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Test Report

Report Number:

F181631E4

Equipment under Test (EUT):

multistreamer pro

Applicant:

audifon GmbH & Co. KG

Manufacturer:

audifon GmbH & Co. KG

ilac-MRA
DAkkS Deutsche Akkreditierungsstelle
D-PL-17186-01-01
D-PL-17186-01-02
D-PL-17186-01-03

References

[1] **ANSI C63.10-2013**, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

[2] **FCC CFR 47 Part 15**, Radio Frequency Devices

[3] **RSS-247 Issue 2 (February 2017)**, Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

[4] **RSS-Gen Issue 4 (November 2014)**, General Requirements for Compliance of Radio Apparatus

Test Result

The requirements of the tests performed as shown in the overview (clause 4) were fulfilled by the equipment under test.
The complete test results are presented in the following.

Test engineer:	Paul NEUFELD		28.02.2019
	Name	Signature	Date
Authorized reviewer:	Bernd STEINER		28.02.2019
	Name	Signature	Date

This test report is only valid in its original form.

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1 Identification

1.1 Applicant

Name:	audifon GmbH & Co. KG
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Country:	Germany
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eMail Address:	stephan.teders@audifon.com
Applicant represented during the test by the following person:	None

1.2 Manufacturer

Name:	audifon GmbH & Co. KG
Address:	Werner-von-Siemens-Strasse 2, 99625 Kölleda
Country:	Germany
Name for contact purposes:	Mr. Stephan Teders
Phone:	+49 (0) 221-669668-14
Fax:	+49 (0) 221-669668-20
eMail Address:	stephan.teders@audifon.com
Applicant represented during the test by the following person:	None

1.3 Test Laboratory

The tests were carried out by:

PHOENIX TESTLAB GmbH
Königswinkel 10
32825 Blomberg
Germany

Accredited by Deutsche Akkreditierungsstelle GmbH (DAkkS) in compliance with DIN EN ISO/IEC 17025 under Reg. No. D-PL-17186-01-05, FCC Test Firm Accreditation designation number DE0004, CAB Identifier DE0003 and ISED# 3469A.

1.4 EUT (Equipment Under Test)

Test object: *	Smartphone to hearing aid streamer
Type / PMN: *	multistreamer pro
FCC ID: *	YU2-MS2
Serial number: *	none
EUT marking: *	#02
PCB identifier: *	AFAS v1.02
Hardware version: *	AFAS v1.02
Software version: *	V0.8.1

Note: Phoenix Testlab GmbH does not take samples. The samples used for tests are provided exclusively by the applicant.

Classic Bluetooth radio channels:

Channel 0	RX:	2402 MHz	TX:	2402 MHz
Channel 39	RX:	2441 MHz	TX:	2441 MHz
Channel 78	RX:	2480 MHz	TX:	2480 MHz

1.5 Technical Data of Equipment

Fulfills specifications: *	BTLE unit: Bluetooth 5.0 low energy only (only supports 1 Mbps mode) BT classic + EDR unit: Bluetooth classic + EDR					
Antenna type: *	BTLE unit: PCB antenna BT classic + EDR unit: Ceramic antenna					
Antenna name: *	BTLE unit: none BT classic + EDR unit: none					
Antenna gain: *	BTLE unit: 4.5 dBi BT classic + EDR unit: 0 dBi					
Antenna connector: *	Both units: None					
Supply voltage EUT: *	U_{nom}=	1.25 V DC	U_{min}=	1.18 V DC	U_{max}=	3.3 V DC
Type of modulation: *	BTLE unit: GFSK BT classic + EDR unit: GFSK, π/4 DQPSK, 8DPSK					
Operating frequency range:*	Both units: 2402 – 2480 MHz					
Number of channels: *	BTLE unit:40 BT classic + EDR unit: 79					
Temperature range: *	0 °C to +50 °C					
Lowest / highest Internal clock frequency: *	48 MHz / 2480 MHz					

* Declared by the applicant

Ancillary devices:

Ancillary Equipment:	
Cables (connected to the EUT):**	USB TTL-232R-3V3 cable
Power supply: *	5 V DC by USB cable
Laptop PC:*	Fujitsu Lifebook E751

*Provided by the laboratory
**Provided by the applicant

1.6 Dates

Date of receipt of test sample:	05.12.2018
Start of test:	05.12.2018
End of test:	19.12.2018

2 Operational States

The equipment under test (EUT) is a BT classic and BTLE transmitter. It connects to a hearing aid device via Bluetooth Low Energy and to an ancillary device (e.g. a smartphone) via either Bluetooth Classic radio connection or a 3.5 mm audio connector.

This test contains the results of the Bluetooth Classic + EDR tests.

For the Bluetooth classic and EDR tests, the EUT was connected to a laptop computer using a USB cable, connecting to a micro USB interface at the EUT.

For the tests in the anechoic chamber, the USB signal was transmitted via an USB to fiber-optics converter.

During the tests the EUT was supplied with 5 V DC via the USB cable.

For the test a test software named BlueTest3.exe, was used which was provided by the applicant.

Maximum power Settings for all measurements:

Modulation	Power setting ch. 0 - 78
GFSK, 1 Mbps	Power (Ext, Int): 255, 50 (default values in the software)

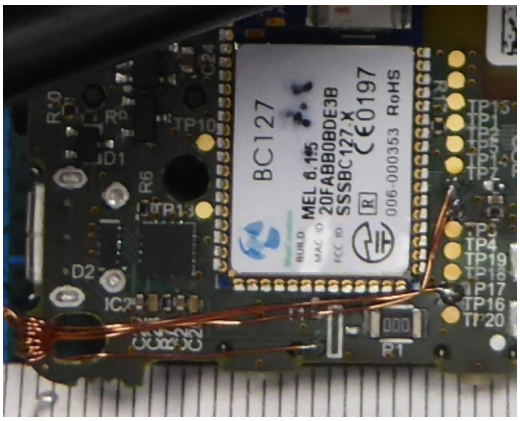
Operation mode	Description of the operation mode	mode	channel	Modulation	Data rate / Mbps
1	Continuous transmitting on 2402 MHz	DH5	0	GFSK	1 Mbps
2	Continuous transmitting on 2440 MHz	DH5	39	GFSK	1 Mbps
3	Continuous transmitting on 2480 MHz	DH5	78	GFSK	1 Mbps

3 Additional Information

This test report contains just limited testcases only, because the used radio module is already certified under FCC ID: SSSBC127-X. The used modes were identified as worst case in the testreport of the original certification testreport of the Bluetooth module.

The test was performed without the EUT housing.

For the implementation of the test mode a temporary USB connector was attached to the EUT as depicted below:



4 Overview

Application	Frequency range [MHz]	FCC 47 CFR Part 15 section [2]	RSS-247 [3] or RSS-Gen, Issue 5 [4]	Status	Refer page
Maximum Peak Output Power	2400.0 - 2483.5	15.247 (b) (3), (4)	5.4 (d) [3]	Passed	11 et seq
Maximum Output Power	2400.0 - 2483.5	15.247 (b) (3), (4)	5.4 (d) [3]	Not tested*	-
DTS Bandwidth	2400.0 - 2483.5	15.247 (a) (2)	5.2 (a) [3]	Not tested*	-
Peak Power Spectral Density	2400.0 - 2483.5	15.247 (e)	5.2 (b) [3]	Not tested*	-
Band edge compliance	2400.0 - 2483.5	15.247 (d) 15.205 (a) 15.209 (a)	5.5 [3] 8.9 [4], 8.10 [4]	Passed	13 et seq.
Radiated emissions (transmitter)	0.009 – 26,500	15.247 (d) 15.205 (a) 15.209 (a)	5.5 [3] 8.9 [4], 8.10 [4]	Passed	14 et seq.
Conducted emissions on supply line	0.15 - 30	15.207 (a)	8.8 [4]	Not tested*	-

*Not tested, because not ordered by the applicant

5 Results

5.1 Duty cycle

The EUT was measured radiated in the anechoic chamber using the procedures described in 5.5.1.

The method described in chapter 11.6 b) of document [1] was used to perform the following test.

The following measurement technique was used:

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between two bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

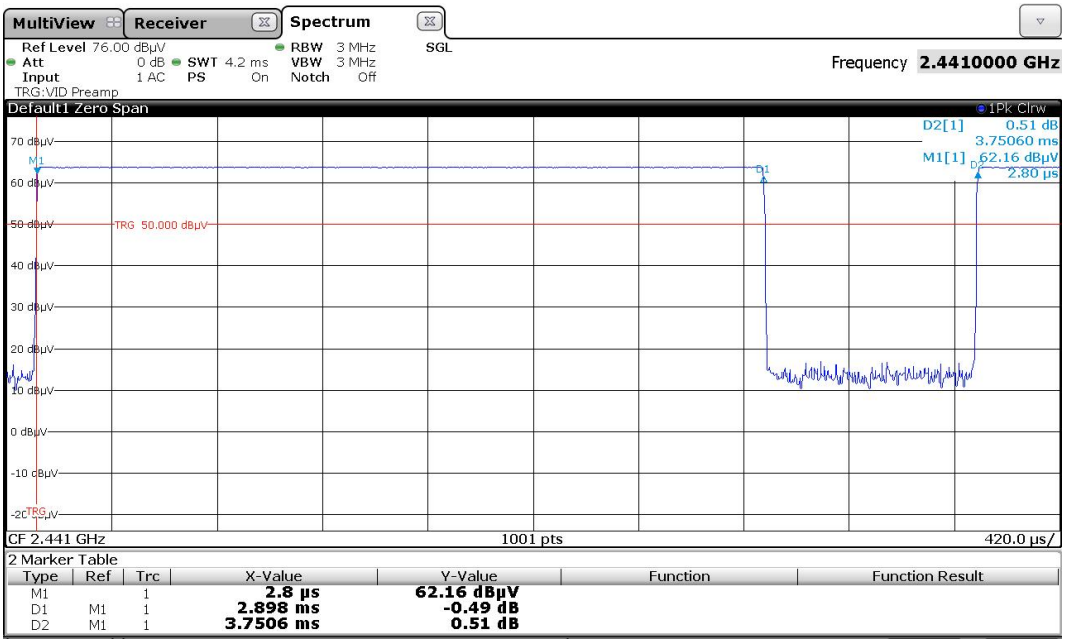
- Set the center frequency of the instrument to the center frequency of the transmission.
- Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
- Set VBW ≥ RBW.
- Set detector = peak or average.
- The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

5.1.1 Test results

Ambient temperature	22 °C	Relative humidity	40 %

Only the worst case duty cycle plot is submitted below.

DutyCycle.PNG: Duty cycle measurement on channel 39 (operation mode 2):



Since only one modulation is tested, the calculation is only performed for the worst case, namely the DH5 mode with GFSK modulation.

T_{TX_On} = 2.898 ms T_{TX_Cycle} = 3.7506 ms **(1)**

$$\frac{50}{T_{TX\_On}} = \frac{50}{2.898\,ms} = 17.253kHz \leq RBW \leq VBW \quad \textbf{(2)}$$

Measurement Points 1001 for 4.2 ms à 2.898 ms = 690 measurement points à Signal has 690 measurement points (and fulfils the requirement of at least 100 Points resolution for the signal)

If power averaging (RMS) mode was used in step f), then the applicable correction factor is 10 log(1/x), where x is the duty cycle.

$$x = \frac{T_{Tx\_On}}{T_{Tx\_Cycle}} = \frac{2.898ms}{3.7506ms} = 0.7727 = 77.27\% \quad \textbf{(3)}$$

$$correction\ factor = 10 \cdot log\left(\frac{1}{x}\right) = 10 \cdot log\left(\frac{1}{0.7727}\right) = 1.12dB \quad \textbf{(4)}$$

Therefore, for average measurements a correction factor of 1.12 dB is used.

TEST EQUIPMENT USED FOR THE TEST:

8 – 14, 17, 18

5.2 Maximum peak conducted output power

5.2.1 Method of measurement

The EUT was measured radiated in the anechoic chamber using the procedures described in 5.5.1.

Acceptable measurement configurations

Procedure 11.9.1.1 in [1] was used for the following test.

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Set span ≥ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

The measurement was performed at the upper and lower end and the middle of the assigned frequency band.

The measured Electric field strength was corrected with the following correction factor:

Antenna Factor [dB] + Cable Attenuation [dB] - Amplifier Gain[dB] = correction factor [dB]

The formula in 11.12.2.2 e) in [1] was used to calculate the EIRP power:

$E = EIRP - 20\log(d) + 104.8$
$EIRP = E - 95.3$

$MPOP = EIRP - G$

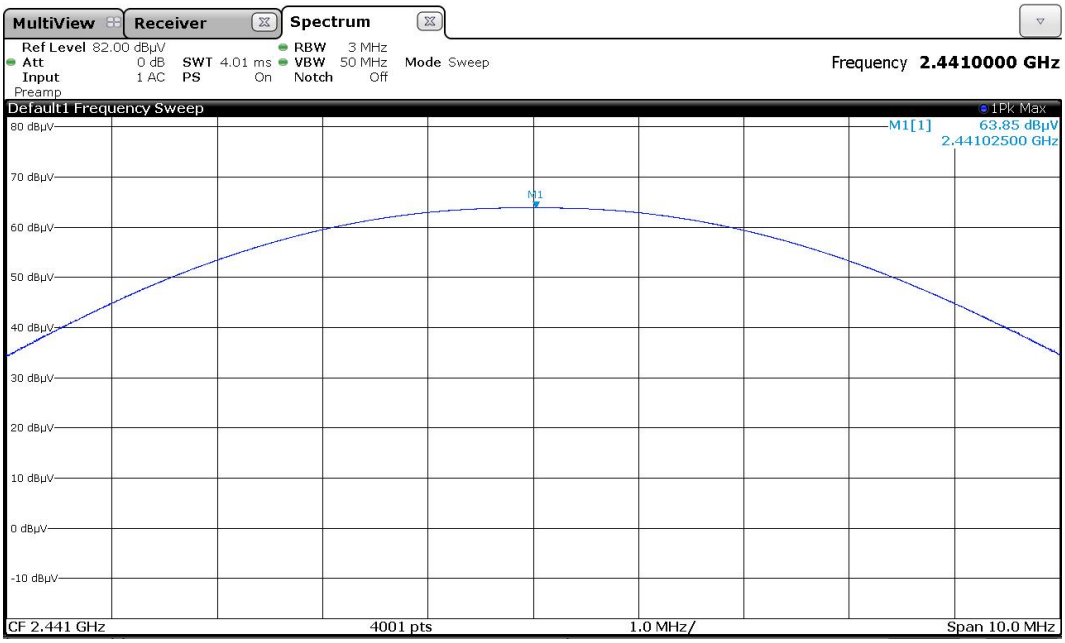
E is the electric field strength in dBµV/m
EIRP is the equivalent isotropically radiated power in dBm
d is the specified measurement distance in m
G is the antenna gain in dBi
MPOP is the maximum peak output power – measured antenna port conducted – in dBm

5.2.2 Test results

Ambient temperature	22 °C	Relative humidity	62 %

The plot below shows the worst case result. All other results are submitted in the table below

Pwr_ch39.PNG: Maximum peak output power measured on channel 39 (operation mode 2):



The antenna gain is below 6 dBi, therefore no conducted output limit reduction is necessary.

Operation mode		Frequency [MHz]	Reading [dBmV]	Corr. Fact. [dB]	Corr. Reading [dBmV]	EIRP [dBm]	MPOP [dBm]	Limit [dBm]
2	GFSK	2441	63.85	33.7	97.55	2.25	2.25	30

The original report for the module has a conducted output power of 3.43 dBm, so the measured result is within the uncertainty range of the original module.

Antenna gain of 0 dBi respected

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

8 – 14, 17, 18

5.4 Band-edge compliance

5.4.1 Method of measurement (band edges next to restricted bands (radiated))

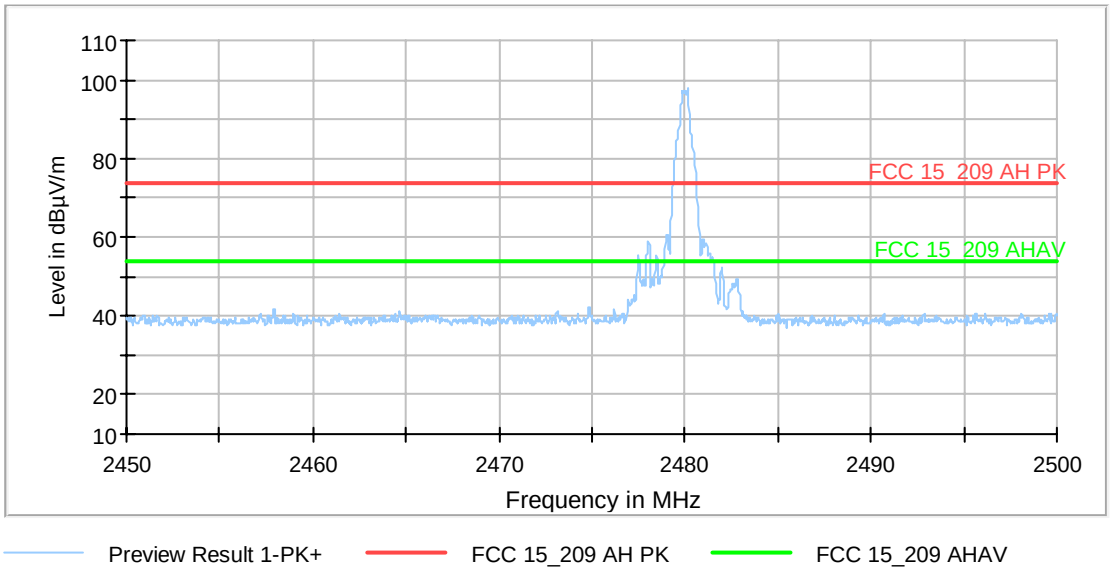
The EUT was measured radiated in the anechoic chamber using the procedures described in 5.5.1.

Acceptable measurement configurations

The same measurement configurations as decribed in 5.5.1. were used for the preview and final measurement.

5.4.2 Test result (band edges next to restricted bands (radiated))

181631_ch78_UpBE: radiated band-edge compliance at an restricted band-edge (operation mode 3):



Transmitter operates at the upper end of the assigned frequency band (operation mode 3 GFSK)

Frequency [MHz]	MaxPeak [dBµV/m]	Caverage [dBµV/m]	Limit [dBµV/m]	Margin (dB)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2483.525000	---	42.45	54.00	11.55	V	105.0	30.0	34
2483.525000	53.75	---	74.00	20.25	V	105.0	30.0	34
Measurement uncertainty				+2.2 dB / -3.6 dB				

Test: Passed

TEST EQUIPMENT USED FOR THE TEST:

8 – 14, 17, 18

5.5 Maximum unwanted emissions

5.5.1 Method of measurement (radiated emissions)

The radiated emission measurement is subdivided into five stages.

- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 30 MHz to 1 GHz.
- A final measurement carried out on an open area test side with reflecting ground plane and various antenna height in the frequency range 30 MHz to 1 GHz.
- A preliminary measurement carried out in a fully anechoic chamber with a variable antenna distance and height in the frequency range above 1 GHz.
- A final measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range above 1 GHz.

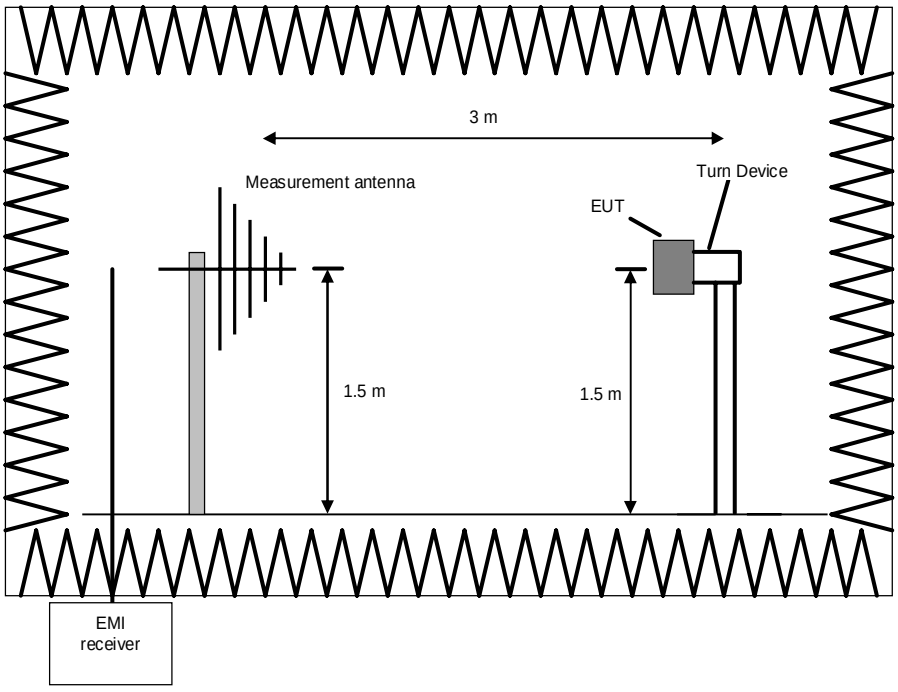
Preliminary measurement (30 MHz to 1 GHz)

In the first stage a preliminary measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Table top devices will set up on a non-conducting turn device on the height of 1.5m. Floor-standing devices will be placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to [1].

The frequency range 30 MHz to 1 GHz will be measured with an EMI Receiver set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °. This measurement is repeated after raising the EUT in 30° steps according 6.6.5.4 in [1].

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 230 MHz	100 kHz
230 MHz to 1 GHz	100 kHz



Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 230 MHz and 230 MHz to 1 GHz.
The following procedure will be used:

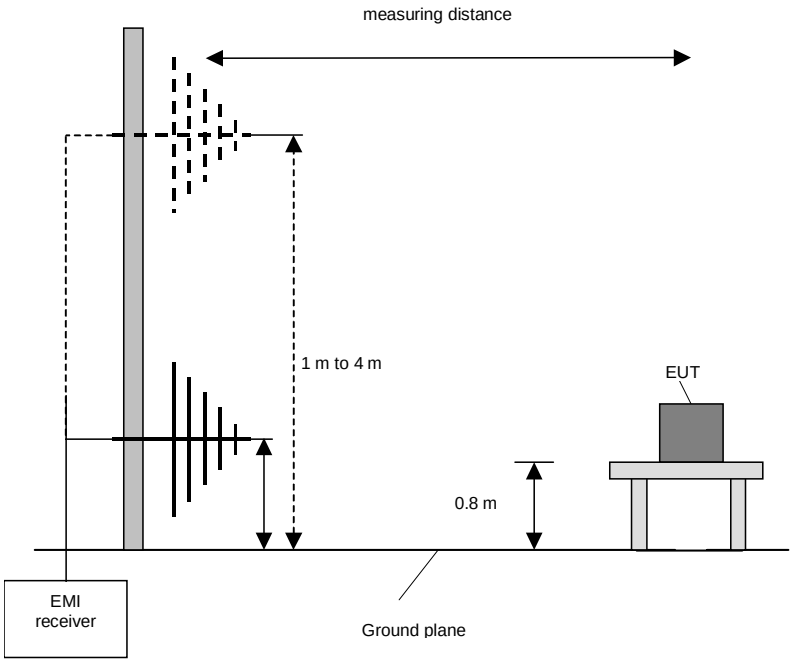
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Repeat 1) to 3) with the vertical polarisation of the measuring antenna.
5. Make a hardcopy of the spectrum.
6. Repeat 1) to 5) with the EUT raised by an angle of 0° (45°, 90°) according to 6.6.5.4 in [1].
7. Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.

Final measurement (30 MHz to 1 GHz)

A final measurement on an open area test site will be performed on selected frequencies found in the preliminary measurement. During this test the EUT will be rotated in the range of
0 ° to 360 °, the measuring antenna will be set to horizontal and vertical polarisation and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



Procedure final measurement:

The following procedure will be used:

1) Measure on the selected frequencies at an antenna height of 1 m and a EUT azimuth of 23 °.
2) Move the antenna from 1 m to 4 m and note the maximum value at each frequency.
3) Rotate the EUT by 45 ° and repeat 2) until an azimuth of 337 ° is reached.
4) Repeat 1) to 3) for the other orthogonal antenna polarization.
5) Move the antenna and the turntable to the position where the maximum value is detected.
6) Measure while moving the antenna slowly +/- 1 m.
7) Set the antenna to the position where the maximum value is found.
8) Measure while moving the turntable +/- 45 °.
9) Set the turntable to the azimuth where the maximum value is found.
10) Measure with Final detector (QP and AV) and note the value.
11) Repeat 5) to 10) for each frequency.
12) Repeat 1) to 11) for each orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).

Preliminary and final measurement (1 GHz to 40 GHz)

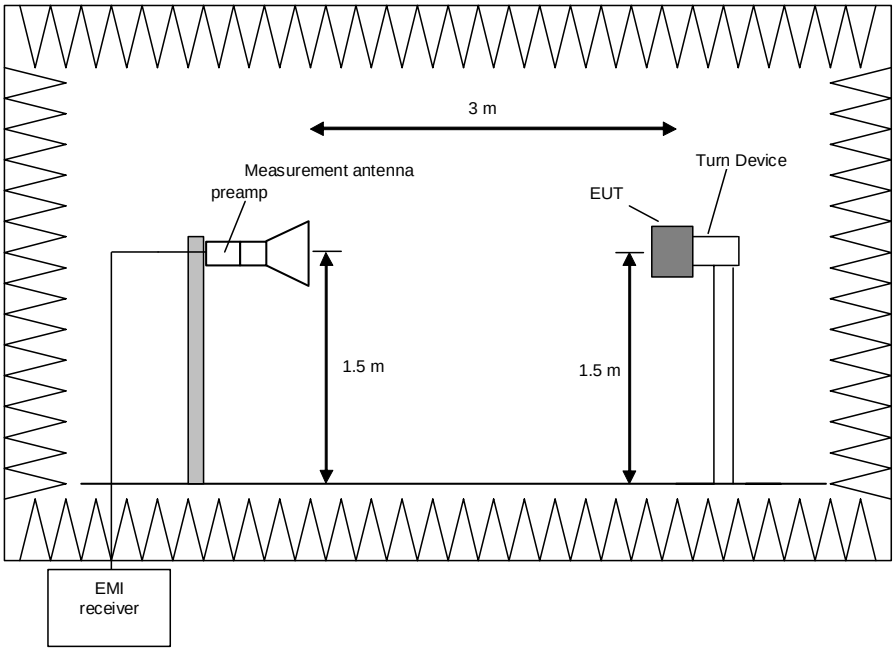
This measurement will be performed in a fully anechoic chamber. Table top devices will set up on a non-conducting turn device on the height of 1.5m. The set-up of the Equipment under test will be in accordance to [1].

Preliminary measurement (1 GHz to 40 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The spectrum analyser will set to fast scan in EMI mode with maximum peak and average detector active. Each frequency is tested for 10 ms in fast scan mode. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °. This measurement is repeated after raising the EUT in 30° steps according 6.6.5.4 in [1].

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	1 MHz
4 GHz to 12 GHz	1 MHz
12 GHz to 18 GHz	1 MHz
18 GHz to 25 / 26.5 GHz	1 MHz
26.5 GHz to 40 GHz	1 MHz



Procedure preliminary measurement:

Prescans were performed in the frequency range 1 to 40 GHz.
The following procedure will be used:

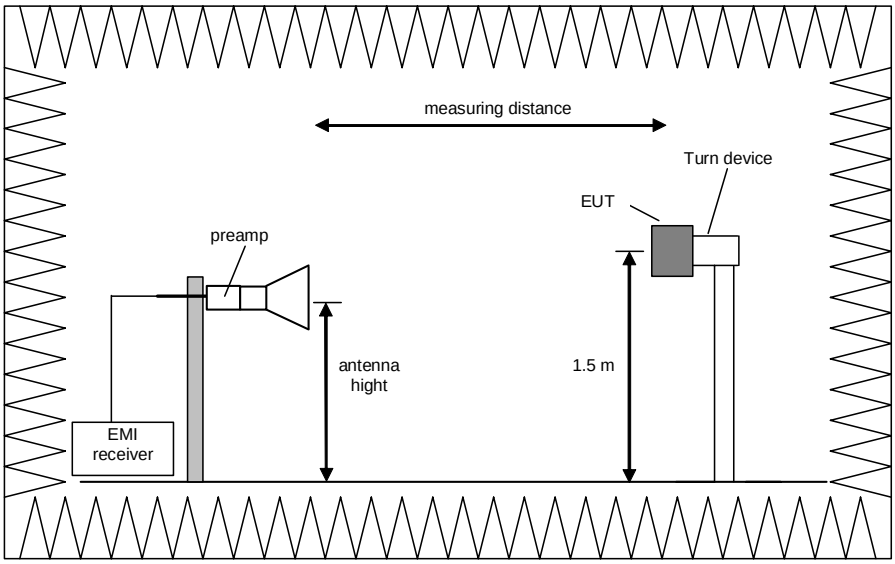
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Rotate the EUT by 360° to maximize the detected signals.
3. Repeat 1) to 2) with the vertical polarisation of the measuring antenna.
4. Repeat 1) to 3) with the EUT raised by an angle of 30° (60°, 90°, 120° and 150°) according to 6.6.5.4 in [1].
5. The maximum frequency values for each polarization, turn table and EUT positioner positions will be saved by the test software.
6. The measurement antenna polarisation, with the according EUT position (Turntable and Turn device) which produces the highest emission for each frequency will be used for the final measurement. The six closest values to the applicable limit will be used for the final measurement.

Final measurement (1 GHz to 40 GHz)

The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1 MHz. The measurement will be performed by rotating the turntable through 0 to 360° in the worst-case EUT orientation which was obtained during the preliminary measurements.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
1 GHz to 4 GHz	1 MHz
4 GHz to 12 GHz	1 MHz
12 GHz to 18 GHz	1 MHz
18 GHz to 25 / 26.5 GHz	1 MHz
26.5 GHz to 40 GHz	1 MHz



Procedure of measurement:

The measurements were performed in the frequency ranges 1 GHz to 4 GHz, 4 GHz to 12 GHz, 12 GHz to 18 GHz, 18 GHz to 25 /26.5 GHz and 26.5 GHz to 40 GHz.
The following procedure will be used:

1) Set the turntable and the turn device to obtain the worst-case emission for the first frequency identified in the preliminary measurements.
2) Set the measurement antenna polarisation to the orientation with the highest emission for the first frequency identified in the preliminary measurements.
3) Set the spectrum analyser to EMI mode with peak and average detector activated.
4) Rotate the turntable +/- 15° of the maximum turn table position identified in the preliminary test.
5) Note the highest displayed peak and average values
6) Repeat the steps 1) to 5) for each frequency detected during the preliminary measurements.

5.5.2 Test results (radiated emissions) – Emissions from 30 MHz – 25 GHz

5.5.2.1 Preliminary radiated emission measurement 30 MHz – 25 GHz

Ambient temperature	22 °C	Relative humidity	59 %

Position of EUT: The EUT was set-up on an EUT turn device of a height of 1.5 m. The distance between EUT and antenna was 3 m.

For the final test on the open area test site the EUT was placed on a table with the height of 0.8 m. The distance between EUT and antenna was 3 m.

Cable guide: For detail information of test set-up and the cable guide refer to the pictures in the annex A in the test report.

Test record: Only the plot of the worst case emission is submitted below.

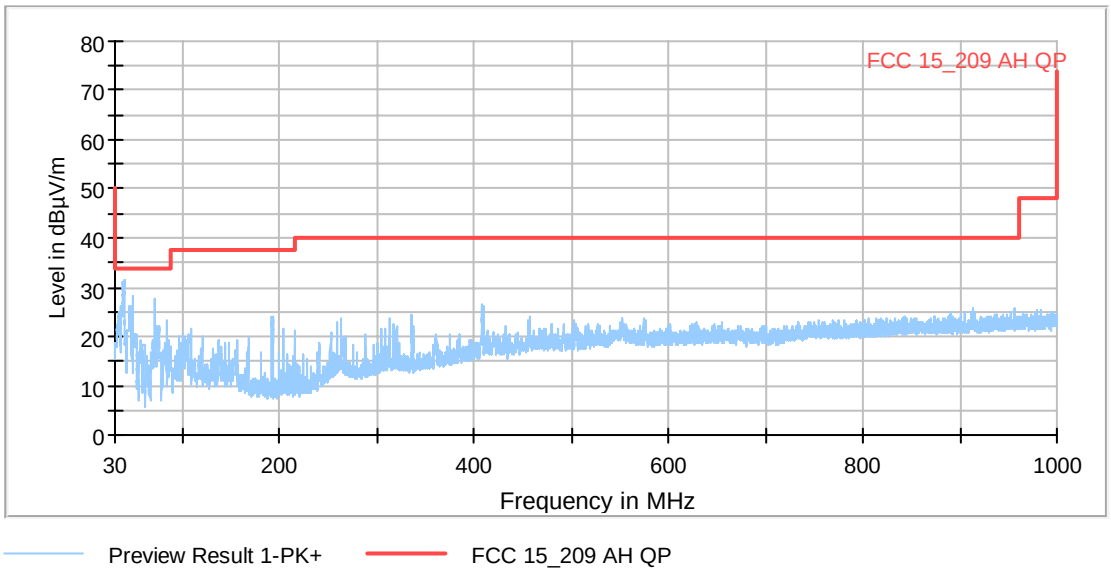
Supply voltage: During all measurements the host of the EUT was powered with 5 V via the USB port of a USB to fibre-optics converter.

Remark: Since there were no differences in the spectrum for f < 1 GHz, only one representative plot is submitted below.

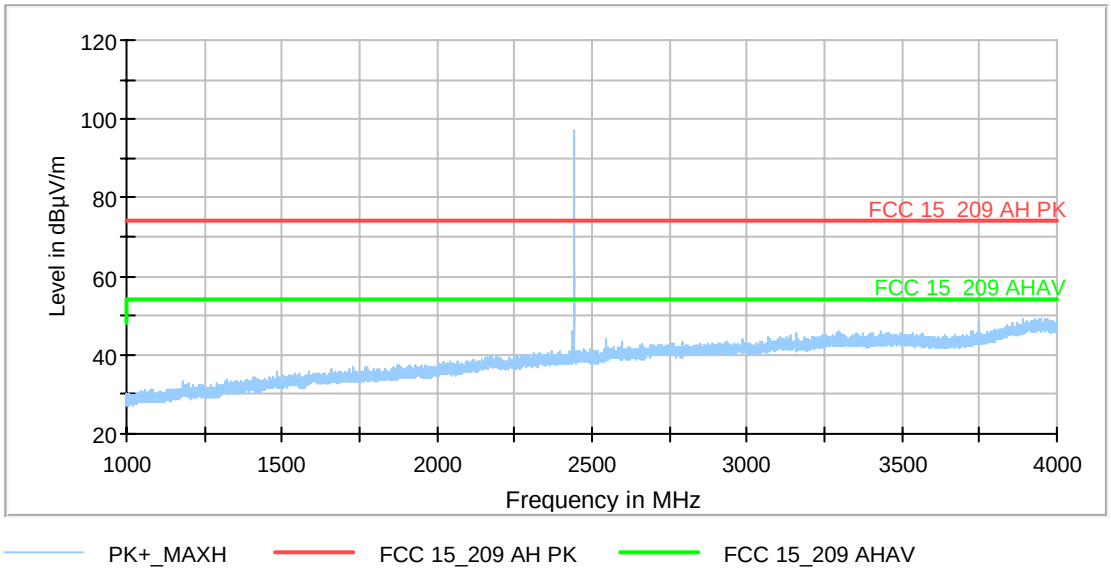
Since the lowest internal frequency is 48 MHz, no tests below 30 MHz were performed.

Plots of the worst case transmitter spurious emissions

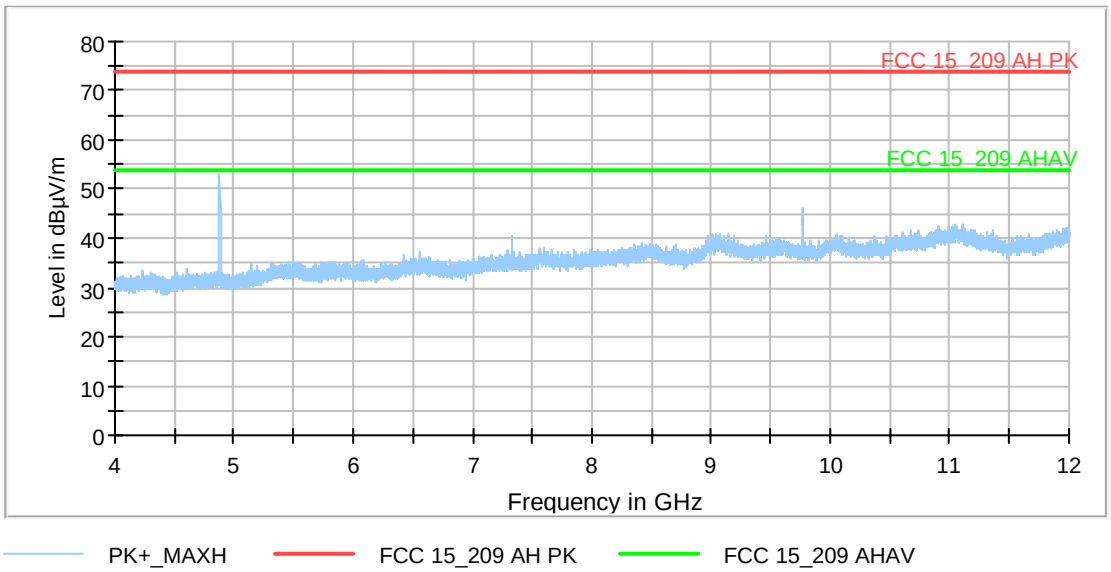
181631_ch39_30M-1G_M20: Spurious emissions from 30 MHz to 1 GHz (operation mode 2):



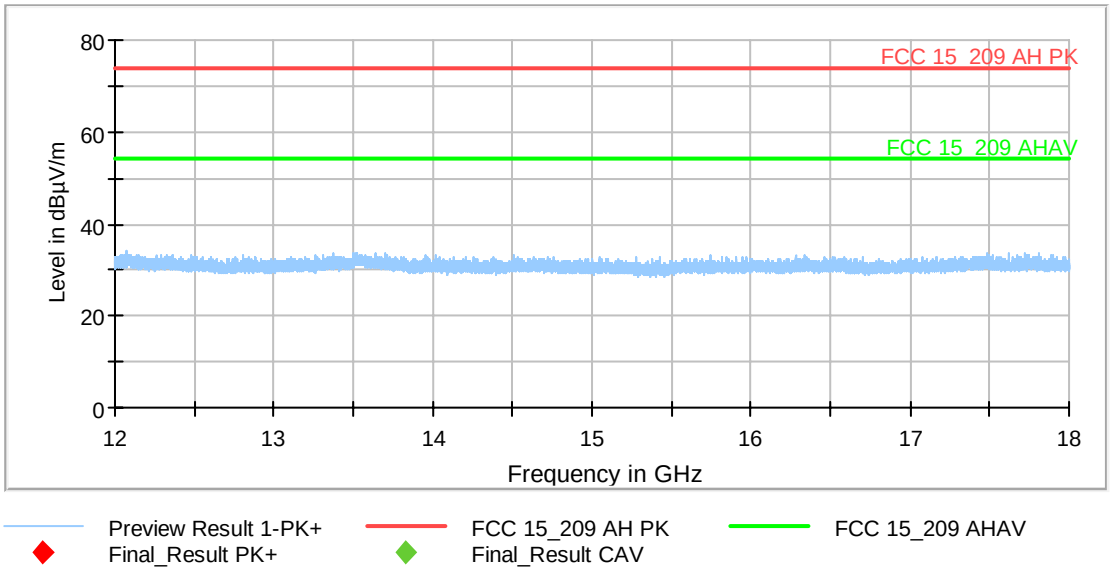
181631_ch39_1-4G: Spurious emissions from 1 GHz to 4 GHz (operation mode 2)



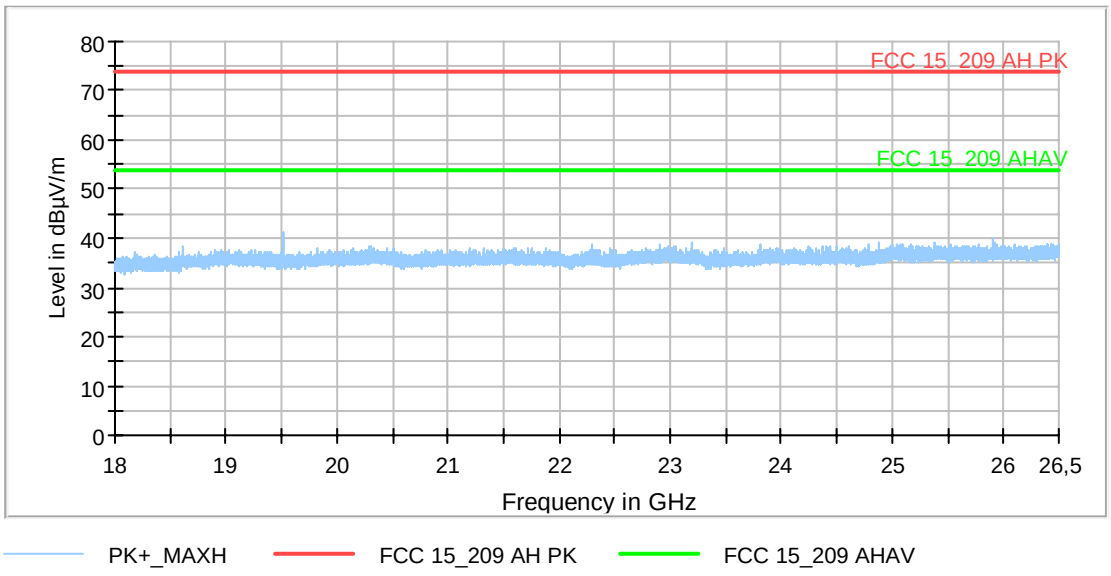
181631_ch39_4-12G: Spurious emissions from 4 GHz to 12 GHz (operation mode 2):



181631_ch39_12-18G: Spurious emissions from 12 GHz to 18 GHz (operation mode 2):



181631_ch39_18-26,5G: Spurious emissions from 18 GHz to 26.5 GHz (operation mode 2):



5.5.2.2 Final radiated measurements

All TX modes (no difference detected when comparing channel / modulation)

Frequency [MHz]	QuasiPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Meas. Time [ms]	Bandwidth [kHz]	Height [cm]	Pol	Azimuth [deg]	Corr. [dB]
35.965500	30.24	40.00	9.76	1000.0	120.000	104.0	V	271.0	24.6
39.360500	26.98	40.00	13.02	1000.0	120.000	109.0	V	70.0	22.9
39.942500	29.93	40.00	10.07	1000.0	120.000	104.0	V	222.0	22.6
45.617000	31.06	40.00	8.94	1000.0	120.000	100.0	V	0.0	19.5
47.993500	32.48	40.00	7.52	1000.0	120.000	102.0	V	358.0	18.0
71.952500	24.88	40.00	15.12	1000.0	120.000	141.0	V	180.0	13.7
83.980500	27.57	40.00	12.43	1000.0	120.000	396.0	H	218.0	15.8
191.990000	28.30	43.50	15.20	1000.0	120.000	145.0	H	81.0	16.3
408.542500	23.46	46.00	22.54	1000.0	120.000	108.0	H	310.0	25.2
Measurement uncertainty					+2.2 dB / -3.6 dB				

Transmitter operates at the middle of the assigned frequency band (operation mode 2, GFSK)

Frequency [MHz]	MaxPeak [dBµV/m]	Caverage [dBµV/m]	Limit [dBµV/m]	Margin (dB)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2441.150000	---	95.6	Fund.	-	H	231	150	34
2441.150000	97.69	---	Fund.	-	H	231	150	34
2544.900000	---	44.54	54	9.46	V	76	90	34
2544.900000	55.8	---	74	18.2	V	76	90	34
4881.911111	---	52.66	54	1.34	V	93	30	-2
4881.911111	56.26	---	74	17.74	V	93	30	-2
7323.466667	---	37.25	54	16.75	H	351	90	5
7323.466667	47.3	---	74	26.7	H	351	90	5
9764.622222	---	42.26	54	11.74	H	25	120	7
9764.622222	52.14	---	74	21.86	H	25	120	7
19523.900000	---	39.49	54	14.51	V	21	120	7
19523.900000	47.88	---	74	26.12	V	21	120	7
Measurement uncertainty				+2.2 dB / -3.6 dB				

TEST EQUIPMENT USED FOR THE TEST:
7 – 26

6 Test equipment and ancillaries used for tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal. Due
1	Shielded chamber M47	-	Albatross Projects	B83117-C6439-T262	480662	Calibration not necessary	
2	EMI Receiver	ESIB 26	Rohde & Schwarz	1088.7490	481182	28.02.2018	02.2020
3	LISN	NSLK8128	Schwarzbeck	8128155	480058	19.04.2018	02.2020
4	High pass filter	HR 0.13-5ENN	FSY Microwave Inc.	DC 0109 SN 002	480340	Calibration not necessary	
5	EMI Software	ES-K1	Rohde & Schwarz	-	480111	Calibration not necessary	
6	Netzteil AC	AC6803A AC Quelle 2000VA	Keysight	JPVJ002509	482350	Calibration not necessary	
7	EMI Software	EMC32	Rohde & Schwarz	100061	481022	Calibration not necessary	
8	HF-Cable	Sucoflex 104	Huber+Suhner	517406	482391	Calibration not necessary	
9	Fully anechoic chamber M20	-	Albatross Projects	B83107-E2439-T232	480303	Calibration not necessary	
10	Signal & Spectrum Analyzer	ESW44	Rohde & Schwarz	101635	482467	29.03.2018	03.2020
11	Controller	MCU	Maturo	MCU/043/971107	480832	Calibration not necessary	
12	Turntable	DS420HE	Deisel	420/620/80	480315	Calibration not necessary	
13	Antenna support	AS615P	Deisel	615/310	480187	Calibration not necessary	
14	Antenna (Log.Per.)*	HL050	Rohde & Schwarz	100438	481170	09.10.2017	01.10.2020
15	Standard Gain Horn 11.9 GHz – 18 GHz	18240-20	Flann Microwave	483	480294	Calibration not necessary	
16	Standard Gain Horn 17.9 GHz – 26.7 GHz	20240-20	Flann Microwave	411	480297	Calibration not necessary	
17	RF-cable No. 3	Sucoflex 106B	Huber&Suhner	500234/6B	482644	Calibration not necessary	
18	RF-cable No. 40	Sucoflex 106B	Huber&Suhner	SF106B/11N/11N/1500MM	482125	Calibration not necessary	
19	Loop antenna	HFH2-Z2	Rohde & Schwarz	832609/014	480059	21.02.2018	02.2020
20	Antenna (Bilog)	CBL6112B	Schaffner EMV GmbH (-Chase)	2688	480328	19.06.2017	06.2020
21	RF-cable 2 m	KPS-1533-800-KPS	Insulated Wire	-	480302	Calibration not necessary	
22	Kabel 36	Sucoflex 106B	Suhner	500003/6B / Kabel 36	481680	Calibration not necessary	
23	Preamplifier 100 MHz - 16 GHz	AFS6-00101600-23-10P-6-R	Narda MITEQ	2011215	482333	10.07.2018	07.2020
24	Preamplifier	JS3-12001800-16-5A	Miteq	571667	480343	10.07.2018	07.2020
25	Preamplifier	JS3-18002600-20-5A	Miteq	658697	480342	10.07.2018	07.2020
26	4 GHz High Pass Filter	WHKX4.0/18G-8SS	Wainwright Instruments	1	480587	Calibration not necessary	
27	Loop antenna	-	Phoenix Testlab GmbH	-	410085	Calibration not necessary	

7 Report History

Report Number	Date	Comment
F181631E4	28.02.2019	Initial Test Report

8 List of Annexes

ANNEX A TEST SETUP PHOTOS 7 pages