

TEST REPORT

For

60GHz mmWave Radar sensor

In conformity with

FCC CFR 47 Part 15 Subpart C (15.255)

Model Name: SMSD-1004
FCC ID: 2BUTASMSD-1004
Report No.: WE251223BG1-11
Issue Date: 12 March 2026

Prepared for

Sony Semiconductor Solutions Corporation
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Prepared by

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History

Report No.	Date	Revisions	Issued By
WE251223BG1-11	12 March 2026	Initial Issue	A.Tamura

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1 General information

1.1 Product description from supplier

Test item : 60GHz mmWave Radar sensor
(Human detection sensor using milli-wave)
Manufacturer : Sony Semiconductor Solutions Corporation
Address : 4-14-1, Asahicho, Atsugi-shi, Kanagawa, 243-0014, Japan
Model : SMSD-1004
FCC ID : 2BUTASMSD-1004
Serial number : 6
Hardware version : PVT
Software version : v 1.0.0.1
Operating frequency : 57.0 – 59.4GHz
Modulation : FMCW
Number of Channel : 1 chirp (2 Tx, 3 Rx)
Antenna Gain : +3.0 dBi (Manufacturer's declare)
Nominal power source voltages : DC 5.0V
Temperature Range : -10°C ~ +60°C
Receipt date of EUT : 16 January 2026

1.2 Test(s) performed/ Summary of test result

Test specification(s) : FCC CFR 47 Part 15 Subpart C (15.255)
Test method(s) : ANSI C63.10: 2020 / KDB364244 D01
Test(s) started : 26 January 2026
Test(s) completed : 22 February 2026

Summary of test result : Complied

Note: The above judgment is only based on the measurement data and it does not include the measurement uncertainty.

Accordingly, the statement below is applied to the test result.

The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the Laboratory.

Compliance of the EUT is more probable than non-compliance is case that the margin is less than the measurement uncertainty in the Laboratory.

Test engineer : 
A. Tamura
C&P Connectivity Wireless RF Lab

Reviewer : 
T. Takei
Manager, C&P Connectivity Wireless

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1.3 Test facility

The Federal Communications Commission has reviewed the technical characteristics of the test facilities at SGS Japan Inc., located in 3-5-23, Kitayamata, Tsuzuki-ku, Yokohama, 224-0021, Japan, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948. The description of the test facilities has been filed under registration number JP5227 at the Office of the Federal Communications Commission. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The list of all public test facilities is available on the Internet at <https://www.fcc.gov>.

Registered by Innovation, Science and Economic Development Canada (ISED):
The registered CAB identifier is JP0009.

Accredited by American Association for Laboratory Accreditation (A2LA) for the emission tests stated in the scope of the certificate under Certificate Number 7080.01

This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the U.S. Government.



1.4 Measurement uncertainty

The treatment of uncertainty is based on the general matters on the definition of uncertainty in “Guide to the expression of uncertainty in measurement (GUM)” published by ISO. The Lab’s uncertainty is determined by referring ETSI TR 100 028-1 V1.4.1.

The uncertainty of the measurement result in the level of confidence of approximately 95% (k=2) is as follows;

Radiated emission	: ± 6.7 dB (9 kHz - 30 MHz)
	: ± 5.2 dB (30 MHz - 1000 MHz)
	: ± 4.3 dB (1 GHz - 6 GHz)
	: ± 4.4 dB (6 GHz - 18 GHz)
	: ± 4.5 dB (18 GHz - 26 GHz)
	: ± 4.6 dB (26 GHz - 40 GHz)
	: ± 4.8 dB (above 40 GHz)

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1.5 Summary of test results

Requirement	Section in FCC	Result	Section in this report
Emission Bandwidth & Occupied Bandwidth	§ 15.255(c) § 15.255(b)(3)	Complied	2.1
Radiated Power	§ 15.255(c)(2)(iii)(A)	Complied	2.2
Duty cycle	§ 15.255(c)(2)(iii)(A)	Complied	2.3
Radiated Spurious Emissions	§ 15.255(d), 15.209	Complied	2.4
Frequency stability	§ 15.255(f)	Complied	2.5
AC Conducted emission	§ 15.207	Complied	2.6

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1.6 Setup of equipment under test (EUT)

1.6.1 Test configuration of EUT

Equipment(s) under test

No.	Item	Manufacture	Model No.	Serial No.
A	60GHz mmWave Radar sensor	Sony Semiconductor	SMSD-T1004	1

Support Equipment(s)

No.	Item	Manufacture	Model No.	Serial No.
B	Note PC	Lenovo	IdeaPad 5	MP1XQK57
C	DC Power Supply	KIKUSUI	PMC18-3A	-

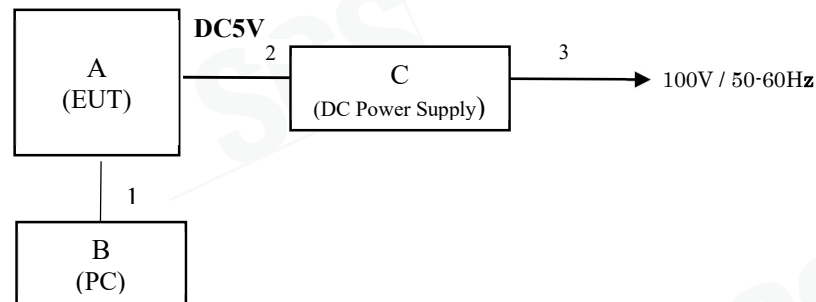
Connected cable(s)

No.	Item	From	To	Cable Shielded	Ferrite Core	Length [m]
1	USB Cable	A	B	Yes	No	1
2	Power Cable	A	C	No	No	1
3	AC Cable	C	AC main	No	No	1

1.6.2 Operating condition:

- Tx 2 ch (time division transmission) / Rx 3ch (simultaneous)
- 1 chirp
- Tx Switching Sequence: Tx1→Tx2→Tx1→Tx2

1.6.3 Setup diagram of tested system



1.7 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the applicable standards described in clause 1.2.

1.8 Deviation from the standard

No deviations from the standards described in clause 1.2.

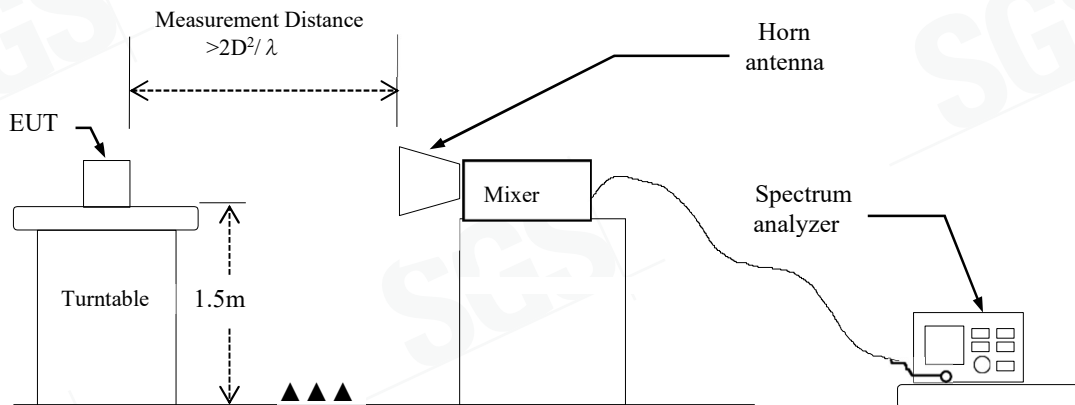
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2 Test procedure and test data

2.1 Emission Bandwidth & Occupied Bandwidth

Test setup



Test procedure

ANSI C63.10-2020 Section 9.4 / KDB364244 D01

Spectrum analyzer is set as below.

1. SPAN = approximately 1.5 times to 5 times the OBW, centered on the carrier frequency
2. RBW = 1 ~ 5% of the expected OBW (ex:1MHz)
3. VBW = 3 x RBW (ex:3MHz)
4. Detector function = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. The EUT shall be transmitting at its maximum data rate. Allow the trace to stabilize.
8. Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.

Limitation

Lower Limit : 57GHz, Upper Limit : 64GHz

Test equipment used (refer to List of utilized test equipment)

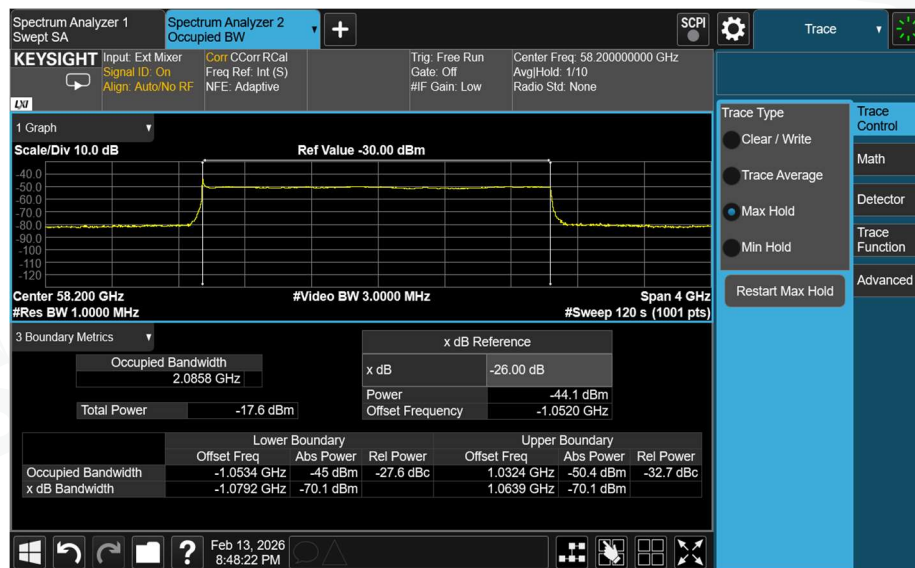
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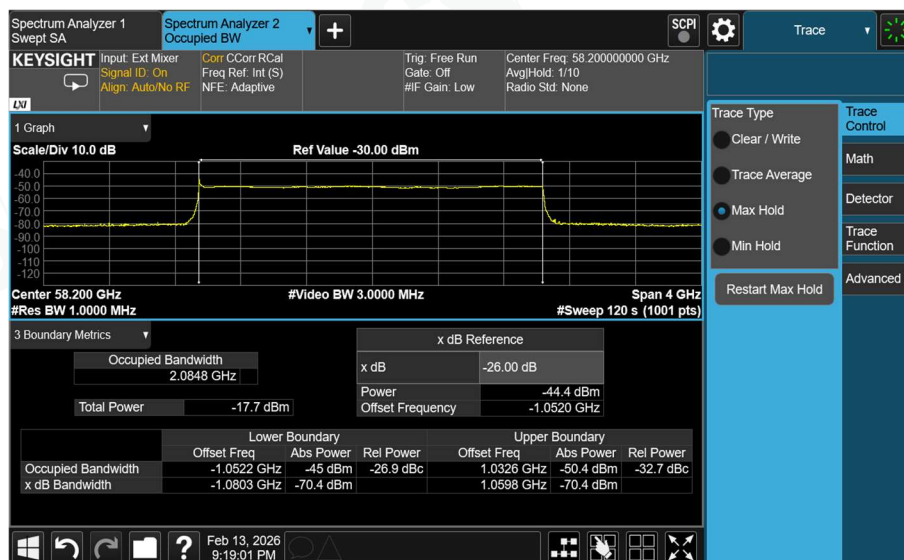
Test Data

	Center Freq. (GHz)	Lower Result (GHz)	Upper Result (GHz)	Occupied Bandwidth (99%) (GHz)	Lower Limit (GHz)	Upper Limit (GHz)	Result
Tx1	58.2	57.147	59.232	2.08	57	64	Pass
Tx2	58.2	57.148	59.233	2.08	57	64	Pass

[Tx1]



[Tx2]

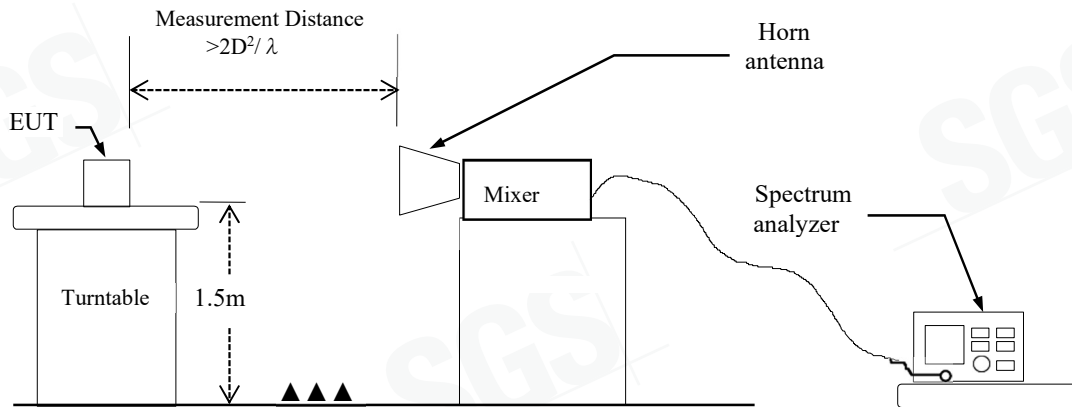


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2.2 Radiated Power (EIRP)

Test setup



Test procedure

ANSI C63.10-2020 Section 9.2.1

Spectrum analyzer is set as below.

1. Span = approximately two times to three times the EBW, centered on the carrier frequency
2. RBW = 1~5% of the expected OBW,
3. VBW > 3 x RBW
4. Detector function = Peak for peak EIRP
5. Sweep time = auto
6. Trace mode = max hold
7. Allow the trace to stabilize
8. Use the peak search function to mark the max of the emission

The Mixers and it's RF cables is composing a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

EIRP : Spectrum Reading Level + FSL(Free space path loss) - RX Horn antenna gain

$$FSL = 10 \cdot \log_{10}(4 \cdot \pi \cdot D / \lambda)^2 \text{ dB}$$

D=measurement distance

Far field distance (Rm)

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

where, D=the largest dimension of the antenna, λ =the wavelength of the emissions

Frequency Range(GHz)	λ (mm)	Rm (m)	Measurement Distance (m)
57.0 – 64.0	0.006	0.624	1.0

Note: Dimension of Measurement Antenna = 43.28mm

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Applicable rule and limitation

FCC §15.255(c)(2)(iii)(A)

The peak EIRP shall not exceed 14 dBm, and the sum of continuous transmitter off-times of at least two milliseconds shall equal at least 25.5 milliseconds within any contiguous interval of 33 milliseconds, except as specific in paragraph (c)(2)(iii)(B) of this section;

(B) The peak EIRP shall not exceed 20 dBm, and the sum of continuous transmitter off-times of at least two milliseconds shall equal at least 16.5 milliseconds within any contiguous interval of 33 milliseconds when operated outdoors:

- (1) As part of a temporary or permanently fixed application; or
- (2) When being used in vehicular applications to perform specific tasks of moving something or someone, except for in-cabin applications;

Test equipment used (refer to List of utilized test equipment)

Test results - *Complied*

Test Data

[Peak]

Ant	Frequency (Peak) [GHz]	Spectrum Reading Level [dBm]	Distance [m]	FSL [dB]	RX Horn Antenna Gain [dB]	Desensitization Factor [dB]	Total EIRP [dBm]	Limit [dBm]	Result
Tx1	57.157	-33.59	1	67.581	24.24	0.94	10.69	14	Pass
Tx2	57.152	-33.67	1	67.581	24.24	0.94	10.61	14	Pass

EIRP(Peak) : Spectrum Reading Level + FSL(Free space path loss) - RX Horn antenna + Desensitization Factor

FSL = $10 \cdot \log_{10}(4 \cdot \pi \cdot D / \lambda)^2$ dB

D=measurement distance

Desensitization Factor (FMCW)= $20 \log(\alpha)$

The Mixers and it's RF cables is composing a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

The Peak Power results was applied to the desensitization correction factor by KDB653005 4.(C).

The derivation of the FMCW desensitization factor is given in ANSI C63.10-2020 Annex L.

$$\alpha = \frac{1}{\sqrt{1 + \left(\frac{2 \ln(2)}{\pi} \right)^2 \left(\frac{BW_{Chirp}}{T_{Chirp} B^2} \right)^2}}$$

Where

α is the reduction in amplitude

BWChirp is the FMCW Chirp Bandwidth

TChirp is the FMCW Chirp Time

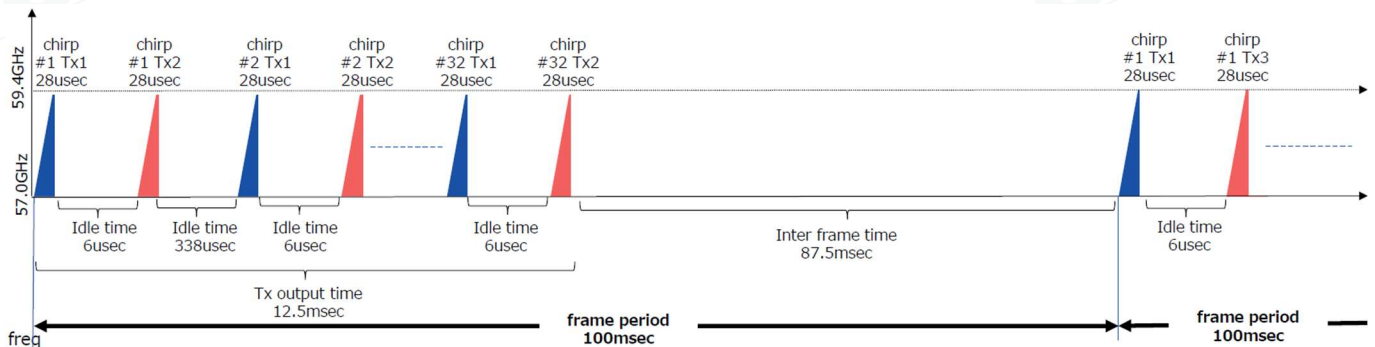
B is the 3 dB IF Bandwidth = RBW

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For the values of BWChirp, TChirp and B, refer to theory of operation specification.

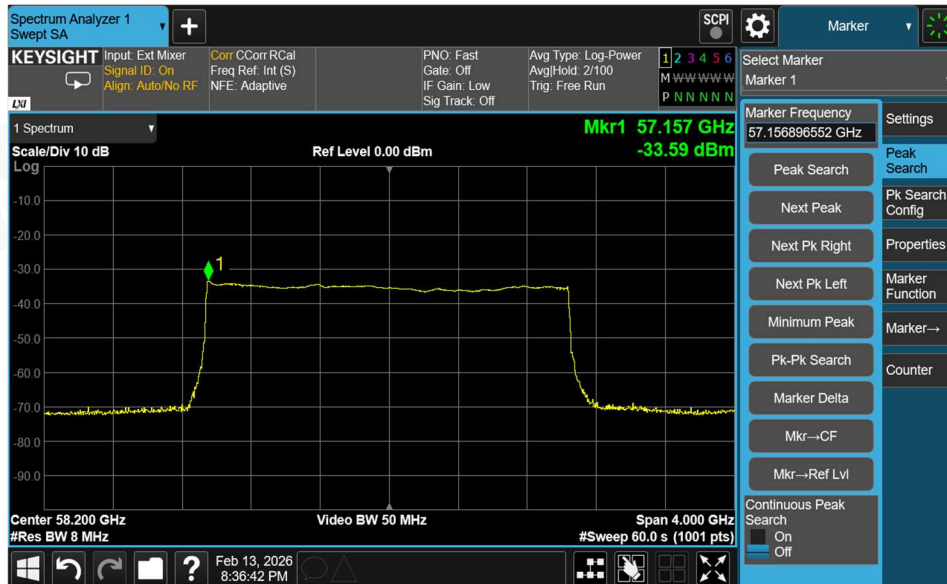
FMCW Sweep Width [MHz]	FMCW Sweep Time [us]	-3dB bandwidth of Gaussian RBW Filter [MHz]	FMCW Desensitization factor [dB]
2000	28	8	0.94



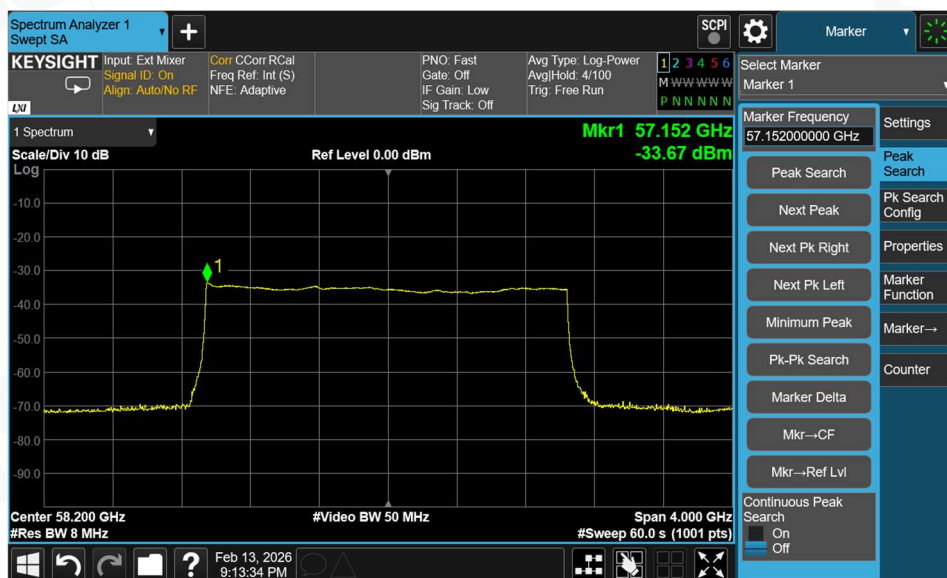
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Tx1
[Peak]



Tx2
[Peak]



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2.3 Duty cycle

Test setup

The same as Radiated Power Test

Test procedure

ANSI C63.10-2020 Section 9.2.1, 9.2.2

The duty cycle was tested with the spectrum analyzer set to zero-span.

Applicable rule and limitation

FCC §15.255(c)(2)(iii)(A)

The peak EIRP shall not exceed 14 dBm, and the sum of continuous transmitter off-times of at least two milliseconds shall equal at least 25.5 milliseconds within any contiguous interval of 33 milliseconds, except as specific in paragraph (c)(2)(iii)(A) of this section;

Test equipment used (refer to List of utilized test equipment)

Test results - *Complied*

Test Data

Tx On + Tx Off Time (ms)	Tx On Time (ms)	Tx Off Time (ms)	Duty Result (%)
100.2	12.44	87.86	12.42

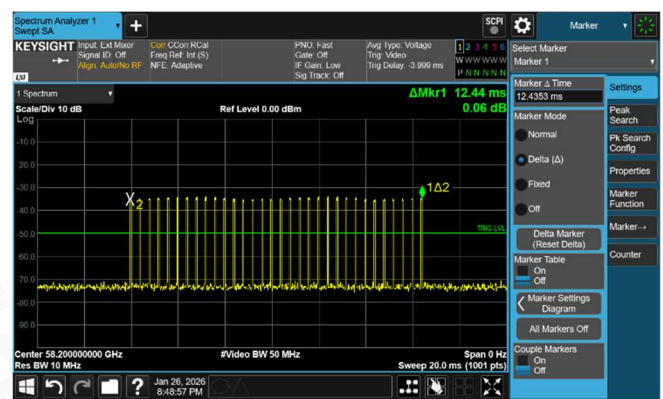
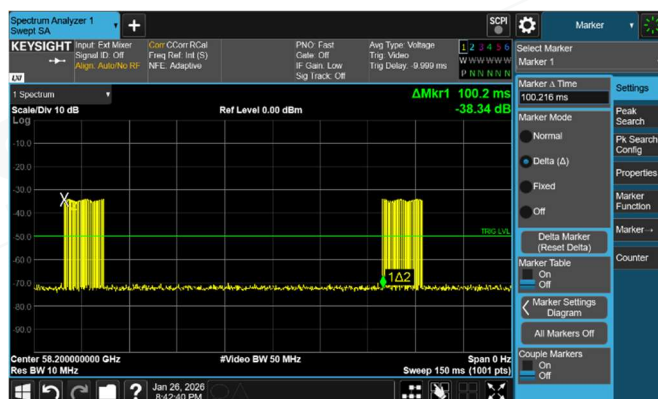
Tx Off Time Ratio (%)	Regulation Time (ms)	Tx Off Time within Regulation Time Limit (ms)	The ratio of TX Off Time Limit (%)	Result
87.68	33.0	25.5	>77.27	Pass

Calculating formula:

TX OFF Time = TX ON + TX OFF Time – TX ON Time

Duty = (TX ON Time / TX ON + TX OFF Time) * 100

TX OFF Time Ratio = (TX OFF Time / TX ON + TX OFF Time) * 100



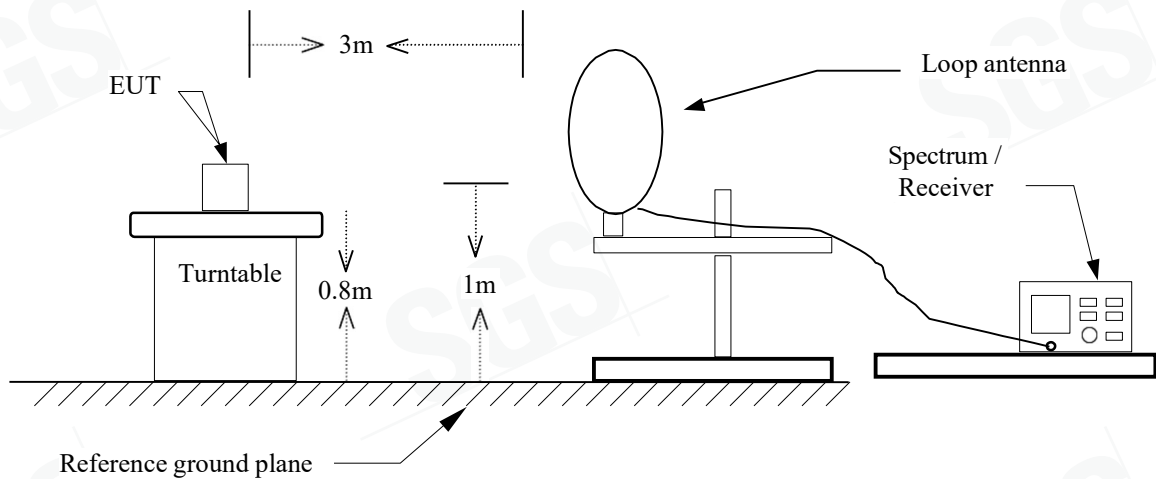
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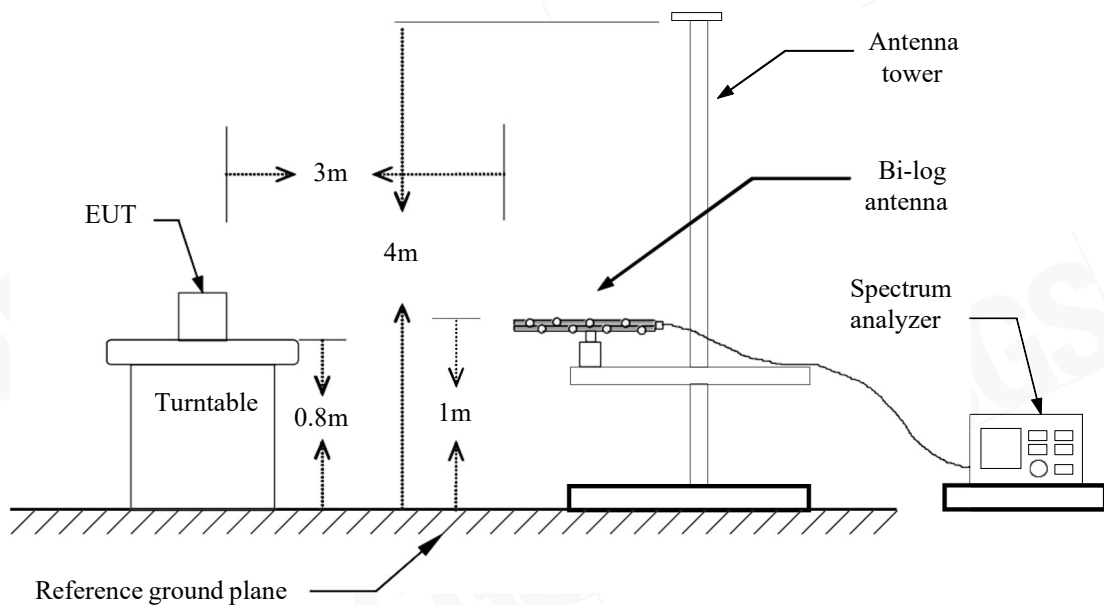
2.4 Radiated Spurious Emission

Test setup

9kHz – 30MHz



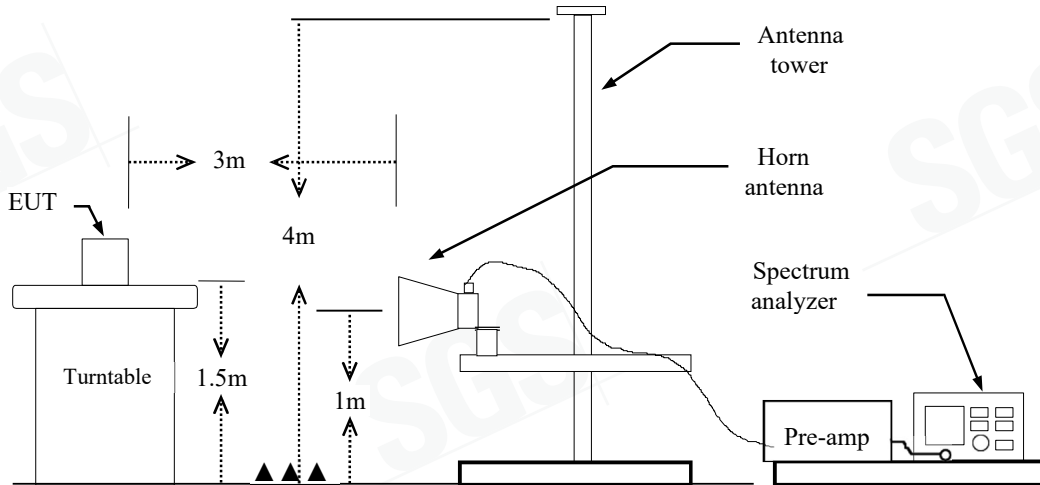
30MHz – 1GHz



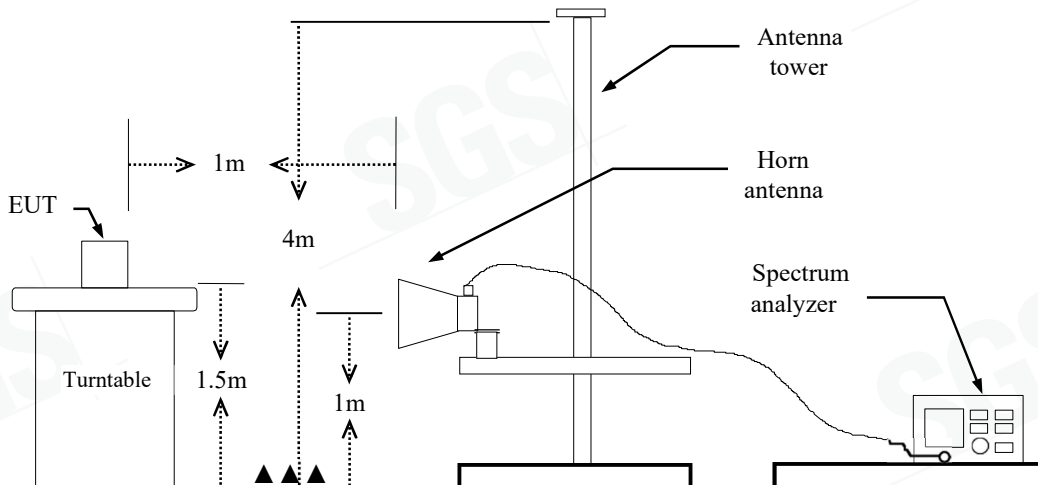
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1GHz – 18GHz



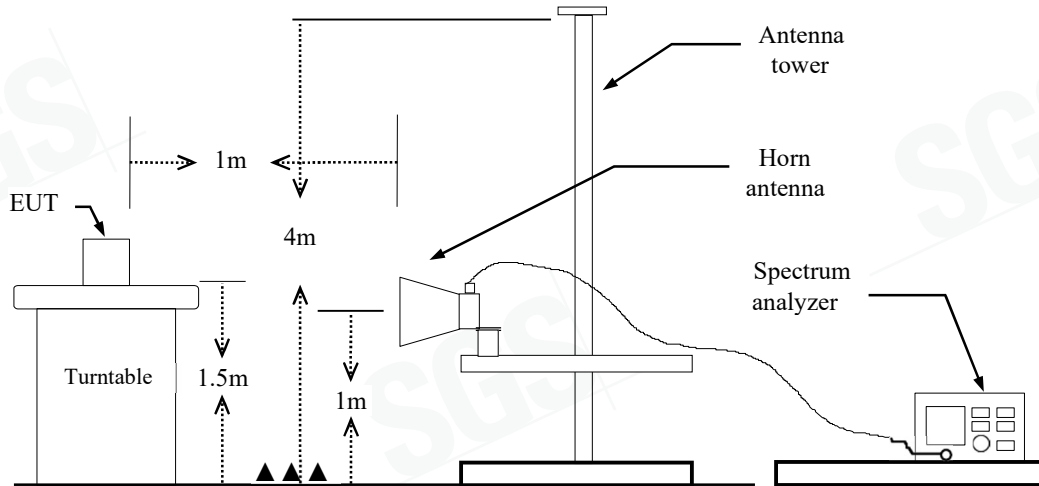
18GHz – 40GHz



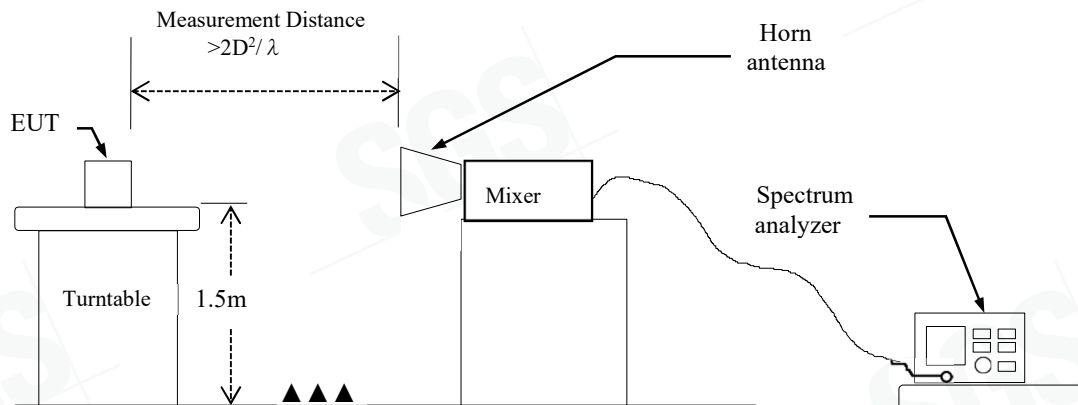
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40GHz – 50GHz



50GHz – 200GHz



Change Mixer & Horn antenna : 50 – 75GHz
75 – 110GHz
110 – 170GHz
170 – 260GHz

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Test procedure

ANSI C63.10-2020 Section 9.10 and 9.11

Spectrum analyzer is set as below.

1. The EUT is placed on a turntable, which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz

RBW = 120kHz, VBW = 300kHz, Detector = Quasi Peak

1 – 40GHz

Peak Measurement

RBW = 1MHz, VBW = 3MHz, Detector = Peak, Sweep time = Auto,
Trace mode = Max Hold until the trace stabilizes

Average Measurement

RBW = 1MHz, VBW = 3MHz, Detector = RMS, Sweep time = Auto,
Trace mode = Max Hold

If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Above 40GHz

Average Measurement

RBW = 1MHz, VBW = 3MHz, Detector = Peak, Sweep time = Auto,
Trace mode = Max Hold

7. Repeat above procedures until the measurements for all frequencies are complete.

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Applicable rule and limitation

FCC §15.255(d), 15.209

Radiated emissions below 40 GHz shall not exceed the field strength as shown in the following emissions table.

Frequency (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	48.5 – 13.8	300
0.490-1.705	24000/F(kHz)	33.8 - 23	30
1.705-30.0	30	29	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960 - 40000	500	54 (Average) 74 (Peak)	3
Frequency (GHz)	EIRP (dBm)	Power Density (pW/cm ² @3m)	
40-200	-10	90	

- (1) The power density of any emissions outside the 57–71 GHz band shall consist solely of spurious emissions.
- (2) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm² at a distance of 3 meters.

Note :

$$90 \text{ pW/cm}^2 = 1 \text{ pW} = 10^{-9} \text{ mW}; 90 * 10^{-9} \text{ mW} = 9 * 10^{-8} \text{ mW}$$

$$1 \text{ mW/cm}^2 = 155.76 \text{ dBuV/m}$$

$$9 * 10^{-8} \text{ mW/cm}^2 = 85.31 \text{ dBuV/m @ 3 m}$$

$$= -9.89 \text{ dBm @ 3 m}$$

$$= -0.35 \text{ dBm @ 1 m}$$

FAR Field Boundary Calculations

The far-field boundary is given in ANSI C63.10-2020

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

Where:

D is the largest dimension of the measurement antenna in m.

Lambda is the wavelength of the emission in m. $[300/f \text{ (MHz)}]$

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The minimum test distance for the frequency range 40GHz-200GHz determine as below:

Anntena Model	Freqeucy Range (GHz)	Lambda (m)	D (mm)	Rm (m)	Test Distance (m)
261U-383	40 - 60	0.0075	49.30	0.648	1
HO12R	60 - 90	0.005	30.00	0.360	1
261V-25/385	50 - 75	0.006	43.28	0.624	1
261W-25/387	75 - 110	0.004	29.87	0.446	1
LB-6-25-A	110 - 170	0.0027	17.50	0.225	1
LB-4-25-A	170 - 260	0.0018	12.90	0.189	1

Test equipment used (refer to List of utilized test equipment)

Test results - *Complied*

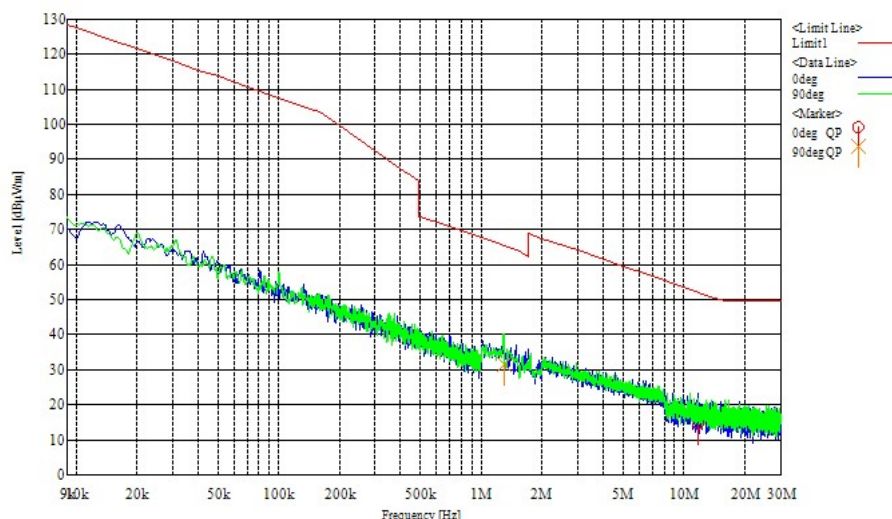
Test Data

Below 30MHz

Operating mode: normal operating mode (Tx1→2)

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

Note: All emissions were under noise floor.



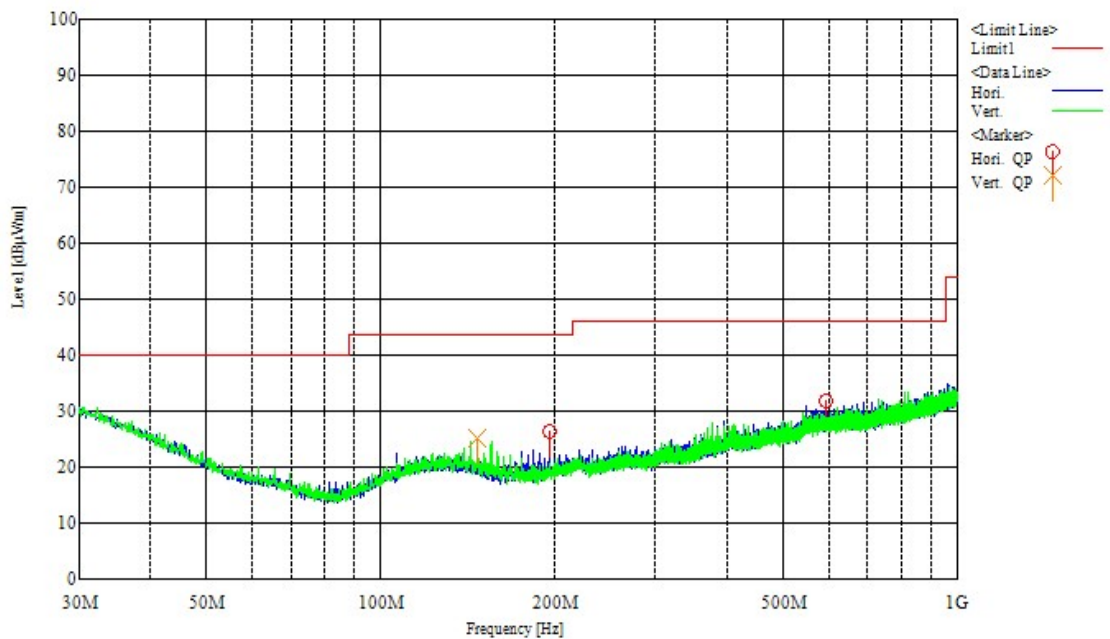
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30MHz – 1000MHz

Operating mode: normal operating mode (Tx1→Tx2)

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	196.823	36.4	11.4	8.7	30.2	26.3	43.5	17.2	Hori.
2	594.484	31.8	18.6	11.5	30.2	31.7	46.0	14.3	Hori.
3	147.552	35.3	11.8	8.3	30.2	25.2	43.5	18.3	Vert.

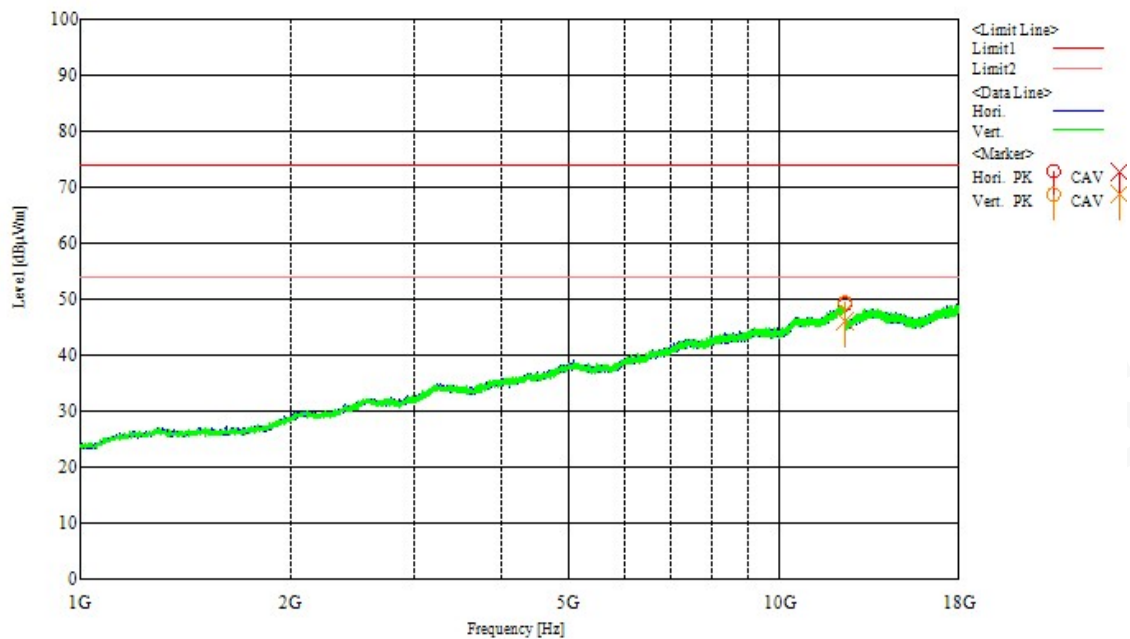


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1 GHz – 18GHz**Operating mode: normal operating mode (Tx1→Tx2)**

No.	Frequency [MHz]	Reading1 [dBμV]	Reading2 [dBμV]	C.Factor [dB]	Result Peak [dBμV/m]	Result Ave [dBμV/m]	Limit Peak [dBμV/m]	Limit Ave [dBμV/m]	Margin PK [dB]	Margin Ave [dB]	Ant.
1	12385.180	36.1	33.2	12.9	49.0	46.1	73.9	53.9	24.9	7.8	Hori.
2	12390.880	36.5	33.1	12.9	49.4	46.0	73.9	53.9	24.5	7.9	Vert.



Tested Date: 15 Feb. 2026 Temperature: 22 degC
Humidity: 36 % Atmos. Press: 1015 hPa

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18GHz – 26.5GHz

Operating mode: normal operating mode (Tx1→Tx2)

Polarity	Frequency [GHz]	Detector	Reading [dBuV]	Ant Fac. [dBm/m]	Cable loss [dB]	Dis Fac [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
V	26.151	Ave	8.15	37.5	7.6	-9.54	43.71	54	10.29
V	23.907	Peak	19.14	37.5	7.6	-9.54	54.70	74	19.3

Result=Reading+Ant Fac.+Cable loss+Dis Fac.

Distans Factor : 18-50GHz : $20\log(1.0\text{m}/3.0\text{m})=-9.54\text{dB}$

[Ave]



[Peak]



Tested Date: 26 Jan. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1010 hPa

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26.5GHz – 40GHz

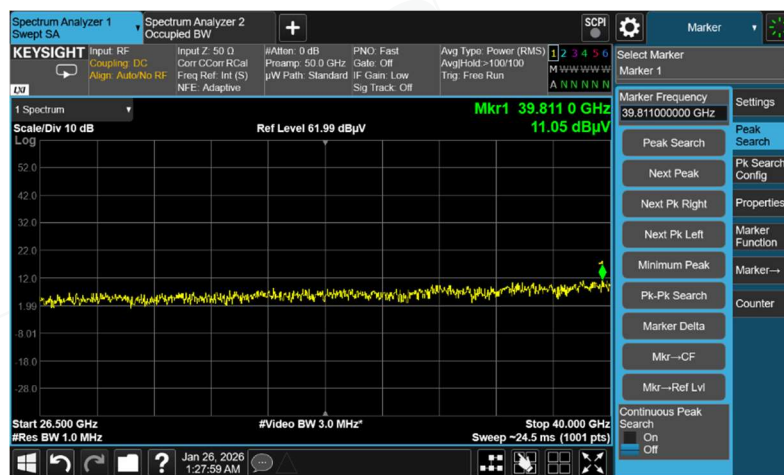
Operating mode: normal operating mode (Tx1→2)

Polarity	Frequency [GHz]	Detector	Reading [dBuV]	Ant Fac. [dBm/m]	Cable loss [dB]	Dis Fac [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
V	39.811	Ave	11.05	37.5	9	-9.54	48.01	54	5.99
V	38.879	Peak	23.99	37.5	9	-9.54	60.95	74	13.05

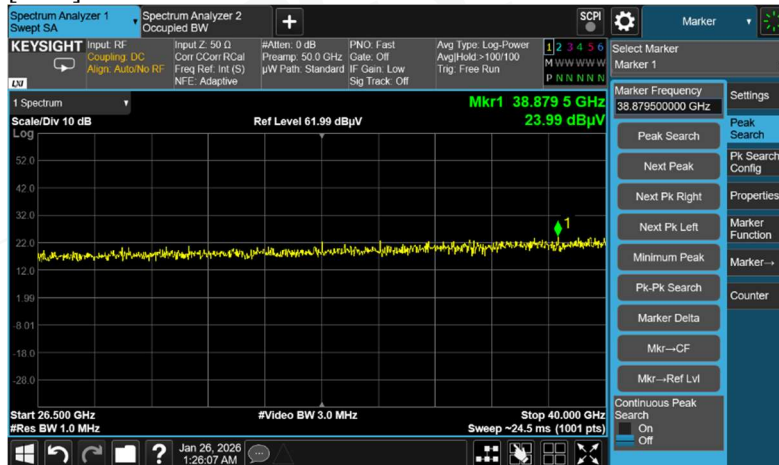
Result=Reading+Ant Fac.+Cable loss+Dis Fac.

Distans Factor : 18-50GHz : $20\log(1.0\text{m}/3.0\text{m})=-9.54\text{dB}$

[Ave]



[Peak]



Tested Date: 26 Jan. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1010 hP

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40GHz – 50GHz

Operating mode: normal operating mode (Tx1→2)

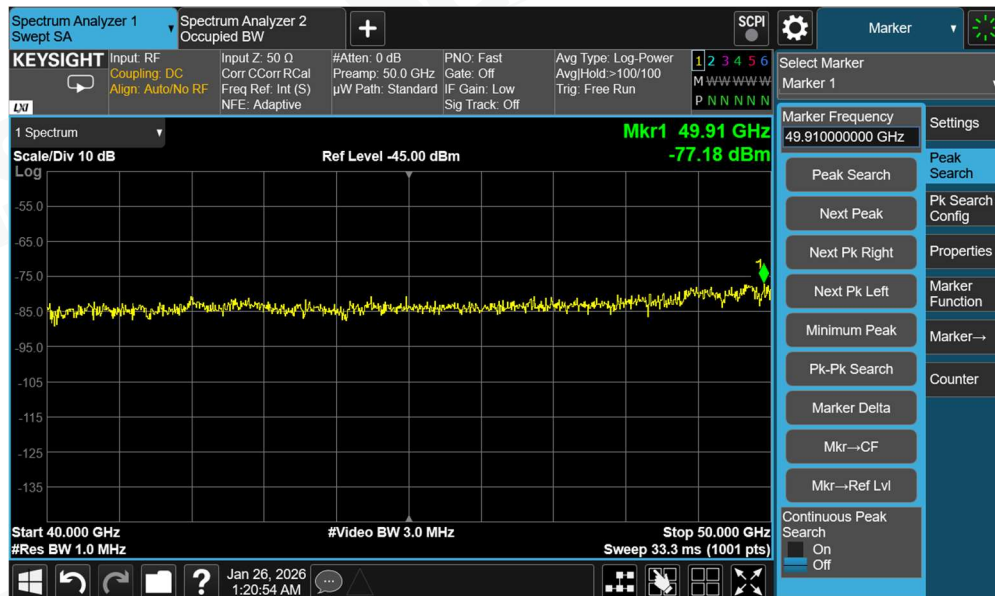
Frequency	Reading	Distance	FSL	Rx Ant Gain	EIRP (Result)		Power density @ 3m	
[GHz]	[dBm]	[m]	[dB]	[dBi]	[dBm]	[mW]	Result	Limit
							[pW/cm ²]	[pW/cm ²]
49.91	-77.18	1	66.404	23.44	-34.22	0.000379	0.335075744	90

The Mixers and it's RF cables is composing a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

FSL(Free Space path Loss)= $10 \cdot \log_{10}((4 \cdot \pi \cdot \text{Tested Distance} / \text{Lambda})^2)$

EIRP=Reading - Rx Ant Gain + FSL

Power density @ 3m = EIRP/($4 \cdot \pi \cdot 3002$)



Tested Date: 26 Jan. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1010 hP

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50GHz – 57GHz

Operating mode: normal operating mode (Tx1→Tx2)

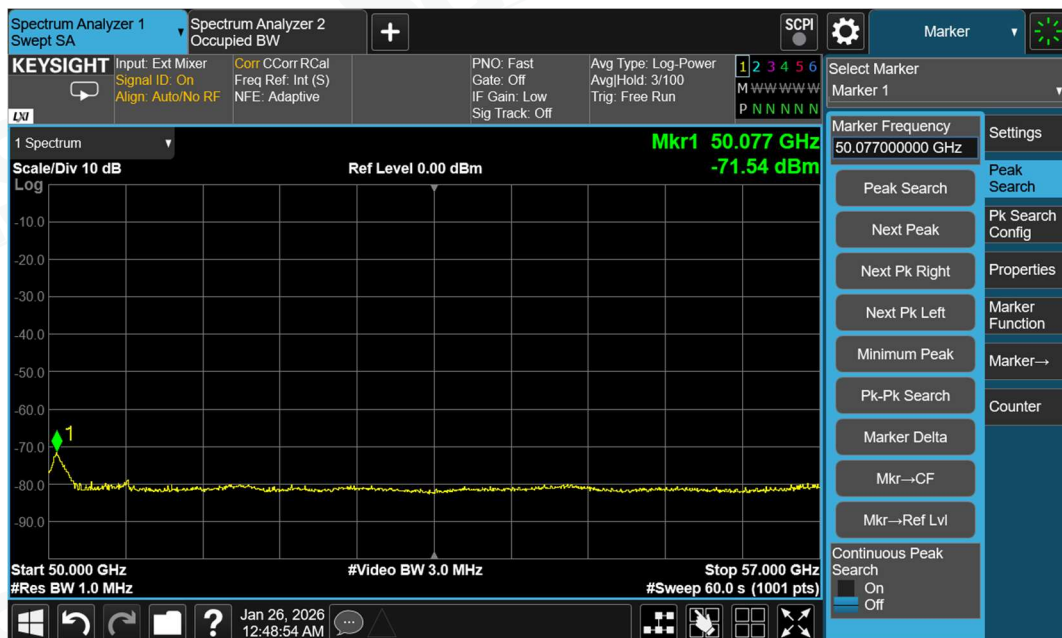
Frequency	Reading	Distance	FSL	Rx Ant Gain	EIRP (Result)		Power density @ 3m	
[GHz]	[dBm]	[m]	[dB]	[dBi]	[dBm]	[mW]	Result [pW/cm ²]	Limit [pW/cm ²]
50.077	-71.54	1	66.433	23.44	-28.55	0.001397	1.2361	90

The Mixers and it's RF cables is composing a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

FSL(Free Space path Loss)=10*log10((4*Pi*Tested Distance/Lambda)^2)

EIRP=Reading - Rx Ant Gain + FSL

Power density @ 3m = EIRP/(4*Pi*3002)



Tested Date: 26 Jan. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1010 hP

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64GHz – 75GHz

Operating mode: normal operating mode (Tx1→2)

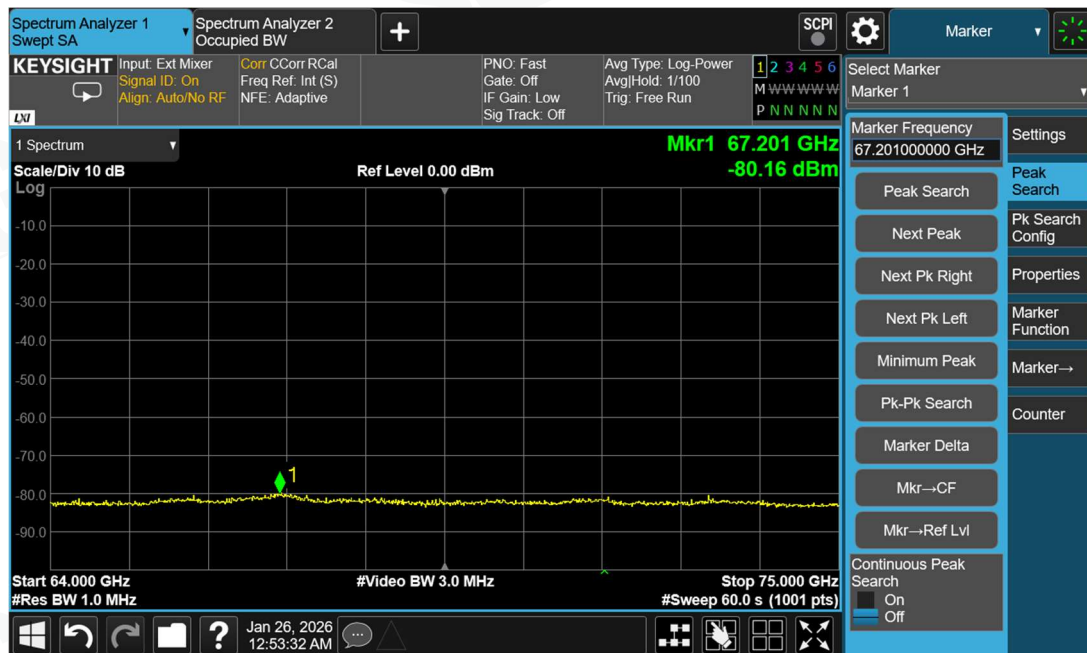
Frequency	Reading	Distance	FSL	Rx Ant Gain	EIRP (Result)		Power density @ 3m	
[GHz]	[dBm]	[m]	[dB]	[dBi]	[dBm]	[mW]	Result [pW/cm ²]	Limit [pW/cm ²]
67.201	-80.16	1	68.988	25	-36.17	0.000241	0.2136	90

The Mixers and it's RF cables is composing a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

FSL(Free Space path Loss)= $10 \cdot \log_{10}((4 \cdot \pi \cdot \text{Tested Distance} / \text{Lambda})^2)$

EIRP=Reading - Rx Ant Gain + FSL

Power density @ 3m = EIRP/($4 \cdot \pi \cdot 3002$)



Tested Date: 26 Jan. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1010 hP

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75GHz – 110GHz

Operating mode: normal operating mode (Tx1→2)

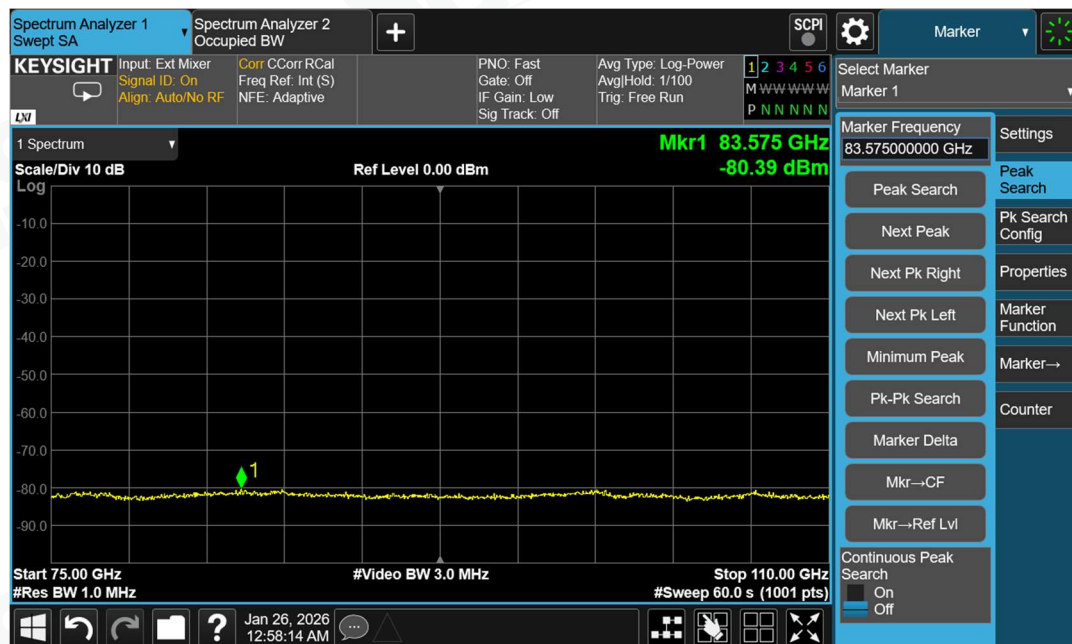
Frequency	Reading	Distance	FSL	Rx Ant Gain	EIRP (Result)		Power density @ 3m	
[GHz]	[dBm]	[m]	[dB]	[dBi]	[dBm]	[mW]	Result [pW/cm ²]	Limit [pW/cm ²]
83.575	-80.39	1	70.882	23.44	-32.95	0.000507	0.4487	90

The Mixers and it's RF cables is composing a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

FSL(Free Space path Loss)= $10 \cdot \log_{10}((4 \cdot \pi \cdot \text{Tested Distance} / \text{Lambda})^2)$

EIRP=Reading - Rx Ant Gain + FSL

Power density @ 3m = EIRP/($4 \cdot \pi \cdot 3002$)



Tested Date: 26 Jan. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1010 hP

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110GHz – 170GHz

Operating mode: normal operating mode (Tx1→2)

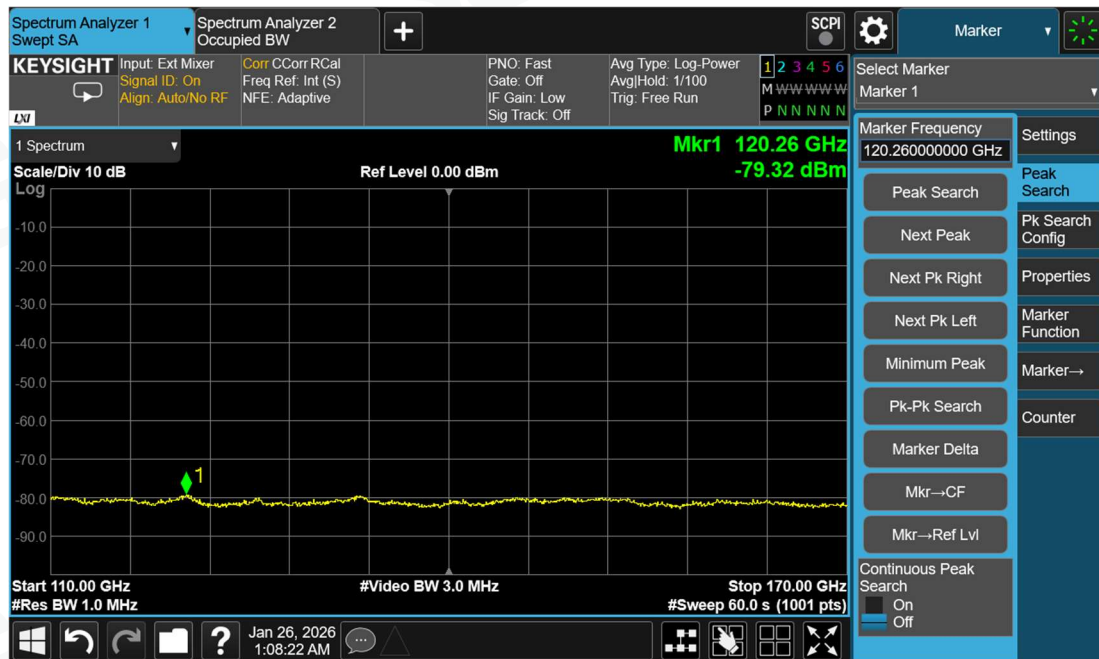
Frequency	Reading	Distance	FSL	Rx Ant Gain	EIRP (Result)		Power density @ 3m	
[GHz]	[dBm]	[m]	[dB]	[dBi]	[dBm]	[mW]	Result [pW/cm ²]	Limit [pW/cm ²]
120.26	-79.32	1	74.042	25.2	-30.48	0.000896	0.7925	90

The Mixers and it's RF cables is composing a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

FSL(Free Space path Loss)= $10 \cdot \log_{10}((4 \cdot \pi \cdot \text{Tested Distance} / \text{Lambda})^2)$

EIRP=Reading - Rx Ant Gain + FSL

Power density @ 3m = EIRP/($4 \cdot \pi \cdot 3002$)



Tested Date: 26 Jan. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1010 hP

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170GHz – 200GHz

Operating mode: normal operating mode (Tx1→2)

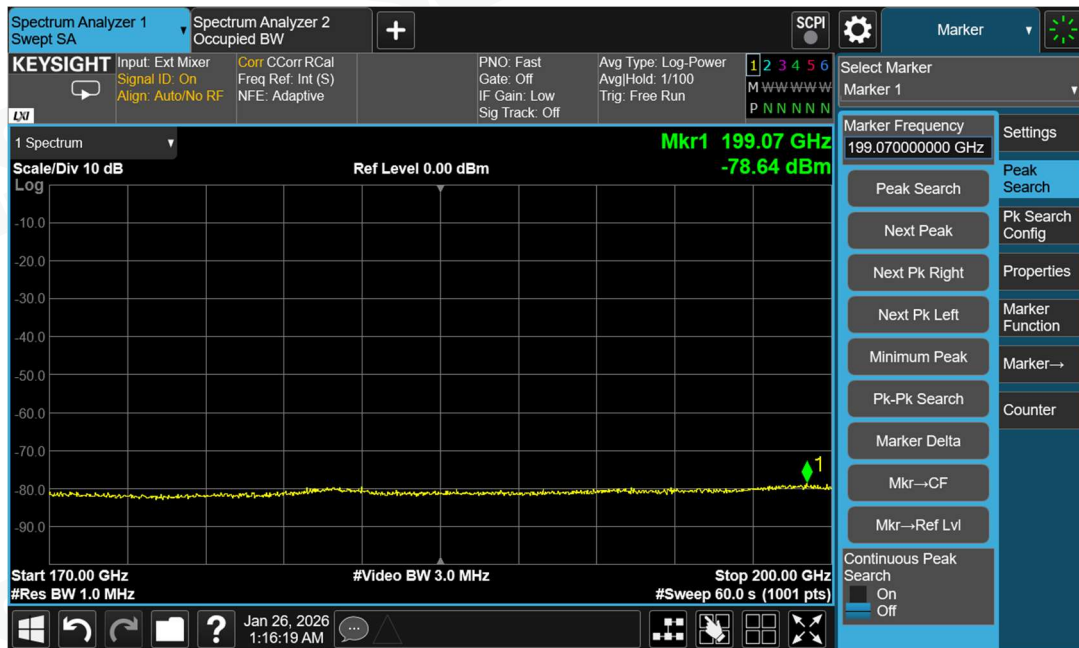
Frequency	Reading	Distance	FSL	Rx Ant Gain	EIRP (Result)		Power density @ 3m	
[GHz]	[dBm]	[m]	[dB]	[dBi]	[dBm]	[mW]	Result [pW/cm ²]	Limit [pW/cm ²]
199.07	-78.64	1	78.420	23.44	-23.66	0.004305	3.8087	90

The Mixers and it's RF cables is composing a system for calibration, the conversion factor was added into the test Spectrum Analyzer in testing.

FSL(Free Space path Loss)= $10 \cdot \log_{10}((4 \cdot \pi \cdot \text{Tested Distance} / \text{Lambda})^2)$

EIRP=Reading - Rx Ant Gain + FSL

Power density @ 3m = EIRP/($4 \cdot \pi \cdot 3002$)



Tested Date: 26 Jan. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1010 hP

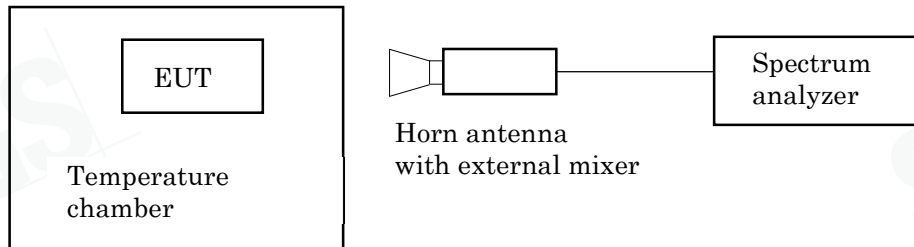
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2.5 Frequency Stability

Test setup



Test procedure

ANSI C63.10-2020 Section 9.5

1. The EUT has to be placed inside the temperature chamber.
2. 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.
3. Vary EUT power supply between 85% and 115% of nominal, and record the frequency excursion of the EUT emission mask.
4. Set the power supply to 100% normal setting and start temperature is the highest operating temperature, which is declared by the applicant or 50°C, whatever is higher. After the temperature stabilized for approximately 30 minutes record the frequency excursion of the EUT emission mask.
5. Repeat step 4. at each 10 °C increment down to -20 °C
6. In case the lowest operating temperature declared by the applicant is lower than -20 °C, repeat step 4. for this temperature.

Applicable rule and limitation

FCC §15.255(f)

Fundamental emissions must be contained within the frequency bands 57 - 64GHz 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 equipment used (refer to List of utilized test equipment)

Test results - *Complied*

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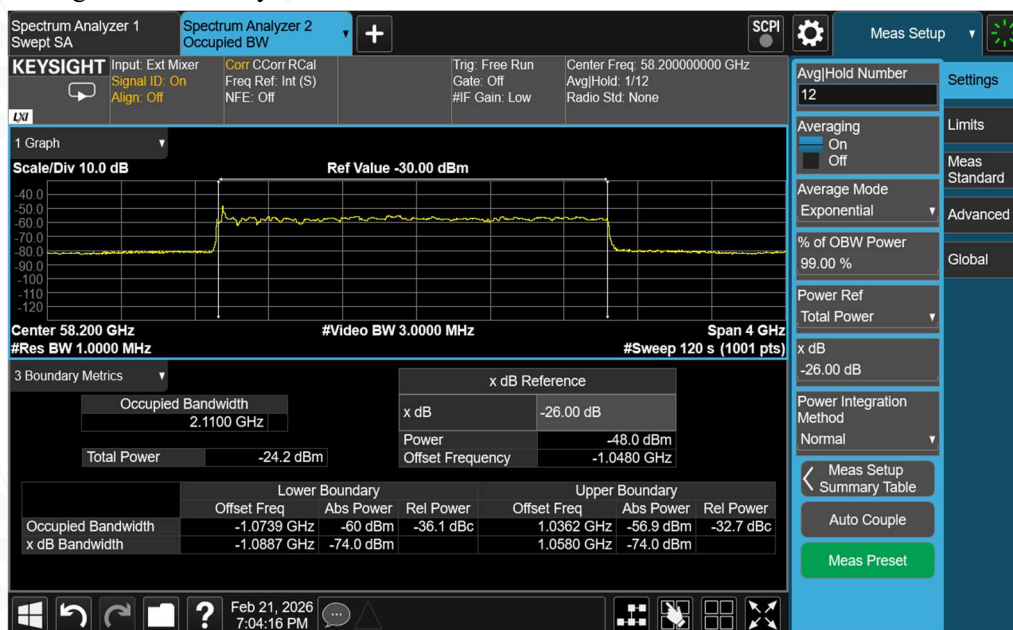
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Test Data

 $[T_{x1} \rightarrow T_{x2}]$

Temp(°C)	Power Supply	Frequency Range(GHz)		Limit(GHz)	Result
50	5.0 (Vnom)	57.122	59.235	57 - 64	Pass
40		57.120	59.233		Pass
30		57.122	59.231		Pass
20(Ref.)		57.126	59.236		Pass
10		57.121	59.234		Pass
0		57.119	59.234		Pass
-10		57.125	59.235		Pass
-20		57.137	59.236		Pass
Nom Temp.	4.25 (Vmin)	57.123	59.236	57 - 64	Pass
Nom Temp.	5.75 (Vmax)	57.120	59.236		Pass

20deg. Reference only



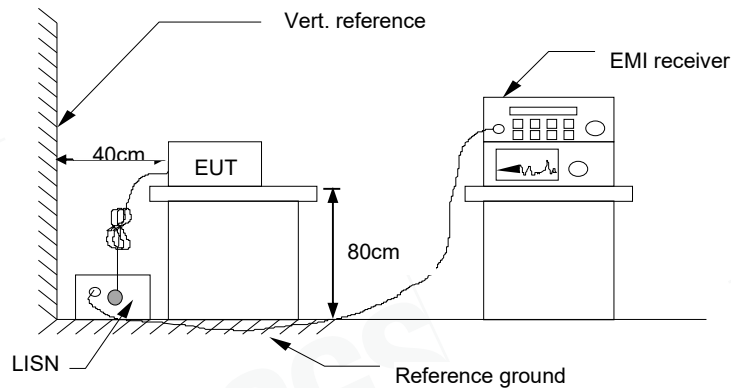
Tested Date: 22 Feb. 2026 Temperature: 22 degC
Humidity: 35 % Atmos. Press: 1009 hPa

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2.6 AC Power Conducted emissions

Test setup



Test procedure

ANSI C63.10-2020 Section 6.2

EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the Maximum signal strength.

Applicable rule and limitation

FCC §15.207(a)

For 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 frequencies hopping mode 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). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission [MHz]	Conducted Limit [dB μ V]	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50

*Decreases with the logarithm of the frequency

Test equipment used (refer to List of utilized test equipment)

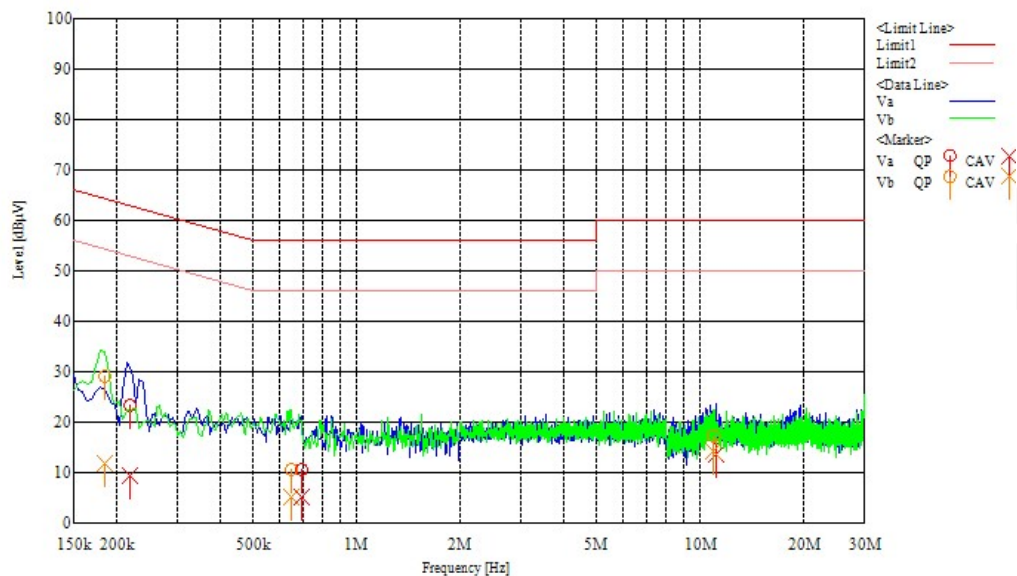
Test results – Complied

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Test Data

Frequency [MHz]	Reading1 [dBμV]	Reading2 [dBμV]	C.Factor [dB]	Result1 [dBμV]	Result2 [dBμV]	Limit1 [dBμV]	Limit2 [dBμV]	Margin1 [dB]	Margin2 [dB]	Line
0.21898	13.1	-0.8	10.3	23.4	9.5	62.9	52.9	39.5	43.4	Va
0.69202	0.4	-5.2	10.2	10.6	5.0	56.0	46.0	45.4	41.0	Va
11.14057	6.5	3.2	10.4	16.9	13.6	60.0	50.0	43.1	36.4	Va
0.18449	18.9	1.6	10.3	29.2	11.9	64.3	54.3	35.1	42.4	Vb
0.64767	0.5	-5.1	10.2	10.7	5.1	56.0	46.0	45.3	40.9	Vb
10.96048	6.9	3.8	10.4	17.3	14.2	60.0	50.0	42.7	35.8	Vb
0.21898	13.1	-0.8	10.3	23.4	9.5	62.9	52.9	39.5	43.4	Va
0.69202	0.4	-5.2	10.2	10.6	5.0	56.0	46.0	45.4	41.0	Va



Tested Date: 15 Feb. 2026 Temperature: 22 degC
Humidity: 36 % Atmos. Press: 1015 hPa

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3 List of utilized test equipment / 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, which is traceable to recognized national standards.

Emission (below 18GHz) Test Site [K1]

ID No.	Kind of Equipment	Manufacturer	Model No.	Serial Number	Cal. Date	Cal. until
AC11(EM)	Anechoic Chamber	TDK	-	-	2025/08/21	2026/08/31
AC11(EG)	Anechoic Chamber	TDK	-	-	2025/08/01	2026/08/31
BA10	Biological Antenna	TESEQ	CBL6111D	32342	2025/06/19	2026/06/30
CL35	RF Cable 2 m	Junkosha	MWX221	1502S020	2025/02/16	2026/02/28
CL36	RF Cable 2 m	Junkosha	MWX221	1502S021	2025/02/16	2026/02/28
CL80	RF Cable 8 m	HUBER&SUHNER	SUCOFLEX104PE	MY3792/4PE	2025/02/16	2026/02/28
CL71	RF Cable for RE	RFT	-	-	2025/01/05	2027/01/31
DH07	DRG Horn Antenna	A.H. Systems	SAS-571	1939	2024/02/08	2026/02/28
LP05	Loop Antenna	ETS-Lindgren	6502	00143302	2025/03/08	2026/03/31
PR15	Pre. Amplifier	Anritsu	MH648A	6201156141	2025/06/10	2026/06/30
PR16	Pre. Amplifier (1-26G)	Agilent Technologies	8449B	3008A01538	2025/02/13	2026/02/28
TR10	Test Receiver (F/W : 3.66)	Rohde & Schwarz	ESR26	101313	2025/05/07	2026/05/31

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Above 18GHz Test Site [K5]

ID No.	Kind of Equipment	Manufacturer	Model No.	Serial Number	Cal. Date	Cal. until
Signal Generator						
SG10	Signal Generator	KEYSIGHT	E8257D	US49060100	2025/8/13	2026/8/31
Spectrum Analyzer						
MSA01	Spectrum Analyzer	KEYSIGHT	N9030B	MY60071202	2025/8/18	2026/8/31
Downconverter						
MMD02	Harmonic Mixer (D/C:50-75GHz)	KEYSIGHT (VDI)	N9029AV15	SAX761	2025/11/4	2027/11/30
MMD03	Harmonic Mixer (D/C:75-110GHz)	KEYSIGHT (VDI)	N9029AV10	SAX739	2025/11/4	2027/11/30
MMD04	Harmonic Mixer (D/C:110-170GHz)	KEYSIGHT (VDI)	N9029BV06	SAX850	2025/11/4	2027/11/30
MMD05	Harmonic Mixer (D/C:170-260GHz)	KEYSIGHT (VDI)	N9029BV04	SAX852	2025/11/4	2027/11/30
Power Meter / Sensor						
PM02R	Power Meter	KEYSIGHT	E4416A	GB41292593	2025/8/5	2026/8/31
PU01R	Power Sensor (50-75GHz)	KEYSIGHT	V8486A	MY53200001	2025/8/14	2026/8/31
Antenna						
SHA05	Standard Horn Antenna (40-60GHz)	mi-Wave	261U-383	001	2023/9/12	2028/9/30
SHA07	Standard Horn Antenna (60-90GHz)	Custom Microwave	HO12R	001	2023/9/12	2028/9/30
SHA01R	Standard Horn Antenna (50-75GHz)	mi-Wave	261V-25/385	001	2023/9/13	2028/9/30
SHA03R	Standard Horn Antenna (75-110GHz)	mi-Wave	261W-25/387	001	2023/9/11	2028/9/30
MHA01	Standard Horn Antenna (110-170GHz)	A-INFO	LB-6-25-A	2020009000018	2023/9/13	2028/9/30
MHA03	Standard Horn Antenna (170-260GHz)	A-INFO	LB-4-25-A	2020276000001	2023/10/16	2028/10/31

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