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October 12, 2015

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## Prüfbericht / Test Report

Nr. / No. 20820838-50305-07 (Edition 6)

Applicant: Bartec GmbH  
Type of equipment: UHF Reader INTERNAL with external antenna  
Type designation: MC92N0ex RFID-UHF INTERNAL with external antenna  
Order No.: 100-6381640  
Test standards: FCC Code of Federal Regulations,  
CFR 47, Part 15,  
Sections 15.205, 15.207, 15.215 and 15.247

### **Note:**

The test data of this report is related only to the individual item which has been tested. This report shall not be reproduced except in full extent without the written approval of the testing laboratory.



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## 1 Description of the Equipment Under Test (EUT)

General data of EUT	
Type designation <sup>1</sup> :	UHF Reader INTERNAL with external antenna
Version:	--
Serial number(s):	1403600500718
Manufacturer:	Bartec GmbH
Type of equipment:	MC92N0ex RFID-UHF INTERNAL with external antenna
Version:	As received
FCC ID:	TBUUHFG3
Additional parts/accessories:	Accumulator: BARTEC – Type: 17-A1Z0-0002 Charging cradle: SYMBOL TECHNOLOGIES INC. – Part: CRD9000-1001SR, Model: CRD9000-1000, S/N: 12153000500777 Power supply: HIPRO – P/N: PWRS-14000-148R Rev. C, Model: HP-A0502R3D, S/N: F33351234012660

<sup>1</sup> Type designation of the system if EUT consists of more than one part.

**Technical data of EUT**

Application frequency range: N/A  
 Frequency range: 902 – 928 MHz  
 Operating frequency: 902.75 - 927.25 MHz  
 Type of modulation: PR-ASK  
 Number of RF-channels: 50  
 Channel spacing:

Pseudo-random List

Channel No.	Center Frequency	Channel No.	Center Frequency	Channel No.	Center Frequency
1	914,75 MHz	18	917,75 MHz	35	921,75 MHz
2	920,25 MHz	19	907,75 MHz	36	926,75 MHz
3	925,75 MHz	20	902,75 MHz	37	915,75 MHz
4	909,25 MHz	21	914,25 MHz	38	911,25 MHz
5	920,75 MHz	22	924,25 MHz	39	904,75 MHz
6	907,25 MHz	23	919,25 MHz	40	915,25 MHz
7	922,25 MHz	24	908,25 MHz	41	905,75 MHz
8	927,25 MHz	25	903,25 MHz	42	921,25 MHz
9	919,75 MHz	26	910,25 MHz	43	926,25 MHz
10	906,25 MHz	27	916,75 MHz	44	918,75 MHz
11	911,75 MHz	28	924,75 MHz	45	912,75 MHz
12	903,75 MHz	29	918,25 MHz	46	923,75 MHz
13	909,75 MHz	30	923,25 MHz	47	905,25 MHz
14	917,25 MHz	31	916,25 MHz	48	913,25 MHz
15	925,25 MHz	32	910,75 MHz	49	922,75 MHz
16	912,25 MHz	33	904,25 MHz	50	908,75 MHz
17	906,75 MHz	34	913,75 MHz		

Designation of emissions<sup>2</sup>: 40K0A1D

Type of antenna: Integrated  
 Size/length of antenna: N/A  
 Connection of antenna:  detachable       not detachable

Type of power supply: DC supply  
 Specifications for power supply:  
 nominal voltage: 7.4 V  
 minimum voltage: 7.4 V  
 maximum voltage: 8.4 V  
 nominal frequency: DC Hz

<sup>2</sup> Also known as "Class of Emission".



Type of power supply of cradle:	AC supply
Specifications for power supply of the cradle:	nominal voltage: 115 V V
	minimum voltage: -- V
	maximum voltage: -- V
	nominal frequency: AC 50/60Hz



## 2 Administrative Data

### Application details

Applicant (full address):	Bartec GmbH Max-Eyth-Str. 16 97980 Bad Mergentheim - Germany
Contact person:	Ralph Lanig
Order number:	100-6381640
Receipt of EUT:	November 17, 2014
Date(s) of test:	January 7 to 9, 2015; September 22, 2015
Note(s):	--

### Report details

Report number:	20820838-50305-07
Edition:	6
Issue date:	October 12, 2015



### 3 Identification of the Test Laboratory

#### Details of the Test Laboratory

Company name:	TÜV SÜD Product Service GmbH
Address:	Aeussere Fruehlingstrasse 45 D-94315 Straubing Germany
Laboratory accreditation:	DAR-Registration No. D-PL-11321-11-01
FCC test site registration number	90926
Industry Canada test site registration:	3050A-2
Contact person:	Mr. Johann Roidt
	Phone: +49 9421 5522-0 Fax: +49 9421 5522-99

## 4 Summary

### Summary of test results

The tested sample complies with the requirements set forth in the

**Code of Federal Regulations CFR 47, Part 15, Sections 15.107, 15.109, 15.205, 15.207, 15.215, 15.247  
and 2.1093**

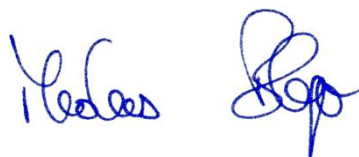
of the Federal Communication Commission (FCC).

### Personnel involved in this report

Laboratory Manager:



Mr. Johann Roidt



Responsible for testing:

Mr. Markus Biberger

Responsible for test report:

Mr. Markus Biberger





## 5 Operation Mode and Configuration of EUT

### Operation Mode(s)

- 1 Transmit on 902.75 MHz
- 2 Transmit on 915.25 MHz
- 3 Transmit on 927.25 MHz
- 4 Transmit on all channels (hopping enabled)
- 5 Charging mode (RFID reader switched off automatically by operating system)

### Configuration(s) of EUT

EUT is voltage supplied via accumulator, operation will be done by test software supplied by applicant

### List of ports and cables

<i>Port</i>	<i>Description</i>	<i>Classification<sup>3</sup></i>	<i>Cable type</i>	<i>Cable length</i>
--		--	--	--

### List of devices connected to EUT

<i>Item</i>	<i>Description</i>	<i>Type Designation</i>	<i>Serial no. or ID</i>	<i>Manufacturer</i>
1	Transponder 902 MHz	Unique	N/A	--

### List of support devices

<i>Item</i>	<i>Description</i>	<i>Type Designation</i>	<i>Serial no. or ID</i>	<i>Manufacturer</i>
1	Cradle Dock	CRD9000-1001SR	12153000500777	Symbol Technologies
2	AC Adapter	PWRS-14000-148R	F33351234012660	HIPRO

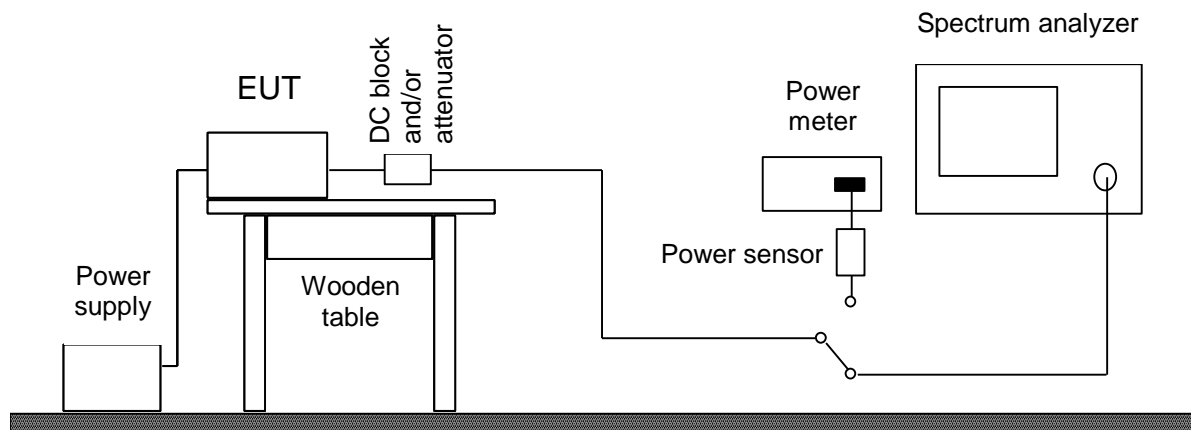
<sup>3</sup> Ports shall be classified as ac power, dc power or signal/control port



## 6 Measurement Procedures

### 6.1 Conducted Output Power

Measurement Procedure: (radiated)	
Rules and specifications:	CFR 47 Part 15, section 15.247 (b) (2)
Guide:	ANSI C63.4 / CFR 47 Part 2, section 2.1046
Measurement setup:	<input type="checkbox"/> Conducted: See below <input checked="" type="checkbox"/> Radiated: Radiated Emission in Fully or Semi Anechoic Room (6.5)
<p>If antenna conducted tests cannot be performed on this device, radiated tests to show compliance with the peak output power limit specified in Section 15.247(b) and the spurious RF conducted emission limit specified in Section 15.247(c) are acceptable. (According Public Notice DA 00-0705)</p> <p>Conducted output power is measured at the RF output terminals (e.g. antenna connector if antenna is detachable) when the transmitter is adjusted in accordance with the tune-up procedure, if applicable. The RF output terminals are connected to a spectrum analyzer and/or a power meter with appropriate sensor. If required, a resistive matching network equal to the impedance specified or employed for the antenna is used as well as dc block and appropriate attenuators (50 Ohms). The electrical characteristics of the radio frequency load attached to the output terminals shall be stated, if applicable.</p> <p>If a spectrum analyzer is used and no other settings are specified resolution bandwidth shall be selected according to the carrier frequency <math>f_c</math> and set to 10 kHz (<math>150 \text{ kHz} \leq f_c &lt; 30 \text{ MHz}</math>), 100 kHz (<math>30 \text{ MHz} \leq f_c &lt; 1 \text{ GHz}</math>) or 1 MHz (<math>f_c \geq 1 \text{ GHz}</math>). The video bandwidth shall be at least three times greater than the resolution bandwidth. The settings used have to be indicated within the appropriate test record(s).</p>	



Test instruments used:

Used	Type	Model	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/>	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
<input checked="" type="checkbox"/>	EMI test receiver	ESU8	100232	Rohde & Schwarz
<input type="checkbox"/>	EMI test receiver	ESPI7	836914/0002	Rohde & Schwarz
<input type="checkbox"/>	EMI test receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
<input type="checkbox"/>	Power meter	NRVS	836856/015	Rohde & Schwarz
<input type="checkbox"/>	Peak power sensor	NRV-Z31	8579604.03	Rohde & Schwarz
<input type="checkbox"/>	Power sensor	NRV-Z52	837901/030	Rohde & Schwarz
<input type="checkbox"/>	Power sensor	NRV-Z4	863828/015	Rohde & Schwarz
<input type="checkbox"/>	DC-block	7006	A2798	Weinschel
<input checked="" type="checkbox"/>	Attenuator	4776-10	9412	Narda
<input type="checkbox"/>	Attenuator	4776-20	9503	Narda



## 6.2 Bandwidth Measurements

Measurement Procedure:	
Rules and specifications:	CFR 47 Part 2, section 2.202(a) CFR 47 Part 15, section 15.215(c)
Guide:	ANSI C63.4
Measurement setup:	<input type="checkbox"/> Conducted: See below <input checked="" type="checkbox"/> Radiated: Radiated Emission in Fully or Semi Anechoic Room (6.5)
<p>If antenna is detachable bandwidth measurements shall be performed at the antenna connector (conducted measurement) when the transmitter is adjusted in accordance with the tune-up procedure, if applicable. The RF output terminals are connected to a spectrum analyzer. If required, a resistive matching network equal to the impedance specified or employed for the antenna is used as well as dc block and appropriate attenuators (50 Ohms). The electrical characteristics of the radio frequency load attached to the output terminals shall be stated, if applicable.</p> <p>If radiated measurements are performed the same test setups and instruments are used as with radiated emission measurements for the appropriate frequency range.</p> <p>The analyzer settings are specified by the test description of the appropriate test record(s).</p>	

## 6.3 Conducted AC Powerline Emission

### Measurement Procedure:

Rules and specifications: CFR 47 Part 15, section 15.207

Guide: ANSI C63.4 (CISPR 22)

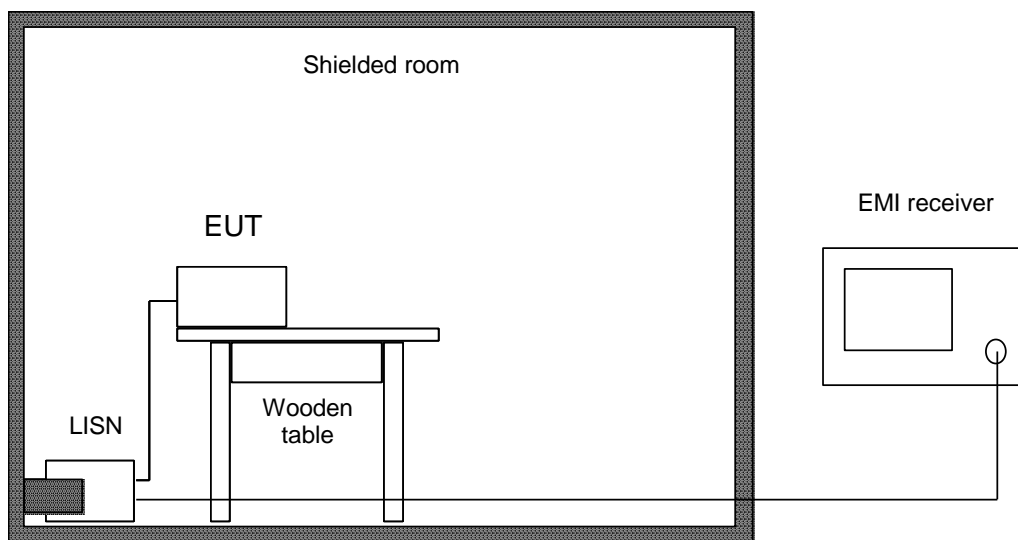
Conducted emission tests in the frequency range 150 kHz to 30 MHz are performed using Line Impedance Stabilization Networks (LISNs). To simplify testing with quasi-peak and average detector the following procedure is used:

First the whole spectrum of emission caused by the equipment under test (EUT) is recorded with detector set to peak using CISPR bandwidth of 10 kHz. After that all emission levels having less margin than 10 dB to or exceeding the average limit are retested with detector set to quasi-peak.

If average limit is kept with quasi-peak levels no additional scan with average detector is necessary. In cases of emission levels between quasi-peak and average limit an additional scan with detector set to average is performed.

According to ANSI C63.4, section 13.1.3.1, testing of intentional radiators with detachable antenna shall be performed using a suitable dummy load connected to the antenna output terminals. Otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended.

Testing with dummy load may be necessary to distinguish (unintentional) conducted emissions on the supply lines from (intentional) emissions radiated by the antenna and coupling directly to supply lines and/or LISN. Usage of dummy load has to be stated in the appropriate test record(s) and notes should be added to clarify the test setup.



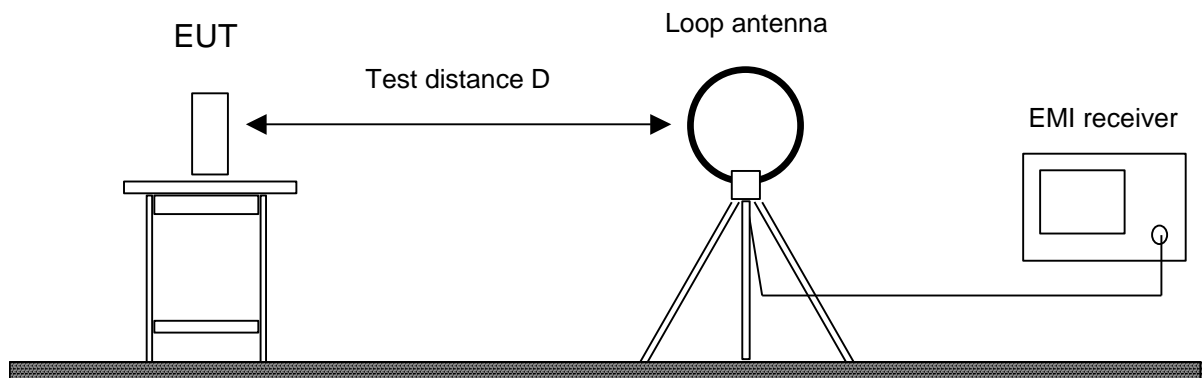


Test instruments used:

Used	Type	Model	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/>	EMI receiver	ESHS 10	860043/016	Rohde & Schwarz
<input checked="" type="checkbox"/>	LISN	ESH3-Z5	862770/021	Rohde & Schwarz
<input type="checkbox"/>	LISN	ESH3-Z5	830952/025	Rohde & Schwarz
<input type="checkbox"/>	Artificial mains network	ESH 2-Z5	842966/004	Rohde & Schwarz
<input type="checkbox"/>	Shielded room	No. 1	1451	Albatross Projects
<input checked="" type="checkbox"/>	Shielded room	No. 4	3FD-100 544	Euroshield

## 6.4 Radiated Emission Measurement 9 kHz to 30 MHz

Measurement Procedure:	
Rules and specifications:	CFR 47 Part 15, sections 15.205, 15.215(b) and 15.225(a)-(d)
Guide:	ANSI C63.4
<p>Radiated emission in the frequency range 9 kHz to 30 MHz is measured using an active loop antenna. First the whole spectrum of emission caused by the equipment is recorded at a distance of 3 meters in a fully or semi anechoic room with the detector of the spectrum analyzer or EMI receiver set to peak. This configuration is also used for recording the spectrum of intentional radiators.</p> <p>Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing. EUT is rotated all around to find the maximum levels of emissions. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.</p> <p>If worst case emission of the EUT cannot be recorded with EUT in standard position and loop antenna in vertical polarization the EUT (or the radiating part of the EUT) is rotated by 90 degrees instead of changing the loop antenna to horizontal polarization. This procedure is selected to minimize the influence of the environment (e.g. effects caused by the floor especially with longer distances).</p> <p>Final measurement is performed at a test distance D of 30 meters using an open field test site. In case the regulation requires testing at other distances, the result is extrapolated by either making measurements at an additional distance D of 10 meters to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). In cases of very low emissions measurements are performed at shorter distances and results are extrapolated to the required distance. The provisions of CFR 47 Part 15 sections 15.31(d) and (f)(2) apply. According to CFR 47 Part 15 section 15.209(d) final measurement is performed with detector function set to quasi-peak except for the frequency bands 9 to 90 kHz and 110 to 490 kHz where, for non-pulsed operation, average detector is employed.</p> <p>If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value.</p>	





Test instruments used:

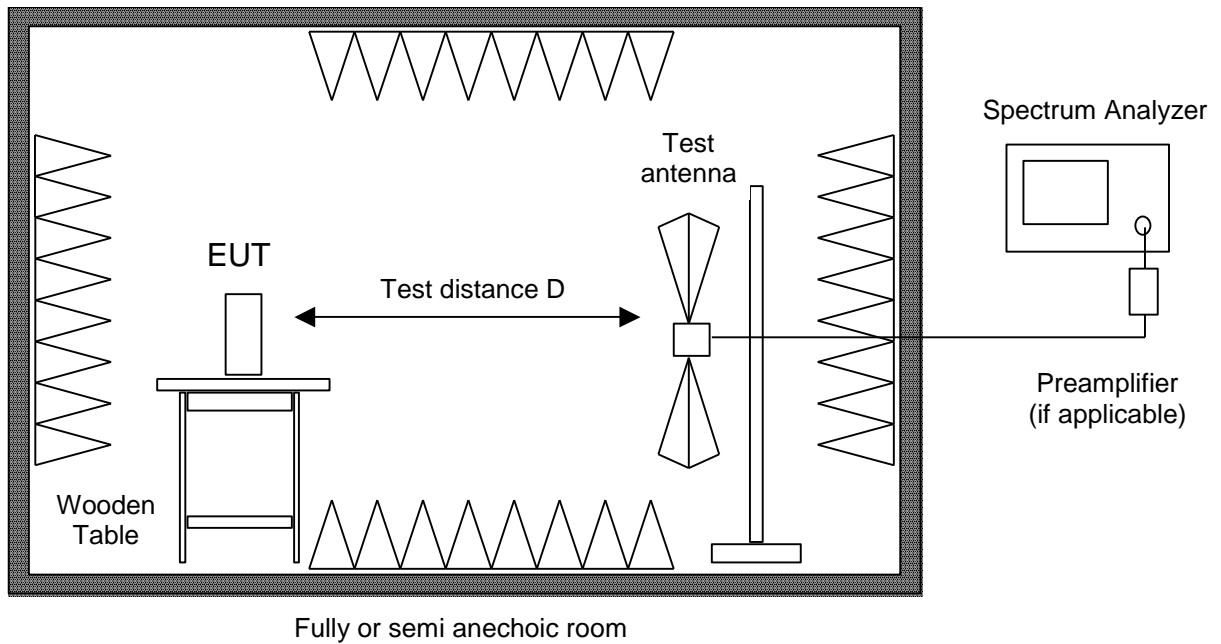
Used	Type	Model	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/>	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
<input type="checkbox"/>	EMI test receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
<input checked="" type="checkbox"/>	Test receiver	ESHS 10	860043/016	Rohde & Schwarz
<input type="checkbox"/>	Preamplifier	CPA9231A	3393	Schaffner
<input type="checkbox"/>	Loop antenna	HFH2-Z2	882964/1	Rohde & Schwarz
<input checked="" type="checkbox"/>	Fully anechoic room	No. 2	1452	Albatross Projects
<input type="checkbox"/>	Semi-anechoic room	No. 3	1453	Siemens
<input checked="" type="checkbox"/>	Open field test site	EG 1	1450	Senton





## 6.5 Radiated Emission in Fully or Semi Anechoic Room

Measurement Procedure:	
Rules and specifications:	CFR 47 Part 15, sections 15.109 and 15.209
Guide:	ANSI C63.4
<p>Radiated emission in fully or semi anechoic room is measured in the frequency range from 30 MHz to the maximum frequency as specified in CFR 47 Part 15 section 15.33.</p> <p>Measurements are made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with the detector function set to peak and resolution as well as video bandwidth set to 100 kHz (below 1 GHz) or 1 MHz (above 1 GHz).</p> <p>Testing up to 1 GHz is performed with a linear polarized logarithmic periodic antenna combined with a 4:1 broadband dipole ("Trilog broadband antenna"). For testing above 1 GHz horn antennas are used.</p> <p>All tests below 18 GHz are performed at a test distance D of 3 meters. For higher frequencies the test distance is reduced (e.g. to 1 meter) due to the sensitivity of the measuring instrument(s) and the test results are calculated according to CFR 47 Part 15 section 15.31(f)(1) using an extrapolation factor of 20 dB/decade. If required, preamplifiers are used for the whole frequency range. Special care is taken to avoid overload, using appropriate attenuators and filters, if necessary.</p> <p>If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value.</p> <p>Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.</p> <p>During testing the EUT is rotated all around to find the maximum levels of emissions. Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.</p> <p>For final testing below 1 GHz an open field test-site is used and the plots recorded in the fully or semi anechoic room are indicated as prescans.</p>	

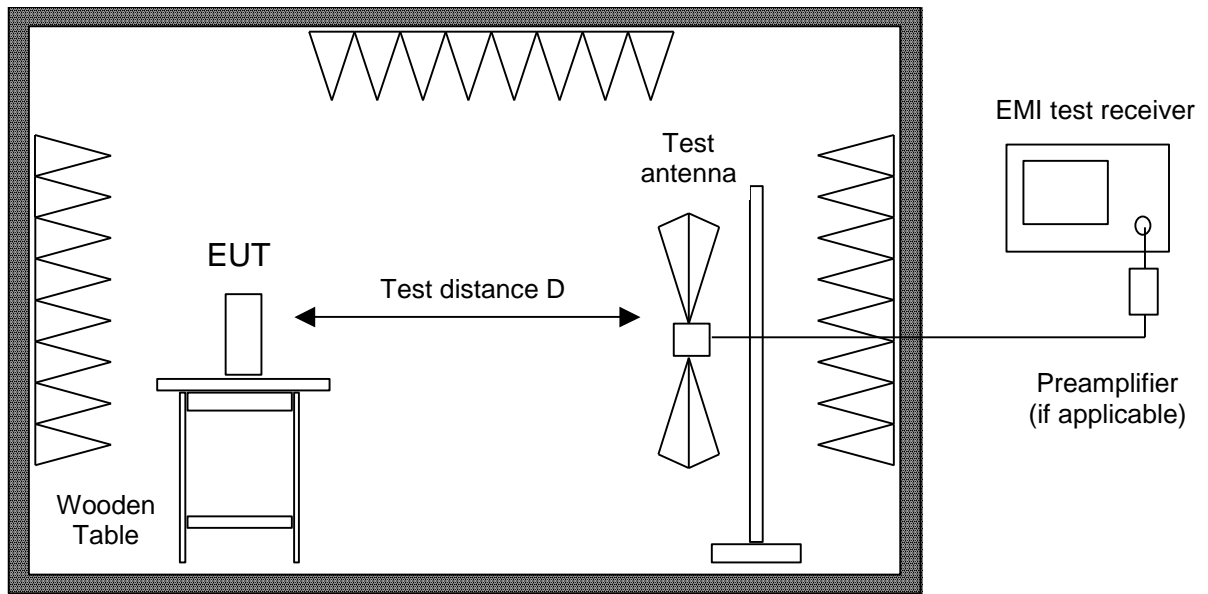


Test instruments used:

Used	Type	Model	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/>	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
<input type="checkbox"/>	Spectrum analyzer	R 3271	05050023	Advantest
<input type="checkbox"/>	EMI test receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
<input checked="" type="checkbox"/>	Preamplifier	CPA9231A	3393	Schaffner
<input type="checkbox"/>	Preamplifier	R14601		Advantest
<input checked="" type="checkbox"/>	Preamplifier 1-8 GHz	AFS3-00100800-32-LN	847743	Miteq
<input type="checkbox"/>	Preamplifier 0.5-8 GHz	AMF-4D-005080-25-13P	860149	Miteq
<input checked="" type="checkbox"/>	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT
<input type="checkbox"/>	External Mixer	WM782A	845881/005	Tektronix
<input type="checkbox"/>	Harmonic Mixer	FS-Z30	843389/007	Rohde & Schwarz
	Accessories			
<input checked="" type="checkbox"/>	Trilog broadband antenna	VULB 9163	9163-188	Schwarzbeck
<input checked="" type="checkbox"/>	Horn antenna	3115	9508-4553	EMCO
<input type="checkbox"/>	Horn antenna	3160-03	9112-1003	EMCO
<input checked="" type="checkbox"/>	Horn antenna	3160-04	9112-1001	EMCO
<input checked="" type="checkbox"/>	Horn antenna	3160-05	9112-1001	EMCO
<input checked="" type="checkbox"/>	Horn antenna	3160-06	9112-1001	EMCO
<input checked="" type="checkbox"/>	Horn antenna	3160-07	9112-1008	EMCO
<input type="checkbox"/>	Horn antenna	3160-08	9112-1002	EMCO
<input type="checkbox"/>	Horn antenna	3160-09	9403-1025	EMCO
<input type="checkbox"/>	Horn antenna	3160-10	399185	EMCO
<input checked="" type="checkbox"/>	Fully anechoic room	No. 2	1452	Albatross Projects
<input type="checkbox"/>	Semi-anechoic room	No. 3	1453	Siemens

## 6.6 Radiated Emission at Alternative Test Site

Measurement Procedure:	
Rules and specifications:	CFR 47 Part 15, sections 15.109 and 15.209
Guide:	ANSI C63.4
<p>Radiated emission in the frequency range 30 MHz to 1 GHz is measured within a semi-anechoic room with groundplane complying with the NSA requirements of ANSI C63.4 for alternative test sites. A linear polarized logarithmic periodic antenna combined with a 4:1 broadband dipole ("Trilog broadband antenna") is used. The measurement bandwidth of the test receiver is set to 120 kHz with quasi-peak detector selected.</p> <p>If the radiated emission limits are expressed in terms of the average value of the emission there also is a peak limit corresponding to 20 dB above the maximum permitted average limit. Additionally, if pulsed operation is employed, the average field strength is determined by averaging over one complete pulse train, including blanking intervals, as specified in CFR 47 Part 15 section 15.35(c). If the pulse train exceeds 0.1 second that 0.1 second interval during which the value of the emission is at its maximum is selected for calculation. The pulse train correction is added to the peak value of the emission to get the average value.</p> <p>Hand-held or body-worn devices are tested in the position producing the highest emission relative to the limit as verified by prescans in fully anechoic room.</p> <p>If no prescan in a fully anechoic room is used first a peak scan is performed in four positions to get the whole spectrum of emission caused by EUT with the measuring antenna raised and lowered from 1 to 4 m to find table position, antenna height and antenna polarization for the maximum emission levels.</p> <p>Data reduction is applied to these results to select those levels having less margin than 10 dB to or exceeding the limit using subranges and limited number of maximums. Further maximization is following.</p> <p>With detector of the test receiver set to quasi-peak final measurements are performed immediately after frequency zoom (for drifting disturbances) and maximum adjustment.</p> <p>Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.</p> <p>In cases where prescans in a fully anechoic room are taken (e. g. if EUT is operating for a short time only or battery is discharged quickly) final measurements with quasi-peak detector are performed manually at frequencies indicated by prescan with EUT rotating all around and receiving antenna raising and lowering within 1 meter to 4 meters to find the maximum levels of emission.</p> <p>Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.</p> <p>For measuring emissions of intentional radiators and receivers a test distance D of 3 meters is selected. Testing of unintentional radiators is performed at a distance of 10 meters. If limits specified for 3 meters shall be used for measurements performed at 10 meters distance the limits are calculated according to CFR 47 Part 15 section 15.31(d) and (f)(1) using an inverse linear-distance extrapolation factor of 20 dB/decade.</p>	



Alternate test site (semi anechoic room)

Test instruments used:

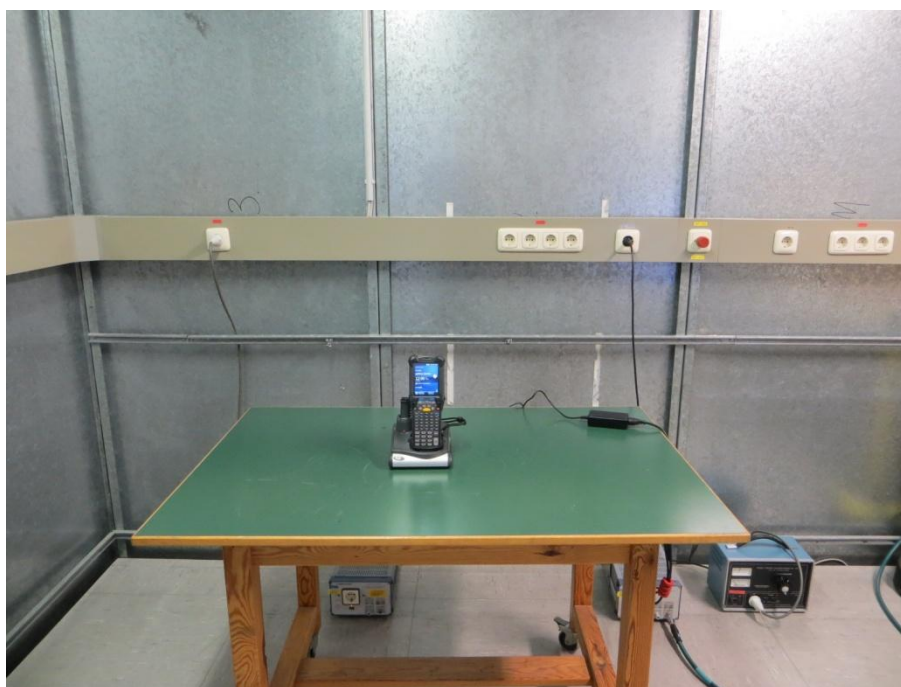
Type	Designation	Inv.-no.	Serial No. or ID	Manufacturer
<input type="checkbox"/> EMI test receiver	ESU8	2044	100232	Rohde & Schwarz
<input type="checkbox"/> Trilog antenna	Cabin no. 8 VULB 9163	1802	9163-214	Schwarzbeck
<input type="checkbox"/> Semi anechoic room	No. 8	2057	---	Albatross



---

## 7 Photographs Taken During Testing

## Test setup for conducted AC powerline emission measurement



**Test setup for radiated emission measurement 9 kHz – 30 MHz**





## Test setup for radiated emission measurement (fully anechoic room)





## 8 Test Results for Transmitter

FCC CFR 47 Parts 15 [2]			
Section(s)	Test	Page	Result
2.202(a)	Occupied bandwidth	26	Recorded
15.204	Antenna requirement	---	Integrated Antenna
15.247 (a) (1) (i)	Channel Bandwidth	30	Test passed
2.201, 2.202	Class of emission	34	Calculated
15.247(a)(1)	Hopping channel separation	38	Test passed
15.247(a)(1)(i)	Number of hopping frequencies used	41	Test passed
15.247(a)(1)(i)	Time occupancy on any channel	43	Test passed
15.247(b)(2)	Maximum peak output power	47	Test passed
15.207	Conducted AC powerline emission 150 kHz to 30 MHz	50	Test passed
15.205(a) 15.209(a) 15.247(d)	Radiated emission 9 kHz to 10 GHz	52	Test passed
15.247(i) 2.1093	RF exposure requirement	67	Test passed

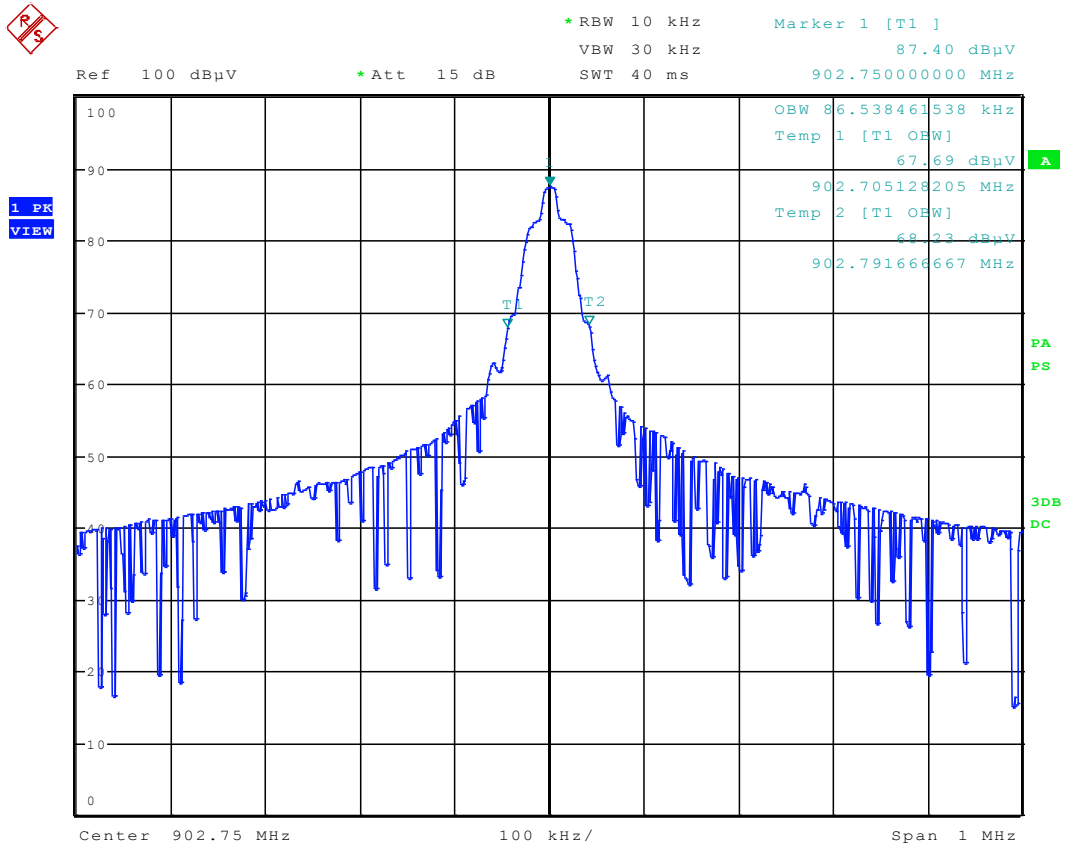


## 8.1 Occupied Bandwidth

Rules and specifications:	CFR 47 Part 2, section 2.202(a)	
Guide:	ANSI C63.4	
Description:	<p>The occupied bandwidth according to CFR 47 Part 2, section 2.202(a), is measured as the 99% emission bandwidth, i.e. below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.</p> <p>The occupied bandwidth according to ANSI C63.4, annex H.6; is measured as the frequency range defined by the points that are 26 dB down relative to the maximum level of the modulated carrier.</p> <p>The resolution bandwidth of the spectrum analyzer shall be set to a value greater than 5.0% of the allowed bandwidth. If no bandwidth specifications are given, the following guidelines are used:</p>	
	Fundamental frequency	Minimum resolution bandwidth
	9 kHz to 30 MHz	1 kHz
	30 MHz to 1000 MHz	10 kHz
	1000 MHz to 40 GHz	100 kHz
	The video bandwidth shall be at least three times greater than the resolution bandwidth.	
Measurement procedure:	Bandwidth Measurements (6.2)	

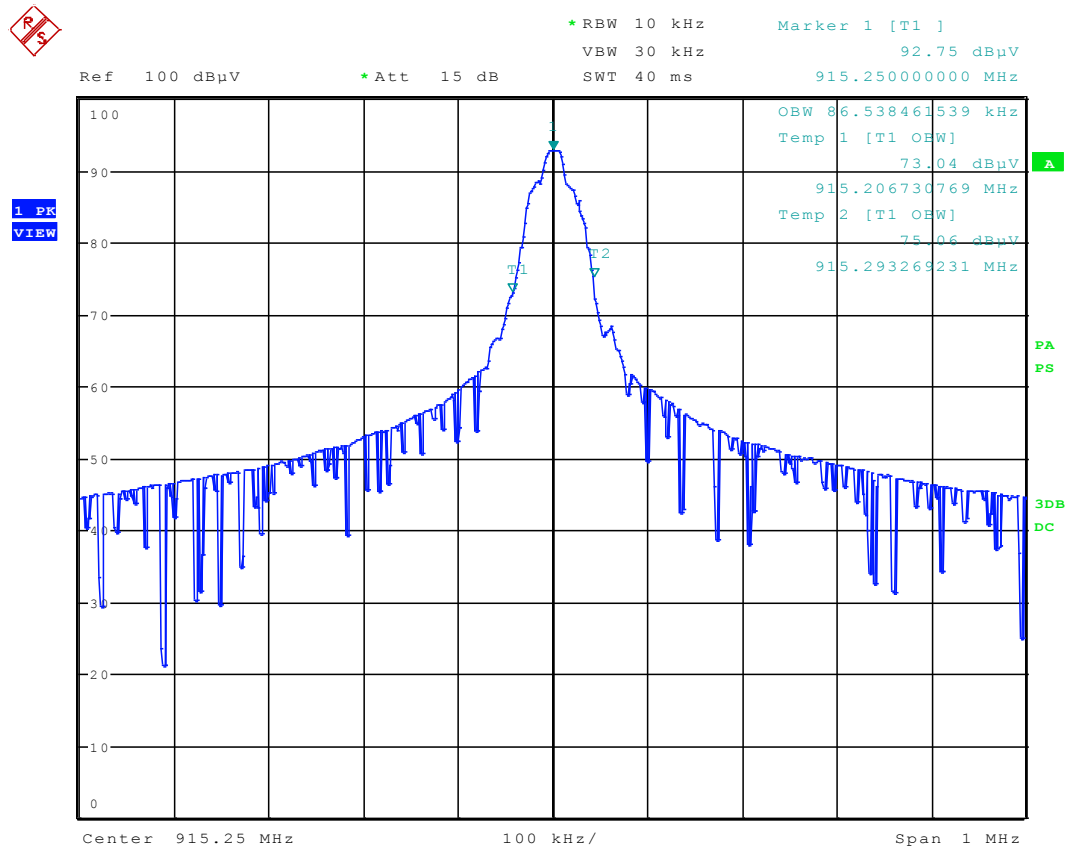
Comment:	--
Date of test:	January 7, 2015
Test site:	Fully anechoic room, cabin no. 2

### Operating mode 1:



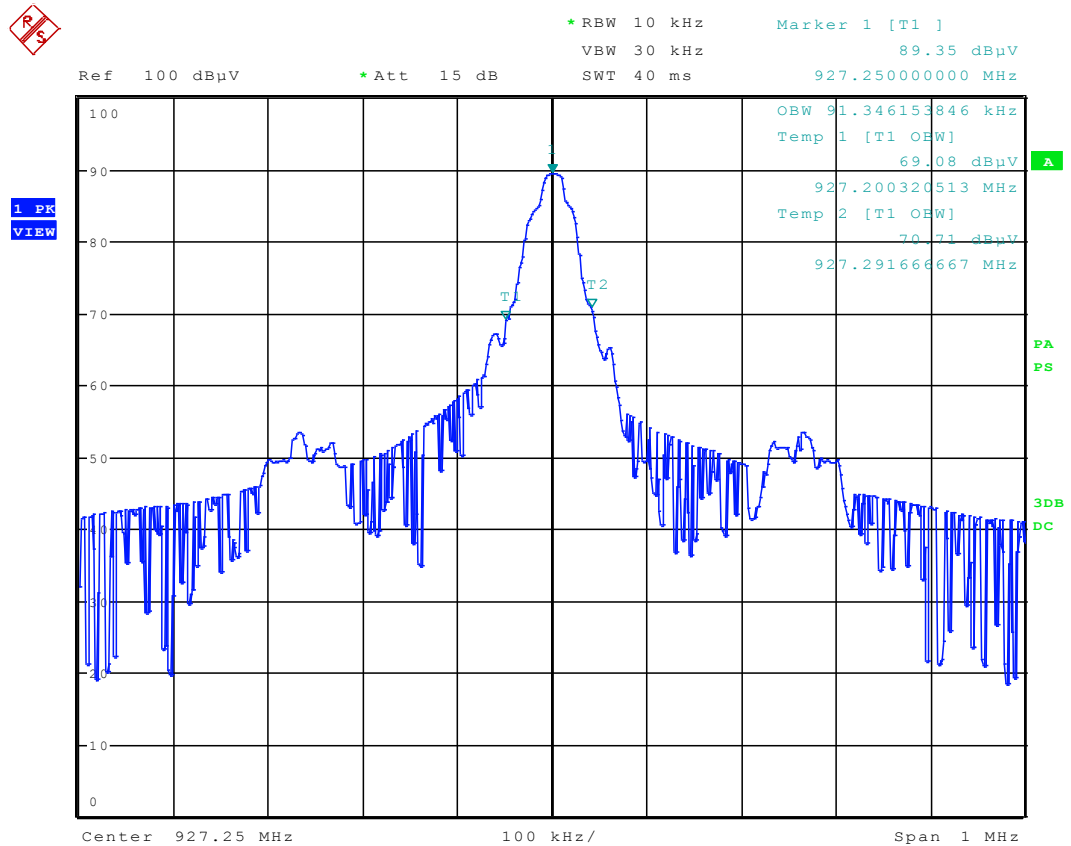
Occupied Bandwidth (99 %): **86.5 kHz**

## Operating mode 2:



Occupied Bandwidth (99 %): **86.5 kHz**

### Operating mode 3:



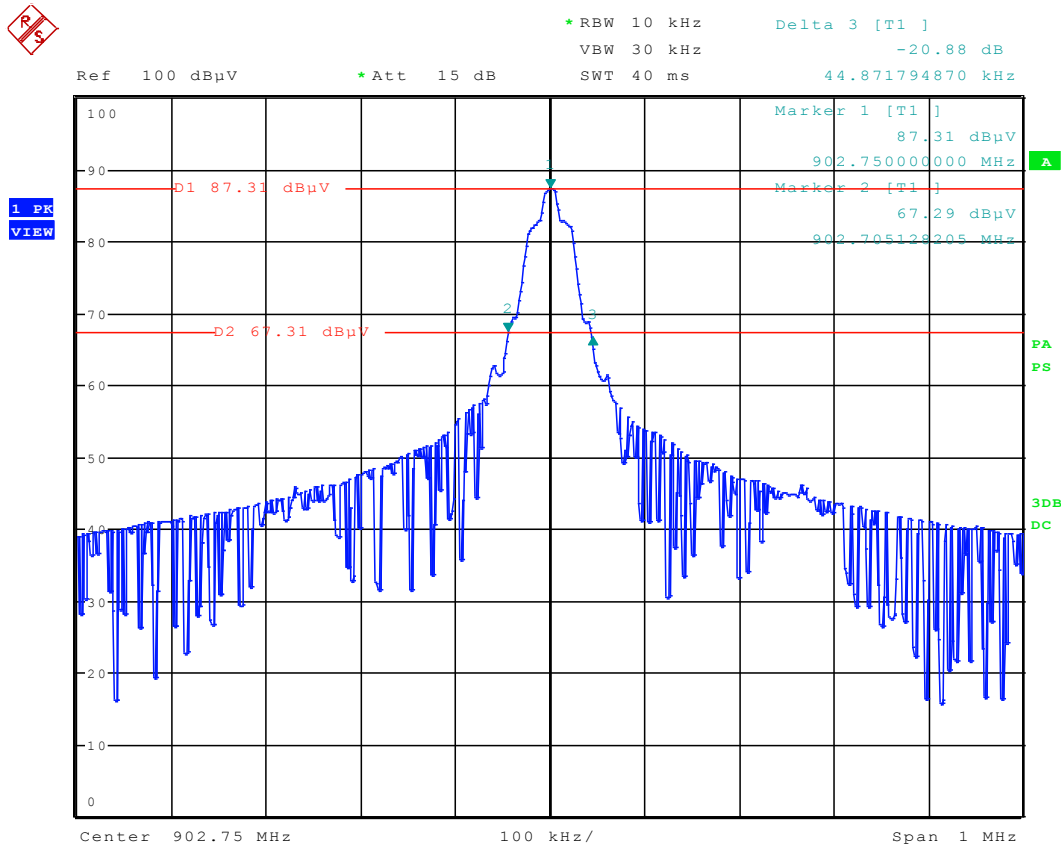
Occupied Bandwidth (99 %): **91.3 kHz**

## 8.2 Bandwidth of the Emission

Rules and specifications:	CFR 47 Part 15, section 15.209	
Guide:	ANSI C63.4	
Description:	<p>The 20 dB bandwidth of the emission is measured as the frequency range defined by the points that are 20 dB down relative to the maximum level of the modulated carrier.</p> <p>For intentional radiators operating under the alternative provisions to the general emission limits the requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.</p> <p>The resolution bandwidth of the spectrum analyzer shall be set to a value greater than 5.0% of the allowed bandwidth. If no bandwidth specifications are given, the following guidelines are used:</p>	
	Fundamental frequency	Minimum resolution bandwidth
	9 kHz to 30 MHz	1 kHz
	30 MHz to 1000 MHz	10 kHz
	1000 MHz to 40 GHz	100 kHz
	The video bandwidth shall be at least three times greater than the resolution bandwidth.	
Measurement procedure:	Bandwidth Measurements (6.2)	
Comment:	Operating mode 1 & 2 & 3	
Date of test:	January 7, 2015	
Test site:	Fully anechoic room, cabin no. 2	

**Operating mode 1:**

Bandwidth (- 20 dB):	<b>44.9 kHz</b>
----------------------	-----------------



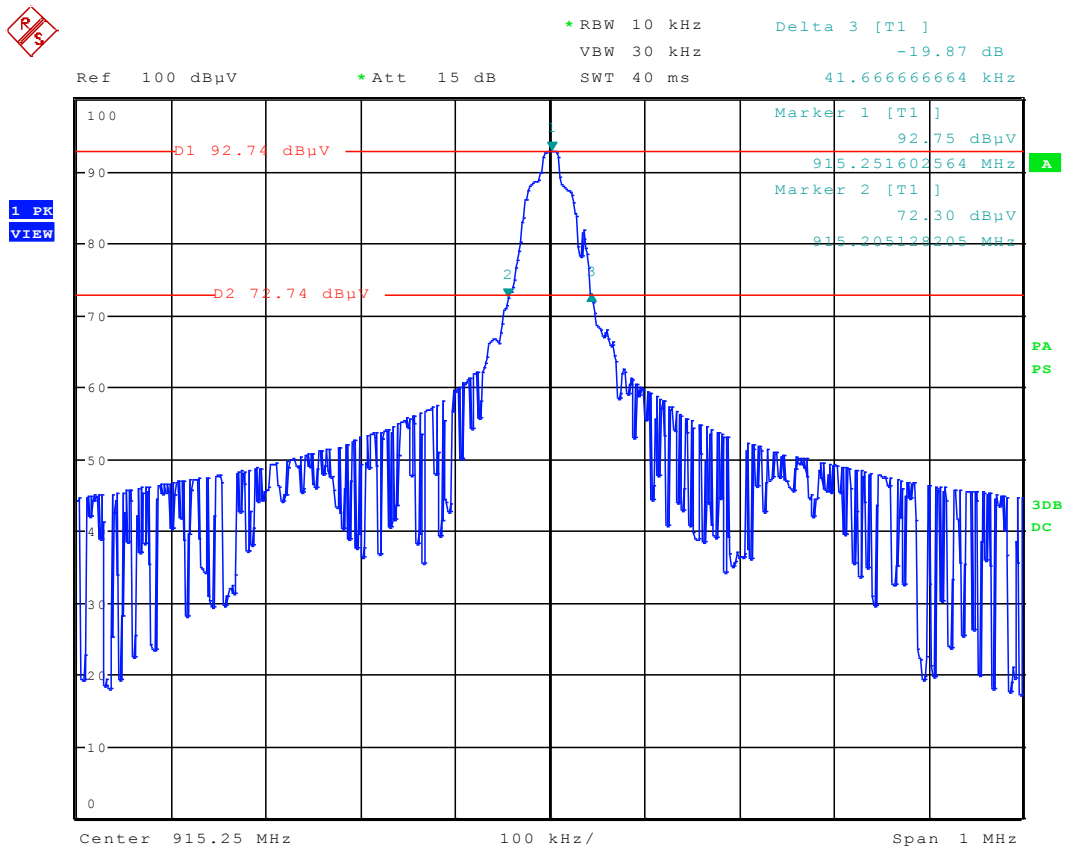
Permitted frequency band:	<b>902 – 928 MHz</b>	
20 dB bandwidth:	<b>44.9 kHz</b>	
Carrier frequency stability:	<input type="checkbox"/> specified	<input checked="" type="checkbox"/> not specified
Maximum frequency tolerances:	<b>+0 kHz - 0 kHz</b>	
Bandwidth of the emission:	<b>44.9 kHz</b>	<b>within permitted frequency band<sup>4</sup>:</b> <input checked="" type="checkbox"/> yes <input type="checkbox"/> no

Test Result:	Test passed
--------------	-------------

<sup>4</sup> If a frequency stability is not specified, it is recommended that the fundamental emission is kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

## Operating mode 2:

Bandwidth (- 20 dB): **41.7 kHz**



Permitted frequency band:	<b>902 – 928 MHz</b>	
20 dB bandwidth:	<b>41.7 kHz</b>	
Carrier frequency stability:	<input type="checkbox"/> specified	<input checked="" type="checkbox"/> not specified
Maximum frequency tolerances:	<b>+0 kHz - 0 kHz</b>	
Bandwidth of the emission:	<b>41.7 kHz</b>	<b>within permitted frequency band<sup>5</sup>:</b> <input checked="" type="checkbox"/> yes <input type="checkbox"/> no

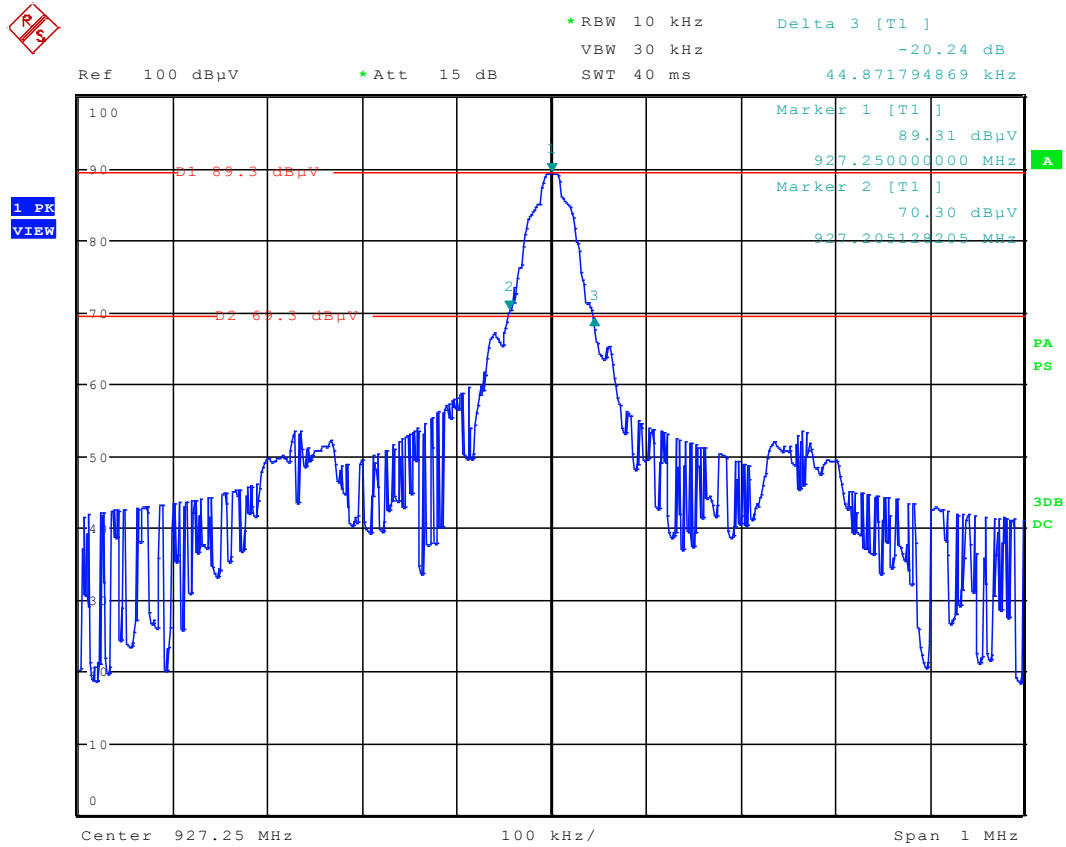
Test Result:	Test passed
--------------	-------------

<sup>5</sup> If a frequency stability is not specified, it is recommended that the fundamental emission is kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.



**Operating mode 3:**

Bandwidth (- 20 dB):	<b>44.9 kHz</b>
----------------------	-----------------



Permitted frequency band:	<b>902 – 928 MHz</b>	
20 dB bandwidth:	<b>44.9 kHz</b>	
Carrier frequency stability:	<input type="checkbox"/> specified	<input checked="" type="checkbox"/> not specified
Maximum frequency tolerances:	<b>+0 kHz - 0 kHz</b>	
Bandwidth of the emission:	<b>44.9 kHz</b>	<b>within permitted frequency band<sup>6</sup>:</b> <input checked="" type="checkbox"/> yes <input type="checkbox"/> no

Test Result:	Test passed
--------------	-------------

<sup>6</sup> If a frequency stability is not specified, it is recommended that the fundamental emission is kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### 8.3 Designation of Emissions

Rules and specifications:	CFR 47 Part 2, sections 2.201 and 2.202
Guide:	ANSI C63.4 / TRC-43

Type of modulation:	Amplitude Modulation
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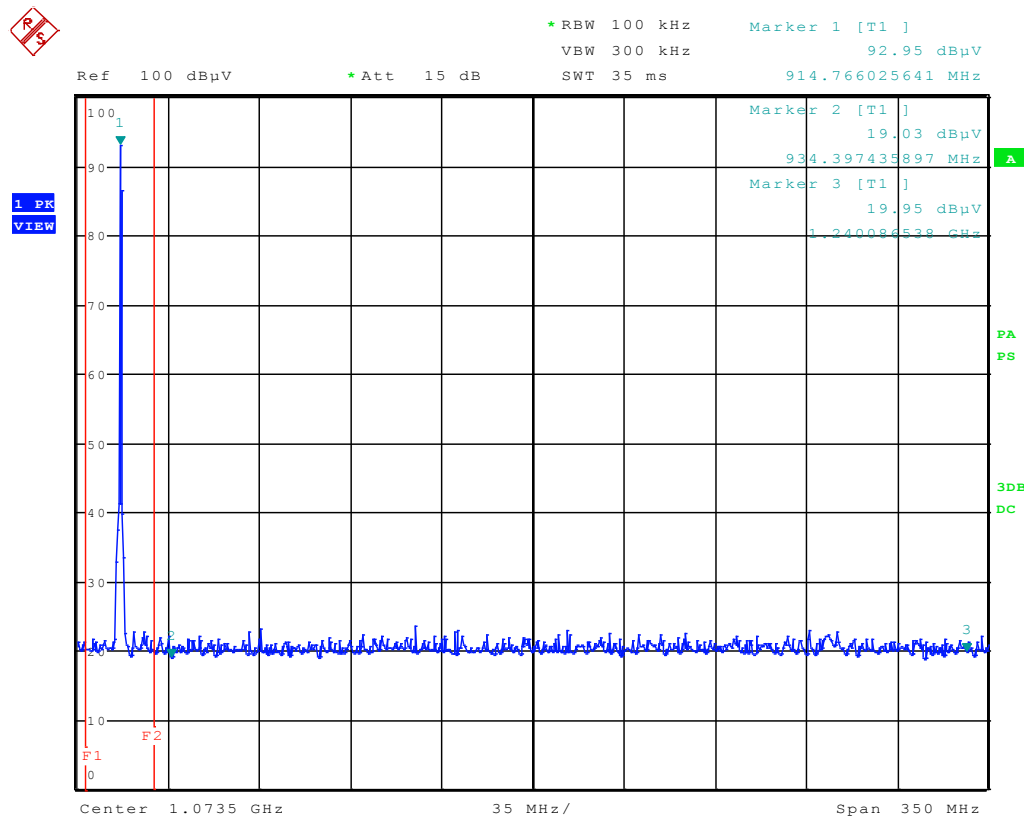
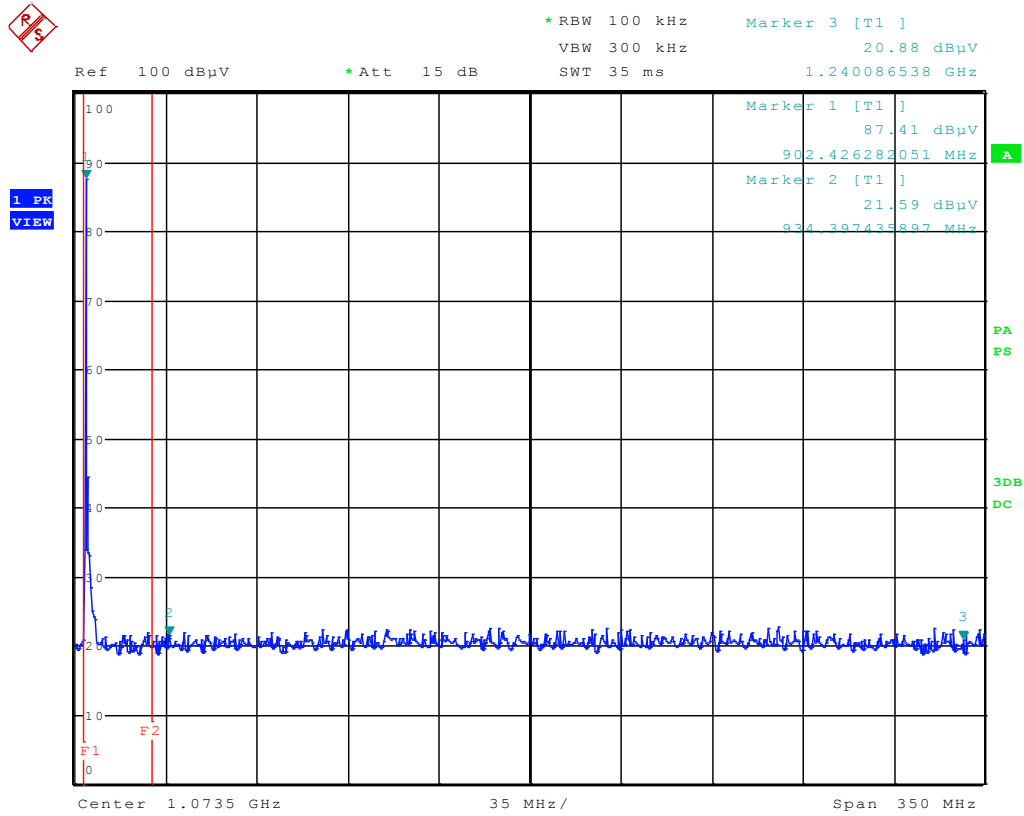
$B_n$ = Necessary Bandwidth	$B_n = 2BK$
B = Modulation rate	B = 40 kbs = 20 kHz
K = Overall numerical factor	K = 1
Calculation:	$B_n = 2 \cdot (20 \text{ kHz}) \cdot 1 = 40 \text{ kHz}$

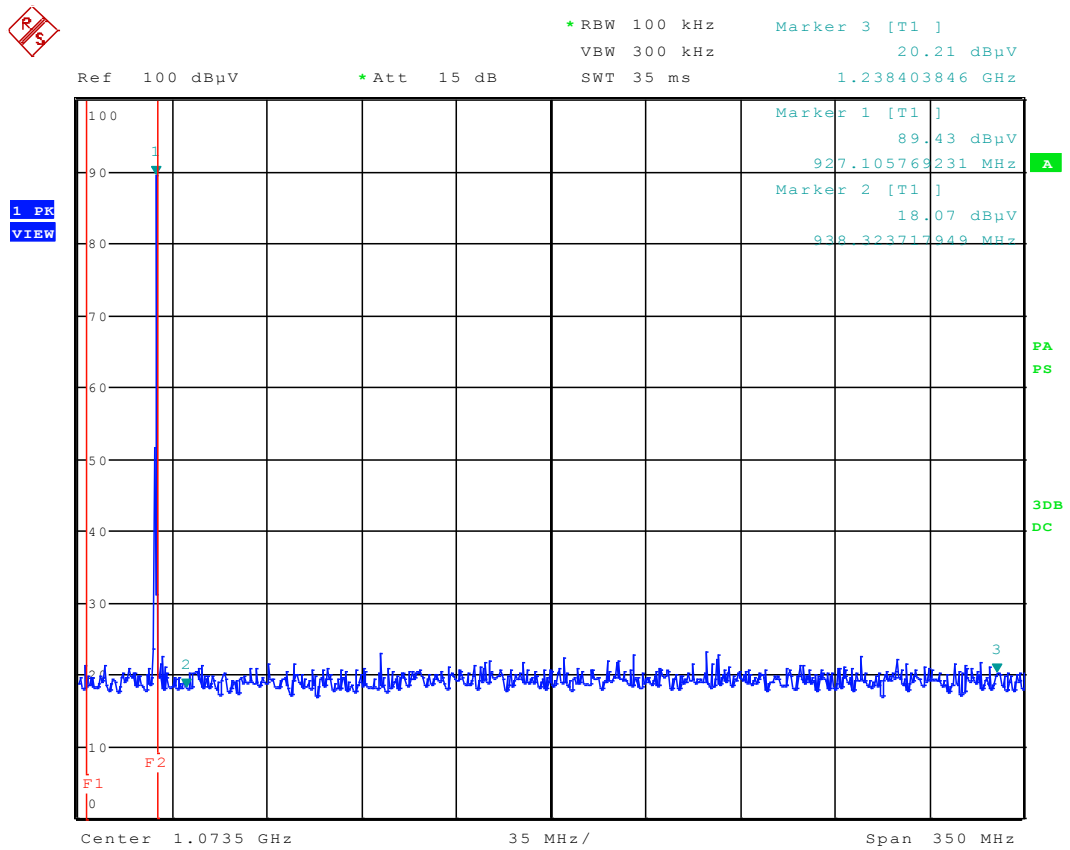
Designation of Emissions:	<b>40K0A1D</b>
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## 8.4 Restricted Bands of Operation

Rules and specifications:	CFR 47 Part 15, section 15.205(a)
Guide:	ANSI C63.4
Limit:	Only spurious emissions are permitted in any of the frequency bands listed in CFR 47 Part 15, section 15.205(a).
Measurement procedure:	Radiated Emission in Fully or Semi Anechoic Room (6.5)

Comment:	Operating mode 1 & 2 & 3
Date of test:	January 8, 2015
Test site:	Fully anechoic room, cabin no. 2
Test distance:	3 meters





Test Result:	Test passed
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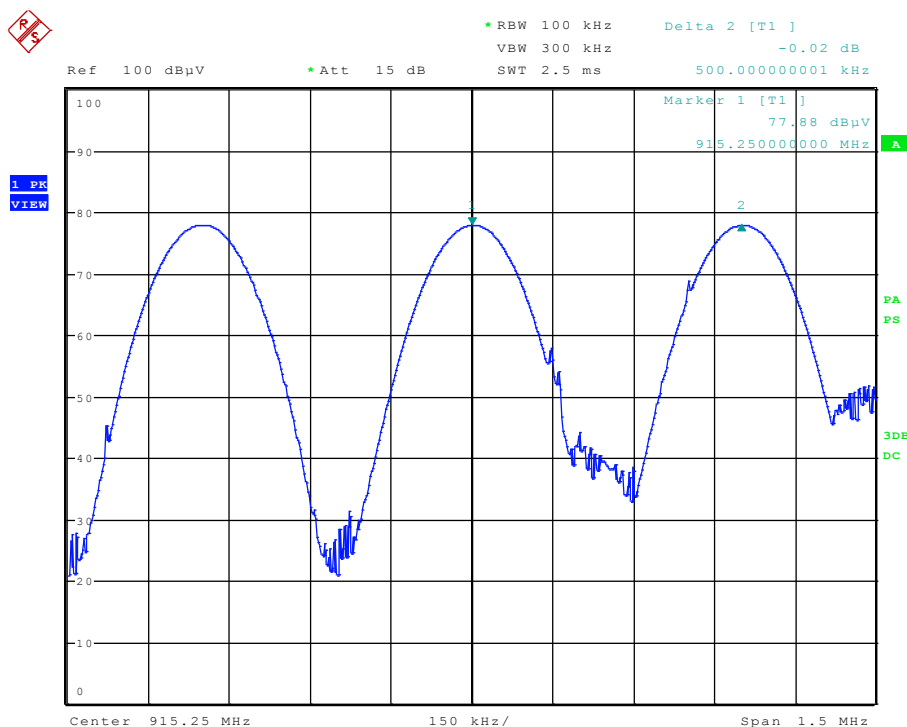
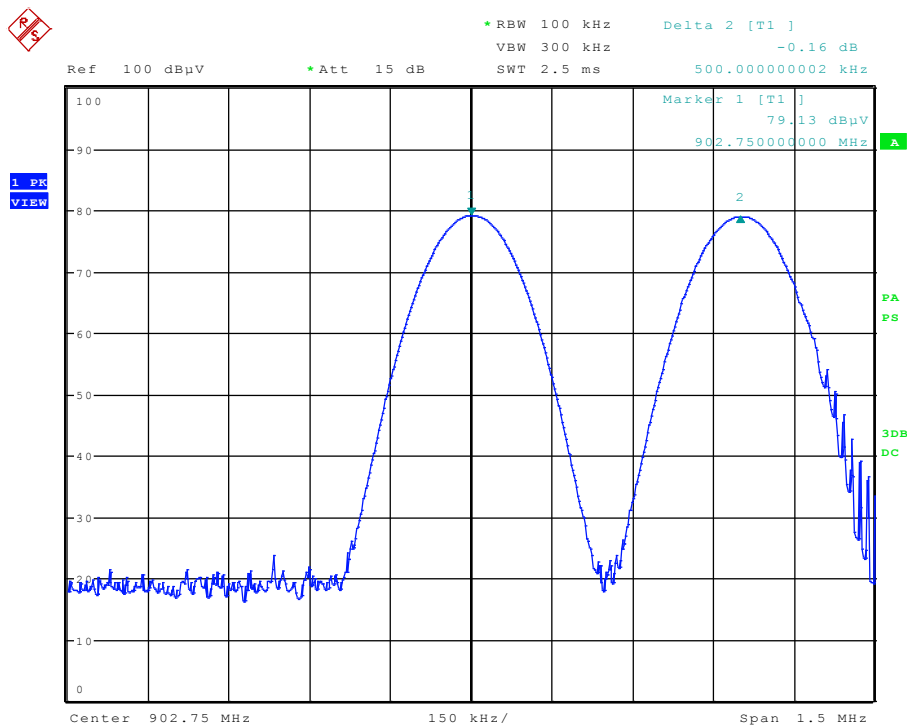
## 8.5 Hopping channel separation

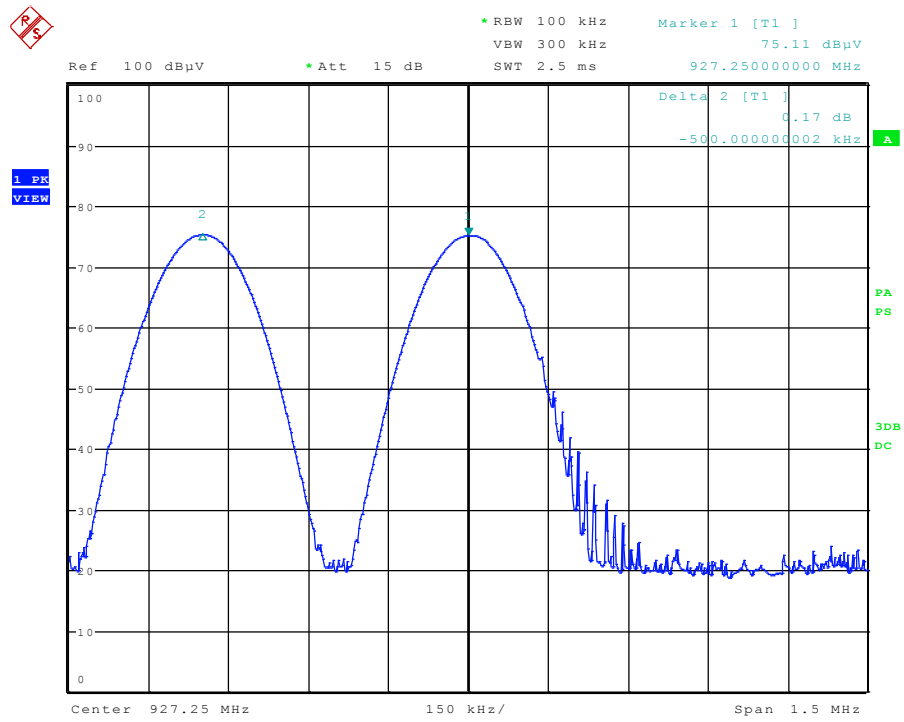
Rules and specifications:	CFR 47 Part 15, section 15.247 (a) (1)
Guide:	ANSI C63.4
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.
Measurement procedure:	Radiated Emission in Fully or Semi Anechoic Room (6.5)

Comment:	Operating mode 4
Date of test:	Januray 7, 2015
Test site:	Fully anechoic room, cabin no. 2
Test distance:	3 meters

Frequency (MHz)	Channel separation (kHz)	Limit (kHz)	Result
902.75	500	> 44.9	Pass
915.25	500	> 41.7	Pass
927.25	500	> 44.9	Pass

Test Result:	Test passed
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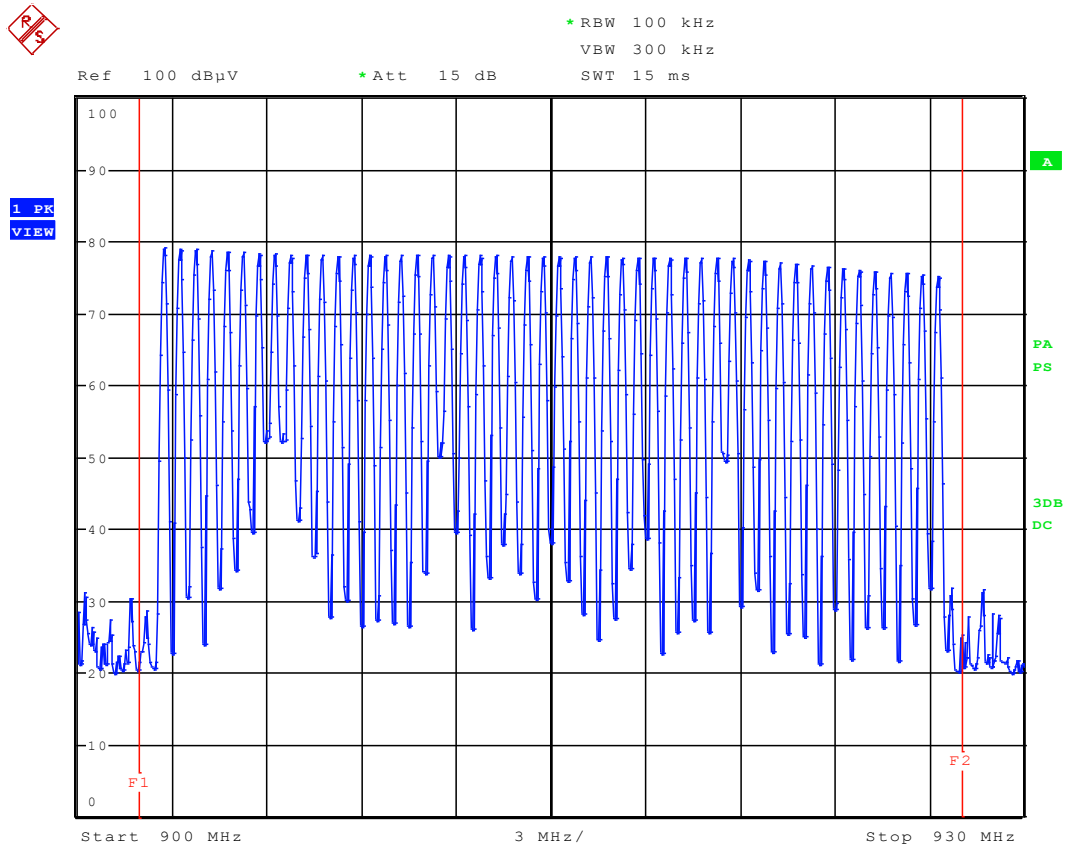
## 8.6 Number of hopping frequencies used

Rules and specifications:	CFR 47 Part 15, section 15.247(a)(1)(i)
Guide:	ANSI C63.4
Limit:	If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.
Measurement procedure:	Radiated Emission in Fully or Semi Anechoic Room (6.5)

Comment:	Operating mode 4
Date of test:	January 7, 2015
Test site:	Fully anechoic room, cabin no. 2
Test distance:	3 meters

Frequencies	Limit	Result
50	≥ 50	Pass

Test Result:	Test passed
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## 8.7 Time occupancy on any channel

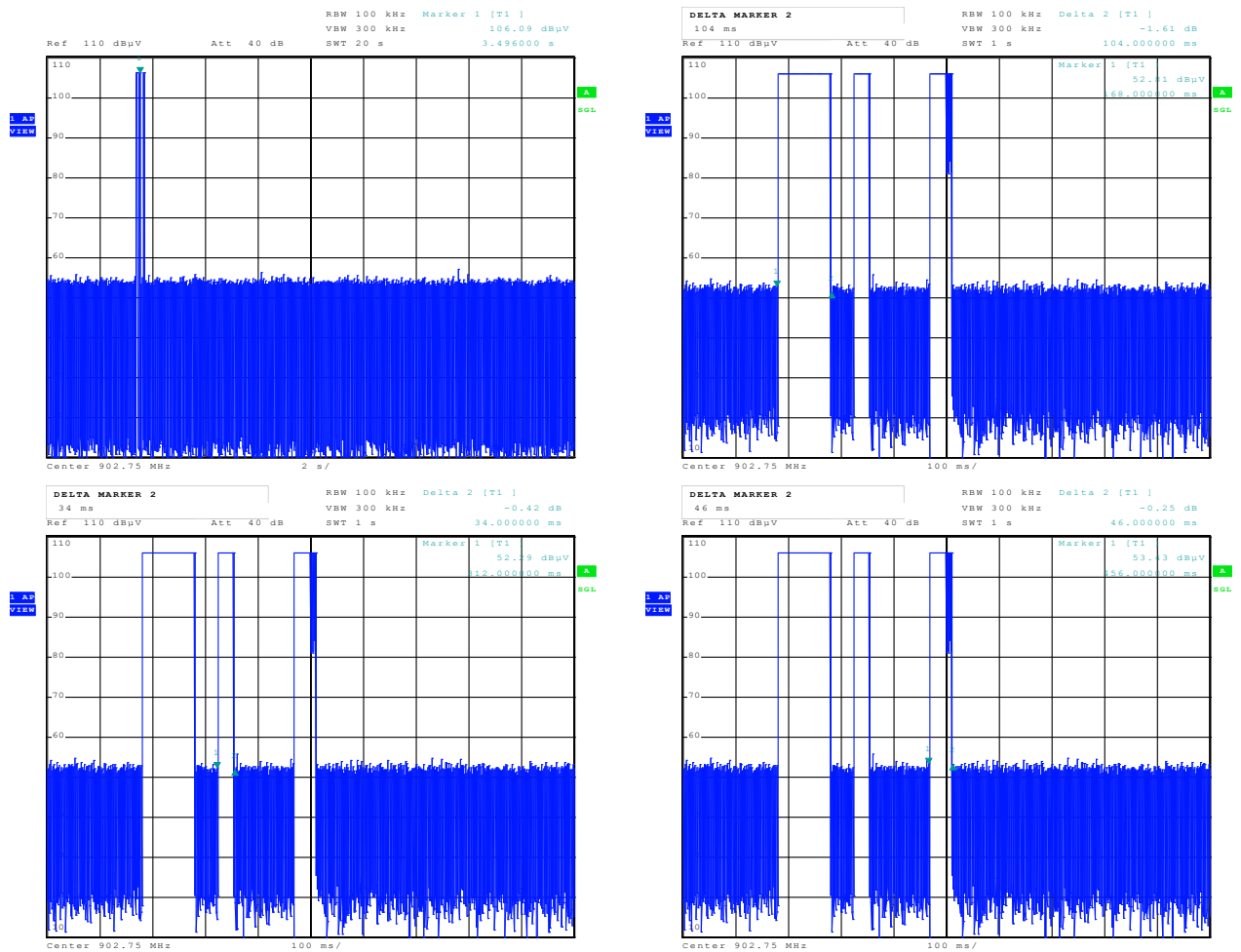
Rules and specifications:	CFR 47 Part 15, section 15.247(a)(1)(i)
Guide:	ANSI C63.4
Limit:	If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 seconds period.
Measurement procedure:	Radiated Emission in Fully or Semi Anechoic Room (6.5)

Comment:	--
Date of test:	September 22, 2015
Test site:	Fully anechoic room, cabin no. 2
Test distance:	3 meters

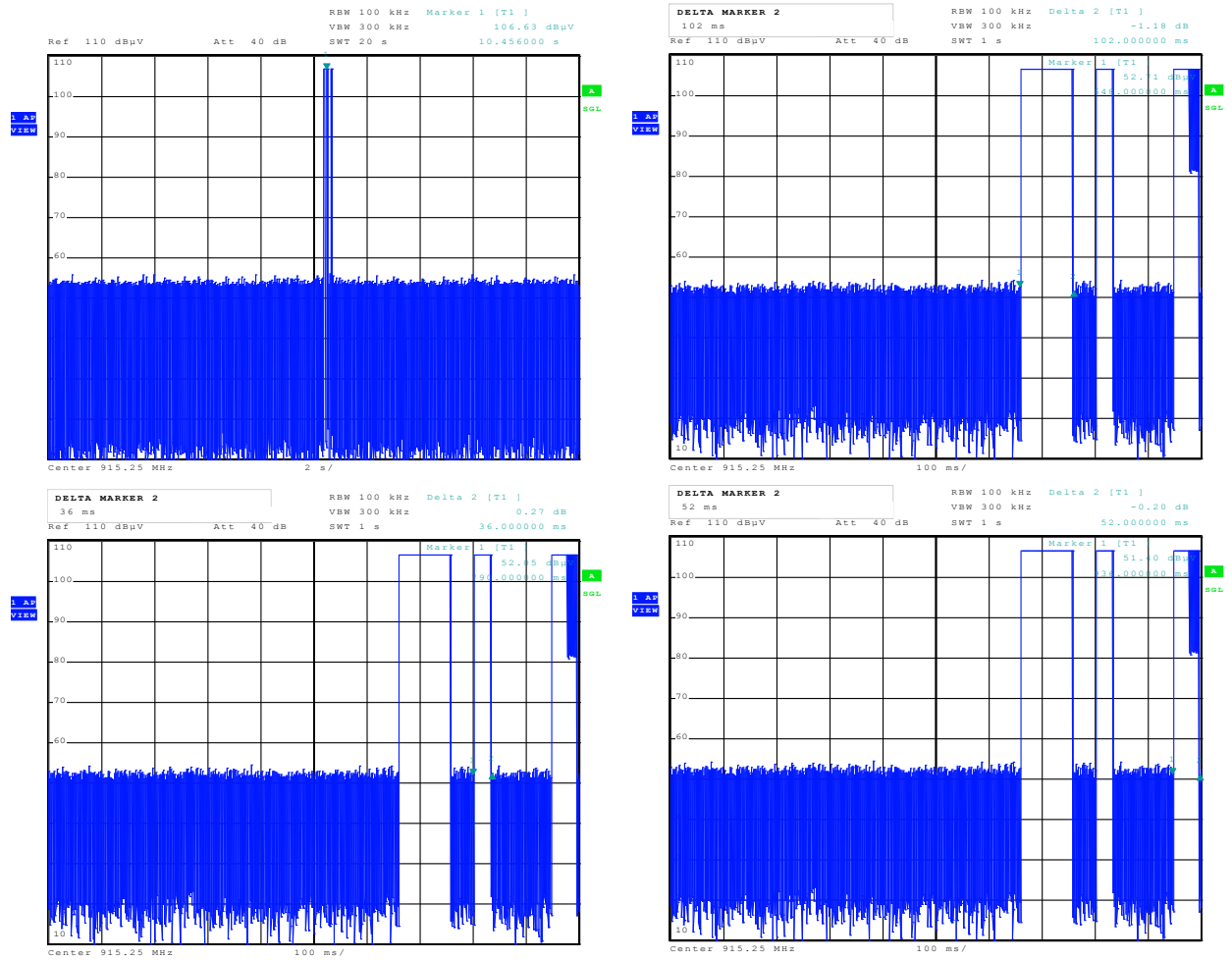
Frequency (MHz)	Number of transmissions in 20 s	Length of transmission time (ms)	Result (ms)	Limit (ms in a 20 s period)
902.75	1	248	248	400
915.25	1	190	190	400
927.25	1	174	174	400

Test Result:	Test passed
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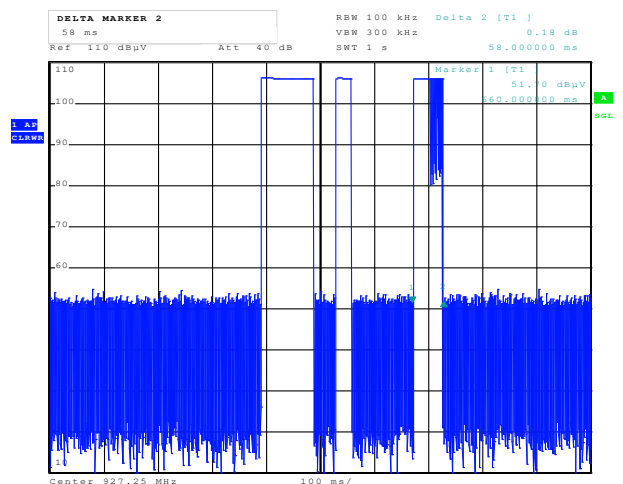
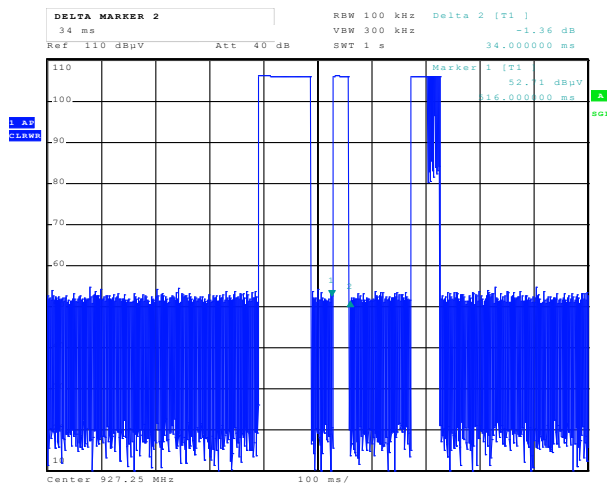
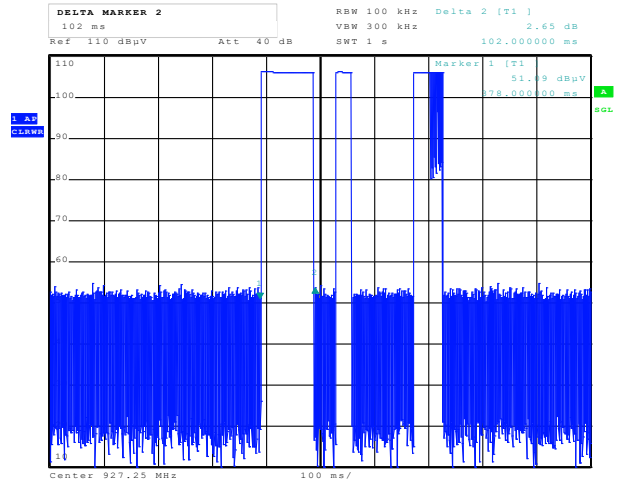
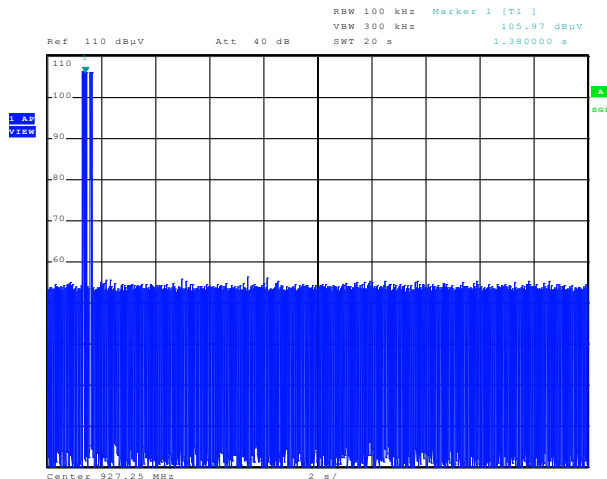
Operating mode 1:



Operating mode 2:



Operating mode 3:



## 8.8 Maximum output power

Rules and specifications:	CFR 47 Part 15, section 15.247(b)(2)
Guide:	ANSI C63.4 / Public Notice DA 00-0705
Limit:	The maximum output power is 1 W (30 dBm) for systems employing at least 50 hopping channels; and 0.25 W (24 dBm) for systems employing less than 50 hopping channels but at least 25 hopping channels.
Measurement procedure:	Radiated Output Power

Comment:	Operating mode 1 & 2 & 3
Date of test:	January 7, 2015
Test site:	Fully anechoic room, cabin no. 2
Test distance:	3 meters

Following calculation will be used for transmitter peak power:

$$P = \frac{(E * d)^2}{30G}$$

Where:

E is the measured maximum fundamental field strength in V/m, utilizing a RBW  $\geq$  the 20 dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.4-1992 with respect to maximizing the emission.

G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.

d is the distance in meters from which the field strength was measured.

P is the power in watts for which you are solving:

Following calculation will be used for conversion dB $\mu$ V/m in V/m:

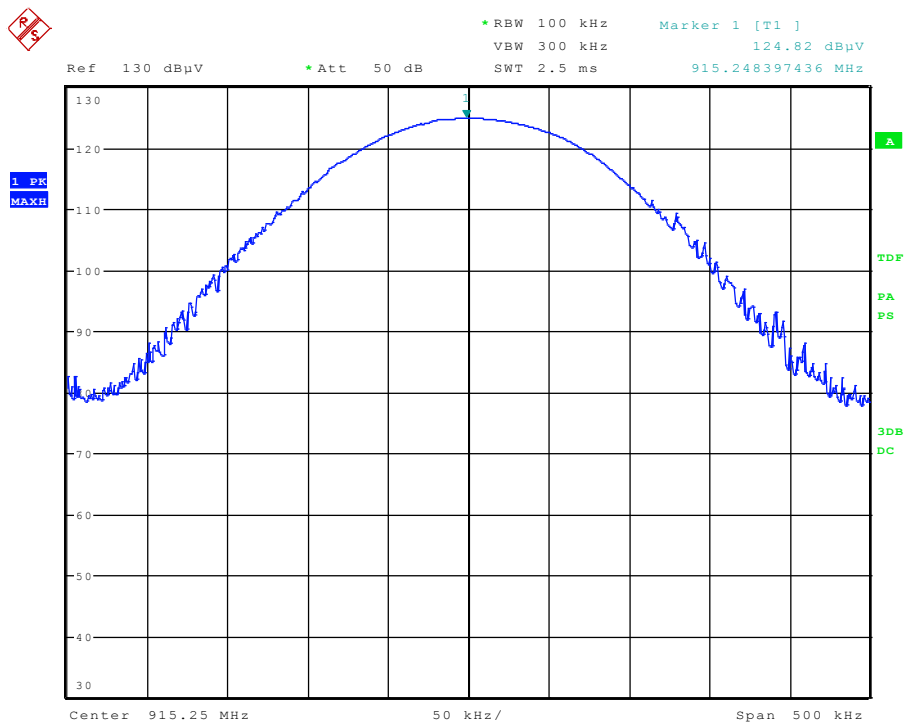
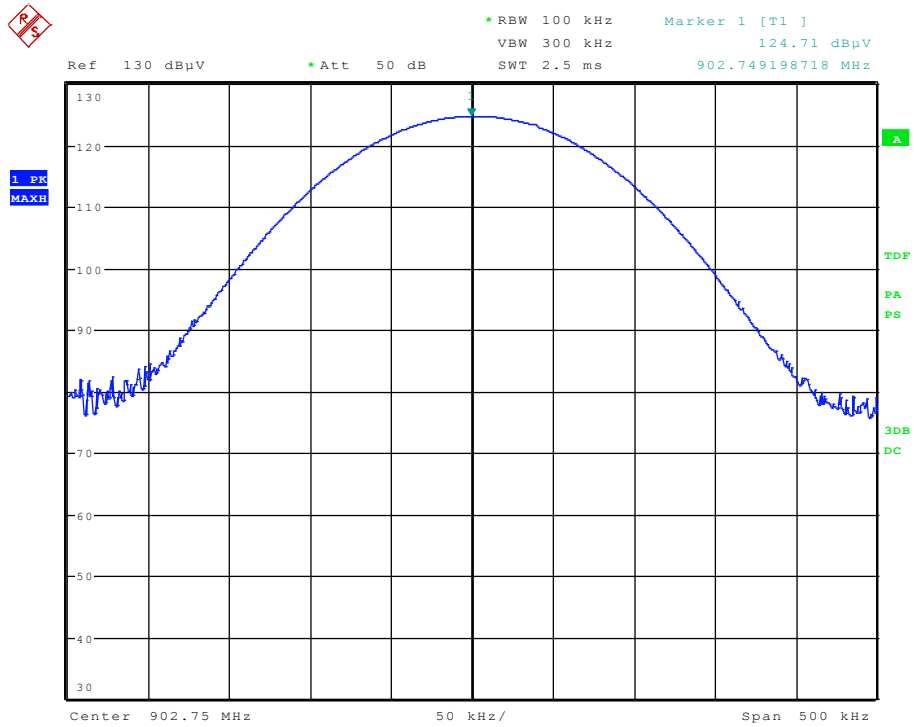
$$E = \frac{10^{(e/20)}}{1.000.000} \quad \text{bzw.} \quad e = 20 * \lg(E * 1.000.000)$$

E = electrical field strength in V/m

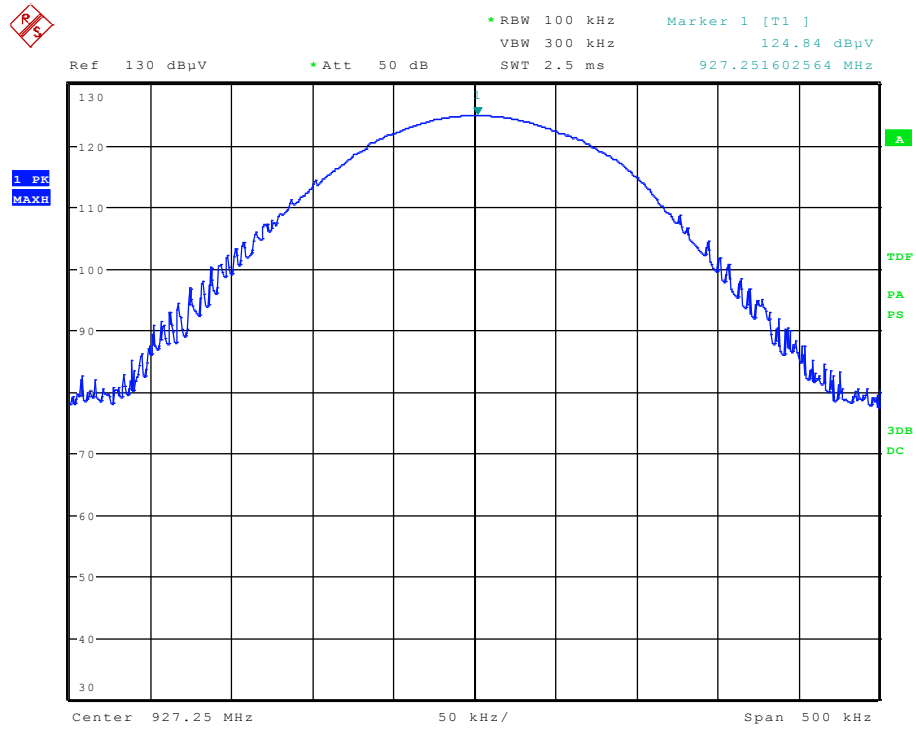
e = electrical field strength in dB $\mu$ V/m

Frequency (MHz)	Measured field strength (dB $\mu$ V/m)	Measured field strength (V/m)	Measurement distance (m)	Gain of transmitting antenna (numeric)	Power (W)	Limit (W)
902.75	124.7	1.717908	3	2.82	0.314	$\leq 1$
915.25	124.8	1.737801	3	2.82	0.321	$\leq 1$
927.25	124.8	1.737801	3	2.82	0.321	$\leq 1$

Test Result:	Test passed
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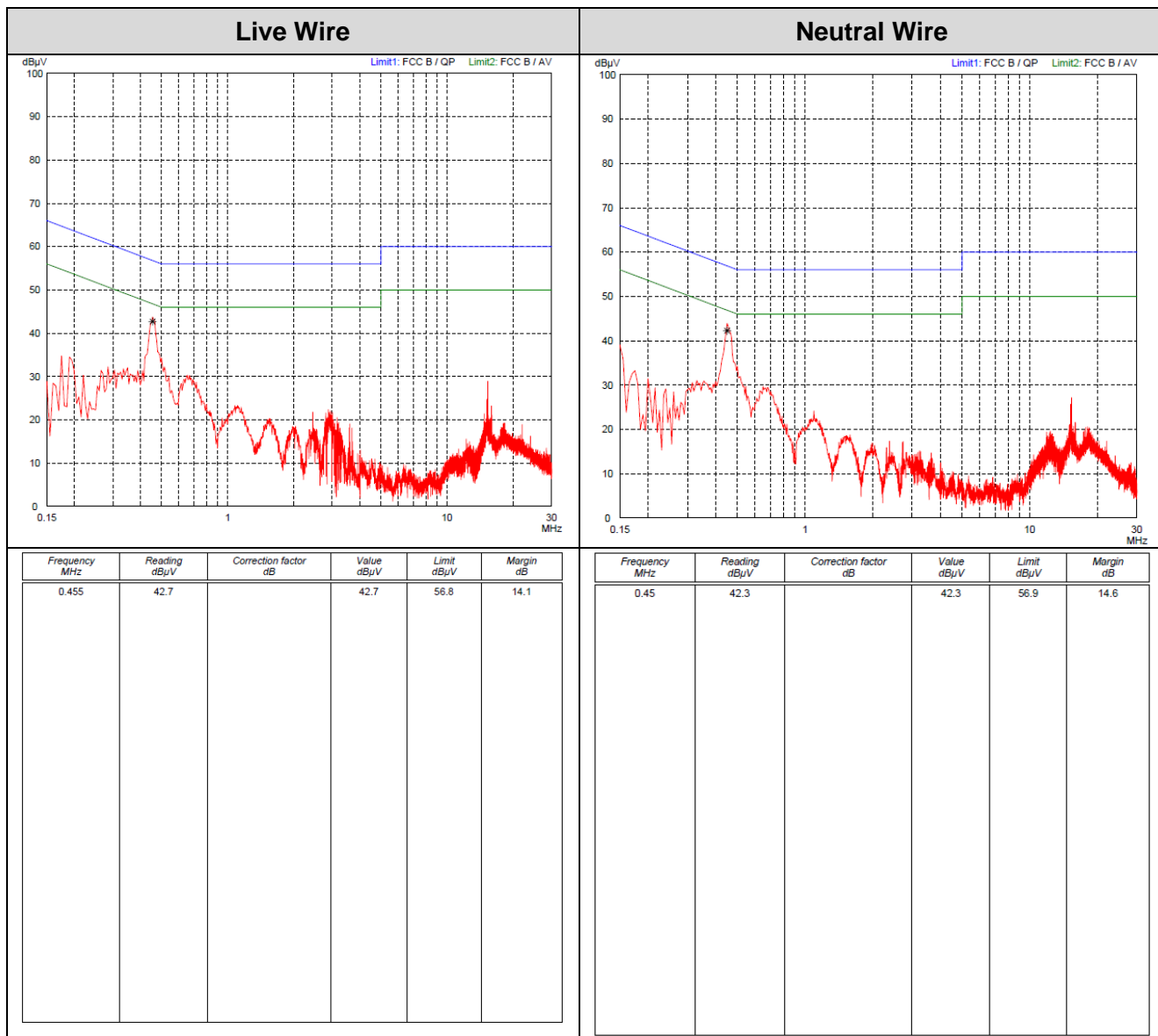
## 8.9 Conducted Powerline Emission Measurement 150 kHz to 30 MHz

Rules and specifications:	CFR 47 Part 15, section 15.207 IC RSS-GEN Issue 4, section 8.8		
Guide:	ANSI C63.4 / CISPR 22		
Limit:	Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
		Quasi-peak	Average
	0.15 - 0.5	66 to 56	56 to 46
	0.5 - 5	56	46
	5 - 30	60	50
Measurement procedure:	Conducted AC Powerline Emission (6.3)		

Comment:	Operating mode 5 $U_{AC} = 115 \text{ V} / 60 \text{ Hz}$
Date of test:	January 8, 2015
Test site:	Shielded room, cabin no. 1

Test Result:	Test passed
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Tested on: AC Input of the charging cradle,



**Sample calculation of final values:**

$$\text{Final Value (dB}\mu\text{V)} = \text{Reading Value (dB}\mu\text{V)} + \text{Correction Factor (dB)}$$



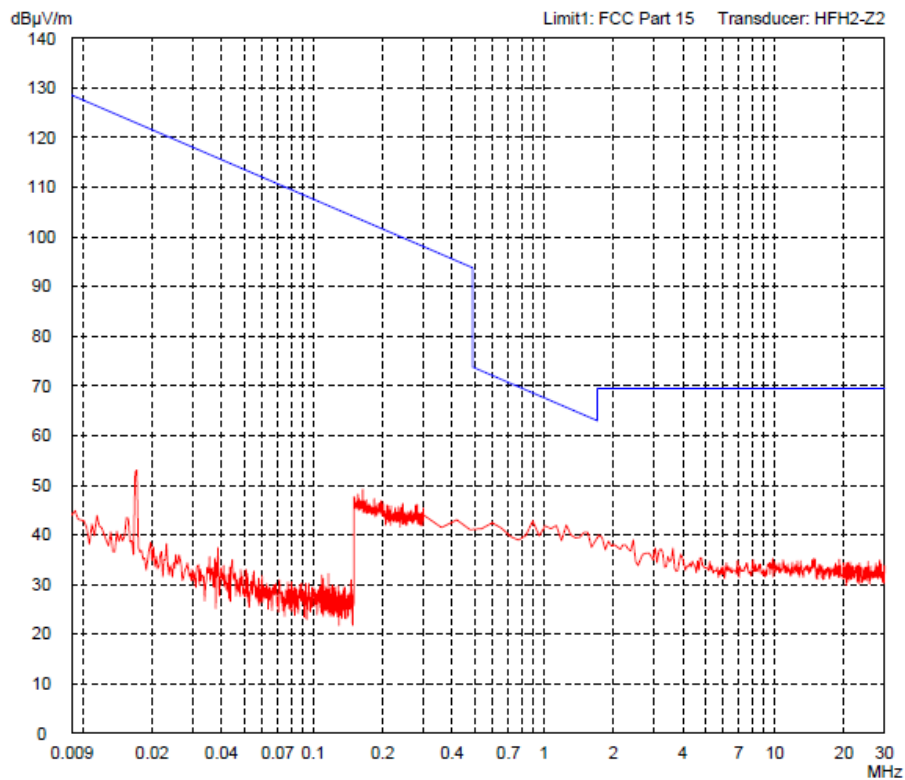
## 8.10 Radiated Emission Measurement 9 kHz to 30 MHz

Rules and specifications:	CFR 47 Part 15, sections 15.247(d), 15.205(a) and 15.209(a) IC RSS-210 Issue 8, section A8.5[4], 2.5[4] and 7.2.2[5]			
Guide:	ANSI C63.4			
Limit:	Frequency of Emission (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	Field Strength (dB $\mu\text{V}/\text{m}$ )	Measurement Distance d (meters)
	0.009 - 0.490	2400/F(kHz)	67.6 - 20 · log(F(kHz))	300
	0.490 - 1.705	24000/F(kHz)	87.6 - 20 · log(F(kHz))	30
	1.705 - 30.000	30	29.5	30
	Additionally, the level of any unwanted emissions shall not exceed the level of the fundamental emission.			
Measurement procedure:	Radiated Emission Measurement 9 kHz to 30 MHz (6.4)			

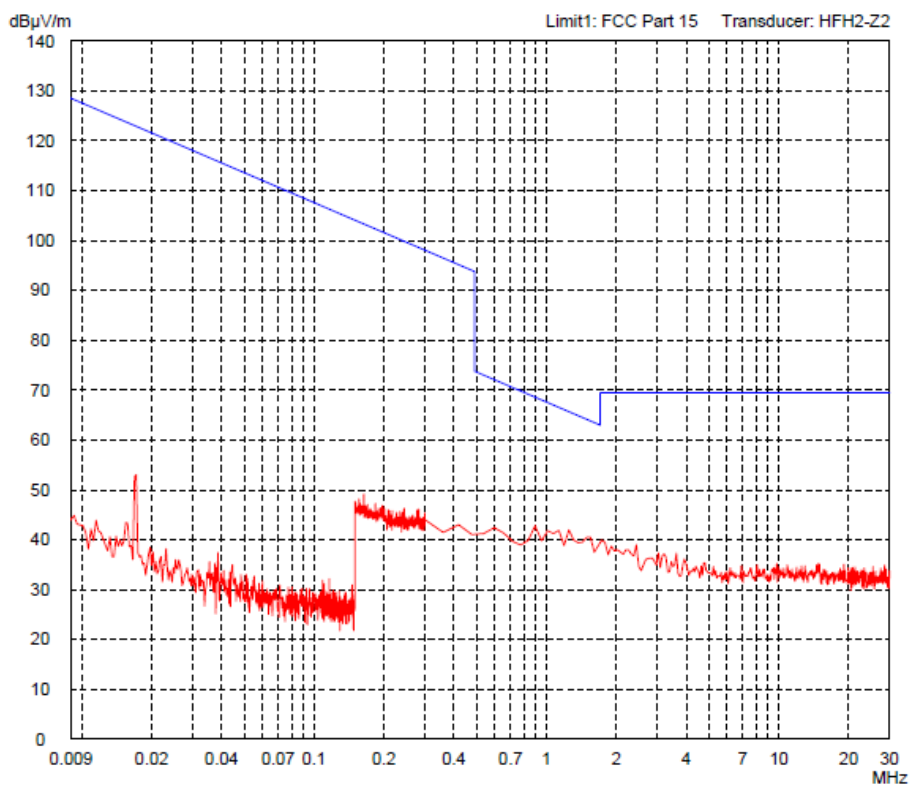
Comment:	Operating mode 1, 2, 3, 5
Date of test:	January 8, 2015
Test site:	Open field test site

Test Result:	Test passed
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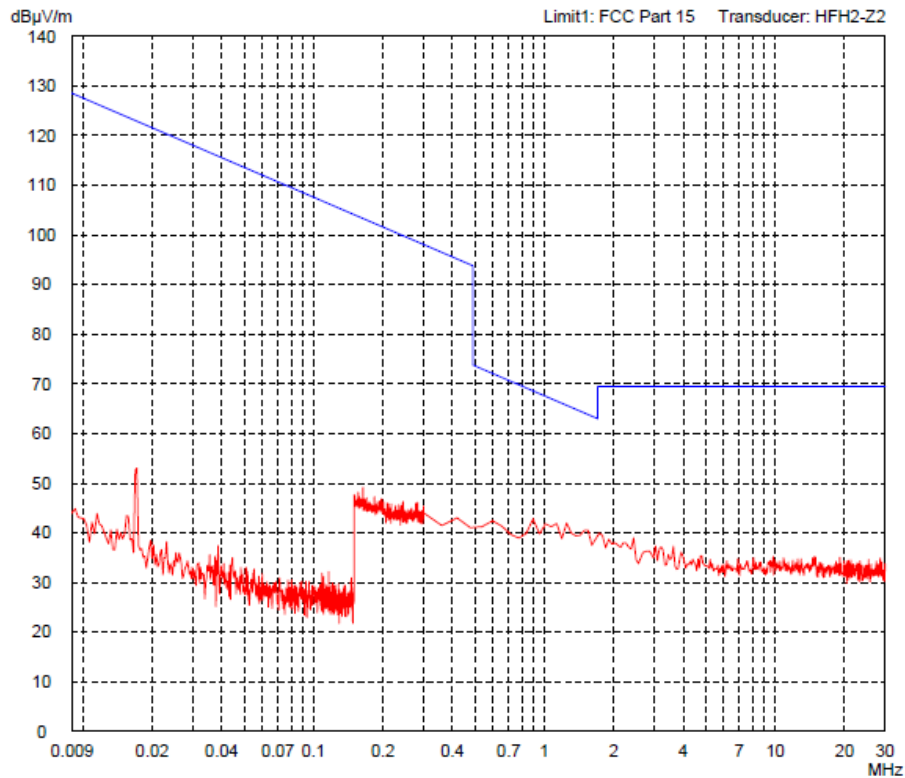
Operating mode 1:



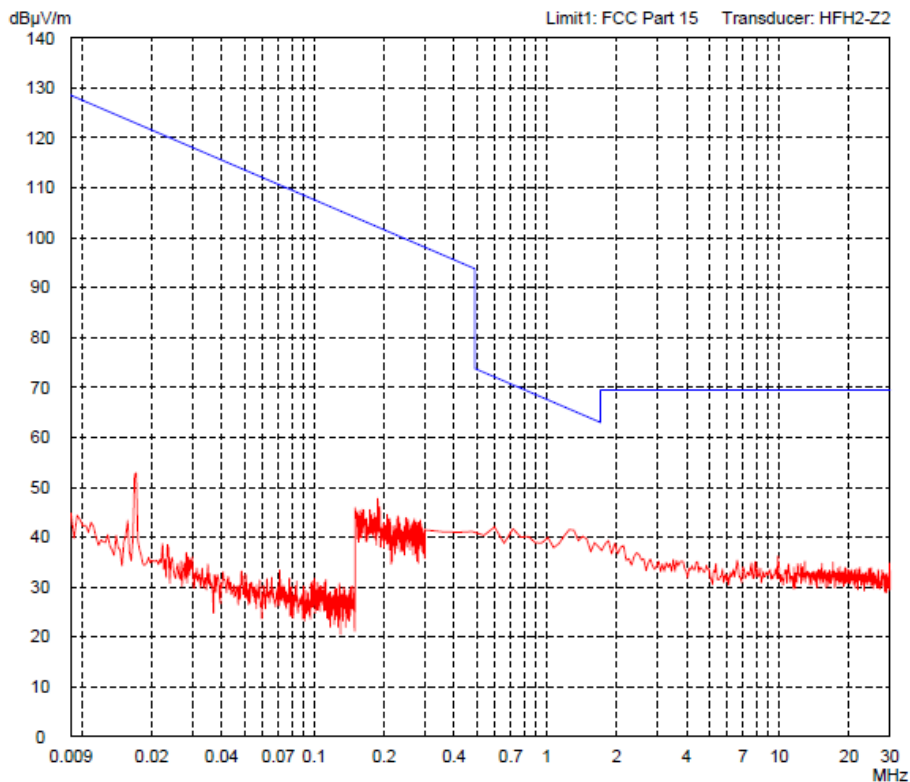
Operating mode 2:



### Operating mode 3:



### Operating mode 5:





**Sample calculation of final values:**

$$\text{Final Value (dB}\mu\text{V/m)} = \text{Reading Value (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

## 8.11 Radiated Emission Measurement 30 MHz to 10 GHz

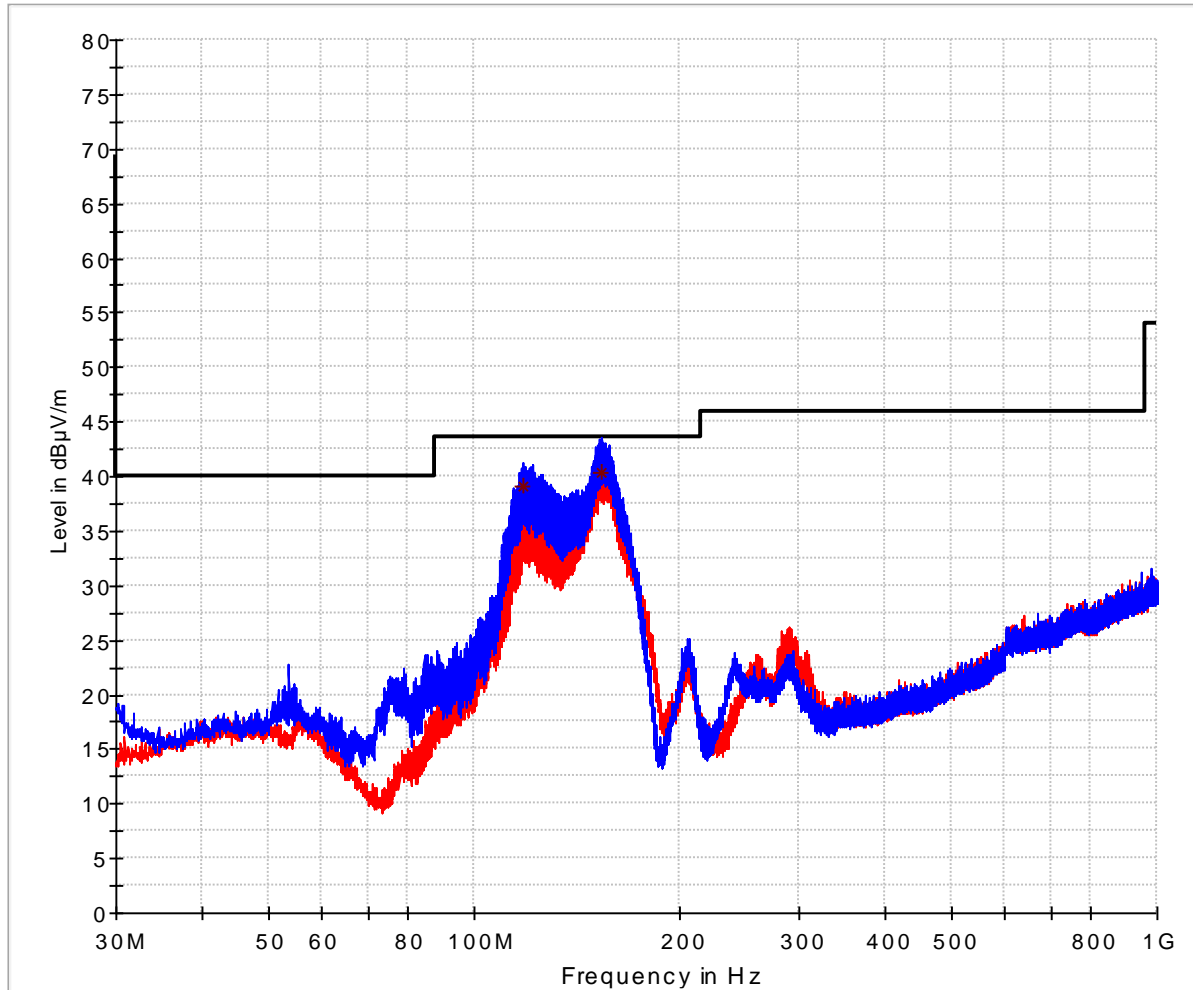
Rules and specifications:	CFR 47 Part 15, sections 15.247(d), 15.205(a) and 15.209(a) IC RSS-210 Issue 8, section A8.5[4], 2.5[4] and 7.2.2[5]		
Guide:	ANSI C63.4		
Limit:	Frequency of Emission (MHz)	Field Strength ( $\mu\text{V}/\text{m}$ )	Field Strength ( $\text{dB}\mu\text{V}/\text{m}$ )
	30 - 88	100	40.0
	88 - 216	150	43.5
	216 - 960	200	46.0
	Above 960	500	54.0
	Additionally, the level of any unwanted emissions shall not exceed the level of the fundamental emission.		
Measurement procedures:	Radiated Emission in Fully or Semi Anechoic Room (6.5)		

Comment:	Operating mode 1, 2, 3, 5
Date of test:	December 22, 23, 2014; January 7, 8, 2015
Test site:	Frequencies $\leq 1$ GHz: Fully anechoic room, cabin no. 2 (pre-measurement Pk) Semi-anechoic room, cabin no. 8 (final measurement QP) Frequencies $> 1$ GHz: Fully anechoic room, cabin no. 2
Test distance:	3 meters

Test Result:	Test passed
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### Operating mode 5



— FCC 15.209      — Preview Result 1H-PK+  
— Preview Result 1V-PK+    \* Final Result 1-QPK

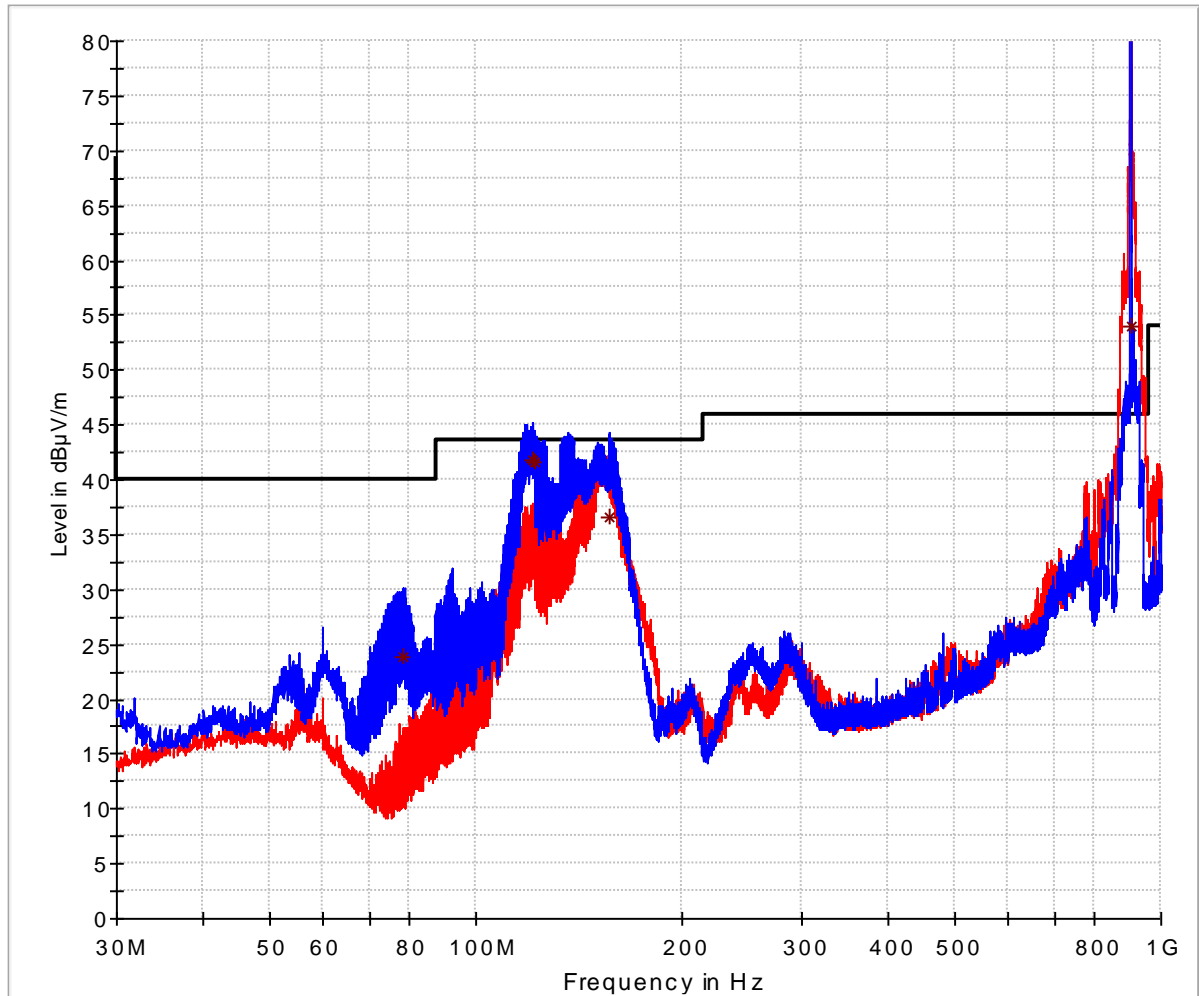
#### Final Results 1:

Frequency MHz	QuasiPeak dBµV/m	Meas. Time ms	Bandwidth kHz	Height cm	Polarization	Azimuth deg	Corr. dB	Margin dB	Limit dBµV/m
118,55	39,1	1000,0	120,000	100,0	V	-164,0	12,2	4,4	43,5
153,93	40,3	1000,0	120,000	100,0	V	27,0	10,0	3,2	43,5

#### Sample calculation of final values:

$$\text{Final Value (dB}\mu\text{V/m)} = \text{Reading Value (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

**Operating mode 1:**

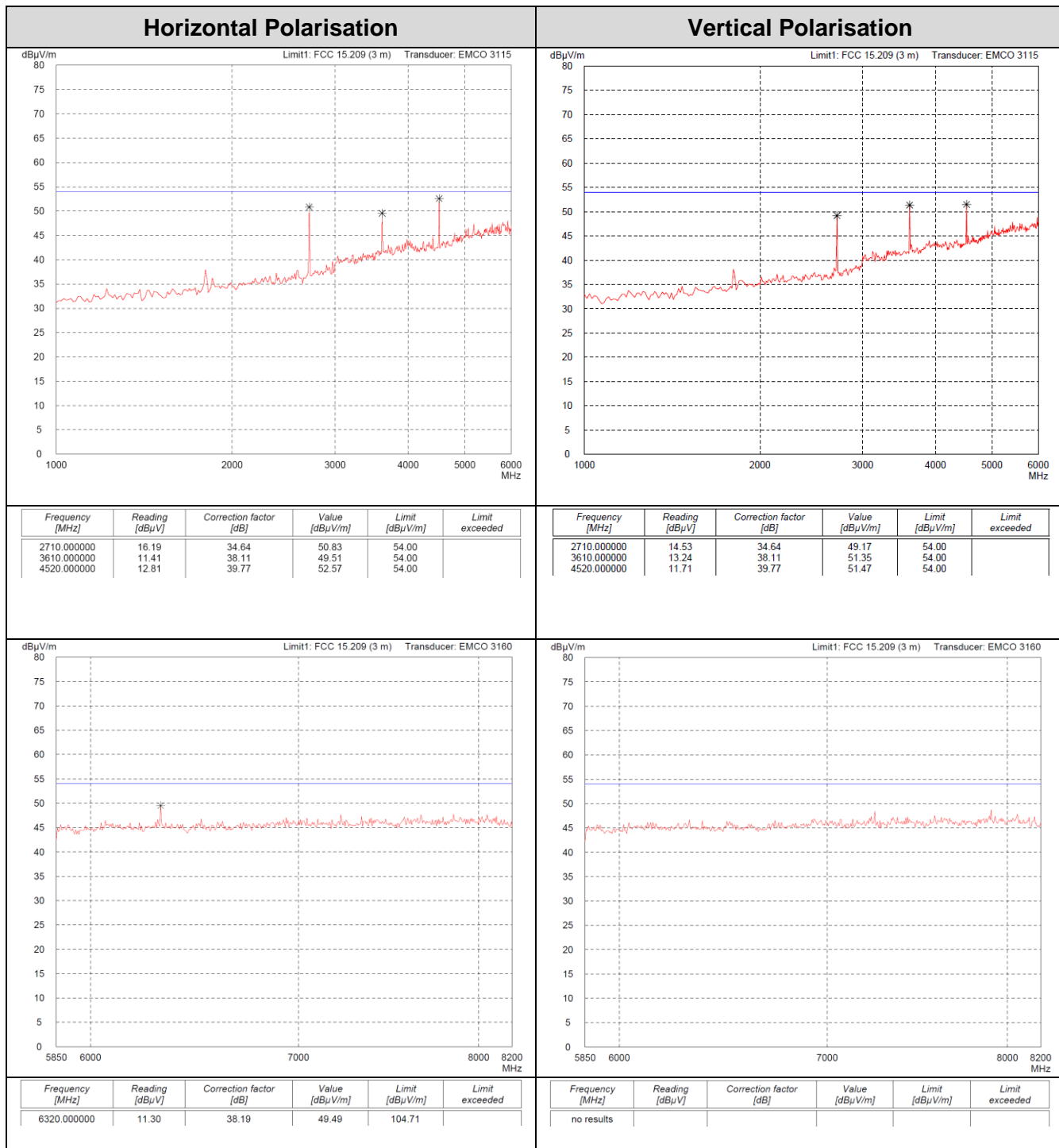


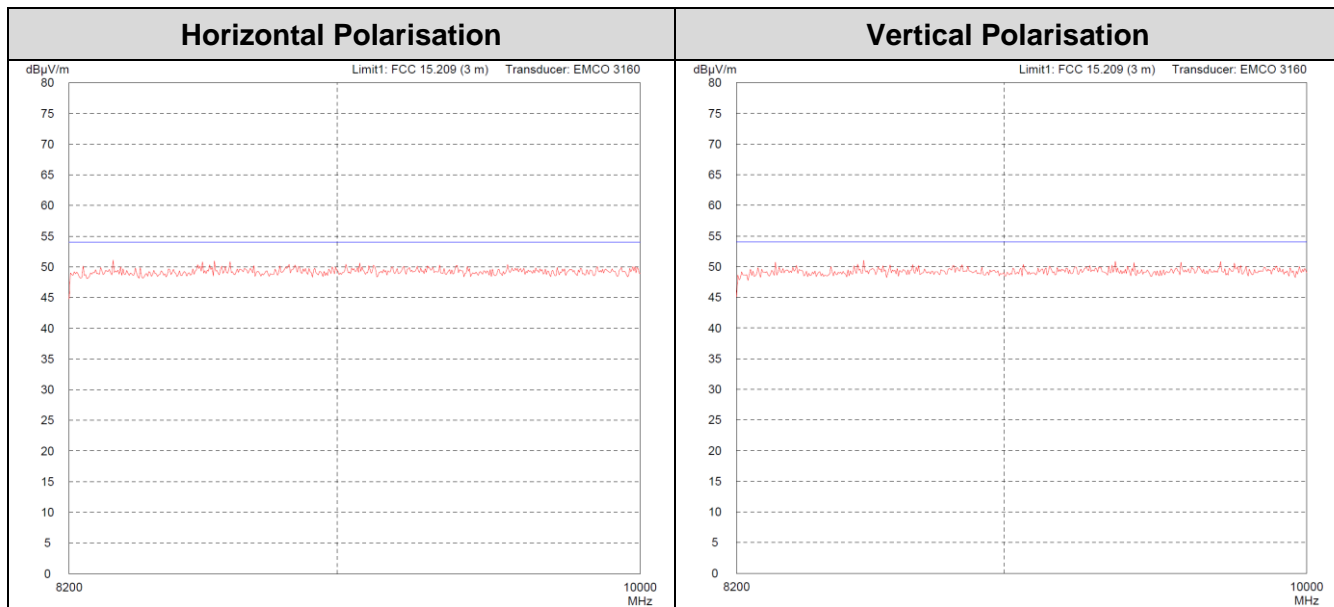
— FCC 15.209      — Preview Result 1H-PK+  
— Preview Result 1V-PK+ \*      — Final Result 1-QPK

**Final Results 1:**

Frequency MHz	QuasiPeak dBµV/m	Meas. Time ms	Bandwidth h kHz	Height cm	Polarization	Azimuth deg	Corr. dB	Margin dB	Limit dBµV/m
78,70	23,8	1000,0	120,000	110,0	V	-90,0	9,2	16,2	40,0
121,670	41,8	1000,0	120,000	100,0	V	170,0	11,7	1,7	43,5
122,04	41,7	1000,0	120,000	100,0	V	170,0	11,7	1,8	43,5
157,04	36,6	1000,0	120,000	100,0	V	-164,0	10,1	6,9	43,5
902,77*	123,0	1000,0	120,000	179,0	H	-176,0	24,8		

\* Operating frequency!





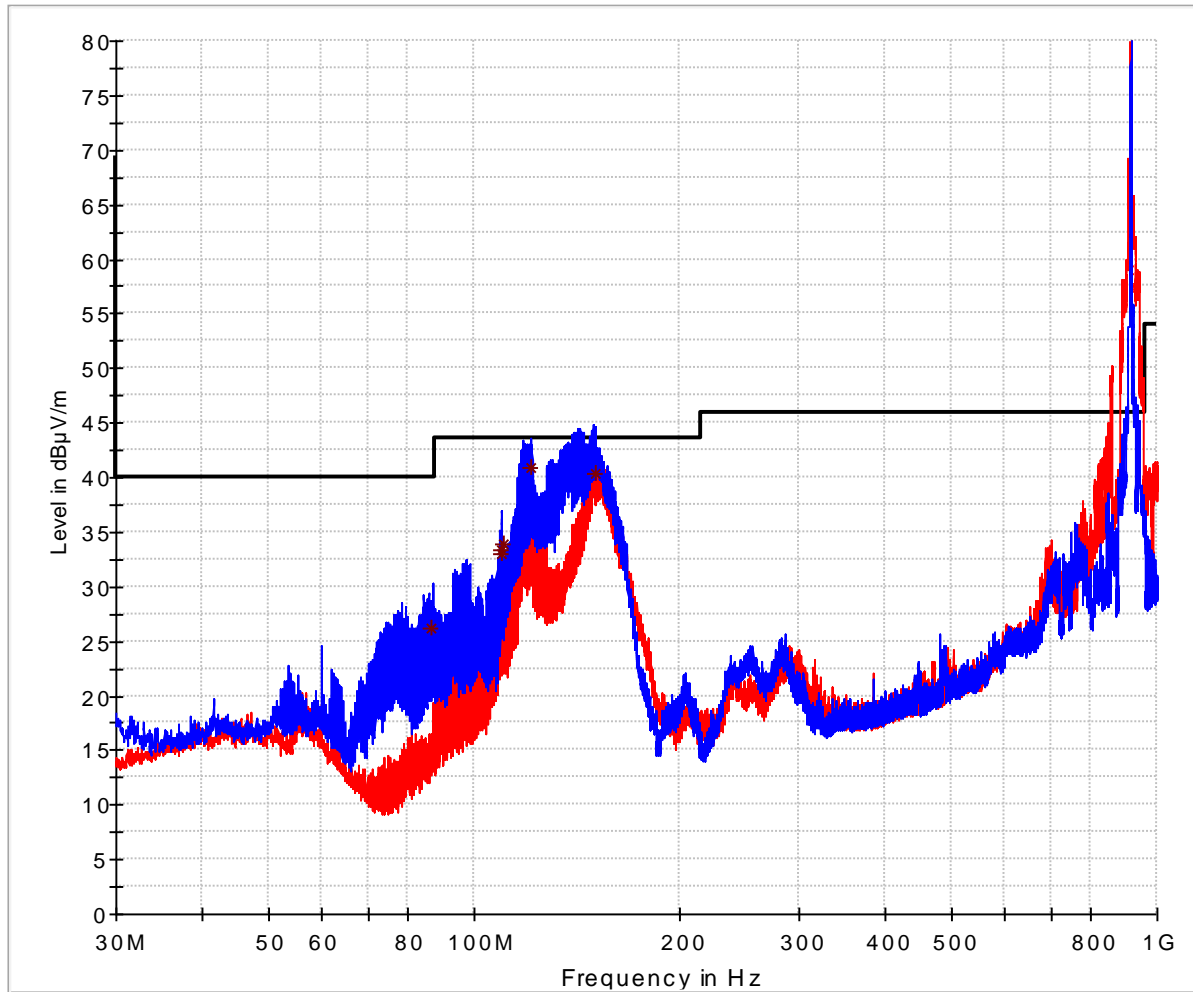
**Note:**

\* Unwanted emission of the operating frequency. Limit kept because the measurement values are 20 dB below the operating frequency level. The measurements was carried out with Peak-detector.  
 The limit for the harmonics is 20dB below the measured fieldstrenght of the carrier frequency.

**Sample calculation of final values:**

$$\text{Final Value (dB}\mu\text{V/m)} = \text{Reading Value (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

### Operating mode 2:

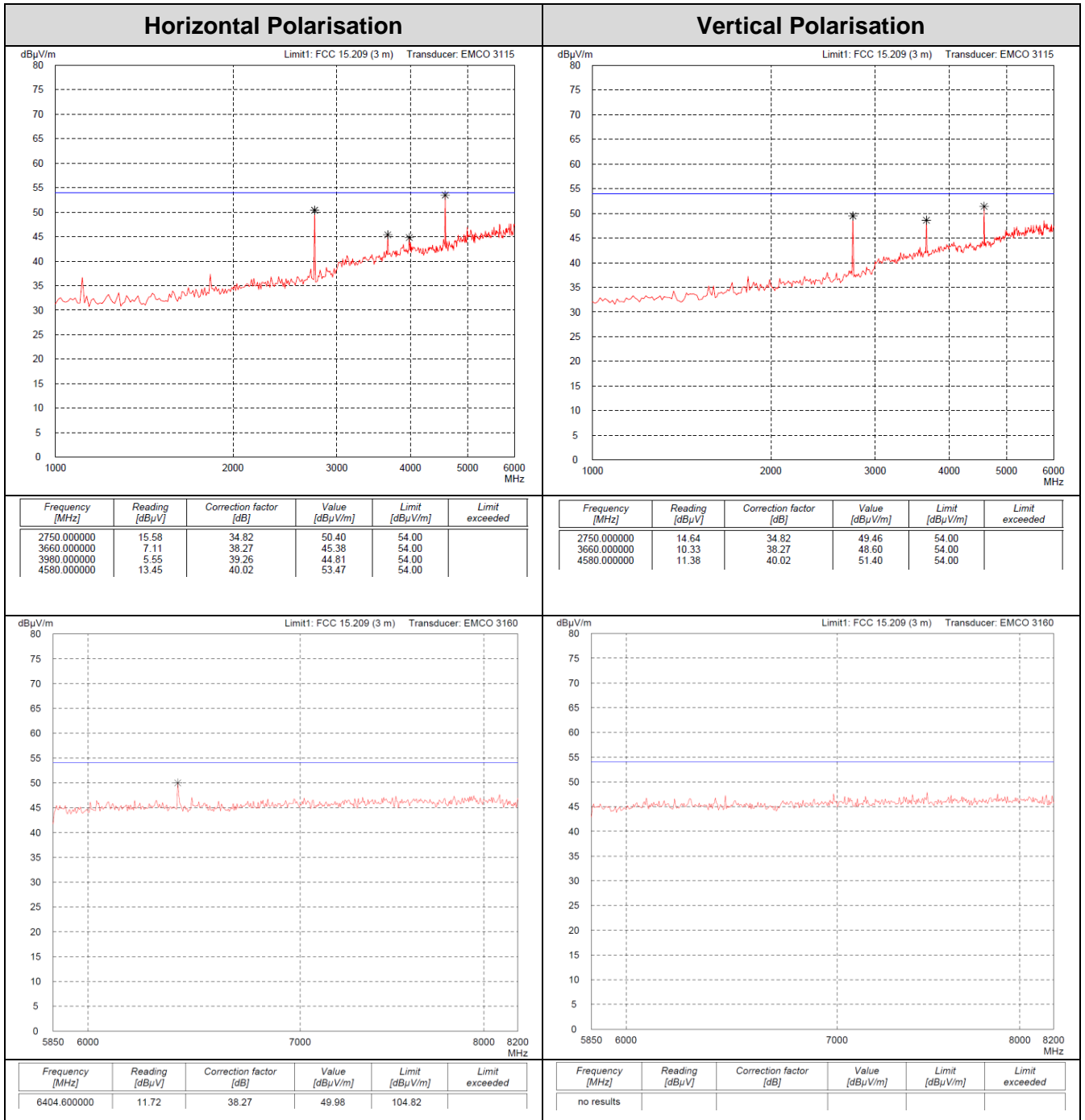


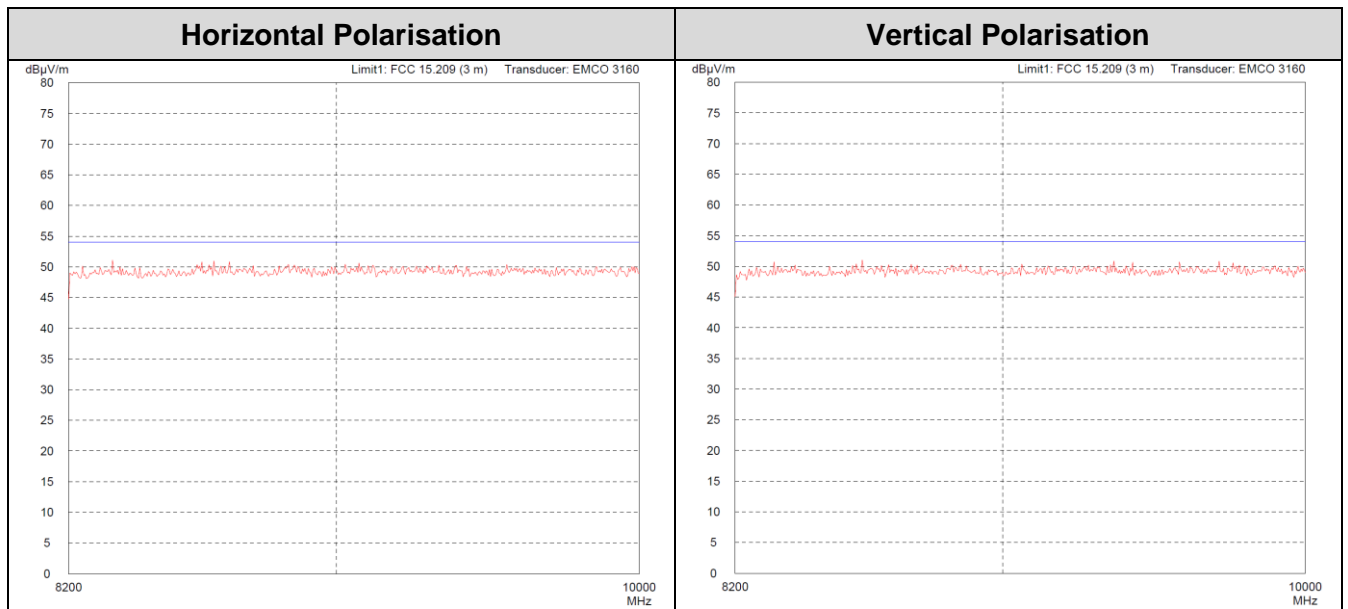
— FCC 15.209      — Preview Result 1H-PK+  
 — Preview Result 1V-PK+ \*      Final Result 1-QPK

#### Final Results 1:

Frequency MHz	QuasiPeak dBµV/m	Meas. Time ms	Bandwidth kHz	Height cm	Polarization	Azimuth deg	Corr. dB	Margin dB	Limit dBµV/m
86,67	26,2	1000,0	120,000	100,0	V	-71,0	11,7	13,8	40,0
110,10	33,0	1000,0	120,000	100,0	V	158,0	13,5	10,5	43,5
110,12	33,4	1000,0	120,000	100,0	V	165,0	13,5	10,1	43,5
110,91	33,9	1000,0	120,000	100,0	V	159,0	13,4	9,6	43,5
121,24	40,9	1000,0	120,000	100,0	V	-200,0	11,8	2,6	43,5
151,02	40,4	1000,0	120,000	100,0	V	-159,0	10,0	3,1	43,5
915,25*	122,7	1000,0	120,000	167,0	H	-169,0	25,0		

\* Operating frequency!





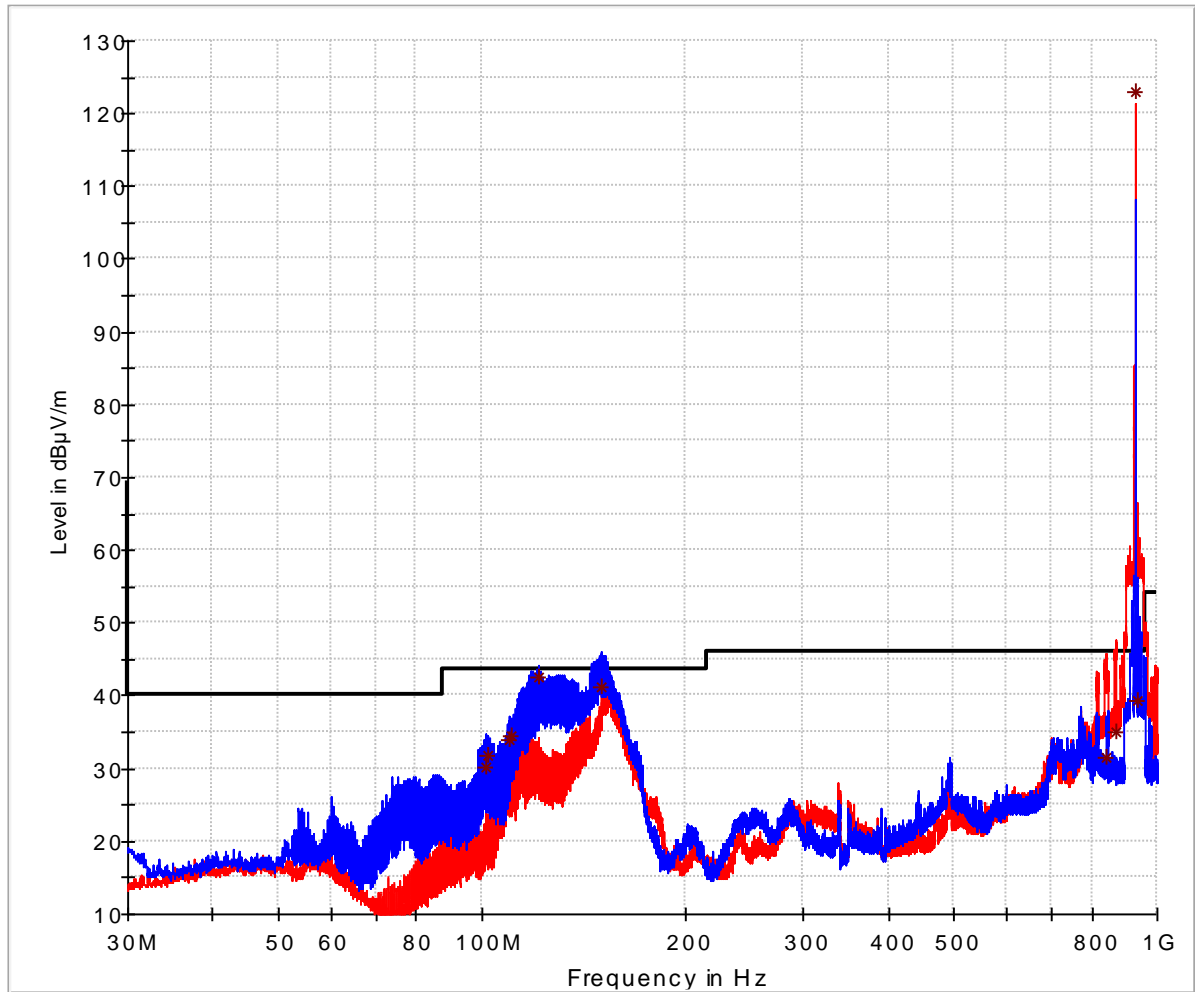
**Note:**

\* Unwanted emission of the operating frequency. Limit kept because the measurement values are 20 dB below the operating frequency level. The measurements was carried out with Peak-detector.  
 The limit for the harmonics is 20dB below the measured fieldstrenght of the carrier frequency.

**Sample calculation of final values:**

$$\text{Final Value (dB}\mu\text{V/m)} = \text{Reading Value (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

### Operating mode 3:



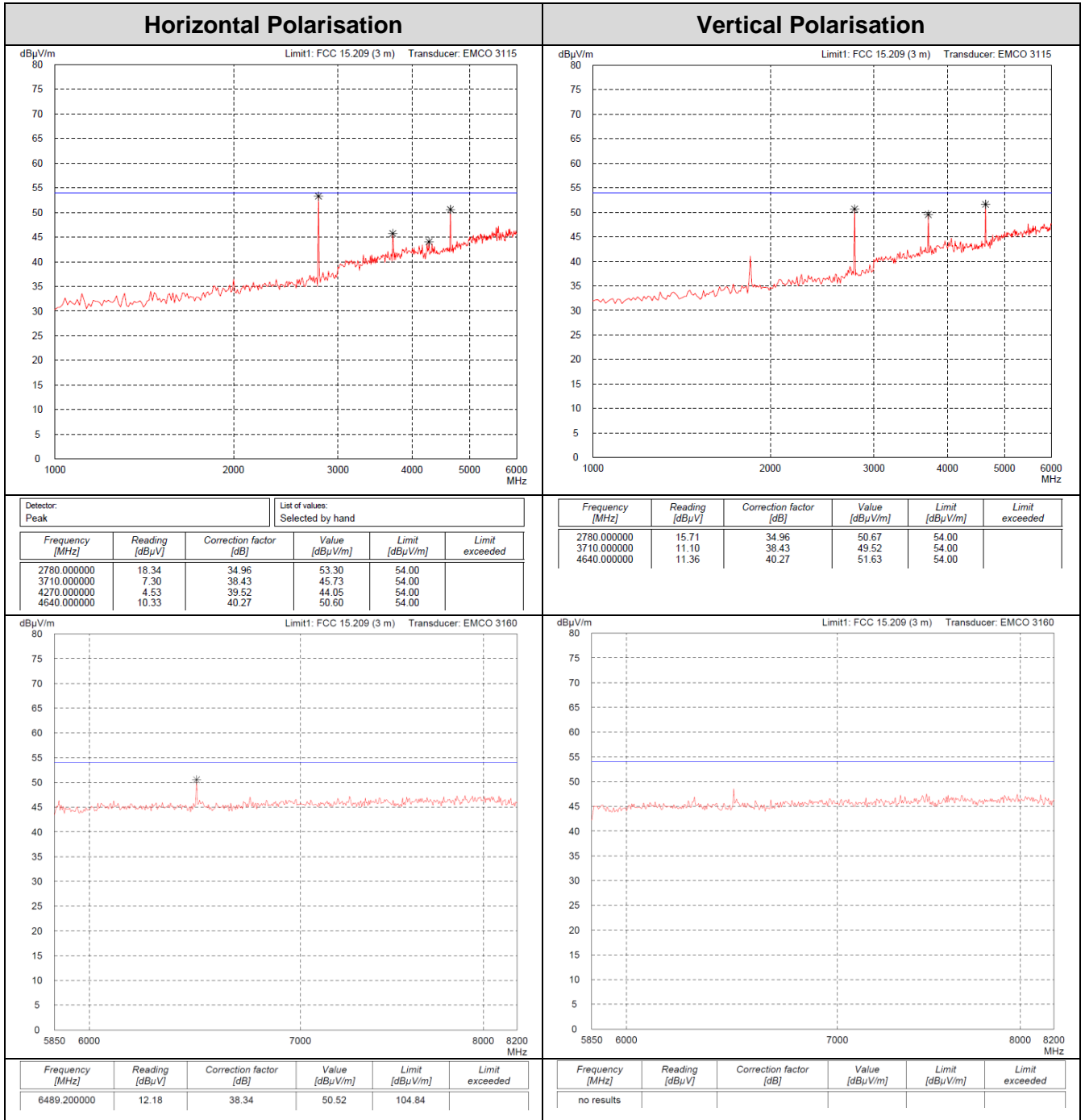
— FCC 15.209      — Preview Result 1H-PK+  
— Preview Result 1V-PK+      \* Final Result 1-QPK

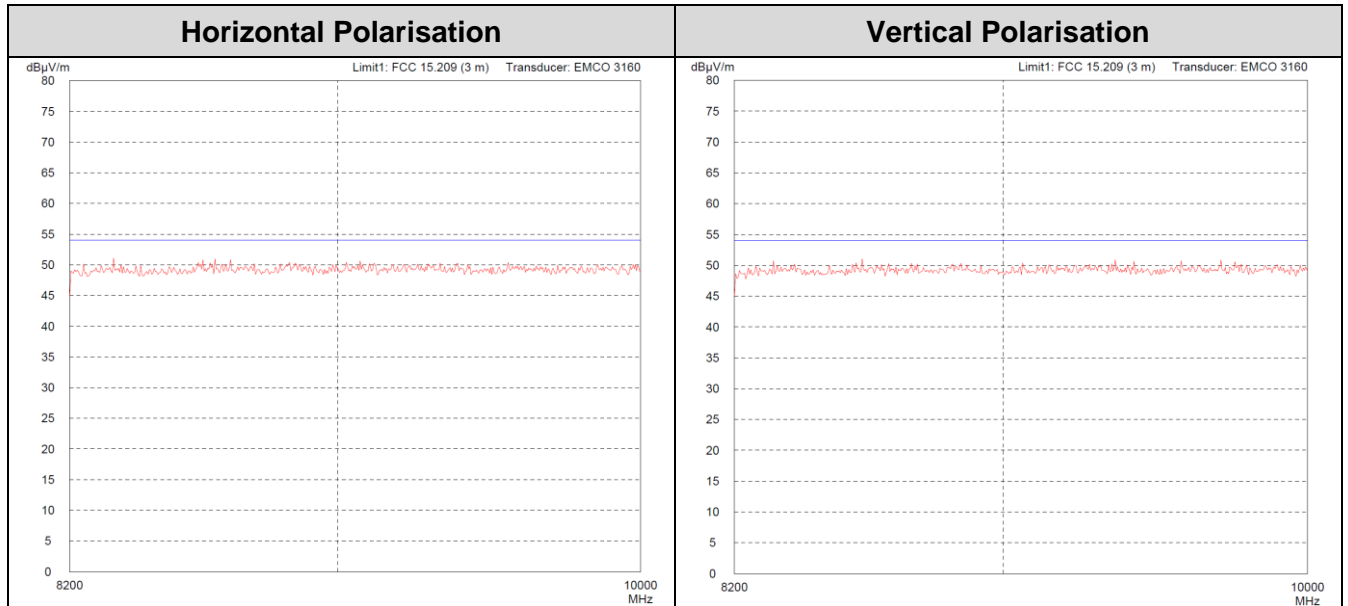
### Final Results 1:

Frequency MHz	QuasiPeak dBµV/m	Meas. Time ms	Bandwidth kHz	Height cm	Polarization	Azimuth deg	Corr. dB	Margin dB	Limit dBµV/m
101,76	30,3	1000,0	120,000	100,0	V	-128,0	13,8	13,2	43,5
102,21	31,7	1000,0	120,000	100,0	V	-127,0	13,8	11,8	43,5
110,16	33,9	1000,0	120,000	100,0	V	158,0	13,5	9,6	43,5
110,49	34,4	1000,0	120,000	100,0	V	168,0	13,4	9,1	43,5
122,05	42,6	1000,0	120,000	100,0	V	177,0	11,7	0,9	43,5
150,72	41,3	1000,0	120,000	100,0	V	-154,0	10,0	2,2	43,5
841,85	31,6	1000,0	120,000	183,0	H	162,0	24,0	14,4	46,0
869,48	35,0	1000,0	120,000	123,0	H	-182,0	24,5	11,0	46,0
927,25*	123,1	1000,0	120,000	179,0	H	-175,0	25,1	-77,1	46,0

\* Operating frequency!







**Note:**

\* Unwanted emission of the operating frequency. Limit kept because the measurement values are 20 dB below the operating frequency level. The measurements was carried out with Peak-detector.  
 The limit for the harmonics is 20dB below the measured fieldstrenght of the carrier frequency.

**Sample calculation of final values:**

$$\text{Final Value (dBµV/m)} = \text{Reading Value (dBµV)} + \text{Correction Factor (dB/m)}$$

## 8.12 Exposure of Humans to RF Fields - MPE

Rules and specifications:	CFR 47 Part 15, section 15.247(i) CFR 47 Part 1, sections 1.1307(b)(1)				
Guide:	OET Bulletin 65, Edition 97-01				
Note:	RF Exposure/SAR on Host Device with maximum hardware mounted. The RF module is exempted from SAR, because it will be used with outstretched hands (>20cm). The RF module functionality will be triggered manually by hand.				
Limits:	Limits for general population / uncontrolled exposure				
	Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time (minutes)
	0.3 - 1.34	614	1.63	(100)*	30
	1.34 - 30	824 / f	2.19 / f	(180 / f <sup>2</sup> )*	30
	30 - 300	27.5	0.073	0.2	30
	300 - 1500	---	---	f/1500	30
	1500 - 100000	---	---	1.0	30
	f = frequency in MHz * Plane-wave equivalent power density				

Spectral power density		Declared by applicant	Measured
Prediction <sup>7</sup> :	$S = P G / 4 \pi R^2$		
Where:	S = Power density P = Power input of antenna G = Power gain of the antenna relativ to an isotropic radiator R = Distance to the center of radiation of the antenna		
Maximum output power:	P = 26.4 dBm = 321 mW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Antenna gain:	G = 2.82	<input checked="" type="checkbox"/>	
Prediction distance:	R = 20 cm		
Power density at 20 cm:	<b>S = 0.180 mW/cm<sup>2</sup></b>		
Limit	<b>S<sub>lim</sub> = 0.602 mW/cm<sup>2</sup></b>		

Test Result:	Test passed
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<sup>7</sup> MPE Prediction of MPE according to equation from page 19 of OET Bulletin 65, Ed. 97-01

## 9 Referenced Regulations

All tests were performed with reference to the following regulations and standards:

<input checked="" type="checkbox"/>	CFR 47 Part 2	Code of Federal Regulations Part 2 (Frequency allocation and radio treaty matters; General rules and regulations) of the Federal Communication Commission (FCC)	October 1, 2014
<input checked="" type="checkbox"/>	CFR 47 Part 15	Code of Federal Regulations Part 15 (Radio Frequency Devices) of the Federal Communication Commission (FCC)	October 1, 2014
<input checked="" type="checkbox"/>	ANSI C63.4	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	December 11, 2003 (published on January 30, 2004)
<input type="checkbox"/>	ANSI C63.4	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	June 7, 2009 (published on September 15, 2009)
<input type="checkbox"/>	ANSI C63.4	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	June 13, 2014 (published on June 20, 2014)
<input type="checkbox"/>	ANSI C63.10	American national Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	June 27, 2013 (published on September 13, 2013)
<input type="checkbox"/>	RSS-Gen	Radio Standards Specification RSS-Gen Issue 4 containing General Requirements and Information for the Certification of Radiocommunication Equipment, published by Industry Canada	November 2014
<input type="checkbox"/>	RSS-210	Radio Standards Specification RSS-210 Issue 8 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, published by Industry Canada	December 2010
<input type="checkbox"/>	RSS-310	Radio Standards Specification RSS-310 Issue 3 for Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category II Equipment, published by Industry Canada	December 2010
<input type="checkbox"/>	RSS-102	Radio Standards Specification RSS-102 Issue 5: Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), published by Industry Canada	March 2015

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<input type="checkbox"/>	ICES-003	Interference-Causing Equipment Standard ICES-003 Issue 4 for Digital Apparatus, published by Industry Canada	February 7, 2004
<input checked="" type="checkbox"/>	CISPR 22	Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement"	1997
<input type="checkbox"/>	CAN/CSA-CEI/IEC CISPR 22	Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment	2002
		CAN/CSA CISPR 22-10 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement (Adopted IEC CISPR 22:2008, sixth edition, 2008-09)	
<input type="checkbox"/>	CAN/CSA CISPR 22-10	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement (Adopted IEC CISPR 22:2008, sixth edition, 2008-09)	2010
<input checked="" type="checkbox"/>	TRC-43	Designation of Emissions, Class of Station and Nature of Service, published by Industry Canada	November 2012

## 10 Test Equipment List with Calibration Data

Type	Inv.-No.	Type Designation	Serial Number	Manufacturer	Calibration Organization	Last Calibration	Next Calibration
EMI test receiver	1028	ESHS10	860043/016	Rohde & Schwarz	Rohde & Schwarz	09/2014	09/2015
EMI test receiver	2044	ESU8	100232	Rohde & Schwarz	Rohde & Schwarz	02/2014	02/2015
Spectrum analyser	1666	FSP30	100063	Rohde & Schwarz	Rohde & Schwarz	05/2014	11/2015
Preamplifier	1651	CPA9231A	3393	Schaffner Electrotest	TÜV SÜD PS-EMC-STR	09/2014	09/2016
V-network	1060	ESH3-Z5	862770/021	Rohde & Schwarz	Rohde & Schwarz	06/2014	06/2015
Double ridged waveguide horn antenna	1516	3115	9508-4553	EMCO Elektronik	Seibersdorf Laboratories	11/2014	11/2016
Horn antenna	1014	3160-07	9112-1008	EMCO Elektronik		see note 1	
Loop antenna	1016	HFH2-Z2	882964/0001	Rohde & Schwarz	Rohde & Schwarz	05/2014	05/2015
TRILOG Broadband Antenna	2058	VULB 9163	9163-408	Schwarzbeck	Rohde & Schwarz	06/2014	06/2016
TRILOG Broadband Antenna (FAC)	2256	VULB 9162	9162-048	Schwarzbeck	Rohde & Schwarz	09/2013	09/2015

Note 1: No calibration required.

Note 2: Not calibrated separately but with the whole test system when recording calibration data.

Note 3: No calibration required. Devices are checked before use.

Note 4: No calibration required. Devices are checked by calibrated equipment during test.



## 11 Revision History

Revision History			
<i>Edition</i>	<i>Date</i>	<i>Issued by</i>	<i>Modifications</i>
1	December 18, 2014	M. Biberger	First Edition
2	March 3, 2015	M. Biberger	Second Edition: Test equipment ESU 8 changed RSS-GEN Issue 3 changed to Issue 4 and references updated
3	September 19, 2015	M. Biberger	Third Edition: Page 66-69: Exposure of human to RF fields according to RSS-102 Issue 5. Page 46: Calculation added (dBµV/m to V/m) Regulation references corrected. Page 4: Modulation type corrected FCC and IC regulations separated.
4	October 1, 2015	M. Biberger	Fourth Edition: Page 27: Test results IC removed Page 37: IC reference removed Page 39: Bandwidth corrected (37.7kHz to 38.5kHz) Page 69-72: RF Exposure RSS-102 removed and FCC MPE added.
5	October 8, 2015	M. Biberger	Fifth Edition: MPE calculation added
6	October 12, 2015	M. Biberger	Sixth Edition: Type designation corrected: MC92N0ex RFID-UHF INTERNAL with external antenna