



47 CFR Part 15 Subpart B Electromagnetic Compatibility Test Report

For

CUE DUAL Camera Basic

ORDER NO.: CCZT-WAY-P21080041

REPORT NO.: FCCCCZT-WAY-P21080041R2

ISSUED DATE: 08 October, 2021

MODEL NO.: SF20-B10

CUE KOREA Co., Ltd

Dada Trading Bldg-3F, 15, Gangnam-daero 112-gil, Gangnam-gu, Seoul, Republic of Korea



Certificate #4068.03

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Report Number FCCCCZT-WAY-P21080041R2
Model Number SF20-B10



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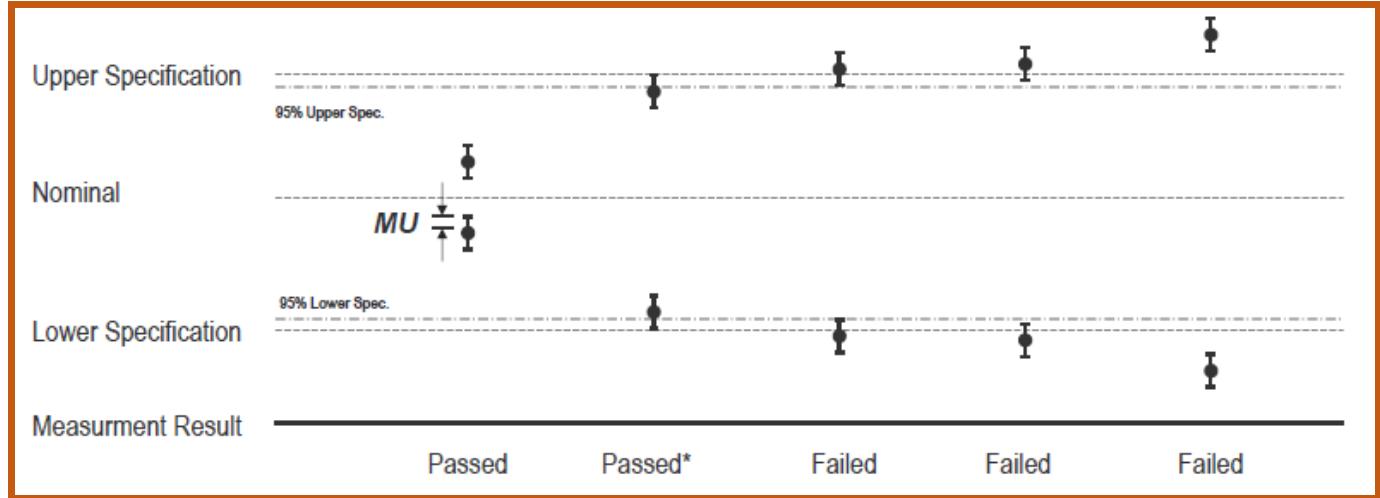
Test Report Details

Test Report No. FCCCCZT-WAY-P21080041R2
Tests Performed By: Bureau Veritas CPS ADT Korea Ltd.
Innoplex No.2 106, Sinwon-ro 306, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Republic of Korea
Test site: Bureau Veritas CPS ADT Korea Ltd.
HeungAn-daero 49, DongAn-gu, Anyang-si, Gyeonggi-do,
14119, Republic of Korea
Applicant: CUE KOREA Co., Ltd
Applicant address: Dada Trading Bldg-3F, 15, Gangnam-daero 112-gil, Gangnam-gu,
Seoul, Republic of Korea
Manufacturer: CUE KOREA Co., Ltd
Manufacturer address: Dada Trading Bldg-3F, 15, Gangnam-daero 112-gil, Gangnam-gu,
Seoul, Republic of Korea
Product Type: CUE DUAL Camera Basic
Model Number: SF20-B10
Multi-listing model number: -
FCC Classification: Part 15 Class A Digital Device (JAD)
FCC ID: 2A2WZ-SF20-B10
Equipment authorization: Certification
Product standards: 47 CFR Part 15 Subpart B / ANSI C63.4: 2014
Sample Serial Number: -
Sample Receive Date: 11 August, 2021
Testing Start Date: 11 August, 2021
Date Testing Complete: 25 August, 2021

This test report apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components Bureau Veritas CPS ADT Korea Ltd. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Bureau Veritas CPS ADT Korea Ltd. issued reports.

Overall Results

I. DECISION RULE FOR STATEMENT OF CONFORMITY



MU =95% expanded measurement uncertainty

QUA-52 Decision Rule Applied

Step 1: Reference Check, Daily Check, Peripheral device Check

Step 2: Retest Procedure (Maximum 3, Different Test Engineer)

1) If the result of the first retest is the same as the initial test, the judgment is made based on the value.

2) If the results of the first retest differ from the initial test result, the second retest is carried out.

After completion of the second retest, the average of the three test results is determined as the final result.

If the deviation of three values is more than 5% of the reference value, Re check the system

II. Measurement uncertainty

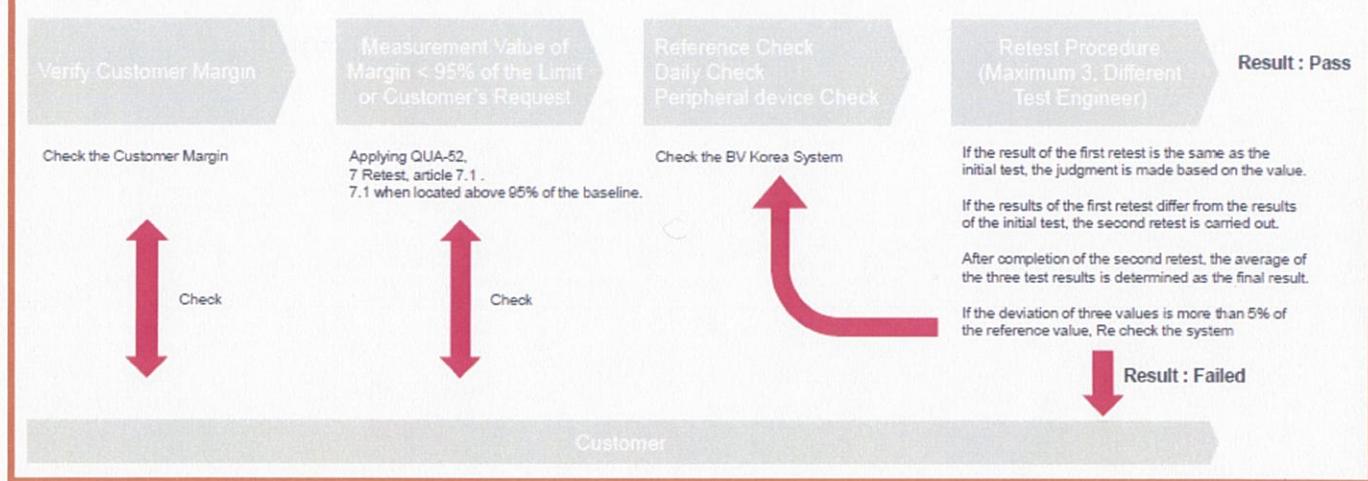
Test Item	Measurement uncertainty
Conducted RF emission (150 kHz to 30 MHz) - AMN	2.46 dB
Radiated RF emission (30 MHz to 1 000 MHz)	4.00 dB
Radiated RF emission (1 GHz to 6 GHz)	6.54 dB
Radiated RF emission (6 GHz to 18 GHz)	5.94 dB
Radiated RF emission (18 GHz to 26.5 GHz)	5.16 dB
Radiated RF emission (26.5 GHz to 40 GHz)	5.40 dB

Note 1: Measurement uncertainty is calculated in according with CISPR 16-4-2: 2011+A1: 2014+A2: 2018
The measurement uncertainty is given with a confidence of 95 % with the coverage factor, k=2.

III. FLOW CHART FOR DECISION RULE

The propose is to establish and apply a decision rule for calculating test result to ensure the validity of the test results and to inform the customer

Reference : ISO/IEC 17025 : 2017, BV CPS Quality Manual, QUA-52 Decision Rule for Statement of Conformity.



IV. FINAL DECISION

RELEASE CONTROL RECORD

REPORT NO.	REASON FOR CHANGE	DATE ISSUED
FCCCCZT-WAY-P210 80041	Original release	17 September, 2021
FCCCCZT-WAY-P210 80041R1	Reissue due to addition of FCC ID	29 September, 2021
FCCCCZT-WAY-P210 80041R2	Modify clock frequency. (10p)	08 October, 2021

This project has been tested and verified to comply with the requirements of **Bureau Veritas CPS ADT Korea Ltd.** Therefore, this certificate is issued.

PREPARED BY:

 Taeiyo Kim / Senior Engineer

, DATE : 08 October, 2021

APPROVED BY :

Rina Bae / Technical Manager

DATE : 08 October, 2021



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1. EMC Result Conclusion (With Justification)

The following tests were performed on a sample submitted for evaluation of compliance with 47 CFR Part 15.107(b) / 47 CFR Part 15.109 (b).

Test requirements	Standard	Results	Verdict
Emissions	<input checked="" type="checkbox"/> Class A / <input type="checkbox"/> Class B		
Conducted RF Emissions		Pass	Complied
Radiated RF Emissions (Below 1 GHz)	47 CFR Part 15 Subpart B ANSI C63.4: 2014	Pass	Complied
Radiated RF Emissions (Above 1 GHz)		Not Applicable <small>Note1)</small>	Not Applicable
We tested the CUE DUAL Camera Basic, Model: SF20-B10, to determine if it was in compliance with the relevant standards as marked on the EMC Verification Summary. We found that the unit met the requirement of 47 CFR Part 15 Subpart B / ANSI C63.4: 2014 standards when tested as received. The production units are required to conform to the initial sample as received when the units are placed on the market.			
Note1) The maximum operating frequency is below 108 MHz or less, so this test is not applicable.			



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2. General Product Description

2.1 Equipment Description

Description	
Dual module camera with integrated infrared thermal imaging function and visible image function.	

2.2 Technical Data

System	
Temperature Accuracy	± 0.5 °C Accuracy
Recommended Distance	1.2 - 3 m
Recommended Field of View	50 ° - 60 °
Detect Time	< 1sec
Face recognition efficiency	< 1sec
Thermal Module	
Detector Type	Uncooled Vox microbolometer
Max. Resolution	256 x 192
Temperature Range	30 °C to 45 °C
Focal Length	3.2 mm
Field of View	V 42 ° / H 56 °
NETD	60 mk
Detect frame Rate	25 fps
Interface	USB
Power	USB 5 V
Power Consumption	< 2 w
Optical Module	
Max. Image Resolution	1920 x 1080 (200M)
Image Sensor	1/2.7" Progressive Scan CMOS
Shutter Speed	1s to 1/100,000s
Field of View	75 °
WDR	120 dB
Interface	USB
Power	USB 5 V
Power Consumption	< 1 w



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2.3 Detail information of Multi-listing model

No.	Model	Description	Comment
-	-	-	-

***Note:** The manufacturer has declared to all the multiple model names into the basic model without any further evaluation by Bureau Veritas CPS ADT Korea.

3. Test Condition

3.1 Ancillary Equipment

Use*	Product Type	Manufacturer	Model	Comments
EUT	CUE DUAL Camera Basic	CUE KOREA Co., Ltd.	SF20-B10	-
AE	Intel NUC	INTEL CORPORATION	NUC8BEH	-
AE	AC/DC ADAPTER	Shenzhen Huntkey Electri Co., Ltd.	HKA09019047-6U	-
AE	LCD MONITOR	Samsung Electronics Co., Ltd.	LC27R500FHKXKR	-
AE	AC/DC ADAPTER	POWERNET Technologies Corp.	A3514_RPN	-
AE	Keyboard	HP Inc.	KBAR211	-
AE	Mouse	Microsoft	1405	-
AE	Galaxy S21 5G	Samsung Electronics Co., Ltd.	SM-G991	-

* Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, SIM - Simulator (Not Subjected to Test)

3.2 Input/Output Ports

Start		END		CABLE		
Name	I/O Port	Name	I/O Port	Length (m)	Shield	With Ferrite
CUE DUAL Camera Basic	USB 1, 2	Intel NUC	USB 1, 2 (front)	1.9	Shielded	-
Intel NUC	DC IN	AC/DC ADAPTER	DC OUT	1.8	Unshielded	-
Intel NUC	HDMI	LCD MONITOR	HDMI	1.8	Shielded	-
Intel NUC	USB 3(rear)	Keyboard	USB	1.7	Unshielded	-
Intel NUC	USB 4(rear)	Mouse	USB	1.7	Unshielded	-
Intel NUC	USB-C	Galaxy S21 5G	USB-C	1.0	Shielded	-
Intel NUC	LAN	LAN external network	LAN	1.8	Unshielded	-
AC/DC ADAPTER	AC IN	AC Source	AC OUT	1.3	Unshielded	-
LCD MONITOR	DC IN	AC/DC ADAPTER	DC OUT	1.4	Unshielded	-
AC/DC ADAPTER	AC IN	AC Source	AC OUT	1.4	Unshielded	-

3.3 Power Interface:

Rated Voltage	DC 5 V via USB
Test Voltage	AC 120 V, 60 Hz (Use of Intel NCU's AC/DC Adapter power)

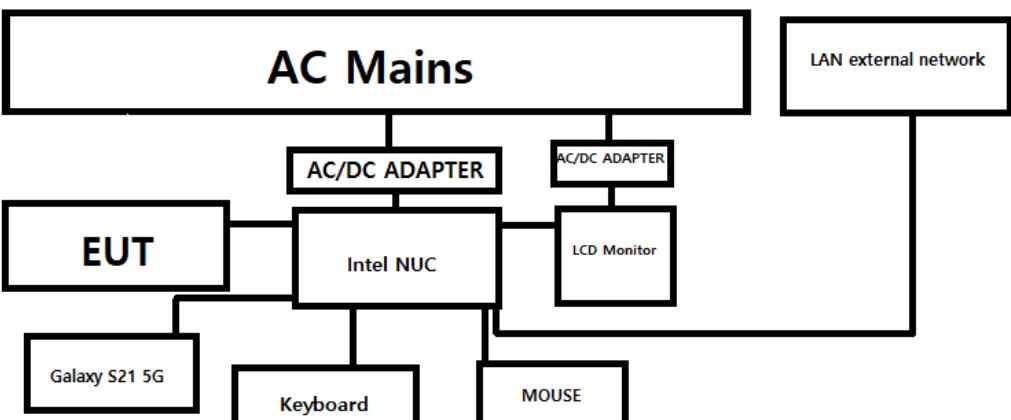
3.4 EUT Internal Operating Frequencies

Clock Frequency	27 MHz
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3.5 Modes of Description

Mode #	Mode	Description	Comments
1	Facial recognition and thermal imaging camera operation mode	The EUT is connected to the industrial controller PC, and the dedicated software is automatically executed so that the face recognition and thermal imaging camera are operating. The PC is connected to the basic interface in normal connection.	-

3.6 Configuration

Mode #	Description
1	 <pre> graph TD ACM[AC Mains] --> ACDA1[AC/DC ADAPTER] ACM --> ACDA2[AC/DC ADAPTER] ACDA1 --> EUT[EUT] ACDA1 --> INUC[Intel NUC] ACDA2 --> LCD[LCD Monitor] EUT --- INUC INUC --- LCD INUC --- GS21[Galaxy S21 5G] INUC --- KB[Keyboard] INUC --- MO[MOUSE] LCD --- LAN[LAN external network] </pre>

4. Test Condition and Results

4.1 Conducted RF Emissions

TEST: Limits of mains terminal conducted RF emission						
Method	The AMN placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.					
Basic Standard		ANSI 63.4: 2014				
Parameters recorded during the test		Laboratory Ambient Temperature		(23.8 ± 1.0) °C		
		Relative Humidity		(50.5 ± 1.0) %		
		Frequency range on each side of line		Measurement Point		
Fully configured sample scanned over the following frequency range		150 kHz to 30 MHz		AC mains power ports		
Limits – AC mains power ports (Class A)						
Frequency (MHz)	Limit (dB μ V)					
	Quasi-Peak	Result	Average	Result		
0.15 to 0.5	79	Pass	66	Pass		
0.5 to 30	73	Pass	60	Pass		
Limits – AC mains power ports (Class B)						
Frequency (MHz)	Limit (dB μ V)					
	Quasi-Peak	Result	Average	Result		
0.15 to 0.5	66 to 56	-	56 to 46	-		
0.5 to 5	56	-	46	-		
5 to 30	60	-	50	-		

Note1) Formula

Final Value (QP and/or CAV) = Reading Value (QP and/or CAV) + Corr. (AMN Insertion Loss + Cable Loss)

Margin (QP and/or CAV) = Limit – Final Value (QP and/or CAV)

QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

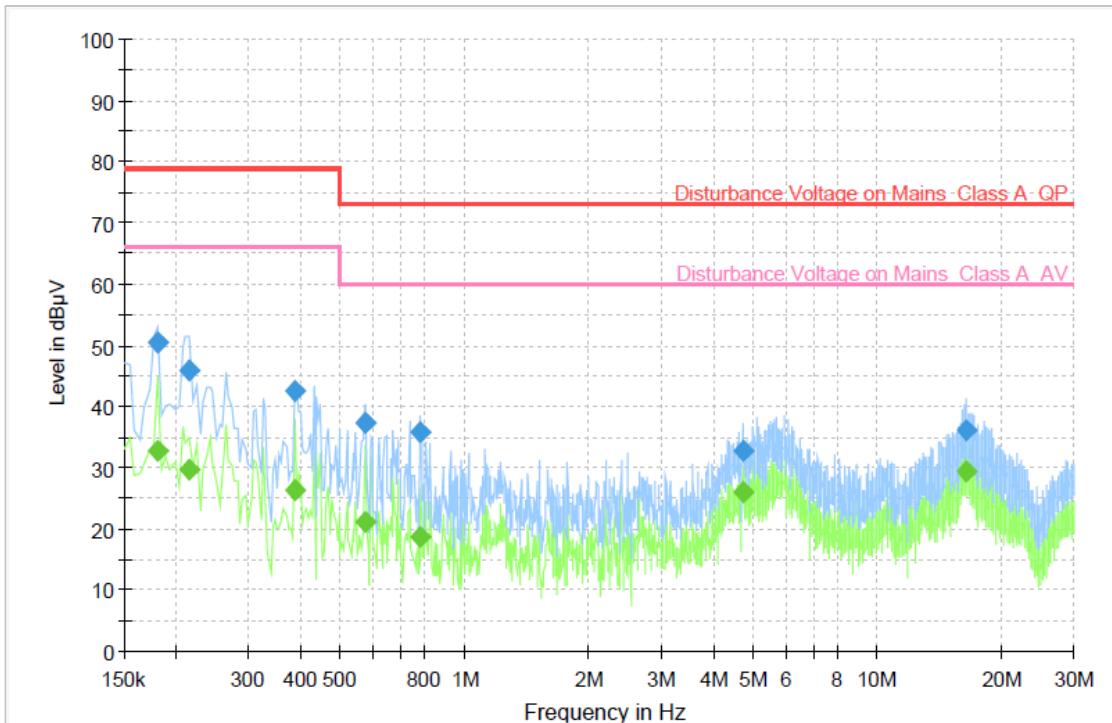
Table 1. Test data for conducted RF emissions

#1

Test Report

Common Information

Project Number CCZT-WAY-P21080041
 Location EMI Test Site
 Date 2021.08.25
 Environment 23.8 °C / 50.5 % R.H.



Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Corr. (dB)
0.180728	---	32.60	66.00	33.40	N	10.0
0.180728	50.39	---	79.00	28.61	N	10.0
0.215846	---	29.71	66.00	36.29	L1	9.8
0.215846	45.82	---	79.00	33.18	L1	9.8
0.387044	42.54	---	79.00	36.46	L1	9.9
0.387044	---	26.29	66.00	39.71	L1	9.9
0.575802	---	21.22	60.00	38.78	L1	9.9
0.575802	37.37	---	73.00	35.63	L1	9.9
0.782118	---	18.51	60.00	41.49	L1	9.8
0.782118	35.70	---	73.00	37.30	L1	9.8
4.710904	---	26.03	60.00	33.97	L1	9.7
4.710904	32.81	---	73.00	40.19	L1	9.7
16.387522	---	29.36	60.00	30.64	L1	9.9
16.387522	36.07	---	73.00	36.93	L1	9.9

Note1) Two graphs measured for both Line 1(L1) and Neutral (N) of the LISN are combined into one graph.

4.2 Radiated RF Emissions (30 MHz - 1 000 MHz)

TEST: Limits for radiated RF emissions		
Method	Measurements were made in a 10-meter semi-anechoic chamber that complies to ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 or 10-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at 1, 2, 3 and 4 meter heights in both horizontal and vertical polarities. Final measurements (quasi-peak as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standards	ANSI C63.4: 2014	
Test Date	11 August, 2021	
Parameters recorded during the test	Laboratory Ambient Temperature	(24.2 ± 1.0) °C
	Relative Humidity	(49.2 ± 1.0) %
Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	30 MHz – 1 000 MHz	3 or 10 meter measurement distance
Limits – Class A (10 m distance)		
Frequency (MHz)	Limit (dB μ V/m)	
	Quasi-Peak	Results
30 to 88	39.0	Pass
88 to 216	43.5	Pass
216 to 960	46.4	Pass
960 to 1000	49.5	Pass
Limits – Class B (3 m distance)		
Frequency (MHz)	Limit (dB μ V/m)	
	Quasi-Peak	Results
30 to 88	40.0	-
88 to 216	43.5	-
216 to 960	46.0	-
960 to 1000	54.0	-

Note1) Formula

Final Value (PK and/or QP and/or CAV) = Reading Value (PK and/or QP and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amplifier Gain)

Margin (PK and/or QP and/or CAV) = Limit – Final Value (PK and/or QP and/or CAV)

PK = Peak, QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

Note2) Distance (Antenna to Centre of Turntable), Antenna Height

Below 1 GHz, Distance = 3 or 10 m, Antenna Height = (1 to 4) m

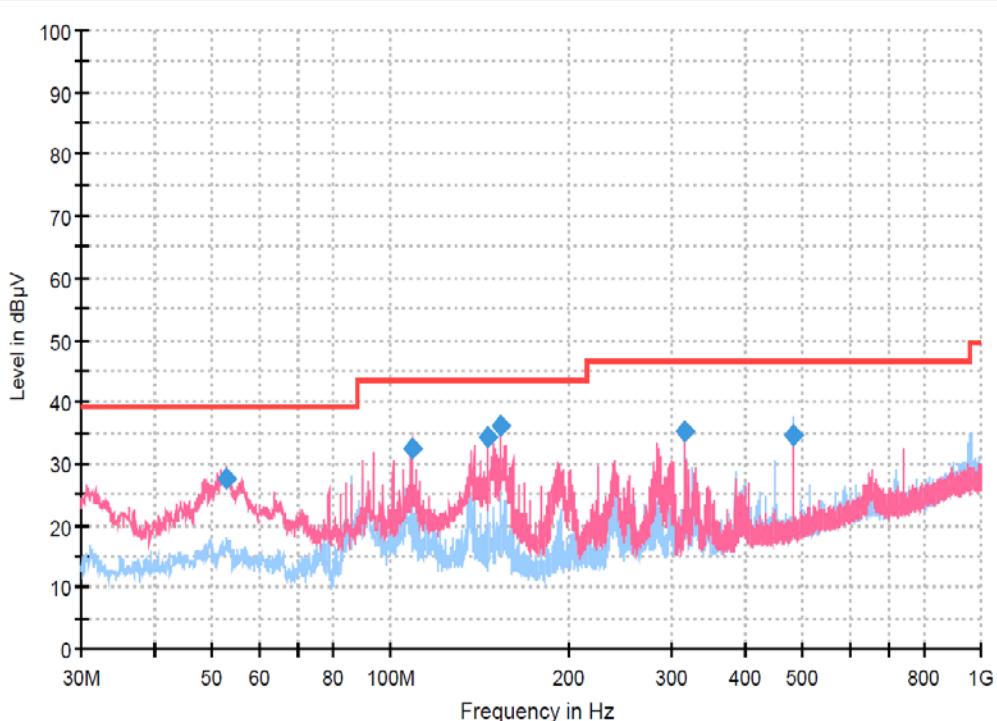
Table 2. Test data for radiated RF emissions

#1

Test Report

Common Information

Project Number CCZT-WAY-P21080041
 Location 10 m SAC
 System: Below 1 GHz
 Date: 2021.08.11
 Environment 24.2 °C / 49.2% R.H.



Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	Limit (dB μ V)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Comment
52.746500	27.40	39.09	11.69	100.0	V	88.0	-19.8	
108.715500	32.37	43.50	11.13	100.0	V	86.0	-22.9	
146.254500	34.32	43.50	9.18	104.0	V	75.0	-25.3	
153.723500	36.06	43.50	7.44	100.0	V	36.0	-25.1	
314.986000	35.05	46.44	11.40	100.0	V	100.0	-18.6	
479.983000	34.70	46.44	11.75	390.0	H	97.0	-14.7	

Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

4.3 Radiated RF Emissions (Above 1 GHz)

TEST: Limits for radiated RF emissions						
Method	Measurements were made in a 10-meter semi-anechoic chamber that complies to ANSI C63.4. Rotate the EUT from 0° to 360° and position the receiving antenna at heights from 1 m to 4 m above the reference ground plane continuously to determine associated with higher emission levels and record them. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.					
Basic Standards	ANSI C63.4: 2014					
Test Date	-----					
Parameters recorded during the test	Laboratory Ambient Temperature		----- °C			
	Relative Humidity		----- %			
Frequency range		Measurement Point				
Fully configured sample scanned over the following frequency range	1 GHz – 40 GHz		3 meter measurement distance			
Limits – Class A						
Frequency (GHz)	Limit (dB μ V/m)					
	Peak	Result	Average	Result		
1 to --	80	-	60	-		
Limits – Class B						
Frequency (GHz)	Limit (dB μ V/m)					
	Peak	Result	Average	Result		
1 to 6	74	-	54	-		

Note1) Formula

Final Value (PK and/or QP and/or CAV) = Reading Value (PK and/or QP and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amplifier Gain)

Margin (PK and/or QP and/or CAV) = Limit – Final Value (PK and/or QP and/or CAV)

PK = Peak, QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

Note2) Distance (Antenna to Centre of Turntable), Antenna Height

Above 1 GHz, Distance = 4.5 m, Antenna Height (Considering size of EUT) = (1 to 4) m

$$L2 = L1 + 20 \log (d1 \text{ (m)} / d2 \text{ (m)}) = 20 \log (4.5 / 3) = \underline{\underline{3.5}}$$



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Table 3. Test data for radiated RF emissions

#1
Not Applicable

Note1) The maximum operating frequency is below 108 MHz or less, so this test is not applicable.



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Appendix A. Test site accreditations

Certificate	Nation	Agency	Code	Remark
Accreditation	USA	A2LA	4068.03	31 July, 2019
Accreditation	KOREA	RRA	KR0158	10 January, 2020
Registration	Japan	VCCI	4013	17 February, 2020
Accreditation	USA MRA	FCC	KR0158, 666061	17 March, 2020
Accreditation	CANADA MRA	ISED	KR0158, 25944	17 March, 2020
Accreditation	Vietnam MRA	MIC	KR0158	20 April, 2020

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

Appendix B. Test Equipment

Conducted Emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR	102529	2020.12.08	2021.12.08
LISN	R&S	ENV216	102437	2020.12.08	2021.12.08
Software	R&S	EMC 32	10.50.40 Version	-	-

Radiated Emissions (30 MHz ~ 1 GHz)					
Equipment Name	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESW44	101812	2020.12.09	2021.12.09
Trilog Antenna (with 6dB ATT.)	Schwarzbeck	VULB9163	01199	2019.08.26	2021.08.26
SIGNAL CONDITIONING UNIT	R&S	SCU08F2	08400016	2020.12.09	2021.12.09
Software	R&S	EMC 32	10.35.10 Version	-	-