

Prüfbericht-Nr.: Test report no.:	CN22BXOF(P15C-WiFi) 001	Auftrags-Nr.: Order no.:	238542281	Seite 1 von 24 Page 1 of 24
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2022-04-14	
Auftraggeber: Client:	Microchip Technology Inc. 2355 West Chandler Blvd. Chandler, Arizona 85224-6199, United States.			
Prüfgegenstand: Test item:	IEEE 802.11 b/g/n Link Controller Module With Integrated Bluetooth			
Bezeichnung / Typ-Nr.: Identification / Type no.:	ATWILC3000-MR110UA			
Auftrags-Inhalt: Order content:	FCC Part 15C Test report (WiFi 2.4GHz)			
Prüfgrundlage: Test specification:	FCC 47CFR Part 15: Subpart C Section 15.247			
Wareneingangsdatum: Date of sample receipt:	2022-05-20			
Prüfmuster-Nr.: Test sample no.:	A003264661-001			
Prüfzeitraum: Testing period:	2022-05-31 - 2022-07-15			
Ort der Prüfung: Place of testing:	EMC/RF Taipei Testing Site			
Prüflaboratorium: Testing laboratory:	Taipei Testing Laboratories			
Prüfergebnis*: Test result*:	Pass			
zusammengestellt von: compiled by:	genehmigt von: authorized by:			
Datum: Date:	2022-07-20	Ausstellungsdatum: Issue date:	2022-07-20	
Stellung / Position:	Project Manager	Stellung / Position:	Senior Project Manager	
Sonstiges / Other:	This is an updated reprot for 2 nd source crystal and 2 nd source RF inductors change, so we only evaluate and verify the output power and RSE tests. The other test results are all referred to the original report no. 50141823 001.			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.				

V05

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.247(b) & 15.203	Antenna Requirement	Pass
5.1.2	15.247(b)(3)	Peak Output Power	Pass
-	15.247(a)(2)	6 dB Bandwidth	Refer to reprt no. 50141823 001
-	2.1049	99% Occupied Bandwidth	
-	15.247(e)	Power Spectral Density	
-	15.247(d)	Conducted Spurious Emissions and Band Edges	
5.1.3	15.247(d) & 15.205 & 15.209	Radiated Spurious Emissions and Band Edges	Pass
-	15.207	Mains Conducted Emission	Refer to reprt no. 50141823 001

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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APPENDIX B - TEST RESULT OF RADIATED Emissions for Ant No. 6

APPENDIX C - TEST RESULT OF RADIATED Emissions for Ant No. 9

APPENDIX SP - Photographs of Test Setup

APPENDIX EP - Photographs of EUT

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HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN22BXOF(P15C-WiFi) 001	Original Release	2022-07-20

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A - Test Result of Radiated Emissions for Ant No. 4

Appendix B - Test Result of Radiated Emissions for Ant No. 6

Appendix C - Test Result of Radiated Emissions for Ant No. 9

Appendix SP - Photographs Test Setup

Appendix EP - Photographs of EUT

Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.247
FCC 47CFR Part 2: Subpart J Section 2.1049
ANSI C63.10:2013
KDB 558074 D01 15.247 Meas Guidance v05r02

1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 226631
ISED Registration No.: 25563

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.30 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.30 dB
Radiated Emission (1 GHz ~ 18 GHz)	± 1.54 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.52 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is an IEEE 802.11 b/g/n Link Controller Module With Integrated Bluetooth .
It contains a WLAN compatible module enabling the user to communicate data through a Wireless interface. For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	IEEE 802.11 b/g/n Link Controller Module With Integrated Bluetooth
Type Identification	ATWILC3000-MR110UA
FCC ID	2ADHKWILC3000U

Technical Specification of EUT

Item	EUT information
Operating Frequency	2412 MHz ~ 2462 MHz
Channel Spacing	5 MHz
Channel Number	802.11b/g/n HT20: 11 802.11n HT40: 7
Data Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS7
Operation Voltage	2.5Vdc to 4.2Vdc (Typical = 3.3Vdc)
Modulation	DSSS (DBPSK, DQPSK, CCK) OFDM (BPSK, QPSK, 16QAM, 64QAM)
Maximum Output Power (mW)	802.11b: 111.17 802.11g: 251.77 802.11n HT20: 245.47
Antenna Information	Refer to Note 1
Accessory Device	Refer to 4.4

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Note 1: External Antenna List

Antennas no. 4, 6 and 9 selected for testing as worst case antennas

Antenna No.	P/N	Vendor	Antenna Gain @ 2.4GHz Band	Antenna type	Remarks
1	W3525B039	Pulse Electronics Corporation	2 dBi	PCB	Cable length 100mm
2	RN-SMA-4	Microchip	2.2 dBi	Dipole	
3	RFDP A870920IMLB 301	WALSIN	1.84 dBi	Dipole-DB	Dual Band
4	RFMTA331215IMAB 701	WALSIN	3.8 dBi	Metal Stamp	Cable length 150mm
5	RFMTA331240IMAB 701	WALSIN	3.0 dBi	Metal Stamp	Antenna same as S1No.4, cable length 400 mm
6	RFPCA381013IMAB 701	WALSIN	4.50 dBi	PCB	Cable length 130mm
7	RFPCA381035IMAB 701	WALSIN	2.7 dBi	PCB	Antenna same as S1No.6, cable length 350mm
8	RFA-02-3-C5H1	Aristotle	3 dBi	Dipole	
9	RFA-02-5-C7H1	Aristotle	5 dBi	Dipole-Long	
10	RFA-02-P33	Aristotle	2 dBi	PCB	Cable length 150mm
11	1461530100	Molex	3 dBi	PCB/Flexi	Cable length 100mm Dual Band
12	RN-SMA-S	Microchip	0.56 dBi	Dipole-short	
13	RN-SMA-7	Microchip	5 dBi	Dipole-Long	
14	RFA-02-5-F7H1	Aristotle	5 dBi	Dipole-Long	
15	RFA-02-D3	Aristotle	2 dBi	Dipole-no encl.	
16	RFA-02-G03	Aristotle	2 dBi	Metal Stamp	Cable length 150mm
17	RFA-02-L2H1	Aristotle	2 dBi	Dipole	
18	RFA-02-P05	Aristotle	2 dBi	PCB	Cable length 150mm
19	RFA-02-C2M2	Aristotle	2 dBi	Dipole	

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The test modes were adapted accordingly in reference to the instructions for use.

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output expected by the customer and is going to be fixed on the firmware of the final end product.

Table for Parameters of Test Software Setting

802.11b		802.11g		802.11n HT20	
Channel	Power Setting	Channel	Power Setting	Channel	Power Setting
1	15,18,-9.5	1	15,18,-12	1	15,18,-12
6	15,18,-9.5	6	15,18,-5.5	6	15,18,-5.5
11	15,18,-9	11	15,18,-12	11	15,18,-12

4.2 Carrier Frequency and Channel

802.11b, 802.11g and 802.11n HT20:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

4.3 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB interface which makes it possible to control them through a test software installed on a notebook computer.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed as below.

Test Software	MCHPRT2.exe
---------------	-------------

The samples were used as follows:

A003264661-001

Full test was applied on all test modes, but only worst case was shown.

Modulation Mode	Tx Function
802.11b	1TX (SISO)
802.11g	1TX (SISO)
802.11n HT20	1TX (SISO)

* The modulation and bandwidth are similar for 802.11n mode HT20 mode VHT20/VHT40, therefore investigated worse case as representative mode in test report.

EUT Configure Mode	Applicable To				Description
	Antenna Port Conducted Measurement	Radiated Spurious Emissions above 1 GHz	Radiated Spurious Emissions below 1 GHz	Mains Conducted Emission	
Ant No. 4	-	√	√	-	-
Ant No. 6	-	√	√	-	-
Ant No. 9	√	√	√	-	-
Ant No. 12	√	-	-	-	-

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on Z-plane.
2. "-" means no effect.

Antenna Port Conducted Measurement

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Date Rate (Mbps)
Ant No. 9, 12	802.11b	1 to 11	1, 6, 11	1.0
	802.11g	1 to 11	1, 6, 11	6.0
	802.11n HT20	1 to 11	1, 6, 11	MCS0

Radiated Spurious Emissions (Above 1 GHz)

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Date Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	1.0
-	802.11g	1 to 11	1, 6, 11	6.0
-	802.11n HT20	1 to 11	1, 6, 11	MCS0

Radiated Spurious Emissions (Below 1 GHz)

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Date Rate (Mbps)
-	802.11n HT20	1 to 11	6	MCS0

Test Condition

Test Item		Ambient Temperature	Relative Humidity	Tested by
Conducted Measurement		18-23 °C	58-67 %	Nick Hsu
Radiated Spurious Emissions above 1 GHz	Ant No. 4	23.3-24.1 °C	55-59 %	Ivan Chiang
	Ant No. 6	23.6-25 °C	53-56 %	
	Ant No. 9	23.6-24.8 °C	56-58 %	
Radiated Spurious Emissions below 1 GHz	Ant No. 4	23.3-24.1 °C	55-59 %	
	Ant No. 6	23.6-25 °C	53-56 %	
	Ant No. 9	23.6-24.8 °C	56-58 %	

4.4 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessory of EUT

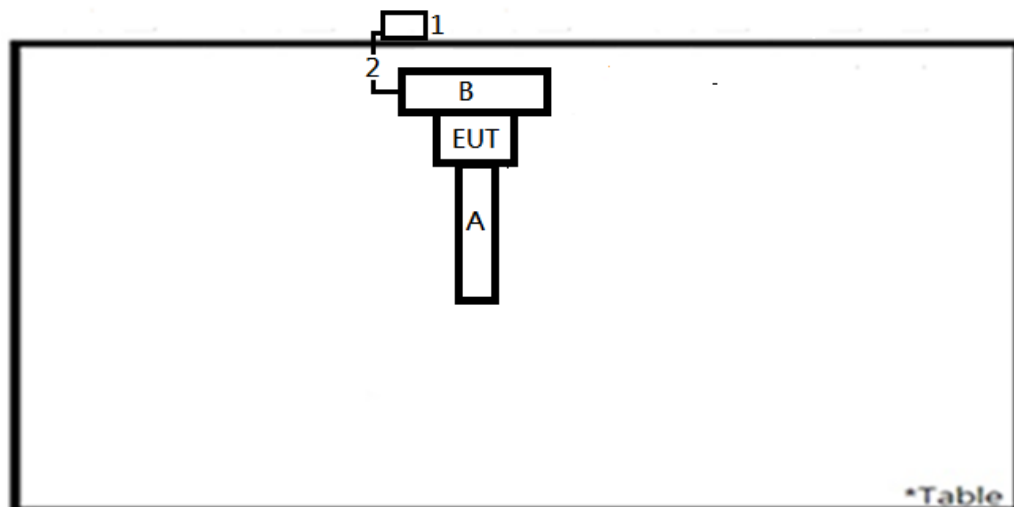
None.

Support Unit

No.	Description	Brand	Model	S/N	Remark
Radiated Test					
1	Notebook	HP	15-da1OTX	CND9111RJB	-
2	USB Cable	TUV	TUV-001	-	200 cm non-shielded cable w/o core
3	USB Cable	TUV	TUV-002	-	300 cm non-shielded cable w/o core
A	Antenna	Microchip	Refer to Antenna list no. 4, 6, 9	-	-
B	Fixture 3000	Microchip	-	-	-
C	BT Fixture	Total Phase	Aardvark I2C/SPI	-	-
Conducted Test					
-	Notebook	LENOVO	TP00094A	PF-1GT015	-

4.5 Test Setup Diagram

<Radiated Spurious Emissions mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only

According to the manufacturer declaration, the EUT has an antenna with Max directional gain of 5dBi (refer to External Antenna List). The antenna is connected through a proprietary connector with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

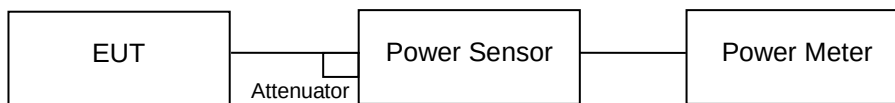
Antenna No.	P/N	Vendor	Antenna Gain @ 2.4GHz Band	Antenna type	Remarks
1	W3525B039	Pulse Electronics Corporation	2 dBi	PCB	Cable length 100mm
2	RN-SMA-4	Microchip	2.2 dBi	Dipole	--
3	RFDP A870920IMLB301	WALSIN	1.84 dBi	Dipole-DB	Dual Band
4	RFMTA331215IMAB701	WALSIN	3.8 dBi	Metal Stamp	Cable length 150mm
5	RFMTA331240IMAB701	WALSIN	3.0 dBi	Metal Stamp	Antenna same as S1No.4, cable length 400 mm
6	RFPCA381013IMAB701	WALSIN	4.50 dBi	PCB	Cable length 130mm
7	RFPCA381035IMAB701	WALSIN	2.7 dBi	PCB	Antenna same as S1No.6, cable length 350mm
8	RFA-02-3-C5H1	Aristotle	3 dBi	Dipole	--
9	RFA-02-5-C7H1	Aristotle	5 dBi	Dipole-Long	--
10	RFA-02-P33	Aristotle	2 dBi	PCB	Cable length 150mm
11	1461530100	Molex	3 dBi	PCB/Flexi	Cable length 100mm Dual Band
12	RN-SMA-S	Microchip	0.56 dBi	Dipole-short	--
13	RN-SMA-7	Microchip	5 dBi	Dipole-Long	--
14	RFA-02-5-F7H1	Aristotle	5 dBi	Dipole-Long	--
15	RFA-02-D3	Aristotle	2 dBi	Dipole-no encl.	--
16	RFA-02-G03	Aristotle	2 dBi	Metal Stamp	Cable length 150mm
17	RFA-02-L2H1	Aristotle	2 dBi	Dipole	--
18	RFA-02-P05	Aristotle	2 dBi	PCB	Cable length 150mm
19	RFA-02-C2M2	Aristotle	2 dBi	Dipole	--

5.1.2 Peak Output Power

Limit 1 watt (30 dBm)

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Power Meter	Anritsu	ML2495A	1901008	2022/3/15	2023/3/14	2022/5/31	2022/5/31
Power Sensor	Anritsu	MA2411B	1725269	2022/3/15	2023/3/14	2022/5/31	2022/5/31

Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

Test Result

Peak Output Power

<802.11b>

Channel	Channel Frequency (MHz)	Peak Output Power		Limit (dBm)
		(dBm)	(mW)	
1	2412	20.46	111.17	30
6	2437	20.28	106.66	30
11	2462	20.40	109.65	30

<802.11g>

Channel	Channel Frequency (MHz)	Peak Output Power		Limit (dBm)
		(dBm)	(mW)	
1	2412	19.99	99.77	30
6	2437	24.01	251.77	30
11	2462	19.95	98.86	30

<802.11n HT20>

Channel	Channel Frequency (MHz)	Peak Output Power		Limit (dBm)
		(dBm)	(mW)	
1	2412	19.65	92.26	30
6	2437	23.90	245.47	30
11	2462	19.73	93.97	30

Average Power
<802.11b>

Channel	Channel Frequency (MHz)	Average Power	
		(dBm)	(mW)
1	2412	17.92	61.94
6	2437	17.62	57.81
11	2462	17.86	61.09

<802.11g>

Channel	Channel Frequency (MHz)	Average Power	
		(dBm)	(mW)
1	2412	12.35	17.18
6	2437	18.30	67.61
11	2462	11.89	15.45

<802.11n HT20>

Channel	Channel Frequency (MHz)	Average Power	
		(dBm)	(mW)
1	2412	12.25	16.79
6	2437	18.34	68.23
11	2462	11.76	15.00

5.1.3 Radiated Spurious Emissions and Band Edges

Limit

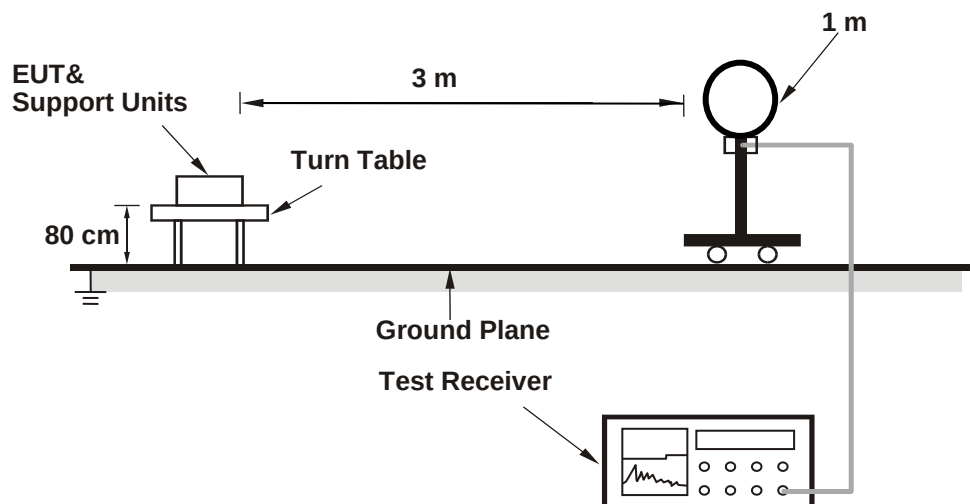
Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Emissions radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in §15.247(d).

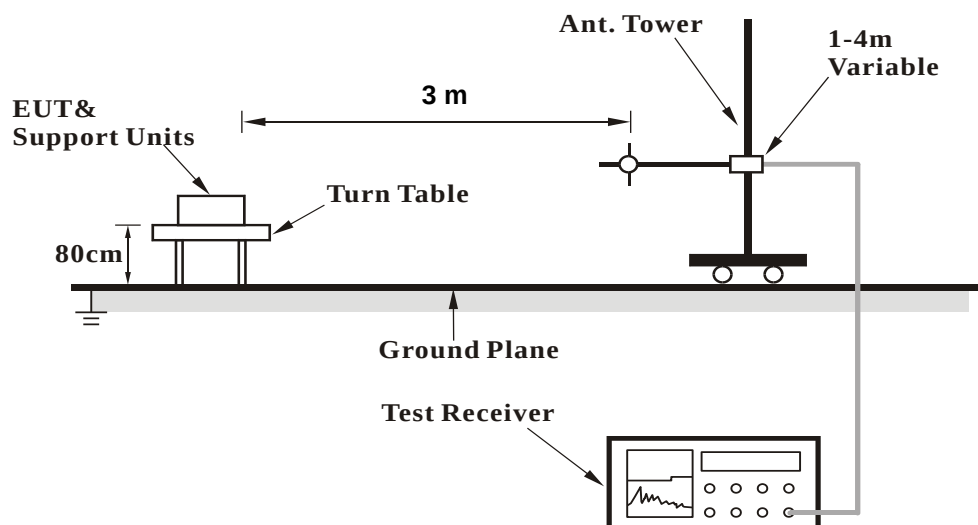
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

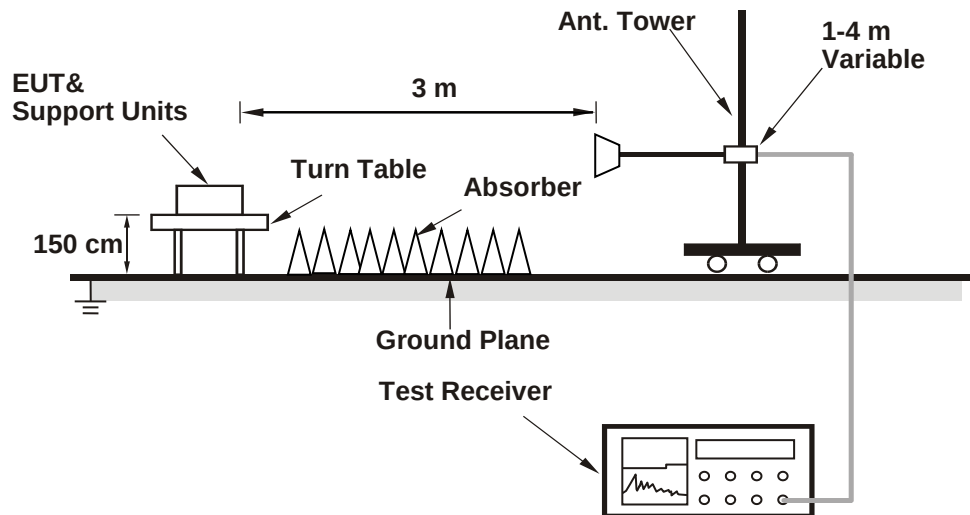
<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>



<Radiated Emissions above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Test Instruments

Ant No. 4 (Test Date: 2022/7/11~2022/7/12)

Ant No. 6 (Test Date: 2022/7/14~2022/7/15)

Ant No. 9 (Test Date: 2022/7/14~2022/7/15)

Below 30MHz					
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Receiver	R&S	ESR7	102108	2022/4/28	2023/4/27
Microwave Cable	SUCOFLEX 104EA	800056/4EA	804680/4	2022/3/22	2023/3/21
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2021/12/8	2022/12/7
30MHz-1GHz					
Receiver	R&S	ESR7	102108	2022/4/28	2023/4/27
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2022/4/6	2023/4/5
LF-AMP	Agilent	8447D	2944A107722	2022/3/22	2023/3/21
Above 1GHz					
Signal Analyzer	R&S	FSV40	101508	2022/4/13	2023/4/12
Horn Antenna	ETS-Lindgren	3117	00218930	2021/12/20	2022/12/19
HF-AMP + AC source	EMCI	EMC051845SE	980633	2022/2/16	2023/2/15
HF-AMP + AC source	EMCI	EMC184045SE	980657	2022/2/16	2023/2/15
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2022/3/29	2023/3/28

Test Procedures**For Radiated Emissions below 30 MHz**

- a. 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.
- 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. Parallel (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) orientations of the antenna are set to make the measurement.
- d. 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.
- e. 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 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated Emissions above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 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 detected 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:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. 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 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.

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Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)

Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

Please refer to Appendix A for Ant 4, Appendix B for Ant 6 and Appendix C for Ant 9.