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RADIO TEST REPORT – 454332-2TRFWL

Type of assessment:

Class II Permissive Change

Description of the equipment:

LightGrid Mesh Node Outdoor Wireless Control System

Applicant:

Current Lighting Solutions Canada LLC

Product marketing name:

Lightgrid 2 Node

Model (HVIN):

Lightgrid 2 Node

FCC ID:

2AS3F-90003

IC Registration number:

25008-90003

Specifications:

- FCC 47 CFR Part 15 Subpart C, §15.247
- RSS-247, Issue 2, Feb 2017, Section 5

Date of issue: July 5, 2022

Yong Huang, Wireless/EMC Specialist
Tested by


Signature

Andrey Adelberg, Senior EMC/RF Specialist
Reviewed by


Signature

Lab locations

Company name	Nemko Canada Inc.			
Facilities	*Ottawa site:* 303 River Road Ottawa, Ontario Canada K1V 1H2 Tel: +1 613 737 9680 Fax: +1 613 737 9691	*Montréal site:* 292 Labrosse Avenue Pointe-Claire, Québec Canada H9R 5L8 Tel: +1 514 694 2684 Fax: +1 514 694 3528	*Cambridge site:* 1-130 Saltsman Drive Cambridge, Ontario Canada N3E 0B2 Tel: +1 519 650 4811	*Almonte site:* 1500 Peter Robinson Road West Carleton, Ontario Canada K0A 1L0 Tel: +1 613 256-9117

Test site identifier	**Organization**	**Ottawa/Almonte**	**Montreal**	**Cambridge**
	FCC:	CA2040	CA2041	CA0101
	ISED:	2040A-4	2040G-5	24676
Website	www.nemko.com			

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Table of Contents

Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.247	Operation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–585 MHz
RSS-247, Issue 2, Feb 2017, Section 5	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

1.2 Test methods

558074 D01 15.247 Meas Guidance v05r02 (April 2, 2019)	Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules.
662911 D01 Multiple Transmitter Output v02r01 (October 31, 2013)	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-102, Issue 5, March 19, 2015	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

1.3 Exclusions

As per quotation of the client, the scope of this report is limited assessment for purpose of verification. Only output power, radiated spurious emission and 20 dB bandwidth tests have been performed, other requirements are excluded.

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.3 above. Results obtained indicate that the product under test complies In full with the requirements tested. The test results relate only to the items tested.
Determining compliance is based on the results of the compliance measurement, not taking into account measurement uncertainty, in accordance with section 1.3 of ANSI C63.10 v2013.

See "Summary of test results" for full details.

1.5 Test report revision history

Table 1.5-1: *Test report revision history*

Revision #	Date of issue	Details of changes made to test report
TRF	July 5, 2022	Original report issued

Section 2 Engineering considerations

2.1 Modifications incorporated in the EUT for compliance

The following modifications were performed by client: To reduce harmonic emissions, shielding has been installed on location as below:

2.2 Technical judgment

Test data are mostly migrated from project NEX 351989, which was tested in April 2018. As per customer, the product is identical to the sample at the time of testing, and spot check was performed on the current sample to make sure the test data is still representing.

2.3 Model variant declaration

There were no model variants declared by the applicant.

2.4 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 3 Test conditions

3.1 Atmospheric conditions

Temperature	15 °C – 35 °C
Relative humidity	20 % – 75 %
Air pressure	86 kPa (860 mbar) – 106 kPa (1060 mbar)

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

3.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 4 Measurement uncertainty

4.1 Uncertainty of measurement

UKAS Lab 34 and TIA-603-B have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada, Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products.

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Table 4.1-1: *Measurement uncertainty calculations*

Test name	Measurement uncertainty, ±dB
All antenna port measurements	0.55
Occupied bandwidth	4.45
Conducted spurious emissions	1.13
Radiated spurious emissions	3.78
AC power line conducted emissions	3.55

Section 5 Information provided by the applicant

5.1 Disclaimer

This section contains information provided by the applicant and has been utilized to support the test plan. Inaccurate information provided by the applicant can affect the validity of the results contained within this test report. Nemko accepts no responsibility for the information contained within this section and the impact it may have on the test plan and resulting measurements.

5.2 Applicant/Manufacture

Applicant name	Current Lighting Solutions, LLC
Applicant address	25825 Science Park STE 400, Beachwood, OH 44122-7392, USA
Manufacturer name	Current Lighting Solutions Canada, Inc.
Manufacturer address	25825 Science Park STE 400, Beachwood, OH 44122-7392, USA
Technical contact name	Current Lighting Solutions, LLC
Technical contact address	1940 Onésime-Gagnon, Lachine, Quebec, H8T 3M6 Canada

5.3 EUT information

Product (PMN)	Lightgrid 2 Node
Model (HVIN)	Lightgrid 2 Node
Serial number	GEL18110036
Part number	ELWN1A8UBXXXXAD
Power requirements	120–480 V_{AC}
Product description and theory of operation	The GE LightGrid Controller is used to source power and dimming control signals to LED outdoor roadway luminaires. Also, it provides monitoring and diagnostic capability to the luminaires being controlled. The Controller connects externally to the outdoor luminaire using an ANSI 7- pin twist-lock receptacle. The controller receives power from the fixture through two conductors in the receptacle and sources a switched input power to the luminaire using one conductor.

5.4 Radio technical information

Category of Wideband Data Transmission equipment	☒ Frequency Hopping Spread Spectrum (FHSS) equipment ☐ Other types of Wideband Data Transmission equipment (e.g. DSSS, OFDM, etc.).
Frequency band	902–928 MHz
Frequency Min (MHz)	902.55
Frequency Max (MHz)	927.44
Channel numbers	1–50
RF power Max (W), Conducted	0.2455 (23.9 dBm)
Field strength, dBµV/m @ 3 m	N/A
Measured BW (kHz), 20dB BW	497.8
Type of modulation	FSK
Emission classification	F1D
Transmitter spurious, dBµV/m @ 3 m	49.5 dBµV/m at 2744.6MHz average@ 3 m
Antenna information	Wire antenna with 2.7 dBi gain The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator.

5.5 EUT setup details

5.5.1 Radio exercise details

Operating conditions	EUT was powered and special mode of operation was set to transmit on selected channels with predefined power settings Instructions: Insert the standard IEC 3-prong power cord into the NEMA-to-IEC plug adapter base (B) and plug the other end into the power supply, ensure the node is powered up by confirming blinking Red LED seen through translucent plastic Node (DUT) cover (A). Lift Node cover (A) revealing internal PCB stack. Locate the small tactile pushbutton on the edge of the upper PCB near the corner of the large IC; Press this button using a pencil eraser or similar stylus to switch unit between RF test modes. Between each test, or any time power is interrupted, remove and reapply power and repeat the pushbutton configuration to ensure the DUT is in the correct mode for the subsequent test. Upon power up, the RF subsystem is in standby. Button presses 1-3 enable listen only mode, on low, mid, and high channels respectively. Button presses 4-6 enable continuous modulated transmission, at max power output, on low, mid, and high channels respectively. Button presses 7 enables continuous CW transmission, at max power output, mid channel (915MHz). Button presses 8 enables simulated frequency hopping, at max power output and duty cycle, across all 50 channels. Confirm the correct mode is selected via observation with a spectrum analyzer before proceeding with the current test. Replace and fully seat the Node cover before beginning any testing. Insure it is always correctly installed during any test sequence.
Transmitter state	Transmitter set into continuous mode.

5.5.2 EUT setup configuration

Table 5.5-1: *EUT sub assemblies*

Description	Brand name	Model, Part number, Serial number, Revision level
WOLC Node (Wireless Outdoor Light Control Node)	GE	MN: Lightgrid 2 Node, PN: ELWN1A8UBXXXXAD, SN: GEL18110036, Rev. 2.1

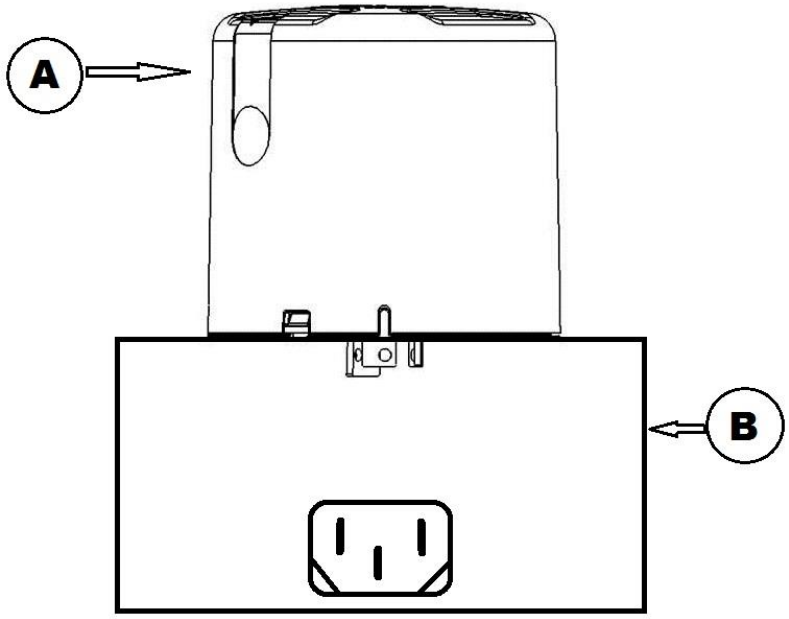

Figure 5.5-1: *Test setup block diagram*

Section 6 Summary of test results

6.1 Testing location

Test location (s)	Montreal

6.2 Testing period

Test start date	April 5, 2018	Test end date	July 18, 2018

6.3 Sample information

Receipt date	April 5, 2018	Nemko sample ID number(s)	1

6.4 FCC Part 15 Subpart C, intentional radiators test results for frequency hopping spread spectrum systems

Table 6.4-1: *FCC 15.247 results for FHSS*

Part	Test description	Verdict
§15.247(a)(1)(i)	Requirements for operation in the 902–928 MHz band	Not tested
§15.247(b)(2)	Maximum peak output power in the 902–928 MHz band	Pass
§15.247(c)(1)	Fixed point-to-point operation with directional antenna gains greater than 6 dBi	Not applicable
§15.247(c)(2)	Transmitters operating in the 2400–2483.5 MHz band that emit multiple directional beams	Not applicable
§15.247(d)	Spurious emissions	Pass
§15.247(f)	Time of occupancy for hybrid systems	Not applicable

Note: As per customer's quotation, only output power and spurious emissions were tested for C2PC

6.5 ISED RSS-247, Issue 2, test results for frequency hopping spread spectrum systems (FHSS)

Table 6.5-1: *RSS-247 results for FHSS*

Part	Test description	Verdict
5.1 (a)	Bandwidth of a frequency hopping channel	Pass
5.1 (b)	Minimum channel spacing	Not tested
5.1 (c)	Systems operating in the 902–928 MHz band	Not tested
5.3	Hybrid Systems	
5.3 (a)	Digital modulation turned off	Not applicable
5.3 (b)	Frequency hopping turned off	Not applicable
5.4	Transmitter output power and e.i.r.p. requirements	
5.4 (a)	Systems operating in the 902–928 MHz band (Output power)	Pass
5.5	Unwanted emissions	Pass

Notes: As per customer's quotation, only output power and spurious emissions were tested for C2PC

Section 7 Test equipment

7.1 Test equipment list

Table 7.1-1: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA002532	2 year	June 5/19
Flush mount turntable	Sunol	FM2022	FA002550	—	NCR
Controller	Sunol	SC104V	FA002551	—	NCR
Antenna mast	Sunol	TLT2	FA002552	—	NCR
Three phase power system	TESEQ	ProfLine 2115-400	FA002516	1 year	Aug. 21/18
Receiver/spectrum analyzer	Rohde & Schwarz	ESU 40	FA002071	1 year	Sept. 18/18
Bilog antenna (20–2000 MHz)	Sunol	JB1	FA002517	1 year	Dec. 6/18
Horn antenna (1–18 GHz)	EMCO	3115	FA001452	1 year	Nov. 20/18
Pre-amplifier (0.5–18 GHz)	COM-POWER	PAM-118A	FA002561	1 year	Sept. 21/18
50 Ω coax cable	C.C.A.	None	FA002603	—	VOU
50 Ω coax cable	C.C.A.	None	FA002605	—	VOU
50 Ω coax cable	C.C.A.	None	FA002831	—	VOU
50 Ω coax cable	C.C.A.	None	FA002607	—	VOU
High Pass Filter (> 1100 MHz)	Microwave Circuits	H1G212G1	FA002342	—	VOU

Note: NCR - no calibration required, VOU - verify on use

Section 8 Testing data

8.1 Frequency Hopping Systems requirements, 900 MHz operation

8.1.1 References, definitions and limits

FCC §15.247:

(a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(i) For frequency hopping systems operating in the 902–928 MHz band: 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; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

(f) For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned-off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Table 8.1-1: *Summary of the basic requirements*

$P_{max\text{-}pk} \leq 1$ W	$P_{max\text{-}pk} \leq 0.125$ W
$N_{ch} \geq 75$	$N_{ch} \geq 15$
$\Delta f \geq$ MAX { 25 kHz, $BW_{20\,dB}$ }	$\Delta f \geq$ MAX [MAX { 25 kHz, 0.67×$BW_{20\,dB}$ } OR MAX{25 kHz, $BW_{20\,dB}$}]
max. $BW_{20\,dB}$ not specified	max. $BW_{20\,dB}$ not specified
$t_{ch} \leq 0.4$ s for T = 0.4×Nch	$t_{ch} \leq 0.4$ s for T = 0.4×Nch

Note: t_{ch} = average time of occupancy; T = period; N_{ch} = # hopping frequencies; BW = bandwidth; Δf = hopping channel carrier frequency separation

RSS-247, Clause 5.1:

a. The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system's radio frequency (RF) bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

c. For FHSs in the band 902–928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10‑second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

RSS-247, Clause 5.3:

Hybrid systems employ a combination of both frequency hopping and digital transmission techniques and shall comply with the following:

a. With the digital transmission operation of the hybrid system turned off, the frequency hopping operation shall have an average time of occupancy on any frequency not exceeding 0.4 seconds within a duration in seconds equal to the number of hopping frequencies multiplied by 0.4.

8.1.2 Test summary

Verdict	Pass		
Tested by	Yong Huang	Test date	April 5, 2018

8.1.3 Observations, settings and special notes

20 dB bandwidth was tested per ANSI C63.10 subclause 6.9.2. Spectrum analyser settings:

Resolution bandwidth	≥ 1–5% of the 20 dB bandwidth
Video bandwidth	≥ RBW
Frequency span	approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel
Detector mode	Peak
Trace mode	Max Hold

8.1.4 Test data

Table 8.1-2: *20 dB bandwidth results*

Frequency, MHz	20 dB bandwidth, kHz	Limit, kHz	Margin, kHz
902.55	497.8	500.0	2.2
914.74	494.9	500.0	5.1
927.44	486.3	500.0	13.7

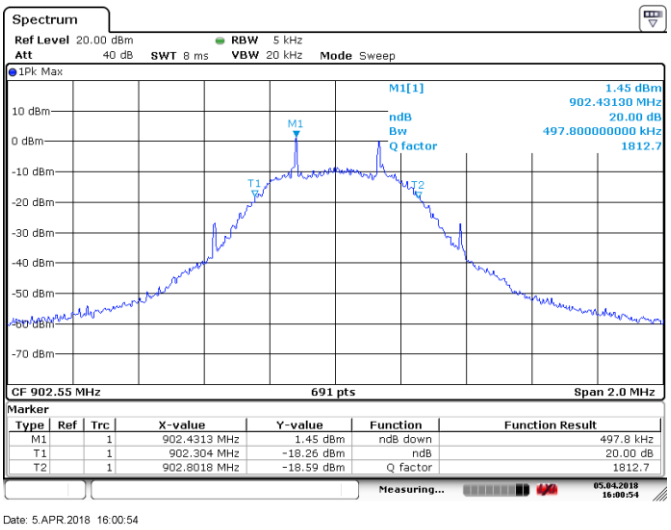

Figure 8.1-1: *20 dB bandwidth on low channel*

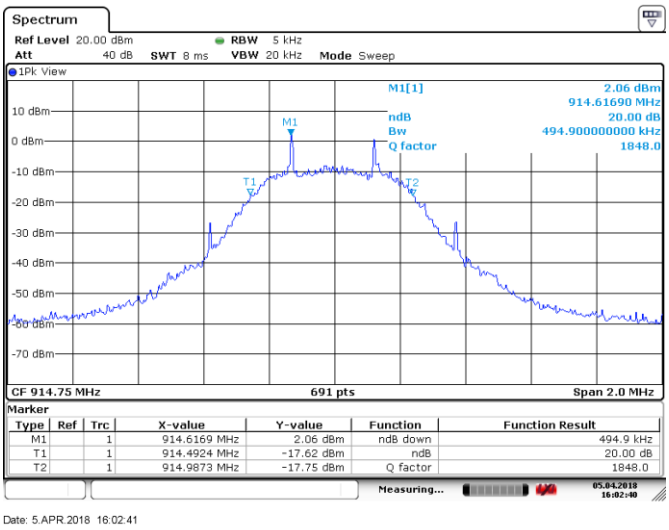

Figure 8.1-2: *20 dB bandwidth on mid channel*

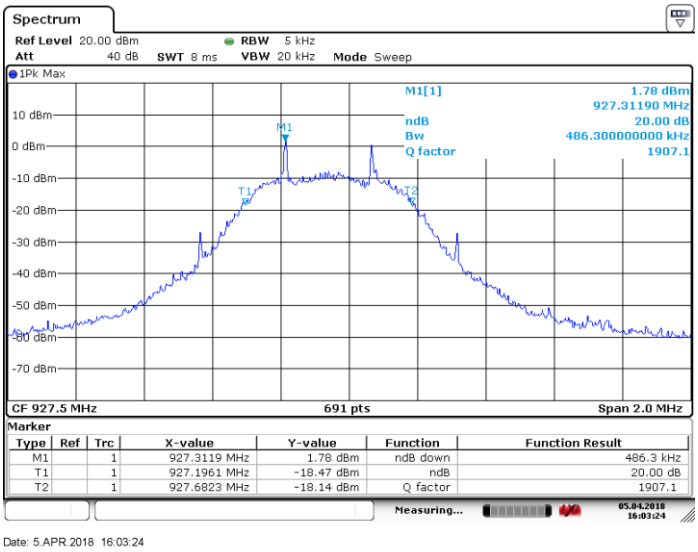

Figure 8.1-3: *20 dB bandwidth on high channel*

8.2 Transmitter output power and e.i.r.p. requirements for FHSS 900 MHz

8.2.1 References, definitions and limits

FCC §15.247:

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

(2) For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-247, Clause 5.4:

Devices shall comply with the following requirements, where applicable:

a. For FHSs operating in the band 902–928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W and the e.i.r.p. shall not exceed 1 W if the hopset uses less than 50 hopping channels.

8.2.2 Test summary

Verdict	Pass		
Tested by	Yong Huang	Test date	September 12, 2018

8.2.3 Observations, settings and special notes

Spectrum analyser settings for output power:

Resolution bandwidth	3 MHz
Video bandwidth	3 MHz
Frequency span	10 MHz
Detector mode	Peak
Trace mode	Max Hold

8.2.4 Test data

Table 8.2-1: *Output power and EIRP results*

Frequency, MHz	Output power, dBm	Output power limit, dBm	Margin, dB	Antenna gain, dBi	EIRP, dBm	EIRP limit, dBm	EIRP margin, dB
902.55	22.6	30.0	7.4	2.7	25.3	36.0	10.7
914.74	23.9	30.0	6.1	2.7	26.6	36.0	9.4
927.44	23.6	30.0	6.4	2.7	26.3	36.0	9.7

EIRP = Output power + Antenna gain

Test data, continued

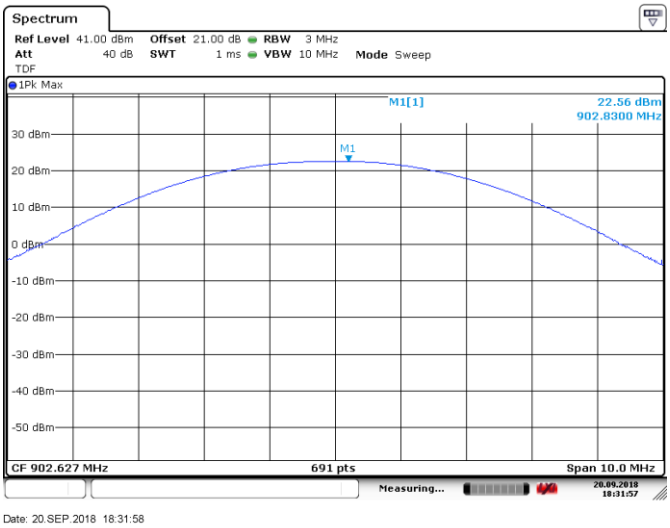

Figure 8.2-1: *Output power on low channel*

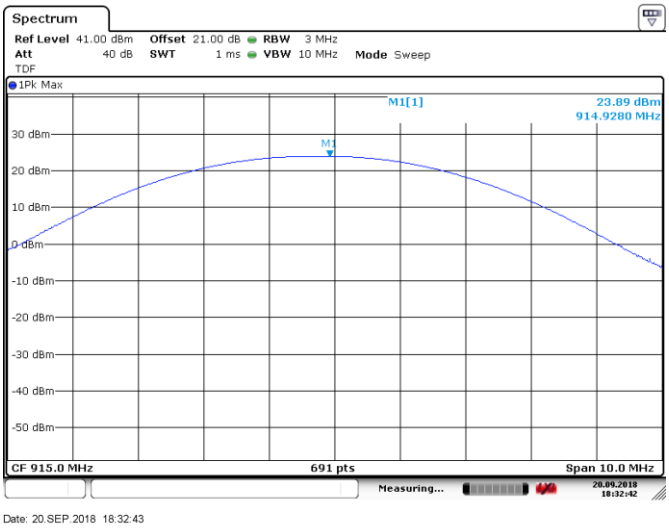

Figure 8.2-2: *Output power on mid channel*

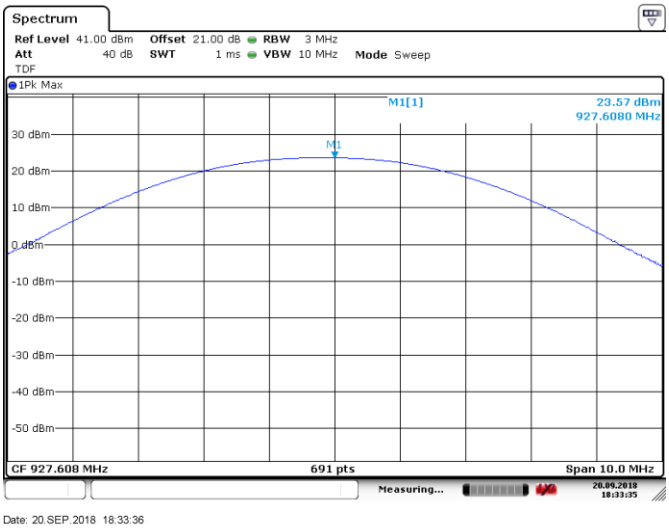

Figure 8.2-3: *Output power on high channel*

8.3 Spurious (out-of-band) unwanted emissions

8.3.1 References, definitions and limits

FCC §15.247:

(d) 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RSS-247, Clause 5.5:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Table 8.3-1: *FCC §15.209 and RSS-Gen – Radiated emission limits*

	Field strength of emissions		
Frequency, MHz	**µV/m**	**dBµV/m**	**Measurement distance, m**
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

References, definitions and limits, continued

Table 8.3-2: *ISED restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	12.57675–12.57725	399.9–410	7.25–7.75
0.495–0.505	13.36–13.41	608–614	8.025–8.5
2.1735–2.1905	16.42–16.423	960–1427	9.0–9.2
3.020–3.026	16.69475–16.69525	1435–1626.5	9.3–9.5
4.125–4.128	16.80425–16.80475	1645.5–1646.5	10.6–12.7
4.17725–4.17775	25.5–25.67	1660–1710	13.25–13.4
4.20725–4.20775	37.5–38.25	1718.8–1722.2	14.47–14.5
5.677–5.683	73–74.6	2200–2300	15.35–16.2
6.215–6.218	74.8–75.2	2310–2390	17.7–21.4
6.26775–6.26825	108–138	2483.5–2500	22.01–23.12
6.31175–6.31225	149.9–150.05	2655–2900	23.6–24.0
8.291–8.294	156.52475–156.52525	3260–3267	31.2–31.8
8.362–8.366	156.7–156.9	3332–3339	36.43–36.5
8.37625–8.38675	162.0125–167.17	3345.8–3358	
8.41425–8.41475	167.72–173.2	3500–4400	Above 38.6
12.29–12.293	240–285	4500–5150	
12.51975–12.52025	322–335.4	5350–5460	

Note: Certain frequency bands listed in Table 8.3-2 and above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Table 8.3-3: *FCC restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

8.3.2 Test summary

Verdict	Pass		
Tested by	Yong Huang	Test date	April 5, 2018

8.3.3 Observations, settings and special notes

- As part of the current assessment, the test range of 9 kHz to 10th harmonic has been fully considered and compared to the actual frequencies utilized within the EUT. Since the EUT contains a transmitter in the GHz range, the EUT has been deemed compliant without formal testing in the 9 kHz to 30 MHz test range, therefore formal test results (tabular data and/or plots) are not provided within this test report.
- EUT was set to transmit with 100 % duty cycle.
- Radiated measurements were performed at a distance of 3 m.
- DTS emissions in restricted frequency bands test was performed as per KDB 558074, section 8.6 with reference to ANSI C63.10 subclause 11.12.
- Below 1 GHz, no spurious emissions related to RF portion were detected in restricted bands within 10 dB below the limit.

Spectrum analyser settings for radiated measurements within restricted bands below 1 GHz:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for peak radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for average radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	10 Hz
Detector mode:	Peak
Trace mode:	Max Hold

8.3.4 Test data

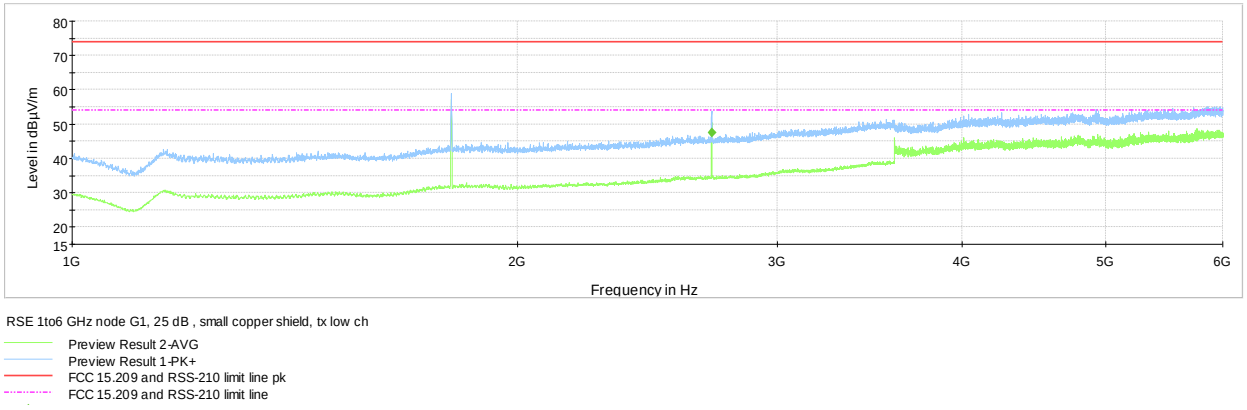

Figure 8.3-1: *Radiated spurious emissions for low channel 1 to 6 GHz for restricted band emissions*

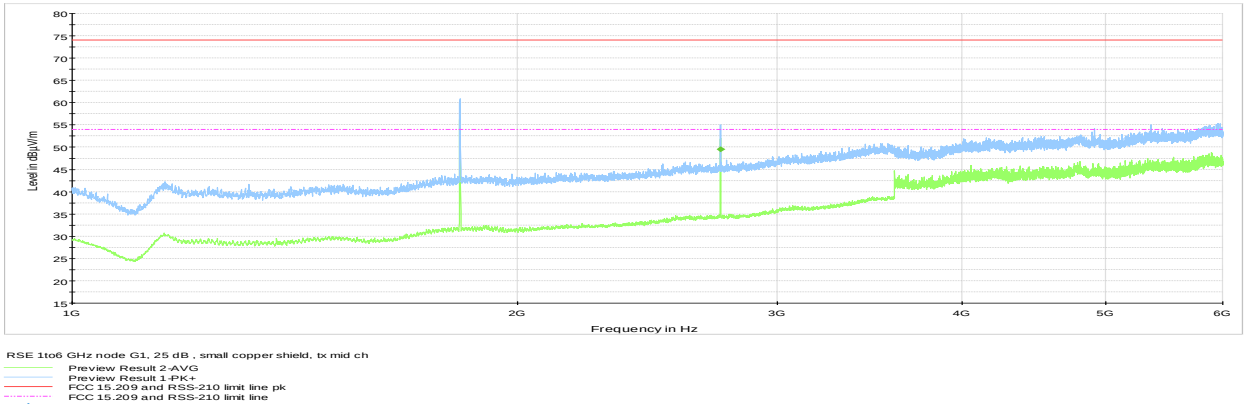

Figure 8.3-2: *Radiated spurious emissions for mid channel 1 to 6 GHz for restricted band emissions*

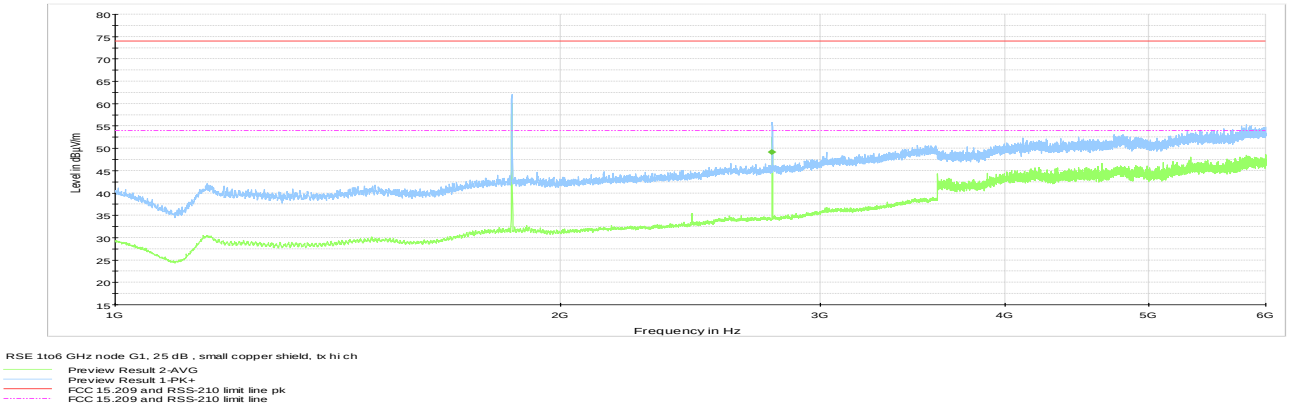

Figure 8.3-3: *Radiated spurious emissions for high channel 1 to 6 GHz for restricted band emissions*

Note: 1.8 GHz emission is a second harmonic that falls outside restricted bands.

8.3.5 Test data, continued

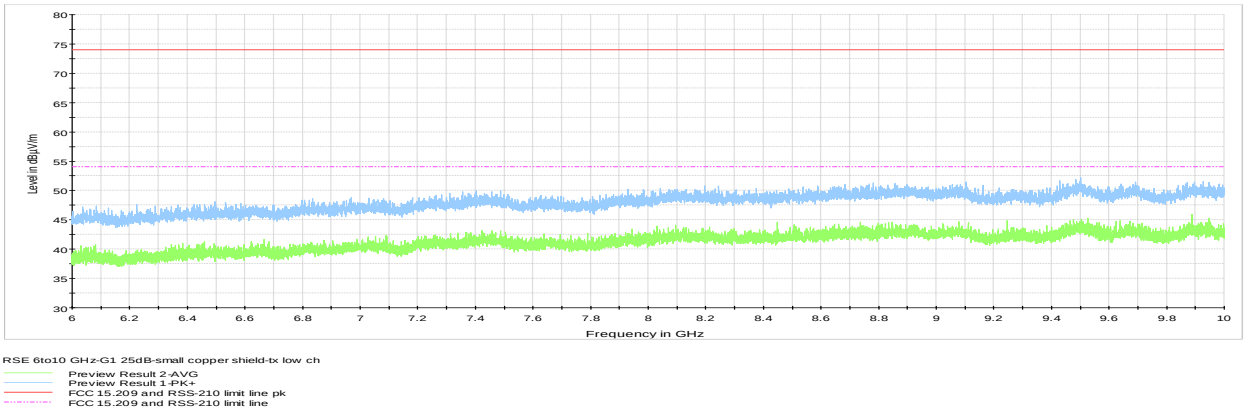

Figure 8.3-4: *Radiated spurious emissions for low channel 6 to 10 GHz for restricted band emissions*

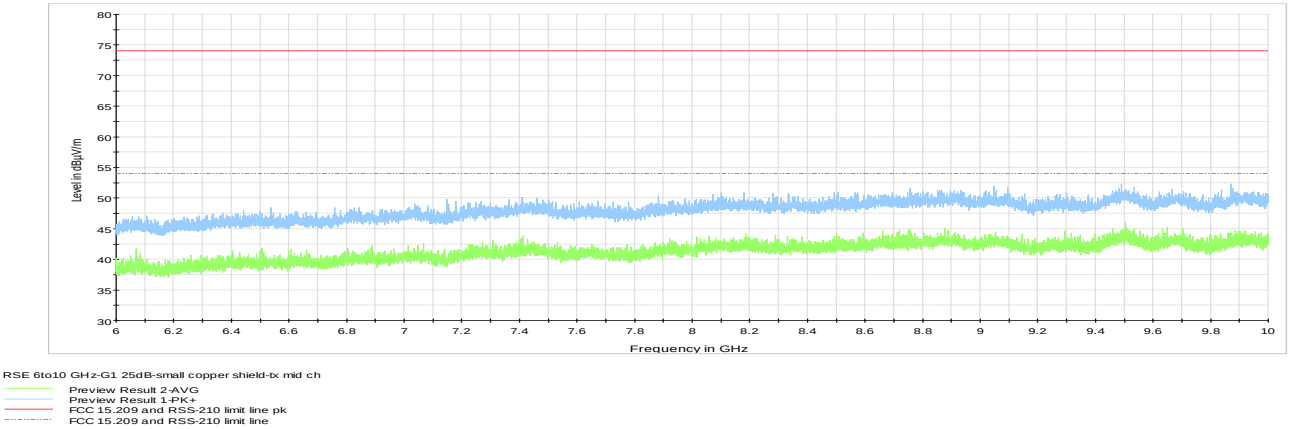

Figure 8.3-5: *Radiated spurious emissions for mid channel 6 to 10 GHz for restricted band emissions*

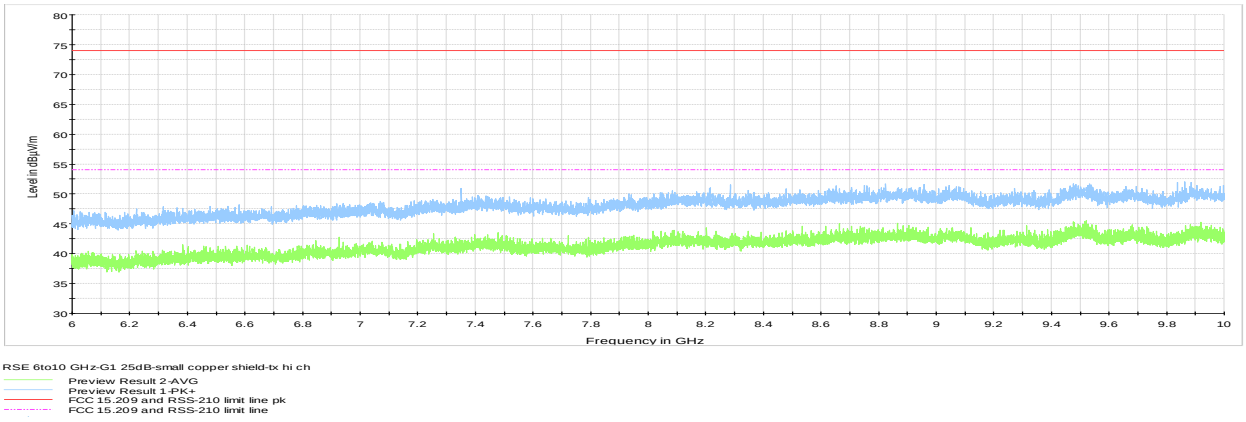

Figure 8.3-6: *Radiated spurious emissions for high channel 6 to 10 GHz for restricted band emissions*

Test data, continued

Table 8.3-4: *Radiated field strength measurement results above 1 GHz*

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	2708.0	54.0	74.0	20.0	47.5	54.0	6.5
mid	2744.6	55.1	74.0	18.9	49.5	54.0	4.5
high	2781.9	55.9	74.0	18.1	49.1	54.0	4.9

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.

End of the test report