

EMI - TEST REPORT

- FCC Part 15.249, RSS210 -

Type / Model Name : B6R-H9T5P (Handset unit)

Product Description : Handset unit for gas burning appliances (room heaters)

Applicant : Plättner Elektronik GmbH

Address : Lerchenbreite 8

38889 BLANKENBURG, GERMANY

Manufacturer : Mertik Maxitrol GmbH & Co.KG

Address : Warnstedter Str.3

06502 THALE, GERMANY

Licence holder : Mertik Maxitrol GmbH & Co.KG

Address : Warnstedter Str.3

06502 THALE, GERMANY

Test Result according to the standards listed in clause 1 test standards:

POSITIVE

Test Report No. : **T40604-00-03KJ**

26. July 2016

Date of issue



Deutsche
Akkreditierungsstelle
D-PL-12030-01-01
D-PL-12030-01-02

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.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15, Subpart A - General (September, 2015)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15, Subpart C - Intentional Radiators (September, 2015)

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 15.209	Radiated emission limits, general requirements
Part 15, Subpart C, Section 15.249	Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz

IC Radio Standards Specifications (RSS)

RSS-210 Issue 8, December 2010 Standards	Spectrum Management and Telecommunications Radio Specifications - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
RSS-Gen Issue 4, November 2014 Standards	Spectrum Management and Telecommunications Radio Specifications - General Requirements and Information for the Certification of Radio Apparatus
ANSI C63.4: 2014	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	Testing Unlicensed Wireless Devices
ANSI C95.1:2005	IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
CISPR 16-4-2: 2013	Uncertainty in EMC measurement
CISPR 22: 2008 EN 55022: 2010	Information technology equipment

2 EQUIPMENT UNDER TEST

2.1 Photo documentation of the EUT – Detailed photos see attachment A



2.2 Short description of the equipment under test (EUT)

The EUT is an electronic remote ignition and control system for gas appliances with pilot burners and ODS system.

Number of tested samples: 1
Serial number: see photo documentation

2.3 EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- cont. TX modulated at 915.0 MHz

- receive mode at 915.0 MHz

2.4 Variants of the EUT

There are no other variants.

2.5 Operation frequency and channel plan

The operating frequency band is 902 MHz to 928 MHz.

The EUT is a one-channel transceiver and operates at 915.0 MHz.

2.6 Transmit operating modes

The EUT uses 2-FSK modulation and provide following data rate:

32 kbps (kbps = *kilobits per second*)

2.7 Antenna

The following antennas shall be used with the EUT:

Number	Characteristic	Model number	Plug	Frequency range (GHz)	Gain (dBi)	Cable loss (dB)	Effective gain (dBi)
1	PCB antenna	-	-	915	-	-	-

2.8 Power supply system utilised

Power supply voltage, V_{nom} : 3 V DC (Battery powered 2x 1.5 V AAA batteries)

2.9 Peripheral devices and interface cables

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

- _____ Model : _____
- _____ Model : _____
- _____ Model : _____

2.10 Determination of worst case conditions for final measurement

Measurements have been made in all three orthogonal axes and the settings of the EUT were changed 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 Z position (EuT in vertical position, small site).

2.11 Test jig

No test jig was used.

2.12 Test software

No special test software was used.

3 TEST RESULT SUMMERY

Operating in the 902 MHz – 928 MHz band:

FCC Rule Part	RSS Rule Part	Description	Result
15.207(a)	RSS-Gen, 8.8	AC power line conducted emissions	not applicable
15.249(a)	RSS-210, A2.9(a)	Field strength of fundamental	passed
15.249(d)	RSS-210, A2.9(a)(b) RSS-Gen, 8.9	Out-of-band emission, radiated	passed
15.35(c)	RSS-Gen, 6.10	Correction for pulse operation	passed
15.215(c)	-	20 dB bandwidth	passed
	RSS-Gen, 6.6	Occupied bandwidth	passed

3.1 Final assessment

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

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

Testing commenced on : 12. January 2016

Testing concluded on : 26. April 2016

Checked by:

Tested by:

Klaus Gegenfurtner
Dipl. Ing.(FH)
Manager: Radio Group

Jürgen Pessinger

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

**CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
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 acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. 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 uncertainty	
Test	Uncertainty
Conducted emissions mains	± 3.1 dB
Power spectral density	± 2.7 dB
bandwidth measurement	± 100 kHz (depends on the used RBW)
Maximum output power	± 1.0 dB
Spurious emissions radiated below 30 MHz	± 3 dB
Spurious emissions radiated 30 MHz to 1 GHz	± 4.4 dB
Spurious emissions radiated 1 GHz to 12.75 GHz	± 3.7 dB
Spurious emissions radiated above 12.75 GHz	± 5.0 dB

4.4 Measurement protocol for FCC and IC

4.4.1 General information

4.4.1.1 Test methodology

Conducted and radiated disturbance testing is performed according to the procedures set out by the International Special Committee on Radio Interference (CISPR) Publication 22, European Standard EN 55022 as shown under section 1 of this report.

The Open Area test site is a listed Open Site under the Canadian Test-Sites File-No:

IC 3009A-01

The anechoic chamber site is a listed chamber under the Canadian Test-Sites File-No:

IC 3009A-02

In compliance with RSS 210 testing for RSS compliance may be achieved by following the procedures set out in ANSI C63.10 and applying the CISPR 22 limits.

4.4.1.2 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.4.1.3 Details of test procedures

The test methods used comply with CISPR Publication 22, EN 55022 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement" and with ANSI C63.4 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.10 and applying the CISPR 22 limits.

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: NONE

5.1.2 Test result

Remarks: Not applicable, because the device is only battery powered.

5.2 Field strength of fundamental

For test instruments and accessories used see section 6 Part CPR 2.

5.2.1 Description of the test location

Test location: OATS 1

Test distance: 3 m

5.2.2 Photo documentation of the test set-up



5.2.3 Applicable standard

According to FCC Part 15C, Section 15.249(a) and RSS-210, A2.9(a):

5.2.4 Test result

Instrument settings:

30 MHz – 1000 MHz: RBW: 120 kHz

Frequency [MHz]	PK reading [dB μ V]	QP reading [dB μ V]	Duty cycle corr. [dB]	Ant. & Cable corr. [dB]	PK level [dB μ V/m]	QP level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
915.0	62.6	62.2	0.0	31.3	93.9	93.5	94.0	-0.5

Note: The correction factor includes cable loss and antenna factor.

Quasi-Peaki-Limit according to FCC Part 15C, Section 15.249(a) and RSS-210, A2.9(a):

Frequency (MHz)	Field strength of fundamental	
	(mV/m)	dB(μ V/m)
902 - 928	50	94
2400 - 2483.5	50	94
5725-5875	50	94
24000 - 24250	250	108

The requirements are **FULFILLED**.

Remarks:

5.3 Out-of-band emission, radiated

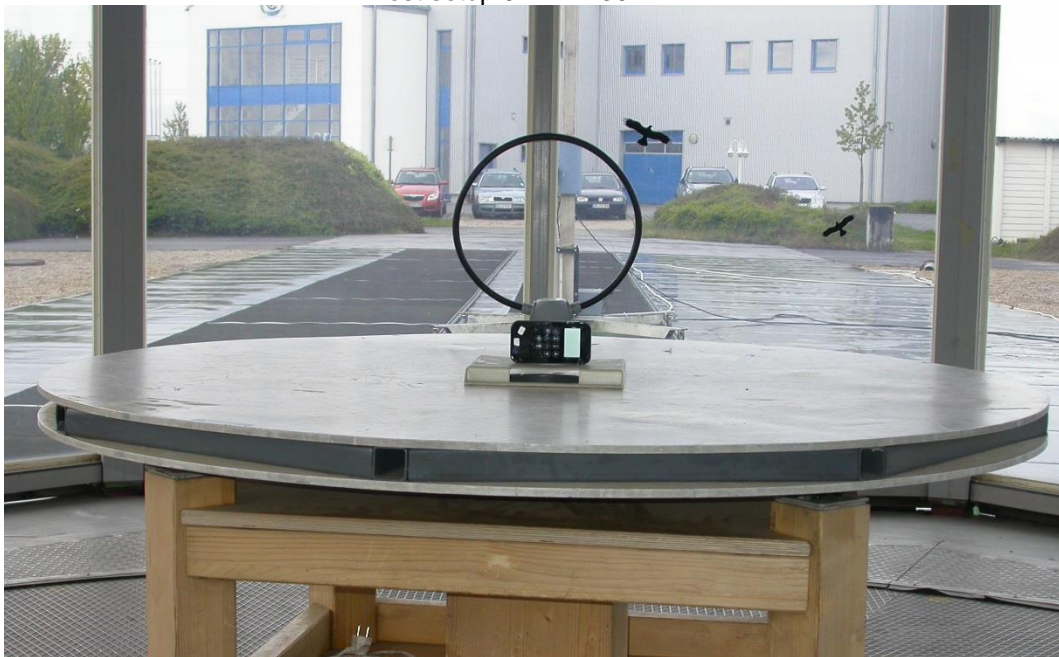
For test instruments and accessories used see section 6 Part SER1, SER 2, SER 3.

5.3.1 Description of the test location

Test location: OATS 1
Test location: Anechoic chamber 1
Test distance: 3 m

5.3.2 Photo documentation of the test set-up

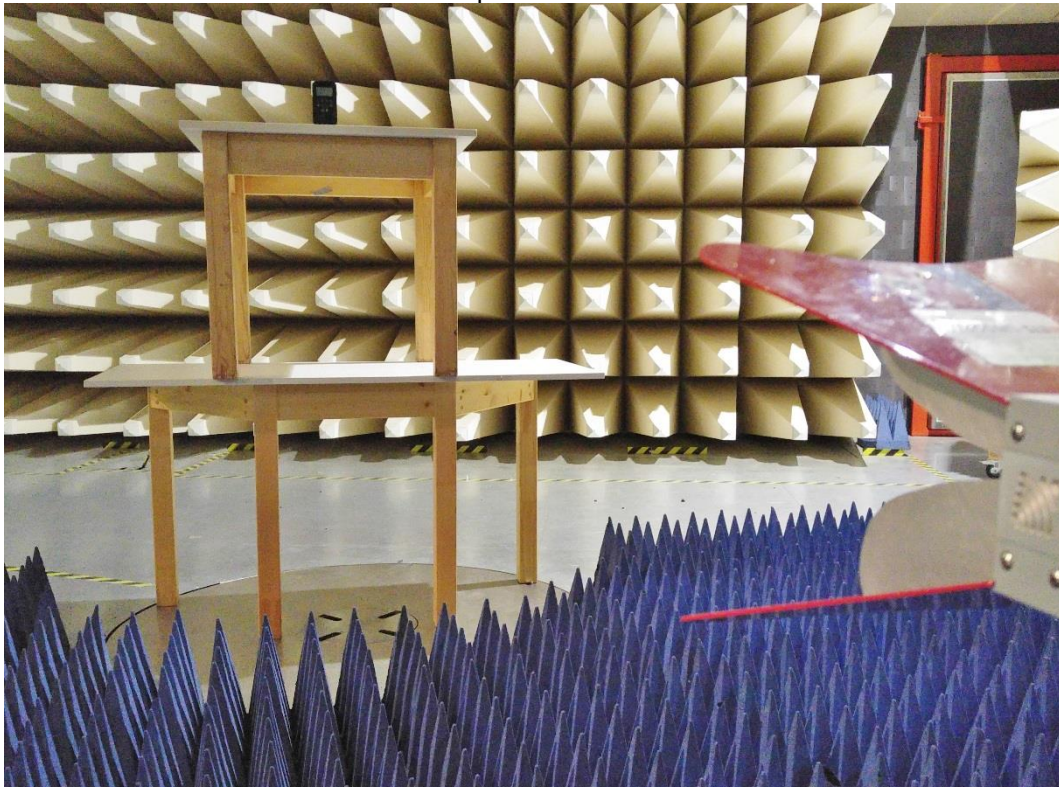
Test setup 9 kHz – 30 MHz:



Test setup 30 MHz – 1000 MHz:



Test setup 1 GHz – 18 GHz:



5.3.3 Applicable standard

According to FCC Part 15C, Section 15.249 (d) and RSS-210, A2.9 (a) (b) and RSS Gen, 8.9:

5.3.4 Test result $f < 1$ GHz

Instrument settings:

9 kHz – 150 kHz	RBW: 200 Hz
150 kHz - 30 MHz	RBW: 9 kHz
30 MHz – 1000 MHz:	RBW: 120 kHz
1000 MHz – 40 GHz	RBW: 1 MHz

Frequency [MHz]	PK reading [dB μ V]	QP reading [dB μ V]	Duty cycle corr. [dB]	Ant. factor [dB]	Distance corr. [dB]	corr. AV level [dB μ V/m]	QP level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
0.1*	42.0	38.0	0.0	20.0	-80.0	-18.0	-22.0	24.0	-42.0
1.5*	18.5	15.8	0.0	20.0	-40.0	-1.5	-4.2	16.0	-20.2
5.0*	20.7	19.7	0.0	20.0	-40.0	0.7	-0.3	30.0	-30.3
15.0*	21.8	18.7	0.0	20.0	-40.0	1.8	-1.3	30.0	-31.3
25.0*	19.8	19.0	0.0	20.0	-40.0	-0.2	-1.0	30.0	-31.0

Frequency [MHz]	PK reading [dB μ V]	QP reading [dB μ V]	Duty cycle corr. [dB]	Ant. & Cable corr. [dB]	PK level [dB μ V/m]	QP level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
150.0*	0.2	--	0.0	13.9	14.1	--	43.5	-29.4
300.0*	-1.6	--	0.0	16.9	15.3	--	46.0	-30.7
450.0*	-1.9	--	0.0	21.2	19.3	--	46.0	-26.7
600.0*	-2.0	--	0.0	25.5	23.5	--	46.0	-22.5
750.0*	-1.3	--	0.0	28.3	27.0	--	46.0	-19.0
900.0*	-0.4	--	0.0	31.1	30.7	--	46.0	-15.3

*) Only ambient noises could be detected.

5.3.5 Test result f > 1 GHz

Frequency [MHz]	PK reading [dB μ V]	AV reading [dB μ V]	Duty cycle corr. [dB]	Ant. & Cable corr. [dB]	calculated AV level [dB μ V/m]	PK level [dB μ V/m]	AV limit [dB μ V/m]	PK limit [dB μ V/m]	Delta [dB]
1198.8	61.2	--	-13.0	-19.5	28.7	41.7	54.0	74.0	-25.3
1830.3	62.6	--	-13.0	-17.3	32.3	45.3	54.0	74.0	-21.7
2745.3	55.6	--	-13.0	-13.2	29.4	42.4	54.0	74.0	-24.6
3660.3	54.8	--	-13.0	-12.9	28.9	41.9	54.0	74.0	-25.1
4574.0	45.9	--	-13.0	2.0	34.9	47.9	54.0	74.0	-19.1
5490.0	49.7	--	-13.0	4.3	41.0	54.0	54.0	74.0	-13.0
6404.0	42.2	--	-13.0	6.4	35.6	48.6	54.0	74.0	-18.4
7320.0	40.9	--	-13.0	7.0	34.9	47.9	54.0	74.0	-19.1

Limit according to FCC Part 15C, Section 15.209 and RSS Gen, 8.9::

Frequency (MHz)	Limits (μ V/m)	Limits dB(μ V/m)	Measurement distance (m)
0.009 - -0.49	2400/F(kHz)	--	300
0.49 - 1.705	24000/F (kHz)	--	30
1.705 - 30.0	30	30	30

FCC ID: RTD-B6RH9P IC: 4943A-B6RH9P

Average limit according to FCC Part 15C, Section 15.249(a) and RSS-210, A2.9(a)::

Fundamental frequency (MHz)	Field strength of harmonics	
	($\mu\text{V}/\text{m}$)	dB($\mu\text{V}/\text{m}$)
902 - 928	500	54
2400 - 2483.5	500	54
5725-5875	500	54
24000 - 24250	2500	68

Peak-Limit according to FCC Subpart 15.249(a), Subpart 15.249(e) and RSS Gen, 8.1:

Frequency (MHz)	Fieldstrength of harmonics	
	($\mu\text{V}/\text{m}$)	dB ($\mu\text{V}/\text{m}$)
902-928	5000	74
2400-2483.5	5000	74
5725-5875	5000	74

Average-Limit according to FCC Subpart 15.249(d) and RSS-210, A2.9(b) for spurious emissions outside of the specified frequency band:

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency [MHz]	50dB below of the fundamental [dB $\mu\text{V}/\text{m}$]	15.209 Limits [dB $\mu\text{V}/\text{m}$]	General Radiated Limits [dB $\mu\text{V}/\text{m}$]
30-88	42.6	40	40
88-216	42.6	43.5	43.5
216-960	42.6	46	46
Above 960	42.6	54	54

The requirements are **FULFILLED**.

Remarks: The measurement was performed up to the 10th harmonic (10.0 GHz).

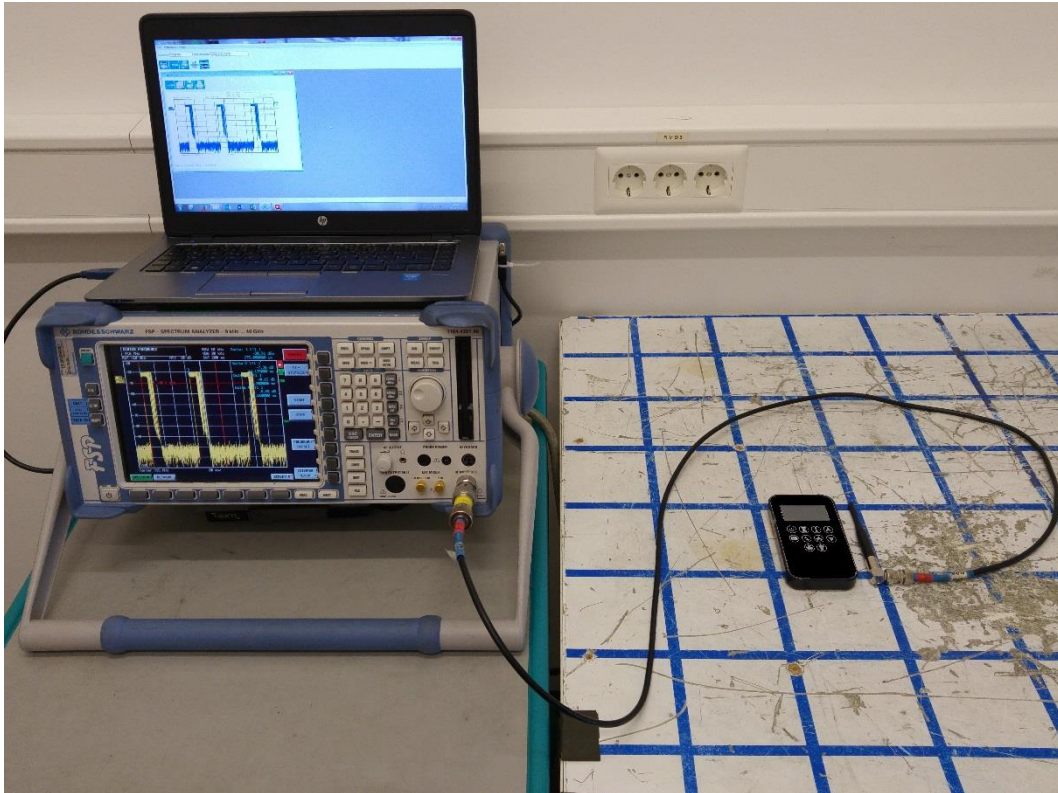
5.4 Correction for pulse operation (duty cycle)

For test instruments and accessories used see section 6 Part DC.

5.4.1 Description of the test location

Test location: Shielded Room S6

5.4.2 Photo documentation of the test set-up



5.4.3 Applicable standard

According to FCC Part 15A, Section 15.35(c) and RSS-Gen, 6.10:

5.4.4 Description of Measurement

The duty cycle factor (dB) is calculated applying the following formula:

$$K_E = 20 \log \frac{T_{ON}}{T_{PT}}$$

$$-13.0dB = 20 \log \frac{14.3ms}{64.2ms}$$

K_E : pulse operation correction factor (dB)
 T_{ON} complete on time (ms)
 T_{PT} complete pulse train (ms)

5.4.5 Test result

Instrument settings:

RBW: 10 kHz
 Sweep time: manual

VBW: 30 kHz
 Detector: Max. peak

Span: zero span
 Trace Mode: single sweep

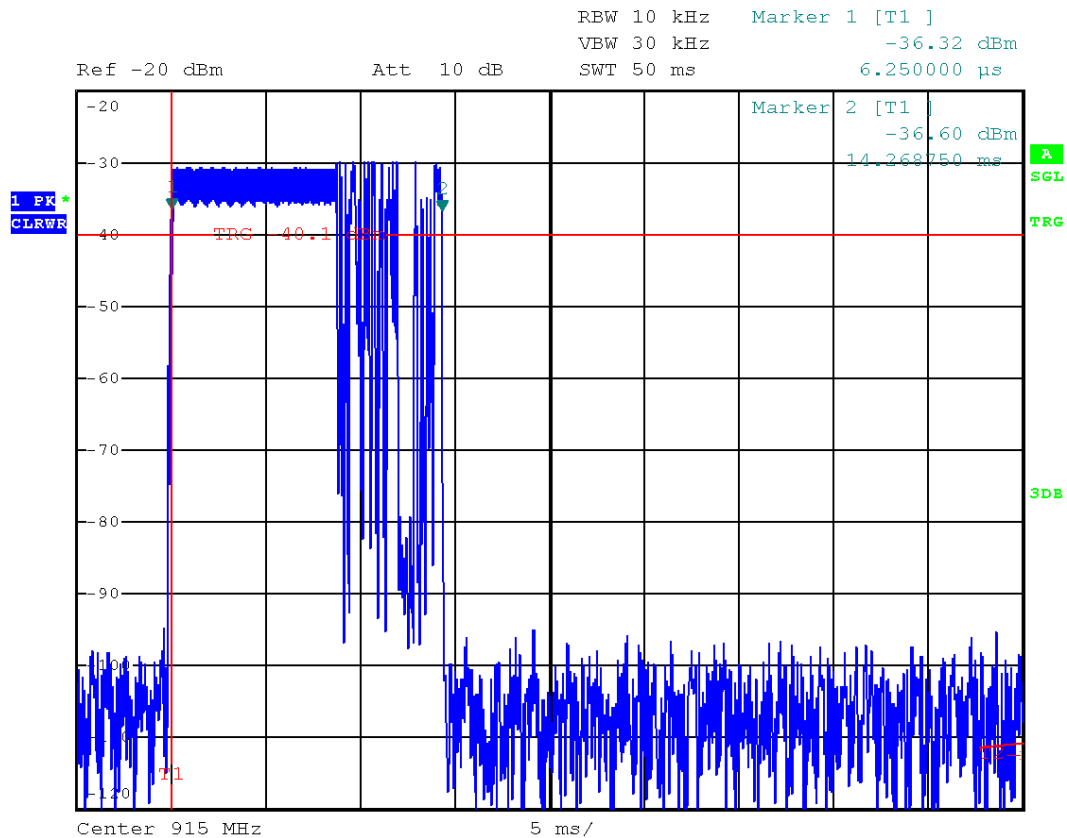
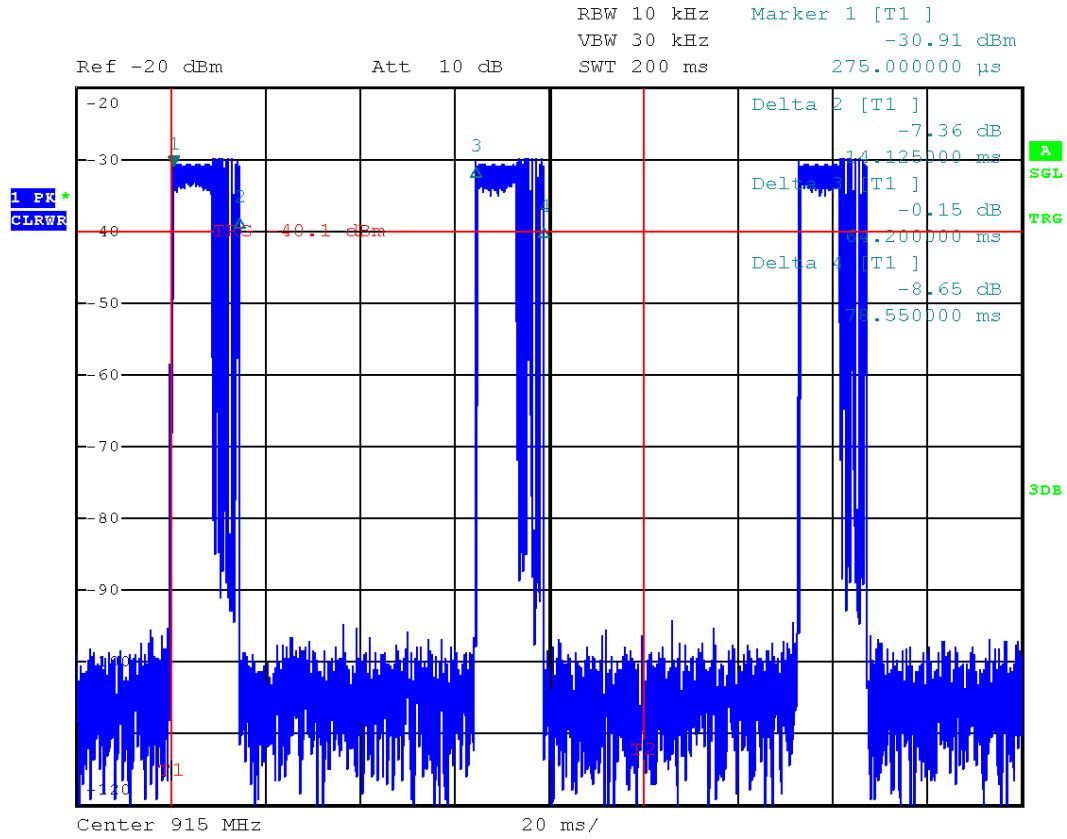
T_{ON} (ms)	T_{PT} (ms)	K_E (dB)
14.3	64.2	-13.0

The requirements are **FULFILLED**.

Remarks: For detailed results, please see the test protocol below.

5.4.6 Test protocol

Correction for pulse operation (duty cycle)
FCC Part 15C, Section 15.35(c) and RSS-Gen, 6.10



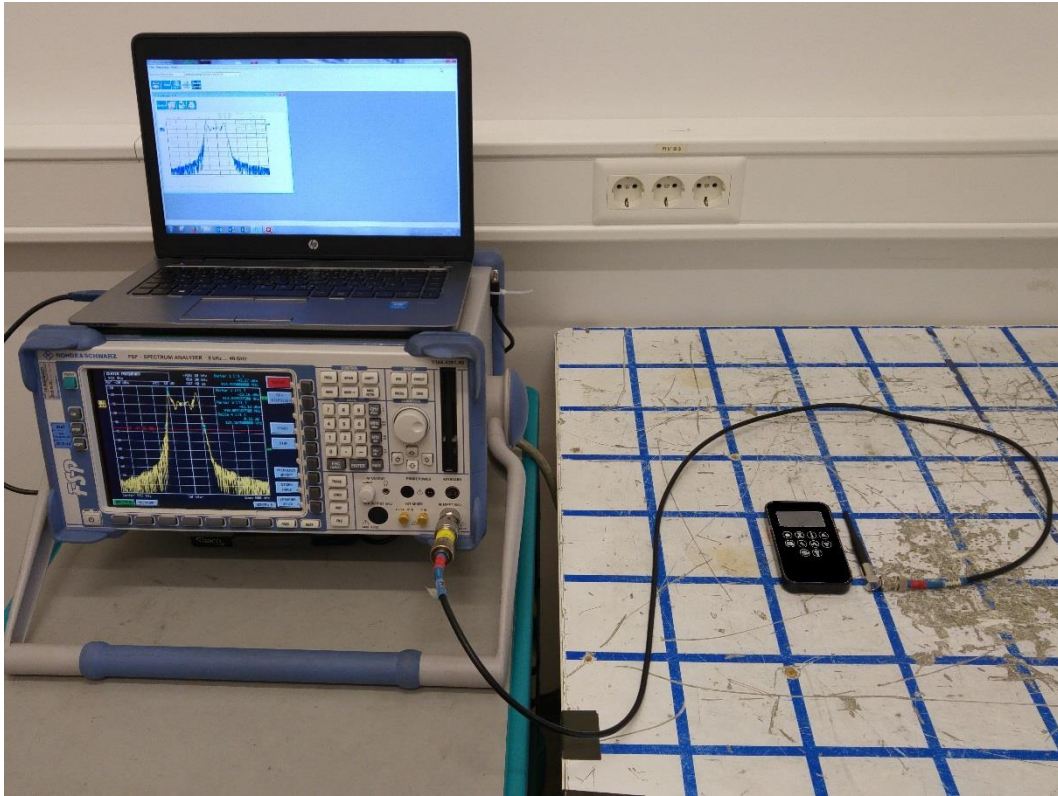
5.5 20 dB bandwidth

For test instruments and accessories used see section 6 Part MB.

5.5.1 Description of the test location

Test location: Shielded Room S6

5.5.2 Photo documentation of the test set-up



5.5.3 Applicable standard

According to FCC Part 15, Section 15.215(c):

5.5.4 Test resultInstrument settings:

RBW: 10 kHz

VBW: 30 kHz

Span: 500 kHz

Sweep time: 40 ms

Detector: Max. peak

Trace Mode: max. hold

Fundamental Frequency [MHz]	20dB Bandwidth F1 [MHz]	20dB Bandwidth F2 [MHz]	Measured Bandwidth [MHz]
915.0	914.9280	915.0572	0.1292

The requirements are **FULFILLED**.**Remarks:** For detailed test result please refer to following test protocols.

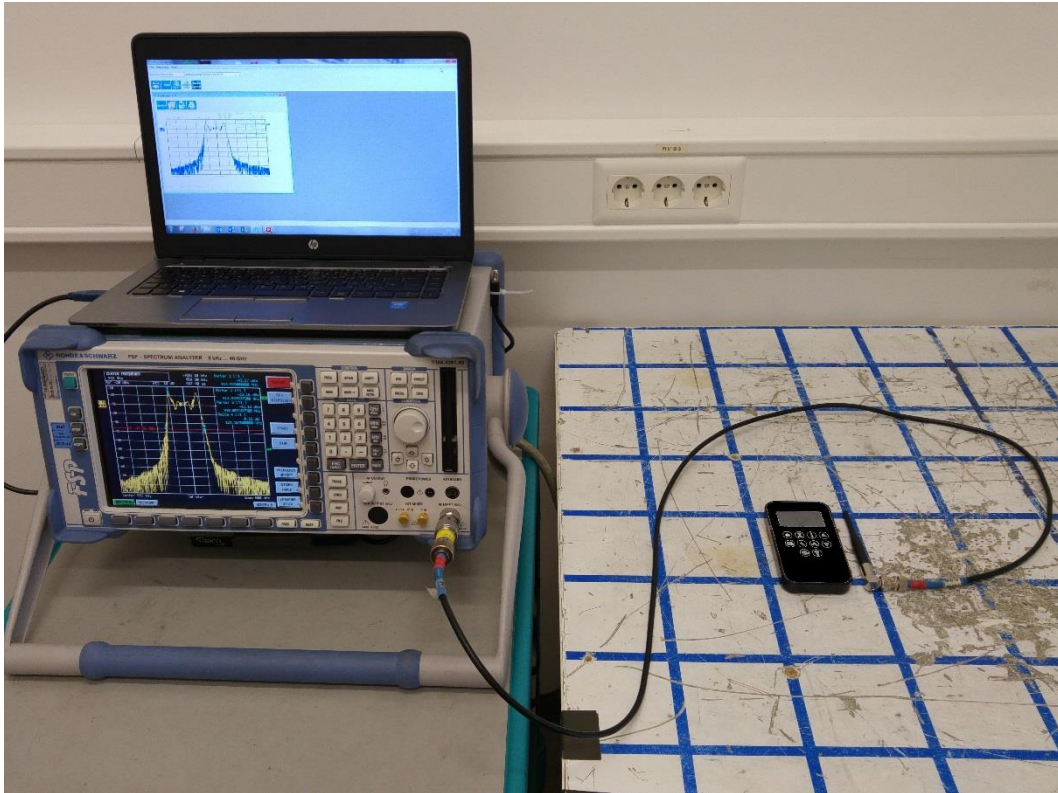
5.6 Occupied bandwidth

For test instruments and accessories used see section 6 Part MB.

5.6.1 Description of the test location

Test location: Shielded Room S6

5.6.2 Photo documentation of the test set-up



5.6.3 Applicable standard

According to RSS-Gen, 6.6

5.6.4 Test resultInstrument settings:

RBW: 10 kHz

VBW: 30 kHz

Span: 500 kHz

Sweep time: 40 ms

Detector: Max. peak

Trace Mode: max. hold

Fundamental Frequency [MHz]	99% Bandwidth F1 [MHz]	99% Bandwidth F2 [MHz]	Measured bandwidth [MHz]
915.0	914.9376	915.0508	0.1132

The requirements are **FULFILLED**.**Remarks:** For detailed results, please see the test protocol below.The Rhode & Schwarz analyzer which we used for this measurement calculates automaticallythe 99 % emission bandwidth.

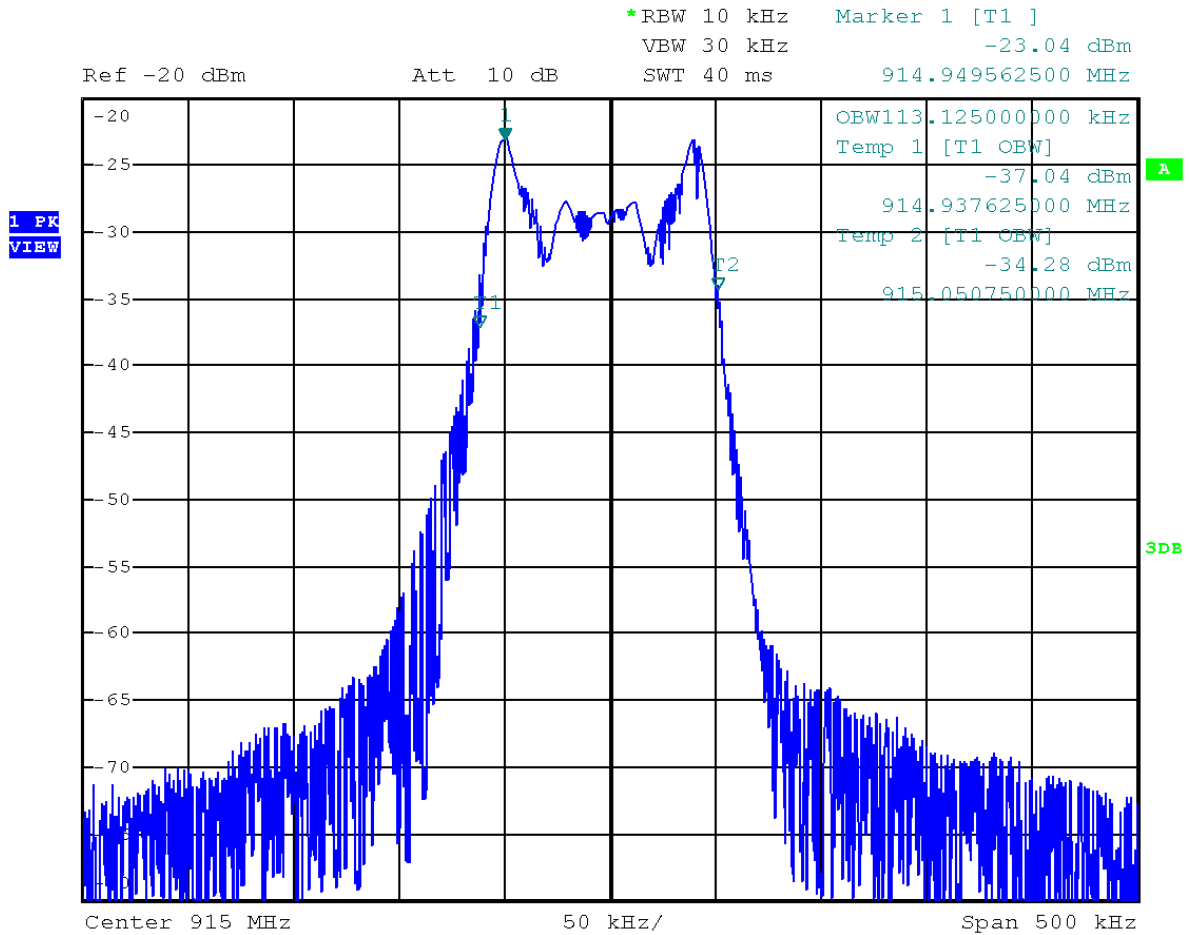
5.6.5 Test protocol

Emission bandwidth

RSS 210 Annex 1, section A1.1.3

The 99 % emission bandwidth was automatically calculated by the used Rhode & Schwarz analyzer.

99% bandwidth CH1, 915.0 MHz:



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.
CPR 2	ESVS 30	02-02/03-05-003	09/07/2016	09/07/2015		
	VULB 9168	02-02/24-05-005	20/04/2017	20/04/2016	20/10/2016	20/04/2016
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
DC	FSP 40	02-02/11-11-001	28/10/2016	28/10/2015		
	RF Antenna	02-02/24-05-032				
MB	FSP 40	02-02/11-11-001	28/10/2016	28/10/2015		
	RF Antenna	02-02/24-05-032				
SER 1	ESCI	02-02/03-05-004	17/09/2016	17/09/2015		
	HFH 2 - Z 2	02-02/24-05-020	26/08/2017	26/08/2014	21/01/2017	21/01/2016
	KK-EF393-21N-16	02-02/50-05-033				
	NW-2000-NB	02-02/50-05-113				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
SER 2	ESVS 30	02-02/03-05-003	09/07/2016	09/07/2015		
	VULB 9168	02-02/24-05-005	20/04/2017	20/04/2016	20/10/2016	20/04/2016
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
	KK-SD_7/8-2X21N-33,0M	02-02/50-15-028				
SER 3	FSP 40	02-02/11-11-001	28/10/2016	28/10/2015		
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	AFS4-01000400-10-10P-4	02-02/17-13-002				
	AMF-4F-04001200-15-10P	02-02/17-13-003				
	3117	02-02/24-05-009	12/05/2016	12/05/2015		
	WHJS 1000-10EE	02-02/50-05-070				
	Sucoflex N-2000-SMA	02-02/50-05-075				
	SF104/11N/11N/1500MM	02-02/50-13-015				