
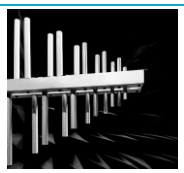
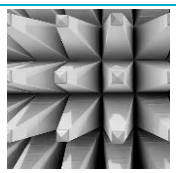

CTC advanced
member of RWTÜV group

TEST REPORT

Test report no.: 1-4397/17-01-02

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing laboratory

CTC advanced GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.ctcadvanced.com
e-mail: mail@ctcadvanced.com

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-12076-01-01

Applicant

Pacific Industrial Co., Ltd
Godo-Cho, Anpachi
Gifu 503-2397 / JAPAN
Phone: -/-
Fax: -/-
Contact: Kunitaka Yano
e-mail: knyano@pacific-ind.co.jp
Phone: +81 584 28 0111

Manufacturer

Pacific Industrial Co., Ltd
Godo-Cho, Anpachi
Gifu 503-2397 / JAPAN

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 210 Issue 9	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment

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

Test Item

Kind of test item:	**Tire Pressure Monitoring System Transmitter**
Model name:	**PMV-CH15**
FCC ID:	**PAXPMVCH15**
IC:	**3729A-PMVCH15**
Frequency:	433.92 MHz
Technology tested:	Modulated carrier
Antenna:	Integrated antenna
Power supply:	3.0 V DC by lithium battery
Temperature range:	-20°C to +60°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:

cn=Stefan Boes, o=CTC advanced GmbH, ou=BOE-161129, email=Stefan.Boes@ctcadvanced.com, c=DE
2017.05.30 08:45:22 +02'00'

Stefan Bös
Lab Manager
Radio Communications & EMC

Test performed:

cn=Marco Bertolino, o=CTC advanced GmbH, ou=BTL-161128, email=Marco.Bertolino@ctcadvanced.com, c=DE
2017.05.30 08:42:59 +02'00'

Marco Bertolino
Lab Manager
Radio Communications & EMC

1 Table of contents

2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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In no case this test report can be considered as a Letter of Approval.

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

2.2 Application details

Date of receipt of order:	2017-05-19
Date of receipt of test item:	2017-05-23
Start of test:	2017-05-23
End of test:	2017-05-24
Person(s) present during the test:	-/-

2.3 Test laboratories sub-contracted

None

3 Test standard/s and references

Test standard	Date	Description
47 CFR Part 15	-/-	Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices
RSS - 210 Issue 9	August 2016	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment
RSS - Gen Issue 4	November 2014	Spectrum Management and Telecommunications Radio Standards Specifications - General Requirements and Information for the Certification of Radio Apparatus

Guidance	Version	Description
ANSI C63.4-2014	-/-	American national standard for methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
ANSI C63.10-2013	-/-	American national standard of procedures for compliance testing of unlicensed wireless devices

4 Test environment

Temperature	:	T_{nom} T_{max} T_{min}	+22 °C during room temperature tests No test under extreme temperature conditions required. No test under extreme temperature conditions required.
Relative humidity content	:		42 %
Barometric pressure	:		1022 hpa
Power supply	:	V_{nom} V_{max} V_{min}	3.0 V DC by lithium battery No test under extreme voltage conditions required. No test under extreme voltage conditions required.

5 Test item

5.1 General description

Kind of test item	:	Tire Pressure Monitoring System Transmitter
Type identification	:	PMV-CH15
HMN	:	PMV-CH15
PMN	:	PMV-CH15
HVIN	:	PMV-CH15
FVIN	:	-/-
S/N serial number	:	EUT 1: 00006B2 EUT 2: 00006B3
HW hardware status	:	No information available!
SW software status	:	RF test mode
Frequency band	:	433.92 MHz
Type of radio transmission Use of frequency spectrum	: :	Modulated carrier
Type of modulation	:	F2D
Number of channels	:	1
Antenna	:	Integrated antenna
Power supply	:	3.0 V DC by lithium battery
Temperature range	:	-20°C to +60°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: 1-4397/17-01-01_AnnexA
1-4397/17-01-01_AnnexB
1-4397/17-01-01_AnnexD

6 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).

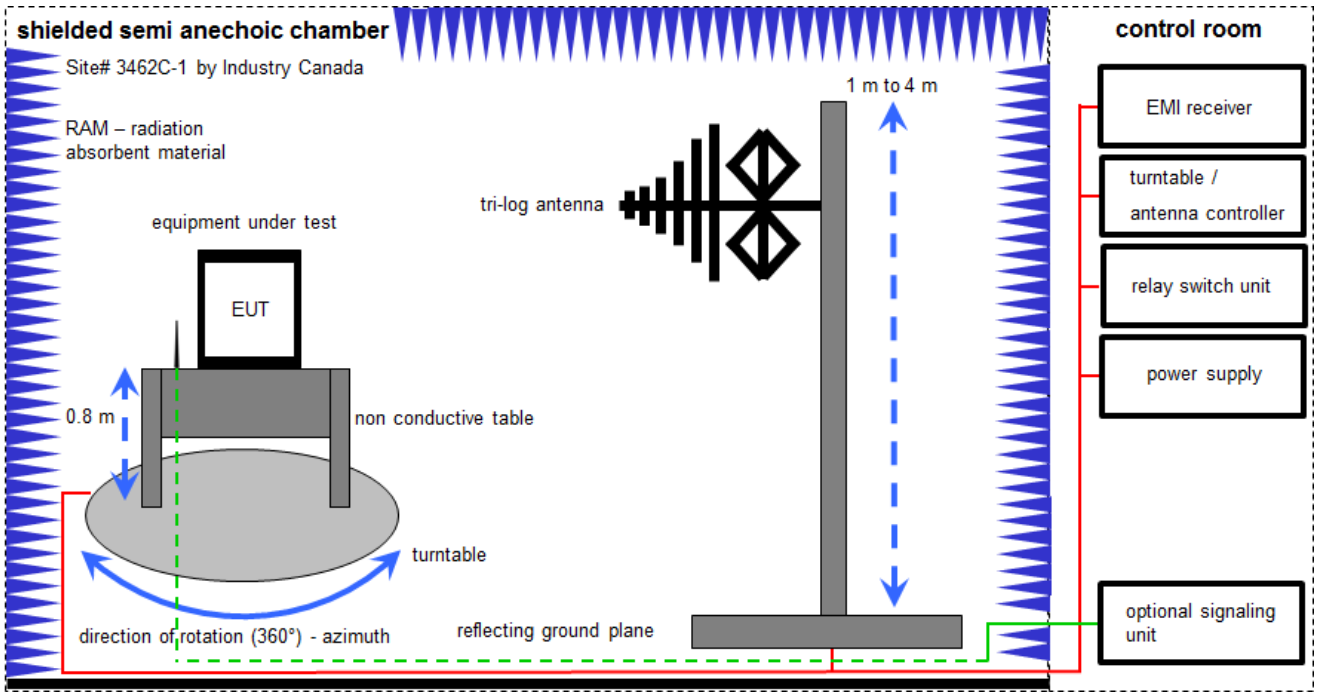
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

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

6.1 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 conform to 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

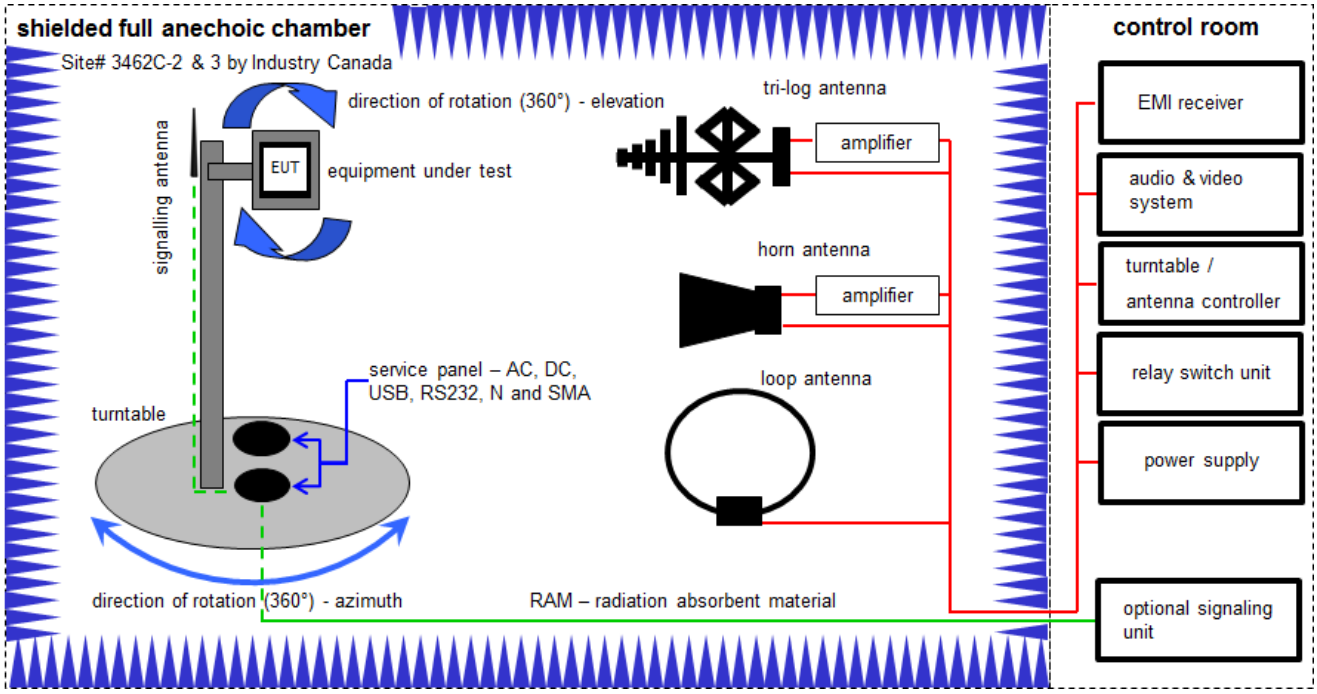
FS = UR + CL + AF
(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

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.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
2	A	Meßkabine 1	HF-Absorberhalle	MWB AG 300023		300000551	ne	-/-	-/-
3	A	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	01.02.2017	31.01.2018
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	25.04.2016	25.04.2018

6.2 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter; loop antenna 3 meter

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

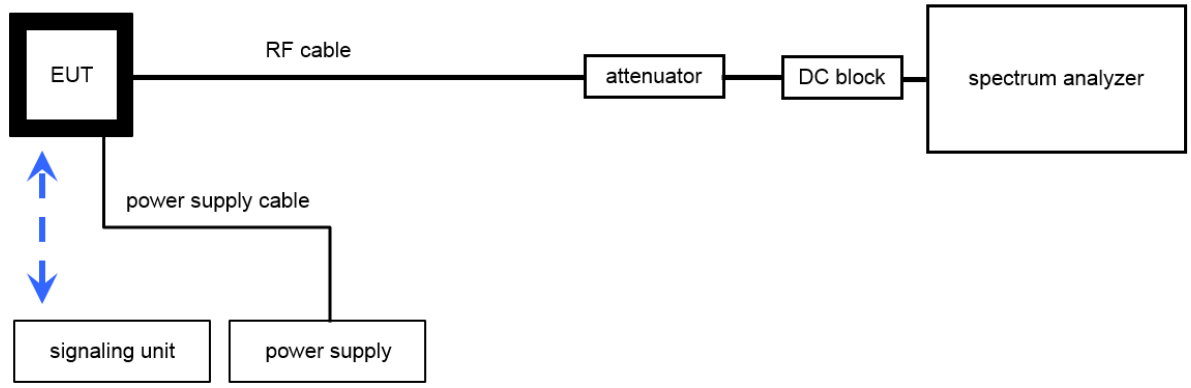
Example calculation:
FS [dBµV/m] = 40.0 [dBµV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m)

Equipment table:

No.	Lab / Item	Equipment	Type	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	21.05.2017	21.05.2019
2	A, B	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
3	A, B	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, B	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	31.01.2017	30.01.2018
6	A	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev	-/-	-/-
7	B	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vIKI!	29.10.2014	29.10.2017
8	A, B	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
9	A, B	NEXIO EMV-Software	BAT EMC V3.16.0.49	EMCO	-/-	300004682	ne	-/-	-/-
10	A, B	PC	ExOne	F+W	-/-	300004703	ne	-/-	-/-

6.3 Conducted measurements

Conducted measurements normal 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.	Kind of Calibration	Last Calibration	Next Calibration
1	A	Hygro-Thermometer	-/-, 5-45C, 20-100rF		-/-	400000108	ev	07.09.2015	07.09.2017
2	A	Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517	k	25.01.2017	24.01.2018
3	A	RF-Cable	ST18/SMAm/SMAm/ 72	Huber & Suhner	Batch no. 699714	400001184	ev	-/-	-/-
4	A	DC-Blocker 0.1-40 GHz	8141A	Inmet	-/-	400001185	ev	-/-	-/-
5	A	Synchron Power Meter	SPM-4	CTC	1	400001294	ev	-/-	-/-
6	A	DC-Blocker	WA7046	Weinschel Associates	-/-	400001310	ev	-/-	-/-

7 Sequence of testing

7.1 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.

7.2 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.

7.3 Sequence of testing radiated spurious 1 GHz to 5 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.

8 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	CFR Part 15 RSS 210, Issue 9	See table!	2017-05-30	-/-

Test specification clause	Test case	Temperature conditions	Power source voltages	C	NC	NA	NP	Remark
§ 15.35 (c) 15.231(e) RSS-GEN	Timing of the transmitter (Duty cycle correction factor)	Nominal	Nominal	☒	☐	☐	☐	-/-
§ 15.231 (e) RSS-210 Issue 9	Silent period between transmissions	Nominal	Nominal	☒	☐	☐	☐	-/-
§ 15.231 (c) RSS-210 Issue 9	Emission bandwidth	Nominal	Nominal	☒	☐	☐	☐	-/-
§ 15.231 (e) RSS-210 Issue 9	Fieldstrength of Fundamental	Nominal	Nominal	☒	☐	☐	☐	-/-
§ 15.209 RSS-210 Issue 9	Fieldstrength of harmonics and spurious	Nominal	Nominal	☒	☐	☐	☐	-/-
§ 15.209 RSS-GEN	Receiver spurious emissions (radiated)	Nominal	Nominal	☐	☐	☒	☐	-/-

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

8.1 Additional comments

Reference documents: Customer Questionnaire_1-4397_17-1_PMV-CH15

How to use Trigger device(PMV-CH15)

TPMS_Technical_Document（PMV-CH15）_北米

Special test descriptions: None

Configuration descriptions: None

9 Measurement results

9.1 Timing of the transmitter and silent periods between transmissions

Measurement:

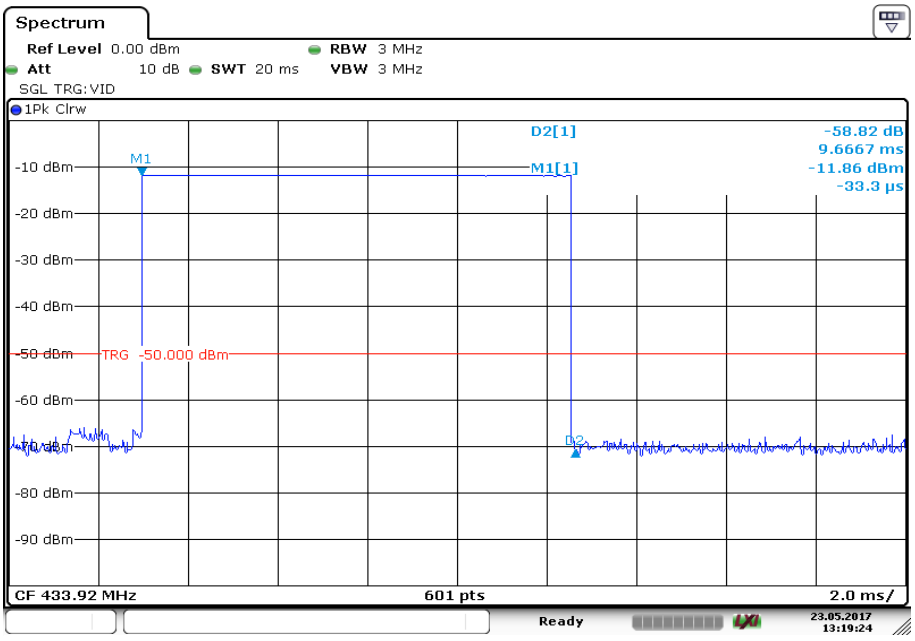
Measurement parameter	
Detector:	Peak
Sweep time:	100 ms
Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Span:	Zero
Trace mode:	Single sweep

Limits:

FCC	IC
(c) Unless otherwise specified, e.g. Section 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.	
§15.231 (a)(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.	
§15.231 (e) In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.	

Result:

Plot 1: one transmit burst

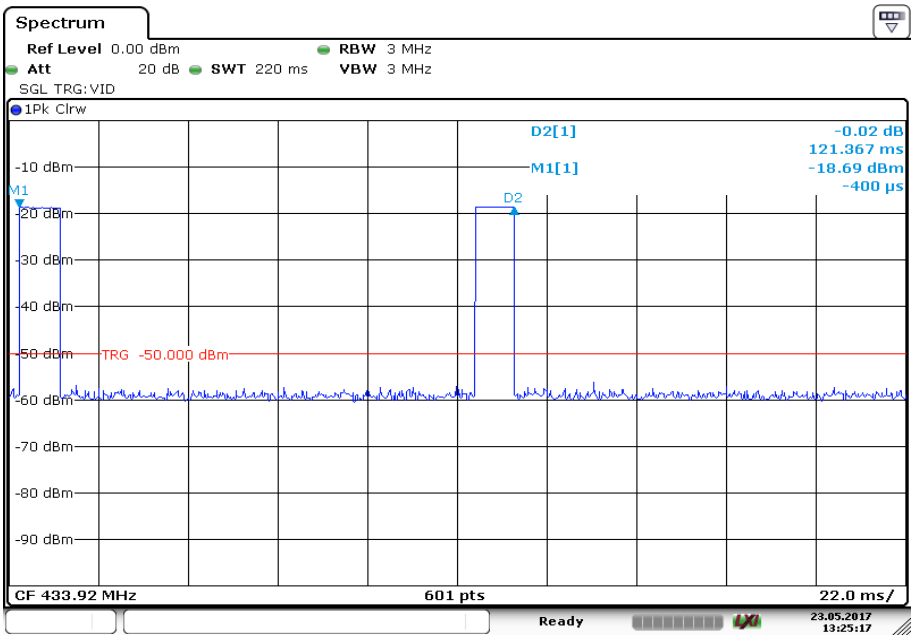


Date: 23.MAY.2017 13:19:25

Burst length within 100 ms: 9.69 ms (declared); 9.67 ms (measured)

Burst transmission duration average correction factor: 20 log (0.0969) = 20.27 dB

Plot 2:

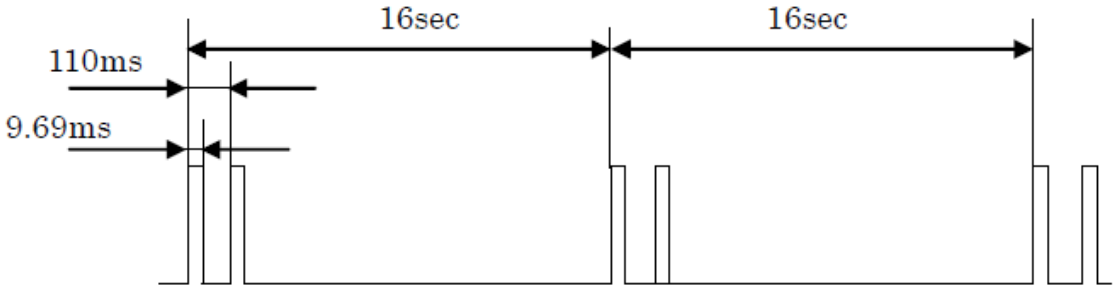


Date: 23.MAY.2017 13:25:17

Timings according technical description "TPMS_Technical_Document（PMV-CH15）_北米"

Rotating mode 1:

☐Rotating mode1



1 burst within 110 ms = 9.69 % correction factor: 20 log (0.0969) = 20.27 dB

2 burst within 16 s (every 110 ms) same correction factor

Maximum emission period: 110 ms + 9.69 ms = **119.69 ms**

Limit (Maximum emission period): acc.§15.231(e)

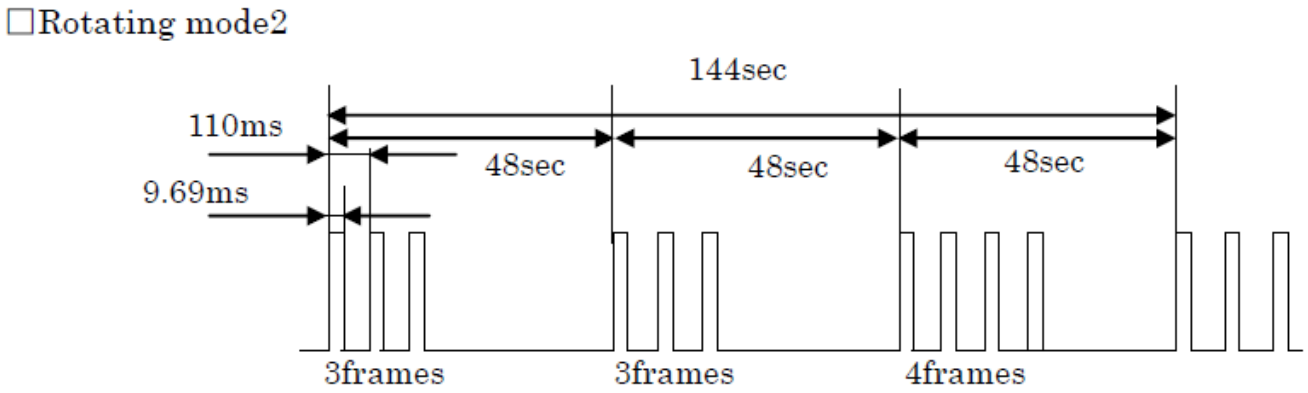
- The duration of each transmission shall not be greater than one second.

Minimum silent period: 16 s – 119.69 ms = **15.88 s**

Limit (Minimum silent period): acc.§15.231(e)

1. > 30 times of the transmission = 30 * 119.69 ms = 3.591 s (only relevant if greater than 10 s)
2. **> 10 s**

Rotating mode 2:



1 burst within 110 ms = 9.69 % correction factor: 20 log (0.0969) = 20.27 dB

3 to 4 burst within 48 s (every 110 ms) same correction factor

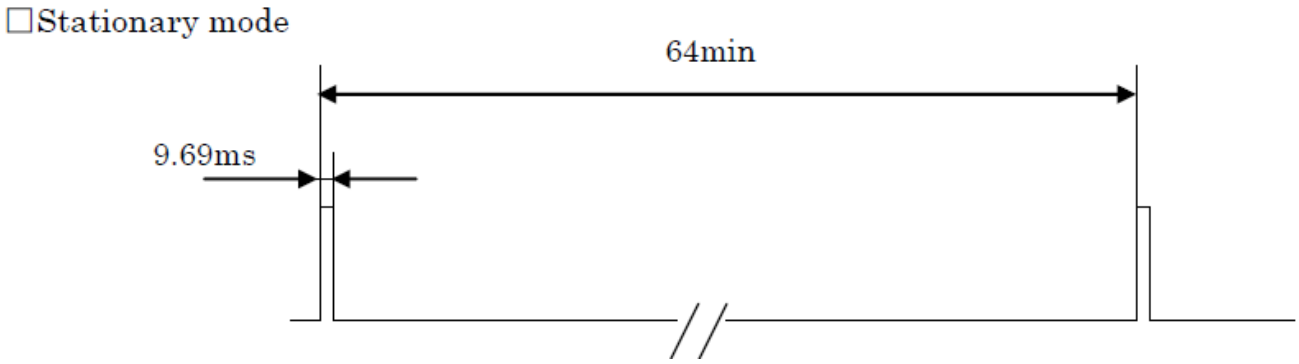
Maximum emission period: 3 x 110 ms + 9.69 ms = **339.69 ms**

Limit (Maximum emission period): acc.§15.231(e)
- The duration of each transmission shall not be greater than one second.

Minimum silent period: 48 s – 339.69 ms = **47.66 s**

Limit (Minimum silent period): acc.§15.231(e)
1. > 30 times of the transmission = 30 * 339.69 ms = 10.19 s (only relevant if greater than 10 s)
2. > 10 s

Stationary mode:



1 burst within 64 min = 9.69 % correction factor: 20 log (0.0969) = 20.27 dB

Maximum emission period: **9.69 ms**

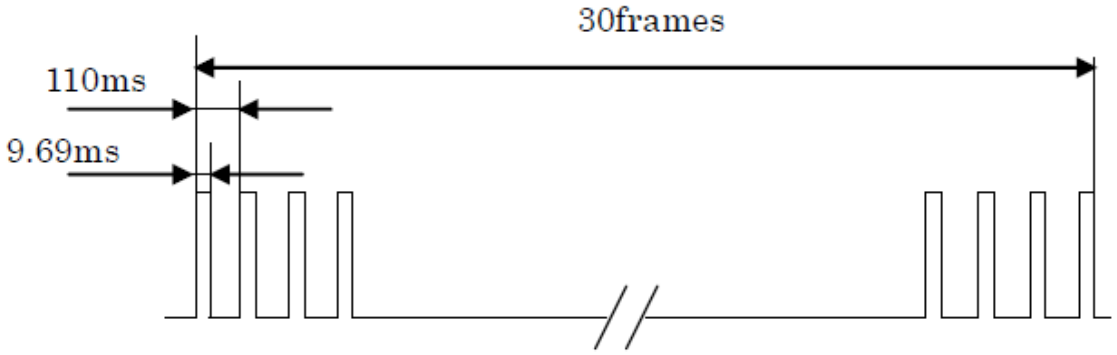
Limit (Maximum emission period): acc.§15.231(e)
- The duration of each transmission shall not be greater than one second.

Minimum silent period: 3840 s – 9.69 ms = **3839.99 s**

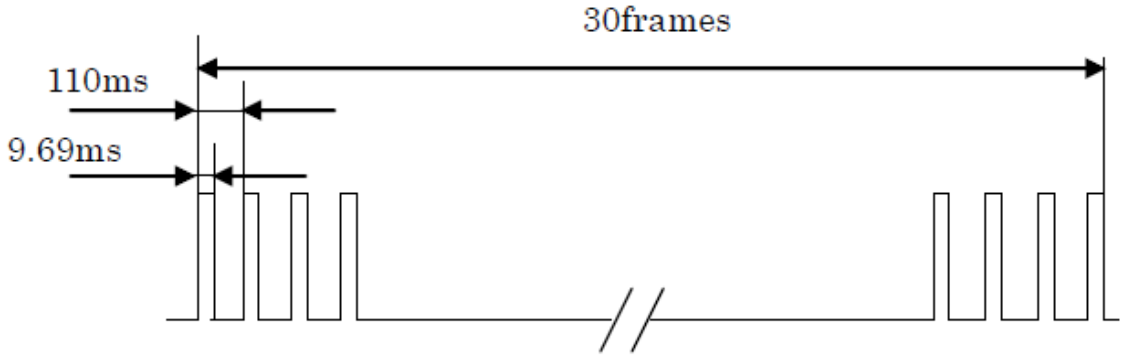
Limit (Minimum silent period): acc.§15.231(e)
1. > 30 times of the transmission = 30 * 9.69 ms = 0.2907s (only relevant if greater than 10 s)
2. > 10 s

Pressure alert and high temperature alert:

☐Pressure alert



☐High temperature alert



1 burst within 110 ms = 9.69 % correction factor: 20 log (0.0969) = 20.27 dB

Maximum emission period: 30 frames = 29 * 110 ms + 9.69 ms = **3199.69 ms**

Limit (Maximum emission period): acc.§15.231(a)(2)

- A transmitter activated automatically shall cease transmission within 5 seconds after activation.

9.2 Emission bandwidth

Measurement:

Measurement of the 99 % bandwidth of the modulated signal

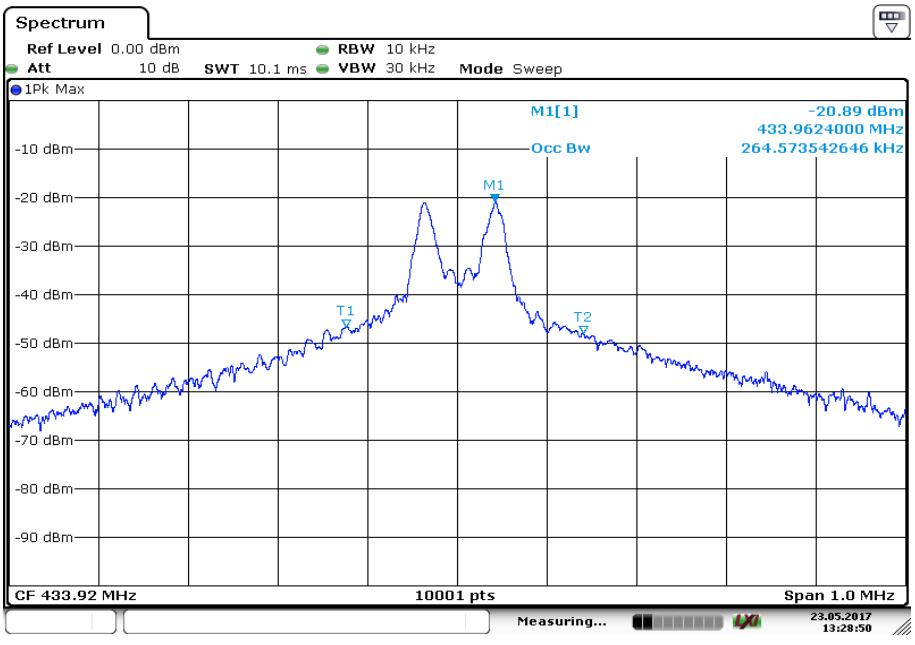
Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1 % of the span (10 kHz)
Video bandwidth:	3 x RBW (30 kHz)
Span:	1 MHz
Trace mode:	Max. hold
Test setup:	Chapter 6.3 – A

Limits:

FCC	IC
The OBW shall not be wider than 0.25% of the centre frequency.	

Result:

Plot 1: Emissions bandwidth



Date: 23.MAY.2017 13:28:50

99 % emission bandwidth: 265 kHz

9.3 Field strength of the fundamental

Measurement:

Measurement parameter	
Detector:	Peak / pulse averaging / quasi peak
Sweep time:	Auto
Resolution bandwidth:	120 kHz
Video bandwidth:	3 x RBW
Trace Mode:	Max. hold
Test setup:	Chapter 6.2 – B

Limits:

FCC		IC
Field strength of the fundamental. In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:		
Fundamental Frequency (MHz)	**Field strength of Fundamental (µV/m)**	**Measurement distance (m)**
40.66 – 40.70	1,000	3
70-130	500	3
130-174	500 to 1,500	3
174-260	1,500	3
260-470	1,500 to 5,000	3
Above 470	5,000	3
433.92	**4,398.7 [72.87 dBµV/m]**	**3**

Result:

TEST CONDITIONS		Maximum power (dBµV/m at 3 m distance)	
Frequency		MHz	MHz
Mode		Peak	Average
T_{nom}	V_{nom}	78.1	57.8
Measurement uncertainty		±3dB	

9.4 Field strength of the harmonics and spurious

Measurement:

Measurement parameter	
Detector:	Peak / average / quasi peak
Sweep time:	Auto
Resolution bandwidth:	200 Hz / 9 kHz / 120 kHz / 1 MHz
Video bandwidth:	3 x RBW
Span:	See plots
Trace mode:	Max. hold
Test setup:	Chapter 6.1 – A & 6.2 – A

Limits:

FCC		IC
Field strength of the fundamental. In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:		
Fundamental Frequency (MHz)	**Field strength of spurious (µV/m)**	**Measurement distance (m)**
40.66 – 40.70	100	3
70-130	50	3
130-174	50 to 150	3
174-260	150	3
260-470	150 to 500	3
Above 470	500	3

The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

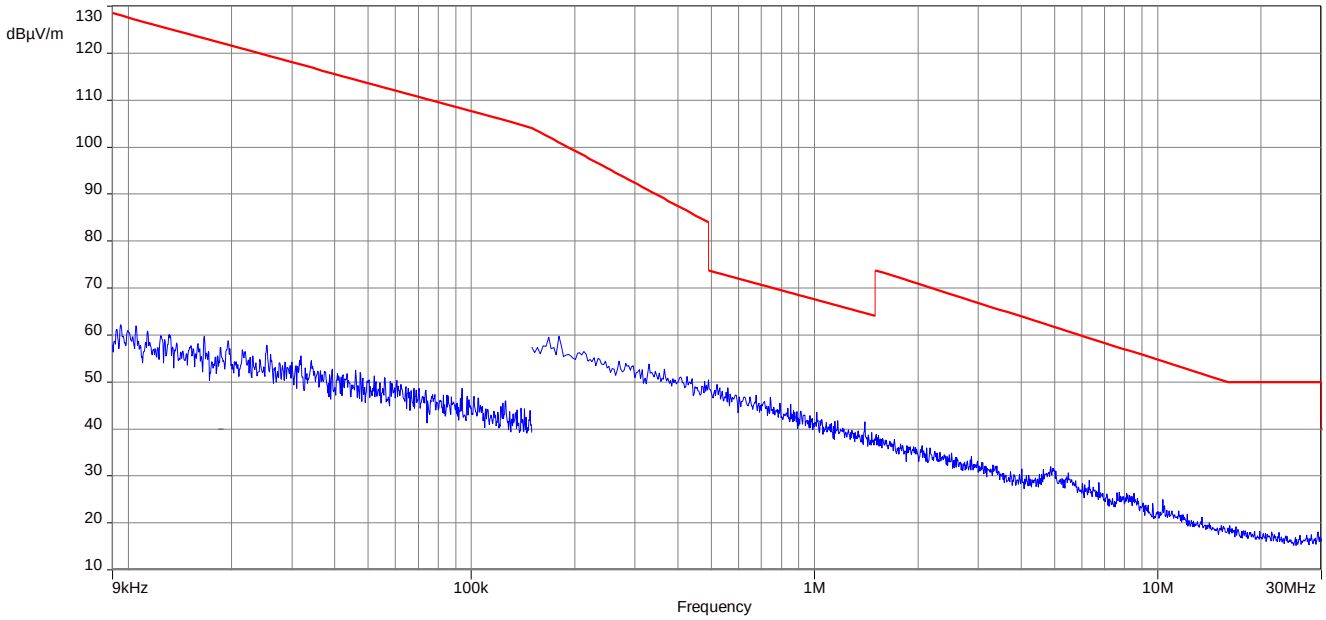
FCC		IC
Frequency (MHz)	**Field strength (µV/m)**	**Measurement distance (m)**
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
above 960	500	3

Results:

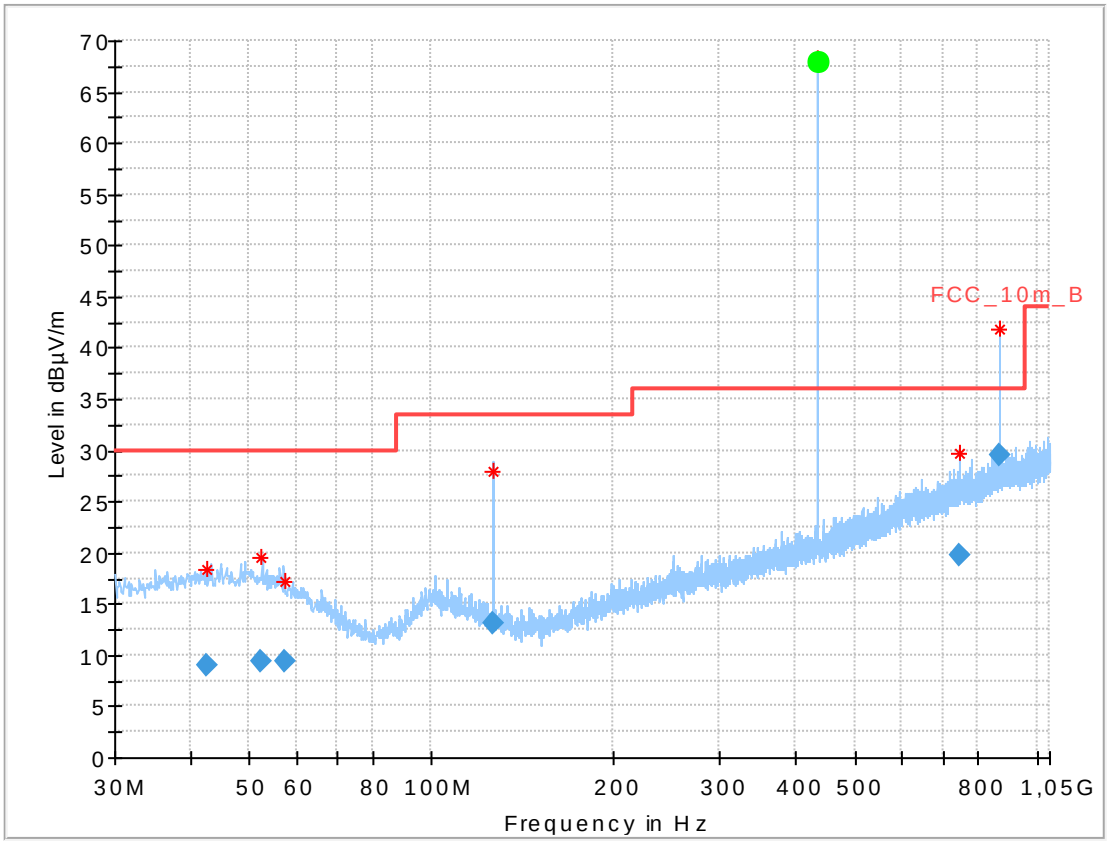
f / MHz	Detector	Amplitude of emission / dBµV/m @ 3 m
1302	Peak	60.6
	Calculated with DC correction	40.3
1518	Peak	38.5
	RMS	28.7
1736	Peak	65.9
	Calculated with DC correction	45.6
2169	Peak	48.6
	Calculated with DC correction	28.3
2604	Peak	55.8
	Calculated with DC correction	35.5
3037	Peak	59.6
	Calculated with DC correction	39.3
3472	Peak	57.0
	Calculated with DC correction	36.7
3906	Peak	63.9
	Calculated with DC correction	43.6
4340	Peak	54.8
	Calculated with DC correction	34.5
-/-	Peak	-/-
	Calculated with DC correction	-/-

Plots:

Plot 1: 9 kHz to 30 MHz



Plot 2: 30 MHz to 1000 MHz, vertical & horizontal polarisation



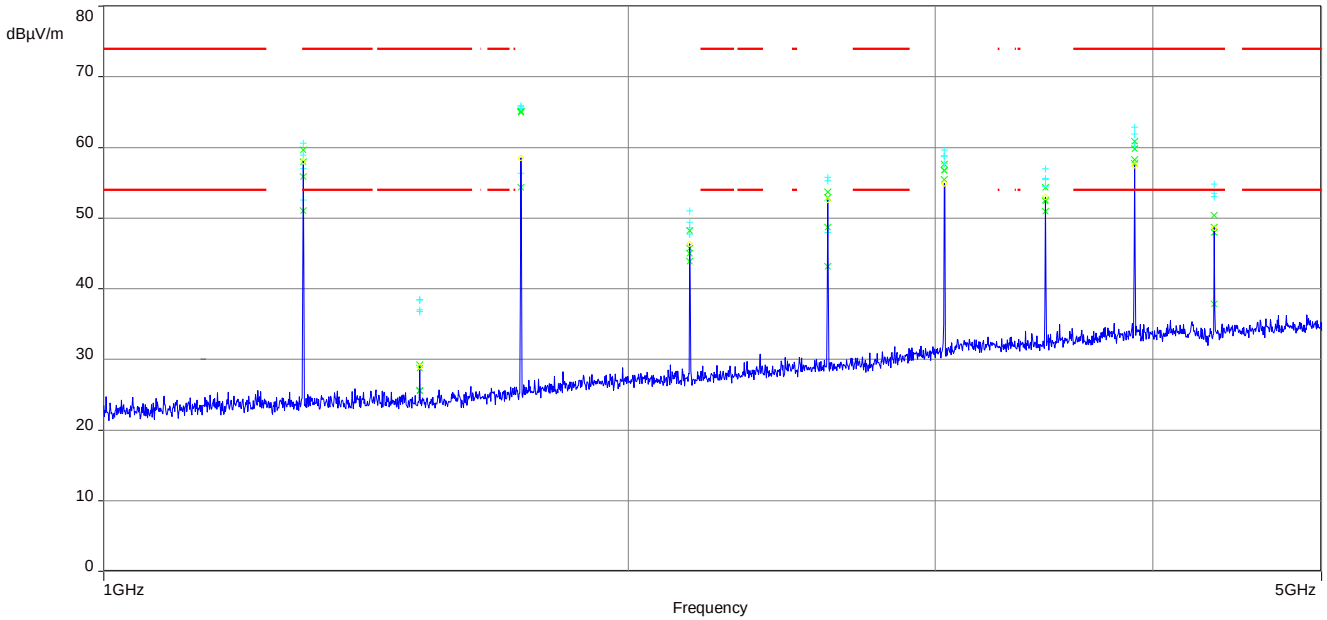
Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
42.706200	8.99	30.00	21.01	1000.0	120.000	172.0	V	50.0	13.4
52.142850	9.42	30.00	20.58	1000.0	120.000	203.0	H	143.0	13.5
57.181500	9.36	30.00	20.64	1000.0	120.000	171.0	V	30.0	12.5
126.413700	13.16	33.50	20.34	1000.0	120.000	203.0	V	105.0	9.8
746.765550	19.69	36.00	16.31	1000.0	120.000	101.0	H	258.0	22.6
868.013400	29.45	36.00	6.55	1000.0	120.000	200.0	H	167.0	23.8

Carrier_Freqency: (@10 m)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
433.963200	68.08	36.00	-32.08	1000.0	120.00	103.0	H

Plot 3: 1000 MHz to 5000 MHz, vertical & horizontal polarisation



10 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	2017-05-30

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
OBW		Occupied Bandwidth
OC		Operating Channel
OCW		Operating Channel Bandwidth
OOB		Out Of Band

Annex C Accreditation Certificate

first page

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

CTC advanced GmbH
Untertürkheimer Straße 6-10, 66117 Saarbrücken

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Funk
Mobilfunk (GSM / DCS) + OTA
Elektromagnetische Verträglichkeit (EMV)
Produktsicherheit
SAR / EMF
Umwelt
Smart Card Technology
Bluetooth®
Automotive
Wi-Fi-Services
Kanadische Anforderungen
US-Anforderungen
Akustik
Near Field Communication (NFC)

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 25.11.2016 mit der Akkreditierungsnummer D-PL-12076-01 und ist gültig bis 17.01.2018. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 63 Seiten.

Registrierungsnummer der Urkunde: **D-PL-12076-01-01**

Frankfurt, 25.11.2016

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

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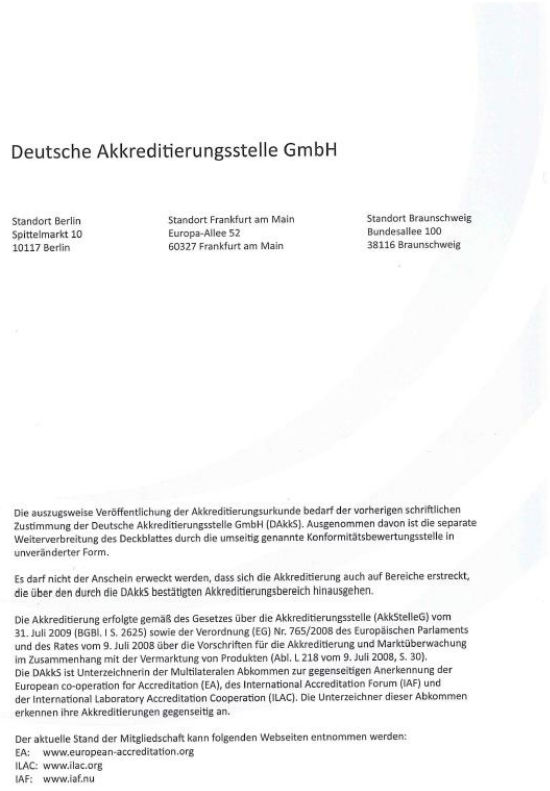

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Note:
The current certificate including annex can be received on request.