TEST REPORT

Test Report No. : UL-RPT-RP-12331248-219-WCDMA

Applicant	:	Procter & Gamble
Model No.	:	Obi-Wan Handle & Obi-Wan Base
FCC ID	:	2AG9A41810
Technology	:	WCDMA Band II, WCDMA Band V
Test Standard(s)	:	FCC Part 22, FCC Part 24
		For details of applied tests refer to test result summary

1. This test report shall not be reproduced in full or partial, without the written approval of UL International Germany GmbH.
2. The results in this report apply only to the sample tested.
3. The test results in this report are traceable to the national or international standards.
4. Test Report Version 1.0
5. Result of the tested sample: **PASS**

Prepared by: Muhammad Asim Shahzad
Title: Laboratory Engineer
Date: 28 September 2018

Approved by: Ajit, Phadtare
Title: Lead Test Engineer
Date: 28 September 2018

Deutsche Akkreditierungsstelle D-PL-19381-02-00

This laboratory is accredited by DAkkS.
The tests reported herein have been performed in accordance with its' terms of accreditation.

This page has been left intentionally blank.

UL INTERNATIONAL GERMANY GMBH
Hedelfinger Str. 61
70327 Stuttgart, Germany
STU.CTECHLab@ul.com

Table of Contents

1. Customer Information

1.1. Applicant information

Company Name:	Procter & Gamble
Company Address:	8611 Beckett Rd, West Chester OH, 5069, USA
Contact Person:	Robert Schick
Contact E-Mail Address:	schick.r@pg.com
Contact Phone No.:	+1 513-626-8667

1.2. Manufacturer Information

Company Name:	Procter & Gamble Service GmbH
Company Address:	Frankfurter Straße 145, 61476 Kronberg im Taunus, Germany
Contact Person:	Ian Good
Contact E-Mail Address:	good.i@pg.com
Contact Phone No.:	+49 6173-30-1295

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 22 Subpart H (Cellular Radiotelephone Service) & Part 24 Subpart E (Broadband PCS)
Test Firm Registration:	399704

Location

Location of Testing:	UL International Germany GmbH Hedelfinger Str. 61 70327 Stuttgart Germany

Date information

Order Date:	24 May 2018
EUT arrived:	06 August 2018
Test Dates:	07 August 2018-17 August 2018
EUT returned:	-/-

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Complied	Did not comply	Not performed	Not applicable
Part 22.913(a)(2) Part 24.232(c)	Transmitter Effective Radiated Power (ERP)	☐	☐	☒	☐
Part 2.1049	Transmitter Occupied Bandwidth	☐	☐	☒	☐
Part 2.1051 Part 22.917 Part 24.238	Transmitter Out of Band Conducted Emissions	☐	☐	☒	☐
Part 2.1051 Part 22.917 Part 24.238	Transmitter Band Edge Conducted Emissions	☐	☐	☒	☐
Part 2.1053 Part 22.917 Part 24.238	Transmitter Out of Band Radiated Emissions	☒	☐	☐	☐
Part 2.1053 Part 22.917 Part 24.238	Transmitter Band Edge Radiated Emissions	☐	☐	☒	☐
Part 2.1055 Part 22.355 Part 24.235	Transmitter Frequency Stability (Temperature and Voltage Variation)	☐	☐	☒	☐

2.3. Methods and Procedures

Reference:	ANSI/TIA-603-D(2010)
Title:	Land Mobile Communications Equipment, Measurements and performance Standards
Reference:	FCC KDB 971168 D01 v03r01 v03, April 2018
Title:	Measurement Guidance for Certification of Licensed Digital Transmitters

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Procter & Gamble
Model Name or Number:	Obi-Wan Handle
Test Sample Serial Number/IMEI:	H3-309
Hardware Version Number:	3.0
Software Version Number:	3.0
FCC ID:	2AG9A41810

Brand Name:	Procter & Gamble
Model Name or Number:	Obi-Wan Handle
Test Sample Serial Number/IMEI:	B3-243
Hardware Version Number:	3.0
Software Version Number:	2.7
FCC ID:	2AG9A41810

3.2. Description of EUT

The equipment under test was The equipment under test was a powered data logging razor handle with accompanying base station for charging and data communication via a cellular connection.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Item	Description	Brand Name	Model Name or Number	Serial Number
1	AC/DC Adapter	Braun	-/-	150389-11
2	Wideband Radio Communication tester	Rhode & Schwarz	CMW 500	-/-

3.5. Additional Information Related to Testing

Technology Tested:	WCDMA Band II		
Type of Radio Device:	Transceiver		
Mode:	WCDMA Band II TX		
Modulation Type:	REL99(RMC)		
Channel Spacing:	5 MHz		
Power Supply Requirement(s):	Nominal	VDC	
Maximum Output Power(ERP):	WCDMA	24 dBm	
Transmit Frequency Range:	1850 to 1910 MHz		
Transmit Channels Tested:	**Channel ID**	**Downlink Ch: NO**	**Uplink Ch: NO**
	Bottom	412	9262
	Top	9938	9538

Technology Tested:	WCDMA Band V		
Type of Radio Device:	Transceiver		
Mode:	WCDMA Band V TX		
Modulation Type:	REL99(RMC)		
Channel Spacing:	5 MHz		
Power Supply Requirement(s):	Nominal	VDC	
Maximum Output Power(ERP):	WCDMA	24 dBm	
Transmit Frequency Range:	824 to 849 MHz		
Transmit Channels Tested:	**Channel ID**	**Downlink Ch: NO**	**Uplink Ch: NO**
	Bottom	1007	4132
	Top	4458	4233

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Constantly transmitting at full power on bottom, middle and top channels as required.
- Transmitter radiated spurious emissions were measured in REL99 (RMC) mode/ MCS1 Coding Scheme / GSMSK found to be the worst case and all final measurements were performed with the EUT in this mode.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Connected to a Rohde & Schwarz CMW 500 Universal Radio Communications Tester, operating in UMTS WCDMA Band II / WCDMA Band V.
- Transmitter radiated spurious emission tests were performed with the following configurations, employing all available accessories:
    - Configuration 1 – data logging razor handle with accompanying base station for charging and data communication via a cellular connection.
- The base station for charging was connected to a 120 VAC 50 Hz supply. The EUT was placed in three orthogonal orientations X, Y and Z to determine the worst case orientation for radiated spurious emissions and all final measurements were performed in this orientation.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

In accordance with DAkkS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Transmitter Out of Band Radiated Emissions WCDMA Band II

Test Summary:

Test Engineer:	Asim Shahzad	**Test Date:**	17 August 2018
Test Sample Serial Number/IMEI:	H3-309		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 2.1053 & Part 24E (24.238)
Test Method Used:	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053
Frequency Range:	30 MHz to 18 GHz
Configuration:	REL99 (RMC) mode / MCS1 Coding Scheme / GSMSK

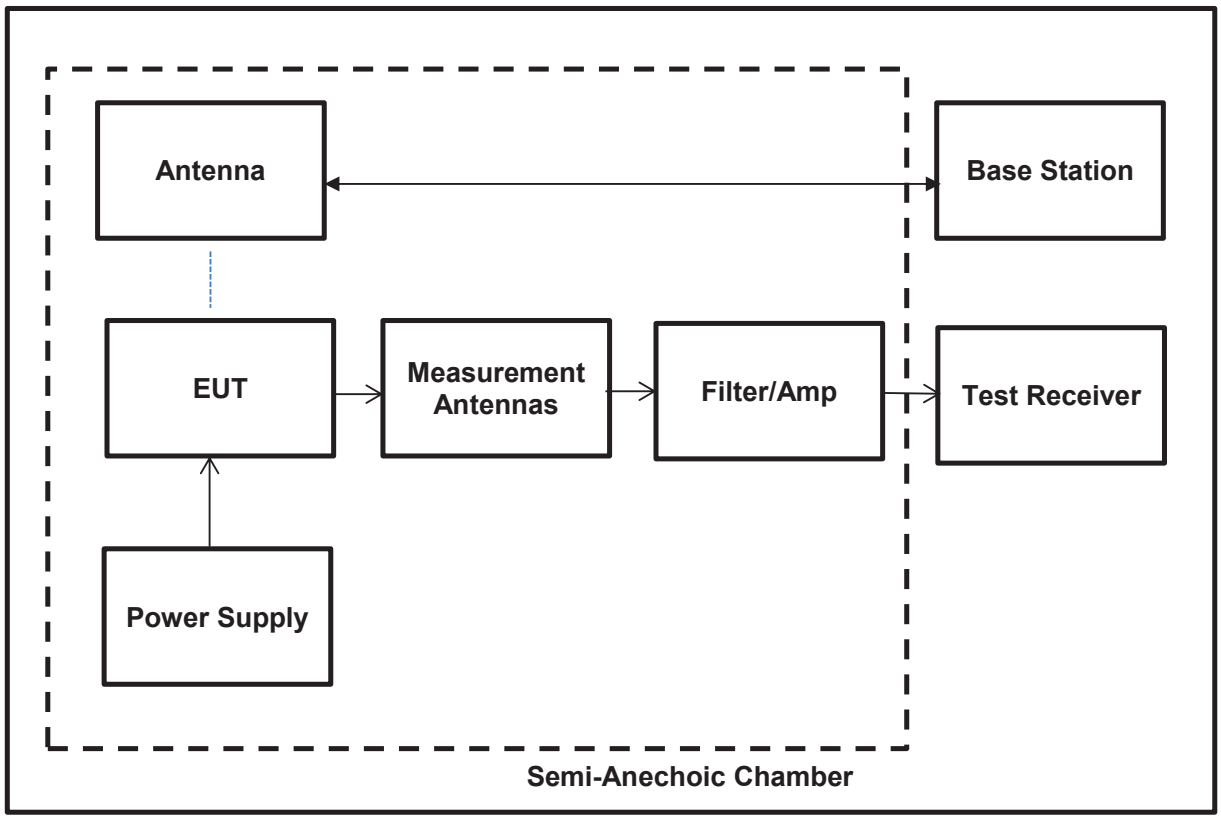
Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	40

Note(s):

1. The uplink traffic channel is shown on plot.
2. All emissions shown on the pre-scan plots were investigated. Final measurements were made using appropriate RF filters and attenuators where required. All emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
3. Measurements were performed in a semi-anechoic chamber at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Test Setup:


Antenna
Base Station
EUT
Measurement Antennas
Filter/Amp
Test Receiver
Power Supply
Semi-Anechoic Chamber

Results: Bottom Channel

Downlink Frequency (MHz)	Uplink Frequency (MHz)
1932.5	1852.5

Note(s):

There was no Spurious seen/Observed in the measurements and can be seen in the plots.

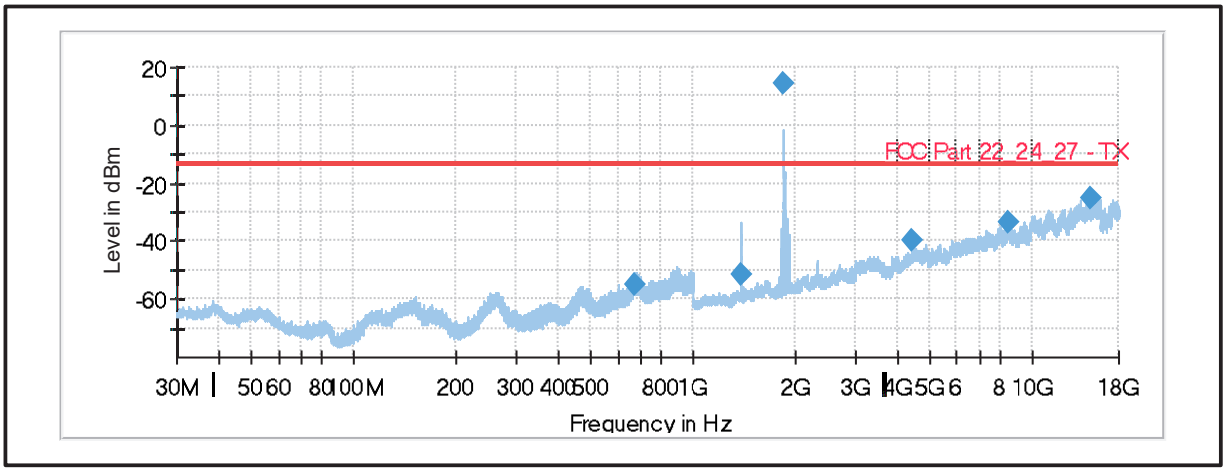
Results: Top Channel

Downlink Frequency (MHz)	Uplink Frequency (MHz)
1987.6	1907.6

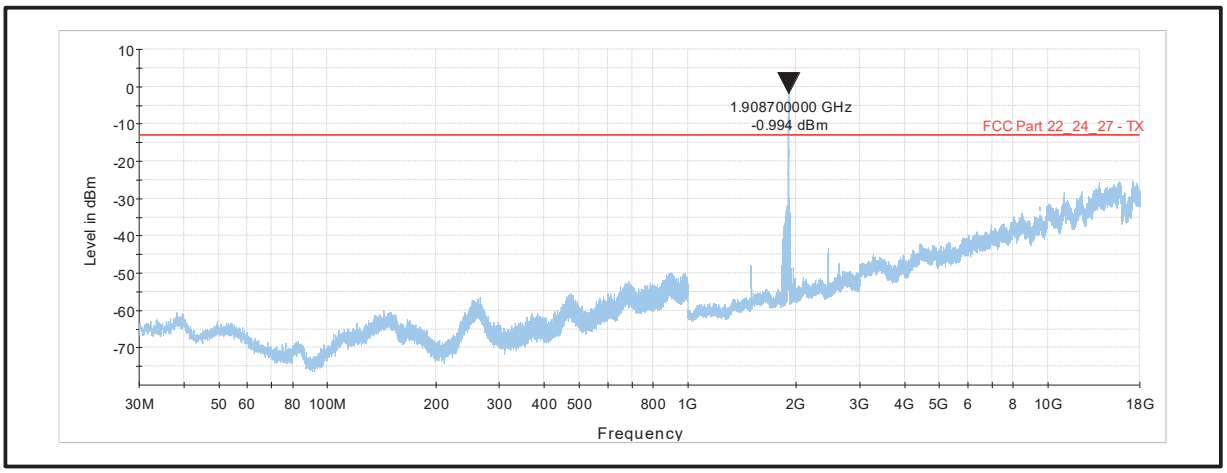
Note(s):

There was no Spurious seen/Observed in the measurements and can be seen in the plots.

Results: Bottom Channel



Results: Top Channel



5.2.2. Transmitter Out of Band Radiated Emissions WCDMA Band V

Test Summary:

Test Engineer:	Asim Shahzad	**Test Date:**	17 August 2018
Test Sample Serial Number/IMEI:	H3-309		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 2.1053 & Part 22H (22.917).
Test Method Used:	As detailed in KDB 971168 Section 6.1 referencing FCC Part 2.1053
Frequency Range:	30 MHz to 9 GHz
Configuration:	REL99 (RMC) mode / MCS1 Coding Scheme / GSMSK

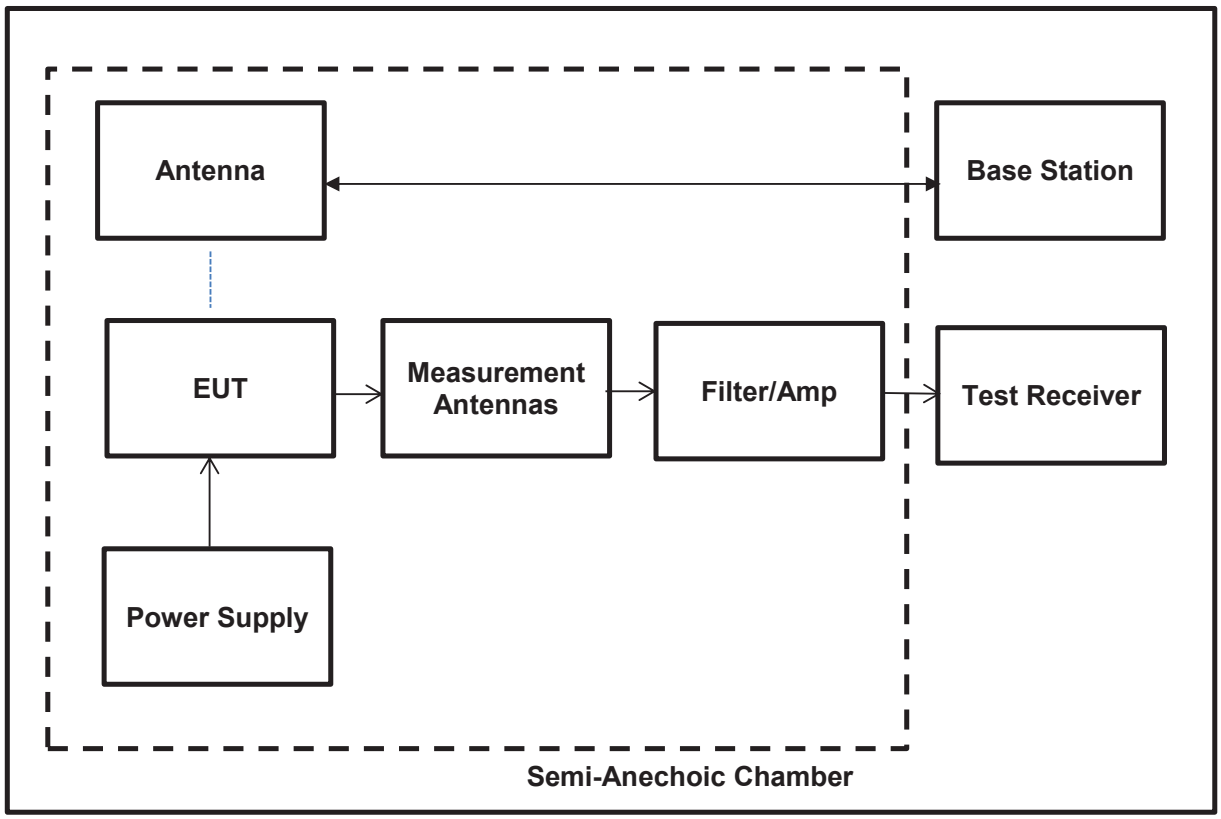
Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	40

Note(s):

4. The uplink traffic channel is shown on plot.
5. All emissions shown on the pre-scan plots were investigated. Final measurements were made using appropriate RF filters and attenuators where required. All emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
6. Measurements were performed in a semi-anechoic chamber at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Test Setup:


Antenna
Base Station
EUT
Measurement Antennas
Filter/Amp
Test Receiver
Power Supply
Semi-Anechoic Chamber

Results: Bottom Channel

Downlink Frequency (MHz)	Uplink Frequency (MHz)
871.5	826.5

Note(s):

There was no Spurious seen/Observed in the measurements and can be seen in the plots.

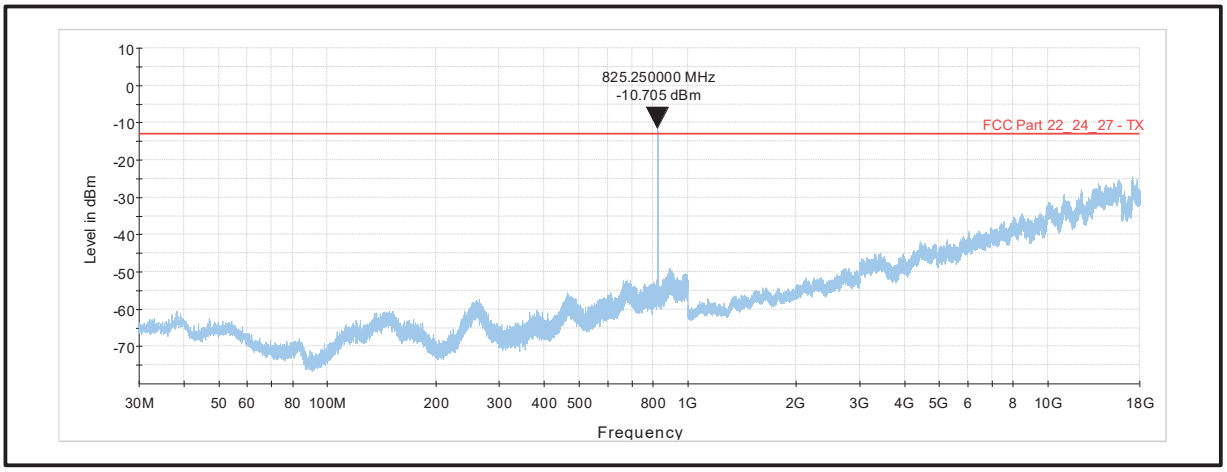
Results: Top Channel

Downlink Frequency (MHz)	Uplink Frequency (MHz)
891.6	846.6

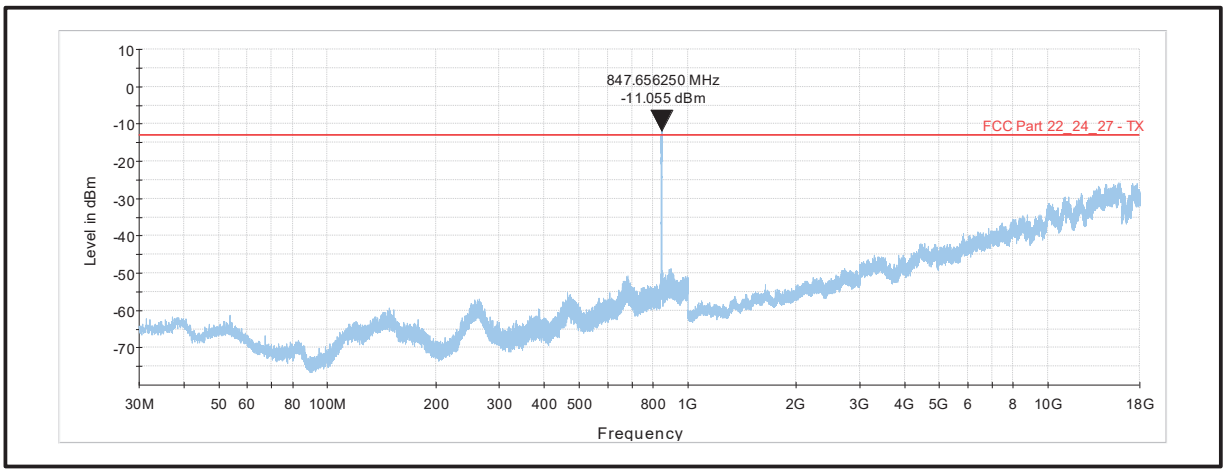
Note(s):

There was no Spurious seen/Observed in the measurements and can be seen in the plots.

Results: Bottom Channel



Results: Top Channel



6. Measurement Uncertainty

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Confidence Level (%)	Calculated Uncertainty
Radiated Spurious Emissions	95%	±3.10 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

7. Used equipment

Test site: SR 1/2

ID	Manufacturer	Type	Model	Serial No.	Calibration Date	Cal. Cycle
103	EMCO	Antenna, Horn	3115	9008/3485	7/20/2016	36
104	EMCO	Antenna, Horn	3115	9008/3486	7/20/2016	36
156	Rohde & Schwarz	V-Network	ESH3-Z6	843864/004	7/11/2018	12
350	Rohde & Schwarz	Receiver, EMI Test	ESIB7	836697/014	7/12/2018	12
377	BONN Elektronik	Amplifier, Low Noise Pre	BLMA 0118-1A	025294B	7/12/2018	12
383	Rohde & Schwarz	Antenna, Rod	HFH2-Z1	890151/11	7/14/2017	24
423	Bonn Elektronik	Amplifier, Low Noise Pre	BLMA 1840-1A	055929	7/12/2018	12
424	EMCO	Antenna, Horn	EMCO 3116	00046537	7/28/2016	36
425	Agilent	Generator, CW Signal	E8247C	MY43320849	7/10/2018	24
426	Agilent	Spectrum Analyzer	E4446A	US44020316	7/11/2018	24
460	Deisl	Turntable	DT 4250 S		n/a	n/a
465	Schwarzbeck	Antenna, Trilog Broadband	VULB 9168	9168-240	8/8/2016	36
474	Agilent	Analyzer, ENA Network	E5071C	MY46100912	7/13/2018	24
495	Rohde & Schwarz	Antenna, Log.- Periodical	HL050	100296	7/20/2016	36
496	Rohde & Schwarz	Antenna, log. - periodical	HL050	100297	7/20/2016	36
497	Schwarzbeck	Antenna, Biconical	VHBB 9124	423	7/7/2016	36
499	Schwarzbeck	Antenna, log.-per	VUSLP 9111	317	8/2/2016	36
587	Maturo	antenna mast, tilting	TAM 4.0-E	011/7180311	n/a	n/a
588	Maturo	Controller	NCD	029/7180311	n/a	n/a
591	Rohde & Schwarz	Receiver	ESU 40	100244/040	7/12/2018	12
607	Schwarzbeck	Antenna broadband horn antenna	BBHA 9170	9170-561	7/28/2016	36
608	Rohde & Schwarz	Switch Matrix	OSP 120	101227	4/8/2014	60
614	Wainwright Instruments	Highpass Filter 3GHz	WHKX10-	1	Lab verification	n/a
615	Wainwright Instruments	Highpass Filter 1GHz	WHKX12-	3	Lab verification	n/a
620	Bonn Elektronik	pre-amplifier	BLNA 0110-01N	1510111	7/12/2017	24
624	Wainwright	6 GHz high-pass filter	WHKX10-5850-6500-18000-40SS	5	Lab verification	n/a
628	Maturo	Antenna mast	CAM 4.0-P	224/19590716	n/a	n/a
629	Maturo	Kippeinrichtung	KE 2.5-R-M	MAT002	n/a	n/a

Additional Control Equipment

ID	Manufacturer	Type	Model	Serial No.	Calibration Date	Cal. Cycle
592	Rohde & Schwarz	Wideband Radio Communication tester	CMW 500	119593	11/13/2017	12

8. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	22	-	Initial Version