




# TEST REPORT

<p><b>KCTL KCTL Inc.</b> 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 <a href="http://www.kctl.co.kr">www.kctl.co.kr</a></p>	<p>Report No.: KR20-SRF0140-A Page (1) of (20)</p>	
<p><b>1. Client</b></p> <ul style="list-style-type: none"> <li>◦ Name : Samsung Electronics Co., Ltd.</li> <li>◦ Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea</li> <li>◦ Date of Receipt : 2020-04-03</li> </ul> <p><b>2. Use of Report</b> : Certification</p> <p><b>3. Name of Product and Model</b> : Smart Wearable / SM-R850</p> <p><b>4. Manufacturer and Country of Origin</b> : Samsung Electronics Co., Ltd. / Vietnam</p> <p><b>5. FCC ID</b> : A3LSMR850</p> <p><b>6. IC Certificate No.</b> : 649E-SMR850</p> <p><b>7. Date of Test</b> : 2020-04-16 to 2020-05-20</p> <p><b>8. Location of Test</b> : <input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing (Address: Address of testing location)</p> <p><b>9. Test method used</b> : FCC Part 15 subpart C, 15.247 RSS-247 Issue 2 February 2017 RSS-Gen Issue 5 March 2019</p> <p><b>10. Test Results</b> : Refer to the test result in the test report</p>		
Affirmation	<p>Tested by</p> <p>Name : Kwonse Kim (Signature)</p>	<p>Technical Manager</p> <p>Name : Seungyong Kim (Signature)</p>
<p style="text-align: right;">2020-05-28</p> <p style="text-align: center;"><b>KCTL Inc.</b></p> <p>As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.</p>		

**REPORT REVISION HISTORY**

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

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Note. The report No. KR20-SRF0140 is superseded by the report No. KR20-SRF0140-A.

**General remarks for test reports**

Nothing significant to report.

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## 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-R850  
Derivative model : SM-R850X, SM-R855X  
Frequency range : Bluetooth(BDR/EDR/BLE)\_2 402 MHz ~ 2 480 MHz  
WIFI(802.11b/g/n20)\_2 412 MHz ~ 2 472 MHz  
Modulation technique : Bluetooth(BDR/EDR)\_ GFSK,  $\pi/4$ DQPSK, 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) : -6.34 dBi  
Software version : R850.001, R850X.001  
Hardware version : REV1.0  
Test device serial No. : Conducted(R3AN301WXGX)  
Radiated(R3AN301WLMF, R3AN301WGZD, R3AN301WBVM)  
Operation temperature : -30 °C ~ 50 °C

## 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-R850:
  - Only LDU App is not added.
- b. For the model SM-R850X, SM-R855X:
  - 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 : A3LSMR855 and IC : 649E-SMR855.

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: A3LSMR850 & IC: 649E-SMR850 shares the same enclosure and circuit board as FCC ID: A3LSMR855 & IC: 649E-SMR855. The WIFI/BT/BLE antenna and surrounding circuitry and layout are identical between these two units. The only difference between the FCC ID: A3LSMR855 & IC: 649E-SMR855 and FCC ID: A3LSMR850 & IC: 649E-SMR850 is to remove the WCDMA/LTE transceiver, MMPA, L-FEMiD and E-SIM from FCC ID:A3LSMR855 & IC: 649E-SMR855.

As for all bands, they have been verified and the parent model test results under FCC ID : A3LSMR855 & IC: 649E-SMR855 shall remain representative of FCC ID : A3LSMR850 & IC: 649E-SMR850.

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

Test band	Test item	Test mode	Channel	Measured frequency (MHz)	SM-R855U (dB $\mu$ V)		SM-R850 (dB $\mu$ V)		Deviation (dB)	
					Avg.	Peak	Avg.	Peak	Avg.	Peak
2.4G WIFI	Band edge	802.11b	11	2 483.5 ~ 2 500	-	50.47	-	52.42	-	-1.95
	RSE		1	4 824	-	47.94	-	45.16	-	2.78
	Band edge	802.11g	1	2 310 ~ 2 390	51.77	62.98	51.28	65.09	0.49	-2.11
	RSE		1	4 824	-	42.45	-	41.92	-	0.53
	Band edge	802.11n HT20	1	2 310 ~ 2 390	51.98	61.43	49.13	59.55	2.85	1.88
	RSE		1	4 824	-	42.98	-	42.74	-	0.25
BT	Band edge	DH5	0	2 310 ~ 2 390	-	43.76	-	43.24	-	0.52
	RSE		78	4 960	-	44.53	-	47.30	-	-2.77
	Band edge	3DH5	78	2 483.5 ~ 2 500	-	44.68	-	43.18	-	1.50
	RSE		78	7 440	-	45.72	-	46.23	-	-0.51
BLE	Band edge	1Mbps Packet 37	39	2 483.5 ~ 2 500	-	43.56	-	43.65	-	-0.09
	RSE		39	7 440	-	44.73	-	44.75	-	-0.02

**Notes:**

- For FCC ID: A3LSMR850 & IC: 649E-SMR850 has been verified the performance as for WIFI, BT, BLE identical with the FCC ID: A3LSMR855 & IC: 649E-SMR855.
- Comparison of two models, upper deviation is within 3 dB range and all test results are under FCC technical limits.
- 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	A3LSMR855, 649E- SMR855	Original	KP20- SRF0133(WIFI)	Test report	KP20- SRF0140	All
DTS	A3LSMR855, 649E- SMR855	Original	KP20- SRF0135(BLE)	Test report	KP20- SRF0140	All
DSS	A3LSMR855, 649E- SMR855	Original	KP20- SRF0134(BT)	Test report	KP20- SRF0140	All

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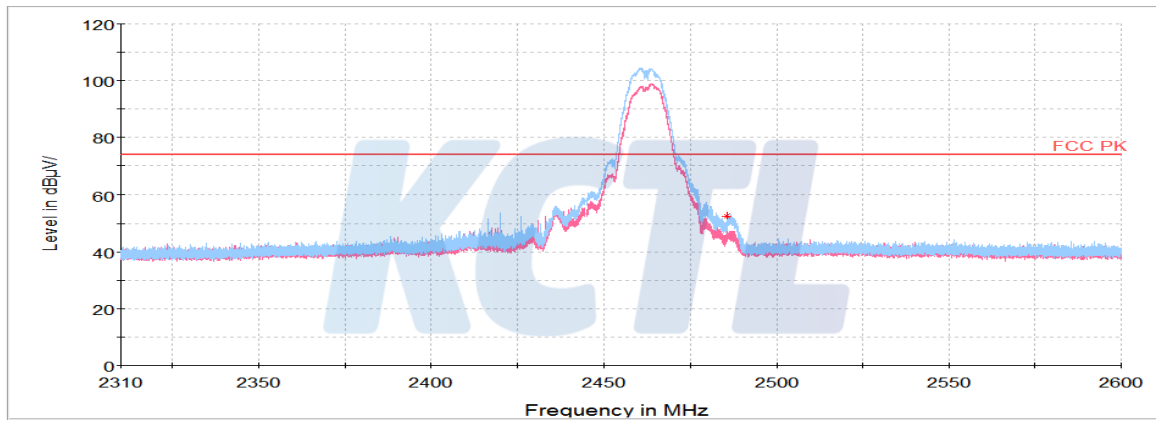
## 4. Test results

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

#### 11 Channel

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Peak data</b>								
2 486.65 <sup>1)</sup>	H	49.57	32.07	-29.22	-	52.42	74.00	21.58
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

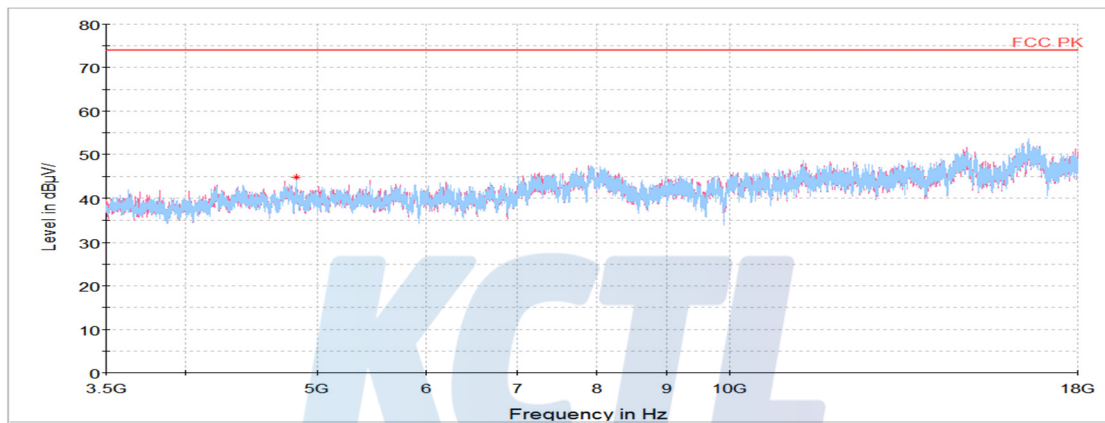
#### Horizontal/Vertical for Band-edge





**802.11b / Harmonic****1 Channel**

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB( $\mu$ V))	(dB)	(dB)	(dB)	(dB( $\mu$ V/m))	(dB( $\mu$ V/m))	(dB)
<b>Peak data</b>								
4 821.31 <sup>1)</sup>	H	64.73	33.93	-53.50	-	45.16	74.00	28.84
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

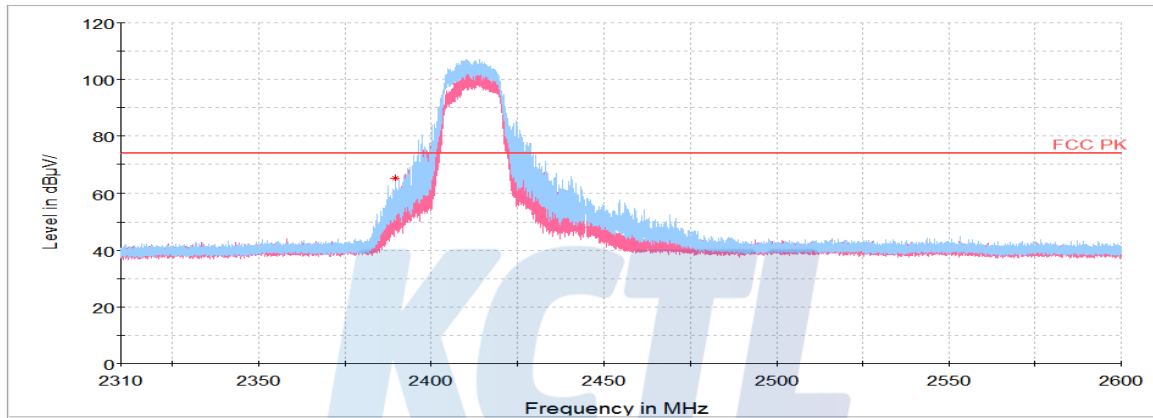
**Horizontal/Vertical for 3.5 GHz ~ 18 GHz**

**802.11g / Band-edge**

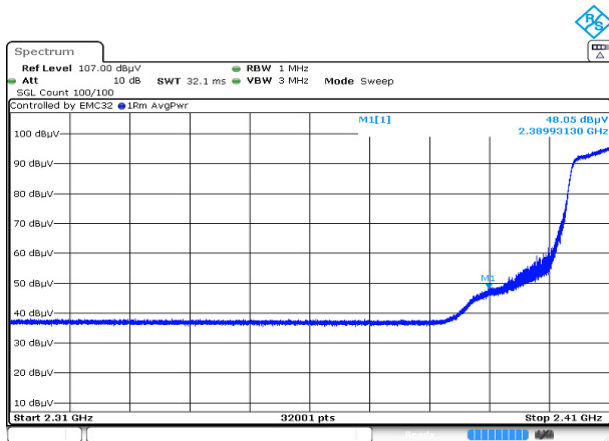
**1 Channel**

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)
<b>Peak data</b>								
2 389.93 <sup>1)</sup>	H	36.24	31.88	-3.03	-	65.09	74.00	8.91
<b>Average Data</b>								
2 389.93 <sup>1)</sup>	H	48.05	31.88	-29.04	0.39	51.28	54.00	2.72

**Horizontal/Vertical for Band-edge**



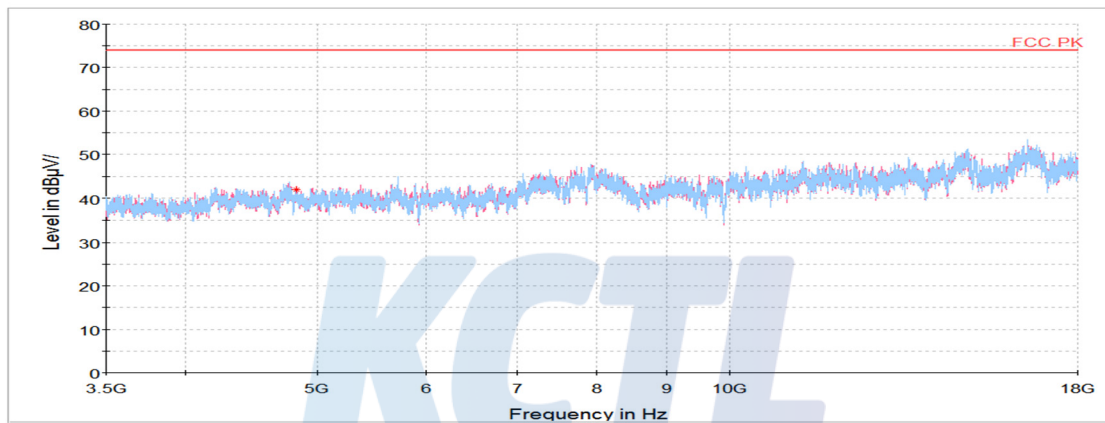
**Average data**



Blank

**802.11g / Harmonic****1 Channel**

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Peak data</b>								
4 822.67 <sup>1)</sup>	V	61.53	33.93	-53.54	-	41.92	74.00	32.08
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

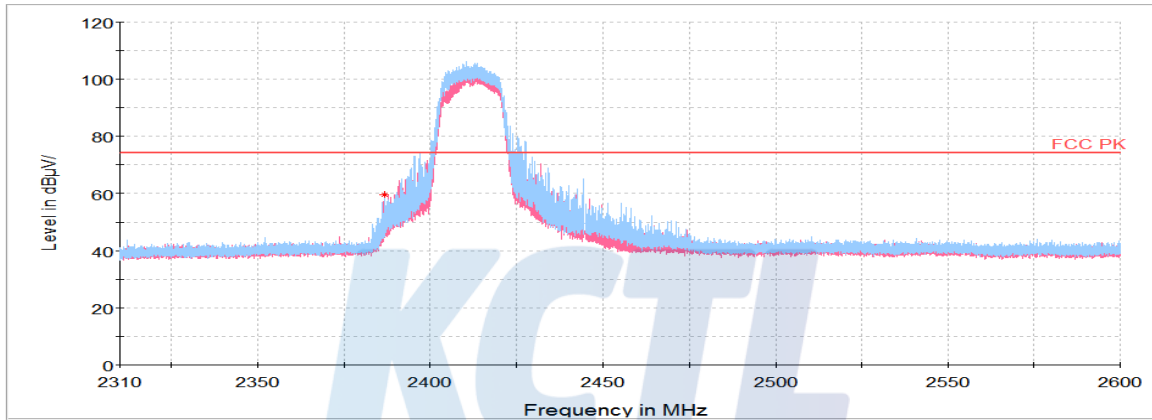
**Horizontal/Vertical for 3.5 GHz ~ 18 GHz**

**802.11n HT20 / Band-edge**

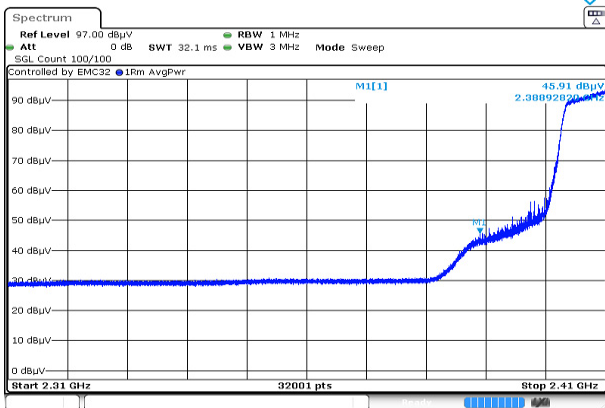
**1 Channel**

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)
<b>Peak data</b>								
2 388.93 <sup>1)</sup>	H	56.71	31.88	-29.04	-	59.55	74.00	14.45
<b>Average Data</b>								
2 388.93 <sup>1)</sup>	H	45.91	31.88	-29.04	0.38	49.13	54.00	4.87

**Horizontal/Vertical for Band-edge**



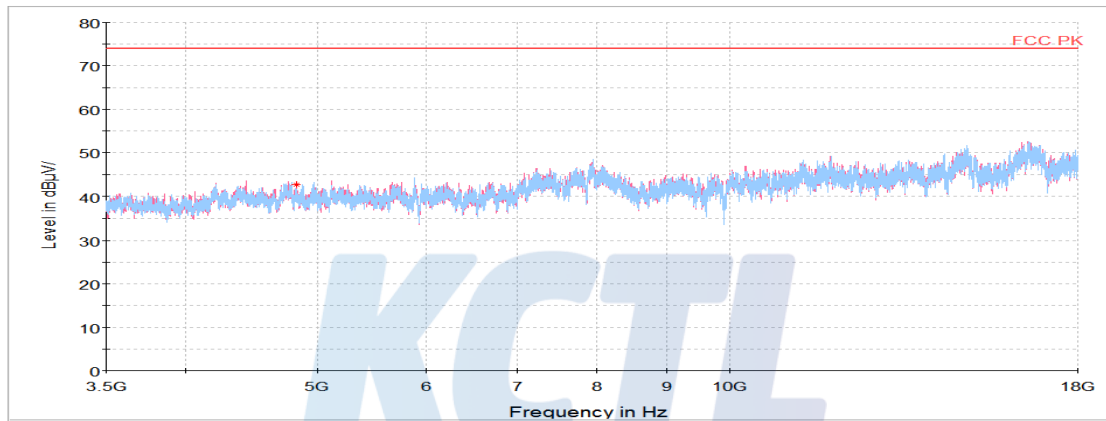
**Average data**



Blank

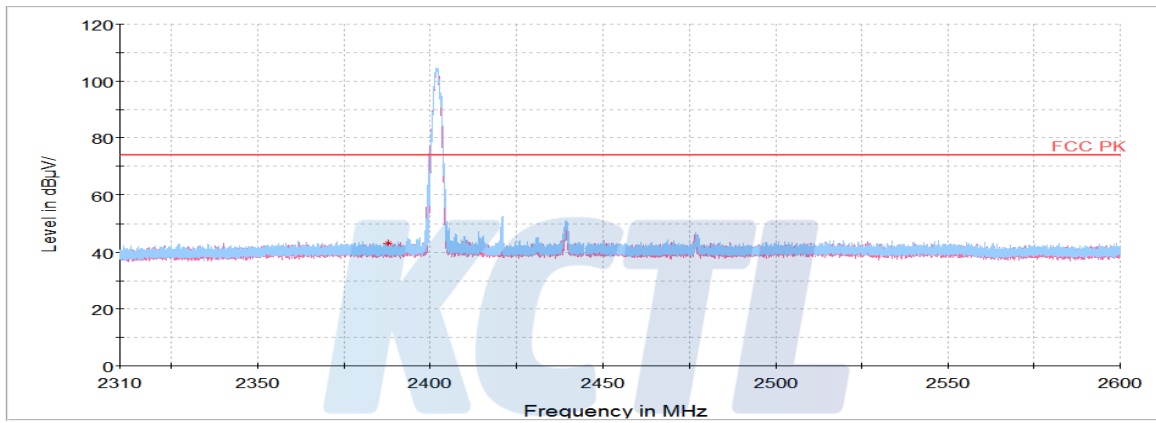
**802.11n HT20 / Harmonic****1 Channel**

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB( $\mu$ V))	(dB)	(dB)	(dB)	(dB( $\mu$ V/m))	(dB( $\mu$ V/m))	(dB)
<b>Peak data</b>								
4 825.84 <sup>1)</sup>	V	62.44	33.93	-53.63	-	42.74	74.00	31.26
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

**Horizontal/Vertical for 3.5 GHz ~ 18 GHz**

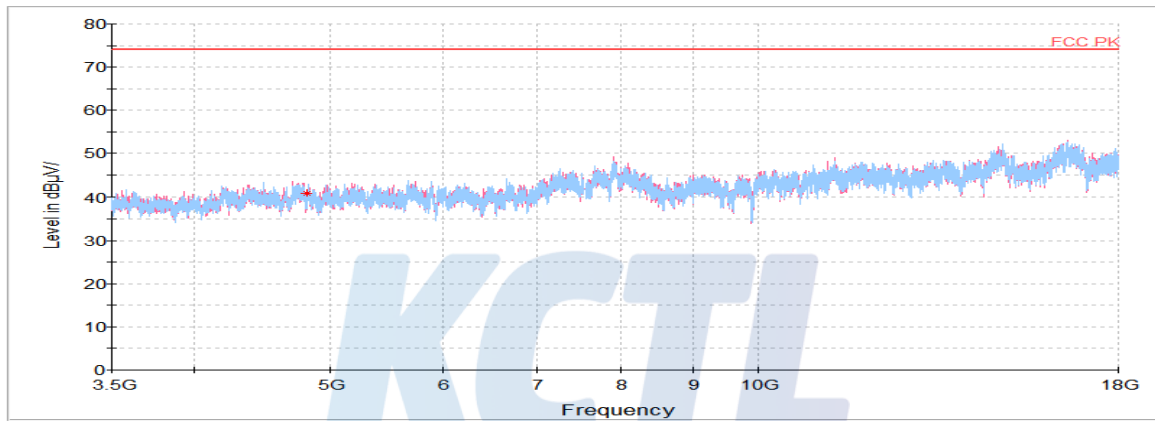
**Test results (Bluetooth)**  
**GFSK / Band-edge****0 Channel**

Frequency (MHz)	Pol. (V/H)	Reading (dB( $\mu$ V))	Ant. Factor (dB)	Amp. + Cable (dB)	DCCF (dB)	Result (dB( $\mu$ V/m))	Limit (dB( $\mu$ V/m))	Margin (dB)
<b>Peak data</b>								
2 387.81 <sup>1)</sup>	H	14.38	31.88	-3.02	-	43.24	74.00	30.76
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

**Horizontal/Vertical for Band-edge**

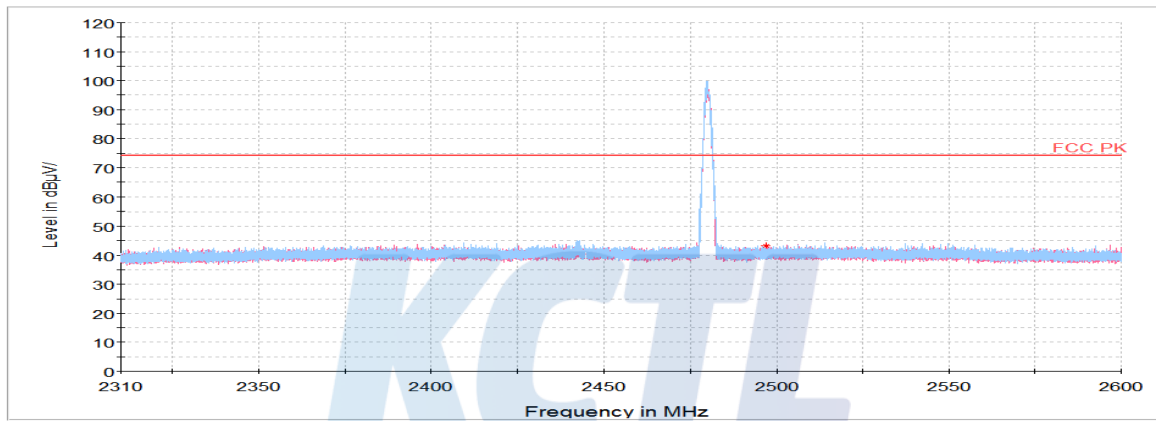
**GFSK / Harmonic****78 Channel**

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Peak data</b>								
4 960.42 <sup>1)</sup>	V	67.98	33.98	-54.66	-	47.30	74.00	26.70
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

**Horizontal/Vertical for 3.5 GHz ~ 18 GHz**

**8DPSK / Band-edge****78 Channel**

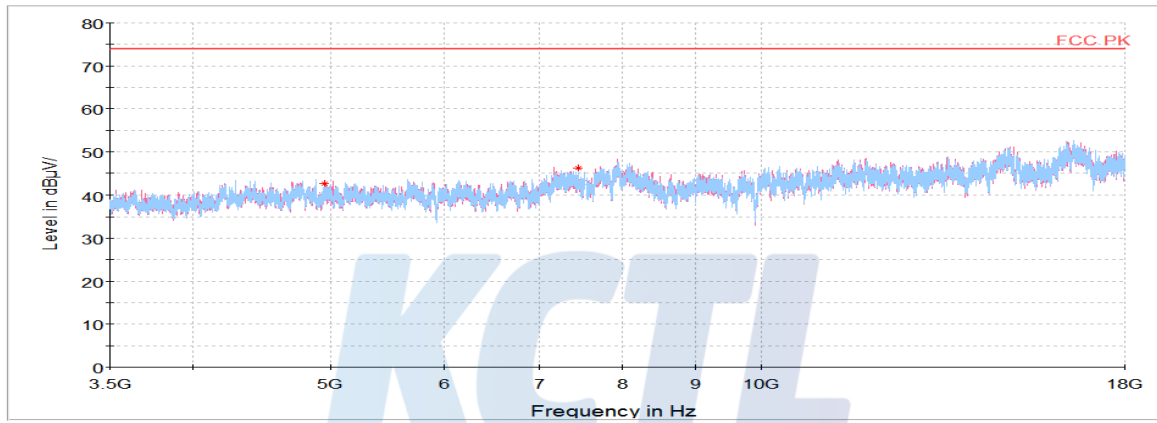
Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB( $\mu$ V))	(dB)	(dB)	(dB)	(dB( $\mu$ V/m))	(dB( $\mu$ V/m))	(dB)
<b>Peak data</b>								
2 497.08 <sup>1)</sup>	V	40.34	32.09	-29.25	-	43.18	74.00	30.82
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

**Horizontal/Vertical for Band-edge**



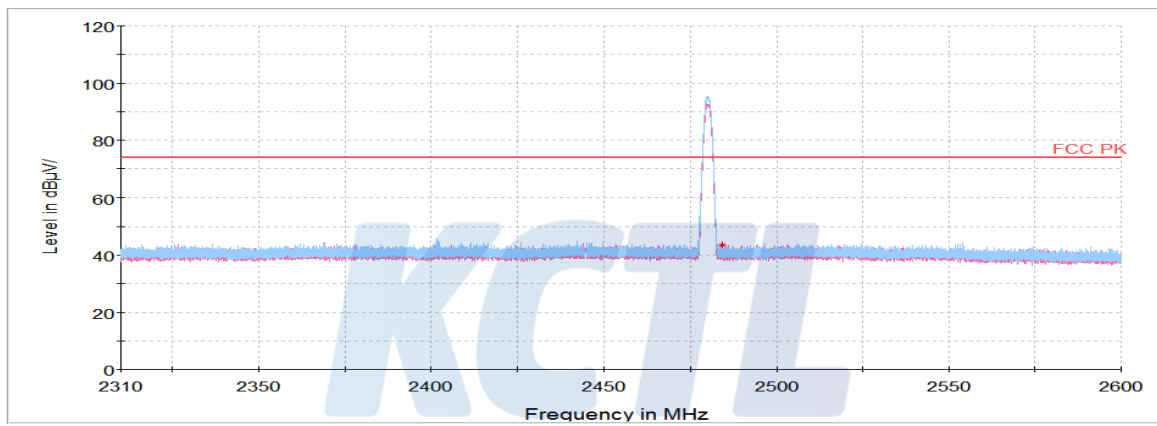
**8DPSK / Harmonic****78 Channel**

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB( $\mu V$ ))	(dB)	(dB)	(dB)	(dB( $\mu V/m$ ))	(dB( $\mu V/m$ ))	(dB)
<b>Peak data</b>								
7 459.41 <sup>1)</sup>	H	62.96	35.40	-52.13	-	46.23	74.00	27.77
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

**Horizontal/Vertical for 3.5 GHz ~ 18 GHz**

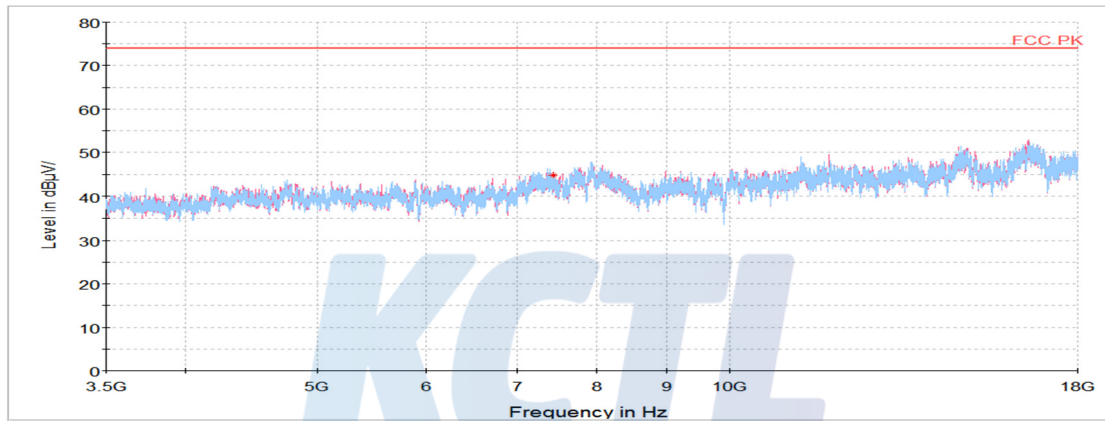
**Test results (Bluetooth Low Energy)  
BLE 1 MBit/s(37 Bytes) / Band-edge****39 Channel**

Frequency (MHz)	Pol. (V/H)	Reading (dB( $\mu$ V))	Ant. Factor (dB)	Amp. + Cable (dB)	DCCF (dB)	Result (dB( $\mu$ V/m))	Limit (dB( $\mu$ V/m))	Margin (dB)
<b>Peak data</b>								
2 484.24 <sup>1)</sup>	V	40.80	32.07	-29.22	-	43.65	74.00	30.35
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

**Horizontal/Vertical for Band-edge**

**BLE 1 MBit/s(37 Bytes) / Harmonic****39 Channel**

Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCCF	Result	Limit	Margin
(MHz)	(V/H)	(dB( $\mu$ V))	(dB)	(dB)	(dB)	(dB( $\mu$ V/m))	(dB( $\mu$ V/m))	(dB)
<b>Peak data</b>								
7 438.11 <sup>1)</sup>	V	61.56	35.40	-52.21	-	44.75	74.00	29.25
<b>Average Data</b>								
No spurious emissions were detected within 20 dB of the limit.								

**Horizontal/Vertical for 3.5 GHz ~ 18 GHz**

**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	ESC17	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**