

## EMC TEST REPORT



Applicant:	APTIV Services Deutschland GmbH
Address:	Am Technologiepark 1, D-42119 Wuppertal Germany

Manufacturer or Supplier:	APTIV Services Deutschland GmbH
Address:	Am Technologiepark 1, D-42119 Wuppertal Germany
Product:	Infotainment Head Unit
Brand Name:	APTIV
Model Name:	IHU 4.2
FCC ID:	LTQIHU42
Date of tests:	Jan. 20, 2024 ~ Jun. 06, 2024

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

- ☐ FCC Part 15, Subpart B, Class A  
☒ FCC Part 15, Subpart B, Class B  
☒ ANSI C63.4:2014

**CONCLUSION:** The submitted sample was found to COMPLY with the test requirement

Prepared by Hanwen Xu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department
 Date: Jun. 06, 2024	 Date: Jun. 06, 2024

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# TABLE OF CONTENTS

<b>RELEASE CONTROL RECORD .....</b>	<b>3</b>
<b>1 GENERAL INFORMATION .....</b>	<b>4</b>
1.1 GENERAL DESCRIPTION OF EUT.....	4
1.2 SUMMARY OF TEST RESULTS .....	6
1.3 MEASUREMENT UNCERTAINTY .....	7
1.4 DESCRIPTION OF TEST MODES.....	8
1.5 DESCRIPTION OF SUPPORT UNITS.....	9
<b>2 EMISSION TEST .....</b>	<b>10</b>
2.1 CONDUCTED EMISSION MEASUREMENT.....	10
2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	10
2.1.2 TEST INSTRUMENTS.....	10
2.1.3 TEST PROCEDURES .....	11
2.1.4 DEVIATION FROM TEST STANDARD .....	11
2.1.5 TEST SETUP.....	12
2.1.6 EUT OPERATING CONDITIONS .....	12
2.1.7 TEST RESULTS .....	13
2.2 RADIATED EMISSION MEASUREMENT.....	15
2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	15
2.2.2 TEST INSTRUMENTS.....	16
2.2.3 TEST PROCEDURE.....	17
2.2.4 DEVIATION FROM TEST STANDARD .....	18
2.2.5 TEST SETUP.....	19
2.2.6 EUT OPERATING CONDITIONS .....	19
2.2.7 TEST RESULTS .....	20
<b>3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....</b>	<b>24</b>



Test Report No.: W7L-P240118W001EM03

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P240118W001EM03	Original release	Jun. 06, 2024

# 1 GENERAL INFORMATION

## 1.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT*</b>	Infotainment Head Unit	
<b>BRAND NAME*</b>	APTIV	
<b>MODEL NAME*</b>	IHU 4.2	
<b>NOMINAL VOLTAGE*</b>	EUT 13.5Vdc	
<b>MODULATION TYPE</b>	<b>BT_LE</b>	GFSK
	<b>Bluetooth</b>	GFSK, $\pi/4$ -DQPSK, 8DPSK
<b>OPERATING FREQUENCY</b>	<b>Bluetooth/BT_LE</b>	2402MHz ~ 2480MHz
<b>HW VERSION*</b>	PF04	
<b>SW VERSION*</b>	master_662.0/42000000BE	
<b>I/O PORTS</b>	Refer to user's manual	
<b>CABLE SUPPLIED*</b>	N/A	
<b>ACCESSORY DEVICES*</b>	Refer to note as below	

### NOTE:

1. \*Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

#### 4. List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
IHU 4.2 Units	APTIV	APTIV	IHU 4.2	DAB variant
2 Connectors (USB and HSD)	N/A	N/A	N/A	N/A
USB Cables	N/A	N/A	N/A	both sides, 0.8m
HSD Z-Code Cables 1	N/A	N/A	N/A	100Ω, both sides, 0.4m
HSD Z-Code Cables 2	Rosenberger	N/A	N/A	100Ω, both sides, 0.8m
Ethernet Cables	Rosenberger	N/A	N/A	both sides, 0.8m
DAB/SDARS Cables	Rosenberger	N/A	N/A	FRAKA connector on one side and BNC on the other sides 50Ω, 1.2m
FM Cables	Rosenberger	N/A	N/A	FRAKA connector (2 pins) on one side and 2 BNC's on the other sides. 50Ω, 1.2m
Cables TTL-232R-3V3	N/A	N/A	N/A	USB and D-Sub connector's not shielded; 1.5m
Harness Cables	Wiretronic	N/A	N/A	Several connector's not shielded; 1.2m
D-Sub Connectors	N/A	N/A	N/A	N/A
Load Boxes	N/A	N/A	N/A	N/A
Amplifier	Alpine	N/A	AUD HP 4-8B	N/A
MOST Cable	N/A	N/A	N/A	1.2m
Power Cable	N/A	N/A	N/A	1.0m
Cable for Speakers	N/A	N/A	N/A	1.2m

## 1.2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart B		
Standard Section	Test Item	Result
FCC Part 15, Subpart B, Class B ANSI C63.4:2014	Conducted Test	Compliance
	Radiated Emission Test (30MHz ~ 1GHz)	Compliance
	Radiated Emission Test (Above 1GHz)	Compliance

### \*Test Lab Information Reference

#### Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

#### Lab Address:

Tower N, Innovation Center, 88 Zhuyi Road, High-tech District, Suzhou City, Anhui Province

#### Accredited Test Lab Cert 6613.01

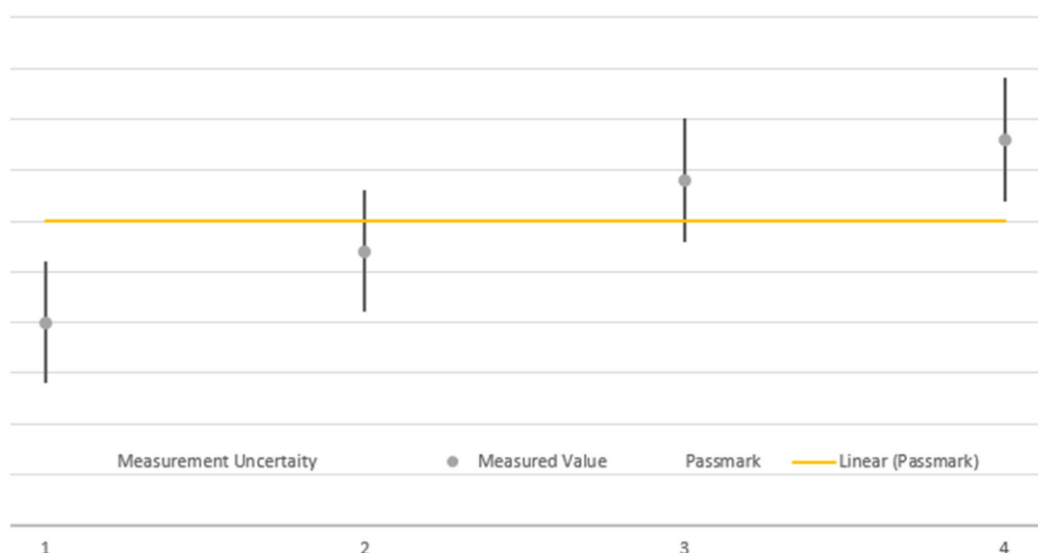
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

### 1.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	150kHz ~ 30MHz	$\pm 2.70\text{dB}$
Radiated emissions	30MHz~1GHz	$\pm 4.98\text{dB}$
	1GHz ~6GHz	$\pm 4.70\text{dB}$
	6GHz ~18GHz	$\pm 4.60\text{dB}$
	18GHz ~40GHz	$\pm 4.12\text{dB}$



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.

## 1.4 DESCRIPTION OF TEST MODES

Test Mode	Test Condition
<b>Radiated emission test</b>	
1	DC source 13.5V + BT Link + Amplifier + Speaker + PC + sample1
2	DC source 13.5V + FM + Amplifier + Speaker + PC + sample1
3	sample2

<b>Conducted emission test</b>	
1	DC source 13.5V + BT Link + Amplifier + Speaker + PC + sample1
2	DC source 13.5V + FM + Amplifier + Speaker + PC + sample1
3	sample2

### NOTE:

1. For conducted emission test, Pre-scan all mode, mode 3 was the worst case and only this mode was presented in this report.
2. For radiated emission test, Pre-scan all mode, test mode 2 was the worst case and only this mode was presented in this report



## 1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

### FOR ALL TESTS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thinkpad E14	SL10W47313	N/A
2	DC Source	HYELEC	HY3010B	551016	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Cable: Unshielded, Detachable 1.0m

## 2 EMISSION TEST

### 2.1 CONDUCTED EMISSION MEASUREMENT

#### 2.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

**TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.107 A CLASS B)**

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

**TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.107 B CLASS A)**

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

**NOTE:** 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 2.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.27,22	Jun.26,24
EMI Test Receiver	Rohde&Schwarz	ESR3	102749	Feb.25,22	Feb.24,24
EMI Test Receiver	Rohde&Schwarz	ESR3	102749	Feb.24,24	Feb.23,26
ELEKTRA test software	Rohde&Schwarz	ELEKTRA	NA	N/A	N/A
LISN network	Rohde&Schwarz	ENV216	102640	Feb.17,22	Feb.16,24
LISN network	Rohde&Schwarz	ENV216	102640	Feb.16,24	Feb.15,26
CABLE	Rohde&Schwarz	W61.01	N/A	Apr.28,23	Apr.27,24
CABLE	Rohde&Schwarz	W61.01	N/A	Apr.27,24	Apr.26,25
CABLE	Rohde&Schwarz	W601	N/A	Apr.28,23	Apr.27,24
CABLE	Rohde&Schwarz	W601	N/A	Apr.27,24	Apr.26,25

**NOTE:** 1. The test was performed in CE shielded room.

### 2.1.3 TEST PROCEDURES

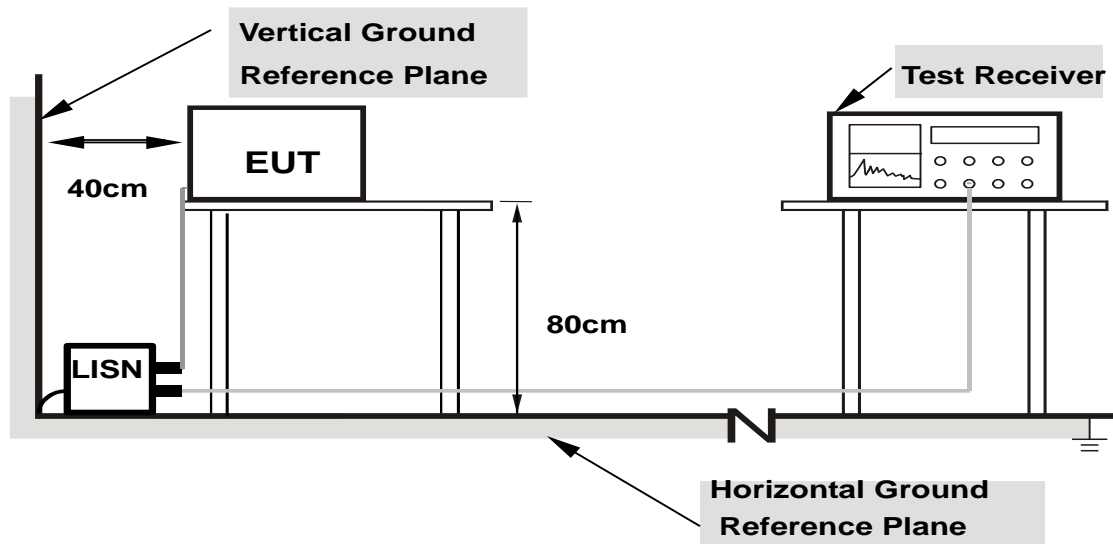
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

### 2.1.4 DEVIATION FROM TEST STANDARD

No deviation.

## 2.1.5 TEST SETUP



**Note:** 1.Support units were connected to second LISN.  
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

## 2.1.6 EUT OPERATING CONDITIONS

- Turned on the power and connected of all equipment.
- EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.

## 2.1.7 TEST RESULTS

TEST VOLTAGE	DC 13.5V	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	TESTED BY	Hanwen Xu

Rg	Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	CAV Level [dBμV]	CAV: AVG Limit [dBμV]	CAV Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]
1	0.155	37.19	65.75	28.56	10.87	55.75	44.88	12.52	L1	9.000
1	1.239	6.06	56.00	49.94	0.49	46.00	45.51	11.75	L1	9.000
1	4.250	7.94	56.00	48.06	2.35	46.00	43.65	11.78	L1	9.000
1	10.991	21.06	60.00	38.94	13.45	50.00	36.55	11.83	L1	9.000
1	15.477	36.16	60.00	23.84	27.73	50.00	22.27	11.85	L1	9.000
1	24.081	27.18	60.00	32.82	15.34	50.00	34.66	11.89	L1	9.000

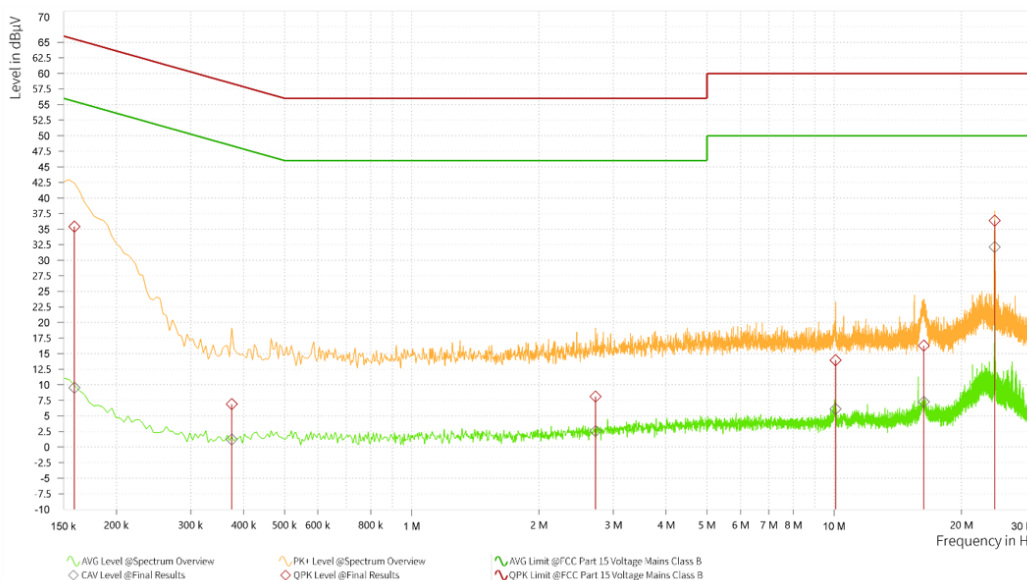
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Limit value - Emission level
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



<b>TEST VOLTAGE</b>	DC 13.5V	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 51%RH	<b>TESTED BY</b>	Hanwen Xu

Rg	Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	CAV Level [dBμV]	CAV: AVG Limit [dBμV]	CAV Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]
1	0.159	35.41	65.52	30.11	9.53	55.52	45.99	12.17	N	9.000
1	0.375	6.91	58.39	51.48	1.23	48.39	47.16	12.83	N	9.000
1	2.724	8.11	56.00	47.89	2.54	46.00	43.46	12.74	N	9.000
1	10.082	13.94	60.00	46.06	6.11	50.00	43.89	12.79	N	9.000
1	16.310	16.28	60.00	43.72	7.25	50.00	42.75	12.83	N	9.000
1	24.000	36.38	60.00	23.62	32.12	50.00	17.88	12.87	N	9.000

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Limit value - Emission level
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



## 2.2 RADIATED EMISSION MEASUREMENT

### 2.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

#### TEST STANDARD: FCC PART 15, SUBPART B (SECTION: 15.109)

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 3 meters (dB $\mu$ V/m)		
Frequencies (MHz)	FCC 15B, Class A	FCC 15B, Class B
30-88	49	40
88-216	53.5	43.5
216-960	56	46
960-1000	59.5	54
Above 1000	Avg: 59.5 Peak: 79.5	Avg: 54 Peak: 74

#### Frequency Range (For unintentional radiators)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40GHz, whichever is lower

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m).
  3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
  4. QP detector shall be applied if not specified.

## 2.2.2 TEST INSTRUMENTS

### Frequency range below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.27,22	Jun.26,24
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.24,22	Nov.23,25
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.28,22	Feb.27,24
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Feb.27,24	Feb.26,26
EMI Test Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
EMI Test Receiver	R&S	ESW44	101973	Feb.24,24	Feb.23,26
Measurement Software	R&S	ELEKTRA	N/A	N/A	N/A
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
CABLE	R&S	W13.01	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W13.01	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W13.02	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25

### Frequency range above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
WIDEBANDRADIO COMMUNICATION TESTER	Rohde&Schwarz	CMW500	169399	Jun.27,22	Jun.26,24
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.24,22	Nov.23,25
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
EMI Test Receiver	R&S	ESW44	101973	Feb.25,22	Feb.24,24
EMI Test Receiver	R&S	ESW44	101973	Feb.24,24	Feb.23,25
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
Measurement Software	R&S	ELEKTRA	N/A	N/A	N/A
CABLE	R&S	W13.01	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W13.01	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W13.02	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.28,23	Apr.27,24
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25

**NOTE:** 1. The test was performed in 3m chamber.  
2. The FCC Site Registration No. is 434559; The Designation No. is CN1325.



## 2.2.3 TEST PROCEDURE

### <Frequency Range below 1GHz>

The basic test procedure was in accordance with ANSI C63.4:2014 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic 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. The height of antenna is varied from 1 meter to 4 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 1GHz.

#### NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2.  $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
3.  $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$  (if the raw value not contains the amplifier);
4.  $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$  (if the raw value contains the amplifier).
5.  $\text{Margin value} = \text{Limit value} - \text{Emission level}$ .

### <Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic 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. 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. The bore sight should be used during the test above 1GHz.
- 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 peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz

#### NOTE:

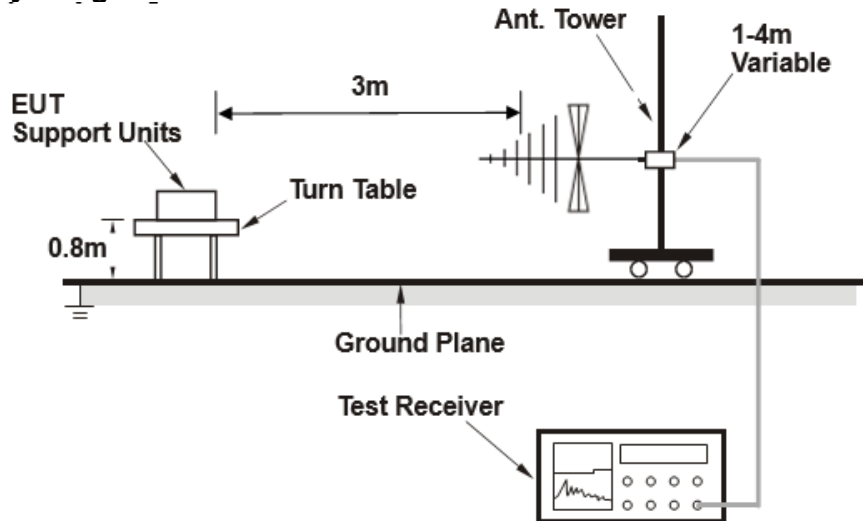
- . The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- . The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth of test receiver/spectrum analyzer is 1Hz for Average detection (AV) at frequency above 1GHz.
- . For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
- .  $\text{Emission level(dBuV/m)} = \text{Raw Value(dBuV)} + \text{Correction Factor(dB/m)}$
- .  $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)}$  (if the raw value not contains the amplifier);
- .  $\text{Correction Factor(dB/m)} = \text{Antenna Factor (dB/m)} + \text{Cable Factor (dB)} - \text{Amplifier Gain(dB)}$  (if the raw value contains the amplifier)
- .  $\text{Margin value} = \text{Limit value} - \text{Emission level.}$

## 2.2.4 DEVIATION FROM TEST STANDARD

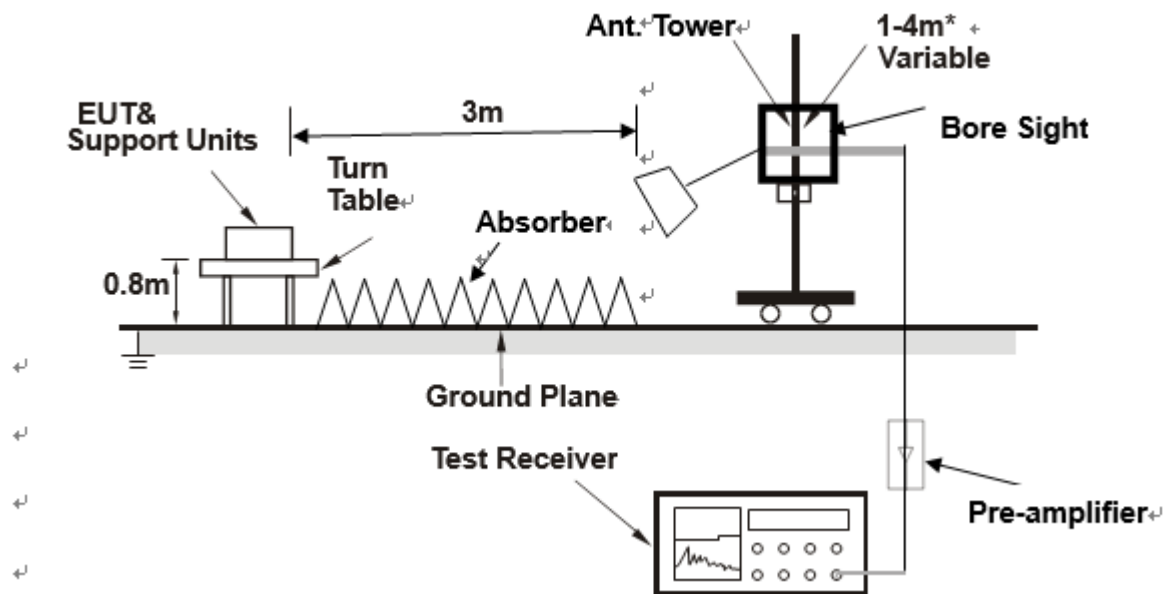
No deviation.

## 2.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



**Note:** Above 1G is a directional antenna

depends on the EUT height and the antenna 3dB bandwidth both, refer to section 7.3 of CISPR 16-2-3.

## 2.2.6 EUT OPERATING CONDITIONS

Same as item 2.1.6.

## 2.2.7 TEST RESULTS

Acceleromete alternative worst case:

TEST VOLTAGE	DC 13.5V	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120 kHz
TESTED BY	Hanwen Xu		

### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

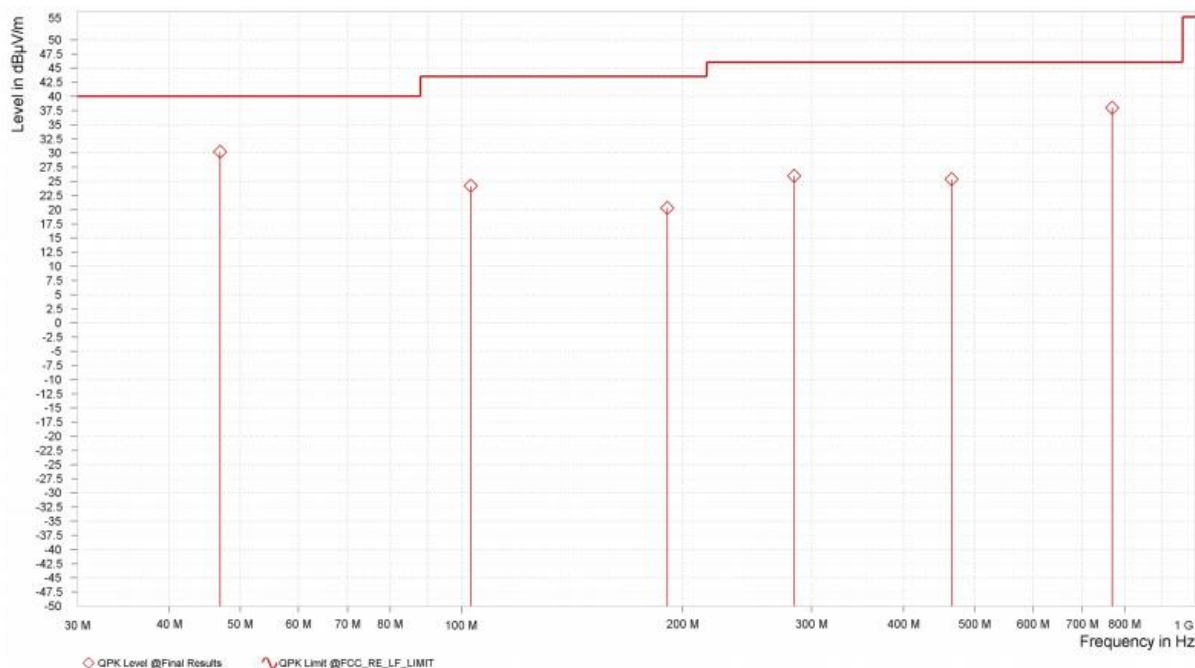
Rg	Frequency [MHz]	QPK Level [dBμV/m]	QPK Limit [dBμV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]
1	46.921	30.19	40.00	9.81	-3.61	H	228.8	1.00	120.000
1	103.019	24.17	43.50	19.33	-5.87	H	355.1	2.00	120.000
1	190.804	20.29	43.50	23.21	-6.03	H	74.6	1.00	120.000
1	283.817	25.94	46.00	20.06	-1.54	H	359.1	1.00	120.000
1	465.261	25.33	46.00	20.67	2.66	H	152.3	1.00	120.000
1	769.571	37.98	46.00	8.02	5.31	H	210.1	2.00	120.000

**REMARKS:** 1. Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)

2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)- Amplifier Gain

3. The other emission levels were very low against the limit.

4. Margin value = Limit value – Emission level.

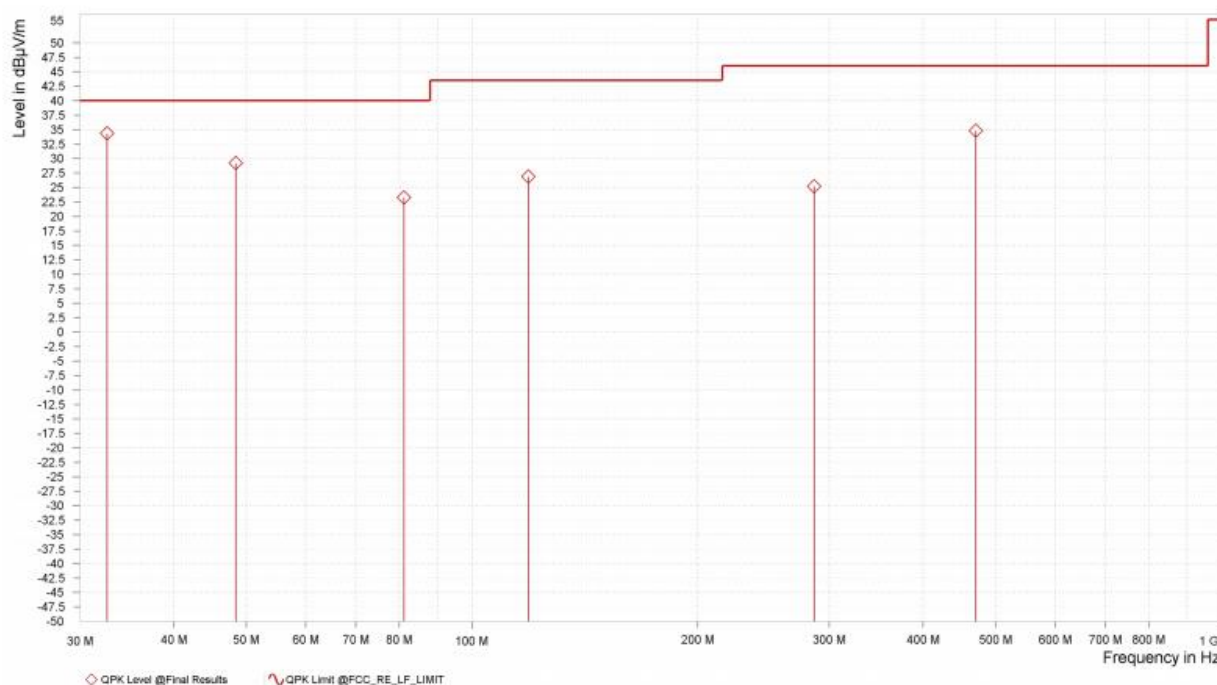


TEST VOLTAGE	DC 13.5V	FREQUENCY RANGE	30-1000 MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70% RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak , 120 kHz
TESTED BY	Hanwen Xu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	QPK Level [dBμV/m]	QPK Limit [dBμV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]
1	32.587	34.31	40.00	5.69	-8.69	V	5.6	1.00	120.000
1	48.430	29.20	40.00	10.80	-4.53	V	227.6	1.00	120.000
1	81.194	23.27	40.00	16.73	-10.43	V	1	1.00	120.000
1	118.917	26.85	43.50	16.65	-6.61	V	359.1	1.00	120.000
1	286.296	25.19	46.00	20.81	-1.78	V	285.4	2.00	120.000
1	470.434	34.78	46.00	11.22	2.46	V	285.4	2.00	120.000

- REMARKS:**
1. Emission level(dBuV/m)=Read Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) -Amplifier Gain
  3. The other emission levels were very low against the limit.
  4. Margin value = Limit value – Emission level.

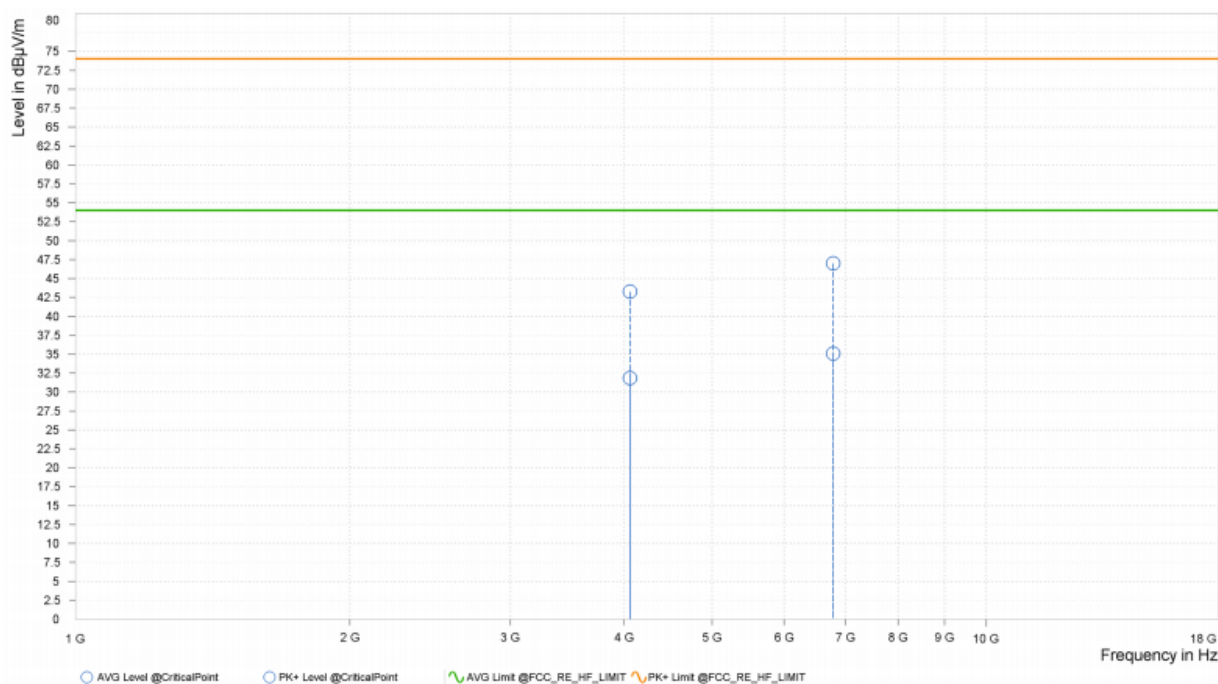


TEST VOLTAGE	DC 13.5V	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Hanwen Xu		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	4,062.500	43.27	74.00	30.73	31.84	54.00	22.16	8.44	H	165.8	2.00
1	6,791.000	47.00	74.00	27.00	35.09	54.00	18.91	13.56	H	0.8	2.00

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency or 40GHz, whichever is lower .For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.
  4. Only emissions significantly above equipment noise floor are reported.

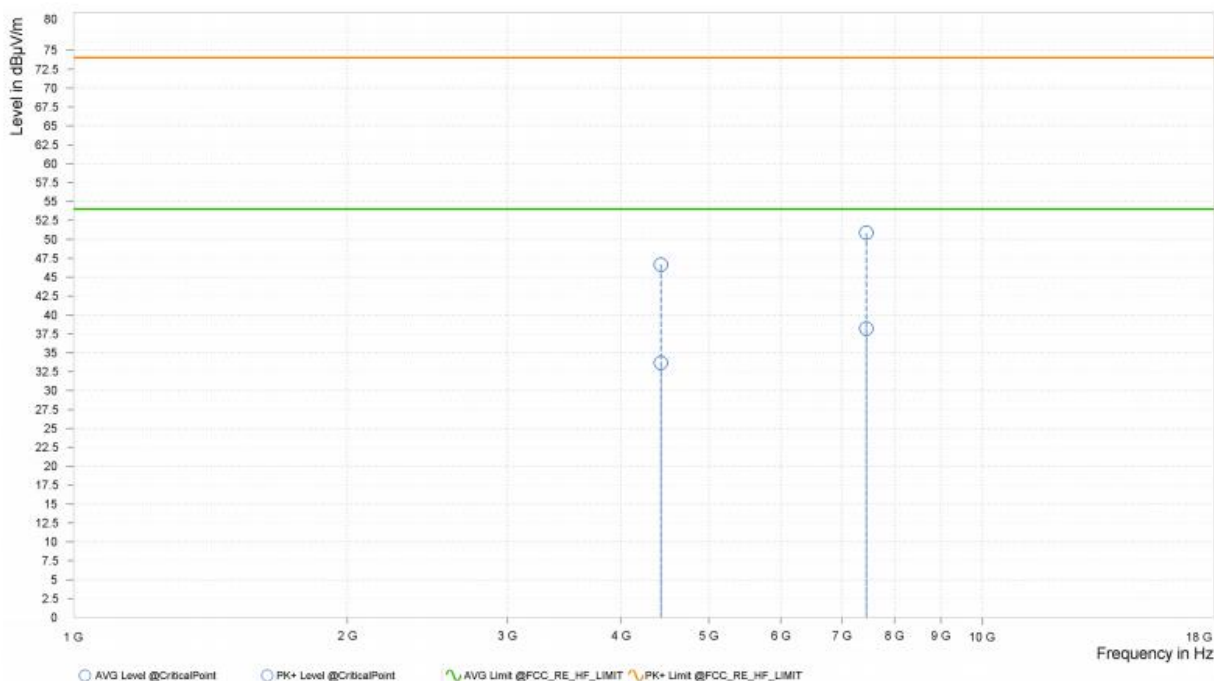


TEST VOLTAGE	DC 13.5V	FREQUENCY RANGE	1-18 GHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70 %RH	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1 MHz
TESTED BY	Hanwen Xu		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	4,428.000	46.66	74.00	27.34	33.68	54.00	20.32	9.73	V	359	2.00
1	7,450.500	50.86	74.00	23.14	38.21	54.00	15.79	14.21	V	197.7	1.00

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 1GHz to 5th harmonic of the highest frequency or 40GHz, whichever is lower .For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.
  4. Only emissions significantly above equipment noise floor are reported.



### **3 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications were made to the EUT by the lab during the test.

**---END---**