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Report No.: SHEM160100023202
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1 Cover Page

RF Test Report

| | |
|---|---|
| Application No.: | SHEM1601000232CR |
| Applicant: | Hangzhou Hikvision Digital Technology Co., Ltd. |
| FCC ID: | 2ADTD-KD81V |
| IC: | 20199-KD81V |
| Equipment Under Test (EUT): NOTE: The following sample(s) was/were submitted and identified by the client as | |
| Product Name: | Video Intercom Door Station |
| Model No.(EUT): | DS-KD8102-V |
| Add Model No.: | DS-KD8XXX-XYZ |
| Standards: | FCC PART 15 Subpart C: 2014 RSS-210 Issue 8 (December 2010) RSS-Gen Issue 4 (December 2014) |
| Date of Receipt: | January 20, 2016 |
| Date of Test: | January 24, 2016 |
| Date of Issue: | March 29, 2016 |
| Test Result: | Pass* |

*In the configuration tested, the EUT detailed in this report complied with the standards specified above.



Parlam Zhan
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.



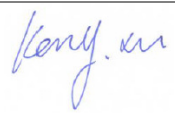
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

| Revision Record | | | | |
|-----------------|---------|----------------|----------|----------|
| Version | Chapter | Date | Modifier | Remark |
| 00 | / | March 29, 2016 | / | Original |
| | | | | |
| | | | | |
| | | | | |

| | | | |
|--------------------------|--|----------------------------------|---|
| Authorized for issue by: | | | |
| Engineer | | Eddy Zong _____ Print Name |  |
| Clerk | | Susie Liu _____ Print Name |  |
| Reviewer | | Kenx Xu _____ Print Name |  |

3 Test

Summary

| Test Item | Test Requirement | IC Reference | Test Method | Result |
|-------------------------------------|--|--------------------------|---------------------------------------|--------|
| Antenna Requirement | 47 CFR Part 15, Subpart C Section 15.203 | RSS-Gen 7.1.2 | / | PASS |
| AC Power Line Conducted Emission | 47 CFR Part 15, Subpart C Section 15.207 | RSS-Gen Section 7.2.4 | ANSI C63.10 (2013) Section 6.2 | PASS |
| Emission Mask | 47 CFR Part 15, Subpart C Section 15.225(a)/(b)/(c) | RSS-Gen section 4.9 | ANSI C63.10 (2013) Section 6.9.2 | PASS* |
| Radiated Emissions | 47 CFR Part 15, Subpart C Section 15.225(d)/15.209 | RSS-Gen section 4.9 | ANSI C63.10 (2013) Section 6.4 | PASS |
| Frequency tolerance | 47 CFR Part 15, Subpart C Section 15.225(e) | RSS 210 A 8.1(b) | ANSI C63.10 (2013) Section 6.4&6.5 | PASS |
| 20dB Bandwidth | 47 CFR Part 15, Subpart C Section 15.215 | RSS 210 A 8.1(a) | ANSI C63.10 (2013) Section 6.8 | PASS |
| 99% Occupied bandwidth | --- | RSS-Gen section 4.6.1 | RSS-Gen Clause 4.6.1 | PASS |

Remark:

Note1:* The test level of the fundamental signal is below the limit of general spurious emission, so the test no performs.

Note2: There are models mentioned in this report, and they are the similar in electrical and electronic characters. Only the model DS-KD8102-V was tested since their difference is name.



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5 General Information

5.1 Client Information

| | |
|--------------------------|--|
| Applicant: | Hangzhou Hikvision Digital Technology Co., Ltd. |
| Address of Applicant: | 700 Dongliu Road, Binjiang, Hangzhou, 310052 Zhejiang, China |
| Manufacturer: | Hangzhou Hikvision Digital Technology Co., Ltd. |
| Address of Manufacturer: | 700 Dongliu Road, Binjiang, Hangzhou, 310052 Zhejiang, China |
| Factory: | Hangzhou Hikvision Digital Technology Co., Ltd. |
| Address of Factory: | 700 Dongliu Road, Binjiang, Hangzhou, 310052 Zhejiang, China |

5.2 General Description of E.U.T.

| | |
|----------------------|--|
| Product Description: | Fixed product with 13.56MHz RF ID function |
| Brand Name: | HIKVISION |
| Rated Input: | DC 12V |
| Test Voltage: | AC 120V, 60Hz For adapter |

5.3 Technical Specifications

| | |
|----------------------|----------|
| Operation Frequency: | 13.56MHz |
| Modulation Type: | ASK |
| Antenna Type: | Integral |

5.4 E.U.T Operation Mode

| Test Mode | Description of Test Mode |
|-------------------|---|
| Engineering mode: | Keep EUT working in continuous transmitting mode. |

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

| Description | Manufacturer | Model No. | Supplied by |
|-------------|--------------|------------------|-------------|
| Adapter | Accepower | BSW0127-1210002W | SGS |

5.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

5.7 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2017-07-14.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2017-09-16.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1. Expiry Date: 2017-06-18.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868, C-4336, T-2221, G-830 respectively. Date of Expiry: 2017-11-16.

5.8 Measurement Uncertainty

| No. | Parameter | Measurement Uncertainty |
|-----|-------------------------------|--|
| 1 | Radio Frequency | $< \pm 1 \times 10^{-5}$ |
| 2 | Total RF power, conducted | $< \pm 1.5 \text{ dB}$ |
| 3 | RF power density, conducted | $< \pm 3 \text{ dB}$ |
| 4 | Spurious emissions, conducted | $< \pm 3 \text{ dB}$ |
| 5 | All emissions, radiated | $< \pm 6 \text{ dB}$ (Below 1GHz) $< \pm 6 \text{ dB}$ (Above 1GHz) |
| 6 | Temperature | $< \pm 1^{\circ}\text{C}$ |
| 7 | Humidity | $< \pm 5 \%$ |
| 8 | DC and low frequency voltages | $< \pm 3 \%$ |

6 Equipments List

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due date |
|------|---|-------------------------------|-----------------------------|-------------|------------|---------------|
| 1 | EMI test receiver | Rohde & Schwarz | ESCS30 | 100086 | 2016-01-14 | 2017-01-13 |
| 2 | Line impedance stabilization network | SCHWARZBECK | NSLK8127 | 8127490 | 2016-01-14 | 2017-01-13 |
| 3 | Line impedance stabilization network | EMCO | 3816/2 | 00034161 | 2016-01-14 | 2017-01-13 |
| 4 | Spectrum Analyzer | Rohde & Schwarz | FSP-30 | 100324 | 2016-01-14 | 2017-01-13 |
| 5 | EMI test receiver | Rohde & Schwarz | ESU40 | 100109 | 2016-01-14 | 2017-01-13 |
| 6 | Active Loop Antenna (9kHz to 30MHz) | Schwarzbeck - Mess-Elektronik | FMZB 1519 | 1519-034 | 2016-01-14 | 2017-01-13 |
| 7 | Broadband UHF-VHF ANTENNA (25MHz to 2GHz) | SCHWARZBECK | VULB9168 | 9168-313 | 2016-01-14 | 2017-01-13 |
| 8 | Ultra broadband antenna (25MHz to 3GHz) | Rohde & Schwarz | HL562 | 100227 | 2015-08-30 | 2016-08-29 |
| 9 | Horn Antenna (1GHz to 18GHz) | Rohde & Schwarz | HF906 | 100284 | 2016-01-14 | 2017-01-13 |
| 10 | Horn Antenna (1GHz to 18GHz) | SCHWARZBECK | BBHA9120D | 9120D-679 | 2016-01-14 | 2017-01-13 |
| 11 | Horn Antenna (14GHz to 40GHz) | SCHWARZBECK | BBHA 9170 | BBHA9170373 | 2016-01-14 | 2017-01-13 |
| 12 | Pre-amplifier (9KHz – 2GHz) | LNA6900 | TESEQ | 71033 | 2016-01-14 | 2017-01-13 |
| 13 | Pre-amplifier (1GHz – 26.5GHz) | Rohde & Schwarz | SCU-F0118-G40-BZ4-CSS(F) | 10001 | 2016-01-14 | 2017-01-13 |
| 14 | Pre-amplifier (14GHz – 40GHz) | Rohde & Schwarz | SCU-F1840-G35-BZ3-CSS(F) | 10001 | 2016-01-14 | 2017-01-13 |
| 15 | Tunable Notch Filter | Wainwright instruments GmbH | WRCT800.0/880.0-0.2/40-5SSK | 9170397 | / | / |
| 16 | High pass Filter | FSCW | HP 12/2800-5AA2 | 19A45-02 | / | / |
| 17 | High-low temperature cabinet | Suzhou Zhihe | TL-40 | 50110050 | 2015-09-11 | 2016-09-10 |
| 18 | AC power stabilizer | WOCEN | 6100 | 51122 | 2016-01-14 | 2017-01-13 |
| 19 | DC power | QJE | QJ30003SII | 611145 | 2016-01-14 | 2017-01-13 |
| 20 | Signal Generator (Interferer) | Agilent | SMR40 | 100555 | 2015-08-13 | 2016-08-12 |
| 21 | Signal Generator (Blocker) | Rohde & Schwarz | SMJ100A | 101394 | 2016-01-14 | 2017-01-13 |
| 22 | Splitter | Anritsu | MA1612A | M12265 | / | / |
| 23 | Coupler | e-meca | 803-S-1 | 900-M01 | / | / |

7 Test results and Measurement Data

7.1 Antenna Requirement

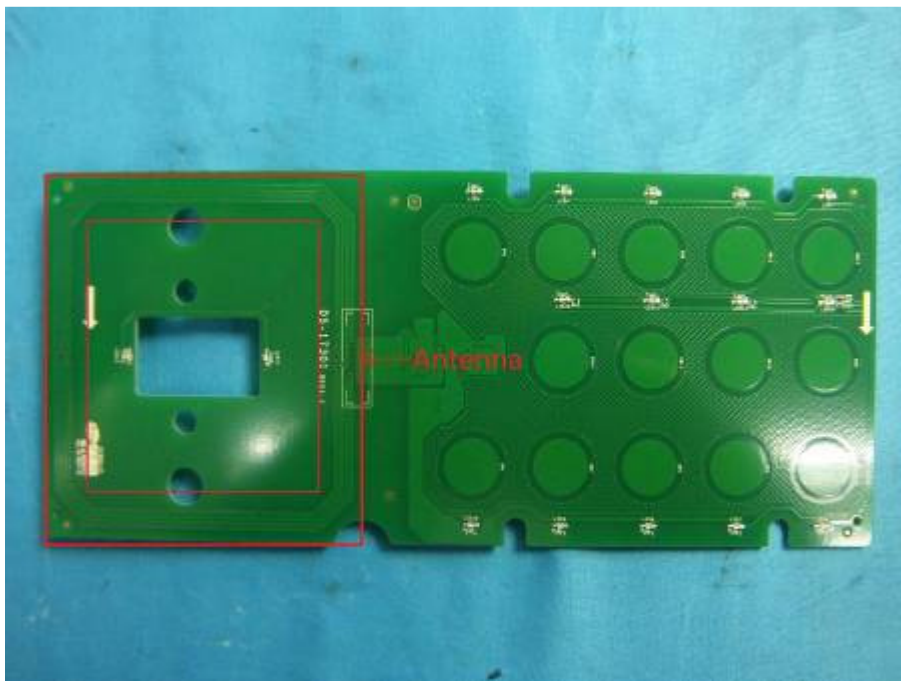
Standard requirement: 47 CFR Part 15C Section 15.203

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 antenna is integrated on the main PCB and no consideration of replacement.

Antenna Configuration:



7.2 Conducted Emissions

Frequency Range: 150 KHz to 30 MHz

Class/Severity: Class B

Limit:

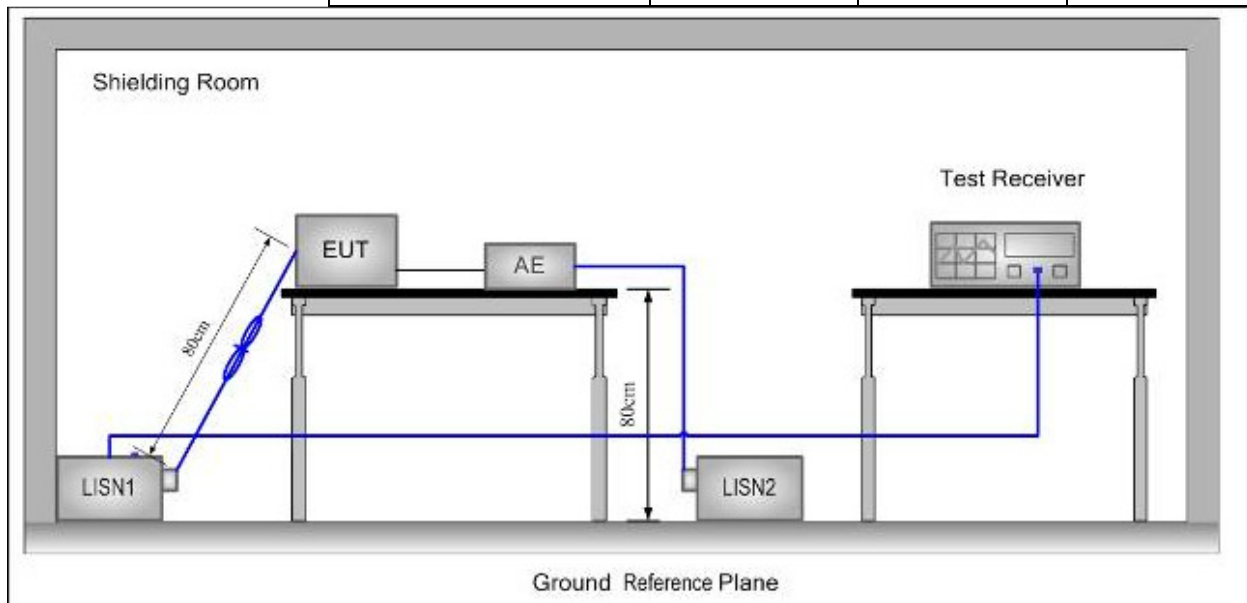
| Frequency range MHz | Class B Limits: dB (μV) | |
|------------------------|-------------------------|----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.
Note2: The lower limit is applicable at the transition frequency.

Test site/setup:

Test instrumentation set-up:

| Frequency Range | Detector | RBW | VBW |
|-----------------|------------|-------|-------|
| 9KHz to 150Hz | Quasi-peak | 200Hz | 500Hz |
| 150KHz to 30MHz | Quasi-peak | 9kHz | 30kHz |



Test Procedure:

1. The mains terminal disturbance voltage was measured with the EUT in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference

plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

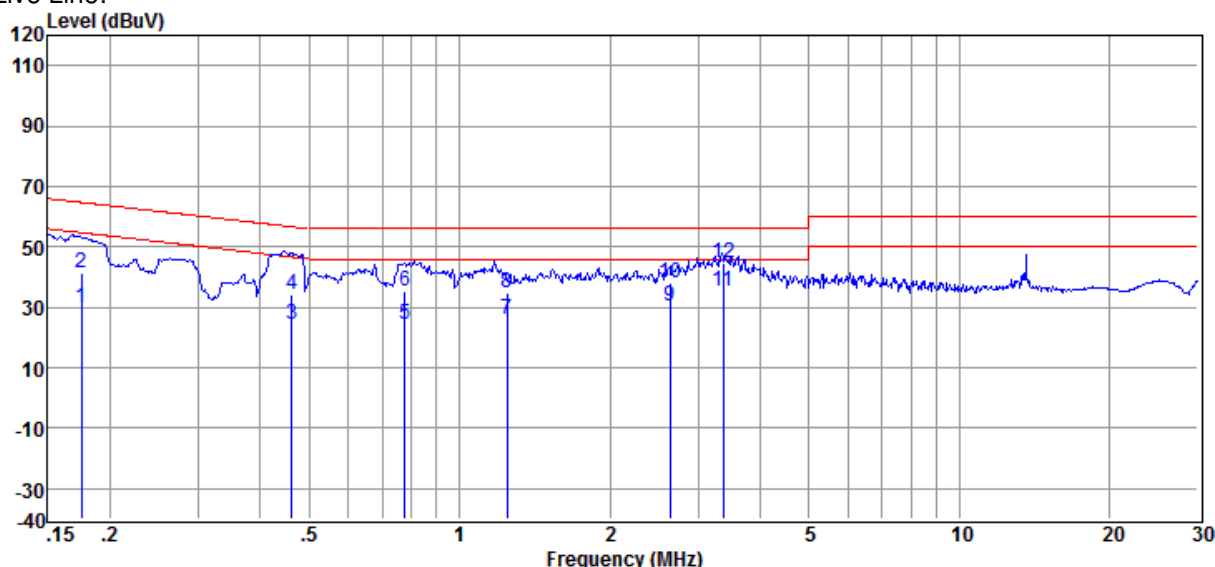
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m. All other units of the EUT and associated equipment were at least 0.8 m from the LISN.

Remark: Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected. Pretest under all modes; choose the worst case mode record on the report. Please see the attached Quasi-peak and Average test results.

Test Result: Pass

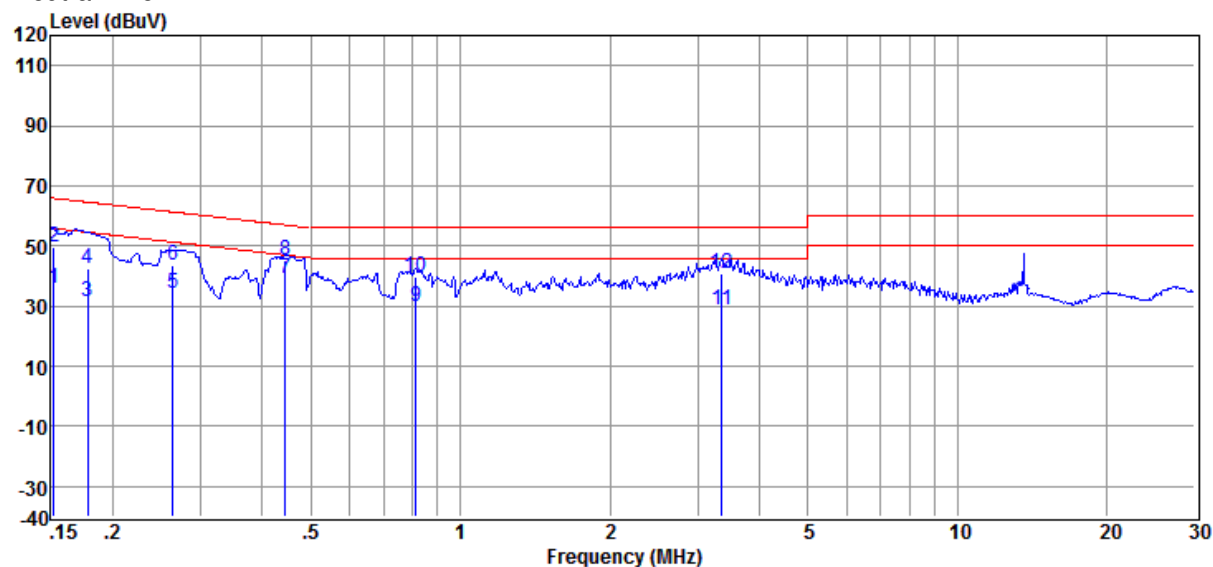
Test data:

Live Line:



| Item | Freq. | Read Level | LISN Factor | Cable Loss | Level | Limit Line | Over Limit | Detector |
|--------|-------|------------|-------------|------------|--------|------------|------------|----------|
| (Mark) | (MHz) | (dBμV) | (dB) | (dB) | (dBμV) | (dBμV) | (dB) | |
| 1 | 0.175 | 19.48 | 0.29 | 9.86 | 29.63 | 54.70 | -25.07 | Average |
| 2 | 0.175 | 31.47 | 0.29 | 9.86 | 41.62 | 64.70 | -23.08 | QP |
| 3 | 0.462 | 14.29 | 0.25 | 9.86 | 24.40 | 46.66 | -22.26 | Average |
| 4 | 0.462 | 24.13 | 0.25 | 9.86 | 34.24 | 56.66 | -22.42 | QP |
| 5 | 0.779 | 14.21 | 0.21 | 9.86 | 24.28 | 46.00 | -21.72 | Average |
| 6 | 0.779 | 25.38 | 0.21 | 9.86 | 35.45 | 56.00 | -20.55 | QP |
| 7 | 1.245 | 15.94 | 0.23 | 9.87 | 26.04 | 46.00 | -19.96 | Average |
| 8 | 1.245 | 24.64 | 0.23 | 9.87 | 34.74 | 56.00 | -21.26 | QP |
| 9 | 2.636 | 20.37 | 0.37 | 9.87 | 30.61 | 46.00 | -15.39 | Average |
| 10 | 2.636 | 28.00 | 0.37 | 9.87 | 38.24 | 56.00 | -17.76 | QP |
| 11 | 3.364 | 25.12 | 0.38 | 9.88 | 35.38 | 46.00 | -10.62 | Average |
| 12 | 3.364 | 34.54 | 0.38 | 9.88 | 44.80 | 56.00 | -11.20 | QP |

Neutral Line:



| Item | Freq. | Read Level | LISN Factor | Cable Loss | Level | Limit Line | Over Limit | Detector |
|--------|-------|------------|-------------|------------|--------|------------|------------|----------|
| (Mark) | (MHz) | (dBμV) | (dB) | (dB) | (dBμV) | (dBμV) | (dB) | |
| 1 | 0.152 | 25.91 | 0.34 | 9.86 | 36.11 | 55.87 | -19.76 | Average |
| 2 | 0.152 | 39.47 | 0.34 | 9.86 | 49.67 | 65.87 | -16.20 | QP |
| 3 | 0.178 | 21.13 | 0.31 | 9.86 | 31.30 | 54.59 | -23.29 | Average |
| 4 | 0.178 | 32.30 | 0.31 | 9.86 | 42.47 | 64.59 | -22.12 | QP |
| 5 | 0.264 | 24.06 | 0.29 | 9.86 | 34.21 | 51.30 | -17.09 | Average |
| 6 | 0.264 | 33.40 | 0.29 | 9.86 | 43.55 | 61.30 | -17.75 | QP |
| 7 | 0.445 | 29.24 | 0.30 | 9.86 | 39.40 | 46.96 | -7.56 | Average |
| 8 | 0.445 | 35.01 | 0.30 | 9.86 | 45.17 | 56.96 | -11.79 | QP |
| 9 | 0.813 | 19.72 | 0.21 | 9.86 | 29.79 | 46.00 | -16.21 | Average |
| 10 | 0.813 | 29.60 | 0.21 | 9.86 | 39.67 | 56.00 | -16.33 | QP |
| 11 | 3.350 | 18.38 | 0.67 | 9.88 | 28.93 | 46.00 | -17.07 | Average |
| 12 | 3.350 | 30.49 | 0.67 | 9.88 | 41.04 | 56.00 | -14.96 | QP |

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

7.3 Radiated Emissions

Test frequency range: 9KHz – 1GHz

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

| Frequency (MHz) | RBW | VBW | Detector |
|-----------------|---------|--------|------------|
| 0.009-0.015 | 200Hz | 1KHz | Quasi-peak |
| 0.015-30 | 9kHz | 30KHz | Quasi-peak |
| 30-1000 | 120 kHz | 300KHz | Quasi-peak |

Note: The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector. For the frequency bands 9~90 kHz, 110~490 kHz and above 1000 MHz, the radiated emission limits are based on measurements employing an average detector.

Limit:

| Frequency (MHz) | Field strength (μV/m) | Measurement distance (m) | Limit @3m (dBμV/m) |
|-----------------|-----------------------|--------------------------|---------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 | 128.5 ~ 93.8 |
| 0.490-1.705 | 24000/F(kHz) | 30 | 73.8 ~63.0 |
| 1.705-30 | 30 | 30 | 69.5 |
| 30-88 | 100 | 3 | 40.0 |
| 88-216 | 150 | 3 | 43.5 |
| 216-960 | 200 | 3 | 46.0 |
| 960-1000 | 500 | 3 | 54.0 |

NOTE:

- (1) For test distance other than what is specified, but fulfilling the requirements of section 15.31(f) (2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).

So the Distance Extrapolation Factor in dB is $40 \cdot \log(D_{\text{TEST}} / D_{\text{SPEC}})$

where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance.

Field strength limit (dBμV/m)@test distance= Field strength limit (dBμV/m)@specified distance -Distance Extrapolation Factor

- (2) The lower limit shall apply at the transition frequencies.

Limit:
(Fundamental signal)

| Frequency | Limit (dBuV/m @3m) | Remark |
|-----------|--------------------|------------------|
| 13.56MHz | 124 | Quasi-peak Value |

Test Procedure:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case

and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. The radiation measurements are performed in X, Y, Z axis positioning. And found the Z axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Test Setup:

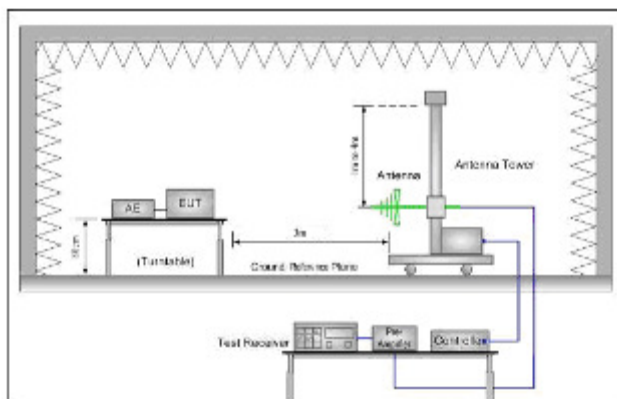


Figure 1. Below 30MHz

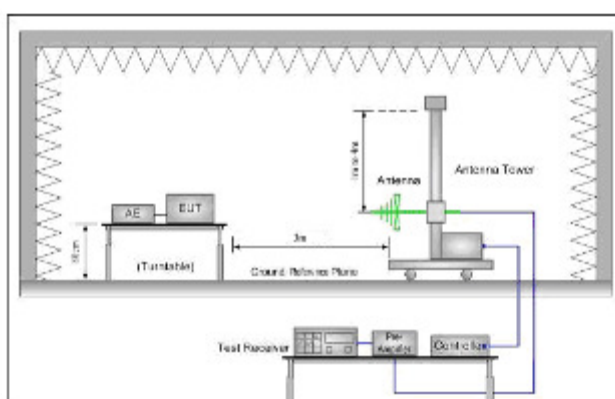


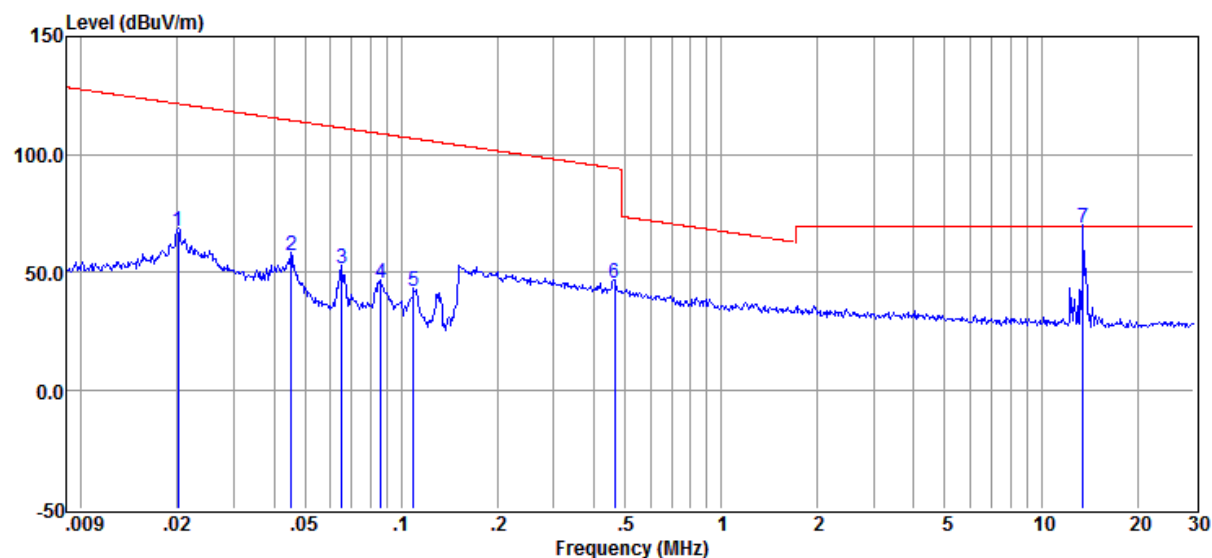
Figure 2. 30MHz to 1GHz

Test Results: Pass

Measurement Data

9kHz - 30MHz:

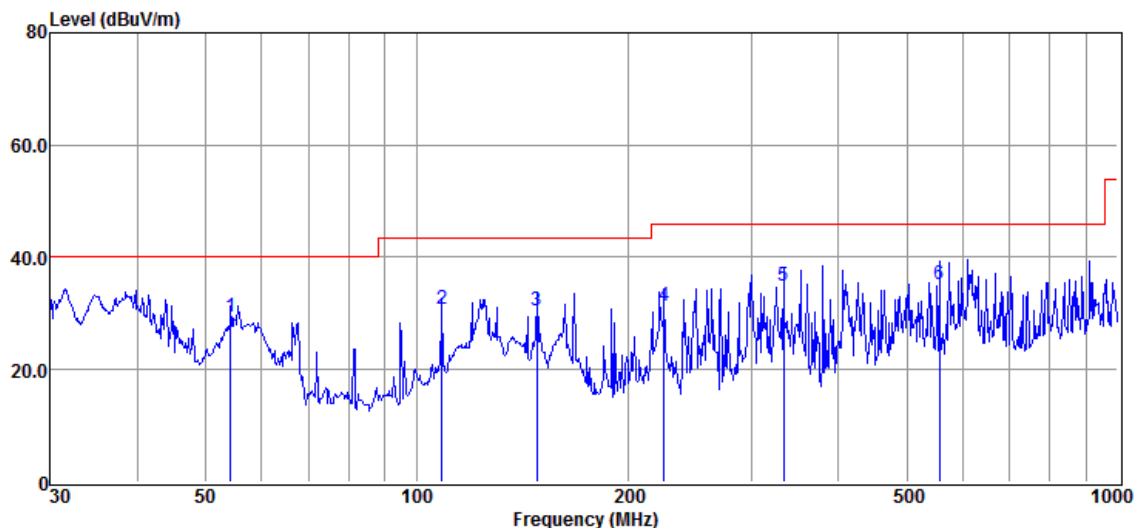
Z:



| Item | Freq. | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector |
|--------|-------|------------|----------------|---------------|------------|--------------|------------|------------|----------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 0.02 | 47.09 | 20.50 | 0.00 | 0.10 | 67.69 | 121.53 | -53.84 | QP |
| 2 | 0.05 | 37.34 | 20.05 | 0.00 | 0.10 | 57.49 | 114.49 | -57.00 | QP |
| 3 | 0.07 | 31.81 | 19.92 | 0.00 | 0.10 | 51.83 | 111.32 | -59.49 | QP |
| 4 | 0.09 | 25.65 | 19.84 | 0.00 | 0.10 | 45.59 | 108.85 | -63.26 | QP |
| 5 | 0.11 | 22.46 | 19.84 | 0.00 | 0.10 | 42.40 | 106.81 | -64.41 | QP |
| 6 | 0.46 | 25.81 | 19.80 | 0.00 | 0.10 | 45.71 | 94.28 | -48.57 | QP |
| 7 | 13.56 | 49.49 | 19.30 | 0.00 | 0.34 | 69.13 | 69.50 | -0.37 | QP |

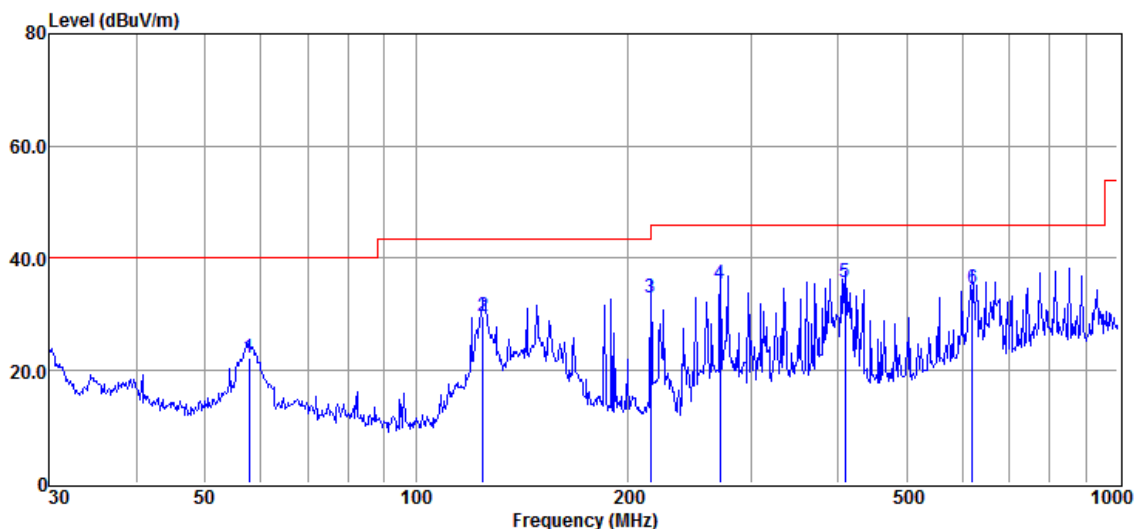
30MHz-1GHz:

Vertical



| Item | Freq. | Read Level | Antenna Factor | Preamplifier Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector |
|--------|--------|------------|----------------|---------------------|------------|--------------|------------|------------|----------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 1 | 54.26 | 39.85 | 13.30 | 24.60 | 0.74 | 29.29 | 40.00 | -10.71 | QP |
| 2 | 108.65 | 43.49 | 10.67 | 24.60 | 1.12 | 30.68 | 43.50 | -12.82 | QP |
| 3 | 148.44 | 40.92 | 12.72 | 24.50 | 1.36 | 30.50 | 43.50 | -13.00 | QP |
| 4 | 225.31 | 43.99 | 10.05 | 24.50 | 1.75 | 31.29 | 46.00 | -14.71 | QP |
| 5 | 333.69 | 44.25 | 12.89 | 24.37 | 2.17 | 34.94 | 46.00 | -11.06 | QP |
| 6 | 556.77 | 37.02 | 19.54 | 24.15 | 2.89 | 35.30 | 46.00 | -10.70 | QP |

Horizontal



| Item | Freq. | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector |
|--------|--------|------------|----------------|---------------|------------|--------------|------------|------------|----------|
| (Mark) | (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 1 | 57.80 | 33.57 | 12.65 | 24.60 | 0.77 | 22.39 | 40.00 | -17.61 | QP |
| 2 | 124.57 | 41.12 | 11.85 | 24.57 | 1.24 | 29.64 | 43.50 | -13.86 | QP |
| 3 | 216.02 | 45.66 | 10.14 | 24.50 | 1.72 | 33.02 | 46.00 | -12.98 | QP |
| 4 | 271.33 | 45.60 | 12.29 | 24.45 | 1.92 | 35.36 | 46.00 | -10.64 | QP |
| 5 | 408.95 | 42.17 | 15.36 | 24.29 | 2.46 | 35.70 | 46.00 | -10.30 | QP |
| 6 | 620.71 | 35.59 | 20.11 | 24.10 | 3.11 | 34.71 | 46.00 | -11.29 | QP |

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
- 2) Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

7.4 Frequency tolerance

Requirements: The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Procedure: The EUT was placed in an environmental test chamber and powered such that control element received normal voltage and the transmitter provided maximum RF output.

Frequency Range: Operation within the band 13.110-14.010 MHz

Test Result: Pass

Test Data:

Nominal Operation Frequency: 13.56MHz

| Test Conditions | | Test Result (MHz) | Deviation (KHz) | Limit (KHz) | Result |
|------------------------|------------------------|----------------------|--------------------|-----------------------|--------|
| Temp (°C) | Volt (V AC) | | | | |
| T _{nom} (20) | V _{nom} (120) | 13.55993 | -0.07 | ±0.01% (1.3560KHz) | Pass |
| T _{nom} (20) | V _{min} (102) | 13.56015 | 0.15 | | Pass |
| | V _{max} (138) | 13. 55982 | -0.18 | | Pass |
| T _{min} (-20) | V _{nom} (120) | 13.56007 | 0.07 | | Pass |
| T _{max} (+50) | | 13.56011 | 0.11 | | Pass |

Note: Deviation (KHz) = (Test Result-13.56MHz)*1000

7.5 20dB Bandwidth

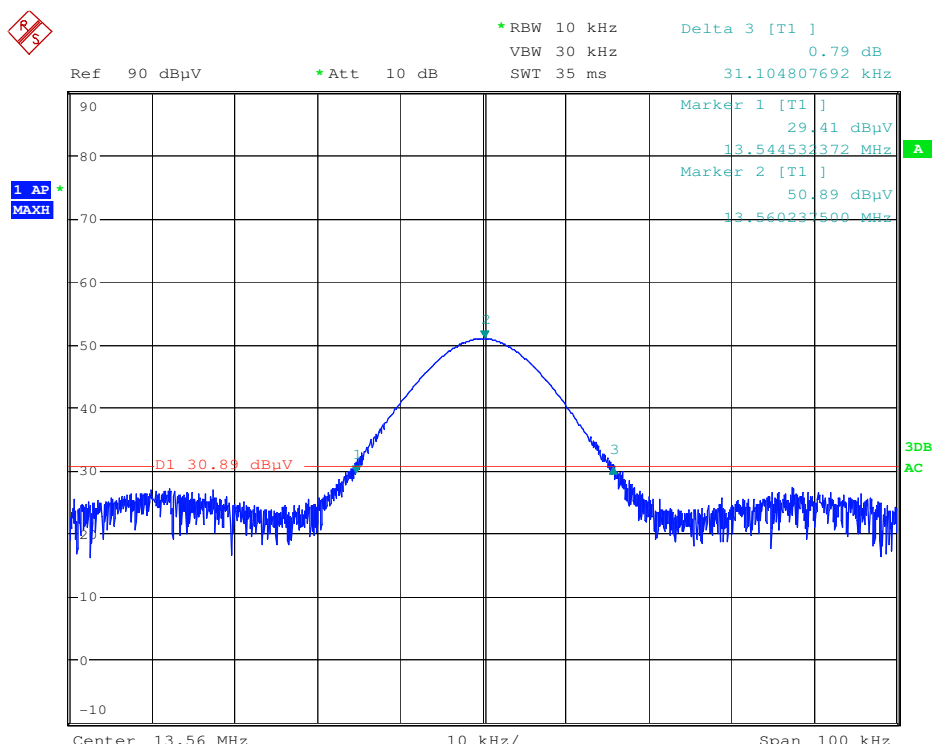
Frequency Range: Operation within the band 13.110 – 14.010 MHz

Requirements: Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through §15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Data:

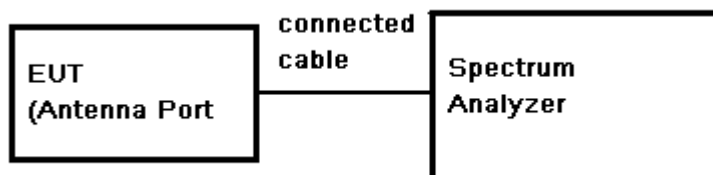
| 20dB bandwidth (kHz) | F _L (MHz) | F _H (MHz) | Limit(MHz) | Result |
|----------------------|----------------------|----------------------|-----------------|--------|
| 31.105 | 13.544 | 13.560 | 13.110 – 14.010 | Pass |

Test plot as follows:



7.6 99% Occupied Bandwidth

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: Span = approximately 2 to 3 times the 20dB bandwidth, centred on the hopping channel;
3. Set the spectrum analyzer: RBW = 1% of the span (set 1 kHz). VBW >= RBW. Sweep = auto; Detector Function = Peak. Trace = Max Hold.
4. Mark the peak frequency and using the 99% OBW function measure the bandwidth.

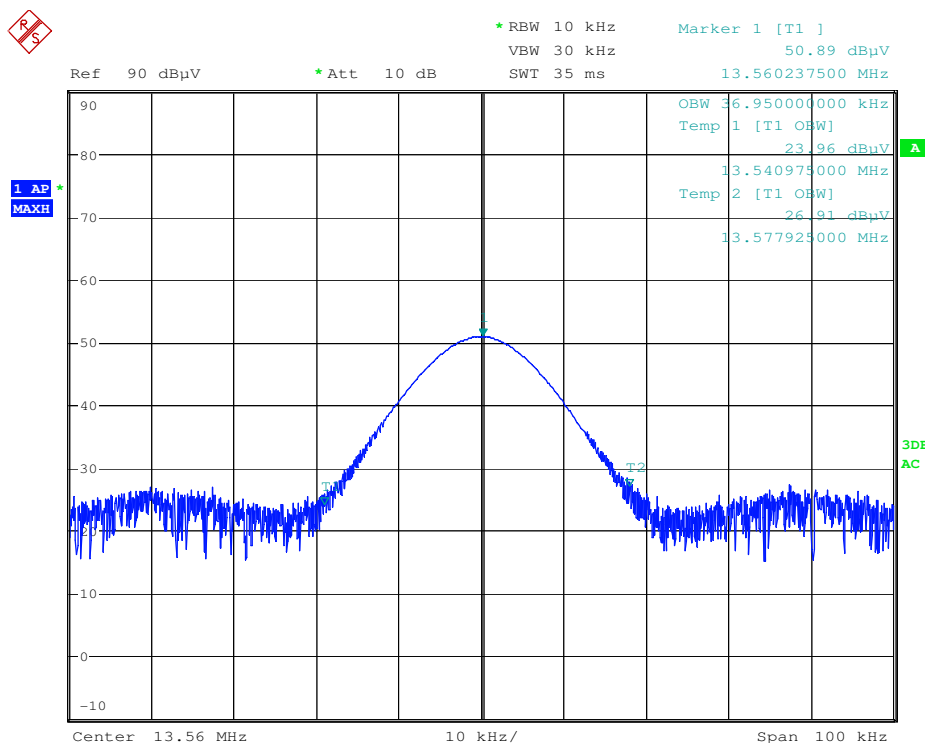
Test Result:

Pass

Test Date:

| Frequency (MHz) | Bandwidth (kHz) | Result |
|-----------------|-----------------|--------|
| 13.56 | 36.95 | PASS |

Test plot as follows:





8 Test Setup Photographs

Refer to the < DS-KD8102-V _Test Setup Photos-FCC >

9 EUT Constructional Details

Refer to the < DS-KD8102-V _External Photos > & < DS-KD8102-V _Internal Photos >.

--End of the Report--