



RF MEASUREMENT REPORT

Applicant: Dana Innovations: SONANCE
Address: 991 CALLE AMANECER SAN CLEMENTE CA 92673,
United States
Product: Power Amplifier
Model No.: UA 2-125 ARC
Brand Name: SONANCE
Standards: EN 300 328 V2.2.2 (2019-07) Clause 4.3.2.9 & 4.3.2.10
Result: Complies
Received Date: 2024-08-08
Test Date: 2024-09-19 ~ 2024-09-24

Reviewed By:

Denise Zhou

Approved By:

Robin Wu



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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Revision History

Report No.	Version	Description	Issue Date	Note
2408RSU015-E2	V01	Initial Report	2025-04-15	Valid

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1. General Information

1.1. Applicant

Dana Innovations: SONANCE

991 CALLE AMANECER SAN CLEMENTE CA 92673, United States

1.2. Manufacturer

Dana Innovations: SONANCE

991 CALLE AMANECER SAN CLEMENTE CA 92673, United States

1.3. Testing Facility

<input checked="" type="checkbox"/>	<p>Test Site – MRT Suzhou Laboratory</p> <p>Laboratory Location (Suzhou - Wuzhong)</p> <p>D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China</p> <p>Laboratory Location (Suzhou - SIP)</p> <p>4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China</p> <p>Laboratory Location (Suzhou - Wujiang)</p> <p>Building 1, No.1 Xingdong Road, Wujiang, Suzhou, Jiangsu, People's Republic of China</p> <p>Laboratory Accreditations</p> <table> <tbody> <tr> <td>A2LA: 3628.01</td><td>CNAS: L10551</td></tr> <tr> <td>FCC: CN1166</td><td>ISED: CN0001</td></tr> <tr> <td>VCCI:</td><td><input type="checkbox"/> R-20025 <input type="checkbox"/> G-20034 <input type="checkbox"/> C-20020 <input type="checkbox"/> T-20020 <input type="checkbox"/> R-20141 <input type="checkbox"/> G-20134 <input type="checkbox"/> C-20103 <input type="checkbox"/> T-20104</td></tr> </tbody> </table>	A2LA: 3628.01	CNAS: L10551	FCC: CN1166	ISED: CN0001	VCCI:	<input type="checkbox"/> R-20025 <input type="checkbox"/> G-20034 <input type="checkbox"/> C-20020 <input type="checkbox"/> T-20020 <input type="checkbox"/> R-20141 <input type="checkbox"/> G-20134 <input type="checkbox"/> C-20103 <input type="checkbox"/> T-20104
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<input type="checkbox"/>	<p>Test Site – MRT Shenzhen Laboratory</p> <p>Laboratory Location (Shenzhen)</p> <p>1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China</p> <p>Laboratory Accreditations</p> <table> <tbody> <tr> <td>A2LA: 3628.02</td><td>CNAS: L10551</td></tr> <tr> <td>FCC: CN1284</td><td>ISED: CN0105</td></tr> </tbody> </table>	A2LA: 3628.02	CNAS: L10551	FCC: CN1284	ISED: CN0105		
A2LA: 3628.02	CNAS: L10551						
FCC: CN1284	ISED: CN0105						
<input type="checkbox"/>	<p>Test Site – MRT Taiwan Laboratory</p> <p>Laboratory Location (Taiwan)</p> <p>No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)</p> <p>Laboratory Accreditations</p> <table> <tbody> <tr> <td>TAF: 3261</td><td></td></tr> <tr> <td>FCC: 291082, TW3261</td><td>ISED: TW3261</td></tr> </tbody> </table>	TAF: 3261		FCC: 291082, TW3261	ISED: TW3261		
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FCC: 291082, TW3261	ISED: TW3261						

1.4. Product Information

Product Name	Power Amplifier
Model No.	UA 2-125 ARC
Brand Name	SONANCE
EUT Identification No.	200240903Sample#02
Bluetooth Specification	BLE 1M & 2M
Antenna Information	Refer to clause 1.5
Working Voltage	100-240V~ 50/60Hz 80W
Operating Temp.	0 ~ 40°C
Integrated Module Information	
Bluetooth Module	Module Name: Bluetooth Module Model No: HC08U Brand Name: Quectel
Notes:	
1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer. 2. The Bluetooth module used in this device is certified. This report is based on the module report (Report No.: PD20220207RF-A) to make the "Transmitter and Receiver Spurious Emissions" spot check.	

1.5. Radio Specification under Test

Frequency Range	2402 ~ 2480MHz
Channel Number	40
Type of Modulation	GFSK
Data Rate	1Mbps, 2Mbps
Antenna Type	FPC
Antenna Gain	3dBi

1.6. Working Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz
03	2408 MHz	04	2410 MHz	05	2412 MHz
06	2414 MHz	07	2416 MHz	08	2418 MHz
09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz
15	2432 MHz	16	2434 MHz	17	2436 MHz
18	2438 MHz	19	2440 MHz	20	2442 MHz
21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz
27	2456 MHz	28	2458 MHz	29	2460 MHz
30	2462 MHz	31	2464 MHz	32	2466 MHz
33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz
39	2480 MHz	--	--	--	--

2. Test Configuration

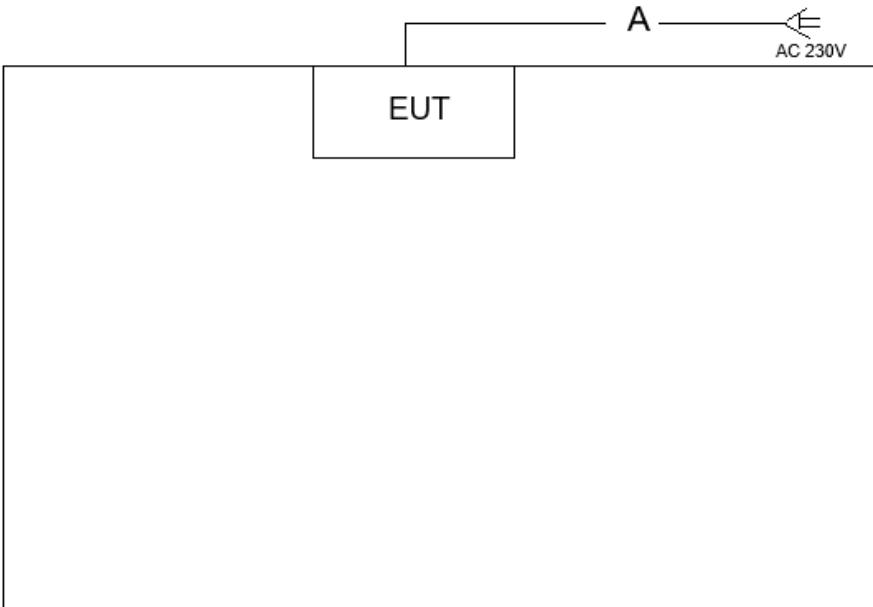
2.1. Test Mode

Mode 1: Transmit by BLE 1M at channel 39

Mode 2: Receive by BLE 1M at channel 39

2.2. Test System Connection Diagram

Connection Diagram			
Cable Type	Cable Description	Length	
A	Power Cable	Non-shielded	1.5m



The diagram shows a rectangular frame representing the test setup. Inside the frame, there is a smaller rectangle labeled 'EUT'. A horizontal line extends from the top center of the frame to the right, labeled 'A' above it. This line then splits into two branches: one branch goes straight to a small electrical plug symbol, and the other branch goes to a symbol representing an AC 230V power source.

2.3. Test Software

The test utility software used during testing was "ssscom", and the version was 5.13.1.

2.4. Application Form for Testing

Modulation Type			
<input type="checkbox"/>	FHSS	<input checked="" type="checkbox"/> other forms of modulation	
Adaptivity Equipment			
<input type="checkbox"/>	Non-Adaptive Equipment:		
	The maximum RF Output Power (e.i.r.p.): ... dBm		
	The maximum (corresponding) Duty Cycle: ... %		
<input checked="" type="checkbox"/>	Adaptive Equipment without the possibility to switch to a non-adaptive mode:		
	<input type="checkbox"/>	The equipment has implemented an LBT mechanism:	
		<input type="checkbox"/>	The equipment is Frame Based equipment
		<input type="checkbox"/>	The equipment is Load Based equipment
		<input type="checkbox"/>	The equipment can switch dynamically between Frame Based and Load Based equipment
<input checked="" type="checkbox"/>	The equipment has implemented a DAA mechanism		
	<input type="checkbox"/>	The equipment can operate in more than one adaptive mode	
<input type="checkbox"/>	Adaptive Equipment which can also operate in a non-adaptive mode		
The Worst Case Operational Mode for Each of The Following Tests			
<input type="checkbox"/>	RF Output Power:		
<input type="checkbox"/>	Power Spectral Density:		
<input type="checkbox"/>	Duty cycle, Tx-Sequence, Tx-gap		
<input type="checkbox"/>	Accumulated Transmit time, Frequency Occupation & Hopping Sequence		
<input type="checkbox"/>	Medium Utilization:		
<input type="checkbox"/>	Hopping Frequency Separation:		
<input type="checkbox"/>	Adaptivity:		
<input type="checkbox"/>	Occupied Nominal Channel Bandwidth:		
<input type="checkbox"/>	Transmitter unwanted emissions in the OOB domain:		
<input checked="" type="checkbox"/>	Transmitter unwanted emissions in the spurious domain: -65.9dBm		
<input checked="" type="checkbox"/>	Receiver spurious emissions: -54.9dBm		
<input type="checkbox"/>	Receiver Blocking:		
Antenna Type			
<input checked="" type="checkbox"/>	Integral Antennas (information to be provided in case of conducted measurements)		
	<input checked="" type="checkbox"/>	Temporary RF connector provided	
	<input type="checkbox"/>	No temporary RF connector provided	
<input type="checkbox"/>	Dedicated Antennas (equipment with antenna connector)		

Operating Conditions			
<input checked="" type="checkbox"/>	Stand-alone		
<input type="checkbox"/>	Combined equipment		
<input type="checkbox"/>	Plug-in radio device		
<input type="checkbox"/>	Other		
Operating Conditions			
<input checked="" type="checkbox"/>	AC Mains	<input type="checkbox"/>	DC
	AC Voltage Range: 100 - 240 V		State DC Voltage:
Type of DC Source	<input type="checkbox"/> Internal power supply <input type="checkbox"/> External power supply or AC/DC adapter <input type="checkbox"/> Battery <input type="checkbox"/> Other		
<input checked="" type="checkbox"/>	Temperature Range: 0 ~ 40°C		

2.5. Test Environment Condition

Ambient Temp.	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

3. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2024-12-17	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2025-07-26	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2024-11-09	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2025-05-15	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2025-04-19	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2024-10-23	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2024-10-25	WZ-AC1

Software	Version	Function
e3	230711	RE & CE
Controller_MF 7802	2.03C	RE Antenna & Turntable

4. Decision Rules and Measurement Uncertainty

4.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2.

(Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.2. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Parameter	Uncertainty
All Emissions, Radiated	6 dB
Temperature	3 °C
Humidity	5 %
DC and Low Frequency Voltages	3 %
Time	5 %

5. Test Result

5.1. Summary

Standard Clause	Test Parameter	Verdict
4.3.2.9	Transmitter Spurious Emissions	Pass
4.3.2.10	Receiver Spurious Emissions	Pass

Notes:

1. This device belongs to adaptive equipment.
2. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

5.2. Transmitter Unwanted Emissions in the Spurious Domain Measurement

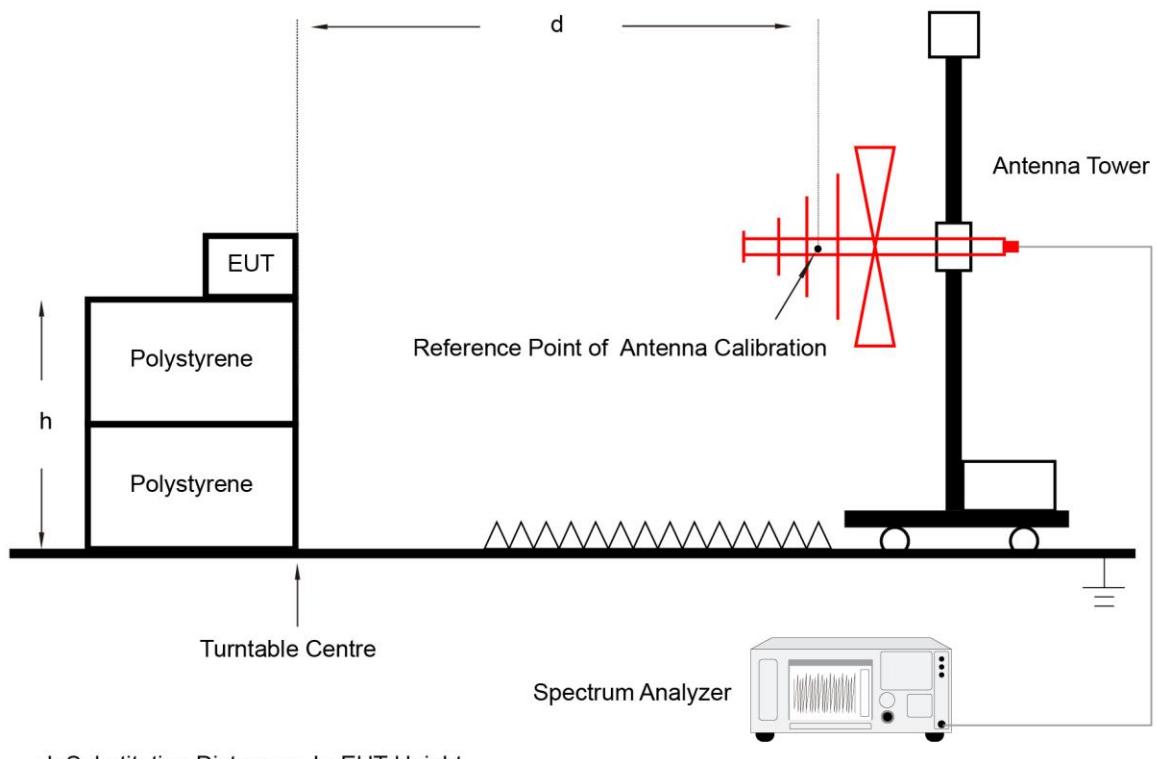
5.2.1. Test Limit

These limits are ERP for emissions up to 1 GHz and EIRP for emissions above 1 GHz.

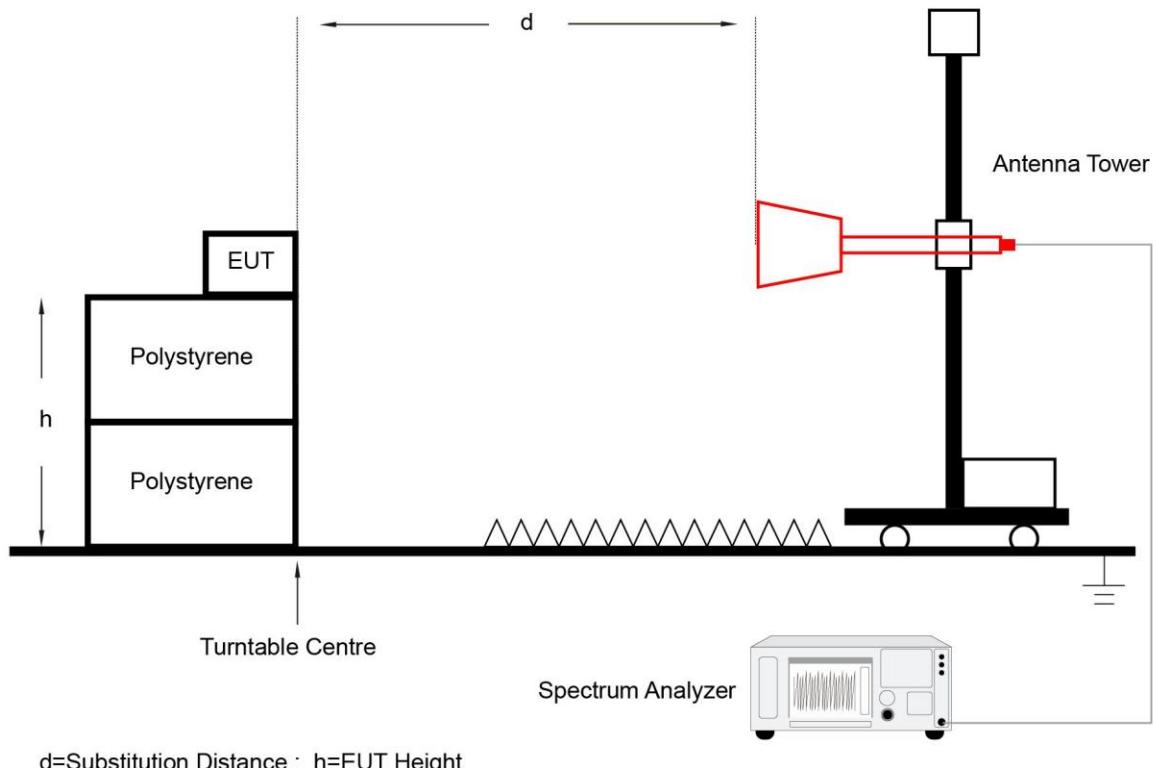
Transmitter Limits for Spurious Emissions		
Frequency Range	Maximum Power	Bandwidth
30 MHz to 47 MHz	-36dBm	100 kHz
47 MHz to 74 MHz	-54dBm	100 kHz
74 MHz to 87,5 MHz	-36dBm	100 kHz
87,5 MHz to 118 MHz	-54dBm	100 kHz
118 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 694 MHz	-54dBm	100 kHz
694 MHz to 1 GHz	-36dBm	100 kHz
1 GHz to 12,75 GHz	-30dBm	1 MHz

5.2.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.2.3. Test Procedure

Refer to EN 300 328 V2.2.2 (2019-07) Clause 5.4.9.2.2.

5.2.4. Test Result

Test Site	WZ-AC1	Test Engineer	Ajin Fan
Test Date	2024-09-24	Test Mode	Mode 1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
39	198.310	-102.8	27.8	-75.0	-54.0	-21.0	Peak	Horizontal
	719.957	-103.6	37.7	-65.9	-54.0	-11.9	Peak	Horizontal
	104.061	-104.0	29.9	-74.1	-54.0	-20.1	Peak	Vertical
	680.437	-102.9	36.0	-66.9	-54.0	-12.9	Peak	Vertical
	4960.925	-65.5	15.9	-49.6	-30.0	-19.6	Peak	Horizontal
	11116.750	-71.4	27.5	-43.9	-30.0	-13.9	Peak	Horizontal
	4960.925	-61.6	16.3	-45.3	-30.0	-15.3	Peak	Vertical
	10746.630	-71.4	27.0	-44.4	-30.0	-14.4	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: For emission below 1GHz:

Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - 2.15 (dB)

For emission above 1GHz:

Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) -
Pre_Amplifier Gain (dB)

Note 3: Test Distance "d" = 3m, Test height "h" = 1.5m

5.3. Receiver Spurious Emissions Measurement

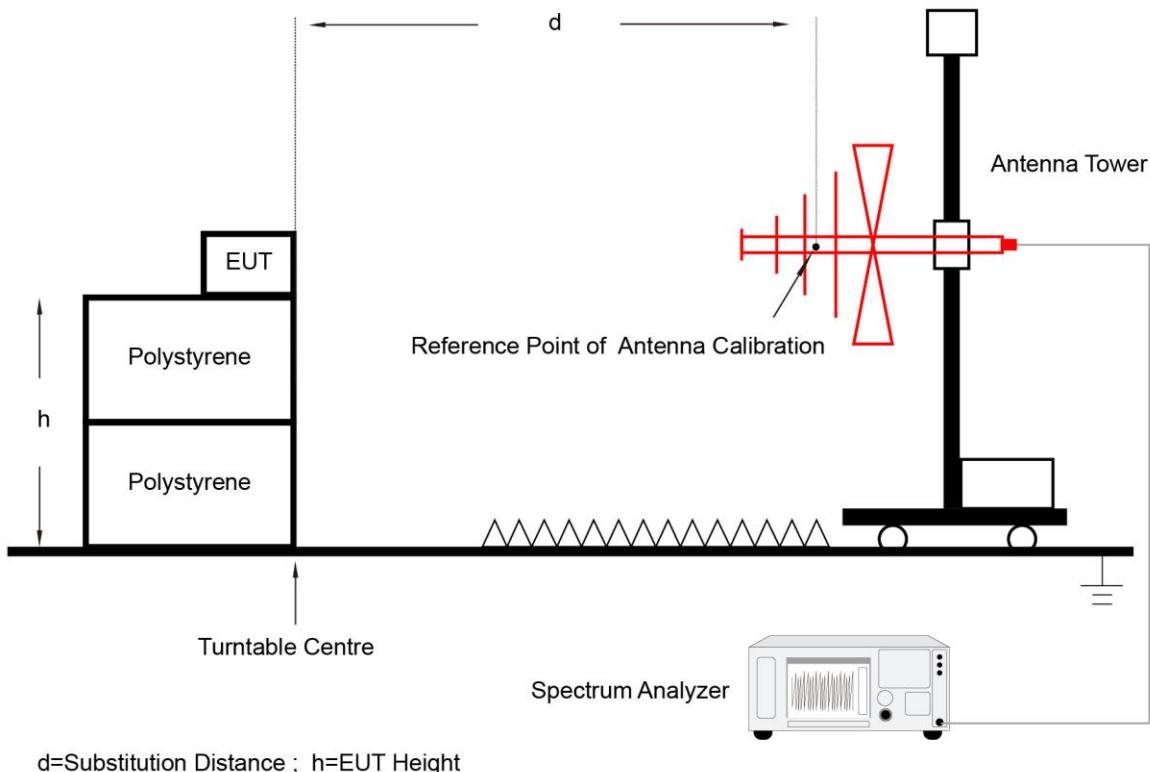
5.3.1. Test Limit

These limits are ERP for emissions up to 1 GHz and EIRP for emissions above 1 GHz.

Spurious emissions limits for receivers		
Frequency Range	Maximum Power	Measurement bandwidth
30 MHz to 1 GHz	-57dBm	100 kHz
1 GHz to 12.75 GHz	-47dBm	1 MHz

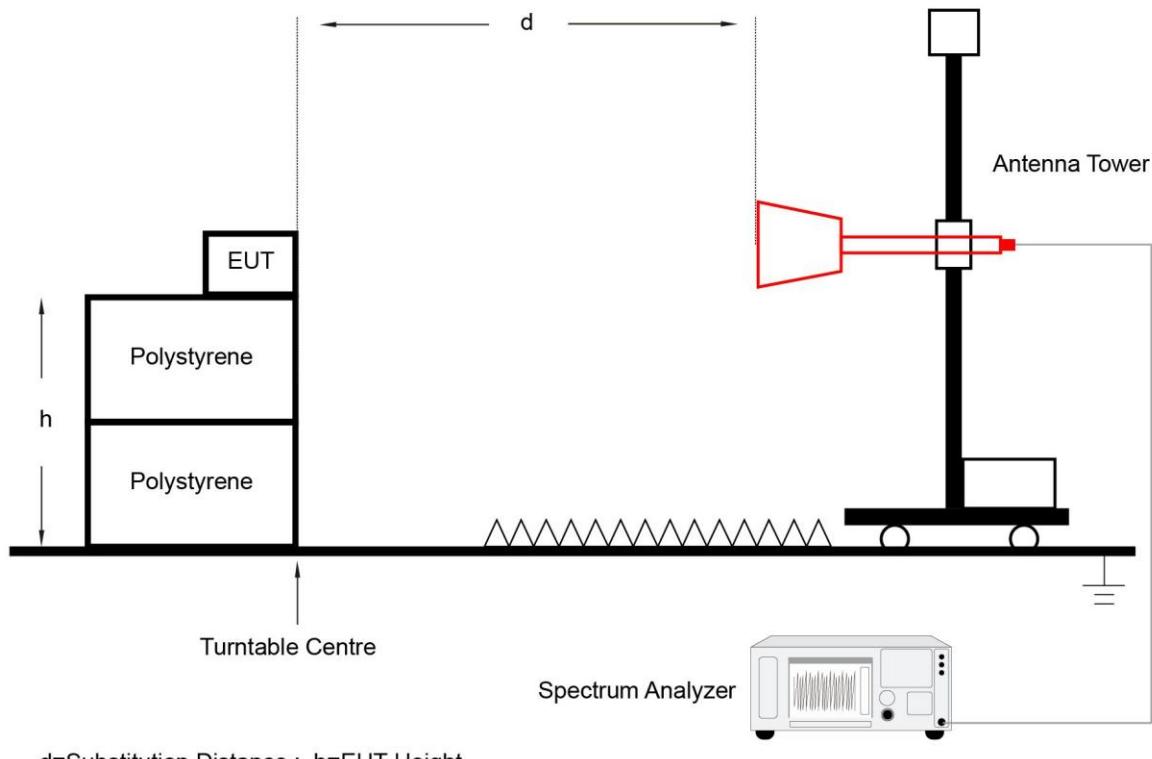
5.3.2. Test Setup

Below 1GHz Test Setup:



d=Substitution Distance ; h=EUT Height

Above 1GHz Test Setup:



5.3.3. Test Procedure

Refer to EN 300 328 V2.2.2 (2019-07) Clause 5.4.10.2.2.

5.3.4. Test Result

Test Site	WZ-AC1	Test Engineer	Ajin Fan
Test Date	2024-09-19	Test Mode	Mode 2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
39	42.319	-100.8	30.7	-70.1	-57.0	-13.1	Peak	Horizontal
	719.767	-103.2	37.6	-65.6	-57.0	-8.6	Peak	Horizontal
	82.477	-102.4	32.8	-69.6	-57.0	-12.6	Peak	Vertical
	618.693	-102.3	34.8	-67.5	-57.0	-10.5	Peak	Vertical
	1195.050	-61.8	4.3	-57.5	-47.0	-10.5	Peak	Horizontal
	3073.875	-66.6	11.0	-55.6	-47.0	-8.6	Peak	Horizontal
	1209.150	-63.0	5.4	-57.6	-47.0	-10.6	Peak	Vertical
	3219.575	-67.6	12.7	-54.9	-47.0	-7.9	Peak	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: For emission below 1GHz:

Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - 2.15 (dB)

For emission above 1GHz:

Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - Pre_Amplifier Gain (dB)

Note 3: Test Distance "d" = 3m, Test height "h" = 1.5m

Appendix A - Test Setup Photograph

Description: Radiated Spurious Emission Test Setup for Below 1GHz



Description: Radiated Spurious Emission Test Setup for Above 1GHz



Appendix B - EUT Photograph

Refer to "2408RSU015-EE" file.

The End