

Test Report No:
2510060R-RFUSV03S-A

TEST REPORT

(Class II Permissive Change)

Product Name	Wi-Fi & Bluetooth Module
Brand Name	Quectel
Model No.	FGM840R
FCC ID	XMR2024FGM840R
Applicant's Name / Address	Quectel Wireless Solutions Company Limited Building 5, Shanghai Business Park Phasell (Area B),No.1016 Tianlin Road, Minhang District, Shanghai, 200233 China
Manufacturer's Name	Quectel Wireless Solutions Co.,Ltd
Test Method Requested, Standard	FCC CFR Title 47 Part 15 Subpart E Section 15.407 ANSI C63.10-2013
Verdict Summary	IN COMPLIANCE
Documented By Ida Tung	<i>Ida Tung</i>
Tested By Ivan Chuang	<i>Ivan Chuang</i>
Approved By Alan Chen	<i>Alan Chen</i>
Date of Receipt	2025/01/03
Date of Issue	2025/05/13
Report Version	V1.0

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Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

General Conditions

1. The test results relate only to the samples tested.
2. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	2025/05/13

Permissive Change

Report No.	Version	Description	Issued Date
2510060R-RFUSV03S-A	V1.0	The major change filed under this application is: Change #1: Add a new antenna type (PIFA). Change #2: Add a new host: LDC-U4.	2025/05/13

Summary of Test Result

Report Clause	Test Items	Result (PASS/FAIL)	Remark
0	Emission Bandwidth	PASS	-
4	Maximum Conducted Output Power	PASS	-
5	Transmitter Radiated Spurious Emission	PASS	-

Comments and Explanations

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1. General Information

1.1. EUT Description

Frequency Range	5150 ~ 5250 MHz 5250 ~ 5350 MHz 5470 ~ 5725 MHz 5725 ~ 5850 MHz	
Operating Frequency / Channel Number	IEEE 802.11a/n (20 MHz)	5180 ~ 5240 MHz / 4 Channels 5260 ~ 5320 MHz / 4 Channels 5500 ~ 5700 MHz / 11 Channels 5745 ~ 5825 MHz / 5 Channels
	IEEE 802.11n (40 MHz)	5190 ~ 5230 MHz / 2 Channels 5270 ~ 5310 MHz / 2 Channels 5510 ~ 5670 MHz / 5 Channels 5755 ~ 5795 MHz / 2 Channels
Type of Modulation	IEEE 802.11a/n	OFDM-BPSK, QPSK, 16QAM, 64QAM

Antenna Information					
Item	Brand Name	Model No.	Type	Antenna Gain (dBi)	
1	AWAN	025.902K4.0001	PIFA	U-NII 1	1.86
				U-NII 2A	2.31
				U-NII 2C	3.00
				U-NII 3	3.04
2	SPEEDWIRE	025.902K5.0001	PIFA	U-NII 1	2.31
				U-NII 2A	2.63
				U-NII 2C	2.51
				U-NII 3	2.39

Note:

1. IEEE 802.11a/n Mode: (1TX, 1RX)
2. Only the higher gain antenna was tested and recorded in this report.

1.2. EUT Information

EUT Power Type	DC 3.0 ~ 3.6 V			
EUT Function	<input checked="" type="checkbox"/>	Point-to-multipoint	<input type="checkbox"/>	Point-to-point
	<input checked="" type="checkbox"/>	IP Based (Load Based)	<input type="checkbox"/>	Frame Based
TPC Function	<input type="checkbox"/>	With TPC Function	<input checked="" type="checkbox"/>	Without TPC Function
Weather Band (5600 ~ 5650 MHz)	<input checked="" type="checkbox"/>	With 5600 ~ 5650 MHz	<input type="checkbox"/>	Without 5600 ~ 5650 MHz

1.3. Testing Location Information

USA	FCC Designation Number: TW0033
Canada	CAB Identifier Number: TW3023 / Company Number: 26930

Site Description	Accredited by TAF
	Accredited Number: 3023

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
	Linkou Laboratory
Address	No. 85, Wenlin St., Linkou Dist., New Taipei City 244017, Taiwan
Performed Location	No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan
Phone Number	+886-3-275-7255
Fax Number	+886-3-327-8031

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual	Test Date
RF Conducted Emission	Temperature (°C)	10~40 °C	24.3 °C	2025/03/07 ~ 2025/03/11
	Humidity (%RH)	10~90 %	51.5 %	
Radiated Emission	Temperature (°C)	10~40 °C	24.2 °C	2025/03/18 ~ 2025/03/19
	Humidity (%RH)	10~90 %	39.2 %	

1.4. Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty
Emission Bandwidth	± 1580.61 Hz
Maximum Conducted Output Power	Spectrum Analyzer: ± 2.13 dB Power Meter: ± 1.07 dB
Transmitter Radiated Spurious Emission	9 kHz~30 MHz: ± 3.30 dB 30 MHz~1 GHz: ± 4.79 dB 1 GHz~18 GHz: ± 4.17 dB 18 GHz~40 GHz: ± 3.32 dB
Duty Cycle	± 0.51 %

1.5. List of Test Equipment

For Conducted Measurements / HY-SR02

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
V	Spectrum Analyzer	R&S	FSV30	103466	2024/12/18	2025/12/17
V	Spectrum Analyzer	KEYSIGHT	N9010A	MY53470892	2024/10/30	2025/10/29
V	Peak Power Analyzer	KEYSIGHT	8990B	MY51000539	2024/05/07	2025/05/06
V	Wideband Power Sensor	KEYSIGHT	N1923A	MY59240002	2024/05/08	2025/05/07
V	Wideband Power Sensor	KEYSIGHT	N1923A	MY59240003	2024/05/08	2025/05/07

Note:

1. All equipment is calibrated every year.
2. The test instruments marked with "V" are used to measure the final test results.
3. Test Software Version : DTC_RF_Tool_Release V100

For Radiated Measurements /HY-CB03

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
V	Loop Antenna	TESEQ	HLA6121	49611	2025/02/18	2026/02/17
V	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-0675	2023/08/09	2025/08/08
V	Horn Antenna	Com-Power	AH-840	101101	2023/12/04	2025/12/03
V	Horn Antenna	RF SPIN	DRH18-E	210507A18ES	2024/05/15	2025/05/14
V	Pre-Amplifier	SGH	SGH0301-9	20211007-11	2025/01/10	2026/01/09
V	Pre-Amplifier	SGH	PRAMP118	20200701	2025/01/10	2026/01/09
V	Pre-Amplifier	EMCI	EMC05820SE	980310	2025/01/10	2026/01/09
V	Pre-Amplifier	EMCI	EMC184045SE	980369	2025/01/10	2026/01/09
V	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160311	2025/01/10	2026/01/09
V	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242	2025/01/10	2026/01/09
	Filter	MICRO TRONICS	BRM20887	G003	2025/01/05	2026/01/04
V	Filter	MICRO TRONICS	BRM50716	G196	2025/01/05	2026/01/04
V	EMI Test Receiver	R&S	ESR3	102793	2024/12/06	2025/12/05
V	Spectrum Analyzer	R&S	FSV3044	101114	2025/02/26	2026/02/25
V	Coaxial Cable	SGH	SGH18	2021005-1	2025/01/10	2026/01/09
V	Coaxial Cable	SGH	SGH18	202108-4	2025/01/10	2026/01/09
V	Coaxial Cable	SGH	HA800	GD20110223-1	2025/01/10	2026/01/09
V	Coaxial Cable	SGH	HA800	GD20110222-8	2025/01/10	2026/01/09

Note:

1. Bi-Log Antenna and Horn Antenna(AH-840) are calibrated every two years, the other equipment is calibrated every year.
2. The test instruments marked with "V" are used to measure the final test results.
3. Test Software Version: e3 230303 dekra V9.

2. Test Configuration of EUT

2.1. Test Condition

EUT Operational Condition	
Testing Voltage	DC 3.3 V

2.2. Test Frequency Mode

Test Software Version	AmebaD_mptool / Version 2V1
-----------------------	-----------------------------

Modulation	Frequency (MHz)	Power Setting
802.11a (20 MHz)	5180	115
	5200	127
	5240	126
	5260	127
	5300	125
	5320	107
	5500	99
	5580	118
	5700	84
	5745	110
	5785	109
	5825	110
802.11n (20 MHz)	5180	112
	5200	127
	5240	125
	5260	127
	5300	125
	5320	105
	5500	96
	5580	119
	5700	88
	5745	108
	5785	110
	5825	112
802.11n (40 MHz)	5190	92
	5230	112
	5270	114
	5310	94
	5510	84
	5550	106
	5670	95
	5755	101
	5795	105

2.3. Duty Cycle

Modulation	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	VBW (Hz)
802.11a (20 MHz)	2.0480	2.2000	93.09	0.31	500
802.11n (20 MHz)	1.9100	2.0500	93.17	0.31	1000
802.11n (40 MHz)	0.9350	1.0750	86.98	0.61	2000



2.4. Measurement Configuration

Test Mode	Mode 1 (Transmit)	802.11a (20 MHz)
		802.11n (20 MHz)
		802.11n (40 MHz)

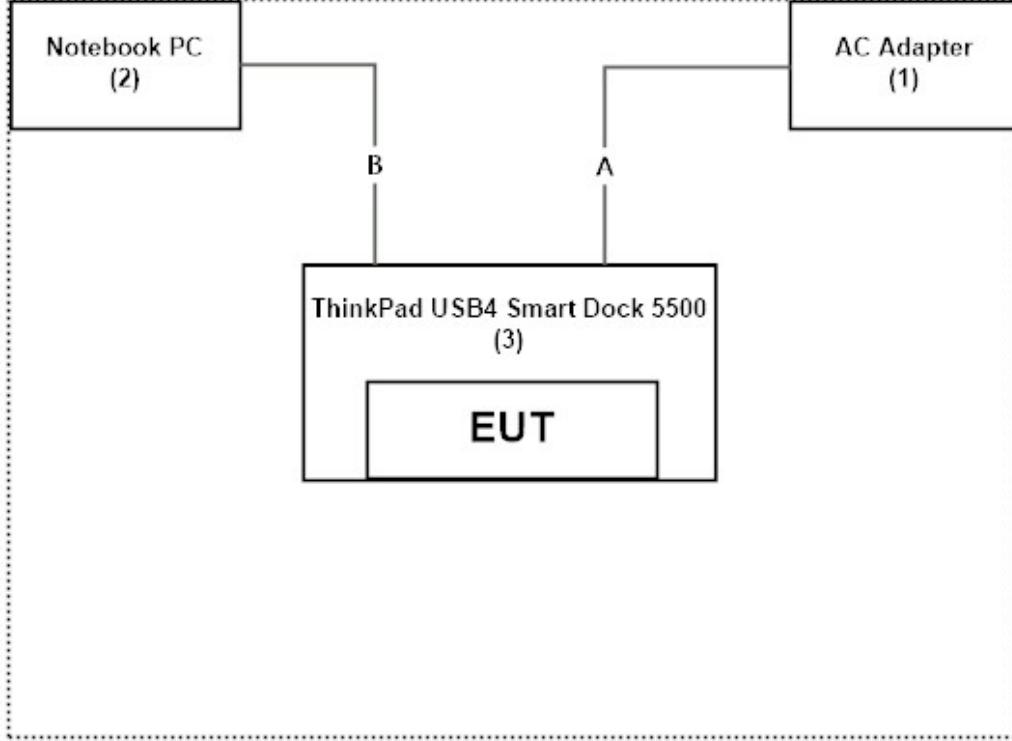
Note:

1. Determining compliance shall be based on the results of the compliance measurement, without taking measurement instrumentation uncertainty into account.
2. For radiated emissions below 1 GHz, all modes of operation were investigated, and the worst-case emissions are reported.
3. The lowest data rates are tested in each mode. Only the worst case is shown in the report.
(802.11a is 6Mbps, 802.11 n is MCS0)

2.5. Tested System Details

No.	Equipment	Brand Name	Model No.	Serial No.	Power Cord
1	AC Adapter	Lenovo	ADL135SDC3A	N/A	N/A
2	Notebook PC	ASUS	P5430U	G8NXCV07J11032C	N/A
3	ThinkPad USB4 Smart Dock 5500	Lenovo	LDC-U4	N/A	N/A

2.6. Configuration of tested System

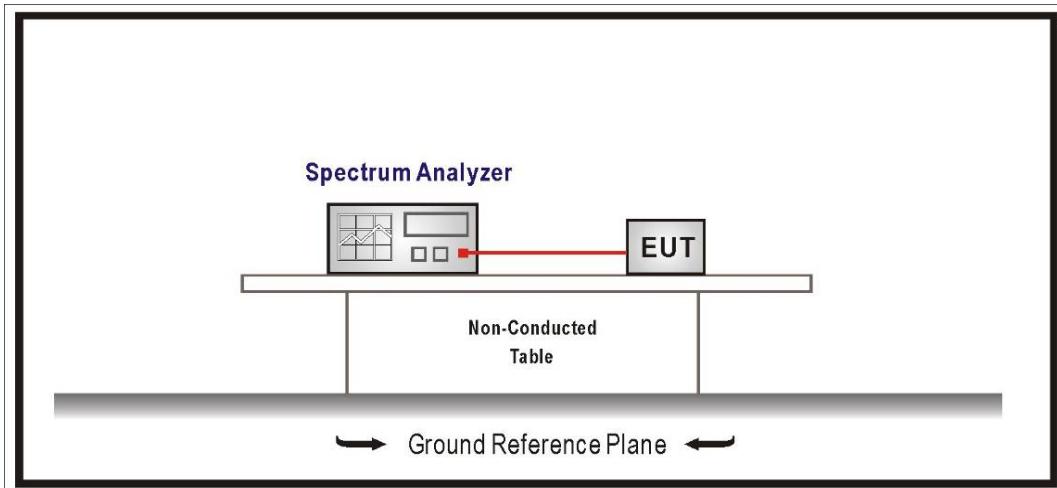
Connection Diagram							
							
<table border="1"> <thead> <tr> <th>Signal Cable Type</th><th>Signal cable Description</th></tr> </thead> <tbody> <tr> <td>A Power Cable</td><td>Non-shielded, 1.7m, with one ferrite core bonded.</td></tr> <tr> <td>B USB Cable</td><td>Shielded, 1m</td></tr> </tbody> </table>	Signal Cable Type	Signal cable Description	A Power Cable	Non-shielded, 1.7m, with one ferrite core bonded.	B USB Cable	Shielded, 1m	
Signal Cable Type	Signal cable Description						
A Power Cable	Non-shielded, 1.7m, with one ferrite core bonded.						
B USB Cable	Shielded, 1m						

2.7. EUT Operating Procedures

1	Setup the EUT as shown in Section 2.6.
2	Execute software “AmebaD_mptool / Version 2V1” on the Notebook PC.
3	Configure the test mode, the test channel, and the data rate.
4	Press “OK” to start the continuous Transmit.
5	Verify that the EUT works properly.

3. Emission Bandwidth

3.1. Test Setup



3.2. Test Limit

26 dB Bandwidth : No Required

6 dB Bandwidth \geq 500kHz

3.3. Test Procedure

26 dB Bandwidth, 99% Occupied Bandwidth :

The EUT was tested according to U-NII test procedure of KDB 789033.

Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.

6 dB Bandwidth :

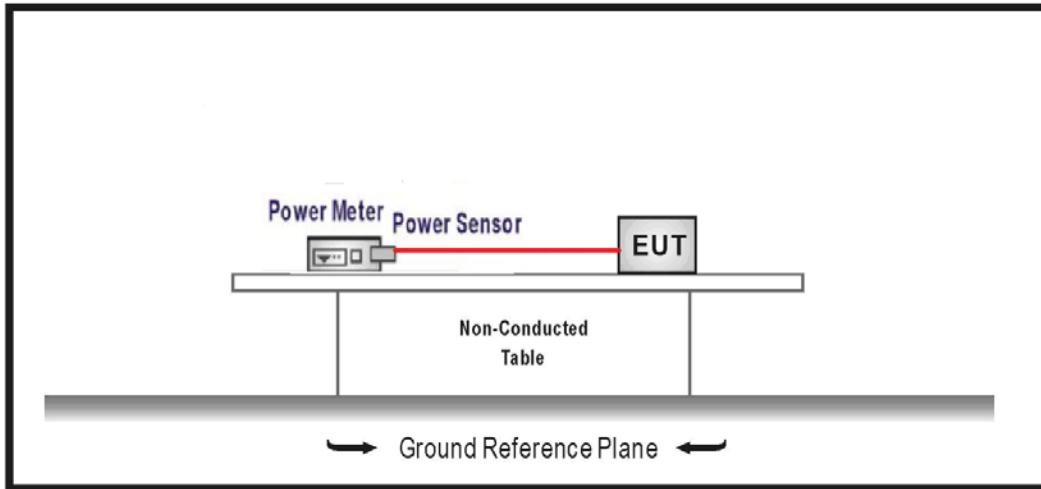
Set RBW = 100kHz, VBW \geq 3xRBW, Sweep time=Auto, Set Peak detector.

3.4. Test Result of Emission Bandwidth

Refer as Appendix A

4. Maximum Conducted Output Power

4.1. Test Setup



4.2. Test Limit

1. For an outdoor access point and an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.3. Test Procedure

The EUT was setup to ANSI C63.10: 2013; tested to U-NII test procedure of 789033.

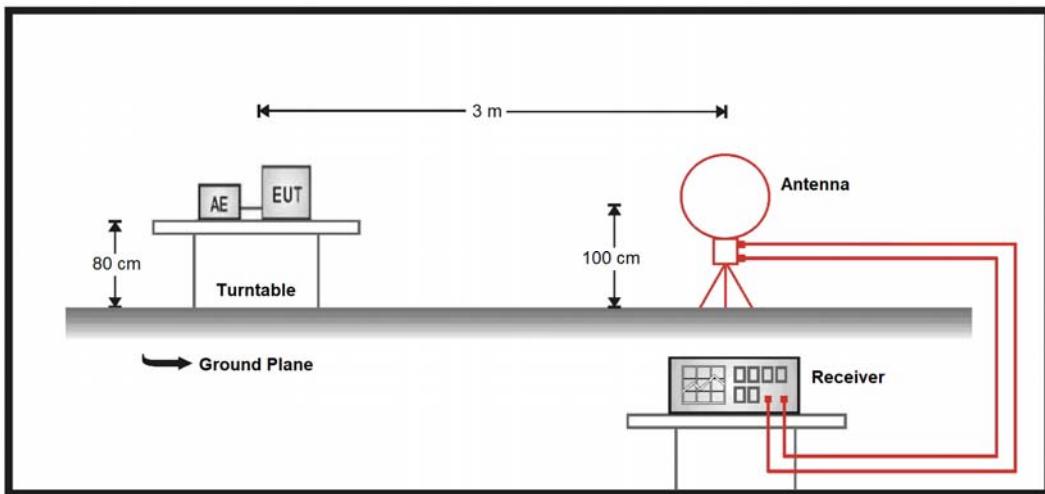
4.4. Test Result of Maximum Conducted Output Power

Refer as Appendix B

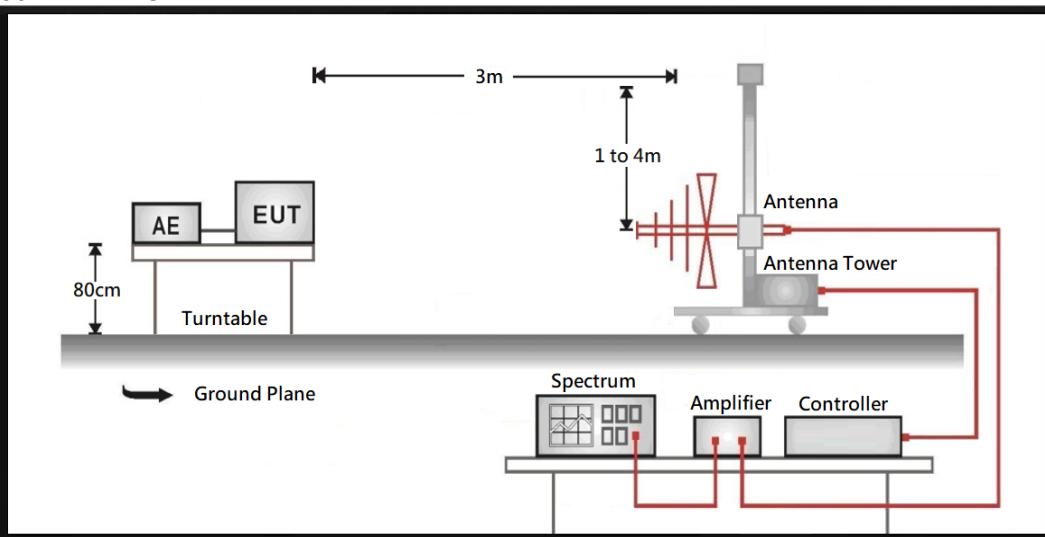
5. Transmitter Radiated Spurious Emission

5.1. Test Setup

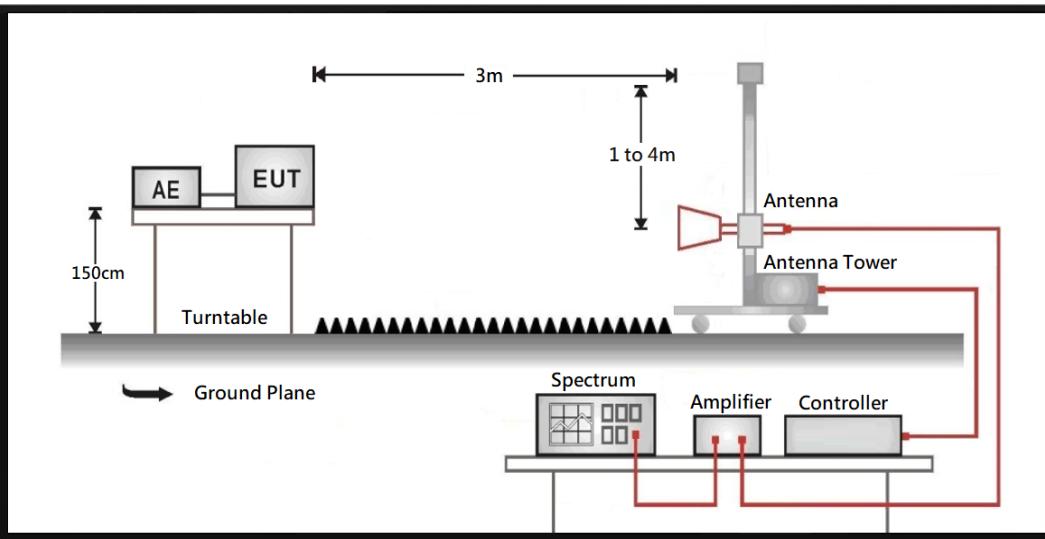
9 kHz ~ 30 MHz



30 MHz ~ 1 GHz



Above 1 GHz



5.2. Test Limit

Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	20 log (2400/F(kHz))	300
0.490 – 1.705	24000/F(kHz)	20 log (24000/F(kHz))	30
1.705 - 30	30	29.5	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Remarks:

1. Field strength (dB μ V/m) = 20 log Field strength (μ V/m)
2. In the Above Table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Unwanted Emission out of the restricted bands Test Limit

Frequency (MHz)	EIRP Limit (dBm/MHz)	Equivalent Field Strength (dB μ V/m@3m)
5150 – 5250	-27	68.2
5250 – 5350	-27	68.2
5470 – 5725	-27	68.2
5725 – 5850	-27 * ¹	68.2 * ¹
	10 * ²	105.2 * ²
	15.6 * ³	110.8 * ³
	27 * ⁴	122.2 * ⁴

*¹ beyond 75 MHz or more above of the band edge.

*² below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*³ below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*⁴ from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Remark:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \text{ uV/m, where } P \text{ is the eirp (Watts).}$$

5.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The additional latch filter below 1 GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

The bandwidth below 1 GHz setting on the field strength meter is 120 kHz, above 1 GHz are 1 MHz.

The frequency range from 9 kHz to 10th harmonics and included The frequency range from the lowest oscillator frequency generated within the device up to the 10th harmonic was checked is checked.

5.4. Test Result of Transmitter Radiated Spurious Emission

Refer as Appendix C