

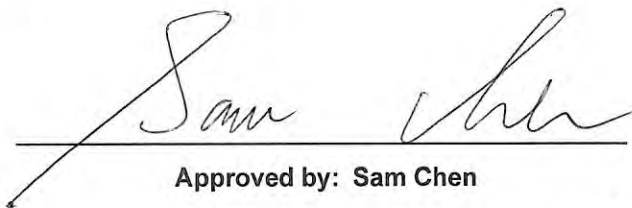


RADIO TEST REPORT

FCC ID : DC9WSOPMW
Equipment : Microwave Module
Brand Name : OPTEX
Model Name : WS-OPMW-WL X5
Applicant : Optex Co Ltd
5-8-12, Ogoto Otsu-Shi, Shiga-Ken, Japan 520-0101
Manufacturer : Optex Co Ltd
5-8-12, Ogoto Otsu-Shi, Shiga-Ken, Japan 520-0101
Standard : 47 CFR FCC Part 15.245

The product was received on Jul. 21, 2022, and testing was started from Jul. 23, 2022 and completed on Aug. 01, 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.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 Information.....	5
1.2 Applicable Standards	6
1.3 Testing Location Information	6
1.4 Measurement Uncertainty	6
2 Test Configuration of Equipment under Test.....	7
2.1 Parameters of Test Software Setting	7
2.2 Conformance Tests and Related Test Frequencies.....	7
2.3 EUT Operation during Test	8
2.4 Accessories	8
2.5 Support Equipment.....	8
2.6 EUT Setups	9
3 Transmitter Test Result	12
3.1 AC Power Conducted Emissions	12
3.2 Field Strength of Fundamental	17
3.3 Transmitter Spurious Emissions.....	21
3.4 Antenna Requirements.....	31
4 Test Equipment and Calibration Data	32
Appendix A. Test Photos	
Photographs of EUT v01	



TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A8_1 Ver1.3



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.207	AC Power Conducted Emissions	PASS	-
3.2	15.245(b)	Field Strength of Fundamental	PASS	-
3.3	15.245(b)	Transmitter Spurious Emissions	PASS	-
3.4	15.203	Antenna Requirements	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: Jessie Wei



1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information	
Frequency Range	10.5 - 10.55 GHz
Operation Frequency	10525 MHz
Channel Number	1
Modulation	CW
Antenna	Antenna Type: Printed Antenna (Without any antenna connector) Antenna Gain: 7.5dBi

Note: The above information was declared by manufacturer.

1.1.2 Field Strength of Fundamental

Field Strength of Fundamental							
Applicable power levels:	☐ Conducted ☐ EIRP ☒ Field Strength at 3m						
Frequency	Highest setting (P_{high}): (dBuV/m)						
	Power Setting	Modulation	Data Rate (Mb/s)	Average Level	Peak Level	Average Level Limit	Peak Level Limit
10525 MHz	N/A	CW	N/A	80.61	107.55	128	148

1.1.3 EUT Operational Condition

EUT Power Type	From host system
----------------	------------------

Note: The above information was declared by manufacturer.

1.1.4 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR231133

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Adding a host systems model names: FLX-P-DT-X5	1. AC Power Conducted Emissions 2. Field Strength of Fundamental 3. Transmitter Spurious Emissions



1.2 Applicable Standards

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

- ♦ ANSI C63.10-2013
- ♦ 47 CFR FCC Part 15.245

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

- ♦ FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information		
Test Lab. : Sporton International Inc. Hsinchu Laboratory		
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)	
(TAF: 3787)	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 below 1GHz	03CH05-CB	Eason Chen	23.8~24.9 / 55~58	Jul. 23, 2022
Radiated above 1GHz	03CH05-CB	Eason Chen	24.4~25.5 / 55~58	Jul. 23, 2022~ Jul. 26, 2022
AC Conduction	CO01-CB	Dean Chang	23~24 / 61~62	Aug. 01, 2022

1.4 Measurement Uncertainty

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)	5.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.7 dB	Confidence levels of 95%

2 Test Configuration of Equipment under Test

2.1 Parameters of Test Software Setting

Software Setting	
Test Frequencies	10525 MHz
Software Setting	Default

2.2 Conformance Tests and Related Test Frequencies

Test	Test Frequencies	Mode
AC Power Conducted Emissions Test Voltage: 120Vac / 60Hz	10525 MHz	Normal Link
Field Strength of Fundamental	10525 MHz	CTX
Transmitter Spurious Emissions Below 1GHz	10525 MHz	Normal Link
Transmitter Spurious Emissions 1GHz~40GHz	10525 MHz	CTX

Note: **For Conducted Emission test:**

Mode 1. Normal link – EUT

For Radiated Emission below 1GHz test:

Mode 1. Normal link – EUT in Z axis

Mode 2. Normal link – EUT in Y axis

Mode 3. Normal link – EUT in X axis

Mode 2 generated the worst test result, so it was recorded in this report.

For Radiated Emission above 1GHz test:

The EUT was performed at Y axis and Z axis position, and the worst case was found at Y axis. So the measurement will follow this same test configuration.

Mode 1. CTX – 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:

During the test, the EUT operation to normal function.

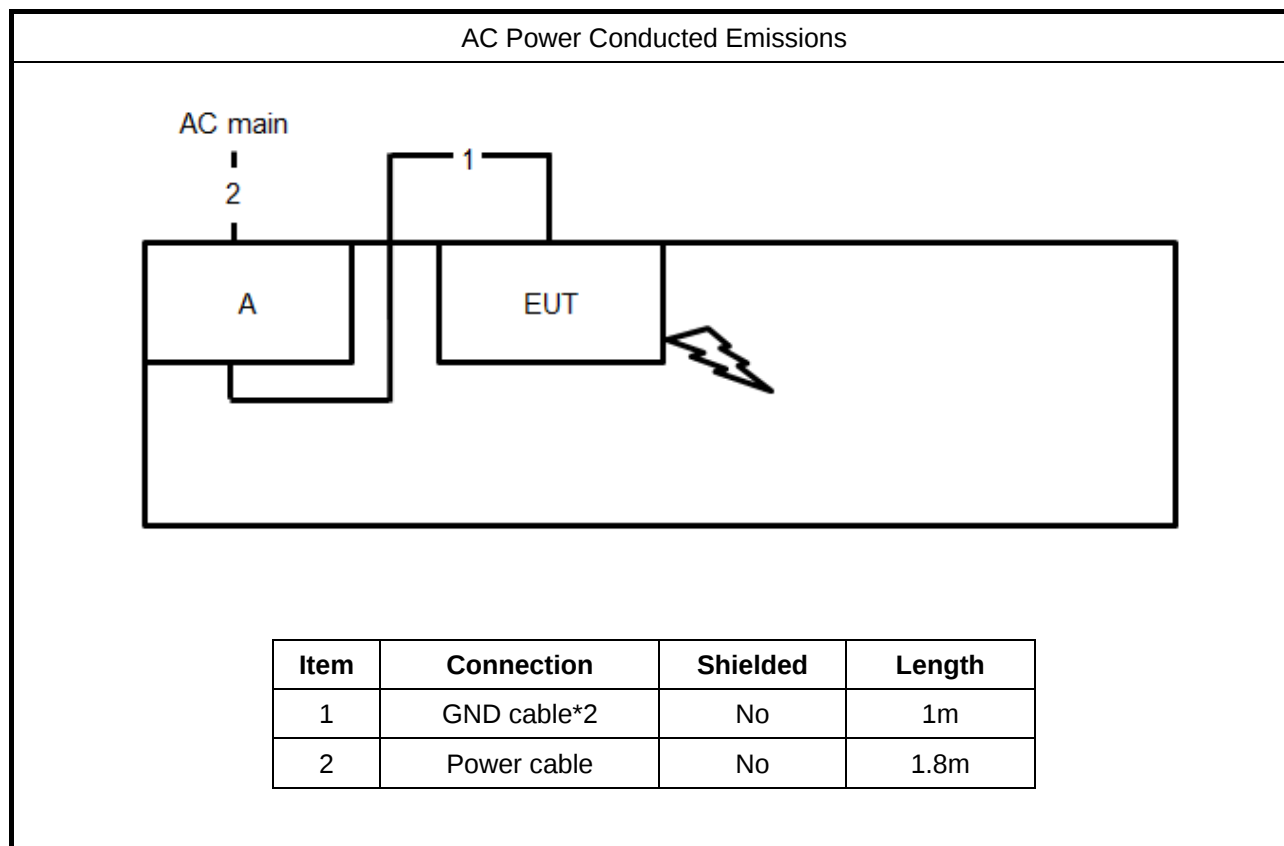
2.4 Accessories

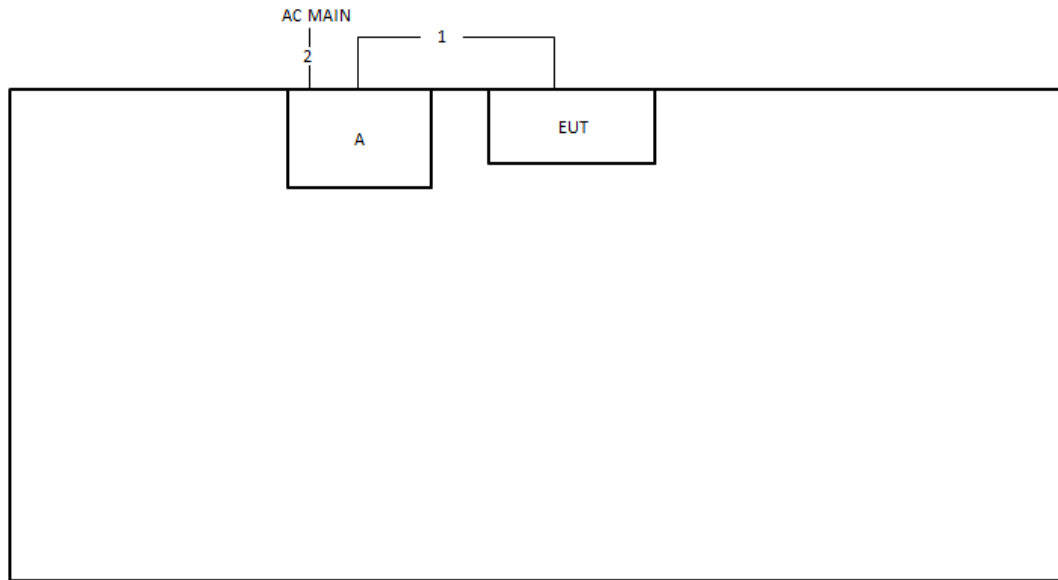
N/A

2.5 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Power Supply	Advanced	LPS-305	N/A

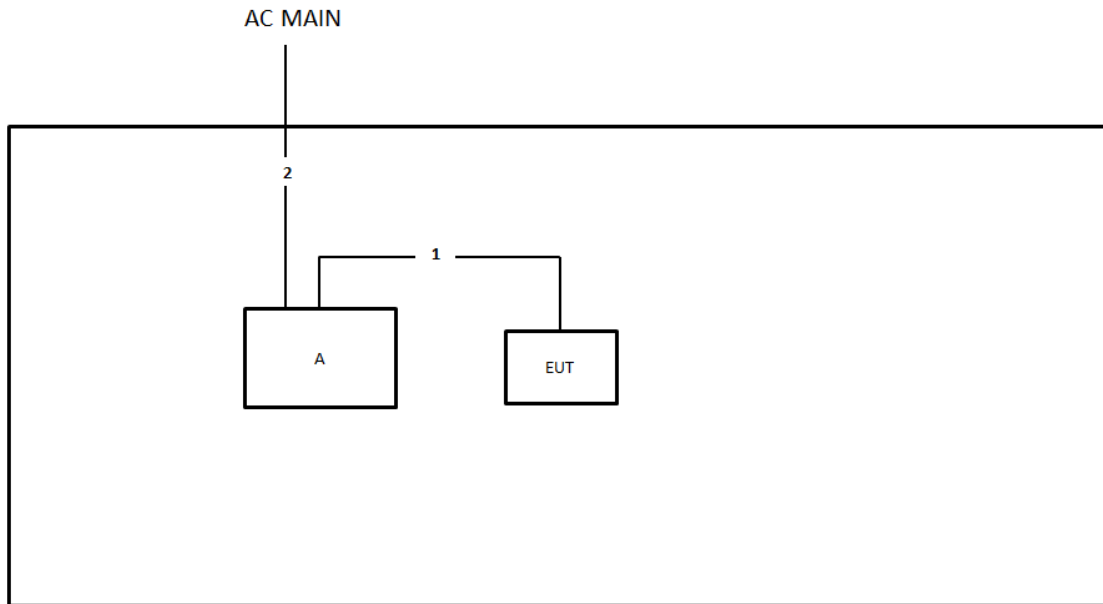
2.6 EUT Setups



Transmitter Spurious Emissions
30MHz~1GHz


Item	Connection	Shielded	Length
1	crocodile clip cable	No	0.8m
2	Power cable	No	1.5m

Above 1GHz



Item	Connection	Shielded	Length
1	crocodile clip cable	No	0.8m
2	Power cable	No	1.5m



3 Transmitter Test Result

3.1 AC Power Conducted Emissions

3.1.1 Limit of AC Power Conducted Emissions

AC Power 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: * Decreases with the logarithm of the frequency.

3.1.2 Measuring Instruments

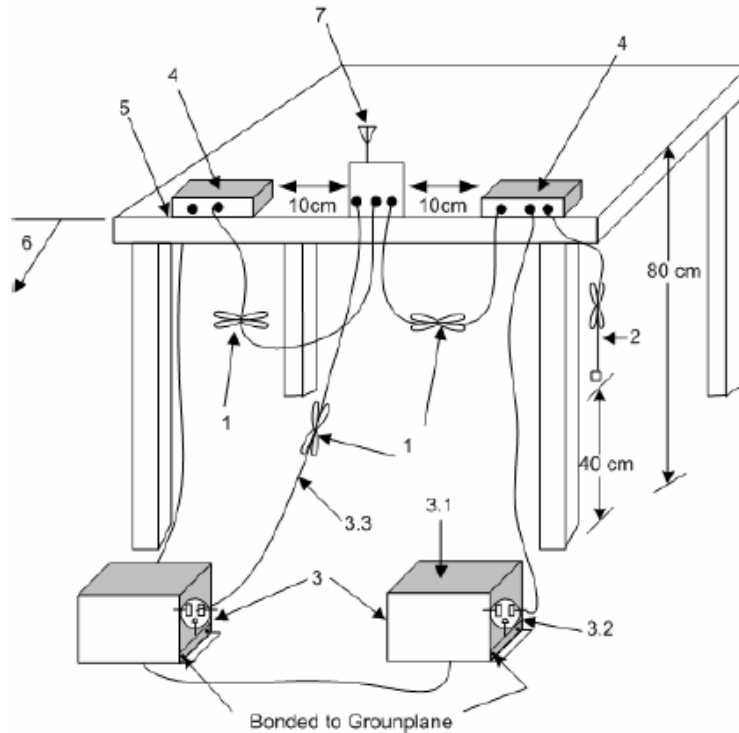
Refer a measuring instruments list in this test report.

3.1.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 6.2.

3.1.4 Test Setup

AC Power Conducted Emissions



- 1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.
- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
 - 3.1—All other equipment powered from additional LISN(s).
 - 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
 - 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

3.1.5 Measurement Results Calculation

The measured Level is calculated using:

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

**3.1.6 Test Result of AC Power Conducted Emissions**

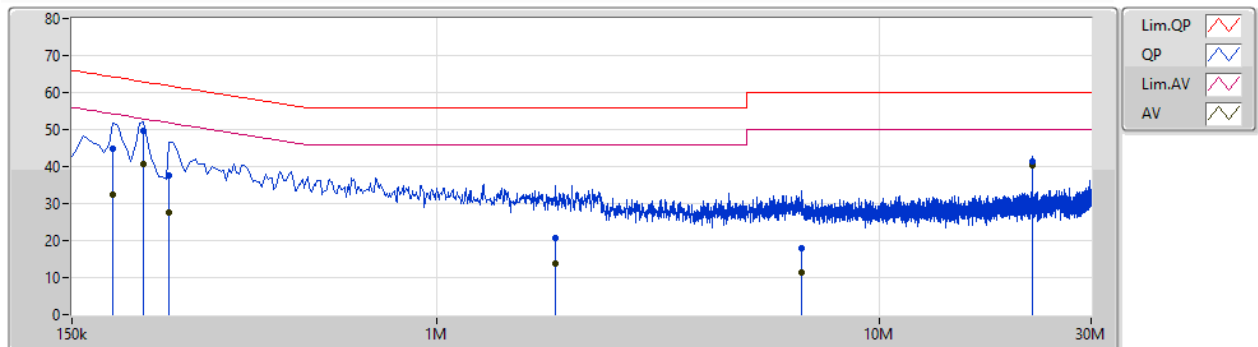
Test Conditions:	see ANSI C63.10, clause 5.11
Test Setup:	see ANSI C63.10, clause 6.2.3
Note 1: If equipment having different channel plan and nominal channel bandwidth modes, the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. If equipment having different transmit operating modes, the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing. Note 2: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit, see ANSI C63.4, clause 10.1.8.1.	



Phase	Line	Configuration	Normal Link
Test Mode	Mode1		

Mode 1

01/08/2022



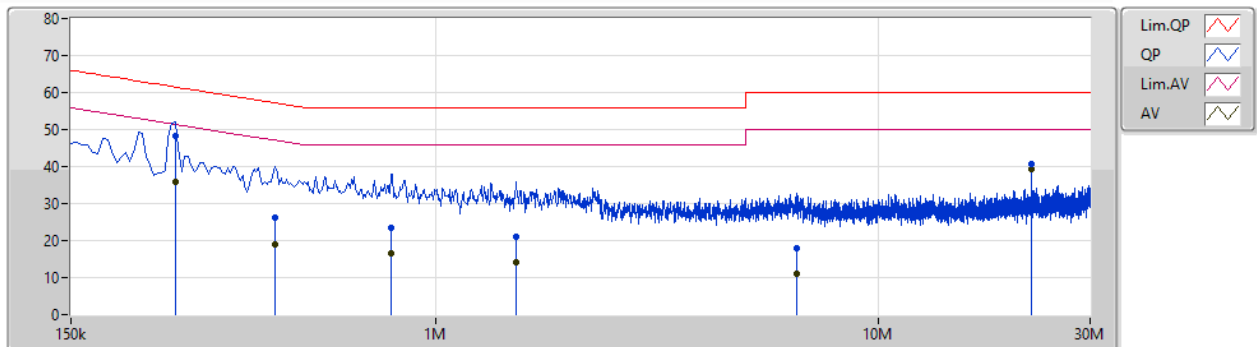
Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	186k	44.95	64.20	-19.25	9.99	Line	-	34.96	0.06	0.04	9.89			
AV	186k	32.48	54.20	-21.72	9.99	Line	-	22.49	0.06	0.04	9.89			
QP	217.5k	49.50	62.92	-13.42	9.99	Line	-	39.51	0.06	0.04	9.89			
AV	217.5k	40.85	52.92	-12.07	9.99	Line	-	30.86	0.06	0.04	9.89			
QP	249k	37.65	61.79	-24.14	10.00	Line	-	27.65	0.06	0.05	9.89			
AV	249k	27.55	51.79	-24.24	10.00	Line	-	17.55	0.06	0.05	9.89			
QP	1.851M	20.57	56.00	-35.43	10.06	Line	-	10.51	0.09	0.08	9.89			
AV	1.851M	13.88	46.00	-32.12	10.06	Line	-	3.82	0.09	0.08	9.89			
QP	6.675M	17.96	60.00	-42.04	10.21	Line	-	7.75	0.18	0.13	9.90			
AV	6.675M	11.24	50.00	-38.76	10.21	Line	-	1.03	0.18	0.13	9.90			
QP	22.119M	41.52	60.00	-18.48	10.53	Line	-	30.99	0.32	0.25	9.96			
AV	22.119M	40.48	50.00	-9.52	10.53	Line	"Worst"	29.95	0.32	0.25	9.96			



Phase	Neutral	Configuration	Normal Link
Test Mode	Mode1		

Mode 1

01/08/2022



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	258k	48.25	61.49	-13.24	10.01	Neutral	-	38.24	0.07	0.05	9.89			
AV	258k	35.81	51.49	-15.68	10.01	Neutral	-	25.80	0.07	0.05	9.89			
QP	433.5k	26.05	57.19	-31.14	10.02	Neutral	-	16.03	0.07	0.06	9.89			
AV	433.5k	19.12	47.19	-28.07	10.02	Neutral	-	9.10	0.07	0.06	9.89			
QP	793.5k	23.35	56.00	-32.65	10.02	Neutral	-	13.33	0.08	0.05	9.89			
AV	793.5k	16.66	46.00	-29.34	10.02	Neutral	-	6.64	0.08	0.05	9.89			
QP	1.518M	20.88	56.00	-35.12	10.05	Neutral	-	10.83	0.09	0.07	9.89			
AV	1.518M	14.24	46.00	-31.76	10.05	Neutral	-	4.19	0.09	0.07	9.89			
QP	6.518M	17.77	60.00	-42.23	10.22	Neutral	-	7.55	0.19	0.13	9.90			
AV	6.518M	11.04	50.00	-38.96	10.22	Neutral	-	0.82	0.19	0.13	9.90			
QP	22.119M	40.57	60.00	-19.43	10.51	Neutral	-	30.06	0.30	0.25	9.96			
AV	22.119M	39.34	50.00	-10.66	10.51	Neutral	"Worst"	28.83	0.30	0.25	9.96			

3.2 Field Strength of Fundamental

3.2.1 Limit of Field Strength of Fundamental

Frequencies (MHz)	Field Strength (mV/meter)	Field Strength (dBuV/m) at 3m
902~928 MHz	500 at 3m	114 (Average)
902~928 MHz	5000 at 3m	134 (Peak)
2435~2465MHz	500 at 3m	114 (Average)
2435~2465MHz	5000 at 3m	134 (Peak)
5785~5815 MHz	500 at 3m	114 (Average)
5785~5815 MHz	5000 at 3m	134 (Peak)
10.5~10.55 GHz	2500 at 3m	128 (Average)
10.5~10.55 GHz	25000 at 3m	148 (Peak)
24.075~24.175 GHz	2500 at 3m	128 (Average)
24.075~24.175 GHz	25000 at 3m	148 (Peak)

Note1: For the applicable limit, see 15.245(b)

Note2: The limit shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

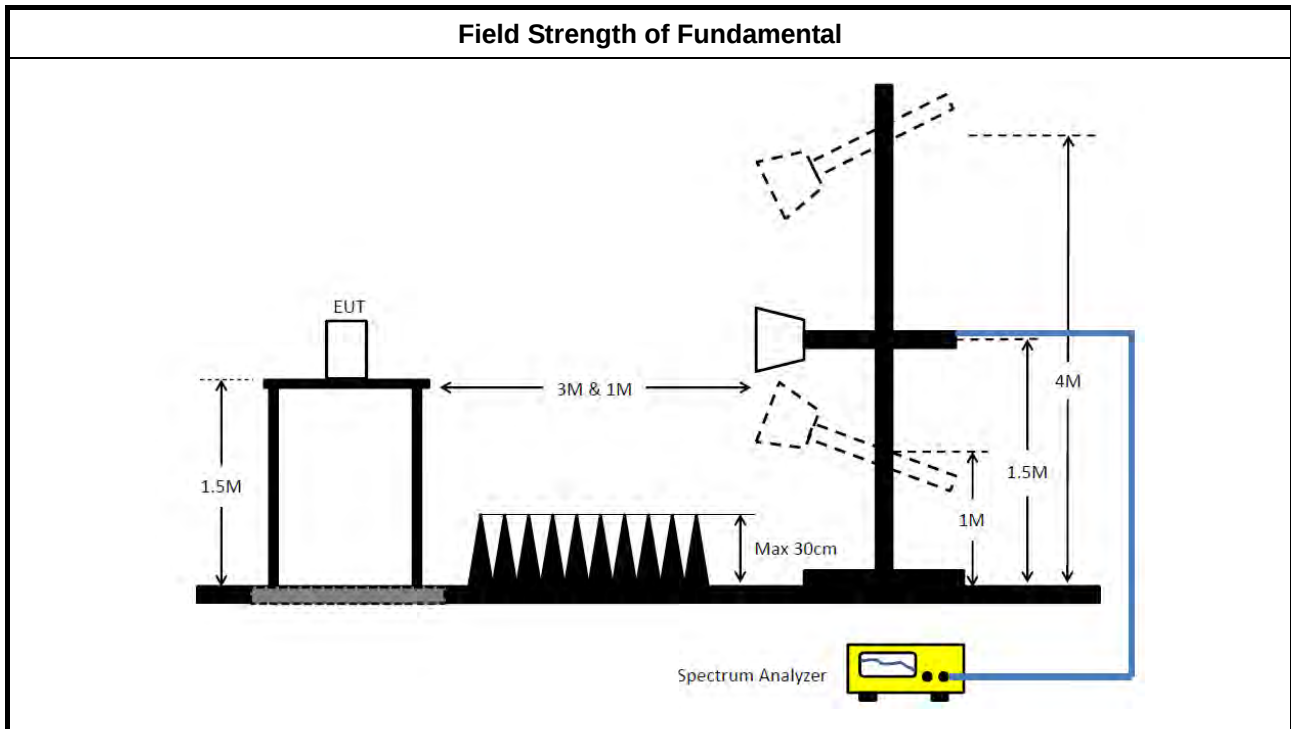
3.2.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.2.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clause 6.6.

3.2.4 Test Setup



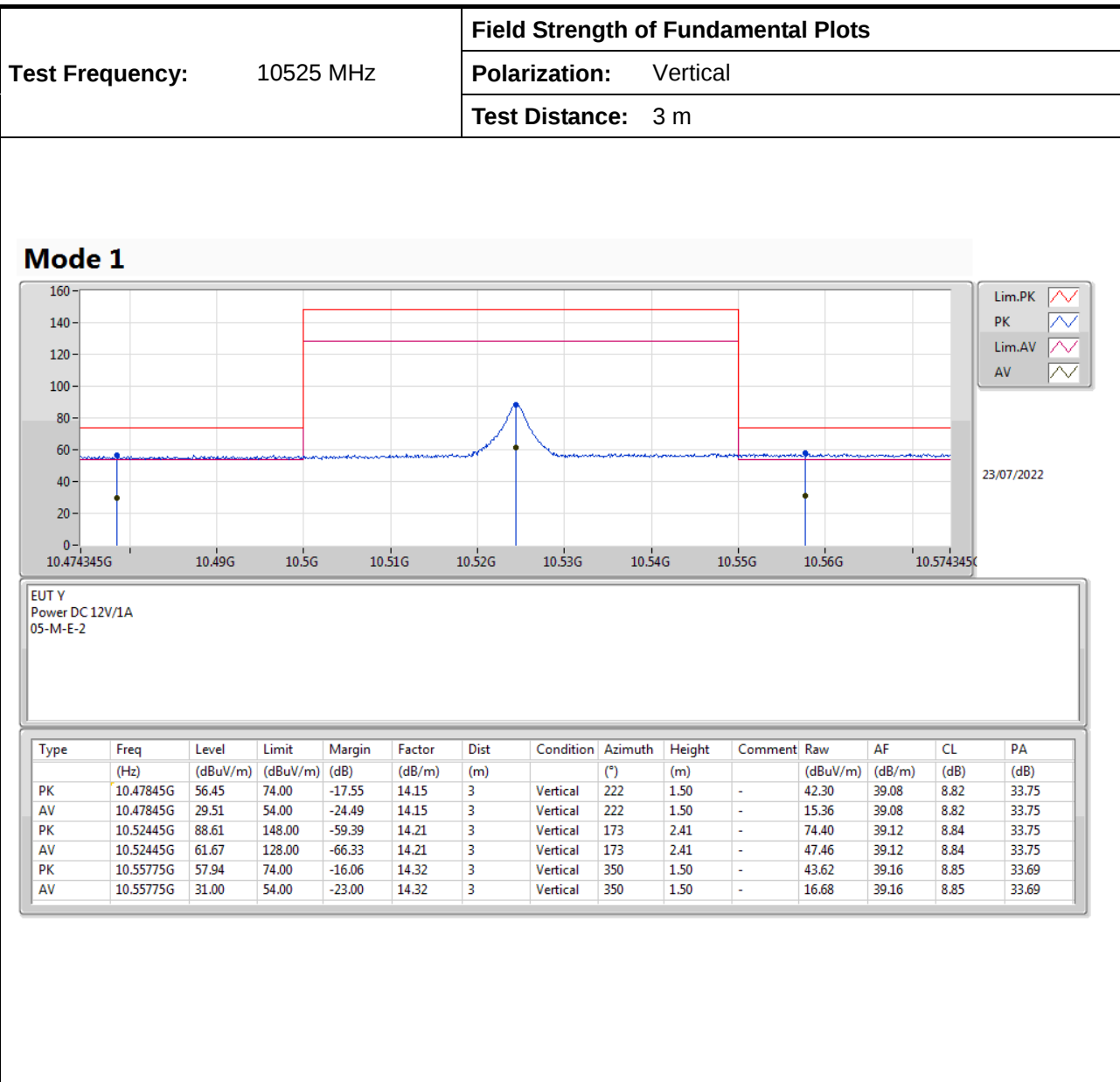
3.2.5 Measurement Results Calculation

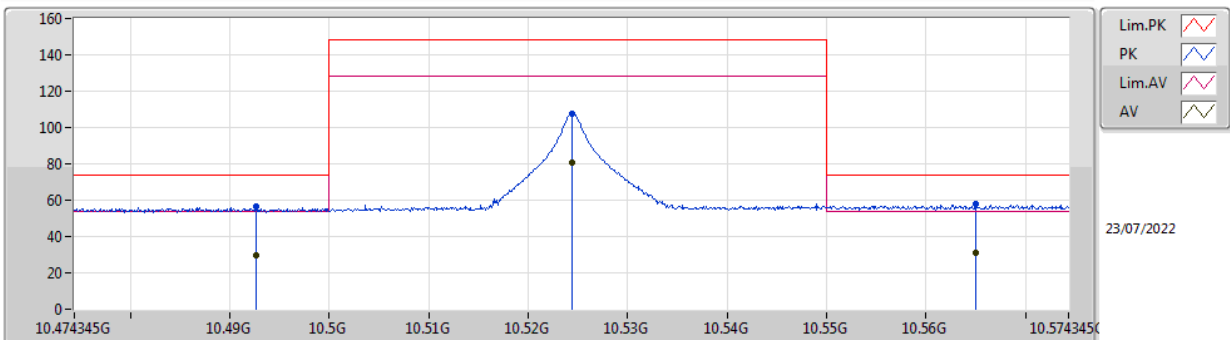
The measured Level is calculated using:

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

3.2.6 Test Result of Field Strength of Fundamental

Test Conditions:	see ANSI C63.10, clause 5.11
Test Setup:	see ANSI C63.10, clause 6.6
Note1: If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing. Note2: Conformance tests have to be performed over the frequency range(s) that has been declared with this Field Strength of Fundamental and using the antenna gain of the antenna with the highest gain among those that have been declared with this Field Strength of Fundamental. For smart antenna systems, the antenna beam forming gain may have to be taken into account as well.	

**3.2.7 Test Result of Field Strength of Fundamental**

**Test Frequency:** 10525 MHz**Field Strength of Fundamental Plots****Polarization:** Horizontal**Test Distance:** 3 m**Mode 1**EUT Y
Power DC 12V/1A
05-M-E-2

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	10.49265G	56.71	74.00	-17.29	14.13	3	Horizontal	320	1.98	-	42.58	39.09	8.82	33.78
AV	10.49265G	29.77	54.00	-24.23	14.13	3	Horizontal	320	1.98	-	15.64	39.09	8.82	33.78
PK	10.52445G	107.55	148.00	-40.45	14.21	3	Horizontal	331	1.98	-	93.34	39.12	8.84	33.75
AV	10.52445G	80.61	128.00	-47.39	14.21	3	Horizontal	331	1.98	-	66.40	39.12	8.84	33.75
PK	10.56505G	57.76	74.00	-16.24	14.34	3	Horizontal	324	1.98	-	43.42	39.17	8.85	33.68
AV	10.56505G	30.82	54.00	-23.18	14.34	3	Horizontal	324	1.98	-	16.48	39.17	8.85	33.68

3.3 Transmitter Spurious Emissions

3.3.1 Limit of Transmitter Spurious Emissions

Transmitter Spurious Emissions	
1.	902 - 928MHz, Field disturbance sensors
♦	Harmonic emissions in the restricted bands: 15.209 limit
♦	Harmonic emissions in the non-restricted bands: 1.6mV/m
♦	Except harmonic emissions, spurious emissions: FCC 15.209 limit or 50 dB below the fundamental, whichever is the lesser attenuation.
2.	2435 - 2465MHz, 5785 - 5815MHz, Field disturbance sensors
♦	Harmonic emissions in the restricted bands at and below 17.7 GHz: 15.209 limit
♦	Harmonic emissions in the restricted bands at and above 17.7 GHz: 7.5mV/m
♦	Harmonic emissions in the non-restricted bands: 1.6mV/m
♦	Except harmonic emissions, spurious emissions: FCC 15.209 limit or 50 dB below the fundamental, whichever is the lesser attenuation.
3.	10500 – 10550MHz, Field disturbance sensors
♦	Harmonic emissions in the restricted bands at and above 17.7 GHz: 7.5mV/m
♦	Harmonic emissions in the non-restricted bands: 25mV/m
♦	Except harmonic emissions, spurious emissions: FCC 15.209 limit or 50 dB below the fundamental, whichever is the lesser attenuation.
4.	24075-24175 MHz, Field disturbance sensors
♦	Second and third harmonics: 25 mV/m
♦	Except harmonic emissions, spurious emissions: FCC 15.209 limit or 50 dB below the fundamental, whichever is the lesser attenuation.

Note: The limit shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

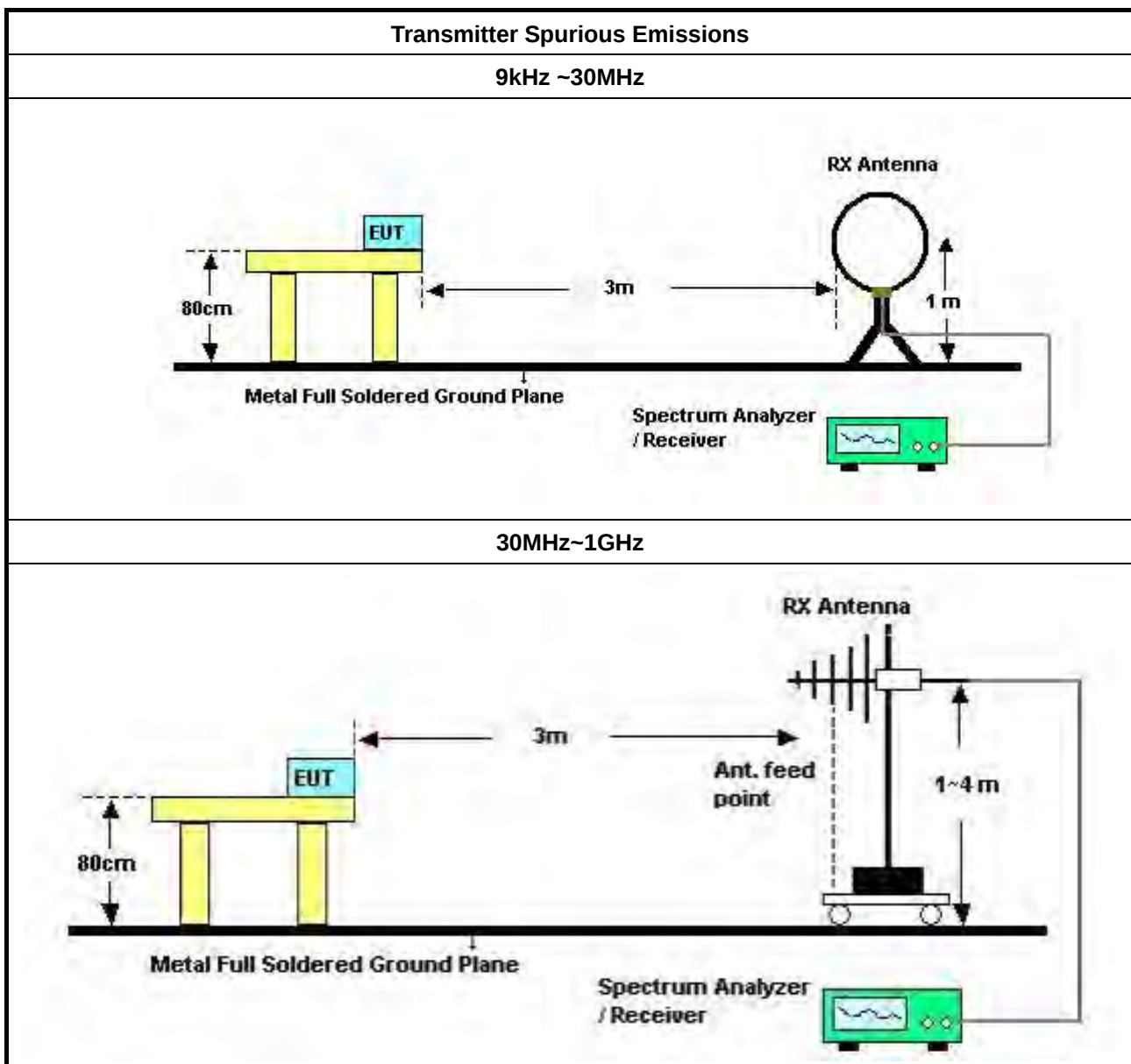
3.3.2 Measuring Instruments

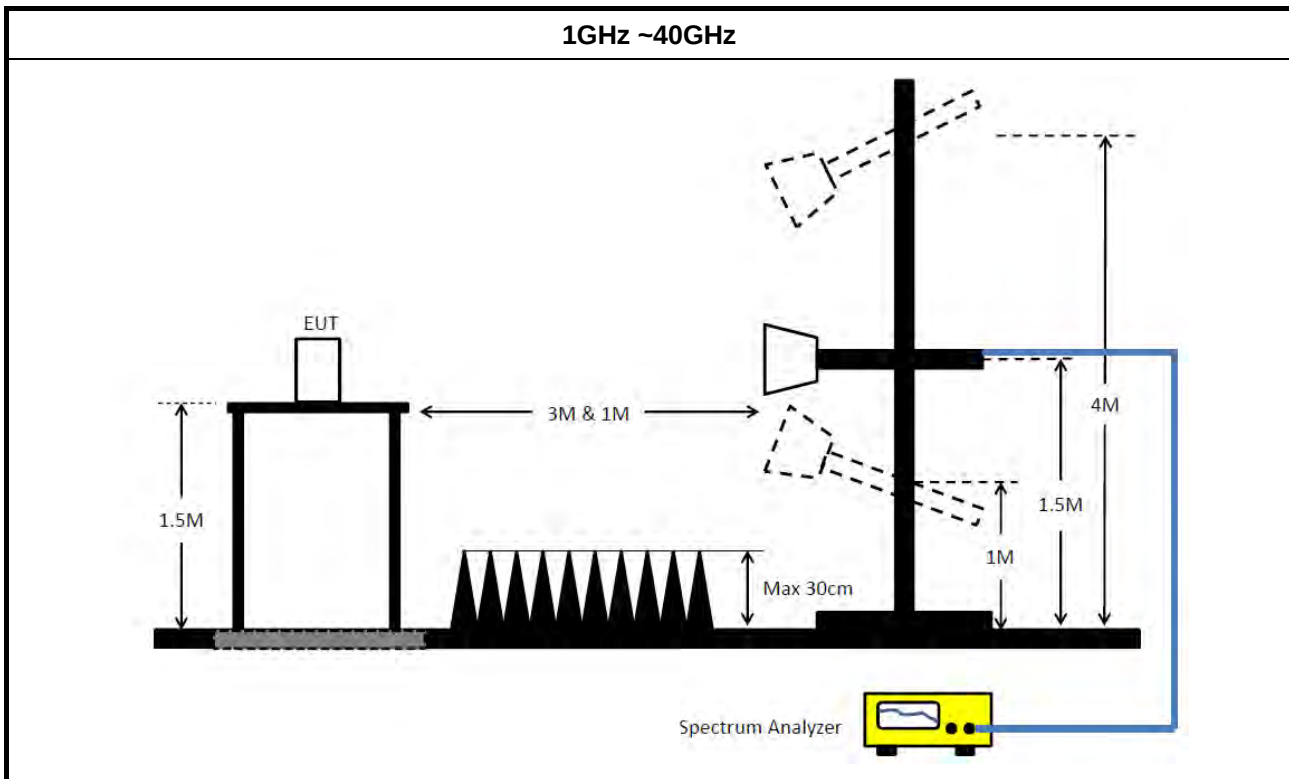
Refer a measuring instruments list in this test report.

3.3.3 Test Procedures

Method of measurement: Refer as ANSI C63.10-2013, clauses 6.3, 6.4, 6.5, 6.6 and 9.12.

3.3.4 Test Setup





3.3.5 Measurement Results Calculation

The measured Level is calculated using:

For below 40GHz

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

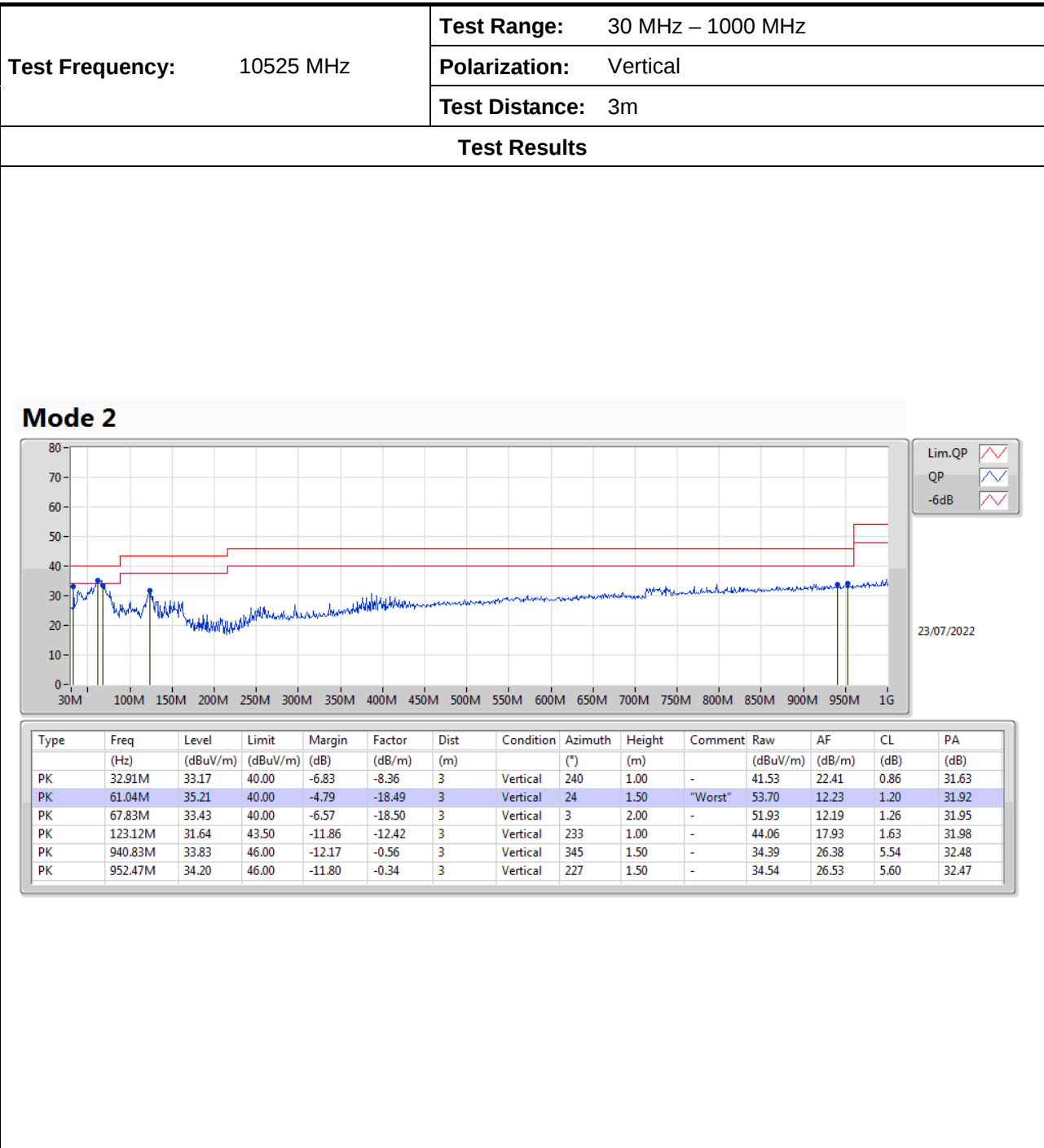
For above 40GHz

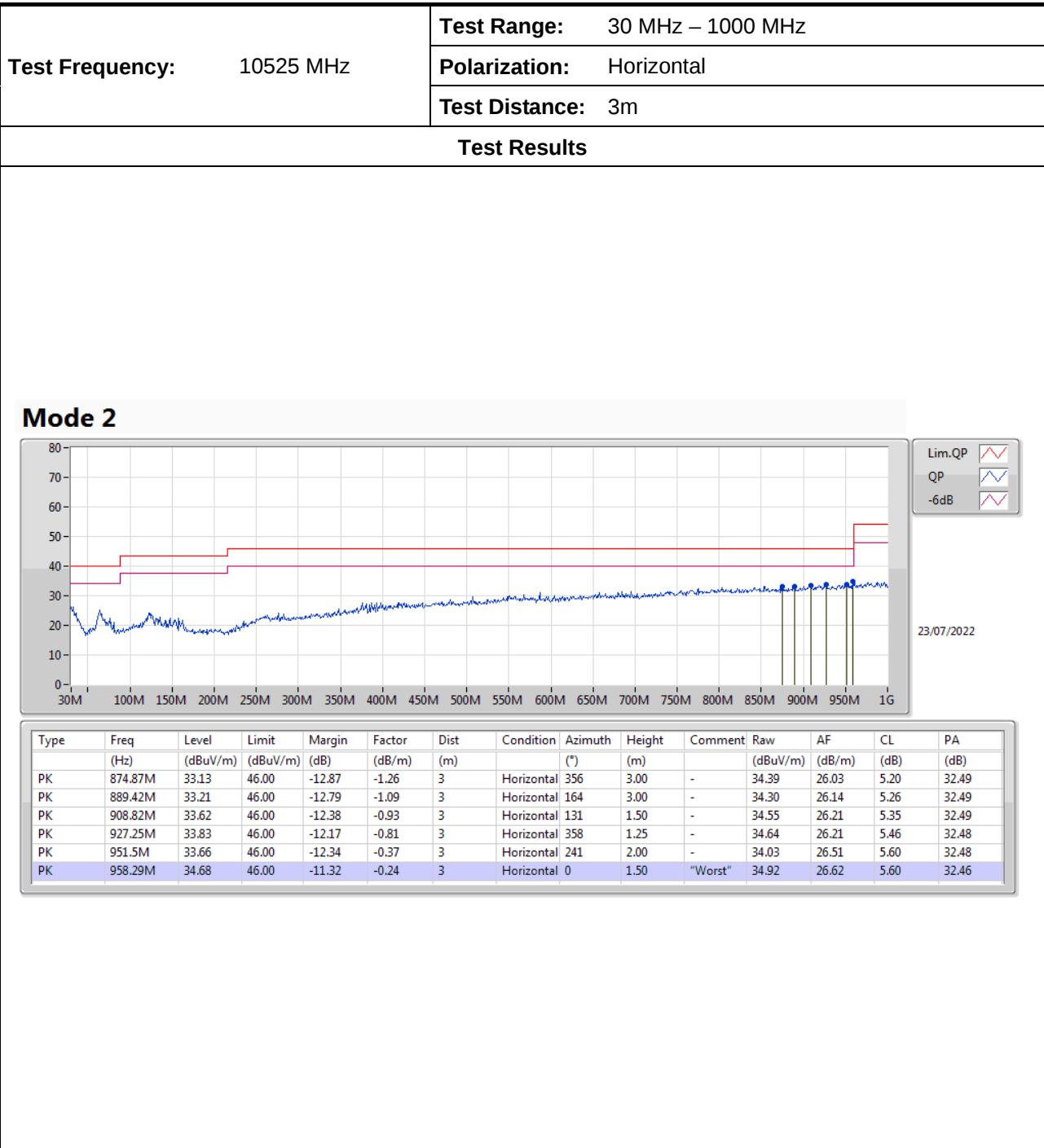
$EIRP = \text{Meas. Level} - \text{RX Antenna Gain} + 20 \cdot \log(4 \cdot \pi \cdot (3.14159) \cdot D / (300 / (\text{Frequency} \cdot 1000)))$

**3.3.6 Test Result of Transmitter Spurious Emissions**

Test Conditions:	see ANSI C63.10, clause 5.11
Test Setup:	see ANSI C63.10, clauses 6.3, 6.4, 6.5, 6.6 and 9.12
Note1: If equipment having different channel plan and nominal channel bandwidth modes, the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.	
Note2: Note: Conformance tests have to be performed over the frequency range(s) that has been declared with this Field Strength of Fundamental and using the antenna gain of the antenna with the highest gain among those that have been declared with this Field Strength of Fundamental. For smart antenna systems, the antenna beam forming gain may have to be taken into account as well.	

Test Frequency: 10525 MHz		Test Range: 9 kHz - 30 MHz			
		Test Results			
Test Range	Emission Frequency (MHz)	Emission Observed (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
9 kHz - 30 MHz	N/F	N/F	-	-	Peak
Note: 1. "N/F" means Nothing Found (No spurious emissions were detected.) 2. 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.					







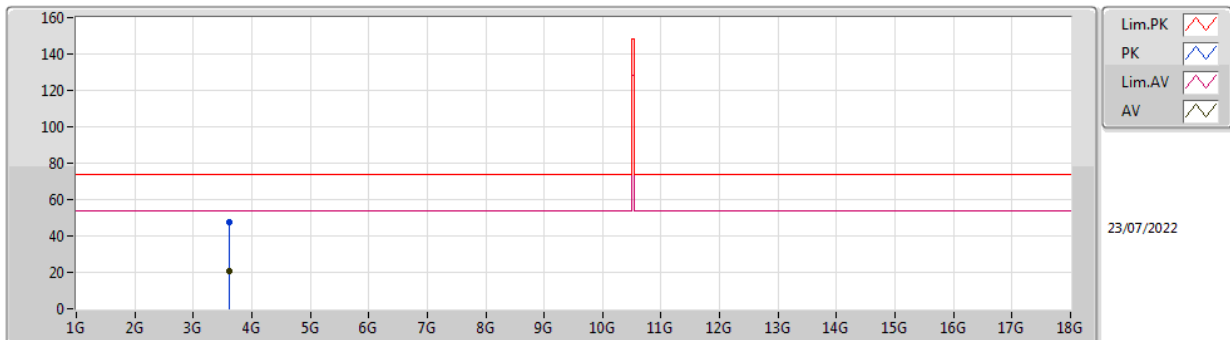
Test Frequency: 10525 MHz	Test Range: 1 GHz – 18 GHz																																													
	Polarization: Vertical																																													
	Test Distance: 3m																																													
Test Results																																														
Radiated Emissions above 1GHz_Mode 1 23/07/2022 EUT Y Power DC 12V/1A 05-M-E-2 <table border="1"><thead><tr><th>Type</th><th>Freq (Hz)</th><th>Level (dBuV/m)</th><th>Limit (dBuV/m)</th><th>Margin (dB)</th><th>Factor (dB/m)</th><th>Dist (m)</th><th>Condition</th><th>Azimuth (°)</th><th>Height (m)</th><th>Comment</th><th>Raw (dBuV/m)</th><th>AF (dB/m)</th><th>CL (dB)</th><th>PA (dB)</th></tr></thead><tbody><tr><td>PK</td><td>3.6162G</td><td>43.03</td><td>74.00</td><td>-30.97</td><td>0.04</td><td>3</td><td>Vertical</td><td>301</td><td>1.77</td><td>-</td><td>42.99</td><td>29.73</td><td>5.91</td><td>35.60</td></tr><tr><td>AV</td><td>3.6162G</td><td>16.09</td><td>54.00</td><td>-37.91</td><td>0.04</td><td>3</td><td>Vertical</td><td>301</td><td>1.77</td><td>"</td><td>16.05</td><td>29.73</td><td>5.91</td><td>35.60</td></tr></tbody></table>		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	3.6162G	43.03	74.00	-30.97	0.04	3	Vertical	301	1.77	-	42.99	29.73	5.91	35.60	AV	3.6162G	16.09	54.00	-37.91	0.04	3	Vertical	301	1.77	"	16.05	29.73	5.91	35.60
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	3.6162G	43.03	74.00	-30.97	0.04	3	Vertical	301	1.77	-	42.99	29.73	5.91	35.60																																
AV	3.6162G	16.09	54.00	-37.91	0.04	3	Vertical	301	1.77	"	16.05	29.73	5.91	35.60																																



Test Frequency: 10525 MHz	Test Range: 1 GHz – 18 GHz
	Polarization: Horizontal
	Test Distance: 3m

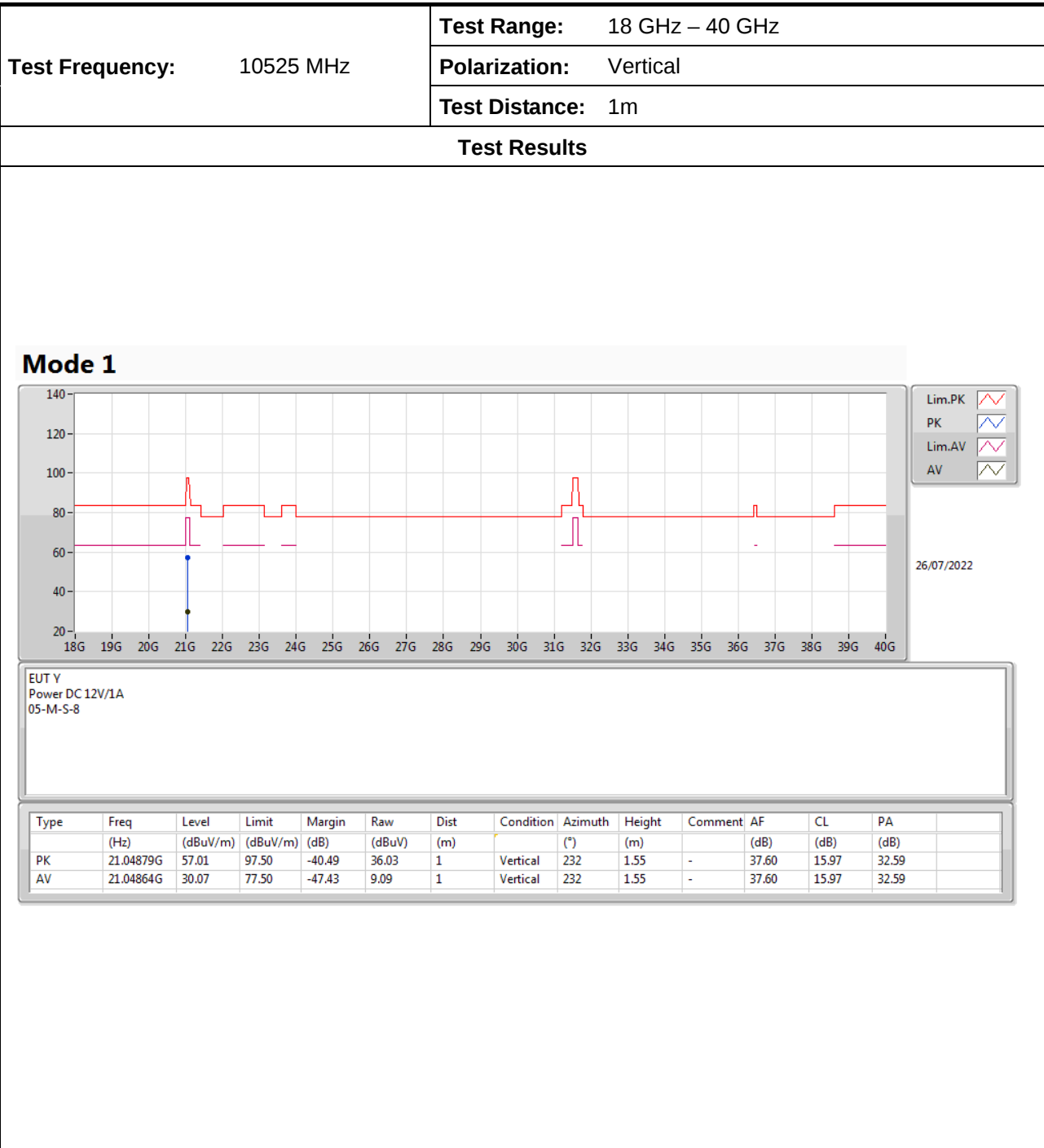
Test Results

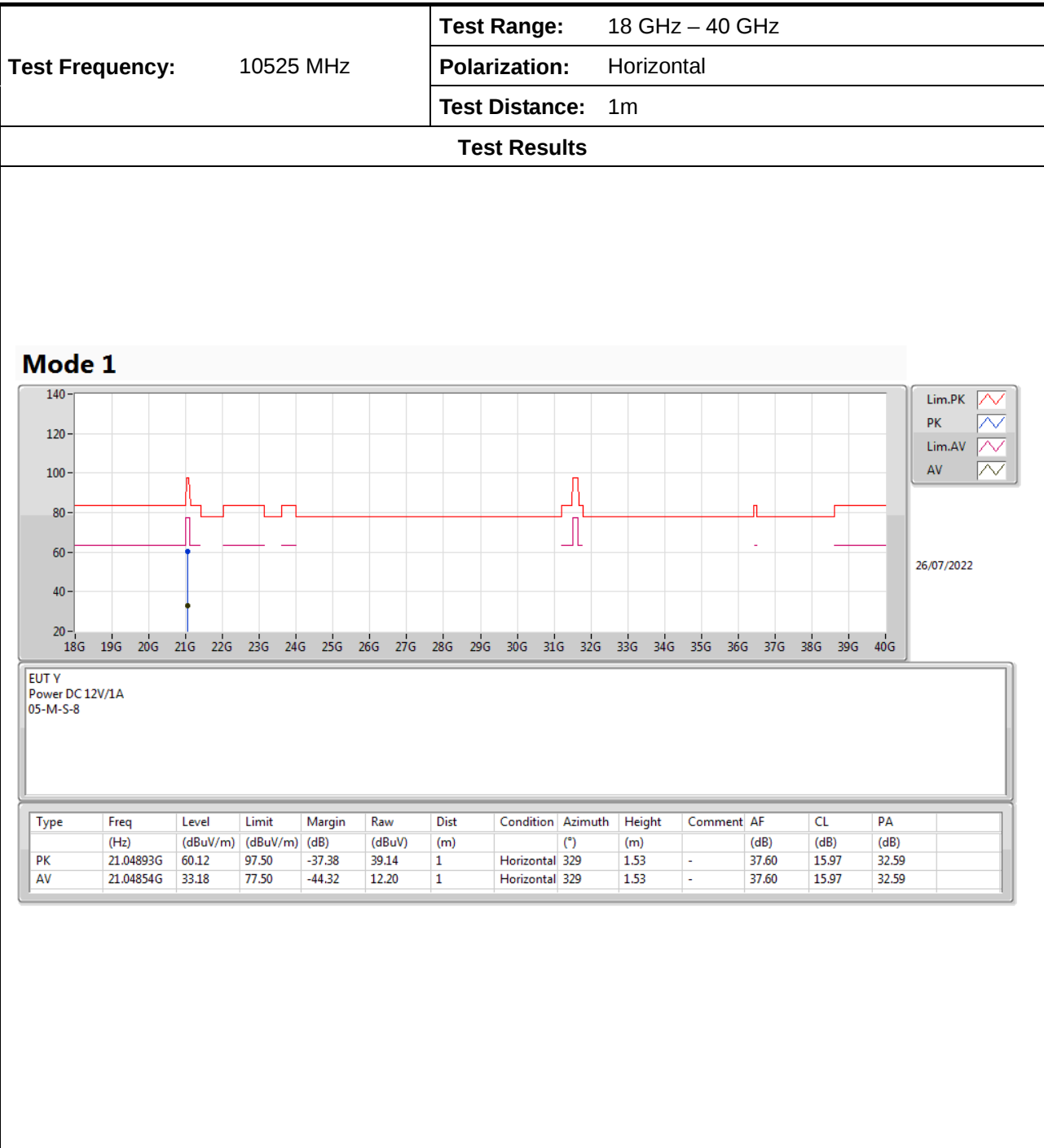
Radiated Emissions above 1GHz_Mode 1



EUT Y
Power DC 12V/1A
05-M-E-2

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	3.6149G	47.78	74.00	-26.22	0.04	3	Horizontal	220	1.80	-	47.74	29.73	5.91	35.60
AV	3.6149G	20.84	54.00	-33.16	0.04	3	Horizontal	220	1.80	"	20.80	29.73	5.91	35.60







3.4 Antenna Requirements

3.4.1 Limit of Antenna Requirements

Limits for Antenna Requirements
The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

3.4.2 EUT Antenna

See test report clause 1.1.1, EUT antenna complied with antenna requirements.



4 Test Equipment and Calibration Data

Instrument	Brand	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-CO 01	9kHz ~ 30MHz	May 18, 2022	May 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. 09, 2021	Aug. 08, 2022	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH05-CB	1GHz ~18GHz 3m	Nov. 07, 2021	Nov. 06, 2022	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)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120 D-1291	1GHz~18GHz	Jun. 23, 2022	Jun. 22, 2023	Radiation (03CH05-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 05, 2021	Aug. 04, 2022	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC12630SE	980287	1GHz ~ 26.5GHz	Jul. 01, 2022	Jun. 30, 2023	Radiation (03CH05-CB)
Pre-Amplifier	-	-	TF-130N-R1	18GHz ~ 40GHz	Jun. 21, 2022	Jun. 20, 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. 13, 2021	Oct. 12, 2022	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-28	1GHz~18GHz	Oct. 13, 2021	Oct. 12, 2022	Radiation (03CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+28	1GHz~18GHz	Oct. 13, 2021	Oct. 12, 2022	Radiation (03CH05-CB)



Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
High Cable	Woken	WCA0929M	40G#5+7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH05-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 08, 2021	Dec. 07, 2022	Radiation (03CH05-CB)
High Cable	Woken	WCA0929M	40G#7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)

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

NCR means Non-Calibration required.