Radio Test Report

Report No.:STS2508144W01

Issued for

Data Realities LLC

3015 Park St, Middleton, WI 53562, United States

Product Name:	Millimeter-Wave Radar USB Sensor (People Counting & Tracking)
Brand Name:	DataRealities
Model Name:	DR6000
Series Model(s)	N/A
FCC ID:	2BSE4-DR6000
Test Standards:	FCC Part 15.255

TEST REPORT

Applicant's Name :	Data Realities LLC
Address :	3015 Park St, Middleton, WI 53562, United States
Manufacture's Name :	Shenzhen Shinywe Technology Co., Ltd
Address :	Room301, Building C, Huafeng Wisdom Innovation Port, 2nd Gushu Road, Xixiang, Baoan, Shenzhen, China

Product Description

Product Name :	Millimeter-Wave Radar USB Sensor (People Counting & Tracking)
Brand Name :	DataRealities
Model Name :	DR6000
Series Model :	N/A
Test Standards :	FCC Part 15.255
Test Procedure :	ANSI C63.10-2020

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

Date of Test :	
Date of receipt of test item :	21 Aug. 2025
Date of performance of tests . :	21 Aug. 2025~09 Oct. 2025
Date of Issue :	09 Oct. 2025
Test Result :	**Pass**

Testing Engineer : Aaron Bu

(Aaron Bu)

Technical Manager : Skylar Li

(Skylar Li)

Authorized Signatory : Bovey Yang

(Bovey Yang)

SHENZHEN STS TEST SERVICES CO., LTD. TESTING APPROVAL

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Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	09 Oct. 2025	STS2508144W01	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 15.255		
FCC standard	Test Item	Results
15.207	AC Conducted Emission	Compliant
15.255(c)	EIRP and Transimitter off-times	Compliant
15.255(e)	Occuoied Bandwidth	Compliant
15.209(a) 15.255(d)	Radiated Spurious Emissions	Compliant
15.255(f)	Frequency stability	Compliant
15.203	Antenna requirement	Compliant

NOTE:

(1) “N/A” denotes test is not applicable in this Test Report.

(2) All tests are according to ANSI C63.10 .

1.1 TEST FACILITY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : 101, Building B, Zhuoke Science Park, No.190 Chongqing Road, ZhanChengShequ, Fuhai Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.755dB
2	Unwanted Emissions, conducted	±2.874dB
3	All emissions, radiated 9K-30MHz	±3.80dB
4	All emissions, radiated 30M-1GHz	±4.18dB
5	All emissions, radiated 1G-6GHz	±4.90dB
6	All emissions, radiated 6G-18GHz	±5.24dB
7	All emissions, radiated 18G-40GHz	±5.42dB
8	All emissions, radiated >40GHz	±5.86dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name	Millimeter-Wave Radar USB Sensor (People Counting & Tracking)
Brand Name	DataRealities
Model Name	DR6000
Series Model(s)	N/A
Model Difference	N/A
Operation Frequency	60 GHz-64 GHz
Modulation Type	FMCW
Antenna Type	Patch Antenna
Antenna Gain	5dBi
Rating	Input: 5V 2A
Adapter	N/A
Battery	N/A
Hardware version number	ACMR6001_C_V1.2_B
Software version number	V2.0.1

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	DataRealities	DR6000	Patch	N/A	5	Antenna

The EUT antenna is External Antenna. No antenna other than that furnished by the responsible party shall be used with the device.

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test,please see the above listed frequency for testing.

2.2 EUT OPERATION MODE

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

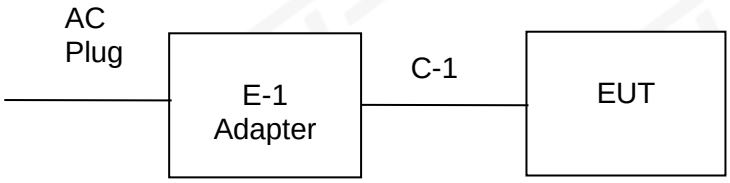
Test Mode	Description
Mode1	TX Mode

For AC Conducted Emission

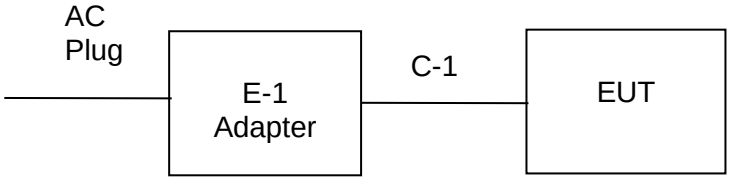
Test Case	
AC Conducted Emission	Mode1 : TX Mode

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test



2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Note
E-1	Adapter	ZTC	NB-A515A	N/A
C-1	USB Cable	MI	RYEW3A	N/A

Item	Equipment	Mfr/Brand	Length	Note
C-1	Shielded	NO	150cm	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.6 TEST EQUIPMENT

RF Radiation Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Pre-Amplifier (0.1M-3GHz)	EM	EM330	60665	2025.02.22	2026.02.21
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2025.09.25	2026.09.24
Pre-Amplifier (18G-40GHz)	SKET	LNPA_1840-50	SK2018101801	2025.02.22	2026.02.21
Active loop Antenna (9KHz-30MHz)	ZHINAN	ZN30900C	16035	2025.02.25	2026.02.24
Bilog Antenna (30-1000MHz)	TESEQ	CBL6111D	34678	2025.09.27	2027.09.26
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA 9120D	2014	2025.09.27	2027.09.26
HornAntenna (18G-40GHz)	A-INFOMW	LB-180400-KF	J211020657	2024/07/10	2026/07/09
Horn Antenna (40G-60GHz)	A-INFO	LB-19-25-A	2020039000053	2024/07/10	2026/07/09
Horn Antenna (50G-75GHz)	A-INFO	LB-15-25-A	2020028000183	2024/07/10	2026/07/09
Horn Antenna (75G-110GHz)	A-INFO	LB-10-25-A	2020017000101	2024/07/10	2026/07/09
Horn Antenna (110G-170GHz)	A-INFO	LB-6-25-A	2020009000108	2024/07/10	2026/07/09
Horn Antenna (170G-260GHz)	A-INFO	LB-4-25-A	20202706000029	2024/07/10	2026/07/09
Mixer(40-60GHz)	AT-Microwave	AT-SAX8-4060	N/A	2024/11/21	2026/11/20
Mixer(50-75GHz)	AT-Microwave	AT-SAXB-5075	N/A	2024/11/21	2026/11/20
Mixer(75-110GHz)	AT-Microwave	AT-SAX8-75110	N/A	2024/11/21	2026/11/20
Mixer(110-170GHz)	AT-Microwave	AT-SAX24-110170	N/A	2024/11/21	2026/11/20
Mixer(170-260GHz)	AT-Microwave	AT-SAX32-170260	N/A	2024/11/21	2026/11/20
Signal Analyzer	Keysight	N9020A	MY52440124	2025.02.22	2026.02.21
Positioning Controller	MF	MF-7802	MF-780208587	N/A	N/A
signal generator	Keysight	E8257D	MY58040082	2025.02.22	2026.02.21
Signal Analyzer	R&S	FSV 40-N	101823	2025.09.26	2026.09.25
Filter Box	BALUN Technology	SU319E	BL-SZ1530051	N/A	N/A
Switch Control Box	N/A	N/A	N/A	N/A	N/A
Antenna Mast	MF	MFA-440H	N/A	N/A	N/A
Turn Table	MF	SC100_1	60531	N/A	N/A
AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A
DC power supply	HONGSHENGFENG	DPS-305AF	17064939	2025.09.22	2026.09.21
Test SW	EZ-MMW	Ver.STSLAB-MMW1.0			

Conduction Test Equipment					
Kind of Equipment	**Manufacturer**	**Type No.**	**Serial No.**	**Last calibration**	**Calibrated until**
Test Receiver	R&S	ESCI	101427	2025.09.25	2026.09.24
Limiter	CYBERTEK	EM5010	N/A	2025.09.25	2026.09.24
LISN	R&S	ENV216	101242	2025.09.25	2026.09.24
LISN	EMCO	3810/2NM	23625	2025.09.25	2026.09.24
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Test SW	EZ-EMC	Ver.STSLAB-03A1 CE			

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

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.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

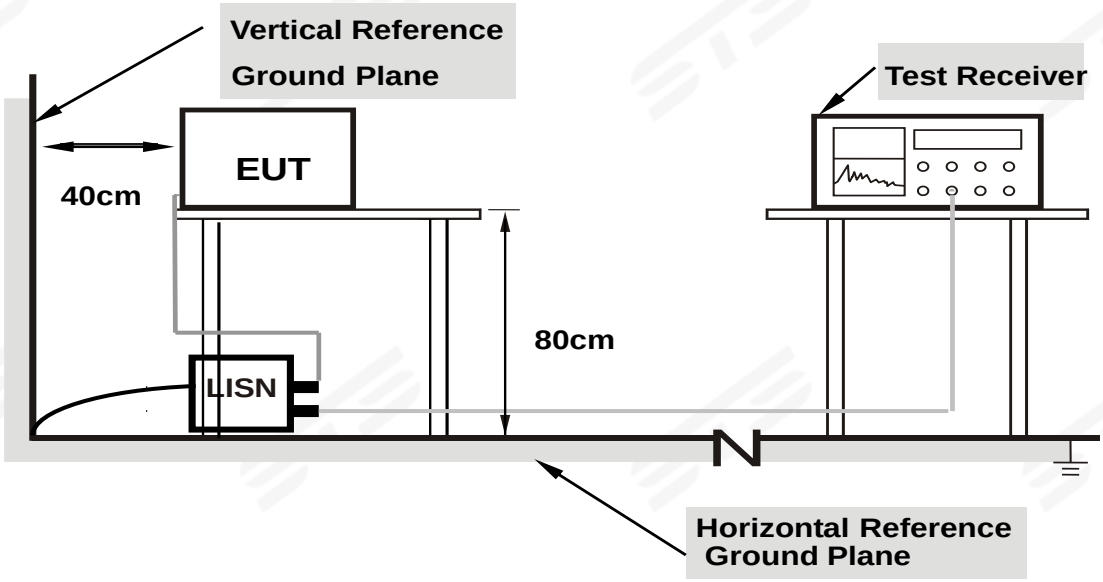
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.2 TEST PROCEDURE

a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN is at least 80 cm from the nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

3.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it).

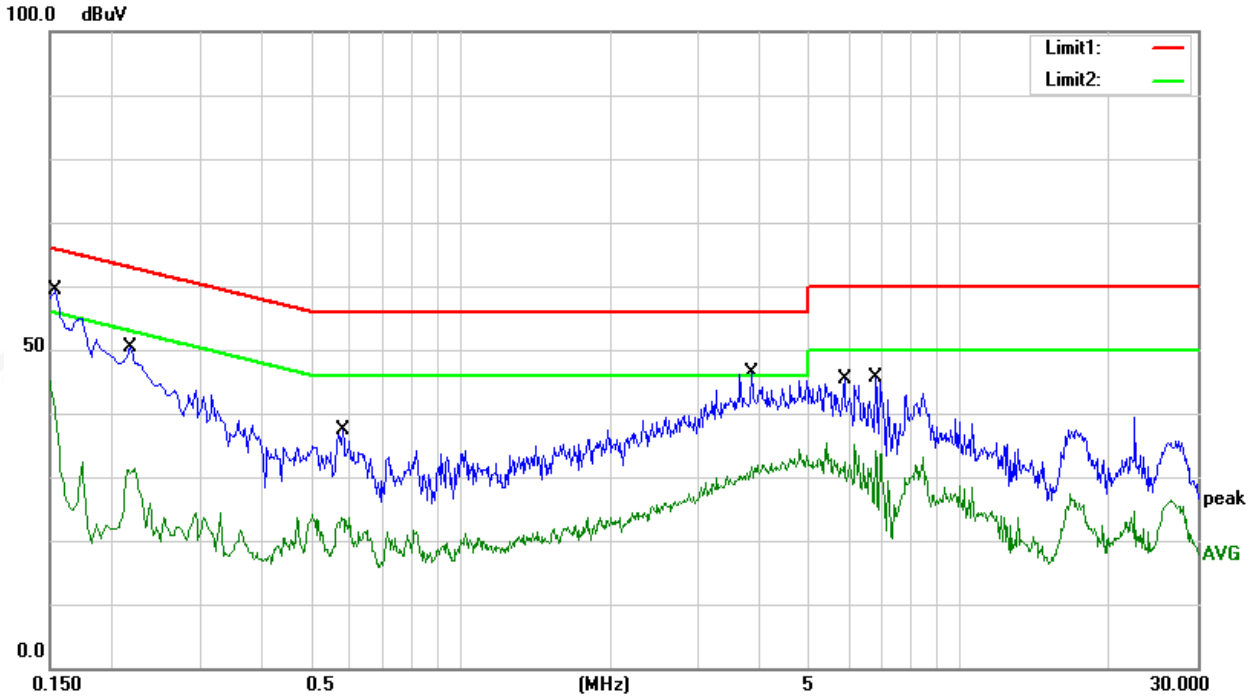
The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.5 TEST RESULT

Temperature:	25.1℃	Relative Humidity:	59%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 1		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1540	39.62	19.87	59.49	65.78	-6.29	QP
2	0.1540	25.30	19.87	45.17	55.78	-10.61	AVG
3	0.2180	30.56	19.89	50.45	62.89	-12.44	QP
4	0.2180	11.49	19.89	31.38	52.89	-21.51	AVG
5	0.5820	17.53	19.81	37.34	56.00	-18.66	QP
6	0.5820	4.35	19.81	24.16	46.00	-21.84	AVG
7	3.8300	26.55	19.82	46.37	56.00	-9.63	QP
8	3.8300	12.09	19.82	31.91	46.00	-14.09	AVG
9	5.8820	25.58	19.79	45.37	60.00	-14.63	QP
10	5.8820	15.61	19.79	35.40	50.00	-14.60	AVG
11	6.7940	25.72	19.80	45.52	60.00	-14.48	QP
12	6.7940	14.30	19.80	34.10	50.00	-15.90	AVG

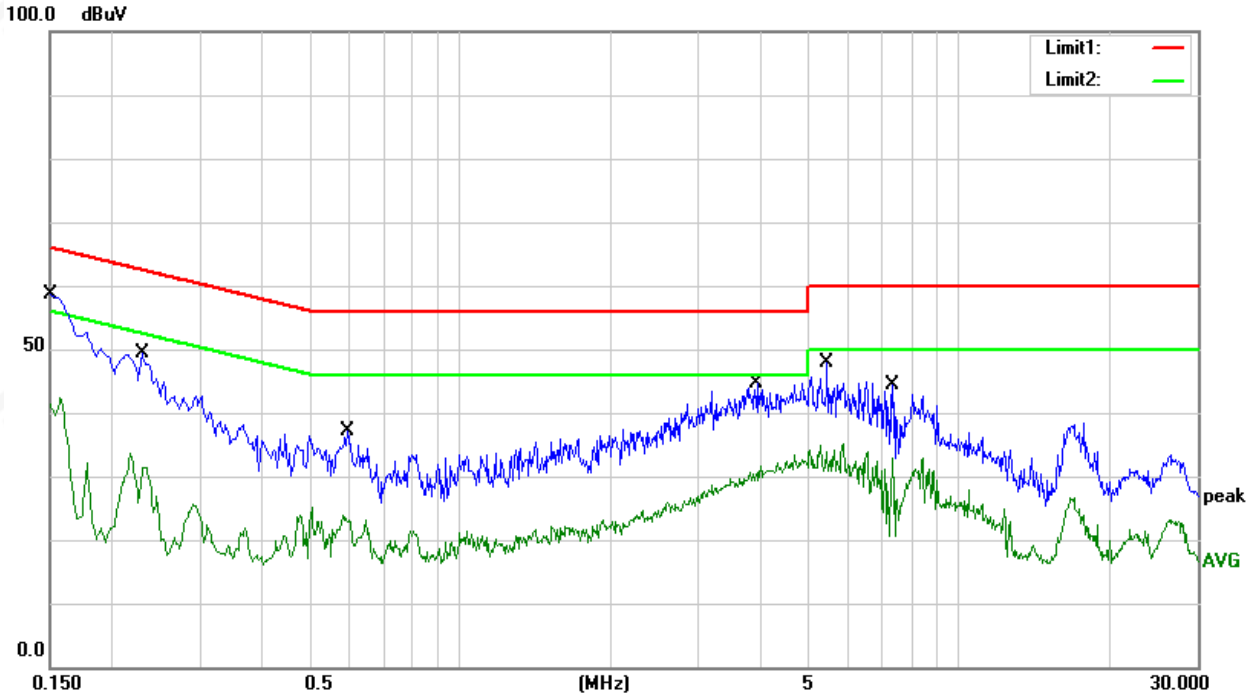
Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



Temperature:	25.1℃	Relative Humidity:	59%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 1		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	38.74	19.88	58.62	66.00	-7.38	QP
2	0.1500	22.51	19.88	42.39	56.00	-13.61	AVG
3	0.2300	29.39	19.89	49.28	62.45	-13.17	QP
4	0.2300	13.81	19.89	33.70	52.45	-18.75	AVG
5	0.5940	17.19	19.81	37.00	56.00	-19.00	QP
6	0.5940	5.25	19.81	25.06	46.00	-20.94	AVG
7	3.9260	24.90	19.82	44.72	56.00	-11.28	QP
8	3.9260	11.84	19.82	31.66	46.00	-14.34	AVG
9	5.4220	28.07	19.81	47.88	60.00	-12.12	QP
10	5.4220	15.44	19.81	35.25	50.00	-14.75	AVG
11	7.3500	24.56	19.81	44.37	60.00	-15.63	QP
12	7.3500	14.18	19.81	33.99	50.00	-16.01	AVG

Remark:
1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



4. Radiated Emissions

4.1 LIMIT

(a) According to § 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.

4.2 TEST PROCEDURE

4.2.1 Sequence of testing radiated spurious 9 KHz to 30 MHz

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.
c. If the EUT is a floor standing device, it is placed directly on the turn table.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.10.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.10) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna height is 1.5m.
c. Set RBW = 200 Hz / VBW = 1 KHz, sweep time: Auto
d. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

a. Identified emissions during the premeaurement are maximized by the software by rotating the turntable from 0 degree to 360 degree.
b. The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
c. Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to The limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.2.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 0.8 m height is used, which is placed on the ground plance.
c. If the EUT is a floor standing device, it is placed directly on the ground plane.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.10.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.10) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna is polarized vertical and horizontal.
c. The antenna height changes from 1m to 4m.

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

Final measurement

The final neasurement us perormed for at least six highest peaks according to the requirements of the ANSI C63.10.
Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable and antenna height between 1 and 4 m.
The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to the
limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.2.3 Sequence of testing radiated spurious 1 GHz to 18 GHz

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.
c. If the EUT is a floor standing device, it is placed directly on the turn table.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in
ANSI C63.10.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.10) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna is polarized vertical and horizontal.
c. The antenna height changes from 1m to 4m.
d. Set RBW = 1 MHz / VBW = 3 MHz, sweep time: Auto, detector: Peak for Peak, RBW = 1 MHz / VBW = 3MHz, sweep time: Auto, detector: Average for Average.
e. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

a. The final neasurement us perormed for at least six highest peaks according to the requirements of the ANSI C63.10.
b. Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable and antenna height between 1 and 4 m.
c. The final measurement is done with quasi-peak detector (as described in ANSI C 63.10).

d. The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing theheight emissions with Peak and Average detector (as described in ANSI C 63.10).

e. Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to the
limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.2.4 Sequence of testing radiated spurious above 18 GHz

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.
c. If the EUT is a floor standing device, it is placed directly on the turn table.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.10.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.10) – see test details.
g. EUT is set into operation.

Premeasurement

a. The turntable rotates from 0 degree to 360 degree.
b. The antenna is polarized vertical and horizontal.
c. The antenna height changes from 1m to 4m.
d. Set RBW = 1 MHz / VBW = 3 MHz, sweep time: Auto, detector: Peak for Peak, RBW = 1 MHz / VBW = 3MHz, sweep time: Auto, detector: Average for Average.
e. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

a. The final neasurement us perormed for at least six highest peaks according to the requirements of the ANSI C63.10.
b. Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable and antenna height between 1 and 4 m.
c. The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
d. All final levels should consider distance conversion factor as format: Final values (3 m) = Measurement values (1 m) + Distance conversion factor
Distance conversion factor = 20 x Log_{10} (d/3), where d = measurement distance in m
- Distance conversion factor = 20 x Log_{10} (1/3) = -10.0 [dB]
e. Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to the limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.2.5 Sequence of testing radiated spurious above 40 GHz with external mixers

Setup

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer
b. If the EUT is a tabletop system, 1.5 m height is used.
c. If the EUT is a floor standing device, it is placed directly on the turn table.
d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C63.10.
e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
f. Measuremet distance is 3m (see ANSI C63.10) – see test details.
g. EUT is set into operation.

Premeasurement

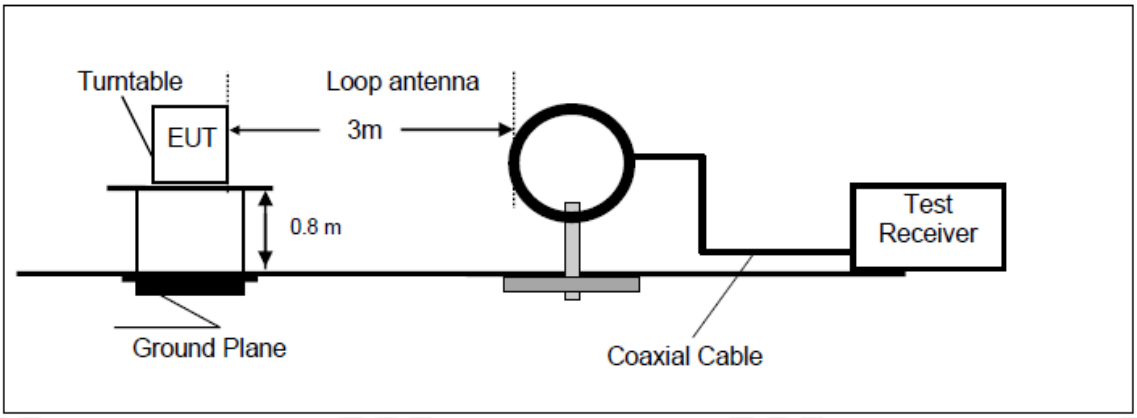
a. The turntable rotates from 0 degree to 360 degree.
b. The antenna is polarized vertical and horizontal.
c. The antenna height changes from 1m to 4m.
d. Set RBW = 1 MHz / VBW = 3 MHz, sweep time: Auto, detector: Peak for Peak, RBW = 1 MHz / VBW = 3MHz, sweep time: Auto, detector: Average for Average.
e. At each turntable position the anzlyer sweeps with position-peak detector to find the maximum of all emissions.

Final measurement

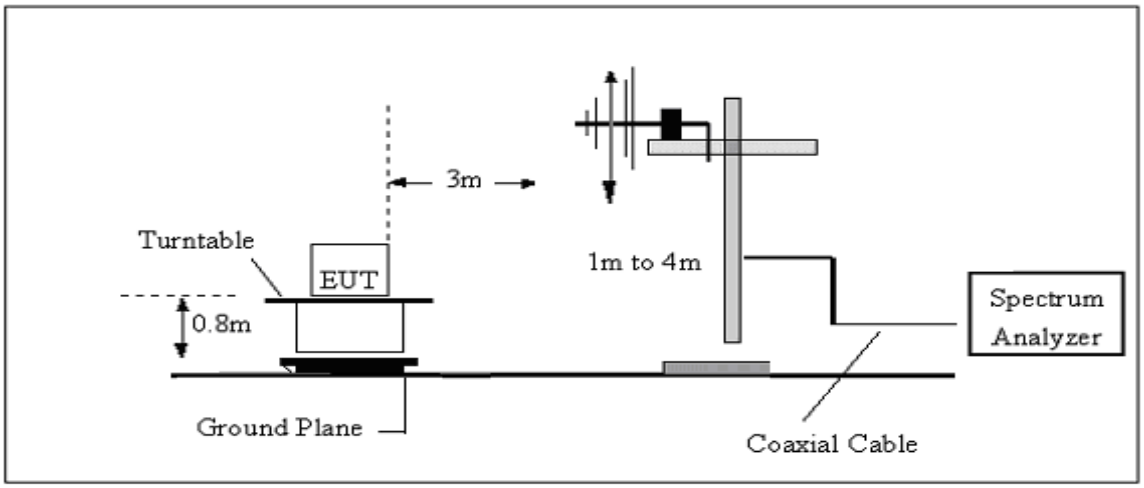
a. The final neasurement us perormed for at least six highest peaks according to the requirements of the ANSI C63.10.
b. Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable and antenna height between 1 and 4 m.
c. The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
d. All final levels should consider distance conversion factor as format: Final values (3 m) = Measurement values (1 m) + Distance conversion factor
Distance conversion factor = 20 x Log_{10} (d/3), where d = measurement distance in m
- Distance conversion factor = 20 x Log_{10} (1/3) = -10.0 [dB]
e. Final levels, frequency, measuring time, bandwidth, turntable position, conrrection factor, margin to the limit and limit will be recorded. A plot with the graph of the measurement and the limit is stored.

4.3 TEST SETUP

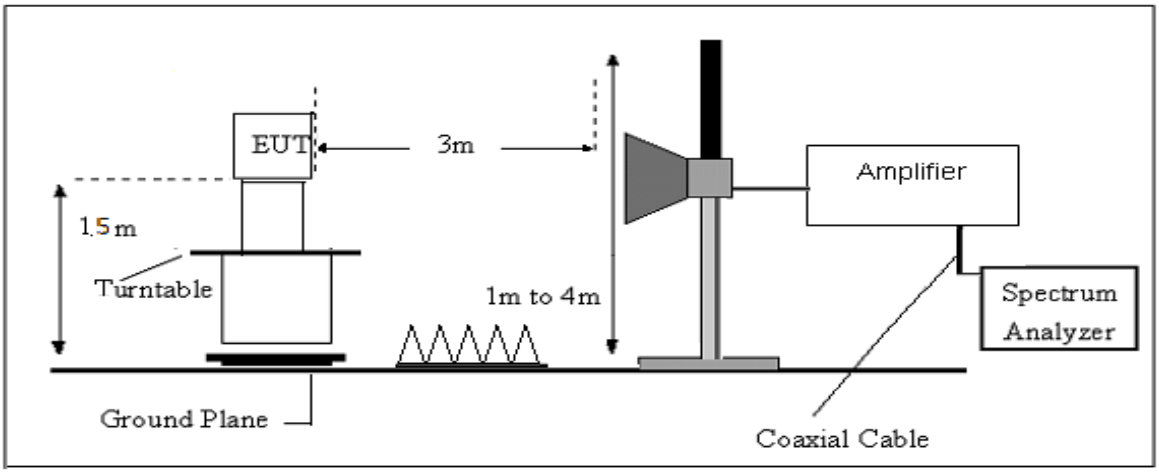
(A) Radiated Emission Test-Up Frequency 9 KHz – 30MHz



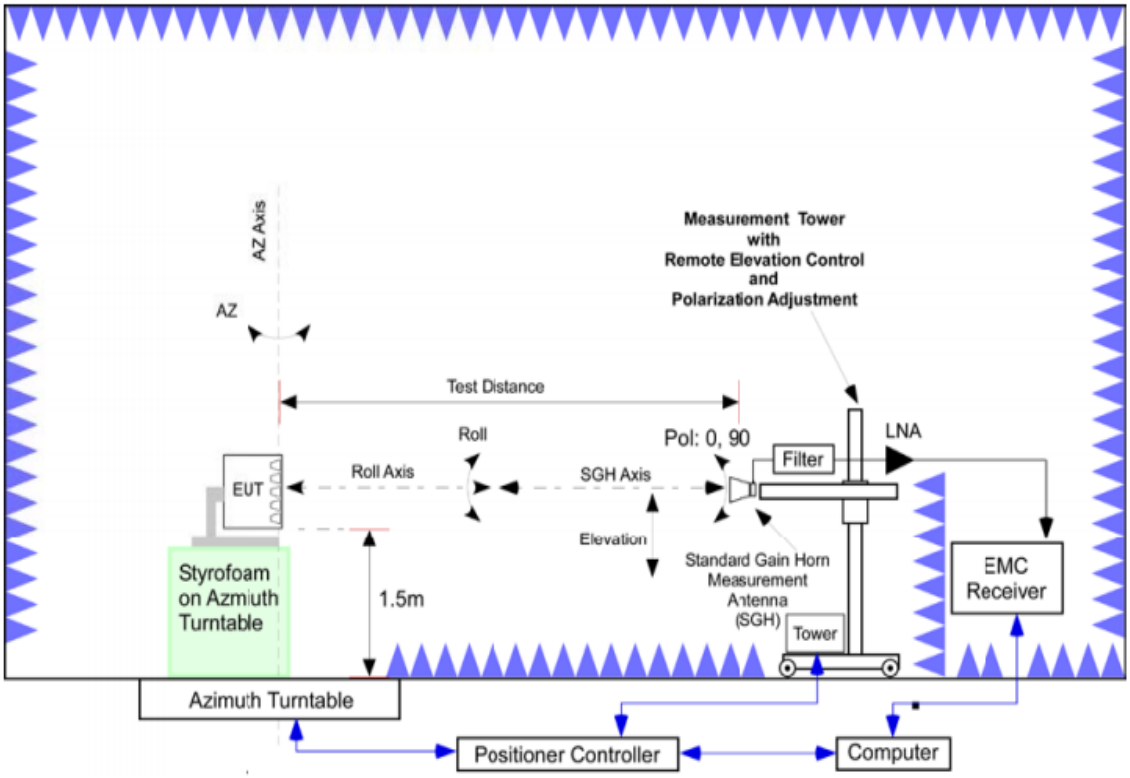
(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency 1GHz~18GHz



(D) Radiated Emission Test-Up Frequency 18GHz~200GHz



4.4 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

Factor=AF+CL-AG

4.5 TEST RESULTS

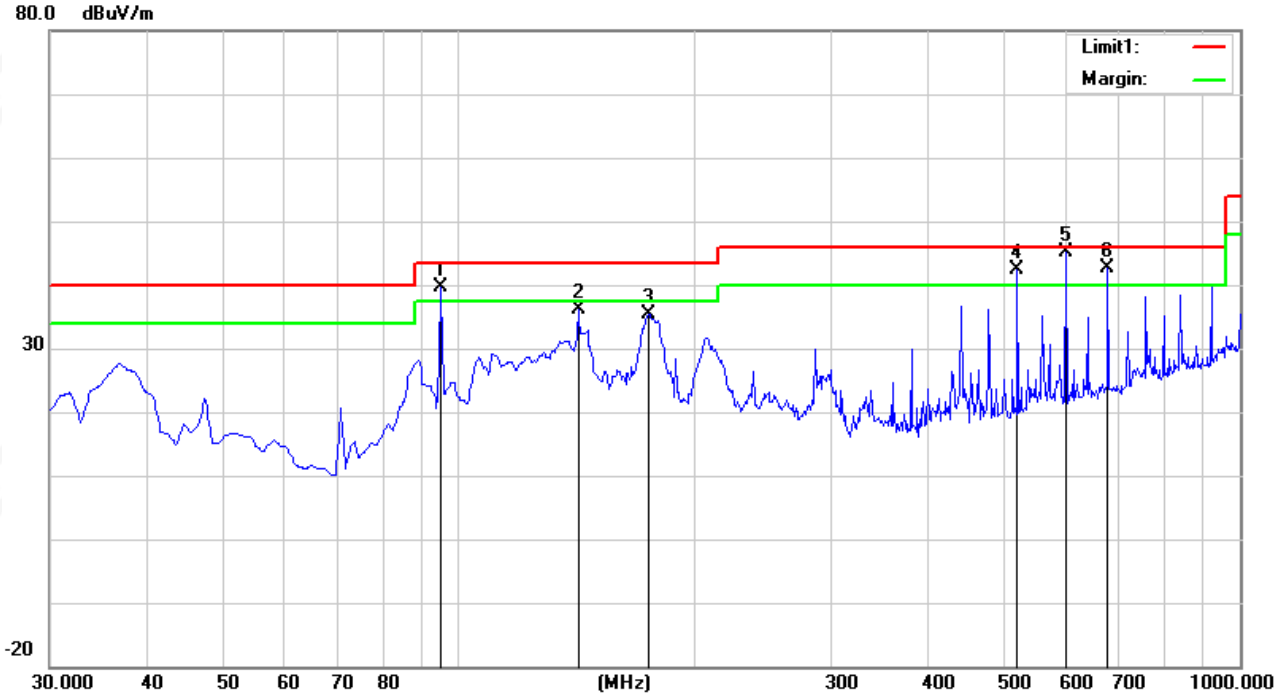
(30MHz - 1000MHz)

Temperature:	23.4℃	Relative Humidtity:	60%
Test Voltage:	AC 120V/60Hz	Phase:	Horizontal
Test Mode:	Mode 1		

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	94.9900	60.47	-20.78	39.69	43.50	-3.81	peak
2	142.5200	54.38	-18.18	36.20	43.50	-7.30	peak
3	175.5000	55.52	-20.04	35.48	43.50	-8.02	peak
4	519.8500	50.27	-7.82	42.45	46.00	-3.55	peak
5	600.3600	50.98	-5.84	45.14	46.00	-0.86	peak
6	679.9000	46.93	-4.28	42.65	46.00	-3.35	peak

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain
3. All modes have been tested,only show the worst case.

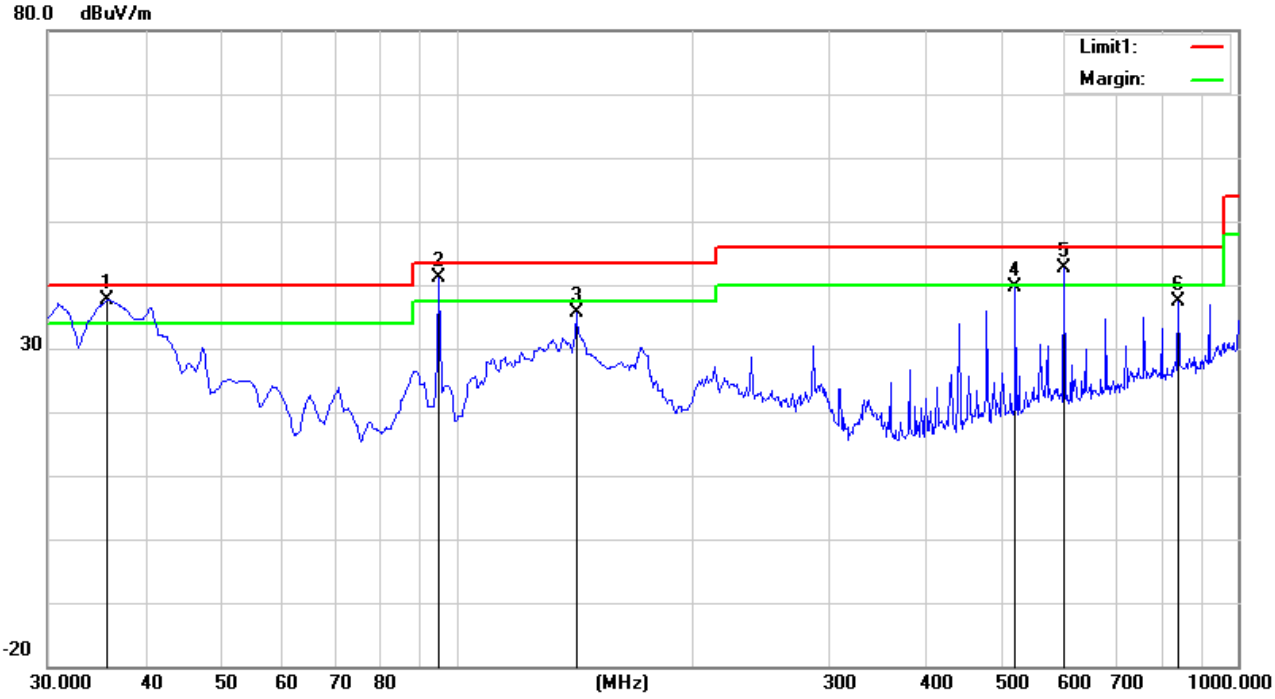


Temperature:	23.4℃	Relative Humidtity:	60%
Test Voltage:	AC 120V/60Hz	Phase:	Vertical
Test Mode:	Mode 1		

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	35.8200	53.65	-15.91	37.74	40.00	-2.26	peak
2	94.9900	61.91	-20.78	41.13	43.50	-2.37	peak
3	142.5200	53.76	-18.18	35.58	43.50	-7.92	peak
4	519.8500	47.51	-7.82	39.69	46.00	-6.31	peak
5	600.3600	48.55	-5.84	42.71	46.00	-3.29	peak
6	839.9500	37.72	-0.34	37.38	46.00	-8.62	peak

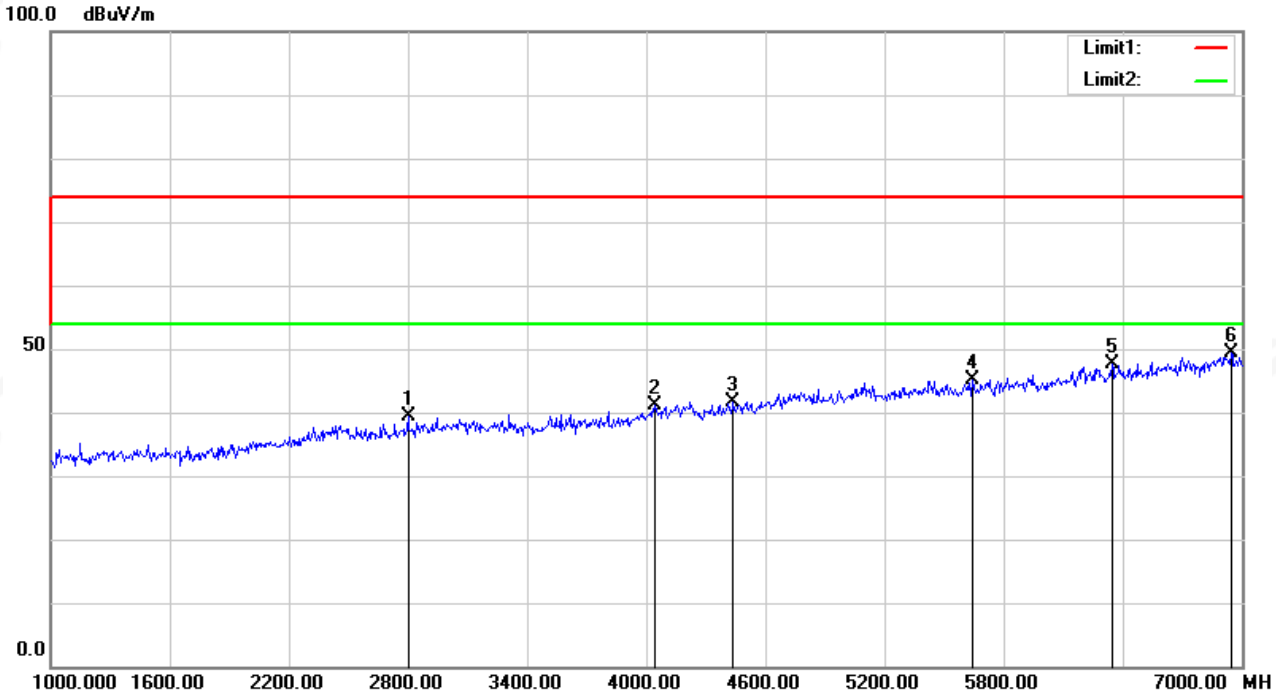
Remark:.

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain
3. All modes have been tested,only show the worst case.



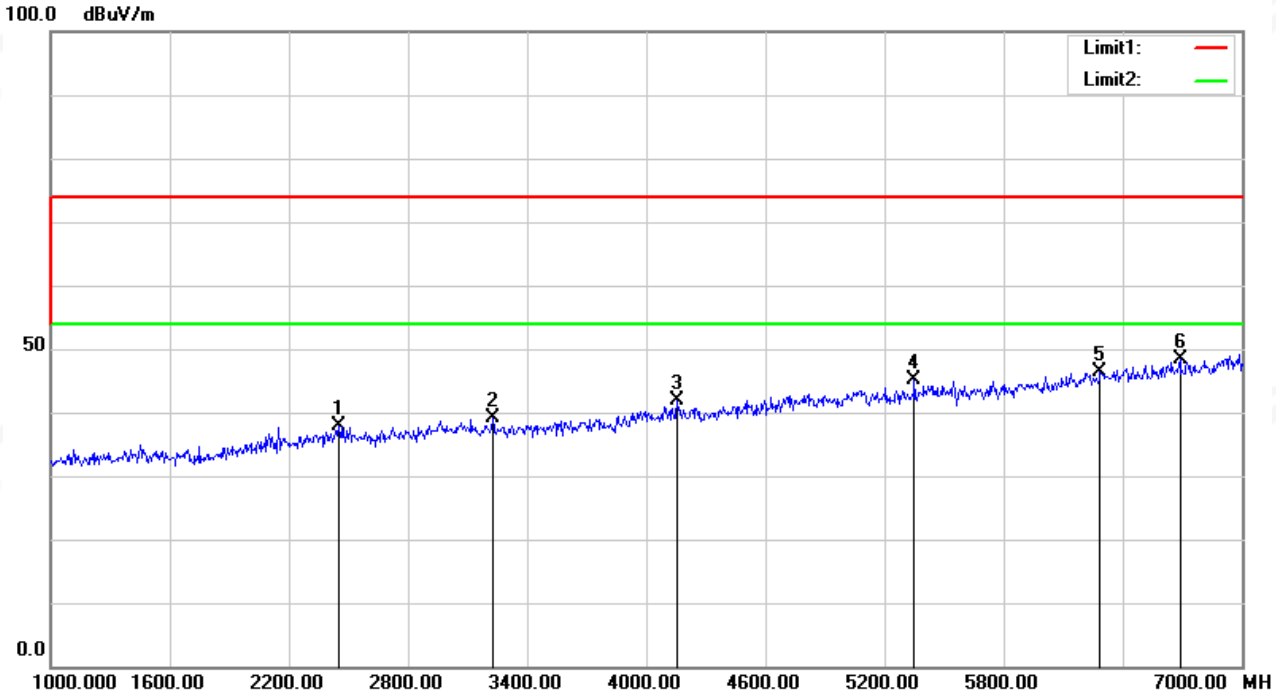
Above 1G Radiation Spurious

1 GHz -7 GHz
Horizontal



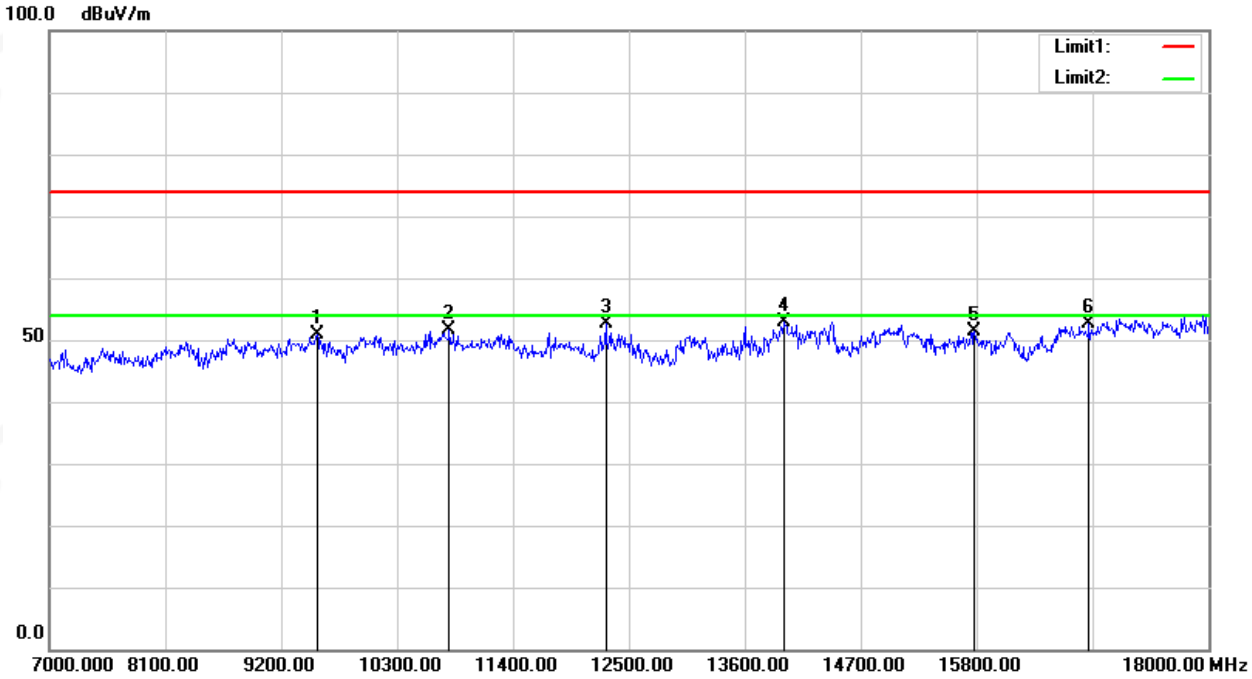
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2800.000	53.09	-13.61	39.48	74.00	-34.52	peak
2	4042.000	51.36	-10.20	41.16	74.00	-32.84	peak
3	4438.000	50.85	-9.18	41.67	74.00	-32.33	peak
4	5644.000	50.49	-5.32	45.17	74.00	-28.83	peak
5	6346.000	49.78	-2.21	47.57	74.00	-26.43	peak
6	6946.000	48.43	0.84	49.27	74.00	-24.73	peak

1 GHz -7 GHz
Vertical



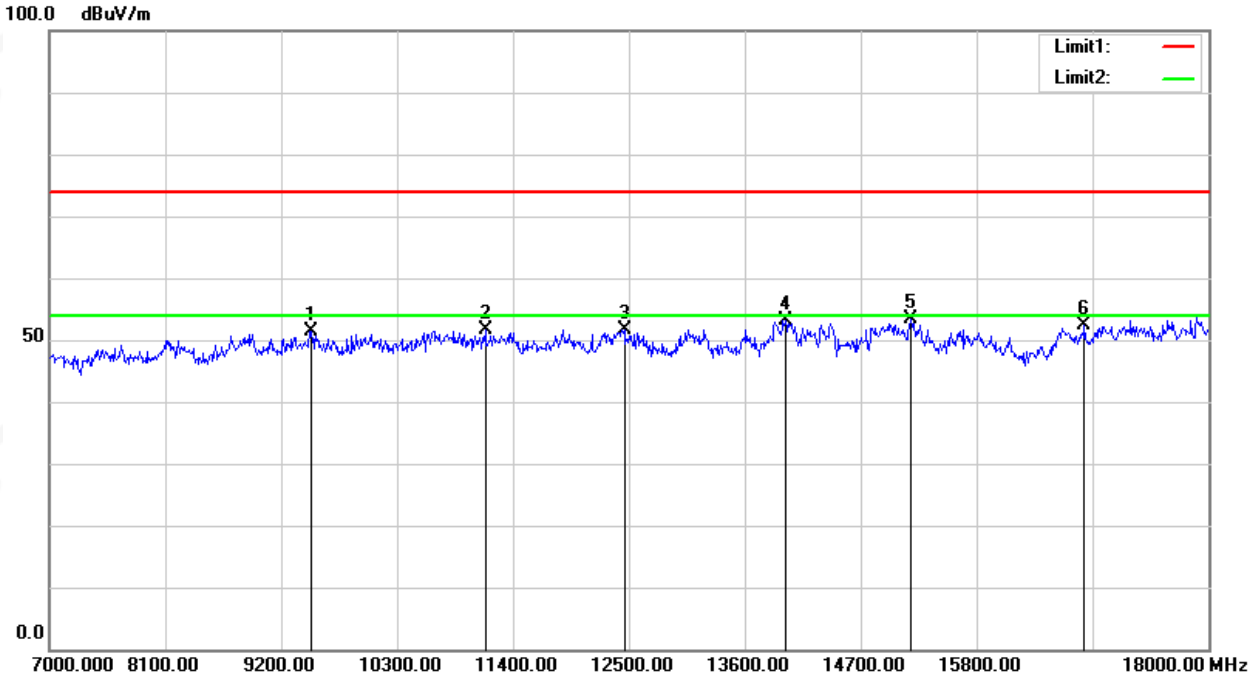
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2452.000	52.52	-14.74	37.78	74.00	-36.22	peak
2	3226.000	51.94	-12.76	39.18	74.00	-34.82	peak
3	4156.000	51.57	-9.67	41.90	74.00	-32.10	peak
4	5350.000	50.83	-5.78	45.05	74.00	-28.95	peak
5	6286.000	49.10	-2.61	46.49	74.00	-27.51	peak
6	6688.000	49.30	-0.84	48.46	74.00	-25.54	peak

7 GHz -18 GHz
Horizontal



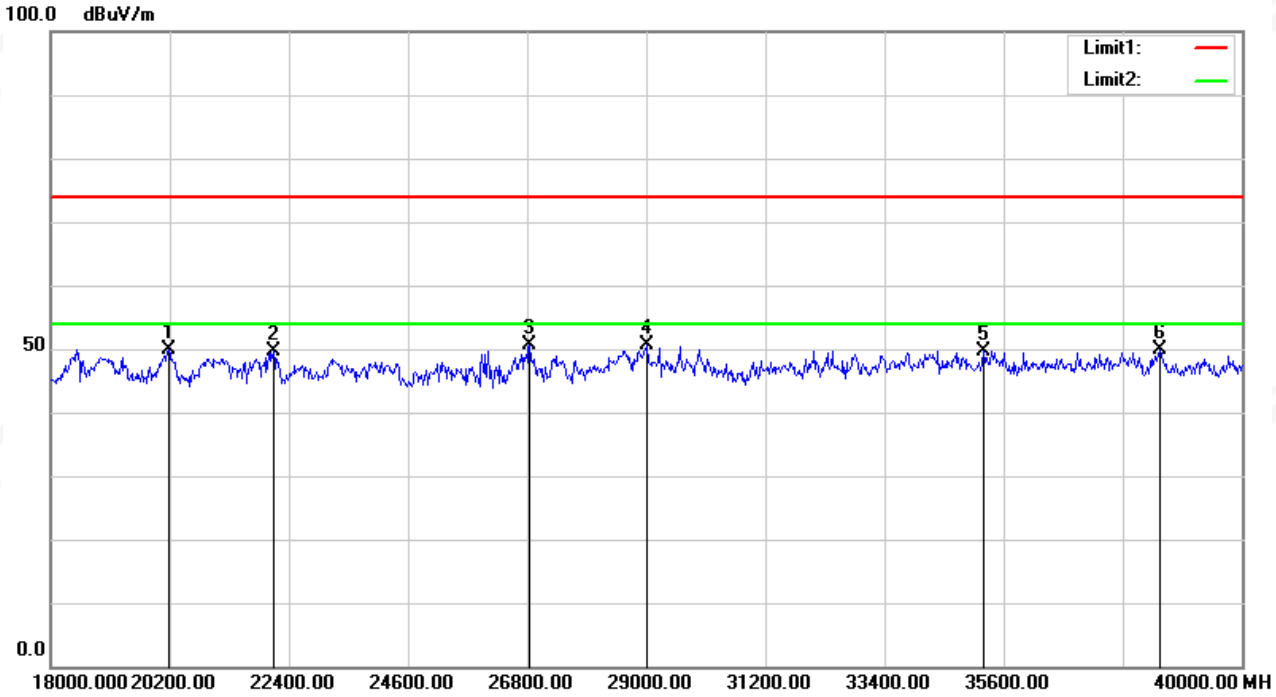
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	9541.000	49.61	1.15	50.76	74.00	-23.24	peak
2	10795.000	49.55	1.99	51.54	74.00	-22.46	peak
3	12280.000	49.57	2.94	52.51	74.00	-21.49	peak
4	13974.000	44.81	8.12	52.93	74.00	-21.07	peak
5	15778.000	48.27	3.14	51.41	74.00	-22.59	peak
6	16867.000	47.91	4.68	52.59	74.00	-21.41	peak

7 GHz -18 GHz
Vertical



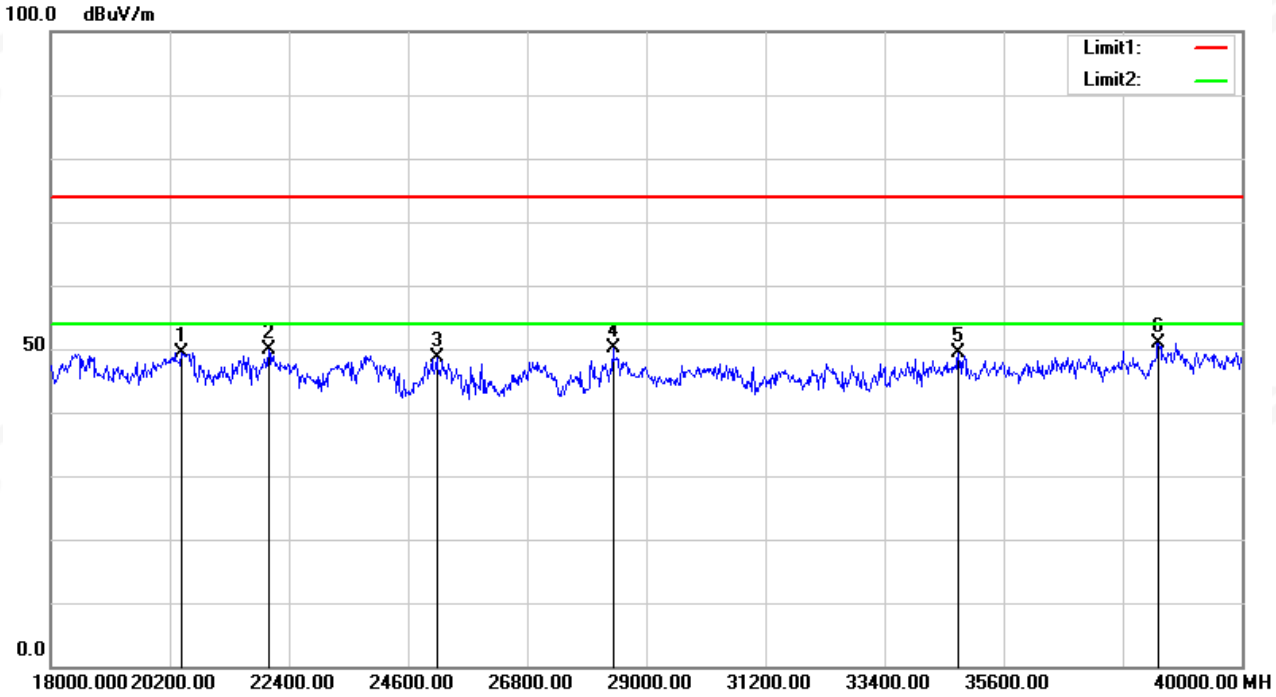
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9486.000	49.81	1.46	51.27	74.00	-22.73	peak
2	11136.000	49.34	2.28	51.62	74.00	-22.38	peak
3	12456.000	49.13	2.62	51.75	74.00	-22.25	peak
4	13985.000	44.97	8.26	53.23	74.00	-20.77	peak
5	15173.000	47.86	5.45	53.31	74.00	-20.69	peak
6	16823.000	47.53	4.87	52.40	74.00	-21.60	peak

18 GHZ -40 GHZ
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20178.000	52.97	-3.00	49.97	74.00	-24.03	peak
2	22114.000	51.47	-1.75	49.72	74.00	-24.28	peak
3	26844.000	53.04	-2.48	50.56	74.00	-23.44	peak
4	29022.000	52.92	-2.35	50.57	74.00	-23.43	peak
5	35226.000	52.18	-2.49	49.69	74.00	-24.31	peak
6	38482.000	53.49	-3.64	49.85	74.00	-24.15	peak

18 GHZ -40 GHZ
Vertical

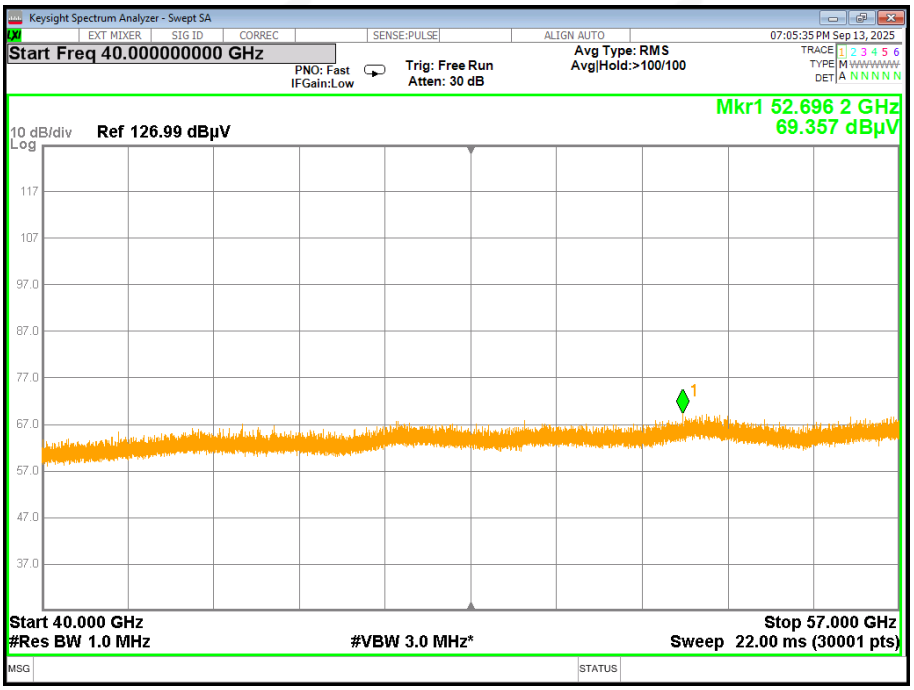


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	20420.000	52.32	-2.87	49.45	74.00	-24.55	peak
2	22026.000	51.61	-1.78	49.83	74.00	-24.17	peak
3	25128.000	50.59	-1.85	48.74	74.00	-25.26	peak
4	28384.000	52.69	-2.63	50.06	74.00	-23.94	peak
5	34764.000	52.08	-2.65	49.43	74.00	-24.57	peak
6	38460.000	54.58	-3.61	50.97	74.00	-23.03	peak

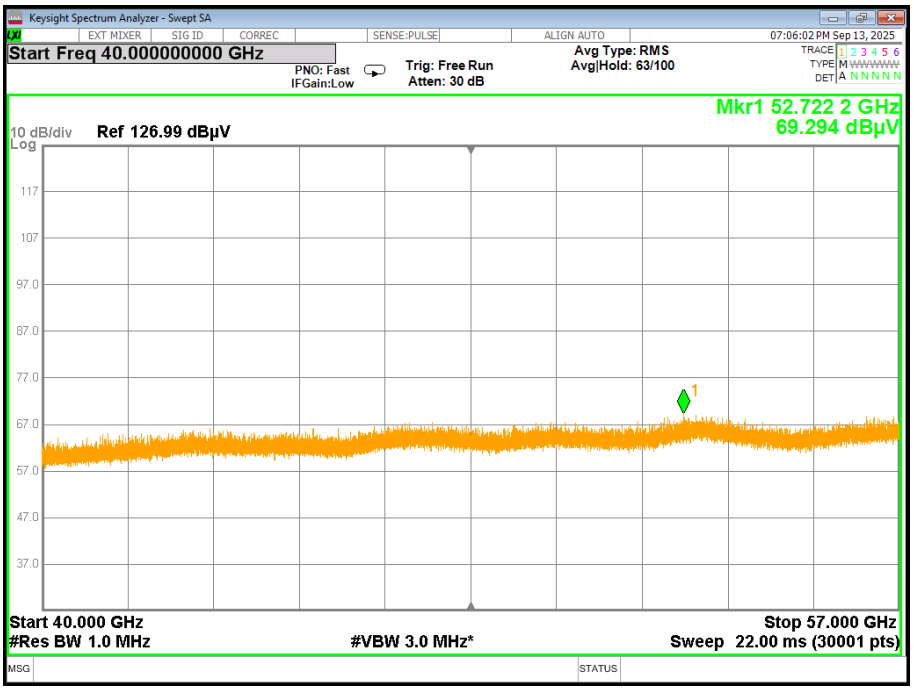
Above 40G

Freq.(GHz)	1.5m (dBuV/m)	3m (dBuV/m)	PowerDensity (pW/cm²)	Limit (pW/cm²)	Result	Pol.
52.6962	69.357	63.336	0.5719	90	PASS	H
52.7222	69.294	63.273	0.5636	90	PASS	V
73.1069	75.449	69.428	2.3254	90	PASS	H
73.0425	62.883	56.862	0.1288	90	PASS	V
77.2003	70.209	64.188	0.6958	90	PASS	H
76.9110	70.194	64.173	0.6934	90	PASS	V
132.6520	76.6	70.579	3.0311	90	PASS	H
113.3940	76.703	70.682	3.1038	90	PASS	V
189.4650	77.084	71.063	3.3884	90	PASS	H
189.1020	78.66	72.639	4.8708	90	PASS	V

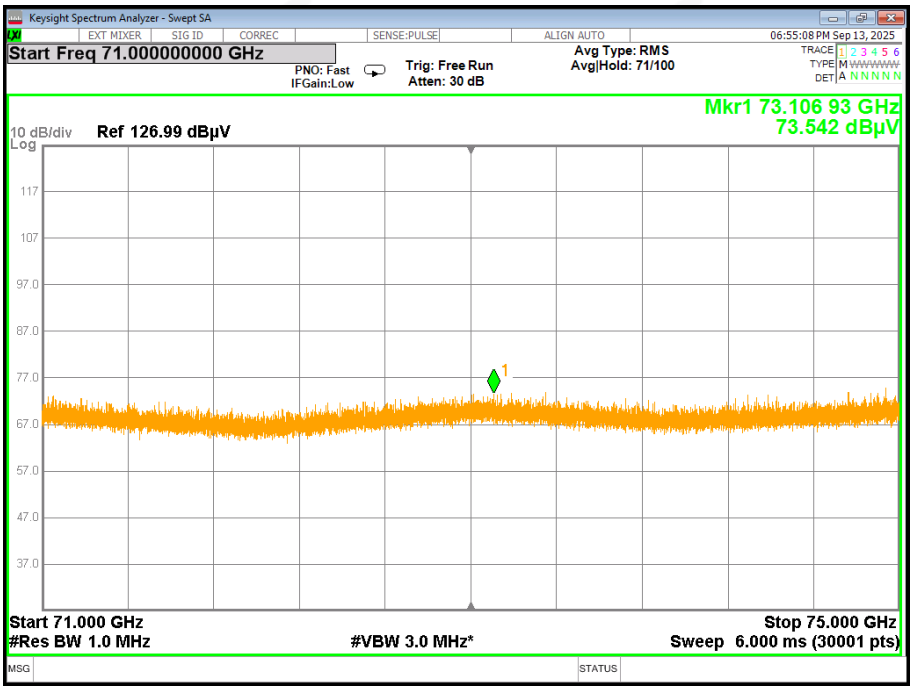
40 GHz- 57 GHz
Horizontal



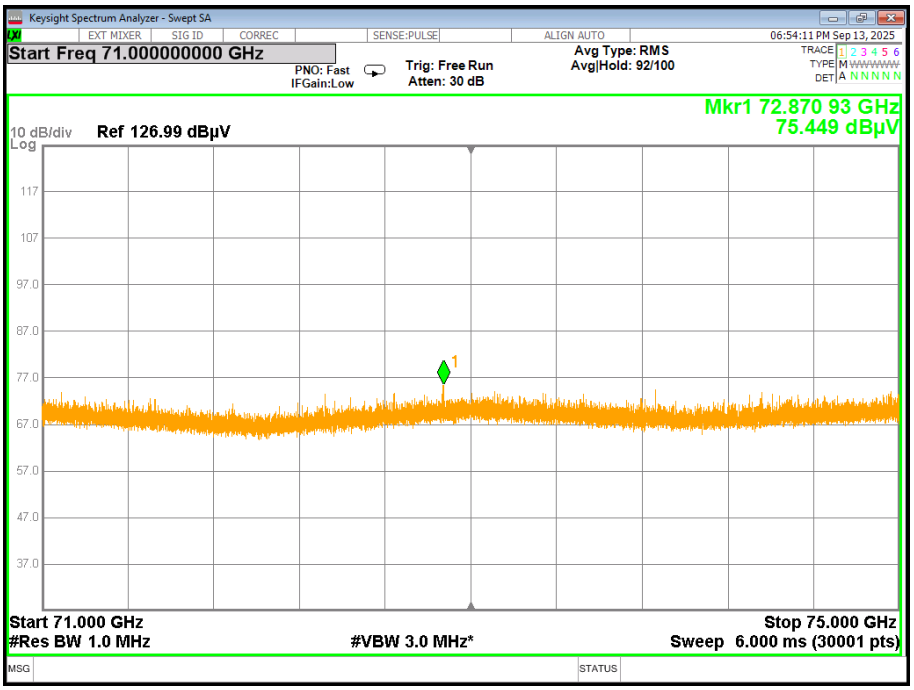
40 GHz- 57 GHz
Vertical



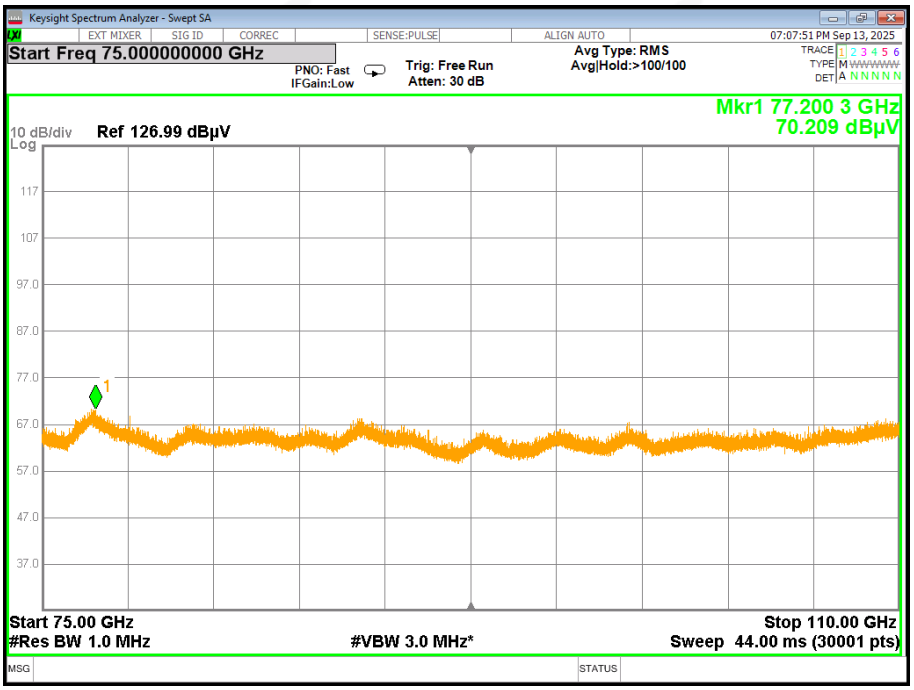
71 GHz -75 GHz
Horizontal



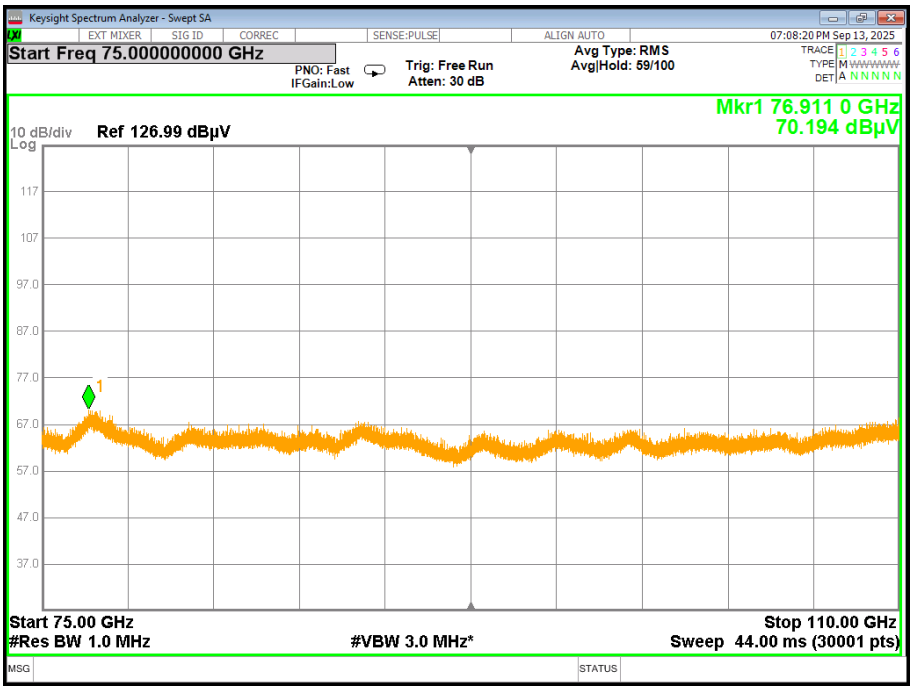
71 GHz -75 GHz
Vertical



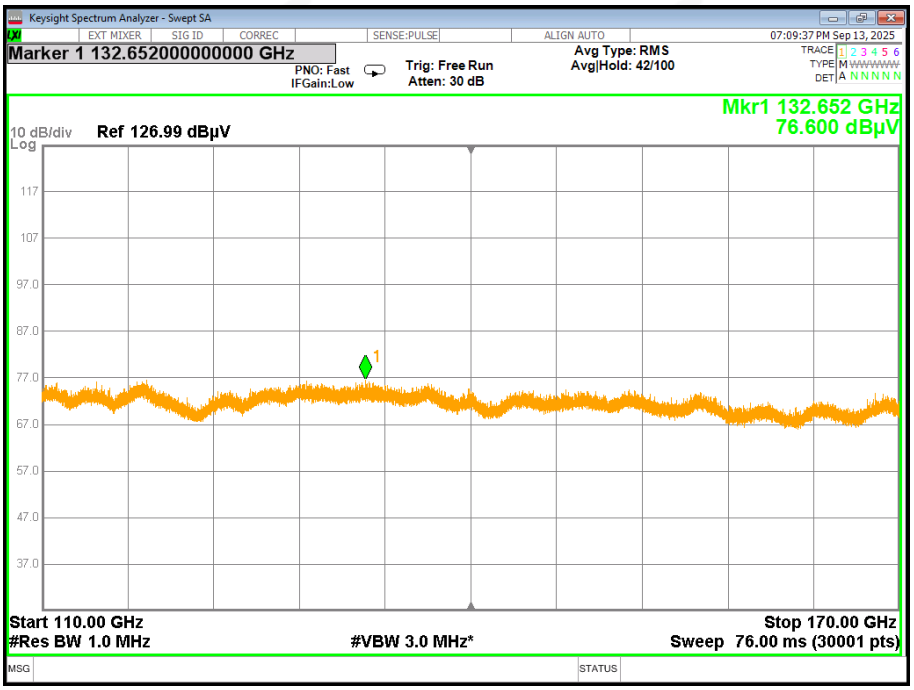
75 GHz -110 GHz
Horizontal



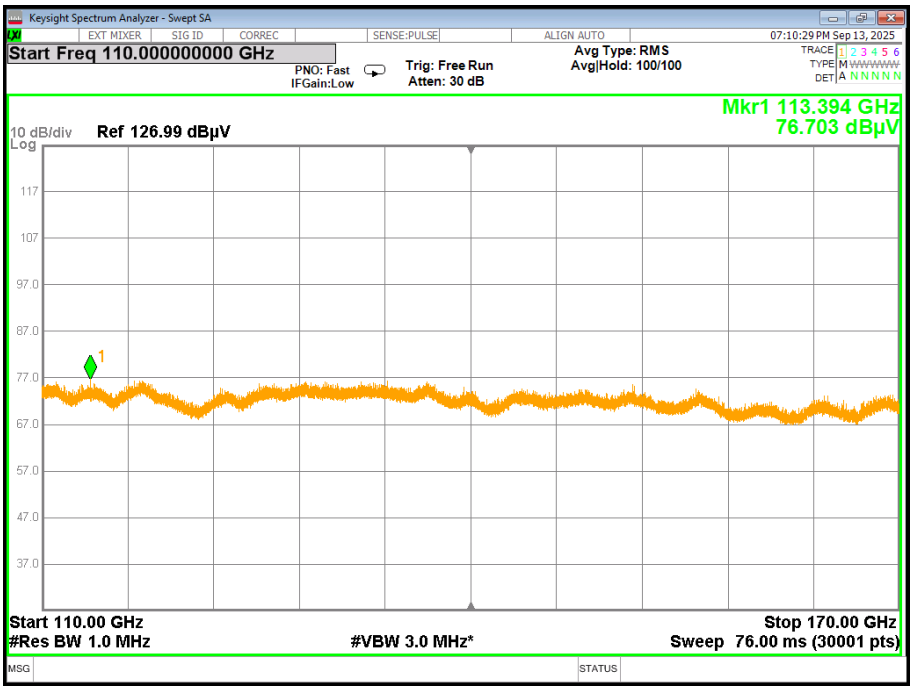
75 GHz -110 GHz
Vertical



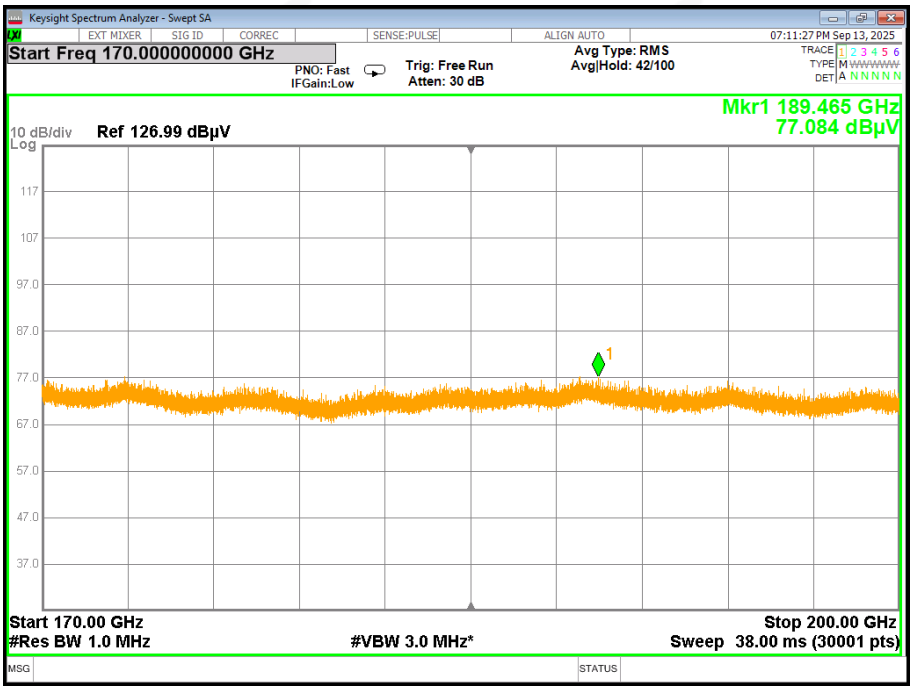
110 GHz -170 GHz
Horizontal



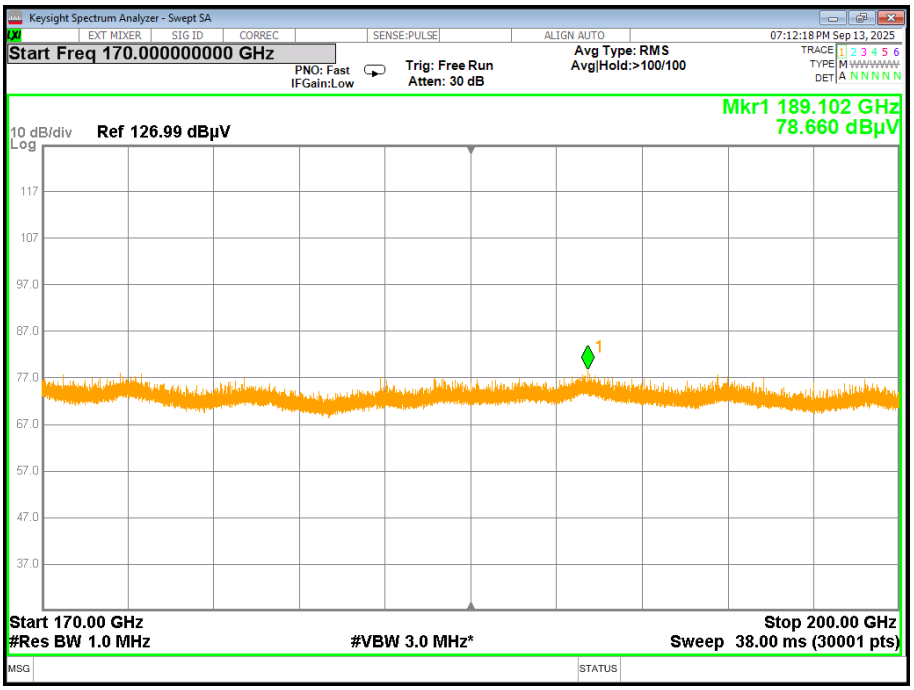
110 GHz -170 GHz
Vertical



170 GHz -200 GHz
Horizontal



170 GHz-200 GHz
Vertical



5. RADIATED POWER (E.I.R.P.) AND TRANSMITTER OFF-TIMES

5.1 LIMIT

FCC Part 15.255(c)(2)(iii)57.0-64.0 GHz
(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;

5.2 TEST PROCEDURE

Please refer to ANSA C63.10-2020

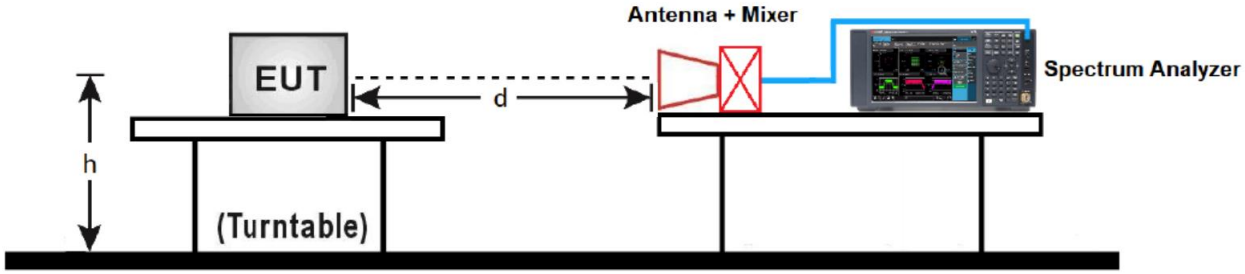
Maximum peak power(EIRP) – Peak detector
1. Set RBW = 1 MHz
2. Set VBW ≥ 3 X RBW
3. span to 2 x to 3 x the OBW
4. Detector = Peak
5. Set number of points in sweep ≥ 2 x span / RBW
6. Sweep time = auto-couple
7. Trace = max-hold

Note1. Sample Calculation E(dBμV/m)= Measured level(dBμV) +107 +AFCL(dB/m) Where, E=field strength / AFCL= Antenna Factor(dB/m) + Cable Loss(dB/m) The mixer loss was applied to the measured level by SA correction factor. EIRP(dB m)= E(dBμV/m) +20log(D)-104.8;where, D is measurement distance(in the far field region) in m.

Note2. P.C.F Calculation (P.C.F=Peak amplitude correction factor of the FMCW signal)
F.C.F = 20*log10(1/α)

$$-\alpha = \frac{1}{\sqrt[4]{1+\left(\frac{2\ln(2)}{\pi}\right)^2\left(\frac{F_S}{T_S B^2}\right)^2}}$$

5.3 TEST SETUP



5.4 TEST RESULT

Frequency (GHz)	Distance (m)	dBuV/m	EIRP Power (dBm)	Desensitization Factor(dB)	Final EIRP Power (dBm)	EIRP Power Limit (dBm)	Result
60-64	1.5	102.532	1.25	10.12	11.38	20	PASS

The FMCW Desensitization Factor

FMCW Witdh(MHz)	Tchirp(us)	RBW(MHz)	Desensitization Factor(lin)	Desensitization Factor(dB)
928	40	1	0.0972	10.12

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

where

α	is the reduction in amplitude
BW_{Chirp}	is the FMCW Chirp Bandwidth
T_{Chirp}	is the FMCW Chirp Time
B	is the 3 dB IF Bandwidth = RBW

Transmitter Off-times

Transmitter On (ms)	Observation Time (ms)	Sum of continuous Transmitter off-times (ms)	Limit (ms)
2.9	33	30.1	⩾16.5
Note: Sum of continuous Transmitter off-times= Observation Time(33)-Ton			

6. OCCUPIED BANDWIDTH

6.1 LIMIT

The occupied bandwidth is defined as the 99% bandwidth.

According to § 2.1049: 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.

6.2 TEST PROCEDURE

a. The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer

b. If the EUT is a tabletop system, 1.5 m height is used.

c. If the EUT is a floor standing device, it is placed directly on the turntable.

d. Auxiliary equipment and cables are positioned to simulate normal operation conditions as described inANSI C63.10.

e. The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

f. Measuremet distance is 1m (see ANSI C63.10) – see test details.

g. EUT is set into operation.

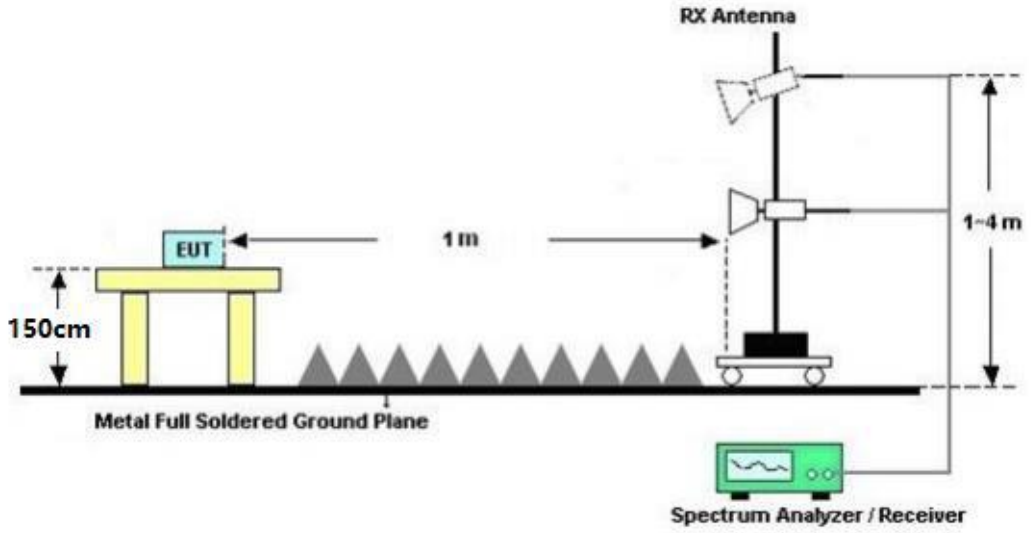
h. The turntable rotates from 0 degree to 360 degree.

i. The antenna with external mixer is polarized vertical and horizontal.

j. The antenna height changes from 1m to 4m.

k. Set the resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

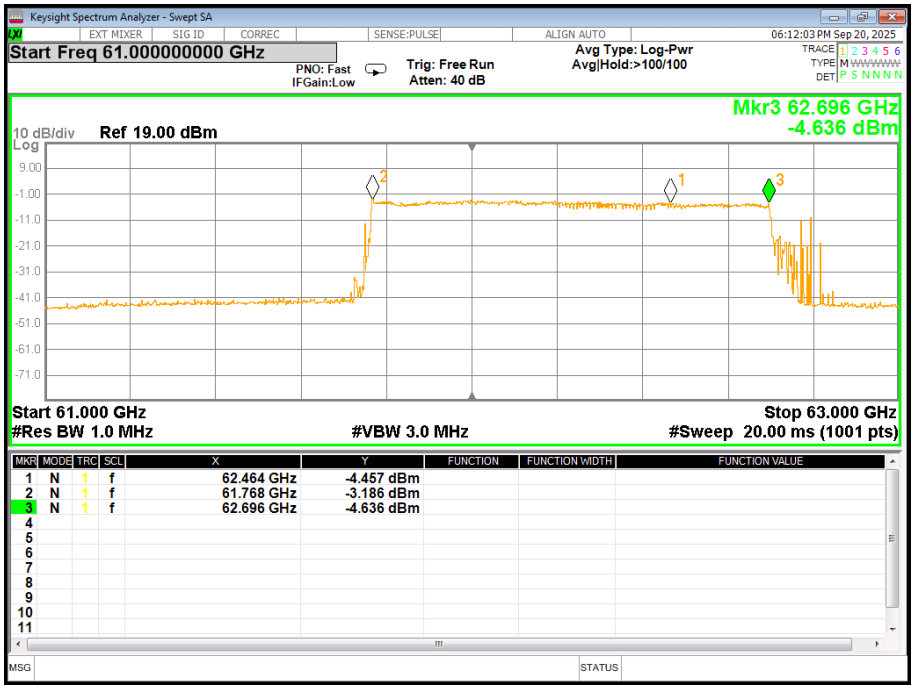
6.3 TEST SETUP



6.4 TEST RESULT

Lowest Frequency(GHz)	Highest Frequency(GHz)	99% Bandwidth(GHz)	Limit (GHz)	Result
61.768	62.696	0.928	57-64	Pass

99% Bandwidth



7. Frequency stability

7.1 LIMIT

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

7.2 TEST PROCEDURES

1. Please refer to ANSI C63.10-2020

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.

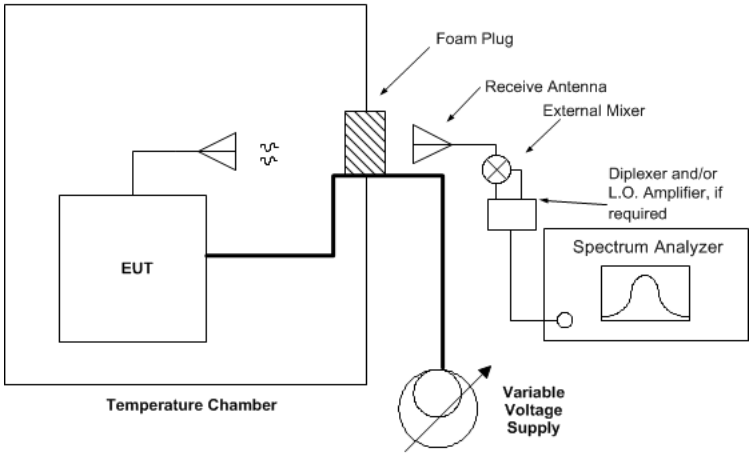
c) Vary EUT power supply between 85% and 115% of nominal, and record the frequency excursion of the EUT emission mask.

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.

7.3 TEST SETUP

EUT uses a horn antenna connected to a spectrum analyzer for measurement. The EUT was placed in an environmental chamber using foam plugs to maintain temperature conditions inside. The horn antenna measures the frequency of the fundamental signal.



7.4 TEST RESULT

Voltage	Power	Temp	FL	FH	Limit	Result
(%)	(VAC)	(℃)	(GHz)	(GHz)	(GHz)	
100%	120	-20	61.777	62.688	57-64GHz	Pass
		-10	61.774	62.692	57-64GHz	Pass
		0	61.777	62.686	57-64GHz	Pass
		10	61.773	62.687	57-64GHz	Pass
		20	61.768	62.696	57-64GHz	Pass
		30	61.770	62.694	57-64GHz	Pass
		40	61.775	62.692	57-64GHz	Pass
		50	61.777	62.689	57-64GHz	Pass
115%	138	20	61.772	62.690	57-64GHz	Pass
85%	102	20	61.774	62.688	57-64GHz	Pass

8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2 EUT ANTENNA

The EUT antenna is Patch Antenna. It comply with the standard requirement.

9. PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※