



RADIO TEST REPORT

FCC ID : 2AXJ4WPA8631PV3
Equipment : AV1300 Gigabit Passthrough Powerline ac Wi-Fi Extender
Brand Name : tp-link
Model Name : TL-WPA8631P
Applicant : TP-Link Corporation Limited
Room 901, 9/F. , New East Ocean Centre, 9 Science Museum
Road, Tsim Sha Tsui, Kowloon, Hong Kong
Manufacturer : TP-Link Corporation Limited
Room 901, 9/F. , New East Ocean Centre, 9 Science Museum
Road, Tsim Sha Tsui, Kowloon, Hong Kong
Standard : 47 CFR FCC Part 15.247

The product was received on Sep. 27, 2022., and testing was started from Oct. 14, 2022 and completed on Dec. 14, 2022. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A10_10 Ver1.



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.247(b)	Maximum Conducted Output Power	PASS	-
3.3	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Declaration of Conformity:

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

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.

Reviewed by: Sam Chen

Report Producer: Sandy Chuang



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
2400-2483.5	b, g, n (HT20)	2412-2462	1-11 [11]
2400-2483.5	n (HT40)	2422-2452	3-9 [7]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	2TX
2.4-2.4835GHz	802.11g	20	2TX
2.4-2.4835GHz	802.11n HT20	20	2TX
2.4-2.4835GHz	802.11n HT40	40	2TX

Note:

- ♦ 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- ♦ 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Port	Brand	P/N	Antenna Type	Connector	Gain (dBi)	
						2.4GHz	5GHz
1	1	TP-Link	3101503165	Dipole Antenna	I-PEX	1.5	1.5
2	2	TP-Link	3101503166	Dipole Antenna	I-PEX	1.5	1.5

Note: The above information was declared by manufacturer.

For 2.4GHz function:

For IEEE 802.11b/g/n (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/n/ac (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

**1.1.3 Mode Test Duty Cycle**

Mode	DC	DCF(dB)	T(s)	VBW(Hz) $\geq 1/T$
802.11b	0.987	0.06	n/a (DC \geq 0.98)	n/a (DC \geq 0.98)
802.11g	0.914	0.39	1.398m	1k
802.11n HT20	0.954	0.2	2.57m	1k
802.11n HT40	0.918	0.37	1.258m	1k

Note:

- ♦ DC is Duty Cycle.
- ♦ DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From Internal power supply			
Beamforming Function	<input type="checkbox"/>	With beamforming	<input checked="" type="checkbox"/>	Without beamforming
Function	<input checked="" type="checkbox"/>	Point-to-multipoint	<input type="checkbox"/>	Point-to-point
Support RU	<input checked="" type="checkbox"/>	Full RU	<input type="checkbox"/>	Partial RU
Test Software Version	QATool (Version 0.0.2.6)			

Note: The above information was declared by manufacturer.

1.1.5 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR672231-01AA.
Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Change PHY chip(from AR8035 to YT8531C) for PLC/power board.	1. AC Power Port Conducted Emission 2. Maximum Conducted Output Power (802.11g / 2437MHz) 3. Emissions in Restricted Frequency Bands (below 1GHz; above 1GHz: 802.11g / 2437MHz)
2. Revising FCC ID to "2AXJ4WPA8631PV3" from "TE7WPA8631PV3." 3. Revising applicant's and manufacturer's company name to "TP-Link Corporation Limited" from "TP-Link Technologies Co., Ltd." 4. Revising applicant's and manufacturer's company address to "Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong" from "Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central Science and Technology Park,Nanshan Shenzhen, 518057 China."	After evaluation, it does not need to re-test.



1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ FCC KDB 558074 D01 v05r02
- ♦ FCC KDB 662911 D01 v02r01
- ♦ FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) TEL: 886-3-656-9065 FAX: 886-3-656-9085 Test site Designation No. TW3787 with FCC. Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH02-CB	Caster Chang	21.3-22.8°C / 62-67%	Dec. 14, 2022
Radiated <Below 1GHz>	03CH05-CB	Wendy Hsu	24.4-25.5°C / 55-58%	Oct. 14, 2022
Radiated <Above 1GHz>	03CH06-CB	Wendy Hsu	22.4~23.3 / 65~67	Dec. 14, 2022
AC Conduction	CO01-CB	Allen Chung	24~25°C / 56-59%	Oct. 18, 2022



1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Conducted Emission	2.4 dB	Confidence levels of 95%
Output Power Measurement	1.5 dB	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11g_Nss1,(6Mbps)_2TX	-
2437MHz	2A

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral
Operating Mode	Normal Link
1	The PLC function of EUT with Idle mode

The Worst Case Mode for Following Conformance Tests	
Tests Item	Maximum Conducted Output Power
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode < 1GHz	CTX
Y-axis generated the worst result for Emissions in Restricted Frequency Bands <Above 1GHz>, thus the measurement will follow this same test configuration.	
1	2.4GHz: Place EUT in Y axis
2	5GHz: Place EUT in Y axis
For operating mode 1 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
Y-axis generated the worst result, thus the measurement will follow this same test configuration.	
1	2.4GHz: Place EUT in Y axis



2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link Mode:

During the test, the EUT operation to normal function.

At the same time, the PLC function of EUT performed "Idle Mode" for the test.

2.4 Accessories

N/A

2.5 Support Equipment

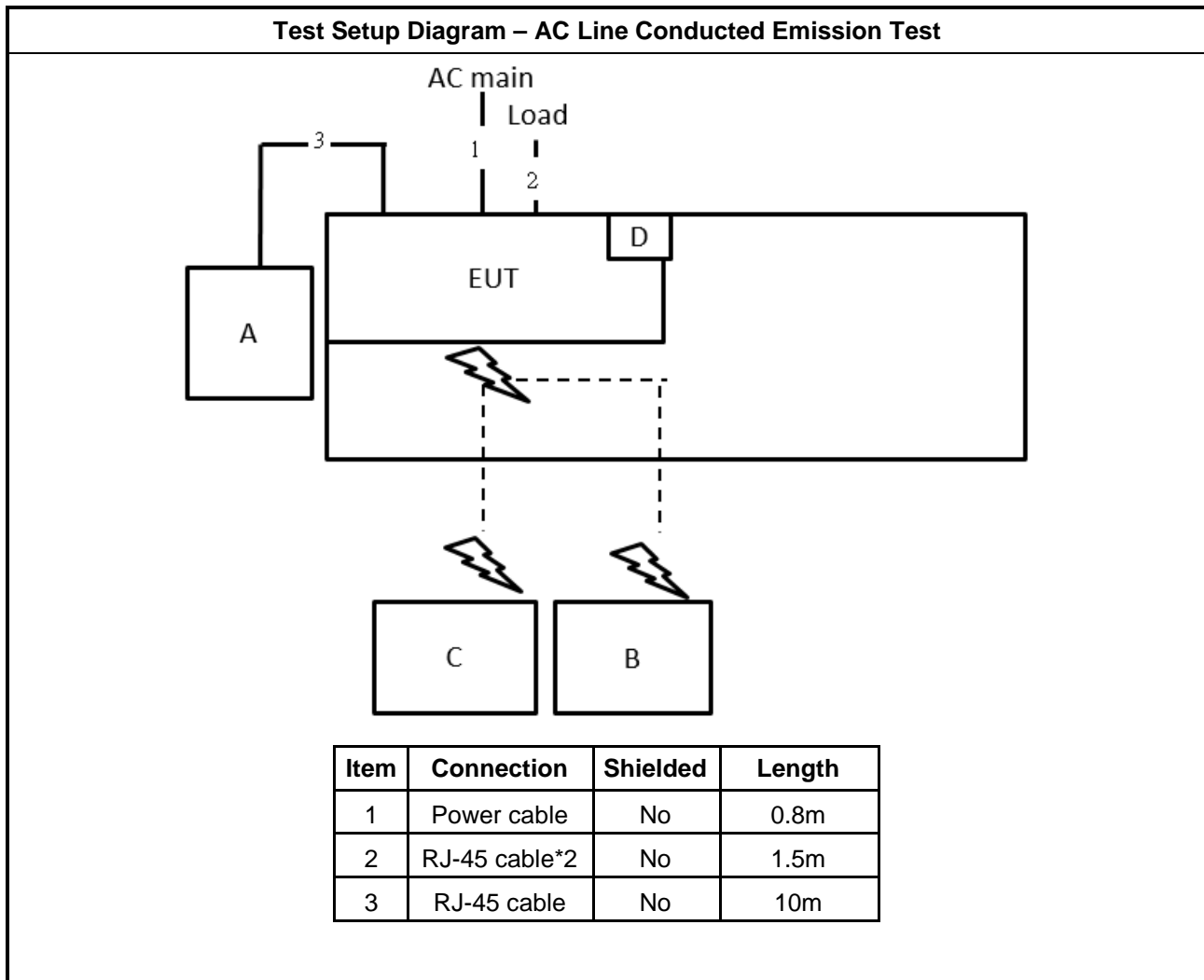
For AC Conduction:

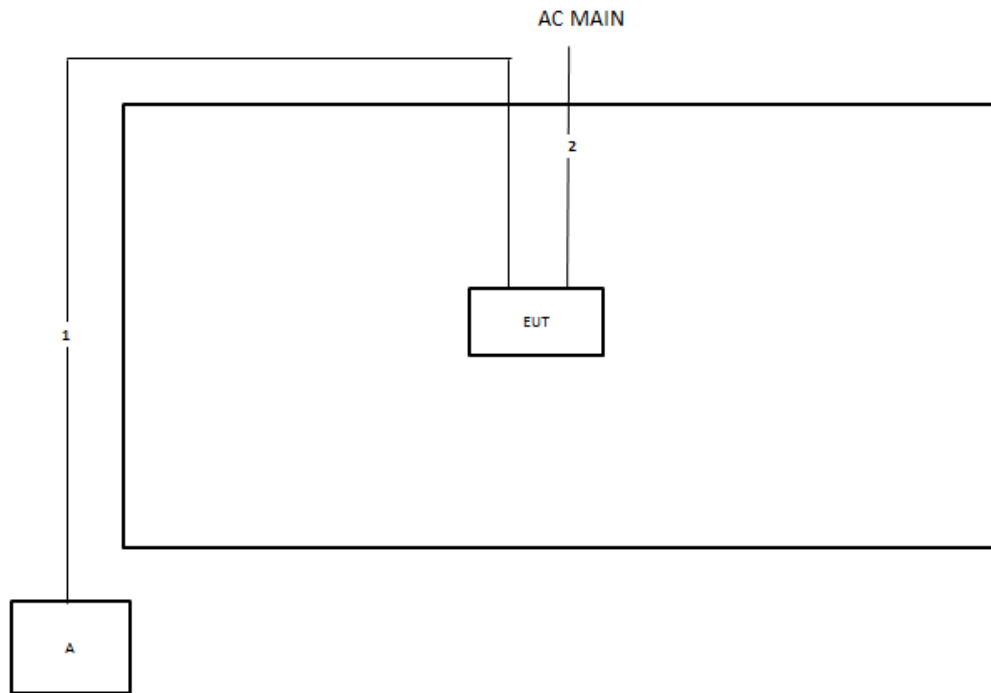
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	LAN NB	DELL	E6430	N/A
B	5G NB	DELL	E6430	N/A
C	2.4G NB	DELL	E6430	N/A
D	Lighting	Philips	E27	NA

For Radiated and RF Conducted:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	NB	DELL	E4300	N/A

2.6 Test Setup Diagram



Test Setup Diagram - Radiated Test


Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	1.5m



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

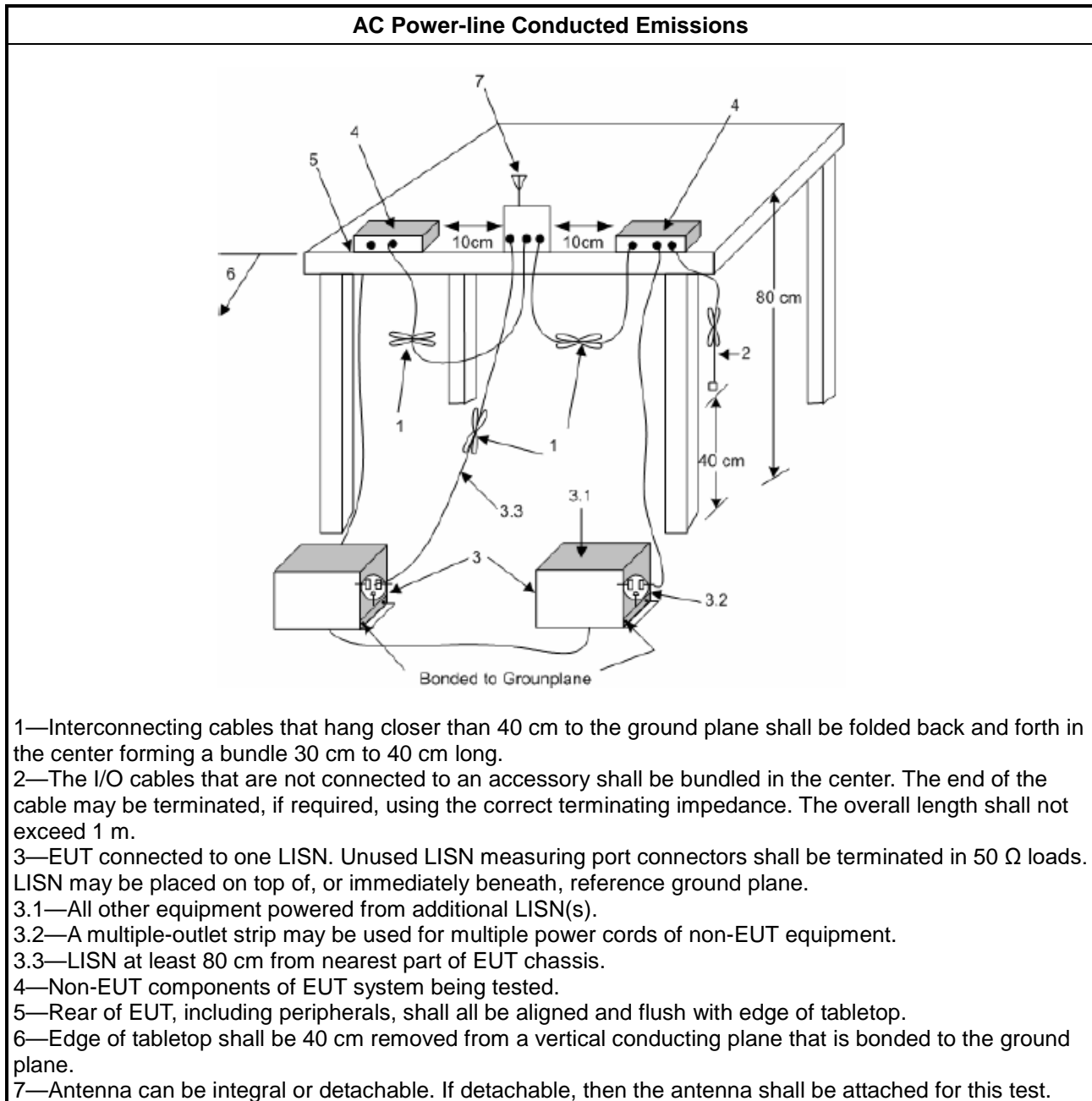
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

3.1.4 Test Setup



3.1.5 Measurement Results Calculation

The measured Level is calculated using:

- Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- Margin = -Limit + Level

3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A



3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
	▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)
	▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm
	▪ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	▪ Smart antenna system (SAS):
	- Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm
	- Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dB dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi.	

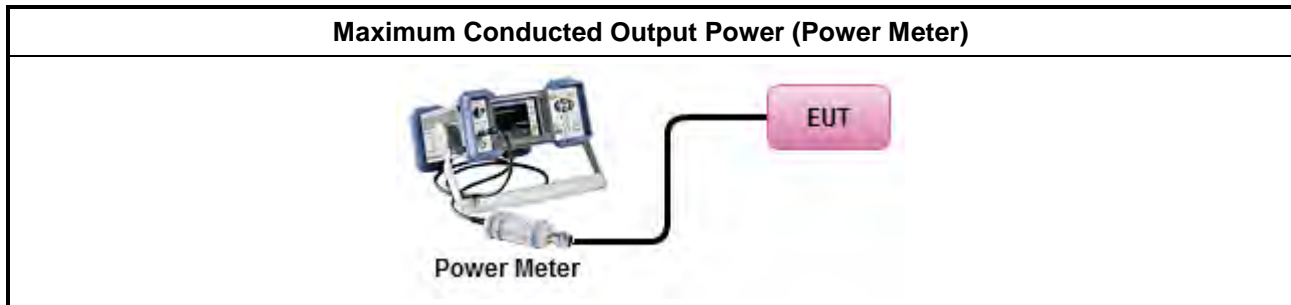
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> Maximum Peak Conducted Output Power 	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).
<ul style="list-style-type: none"> Maximum Conducted Output Power 	
[duty cycle ≥ 98% or external video / power trigger]	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.3 Method AVGSA-1A. (alternative)
duty cycle < 98% and average over on/off periods with duty factor	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)
Measurement using a power meter (PM)	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.1 Method AVGPM (using an RF average power meter).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.2 Method AVGPM-G (using an gate RF average power meter).
<ul style="list-style-type: none"> For conducted measurement. 	
<ul style="list-style-type: none"> If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them. 	
<ul style="list-style-type: none"> If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$ 	

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B



3.3 Emissions in Restricted Frequency Bands

3.3.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

3.3.2 Measuring Instruments

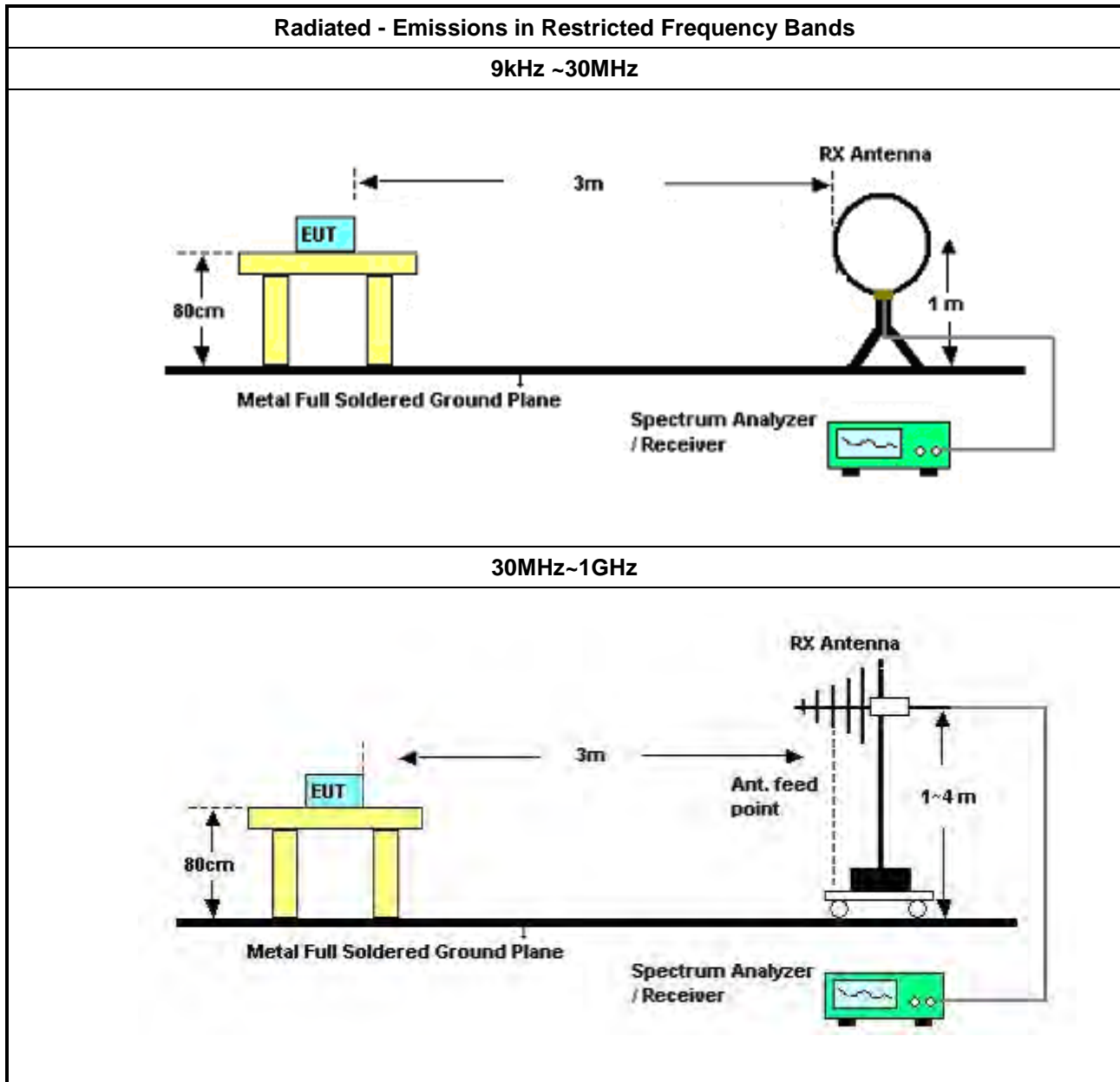
Refer a test equipment and calibration data table in this test report.

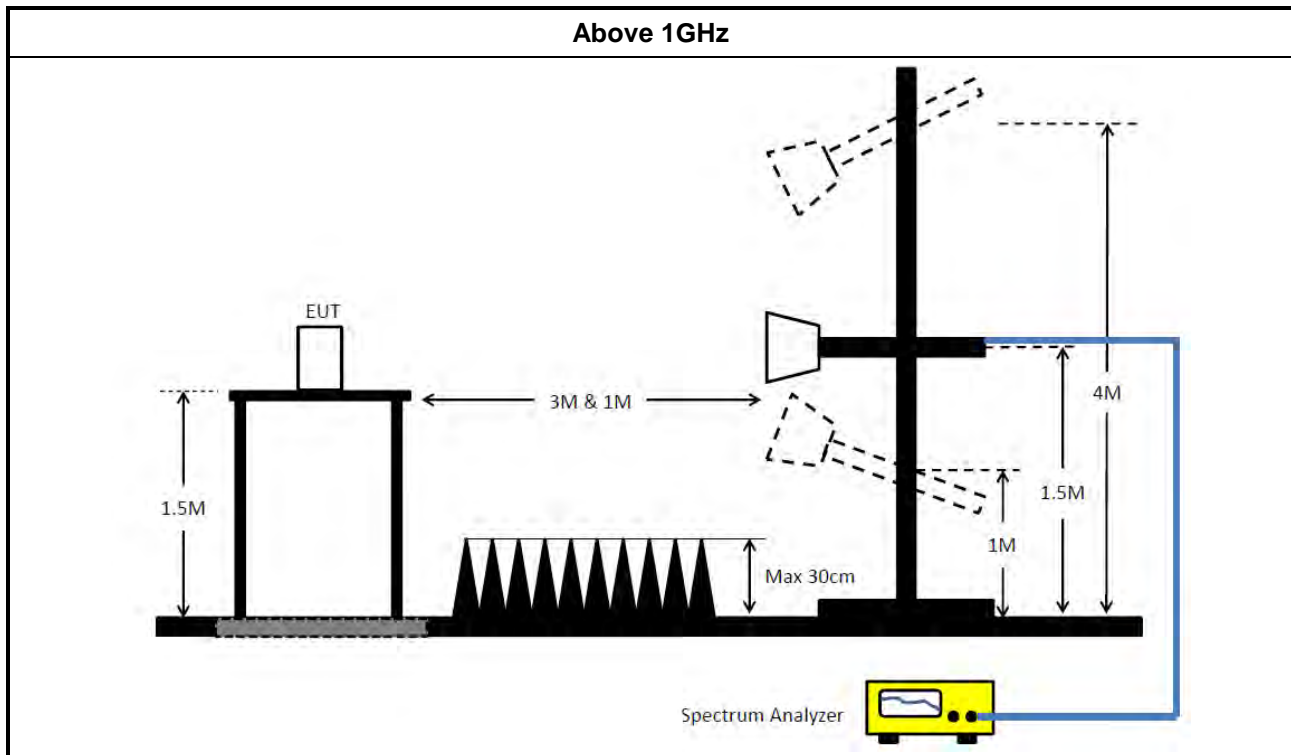


3.3.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor]. 	
<ul style="list-style-type: none"> Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band. 	
<ul style="list-style-type: none"> For the transmitter unwanted emissions shall be measured using following options below: 	
	<ul style="list-style-type: none"> Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle $\geq 98\%$).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW $\geq 1/T$).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW $\geq 1/T$, where T is pulse time.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.
<ul style="list-style-type: none"> For the transmitter band-edge emissions shall be measured using following options below: 	
	<ul style="list-style-type: none"> Refer as FCC KDB 558074 clause 8.7 & C63.10 clause 11.13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
	<ul style="list-style-type: none"> Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
	<ul style="list-style-type: none"> Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
	<ul style="list-style-type: none"> For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
	<ul style="list-style-type: none"> For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.3.4 Test Setup





3.3.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

3.3.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10th harmonic or 40 GHz, whichever is appropriate.

3.3.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix C



4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 22, 2022	Feb. 21, 2023	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Feb. 09, 2022	Feb. 08, 2023	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 12, 2022	Apr. 11, 2023	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 10, 2022	Feb. 09, 2023	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	Oct. 18, 2022	Oct. 17, 2023	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	May 14, 2022	May 13, 2023	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 03, 2022	Aug. 02, 2023	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 25, 2022	Mar. 24, 2023	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Mar. 14, 2022	Mar. 13, 2023	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 17, 2022	Jun. 16, 2023	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Sep. 30, 2022	Sep. 29, 2023	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Aug. 09, 2022	Aug. 08, 2023	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2022	Aug. 21, 2023	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	Aug 02, 2022	Aug 01, 2023	Radiation (03CH06-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 16, 2022	Nov. 15, 2023	Radiation (03CH06-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-67	1GHz~18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+67	1GHz~18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH06-CB)
Power Sensor	Anritsu	MA2411B	1126203	300MHz~40GHz	Oct. 17, 2022	Oct. 16, 2023	Conducted (TH02-CB)
Power Meter	Anritsu	ML2495A	1210004	300MHz~40GHz	Oct. 17, 2022	Oct. 16, 2023	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-01	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-02	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-03	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (TH02-CB)
Switch	SPTCB	SP-SWI	SWI-02	1 GHz –26.5 GHz	Oct. 04, 2022	Oct. 03, 2023	Conducted (TH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH02-CB)

Note: Calibration Interval of instruments listed above is one year.
NCR means Non-Calibration required.



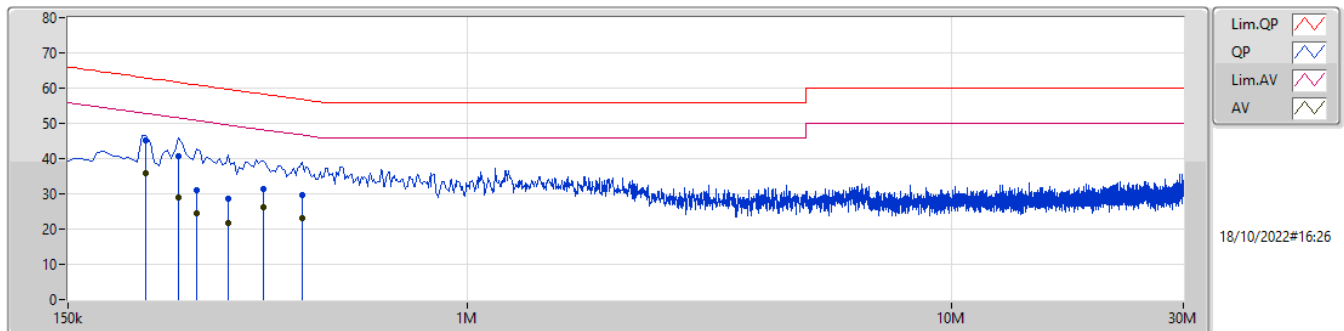
Conducted Emissions at Powerline

Appendix A

Summary

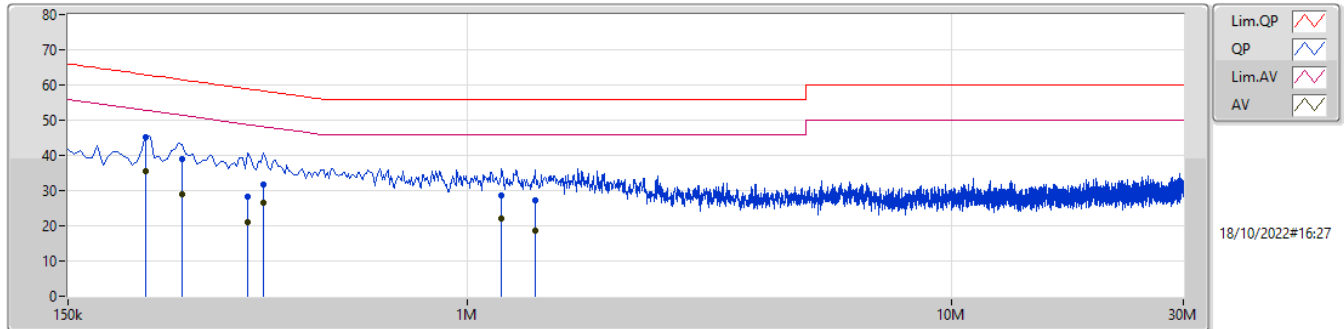
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	217.5k	35.74	52.92	-17.18	Line

Mode 1



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)						
QP	217.5k	45.27	62.92	-17.65	9.99	Line	-	35.28	0.06	0.04	9.89						
AV	217.5k	35.74	52.92	-17.18	9.99	Line	"Worst"	25.75	0.06	0.04	9.89						
QP	253.5k	40.74	61.64	-20.90	10.00	Line	-	30.74	0.06	0.05	9.89						
AV	253.5k	28.85	51.64	-22.79	10.00	Line	-	18.85	0.06	0.05	9.89						
QP	276k	30.97	60.93	-29.96	10.00	Line	-	20.97	0.06	0.05	9.89						
AV	276k	24.48	50.93	-26.45	10.00	Line	-	14.48	0.06	0.05	9.89						
QP	321k	28.49	59.67	-31.18	10.00	Line	-	18.49	0.06	0.05	9.89						
AV	321k	21.62	49.67	-28.05	10.00	Line	-	11.62	0.06	0.05	9.89						
QP	379.5k	31.51	58.29	-26.78	10.01	Line	-	21.50	0.06	0.06	9.89						
AV	379.5k	26.35	48.29	-21.94	10.01	Line	-	16.34	0.06	0.06	9.89						
QP	456k	29.67	56.76	-27.09	10.01	Line	-	19.66	0.06	0.06	9.89						
AV	456k	23.03	46.76	-23.73	10.01	Line	-	13.02	0.06	0.06	9.89						

Mode 1



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)						
QP	217.5k	45.02	62.92	-17.90	10.00	Neutral	-	35.02	0.07	0.04	9.89						
AV	217.5k	35.51	52.92	-17.41	10.00	Neutral	"Worst"	25.51	0.07	0.04	9.89						
QP	258k	38.90	61.49	-22.59	10.01	Neutral	-	28.89	0.07	0.05	9.89						
AV	258k	28.96	51.49	-22.53	10.01	Neutral	-	18.95	0.07	0.05	9.89						
QP	352.5k	28.15	58.91	-30.76	10.02	Neutral	-	18.13	0.07	0.06	9.89						
AV	352.5k	21.14	48.91	-27.77	10.02	Neutral	-	11.12	0.07	0.06	9.89						
QP	379.5k	31.58	58.29	-26.71	10.02	Neutral	-	21.56	0.07	0.06	9.89						
AV	379.5k	26.46	48.29	-21.83	10.02	Neutral	-	16.44	0.07	0.06	9.89						
QP	1.176M	28.54	56.00	-27.46	10.02	Neutral	-	18.52	0.08	0.05	9.89						
AV	1.176M	21.98	46.00	-24.02	10.02	Neutral	-	11.96	0.08	0.05	9.89						
QP	1.379M	27.41	56.00	-28.59	10.04	Neutral	-	17.37	0.09	0.06	9.89						
AV	1.379M	18.54	46.00	-27.46	10.04	Neutral	-	8.50	0.09	0.06	9.89						



Average Power

Appendix B

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11g_Nss1,(6Mbps)_2TX	24.54	0.28445



Average Power

Appendix B

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2437MHz	Pass	1.50	21.58	21.47	24.54	30.00

DG = Directional Gain; Port X = Port X output power



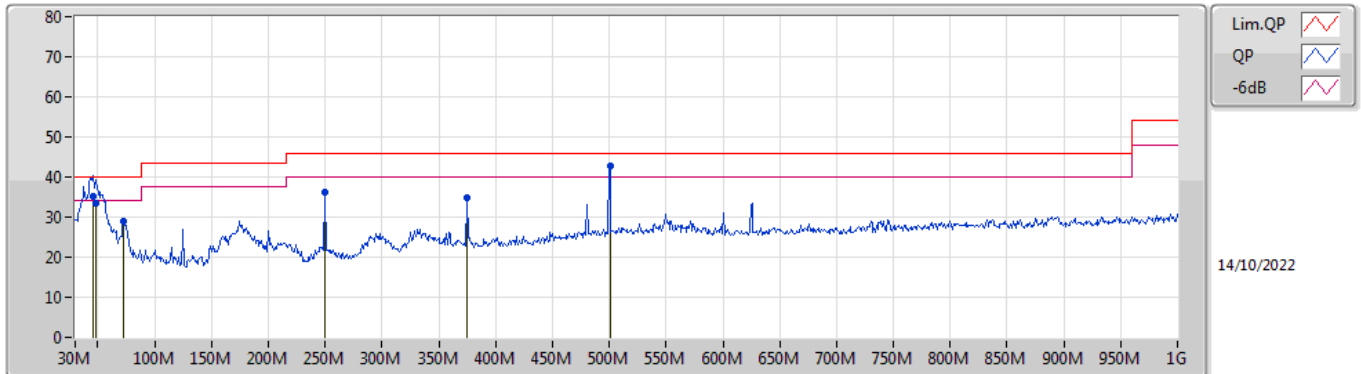
Radiated Emissions below 1GHz

Appendix C.1

Summary

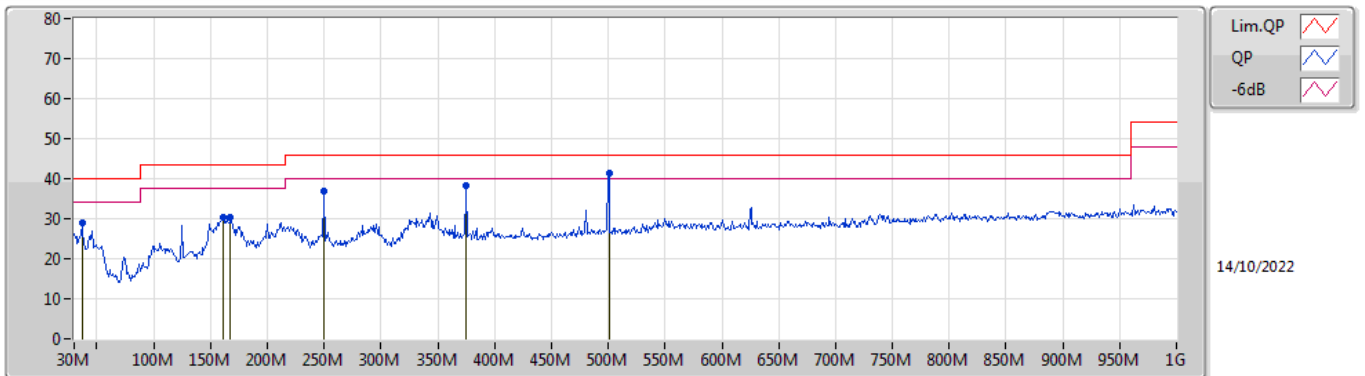
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	500.45M	42.66	46.00	-3.34	Vertical

Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
QP	45.52M	35.17	40.00	-4.83	-15.43	3	Vertical	357	1.00	-	50.60	15.78	0.62	31.83
QP	48.43M	33.39	40.00	-6.61	-16.61	3	Vertical	0	1.25	-	50.00	14.59	0.65	31.85
PK	72.68M	29.01	40.00	-10.99	-18.92	3	Vertical	193	1.25	-	47.93	12.17	0.88	31.97
PK	250.19M	36.06	46.00	-9.94	-11.78	3	Vertical	94	1.00	-	47.84	18.22	2.00	32.00
PK	375.32M	34.66	46.00	-11.34	-8.75	3	Vertical	171	1.00	-	43.41	20.83	2.59	32.17
QP	500.45M	42.66	46.00	-3.34	-6.24	3	Vertical	240	1.00	"Worst"	48.90	23.20	2.96	32.40

Mode 1



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
PK	36.79M	28.85	40.00	-11.15	-10.83	3	Horizontal	214	1.00	-	39.68	20.36	0.52	31.71
PK	160.95M	30.32	43.50	-13.18	-14.75	3	Horizontal	95	1.50	-	45.07	15.71	1.52	31.98
PK	167.74M	30.37	43.50	-13.13	-14.89	3	Horizontal	88	1.50	-	45.26	15.54	1.56	31.99
PK	250.19M	36.81	46.00	-9.19	-11.78	3	Horizontal	114	1.25	-	48.59	18.22	2.00	32.00
PK	375.32M	38.29	46.00	-7.71	-8.75	3	Horizontal	212	1.00	-	47.04	20.83	2.59	32.17
PK	500.45M	41.24	46.00	-4.76	-6.24	3	Horizontal	223	1.50	"Worst"	47.48	23.20	2.96	32.40

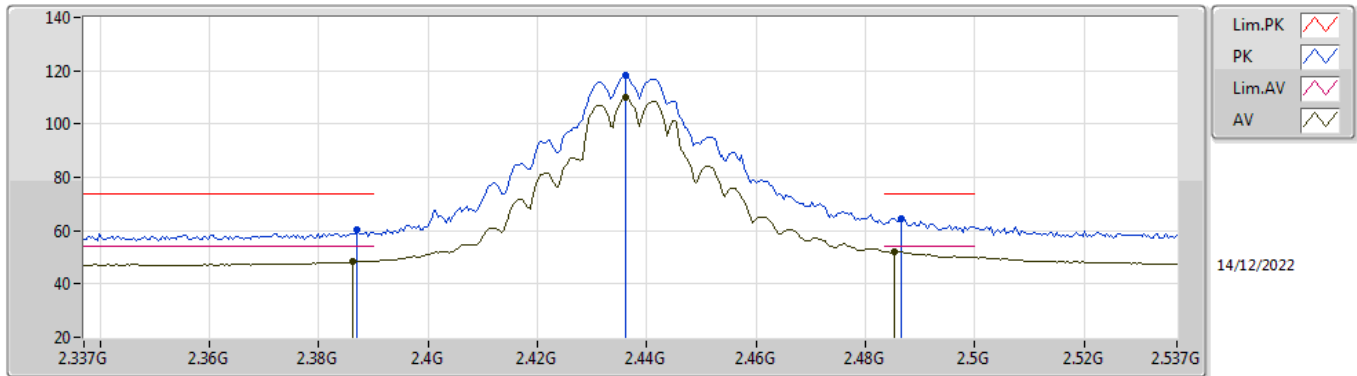


Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
802.11g_Nss1,(6Mbps)_2TX	Pass	AV	2.4854G	52.10	54.00	-1.90	3	Vertical	352	2.22	-

2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_2TX

2437MHz_TX

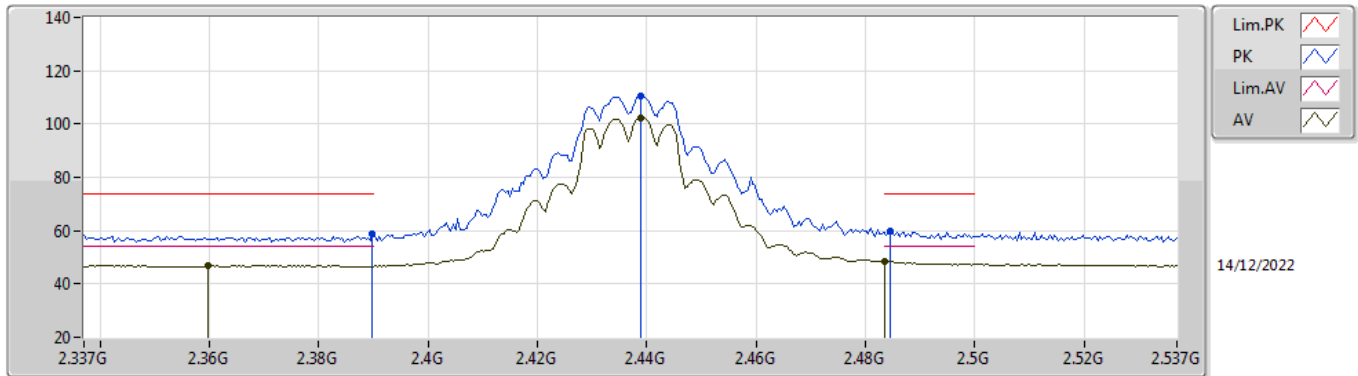


EUT Y_2TX
Setting 2A
06-H-G-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.387G	60.11	74.00	-13.89	28.58	3	Vertical	352	2.22	-	27.65	3.88	-
AV	2.3862G	48.42	54.00	-5.58	16.88	3	Vertical	352	2.22	-	27.66	3.88	-
PK	2.4362G	118.31	Inf	-Inf	86.77	3	Vertical	352	2.22	-	27.60	3.94	-
AV	2.4362G	109.99	Inf	-Inf	78.45	3	Vertical	352	2.22	-	27.60	3.94	-
PK	2.4866G	64.74	74.00	-9.26	33.15	3	Vertical	352	2.22	-	27.60	3.99	-
AV	2.4854G	52.10	54.00	-1.90	20.51	3	Vertical	352	2.22	-	27.60	3.99	-

2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_2TX

2437MHz_TX

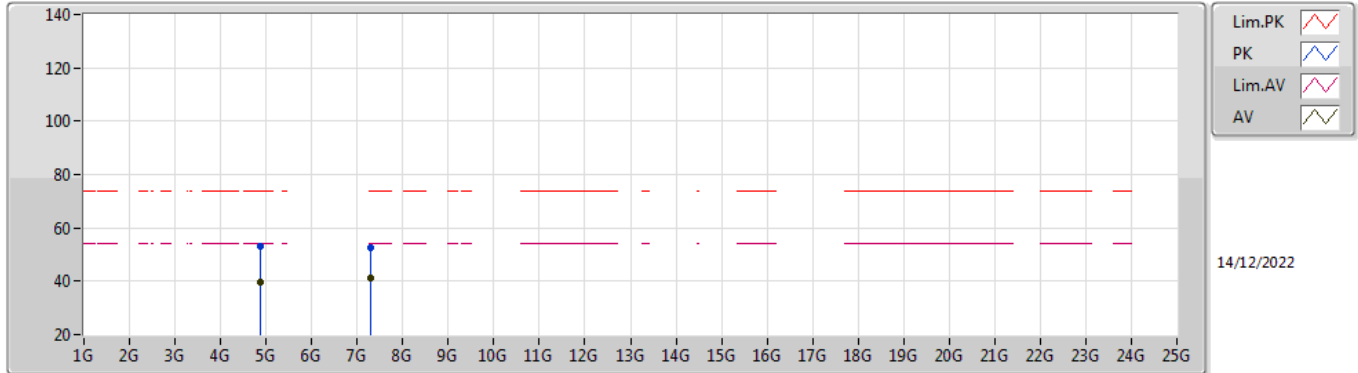


EUT Y_2TX
Setting 2A
06-H-G-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3898G	58.56	74.00	-15.44	27.04	3	Horizontal	333	1.29	-	27.64	3.88	-
AV	2.3598G	46.81	54.00	-7.19	15.21	3	Horizontal	333	1.29	-	27.76	3.84	-
PK	2.439G	110.39	Inf	-Inf	78.85	3	Horizontal	333	1.29	-	27.60	3.94	-
AV	2.439G	102.46	Inf	-Inf	70.92	3	Horizontal	333	1.29	-	27.60	3.94	-
PK	2.4846G	59.96	74.00	-14.04	28.38	3	Horizontal	333	1.29	-	27.60	3.98	-
AV	2.4835G	48.50	54.00	-5.50	16.92	3	Horizontal	333	1.29	-	27.60	3.98	-

2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_2TX

2437MHz_TX

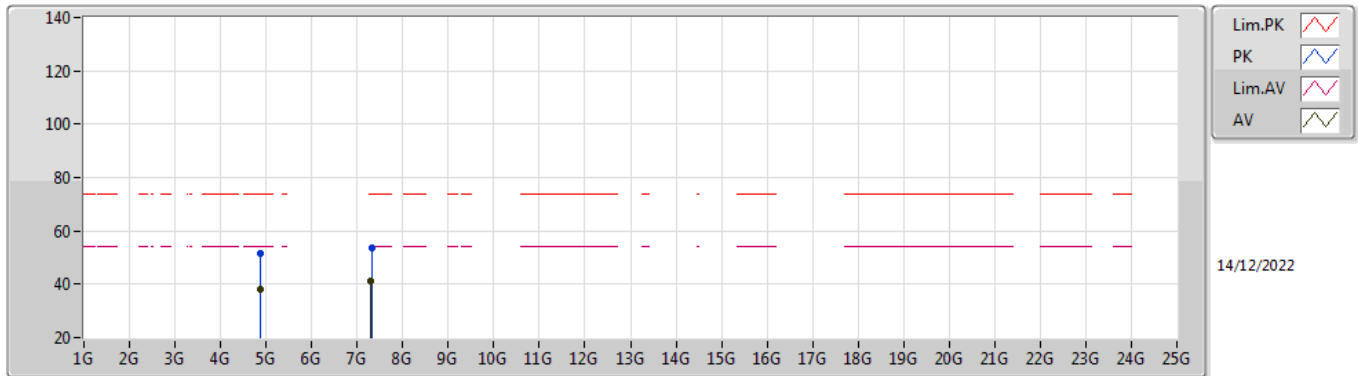


EUT Y_2TX
Setting 2A
06-H-G-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.86962G	53.00	74.00	-21.00	48.67	3	Vertical	337	1.71	-	31.40	5.43	32.50
AV	4.8749G	39.83	54.00	-14.17	35.49	3	Vertical	337	1.71	-	31.40	5.44	32.50
PK	7.30032G	52.71	74.00	-21.29	42.63	3	Vertical	3	1.06	-	36.70	6.80	33.42
AV	7.30854G	40.98	54.00	-13.02	30.91	3	Vertical	3	1.06	-	36.70	6.80	33.43

2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_2TX

2437MHz_TX



EUT Y_2TX
Setting 2A
06-H-G-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.87544G	51.53	74.00	-22.47	47.19	3	Horizontal	354	2.01	-	31.40	5.44	32.50
AV	4.87202G	38.29	54.00	-15.71	33.95	3	Horizontal	354	2.01	-	31.40	5.44	32.50
PK	7.3137G	53.45	74.00	-20.55	43.39	3	Horizontal	266	1.80	-	36.70	6.80	33.44
AV	7.30086G	41.38	54.00	-12.62	31.31	3	Horizontal	266	1.80	-	36.70	6.80	33.43