

FCC/IC TEST REPORT

Job No. : GPWE2212000179EC
Applicant : Cresyn Co.,Ltd
Equipment Under Test (EUT) :
Product Name : Bluetooth Noise cancelling Headphone
Model Name : BN0300
FCC Authorization Type : Certification
Applied Standards : FCC Part 15 Subpart B, Class B
ICES-003 Issue 7:2020
FCC ID : V2R-BN0300
IC Certification : 10488A-BN0300
Date of Receipt : December 20, 2022
Date of Test : January 2, 2023 ~ January 3, 2023
Date of Issue : January 26, 2023
Test Results : Complied

Tested by

:



Luther Choi

Reviewed by

:



Julia Choi

This test report does not assure KOLAS accreditation.

- 1) The results of this test report are effective only to the items tested.
2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.

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Revision History

Revision	Report number	Description
0	F690501-RF-EMC001091	Initial
1	F690501-RF-EMC001091_1	Corrected manufacturer information for Travel adapter on page 4.

1. General Information

1.1 Client Information

Applicant	Cresyn Co.,Ltd
Applicant Address	5, Gangnam-daero 107-gil, Seocho-gu, Seoul, Republic of Korea
Manufacturer	Cresyn Co.,Ltd
Manufacturer Address	5, Gangnam-daero 107-gil, Seocho-gu, Seoul, Republic of Korea
Factory	CRESYN HANOI CO., LTD.
Factory Address	Dong Tho Industrial Complex, Yen Phong District, Bac Ninh Province, Vietnam

1.2 Test Laboratory

Name and Address	SGS Korea Co., Ltd.
- Giheung Laboratory	35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
- Gunpo Laboratory	4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, Republic of Korea
- Dongtan Laboratory	12, Dongtansandan 10-gil, Hwaseong-si, Gyeonggi-do, 18487, Republic of Korea
FCC Registration No.	KR0150
IC Registration No.	7837B
Phone	+ 82 31 548 0710
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e-mail	julia.choi@sgs.com

1.3 General Information of E.U.T.

Classification	Specification
Product Name	Bluetooth Noise cancelling Headphone
Model Name	BN0300
Serial No.	-
EMI Classification	Class B
Clock Frequency	2 480 MHz
Rated Power	DC 5 V
Test Voltage	AC 120 V, 60 Hz
H/W Version	1.0
S/W Version	1.0
Port	USB(C-TYPE)
Components	USB Cable
Function	It is Bluetooth headset that can be used by connected to mobile phone.

1.4 Operating Modes and Conditions

Operating mode	Operating Condition
1) Charge + Idle	A state that EUT was charging connected to travel adapter

1.5 Peripheral Equipments

Description	Model	Serial No.	Manufacturer	Note.
TRAVEL ADAPTER	EP-TA800	R37T5SV9BP4HM3	SOLUM VINA COMPANY LIMITED	-

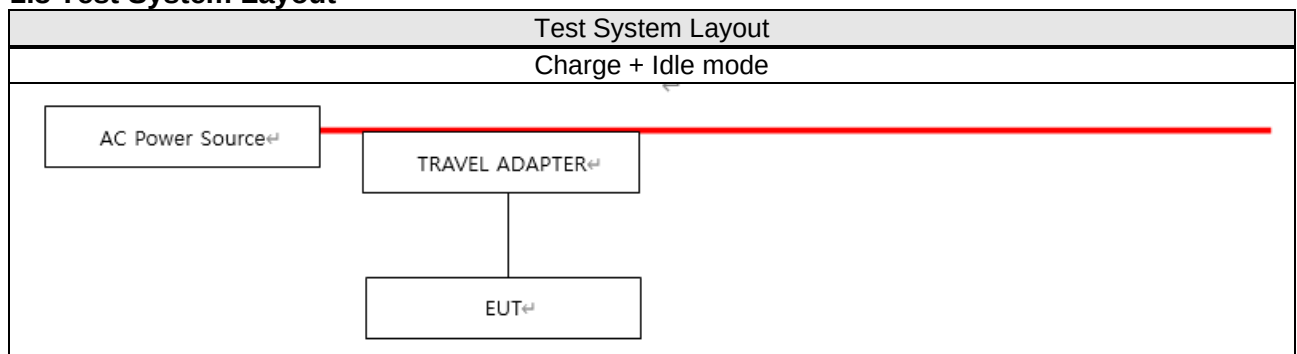
1.6 Cable List

Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length (m)	Shield	
Charge + Idle mode						
EUT	USB(C-Type)	TRAVEL ADAPTER	USB(C-Type)	1.0	Shielded	No

1.7 System Configurations

Description	Model	Serial No.	Manufacturer	Note
MAIN BOARD	PPU-BN0300_V1.0	-	-	-
SUB BOARD	-	-	-	-
SPEAKER MAIN BOARD1	BN0300 V1.0 A	-	-	-
SPEAKER MAIN BOARD2	BN0300 V1.0 A	-	-	-
SPEAKER SUB BOARD1	FF_MIC_V1.0 A	-	-	-
SPEAKER SUB BOARD2	CALL_MIC V1.0 A	-	-	-
SPEAKER SUB BOARD3	FF_MIC_V1.0 A	-	-	-
Li-ion BATTERY	782124B	-	Chongqing VDL Electronics Co.,Ltd.	-

1.8 Test System Layout



1.9 Modifications/Notes

- There was no modified item during the test.

1.10 Applicable Standards for Testing

Standards	Status	Deviation
FCC Part 15 : Subpart B ICES-003 Issue 7:2020	Applicable	No Deviation

1.11 Summary of Test Results

Test Item	Standards	Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107 ICES-003 Issue 7:2020 ANSI C63.4a:2017	Complied
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ICES-003 Issue 7:2020 ANSI C63.4a:2017	Complied

Note : Test methods of all test items are performed according to the basic standards in this table.

EMISSION

2.1 Test Results

Test Items	Standards	Test Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107 ICES-003 Issue 7:2020 ANSI C63.4a:2017	Complied
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ICES-003 Issue 7:2020 ANSI C63.4a:2017	Complied

2.2 Test Method and Limits

2.2.1 Test Method

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 MHz ~ 30 MHz	9 kHz	-
Radiated Emission	30 MHz ~ 1 GHz	120 kHz	10 m & 3 m
	Above 1 GHz	1 MHz	3 m

Note : 10 m method of radiated emission measurement is only applied to Class A equipment over the frequency range of 30 MHz ~ 1 GHz. Except this, 3 m method is applied to Class B equipment over the frequency range of 30 MHz ~ 1 GHz and Class A and Class B equipment above 1 GHz.

2.2.2 Test Limits

-Conducted Emission Limits

Frequency Range	Limits(dB μ V)		Class
	Quasi-peak	Average	
0.15 MHz ~ 0.5 MHz	79	66	Class A
0.5 MHz ~ 30 MHz	73	60	
0.15 MHz ~ 0.5 MHz	66 to 56	56 to 46	Class B
0.5 MHz ~ 5 MHz	56	46	
5 MHz ~ 30 MHz	60	50	

Note : The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

-Radiated Emission Limits below 1 GHz

[FCC Part 15 Subpart B]

Frequency Range	Limits(dB μ V/m)	Class
	Quasi-peak	
30 MHz ~ 88 MHz	39.0	Class A (10 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 960 MHz	46.4	
960 MHz ~ 1 GHz	49.5	
30 MHz ~ 88 MHz	40.0	Class B (3 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 960 MHz	46.0	
960 MHz ~ 1 GHz	54.0	

[ICES-003 Issue 7 : 2020]

Frequency Range	Limits(dB μ V/m)	Class
	Quasi-peak	
30 MHz ~ 88 MHz	40.0	Class A (10 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 230 MHz	46.4	
230 MHz ~ 960 MHz	47.0	
960 MHz ~ 1 GHz	49.5	
30 MHz ~ 88 MHz	50.0	Class A (3 m method)
88 MHz ~ 216 MHz	54.0	
216 MHz ~ 230 MHz	56.9	
230 MHz ~ 960 MHz	57.0	
960 MHz ~ 1 GHz	60.0	
30 MHz ~ 88 MHz	30.0	Class B (10 m method)
88 MHz ~ 216 MHz	33.1	
216 MHz ~ 230 MHz	35.6	
230 MHz ~ 960 MHz	37.0	
960 MHz ~ 1 GHz	43.5	
30 MHz ~ 88 MHz	40.0	Class B (3 m method)
88 MHz ~ 216 MHz	43.5	
216 MHz ~ 230 MHz	46.0	
230 MHz ~ 960 MHz	47.0	
960 MHz ~ 1 GHz	54.0	

-Radiated Emission Limits above 1 GHz (3 m method)

[FCC Part 15 Subpart B]

Frequency Range	Limits(dB μ V/m)		Class
	Average	Peak	
Above 1 GHz	59.5	79.5	Class A
Above 1 GHz	54.0	74.0	Class B

Note : The limits of class A equipment is extrapolated using an extrapolation factor of 20 dB/decade because it was measured at 3 m distance not 10 m distance.

[ICES-003 Issue 7 : 2020]

Frequency Range	Limits(dB μ V/m)		Class
	Average	Peak	
Above 1 GHz	60.0	80.0	Class A
Above 1 GHz	54.0	74.0	Class B

2.3 Conducted Disturbance

The initial preliminary exploratory scans were performed over the measuring frequency range(0.15 MHz to 30 MHz) using a max hold mode incorporating a Peak detector and CISPR-Average detector and using the EMI measuring software. The final test data was measured using a Quasi-Peak detector and CISPR-Average detector.

Note. Measuring software

- Giheung Lab.: EMC32(V10.40.10) from R&S
- Gunpo Lab.: EMC32(V10.60.20) from R&S
- Dongtan Lab.: EMC32(V10.40.00) from R&S

2.3.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
EMI TEST RECEIVER	ESU8	R&S	100128	2023.05.26
2-LINE V-NETWORK	ENV216	R&S	101180	2023.08.04
PULSE LIMITER	ESH3-Z2	R&S	100283	2023.08.22

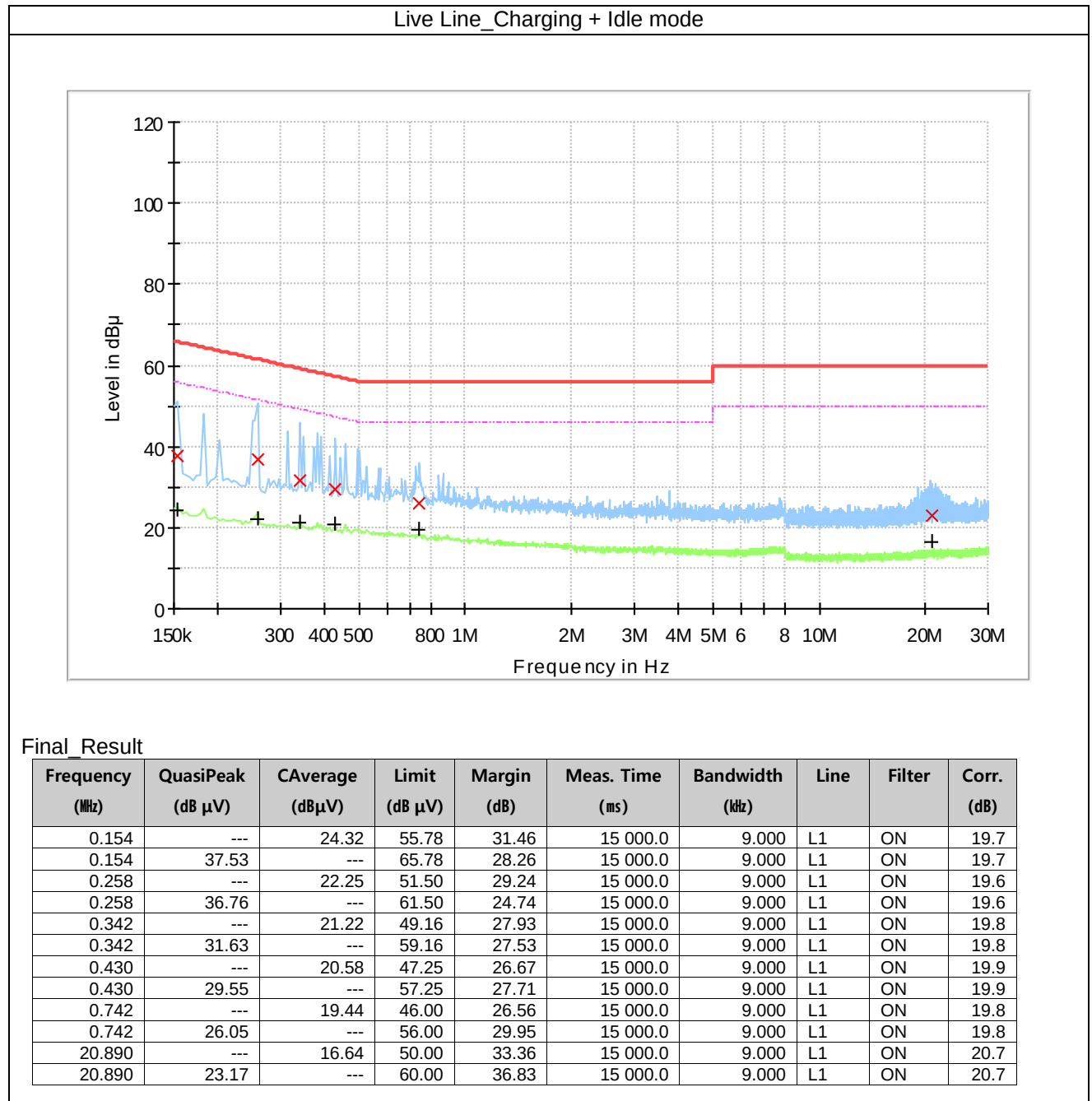
2.3.2 Test Site

Shield Room in Giheung Laboratory

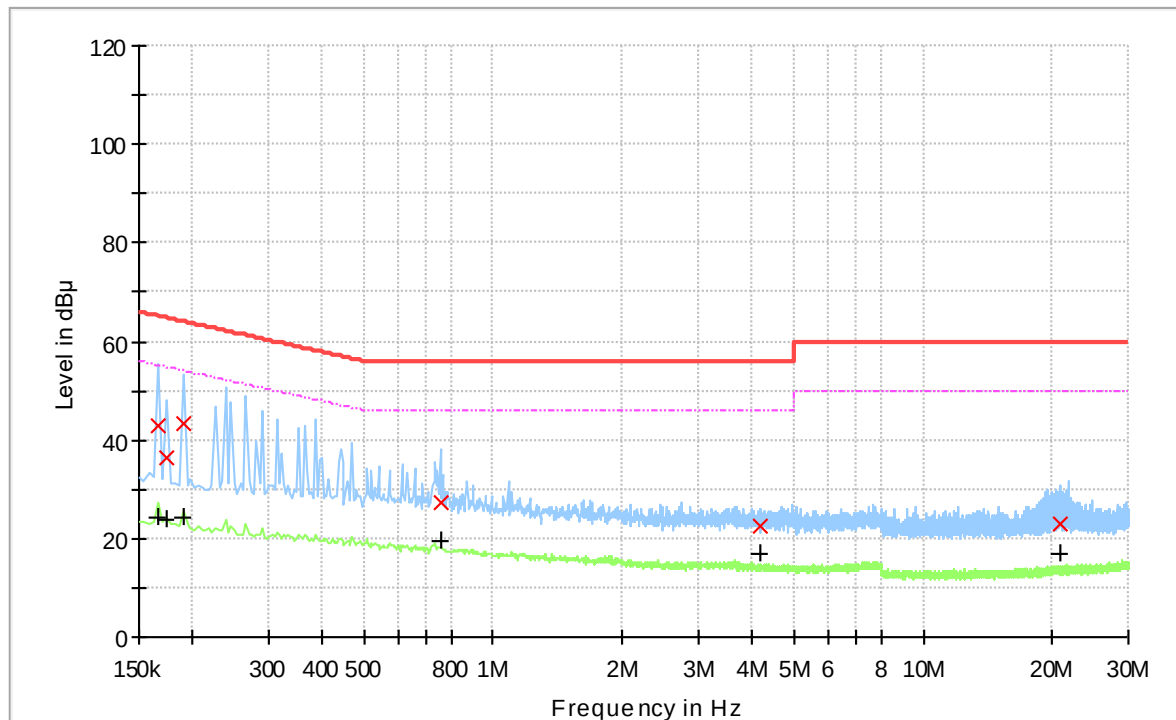
2.3.3 Environment Conditions

Temperature	(Minimum 19.6, Maximum 20.6) °C
Humidity	(Minimum 33.0, Maximum 34.0) % R.H.
Atmospheric Pressure	(Minimum 102.1, Maximum 102.1) kPa
Test Date	January 2, 2023

2.3.4 Test Results



Neutral Line_ Charging + Idle mode



Final Result

Frequency (MHz)	QuasiPeak (dB μV)	CAverage (dBμV)	Limit (dB μV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.166	---	24.42	55.16	30.73	15 000.0	9.000	N	ON	19.9
0.166	42.86	---	65.16	22.30	15 000.0	9.000	N	ON	19.9
0.174	---	23.86	54.77	30.91	15 000.0	9.000	N	ON	19.9
0.174	36.47	---	64.77	28.29	15 000.0	9.000	N	ON	19.9
0.190	---	24.13	54.04	29.90	15 000.0	9.000	N	ON	19.8
0.190	43.51	---	64.04	20.53	15 000.0	9.000	N	ON	19.8
0.754	---	19.51	46.00	26.49	15 000.0	9.000	N	ON	19.8
0.754	27.35	---	56.00	28.65	15 000.0	9.000	N	ON	19.8
4.174	---	16.81	46.00	29.19	15 000.0	9.000	N	ON	19.9
4.174	22.63	---	56.00	33.37	15 000.0	9.000	N	ON	19.9
20.930	---	16.70	50.00	33.30	15 000.0	9.000	N	ON	20.7
20.930	22.96	---	60.00	37.04	15 000.0	9.000	N	ON	20.7

Measurement Uncertainty : See Appendix A

Note : • (L1) : Hot

• Margin = Limit – Quasi Peak or CAverage

• (N) : Neutral

• Corr. = LISN Factor + Cable loss + Pulse Limiter factor

Ex) In case

Freq ; 0.5 MHz, level ; 30 dB(μV), CL ; 0.2 dB, LISN ; 9.5 dB, P/L: 9.8 dB

Result = Level + CL + LISN + P/L

= 30 + 0.2 + 9.5 + 9.8

= 49.5

Margin = Limit – Result

= 79 - 49.5

= 29.5

2.4 Radiated Emission

The initial preliminary exploratory scans were performed over the measuring frequency range (30 MHz to 13 GHz) using a max hold mode incorporating a Peak detector by using the EMI measuring software. The final test data was measured using a Quasi-Peak detector below 1 GHz, Peak and CISPR Average detector above 1 GHz. Measurements were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna height was varied from 1 m to 4 m and the EUT was rotated 360° to find the maximum emitting point for each frequency.

Note. Measuring software

- Giheung Lab.: EMC32(V10.40.10) from R&S
- Gunpo Lab.: EP5RE(V5.3.70) from TOYO
- Dongtan Lab.: EMC32(V10.40.10) from R&S

2.4.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
EMI TEST RECEIVER	ESU40	R&S	100075	2023.01.19
Hybrid ANTENNA	VULB 9163	SCHWARZBECK	9163-396	2023.03.24
Double Ridged Horn Antenna	HF907	R&S	102578	2023.05.02
PREAMPLIFIER	AM-1431	MITEQ	1336160	2023.05.23
Pre-Amplifier	SCU18	R&S	102244	2023.07.06

Note: The calibration period of every equipment is 1 year.

2.4.2 Test Site

10 m SEMI-ANECHOIC CHAMBER in Giheung Laboratory

2.4.3 Environment Conditions

Below 1 GHz

Temperature	(Minimum 17.5, Maximum 17.9) °C
Humidity	(Minimum 32.0, Maximum 33.0) % R.H.
Atmospheric Pressure	(Minimum 102.1, Maximum 102.1) kPa
Test Date	January 2, 2023

Above 1 GHz

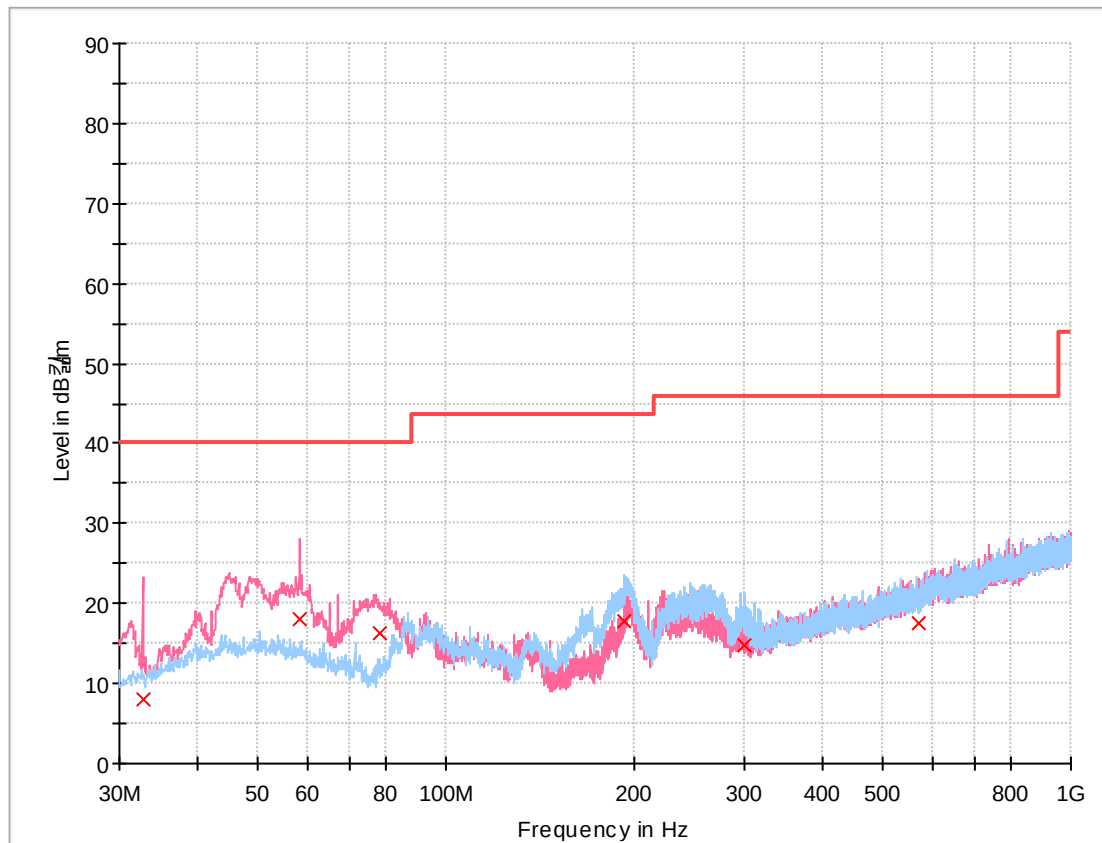
Temperature	(Minimum 17.9, Maximum 18.2) °C
Humidity	(Minimum 30.0, Maximum 31.0) % R.H.
Atmospheric Pressure	(Minimum 102.0, Maximum 102.0) kPa
Test Date	January 3, 2023

2.4.4 Test Results

Below 1 GHz (3 m method)

[FCC Part 15 Subpart B]

Charging + Idle mode

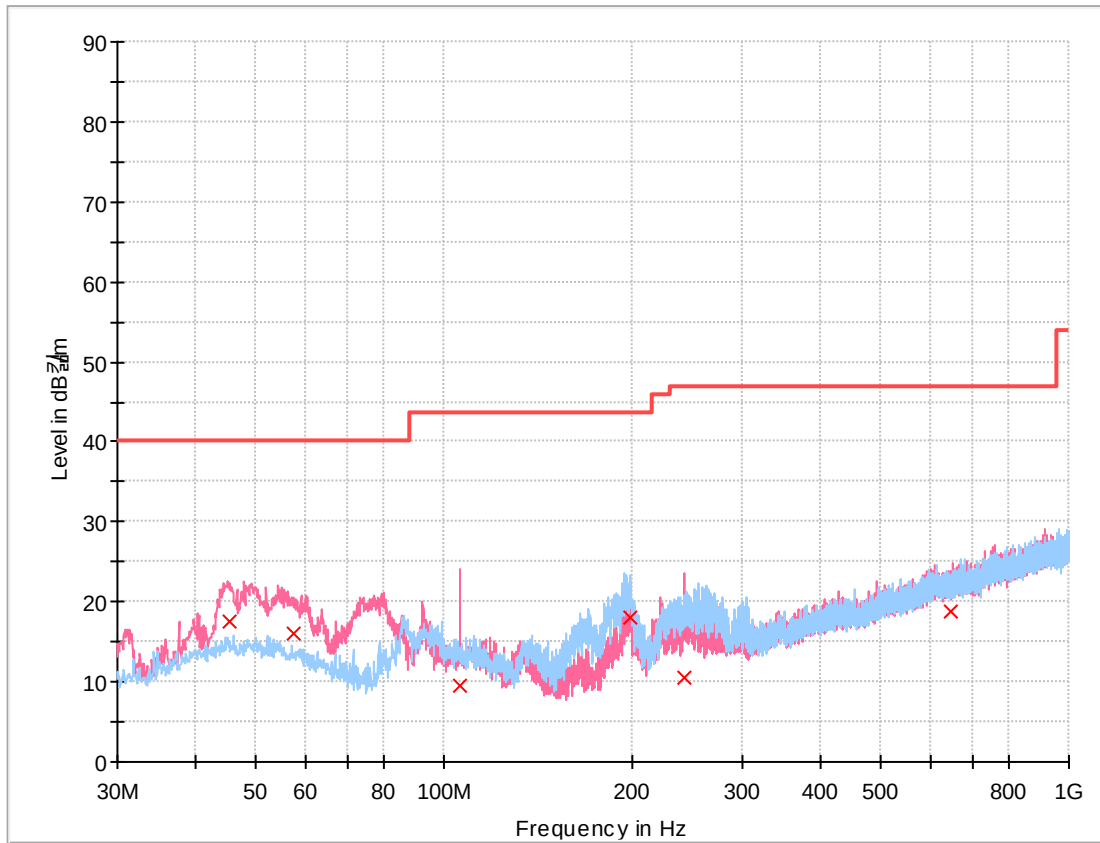


Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.716	7.91	40.00	32.09	15 000.0	120.000	100.0	V	240.0	-21.2
58.227	18.09	40.00	21.91	15 000.0	120.000	100.0	V	213.0	-18.5
78.306	16.30	40.00	23.70	15 000.0	120.000	200.0	V	20.0	-24.6
192.960	17.92	43.50	25.58	15 000.0	120.000	300.0	H	0.0	-19.6
299.660	14.77	46.00	31.23	15 000.0	120.000	200.0	H	283.0	-16.8
569.029	17.52	46.00	28.48	15 000.0	120.000	100.0	V	240.0	-10.8

[ICES-003 Issue 7: 2020]

Charging + Idle mode



Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
45.326	17.46	40.00	22.54	15000.0	120.000	100.0	V	14.0	-17.6
57.257	16.07	40.00	23.93	15000.0	120.000	100.0	V	22.0	-18.4
105.951	9.61	43.50	33.89	15000.0	120.000	100.0	V	170.0	-19.4
198.198	18.06	43.50	25.44	15000.0	120.000	200.0	H	0.0	-19.1
242.624	10.54	47.00	36.46	15000.0	120.000	200.0	V	304.0	-18.0
647.114	18.87	47.00	28.13	15000.0	120.000	400.0	V	234.0	-9.3

Measurement Uncertainty: See Appendix A

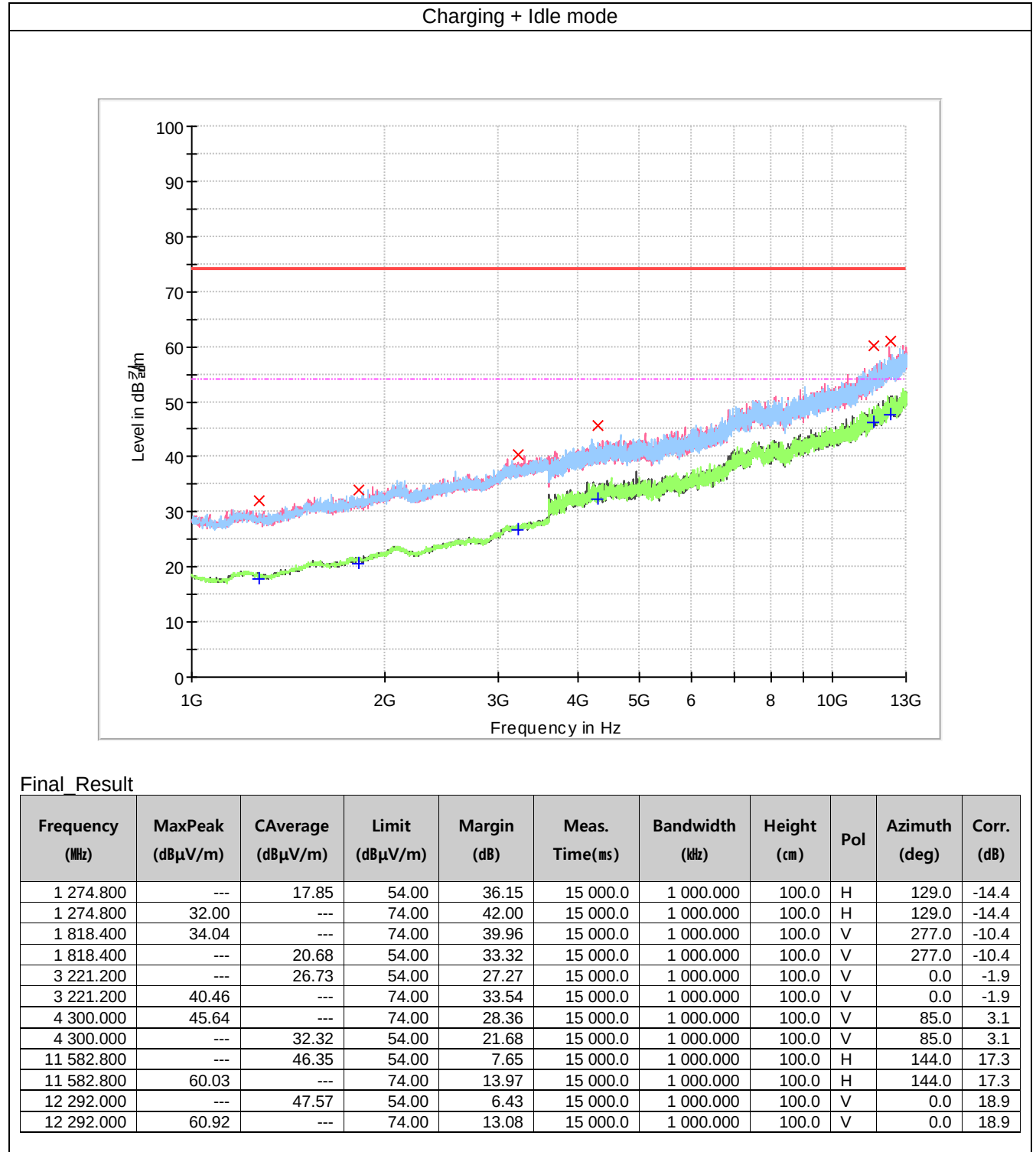
Note : • POL H = Horizontal

• POL V = Vertical

• Margin = Limit – Quasi Peak • Corr. = Antenna Factor + Cable loss – Amplifier Gain

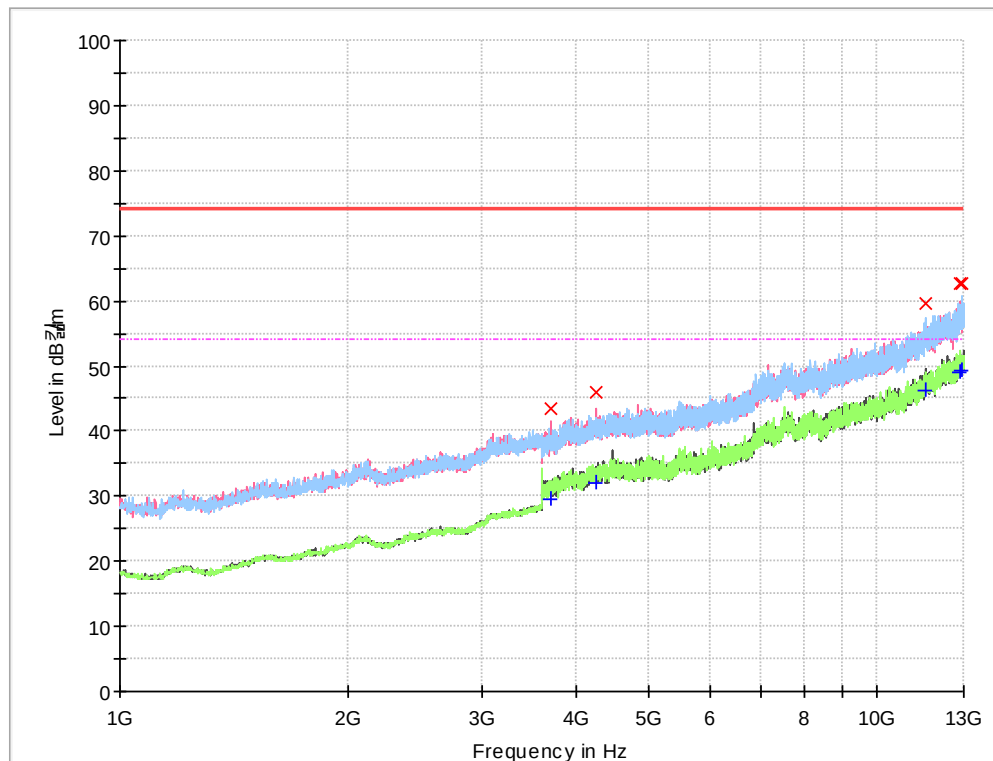
Above 1 GHz (3 m method)

[FCC Part 15 Subpart B]



[ICES-003 Issue 7: 2020]

Charging + Idle mode



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time(ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
3 703.600	43.46	---	74.00	30.54	15 000.0	1 000.000	100.0	V	0.0	-0.1
3 703.600	---	29.63	54.00	24.37	15 000.0	1 000.000	100.0	V	0.0	-0.1
4 250.800	---	32.12	54.00	21.88	15 000.0	1 000.000	100.0	V	336.0	2.8
4 250.800	45.85	---	74.00	28.15	15 000.0	1 000.000	100.0	V	336.0	2.8
11 557.600	59.51	---	74.00	14.49	15 000.0	1 000.000	100.0	H	164.0	17.3
11 557.600	---	46.21	54.00	7.79	15 000.0	1 000.000	100.0	H	164.0	17.3
12 834.400	---	49.13	54.00	4.87	15 000.0	1 000.000	100.0	V	242.0	20.1
12 834.400	62.77	---	74.00	11.23	15 000.0	1 000.000	100.0	V	242.0	20.1
12 962.800	---	49.20	54.00	4.80	15 000.0	1 000.000	100.0	H	17.0	20.4
12 962.800	62.71	---	74.00	11.29	15 000.0	1 000.000	100.0	H	17.0	20.4

Measurement Uncertainty : See Appendix A

Note : • AF = Antenna Factor

• POL H = Horizontal

• H = Height

• Corr. = AF + CL – AMP

** The value of 'Level' includes 'Corr.'.

• CL = Cable Loss

• POL V = Vertical

• Margin = Limit – Result

• AMP = Amplifier Gain

• A = Angle

Ex) In case

Freq ; 100 Mhz, level ; 30 dB(μV/m), AF ; 10 dB/m, CL ; 4 dB, Amp ; 25 dB

Result = Level + AF + CL – Amp

= 30 + 10 + 4 - 25

= 19

Margin = Limit – Result

= 43.5 – 19

= 24.5

Appendix A : Measurement Uncertainty

- Giheung Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	3.7 dB (The confidential level is 95 %, k=2)
		ESH2-Z5	3.2 dB (The confidential level is 95 %, k=2)
		ESH3-Z6	3.2 dB (The confidential level is 95 %, k=2)
		NNLK8129	3.1 dB (The confidential level is 95 %, k=2)
Conducted Emission - Signal		ISN T800	5.4 dB (The confidential level is 95 %, k=2)
		ISN ST08	6.6 dB (The confidential level is 95 %, k=2)
Discontinuous		2.7 dB (The confidential level is 95 %, k=2)	
Radiated Emission	9 kHz ~30 MHz	Horizontal	3.3 dB (The confidential level is 95 %, k=2)
		Vertical	3.3 dB (The confidential level is 95 %, k=2)
	30 MHz ~ 1 000 MHz	Horizontal	4.3 dB (The confidential level is 95 %, k=2)
		Vertical	4.6 dB (The confidential level is 95 %, k=2)
	1 GHz ~ 18 GHz	Horizontal	3.9 dB (The confidential level is 95 %, k=2)
		Vertical	4.0 dB (The confidential level is 95 %, k=2)

- Gunpo Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	4.0 dB (The confidential level is 95 %, k=2)
		ESH2-Z5	3.6 dB (The confidential level is 95 %, k=2)
		ESH3-Z6	3.8 dB (The confidential level is 95 %, k=2)
Conducted Emission - Signal		ISN T800	5.8 dB (The confidential level is 95 %, k=2)
		ISNT8-Cat6	5.8 dB (The confidential level is 95 %, k=2)
		ISN S751	7.5 dB (The confidential level is 95 %, k=2)
Disturbance Voltage at Antenna Terminal		2.9 dB (The confidential level is 95 %, k=2)	
Radiated Emission	9 kHz ~30 MHz	Horizontal	3.4 dB (The confidential level is 95 %, k=2)
		Vertical	3.4 dB (The confidential level is 95 %, k=2)
	30 MHz ~ 1 000 MHz	Horizontal	4.5 dB (The confidential level is 95 %, k=2)
		Vertical	5.1 dB (The confidential level is 95 %, k=2)
	1 GHz ~ 18 GHz	Horizontal	3.7 dB (The confidential level is 95 %, k=2)
		Vertical	3.9 dB (The confidential level is 95 %, k=2)

- Dongtan Laboratory

Test Method		Measurement Uncertainty	
Conducted Emission	ENV216	3.4 dB (The confidential level is 95 %, k=2)	
	ESH2-Z5	3.1 dB (The confidential level is 95 %, k=2)	
	ESH3-Z6	3.1 dB (The confidential level is 95 %, k=2)	
	NNLK8129	3.1 dB (The confidential level is 95 %, k=2)	
Conducted Emission - Signal	ISN T800	5.4 dB (The confidential level is 95 %, k=2)	
	ISN ST08	5.4 dB (The confidential level is 95 %, k=2)	
	ISN S751	5.6 dB (The confidential level is 95 %, k=2)	
Discontinuous		3.1 dB (The confidential level is 95 %, k=2)	
disturbance Power		3.0 dB (The confidential level is 95 %, k=2)	
Radiated Emission	9 kHz ~30 MHz (Triple Loop Ant)	2.7 dB (The confidential level is 95 %, k=2)	
	9 kHz ~30 MHz	Horizontal	3.3 dB (The confidential level is 95 %, k=2)
		Vertical	3.3 dB (The confidential level is 95 %, k=2)
	30 MHz ~ 1 000 MHz	Horizontal	4.7 dB (The confidential level is 95 %, k=2)
		Vertical	4.7 dB (The confidential level is 95 %, k=2)
	1 GHz ~ 18 GHz	Horizontal	4.0 dB (The confidential level is 95 %, k=2)
		Vertical	4.0 dB (The confidential level is 95 %, k=2)

- End of Test Report -