

TEST REPORT

APPLICANT

Meta Platforms Technologies, LLC

MODEL NAME

G4QM, G4QR, G4QB, G4QS

FCC ID

2AG0Z-G4Q

ISED ID

20849-G4Q

REPORT NUMBER

HA2602-0024-R01

TEST REPORT

Date of Issue
March 06, 2026

Test Site
HCT America, Inc.
840 Yosemite Way, Milpitas, CA 95035, USA

Applicant	Meta Platforms Technologies, LLC
Applicant Address	1 Hacker Wy Menlo Park, CA 94025 United States
FCC ID	2AG0Z-G4Q
ISED ID	20849-G4Q
Model Name	G4QM, G4QR, G4QB, G4QS
EUT Type	AI Glasses
Modulation Type	Amplitude-Shift Keying (ASK)
FCC Classification	Low Power Communication Device Transmitter (DXX)
FCC Rule Part(s)	Part 15 Subpart C (15.255)
ISED Rule Part(s)	RSS-210, Issue 11, Annex J
Test Procedure	ANSI C63.10-2020

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures required. The results of testing in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By



Kevin Kim

Test Engineer

Reviewed By



Dan Corona

Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	REVISION	DATE	DESCRIPTION
HA2602-0024-R01	0	March 06, 2025	Initial Issue

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1. GENERAL INFORMATION

1.1. GENERAL INFORMATION

Model	G4QM, G4QR, G4QB, G4QS
Product Name	AI Glasses
Serial Number	4QYM42J0J002Q
Power Supply	5 Vdc
RF Specification	Low Power Communication Device Transmitter (DXX)
Transmitter Chain	60.5 GHz Radar: 1 Tx
Operating Environment	Indoors and outdoor
Operating Temperature	-20 °C ~ 50 °C

1.2. RF SPECIFICATION SUBJECT TO THE REPORT

RF Specification	Low Power Communication Device Transmitter (DXX)
Transmitter Chain	1
Frequency Range	58.08 GHz – 62.94 GHz
Max. RF Output Power	0.42 dBm
Modulation Type	Amplitude-Shift Keying (ASK)
Number of Channels	1 Channel
Antenna Specification ¹⁾	Antenna type: Aperture coupled patch single antenna Peak Gain: 4.0 dBi
Firmware Version ²⁾	qcom/florian/lager:14/UKQ1.250303.001/6657880000001291:userdebug/test-keys
Hardware Version ²⁾	EVT
Date(s) of Tests	February 17, 2026, ~ February 27, 2026

Note(s):

1. Antenna information is based on the document provided.
2. Firmware and Hardware Versions are provided by the manufacturer.
3. Testing was performed on the G4QM model. G4QM, G4QR, G4QB, and G4QS share fully identical RF and EE designs.

1.3. EUT Operation During Test

The scope of this report is strictly limited to the emissions associated with the 60 GHz DXX transmitter function. Evaluation of other wireless technologies is not covered in this report.

The EUT consists of a AI Glasses device containing a 60.5 GHz unlicensed/license-exempt data communications transmitter module. A proprietary Debug Cable with a corresponding 60.5 GHz module is needed to activate transmission on the AI Glasses.

A magnetic alignment fixture locks the AI Glasses in place on top of the Wireless Debug Tool, thus allowing communication between the AI Glasses and the Debug Cable.

The Debug Tool is powered by a USB-C Port.

Test Configuration			
Mode	Frequency (GHz)	Data Rate (kHz)	Duty Cycle (%)
Device TX Debug Tool RX	60.5	724.280	81.38
Device TX Debug Tool RX	60.5	879.080	80.63

Note(s):

1. Frequency, Data Rate was declared by manufacturer.

2. METHODOLOGY

The measurement procedure described in the “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices” (ANSI C63.10-2020) Operating Under 47 CFR §15.255 were used in the measurement.

EUT CONFIGURATION

The EUT configuration for testing is installed on EIRP measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx Frequency that was for the purpose of the measurements.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2020) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. Also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. To find out the maximum emission, the relative positions of this hand-held transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10.

DESCRIPTION OF TEST MODES

The EUT was tested under normal operating conditions, and frequency stability measurements were performed over variations in input voltage and operating temperature.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards. Especially, all antenna (up to 40 GHz) for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

HCT America, Inc. holds A2LA accreditation (certificate no. 4201.01) covering all testing included in the scope of this report. All tests were conducted at the facilities listed below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	840 Yosemite Way, Milpitas, CA 95035 USA	US0198	25729	898494
☐	1177 Comstock Road, Hollister, CA 95023 USA	US0198	25729	898494



EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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.

- (1) The antenna of this E.U.T is permanently attached and there is no provision for connection to an external antenna.
- (2) The E.U.T Complies with the requirement of §15.203

According to RSS-Gen Issue 5 Amd 2 (Section 6.8) :

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty
Output Power, Conducted	± 0.54 dB
Occupied Bandwidth	± 120.66 kHz
Unwanted Emissions, Conducted	± 0.54 dB
Radiated Emissions (below 1 GHz)	± 5.29 dB
Radiated Emissions (Above 1 ~ 40 GHz)	± 4.29 dB
Radiated Emission (Above 40 GHz)	± 5.58 dB
Transmitter Frequency Stability	± 16.78 kHz

Coverage factor $k = 2$, Confidence levels of 95 %

7. DESCRIPTION OF TESTS

7.1. 6 dB Emission Bandwidth

FCC Rule

§15.255 (e) (2)

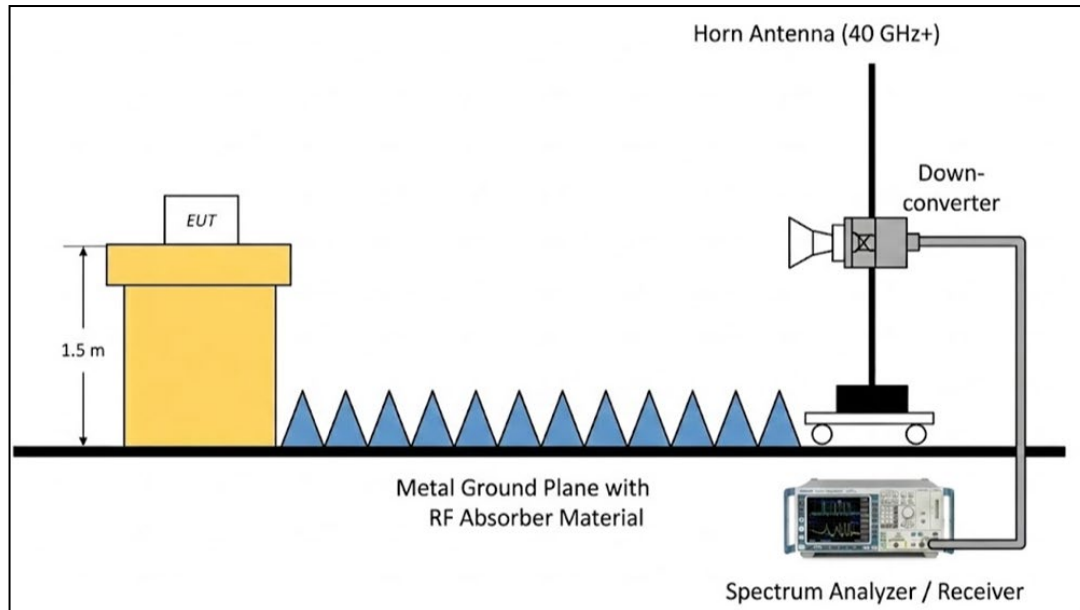
Devices other than field disturbance sensors/radars with an emission bandwidth of less than 100 MHz must limit their peak transmitter conducted output power to the product of 500 mW times their emission bandwidth divided by 100 megahertz. For the purposes of this paragraph, emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kilohertz resolution bandwidth spectrum analyzer. The center frequency must be stationary during the measurement interval, even if not stationary during normal operation (e.g., for frequency hopping devices).

ISED Rule

RSS-210 Annex J.3.3.d

For devices with an emission bandwidth less than 100 MHz, the peak transmitter conducted output power (PTCOP) shall be less than or equal to the product of 500 mW times their emission bandwidth divided by 100 MHz. For the purpose of J.3.3(d), emission bandwidth is the instantaneous frequency range occupied by a steady radiated signal with modulation, outside which the radiated power spectral density is 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth. The centre frequency shall be stationary during the measurement interval, even if not stationary during normal operation (e.g. for frequency hopping devices).

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

ANSI C63.10-2020

- Span equal to 2-3 times the EBW, centered on the carrier frequency
- RBW = 100 kHz
- VBW $\geq 3 \times$ RBW
- Allow the trace to stabilize
- amplitude exceeding the maximum spectrum analyzer input mixer level for linear operation.
- See guidance provided in 4.1.6.
- Sweep = No faster than coupled (auto) time
- Detector = Peak
- Trace mode = max hold

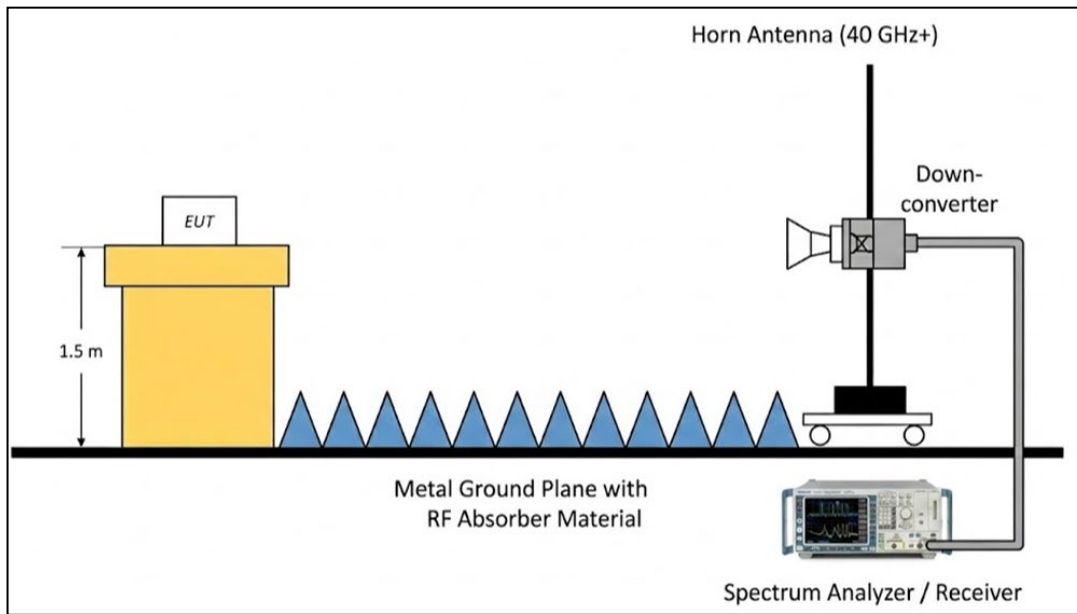
7.2. 99% Emission Bandwidth

FCC/ISED Rule

§2.1049/RSS-Gen [6.7]

The Occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

ANSI C63.10-2020 / RSS-Gen[6.7]

The occupied bandwidth (OBW) is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

- Span equal to approximately 1.5~5 times the OBW, centered on the carrier frequency
- RBW = 1% to 5% of the 99% bandwidth, or a minimum of 1 MHz if this is not possible due to a large OBW
- VBW $\geq 3 \times$ RBW
- Allow the trace to stabilize
- amplitude exceeding the maximum spectrum analyzer input mixer level for linear operation.
- See guidance provided in 4.1.6.
- Sweep = No faster than auto time
- Detector = Peak
- Trace mode = max hold

7.3. RF Output Power

▣ TEST REQUIREMENTS AND LIMITS

§15.255 Operation within the band 57-71 GHz.

7.3.1 Radiated Power

§15.255(c)(1)(i); RSS-210 Annex J.3.3 a

(c) **Radiated power limits.** Within the 57-71 GHz band, emission levels shall not exceed the following equivalent isotropically radiated power (EIRP):

- (1) Devices other than field disturbance sensors shall comply with one of the following power limits, as measured during the transmit interval.
 - (i) The average power of any emission shall not exceed 40 dBm and the peak power of any emission shall not exceed 43 dBm

7.3.2 Conducted Output Power

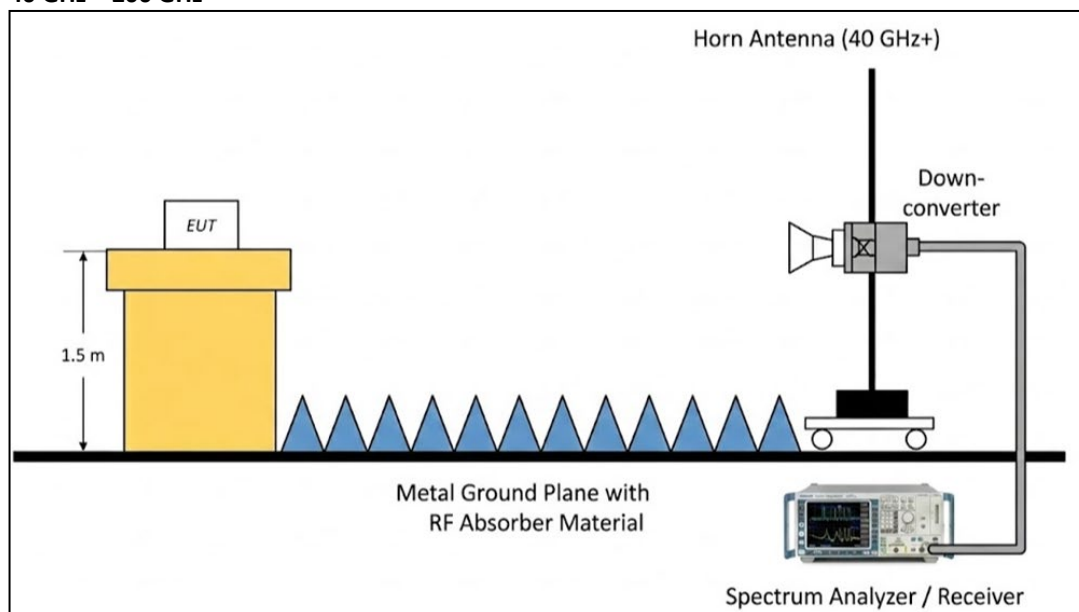
§15.255(e)(2); RSS-210 Annex J.3.3 d

(e) **Limits on transmitter conducted output power.**

- (1) Except as specified in paragraph (e)(2) of this section, the peak transmitter conducted output power of devices other than field disturbance sensors/radars shall not exceed 500 mW. Depending on the gain of the antenna, it may be necessary to operate the intentional radiator using a lower peak transmitter output power in order to comply with the EIRP limits specified in paragraph (c) of this section.
- (2) Devices other than field disturbance sensors/radars with an emission bandwidth of less than 100 megahertz must limit their peak transmitter conducted output power to the product of 500 mW times their emission bandwidth divided by 100 MHz. For the purposes of this paragraph, emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kilohertz resolution bandwidth spectrum analyzer. The center frequency must be stationary during the measurement interval, even if not stationary during normal operation (e.g., for frequency hopping devices).

▣ TEST CONFIGURATION

40 GHz – 200 GHz



▣ TEST PROCEDURE

Where applicable, the following procedure shall be used for measuring the field strength from millimeter-wave systems:

a) Set up the test as follows:

- 1) For conducted measurements, connect the external mixer or spectrum analyzer, with appropriate attenuation as needed to reduce the chance of damage or overload to the measurement instrumentation, to the output port of the EUT.
- 2) For radiated measurements, connect the measurement antenna for the fundamental frequency band to a spectrum analyzer via an external mixer, or directly to the spectrum analyzer if the instrument supports the required frequency range.

b) For all measurements

- 1) For pulsed emissions, the procedures in 4.1.5.2.4 and Annex C shall be used.
- 2) For FMCW emissions, the procedures in 4.1.5.2.8 and Annex L shall be used.
- 3) For any other emission, set spectrum analyzer RBW, VBW, detector, span, and so on, to the proper values.

c) For radiated measurements:

- 1) Place the measurement antenna at a measurement distance that is in the far-field of the measurement antenna, in the far-field of the EUT antenna, and meets the measurement distance requirements for final radiated measurements as specified in 9.1.4.
- 2) Place the measurement antenna in the main beam of the EUT then maximize the fundamental emission using the procedures of 9.7, noting that multiple peaks can be found at different beam orientations and/or polarizations.
- 3) Correct the power reading from the spectrum analyzer for any external gain and/or attenuation between the measurement antenna and the spectrum analyzer. This is the power at the output of the measurement antenna
- 4) Calculate the EIRP from the power at the output of the measurement antenna using Equation (22) and then convert to linear form using Equation (24).
- 5) Where applicable, calculate conducted output power from the EIRP using Equation (27).

d) For conducted measurements:

- 1) Correct the power reading from the spectrum analyzer for any external gain and/or attenuation between the EUT and the spectrum analyzer. This is the conducted output power of the EUT.
 - 2) Calculate the EIRP from the conducted output power of the EUT using Equation (23), and then convert to linear form using Equation (24).
- e) Repeat the preceding sequence to determine the EIRP and where applicable, conducted power for each detector (peak and average) as required.
- f) Repeat the preceding sequence for every operating configuration supported by the EUT.

7.4 Unwanted Emissions

▣ TEST REQUIREMENTS AND LIMITS

§15.255(d); RSS-210 Annex J.4

§15.209; RSS-Gen 8.9

§15.205; RSS-Gen 8.1

(d) Limit 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.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meter)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

- (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.

▣ TEST PROCEDURE

For below 40 GHz

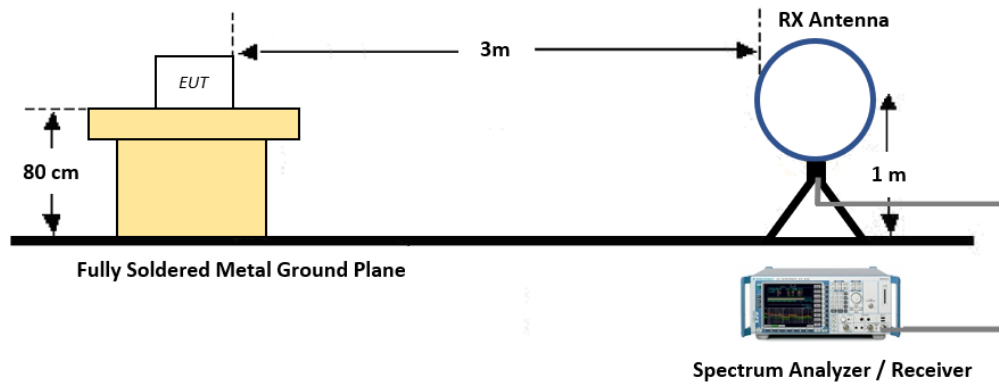
1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until the measurements for all frequencies are complete.

For Above 40 GHz

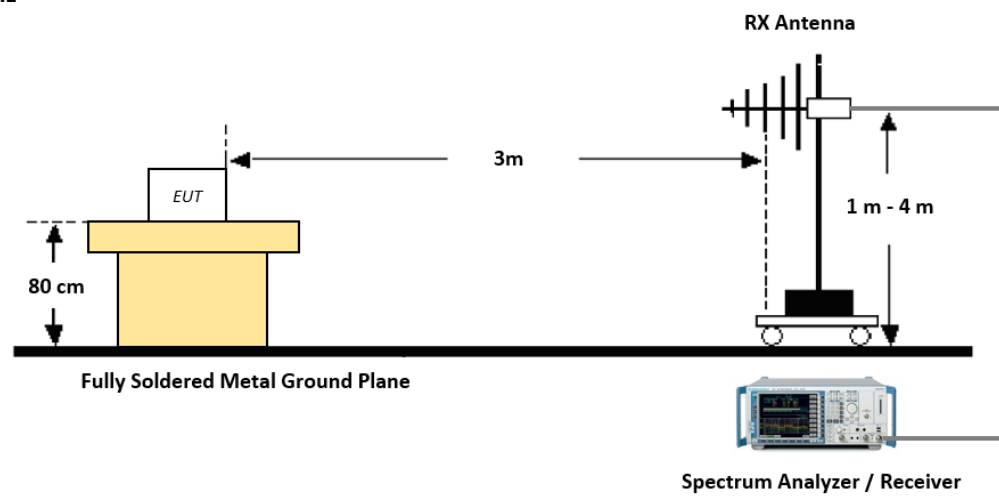
1. Connect the test antenna covering the appropriate frequency range to a spectrum analyzer via an external mixer to the spectrum analyzer.
2. Set spectrum analyzer RBW = 1 MHz, VBW = 3 MHz, average detector.
3. Calculate the distance to the far field boundary and determine the maximum measurement distance.
4. Perform an exploratory search for emissions and determine the approximate direction at which each observed emission emanates from the EUT.
5. Exploratory measurements be made at a closer distance than the validated maximum measurement distance.
6. Perform a final measurement; begin with the test antenna at the approximate position where the maximum level occurred during the exploratory scan.
7. 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 to find the final position, polarization, and orientation at which the maximum level of the emission is observed.
8. Record the measured reading with the test antenna fixed at this maximized position, polarization, and orientation. Record the measurement distance.
9. Calculate the maximum field strength of the emission at the measurement distance and the adjusted/corrected power at the output of the test antenna.
10. Calculate the EIRP from the measured field strength and then convert to the linear.
11. Calculate the power density at the distance specified by the limit from the field strength at the distance specified by the limit.
12. Repeat the preceding sequence for every emission observed in the frequency band under investigation.

▣ TEST CONFIGURATION

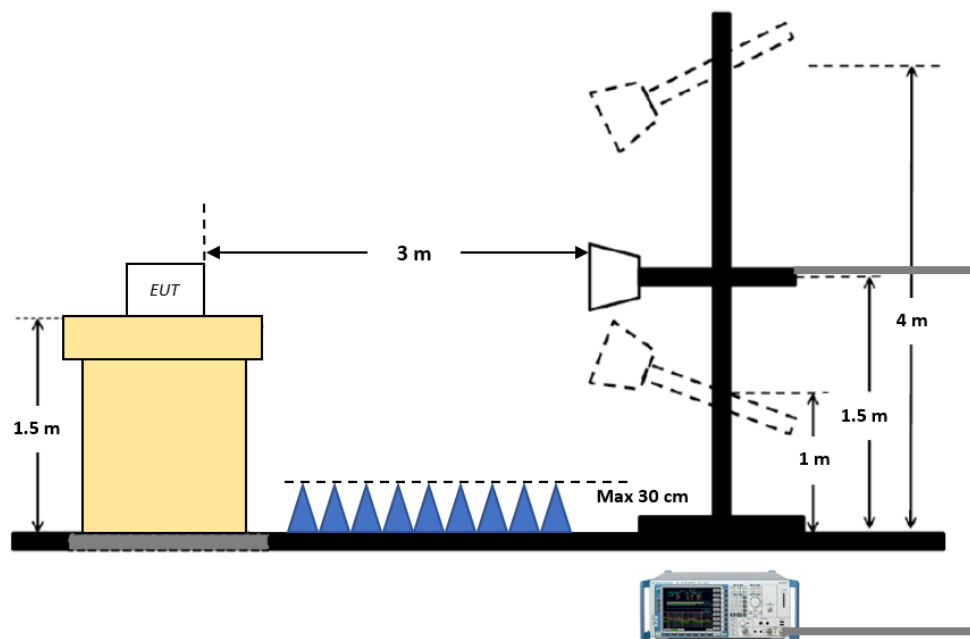
Below 30 MHz



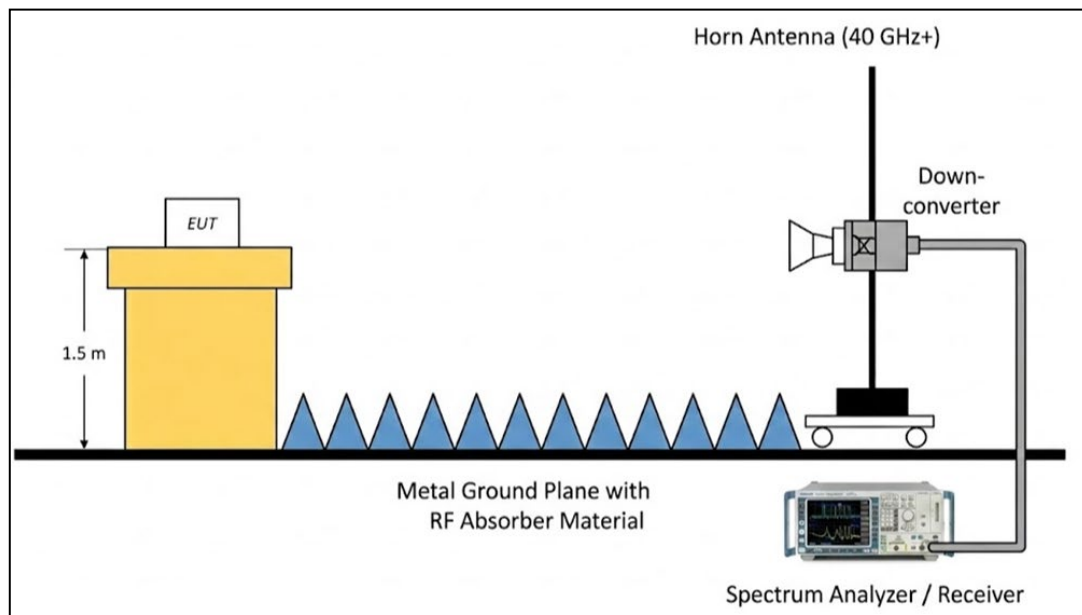
30 MHz - 1 GHz



1 GHz – 40 GHz



40 GHz – 200 GHz



7.5 Frequency Stability

▣ TEST REQUIREMENT

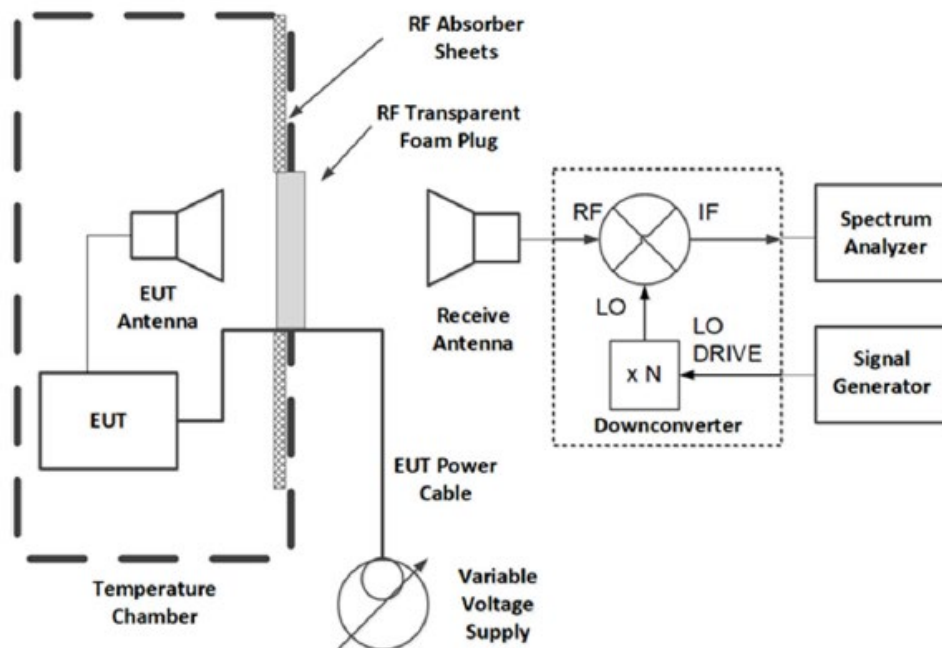
§15.255(f); RSS-Gen Annex J.6

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.

▣ TEST PROCEDURE

1. The spectrum mask of the EUT emission is measured at ambient room temperature and nominal operating voltage (100%) to provide a reference. The spectrum mask of the EUT emission is defined by frequency measurement
2. EUT primary supply voltage is varied between 85% and 115% of the nominal supply voltage (at room temperature.) Frequency excursion of the EUT emission mask is recorded at each of these conditions.
3. With the primary supply voltage set to the nominal value, the frequency excursion of the EUT emission mask is recorded at 10°C intervals from -20°C to $+50^{\circ}\text{C}$.

▣ TEST CONFIGURATION



Note(s):

1. Temperature chambers have other opening that permits locating that permits locating the receive antenna and instrumentation outside the chamber.
2. RF absorber sheets were installed on selected chamber surfaces to minimize unintended reflections from nearby metallic structures.

7.6 AC Power Line Conducted Emissions

▣ TEST REQUIREMENTS AND LIMITS

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56 ^(a)	56 to 46 ^(a)
0.50 to 5	56	46
5 to 30	60	50

^(a)Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

▣ Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors: Quasi Peak and Average Detector.

8. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	RSS Part Section(s)	Test Limit			Test Condition	Test Result
6dB Emission Bandwidth	15.255(e)(2)	RSS-210 Annex J.3.3. d	N/A			Radiated	Pass
99% Occupied Bandwidth	2.1049	RSS-Gen 6.7	N/A				Pass
Radiated Power	15.255(c)(1)(i)	RSS-210 Annex J.3.3. a	< EIRP 40 dBm (Average) < EIRP 43 dBm (Peak)				Pass
Conducted Output Power	15.255(e)(2)	RSS-210 Annex J.3.3. d	< 500 mW * (EBW/100 MHz)				Pass
Radiated Spurious Emissions (Above 40 GHz)	15.255(d) (1,3,4)	RSS-210 Annex J.4 (a, c)	90 pW/cm² at a distance of 3m				Pass
Radiated Spurious Emissions (Below 40 GHz)	15.255(d)(2) 15.209 15.205	RSS-210 Annex J.4 (b) RSS-Gen 8.9 RSS-Gen 8.10	Cf. Section 7.3				Pass
Frequency Stability	15.255 (f)	RSS-210 Annex J.6	57 ~ 71 GHz				Pass
AC Power line Conducted Emissions	§15.207(C)	RSS-Gen 8.8	Frequency (MHz)	Quasi-peak (dBµV)	Average (dBµV)	Conducted	Pass
			0.15 – 0.5	66 to 50	56 to 46		
			0.5 – 5	56	46		
			5 - 30	60	50		

Note(s):

1. All modes of operation and modulations were investigated. The test results shown in the following sections represent the worst-case results.
2. The spectrum analyzer measurement plots over the frequency range of 40 GHz to 200 GHz were corrected by incorporating compensation factors for Free Space Path Loss (FSPL), mixer conversion loss, cable loss, and antenna factor.

9. Measurement Distance

The measurement antenna is in the far field of the EUT per formula $2D^2/\lambda$ where D is the larger between the dimension of the measurement antenna and the transmitting antenna of the EUT. In this case, "D" is the largest dimension of the measurement antenna. The EUT is manipulated through all orthogonal planes representative of its typical use and for both polarities of the measurement antenna in order to achieve the highest signal level. The worst- case position found was used for all radiated testing.

9.1 In-Band Measurement Distance

$$\begin{aligned} \text{Wavelength}[m] &= \text{Speed of light}[m/s] / \text{Measurement frequency [Hz]} = (3 \times 10^8) / (71 \times 10^9) = 0.004\ 225 \\ (2 \times (\text{EUT Antenna dimension})^2) / \text{Wavelength} &= (2 \times (0.005\ 020)^2) / 0.004\ 225 = 0.012\ m \\ (2 \times (\text{measurement Antenna dimension})^2) / \text{Wavelength} &= (2 \times (0.005\ 020)^2) / 0.004\ 225 = 0.989\ m \end{aligned}$$

For fundamental and out-of-band emissions the largest far-field distance of either the EUT antenna or measurement antenna shall be used. **So, measurement distance is 1.0 m.**

Frequency Range (GHz)	Wavelength (cm)	Far Field Distance (m)	Measured Distance (m)
57~ 71	0.422	0.989	1

9.2 Out-of-Band Measurement Distance

$$\begin{aligned} \text{Wavelength}[m] &= \text{Speed of light}[m/s] / \text{Measurement frequency [Hz]} = (3 \times 10^8) / (57 \times 10^9) = 0.005\ 263 \\ (2 \times (\text{EUT Antenna dimension})^2) / \text{Wavelength} &= (2 \times (0.005\ 020)^2) / 0.005\ 263 = 0.009\ 576\ m \\ (2 \times (\text{measurement Antenna dimension})^2) / \text{Wavelength} &= (2 \times (0.058\ 200)^2) / 0.005\ 263 = 1.287\ m \end{aligned}$$

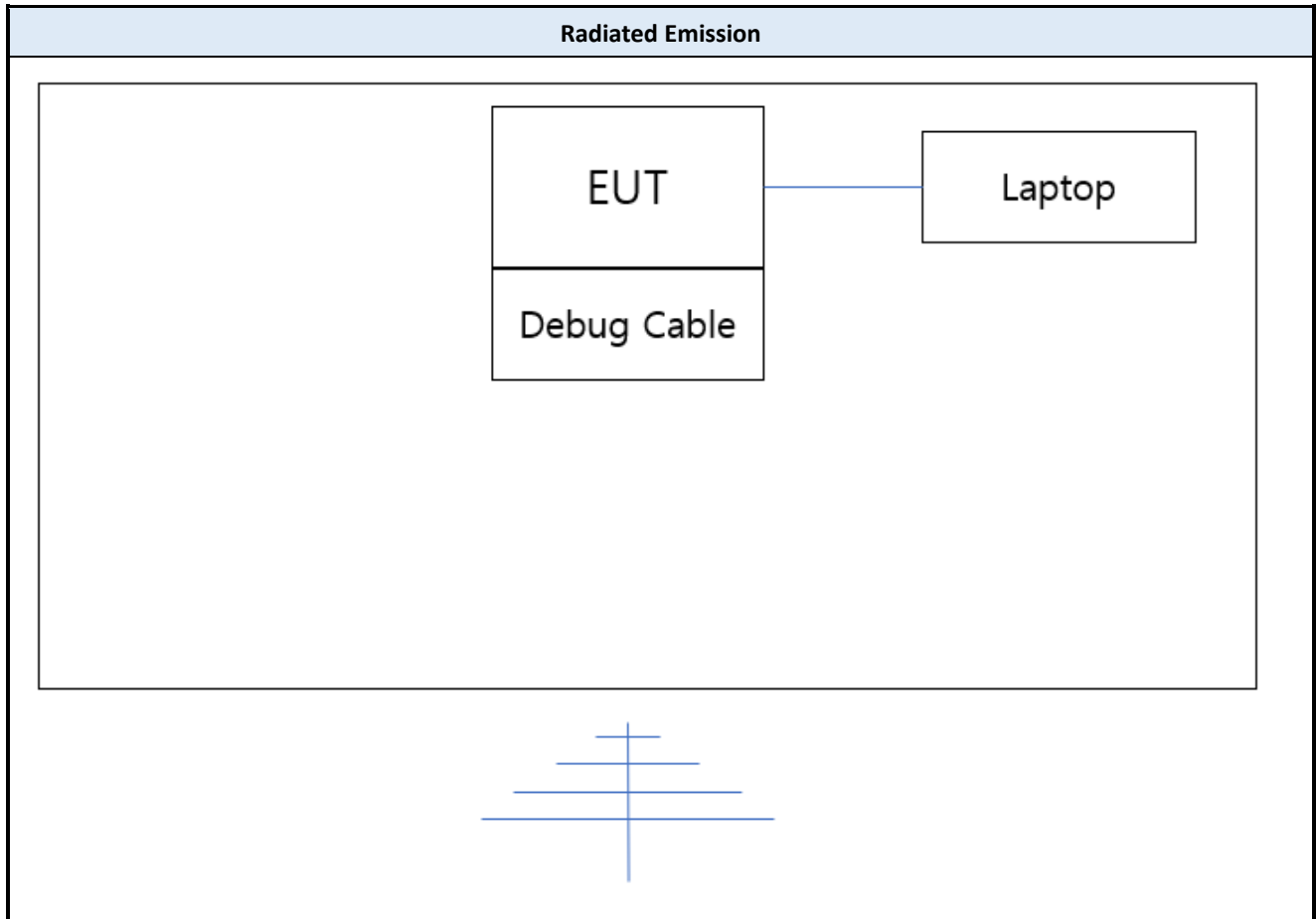
For fundamental and out-of-band emissions the largest far-field distance of either the EUT antenna or measurement antenna shall be used. So Spurious emissions measurement distance is shown in table below.

Frequency Range (GHz)	Wavelength (cm)	Far Field Distance (m)	Measured Distance (m)
40 ~ 57	0.50	1.287	1.50
71 ~ 90	0.33	0.852	1.00
90 ~ 140	0.21	0.574	1.00
140 ~ 200	0.15	0.332	1.00

Note(s):

1. For Far-Field determination, the frequency yielding the maximum required distance was used
2. The Dimension of the EUT antenna was provided by the manufacturer.

10. Test Configuration



LIST OF SUPPORT EQUIPMENT

Equipment Type	Model No.	Serial No.	Manufacturer	Qty	Note
Debug Tool	C4B	GTK20251201072	Meta	1	It must be connected directly to the EUT for data communication to be possible.
Laptop	Thinkpad L14	8T1L4R5	Lenovo	1	

11.2. 99% OCCUPIED BANDWIDTH MEASUREMENT

Low Rate

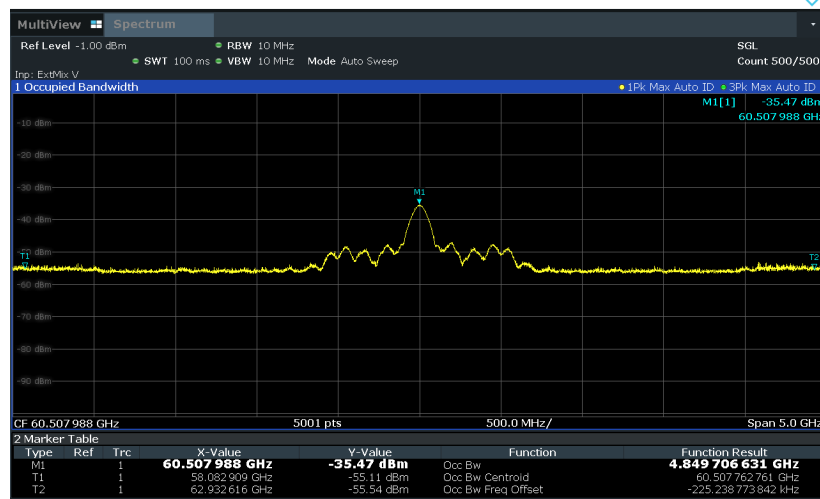
TEST CONDITIONS		Occupied Channel Bandwidth (GHz)
T nom	V nom	4.850

High Rate

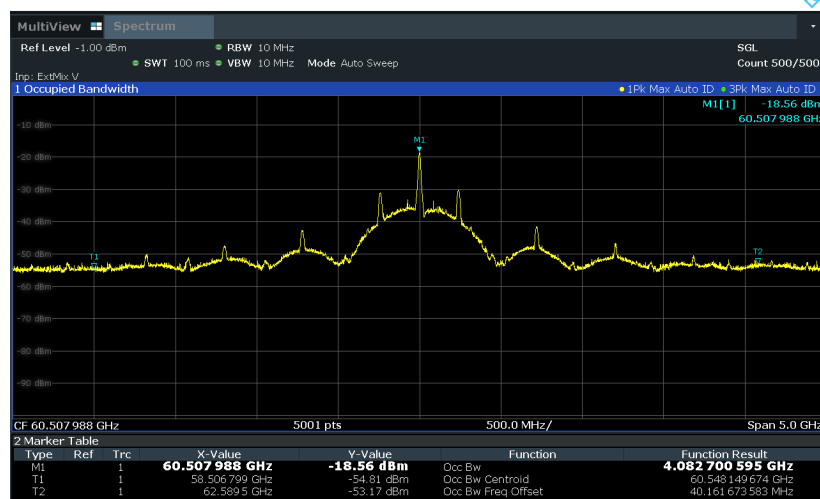
TEST CONDITIONS		Occupied Channel Bandwidth (GHz)
T nom	V nom	4.083

TEST PLOTS

Low Rate 99% Bandwidth



High Rate 99% Bandwidth



11.3. Radiated Power

Low Rate

TEST CONDITIONS	Frequency (GHz)	RF output power (dBm)	Detector	Limit (dBm)	Margin (dB)
V / Normal	60.50	-13.30	Average	40	53.30
	60.50	-4.13	Peak	43	47.13

High Rate

TEST CONDITIONS	Frequency (GHz)	RF output power (dBm)	Detector	Limit (dBm)	Margin (dB)
V / Normal	60.50	-8.10	Average	40	48.10
	60.50	0.42	Peak	43	42.58

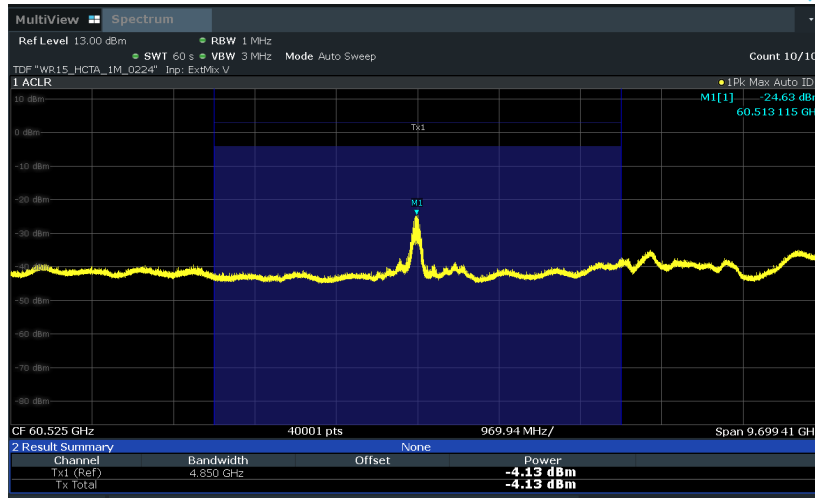
Note(s):

1. Measurement Distance is 1m
2. The measurement system was calibrated over 50–75 GHz.
Frequency-dependent total correction factors, including free-space path loss (1 m), transmit and receive antenna gains, cable losses, and downconverter conversion losses, were applied in the spectrum analyzer.
The total correction factor used for EIRP calculation was derived from a substitution measurement using a calibrated signal generator and spectrum analyzer setup, reflecting the actual combined system response.
This method is considered more reliable than the sum of individually measured losses due to reduced cumulative measurement uncertainties.
3. Therefore, the reported Channel Power results represent the calculated EIRP directly.
4. All modes of operation were investigated, and the worst-case configuration results are reported in this section.

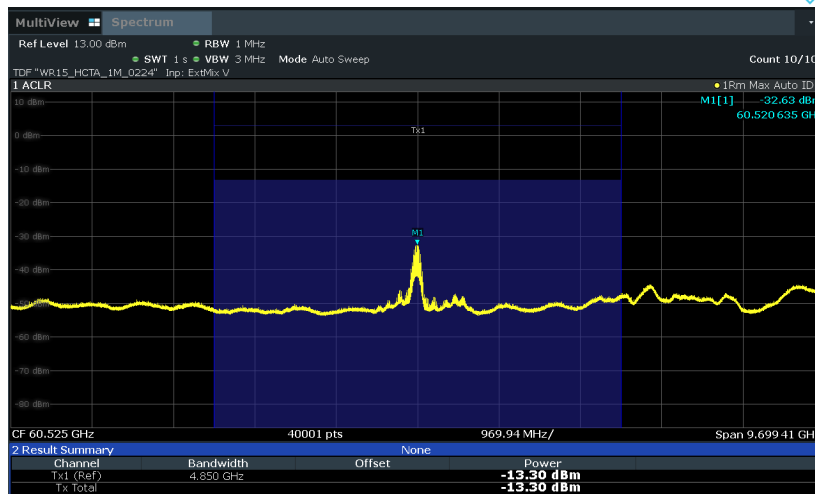
TEST PLOTS

Low Rate

Peak Output Power



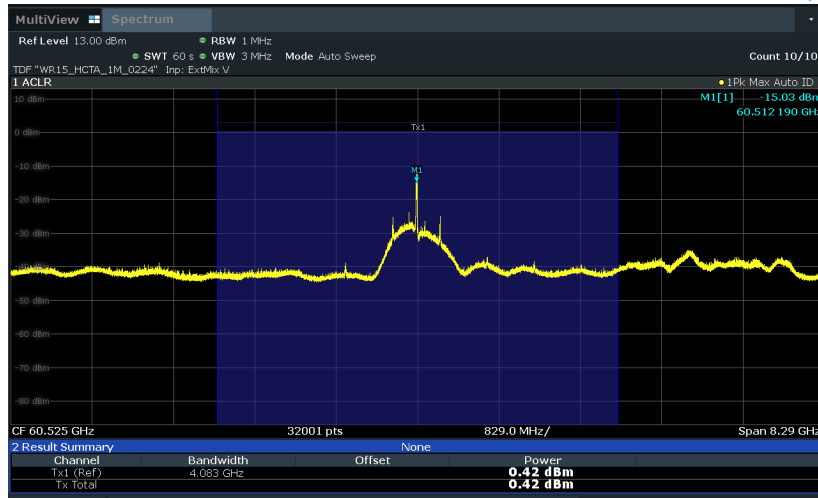
Average Output Power



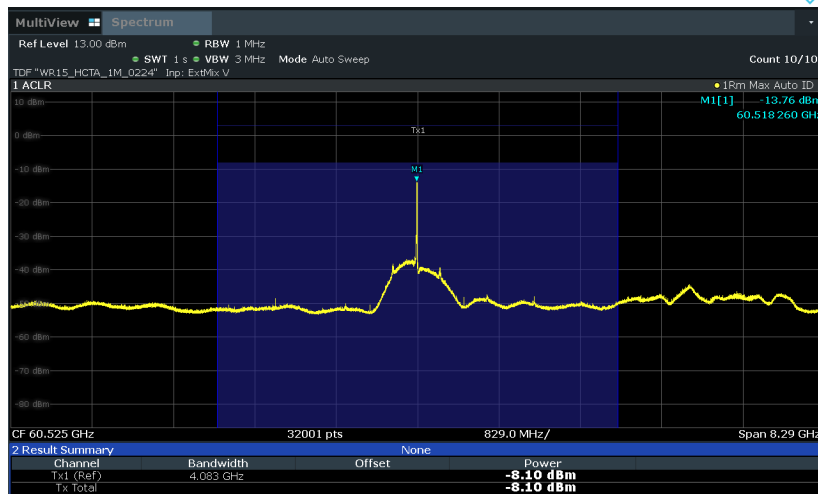
TEST PLOTS

High Rate

Peak Output Power



Average Output Power



11.4. Conducted Power

Low Rate

Frequency (GHz)	Peak EIRP (dBm)	EUT Antenna Gain (dBi)	Peak Conducted Output Power (dBm)	Peak Conducted Output Power (mW)	Measured 6dB BW (MHz)	Limit (mW)	Margin (mW)
60.50	-4.13	4.00	-8.13	0.15	0.77	3.85	3.70

High Rate

Frequency (GHz)	Peak EIRP (dBm)	EUT Antenna Gain (dBi)	Peak Conducted Output Power (dBm)	Peak Conducted Output Power (mW)	Measured 6dB BW (MHz)	Limit (mW)	Margin (mW)
60.50	0.42	4.00	-3.58	0.44	0.90	4.5	4.06

Note(s):

1. 6dB Bandwidth is measured using the procedure outlined in Section 7.1 of this test report
2. Peak EIRP is measured using the procedure outlined in Section 7.3.1
3. Peak Conducted Output Power is calculated from Peak EIRP
4. According to FCC Part 15.255 §15.255(e)(2),
for devices with an emission bandwidth less than 100 MHz, the peak transmitter conducted output power limit is calculated as follows:
 - Limit = 500 mW × (EBW/100 MHz)

11.5. Radiated Spurious Emissions

9 kHz – 30 MHz

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
No major peaks found							

Note(s):

1. All modes of operation were investigated for Unwanted Emissions and the worst-case emissions are reported.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to measured.
3. Measurements were performed for the EUT in the X, Y, and Z planes, with the detecting antenna in horizontal, vertical, and bent-over orientations

30 MHz - 1 GHz

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
49.868	V	16.36	14.57	30.93	40	9.07	QPK
270.189	H	12.77	20.42	33.19	46	12.81	QPK
276.165	V	6.46	20.60	27.06	46	18.94	QPK
951.176	H	-3.28	31.01	27.73	46	18.27	QPK
951.757	V	-3.32	31.03	27.71	46	18.29	QPK

Note(s):

1. Correction Factor = Antenna Factor + Cable Loss – Amplifier Gain + Distance Factor
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. All modes of operation were investigated for Unwanted Emissions and the worst-case emissions are reported.
4. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to measured.
5. Measurements were performed for the EUT in the X, Y, and Z planes, with both horizontal and vertical polarizations of the detecting antenna.

1 GHz – 40 GHz

Frequency (GHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
14.331 012	V	56.61	-5.08	51.53	74.00	22.47	PK
14.331 012	V	43.84	-5.08	38.76	54.00	14.64	AV
14.402 775	H	56.91	-5.03	51.88	74.00	22.12	PK
14.402 775	H	44.39	-5.03	39.36	54.00	14.64	AV
20.170 722	V	69.87	-14.51	55.36	74.00	18.64	PK
20.170 722	V	59.62	-14.51	45.11	54.00	8.89	AV
20.173 133	H	72.54	-14.50	58.04	74.00	15.96	PK
20.173 133	H	65.99	-14.50	51.49	54.00	2.51	AV

Note(s):

1. Correction Factor = Antenna Factor + Cable Loss – Amplifier Gain + Distance Factor
2. All modes of operation were investigated for Unwanted Emissions and the worst-case emissions are reported.
3. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to measured.
4. Measurements were performed for the EUT in the X, Y, and Z planes, with both horizontal and vertical polarizations of the detecting antenna.

40 GHz – 200 GHz

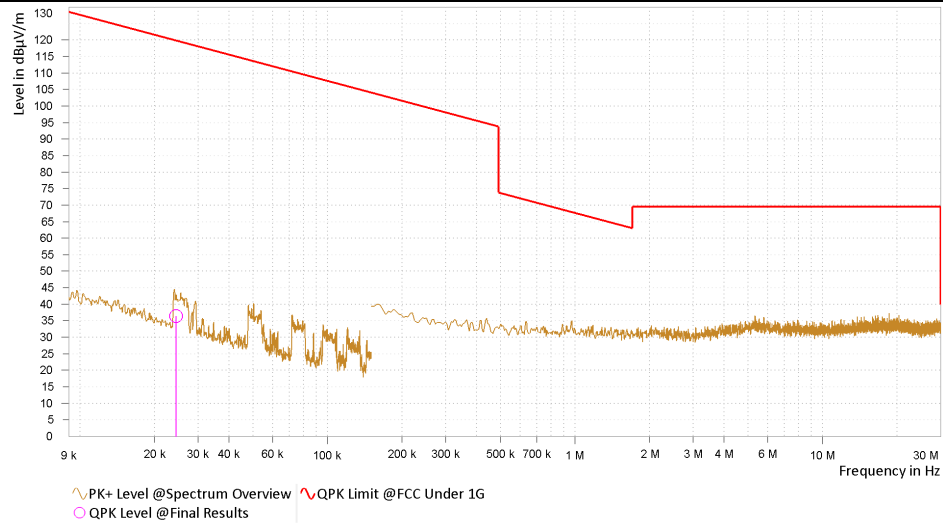
Frequency (GHz)	Polarization	Reading Result (dBm)	Reading Result (pW/cm ²)	Limit (pW/cm ²)	Margin (pW/cm ²)
56.639	H	-45.19	0.027	90.000	89.973
71.415	V	-42.70	0.048	90.000	89.952
103.695	V	-45.93	0.023	90.000	89.977
135.895	V	-47.70	0.016	90.000	89.984
141.955	H	-41.72	0.060	90.000	89.940
174.997	H	-41.35	0.065	90.000	89.935

Note(s):

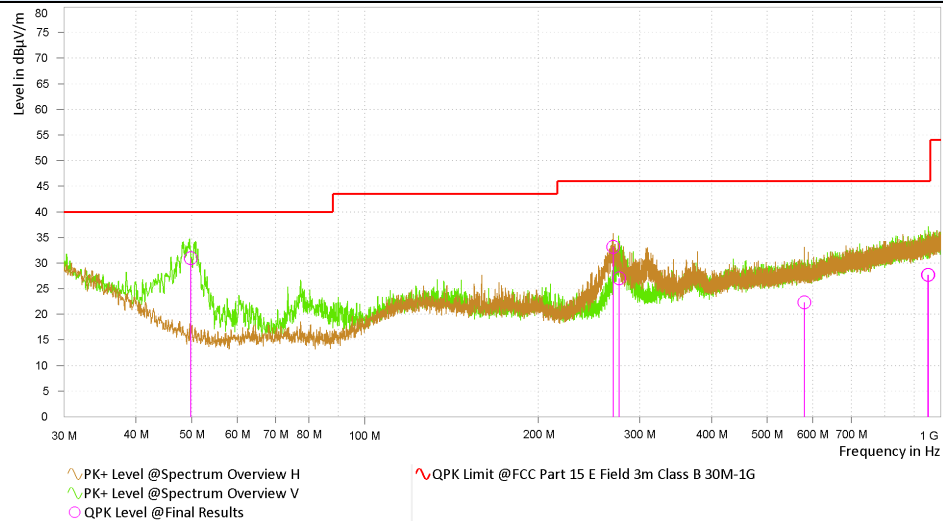
1. The measurement distance was in accordance with Section 9.2.
2. The measurement system was calibrated over 40–200 GHz.
Frequency-dependent total correction factors, including free-space path loss, transmit and receive antenna gains, cable losses, and downconverter conversion losses, were applied in the spectrum analyzer.
The total correction factor used for EIRP calculation was derived from a substitution measurement using a calibrated signal generator and spectrum analyzer setup, reflecting the actual combined system response.
This method is considered more reliable than the sum of individually measured losses due to reduced cumulative measurement uncertainties.
3. Therefore, the reported Spurious Emissions results represent the calculated EIRP directly.
4. All modes of operation were investigated, and the worst-case configuration results are reported in this section.

TEST PLOTS

Radiated Spurious Emissions 9 kHz – 30 MHz

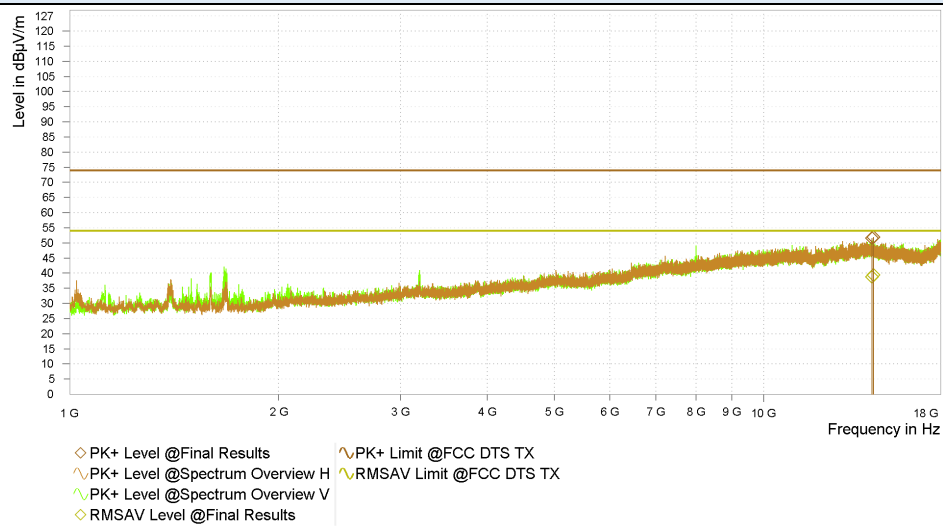


Radiated Spurious Emissions 30 MHz – 1 GHz

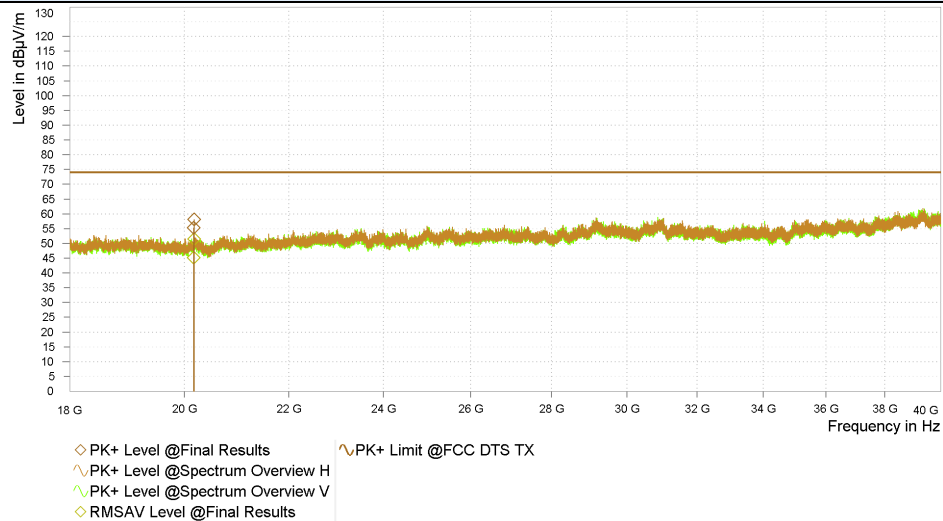


TEST PLOTS

Radiated Spurious Emissions 1 GHz – 18 GHz

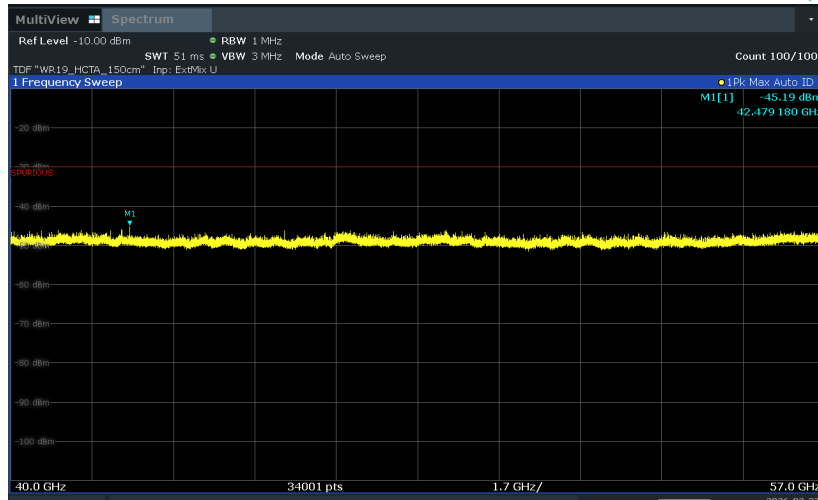


Radiated Spurious Emissions 18 GHz – 40 GHz

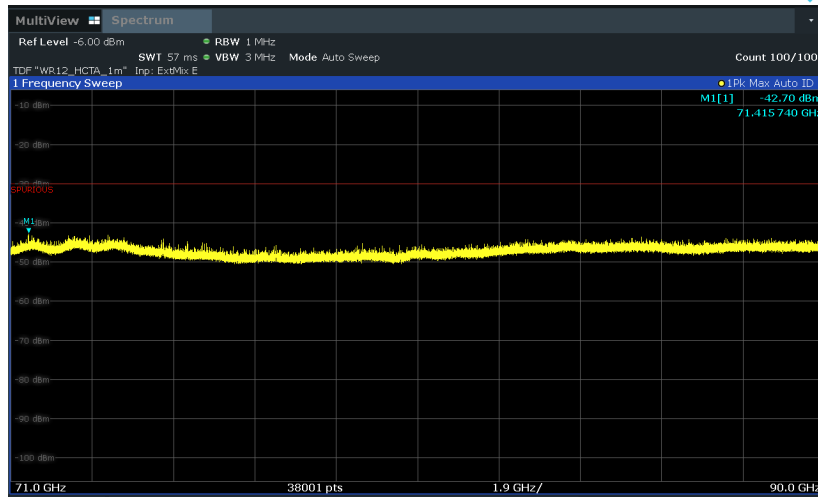


TEST PLOTS

Radiated Spurious Emissions 40 GHz – 57 GHz

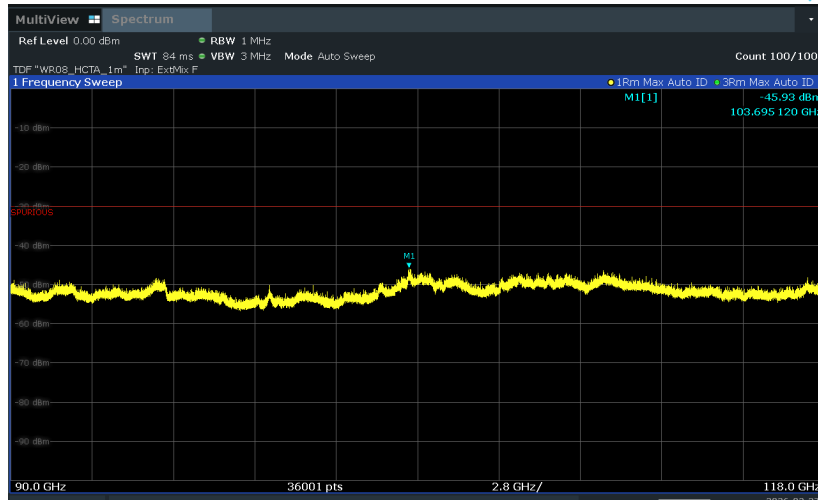


Radiated Spurious Emissions 71 GHz – 90 GHz

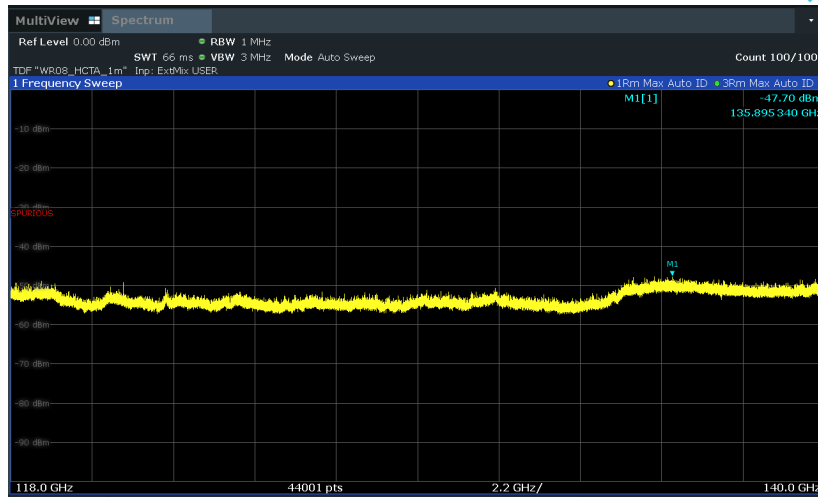


TEST PLOTS

Radiated Spurious Emissions 90 GHz – 118 GHz

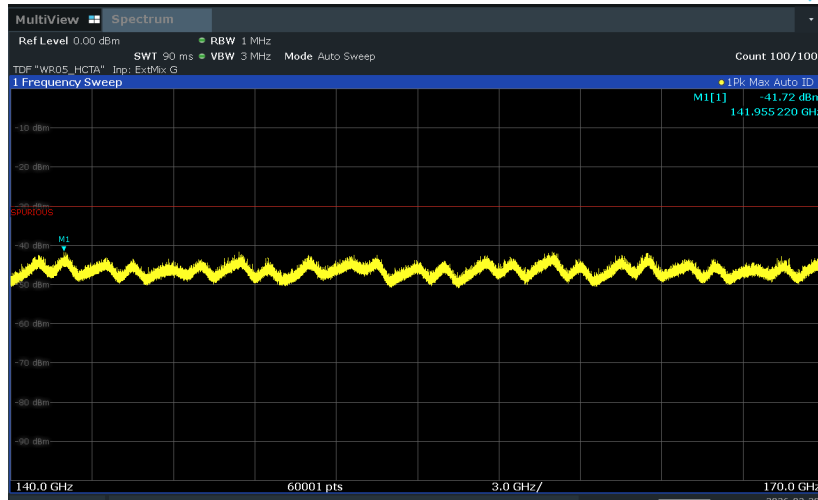


Radiated Spurious Emissions 118 GHz – 140 GHz

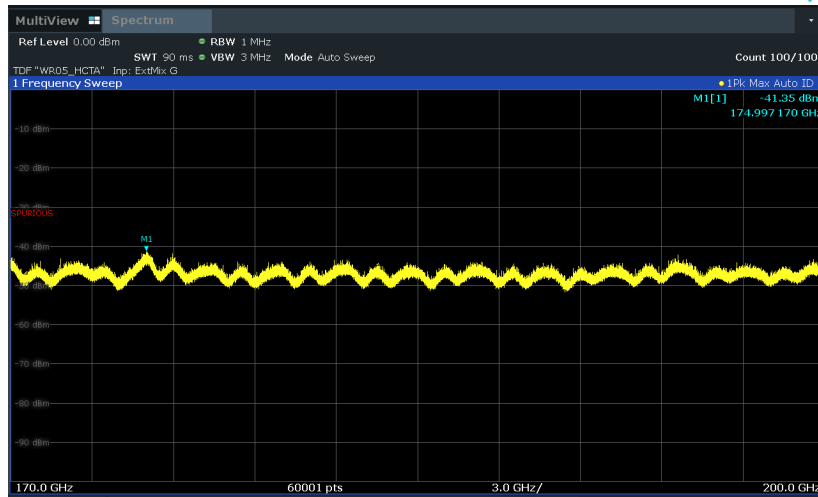


TEST PLOTS

Radiated Spurious Emissions 140 GHz – 170 GHz



Radiated Spurious Emissions 170 GHz – 200 GHz



11.6. Frequency Stability

Low Data Rate

Test Condition(°C)	Frequency (GHz)		Result
	Low	High	
-20°C	58.1081	62.9578	Pass
-10°C	58.1061	62.9558	Pass
0°C	58.1021	62.9518	Pass
+10°C	58.0886	62.9383	Pass
+20°C	58.0766	62.9263	Pass
+30°C	58.0821	62.9318	Pass
+40°C	58.0936	62.9433	Pass
+50°C	58.0881	62.9378	Pass
+20°C / 85% Voltage	58.1006	62.9503	Pass
+20°C / 115% Voltage	58.1116	62.9613	Pass

High Data Rate

Test Condition(°C)	Frequency (GHz)		Result
	Low	High	
-20°C	58.4836	62.5663	Pass
-10°C	58.4826	62.5653	Pass
0°C	58.4786	62.5613	Pass
+10°C	58.4781	62.5608	Pass
+20°C	58.4766	62.5593	Pass
+30°C	58.4761	62.5588	Pass
+40°C	58.4751	62.5578	Pass
+50°C	58.4721	62.5548	Pass
+20°C / 85% Voltage	58.4765	62.5592	Pass
+20°C / 115% Voltage	58.4763	62.5590	Pass

Note(s):

1. The spectrum mask of the EUT emission is measured at ambient room temperature and nominal operating voltage to provide a reference.
2. The voltages were declared by the manufacturer.

11.7. AC Power Line Conducted Emissions

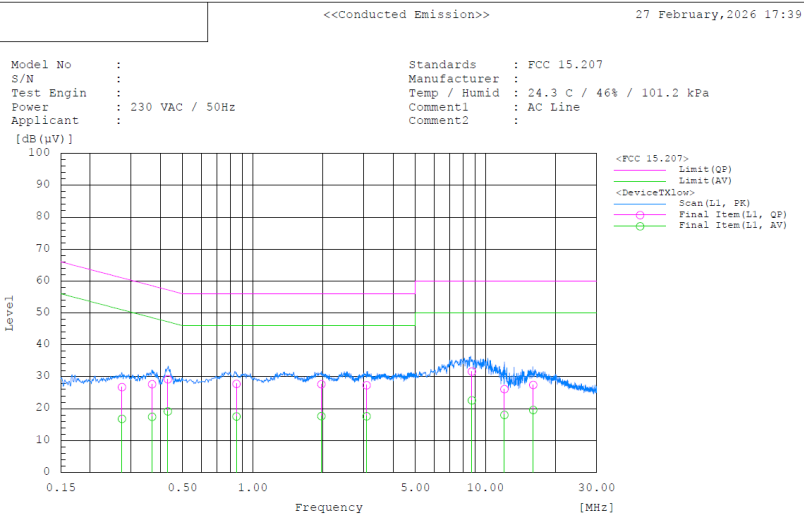
Frequency (MHz)	Line	Reading (dB μ V)		Corr. ¹⁾ (dB)	Level (dB μ V)		Limit (dB μ V)		Margin (dB)	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
0.432	L1	19.5	9.5	9.7	29.2	19.2	57.2	47.2	28.0	28.0
0.369	L1	18.0	7.8	9.7	27.7	17.5	58.5	48.5	30.8	31.0
0.274	L1	17.2	7.3	9.6	26.8	16.9	61	51	34.2	34.1
1.970	L1	17.9	7.9	9.8	27.7	17.7	56	46	28.3	28.3
0.850	L1	18.1	7.8	9.7	27.8	17.5	56	46	28.2	28.5
3.082	L1	17.4	7.7	9.9	27.3	17.6	56	46	28.7	28.4
8.723	L1	21.4	12.3	10.3	31.7	22.6	60	50	28.3	27.4
12.025	L1	15.5	7.4	10.6	26.1	18.0	60	50	33.9	32.0
15.991	L1	16.6	8.7	10.9	27.5	19.6	60	50	32.5	30.4
0.429	N	16.4	8.4	9.7	26.1	18.1	57.3	47.3	31.2	29.2
0.437	N	16.3	10.7	9.7	26.0	20.4	57.1	47.1	31.1	26.7
0.415	N	16.4	9.7	9.7	26.1	19.4	57.6	47.6	31.5	28.2
4.894	N	17.1	10.8	10.1	27.2	20.9	56	46	28.8	25.1
0.824	N	16.8	9.2	9.7	26.5	18.9	56	46	29.5	27.1
4.281	N	17.0	10.7	10.0	27.0	20.7	56	46	29.0	25.3
7.595	N	19.3	12.8	10.3	29.6	23.1	60	50	30.4	26.9
24.058	N	16.0	11.0	11.3	27.3	22.3	60	50	32.7	27.7
13.562	N	16.4	10.6	10.9	27.3	21.5	60	50	32.7	28.5

Note(s):

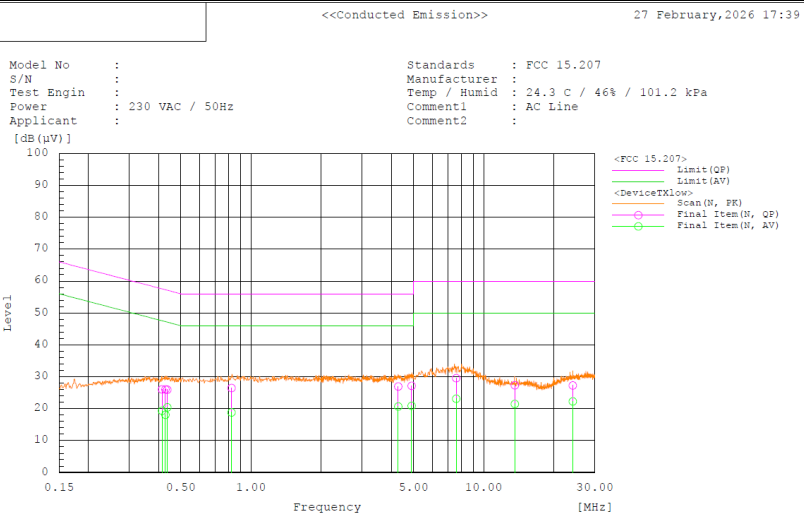
1. All modes of operation were investigated, and the worst-case configuration results are reported in this section.

TEST PLOTS

AC Line Conducted Emission (L1)



AC Line Conducted Emission (N)



12. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Calibration Due (mm/dd/yy)	Manufacture	Serial No.
☒	Signal Analyzer (1 Hz ~ 40.0 GHz)	ESW44	08/05/2026	Rohde & Schwarz	103176
☒	Loop Antenna (0.009 MHz ~ 30 MHz)	HLA 6121	03/03/2027	TESEQ	43964
☒	BI-LOG Antenna (30 MHz ~ 6 GHz)	JB6	10/22/2026	Sunol	A071116
☒	BI-LOG Antenna (30 MHz ~ 1 GHz)	JB1	07/17/2027	Sunol	A061416
☒	Horn Antenna (1 GHz ~ 18 GHz)	BBHA 9120 D	07/15/2027	Schwarzbeck	03023
☒	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	12/04/2026	Sunol	A061616
☒	Horn Antenna (18 GHz ~ 40 GHz)	DRH-1840	01/16/2027	Sunol	17121
☒	Horn Antenna (15 GHz ~ 40 GHz)	BBHA 9170	01/21/2027	Schwarzbeck	1342
☒	RF Switch Matrix System	HRSMS-VL	01/02/2027	HCT Ltd.	2-51-001
☒	Horn Antenna (WR19)	AT-SGA-25-19B	07/22/2027	AT Microwave	A5MA02
☒	Horn Antenna (WR19)	AT-SGA-25-19B	07/22/2027	AT Microwave	A5MA03
☒	Horn Antenna (WR12)	AT-SGA-25-12B	07/22/2027	AT Microwave	A5MA02
☒	Horn Antenna (WR12)	AT-SGA-25-12B	07/22/2027	AT Microwave	A5MA03
☒	Horn Antenna (WR08)	AT-SGA-25-08B	07/22/2027	AT Microwave	A5MA01
☒	Horn Antenna (WR08)	AT-SGA-25-08B	07/22/2027	AT Microwave	A5MA02
☒	Horn Antenna (WR05)	AT-SGA-25-05B	07/22/2027	AT Microwave	A5MAY02
☒	Horn Antenna (WR05)	AT-SGA-25-05B	07/22/2027	AT Microwave	A5AP01
☒	Horn Antenna (WR15)	AT-SGA-25-15B	07/22/2027	AT Microwave	A5MA01
☒	mmWave Frequency Extension Module(WR19)	FEM4060LP	07/20/2026	C&K Technologies, Inc	19AS1
☒	mmWave Frequency Extension Module(WR12)	FEM6090LP	07/20/2026	C&K Technologies, Inc	12AS1
☒	mmWave Frequency Extension Module(WR08)	FEM90140LP	07/20/2026	C&K Technologies, Inc	08AS1
☒	mmWave Frequency Extension Module(WR05)	FEM140220LP	07/20/2026	C&K Technologies, Inc	05AS1
☒	Down-Converter Module(WR19)	DC4060-SAX	07/20/2026	C&K Technologies, Inc	1904
☒	Down-Converter Module(WR15)	DC5075-SAX	07/20/2026	C&K Technologies, Inc	1506

☒	Down-Converter Module(WR12)	DC6090-SAX	07/20/2026	C&K Technologies, Inc	1206
☒	Down-Converter Module(WR08)	DC90140-SAX	07/20/2026	C&K Technologies, Inc	812
☒	Down-Converter Module(WR05)	DC140220-SAX	07/20/2026	C&K Technologies, Inc	518
☒	DC Power Source	E36232A	06/03/2026	Keysight Technologies	90302
☒	DC Power Source	E36232A	06/03/2026	Keysight Technologies	90301
☒	LISN	ENV216	08/28/2026	Rohde & Schwarz	101550
☒	LISN	ENV216	12/09/2026	Rohde & Schwarz	101349
☒	ESR Test Receiver	ESR3	07/18/2026	Rohde & Schwarz	102363
☒	Test Software	R&S*ELEKTRA	-	Rohde & Schwarz	-

Note(s):

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

APPENDIX A. TEST SETUP PHOTOS

The setup photos are provided as a separate document.

APPENDIX B. PHOTOGRAPHS OF EUT

B.1. EXTERNAL PHOTOS

The external photos are provided as separate documents.

B.2. INTERNAL PHOTOS

The internal photos are provided as separate documents.

END OF TEST REPORT