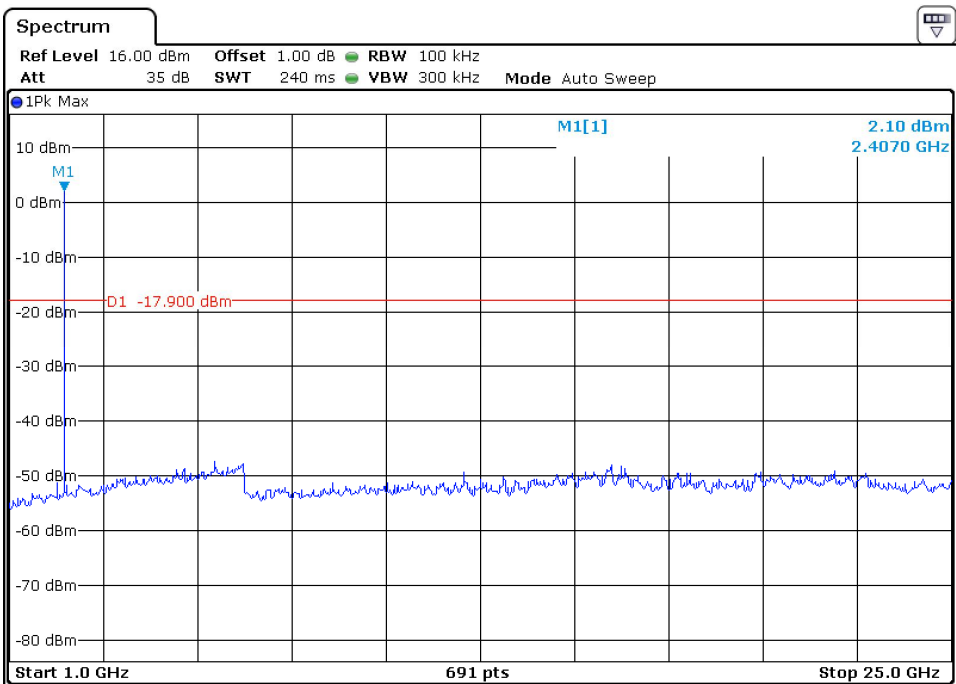
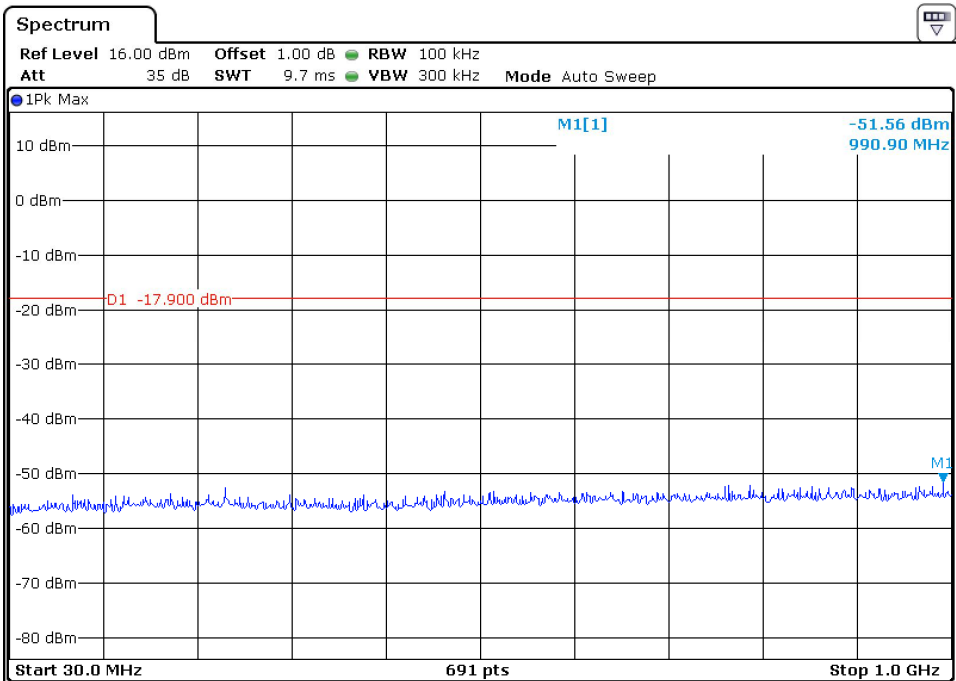
**Limit**

| Frequency Range<br>MHz | Limit (dBc) |
|------------------------|-------------|
| 30-25000               | -20         |

Spurious RF conducted emissions

Only the worse case test result is listed in the report.

2402MHz



## 9.8 Band edge testing

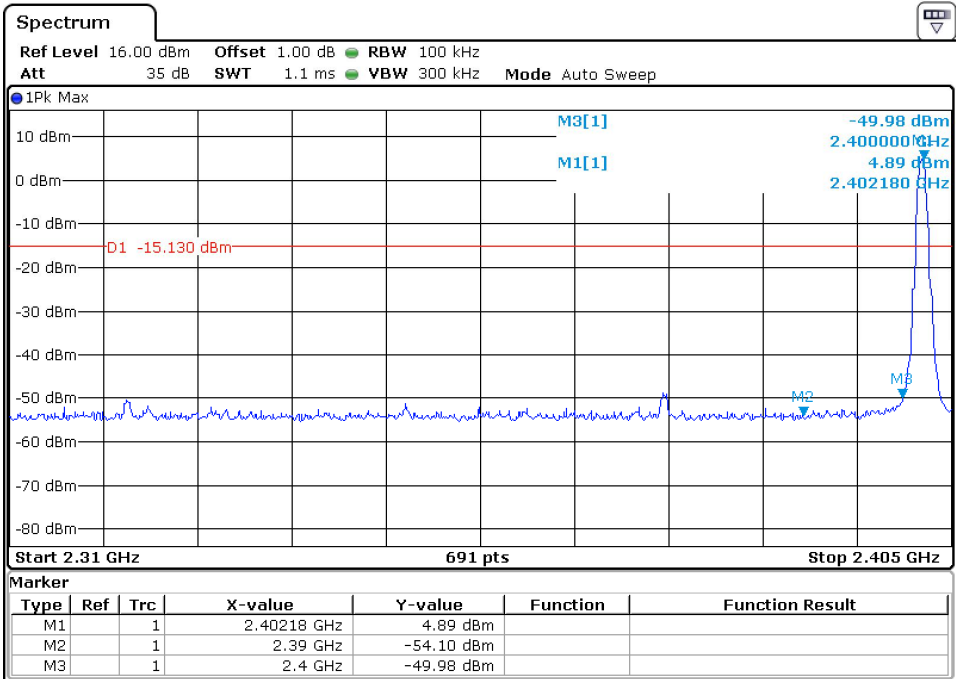
### Test Method

- 1 Use the following spectrum analyzer settings:  
Span = wide enough to capture the peak level of the in-band emission and all spurious  
RBW = 100 kHz, VBW  $\geq$  RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section. .
- 4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

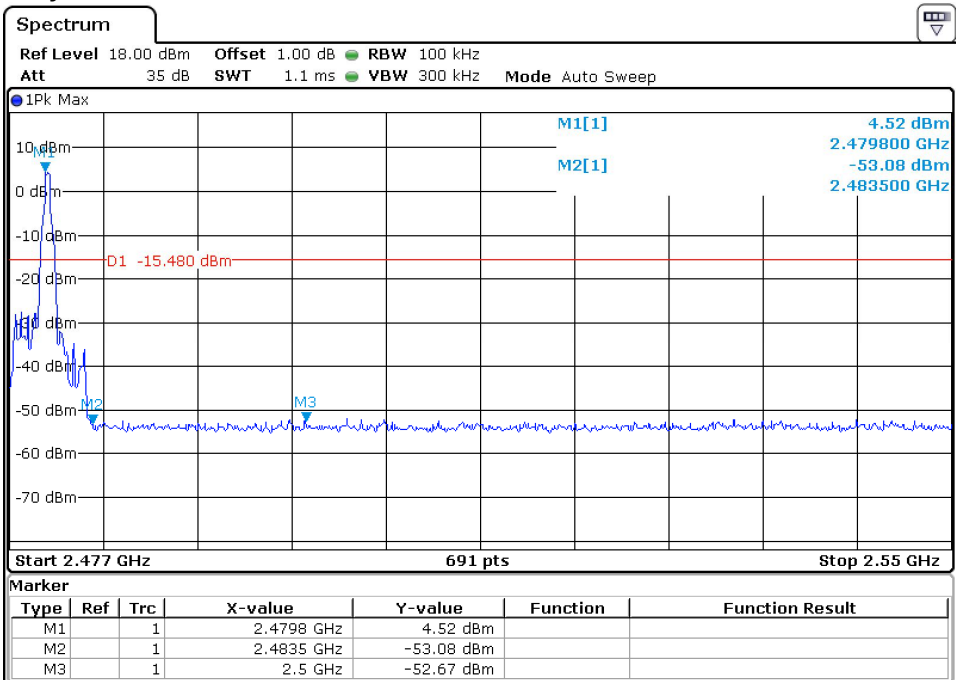
Band edge testing

Test Result:

Lowest Frequency:



Highest Frequency:



## 9.9 Spurious radiated emissions for transmitter

### Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:  
Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for  $f \geq 1\text{GHz}$ , 100 kHz for  $f < 1\text{GHz}$ , VBW  $\geq$  RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4-2009 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.  
The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20\log(\text{duty cycle}/100\text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

### Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

| Frequency<br>MHz | Field Strength<br>uV/m | Field Strength<br>dB $\mu$ V/m | Detector |
|------------------|------------------------|--------------------------------|----------|
| 30-88            | 100                    | 40                             | QP       |
| 88-216           | 150                    | 43.5                           | QP       |
| 216-960          | 200                    | 46                             | QP       |
| 960-1000         | 500                    | 54                             | QP       |
| Above 1000       | 500                    | 54                             | AV       |
| Above 1000       | 5000                   | 74                             | PK       |

### Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

The only worse case (which is subject to the maximum EIRP, GFSK mode) test result is listed in the report.

### Transmitting spurious emission test result as below:

Remark:

- (1) AV Emission Level= PK Emission Level+20log(dutycycle)
- (2) Data of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- (3) “\*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

#### Frequency (Vertical – 30MHz to 3GHz)

Adaptor Model: S005ANU0500100

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol |
|-----------------|--------------------|----------------|-------------|-----|
| 59.100000       | 34.18              | 40.00          | 5.82        | V   |
| 395.993125      | 42.89              | 46.00          | 3.11        | V   |
| 420.000625      | 41.95              | 46.00          | 4.05        | V   |

Adaptor Model: S006AKU0500100

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol |
|-----------------|--------------------|----------------|-------------|-----|
| 42.488750       | 35.72              | 40.00          | 4.18        | V   |
| 92.383125       | 35.14              | 43.50          | 8.36        | V   |
| 124.938750      | 32.20              | 43.50          | 11.30       | V   |
| 250.008125      | 32.05              | 46.00          | 13.95       | V   |
| 455.951250      | 39.08              | 46.00          | 6.92        | V   |
| 492.023125      | 41.77              | 46.00          | 4.23        | V   |

| Frequency (MHz) | MaxPeak (dBm) | Limit (dBm) | Margin (dB) | Pol |
|-----------------|---------------|-------------|-------------|-----|
| 1196.062500     | -54.77        | -30.00      | 24.77       | V   |
| 2416.500000     | 3.74          | -30.00      | -33.74      | V   |
| 2576.625000     | -49.41        | -30.00      | 19.41       | V   |

**Frequency (Horizontal – 30MHz to 3GHz)**

Adaptor Model: S005ANU0500100

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol |
|-----------------|--------------------|----------------|-------------|-----|
| 56.008125       | 34.70              | 40.00          | 5.30        | H   |
| 155.978750      | 35.34              | 43.50          | 8.16        | H   |
| 372.004000      | 44.20              | 46.00          | 1.80        | H   |
| 803.999375      | 39.82              | 46.00          | 6.18        | H   |

Adaptor Model: S006AKU0500100

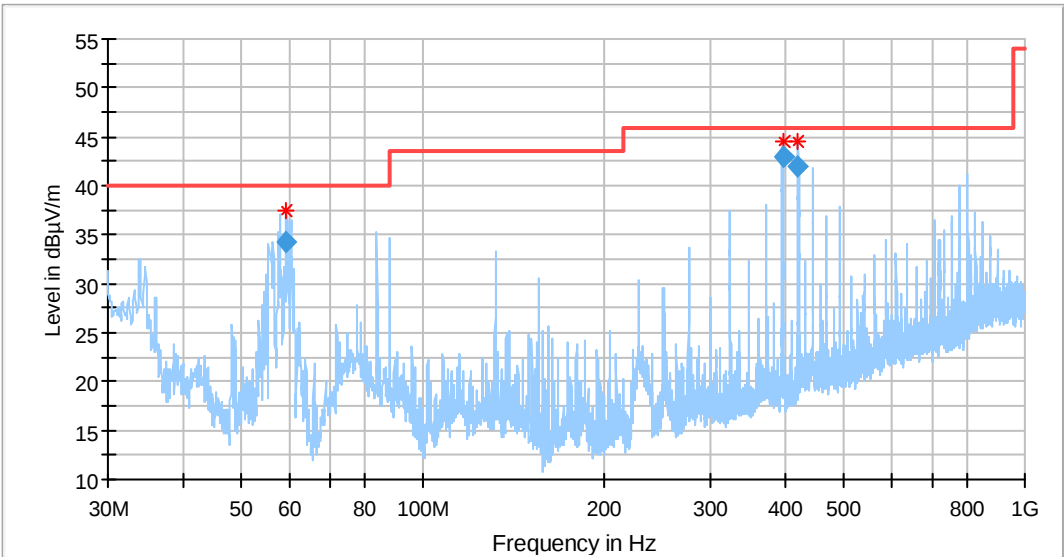
| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol |
|-----------------|--------------------|----------------|-------------|-----|
| 250.008125      | 27.08              | 46.00          | 18.92       | H   |
| 418.000000      | 31.45              | 46.00          | 14.55       | H   |
| 505.966875      | 34.39              | 46.00          | 11.61       | H   |
| 804.060000      | 37.34              | 46.00          | 8.66        | H   |

| Frequency (MHz) | MaxPeak (dBm) | Limit (dBm) | Margin (dB) | Pol |
|-----------------|---------------|-------------|-------------|-----|
| 1799.937500     | -57.21        | -30.00      | 27.21       | H   |
| 2410.375000     | 2.25          | -30.00      | -32.25      | H   |
| 2478.625000     | -44.44        | -30.00      | 14.44       | H   |

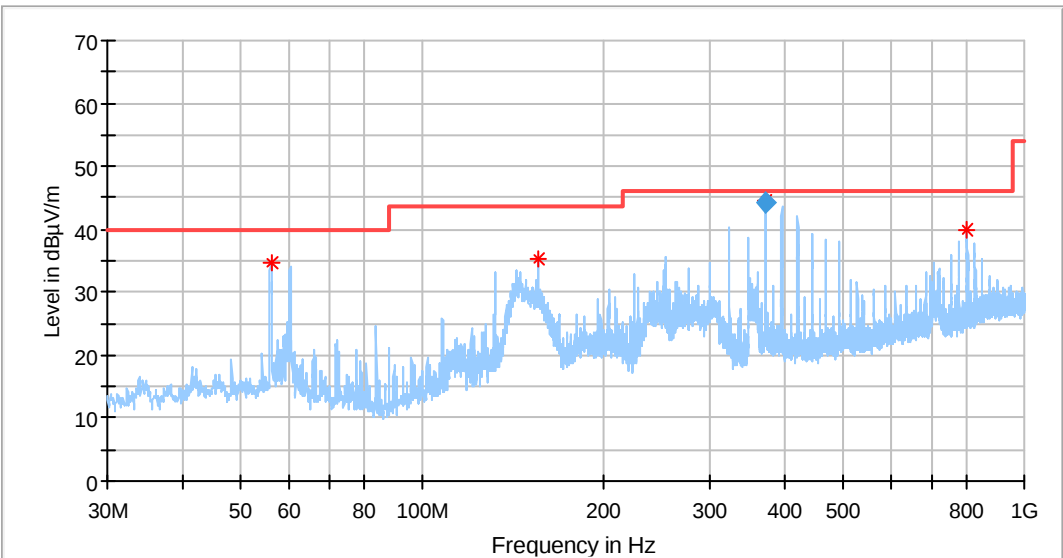
**Spurious radiated emissions for transmitter**

**Radiated emission data graph (Vertical polarization, 30MHz-1GHz)**

Adaptor Model: S005ANU0500100

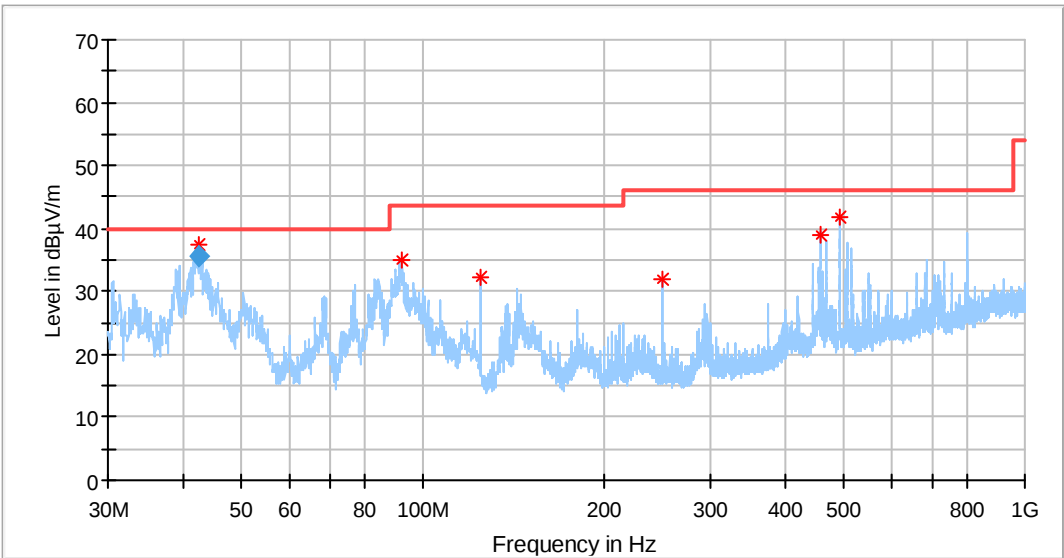


**Radiated emission data graph (Horizontal polarization, 30MHz-1GHz)**

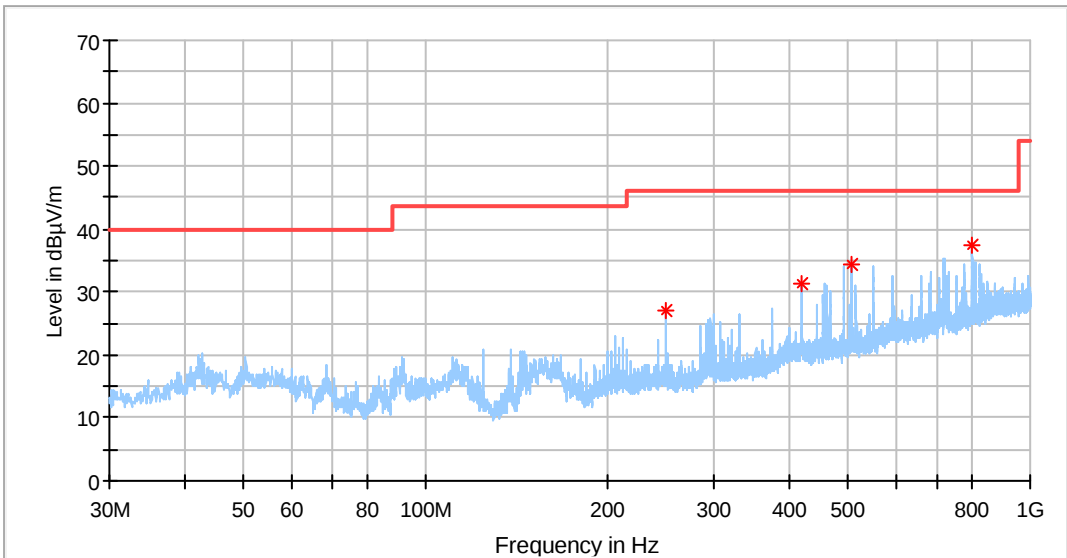


**Radiated emission data graph (Vertical polarization, 30MHz-1GHz)**

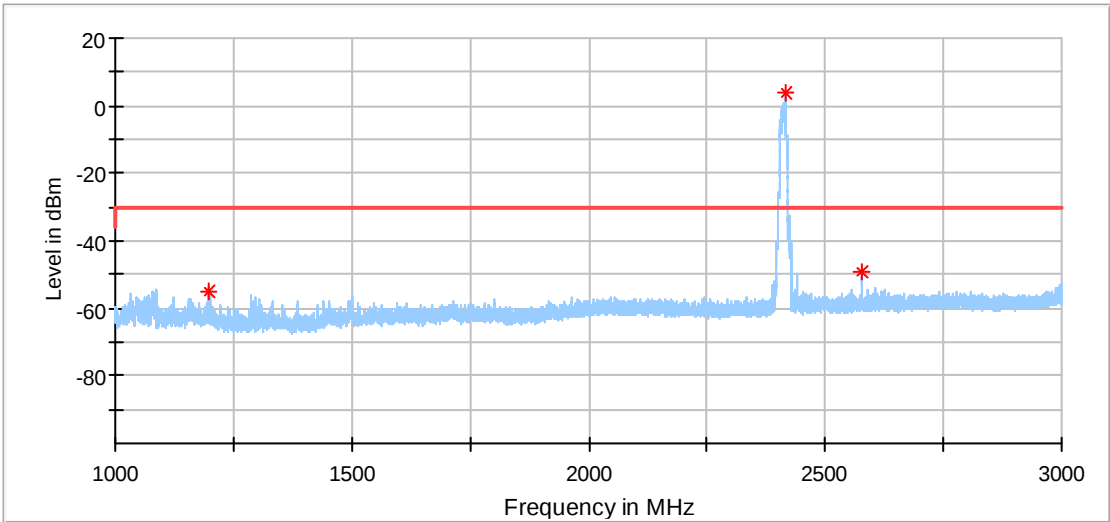
Adaptor Model: S006AKU0500100



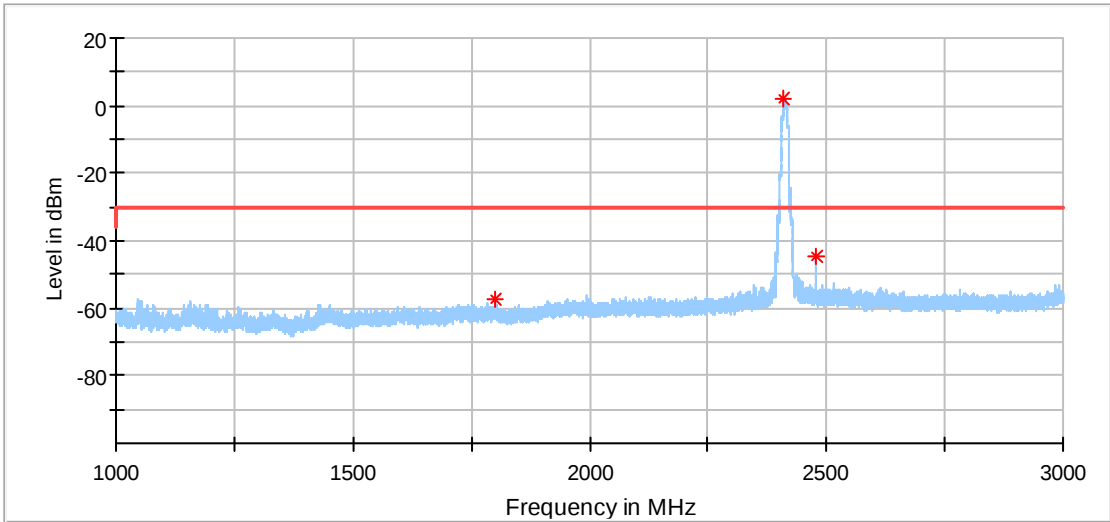
**Radiated emission data graph (Horizontal polarization, 30MHz-1GHz)**



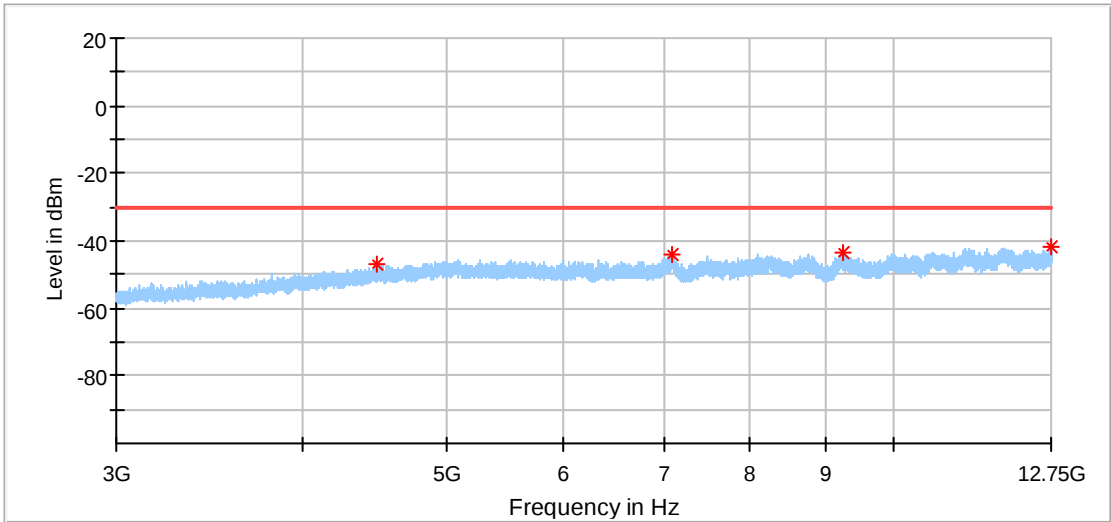
**Radiated emission data graph (Vertical polarization, 1GHz-3GHz)**



**Radiated emission data graph (Horizontal polarization, 1GHz-3GHz)**



Radiated emission data graph (Vertical polarization, 3GHz-18GHz)

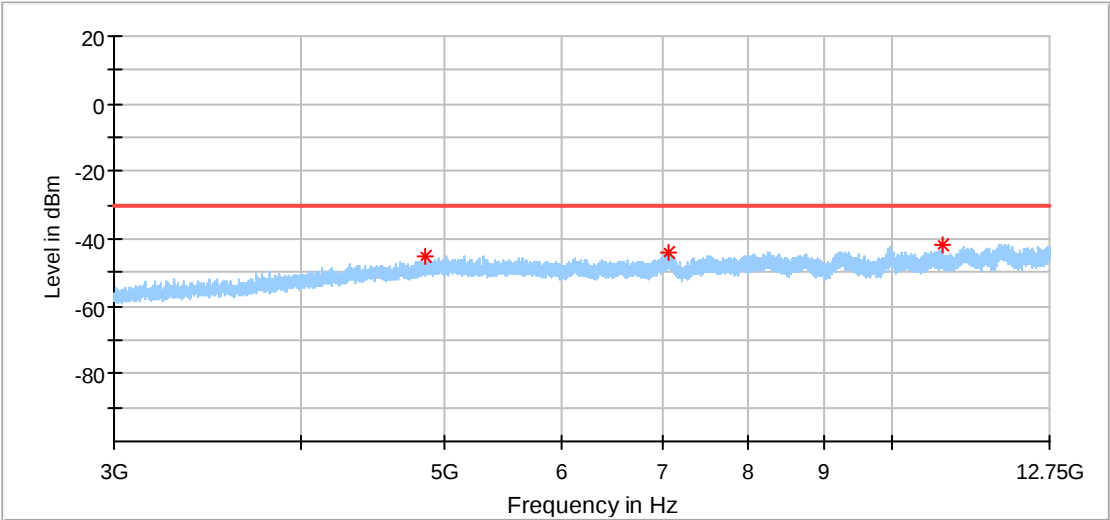


Remark: Only background noise was measured from 12.75GHz-26GHz.

| Frequency (MHz) | MaxPeak (dBm) | Limit (dBm) | Margin (dB) | Pol |
|-----------------|---------------|-------------|-------------|-----|
| 4493.578125     | -46.76        | -30.00      | 16.76       | V   |
| 7098.351563     | -44.23        | -30.00      | 14.23       | V   |
| 9245.179688     | -43.45        | -30.00      | 13.45       | V   |
| 12749.695313    | -41.90        | -30.00      | 11.90       | V   |



Radiated emission data graph (Horizontal polarization, 3GHz-18GHz)



Remark: Only background noise was measured from 12.75GHz-26GHz.

| Frequency (MHz) | MaxPeak (dBm) | Limit (dBm) | Margin (dB) | Pol |
|-----------------|---------------|-------------|-------------|-----|
| 4853.109375     | -44.95        | -30.00      | 14.95       | H   |
| 7065.750000     | -44.03        | -30.00      | 14.03       | H   |
| 10818.585938    | -41.48        | -30.00      | 11.48       | H   |

## 10 Test Equipment List

### List of Test Instruments

|    | DESCRIPTION                         | MANUFACTURER    | MODEL NO.        | SERIAL NO.    | CAL. DUE DATE |
|----|-------------------------------------|-----------------|------------------|---------------|---------------|
| CE | EMI Test Receiver                   | Rohde & Schwarz | ESR 3            | 101782        | 2016-8-17     |
|    | LISN                                | Rohde & Schwarz | ENV4200          | 100249        | 2016-8-17     |
|    | LISN                                | Rohde & Schwarz | ENV216           | 100326        | 2016-8-17     |
|    | ISN                                 | Rohde & Schwarz | ENY81            | 100177        | 2016-8-17     |
|    | ISN                                 | Rohde & Schwarz | ENY81-CAT6       | 101664        | 2016-8-17     |
|    | High Voltage Probe                  | Rohde & Schwarz | TK9420(VT9 420)  | 9420-58       | 2016-8-17     |
|    | RF Current probe                    | Rohde & Schwarz | EZ-17            | 100816        | 2016-8-17     |
| C  | Signal Generator                    | Rohde & Schwarz | SMB100A          | 108272        | 2016-8-17     |
|    | Signal Analyzer                     | Rohde & Schwarz | FSV40            | 101030        | 2016-8-17     |
|    | Vector Signal Generator             | Rohde & Schwarz | SMU 200A         | 105324        | 2016-8-17     |
|    | RF Switch Module                    | Rohde & Schwarz | OSP120/OS P-B157 | 101226/100851 | 2016-8-17     |
|    | EMI Test Receiver                   | Rohde & Schwarz | ESR 26           | 101269        | 2016-8-17     |
| RE | Trilog Super Broadband Test Antenna | Schwarzbeck     | VULB 9163        | 707           | 2017-8-17     |
|    | Horn Antenna                        | Rohde & Schwarz | HF907            | 102294        | 2017-8-17     |
|    | Pre-amplifier                       | Rohde & Schwarz | SCU 18           | 102230        | 2016-8-17     |
|    | 3m Semi-anechoic chamber            | TDK             | 9X6X6            | ----          | 2019-5-29     |

#### C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth
- 20dB bandwidth and 99% Occupied Bandwidth
- Carrier frequency separation
- Number of hopping frequencies
- Dwell Time
- Power spectral density\*
- Spurious RF conducted emissions
- Band edge

## 11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

| System Measurement Uncertainty                                   |                                          |
|------------------------------------------------------------------|------------------------------------------|
| Test Items                                                       | Extended Uncertainty                     |
| Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz    | Horizontal: 4.83dB;<br>Vertical: 4.91dB; |
| Uncertainty for Radiated Emission in 3m chamber 1000MHz-18000MHz | Horizontal: 4.89dB;<br>Vertical: 4.88dB; |
| Uncertainty for Conducted Emission 9kHz-150KHz                   | 3.88dB                                   |