

TEST REPORT

Job No. : GPWE2405000073EC
Test Report No. : F690501-RF-EMC002661
Applicant : NEUROSENCE CO., LTD.
Product Name : Accel Audio BT Sensor
Model Name : NVS-100
Standards : FCC Part 15 Subpart B
FCC ID : 2BF76-NVS100
Date of Receipt : April 30, 2024
Date of Test : July 22, 2024 ~ August 1, 2024
Date of Issue : August 29, 2024
Test Result : Complied

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

Affirmation Tested by (Name, signature) Approved by (Name, signature)
Luther Choi  Julia Choi 

SGS Korea Co., Ltd. Gunpo Laboratory

4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 15807, KOREA

Remarks :

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

Contents

1. Test Laboratory.....	4
1.1 General information.....	4
2. General Information of E.U.T.	5
2.1 Applicant Information	5
2.2 General Information of E.U.T.	5
2.3 Configurations of E.U.T	5
3. E.U.T. Operation and Test Configuration	6
3.1 Peripheral Equipments.....	6
3.2 Cable List.....	6
3.3 Operating Modes and Conditions	6
3.4 Test System Layout	6
3.5 Modifications to the test items during testing	6
4. Test Results.....	7
4.1 Summary	7
4.2 Note	7
5. Emission Test	8
5.1 Test Method and Limits	8
5.2 Test Limits.....	8
5.3 Conducted Emission	9
5.3.1 Test Equipments.....	9
5.3.2 Environment Conditions.....	9
5.3.3 Test Results.....	10
5.4 Radiated Emission	12
5.4.1 Test Equipments.....	12
5.4.2 Environment Conditions.....	12
5.4.3 Test Result	13
Appendix A: Measurement Uncertainty	16



Revision History

Revision	Report Number	Description
0	F690501-RF-EMC002661	Initial

1. Test Laboratory

1.1 General information

Name	SGS Korea Co., Ltd.		
- Branch Site	4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Republic of Korea		
	Tel. 82 31 428 5700		Fax. 82 31 427 5370
- Branch Site-3	35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea		
	Tel. 82 31 548 0710		Fax. 82 31 548 0719
- Branch Site-4	12, Dongtansandan 10-gil, Hwaseong-si, Gyeonggi-do, 18487, Republic of Korea		
	Tel. 82 31 8007 5302		Fax. 82 31 427 2370
Website	http://www.sgsgroup.kr/ee		

SGS Korea Co., Ltd. has been accredited by the agencies listed in the following table;

Accreditation	Accreditation bodies	Accreditation No.
KC	MSIT- RRA	KR0150
FCC	FCC (MRA)	
IC	IC (MRA)	
Vietnam-MIC	Vietnam-MIC	
Japan EMI	VCCI	C-14102, T-11156, R-13662, G-20037
KOLAS	KATS - KOLAS	Testing No.123
CBTL	IECEE	TL 146
SDPPI	SDPPI	-

2. General Information of E.U.T.

2.1 Applicant Information

Applicant	NEUROSENCE CO., LTD.
Applicant Address	Room 1014, A, Gwangmyeong G-tower, 190, Soha-ro, Gwangmyeong-si, Gyeonggi-do, Republic of Korea
Manufacturer	NEUROSENCE CO., LTD.
Manufacturer Address	Room 1014, A, Gwangmyeong G-tower, 190, Soha-ro, Gwangmyeong-si, Gyeonggi-do, Republic of Korea
Factory	JINYOUNG ELECTRO-MECHANICS CO., LTD.
Factory Address	46-47, Sandan-2-gil, Jinbuk-myeon, Masanhappo-gu, Changwon-si, Gyeongsangnam-do, Republic of Korea

2.2 General Information of E.U.T.

Classification	Description
Product Name	Accel Audio BT Sensor
Model Name	NVS-100
Alt. Model Name	-
Model Differences	-
Serial No.	-
EMI Classification	Class A
Internal Clock Frequency	480 MHz (Wireless Frequency : 2.4 GHz)
Rated Power	DC 3.7 V (Battery), DC 5.0 V (USB)
Tested Power	120 V~, 60 Hz
H/W Version	v7.0
S/W Version	n1.3.0-s1.8.0
Port	USB C-Type (2 EA)
Components	EUT, Accel Audio Sensor(NVS-150), USB Cable
Function	Vibration and noise measurement equipment for a vehicle.

2.3 Configurations of E.U.T

Description	Model	Serial No.	Manufacturer	Note
Accel Audio Sensor	NVS-150	-	NEUROSENCE CO., LTD.	-
Battery	TW502540	-	SHENZHEN TAIWOO BATTERY CO.,LTD	-
Main Board	NVSS-100-V7.0	-	-	-

3. E.U.T. Operation and Test Configuration

3.1 Peripheral Equipments

Description	Model	Serial No.	Manufacturer	Note.
Notebook Computer	NT740U5L	-	Samsung Electronics Co., Ltd.	-

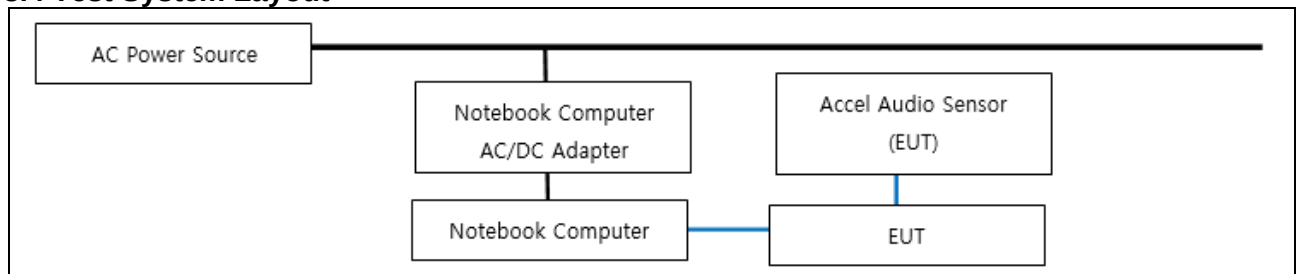
3.2 Cable List

Start		END		Cable Spec.		Used core
Name	I/O Port	Name	I/O Port	Length (m)	Shield	
EUT	USB C-Type	Accel Audio Sensor (EUT)	USB C-Type	3.0	Unshielded	No
	USB C-Type	Notebook Computer	USB	1.5	Unshielded	2 EA

3.3 Operating Modes and Conditions

Operating mode	Operating condition
01 USB data transmission	The status that measured data transmitted to the notebook computer and charged at the same time.

3.4 Test System Layout



3.5 Modifications to the test items during testing

- ☒ No modifications done during testing
- ☐ Modification done during testing (see details below)

No.	Description of modification (if any)
1	
2	

4. Test Results

4.1 Summary

Test Items	Standards	Test Results
Conducted Emission	FCC Part 15 Subpart B Section 15.107 ANSI C63.4a:2017	Complied
Radiated Emission	FCC Part 15 Subpart B Section 15.109 ANSI C63.4a:2017	Complied

4.2 Note

- 1 Test Methods of all test items are performed according to the basic standard in subclause 4.1.
- 2

Emission Test

5.1 Test Method and Limits

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 or 3 m
	Above 1 GHz	1 MHz	3 m

5.2 Test Limits

Frequency Range	Limits(dBμV)		Class
	Quasi-peak	CISPR-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 ^{Note1}	56 to 46 ^{Note1}	Class B
0.5 MHz - 5 MHz	56	46	
5 MHz - 30 MHz	60	50	

[Table 2.1 Conducted Emission Limits]

Frequency Range	Limits(dBμV/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	

[Table 2.2 Radiated Emission Limits below 1 GHz]

Frequency Range	Limits(dBμV)		Class
	Quasi-peak	CISPR-Average	
Above 1 GHz	79.5	59.5	Class A
	74.0	54.0	Class B

[Table 2.3 Radiated Emission Limits Above 1 GHz ^{Note2}]

Note 1. The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of that frequency.

Note 2. 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.

5.3 Conducted Emission

5.3.1 Test Equipments

Description	Model No.	Manufacturer	Serial No	Cal Due. Date
EMI TEST RECEIVER	ESU8	R&S	100128	2025-05-28
2-LINE V-NETWORK	ENV216	R&S	101180	2024-08-04
PULSE LIMITER	ESH3-Z2	R&S	100283	2024-08-28
RF Cable	EMH-1Lab-CE-01	-	-	2025-01-05

Note. Measuring software is below

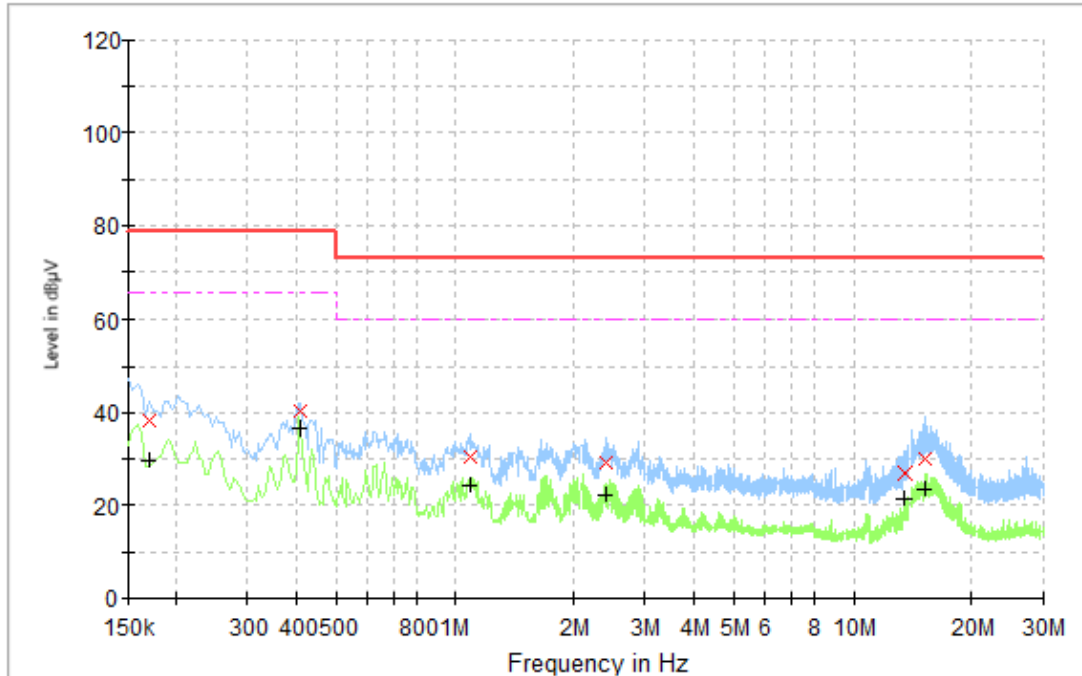
- Branch Site : EMC32(V10.60.20) from R&S
- Branch Site-3 : EMC32(V10.40.10) from R&S
- Branch Site-4 : EMC32(V10.40.00) from R&S

5.3.2 Environment Conditions

Test Site	Shield Room in Branch site-3
Temperature	(Minimum 21.5, Maximum 21.9) °C
Humidity	(Minimum 33.0, Maximum 36.0) % R.H.
Atmospheric Pressure	(Minimum 100.5, Maximum 100.5) kPa
Test Date	2024-08-01

5.3.3 Test Results

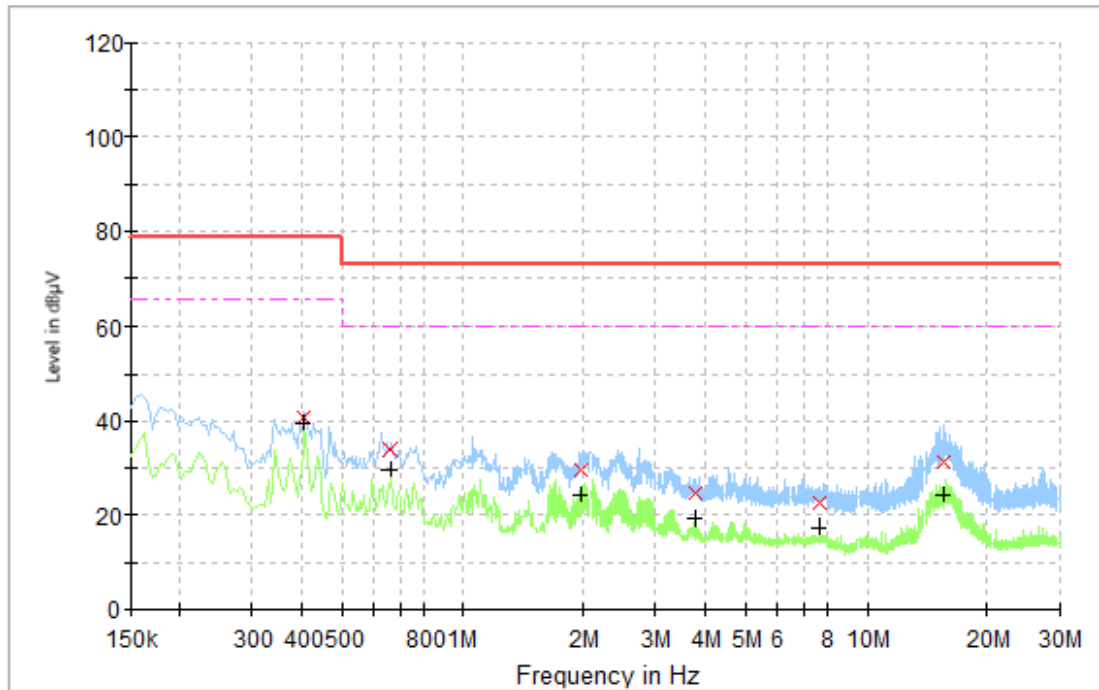
Live Line_01 Mode



Final Result

Frequency (kHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ns)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.170	---	29.50	66.00	36.50	15 000.0	9.000	L1	ON	19.8
0.170	38.31	---	79.00	40.69	15 000.0	9.000	L1	ON	19.8
0.410	---	36.22	66.00	29.78	15 000.0	9.000	L1	ON	19.7
0.410	40.18	---	79.00	38.82	15 000.0	9.000	L1	ON	19.7
1.094	---	24.27	60.00	35.73	15 000.0	9.000	L1	ON	19.6
1.094	30.47	---	73.00	42.53	15 000.0	9.000	L1	ON	19.6
2.402	---	22.26	60.00	37.74	15 000.0	9.000	L1	ON	19.6
2.402	29.18	---	73.00	43.82	15 000.0	9.000	L1	ON	19.6
13.562	---	21.31	60.00	38.69	15 000.0	9.000	L1	ON	19.8
13.562	26.87	---	73.00	46.13	15 000.0	9.000	L1	ON	19.8
15.082	---	23.44	60.00	36.56	15 000.0	9.000	L1	ON	19.9
15.082	30.04	---	73.00	42.96	15 000.0	9.000	L1	ON	19.9

Neutral Line_01 Mode



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.408	---	39.44	66.00	26.56	15 000.0	9.000	N	ON	19.7
0.408	40.89	---	79.00	38.11	15 000.0	9.000	N	ON	19.7
0.662	---	29.47	60.00	30.53	15 000.0	9.000	N	ON	19.7
0.662	33.58	---	73.00	39.42	15 000.0	9.000	N	ON	19.7
1.978	---	24.23	60.00	35.77	15 000.0	9.000	N	ON	19.8
1.978	29.67	---	73.00	43.33	15 000.0	9.000	N	ON	19.8
3.782	---	19.21	60.00	40.79	15 000.0	9.000	N	ON	19.7
3.782	24.81	---	73.00	48.19	15 000.0	9.000	N	ON	19.7
7.650	---	17.15	60.00	42.85	15 000.0	9.000	N	ON	19.8
7.650	22.74	---	73.00	50.26	15 000.0	9.000	N	ON	19.8
15.482	---	24.24	60.00	35.76	15 000.0	9.000	N	ON	19.9
15.482	31.03	---	73.00	41.97	15 000.0	9.000	N	ON	19.9

Note. Measurement Uncertainty : See Appendix A

- Line (L1) : Live Line of AC Power
- Margin = Limit – Quasi Peak or CAverage

- Line (N) : Neutral Line of AC Power
- 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

5.4 Radiated Emission

5.4.1 Test Equipments

Equipment	Model	Manufacturer	Serial No	Cal Due. Date
EMI TEST RECEIVER	ESU40	R&S	100075	2025-01-17
TRILOG BROADBAND ANTENNA	VULB 9163	SCHWARZBECK	01126	2025-02-26
Double Ridged Horn Antenna	HF907	R&S	100208	2025-03-04
PREAMPLIFIER	AM-1431	MITEQ	1336160	2025-05-31
AMPLIFIER	SCU 18	R&S	10070	2024-08-23
RF Cable (Below 1 GHz)	EMH-1Lab-RE-01	-	-	2024-07-05
RF Cable (Below 1 GHz)	EMH-1Lab-RE-04	-	-	2024-07-05
RF Cable (Above 1 GHz)	EMH-1Lab-RE-05	-	-	2025-01-05
RF Cable (Below 1 GHz, Above 1 GHz)	EMH-1Lab-RE-06	-	-	2025-01-05

Note. Measuring software is below

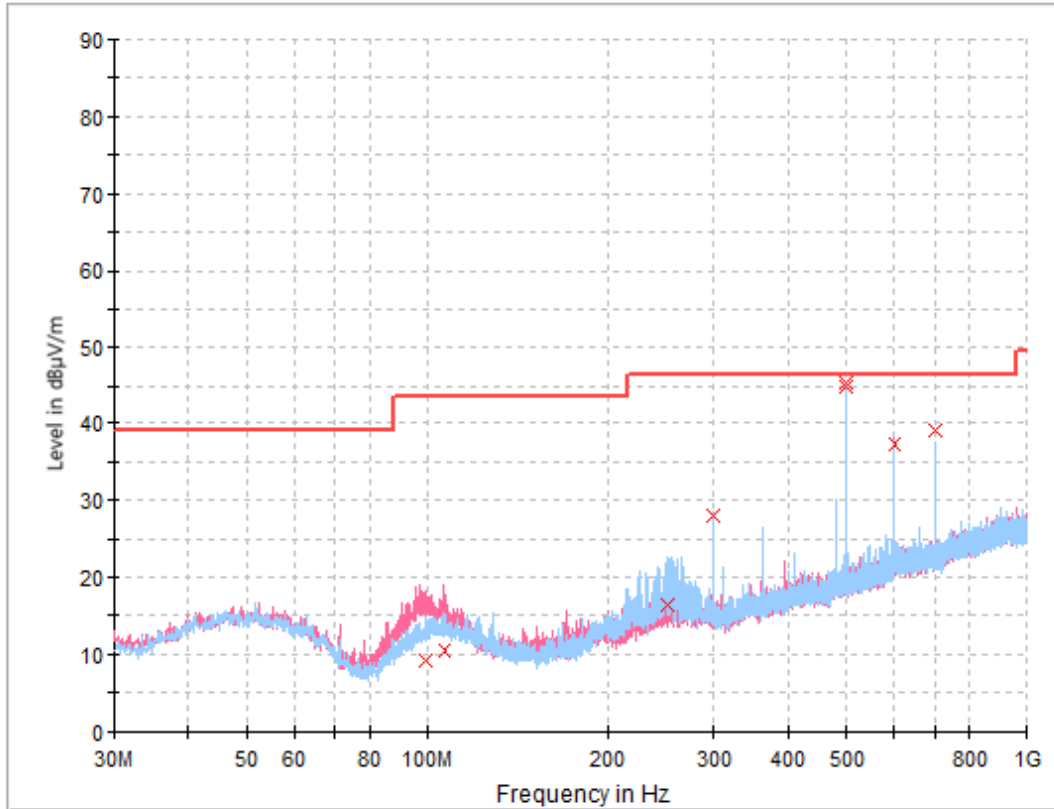
- Branch Site : ELECTRA(V5.02.0) from R&S
- Branch Site-3 : EMC32(V10.40.10) from R&S
- Branch Site-4 : EMC32(V10.40.10) from R&S

5.4.2 Environment Conditions

Test Site	10 m SEMI-ANECHOIC CHAMBER in Branch site-3
Temperature	(Minimum 21.1, Maximum 21.4) °C
Humidity	(Minimum 34.0, Maximum 38.0) % R.H.
Atmospheric Pressure	(Minimum 101.0, Maximum 101.0) kPa
Test Date	2024-07-22 (for Below 1 GHz) 2024-07-31 (for Above 1 GHz)

5.4.3 Test Result

01 Mode



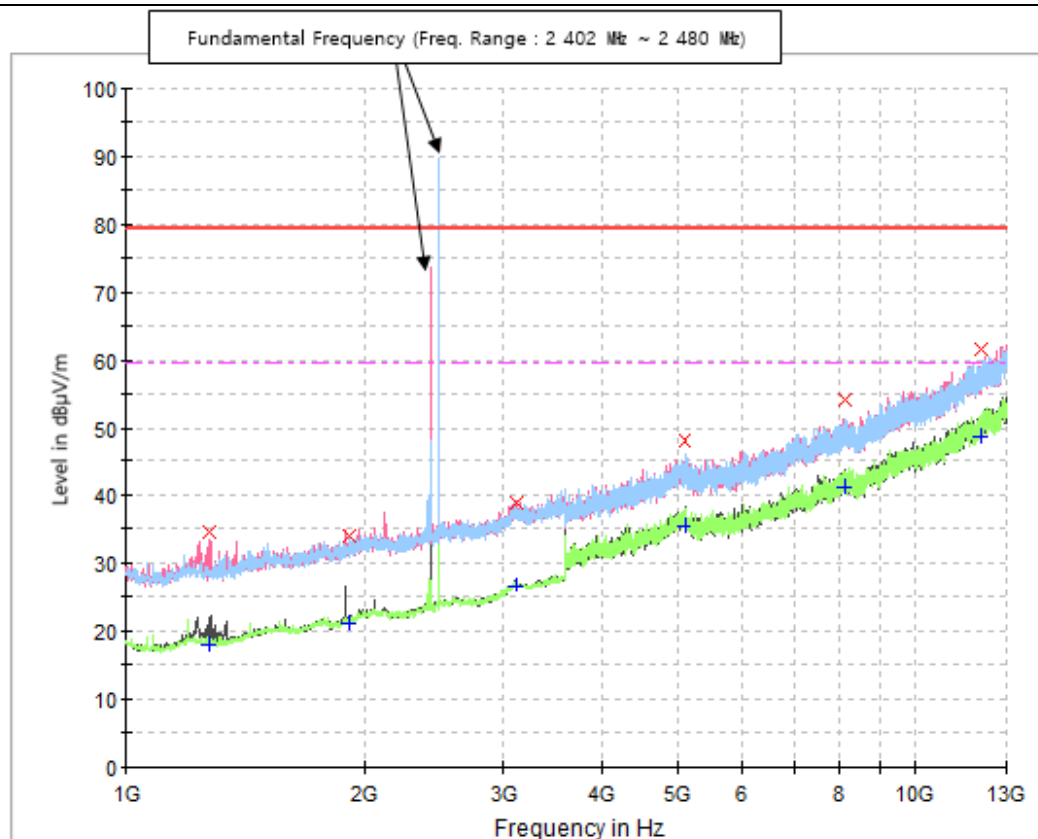
Final Result

Frequency (kHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
99.030	9.37	43.52	34.15	15 000.0	120.000	292.0	V	275.0	-19.3
106.870	10.42	43.52	33.10	15 000.0	120.000	250.0	V	15.0	-19.3
251.011	16.56	46.50	29.94	15 000.0	120.000	295.0	H	241.0	-17.9
299.991	28.16	46.50	18.34	15 000.0	120.000	400.0	H	191.0	-17.2
499.982	44.89	46.50	1.61	15 000.0	120.000	183.0	H	293.0	-12.4
500.005	45.40	46.50	1.10	15 000.0	120.000	184.0	H	295.0	-12.4
599.972	37.45	46.50	9.05	15 000.0	120.000	294.0	V	138.0	-9.7
699.996	39.14	46.50	7.36	15 000.0	120.000	124.0	H	124.0	-9.2

Note. Measurement Uncertainty: See Appendix A

- POL H = Horizontal
- POL V = Vertical
- Margin = Limit – Quasi Peak
- Corr. = Antenna Factor + Cable loss – Amplifier Gain

01 Mode



Final Result

Frequency (kHz)	MaxPeak (dBμV/m)	CAverage (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1 271.200	34.53	---	79.50	44.97	15 000.0	1 000.000	100.0	V	28.0	-13.7
1 271.200	---	18.08	59.50	41.44	15 000.0	1 000.000	100.0	V	28.0	-13.7
1 913.200	33.91	---	79.50	45.59	15 000.0	1 000.000	100.0	H	274.0	-8.7
1 913.200	---	21.11	59.50	38.39	15 000.0	1 000.000	100.0	H	274.0	-8.7
3 120.400	39.10	---	79.50	40.40	15 000.0	1 000.000	100.0	V	276.0	-1.7
3 120.400	---	26.65	59.50	32.85	15 000.0	1 000.000	100.0	V	276.0	-1.7
5 094.400	48.21	---	79.50	31.29	15 000.0	1 000.000	100.0	H	54.0	6.6
5 094.400	---	35.27	59.50	24.23	15 000.0	1 000.000	100.0	H	54.0	6.6
8 120.800	54.11	---	79.50	25.39	15 000.0	1 000.000	100.0	H	149.0	12.4
8 120.800	---	41.19	59.50	18.31	15 000.0	1 000.000	100.0	H	149.0	12.4
12 079.600	61.44	---	79.50	18.06	15 000.0	1 000.000	100.0	V	100.0	20.7
12 079.600	---	48.69	59.50	10.81	15 000.0	1 000.000	100.0	V	100.0	20.7

Note. Measurement Uncertainty: See Appendix A

- AF = Antenna Factor
 - POL H = Horizontal
 - H = Height
 - Corr. = AF + CL – AMP
 - CL = Cable Loss
 - POL V = Vertical
 - Margin = Limit – Result
 - AMP = Amplifier Gain
 - A = Angle
- ** The value of 'Level' includes 'Corr.'.

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

Test Method		Measurement Uncertainty
Conducted Emission	ENV216	3.1 dB (The confidential level is 95 %, $k=2$)
	ESH2-Z5	2.8 dB (The confidential level is 95 %, $k=2$)
	ESH3-Z6	3.0 dB (The confidential level is 95 %, $k=2$)
Conducted Emission - Signal	ISN T800	5.3 dB (The confidential level is 95 %, $k=2$)
	ISNT8-Cat6	5.4 dB (The confidential level is 95 %, $k=2$)
	ISN S751	7.1 dB (The confidential level is 95 %, $k=2$)
Disturbance Voltage at Antenna Terminal		2.2 dB (The confidential level is 95 %, $k=2$)
Radiated Emission	9 kHz - 30 MHz	Horizontal 3.6 dB (The confidential level is 95 %, $k=2$)
		Vertical 3.6 dB (The confidential level is 95 %, $k=2$)
	30 MHz - 1 000 MHz	Horizontal 4.6 dB (The confidential level is 95 %, $k=2$)
		Vertical 4.9 dB (The confidential level is 95 %, $k=2$)
	1 GHz - 18 GHz	Horizontal 3.9 dB (The confidential level is 95 %, $k=2$)
		Vertical 3.8 dB (The confidential level is 95 %, $k=2$)

Table A.1 Measurement Uncertainty of Branch Site

Test Method		Measurement Uncertainty	
Conducted Emission		ENV216	3.2 dB (The confidential level is 95 %, $k=2$)
		ESH3-Z6	3.2 dB (The confidential level is 95 %, $k=2$)
		ESH2-Z5	3.0 dB (The confidential level is 95 %, $k=2$)
		NNLK8129	3.0 dB (The confidential level is 95 %, $k=2$)
Conducted Emission - Signal		ISN T800	5.5 dB (The confidential level is 95 %, $k=2$)
		ISN ST08	6.6 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 %, $k=2$)

Table A.2 Measurement Uncertainty of Branch Site-3

Test Method		Measurement Uncertainty	
Conducted Emission	ENV216	3.5 dB	(The confidential level is 95 %, $k=2$)
	ESH2-Z5	3.3 dB	(The confidential level is 95 %, $k=2$)
	ESH3-Z6	3.3 dB	(The confidential level is 95 %, $k=2$)
	NNLK8129	3.4 dB	(The confidential level is 95 %, $k=2$)
Conducted Emission - Signal	ISN T800	5.6 dB	(The confidential level is 95 %, $k=2$)
	ISN ST08	5.5 dB	(The confidential level is 95 %, $k=2$)
Radiated Emission	9 kHz - 30 MHz (Triple Loop Ant.)	3.7 dB	(The confidential level is 95 %, $k=2$)
	9 kHz - 30 MHz (Loop Ant.)	Horizontal	4.2 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.2 dB (The confidential level is 95 %, $k=2$)
	30 MHz - 1 000 MHz	Horizontal	4.8 dB (The confidential level is 95 %, $k=2$)
		Vertical	5.2 dB (The confidential level is 95 %, $k=2$)
	1 GHz - 18 GHz	Horizontal	4.5 dB (The confidential level is 95 %, $k=2$)
		Vertical	4.5 dB (The confidential level is 95 %, $k=2$)

Table A.3 Measurement Uncertainty of Branch Site-4

- End of Test Report -