Testing Laboratory 3787

RADIO TEST REPORT

FCC ID	:	2BH7FEAP772OD
Equipment	:	BE11000 Indoor/Outdoor Wi-Fi 7 Access Point
Brand Name	:	tp-link
Model Name	:	EAP772-Outdoor
Applicant	:	TP-Link Systems Inc. 10 Mauchly, Irvine, CA 92618
Manufacturer	:	TP-Link Systems Inc. 10 Mauchly, Irvine, CA 92618
Standard	:	47 CFR FCC Part 15.407 (Comply with Unwanted Emissions Below 1GHz testing only)

The product was received on Jan. 06, 2025, and testing was started from Mar. 11, 2025 and completed on Mar. 11, 2025. 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 partial 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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History of this test report

Report No.	Version	Description	Issued Date
FR510618	01	Initial issue of report	May 09, 2025

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	15.407(b)	Unwanted Emissions	PASS	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

1. The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.
2. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.

Reviewed by: Sam Chen
Report Producer: Wendy Pan

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5925-6425	ax (HEW20), be (EHT20)	6115-6415	33-93 [16]
6525-6875		6535-6855	117-181 [17]
5925-6425	ax (HEW40), be (EHT40)	6125-6405	35-91 [8]
6525-6875		6565-6845	123-179 [8]
5925-6425	ax (HEW80), be (EHT80)	6145-6385	39-87 [4]
6525-6875		6625-6785	135-167 [3]
5925-6425	ax (HEW160), be (EHT160)	6185-6345	47-79 [2]
6525-6875		6665	143 [1]
5925-6425	be (EHT320)	6105	31 [1]

Band	Mode	BWch (MHz)	Nant
UNII 5 / UNII 7	ax (HEW20)	20	2
UNII 5 / UNII 7	ax (HEW20)-BF	20	2
UNII 5 / UNII 7	be (EHT20)	20	2
UNII 5 / UNII 7	be (EHT20)-BF	20	2
UNII 5 / UNII 7	ax (HEW40)	40	2
UNII 5 / UNII 7	ax (HEW40)-BF	40	2
UNII 5 / UNII 7	be (EHT40)	40	2
UNII 5 / UNII 7	be (EHT40)-BF	40	2
UNII 5 / UNII 7	ax (HEW80)	80	2
UNII 5 / UNII 7	ax (HEW80)-BF	80	2
UNII 5 / UNII 7	be (EHT80)	80	2
UNII 5 / UNII 7	be (EHT80)-BF	80	2
UNII 5 / UNII 7	ax (HEW160)	160	2
UNII 5 / UNII 7	ax (HEW160)-BF	160	2
UNII 5 / UNII 7	be (EHT160)	160	2
UNII 5 / UNII 7	be (EHT160)-BF	160	2
UNII 5 / UNII 7	be (EHT320)	320	2
UNII 5 / UNII 7	be (EHT320)-BF	320	2

Note:
- 11a use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- HEW20, HEW40, HEW80 and HEW160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- EHT20, EHT40, EHT80 and EHT160, EHT320 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM modulation.
- BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		
					WLAN	Bluetooth	GPS
Ant1	TP-Link	EAP772-Outdoor	Alford	I-PEX	Note 1	-	-
Ant2	TP-Link	EAP772-Outdoor	Alford	I-PEX			
Ant3	TP-Link	EAP772-Outdoor	Dipole	I-PEX			
Ant4	TP-Link	EAP772-Outdoor	Dipole	I-PEX			
Ant5	TP-Link	EAP772-Outdoor	Franklin	I-PEX			
Ant6	TP-Link	EAP772-Outdoor	Franklin	I-PEX			
Ant7	TP-Link	EAP772-Outdoor	IFA	I-PEX	-	3	-
Ant8	TP-Link	EAP772-Outdoor	IFA	I-PEX	-	-	3

Note1:

Ant.	Gain (dBi)								
	WLAN 2.4GHz	WLAN 5GHz UNII1	WLAN 5GHz UNII2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII3	WLAN 6GHz UNII5	WLAN 6GHz UNII6	WLAN 6GHz UNII 7	WLAN 6GHz UNII8
Ant1	2.00	-	-	-	-	-	-	-	-
Ant2	2.00	-	-	-	-	-	-	-	-
Ant3	2.00	2.48	2.50	3.00	2.97	-	-	-	-
Ant4	2.00	1.74	1.75	3.00	2.77	-	-	-	-
Ant5	-	-	-	-	-	3.00	1.76	2.48	2.68
Ant6	-	-	-	-	-	2.11	2.76	3.00	3.65

Note2: The above information was declared by manufacturer.

For 2.4GHz function
For IEEE 802.11 b/g/n/VHT/ax/be (2TX/2RX):
Ant.1~4 can be used as transmitting/receiving antennas.
Ant.1~2 could transmit/receive simultaneously.
Ant.3~4 could transmit/receive simultaneously.
Ant.1~2 and Ant.3~4 could not transmit/receive simultaneously at the same time.
Only one of Ant.1~2 and Ant.3~4 will be used at one time.
Ant.1~2 are vertical antennas.
Ant.3~4 are horizontal antennas.
For 5GHz function:
For IEEE 802.11 a/n/ac/ax/be (2TX/2RX):
Ant.3~4 can be used as transmitting/receiving antenna.
Ant.3~4 could transmit/receive simultaneously.
For 6GHz function:
For IEEE 802.11 ax/be (2TX/2RX):
Ant.5~6 can be used as transmitting/receiving antenna.
Ant.5~6 could transmit/receive simultaneously.
For Bluetooth function (1TX/1RX):
Ant.7 can be used as transmitting antenna.
For GPS function (1TX/1RX):
Ant.8 can be used as transmitting antenna.

1.1.3 EUT Operational Condition

EUT Power Type	From PoE 802.3at			
Beamforming Function	☒	With beamforming	☐	Without beamforming
	The product has beamforming function for n/VHT/ax/be in 2.4GHz, n/ac/ax/be in 5GHz and ax/be in 6GHz			
Device Type	☐	Indoor Access Point	☐	Subordinate
	☐	Indoor Client	☒	Standard Power Access Point
	☐	Dual Client	☐	Standard Client
	☐	Fixed Client	☐	Very Low Power
Condition of EUT	☒	Indoor	☒	Outdoor
Channel Puncturing Function	☐	Supported Static Puncturing		
	☐	Supported Dynamic Puncturing (Reduce BW)		
	☒	Unsupported		
Support RU	☒	Full RU	☐	Partial RU

Note: The above information was declared by manufacturer.

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 15.407
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01

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

- FCC KDB 987594 D02 v03
- 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 (°C / %)	Test Date
Radiated	03CH05-CB	Roy Mai	21.9-22.4 / 60-62	Mar. 11, 2025

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
Radiated Emission (9kHz ~ 30MHz)	4.1 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.2 dB	Confidence levels of 95%

2 Test Configuration of EUT

2.1 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Unwanted Emissions
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	Normal Link
After evaluating, the worst case was found at Y axis. So the measurement will follow this same test configuration.	
1	EUT in Y axis + PoE

Note: The PoE for measurement only, would not be marketed. PoE information as below:

Power	Brand	Model
PoE	tp-link	TL-POE4824G

2.2 EUT Operation during Test

During the test, the EUT operation to normal function.

2.3 Accessories

N/A

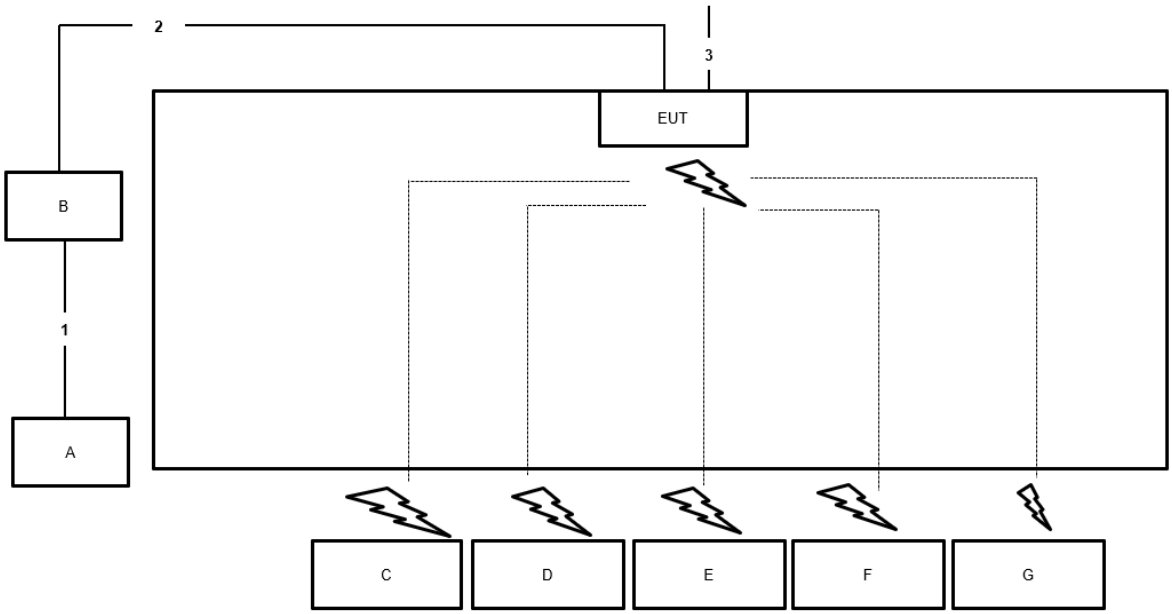
2.4 Support Equipment

For Radiated (below 1GHz):

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	POE	tp-link	TL-POE4824G	N/A
C	Notebook(Wifi 2.4G)	DELL	E4300	N/A
D	Notebook(Wifi 5G)	DELL	E4300	N/A
E	Notebook(Wifi 6G)	DELL	E4300	N/A
F	GPS Simulator	WELNAVIGATE	GS-100	N/A
G	iPod	Apple	A1136	N/A

2.5 Test Setup Diagram

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length
1	RJ-45 cable	No	1.5m
2	RJ-45 cable	No	10m
3	Ground Cable	No	1.5m

3 Transmitter Test Result

3.1 Unwanted Emissions

3.1.1 Transmitter Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz 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(20 x log (standard distance/ test distance) = 20log(3/1) = 9.54dB.
EX. Above 18GHz emission limit calculation (3m to 1m) = 54dBuV/m at 3m + 9.54dB = 63.54 dBuV/m at 1m.

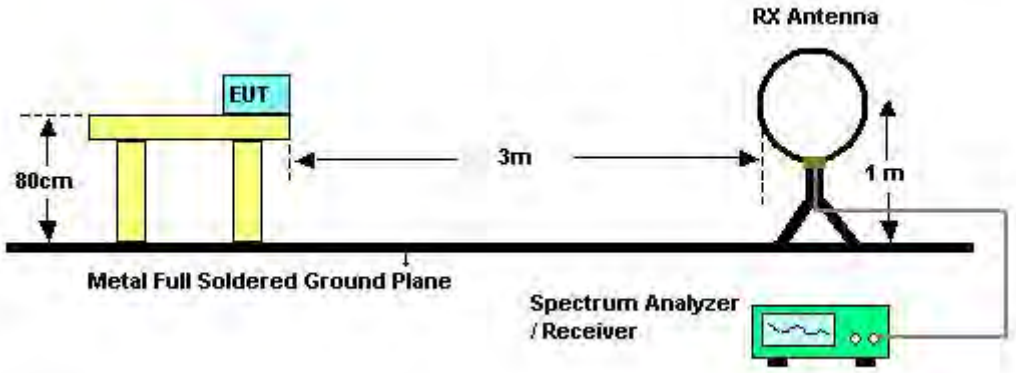
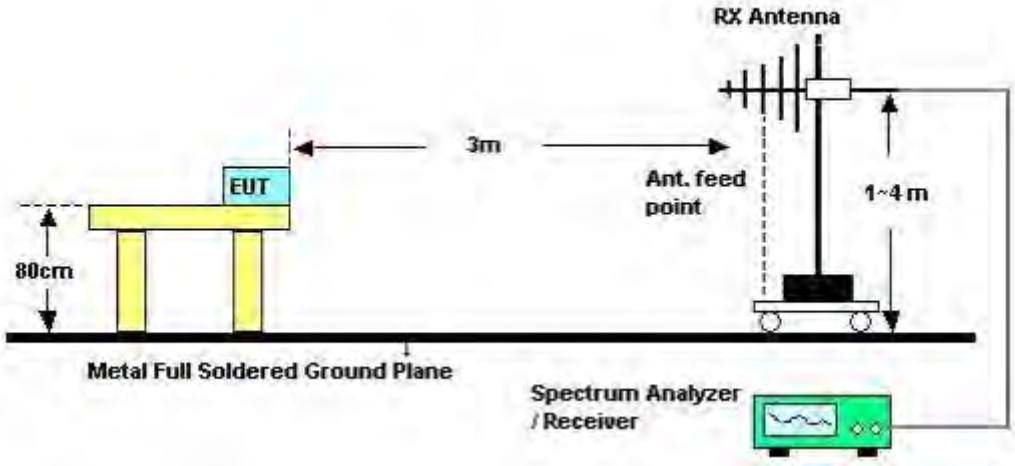
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method			
▪ According to FCC KDB 987594 D02 II.G. the unwanted emission measurement procedure shall refer to KDB 789300(except emission MASK). 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. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. 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).			
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].			
▪ For the transmitter unwanted emissions shall be measured using following options below:			
	▪ Refer as FCC KDB 789033 D02, clause G)2) for unwanted emissions into non-restricted bands.		
	▪ Refer as FCC KDB 789033 D02, clause G)1) for unwanted emissions into restricted bands.		
		☒	Refer as FCC KDB 789033 D02, G)6) Method AD (Trace Averaging). (For unrestricted band measurement)
		☐	Refer as FCC KDB 789033 D02, G)6) Method VB (Reduced VBW).
		☒	Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.(For restricted band average measurement)
		☐	Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
		☒	Refer as FCC KDB 789033 D02, clause G)5) measurement procedure peak limit.
		☐	Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
	▪ Refer as FCC KDB 789033 D02, clause G)3)d)ii) for Band edge Integration measurements.		
▪ For emission MASK shall be measured using following options below:			
		☒	Refer as FCC KDB 987594 D02, J) In-Band Emissions
▪ For radiated measurement.			
	▪ Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.		
	▪ Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.		
	▪ Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.		
▪ The any unwanted emissions level shall not exceed the fundamental emission level.			
▪ All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.			

3.1.4 Test Setup

Transmitter Radiated Unwanted Emissions
9kHz ~30MHz

30MHz~1GHz


3.1.5 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

3.1.6 Transmitter Unwanted Emissions (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.

3.1.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix A

4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30MHz	Oct. 16, 2024	Oct. 15, 2025	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 01, 2024	Jul. 31, 2025	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 23, 2024	Mar. 22, 2025	Radiation (03CH05-CB)
Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 02, 2024	May 01, 2025	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Apr. 17, 2024	Apr. 16, 2025	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESR7	102172	9kHz ~ 7GHz	Oct. 21, 2024	Oct. 20, 2025	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 01, 2024	Sep. 30, 2025	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE-EMI	V5.11.8	30MHz-40GHz	N.C.R.	N.C.R.	Radiation (03CH05-CB)

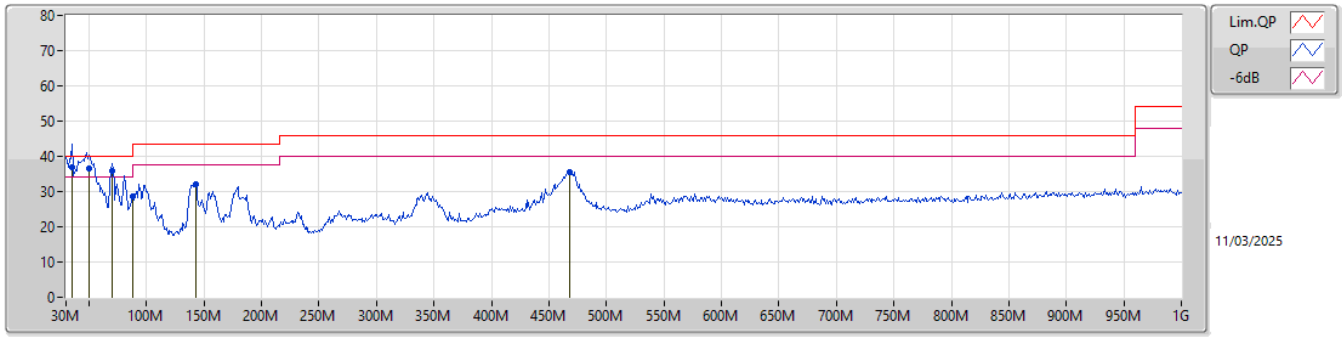
Note: Calibration Interval of instruments listed above is one year.

N.C.R. means Non-Calibration required.

Summary

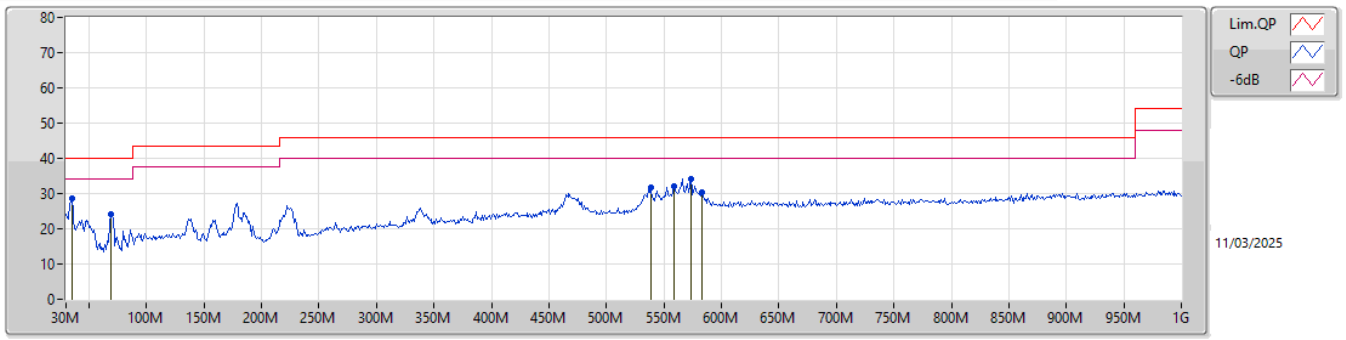
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	34.85M	36.90	40.00	-3.10	Vertical

Mode 1



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV)	(dB/m)	(dB)	(dB)
QP	34.85M	36.90	40.00	-3.10	-8.58	3	Vertical	360	1.00	"Worst"	45.48	21.90	1.01	31.49
QP	50.37M	36.50	40.00	-3.50	-16.22	3	Vertical	234	1.50	-	52.72	14.25	1.16	31.63
QP	69.77M	35.82	40.00	-4.18	-17.81	3	Vertical	332	2.00	-	53.63	12.57	1.32	31.70
PK	88M	28.55	43.50	-14.95	-15.70	3	Vertical	221	1.00	-	44.25	14.58	1.45	31.73
PK	142.52M	31.99	43.50	-11.51	-12.94	3	Vertical	164	1.00	-	44.93	17.00	1.81	31.75
PK	468.44M	35.51	46.00	-10.49	-5.74	3	Vertical	188	1.00	-	41.25	23.00	3.32	32.06

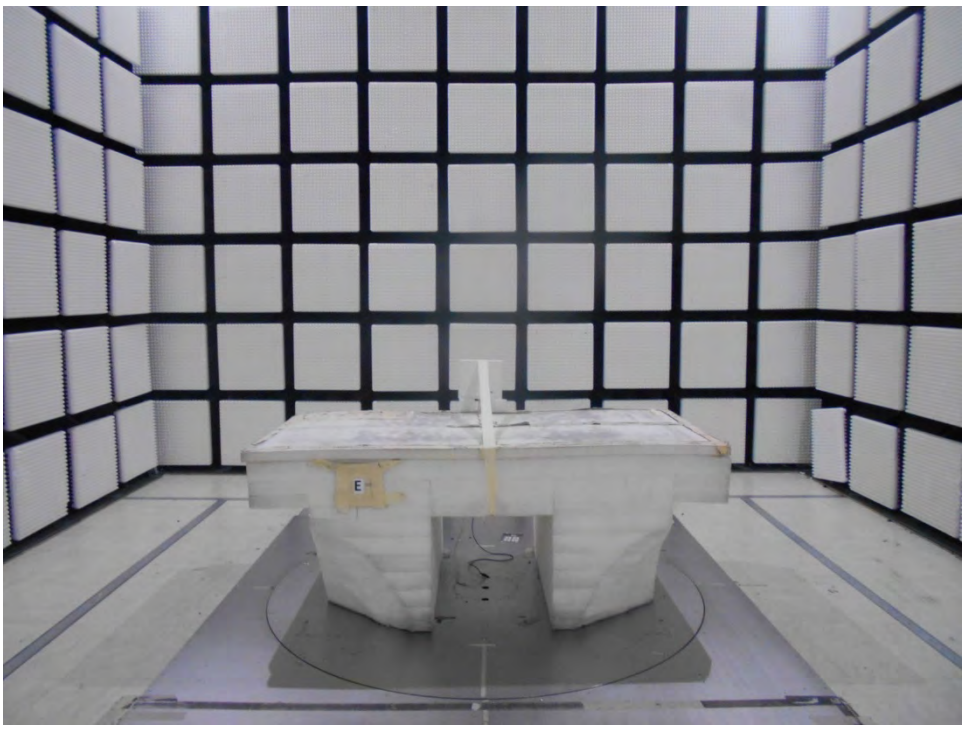
Mode 1



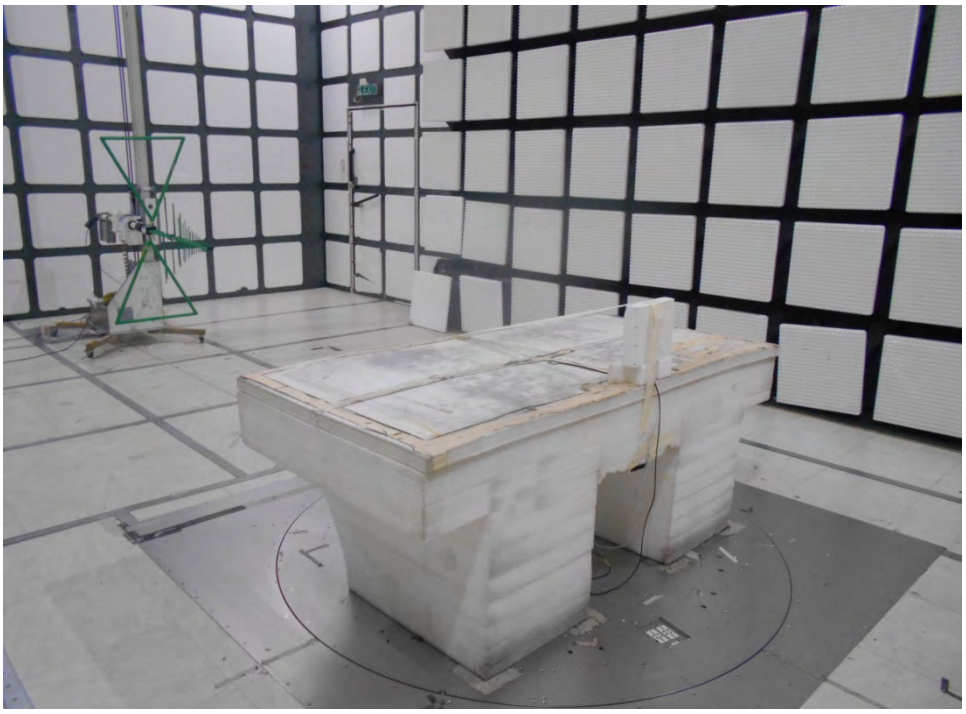
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV)	(dB/m)	(dB)	(dB)
PK	34.85M	28.63	40.00	-11.37	-8.58	3	Horizontal	341	2.00	"Worst"	37.21	21.90	1.01	31.49
PK	68.8M	24.30	40.00	-15.70	-17.81	3	Horizontal	249	2.00	-	42.11	12.58	1.31	31.70
PK	538.28M	31.82	46.00	-14.18	-4.63	3	Horizontal	197	1.50	-	36.45	23.99	3.54	32.16
PK	558.65M	32.21	46.00	-13.79	-4.02	3	Horizontal	193	1.25	-	36.23	24.56	3.61	32.19
PK	573.2M	34.07	46.00	-11.93	-4.08	3	Horizontal	189	1.25	-	38.15	24.45	3.67	32.20
PK	582.9M	30.46	46.00	-15.54	-3.97	3	Horizontal	166	1.50	-	34.43	24.53	3.71	32.21

1. Photographs of Radiated Emissions Test Configuration

FRONT VIEW



REAR VIEW



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