



RF - TEST REPORT

- FCC Part 15.247, RSS-247 -

Type / Model Name : 1674 FC

Product Description : Multifunction Tester with BLE

Applicant : Fluke Corporation

Address : 6920 Seaway Blvd Everett.

Washington 98203, US

Manufacturer : Fluke Corporation

Address : 6920 Seaway Blvd Everett.

Washington 98203, US

Test Result according to the standards listed in clause 1 test standards:	POSITIVE
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Test Report No. :	80200997-03 Rev_0	26. July 2024 Date of issue
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Deutsche
Akkreditierungsstelle
D-PL-12030-01-00

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ATTACHMENT A as separate supplement

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

1 TEST STANDARDS

The tests were partly performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (July 2024)

Part 15, Subpart A	General
FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (July 2024)	
Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204 modifications	External radio frequency power amplifiers and antenna
Part 15, Subpart C, Section 15.205	Restricted bands of operation
Part 15, Subpart C, Section 15.207	Conducted limits
Part 15, Subpart C, Section 15.209	Radiated emission limits, general requirements
Part 15, Subpart C, Section 15.247	Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz
ANSI C63.10: 2013	Testing Unlicensed Wireless Devices
KDB 558074 D01 v05r02	Guidance for compliance measurements on DTS; FHSS and hybrid system devices operating under Section 15.247 of the FCC rules, April 2, 2019.
ISED Canada Rules and Regulations	
RSS-Gen, Issue 5 + Amendment 1 + 2	General Requirements for Compliance of Radio Apparatus
RSS-247, Issue 3	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
ANSI C63.10: 2013	Testing Unlicensed Wireless Devices

2 EQUIPMENT UNDER TEST

2.1 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

2.2 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according his/her instructions.

2.3 General remarks

This report covers the emissions of the Module “BT860SA” in combination with the host device 1674FC.

Performed tests:

- RF output power (radiated)
- Transmitter unwanted emissions, radiated

2.4 Photo documentation of the EUT – Detailed photos see ATTACHMENT A

2.5 Equipment type

BLE device

2.6 Short description of the equipment under test (EUT)

The Fluke 1674 FC is a battery-powered multifunctional tester with BLE.

Number of tested samples: 1
Serial number: PB12
Firmware version: 0.33.0

2.7 Variants of the EUT

According to the manufacturer there are three model variations, 1672, 1673 FC, and 1674 FC in the 167x family. Only the model 1672 has no Bluetooth module and the 1674 FC Supersedes all other models. This report covers the 1674 FC model only.

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

2.8 Operation frequency and channel plan

The operating frequency is 2400 MHz to 2483.5 MHz.

Channel plan:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
37	2402	18	2442
0	2404	19	2444
1	2406	20	2446
2	2408	21	2448
3	2410	22	2450
4	2412	23	2452
5	2414	24	2454
6	2416	25	2456
7	2418	26	2458
8	2420	27	2460
9	2422	28	2462
10	2424	29	2464
38	2426	30	2466
11	2428	31	2468
12	2430	32	2470
13	2432	33	2472
14	2434	34	2474
15	2436	35	2476
16	2438	36	2478
17	2440	39	2480

Note: the marked frequencies are determined for final testing.

2.9 Transmit operating modes

The EUT uses GFSK modulation and may provide following data rates:

- 1000 kbps

(kbps = kilobits per second)

2.10 Antenna

The following antennas shall be used with the EUT:

Number	Characteristic	Model number	Frequency range (GHz)	Gain (dBi)
1	Omni	AT2116-B2R7HAA	2.4	0.1

2.11 Power supply system utilised

Power supply voltage, V_{nom} : 10.8 V_{DC}, battery powered
Power supply voltage (alternative) : 5 V_{DC} (USB_C, AC Adapter 120 V_{AC} battery charging)

2.12 Peripheral devices and interface cables

The following peripheral devices and interface cables are connected during the measurements:

- _____ Model : _____
- _____ Model : _____

2.13 Determination of worst-case conditions for final measurement

Preliminary tests are performed in all three orthogonal axes of the EUT to locate at which position and at what setting of the EUT produce the maximum of the emissions. For the further measurement the EUT is set in Y position.

The tests are carried out in the following frequency band:

2400 MHz – 2483.5 MHz

For the final test the following channels and test modes are selected:

Wireless system	Available channel	Tested channels	Power setting	Modulation	Modulation type	Data rate
802.15.1	0 - 39	37, 39	0dBm	DSSS	GFSK	1000 kbps

2.13.1 Test jig

No test jig is used.

2.13.2 Test software

The test software for the EUT provides free power setting, the special test mode RX and the TX continuous mode, modulated. The EUT was set with test modulation to transmit data during the tests with a maximum duty cycle (x) from an internal packet generator.

3 TEST RESULT SUMMARY

BLE device using digital modulation and operates in the 2400 MHz – 2483.5 MHz band:

FCC Rule Part	RSS Rule Part	Description	Result
15.207(a)	RSS-Gen, 8.8	AC power line conducted emissions	passed
15.247(a)(2)	RSS-247, 5.2(a)	-6 dB EBW	Not tested
15.247(b)(3) 15.247(b)(4)	RSS-247, 5.4(d)	Maximum peak radiated output power	passed
15.247(d)	RSS-247, 5.5	Spurious emissions	passed
15.209	RSS-Gen, 8.9 RSS-Gen 8.10	Restricted frequency bands	passed
15.247(e)	RSS-247, 5.2(b)	PSD	Not tested
15.35(c)	RSS-Gen, 8.2	Pulsed operation	Not tested
15.203	-	Antenna requirement	passed
-	RSS-Gen, 6.7	99 % Bandwidth	Not tested

Not tested because only a module integration was tested.

3.1 Revision history of test report

Test report No	Rev.	Issue Date	Changes
80200997-03	0	26 July 2024	Initial test report

The test report with the highest revision number replaces the previous test reports.

3.2 Final assessment

The equipment under test fulfils the requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 21 June 2024

Testing concluded on : 11 July 2024

Checked by:

Tested by:

Klaus Gegenfurtner
Teamleader Radio

Christopher Thaller
Radio Team

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Straubinger Straße 100
94447 PLATTLING
GERMANY**

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15 - 35 °C

Humidity: 30 - 60 %

Atmospheric pressure: 86 - 106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report on basis of the ETSI Technical Report TR 100 028 Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1 and Part 2. The results are documented in the quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Measurement Type	Range	Confidence Level	Calculated Uncertainty
AC power line conducted emissions	0.15 MHz to 30 MHz	95%	$\pm 3.29 \text{ dB}$
EBW and OBW	2400 MHz to 3000 MHz	95%	$\pm 2.5 \times 10^{-7}$
Maximum peak conducted output power	2400 MHz to 3000 MHz	95%	$\pm 0.62 \text{ dB}$
Power spectral density	2400 MHz to 3000 MHz	95%	$\pm 0.62 \text{ dB}$
Conducted Spurious Emissions	9 kHz to 10000 MHz	95%	$\pm 2.15 \text{ dB}$
Conducted Spurious Emissions	10000 MHz to 40000 MHz	95%	$\pm 3.47 \text{ dB}$
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	$\pm 3.53 \text{ dB}$
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	$\pm 3.71 \text{ dB}$
Radiated Spurious Emissions	1000 MHz to 30000 MHz	95%	$\pm 2.34 \text{ dB}$
Field strength of the fundamental	100 kHz to 100 MHz	95%	$\pm 3.53 \text{ dB}$

4.4 Conformity Decision Rule

The applied conformity decision rule is based on ILAC G8:09/2019 clause 4.2.1 Binary Statement for Simple Acceptance Rule ($w = 0$).

Details can be found in the procedure CSA_B_V50_29.

4.5 Measurement protocol for FCC and ISCED

4.5.1 General information

CSA Group Bayern GmbH is recognized as wireless testing laboratory under the CAB identifier:

FCC: DE 0011

ISED: DE0009

4.5.2 General Standard information

The test methods used comply with ANSI C63.10 - "Testing Unlicensed Wireless Devices".

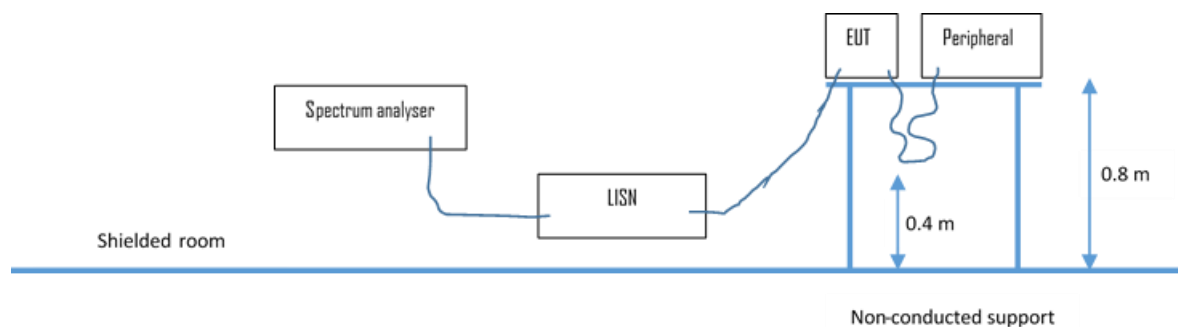
4.5.2.1 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions.

4.5.3 Details of test procedures

4.5.3.1 Conducted emission

Test setup according ANSI C63.10



The final level, expressed in dB μ V, is arrived at by taking the reading directly from the Spectrum analyser. This level is compared to the limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

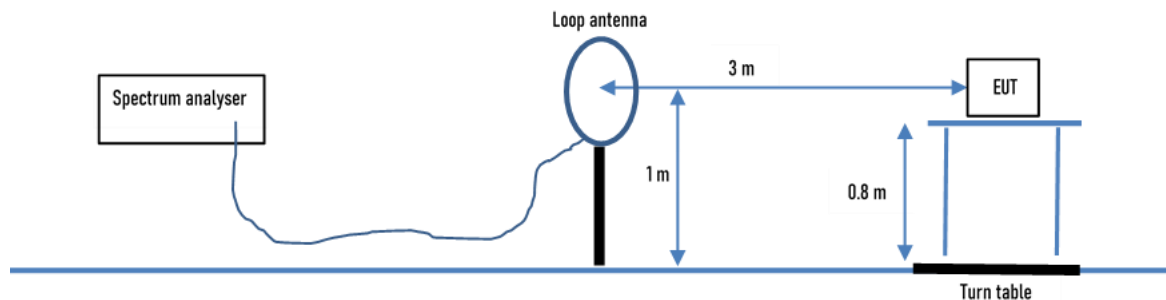
$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50 Ω / 50 μ H (CISPR 16) characteristics. The receiver is protected by means of an impedance matched pulse limiter connected directly to the RF input. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emission is re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

4.5.3.2 Radiated emission

4.5.3.2.1 OATS1 test site (9 kHz - 30 MHz):

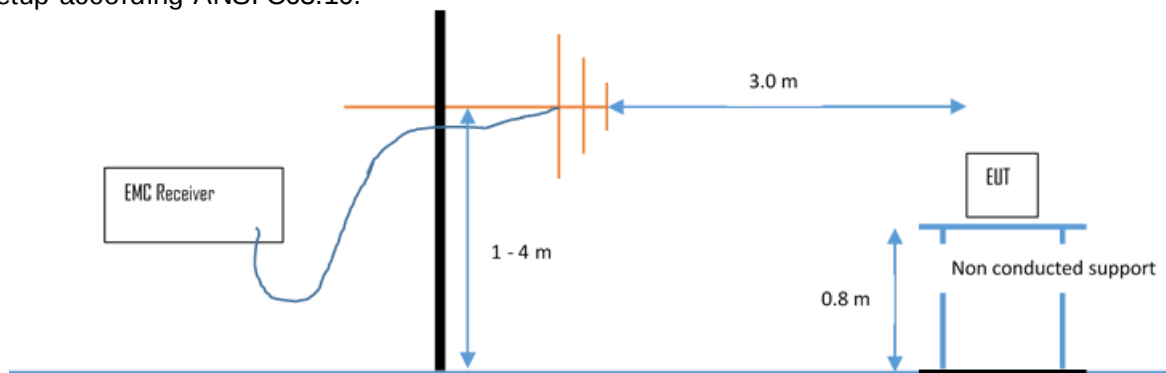
Test setup according ANSI C63.10



Emissions from the EUT are measured in the frequency range of 9 MHz to 30 MHz using a tuned receiver and a calibrated loop antenna. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. The antenna is positioned 3, 10 or 30 metres horizontally from the EUT and is repeated vertically. To locate maximum emissions from the test sample the antenna is varied along the site axis and the EUT is rotated 360 degrees.

4.5.3.2.2 OATS1 test site (30 MHz - 1 GHz):

Test setup according ANSI C63.10.



Spurious emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees. The final level in dBµV/m is calculated by taking the reading from the EMI receiver (Level dBµV) and adding the correction factors and cable loss factor (dB). The FCC limit is subtracted from this result in order to provide the limit margin listed in the measurement protocol.

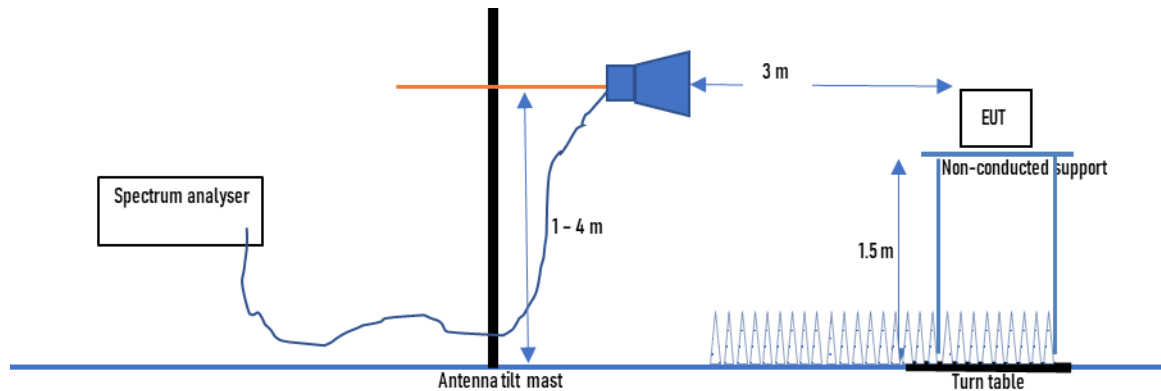
The resolution bandwidth setting:
30 MHz – 1000 MHz: RBW: 120 kHz

Example:

Frequency (MHz)	Level (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	-	Limit (dBµV/m)	=	Delta (dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

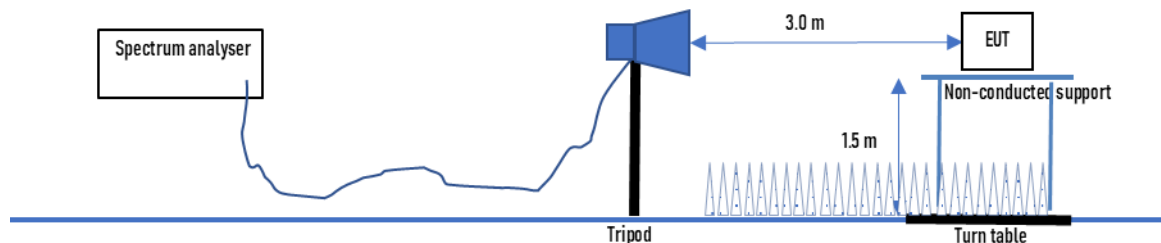
4.5.3.2.3 Anechoic chamber 1 (1000 MHz – 18000 MHz)

Test setup according ANSI C63.10.



Radiated emissions from the EUT are measured in the frequency range 1 GHz up to 18 GHz as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a non-conducting table, 1.5 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the centre, forming a bundle 30 cm to 40 cm long. Measurements are made in in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements.

4.5.3.2.4 Anechoic chamber 1 (18 GHz – 40 GHz)



Emissions from the EUT are measured in the frequency range 18 GHz up to 40 GHz as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a non-conducting table, 1.5 metre above the ground plane. The turntable is fully covered with the appropriate absorber (Type VHP-12). Any controlling device is positioned such that it does not significantly influence the measurement results. Interconnecting cables that hang closer than 40 cm to the ground plane are folded back and forth in the centre, forming a bundle 30 cm to 40 cm long. Measurements are made in in three orientations of the EUT and the horizontal and vertical polarization planes of measurement antenna in a fully anechoic room. The measurement antenna is adjusted and the EUT orientated to permit the measurement of the maximum emission from the EUT. The conditions determined as worst-case will then be used for the final measurements. Where appropriate, the test distance may be reduced in order to detect emissions under better uncertainty. The limit is adopted.

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5 TEST CONDITIONS AND RESULTS

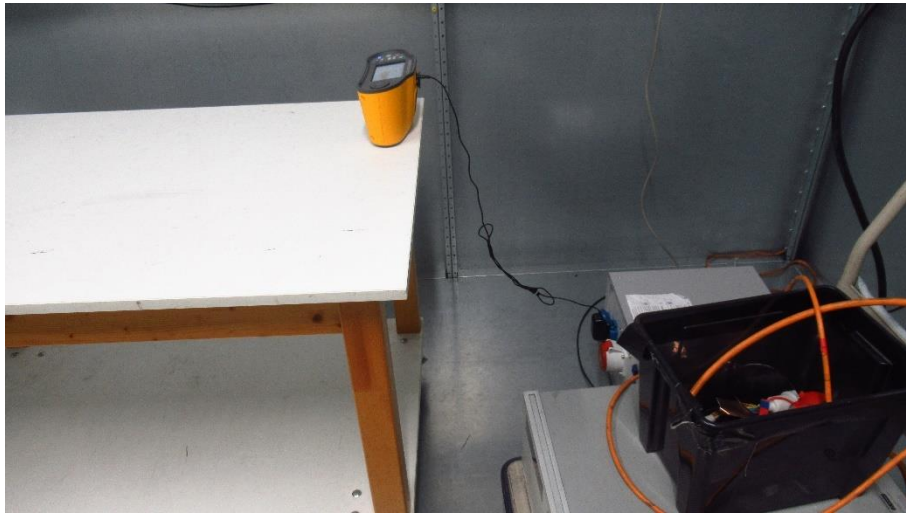
5.1 AC power line conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room SR4

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

According to FCC Part 15, Section 15.207(a):

Except as shown in paragraphs (b) and (c) of this Section, 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 given limits.

According to RSS-Gen 8.8:

Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 μ H / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

5.1.4 Description of Measurement

The measurements are performed following the procedures set out in ANSI C63.10 described under item 4.4.3. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz
 Min. limit margin -23.5 dB at 0.16 MHz

Limit according to FCC Part 15, Section 15.207(a):

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

The requirements are **FULFILLED**.

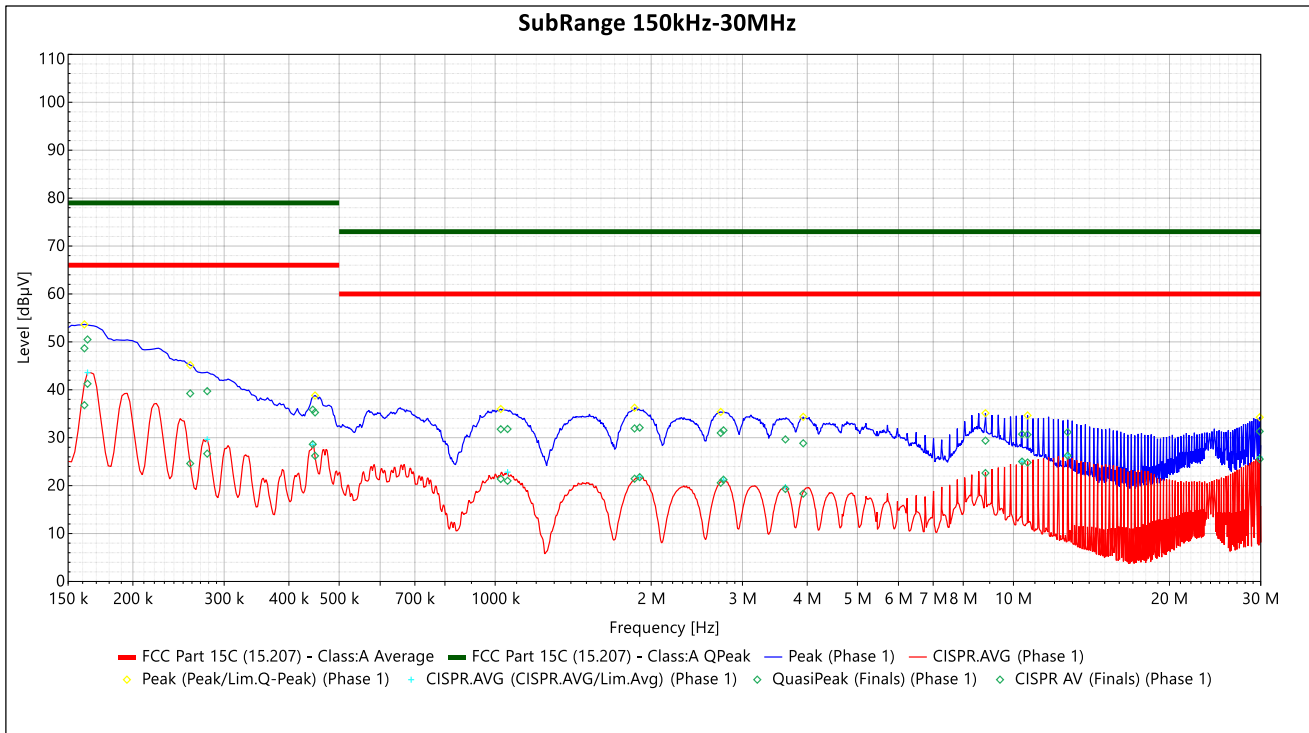
Remarks: For detailed test result please see the following test protocols
AC Adapter Model KSAS0120500200D5

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

5.1.6 Test protocol

Test point L1
Operation mode: Transmission at 2.4 GHz

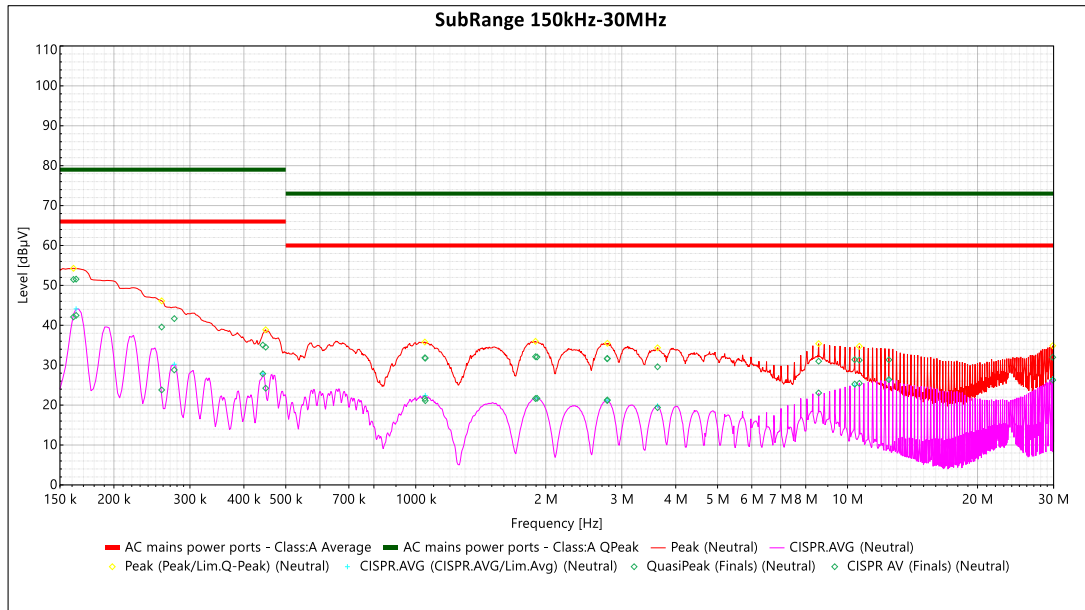
Result: passed



Frequency (Hz)	QuasiPeak (dBμV)	QP Margin	QP Limit (dBμV)	CISPR AV (dBμV)	CISPR AV Margin	AV Limit (dBμV)	Line	RBW (Hz)	Meas.Time (s)	Correction (dB)
161.25 k	48.664	-30.336	79	36.788	-29.212	66	Phase 1	9000	1	10.347
163.5 k	50.49	-28.51	79	41.26	-24.74	66	Phase 1	9000	1	10.346
258 k	39.229	-39.771	79	24.61	-41.39	66	Phase 1	9000	1	10.353
278.25 k	39.716	-39.284	79	26.667	-39.333	66	Phase 1	9000	1	10.357
444.75 k	35.845	-43.155	79	28.626	-37.374	66	Phase 1	9000	1	10.392
449.25 k	35.273	-43.727	79	26.217	-39.783	66	Phase 1	9000	1	10.393
1.02525 M	31.766	-41.234	73	21.385	-38.615	60	Phase 1	9000	1	10.493
1.05675 M	31.811	-41.189	73	20.995	-39.005	60	Phase 1	9000	1	10.497
1.85775 M	31.93	-41.07	73	21.44	-38.56	60	Phase 1	9000	1	10.588
1.9005 M	32.096	-40.904	73	21.773	-38.227	60	Phase 1	9000	1	10.593
2.724 M	30.987	-42.013	73	20.591	-39.409	60	Phase 1	9000	1	10.64
2.75775 M	31.538	-41.462	73	21.233	-38.767	60	Phase 1	9000	1	10.641
3.63075 M	29.647	-43.353	73	19.308	-40.692	60	Phase 1	9000	1	10.628
3.93 M	28.837	-44.163	73	18.325	-41.675	60	Phase 1	9000	1	10.618
8.8305 M	29.382	-43.618	73	22.617	-37.383	60	Phase 1	9000	1	10.562
10.38975 M	30.74	-42.26	73	25.025	-34.975	60	Phase 1	9000	1	10.606
10.6485 M	30.647	-42.353	73	24.817	-35.183	60	Phase 1	9000	1	10.619
12.7275 M	31.164	-41.836	73	26.267	-33.733	60	Phase 1	9000	1	10.741
29.87025 M	31.322	-41.678	73	25.533	-34.467	60	Phase 1	9000	1	11.263

Test point N
Operation mode: Transmission at 2.4 GHz

Result: passed



Frequency (Hz)	QuasiPeak (dBμV)	QP Margin	QP Limit (dBμV)	CISPR AV (dBμV)	CISPR AV Margin	AV Limit (dBμV)	Line	RBW (Hz)	Meas.Time (s)	Correction (dB)
161.25 k	51.483	-27.517	79	42.1	-23.9	66	Neutral	9000	1	10.371
163.5 k	51.558	-27.442	79	42.48	-23.52	66	Neutral	9000	1	10.369
258 k	39.559	-39.441	79	23.803	-42.197	66	Neutral	9000	1	10.373
276 k	41.678	-37.322	79	28.821	-37.179	66	Neutral	9000	1	10.377
442.5 k	35.045	-43.955	79	27.849	-38.151	66	Neutral	9000	1	10.403
449.25 k	34.53	-44.47	79	24.241	-41.759	66	Neutral	9000	1	10.403
1.05 M	31.857	-41.143	73	21.648	-38.352	60	Neutral	9000	1	10.508
1.05225 M	31.76	-41.24	73	21.114	-38.886	60	Neutral	9000	1	10.509
1.89375 M	32.126	-40.874	73	21.647	-38.353	60	Neutral	9000	1	10.616
1.9095 M	32.075	-40.925	73	21.695	-38.305	60	Neutral	9000	1	10.617
2.77575 M	31.621	-41.379	73	21.146	-38.854	60	Neutral	9000	1	10.676
2.778 M	31.686	-41.314	73	21.289	-38.711	60	Neutral	9000	1	10.676
3.63075 M	29.599	-43.401	73	19.383	-40.617	60	Neutral	9000	1	10.668
8.57175 M	30.996	-42.004	73	23.046	-36.954	60	Neutral	9000	1	10.676
10.38975 M	31.398	-41.602	73	25.261	-34.739	60	Neutral	9000	1	10.754
10.6485 M	31.273	-41.727	73	25.447	-34.553	60	Neutral	9000	1	10.771
12.4665 M	31.348	-41.652	73	26.387	-33.613	60	Neutral	9000	1	10.914
29.868 M	31.991	-41.009	73	26.285	-33.715	60	Neutral	9000	1	11.888

5.2 Maximum peak radiated output power

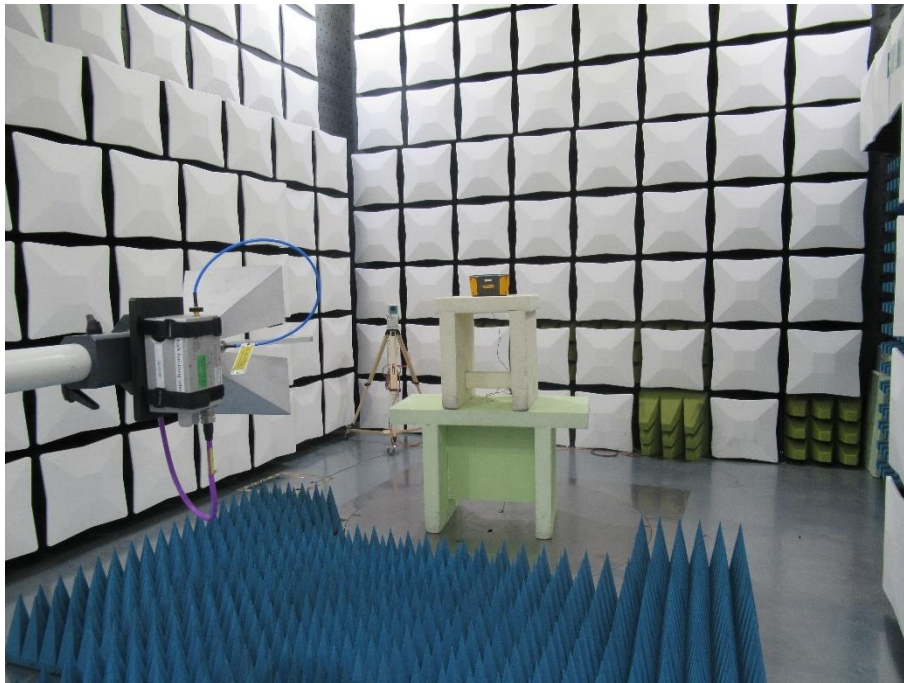
For test instruments and accessories used see section 6 Part **CPR 3**.

5.2.1 Description of the test location

Test location: Semi-Anechoic Chamber SAC2

Test distance: 3 m

5.2.2 Photo documentation of the test set-up



5.2.3 Applicable standard

According to FCC Part 15, Section 15.247(b)(3):

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

According to RSS-247 5.4(d):

For DTSSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1 W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

5.2.4 Description of Measurement

The maximum peak radiated output power is measured using a spectrum analyser following the procedure set out in ANSI C63.10, item 11.9.2.2. The EUT is set in TX continuous mode while measuring.

5.2.5 Test result

FCC §15.247 (b)(3 & 4) RSS-247 5.4 (d)						
Modulation	Channel	Frequency	Measured fieldstrength	Calculated EIRP	Conducted Tx-Power Limit	Margin
		MHz	dB(μV/m)	dBm	dBm	dB
1 Mbps	CH37	2402	88.2	-7.0	30	-37.0
	CH39	2480	86.5	-8.7	30	-38.7

Peak Power Limit according to FCC Part 15, Section 15.247(b)(3):

Frequency (MHz)	Peak Power Limit	
	(dBm)	(W)
902-928	30	1.0
2400-2483.5	30	1.0
5725-5850	30	1.0

Peak output power limit according to RSS-247 5.4(d):

Frequency (MHz)	Peak Power Limit	
	(dBm)	(W)
902-928	30	1.0
2400-2483.5	30	1.0

Frequency (MHz)	EIRP Limit	
	(dBm)	(W)
902-928	36	4.0
2400-2483.5	36	4.0

The requirements are **FULFILLED**.

Remarks: None

5.3 Spurious emissions radiated

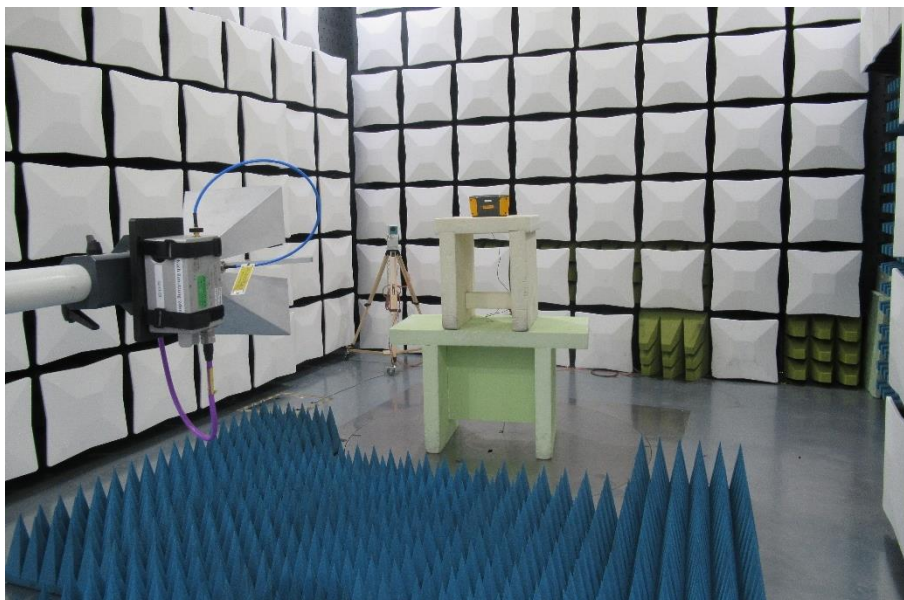
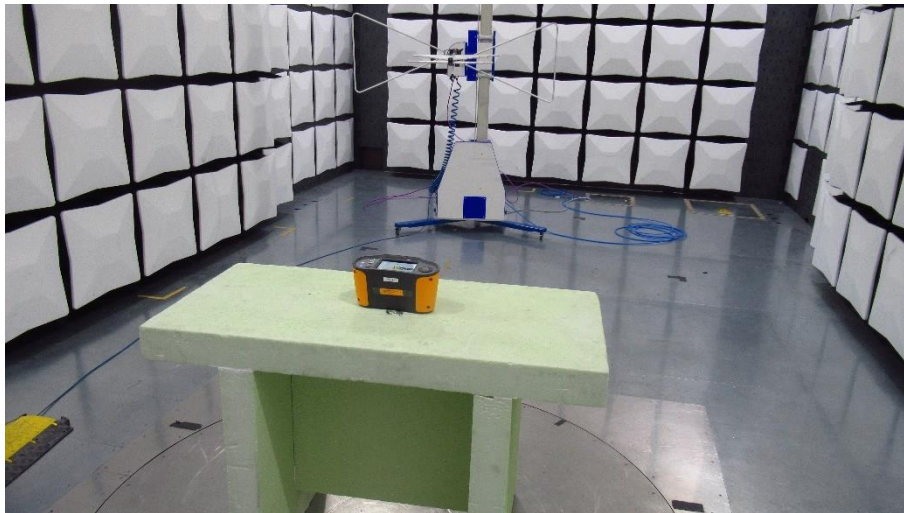
For test instruments and accessories used see section 6 Part **SER 2, SER 3.**

5.3.1 Description of the test location

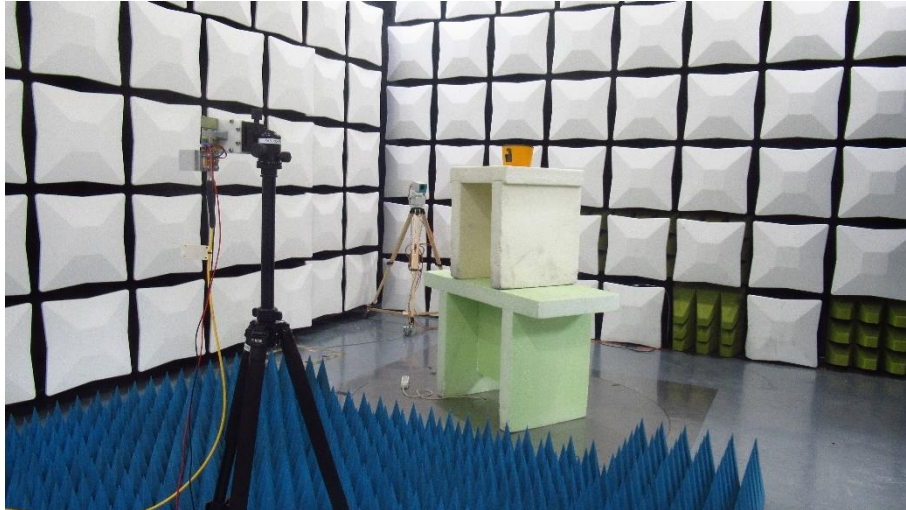
Test location: Semi-Anechoic chamber SAC2

Test distance: 3 m

5.3.2 Photo documentation of the test set-up



The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.



5.3.3 Applicable standard

According to FCC Part 15, Section 15.247(d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

According to RSS-247 5.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

5.3.4 Description of Measurement

The restricted bands are measured radiated. The span of the spectrum analyser is set wide enough to capture the restricted band and measure the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation. The restricted bands are measured falling emissions into it and the nearest restricted band are checked for emissions also the restricted band for the harmonics of the carrier.

The radiated power of the spurious emission from the EUT is measured in a test setup following the procedures set out in ANSI C63.10. If the emission level of the EUT in peak mode complies with the average limit is 20 dB lower, then testing will be stopped and peak values of the EUT will be reported, otherwise the emission will be measured in average mode again and reported.

Measurements are performed in following order:

1) Measurement of emissions according to General Limit specified in section 15.209(a):

Test receiver settings for SER1, SER2:

9kHz-150kHz	RBW: 200 Hz	Detector: Quasi peak*	Meas. Time: 1 s,
150kHz-30MHz	RBW: 9 kHz	Detector: Quasi peak*	Meas. Time: 1 s,
30MHz-1GHz	RBW: 120 MHz	Detector: Quasi peak	Meas. Time: 1 s,

*AV Detector in the ranges 9-90kHz and 110-490kHz

Spectrum analyser settings for SER3:

1GHz-26GHz	RBW: 1 MHz	Detector: Max. peak	Trace: Max. hold	Sweep: Auto
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2) If emissions outside the Restricted Bands are above General Limit additional measurements of emissions according to Spurious Emissions Limit specified in section 15.247(d) are performed:

Spectrum analyser settings:

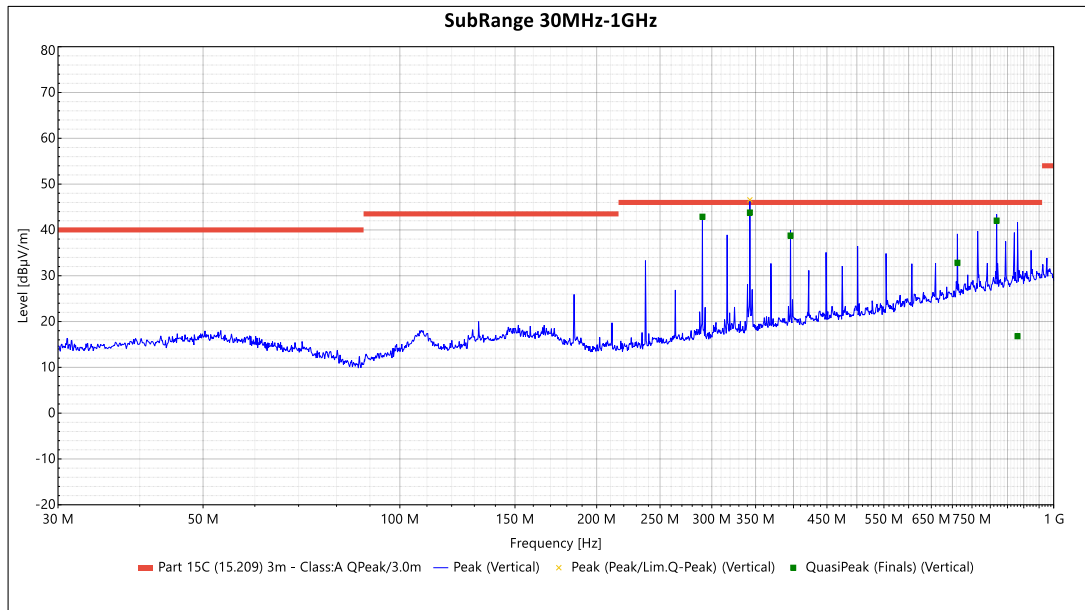
RBW: 100 kHz	VBW: 300 kHz	Detector: Max. peak	Trace: Max. hold	Sweep: Auto
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The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

5.3.5 Test result

30 MHz < f < 1000 MHz:

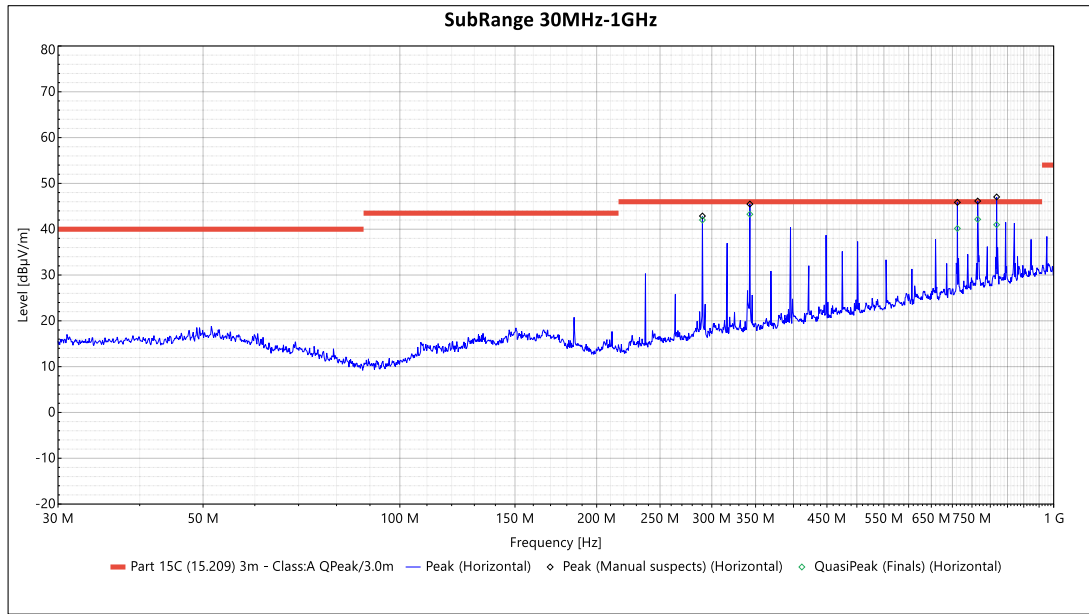
Vertical



Finals:

Frequency (Hz)	QuasiPeak (dBµV/m)	QP Margin	QP Limit (dBµV/m)	angle	height	polarization	RBW (Hz)	Meas.Time (s)	Correction (dB)
290.2678262 M	42.89	-3.11	46	118	1.5	Vertical	120000	0.01	-9.749
343.0397607 M	43.804	-2.196	46	81	1.5	Vertical	120000	0.01	-8.334
395.7988343 M	38.777	-7.223	46	46	1.5	Vertical	120000	0.01	-6.725
712.531681 M	32.835	-13.165	46	131	1.5	Vertical	120000	0.01	-0.394
818.0362415 M	42.042	-3.958	46	0	1.5	Vertical	120000	0.01	1.207
880.4581585 M	16.786	-29.214	46	60	1.5	Vertical	120000	0.01	1.899

Horizontal:



Finals:

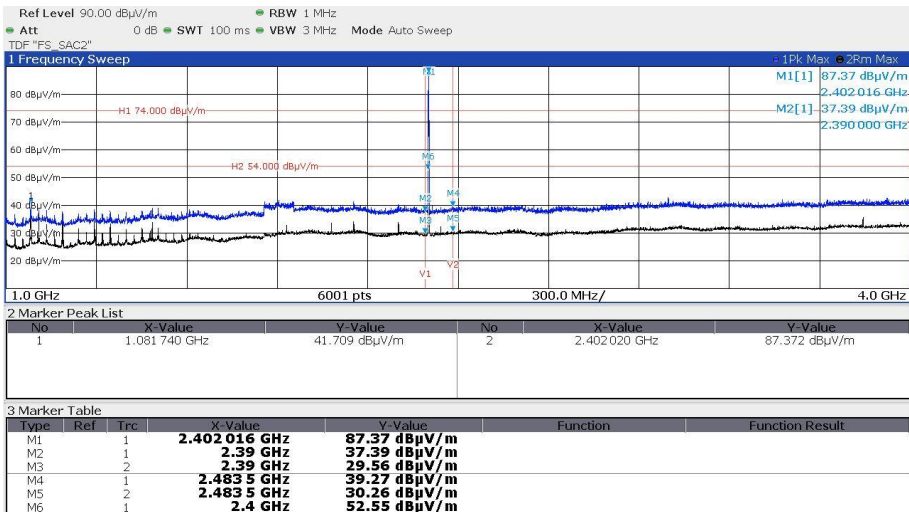
Frequency (Hz)	QuasiPeak (dBµV/m)	QP Margin	QP Limit (dBµV/m)	angle	height	polarization	RBW (Hz)	Meas.Time (s)	Correction (dB)
290.2674891 M	42.013	-3.987	46	33	1	Horizontal	120000	0.01	-9.285
343.0428227 M	43.271	-2.729	46	33	1	Horizontal	120000	0.01	-8.01
712.4853615 M	40.159	-5.841	46	209	1	Horizontal	120000	0.01	0.02
765.2467362 M	42.155	-3.845	46	209	1	Horizontal	120000	0.01	1.532
818.0362415 M	40.975	-5.025	46	209	1	Horizontal	120000	0.01	1.797

f > 1000 MHz

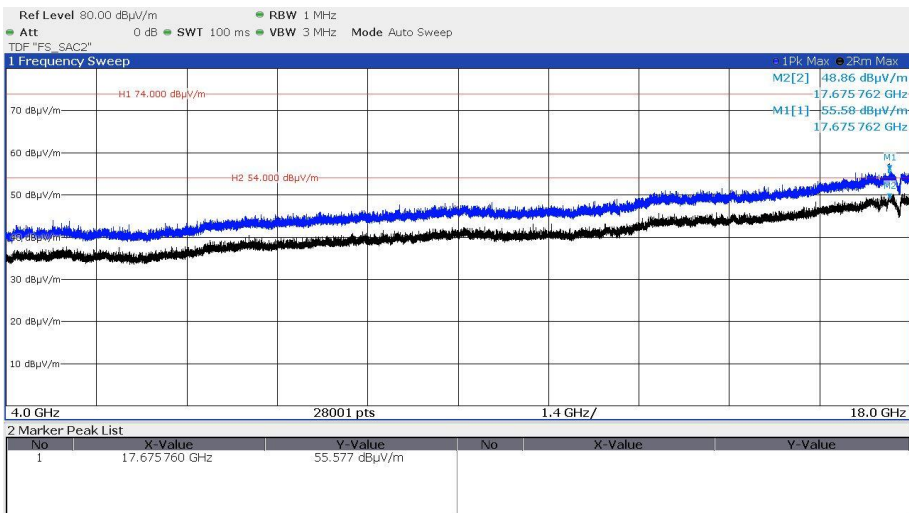
1) Measurement of emissions according to General Limit specified in section 15.209(a) / RSS-Gen 8.9:

1 Mbps CH37 – 2402 MHz

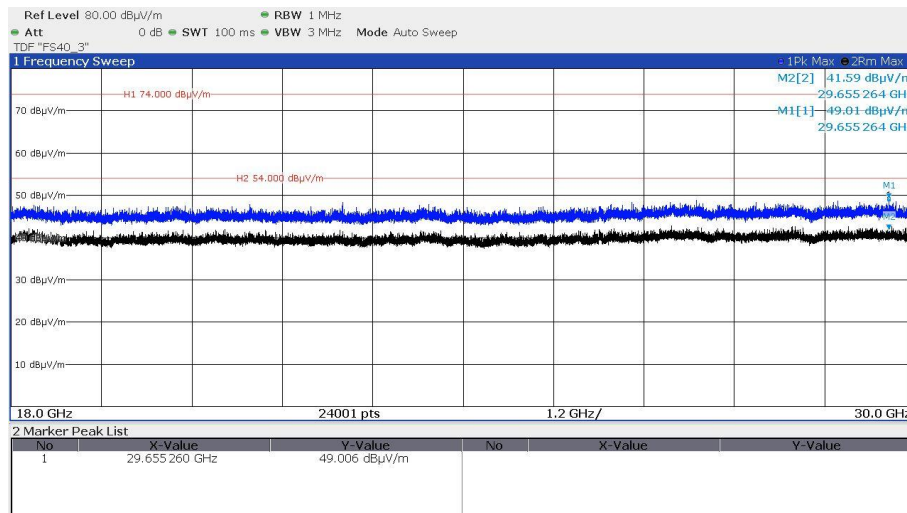
1-4 GHz



4-18GHz

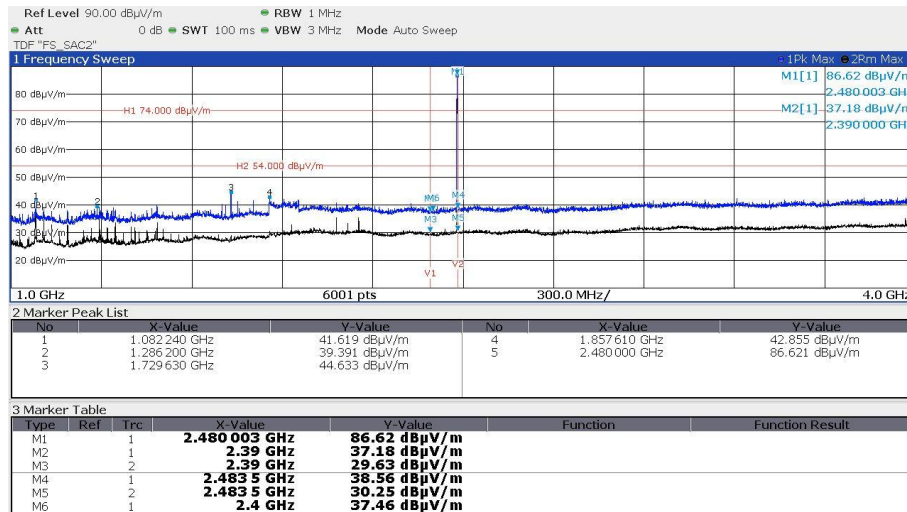


18-30GHz

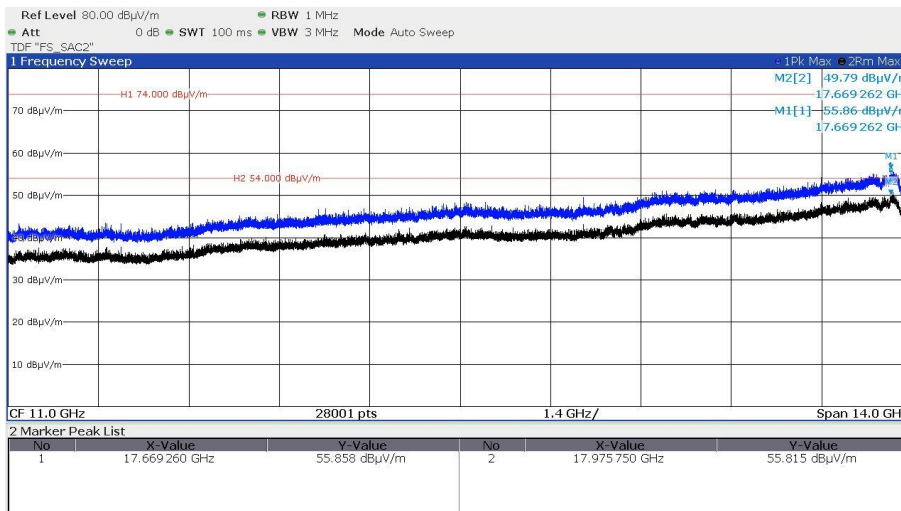


1 Mbps CH39 – 2480 MHz

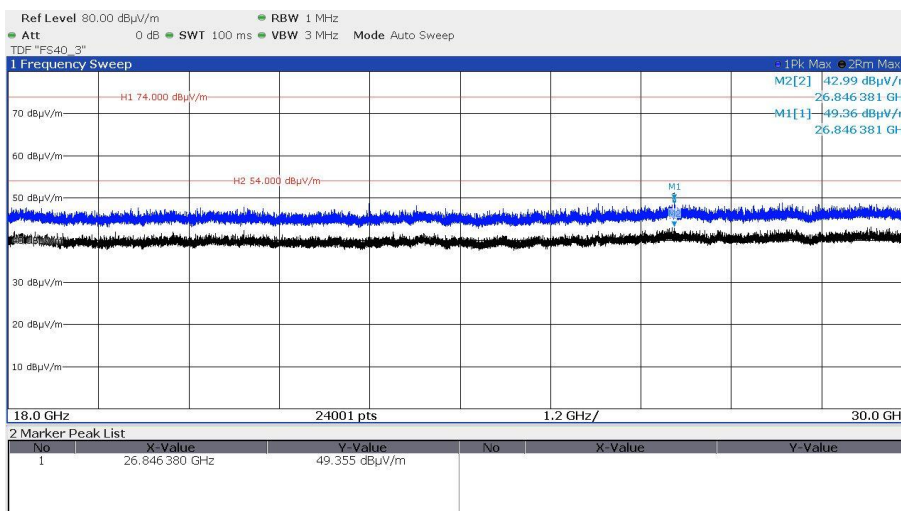
1-4GHz



4-18GHz



18-30GHz



2) Measurement of emissions according to 15.247(d) not necessary as emissions already below general limit

Radiated limits according to FCC Part 15, Section 15.209 for spurious emissions which fall in restricted bands:

Frequency (MHz)	15.209 Limits ($\mu\text{V/m}$)	Measurement distance (m)
0.009 - -0.49	$2400/f(\text{kHz})$	300
0.49 - 1.705	$24000/f(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Radiated limits according to RSS-Gen, 8.9 for spurious emissions which fall in restricted bands:

Frequency (MHz)	RSS-Gen Limits ($\mu\text{A/m}$)	Measurement distance (m)
0.009 - -0.49	$63.7/f(\text{kHz})$	300
0.49 - 1.705	$63.7/f(\text{kHz})$	30
1.705 - 30.0	0.08	30

Frequency (MHz)	RSS-Gen Limits ($\mu\text{V/m}$)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Limit according to FCC Part 15, Section 15.247(d) for emissions falling not in restricted bands:

Frequency (MHz)	Spurious emission limit
Below 1000	20 dB below the highest level of the desired power
Above 1000	20 dB below the highest level of the desired power

Attenuation below the general limits specified in Section 15.209(a) is not required.

Limit according to RSS-247, 5.5 for emissions falling not in restricted bands:

Frequency (MHz)	Spurious emission limit
Below 1000	20 dB below the highest level of the desired power
Above 1000	20 dB below the highest level of the desired power

Attenuation below the general limits specified in RSS-Gen is not required.

Restricted bands of operation:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209

MHz	MHz	MHz	GHz
0.090 – 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 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	322 – 335.4	3600 – 4400	Above 38.6

RSS-Gen, Table 6 – Restricted Frequency Bands

MHz	MHz	MHz	GHz
0.090 - 0.110	12.57675 - 12.57725	399.9 - 410	7.250 - 7.750
0.495 - 0.505	13.36 - 13.41	608 - 614	8.025 – 8.500
2.1735 - 2.1905	16.42 - 16.423	960 - 1427	9.0 - 9.2
3.020 - 3.026	16.69475 - 16.69525	1435 - 1626.5	9.3 - 9.5
4.125 - 4.128	16.80425 - 16.80475	1645.5 - 1646.5	10.6 - 12.7
4.17725 - 4.17775	25.5 - 25.67	1660 - 1710	13.25 - 13.4
4.20725 - 4.20775	37.5 - 38.25	1718.8 - 1722.2	14.47 - 14.5
5.677 - 5.683	73 - 74.6	2200 - 2300	15.35 - 16.2
6.215 - 6.218	74.8 - 75.2	2310 - 2390	17.7 - 21.4
6.26775 - 6.26825	108 – 138	2483.5 - 2500	22.01 - 23.12
6.31175 - 6.31225	149.9 - 150.05	2655 - 2900	23.6 - 24.0
8.291 - 8.294	156.52475 - 156.52525	3260 – 3267	31.2 - 31.8
8.362 - 8.366	156.7 - 156.9	3332 - 3339	36.43 - 36.5
8.37625 - 8.38675	162.0125 - 167.17	3345.8 - 3358	Above 38.6
8.41425 - 8.41475	167.72 - 173.2	3500 - 4400	
12.29 - 12.293	240 – 285	4500 - 5150	
12.51975 - 12.52025	322 - 335.4	5350 - 5460	

The requirements are **FULFILLED**.

Remarks: The measurement was performed up to the 10th harmonic. Only the worst-case plots are listed.

5.4 Antenna application

5.4.1 Applicable standard

According to FCC Part 15C, 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 manufacturer may design the unit that broken antennas can be replaced by the user, but the use of a standard antenna jack is prohibited.

The EUT has an integrated antenna. No other antenna can be used with the device.

The supplied antenna meets the requirements of part 15.203.

Remarks: None.

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	ESR3	09-02/03-21-002	26/07/2024	26/07/2023		
	ENV4200	09-02/20-21-002	26/07/2024	26/07/2023	26/07/2024	26/07/2023
	KK-SPU195FR01-2X11N-3,5M	09-02/50-21-038				
	KK-SPU195FR01-2X11N-2M	09-02/50-21-041				
	CDB-10K-18-50V-NMF-I	09-02/50-22-030	06/09/2024	06/09/2023		
	BAT-EMC 2023.0.8.0	09-02/68-21-002				
	6430	02-02/50-13-014				
A 5	ESR7	09-02/03-21-004	14/07/2024	14/07/2023		
	KK-7.8F-2XNM_4.0M	09-02/50-21-018				
	KK-7.8F-2XNM-10.0M	09-02/50-21-019				
	KK-7.8F-2XNM_4.5M	09-02/50-21-023				
	KK-7.8F-2XNM_9.5M	09-02/50-21-025				
	50F-003 N 3dB	09-02/50-22-002				
	CDB-10K-18-50V-NMF-I	09-02/50-22-031	06/09/2024	06/09/2023		
	BAT-EMC 2023.0.8.0	09-02/68-21-002				
SER 3	FSW43	02-02/11-21-001	07/06/2025	07/06/2024		
	BBHA 9170	02-02/24-05-013	21/03/2026	21/03/2023	22/01/2025	22/01/2024
	R1 _ 18 - 40 GHz	02-02/30-09-002	22/01/2025	22/01/2024		
	BBV 9718 C	09-02/17-21-003	23/04/2025	23/04/2024		
	PA18G-HB	09-02/17-23-001	24/07/2024	24/07/2023		
	HF907	09-02/24-21-003	16/05/2025	16/05/2024		
	KK-7.8F-2XNM-10.0M	09-02/50-21-019				
	BAT-EMC 2023.0.8.0	09-02/68-21-002				

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.