



47 CFR Part 15 Subpart B Electromagnetic Compatibility Test Report

For

Notebook computer

ORDER NO.: BVCO-WAY-P21070008

REPORT NO.: FCCBVCO-WAY-P21070008-1R2

ISSUED DATE: 31 August, 2021

MODEL NO.: NP935QDC

Samsung Electronics Co., Ltd.

129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16667, Korea



Certificate #4068.03

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Test Report Details

Test Report No. FCCBVCO-WAY-P21070008-1R2

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: Samsung Electronics Co., Ltd.

Applicant address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16667,
Korea

Manufacturer: Samsung Electronics Co., Ltd.

Manufacturer address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16667,
Korea

Product Type: Notebook computer

Model Number: NP935QDC

Multi-listing model number: -

FCC Classification: Part 15 Class B Computing Device/Personal Computer (JBC)
Part 15 Class B Computing Device Peripheral (JBP)

Equipment authorization: Supplier's Declaration of Conformity

Product standards: 47 CFR Part 15 Subpart B / ANSI C63.4: 2014

Sample Serial Number: 1J9E91ZR600044T

Sample Receive Date: 05 July, 2021

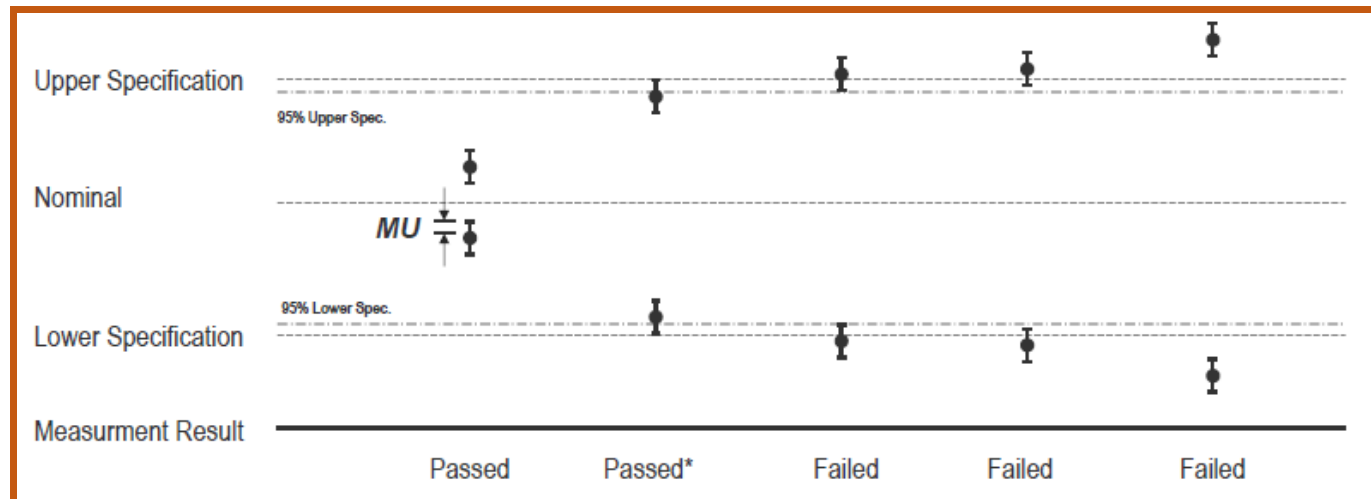
Testing Start Date: 07 July, 2021

Date Testing Complete: 13 July, 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

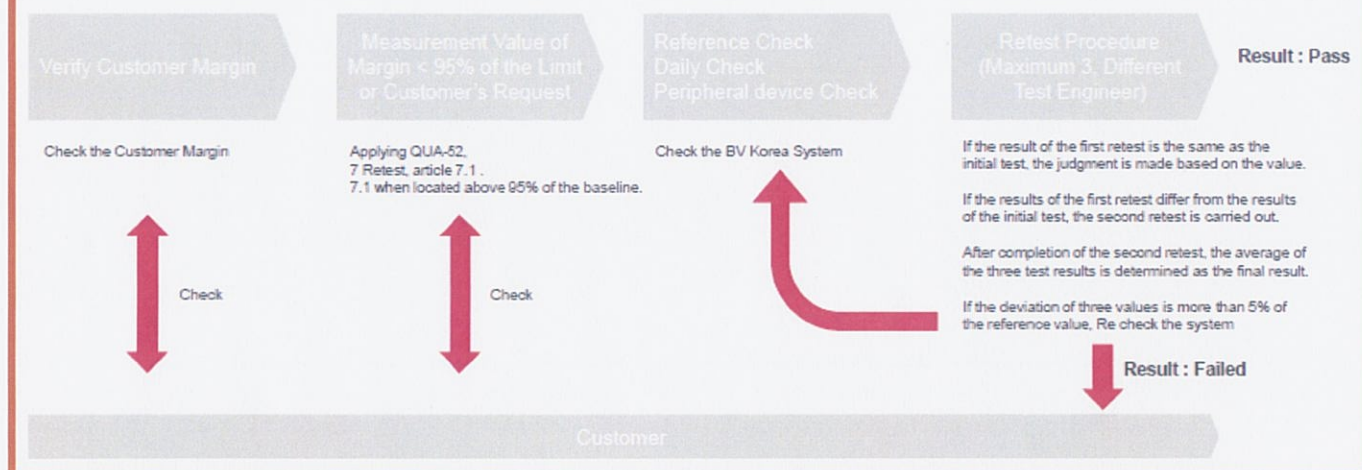
Test Item	Measurement uncertainty
Conducted RF emission (150 kHz to 30 MHz) - AMN	2.46 dB
Radiated RF emission (30 MHz to 1 000 MHz)	4.00 dB
Radiated RF emission (1 GHz to 6 GHz)	6.54 dB
Radiated RF emission (6 GHz to 18 GHz)	5.94 dB
Radiated RF emission (18 GHz to 26.5 GHz)	5.16 dB
Radiated RF emission (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
FCCBVCO-WAY-P210 70008-1	Original release	10 August, 2021
FCCBVCO-WAY-P210 70008-1R1	Overall Modification	27 August, 2021
FCCBVCO-WAY-P210 70008-1R2	Added FCC Classification (JBP) as C2PC target is module.	31 August, 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 :

Taejoo Kim / Senior Engineer

, DATE : 31 August, 2021

APPROVED BY :

Rina Bae / Technical Manager

, DATE : 31 August, 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 type="checkbox"/> Class A / <input checked="" type="checkbox"/> Class B		
Conducted RF Emissions	47 CFR Part 15 Subpart B ANSI C63.4: 2014	Pass	Complied
Radiated RF Emissions (Below 1 GHz)		Pass	Complied
Radiated RF Emissions (Above 1 GHz)		Pass	Complied
We tested the Notebook computer, Model: NP935QDC, 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.			

2. General Product Description

2.1 Equipment Description

Description
<p>The Equipment under Test (EUT) is the Notebook computer.</p> <p>The test data contained in this report pertains only to the emissions due to the digital circuitry of the EUT.</p> <p>(Bluetooth, WLAN, LTE, 5G NR, WCDMA, Camera, Audio, Video, Display(HDMI) and micro SD Card, Disk Drive)</p> <ul style="list-style-type: none"> - Bluetooth 5.2(BDR/EDR/LE)(2400.0-2483.5 MHz) - 802.11b/g/n/ax(2400.0-2483.5 MHz) - 802.11a/n/ac/ax(5150.0-5850.0 MHz) - 802.11a/n/ac/ax(5925.0-7125.0 MHz) - WCDMA Band : 2/4/5 - LTE Band : 2/4/5/7/12/13/14/17/25/29/41/66/71 - 5G NR : 2/5/41/66/71/77

2.2 Technical Data

CPU	Intel, TGL-UP4 i5-1130G7
Main Memory	Samsung, LPDDR4x 8 GB
Graphic Controller	Intel, Shared Internal Memory
Display	Samsung, 13.3" AMOLED display FHD Up to 400nit
Storage	Samsung, NVMe x2 256 / 512 G
WLAN/Bluetooth	Intel, AX210 Wi-Fi 6E
	Intel, AX210 BT 5.1
Battery	SAMSUNG SDI, AA-PBMN4MR, 62.5 Wh Li-ion, Quick Charging
Camera	Kingcome, 720p HD Camera
Input Devices	Keyboard, Touchpad
Ports	TBT4 x1, Type-C x2, uSD, Audio Jack, USIM Slot
H/W Version	REV 1.0
S/W Version	0
Un-licensed Module	Samsung, AX210D2W (FCC ID : A3LAX210D)
Licensed Module	Samsung, SM-H111U (FCC ID : A3LH111U935QDC)

2.3 Detail information of Multi-listing model

No.	Model	Description	Comment
1	-	-	-
*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	Notebook computer	Samsung Electronics Co., Ltd.	NP935QDC	-
EUT	Travel adapter	Samsung Electronics Co., Ltd.	EP-TA865	In box
EUT	DONGLE-USB3.0 C TO A	Samsung Electronics Co., Ltd.	BA96-07506A	In box
EUT	DONGLE-USB3.0 C TO HDMI	Samsung Electronics Co., Ltd.	BA39-01509A	In box
EUT	S-Pen	Samsung Electronics Co., Ltd.	BA98-02871A	In box
AE	LED Monitor	Samsung Electronics Co., Ltd.	LU32J590UQKX KR	-
AE	AC/DC adapter	POWERNET Technologies Corp.	A5919_KPNL	-
AE	IN-EAR HEADPHONES	Samsung Electronics Co., Ltd.	EO-HS1303	-
AE	Micro USIM	-	-	-
AE	Micro SD Card	Samsung Electronics Co., Ltd.	MB-MC64G	-
AE	Mouse	Logitech Inc.	M-U0026	-
SIM	Wide Band Radio Communication Tester	R&S	CMW500	For Conducted Emission

* **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
EUT	USB Type-C(Left)	Travel adapter	USB Type-C (DC Out)	1.8	Shield	-
	Thunderbolt 4	DONGLE-USB 3.0 C TO HDMI	USB Type-C	0.1	Shield	-
	Memory card slot	Micro SD Card	-	-	-	-
	USIM Slot	Micro USIM	-	-	-	-
	USB Type-C(Right)	DONGLE-USB 3.0 C TO A	-	-	-	-
	Audio Jack	IN-EAR HEADPHONES	-	1.2	Unshield	-
	-	S-Pen	-	-	-	-
Travel adapter	AC IN	AC Mains	AC Out	-	-	-
DONGLE-USB 3.0 C TO HDMI	HDMI	LED Monitor	HDMI	2.0	Shield	-
DONGLE-USB 3.0 C TO A	USB Type-A	Mouse	USB Type-A	1.8	Unshield	-
LED Monitor	DC IN	AC/DC adapter	DC Out	1.8	Unshield	-
AC/DC adapter	AC IN	AC Mains	AC Out	-	-	-

3.3 Power Interface:

Rated Voltage	Travel adapter	Input: AC (100-240) V, (50-60) Hz Output: (PDO) DC 5 V, 3 A / DC 9 V, 3 A / DC 15 V, 3 A / DC 20 V, 3.25 A (PPS) DC (5-20) V, 3.25 A
	Notebook computer rating	DC 20 V, 3.25 A, 65 W
Test Voltage		AC 120 V, 60 Hz

3.4 EUT Internal Operating Frequencies

Clock Frequency	CPU : 4.6 GHz Memory : 4 266 MHz Wi-Fi : 7 125 MHz
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3.5 Modes of Description

Mode #	Mode	Description	Comments
Conducted Emission ^{Note4)}			
1	Notebook mode	eUFS(internal storage) & micro SD Card Read/Write/Delete + Display Port(USB C-Type to HDMI) + Camera Preview + Scrolled H-character on video + Digital white noise sound(W/ earphone) + Cellular receiver (LTE B5) + Charging(w/ TA)	-
2	Tablet mode	eUFS(internal storage) & micro SD Card Read/Write/Delete + Display Port(USB C-Type to HDMI) + Camera Preview + Scrolled H-character on video + Digital white noise sound(W/ earphone) + Cellular receiver (LTE B5) + Charging(w/ TA)	-
Radiated Emission ^{Note5)}			
1	Notebook mode	eUFS(internal storage) & micro SD Card Read/Write/Delete + Display Port(USB C-Type to HDMI) + Camera Preview + Scrolled H-character on video + Digital white noise sound(W/ earphone) + Charging(w/ TA)	-
2	Tablet mode	eUFS(internal storage) & micro SD Card Read/Write/Delete + Display Port(USB C-Type to HDMI) + Camera Preview + Scrolled H-character on video + Digital white noise sound(W/ earphone) + Charging(w/ TA)	-

Note1) The connection status of Ancillary Equipment in Notebook mode and Tablet mode is the same.

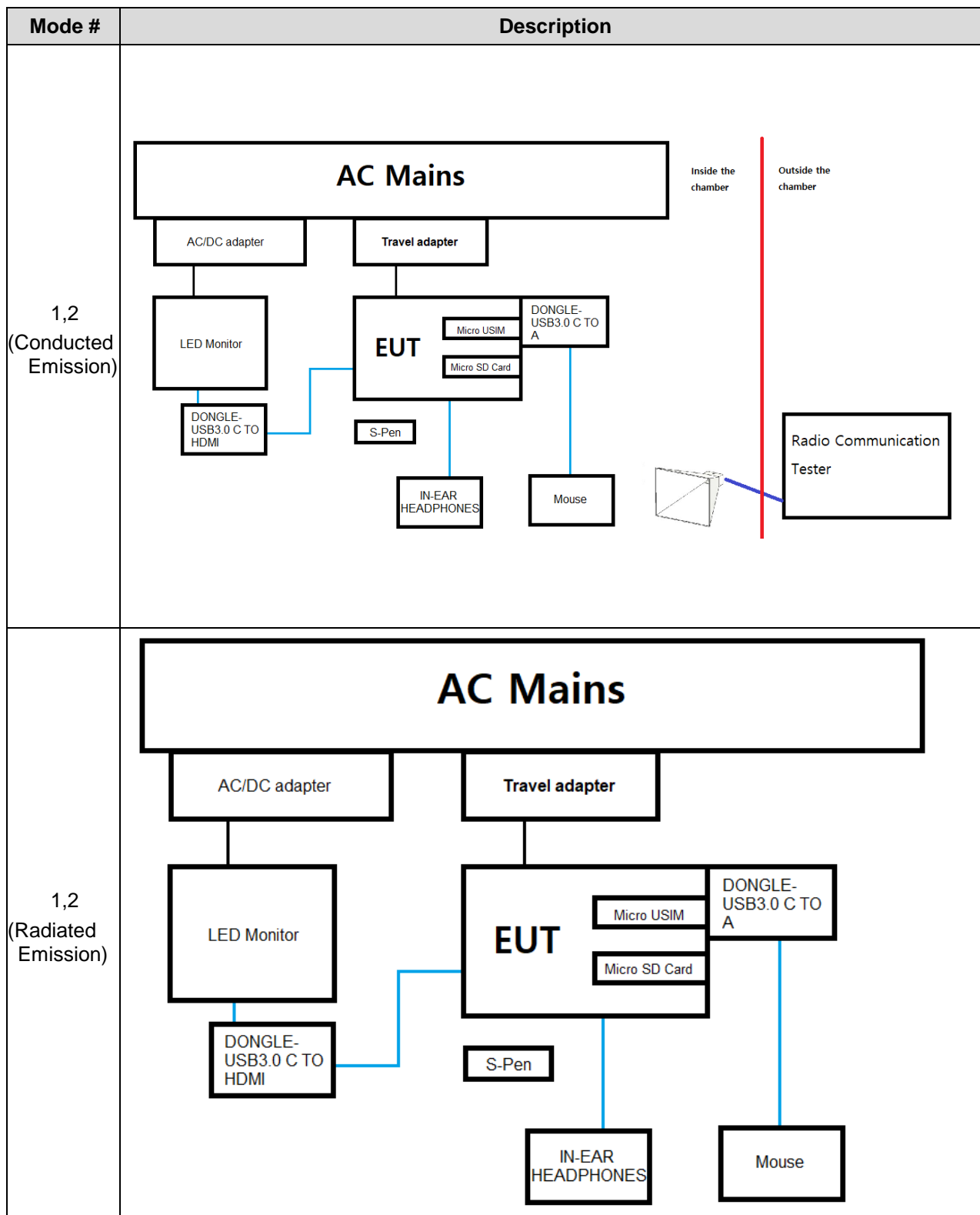
Note2) Test Resolution: 1920 x 1080 @ 60 Hz

Note3) Bluetooth + Wi-Fi Standby

Note4) RX mode testing was performed with the LTE B5 RX test mode at center frequency. All licensed communication RX mode, WCDMA/LTE/5G, test results are not significantly different.

Note5) Compliance with Part 15B requirements for the receiver part of the licensed transmitter (equipment code CXX) is covered by other test report (FCCBVCO-WAY-P21070008-3R1).

3.6 Configuration



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		
Test Date		07 July, 2021		
Parameters recorded during the test		Laboratory Ambient Temperature		(24.5 ± 1.0) °C
		Relative Humidity		(52.1 ± 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 (dBµV)			
	Quasi-Peak	Result	Average	Result
0.15 to 0.5	79	-	66	-
0.5 to 30	73	-	60	-
Limits – AC mains power ports (Class B)				
Frequency (MHz)	Limit (dBµV)			
	Quasi-Peak	Result	Average	Result
0.15 to 0.5	66 to 56	Pass	56 to 46	Pass
0.5 to 5	56	Pass	46	Pass
5 to 30	60	Pass	50	Pass

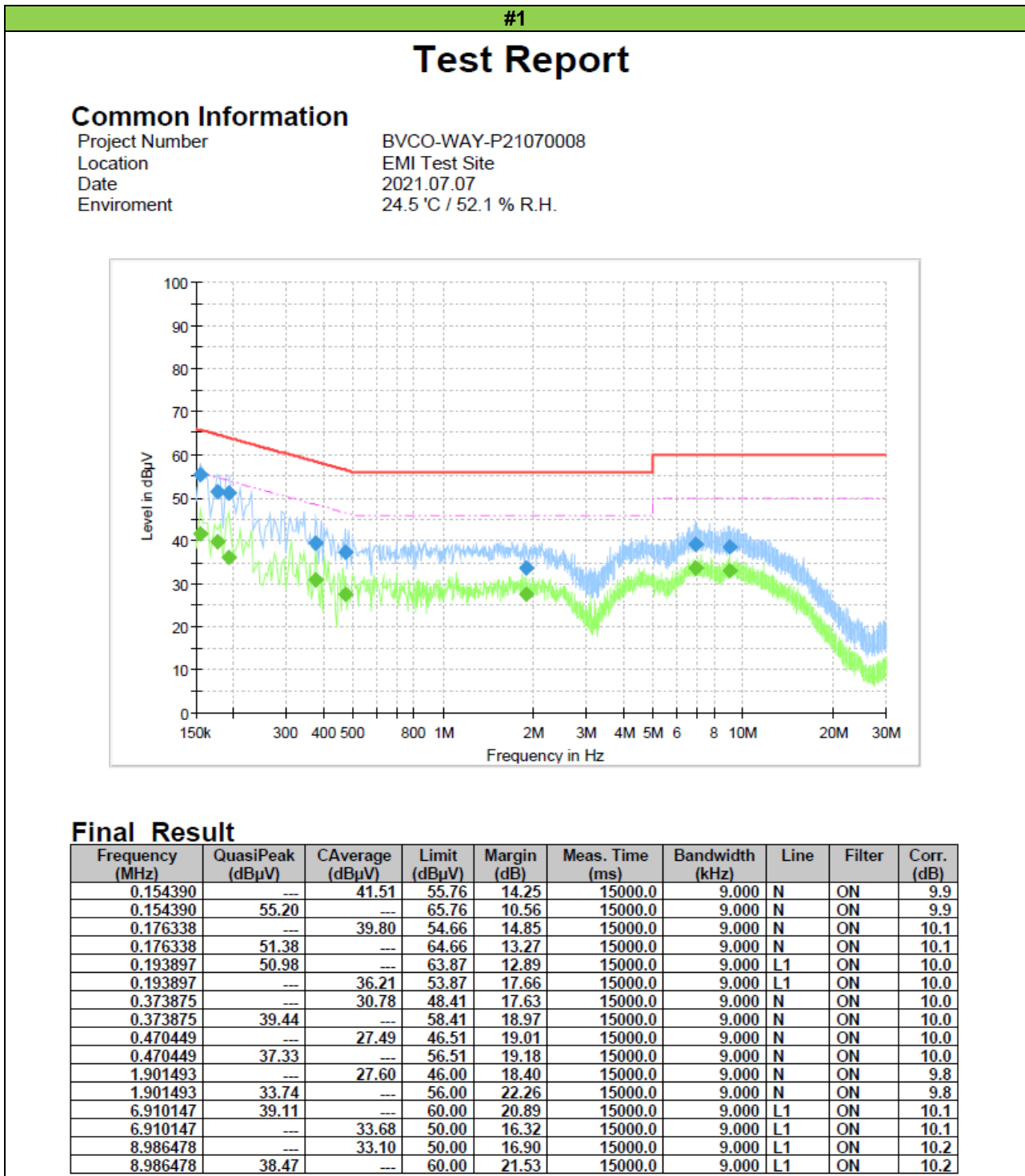
Note1) Formula

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



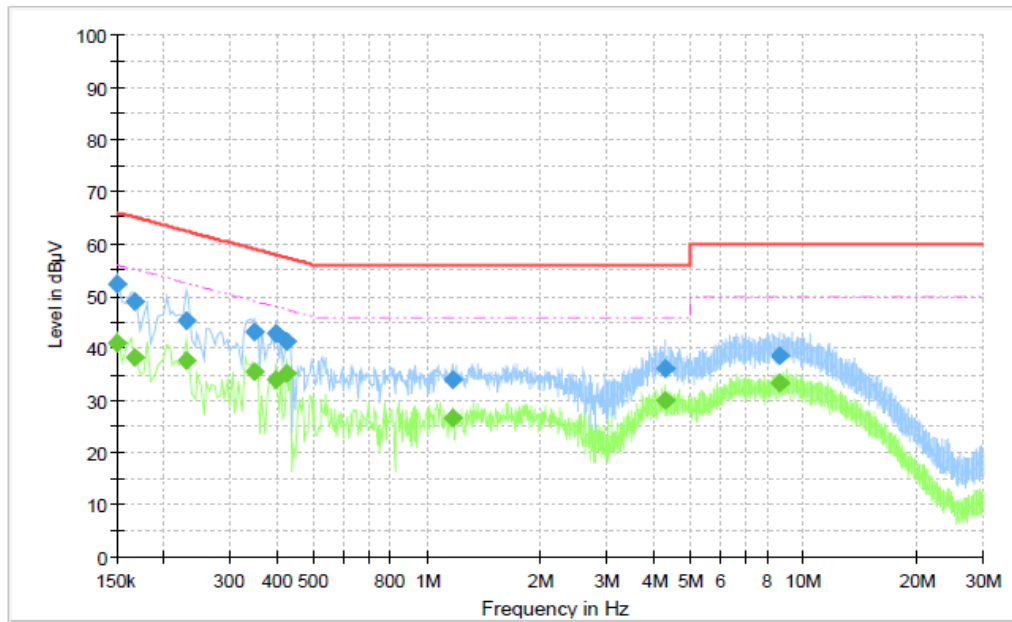
Note1) Two graphs measured for both Line 1(L1) and Neutral (N) of the LISN are combined into one graph.

#2

Test Report

Common Information

Project Number BVCO-WAY-P21070008
Location EMI Test Site
Date 2021.07.07
Environment 24.5 °C / 52.1 % R.H.



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	52.36	---	66.00	13.64	15000.0	9.000	L1	ON	9.8
0.150000	---	40.93	56.00	15.07	15000.0	9.000	L1	ON	9.8
0.167559	48.91	---	65.08	16.17	15000.0	9.000	L1	ON	10.1
0.167559	---	38.11	55.08	16.97	15000.0	9.000	L1	ON	10.1
0.229015	45.13	---	62.49	17.35	15000.0	9.000	N	ON	9.8
0.229015	---	37.56	52.49	14.92	15000.0	9.000	N	ON	9.8
0.347537	43.03	---	59.02	15.99	15000.0	9.000	L1	ON	9.9
0.347537	---	35.33	49.02	13.69	15000.0	9.000	L1	ON	9.9
0.395824	42.80	---	57.94	15.14	15000.0	9.000	N	ON	10.0
0.395824	---	33.84	47.94	14.10	15000.0	9.000	N	ON	10.0
0.422162	---	35.17	47.41	12.24	15000.0	9.000	N	ON	10.0
0.422162	41.43	---	57.41	15.98	15000.0	9.000	N	ON	10.0
1.168412	---	26.67	46.00	19.33	15000.0	9.000	N	ON	9.9
1.168412	34.06	---	56.00	21.94	15000.0	9.000	N	ON	9.9
4.289493	---	29.98	46.00	16.02	15000.0	9.000	L1	ON	9.9
4.289493	35.96	---	56.00	20.04	15000.0	9.000	L1	ON	9.9
8.674809	---	33.20	50.00	16.80	15000.0	9.000	L1	ON	10.2
8.674809	38.66	---	60.00	21.34	15000.0	9.000	L1	ON	10.2

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	12 July, 2021	
Parameters recorded during the test	Laboratory Ambient Temperature	(21.1 ± 1.0) °C
	Relative Humidity	(46.9 ± 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 (dBμV/m)	
	Quasi-Peak	Results
30 to 88	39.0	-
88 to 216	43.5	-
216 to 960	46.4	-
960 to 1000	49.5	-
Limits –Class B (3 m distance)		
Frequency (MHz)	Limit (dBμV/m)	
	Quasi-Peak	Results
30 to 88	40.0	Pass
88 to 216	43.5	Pass
216 to 960	46.0	Pass
960 to 1000	54.0	Pass

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)

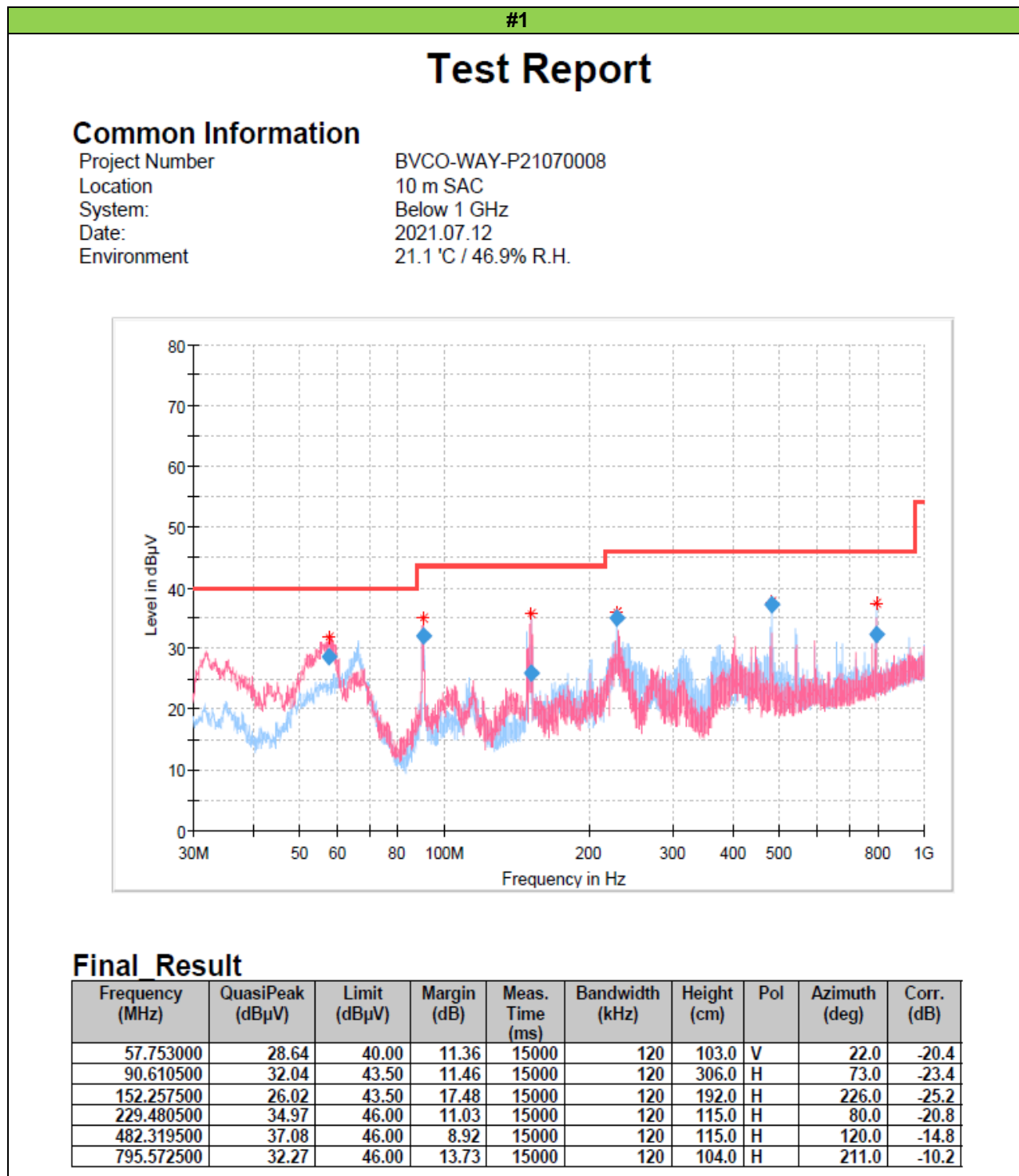
Margin (PK and/or QP and/or CAV) = Limit – Final Value (PK and/or QP and/or CAV)

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



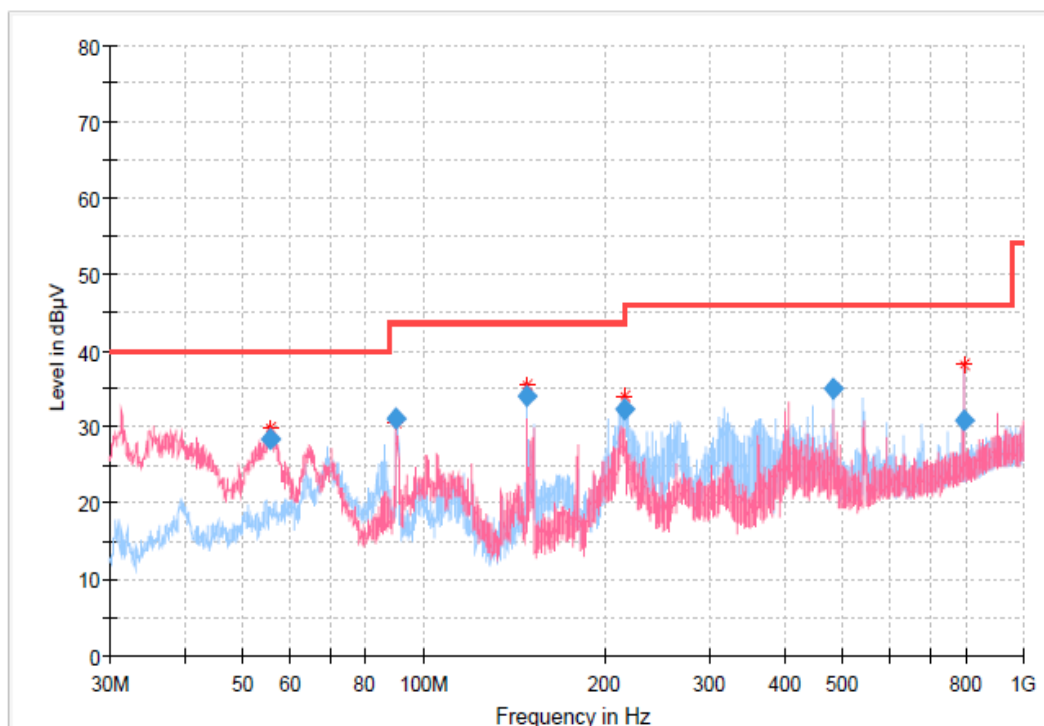
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#2

Test Report

Common Information

Project Number BVCO-WAY-P21070008
Location 10 m SAC
System: Below 1 GHz
Date: 2021.07.12
Environment 21.1 °C / 46.9% R.H.



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
55.450500	28.31	40.00	11.69	15000	120	106.0	V	48.0	-20.2
90.022500	31.17	43.50	12.33	15000	120	288.0	H	83.0	-23.5
148.485500	34.02	43.50	9.48	15000	120	192.0	H	317.0	-25.3
216.262000	32.27	46.00	13.73	15000	120	115.0	H	330.0	-21.4
482.319500	34.95	46.00	11.05	15000	120	215.0	H	114.0	-14.8
795.532500	30.74	46.00	15.26	15000	120	188.0	V	139.0	-10.2

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	12 July, 2021 ~ 13 July, 2021			
Parameters recorded during the test	Laboratory Ambient Temperature	(20.1 ~ 22.5) °C		
	Relative Humidity	(45.9 ~ 48.3) %		
	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 (dBµV/m)			
	Peak	Result	Average	Result
1 to --	80	-	60	-
Limits – Class B				
Frequency (GHz)	Limit (dBµV/m)			
	Peak	Result	Average	Result
1 to 40	74	Pass	54	Pass

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)

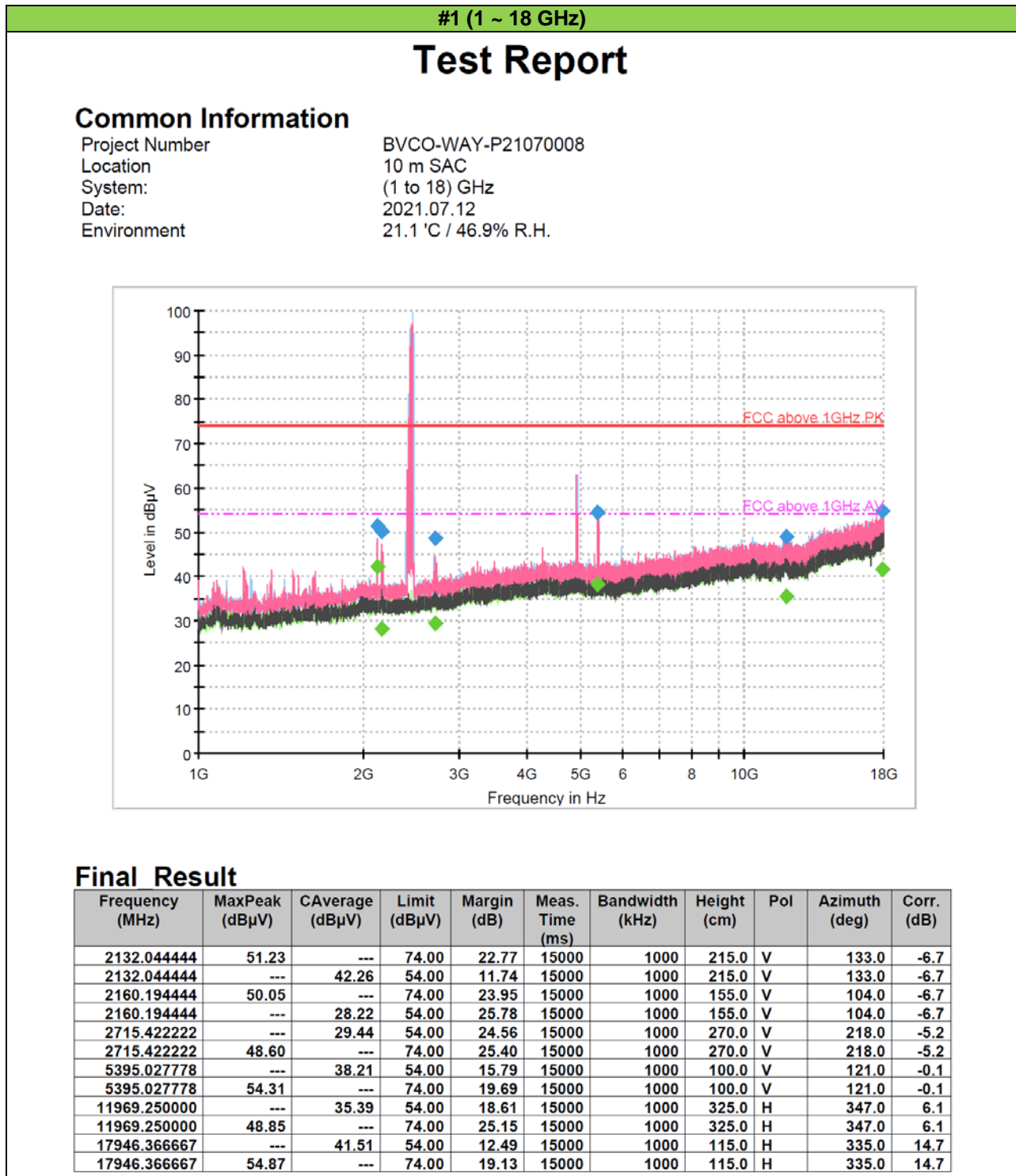
PK = Peak, QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

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

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

Table 3. Test data for radiated RF emissions



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

Note2) Radiated emissions (Tx / Rx frequency) from the transceiver shall be ignored.

-Data transmission in the 2.4 GHz ISM Fundamental band (Bluetooth/Wi-Fi 802.11 b/g/n)

-Data transmission in the 4.8 GHz ISM Harmonic band (Bluetooth/Wi-Fi 802.11 b/g/n)

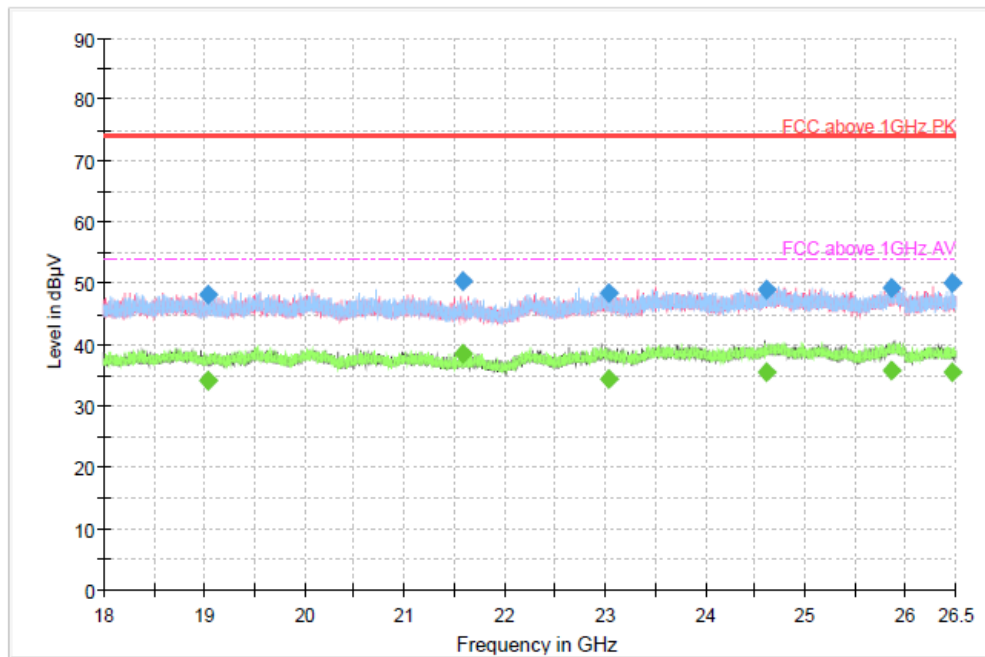
: Operating frequencies (2 400 ~2483.5) MHz

#1 (18 ~ 26.5 GHz)

Test Report

Common Information

Project Number BVCO-WAY-P21070008
Location 10 m SAC
System: (18.0 to 26.5) GHz
Date: 2021.07.13
Environment 21.5 °C / 47.3 % R.H.



Final Result

Frequency (MHz)	MaxPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
19042.666667	---	34.23	54.00	19.77	15000	1000	160.0	V	32.0	3.3
19042.666667	48.18	---	74.00	25.82	15000	1000	160.0	V	32.0	3.3
21584.166667	50.34	---	74.00	23.66	15000	1000	303.0	V	119.0	5.6
21584.166667	---	38.42	54.00	15.58	15000	1000	303.0	V	119.0	5.6
23034.361111	48.39	---	74.00	25.61	15000	1000	350.0	V	88.0	5.5
23034.361111	---	34.45	54.00	19.55	15000	1000	350.0	V	88.0	5.5
24620.555556	---	35.39	54.00	18.61	15000	1000	400.0	V	332.0	4.7
24620.555556	49.05	---	74.00	24.95	15000	1000	400.0	V	332.0	4.7
25862.500000	49.25	---	74.00	24.75	15000	1000	350.0	V	307.0	6.0
25862.500000	---	35.66	54.00	18.34	15000	1000	350.0	V	307.0	6.0
26465.527778	50.03	---	74.00	23.97	15000	1000	99.0	H	-45.0	6.9
26465.527778	---	35.50	54.00	18.50	15000	1000	99.0	H	-45.0	6.9

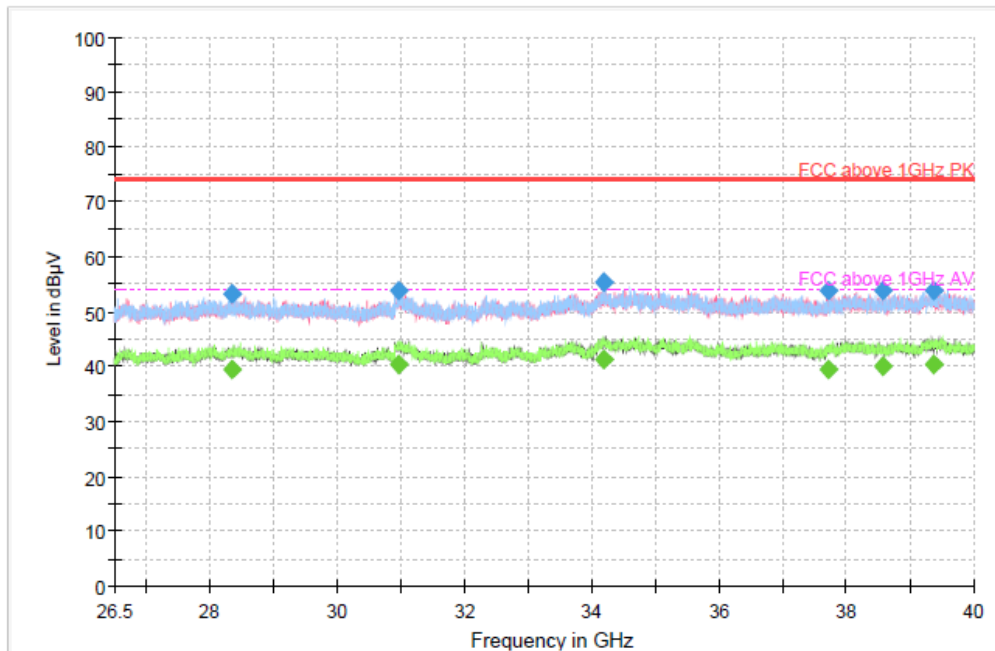
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#1 (26.5 ~ 40 GHz)

Test Report

Common Information

Project Number BVCO-WAY-P21070008
Location 10 m SAC
System: (26.5 to 40.0) GHz
Date: 2021.07.13
Environment 21.5 °C / 47.3 % R.H.



Final Result

Frequency (MHz)	MaxPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azim uth (deg)	Corr. (dB)
28336.600000	---	39.39	54.00	14.61	15000	1000	378.0	V	10.0	13.2
28336.600000	53.17	---	74.00	20.83	15000	1000	378.0	V	10.0	13.2
30953.014286	---	40.28	54.00	13.72	15000	1000	282.0	V	12.0	12.0
30953.014286	53.93	---	74.00	20.07	15000	1000	282.0	V	12.0	12.0
34187.814286	---	41.29	54.00	12.71	15000	1000	313.0	H	316.0	12.9
34187.814286	55.47	---	74.00	18.53	15000	1000	313.0	H	316.0	12.9
37702.214286	53.86	---	74.00	20.14	15000	1000	225.0	V	116.0	11.2
37702.214286	---	39.56	54.00	14.44	15000	1000	225.0	V	116.0	11.2
38558.571429	---	40.13	54.00	13.87	15000	1000	325.0	V	250.0	11.6
38558.571429	53.84	---	74.00	20.16	15000	1000	325.0	V	250.0	11.6
39353.235714	53.84	---	74.00	20.16	15000	1000	392.0	H	8.0	13.7
39353.235714	---	40.48	54.00	13.52	15000	1000	392.0	H	8.0	13.7

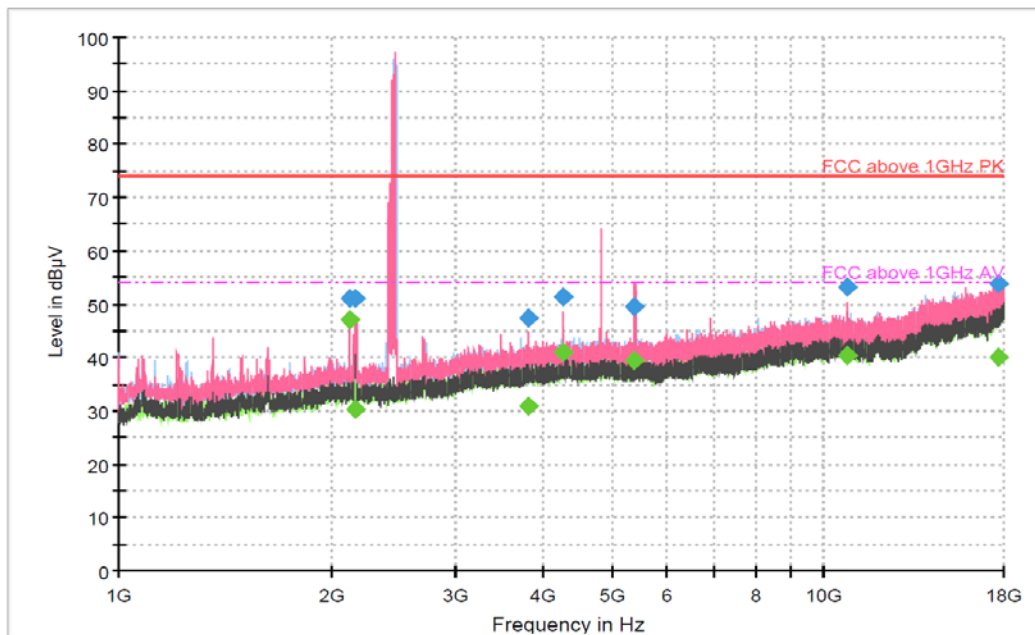
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#2 (1 ~ 18 GHz)

Test Report

Common Information

Project Number BVCO-WAY-P21070008
Location 10 m SAC
System: (1 to 18) GHz
Date: 2021.07.12
Environment 21.1 °C / 46.9% R.H.



Final Result

Frequency (MHz)	MaxPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
2132.116667	---	47.02	54.00	6.98	15000	1000	208.0	V	132.0	-6.7
2132.116667	51.11	---	74.00	22.89	15000	1000	208.0	V	132.0	-6.7
2161.716667	51.18	---	74.00	22.82	15000	1000	194.0	V	85.0	-6.7
2161.716667	---	30.27	54.00	23.73	15000	1000	194.0	V	85.0	-6.7
3803.566667	---	30.78	54.00	23.22	15000	1000	400.0	V	56.0	-1.9
3803.566667	47.52	---	74.00	26.48	15000	1000	400.0	V	56.0	-1.9
4264.272222	51.49	---	74.00	22.51	15000	1000	289.0	V	118.0	-0.6
4264.272222	---	40.91	54.00	13.09	15000	1000	289.0	V	118.0	-0.6
5392.138889	49.63	---	74.00	24.37	15000	1000	315.0	V	227.0	-0.1
5392.138889	---	39.38	54.00	14.62	15000	1000	315.0	V	227.0	-0.1
10801.788889	53.15	---	74.00	20.85	15000	1000	150.0	V	155.0	6.3
10801.788889	---	40.23	54.00	13.77	15000	1000	150.0	V	155.0	6.3
17634.622222	---	40.21	54.00	13.79	15000	1000	288.0	V	191.0	13.8
17634.622222	53.77	---	74.00	20.23	15000	1000	288.0	V	191.0	13.8

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

Note2) Radiated emissions (Tx / Rx frequency) from the transceiver shall be ignored.

-Data transmission in the 2.4 GHz ISM Fundamental band (Bluetooth/Wi-Fi 802.11 b/g/n)

-Data transmission in the 4.8 GHz ISM Harmonic band (Bluetooth/Wi-Fi 802.11 b/g/n)

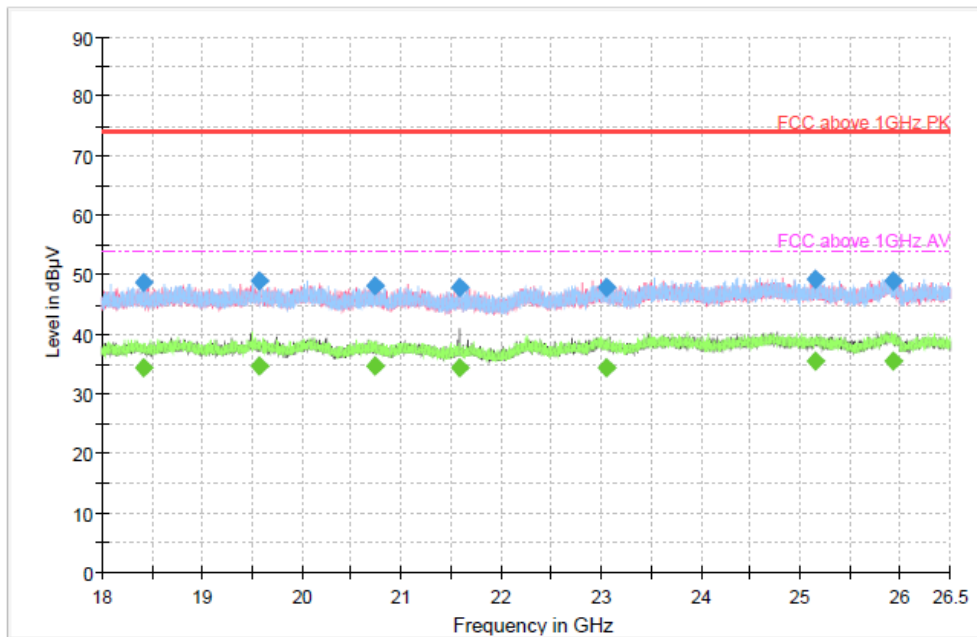
: Operating frequencies (2 400 ~2483.5) MHz

#2 (18 ~ 26.5 GHz)

Test Report

Common Information

Project Number BVCO-WAY-P21070008
Location 10 m SAC
System: (18.0 to 26.5) GHz
Date: 2021.07.13
Environment 21.5 °C / 47.3 % R.H.



Final Result

Frequency (MHz)	MaxPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
18415.555556	---	34.44	54.00	19.56	15000	1000	374.0	V	141.0	2.7
18415.555556	48.64	---	74.00	25.36	15000	1000	374.0	V	141.0	2.7
19583.833333	49.05	---	74.00	24.95	15000	1000	103.0	H	269.0	3.4
19583.833333	---	34.81	54.00	19.19	15000	1000	103.0	H	269.0	3.4
20731.333333	48.22	---	74.00	25.78	15000	1000	400.0	H	-8.0	5.1
20731.333333	---	34.55	54.00	19.45	15000	1000	400.0	H	-8.0	5.1
21580.861111	47.89	---	74.00	26.11	15000	1000	290.0	H	345.0	5.6
21580.861111	---	34.27	54.00	19.73	15000	1000	290.0	H	345.0	5.6
23056.083333	47.90	---	74.00	26.10	15000	1000	350.0	V	253.0	5.5
23056.083333	---	34.32	54.00	19.68	15000	1000	350.0	V	253.0	5.5
25143.777778	49.19	---	74.00	24.81	15000	1000	322.0	H	285.0	5.4
25143.777778	---	35.43	54.00	18.57	15000	1000	322.0	H	285.0	5.4
25929.083333	49.06	---	74.00	24.94	15000	1000	150.0	V	71.0	6.1
25929.083333	---	35.64	54.00	18.36	15000	1000	150.0	V	71.0	6.1

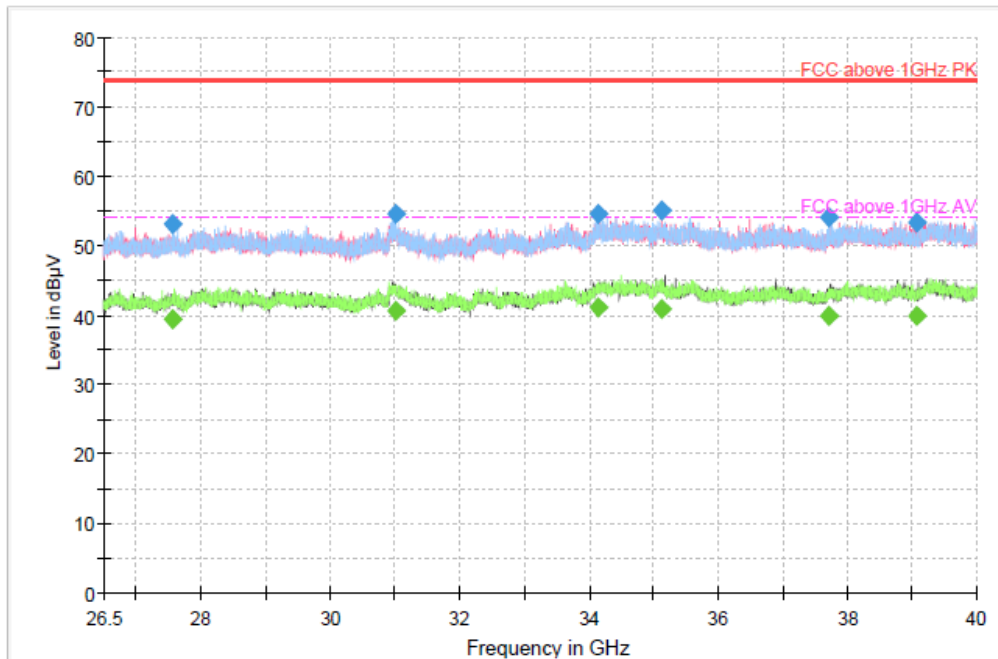
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#2 (26.5 ~ 40 GHz)

Test Report

Common Information

Project Number 200414K003
Location 10 m SAC
System: (26.5 to 40.0) GHz
Date: 2021.07.13
Environment 21.5 °C / 47.3 % R.H.



Final Result

Frequency (MHz)	MaxPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
27574.214286	52.99	---	74.00	21.01	15000	1000	400.0	H	100.0	12.3
27574.214286	---	39.32	54.00	14.68	15000	1000	400.0	H	100.0	12.3
31010.928572	---	40.67	54.00	13.33	15000	1000	102.0	H	279.0	11.8
31010.928572	54.61	---	74.00	19.39	15000	1000	102.0	H	279.0	11.8
34151.607143	---	40.98	54.00	13.02	15000	1000	125.0	V	237.0	13.0
34151.607143	54.55	---	74.00	19.45	15000	1000	125.0	V	237.0	13.0
35121.678572	55.05	---	74.00	18.95	15000	1000	325.0	V	129.0	11.9
35121.678572	---	40.95	54.00	13.05	15000	1000	325.0	V	129.0	11.9
37722.357143	---	40.00	54.00	14.00	15000	1000	325.0	H	242.0	11.2
37722.357143	53.99	---	74.00	20.01	15000	1000	325.0	H	242.0	11.2
39064.642857	---	39.98	54.00	14.02	15000	1000	277.0	V	335.0	12.9
39064.642857	53.41	---	74.00	20.59	15000	1000	277.0	V	335.0	12.9

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

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
LISN	R&S	ENV432	101474	2020.12.08	2021.12.08
50 ohm Termination	R&S	50 OHM	3	2020.12.09	2021.12.09
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	-	-

Radiated Emissions (1 GHz ~ 40 GHz)					
Equipment Name	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESW44	101812	2020.12.09	2021.12.09
HORN ANTENNA	R&S	HF907	102772	2020.12.09	2021.12.09
HORN ANTENNA	Steatite Antenna	QSH-SL-18-26- S-20	19926	2020.12.09	2021.12.09
HORN ANTENNA	Steatite Antenna	QSH-SL-26-40- K-20	18320	2020.12.09	2021.12.09
SIGNAL CONDITIONING UNIT	R&S	SCU-18F	180111	2020.12.09	2021.12.09
SIGNAL CONDITIONING UNIT	R&S	SCU-26F	260005	2020.12.08	2021.12.08
SIGNAL CONDITIONING UNIT	R&S	SCU-40F	400010	2020.12.08	2021.12.08
Software	R&S	EMC 32	10.35.10 Version	-	-

- The End -