

FCC REPORT

Applicant: PORTMAN ELECTRONICS (DONGGUAN) CO., LTD.

Address of Applicant: NO#10, Luyi 2 Road, Keyuancheng, Tangxia Town,
DONGGUAN CITY, GUANGDONG PROVINCE CHINA 523718

Equipment Under Test (EUT)

Product Name: CAR ALARM

Model No.: 185SP, 185SPR

FCC ID: TBQT12-SS1W

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: 24 May, 2018

Date of Test: 31 May, to 25 Jun., 2018

Date of report issued: 26 Jun., 2018

Test Result: PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

| Version No. | Date | Description |
|-------------|---------------|-------------|
| 00 | 26 Jun., 2018 | Original |
| | | |
| | | |
| | | |
| | | |

Tested by:

YT Yang

Date:

26 Jun., 2018

Test Engineer

Reviewed by:

Wimer Zhang

Date:

26 Jun., 2018

Project Engineer

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4 Test Summary

| Test Items | Section in CFR 47 | Result |
|---|---------------------|--------|
| Antenna Requirement | 15.203 & 15.247 (c) | Pass |
| AC Power Line Conducted Emission | 15.207 | N/A |
| Conducted Peak Output Power | 15.247 (b)(2) | Pass |
| 20dB Occupied Bandwidth | 15.247 (a)(1)(i) | Pass |
| Carrier Frequencies Separation | 15.247 (a)(1) | Pass |
| Hopping Channel Number | 15.247 (a)(1)(i) | Pass |
| Dwell Time | 15.247 (a)(i) | Pass |
| Spurious Emission | 15.205 & 15.209 | Pass |
| Band Edge | 15.247(d) | Pass |
| <p><i>Pass: The EUT complies with the essential requirements in the standard.</i> <i>N/A: N/A: Not Applicable.</i></p> | | |

5 General Information

5.1 Client Information

| | |
|------------------------|---|
| Applicant: | PORTMAN ELECTRONICS (DONGGUAN) CO., LTD. |
| Address: | NO#10, Luyi 2 Road, Keyuancheng, Tangxia Town, DONGGUAN CITY, GUANGDONG PROVINCE CHINA 523718 |
| Manufacturer/ Factory: | PORTMAN ELECTRONICS (DONGGUAN) CO., LTD. |
| Address: | NO#10, Luyi 2 Road, Keyuancheng, Tangxia Town, DONGGUAN CITY, GUANGDONG PROVINCE CHINA 523718 |

5.2 General Description of E.U.T.

| | |
|------------------------|---|
| Product Name: | CAR ALARM |
| Model No.: | 185SP, 185SPR |
| Operation Frequency: | 902MHz~928MHz |
| Number of channel: | 25 |
| Modulation technology: | 2-FSK |
| Antenna Type: | Helix Antenna |
| Antenna gain: | -1.25 dBi |
| Power supply: | DC3.0V (CR2032 Battery) |
| Remark: | The No.: 185SP, 185SPR were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name and for different areas |

Operation Frequency each of channel for 2-FSK

| Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|---------|-----------|
| 0 | 905.4MHz | 11 | 914.2MHz | 22 | 923.0MHz |
| 1 | 906.2MHz | 12 | 915.0MHz | 23 | 923.8MHz |
| 2 | 907.0MHz | 13 | 915.8MHz | 24 | 924.6MHz |
| 3 | 907.8MHz | 14 | 916.6MHz | | |
| 4 | 908.6MHz | 15 | 917.4MHz | | |
| 5 | 909.4MHz | 16 | 918.2MHz | | |
| 6 | 910.2MHz | 17 | 919.0MHz | | |
| 7 | 911.0MHz | 18 | 919.8MHz | | |
| 8 | 911.8MHz | 19 | 920.6MHz | | |
| 9 | 912.6MHz | 20 | 921.4MHz | | |
| 10 | 913.4MHz | 21 | 922.2MHz | | |

Remark: In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test. Channel No. 0, 12 & 24 were selected as Lowest, Middle and Highest channel.

5.3 Test environment and test mode

| Operating Environment: | |
|------------------------|---|
| Temperature: | 24.0 °C |
| Humidity: | 54 % RH |
| Atmospheric Pressure: | 1010 mbar |
| Test Modes: | |
| Non-hopping mode: | Keep the EUT in continuous transmitting mode with worst case data rate. |
| Hopping mode: | Keep the EUT in hopping mode. |

The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working with a fresh battery, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

5.4 Description of Support Units

| |
|---|
| The EUT has been tested as an independent unit. |
|---|

5.5 Measurement Uncertainty

| Parameters | Expanded Uncertainty |
|-------------------------------------|----------------------|
| Conducted Emission (9kHz ~ 30MHz) | ±2.22 dB (k=2) |
| Radiated Emission (9kHz ~ 30MHz) | ±2.76 dB (k=2) |
| Radiated Emission (30MHz ~ 1000MHz) | ±4.28 dB (k=2) |
| Radiated Emission (1GHz ~ 18GHz) | ±5.72 dB (k=2) |
| Radiated Emission (18GHz ~ 40GHz) | ±2.88 dB (k=2) |

5.6 Laboratory Facility

| |
|---|
| <p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> ● FCC - Registration No.: 727551 Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551. ● IC - Registration No.: 10106A-1 The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1. ● CNAS - Registration No.: CNAS L6048 Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048. ● A2LA - Registration No.: 4346.01 This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf |
|---|

5.7 Laboratory Location

| |
|---|
| <p>Shenzhen Zhongjian Nanfang Testing Co., Ltd. Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China Tel: +86-755-23118282, Fax: +86-755-23116366 Email: info@ccis-cb.com, Website: http://www.ccis-cb.com</p> |
|---|

5.8 Test Instruments list

| Radiated Emission: | | | | | |
|--------------------|-----------------|---------------|------------|----------------------|--------------------------|
| Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date (mm-dd-yy) | Cal. Due date (mm-dd-yy) |
| 3m SAC | SAEMC | 9m*6m*6m | 966 | 07-22-2017 | 07-21-2020 |
| Loop Antenna | SCHWARZBECK | FMZB1519B | 00044 | 03-16-2018 | 03-15-2019 |
| BiConiLog Antenna | SCHWARZBECK | VULB9163 | 497 | 03-16-2018 | 03-15-2019 |
| Horn Antenna | SCHWARZBECK | BBHA9120D | 916 | 03-16-2018 | 03-15-2019 |
| EMI Test Software | AUDIX | E3 | 6.110919b | N/A | N/A |
| Pre-amplifier | HP | 8447D | 2944A09358 | 03-07-2018 | 03-06-2019 |
| Pre-amplifier | CD | PAP-1G18 | 11804 | 03-07-2018 | 03-06-2019 |
| Spectrum analyzer | Rohde & Schwarz | FSP30 | 101454 | 03-07-2018 | 03-06-2019 |
| EMI Test Receiver | Rohde & Schwarz | ESRP7 | 101070 | 03-07-2018 | 03-06-2019 |
| Cable | ZDECL | Z108-NJ-NJ-81 | 1608458 | 03-07-2018 | 03-06-2019 |
| Cable | MICRO-COAX | MFR64639 | K10742-5 | 03-07-2018 | 03-06-2019 |
| Cable | SUHNER | SUCOFLEX100 | 58193/4PE | 03-07-2018 | 03-06-2019 |

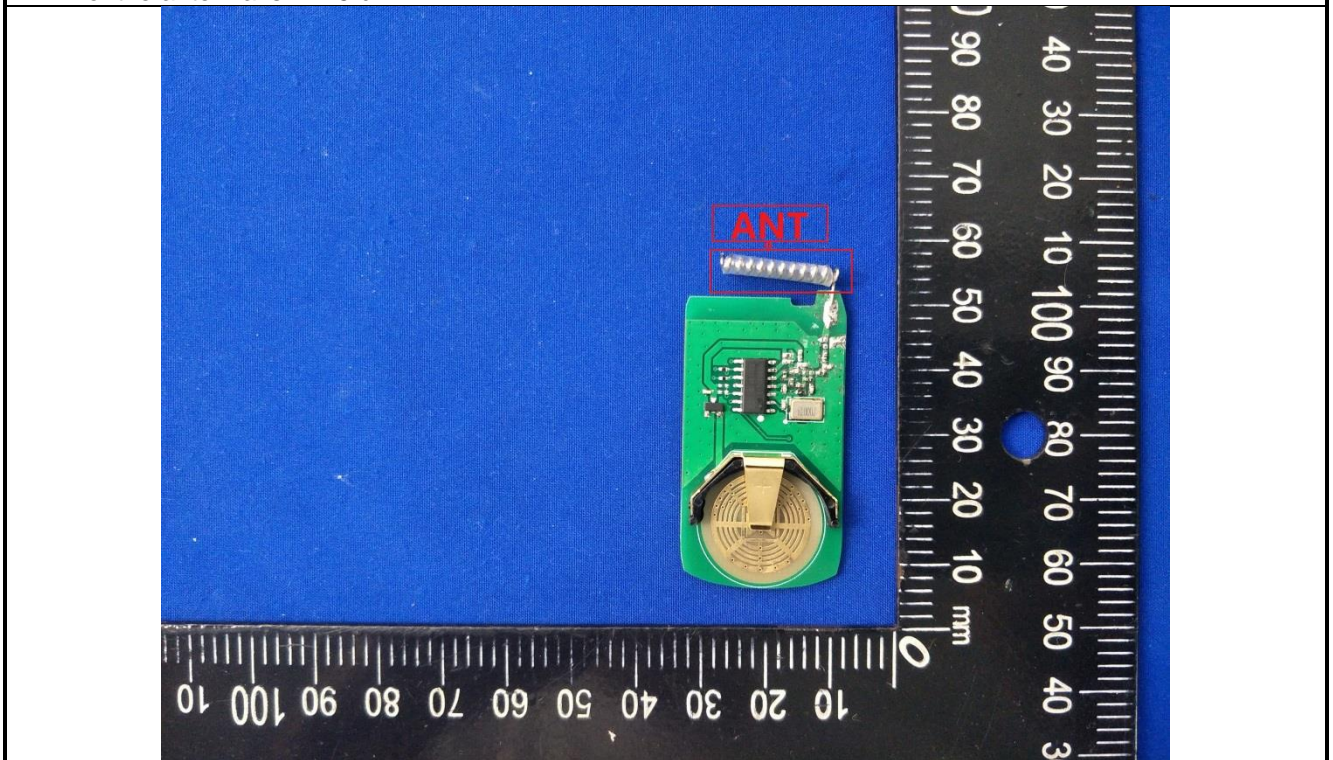
| Conducted Emission: | | | | | |
|---------------------|-----------------|------------|-------------|----------------------|--------------------------|
| Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date (mm-dd-yy) | Cal. Due date (mm-dd-yy) |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 101189 | 03-07-2018 | 03-06-2019 |
| Pulse Limiter | SCHWARZBECK | OSRAM 2306 | 9731 | 03-07-2018 | 03-06-2019 |
| LISN | CHASE | MN2050D | 1447 | 03-19-2018 | 03-18-2019 |
| LISN | Rohde & Schwarz | ESH3-Z5 | 8438621/010 | 07-21-2017 | 07-20-2018 |
| Cable | HP | 10503A | N/A | 03-07-2018 | 03-06-2019 |
| EMI Test Software | AUDIX | E3 | 6.110919b | N/A | N/A |

6 Test results and measurement data

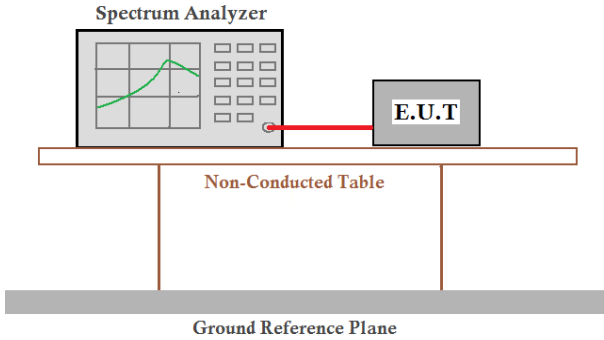
6.1 Antenna Requirement

| | |
|--|---------------------------------------|
| Standard requirement: | FCC Part 15 C Section 15.203 & 247(c) |
| <p>15.203 requirement: 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi 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 6dBi.</p> | |

| | |
|--|--|
| E.U.T Antenna: | |
| The Bluetooth antenna is an Coil antenna antenna which permanently attached, and the best case gain of the antenna is -1.25 dBi. | |



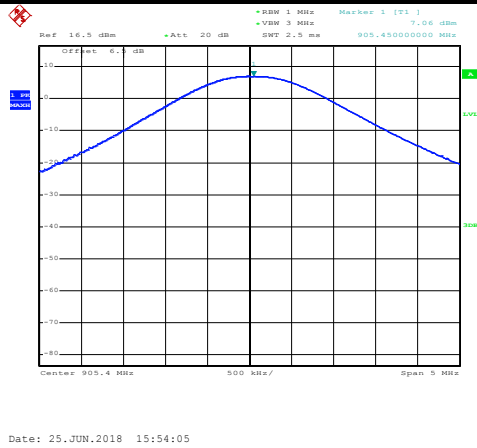
6.2 Conducted Output Power

| | |
|-------------------|---|
| Test Requirement: | FCC Part 15 C Section 15.247 (b)(2) |
| Test Method: | ANSI C63.10:2013 and DA00-705 |
| Receiver setup: | RBW=1MHz, VBW=3MHz, Detector=Peak (If 20dB BW ≤1 MHz) RBW=3MHz, VBW=10MHz, Detector=Peak (If 20dB BW > 1 MHz and < 3MHz) |
| Limit: | For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section. |
| Test setup: |  <p>The diagram shows a Spectrum Analyzer and an E.U.T. (Equipment Under Test) connected by a red cable. They are positioned on a table labeled 'Non-Conducted Table'. Below the table is a 'Ground Reference Plane'.</p> |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Non-hopping mode |
| Test results: | Pass |

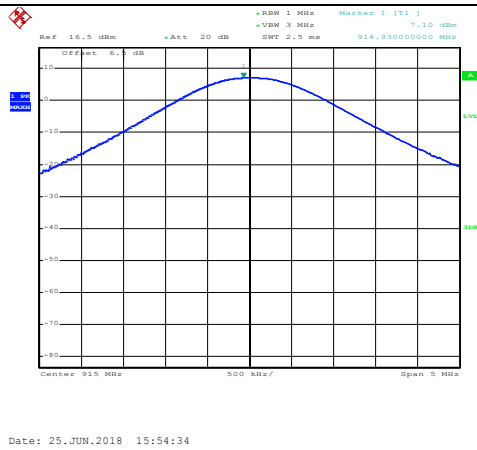
Measurement Data:

| Test channel | Peak Output Power (dBm) | Limit (dBm) | Result |
|-----------------|-------------------------|-------------|--------|
| Lowest channel | 7.06 | 24.00 | Pass |
| Middle channel | 7.10 | 24.00 | Pass |
| Highest channel | 7.17 | 24.00 | Pass |

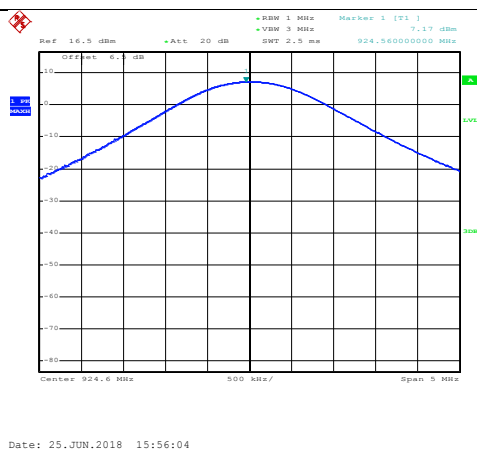
Test plot as follows:



Lowest channel

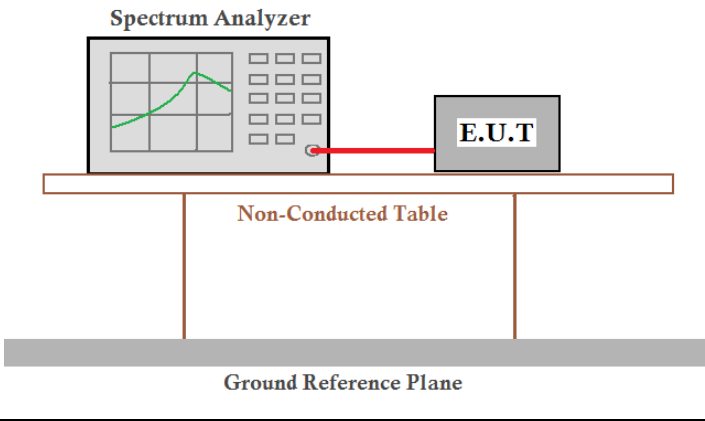


Middle channel



Highest channel

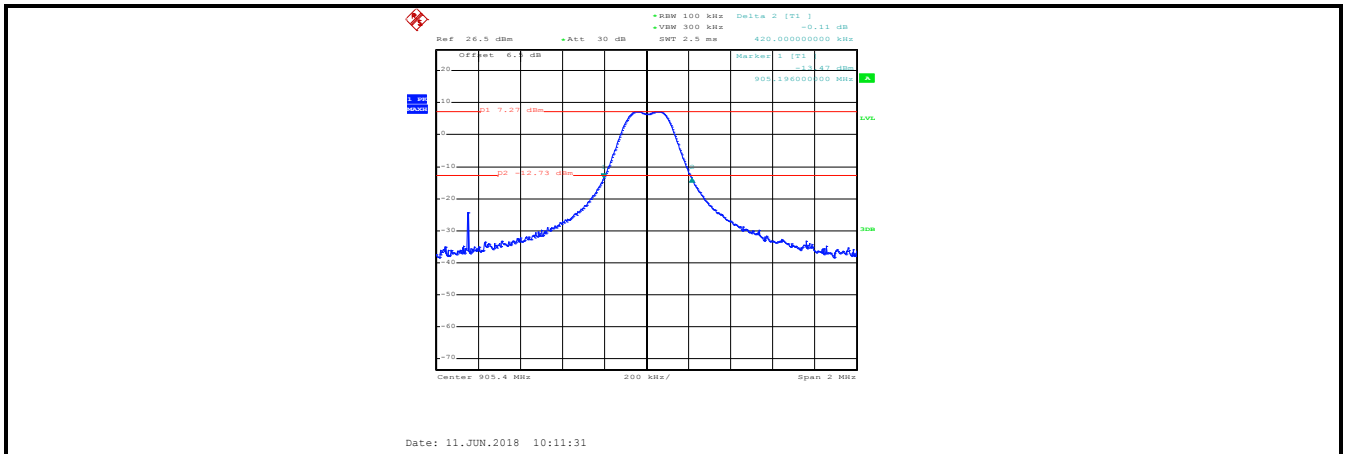
6.3 20dB Occupy Bandwidth

| | |
|-------------------|--|
| Test Requirement: | FCC Part 15 C Section 15.247 (a)(1)(i) |
| Test Method: | ANSI C63.10:2013 and DA00-705 |
| Receiver setup: | RBW=30 kHz, VBW=100 kHz, detector=Peak |
| Limit: | 250KHz < 20dB < 500KHz |
| Test setup: |  <p>The diagram shows a Spectrum Analyzer on the left and an E.U.T. (Equipment Under Test) on the right. They are connected by a red cable. Both are placed on a table labeled 'Non-Conducted Table'. Below the table is a 'Ground Reference Plane'.</p> |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Non-hopping mode |
| Test results: | Pass |

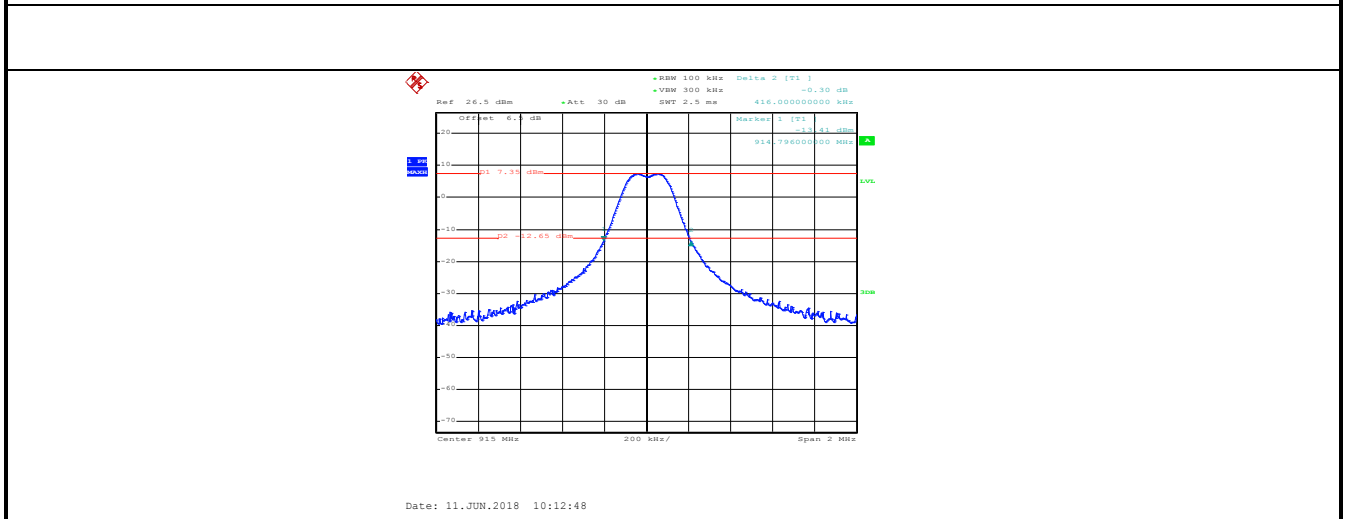
Measurement Data:

| Test channel | Lowest channel | Middle channel | Highest channel |
|-----------------------------|----------------|----------------|-----------------|
| 20dB Occupy Bandwidth (kHz) | 420 | 416 | 420 |

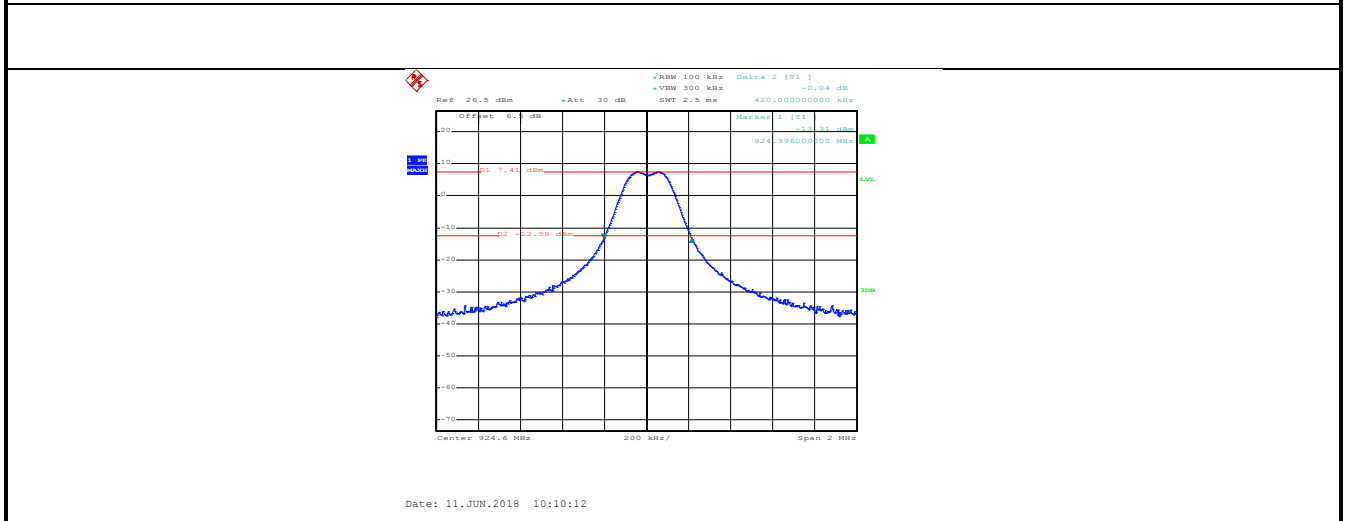
Test plot as follows:



Lowest channel

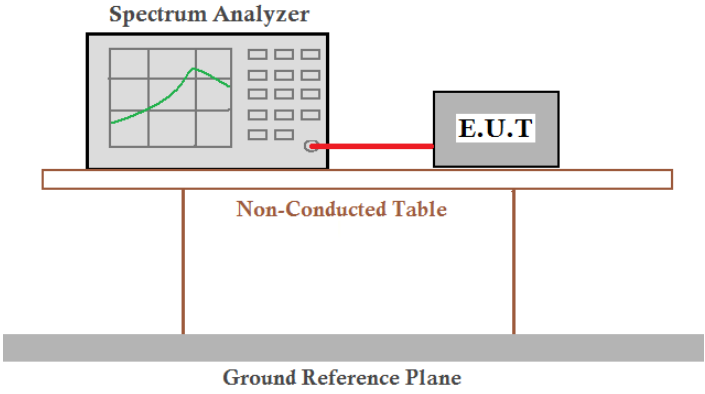


Middle channel



Highest channel

6.4 Carrier Frequencies Separation

| | |
|-------------------|--|
| Test Requirement: | FCC Part 15 C Section 15.247 (a)(1) |
| Test Method: | ANSI C63.10:2013 and DA00-705 |
| Receiver setup: | RBW=100 kHz, VBW=300 kHz, detector=Peak |
| Limit: | Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. |
| Test setup: |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Hopping mode |
| Test results: | Pass |

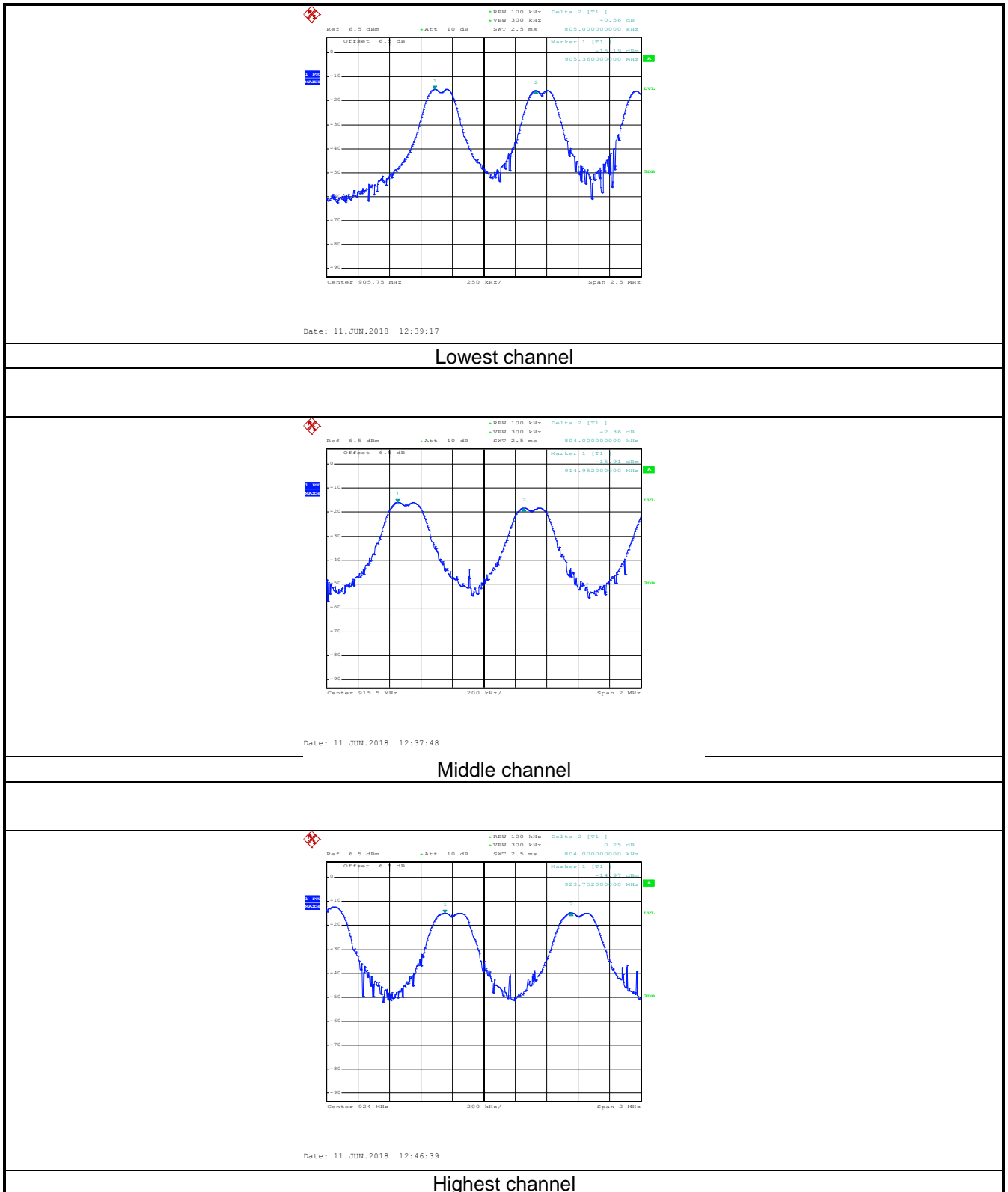
Measurement Data:

| Test channel | Carrier Frequencies Separation (kHz) | Limit (kHz) | Result |
|--------------|--------------------------------------|-------------|--------|
| Lowest | 805 | 420.00 | Pass |
| Middle | 804 | 420.00 | Pass |
| Highest | 804 | 420.00 | Pass |

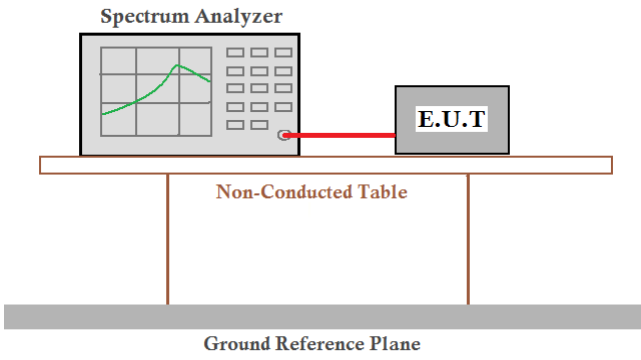
Note: According to section 6.4

| Mode | 20dB bandwidth (kHz) (worse case) | Limit (kHz) (Carrier Frequencies Separation) |
|-------|--------------------------------------|---|
| 2-FSK | 420 | 420.00 |

Test plot as follows:



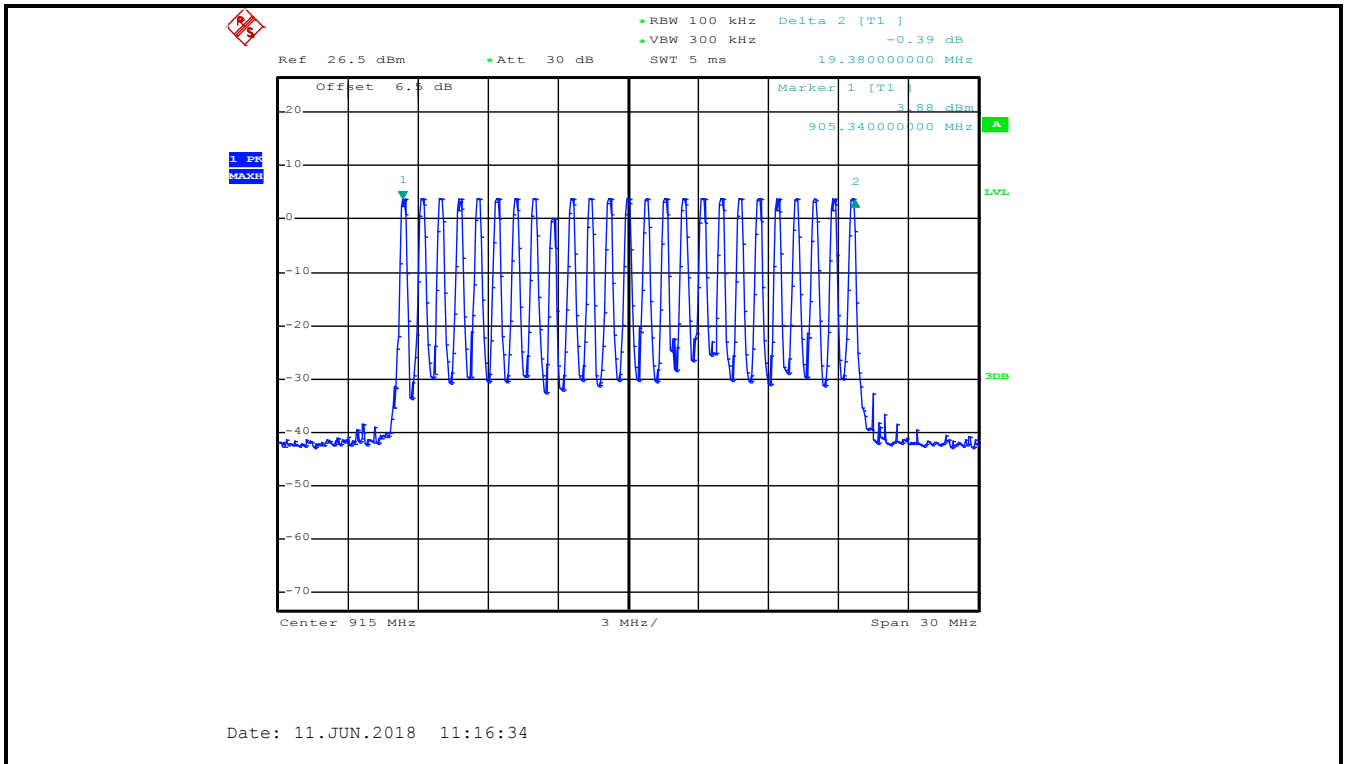
6.5 Hopping Channel Number

| | |
|-------------------|--|
| Test Requirement: | FCC Part 15 C Section 15.247 (a)(1)(i) |
| Test Method: | ANSI C63.10:2013 and DA00-705 |
| Receiver setup: | RBW=100 kHz, VBW=300 kHz, Frequency range=902MHz-928MHz, Detector=Peak |
| Limit: | 25 channels |
| Test setup: |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Hopping mode |
| Test results: | Pass |

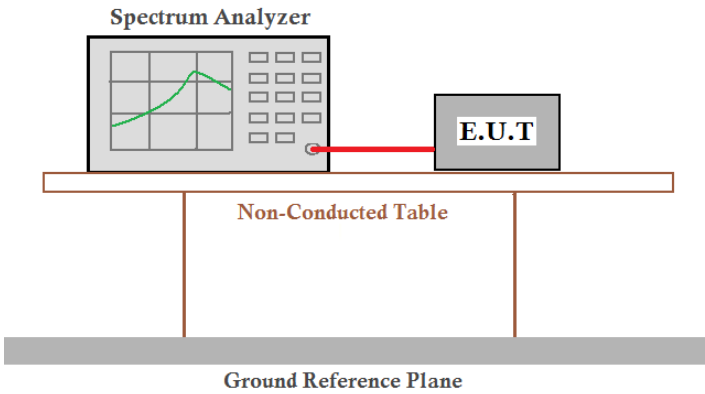
Measurement Data:

| Mode | Hopping channel numbers | Limit | Result |
|-------|-------------------------|-------|--------|
| 2-FSK | 25 | 25 | Pass |

Test plot as follows:



6.6 Dwell Time

| | |
|-------------------|--|
| Test Requirement: | FCC Part 15 C Section 15.247 (a)(1)(i) |
| Test Method: | ANSI C63.10:2013 and KDB DA00-705 |
| Receiver setup: | RBW=1 MHz, VBW=1 MHz, Span=0 Hz, Detector=Peak |
| Limit: | The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. |
| Test setup: |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Hopping mode |
| Test results: | Pass |

Measurement Data (Worse case):

| Mode | 10 second period (numbers) | Dwell time (second) | Limit (second) | Result |
|------|----------------------------|---------------------|----------------|--------|
| TX | 1 | 0.24 | 0.4 | Pass |

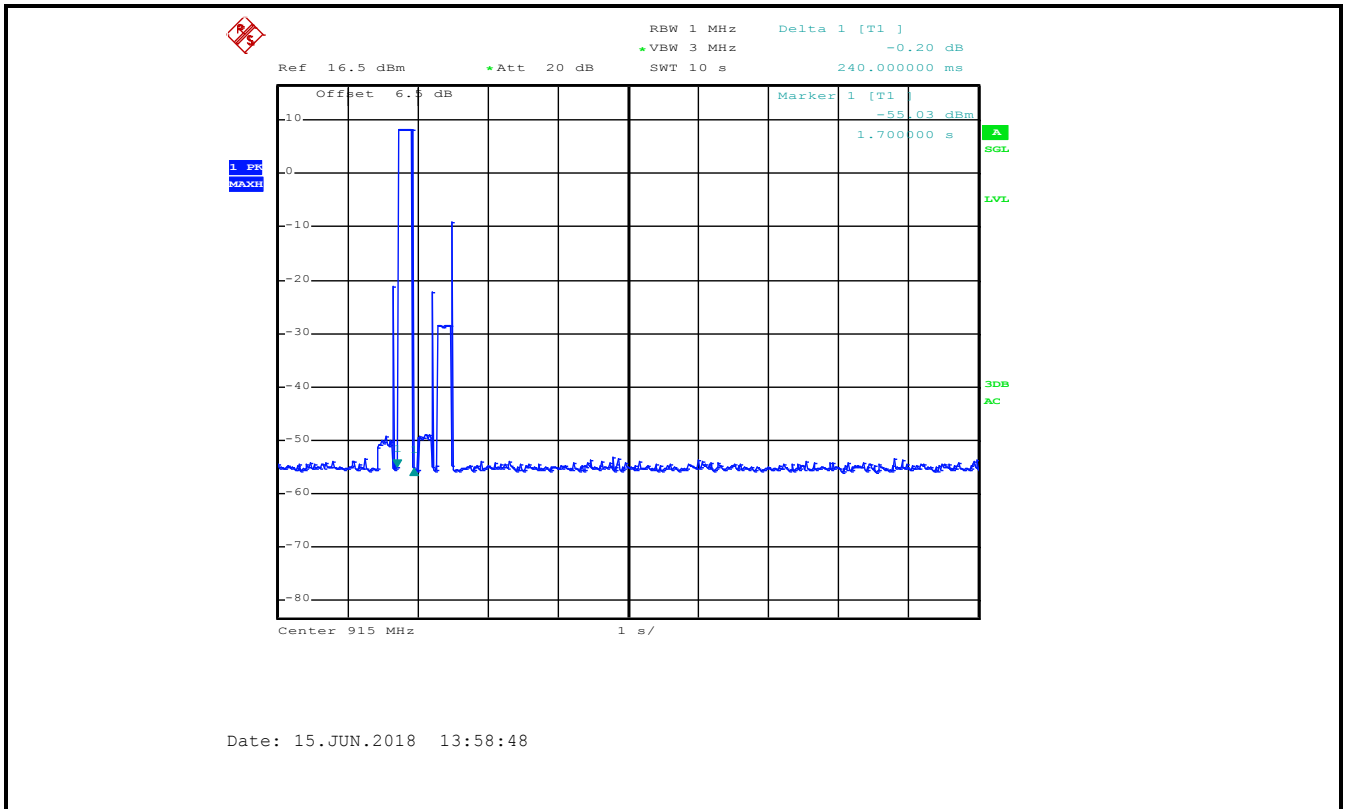
Note:

Calculation Formula: Dwell time = Ton time per hop * Hopping numbers

For example:

Time slot=0.24*1 =0.24S

Test plot as follows:

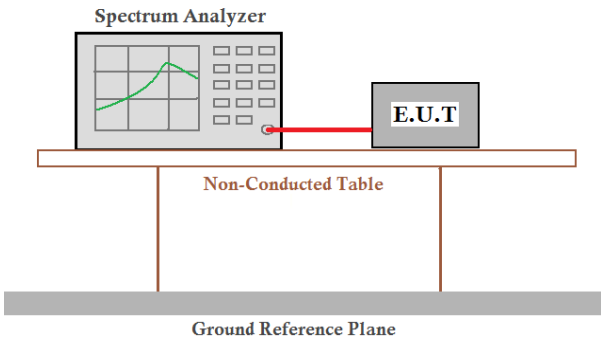


6.7 Pseudorandom Frequency Hopping Sequence

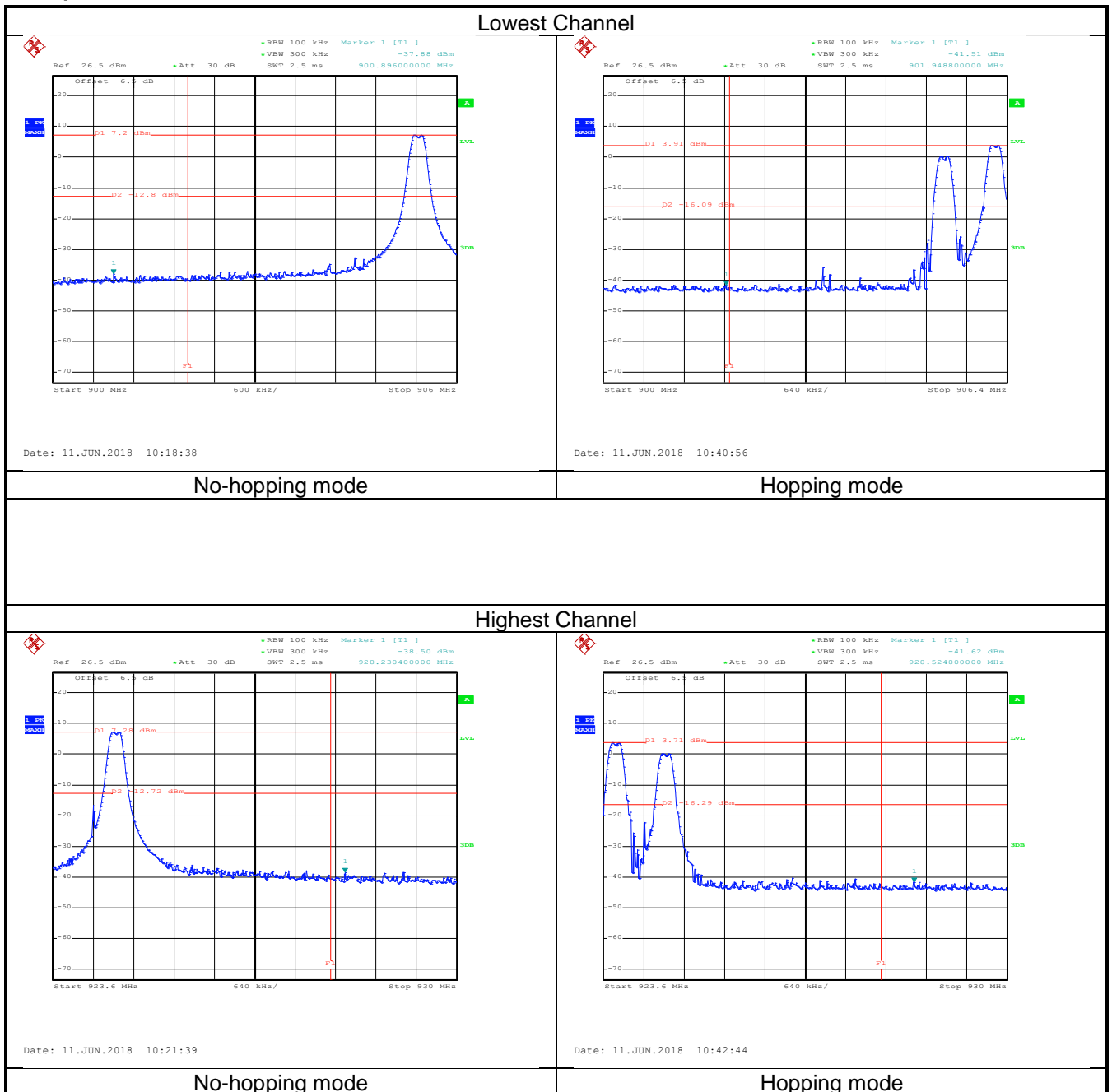
| Test Requirement: | FCC Part 15 C Section 15.247 (a)(1) requirement: |
|--|--|
| <p>Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.</p> <p>Alternatively, Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.</p> | |
| EUT Pseudorandom Frequency Hopping Sequence | |
| <p>The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones.</p> <ul style="list-style-type: none"> • Number of shift register stages: 9 • Length of pseudo-random sequence: $2^9 - 1 = 511$ bits • Longest sequence of zeros: 8 (non-inverted signal) <div data-bbox="256 987 1294 1133" style="text-align: center;"> </div> <p style="text-align: center;"><i>Linear Feedback Shift Register for Generation of the PRBS sequence</i></p> <p>An example of Pseudorandom Frequency Hopping Sequence as follow:</p> <div data-bbox="256 1234 1241 1379" style="text-align: center;"> </div> <p>Each frequency used equally on the average by each transmitter. The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.</p> | |

6.8 Band Edge

6.8.1 Conducted Emission Method

| | |
|-------------------|---|
| Test Requirement: | FCC Part 15 C Section 15.247 (d) |
| Test Method: | ANSI C63.10:2013 and DA00-705 |
| Receiver setup: | RBW=100 kHz, VBW=300 kHz, Detector=Peak |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. |
| Test setup: |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Non-hopping mode and hopping mode |
| Test results: | Pass |

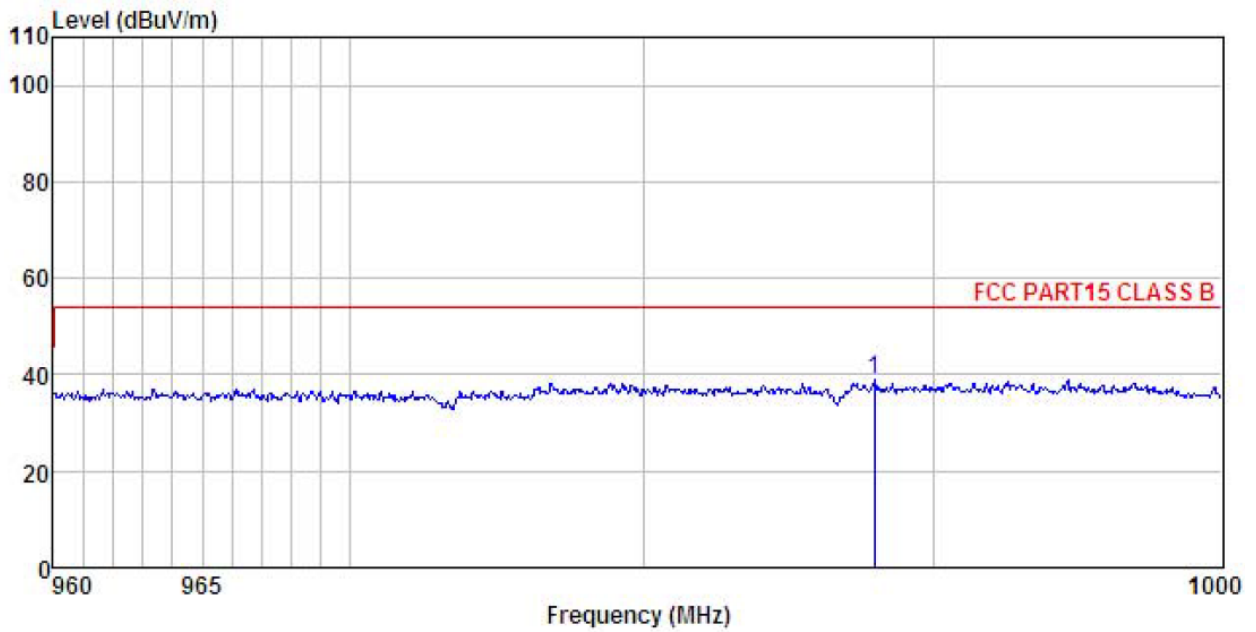
Test plot as follows:



6.8.2 Radiated Emission Method

| | | | | | |
|-----------------------|--|--------------------|------|---------------|---------------|
| Test Requirement: | FCC Part 15 C Section 15.209 and 15.205 | | | | |
| Test Method: | ANSI C63.10: 2013 | | | | |
| Test Frequency Range: | 2.3GHz to 2.5GHz | | | | |
| Test Distance: | 3m | | | | |
| Receiver setup: | Frequency | Detector | RBW | VBW | Remark |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak Value |
| | | RMS | 1MHz | 3MHz | Average Value |
| Limit: | Frequency | Limit (dBuV/m @3m) | | Remark | |
| | Above 1GHz | 54.00 | | Average Value | |
| | | 74.00 | | Peak Value | |
| Test setup: | | | | | |
| Test Procedure: | <ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 1.5meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. | | | | |
| Test Instruments: | Refer to section 5.8 for details | | | | |
| Test mode: | Non-hopping mode | | | | |
| Test results: | Passed | | | | |

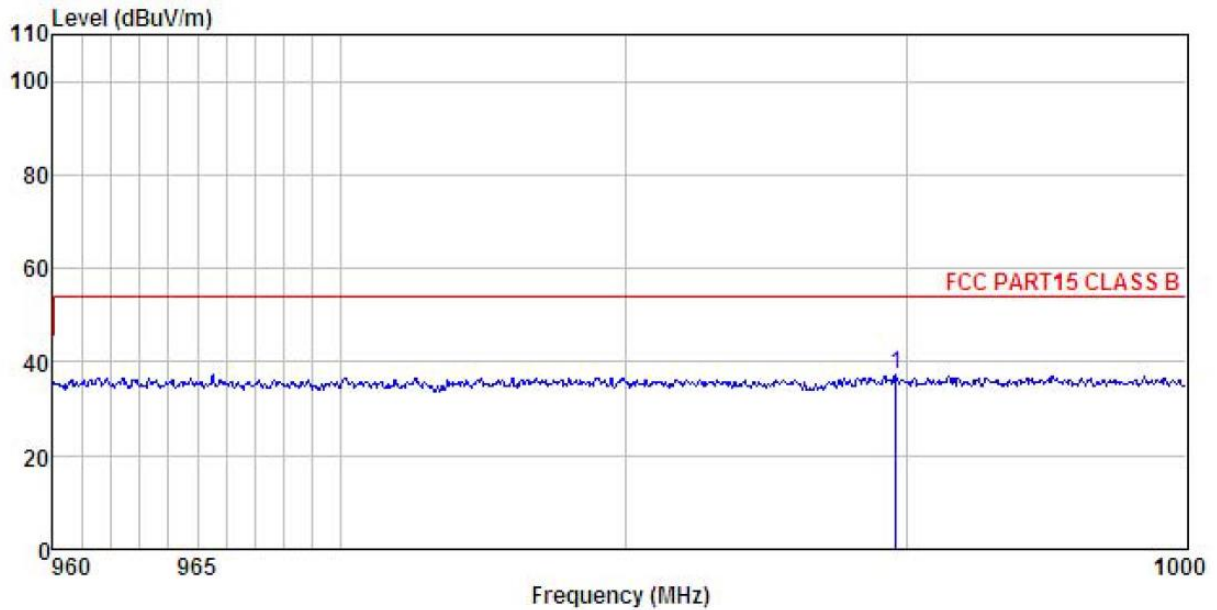
Test Polarization: Horizontal



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) HORIZONTAL
 EUT : CAR ALARM
 Model : 185SP
 Test mode : TX mode
 Power Rating : DC 3V
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: YI
 Remark :

| | ReadAntenna | Cable | Preamp | | Limit | Over | |
|-------|-------------|--------|--------|--------|--------|--------|--------------|
| Freq | Level | Factor | Loss | Factor | Level | Line | Limit |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB |
| 1 | 987.909 | 11.95 | 22.71 | 4.41 | 0.00 | 39.07 | 54.00 -14.93 |

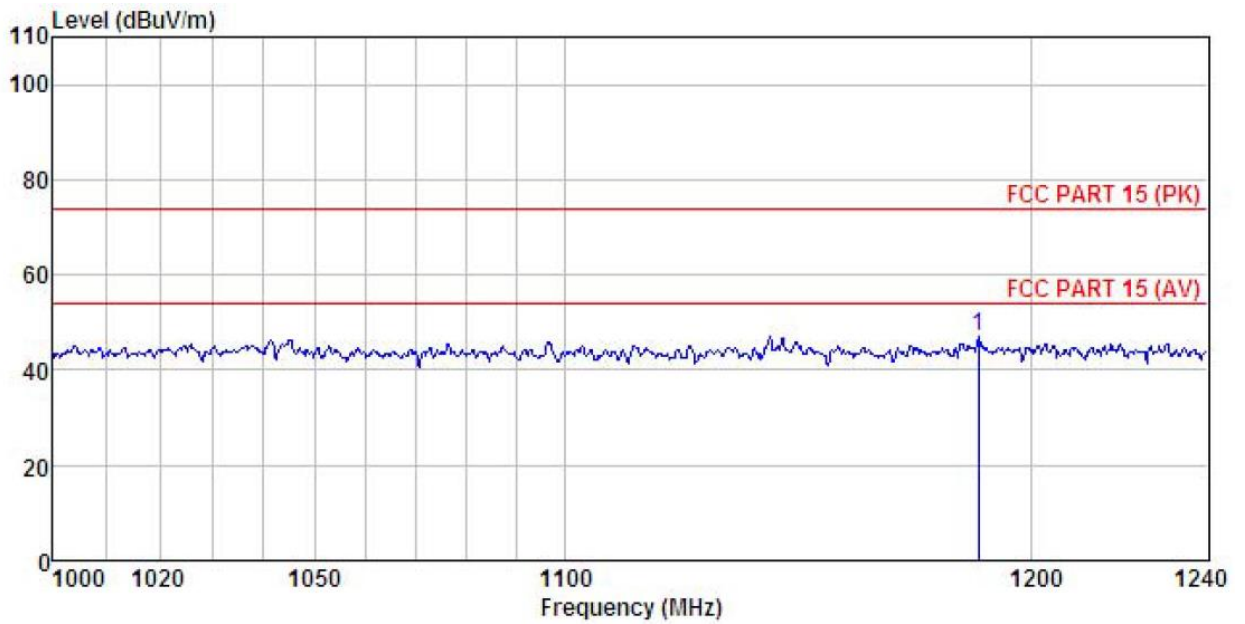
Test Polarization: Vertical



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) VERTICAL
 EUT : CAR ALARM
 Model : 185SP
 Test mode : TX mode
 Power Rating : DC 3V
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: YT
 Remark :

| | Read | Antenna | Cable | Preamp | Limit | Over | |
|-------|---------|---------|-------|--------|--------|--------|-----------------|
| Freq | Level | Factor | Loss | Factor | Line | Limit | Remark |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB |
| 1 | 989.564 | 10.21 | 22.72 | 4.41 | 0.00 | 37.34 | 54.00 -16.66 QP |

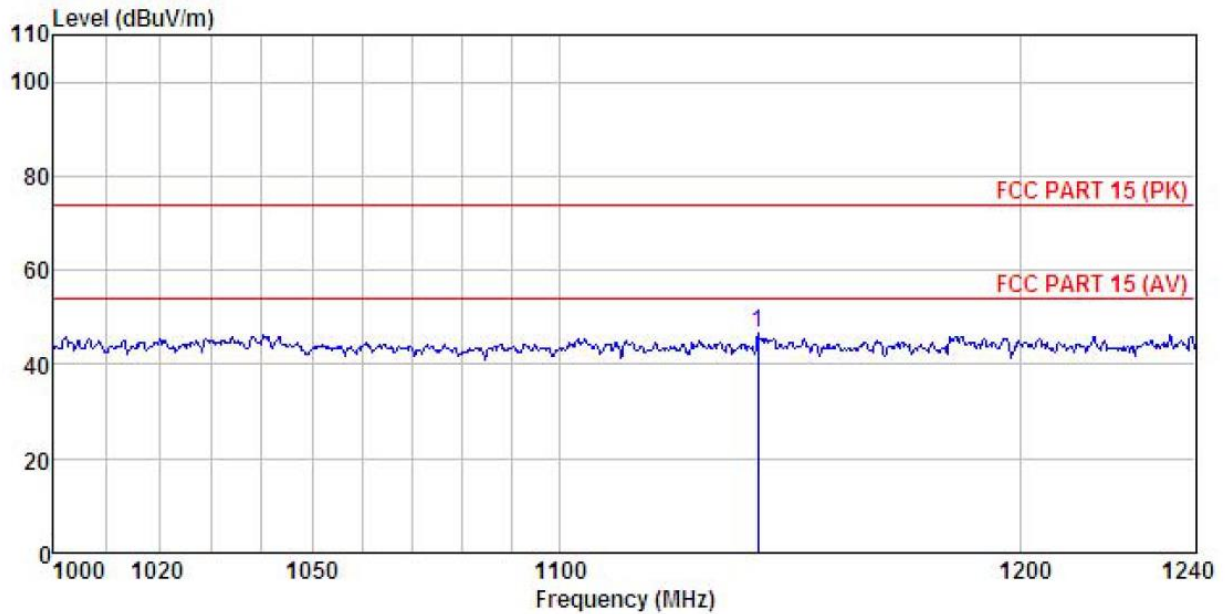
Test Polarization: Horizontal



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) HORIZONTAL
 EUT : CAR ALARM
 Model : 185SP
 Test mode : TX mode
 Power Rating : DC 3V
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: YT
 Remark :

| | Read | Antenna | Cable | Preamp | Limit | Over | |
|-------|----------|---------|-------|--------|--------|--------|--------------|
| Freq | Level | Factor | Loss | Factor | Level | Line | Limit |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB |
| 1 | 1188.039 | 19.53 | 24.28 | 3.30 | 0.00 | 47.11 | 74.00 -26.89 |

Test Polarization: Vertical

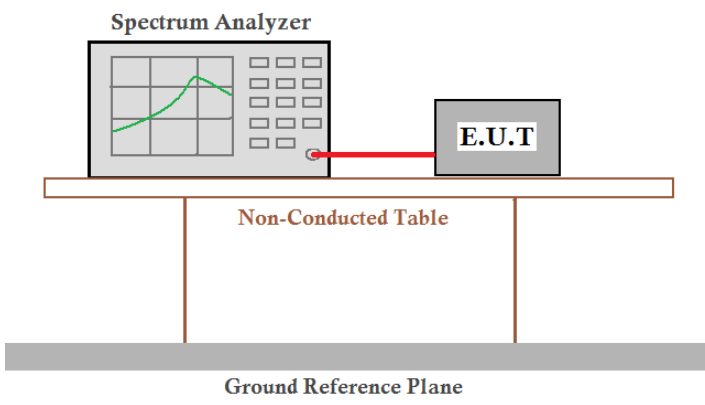


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18G) VERTICAL
 EUT : CAR ALARM
 Model : 185SP
 Test mode : TX mode
 Power Rating : DC 3V
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: YT
 Remark :

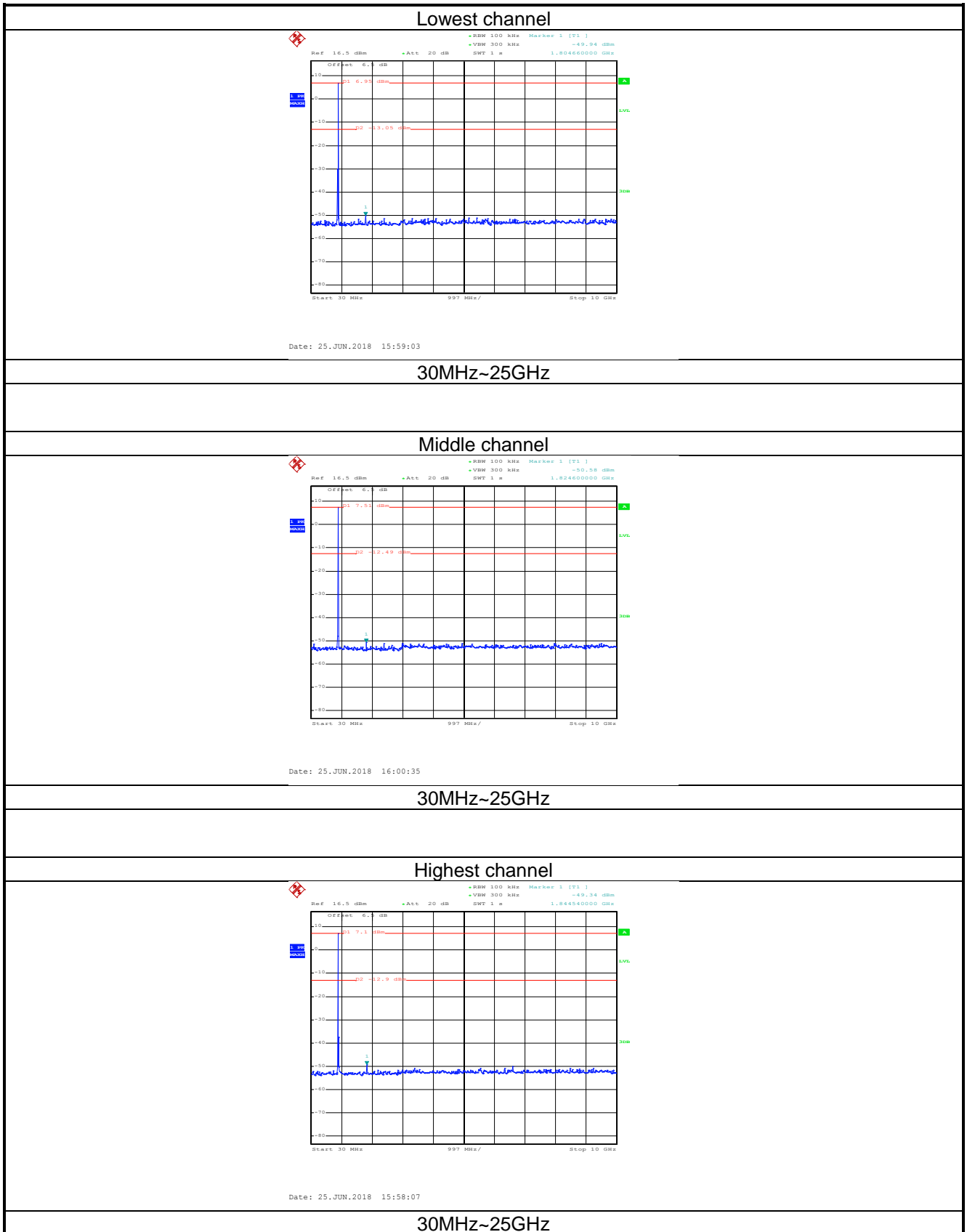
| | Read | Antenna | Cable | Preamp | Limit | Over | |
|-------|----------|---------|-------|--------|--------|--------|--------------|
| Freq | Level | Factor | Loss | Factor | Level | Line | Limit Remark |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB |
| 1 | 1141.934 | 19.26 | 24.12 | 3.23 | 0.00 | 46.61 | 74.00 -27.39 |

6.9 Spurious Emission

6.9.1 Conducted Emission Method

| | |
|-------------------|---|
| Test Requirement: | FCC Part 15 C Section 15.247 (d) |
| Test Method: | ANSI C63.10:2013 and DA00-705 |
| Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. |
| Test setup: |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two legs and sits on a Ground Reference Plane.</p> |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Non-hopping mode |
| Test results: | Pass |

Test plot as follows:



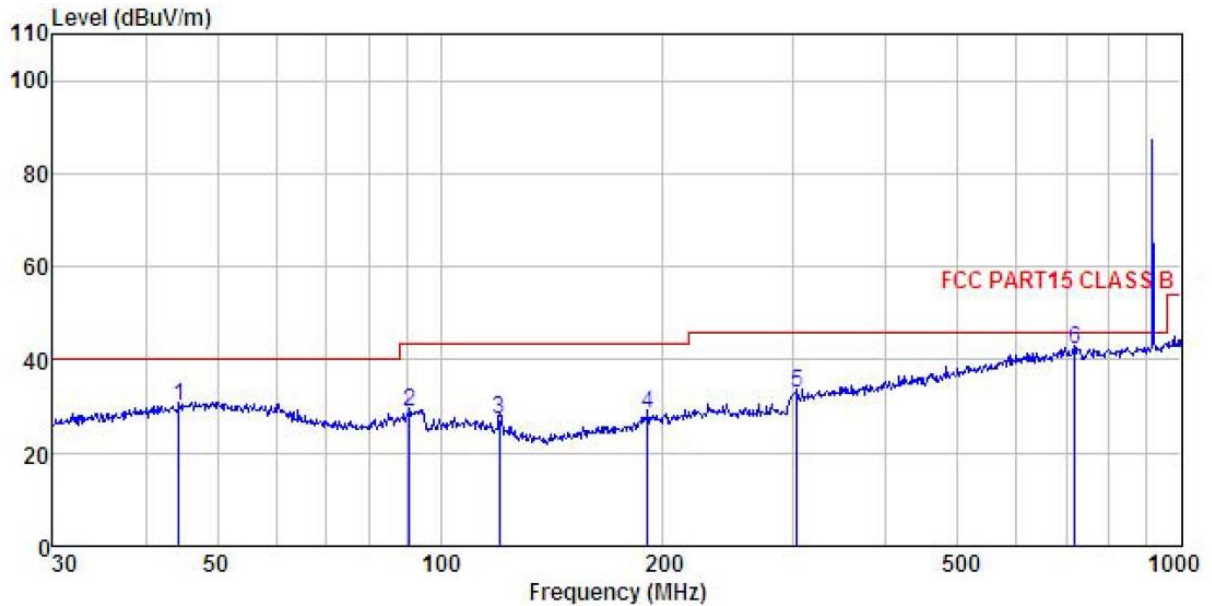
6.9.2 Radiated Emission Method

| | | | | | |
|-----------------------|--|--------------------|--------|------------------|------------------|
| Test Requirement: | FCC Part 15 C Section 15.209 | | | | |
| Test Method: | ANSI C63.10: 2013 | | | | |
| Test Frequency Range: | 9 kHz to 25 GHz | | | | |
| Test Distance: | 3m | | | | |
| Receiver setup: | Frequency | Detector | RBW | VBW | Remark |
| | 30MHz-1GHz | Quasi-peak | 120kHz | 300kHz | Quasi-peak Value |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak Value |
| | | RMS | 1MHz | 3MHz | Average Value |
| Limit: | Frequency | Limit (dBuV/m @3m) | | Remark | |
| | 30MHz-88MHz | 40.0 | | Quasi-peak Value | |
| | 88MHz-216MHz | 43.5 | | Quasi-peak Value | |
| | 216MHz-960MHz | 46.0 | | Quasi-peak Value | |
| | 960MHz-1GHz | 54.0 | | Quasi-peak Value | |
| | Above 1GHz | 54.0 | | Average Value | |
| | | 74.0 | | Peak Value | |
| Test setup: | Below 1GHz | | | | |
| | | | | | |
| | Above 1GHz | | | | |
| | | | | | |
| Test Procedure: | 1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the ground at a 3 meter chamber. The table | | | | |

| | |
|-------------------|---|
| | <p>was rotated 360 degrees to determine the position of the highest radiation.</p> <ol style="list-style-type: none"> 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| Test Instruments: | Refer to section 5.8 for details |
| Test mode: | Non-hopping mode |
| Test results: | Pass |
| Remark: | <ol style="list-style-type: none"> 1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 2. 9 kHz to 30 MHz is noise floor, so only shows the data of above 30MHz in this report. |

**Measurement Data (worst case):
Below 1GHz:**

Test Polarization: Vertical



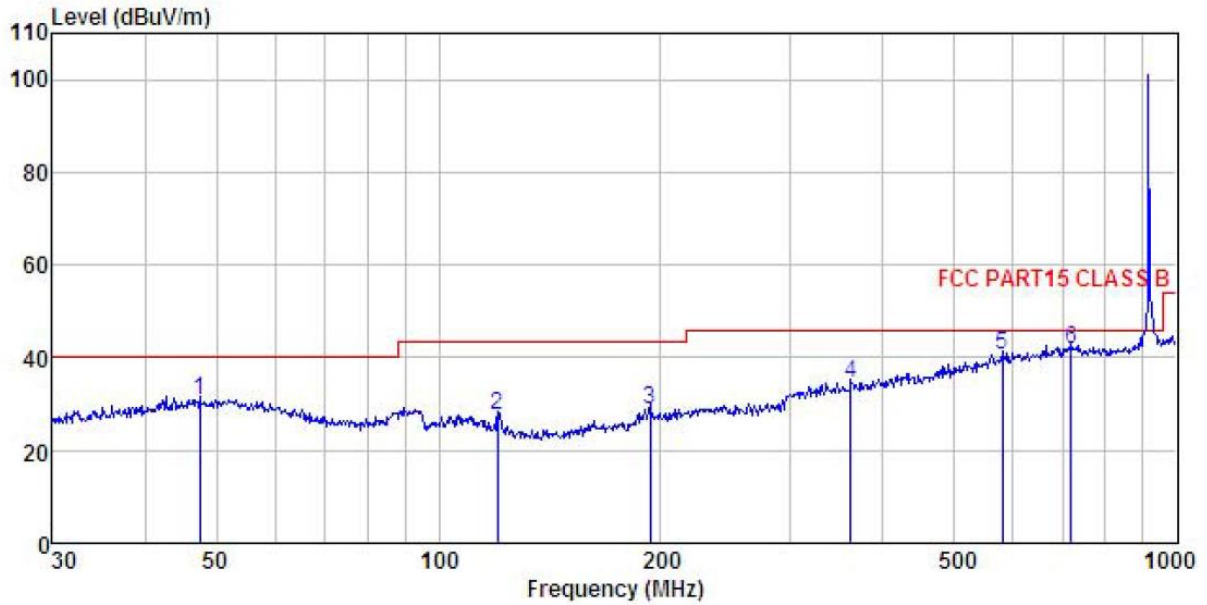
Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) VERTICAL
 EUT : CAR ALARM
 Model : 185SP
 Test mode : TX mode
 Power Rating : DC 3V
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: YT
 Remark :

| | Read | Antenna | Cable | Preamp | Limit | Over | |
|------|---------|---------|-------|--------|--------|--------|-----------------|
| Freq | Level | Factor | Loss | Factor | Line | Limit | Remark |
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB |
| 1 | 44.431 | 15.12 | 13.60 | 1.28 | 0.00 | 30.00 | 40.00 -10.00 QP |
| 2 | 90.855 | 16.46 | 10.15 | 2.03 | 0.00 | 28.64 | 43.50 -14.86 QP |
| 3 | 120.277 | 15.04 | 10.16 | 2.17 | 0.00 | 27.37 | 43.50 -16.13 QP |
| 4 | 190.405 | 14.33 | 11.21 | 2.80 | 0.00 | 28.34 | 43.50 -15.16 QP |
| 5 | 303.544 | 16.20 | 13.68 | 2.95 | 0.00 | 32.83 | 46.00 -13.17 QP |
| 6 | 719.200 | 17.65 | 20.27 | 4.25 | 0.00 | 42.17 | 46.00 -3.83 QP |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamp Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Test Polarization: Horizontal



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VULB9163(30M2G) HORIZONTAL
 EUT : CAR ALARM
 Model : 185SP
 Test mode : TX mode
 Power Rating : DC 3W
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: YT
 Remark :

| | Read | Antenna | Cable | Preamp | Limit | Over | | |
|------|---------|---------|-------|--------|--------|--------|--------|-----------|
| Freq | Level | Factor | Loss | Factor | Line | Limit | Remark | |
| MHz | dBuV | dB/m | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 47.492 | 15.63 | 13.90 | 1.27 | 0.00 | 30.80 | 40.00 | -9.20 QP |
| 2 | 120.277 | 15.11 | 10.16 | 2.17 | 0.00 | 27.44 | 43.50 | -16.06 QP |
| 3 | 193.095 | 14.86 | 11.29 | 2.82 | 0.00 | 28.97 | 43.50 | -14.53 QP |
| 4 | 361.714 | 16.58 | 14.82 | 3.10 | 0.00 | 34.50 | 46.00 | -11.50 QP |
| 5 | 580.703 | 17.78 | 18.75 | 3.92 | 0.00 | 40.45 | 46.00 | -5.55 QP |
| 6 | 719.200 | 17.48 | 20.27 | 4.25 | 0.00 | 42.00 | 46.00 | -4.00 QP |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss - Pre-amplifier Factor.
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Above 1GHz

| LOW CHANNEL | | | | | | | | | |
|-----------------|-------------------|-----------------------|-----------------|----------------|--------------------|----------------|---------------------|-----------------|--------------|
| Peak value | | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | AUX Factor(dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 1810.80 | 48.40 | 25.98 | 4.12 | 2.37 | 41.22 | 39.65 | 74.00 | -34.35 | Vertical |
| 2716.20 | 52.09 | 28.07 | 5.06 | 2.87 | 41.75 | 46.34 | 74.00 | -27.66 | Vertical |
| 3621.60 | 48.97 | 29.23 | 5.91 | 2.97 | 41.57 | 45.51 | 74.00 | -28.49 | Vertical |
| 4527.00 | 45.74 | 31.15 | 6.82 | 3.54 | 42.07 | 45.18 | 74.00 | -28.82 | Vertical |
| 5432.40 | 46.58 | 32.34 | 7.16 | 3.89 | 41.85 | 48.12 | 74.00 | -25.88 | Vertical |
| 6337.80 | 47.40 | 34.12 | 8.19 | 4.63 | 41.94 | 52.40 | 74.00 | -21.60 | Vertical |
| 1810.80 | 60.36 | 25.95 | 4.12 | 2.37 | 41.22 | 51.58 | 74.00 | -22.42 | Horizontal |
| 2716.20 | 54.71 | 28.06 | 5.05 | 2.87 | 41.76 | 48.93 | 74.00 | -25.07 | Horizontal |
| 3621.60 | 56.23 | 29.24 | 5.92 | 2.97 | 41.58 | 52.78 | 74.00 | -21.22 | Horizontal |
| 4527.00 | 46.27 | 31.15 | 6.82 | 3.54 | 42.07 | 45.71 | 74.00 | -28.29 | Horizontal |
| 5432.40 | 46.82 | 32.34 | 7.16 | 3.89 | 41.85 | 48.36 | 74.00 | -25.64 | Horizontal |
| 6337.80 | 46.79 | 34.12 | 8.19 | 4.63 | 41.94 | 51.79 | 74.00 | -22.21 | Horizontal |
| Averagevalue | | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | AUX Factor(dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
| 1810.80 | 47.14 | 25.98 | 4.12 | 2.37 | 41.22 | 38.39 | 54.00 | -15.61 | Vertical |
| 2716.20 | 50.71 | 28.07 | 5.06 | 2.87 | 41.75 | 44.96 | 54.00 | -9.04 | Vertical |
| 3621.60 | 46.23 | 29.23 | 5.91 | 2.97 | 41.57 | 42.77 | 54.00 | -11.23 | Vertical |
| 4527.00 | 13.37 | 31.15 | 6.82 | 3.54 | 42.07 | 12.81 | 54.00 | -41.19 | Vertical |
| 5432.40 | 44.74 | 32.34 | 7.16 | 3.89 | 41.85 | 46.28 | 54.00 | -7.72 | Vertical |
| 6337.80 | 45.27 | 34.12 | 8.19 | 4.63 | 41.94 | 50.27 | 54.00 | -3.73 | Vertical |
| 1810.80 | 58.21 | 25.95 | 4.12 | 2.37 | 41.22 | 49.43 | 54.00 | -4.57 | Horizontal |
| 2716.20 | 52.73 | 28.06 | 5.05 | 2.87 | 41.76 | 46.95 | 54.00 | -7.05 | Horizontal |
| 3621.60 | 54.78 | 29.24 | 5.92 | 2.97 | 41.58 | 51.33 | 54.00 | -2.67 | Horizontal |
| 4527.00 | 44.78 | 31.15 | 6.82 | 3.54 | 42.07 | 44.22 | 54.00 | -9.78 | Horizontal |
| 5432.40 | 43.17 | 32.34 | 7.16 | 3.89 | 41.85 | 44.71 | 54.00 | -9.29 | Horizontal |
| 6337.80 | 44.74 | 34.12 | 8.19 | 4.63 | 41.94 | 49.74 | 54.00 | -4.26 | Horizontal |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

| MID CHANNEL | | | | | | | | | |
|-----------------|-------------------|-----------------------|-----------------|-----------------|--------------------|-----------------|----------------------|-----------------|--------------|
| Peak value | | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | AUX Factor(dB) | Preamp Factor (dB) | Level (dBuV/ m) | Limit Line (dBuV/ m) | Over Limit (dB) | Polarization |
| 1830.00 | 47.73 | 26.02 | 4.15 | 2.40 | 41.27 | 39.03 | 74.00 | -34.97 | Vertical |
| 2745.00 | 51.23 | 28.12 | 5.08 | 2.88 | 41.72 | 45.59 | 74.00 | -28.41 | Vertical |
| 3660.00 | 49.96 | 29.34 | 5.95 | 2.97 | 41.62 | 46.60 | 74.00 | -27.40 | Vertical |
| 4575.00 | 46.51 | 31.22 | 6.87 | 3.47 | 46.04 | 42.03 | 74.00 | -31.97 | Vertical |
| 5490.00 | 45.63 | 32.40 | 7.22 | 3.92 | 41.83 | 47.34 | 74.00 | -26.66 | Vertical |
| 6405.00 | 47.25 | 34.27 | 8.23 | 4.76 | 41.92 | 52.59 | 74.00 | -21.41 | Vertical |
| 1830.00 | 57.22 | 26.02 | 4.15 | 2.40 | 41.27 | 48.52 | 74.00 | -25.48 | Horizontal |
| 2745.00 | 51.80 | 28.12 | 5.08 | 2.88 | 41.72 | 46.16 | 74.00 | -27.84 | Horizontal |
| 3660.00 | 56.30 | 29.34 | 5.95 | 2.97 | 41.62 | 52.94 | 74.00 | -21.06 | Horizontal |
| 4575.00 | 46.31 | 31.22 | 6.87 | 3.47 | 46.04 | 41.83 | 74.00 | -32.17 | Horizontal |
| 5490.00 | 45.84 | 32.40 | 7.22 | 3.92 | 41.83 | 47.55 | 74.00 | -26.45 | Horizontal |
| 6405.00 | 45.88 | 34.27 | 8.23 | 4.76 | 41.92 | 51.22 | 74.00 | -22.78 | Horizontal |
| Averagevalue | | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | AUX Factor(dB) | Preamp Factor (dB) | Level (dBuV/ m) | Limit Line (dBuV/ m) | Over Limit (dB) | Polarization |
| 1830.00 | 45.67 | 26.02 | 4.15 | 2.40 | 41.27 | 36.97 | 54.00 | -17.03 | Vertical |
| 2745.00 | 49.37 | 28.12 | 5.08 | 2.88 | 41.72 | 43.73 | 54.00 | -10.27 | Vertical |
| 3660.00 | 47.65 | 29.34 | 5.95 | 2.97 | 41.62 | 44.29 | 54.00 | -9.71 | Vertical |
| 4575.00 | 44.39 | 31.22 | 6.87 | 3.47 | 46.04 | 39.91 | 54.00 | -14.09 | Vertical |
| 5490.00 | 43.38 | 32.40 | 7.22 | 3.92 | 41.83 | 45.09 | 54.00 | -8.91 | Vertical |
| 6405.00 | 45.78 | 34.27 | 8.23 | 4.76 | 41.92 | 51.12 | 54.00 | -2.88 | Vertical |
| 1830.00 | 55.73 | 26.02 | 4.15 | 2.40 | 41.27 | 47.03 | 54.00 | -6.97 | Horizontal |
| 2745.00 | 48.66 | 28.12 | 5.08 | 2.88 | 41.72 | 43.02 | 54.00 | -10.98 | Horizontal |
| 3660.00 | 54.39 | 29.34 | 5.95 | 2.97 | 41.62 | 51.03 | 54.00 | -2.97 | Horizontal |
| 4575.00 | 44.18 | 31.22 | 6.87 | 3.47 | 46.04 | 39.70 | 54.00 | -14.30 | Horizontal |
| 5490.00 | 44.17 | 32.40 | 7.22 | 3.92 | 41.83 | 45.88 | 54.00 | -8.12 | Horizontal |
| 6405.00 | 43.17 | 34.27 | 8.23 | 4.76 | 41.92 | 48.51 | 54.00 | -5.49 | Horizontal |

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

| HIG CHANNEL | | | | | | | | | |
|-----------------|-------------------|-----------------------|-----------------|-----------------|--------------------|-----------------|----------------------|-----------------|--------------|
| Peak value | | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | AUX Factor(dB) | Preamp Factor (dB) | Level (dBuV/ m) | Limit Line (dBuV/ m) | Over Limit (dB) | Polarization |
| 1849.20 | 48.49 | 26.07 | 4.17 | 2.41 | 41.32 | 39.82 | 74.00 | -34.18 | Vertical |
| 2773.80 | 50.66 | 28.17 | 5.11 | 2.88 | 41.69 | 45.13 | 74.00 | -28.87 | Vertical |
| 3698.40 | 46.50 | 29.43 | 5.98 | 2.97 | 43.23 | 41.65 | 74.00 | -32.35 | Vertical |
| 4623.00 | 46.28 | 31.31 | 6.89 | 3.57 | 42.10 | 45.95 | 74.00 | -28.05 | Vertical |
| 5547.60 | 46.41 | 32.48 | 7.24 | 3.91 | 41.81 | 48.23 | 74.00 | -25.77 | Vertical |
| 6472.20 | 45.77 | 34.44 | 8.28 | 4.76 | 41.90 | 51.35 | 74.00 | -22.65 | Vertical |
| 1849.20 | 54.22 | 26.07 | 4.17 | 2.41 | 41.32 | 45.55 | 74.00 | -28.45 | Horizontal |
| 2773.80 | 55.04 | 28.17 | 5.11 | 2.88 | 41.69 | 49.51 | 74.00 | -24.49 | Horizontal |
| 3698.40 | 52.20 | 29.43 | 5.98 | 2.97 | 41.66 | 48.92 | 74.00 | -25.08 | Horizontal |
| 4623.00 | 46.51 | 31.31 | 6.89 | 3.57 | 42.10 | 46.18 | 74.00 | -27.82 | Horizontal |
| 5547.60 | 46.01 | 32.48 | 7.24 | 3.91 | 41.81 | 47.83 | 74.00 | -26.17 | Horizontal |
| 6472.20 | 46.02 | 34.44 | 8.28 | 4.76 | 41.90 | 51.60 | 74.00 | -22.40 | Horizontal |
| Averagevalue | | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | AUX Factor(dB) | Preamp Factor (dB) | Level (dBuV/ m) | Limit Line (dBuV/ m) | Over Limit (dB) | Polarization |
| 1849.20 | 46.25 | 26.07 | 4.17 | 2.41 | 41.32 | 37.58 | 54.00 | -16.42 | Vertical |
| 2773.80 | 49.62 | 28.17 | 5.11 | 2.88 | 41.69 | 44.09 | 54.00 | -9.91 | Vertical |
| 3698.40 | 44.17 | 29.43 | 5.98 | 2.97 | 43.23 | 39.32 | 54.00 | -14.68 | Vertical |
| 4623.00 | 44.57 | 31.31 | 6.89 | 3.57 | 42.10 | 44.24 | 54.00 | -9.76 | Vertical |
| 5547.60 | 44.58 | 32.48 | 7.24 | 3.91 | 41.81 | 46.40 | 54.00 | -7.60 | Vertical |
| 6472.20 | 42.39 | 34.44 | 8.28 | 4.76 | 41.90 | 47.97 | 54.00 | -6.03 | Vertical |
| 1849.20 | 52.24 | 26.07 | 4.17 | 2.41 | 41.32 | 43.57 | 54.00 | -10.43 | Horizontal |
| 2773.80 | 52.89 | 28.17 | 5.11 | 2.88 | 41.69 | 47.36 | 54.00 | -6.64 | Horizontal |
| 3698.40 | 51.47 | 29.43 | 5.98 | 2.97 | 41.66 | 48.19 | 54.00 | -5.81 | Horizontal |
| 4623.00 | 44.88 | 31.31 | 6.89 | 3.57 | 42.10 | 44.55 | 54.00 | -9.45 | Horizontal |
| 5547.60 | 44.85 | 32.48 | 7.24 | 3.91 | 41.81 | 46.67 | 54.00 | -7.33 | Horizontal |
| 6472.20 | 43.17 | 34.44 | 8.28 | 4.76 | 41.90 | 48.75 | 54.00 | -5.25 | Horizontal |

Remark:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.