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consulting - testing - certification

TEST REPORT

Test report no.: 1-9797/15-01-03-D

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-00

Testing laboratory

CETECOM ICT Services GmbH
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Accredited Testing Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-00

Applicant

Philips Medizin Systeme Böblingen GmbH
Hewlett-Packard-Strasse 2
71034 Böblingen / GERMANY
Phone: +49 7031 463-1879
Fax: +49 7031 463-2944
Contact: Hansjörg Geywitz
e-mail: hansjoerg.geywitz@philips.com

Manufacturer

Philips Medizin Systeme Böblingen GmbH
Hewlett-Packard-Strasse 2
71034 Böblingen / GERMANY

Test standard/s

47 CFR Part 95	Title 47 of the Code of Federal Regulations; Chapter I Subpart H—Wireless Medical Telemetry Service (WMTS); Part 95 - Personal radio services
RSS - 210 Issue 8	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	Patient Monitoring
Model name:	Avalon CL Wide Range Pod 866487
FCC ID:	PQC-OBRWRPBV1
IC:	3549C-OBRWRPBV1
Frequency:	608 MHz – 614 MHz Lowest Channel 3 (608.375 MHz) / Highest Channel 38 (613.625 MHz)
Technology tested:	proprietary
Antenna:	Integrated antenna
Power supply:	3.3 V DC by Li-Ion battery
Temperature range:	-20°C to +55°C

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

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Christoph Schneider
Testing Manager
Radio Communications & EMC

1 Table of contents

2 General information

2.1 Notes and disclaimer

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This test report replaces the test report with the number 1-9797/15-01-03-C and dated 2016-05-02

2.2 Application details

Date of receipt of order:	2015-07-03
Date of receipt of test item:	2015-09-30
Start of test:	2015-09-30
End of test:	2015-10-08
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 95	2010-10	Title 47 of the Code of Federal Regulations; Chapter I Subpart H—Wireless Medical Telemetry Service (WMTS); Part 95 - Personal radio services
RSS - 210 Issue 8	2010-12	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

4 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+22 °C during room temperature tests +55 °C during high temperature tests -20 °C during low temperature tests
Relative humidity content	:		55 %
Barometric pressure	:		not relevant for this kind of testing
Power supply	:	V_{nom} V_{max} V_{min}	3.3 V DC by Li-Ion battery 3.8 V 2.8 V

5 Test item

5.1 General description

Kind of test item	:	Patient Monitoring
Type identification	:	Avalon CL Wide Range Pod 866487
PMN	:	Avalon CL Wide Range Pod
HVIN	:	866487
FVIN	:	866487
HMN	:	n.a.
S/N serial number	:	Rad. DE3100121 Cond. -/-
HW hardware status	:	1
SW software status	:	A.01.02
Frequency band	:	608 MHz – 614 MHz Lowest Channel 3 (608.375 MHz) Highest Channel 38 (613.625 MHz)
Type of radio transmission Use of frequency spectrum	: :	TDM
Type of modulation	:	GFSK
Number of channels	:	36
Antenna	:	Integrated antenna
Power supply	:	3.25 V to 3.35 V AC, 50/60 Hz
Temperature range	:	-20°C to +55°C

5.2 Additional information

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup- and EUT-photos are included in test report: 1-9797/15-01-01_AnnexA
1-9797/15-01-01_AnnexB
1-9797/15-01-01_AnnexD

6 Test laboratories sub-contracted

None

7 Description of the test setup

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

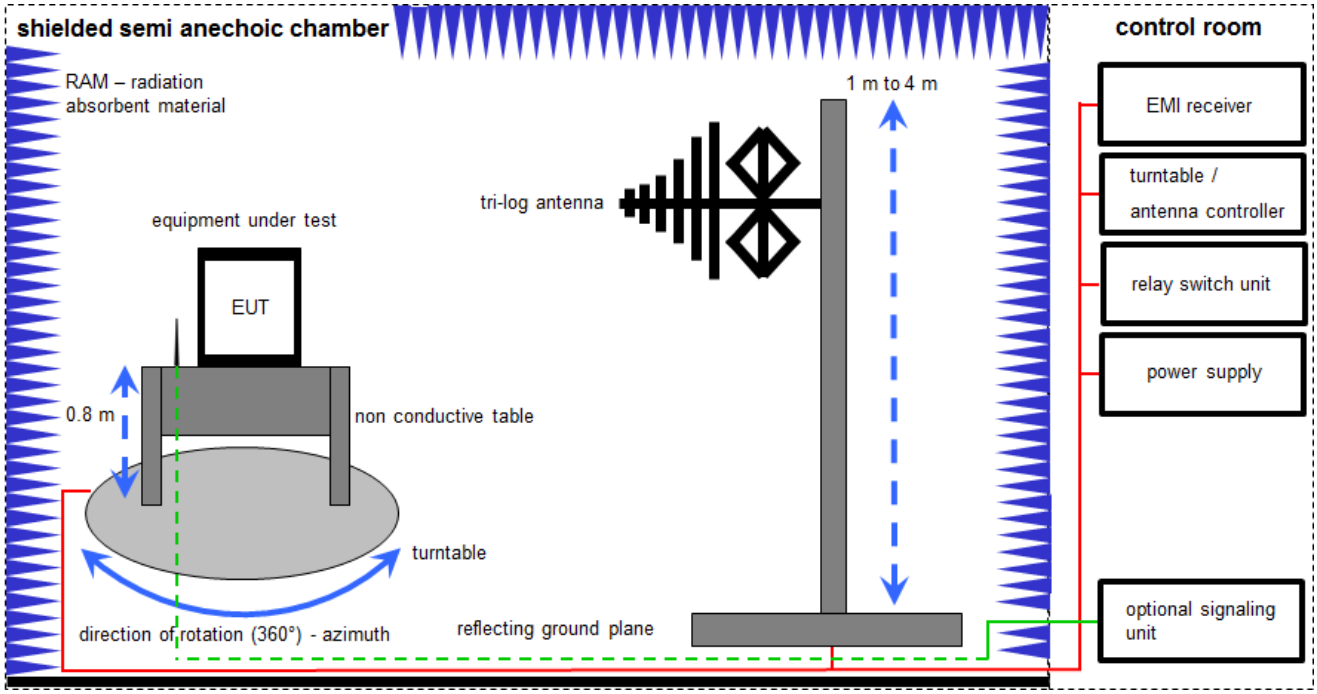
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

7.1 Shielded semi anechoic chamber

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Measurement distance: tri-log antenna 10 meter

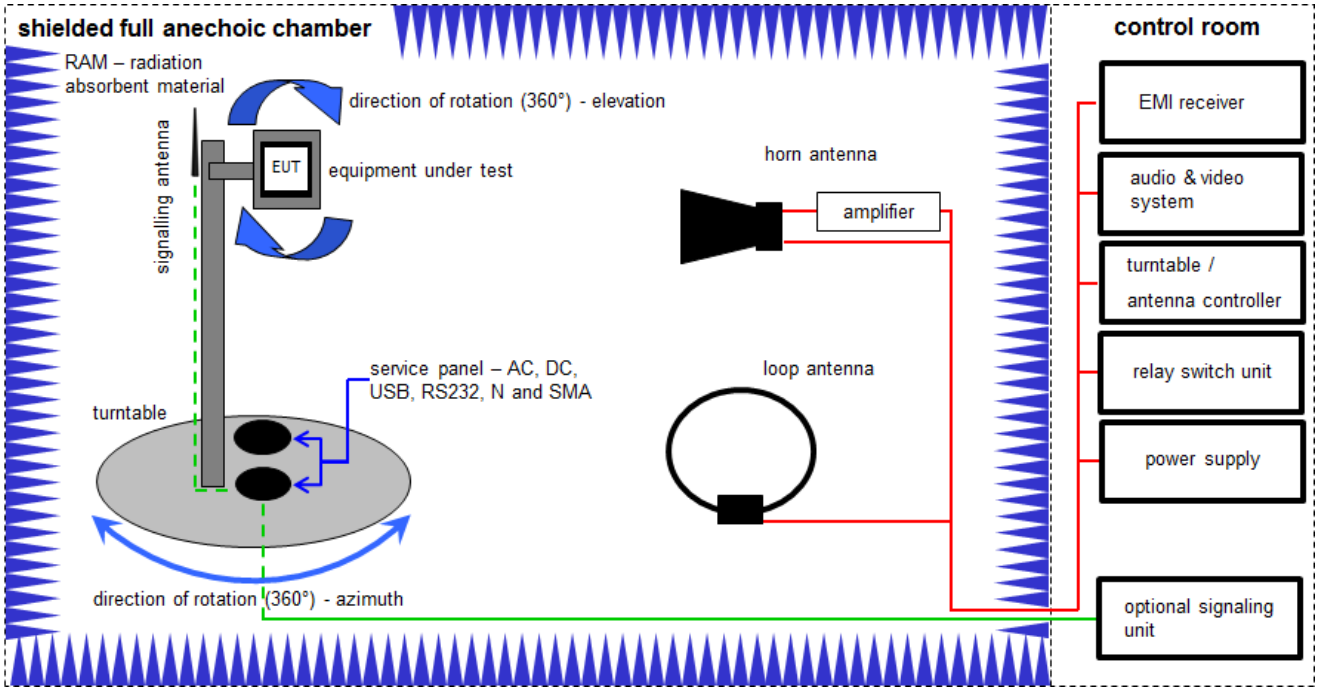
FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 12.35 [dBµV/m] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dBµV/m] (35.69 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev		
2	A	RF-Filter-section	85420E	HP	3427A00162	300002214	ne		
3	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	26.01.2015	26.01.2016
4	A	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw		
5	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw		
6	A	Turntable Interface-Box	Model 105637	ETS-Lindgren	44583	300003747	izw		
7	A	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787	k	22.04.2014	22.04.2016

7.2 Shielded fully anechoic chamber



Measurement distance: horn antenna 3 meter; loop antenna 3 meter / 1 meter

FS = UR + CA + AF
(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m)

OP = AV + D - G + CA
(OP-radiated output power; AV-analyzer value; D-free field attenuation of measurement distance; G-antenna gain+amplifier gain; CA-loss signal path)

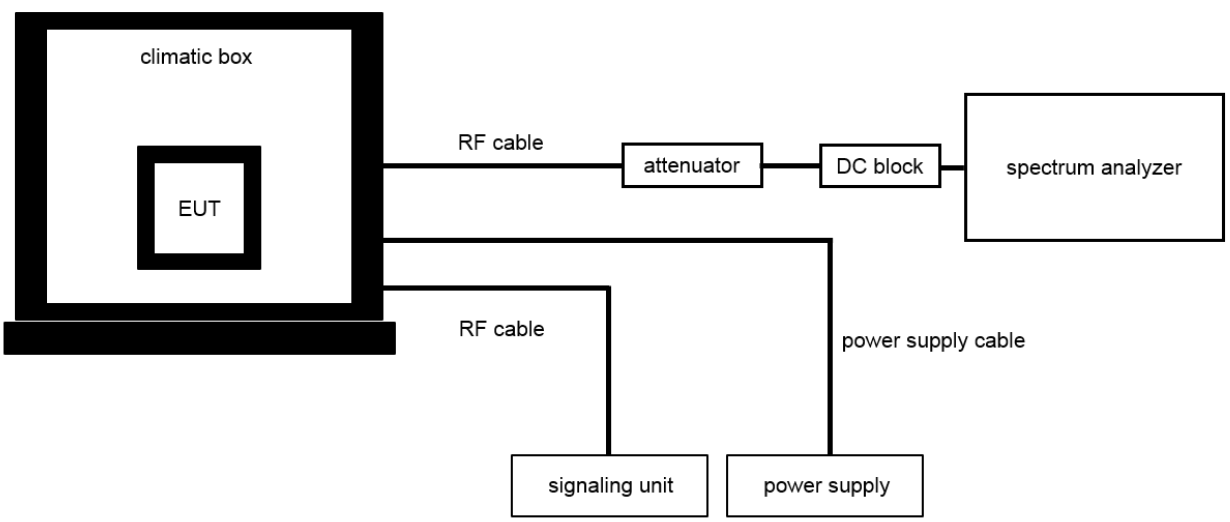
Example calculation:
OP [dBm] = -39.0 [dBm] + 57.0 [dB] - 12.0 [dBi] + (-36.0) [dB] = -30 [dBm] (1 µW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	20.05.2015	20.05.2017
2	A	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
3	A	Switch / Control Unit	3488A	HP	*	300000199	ne		
4	A	Active Loop Antenna 10 kHz to 30 MHz	6502	EMCO/2	8905-2342	300000256	k	24.06.2015	24.06.2017
5	A	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
6	A	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
7	A	MXE EMI Receiver 20 Hz to 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	06.03.2015	06.03.2016
8	A	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne		

7.3 Conducted measurements normal and extreme conditions

Conducted measurements normal & extreme conditions



OP = AV + CA
(OP-output power; AV-analyzer value; CA-loss signal path)

Example calculation:
OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	A	DC Power Supply 0 – 32V	1108-32	Heiden Elektronik	001802	300001383	Ve	29.01.2014	29.01.2017
2	A	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002326	ev	03.09.2015	03.09.2017
3	A	EMI Test Receiver 9 kHz - 3 GHz incl. Preselector	ESPI3	R&S	101713	300004059	k	23.01.2015	23.01.2016
4	A	RF-Cable	ST18/SMAm/SMAm/48	Huber & Suhner	Batch no. 600918	400001182	ev		

8 Measurement uncertainty

Test case	Uncertainty
Maximum field strength	± 3 dB
Frequency stability	± 10 Hz
Occupied bandwidth	± 100 kHz (depends on the used RBW)
Spurious emissions radiated below 30 MHz	± 3 dB
Spurious emissions radiated 30 MHz to 1 GHz	± 3 dB
Spurious emissions radiated 1 GHz to 12.75 GHz	± 3.7 dB

9 Sequence of testing

9.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1.5 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

Final measurement

- Identified emissions during the premeasurement are maximized by the software by rotating the turntable from 0° to 360°. In case of the 2-axis positioner is used the elevation axis is also rotated from 0° to 360°.
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

9.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position ± 45° and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

9.3 Sequence of testing radiated spurious 1 GHz to 12.75 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) – see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.

10 Summary of measurement results

☒	No deviations from the technical specifications were ascertained
☐	There were deviations from the technical specifications ascertained
☐	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	47 CFR Part 2 47 CFR Part 95 H RSS Gen Issue 4 RSS 210 Issue 8 Annexe 4	See table!	2016-05-09	-/-

Test Specification Clause	Test Case	Temperature Conditions	Power Source Voltages	C	NC	NA	NP	Remark
FCC 47 CFR § 2.1046 § 95.1111(a)(3) § 95.1115(a) RSS 210 Issue 8 A4.4	Radiated field strength	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC 47 CFR § 2.1055 § 95.1115(e) RSS Gen Issue 4	Frequency stability	Nominal	Extreme	☒	☐	☐	☐	-/-
		Extreme	Nominal	☒	☐	☐	☐	
FCC 47 CFR § 2.1049 (1) RSS Gen Issue 4	Occupied bandwidth	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC 47 CFR § 2.1053 § 95.1115(b) RSS Gen Issue 4	Field strength of spurious radiation Transmitter unwanted emissions	Nominal	Nominal	☒	☐	☐	☐	-/-
FCC 47 CFR § 15.209 RSS Gen Issue 4	Receiver spurious emissions (radiated)	Nominal	Nominal	☒	☐	☐	☐	-/-

Note: C = Compliant; NC = Not compliant; NA = not applicable; NP = not performed

11 RF measurements

11.1 Additional comments

Reference documents:	Referenced Testprotocol B3-P35440-AVCL-WIDE-FCC-OBR-TP Revision A.00.00
Special test descriptions:	None
Duty cycle correction factor: (FCC 47 CFR 15.35 (c))	Maximum transmission length: 38.4 ms Duty cycle correction factor: 20*log(0.384) = -8.31 dB
Configuration descriptions:	Tested channels: CH 3 – 608.375 MHz CH 20 – 610.925 MHz CH 38 – 613.625 MHz

12 Measurement results

12.1 Radiated field strength

Measurement:

Measurement parameter	
Detector:	Quasi peak
Sweep time:	Auto
Resolution bandwidth:	120kHz
Video bandwidth:	Auto
Span:	> EBW
Trace-Mode:	Max. hold
Test setup	See sub clause 7.2 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
CFR § 2.1046 CFR § 95.1115 (a) CFR § 95.1111 (a)(3)	RSS 210 - Issue 8
Radiated field strength	
200 mV/m @ 3 m (106 dBµV/m @ 3 m)	

Result:

Frequency	Radiated field strength
608.375 MHz	85.96 dBµV/m @ 3m (19.7 mV/m; -9.3 dBm e.r.p.)
610.925 MHz	85.95 dBµV/m @ 3m (19.7 mV/m; -9.3 dBm e.r.p.)
613.625 MHz	87.00 dBµV/m @ 3m (22.4 mV/m; -8.2 dBm e.r.p.)

12.2 Frequency stability

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	10 Hz
Video bandwidth:	30 Hz
Span:	500 Hz
Trace-Mode:	Max. hold
Test setup	See sub clause 7.3 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
CFR § 2.1055 CFR § 95.1115 (e)	RSS - Gen Issue 4
Manufacturers of wireless medical telemetry devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all of the manufacturer's specified conditions.	

Results: low channel

Temperature	Frequency (MHz)	Emission within band
-20 °C	608.374035	Yes
-10 °C	608.373818	Yes
0 °C	608.373986	Yes
10 °C	608.374308	Yes
20 °C (V nom)	608.374593	Yes
30 °C	608.374782	Yes
40 °C	608.374846	Yes
55 °C	608.374780	Yes
Voltage		
85 %	608.374355	Yes
115 %	608.374633	Yes

Results: middle channel

Temperature	Frequency (MHz)	Emission within band
-20 °C	610.924015	Yes
-10 °C	610.923813	Yes
0 °C	610.923983	Yes
10 °C	610.924307	Yes
20 °C (V nom)	610.924595	Yes
30 °C	610.924821	Yes
40 °C	610.924854	Yes
55 °C	610.924800	Yes
Voltage		
85 %	610.924379	Yes
115 %	610.924700	Yes

Results: high channel

Temperature	Frequency (MHz)	Emission within band
-20 °C	613.623989	Yes
-10 °C	613.623809	Yes
0 °C	613.623997	Yes
10 °C	613.624294	Yes
20 °C (V nom)	613.624601	Yes
30 °C	613.624813	Yes
40 °C	613.624849	Yes
55 °C	613.624800	Yes
Voltage		
85 %	613.624389	Yes
115 %	613.624723	Yes

12.3 Occupied bandwidth

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 % – 5 % of the occupied bandwidth
Video bandwidth:	≥ 3x RBW
Trace-Mode:	Max. hold
Analyser function:	99 % power function
Test setup	See sub clause 7.3 A
Measurement uncertainty	See sub clause 8

Limits:

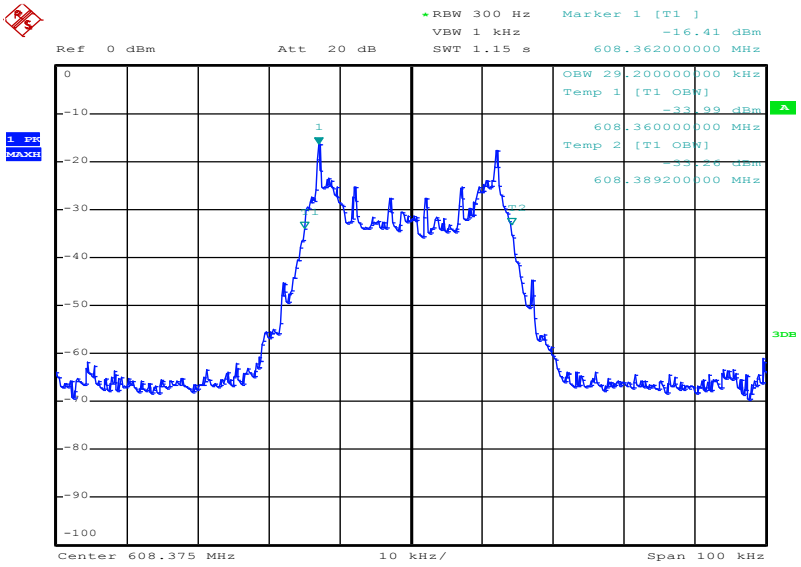
FCC	IC
47 CFR § 2.1049 (1)	RSS - Gen Issue 4
When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.	
Not limited	

Result:

Frequency	99% Bandwidth
608.375 MHz	29.2 kHz
610.925 MHz	29.0 kHz
613.625 MHz	29.2 kHz

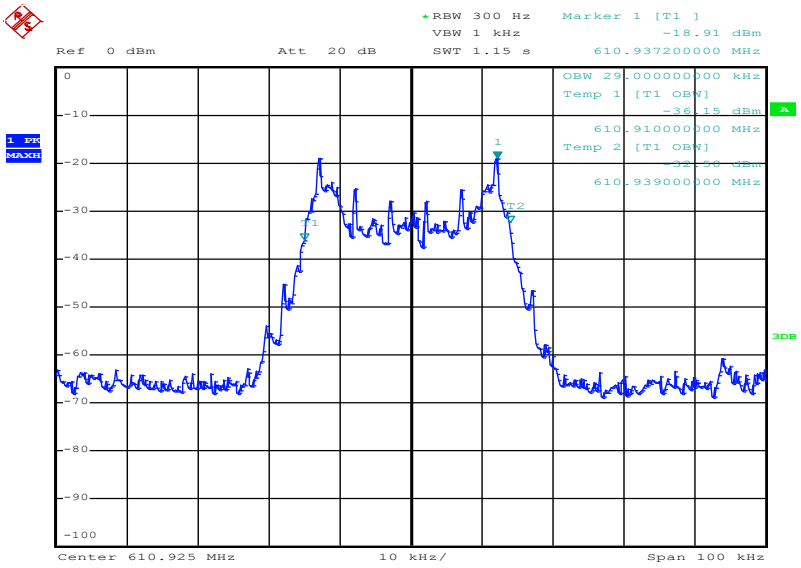
Plots of the measurements

Plot 1: low channel



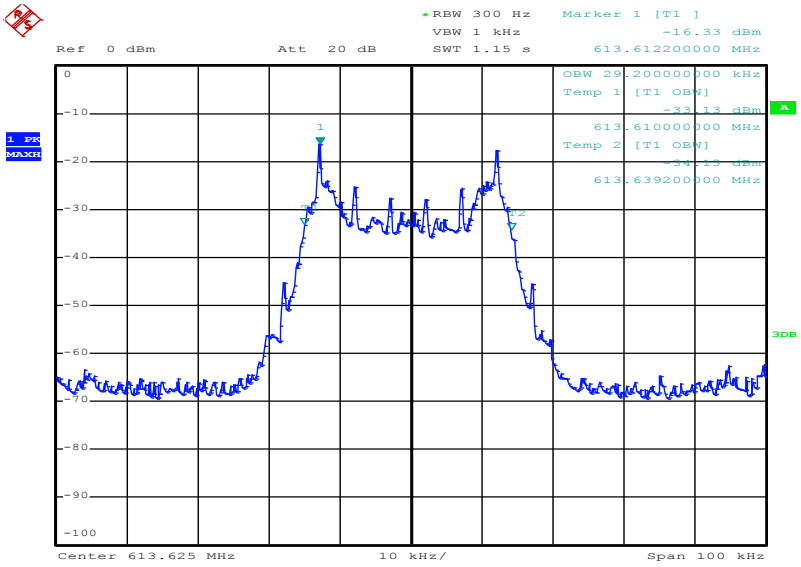
Date: 8.OCT.2015 07:57:21

Plot 2: middle channel



Date: 8.OCT.2015 07:58:55

Plot 3: high channel



Date: 8.OCT.2015 08:00:11

12.4 Field strength of spurious radiation

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	f < 1 GHz : 100 kHz f ≥ 1GHz : 1 MHz
Video bandwidth:	f < 1 GHz : 100 kHz f ≥ 1GHz : 1 MHz
Span:	-/-
Trace-Mode:	Max. hold
Test setup	See sub clause 7.2 A
Measurement uncertainty	See sub clause 8

Limits:

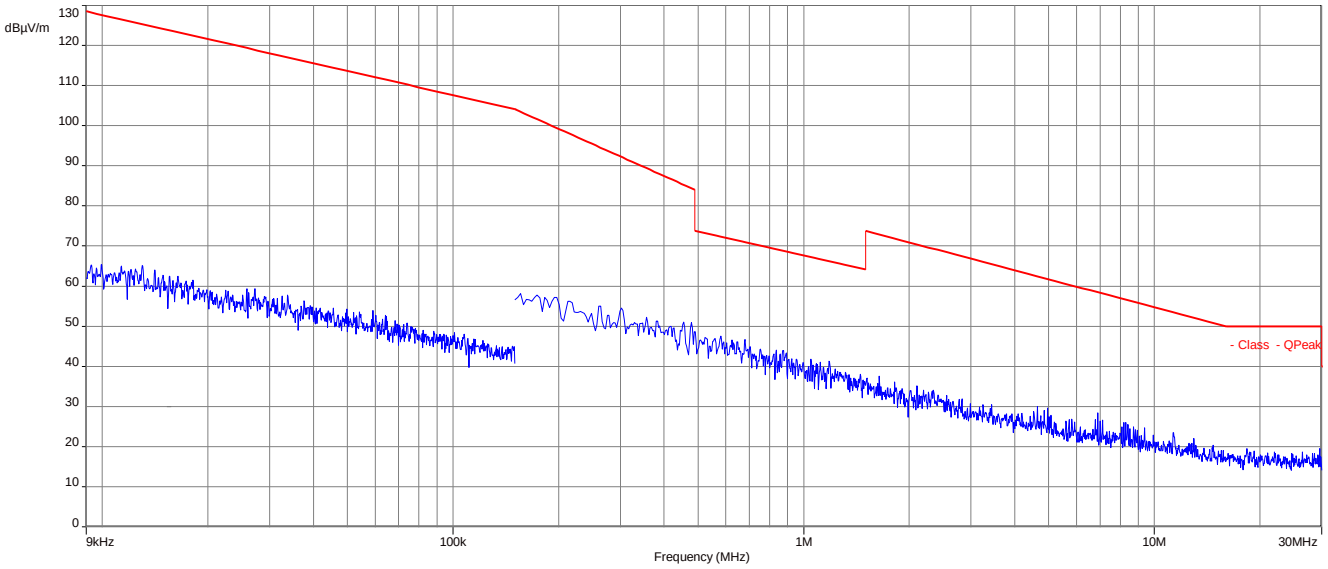
FCC	IC
47 CFR § 2.1053 47 CFR § 95.1115 (b)	RSS - Gen Issue 4
Out-of band emissions below 960 MHz are limited to 200 microvolts/meter, as measured at a distance of 3 meters, using measuring instrumentation with a CISPR quasi-peak detector. Out-of-band emissions above 960 MHz are limited to 500 microvolts/meter as measured at a distance of 3 meters, using measuring equipment with an averaging detector and a 1 MHz measurement bandwidth.	

SPURIOUS EMISSIONS LEVEL								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
1217 MHz	Peak	46.65 dBµV/m	1223 MHz	Peak	45.04 dBµV/m	1227 MHz	Peak	45.60 dBµV/m
	AVG*	38.34 dBµV/m		AVG*	37.09 dBµV/m		AVG*	37.29 dBµV/m
2433 MHz	Peak	54.87 dBµV/m	2444 MHz	Peak	55.53 dBµV/m	2454 MHz	Peak	56.01 dBµV/m
	AVG*	46.56 dBµV/m		AVG*	47.22 dBµV/m		AVG*	47.70 dBµV/m
3042 MHz	Peak	48.84 dBµV/m	2355 MHz	Peak	48.53 dBµV/m	3068 MHz	Peak	49.70 dBµV/m
	AVG*	40.53 dBµV/m		AVG*	40.22 dBµV/m		AVG*	41.39 dBµV/m
5475 MHz	Peak	56.74 dBµV/m	5499 MHz	Peak	57.39 dBµV/m	5522 MHz	Peak	56.37 dBµV/m
	AVG*	48.43 dBµV/m		AVG*	49.08 dBµV/m		AVG*	48.06 dBµV/m

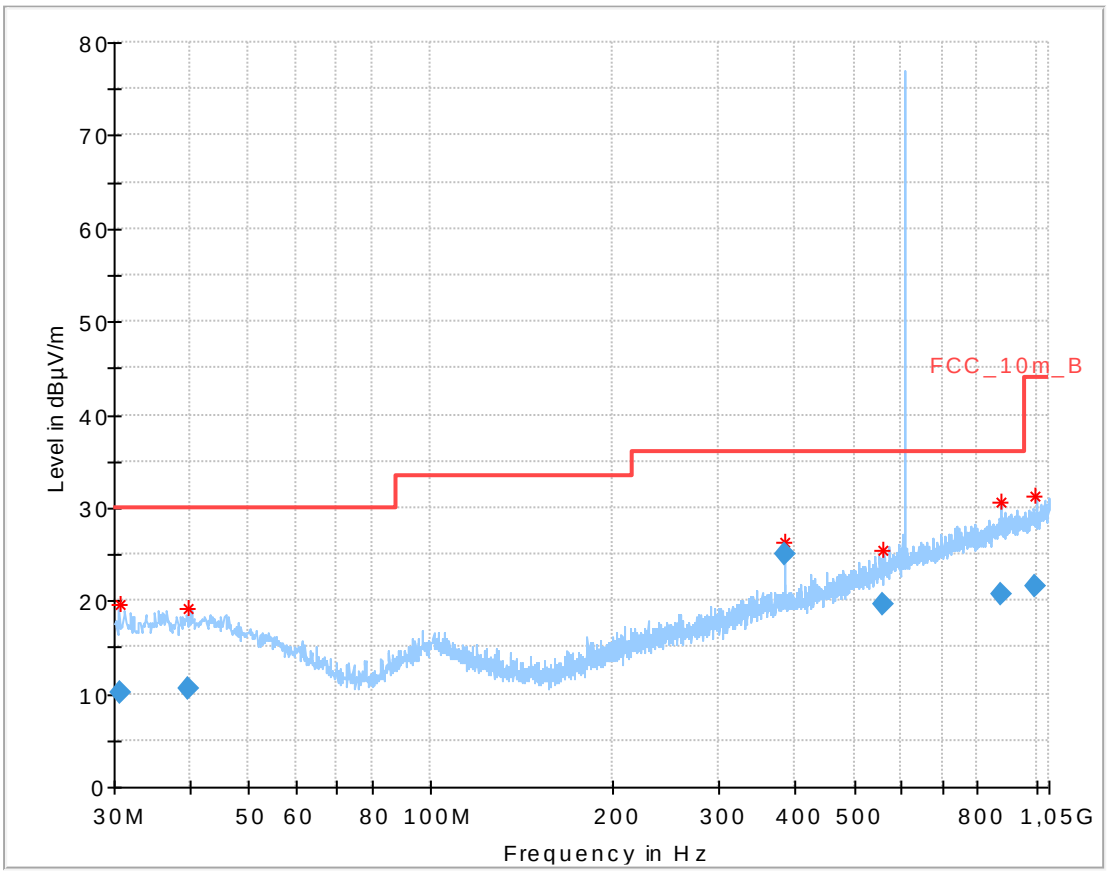
* AVG values calculated using duty cycle correction factor (see 11.1)

Plots of the measurements

Plot 1: 150 kHz – 30 MHz, low channel



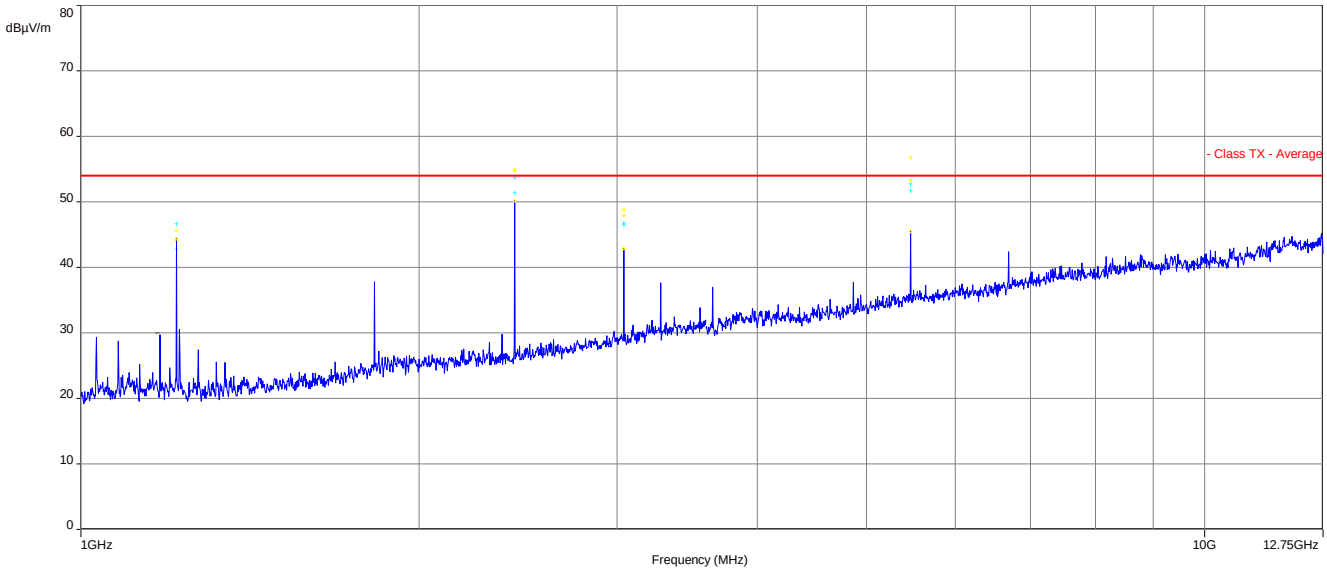
Plot 2: 30 MHz – 1 GHz, low channel



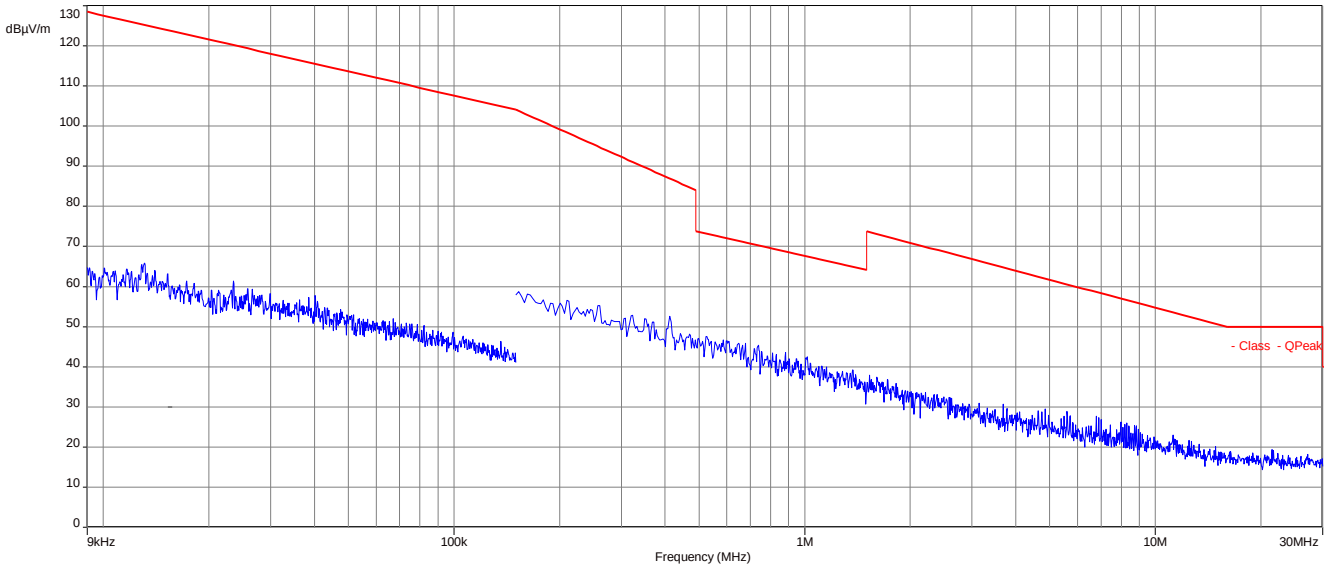
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.621045	10.21	30.00	19.79	1000.0	120.000	275.0	H	320	13.4
39.695400	10.61	30.00	19.39	1000.0	120.000	274.0	V	-5	14.0
384.010800	25.05	36.00	10.95	1000.0	120.000	100.0	V	1	16.6
560.023800	19.62	36.00	16.38	1000.0	120.000	200.0	V	-13	19.6
872.497950	20.78	36.00	15.22	1000.0	120.000	400.0	V	185	23.8
999.275400	21.59	44.00	22.41	1000.0	120.000	349.0	V	282	24.8

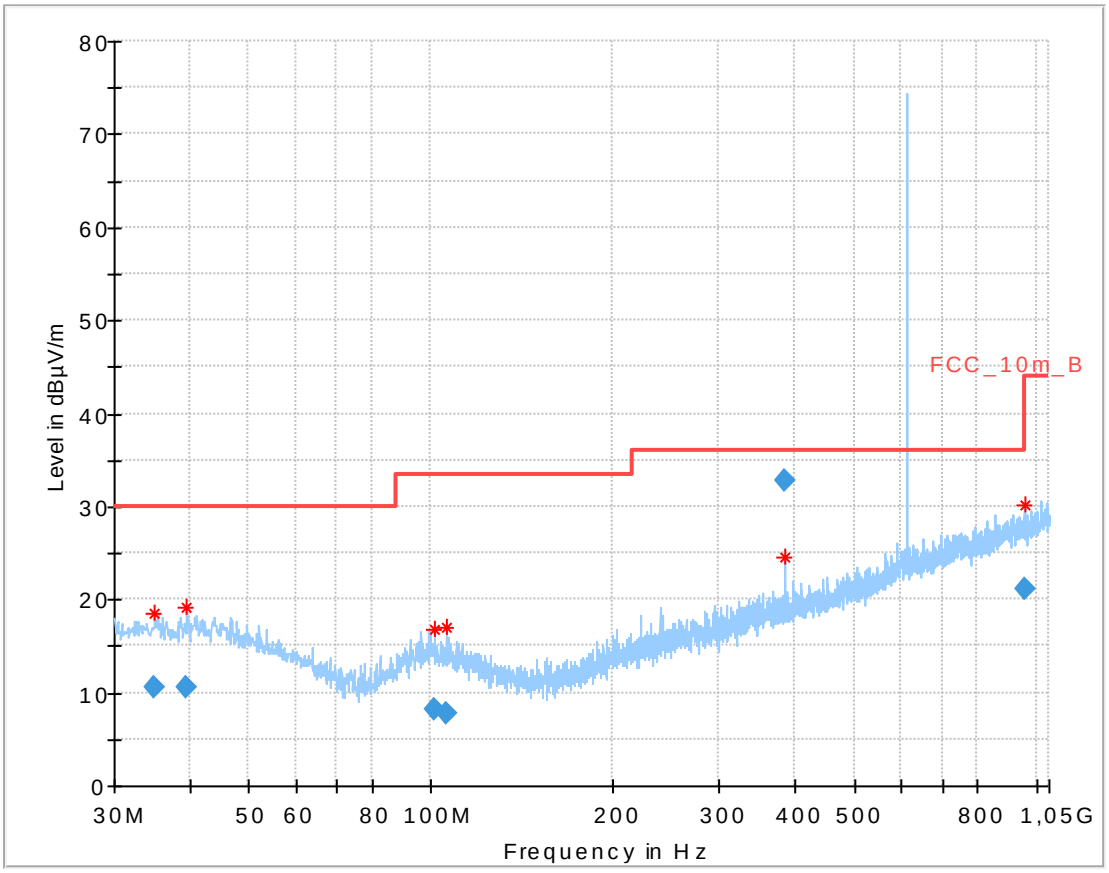
Plot 3: 1 GHz – 12.75 GHz, low channel, antenna horizontal/vertical



Plot 4: 150 kHz – 30 MHz, middle channel



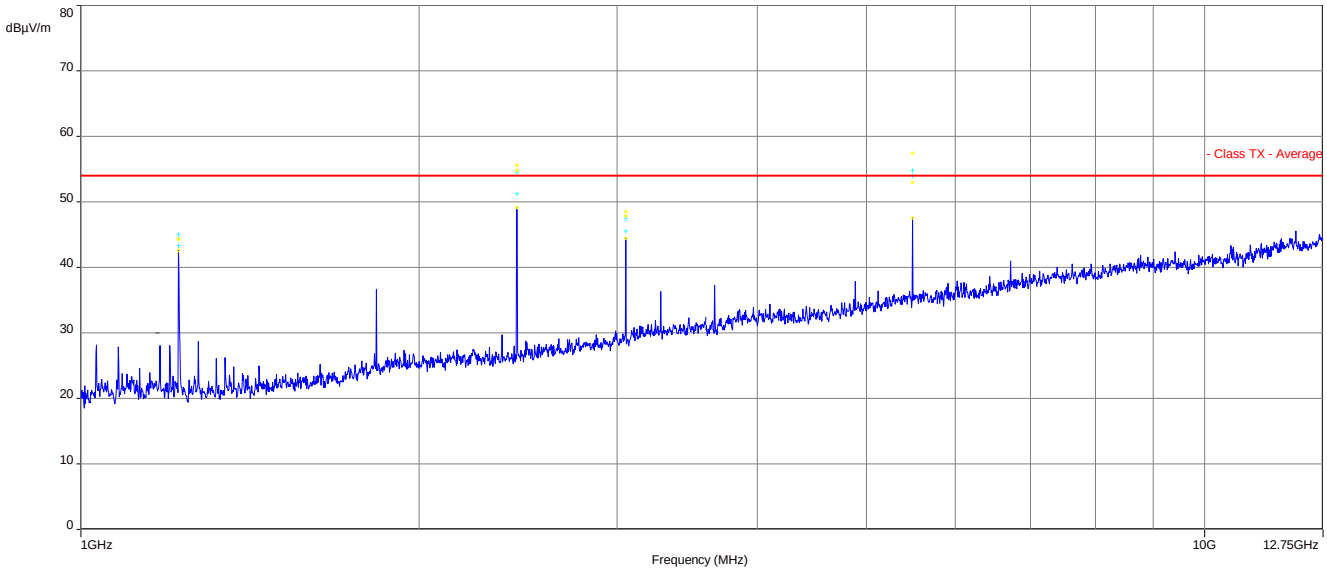
Plot 5: 30 MHz – 1 GHz, middle channel



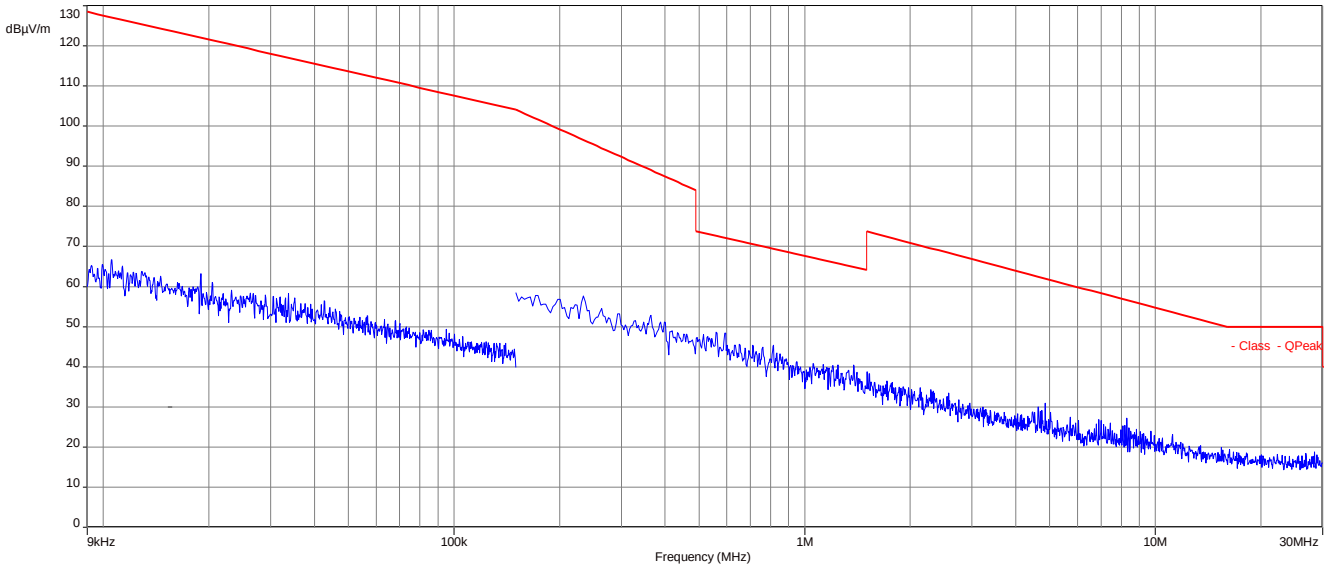
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
35.024850	10.60	30.00	19.40	1000.0	120.000	101.0	H	100	13.8
39.539250	10.54	30.00	19.46	1000.0	120.000	101.0	V	100	14.0
101.360850	8.27	33.50	25.23	1000.0	120.000	101.0	V	81	12.0
106.020750	7.72	33.50	25.78	1000.0	120.000	101.0	V	-10	11.5
383.994750	32.68	36.00	3.32	1000.0	120.000	98.0	V	190	16.6
954.872250	21.14	36.00	14.86	1000.0	120.000	170.0	H	80	24.3

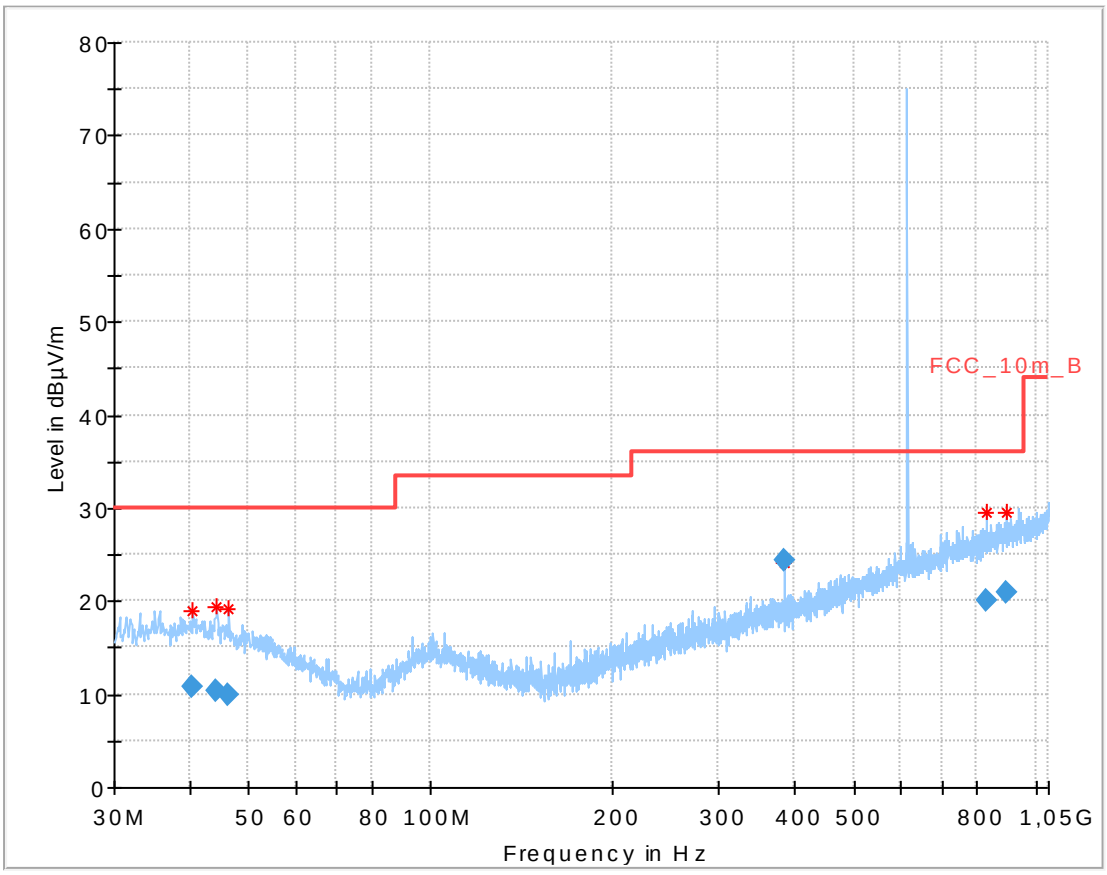
Plot 6: 1 GHz – 12.75 GHz, middle channel, antenna horizontal/vertical



Plot 7: 150 kHz – 30 MHz, high channel



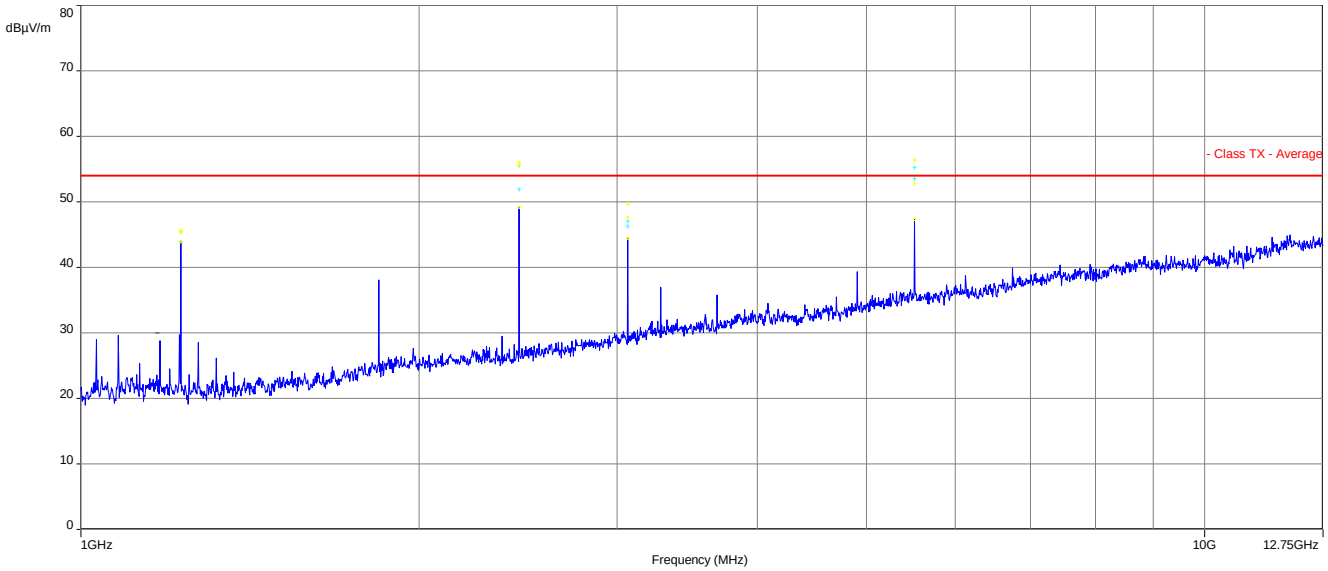
Plot 8: 30 MHz – 1 GHz, high channel



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.245300	10.88	30.00	19.12	1000.0	120.000	101.0	V	170	14.0
44.114850	10.31	30.00	19.69	1000.0	120.000	101.0	V	260	13.9
46.316850	9.91	30.00	20.09	1000.0	120.000	101.0	H	190	13.5
383.982900	24.47	36.00	11.53	1000.0	120.000	98.0	V	80	16.6
830.071350	20.03	36.00	15.97	1000.0	120.000	170.0	V	171	23.2
891.933450	20.96	36.00	15.04	1000.0	120.000	170.0	V	10	24.0

Plot 9: 1 GHz – 12.75 GHz, high channel, antenna horizontal/vertical



12.5 Receiver spurious emissions (radiated)

Measurement:

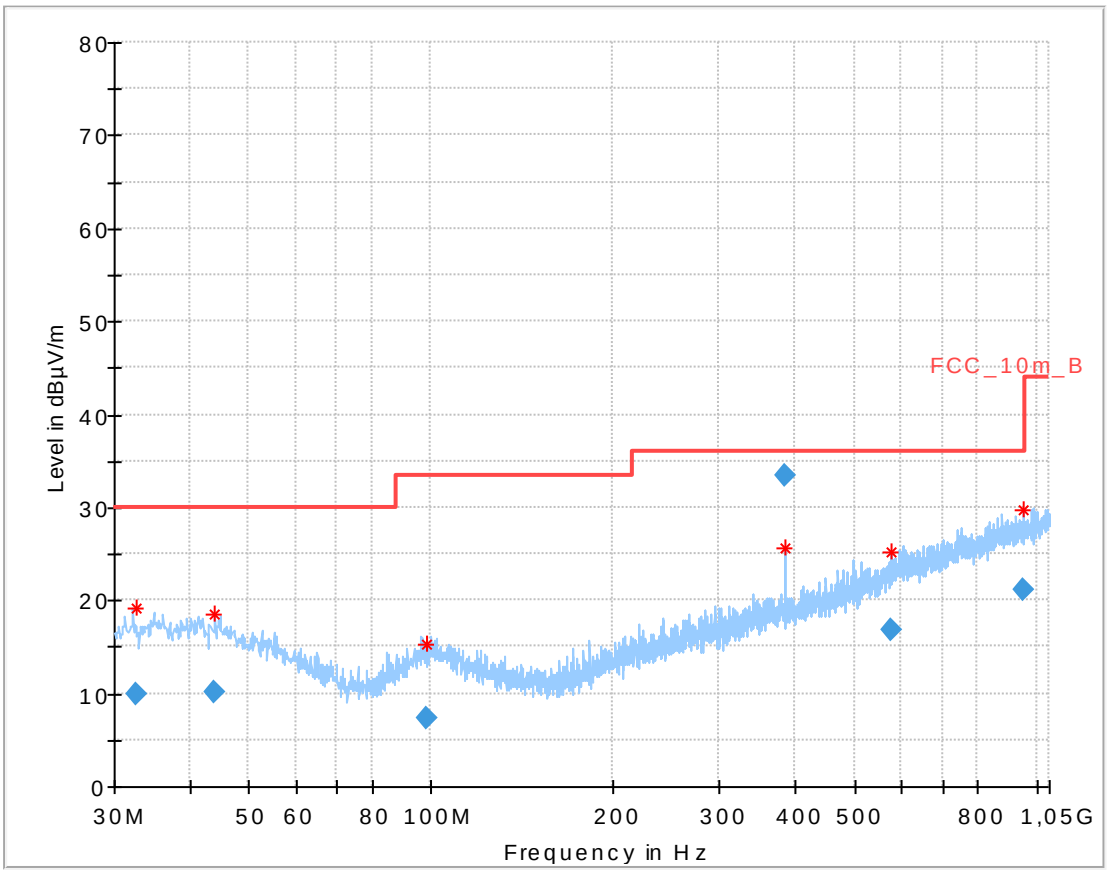
Measurement parameter	
Detector:	Peak - Quasi Peak / Average
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold
Test setup	See sub clause 7.2 A
Measurement uncertainty	See sub clause 8

Limits:

FCC		IC
SUBCLAUSE § 15.109		RSS-GEN Issue 4
Receiver Spurious Emission (radiated)		
Frequency (MHz)	**Field strength (µV/m)**	**Measurement distance (m)**
30 - 88	100 (40 dBµV/m)	3
88 - 216	150 (43.5 dBµV/m)	3
216 - 960	200 (46 dBµV/m)	3
above 960	500 (54 dBµV/m)	3

Plots of the measurements

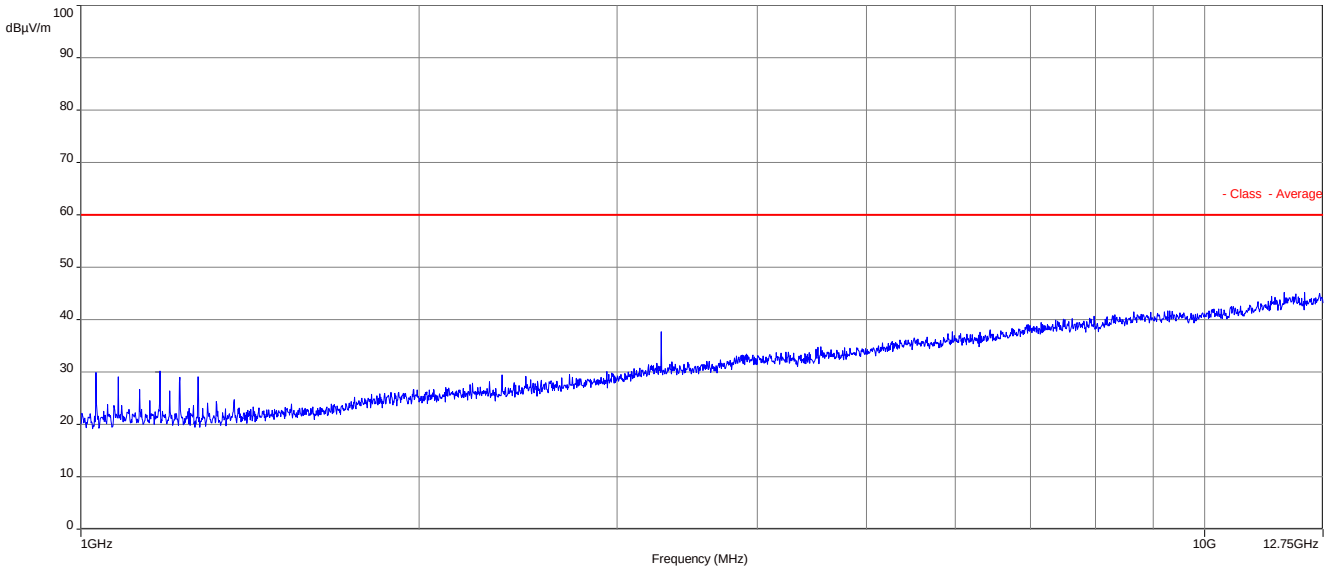
Plot 2: 30 MHz – 1 GHz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
32.573850	9.93	30.00	20.07	1000.0	120.000	101.0	V	170	13.6
44.057550	10.21	30.00	19.79	1000.0	120.000	101.0	V	260	13.9
98.664900	7.29	33.50	26.21	1000.0	120.000	101.0	V	170	12.0
383.995950	33.39	36.00	2.61	1000.0	120.000	98.0	V	10	16.6
573.444900	16.73	36.00	19.27	1000.0	120.000	98.0	V	10	20.0
953.834250	21.18	36.00	14.82	1000.0	120.000	170.0	V	80	24.3

Plot 3: 1 GHz – 12.75 GHz, antenna horizontal/vertical



13 Observations

No observations except those reported with the single test cases have been made.

Annex A Document history

Version	Applied changes	Date of release
	Initial release	2015-10-09
A	Editorial changes	2015-11-04
B	PMN changed	2016-02-18
C	e.r.p. power values added	2016-05-02
D	limit in 12.1 corrected	2016-05-09

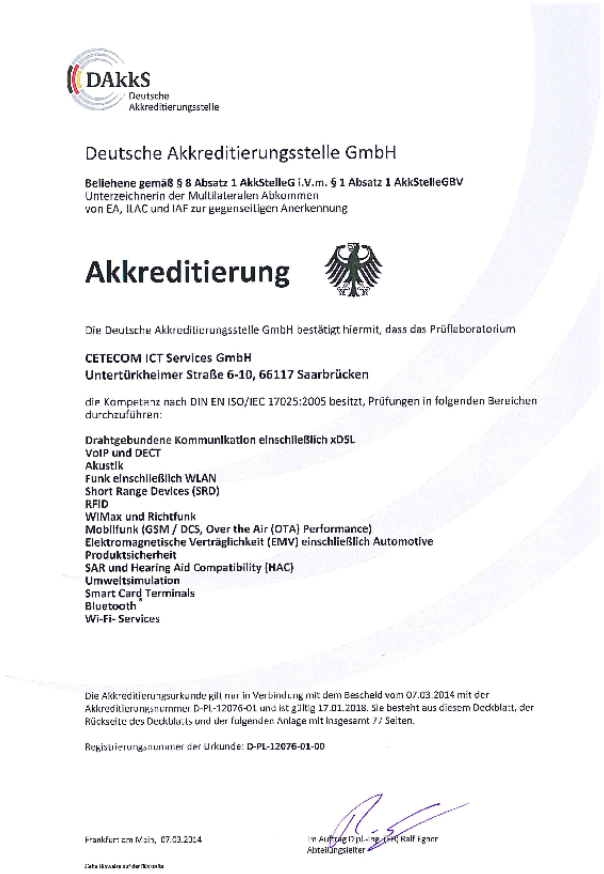
Annex B Further information

Glossary

AVG - Average
DUT - Device under test
EMC - Electromagnetic Compatibility
EN - European Standard
EUT - Equipment under test
ETSI - European Telecommunications Standard Institute
FCC - Federal Communication Commission
FCC ID - Company Identifier at FCC
HW - Hardware
IC - Industry Canada
Inv. No. - Inventory number
N/A - Not applicable
PP - Positive peak
QP - Quasi peak
S/N - Serial number
SW - Software
PMN Product marketing name
HMN Host marketing name
HVIN Hardware version identification number
FVIN Firmware version identification number

Annex C Accreditation Certificate

Front side of certificate



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Deutsche
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Unterzeichnerin der Multilateralen Abkommen
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Untertürkheimer Straße 6-10, 66117 Saarbrücken

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Short Range Devices (SRD)
RFID
WIMax und Richtfunk
Mobilfunk (GSM / DCS, Over the Air (OTA) Performance)
Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive
Produktsicherheit
SAR und Hearing Aid Compatibility (HAC)
Umweltsimulation
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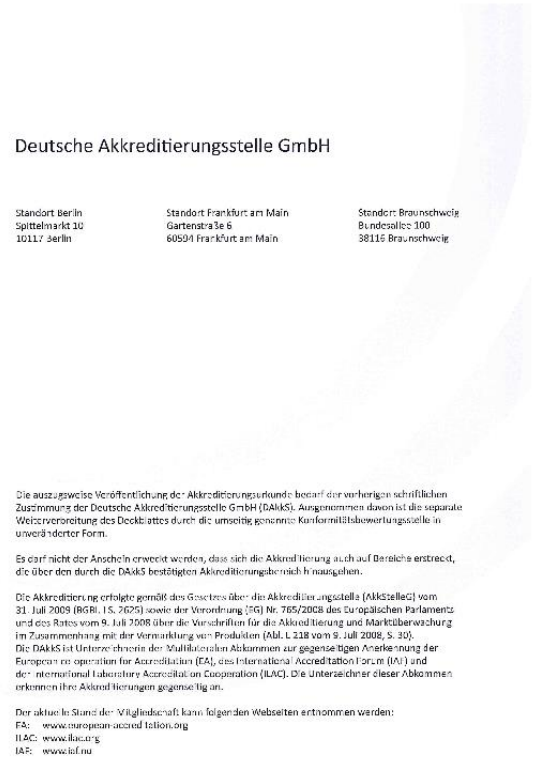
Frankfurt am Main, 07.03.2014

Im Auftrag Dipl.-Ing. (FH) Ralf Egner
Abteilungsleiter

Back side of certificate



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