
FCC Test Report

Report No.: AGC16740241105FR01

FCC ID : WQ8-SK2431

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : UNIVERSAL SMART KEY

BRAND NAME : AUTEL

MODEL NAME : IKEYLR005AL

APPLICANT : Autel Intelligent Technology Corp., Ltd.

DATE OF ISSUE : Jan. 09, 2025

STANDARD(S) : FCC Part 15 Subpart C §15.231

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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Report Revise Record

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0 | / | Jan. 09, 2025 | Valid | Initial Release |

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Table of Contents

| | |
|---|-----------|
| 1. General Information | 5 |
| 2. Product Information | 6 |
| 2.1 Product Technical Description | 6 |
| 2.2 Test Frequency List | 6 |
| 2.3 Related Submittal(S) / Grant (S) | 7 |
| 2.4 Test Methodology | 7 |
| 2.5 Special Accessories | 7 |
| 2.6 Equipment Modifications | 7 |
| 2.7 Antenna Requirement..... | 7 |
| 3. Test Environment | 8 |
| 3.1 Address of The Test Laboratory | 8 |
| 3.2 Test Facility | 8 |
| 3.3 Environmental Conditions | 9 |
| 3.4 Measurement Uncertainty | 9 |
| 3.5 List of Equipment Used | 10 |
| 4. System Test Configuration..... | 11 |
| 4.1 EUT Configuration..... | 11 |
| 4.2 EUT Exercise..... | 11 |
| 4.3 Configuration of Tested System | 11 |
| 4.4 Equipment Used in Tested System..... | 11 |
| 4.5 Summary of Test Results | 12 |
| 5. Description of Test Modes | 13 |
| 6. Provision for Momentary Operation..... | 14 |
| 6.1 Provisions Applicable | 14 |
| 6.2 Measurement Procedure..... | 14 |
| 6.3 Measurement Setup (Block Diagram of Configuration) | 14 |
| 6.4 Measurement Result | 15 |
| 7. Duty Cycle of Correction Factor | 18 |
| 7.1 Provisions Applicable | 18 |
| 7.2 Measurement Procedure..... | 18 |
| 7.3 Measurement Setup (Block Diagram of Configuration) | 18 |
| 7.4 Measurement Result | 19 |
| 8. Field Strength of Fundamental and Radiated Emission | 27 |
| 8.1 Provisions Applicable | 27 |
| 8.2 Measurement Procedure..... | 28 |
| 8.3 Measurement Setup (Block Diagram of Configuration) | 30 |
| 8.4 Measurement Result | 31 |
| 9. -20dB Bandwidth Measurement | 47 |
| 9.1 Provisions Applicable | 47 |
| 9.2 Measurement Procedure..... | 47 |

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| | |
|--|-----------|
| 9.3 Measurement Setup (Block Diagram of Configuration) | 47 |
| 9.4 Measurement Result | 48 |
| 10. AC Power Line Conducted Emission Test..... | 51 |
| 10.1 Measurement Limit..... | 51 |
| 10.2 Measurement Setup (Block Diagram of Configuration) | 51 |
| 10.3 Preliminary Procedure of Line Conducted Emission Test | 52 |
| 10.4 Final Procedure of Line Conducted Emission Test | 52 |
| 10.5 Measurement Result | 52 |
| Appendix I: Photographs of Test Setup..... | 53 |
| Appendix II: Photographs of Test EUT | 53 |

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1. General Information

| | |
|------------------------------|--|
| Applicant | Autel Intelligent Technology Corp., Ltd. |
| Address | Floor 2, Caihong Keji Building, 36 Hi-tech North Six Road, Songpingshan Community, Xili, Nanshan, Shenzhen 518055, China |
| Manufacturer | Autel Intelligent Technology Corp., Ltd. |
| Address | Floor 2, Caihong Keji Building, 36 Hi-tech North Six Road, Songpingshan Community, Xili, Nanshan, Shenzhen 518055, China |
| Factory | Autel Intelligent Technology Corp., Ltd. Guangming Branch |
| Address | 7F&6F, East Wing, Building 2, and 6F of Electronical Building, Yanxiang Industrial Zone, Gaoxin Rd, Dongzhou Community of Guangming New District, Shenzhen |
| Product Designation | UNIVERSAL SMART KEY |
| Brand Name | AUTEL |
| Test Model | IKEYLR005AL |
| Series Model(s) | N/A |
| Difference Description | N/A |
| Date of receipt of test item | Nov. 21, 2024 |
| Date of Test | Nov. 21, 2024~Jan. 09, 2025 |
| Deviation from Standard | No any deviation from the test method |
| Condition of Test Sample | Normal |
| Test Result | Pass |
| Test Report Form No | AGCER-FCC-SRD1-V1 |

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By

Cici Li
(Project Engineer)

Jan. 09, 2025

Reviewed By

Calvin Liu
(Reviewer)

Jan. 09, 2025

Approved By

Angela Li
(Authorized Officer)

Jan. 09, 2025

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2. Product Information

2.1 Product Technical Description

| | | |
|-------------------------------|---|--|
| Operation Frequency | 315MHz, 433.92MHz | |
| Hardware Version | SK2431_V1 | |
| Software Version | V01.01.00 | |
| Modulation Type | ASK, FSK | |
| Number of channels | 2 | |
| Field Strength of Fundamental | 315.0MHz: 63.31dBμV/m(PK)@3m 57.80dBμV/m(AV)@3m | 433.92MHz: 79.75dBμV/m(PK)@3m 73.73dBμV/m(AV)@3m |
| Antenna Designation | PCB Antenna | |
| Antenna Gain | 315MHz: -21.43dBi, 433MHz:-26.30dBi | |
| Power Supply | DC 3V (alkaline dry battery AAA*2) | |

2.2 Test Frequency List

| Channel Number | Test Frequency |
|----------------|----------------|
| 01 | 433.92 MHz |
| 02 | 315.00 MHz |

Note: According to manufacturer's requirements, periodic operation in the band 40.66-40.70 MHz and above 70MHz

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2.3 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: **WQ8-SK2431**, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.4 Test Methodology

The tests were performed according to following standards:

| No. | Identity | Document Title |
|-----|--------------------|---|
| 1 | FCC 47 CFR Part 2 | Frequency allocations and radio treaty matters; general rules and regulations |
| 2 | FCC 47 CFR Part 15 | Radio Frequency Devices |
| 3 | ANSI C63.10-2013 | American National Standard for Testing Unlicensed Wireless Devices |

2.5 Special Accessories

Not available for this EUT intended for grant.

2.6 Equipment Modifications

Not available for this EUT intended for grant.

2.7 Antenna Requirement

| Standard Requirement |
|--|
| 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. |
| EUT Antenna: The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 315MHz:-21.43dBi and 433MHz:-26.30dBi. |

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3. Test Environment

3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

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

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files with Registration 975832.

IC-Registration No.: 24842(CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

3.3 Environmental Conditions

| | Normal Conditions |
|-------------------------|-------------------|
| Temperature range (°C) | 15 - 35 |
| Relative humidity range | 20 % - 75 % |
| Pressure range (kPa) | 86 - 106 |
| Power supply | DC 3V |

3.4 Measurement Uncertainty

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

| C | Measurement Uncertainty |
|--|----------------------------|
| Uncertainty of Conducted Emission for AC Port | $U_c = \pm 2.9 \text{ dB}$ |
| Uncertainty of Radiated Emission for 9kHz-30MHz | $U_c = \pm 3.9 \text{ dB}$ |
| Uncertainty of Radiated Emission for 30MHz-1GHz | $U_c = \pm 3.9 \text{ dB}$ |
| Uncertainty of Radiated Emission above 1GHz | $U_c = \pm 4.9 \text{ dB}$ |
| Uncertainty of Conducted Spurious Emissions for 9kHz-40GHz | $U_c = \pm 2.7 \text{ dB}$ |
| Uncertainty of Occupied Channel Bandwidth | $U_c = \pm 2.0 \%$ |
| Uncertainty of Dwell Time | $U_c = \pm 0.2 \%$ |

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3.5 List of Equipment Used

| ● RF Conducted Test System | | | | | | | |
|-------------------------------------|---------------|---------------------|--------------|------------|------------|---------------------------|---------------------------|
| Used | Equipment No. | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| <input checked="" type="checkbox"/> | AGC-ER-E036 | Spectrum Analyzer | Agilent | N9020A | MY49100060 | 2024-05-24 | 2025-05-23 |
| <input checked="" type="checkbox"/> | AGC-ER-E062 | Power Sensor | Agilent | U2021XA | MY54110007 | 2024-02-01 | 2025-01-31 |
| <input checked="" type="checkbox"/> | AGC-ER-E063 | Power Sensor | Agilent | U2021XA | MY54110009 | 2024-02-01 | 2025-01-31 |
| <input checked="" type="checkbox"/> | AGC-EM-A152 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | N/A | 2023-06-09 | 2025-06-08 |
| <input checked="" type="checkbox"/> | N/A | RF Connection Cable | N/A | 1# | N/A | Each time | N/A |
| <input checked="" type="checkbox"/> | N/A | RF Connection Cable | N/A | 2# | N/A | Each time | N/A |
| <input checked="" type="checkbox"/> | N/A | Induction Antenna | N/A | 1# | N/A | Each time | N/A |

| ● Radiated Spurious Emission | | | | | | | |
|-------------------------------------|---------------|-------------------------------|--------------|------------|------------|---------------------------|---------------------------|
| Used | Equipment No. | Test Equipment | Manufacturer | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| <input type="checkbox"/> | AGC-EM-E046 | EMI Test Receiver | R&S | ESCI | 10096 | 2024-02-01 | 2025-01-31 |
| <input checked="" type="checkbox"/> | AGC-EM-E116 | EMI Test Receiver | R&S | ESCI | 100034 | 2024-05-24 | 2025-05-23 |
| <input checked="" type="checkbox"/> | AGC-EM-E061 | Spectrum Analyzer | Agilent | N9010A | MY53470504 | 2024-05-28 | 2025-05-27 |
| <input checked="" type="checkbox"/> | AGC-EM-E086 | Loop Antenna | ZHINAN | ZN30900C | 18051 | 2024-03-05 | 2026-03-04 |
| <input checked="" type="checkbox"/> | AGC-EM-E001 | Wideband Antenna | SCHWARZBECK | VULB9168 | D69250 | 2023-05-11 | 2025-05-10 |
| <input checked="" type="checkbox"/> | AGC-EM-E029 | Broadband Ridged Horn Antenna | ETS | 3117 | 00034609 | 2024-03-31 | 2025-03-30 |
| <input checked="" type="checkbox"/> | AGC-EM-E082 | Horn Antenna | SCHWARZBECK | BBHA 9170 | #768 | 2023-09-24 | 2025-09-23 |
| <input checked="" type="checkbox"/> | AGC-EM-E146 | Pre-amplifier | ETS | 3117-PA | 00246148 | 2024-07-24 | 2026-07-23 |
| <input checked="" type="checkbox"/> | AGC-EM-A119 | 2.4G Filter | SongYi | N/A | N/A | 2024-05-23 | 2025-05-22 |
| <input checked="" type="checkbox"/> | AGC-EM-A138 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | N/A | 2023-06-09 | 2025-06-08 |
| <input type="checkbox"/> | AGC-EM-A139 | 6dB Attenuator | Eeatsheep | LM-XX-6-5W | N/A | 2023-06-09 | 2025-06-08 |

| ● Test Software | | | | | |
|-------------------------------------|---------------|---------------------|--------------|---------------------------------|---------------------|
| Used | Equipment No. | Test Equipment | Manufacturer | Model No. | Version Information |
| <input type="checkbox"/> | AGC-EM-S001 | CE Test System | R&S | ES-K1 | V1.71 |
| <input checked="" type="checkbox"/> | AGC-EM-S003 | RE Test System | FARA | EZ-EMC | V.RA-03A |
| <input checked="" type="checkbox"/> | AGC-EM-S004 | RE Test System | Tonscend | TS ⁺ Ver2.1(JS32-RE) | 4.0.0.0 |
| <input type="checkbox"/> | AGC-ER-S012 | BT/WIFI Test System | Tonscend | JS1120-2 | 2.6 |
| <input checked="" type="checkbox"/> | AGC-EM-S011 | RSE Test System | Tonscend | TS+-Ver2.1(JS36-RSE) | 4.0.0.0 |

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4. System Test Configuration

4.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 Configuration of Tested System

Radiated Emission Configure:



4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

- ☐ Test Accessories Come From The Laboratory
☐ Test Accessories Come From The Manufacturer

| No. | Equipment | Model No. | Manufacturer | Specification Information | Cable |
|-----|-----------|-----------|--------------|---------------------------|-------|
| 1 | -- | -- | -- | -- | -- |

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4.5 Summary of Test Results

| Item | FCC Rules | Description Of Test | Result |
|------|------------|-----------------------------------|--------|
| 1 | §15.203 | Antenna Equipment | Pass |
| 2 | §15.231(a) | Provision for Momentary Operation | Pass |
| 3 | §15.231 | Field Strength of Fundamental | Pass |
| 4 | §15.209 | Radiated Emission | Pass |
| 5 | §15.205(a) | Restricted Bands of Operation | Pass |
| 6 | §15.231(c) | -20dB Bandwidth | Pass |
| 7 | §15.207 | AC Power Line Conducted Emission | N/A |

Note: 1.N/A means not applicable

Note: 2. The device under test is battery-powered and does not require evaluation of AC Power Line Conducted Emission.

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5. Description of Test Modes

| Summary table of Test Cases | |
|---------------------------------|--|
| Test Item | Equipment Type / Modulation |
| | Short Range Wireless Device/ ASK/FSK |
| Radiated & Conducted Test Cases | Mode 1: Normal Transmission Operation at 315.00MHz_ASK Mode 2: Normal Transmission Operation at 315.00MHz_FSK Mode 3: Normal Transmission Operation at 433.92MHz_ASK Mode 4: Normal Transmission Operation at 433.92MHz_FSK |
| AC Conducted Emission | N/A |

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. The battery is full-charged during the test.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
5. The fixed-frequency transmission of the prototype is debugged through the buttons. Power is the default.

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6. Provision for Momentary Operation

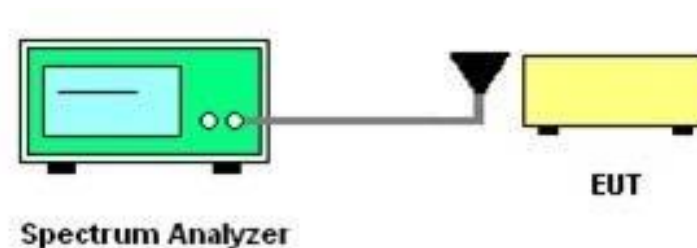
6.1 Provisions Applicable

- ☒ (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- ☐ (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- ☐ (3) Periodic transmissions at regular predetermined intervals are not permitted.
However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.
- ☐ (4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.
- ☐ (5) Transmission of set-up information for security systems may exceed the transmission duration limits in (1) and (2) above, provided such transmission are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

6.2 Measurement Procedure

1. Set the parameters of SPA as below:
2. Centre frequency = Operation Frequency
3. RBW=8MHz, VBW=50MHz Span: 0Hz Sweep time: 5s
4. Set the EUT to transmit by manually operated. Use the "View" function of SPA to find the transmission time of being released.
5. Record the data and Reported.

6.3 Measurement Setup (Block Diagram of Configuration)



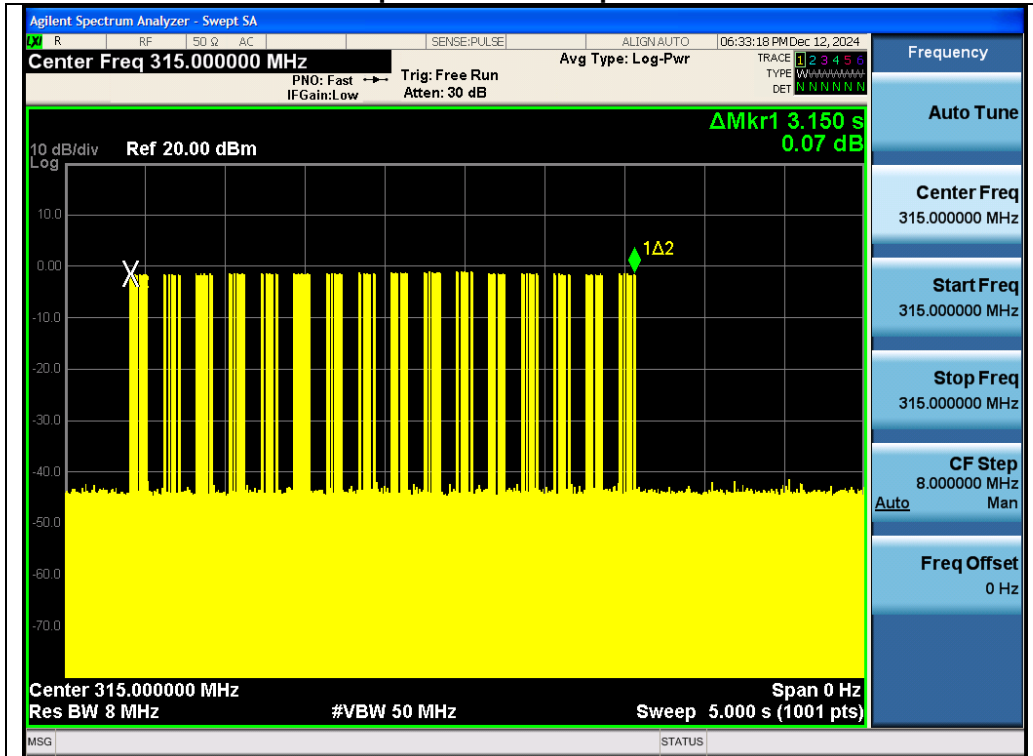
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6.4 Measurement Result

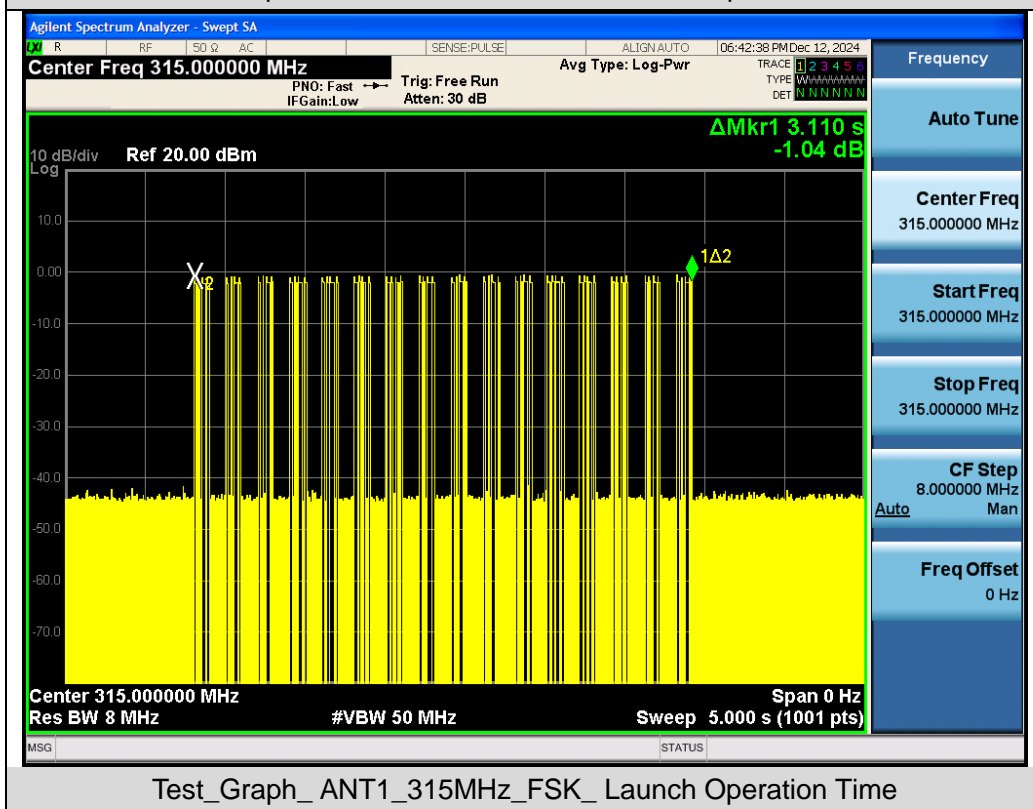
| Test Mode | Test Frequency (MHz) | Measure launch time (s) | Limits (s) | Result |
|------------|----------------------|-------------------------|------------|--------|
| SRD_TX_ASK | 315.00 | 3.150 | ≤ 5 | Pass |
| SRD_TX_FSK | 315.00 | 3.110 | ≤ 5 | Pass |
| SRD_TX_ASK | 433.92 | 3.085 | ≤ 5 | Pass |
| SRD_TX_FSK | 433.92 | 3.080 | ≤ 5 | Pass |

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Test Graphs of Launch Operation Time

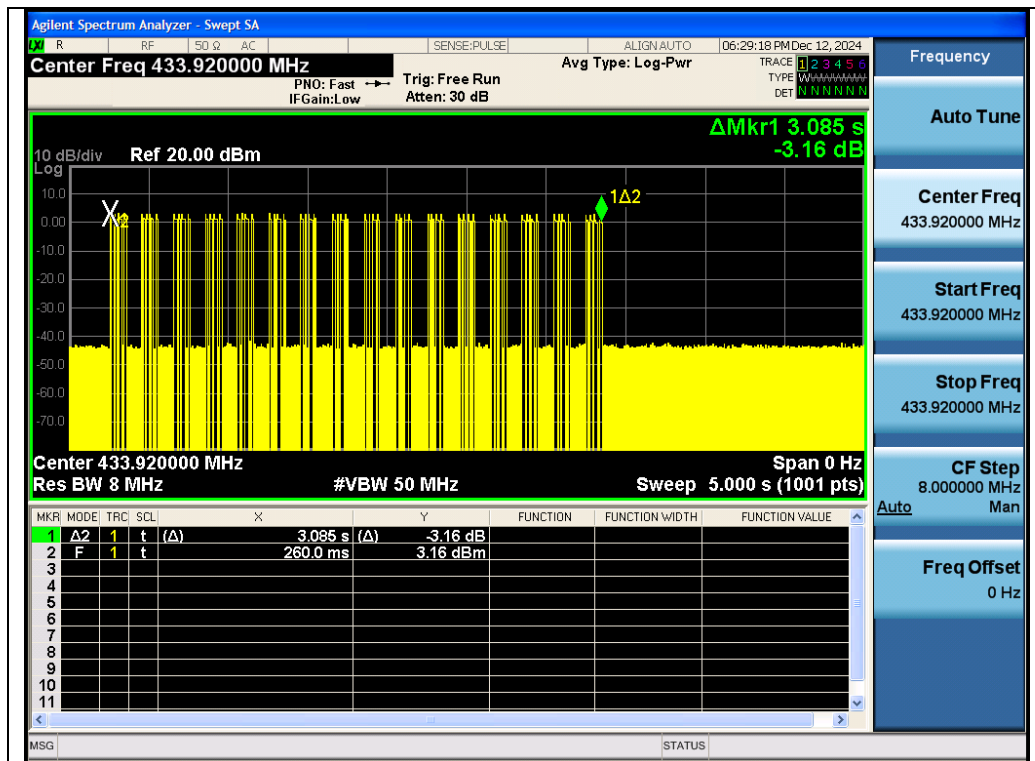


Test_Graph_ ANT1_315MHz_ASK_ Launch Operation Time

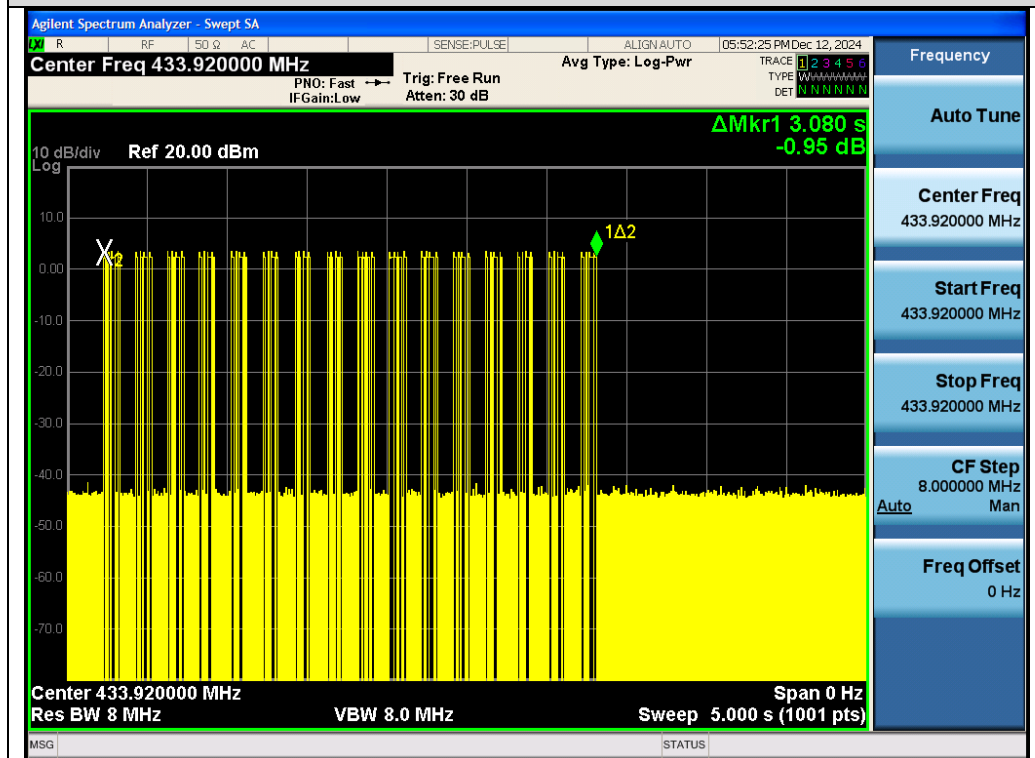


Test_Graph_ ANT1_315MHz_FSK_ Launch Operation Time

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Test_Graph_ ANT1_433.92MHz_ASK_ Launch Operation Time



Test_Graph_ ANT1_433.92MHz_FSK_ Launch Operation Time

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7. Duty Cycle of Correction Factor

7.1 Provisions Applicable

According to FCC Part 15.231 (b)(2) and 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

7.2 Measurement Procedure

After the antenna of the EUT is connected, the output signal of the EUT is received by the connected test antenna

To the spectrum analyzer. Set the center frequency to the actual working frequency of the EUT, and then set the spectrum analyzer to Zero Span for

Release time reading. During the test, the switch is released and the EUT is automatically closed

1. Set the parameters of SPA as below:

Centre frequency = Operation Frequency

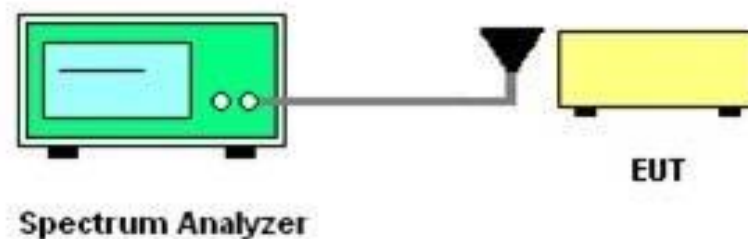
RBW=8MHz, VBW=50MHz

Span: 0Hz

Sweep time: more than two pulse trains or more than each type of pulse occupancy time

2. Set the EUT to transmit by manually operated. Use the "Delta mark" function of SPA to find the period time between two pulse trains and each type of pulse occupancy time.
3. Record the plots and Reported.

7.3 Measurement Setup (Block Diagram of Configuration)



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7.4 Measurement Result

■ Mode 1:315MHz, ASK

| Type of Pules | Width of Pules (ms) | Quantity of Pules (pcs) | Transmission Time (ms) | Total Time (Ton) (ms) |
|---------------|---------------------|-------------------------|------------------------|-----------------------|
| Pules 1 | 14 | 1 | 14 | 53 |
| Pules 2 | 21 | 1 | 21 | |
| Pules 3 | 7 | 1 | 7 | |
| Pules 4 | 11 | 1 | 11 | |

| Test Period (Tp) (ms) | Total Time (Ton) (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|-----------------------|-----------------------|----------------|-----------------------------------|
| 100 | 53 | 53.00 | -5.51 |

■ Mode 2:315MHz, FSK

| Type of Pules | Width of Pules (ms) | Quantity of Pules (pcs) | Transmission Time (ms) | Total Time (Ton) (ms) |
|---------------|---------------------|-------------------------|------------------------|-----------------------|
| Pules 1 | 13 | 1 | 13 | 50 |
| Pules 2 | 20 | 1 | 20 | |
| Pules 3 | 7 | 1 | 7 | |
| Pules 4 | 10 | 1 | 10 | |

| Test Period (Tp) (ms) | Total Time (Ton) (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|-----------------------|-----------------------|----------------|-----------------------------------|
| 100 | 50 | 50.00 | -6.02 |

■ Mode 3: 433.92MHz ,ASK

| Type of Pules | Width of Pules (ms) | Quantity of Pules (pcs) | Transmission Time (ms) | Total Time (Ton) (ms) |
|---------------|---------------------|-------------------------|------------------------|-----------------------|
| Pules 1 | 14 | 1 | 14 | 50 |
| Pules 2 | 19 | 1 | 19 | |
| Pules 3 | 7 | 1 | 7 | |
| Pules 4 | 10 | 1 | 10 | |

| Test Period (Tp) (ms) | Total Time (Ton) (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|-----------------------|-----------------------|----------------|-----------------------------------|
| 100 | 50 | 50.00 | -6.02 |

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■ Mode 4: 433.92MHz ,FSK

| Type of Pules | Width of Pules (ms) | Quantity of Pules (pcs) | Transmission Time (ms) | Total Time (Ton) (ms) |
|---------------|---------------------|-------------------------|------------------------|-----------------------|
| Pules 1 | 14 | 1 | 14 | 51 |
| Pules 2 | 20 | 1 | 20 | |
| Pules 3 | 7 | 1 | 7 | |
| Pules 4 | 10 | 1 | 10 | |

| Test Period (Tp) (ms) | Total Time (Ton) (ms) | Duty Cycle (%) | Duty Cycle Correction Factor (dB) |
|-----------------------|-----------------------|----------------|-----------------------------------|
| 100 | 51 | 51.00 | -5.85 |

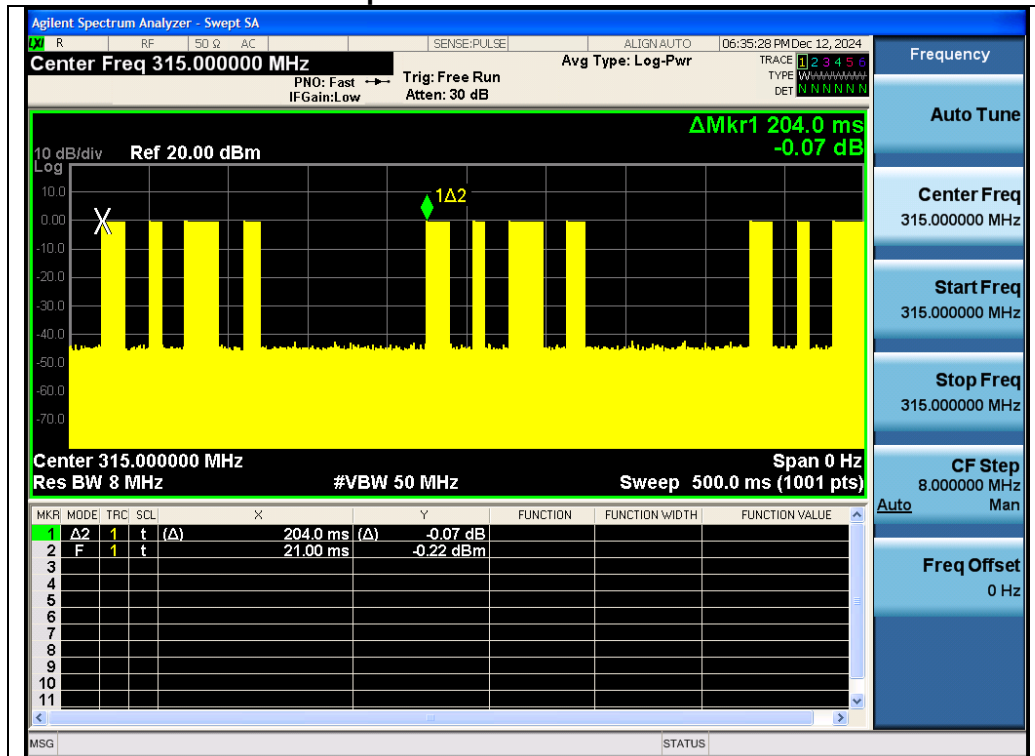
Note 1: Duty Cycle Factor=20 log (Duty Cycle)

Note 2: The maximum reference value of the test cycle is 100ms.

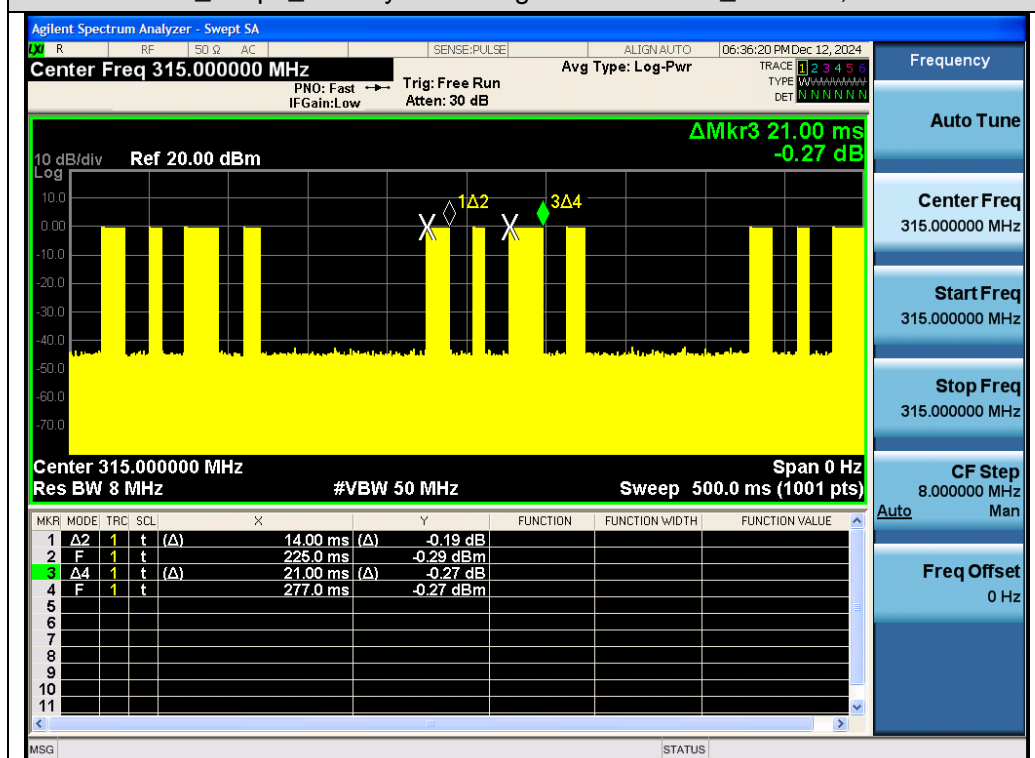
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Test Graphs of Pulse Emission Time Test

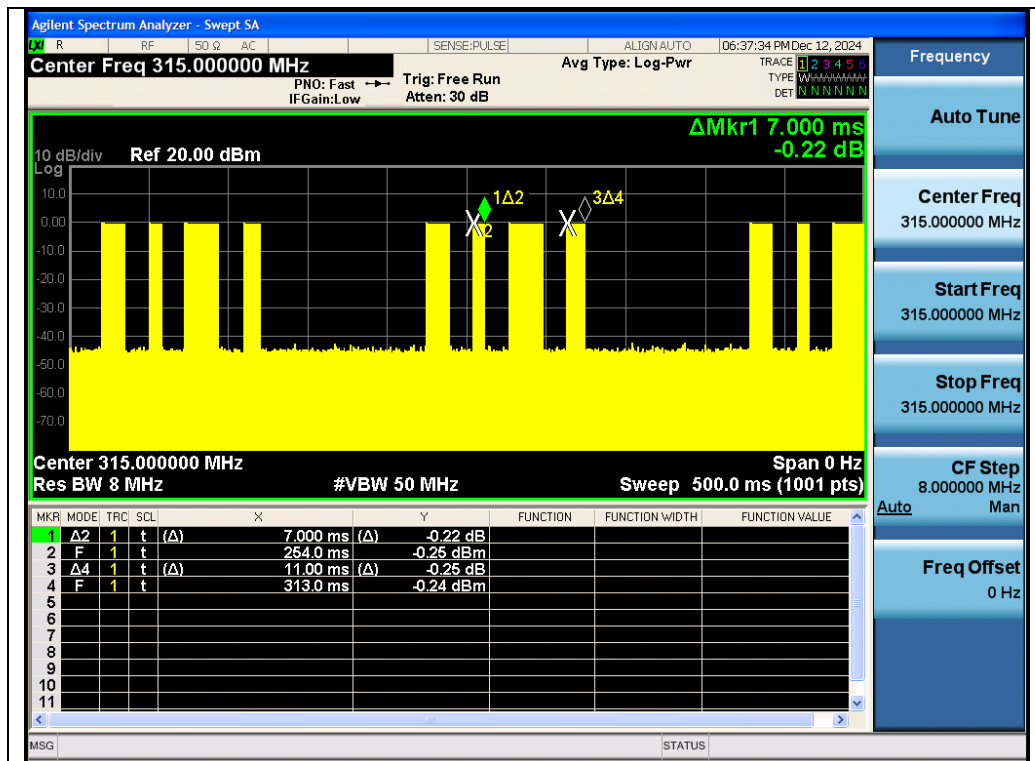


Test_Graph_ Full Cycle Testing Demonstration_315MHz, ASK

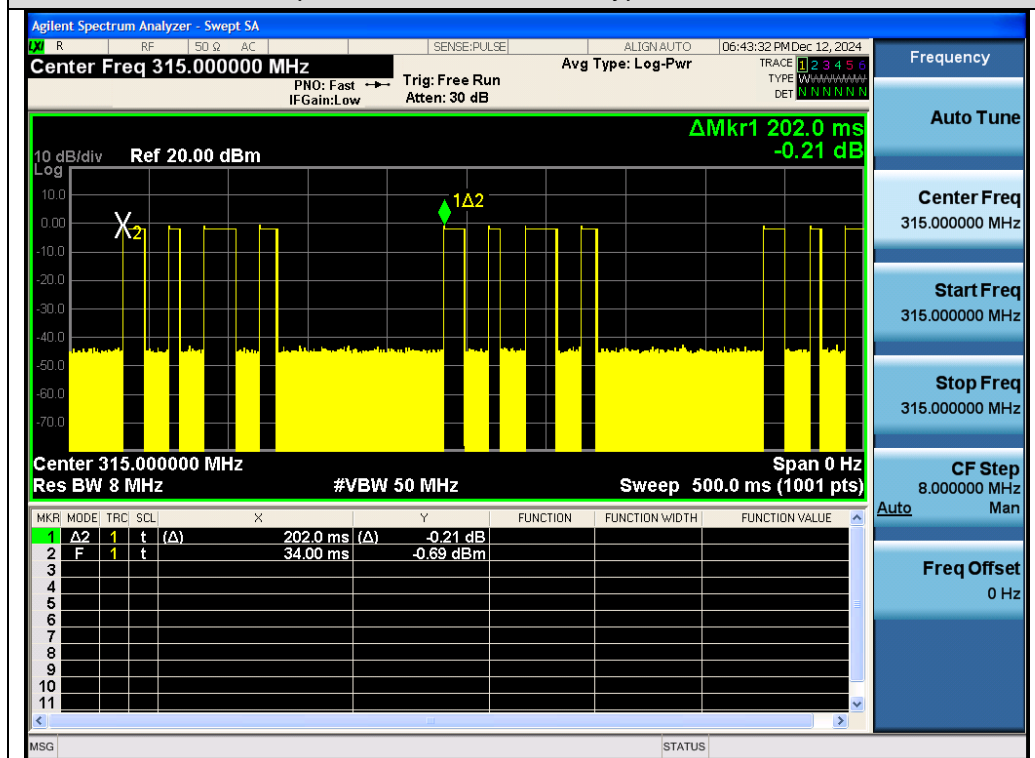


Test_Graph_ Long Pulse_ Pulse Type 1_315MHz, ASK

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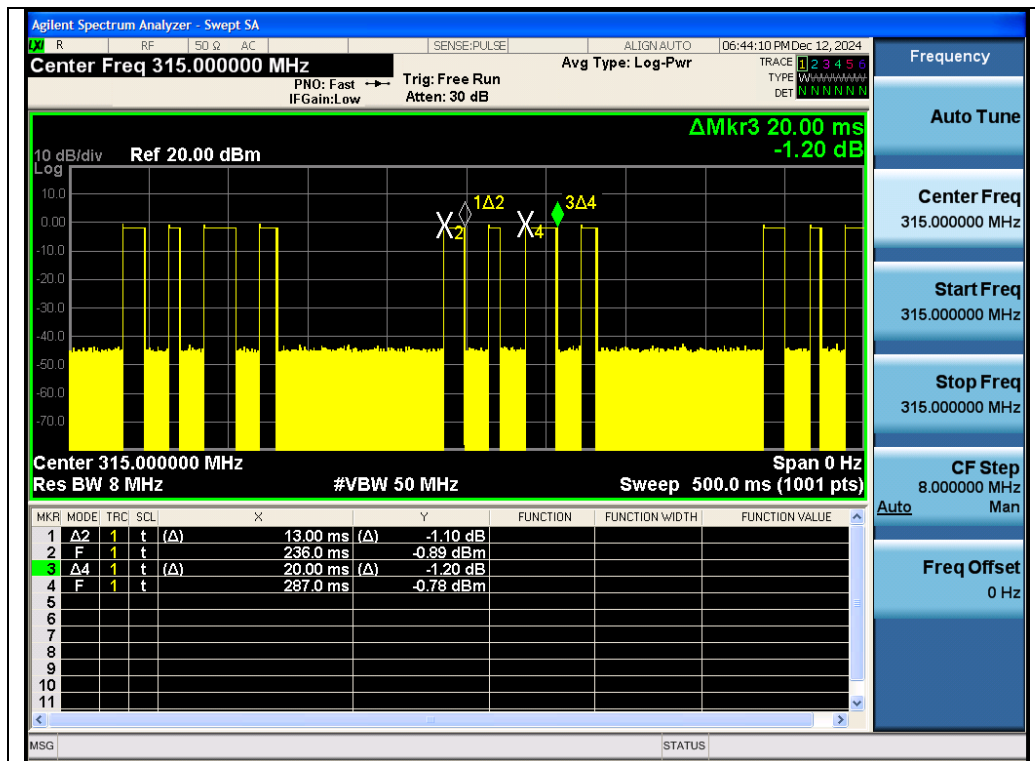


Test_Graph_ Short Pulse_ Pulse Type 2_315MHz, ASK

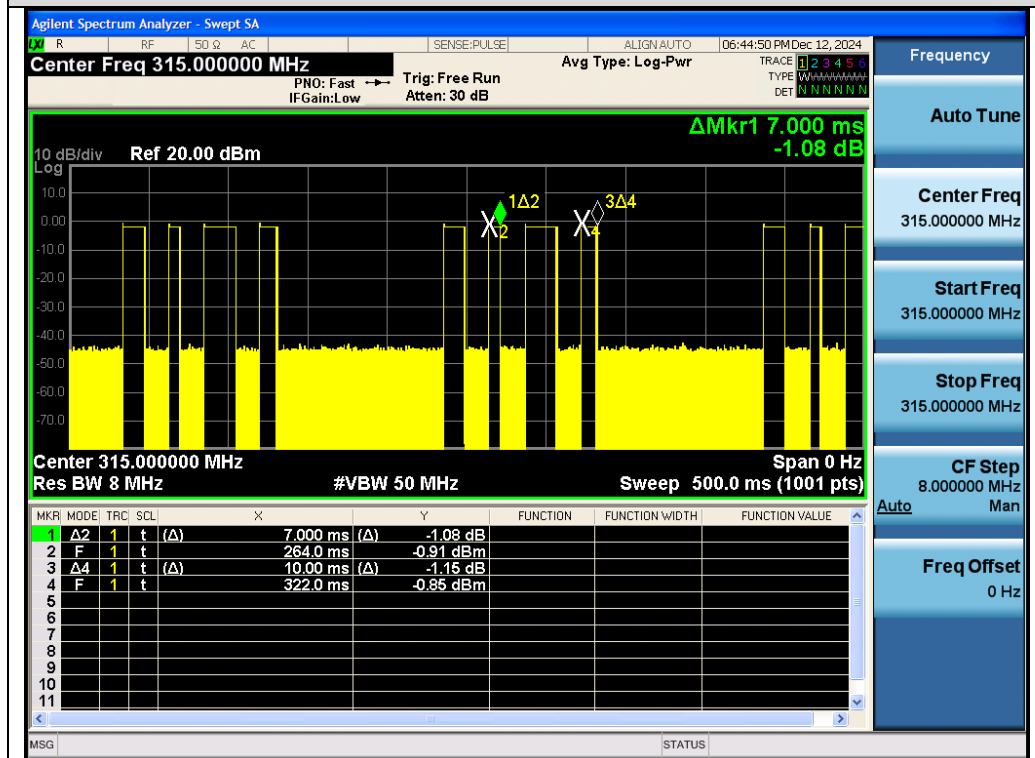


Test_Graph_ Full Cycle Testing Demonstration_315MHz, FSK

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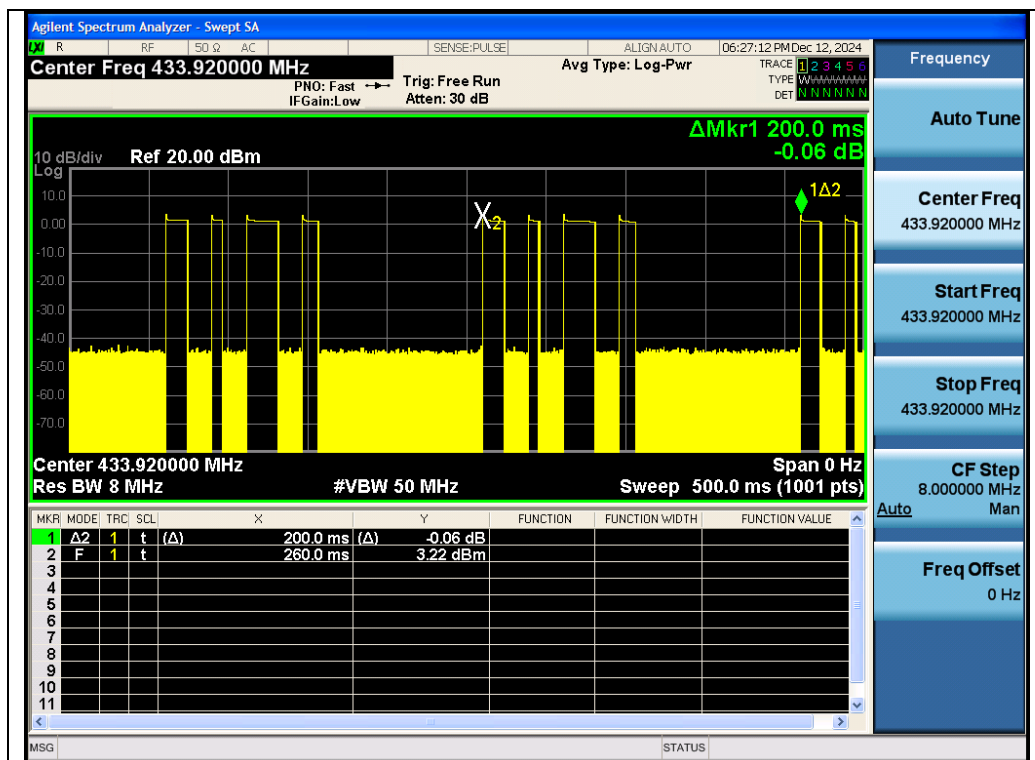


Test_Graph_ Long Pulse_ Pulse Type 1_315MHz, FSK

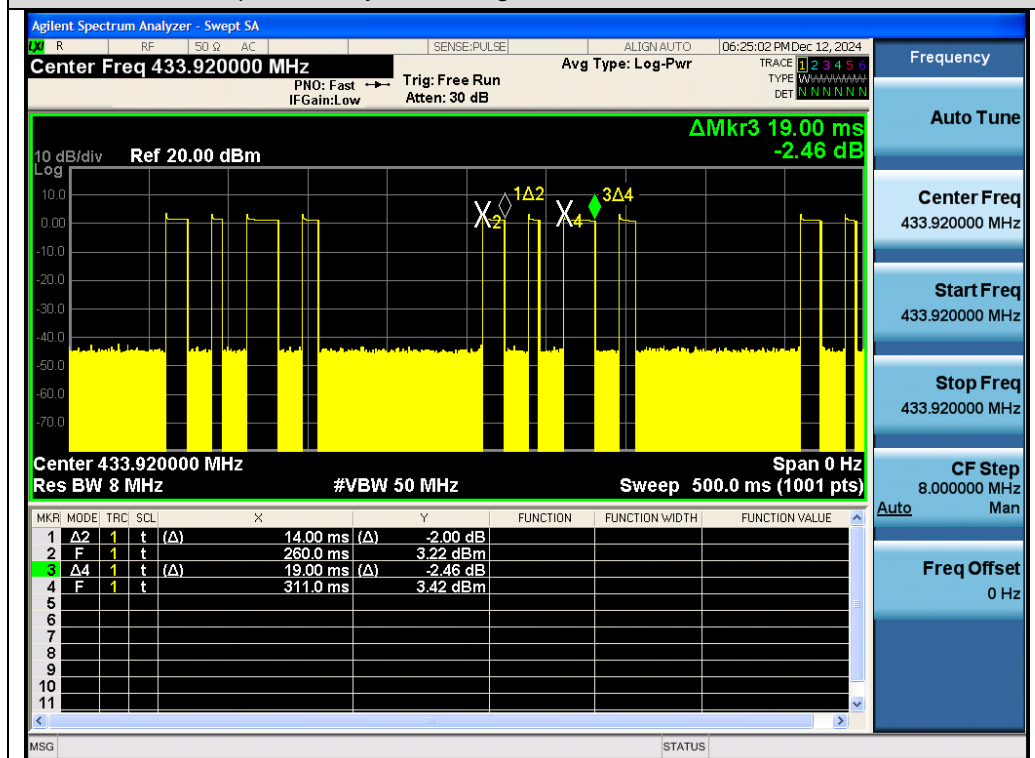


Test_Graph_ Short Pulse_ Pulse Type 2_315MHz, FSK

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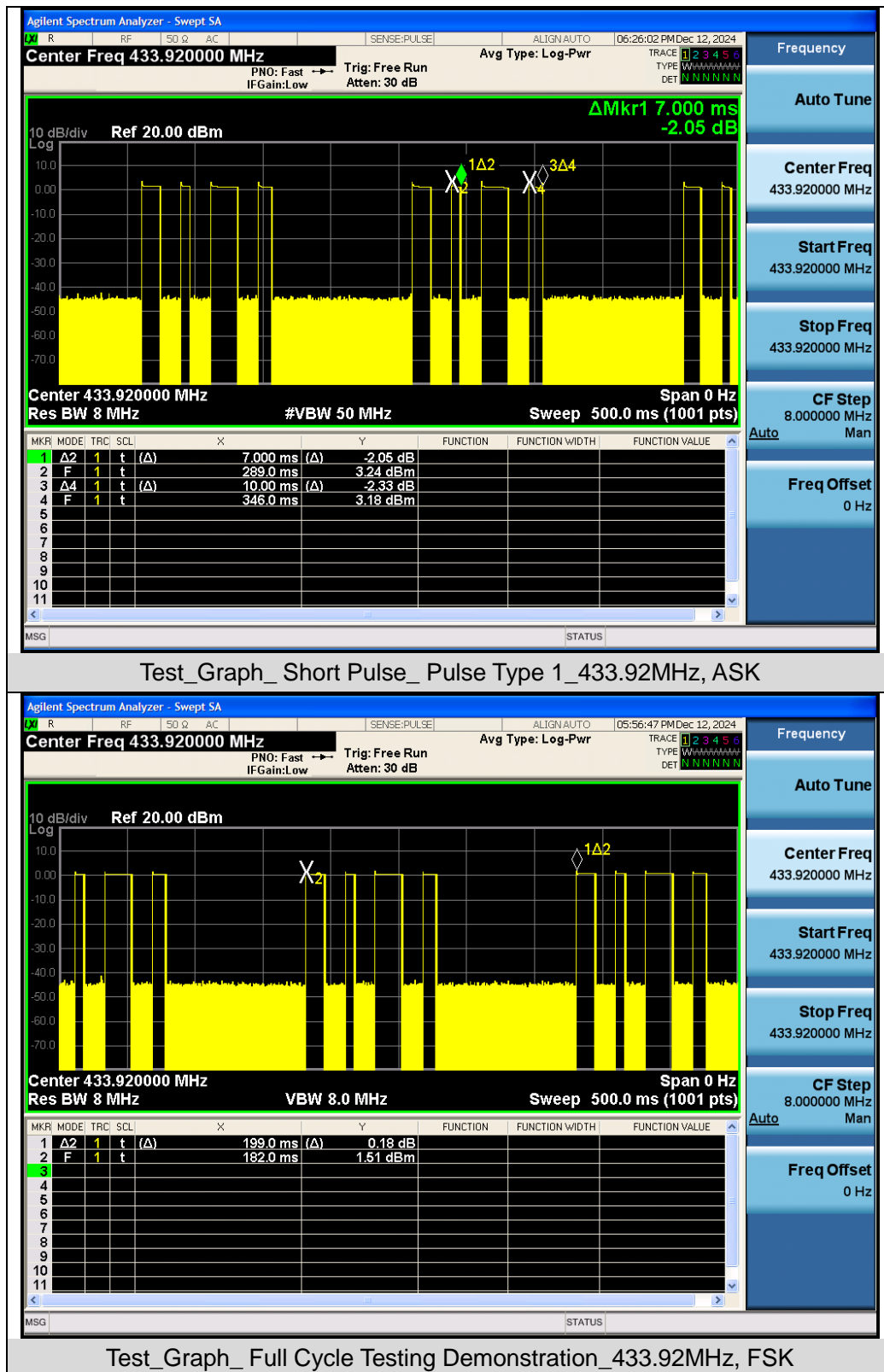


Test_Graph_ Full Cycle Testing Demonstration_433.92MHz, ASK

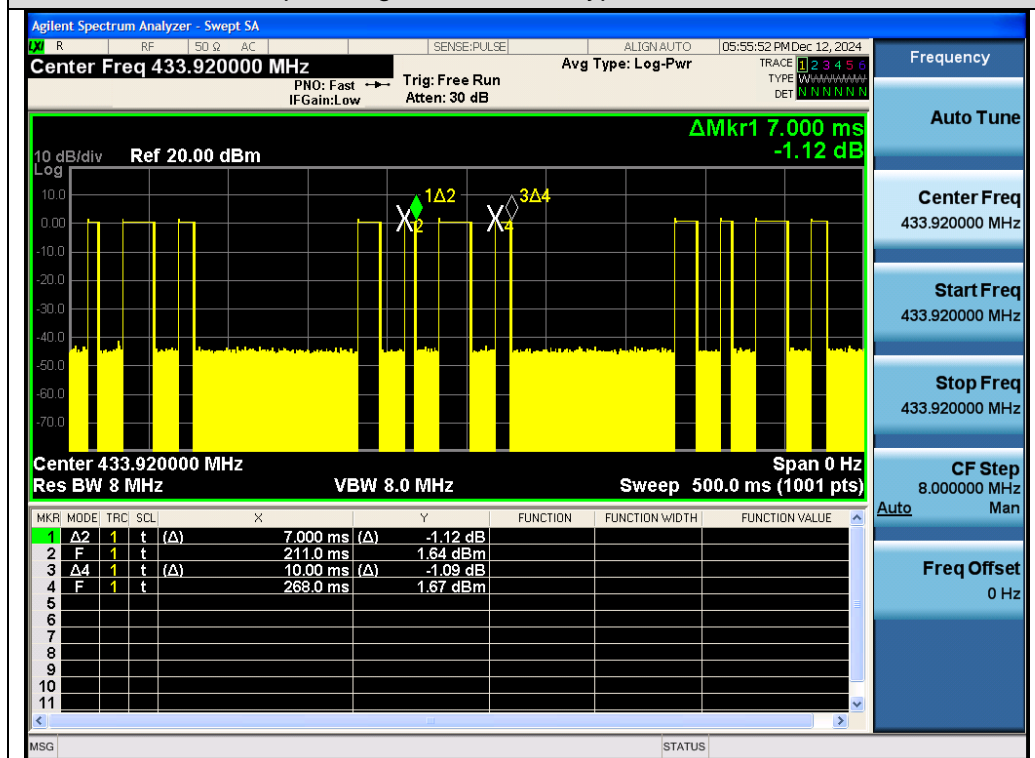
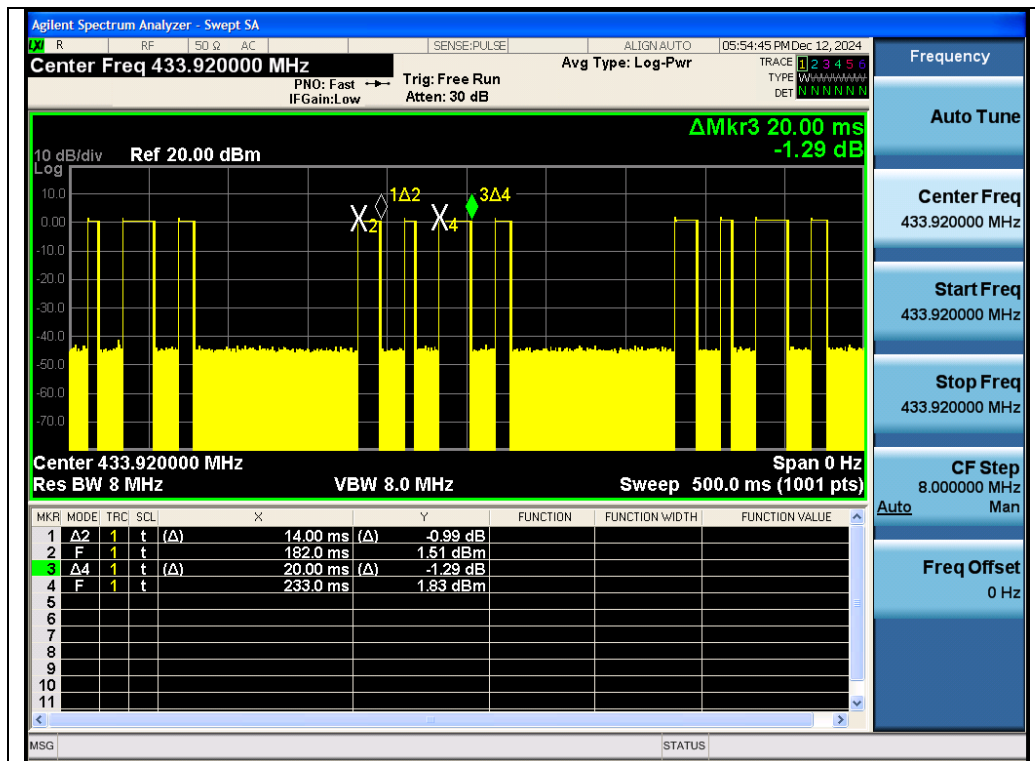


Test_Graph_Long Pulse_ Pulse Type 1_433.92MHz, ASK

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8. Field Strength of Fundamental and Radiated Emission

8.1 Provisions Applicable

- 15.209 Limit in the below table has to be followed:

| Frequency (MHz) | Distance Meters | Field Strengths Limit | |
|-----------------|-----------------|---|--------------------------|
| | | $\mu\text{V/m}$ | $\text{dB}\mu\text{V/m}$ |
| 0.009 ~ 0.490 | 300 | 2400/F(kHz) | --- |
| 0.490 ~ 1.705 | 30 | 24000/F(kHz) | --- |
| 1.705 ~ 30 | 30 | 30 | --- |
| 30 ~ 88 | 3 | 100 | 40.0 |
| 88 ~ 216 | 3 | 150 | 43.5 |
| 216 ~ 960 | 3 | 200 | 46.0 |
| 960 ~ 1000 | 3 | 500 | 54.0 |
| Above 1000 | 3 | 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) | |

Remark:

- 1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$
- 2) The smaller limit shall apply at the cross point between two frequency bands
- 3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

- 15.231(b) Limit in the below table has to be followed:

| Fundamental Frequency | Field Strength of Fundamental (microvolts/meter) | Field Strength of Harmonics (microvolts/meter) |
|-----------------------|--|--|
| 40.66-40.70MHz | 2250 | 225 |
| 70-130MHz | 1250 | 125 |
| 130-174MHz | 1250 to 3750 | 125 to 375 |
| 174-260MHz | 3750 | 375 |
| 260-470MHz | 3750 to 12500 | 375 to 1250 |
| Above 470MHz | 12500 | 1250 |

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15.231(e) Limit in the below table has to be followed:

| Fundamental Frequency | Field Strength of Fundamental (microvolts/meter) | Field Strength of Harmonics (microvolts/meter) |
|-----------------------|---|---|
| 40.66-40.70MHz | 1000 | 100 |
| 70-130MHz | 500 | 50 |
| 130-174MHz | 500 to 1500 | 50 to 150 |
| 174-260MHz | 1500 | 150 |
| 260-470MHz | 1500 to 5000 | 150 to 500 |
| Above 470MHz | 5000 | 500 |

8.2 Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.

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9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

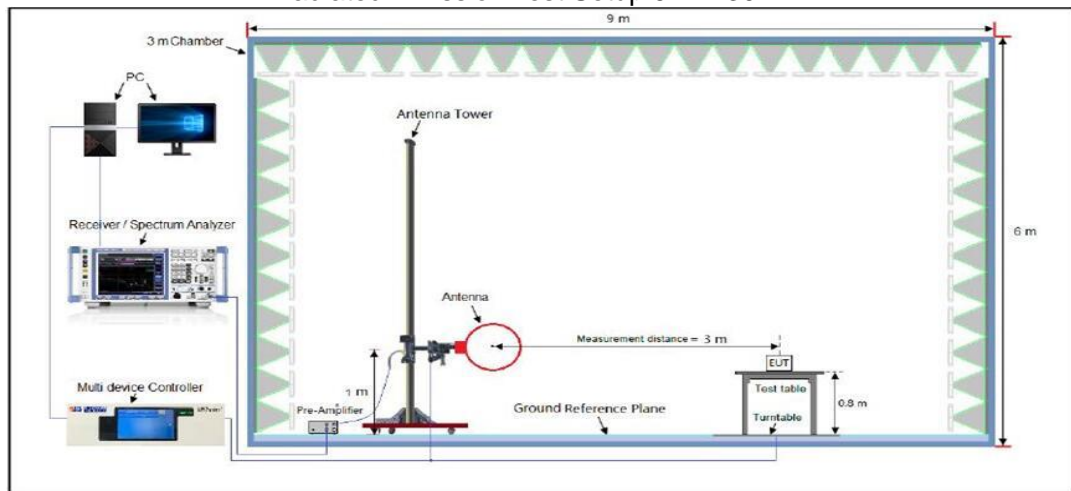
| Spectrum Parameter | Test Setting |
|-----------------------|---|
| Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP |
| Start ~Stop Frequency | 1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average |

| Receiver Parameter | Test Setting |
|-----------------------|--------------------------------|
| Start ~Stop Frequency | 9KHz~150KHz/RB 200Hz for QP |
| Start ~Stop Frequency | 150KHz~30MHz/RB 9KHz for QP |
| Start ~Stop Frequency | 30MHz~1000MHz/RB 120KHz for QP |

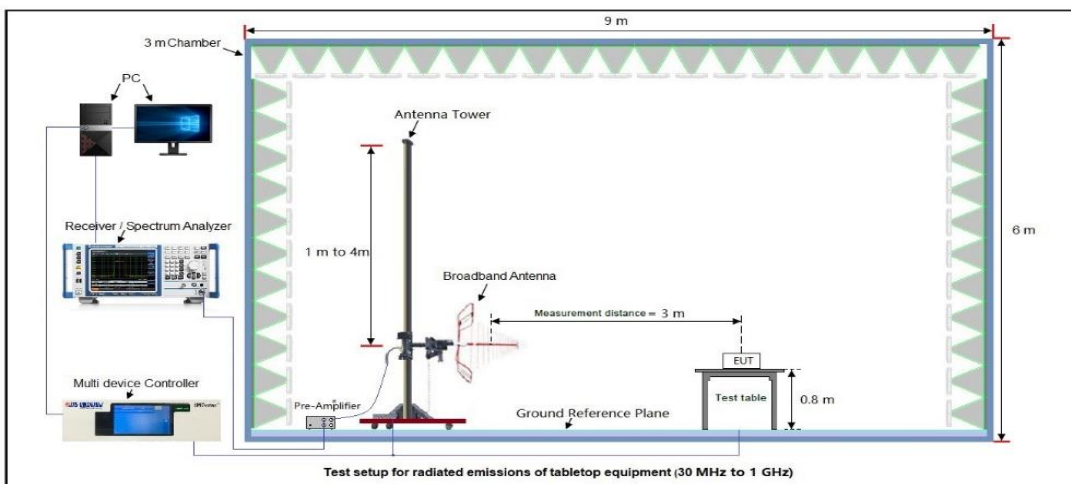
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8.3 Measurement Setup (Block Diagram of Configuration)

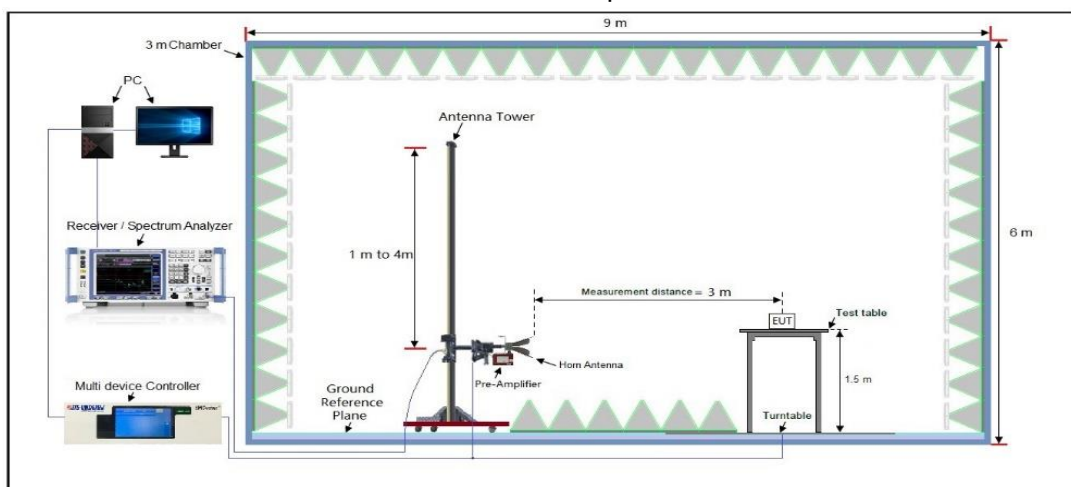
Radiated Emission Test Setup 9kHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



Radiated Emission Test Setup Above 1000MHz



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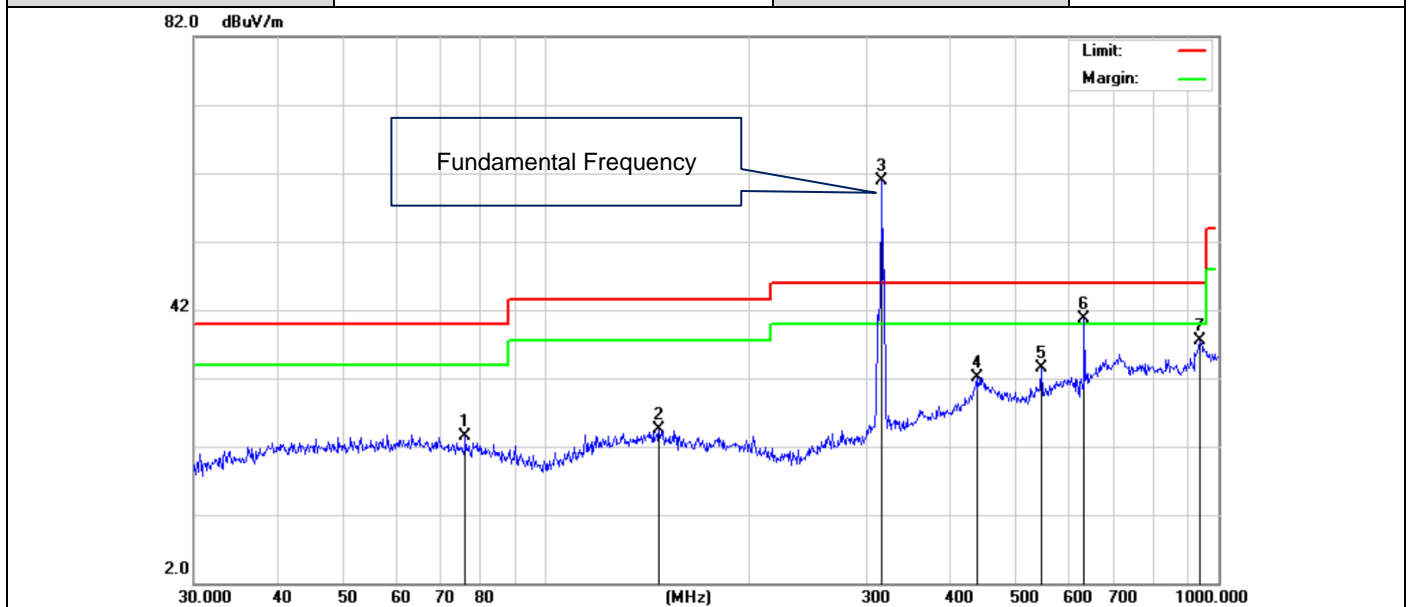
8.4 Measurement Result

Radiated Emission from 9kHz~30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

Radiated Emission from 30MHz~1000MHz

| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 1 | Antenna | Vertical |



Suspected Data List_ Peak Detection

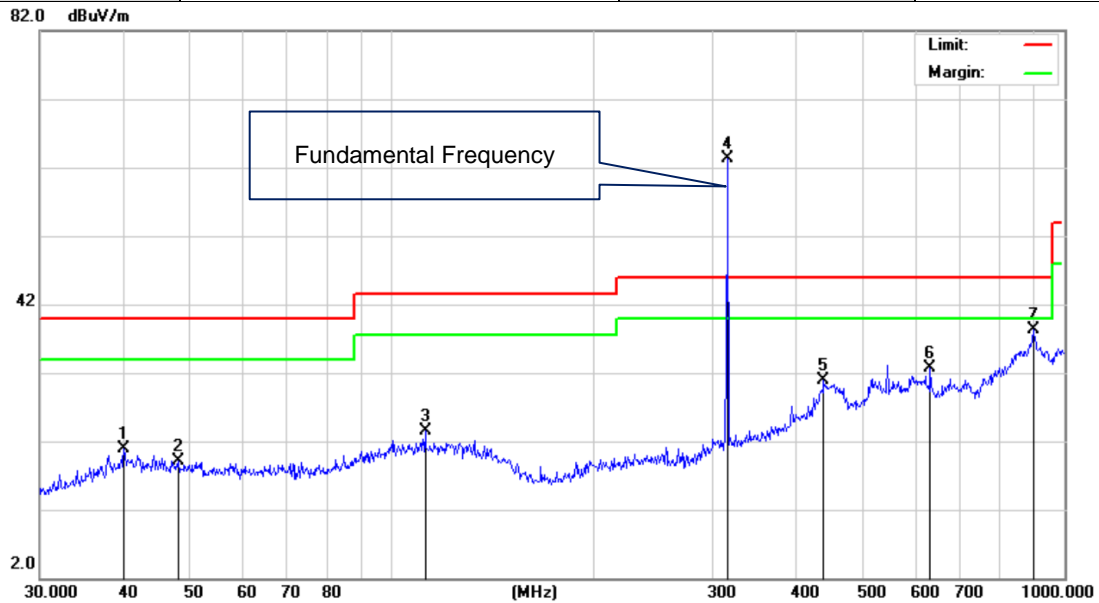
| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 75.9772 | 23.46 | 16.94 | 40.00 | 16.54 | 150 | 112 | Vertical |
| 2 | 147.4036 | 24.48 | 18.20 | 43.50 | 19.02 | 150 | 156 | Vertical |
| 3 | 315.000 | 60.92 | 19.98 | 95.62 | 34.70 | 150 | 131 | Vertical |
| 4 | 437.1197 | 32.13 | 25.64 | 46.00 | 13.87 | 150 | 100 | Vertical |
| 5 | 545.1825 | 33.55 | 24.67 | 46.00 | 12.45 | 150 | 144 | Vertical |
| 6 | 630.000 | 40.73 | 25.37 | 75.62 | 34.89 | 150 | 129 | Vertical |
| 7 | 938.8325 | 37.52 | 30.84 | 46.00 | 8.48 | 150 | 80 | Vertical |

Final Data Result_ Average Detection

| NO. | Freq. [MHz] | PK Level [dBμV/m] | Duty cycle factor(dB) | AV Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Polarity |
|-----|-------------|-------------------|-----------------------|-------------------|----------------|-------------|----------|
| 1 | 315.000 | 60.92 | -5.51 | 55.41 | 75.62 | 20.21 | Vertical |
| 2 | 630.000 | 40.73 | -5.51 | 35.22 | 55.62 | 20.40 | Vertical |

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| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 1 | Antenna | Horizontal |



Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 39.9941 | 21.00 | 13.90 | 40.00 | 19.0 | 150 | 112 | Horizontal |
| 2 | 48.1625 | 19.03 | 13.33 | 40.00 | 20.97 | 150 | 156 | Horizontal |
| 3 | 112.1304 | 23.57 | 16.32 | 43.50 | 19.93 | 150 | 131 | Horizontal |
| 4 | 315.000 | 63.31 | 16.50 | 95.62 | 32.31 | 150 | 100 | Horizontal |
| 5 | 438.6553 | 30.83 | 24.81 | 46.00 | 15.17 | 150 | 144 | Horizontal |
| 6 | 630.000 | 32.70 | 24.09 | 75.62 | 42.92 | 150 | 129 | Horizontal |
| 7 | 900.1473 | 38.34 | 31.78 | 46.00 | 7.66 | 150 | 80 | Horizontal |

Final Data Result_ Average Detection

| NO. | Freq. [MHz] | PK Level [dBμV/m] | Duty cycle factor(dB) | AV Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Polarity |
|-----|-------------|-------------------|-----------------------|-------------------|----------------|-------------|------------|
| 1 | 315.000 | 63.31 | -5.51 | 57.80 | 75.62 | 17.82 | Horizontal |
| 2 | 630.000 | 38.34 | -5.51 | 32.83 | 55.62 | 22.79 | Horizontal |

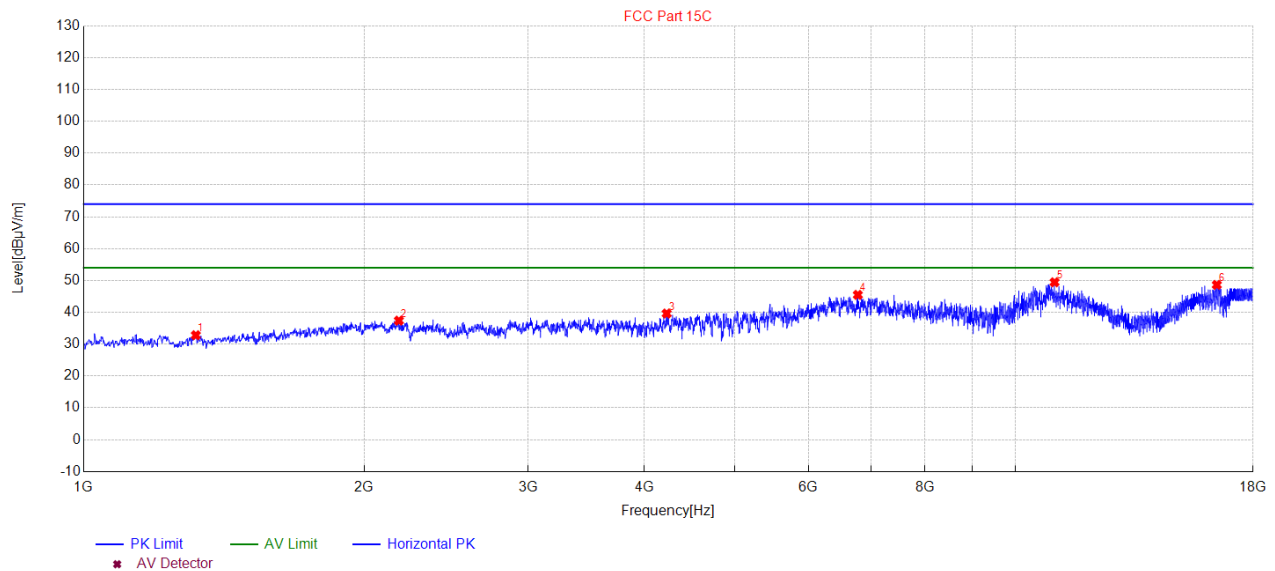
RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Limit-Measurement.

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Radiated Emission from Above 1GHz

| | | | |
|--------------------|---------------------|--------------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 1 | Antenna | Horizontal |



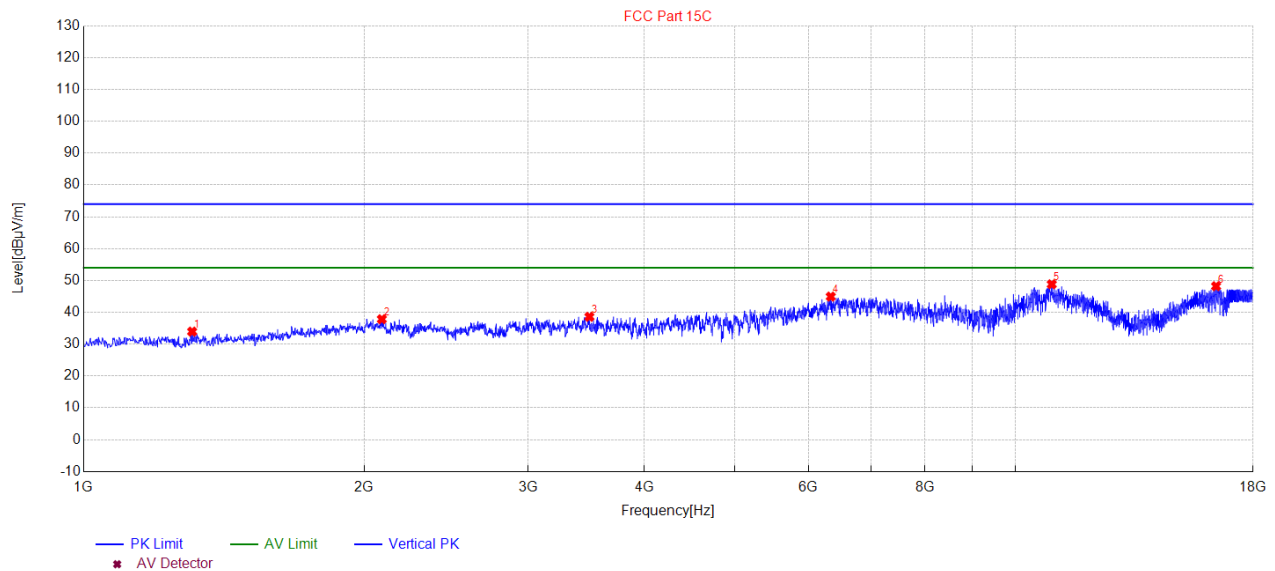
Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|--------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 1319.631963 | 32.81 | -17.83 | 74.00 | 41.19 | 150 | 359 | Horizontal |
| 2 | 2179.917992 | 37.39 | -12.98 | 74.00 | 36.61 | 150 | 38 | Horizontal |
| 3 | 4225.222522 | 39.61 | -9.03 | 74.00 | 34.39 | 150 | 42 | Horizontal |
| 4 | 6777.177718 | 45.48 | -4.00 | 74.00 | 28.52 | 150 | 42 | Horizontal |
| 5 | 11020.80208 | 49.44 | 2.62 | 74.00 | 24.56 | 150 | 48 | Horizontal |
| 6 | 16457.945795 | 48.62 | 5.56 | 74.00 | 25.38 | 150 | 114 | Horizontal |

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Radiated Emission from Above 1GHz

| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 1 | Antenna | Vertical |



Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|--------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 1307.730773 | 33.94 | -17.85 | 74.00 | 40.06 | 150 | 301 | Vertical |
| 2 | 2089.808981 | 37.84 | -13.19 | 74.00 | 36.16 | 150 | 39 | Vertical |
| 3 | 3490.749075 | 38.59 | -10.66 | 74.00 | 35.41 | 150 | 41 | Vertical |
| 4 | 6338.533853 | 44.94 | -4.79 | 74.00 | 29.06 | 150 | 50 | Vertical |
| 5 | 10944.294429 | 48.80 | 2.48 | 74.00 | 25.20 | 150 | 70 | Vertical |
| 6 | 16427.342734 | 48.20 | 5.51 | 74.00 | 25.80 | 150 | 220 | Vertical |

RESULT: PASS

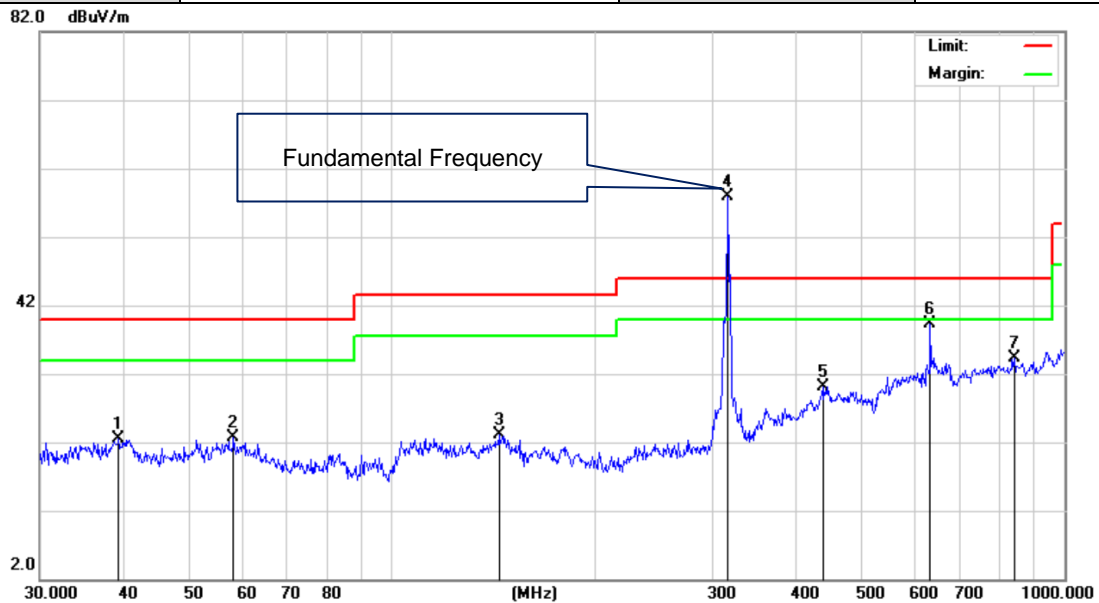
Note:

- Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measure result.
- The "Factor" value can be calculated automatically by software of measurement system.

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Radiated Emission from 30MHz~1000MHz

| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 2 | Antenna | Vertical |



Suspected Data List_ Peak Detection

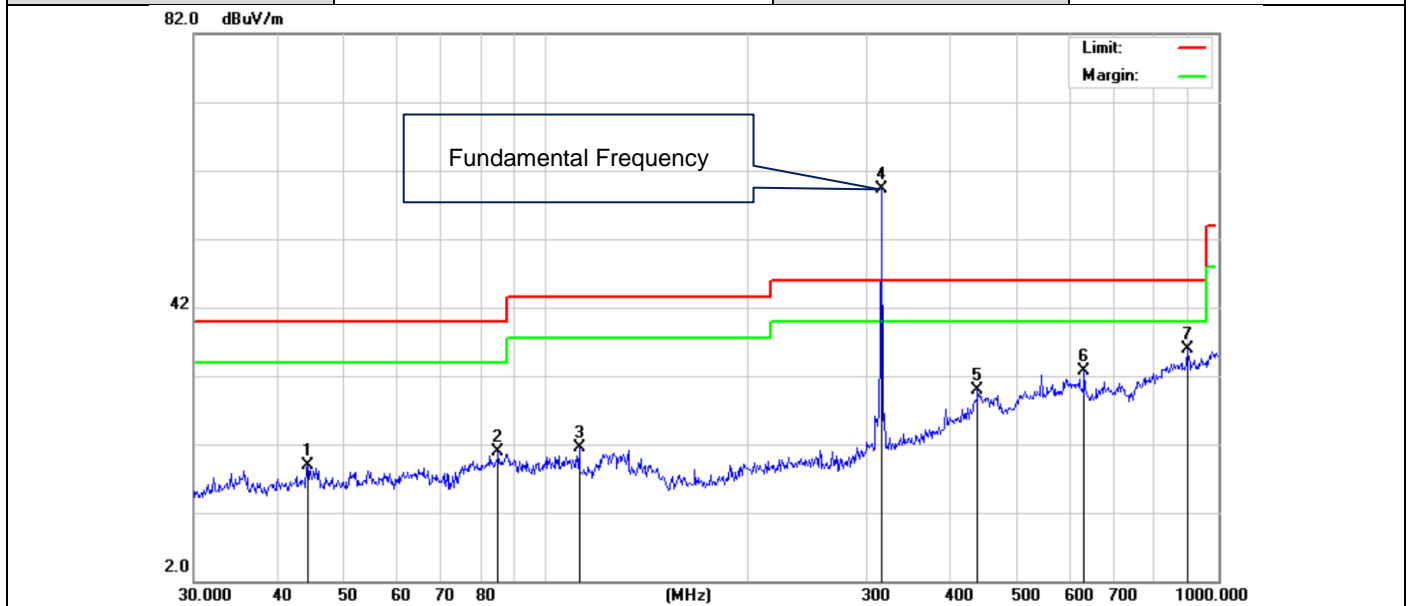
| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 39.2991 | 22.44 | 16.67 | 40.00 | 23.33 | 150 | 120 | Vertical |
| 2 | 58.2030 | 22.78 | 17.08 | 40.00 | 22.92 | 150 | 116 | Vertical |
| 3 | 144.3348 | 23.08 | 18.20 | 43.50 | 25.30 | 150 | 119 | Vertical |
| 4 | 315.0000 | 57.92 | 19.98 | 95.62 | 75.64 | 150 | 162 | Vertical |
| 5 | 437.1197 | 30.13 | 25.64 | 46.00 | 20.36 | 150 | 185 | Vertical |
| 6 | 630.000 | 39.23 | 25.37 | 75.62 | 50.25 | 150 | 174 | Vertical |
| 7 | 842.1295 | 34.27 | 27.56 | 46.00 | 18.44 | 150 | 90 | Vertical |

Final Data Result_ Average Detection

| NO. | Freq. [MHz] | PK Level [dBμV/m] | Duty cycle factor(dB) | AV Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Polarity |
|-----|-------------|-------------------|-----------------------|-------------------|----------------|-------------|----------|
| 1 | 315.000 | 57.92 | -6.02 | 51.90 | 75.62 | 23.72 | Vertical |
| 2 | 630.000 | 39.23 | -6.02 | 33.21 | 55.62 | 22.41 | Vertical |

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| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 2 | Antenna | Horizontal |



Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 44.2751 | 18.82 | 13.60 | 40.00 | 26.40 | 150 | 134 | Horizontal |
| 2 | 84.9993 | 20.95 | 13.87 | 40.00 | 26.13 | 150 | 117 | Horizontal |
| 3 | 112.1304 | 21.57 | 16.32 | 43.50 | 27.18 | 150 | 163 | Horizontal |
| 4 | 315.0000 | 59.31 | 16.50 | 95.62 | 79.12 | 150 | 119 | Horizontal |
| 5 | 438.6553 | 29.83 | 24.81 | 46.00 | 21.19 | 150 | 152 | Horizontal |
| 6 | 630.0000 | 32.70 | 24.09 | 75.62 | 51.53 | 150 | 174 | Horizontal |
| 7 | 900.1473 | 35.84 | 31.78 | 46.00 | 14.22 | 150 | 100 | Horizontal |

Final Data Result_ Average Detection

| NO. | Freq. [MHz] | PK Level [dBμV/m] | Duty cycle factor(dB) | AV Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Polarity |
|-----|-------------|-------------------|-----------------------|-------------------|----------------|-------------|------------|
| 1 | 315.000 | 59.31 | -6.02 | 53.29 | 75.62 | 22.33 | Horizontal |
| 2 | 630.000 | 32.70 | -6.02 | 26.68 | 55.62 | 28.94 | Horizontal |

RESULT: PASS

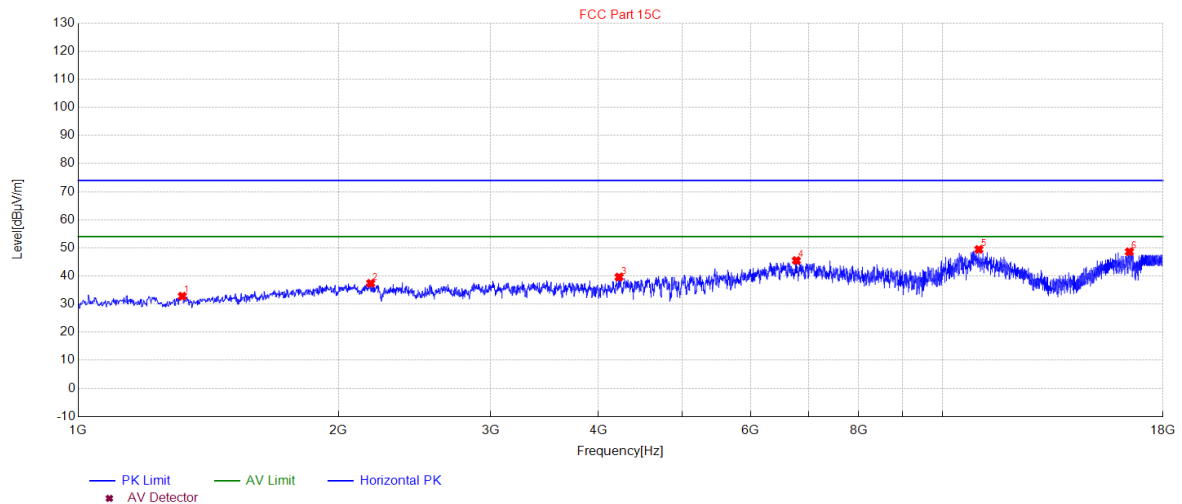
Note: 1. Factor=Antenna Factor + Cable loss, Margin=Limit-Measurement.

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Radiated Emission from Above 1GHz

| | | | |
|--------------------|---------------------|--------------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 2 | Antenna | Horizontal |



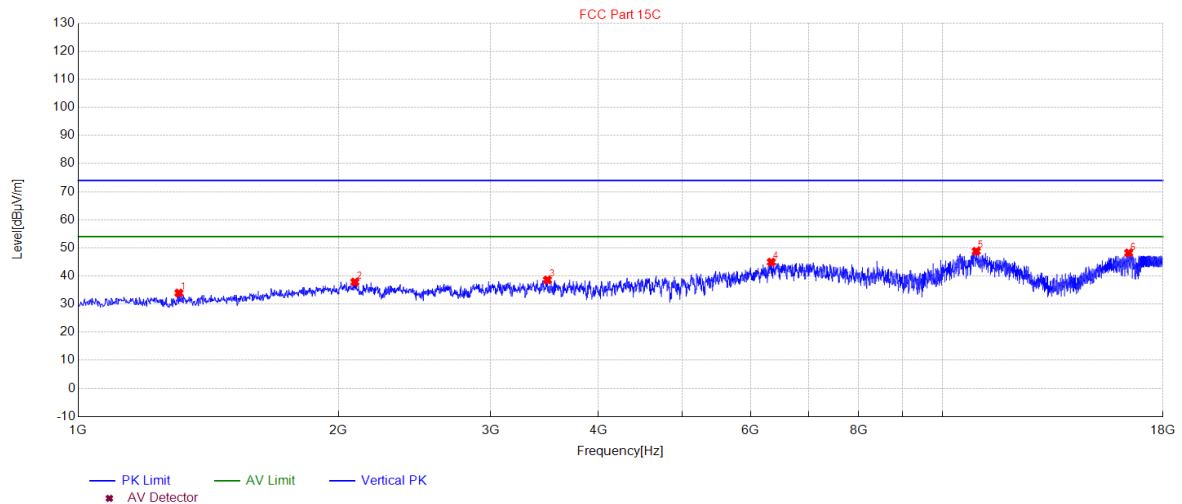
Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|--------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 1319.631963 | 32.81 | -17.83 | 74.00 | 41.19 | 150 | 30 | Horizontal |
| 2 | 2179.917992 | 37.39 | -12.98 | 74.00 | 36.61 | 150 | 270 | Horizontal |
| 3 | 4225.222522 | 39.61 | -9.03 | 74.00 | 34.39 | 150 | 320 | Horizontal |
| 4 | 6777.177718 | 45.48 | -4.00 | 74.00 | 28.52 | 150 | 50 | Horizontal |
| 5 | 11020.80208 | 49.44 | 2.62 | 74.00 | 24.56 | 150 | 250 | Horizontal |
| 6 | 16457.945795 | 48.62 | 5.56 | 74.00 | 25.38 | 150 | 260 | Horizontal |

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Radiated Emission from Above 1GHz

| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 2 | Antenna | Vertical |



Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|--------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 1307.730773 | 33.94 | -17.85 | 74.00 | 40.06 | 150 | 200 | Vertical |
| 2 | 2089.808981 | 37.84 | -13.19 | 74.00 | 36.16 | 150 | 150 | Vertical |
| 3 | 3490.749075 | 38.59 | -10.66 | 74.00 | 35.41 | 150 | 90 | Vertical |
| 4 | 6338.533853 | 44.94 | -4.79 | 74.00 | 29.06 | 150 | 250 | Vertical |
| 5 | 10944.294429 | 48.80 | 2.48 | 74.00 | 25.20 | 150 | 60 | Vertical |
| 6 | 16427.342734 | 48.20 | 5.51 | 74.00 | 25.80 | 150 | 230 | Vertical |

RESULT: PASS

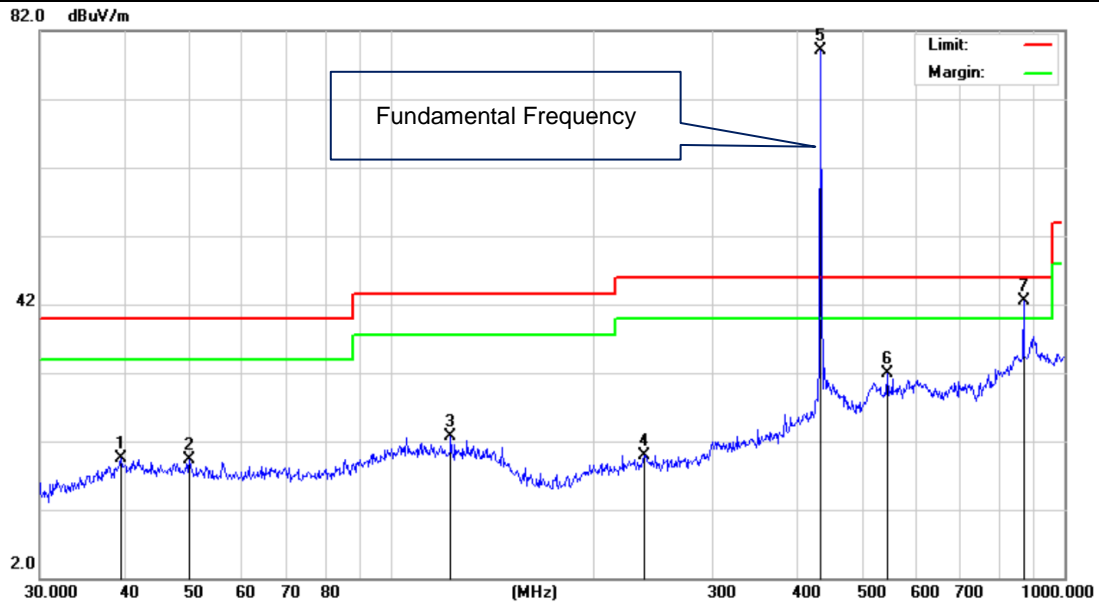
Note:

- Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measure result.
- The "Factor" value can be calculated automatically by software of measurement system.

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Radiated Emission from 30MHz~1000MHz

| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 3 | Antenna | Vertical |



Suspected Data List_ Peak Detection

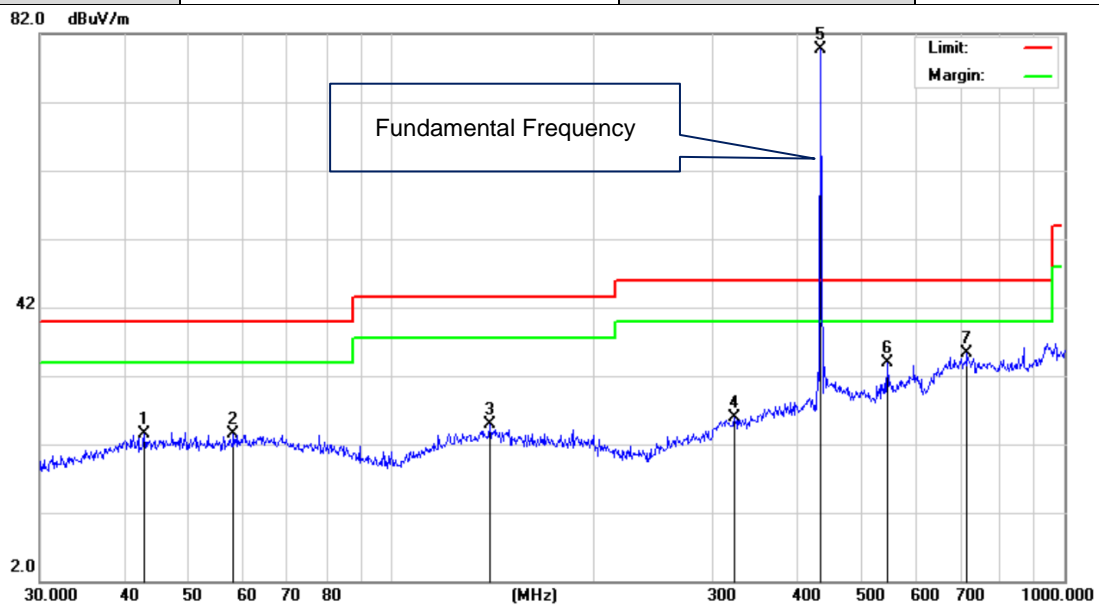
| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 39.5756 | 19.41 | 13.72 | 40.00 | 20.59 | 150 | 140 | Vertical |
| 2 | 50.0566 | 19.33 | 13.20 | 40.00 | 20.67 | 150 | 202 | Vertical |
| 3 | 122.4039 | 22.68 | 16.26 | 43.50 | 20.82 | 150 | 160 | Vertical |
| 4 | 237.4759 | 19.87 | 15.27 | 46.00 | 26.13 | 150 | 200 | Vertical |
| 5 | 433.92 | 79.11 | 23.82 | 100.82 | 21.71 | 150 | 80 | Vertical |
| 6 | 545.1825 | 31.97 | 23.98 | 46.00 | 14.03 | 150 | 109 | Vertical |
| 7 | 867.84 | 42.48 | 29.19 | 80.82 | 38.34 | 150 | 60 | Vertical |

Final Data Result_ Average Detection

| NO. | Freq. [MHz] | PK Level [dBμV/m] | Duty cycle factor(dB) | AV Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Polarity |
|-----|-------------|-------------------|-----------------------|-------------------|----------------|-------------|----------|
| 1 | 433.92 | 79.11 | -6.02 | 73.09 | 75.62 | 2.53 | Vertical |
| 2 | 867.84 | 42.48 | -6.02 | 36.46 | 55.62 | 19.16 | Vertical |

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| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 3 | Antenna | Horizontal |



Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 42.8997 | 23.59 | 16.93 | 40.00 | 16.41 | 150 | 170 | Horizontal |
| 2 | 58.2030 | 23.43 | 17.08 | 40.00 | 16.57 | 150 | 202 | Horizontal |
| 3 | 139.8507 | 24.88 | 18.20 | 43.50 | 18.62 | 150 | 156 | Horizontal |
| 4 | 323.3204 | 25.87 | 20.18 | 46.00 | 20.13 | 150 | 80 | Horizontal |
| 5 | 433.92 | 79.75 | 25.15 | 100.82 | 21.07 | 150 | 40 | Horizontal |
| 6 | 545.1825 | 33.95 | 24.67 | 46.00 | 12.05 | 150 | 189 | Horizontal |
| 7 | 867.84 | 35.33 | 28.68 | 80.82 | 45.49 | 150 | 60 | Horizontal |

Final Data Result _ Average Detection

| NO. | Freq. [MHz] | PK Level [dBμV/m] | Duty cycle factor(dB) | AV Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Polarity |
|-----|-------------|-------------------|-----------------------|-------------------|----------------|-------------|------------|
| 1 | 433.92 | 79.75 | -6.02 | 73.73 | 75.62 | 1.89 | Horizontal |
| 2 | 867.84 | 35.33 | -6.02 | 29.31 | 55.62 | 26.31 | Horizontal |

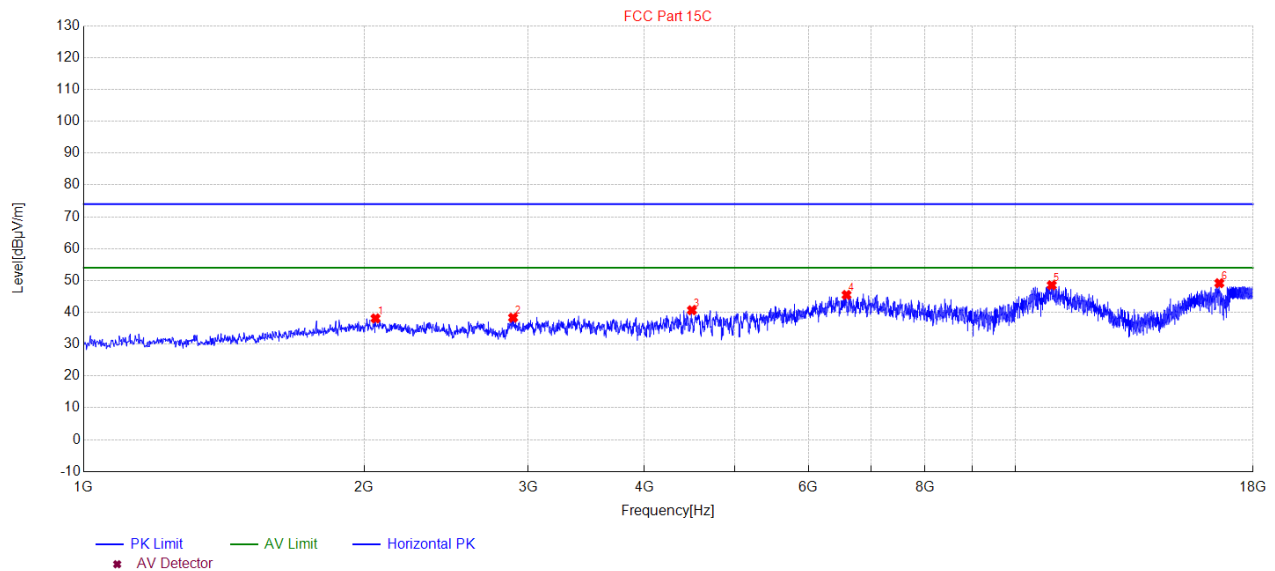
RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Limit-Measurement.

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Radiated Emission from Above 1GHz

| | | | |
|--------------------|---------------------|--------------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 3 | Antenna | Horizontal |



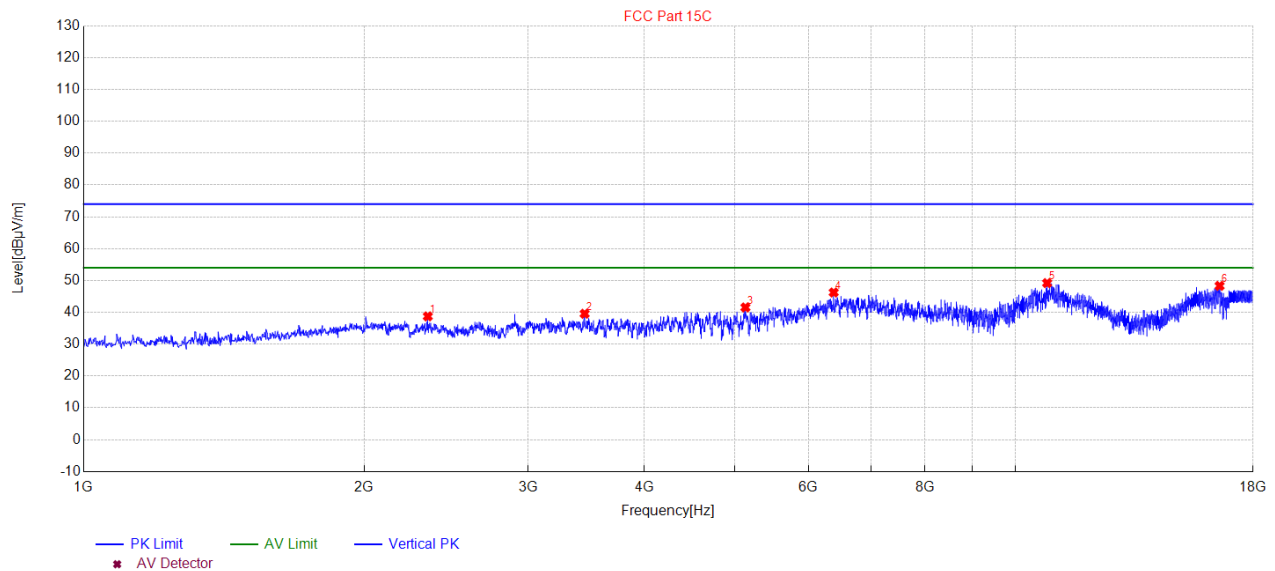
Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|--------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 2057.505751 | 38.08 | -13.27 | 74.00 | 35.92 | 150 | 296 | Horizontal |
| 2 | 2890.589059 | 38.31 | -12.02 | 74.00 | 35.69 | 150 | 23 | Horizontal |
| 3 | 4497.249725 | 40.65 | -7.90 | 74.00 | 33.35 | 150 | 100 | Horizontal |
| 4 | 6590.159016 | 45.45 | -4.33 | 74.00 | 28.55 | 150 | 160 | Horizontal |
| 5 | 10944.294429 | 48.51 | 2.48 | 74.00 | 25.49 | 150 | 100 | Horizontal |
| 6 | 16559.955996 | 49.15 | 5.69 | 74.00 | 24.85 | 150 | 114 | Horizontal |

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Radiated Emission from Above 1GHz

| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 3 | Antenna | Vertical |



Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|--------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 2341.434143 | 38.73 | -12.59 | 74.00 | 35.27 | 150 | 259 | Vertical |
| 2 | 3449.944995 | 39.56 | -10.77 | 74.00 | 34.44 | 150 | 40 | Vertical |
| 3 | 5133.113311 | 41.53 | -7.54 | 74.00 | 32.47 | 150 | 80 | Vertical |
| 4 | 6384.438444 | 46.23 | -4.70 | 74.00 | 27.77 | 150 | 160 | Vertical |
| 5 | 10820.182018 | 49.18 | 2.07 | 74.00 | 24.82 | 150 | 180 | Vertical |
| 6 | 16571.857186 | 48.30 | 5.70 | 74.00 | 25.70 | 150 | 270 | Vertical |

RESULT: PASS

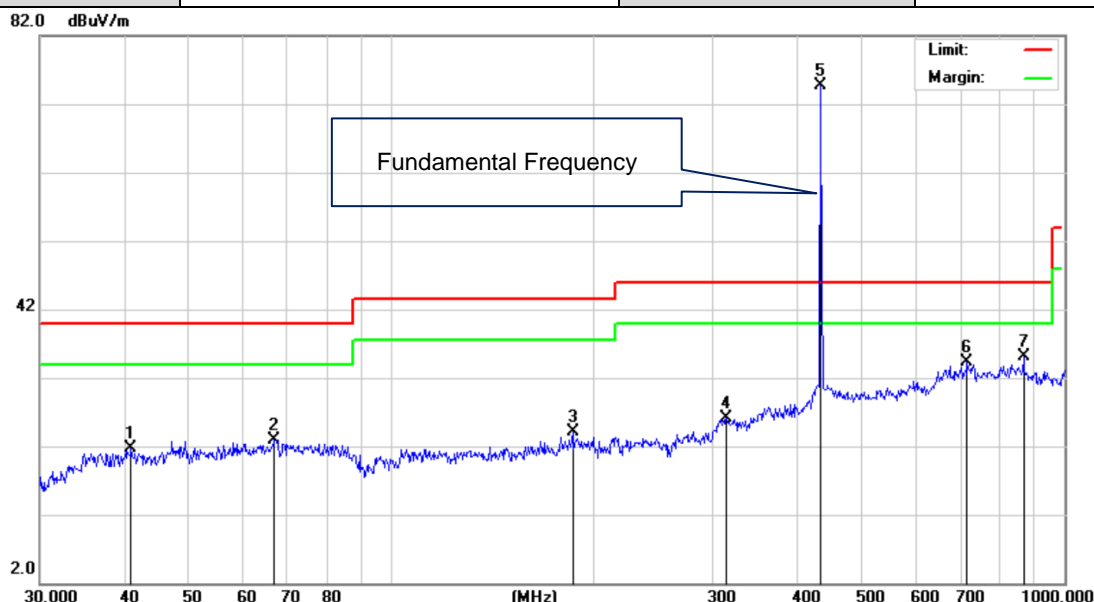
Note:

- Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measure result.
- The "Factor" value can be calculated automatically by software of measurement system.

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Radiated Emission from 30MHz~1000MHz

| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 4 | Antenna | Vertical |



Suspected Data List_ Peak Detection

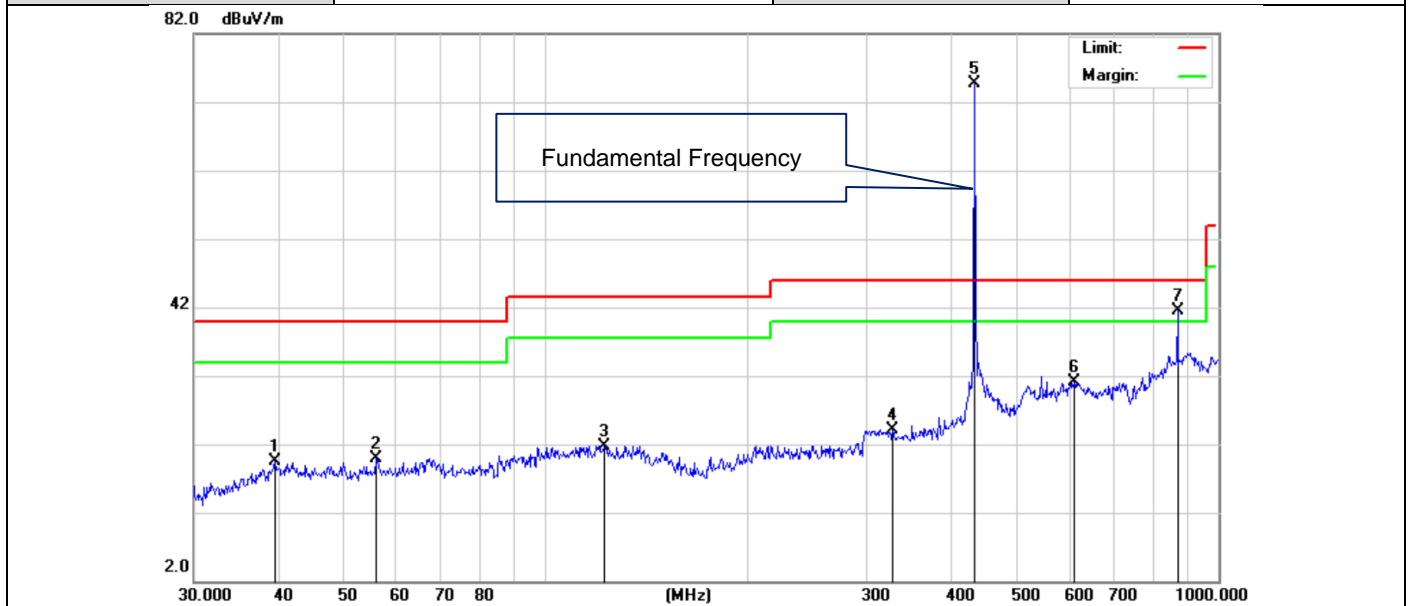
| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 40.9881 | 21.71 | 16.91 | 40.00 | 23.09 | 150 | 70 | Vertical |
| 2 | 66.9668 | 23.00 | 17.03 | 40.00 | 22.97 | 150 | 123 | Vertical |
| 3 | 185.7881 | 24.02 | 18.33 | 43.50 | 25.17 | 150 | 147 | Vertical |
| 4 | 314.3765 | 26.07 | 19.91 | 46.00 | 26.09 | 150 | 166 | Vertical |
| 5 | 433.92 | 74.75 | 25.15 | 100.82 | 75.67 | 150 | 149 | Vertical |
| 6 | 716.6820 | 34.33 | 28.68 | 46.00 | 17.32 | 150 | 141 | Vertical |
| 7 | 867.84 | 35.02 | 27.73 | 80.82 | 53.09 | 150 | 150 | Vertical |

Final Data Result_ Average Detection

| NO. | Freq. [MHz] | PK Level [dBμV/m] | Duty cycle factor(dB) | AV Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Polarity |
|-----|-------------|-------------------|-----------------------|-------------------|----------------|-------------|----------|
| 1 | 433.92 | 74.75 | -5.85 | 68.9 | 75.62 | 6.72 | Vertical |
| 2 | 867.84 | 35.02 | -5.85 | 29.17 | 55.62 | 26.45 | Vertical |

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| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 4 | Antenna | Horizontal |



Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 39.5756 | 19.41 | 13.72 | 40.00 | 26.28 | 150 | 163 | Horizontal |
| 2 | 56.0007 | 19.82 | 12.78 | 40.00 | 27.22 | 150 | 174 | Horizontal |
| 3 | 121.9754 | 21.76 | 16.28 | 43.50 | 27.22 | 150 | 166 | Horizontal |
| 4 | 327.8872 | 24.07 | 16.74 | 46.00 | 29.26 | 150 | 149 | Horizontal |
| 5 | 433.92 | 74.61 | 23.82 | 100.82 | 77.00 | 150 | 179 | Horizontal |
| 6 | 609.9215 | 31.03 | 25.15 | 46.00 | 20.85 | 150 | 133 | Horizontal |
| 7 | 867.84 | 41.48 | 29.19 | 80.82 | 51.63 | 150 | 60 | Horizontal |

Final Data Result_ Average Detection

| NO. | Freq. [MHz] | PK Level [dBμV/m] | Duty cycle factor(dB) | AV Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Polarity |
|-----|-------------|-------------------|-----------------------|-------------------|----------------|-------------|------------|
| 1 | 433.92 | 74.61 | -5.85 | 68.76 | 75.62 | 6.86 | Horizontal |
| 2 | 867.84 | 41.48 | -5.85 | 35.63 | 55.62 | 19.99 | Horizontal |

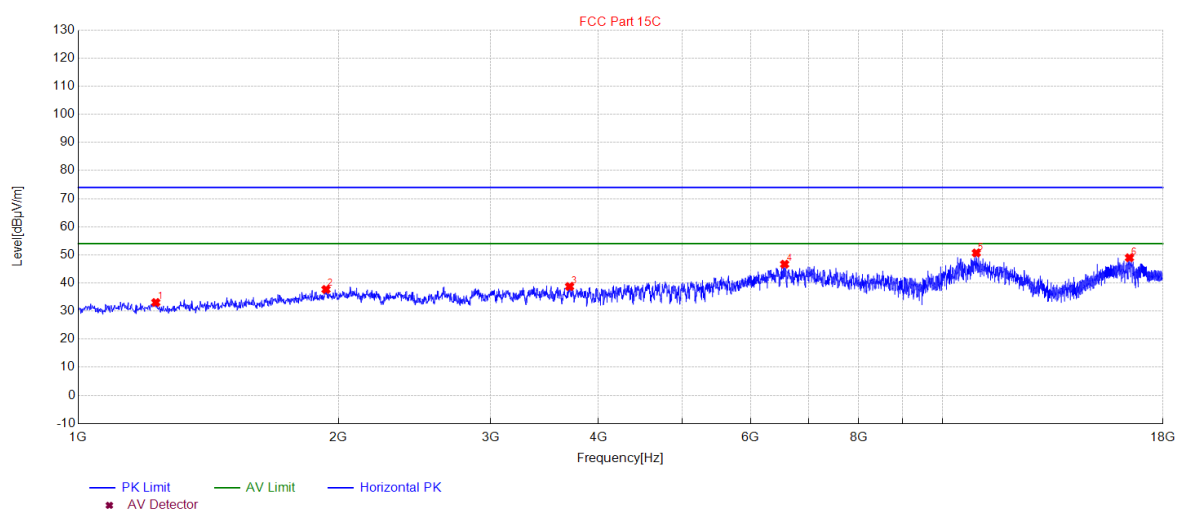
RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Limit-Measurement.

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Radiated Emission from Above 1GHz

| | | | |
|--------------------|---------------------|--------------------------|----------------|
| EUT Name | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 4 | Antenna | Horizontal |



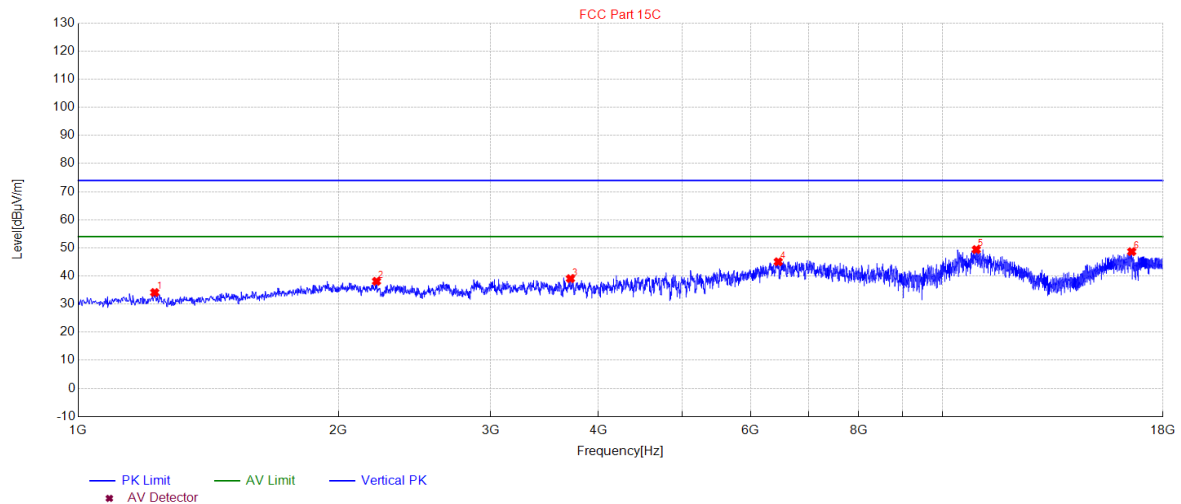
Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|--------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1 | 1229.522952 | 33.05 | -17.97 | 74.00 | 40.95 | 150 | 270 | Horizontal |
| 2 | 1935.093509 | 37.69 | -13.94 | 74.00 | 36.31 | 150 | 80 | Horizontal |
| 3 | 3703.270327 | 38.73 | -10.37 | 74.00 | 35.27 | 150 | 250 | Horizontal |
| 4 | 6568.056806 | 46.67 | -4.37 | 74.00 | 27.33 | 150 | 150 | Horizontal |
| 5 | 10945.9946 | 50.67 | 2.48 | 74.00 | 23.33 | 150 | 180 | Horizontal |
| 6 | 16461.346135 | 48.97 | 5.57 | 74.00 | 25.03 | 150 | 80 | Horizontal |

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Radiated Emission from Above 1GHz

| | | | |
|-------------|---------------------|-------------------|----------------|
| EUT | UNIVERSAL SMART KEY | Model Name | IKEYLR005AL |
| Temperature | 25° C | Relative Humidity | 55.4% |
| Pressure | 960hPa | Test Voltage | Normal Voltage |
| Test Mode | Mode 4 | Antenna | Vertical |



Suspected Data List_ Peak Detection

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|--------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1 | 1226.122612 | 34.11 | -17.98 | 74.00 | 39.89 | 150 | 30 | Vertical |
| 2 | 2213.921392 | 38.11 | -12.89 | 74.00 | 35.89 | 150 | 270 | Vertical |
| 3 | 3711.771177 | 39.05 | -10.36 | 74.00 | 34.95 | 150 | 110 | Vertical |
| 4 | 6457.545755 | 45.05 | -4.57 | 74.00 | 28.95 | 150 | 120 | Vertical |
| 5 | 10945.9946 | 49.39 | 2.48 | 74.00 | 24.61 | 150 | 190 | Vertical |
| 6 | 16561.656166 | 48.66 | 5.69 | 74.00 | 25.34 | 150 | 110 | Vertical |

RESULT: PASS

Note:

- Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measure result.
- The "Factor" value can be calculated automatically by software of measurement system.

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9. -20dB Bandwidth Measurement

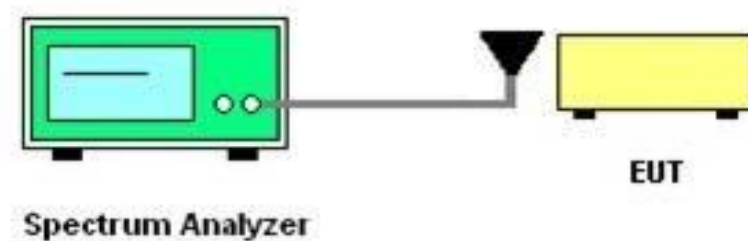
9.1 Provisions Applicable

According to FCC Part 15.231(c), 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. Bandwidth is determined at the points 20 dB down from the modulated carrier

9.2 Measurement Procedure

1. Set the parameters of SPA as below:
2. Centre frequency = Operation Frequency
3. RBW=3kHz, VBW=10kHz
4. Span: 300kHz/500kHz
5. Sweep time: Auto
6. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
7. Record the plots and Reported.

9.3 Measurement Setup (Block Diagram of Configuration)



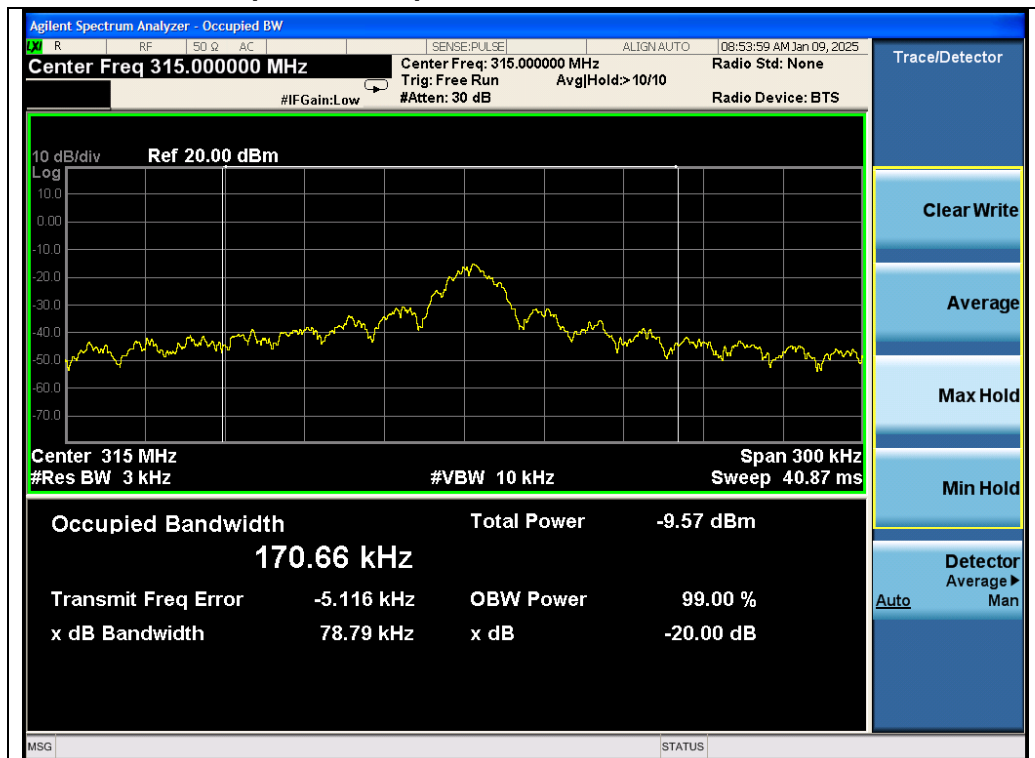
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9.4 Measurement Result

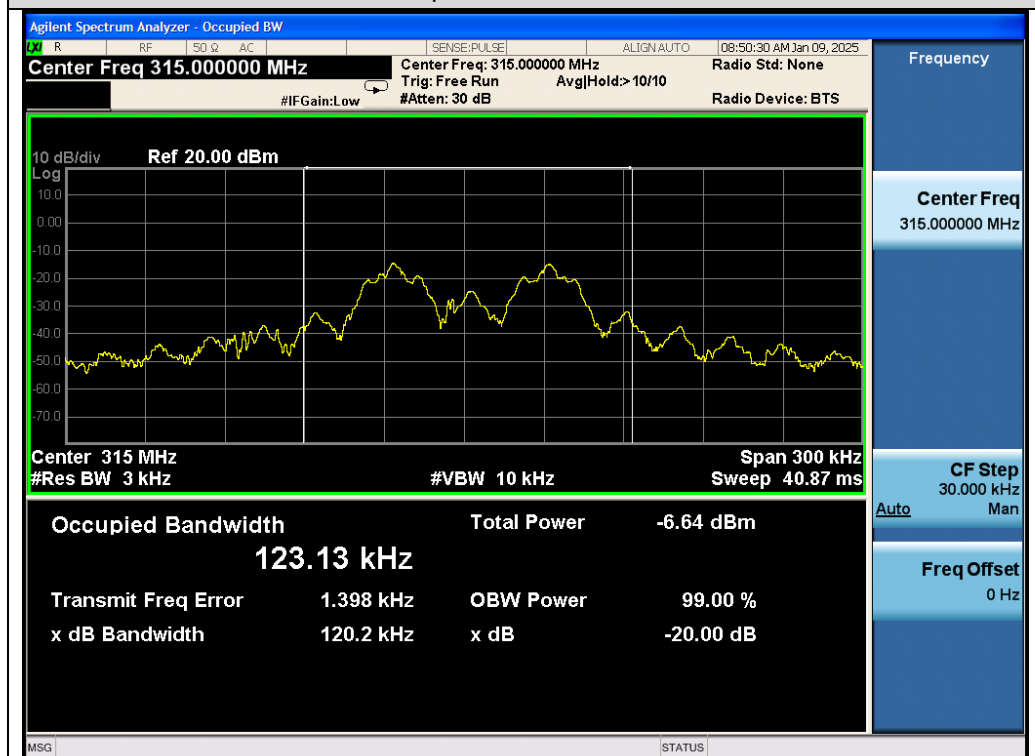
| Test Data of Bandwidth Measurement | | | | | |
|------------------------------------|--------------------|------------------------------|-----------------------|--------------|--------------|
| Test Mode | Test Channel (MHz) | 99% Occupied Bandwidth (kHz) | -20dB Bandwidth (kHz) | Limits (kHz) | Pass or Fail |
| Mode 1 | 315 | 170.66 | 78.79 | 787.5 | Pass |
| Mode 2 | 315 | 123.13 | 120.20 | 787.5 | Pass |
| Mode 3 | 433.92 | 235.20 | 78.25 | 1084.8 | Pass |
| Mode 4 | 433.92 | 154.48 | 121.30 | 1084.8 | Pass |

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Test Graphs of Occupied Bandwidth and -20dB Bandwidth

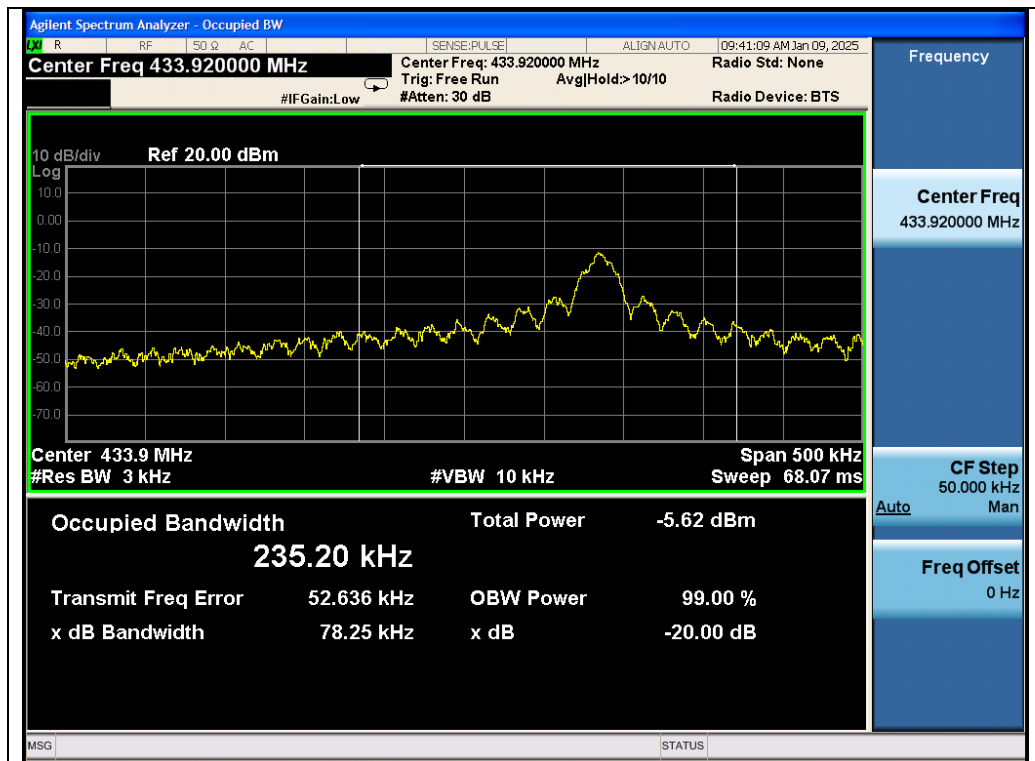


Test_Graph_ASK_315MHz_OBW

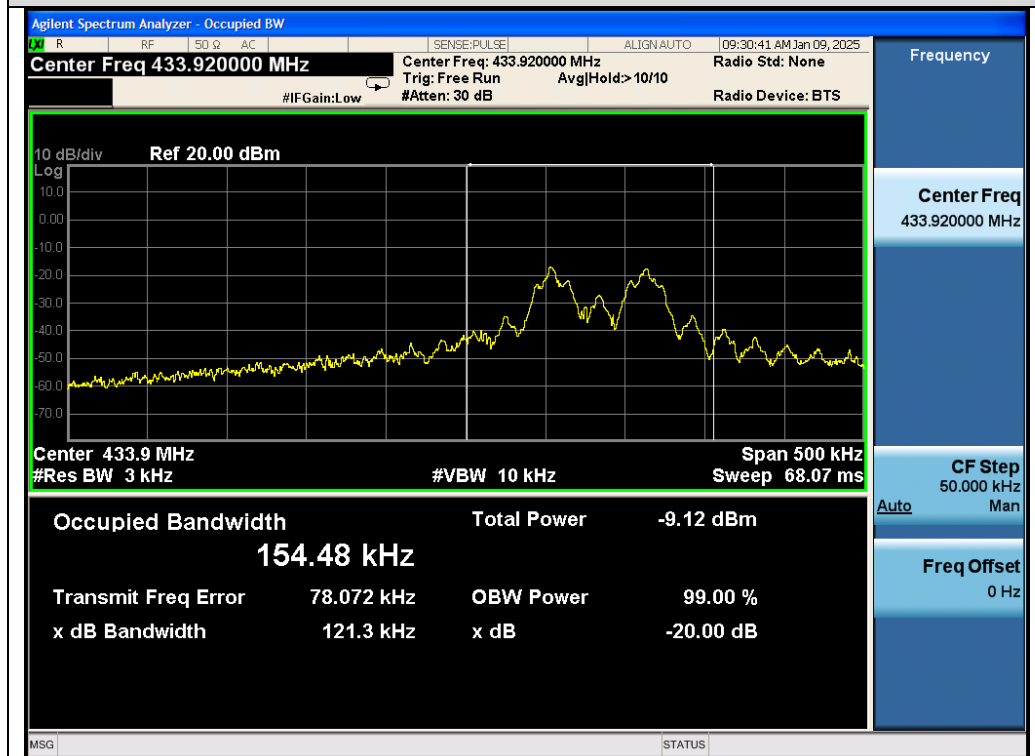


Test_Graph_FSK_315MHz_OBW

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Test_Graph_ASK_433.92MHz_OBW



Test_Graph_FSK_433.92MHz_OBW

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10. AC Power Line Conducted Emission Test

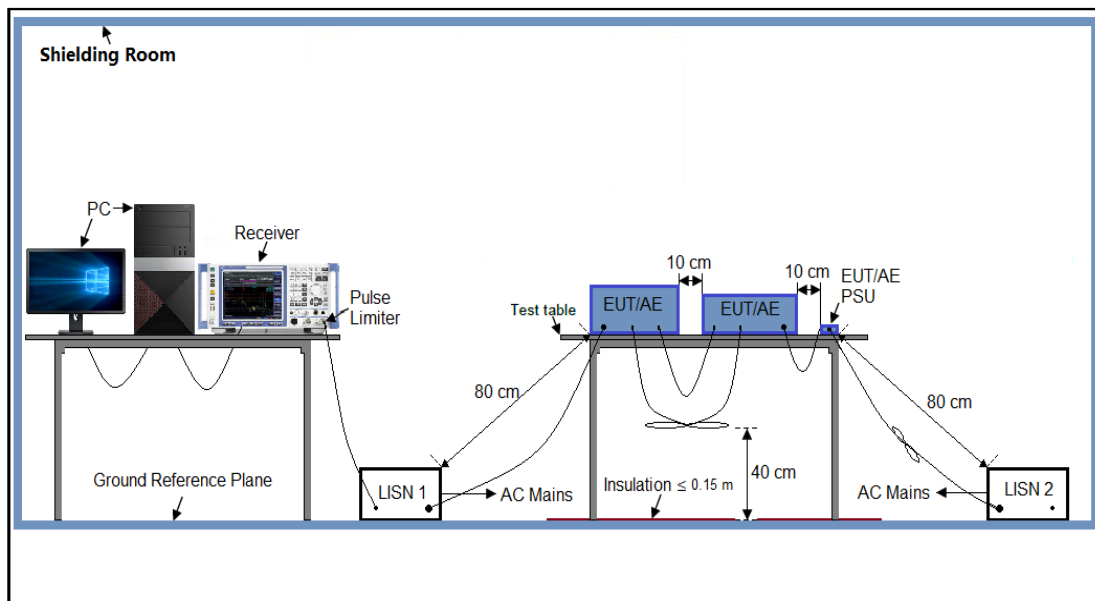
10.1 Measurement Limit

| Frequency Range | Maximum RF Line Voltage | |
|-----------------|-------------------------|----------------------|
| | Q.P. (dB μ V) | Average (dB μ V) |
| 150kHz~500kHz | 66-56 | 56-46 |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

10.2 Measurement Setup (Block Diagram of Configuration)



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10.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 3V power from battery.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

10.4 Final Procedure of Line Conducted Emission Test

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

10.5 Measurement Result

Not Applicable

Note: This device is battery powered, there is no AC power supply

Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC16740241105AP01

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC16740241105AP02

-----End of Report-----

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