

Vector Signal Generator	KEYSIGHT	N5182B	MY59101429	Sep.01.2022	Aug. 31, 2023
Analog Signal Generator	KEYSIGHT	N5173B	MY61252685	Dec. 15, 2022	Dec. 14, 2023
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep.01.2022	Aug. 31, 2023
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep.01.2022	Aug. 31, 2023
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep.01.2022	Aug. 31, 2023
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep.01.2022	Aug. 31, 2023
RF Control Unit	Tonsced	JS0806-1	21C8060380	N/A	N/A
RF Control Unit	Tonsced	JS0806-2	21F8060439	Sep.01.2022	Aug. 31, 2023
Band Reject Filter Group	Tonsced	JS0806-F	21D8060414	Jun. 23, 2022	Jun. 22, 2023
Power Control Box	Tonsced	JS0806-4ADC	21C8060387	N/A	N/A
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	144382	Sep.01.2022	Aug. 31, 2023
Universal Radio Communication Tester	Rohde&Schwarz	CMW500	168796	Jun. 23, 2022	Jun. 22, 2023
Temperature and Humidity Chamber	ZhengHang	ZH-QTH-1500	ZH2107264	Jun. 22, 2022	Jun. 21, 2023

5. Conducted Emission

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC Part 15.207

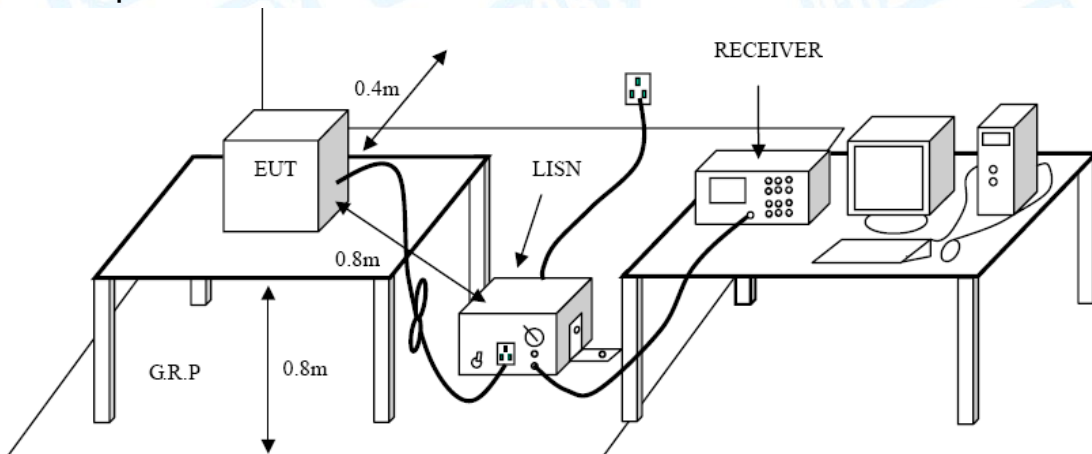
5.1.2 Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2 Test Setup



5.3 Test Procedure

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.

- The bandwidth of EMI test receiver is set at 9 kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation From Test Standard

No deviation

5.5 EUT Operating Mode

Please refer to the description of test mode.

5.6 Test Data

Please refer to the Attachment A inside test report.

6. Radiated and Conducted Unwanted Emissions

6.1 Test Standard and Limit

6.1.1 Test Standard

FCC Part 15.209 & FCC Part 15.247(d)

6.1.2 Test Limit

General field strength limits at frequencies Below 30MHz		
Frequency (MHz)	Field Strength (microvolt/meter)**	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30

Note: 1, The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

General field strength limits at frequencies above 30 MHz		
Frequency (MHz)	Field strength (μV/m at 3 m)	Measurement Distance (meters)
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

General field strength limits at frequencies Above 1000MHz		
Frequency (MHz)	Distance of 3m (dBuV/m)	
	Peak	Average
Above 1000	74	54

Note:

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

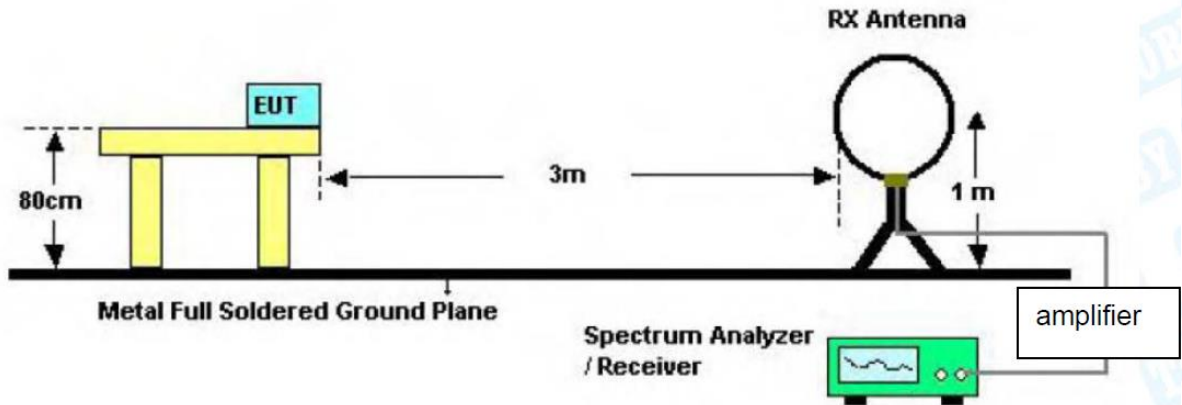
(2) Emission Level(dBuV/m)=20log Emission Level(uV/m)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the

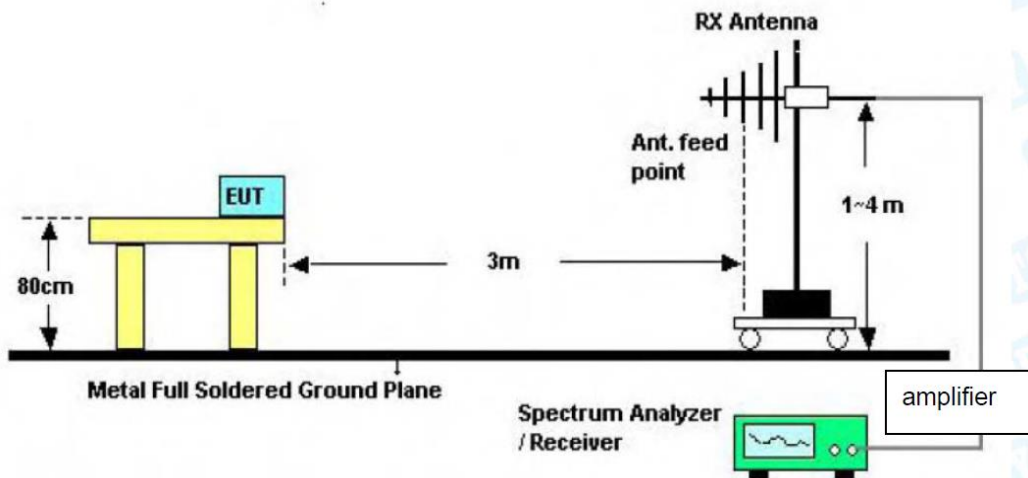
transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

6.2 Test Setup

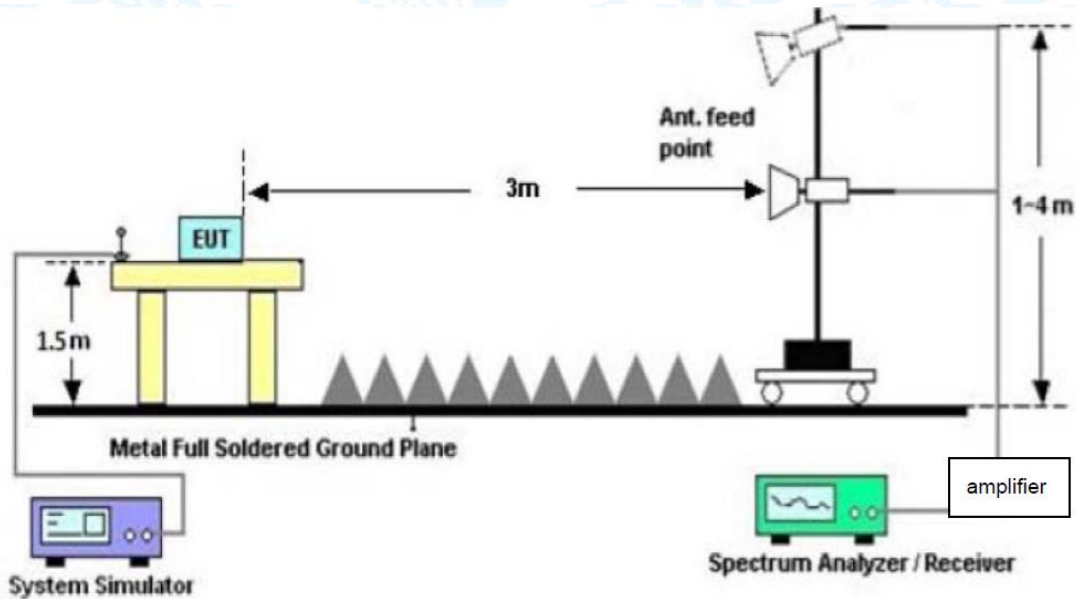
Radiated measurement



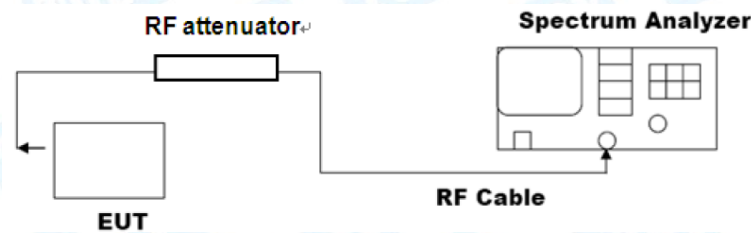
Below 30MHz Test Setup



Below 1000MHz Test Setup



**Above 1GHz Test Setup
Conducted measurement**



6.3 Test Procedure

---Radiated measurement

- The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Below 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode

measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.

- Testing frequency range 30MHz-1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection. Testing frequency range 9KHz-150Hz the measuring instrument use VBW=200Hz with Quasi-peak detection. Testing frequency range 9KHz-30MHz the measuring instrument use VBW=9kHz with Quasi-peak detection.

- Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

- For the actual test configuration, please see the test setup photo.

--- Conducted measurement**● Reference level measurement**

Establish a reference level by using the following procedure:

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set the span to ≥ 1.5 times the DTS bandwidth.
- c) Set the RBW = 100 kHz.
- d) Set the VBW $\geq [3 \cdot \text{RBW}]$.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

● Emission level measurement

Establish an emission level by using the following procedure:

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW $\geq [3 \cdot \text{RBW}]$.
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Mode

Please refer to the description of test mode.

6.6 Test Data

Radiated measurement please refer to the Attachment B inside test report.

Conducted measurement please refer to the Appendix A.

7. Emissions in Restricted Bands

7.1 Test Standard and Limit

7.1.1 Test Standard

FCC Part 15.205 & FCC Part 15.247(d)

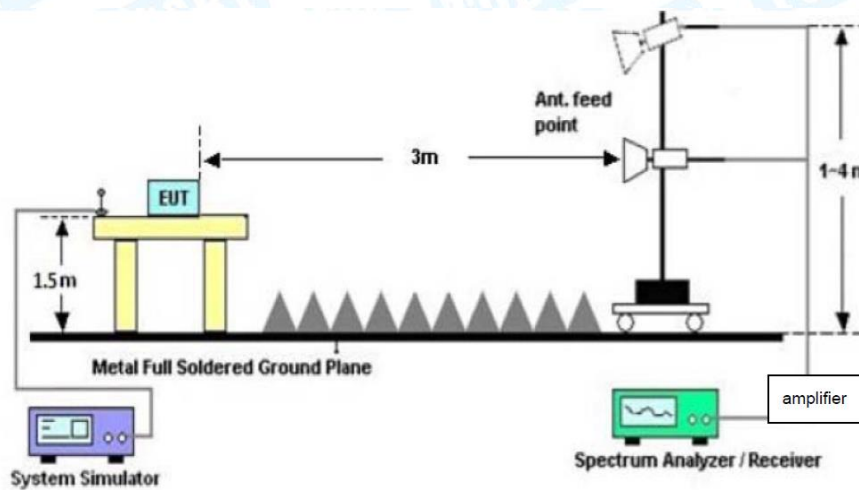
7.1.2 Test Limit

Restricted Frequency Band (MHz)	Distance Meters(at 3m)	
	Peak (dBuV/m)	Average (dBuV/m)
2310 ~2390	74	54
2483.5 ~2500	74	54
	Peak (dBm) _{see 7.3 e)}	Average (dBm) _{see 7.3 e)}
2310 ~2390	-41.20	-21.20
2483.5 ~2500	-41.20	-21.20

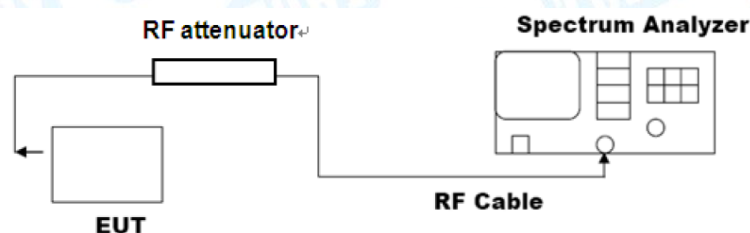
Note: According the ANSI C63.10 11.12.2 antenna-port conducted measurements may also be used as an alternative to radiated measurements for determining compliance in the restricted frequency bands requirements. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case emissions is required.

7.2 Test Setup

Radiated measurement



Conducted measurement



7.3 Test Procedure

---Radiated measurement

- Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- The Peak Value and average value both need to comply with applicable limit above 1 GHz.
- Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- For the actual test configuration, please see the test setup photo.

--- Conducted measurement

- a) Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 11.12.2.3 through 11.12.2.5 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP (see 11.12.2.6 for guidance on determining the applicable antenna gain).
- c) Add the appropriate maximum ground reflection factor to the EIRP (6 dB for frequencies ≤ 30 MHz; 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive; and 0 dB for frequencies > 1000 MHz).
- d) For MIMO devices, measure the power of each chain and sum the EIRP of all chains in linear terms (i.e., watts and mW).
- e) Convert the resultant EIRP to an equivalent electric field strength using the following relationship:

$$E = \text{EIRP} - 20 \log d + 104.8$$

where

E is the electric field strength in dBuV/m

EIRP is the equivalent isotropically radiated power in dBm

d is the specified measurement distance in m

- f) Compare the resultant electric field strength level with the applicable regulatory limit.
- g) Perform the radiated spurious emission test.