TEST REPORT

KCTL KCTL Inc.
65, Sinwon-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311
www.kctl.co.kr

KCTL

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2020-04-03

2. Use of Report : Certification

3. Name of Product and Model : Smart Wearable / SM-R840

4. Manufacturer and Country of Origin : Samsung Electronics Co., Ltd. / Vietnam

5. FCC ID : A3LSMR840

6. IC Certificate No. : 649E-SMR840

7. Date of Test : 2020-04-16 to 2020-05-20

8. Location of Test : ■ Permanent Testing Lab □ On Site Testing (Address: Address of testing location)

9. Test method used : FCC Part 15 subpart C, 15.247
RSS-247 Issue 2 February 2017
RSS-Gen Issue 5 March 2019

10. Test Results : Refer to the test result in the test report

Affirmation	Tested by Name : Kwonse Kim (Signature)	Technical Manager Name : Seungyong Kim (Signature)

2020-05-28

KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2020-05-25	Originally issued	-
2020-05-27	Updated	5, 6
2020-05-28	Updated	5

Note. The report No. KR20-SRF0139-A is superseded by the report No. KR20-SRF0139-B.

General remarks for test reports

Nothing significant to report.

CONTENTS

1. General information 4
2. Device information 4
2.1. Accessory information 5
2.2. Model Information 5
3. Introduction 5
3.1 Difference 5
3.2 Spot check verification data (Band-edge & Spurious emission) 6
3.3 Reference Detail 7
4. Test results 8
5. Measurement equipment 20

1. General information

Client	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Manufacturer	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Laboratory	:	KCTL Inc.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132
		VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
		Industry Canada Registration No. : 8035A
		KOLAS No.: KT231

2. Device information

Equipment under test	:	Smart Wearable
Model	:	SM-R840
Derivative model	:	SM-R840X, SM-R845X
Frequency range	:	Bluetooth(BDR/EDR/BLE)_2 402 ㎒ ~ 2 480 ㎒
		WIFI(802.11b/g/n20)_2 412 ㎒ ~ 2 472 ㎒
Modulation technique	:	Bluetooth(BDR/EDR)_ GFSK, π/4DQPSK, 8DPSK
		Bluetooth(BLE)_GFSK
		WIFI(802.11b/g/n20)_DSSS, OFDM
Number of channels	:	Bluetooth(BDR/EDR)_79 ch
		Bluetooth(BLE)_40 ch
		WIFI(802.11b/g/n20)_13 ch
Power source	:	DC 3.85 V
Antenna specification	:	WIFI/Bluetooth(BDR/EDR/BLE)_LDS Antenna
Antenna gain	:	WIFI/Bluetooth(BDR/EDR/BLE) : -8.31 ㏈i
Software version	:	R840.001, R840X.001
Hardware version	:	REV1.0
Test device serial No.	:	Conducted(R3AN300KYEL)
		Radiated(RFAN40RK59Z, RFAN40RK5EN, RFAN40RK4YJ)
Operation temperature	:	-30 ℃ ~ 50 ℃

2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source	FCC ID & IC
Wireless charger	Samsung Electronics Co., Ltd.	EP-OR825	-	DC 5.0 V, 1.0 A	A3LEPOR825 / 649E-EPOR825

2.2. Model Information

The difference between basic model and derivative models is:

Hardware is identical with the basic model and software is as follows.
a. For the model SM-R840:
- Only LDU App is not added.

b. For the model SM-R840X, SM-R845X:
- All application of features are same with basic model.
- Only LDU App is added.
- These models are not filing for ISED filing.

3. Introduction

This report referenced from the FCC ID : A3LSMR845 and IC : 649E-SMR845.
Based on their similarity, the FCC Part 15C and RSS-247 (equipment class : DTS, DSS) reuse the original model's result and do spot-check, following the FCC KDB 484596 D01 v01.
And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

3.1 Difference

The FCC ID: A3LSMR840 & IC: 649E-SMR840 shares the same enclosure and circuit board as FCC ID: A3LSMR845 & IC: 649E-SMR845. The WIFI/BT/BLE antenna and surrounding circuitry and layout are identical between these two units. The only difference between the FCC ID: A3LSMR845 & IC: 649E-SMR845 and FCC ID: A3LSMR840 & IC: 649E-SMR840 is to remove the WCDMA/LTE transceiver, MMPA, L-FEMiD and E-SIM from the models filed under FCC ID:A3LSMR840 & IC: 649E-SMR840.

As for all bands, they have been verified and the parent model test results under FCC ID : A3LSMR845 & IC: 649E-SMR845 shall remain representative of FCC ID : A3LSMR840 & IC: 649E-SMR840.

3.2 Spot check verification data (Band-edge & Spurious emission)

Test band	Test item	Test mode	Channel	Measured frequency (㎒)	SM-R845U (dB㎶)		SM-R840 (dB㎶)		Deviation (dB)	
					Avg.	Peak	Avg.	Peak	Avg.	Peak
2.4G WIFI	Band edge	802.11b	1	2 310 ~ 2 390	-	47.56	-	46.76	-	0.80
	RSE		1	4 824	-	41.44	-	41.46	-	-0.02
	Band edge	802.11g	1	2 310 ~ 2 390	49.32	61.82	49.50	59.07	-0.18	2.75
	RSE		1	4 824	-	42.33	-	41.93	-	0.40
	Band edge	802.11n HT20	1	2 310 ~ 2 390	47.05	61.07	49.06	61.73	-2.01	-0.66
	RSE		12	4 934	-	42.22	-	40.35	-	1.87
BT	Band edge	DH5	0	2 310 ~ 2 390	-	43.36	-	42.51	-	0.85
	RSE		78	4 960	-	41.92	-	43.50	-	-1.58
	Band edge	3DH5	0	2 310 ~ 2 390	-	43.95	-	43.95	-	0.00
	RSE		78	4 960	-	42.41	-	41.05	-	1.36
BLE	Band edge	1Mbps Packet 37	0	2 310 ~ 2 390	-	43.73	-	42.31	-	1.42
	RSE		19	4 880	-	40.65	-	41.51	-	-0.86

Notes:

1. For FCC ID: A3LSMR840 & IC: 649E-SMR840 has been verified the performance as for WIFI, BT, BLE identical with the FCC ID: A3LSMR845 & IC: A3LSMR845.
2. Comparison of two models, upper deviation is within 3 ㏈ range and all test results are under FCC technical limits.
3. The test procedure(s) in this report were performed in accordance as following.
   - KDB 484596 D01 v01

3.3 Reference Detail

Reference application that contains the reused reference data in the individual test reports.

Equipment Class	Reference FCC ID & IC	Application Type	Reference Test report Number	Exhibit Type	Variant Test Report Number	Date Reused
DTS	A3LSMR845, 649E-SMR845	Original	KP20-SRF0127(WIFI)	Test report	KP20-SRF0139	All
DTS	A3LSMR845, 649E-SMR845	Original	KP20-SRF0129(BLE)	Test report	KP20-SRF0139	All
DSS	A3LSMR845, 649E-SMR845	Original	KP20-SRF0128(BT)	Test report	KP20-SRF0139	All

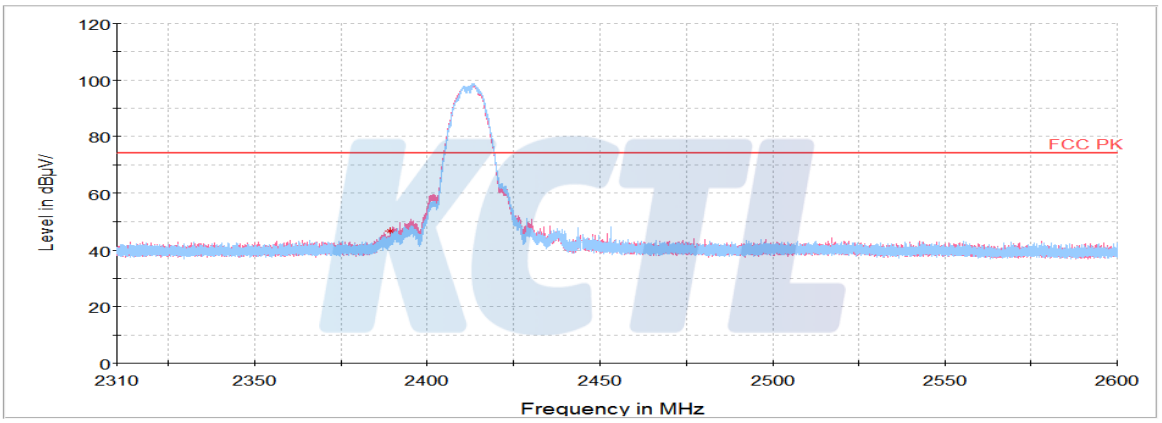
4. Test results

Test results (2.4G WIFI)
802.11b / Band-edge

1 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
2 389.41[1)]	V	43.92	31.88	-29.04	-	46.76	74.00	27.24
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Horizontal/Vertical for Band-edge

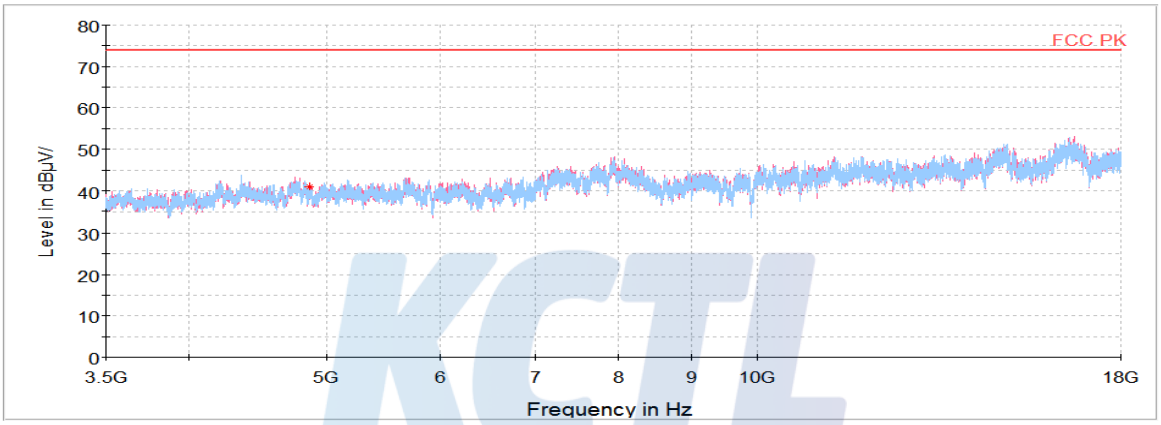


802.11b / Harmonic

1 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
4 826.75[1)]	V	61.19	33.93	-53.66	-	41.46	74.00	32.54
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

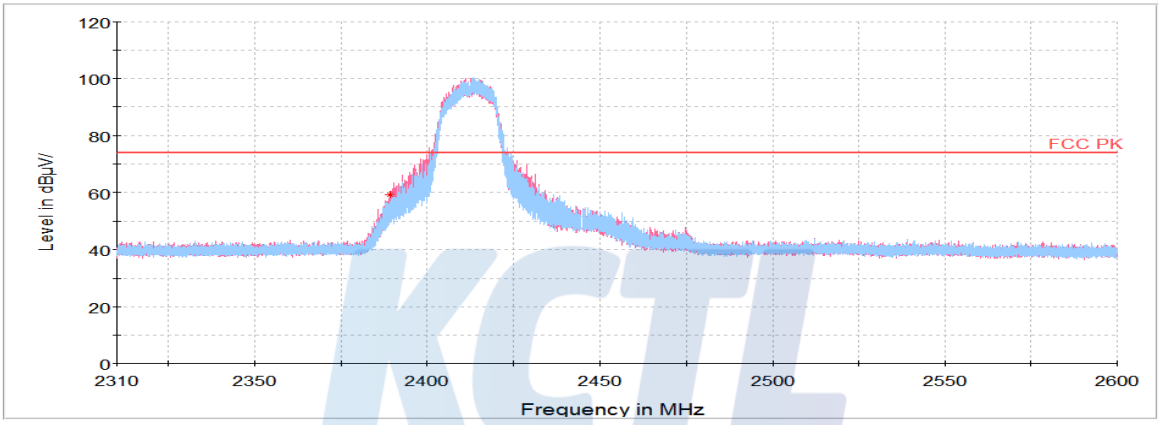


802.11g / Band-edge

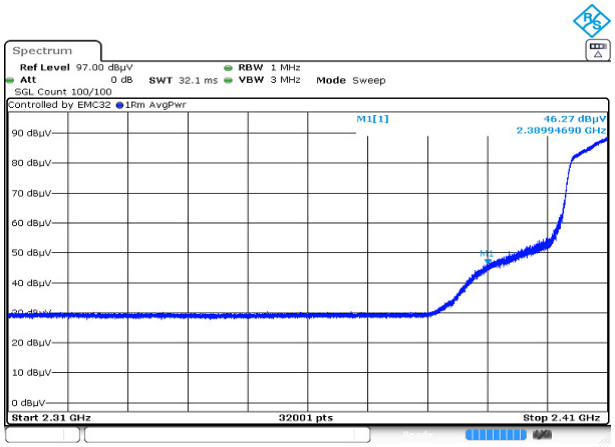
1 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
2 389.95[1)]	V	56.23	31.88	-29.04	-	59.07	74.00	14.93
Average Data								
2 389.95[1)]	V	46.27	31.88	-29.04	0.39	49.50	54.00	4.50

Horizontal/Vertical for Band-edge



Average data



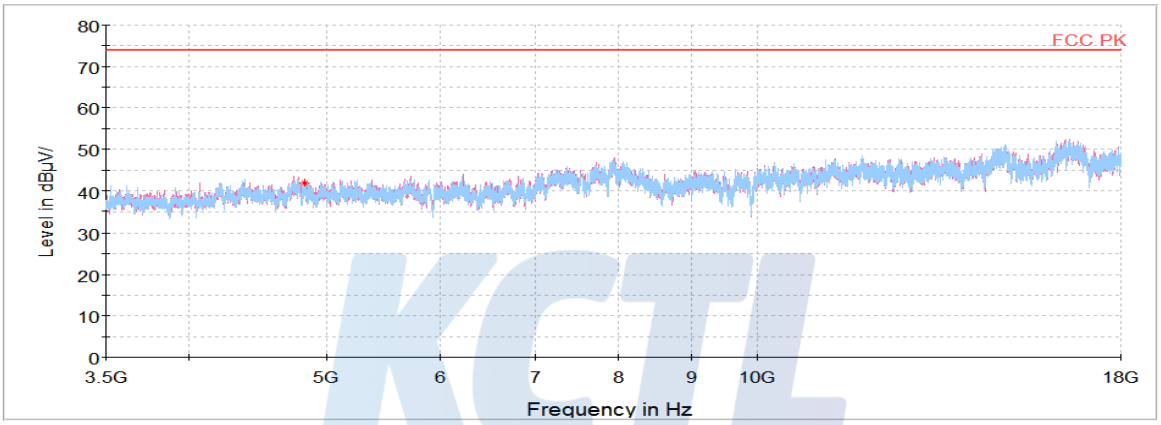
Blank

802.11g / Harmonic

1 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
4 827.20[1)]	V	61.67	33.93	-53.67	-	41.93	74.00	32.07
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

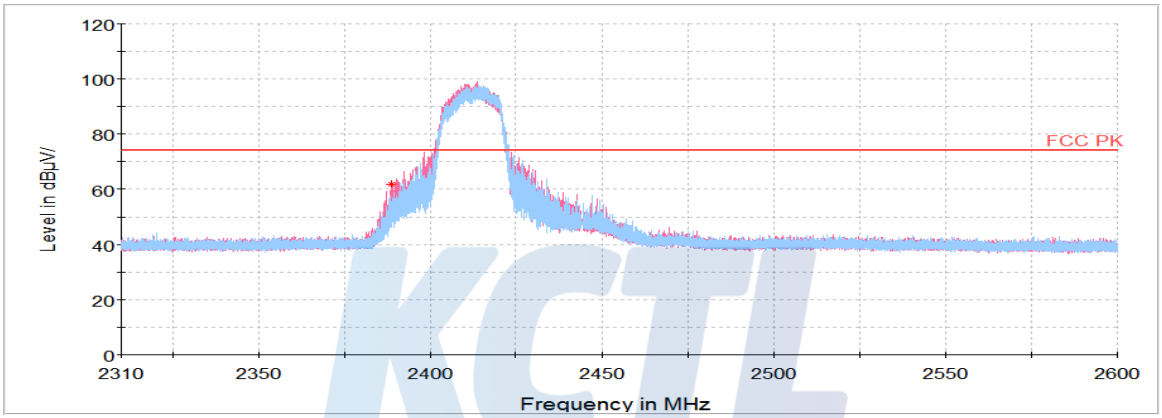


802.11n HT20 / Band-edge

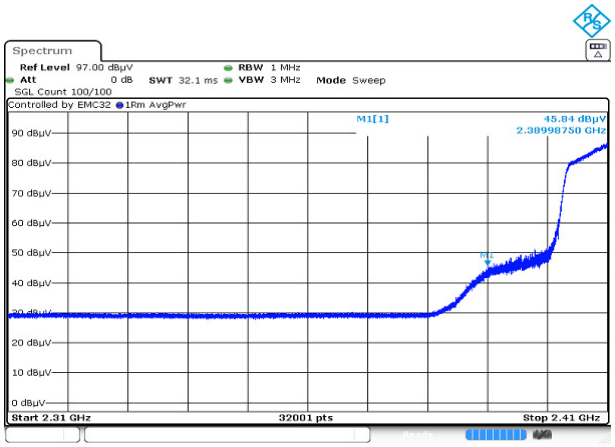
1 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
2 389.99[1)]	V	58.89	31.88	-29.04	-	61.73	74.00	12.27
Average Data								
2 389.99[1)]	V	45.84	31.88	-29.04	0.38	49.06	54.00	4.94

Horizontal/Vertical for Band-edge



Average data



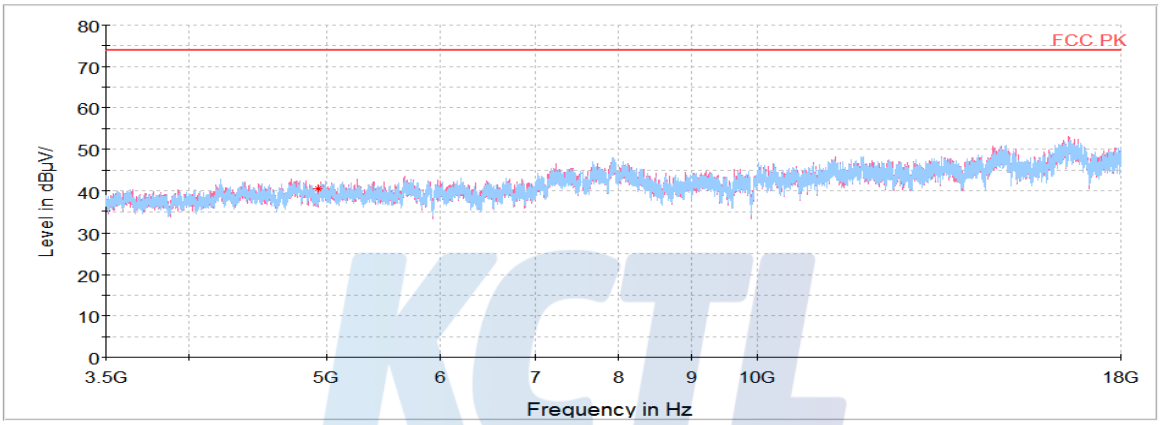
Blank

802.11n HT20 / Harmonic

12 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
4 935.50[1)]	V	61.48	33.97	-55.10	-	40.35	74.00	33.65
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

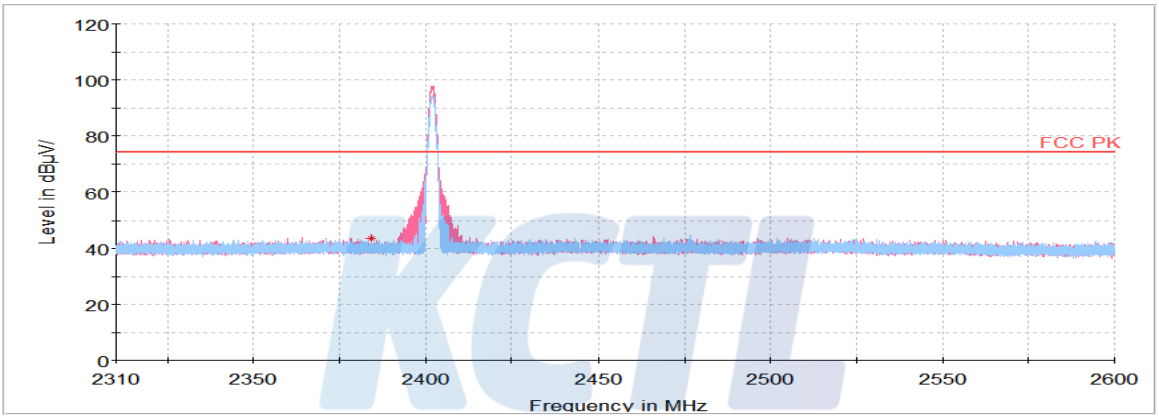


Test results (Bluetooth)
GFSK / Band-edge

0 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
2 389.23[1)]	H	39.67	31.88	-29.04	-	42.51	74.00	31.49
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for Band-edge

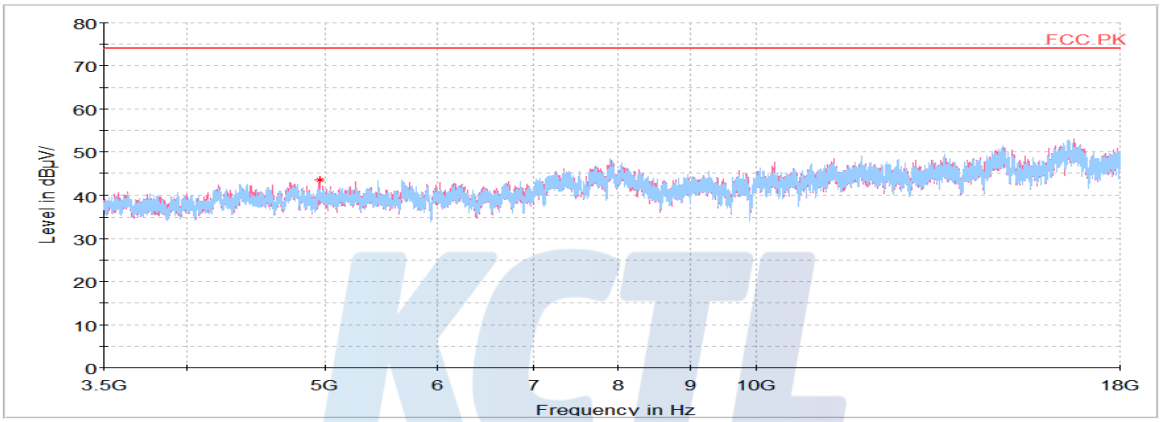


GFSK / Harmonic

78 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
4 960.42[1)]	V	64.18	33.98	-54.66	-	43.50	74.00	30.50
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

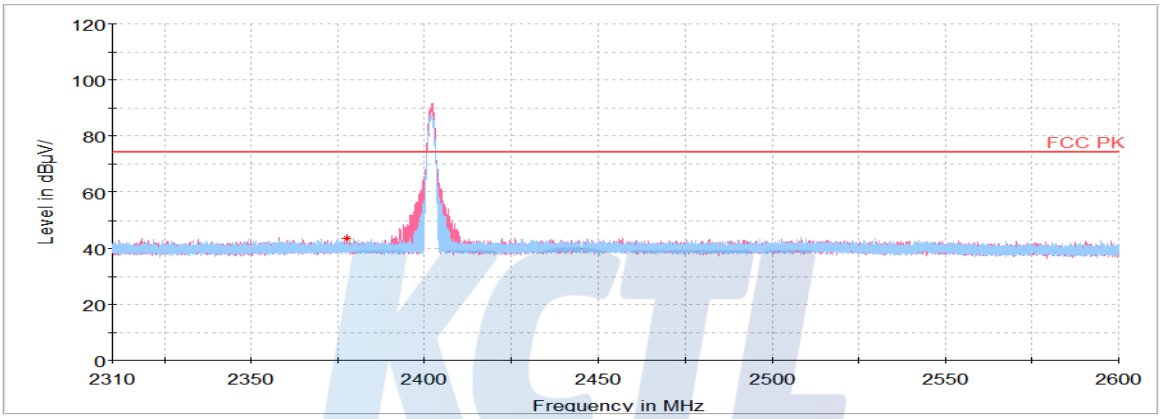


8DPSK / Band-edge

0 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
2 381.03[1)]	V	41.18	31.86	-29.09	-	43.95	74.00	30.05
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for Band-edge

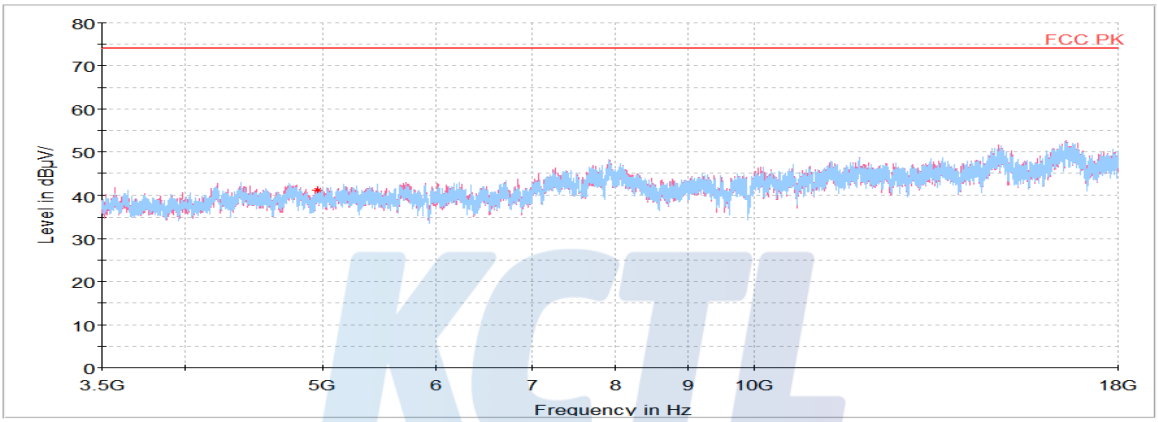


8DPSK / Harmonic

78 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
4 959.97[1)]	V	61.73	33.98	-54.66	-	41.05	74.00	32.95
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓

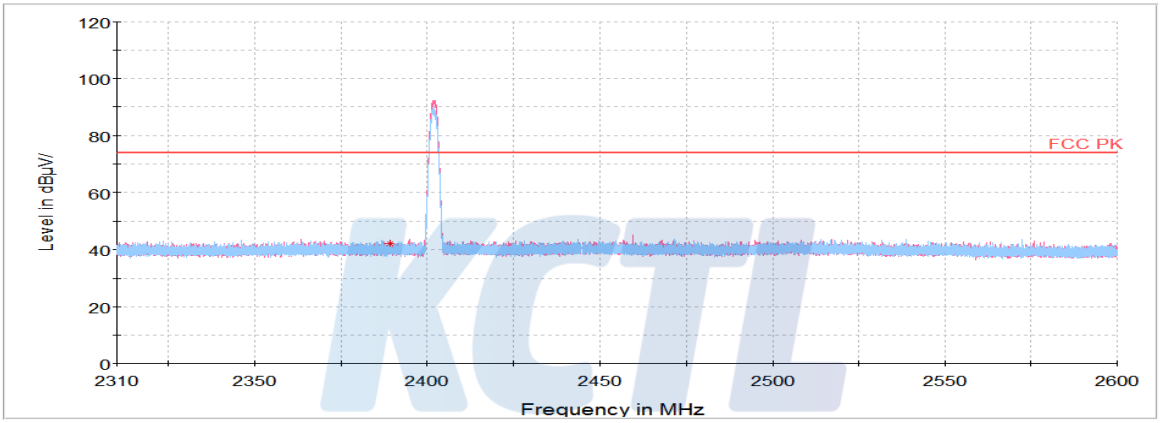


Test results (Bluetooth Low Energy)
BLE_1 MBit/s(37 Bytes) / Band-edge

0 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
2 389.27[1)]	V	39.47	31.88	-29.04	-	42.31	74.00	31.69
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Horizontal/Vertical for Band-edge

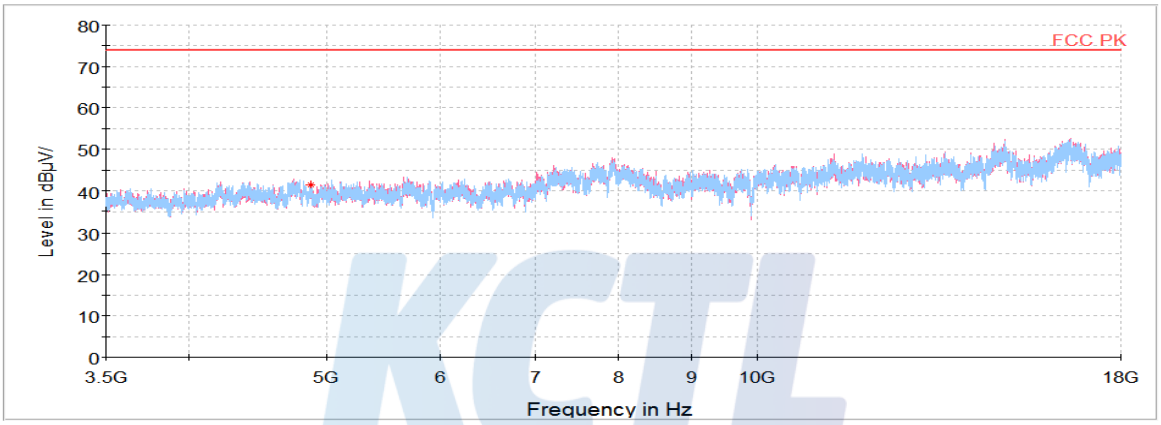


BLE_1 MBit/s(37 Bytes) / Harmonic

19 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(㎒)	(V/H)	(dB(㎶))	(dB)	(dB)	(dB)	(dB(㎶/m))	(dB(㎶/m))	(dB)
Peak data								
4 873.42[1)]	V	62.54	33.95	-54.98	-	41.51	74.00	32.49
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



5. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV40	100988	21.01.03
EMI TEST RECEIVER	R&S	ESCI7	100732	20.08.22
Bluetooth Tester	TESCOM	TC-3000C	3000C000270	20.07.31
Bi-Log Antenna	TESEQ	CBL 6112D	37876	20.07.20
Amplifier	SONOMA INSTRUMENT	310N	284608	20.08.22
COAXIAL FIXED ATTENUATOR	Agilent	8491B-003	2708A18758	22.04.23*
ATTENUATOR	Agilent	8491B	MY39270292	20.07.20
Horn antenna	ETS.lindgren	3117	155787	20.10.24
Horn antenna	ETS.lindgren	3116	00086632	21.02.17
Attenuator	API Inmet	40AH2W-10	10	20.08.01
Broadband PreAmplifier	SCHWARZBECK	BBV9718	216	20.07.30
AMPLIFIER	L-3 Narda-MITEQ	AMF-7D-01001800 -22-10P	2031196	21.02.12
AMPLIFIER	L-3 Narda-MITEQ	JS44-18004000-33-8P	2000996	21.01.22
LOOP Antenna	R&S	HFH2-Z2	100355	20.08.24
Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
Turn Table	Innco Systems	DT2000	79	-
Antenna Mast	Innco Systems	MA4000-EP	303	-
Turn Table	Innco Systems	DT2000	79	-
Highpass Filter	WT	WT-A1698-HS	WT160411001	21.05.11*
Vector Signal Generator	R&S	SMBV100A	257566	20.07.16
Signal Generator	R&S	SMR40	100007	21.04.08

*The equipment was used after finished calibration.

End of test report