



TESTING LABORATORY
CERTIFICATE#4323.01



FCC PART 15.247

TEST REPORT

For

Murata Manufacturing Co., Ltd.

10-1, Higashikotari 1-chome, Nagaokakyo-shi Kyoto 617-8555 Japan

FCC ID: VPYCMABZ

| | |
|--|-------------------------------------|
| Report Type: CIIPC Report | Product Type: LoRa module |
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| Report Number: <u>RKSA180809001-00A</u> | |
| Report Date: <u>2018-08-21</u> | |
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

| | |
|--------------|----------------------------------|
| Applicant | Murata Manufacturing Co., Ltd. |
| Tested Model | CMWX1ZZABZ |
| Product Type | LoRa module |
| Dimension | 12.5 mm(L)×11.6 mm(W)×1.76 mm(H) |
| Power Supply | DC 3.3V |

**All measurement and test data in this report was gathered from production sample serial number: 201800809001. (Assigned by BACL, Kunshan). The EUT was received on 2018-08-09.*

Objective

This report is prepared on behalf of Murata Manufacturing Co., Ltd. in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.247 rules.

This is a CIIPC report base on the original report with FCC ID: VPYCMABZ which was granted on 2017-02-08, the difference between the original device and the current one is as follows:

| Item | Original Device | Current Device |
|-----------------|------------------|---------------------------|
| Type of Antenna | Monopole Antenna | PCB Antenna, Chip Antenna |

The above difference will affect “part of tests”, all test data were presented in this report, and other data were referred to the original report.

Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC 558074 D01 15.247 Meas Guidance v05.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

| Item | | Uncertainty |
|-------------------|------------|-------------|
| Radiated emission | 30MHz~1GHz | 6.11dB |
| | 1GHz~6GHz | 4.45dB |
| | 6GHz~18GHz | 5.23dB |
| Temperature | | 1.0°C |
| Humidity | | 6% |

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

Test channel list as below,

For 125 kHz channel, EUT was tested with channel 0, 31 and 63;

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 0 | 902.3 | 32 | 908.7 |
| 1 | 902.5 | 33 | 908.9 |
| 2 | 902.7 | 34 | 909.1 |
| 3 | 902.9 | 35 | 909.3 |
| 4 | 903.1 | 36 | 909.5 |
| 5 | 903.3 | 37 | 909.7 |
| 6 | 903.5 | 38 | 909.9 |
| 7 | 903.7 | 39 | 910.1 |
| 8 | 903.9 | 40 | 910.3 |
| 9 | 904.1 | 41 | 910.5 |
| 10 | 904.3 | 42 | 910.7 |
| 11 | 904.5 | 43 | 910.9 |
| 12 | 904.7 | 44 | 911.1 |
| 13 | 904.9 | 45 | 911.3 |
| 14 | 905.1 | 46 | 911.5 |
| 15 | 905.3 | 47 | 911.7 |
| 16 | 905.5 | 48 | 911.9 |
| 17 | 905.7 | 49 | 912.1 |
| 18 | 905.9 | 50 | 912.3 |
| 19 | 906.1 | 51 | 912.5 |
| 20 | 906.3 | 52 | 912.7 |
| 21 | 906.5 | 53 | 912.9 |
| 22 | 906.7 | 54 | 913.1 |
| 23 | 906.9 | 55 | 913.3 |
| 24 | 907.1 | 56 | 913.5 |
| 25 | 907.3 | 57 | 913.7 |
| 26 | 907.5 | 58 | 913.9 |
| 27 | 907.7 | 59 | 914.1 |
| 28 | 907.9 | 60 | 914.3 |
| 29 | 908.1 | 61 | 914.5 |
| 30 | 908.3 | 62 | 914.7 |
| 31 | 908.5 | 63 | 914.9 |

For 500 kHz channel, EUT was tested with channel 64, 67 and 71.

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 64 | 903.0 | 68 | 909.4 |
| 65 | 904.6 | 69 | 911.0 |
| 66 | 906.2 | 70 | 912.6 |
| 67 | 907.8 | 71 | 914.2 |

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

RF test tool : FSK-LoRa Modulation Test Tool

Power level setting: 20

Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|--------------|-------------|------------|---------------|
| DELL | Notebook | GX620 | D65874152 |
| DELL | Adapter | LA65NS0-00 | DF263 |

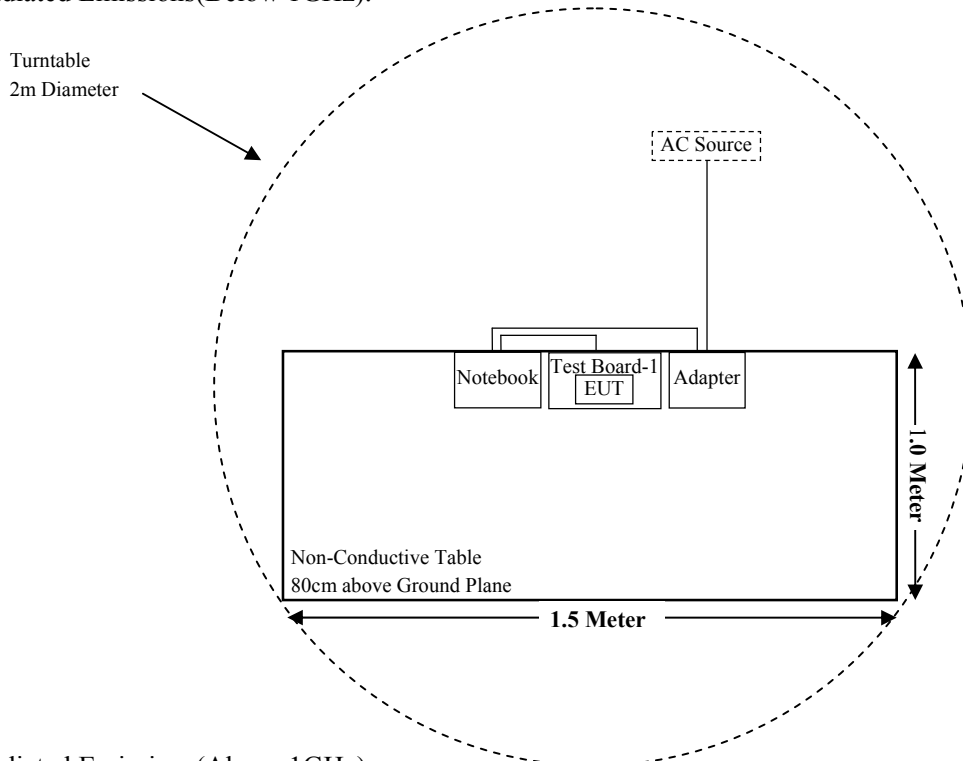
External I/O Cable

| Cable Description | Shielding Type | Length (m) | From Port | To |
|-------------------|----------------|------------|--------------------------------|----------|
| Data Cable-1 | Un-Shielding | 0.3 | Test Board-1 (PCB Antenna) | Notebook |
| Data Cable-2 | Un-Shielding | 0.3 | Test Board-2 (Chip Antenna) | Notebook |

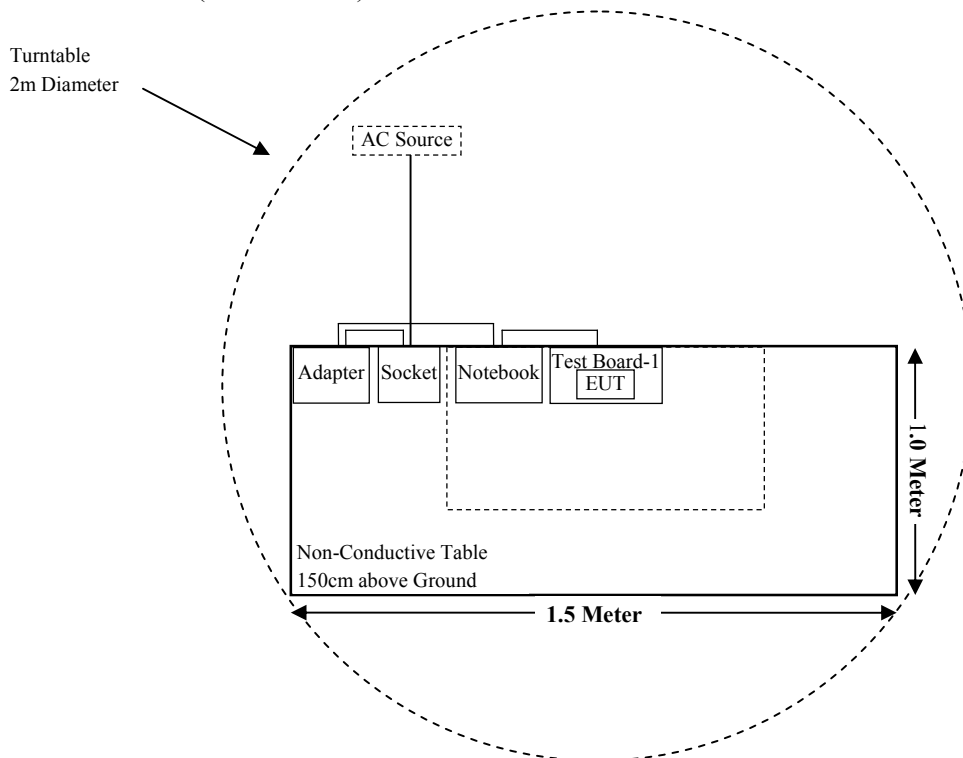
Block Diagram of Test Setup

For PCB Antenna:

For Radiated Emissions(Below 1GHz):

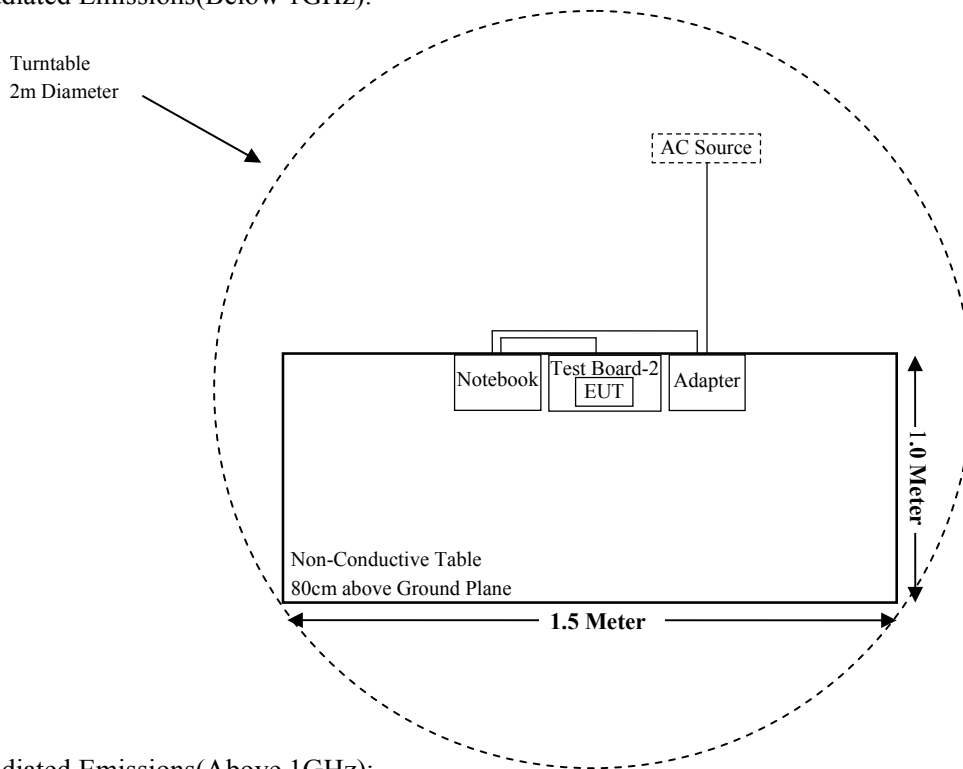


For Radiated Emissions(Above 1GHz):

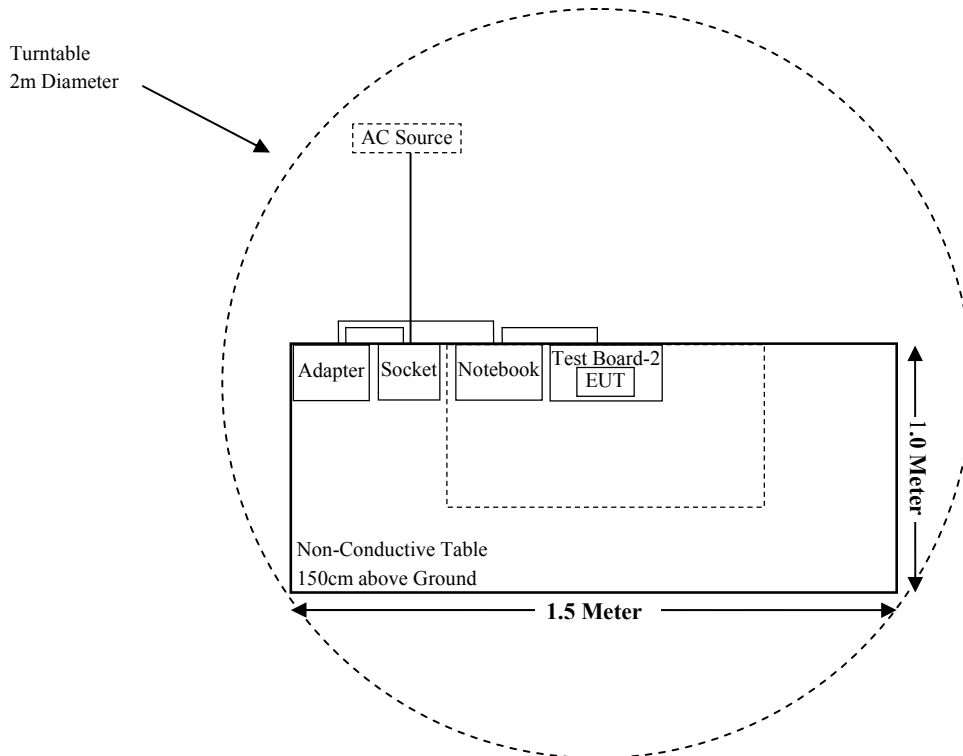


For Chip Antenna:

For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---------------------------------|------------------------------------|---------------|
| §15.203 | Antenna Requirement | Compliant |
| §1.1310 & §2.1091 | Maximum Permissible Exposure (MPE) | Compliant |
| §15.207 (a) | AC Line Conducted Emissions | Compliant* |
| §15.247(d) | Spurious Emissions at Antenna Port | Compliant* |
| §15.205, §15.209, §15.247(d) | Spurious Emissions | Compliant |
| §15.247(a)(1) | Channel Separation Test | Compliant* |
| §15.247(a)(1) | 20 dB Emission Bandwidth | Compliant* |
| §15.247(a)(1)(iii) | Time of Occupancy (Dwell Time) | Compliant* |
| §15.247(a)(1)(iii) | Quantity of hopping channel Test | Compliant* |
| §15.247 (a)(2) | 6 dB Emission Bandwidth | Compliant* |
| §15.247(b)(3) | Maximum Conducted Output Power | Compliant* |
| §15.247(d) | Band Edge | Compliant* |
| §15.247(e) & §15.247(f) | Power Spectral Density | Compliant* |

Compliant*: For these test items, all the test data were referred to the original report.

TEST EQUIPMENT LIST

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|--|--------------------|-------------|---------------|------------------|----------------------|
| Radiated Emission Test (Chamber 1#) | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100195 | 2017-11-25 | 2018-11-24 |
| Sunol Sciences | Broadband Antenna | JB3 | A040914-2 | 2016-01-09 | 2019-01-08 |
| Sonoma Instrument | Pre-amplifier | 310N | 171205 | 2017-08-15 | 2018-08-14 |
| Rohde & Schwarz | Auto test Software | EMC32 | 100361 | / | / |
| MICRO-COAX | Coaxial Cable | Cable-8 | 008 | 2018-08-15 | 2019-08-14 |
| MICRO-COAX | Coaxial Cable | Cable-9 | 009 | 2018-08-15 | 2019-08-14 |
| MICRO-COAX | Coaxial Cable | Cable-10 | 010 | 2018-08-15 | 2019-08-14 |
| Radiated Emission Test (Chamber 2#) | | | | | |
| Rohde & Schwarz | EMI Test Receiver | ESU40 | 100207 | 2017-08-27 | 2018-08-26 |
| ETS-LINDGREN | Horn Antenna | 3115 | 6229 | 2016-01-11 | 2019-01-10 |
| Mini-Circuits | Amplifier | ZVA-183W-S+ | 220701818 | 2018-05-20 | 2019-05-19 |
| MICRO-TRONICS | Band Reject Filter | BRC50722 | G013 | 2018-08-05 | 2019-08-04 |
| Rohde & Schwarz | Auto test Software | EMC32 | 100361 | / | / |
| MICRO-COAX | Coaxial Cable | Cable-6 | 006 | 2018-08-15 | 2019-08-14 |
| MICRO-COAX | Coaxial Cable | Cable-11 | 011 | 2018-08-15 | 2019-08-14 |
| MICRO-COAX | Coaxial Cable | Cable-12 | 012 | 2018-08-15 | 2019-08-14 |
| MICRO-COAX | Coaxial Cable | Cable-13 | 013 | 2018-08-15 | 2019-08-14 |

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has two types of antennas as below, which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

| Antenna Type | Antenna Gain (dBi) |
|---------------------|---------------------------|
| PCB Antenna | 1.0 |
| Chip Antenna | -2.1 |

Result: Compliance.

FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure | | | | |
|--|--------------------------------------|--------------------------------------|--|---------------------------------|
| Frequency Range (MHz) | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm²) | Averaging Time (minutes) |
| 0.3-1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34-30 | 824/f | 2.19/f | *(180/f ²) | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | / | / | f/1500 | 30 |
| 1500-100,000 | / | / | 1.0 | 30 |

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

For PCB Antenna:

| Mode | Frequency Range (MHz) | Antenna Gain | | Target Output Power | | Evaluation Distance (cm) | Power Density (mW/cm²) | MPE Limit (mW/cm²) |
|----------------|------------------------------|---------------------|------------------|----------------------------|-------------|---------------------------------|--|--------------------------------------|
| | | (dBi) | (numeric) | (dBm) | (mW) | | | |
| 125kHz Channel | 902.3-914.9 | 1.00 | 1.26 | 19.00 | 79.43 | 20 | 0.0199 | 0.6015 |
| 500kHz Channel | 903-914.2 | 1.00 | 1.26 | 18.50 | 70.79 | 20 | 0.0177 | 0.6020 |

For Chip Antenna:

| Mode | Frequency Range (MHz) | Antenna Gain | | Target Output Power | | Evaluation Distance (cm) | Power Density (mW/cm ²) | MPE Limit (mW/cm ²) |
|----------------|-----------------------|--------------|-----------|---------------------|-------|--------------------------|-------------------------------------|---------------------------------|
| | | (dBi) | (numeric) | (dBm) | (mW) | | | |
| 125kHz Channel | 902.3-914.9 | -2.10 | 0.62 | 19.00 | 79.43 | 20 | 0.0098 | 0.6015 |
| 500kHz Channel | 903-914.2 | -2.10 | 0.62 | 18.50 | 70.79 | 20 | 0.0087 | 0.6020 |

Note: The target output power was declared by the manufacturer.

Conclusion: The EUT meets exemption requirement- RF exposure evaluation greater than 20cm distance specified in § 2.1091. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by § 2.1093.

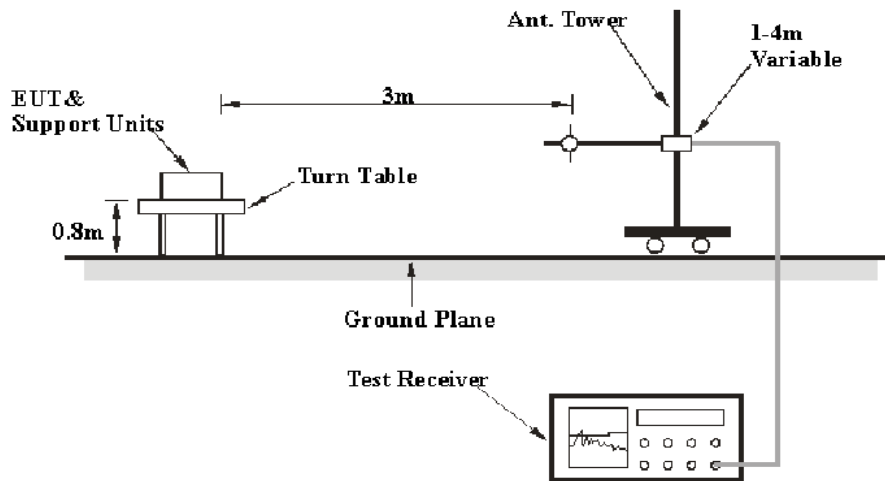
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

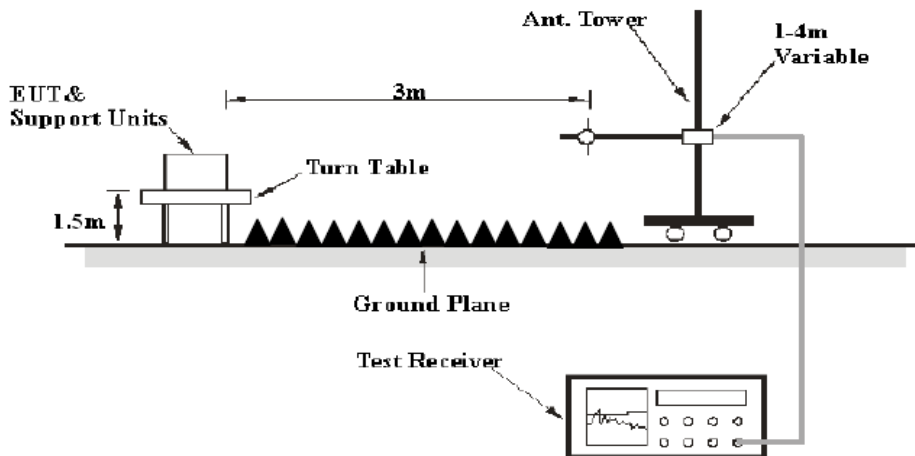
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 10 GHz.

During the radiated emission test, the EMI test receiver setup was set with the following configurations:

| Frequency Range | RBW | Video B/W | IF B/W | Detector |
|-------------------|---------|-----------|---------|----------|
| 30 MHz – 1000 MHz | 120 kHz | 300 kHz | 120 kHz | QP |
| Above 1GHz | 1MHz | 3 MHz | / | PK |
| | 1MHz | 3 MHz | / | Ave |

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude (dB}\mu\text{V/m)} = \text{Meter Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Amplifier Gain (dB)}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin (dB)} = \text{Limit (dB}\mu\text{V/m)} - \text{Corrected Amplitude (dB}\mu\text{V/m)}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Test Data

Environmental Conditions

| | |
|---------------------------|-----------|
| Temperature: | 24.2°C |
| Relative Humidity: | 51 % |
| ATM Pressure: | 101.2 kPa |

The testing was performed by Hope Zhang on 2018-08-18.

EUT operation mode: Transmitting

Data for PCB antenna at 125kHz channel:

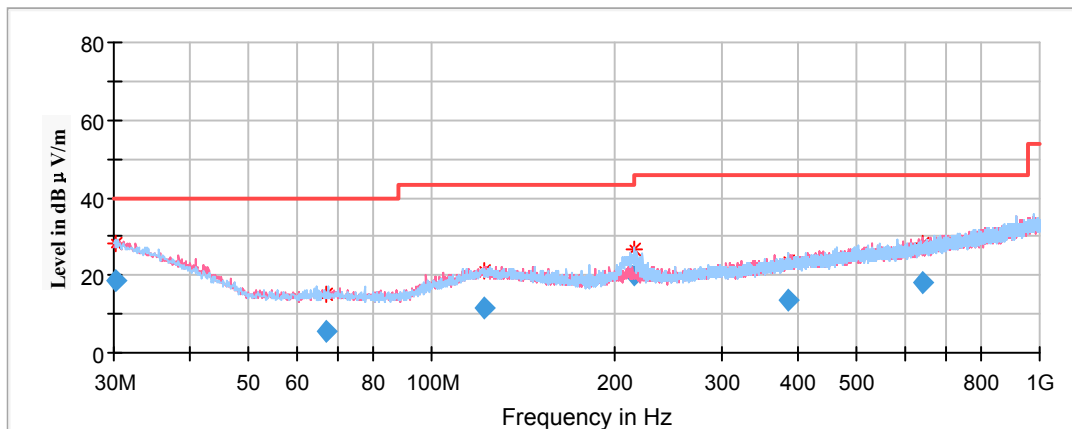
Spurious Emission Test:

30MHz-1GHz

(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **low channel of operation in X-axis of orientation** was recorded)

Note:

1. This test was performed with the 902 – 928MHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
 Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
 Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)



| Frequency (MHz) | Corrected Amplitude QuasiPeak (dBµV/m) | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|--|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | | Height (cm) | Polar (H/V) | | | | |
| 30.202388 | 18.75 | 199.0 | V | 233.0 | -4.1 | 40.00 | 21.25 |
| 67.205300 | 5.47 | 101.0 | H | 25.0 | -17.5 | 40.00 | 34.53 |
| 122.002300 | 11.39 | 101.0 | V | 65.0 | -11.3 | 43.50 | 32.11 |
| 215.358350 | 20.00 | 101.0 | H | 73.0 | -12.3 | 43.50 | 23.50 |
| 386.620200 | 13.68 | 101.0 | H | 83.0 | -8.4 | 46.00 | 32.32 |
| 640.504300 | 18.15 | 101.0 | V | 86.0 | -4.4 | 46.00 | 27.85 |

1GHz-10GHz

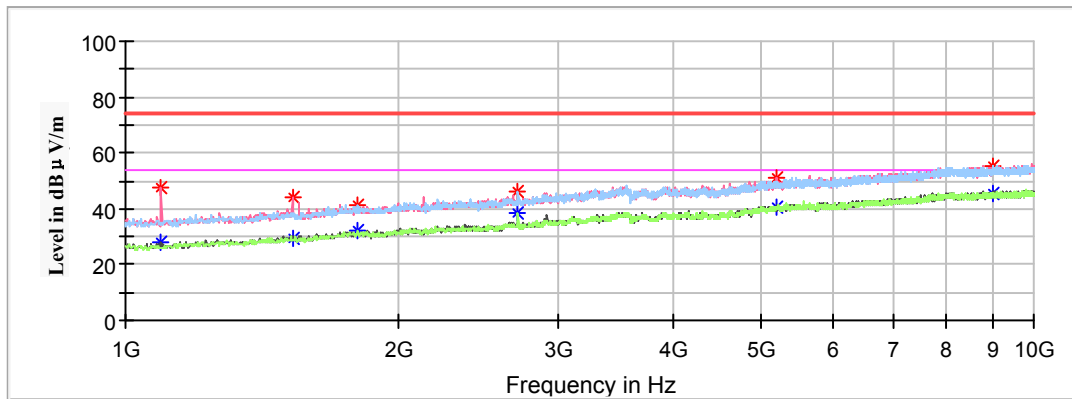
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

- 1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
- Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
- Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

Low Channel: 902.3MHz

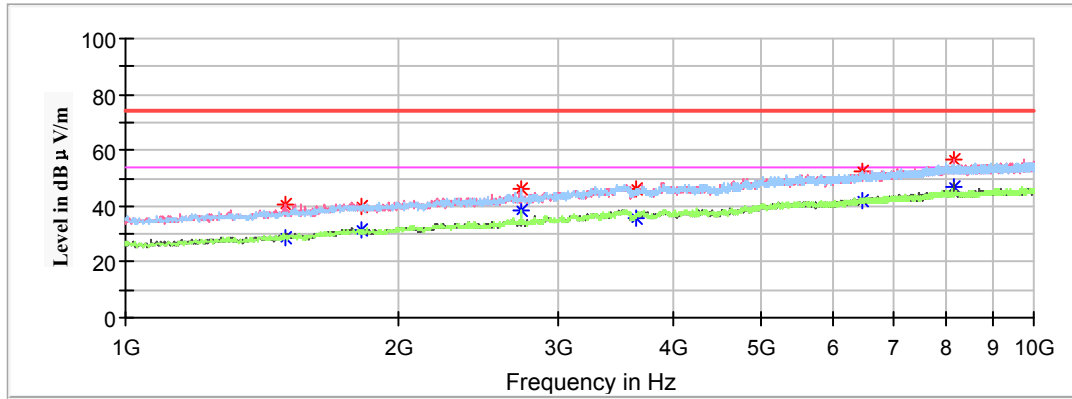
Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| 1095.400000 | --- | 27.84 | 100.0 | V | 120.0 | -3.7 | 54.00 | 26.16 |
| 1095.400000 | 47.88 | --- | 100.0 | V | 120.0 | -3.7 | 74.00 | 26.12 |
| 1527.400000 | --- | 29.09 | 100.0 | V | 45.0 | -1.1 | 54.00 | 24.91 |
| 1527.400000 | 44.13 | --- | 100.0 | V | 45.0 | -1.1 | 74.00 | 29.87 |
| 1804.600000 | --- | 31.87 | 250.0 | H | 237.0 | 0.8 | 54.00 | 22.13 |
| 1804.600000 | 41.18 | --- | 250.0 | H | 237.0 | 0.8 | 74.00 | 32.82 |
| 2706.900000 | --- | 38.33 | 100.0 | H | 144.0 | 4.3 | 54.00 | 15.67 |
| 2706.900000 | 45.88 | --- | 100.0 | H | 144.0 | 4.3 | 74.00 | 28.12 |
| 5215.600000 | --- | 40.90 | 200.0 | V | 217.0 | 12.0 | 54.00 | 13.10 |
| 5215.600000 | 51.16 | --- | 200.0 | V | 217.0 | 12.0 | 74.00 | 22.84 |
| 9001.000000 | --- | 45.15 | 100.0 | H | 38.0 | 17.5 | 54.00 | 8.85 |
| 9001.000000 | 55.58 | --- | 100.0 | H | 38.0 | 17.5 | 74.00 | 18.42 |

Middle Channel: 908.5MHz

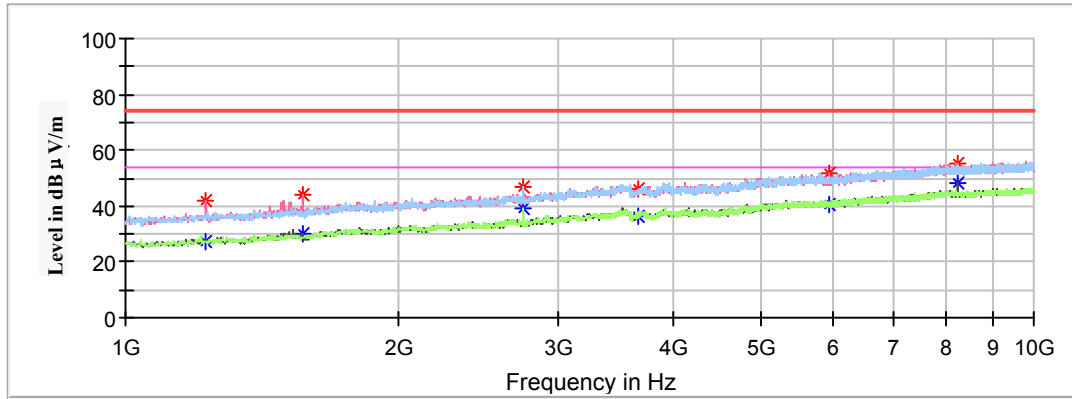
Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| 1500.400000 | --- | 28.59 | 200.0 | V | 71.0 | -1.3 | 54.00 | 25.41 |
| 1500.400000 | 40.28 | --- | 200.0 | V | 71.0 | -1.3 | 74.00 | 33.72 |
| 1817.000000 | 39.71 | --- | 100.0 | H | 255.0 | 0.9 | 74.00 | 34.29 |
| 1817.000000 | --- | 31.19 | 100.0 | H | 255.0 | 0.9 | 54.00 | 22.81 |
| 2725.500000 | 46.22 | --- | 150.0 | H | 256.0 | 4.5 | 74.00 | 27.78 |
| 2725.500000 | --- | 38.60 | 150.0 | H | 256.0 | 4.5 | 54.00 | 15.40 |
| 3634.000000 | --- | 35.69 | 200.0 | H | 201.0 | 7.8 | 54.00 | 18.31 |
| 3634.000000 | 45.94 | --- | 200.0 | H | 201.0 | 7.8 | 74.00 | 28.06 |
| 6479.200000 | --- | 41.61 | 150.0 | H | 19.0 | 14.3 | 54.00 | 12.39 |
| 6479.200000 | 52.61 | --- | 150.0 | H | 19.0 | 14.3 | 74.00 | 21.39 |
| 8178.400000 | --- | 47.02 | 250.0 | V | 164.0 | 17.2 | 54.00 | 6.98 |
| 8178.400000 | 56.33 | --- | 250.0 | V | 164.0 | 17.2 | 74.00 | 17.67 |

High Channel: 914.9MHz

Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBμV /m) | Average (dBμV /m) | Height (cm) | Polar (H/V) | | | | |
| 1226.800000 | --- | 27.42 | 200.0 | V | 337.0 | -2.9 | 54.00 | 26.58 |
| 1226.800000 | 41.61 | --- | 200.0 | V | 337.0 | -2.9 | 74.00 | 32.39 |
| 1568.800000 | --- | 29.94 | 100.0 | V | 214.0 | -0.8 | 54.00 | 24.06 |
| 1568.800000 | 43.85 | --- | 100.0 | V | 214.0 | -0.8 | 74.00 | 30.15 |
| 2744.700000 | --- | 39.36 | 200.0 | H | 310.0 | 4.6 | 54.00 | 14.64 |
| 2744.700000 | 46.87 | --- | 200.0 | H | 310.0 | 4.6 | 74.00 | 27.13 |
| 3659.600000 | --- | 36.49 | 200.0 | H | 57.0 | 7.9 | 54.00 | 17.51 |
| 3659.600000 | 46.04 | --- | 200.0 | H | 57.0 | 7.9 | 74.00 | 27.96 |
| 5953.600000 | --- | 40.70 | 100.0 | V | 45.0 | 12.9 | 54.00 | 13.30 |
| 5953.600000 | 51.48 | --- | 100.0 | V | 45.0 | 12.9 | 74.00 | 22.52 |
| 8236.000000 | --- | 48.23 | 200.0 | V | 170.0 | 17.2 | 54.00 | 5.77 |
| 8236.000000 | 55.06 | --- | 200.0 | V | 170.0 | 17.2 | 74.00 | 18.94 |

Fundamental Test & Band Edge Test:

(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)

Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-------------------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| Fundamental Test | | | | | | | | |
| 902.300000 | 117.32 | --- | 200.0 | H | 251.0 | 0.2 | / | / |
| 902.300000 | --- | 107.50 | 200.0 | H | 251.0 | 0.2 | / | / |
| 902.300000 | 112.55 | --- | 200.0 | V | 275.0 | 0.2 | / | / |
| 902.300000 | --- | 102.77 | 200.0 | V | 275.0 | 0.2 | / | / |
| 908.500000 | 116.94 | --- | 250.0 | H | 36.0 | 0.3 | / | / |
| 908.500000 | --- | 106.96 | 250.0 | H | 36.0 | 0.3 | / | / |
| 908.500000 | 112.58 | --- | 200.0 | V | 98.0 | 0.3 | / | / |
| 908.500000 | --- | 102.75 | 200.0 | V | 98.0 | 0.3 | / | / |
| 914.900000 | 116.48 | --- | 200.0 | H | 263.0 | 0.5 | / | / |
| 914.900000 | --- | 106.62 | 200.0 | H | 263.0 | 0.5 | / | / |
| 914.900000 | 112.41 | --- | 200.0 | V | 85.0 | 0.5 | / | / |
| 914.900000 | --- | 102.59 | 200.0 | V | 85.0 | 0.5 | / | / |

| Frequency (MHz) | Corrected Amplitude | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------------|---------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | QuasiPeak (dBµV/m) | Height (cm) | Polar (H/V) | | | | |
| Band Edge Test | | | | | | | |
| 902.000000 | 42.72 | 100.0 | H | 114.0 | 0.2 | 46.00 | 3.28 |
| 902.000000 | 41.69 | 150.0 | V | 124.0 | 0.2 | 46.00 | 4.31 |
| 928.000000 | 38.12 | 100.0 | H | 266.0 | 0.8 | 46.00 | 7.88 |
| 928.000000 | 37.68 | 200.0 | V | 290.0 | 0.8 | 46.00 | 8.32 |

Data for PCB antenna at 500kHz channel:

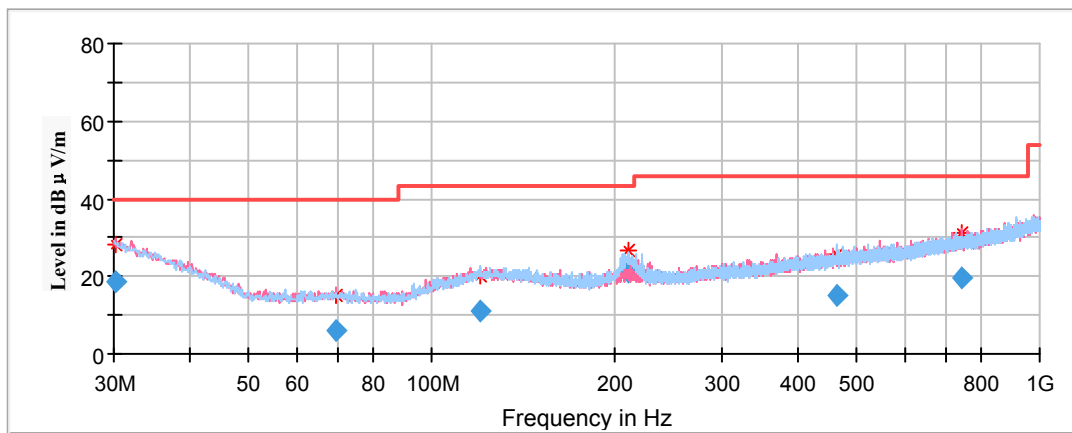
Spurious Emission Test:

30MHz-1GHz

*(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **middle channel of operation in X-axis of orientation** was recorded)*

Note:

1. This test was performed with the 902 – 928MHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
 Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
 Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)



| Frequency (MHz) | Corrected Amplitude | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | QuasiPeak (dBµV/m) | Height (cm) | Polar (H/V) | | | | |
| 30.267223 | 18.65 | 199.0 | V | 106.0 | -4.1 | 40.00 | 21.35 |
| 69.585400 | 5.89 | 199.0 | V | 0.0 | -17.3 | 40.00 | 34.11 |
| 119.948800 | 11.00 | 101.0 | H | 39.0 | -11.2 | 43.50 | 32.50 |
| 210.060250 | 21.01 | 101.0 | H | 60.0 | -12.3 | 43.50 | 22.49 |
| 463.471450 | 15.18 | 101.0 | H | 29.0 | -7.1 | 46.00 | 30.82 |
| 743.695600 | 19.61 | 199.0 | V | 283.0 | -2.6 | 46.00 | 26.39 |

1GHz-10GHz

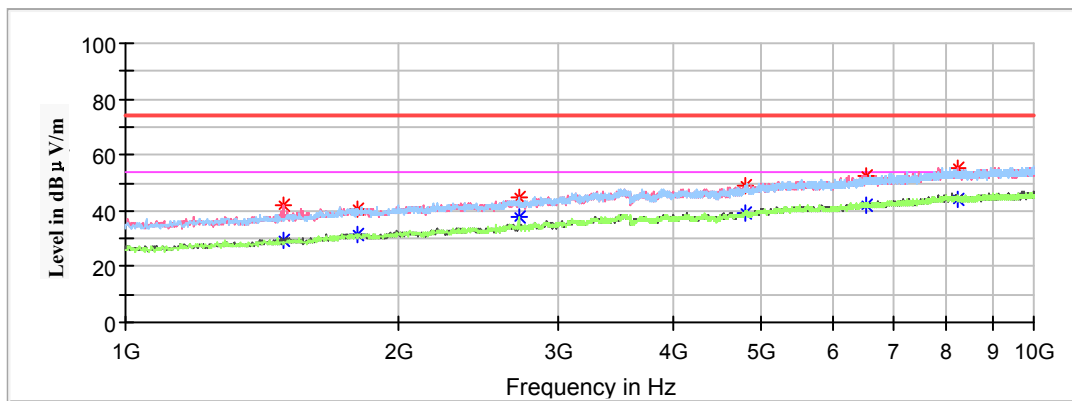
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

- 1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
- Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
- Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

Low Channel: 903MHz

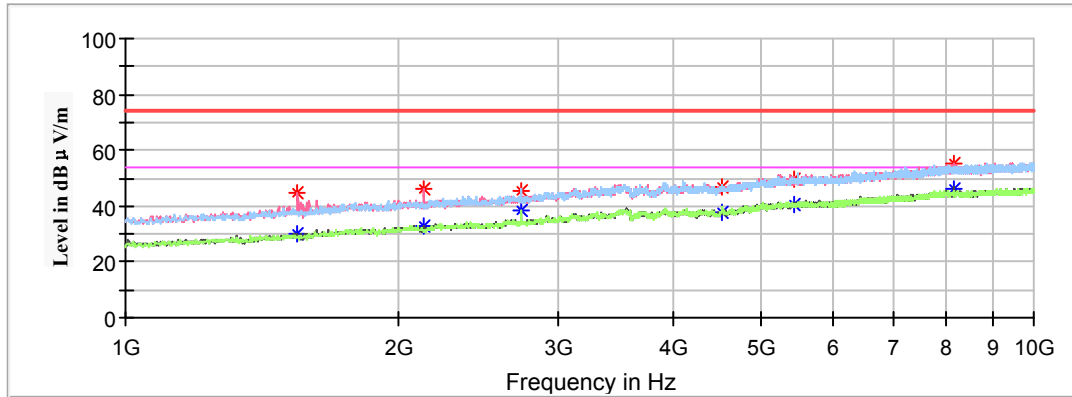
Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| 1493.200000 | --- | 29.31 | 200.0 | V | 66.0 | -1.3 | 54.00 | 24.69 |
| 1493.200000 | 42.13 | --- | 200.0 | V | 66.0 | -1.3 | 74.00 | 31.87 |
| 1806.000000 | --- | 31.27 | 150.0 | H | 86.0 | 0.8 | 54.00 | 22.73 |
| 1806.000000 | 40.48 | --- | 150.0 | H | 86.0 | 0.8 | 74.00 | 33.52 |
| 2709.000000 | --- | 37.97 | 250.0 | H | 253.0 | 4.4 | 54.00 | 16.03 |
| 2709.000000 | 44.95 | --- | 250.0 | H | 253.0 | 4.4 | 74.00 | 29.05 |
| 4812.400000 | --- | 39.30 | 200.0 | H | 164.0 | 10.8 | 54.00 | 14.70 |
| 4812.400000 | 48.85 | --- | 200.0 | H | 164.0 | 10.8 | 74.00 | 25.15 |
| 6524.200000 | --- | 42.31 | 150.0 | V | 33.0 | 14.3 | 54.00 | 11.69 |
| 6524.200000 | 52.69 | --- | 150.0 | V | 33.0 | 14.3 | 74.00 | 21.31 |
| 8245.000000 | --- | 44.34 | 200.0 | V | 107.0 | 17.2 | 54.00 | 9.66 |
| 8245.000000 | 55.06 | --- | 200.0 | V | 107.0 | 17.2 | 74.00 | 18.94 |

Middle Channel: 907.8MHz

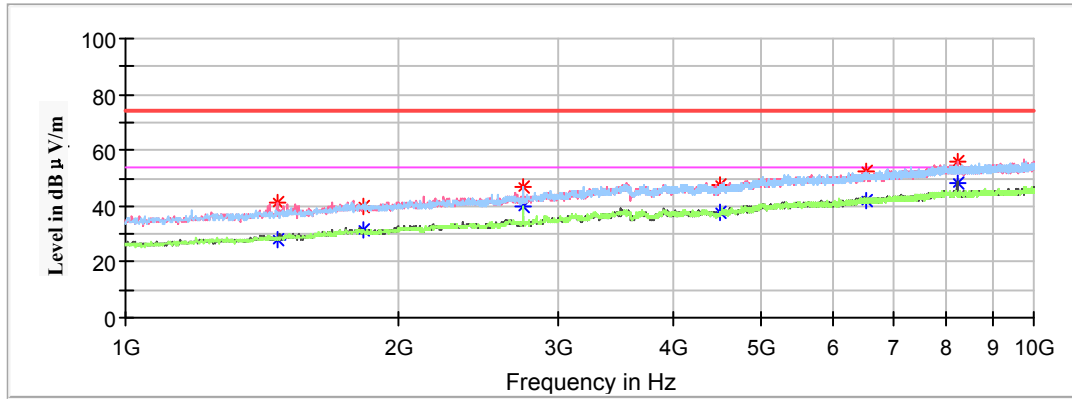
Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| 1547.200000 | 44.85 | --- | 200.0 | V | 211.0 | -0.9 | 74.00 | 29.15 |
| 1547.200000 | --- | 30.21 | 200.0 | V | 211.0 | -0.9 | 54.00 | 23.79 |
| 2126.800000 | 45.93 | --- | 100.0 | V | 271.0 | 2.3 | 74.00 | 28.07 |
| 2126.800000 | --- | 32.77 | 100.0 | V | 271.0 | 2.3 | 54.00 | 21.23 |
| 2723.400000 | 45.49 | --- | 100.0 | H | 129.0 | 4.4 | 74.00 | 28.51 |
| 2723.400000 | --- | 38.71 | 100.0 | H | 129.0 | 4.4 | 54.00 | 15.29 |
| 4539.000000 | --- | 37.55 | 250.0 | H | 208.0 | 9.4 | 54.00 | 16.45 |
| 4539.000000 | 46.90 | --- | 250.0 | H | 208.0 | 9.4 | 74.00 | 27.10 |
| 5446.800000 | --- | 40.58 | 100.0 | H | 172.0 | 12.3 | 54.00 | 13.42 |
| 5446.800000 | 49.64 | --- | 100.0 | H | 172.0 | 12.3 | 74.00 | 24.36 |
| 8171.200000 | --- | 46.48 | 250.0 | V | 351.0 | 17.2 | 54.00 | 7.52 |
| 8171.200000 | 55.32 | --- | 250.0 | V | 351.0 | 17.2 | 74.00 | 18.68 |

High Channel: 914.2MHz

Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBμV /m) | Average (dBμV /m) | Height (cm) | Polar (H/V) | | | | |
| 1468.000000 | --- | 28.20 | 100.0 | V | 294.0 | -1.4 | 54.00 | 25.80 |
| 1468.000000 | 41.39 | --- | 100.0 | V | 294.0 | -1.4 | 74.00 | 32.61 |
| 1828.400000 | --- | 31.13 | 100.0 | H | 208.0 | 1.0 | 54.00 | 22.87 |
| 1828.400000 | 40.06 | --- | 100.0 | H | 208.0 | 1.0 | 74.00 | 33.94 |
| 2742.600000 | --- | 40.12 | 200.0 | H | 198.0 | 4.6 | 54.00 | 13.88 |
| 2742.600000 | 46.77 | --- | 200.0 | H | 198.0 | 4.6 | 74.00 | 27.23 |
| 4520.800000 | --- | 37.49 | 100.0 | H | 255.0 | 9.3 | 54.00 | 16.51 |
| 4520.800000 | 47.24 | --- | 100.0 | H | 255.0 | 9.3 | 74.00 | 26.76 |
| 6529.600000 | --- | 41.83 | 200.0 | V | 103.0 | 14.4 | 54.00 | 12.17 |
| 6529.600000 | 52.53 | --- | 200.0 | V | 103.0 | 14.4 | 74.00 | 21.47 |
| 8228.800000 | 56.06 | --- | 100.0 | V | 132.0 | 17.2 | 74.00 | 17.94 |
| 8228.800000 | --- | 48.32 | 100.0 | V | 132.0 | 17.2 | 54.00 | 5.68 |

Fundamental Test & Band Edge Test:

(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

- 1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
- Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
- Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-------------------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| Fundamental Test | | | | | | | | |
| 903.000000 | 117.26 | --- | 200.0 | H | 282.0 | 0.2 | / | / |
| 903.000000 | --- | 107.41 | 200.0 | H | 282.0 | 0.2 | / | / |
| 903.000000 | 112.43 | --- | 200.0 | V | 68.0 | 0.2 | / | / |
| 903.000000 | --- | 102.64 | 200.0 | V | 68.0 | 0.2 | / | / |
| 907.800000 | 117.34 | --- | 200.0 | H | 323.0 | 0.3 | / | / |
| 907.800000 | --- | 107.36 | 200.0 | H | 323.0 | 0.3 | / | / |
| 907.800000 | 112.85 | --- | 150.0 | V | 102.0 | 0.3 | / | / |
| 907.800000 | --- | 103.05 | 150.0 | V | 102.0 | 0.3 | / | / |
| 914.200000 | 116.51 | --- | 200.0 | H | 163.0 | 0.5 | / | / |
| 914.200000 | --- | 106.63 | 200.0 | H | 163.0 | 0.5 | / | / |
| 914.200000 | 112.63 | --- | 150.0 | V | 122.0 | 0.5 | / | / |
| 914.200000 | --- | 102.72 | 150.0 | V | 122.0 | 0.5 | / | / |

| Frequency (MHz) | Corrected Amplitude | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------------|---------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | QuasiPeak (dBµV/m) | Height (cm) | Polar (H/V) | | | | |
| Band Edge Test | | | | | | | |
| 902.000000 | 44.28 | 200.0 | H | 43.0 | 0.2 | 46.00 | 1.72 |
| 902.000000 | 43.16 | 150.0 | V | 69.0 | 0.2 | 46.00 | 2.84 |
| 928.000000 | 38.22 | 200.0 | H | 336.0 | 0.8 | 46.00 | 7.78 |
| 928.000000 | 37.73 | 200.0 | V | 134.0 | 0.8 | 46.00 | 8.27 |

Data for Chip antenna at 125kHz channel:

Spurious Emission Test:

30MHz-1GHz

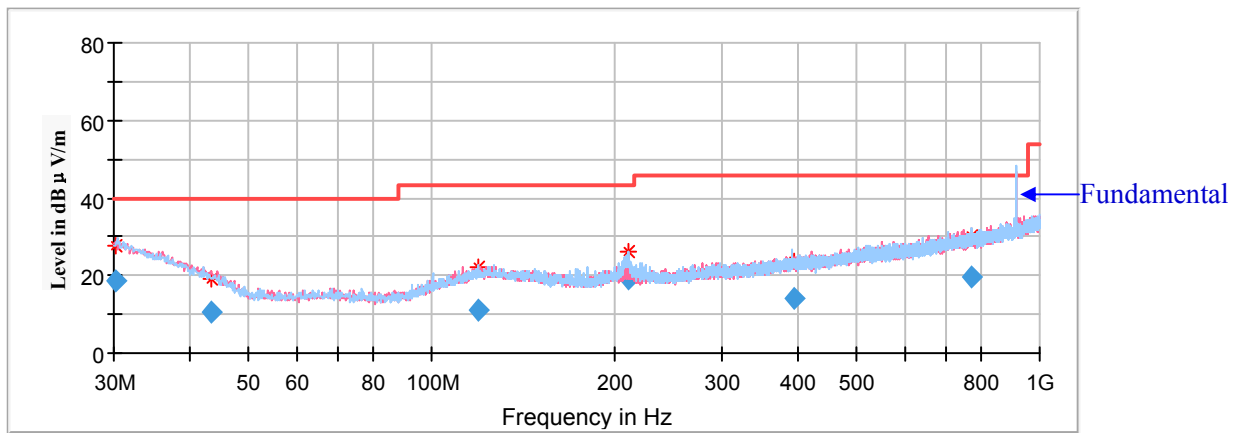
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case low channel of operation in X-axis of orientation was recorded)

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)

Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)



| Frequency (MHz) | Corrected Amplitude | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | QuasiPeak (dBµV/m) | Height (cm) | Polar (H/V) | | | | |
| 30.131550 | 18.76 | 199.0 | H | 0.0 | -4.0 | 40.00 | 21.24 |
| 43.520650 | 10.35 | 199.0 | V | 314.0 | -13.1 | 40.00 | 29.65 |
| 119.404750 | 10.89 | 101.0 | H | 65.0 | -11.3 | 43.50 | 32.61 |
| 210.158400 | 19.35 | 199.0 | H | 198.0 | -12.3 | 43.50 | 24.15 |
| 393.320500 | 13.84 | 199.0 | H | 329.0 | -8.3 | 46.00 | 32.16 |
| 771.727350 | 19.74 | 101.0 | H | 330.0 | -2.1 | 46.00 | 26.26 |

1GHz-10GHz

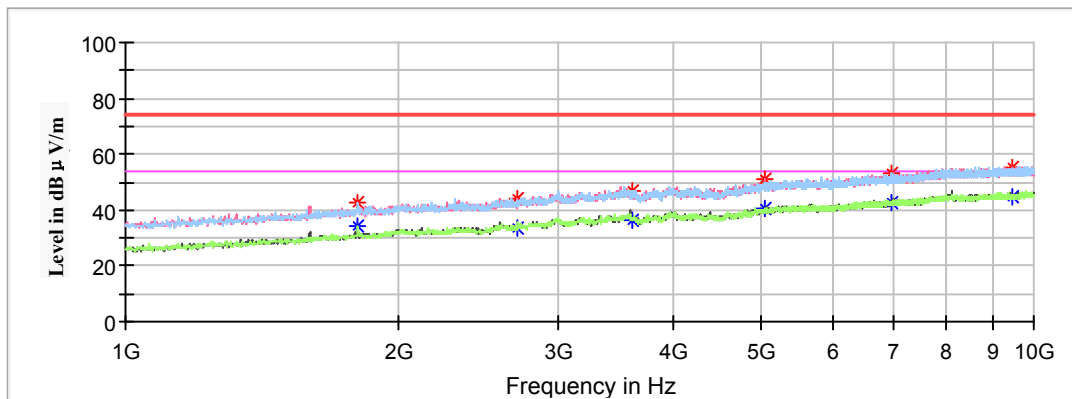
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

- 1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
- Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
- Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

Low Channel: 902.3MHz

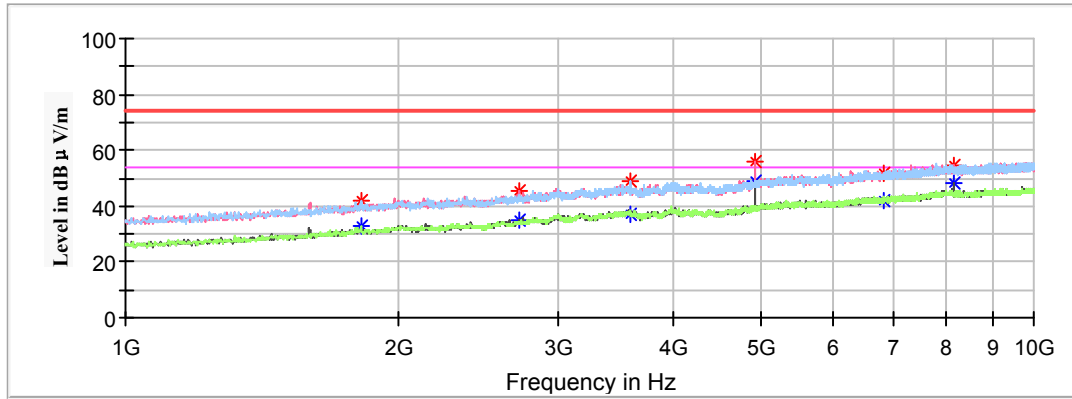
Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| 1804.600000 | --- | 34.22 | 100.0 | H | 188.0 | 0.8 | 54.00 | 19.78 |
| 1804.600000 | 42.74 | --- | 100.0 | H | 188.0 | 0.8 | 74.00 | 31.26 |
| 2706.900000 | --- | 33.86 | 150.0 | H | 25.0 | 4.3 | 54.00 | 20.14 |
| 2706.900000 | 43.77 | --- | 150.0 | H | 25.0 | 4.3 | 74.00 | 30.23 |
| 3609.200000 | --- | 36.51 | 250.0 | H | 245.0 | 7.7 | 54.00 | 17.49 |
| 3609.200000 | 46.53 | --- | 250.0 | H | 245.0 | 7.7 | 74.00 | 27.47 |
| 5046.400000 | --- | 40.27 | 100.0 | V | 176.0 | 11.7 | 54.00 | 13.73 |
| 5046.400000 | 51.11 | --- | 100.0 | V | 176.0 | 11.7 | 74.00 | 22.89 |
| 6972.400000 | --- | 42.50 | 250.0 | H | 12.0 | 14.9 | 54.00 | 11.50 |
| 6972.400000 | 53.47 | --- | 250.0 | H | 12.0 | 14.9 | 74.00 | 20.53 |
| 9494.200000 | --- | 44.84 | 100.0 | V | 41.0 | 17.8 | 54.00 | 9.16 |
| 9494.200000 | 55.29 | --- | 100.0 | V | 41.0 | 17.8 | 74.00 | 18.71 |

Middle Channel: 908.5MHz

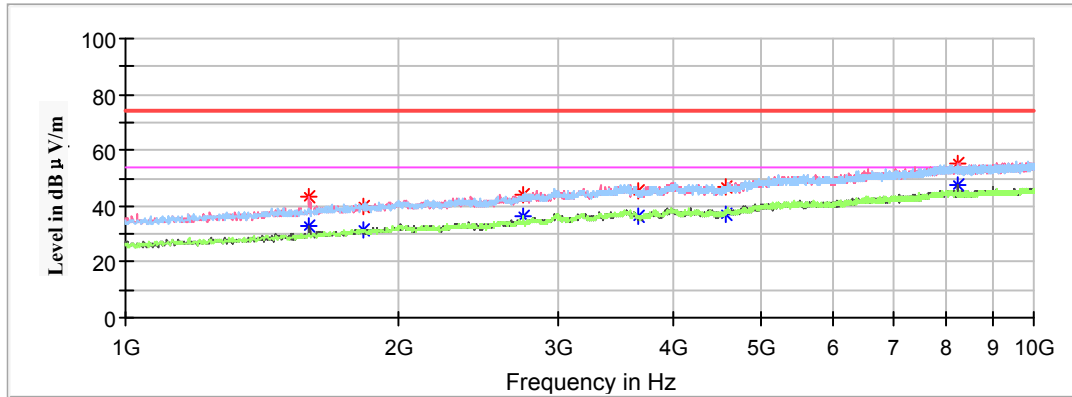
Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| 1817.000000 | 41.89 | --- | 250.0 | H | 152.0 | 0.9 | 74.00 | 32.11 |
| 1817.000000 | --- | 32.85 | 250.0 | H | 152.0 | 0.9 | 54.00 | 21.15 |
| 2725.500000 | 45.13 | --- | 150.0 | H | 184.0 | 4.5 | 74.00 | 28.87 |
| 2725.500000 | --- | 34.86 | 150.0 | H | 184.0 | 4.5 | 54.00 | 19.14 |
| 3592.000000 | 48.62 | --- | 100.0 | H | 251.0 | 7.6 | 74.00 | 25.38 |
| 3592.000000 | --- | 37.40 | 100.0 | H | 251.0 | 7.6 | 54.00 | 16.60 |
| 4934.800000 | 55.81 | --- | 200.0 | V | 153.0 | 11.4 | 74.00 | 18.19 |
| 4934.800000 | --- | 48.72 | 200.0 | V | 153.0 | 11.4 | 54.00 | 5.28 |
| 6839.200000 | --- | 42.19 | 150.0 | H | 360.0 | 14.7 | 54.00 | 11.81 |
| 6839.200000 | 51.89 | --- | 150.0 | H | 360.0 | 14.7 | 74.00 | 22.11 |
| 8176.600000 | 54.70 | --- | 200.0 | V | 321.0 | 17.2 | 74.00 | 19.30 |
| 8176.600000 | --- | 48.43 | 200.0 | V | 321.0 | 17.2 | 54.00 | 5.57 |

High Channel: 914.9MHz

Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBμV /m) | Average (dBμV /m) | Height (cm) | Polar (H/V) | | | | |
| 1594.000000 | 43.13 | --- | 250.0 | V | 131.0 | -0.6 | 74.00 | 30.87 |
| 1594.000000 | --- | 32.76 | 250.0 | V | 131.0 | -0.6 | 54.00 | 21.24 |
| 1829.800000 | 40.07 | --- | 150.0 | H | 331.0 | 1.0 | 74.00 | 33.93 |
| 1829.800000 | --- | 31.75 | 150.0 | H | 331.0 | 1.0 | 54.00 | 22.25 |
| 2744.700000 | --- | 36.47 | 200.0 | H | 107.0 | 4.6 | 54.00 | 17.53 |
| 2744.700000 | 44.14 | --- | 200.0 | H | 107.0 | 4.6 | 74.00 | 29.86 |
| 3659.600000 | 45.72 | --- | 250.0 | H | 41.0 | 7.9 | 74.00 | 28.28 |
| 3659.600000 | --- | 36.40 | 250.0 | H | 41.0 | 7.9 | 54.00 | 17.60 |
| 4574.500000 | 47.15 | --- | 100.0 | H | 171.0 | 9.6 | 74.00 | 26.85 |
| 4574.500000 | --- | 37.08 | 100.0 | H | 171.0 | 9.6 | 54.00 | 16.92 |
| 8234.200000 | --- | 47.66 | 200.0 | V | 171.0 | 17.2 | 54.00 | 6.34 |
| 8234.200000 | 55.14 | --- | 200.0 | V | 171.0 | 17.2 | 74.00 | 18.86 |

Fundamental Test & Band Edge Test:

(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)

Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-------------------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| Fundamental Test | | | | | | | | |
| 902.300000 | 117.28 | --- | 200.0 | H | 239.0 | 0.2 | / | / |
| 902.300000 | --- | 107.43 | 200.0 | H | 239.0 | 0.2 | / | / |
| 902.300000 | 112.59 | --- | 200.0 | V | 158.0 | 0.2 | / | / |
| 902.300000 | --- | 102.77 | 200.0 | V | 158.0 | 0.2 | / | / |
| 908.500000 | 116.88 | --- | 200.0 | H | 296.0 | 0.3 | / | / |
| 908.500000 | --- | 106.93 | 200.0 | H | 296.0 | 0.3 | / | / |
| 908.500000 | 112.49 | --- | 200.0 | V | 148.0 | 0.3 | / | / |
| 908.500000 | --- | 102.64 | 200.0 | V | 148.0 | 0.3 | / | / |
| 914.900000 | 116.53 | --- | 250.0 | H | 352.0 | 0.5 | / | / |
| 914.900000 | --- | 106.71 | 250.0 | H | 352.0 | 0.5 | / | / |
| 914.900000 | 112.45 | --- | 250.0 | V | 10.0 | 0.5 | / | / |
| 914.900000 | --- | 102.65 | 250.0 | V | 10.0 | 0.5 | / | / |

| Frequency (MHz) | Corrected Amplitude | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------------|---------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | QuasiPeak (dBµV/m) | Height (cm) | Polar (H/V) | | | | |
| Band Edge Test | | | | | | | |
| 902.000000 | 42.68 | 150.0 | H | 117.0 | 0.2 | 46.00 | 3.32 |
| 902.000000 | 41.57 | 150.0 | V | 50.0 | 0.2 | 46.00 | 4.43 |
| 928.000000 | 38.23 | 150.0 | H | 354.0 | 0.8 | 46.00 | 7.77 |
| 928.000000 | 37.71 | 250.0 | V | 111.0 | 0.8 | 46.00 | 8.29 |

Data for Chip antenna at 500kHz channel:

Spurious Emission Test:

30MHz-1GHz

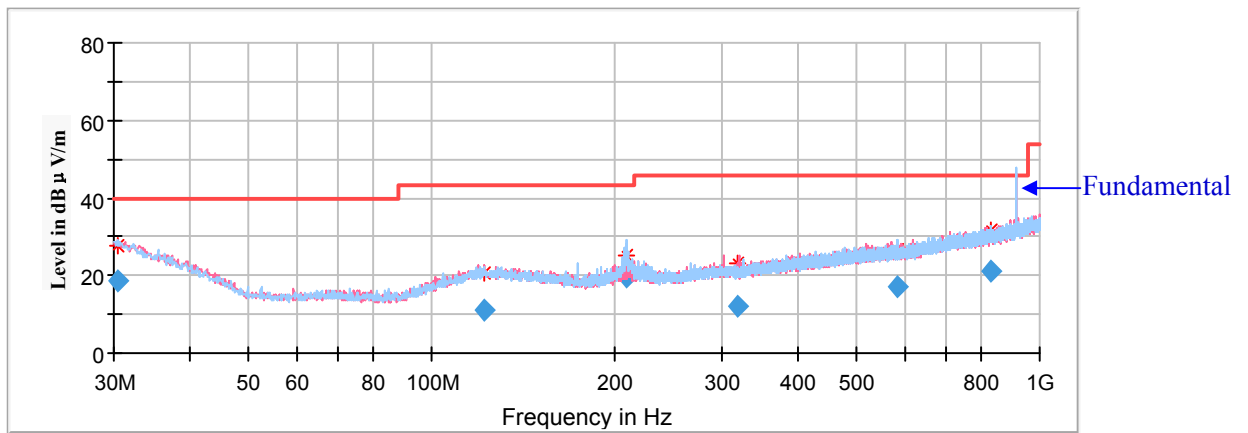
*(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **middle channel of operation in X-axis of orientation** was recorded)*

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)

Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)



| Frequency (MHz) | Corrected Amplitude | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | QuasiPeak (dBµV/m) | Height (cm) | Polar (H/V) | | | | |
| 30.389355 | 18.53 | 199.0 | H | 60.0 | -4.2 | 40.00 | 21.47 |
| 122.265750 | 11.32 | 199.0 | V | 0.0 | -11.3 | 43.50 | 32.18 |
| 208.930250 | 19.70 | 199.0 | H | 209.0 | -12.3 | 43.50 | 23.80 |
| 318.627950 | 12.09 | 101.0 | V | 277.0 | -10.1 | 46.00 | 33.91 |
| 582.803700 | 16.99 | 101.0 | H | 112.0 | -5.4 | 46.00 | 29.01 |
| 831.065550 | 21.12 | 199.0 | H | 309.0 | -1.3 | 46.00 | 24.88 |

1GHz-10GHz

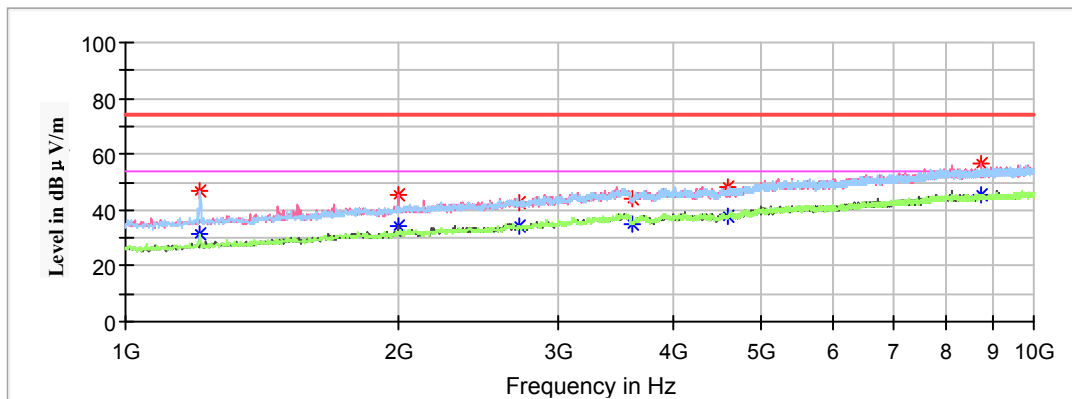
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

- 1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
- Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
- Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

Low Channel: 903MHz

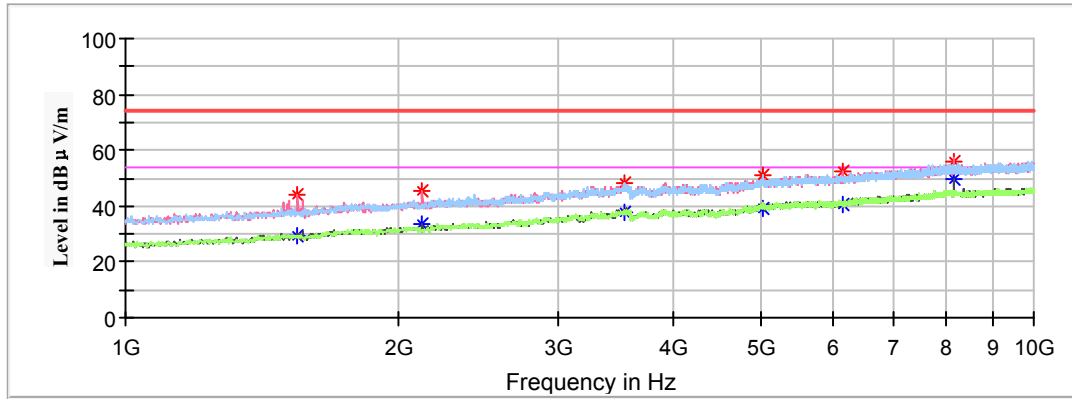
Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| 1208.800000 | --- | 31.74 | 100.0 | H | 297.0 | -3.0 | 54.00 | 22.26 |
| 1208.800000 | 46.71 | --- | 100.0 | H | 297.0 | -3.0 | 74.00 | 27.29 |
| 1999.000000 | --- | 34.07 | 150.0 | V | 107.0 | 2.0 | 54.00 | 19.93 |
| 1999.000000 | 45.11 | --- | 150.0 | V | 107.0 | 2.0 | 74.00 | 28.89 |
| 2709.000000 | --- | 34.16 | 250.0 | H | 158.0 | 4.4 | 54.00 | 19.84 |
| 2709.000000 | 42.80 | --- | 250.0 | H | 158.0 | 4.4 | 74.00 | 31.20 |
| 3612.000000 | --- | 34.63 | 100.0 | H | 308.0 | 7.7 | 54.00 | 19.37 |
| 3612.000000 | 44.10 | --- | 100.0 | H | 308.0 | 7.7 | 74.00 | 29.90 |
| 4601.800000 | --- | 37.72 | 200.0 | H | 77.0 | 9.7 | 54.00 | 16.28 |
| 4601.800000 | 48.50 | --- | 200.0 | H | 77.0 | 9.7 | 74.00 | 25.50 |
| 8738.200000 | --- | 45.41 | 150.0 | V | 350.0 | 17.4 | 54.00 | 8.59 |
| 8738.200000 | 56.32 | --- | 150.0 | V | 350.0 | 17.4 | 74.00 | 17.68 |

Middle Channel: 907.8MHz

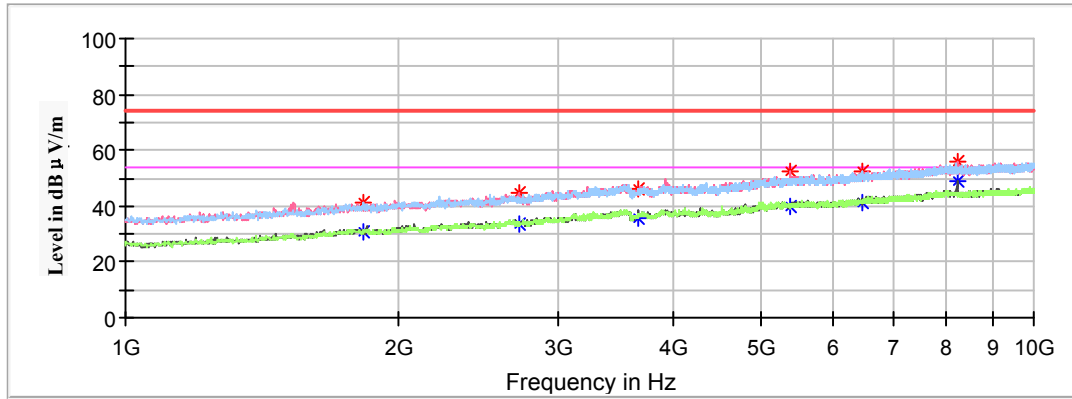
Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| 1547.200000 | 44.22 | --- | 150.0 | V | 288.0 | -0.9 | 74.00 | 29.78 |
| 1547.200000 | --- | 29.03 | 150.0 | V | 288.0 | -0.9 | 54.00 | 24.97 |
| 2123.200000 | 45.28 | --- | 100.0 | V | 100.0 | 2.3 | 74.00 | 28.72 |
| 2123.200000 | --- | 33.49 | 100.0 | V | 100.0 | 2.3 | 54.00 | 20.51 |
| 3545.200000 | 48.54 | --- | 250.0 | H | 359.0 | 7.4 | 74.00 | 25.46 |
| 3545.200000 | --- | 37.62 | 250.0 | H | 359.0 | 7.4 | 54.00 | 16.38 |
| 5023.000000 | --- | 39.41 | 100.0 | H | 108.0 | 11.7 | 54.00 | 14.59 |
| 5023.000000 | 50.93 | --- | 100.0 | H | 108.0 | 11.7 | 74.00 | 23.07 |
| 6169.600000 | --- | 40.73 | 200.0 | V | 192.0 | 13.4 | 54.00 | 13.27 |
| 6169.600000 | 52.23 | --- | 200.0 | V | 192.0 | 13.4 | 74.00 | 21.77 |
| 8169.400000 | 56.05 | --- | 100.0 | V | 280.0 | 17.2 | 74.00 | 17.95 |
| 8169.400000 | --- | 49.39 | 100.0 | V | 280.0 | 17.2 | 54.00 | 4.61 |

High Channel: 914.2MHz

Full Spectrum



| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBμV /m) | Average (dBμV /m) | Height (cm) | Polar (H/V) | | | | |
| 1828.400000 | --- | 30.64 | 100.0 | H | 21.0 | 1.0 | 54.00 | 23.36 |
| 1828.400000 | 41.00 | --- | 100.0 | H | 21.0 | 1.0 | 74.00 | 33.00 |
| 2708.200000 | --- | 33.74 | 150.0 | V | 168.0 | 4.4 | 54.00 | 20.26 |
| 2708.200000 | 44.68 | --- | 150.0 | V | 168.0 | 4.4 | 74.00 | 29.32 |
| 3656.800000 | --- | 36.01 | 250.0 | H | 141.0 | 7.9 | 54.00 | 17.99 |
| 3656.800000 | 46.19 | --- | 250.0 | H | 141.0 | 7.9 | 74.00 | 27.81 |
| 5384.800000 | --- | 39.60 | 100.0 | V | 348.0 | 12.3 | 54.00 | 14.40 |
| 5384.800000 | 52.22 | --- | 100.0 | V | 348.0 | 12.3 | 74.00 | 21.78 |
| 6464.800000 | --- | 41.44 | 250.0 | H | 266.0 | 14.2 | 54.00 | 12.56 |
| 6464.800000 | 52.61 | --- | 250.0 | H | 266.0 | 14.2 | 74.00 | 21.39 |
| 8228.800000 | --- | 48.90 | 150.0 | V | 147.0 | 17.2 | 54.00 | 5.10 |
| 8228.800000 | 55.86 | --- | 150.0 | V | 147.0 | 17.2 | 74.00 | 18.14 |

Fundamental Test & Band Edge Test:

(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

- 1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) - Amplifier Factor (dB)
- Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
- Margin (dB) = Limit (dBµV/m) - Corrected Amplitude (dBµV /m)

| Frequency (MHz) | Corrected Amplitude | | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-------------------------|---------------------|-------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | MaxPeak (dBµV /m) | Average (dBµV /m) | Height (cm) | Polar (H/V) | | | | |
| Fundamental Test | | | | | | | | |
| 903.000000 | 117.33 | --- | 200.0 | H | 258.0 | 0.2 | / | / |
| 903.000000 | --- | 107.51 | 200.0 | H | 258.0 | 0.2 | / | / |
| 903.000000 | 112.45 | --- | 150.0 | V | 264.0 | 0.2 | / | / |
| 903.000000 | --- | 102.70 | 150.0 | V | 264.0 | 0.2 | / | / |
| 907.800000 | 117.39 | --- | 150.0 | H | 91.0 | 0.3 | / | / |
| 907.800000 | --- | 107.28 | 150.0 | H | 91.0 | 0.3 | / | / |
| 907.800000 | 112.82 | --- | 250.0 | V | 354.0 | 0.3 | / | / |
| 907.800000 | --- | 103.01 | 250.0 | V | 354.0 | 0.3 | / | / |
| 914.200000 | 116.49 | --- | 200.0 | H | 288.0 | 0.5 | / | / |
| 914.200000 | --- | 106.64 | 200.0 | H | 288.0 | 0.5 | / | / |
| 914.200000 | 112.66 | --- | 250.0 | V | 136.0 | 0.5 | / | / |
| 914.200000 | --- | 102.78 | 250.0 | V | 136.0 | 0.5 | / | / |

| Frequency (MHz) | Corrected Amplitude | Rx Antenna | | Turntable Degree | Corrected Factor (dB/m) | Limit (dBµV/m) | Margin (dB) |
|-----------------------|---------------------|-------------|-------------|------------------|-------------------------|----------------|-------------|
| | QuasiPeak (dBµV/m) | Height (cm) | Polar (H/V) | | | | |
| Band Edge Test | | | | | | | |
| 902.000000 | 44.33 | 150.0 | H | 265.0 | 0.2 | 46.00 | 1.67 |
| 902.000000 | 43.18 | 200.0 | V | 225.0 | 0.2 | 46.00 | 2.82 |
| 928.000000 | 38.18 | 200.0 | H | 86.0 | 0.8 | 46.00 | 7.82 |
| 928.000000 | 37.81 | 150.0 | V | 158.0 | 0.8 | 46.00 | 8.19 |

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