

TEST REPORT

Application No.:	KSCR2411002411AT
FCC ID:	WBKR23207
Applicant:	BTI Wireless
Address of Applicant:	11205 Knott Avenue-Suite A, Cypress, CA 90630, United States
Manufacturer:	BTI Wireless
Address of Manufacturer:	11205 Knott Avenue-Suite A, Cypress, CA 90630, United States
Equipment Under Test (EUT):	
EUT Name:	Remote Unit
Model No.:	PS-R232
Trade mark:	
Standard(s) :	FCC Part 2 FCC Part 20 FCC Part 90
Date of Receipt:	2024-12-09
Date of Test:	2024-12-13 to 2025-02-20
Date of Issue:	2025-02-20
Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Revision Record			
Version	Description	Date	Remark
00	Original	2025-02-20	/

Authorized for issue by:				
Tested By		Kass Gao		
		Kass Gao /Project Engineer		
Approved By		Terry Hou		
		Terry Hou /Reviewer		

2 Test Summary

2.1 769MHz-775MHz for FCC Part 90

Test Item	Reference	Result
AGC threshold	KDB 935210 D05 v01r04	PASS
Out of band rejection	KDB 935210 D05 v01r04	PASS
Occupied bandwidth	§90.209, §90.219	PASS
Output power at RF antenna connector	§90.205, §90.219	PASS
Noise Figure	§90.219	PASS
Spurious emissions at RF antenna connector	§90.543, §90.219	PASS
Radiated spurious emissions	§90.543, §90.219	PASS
Radiated spurious emissions within 1559-1610 MHz band	§90.543, §90.219	PASS
Frequency stability	§90.213	N/A
Emission Mask	§90.210	PASS
N/A: not applicable		
Remark:		
EUT: In this whole report EUT means Equipment Under Test.		
Tx: In this whole report Tx (or tx) means Transmitter.		
Rx: In this whole report Rx (or rx) means Receiver.		
All modes have been tested and only record the worst test result.		
This product has two power supply modules, one is AC power supply module, the other is DC power supply module. We evaluated and tested all power supply modules. The worst mode is AC power supply module. This report only record the worst mode.		
Test method standard:		
ANSI C63.26-2015		
KDB 935210 D05 Indus Booster Basic Meas v01r04		
KDB 935210 D02 Signal Booster Certification v04r02		

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4 General Information

4.1 Details of E.U.T.

Product Name:	Remote Unit
Device type:	Booster
Model No.:	PS-R232
Antenna Type:	External Antenna
Antenna Gain:	0 dBi (Provided by manufacturer)
Power Supply:	AC 100-240V 50/60Hz or DC 48V or DC 24V
Type of Modulation:	TETRA/P25/DMR/CQPSK/FM
Frequency Band:	769MHz to 775MHz
Power Control Method:	ALC
Antenna Delivery:	SISO
Nominal Output Power:	37±1dBm
Nominal gain:	47dB

4.2 Description of Support Units

Description	Manufacture	Model No.	S/N
Note Book	Acer	ZQT	NXM0QCN01031403EE876
AU	CROSSFIRE	N/A	/

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz) 5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz) 4.5dB (30MHz-1GHz) 5.1dB (1GHz-18GHz) 5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

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

4.4 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.
No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.
Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

- 1.SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
- 2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).
3. Sample source: sent by customer.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

- **ISED**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

- **VCCI**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	08/01/2024	07/31/2025
2	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	08/01/2024	07/31/2025
3	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	01/15/2024 01/14/2025 01/14/2025	01/14/2025 01/13/2026
4	Signal Generator	R&S	SMBV100B	KSEM032	03/19/2024	03/18/2025
5	Signal Generator	R&S	SMW200A	KSEM020-1	08/02/2024	08/01/2025
6	Signal Generator	Agilent	N5182A	KUS2001M001-1	08/01/2024	07/31/2025
7	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	08/01/2024	07/31/2025
8	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	03/19/2024	03/18/2025
9	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	08/13/2024	08/12/2025
10	Switcher	CCSRF	FY562	KUS2001M001-3	08/02/2024	08/01/2025
11	AC Power Source	EXTECH	6605	KS301178	N.C.R	N.C.R
12	DC Power Supply	Agilent	E3632A	KS301180	N.C.R	N.C.R
13	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	02/02/2024 02/01/2025	02/01/2025 01/31/2026
14	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	08/26/2024	08/25/2025
15	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	03/21/2024	03/20/2025
16	Software	BST	TST-PASS	/	N/A	N/A
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	08/05/2024	08/04/2025
2	Universal Radio Communication Tester	R&S	CMW500	KSEM009-1	03/19/2024	03/18/2025
3	Signal Generator	Agilent	E8257C	KS301066	08/05/2024	08/04/2025
4	Loop Antenna	COM-POWER	AL-130R	KUS1806E001	03/18/2023	03/17/2025
5	Bilog Antenna	TESEQ	CBL 6112D	KUS1806E005	06/29/2023	06/28/2025
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	03/23/2024	03/22/2025
7	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	01/17/2024 01/16/2025 01/16/2025	01/16/2025 01/15/2026
8	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	KS301187	01/17/2024 01/16/2025 01/15/2026	01/16/2025 01/15/2026
9	Amplifier(30MHz~18GHz)	PANSHAN TECHNOLOGY	LNA:1~18G	KSEM010-1	01/15/2024 01/14/2025	01/14/2025 01/13/2026
10	Amplifier(18~40GHz)	TST	LNA180400G40	KSEM038	08/12/2024	08/11/2025
11	RE Test Cable	REBES MICROWAVE	/	CZ301097	11/10/2024	11/09/2025
12	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	03/21/2024	03/20/2025
13	Software	Faratronic	EZ_EMCA-3A1	/	N/A	N/A

6 Test Results

6.1 Test conditions

Input voltage:	AC 100-240V 50/60Hz or DC 48V or DC 24V	
Test voltage	Normal	AC 120V/60Hz
	Extreme	AC 102V-AC138V
Operating Environment:		
Test Temperature:	Normal	22°C~26°C
	Extreme	-40~55°C
Humidity:	46%~56% RH	
Atmospheric Pressure:	990~1005mbar	
Test Requirement:	<p>The RF output power of the EUT was measured at the antenna port, by adjusting the input power of signal generator to drive the EUT to get to maximum output power point and keep the EUT at maximum gain setting for all tests. The device should be tested on downlink.</p> <p>For detail test Modulation and Frequency, please refer to 7.2.</p>	

Remark:

FIBER-OPTIC AND OTHER SIMILAR RF DISTRIBUTION SYSTEMS

Fiber-optic distribution systems are a type of in-building radiation system that receives RF signals from an antenna, distributes the signal over fiber-optic cable, and then retransmits at another location for example within a building or tunnel. Most fiber-optic systems are signal boosters; however, some may be boosters. These systems generally have two enclosures typically called host (or local or donor unit) and remote. Some systems may also have an optional expander box for fan-out to multiple remotes. The system transmits downlink signals from the remote unit to handsets, portables, or clients, and transmits uplink signals via from the host unit. Usually but not always the uplink goes through an intermediate amplifier to a “donor” antenna. Therefore both uplink and downlink must be tested, unless filing effectively documents how connection of uplink to donor antenna with or without an intermediate amplifier will be prevented, such as for always only a cabled connection to a base station. Fiber-optic systems are not amplifiers (AMP equipment class) – they are equipment class TNB or PCB. The same approval procedures also apply for multiple-enclosure systems connected by coax cable.

Synonyms and related terms: in-building radiation system, coverage enhancer, distributed antenna system, fiber-optic distribution system, converter, donor antenna

Typical in-building or distributed antenna systems can consist of five different components (enclosures), not counting antennas:

1) host unit

- a) transmits uplink to base station via antenna thru coax, **passive interface unit**, or **active interface unit** (amplifier)
- b) sends base-station downlink via fiber-optic or coax to **remote**
- c) receives handset uplink via fiber-optic or coax from **remote**
- d) optional connection to **expansion unit** via fiber-optic
- e) separate FCC ID from **remote**, unless electrically identical
- f) **non-transmitting host unit**

- i) connects directly to a base station via coax cable but does not connect to antenna or amplifier
- ii) Part 15 digital device subject to Verification, no FCC ID

2) remote unit

- a) receives base-station downlink via fiber-optic or coax from **host**, transmits via antenna to handsets

- b) returns handset uplink via fiber-optic or coax to **host**
- c) separate FCC ID from **remote**, unless electrically identical

3) fiber-optic expansion unit

- a) fiber-optic or coax from **host**
- b) fiber-optic or coax fan-out to **remote(s)**
- c) Part 15 digital device subject to Verification, no FCC ID

4) RF expansion unit

- a) internal or external device used to add band(s) and/or transmit mode(s) to a **remote**
- b) operates only when connected to a **remote unit** as part of a booster system
- c) contains signal-processing functions to convert baseband signal into modulated RF signal
- d) use equipment class PCB or TNB for an **RF expansion unit** (the associated **remote** uses an equipment class Bxx per **Table C.1** of this document, e.g., B2I)

5) passive interface unit

- a) contains attenuators, splitters, combiners
- b) coax cable connection between **host** and base-station
- c) passive device, no FCC ID

6) active interface unit

- a) amplifies uplink signal from **host unit** for transmit by donor antenna
- b) attenuates downlink from donor antenna
- c) coax cable connection between **host** and **active interface unit**
- d) usually has separate FCC ID; in some cases could be combined/included with **host** as one enclosure

GENERAL DEFINITIONS FOR CERTIFICATION PURPOSES:

The following three general definitions follow from those stated in the Part 90 rule sections as listed above. Two of the definitions replace previous EAB internal definitions given for booster, booster and extender. The general term "extender" is the same as booster, but booster should be used rather than extender. The general term "translator" is the same as booster, but booster should be used rather than translator.

External radio frequency power amplifier (ERFPA) - any device which, (1) when used in conjunction with a radio transmitter signal source, is capable of amplification of that signal, and (2) is not an integral part of a radio transmitter as manufactured. The EAS equipment class AMP is used only for an ERFPA device inserted between a transmitter (TNB/PCB) and an antenna (has only one antenna port). **Booster** is a device that automatically reradiates signals from base transmitters without channel translation, for the purpose of improving the reliability of existing service by increasing the signal strength in dead spots. An "in-building radiation system" is a signal booster. These devices are not intended to extend the size of coverage from the originating base station. A booster can be either single or multiple channels.

Booster is a device that retransmits the signals of other stations. Boosters are different from boosters in that they can include frequency translation and can extend coverage beyond the design of the original base station. A booster is typically single channel but can also be multiple channels.

ERFPA (AMP) and boosters/boosters (TNB/PCB) can generally be authorized for all rule parts except 15 and 18.

Tests should be done with each typical signal. e.g., for F3E emissions use 2500 Hz with 2.5 or 5 kHz deviation. Use of CW signal for some tests is acceptable in lieu of actual emission, in some cases when CW signal gives worst case.

6.2 Test Procedure & Measurement Data

6.2.1 AGC threshold

Test Requirement: KDB 935210 D05 Indus Booster Basic Meas v01r04

Test Method: KDB 935210 D05 Indus Booster Basic Meas v01r04

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

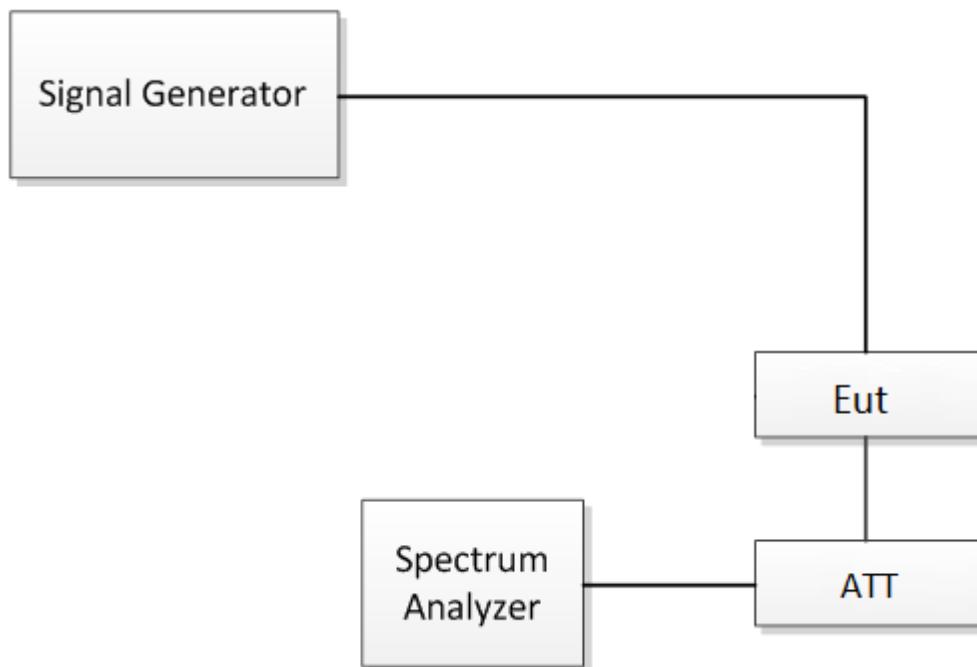


Fig.1 AGC threshold

Test Procedure:

RF output power test procedure:

- a) Connect a signal generator to the input of the EUT.
- b) Configure to generate the CW signal.
- c) The frequency of the signal generator shall be set to the frequency f_0 as determined from 3.3.
- d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
- e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
- f) Measure and record the output power of the EUT; use 3.5.3 or 3.5.4 for power measurement.
- g) Remove the EUT from the measurement setup. Using the same signal generator settings, repeat the power measurement at the signal generator port, which was used as the input signal to the EUT, and record as the input power. EUT gain may be calculated as described in 3.5.5.
- h) Repeat steps f) and g) with input signal amplitude set to 3 dB above the AGC threshold level.
- i) Repeat steps e) to h) with the narrowband test signal.
- j) Repeat steps e) to i) for all frequency bands authorized for use by the EUT.

Amplifier gain test procedure:

After the mean input and output power levels have been measured as described in the preceding subclauses, the mean gain of the EUT can be determined from:

$$\text{Gain (dB)} = \text{output power (dBm)} - \text{input power (dBm)}.$$

Peak to Average Ratio:

Please according to KDB 971168 D01 clause 5.7.

Remark:

The system continuously monitors the input power.

6.2.1.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

6.2.2 Out of band rejection

Test Requirement:

KDB 935210 D05 Indus Booster Basic Meas v01r04

Test Method:

KDB 935210 D05 Indus Booster Basic Meas v01r04

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

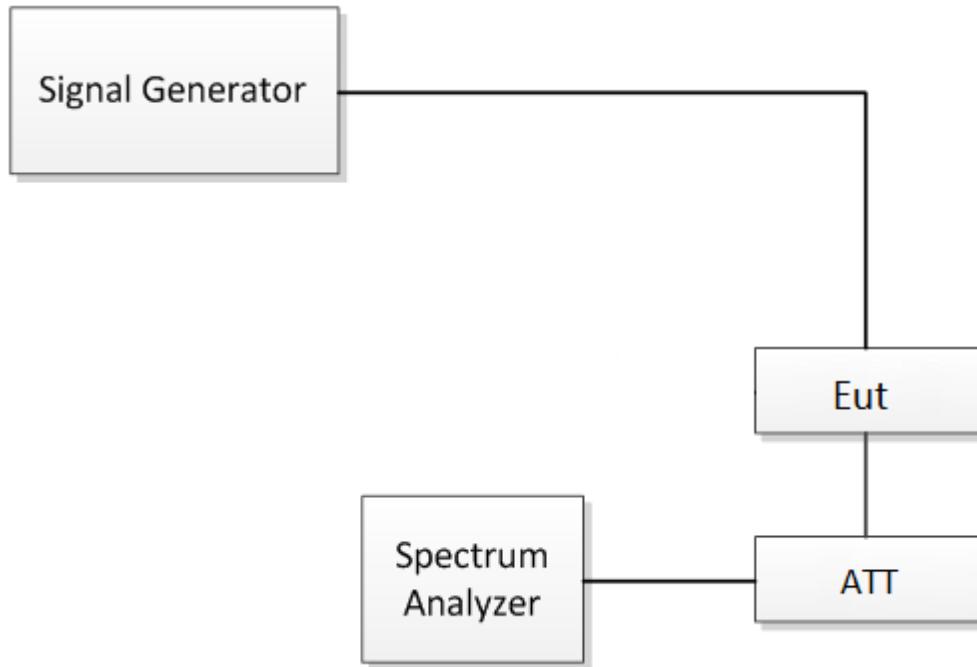


Fig.2. Out of Band rejection test configuration

Test Procedure:

A signal booster shall reject amplification of other signals outside of its passband. Adjust the internal gain control of the EUT to the maximum gain for which equipment certification is sought.

- a) Connect a signal generator to the input of the EUT.
- b) Configure a swept CW signal with the following parameters:
 - 1) Frequency range = ± 250 % of the manufacturer's specified pass band.
 - 2) The CW amplitude shall be 3 dB below the AGC threshold, and shall not activate the AGC threshold throughout the test.
 - 3) Dwell time = approximately 10 ms.
 - 4) Frequency step = 50 kHz.
- c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
- d) Set the RBW of the spectrum analyzer to between 1 % and 5 % of the manufacturer's rated passband, and $VBW = 3 \times RBW$.
- e) Set the detector to Peak and the trace to Max-Hold.
- f) After the trace is completely filled, place a marker at the peak amplitude, which is designated as f_0 , and with two additional markers (use the marker-delta method) at the 20 dB bandwidth (i.e., at the points where the level has fallen by 20 dB).
- g) Capture the frequency response plot for inclusion in the test report.

6.2.2.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

6.2.3 Occupied bandwidth

Test Requirement:	§90.209, §90.219(e)(4)
Test Method:	KDB 935210 D05 Indus Booster Basic Meas v01r04
EUT Operation:	
Status:	Drive the EUT to maximum output power.
Conditions:	Normal conditions
Application:	Cellular Band RF output ports
Test Configuration:	

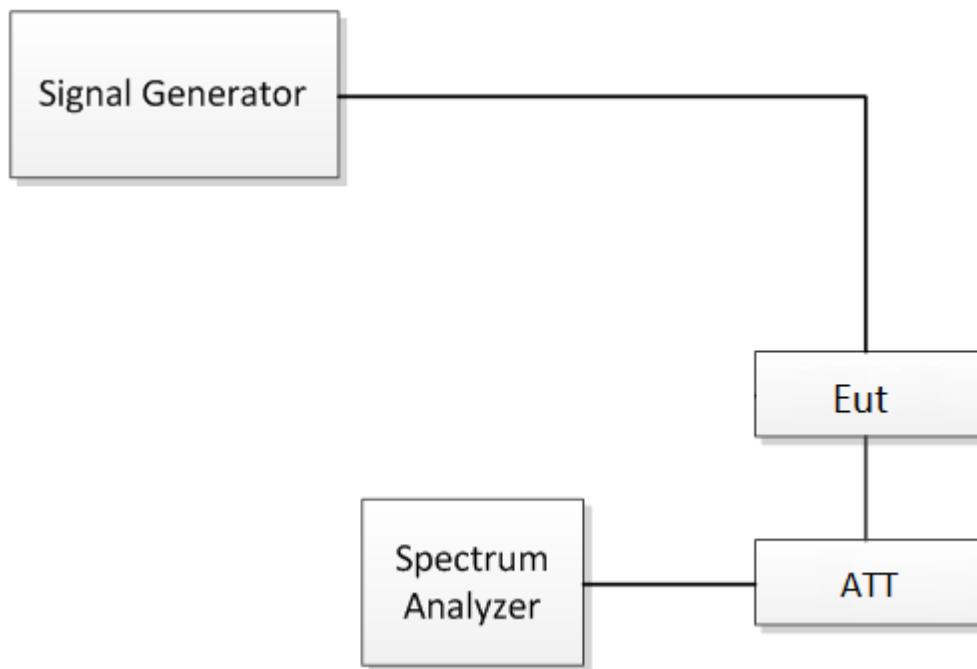


Fig.3. Occupied bandwidth test configuration

Test Procedure:

- a) Connect a signal generator to the input of the EUT.
- b) Configure the signal generator to transmit the appropriate test signal associated with the public safety emission designation (see Table 1).
- c) Configure the signal level to be just below the AGC threshold (see results from 4.2).
- d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.
- e) Set the spectrum analyzer center frequency to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between $2 \times$ to $5 \times$ the EBW (or OBW).
- f) The nominal RBW shall be 300 Hz for 16K0F3E, and 100 Hz for all other emissions types.
- g) Set the reference level of the spectrum analyzer to accommodate the maximum input amplitude level, i.e., the level at f_0 per 4.3.
- h) Set spectrum analyzer detection mode to peak, and trace mode to max hold.
- i) Allow the trace to fully stabilize.
- j) Confirm that the signal is contained within the appropriate

emissions mask.

- k) Use the marker function to determine the maximum emission level and record the associated frequency.
- l) Capture the emissions mask plot for inclusion in the test report (output signal spectra).
- m) Measure the EUT input signal power (signal generator output signal) directly from the signal generator using power measurement guidance provided in KDB Publication 971168 [R8] (input signal spectra).
- n) Compare the spectral plot of the output signal (determined in step k), to the input signal (determined in step l) to affirm they are similar (in passband and rolloff characteristic features and relative spectral locations).
- o) Repeat steps d) to n) with the input signal amplitude set 3 dB above the AGC threshold.
- p) Repeat steps b) to o) for all authorized operational bands and emissions types (see applicable regulatory specifications, e.g., Section 90.210).
- q) Include all accumulated spectral plots depicting EUT input signal and EUT output signal in the test report, and note any observed dissimilarities.

6.2.3.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

6.2.4 Output power at RF antenna connector

Test Requirement: KDB 935210 D05 Indus Booster Basic Meas v01r04
Test Method: KDB 935210 D05 Indus Booster Basic Meas v01r04
EUT Operation:
Status: Drive the EUT to maximum output power.
Conditions: Normal conditions
Application: Cellular Band RF output ports
Test Configuration:

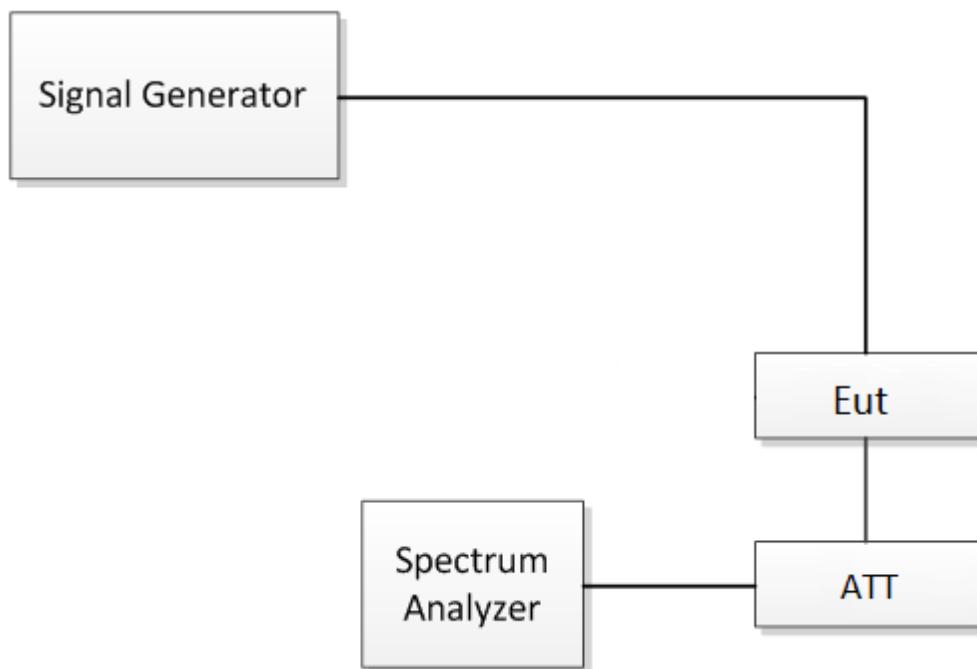


Fig.4 Output power at RF antenna connector

Test Procedure:

RF output power test procedure:

- a) Connect a signal generator to the input of the EUT.
- b) Configure to generate the CW signal.
- c) The frequency of the signal generator shall be set to the frequency f_0 as determined from 3.3.
- d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
- e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
- f) Measure and record the output power of the EUT; use 3.5.3 or 3.5.4 for power measurement.
- g) Remove the EUT from the measurement setup. Using the same signal generator settings, repeat the power measurement at the signal generator port, which was used as the input signal to the EUT, and record as the input power. EUT gain may be calculated as described in 3.5.5.
- h) Repeat steps f) and g) with input signal amplitude set to 3 dB above the AGC threshold level.
- i) Repeat steps e) to h) with the narrowband test signal.
- j) Repeat steps e) to i) for all frequency bands authorized for use by the EUT.

Amplifier gain test procedure:

After the mean input and output power levels have been measured as described in the preceding subclauses, the mean gain of the EUT can be determined from:

$$\text{Gain (dB)} = \text{output power (dBm)} - \text{input power (dBm)}.$$

Peak to Average Ratio:

Please according to KDB 971168 D01 clause 5.7.

Remark:

The system continuously monitors the input power.

6.2.4.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

6.2.5 Noise Figure

Test Requirement:	§Part 90.219(e)(2)
Test Method:	KDB 935210 D05 Indus Booster Basic Meas v01r04 Clause 4.6
EUT Operation:	
Status:	Drive the EUT to maximum output power. .
Conditions:	Normal conditions
Application:	Cellular Band RF output ports
Test Configuration:	

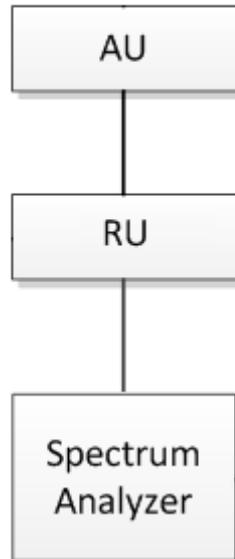


Fig.5. Noise Figure

Test Procedure:

Several widely recognized methods for performing noise figure measurements are available. Some require the use of specialized equipment, such as a noise figure analyzer and/or an excess noise ratio (ENR) calibrated noise source, while others involve the use of conventional measurement instrumentation such as a spectrum analyzer. Methods that require use of a noise figure analyzer are generally accepted as producing the most accurate results and are considered to be the reference method within this document, while others are considered to be acceptable alternative methods.

Consult the relevant instrumentation application notes for detailed guidance regarding the selection and application of an appropriate methodology for performing noise figure measurements. Note also that noise figure measurements require that any AGC circuitry be disabled over the duration of the measurement.

6.2.5.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

6.2.6 Spurious emissions at RF antenna connector

Test Requirement:

§90.543, §90.219

Test Method:

KDB 935210 D05 Indus Booster Basic Meas v01r04

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

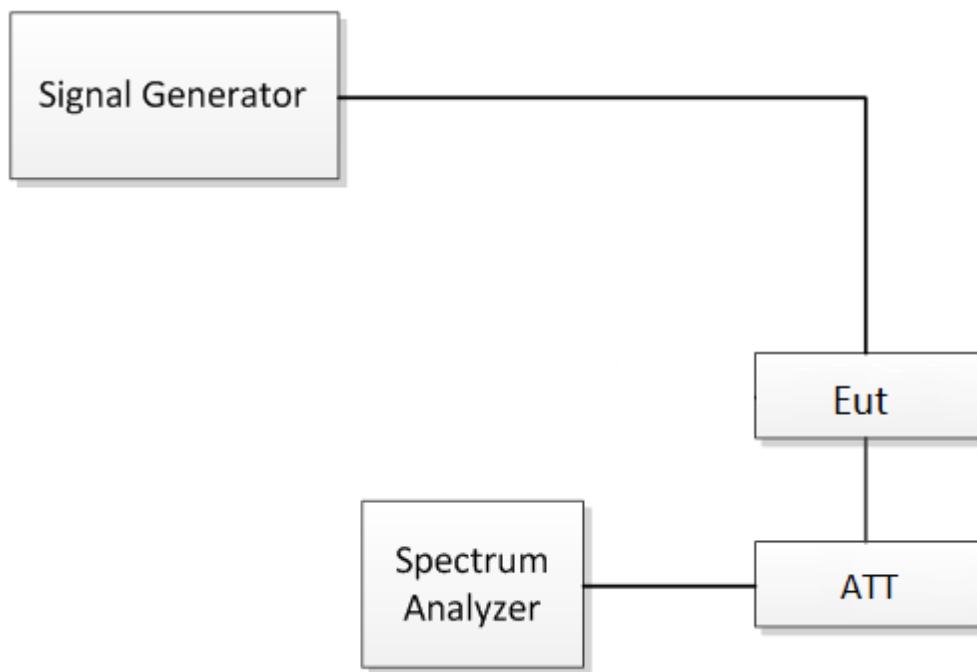


Fig.6. Spurious emissions at RF antenna connector

Test Procedure: Conducted Emissions test procedure:

- a) Connect a signal generator to the input of the EUT.
- b) Configure the signal generator to produce a CW signal.
- c) Set the frequency of the CW signal to the center channel of the EUT passband.
- d) Set the output power level so that the resultant signal is just below the AGC threshold (see 4.2).
- e) Connect a spectrum analyzer to the output of the EUT, using appropriate attenuation as necessary.
- f) Set the RBW = 100 kHz. (i.e., for 30 MHz to 1 GHz PLMRS and/or PSRS booster devices)
- g) Set the VBW = 3 × RBW.
- h) Set the Sweep time = auto-couple.
- i) Set the detector to PEAK.
- j) Set the spectrum analyzer start frequency to 30 MHz (or the lowest radio frequency signal generated in the EUT, without going below 9 kHz if the EUT has additional internal clock frequencies), and the stop frequency to 10 × the highest allowable frequency of the EUT passband.
- k) Select MAX HOLD, and use the marker peak function to find the highest emission(s) outside the passband. (This could be either at a frequency lesser or greater than the passband frequencies.)
- l) Capture a plot for inclusion in the test report.
- m) Repeat steps c) to l) for each authorized frequency band/block of operation.

6.2.6.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

6.2.7 Radiated Spurious Emissions

Test Requirement: §90.543, §90.691

Test Method: KDB 935210 D05 Indus Booster Basic Meas v01r04

EUT Operation:

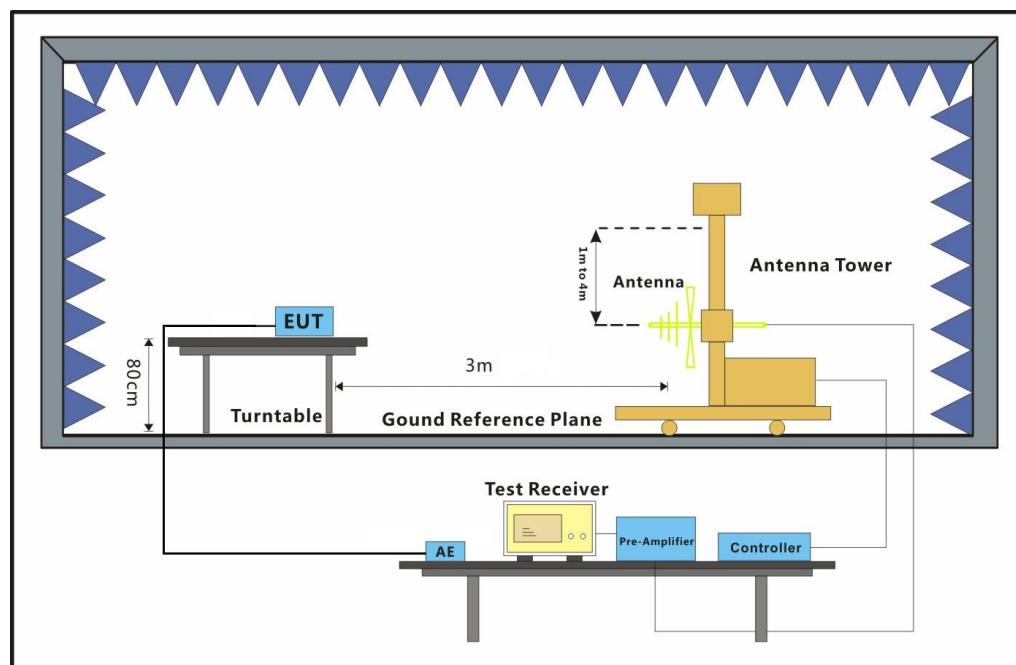
Status: Drive the EUT to maximum output power.

Conditions: Normal conditions

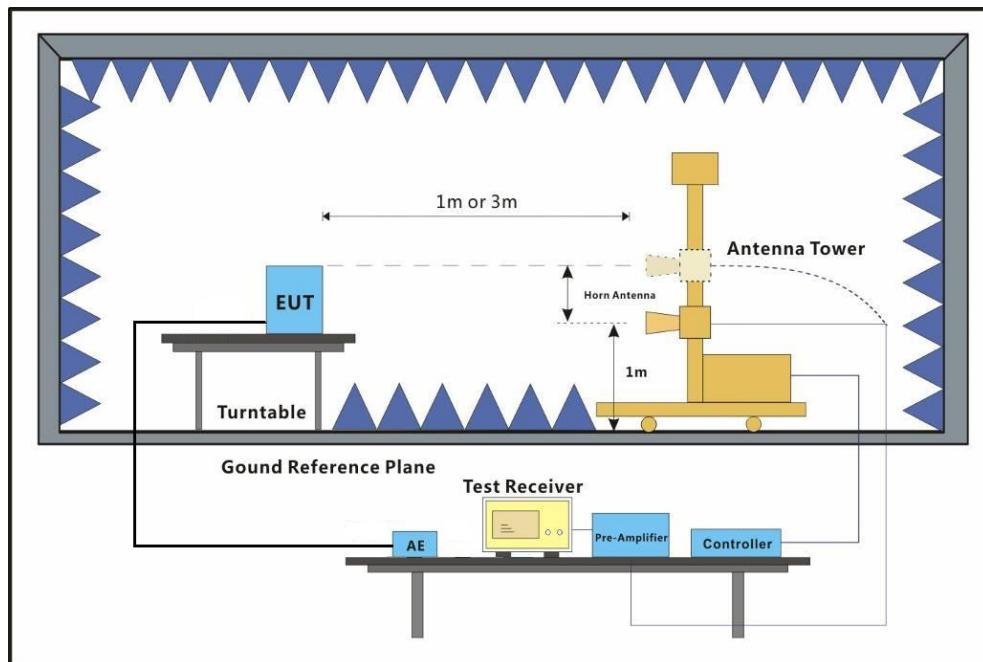
Application: Enclosure

Test Configuration:

30MHz to 1GHz emissions:



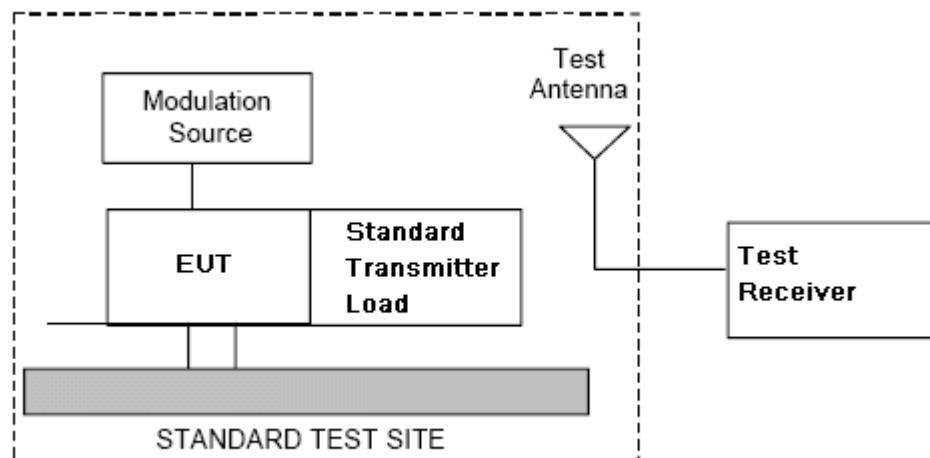
1GHz to 40GHz emissions:



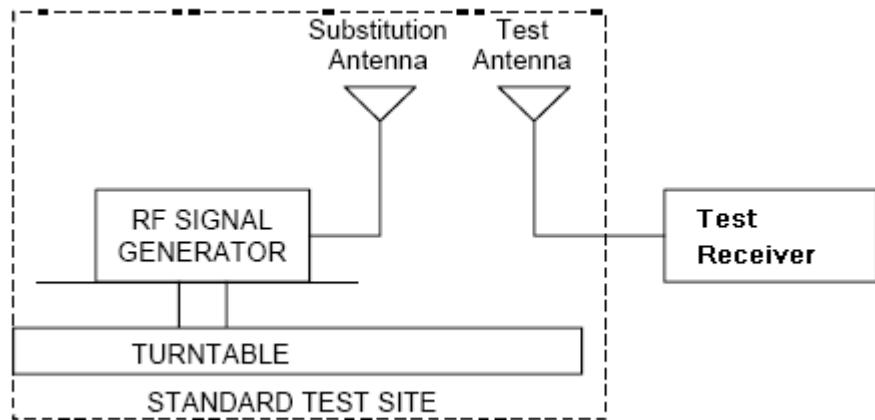
Test Procedure:

1. Test the background noise level with all the test facilities;
2. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
3. Select the suitable RF notch filter to avoid the test receiver or spectrum analyzer produce unwanted spurious emissions;
4. Keep the EUT continuously transmitting in max power;
5. Read the radiated emissions of the EUT enclosure.

Radiated Emissions Test Procedure:



- a) Connect the equipment as illustrated.
- b) Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.
 - 2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.
 - 3) Sweep Speed slow enough to maintain measurement calibration.
 - 4) Detector Mode = Positive Peak.
- c) Place the transmitter to be tested on the turntable in the standard test site, The transmitter is transmitting into a no radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.
- d) Measurements shall be made from 30MHz to 10 times of fundamental carrier, except for the region close to the carrier equal to \pm the carrier bandwidth.
- e) Key the transmitter without modulation or normal modulation base the standard.
- f) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
- g) Repeat step f) for each spurious frequency with the test antenna polarized vertically.



- h) Reconnect the equipment as illustrated.
- i) Keep the spectrum analyzer adjusted as in step b).
- j) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
- k) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a no radiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
- l) Repeat step k) with both antennas vertically polarized for each spurious frequency.
- m) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps k) and l) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

$$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dB)}$$

where:

P_d is the dipole equivalent power and

P_g is the generator output power into the substitution antenna.

NOTE:

- 1) It is permissible to use other antennas provided they can be referenced to a dipole.
- 2) For below 1GHz signal, the *antenna gain* (dB) is dBd, and for above 1GHz signal, the *antenna gain* (dB) is dBi
- 3) Effective radiated power (e.r.p) refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p. and e.r.p.
 $e.r.p \text{ (dBm)} = e.i.r.p. \text{ (dBm)} - 2.15$
- 4) For this test, the AU and EU are put outside of the chamber; connect to the RU through the optical fiber

6.2.7.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

6.2.8 Frequency Stability

Test Requirement: §90.213

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Temperature conditions, voltage conditions

Application: Cellular Band RF output ports

Test Procedure:

1. Temperature conditions:

- a) The RF output port of the EUT was connected to Frequency Meter;
- b) Set the working Frequency in the middle channel;
- c) record the 20°C and norminal voltage frequency value as reference point;
- d) vary the temperature from -40°C to 55°C with step 10°C
- e) when reach a temperature point, keep the temperature banlance at least 1 hour to make the product working in this status;
- f) read the frequency at the relative temperature.

2. Voltage conditions:

- a) record the 20°C and norminal voltage frequency value as reference point;
- b) vary the voltage from -15% norminal voltage to +15% voltage;
- c) read the frequency at the relative voltage.

6.2.8.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

6.2.9 Emission Mask

Test Requirement: §90.210

The spectral shape of the output should look similar to input for all modulations.

EUT Operation:

Status: Drive the EUT to maximum output power. .

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:

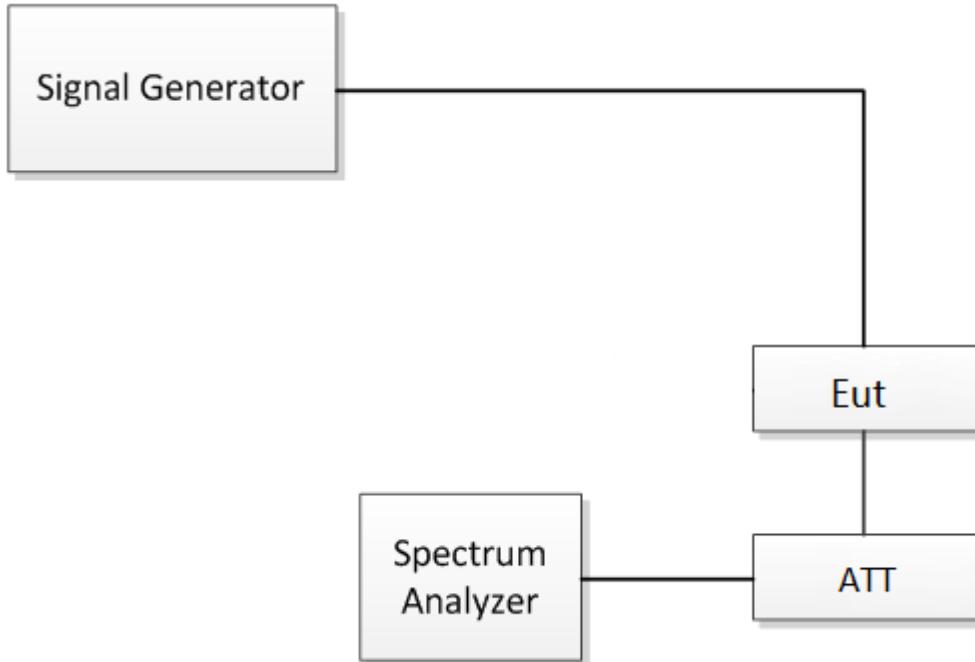


Fig.4. Emission mask test configuration

Test Procedure:
Please refer to §90.210(b).

6.2.9.1 Measurement Record:

Please refer to Appendix B for KSCR241100241102.

7 Photographs - Test Setup

Please refer to test setup photo

8 Photographs - EUT Constructional Details

Please refer to external and internal photo

--The End of Report--