



TEST REPORT

Test Report No. : UL-RPT-RP11478058JD01A V2.0

Manufacturer : VASCO DATA SECURITY NV/SA
Model No. : DIGIPASS Bluetooth Bridge
FCC ID : 2AH88-DPBB
Technology : *Bluetooth* – Low Energy
Test Standard(s) : FCC Parts 15.207, 15.209(a) & 15.247

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 13 February 2017

Checked by:

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Senior Engineer, Radio Laboratory
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1. Customer Information

Company Name:	VASCO DATA SECURITY NV/SA
Address:	Koningin Astridlaan 164 Wemmel 1780 Belgium

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
Site Registration:	209735
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	06 February 2017 to 10 February 2017

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	
Part 15.247(a)(2)	Transmitter Minimum 6 dB Bandwidth	
Part 15.247(e)	Transmitter Power Spectral Density	Note 1
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	
Part 15.247(d)/15.209(a)	Transmitter Radiated Emissions	
Part 15.247(d)/15.209(a)	Transmitter Band Edge Radiated Emissions	
Key to Results  = Complied  = Did not comply		

Note(s):

1. In accordance with FCC KDB 558074 Section 10.1, PSD measurements are 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 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 v03r05
Title:	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
Reference:	KDB 174176 D01 Line Conducted FAQ v01r01 June 3, 2015
Title:	AC Power-Line Conducted Emissions Frequently Asked Questions

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:	DIGIPASS
Model Name or Number:	DIGIPASS <i>Bluetooth</i> Bridge
Test Sample Serial Number:	#1 (<i>Radiated RF sample</i>)
Hardware Version:	0.3
Firmware Version:	FC.0A
FCC ID:	2AH88-DPBB

Brand Name:	DIGIPASS
Model Name or Number:	DIGIPASS <i>Bluetooth</i> Bridge
Test Sample Serial Number:	#4 (<i>Conducted RF sample</i>)
Hardware Version:	0.3
Software Version:	FC.0A
FCC ID:	2AH88-DPBB

3.2. Description of EUT

The Equipment Under Test was a USB dongle. It contains a *Bluetooth* LE transceiver and is powered from a USB host device.

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	5 VDC via USB host	
Maximum Conducted Output Power:	1.1 dBm		
Antenna Gain:	-4.0 dBi		
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. Support Equipment

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

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	Latitude
Serial Number:	Not marked or stated

Description:	Power supply
Brand Name:	Dell
Model Name or Number:	PA-1900-02D
Serial Number:	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 with a modulated carrier in *Bluetooth* LE test mode.

4.2. Configuration and Peripherals

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

- The EUT was inserted to and powered from the USB port on the laptop PC supplied by the customer.
- Controlled using a test application ('FCC_test' dated 02/02/2017) on the laptop PC supplied by the customer. The application was used to enable continuous transmission at 100% duty cycle and to select the test channels as required. Test modes 4, 5 & 6 were used.
- The EUT conducted sample was used for 6 dB bandwidth and maximum peak output power tests.
- The EUT radiated sample was used for AC conducted emissions and radiated spurious emissions tests. The laptop PC was powered from its internal battery during radiated emissions tests.
- AC conducted emissions tests. The host laptop PC was powered from its power supply. The laptop power supply was connected to a single phase mains supply via a LISN.

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 UKAS 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 AC Conducted Spurious Emissions

Test Summary:

Test Engineers:	Richard Johnson & Ian Watch	Test Date:	10 February 2017
Test Sample Serial Number:	#1		

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10 Section 6.2 / FCC KDB 174176 and notes below

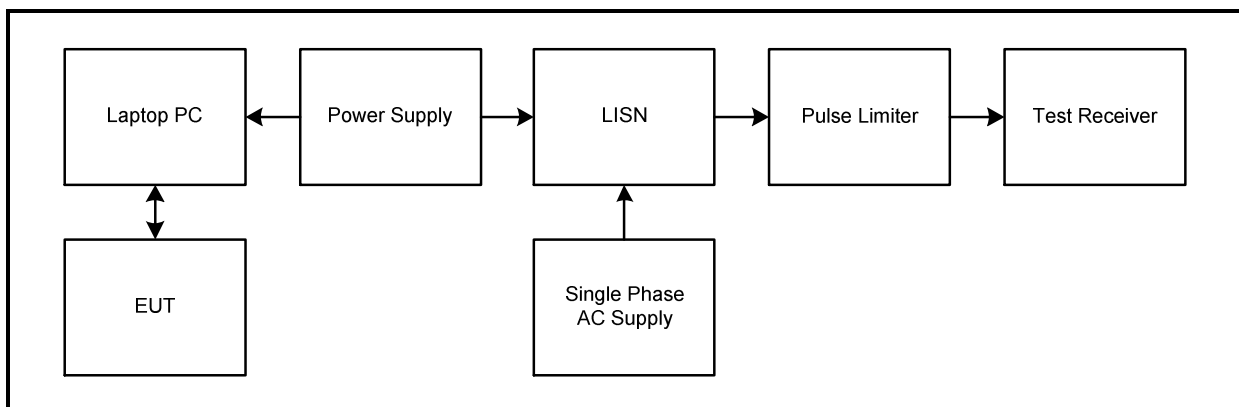
Environmental Conditions:

Temperature (°C):	29
Relative Humidity (%):	27

Note(s):

1. The EUT was inserted into the USB port on a laptop PC. The laptop PC power supply was connected to a 120 VAC 60 Hz single phase supply via a LISN.
2. In accordance with FCC KDB 174176 Q4, tests were performed with a 240 VAC 60 Hz single phase supply as this was within the voltage range marked on the laptop PC power supply.
3. A pulse limiter was fitted between the LISN and the test receiver.
4. Pre-scans were performed and markers placed on the highest live and neutral measured levels. Final measurements were performed on the marker frequencies and the results entered into the tables below.

Test setup:



Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 120 VAC 60 Hz**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.150000	Live	43.8	66.0	22.2	Complied
0.366000	Live	49.7	58.6	8.9	Complied
7.129500	Live	21.4	60.0	38.6	Complied
14.820000	Live	26.3	60.0	33.7	Complied
18.915000	Live	36.7	60.0	23.3	Complied
24.004500	Live	30.8	60.0	29.2	Complied

Results: Live / Average / 120 VAC 60 Hz

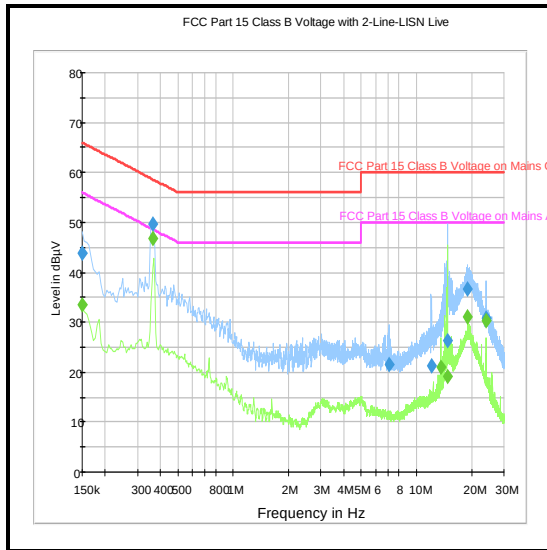
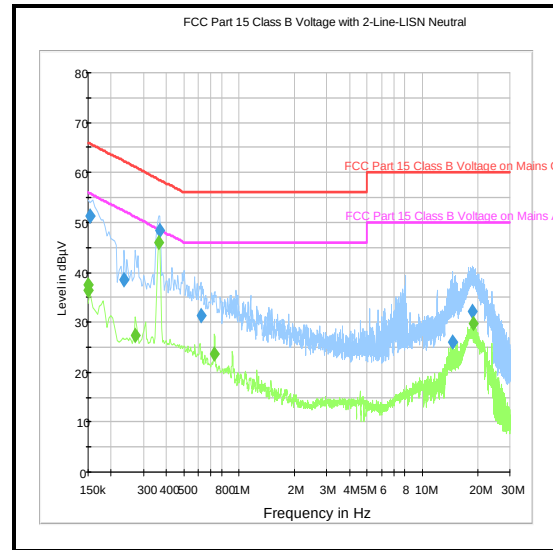
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.150000	Live	33.4	56.0	22.6	Complied
0.366000	Live	46.9	48.6	1.7	Complied
13.555500	Live	21.0	50.0	29.0	Complied
14.820000	Live	19.0	50.0	31.0	Complied
18.915000	Live	31.0	50.0	19.0	Complied
24.000000	Live	30.3	50.0	19.7	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak / 120 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.154500	Neutral	51.2	65.8	14.6	Complied
0.235500	Neutral	38.6	62.3	23.7	Complied
0.370500	Neutral	48.5	58.5	10.0	Complied
0.618000	Neutral	31.5	56.0	24.5	Complied
14.586000	Neutral	26.1	60.0	33.9	Complied
18.618000	Neutral	32.1	60.0	27.9	Complied

Results: Neutral / Average / 120 VAC 60 Hz

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.150000	Neutral	37.4	56.0	18.6	Complied
0.271500	Neutral	27.3	51.1	23.8	Complied
0.366000	Neutral	45.9	48.6	2.7	Complied
0.735000	Neutral	23.7	46.0	22.3	Complied
18.915000	Neutral	29.8	50.0	20.2	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: 120 VAC 60 Hz****Live****Neutral**

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

Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 240 VAC 60 Hz**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.172500	Live	45.3	64.8	19.5	Complied
0.307500	Live	42.2	60.0	17.8	Complied
0.334500	Live	39.6	59.3	19.7	Complied
0.591000	Live	39.3	56.0	16.7	Complied
0.600000	Live	39.1	56.0	16.9	Complied
20.503500	Live	34.0	60.0	26.0	Complied

Results: Live / Average / 240 VAC 60 Hz

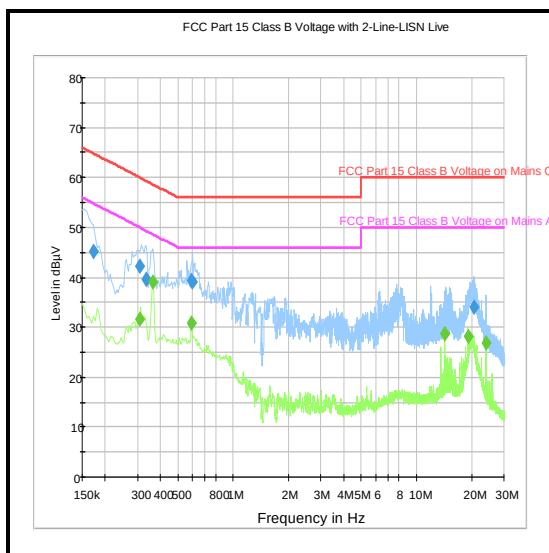
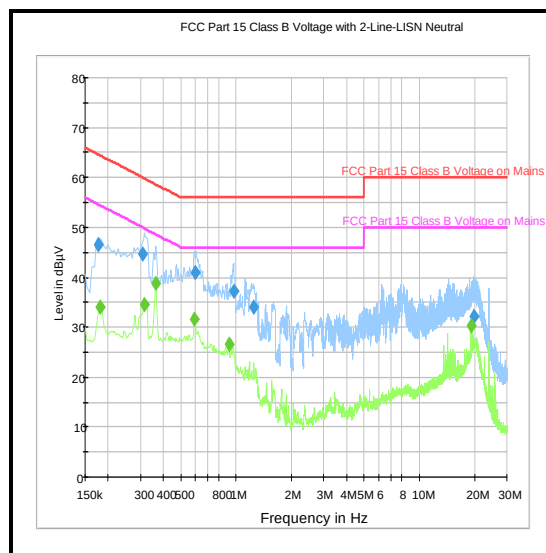
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.307500	Live	31.7	50.0	18.3	Complied
0.366000	Live	39.0	48.6	9.6	Complied
0.591000	Live	30.7	46.0	15.3	Complied
14.316000	Live	28.7	50.0	21.3	Complied
19.099500	Live	28.2	50.0	21.8	Complied
24.000000	Live	26.8	50.0	23.2	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak / 240 VAC 60 Hz**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.177000	Neutral	46.4	64.6	18.2	Complied
0.307500	Neutral	44.6	60.0	15.4	Complied
0.600000	Neutral	40.9	56.0	15.1	Complied
0.973500	Neutral	37.1	56.0	18.9	Complied
1.243500	Neutral	34.0	56.0	22.0	Complied
19.882500	Neutral	32.1	60.0	27.9	Complied

Results: Neutral / Average / 240 VAC 60 Hz

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.181500	Neutral	33.9	54.4	20.5	Complied
0.316500	Neutral	34.6	49.8	15.2	Complied
0.366000	Neutral	38.9	48.6	9.7	Complied
0.591000	Neutral	31.5	46.0	14.5	Complied
0.915000	Neutral	26.5	46.0	19.5	Complied
19.158000	Neutral	30.3	50.0	19.7	Complied

Transmitter AC Conducted Spurious Emissions (continued)**Results: 240 VAC 60 Hz****Live****Neutral**

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2013	Thermohygrometer	JM Handelspunkt	608-H1	None stated	10 Jun 2017	12
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	20 Jul 2017	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	08 Mar 2017	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	07 Nov 2017	12

5.2.2. Transmitter Minimum 6 dB Bandwidth**Test Summary:**

Test Engineers:	Richard Johnson & Ian Watch	Test Date:	07 February 2017
Test Sample Serial Number:	#4		

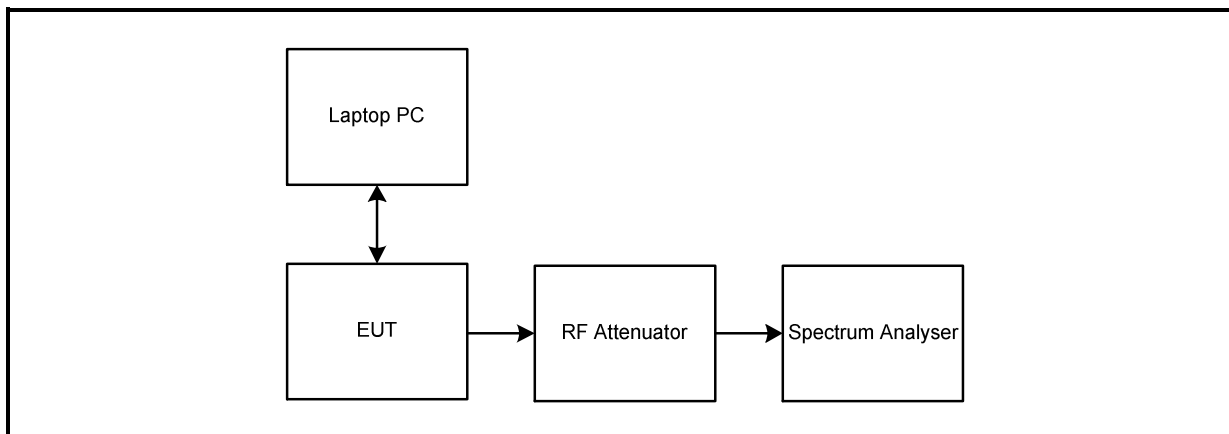
FCC Reference:	Part 15.247(a)(2)
Test Method Used:	FCC KDB 558074 Section 8.1 Option 1

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	36

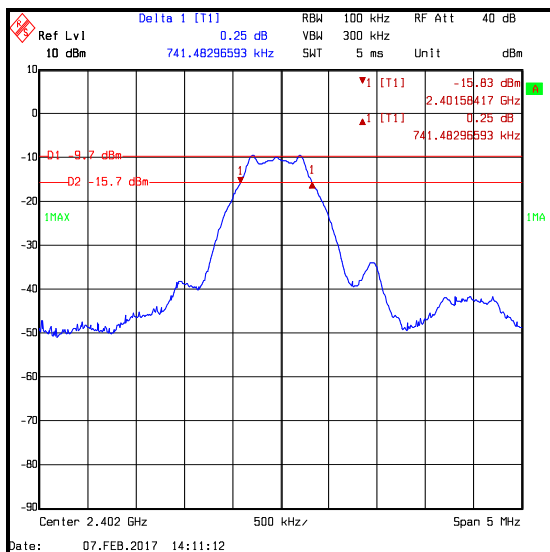
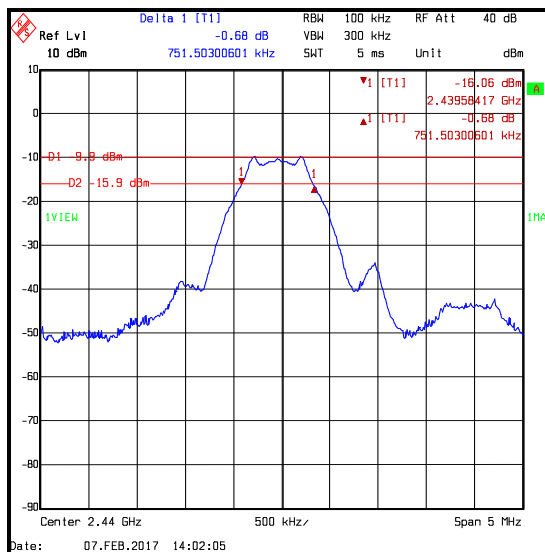
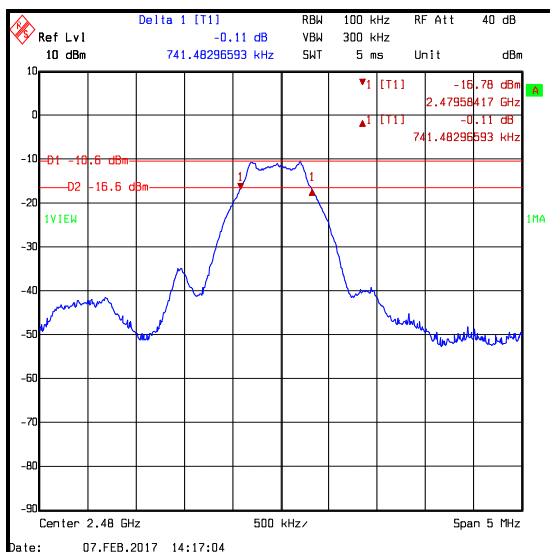
Note(s):

5. 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.
6. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

Test setup:

Transmitter Minimum 6 dB Bandwidth (continued)**Results:**

Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	741.483	≥500	241.483	Complied
Middle	751.503	≥500	251.503	Complied
Top	741.483	≥500	241.483	Complied

**Bottom Channel****Middle Channel****Top Channel**

Transmitter Minimum 6 dB Bandwidth (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	02 Apr 2017	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB	842659/016	08 Sep 2017	12
A2140	Attenuator	AtlanTecRF	AN18-10	090918-14	26 Apr 2017	12

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

Test Engineers:	Richard Johnson & Ian Watch	Test Date:	07 February 2017
Test Sample Serial Number:	#4		

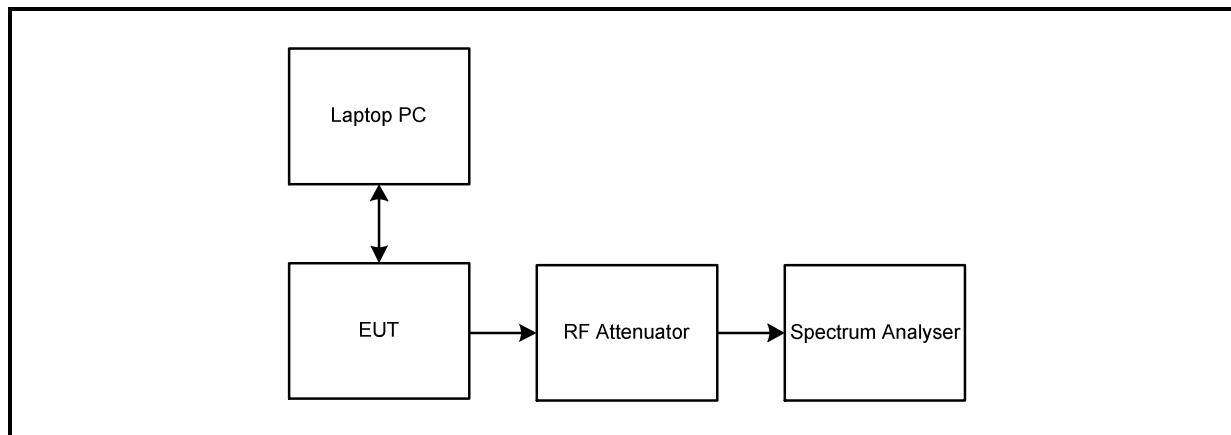
FCC Reference:	Part 15.247(b)(3)
Test Method Used:	FCC KDB 558074 Section 9.1.1

Environmental Conditions:

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

Note(s):

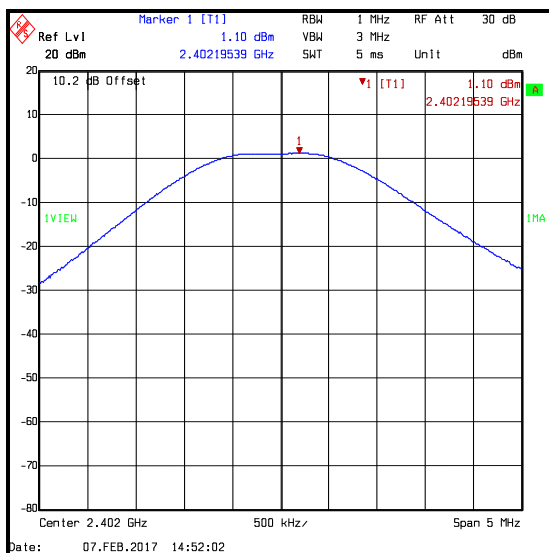
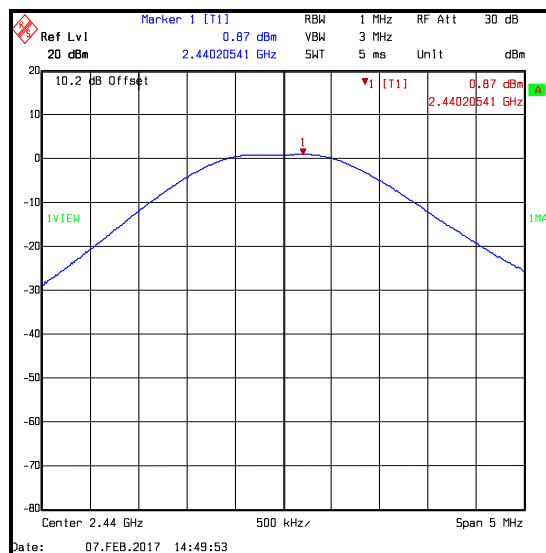
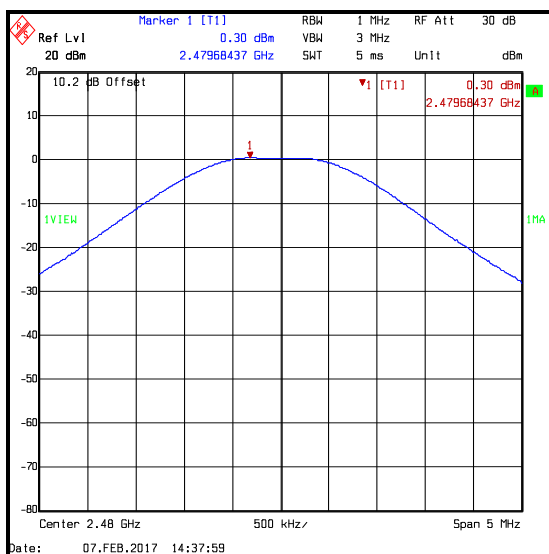
1. Conducted power tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 9.1.1 procedure. A resolution bandwidth of 1 MHz was used and the video bandwidth was set to 3 MHz.
2. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset of 10.2 dB was used on the spectrum analyser to compensate for the loss of the attenuator (9.8 dB) and RF cable (0.4 dB).
3. The conducted power was added to the declared antenna gain to obtain the EIRP.

Test setup:

Transmitter Maximum Peak Output Power (continued)**Results:**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	1.1	30.0	28.9	Complied
Middle	0.9	30.0	29.1	Complied
Top	0.3	30.0	29.7	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	1.1	-4.0	-2.9	36.0	38.9	Complied
Middle	0.9	-4.0	-3.1	36.0	39.1	Complied
Top	0.3	-4.0	-3.7	36.0	39.7	Complied

Transmitter Maximum Peak Output Power (continued)**Results:****Bottom Channel****Middle Channel****Top Channel****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	02 Apr 2017	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB	842659/016	08 Sep 2017	12
A2140	Attenuator	AtlanTecRF	AN18-10	090918-14	26 Apr 2017	12

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

Test Engineers:	Richard Johnson & Ian Watch	Test Date:	08 February 2017
Test Sample Serial Number:	#1		

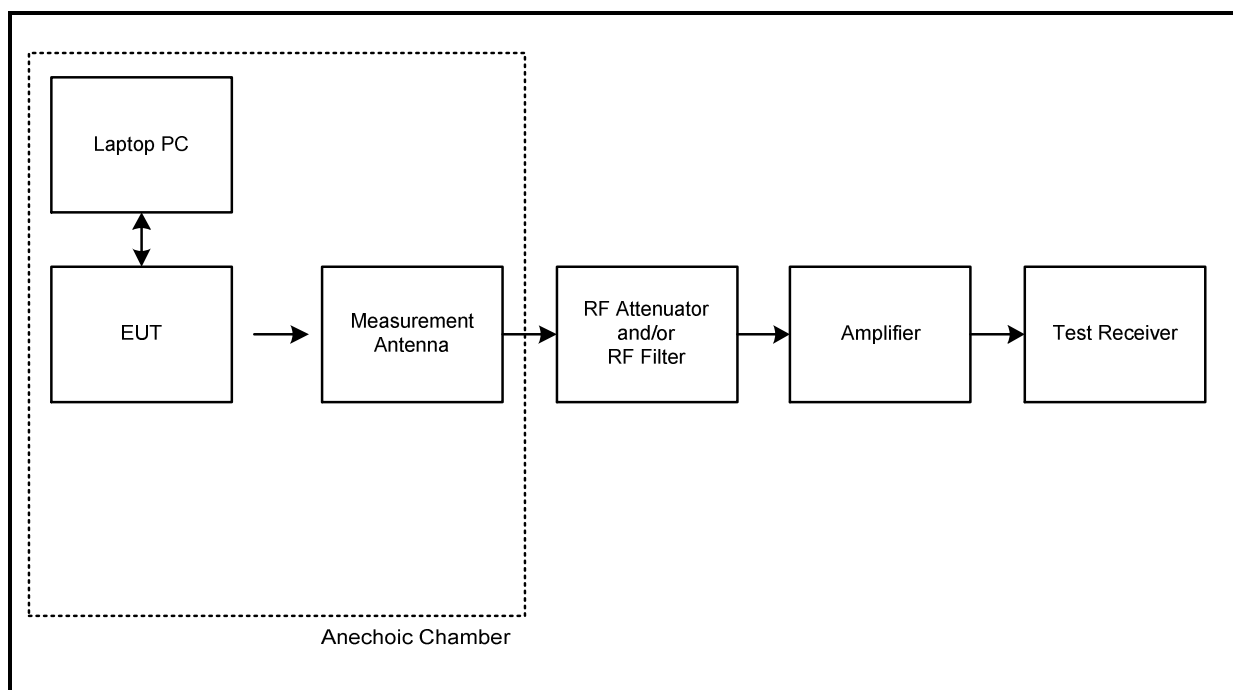
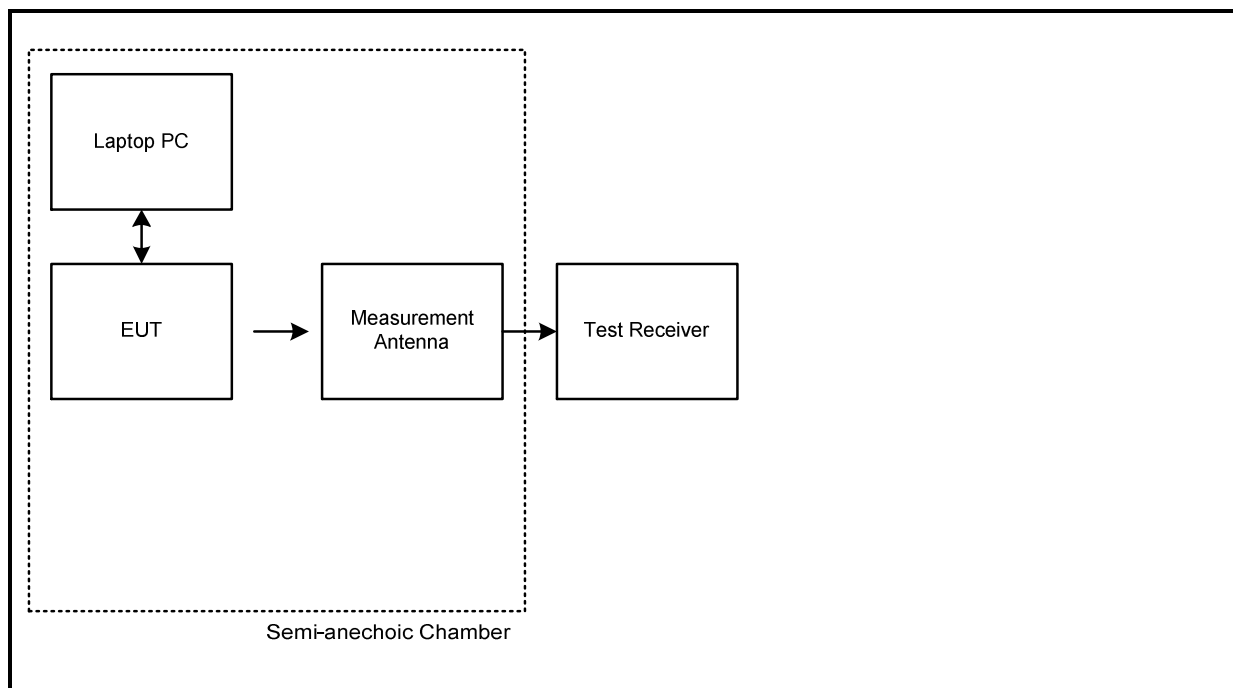
FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Sections 6.3 and 6.5
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	36

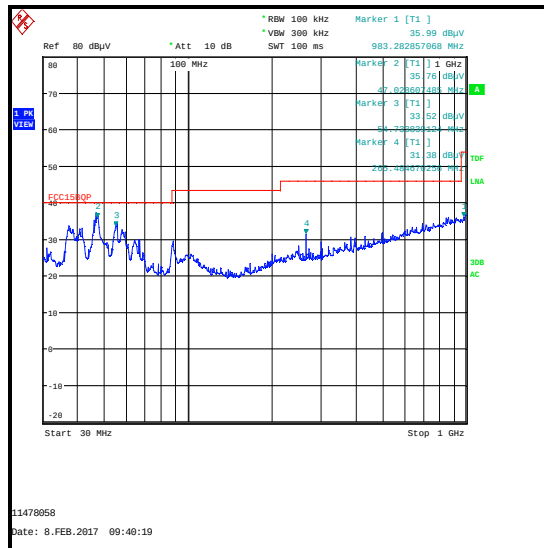
Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore radiated emissions measurements were performed with the EUT set to the middle channel only.
3. All emissions shown on the pre-scans were investigated and found to be ambient, coming from the laptop PC used as support equipment, > 20 dB below the appropriate limit or below the noise floor of the measurement system. Therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
4. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0017) 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.
5. Pre-scans were performed and markers placed on the highest measured levels. 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.

Transmitter Radiated Emissions (continued)**Test setup for radiated measurements:**

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

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
983.283	Horizontal	36.0	54.0	18.0	Complied

**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Apr 2017	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	16 Nov 2017	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	21 Mar 2017	12
A2888	Antenna	Schwarzbeck	VULB 9163	9163-941	06 May 2017	12

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

Test Engineers:	Richard Johnson & Ian Watch	Test Dates:	07 February 2017 & 08 February 2017
Test Sample Serial Number:	#1		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	FCC KDB 558074 Sections 11 & 12 referencing ANSI C63.10 Sections 6.3 and 6.6
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

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

Note(s):

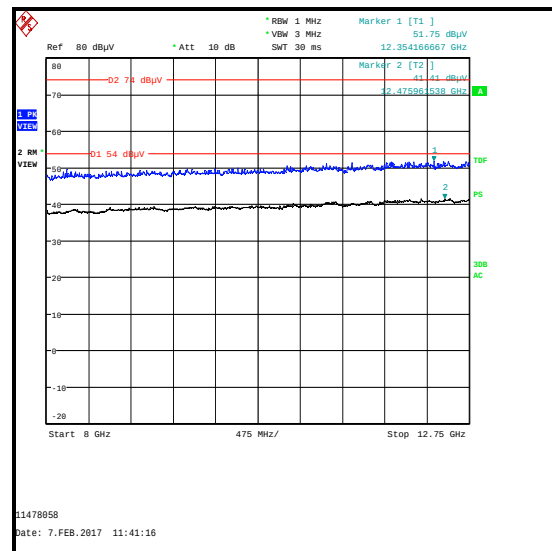
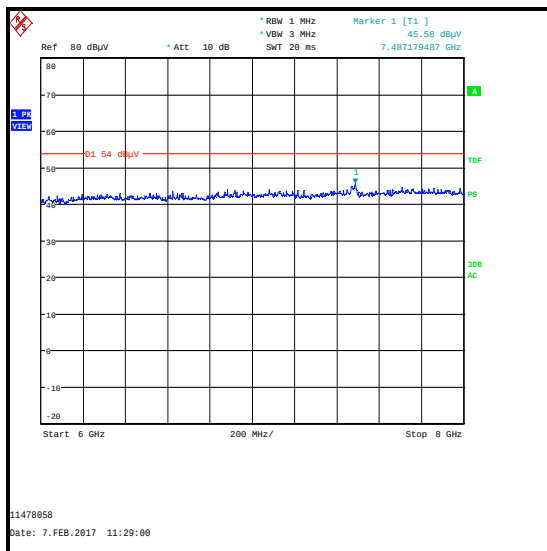
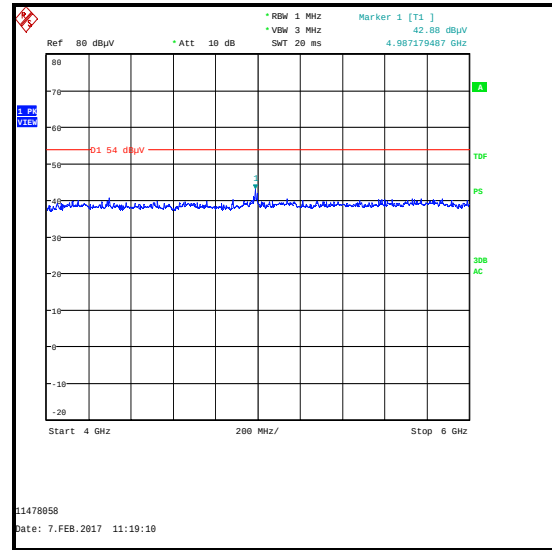
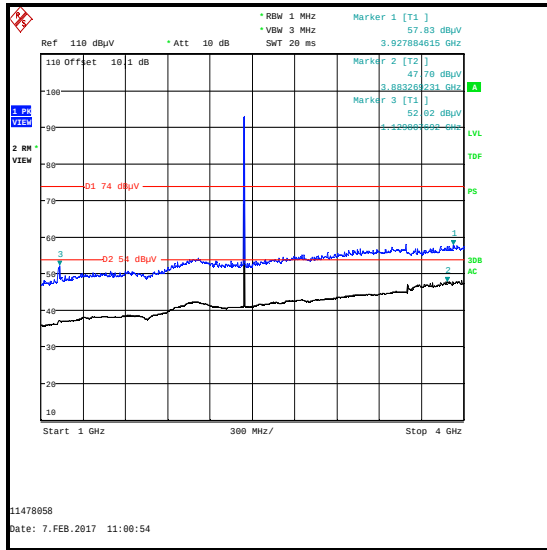
1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest noise floor readings of the measuring receiver was recorded as shown in the tables below.
3. The emission shown on the 1 GHz to 4 GHz plot is the EUT fundamental.
4. Pre-scans from 1 GHz to 18 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Pre-scans above 18 GHz were performed in a fully anechoic chamber (Asset Number K0017) at a distance of 1 metre. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. The measurement antenna was placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT.
5. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto.

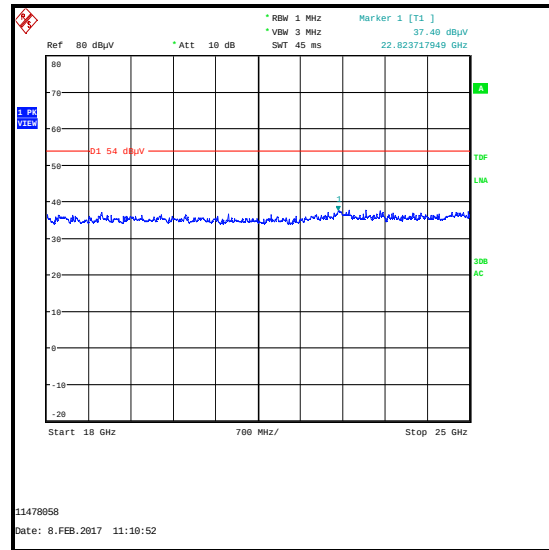
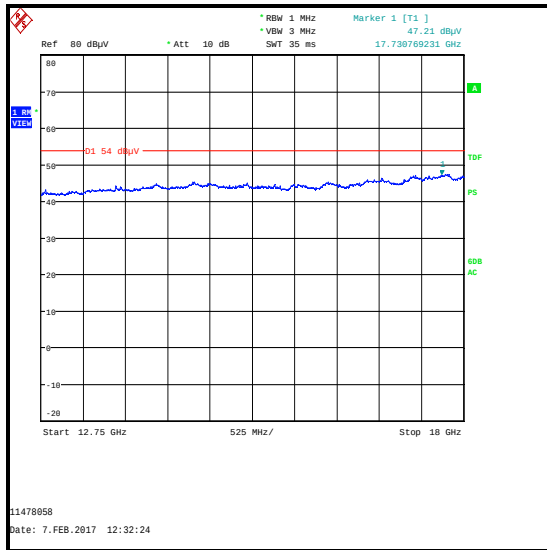
Transmitter Radiated Emissions (continued)**Results: Peak / Middle Channel**

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
3927.885	Horizontal	57.8	74.0	16.2	Complied

Results: Average / Middle Channel

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
3883.269	Horizontal	47.7	54.0	6.3	Complied

Transmitter Radiated Emissions (continued)

Transmitter Radiated Emissions (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	02 Apr 2017	12
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Apr 2017	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	16 Nov 2017	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	19 May 2017	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	21 Mar 2017	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	21 Mar 2017	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	21 Mar 2017	12
A1818	Antenna	Flann Microwave	3115	00075692	08 Nov 2017	12
A253	Antenna	Flann Microwave	12240-20	128	08 Nov 2017	12
A254	Antenna	Flann Microwave	14240-20	139	08 Nov 2017	12
A255	Antenna	Flann Microwave	16240-20	519	08 Nov 2017	12
A256	Antenna	Flann Microwave	18240-20	400	08 Nov 2017	12
A2890	Antenna	Schwarzbeck	HWRD 750	014	06 May 2017	12
A2891	Pre Amplifier	Schwarzbeck	BBV 9718	9718-306	07 Apr 2017	12

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

Test Engineers:	Richard Johnson & Ian Watch	Test Date:	07 February 2017
Test Sample Serial Number:	#1		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.10.4, 6.10.5 & KDB 558074 Section 11

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	33

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. The maximum peak conducted output power was previously measured. In accordance with FCC KDB 558074 Section 11.1(a), the lower band edge measurement was performed with a peak detector and the -20 dBc limit applied.
3. As the lower band edge is adjacent to a non-restricted band, 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 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.
4. As the upper band edge is adjacent to a restricted band both peak and average measurements were recorded by placing a marker at the edge of the band. The test receiver resolution bandwidth was set to 1 MHz and the video bandwidth 3 MHz. A peak detector was used for peak measurements and RMS detector used for average, 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.
5. There is a restricted band 10 MHz below the lower band edge from 2310 MHz to 2390 MHz. 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 peak and RMS detectors. Markers were placed on the highest point on each trace. No emissions were observed above the noise floor of the measurement system with the EUT transmitting on the bottom, middle or top channels.

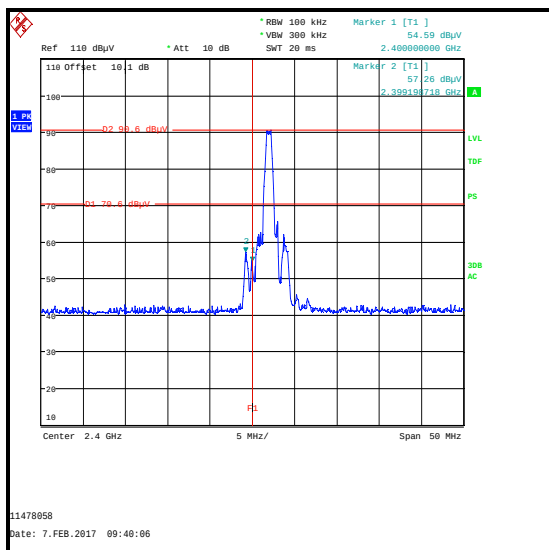
Transmitter Band Edge Radiated Emissions (continued)**Results: Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2399.199	57.3	70.6	13.3	Complied
2400.0	54.6	70.6	16.0	Complied
2483.5	56.8	74.0	17.2	Complied

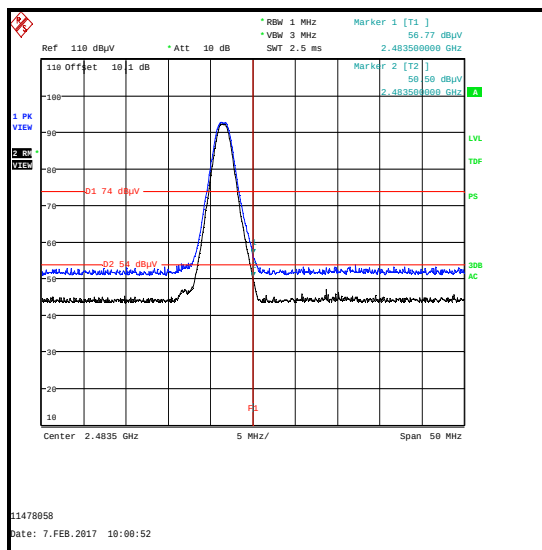
Results: Average

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2483.5	50.5	54.0	3.5	Complied

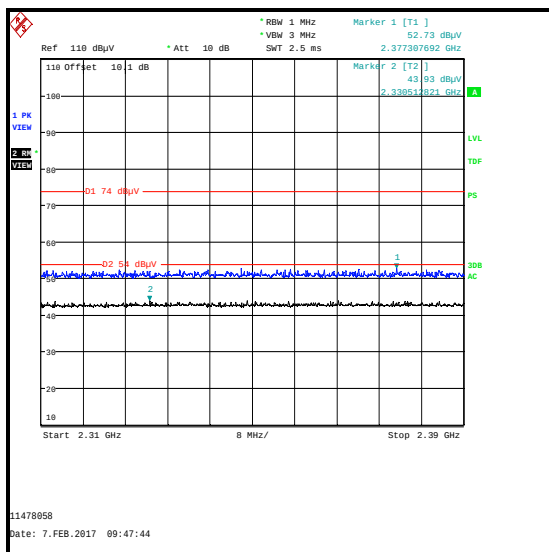
Transmitter Band Edge Radiated Emissions (continued)



Lower Band Edge



Upper Band Edge



2310 MHz to 2390 MHz Restricted Band

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015	None stated	02 Apr 2017	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	16 Nov 2017	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	02 Apr 2017	12
M1886	Test Receiver	Rohde & Schwarz	ESU26	100554	21 Mar 2017	12
A1818	Antenna	EMCO	3115	0075692	08 Nov 2017	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	26 Apr 2017	12

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value measured (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

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	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 dB
Conducted Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±1.13 dB
Minimum 6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±4.59 %
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 25 GHz	95%	±2.94 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. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	6	-	Section 2.1. Changed 'KDB 558074 D01 DTS Meas Guidance' to 'KDB 558074 D01 DTS Meas Guidance v03r05'

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