

RM Costruzioni Elettroniche S.r.l.

RF TEST REPORT

Report Type:

FCC Part 97 RF report

Model:

BLA703 FCC

REPORT NUMBER:

2405B0268SHA-001

ISSUE DATE:

December 13, 2024

DOCUMENT CONTROL NUMBER:

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Applicant: RM Costruzioni Elettroniche S.r.l.
Via IV Novembre 42, 40046, Ponte della Venturina, Alto Reno Terme
(BOLOGNA), ITALY

Manufacturer: RM Costruzioni Elettroniche S.r.l.
Via IV Novembre 42, 40046, Ponte della Venturina, Alto Reno Terme
(BOLOGNA), ITALY

Manufacturing site: RM Costruzioni Elettroniche S.r.l.
Via IV Novembre 42, 40046, Ponte della Venturina, Alto Reno Terme
(BOLOGNA), ITALY

Product Name: HF 25-30 MHz Linear Amplifier

Type/Model: BLA703 FCC

FCC ID: 2ACTR-BLA703

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 97 (2017): FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 97 – AMATEUR RADIO SERVICE

47CFR Part 2 (2021): Frequency allocations and radio treaty matters; general rules and regulations.

PREPARED BY:

Project Engineer
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TEST REPORT

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Revision History

Report No.	Version	Description	Issued Date
2405B0268SHA-001	Rev. 01	Initial issue of report	December 13, 2024

Measurement result summary

TEST ITEM	FCC REFERENCE	RESULT
Amplifier gain	97.317 (a)(2);2.1046	Pass
Amplification between 26 MHz and 28 MHz	97.317 (a)(3)	Pass
Spurious emissions	97.307 (d); 97.317 (a)(1)	Pass
Field strength of spurious radiation	97.307 (d)(e); 2.1053	Pass

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	BLA703
Type/Model:	BLA703 FCC
Description of EUT:	The EUT is a BLA703, it has only one model.
Rating:	AC100/120V 550W max
EUT type:	☒ Table top ☐ Floor standing
Software Version:	1.4
Hardware Version:	1.1
Sample received date:	May 9, 2024
Date of test:	May 9, 2024 ~ November 1, 2024

1.2 Technical Specification

Frequency Range:	28MHz ~ 30MHz
RF O/P Power (Max.)	550W
Type of Modulation:	SSB, CW, AM, FM, Data
Antenna Connector	UHF

1.3 Description of Test Facility

Name:	Intertek Testing Services (Shanghai FTZ) Co., Ltd.
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L21189
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252
	NVLAP Accreditation Lab NVLAP LAB CODE: 200849-0
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 97 (2017)

47CFR Part 2 (2021)

2.2 Mode of operation during the test

The channel was tested as representatives.

Frequency Band (MHz)				28 ~ 30			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	28.11	2	28.98	3	29.56	-	-

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Attenuator	DA9-5600-0-4000-2047	-
2	SW transceiver	IC-7300/Icom	DC 13.8V

2.5 Test environment condition:

Test items	Temperature	Humidity
Amplifier gain	23°C	52% RH
Spurious emissions		

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2.6 Instrument list

Conducted Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESR7	EC 6194	2025-02-27
☒	A.M.N.	R&S	ESH2-Z5	EC 3119	2024-11-19
☐	A.M.N.	R&S	ENV4200	EC 3558	2025-06-05
☒	Attenuator	Hua Xiang	Ts5-10db-6g	EC 6194-1	2024-12-07
☒	Shielded room	Zhongyu	-	EC 2838	2025-01-11
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2025-08-18
☒	Bilog Antenna	TESEQ	CBL 6112B	EC 6411	2025-09-11
☐	Pre-amplifier	R&S	AFS42-00101800-25-S-42	EC 5262	2025-11-06
☒	Pre-amplifier	Tonscend	tap01018050	EC 6432-1	2024-12-07
☒	Horn antenna	Tonscend	bha9120d	EC 6432-2	2025-02-15
☐	Horn antenna	ETS	3116c	EC 5955	2025-08-14
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2026-07-11
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Therom-Hygrograph	Testo	175h1	EC 6640	2025-08-29
☒	Pressure meter	YM3	Shanghai Mengde	EC 3320	2025-08-16

2.7 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Amplifier gain	$\pm 0.74\text{dB}$
Spurious emissions	$\pm 0.74\text{dB}$
Radiated Emissions in restricted frequency bands below 1GHz	$\pm 4.90\text{dB}$

3 Amplifier Gain

Test result: Pass

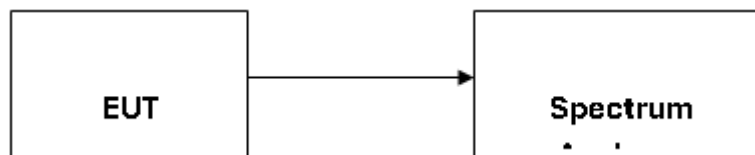
3.1 Limit

Frequencies (MHz)	Limit (dB)
26.0 - 28.0	0
28.0 – 30.0	15

3.2 Measurement Procedure

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The bandwidth of the test receiver is set at 9 kHz.

3.3 Test Configuration



3.4 Test Results

Frequency f0 [MHz]	Input power [dBm]	Output power [dBm]	Amplifier gain [dB]	Limit [dB]	Result
28.11	44.30	57.20	12.90	15	Pass
28.98	44.41	57.38	12.97	15	Pass
29.56	44.65	57.43	12.78	15	Pass

Frequency f0 [MHz]	Input power [dBm]	Output power [dBm]	Amplifier gain [dB]	Limit [dB]	Result
26.00	44.3	44.3	0	0	Pass
27.00	44.3	44.3	0	0	Pass
28.00	44.3	44.3	0	0	Pass
28.11	44.3	57.2	12.9	15	Pass

No gain was measured between 26 MHz and 28 MHz.

4 Spurious emissions

Test result: Pass

4.1 Limit

For transmitters installed after January 1, 2003, the mean power of any spurious emission from a station transmitter or external RF power amplifier transmitting on a frequency below 30 MHz must be at least 43 dB below the mean power of the fundamental emission. For transmitters installed on or before January 1, 2003, the mean power of any spurious emission from a station transmitter or external RF power amplifier transmitting on a frequency below 30 MHz must not exceed 50 mW and must be at least 40 dB below the mean power of the fundamental emission. For a transmitter of mean power less than 5 W installed on or before January 1, 2003, the attenuation must be at least 30 dB. A transmitter built before April 15, 1977, or first marketed before January 1, 1978, is exempt from this requirement

4.2 Measurement Procedure

Conducted emission:

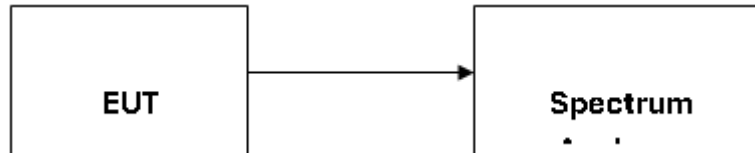
- a) The EUT was placed on the top of a rotating table 0.8 meters above the ground chamber room.
- b) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- c) The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10kHz at frequency below 30MHz

Note:

1. All modes of operation were investigated and the worst-case emissions are reported

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4.3 Test Configuration



4.4 Test Results

Operating mode:

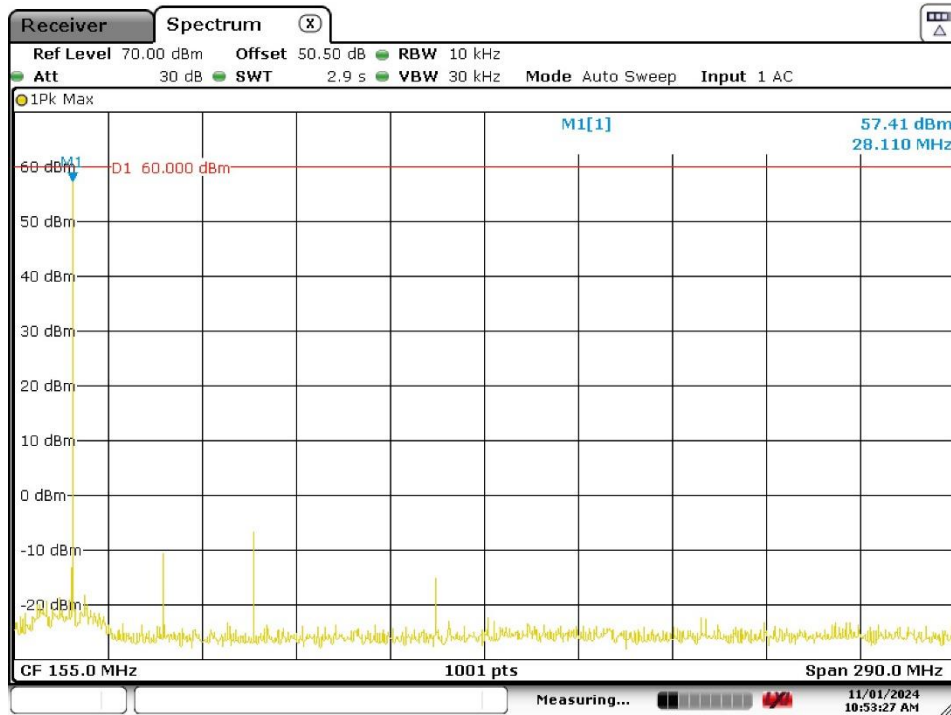
Frequency f ₀ [MHz]	Output power [dBm]	2 * f ₀ [dBc]	3 * f ₀ [dBc]	4 * f ₀ [dBc]	5 * f ₀ [dBc]	6 * f ₀ [dBc]	7 * f ₀ [dBc]	8 * f ₀ [dBc]	9 * f ₀ [dBc]	10 * f ₀ [dBc]	Limit [dBc]	Result
28.11	57.41	54.41	>67	>67	>67	>67	>67	>67	>67	>67	43	Pass
28.98	57.36	>67	>67	>67	>67	>67	>67	>67	>67	>67	43	Pass
29.56	57.42	>70	>70	>70	>70	>70	>70	>70	>70	>70	43	Pass

Standby mode:

In standby mode no spurious emissions were found above the noise floor of the measuring system.

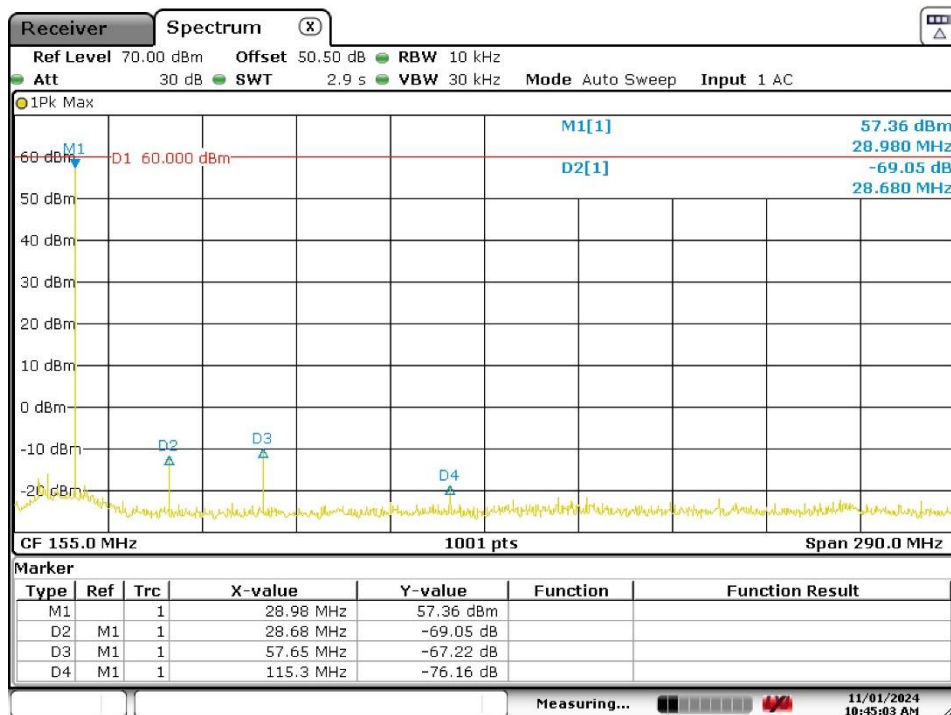
4.5 Measurement Plots

EUT at 28.11 MHz in mode "on"

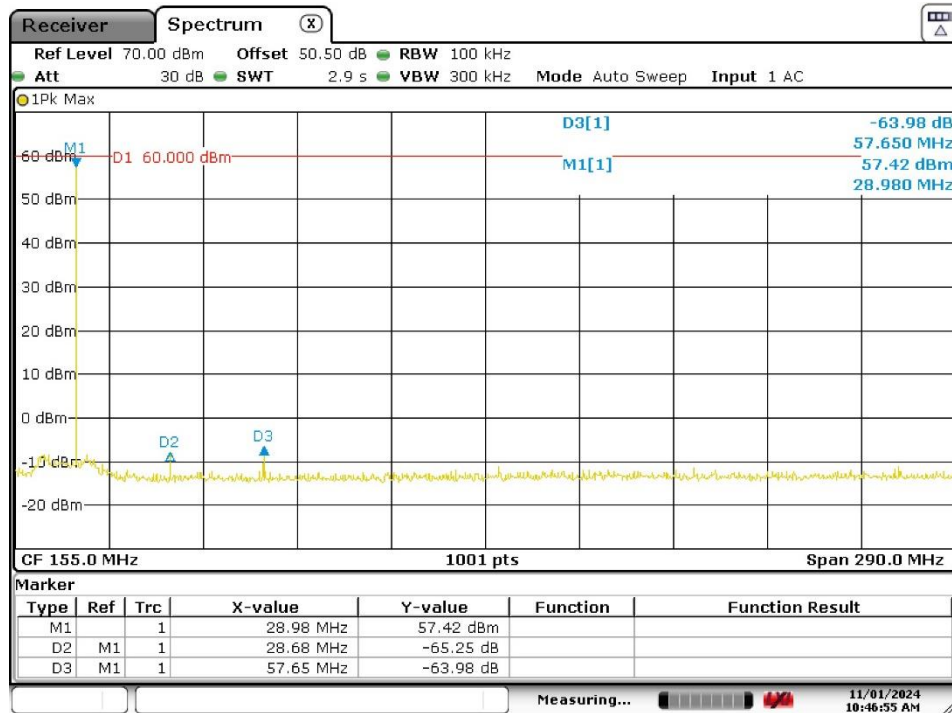


Date: 1.NOV.2024 10:53:27

EUT at 28.98 MHz in mode "on"

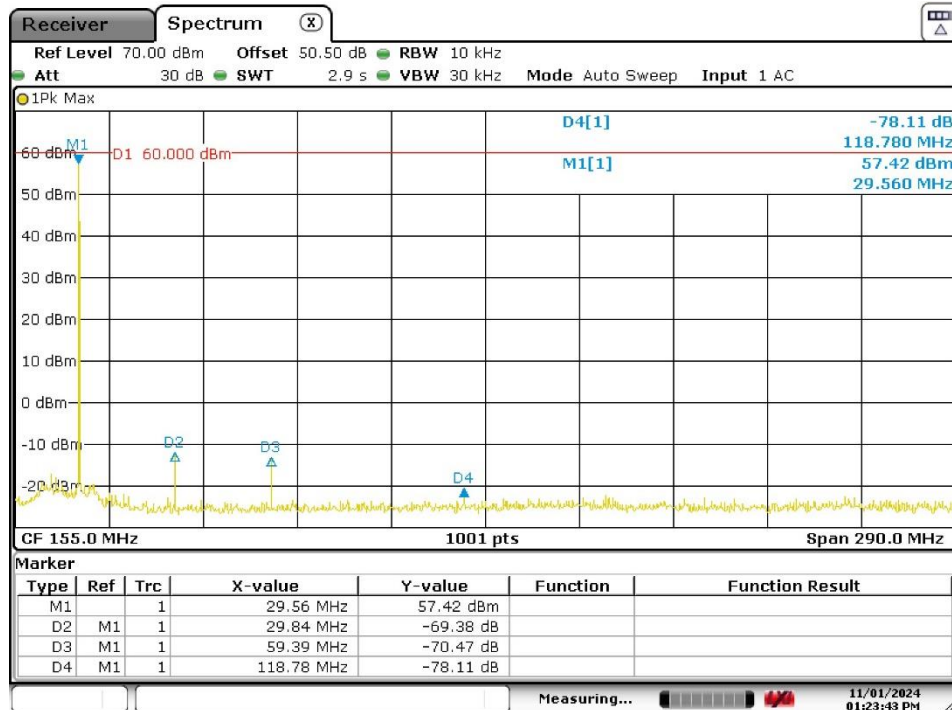


Date: 1.NOV.2024 10:45:02

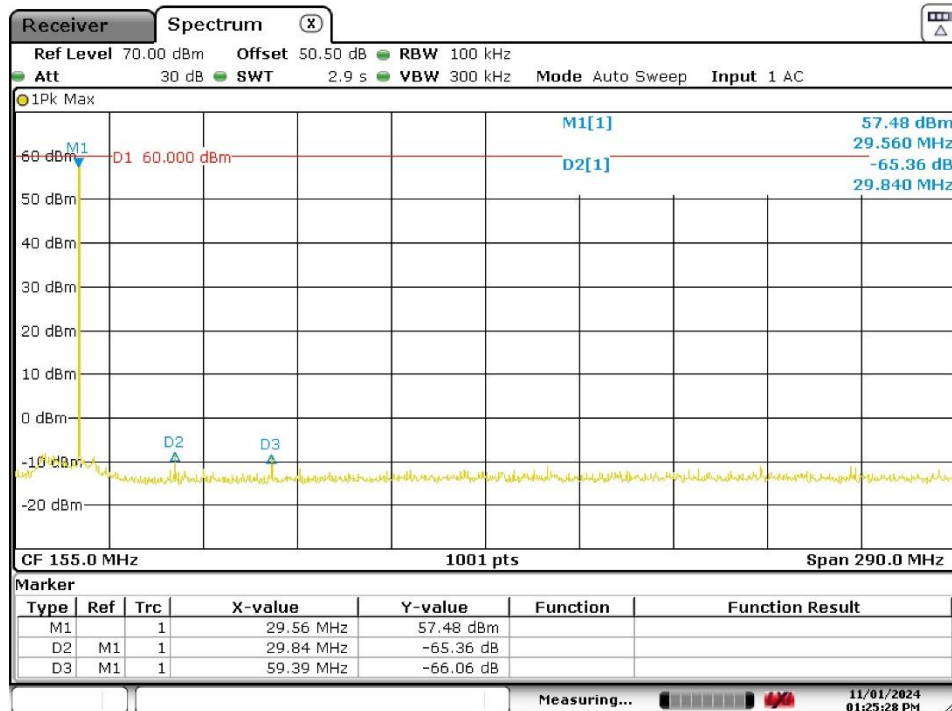


Date: 1.NOV.2024 10:46:55

EUT at 29.56 MHz in mode "on"

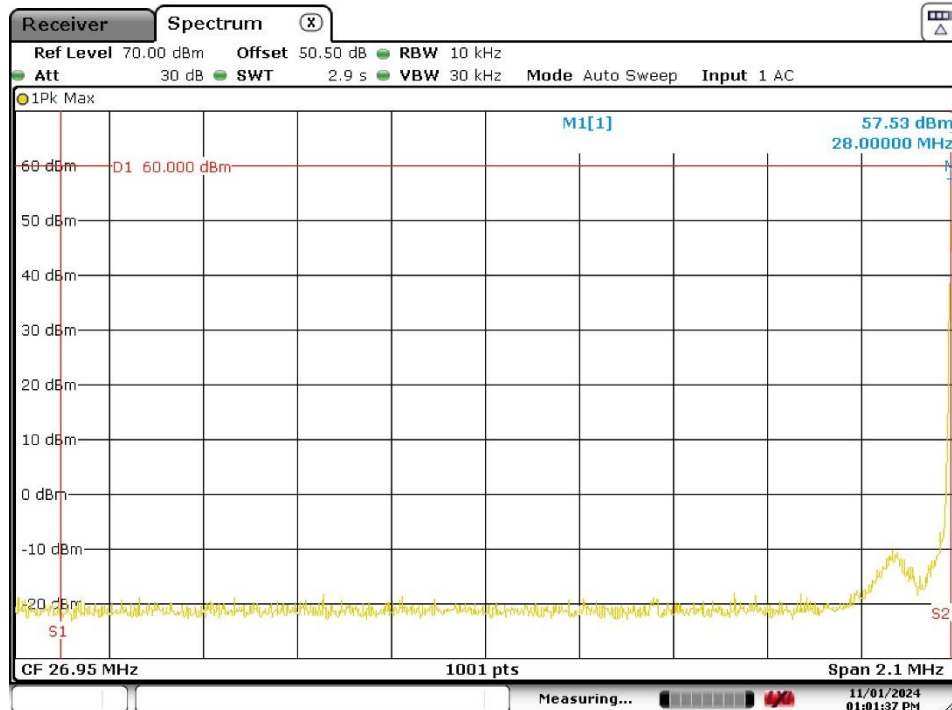


Date: 1.NOV.2024 13:23:44



Date: 1.NOV.2024 13:25:29

Input swept from 25.9 MHz to 28.1 MHz



Date: 1.NOV.2024 13:01:38

5 Spurious emissions

Test result: Pass

5.1 Limit

The mean power of any spurious emission from a station transmitter or external RF power amplifier transmitting on a frequency between 30-225 MHz must be at least 60 dB below the mean power of the fundamental. For a transmitter having a mean power of 25 W or less, the mean power of any spurious emission supplied to the antenna transmission line must not exceed 25 μ W and must be at least 40 dB below the mean power of the fundamental emission, but need not be reduced below the power of 10 μ W. A transmitter built before April 15, 1977, or first marketed before January 1, 1978, is exempt from this requirement.

5.2 Measurement Procedure

For Radiated emission below 30MHz:

- d) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- e) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- f) Both X and Y axes of the antenna are set to make the measurement.
- g) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- h) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz:

- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360

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degrees to find the maximum reading.

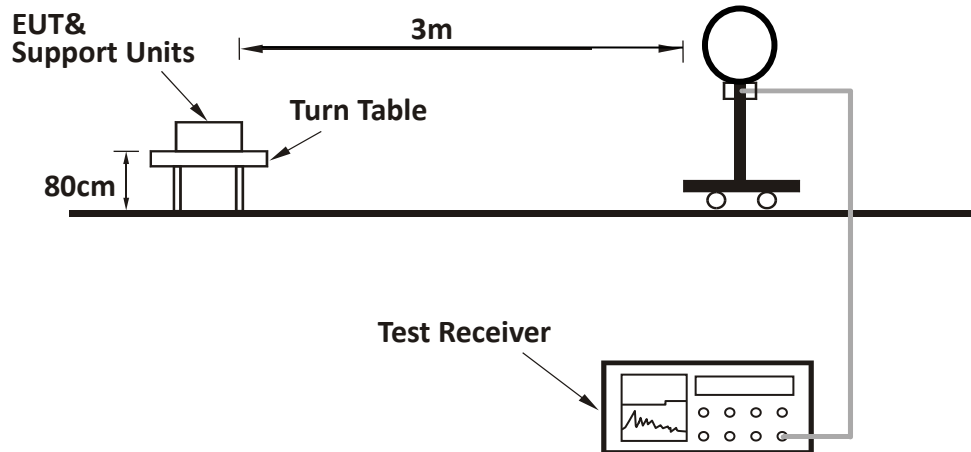
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

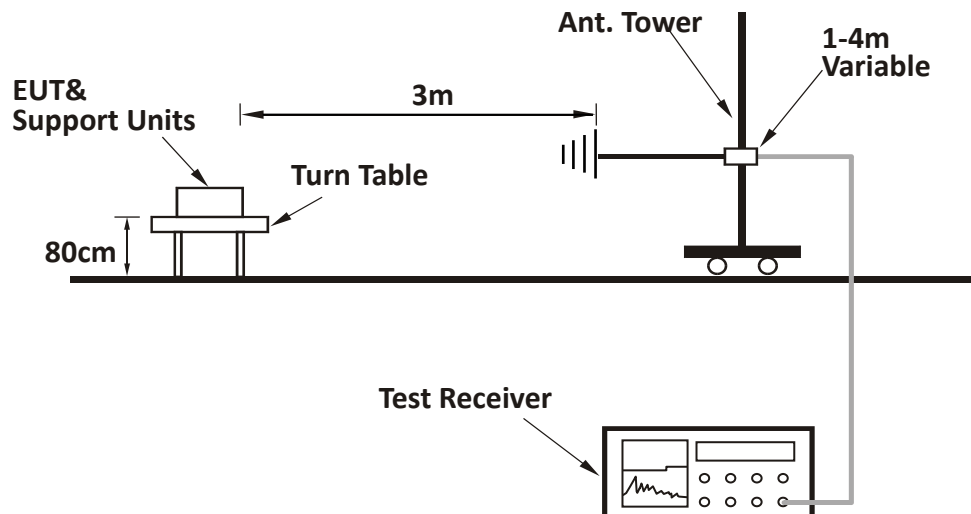
- 2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or $3 \times \text{RBW}$ (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
- 5. All modes of operation were investigated and the worst-case emissions are reported

Test Configuration

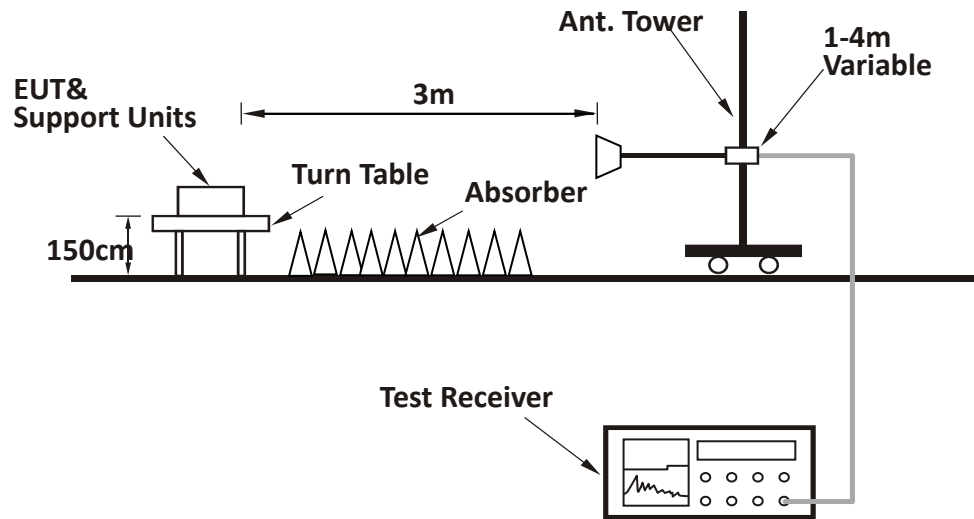
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:



Test Results of Radiated Emissions

All modes of operation were investigated and the worst-case emissions are reported.

Frequency (MHz)	Antenna	Frequency (MHz)	Reading (dBuV/m)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	ERP (dBm)	Spurious Limit (dBm)	Margin (dB)	Detector
28.11	H	56.22	33.99	14.13	48.12	-49.23	-16.00	33.23	PK
	H	84.33	25.01	9.70	34.71	-62.64	-16.00	46.64	PK
	H	112.44	36.05	11.40	47.45	-49.9	-16.00	33.90	PK
	H	140.55	32.30	14.16	46.46	-50.89	-16.00	34.89	PK
	H	168.66	37.77	14.19	51.96	-45.39	-16.00	29.39	PK
	H	196.77	22.98	11.85	34.83	-62.52	-16.00	46.52	PK
	H	224.88	37.93	12.53	50.46	-46.89	-16.00	30.89	PK
	H	252.99	41.62	13.69	55.31	-42.04	-16.00	26.04	PK
	H	281.10	37.78	14.71	52.49	-44.86	-16.00	28.86	PK
	V	56.22	44.70	14.13	58.83	-38.52	-16.00	22.52	PK
	V	84.33	36.51	9.70	46.21	-51.14	-16.00	35.14	PK
	V	112.44	30.85	11.40	42.25	-55.10	-16.00	39.10	PK
	V	140.55	35.86	14.16	50.02	-47.33	-16.00	31.33	PK
	V	168.66	32.96	14.19	47.15	-50.20	-16.00	34.20	PK
	V	196.77	24.31	11.85	36.16	-61.19	-16.00	45.19	PK
	V	224.88	30.80	12.53	43.33	-54.02	-16.00	38.02	PK
	V	252.99	30.28	13.69	43.97	-53.38	-16.00	37.38	PK
	V	281.10	33.28	14.71	47.99	-49.36	-16.00	33.36	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (- Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.

2. Corrected Reading = Reading + Correct Factor

3. Margin = Limit - ERP

4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,

Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,

Limit = 40.00dBuV/m.

Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;

Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;

Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

*****END*****