Report On

FCC and Industry Canada Testing of the
DEB Group Ltd Universal GMS PCB
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN

COMMERCIAL-IN-CONFIDENCE

FCC ID: YPHDEB1135-300
IC: 10648A-1135300

Document 75927312 Report 02 Issue 1 July 2014

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REPORT ON

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Document 75927312 Report 02 Issue 1

July 2014

PREPARED FOR

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PREPARED BY

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APPROVED BY

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Authorised Signatory

DATED

21 July 2014

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler S Milliken

Product Service

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Product Service

SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
DEB Group Ltd Universal GMS PCB
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210
and Industry Canada RSS-GEN

1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of the DEB Group Ltd Universal GMS PCB to the requirements of FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN.

Objective	To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	DEB Group Ltd
Model Number(s)	1135-200 Type 0 Issue V1-1.00
Serial Number(s)	FCC Sample 3 DD1420AGA00693 FCC Sample 1
Number of Samples Tested	3
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2013) Industry Canada RSS-210 (2010) Industry Canada RSS-GEN (2010)
Incoming Release Date	Application Form 18 July 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	DIP-1008645 02 July 2014
Start of Test	8 July 2014
Finish of Test	15 July 2014
Name of Engineer(s)	G Lawler S Milliken
Related Document(s)	ANSI C63.10: 2009 KDB 558074 D01 V03 R01

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN is shown below.

Section	Spec Clause			Test Description	Result	Comments/Base Standard
	Pt 15B	RSS-210	RSS-GEN			
Bluetooth						
2.1	15.247 (b)(3)	A8.4 (2)	-	Maximum Peak Conducted Output Power	Pass	
2.2	15.247 (b)(4)	A8.4 (4)		EIRP Peak Power	Pass	
2.3	15.247 (e)	A8.2 (b)	-	Power Spectral Density	Pass	
2.4	15.247 (d)	A8.5	2.2	Spurious and Band Edge Emissions	Pass	
2.5	15.247 (a)(2)	A8.2 (b)	-	6dB Bandwidth	Pass	

Product Service

1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION	
Model Name/Number	Universal GMS PCB
Part Number	1135-300
FCC ID (if applicable)	YPHDEB1135-300
Industry Canada ID (if applicable)	10648A-1135300
Technical Description (Please provide a brief description of the intended use of the equipment)	A device for monitoring dispenser activity for the purposes of hand hygiene compliance

Types of Modulations used by the Equipment	
☐	FHSS
☒	Other forms of modulation
In case of FHSS Modulation	
In case of non-Adaptive Frequency Hopping equipment:	
	Number of Hopping Frequencies:
In case of Adaptive Frequency Hopping Equipment:	
	Maximum number of Hopping Frequencies:
	Minimum number of Hopping Frequencies:
Dwell Time:	
Minimum Channel Occupation Time:	
Adaptive / non-adaptive equipment:	
☒	non-adaptive Equipment
☐	adaptive Equipment without the possibility to switch to a non-adaptive mode
☐	adaptive Equipment which can also operate in a non-adaptive mode
In case of adaptive equipment:	
The Channel Occupancy Time implemented by the equipment: ms	
☐	The equipment has implemented an LBT based DAA mechanism
In case of equipment using modulation different from FHSS:	
☐	The equipment is Frame Based equipment
☐	The equipment is Load Based equipment
☐	The equipment can switch dynamically between Frame Based and Load Based equipment
The CCA time implemented by the equipment: µs	
The value q as referred to in clause 4.3.2.5.2.2.2 is:	
☐	The equipment has implemented an non-LBT based DAA mechanism
☐	The equipment can operate in more than one adaptive mode

Product Service

In case of non-adaptive Equipment:		
The maximum RF Output Power (e.i.r.p.): +20 dBm		
The maximum (corresponding) Duty Cycle: << 1 %		
Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):		
The worst case operational mode for each of the following tests:		
RF Output Power: +20dBm		
Power Spectral Density:		
Duty cycle, Tx-Sequence, Tx-gap:		
Dwell time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment):		
Hopping Frequency Separation (only for FHSS equipment):		
Medium Utilisation:		
Adaptivity & Receiver Blocking:		
Occupied Channel Bandwidth:		
Transmitter unwanted emissions in the OOB domain:		
Transmitter unwanted emissions in the spurious domain:		
Receiver spurious emissions:		
The different transmit operating modes (tick all that apply):		
☒	Operating mode 1: Single Antenna Equipment	
	☒	Equipment with only 1 antenna
	☐	Equipment with 2 diversity antennas but only 1 antenna active at any moment in time
	☐	Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)
☐	Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming	
	☐	Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)
	☐	High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
	☐	High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
NOTE: Add more lines if more channel bandwidths are supported.		
☐	Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming	
	☐	Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
	☐	High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1
	☐	High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2
NOTE: Add more lines if more channel bandwidths are supported.		
In case of Smart Antenna Systems:		
The number of Receive chains:		
The number of Transmit chains:		
☐	symmetrical power distribution	
☐	asymmetrical power distribution	
In case of beam forming, the maximum beam forming gain:		
NOTE: Beam forming gain does not include the basic gain of a single antenna.		

Product Service

Operating Frequency Range(s) of the equipment:	
Operating Frequency Range 1: 905 MHz to MHz	(e.g Bluetooth for EU)
Operating Frequency Range 2: MHz to MHz	(e.g WLAN for EU)
Operating Frequency Range 3: MHz to MHz	(e.g Bluetooth for FCC and/or Industry Canada)
Operating Frequency Range 4: MHz to MHz	(e.g WLAN for FCC and/or Industry Canada)
NOTE: Add more lines if more Frequency Ranges are supported.	

Occupied Channel Bandwidth(s):	
Occupied Channel Bandwidth1: MHz to MHz	
Occupied Channel Bandwidth2: MHz to MHz	
NOTE: Add more lines if more channel bandwidths are supported.	

Type of Equipment (stand-alone, combined, plug-in radio device, etc.):	
☒	Stand-alone
☐	Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)
☐	Plug-in radio device (Equipment intended for a variety of host systems)
☐	Other

The extreme operating conditions that apply to the equipment:			
Operating temperature range: 15 °C to 25 °C			
Operating voltage range: 3.6 V to V		☐ AC	☒ DC
	Details provided are for the:		
☒	stand-alone equipment		
☐	combined (or host) equipment		
☐	test jig		

Product Service

The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:			
Antenna Type:			
☒ Integral Antenna			
Antenna Gain: 0 dBi			
If applicable, additional beamforming gain (excluding basic antenna gain): dB			
☐ Temporary RF connector provided			
☐ No temporary RF connector provided			
☐ Dedicated Antennas (equipment with antenna connector)			
☐ Single power level with corresponding antenna(s)			
☐ Multiple power settings and corresponding antenna(s)			
Number of different Power Levels:			
Power Level 1: dBm			
Power Level 2: dBm			
Power Level 3: dBm			
Power Level 4: dBm			
NOTE 1: Add more lines in case the equipment has more power levels.			
NOTE 2: These power levels are conducted power levels (at antenna connector).			
For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable			
Power Level 1: dBm			
Number of antenna assemblies provided for this power level:			
Assembly #	**Gain (dBi)**	**e.i.r.p (dBm)**	**Part number or model number**
1			
2			
3			
4			
NOTE: Add more rows in case more antenna assemblies are supported for this power level.			
Power Level 2: dBm			
Number of antenna assemblies provided for this power level:			
Assembly #	**Gain (dBi)**	**e.i.r.p (dBm)**	**Part number or model number**
1			
2			
3			
4			
NOTE: Add more rows in case more antenna assemblies are supported for this power level.			
Power Level 3: dBm			
Number of antenna assemblies provided for this power level:			
Assembly #	**Gain (dBi)**	**e.i.r.p (dBm)**	**Part number or model number**
1			
2			
3			
4			
NOTE: Add more rows in case more antenna assemblies are supported for this power level.			

Product Service

The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:	
Details provided are for the: ☒ stand-alone equipment	
☐ combined (or host) equipment	
☐ test jig	
Supply Voltage ☐ AC mains State AC voltage	
☒ State DC voltage 3.6	
In case of DC, indicate the type of power source	
☐ Internal Power Supply	
☐ External Power Supply or AC/DC adapter	
☒ Battery	
☐ Other:	
Describe the test modes available which can facilitate testing:	
The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):	
Proprietary	
Combination for testing (see clause 5.1.3.3 of EN 300 328 V1.8.1)	
From all combinations of conducted power settings and intended antenna assembly(ies) specified in clause 3.1 m), specify the combination resulting in the highest e.i.r.p. for the radio equipment. Unless otherwise specified in EN 300 328, this power setting is to be used for testing against the requirements of EN 300 328. In case there is more than one such conducted power setting resulting in the same (highest) e.i.r.p. level, the highest power setting is to be used for testing. See also EN 300 328, clause 5.1.3.3.	
Highest overall e.i.r.p. value: 20 dBm	
Corresponding Antenna assembly gain: 0 dBi	Antenna Assembly #:
Corresponding conducted power setting: 0 dBm	Listed as Power Setting #:
(also the power level to be used for testing)	
Additional information provided by the applicant	
Modulation	
ITU Class(es) of emission:	
Can the transmitter operate unmodulated? ☐ Yes ☒ No	
Duty Cycle	
The transmitter is intended for:	
☐ Continuous duty	
☒ Intermittent duty	
☐ Continuous operation possible for testing purposes	
About the UUT	
☐ The equipment submitted are representative production models	
☒ If not, the equipment submitted are pre-production models ?	
☐ If pre-production equipment are submitted, the final production equipment will be identical in all respects with the equipment tested	
☒ If not, supply full details : The circuitry is identical but the silkscreen will reflect the updated FCC/IC numbers	
☐ The equipment submitted is CE marked	
☐ In addition to the CE mark, the Class-II identifier (Alert Sign) is affixed.	

	Additional items and/or supporting equipment provided
☒	Spare batteries (e.g. for portable equipment)
☐	Battery charging device
☐	External Power Supply or AC/DC adapter
☐	Test Jig or interface box
☐	RF test fixture (for equipment with integrated antennas)
☐	Host System
	Manufacturer
	Model
	Model Name
☐	Combined equipment
	Manufacturer
	Model
	Model Name
☐	User Manual
☒	Technical documentation (Handbook and circuit diagrams)

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature: Held on file at TUV SUD Product Services Ltd Name: Paul Dodds

Position held: Electronics Development Manager Date: 18th July 2014

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a DEB Group Ltd Universal GMS PCB. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 3.6 V DC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

Industry Canada Company Address Code
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard were made during testing.

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.

Product Service

SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
DEB Group Ltd Universal GMS PCB
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210
and Industry Canada RSS-GEN

2.1 MAXIMUM PEAK CONDUCTED OUTPUT POWER

2.1.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (b)(3)
Industry Canada RSS-210, Clause A8.4 (2)

2.1.2 Equipment Under Test and Modification State

1135-200 Type 0 Issue V1-1.00 S/N: DD1420AGA00693 - Modification State 0

2.1.3 Date of Test

8 July 2014

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 in conjunction with FCC KDB 558074 D01 DTS Meas Guidance v03r02, Clause 9.2.2.3.

The EUT was connected to a spectrum analyser through a 30 dB attenuator. The path loss of this network was measured and applied as a reference level offset in the spectrum analyser. The EUT was set to transmit with O-QPSK modulation at maximum power on its intended single frequency of operation, 905 MHz. The maximum average (RMS) conducted output power was measured using the aforementioned FCC KDB.

2.1.6 Environmental Conditions

Ambient Temperature	20.4°C
Relative Humidity	58.4%

Product Service

2.1.7 Test Results

3.6 V DC Supply

Modulation Data Rate (Mbps)	Maximum Peak Conducted Output Power	
	dBm	mW
	905 MHz	905 MHz
1	18.08	64.629

Limit Clause

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

2.2 EIRP PEAK POWER

2.2.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (b)(4)
Industry Canada RSS-210 , Clause A8.4 (4)

2.2.2 Equipment Under Test and Modification State

YPHDEB1135-200 S/N: FCC Sample 1 - Modification State 0

2.2.3 Date of Test

14 July 2014

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

The EUT was transmitted at maximum power via a cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a resolution bandwidth and video bandwidth of 1 MHz were used to perform the measurement. The level on the spectrum analyser was maximised by rotating the EUT through 360° and a height search of the measuring antenna. A substitution was then performed using a suitable calibrated antenna and signal generator.

This level was maximised by adjusting the height of the measuring antenna once more. The level from the signal generator was then adjusted to achieve the same raw result as with the EUT. This level was then corrected to account for cable loss and antenna factor. A peak power analyser was also used to obtain a correction factor for the wideband signal.

A calculation was then performed to obtain the final figure.

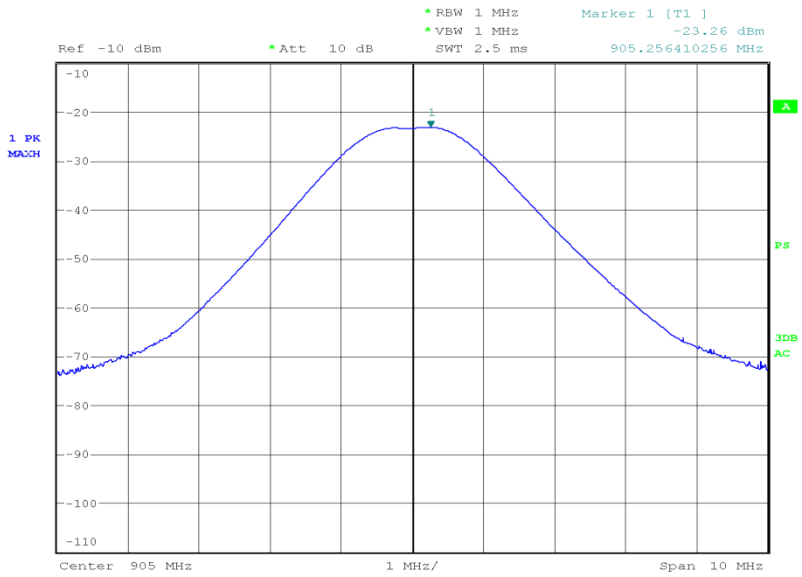
2.2.6 Environmental Conditions

Ambient Temperature	19.3°C
Relative Humidity	55.0%

2.2.7 Test Results

905 MHz

EIRP (dBm)	EIRP (mW)
12.02	15.92



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Limit

Limit EIRP (dBm)	Limit EIRP(mW)
36.0	4000

2.3 POWER SPECTRAL DENSITY

2.3.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (e)
Industry Canada RSS-210, Clause A8.2 (b)

2.3.2 Equipment Under Test and Modification State

1135-200 Type 0 Issue V1-1.00 S/N: DD1420AGA00693 - Modification State 0

2.3.3 Date of Test

8 July 2014

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 in conjunction with FCC KDB 558074 D01 DTS Meas Guidance v03r02, Clause 10.4.

The EUT was connected to a spectrum analyser through a 30 dB attenuator. The path loss of this network was measured and applied as a reference level offset in the spectrum analyser. The EUT was set to transmit with O-QPSK modulation at maximum power on its intended single frequency of operation, 905 MHz. The maximum average (RMS) conducted power spectral density was measured using the aforementioned FCC KDB.

2.3.6 Environmental Conditions

Ambient Temperature	20.4°C
Relative Humidity	58.4%

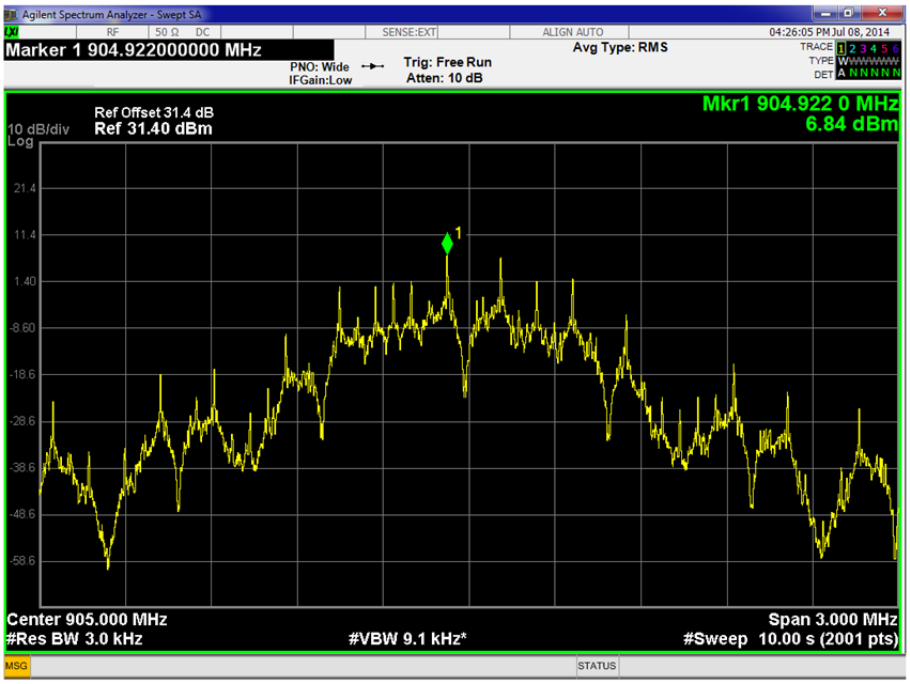
Product Service

2.3.7 Test Results

3.6 V DC Supply

Frequency	Power Spectral Density in 3 kHz Bands (dBm)
905 MHz	6.84

905 MHz



Limit Clause

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

2.4 SPURIOUS AND BAND EDGE EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (d)
Industry Canada RSS-210 , Clause A8.5
Industry Canada RSS-GEN, Clause 2.2

2.4.2 Equipment Under Test and Modification State

YPHDEB1135-200 S/N: FCC Sample 1 - Modification State 0

2.4.3 Date of Test

9 July 2014 & 14 July 2014

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 in conjunction with FCC KDB 558074 D01 DTS Meas Guidance v03r02.

For conducted measurements, the EUT was connected to a spectrum analyser through a 30 dB attenuator. The path loss of this network was measured and applied as a reference level offset in the spectrum analyser. The EUT was set to transmit with O-QPSK modulation at maximum power on its intended single frequency of operation, 905 MHz. The peak spurious emissions from the antenna port were measured using FCC KDB 558074 D01 DTS Meas Guidance v03r02, Clause 11.3; over a frequency range of 9 kHz to 10 GHz (excluding the operating band) and against the -30 dBc limit with respect to the average power spectral density measurement.

Radiated Emissions

A test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane.

The horizontal reference ground plane encompasses a turntable which is used to adjust the azimuth of the EUT. An antenna positioner is used to elevate the measuring antenna above the horizontal reference ground plane whereby the antenna elevation is adjustable between 1 m and 4 m.

Exploratory radiated emissions measurements were made by azimuth emissions searches over a range of 0° and 360°. These exploratory radiated emissions measurements were made using a peak detector over a frequency range of 30 MHz to 10 GHz, with the measuring antenna in both vertical and horizontal polarizations.

At least six of the greatest peak emissions, frequency positions were selected from the exploratory radiated emissions measurements for further evaluation as final measuring points.

To ascertain the azimuth and measuring antenna polarization that yields the highest peak emission level, each final measurement frequency was investigated by continuous azimuth emissions searching with the measuring antenna in both vertical and horizontal polarizations. For each final measurement frequency, the respective peak emission azimuth and measuring antenna polarization was used during a measuring antenna elevation search from 1 m to 4 m. Each final measurement frequency was then measured with the EUT azimuth, measuring antenna height and polarization that yielded the greatest peak emission level.

Final measurement points over the frequency range of 30 MHz to 1 GHz were measured using a quasi-peak detector. Final measurement points over the frequency range of 1 GHz and 10 GHz were measured using peak and average methods. Peak measurements were made using a peak detector with 1 MHz resolution and video bandwidths. Average measurements were made using a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

2.4.6 Environmental Conditions

Ambient Temperature	19.3 - 21.2°C
Relative Humidity	55.0 - 56.6%

Product Service

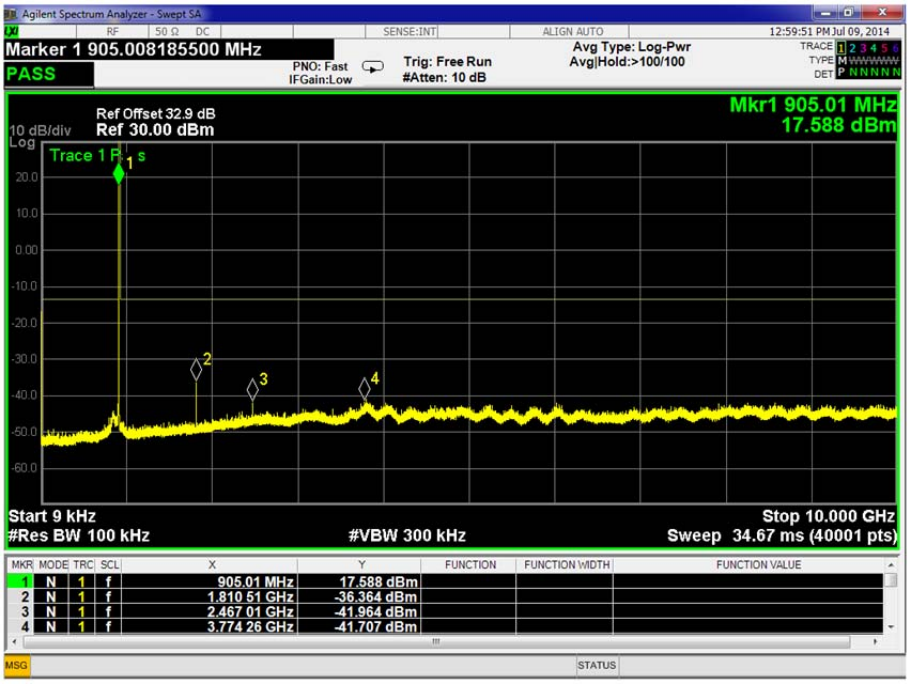
2.4.7 Test Results

3.6 V DC Supply

Spurious Conducted Emissions

905 MHz

9 kHz to 10 GHz



Limit Clause

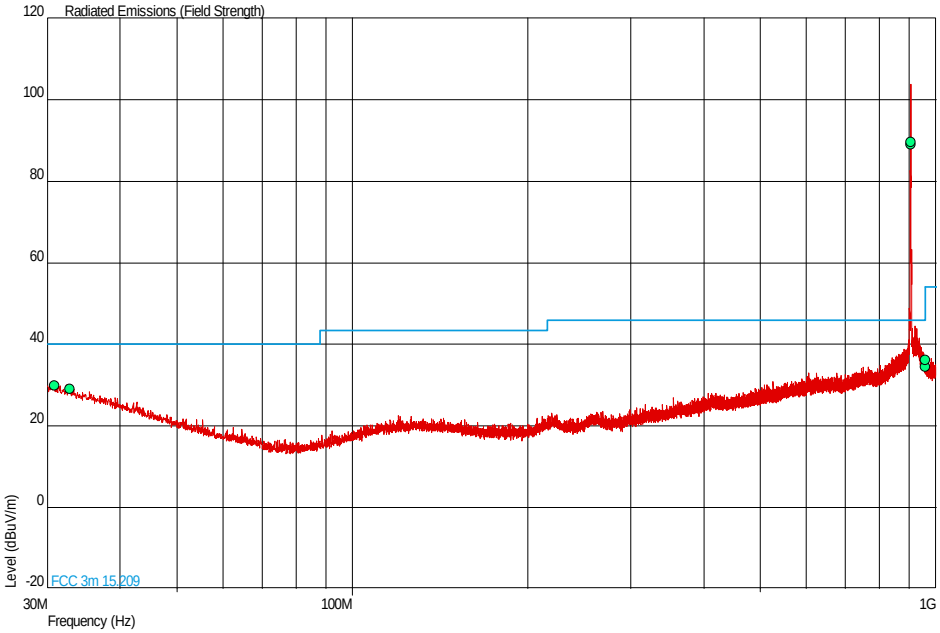
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.

Spurious Radiated Emissions

905 MHz

30 MHz to 1 GHz

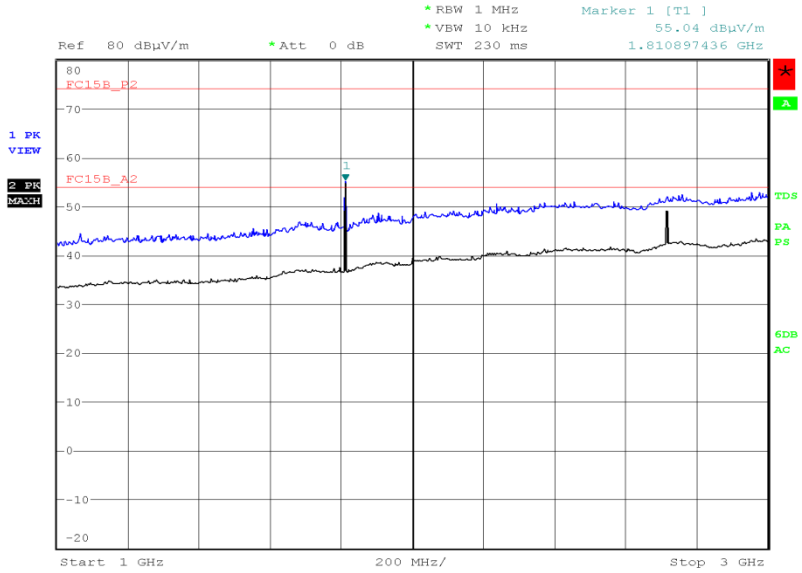


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
30.871	29.9	31.3	40.0	100	-10.1	-68.7	144	1.00	Vertical
32.768	28.9	27.9	40.0	100	-11.1	-72.1	220	1.00	Vertical
960.000	34.4	52.5	46.0	200	-11.6	-147.5	280	1.30	Vertical
960.000	36.0	63.1	46.0	200	-10.0	-136.9	163	1.00	Horizontal

1 GHz to 25 GHz

Frequency (GHz)	Antenna Polarisation	Antenna Height (cm)	EUT Arc (degrees)	Final Peak (dBµV/m)	Final Average (dBµV/m)
2.715	Horizontal	100	194	57.55	47.68
4.526	Horizontal	117	187	55.29	48.15
5.428	Horizontal	153	37	60.79	52.48

1 GHz to 3 GHz



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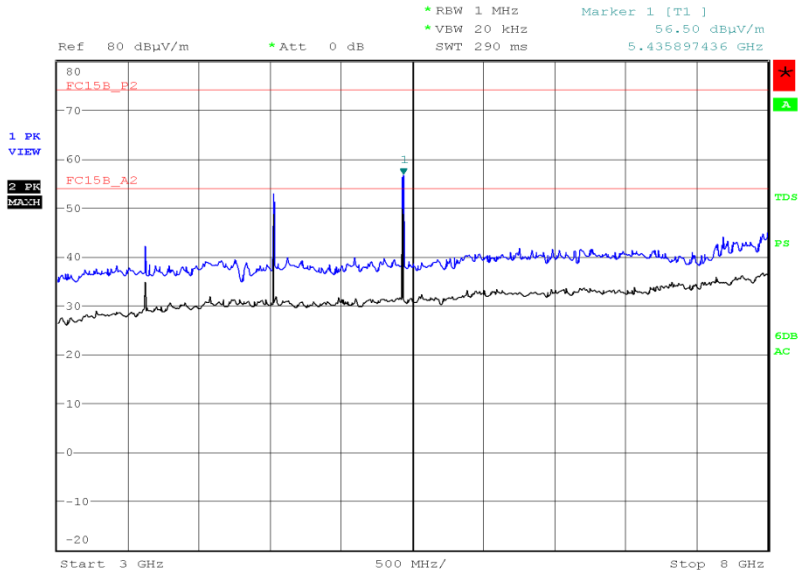
3 GHz to 8 GHz



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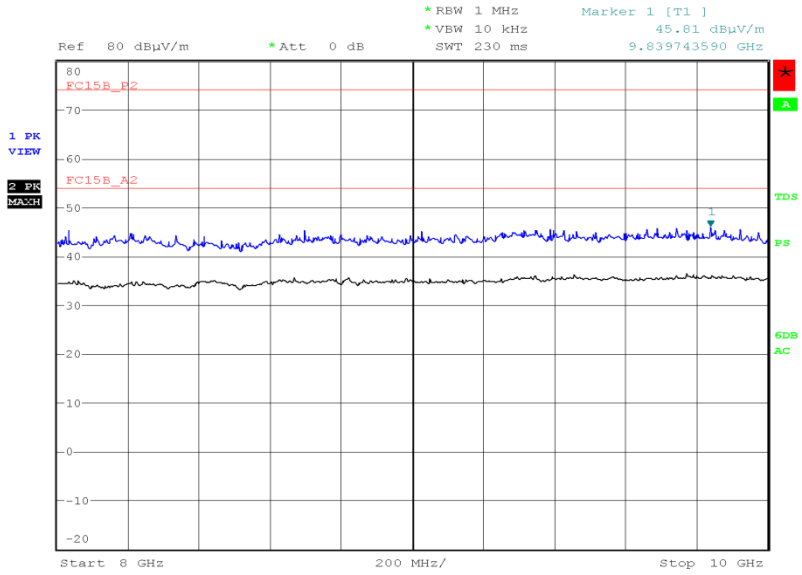
Product Service

8 GHz to 10 GHz



Limit

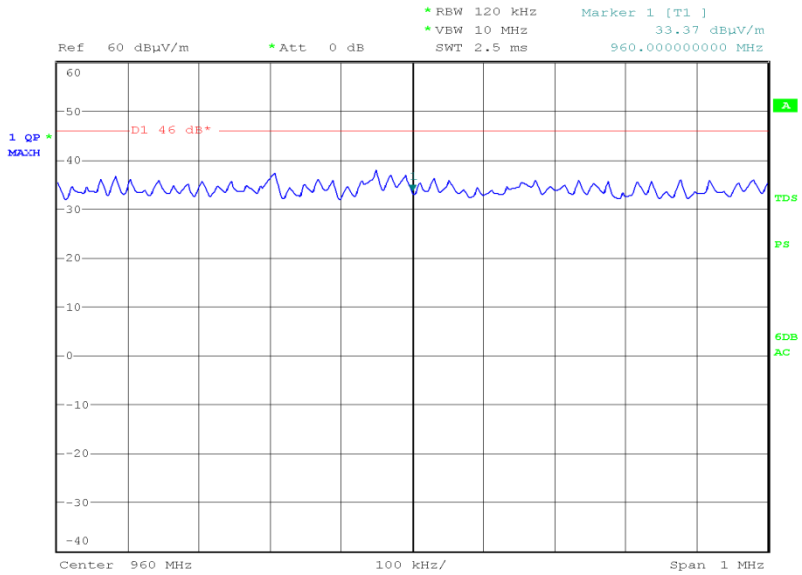
Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

The above table applies where F is either; within a restricted band of operation as detailed in 15.205 or the above table results in lesser attenuation than either 20 dB below the power radiated by the intentional radiator within the band or 30 dB where RMS averaging has been used.

Band Edge Emissions

905 MHz

Polarisation	Final Peak (dBµV/m)
Horizontal	33.37



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Limit

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

The above table applies where F is either; within a restricted band of operation as detailed in 15.205 or the above table results in lesser attenuation than either 20 dB below the power radiated by the intentional radiator within the band or 30 dB where RMS averaging has been used.

2.5 6 dB BANDWIDTH

2.5.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (a)(2)
Industry Canada RSS-210, Clause A8.2 (b)

2.5.2 Equipment Under Test and Modification State

1135-200 Type 0 Issue V1-1.00 S/N: DD1420AGA00693 - Modification State 0

2.5.3 Date of Test

9 July 2014

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.247 in conjunction with FCC KDB 558074 D01 DTS Meas Guidance v03r02, Clause 8.1.

The EUT was connected to a spectrum analyser through a 30 dB attenuator. The path loss of this network was measured and applied as a reference level offset in the spectrum analyser. The EUT was set to transmit with O-QPSK modulation at maximum power on its intended single frequency of operation, 905 MHz. The 6 dB bandwidth was measured using the aforementioned FCC KDB.

2.5.6 Environmental Conditions

Ambient Temperature	21.2°C
Relative Humidity	56.6%

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2.5.7 Test Results

3.6 V DC Supply

Frequency (MHz)	6dB Bandwidth (kHz)
905 MHz	789.000 kHz

905 MHz

Limit Clause

The minimum 6 dB Bandwidth shall be at least 500 kHz.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 - Maximum Peak Conducted Output Power					
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	30-Jun-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	27-Feb-2015
Section 2.2 - EIRP Peak Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	8-Nov-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	10-Sep-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Section 2.3 - Power Spectral Density					
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	30-Jun-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	27-Feb-2015

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4- Spurious and Band Edge Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-May-2015
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Pre-Amplifier	Phase One	PS04-0086	1533	12	19-Dec-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	10-Jun-2015
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	30-Jun-2015
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	5-Nov-2014
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	1-Oct-2014
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	27-Feb-2015
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4412	12	21-Mar-2015
Section 2.6 - 6dB Bandwidth					
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Hygrometer	Rotronic	I-1000	3220	12	16-Jul-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Sep-2014
DC - 8 GHz Attenuator	Lucas Weinschel	24-30-33	3963	12	30-Jun-2015
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	18-Sep-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
PXA Signal Analyser	Agilent Technologies	N9030A PXA	4409	12	27-Feb-2015

TU – Traceability Unscheduled

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
Spurious and Band Edge Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
EIRP Peak Power	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
Maximum Peak Conducted Output Power	± 0.70 dB
Power Spectral Density	± 3.0 dB
6dB Bandwidth	± 212.114 kHz

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).