# FCC - TEST REPORT

| | | | | |
|---|---|---|---|---|
| Report Number | : | 68.950.20.0261.01 | Date of Issue: | June 25, 2021 |
| Model | : | TG-SD, TG-CN, TG-EN, TG-OP, TG-CU | | |
| Product Type | : | Intelligent voice mouse | | |
| Applicant | : | Heyday (HongKong) International Trade Limited | | |
| Address | : | Room 061 1/F Amoycan Ind Ctr 7 Ngau Tau Kok Road Kowloon | | |
| | : | Bay Kl Hong Kong. | | |
| Factory | : | Shenzhen Lingxian Electronics Co. LTD. | | |
| Address | : | Room 201, 2nd Floor, 137 Songyu Road, Songgang, | | |
| | : | Shenzhen, Guangdong, CHINA | | |
| Test Result | : | n **Positive** o **Negative** | | |
| Total pages including Appendices | : | 39 | | |

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# 1 Table of Contents





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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<br>Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District<br>Shenzhen 518052<br>P.R. China |
| Telephone: | 86 755 8828 6998 |
| Fax: | 86 755 8288 5299 |
| FCC Registration No.: | 514049 |

# 3 Description of the Equipment Under Test

| | |
|---|---|
| Product: | Intelligent voice mouse |
| Model no.: | TG-SD, TG-CN, TG-EN, TG-OP, TG-CU |
| FCC ID: | 2AYAETG01 |
| Options and accessories: | N/A |
| Rating: | 3.7VDC, 400mAh (Supplied by Rechargeable batteries)<br>5VDC, 500mA (Supplied by USB Port) |
| RF Transmission Frequency: | 2405MHz-2470MHz |
| No. of Operated Channel: | 15 |
| Modulation: | GFSK |
| Antenna Type: | PCB antenna |
| Antenna Gain: | 0dBi |
| Description of the EUT: | The Equipment Under Test (EUT) is a Intelligent voice mouse operated at 2.4GHz |

# 4 Summary of Test Standards

| Test Standards | |
|---|---|
| FCC Part 15 Subpart C<br>10-1-2019 Edition | PART 15 - RADIO FREQUENCY DEVICES<br>Subpart C - Intentional Radiators |

All the test methods were according to Public Notice DA 00-705 -Frequency Hopper Spread Spectrum Test Procedure, KDB558074 D01 v05r02 and ANSI C63.10-2013.

# 5 Summary of Test Results

| Technical Requirements | | | | |
|---|---|---|---|---|
| **FCC Part 15 Subpart C** | | | | |
| Test Condition | | Pages | Test Result | Test Site |
| §15.207 | Conducted emission AC power port | 10 | Pass | Site 1 |
| §15.247(b)(1) | Conducted peak output power | 13 | Pass | Site 1 |
| §15.247(e) | Power spectral density | -- | N/A | -- |
| §15.247(a)(2) | 6dB bandwidth | -- | N/A | -- |
| §15.247(a)(1) | 20dB bandwidth and 99% Occupied Bandwidth | 16 | Pass | Site 1 |
| §15.247(a)(1) | Carrier frequency separation | 20 | Pass | Site 1 |
| §15.247(a)(1)(iii) | Number of hopping frequencies | 22 | Pass | Site 1 |
| §15.247(a)(1)(iii) | Dwell Time | 24 | Pass | Site 1 |
| §15.247(d) | Spurious RF conducted emissions | 27 | Pass | Site 1 |
| §15.247(d) | Band edge | 31 | Pass | Site 1 |
| §15.247(d) & §15.209 & §15.205 | Spurious radiated emissions for transmitter and receiver | 34 | Pass | Site 1 |
| §15.203 | Antenna requirement | See note 2 | Pass | -- |

Note 1: N/A=Not Applicable.
Note 2: The EUT uses a PCB antenna, which gain is 0dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.


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# 6 General Remarks

**Remarks**

This submittal(s) (test report) is intended for FCC ID: 2AYAETG01 complies with Section 15.205, 15.209, 15.247 of the FCC Part 15, Subpart C.

All Models are identical, except for the model number. Unless otherwise specified, the model TG-SD was chosen as representative model to perform all the tests.

**SUMMARY:**

All tests according to the regulations cited on page 5 were

n - Performed

o - **Not** Performed

The Equipment Under Test

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

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

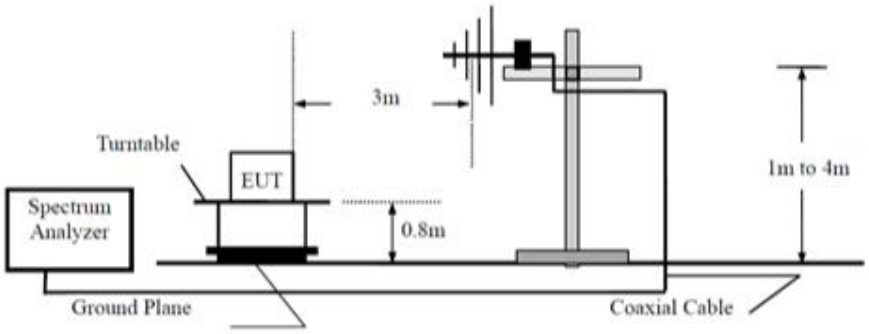
| | |
|---|---|
| Sample Received Date: | April 28, 2020 |
| Testing Start Date: | April 28, 2020 |
| Testing End Date: | July 30, 2020 |

| Reviewed by: | Prepared by: | Tested by: |
|---|---|---|
| John Zhi | Mark Chen | Carry Cai |
| EMC Project Manager | EMC Project Engineer | EMC Test Engineer |

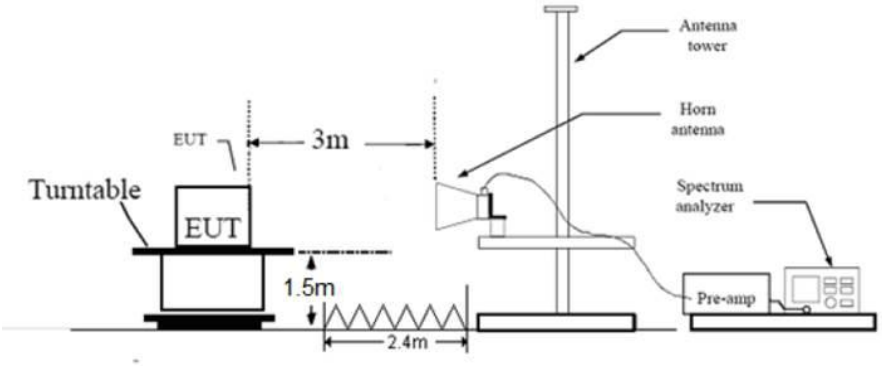
# 7 Test Setups

## 7.1 Radiated test setups

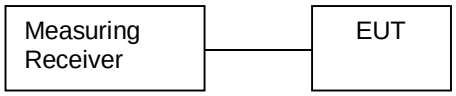
Below 1GHz



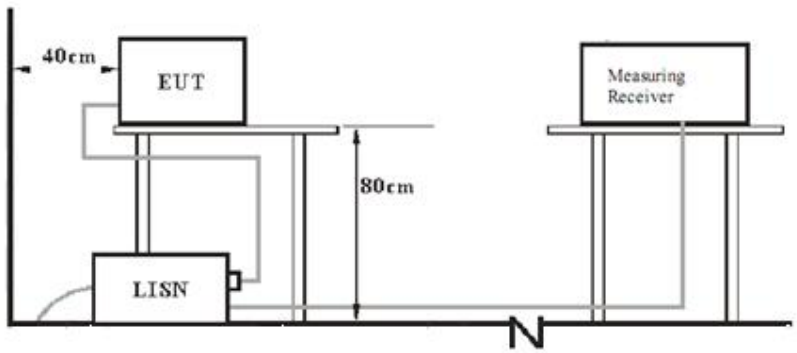

Above 1GHz




## 7.2 Conducted RF test setups




## 7.3 AC Power Line Conducted Emission test setups



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# 8 Systems test configuration

Auxiliary Equipment Used during Test:

| DESCRIPTION | MANUFACTURER | MODEL NO. | S/N |
|---|---|---|---|
| Notebook | Lenovo | X220 | --- |

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 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

**Limit**

| Frequency MHz | QP Limit dBµV | AV Limit dBµV |
|---|---|---|
| 0.150-0.500 | 66-56* | 56-46* |
| 0.500-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreasing linearly with logarithm of the frequency.


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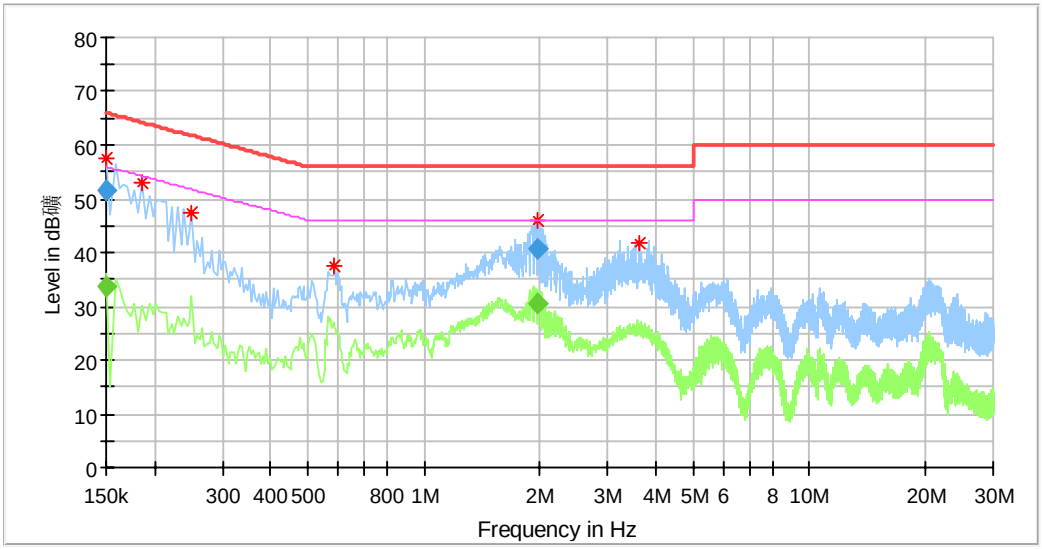
## Conducted Emission Test 0.15MHz – 30MHz

EUT: Intelligent voice mouse
M/N: TG-SD
Operating Condition: TX
Test Specification: Power Line, Live
Comment: AC120V/60Hz




## Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB/m) |
|---|---|---|---|---|---|---|
| 0.150000 | 57.55 | --- | 66.00 | 8.45 | L1 | 9.74 |
| 0.186000 | 52.97 | --- | 64.21 | 11.24 | L1 | 9.71 |
| 0.250000 | 47.34 | --- | 61.76 | 14.41 | L1 | 9.68 |
| 0.586000 | 37.43 | --- | 56.00 | 18.57 | L1 | 9.65 |
| 1.961500 | 46.03 | --- | 56.00 | 9.97 | L1 | 9.68 |
| 3.638000 | 41.73 | --- | 56.00 | 14.27 | L1 | 9.76 |

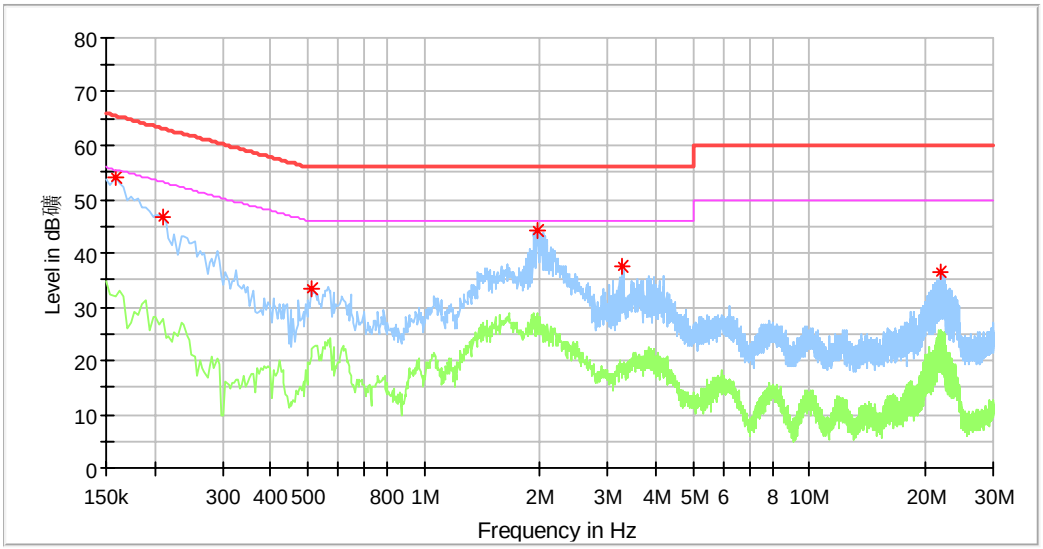
## Final_Result

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB/m) |
|---|---|---|---|---|---|---|
| 0.150000 | --- | 33.69 | 55.78 | 22.09 | L1 | 9.74 |
| 0.150000 | 51.68 | --- | 65.78 | 14.10 | L1 | 9.74 |
| 1.961500 | --- | 30.57 | 46.00 | 15.43 | L1 | 9.68 |
| 1.961500 | 40.60 | --- | 56.00 | 15.40 | L1 | 9.68 |

Remark:
Level=Reading Level + Correction Factor
Correction Factor=Cable Loss + LISN Factor
(The Reading Level is recorded by software which is not shown in the sheet)

## Conducted Emission Test 0.15MHz – 30MHz

EUT: Intelligent voice mouse
M/N: TG-SD
Operating Condition: TX
Test Specification: Power Line, Neutral
Comment: AC120V/60Hz




## Critical_Freqs

| Frequency (MHz) | MaxPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB/m) |
|---|---|---|---|---|---|---|
| 0.158000 | 54.19 | --- | 65.57 | 11.38 | N | 9.78 |
| 0.210000 | 46.73 | --- | 63.21 | 16.47 | N | 9.73 |
| 0.510000 | 33.45 | --- | 56.00 | 22.55 | N | 9.68 |
| 1.982000 | 44.24 | --- | 56.00 | 11.76 | N | 9.73 |
| 3.262000 | 37.40 | --- | 56.00 | 18.60 | N | 9.79 |
| 21.810000 | 36.47 | --- | 60.00 | 23.53 | N | 10.70 |

Remark:
Level=Reading Level + Correction Factor
Correction Factor=Cable Loss + LISN Factor
(The Reading Level is recorded by software which is not shown in the sheet)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## 9.2 Conducted peak output power

**Test Method**

1. Use the following spectrum analyzer settings:
   Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel
   RBW > the 20dB 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 | ≤1 | ≤30 |


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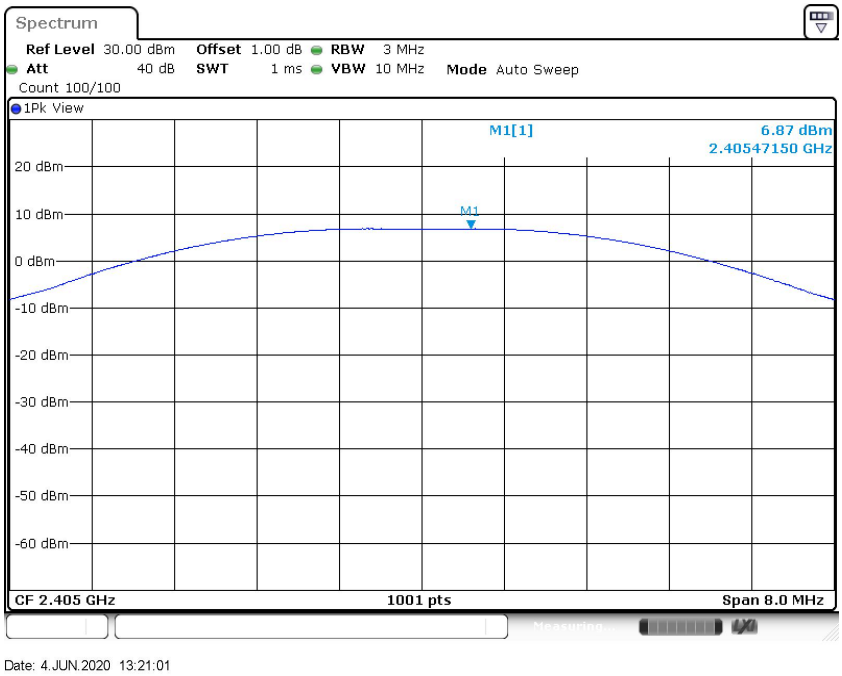
## Conducted peak output power

GFSK modulation Test Result

| Frequency MHz | Conducted Peak Output Power dBm | Result |
|---|---|---|
| Low channel 2405MHz | 6.87 | Pass |
| Middle channel 2435MHz | 7.13 | Pass |
| High channel 2470MHz | 7.12 | Pass |

Low channel 2405MHz



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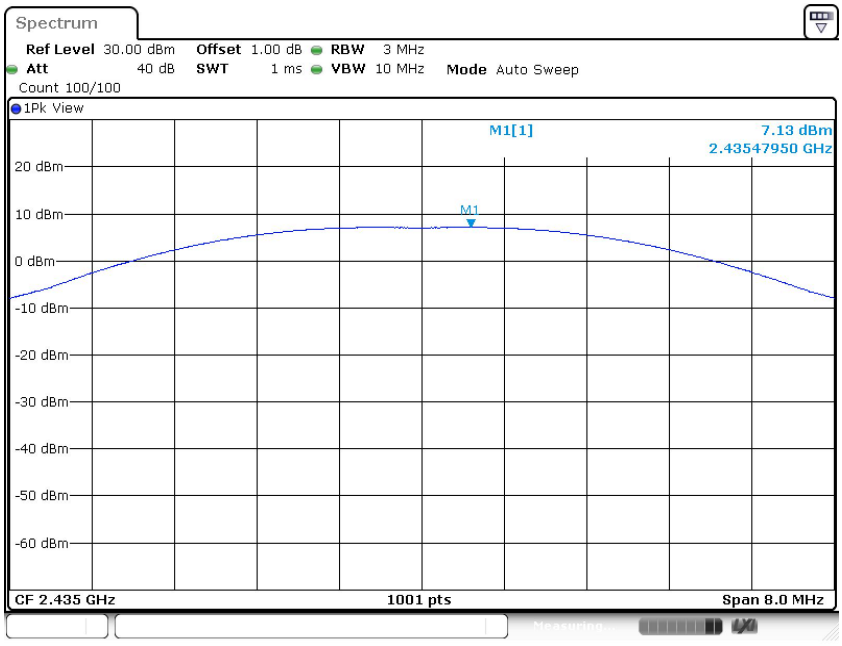
Middle channel 2435MHz

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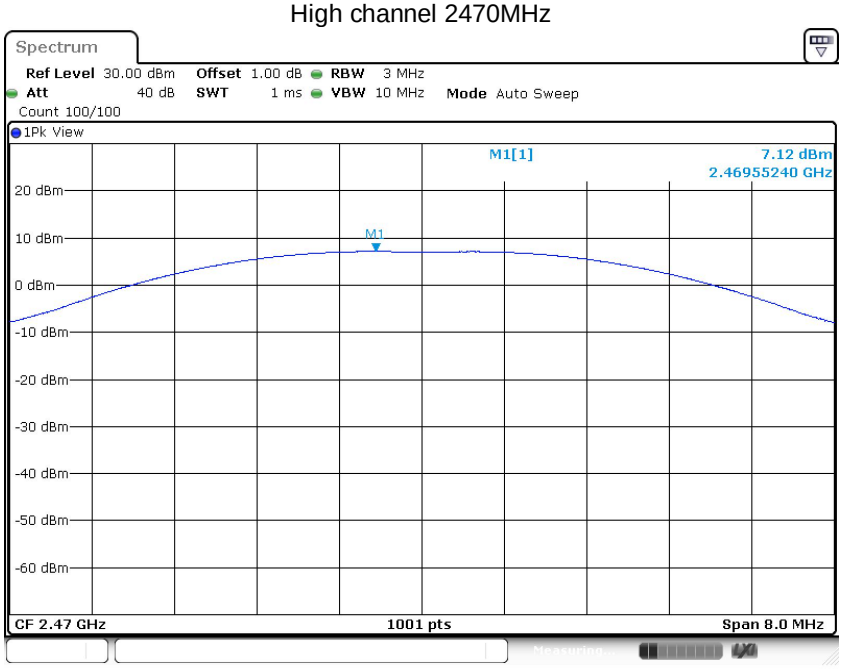
High channel 2470MHz

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## 9.3 20 dB bandwidth and 99% Occupied 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**

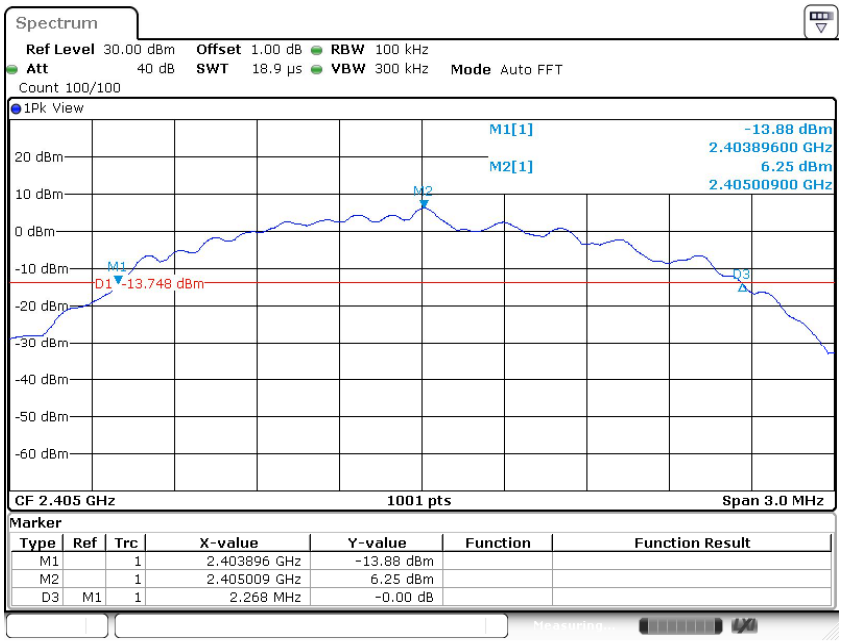
| Limit [kHz] |
|---|
| N/A |

## 20 dB bandwidth and 99% Occupied Bandwidth

GFSK Modulation test result

| Frequency MHz | 20 dB Bandwidth kHz | 99% Bandwidth kHz | Limit kHz | Result |
|---|---|---|---|---|
| 2405 | 2268 | 2047 | -- | Pass |
| 2435 | 2268 | 2041 | -- | Pass |
| 2470 | 2262 | 2038 | -- | Pass |

Low channel 2405MHz

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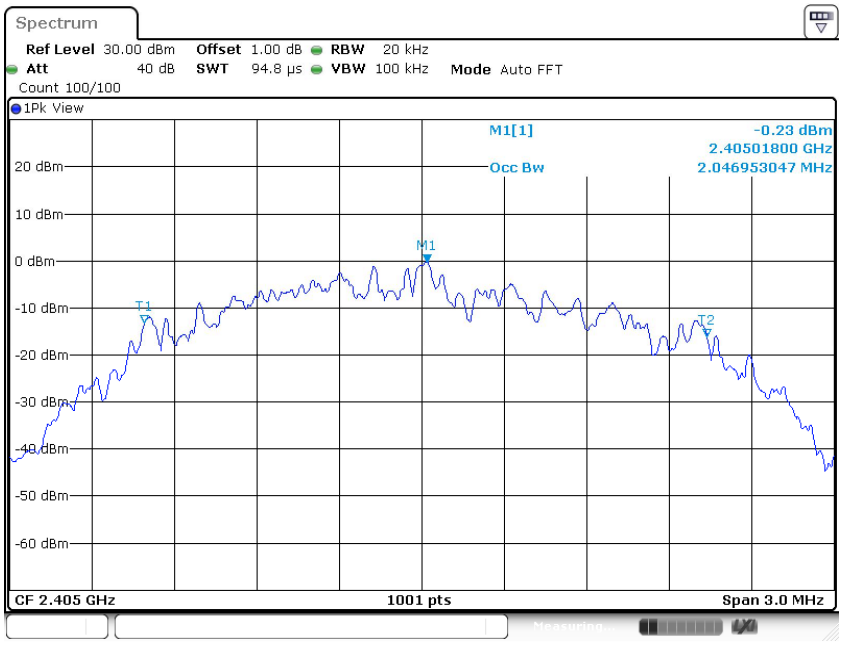


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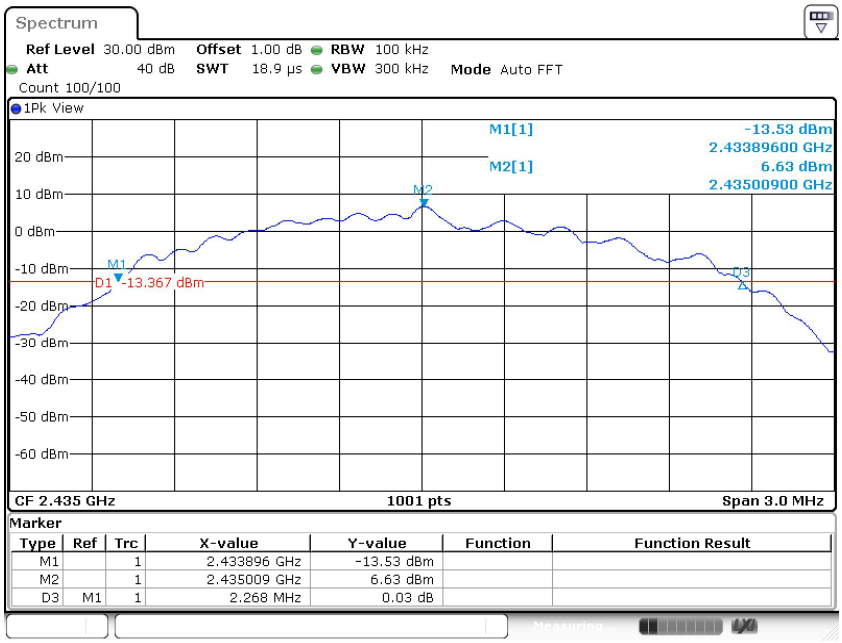
Middle channel 2435MHz

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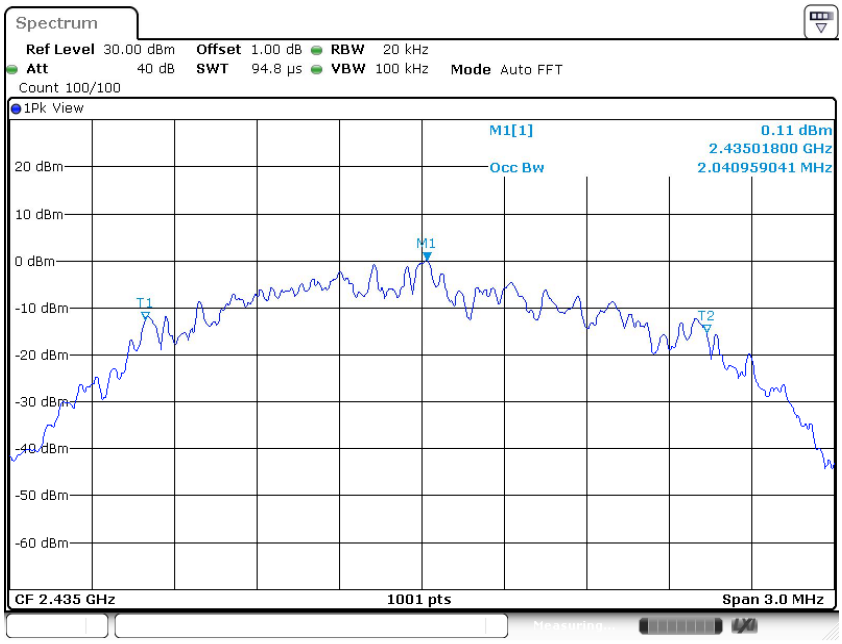


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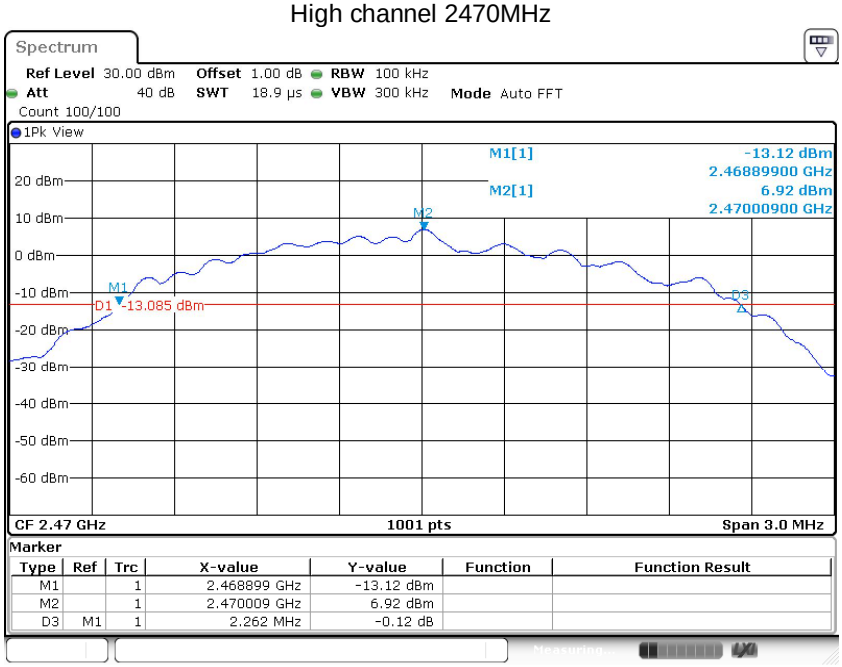
High channel 2470MHz

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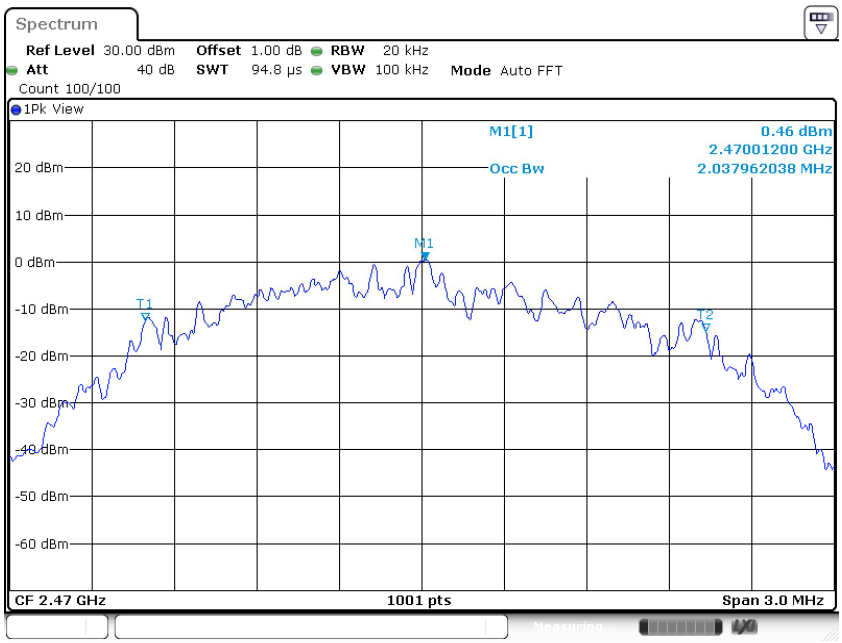


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## 9.4 Carrier Frequency Separation

**Test Method**

1. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥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<br>kHz |
|---|
| ≥25KHz or 2/3 of the 20 dB bandwidth which is greater |

GFSK Modulation Limit

| Test Mode | 2/3 of 20 dB Bandwidth<br>kHz |
|---|---|
| GFSK | 1512 |



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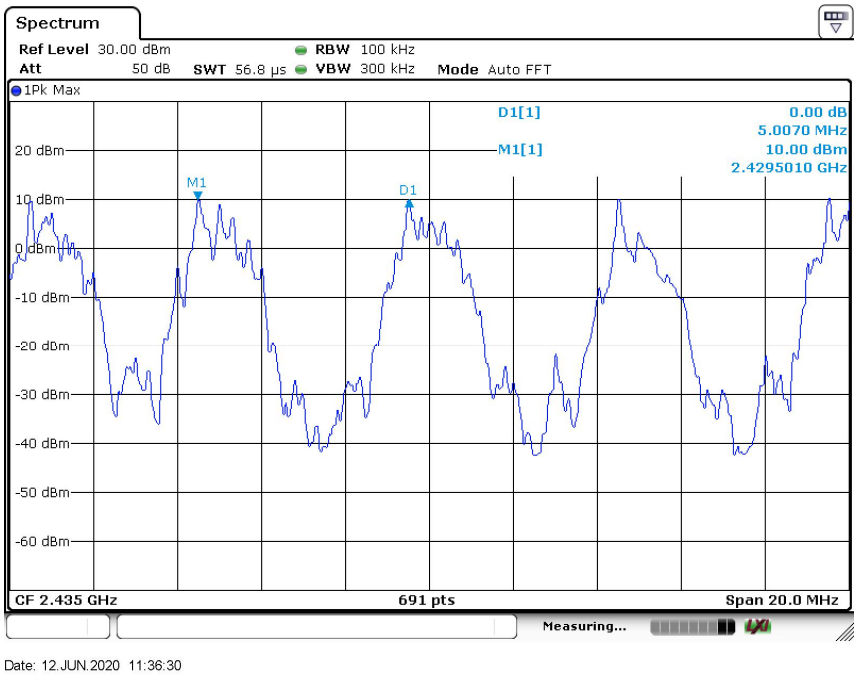
## Carrier Frequency Separation

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

| Test Mode | Carrier Frequency Separation kHz | Result |
|---|---|---|
| GFSK | 5007 | Pass |

Middle channel 2435MHz



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## 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 ≥ 1% of the span, VBW) ≥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.

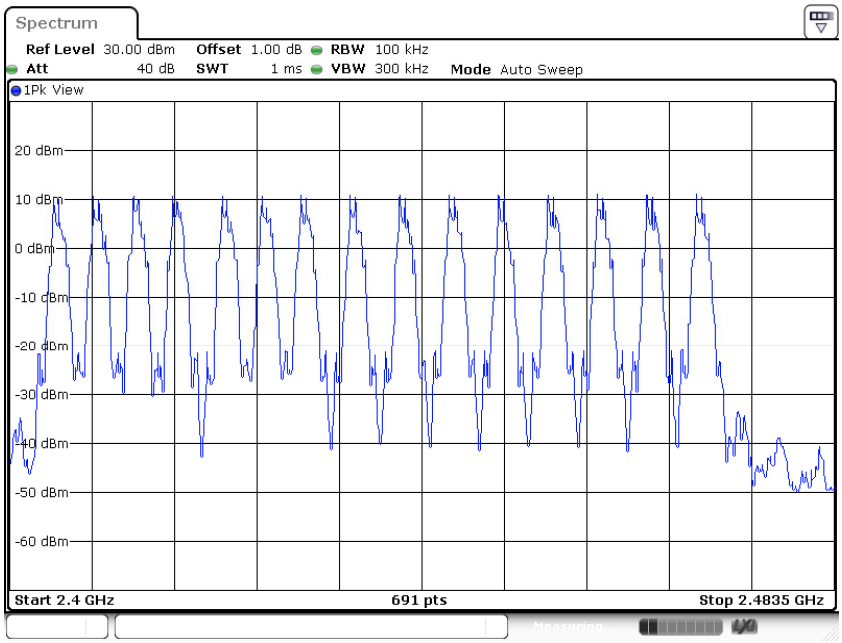
**Limit**

| Limit number |
|---|
| ≥ 15 |

## Number of hopping frequencies

Test result: The measurement was performed with the typical configuration (normal hopping status), and the total hopping channels is constant for the all modulation mode according with the Bluetooth Core Specification. Here GFSK modulation mode was used to show compliance.

| Number of hopping frequencies | Result |
|---|---|
| 15 | Pass |



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## 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

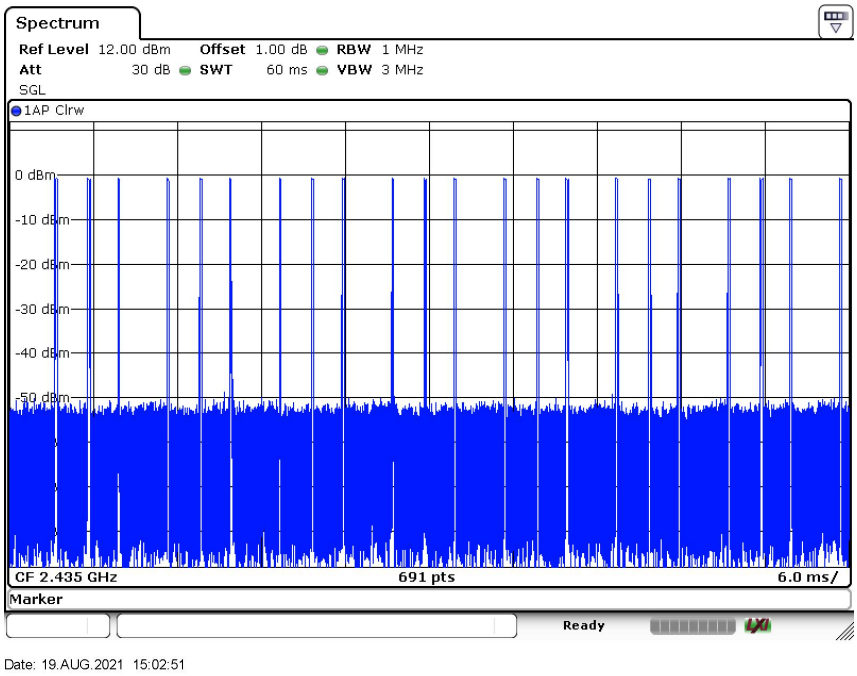
**Dwell time**
The maximum dwell time shall be 0.4 s.

The Dwell Time = Burst Width * Total Hops.

Test Result

| Modulation | Mode | Reading Burst Width (us) | Total Hops | Test Result (ms) | Limit (ms) | Result |
|---|---|---|---|---|---|---|
| GFSK | TX | 156.52 | 2200 | 344.344 | < 400 | Pass |

GFSK Modulation



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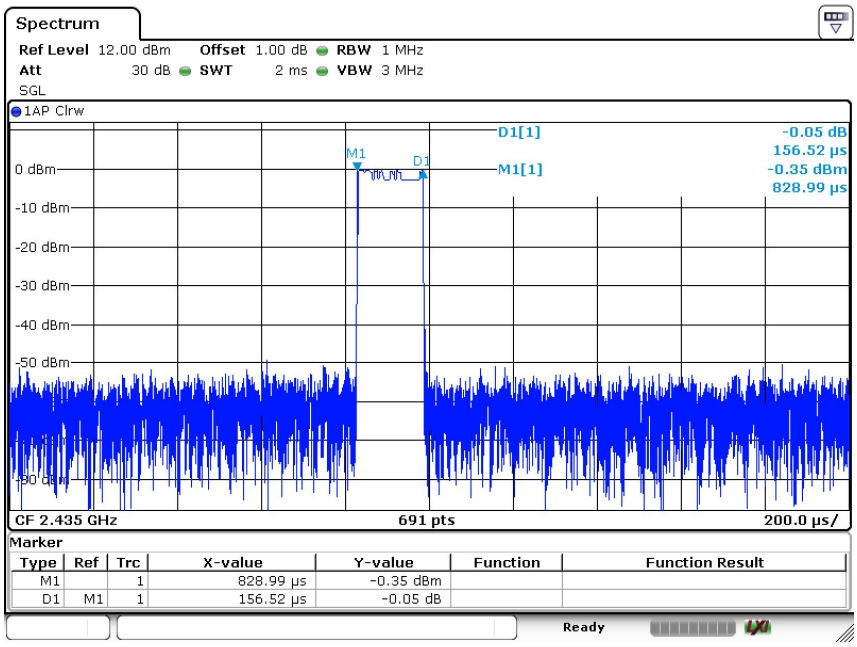


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## 9.7 Spurious RF conducted emissions

**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$^{th}$ 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 MHz | Limit (dBc) |
|---|---|
| 30-25000 | -20 |


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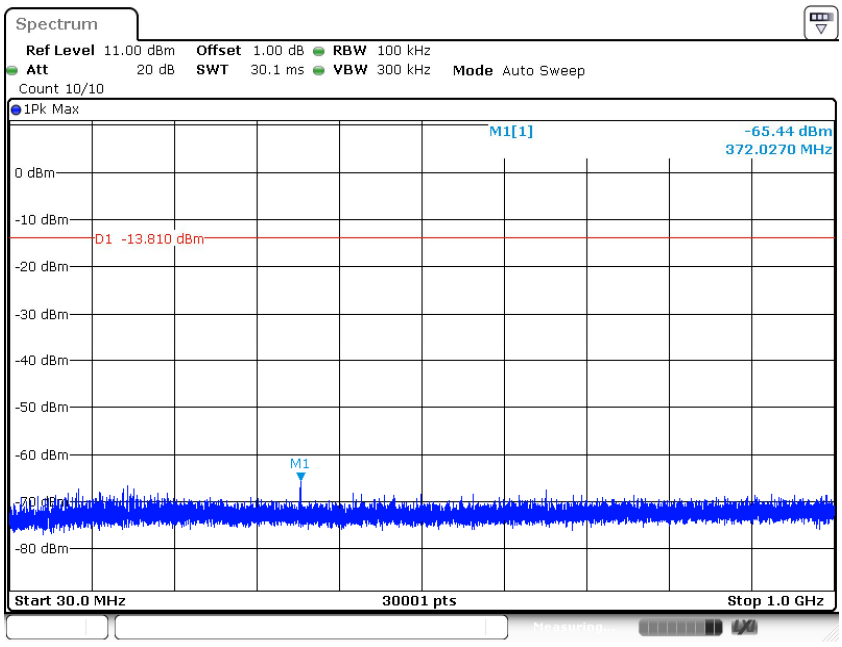
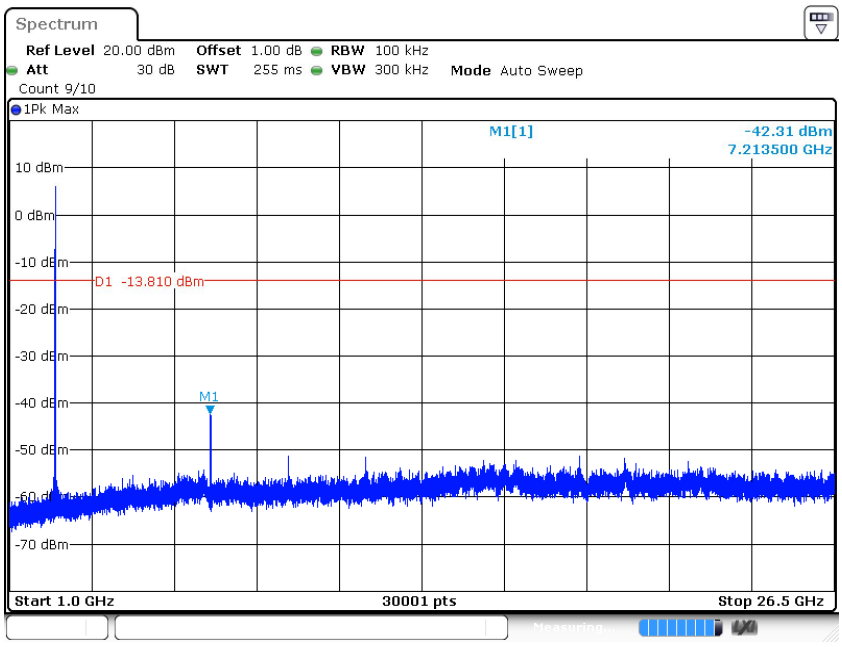
## Spurious RF conducted emissions

Only the worse case test result is listed in the report.
GFSK Modulation:

Low channel 2405MHz

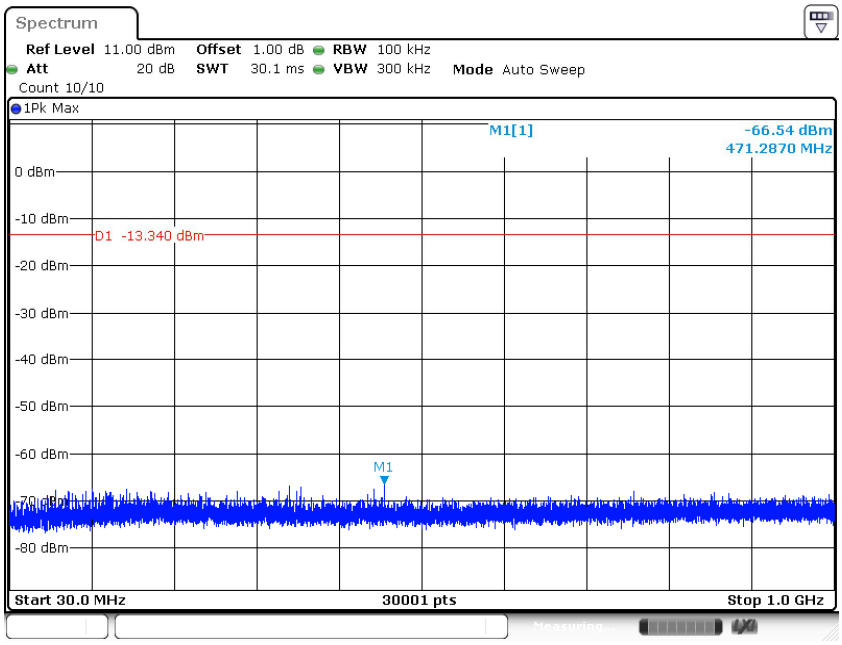



Date: 4.JUN.2020 13:23:43

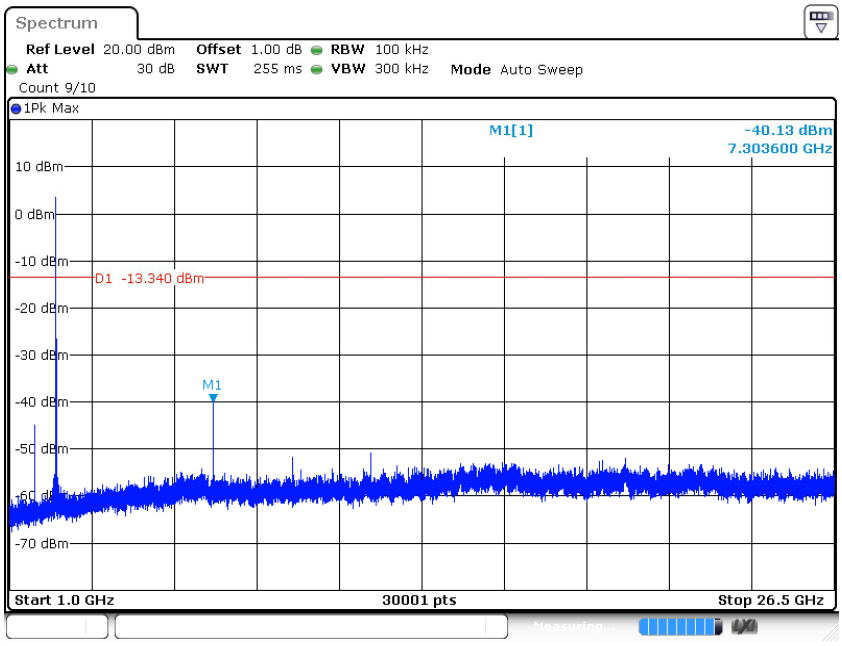



Date: 4.JUN.2020 13:23:51

Middle channel 2435MHz




Date: 4.JUN.2020 13:25:39




Date: 4.JUN.2020 13:25:47



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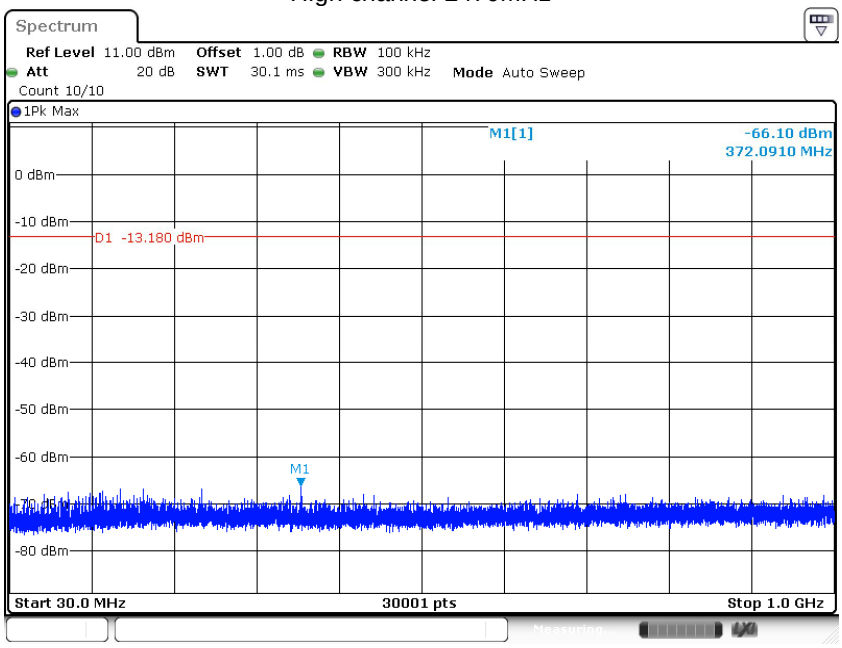
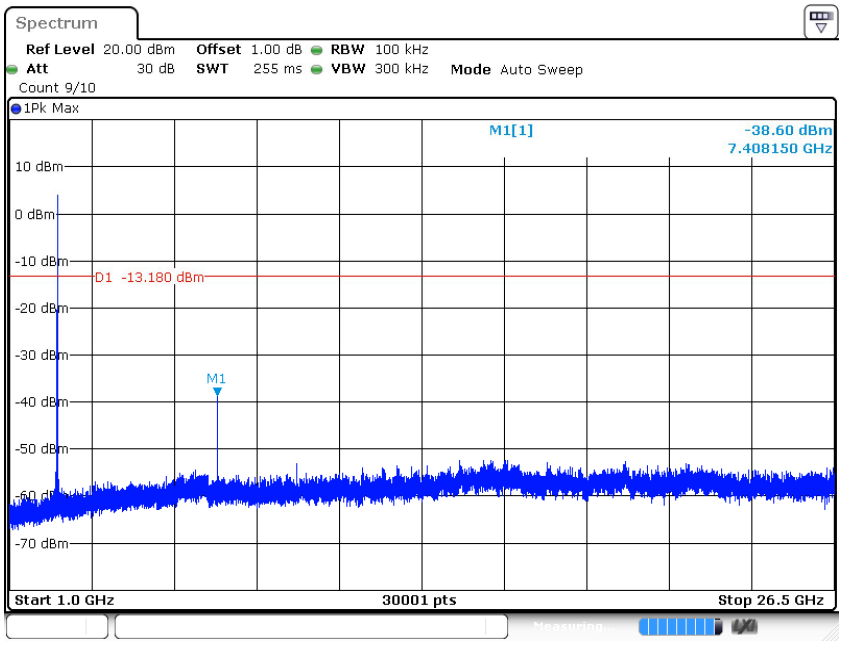
High channel 2470MHz




Date: 4.JUN.2020 13:26:47




Date: 4.JUN.2020 13:26:55



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## 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≥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.

**Limit:**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.


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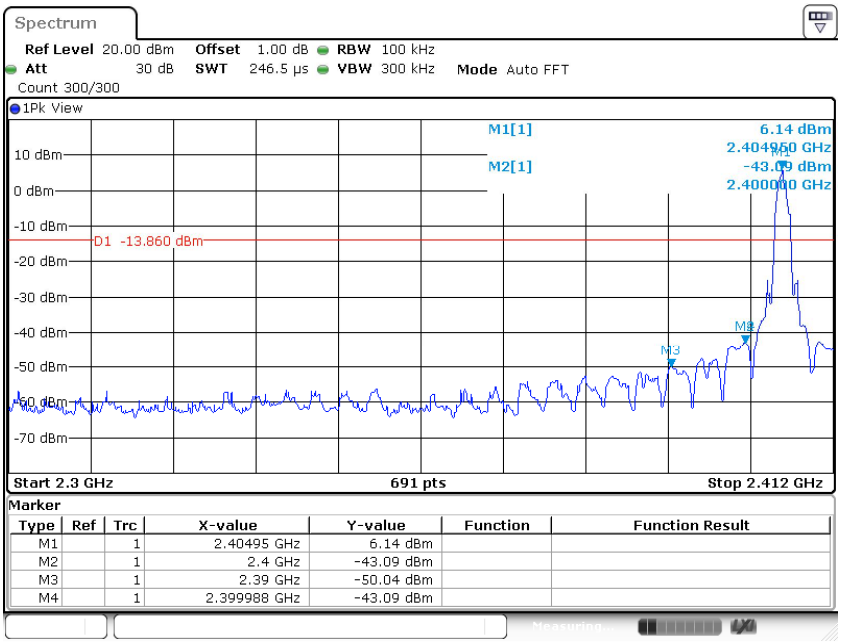
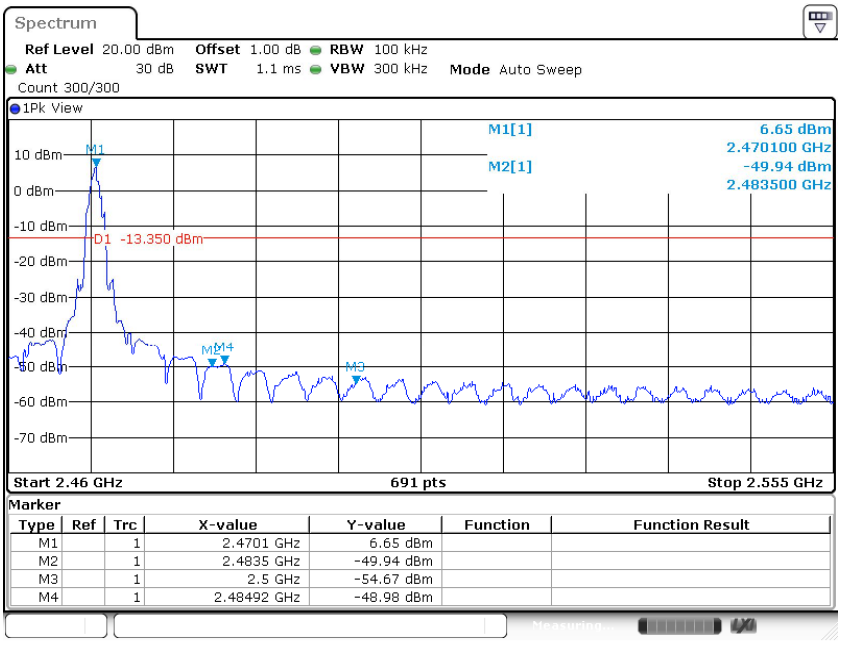
## GFSK mode: Hopping off

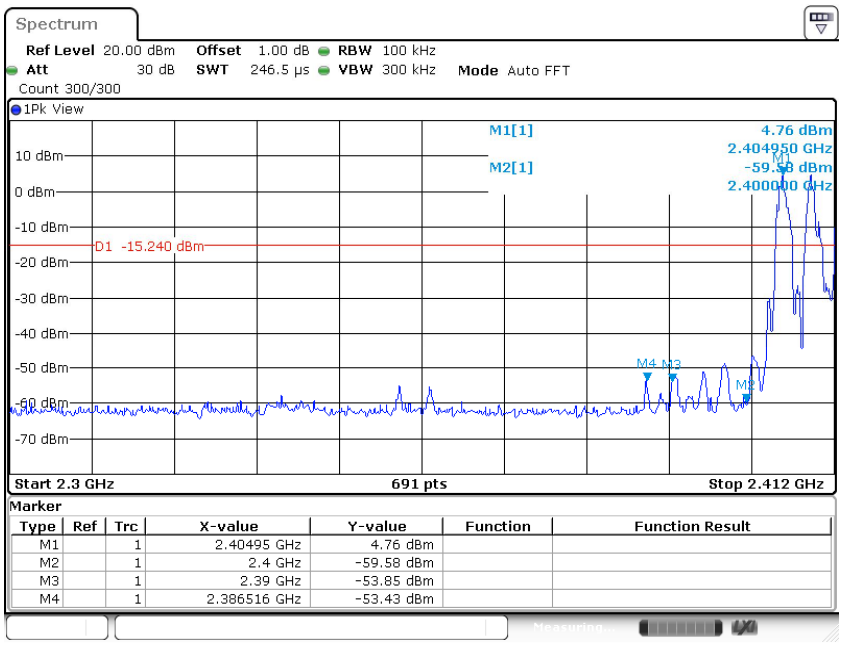



Date: 4.JUN.2020 13:23:30

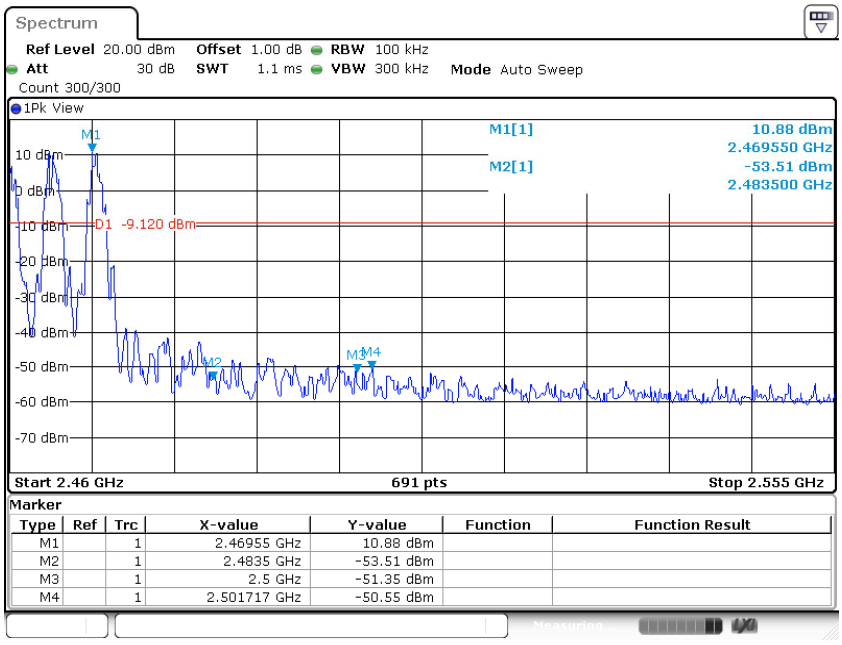



Date: 4.JUN.2020 13:26:35

## GFSK mode: Hopping on




Date: 9.JUN.2020 17:21:49




Date: 9.JUN.2020 17:24:48

## 9.9 Spurious radiated emissions for transmitter

**Test Method**

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.

3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5: Use the following spectrum analyzer settings According to C63.10:

For Below 1GHz

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 to 120KHz, VBW≥RBW for peak measurement, Sweep = auto,
Detector function = peak, Trace = max hold.

For Peak unwanted emissions Above 1GHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW≥RBW for peak measurement ,Sweep = auto,
Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW=10Hz, Sweep = auto, Detector function = peak, Trace = max hold.
If the dwell time 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 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit.

If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correct factor, derived from the appropriate the duty cycle calculation.

The setting method can refer to DA00-705.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## 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 section15.205, must comply with the radiated emission limits specified in section 15.209.

| Frequency MHz | Field Strength uV/m | Field Strength dBµV/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 |


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## 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.

### Transmitting spurious emission test result as below:

Remark: No emissions above 18GHz, so no test plots above 18GHz in report.

Low channel 2405MHz Test Result

| Frequency Band | Frequency | Emission Level | Polarization | Limit | Detector | Margin | Correct factor | Result |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | | dBµV/m | | dBuV/m | (dB) | |
| 30-1000MHz | 539.09 | 29.61 | H | 46 | QP | 16.39 | 19.7 | Pass |
| | 945.63 | 37.99 | V | 40 | QP | 8.01 | 25.8 | Pass |
| 1000-25000MHz | 7215 | 50.89 | H | 74 | PK | 23.11 | 6.1 | Pass |
| | -- | -- | H | 54 | AV | -- | -- | Pass |
| | 7215 | 49.66 | V | 74 | PK | 24.34 | 6.1 | Pass |
| | -- | -- | V | 54 | AV | -- | -- | Pass |

Middle channel 2435MHz Test Result

| Frequency Band | Frequency | Emission Level | Polarization | Limit | Detector | Margin | Correct factor | Result |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | | dBµV/m | | dBuV/m | (dB) | |
| 30-1000MHz | -- | -- | H | 43.5 | QP | -- | -- | Pass |
| | -- | -- | H | 46 | QP | -- | -- | Pass |
| 1000-25000MHz | 7305 | 51.02 | H | 43.5 | QP | 22.98 | 6.4 | Pass |
| | -- | -- | H | 54 | AV | -- | -- | Pass |
| | 7305 | 50.38 | H | 74 | PK | 23.62 | 6.4 | Pass |
| | -- | -- | V | 54 | AV | -- | -- | Pass |

High channel 2470MHz Test Result

| Frequency Band | Frequency | Emission Level | Polarization | Limit | Detector | Margin | Correct factor | Result |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | | dBµV/m | | dBuV/m | (dB) | |
| 30-1000MHz | -- | -- | H | 43.5 | QP | -- | -- | Pass |
| | -- | -- | H | 46 | QP | -- | -- | Pass |
| 1000-25000MHz | 7410 | 51.23 | H | 74 | PK | 22.77 | 5.9 | Pass |
| | -- | -- | H | 54 | AV | -- | -- | Pass |
| | 7410 | 51.62 | V | 74 | PK | 22.38 | 5.9 | Pass |
| | -- | -- | V | 54 | AV | -- | -- | Pass |

Remark:

(1) Level=Reading Level + Correction Factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)


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# 10 Test Equipment List

## List of Test Instruments

### Radiated Emission Test

| Description | Manufacturer | Model no. | Equipment ID | Serial no. | cal interval (year) | cal. due date |
|---|---|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESR 26 | 68-4-74-14-002 | 101269 | 1 | 2021-6-29 |
| Trilog Super Broadband Test Antenna | Schwarzbeck | VULB 9162 | 68-4-80-19-003 | 284 | 1 | 2021-2-24 |
| Wave Guide Antenna | ETS | 3117 | 68-4-80-19-001 | 00218954 | 1 | 2021-6-15 |
| Pre-amplifier | Rohde & Schwarz | SCU 18F | 68-4-29-19-001 | 100745 | 1 | 2020-12-14 |
| Pre-amplifier | Rohde & Schwarz | SCU 08F2 | 68-4-29-19-004 | 08400018 | 1 | 2020-12-14 |
| Sideband Horn Antenna | Q-PAR | QWH-SL-18-40-K-SG | 68-4-80-14-008 | 12827 | 1 | 2021-8-5 |
| Pre-amplifier | Rohde & Schwarz | SCU 40A | 68-4-29-14-002 | 100432 | 1 | 2021-7-30 |
| 3m Semi-anechoic chamber | TDK | 9X6X6 | 68-4-90-19-006 | ---- | 3 | 2022-12-29 |
| Test software | Rohde & Schwarz | EMC32 | 68-4-90-19-006-A01 | Version10.35.02 | N/A | N/A |

### Conducted Emission Test

| Description | Manufacturer | Model no. | Equipment ID | Serial no. | cal interval (year) | cal. due date |
|---|---|---|---|---|---|---|
| EMI Test Receiver | Rohde & Schwarz | ESR 3 | 68-4-74-19-002 | 102590 | 1 | 2021-6-29 |
| LISN | Rohde & Schwarz | ENV216 | 68-4-87-19-001 | 102472 | 1 | 2021-6-12 |
| ISN | Rohde & Schwarz | ENY81 | 68-4-87-14-003 | 100177 | 1 | 2021-6-12 |
| ISN | Rohde & Schwarz | ENY81-CA6 | 68-4-87-14-004 | 101664 | 1 | 2021-6-12 |
| High Voltage Probe | Schwarzbeck | TK9420(VT9420) | 68-4-27-14-001 | 9420-584 | 1 | 2021-6-23 |
| RF Current Probe | Rohde & Schwarz | EZ-17 | 68-4-27-14-002 | 100816 | 1 | 2021-6-28 |
| Attenuator | Shanghai Huaxiang | TS2-26-3 | 68-4-81-16-003 | 080928189 | 1 | 2021-6-21 |
| Test software | Rohde & Schwarz | EMC32 | 68-4-90-19-005-A01 | Version10.35.02 | N/A | N/A |
| Shielding Room | TDK | CSR #2 | 68-4-90-19-005 | ---- | 1 | 2022-11-07 |

RF Conducted Test

| Description | Manufacturer | Model no. | Equipment ID | Serial no. | cal interval (year) | cal. due date |
|---|---|---|---|---|---|---|
| Signal Analyzer | Rohde & Schwarz | FSV40 | 68-4-74-14-004 | 101030 | 1 | 2021-6-21 |

## 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 Conducted Emission in shielding room 150kHz-30MHz | 3.21dB |
| Radiated Spurious Emission 25MHz-3000MHz | Horizontal: 4.35dB;<br>Vertical: 4.44dB; |
| Radiated Spurious Emission 3000MHz-18000MHz | Horizontal: 4.30dB;<br>Vertical: 4.29dB; |
| Radiated Spurious Emission 18000MHz-40000MHz | Horizontal: 4.51dB;<br>Vertical: 4.50dB; |
| Conducted RF test with TS 8997 | RF Power Conducted: 1.31dB<br>Frequency test involved:<br>$0.6\times10^{-7}$ or 1% |


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