



EMC TEST REPORT

Report No.: SET2021-04410

Product Name: Thermal Imaging monocular

FCC ID: 2AMSPDTI335

IC: 22938-DTI335

Model No. : DTI 3/35, DTI 3/25

Applicant: Carl Zeiss AG

Address: Carl-Zeiss-Str. 22 73447 Oberkochen, Germany

Dates of Testing: 06/04/2021 —08/04/2021

Issued by: CCIC Southern Testing Co., Ltd.

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Test Report

Product Name Thermal Imaging monocular

Model No. DTI 3/35, DTI 3/25

Trade nam ZEISS

Applicant Carl Zeiss AG

Applicant Address Carl-Zeiss-Str. 22 73447 Oberkochen, Germany

Manufacturer Carl Zeiss AG

Manufacturer Address Carl-Zeiss-Str. 22 73447 Oberkochen, Germany

Test Standards 47 CFR Part 15 Subpart B
ICES-003 Issue 7 October 2020

Test Result PASS

Tested by Zhang Pei Sen

Pei Sen Zhang Test Engineer

2021.05.26

Reviewed by Chris You

Chris You Senior Engineer

2021.05.26

Approved by Shuangwen Zhang

Shuangwen Zhang, Manager

2021.05.26

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Change History		
Issue	Date	Reason for change
1.0	2021.05.26	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Name : Thermal Imaging monocular
Trade Name..... : ZEISS
Brand Name..... : ZEISS
Hardware Version..... : V1.0
Software Version : 01040204150108
Power supply..... : Battery
Model No.: JQ033-14L
Capacitance: 4.4Ah
Rated Voltage:4.6V
Charge Limit:4.2V
Manufacturer : JinQU Electronic
Ancillary Equipment ... : AC Adapter
Model No.: SK22G-05002002
I/p: 100-240V~50/60Hz ,0.6mA
O/p: 4.75-5.25V---2000mA
Manufacturer :Shenzhen Simsukian Electronics Technology Co,Ltd.

*Note1:*The EUT is a Thermal Imaging monocular;

*Note 2:*For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note3: According to the report SET2020-07647, Increase the model, replace the resistor, and quote the data in the original report. Retest the Radiation Emission (Just put the worst data compared to the previous ones.)

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart B:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart B	Radio Frequency Devices
2	ICES-003 Issue 7 October 2020	Information Technology Equipment (including Digital Apparatus)

Test detailed items/section required by FCC rules and results are as below:

No.	Description	Result
1	Conduct Emission	N/A
2	Radiated Emission	PASS

NOTE:

- (1) The EUT has been tested according to 47 CFR Part 15 Subpart B, Class B. The test procedure is according to ANSI C63.4:2014.

1.3 Facilities and Accreditations

1.3.1 Facilities

FCC-Registration No.: CN1283

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until April 19th, 2023.

ISED Registration: 11185A-1

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until April 20th, 2023

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 °C - 35 °C
Relative Humidity (%):	25% -75%
Atmospheric Pressure (kPa):	86kPa-106kPa

1.3.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

Uncertainty of Conducted Emission:	$U_c = 2.6 \text{ dB (k=2)}$
Uncertainty of Radiated Emission: (30MHz~1GHz)	$U_c = 3.91 \text{ dB (k=2)}$
Uncertainty of Radiated Emission: (1~18GHz)	$U_c = 4.5 \text{ dB (k=2)}$

2. TEST CONDITIONS SETTING

2.1 Test Peripherals

The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Support Equipment:

Description	Brand name	Model	Serial No.	FCCID
Notebook	ThinkPad	E430C	A131101550	N/A
Mouse	Logitech	M100r	25011051	DOC

Support Cable:

Description	Shield Type	Ferrite Core	Length
PC Power adapter Cable	Un- shielding	No	1.2m
Mouse Cable	Un- shielding	No	1m

Support Software:

Software	Version number	Manufacturer	Use the project
ES-K1	V1.73	ROHDE&SCHWARZ	Radiated Emissions below 1GHz
TS+	JS32-RE 2.5.2.0	Tonsceng	Radiated Emissions above 1GHz
EMC32	Version 10.35.10	ROHDE&SCHWARZ	Conducted Emission

2.2 Test Mode

The EUT have the following typical setups during the test:

Setup1: WiFi+ Charger

Setup2: Idle + charger

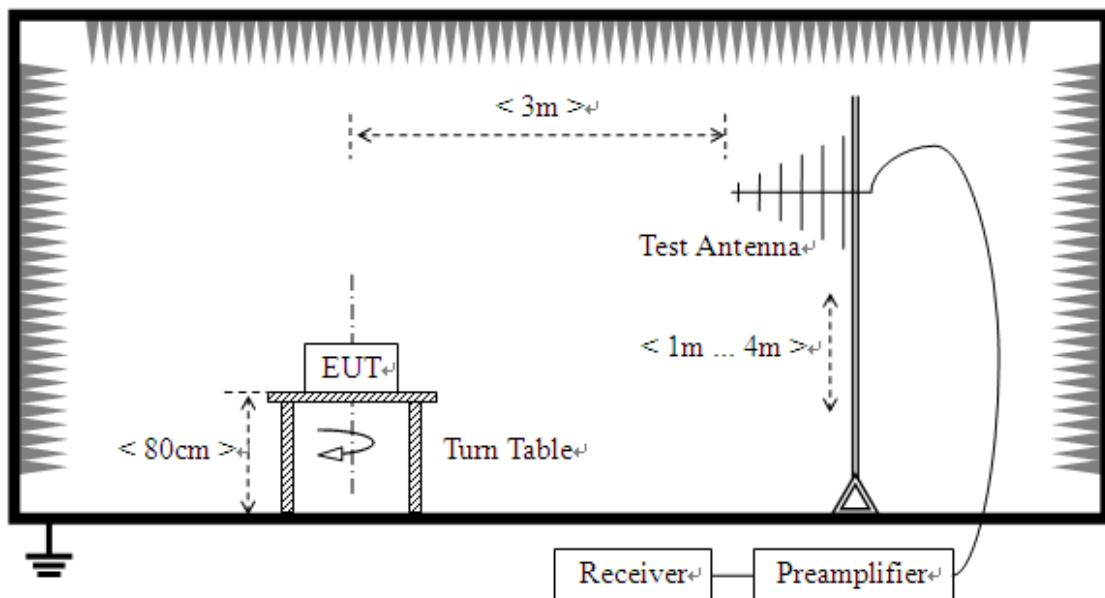
Note: only worst-case mode setup 1 mode data provide at the report

2.3 Test Setup and Equipment List

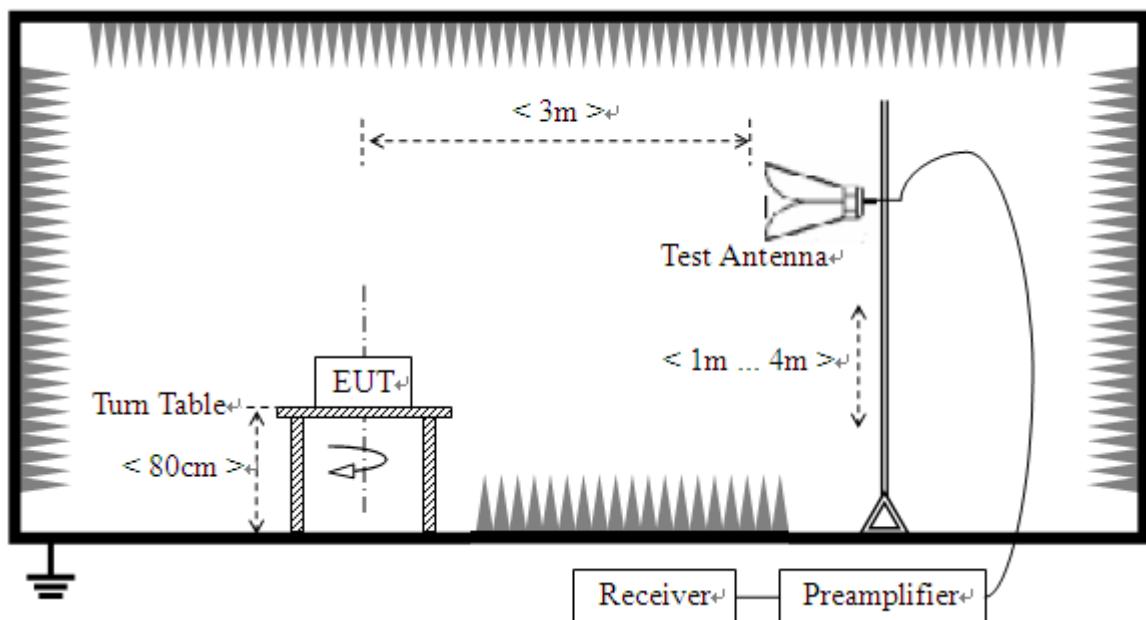
2.3.1 Radiated Emission

A. Test Setup:

- 1) For radiated emissions from 30MHz to 1GHz



- 2) For radiated emissions above 1GHz



B. Test Procedure

The test is performed in a 3m Semi-Anechoic Chamber; the antenna factor, cable loss and so on of the site (factors) is calculated to correct the reading. The EUT is placed on a 0.8m high insulating Turn Table, and keeps 3m away from the Test Antenna, which is mounted on a variable-height antenna master tower.

For the test Antenna:

- 1) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

C. Equipments List:

Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due. Date
EMI Test Receiver	ROHDE&SCHWARZ	ESIB7	A0902601	2020.07.01	2021.06.23
Broadband Ant.	2786	ETC	A150402239	2018.09.17	2021.09.16
3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2019.03.26	2023.03.25
EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2020.10.21	2021.08.12
System Simulator	ROHDE&SCHWARZ	CMW500	A150802214	2019.07.30	2021.07.29
5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2019.03.25	2023.03.24
EMI Horn Ant.	ROHDE&SCHWARZ	HF906	A0304225	2019.04.17	2022.04.17

3. 47 CFR PART 15B REQUIREMENTS

3.1 Radiated Emission

3.1.1 Requirement

According to FCC section 15.109, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency range (MHz)	Field Strength		Field Strength Limitation at 3m Measurement Dist	
	μV/m	Dist	(uV/m)	(dBuV/m)
30.0 - 88.0	100	3m	100	20log 100
88.0 - 216.0	150	3m	150	20log 150
216.0 - 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

- a) As shown in FCC section 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.
- b) Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.
- c) For below 1G :QP detector RBW 120kHz ,VBW 300kHz.
- d) For Above 1G: PK detector RBW 1MHz,VBW 3MHz for PK value ;AV detector RBW 1MHz, VBW 10Hz for AV value.

Note:

- 1) The tighter limit shall apply at the boundary between two frequency range.
- 2) Limitation expressed in dBuV/m is calculated by 20log Emission Level(uV/m).
- 3) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula of $Ld1 = Ld2 * (d2/d1)^2$.

Example:

F.S Limit at 30m distance is 30uV/m, then F.S Limitation at 3m distance is adjusted as $Ld1 = L1 = 30uV/m * (10)^2 = 100 * 30uV/m$.

3.1.2 Test Description

See section 2.3.2 of this report.

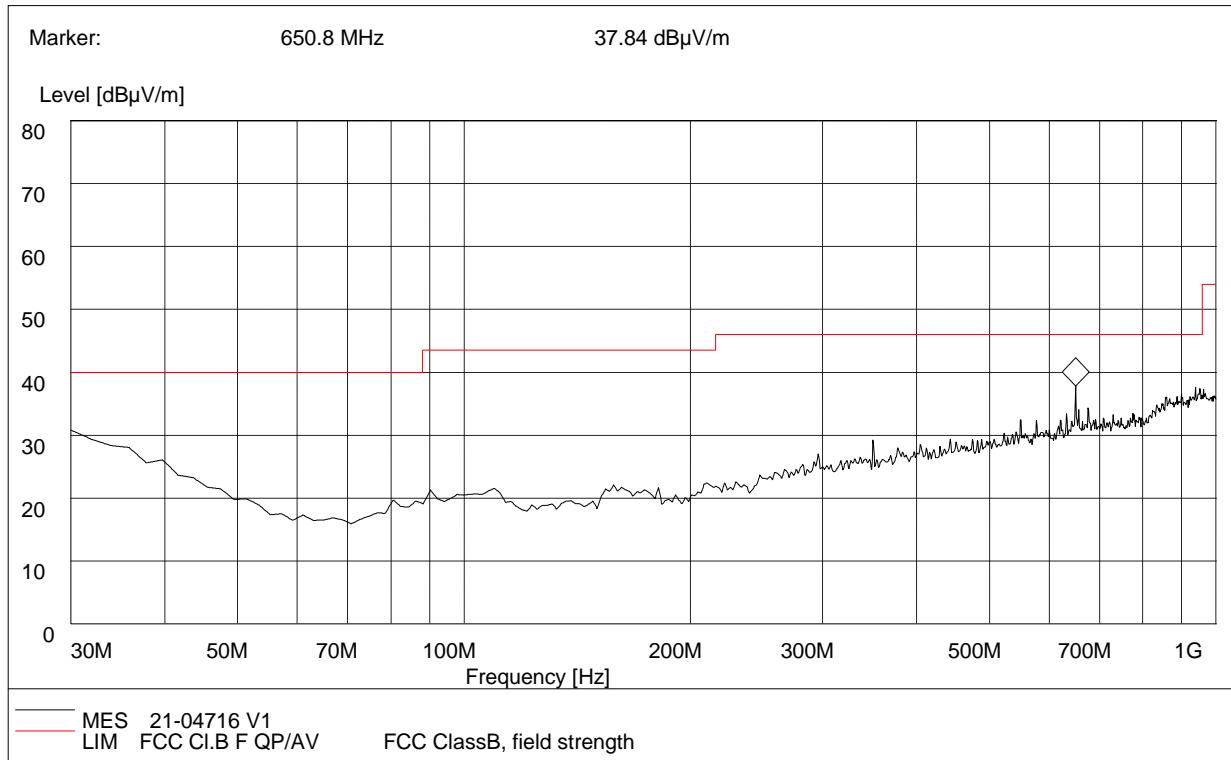
3.1.3 Test Result

The maximum radiated emission is searched using PK, QP and AV detectors; the emission levels more than the limits, and that have narrow margins from the limits will be re-measured with AV and QP detectors. Both the vertical and the horizontal polarizations of the Test Antenna are considered to perform the tests. All test modes are considered, refer to recorded points and plots below.

The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

Note: All radiated emission tests were performed in X, Y, Z axis direction, and only the worst axis test condition was recorded in this test report.

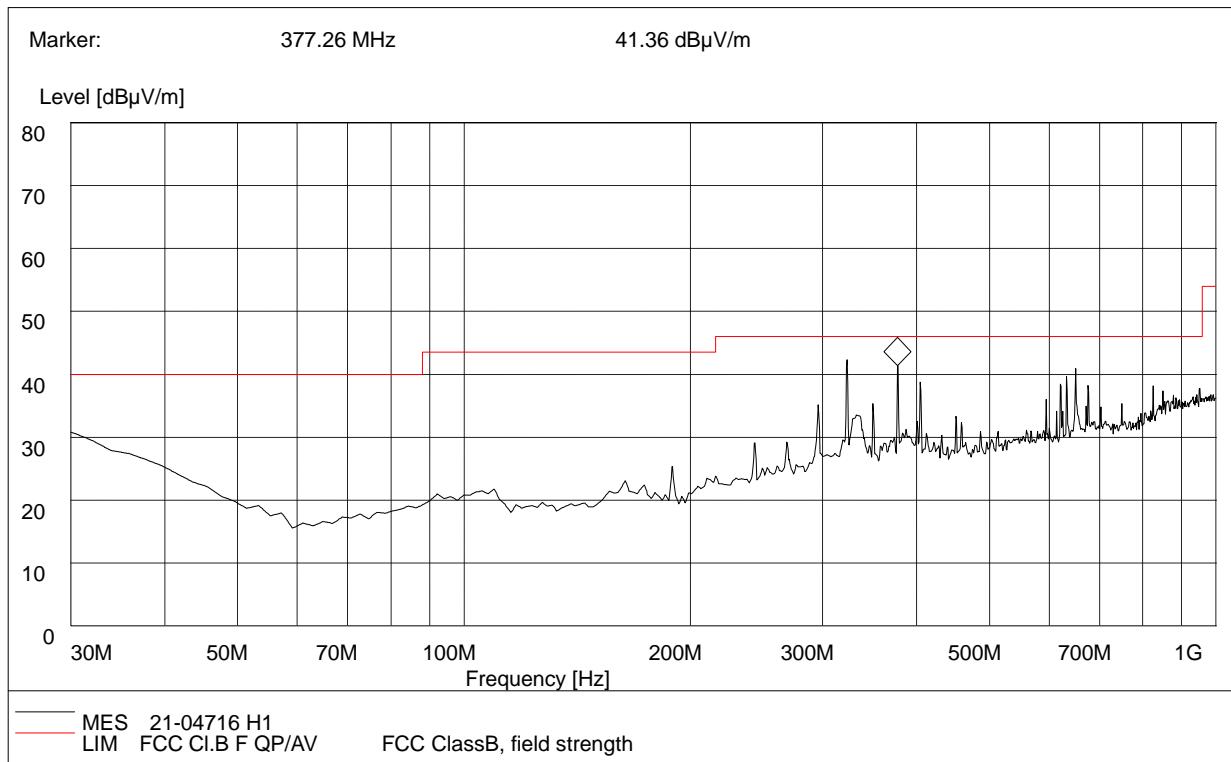
A.Radiation disturbances, antenna polarization:Vertical



(Plot A: Test Antenna Vertical 30M - 1G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB)	Verdict
30.00	29.63	120.000	100	40.00	10.37	Vertical	0.2	26.2	Pass
35.82	28.01	120.000	100	40.00	11.99	Vertical	0.3	25.4	Pass
158.04	21.36	120.000	100	43.50	22.14	Vertical	0.4	27.2	Pass
350.10	29.32	120.000	100	46.00	16.68	Vertical	0.3	28.0	Pass
633.32	31.28	120.000	100	46.00	14.72	Vertical	0.5	28.1	Pass
650.80	36.34	120.000	100	46.00	9.66	Vertical	0.6	28.3	Pass

B.Radiation disturbances, antenna polarization: Horizontal

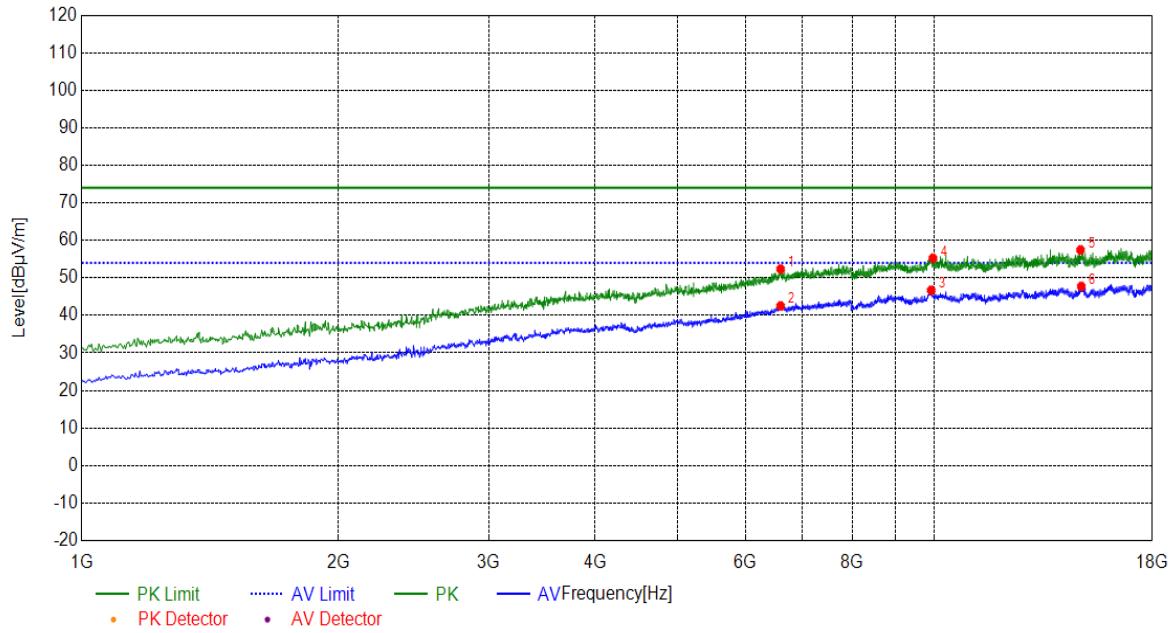


(Plot B: Test Antenna Horizontal 30M - 1G)

Frequency (MHz)	QuasiPeak (dB μ V/m)	Bandwidth (kHz)	Antenna height (cm)	Limit (dB μ V/m)	Margin (dB)	Antenna	Cable Loss(dB)	ANT. Factor(dB)	Verdict
30.00	29.32	120.000	100	40.00	10.68	Horizontal	0.4	24.1	Pass
189.05	24.38	120.000	100	43.50	19.12	Horizontal	0.5	25.4	Pass
295.50	34.39	120.000	100	46.00	11.61	Horizontal	0.5	26.0	Pass
322.91	40.31	120.000	100	46.00	5.69	Horizontal	0.6	26.5	Pass
377.00	40.36	120.000	100	46.00	5.64	Horizontal	0.7	27.4	Pass
650.80	40.25	120.000	100	46.00	5.75	Horizontal	0.8	28.5	Pass

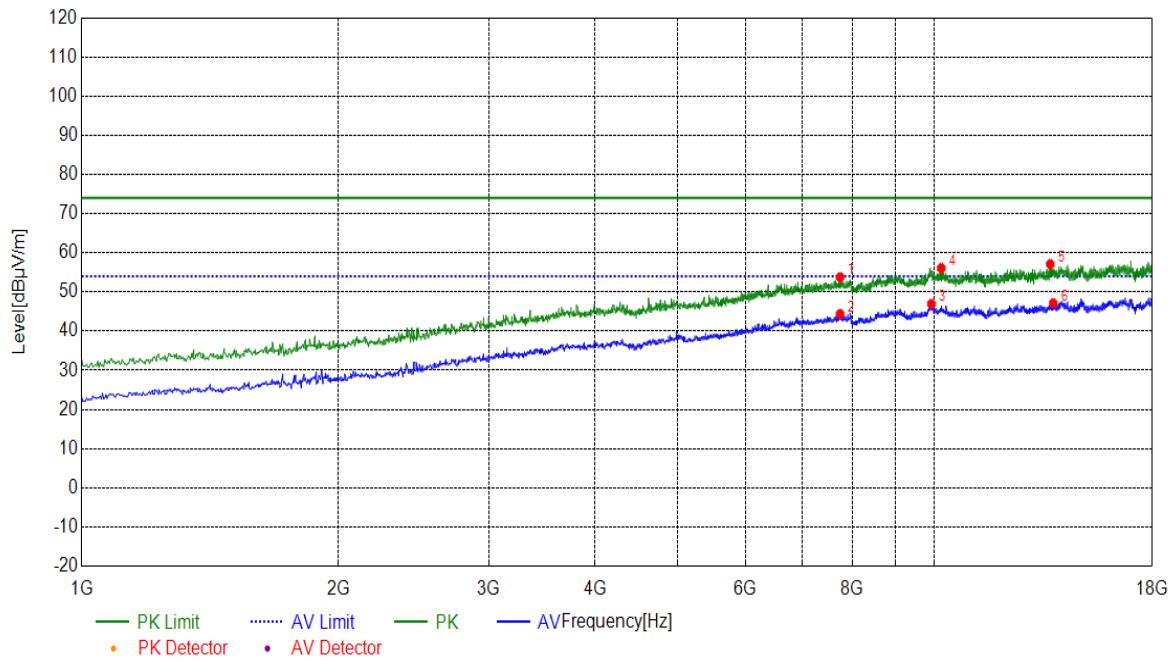
Test Result: PASS

C.Radiation disturbances, antenna polarization: Horizontal



NO.	Freq. [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity
1	6597.51	52.36	74.00	21.64	PK	100	260	Horizontal
2	6597.51	42.54	54.00	11.46	AV	100	220	Horizontal
3	9906.38	46.71	54.00	7.29	AV	100	40	Horizontal
4	9953.99	55.25	74.00	18.75	PK	100	160	Horizontal
5	14823.7	57.45	74.00	16.55	PK	100	40	Horizontal
6	14854.3	47.75	54.00	6.25	AV	100	310	Horizontal

D.Radiation disturbances, antenna polarization: Vertical



(Plot D: Test Antenna Vertical 1G – 18G)

NO.	Freq. [MHz]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Trace	Height [cm]	Angle [°]	Polarity
1	7746.94	53.78	74.00	20.22	PK	100	310	Vertical
2	7746.94	44.38	54.00	9.62	AV	100	280	Vertical
3	9913.18	46.94	54.00	7.06	AV	100	60	Vertical
4	10178.4	56.09	74.00	17.91	PK	100	130	Vertical
5	13660.7	57.09	74.00	16.91	PK	100	170	Vertical
6	13772.9	47.13	54.00	6.87	AV	100	230	Vertical

-----End of Report-----