TEST REPORT

Test Report No. : UL-RPT-RP10445344JD01A V2.0

Manufacturer	:	Telensa Ltd
Model No.	:	T2A1N-G-3
FCC ID	:	XYD-2NXD
IC Certification No.	:	12199A-2NXD
Technology	:	FHSS
Test Standard(s)	:	FCC Parts 15.107(a), 15.109, 15.207, 15.209(a) & 15.247 Industry Canada RSS-210 A8.1(b), A8.1(c), A8.4(1) & A8.5; RSS-Gen 4.6.3, 4.8, 4.9 & 7.2.4

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
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: 27 October 2014

Checked by:

Ian Watch
Senior Engineer, Radio Laboratory

Issued by :

pp

John Newell
Quality Manager,
UL VS LTD

0644

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

UL VS LTD

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1. Customer Information

Company Name:	Telensa Ltd
Address:	Plextek Building London Road Great Chesterford Essex CB10 1NY United Kingdom

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:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart B (Unintentional Radiators) - Sections 15.107 and 15.109
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
Specification Reference:	RSS-Gen Issue 3 December 2010
Specification Title:	General Requirements and Information for the Certification of Radio Apparatus
Specification Reference:	RSS-210 Issue 8 December 2010
Specification Title:	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment.
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	11 September 2014 to 21 October 2014

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.107(a)	RSS-Gen 7.2.4	Receiver/Idle Mode AC Conducted Emissions	✓
Part 15.109	N/A	Receiver/Idle Mode Radiated Spurious Emissions	✓
Part 15.207	RSS-Gen 7.2.4	Transmitter AC Conducted Emissions	✓
Part 15.247(a)(1)(i)	RSS-Gen 4.6.3 RSS-210 A8.1(c)	Transmitter 20 dB Bandwidth	✓
Part 15.247(a)(1)	RSS-210 A8.1(b)	Transmitter Carrier Frequency Separation	✓
Part 15.247(a)(1)(i)	RSS-210 A8.1(c)	Transmitter Number of Hopping Frequencies and Average Time of Occupancy	✓
Part 15.247(b)(2)	RSS-Gen 4.8 RSS-210 A8.4(1)	Transmitter Maximum Peak Output Power	✓
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Radiated Emissions	✓
Part 15.247(d)/ 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Band Edge Radiated Emissions	✓
Key to Results ✓ = Complied ✗ = Did not comply			

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Reference:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices

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:	Telensa
Model Name or Number:	T2A1N-G-3
Test Sample Serial Number:	575 *(Radiated sample #1)*
Hardware Version Number:	04
Software Version Number:	v2.13.0a2-g7b80d36
FCC ID:	XYD-2NXD
Industry Canada Certification Number:	12199A-2NXD

Brand Name:	Telensa
Model Name or Number:	T2A1N-G-3
Test Sample Serial Number:	597 *(Radiated sample #2)*
Hardware Version Number:	03
Software Version Number:	v2.13.0a2-g7b80d36
FCC ID:	XYD-2NXD
Industry Canada Certification Number:	12199A-2NXD

Brand Name:	Telensa
Model Name or Number:	T2A1N-G-3
Test Sample Serial Number:	577 *(Conducted sample)*
Hardware Version Number:	04
Software Version Number:	v2.13.0a2-g7b80d36
FCC ID:	XYD-2NXD
Industry Canada Certification Number:	12199A-2NXD

3.2. Description of EUT

The Equipment Under Test was a public lighting control unit. It contains an FHSS transceiver operating over six sub-bands in the 902–928 MHz band.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	Frequency hopping system with a 20 dB bandwidth of less than 250 kHz and hopping on at least 50 frequencies		
Power Supply Requirement:	Nominal	120 VAC 60 Hz	
Type of Unit:	Transceiver		
Channel Spacing:	25 kHz		
Modulation:	2 level FSK		
Data Rates (bit/s)	62.5 & 500		
Maximum Conducted Output Power:	19.4 dBm		
Transmit Frequency Range:	902 MHz to 928 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	Sub-band 0 Channel 0	910.500
	Middle	Sub-band 2 Channel 58	915.000
	Top	Sub-band 5 Channel 58	919.975
Receive Frequency Range:	902 MHz to 928 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	Sub-band 0 Channel 0	910.500
	Middle	Sub-band 2 Channel 58	915.000
	Top	Sub-band 5 Channel 58	919.975

3.5. Support Equipment

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

Description:	Representative road lighting luminaire with ballast mimic and voltmeter
Brand Name:	Philips
Model Name or Number:	Broadway
Serial Number:	Not marked or stated

Description:	Linux PC
Brand Name:	Jetway
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Switching mode power supply
Brand Name:	Maplin
Model Name or Number:	L11BQ
Serial Number:	Not marked or stated

Description:	9 VDC rechargeable battery
Brand Name:	ANSMANN
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	1.5 metre cable with USB connector at one end and 6 pin connector at the other end
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	Power supply
Brand Name:	Raspberry Pi PSU
Model Name or Number:	KSAS0060500100VKD
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):

- Constantly transmitting at maximum power in fixed frequencies.
- Constantly transmitting at maximum power in hopping mode.
- Receive mode.

4.2. Configuration and Peripherals

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

- Controlled using a test application on the Linux PC supplied by the customer. The application was used to enable a suitable transmission / receive mode and to select the test channels and data rates. The EUT was connected to the Linux PC via a cable with USB connector at one end and 6 pin connector at the other end. Once the appropriate transmit / receive mode was enabled, the PC was disconnected from the EUT.
- During all testing the EUT was connected to a representative road lighting luminaire. The luminaire was connected to a 120 VAC 60 Hz single phase supply. It had a ballast mimic and a voltmeter which was powered either from a 9 V battery or a power supply. For AC conducted emissions testing, the ballast mimic was powered from a 9 V battery and for all other testing it was powered from a Raspberry Pi power supply.
- AC conducted spurious emissions and radiated spurious emissions for both transmit and receive modes were performed with the EUT transmitting with a data rate of 62.5 bit/s. This was found to be the worst case with regards to emissions after preliminary investigations and, as this mode emits the highest output power level, it was deemed to be the worst case.
- The radiated sample with serial number 575 was used for transmitter radiated spurious emissions tests.
- The radiated sample with serial number 597 was used for AC conducted spurious emissions, receiver radiated spurious emissions and band edge radiated emissions tests.
- The conducted sample with serial number 577 was used for all other tests.

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. Receiver/Idle Mode AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	24 September 2014
Test Sample Serial Number:	597		

FCC Reference:	Part 15.107(a)
Industry Canada Reference:	RSS-Gen 7.2.4
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	50

Note(s):

1. The EUT was connected to an AC charger via a USB cable. The AC charger was connected to a 120 VAC 60 Hz single phase supply via a LISN.
2. 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.
3. A pulse limiter was fitted between the LISN and the test receiver.

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Live	46.6	66.0	19.4	Complied
0.600	Live	40.4	56.0	15.6	Complied
1.401	Live	39.3	56.0	16.7	Complied
2.198	Live	36.8	56.0	19.2	Complied
13.601	Live	38.8	60.0	21.2	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Live	40.5	56.0	15.5	Complied
0.600	Live	39.1	46.0	6.9	Complied
1.199	Live	38.3	46.0	7.7	Complied
1.401	Live	39.0	46.0	7.0	Complied
1.599	Live	38.8	46.0	7.2	Complied
1.802	Live	37.0	46.0	9.0	Complied
2.000	Live	37.4	46.0	8.6	Complied
2.198	Live	35.7	46.0	10.3	Complied
4.799	Live	33.7	46.0	12.3	Complied
13.601	Live	35.8	50.0	14.2	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)

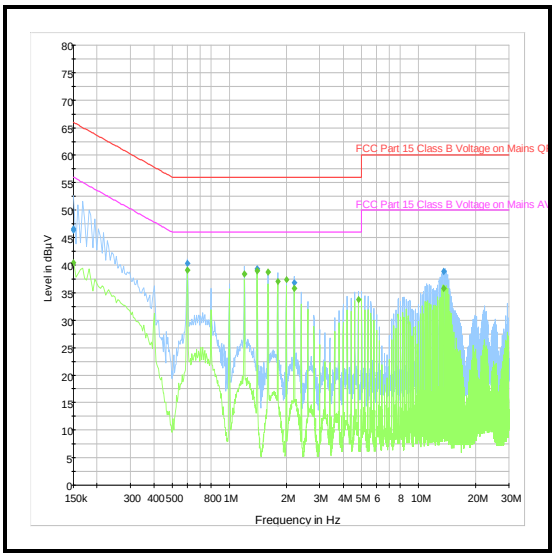
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Neutral	44.7	66.0	21.3	Complied
0.600	Neutral	40.4	56.0	15.6	Complied
1.401	Neutral	38.7	56.0	17.3	Complied
2.198	Neutral	37.1	56.0	18.9	Complied
13.794	Neutral	39.1	60.0	20.9	Complied

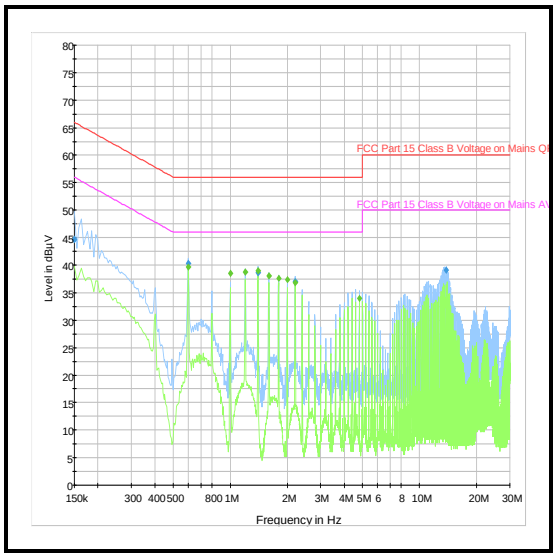
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.600	Neutral	39.7	46.0	6.3	Complied
1.001	Neutral	38.5	46.0	7.5	Complied
1.199	Neutral	38.7	46.0	7.3	Complied
1.401	Neutral	39.0	46.0	7.0	Complied
1.599	Neutral	38.1	46.0	7.9	Complied
1.802	Neutral	37.7	46.0	8.3	Complied
2.000	Neutral	37.3	46.0	8.7	Complied
2.198	Neutral	36.8	46.0	9.2	Complied
4.799	Neutral	34.0	46.0	12.0	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)



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)
M1625	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	31 Dec 2014	12
A004	LISN	Rohde & Schwarz	ESH3-Z5	890604/027	18 Nov 2014	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	27 Feb 2015	12
M1263	Test Receiver	Rohde & Schwarz	ESIB 7	100265	14 Oct 2014	12

5.2.2. Receiver/Idle Mode Radiated Spurious Emissions

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	11 September 2014
Test Sample Serial Number:	597		

FCC Reference:	Part 15.109
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	33

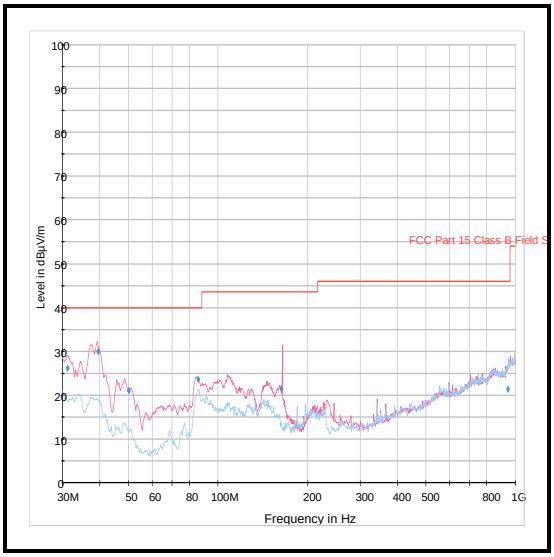
Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) 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.

Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
31.215	Vertical	26.1	40.0	13.9	Complied
39.431	Vertical	30.0	40.0	10.0	Complied
50.042	Vertical	21.0	40.0	19.0	Complied
85.674	Vertical	23.6	40.0	16.4	Complied

Receiver/Idle Mode Radiated Spurious Emissions (continued)



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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1622	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	31 Dec 2014	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	26 Nov 2014	12
A1834	Attenuator	Hewlett Packard	8491B	10444	15 Nov 2014	12
G0543	Amplifier	Sonoma	310N	230801	20 Nov 2014	3
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	15 Feb 2015	12
A490	Antenna	Chase	CBL6111A	1590	29 Apr 2015	12

Receiver/Idle Mode Radiated Spurious Emissions (continued)

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	23 September 2014
Test Sample Serial Number:	597		

FCC Reference:	Part 15.109
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range:	1 GHz to 5 GHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	43

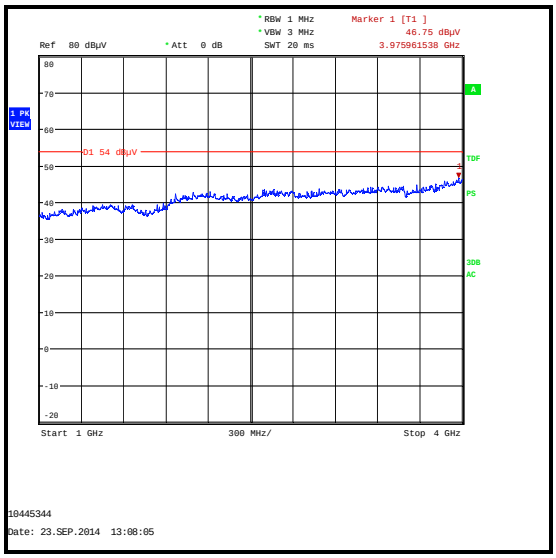
Note(s):

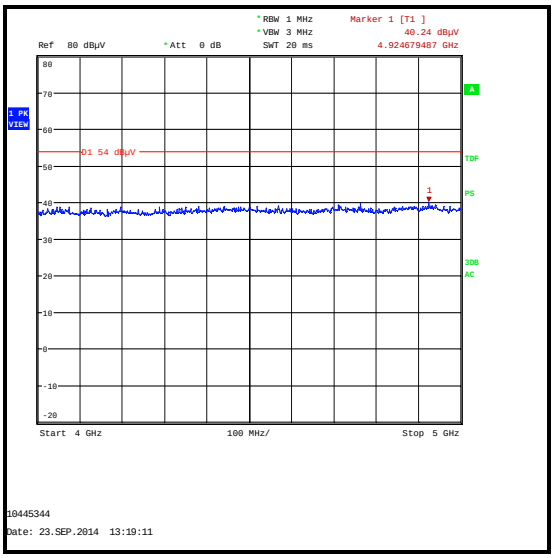
1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table below. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. Pre-scans above 1 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. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) 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.

Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3975.962	Vertical	46.8	54.0	7.2	Complied

Receiver/Idle Mode Radiated Spurious 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	Not stated	14 Mar 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Nov 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	13 May 2015	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	18 May 2015	12
A1818	Antenna	EMCO	3115	00075692	14 Nov 2014	12
A253	Antenna	Flann Microwave	12240-20	128	14 Nov 2014	12

5.2.3. Transmitter AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	24 September 2014
Test Sample Serial Number:	597		

FCC Reference:	Part 15.207
Industry Canada Reference:	RSS-Gen 7.2.4
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	50

Note(s):

1. The EUT was connected to an AC charger via a USB cable. The AC charger was connected to a 120 VAC 60 Hz single phase supply via a LISN.
2. 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.
3. A pulse limiter was fitted between the LISN and the test receiver.

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Live	48.6	66.0	17.4	Complied
0.600	Live	40.7	56.0	15.3	Complied
1.199	Live	40.2	56.0	15.8	Complied
1.401	Live	39.2	56.0	16.8	Complied
13.601	Live	41.6	60.0	18.4	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.600	Live	40.0	46.0	6.0	Complied
1.199	Live	39.2	46.0	6.8	Complied
1.401	Live	38.7	46.0	7.3	Complied
1.599	Live	38.2	46.0	7.8	Complied
1.802	Live	37.6	46.0	8.4	Complied
2.000	Live	37.8	46.0	8.2	Complied
2.202	Live	36.9	46.0	9.1	Complied
13.403	Live	38.5	50.0	11.5	Complied

Transmitter AC Conducted Spurious Emissions (continued)

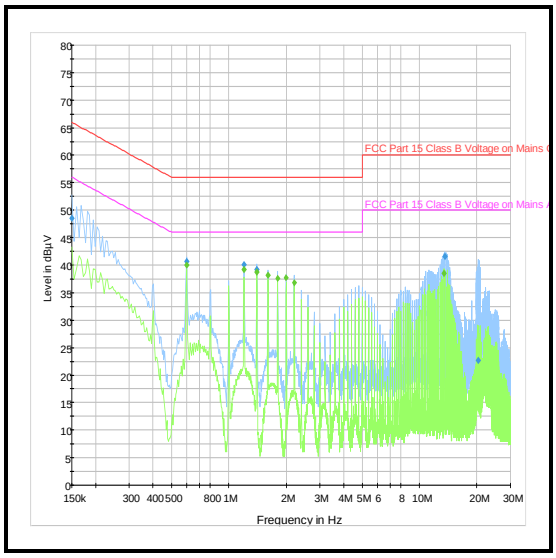
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150	Neutral	46.8	66.0	19.2	Complied
0.600	Neutral	40.7	56.0	15.3	Complied
1.199	Neutral	39.9	56.0	16.1	Complied
1.401	Neutral	39.4	56.0	16.6	Complied
1.802	Neutral	38.6	56.0	17.4	Complied
13.619	Neutral	41.7	60.0	18.3	Complied

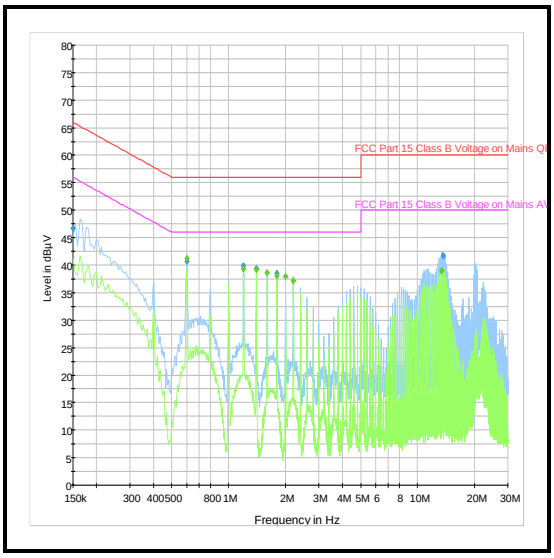
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.600	Neutral	41.2	46.0	4.8	Complied
1.199	Neutral	39.3	46.0	6.7	Complied
1.401	Neutral	39.2	46.0	6.8	Complied
1.599	Neutral	38.6	46.0	7.4	Complied
1.802	Neutral	38.1	46.0	7.9	Complied
2.000	Neutral	37.9	46.0	8.1	Complied
2.202	Neutral	37.1	46.0	8.9	Complied
13.403	Neutral	39.0	50.0	11.0	Complied

Transmitter AC Conducted Spurious Emissions (continued)



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)
M1625	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	31 Dec 2014	12
A004	LISN	Rohde & Schwarz	ESH3-Z5	890604/027	18 Nov 2014	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	27 Feb 2015	12
M1263	Test Receiver	Rohde & Schwarz	ESIB 7	100265	14 Oct 2014	12

5.2.4. Transmitter 20 dB Bandwidth

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Dates:**	25 September 2014 & 26 September 2014
Test Sample Serial Number:	577		

FCC Reference:	Part 15.247(a)(1)(i)
Industry Canada Reference:	RSS-Gen 4.6.3, RSS-210 A8.1(c)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	42 to 43

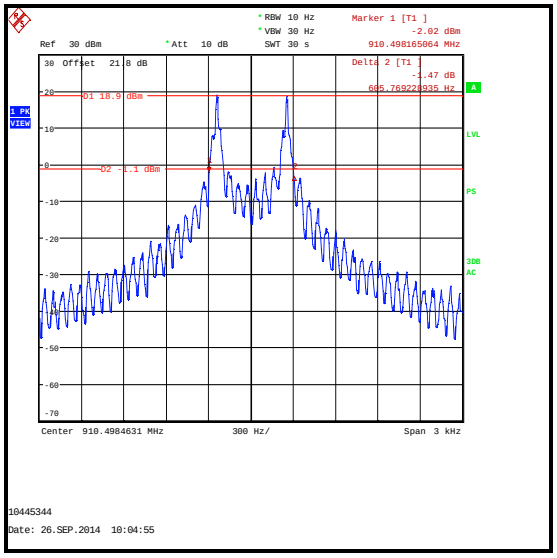
Note(s):

1. The test receiver resolution bandwidth was set to 10 Hz and video bandwidth 30 Hz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 5 kHz. Normal and delta markers were placed 20 dB down from the peak of the carrier. These results are documented in the table below.
2. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.

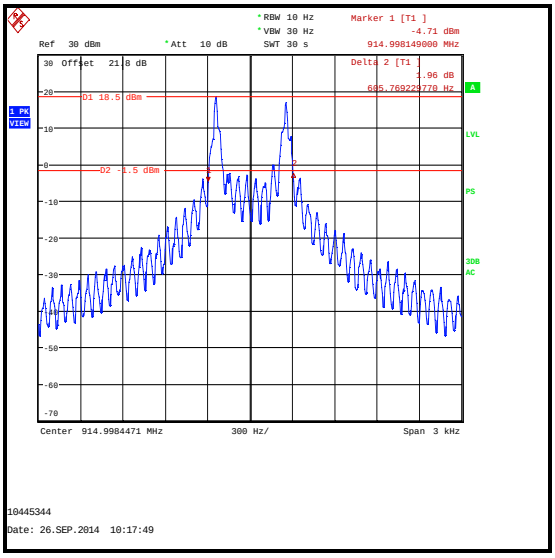
Transmitter 20 dB Bandwidth (continued)

Results: 62.5 bit/s

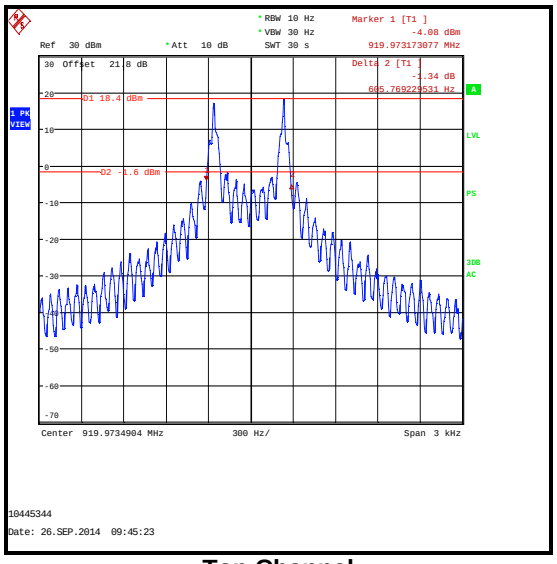
Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	0.606	≤500	499.394	Complied
Middle	0.606	≤500	499.394	Complied
Top	0.606	≤500	499.394	Complied



Bottom Channel



Middle Channel

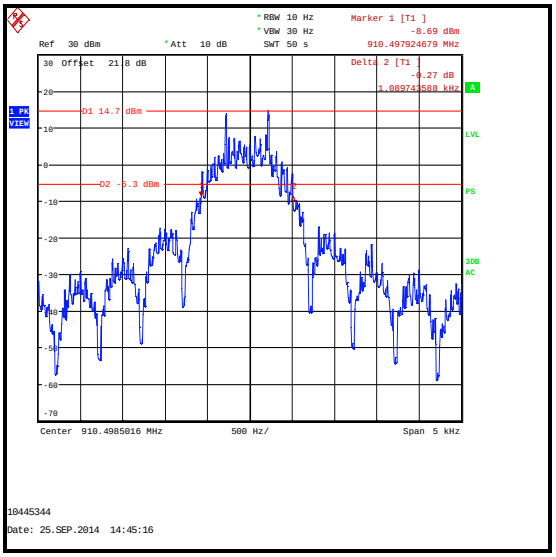


Top Channel

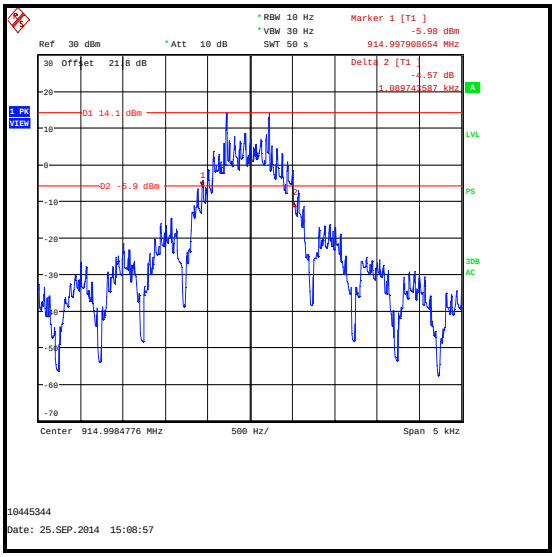
Transmitter 20 dB Bandwidth (continued)

Results: 500 bit/s

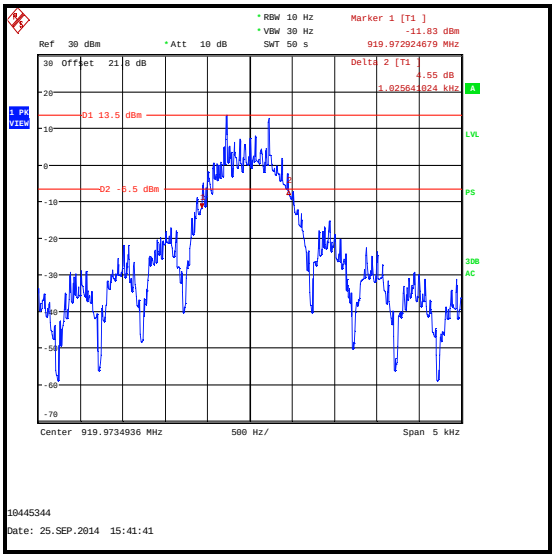
Channel	20 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	1.090	≤500	498.910	Complied
Middle	1.090	≤500	498.910	Complied
Top	1.026	≤500	498.974	Complied



Bottom Channel



Middle Channel



Top Channel

Transmitter 20 dB Bandwidth (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	25 Apr 2015	12

5.2.5. Transmitter Carrier Frequency Separation

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Dates:**	25 September 2014 & 26 September 2014
Test Sample Serial Number:	577		

FCC Reference:	Part 15.247(a)(1)
Industry Canada Reference:	RSS-210 A8.1(b)
Test Method Used:	As detailed in ANSI C63.10 Section 7.7.2

Environmental Conditions:

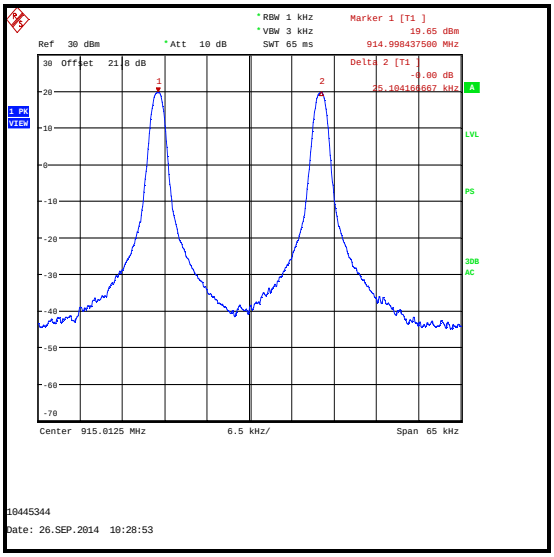
Temperature (°C):	24
Relative Humidity (%):	42 to 43

Note(s):

1. *The limit is a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The 20 dB bandwidth has been measured as <25 kHz, therefore the applicable limit is ≥25 kHz.
2. The test receiver resolution bandwidth was set to 1 kHz and video bandwidth of 3 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 65 kHz. A marker was placed at the centre of one carrier frequency and then a delta marker was placed at the centre of the second carrier frequency. The results are recorded in the table below.
3. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.

Results: 62.5 bit/s

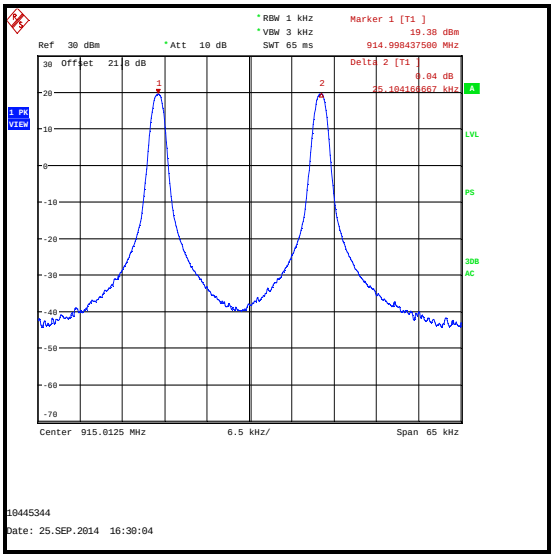
Carrier Frequency Separation (kHz)	Limit* (kHz)	Margin (kHz)	Result
25.104	≥25.0	0.104	Complied



Transmitter Carrier Frequency Separation (continued)

Results: 500 bit/s

Carrier Frequency Separation (kHz)	Limit* (kHz)	Margin (kHz)	Result
25.104	≥25.0	0.104	Complied



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	25 Apr 2015	12

5.2.6. Transmitter Number of Hopping Frequencies and Average Time of Occupancy

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	26 September 2014
Test Sample Serial Number:	577		

Test Summary:

FCC Reference:	Part 15.247(a)(1)(i)
Industry Canada Reference:	RSS-210 A8.1(c)
Test Method Used:	As detailed in ANSI C63.10 Sections 7.7.3 and 7.7.4

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	43

Note(s):

1. For a hopping channel with a 20 dB bandwidth of less than 250 kHz.
2. *In a 20 second period.
3. The EUT could be set to hop in one of six hopping sub-bands. The test was performed with the EUT transmitting in sub-band 2 which is the only sub-band that incorporates the channel in the centre of the 902-928 MHz band.
4. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.

Results: Number of Hopping Frequencies (in sub-band 2) / 62.5 bit/s

Number of Hops	Limit (Hops)	Note	Result
59	≥50	1	Complied

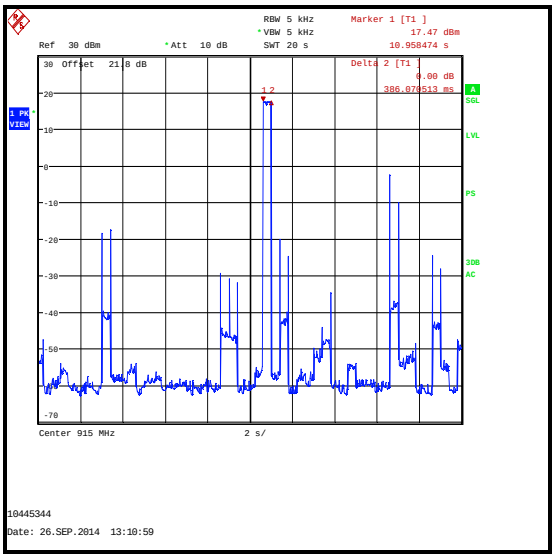
Results: Average Time of Occupancy / 62.5 bit/s

Emission Width (ms)	Average Time of Occupancy* (s)	Limit (s)	Margin (s)	Note	Result
399.840	0.386	0.4	0.014	3	Complied

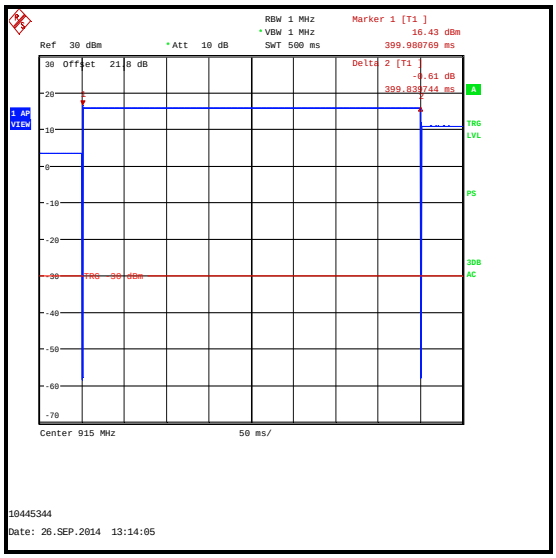
Limit:

If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

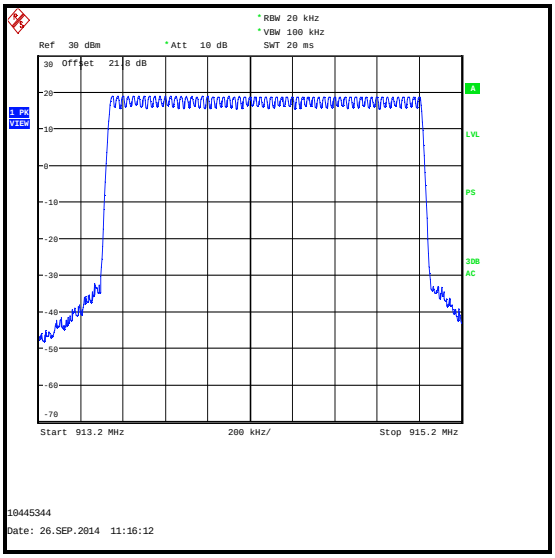
Transmitter Time of Occupancy (continued)



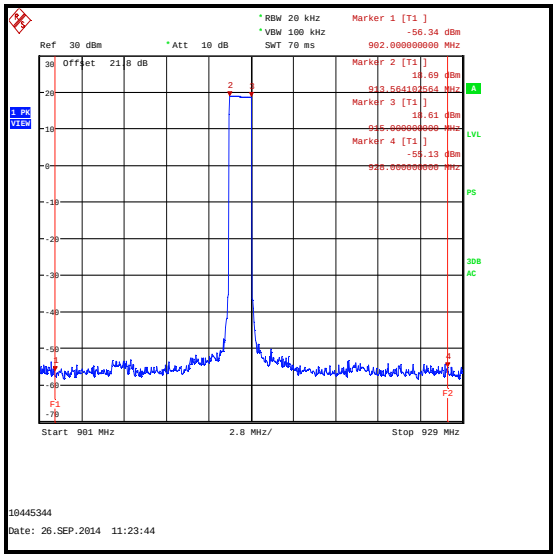
TX on time in 20 second period (Sub-band 2)



TX on period (Sub-band 2)



Number of hopping channels (Sub-band 2)



Number of hopping channels (Showing sub-band 2 within operating band)

Transmitter Time of Occupancy (continued)

Results: Number of Hopping Frequencies / 500 bit/s

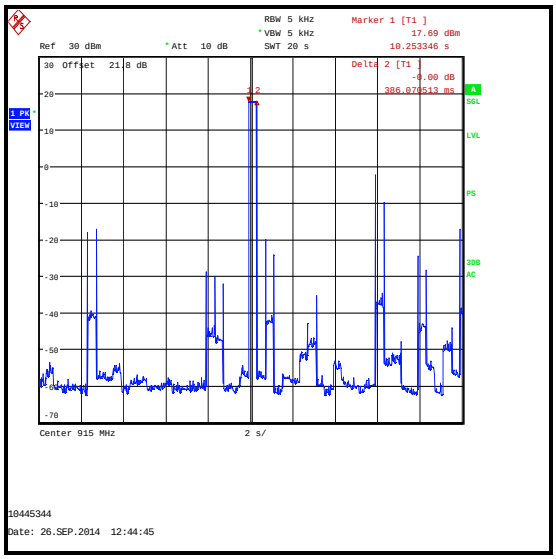
Number of Hops	Limit (Hops)	Note	Result
59	≥50	1	Complied

Results: Average Time of Occupancy / 500 bit/s

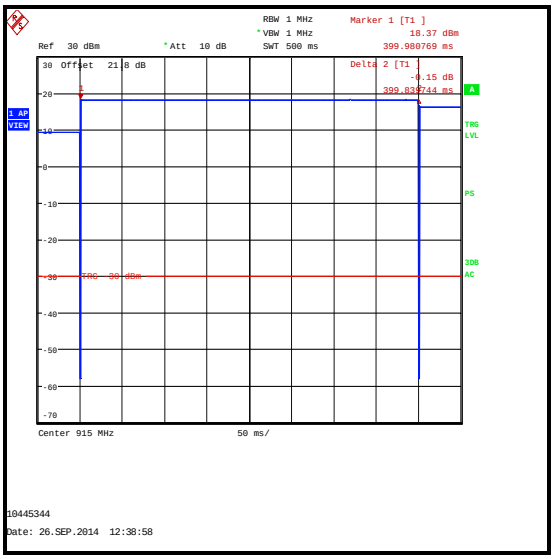
Emission Width (ms)	Average Time of Occupancy* (s)	Limit (s)	Margin (s)	Note	Result
399.840	0.386	0.4	0.014	3	Complied

Limit:

If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

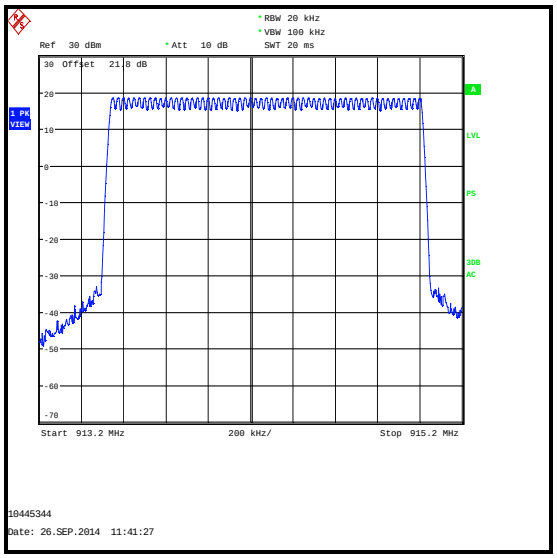


TX on time in 20 second period (Sub-band 2)

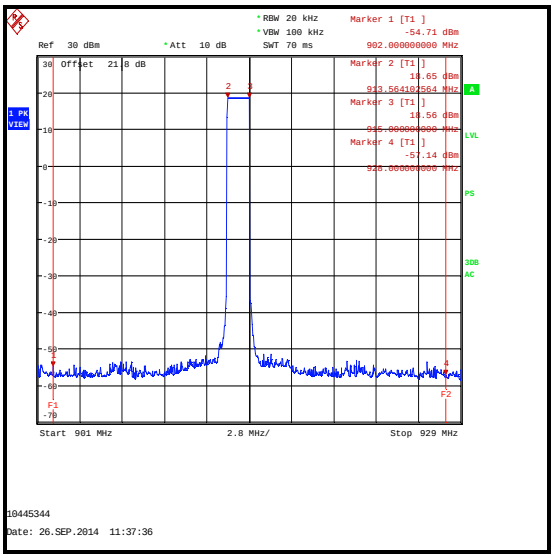


TX on period (Sub-band 2)

Transmitter Time of Occupancy (continued)



Number of hopping channels (Sub-band 2)



Number of hopping channels (Showing sub-band 2 within operating band)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	25 Apr 2015	12

5.2.7. Transmitter Maximum Peak Output Power

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Dates:**	25 September 2014 & 26 September 2014
Test Sample Serial Number:	577		

FCC Reference:	Part 15.247(b)(2)
Industry Canada Reference:	RSS-Gen 4.8 & RSS-210 A8.4(1)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.1

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	42 to 43

Note(s):

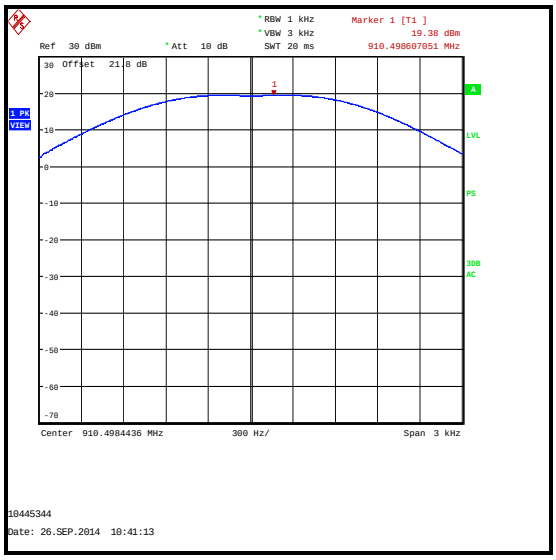
1. For frequency hopping systems employing at least 50 hopping channels
2. For the data rate of 62.5 bit/s, the test receiver's resolution bandwidth was set to 1 kHz and the video bandwidth to 3 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 3 kHz. A marker was placed at the peak of the signal and the results recorded in the table below.
3. For the data rate of 500 bit/s, the test receiver's resolution bandwidth was set to 2 kHz and the video bandwidth to 10 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The span was set to 5 kHz. A marker was placed at the peak of the signal and the results recorded in the table below.
4. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF offset level was entered on the test receiver to compensate for the loss of the attenuator and RF cable.

Transmitter Maximum Peak Output Power (continued)

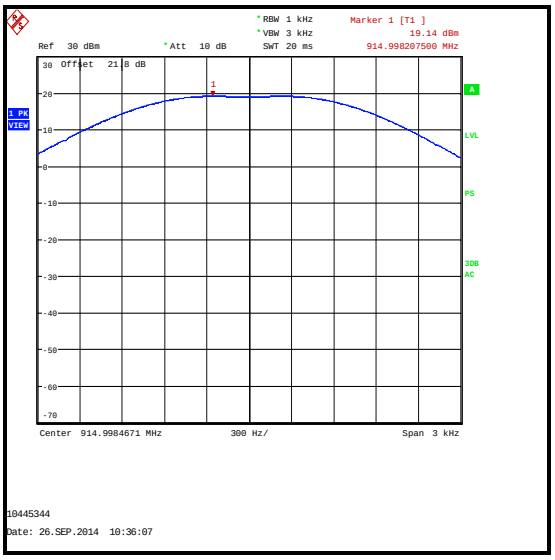
Results: 62.5 bit/s

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Note	Result
Bottom	19.4	30.0	10.6	1	Complied
Middle	19.1	30.0	10.9	1	Complied
Top	18.9	30.0	11.1	1	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Note	Result
Bottom	19.4	0.0	19.4	36.0	16.6	1	Complied
Middle	19.1	0.0	19.1	36.0	16.9	1	Complied
Top	18.9	0.0	18.9	36.0	17.1	1	Complied

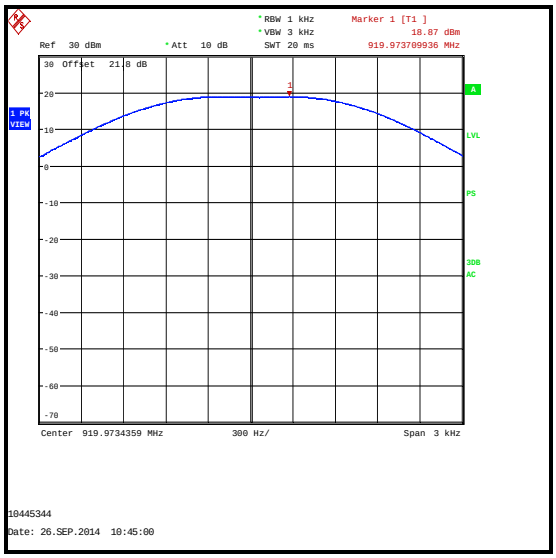


Bottom Channel



Middle Channel

Transmitter Maximum Peak Output Power (continued)



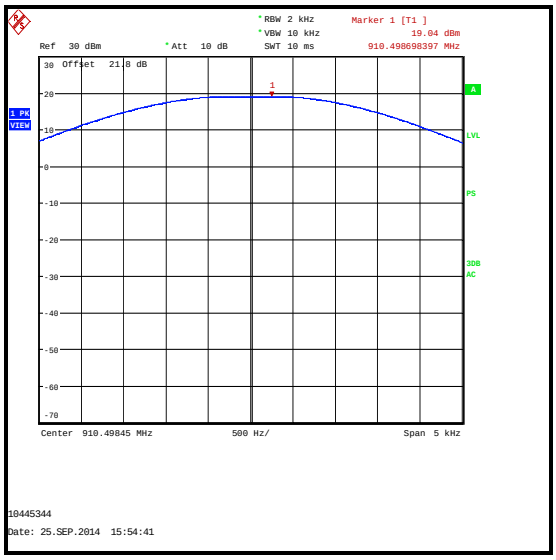
Top Channel

Transmitter Maximum Peak Output Power (continued)

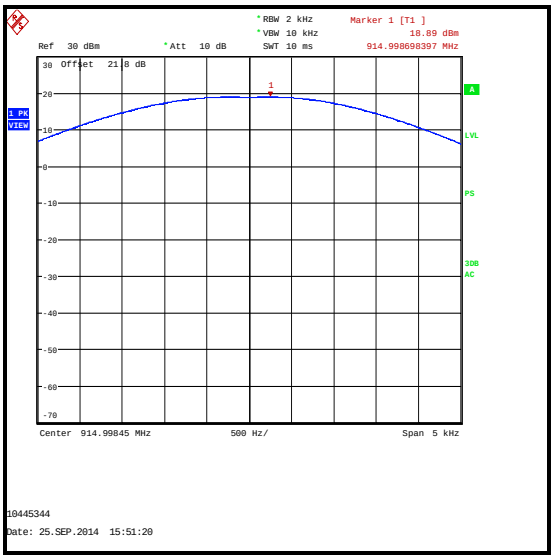
Results: 500 bit/s

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Note	Result
Bottom	19.0	30.0	1.1	1	Complied
Middle	18.9	30.0	1.1	1	Complied
Top	18.6	30.0	1.4	1	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Note	Result
Bottom	19.0	0.0	19.0	36.0	17.0	1	Complied
Middle	18.9	0.0	18.9	36.0	17.1	1	Complied
Top	18.6	0.0	18.6	36.0	17.4	1	Complied

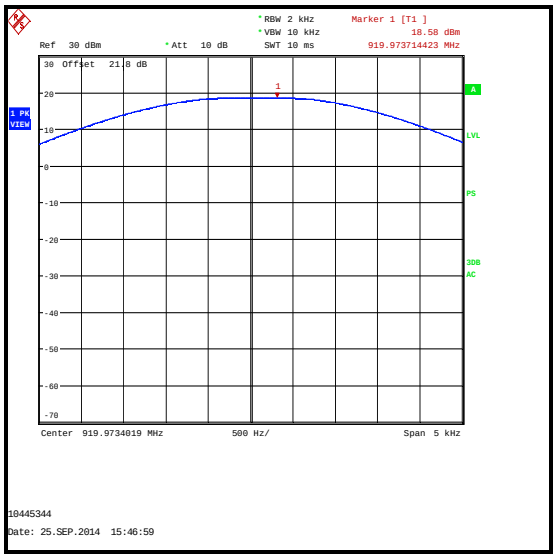


Bottom Channel



Middle Channel

Transmitter Maximum Peak Output Power (continued)



Top Channel

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Mar 2015	12
A2142	Attenuator	AtlanTecRF	AN18-20	081120-23	25 Apr 2015	12

5.2.8. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	21 October 2014
Test Sample Serial Number:	575		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9, RSS-210 A8.5
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

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

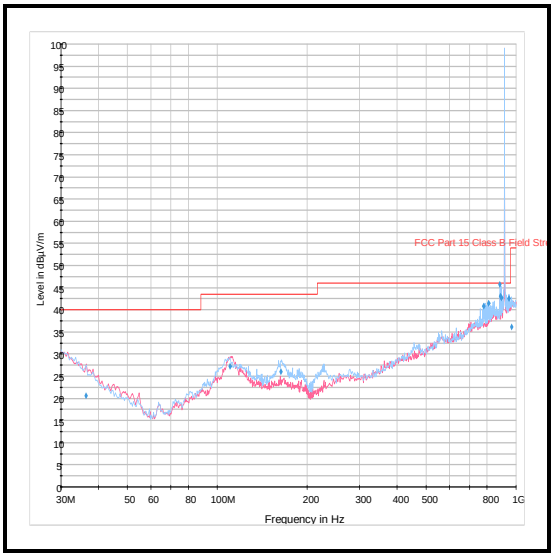
Note(s):

1. The EUT was transmitting at full power with a data rate of 62.5 bit/s.
2. The emission at approximately 915 MHz shown on the 30 MHz to 1 GHz plot is the EUT fundamental.
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 middle channel only.
5. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
6. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) 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. 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. 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. Final measurements were performed on the marker frequencies and the results entered into the table below. The test receiver resolution bandwidth was set to 120 kHz, using a CISPR quasi-peak detector and span wide enough to see the whole emission.

Transmitter Radiated Emissions (continued)

Results: Quasi-Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
110.418	Vertical	27.3	43.5	16.2	Complied
163.277	Horizontal	26.1	43.5	17.4	Complied
967.397	Horizontal	36.2	54.0	17.8	Complied



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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1622	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	31 Dec 2014	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	26 Nov 2014	12
A490	Antenna	Chase	CBL6111A	1590	29 Apr 2015	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	15 Feb 2015	12
G0543	Amplifier	Sonoma	310N	230801	20 Nov 2014	3
A1834	Attenuator	Hewlett Packard	8491B	10444	15 Nov 2014	12
A2140	Attenuator	AtlanTecRF	AN18-10	090918-14	25 Apr 2015	12

5.2.9. Transmitter Radiated Emissions

Test Summary

Test Engineer:	Georgios Vrezas	**Test Dates:**	13 October 2014 & 14 October 2014
Test Sample Serial No:	575		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9, RSS-210 A8.5
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range	1 GHz to 9.3 GHz

Environmental Conditions:

Temperature (°C):	22 to 23
Relative Humidity (%):	46 to 49

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 EUT was transmitting at full power with a data rate of 62.5 bit/s.
3. Pre-scans above 1 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. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) 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.
4. Pre-scans were performed and markers were placed on the highest measured levels 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. Peak and average measurements were performed with their own appropriate detectors during the pre-scan measurements.
5. Radiated spurious emissions were performed with the EUT transmitting at fixed frequencies. The field strength in hopping mode was investigated and found to be less than the field strength in static mode. Therefore transmitting in a single channel was deemed as worst case. Pre-scan plots with the EUT in hopping mode are archived on the UL VS LTD IT server and are available for inspection upon request.

Transmitter Radiated Emissions (continued)

Results: Peak Bottom Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2731.458	Vertical	52.8	74.0	21.2	Complied
3642.198	Vertical	52.5	74.0	21.5	Complied
4552.436	Horizontal	51.7	74.0	22.3	Complied
7283.878	Vertical	52.5	74.0	21.5	Complied
8194.333	Vertical	42.4	74.0	31.6	Complied
9104.936	Vertical	45.7	74.0	28.3	Complied

Results: Average Bottom Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2731.538	Vertical	51.1	54.0	2.9	Complied
3641.893	Vertical	49.7	54.0	4.3	Complied
4552.468	Horizontal	50.1	54.0	3.9	Complied
7283.894	Vertical	49.6	54.0	4.4	Complied
8194.477	Vertical	36.5	54.0	17.5	Complied
9105.080	Vertical	42.4	54.0	11.6	Complied

Transmitter Radiated Emissions (continued)

Results: Peak Middle Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2744.984	Vertical	53.4	74.0	20.6	Complied
3659.963	Vertical	52.6	74.0	21.4	Complied
4574.920	Horizontal	53.1	74.0	20.9	Complied
7320.064	Vertical	52.1	74.0	21.9	Complied
8234.862	Vertical	44.2	74.0	29.8	Complied
9149.792	Vertical	46.2	74.0	27.8	Complied

Results: Average Middle Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2745.048	Vertical	52.1	54.0	1.9	Complied
3660.075	Vertical	50.3	54.0	3.7	Complied
4575.016	Horizontal	51.9	54.0	2.1	Complied
7319.968	Vertical	48.6	54.0	5.4	Complied
8234.958	Vertical	39.9	54.0	14.1	Complied
9150.032	Vertical	42.7	54.0	11.3	Complied

Transmitter Radiated Emissions (continued)

Results: Peak Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2759.948	Vertical	54.3	74.0	19.7	Complied
3679.891	Vertical	53.9	74.0	20.1	Complied
4599.840	Horizontal	54.3	74.0	19.7	Complied
7442.580	Vertical	52.0	74.0	22.0	Complied
8279.750	Vertical	46.4	74.0	27.6	Complied
9199.728	Vertical	45.5	74.0	28.5	Complied

Results: Average Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2759.948	Vertical	53.0	54.0	1.0	Complied
3679.907	Vertical	51.4	54.0	2.6	Complied
4599.888	Horizontal	53.2	54.0	0.8	Complied
7442.612	Vertical	48.4	54.0	5.6	Complied
8279.765	Vertical	42.5	54.0	11.5	Complied
9199.696	Vertical	41.9	54.0	12.1	Complied

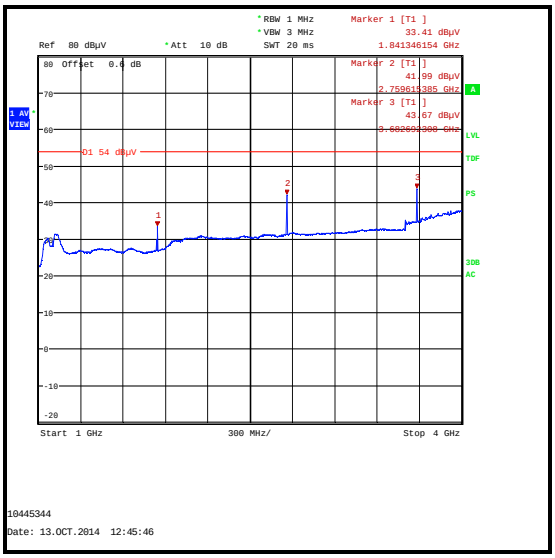
Results: Peak Hopping Mode

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
Note 5					

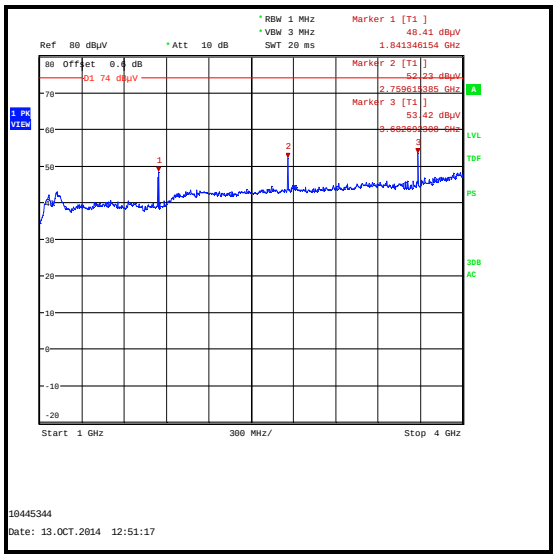
Results: Average Hopping Mode

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
Note 5					

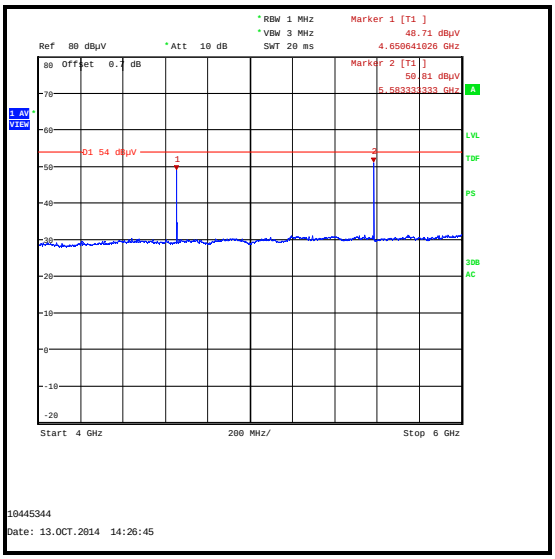
Transmitter Radiated Emissions (continued)



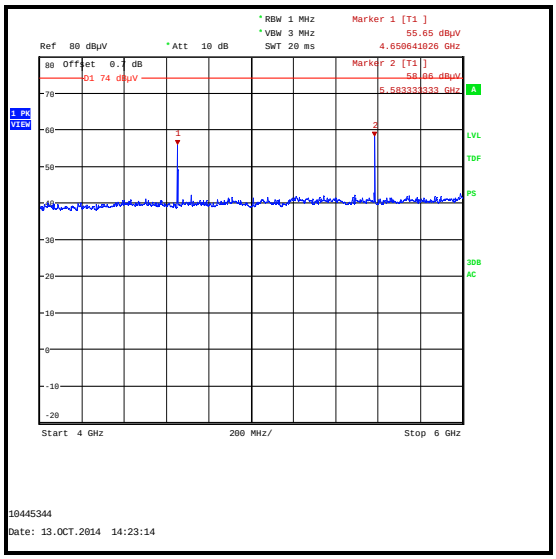
Average Detector



Peak Detector

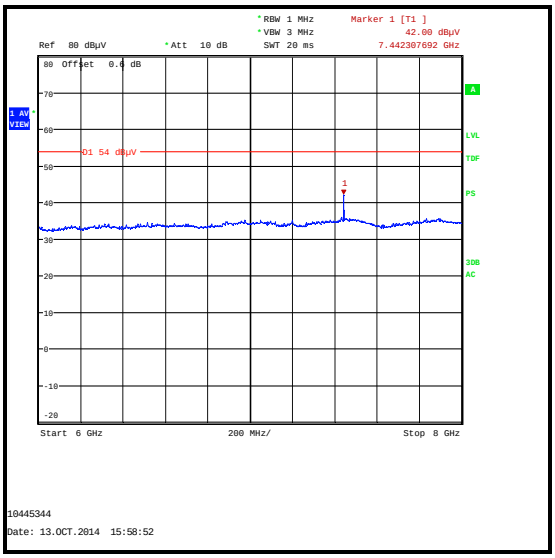


Average Detector

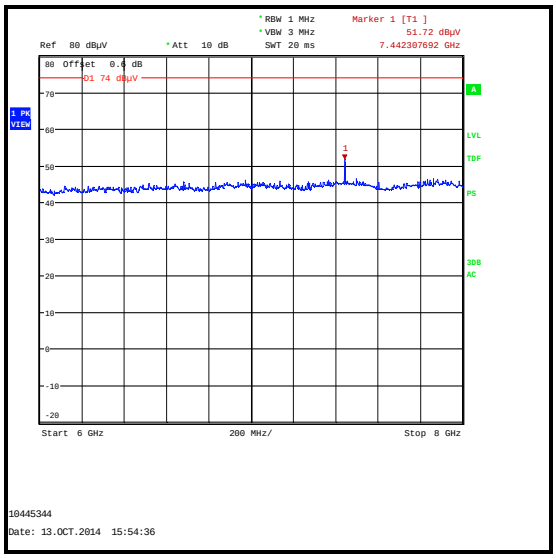


Peak Detector

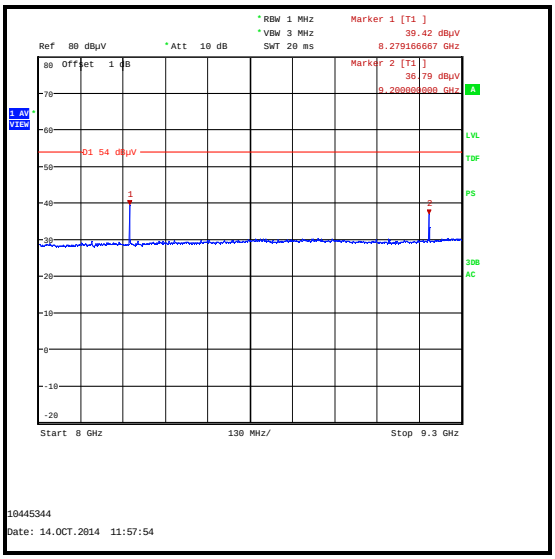
Transmitter Radiated Emissions (continued)



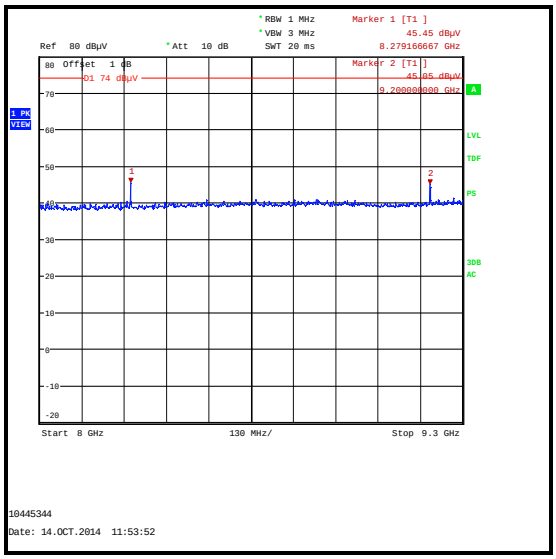
Average Detector



Peak Detector



Average Detector



Peak Detector

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

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	Not stated	14 Mar 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	19 Dec 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	13 May 2015	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	18 May 2015	12
A1818	Antenna	EMCO	3115	00075692	19 Dec 2014	12
A253	Antenna	Flann Microwave	12240-20	128	19 Dec 2014	12
A254	Antenna	Flann Microwave	14240-20	139	19 Dec 2014	12
A255	Antenna	Flann Microwave	16240-20	519	19 Dec 2014	12
A148	High Pass Filter	Filtronic	5H036	32218	17 May 2015	12

5.2.10. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Georgios Vrezas	**Test Date:**	01 October 2014
Test Sample Serial Number:	597		

FCC Reference:	Parts 15.247(d) & 15.209(a)
Industry Canada Reference:	RSS-Gen 4.9, RSS-210 A8.5
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.2

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	50

Note(s):

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. As both band edges fall within the non-restricted band, only peak measurements are required. 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 reference level line was placed on the peak of the carrier and a second reference line was placed at -20 dBc. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission or noise floor level in the adjacent band. Marker frequencies and levels were recorded.

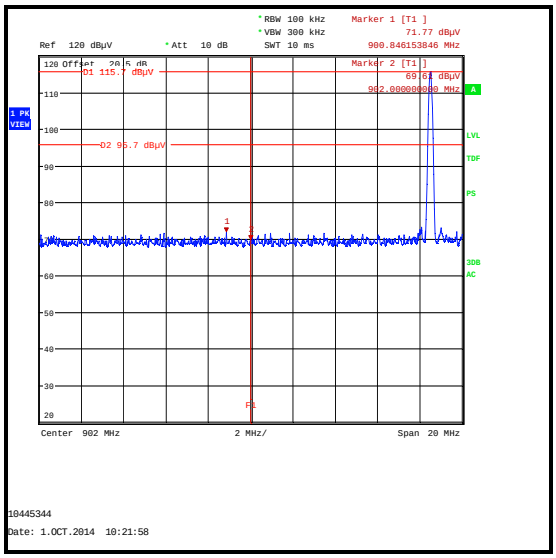
Results: Static Mode / 62.5 bit/s

Frequency (MHz)	Peak Level (dBµV/m)	-20 dBc Limit (dBµV/m)	Margin (dB)	Result
900.846	71.8	95.7	23.9	Complied
902	69.6	95.7	26.1	Complied
928	70.2	94.9	24.7	Complied
929.410	74.1	94.9	20.8	Complied

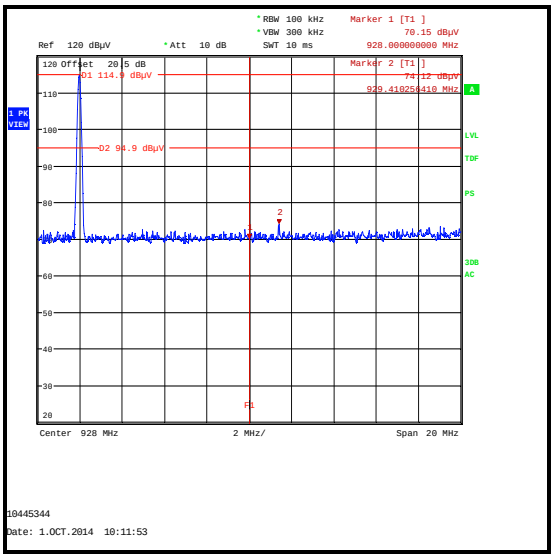
Results: Hopping Mode / 62.5 bit/s

Frequency (MHz)	Peak Level (dBµV/m)	-20 dBc Limit (dBµV/m)	Margin (dB)	Result
900.365	72.4	95.7	23.3	Complied
902	71.2	95.7	24.5	Complied
928	70.5	95.0	24.5	Complied
929.506	73.6	95.0	21.4	Complied

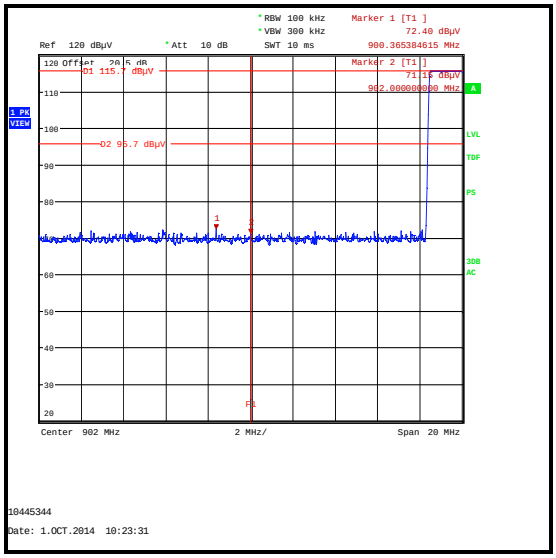
Transmitter Band Edge Radiated Emissions (continued)



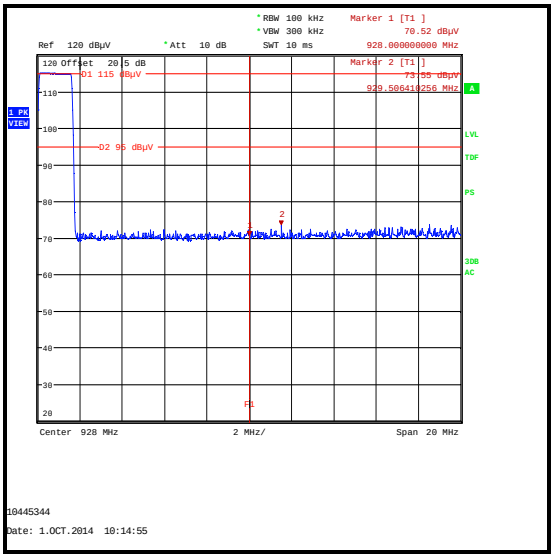
Lower Band Edge / Bottom Channel / Static



Upper Band Edge / Top Channel / Static



Lower Band Edge / Bottom Channel / Hopping



Upper Band Edge / Top Channel / Hopping

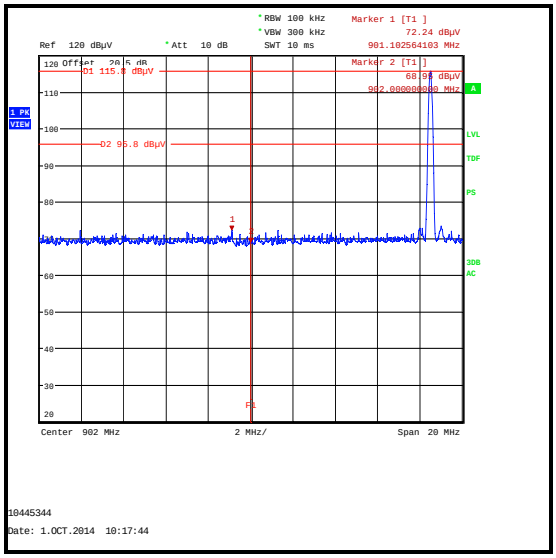
Transmitter Band Edge Radiated Emissions (continued)

Results: Static Mode / 500 bit/s

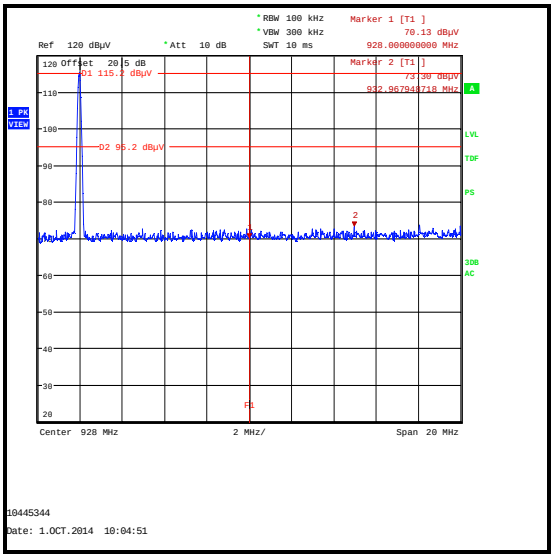
Frequency (MHz)	Peak Level (dBµV/m)	-20 dBc Limit (dBµV/m)	Margin (dB)	Result
901.103	72.2	95.8	23.6	Complied
902	69.0	95.8	26.8	Complied
928	70.1	95.2	25.1	Complied
932.968	73.3	95.2	21.9	Complied

Results: Hopping Mode / 500 bit/s

Frequency (MHz)	Peak Level (dBµV/m)	-20 dBc Limit (dBµV/m)	Margin (dB)	Result
899.692	71.8	95.8	24.0	Complied
902	69.1	95.8	26.7	Complied
928	70.5	95.0	24.5	Complied
929.506	73.6	95.0	21.4	Complied

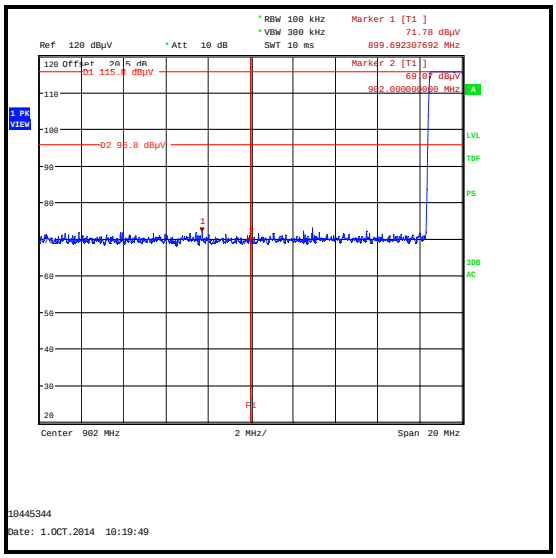


Lower Band Edge / Bottom Channel / Static

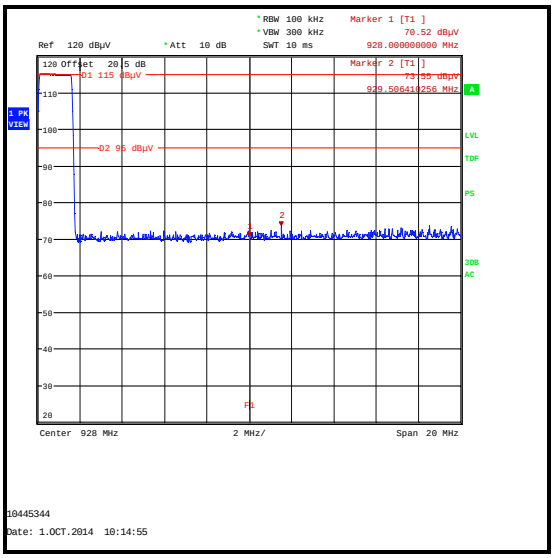


Upper Band Edge / Top Channel / Static

Transmitter Band Edge Radiated Emissions (continued)



Lower Band Edge / Bottom Channel / Hopping



Upper Band Edge / Top Channel / Hopping

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	Not stated	14 Mar 2015	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	19 Dec 2014	12
M1874	Test Receiver	Rohde & Schwarz	ESU26	100553	13 May 2015	12
A288	Antenna	Chase	CBL6111A	1589	21 Aug 2015	12
A1393	Attenuator	Huber & Suhner	6820.17.B	757456	02 May 2015	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 of the measurand (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	902 MHz to 928 MHz	95%	±1.13 dB
Carrier Frequency Separation	902 MHz to 928 MHz	95%	±0.92 ppm
Average Time of Occupancy	902 MHz to 928 MHz	95%	±0.3 ns
20 dB Bandwidth	902 MHz to 928 MHz	95%	±3.92%
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 9.3 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	34 & 36	-	Changed declared antenna gain from +2 dBi to 0 dBi due to new information received from the manufacturer

---END OF REPORT---