TEST REPORT

## KCTL Inc.

65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
TEL: 82-31-285-0894 FAX: 82-505-299-8311

Report No.:
KR21-SRF0195-C
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1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt: 2021-08-19

2. Use of Report : Class II Permissive change
3. Name of Product / Model : Smart Wearable / SM-R870
4. Manufacturer / Country of Origin: Samsung Electronics Co., Ltd. / Vietnam
5. FCC ID
: A3LSMR870
6. Date of Test : 2021-08-30 to 2021-09-06
7. Location of Test

■ Permanent Testing Lab $\quad \square$ On Site Testing (Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)
8. Test method used FCC Part 15 Subpart C, 15.247
9. Test Result : Refer to the test result in the test report


## KCTL Inc.

As a test result of the sample which was submitted from the client, this report does not guar antee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.

| KCTL Inc. <br> 65, Sinwon-ro, Yeonctang-.gu <br> TEL: 82-31-285-0894 FAX: 82-505-299-831 <br> www.kctl.co.kr | Report No. <br> KR21-SRF0195-C Page (2) of (28) |  |
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## REPORT REVISION HISTORY

| Date | Revision | Page No |
| :---: | :---: | :---: |
| $2021-09-08$ | Originally issued | - |
| $2021-09-10$ | Updated | 1,12 |
| $2021-09-17$ | Removed the IC information and <br> $2021-09-18$ | Added output power section 6.1 |

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Note. The report No. KR21-SRF0195-B is superseded by the report No. KR21-SRF0195-C.

## General remarks for test reports

## Statement concerning the uncertainty of the measurement systems used for the tests (may be required by the product standard or client) <br> $\square$ Internal procedure used for type testing through which traceability of the measuring uncertainty has been established: <br> Procedure number, issue date and title: <br> Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

## Statement not required by the standard or client used for type testing

| KCTL_ Inc. |  |
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## 1. General information

Client
Address

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

Equipment under test
Model
Modulation technique

Number of channels

Power source
Antenna specification
Antenna gain

|  | UNII-1 $\quad:-9.20 \mathrm{dBi}$ |
| :---: | :---: |
|  | UNII-2A : -7.30 dBi |
|  | UNII-2C $:-8.10 \mathrm{dBi}$ |
|  | UNII-3 : 7.60 dBi |
| Frequency range | Bluetooth(BDR/EDR/BLE)_2 402 MHz ~ 2480 MHz |
|  | 2412 MHz ~ 2472 MHz (802.11b/g/n_HT20) |
|  | UNII-1: $5180 \mathrm{MHz} \sim 5240 \mathrm{MHz}$ (802.11a/n_HT20) |
|  | UNII-2A: $5260 \mathrm{MHz} \sim 5320 \mathrm{MHz}$ (802.11a/n_HT20) |
|  | UNII-2C: $5500 \mathrm{MHz} \sim 5720$ MHz (802.11a/n_HT20) |
|  | UNII-3: 5745 MHz ~ 5825 MHz (802.11a/n_HT20) |
| Software version | R870.001 |
| Hardware version | REV1.0 |
| Test device serial No. | Conducted(R3AR404E2ZD, R3AR404E31X, 410005cfe4884893) Radiated(R3AR404E46L, R3AR404E4YE, R3AR404E4QH, R3AR404E2CK) |
| Operation temperature | $-30{ }^{\circ} \mathrm{C} \sim 50{ }^{\circ} \mathrm{C}$ |

### 2.1. Frequency/channel operations

This device contains the following capabilities:
WiFi (802.11a/b/g/n), Bluetooth (BDR/EDR/BLE)

| Ch. | Frequency (MIZ) |
| :---: | :---: |
| 00 | 2402 |
| $\vdots$ | $\vdots$ |
| 39 | 2441 |
| $\vdots$ | $\vdots$ |
| 78 | 2480 |

Table 2.1.1. Bluetooth(BDR/EDR) mode
15.247 Requirements for Bluetooth transmitter:

- This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:

1) This system is hopping pseudo-randomly.
2) Each frequency is used equally on the average by each transmitter.
3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters
4) The receiver shifts frequencies in synchronization with the transmitted signals.
$-15.247(\mathrm{~g})$ : The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.

- $15.247(\mathrm{~h})$ : The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.


### 2.2. Duty Cycle Correction Factor

| Test mode | Period (ms) | On time (ms) | Reduced VBW (Hz) |
| :---: | :---: | :---: | :---: |
| GFSK | 1.2256 | 0.3820 | 2617.80 |
| 8DPSK | 1.2504 | 0.3872 | 2582.64 |



## 3. Antenna requirement

Requirement of FCC part section 15.203:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

- The transmitter has permanently attached LDS Antenna (Internal antenna) on board.

4. Summary of tests

| FCC Part <br> section(s) | Parameter | Test <br> Condition | Test <br> results |
| :---: | :---: | :---: | :---: |
| $15.247(\mathrm{~b})(1),(4)$ | Maximum peak output power | Conducted | Pass |
| $15.205(\mathrm{a})$, | Spurious emission | Radiated | Pass |
| $15.209(\mathrm{a})$ | Band-edge, restricted band |  |  |

## Notes:

1. For this C2PC report regarding SM-R870, as documented in the C2PC letter that the change does not affect RF characteristics therefore, only radiated spurious emission test was done. All the rest tests were documented in the original filing approved in 06/15/2021 under SM-R870.
2. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
3. According to exploratory test no any obvious emission were detected from 9 kilz to 30 MHz . Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30 m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
4. All the radiated tests have been performed two modes (with charger and without charger) and the fundamental of the EUT was investigated in three orthogonal orientations $\mathrm{X}, \mathrm{Y}$ and Z .

|  | with charger | without charger |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | X-axis | X-axis | Y-axis | Z-axis |
|  |  |  |  | $\sqrt{ }$ |
| Spurious |  |  |  | $\sqrt{ }$ |

5. The worst-case data rate were: BDR Packet type DH-1

EDR Packet type 3DH-1
6. The test procedure(s) in this report were performed in accordance as following.

- ANSI C63.10-2013
- KDB 558074 D01 v05r02


## 5. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.
All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicated a $95 \%$ level of confidence. The measurement data shown herein meets of exceeds the $U_{\text {CISPR }}$ measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

| Parameter | Expanded uncertainty (土) |  |
| :--- | :---: | :---: |
| Conducted RF Power | 0.9 dB |  |
| Radiated spurious emissions | $9 \mathrm{NHz} \sim 30 \mathrm{MHz}$ | 2.3 dB |
|  | $30 \mathrm{NHz} \sim 1000 \mathrm{NHz}$ | 2.2 dB |
|  | $1000 \mathrm{MHz} \sim 18000 \mathrm{MHz}$ | 5.6 dB |
|  | Above 18000 HHz | 5.7 dB |

6. Test results
6.1. Maximum peak output power

Test setup


## Limit

According to $\S 15.247(a)(1)$, Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2 400-2 483.5 HHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW .

According to $\S 15.247(\mathrm{~b})(1)$, for frequency hopping systems operating in the $2400-2483.5 \mathrm{MHz}$ band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5 725-5 850 MHz band: 1 watt. For all other frequency hopping systems in the 2 400-2 483.5 NHzz band: 0.125 watts.

According to $\S 15.247(b)(4)$ The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi .

## Test procedure

ANSI C63.10-2013-Section 7.8.5

## Test settings

The test follows ANSI C63.10-2013 - Section 7.8.5. Using the power sensor instead of a spectrum analyzer.

## Notes:

A peak responding power sensor is used, where the power sensor system video bandwidth is greater than the occupied bandwidth of the EUT.

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## Test results

| Frequency(MHz) | Data rate <br> (Mbps) | Measured output power(dBm) |  | Limit <br> (dBm) |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Peak | Average |  |
| 2441 | 1 | 16.08 | 15.30 |  |
| 2480 | 1 | 16.22 | 15.56 |  |
| 2402 | 2 | 15.40 | 14.89 |  |
| 2441 | 2 | 11.23 | 8.25 | 20.97 |
| 2480 | 2 | 10.85 | 8.56 |  |
| 2402 | 3 | 11.89 | 8.56 |  |
| 2441 | 3 | 11.72 | 8.34 |  |
| 2480 | 3 | 10.97 | 7.61 |  |

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### 6.2. Radiated spurious emissions \& band edge

## Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 9 klyz to 30 NHz Emissions


The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 CHz emissions.


The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz emissions, whichever is lower.

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## Limit

According to section 15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field strength $(\mu \mathrm{V} / \mathbf{m})$ | Measurement distance $(\mathbf{m})$ |
| :---: | :---: | :---: |
| $0.009-0.490$ | $2400 / \mathrm{F}(\mathrm{kHzz})$ | 300 |
| $0.490-1.705$ | $24000 / \mathrm{F}(\mathrm{kHz})$ | 30 |
| $1.705-30$ | 30 | 30 |
| $30-88$ | $100^{* *}$ | 3 |
| $88-216$ | $150^{* *}$ | 3 |
| $216-960$ | $200^{* *}$ | 3 |
| Above 960 | 500 | 3 |

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 $\mathbb{N L z}, 76-88 \mathrm{MHz}, 174-216 \mathrm{NHz}$ or $470-806$ MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., Section15.231 and 15.241.

According to section 15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
| :---: | :---: | :---: | :---: |
| $0.009-0.110$ | $16.42-16.423$ | $399.9-410$ | $4.5-5.15$ |
| $0.495-0.505$ | $16.69475-16.69525$ | $608-614$ | $5.35-5.46$ |
| $2.1735-2.1905$ | $16.80425-16.80475$ | $960-1240$ | $7.25-7.75$ |
| $4.125-4.128$ | $25.5-25.67$ | $1300-1427$ | $8.025-8.5$ |
| $4.17725-4.17775$ | $37.5-38.25$ | $1435-1626.5$ | $9.0-9.2$ |
| $4.20725-4.20775$ | $73-74.6$ | $1645.5-1646.5$ | $9.3-9.5$ |
| $6.215-6.218$ | $74.8-75.2$ | $1660-1710$ | $10.6-12.7$ |
| $6.26775-6.26825$ | $108-121.94$ | $1718.8-1722.2$ | $13.25-13.4$ |
| $6.31175-6.31225$ | $123-138$ | $2200-2300$ | $14.47-14.5$ |
| $8.291-8.294$ | $149.9-150.05$ | $2310-2390$ | $15.35-16.2$ |
| $8.362-8.366$ | $156.52475-156.525$ | $2483.5-2500$ | $17.7-21.4$ |
| $8.37625-8.38675$ | 25 | $2690-2900$ | $22.01-23.12$ |
| $8.41425-8.41475$ | $156.7-156.9$ | $3260-3267$ | $23.6-24.0$ |
| $12.29-12.293$ | $162.0125-167.17$ | $3332-3339$ | $31.2-31.8$ |
| $12.51975-12.52025$ | $167.72-173.2$ | $3345.8-3358$ | $36.43-36.5$ |
| $12.57675-12.57725$ | $240-285$ | $3600-4400$ | Above 38.6 |
| $13.36-13.41$ | $322-335.4$ |  |  |

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in section 15.209. At frequencies equal to or less than 1000 WHz , compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasipeak detector. Above 1000 MHz , compliance with the emission limits in section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in section 15.35 apply to these measurements.

## Test procedure

## ANSI C63.10-2013

## Test settings

## Peak field strength measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW $\geq(3 \times$ RBW $)$
4. Detector $=$ peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow sweeps to continue until the trace stabilizes

Table. RBW as a function of frequency

| Frequency | RBW |
| :---: | :---: |
| 9 kHz to 150 kHz | 200 Hz to 300 Hz |
| 0.15 MHz to 30 MHz | 9 kHz to 10 kHz |
| 30 MHz to 1000 NHz | 100 kHz to 120 kHz |
| $>1000 \mathrm{MHz}$ | 1 MHz |

## Average field strength measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW $=1 \mathrm{MHz}$
3. $\mathrm{VBW}=1 / \mathrm{T} \geq 1 \mathrm{~Hz}$
4. Averaging type was set to RMS to ensure that video filtering was applied in the power domain
5. Detector = peak
6. Sweep time = auto
7. Trace mode = max hold
8. Trace was allowed to run for at least 50 times(1/duty cycle) traces

## Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 WHz for Peak detection and frequency above 1 GHz . The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $3 \mathrm{kHz}(\geq 1 / \mathrm{T}$ ) for Average detection (AV) at frequency above 1 GHz.
2. $f<30 \mathrm{MHz}$, extrapolation factor of $40 \mathrm{~dB} /$ decade of distance. $\mathrm{F}_{\mathrm{d}}=40 \log \left(\mathrm{D}_{\mathrm{m}} / \mathrm{D}_{\mathrm{s}}\right)$
$f \geq 30 \mathrm{MHz}$, extrapolation factor of $20 \mathrm{~dB} /$ decade of distance. $\mathrm{F}_{\mathrm{d}}=20 \log \left(\mathrm{D}_{\mathrm{m}} / \mathrm{D}_{\mathrm{s}}\right)$
Where:
$\mathrm{F}_{\mathrm{d}}=$ Distance factor in dB
$\mathrm{D}_{\mathrm{m}}=$ Measurement distance in meters
$\mathrm{D}_{\mathrm{s}}=$ Specification distance in meters
3. Factors $(d B)=$ Antenna factor $(d B / m)+$ Cable loss $(d B)+$ or Amp. gain $(d B)+$ or $F_{d}(d B)$
4. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
5. Average test would be performed if the peak result were greater than the average limit.
6. 7) means restricted band.

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Test results (Below 30 M Hz ) - Worst case: GFSK 2441 M Hz

| Frequency | Pol. | Reading | Ant. Factor | Amp. <br> + Cable | Distance <br> Factor | DCCF | Result | Limit | Margin |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $(\mathrm{MIL})$ | $(\mathrm{V} / \mathrm{H})$ | $(\mathrm{dB}(\mu \mathrm{V}))$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}))$ | $(\mathrm{dB}(\mu / \mathrm{m}))$ | $(\mathrm{dB})$ |

No spurious emissions were detected within 20 dB of the limit.


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Test results (Below 1000 MIz) - Worst case: GFSK 2441 MIz

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $(\mathrm{M} \mathrm{H})$ | $(\mathrm{V} / \mathrm{H})$ | $(\mathrm{dB}(\mu \mathrm{N}))$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB}(\mu \mathrm{N} / \mathrm{m}))$ | $(\mathrm{dB}(\mu \mathrm{N} / \mathrm{m}))$ | $(\mathrm{dB})$ |
| Quasi peak data |  |  |  |  |  |  |  |  |
| 47.82 | H | 25.50 | 14.87 | -29.94 | - | 10.43 | 40.00 | 29.57 |
| 173.32 | V | 26.10 | 15.30 | -27.44 | - | 13.96 | 43.50 | 29.54 |
| 183.87 | H | 25.20 | 14.80 | -27.29 | - | 12.71 | 43.50 | 30.79 |
| 191.87 | V | 28.30 | 14.89 | -27.26 | - | 15.93 | 43.50 | 27.57 |
| 199.51 | V | 27.90 | 15.20 | -27.17 | - | 15.93 | 43.50 | 27.57 |
| 345.86 | V | 24.10 | 20.13 | -25.23 | - | 19.00 | 46.00 | 27.00 |



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## Test results (Above 1000 MHz )

## GFSK_Lowest Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $(\mathrm{MHz})$ | $(\mathrm{V} / \mathrm{H})$ | $(\mathrm{dB}(\mu \mathrm{V}))$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}))$ | $(\mathrm{dB}(\mu \mathrm{N} / \mathrm{m}))$ | $(\mathrm{dB})$ |
| Peak data |  |  |  |  |  |  |  |  |
| $2355.59^{1)}$ | H | 44.08 | 31.94 | -27.27 | - | 48.75 | 74.00 | 25.25 |
| $4820.41^{1)}$ | V | 61.22 | 33.79 | -53.11 | - | 41.90 | 74.00 | 32.10 |
| 7164.42 | H | 60.28 | 35.30 | -50.73 | - | 44.85 | 74.00 | 29.15 |
| Average Data |  |  |  |  |  |  |  |  |
| No spurious emissions were detected within 20 dB of the limit. |  |  |  |  |  |  |  |  |



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## GFSK_Middle Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $($ (MIZ $)$ | $(\mathrm{V} / \mathrm{H})$ | $(\mathrm{dB}(\mu \mathrm{V}))$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}))$ | $(\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}))$ | $(\mathrm{dB})$ |
| Peak data |  |  |  |  |  |  |  |  |
| $4885.66^{1)}$ | V | 60.75 | 33.83 | -53.16 | - | 41.42 | 74.00 | 32.58 |
| 7187.98 | H | 61.12 | 35.30 | -50.68 | - | 45.74 | 74.00 | 28.26 |
| Average Data |  |  |  |  |  |  |  |  |
| No spurious emissions were detected within 20 dB of the limit. |  |  |  |  |  |  |  |  |


| Horizontal/Vertical for $1 \mathrm{CHz} \sim 3.5 \mathrm{CHz}$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |
| Horizontal/Vertical for 3.5 GHz $\sim 18 \mathrm{CHz}$ |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

## GFSK_Highest Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ( MHz ) | (V/H) | $(\mathrm{dB}(\mu \mathrm{V})$ ) | (dB) | (dB) | (dB) | ( $\mathrm{dB}(\mu \mathrm{V} / \mathrm{m})$ ) | ( $\mathrm{dB}(\mu \mathrm{V} / \mathrm{m})$ ) | (dB) |
| Peak data |  |  |  |  |  |  |  |  |
| $2486.85{ }^{1)}$ | H | 43.04 | 32.18 | -28.34 | - | 46.88 | 74.00 | 27.12 |
| $4975.83{ }^{1)}$ | H | 60.88 | 33.89 | -52.31 | - | 42.46 | 74.00 | 31.54 |
| $7409.56{ }^{1}$ | H | 59.47 | 35.30 | -50.24 | - | 44.53 | 74.00 | 29.47 |
| Average Data |  |  |  |  |  |  |  |  |
| No spurious emissions were detected within 20 dB of the limit. |  |  |  |  |  |  |  |  |



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## 8DPSK_Lowest Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (NHL) | (V/H) | ( $\mathrm{dB}(\mu \mathrm{V})$ ) | (dB) | (dB) | (dB) | ( $\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}$ ) ) | ( $\mathrm{dB}(\mu \mathrm{V} / \mathrm{m})$ ) | (dB) |
| Peak data |  |  |  |  |  |  |  |  |
| $2337.69^{1)}$ | H | 44.49 | 31.91 | -27.27 | - | 49.13 | 74.00 | 24.87 |
| $4826.75{ }^{1)}$ | V | 61.25 | 33.80 | -53.11 | - | 41.94 | 74.00 | 32.06 |
| 7193.88 | V | 60.27 | 35.30 | -50.67 | - | 44.90 | 74.00 | 29.10 |
| Average Data |  |  |  |  |  |  |  |  |
| No spurious emissions were detected within 20 dB of the limit. |  |  |  |  |  |  |  |  |



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## 8DPSK_Middle Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $(\mathrm{MHz})$ | $(\mathrm{V} / \mathrm{H})$ | $(\mathrm{dB}(\mu \mathrm{V}))$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}))$ | $(\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}))$ | $(\mathrm{dB})$ |
| Peak data |  |  |  |  |  |  |  |  |
| $4872.52^{1)}$ | H | 60.60 | 33.82 | -53.15 | - | 41.27 | 74.00 | 32.73 |
| $7301.27^{1)}$ | V | 59.91 | 35.30 | -50.46 | - | 44.75 | 74.00 | 29.25 |
| Average Data |  |  |  |  |  |  |  |  |
| No spurious emissions were detected within 20 dB of the limit. |  |  |  |  |  |  |  |  |



## 8DPSK_Highest Channel

| Frequency | Pol. | Reading | Ant. Factor | Amp. + Cable | DCCF | Result | Limit | Margin |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $(\mathrm{MHz})$ | $(\mathrm{V} / \mathrm{H})$ | $(\mathrm{dB}(\mu \mathrm{V}))$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB})$ | $(\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}))$ | $(\mathrm{dB}(\mu \mathrm{V} / \mathrm{m}))$ | $(\mathrm{dB})$ |
| Peak data |  |  |  |  |  |  |  |  |
| $2486.71^{1)}$ | H | 43.95 | 32.18 | -28.33 | - | 47.80 | 74.00 | 26.20 |
| $4986.70^{1)}$ | H | 61.11 | 33.89 | -52.18 | - | 42.82 | 74.00 | 31.18 |
| $7421.80^{1)}$ | V | 59.55 | 35.30 | -50.22 | - | 44.63 | 74.00 | 29.37 |
| Average Data |  |  |  |  |  |  |  |  |
| No spurious emissions were detected within 20 dB of the limit. |  |  |  |  |  |  |  |  |



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Test results (Above 18 CHz) - Worst case: 8DPSK 2402 MHz


Note: The Worst case was based on the lowest margin condition considering Harmonic and Spurious Emission

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## 7. Measurement equipment

| Equipment Name | Manufacturer | Model No. | Serial No. | Next Cal. Date |
| :---: | :---: | :---: | :---: | :---: |
| Spectrum Analyzer | R\&S | FSV30 | 100732 | 22.01.20 |
| Signal Generator | R\&S | SMB100A | 176206 | 22.01.20 |
| Vector Signal Generator | R\&S | SMBV100A | 257566 | 22.07 .09 |
| Bluetooth Tester | TESCOM | TC-3000C | 3000C000270 | 22.07.28 |
| Power Divider | Aeroflex/ Weinschel, Inc | 1580-1 | PE430 | 22.07.29 |
| DC Power Supply | Agilent | E3632A | MY40000265 | 22.05 .10 |
| Spectrum Analyzer | R\&S | FSV40 | 100989 | 21.12 .23 |
| High pass Filter | WT | WT-A1698-HS | WT160411001 | 22.05.10 |
| EMI TEST RECEIVER | R\&S | ESCI7 | 100732 | 22.03 .05 |
| Bi-Log Antenna | TESEQ | CBL 6112D | 55545 | 23.01.14 |
| Attenuator | KEYSIGHT | 8491B-6dB | MY39271060 | 21.12.24 |
| Power Sensor | R\&S | NRP-Z81 | $\begin{gathered} \text { 1137.9009.02- } \\ 106223-\mathrm{bB} \end{gathered}$ | 22.05.11 |
| ISOLATION TRANSFORMER | ONETECH CO., LTD | OT-IT500VA | OTR1-16026 | 22.04.02 |
| Amplifier | SONOMA INSTRUMENT | 310 N | 284608 | 22.08.19 |
| COAXIAL FIXED ATTENUATOR | Agilent | 8491B-003 | 2708A18758 | 22.04.23 |
| Horn antenna | ETS.lindgren | 3117 | 00155787 | 21.10 .28 |
| Horn antenna | ETS.lindgren | 3116 | 00086632 | 22.01.29 |
| Attenuator | API Inmet | 40AH2W-10 | 12 | 22.05.11 |
| Broadband Pre-Amplifier | SCHWARZBECK | BBV9718 | 216 | 22.07.27 |
| AMPLIFIER | L-3 Narda-MITEQ | $\begin{gathered} \text { AMF-7D-01001800 } \\ -22-10 \mathrm{P} \\ \hline \end{gathered}$ | 2003683 | 22.08.19 |
| AMPLIFIER | L-3 Narda-MITEQ | JS44-18004000-33-8P | 2000996 | 22.01.21 |
| LOOP Antenna | R\&S | HFH2-Z2 | 100355 | 22.08.21 |
| 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 | - |

## End of test report

