



# FCC Test Report

Report No: FCS20220202150W01

Issued for

|                                                                                                                                                                                                                                                                           |                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Applicant:                                                                                                                                                                                                                                                                | Shenzhen Qi Xin Chuang Zhan Technology Co., LTD                                                             |
| Address:                                                                                                                                                                                                                                                                  | Rm 928, Bldg A, Fengtian Industrial Park, No.308, Qinhua Xuegang Bei Rd., Longhua District, Shenzhen, China |
| Product Name:                                                                                                                                                                                                                                                             | Wireless Voice Transmission System                                                                          |
| Brand Name:                                                                                                                                                                                                                                                               | EXMAX                                                                                                       |
| Model Name:                                                                                                                                                                                                                                                               | EX-200E                                                                                                     |
| Series Model:                                                                                                                                                                                                                                                             | EX-200ET, EX-200ER, EX-200EHT, EX-624, EX-6688, EX-300E, EX-686E, EX-11                                     |
| FCC ID:                                                                                                                                                                                                                                                                   | 2ANVTEX-200E                                                                                                |
| Issued By: Flux Compliance Service Laboratory<br>Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan<br>Tel: 769-27280901 Fax: 769-27280901 <a href="http://www.fcs-lab.com">http://www.fcs-lab.com</a> |                                                                                                             |

## TEST RESULT CERTIFICATION

Applicant's Name.....: Shenzhen Qi Xin Chuang Zhan Technology Co., LTD

Address.....: Rm 928, Bldg A, Fengtian Industrial Park, No.308, Qinhua Xuegang Bei Rd., Longhua District,Shenzhen,China

Manufacture's Name.....: Shenzhen Qi Xin Chuang Zhan Technology Co., LTD

Address.....: Rm 928, Bldg A, Fengtian Industrial Park, No.308, Qinhua Xuegang Bei Rd., Longhua District,Shenzhen,China

### Product Description

Product Name.....: Wireless Voice Transmission System

Brand Name .....: EXMAX

Model Name.....: EX-200E

Series Model.....: Refer to page 1

Test Standards.....: FCC Rules and Regulations Part 15 Subpart C section 15.236

Test Procedure.....: ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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### Date of Test.....:

Date (s) of performance of tests.: 24 Feb ,2022 ~ 28 Feb ,2022

Date of Issue.....: 07 Feb ,2022

Test Result.....: Pass

Tested by

:

*Scott Shen*

(Scott Shen)

Reviewed by

:

*Duke Qian*

(Duke Qian)

Approved by

:

*Jack Wang*

(Jack Wang)



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## Revision History

| Rev. | Issue Date   | Effect Page | Contents      |
|------|--------------|-------------|---------------|
| 00   | 07 Mar. 2022 | N/A         | Initial Issue |
|      |              |             |               |

## 1. SUMMARY OF TEST RESULTS

| FCC Part 15 Subpart C section 15.236 |                                                |                                                                          |        |
|--------------------------------------|------------------------------------------------|--------------------------------------------------------------------------|--------|
| Standard Section                     | Test Item                                      | Judgment                                                                 | Remark |
| FCC Part 15.236(d)                   | Maximum Radiated Power                         | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> N/A | --     |
| FCC Part 15.236(f)(2)                | Occupied Bandwidth                             | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> N/A | --     |
| FCC Part 15.236(g)                   | Necessary bandwidth                            | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> N/A | --     |
| FCC Part 15.236(f)(3)                | Frequency stability                            | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> N/A | --     |
| FCC Part 15.236(g)                   | Emission within the band and outside this band | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> N/A | --     |
| FCC Part 207(a)                      | Conducted Emission                             | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> N/A | --     |
| FCC Part 15.203                      | Antenna Requirement                            | <input checked="" type="checkbox"/> PASS<br><input type="checkbox"/> N/A |        |

### NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report
- (2) All tests are according to ANSI C63.10:2013

## 1.1 TEST LABORATORY

|                                                                                                                                                            |                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Company Name:                                                                                                                                              | Flux Compliance Service Laboratory                                                                               |
| Address:                                                                                                                                                   | Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan |
| Telephone:                                                                                                                                                 | +86-769-27280901                                                                                                 |
| Fax:                                                                                                                                                       | +86-769-27280901                                                                                                 |
| Laboray Accreditations                                                                                                                                     |                                                                                                                  |
| FCC Test Firm Registration Number: 514908<br>CNAS Number: L15566<br>Designation number: CN0127<br>A2LA accreditation number: 5545.01<br>ISED Number: 25801 |                                                                                                                  |

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

| No. | Item                                      | Uncertainty   |
|-----|-------------------------------------------|---------------|
| 1   | RF output power, conducted                | $\pm 0.71$ dB |
| 2   | Unwanted Emissions, conducted             | $\pm 2.98$ dB |
| 3   | Conducted Emission (9KHz-150KHz)          | $\pm 4.13$ dB |
| 4   | Conducted Emission (150KHz-30MHz)         | $\pm 4.74$ dB |
| 5   | All emissions,radiated(<1G) 30MHz-1000MHz | $\pm 3.2$ dB  |
| 6   | All emissions,radiated (1GHz -18GHz)      | $\pm 3.66$ dB |
| 7   | All emissions,radiated (18GHz -40GHz)     | $\pm 4.31$ dB |

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF THE EUT

|                         |                                                                                                                                                                                                           |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name            | Wireless Voice Transmission System                                                                                                                                                                        |
| Brand Name              | EXMAX                                                                                                                                                                                                     |
| Model Name              | EX-200E                                                                                                                                                                                                   |
| Series Model            | Refer to page 1                                                                                                                                                                                           |
| Model differences       | The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, the materials of decorative accessories is same, only different appearance shape and different color. |
| Channel List            | Please refer to the Note 2.                                                                                                                                                                               |
| Operation frequency     | Channel: 501MHz- 538.5MHz                                                                                                                                                                                 |
| Channel Interval        | <input checked="" type="checkbox"/> 250KHz                                                                                                                                                                |
| Modulation Type         | DQPSK <input checked="" type="checkbox"/> FM                                                                                                                                                              |
| Antenna Type            | <input checked="" type="checkbox"/> external Antenna <input type="checkbox"/> PCB antenna                                                                                                                 |
| Antenna Gain (dBi)      | 1.0(dBi)                                                                                                                                                                                                  |
| Power Supply            | DC 5V                                                                                                                                                                                                     |
| Battery                 | DC 3.7V                                                                                                                                                                                                   |
| Hardware version number | V1.0                                                                                                                                                                                                      |
| Software version number | V1.0                                                                                                                                                                                                      |
| Connecting I/O Port(s)  | Please refer to the User's Manual                                                                                                                                                                         |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

## 2. Channel List

| Channel |                 |         |                 |         |                 |
|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 01      | 501.0           | 02      | 511.5           | 03      | 524.0           |
| 04      | 538.5           |         |                 |         |                 |
|         |                 |         |                 |         |                 |

| Ant. | Antenna Brand | Antenna Model Name | Antenna Type     | Connector | Gain (dBi) | NOTE    |
|------|---------------|--------------------|------------------|-----------|------------|---------|
| 1    | N/A           | N/A                | external Antenna | N/A       | 1.0        | Antenna |

## 2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test software:FCC tools

The test software was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table, the following operating modes were applied for the related test items. All test modes were tested, only the result of the worst case was recorded in the report.

| Test Channel List for |         |                 |
|-----------------------|---------|-----------------|
| Mode                  | Channel | Frequency (MHz) |
| Channel               | CH 01   | 501.0           |
|                       | CH 03   | 511.5           |
|                       | CH 04   | 538.5           |

Note: that use new battery during the test

Mode 1:

DC Power

Supply



### 2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

#### Necessary accessories

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note       |
|------|-----------|-----------|----------------|------------|------------|
| 1    | Adapter   | XIAOMI    | MDY-10-EF      | N/A        | Test using |
|      |           |           |                |            |            |
|      |           |           |                |            |            |
|      |           |           |                |            |            |

#### Support units

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|------|-----------|-----------|----------------|------------|------|
| N/A  | N/A       | N/A       | N/A            | N/A        | N/A  |
|      |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |

#### Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

## 2.4 EQUIPMENTS LIST

### Radiation Test equipment

| Kind of Equipment                | Manufacturer | Type No.     | Company No. | Last calibration | Calibrated until |
|----------------------------------|--------------|--------------|-------------|------------------|------------------|
| EMI Test Receiver                | R&S          | ESRP 3       | FCS-E001    | 2022.02.10       | 2023.02.09       |
| Signal Analyzer                  | R&S          | FSV40-N      | FCS-E012    | 2022.02.10       | 2023.02.09       |
| Active loop Antenna              | ZHINAN       | ZN30900C     | FCS-E013    | 2022.02.10       | 2023.02.09       |
| Bilog Antenna                    | SCHWARZBECK  | VULB 9168    | FCS-E002    | 2022.02.10       | 2023.02.09       |
| Horn Antenna                     | SCHWARZBECK  | BBHA 9120D   | FCS-E003    | 2022.02.10       | 2023.02.09       |
| SHF-EHF Horn Antenna (18G-40GHz) | A-INFO       | LB-180400-KF | FCS-E018    | 2022.02.10       | 2023.02.09       |
| Pre-Amplifier(0.1M-3G Hz)        | EMCI         | EM330N       | FCS-E004    | 2022.02.10       | 2023.02.09       |
| Pre-Amplifier (1G-18GHz)         | N/A          | TSAMP-0518SE | FCS-E014    | 2022.02.10       | 2023.02.09       |
| Pre-Amplifier (18G-40GHz)        | TERA-MW      | TRLA-0400    | FCS-E019    | 2022.02.10       | 2023.02.09       |
| Temperature & Humidity           | HTC-1        | victor       | FCS-E005    | 2022.02.10       | 2023.02.09       |
| Signal generator                 | Agilent      | E4421B       | FCS-E025    | 2022.02.10       | 2023.02.09       |

### Conduction Test equipment

| Kind of Equipment      | Manufacturer | Type No. | Company No. | Last calibration | Calibrated until |
|------------------------|--------------|----------|-------------|------------------|------------------|
| EMI Test Receiver      | R&S          | ESPI     | FCS-E020    | 2022.02.10       | 2023.02.09       |
| LISN                   | R&S          | ENV216   | FCS-E007    | 2022.02.10       | 2023.02.09       |
| LISN                   | ETS          | 3810/2NM | FCS-E009    | 2022.02.10       | 2023.02.09       |
| Temperature & Humidity | HTC-1        | victor   | FCS-E008    | 2022.02.10       | 2023.02.09       |

### RF Connected Test

| Kind of Equipment | Manufacturer | Type No. | Company No. | Last calibration | Calibrated until |
|-------------------|--------------|----------|-------------|------------------|------------------|
| Spectrum Analyzer | Keysight     | N9020A   | FCS-E015    | 2022.02.10       | 2023.02.09       |
| Spectrum Analyzer | Agilent      | E4447A   | MY50180039  | 2022.02.10       | 2023.02.09       |
| Spectrum Analyzer | R&S          | FSV-40   | 101499      | 2022.02.10       | 2023.02.09       |
| Power meter       | Agilent      | U2021XA  | MY55150021  | 2022.02.10       | 2023.02.09       |

### 3. CONDUCTED EMISSION MEASUREMENT

#### 3.1 LIMIT

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

| FREQUENCY (MHz) | Conducted Emissionlimit (dBuV) |           |
|-----------------|--------------------------------|-----------|
|                 | Quasi-peak                     | Average   |
| 0.15 -0.5       | 66 - 56 *                      | 56 - 46 * |
| 0.50 -5.0       | 56.00                          | 46.00     |
| 5.0 -30.0       | 60.00                          | 50.00     |

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

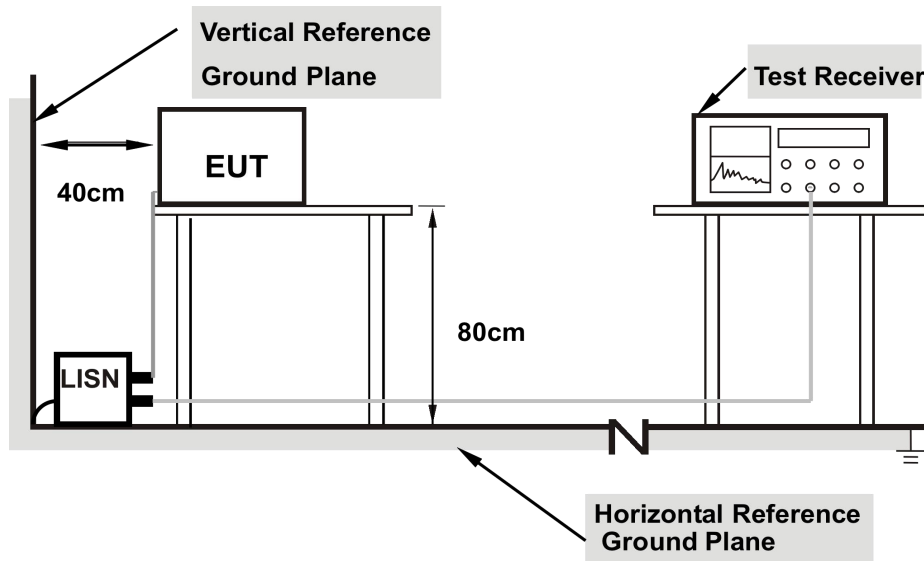
#### 3.2 TEST PROCEDURE

The following table is the setting of the receiver

| Receiver Parameters | Setting  |
|---------------------|----------|
| Attenuation         | 10 dB    |
| Start Frequency     | 0.15 MHz |
| Stop Frequency      | 30 MHz   |
| IF Bandwidth        | 9 kHz    |

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

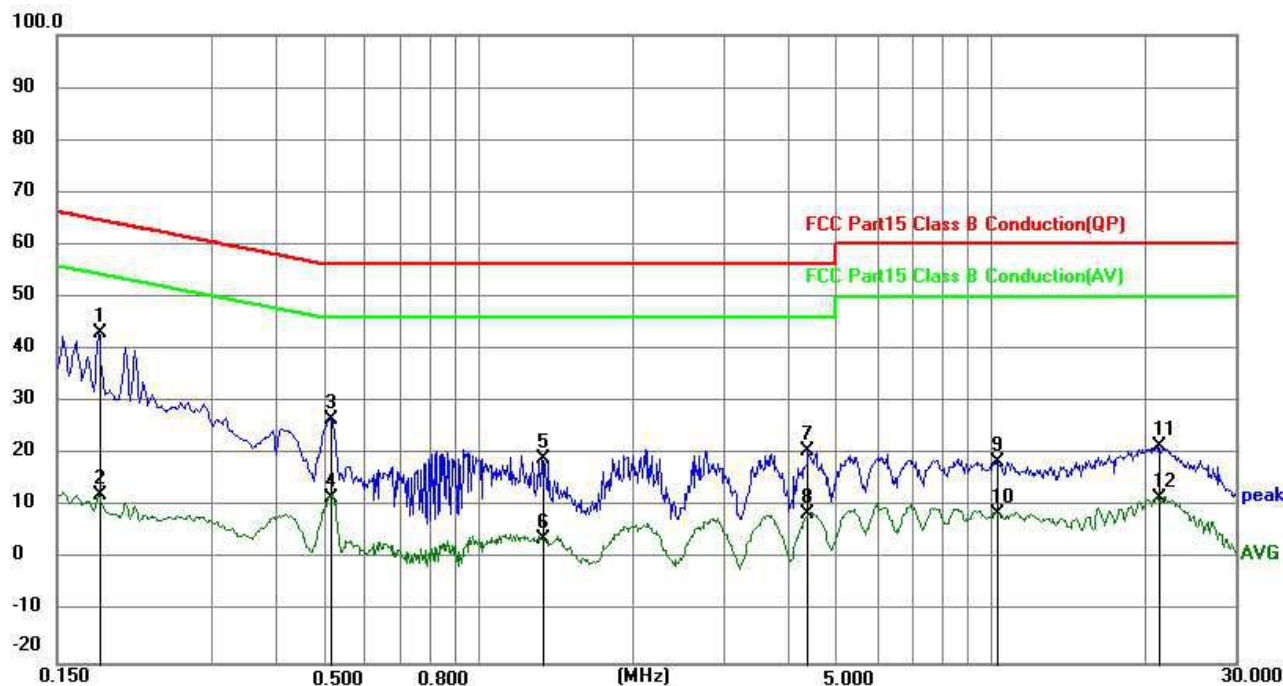
### 3.3 TEST SETUP



- Note:** 1.Support units were connected to second LISN.  
 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

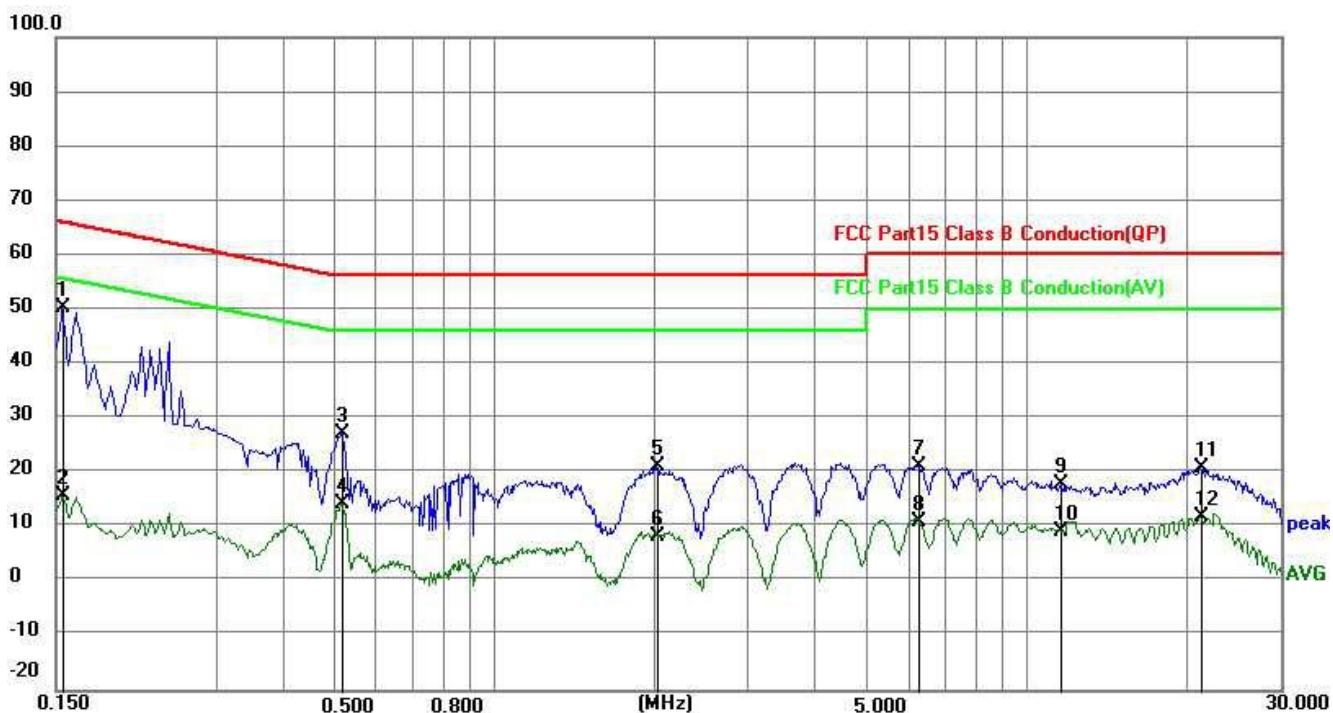
### 3.4 TEST RESULTS

|              |      |                    |       |
|--------------|------|--------------------|-------|
| Temperature: | 25°C | Relative Humidity: | 50%   |
| Test Mode:   | FM   | Test Voltage:      | DC 5V |
| Phase:       | L    | Result:            | Pass  |



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>Factor(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------------|--------------------|-------------------|----------------|--------|
| 1   | 0.1815             | 33.55             | 9.53                    | 43.08              | 64.42             | 21.34          | QP     |
| 2   | 0.1815             | 2.58              | 9.53                    | 12.11              | 54.42             | 42.31          | AVG    |
| 3   | 0.5144             | 17.06             | 9.56                    | 26.62              | 56.00             | 29.38          | QP     |
| 4   | 0.5144             | 2.24              | 9.56                    | 11.80              | 46.00             | 34.20          | AVG    |
| 5   | 1.3245             | 9.52              | 9.57                    | 19.09              | 56.00             | 36.91          | QP     |
| 6   | 1.3245             | -5.71             | 9.57                    | 3.86               | 46.00             | 42.14          | AVG    |
| 7   | 4.3890             | 11.20             | 9.59                    | 20.79              | 56.00             | 35.21          | QP     |
| 8   | 4.3890             | -0.80             | 9.59                    | 8.79               | 46.00             | 37.21          | AVG    |
| 9   | 10.3290            | 8.95              | 9.64                    | 18.59              | 60.00             | 41.41          | QP     |
| 10  | 10.3290            | -0.84             | 9.64                    | 8.80               | 50.00             | 41.20          | AVG    |
| 11  | 21.1605            | 11.86             | 9.76                    | 21.62              | 60.00             | 38.38          | QP     |
| 12  | 21.1605            | 2.01              | 9.76                    | 11.77              | 50.00             | 38.23          | AVG    |

|              |      |                    |       |
|--------------|------|--------------------|-------|
| Temperature: | 25°C | Relative Humidity: | 50%   |
| Test Mode:   | FM   | Test Voltage:      | DC 5V |
| Phase:       | N    | Result:            | Pass  |



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>Factor(dB/m) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|--------------------|-------------------|-------------------------|--------------------|-------------------|----------------|--------|
| 1   | 0.1545             | 40.91             | 9.51                    | 50.42              | 65.75             | 15.33          | QP     |
| 2   | 0.1545             | 6.41              | 9.51                    | 15.92              | 55.75             | 39.83          | AVG    |
| 3   | 0.5190             | 17.61             | 9.56                    | 27.17              | 56.00             | 28.83          | QP     |
| 4   | 0.5190             | 4.77              | 9.56                    | 14.33              | 46.00             | 31.67          | AVG    |
| 5   | 2.0130             | 11.64             | 9.58                    | 21.22              | 56.00             | 34.78          | QP     |
| 6   | 2.0130             | -1.33             | 9.58                    | 8.25               | 46.00             | 37.75          | AVG    |
| 7   | 6.3060             | 11.61             | 9.71                    | 21.32              | 60.00             | 38.68          | QP     |
| 8   | 6.3060             | 1.39              | 9.71                    | 11.10              | 50.00             | 38.90          | AVG    |
| 9   | 11.6790            | 8.02              | 9.80                    | 17.82              | 60.00             | 42.18          | QP     |
| 10  | 11.6790            | -0.45             | 9.80                    | 9.35               | 50.00             | 40.65          | AVG    |
| 11  | 21.1650            | 11.06             | 9.84                    | 20.90              | 60.00             | 39.10          | QP     |
| 12  | 21.1650            | 2.07              | 9.84                    | 11.91              | 50.00             | 38.09          | AVG    |

Remark:

- All readings are Quasi-Peak and Average values.

## 4 MAXIMUM RADIATED POWER

### 4.1 LIMIT

Refer to FCC 15.236(d)

In the bands allocated and assigned for broadcast television and in the 600 MHz service band: 50 mW EIRP

### 4.2 TEST PROCEDURE

A. Connect each EUT's antenna output to power sensor by RF cable and attenuator

### 4.3 TEST SETUP



### 4.4 TEST RESULTS

| Channel List for Band |         |                 |                         |                  |                    |            |             |         |
|-----------------------|---------|-----------------|-------------------------|------------------|--------------------|------------|-------------|---------|
| Test mode             | Channel | Frequency (MHz) | Peak Output Power (dBm) | Cable loss(dB m) | Atnenna Gain (dBi) | EIRP(d Bm) | Limit(dB m) | Verdict |
| Channel               | 01      | 501.0           | 4.23                    | 1.0              | 1.0                | 6.23       | 16.99       | PASS    |
|                       | 03      | 511.5           | 4.25                    | 1.0              | 1.0                | 6.25       |             |         |
|                       | 04      | 538.5           | 4.41                    | 1.0              | 1.0                | 6.41       |             |         |

Note:EIRP(dBm)=Peak Output Power(dBm)+Cable loss(dBm)+Atnenna Gain(dBi)

## 5. OCCUPIED BANDWIDTH

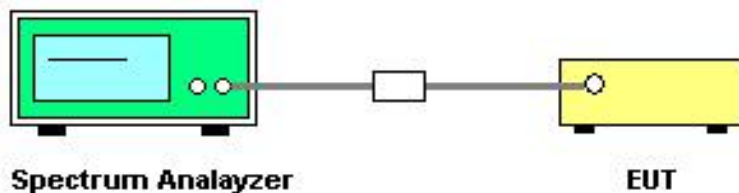
### 5.1 LIMIT

One or more adjacent 25KHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200 kHz. The operating bandwidth shall not exceed 200 kHz

### 5.2 TEST PROCEDURE

| Parameter            | Setting                                                        |
|----------------------|----------------------------------------------------------------|
| Detector             | Peak/AV                                                        |
| Sweep time           | Auto                                                           |
| Resolution bandwidth | 1 % to 5 % of the occupied bandwidth                           |
| Video bandwidth:     | 3 x resolution bandwidth                                       |
| Span:                | 2 x emission bandwidth                                         |
| Trace mode:          | Max. hold                                                      |
| Analyzer function:   | 99% power occupied bandwidth function                          |
| EUT:                 | Modulated signal with max(FM,2.5kHz tone). frequency deviation |

### 5.3 TEST SETUP



### 5.4 TEST RESULTS

| Channel List for Band A |           |                 |                      |            |         |
|-------------------------|-----------|-----------------|----------------------|------------|---------|
| Test mode               | Channel   | Frequency (MHz) | 20dB Bandwidth (KHz) | Limit(KHz) | Verdict |
| Channel                 | Low CH    | 501.0           | 69.58 KHz            | 200        | PASS    |
|                         | Middle CH | 511.5           | 68.75 KHz            |            |         |
|                         | High CH   | 538.5           | 66.98KHz             |            |         |



## 6.NECESSARY BANDWITH

### 6.1 LIMIT

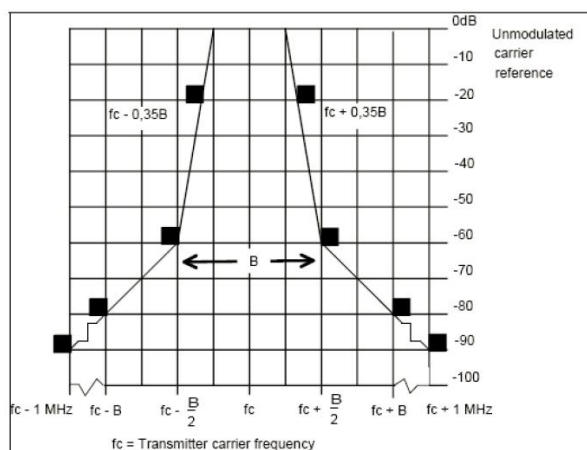
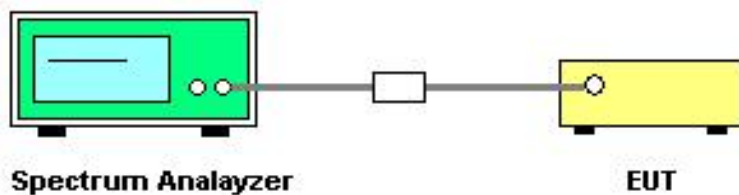


Figure 1: Spectrum mask for analogue systems in all bands

### 6.2 TEST PROCEDURE

EN300422-1 V1.4.2 Clause 8.3.

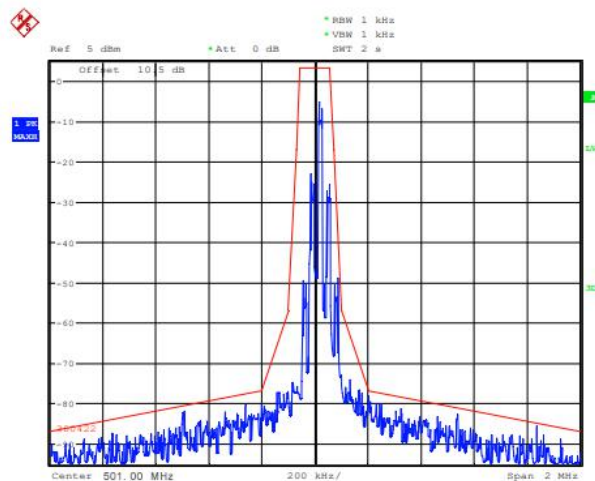
### 6.3 TEST SETUP



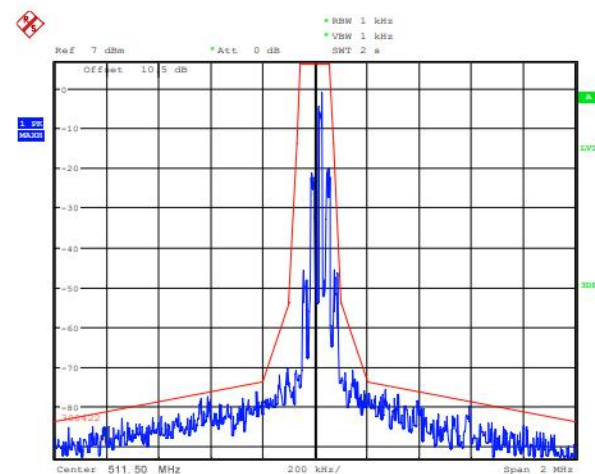
## 6.4 TEST RESULT

### Emission Mask Channel List for

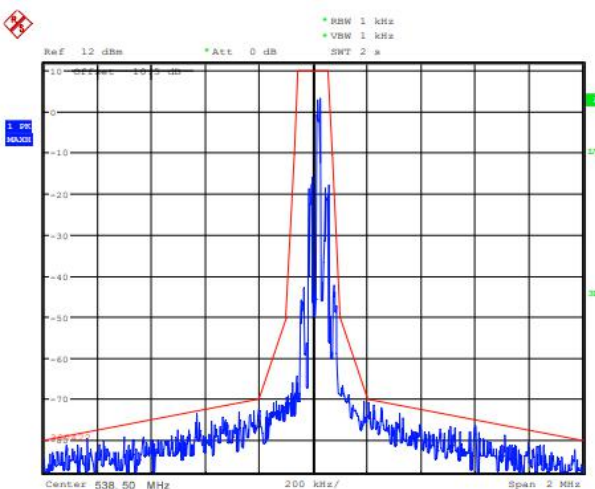
#### Low CH



#### Middle CH



#### High CH



## 7. TRANSMITTER UNWANTED EMISSIONS

### 7.1 LIMIT

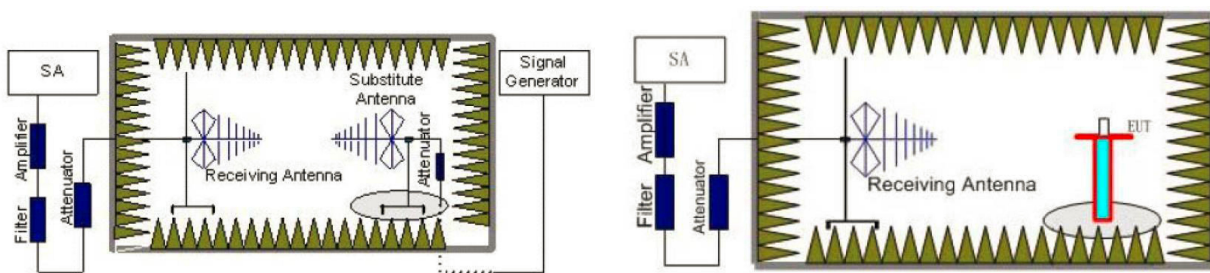
Spurious emissions are emissions outside the frequency range(s) of the equipment. The power of the spurious emissions shall not exceed the limits of table as below:

| State     | Frequency                                                               |                                    |                              |
|-----------|-------------------------------------------------------------------------|------------------------------------|------------------------------|
|           | 47MHz to 74MHz, 87.5MHz to 137MHz<br>174MHz to 230MHz, 470MHz to 862MHz | Other Frequencies<br>below 1000MHz | Frequencies above<br>1000MHz |
| Operation | 4nW                                                                     | 250nW                              | 1uW                          |
| Standby   | 2nW                                                                     | 2nW                                | 20nW                         |

### 7.2 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 30MHz to 6000MHz with 100 KHz RBW and 300 KHz VBW
2. Please refer to ETSI EN 300 422-1 V2.1.2 (2017-01) clause 6.1 for the test conditions.
3. Please refer to ETSI EN 300 422-1 V2.1.1 (2017-02) clause 8.4.2 for the measurement method.

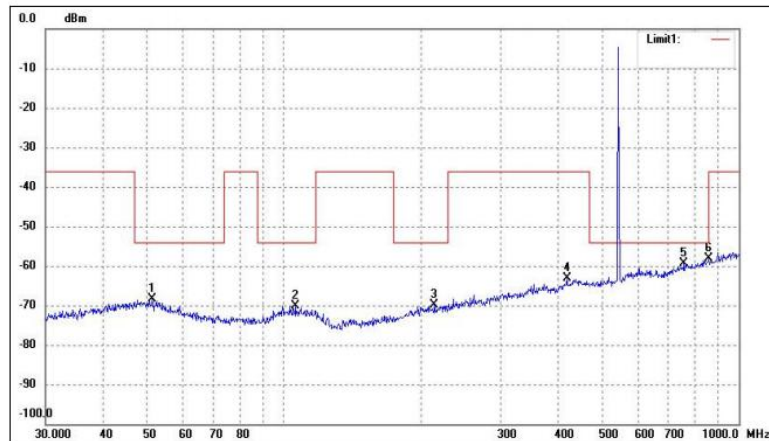
### 5.3 TEST SETUP



## 7.4 TEST RESULTS

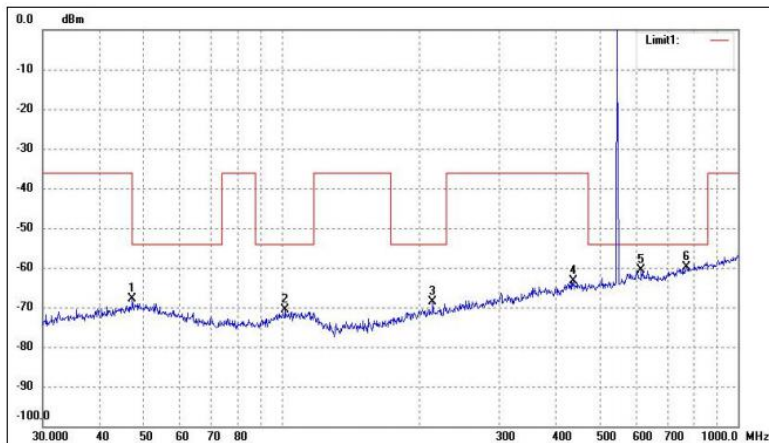
CHNNEL -LOW CH-30MHZ-1000MHZ

Vertical



| No. | Frequency (MHz) | Reading (dBm) | Correct dB | Result (dBm) | Limit (dBm) | Margin (dB) | Degree ( ) | Height (cm) | Remark |
|-----|-----------------|---------------|------------|--------------|-------------|-------------|------------|-------------|--------|
| 1   | 51.4807         | -68.77        | 0.47       | -68.30       | -54.00      | -14.30      | 83         | 100         | peak   |
| 2   | 106.3850        | -68.82        | -1.28      | -70.10       | -54.00      | -16.10      | 319        | 100         | peak   |
| 3   | 214.5143        | -69.16        | -0.67      | -69.83       | -54.00      | -15.83      | 59         | 100         | peak   |
| 4   | 419.1081        | -68.52        | 5.37       | -63.15       | -36.00      | -27.15      | 330        | 100         | peak   |
| 5   | 758.0408        | -68.64        | 9.22       | -59.42       | -54.00      | -5.42       | 239        | 100         | peak   |
| 6   | 860.0352        | -68.66        | 10.62      | -58.04       | -54.00      | -4.04       | 97         | 100         | peak   |

Horizontal



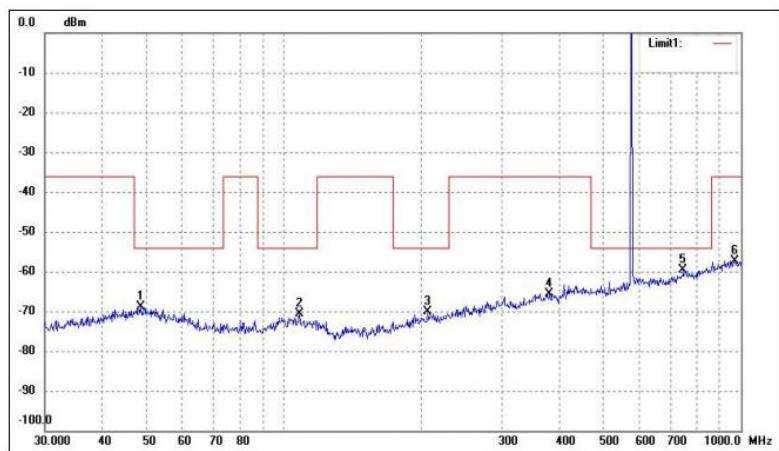
| No. | Frequency (MHz) | Reading (dBm) | Correct dB | Result (dBm) | Limit (dBm) | Margin (dB) | Degree ( ) | Height (cm) | Remark |
|-----|-----------------|---------------|------------|--------------|-------------|-------------|------------|-------------|--------|
| 1   | 47.1599         | -68.37        | 0.61       | -67.76       | -54.00      | -13.76      | 216        | 100         | peak   |
| 2   | 102.0014        | -69.17        | -1.34      | -70.51       | -54.00      | -16.51      | 99         | 100         | peak   |
| 3   | 214.5143        | -67.99        | -0.67      | -68.66       | -54.00      | -14.66      | 240        | 100         | peak   |
| 4   | 435.5898        | -68.88        | 5.60       | -63.28       | -36.00      | -27.28      | 120        | 100         | peak   |
| 5   | 614.2142        | -68.40        | 7.72       | -60.68       | -54.00      | -6.68       | 227        | 100         | peak   |
| 6   | 771.4486        | -69.13        | 9.37       | -59.76       | -54.00      | -5.76       | 278        | 100         | peak   |

Note :

1. Result = Reading + Corrected Factor Note :
2. The fundamental wave filtered out during the test.

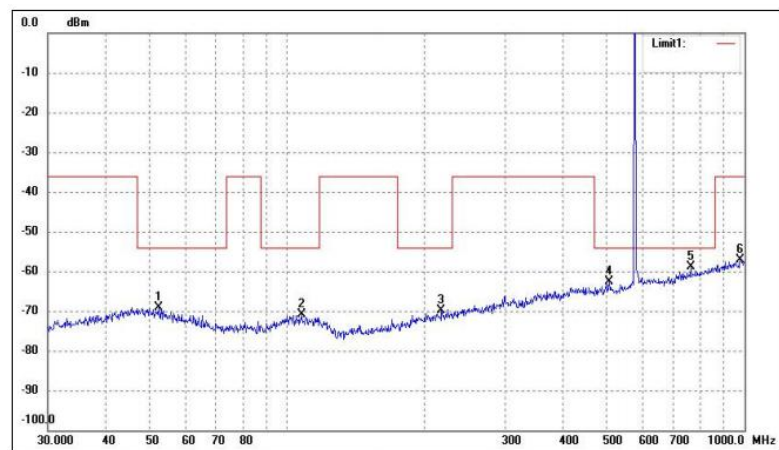
# CHANNEL –MIDDLE CH–30MHZ-1000MHZ

## Vertical



| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 48.6719            | -69.61           | 0.72          | -68.89          | -54.00         | -14.89         | 217           | 100            | peak   |
| 2   | 108.2667           | -69.29           | -1.25         | -70.54          | -54.00         | -16.54         | 97            | 100            | peak   |
| 3   | 206.3976           | -69.26           | -0.80         | -70.06          | -54.00         | -16.06         | 254           | 100            | peak   |
| 4   | 381.2487           | -69.73           | 4.23          | -65.50          | -36.00         | -29.50         | 97            | 100            | peak   |
| 5   | 747.4826           | -68.79           | 9.11          | -59.68          | -54.00         | -5.68          | 74            | 100            | peak   |
| 6   | 968.9338           | -69.41           | 12.05         | -57.36          | -36.00         | -21.36         | 342           | 100            | peak   |

## Horizontal



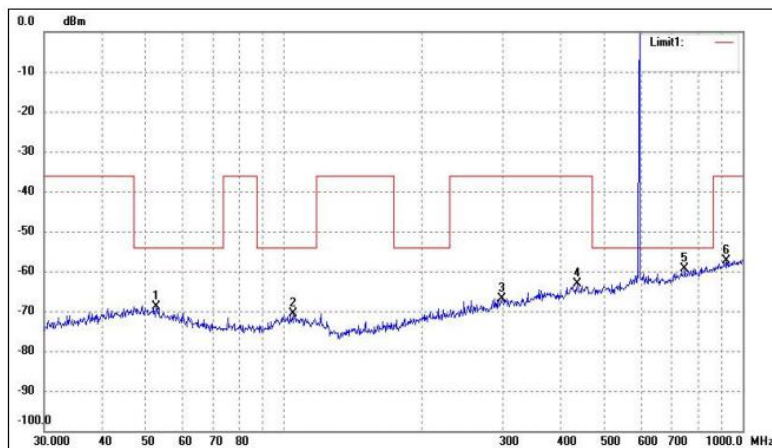
| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 52.3913            | -69.40           | 0.26          | -69.14          | -54.00         | -15.14         | 313           | 100            | peak   |
| 2   | 107.5101           | -69.57           | -1.25         | -70.82          | -54.00         | -16.82         | 173           | 100            | peak   |
| 3   | 217.5443           | -69.30           | -0.63         | -69.93          | -54.00         | -15.93         | 129           | 100            | peak   |
| 4   | 506.4791           | -68.27           | 5.63          | -62.64          | -54.00         | -8.64          | 105           | 100            | peak   |
| 5   | 763.3757           | -68.09           | 9.29          | -58.80          | -54.00         | -4.80          | 344           | 100            | peak   |
| 6   | 979.1804           | -69.15           | 12.15         | -57.00          | -36.00         | -21.00         | 95            | 100            | peak   |

Note :

1. Result = Reading + Corrected Factor Note :
2. The fundamental wave filtered out during the test.

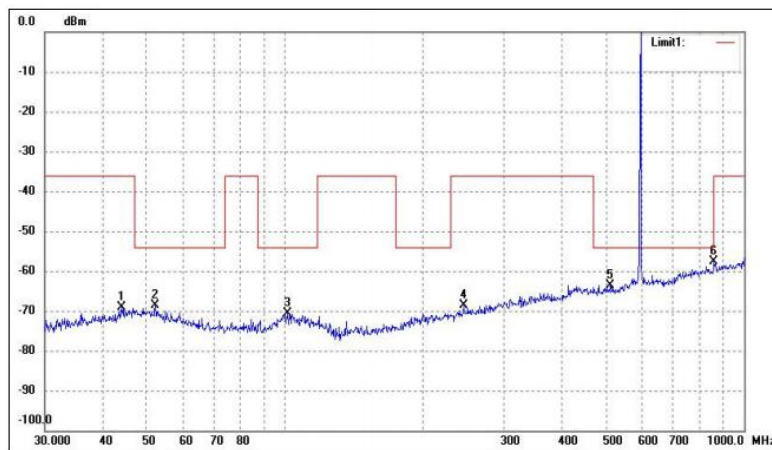
CHNNEL -HIGH CH-30MHZ-1000MHZ

Vertical



| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 52.7600            | -68.95           | 0.16          | -68.79          | -54.00         | -14.79         | 65            | 100            | peak   |
| 2   | 104.9033           | -69.36           | -1.30         | -70.66          | -54.00         | -16.66         | 109           | 100            | peak   |
| 3   | 298.2681           | -69.39           | 2.47          | -66.92          | -36.00         | -30.92         | 126           | 100            | peak   |
| 4   | 435.5898           | -68.62           | 5.60          | -63.02          | -36.00         | -27.02         | 133           | 100            | peak   |
| 5   | 747.4826           | -68.38           | 9.11          | -59.27          | -54.00         | -5.27          | 306           | 100            | peak   |
| 6   | 919.2866           | -68.91           | 11.52         | -57.39          | -36.00         | -21.39         | 244           | 100            | peak   |

Horizontal



| No. | Frequency<br>(MHz) | Reading<br>(dBm) | Correct<br>dB | Result<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) | Degree<br>( ) | Height<br>(cm) | Remark |
|-----|--------------------|------------------|---------------|-----------------|----------------|----------------|---------------|----------------|--------|
| 1   | 44.1202            | -69.44           | 0.26          | -69.18          | -36.00         | -33.18         | 60            | 100            | peak   |
| 2   | 52.2079            | -68.97           | 0.30          | -68.67          | -54.00         | -14.67         | 274           | 100            | peak   |
| 3   | 101.2885           | -69.23           | -1.37         | -70.60          | -54.00         | -16.60         | 99            | 100            | peak   |
| 4   | 245.0900           | -69.16           | 0.54          | -68.62          | -36.00         | -32.62         | 136           | 100            | peak   |
| 5   | 511.8352           | -69.24           | 5.64          | -63.60          | -54.00         | -9.60          | 123           | 100            | peak   |
| 6   | 860.0352           | -68.36           | 10.62         | -57.74          | -54.00         | -3.74          | 196           | 100            | peak   |

Note :

1. Result = Reading + Corrected Factor Note :
2. The fundamental wave filtered out during the test.

## CHANNEL 1GHZ-6GHZ

| Frequency               | Reading | Correct | Result | Limit | Margin | Polar |
|-------------------------|---------|---------|--------|-------|--------|-------|
| (MHz)                   | (dBm)   | dB      | (dBm)  | (dBm) | (dB)   | H/V   |
| Low Channel-501.0MHz    |         |         |        |       |        |       |
| 1002.0                  | -50.92  | 7.92    | -43.00 | -30   | -13.00 | H     |
| 1503.0                  | -57.40  | 13.97   | -43.43 | -30   | -13.43 | H     |
| 1002.0                  | -49.36  | 7.92    | -41.44 | -30   | -11.44 | V     |
| 1503.0                  | -49.43  | 13.64   | -35.79 | -30   | -5.79  | V     |
| Middle Channel-511.5MHz |         |         |        |       |        |       |
| 1023.0                  | -54.05  | 8.27    | -45.78 | -30   | -15.78 | H     |
| 1534.5                  | -56.92  | 13.73   | -43.19 | -30   | -13.19 | H     |
| 1023.0                  | -50.22  | 8.27    | -41.95 | -30   | -11.95 | V     |
| 1534.5                  | -48.21  | 13.73   | -34.48 | -30   | -4.48  | V     |
| High Channel-538.5MHz   |         |         |        |       |        |       |
| 1077.0                  | -53.77  | 8.27    | -45.50 | -30   | -15.50 | H     |
| 1615.5                  | -54.07  | 13.73   | -40.34 | -30   | -10.34 | H     |
| 1077.0                  | -52.27  | 8.27    | -44.00 | -30   | -14.00 | V     |
| 1615.5                  | -47.77  | 13.73   | -34.04 | -30   | -4.04  | V     |

Note: all other emissions are attenuated 20dB below the limits, so it does not record in report.

## 8. FREQUENCY STABILITY

### 8.1 LIMIT

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.005\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C

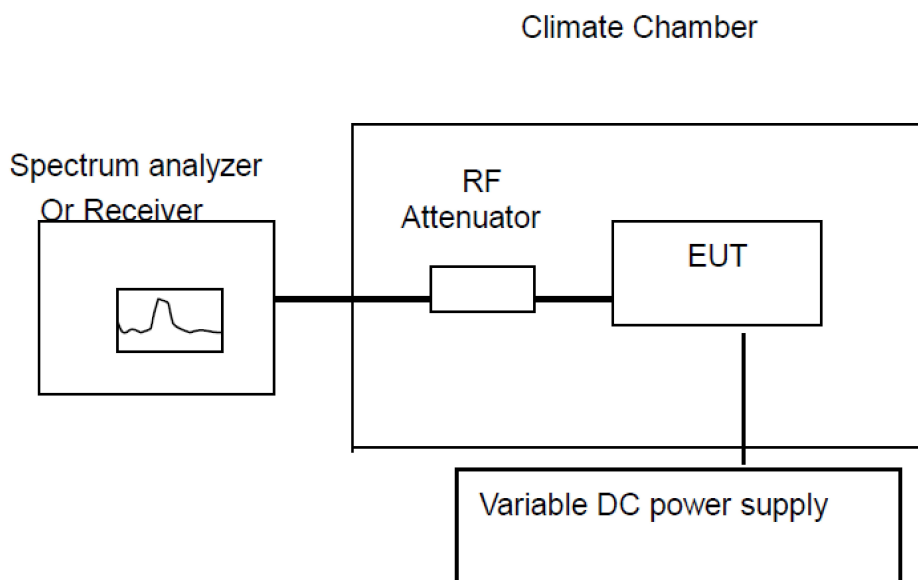
### 8.2 TEST PROCEDURE

a. The EUT was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. The DC leads and the RF output cable, exited the chamber through an opening made for that purpose.

After the temperature stabilized the frequency output was recorded from the counter. An external variable DC power supply was connected to the battery terminals of the equipment under test.

b. For hand carried, battery powered equipment primary supply voltage was reduced to the battery operating end point as specified by the manufacturer. The output frequency was recorded for each battery voltage.

### 8.3 TEST SETUP



#### 8.4 TEST RESULTS

- (1) Frequency stability versus input voltage (Supply Nominal voltage is DC 3V)
- (2) Frequency stability versus input voltage (Supply battery operating end point which shall be specified by the manufacturer DC 3.7V)

| Refernce Frequency: 501.0MHz |                                |                         |                          |
|------------------------------|--------------------------------|-------------------------|--------------------------|
| Power supply                 | Environment<br>Temperature(°C) | Frequency Error<br>(Hz) | Frequency Error<br>(ppm) |
| DC 3.33V                     | 20                             | 1010                    | 2.02                     |
| DC 3.7V                      | 20                             | 1008                    | 2.01                     |
| DC 4.07V                     | 20                             | 1015                    | 2.03                     |

| Refernce Frequency: 501.0MHz                              |                         |                          |             |         |
|-----------------------------------------------------------|-------------------------|--------------------------|-------------|---------|
| Frequency Deviation measured with time Elapse(30 minutes) |                         |                          |             |         |
| Environment<br>Temperature(°C)                            | Frequency Error<br>(Hz) | Frequency Error<br>(ppm) | Limit (ppm) | Results |
| 50                                                        | 1021                    | 2.04                     | 50          | Pass    |
| 40                                                        | 1008                    | 2.01                     |             |         |
| 30                                                        | 1005                    | 2.00                     |             |         |
| 20                                                        | 1008                    | 2.01                     |             |         |
| 10                                                        | 1007                    | 2.01                     |             |         |
| 0                                                         | 1009                    | 2.01                     |             |         |
| -10                                                       | 1008                    | 2.01                     |             |         |
| -20                                                       | 1009                    | 2.01                     |             |         |

| Refernce Frequency: 511.5MHz |                             |                      |                       |
|------------------------------|-----------------------------|----------------------|-----------------------|
| Power supply                 | Environment Temperature(°C) | Frequency Error (Hz) | Frequency Error (ppm) |
| DC 3.33V                     | 20                          | 1009                 | 1.97                  |
| DC 3.7V                      | 20                          | 1006                 | 1.96                  |
| DC 4.07V                     | 20                          | 1010                 | 1.97                  |
|                              |                             |                      |                       |

| Refernce Frequency: 511.5MHz                              |                      |                       |             |         |
|-----------------------------------------------------------|----------------------|-----------------------|-------------|---------|
| Frequency Deviation measured with time Elapse(30 minutes) |                      |                       |             |         |
| Environment Temperature(°C)                               | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Results |
| 50                                                        | 1011                 | 1.97                  | 50          | Pass    |
| 40                                                        | 1006                 | 1.96                  |             |         |
| 30                                                        | 1006                 | 1.96                  |             |         |
| 20                                                        | 1008                 | 1.97                  |             |         |
| 10                                                        | 1007                 | 1.97                  |             |         |
| 0                                                         | 1008                 | 1.97                  |             |         |
| -10                                                       | 1008                 | 1.97                  |             |         |
| -20                                                       | 1006                 | 1.96                  |             |         |

| Refernce Frequency: 538.5MHz |                             |                      |                       |
|------------------------------|-----------------------------|----------------------|-----------------------|
| Power supply                 | Environment Temperature(°C) | Frequency Error (Hz) | Frequency Error (ppm) |
| DC 3.33V                     | 20                          | 1013                 | 1.91                  |
| DC 3.7V                      | 20                          | 1011                 | 1.88                  |
| DC 4.07V                     | 20                          | 1010                 | 1.87                  |
|                              |                             |                      |                       |

| Refernce Frequency: 538.5MHz                              |                      |                       |             |         |
|-----------------------------------------------------------|----------------------|-----------------------|-------------|---------|
| Frequency Deviation measured with time Elapse(30 minutes) |                      |                       |             |         |
| Environment Temperature(°C)                               | Frequency Error (Hz) | Frequency Error (ppm) | Limit (ppm) | Results |
| 50                                                        | 1010                 | 1.88                  | 50          | Pass    |
| 40                                                        | 1005                 | 1.95                  |             |         |
| 30                                                        | 1005                 | 1.95                  |             |         |
| 20                                                        | 1006                 | 1.97                  |             |         |
| 10                                                        | 1007                 | 1.99                  |             |         |
| 0                                                         | 1006                 | 1.97                  |             |         |
| -10                                                       | 1007                 | 1.99                  |             |         |
| -20                                                       | 1006                 | 1.97                  |             |         |

## 8.5 ANTENNA REQUIREMENT

### 8.5.1 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.

### 8.5.2 EUT ANTENNA

The antennas used for this product are external antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 1.0 dBi.

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