



TEST REPORT

Test Report No. : UL-RPT-RP-12191016-416-FCC

Applicant : Visteon Electronics Germany GmbH

Model No. : MFA2

FCC ID : 2AA98-DBMFA2C5

Technology : Bluetooth – Low Energy

Test Standard(s) : FCC Parts 15.209 & 15.247

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: Segun I., Adeniji
Title: Engineer
Date: 25.September.2018

Approved by: Ajit, Phadtare
Title: Lead Test Engineer
Date: 25.September.2018



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

UL INTERNATIONAL GERMANY GMBH

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1. Customer Information

1.1.Applicant Information

Company Name:	Visteon Electronics Germany GmbH
Company Address:	Visteonstrasse 4-10 50170 Kerpen Germany
Contact Person:	Dr.-Ing. Dennis Prill
Contact E-Mail Address:	dprill@visteon.com
Contact Phone No.:	+49 721 4766 1026

1.2.Manufacturer Information

Company Name:	Visteon Electronics Germany GmbH
Company Address:	Visteonstrasse 4-10 50170 Kerpen Germany
Contact Person:	Dr.-Ing. Dennis Prill
Contact E-Mail Address:	dprill@visteon.com
Contact Phone No.:	+49 721 4766 1026

2. Summary of Testing

2.1. General Information

Applied Standards

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.209
Test Firm Registration:	399704

Location

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

Order Date:	13 March 2018
EUT arrived:	14 May 2018
Test Dates:	24 May 2018 to 22 August 2018
EUT returned:	-/-

2.2. Summary of Test Results

Clause	Measurement	Complied	Did not comply	Not performed	Not applicable
Part 15.207	Transmitter AC Conducted Emissions ⁽¹⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Part 15.247(a)(2)	Transmitter Minimum 6 dB Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part 15.247(e)	Transmitter Power Spectral Density ⁽²⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part 15.247(d)	Transmitter Conducted Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part 15.247(d)/15.209(a)	Transmitter Radiated Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part 15.247(d)/15.209(a)	Transmitter Band Edge Radiated Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note(s):

1. Device is an in car/vehicle device. No connection to AC mains. Due to this fact Part 15.207 (Transmitter AC conducted measurements) is not applicable.
2. In accordance with FCC KDB 558074 Section 10.1, PSD is not required if the maximum conducted output power is less than the PSD limit of 8 dBm / 3 kHz. The PSD level is therefore deemed to be equal to the measured total output power.

2.3. Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	KDB 558074 D01 DTS Meas Guidance v04 April 5, 2017
Title:	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

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:	Visteon
Model Name or Number:	MFA2
Test Sample Serial Number:	WACG000059
Hardware Version Number:	VPJMKF-10849
Software Version Number:	913.1.3
FCC ID:	2AA98-DBMFA2C5

Brand Name:	Visteon
Model Name or Number:	MFA2
Test Sample Serial Number:	WACG000059
Hardware Version Number:	VPJMKF-10849
Software Version Number:	913.1.3
FCC ID:	2AA98-DBMFA2C5

3.2. Description of EUT

The equipment under test (EUT) was an infotainment system that supports Bluetooth Low Energy functionality for use within different vehicles. The Bluetooth Low Energy functionality is the subject of this test report. The EUT has an external antenna as detailed above in section 3.5 below

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	Bluetooth Low Energy (Digital Transmission System)		
Type of Unit:	Transceiver		
Channel Spacing:	2 MHz		
Modulation:	GFSK		
Data Rate:	1 Mbps		
Power Supply Requirement(s):	Nominal	13.5 VDC	
Maximum Conducted Output Power:	7.2 dBm		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	Channel ID	RF Channel	Channel Frequency (MHz)
	Bottom	0	2402
	Middle	19	2440
	Top	39	2480

3.5. Additional Antenna Information

Antenna Gain:	2.0 dBi
Antenna Type:	Patch-Antenna (external antenna)
Manufacturer	Rosenberger
Part Number	A 177 905 29 02

3.6. Support Equipment

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

Item	Description	Brand Name	Model Name or Number	Serial Number
1	Laptop PC with software application CANoe 10.0	DELL	LATITUDE E5530	18X75S1
2	Power supply wires (Length 2 metres)	Not marked or stated	Not marked or stated	Not marked or stated
3	CAN Box	Vector Informatik GmbH	VN1630A CAN/LIN Interface	Not marked or stated
4	USB-Adapter			Not marked or stated
5	USB cable (Length 2 metres)	Not marked or stated	Not marked or stated	Not marked or stated
6	Laboratory Power Supply	Conrad Electronic Germany	PS -2403D	Not marked or stated
7	USB stick	Kingston	DTR3.0 G2	Not marked or stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

☒ Transmitting at maximum power in *Bluetooth* LE mode with modulation, maximum possible data length available.

4.2. Configuration and Peripherals

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

- The EUT was placed into *Bluetooth* Low Energy test mode by using a canoe application on the laptop PC along with instructions provided by the customer. The document containing the configuration instruction was named "LE_Direct_command_Guideline.pdf". The customer had installed the application onto the EUT that places it in *Bluetooth* Low Energy test mode after configuration.
- A conducted spurious emission was initially performed at the EUT antenna port.
- The cabinet radiated spurious emissions were performed with the EUT in normal position at the center of a table in 3 m Semi- Anechoic chamber at a distance of 3 m to receiving measurement antennas whilst the device in operation. The RF Port of the device was terminated with a 50 Ohms load for cabinet radiation and with antenna for the radiated band edge compliance.
- The EUT was powered by 13.5 V DC power supply.
- The EMC32 V10.1.0 software was used for the measurement.

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 Minimum 6 dB Bandwidth

Test Summary:

Test Engineer:	Segun Adeniji	Test Date:	24 May 2018
Test Sample Serial Number:	WACG000059		
Test Site Identification	SR 9		

FCC Reference:	Part 15.247(a)(2)
Test Method Used:	FCC KDB 558074 Section 8.1 Option 1

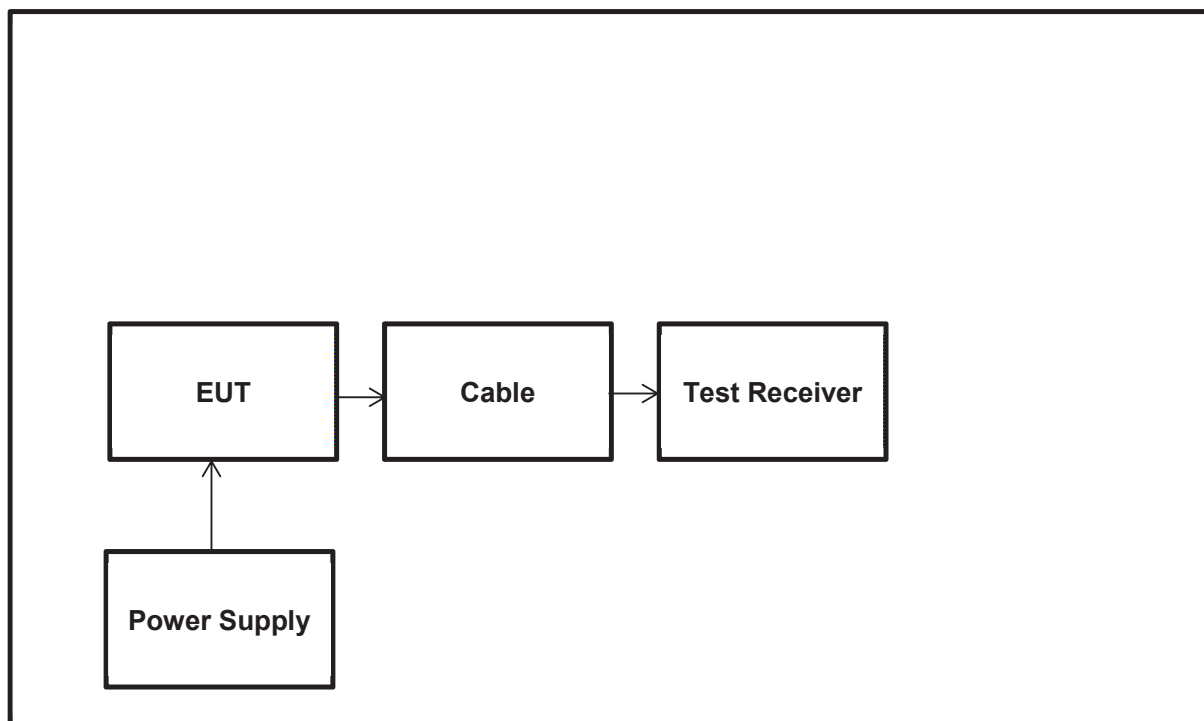
Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	32

Note(s):

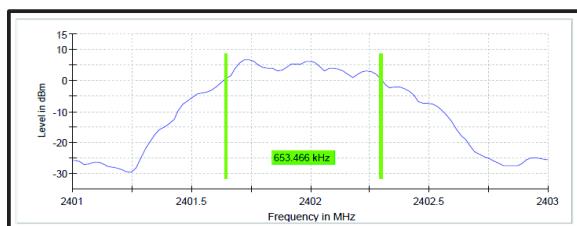
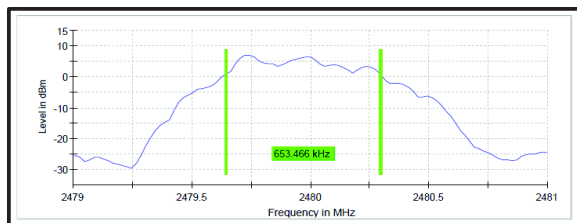
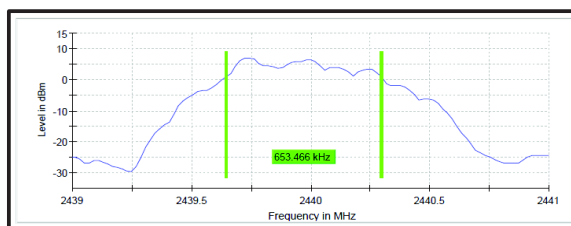
- 6 dB DTS bandwidth tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 8.1 Option 1 measurement procedure. The spectrum analyser resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The DTS bandwidth was measured at 6 dB down from the peak of the signal.
- The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

Test Setup:



Results:

Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	653.466	≥ 500	153.466	Complied
Middle	653.466	≥ 500	153.466	Complied
Top	653.466	≥ 500	153.466	Complied

**Bottom Channel****Top Channel****Middle Channel****Result: Pass**

5.2.2. Transmitter Maximum Peak Output Power**Test Summary:**

Test Engineer:	Segun Adeniji	Test Date:	24 May 2018
Test Sample Serial Number:	WACG000059		
Test Site Identification	SR 9		

FCC Reference:	Part 15.247(b)(3)
Test Method Used:	FCC KDB 558074 Section 9.1.1 and Notes below

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	41

Note(s):

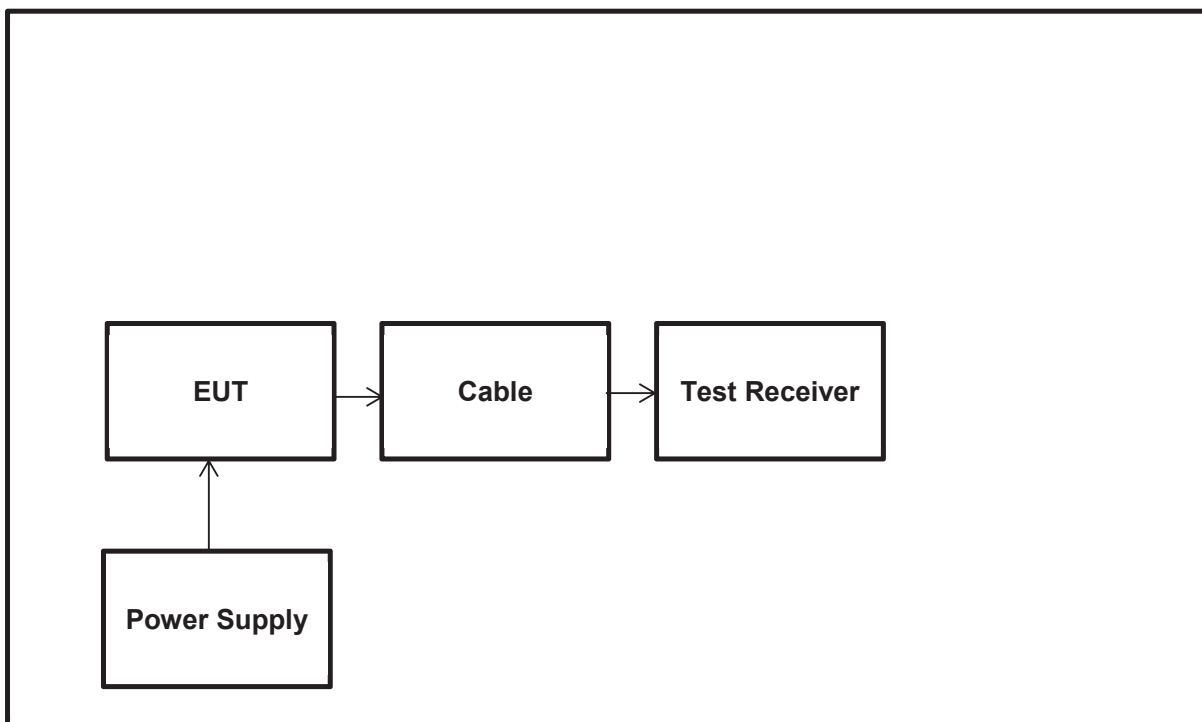
Conducted power tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 9.1.1 with the RBW > *DTS bandwidth* procedure.

The signal analyser resolution bandwidth was set to 1 MHz and video bandwidth of 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 3 MHz. A marker was placed at the peak of the signal and the results recorded in the table below.

The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the spectrum analyser to compensate for the loss of the attenuator and RF cable.

The measurement was made with highest possible duty cycle.

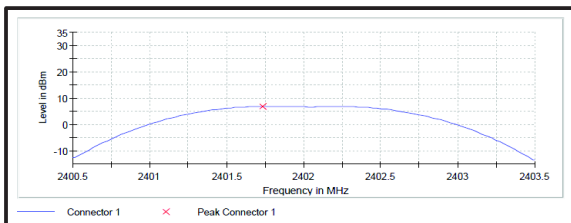
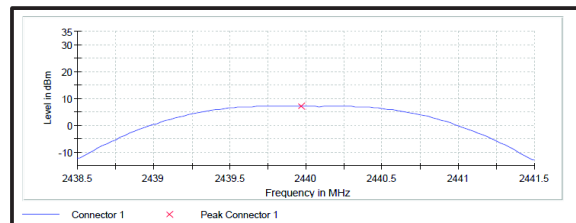
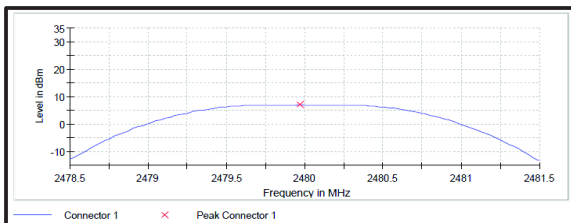
The conducted power was added to the declared antenna gain to obtain the EIRP.

Test setup:

Results:

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	6.9	30.0	23.1	Complied
Middle	7.2	30.0	22.8	Complied
Top	7.0	30.0	23.0	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	6.9	2.0	8.9	36.0	27.1	Complied
Middle	7.2	2.0	9.2	36.0	26.8	Complied
Top	7.0	2.0	9.0	36.0	26.0	Complied

**Bottom Channel****Middle Channel****Top Channel****Result: Pass**

5.2.3. Transmitter Conducted Emissions**Test Summary:**

Test Engineer:	Segun Adeniji	Test Date:	24 May 2018
Test Sample Serial Number:	WACG000059		
Test Site Identification	SR 9		

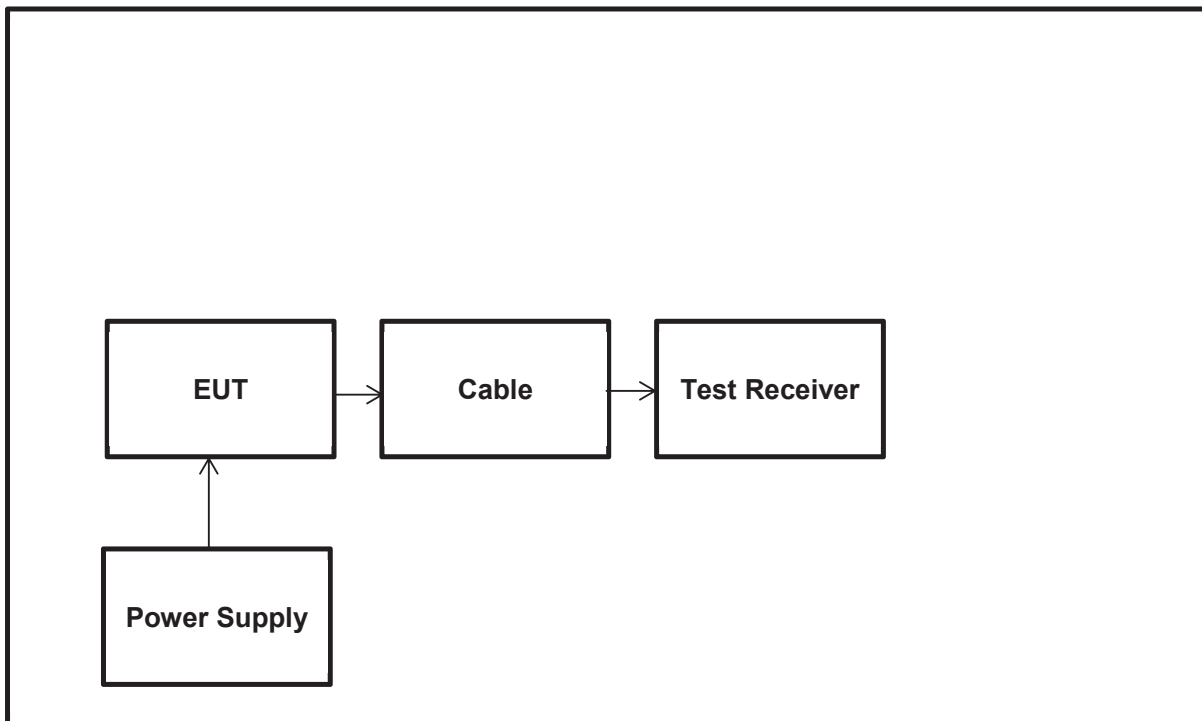
FCC Reference:	Part 15.247(d)
Test Method Used:	ANSI C63.10 Section 6.7
Frequency Range	30 MHz to 26 GHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	36

Note(s):

1. Transmitter conducted spurious emissions tests were performed with the EUT transmitting in Bluetooth Low Emission mode. The measurement was done at the EUT antenna port. The final measured value, for the given emission, in the table below incorporates the attenuator value and cable loss.
2. All emissions shown on the pre-scan plot were investigated and found to be below the applicable limit.
3. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz for measurements below 1 GHz and resolution bandwidth of 1 MHz and video bandwidth of 3 MHz for measurements above 1 GHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
4. Aside from the first harmonic, no other spurious emission was found on all channels.
5. The Radiated Limit has been converted to EIRP Limit according to ANSI C63.10 section 9.5.
6. Since the EUT complied to the spurious emission limit with peak detector, therefore no quasi-peak or average measurement was necessary according to ANSI C63.10.

Transmitter Spurious Emissions (continued)**Test setup:**

Results: Bottom Channel

Frequency (MHz)	Peak Level (dBm)	Average Limit (dBm)	Margin (dB)	Result
4804	-50.0	-41.2	8.8	Complied

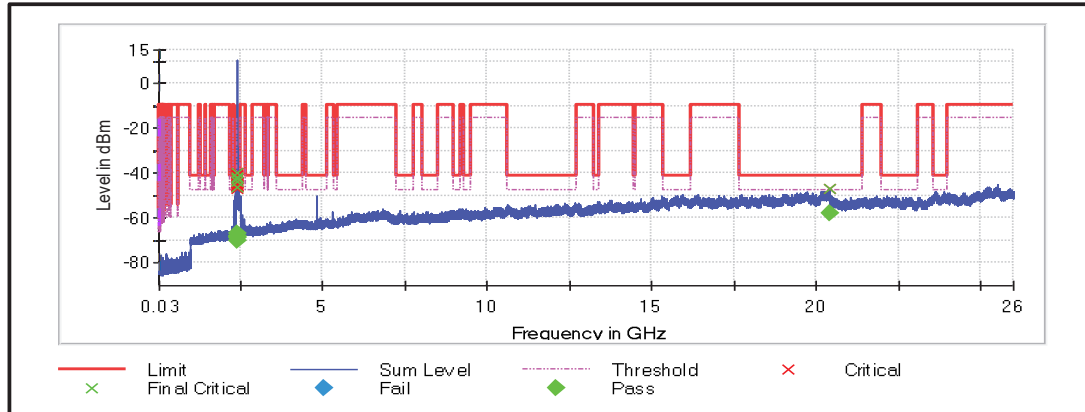
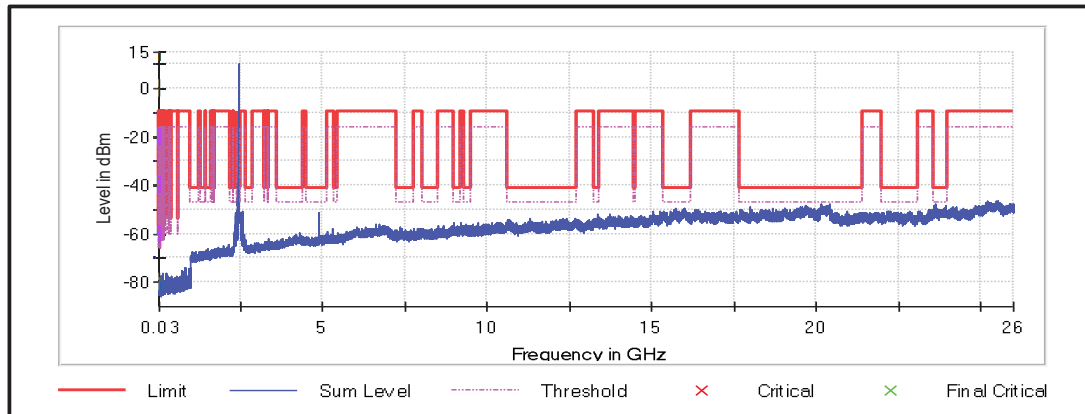
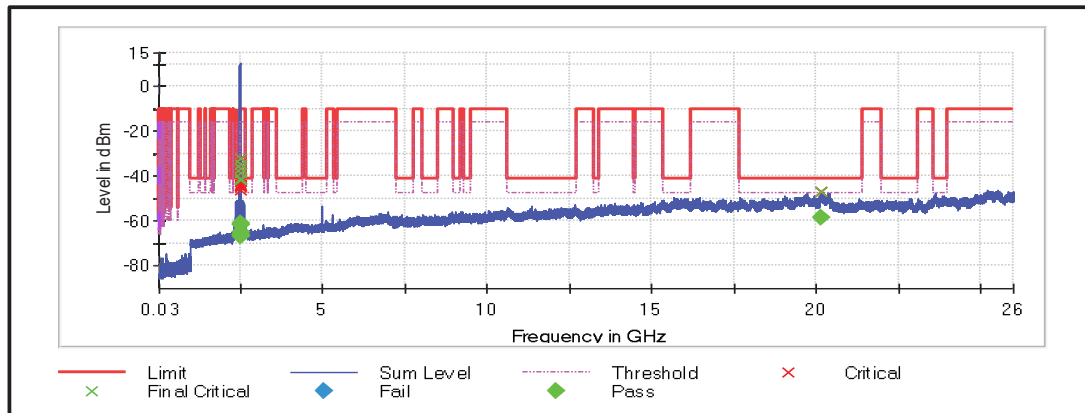
Results: Middle Channel

Frequency (MHz)	Peak Level (dBm)	Average Limit (dBm)	Margin (dB)	Result
4880	-52.3	-41.2	11.1	Complied

Results: Top Channel

Frequency (MHz)	Peak Level (dBm)	Average Limit (dBm)	Margin (dB)	Result
4960	-53.1	-41.2	11.9	Complied

Result: Pass

Transmitter Conducted Emissions (Continued)**Bottom Channel Plot****Middle Channel Plot****Top Channel Plot**

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.2.4. Transmitter Radiated Emissions**Test Summary:**

Test Engineer:	Segun Adeniji	Test Date:	12 June 2018
Test Sample Serial Number:	WACG000059		
Test Site Identification	SR 1/2		

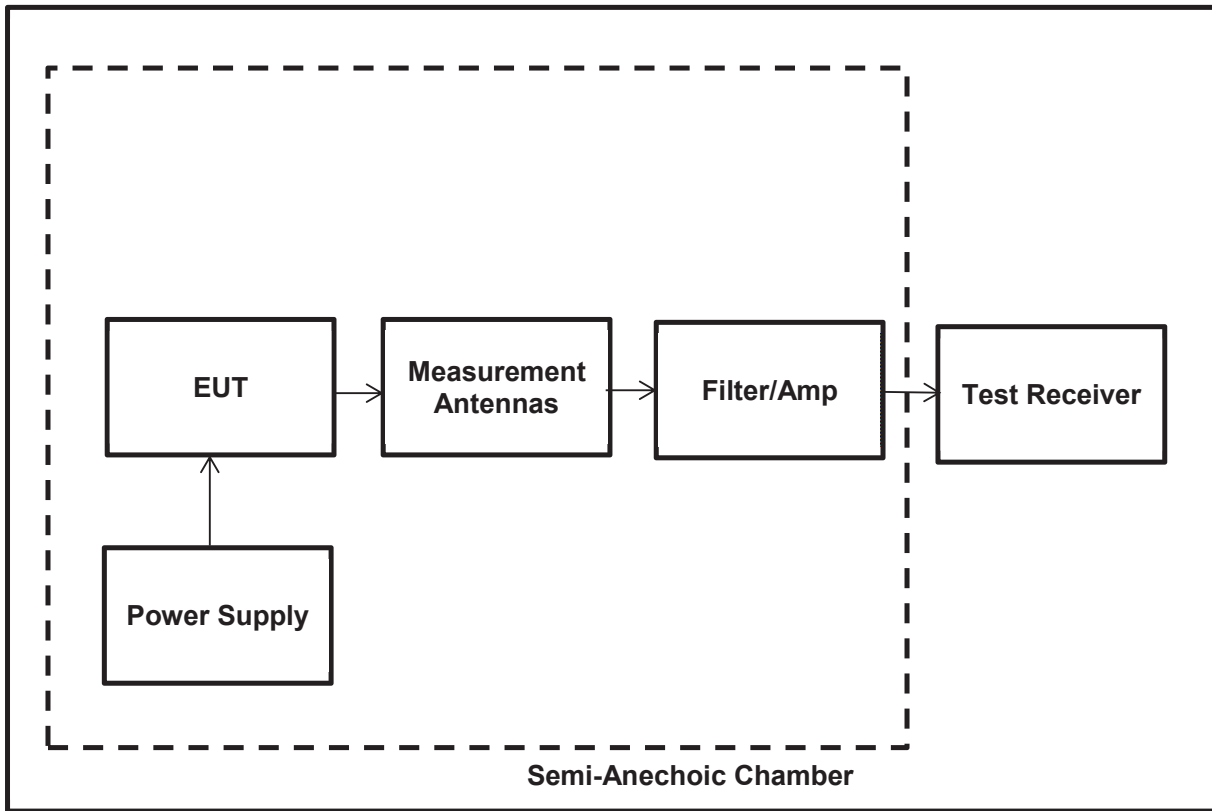
FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Sections 6.3 and 6.5
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	34

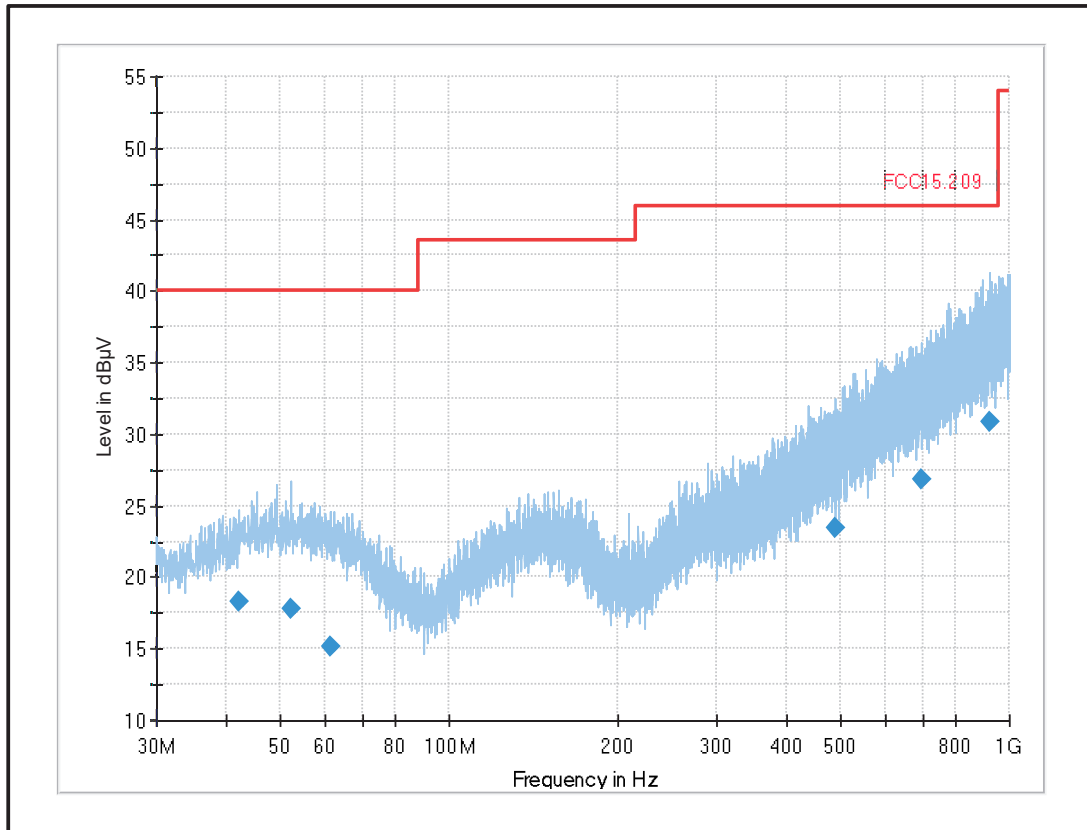
Note(s):

1. Transmitter radiated spurious emissions tests were performed with the EUT transmitting in Bluetooth Low Energy mode.
2. The measurement was done with the Cabinet Radiated i.e. EUT antenna port terminated with a 50 Ohms load.
3. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
4. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the Bottom channel only.
5. No spurious emission was found and only the system noise floor has been reported in the result table.
6. Measurements below 1 GHz 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.
7. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. The sweep time was set to auto. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
8. Since the EUT complied to the spurious emission limit with peak detector, therefore no quasi-peak measurement was necessary according to ANSI C63.10.

Test Setup:

Transmitter Radiated Emissions (Cabinet Radiated)**Results: Middle Channel**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
42.24	V	18.33	40.00	21.67	Complied
52.27	V	17.74	40.00	22.26	Complied
61.54	V	15.19	40.00	24.81	Complied
488.00	V	23.47	46.00	22.53	Complied
698.20	V	26.84	46.00	19.16	Complied
922.37	H	30.85	46.00	15.15	Complied

Plot: 30 MHz – 1GHz

Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Result: Pass

Transmitter Radiated Emissions (Continued)**Test Summary:**

Test Engineer:	Segun Adeniji	Test Date:	24 May 2018
Test Sample Serial Number:	WACG000059		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Sections 6.3 and 6.6
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	35

Note(s):

1. Transmitter radiated spurious emissions tests were performed with the EUT transmitting in Bluetooth Low Energy mode.
2. The measurement was done with the Cabinet Radiated i.e. EUT antenna port terminated with a 50 Ohms load.
3. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
4. The emission shown at around 2.4 GHz are the EUT fundamentals at their transmitting frequencies. The leakage was investigated to be coming from the EUT cabinet.
5. *In accordance with ANSI C63.10 Section 6.6.4.3 (Note 1), if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.
6. The worst case of the spurious detected has been reported in the table below.
7. All other emissions shown on the pre-scans were investigated and found to be ambient, or > 20 dB below the appropriate limit or below the noise floor of the measurement system.
8. Measurements were performed in a semi-anechoic chamber at a distance of 3 metres. The EUT was placed at a height of 1.5 m 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 meter to 4 meter.
9. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto. Peak and average measurements were performed with their own appropriate detectors during the pre-scan measurements.

Transmitter Radiated Emissions (Cabinet Radiated)**Results: Peak / Bottom Channel**

Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
1650	H	43.55	54.0	10.45	Complied

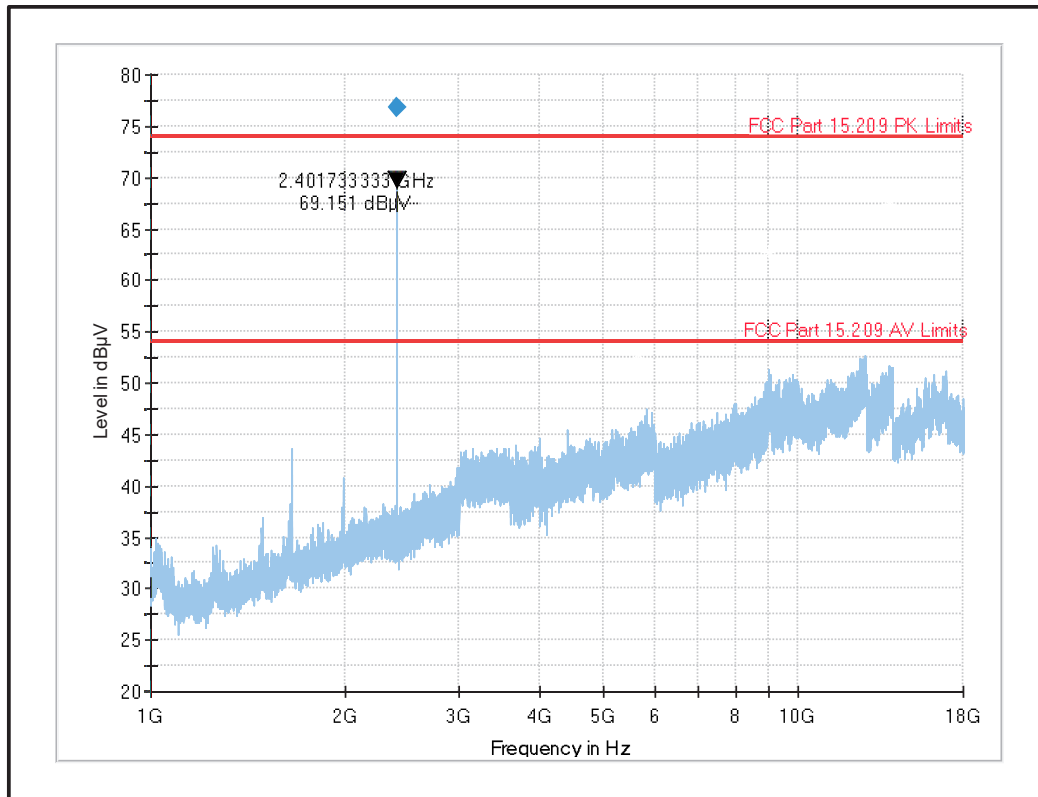
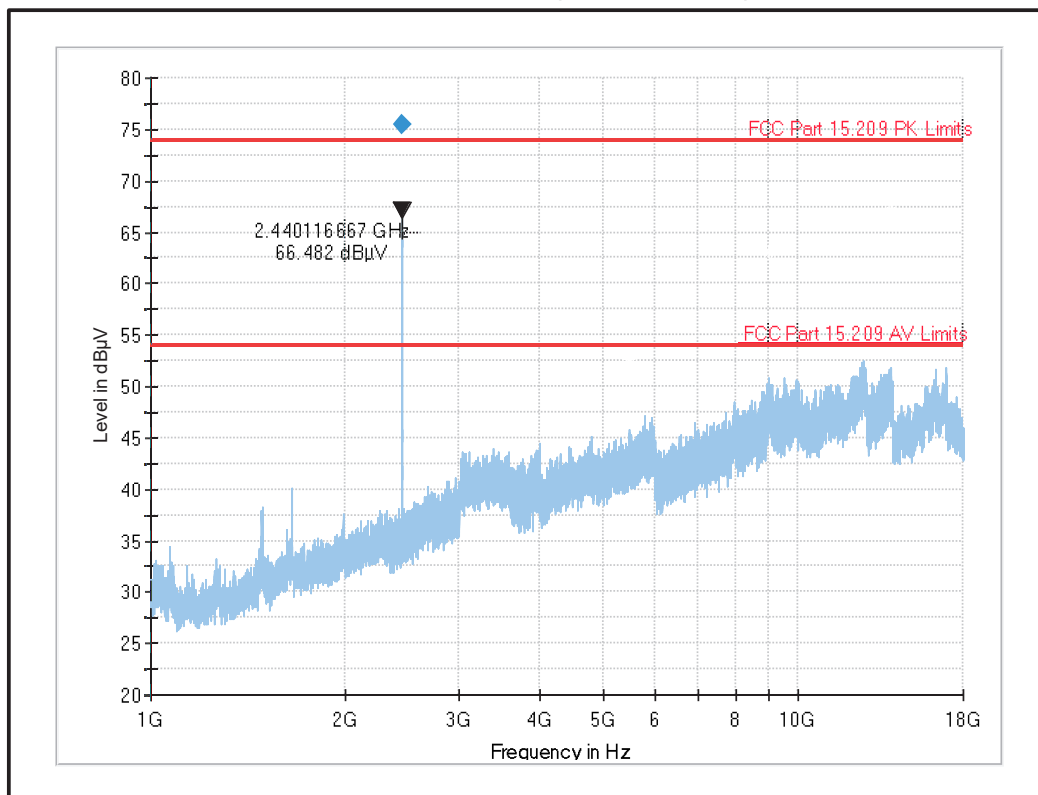
Results: Peak / Middle Channel

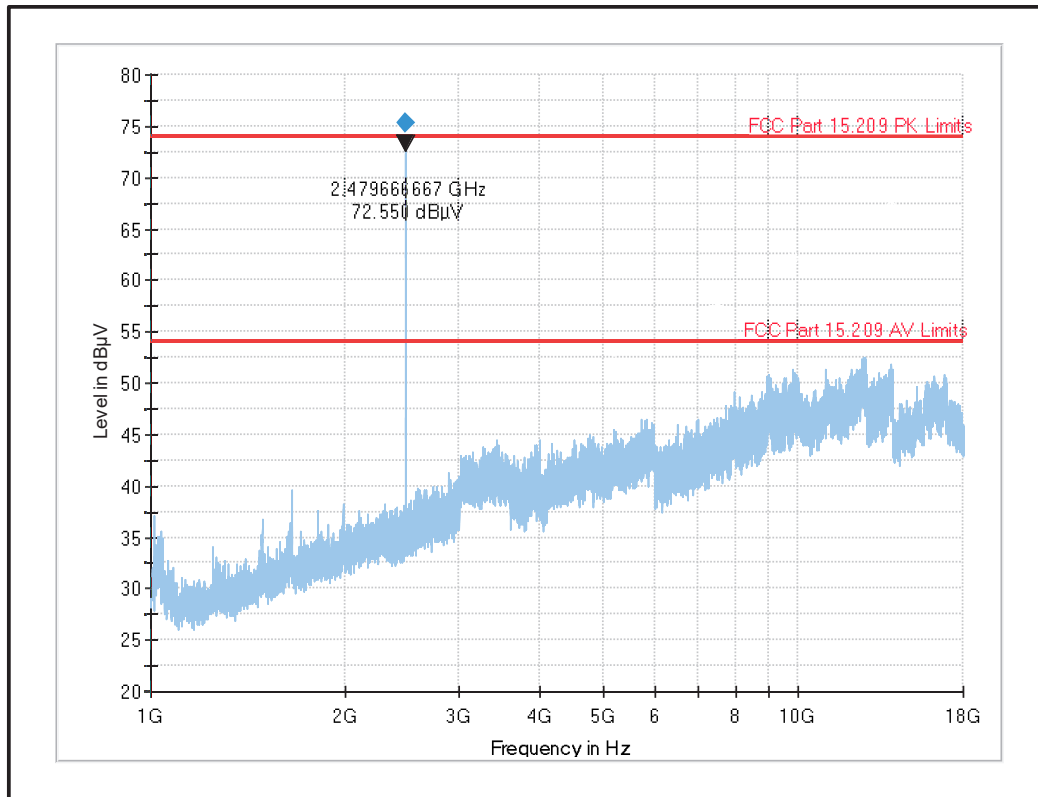
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
1650	H	40.18	54.0	13.82	Complied

Results: Peak / Top Channel

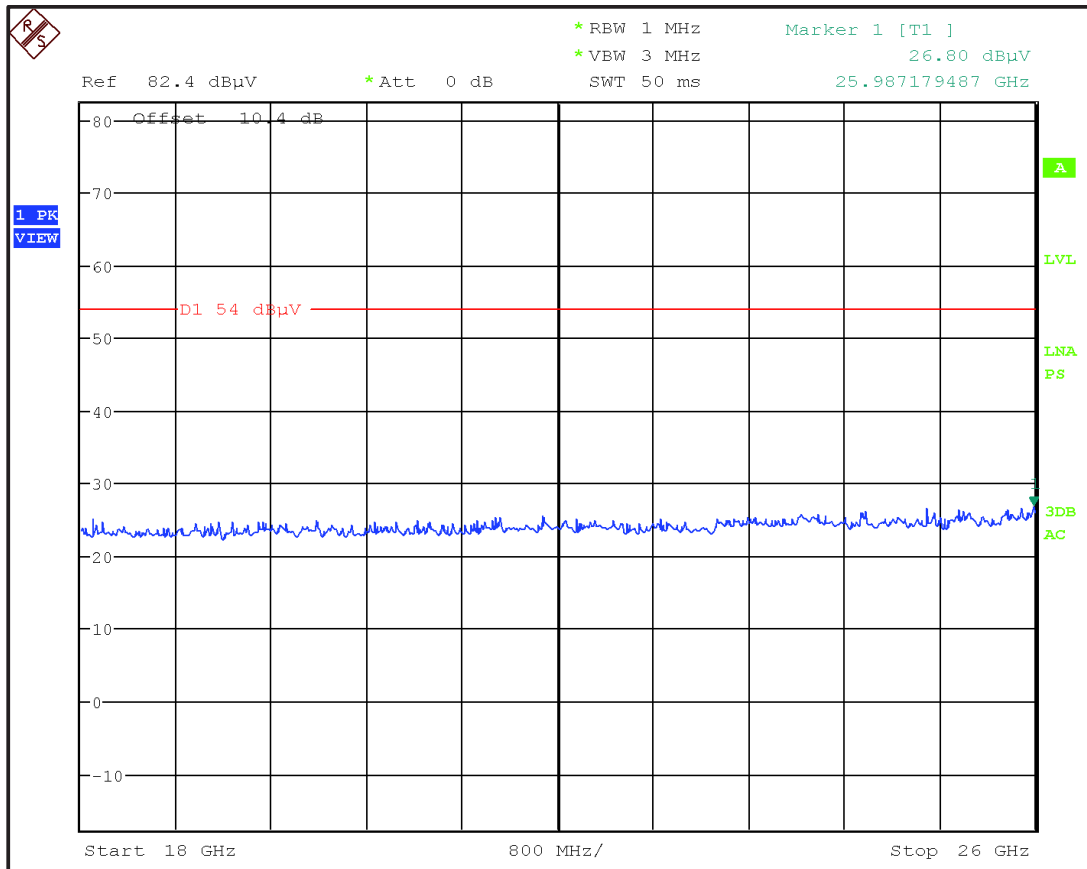
Frequency (MHz)	Antenna Polarity	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
1650	H	39.27	54.0	14.73	Complied

Result: Pass

Transmitter Radiated Emissions (Cabinet Radiated)**Plot: 1 GHz – 18GHz (Bottom channel)****Plot: 1 GHz – 18GHz (Middle channel)**

Transmitter Radiated Emissions (Cabinet Radiated)**Plot: 1 GHz – 18GHz (Top channel)**

Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions (Cabinet Radiated)**Plot: 18 GHz – 25GHz (Bottom channel)**

Note: The above plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.2.5. Transmitter Band Edge Radiated Emissions**Test Summary:**

Test Engineer:	Abdoufataou Salifou	Test Date:	22 August 2018
Test Sample Serial Number:	WACG000059		
Test Site Identification	SR 1/2		

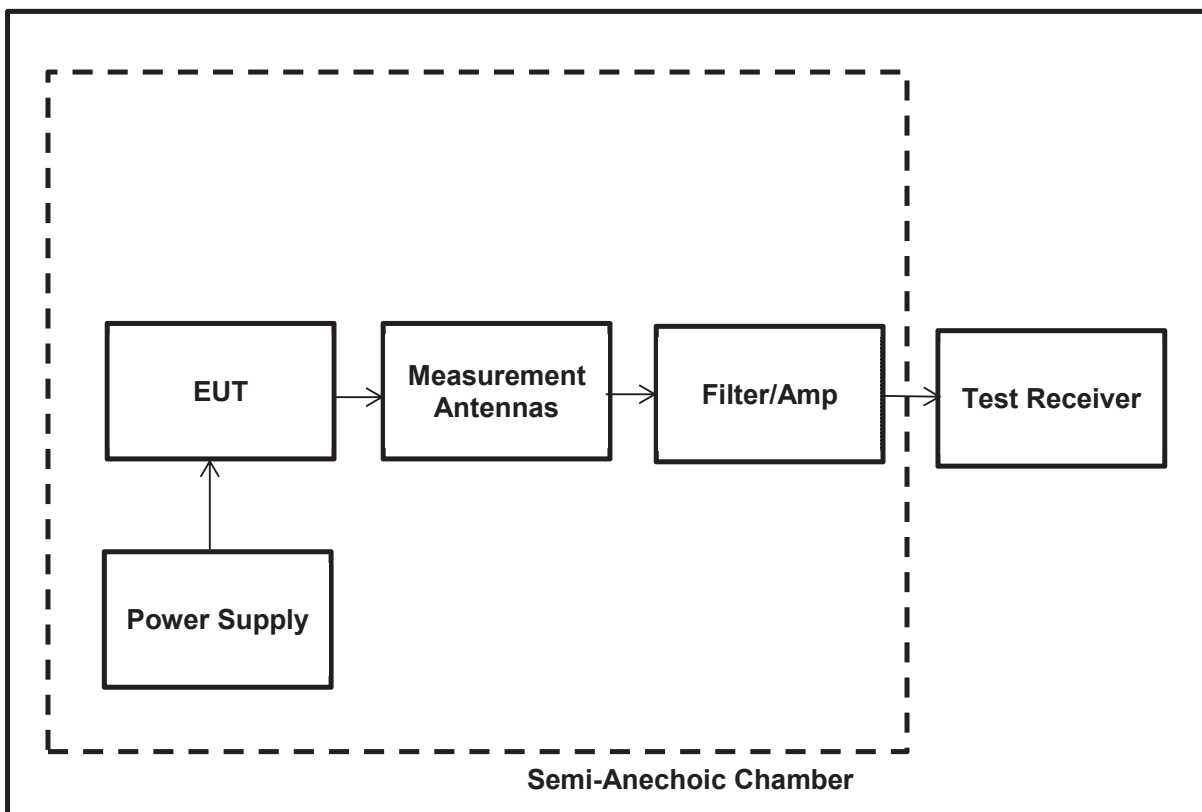
FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Sections 6.3 and 6.5

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	37

Note(s):

1. The Band Edge measurements were done with the Antenna Radiated i.e. EUT antenna connected.
2. As the lower band edges fall within non-restricted bands, only peak measurements are required. In accordance with FCC KDB 558074 Section 11.1, the test method in Section 11.3 was followed: the test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker and corresponding reference level line were placed on the peak of the carrier. As the maximum peak conducted output power was measured using a peak detector in accordance with FCC KDB 558074 Section 9.1.1 an out-of-band limit line was placed 20 dB below the peak level (FCC KDB 558074 Section 11.1(a)). A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent non-restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
3. As the upper band edge falls within a restricted band both peak and average measurements were recorded by placing a marker at the edge of the band. For peak measurements the test receiver resolution bandwidth was set to 1 MHz and the video bandwidth 3 MHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. For average measurements the test receiver resolution bandwidth was set to 1 MHz and the video bandwidth 3 MHz. An average detector was used, sweep time was set to auto and trace mode was Max Hold. The test receiver was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emissions. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
4. There is a restricted band 10 MHz below the lower band edge. The test receiver was set up as follows: the RBW set to 1 MHz, the VBW set to 3 MHz, with the sweep time set to auto couple. Peak and average measurements were performed with their respective detectors. Markers were placed on the highest point on each trace.
5. *Emissions in restricted bands: In accordance with C63.10 Section 6.6.4.3, Note 1, where the peak detected amplitude was shown to comply with the average limit, an average measurement was not performed.
6. On the top channel, the final measurement has been performed using integrated method.

Test Setup:

Transmitter Band Edge Radiated Emissions (Antenna Radiated)**Results: Lower Band Edge/Peak**

Frequency (MHz)	Peak Level (dB μ V/m)	-20 dBc Limit (dB μ V/m)	Margin (dB)	Result
2400	50.04	79.51	29.47	Complied

Results: Upper Band Edge / Restricted Band / Peak

Frequency (MHz)	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
2483.500	60.04	74.0	13.96	Complied

Results: Upper Band Edge / Restricted Band / Average

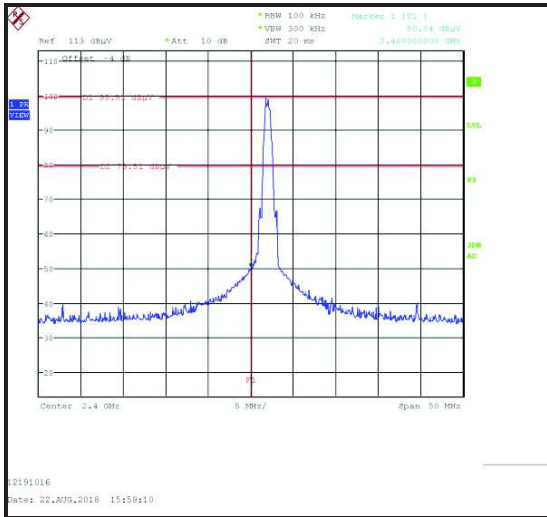
Frequency (MHz)	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
2483.500	51.17	54.0	2.83	Complied

Results: 2310 to 2390 MHz Restricted Band / Peak

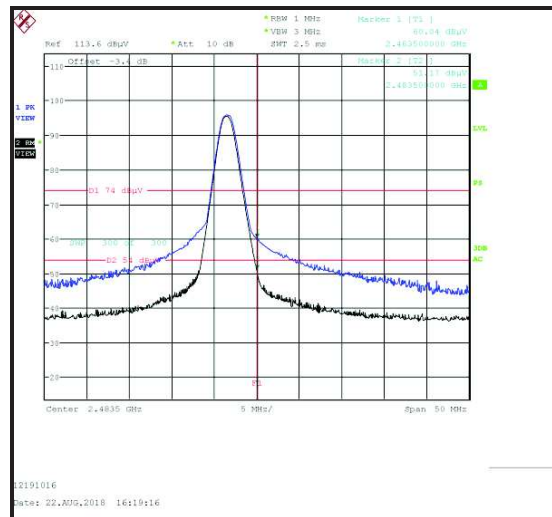
Frequency (MHz)	Peak Level (dB μ V/m)	Peak Limit (dB μ V/m)	Margin (dB)	Result
2389.8	54.67	74.0	19.33	Complied

Results: 2310 to 2390 MHz Restricted Band / Average

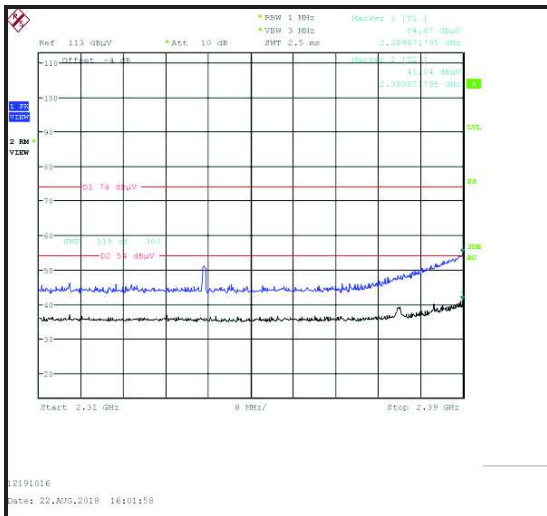
Frequency (MHz)	Average Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
2389.8	41.04	54.0	12.96	Complied



Lower Band Edge Peak Measurement



Upper Band Edge Peak & Average Measurement



2310 MHz to 2390 MHz Restricted Band Plot

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
Conducted Maximum Peak Output Power	95%	± 0.59 dB
Conducted Spurious Emissions	95%	± 0.59 dB
Radiated Spurious Emissions	95%	± 3.10 dB
Band Edge Radiated Emissions	95%	± 3.10 dB
Minimum 6 dB Bandwidth	95%	± 0.87 %

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	24
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	24
496	Rohde & Schwarz	Antenna, log. - periodical	HL050	100297	7/20/2016	24
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	24
608	Rohde & Schwarz	Switch Matrix	OSP 120	101227	4/8/2014	60
363	Wainwright	Notch Filter GSM900	WW-NF9	100002	Lab verification	n/a
611	Wainwright Instruments	Band Reject Filter DL LTE	WRCGV8-	1	Lab verification	n/a
612	Wainwright Instruments	Band Reject Filter UL LTE	WRCGV8-	1	Lab verification	n/a
613	Wainwright Instruments	Band Reject Filter WLAN/ BT	WRCTF12-	1	Lab verification	n/a
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

Test site: SR 9

ID	Manufacturer	Type	Model	Serial No.	Calibration Date	Cal. Cycle
472	Rohde & Schwarz	Generator, Vektorsignal	SMU200A	102409	7/11/2018	12
592	Rohde & Schwarz	Wideband Radio Communication tester	CMW 500	119593	8/15/2017	12
622	Rohde & Schwarz	Step Attenuator	RSC	101904	7/12/2018	12
626	Rohde & Schwarz	Bluetooth Tester	CBT	100481	Signaling Only	24
635	Rohde & Schwarz	Signal generator	SMB100A	179875	7/10/2018	12
636	Rohde & Schwarz	switching unit	OSP120	101698	7/12/2018	12
637	Rohde & Schwarz	Spectrum Analyzer	FSV40	101587	7/11/2018	12
423	Bonn Elektronik	Amplifier, Low Noise Pre	BLMA 1840-1A	55929	7/12/2018	24
451	Rohde & Schwarz	Power Meter, Dual Channel	NRVD	101190	7/10/2018	12
427	Rohde & Schwarz	Probe, Power Sensor	NRV-Z5	100106	7/12/2018	12
195	SPS	Power Supply	TOE8842-24	51455	Verified by Multimeter	12
216	Agilent	Multimeter	34401A	US36017458	7/11/2017	24
378	ESPEC/ Thermotec	Climatic Chamber	PL-1FT	5100869	8/9/2016	36

8. Report Revision History

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