

FCC - TEST REPORT

Report Number	:	68.760.19.0563.01	Date of Issue:	2019-12-26
Model	:	E3		
Product Type	:	Dock		
Applicant	:	VR Technology (Shenzhen) Limited		
Address	:	Room 201, 12 Gaoxin South Road, Huiheng Building, Nanshan District, Shenzhen		
Manufacturer	:	VR Technology (Shenzhen) Limited		
Address	:	Room 201, 12 Gaoxin South Road, Huiheng Building, Nanshan District, Shenzhen		
Test Result	:	☒ Positive ☐ Negative		
Total pages including Appendices	:	19		

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2. Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint
Road 2, Nanshan District
Shenzhen 518052
P.R. China

Telephone: 86 755 8828 6998

Fax: 86 755 8828 5299

FCC Registration No.: 514049

FCC Designation Number: CN5009

IC Registration No.: 10320A

3. Description of the Equipment Under Test

Product:	Dock
Model no.:	E3
FCC ID:	2AKA6-E3
Rating:	Supplied by 5.0Vdc, 3.0A external adapter
Adapter information:	Adapter Model: A138A-120150U-US2 Input: 100-240Vac, 50/60Hz; 0.5A Output: 5.0Vdc, 3.0A
RF Transmission Frequency:	2412MHz-2462MHz
No. of Operated Channel:	11
Modulation:	DSSS, OFDM
Antenna Type:	Integrated antenna
Antenna Gain:	2.0dBi
Description of the EUT:	The Equipment Under Test (EUT) is a E3 Dock which support WiFi function operated at 2.4GHz.

4. Summary of Test Standards

Test Standards	
FCC Part 15 Subpart B 10-1-18 Edition	Unintentional Radiators

5. Summary of Test Results

Emission Tests				
FCC Part 15 Subpart B 10-1-18 Edition				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
Conducted Emission on AC 150kHz to 30MHz	10	☒	☐	☐
Radiated Emission 30MHz to 1000MHz	13	☒	☐	☐
Radiated Emission 1000MHz to 40000MHz	16	☒	☐	☐

6. General Remarks

Remarks

The Equipment Under Test (EUT) is a Dock which support WiFi function which operated at 2.4GHz.

SUMMARY:

All tests according to the regulations cited on page 5 were.

■ - Performed

□ - Not Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: August 26, 2019

Testing Start Date: September 24, 2019

Testing End Date: December 26, 2019

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

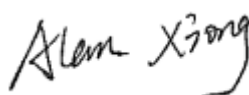
Reviewed by:

Prepared by:

Tested by:



John Zhi
Project Manager



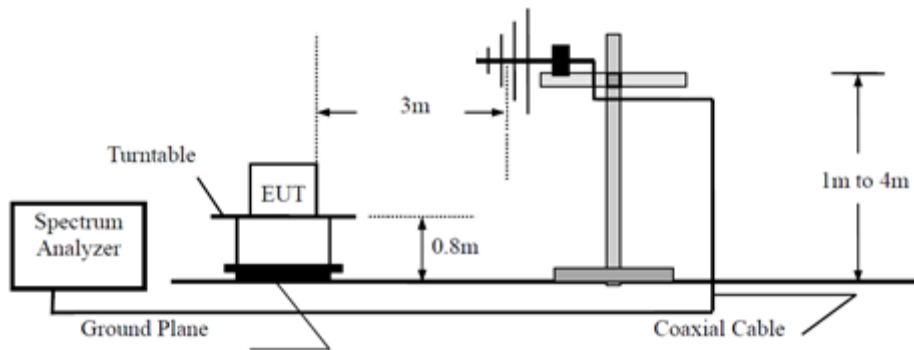
Alan Xiong
Project Engineer



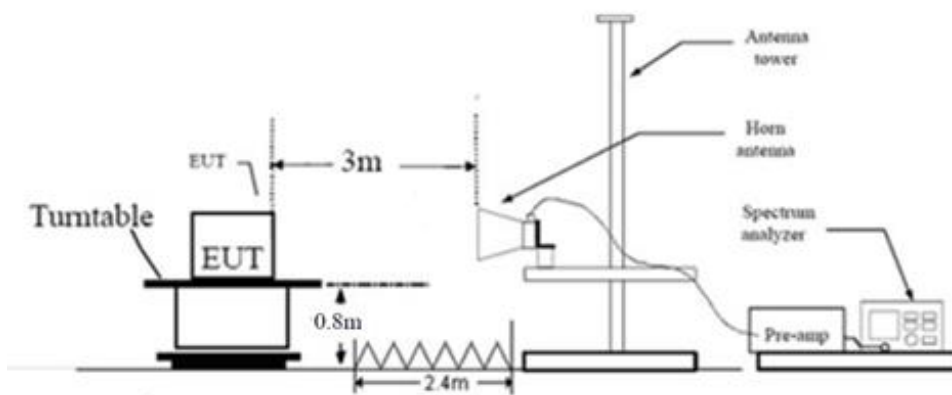
Tree Zhan
Test Engineer

7. Test Setups

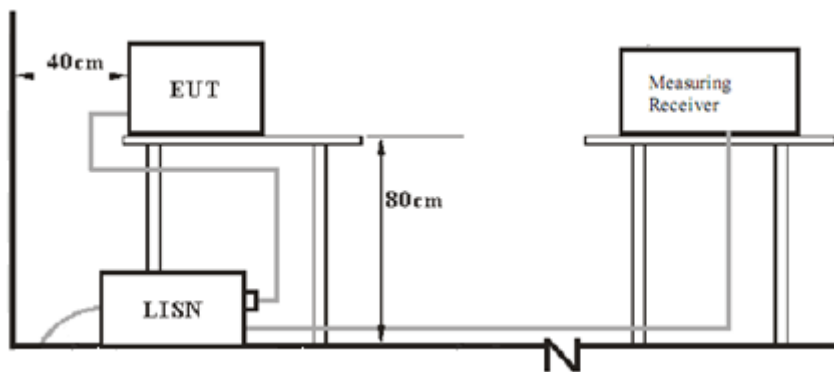
Below 1GHz



Above 1GHz



AC Power Line Conducted Emission test setups



8. Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Notebook	Lenovo	X240	---
Wearable on Neck Host	VR Technology	3BOX A2	---
TV	XIAOMI	L32M5-AZ	---
USB Disk	TOSHIBA	U202	---
Mouse	DELL	MS111-L	---
Keyboard	DELL	KB212-B	---

9. Technical Requirement

9.1 Conducted Emission Test

Test Method

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

Limit

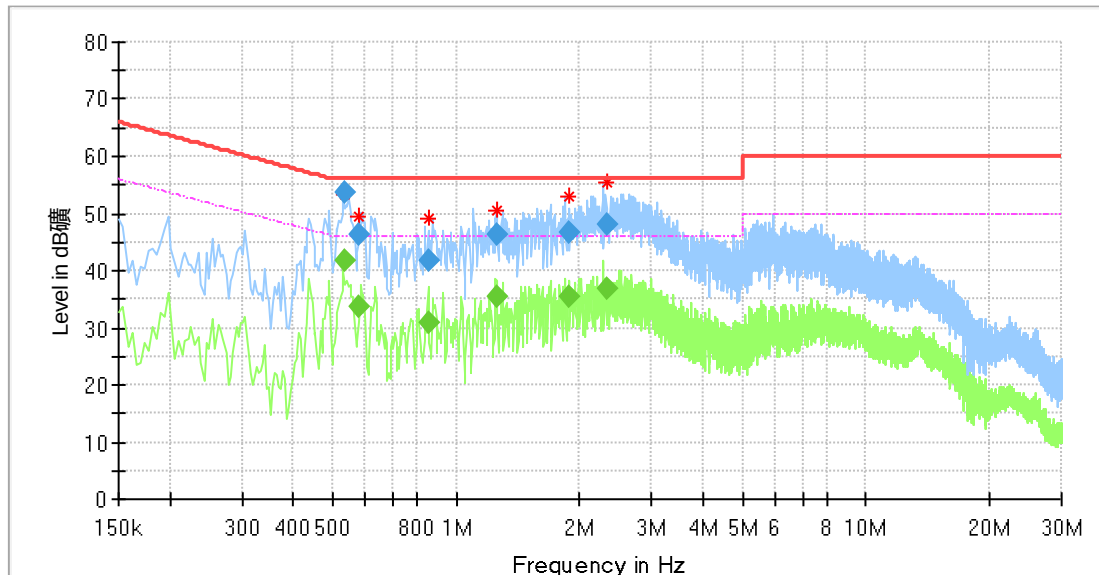
According to §15.107, conducted emissions limit as below:

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Remark: *Decreasing linearly with logarithm of the frequency

Conducted Emission

Product Type : Dock
 M/N : E3
 Operating Condition : Normal Working with WiFi traffic Mode (connect to A2 via USB Cable, connect to PC via RJ45, connect to Mouse/Keyboard/USB Dick via USB port, connect to monitor via HDMI Cable)
 Test Specification : Line
 Comment : AC 120V/60Hz



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.537000	---	41.83	46.00	4.17	L1	10.3
0.537000	53.56	---	56.00	2.44	L1	10.3
0.577000	---	33.54	46.00	12.46	L1	10.3
0.577000	46.16	---	56.00	9.84	L1	10.3
0.861000	---	30.99	46.00	15.01	L1	10.3
0.861000	41.85	---	56.00	14.15	L1	10.3
1.253000	---	35.34	46.00	10.66	L1	10.3
1.253000	46.44	---	56.00	9.56	L1	10.3
1.877000	---	35.56	46.00	10.44	L1	10.3
1.877000	46.54	---	56.00	9.46	L1	10.3
2.327000	---	36.75	46.00	9.25	L1	10.4
2.327000	48.20	---	56.00	7.80	L1	10.4

Remark:

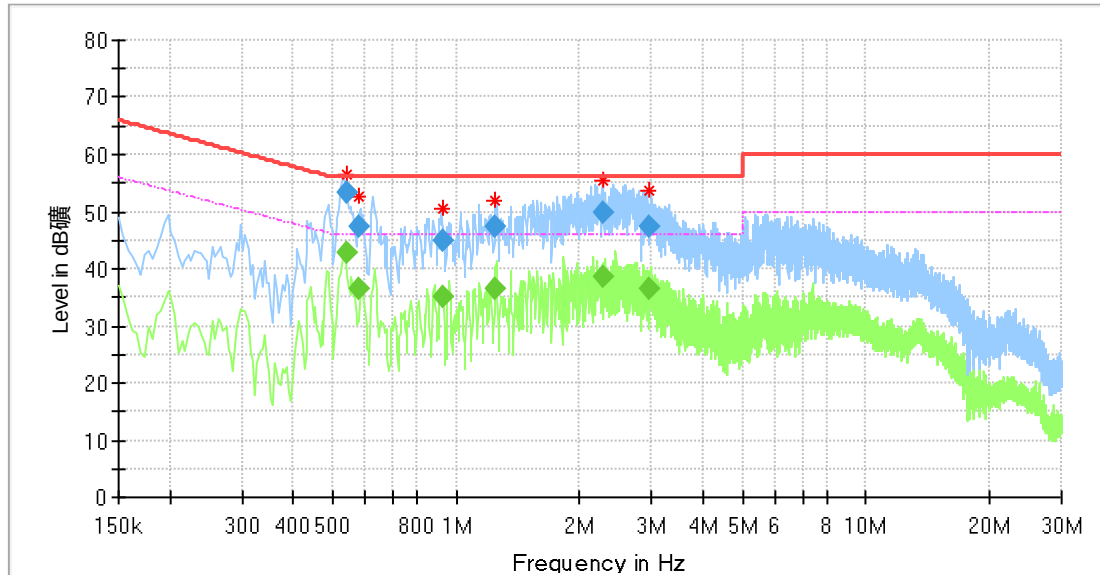
Max Peak= Read level + Corrector factor

Correct factor=cable loss + LISN factor

(The Reading Level is recorded by software which is not shown in the sheet)

Conducted Emission

Product Type : Dock
 M/N : E3
 Operating Condition : Normal Working with WiFi traffic Mode (connect to A2 via USB Cable, connect to PC via RJ45, connect to Mouse/Keyboard/USB Dick via USB port, connect to monitor via HDMI Cable)
 Test Specification : Neutral
 Comment : AC 120V/60Hz



Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.541000	53.46	---	56.00	2.54	N	10.3
0.541000	---	42.91	46.00	3.09	N	10.3
0.581000	---	36.64	46.00	9.36	N	10.3
0.581000	47.35	---	56.00	8.65	N	10.3
0.929000	---	35.00	46.00	11.00	N	10.3
0.929000	44.91	---	56.00	11.09	N	10.3
1.241000	---	36.38	46.00	9.62	N	10.3
1.241000	47.30	---	56.00	8.70	N	10.3
2.273000	---	38.43	46.00	7.57	N	10.4
2.273000	49.78	---	56.00	6.22	N	10.4
2.969000	---	36.41	46.00	9.59	N	10.4
2.969000	47.30	---	56.00	8.70	N	10.4

Remark:

Max Peak= Read level + Corrector factor

Correct factor=cable loss + LISN factor

(The Reading Level is recorded by software which is not shown in the sheet)

9.2 Radiated Emission Test

Test Method

- 1: The EUT was placed on a turn table which is 0.8m above ground plane. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
- 3: 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.
- 4: 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.
- 5: Use the following spectrum analyzer settings According to C63.4:2010:

For Above 1GHz

Span = wide enough to capture the peak level of the in-band emission and all spurious
 RBW = 1MHz, VBW ≥ RBW for peak measurement and VBW = 10Hz for average measurement,
 Sweep = auto, Detector function = peak, Trace = max hold.

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious
 RBW = 120 KHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = Quasi-peak, Trace = max hold.

Limits

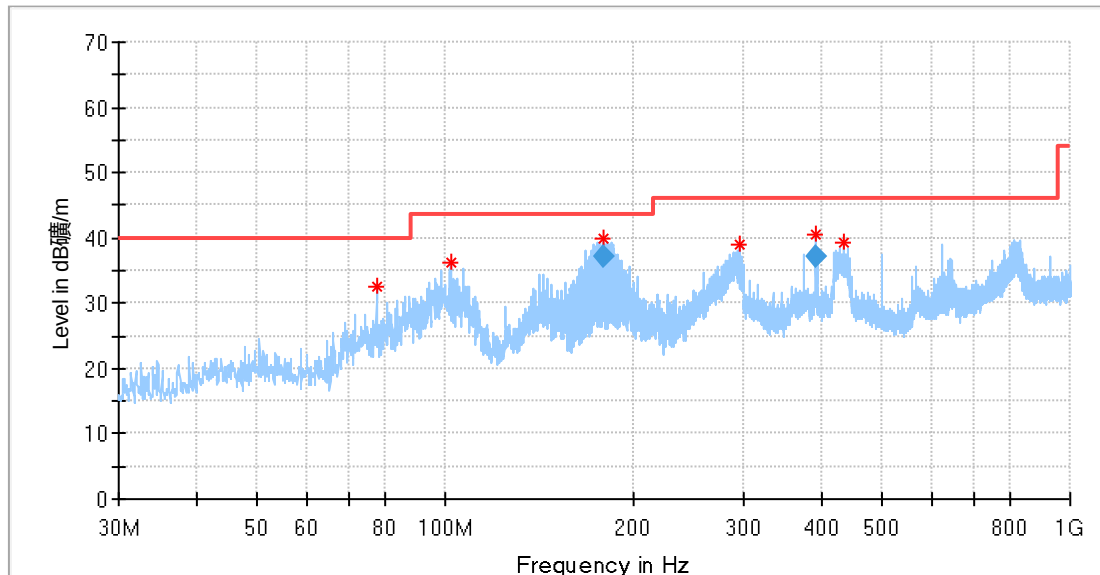
According to §15.109, Radiated emissions limit as below:

Frequency MHz	Field Strength μV/m	Field Strength dBμV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

Remark: we test all modes and only worse case (2.4GWiFi traffic) recorded in this report.

Radiated Emission

Product Type : Dock
 M/N : E3
 Operating Condition : Normal Working with WiFi traffic Mode (connect to A2 via USB Cable, connect to PC via RJ45, connect to Mouse/Keyboard/USB Dick via USB port, connect to monitor via HDMI Cable)
 Ant. Polarity : Horizontal
 Comment : 30-1000MHz



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
77.590625	32.54	40.00	7.46	200.0	H	92.0	11.4
101.840625	36.29	43.50	7.21	200.0	H	290.0	16.0
178.470625	37.01	43.50	6.49	100.0	H	163.0	14.1
295.113125	38.92	46.00	7.08	100.0	H	234.0	18.6
391.749375	37.15	46.00	8.85	100.0	H	234.0	21.0
434.005000	39.30	46.00	6.70	200.0	H	217.0	22.1

Remark:

Corrected Amplitude = Read level + Corrector factor

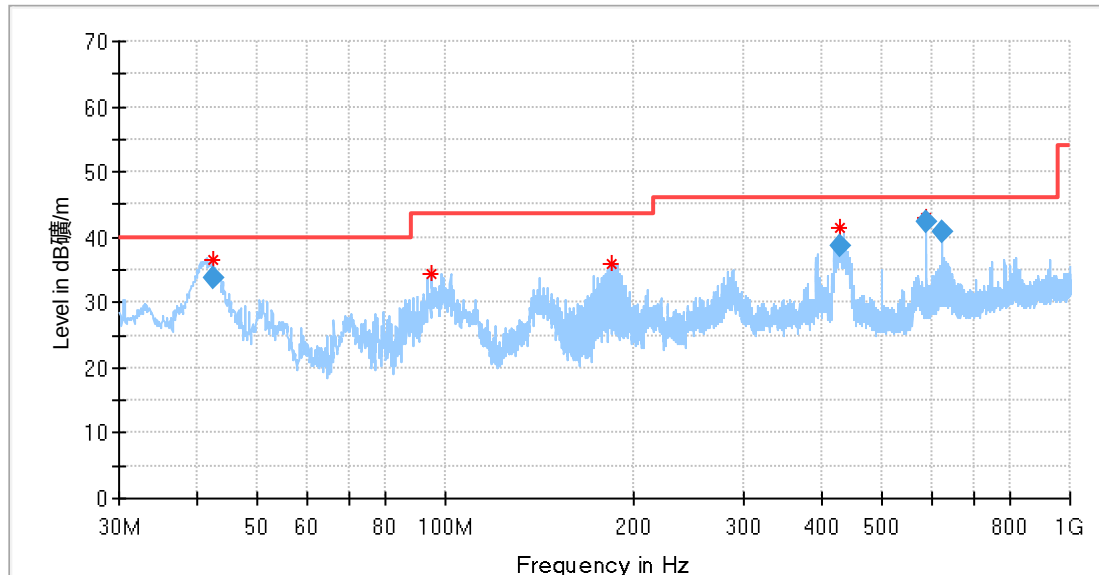
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain

Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

(The Reading Level is recorded by software which is not shown in the sheet)

Radiated Emission

Product Type : Dock
M/N : E3
Operating Condition : Normal Working with WiFi traffic Mode (connect to A2 via USB Cable, connect to PC via RJ45, connect to Mouse/Keyboard/USB Dick via USB port, connect to monitor via HDMI Cable)
Ant. Polarity : Vertical
Comment : 30-1000MHz



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.306875	33.78	40.00	6.22	100.0	V	320.0	17.2
95.171875	34.31	43.50	9.19	100.0	V	320.0	15.4
184.169375	35.78	43.50	7.72	200.0	V	77.0	14.7
428.185000	38.67	46.00	7.33	100.0	V	140.0	22.0
589.508125	42.52	46.00	3.48	100.0	V	218.0	25.3
624.973750	40.69	46.00	5.31	100.0	V	5.0	25.9

Remark:

Corrected Amplitude = Read level + Corrector factor

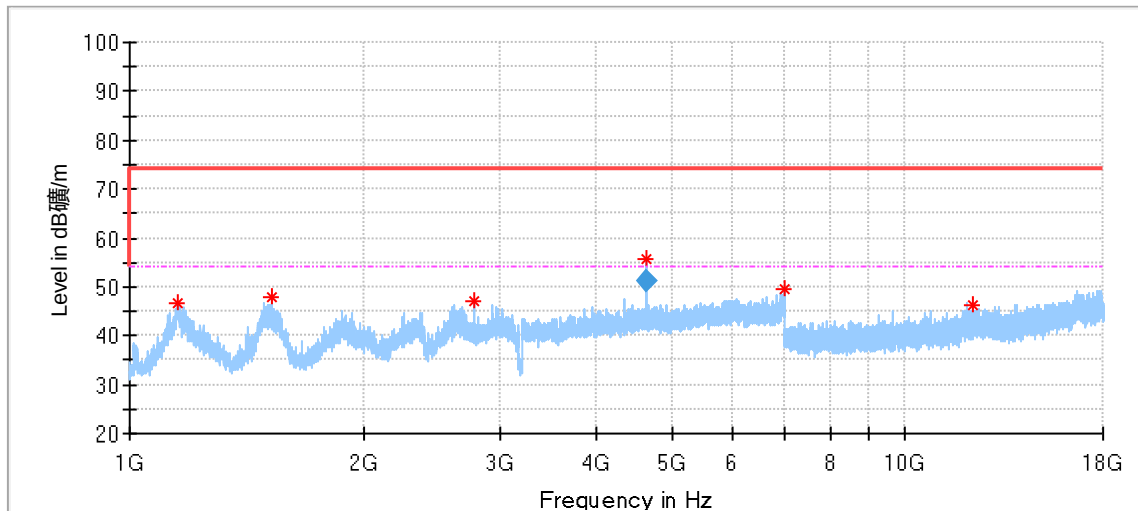
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain

Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

(The Reading Level is recorded by software which is not shown in the sheet)

Radiated Emission

Product Type : Dock
 M/N : E3
 Operating Condition : Normal Working with WiFi traffic Mode (connect to A2 via USB Cable, connect to PC via RJ45, connect to Mouse/Keyboard/USB Dick via USB port, connect to monitor via HDMI Cable)
 Ant. Polarity : Horizontal
 Comment : 1GHz-18GHz



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1151.000000	46.60	74.00	27.40	100.0	H	170.0	-9.8
1528.000000	47.86	74.00	26.14	100.0	H	181.0	-9.1
2785.000000	46.91	74.00	27.09	100.0	H	13.0	-3.2
4641.000000	55.63	74.00	18.37	100.0	H	11.0	2.7
4641.000000	51.12	54.00	2.88	100.0	H	11.0	2.7
6994.000000	49.64	74.00	24.36	100.0	H	355.0	7.3
12226.000000	46.16	74.00	27.84	100.0	H	85.0	9.6

Remark:

Corrected Amplitude = Read level + Corrector factor

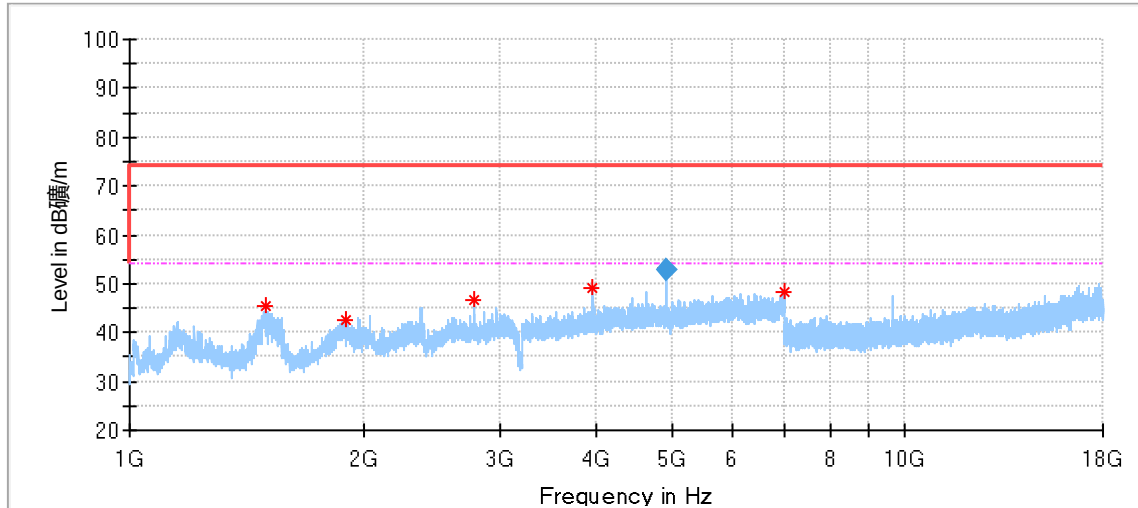
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain

Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

(The Reading Level is recorded by software which is not shown in the sheet)

Radiated Emission

Product Type : Dock
M/N : E3
Operating Condition : Normal Working with WiFi traffic Mode (connect to A2 via USB Cable, connect to PC via RJ45, connect to Mouse/Keyboard/USB Dick via USB port, connect to monitor via HDMI Cable)
Ant. Polarity : Vertical
Comment : 1GHz-18GHz



Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1498.000000	45.44	74.00	28.56	100.0	V	52.0	-9.4
1899.000000	42.70	74.00	31.30	100.0	V	41.0	-5.6
2785.000000	46.82	74.00	27.18	100.0	V	314.0	-3.2
3961.000000	49.11	74.00	24.89	100.0	V	8.0	1.1
4924.500000	53.37	74.00	20.63	100.0	V	165.0	2.2
4924.500000	52.98	54.00	1.02	100.0	V	165.0	2.2
6982.500000	48.42	74.00	25.58	100.0	V	154.0	7.2

Remark:

Corrected Amplitude = Read level + Corrector factor

Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain

Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

(The Reading Level is recorded by software which is not shown in the sheet)

Note: Testing is carried out with frequency rang 30MHz to 25GHz, which above 18GHz are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

10. Test Equipment List

Radiated Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	2020-6-28
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	68-4-80-14-002	707	2020-8-20
Horn Antenna	Rohde & Schwarz	HF907	68-4-80-14-005	102294	2020-6-22
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	2020-7-7
Pre-amplifier	Rohde & Schwarz	SCU 18	68-4-29-14-001	102230	2020-6-28
Signal Generator	Rohde & Schwarz	SMY01	68-4-48-16-001	839369/005	2020-6-28
Attenuator	Agilent	8491A	68-4-81-16-001	MY39264334	2020-6-28
3m Semi-anechoic chamber	TDK	9X6X6	68-4-90-14-001	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	68-4-90-14-001-A10	Version9.15.00	N/A

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-14-001	101782	2020-6-28
LISN	Rohde & Schwarz	ENV432	68-4-87-16-001	101318	2020-7-19
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	2020-6-28
Test software	Rohde & Schwarz	EMC32	68-4-90-14-003-A10	Version9.15.00	N/A

11. Measurement System Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Items	Extended Uncertainty
Uncertainty for Radiated Emission 25MHz-3000MHz	Horizontal: 5.12dB; Vertical: 5.10dB;
Uncertainty for Radiated Emission 3000MHz-18000MHz	Horizontal: 5.01dB; Vertical: 5.00dB;
Uncertainty for Radiated Emission 18000MHz-40000MHz	Horizontal: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted Emission 150kHz-30MHz	3.21dB

THE END