FCC PART 15, SUBPART C

TEST REPORT

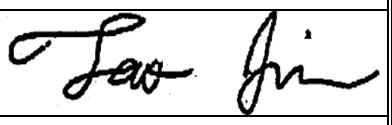
For

ROCHESTER SENSORS LLC

1025 S. Belt Line Road, Suite 100
Coppell, TX 75019, USA

FCC ID: 2BCFFTEK880

Report Type:	Product Type:
Original Report	Radar Level Sensor

Prepared By:	Tao Jin Test Engineer	
Report Number:	R2308174-255	
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ACCREDITED
CERTIFICATE #3297.02

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2308174-255	Original Report	2023-09-13

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test report was prepared on behalf of *Rochester Sensors LLC.*, and their product model: TEK 880, *FCC ID: 2BCFFTEK880. T*he "EUT" as referred to in this report. The EUT is a Radar Level Sensor which operates in the 57-64 GHz spectrum. The radio also will co-locate with a BLE module (FCC ID: 2ATPO-PB03) as well as LTE module (FCC ID: XMR201910BG95M3).

1.2 Mechanical Description of EUT

TEK 880 measures approximately 115mm x 50mm.

The data gathered is from a production sample provided by Rochester Sensors LLC. with BACL assigned serial numbers: R2308174-1 & R2308174-2

1.3 Objective

This report was prepared on behalf of *Rochester Sensors LLC.*, in accordance with Part 15, Subpart C of the Federal Communication Commission's rules.

The objective was to determine compliance with FCC Part 15, Subpart C for Peak Fundamental Emission, Antenna Requirements, RF Exposure, Frequency Stability and Radiated Spurious Emissions. In addition, co-location was evaluated for the radar's performance alongside other two modules listed in section 1.1.

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2 º C
Humidity	±5 %
DC and low frequency voltages	±1.0 %
Time	±2 %
Duty Cycle	±3 %

1.7 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R.

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

1.8 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2017 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2017 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report.

BACL's ISO/IEC 17025:2017 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment

[including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.03)*** to certify

- For the USA (Federal Communications Commission):
  - 1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  - 2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  - 3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  - 1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  - 2 All Scope 2-Licensed Personal Mobile Radio Services;
  - 3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  - 4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  - 5 All Scope 5-Licensed Fixed Microwave Radio Services
  - 6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  - 1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  - 2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2
- For the Hong Kong Special Administrative Region:
  - 1 All Radio Equipment, per KHCA 10XX-series Specifications;
  - 2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  - 3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  - 1 MIC Telecommunication Business Law (Terminal Equipment):
    - All Scope A1 - Terminal Equipment for the Purpose of Calls;
    - All Scope A2 - Other Terminal Equipment
  - 2 Radio Law (Radio Equipment):
    - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
    - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
    - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment

- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISEDC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.10-2013.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

2.2 EUT Exercise Software

Test Software was verified to be compliant with the standard requirements being tested against. The following configurations were set for testing, and the corresponding power settings used are listed below.

Radio	Frequency (GHz)	Power Setting
Radar	60.88	Default
BLE	2.402	Default
GSM850	0.8242	Default

2.3 Modulation Characteristics

Per FCC §2.1047(d) *Other types of equipment*: A curve or equivalent data which shows that the equipment will meet the modulation requirements of the rules under which the equipment is to be licensed.

Information pertaining to the radar listed below as declared by customer:

Parameter	Radar technical information
Number of channels	1
Modulation	Pulse Modulation
Max Pulse Duration	4.8 ns
Duty Cycle time	3.84%

Note: Above table shows compliance to duty cycle requirements of pulse duration (≤6 ns), duty cycle within 0.3 μs (≤10%) as specified in FCC § 15.255(c)(3).

2.4 Equipment Modifications

None

2.5 Remote Support Equipment

None

2.6 Local Support Equipment

Manufacturer	Description	Model	S/N
Volteq	DC Power Supply	HY5003D	160402343

2.7 Interface Ports and Cabling

Cable Description	Length (m)	To	From
Power Cables	< 2 m	EUT	DC Power Supply

2.8 Far-Field Calculations

Antenna Model	Frequency Range (GHz)	Measurement Antenna		
		D (meters)	λ (meters)	R_m (meters)
M19RH	40-60	0.04625	0.004997	0.86
M12RH	60-90	0.03002	0.003331	0.54
M08RH	90-140	0.01969	0.002141	0.36
M05RH	140-162	0.01255	0.001852	0.17
	162-220	0.01255	0.001364	0.23

Note: Far-Field (Rayleigh) distance formula used is shown below (According to ANSI C63.26-2015 Section 4.4.3 Note f)

$$R_m = 2D^2/\lambda$$

, where the R_m is the Rayleigh (far-field) distance, D is the largest dimension of the antenna aperture and λ is the free-space wavelength in meters at the frequency of measurement (calculated by speed of light divided by frequency).

Note: Measurements in report were made at distances greater than calculated far-field distances shown in table

3 Summary of Test Results

Results reported relate only to the product tested.

FCC Rules	Description of Test	Results
FCC §15.203, §15.255(c), §2.909	Antenna Requirement	Compliant
FCC §15.255(g), §1.1307(b), §1.1310, §2.1091	RF Exposure	Compliant
FCC §15.207	AC Line Conducted Emissions	N/A[1]
FCC §15.255(d)	Radiated Spurious Emissions	Compliant
FCC §15.255(f)	Frequency Stability	Compliant
FCC §15.215(c)	20dB Bandwidth	Compliant
FCC §15.255(c)(3)	Radiated Power lmits	Compliant

Note[1]: Device is DC powered by battery.

BACL is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report. Information provided by the customer, e.g., antenna gain, can affect the validity of results.

4 FCC §15.203, §15.255(c)(1)(B) - Antenna Requirements

4.1 Applicable Standards

According to FCC §15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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.

And according to FCC §15.255(c)(1)(B), the provisions of § 15.204(c)(2) and (4) that permit the use of different antennas of the same type and of equal or less directional gain do not apply to intentional radiator systems operating under this provision. In lieu thereof, intentional radiator systems shall be certified using the specific antenna(s) with which the system will be marketed and operated. Compliance testing shall be performed using the highest gain and the lowest gain antennas for which certification is sought and with the intentional radiator operated at its maximum available output power level. The responsible party, as defined in § 2.909 of this chapter, shall supply a list of acceptable antennas with the application for certification.

4.2 Antenna Description

External/Internal/Integral	Total Antenna Gain (dBi)	Antenna Type
Integral	11.2	Loop

The antenna is factory-installed and is not modifiable by users.

5 FCC §255(g), §2.1091, §1.1310(d) (3) - RF Exposure

5.1 Applicable Standards

As per FCC §15.255(g): Radio frequency devices operating under the provisions of this part are subject to the radio frequency radiation exposure requirements specified in §§ 1.1307(b), 1.1310, 2.1091, and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of mobile or portable devices operating under this section must contain a statement confirming compliance with these requirements. Technical information showing the basis for this statement must be submitted to the Commission upon request.

As per FCC §1.1310(d) (3), At operating frequencies above 6 GHz, the MPE limits listed in Table 1 in paragraph (e)(1) of this section shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b) of this part.

TABLE 1 TO §1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*($900/f^2$)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) Limits for General Population/Uncontrolled Exposure				
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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

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

5.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = EIRP/4\pi R^2$$

Where: S = power density
EIRP = Effective Isotropic Radiated Power
R = distance to the center of radiation of the antenna

5.3 MPE Results for the FCC

Radar Standalone

Maximum EIRP (dBm):	0.5
Maximum EIRP (mW):	1.12
Prediction distance (cm):	20.1
Prediction frequency (MHz):	60500
Power density of prediction frequency at 20.1 cm (mW/cm^2):	0.0002
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the FCC requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20.1 cm is 0.0002mW/cm^2. Limit is 1.0 mW/cm^2.

Worst Case Co-location MPE Calculation

Radio	Max EIRP (dBm)	Evaluated Distance (cm)	Worst-Case Exposure Level [mW/cm^2]	Limit [mW/cm^2]	Worst-Case Ratios	Sum of Ratios	Limit
Worst Case							
BLE	9.5	20.1	0.00176mW/cm^2	1.0 mW/cm^2	0.176%	99.26%	100%
Radar	0.5	20.1	0.0002 mW/cm^2	1.0 mW/cm^2	0.02%		
GSM850	34.541	20.1	0.561 mW/cm^2	0.566mW/cm^2	99.06%		

Note: For BLE and GSM850 data referenced above, please refer to original FCC certification's MPE calculations

6 FCC §15.255(c)(3) - Radiated Power Limits

6.1 Applicable Standards

According to FCC §15.255(c)(3): Within the 57–71 GHz band, emission levels shall not exceed the following equivalent isotropically radiated power (EIRP):

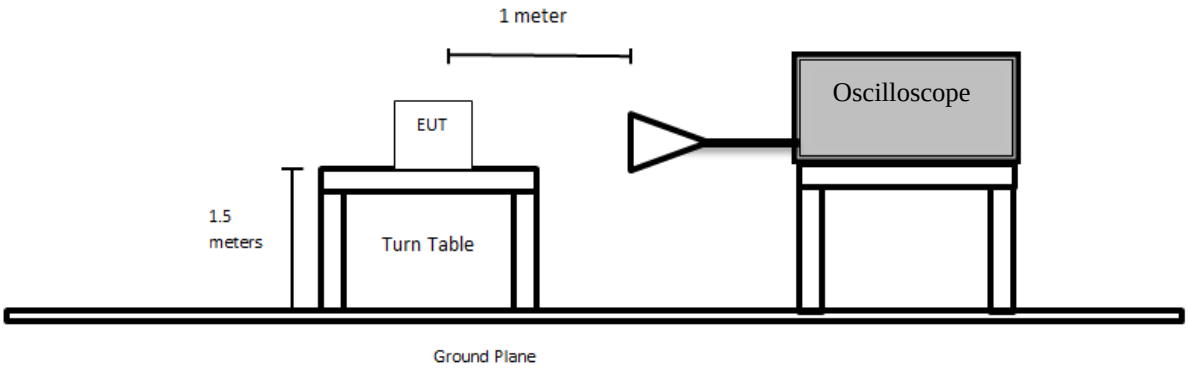
(3) For pulsed field disturbance sensors/radars operating in the 57–64 GHz band that have a maximum pulse duration of 6 ns, the average EIRP shall not exceed 13 dBm and the transmit duty cycle shall not exceed 10% during any 0.3 μs time window. In addition, the average integrated EIRP within the frequency band 61.5–64.0 GHz shall not exceed 5 dBm in any 0.3 μs time window. Peak emissions shall not exceed 20 dB above the maximum permitted average emission limit applicable to the equipment under test. The radar bandwidth is the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna.

6.2 Measurement Procedure

Based on ANSI C63.10-2013 Subclause 9.11, the following procedure was followed:

a) For all measurements, measure the level of the emission using substitution as follows:
   1) Record the average and peak voltages from the DSO with the EUT placed in front of measurement of antenna connected to DSO.
   2) Remove the EUT from the path of the measurement antenna.
   3) Connect a mm-wave source to the RF input port of the instrumentation system via a waveguide variable attenuator.
   4) The mm-wave source shall be unmodulated.
   5) Adjust the frequency of the mm-wave source to the center of the frequency range occupied by the transmitter.
   6) Adjust the amplitude of the mm-wave source and/or the variable attenuator such that the DSO indicates a voltage equal to the peak voltage recorded in step e1).
   7) Disconnect the waveguide variable attenuator from the RF input port of the instrumentation system.
   8) Without changing any settings, connect the waveguide variable attenuator to a wideband mm-wave power meter with a thermocouple detector or equivalent.
   9) Measure and note the power.
   10) Repeat steps e3) through e9) for the average voltage recorded in step e1).
   11) The resulting value is the applicable radiated power.

6.3 Test Setup Block Diagram



6.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
54	Tektronix	Oscilloscope	TDS7104	B020557	2023-04-04	1 year
861	OML Inc.	Horn Antenna	M012HWA M12RH	17061501	N/R	N/A
1130	Aglient	MXG Signal Generator	N5183A	MY50140453	2022-09-20	1 year
1223	OML Inc.	Millimeter Wave Source Module	S12MS-A	210801-1	N/R	N/A
-	-	RF cable	-	-	Each time[1]	N/A

Note[1]: cables included in the test set-up will be checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

6.5 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Tao Jin on 2023-08-22 in 5 meter chamber 3.

6.6 Test Results

Peak Power

Frequency (GHz)	Oscilloscope Reading (mV)	Conducted Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
60.88	2.3	-10.7	11.2	0.5	33

Average Power

Frequency (GHz)	Oscilloscope Reading (mV)	Conducted Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)
60.88	1.9	-12.4	11.2	-1.2	13

Note[1]: the above limits are based on the device meeting the requirements specific to 15.255(c)(3)
Note: For compliance to Duty Cycle requirements, please refer to section 2.3

7 FCC §15.255(d)– Spurious Radiated Emissions

7.1 Applicable Standards

As per FCC §15.255(d): Limits on spurious emissions:

(1) The power density of any emissions outside the 57–71 GHz band shall consist solely of spurious emissions.

(2) Radiated emissions below 40 GHz shall not exceed the general limits in § 15.209.

(3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm2 at a distance of 3 meters.

(4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

7.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2013. The specification used was the FCC 15 Subpart C limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

7.3 Measurement Procedure

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

For radiated testing the EUT was set 3 or 1 meter away from the testing antenna, which was varied from 1-4 meter, and the EUT was placed on a turntable, which was 0.8 meter and 1.5 meter above the ground plane for below and above 960 MHz measurements, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna's polarity should be changed between horizontal and vertical.

The spectrum analyzer or receiver was set as:

Below 960 MHz:

Quasi Peak: RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 960 MHz:

(1) Peak: RBW = 1MHz / VBW = 3MHz / Sweep = 100ms
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

Above 40GHz:

Per ANSI C63.10-2013 Section 9.9:

Maximize emissions as follows:
a) Connect the test antenna to the instrumentation system.
b) Place the EUT in a continuous transmission mode.
c) Set the instruments to the proper values.
d) For all tests, maintain the test antenna at a measurement distance less than or equal to the maximum measurement distance determined in 9.8.
e) Perform an exploratory search for emissions and determine the approximate direction at which each observed emission emanates from the EUT, as follows:
1) It is recommended that exploratory measurements be made at a closer distance than the validated maximum measurement distance. However, exercise care not to overload the measurement system when the test antenna is directed toward the main beam(s) of the EUT antenna.
2) Begin handheld measurements with the test antenna in a horizontally polarized position.
3) Scan the test antenna around all surfaces of the EUT, keeping the test antenna at a separation distance equal to the selected measurement distance, except increase the distance as needed to prevent measurement system overload when the test antenna is directed to the main beam(s) of the EUT antenna.
4) As the surfaces of the EUT are scanned, keep the test antenna pointed toward the EUT.
5) As the surfaces of the EUT are scanned, vary the test antenna polarization by rotating through at least 0° to 180° to cover all possible polarizations of the emission.
6) For each observed emission, note the approximate test antenna position at which the maximum level occurs.
7) Where applicable, using two active traces on a spectrum analyzer (one set to clear-write, the second set to max-hold) can aid the process.
f) For each emission observed, perform a final measurement as follows:
1) Begin with the test antenna at the approximate position where the maximum level occurred during the exploratory scan.
2) Move the test antenna away from the EUT, to the maximum measurement distance, if it is still possible to observe the emission at this distance and the emission has a signal-to-noise ratio of at least 6 dB. Otherwise,

move the test antenna away from the EUT to the distance at which the signal-to-noise ratio of the emission is 6 dB.
3) Slowly scan the test antenna around this position, slowly vary the test antenna polarization by rotating through at least 0° to 180°, and slowly vary the orientation of the test antenna (e.g., so that it is not always pointing directly at the EUT) to find the final position, polarization, and orientation at which the maximum level of the emission is observed.
Record the measured reading with the test antenna fixed at this maximized position, polarization, and orientation. Record the measurement distance.

Note: Pre-scan was performed in order to determine worst-case orientation of device (shown in Test Setup Photos) with respect to measurement antenna. Plots/data shown represent measurements made in worst-case orientation.

Per ANSI C63.10-2013 Section 9.12:

The following procedure shall be used for measuring harmonic and spurious emissions for frequencies above 40 GHz:

a)Connect the test antenna covering the appropriate frequency range to a spectrum analyzer via an external mixer or directly to the spectrum analyzer if the instrument supports the required frequency range.
b) Set spectrum analyzer RBW = 1 MHz, VBW = 1 MHz or 3 MHz (as specified in the requirements), average detector, span as required, and so on.
c) Determine the maximum measurement distance using 9.8.
d) Search for emissions over the mixer band and maximize all observed emissions using 9.9.
e) Note the maximum power indicated on the spectrum analyzer. Adjust this reading, if necessary, by the conversion loss of the external mixer used at the frequency under investigation and the external mixer IF cable loss.
f) Calculate the maximum field strength of the emission at the measurement distance using Equation (19) and the adjusted/corrected power at the output of the test antenna.
g) Where applicable, calculate the EIRP from the measured field strength using Equation (22) and then convert to the linear form using Equation (24).
h) If measurements were made at any distance other than the distance specified by the limit, then extrapolate the maximum measured field strength to the field strength at the distance specified by the limit using Equation (20), and then convert to the field strength in V/m using Equation (21).
i) Where applicable, calculate the power density at the distance specified by the limit from the field strength at the distance specified by the limit using Equation (26).
j) Repeat the preceding sequence for every emission observed in the frequency band under investigation.
k) Repeat the preceding sequence for every external mixer band as needed to encompass the required frequency range of investigation (as specified by the regulatory requirements to which compliance is being tested).
l) Repeat the preceding sequence in all operating configurations supported by the EUT (e.g., forward-looking, side-looking, and rear-looking configurations, with the vehicle at rest and in motion)

7.4 Corrected Amplitude and Margin Calculation

For emissions below 1 GHz,

The Corrected Amplitude (CA) is calculated by adding the Correction Factor to the S.A. Reading. The basic equation is as follows:

CA = S.A. Reading + Correction Factor

For example, a corrected amplitude of 40.3 dBuV/m = S.A. Reading (32.5 dBuV) + Correction Factor (7.8 dB/m)

The Correction Factor is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) together. This calculation is done in the measurement software, and reported in the test result section. The basic equation is as follows:

Correction Factor = AF + CL + Atten – Ga

For emission above 1 GHz up to 40GHz,

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

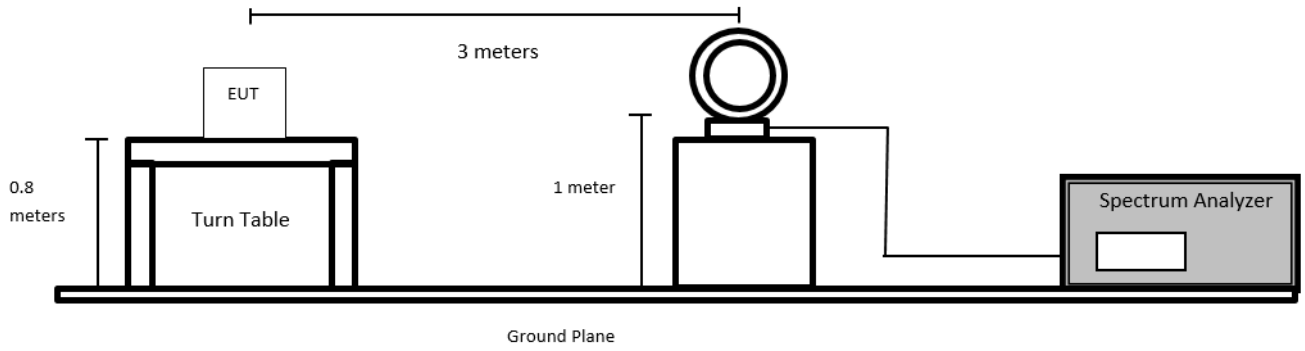
The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – Limit

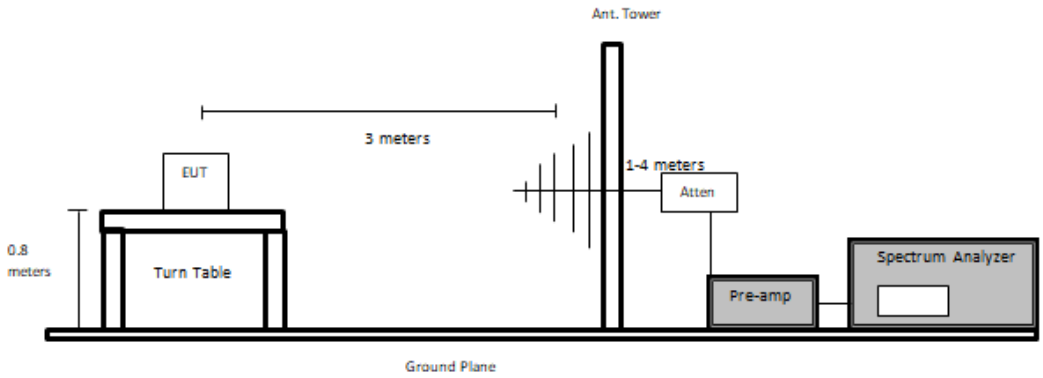
For corrections above 40GHz, please refer to notes in section 7.10

7.5 Test Setup Block Diagram

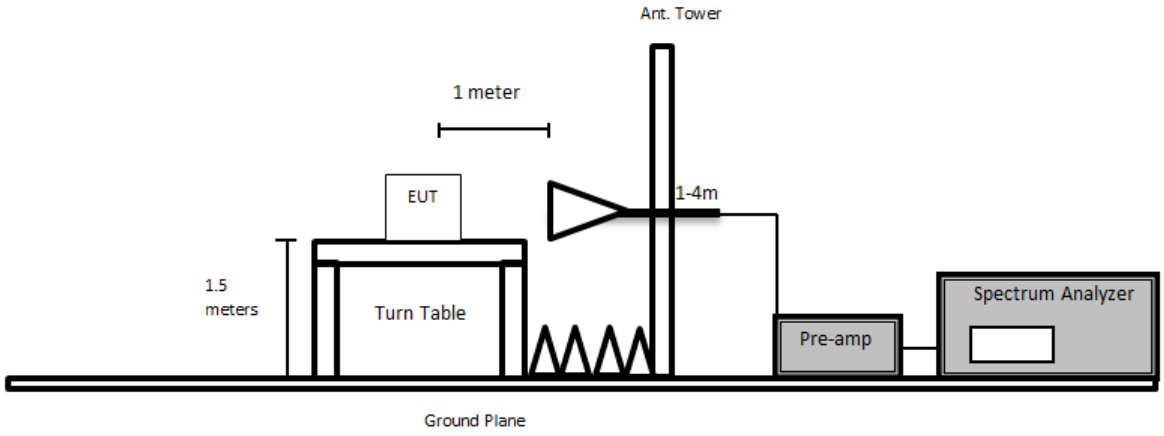
9 kHz to 30 MHz:



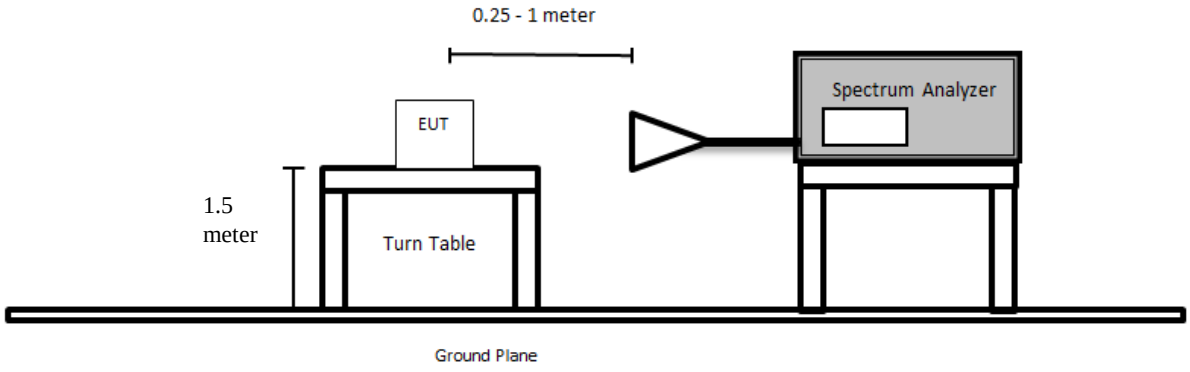
Below 1GHz:



1-40 GHz:



Above 40 GHz:



7.6 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
310	Rohde & Schwarz	EMI test receiver 9 KHZ to 3 GHZ	ESCI 1166.5950. 03	100338	2023-05-11	1 year
393	Com-Power	Active Loop Antenna	AL-130	17043	2023-05-26	2 years
-	Sunol Sciences Corp	System Controller	SC110V	122303-1	N/R	N/A
316	Sonoma Instruments	Preamplifier 10 kHz - 2.5 GHz	317	260406	2023-04-12	6 months
658	HP/Agilent	Preamplifier	8449B OPT HO2	3008A0113	2023-06-13	1 year
827	AH Systems	Preamplifier	PAM 1840 VH	170	2023-05-17	1 year
1186	Pasternack	Coaxial Cable, RG214	PE3062-1050CM	N/A	2023-04-14	6 months
1247	Uti flex	Micro - Coax	N/A	N/A	2023-06-13	1 year
1248	Pasternack	RG214 COAX Cable	PE3062	N/A	2023-04-14	6 months
1249	time microwave	LMR-400 Cable Dc-3 GHz	AE13684	2k80612-5 6fts	2023-04-14	6 months
1295	Carlisle	10m Ultra Low Loss Coaxial Cable	UFB142A-1-3937-200200	64639890912-001	2023-05-04	6 months
1329	Pasternack	2.92mm short coaxial cable	PE360-12	N/A	2023-06-09	6 months
1345	RFMW	2.92mm 10ft RF cable	KMSE-160SAW-240.0-KSME	N/A	2023-06-23	6 months
321	Sunol Sciences Corp	Biconilog Antenna	JB3	A020106-2	2021-11-22	2 years
1192	ETS Lindgren	Horn Antenna	3117	00218973	2021-09-14	2 years
91	Wisewave	Horn Antenna	ARH-4223-02	10555-02	2022-03-08	2 years
230	Wisewave	Horn Antenna	ARH-2823-02	10555-02	2022-03-08	2 years
624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2023-05-12	1 year
861	OML Inc.	Mixer and Horn Antenna set	M05HWA M08HWA M012HWA M19HWA M05RH M08RH M12RH M19RH	170615-1	N/R	N/A
-	-	RF cable	-	-	Each time[1]	N/A
-	Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Note[1]: cables included in the test set-up will be checked each time before testing.

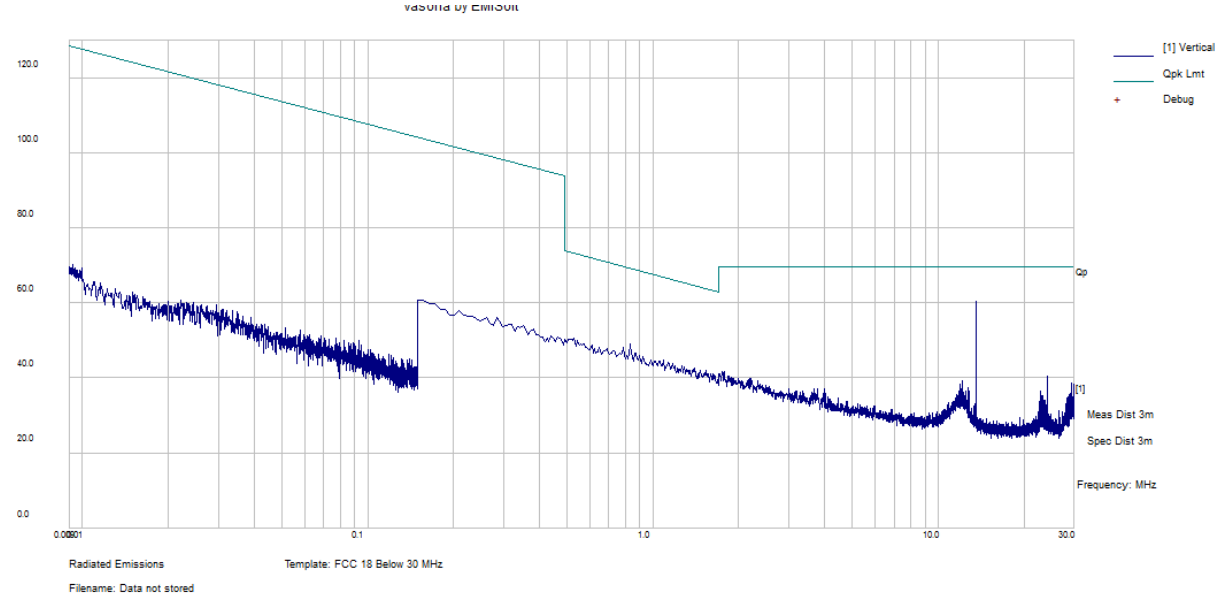
Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

7.7 Test Environmental Conditions

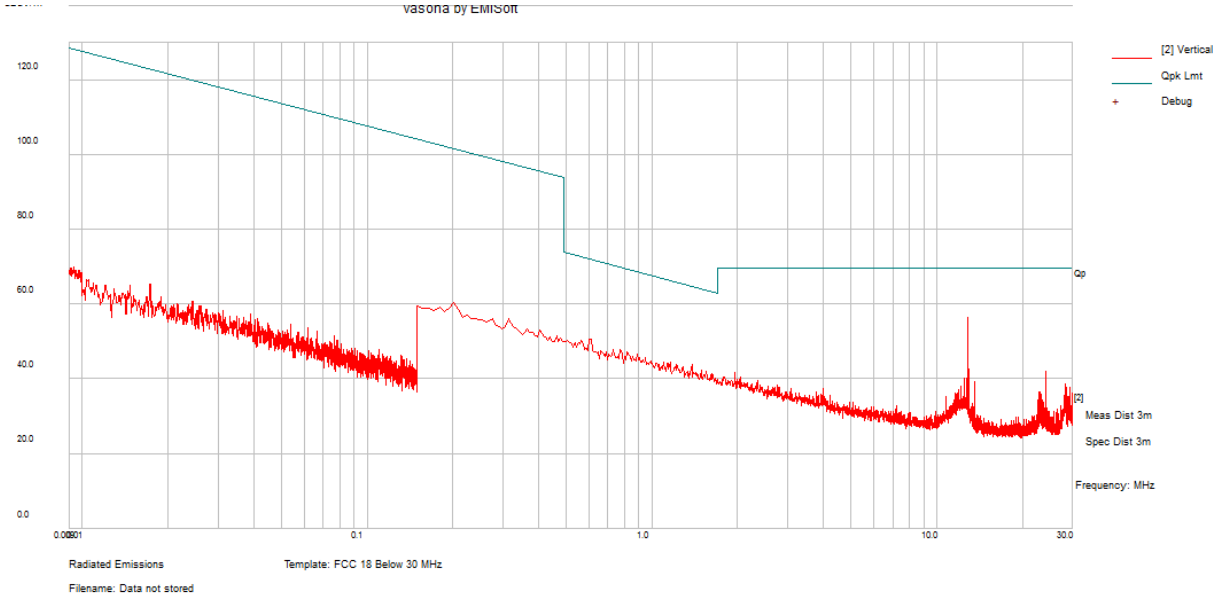
Temperature:	20-22 ºC
Relative Humidity:	42-50 %
ATM Pressure:	102.7 kPa

The equipment above was used for testing performed by Steven Lianto from 2023-07-03 to 2021-07-10 in 5-meter chamber 3.

7.8 Test Results 9 kHz to 30 MHz Parallel measured at 3 meters

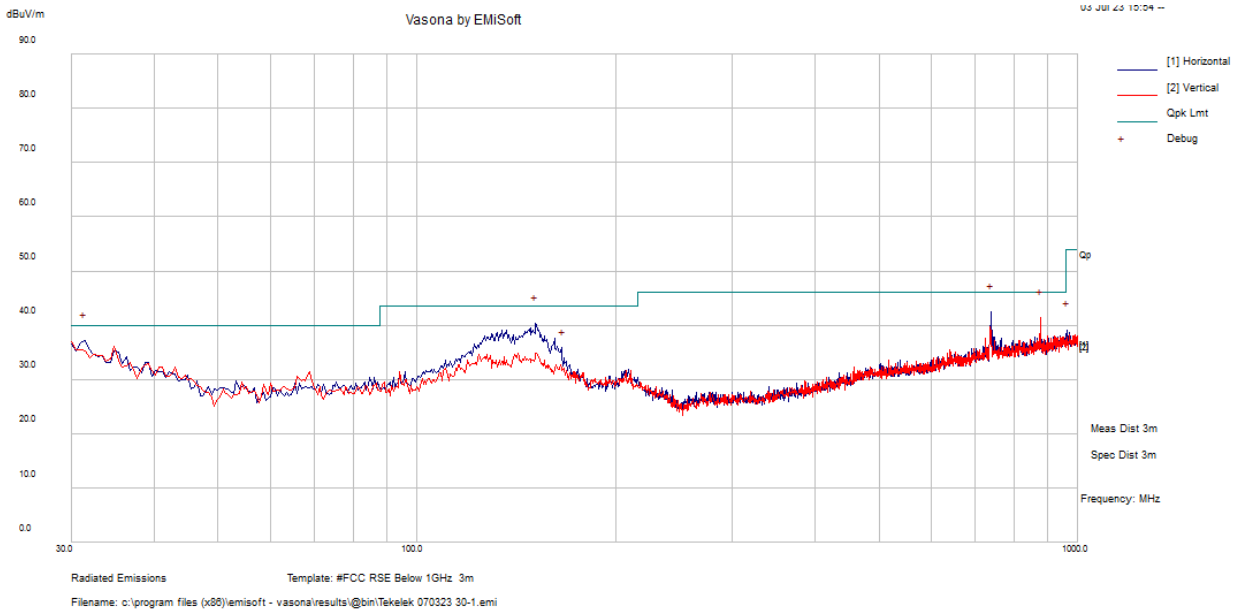


7.9 Test Results 9 kHz to 30 MHz Perpendicular measured at 3 meters



7.10 Test Results 30 MHz to 1 GHz measured at 3 meters

Test Results below 1 GHz measured at 3 meters

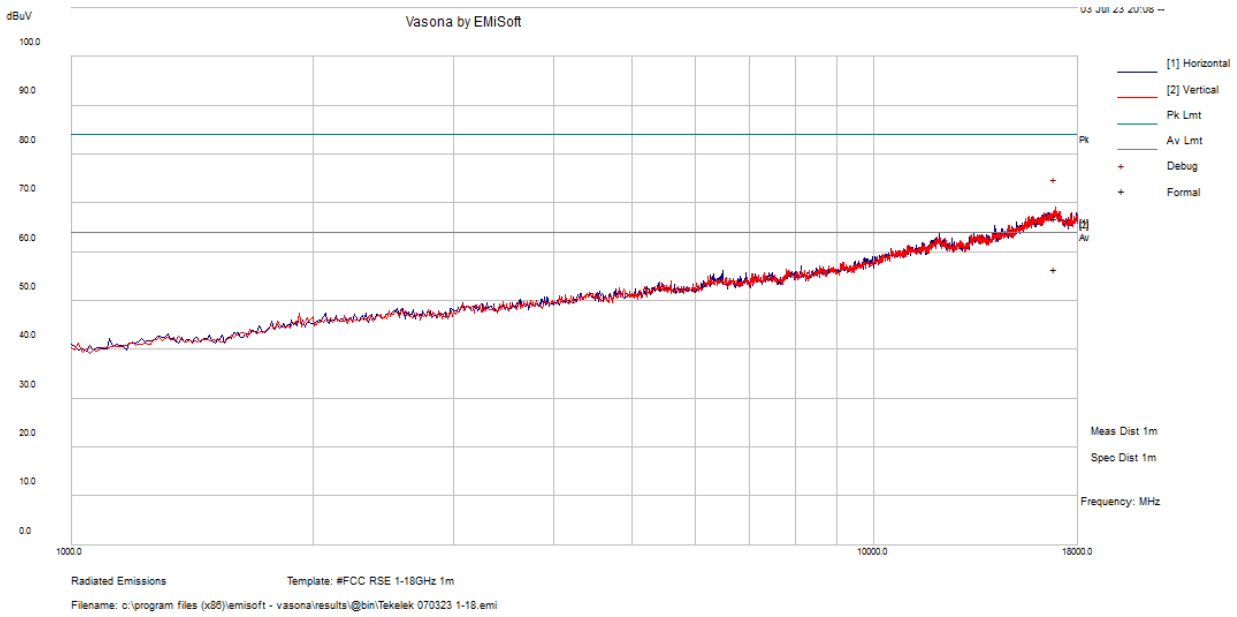


Freq. (MHz)	S.A. Reading (dBµV)	Corr. Factor (dB/m)	Corrected Amp. (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
31.455	39.12	-27.09	25.03	300	H	0	40	-2.95	Peaks
151.25	48.54	-26.62	18.32	300	H	0	43.5	-3.26	Peak
739.07	40.65	-25.45	27.17	300	H	0	46	-3.62	Peak
878.265	38.01	-25.27	28.59	300	V	0	46	-4.67	Peak
166.77	42.78	-26.74	17.86	300	H	0	43.5	-9.61	Peak
963.14	35.17	-25.09	29.02	100	H	0	54	-14.9	Peak

7.11 Test Results above 1 GHz to 40 GHz measured at 1 meter

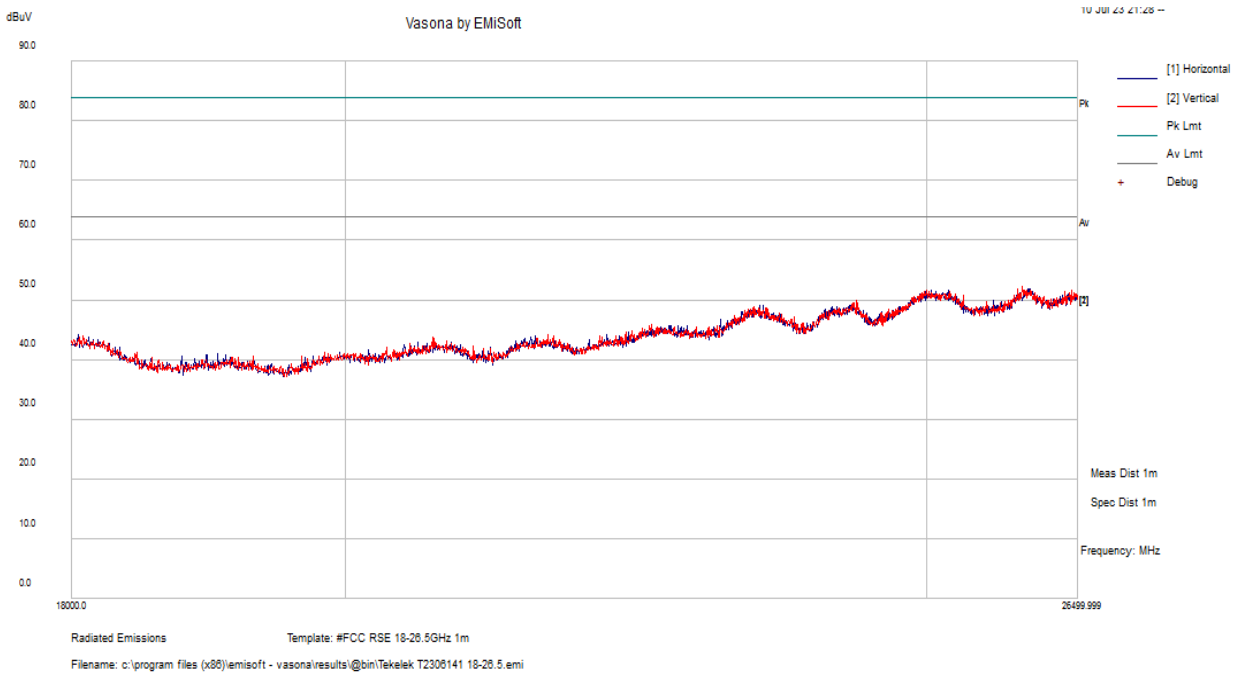
Note: For below spurious emissions, a peak detector was used in comparison to peak and average limits in order to show compliance. Where such a pre-scan exceeds the average limit, a formal measurement was performed.

1 – 18 GHz, measured at 1 meter:

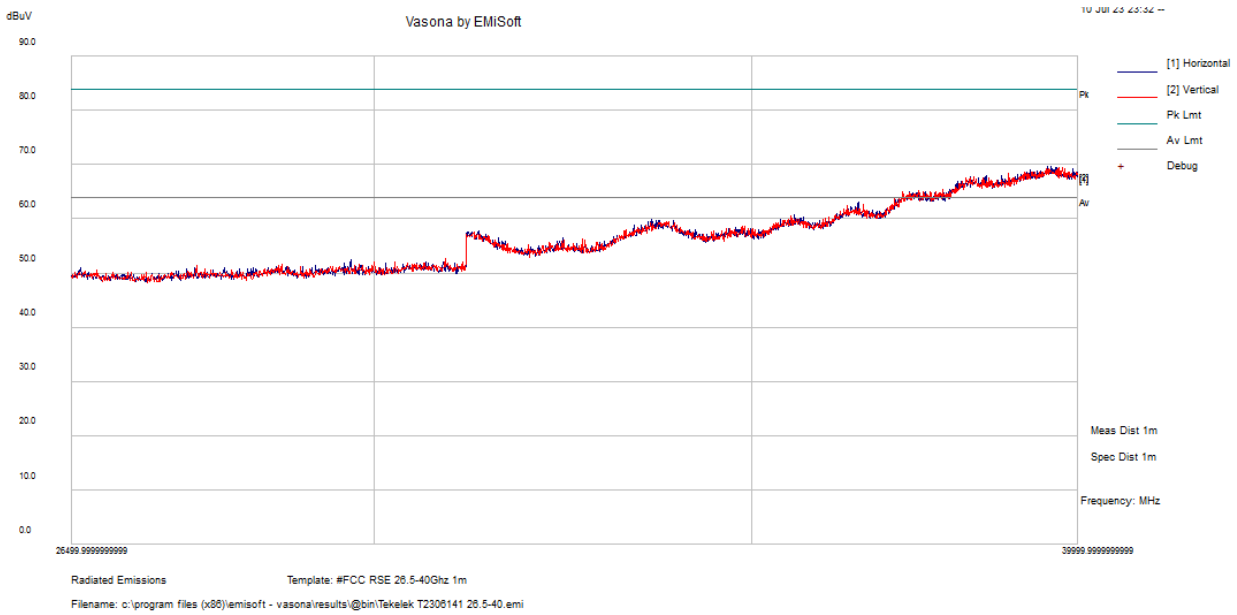


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
16862.76	45.17	14.42	7.28	H	166	29	84	-17.13	Peak
16862.76	34.78	14.42	7.28	H	166	29	64	-7.52	Ave

18-26.5 GHz, measured at 1 meter:



26.5-40 GHz, measured at 1 meter:



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Ant. Polarity (H/V)	Ant. Height (cm)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector (Peak /Ave.)
39503.53	56.82	16.23	4.22	H	147	130	84	-6.72	Peak
39503.53	43.34	16.23	4.22	H	147	130	64	-0.2	Ave

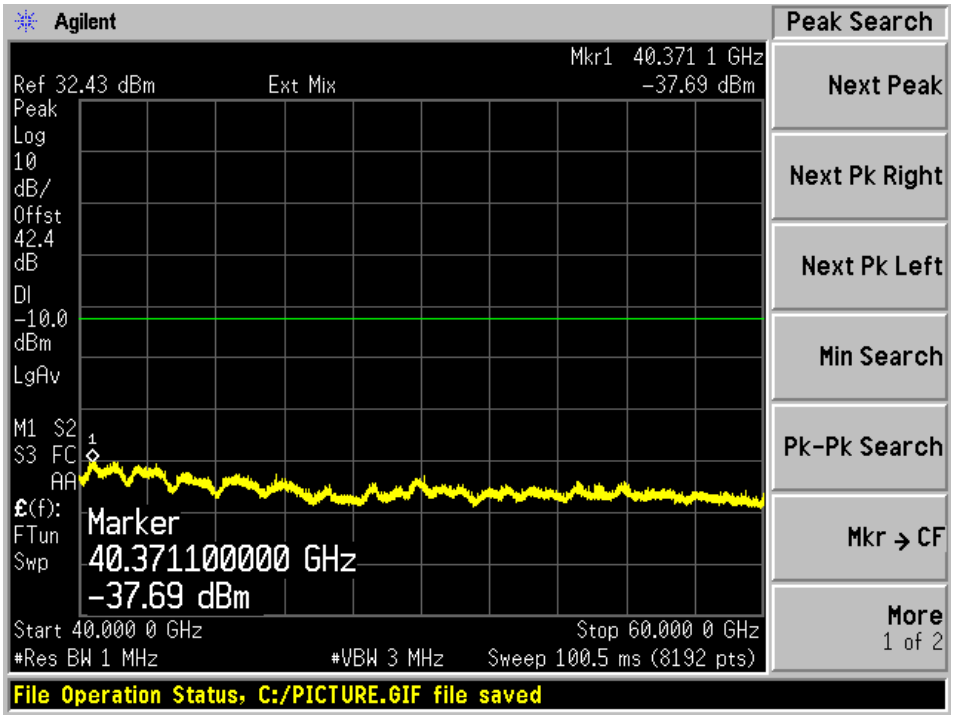
7.12 Test Results 40 GHz to 200 GHz

Frequency Range (GHz)	Limit	
	(pW/cm^2) @ 3m	(dBm)
40-60	90	-9.99
60-90	90	-9.99
90-140	90	-9.99
140-200	90	-9.99

Note: For below spurious emissions, a peak detector was used in comparison to average limits in order to show compliance.
Note: The correction factors have been considered in the reference level offset as shown in the following measurement screenshots.
Note: Per ANSI C63.10-2013 Section 9.5, EIRP[dBm]= Field Strength [dBuV/m] + 20log(measurement distance[meters]) – 104.7
Note: Field Strength [dBuV/m] = dBuV + Equipment Factors [dB/m]
Note: Equipment Factors [dB/m] = Antenna Factor(dB/m) + path loss(dB)
Note: dBm = dBuV - 106.99dB
Note: Based on above, EIRP[dBm]= dBm + 2.29dB + Equipment Factors [dB/m] + 20log(measurement distance[meters])
Note: Therefore, 2.29dB + Equipment Factors [dB/m] + 20log(measurement distance[meters]) = offset [dB]

40-60 GHz, Measured at 1 meter

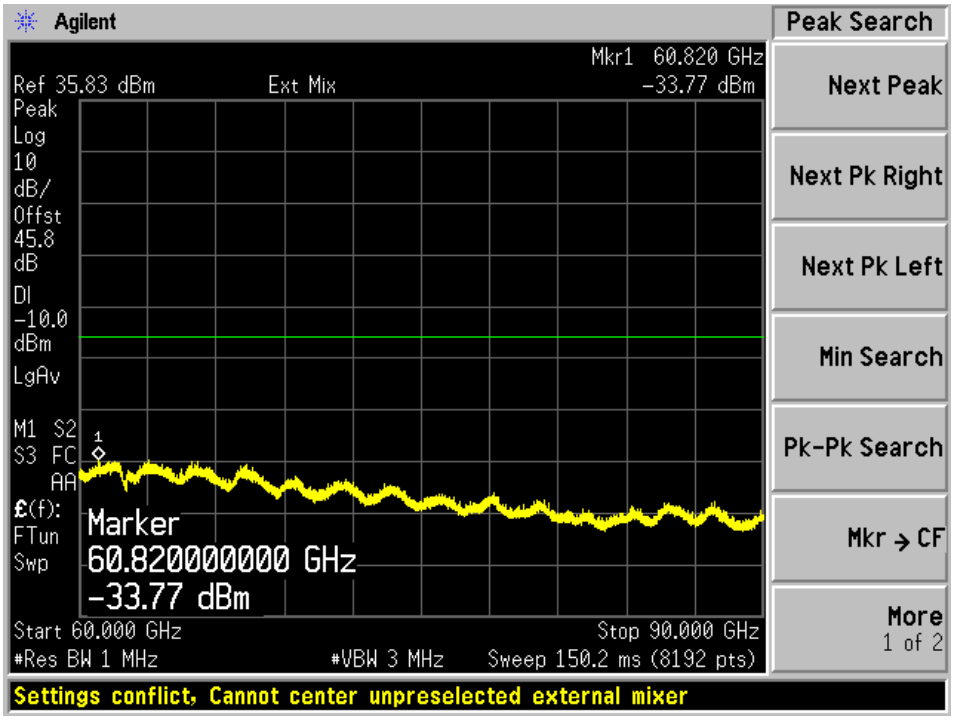
Worst Case



Note: Offset [dB] = 2.29dB + 40.11dB/m + 0dB = 42.4dB

60-90 GHz, Measured at 1 meter

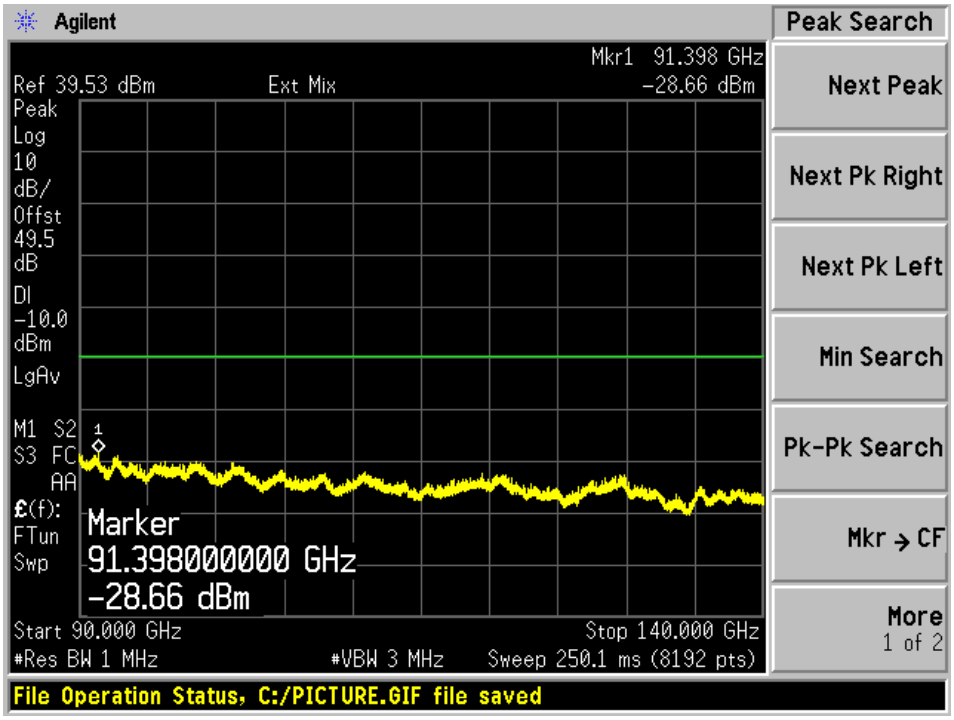
Worst Case



Note: Offset [dB] = 2.29dB + 43.51dB/m + 0dB = 45.8dB

90-140 GHz, Measured at 0.5 meter

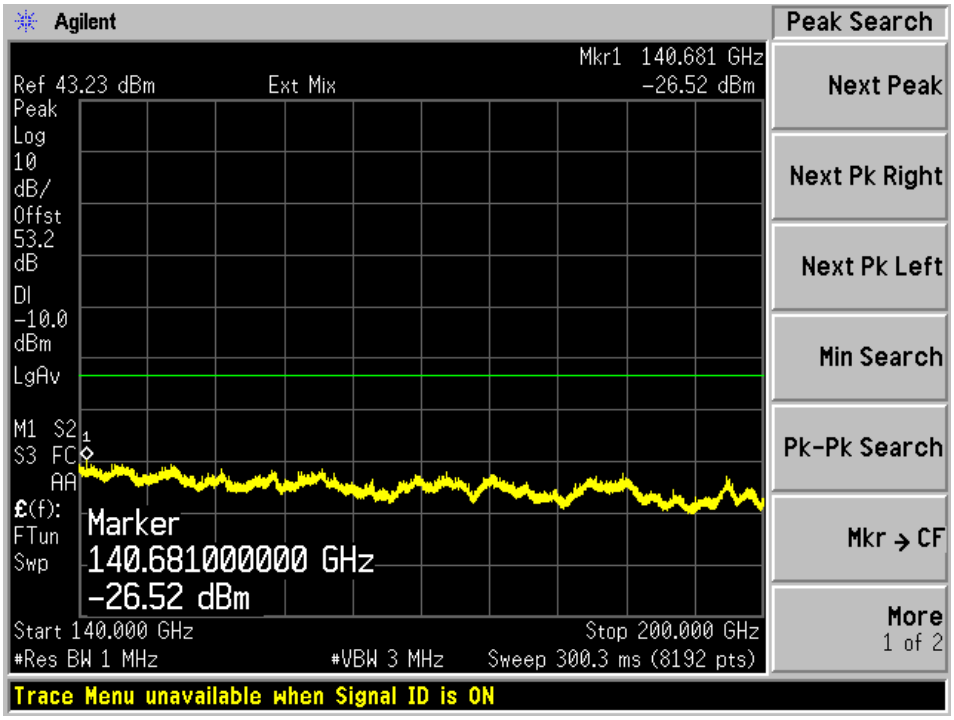
Worst Case



Note: Offset [dB] = 2.29dB + 53.23dB/m + -6.02dB = 49.5 dB

140-200 GHz, Measured at 0.25 meter

Worst Case



Note: Offset [dB] = 2.29dB + 62.95dB/m + -12.04dB = 53.2 dB

8 FCC §15.255(f) - Frequency Stability

8.1 Applicable Standards

According to FCC §15.255(f): Frequency stability. Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range −20 to + 50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

8.2 Measurement Procedure

According to ANSI C63.10-2013 Subclause 9.14, the following procedure shall be used for determining frequency stability of millimeter-wave systems:

a) Arrange EUT and test equipment as shown in Figure 21. Some temperature chambers have a window or other opening that permits locating the receive antenna outside the chamber.

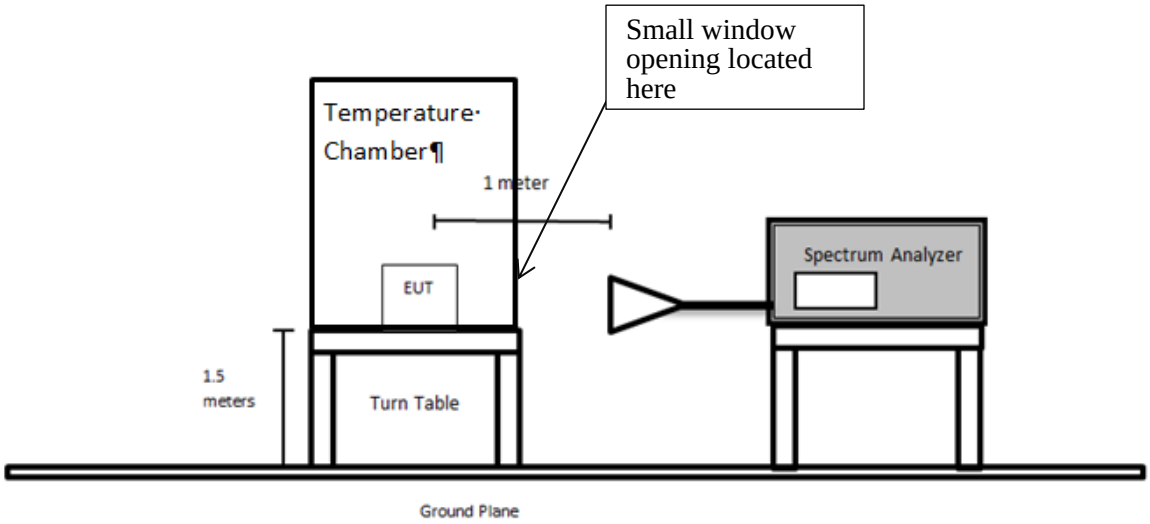
b) With the EUT at ambient temperature (approximately 25 °C) and voltage source set to the EUT nominal operating voltage (100%), record the spectrum mask of the EUT emission on the spectrum analyzer.

c) Vary EUT power supply between 85% and 115% of nominal, and record the frequency excursion of the EUT emission mask.

d) Set the power supply to 100% nominal setting, and raise EUT operating temperature to 50 °C. Record the frequency excursion of the EUT emission mask.

e) Repeat step d) at each 10 °C increment down to −20 °C

8.3 Test Setup Block Diagram



Note: Small window opening is located on the outside of the chamber which permits receive antenna to make measurements on EUT

8.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2023-05-12	1 year
861	OML Inc.	Mixer and Horn Antenna set	M012HW A M12RH	170615-1	N/R	N/A
-	-	RF cable	-	-	Each time[1]	N/A
1060	BACL	Temperature and Humidity Chamber	BTH-150-40	30078	2022-10-27	1 year

Note[1]: cables included in the test set-up will be checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

8.5 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

The testing was performed by Tao Jin on 2023-08-22 at RF Site.

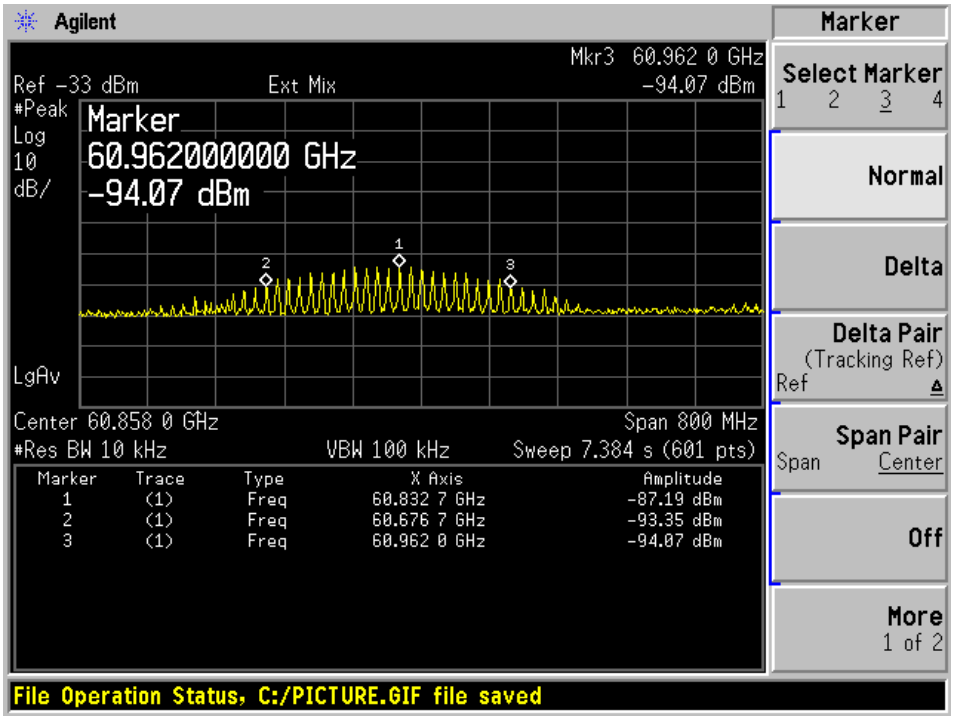
8.6 Test Results

Worst Case

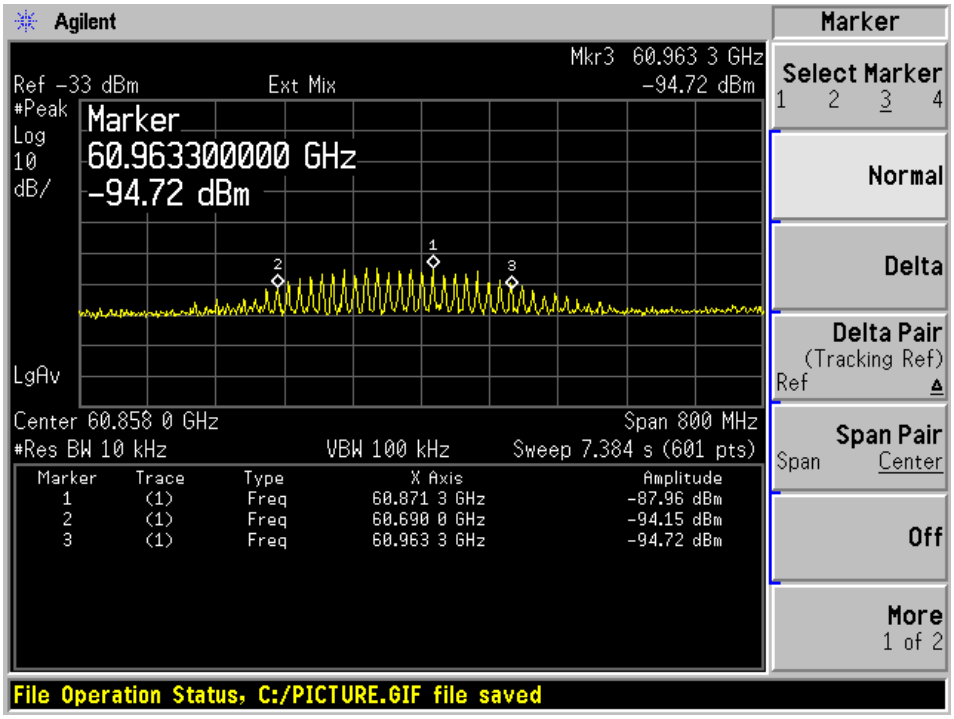
Voltage	Temperature (°C)	F_L[1] (GHz)	F_H[1] (GHz)	Fundamental Bands within 57GHz-71GHz
3.6 V	-20	60.6767	60.9620	Pass
	-10	60.6900	60.9633	Pass
	0	60.6380	60.9620	Pass
	10	60.6380	60.9620	Pass
	20	60.6110	60.9231	Pass
	30	60.6247	60.9367	Pass
	40	60.6247	60.9100	Pass
	50	60.5847	60.8967	Pass
3.06 V	20	60.6110	60.9231	Pass
4.14 V	20	60.5987	60.9231	Pass

Note[1]: F_L and F_H are measured using 6 dB Emission bandwidth method
Please refer to the following plots.

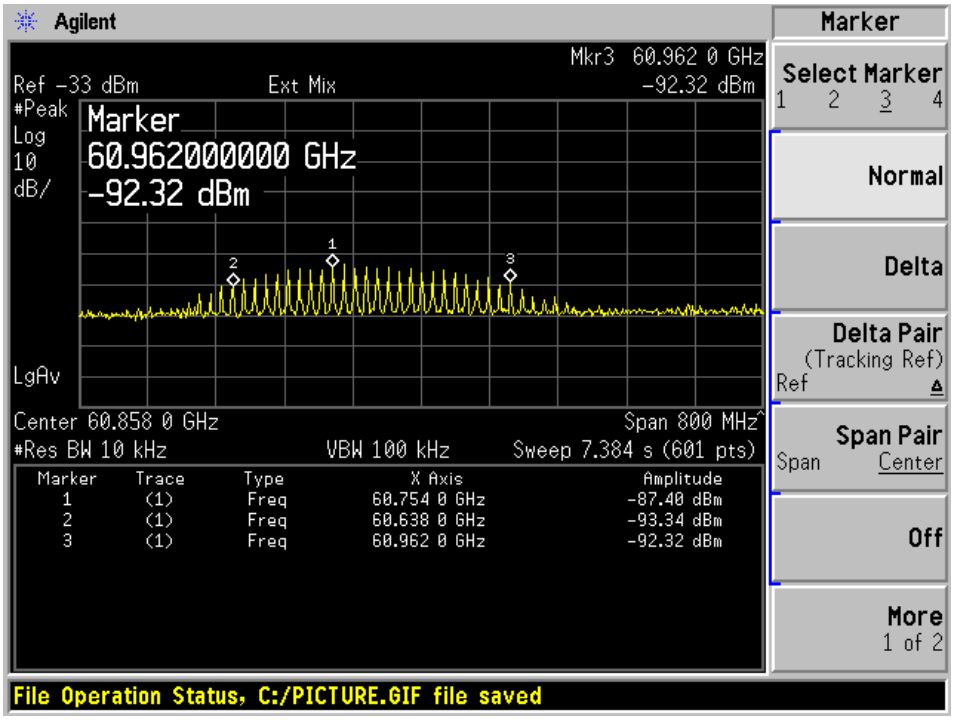
3.6V
-20°C


Agilent
Marker
Mkr3 60.962 0 GHz
Ref -33 dBm
Ext Mix
-94.07 dBm
#Peak
Log
10
dB/
Marker
60.962000000 GHz
-94.07 dBm
LgAv
Center 60.858 0 GHz
Span 800 MHz
#Res BW 10 kHz
VBW 100 kHz
Sweep 7.384 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 60.832 7 GHz -87.19 dBm
2 (1) Freq 60.676 7 GHz -93.35 dBm
3 (1) Freq 60.962 0 GHz -94.07 dBm
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, C:/PICTURE.GIF file saved

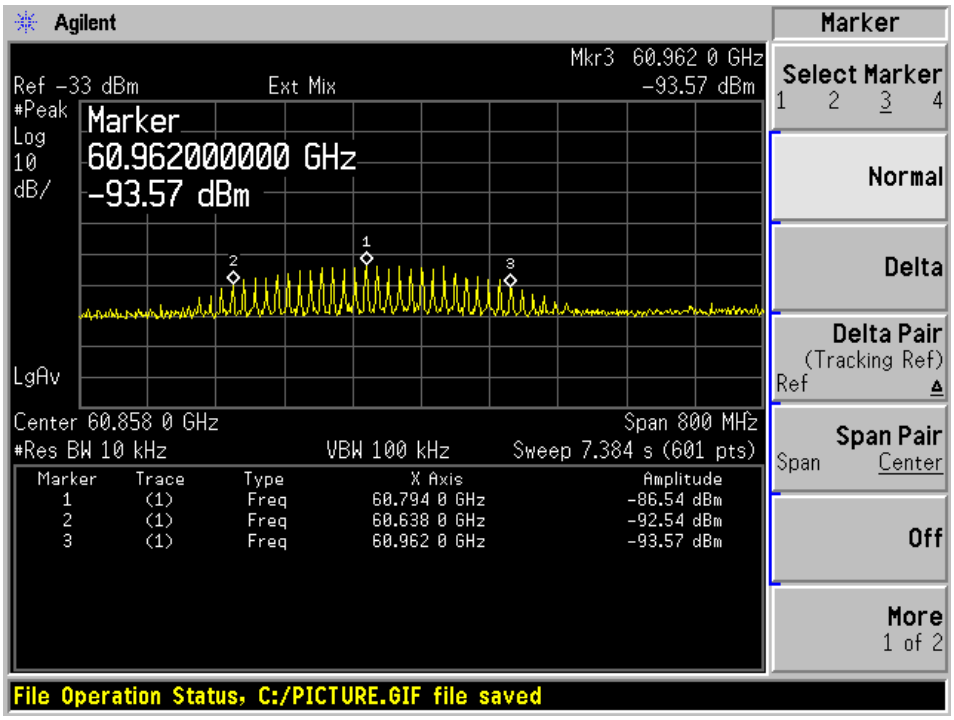
-10°C


Agilent
Marker
Mkr3 60.963 3 GHz
Ref -33 dBm
Ext Mix
-94.72 dBm
#Peak
Log
10
dB/
Marker
60.963300000 GHz
-94.72 dBm
LgAv
Center 60.858 0 GHz
Span 800 MHz
#Res BW 10 kHz
VBW 100 kHz
Sweep 7.384 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 60.871 3 GHz -87.96 dBm
2 (1) Freq 60.690 0 GHz -94.15 dBm
3 (1) Freq 60.963 3 GHz -94.72 dBm
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, C:/PICTURE.GIF file saved

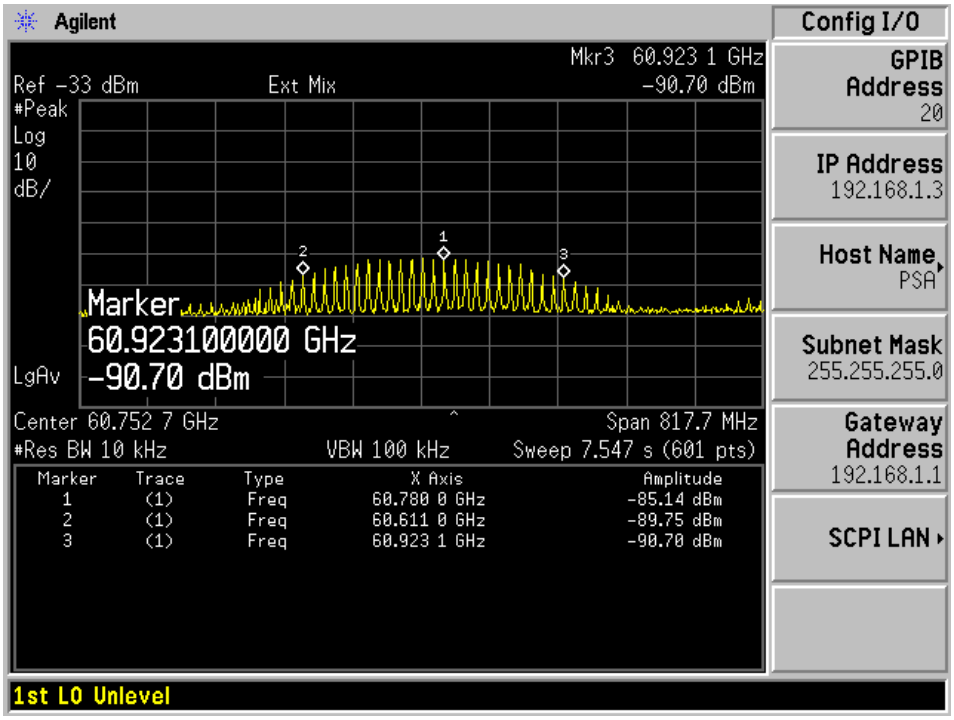
0°C


Agilent
Marker
Mkr3 60.962 0 GHz
Ref -33 dBm
Ext Mix
-92.32 dBm
#Peak
Log
10
dB/
Marker
60.962000000 GHz
-92.32 dBm
LgAv
Center 60.858 0 GHz
Span 800 MHz
#Res BW 10 kHz
VBW 100 kHz
Sweep 7.384 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 60.754 0 GHz -87.40 dBm
2 (1) Freq 60.638 0 GHz -93.34 dBm
3 (1) Freq 60.962 0 GHz -92.32 dBm
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, C:/PICTURE.GIF file saved

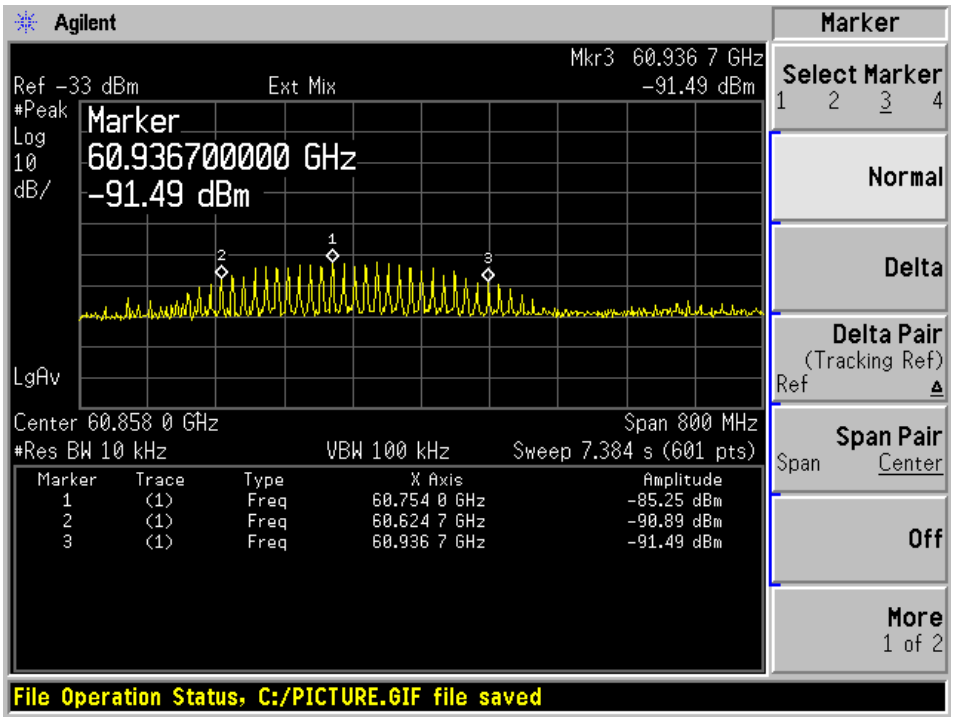
10°C


Agilent
Marker
Mkr3 60.962 0 GHz
Ref -33 dBm
Ext Mix
-93.57 dBm
#Peak
Log
10
dB/
Marker
60.962000000 GHz
-93.57 dBm
LgAv
Center 60.858 0 GHz
Span 800 MHz
#Res BW 10 kHz
VBW 100 kHz
Sweep 7.384 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 60.794 0 GHz -86.54 dBm
2 (1) Freq 60.638 0 GHz -92.54 dBm
3 (1) Freq 60.962 0 GHz -93.57 dBm
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, C:/PICTURE.GIF file saved

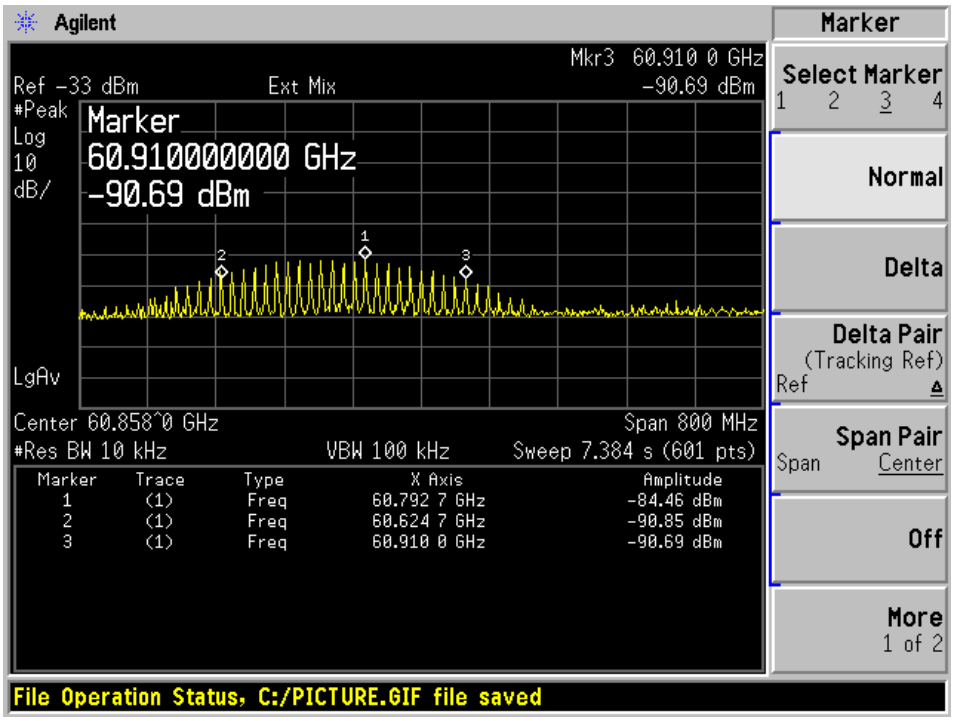
20°C


Agilent
Config I/O
Mkr3 60.923 1 GHz
Ref -33 dBm
Ext Mix
-90.70 dBm
#Peak
Log
10
dB/
Marker
60.923100000 GHz
-90.70 dBm
LgAv
Center 60.752 7 GHz
Span 817.7 MHz
#Res BW 10 kHz
VBW 100 kHz
Sweep 7.547 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 60.780 0 GHz -85.14 dBm
2 (1) Freq 60.611 0 GHz -89.75 dBm
3 (1) Freq 60.923 1 GHz -90.70 dBm
GPIB Address 20
IP Address 192.168.1.3
Host Name PSA
Subnet Mask 255.255.255.0
Gateway Address 192.168.1.1
SCPI LAN
1st LO Unlevel

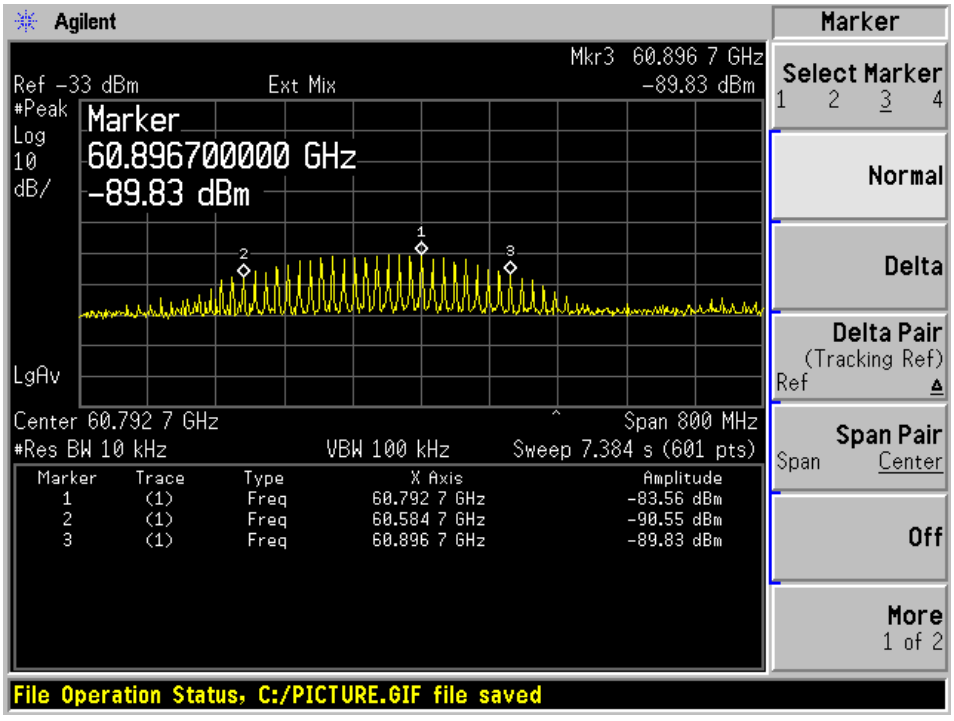
30°C


Agilent
Marker
Mkr3 60.936 7 GHz
Ref -33 dBm
Ext Mix
-91.49 dBm
#Peak
Log
10
dB/
Marker
60.936700000 GHz
-91.49 dBm
LgAv
Center 60.858 0 GHz
Span 800 MHz
#Res BW 10 kHz
VBW 100 kHz
Sweep 7.384 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 60.754 0 GHz -85.25 dBm
2 (1) Freq 60.624 7 GHz -90.89 dBm
3 (1) Freq 60.936 7 GHz -91.49 dBm
Select Marker 1 2 3 4
Normal
Delta
Delta Pair (Tracking Ref)
Ref
Span Pair
Span Center
Off
More 1 of 2
File Operation Status, C:/PICTURE.GIF file saved

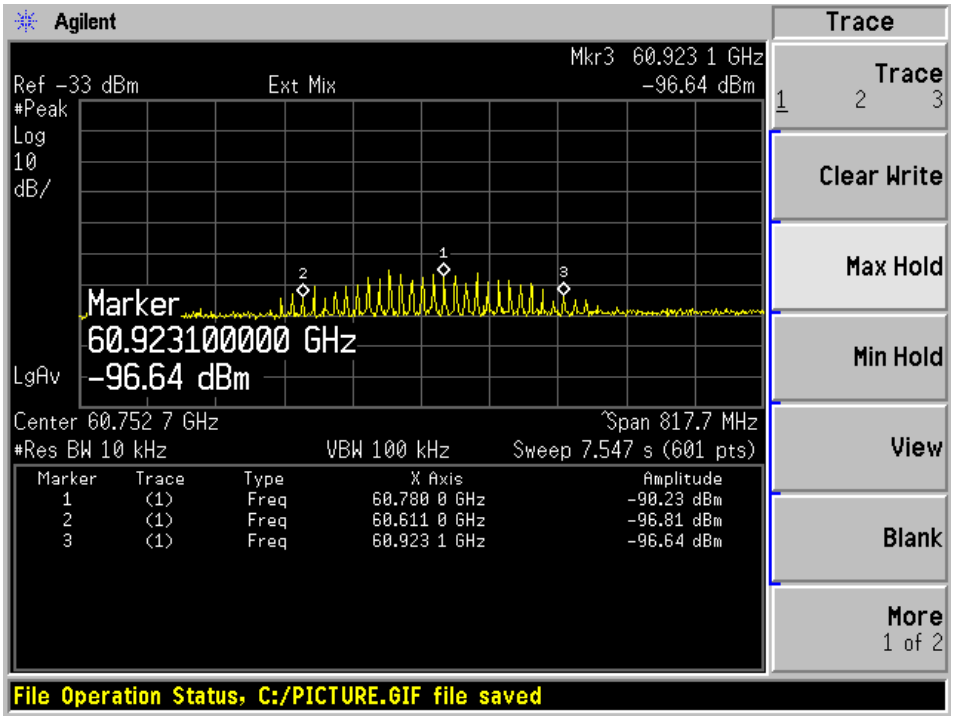
40°C


Agilent
Marker
Mkr3 60.910 0 GHz
Ref -33 dBm
Ext Mix
-90.69 dBm
#Peak
Log
10
dB/
Marker
60.910000000 GHz
-90.69 dBm
LgAv
Center 60.858^0 GHz
Span 800 MHz
#Res BW 10 kHz
VBW 100 kHz
Sweep 7.384 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 60.792 7 GHz -84.46 dBm
2 (1) Freq 60.624 7 GHz -90.85 dBm
3 (1) Freq 60.910 0 GHz -90.69 dBm
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, C:/PICTURE.GIF file saved

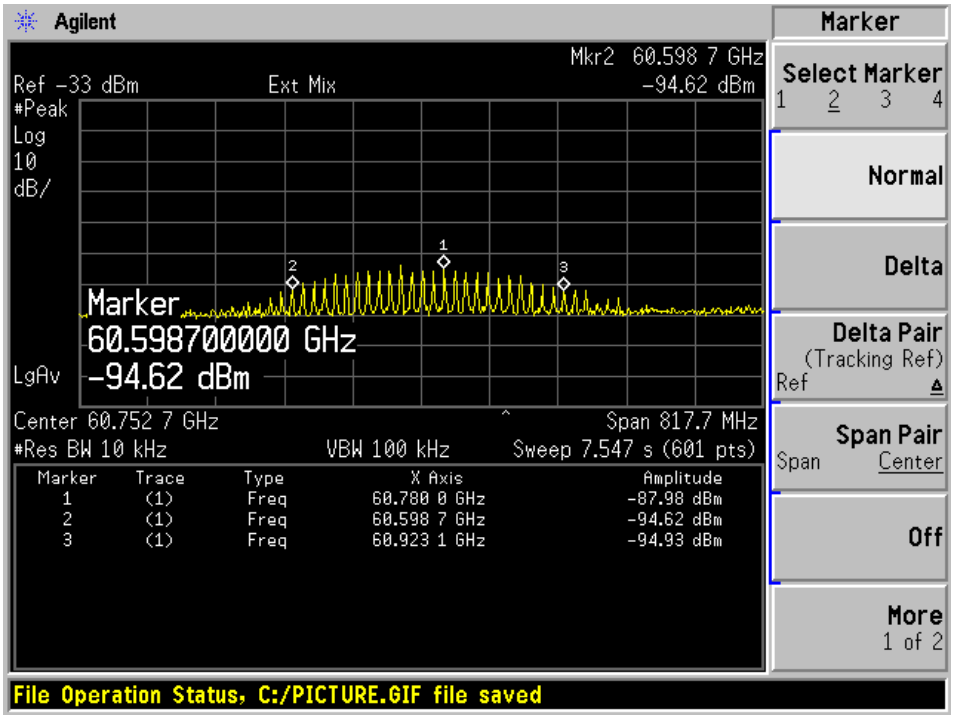
50°C


Agilent
Marker
Mkr3 60.896 7 GHz
Ref -33 dBm
Ext Mix
-89.83 dBm
#Peak
Log
10
dB/
Marker
60.896700000 GHz
-89.83 dBm
LgAv
Center 60.792 7 GHz
Span 800 MHz
#Res BW 10 kHz
VBW 100 kHz
Sweep 7.384 s (601 pts)
Marker Trace Type X Axis Amplitude
1 (1) Freq 60.792 7 GHz -83.56 dBm
2 (1) Freq 60.584 7 GHz -90.55 dBm
3 (1) Freq 60.896 7 GHz -89.83 dBm
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
File Operation Status, C:/PICTURE.GIF file saved

3.06V
20°C



4.14V
20°C



9 FCC §15.215(c) – 20dB Bandwidth

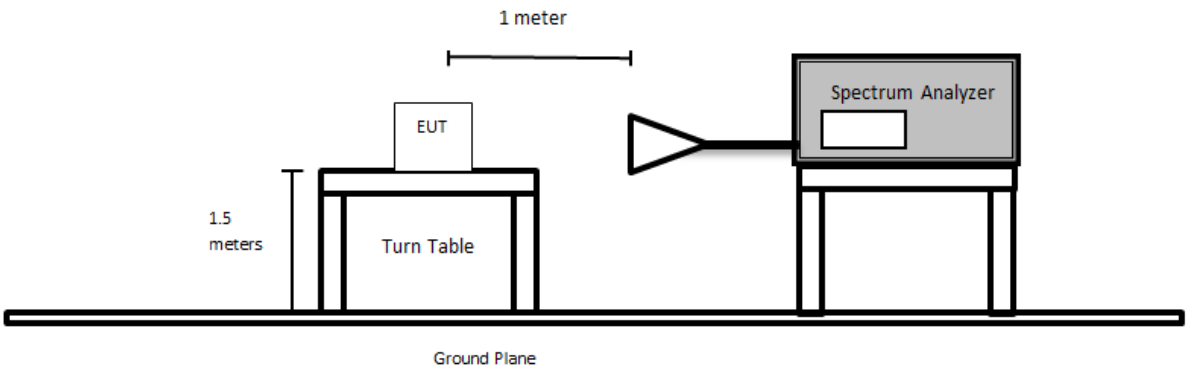
9.1 Applicable Standards

According to FCC §15.215(c): 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, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated 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 a 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.

9.2 Measurement Procedure

RBW=10kHz
VBW>3RBW
Span=600MHz
Detector=peak
Trace=max hold
Sweep=AUTO

9.3 Test Setup Block Diagram



9.4 Test Equipment List and Details

BACL No.	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
624	Agilent	Spectrum Analyzer	E4446A	MY48250238	2023-05-12	1 year
861	OML Inc.	Mixer and Horn Antenna set	M012HW A M12RH	170615-1	N/R	N/A
-	-	RF cable	-	-	Each time[1]	N/A

Note[1]: cables included in the test set-up will be checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

9.5 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	102.7 KPa

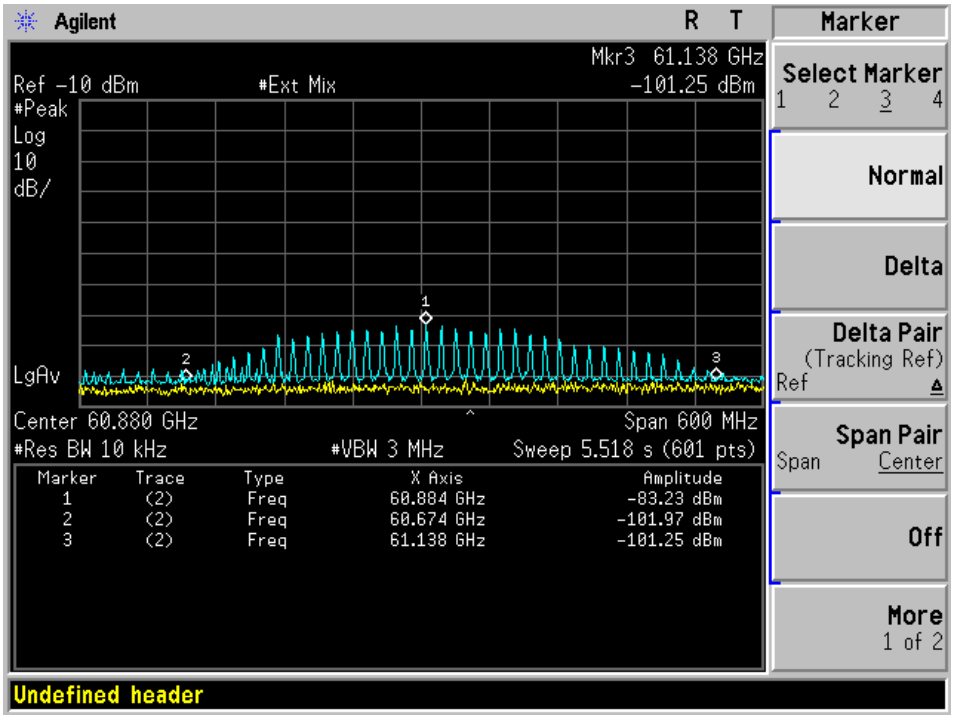
The testing was performed by Tao Jin on 2023-08-22 at RF Site.

9.6 Test Results

Fund Freq (GHz)	F_L[1] (GHz)	F_H[1] (GHz)	20dB BW (MHz)	Fundamental Bands within 57GHz-71GHz
60.88	60.674	61.138	464	Pass

Note[1]: F_L and F_H are measured using 20 dB Emission bandwidth method
Please refer to the following plots.

20dB BW



9 Annex A (Normative) - Test Setup Photographs

Please refer to the attachment

10 Annex B (Normative) - EUT External Photographs

Please refer to the attachment

11 Annex C (Normative) - EUT Internal Photographs

Please refer to the attachment

12 Annex D (Normative) - A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA *R222 - Specific Requirements EPA ENERGY STAR Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 21st day of December 2022.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

Please follow the web link below for a full ISO 17025 scope

https://www.a2la.org/scopepdf/3297-02.pdf

--- END OF REPORT ---