

TEST REPORT

Application No.:

KSCR2506001283AT

FCC ID:

2BO4C-HAR5GSM009

Applicant:

Harman Connected Services Inc.

Address of Applicant:

445 Indio Way Sunnyvale California United States 94085

Manufacturer:

Harman Connected Services Inc.

Address of Manufacturer:

445 Indio Way Sunnyvale California United States 94085

Equipment Under Test (EUT):

5G NR Femtocell

EUT Name:

HCS-NW-FEMTO009

Model No.:**Trade mark:****Standard(s) :**

47 CFR Part 2

47 CFR Part 27M

Date of Receipt:

2025-06-16

Date of Test:

2025-06-17 to 2025-06-20

Date of Issue:

2025-06-23

Test Result:**Pass**

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

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Revision Record			
Version	Description	Date	Remark
00	Original	2025-06-23	/

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



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2 Test Summary

Test Item	FCC Rule No.	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50	PASS
Peak-Average Ratio	§27.50	PASS
Bandwidth	§2.1049	PASS
Band Edge Compliance	§2.1051, §27.53	PASS
Spurious emissions at antenna terminals	§2.1051, §27.53	PASS
Field strength of spurious radiation	§2.1051, §27.55	PASS
Frequency stability	§2.1055, §27.54	PASS

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4 General Information

4.1 General Description of E.U.T.

Power Supply:	DC 12V by Adapter Adapter information: Model: KPL-060F-VI Input: AC 100-240V, 50/60Hz, 1.7A Output: DC 12V, 5A, 60W
Test Voltage:	AC 120V/60Hz

4.2 Details of E.U.T.

Product Name:	5G NR Femtocell
Model No.:	HCS-NW-FEMTO009
Antenna Type:	External Antenna
Antenna Gain:	2dBi (Provided by manufacturer)
Number of Carriers:	1CC
Support Bandwidth:	20MHz, 40MHz, 60MHz, 80MHz, 100MHz
Subcarrier spacing:	30kHz
Type of Modulation:	QPSK, 16QAM, 64QAM, 256QAM
Frequency Band:	NR Band n41
Frequency Range:	2496MHz-2690MHz
Normal Output Power per Antenna Port:	24±1dBm
Antenna Delivery:	SISO, 2T2R MIMO

Note: The antenna gain value is provided by the customer. The test lab will not be responsible for wrong test result due to incorrect information about antenna gain values.

4.3 Test Frequency

NR Band n41 (2496-2690MHz)	Carrier	Bandwidth (MHz)	Frequency (MHz)		
			Bottom Channel	Middle Channel	Top Channel
	1CC	20	2506.02	2592.99	2679.99
	1CC	40	2516.01	2592.99	2670
	1CC	60	2526	2592.99	2659.98
	1CC	80	2536.02	2592.99	2649.99
	1CC	100	2546.01	2592.99	2640



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4.4 Test Support Unit

Description	Manufacture	Model No.	S/N
Notebook	LENOVO	K27	EB24537645

4.5 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.



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4.6 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.

4.7 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.

4.8 Deviation from Standards

None

4.9 Abnormalities from Standard Conditions

None



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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	01/15/2025	01/14/2026
4	Signal Generator	R&S	SMBV100B	KSEM032	02/19/2025	02/18/2026
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	02/19/2025	02/18/2026
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	01/14/2025	01/13/2026
14	Attenuator	junke	DTS200G-30-1N	KSEM025-10	04/15/2025	04/14/2026
15	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	08/26/2024	08/25/2025
16	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	02/26/2025	02/25/2026
17	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	02/18/2025	02/17/2026
3	Signal Generator	Agilent	E8257C	KS301066	08/05/2024	08/04/2025
4	Loop Antenna	COM-POWER	AL-130R	KUS1806E001	03/01/2025	02/28/2027
5	Bilog Antenna	TESEQ	CBL 6112D	KUS1806E005	06/29/2023	06/28/2025
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	03/23/2024	03/22/2026
7	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	01/07/2024	01/06/2026
8	Amplifier(30MHz~18GHz)	PANSHAN TECHNOLOGY	LNA:1~18G	KSEM010-1	01/15/2025	01/14/2026
9	Amplifier(18~40GHz)	TST	LNA180400G40	KSEM038	08/12/2024	08/11/2025
10	RE Test Cable	REBES MICROWAVE	/	CZ301097	11/10/2024	11/09/2025
11	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	02/26/2025	02/25/2026
12	Software	Faratronic	EZ_EMCA-3A1	/	N/A	N/A

6 Radio Spectrum Matter Test Results

6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §27.50

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: EIRP \leq 63dBm

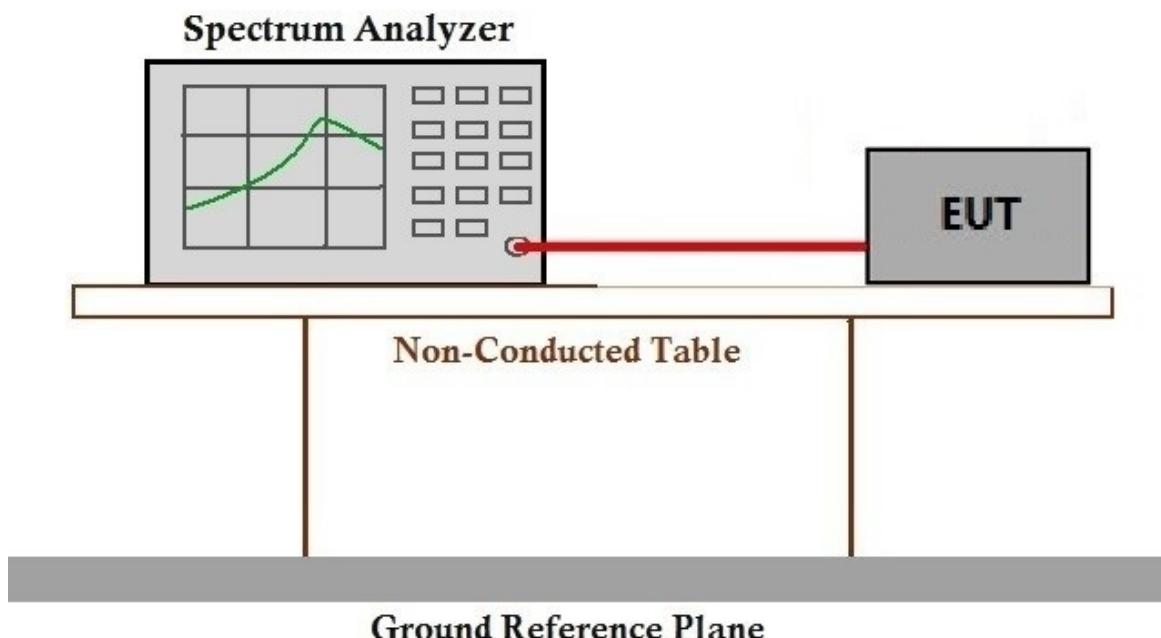
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.1.2 Test Setup Diagram





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6.1.3 Measurement Data

Test Procedure:

Many contemporary EUTs utilize multiple output ports to accommodate multiple-input and multiple-output (MIMO) technologies. In these cases it may be necessary to measure the RF power at each output port and then sum the measured power levels (in linear terms) to determine the effective total RF output power.

EUT supports MIMO and each antenna port is the same, according to C63.26 6.4, a coefficient is added to the single antenna port power to calculate the total power. 2x2 MIMO add $10\lg(2)=3.01$ dB, 4x4 MIMO add $10\lg(4)=6.02$ dB.

Please refer to Appendix

6.2 Peak-Average Ratio

Test Requirement: §27.50

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: ≤13dB

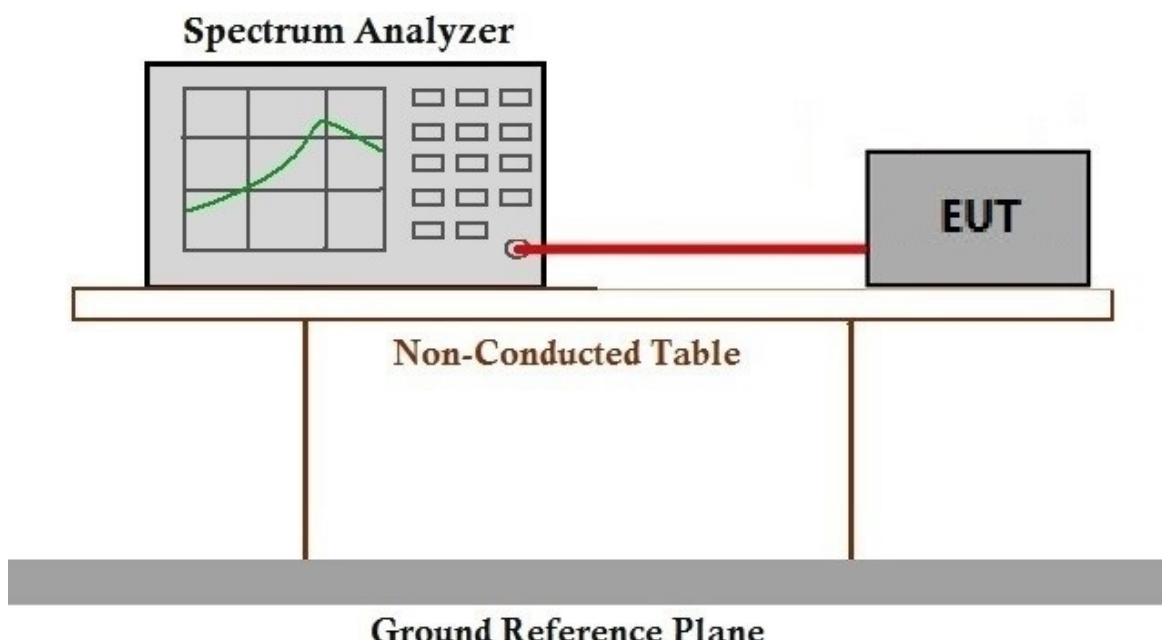
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.2.2 Test Setup Diagram



6.2.3 Measurement Data

Please refer to Appendix

6.3 Bandwidth

Test Requirement:

§2.1049

Test Method:

ANSI C63.26, KDB 971168 D01 v03

Limit:

OBW: No limit

EBW: No limit

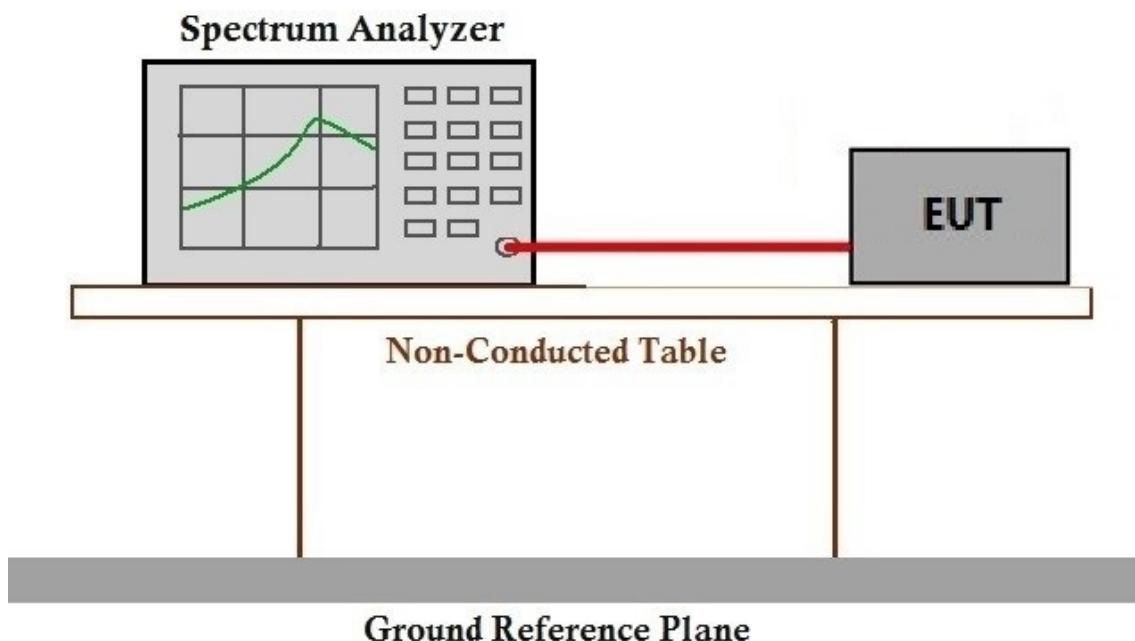
6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.3.2 Test Setup Diagram



6.3.3 Measurement Data

Please refer to Appendix

6.4 Band Edge Compliance

Test Requirement: §2.1051, §27.53

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: $\leq -13\text{dBm/MHz}$

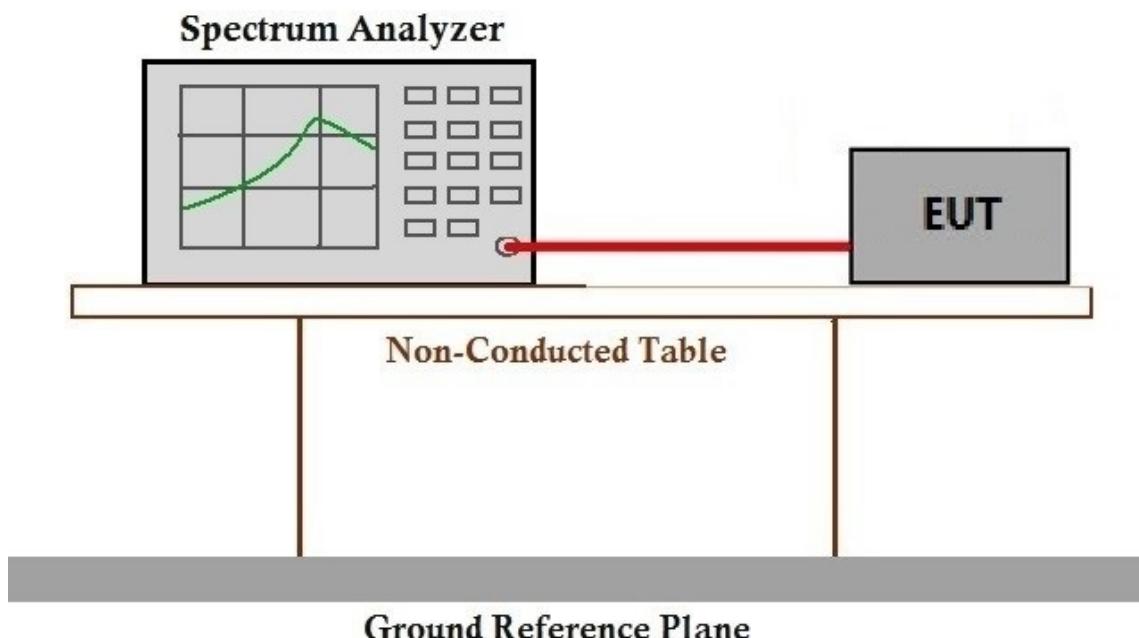
6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.4.2 Test Setup Diagram



6.4.3 Measurement Data

Please refer to Appendix

6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §27.53

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: $\leq -13\text{dBm/MHz}$

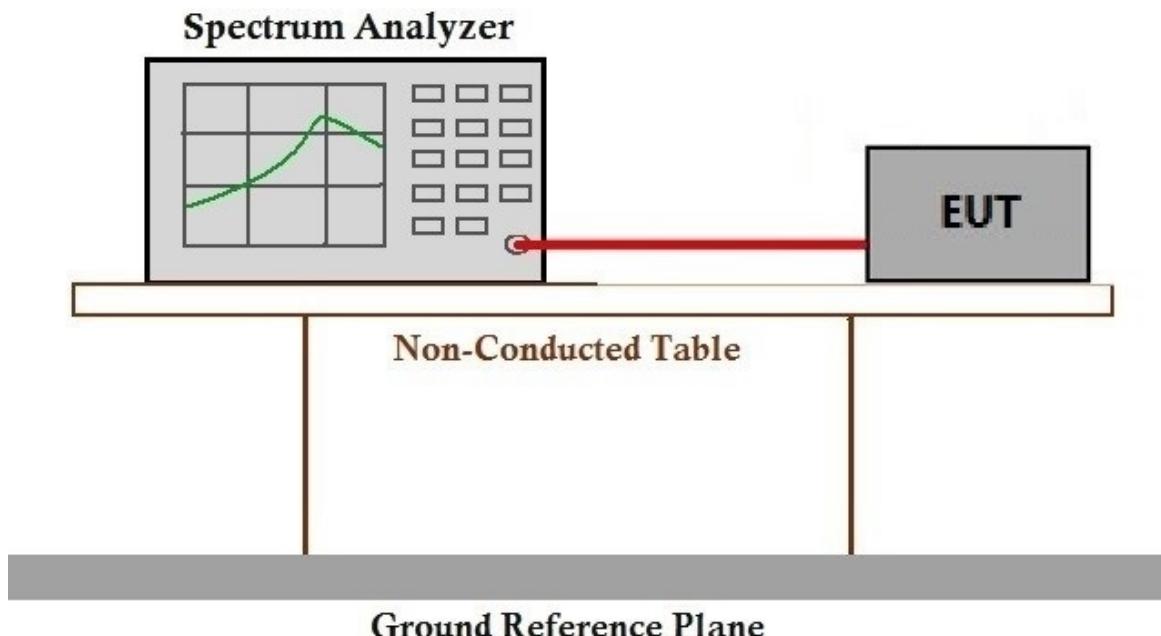
6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.5.2 Test Setup Diagram



6.5.3 Measurement Data

Please refer to Appendix

6.6 Field strength of spurious radiation

Test Requirement: §2.1051, §27.55

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: $\leq -13\text{dBm/MHz}$

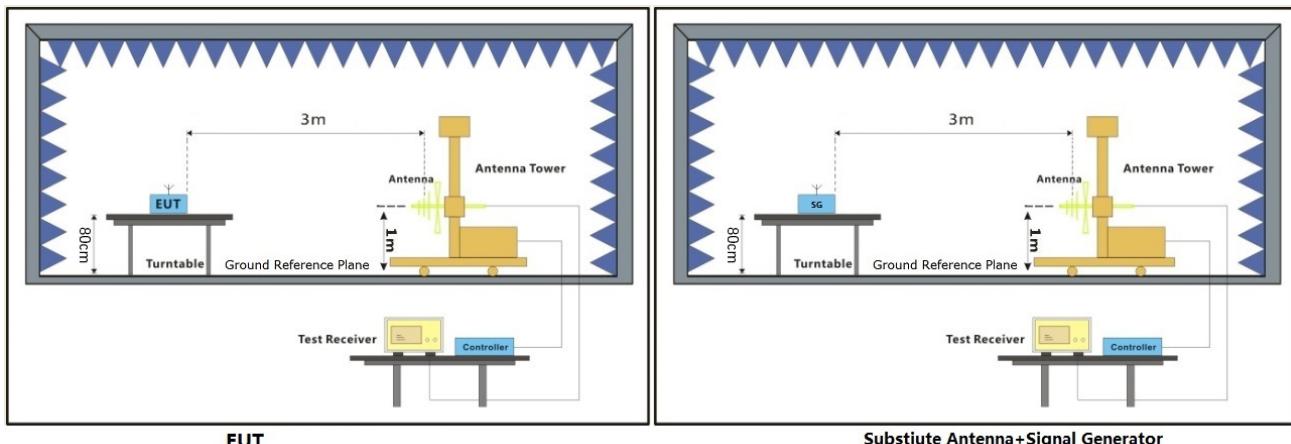
6.6.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.6.2 Test Setup Diagram



6.6.3 Measurement Procedure and Data

Test Procedure:

- (1)On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
- (2)The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3)The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4)The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5)The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6)The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7)The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8)The maximum signal level detected by the measuring receiver shall be noted.
- (9)The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11)The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12)The substitution antenna shall be connected to a calibrated signal generator.
- (13)If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14)The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15)The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16)The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17)The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

Please refer to Appendix

6.7 Frequency stability

Test Requirement: §2.1055, §27.54

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Fundamental emission stays within authorized frequency block

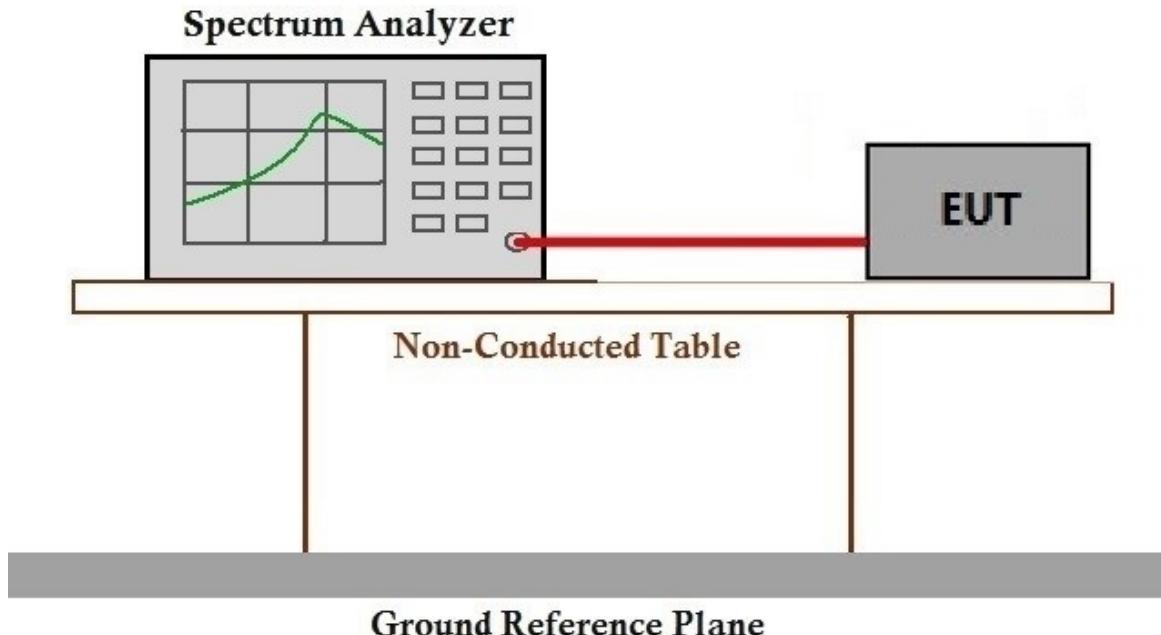
6.7.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.7.2 Test Setup Diagram



6.7.3 Measurement Data

Please refer to Appendix



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7 Test Setup Photographs

Refer to the < Test Setup photos>.

8 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -