eurofins | Product Service

FCC TEST REPORT **Co-Location**	
Report Reference No	G0M-1909-8479-TFCCOLOC-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	pei tel Communications GmbH
Address	Rheinstraße 15 A 14513 Teltow GERMANY
Test Specification	47 CFR Part 22H, 47 CFR Part 24E RSS-132, Issue 3: 2013-01, RSS-133, Issue 6:2013-01 47 CFR Part 15C RSS-247, Issue 2, 2017-02
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	PTCarPhone
Model(s)	PTCarPhone 6
Additional Model(s)	None
Brand Name(s)	PEI TEL
Hardware Version(s)	01
Software Version(s)	V.6.01.01
FCC-ID	2AU9JPTC6
IC	25691-PTC6
Test Result	**PASSED**

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2019-11-18	
Report:		
Compiled by	Toralf Jahn	
Tested by (+ signature) (Responsible for Test)	Toralf Jahn	
Approved by (+ signature) (Head of Lab)	Christian Weber	
Date of Issue	2020-02-06	
Total number of pages	36	
General Remarks:		
The test results presented in this report relate only to the object tested. **The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.** This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		
Additional Comments: PTCarPhone 6 6609-006-101-51 consists of: 6098-006-000-51 (TPU), 6922-001-002-51 (ME16), 6508-006-000-51 (HA59), 6507-002-100-51 (A58), 6601-011-000-51 (KL18), 6098-024-000-51 Versorgungskabel), 6098-260-005-51 (Verlängerungskabel)		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-02-06	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V_{NOM}	Nominal supply voltage

REPORT INDEX

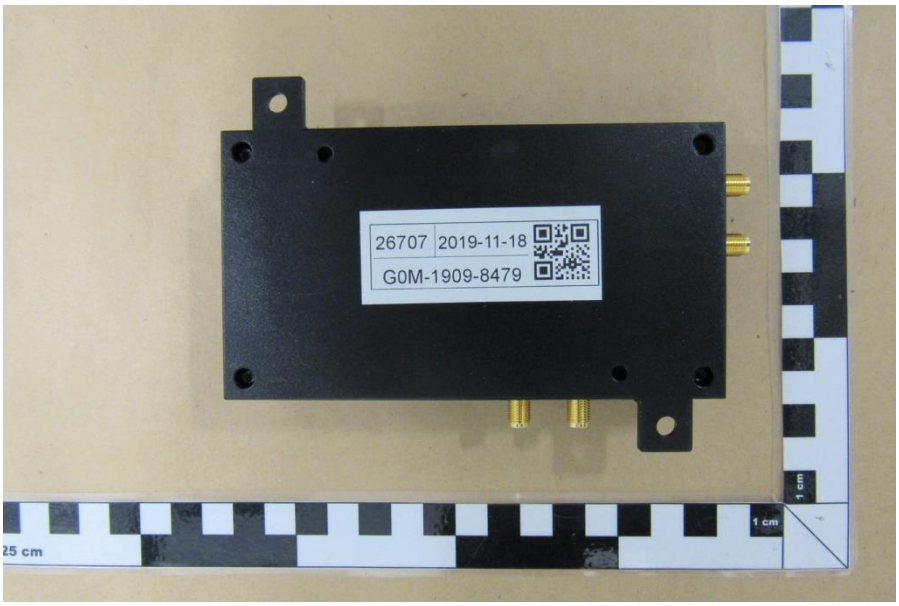
1 Equipment (Test Item) Under Test

Description	PTCarPhone	
Model	PTCarPhone 6	
Additional Model(s)	None	
Brand Name(s)	PEI TEL	
Serial Number(s)	Q8 (IMEI 354328090011039)	
Hardware Version(s)	01	
Software Version(s)	V.6.01.01	
PMN	PTCarPhone6	
HVIN	01	
FVIN	V.6.01.01	
HMN	N/A	
FCC-ID	2AU9JPTC6	
IC	25691-PTC6	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	IEEE 802.11 = 2400 - 2483.5 MHz UMTS FDDII = UL = 1850 - 1910 MHz, DL = 1930 - 1990 MHz UMTS FDDIV = UL = 1710 - 1755 MHz, DL = 2110 - 2155 MHz UMTS FDDV = UL = 824 - 849 MHz, DL = 869 - 894 MHz LTE FDD2 = UL = 1850 - 1910 MHz, DL = 1930 - 1990 MHz LTE FDD4 = UL = 1710 - 1755 MHz, DL = 2110 - 2155 MHz LTE FDD5 = UL = 824 - 849 MHz, DL = 869 - 894 MHz LTE FDD12 = UL = 699 - 716 MHz, DL = 729 - 746 MHz LTE FDD13 = UL = 777 - 787 MHz, DL = 746 - 756 MHz LTE FDD14 = UL = 788 - 798 MHz, DL = 758 - 768 MHz LTE FDD66 = UL = 1710 - 1780 MHz, DL = 2110 - 2200 MHz LTE FDD71 = UL = 663 - 698 MHz, DL = 617 - 652 MHz	
Radio technologies	UMTS / LTE / IEEE 802.11 b/g/n (HT20 + HT40)	
Operating modes	UMTS + IEEE 802.11	
Number of modules	2	
Radio Module IEEE 802.11	Type	IEEE 802.11
	Model	WE866C3-P
	Manufacturer	Telit
	HW Version	unspecified
	SW Version	unspecified
	FCC-ID	RI7WE866C3
	IC	5131A-WE866C3
Radio Module UMTS / LTE	Type	UMTS / LTE
	Model	LE910C4-NF
	Manufacturer	Telit
	HW Version	unspecified
	SW Version	unspecified
	FCC-ID	RI7LE910CXNF
	IC	5131A-LE910CXNF
Antenna IEEE 802.11	Type	external
	Model	ANT-2/5-HDP-2000-SMA
	Manufacturer	Linx Technologies
	Gain	4.0 dBi

Antenna UMTS / LTE	Type	external
	Model	CEL 70 26 RD M/FME/2,5
	Manufacturer	Hirschmann
	Gain	3.0 dBi
Supply Voltage	V_{NOM}	14 VDC
AC/DC-Adaptor	Model	None
	Vendor	None
	Input	None
	Output	None
Manufacturer	pei tel Communications GmbH Rheinstraße 15 A 14513 Teltow GERMANY	

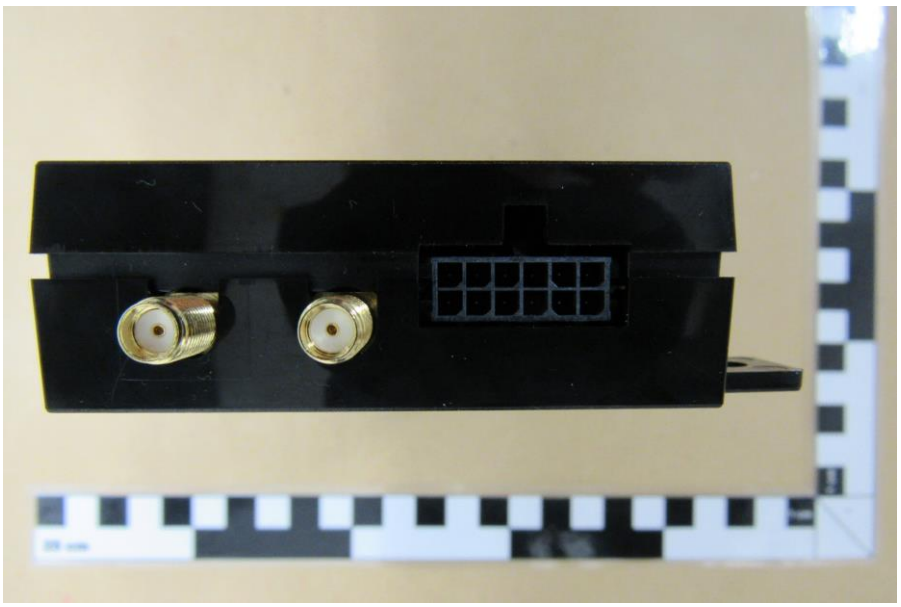
1.1 Photos – Equipment External

TPU


TPU


TPU


TPU


TPU


HA59


HA59


GNSS ANTENNA


LTE ANTENNA


LTE ANTENNA


WIFI ANTENNA


MICROPHONE


SPEAKER

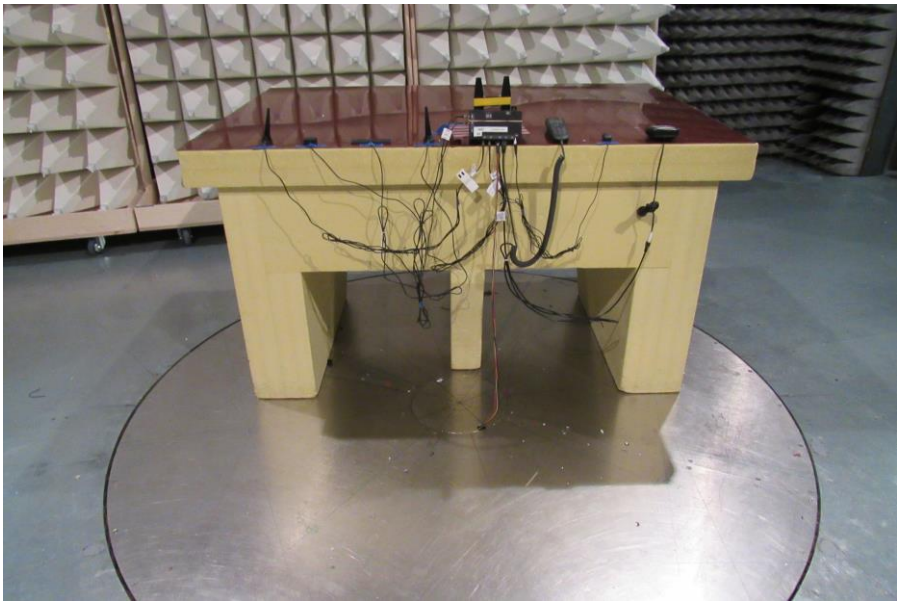

1.2 Photos – Equipment Internal

PCB


PCB


Note: Internal photos provided by manufacturer.

1.3 Photos – Test Setup

RADIATED


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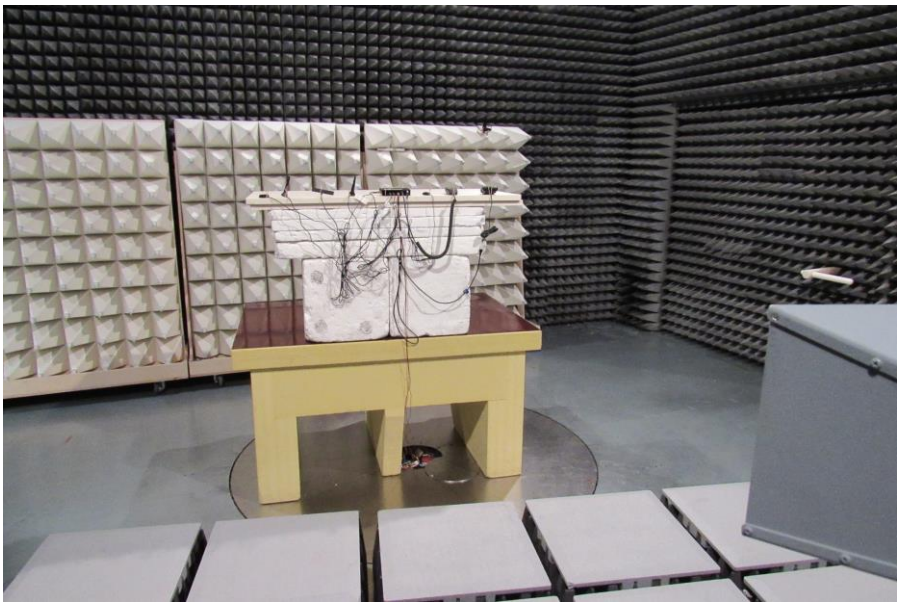


1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
SIM	Communication Tester	R&S	CMW500	GSM-Tester
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.5 Test Modes

Mode	Description
UMTS FDDII / QPSK	Channel = 1880 MHz Mode = RMC TPC = All 1 Modulation = QPSK Duty cycle = 100 %
DSSS (IEEE 802.11b)	Mode = Transmit Modulation = BPSK Spreading = DSSS Bandwidth = 20 MHz Duty cycle = 99% Power setting = TxPowerAuto Data rate = 1 Mbps
Comment: The above combination of co-location was found during pre-tests.	

1.6 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx UMTS	9400	1880
F2	Tx IEEE 802.11	6	2437

1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

Reading on Analyzer (dBµV) + A.F. (dB/m) = Net field strength (dBµV/m)

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

Limit (dBµV/m) = 20*log (µV/m)

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading + AF	= Net Reading	:	Net reading - FCC limit	= Margin
+21.5 dBµV + 26 dB/m	= 47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m	= -9.5 dB

2 Result Summary

FCC 47 CFR Part 22H, 24E, 27, 90 ISED RSS-132, 133, 139, 130, 140				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
47 CFR §22.917 47 CFR §24.238 47 CFR §27.53 47 CFR §90.542 ISED RSS-132 §5.5 ISED RSS-133 §6.5 ISED RSS-139 §6.6 ISED RSS-130 §4.7 ISED RSS-140 §4.4	Transmitter radiated emissions	ANSI C63.26 KDB 971168	PASS	
Comment:				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - Transmitter radiated emissions

3.1.1 Information

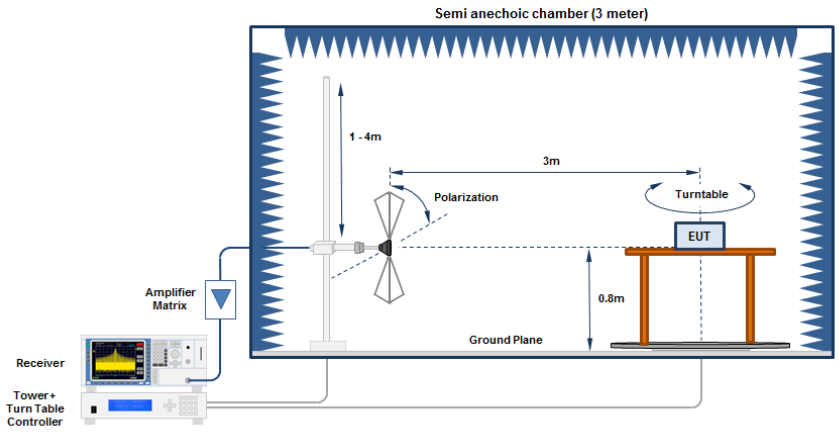
Test Information	
Reference	47 CFR §22.917 47 CFR §24.238 47 CFR §27.53 47 CFR §90.543 ISED RSS-132 §5.5 ISED RSS-133 §6.5 ISED RSS-139 §6.6 ISED RSS-130 §4.7 ISED RSS-140 §4.4
Measurement Method	FCC KDB 971168 D01 Section 7 ANSI C63.26-2015 5.5
Operator	Toralf Jahn
Date	2020-01-30

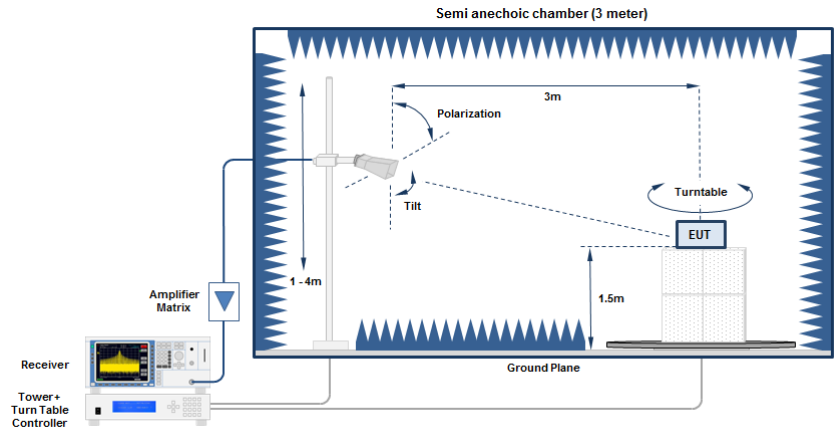
3.1.2 Limits

Limits	
Carrier frequency range [MHz]	Limit
30 - 22000	Attenuation below transmitter power ≥ 43 + 10 • log10(P) [dB] = -13 dBm

3.1.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz


3.1.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2020-05

3.1.5 Procedure

Test Procedure 30 - 1000 MHz
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

3.1.6 Results

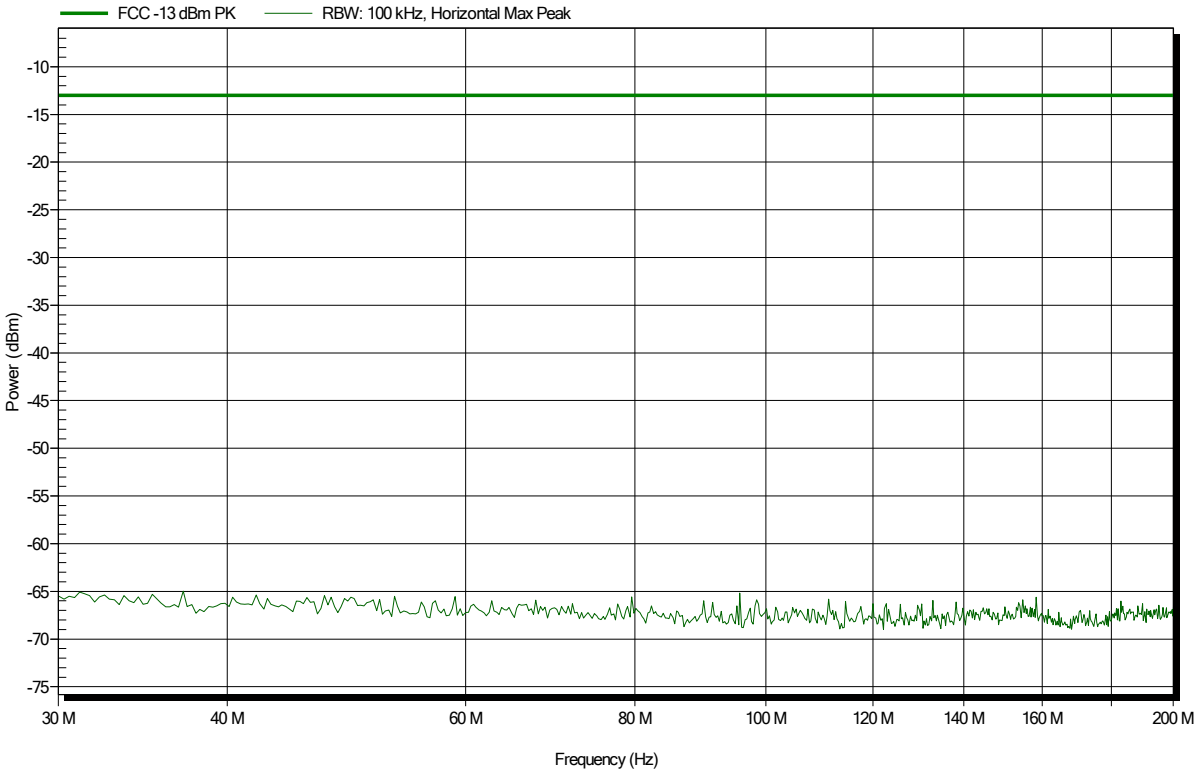
Test Results - GSM1900						
Frequency [MHz]	Mode	Emission [MHz]	Level [dBm]	Pol.	Limit [dBm]	Margin [dB]
1880 + 2437	UMTS FDDII / QPSK + DSSS (IEEE 802.11b)	No significant spurious emissions found				

ANNEX A Transmitter sprurious emissions

Spurious emissions according to FCC

Project number:	G0M-1909-8479
Applicant:	pei tel Communications GmbH
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

Index 15



Spurious emissions according to FCC

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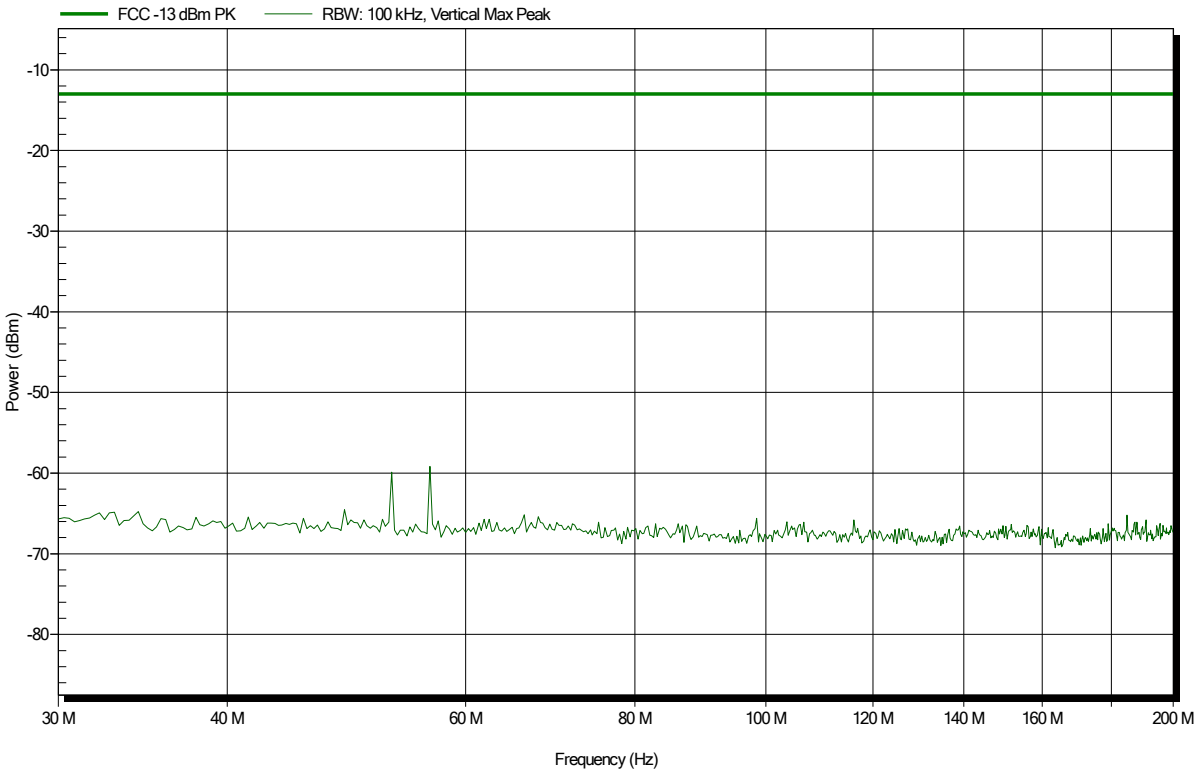
Applicant:	pei tel Communications GmbH
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

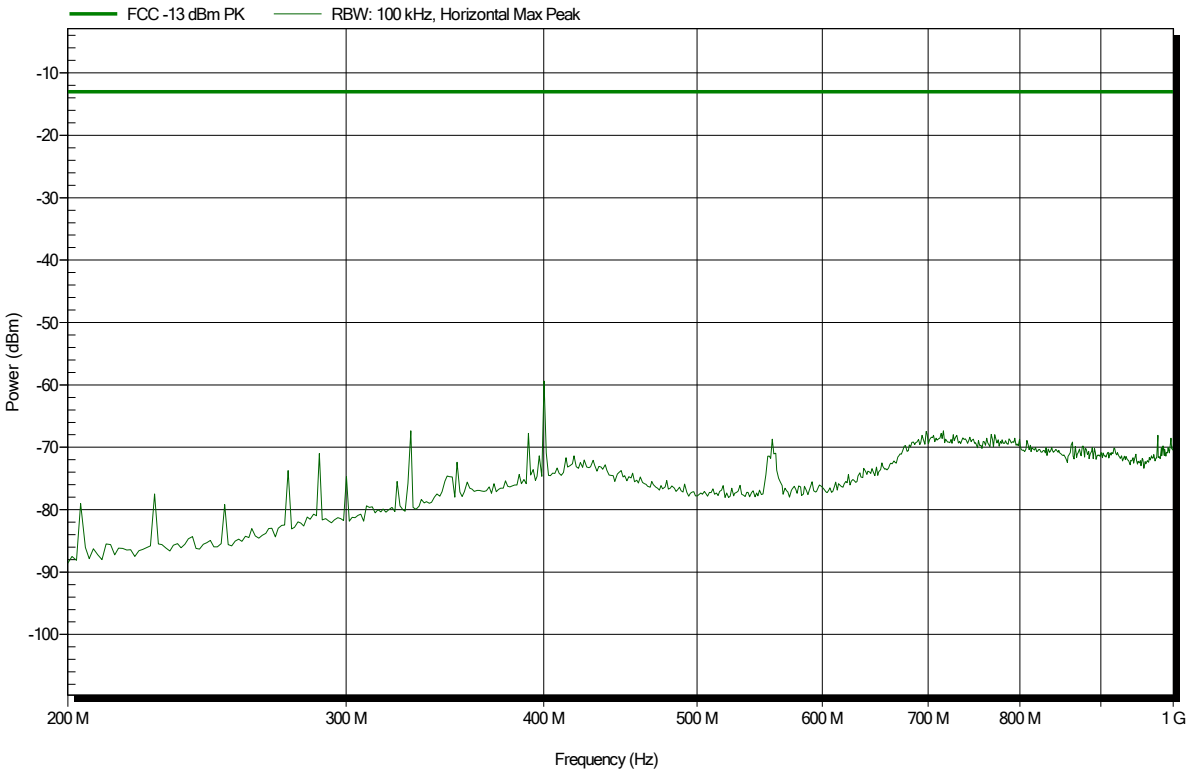
Index 16



Spurious emissions according to FCC

Project number:	G0M-1909-8479
Applicant:	pei tel Communications GmbH
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

Index 14



Spurious emissions according to FCC

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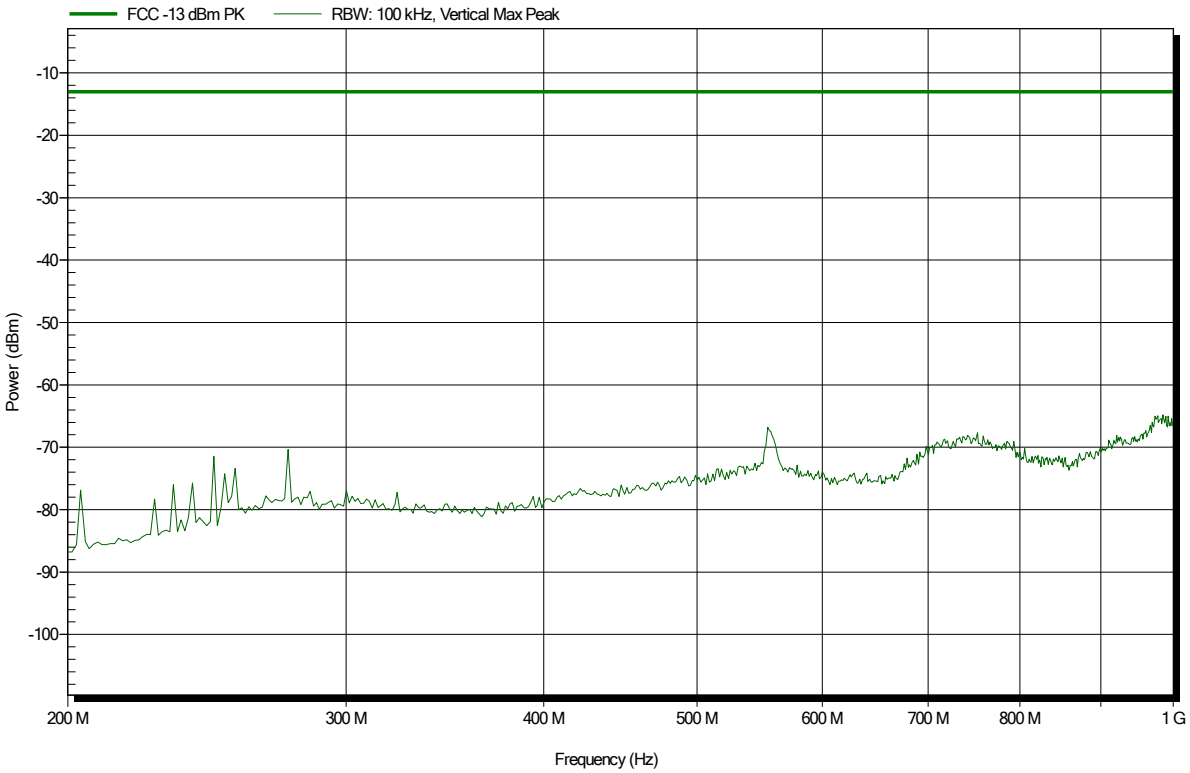
Applicant:	pei tel Communications GmbH
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

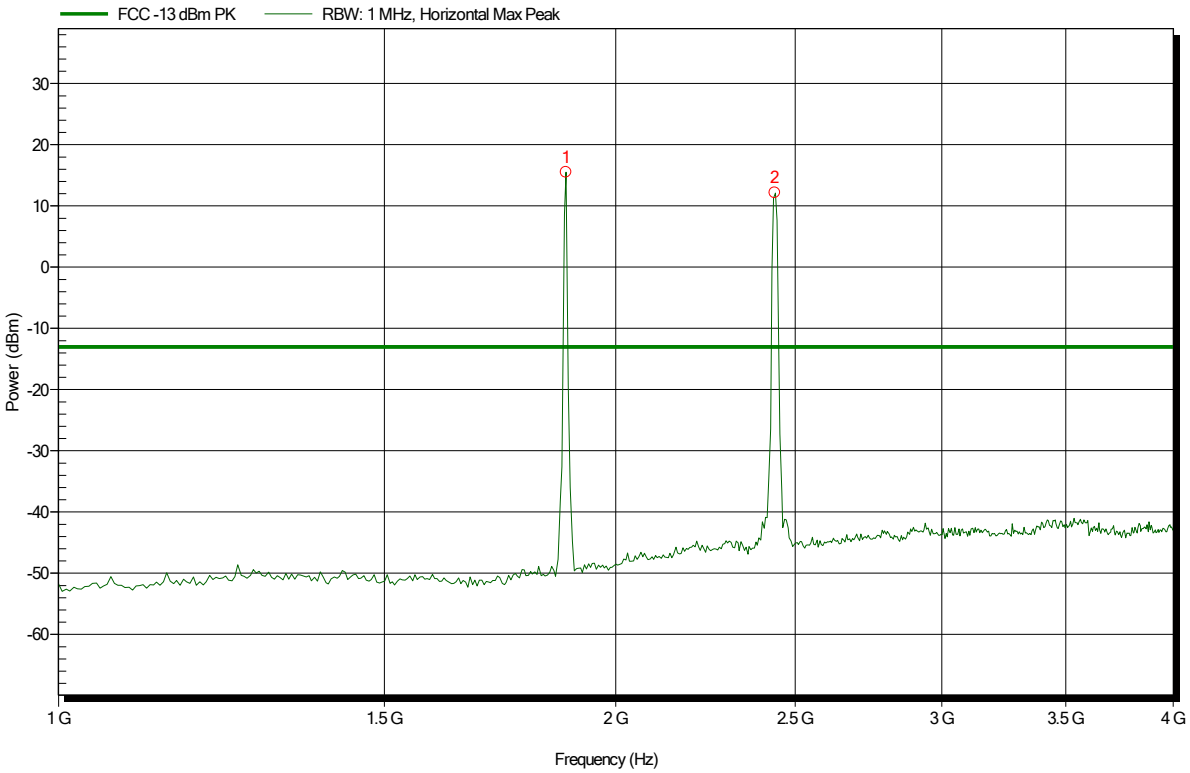
Index 13



Spurious emissions according to FCC

Project number:	G0M-1909-8479
Applicant:	pei tel Communications GmbH
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

Index 17

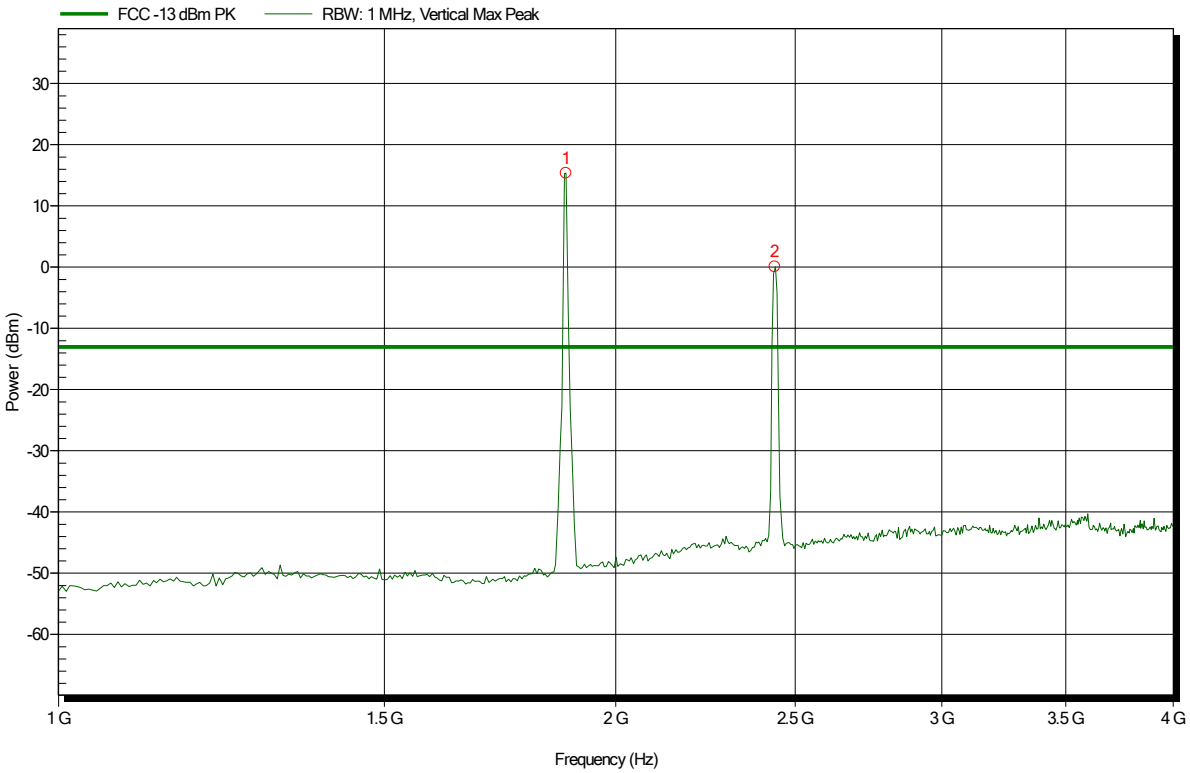


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.88 GHz	15.5 dBm			UMTS
2.438 GHz	12.1 dBm			WLAN

Spurious emissions according to FCC

Project number:	G0M-1909-8479
Applicant:	pei tel Communications GmbH
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

Index 24

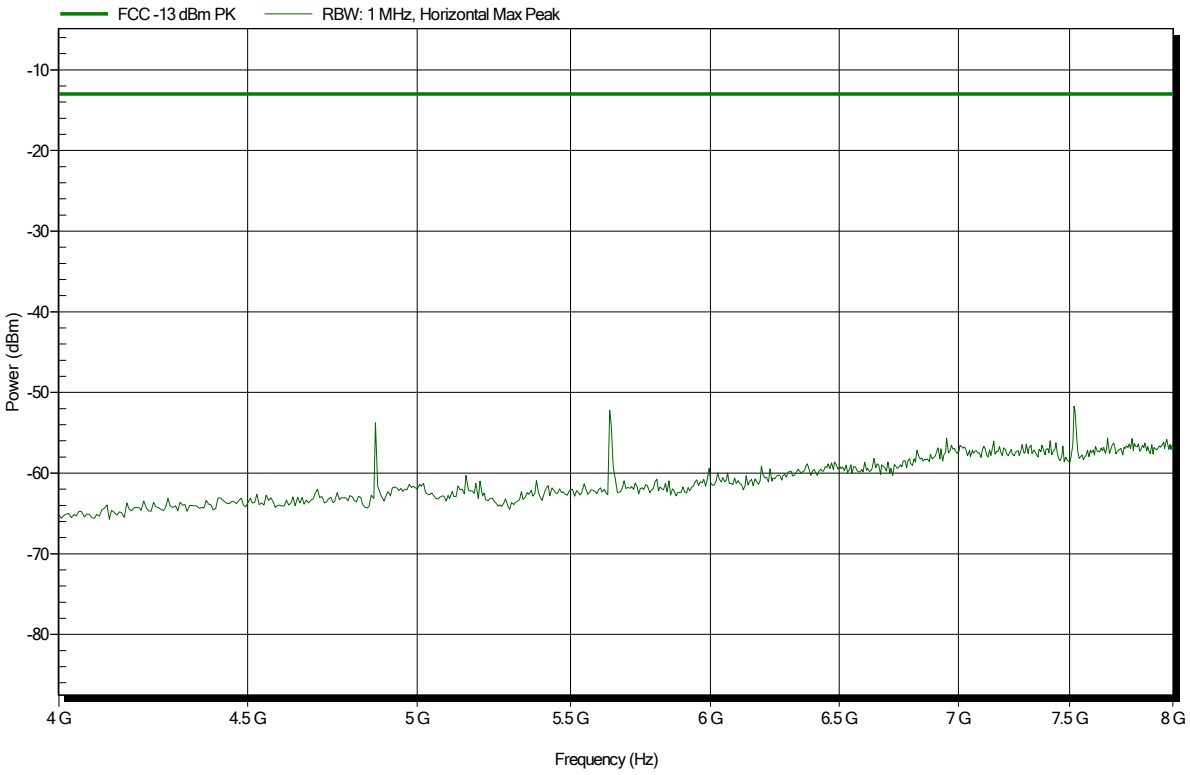


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.88 GHz	15.4 dBm			UMTS
2.438 GHz	0.1 dBm			WLAN

Spurious emissions according to FCC

Project number:	G0M-1909-8479
Applicant:	pei tel Communications GmbH
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

Index 18



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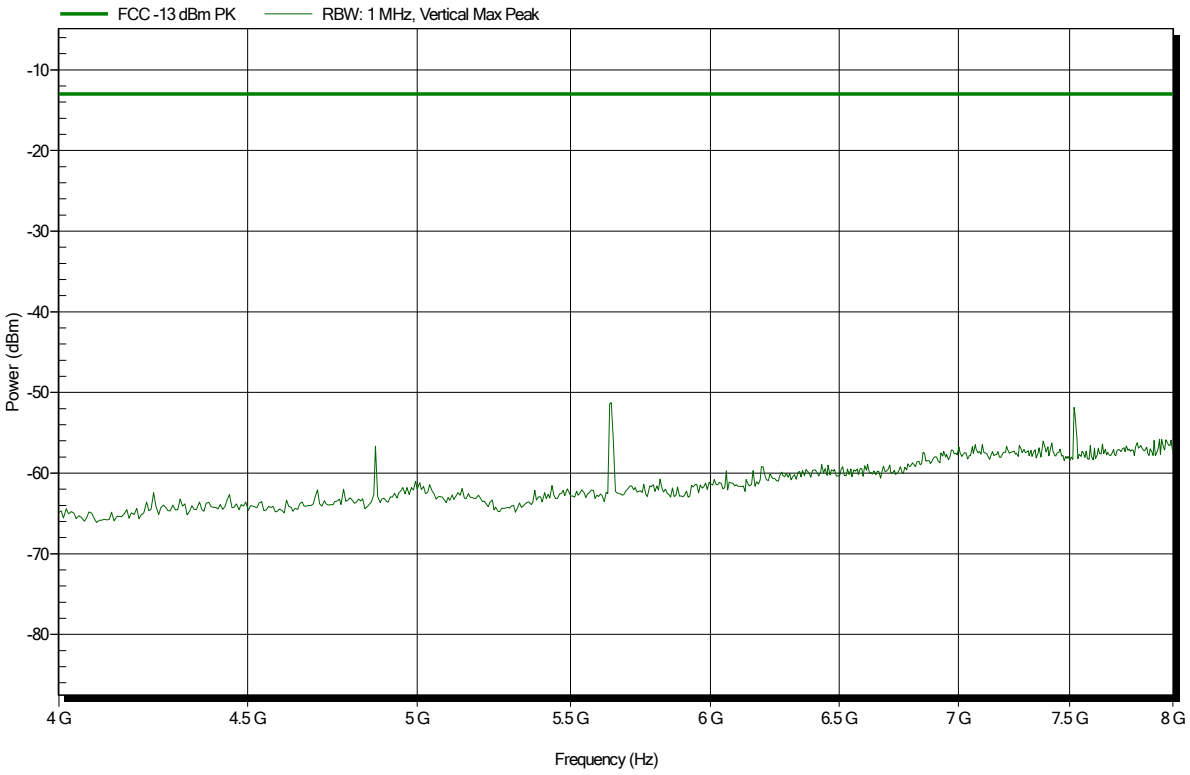
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

Index 23



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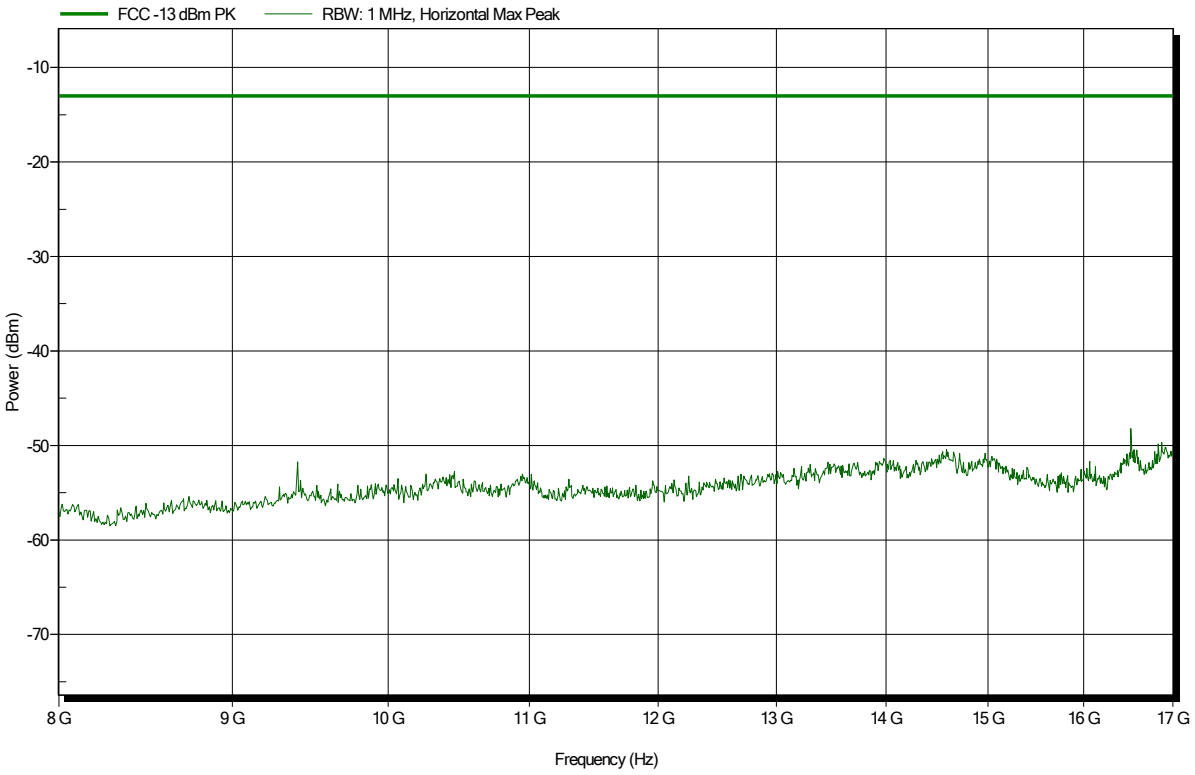
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

Index 19



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Antenna:	Schwarzbeck BBHA 9120D, Vertical
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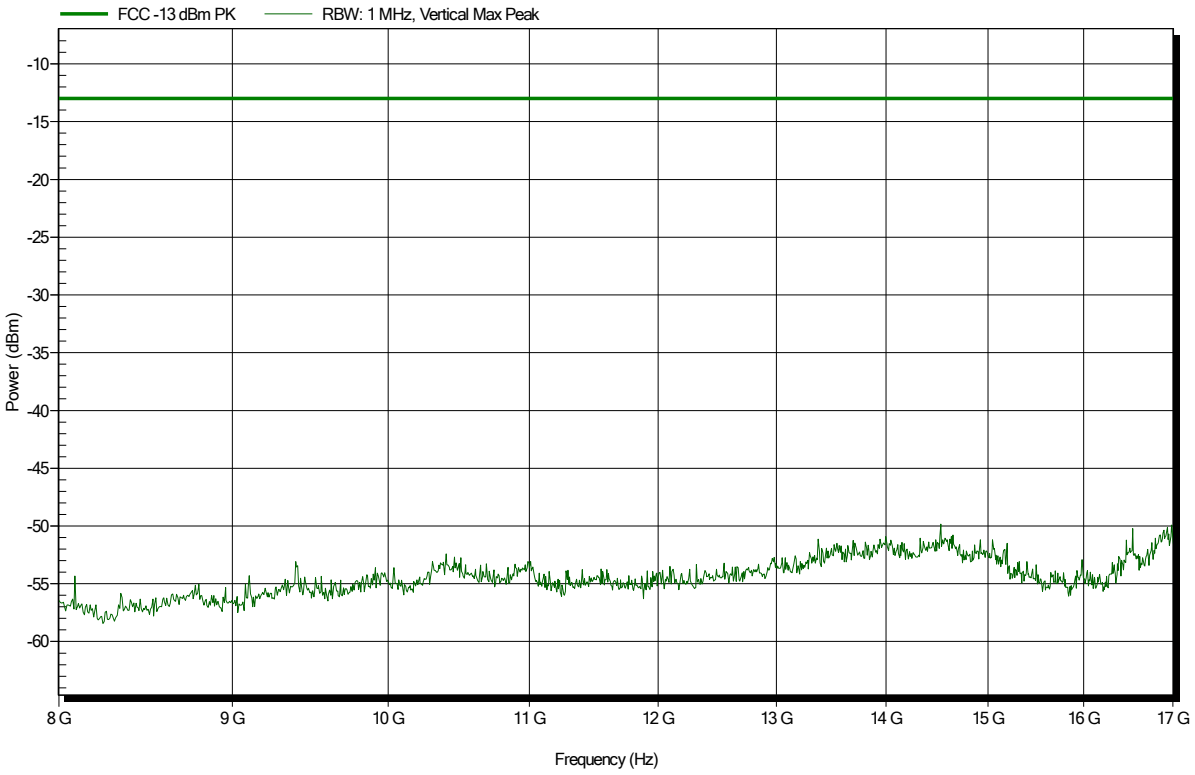
Index 22



Spurious emissions according to FCC

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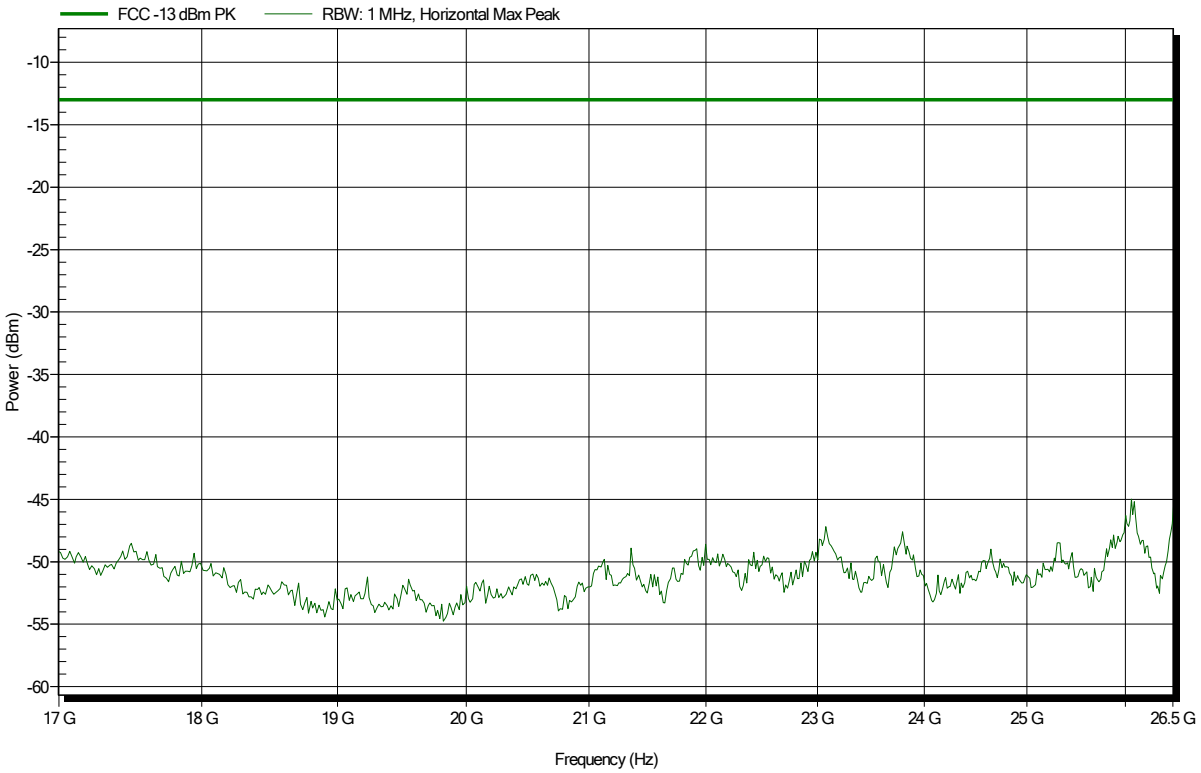
EUT Name:	PTCarPhone
Model:	PTCarPhone 6
Test Site:	Eurofins Product Service GmbH
Operator:	Toralf Jahn
Test Conditions:	Tnom: 23°C, Vnom: 14.0 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m
Mode:	TX; UMTS II 1880 MHz + WLAN 2437 MHz
Test Date:	2020-01-30
Note:	

Index 20



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Note:	

Index 21