47 CFR Part 15 Subpart B
Electromagnetic Compatibility Test Report

For

Smart Wearable

ORDER NO.:	BVCO-WAY-P21090029
REPORT NO.:	FCCBVCO-WAY-P21090029-4
ISSUED DATE:	18 October, 2021
MODEL NO.:	SM-R865U

Samsung Electronics Co., Ltd.

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

Certificate #4068.03

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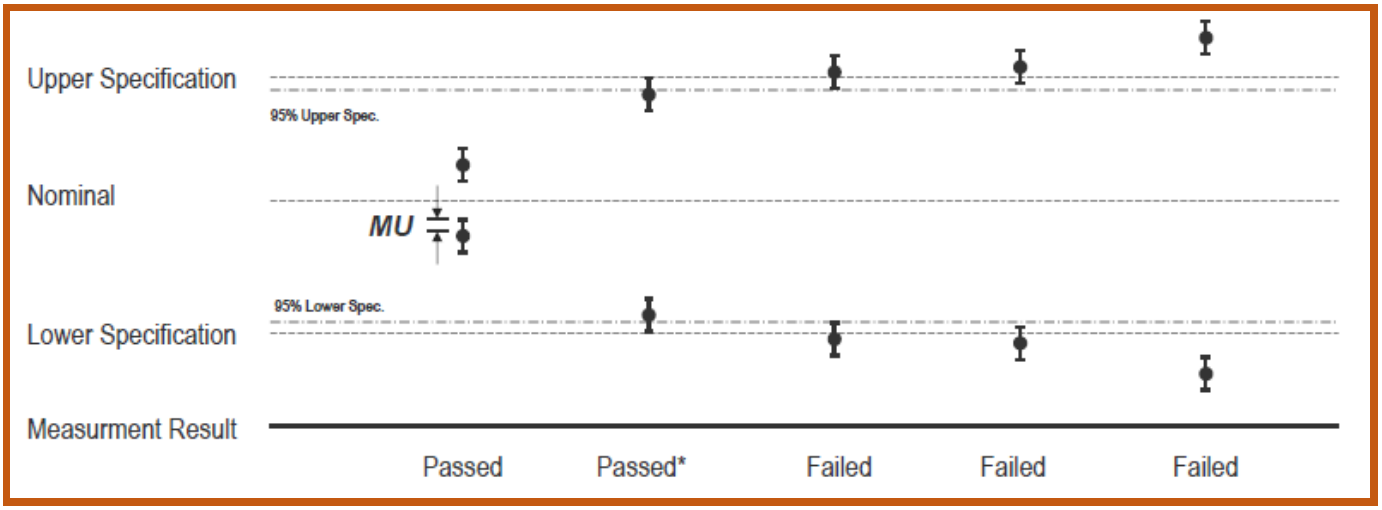
Test Report Details

Test Report No.	FCCBVCO-WAY-P21090029-4
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, Korea
Manufacturer:	AG TECH Co., Ltd.
Manufacturer address:	Lot G3, Que Vo Industrial Park (Expanded Area), Nam Son Ward, Bac Ninh City, Bac Ninh Province, Vietnam
Product Type:	Smart Wearable
Brand:	Samsung
Model Number:	SM-R865U
Multi-listing model number:	SM-R865F
FCC Classification:	Part 15 Class B Digital Devices (JAB)
Equipment Authorization	Supplier's Declaration of Conformity
Product Standards:	47 CFR Part 15 Subpart B / ANSI C63.4: 2014
Sample Serial Number:	R3AR301CLRA
Sample Receive Date:	29 September, 2021
Testing Start Date:	01 October, 2021
Date Testing Complete:	06 October, 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



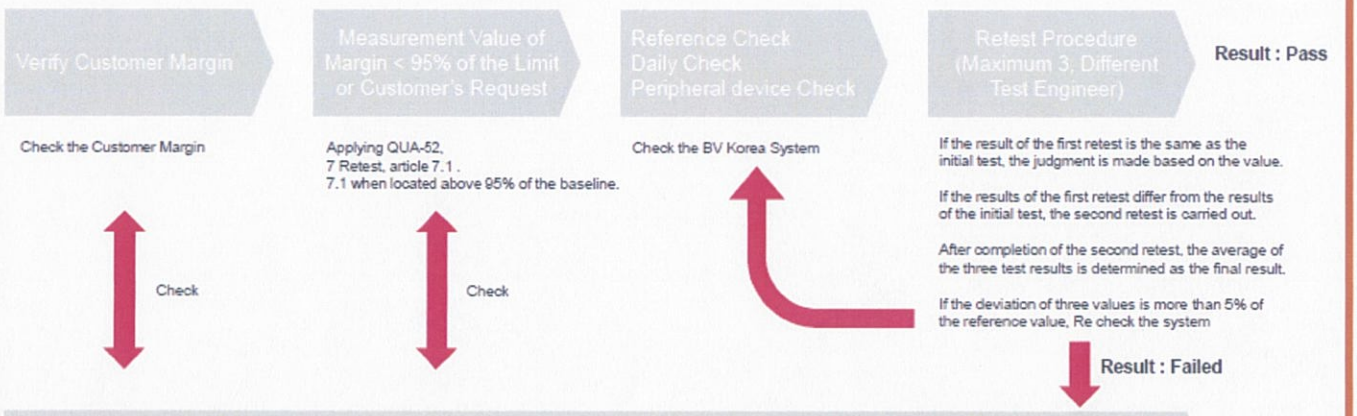
MU =95% expanded measurement uncertainty
QUA-52 Decision Rule Applied
Step 1: Reference Check, Daily Check, Peripheral device Check
Step 2: Retest Procedure (Maximum 3, Different Test Engineer)
1) If the result of the first retest is the same as the initial test, the judgment is made based on the value.
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-P21090029-4	Original release	18 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 : _____ , **DATE :** 18 October, 2021
Junil Park / Senior Engineer

APPROVED BY : _____ , **DATE :** 18 October, 2021
Rina Bae / Techinical Manager

Table of Contents

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	☐ Class A / ☒ 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 Smart Wearable, Model: SM-R865U, 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
The EUT is a watch type Smart Wearable which can operate on WCDMA FDD2/4/5, LTE FDD2/4/5/12/13/25/26/66/71 bands and incorporates a Bluetooth, Wi-Fi(802.11 a/b/g/n), GNSS, NFC, Wireless Charging and Audio.

2.2 Technical Data

-General specifications

CPU	Exynos W920
H/W Version	REV 1.0
S/W Version	R865U.001
FCC ID	A3LSMR865
Wireless Communication	1. UMTS Band 2/4/5 2. LTE Band 2/4/5/12/13/25/26/66/71 3. WLAN a/b/g/n(HT20) 4. DFS (UNII client without radar detection) 5. Bluetooth BDR/EDR/LE 1M/LE 2M 6. NFC (Card emulation only)

2.3 Detail information of Multi-listing model

No.	Model	Description	Comment
1	SM-R865F	Due to marketing purpose, addition variant model.	-

***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
Conducted Emission (Mode 1,2), Radiated Emission (Mode 1)				
EUT	Smart Wearable	Samsung Electronics Co., Ltd.	SM-R865U	EUT
EUT	Wireless Charger	Samsung Electronics Co., Ltd.	EP-OR825	In box (FCC ID: A3LEPOR825)
AE	Travel Adapter	RFTECH THAI NGUYEN CO.,LTD.	EP-TA20KWK	-
Radiated Emission (Mode 2)				
EUT	Smart Wearable	Samsung Electronics Co., Ltd.	SM-R865U	EUT
Conducted Emission (Mode 3), Radiated Emission (Mode 3)				
EUT	Smart Wearable	Samsung Electronics Co., Ltd.	SM-R865U	EUT
EUT	Wireless Charger	Samsung Electronics Co., Ltd.	EP-OR825	In box (FCC ID: A3LEPOR825)
AE	Laptop Computer	Lenovo Information Products(Shenzhen) Co.,Ltd.	TP00087A	-
AE	Laptop AC adapter	CHICONY POWER TECHNOLOGY (SUZHOU) CO., LTD.	ADLX45NCC3A	-
AE	Mouse	Microsoft	1405	-
AE	Router	PLANET Technology Corp.	FSD-803	-
AE	Router AC adapter	BILLION	BA018-050250AXB	-
AE	DONGLE-USB 3.0 C to RJ 45	Samsung Electronics Co., Ltd.	-	-
*** Note:** EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment				

3.2 Input/Output Ports

START		END		CABLE		
Name	**I/O Port**	**Name**	**I/O Port**	**Length (m)**	**Shield**	**With Ferrite**
Conducted Emission (Mode 1,2), Radiated Emission (Mode 1)						
EUT	-	Wireless Charger	-	-	-	-
Wireless Charger	-	Travel Adapter	USB Type-A	0.8	Unshield	-
Travel Adapter	AC In	AC Mains	AC Out	-	-	-
Radiated Emission (Mode 2)						
EUT	-	-	-	-	-	-
Conducted Emission (Mode 3), Radiated Emission (Mode 3)						
EUT	-	Wireless Charger	-	-	-	-
Laptop Computer	USB Type-A	Wireless Charger	-	0.8	Unshield	-
Laptop Computer	DC In	Laptop AC adapter	DC Out	1.8	Unshield	-
Laptop AC adapter	AC In	AC Mains	AC Out	1.5	Unshield	-
Laptop Computer	USB Type-A	Mouse	-	1.5	Unshield	-
Router	DC In	Router AC adapter	DC Out	1.5	Unshield	-
Router AC adapter	AC In	AC Mains	AC Out	-	-	-
Laptop Computer	LAN	Router	LAN	1.0	Unshield	-
Laptop Computer	USB Type-C	DONGLE-USB 3.0 C to RJ 45	-	0.1	Unshield	-
DONGLE-USB 3.0 C to RJ 45	LAN	Router	LAN	1.0	Unshield	-

3.3 Power Interface:

Rated Voltage	Wireless Charging: DC 5 V, 1 A
	Operating: DC 3.88 V
Test Voltage	Wireless Charging: AC 120 V, 60 Hz (Using wireless charger AC power) Operating: DC 3.88 V (Using internal battery power)

3.4 EUT Internal Operating Frequency

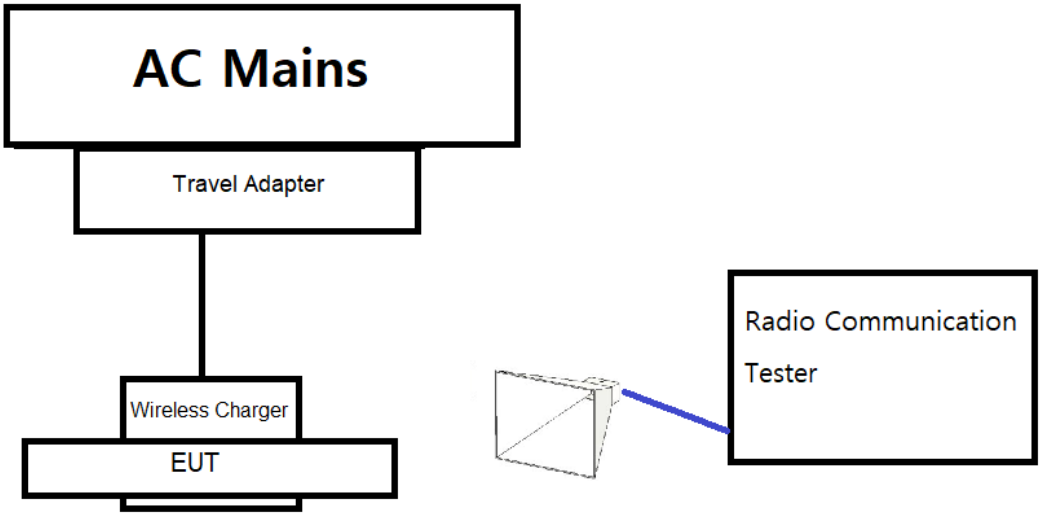
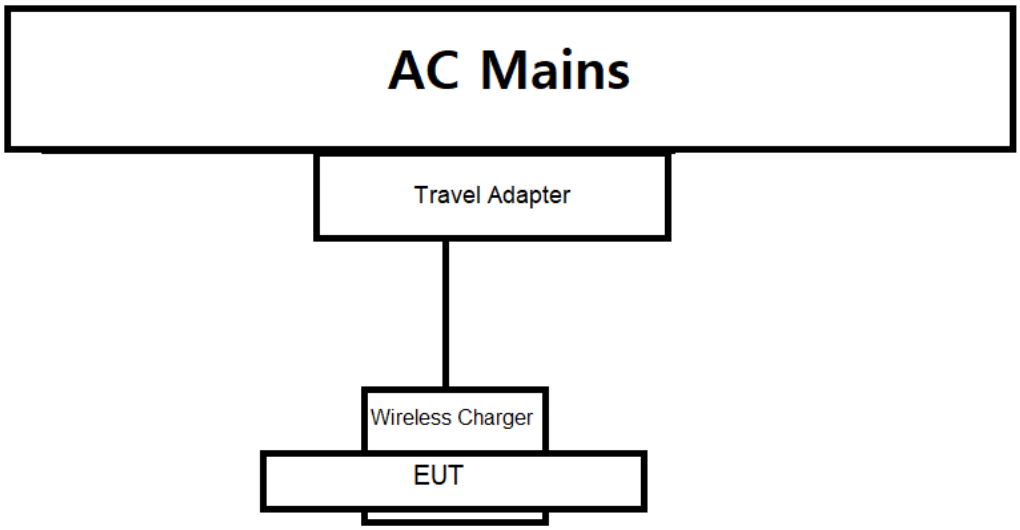
The Highest Frequency (Generated or Used)	Wi-Fi : 5 825 MHz

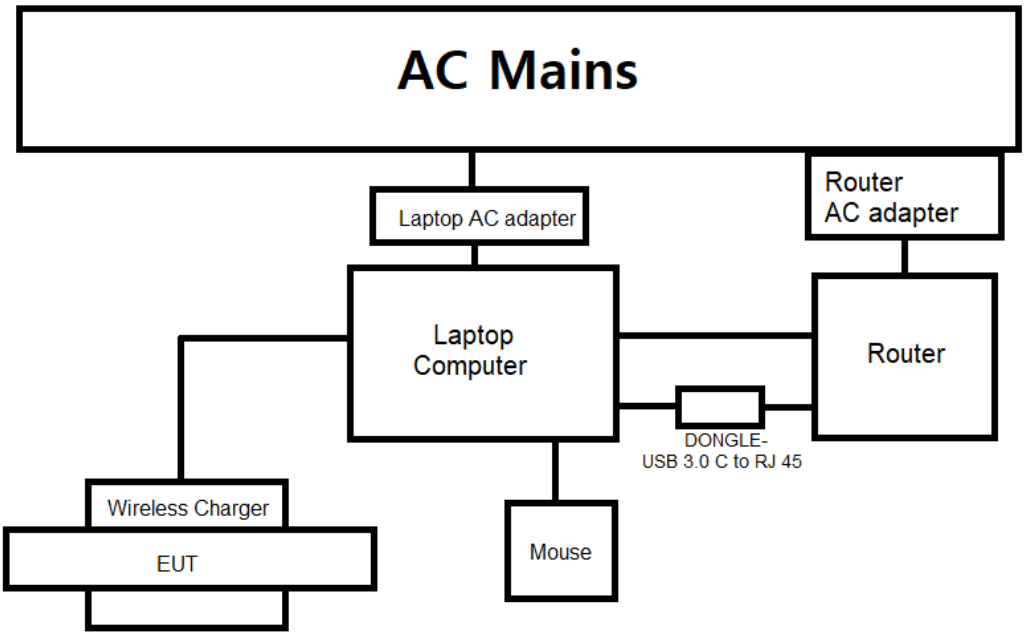
3.5 Modes of Description

Mode #	Description	Comments
Conducted Emission Note2)		
1	Wireless Charging (w/TA) + Cellular Receiver (LTE FDD Band13 Center Frequency)	-
2	Audio playback from internal memory data + Wireless Charging (w/TA)	-
3	Wireless Charging (w/USB port of Laptop Computer)	-
Radiated Emission Note3)		
1	Wireless Charging (w/TA)	-
2	Audio playback from internal memory data	-
3	Wireless Charging (w/USB port of Laptop Computer)	-

Note1) Bluetooth + Wi-Fi Standby
Note2) RX mode testing was performed with the LTE B13 RX test mode at center frequency. All licensed communication RX mode, WCDMA/LTE, test results do not affect conducted emission test.
Note3) Compliance with Part 15B requirements for the receiver part of the licensed transmitter (equipment code CXX) is covered by other test report (FCCBVCO-WAY-P21090029-5).

3.6 Configuration

Mode #	Description
1 (Conducted Emission)	
2 (Conducted Emission) 1 (Radiated Emission)	

Mode #	Description
2 (Radiated Emission)	
3 (Conducted Emission) 3 (Radiated Emission)	

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	01 October, 2021			
Parameters recorded during the test	Laboratory Ambient Temperature	(23.4 ± 1.0) °C		
	Relative Humidity	(54.1 ± 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

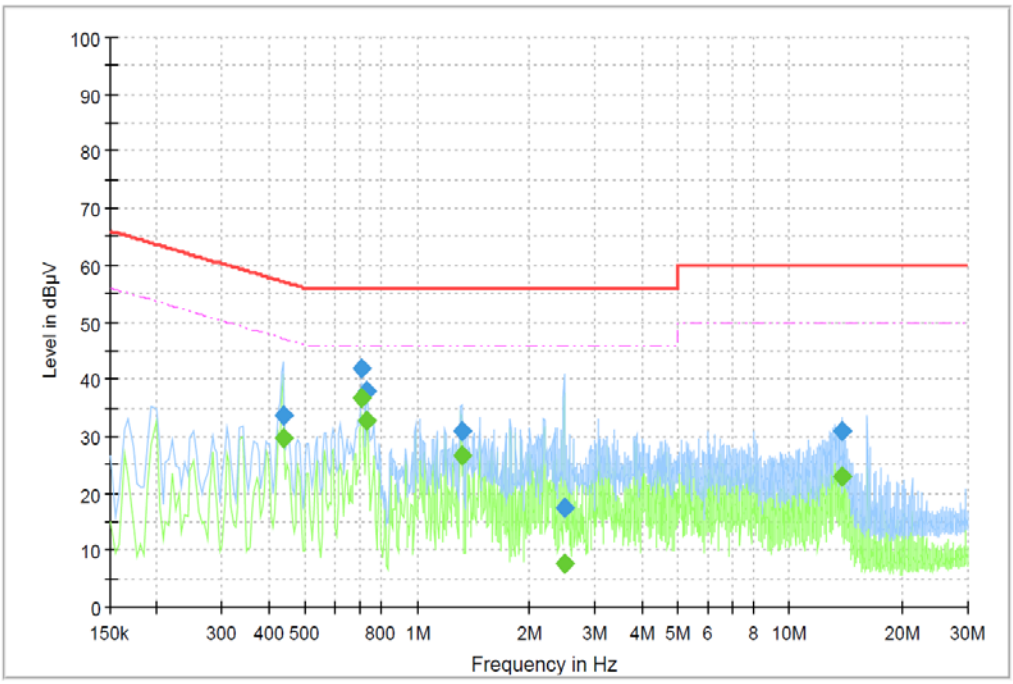
Table 1. Test data for conducted RF emissions

#1

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	EMI Test Site (AC Line)
Date	2021.10.01
Environment	23.4 'C / 54.1 % R.H.



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.435331	33.78	---	57.15	23.37	15000.0	9.000	N	ON	10.0
0.435331	---	29.58	47.15	17.57	15000.0	9.000	N	ON	10.0
0.707493	41.83	---	56.00	14.17	15000.0	9.000	N	ON	10.0
0.707493	---	36.75	46.00	9.25	15000.0	9.000	N	ON	10.0
0.729441	38.05	---	56.00	17.95	15000.0	9.000	N	ON	10.0
0.729441	---	32.73	46.00	13.27	15000.0	9.000	N	ON	10.0
1.313272	30.98	---	56.00	25.02	15000.0	9.000	N	ON	9.9
1.313272	---	26.75	46.00	19.25	15000.0	9.000	N	ON	9.9
2.472154	17.33	---	56.00	38.67	15000.0	9.000	N	ON	9.9
2.472154	---	7.77	46.00	38.23	15000.0	9.000	N	ON	9.9
13.867831	30.99	---	60.00	29.01	15000.0	9.000	N	ON	10.3
13.867831	---	22.98	50.00	27.02	15000.0	9.000	N	ON	10.3

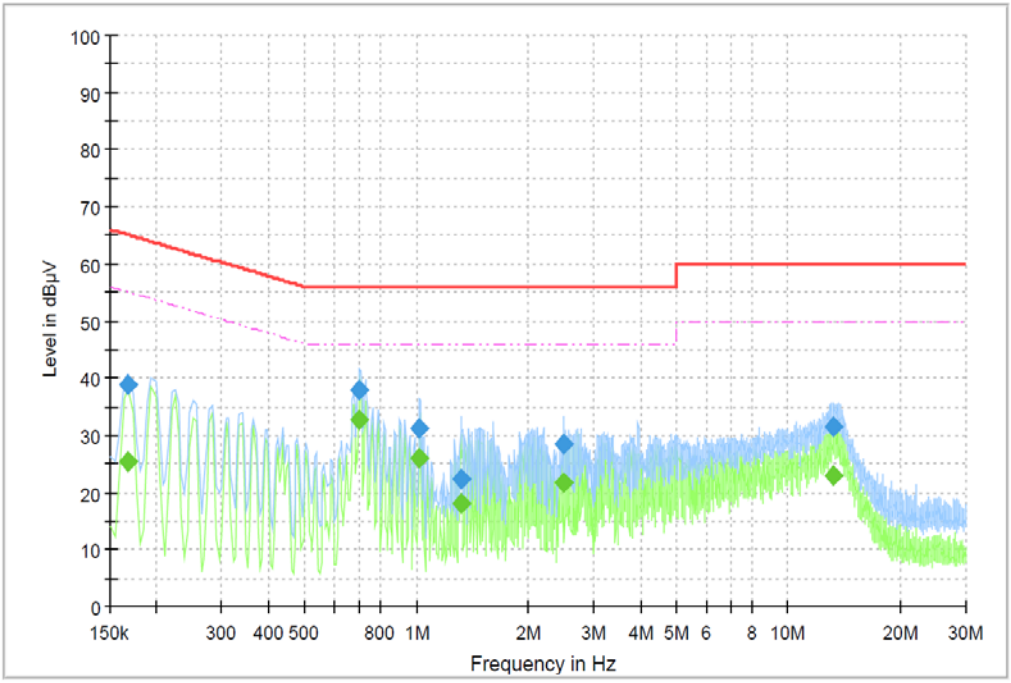
Note1) Two graphs measured for both Line 1(L1) and Neutral (N) of the LISN are combined into one graph.

#2

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	EMI Test Site (AC Line)
Date	2021.10.01
Environment	23.4 'C / 54.1 % R.H.



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.167559	---	25.52	55.08	29.56	15000.0	9.000	L1	ON	10.1
0.167559	38.80	---	65.08	26.28	15000.0	9.000	L1	ON	10.1
0.703103	---	32.64	46.00	13.36	15000.0	9.000	N	ON	10.0
0.703103	38.00	---	56.00	18.00	15000.0	9.000	N	ON	10.0
1.019162	---	25.87	46.00	20.13	15000.0	9.000	N	ON	9.9
1.019162	31.05	---	56.00	24.95	15000.0	9.000	N	ON	9.9
1.317662	---	17.99	46.00	28.01	15000.0	9.000	N	ON	9.9
1.317662	22.26	---	56.00	33.74	15000.0	9.000	N	ON	9.9
2.485324	28.40	---	56.00	27.60	15000.0	9.000	L1	ON	9.8
2.485324	---	21.67	46.00	24.33	15000.0	9.000	L1	ON	9.8
13.284000	31.40	---	60.00	28.60	15000.0	9.000	L1	ON	10.4
13.284000	---	23.04	50.00	26.96	15000.0	9.000	L1	ON	10.4

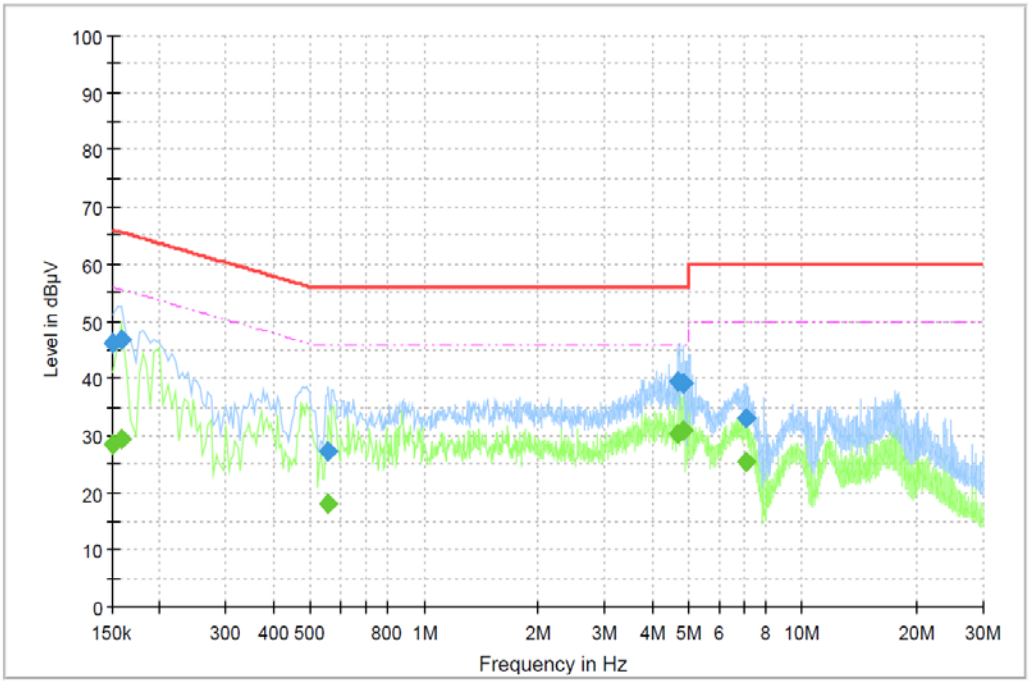
Note1) Two graphs measured for both Line 1(L1) and Neutral (N) of the LISN are combined into one graph.

#3

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	EMI Test Site (AC Line)
Date	2021.10.01
Environment	23.4 'C / 54.1 % 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	46.18	---	66.00	19.82	15000.0	9.000	L1	ON	9.7
0.150000	---	28.30	56.00	27.70	15000.0	9.000	L1	ON	9.7
0.158779	46.65	---	65.53	18.87	15000.0	9.000	L1	ON	9.9
0.158779	---	29.47	55.53	26.06	15000.0	9.000	L1	ON	9.9
0.558243	---	18.04	46.00	27.96	15000.0	9.000	L1	ON	9.9
0.558243	27.28	---	56.00	28.72	15000.0	9.000	L1	ON	9.9
4.686684	39.36	---	56.00	16.64	15000.0	9.000	L1	ON	9.7
4.686684	---	30.13	46.00	15.87	15000.0	9.000	L1	ON	9.7
4.846985	39.23	---	56.00	16.77	15000.0	9.000	L1	ON	9.7
4.846985	---	30.89	46.00	15.11	15000.0	9.000	L1	ON	9.7
7.129632	---	25.29	50.00	24.71	15000.0	9.000	L1	ON	9.8
7.129632	33.02	---	60.00	26.98	15000.0	9.000	L1	ON	9.8

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	05 October, 2021	
Parameters recorded during the test	Laboratory Ambient Temperature	(20.9 ± 1.0) °C
	Relative Humidity	(54.8 ± 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

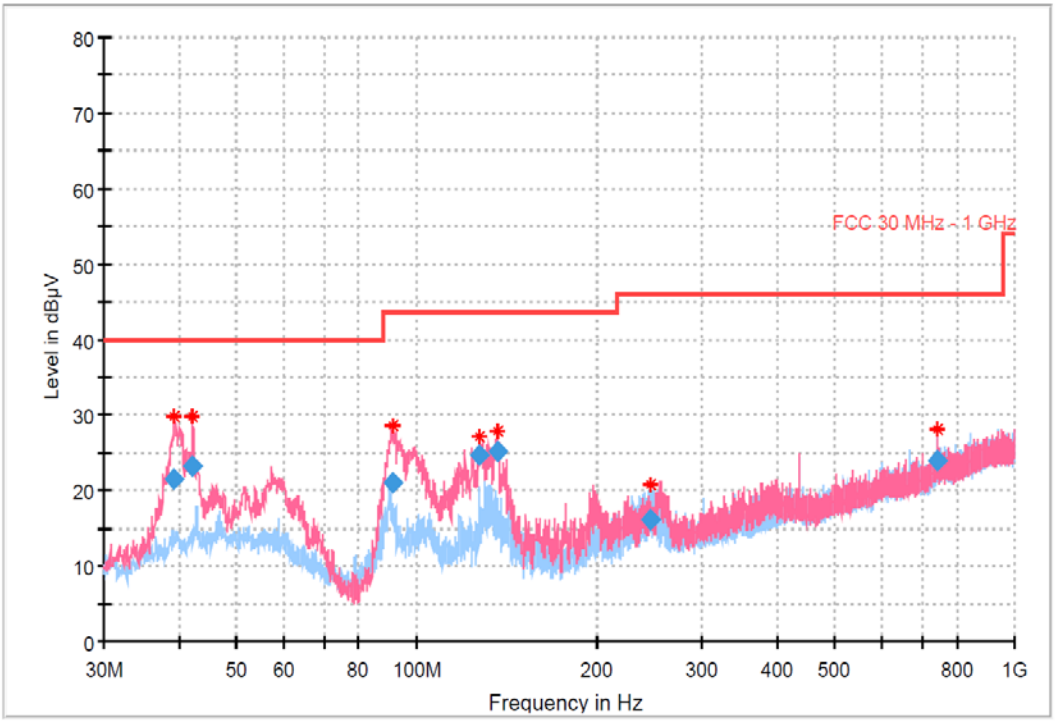
Table 2. Test data for radiated RF emissions

#1

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Below 1 GHz
Date:	2021.10.05
Environment	20.9 'C / 54.8 % R.H.



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
39.263500	21.56	40.00	18.44	15000	120	115.0	V	249.0	-20.6
42.173500	23.36	40.00	16.64	15000	120	109.0	V	338.0	-20.0
91.401000	21.07	43.50	22.43	15000	120	115.0	V	54.0	-23.7
127.436500	24.73	43.50	18.77	15000	120	111.0	V	298.0	-25.2
136.457500	25.17	43.50	18.33	15000	120	110.0	V	20.0	-25.7
246.698000	16.11	46.00	29.89	15000	120	109.0	H	141.0	-20.4
741.689000	24.01	46.00	21.99	15000	120	109.0	V	292.0	-11.2

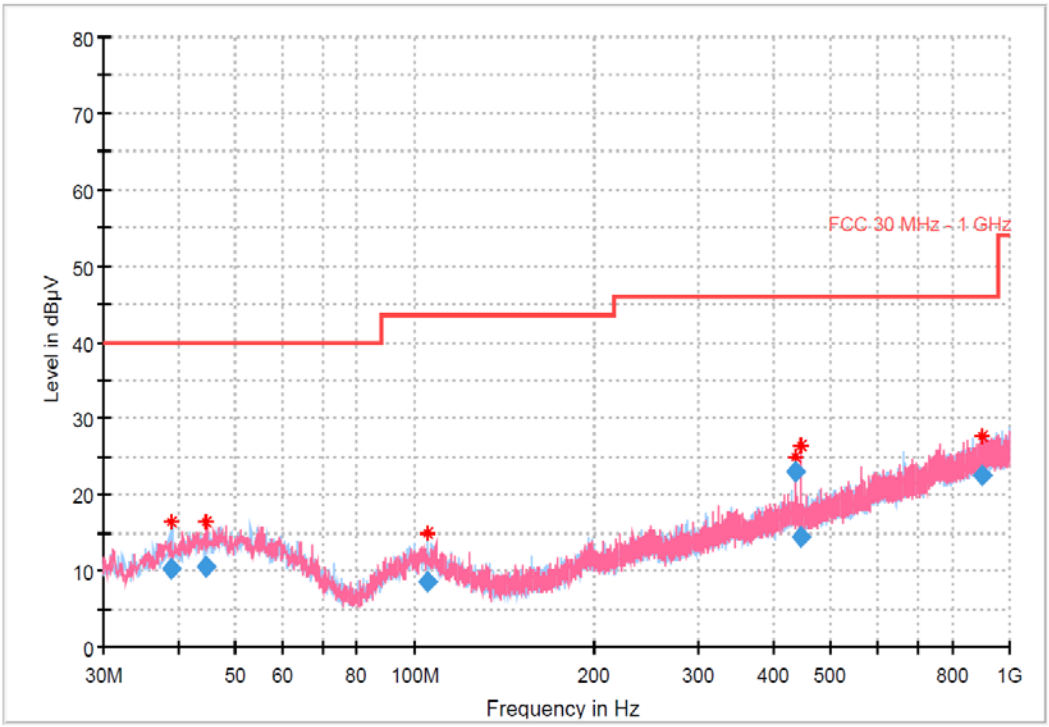
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#2

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Below 1 GHz
Date:	2021.10.05
Environment	20.9 'C / 54.8 % R.H.



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
39.118000	10.22	40.00	29.78	15000	120	315.0	H	179.0	-20.6
44.744000	10.56	40.00	29.44	15000	120	115.0	V	52.0	-19.7
105.272000	8.57	43.50	34.93	15000	120	215.0	H	44.0	-22.2
437.545500	22.97	46.00	23.03	15000	120	104.0	V	150.0	-16.2
447.245500	14.34	46.00	31.66	15000	120	394.0	V	16.0	-16.2
900.187000	22.45	46.00	23.55	15000	120	385.0	H	53.0	-9.6

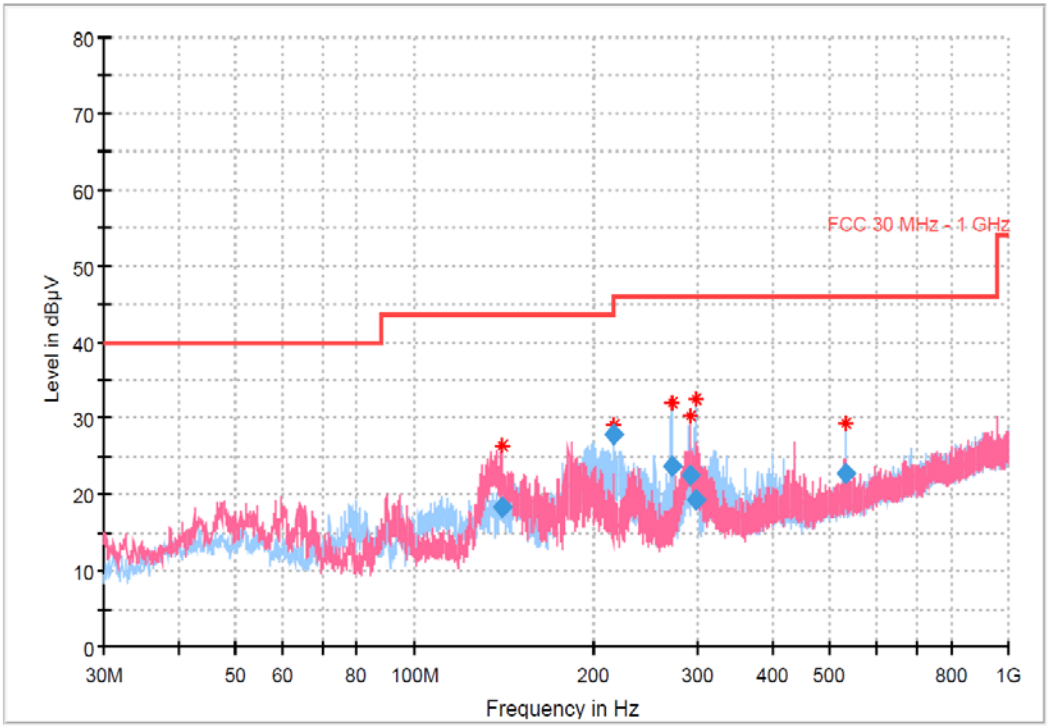
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#3

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Below 1 GHz
Date:	2021.10.05
Environment	20.9 'C / 54.8 % R.H.



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
140.169000	18.35	43.50	25.15	15000	120	215.0	V	78.0	-25.8
215.997500	27.88	43.50	15.62	15000	120	108.0	H	8.0	-22.5
271.257000	23.70	46.00	22.30	15000	120	115.0	H	86.0	-20.5
292.382500	22.60	46.00	23.40	15000	120	192.0	V	172.0	-19.8
298.298500	19.21	46.00	26.79	15000	120	115.0	H	22.0	-19.7
531.653500	22.76	46.00	23.24	15000	120	202.0	H	177.0	-14.8

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	05 October, 2021 ~ 06 October, 2021			
Parameters recorded during the test	Laboratory Ambient Temperature	(21.4 ± 1.0) ~ (22.6 ± 1.0) °C		
	Relative Humidity	(48.0 ± 1.0) ~ (54.6 ± 1.0) %		
	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 30	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 (4.5 / 3) = **3.5**

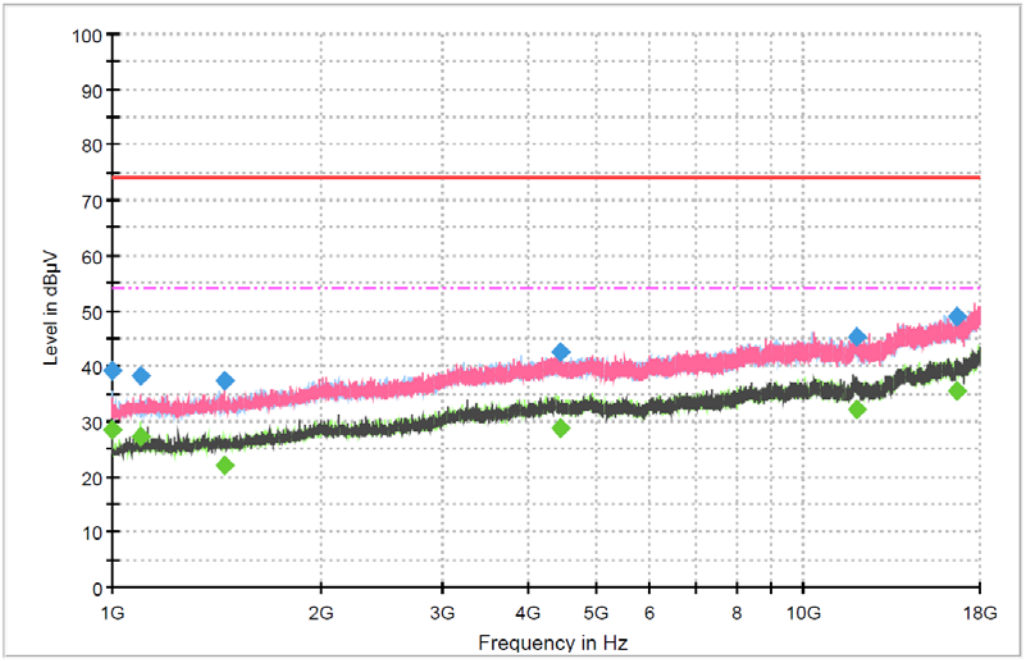
Table 3. Test data for radiated RF emissions

#1 (1 ~ 18 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.05
Environment	21.9 'C / 54.6 % 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)
1000.000000	---	28.55	54.00	25.45	15000	1000	315.0	H	46.0	-11.4
1000.000000	39.05	---	74.00	34.95	15000	1000	315.0	H	46.0	-11.4
1099.838889	38.26	---	74.00	35.74	15000	1000	215.0	H	219.0	-10.9
1099.838889	---	27.32	54.00	26.68	15000	1000	215.0	H	219.0	-10.9
1458.438889	---	22.07	54.00	31.93	15000	1000	102.0	V	138.0	-9.3
1458.438889	37.40	---	74.00	36.60	15000	1000	102.0	V	138.0	-9.3
4455.338889	42.38	---	74.00	31.62	15000	1000	393.0	H	79.0	-0.5
4455.338889	---	28.76	54.00	25.24	15000	1000	393.0	H	79.0	-0.5
11934.616667	45.40	---	74.00	28.60	15000	1000	115.0	H	68.0	7.7
11934.616667	---	32.19	54.00	21.81	15000	1000	115.0	H	68.0	7.7
16685.611111	48.99	---	74.00	25.01	15000	1000	115.0	V	208.0	11.7
16685.611111	---	35.52	54.00	18.48	15000	1000	115.0	V	208.0	11.7

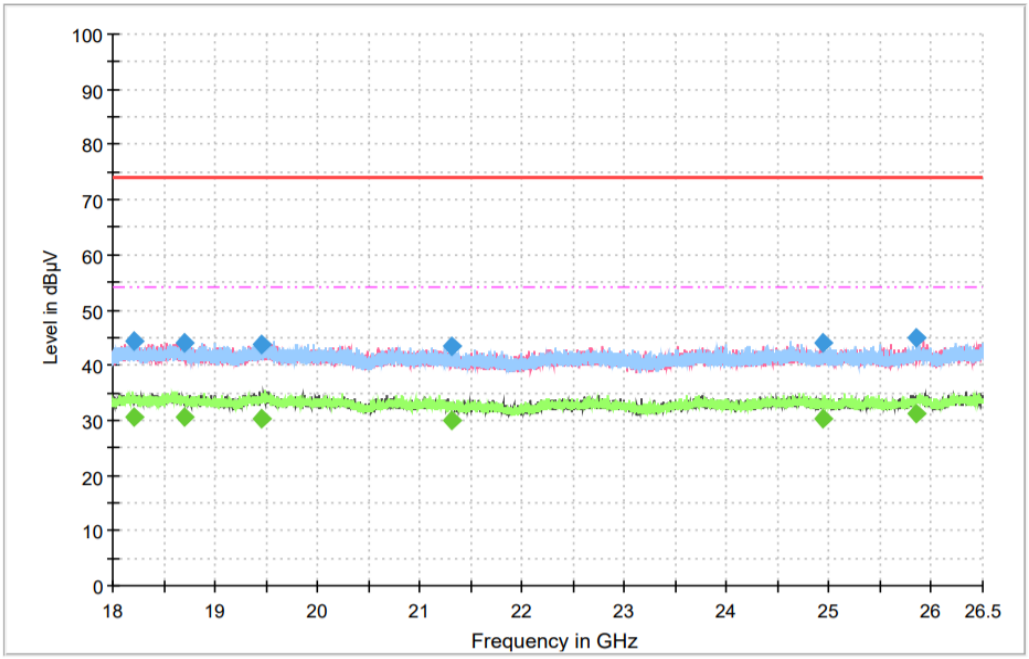
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Radiated emissions (Tx / Rx frequency) from the transceiver shall be ignored.
-Data transmission in the 2.4 GHz ISM Fundamental band (Bluetooth/Wi-Fi 802.11 a/b/g/n)
-Data transmission in the 4.8 GHz ISM Harmonic band (Bluetooth/Wi-Fi 802.11 a/b/g/n)

#1 (18 ~ 26.5 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.06
Environment	21.4 'C / 49.7 % 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)
18207.361111	44.37	---	74.00	29.63	15000	1000	207.0	H	219.0	-1.6
18207.361111	---	30.68	54.00	23.32	15000	1000	207.0	H	219.0	-1.6
18700.616667	43.93	---	74.00	30.07	15000	1000	215.0	H	18.0	-0.5
18700.616667	---	30.70	54.00	23.30	15000	1000	215.0	H	18.0	-0.5
19451.811111	43.82	---	74.00	30.18	15000	1000	400.0	H	200.0	-0.8
19451.811111	---	30.37	54.00	23.63	15000	1000	400.0	H	200.0	-0.8
21304.305556	---	29.83	54.00	24.17	15000	1000	194.0	H	41.0	1.1
21304.305556	43.38	---	74.00	30.62	15000	1000	194.0	H	41.0	1.1
24931.444444	---	30.35	54.00	23.65	15000	1000	215.0	V	50.0	0.8
24931.444444	44.07	---	74.00	29.93	15000	1000	215.0	V	50.0	0.8
25852.233333	44.84	---	74.00	29.16	15000	1000	102.0	H	17.0	1.6
25852.233333	---	31.04	54.00	22.96	15000	1000	102.0	H	17.0	1.6

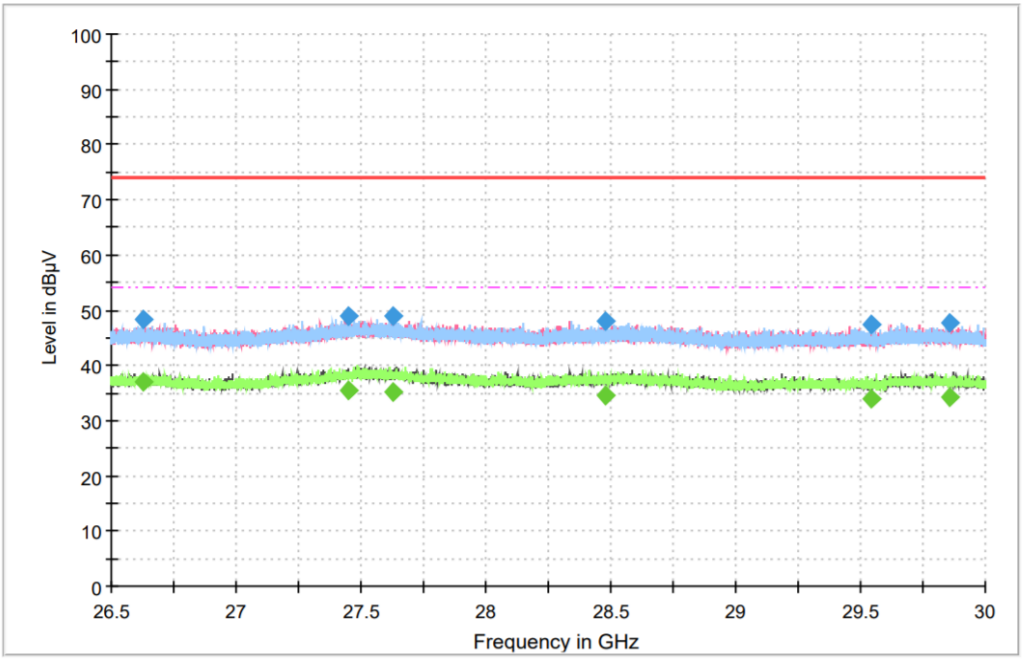
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#1 (26.5 ~ 30 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.06
Environment	22.6 'C / 48.0 % 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)
26630.750000	48.43	---	74.00	25.57	15000	1000	222.0	H	61.0	7.1
26630.750000	---	36.96	54.00	17.04	15000	1000	222.0	H	61.0	7.1
27450.500000	48.88	---	74.00	25.12	15000	1000	329.0	H	327.0	9.7
27450.500000	---	35.40	54.00	18.60	15000	1000	329.0	H	327.0	9.7
27628.250000	---	35.28	54.00	18.72	15000	1000	101.0	V	127.0	9.6
27628.250000	49.00	---	74.00	25.00	15000	1000	101.0	V	127.0	9.6
28477.000000	48.13	---	74.00	25.87	15000	1000	100.0	V	15.0	9.6
28477.000000	---	34.46	54.00	19.54	15000	1000	100.0	V	15.0	9.6
29544.750000	47.31	---	74.00	26.69	15000	1000	374.0	V	10.0	8.3
29544.750000	---	33.81	54.00	20.19	15000	1000	374.0	V	10.0	8.3
29858.000000	---	34.13	54.00	19.87	15000	1000	119.0	V	-14.0	8.6
29858.000000	47.83	---	74.00	26.17	15000	1000	119.0	V	-14.0	8.6

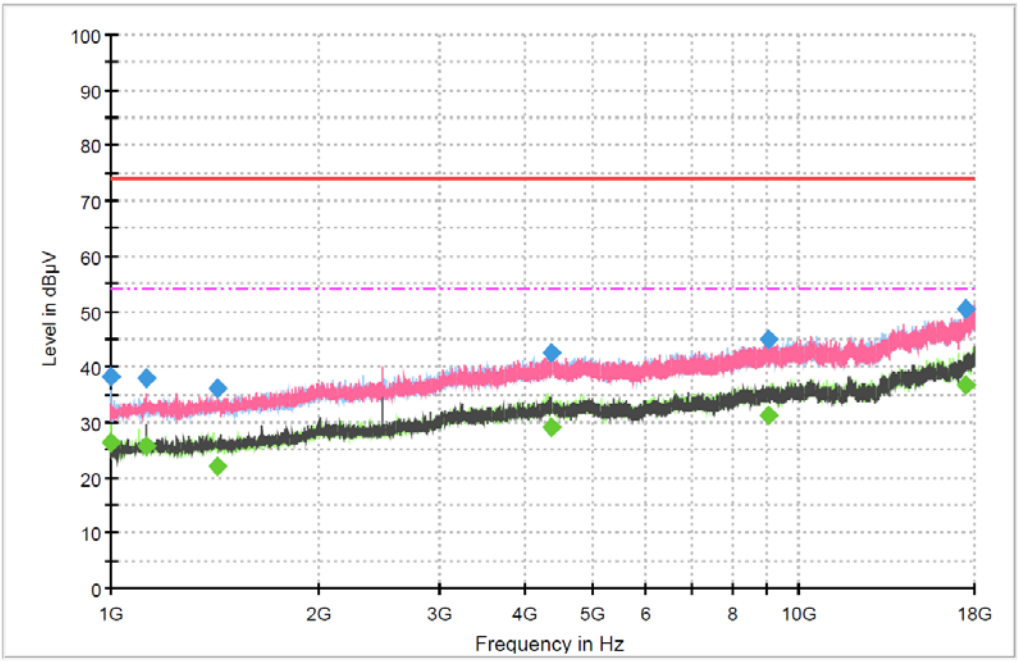
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#2 (1 ~ 18 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.05
Environment	21.9 'C / 54.6 % 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)
1000.000000	---	26.16	54.00	27.84	15000	1000	396.0	H	90.0	-11.4
1000.000000	38.23	---	74.00	35.77	15000	1000	396.0	H	90.0	-11.4
1124.938889	37.84	---	74.00	36.16	15000	1000	315.0	V	321.0	-10.9
1124.938889	---	25.65	54.00	28.35	15000	1000	315.0	V	321.0	-10.9
1428.216667	---	22.13	54.00	31.87	15000	1000	388.0	V	273.0	-9.6
1428.216667	36.23	---	74.00	37.77	15000	1000	388.0	V	273.0	-9.6
4372.700000	---	29.07	54.00	24.93	15000	1000	215.0	H	266.0	-0.2
4372.700000	42.47	---	74.00	31.53	15000	1000	215.0	H	266.0	-0.2
9042.944444	---	31.06	54.00	22.94	15000	1000	289.0	V	43.0	4.3
9042.944444	44.91	---	74.00	29.09	15000	1000	289.0	V	43.0	4.3
17427.716667	50.34	---	74.00	23.66	15000	1000	187.0	H	4.0	13.2
17427.716667	---	36.57	54.00	17.43	15000	1000	187.0	H	4.0	13.2

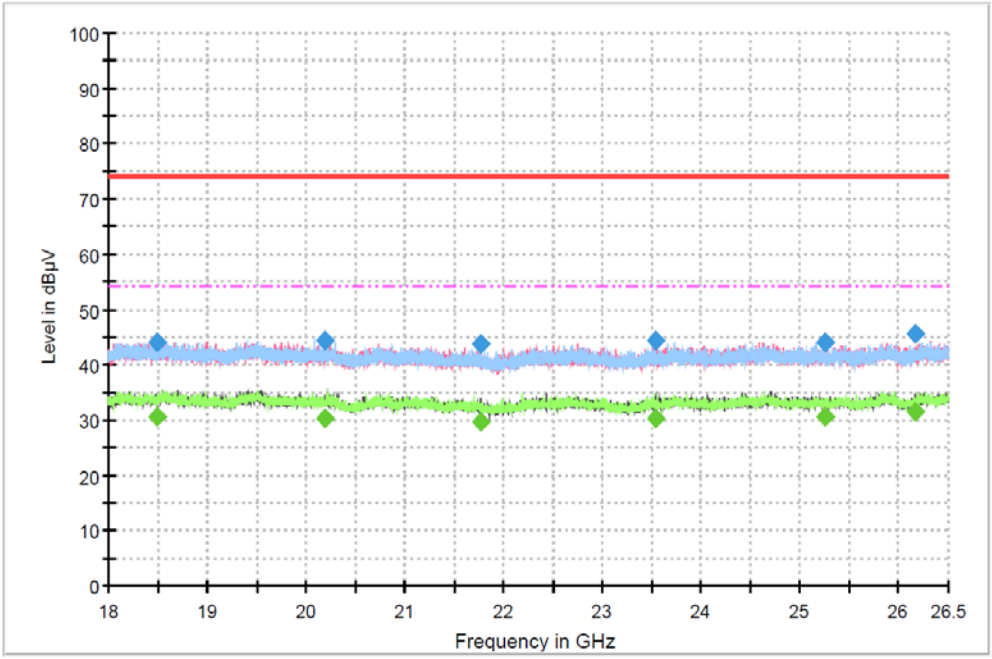
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Radiated emissions (Tx / Rx frequency) from the transceiver shall be ignored.
-Data transmission in the 2.4 GHz ISM Fundamental band (Bluetooth/Wi-Fi 802.11 a/b/g/n)
-Data transmission in the 4.8 GHz ISM Harmonic band (Bluetooth/Wi-Fi 802.11 a/b/g/n)

#2 (18 ~ 26.5 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.06
Environment	21.4 'C / 49.7 % 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)
18484.450000	---	30.49	54.00	23.51	15000	1000	315.0	V	37.0	-0.9
18484.450000	43.99	---	74.00	30.01	15000	1000	315.0	V	37.0	-0.9
20199.155556	---	30.38	54.00	23.62	15000	1000	185.0	V	338.0	0.8
20199.155556	44.31	---	74.00	29.69	15000	1000	185.0	V	338.0	0.8
21766.250000	---	29.66	54.00	24.34	15000	1000	315.0	H	300.0	1.1
21766.250000	43.83	---	74.00	30.17	15000	1000	315.0	H	300.0	1.1
23546.155556	---	30.27	54.00	23.73	15000	1000	400.0	V	30.0	0.5
23546.155556	44.26	---	74.00	29.74	15000	1000	400.0	V	30.0	0.5
25249.650000	---	30.45	54.00	23.55	15000	1000	201.0	H	22.0	1.0
25249.650000	44.10	---	74.00	29.90	15000	1000	201.0	H	22.0	1.0
26164.627778	---	31.46	54.00	22.54	15000	1000	306.0	V	83.0	2.1
26164.627778	45.44	---	74.00	28.56	15000	1000	306.0	V	83.0	2.1

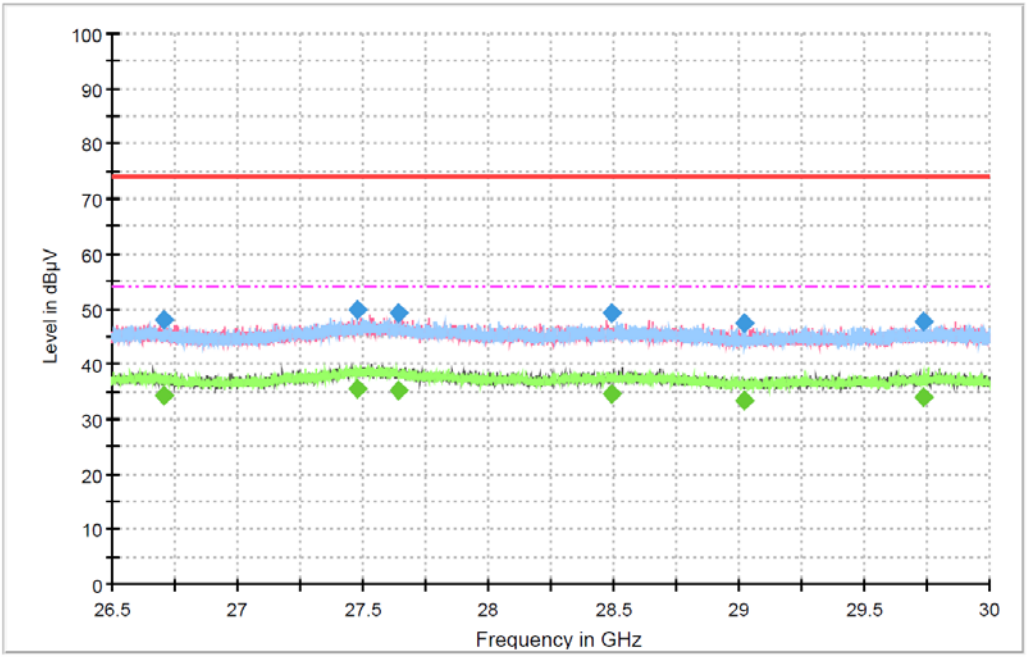
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#2 (26.5 ~ 30 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.06
Environment	22.6 'C / 48.0 % 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)
26708.000000	---	34.21	54.00	19.79	15000	1000	210.0	H	144.0	7.2
26708.000000	48.13	---	74.00	25.87	15000	1000	210.0	H	144.0	7.2
27481.000000	---	35.55	54.00	18.45	15000	1000	225.0	H	97.0	9.9
27481.000000	49.83	---	74.00	24.17	15000	1000	225.0	H	97.0	9.9
27644.250000	---	35.19	54.00	18.81	15000	1000	382.0	V	135.0	9.6
27644.250000	49.24	---	74.00	24.76	15000	1000	382.0	V	135.0	9.6
28492.000000	---	34.52	54.00	19.48	15000	1000	184.0	V	319.0	9.6
28492.000000	49.18	---	74.00	24.82	15000	1000	184.0	V	319.0	9.6
29021.250000	47.52	---	74.00	26.48	15000	1000	386.0	H	41.0	8.5
29021.250000	---	33.30	54.00	20.70	15000	1000	386.0	H	41.0	8.5
29733.750000	47.63	---	74.00	26.37	15000	1000	125.0	V	89.0	8.4
29733.750000	---	34.04	54.00	19.96	15000	1000	125.0	V	89.0	8.4

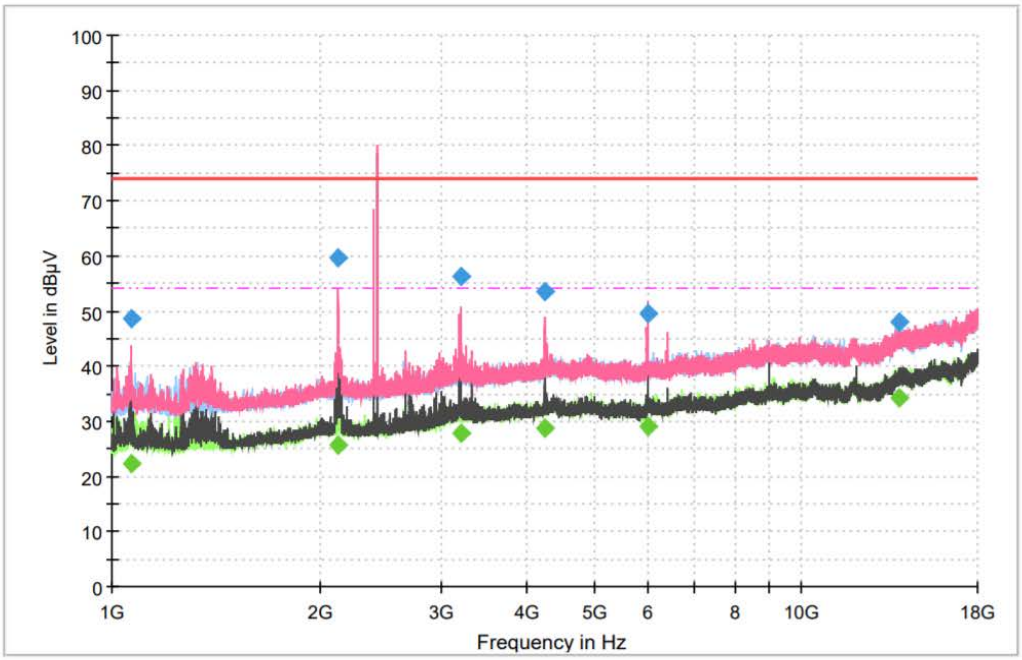
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#3 (1 ~ 18 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.05
Environment	21.9 'C / 54.6 % 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)
1066.088889	---	22.27	54.00	31.73	15000	1000	187.0	V	36.0	-11.0
1066.088889	48.67	---	74.00	25.33	15000	1000	187.0	V	36.0	-11.0
2127.538889	59.53	---	74.00	14.47	15000	1000	400.0	V	305.0	-6.7
2127.538889	---	25.81	54.00	28.19	15000	1000	400.0	V	305.0	-6.7
3199.011111	---	27.84	54.00	26.16	15000	1000	400.0	V	47.0	-3.1
3199.011111	56.42	---	74.00	17.58	15000	1000	400.0	V	47.0	-3.1
4250.105556	53.37	---	74.00	20.63	15000	1000	400.0	V	53.0	-0.7
4250.105556	---	28.61	54.00	25.39	15000	1000	400.0	V	53.0	-0.7
5995.688889	---	28.90	54.00	25.10	15000	1000	294.0	V	151.0	0.7
5995.688889	49.54	---	74.00	24.46	15000	1000	294.0	V	151.0	0.7
13850.494444	---	34.21	54.00	19.79	15000	1000	186.0	H	301.0	9.7
13850.494444	48.01	---	74.00	25.99	15000	1000	186.0	H	301.0	9.7

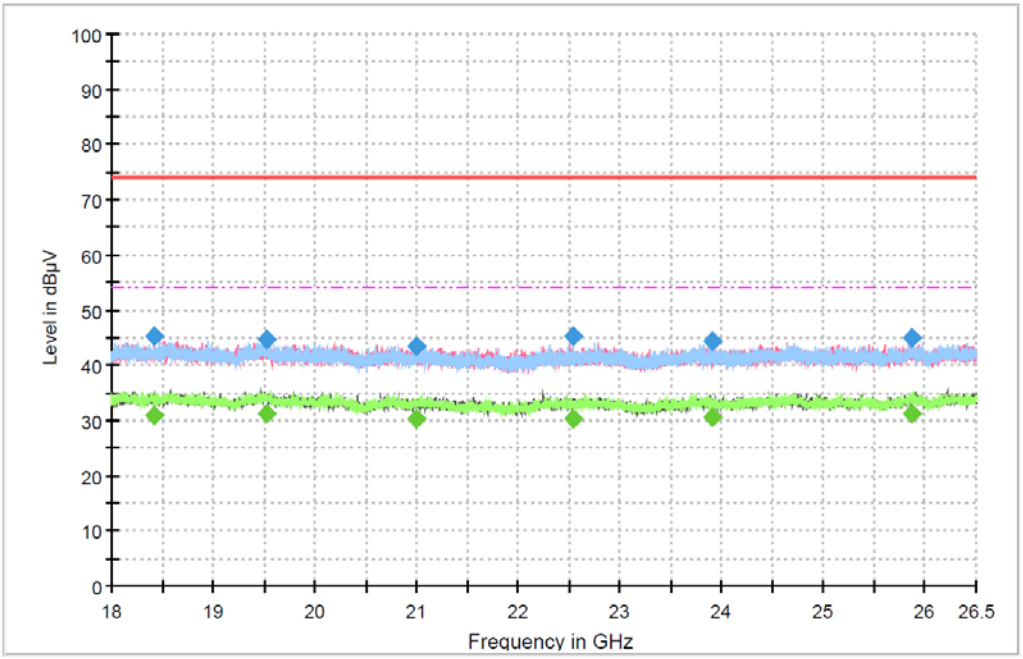
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Radiated emissions (Tx / Rx frequency) from the transceiver shall be ignored.
-Data transmission in the 2.4 GHz ISM Fundamental band (Bluetooth/Wi-Fi 802.11 a/b/g/n)
-Data transmission in the 4.8 GHz ISM Harmonic band (Bluetooth/Wi-Fi 802.11 a/b/g/n)

#3 (18 ~ 26.5 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.06
Environment	21.4 'C / 49.7 % 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)
18419.805556	45.26	---	74.00	28.74	15000	1000	315.0	V	24.0	-1.1
18419.805556	---	30.77	54.00	23.23	15000	1000	315.0	V	24.0	-1.1
19528.583333	---	31.14	54.00	22.86	15000	1000	115.0	H	334.0	-0.7
19528.583333	44.79	---	74.00	29.21	15000	1000	115.0	H	334.0	-0.7
20998.611111	---	30.14	54.00	23.86	15000	1000	390.0	V	282.0	0.9
20998.611111	43.49	---	74.00	30.51	15000	1000	390.0	V	282.0	0.9
22538.055556	---	30.16	54.00	23.84	15000	1000	315.0	H	334.0	2.0
22538.055556	45.18	---	74.00	28.82	15000	1000	315.0	H	334.0	2.0
23907.500000	44.23	---	74.00	29.77	15000	1000	311.0	V	109.0	0.5
23907.500000	---	30.43	54.00	23.57	15000	1000	311.0	V	109.0	0.5
25866.750000	---	31.25	54.00	22.75	15000	1000	303.0	V	-21.0	1.6
25866.750000	45.05	---	74.00	28.95	15000	1000	303.0	V	-21.0	1.6

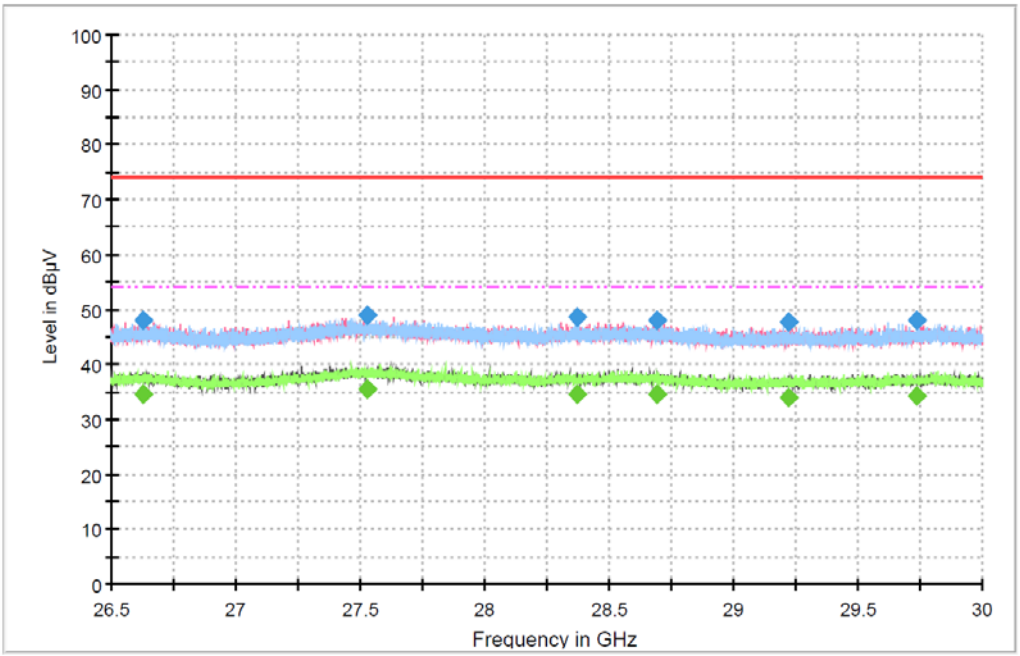
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.

#3 (26.5 ~ 30 GHz)

Test Report

Common Information

Project Number	BVCO-WAY-P21090029
Location	10 m SAC
System:	Above 1 GHz
Date:	2021.10.06
Environment	22.6 'C / 48.0 % 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)
26628.250000	---	34.54	54.00	19.46	15000	1000	115.0	H	292.0	7.1
26628.250000	48.04	---	74.00	25.96	15000	1000	115.0	H	292.0	7.1
27527.000000	---	35.55	54.00	18.45	15000	1000	102.0	V	210.0	9.9
27527.000000	48.94	---	74.00	25.06	15000	1000	102.0	V	210.0	9.9
28371.750000	---	34.50	54.00	19.50	15000	1000	125.0	H	204.0	9.5
28371.750000	48.53	---	74.00	25.47	15000	1000	125.0	H	204.0	9.5
28689.750000	---	34.52	54.00	19.48	15000	1000	378.0	V	163.0	9.2
28689.750000	48.10	---	74.00	25.90	15000	1000	378.0	V	163.0	9.2
29220.500000	---	33.93	54.00	20.07	15000	1000	116.0	H	261.0	8.4
29220.500000	47.66	---	74.00	26.34	15000	1000	116.0	H	261.0	8.4
29733.000000	---	34.11	54.00	19.89	15000	1000	211.0	H	31.0	8.4
29733.000000	47.92	---	74.00	26.08	15000	1000	211.0	H	31.0	8.4

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	-	-
WIDE BAND RADIO COMMUNICATION TESTER	R&S	CMW500	140398	2021.08.12	2022.08.12

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	2021.02.22	2023.02.22
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 ~ 30 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	-	-

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