

47 CFR Part 15 Subpart B Electromagnetic Compatibility Test Report

For

Smart Wearable

 ORDER NO.:
 BVCO-WAY-P21090029

 REPORT NO.:
 FCCBVCO-WAY-P21090029-5

 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

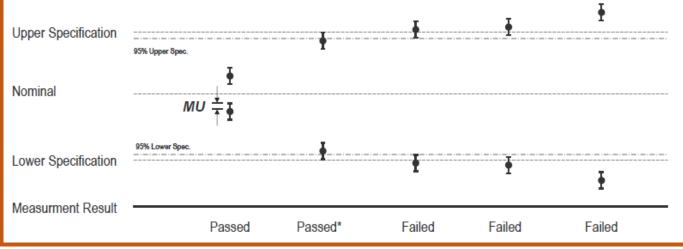
Test Report No.	FCCBVCO-WAY-P21090029-5
Tests Performed By:	Bureau Veritas CPS ADT Korea Ltd. Innoplex No.2 106, Sinwon-ro 306, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Republic of Korea
Test site:	Bureau Veritas CPS ADT Korea Ltd. HeungAn-daero 49, DongAn-gu, Anyang-si, Gyeonggi-do, 14119, Republic 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
Model Number: Multi-listing model number:	SM-R865U SM-R865F
Multi-listing model	
Multi-listing model number:	SM-R865F
Multi-listing model number: FCC Classification: Equipment	SM-R865F Communications Rcvr for use w/ licensed Tx and CBs (CXX)
Multi-listing model number: FCC Classification: Equipment Authorization	SM-R865F Communications Rcvr for use w/ licensed Tx and CBs (CXX) Supplier's Declaration of Conformity
Multi-listing model number: FCC Classification: Equipment Authorization Product Standards:	SM-R865F Communications Rcvr for use w/ licensed Tx and CBs (CXX) Supplier's Declaration of Conformity 47 CFR Part 15 Subpart B / ANSI C63.4: 2014
Multi-listing model number: FCC Classification: Equipment Authorization Product Standards: Sample Serial Number:	SM-R865F Communications Rcvr for use w/ licensed Tx and CBs (CXX) Supplier's Declaration of Conformity 47 CFR Part 15 Subpart B / ANSI C63.4: 2014 R3AR301CLRA

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
Note 1: Measurement uncertainty is calculated in acco The measurement uncertainty is given with a confidence	

Report Number Model Number

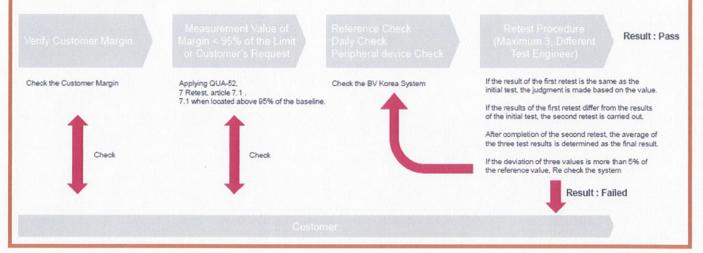
FCCBVCO-WAY-P21090029-5 SM-R865U



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 90029-5	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:

Junil Park / Senior Engineer

, DATE : 18 October, 2021 , DATE : 18 October, 201

APPROVED BY :

Rina Bae / Techinical Manager



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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		ass A / 🔀 Class B			
Conducted RF Emissions		Not Applicable	Not Applicable ^{Note1)}		
Radiated RF Emissions (Below 1 GHz)	47 CFR Part 15 Subpart B ANSI C63.4: 2014	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.					
Note1) Compliance with Part 15B requirement for the conducted emissions is covered by JAB(FCCBVCO-WAY-P21090029-4) test report.					



2. General Product Description

2.1 Equipment Description

Description

The Equipment Under Test (EUT) is the Smart Wearable. The test data contained in this report pertains only to the emissions due to receiver circuitry of the licensed transmitter of the EUT.

The device contains receivers which tune and operating between 30 MHz – 960 MHz in the following bands: WCDMA B5, LTE B5/B12/B13/B26/B71

2.2 Technical Data

CPU	Exynos W920
Ports	-
H/W Version	REV 1.0
S/W Version	R865U.001
FCC ID	A3LSMR865
Wireless Communication	 UMTS Band 2/4/5 LTE Band 2/4/5/12/13/25/26/66/71 WLAN a/b/g/n(HT20) DFS (UNII client without radar detection) Bluetooth BDR/EDR/LE 1M/LE 2M 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			
	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	-			
	Mode 2						
EUT	Smart Wearable	Samsung Electronics Co., Ltd.	SM-R865U	EUT			
* Note: EUT -	Equipment Under Tes	st, AE - Auxiliary/Associated Equ	uipment				

3.2 Input/Output Ports

START		END					
Name	I/O Port	Name	I/O Port	Length (m)	Shield	With Ferrite	
		Moo	de 1				
EUT	-	Wireless Charger	-	-	-	-	
Wireless Charger	-	Travel Adapter	USB Type-A	0.8	Unshield	-	
Travel Adapter	AC In	AC Mains	AC Out	-	-	-	
	Mode 2						
EUT	-	-	-	-	-	-	

3.3 Power Interface:

Pated Voltage	Wireless Charging: DC 5 V, 1 A
Rated Voltage	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 Modes of Description

Mode #	Description	Comments	
1	Wireless Charging(w/TA) + Cellular receiver (LTE FDD Band13 Center Frequency)	Low/Middle/High Channel	
2	Battery + Cellular receiver (LTE FDD Band13 Center Frequency)	Low/Middle/High Channel	

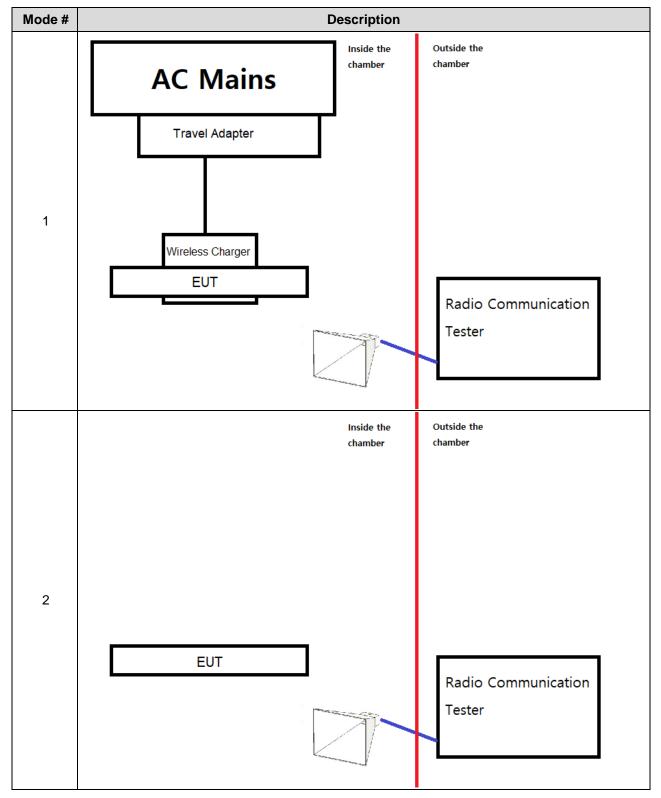
*Worst case by LTE FDD Band13

Note1) All cellular RX bands operating below 1 GHz, including WCDMA and LTE have been investigated with Low/Middle/High channels. Among the bands, LTE 13_Middle (751 MHz) is the worst mode.

Note2) The device was determined in the worst orientation y of the 3 orientations (x, y and z). Accordingly, all final radiated emission tests were performed in the y orientation of the EUT and contained test result in this report.



3.5 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.						
В	asic S	tandard		ANSI 63.4: 201	4		
	Test	Date		-			
Parameters		led during the test	Laboratory Ambient	Temperature		°C	
1 drameters	Parameters recorded during the test		Relative Hu	midity		%	
			Frequency range on e	each side of line	М	easurement Point	
Fully configured sample scanned over the following frequency range			150 kHz to 30 MHz A		AC	AC mains power ports	
		Limits –	AC mains power port	s (Class A)			
Frequency (Limit (dBµV)			
Frequency (IVII 1 <i>2)</i>	Quasi-Peak	Result	Average	Result		
0.15 to 0	.5	79	-	66		-	
0.5 to 30	0	73	-	60		-	
		Limits –	AC mains power port	s (Class B)			
- Erecuency (Limit (dBµV)				
Frequency (ivi⊓∠)	Quasi-Peak	Result	Average		Result	
0.15 to 0	.5	66 to 56	-	56 to 46		-	
0.5 to 5	5	56	-	46		-	
5 to 30		60	-	50		-	
e1) Formula	-						

Note1) Formula

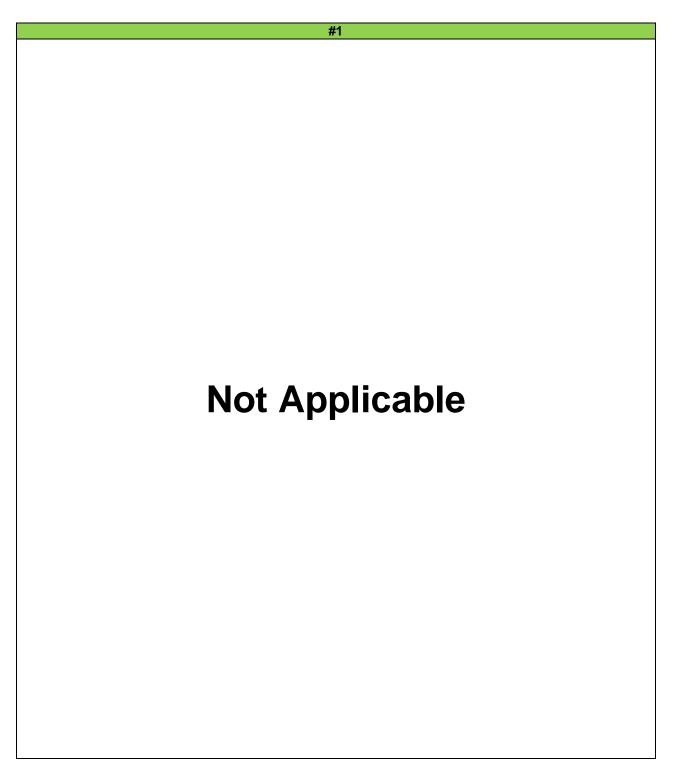
Final Value (QP and/or CAV) = Reading Value (QP and/or CAV) + Corr. (AMN Insertion Loss + Cable Loss) Margin (QP and/or CAV) = Limit – Final Value (QP and/or CAV)

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

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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	3.4: 2014			
Test Date	05 October, 2021				
Parameters recorded during the test	Laboratory Ambient Temperature	(20.6 ± 1.0) °C			
	Relative Humidity	(54.4 ± 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			
l	imits – 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)				
Frequency (Miriz)	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

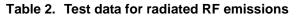
Final Value (PK and/or QP and/or CAV) = Reading Value (PK and/or QP and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amplifier Gain)

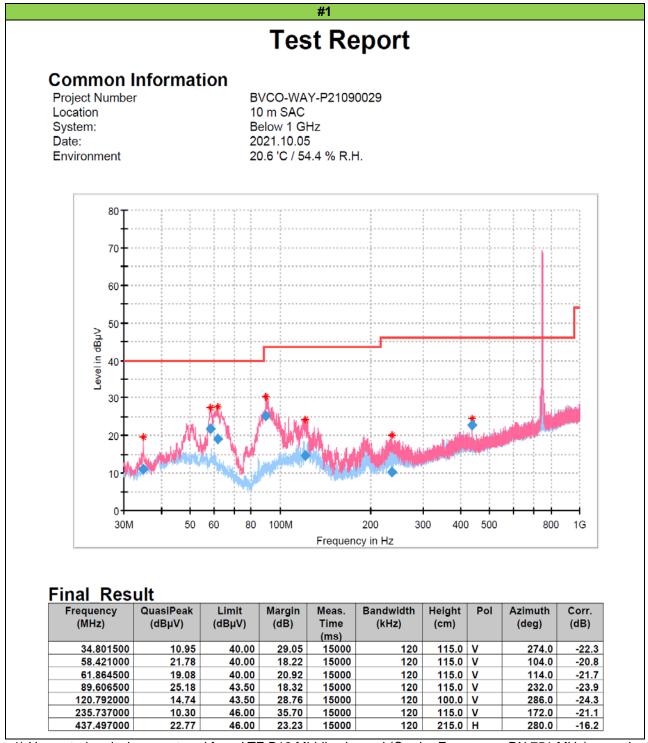
Margin (PK and/or QP and/or CAV) = Limit – Final Value (PK and/or QP and/or CAV) PK = Peak, QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

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

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



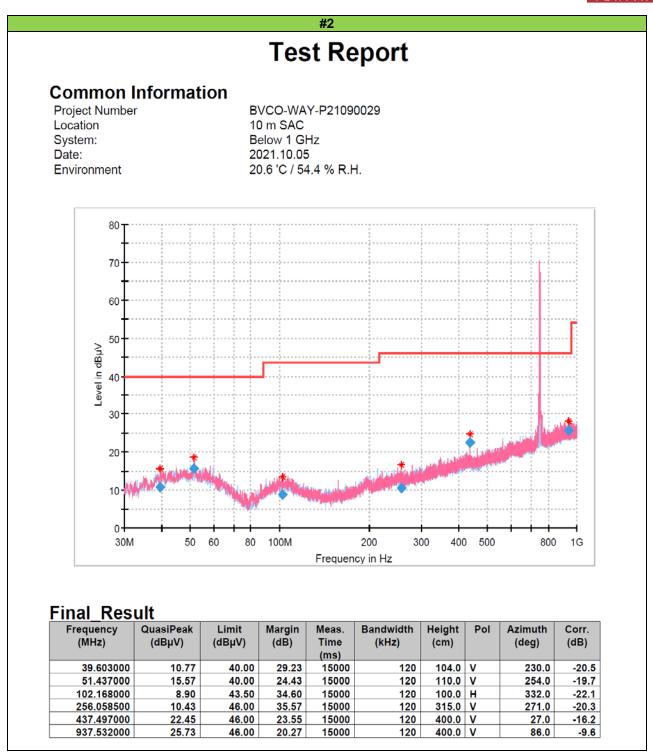




Note1) Unwanted emissions captured from LTE B13 Middle channel (Carrier Frequency: RX 751 MHz) were the RX signals generated from the call-simulator.

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Note1) Unwanted emissions captured from LTE B13 Middle channel (Carrier Frequency: RX 751 MHz) were the RX signals generated from the call-simulator.



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				
Parameters recorded during the test	Laboratory Ambi	ent Temperature	(21.7 ± 1.0)		
	Relative Humidity		(52.3 ± 1.0) %		
	Frequency range		Measurement Point		
Fully configured sample scanned over the following frequency range	1 GHz – 40 GHz		3 meter measurement distance		
	Limits – C	lass A			
	Limit (dBµV/m)				
Frequency (GHz)	Peak	Result	Average	Result	
1 to	80	-	60	-	
Limits – Class B					
	Limit (dBµV/m)				
Frequency (GHz)	Peak	Result	Average	Result	
1 to 10	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)

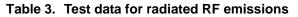
PK = Peak, QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

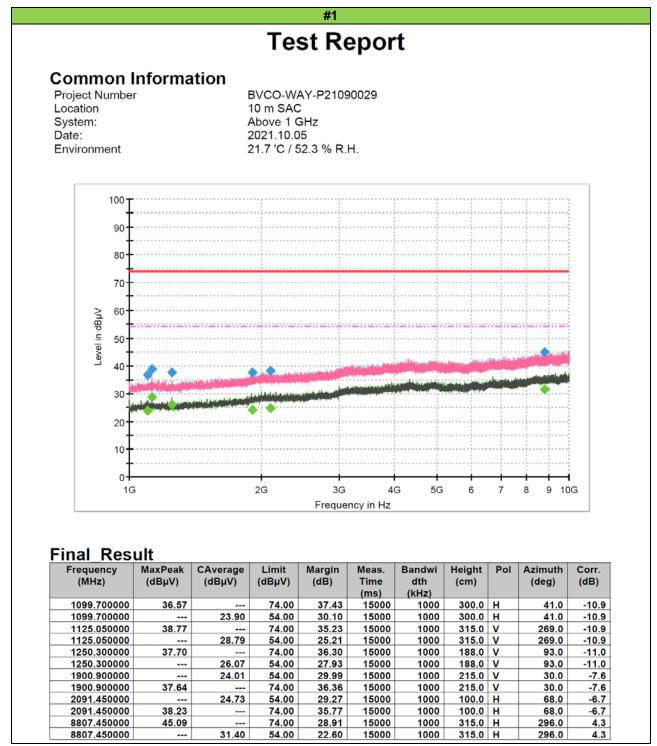
Note2) Distance (Antenna to Centre of Turntable), Antenna Height

Above 1 GHz, Distance = 4.5 m, Antenna Height (Considering size of EUT) = (1 to 4) m $1.2 = 1.1 + 20 \log (d1 (m)) (d2 (m)) = 20 \log (4.5 / 3) = 3.5$

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



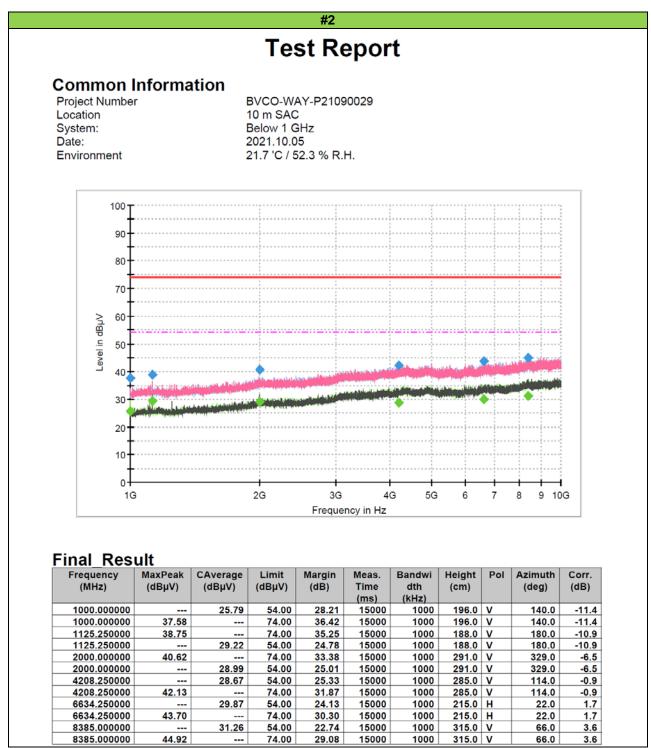




Note1) LTE B13 Middle channel (Carrier Frequency: RX 751 MHz)

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Note1) LTE B13 Middle channel (Carrier Frequency: RX 751 MHz)



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

Appendix A. Test site accreditations

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

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



Radiated Emissions (1 GHz ~ 10 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
SIGNAL CONDITIONING UNIT	R&S	SCU-18F	180111	2020.12.09	2021.12.09
Software	R&S	EMC 32	10.35.10 Version	-	-
WIDE BAND RADIO COMMUNICATION TESTER	R&S	CMW500	140398	2021.08.12	2022.08.12

- The End -