

**TEST REPORT**

|                                 |                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------|
| <b>Applicant:</b>               | TOTEM ACOUSTIQUE INC.                                                                   |
| <b>Address of Applicant:</b>    | 9165, Champ d'Eau, St. Leonard, Quebec, H1P3M3, Canada                                  |
| <b>Manufacturer:</b>            | TOTEM ACOUSTIQUE INC.                                                                   |
| <b>Address of Manufacturer:</b> | 9165, Champ d'Eau, St. Leonard, Quebec, H1P3M3, Canada                                  |
| <b>Product name:</b>            | Active Speaker                                                                          |
| <b>Model:</b>                   | KIN Play                                                                                |
| <b>Rating(s):</b>               | 100-120V ~ , 60Hz or 220-240V ~ , 50Hz, 300W                                            |
| <b>Trademark:</b>               | TOTEM  |
| <b>Standards:</b>               | FCC Part 15.247: 2019<br>RSS-247 Issue 2                                                |
| <b>FCC ID:</b>                  | 2AQ6V-KINPLAY                                                                           |
| <b>IC :</b>                     | 24314-KINPLAY                                                                           |
| <b>Data of Receipt:</b>         | 2020-08-12                                                                              |
| <b>Date of Test:</b>            | 2020-08-12~2020-09-21                                                                   |
| <b>Date of Issue:</b>           | 2020-09-22                                                                              |
| <b>Test Result</b>              | <b>Pass*</b>                                                                            |

\* In the configuration tested, the test item complied with the standards specified above.

**Authorized for issue by:**

**Test by:**

Sep.22, 2020 Eleven Liang

Project Engineer

Date

Name/Position

Signature



**Reviewed by:**

Sep.22, 2020

Pauler Li

Project Manager

Date

Name/Position

Signature

**Possible test case verdicts:**

test case does not apply to the test object ...: N/A  
test object does meet the requirement .....: P (Pass)  
test object does not meet the requirement ...: F (Fail)

**Testing Laboratory information:**

Testing Laboratory Name .....: ITL Co., LTD  
Address.....: No.8, Jinqianling Street 5, Huangjiang, Dongguan,  
Guangdong, China.  
Testing location : Same as above  
Tel : 0086-769-39001678  
Fax : 0086-20-62824387  
E-mail : itl@i-testlab.com

**General remarks:**

**The test results presented in this report relate only to the object tested.**

**The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.**

**This report would be invalid test report without all the signatures of testing technician and approver.**

**This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.**

**General product information:**

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## 1 Test Summary

| Test                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Test Requirement                                          | Test method                                                | Result |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|--------|
| Antenna Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FCC PART 15 C<br>section 15.247 (c) and<br>Section 15.203 | FCC PART 15 C<br>section 15.247 (c) and<br>Section 15.203  | PASS   |
| Conducted Spurious<br>Emission<br>(30 MHz to 25 GHz)                                                                                                                                                                                                                                                                                                                                                                                                                                    | FCC PART 15 C<br>section 15.247(d);<br>RSS 247 5.5        | ANSI C63.10:2013<br>Clause 6.7<br>& DA 00-705              | PASS   |
| Radiated Spurious Emission<br>(9 kHz to 25 GHz)                                                                                                                                                                                                                                                                                                                                                                                                                                         | FCC PART 15 C<br>section 15.247(d);<br>RSS 247 5.5        | ANSI C63.10:2013 Clause<br>6.4,<br>6.5 and 6.6 & DA 00-705 | PASS   |
| <b>Remark:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                           |                                                            |        |
| N/A: not applicable. Refer to the relative section for the details.<br>EUT: In this whole report EUT means Equipment Under Test.<br>Tx: In this whole report Tx (or tx) means Transmitter.<br>Rx: In this whole report Rx (or rx) means Receiver.<br>RF: In this whole report RF means Radio Frequency.<br>ANSI C63.10:2013 the detail version is ANSI C63.10:2013 in the whole report.<br>DA 00-705: "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" |                                                           |                                                            |        |

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### 3 General Information

#### 3.1 Client Information

Applicant: TOTEM ACOUSTIQUE INC.  
Address of Applicant: 9165, Champ d'Eau, St. Leonard, Quebec, H1P3M3, Canada

#### 3.2 General Description of E.U.T.

Name: Active Speaker  
Model No.: KIN Play  
Trade Mark: 

Operating Frequency: 2402 MHz to 2480 MHz for Bluetooth.  
Channels: 79 channels with 1MHz step for Bluetooth  
Bluetooth Version: 4.1  
This report is for classic mode.

Modulation Technique: Frequency Hopping Spread Spectrum (FHSS)  
Type of Modulation: GFSK, ( $\pi/4$ ) DQPSK, 8DPSK for Bluetooth  
Dwell time: Per channel is less than 0.4s.  
Antenna Type: PCB antenna  
Antenna gain: 0 dBi  
Function: Bluetooth speaker

#### 3.3 Details of E.U.T.

EUT Power Supply: AC for power supply  
Rated power: 100-240V ~ , 50/60Hz  
Test mode: The program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lowest (2402MHz), middle (2441MHz) and highest (2480MHz) are chosen for Bluetooth full testing.  
Normal mode: the Bluetooth has been tested on the Modulation of GFSK;  
EDR mode: the Bluetooth has been tested on the Modulation of ( $\pi/4$ )DQPSK and 8DPSK, compliance test and record the worst case on ( $\pi/4$ )DQPSK and 8DPSK

#### 3.4 Description of Support Units

The EUT has been tested as an independent unit for fixed frequency by testing lab.

### 3.5 Test Location

All the tests were performed in ITL Co., Ltd. Which is located at No.8, JinQianLing street 5, DongHuan Road, Huangjiang Town, Dongguan, China

Tel: 0086-769-39001678

No test is subcontracted

### 3.6 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

### 3.7 Abnormalities from Standard Conditions

None.

### 3.8 Other Information Requested by the Customer

None.

### 3.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- CNAS Lab code:L9342
- FCC Designation No.:CN5035
- IC Registration NO.: 12593A
- NVLAP LAB CODE: 600199-0

### 3.10 Measurement Uncertainty

The below measurement uncertainties given below are based on a 95% confidence level (base on a coverage factor (k=2).)

| Parameter                     | Uncertainty               |
|-------------------------------|---------------------------|
| Radio frequency               | $\pm 1.06 \times 10^{-7}$ |
| total RF power, conducted     | 1.37 dB                   |
| RF power density , conducted  | 2.89 dB                   |
| All emissions, radiated       | $\pm 3.35$ dB             |
| Temperature                   | $\pm 0.23$ °C             |
| Humidity                      | $\pm 0.3$ %               |
| DC and low frequency voltages | $\pm 0.3$ %               |

#### 4 Instruments Used during Test

| No.     | Test Equipment                       | Manufacturer  | Model              | Serial No.         | Last Cal.  | Cal. Due   |
|---------|--------------------------------------|---------------|--------------------|--------------------|------------|------------|
| ITL-114 | Spectrum Analyzer                    | Agilent       | N9010A             | MY51250936         | 2020/01/15 | 2021/01/14 |
| ITL-154 | EMI test receiver<br>9kHz to 26.5GHz | R&S           | ESR26              | 101257             | 2020/01/15 | 2021/01/14 |
| ITL-116 | Pre Amplifier                        | HP            | 8447F              | 3113A05905         | 2020/01/15 | 2021/01/14 |
| ITL-117 | Wideband<br>Amplifier Super<br>Ultra | Mini-circuits | ZVA-183-<br>S+     | 469101134          | 2020/01/15 | 2021/01/14 |
| ITL-164 | Trilog-Broadband<br>Antenna          | Schwarzbeck   | VULB<br>9168       | 9168-0844          | 2017/11/16 | 2020/11/16 |
| ITL-110 | Horn Antenna                         | A-INFOMW      | JXTXLB-<br>10180-N | J2031090612<br>133 | 2020/01/15 | 2021/01/14 |
| ITL-125 | EMI Test receiver                    | R&S           | ESCI               | 100910             | 2020/06/17 | 2021/06/16 |
| ITL-103 | Two-line v-<br>network               | R&S           | ENV216             | 100120             | 2019/10/15 | 2020/10/14 |
| ITL-115 | 50Ω Coaxial<br>Cable                 | Mini-circuits | CBL                | C001               | 2020/06/19 | 2021/06/18 |
| ITL-100 | Semi-Anechoic<br>chamber             | ETS Lindgren  | FACT3<br>2.0       | CT09015            | 2018/12/29 | 2021/12/28 |
| ITL-101 | Shielded Room                        | ETS•Lindgren  | 8*4*3              | CT09010            | 2018/01/27 | 2021/01/26 |

## 5 Test Results

### 5.1 E.U.T. test conditions

**Test Voltage:** Input: AC 120V, 60 Hz

**Temperature:** 20.0 -25.0 °C

**Humidity:** 38-50 % RH

**Atmospheric Pressure:** 1000 -1010 mbar

**Test frequencies and frequency range:** According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

**Number of fundamental frequencies to be tested in EUT transmit band**

| Frequency range in which | Number of | Location in frequency range                 |
|--------------------------|-----------|---------------------------------------------|
| 1 MHz or less            | 1         | Middle                                      |
| 1 MHz to 10 MHz          | 2         | 1 near top and 1 near bottom                |
| More than 10 MHz         | 3         | 1 near top, 1 near middle and 1 near bottom |

**Frequency range of radiated emission measurements**

| Lowest frequency generated  | Upper frequency range of measurement                         |
|-----------------------------|--------------------------------------------------------------|
| 9 kHz to below 10 GHz       | 10th harmonic of highest fundamental frequency or to 40 GHz, |
| At or above 10 GHz to below | 5th harmonic of highest fundamental frequency or to 100 GHz, |
| At or above 30 GHz          | 5th harmonic of highest fundamental frequency or to 200 GHz, |

**EUT channels and frequencies list for Bluetooth:**

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|---------|-----------------|
| 0       | 2402            | 11      | 2413            | 22      | 2424            |
| 1       | 2403            | 12      | 2414            | 23      | 2425            |



|    |      |    |      |    |      |
|----|------|----|------|----|------|
| 2  | 2404 | 13 | 2415 | 24 | 2426 |
| 3  | 2405 | 14 | 2416 | 25 | 2427 |
| 4  | 2406 | 15 | 2417 | 26 | 2428 |
| 5  | 2407 | 16 | 2418 | 27 | 2429 |
| 6  | 2408 | 17 | 2419 | 28 | 2430 |
| 7  | 2409 | 18 | 2420 | 29 | 2431 |
| 8  | 2410 | 19 | 2421 | 30 | 2432 |
| 9  | 2411 | 20 | 2422 | 31 | 2433 |
| 10 | 2412 | 21 | 2423 | 32 | 2434 |
| 33 | 2435 | 49 | 2451 | 65 | 2467 |
| 34 | 2436 | 50 | 2452 | 66 | 2468 |
| 35 | 2437 | 51 | 2453 | 67 | 2469 |
| 36 | 2438 | 52 | 2454 | 68 | 2470 |
| 37 | 2439 | 53 | 2455 | 69 | 2471 |
| 38 | 2440 | 54 | 2456 | 70 | 2472 |
| 39 | 2441 | 55 | 2457 | 71 | 2473 |
| 40 | 2442 | 56 | 2458 | 72 | 2474 |
| 41 | 2443 | 57 | 2459 | 73 | 2475 |
| 42 | 2444 | 58 | 2460 | 74 | 2476 |
| 43 | 2445 | 59 | 2461 | 75 | 2477 |
| 44 | 2446 | 60 | 2462 | 76 | 2478 |
| 45 | 2447 | 61 | 2463 | 77 | 2479 |
| 46 | 2448 | 62 | 2464 | 78 | 2480 |
| 47 | 2449 | 63 | 2465 |    |      |
| 48 | 2450 | 64 | 2466 |    |      |

Test frequencies are the lowest channel: 0 channel (2402 MHz), middle channel: 39 channel (2441

MHz) and highest channel: 78 channel (2480 MHz)

## 5.2 Antenna requirement

### Standard requirement

15.203 requirement:

For intentional device. According to 15.203. an intentional radiator shall be designed to Ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

### EUT Antenna

The antenna is a PCB antenna and no consideration of replacement. The best case gain of the antenna is 0 dBi.

**Test result: The unit does meet the FCC requirements.**

### 5.3 Radiated Spurious Emissions

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b> | FCC Part15 C section 15.247 and RSS-247<br><br>(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, and provided the transmitter demonstrates compliance with the peak conducted power limits. |
| <b>Test Method:</b>      | ANSI C63.10:2013 Clause 6.4, 6.5 and 6.6 & DA 00-705                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Test Status:</b>      | Pre-test the EUT in continuous transmitting mode at the lowest, middle and highest channel with different data packet. Compliance test in continuous transmitting mode with normal mode (DH5) as the worst case was found.                                                                                                                                                                                                                                                                                                                                   |
| <b>Detector:</b>         | For PK value:<br><br>RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz, 9kHz for $<30$ MHz, VBW $\geq$ RBW Sweep = auto<br><br>Detector function = peak<br><br>Trace = max hold<br><br>For AV value:<br><br>RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz, 9kHz for $<30$ MHz, VBW =10 Hz<br><br>Sweep = auto<br><br>Detector function = peak<br><br>Trace = max hold                                                                                                                                                                        |

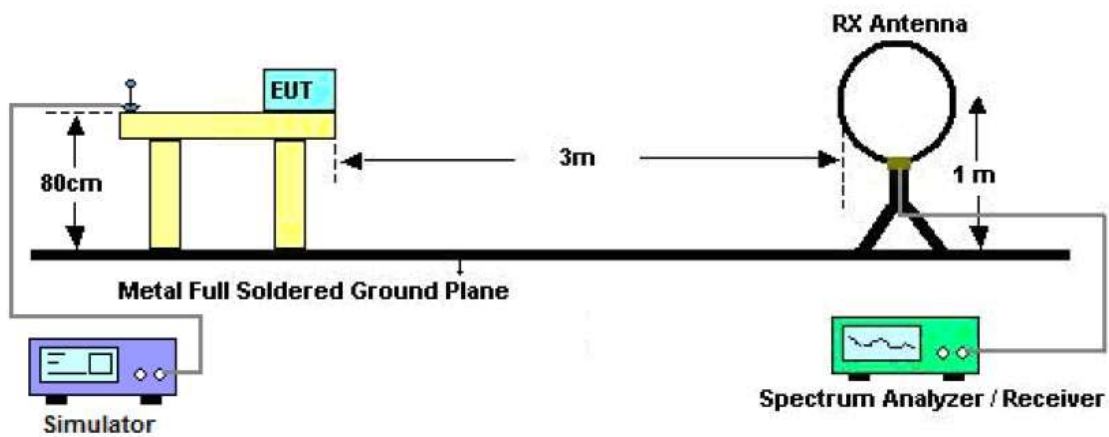
15.209 Limit:

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009 - 0.490   | 2400/F(kHz)                       | 300                           |
| 0.490 - 1.705   | 24000/F(kHz)                      | 30                            |
| 1.705 - 30.0    | 30                                | 30                            |
| 30 - 88         | 100                               | 3                             |
| 88 - 216        | 150                               | 3                             |
| 216 - 960       | 200                               | 3                             |

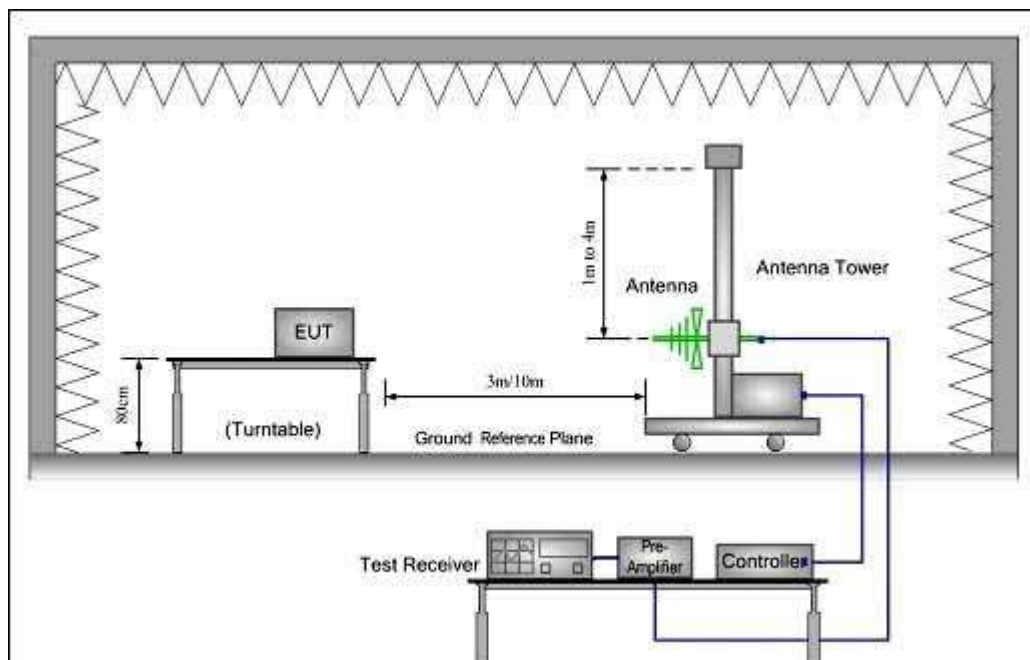
|           |     |   |
|-----------|-----|---|
| Above 960 | 500 | 3 |
|-----------|-----|---|

**Test Configuration:**

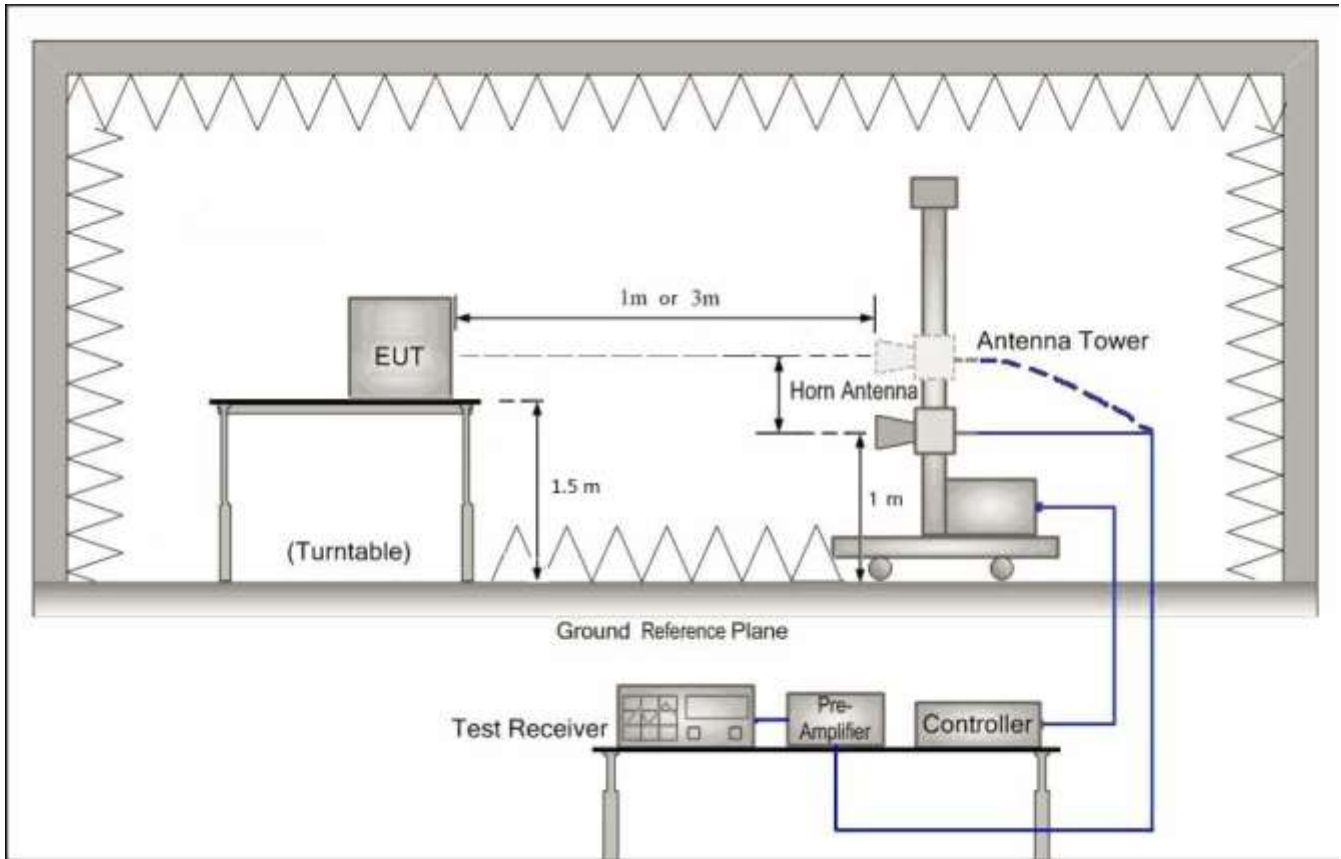
- 1) 9kHz to 30MHz emissions:



- 2) 30 MHz to 1 GHz emissions:



## 3) 1 GHz to 40 GHz emissions:



**Test Procedure:** The receiver was scanned from 30MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. After pre-test, it was found that the worse radiation emission was get at the X position. So the data shown was the X position only. The worst case emissions were reported.

Now 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 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  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

### 5.3.1 Harmonic and other spurious emissions

Worst case mode DH5

#### Test at low Channel in transmitting status

9kHz~30MHz Test result

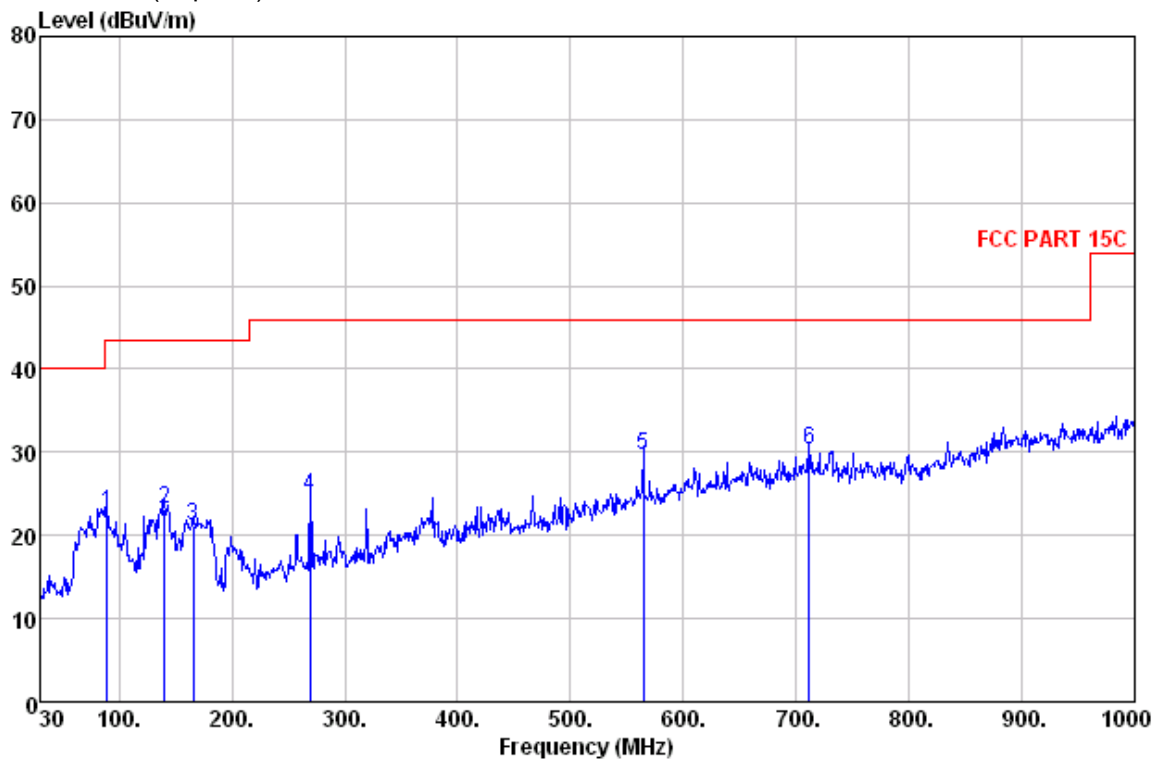
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

| No. | Freq<br>MHz | Read<br>Level<br>dBμV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBμV/m | Limit<br>Line<br>dBμV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|--------|
| 1   | 89.170      | 37.70                 | 12.38                   | 1.10                | 28.38                  | 22.80           | 43.50                   | -20.70              | HORIZONTAL    | QP     |
| 2   | 140.580     | 33.35                 | 16.72                   | 1.41                | 28.22                  | 23.26           | 43.50                   | -20.24              | HORIZONTAL    | QP     |
| 3   | 165.800     | 31.36                 | 16.66                   | 1.54                | 28.33                  | 21.23           | 43.50                   | -22.27              | HORIZONTAL    | QP     |
| 4   | 269.590     | 32.87                 | 17.14                   | 2.01                | 27.22                  | 24.80           | 46.00                   | -21.20              | HORIZONTAL    | QP     |
| 5   | 564.470     | 30.81                 | 24.74                   | 2.96                | 28.78                  | 29.73           | 46.00                   | -16.27              | HORIZONTAL    | QP     |
| 6   | 711.910     | 27.92                 | 27.08                   | 3.35                | 28.07                  | 30.28           | 46.00                   | -15.72              | HORIZONTAL    | QP     |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

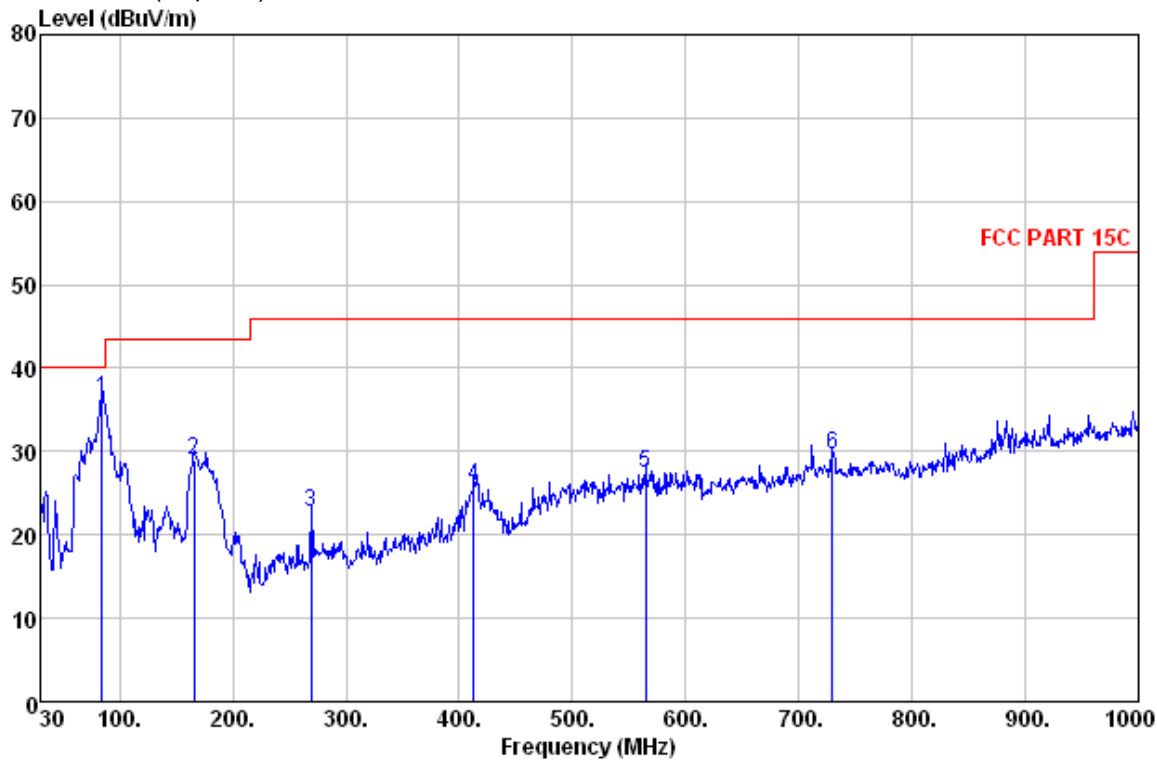
## Test at low Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



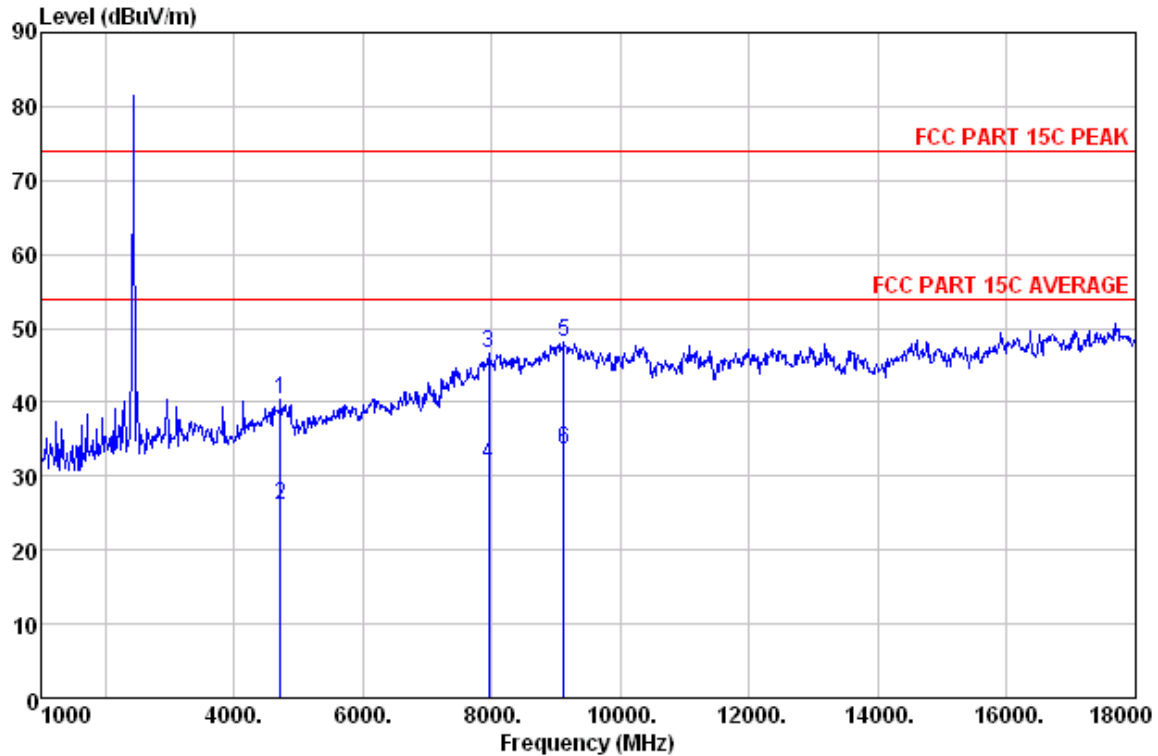
Quasi-peak measurement

| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|--------|
| 1   | 84.320      | 51.29                 | 12.26                   | 1.07                | 28.23                  | 36.39           | 40.00                   | -3.61               | VERTICAL      | QP     |
| 2   | 165.800     | 39.18                 | 16.66                   | 1.54                | 28.33                  | 29.05           | 43.50                   | -14.45              | VERTICAL      | QP     |
| 3   | 269.590     | 30.74                 | 17.14                   | 2.01                | 27.22                  | 22.67           | 46.00                   | -23.33              | VERTICAL      | QP     |
| 4   | 413.150     | 30.47                 | 21.06                   | 2.50                | 28.15                  | 25.88           | 46.00                   | -20.12              | VERTICAL      | QP     |
| 5   | 564.470     | 28.55                 | 24.74                   | 2.96                | 28.78                  | 27.47           | 46.00                   | -18.53              | VERTICAL      | QP     |
| 6   | 729.370     | 26.79                 | 27.02                   | 3.40                | 27.58                  | 29.63           | 46.00                   | -16.37              | VERTICAL      | QP     |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

**Spurious emissions above 1GHz****Horizontal:**

Peak scan

Level (dB $\mu$ V/m)

| Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark  |
|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|---------|
| 4723.000    | 25.31                 | 33.28                   | 9.48                | 27.64                  | 40.43           | 74.00                   | -33.57              | HORIZONTAL    | Peak    |
| 4723.000    | 11.00                 | 33.28                   | 9.48                | 27.64                  | 26.12           | 54.00                   | -27.88              | HORIZONTAL    | Average |
| 7953.000    | 23.96                 | 37.02                   | 12.86               | 27.30                  | 46.54           | 74.00                   | -27.46              | HORIZONTAL    | Peak    |
| 7953.000    | 9.00                  | 37.02                   | 12.86               | 27.30                  | 31.58           | 54.00                   | -22.42              | HORIZONTAL    | Average |
| 9126.000    | 22.44                 | 38.80                   | 14.00               | 27.19                  | 48.05           | 74.00                   | -25.95              | HORIZONTAL    | Peak    |
| 9126.000    | 8.00                  | 38.80                   | 14.00               | 27.19                  | 33.61           | 54.00                   | -20.39              | HORIZONTAL    | Average |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

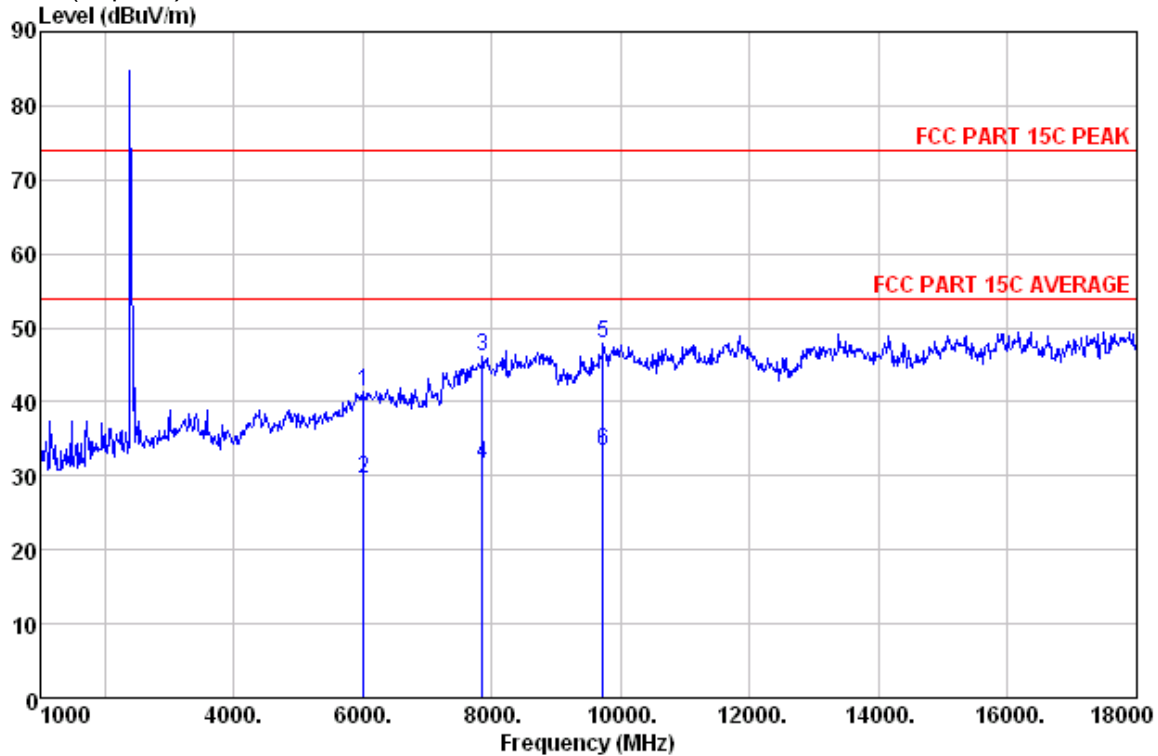
**Note:** The emission above limit is fundamental emission, which is not subject to the limit.



Vertical:

Peak scan

Level (dBμV/m)



| Freq<br>MHz | Read<br>Level<br>dBμV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBμV/m | Limit<br>Line<br>dBμV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark  |
|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|---------|
| 6015.000    | 21.82                 | 35.99                   | 10.92               | 27.42                  | 41.31           | 74.00                   | -32.69              | VERTICAL      | Peak    |
| 6015.000    | 9.99                  | 35.99                   | 10.92               | 27.42                  | 29.48           | 54.00                   | -24.52              | VERTICAL      | Average |
| 7851.000    | 23.62                 | 37.06                   | 12.76               | 27.31                  | 46.13           | 74.00                   | -27.87              | VERTICAL      | Peak    |
| 7851.000    | 9.01                  | 37.06                   | 12.76               | 27.31                  | 31.52           | 54.00                   | -22.48              | VERTICAL      | Average |
| 9721.000    | 21.61                 | 38.89                   | 14.46               | 27.13                  | 47.83           | 74.00                   | -26.17              | VERTICAL      | Peak    |
| 9721.000    | 7.00                  | 38.89                   | 14.46               | 27.13                  | 33.22           | 54.00                   | -20.78              | VERTICAL      | Average |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

**Note:** The emission above limit is fundamental emission, which is not subject to the limit.

## Test at Middle Channel in transmitting status

### Worst case mode DH5

9kHz~30MHz Test result

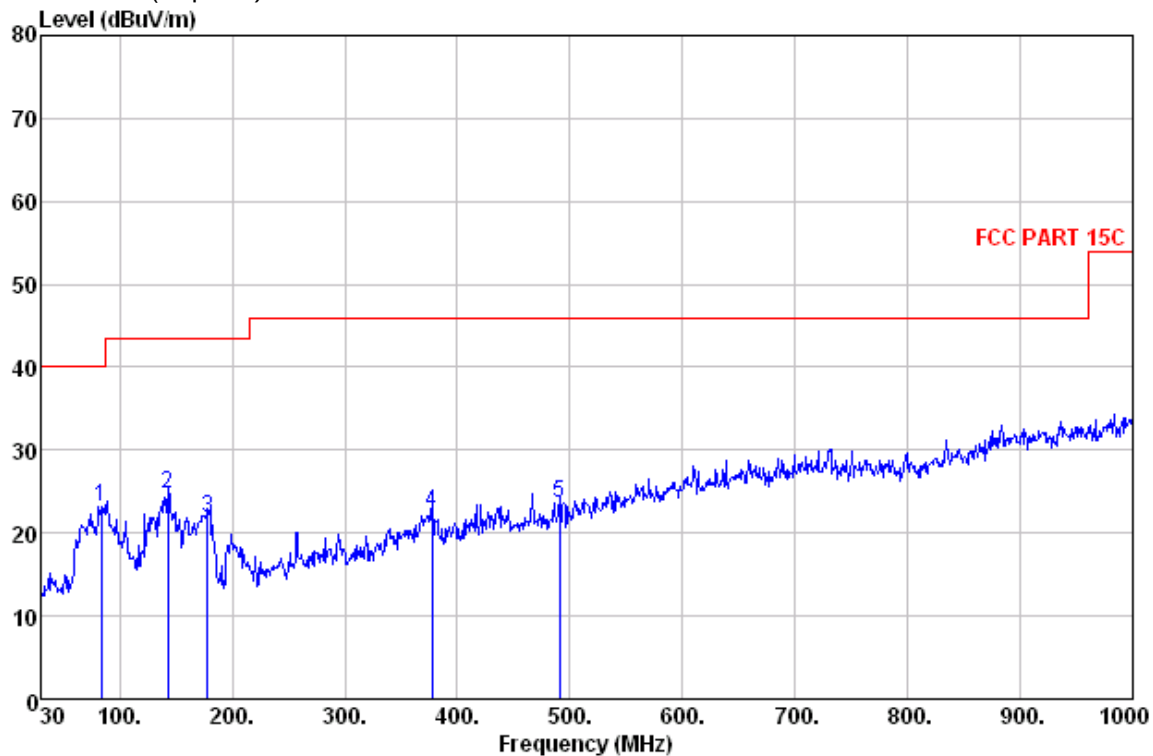
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

| No. | Freq<br>MHz | Read<br>Level<br>dBμV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBμV/m | Limit<br>Line<br>dBμV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|--------|
| 1   | 83.350      | 38.03                 | 12.23                   | 1.06                | 28.20                  | 23.12           | 40.00                   | -16.88              | HORIZONTAL    | QP     |
| 2   | 142.520     | 34.84                 | 16.77                   | 1.42                | 28.30                  | 24.73           | 43.50                   | -18.77              | HORIZONTAL    | QP     |
| 3   | 178.410     | 32.78                 | 15.46                   | 1.60                | 27.91                  | 21.93           | 43.50                   | -21.57              | HORIZONTAL    | QP     |
| 4   | 377.260     | 28.47                 | 20.13                   | 2.37                | 28.38                  | 22.59           | 46.00                   | -23.41              | HORIZONTAL    | QP     |
| 5   | 490.750     | 26.57                 | 22.86                   | 2.75                | 28.65                  | 23.53           | 46.00                   | -22.47              | HORIZONTAL    | QP     |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

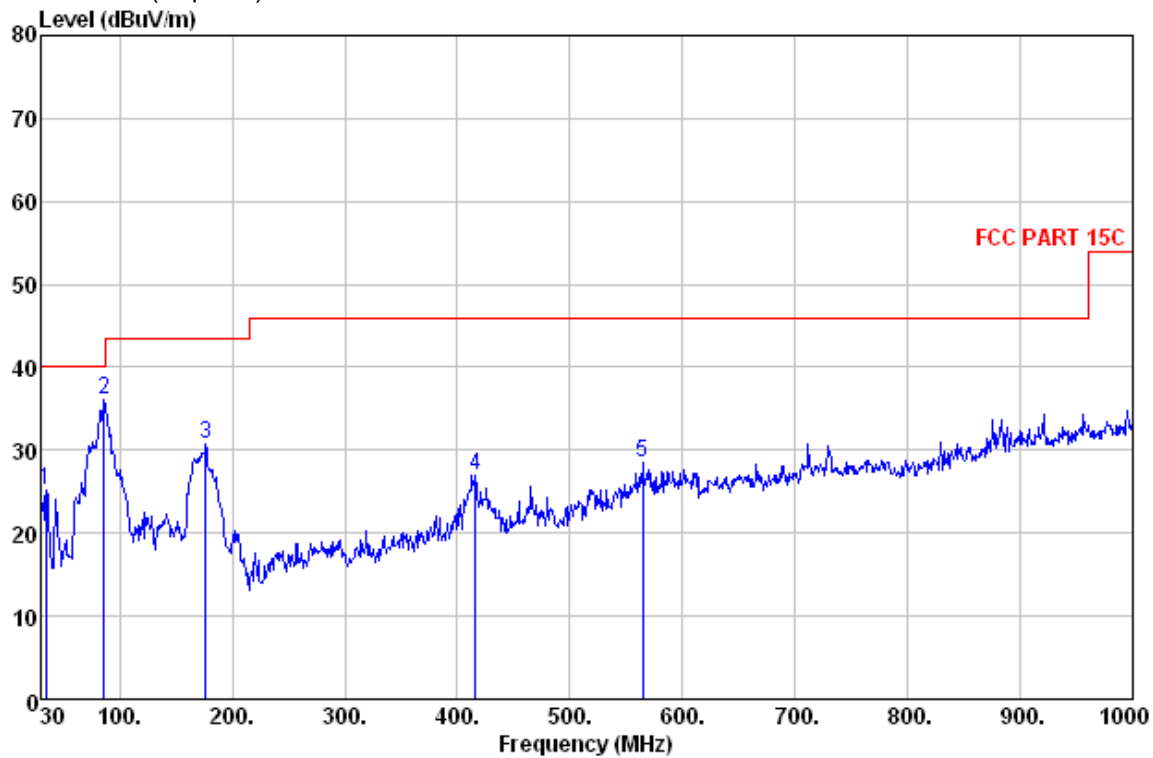
## Test at Middle Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

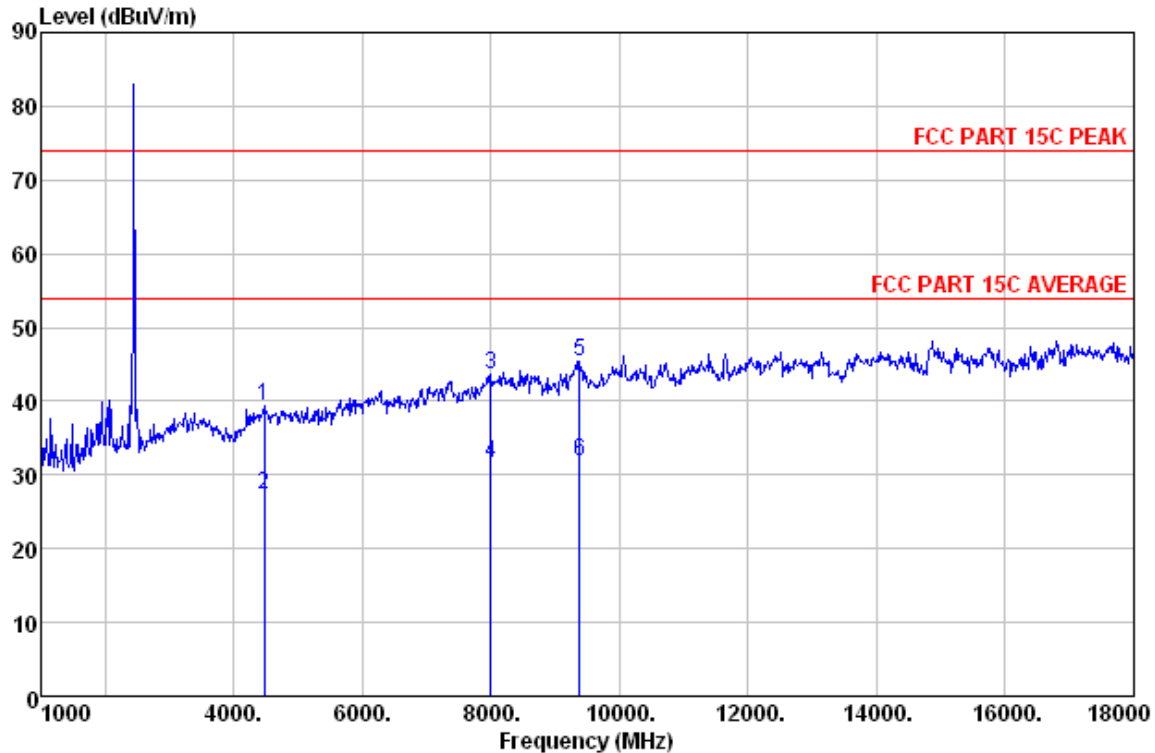
| No. | Freq<br>MHz | Read<br>Level<br>dBμV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBμV/m | Limit<br>Line<br>dBμV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|--------|
| 1   | 34.850      | 36.63                 | 16.45                   | 0.67                | 28.60                  | 25.15           | 40.00                   | -14.85              | VERTICAL      | QP     |
| 2   | 86.260      | 50.98                 | 12.31                   | 1.08                | 28.29                  | 36.08           | 40.00                   | -3.92               | VERTICAL      | QP     |
| 3   | 176.470     | 41.59                 | 15.65                   | 1.59                | 28.04                  | 30.79           | 43.50                   | -12.71              | VERTICAL      | QP     |
| 4   | 416.060     | 31.38                 | 21.12                   | 2.51                | 28.14                  | 26.87           | 46.00                   | -19.13              | VERTICAL      | QP     |
| 5   | 564.470     | 29.51                 | 24.74                   | 2.96                | 28.78                  | 28.43           | 46.00                   | -17.57              | VERTICAL      | QP     |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

## Spurious emissions above 1GHz

Horizontal:

Peak scan

Level (dB $\mu$ V/m)

| Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark  |
|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|---------|
| 4468.000    | 24.87                 | 32.87                   | 9.19                | 27.69                  | 39.24           | 74.00                   | -34.76              | HORIZONTAL    | Peak    |
| 4468.000    | 13.00                 | 32.87                   | 9.19                | 27.69                  | 27.37           | 54.00                   | -26.63              | HORIZONTAL    | Average |
| 8004.000    | 20.99                 | 37.01                   | 12.91               | 27.30                  | 43.61           | 74.00                   | -30.39              | HORIZONTAL    | Peak    |
| 8004.000    | 9.00                  | 37.01                   | 12.91               | 27.30                  | 31.62           | 54.00                   | -22.38              | HORIZONTAL    | Average |
| 9381.000    | 19.57                 | 38.80                   | 14.23               | 27.16                  | 45.44           | 74.00                   | -28.56              | HORIZONTAL    | Peak    |
| 9381.000    | 6.00                  | 38.80                   | 14.23               | 27.16                  | 31.87           | 54.00                   | -22.13              | HORIZONTAL    | Average |

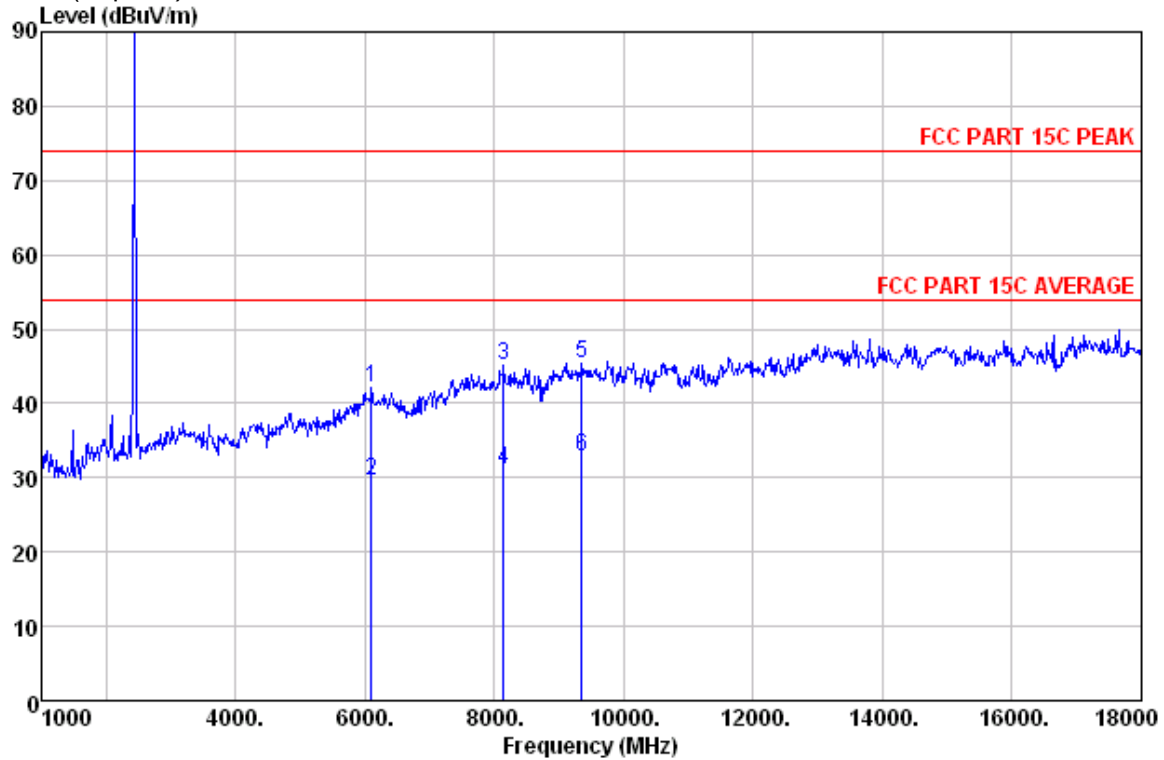
**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

**Note:** The emission above limit is fundamental emission, which is not subject to the limit.

Vertical:

Peak scan

Level (dBμV/m)



| Freq<br>MHz | Read<br>Level<br>dBμV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBμV/m | Limit<br>Line<br>dBμV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark  |
|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|---------|
| 6100.000    | 22.51                 | 35.90                   | 11.00               | 27.41                  | 42.00           | 74.00                   | -32.00              | VERTICAL      | Peak    |
| 6100.000    | 10.00                 | 35.90                   | 11.00               | 27.41                  | 29.49           | 54.00                   | -24.51              | VERTICAL      | Average |
| 8140.000    | 22.02                 | 37.22                   | 13.05               | 27.29                  | 45.00           | 74.00                   | -29.00              | VERTICAL      | Peak    |
| 8140.000    | 8.01                  | 37.22                   | 13.05               | 27.29                  | 30.99           | 54.00                   | -23.01              | VERTICAL      | Average |
| 9347.000    | 19.52                 | 38.80                   | 14.20               | 27.17                  | 45.35           | 74.00                   | -28.65              | VERTICAL      | Peak    |
| 9347.000    | 7.00                  | 38.80                   | 14.20               | 27.17                  | 32.83           | 54.00                   | -21.17              | VERTICAL      | Average |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

Note: The emission above limit is fundamental emission, which is not subject to the limit.

## Test at high Channel in transmitting status

### Worst case mode DH5

9kHz~30MHz Test result

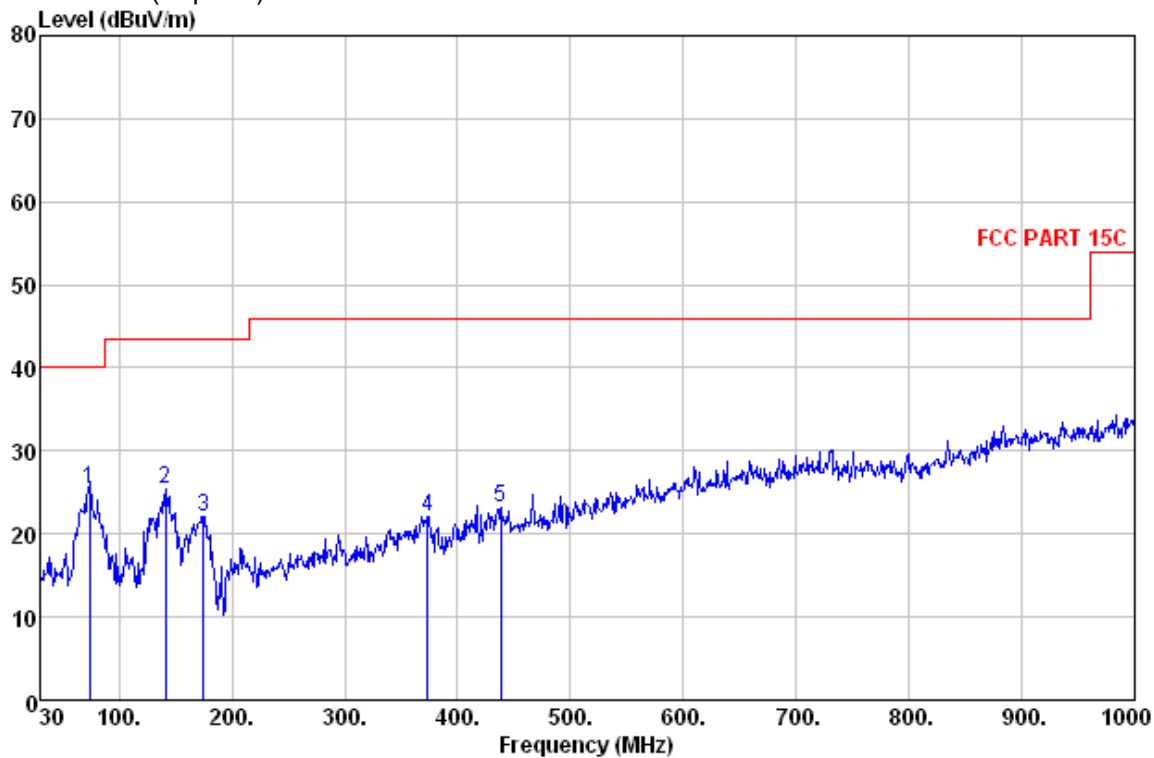
The Low frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not report

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

| No. | Freq<br>MHz | Read<br>Level<br>dBμV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBμV/m | Limit<br>Line<br>dBμV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|--------|
| 1   | 73.650      | 38.71                 | 13.82                   | 1.00                | 28.22                  | 25.31           | 40.00                   | -14.69              | HORIZONTAL    | QP     |
| 2   | 141.550     | 35.52                 | 16.75                   | 1.42                | 28.26                  | 25.43           | 43.50                   | -18.07              | HORIZONTAL    | QP     |
| 3   | 174.530     | 32.89                 | 15.83                   | 1.58                | 28.18                  | 22.12           | 43.50                   | -21.38              | HORIZONTAL    | QP     |
| 4   | 373.380     | 28.06                 | 20.02                   | 2.35                | 28.33                  | 22.10           | 46.00                   | -23.90              | HORIZONTAL    | QP     |
| 5   | 438.370     | 27.29                 | 21.64                   | 2.59                | 28.37                  | 23.15           | 46.00                   | -22.85              | HORIZONTAL    | QP     |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

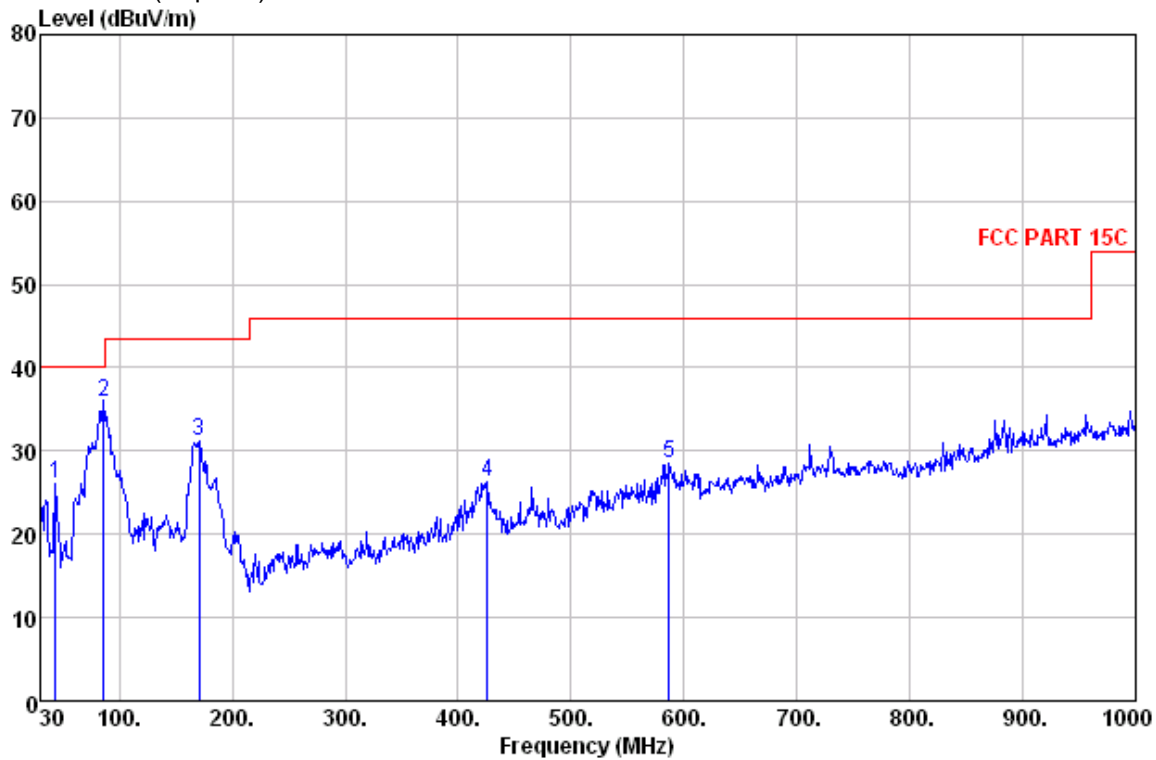
## Test at High Channel in transmitting status

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

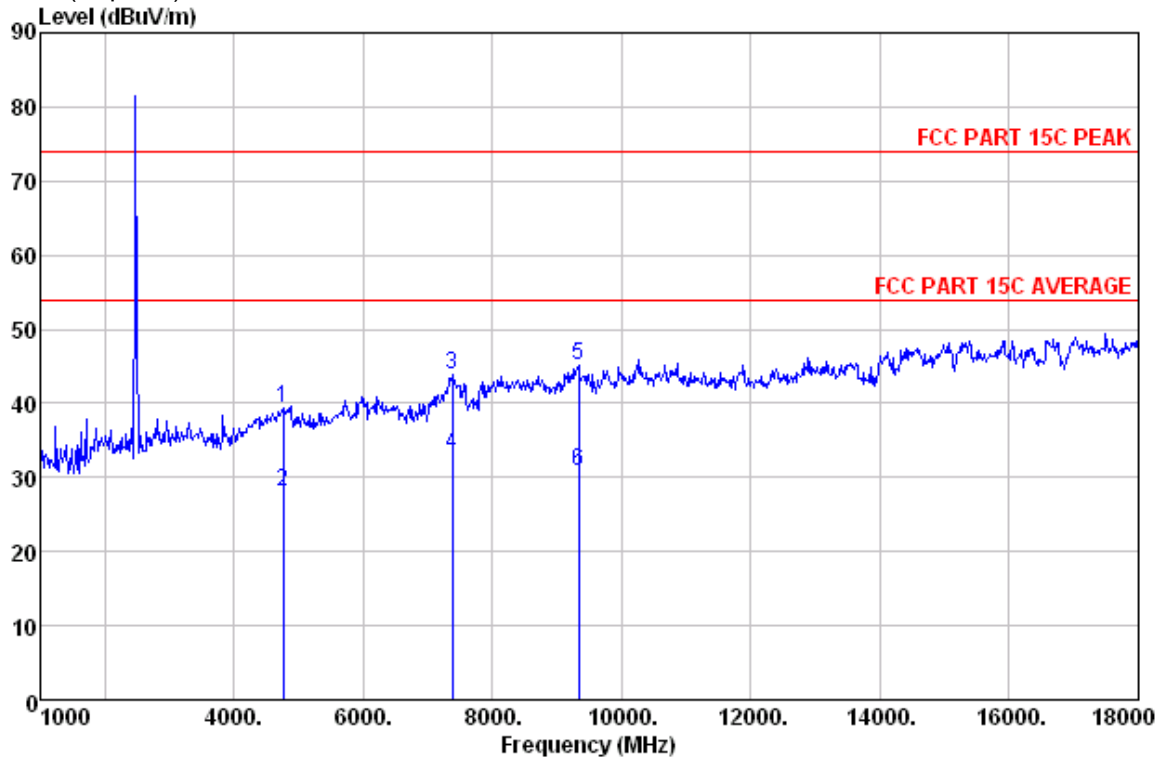
| No. | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark |
|-----|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-----------------|---------------------|---------------|--------|
| 1   | 43.580      | 36.57                 | 17.07                   | 0.75                | 28.39                  | 26.00           | 40.00           | -14.00              | VERTICAL      | QP     |
| 2   | 86.260      | 50.81                 | 12.31                   | 1.08                | 28.29                  | 35.91           | 40.00           | -4.09               | VERTICAL      | QP     |
| 3   | 170.650     | 41.80                 | 16.20                   | 1.56                | 28.45                  | 31.11           | 43.50           | -12.39              | VERTICAL      | QP     |
| 4   | 425.760     | 30.56                 | 21.35                   | 2.54                | 28.12                  | 26.33           | 46.00           | -19.67              | VERTICAL      | QP     |
| 5   | 586.780     | 28.63                 | 25.32                   | 3.02                | 28.46                  | 28.51           | 46.00           | -17.49              | VERTICAL      | QP     |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

## Spurious emissions above 1GHz

Horizontal:

Peak scan

Level (dB $\mu$ V/m)

| Freq<br>MHz | Read<br>Level<br>dB $\mu$ V | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dB $\mu$ V/m | Limit<br>Line<br>dB $\mu$ V/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark  |
|-------------|-----------------------------|-------------------------|---------------------|------------------------|-----------------------|-------------------------------|---------------------|---------------|---------|
| 4757.000    | 24.06                       | 33.31                   | 9.52                | 27.63                  | 39.26                 | 74.00                         | -34.74              | HORIZONTAL    | Peak    |
| 4757.000    | 12.99                       | 33.31                   | 9.52                | 27.63                  | 28.19                 | 54.00                         | -25.81              | HORIZONTAL    | Average |
| 7375.000    | 21.87                       | 37.00                   | 12.30               | 27.33                  | 43.84                 | 74.00                         | -30.16              | HORIZONTAL    | Peak    |
| 7375.000    | 11.00                       | 37.00                   | 12.30               | 27.33                  | 32.97                 | 54.00                         | -21.03              | HORIZONTAL    | Average |
| 9330.000    | 19.32                       | 38.80                   | 14.19               | 27.17                  | 45.14                 | 74.00                         | -28.86              | HORIZONTAL    | Peak    |
| 9330.000    | 5.00                        | 38.80                   | 14.19               | 27.17                  | 30.82                 | 54.00                         | -23.18              | HORIZONTAL    | Average |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

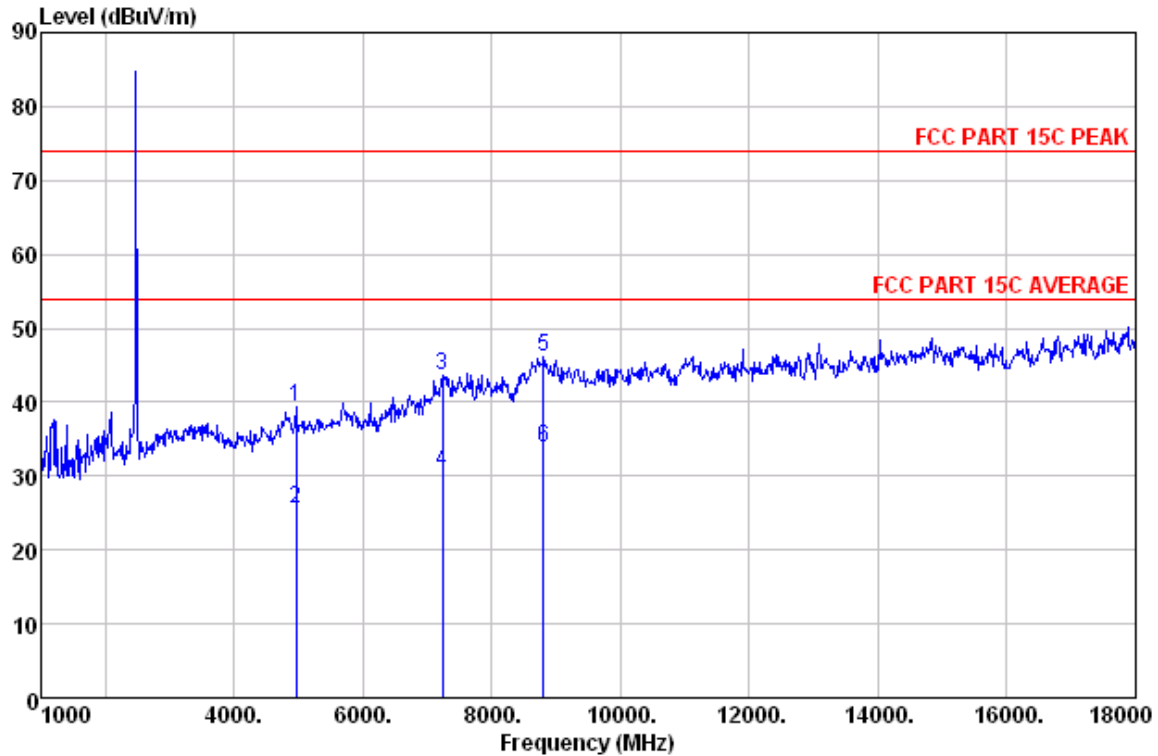
Note: The emission above limit is fundamental emission, which is not subject to the limit.



Vertical:

Peak scan

Level (dBμV/m)



| Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Preamp<br>Factor<br>dB | Level<br>dBuV/m | Limit<br>Line<br>dBuV/m | Over<br>Limit<br>dB | Pol/<br>Phase | Remark  |
|-------------|-----------------------|-------------------------|---------------------|------------------------|-----------------|-------------------------|---------------------|---------------|---------|
| 4961.000    | 23.63                 | 33.47                   | 9.76                | 27.60                  | 39.26           | 74.00                   | -34.74              | VERTICAL      | Peak    |
| 4961.000    | 10.00                 | 33.47                   | 9.76                | 27.60                  | 25.63           | 54.00                   | -28.37              | VERTICAL      | Average |
| 7239.000    | 22.03                 | 36.78                   | 12.16               | 27.33                  | 43.64           | 74.00                   | -30.36              | VERTICAL      | Peak    |
| 7239.000    | 9.01                  | 36.78                   | 12.16               | 27.33                  | 30.62           | 54.00                   | -23.38              | VERTICAL      | Average |
| 8803.000    | 21.15                 | 38.41                   | 13.70               | 27.23                  | 46.03           | 74.00                   | -27.97              | VERTICAL      | Peak    |
| 8803.000    | 9.00                  | 38.41                   | 13.70               | 27.23                  | 33.88           | 54.00                   | -20.12              | VERTICAL      | Average |

**Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor**

**Note: The emission above limit is fundamental emission, which is not subject to the limit.**

Remark:

- 1). The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Loss - Preamplifier Factor.
- 2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

**Test result: The unit does meet the FCC and RSS-247 requirements.**

#### 5.4 Conducted Emissions at Mains Terminals 150 kHz to 30 MHz

**Test Requirement:** FCC Part 15 C section 15.207 and RSS-GEN

**Test Method:** ANSI C63.10:2013 Clause 6.2 & DA 00-705

**Frequency Range:** 150 kHz to 30 MHz

**Detector:** Peak for pre-scan (9 kHz Resolution Bandwidth)

**Test Limit**

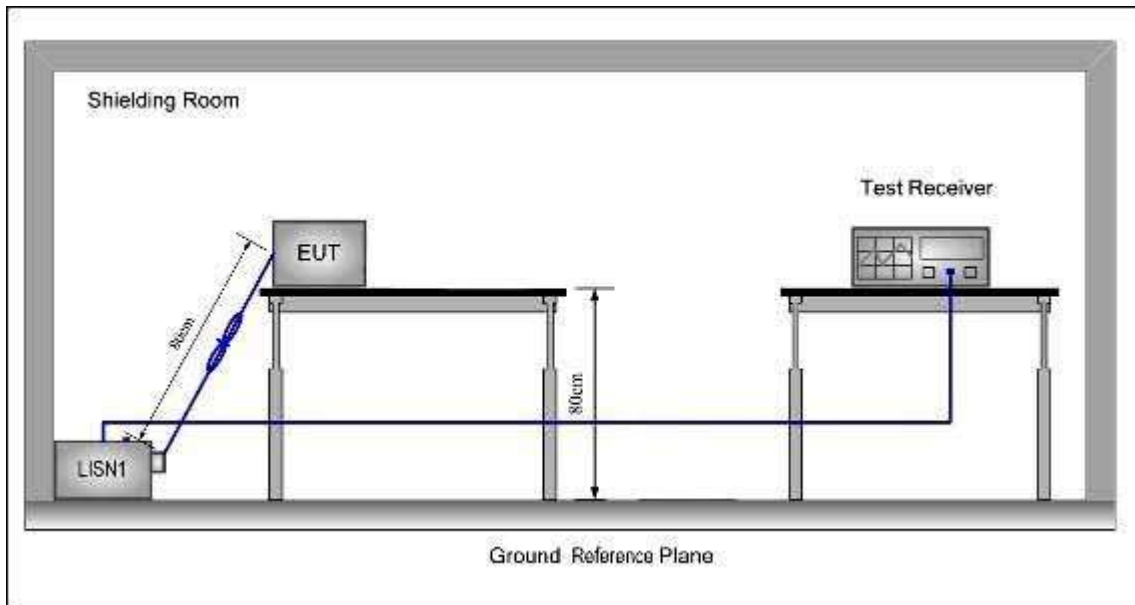
**Limits for conducted disturbance at the mains ports of class B**

| Frequency Range                                                                                            | Class B Limit dB( $\mu$ V) |          |
|------------------------------------------------------------------------------------------------------------|----------------------------|----------|
|                                                                                                            | Quasi-peak                 | Average  |
| 0.15 to 0.50                                                                                               | 66 to 56                   | 56 to 46 |
| 0.50 to 5                                                                                                  | 56                         | 46       |
| 5 to 30                                                                                                    | 60                         | 50       |
| NOTE 1 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz. |                            |          |

**EUT Operation:**

Test in normal operating mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

**Test Configuration:****Test procedure:**

1. The mains terminal disturbance voltage test was conducted in a shielded room.
2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

### 5.4.1 Measurement Data

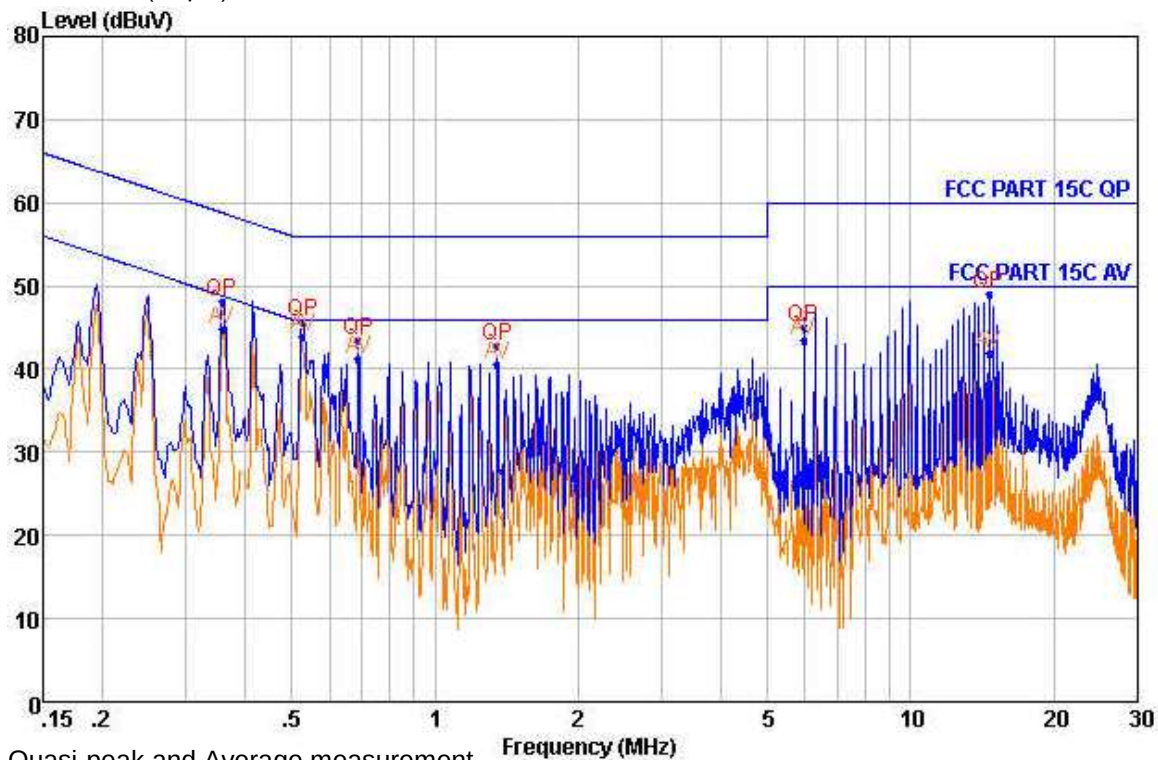
An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT the communicating was worst case mode.

The following Quasi-Peak and Average measurements were performed on the EUT

#### Live line

Peak Scan:

Level (dBμV)



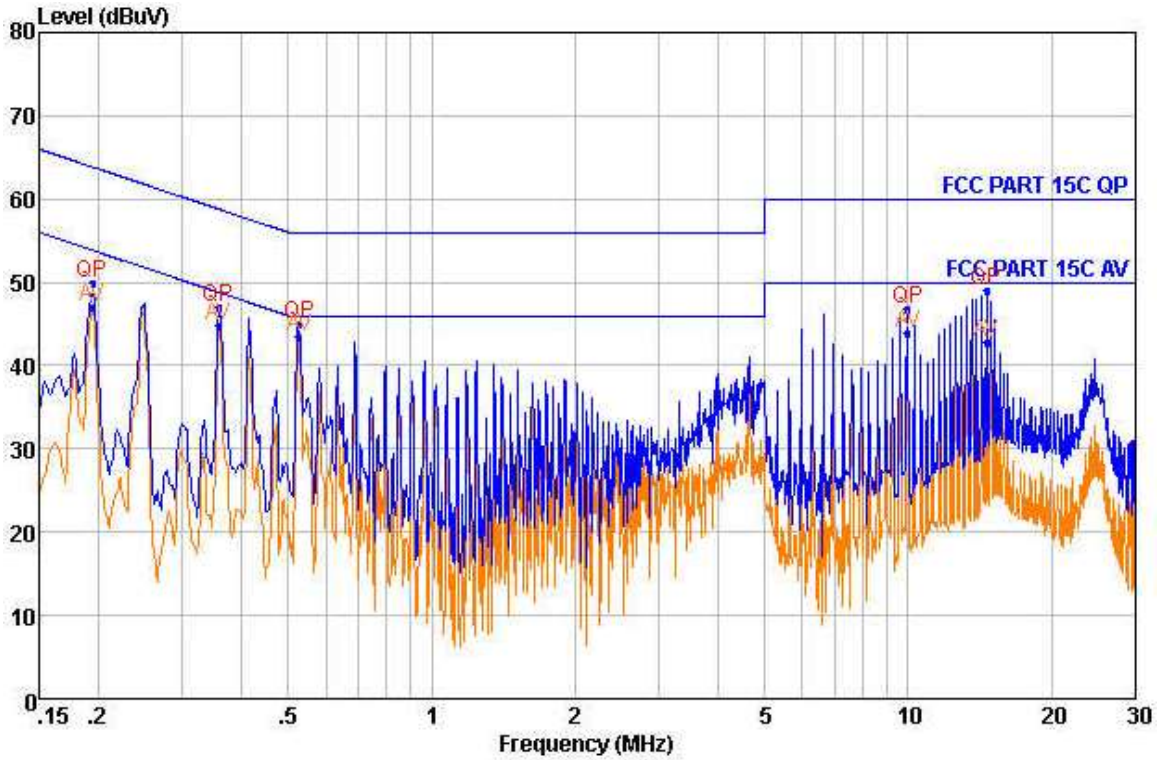
Quasi-peak and Average measurement

| NO. | Freq<br>MHz | Level<br>dBμV | Remark  | LISN Factor<br>dB | Cable Loss<br>dB | Limit Line<br>dBμV | Over Limit<br>dB |
|-----|-------------|---------------|---------|-------------------|------------------|--------------------|------------------|
| 1   | 0.358       | 48.18         | QP      | 9.66              | 0.25             | 58.78              | -10.60           |
| 2   | 0.358       | 44.81         | Average | 9.66              | 0.25             | 48.78              | -3.97            |
| 3   | 0.527       | 45.65         | QP      | 9.66              | 0.27             | 56.00              | -10.35           |
| 4   | 0.527       | 43.88         | Average | 9.66              | 0.27             | 46.00              | -2.12            |
| 5   | 0.690       | 43.45         | QP      | 9.71              | 0.29             | 56.00              | -12.55           |
| 6   | 0.690       | 41.25         | Average | 9.71              | 0.29             | 46.00              | -4.75            |
| 7   | 1.352       | 42.81         | QP      | 9.66              | 0.32             | 56.00              | -13.19           |
| 8   | 1.352       | 40.51         | Average | 9.66              | 0.32             | 46.00              | -5.49            |
| 9   | 5.961       | 45.10         | QP      | 9.65              | 0.41             | 60.00              | -14.90           |
| 10  | 5.961       | 43.42         | Average | 9.65              | 0.41             | 50.00              | -6.58            |
| 11  | 14.594      | 49.08         | QP      | 9.71              | 0.46             | 60.00              | -10.92           |
| 12  | 14.594      | 41.83         | Average | 9.71              | 0.46             | 50.00              | -8.17            |

**Neutral Line**

Peak Scan:

Level (dBμV)



Quasi-peak and Average measurement

| NO. | Freq<br>MHz | Level<br>dBuV | Remark  | LISN Factor<br>dB | Cable Loss<br>dB | Limit Line<br>dBuV | Over Limit<br>dB |
|-----|-------------|---------------|---------|-------------------|------------------|--------------------|------------------|
| 1   | 0.194       | 49.97         | QP      | 9.64              | 0.21             | 63.84              | -13.87           |
| 2   | 0.194       | 47.04         | Average | 9.64              | 0.21             | 53.84              | -6.80            |
| 3   | 0.358       | 46.95         | QP      | 9.66              | 0.25             | 58.78              | -11.83           |
| 4   | 0.358       | 44.72         | Average | 9.66              | 0.25             | 48.78              | -4.06            |
| 5   | 0.527       | 44.94         | QP      | 9.66              | 0.27             | 56.00              | -11.06           |
| 6   | 0.527       | 43.53         | Average | 9.66              | 0.27             | 46.00              | -2.47            |
| 7   | 9.966       | 46.90         | QP      | 9.62              | 0.44             | 60.00              | -13.10           |
| 8   | 9.966       | 43.89         | Average | 9.62              | 0.44             | 50.00              | -6.11            |
| 9   | 14.594      | 49.03         | QP      | 9.63              | 0.46             | 60.00              | -10.97           |
| 10  | 14.594      | 42.70         | Average | 9.63              | 0.46             | 50.00              | -7.30            |

--End of Report--