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FCC UWB REPORT

Certification

pplicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
October 16, 2023

Test Site/Location:
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2310-FC009

FCC ID:	**A3LSMS926U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model:	SM-S926U
Additional Model:	SM-S926U1
EUT Type:	Mobile Phone
Max. Peak Power (EIRP):	-1.53 (dBm/50MHz) (0.703 mW)
Frequency Range:	6 489.6 MHz ~ 7 987.2 MHz
FCC Classification:	Ultra Wideband (UWB)
FCC Rule Part(s):	FCC Part Subpart F (15.519, 15.521)

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

REVIEWED BY

Report prepared by : Kyung Jun Woo
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2310-FC009	October 16, 2023	- First Approval Report

Table of Contents

1. EUT DESCRIPTION

Model	SM-S926U	
Additional Model	SM-S926U1	
EUT Type	Mobile Phone	
Power Supply	DC 3.88 V	
Frequency Range	6 489.6 MHz ~ 7 987.2 MHz	
RF Output Power (EIRP):	Peak (dBm/50 MHz)	-1.53
	Average (dBm/MHz)	-42.93
Channel:	5ch, 9ch	
Packet Configuration:	SP0, SP1, SP3	
PRF Mode:	BPRF(9, 10, 11, 12), HPRF(27)	
Payload:	Up to 127 Bytes	
UWB Classification	Hand-held Communication Device	
Modulation type	BPSK pulsed modulation signal	
Date(s) of Tests	September 01, 2023 ~ October 13, 2023	
Serial number	R3CW80MB52K	

ANTENNA DESCRIPTION

Channel	Antenna	
	Ant 1 (Tx & Rx)	**Ant 2 (Only Rx)**
5ch	O	O
9ch	O	O

2. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Device (ANSI C63.10-2013, KDB 393764 D01) is used in the measurement of the test device.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.519, 15.521 under the FCC Rules Part 15 Subpart F.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5 m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated March 31, 2022 (CAB identifier: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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."

(1) The antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of §15.203

6. 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 indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the U_{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 (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.52 (Confidence level about 95 %, k=2)

7. DESCRIPTION OF TESTS

7.1. Radiated Emissions

Limit

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3

The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz

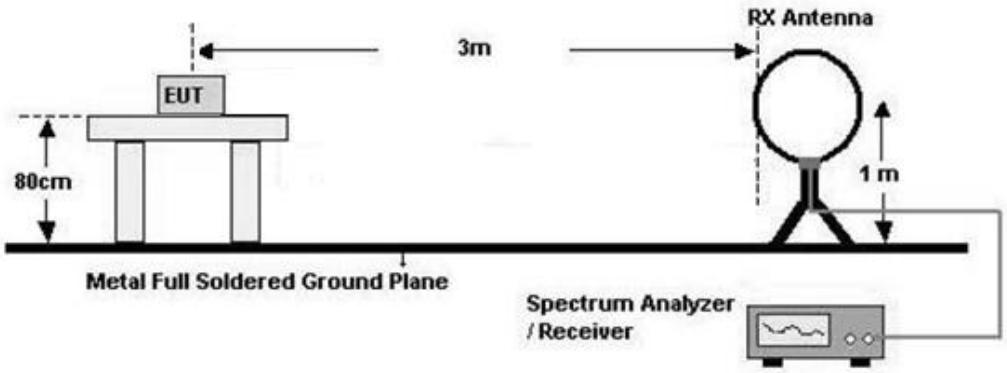
Frequency (MHz)	EIRP in dBm
960 – 1610	-75.3
** 1164 – 1240	-85.3
** 1559 – 1610	-85.3
1610 – 1990	-63.3
1990 – 3100	-61.3
3100 – 10600	-41.3
Above 10600	-61.3

** GPS Bands

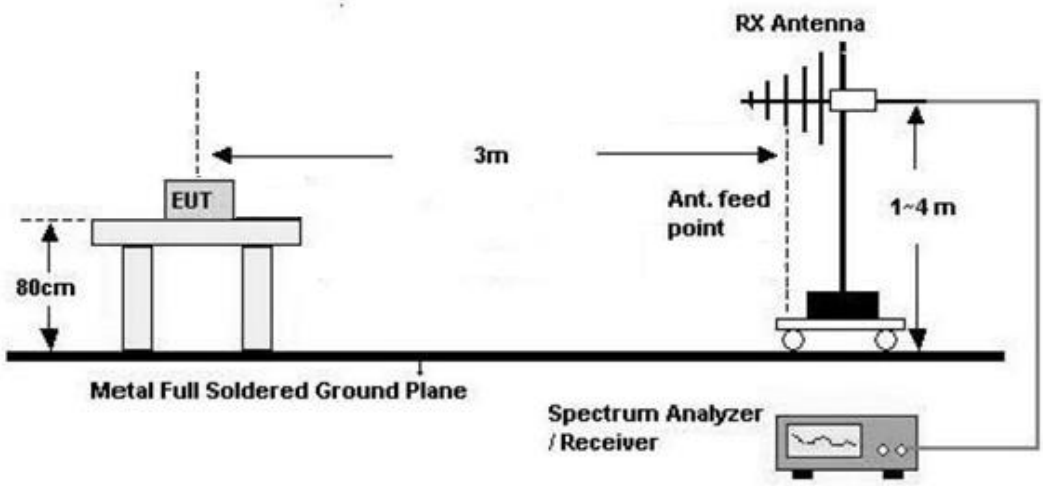
There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, f_M. That limit is 0 dBm EIRP.

Test Configuration

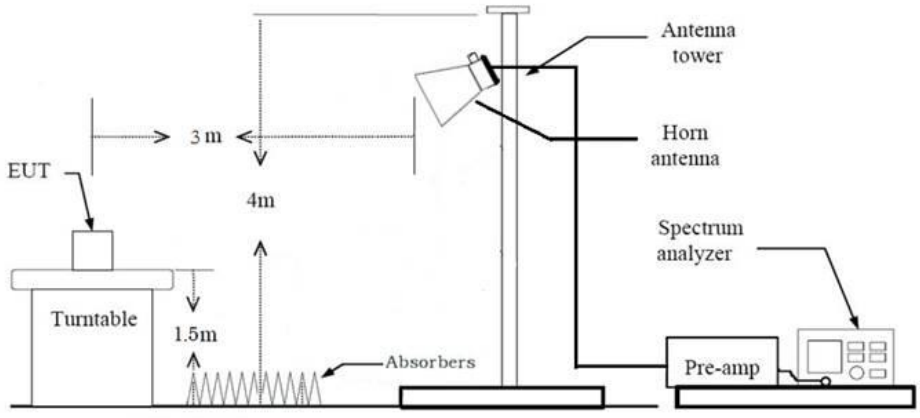
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) =40log(3 m/300 m)= - 80 dB
   Measurement Distance: 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) =40log(3 m/30 m)= - 40 dB
   Measurement Distance: 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW
     9 kHz - 150 kHz: 300 Hz
     150 kHz - 30 MHz: 10 kHz
   - VBW ≥ 3 x RBW

9.Total = Measured Value + Antenna Factor(A.F.) + Cable Loss(C.L.) + Distance Factor(D.F.)

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions(Below 960 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range: 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range: 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

   ※In general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F.) + Cable Loss(C.L.)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions(Above 960 MHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   - RBW = 1 MHz (10kHz for emissions in the GPS bands)
   - VBW = 3 MHz (30kHz for emissions in the GPS bands)
   - Detector = Average(RMS)
   - Trace = Maxhold
   - Trace was allowed to stabilize
   - Sweep time = No more than 1ms integration period over measurement bin
9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. GPS bands and above 10600 MHz pre-scan plots were tested at 0.55 meter respectively.
    The plots are only for the purpose of spurious emission identification.
    If no spurious emissions are measured, the test is completed in the pre-scan state.
11. Below 10600 MHz
    E (dBuv/m) = Measured Value(dBuV)
    - We apply to the offset in all range
    - The offset = Antenna Factor(A.F) + Cable Loss(C.L) – Amp Gain(A.G)

    EIRP (dBm) = E (dBuv/m) – 95.3 dB
12. GPS bands & Above 10600 MHz
    E (dBuv/m) = Measured Value(dBuV)
    - We apply to the offset in all range
    - The offset = Antenna Factor(A.F.) + Cable Loss(C.L.) – Amp Gain(A.G.)

    EIRP (dBm) = E (dBuv/m) – Distance Factor(D.F) – 95.3 dB

Maximum Peak Power

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. The unit was tested with its standard battery.
7. Spectrum Setting
   - RBW = 50 MHz
   - VBW = 80 MHz
   - Detector = Peak
   - Trace = Maxhold
   - Trace was allowed to stabilize
   - Sweep time = auto coupled
8. E (dBuv/m) = Measured Value(dBuV)
   - We apply to the offset in all range
   - The offset = Antenna Factor(A.F) + Cable Loss(C.L) – Amp Gain(A.G)

EIRP (dBm) = E (dBuv/m) – 95.3 dB

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

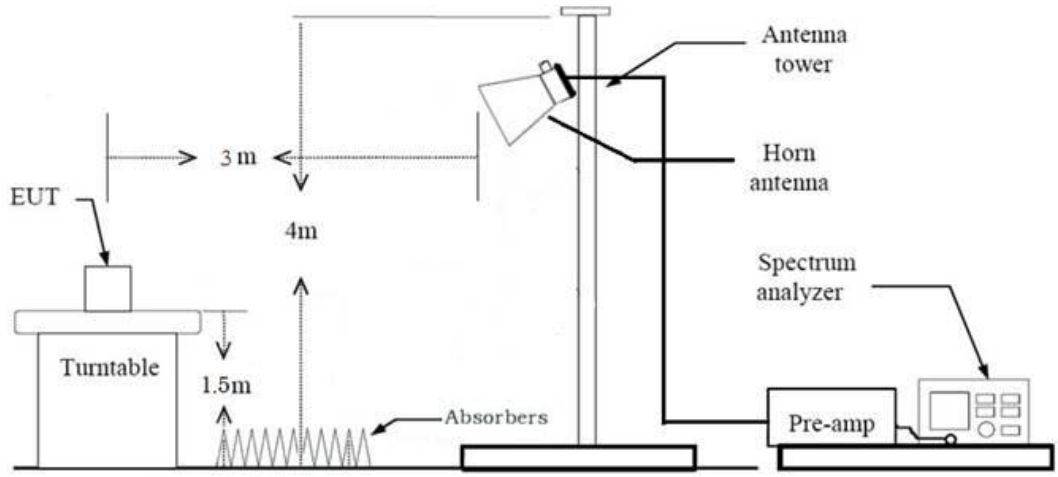
7.2. 10 dB Bandwidth

Limit

According to §15.503(d), fractional bandwidth is equal to or greater than 0.20, or UWB bandwidth is equal to or greater than 500 MHz.

According to §15.519(b), The UWB bandwidth of hand held UWB system must be contained between 3 100 MHz and 10 600 MHz.

Test Configuration



Test Procedure

We tested according to the Procedure 10.1 in ANSI 63.10-2013.

The Analyzer is set to

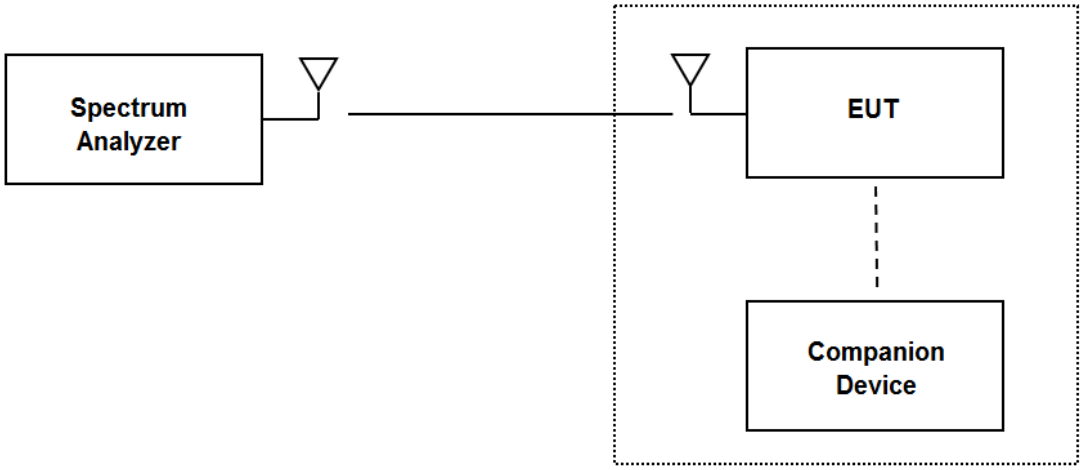
1. Set the analyzer's center frequency to a supported channel.
2. Trace = Max hold
3. Detector = Peak
4. RBW = 1 MHz
5. VBW = 3 MHz
6. Sweep time = 2s
7. Allow the trace to stabilize
8. The frequency at which the maximum power level is measured with the peak detector is designated f_M and the outermost 1 MHz segments above and below f_M, where the peak power falls by 10 dB relative to the level at f_M, are designated as f_H and f_L, respectively.
9. 10 dB bandwidth is defined as (f_H - f_L). The center frequency (fc) is mathematically determined from (f_H - f_L) / 2. The fractional bandwidth is defined as 2(f_H - f_L) / (f_H + f_L).

7.3. Cessation Time

Limit

A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting

Test Configuration



Test Procedure

The Analyzer is set to

1. SPAN = Zero Span(0 Hz)
2. RBW = 1 MHz
3. VBW = 3 MHz
4. Sweep time shall be sufficient to demonstrate EUTs compliance with the rule part.
5. Sets the marker to the points where 10 seconds after the EUT recognizes the interruption of reception.

7.4. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[(a)]	56 to 46[(a)]
0.50 to 5	56	46
5 to 30	60	50

[(a)]Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors: Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Measured Value + Correction Factor

7.5. Worst case

7.5.1. 10dBc Bandwidth, Peak Power, Average Power

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, etc.)
   - Worst case : Stand alone
2. The EUT was tested in three axis were investigated and the worst case axis results are reported.
   - Axis : X, Y, Z
   - Worst case : Y
3. All Preamble ID of operation were investigated and the worst case results are reported.
   - Preamble ID : BPRF(9, 10, 11, 12), HPRF (27)
   - Worst case : BPRF(9), HPRF (27)
4. All Payload of operation were investigated and the worst case results are reported.
   - Payload: Up to 127 bytes
   - Worst case : 4 byte, 127 byte
5. SM-S926U, SM-S926U1 were tested and the worst case results are reported.

(Worst case: SM-S926U)

7.5.2. Radiated Emission

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone etc.)
   - Worst case : Stand alone
2. The EUT was tested in three axis were investigated and the worst case axis results are reported.
   - Axis : X, Y, Z
   - Worst case : Y
3. All Preamble ID of operation were investigated and the worst case results are reported.
   - Preamble ID : BPRF(9, 10, 11, 12), HPRF (27)
   - Worst case : BPRF(9), HPRF (27)
4. All Packet of operation were investigated and the worst case results are reported.
   - Payload: SP0, SP1, SP3
   - Worst case : SP3
5. All Payload of operation were investigated and the worst case results are reported.
   - Payload: Up to 127 bytes
   - Worst case : 127 byte
6. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane
7. SM-S926U, SM-S926U1 were tested and the worst case results are reported.

(Worst case: SM-S926U)

7.5.3. AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone+ External accessories(Earphone)+Travel Adapter
     Stand alone + Travel Adapter
   - Worst case : Stand alone + Travel Adapter
2. SM-S926U, SM-S926U1 were tested and the worst case results are reported.

(Worst case: SM-S926U)

8. SUMMARY TEST OF RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Result
§15.503, §15.519 (b)	10 dB Bandwidth	≥ 500 MHz	PASS
§15.519(a)(1)	Cessation Time	Transmission shall cease in less than 10s	PASS
§15.519(e)	Maximum Peak Power	< 0 dBm/50MHz EIRP	PASS
§15.519(c)	Maximum Average Power	< -41.3 dBm/MHz EIRP	PASS
§15.519(c)	Radiated Emissions Above 960MHz	cf. Section 7.1	PASS
§15.519(c), §15.519(a)	Radiate Emissions Below 960MHz	cf. Section 7.1	PASS
§15.519(d)	Radiated Emissions in the 1 164 – 1 240Mhz and 1 559 – 1 610MHz GPS Bands	< -85.3 dBm EIRP	PASS
§15.207	AC Conducted Emissions 150kHz – 30MHz	cf. Section 7.4	PASS

Note:

1. All tests except the AC conducted emissions were performed radiated condition.

9. TEST RESULT

9.1 10dB Bandwidth

Channel	Preamble ID	Config	Payload	f_M (MHz)	f_L (MHz)	f_H (MHz)	f_C (MHz)	Result (MHz)
5	9	SP0	***4***	***6454.12***	***6224.23***	***6753.97***	***6489.10***	***529.74***
			127	6443.62	6222.23	6762.96	6492.60	540.73
		SP1	4	6454.62	6222.74	6754.47	6488.60	531.73
			127	6454.12	6219.74	6770.46	6495.10	550.72
		SP3	4	6448.12	6223.23	6761.96	6492.60	538.73
			127	6438.13	6221.24	6759.97	6490.60	538.73
	27	SP0	4	6501.59	6222.73	6756.46	6489.60	533.73
			127	6401.59	6119.73	6662.46	6391.10	542.73
		SP1	4	6501.59	6213.70	6756.46	6485.08	542.76
			127	6501.59	6222.23	6760.46	6491.35	538.23
		SP3	4	6427.13	6223.73	6755.47	6489.60	531.74
			127	6427.13	6223.23	6754.47	6488.85	531.24
9	9	SP0	4	8142.62	7709.34	8267.56	7988.45	558.22
			127	8142.62	7707.84	8270.56	7989.20	562.72
		SP1	4	8142.62	7708.84	8270.56	7989.70	561.72
			127	8142.62	7706.34	8270.56	7988.45	564.22
		SP3	4	8205.59	7703.84	8278.55	7991.20	574.71
			127	8205.59	7703.34	8278.55	7990.95	575.21
	27	SP0	4	8224.58	7712.84	8269.06	7990.95	556.22
			127	8224.58	7709.34	8272.06	7990.70	562.72
		SP1	4	8224.58	7709.84	8269.56	7989.70	559.72
			127	8224.58	7709.84	8270.56	7990.20	560.72
		SP3	4	8174.61	7708.34	8275.06	7991.70	566.72
			127	8174.61	7703.85	8277.56	7990.70	573.71

Note:

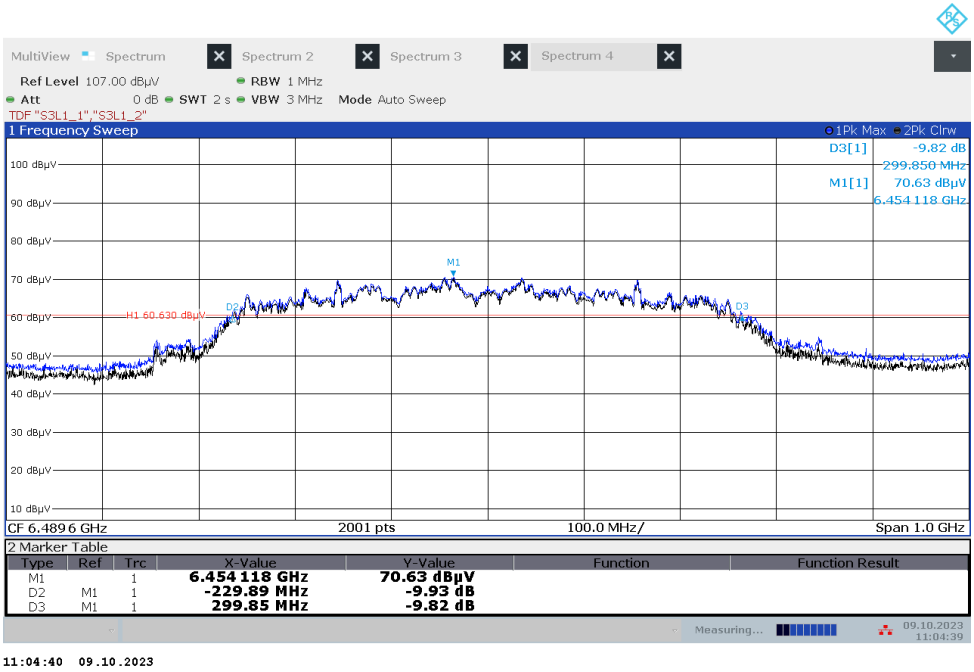
1. Limit : ≥ 500MHz
2. f_M : The frequency at which the maximum power level is measured with the peak detector.
3. f_L : For the lowest frequency bound f_L
4. f_H : For the highest frequency bound f_H
5. f_C : ($f_H - f_L$) / 2
6. Result : $f_H - f_L$

▣ Test Plots

Note :

To simplify the report, the attached plots represent the worst case 10 dB BW.

[Ch 5, Preamble ID 9, SP0]



9.2 Maximum Peak Power

(Ch. 5)

Preamble ID	Config	Payload	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm/50MHz)	Limit (dBm/50MHz)	Margin (dB)
9	SP0	***4***	***93.70***	***H***	***93.70***	***-1.53***	***0***	***1.53***
		127	90.43	H	90.43	-4.80	0	4.80
	SP1	4	92.14	H	92.14	-3.09	0	3.09
		127	89.53	H	89.53	-5.70	0	5.70
	SP3	4	84.09	H	84.09	-11.14	0	11.14
		127	84.01	H	84.01	-11.22	0	11.22
27	SP0	4	88.42	H	88.42	-6.81	0	6.81
		127	83.50	H	83.50	-11.73	0	11.73
	SP1	4	85.19	H	85.19	-10.04	0	10.04
		127	82.59	H	82.59	-12.64	0	12.64
	SP3	4	82.02	H	82.02	-13.21	0	13.21
		127	82.37	H	82.37	-12.86	0	12.86

(Ch. 9)

Preamble ID	Config	Payload	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm/50MHz)	Limit (dBm/50MHz)	Margin (dB)
9	SP0	***4***	***93.60***	***V***	***93.60***	***-1.63***	***0***	***1.63***
		127	90.98	V	90.98	-4.25	0	4.25
	SP1	4	92.89	V	92.89	-2.34	0	2.34
		127	90.42	V	90.42	-4.81	0	4.81
	SP3	4	84.71	V	84.71	-10.52	0	10.52
		127	84.60	V	84.60	-10.63	0	10.63
27	SP0	4	89.13	V	89.13	-6.10	0	6.10
		127	84.60	V	84.60	-10.63	0	10.63
	SP1	4	86.61	V	86.61	-8.62	0	8.62
		127	84.05	V	84.05	-11.18	0	11.18
	SP3	4	83.08	V	83.08	-12.15	0	12.15
		127	82.82	V	82.82	-12.41	0	12.41

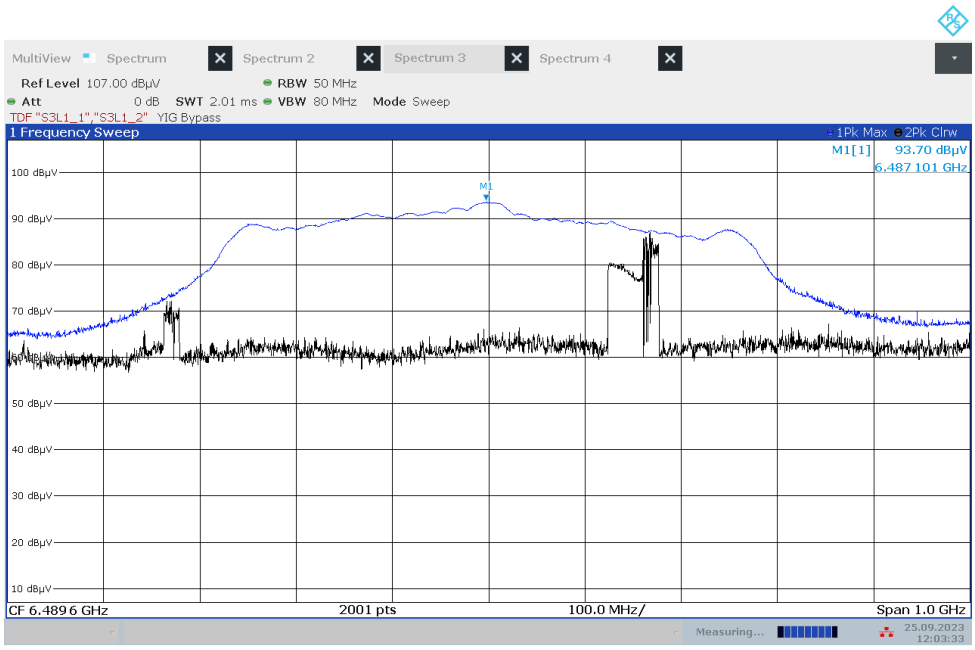
Note:
1. E (dBuv/m) = Measured Value(dBuV)
   EIRP (dBm/50MHz) = E (dBuv/m) – 95.3

▣ Test Plots

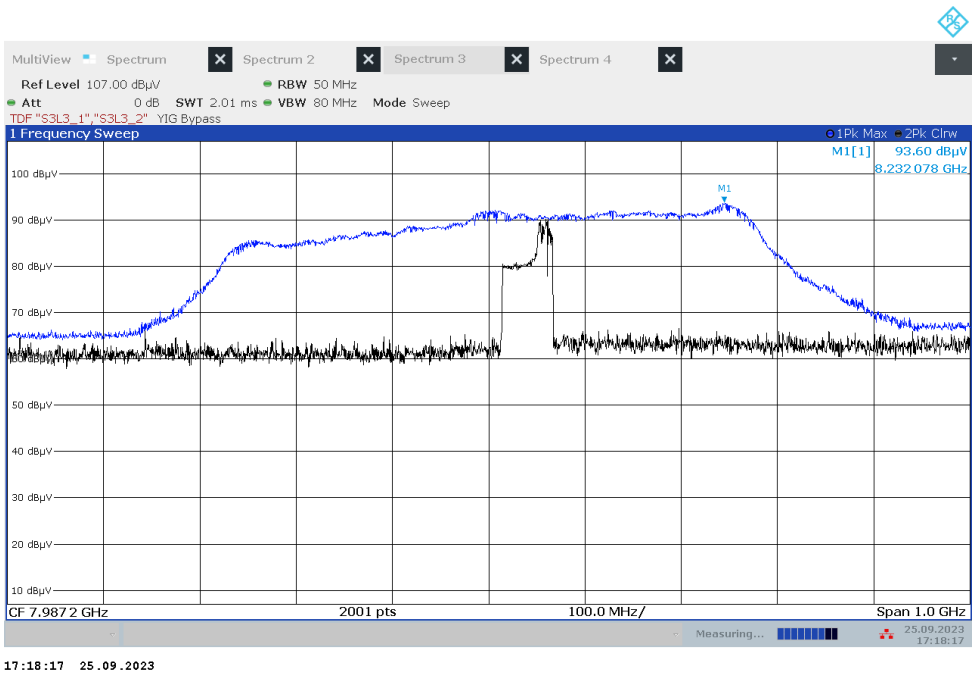
Note:

To simplify the report, the attached plots represent the worst-case EIRP.

[Ch 5, Preamble ID 9, SP0]



[Ch 9, Preamble ID 9, SP0]



9.3 Maximum Average Power

(Ch. 5)

Preamble ID	Config	Payload	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
9	SP0	4	51.49	H	51.49	-43.74	-41.3	2.44
		127	51.66	H	51.66	-43.57	-41.3	2.27
	SP1	4	52.13	H	52.13	-43.10	-41.3	1.80
		127	51.89	H	51.89	-43.34	-41.3	2.04
	SP3	4	52.28	H	52.28	-42.95	-41.3	1.65
		127	52.26	H	52.26	-42.97	-41.3	1.67
27	SP0	***4***	***52.30***	***H***	***52.30***	***-42.93***	***-41.3***	***1.63***
		127	51.65	H	51.65	-43.58	-41.3	2.28
	SP1	4	51.94	H	51.94	-43.29	-41.3	1.99
		127	51.85	H	51.85	-43.38	-41.3	2.08
	SP3	4	52.05	H	52.05	-43.18	-41.3	1.88
		127	52.05	H	52.05	-43.18	-41.3	1.88

(Ch. 9)

Preamble ID	Config	Payload	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
9	SP0	4	50.69	V	50.69	-44.54	-41.3	3.24
		127	***52.16***	***V***	***52.16***	***-43.07***	***-41.3***	***1.77***
	SP1	4	51.97	V	51.97	-43.26	-41.3	1.96
		127	51.99	V	51.99	-43.24	-41.3	1.94
	SP3	4	52.03	V	52.03	-43.20	-41.3	1.90
		127	52.12	V	52.12	-43.11	-41.3	1.81
27	SP0	4	51.95	V	51.95	-43.28	-41.3	1.98
		127	51.46	V	51.46	-43.77	-41.3	2.47
	SP1	4	51.68	V	51.68	-43.55	-41.3	2.25
		127	51.78	V	51.78	-43.45	-41.3	2.15
	SP3	4	51.81	V	51.81	-43.42	-41.3	2.12
		127	51.73	V	51.73	-43.50	-41.3	2.20

Note:

1. E (dBuv/m) = Measured Value(dBuV)

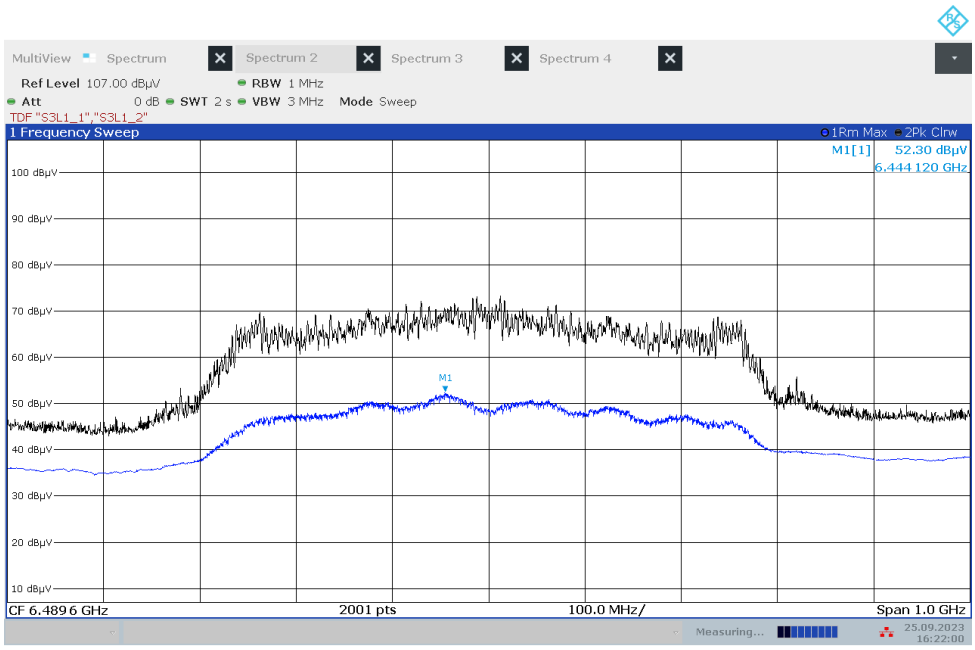
   EIRP (dBm) = E (dBuv/m) – 95.3

▣ Test Plots

Note :

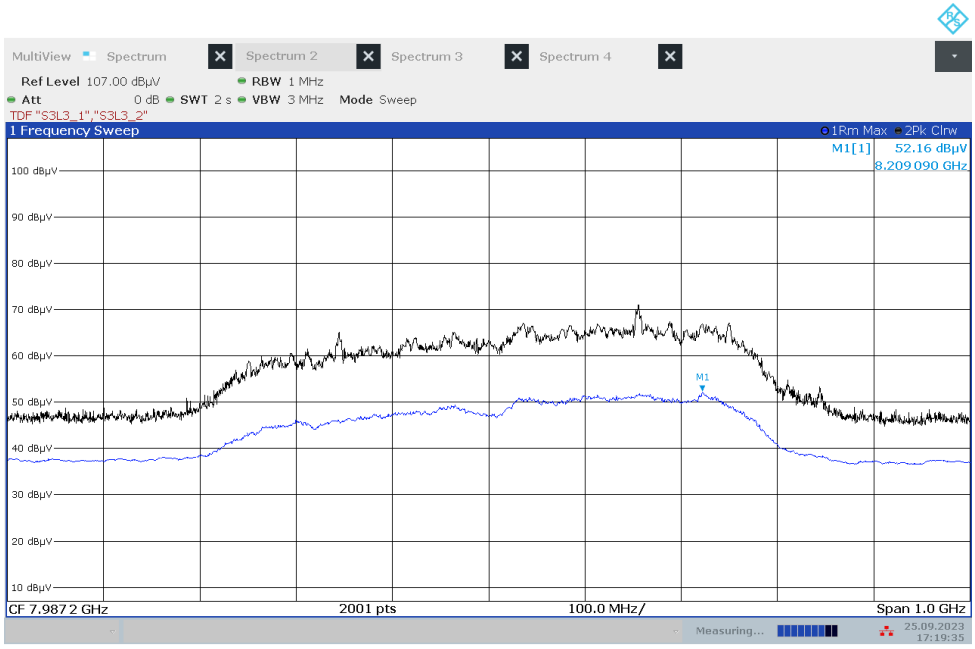
To simplify the report, the attached plots represent the worst-case EIRP.

[Ch 5, Preamble ID 27, SP0]



16:22:01 25.09.2023

[Ch 9, Preamble ID 9, SP0]



17:19:36 25.09.2023

9.4 Radiated Emissions Below 960MHz

Frequency Range : 9 kHz – 30MHz

Frequency	Measured Value	A.F+C.L+D.F	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. The Measured of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

9.5 Radiated Emissions Above 960 MHz

Channel :	5
Operating Frequency :	6 489.6 MHz
Operation Mode:	BPRF
Preamble ID:	9
Configuration:	SP 3
Payload:	127 Bytes

Below 10 600 MHz

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
14.729.781	41.39	H	41.39	-68.57	-61.30	7.27

Above 10 600 MHz

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
15099.733	42.4	H	42.40	-67.56	-61.30	6.26

Note:

1. No spurious emissions were measured above 10 600 MHz.

Channel :	5
Operating Frequency :	6 489.6 MHz
Operation Mode:	HPRF
Preamble ID:	27
Configuration:	SP 3
Payload:	127 Bytes

Below 10 600 MHz

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
14730.281	41.35	H	41.35	-68.61	-61.30	7.31

Above 10 600 MHz

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
15098.234	42.33	H	42.33	-67.63	-61.30	6.33

Note:

1. No spurious emissions were measured above 10 600 MHz.

Channel :	9
Operating Frequency :	7 987.2 MHz
Operation Mode:	BPRF
Preamble ID:	9
Configuration:	SP 3
Payload:	127 Bytes

Below 10 600 MHz

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
14729.781	41.39	H	41.39	-68.57	-61.30	7.27

Above 10 600 MHz

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
15101.733	42.48	V	42.48	-67.48	-61.30	6.18

Note:

1. No spurious emissions were measured above 10 600 MHz.

Channel :	9
Operating Frequency :	7 987.2 MHz
Operation Mode:	HPRF
Preamble ID:	27
Configuration:	SP 3
Payload:	127 Bytes

Below 10 600 MHz

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
14729.781	41.22	H	41.22	-68.74	-61.30	7.44

Above 10 600 MHz

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
15101.733	42.44	V	42.44	-67.52	-61.30	6.22

Note:

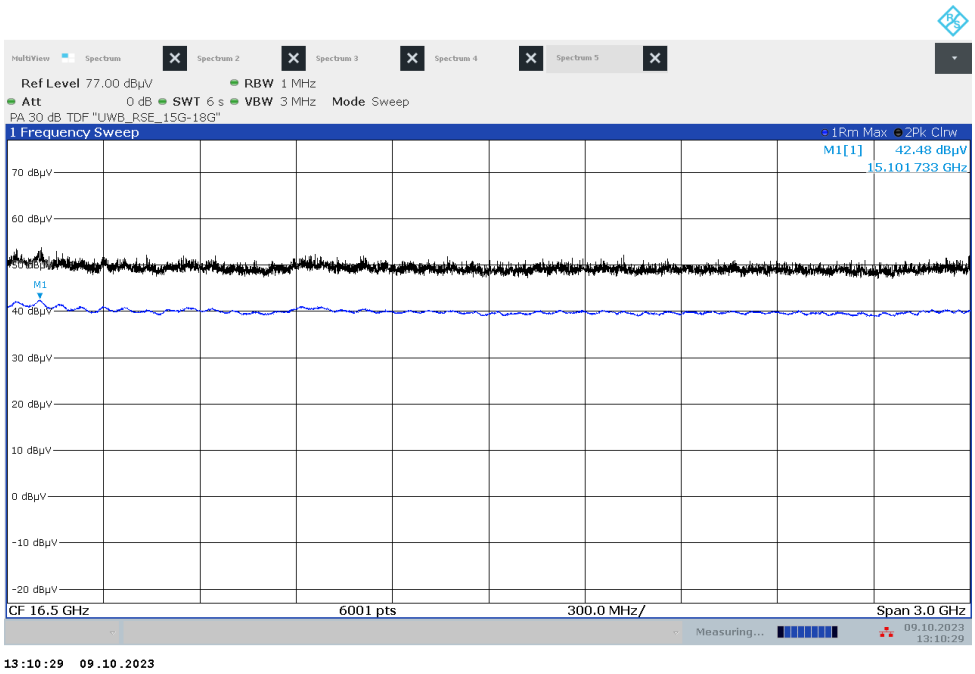
1. No spurious emissions were measured above 10 600 MHz.

▣ Test Plots

Note :

To simplify the report, the attached plots represent the worst-case mode.

15.0 GHz – 18.0 GHz(Ch.9)



9.6 Radiated Emissions in the 1164 MHz - 1240 MHz and 1559 MHz - 1610 MHz GPS Bands

Channel :	5
Operating Frequency :	6 489.6 MHz
Operation Mode:	BPRF
Preamble ID:	9
Configuration:	SP 3
Payload:	127 Bytes

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1189.74	14.88	H	14.88	-95.08	-85.30	9.78
1608.85	16.05	H	16.05	-93.91	-85.30	8.61

Note:

1. No spurious emissions were measured GPS Bands

Channel :	5
Operating Frequency :	6 489.6 MHz
Operation Mode:	HPRF
Preamble ID:	27
Configuration:	SP 3
Payload:	127 Bytes

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1221.78	15.32	H	15.32	-94.64	-85.30	9.34
1608.93	15.84	H	15.84	-94.12	-85.30	8.82

Note:

1. No spurious emissions were measured GPS Bands

Channel :	9
Operating Frequency :	7 987.2 MHz
Operation Mode:	BPRF
Preamble ID:	9
Configuration:	SP 3
Payload:	127 Bytes

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1227.09	15.02	H	15.02	-94.94	-85.30	9.64
1581.56	15.55	H	15.55	-94.41	-85.30	9.11

Note:

1. No spurious emissions were measured GPS Bands

Channel :	9
Operating Frequency :	7 987.2 MHz
Operation Mode:	HPRF
Preamble ID:	27
Configuration:	SP 3
Payload:	127 Bytes

Meas. Freq (MHz)	Meas. Value (dBuv/m)	Pol.	E (dBuv/m)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1234.39	15.11	H	15.11	-94.85	-85.30	9.55
1573.22	15.69	H	15.69	-94.27	-85.30	8.97

Note:

1. No spurious emissions were measured GPS Bands

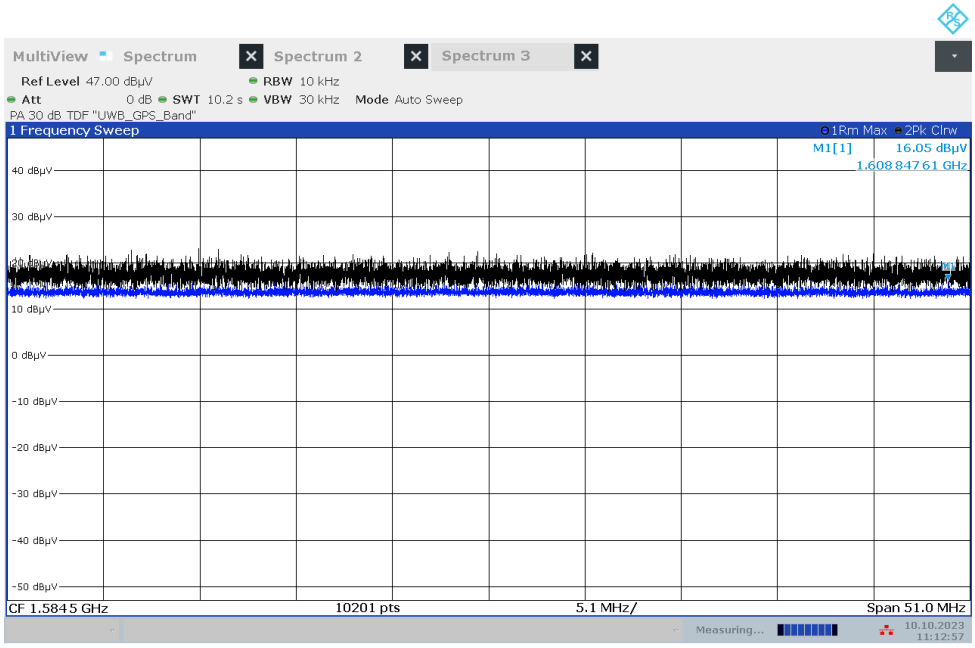
▣ Test Plots

Note :

To simplify the report, the attached plots represent the worst-case mode.

[BPRF, SP3, Payload 127 Bytes (Ch. 5)]

1559 MHz -1610 MHz



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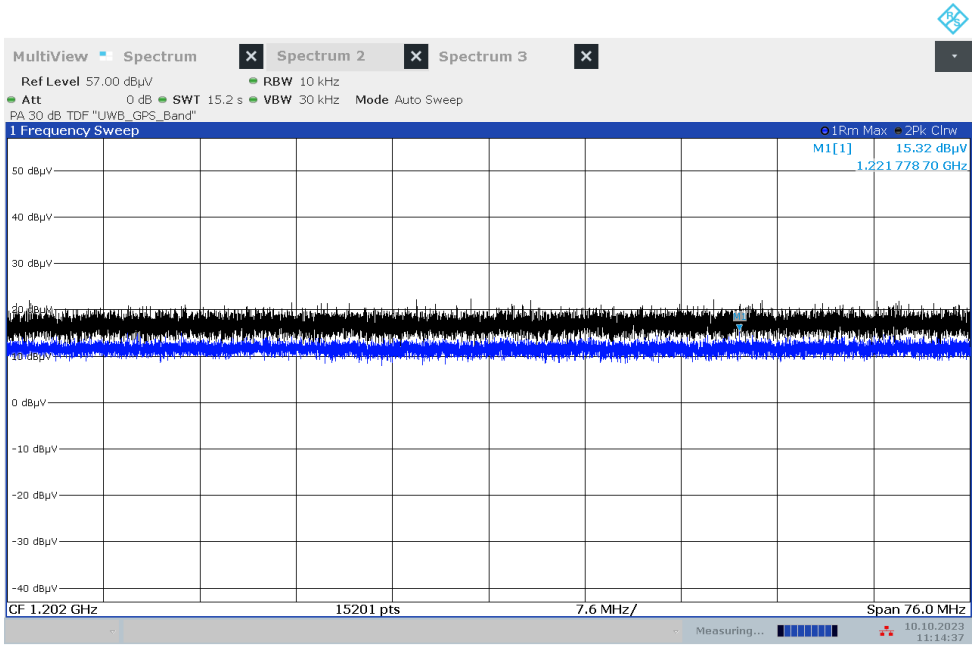
[HPRF, SP3, Payload 127 Bytes (Ch. 5)]

1164 MHz -1240 MHz



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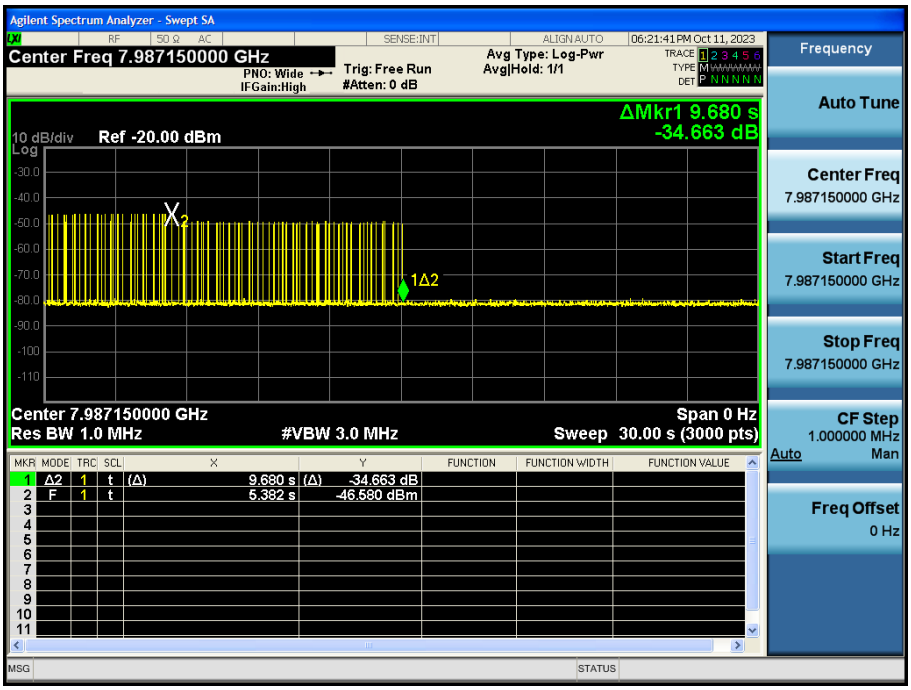
9.7 Cease Transmission Time



Note:

1. Result: 9.680 s
2. Limit: 10.00 s
3. X2 represents the EUT for UWB stop receiving, and 1Δ2 shows the EUT for UWB cease transmitting.

9.8 Powerline Conducted Emissions

Conducted Emissions

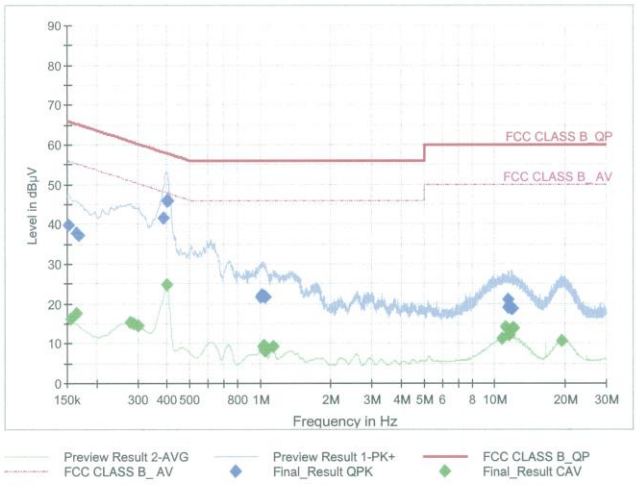
Test 1 / 2

Test Report

Common Information

EUT : SM-S926U
Operating Conditions : UWB Mode
Comment :

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1523	39.81	65.88	26.07	9.000	L1	9.6
0.1635	37.89	65.28	27.40	9.000	N	9.6
0.1680	37.33	65.06	27.73	9.000	N	9.6
0.3840	41.49	58.19	16.70	9.000	L1	9.6
0.3975	45.90	57.91	12.01	9.000	L1	9.6
0.4020	45.79	57.81	12.02	9.000	L1	9.6
0.9995	21.55	56.00	34.45	9.000	L1	9.6
1.0108	21.92	56.00	34.08	9.000	L1	9.7
1.0198	22.11	56.00	33.89	9.000	L1	9.7
1.0310	22.05	56.00	33.95	9.000	L1	9.7
1.0378	21.98	56.00	34.03	9.000	L1	9.7
1.0490	21.74	56.00	34.26	9.000	L1	9.7
11.4283	21.10	60.00	38.90	9.000	L1	10.0
11.4463	18.96	60.00	41.04	9.000	L1	10.0
11.4688	19.25	60.00	40.75	9.000	L1	10.0
11.8198	18.81	60.00	41.19	9.000	L1	10.1
11.8423	19.05	60.00	40.95	9.000	L1	10.1
11.8648	18.72	60.00	41.28	9.000	L1	10.1

2023-10-10 오전 9:30:18

Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1545	16.12	55.75	39.64	9.000	N	9.6
0.1635	17.54	55.28	37.75	9.000	N	9.6
0.2783	15.40	50.87	35.47	9.000	L1	9.6
0.2895	15.12	50.54	35.42	9.000	L1	9.6
0.3008	14.52	50.22	35.70	9.000	L1	9.6
0.3998	24.94	47.86	22.92	9.000	L1	9.6
1.0243	9.30	46.00	36.70	9.000	N	9.7
1.0378	9.52	46.00	36.48	9.000	N	9.7
1.0423	8.39	46.00	37.61	9.000	N	9.7
1.0468	8.21	46.00	37.79	9.000	N	9.7
1.0513	7.98	46.00	38.02	9.000	N	9.7
1.1413	9.17	46.00	36.83	9.000	L1	9.7
10.7600	11.37	50.00	38.63	9.000	L1	10.0
11.1245	14.00	50.00	36.00	9.000	L1	10.0
11.5115	12.09	50.00	37.91	9.000	L1	10.0
11.8738	13.98	50.00	36.02	9.000	L1	10.1
11.9975	13.83	50.00	36.17	9.000	L1	10.1
19.4405	10.70	50.00	39.30	9.000	L1	10.3

2023-10-10 오전 9:30:18

10. List of Test Equipment

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S3AM	08/03/2025	Biennial
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
RF Switching System	FBSR-03A (3G HPF+LNA)	T&M SYSTEM	S3L1	12/05/2023	Annual
RF Switching System	FBSR-03A (10dB ATT+LNA)	T&M SYSTEM	S3L2	12/05/2023	Annual
RF Switching System	FBSR-03A (7G HPF+LNA)	T&M SYSTEM	S3L3	12/05/2023	Annual
RF Switching System	FBSR-03A (3dB ATT+LNA)	T&M SYSTEM	S3L4	12/05/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/02/2024	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/28/2024	Annual
High Pass Filter	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	03/02/2024	Annual
Spectrum Analyzer	FSW	Rohde & Schwarz	101736	05/18/2024	Annual
Spectrum Analyzer	FSV40-N(9 kHz ~ 30 GHz)	Rohde & Schwarz	101068-SZ	08/30/2024	Annual
LISN	ENV216	Rohde & Schwarz	102245	08/02/2024	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	05/26/2024	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

11. Annex A_Test Setup Photo

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2310-FC009-P