REPORT No. : SZ16060158W03

# FCC RF TEST REPORT

| | | |
|---|---|---|
| **APPLICANT** | : | Nomura Engineering Co., Ltd. |
| **PRODUCT NAME** | : | Radio Module |
| **MODEL NAME** | : | TS02FE-F |
| **TRADE NAME** | : | N/A |
| **BRAND NAME** | : | N/A |
| **FCC ID** | : | 2AIXL-TS02FE |
| **STANDARD(S)** | : | 47 CFR Part 15 Subpart C |
| **ISSUE DATE** | : | 2016-09-08 |

**SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.**



**MORLAB GROUP**
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555 Http://www.morlab.com
Fax: 86-755-36698525 E-mail: service@morlab.cn

# DIRECTORY

| Change History | | |
|---|---|---|
| Issue | Date | Reason for change |
| 1.0 | 2016-09-08 | First edition |
| | | |

# TEST REPORT DECLARATION

| | |
|---|---|
| Applicant | Nomura Engineering Co., Ltd. |
| Applicant Address | 1-7-2 Shibuya, Yamato City, Kanagawa, 242-0023 Japan |
| Manufacturer | Nomura Engineering Co., Ltd. |
| Manufacturer Address | 1-7-2 Shibuya, Yamato City, Kanagawa, 242-0023 Japan |
| Product Name | Radio Module |
| Model Name | TS02FE-F |
| Brand Name | N/A |
| HW Version | P5-3 |
| SW Version | 0040 |
| Test Standards | 47 CFR Part 15 Subpart C |
| Test Date | 2016-08-08 to 2016-09-07 |
| Test Result | PASS |

Tested by : Zou Jian

Zou Jian

Reviewed by : Qiu Xiaojun

Qiu Xiaojun

Approved by : Peng Huarui

Peng Huarui

# 1. TECHNICAL INFORMATION

Note: Provide by applicant.

## 1.1 Applicant Information

| | |
|---|---|
| Company: | Nomura Engineering Co., Ltd. |
| Address: | 1-7-2 Shibuya, Yamato City, Kanagawa, 242-0023 Japan |

## 1.2 Equipment under Test (EUT) Description

| | |
|---|---|
| Brand Name: | N/A |
| Trade Name: | N/A |
| Model Name: | TS02FE-F |
| Frequency Range: | The frequency used is 434.05MHz -434.5375MHz |
| Modulation Type: | FSK |
| Transmitter Bandwidth: | 12.5KHz |
| Antenna Type: | λ/4 antenna |
| Antenna Gain: | 2.14dBi |

**NOTE:**

The EUT is a Radio Module and the frequencies allocated for the Radio Module is F(MHz)=434.05+0.0125*(n-1) (1<=n<=40). The lowest, middle, highest channel numbers of the Bluetooth Module used and tested in this report are separately 1 (434.05MHz), 20 (434.2875MHz) and 40 (434.5375MHz).

For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

### 1.2.1 Identification of all used EUTs

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

| EUT Identity | Hardware Version | Software Version |
|---|---|---|
| A01 | P5-3 | 0040 |

## 1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C for the EUT FCC ID Certification:

| No. | Identity | Document Title |
|---|---|---|
| 1 | 47 CFR Part 15(10-1-13 Edition) | Radio Frequency Devices |

Test detailed items/section required by FCC rules and results are as below:

| No. | Section | Description | Result |
|---|---|---|---|
| 1 | 15.203 | Antenna Requirement | **PASS** |
| 2 | 15.231(a)(1) | Release Time measurement | **PASS** |
| 3 | 15.231(c) | 20dB Bandwidth | **PASS** |
| 4 | 15.207 | Conducted Emission | **PASS** |
| 5 | 15.231(b)&15.209(a) | Radiated Emission | **PASS** |

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013.

### 1.3.1 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

| | |
|---|---|
| Temperature (°C): | 15 - 35 |
| Relative Humidity (%): | 30 -60 |
| Atmospheric Pressure (kPa): | 86-106 |

# 2. 47 CFR PART 15C REQUIREMENTS

## 2.1 Antenna requirement

### 2.1.1 Applicable Standard

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

### 2.1.2 **Result:** Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

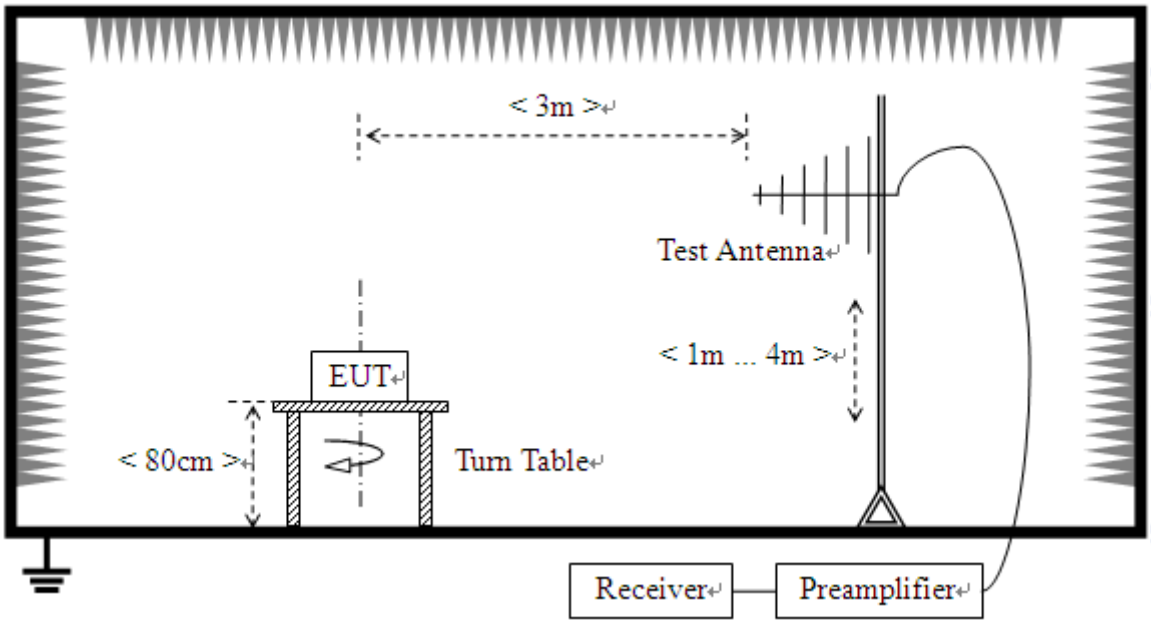
## 2.2 Release Time measurement

### 2.2.1 Requirement

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### 2.2.2 Test Description

**A. Test Setup:**



**B. Test procedure:**

Set SPA Center Frequency=Fundamental frequency, RBW=1MHz, VBW=3MHz, Span=0Hz, Sweep time=10s.

Set EUT as normal operation and press Transmitter button.

Set SPA View. Delta Mark time.

**C. Equipments List:**

Please reference ANNEX A(1.5).

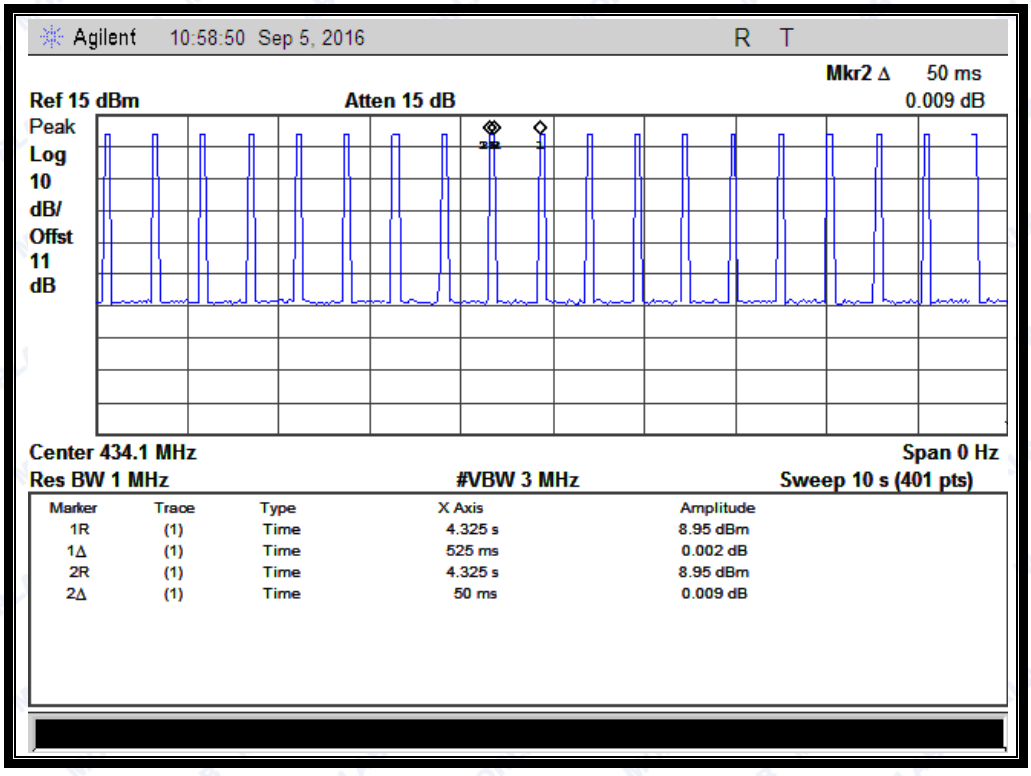
### 2.2.3 Test Result

The lowest, middle and highest channels are selected to perform testing to verify the radiated release time measurement of the Module.

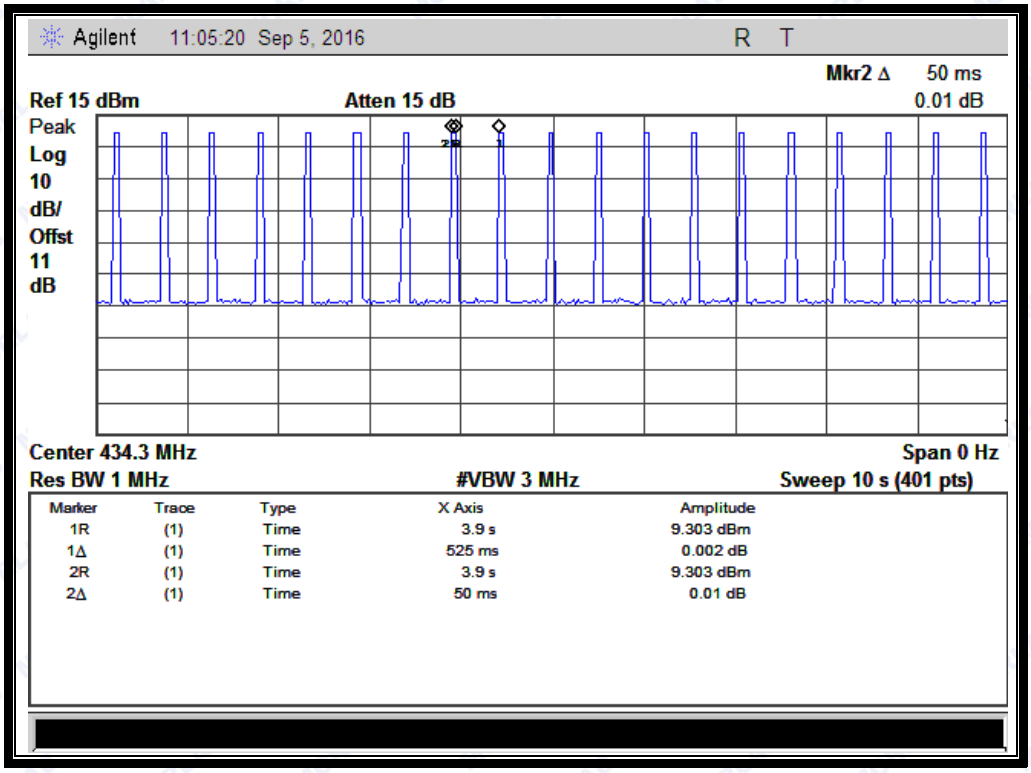
**A. Test Verdict:**

| Channel | Frequency (MHz) | Release Time | Limit | Verdict |
|---|---|---|---|---|
| 1 | 434.05 | 50ms | 5S | PASS |
| 20 | 434.2875 | 50ms | 5S | PASS |
| 40 | 434.5875 | 50ms | 5S | PASS |

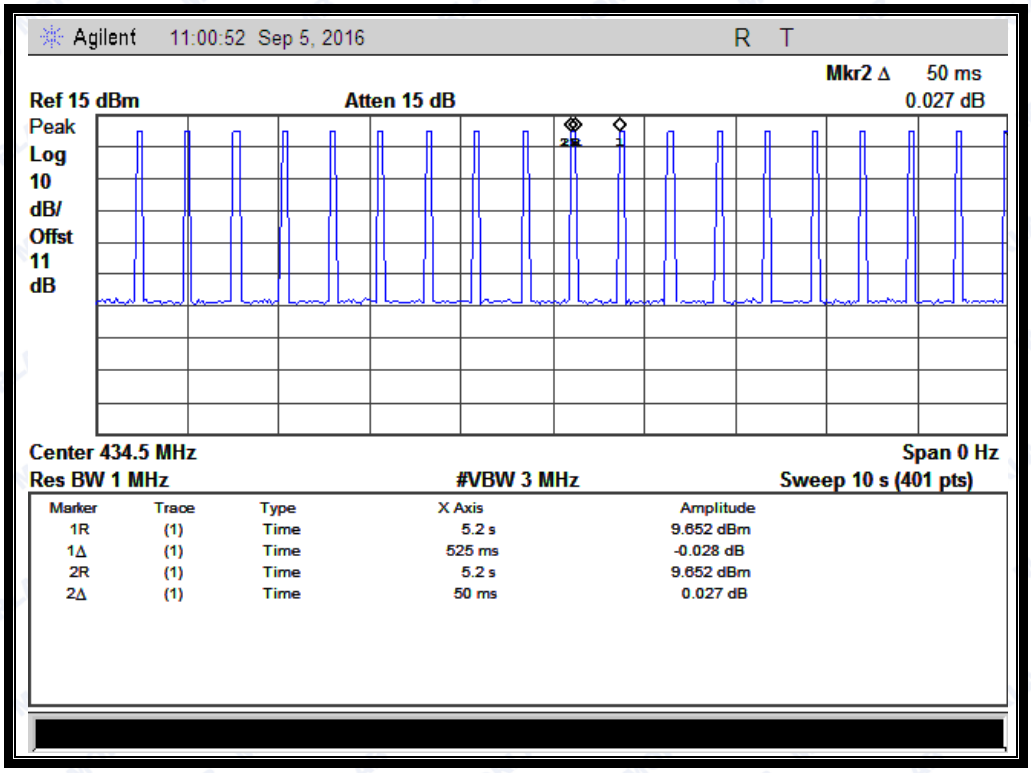
**B. Test Plots:**




(Channel 1 434.05MHz)




(Channel 20 434.2875MHz)




(Channel 40 434.5875MHz)

## 2.3 20dB Bandwidth

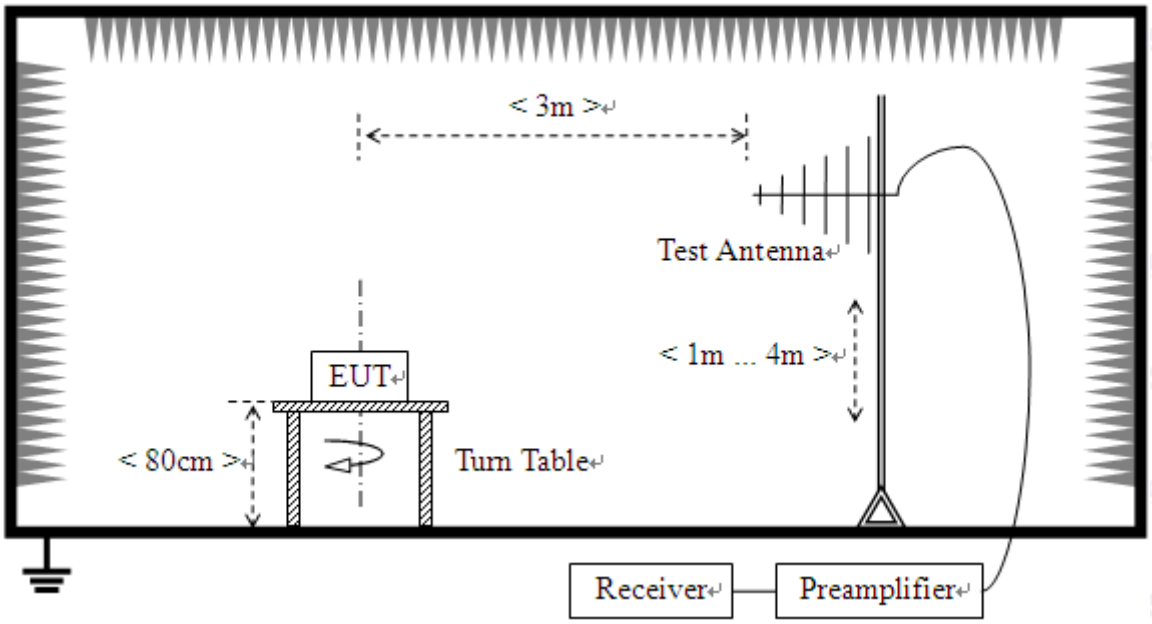
### 2.3.1 Requirement

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

As the Lowest, Middle, Highest frequency for the device operating is 434.05MHz, 434.2875MHz, 434.5375MHz, thus, the 20dB bandwidth limit is 1085.125KHz, 1085.719KHz, 1086.344KHz.

### 2.3.2 Test Description

**A. Test Set:**




**B. Test procedure:**

Set spectrum analyzer's Center Frequency =Fundamental frequency, RBW,VBW and span to applicable value with Peak in Max Hold, A PEAK output reading and 20db Bandwidth function in spectrum analyzer were taken.

**C. Equipments List:**

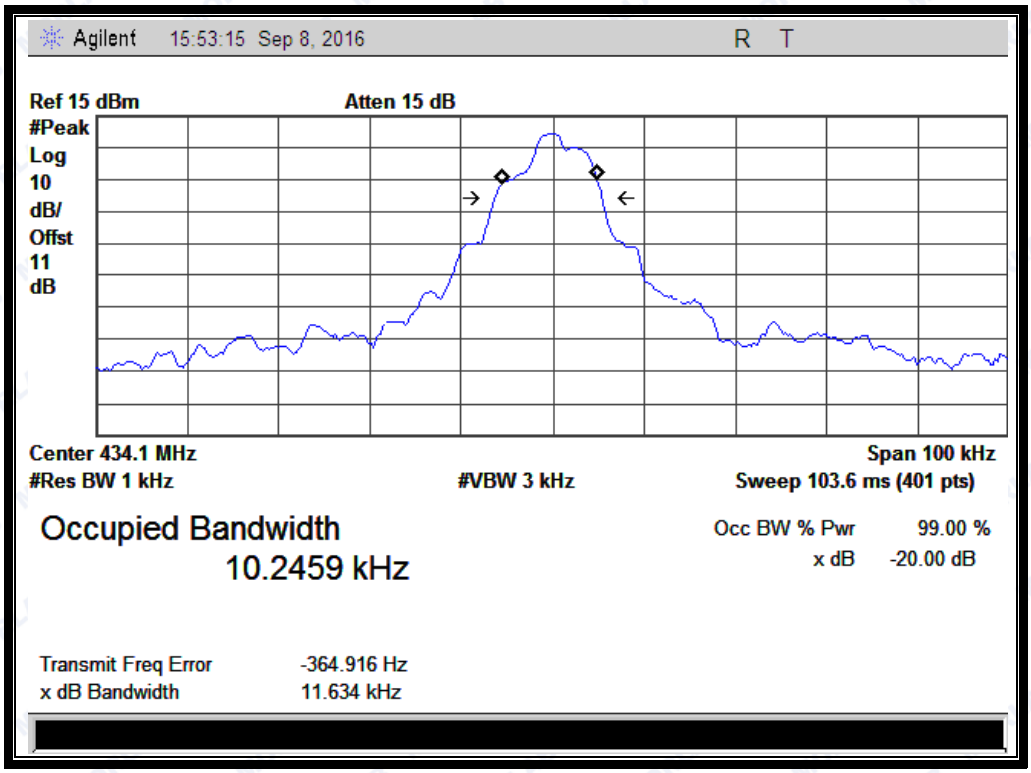
Please reference ANNEX A(1.5).

### 2.3.3 Test Result

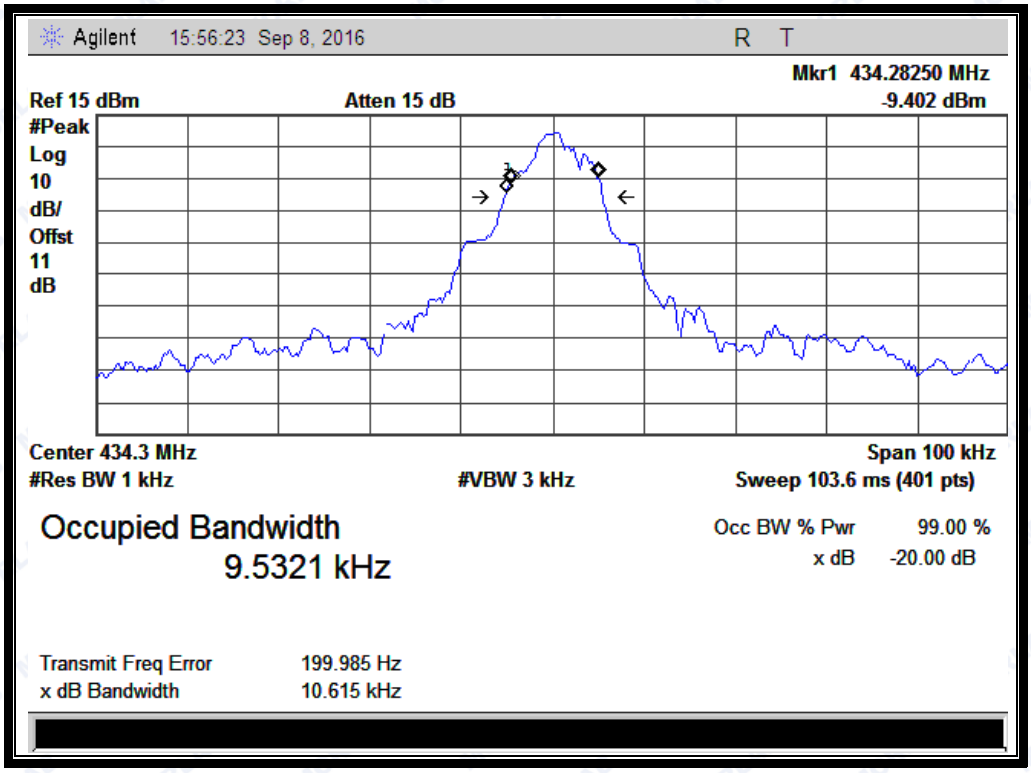
**A. Test Verdict:**

| Channel | Frequency (MHz) | 20dB Bandwidth (KHz) | Limits(kHz) | Result |
|---|---|---|---|---|
| 1 | 434.05 | 11.634 | 1085.125 | PASS |
| 20 | 434.2875 | 10.615 | 1085.719 | PASS |
| 40 | 434.5375 | 11.331 | 1086.344 | PASS |

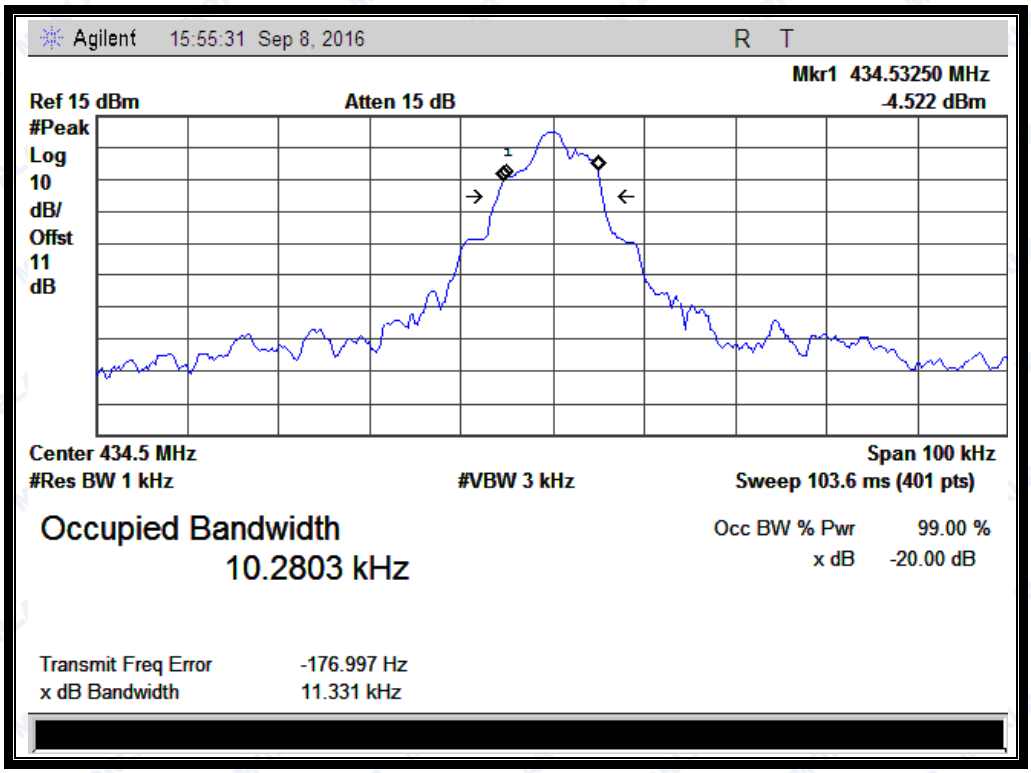
**B. Test Plots:**




(Channel 1 434.05MHz)




(Channel 20 434.2875MHz)




(Channel 40 434.5375MHz)

## 2.4 Conducted Emission

### 2.4.1 Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

| Frequency range (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quai-peak | Average |
| 0.15 - 0.50 | 66 to 56 | 56 to 46 |
| 0.50 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

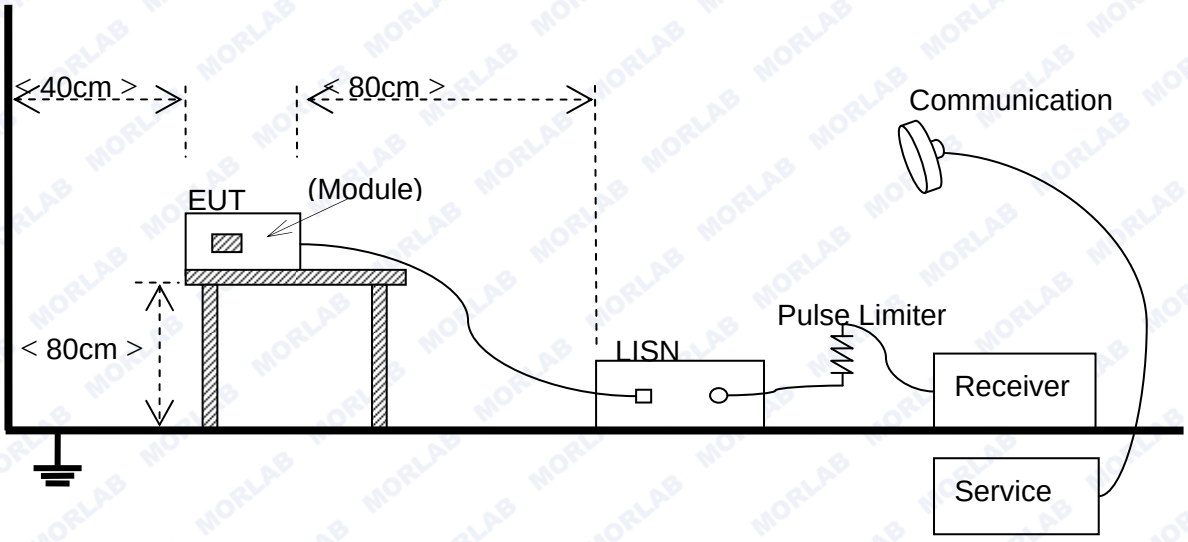
NOTE:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

### 2.4.2 Test Description

**A. Test Setup:**




The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10:2013

**B. Equipments List:**

Please reference ANNEX A(1.5).

### 2.4.3 Test Result

This test case not applies this kind of EUT.

## 2.5 Radiated Emission

### 2.5.1 Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (μV/m) | Measurement Distance (m) |
|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 - 30.0 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

FCC Part 15.231(b)

| Fundamental frequency(MHz) | Field strength of fundamental (microvolts/meter) | Field strength of spurious emission(microvolts/meter) |
|---|---|---|
| 40.66-40.70 | 2250 | 225 |
| 70-130 | 1250 | 125 |
| 130-174 | 1250 to 3750 | 125 to 375 |
| 174-260 | 3750 | 375 |
| 260-470 | 3750 to 12500 | 375 to 1250 |
| Above 470 | 12500 | 1250 |

[1] Linear interpolations.

Note:

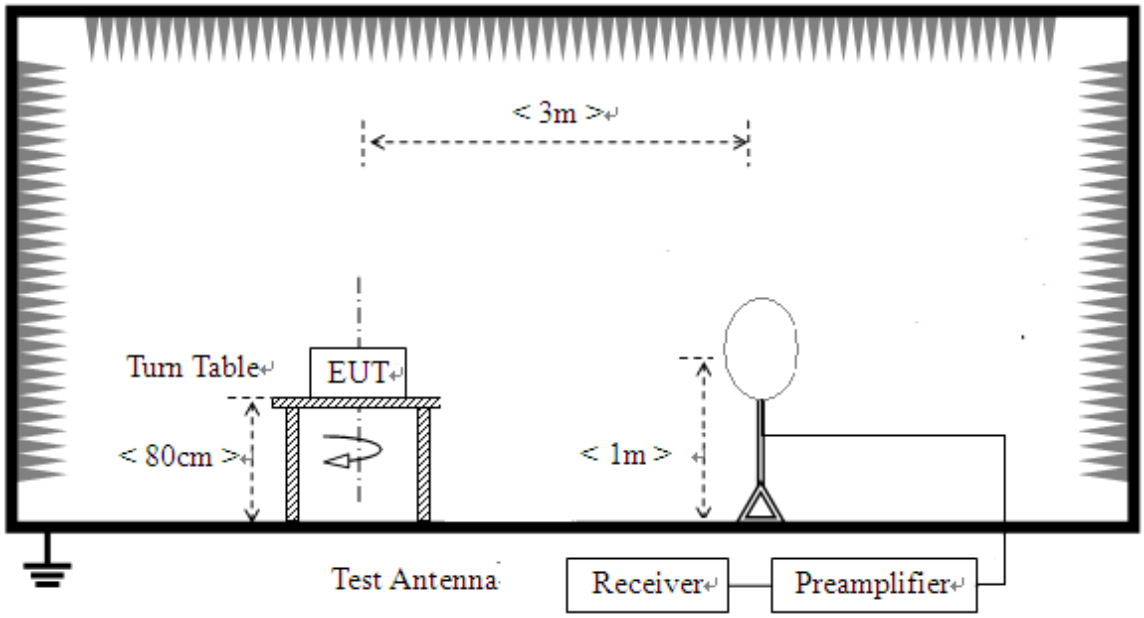
For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

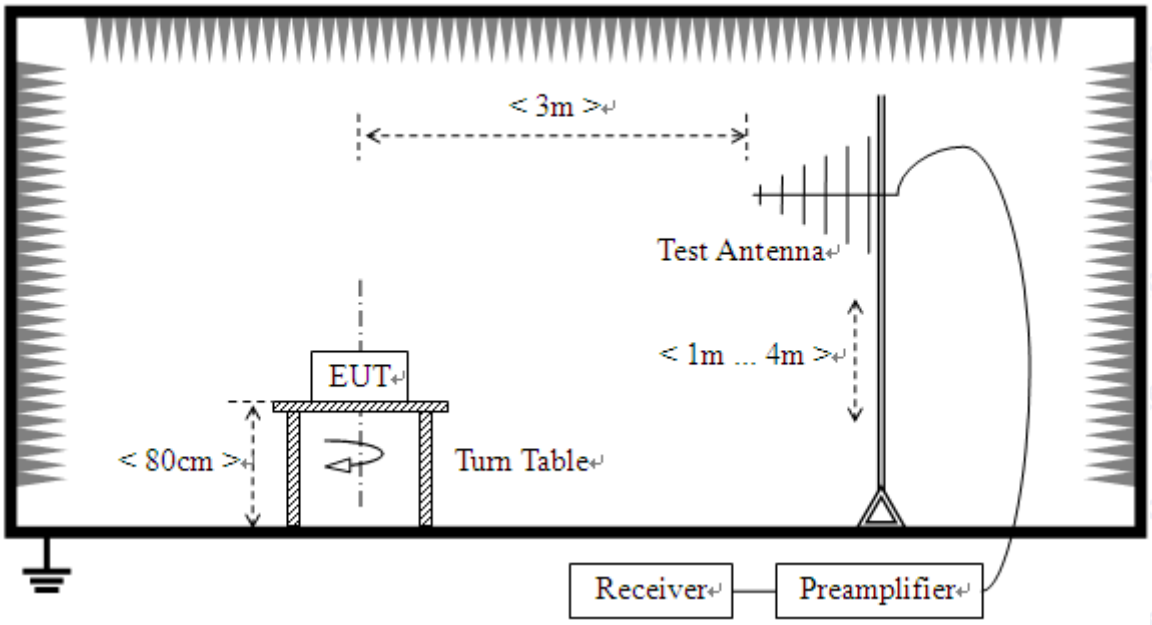
### 2.5.2 Test Description

**A. Test Setup:**

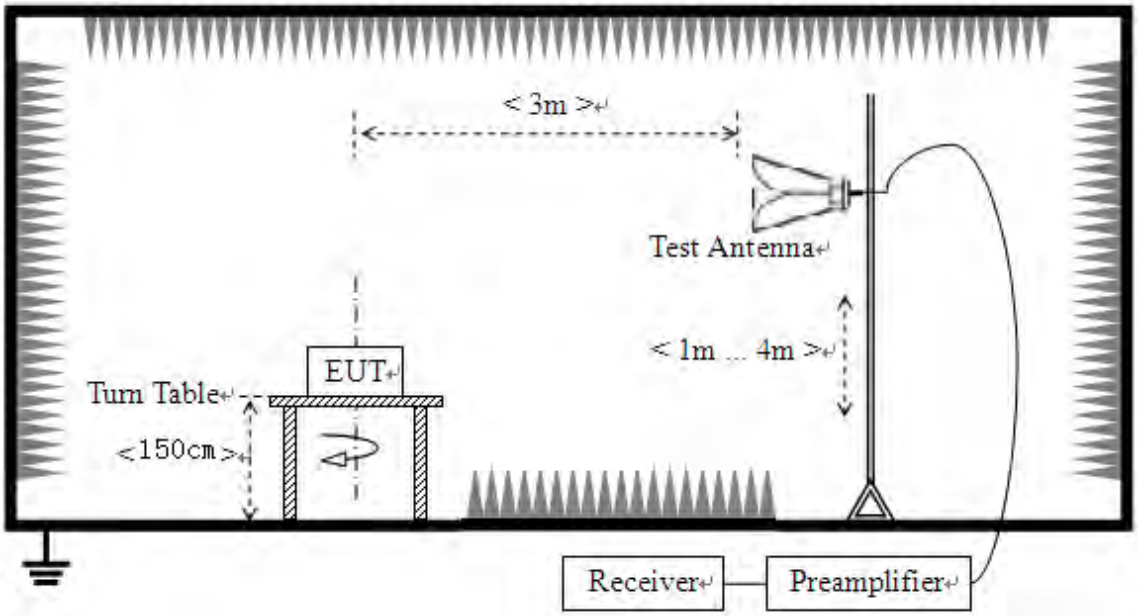
1) For radiated emissions from 9kHz to 30MHz




2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz




The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2013). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:
(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

**B. Equipments List:**
Please reference ANNEX A(1.5).

### 2.5.3 Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

$A_T$: Total correction Factor except Antenna

$U_R$: Receiver Reading

$G_{preamp}$: Preamplifier Gain

$A_{Factor}$: Antenna Factor at 3m

Final Emission_PK=E(peak)

Final Emission_AV=E+AV factor.

During the test, the total correction Factor $A_T$ and $A_{Factor}$ were built in test software.

**Note:** All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

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

**Field strength of fundamental，Verdict：Pass**

| Frequency (MHz) | PK $_{read}$ | Cable Loss | ANT $_{factor}$ (dB) | Final Emission_PK (dBuV/m) | AV factor (dB) | Final Emission_AV (dBuV/m) | Limit-AV (dBuV/m) |
|---|---|---|---|---|---|---|---|
| 434.05 | 107.439 | -35.4 | 16.1 | 88.14 | -20.42 | 67.72 | 80.83 |
| 434.2875 | 108.222 | -35.4 | 16.1 | 88.92 | -20.42 | 68.50 | 80.84 |
| 434.5375 | 109.088 | -35.4 | 16.1 | 89.79 | -20.42 | 69.37 | 80.85 |

**Field strength of spurious emission：**

**Channel 1: 434.05MHz**

| Frequency (MHz) | Final Emission_PK (dBuV/m) | AV factor(dB) | Final Emission_AV (dBuV/m) | Limit-AV (dBuV/m) | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 868.080 | 34.18 | -20.42 | 13.76 | 60.83 | Horizontal | PASS |
| 1302.400 | 43.66 | -20.42 | 23.24 | 60.83 | Horizontal | PASS |
| 1736.533 | 43.70 | -20.42 | 23.28 | 60.83 | Horizontal | PASS |
| 2170.667 | 46.96 | -20.42 | 26.54 | 60.83 | Horizontal | PASS |
| 3906.880 | 48.12 | -20.42 | 27.7 | 60.83 | Horizontal | PASS |
| 868.080 | 29.41 | -20.42 | 8.99 | 60.83 | Vertical | PASS |
| 1302.400 | 41.86 | -20.42 | 21.44 | 60.83 | Vertical | PASS |
| 1736.533 | 44.76 | -20.42 | 24.34 | 60.83 | Vertical | PASS |
| 3906.880 | 49.55 | -20.42 | 29.13 | 60.83 | Vertical | PASS |

**Channel 20: 434.2875MHz**

| Frequency (MHz) | Final Emission_PK (dBuV/m) | AV factor(dB) | Final Emission_AV (dBuV/m) | Limit-AV (dBuV/m) | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 869.050 | 36.04 | -20.42 | 15.62 | 60.84 | Horizontal | PASS |
| 1303.467 | 42.11 | -20.42 | 21.69 | 60.84 | Horizontal | PASS |
| 1737.600 | 44.64 | -20.42 | 24.22 | 60.84 | Horizontal | PASS |
| 2171.733 | 47.13 | -20.42 | 26.71 | 60.84 | Horizontal | PASS |
| 3909.440 | 46.88 | -20.42 | 26.46 | 60.84 | Horizontal | PASS |
| 869.050 | 28.30 | -20.42 | 7.88 | 60.84 | Vertical | PASS |
| 1303.467 | 42.01 | -20.42 | 21.59 | 60.84 | Vertical | PASS |
| 1737.600 | 43.97 | -20.42 | 23.55 | 60.84 | Vertical | PASS |
| 2171.733 | 47.12 | -20.42 | 26.7 | 60.84 | Vertical | PASS |
| 3908.160 | 46.02 | -20.42 | 25.6 | 60.84 | Vertical | PASS |

**Channel 40: 434.5375MHz**

| Frequency (MHz) | Final Emission_PK (dBuV/m) | AV factor(dB) | Final Emission_AV (dBuV/m) | Limit-AV (dBuV/m) | Antenna | Verdict |
|---|---|---|---|---|---|---|
| 869.050 | 36.04 | -20.42 | 15.62 | 60.85 | Horizontal | PASS |
| 1304.000 | 43.33 | -20.42 | 22.91 | 60.85 | Horizontal | PASS |
| 1738.667 | 44.54 | -20.42 | 24.12 | 60.85 | Horizontal | PASS |
| 2173.333 | 47.63 | -20.42 | 27.21 | 60.85 | Horizontal | PASS |
| 3912.000 | 47.98 | -20.42 | 27.56 | 60.85 | Horizontal | PASS |
| 869.050 | 28.35 | -20.42 | 7.93 | 60.85 | Vertical | PASS |
| 1304.000 | 43.44 | -20.42 | 23.02 | 60.85 | Vertical | PASS |
| 1738.667 | 45.56 | -20.42 | 25.14 | 60.85 | Vertical | PASS |
| 2173.333 | 44.68 | -20.42 | 24.26 | 60.85 | Vertical | PASS |
| 3910.720 | 50.70 | -20.42 | 30.28 | 60.85 | Vertical | PASS |

Note 1: The above table only shows the frequency which peak emission exceed the average limit. The peak data of other frequencies are all below the average limit(please refer to the test graph in following pages), so the average data of other frequencies are deems to fulfill the average limits and not reported.

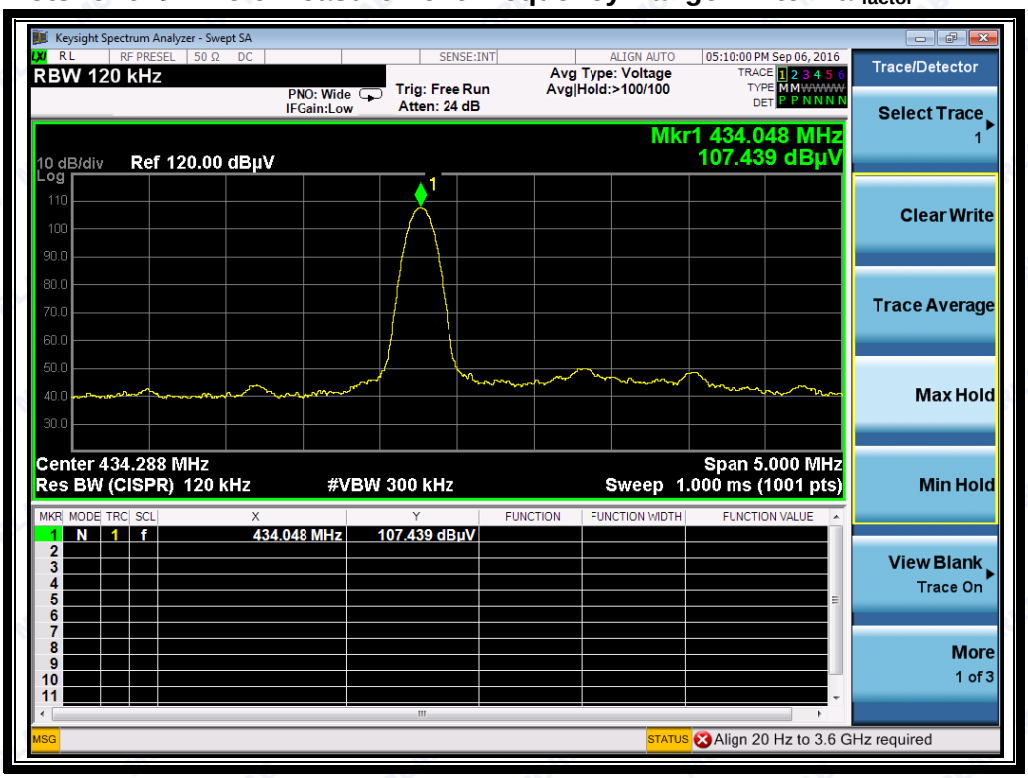
Note 2: The emission below 30MHz are not reported for they are much lower than the limits

Note 3: The duty cycle is simply the on-time divided by the period:

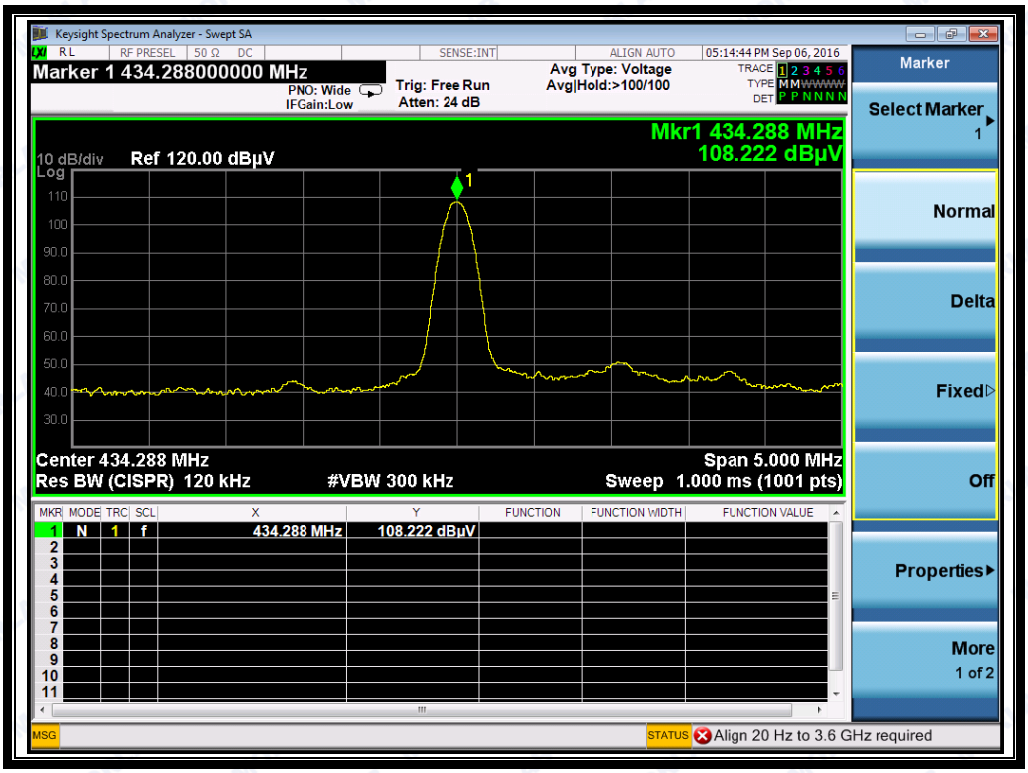
| | |
|---|---|
| The duration of one cycle | 0.525s |
| Effective period of the cycle | 0.05s |
| Duty cycle | 9.5 |

Therefore, the average factor is found by 20log(Duty cycle)=-20.42

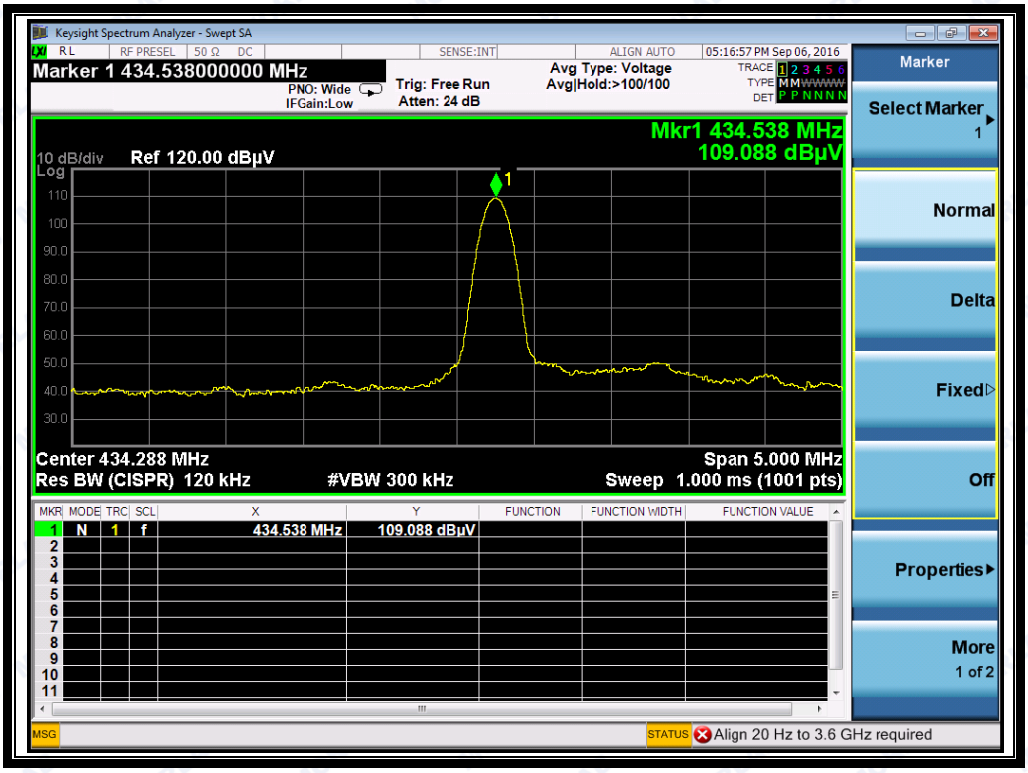
## A. Test Plots for the Whole Measurement Frequency Range: Antenna factor




(Permissible Field Strengths @Channel 1 434.05MHz)

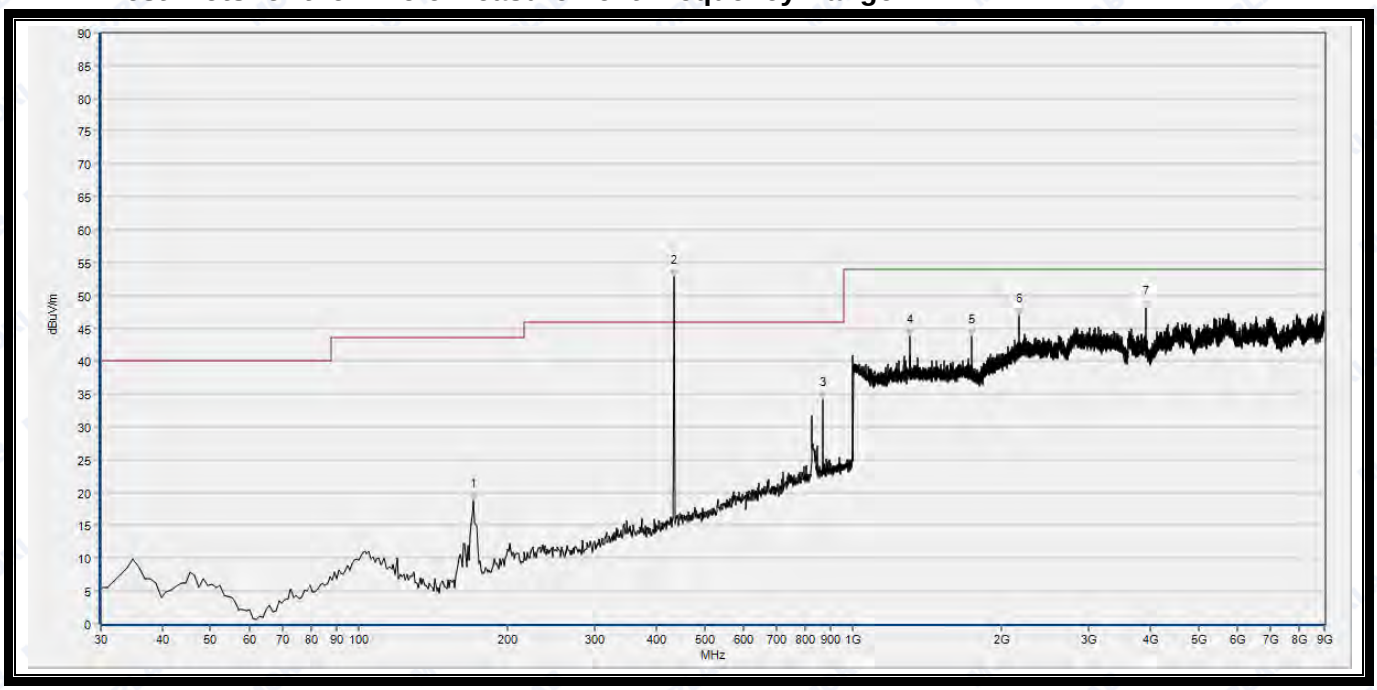



(Permissible Field Strengths @Channel 20 434.2875MHz)



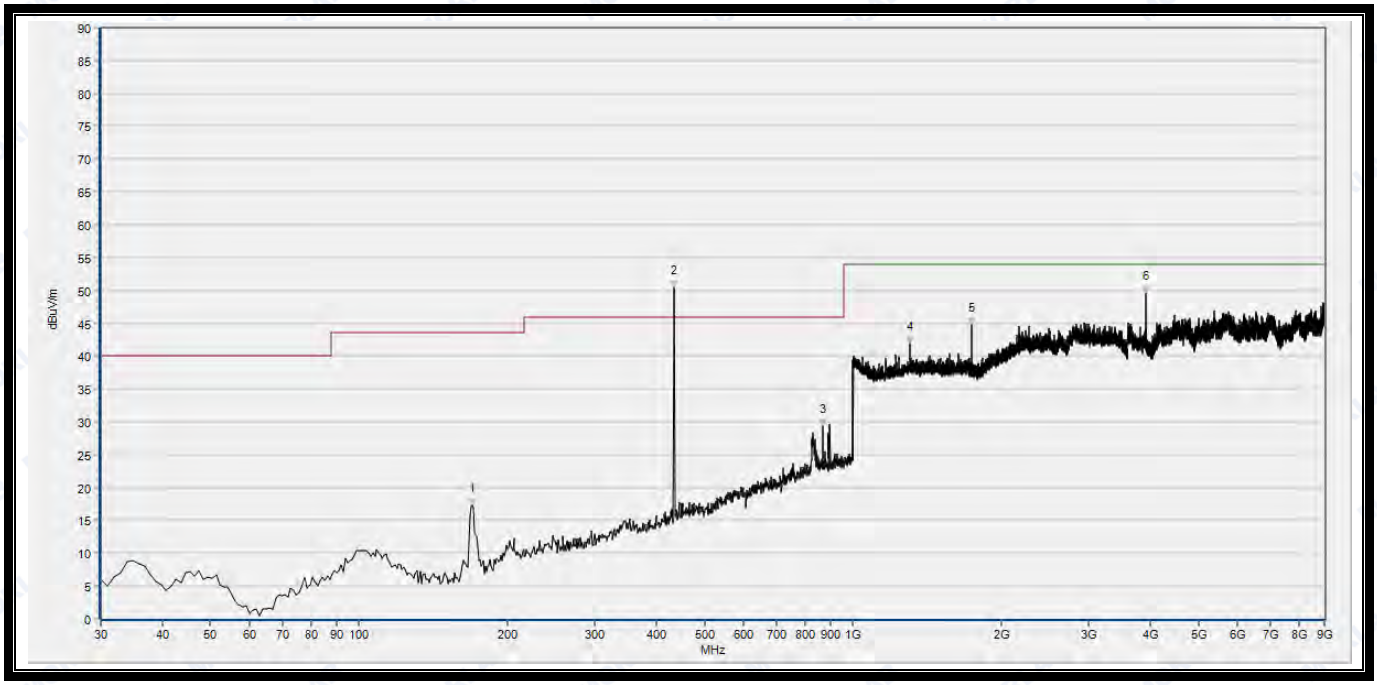

(Permissible Field Strengths @Channel 40 434.5375MHz)

## B. Test Plots for the Whole Measurement Frequency Range:



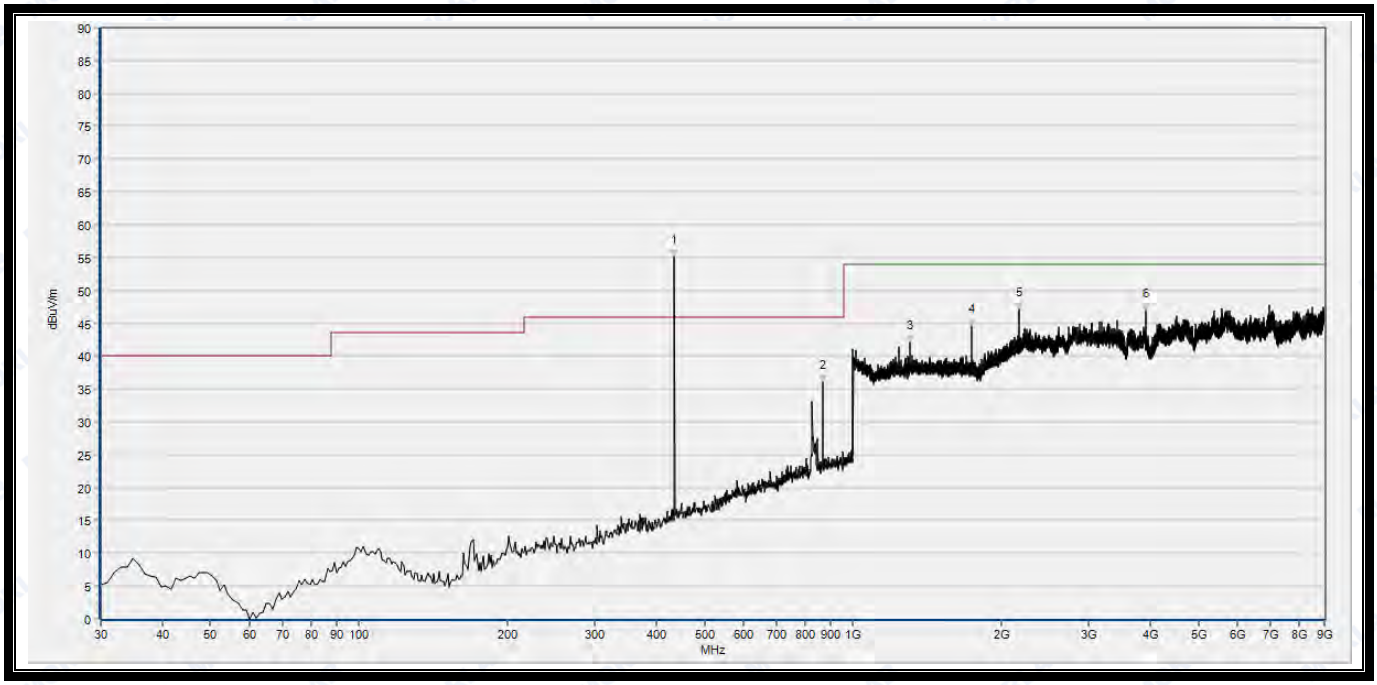

(Antenna Horizontal, 30MHz to 5GHz @Channel 1 434.05MHz)

| Fre. (MHz) | Pk | QP | AV | Limit-PK | Limit-QP | Limit-AV | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 170.650 | 18.84 | N.A | N.A | N.A | 43.50 | N.A | Horizontal | PASS |
| 434.050 | 52.79 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | N.A |
| 868.080 | 34.18 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | PASS |
| 1302.400 | 43.66 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 1736.533 | 43.70 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 2170.667 | 46.96 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 3906.880 | 48.12 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |



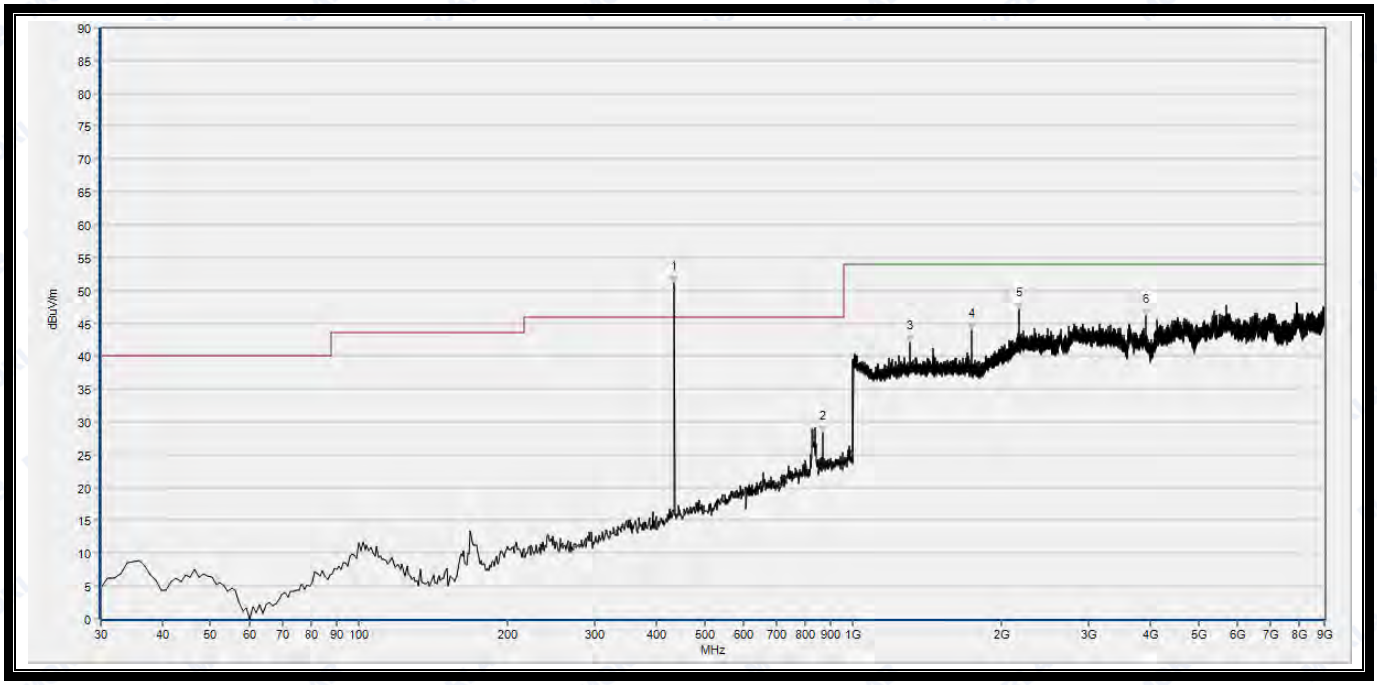

(Antenna Vertical, 30MHz to 5GHz @Channel 1 434.05MHz)

| Fre. (MHz) | Pk | QP | AV | Limit-PK | Limit-QP | Limit-AV | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 169.680 | 17.26 | N.A | N.A | N.A | 43.50 | N.A | Horizontal | PASS |
| 434.050 | 50.42 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | N.A |
| 868.080 | 29.41 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | PASS |
| 1302.400 | 41.86 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 1736.533 | 44.76 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 3906.880 | 49.55 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |



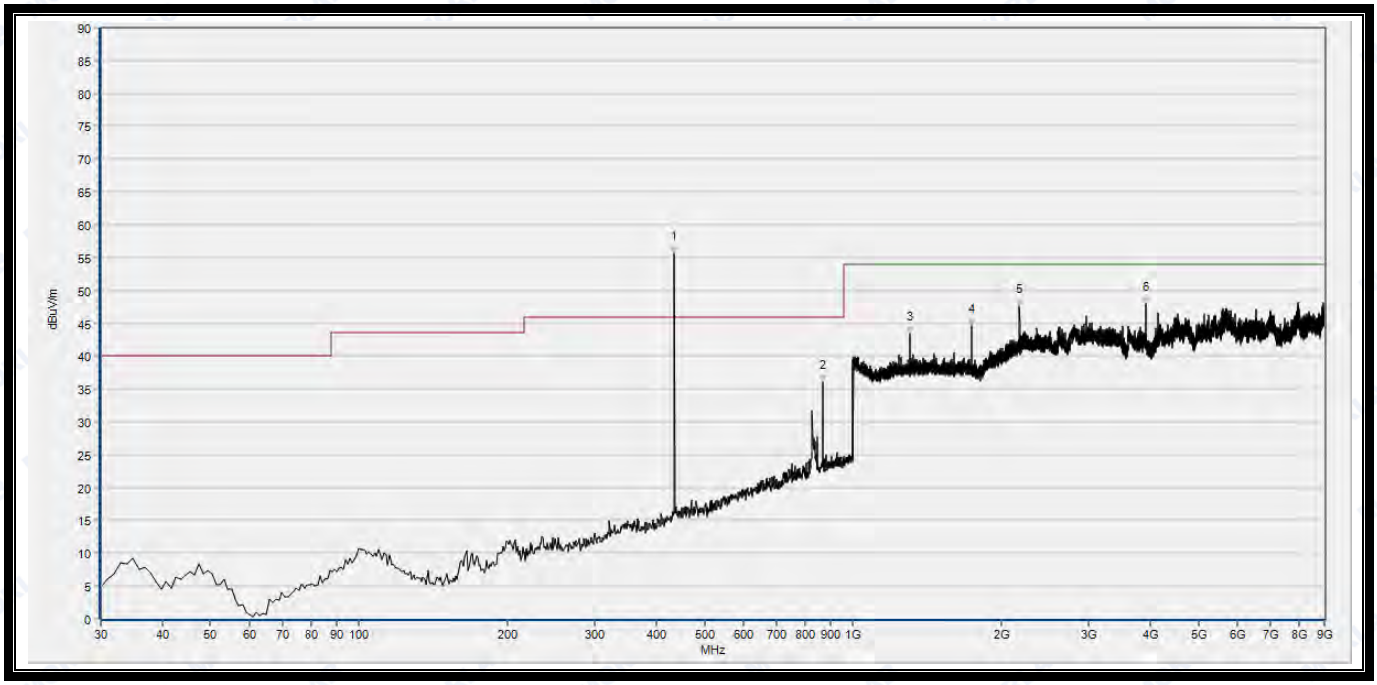

(Antenna Horizontal, 30MHz to 5GHz @Channel 20 434.2875MHz)

| Fre. (MHz) | Pk | QP | AV | Limit-PK | Limit-QP | Limit-AV | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 434.287 | 55.21 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | N.A |
| 869.050 | 36.04 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | PASS |
| 1303.467 | 42.11 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 1737.600 | 44.64 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 2171.733 | 47.13 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 3909.440 | 46.88 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |



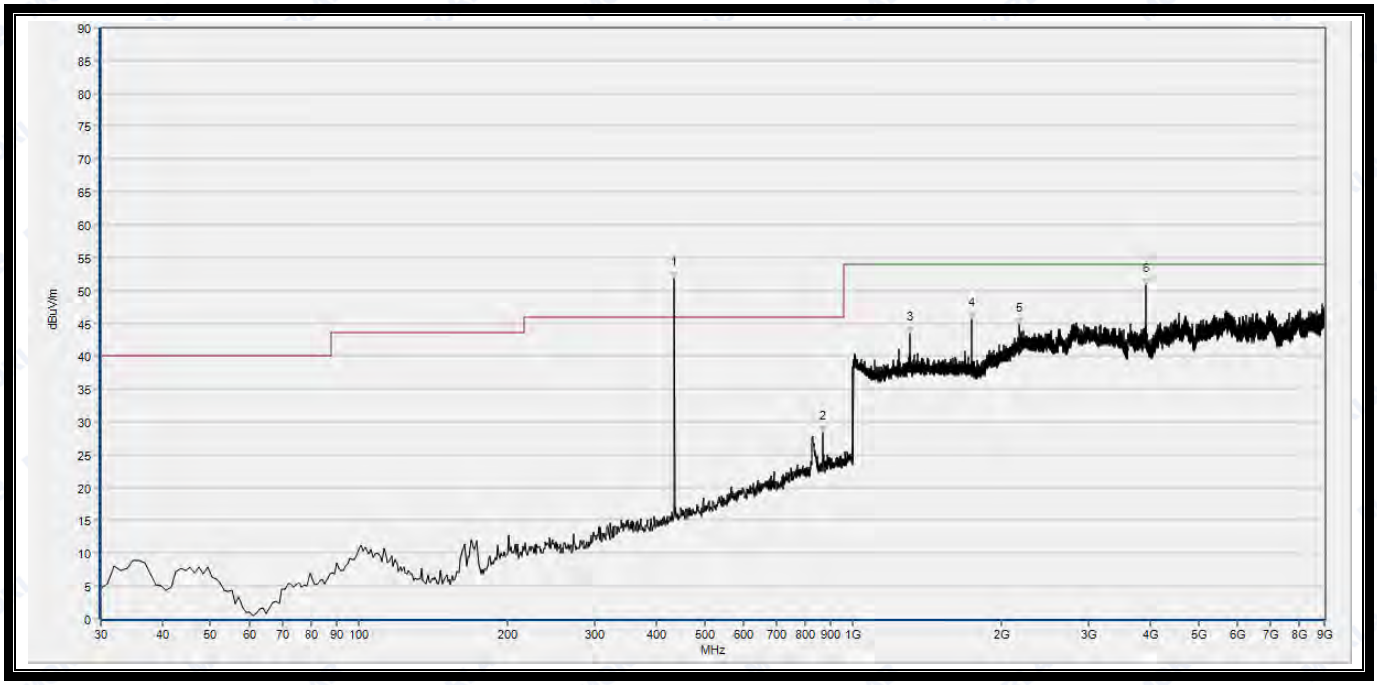

(Antenna Vertical, 30MHz to 5GHz @Channel 20 434.2875MHz)

| Fre. (MHz) | Pk | QP | AV | Limit-PK | Limit-QP | Limit-AV | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 434.287 | 51.10 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | N.A |
| 869.050 | 28.30 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | PASS |
| 1303.467 | 42.01 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 1737.600 | 43.97 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 2171.733 | 47.12 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 3908.160 | 46.02 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |




(Antenna Horizontal, 30MHz to 5GHz @Channel 40 434.5375MHz)

| Fre. (MHz) | Pk | QP | AV | Limit-PK | Limit-QP | Limit-AV | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 434.537 | 55.64 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | N.A |
| 869.050 | 36.04 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | PASS |
| 1304.000 | 43.33 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 1738.667 | 44.54 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 2173.333 | 47.63 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 3912.000 | 47.98 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |




(Antenna Vertical, 30MHz to 5GHz @Channel 40 434.5375MHz)

| Fre. (MHz) | Pk | QP | AV | Limit-PK | Limit-QP | Limit-AV | Antenna | Verdict |
|---|---|---|---|---|---|---|---|---|
| 434.537 | 51.71 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | N.A |
| 869.050 | 28.35 | N.A | N.A | N.A | 46.00 | N.A | Horizontal | PASS |
| 1304.000 | 43.44 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 1738.667 | 45.56 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 2173.333 | 44.68 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |
| 3910.720 | 50.70 | N.A | N.A | 74.0 | N.A | 54.0 | Horizontal | PASS |

# ANNEX A GENERAL INFORMATION

## 1.1 Identification of the Responsible Testing Laboratory

| | |
|---|---|
| Company Name: | Shenzhen Morlab Communications Technology Co., Ltd. |
| Department: | Morlab Laboratory |
| Address: | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |
| Responsible Test Lab Manager: | Mr. Su Feng |
| Telephone: | +86 755 36698555 |
| Facsimile: | +86 755 36698525 |

## 1.2 Identification of the Responsible Testing Location

| | |
|---|---|
| Name: | Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory |
| Address: | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |

## 1.3 Facilities and Accreditations

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10 2013 and CISPR Publication 22; the FCC registration number is 695796.

## 1.4 Maximum measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

| Measurements | Frequency | Uncertainty |
|---|---|---|
| Conducted emissions | 9KHz~30MHz | 2.44dB |
| Radiated emissions | 9KHz~30MHz | 2.44dB |
| | 30MHz~200MHz | 2.93dB |
| | 200MHz~1000MHz | 2.95dB |
| | 1GHz~18GHz | 2.26dB |
| | 18GHz~40GHz | 1.94dB |

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2

## 1.5 Test Equipments Utilized

### 1.5.1 Radiated Test Equipments

| Radiated Test Equipments | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Equipment Name** | **Serial No.** | **Type** | **Manufacturer** | **Cal. Date** | **Cal.Due Date** |
| 1 | System Simulator | GB45360846 | 8960-E5515C | Agilent | 2016.03.02 | 2017.03.01 |
| 2 | Receiver | MY54130016 | N9038A | Agilent | 2016.03.02 | 2017.03.01 |
| 3 | Test Antenna - Bi-Log | N/A | VULB9163 | Schwarzbeck | 2016.03.02 | 2017.03.01 |
| 4 | Test Antenna - Horn | 9170C-531 | BBHA9170 | Schwarzbeck | 2016.03.02 | 2017.03.01 |
| 5 | Test Antenna - Loop | 1519-022 | FMZB1519 | Schwarzbeck | 2016.03.02 | 2017.03.01 |
| 6 | Test Antenna - Horn | 71688 | BBHA 9120D | Schwarzbeck | 2016.03.02 | 2017.03.01 |
| 7 | Coaxial cable(N male) | CB02 | EMC02 | Morlab | N/A | N/A |
| 8 | Coaxial cable(N male) | CB03 | EMC03 | Morlab | N/A | N/A |
| 9 | 1-18GHz pre-Amplifier | MA02 | TS-PR18 | Rohde&Schwarz | 2016.03.02 | 2017.03.01 |
| 10 | 18-26.5GHz pre-Amplifier | MA03 | TS-PR18 | Rohde&Schwarz | 2016.03.02 | 2017.03.01 |

### 1.5.2 Climate Chamber

| Climate Chamber | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Equipment Name** | **Serial No.** | **Type** | **Manufacturer** | **Cal.Date** | **Cal.Due Date** |
| 1 | Climate Chamber | 2004012 | HL4003T | Yinhe | 2016.03.02 | 2017.03.01 |

### 1.5.3 Vibration Table

| Vibration Table | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Equipment Name** | **Serial No.** | **Type** | **Manufacturer** | **Cal.Date** | **Cal.Due Date** |
| 1 | Vibration Table | N/A | ACT2000-S015L | CMI-COM | 2016.03.02 | 2017.03.01 |

### 1.5.4 Anechoic Chamber

| Anechoic Chamber | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Equipment Name** | **Serial No.** | **Type** | **Manufacturer** | **Cal.Date** | **Cal.Due Date** |
| 1 | Anechoic Chamber | N/A | 9m*6m*6m | Changning | 2016.03.02 | 2017.03.01 |

### 1.5.5 Auxiliary Test Equipment

| Auxiliary Test Equipment | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Equipment Name** | **Serial No.** | **Type** | **Manufacturer** | **Cal.Date** | **Cal.Due Date** |
| 1 | Computer | N.A | PU500C | Asus | N.A | N.A |

***** END OF REPORT *****