Modular Approval
Certification Test Report

FCC ID: SDBIDTB006
IC: 2220A-IDTB006

FCC Rule Part: 15.247
ISED Canada's Radio Standards Specification: RSS-247

TÜV SÜD Report Number: RD72141545.400

Manufacturer: Sensus Metering Systems, Inc.
Model: IDTB006

Test Begin Date: September 28,2018
Test End Date: November 30, 2018

Report Issue Date: December 5, 2018

FOR THE SCOPE OF ACCREDITATION UNDER LAB Code AT-1921

This report must not be used by the client to claim product certification, approval, or endorsement by ANAB, ANSI, or any agency of the Federal Government.

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EMC Technician
TÜV SÜD America, Inc.

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EMC Manager
TÜV SÜD America, Inc.

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1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Innovation, Science and Economic Development Canada Radio Standards Specification: RSS-247 Certification.

1.2 Product Description

The module contains a transceiver that is a standard FlexNet protocol with FEM controlled output capable of 1W nominal conducted output power and a Zigbee transceiver. The modular design enables Sensus to locate the transceiver in several standard S form meters retailed to Utilities. This report documents the Zigbee transceiver.

The 900MHz radio handles WAN communication and the 2.4 GHz radio handles HAN communications.

The transmitters are not capable of simultaneous transmission.

Technical Information:

Detail	Description
Frequency Range	2405-2480
Number of Channels	26
Modulation Format	O-QPSK
Data Rates	N/A
Number of Inputs/Outputs	1T/1R
Operating Voltage	4VDC
Antenna Type / Gain	PCB Inverted F Antenna / 2.2 dBi

Manufacturer Information:
Sensus Metering Systems, Inc.
639 Davis Drive
Morrisville, NC 27560

EUT Serial Numbers: RE: 72495597, CE: 72495598

Test Sample Condition: The test samples were provided in good working order with no visible defects.

1.3 Test Methodology and Considerations

The Zigbee transceiver was configured using a proprietary communication interface provided by the client. The interface allows power level and channel control required to support the evaluation. The power level settings in the table below were used for the evaluation.

Frequency	Power settings RF Conducted EUT	Power settings Radiated EUT
2405	-6	-5
2440	-6	-5
2470	-6	-5
2475	-8	-9
2480	-20	-20

For radiated emissions, the EUT was programmed to generate a continuously modulated signal on each channel investigated. The EUT was evaluated in the three orthogonal orientations (X,Y, and Z planes). The final radiated measurements presented in this report are based on the Y-plane which was determined to be worst case.

For RF conducted measurements, a SMA connecter was installed on the output of the transmitter to facilitate connection to the test equipment.

2 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

TÜV SÜD America Inc.
2320 Presidential Drive, Suite 101
Durham, NC 27703
Phone: (919) 381-4235

2.2 Laboratory Accreditations/Recognitions/Certifications

TÜV SÜD America Inc. is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ANAB program and has been issued certificate number AT-1921 in recognition of this accreditation. Unless otherwise specified, all test methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

FCC Registered Test Site Number: 637011
ISED Canada Test Site Registration Number: 20446

2.3 Radiated Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The Semi-Anechoic Chamber Test Site consists of a 18' x 28' x 18' shielded enclosure. The chamber is lined with Samwha Electronics Co. LTD Ferrite Absorber, model number SFA300 (HSN-1). The ferrite tile is 10cm x 10 cm and weighs approximately 1.4lbs. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber. On top of the ferrite tiles is DMAS HT-45 (Dutch Microwave Absorber Solutions) hybrid absorber on all walls except the wall behind the antenna mast which has a shorter DMAS HT-25 absorber.

The turntable is 1.50m in diameter and is located 150cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using short #6 copper wire. The turntable is all steel, flush mounted table installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the turntable. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane.

Behind the turntable is a 2' x 6' x 1.5' deep shielded pit used for support equipment if necessary. The pit is equipped with 2 - 4" PVC chase from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

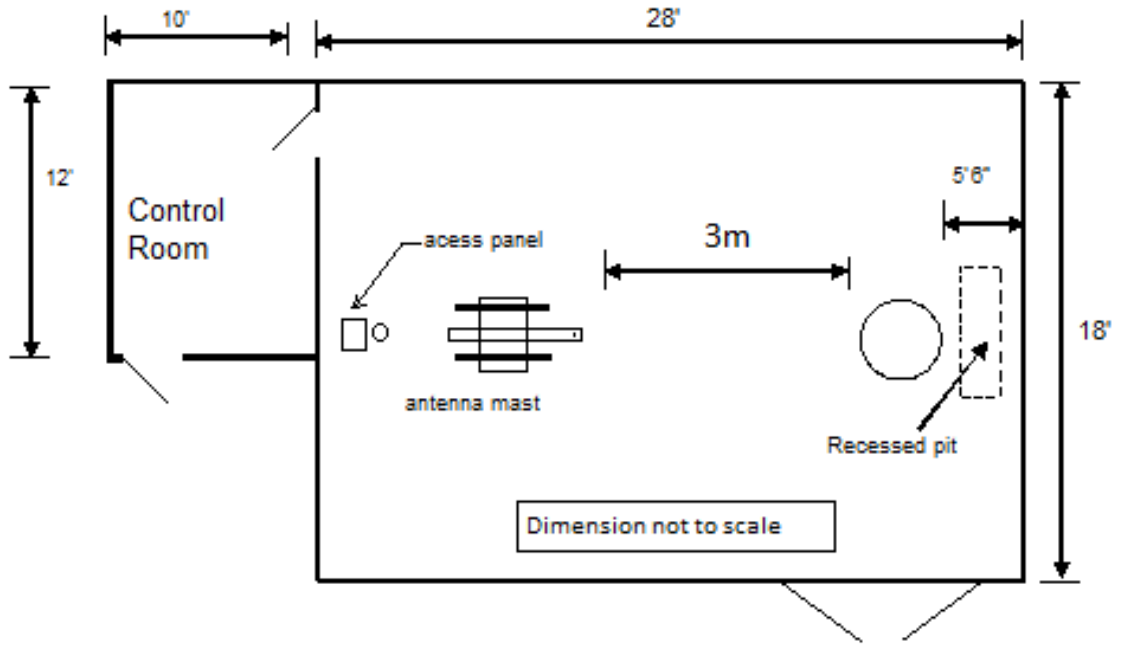

Figure 2.3-1: Semi-Anechoic Chamber Test Site

2.4 Conducted Emissions Test Site Description

The AC mains conducted EMI site is located in the main EMC lab. It consists of an 8’ x 10’ sheet galvanized steel horizontal ground reference plane (GRP) bonded every 6” to an 8’ X 8’ aluminum vertical ground plane.

A diagram of the room is shown below in figure 2.4-1:

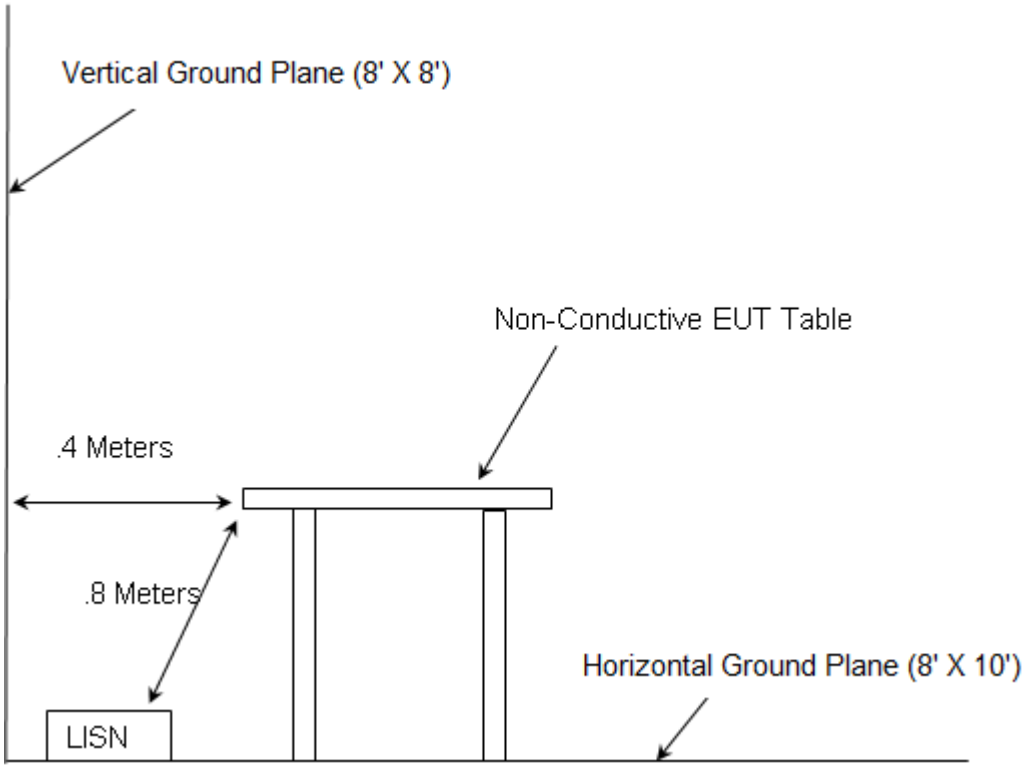

Figure 2.4-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ANSI C63.4-2014: American National Standard for Methods of Measurement of Radio-Noise Emissions from low-voltage electrical and electronic equipment in the range of 9kHz to 40 GHz.
- ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
- US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2018
- US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2018
- FCC KDB 558074 D01 15.247 Meas Guidance v05 – 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, August 24, 2018
- ISED Canada Radio Standards Specification: RSS-247, Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices, Issue 2, February 2017
- ISED Canada Radio Standards Specification: RSS-GEN – General Requirements for Compliance of Radio Apparatus, Issue 5, April 2018

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment Radiated Emissions

Asset ID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
DEMC0499	EMCO	3146	Antennas	1108	5/3/2017	5/3/2019
DEMC0626	EMCO	3110B	Antennas	9411-1945	3/21/2017	3/21/2019
DEMC3002	Rohde & Schwarz	ESU40	Receiver	100346	7/24/2017	10/24/2018*
DEMC3006	Rohde & Schwarz	TS-PR18	Amplifiers	122006	1/10/2018	1/10/2019
DEMC3008	Rohde & Schwarz	NRP2	Meter	103131	2/15/2018	2/15/2019
DEMC3009	Rohde & Schwarz	NRP-Z81	Meter	102397	2/15/2018	2/15/2019
DEMC3012	Rohde & Schwarz	EMC32-EB	Software	100731	NCR	NCR
DEMC3016	Fei Teng Wireless Technology	HA-07M18G-NF	Antennas	2013120203	2/7/2018	2/7/2020
DEMC3027	Micro-Tronics	BRM50702	Filter	175	1/7/2018	1/7/2019
DEMC3028	Micro-Tronics	HPM50111	Filter	122	1/7/2018	1/7/2019
DEMC3037	Hasco, Inc.	HLL142-S1-S1-18	Cables	6367	1/9/2018	1/9/2019
DEMC3038	Florida RF Labs	NMSE-290AW-60.0-NMSE	Cable Set	1448	1/5/2018	1/5/2019
DEMC3039	Florida RF Labs	NMSE-290AW-396.0-NMSE	Cable Set	1447	1/5/2018	1/5/2019
DEMC3041	Aeroflex Inmet	18N10W-30	Attenuator	1447	1/15/2018	1/15/2019
DEMC3045	Aeroflex Inmet	18N10W-20	Attenuator	1437	1/8/2018	1/8/2019
DEMC3050	Aeroflex Inment	26AH-30	Attenuator	1447	1/9/2018	1/9/2019
DEMC3053	Fluke	115	Digital Multimeter	28840861	1/9/2018	1/9/2019
DEMC3055	Rohde & Schwarz	3005	Cables	3055	1/8/2018	1/8/2019
DEMC3085	Rohde & Schwarz	FSW43	Spectrum Analyzer	103997	3/15/2018	3/15/2019

*Note: The test equipment was not used outside if the calibration cycle.
NCR = No Calibration Required
DMAS MT-25 RF absorber material was used on the floor for all final measurements above 1 GHz.
Asset DEMC3002: Firmware Version: ESU40 is 4.73 SP4
Asset DEMC3020: Firmware Rev: 2.20.382.113
Asset DEMC3085: Instrument Firmware 2.90 SP1

5 SUPPORT EQUIPMENT

Table 5-1: EUT and Support Equipment

Item #	Type Device	Manufacturer	Model/Part #	Serial #
1	EUT	Sensus	IDTB006	RE: 72495597, CE: 72495598
2	Power Supply	Bk Precision	1694	258F12330

Table 5-2: Cable Description

Cable #	Cable Type	Length	Shield	Termination
A	Power	140cm	No	1 to 2

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

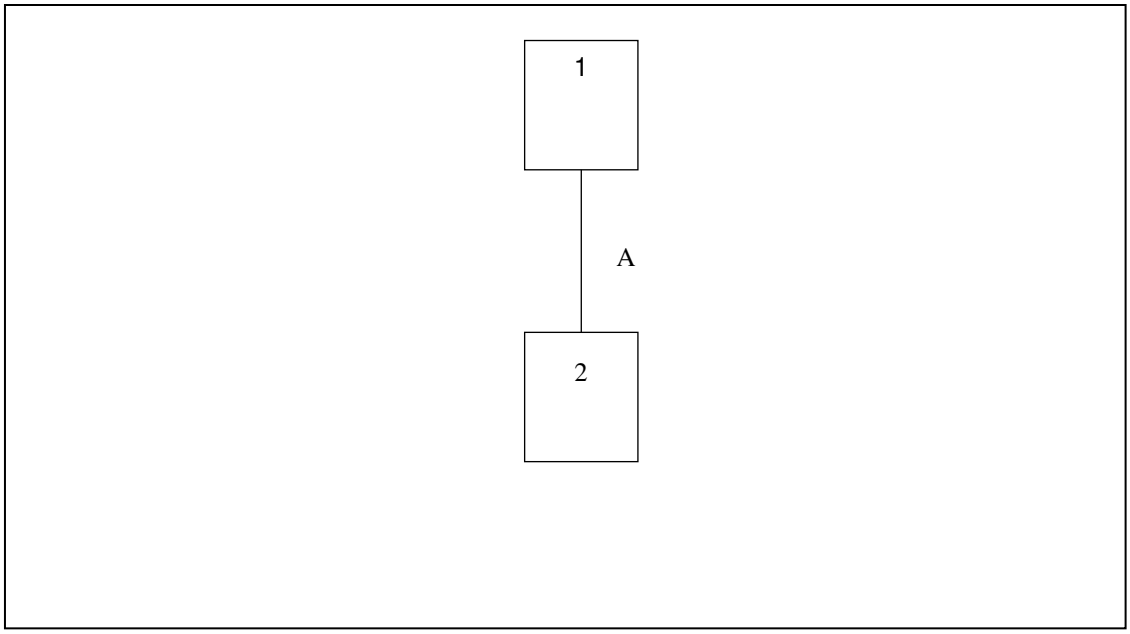

Figure 6-1: EUT Test Setup

7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: 15.203

The antenna is integral to the device and cannot be removed or replaced by the end user. Therefore, the antenna requirements in 15.203 are met.

7.2 Power Line Conducted Emissions – FCC: 15.207; ISED Canada: RSS-Gen 8.8

7.2.1 Measurement Procedure

ANSI C63.10-2013 section 6 was the guiding document for this evaluation. Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss
Margin = Applicable Limit - Corrected Reading

7.2.2 Measurement Results

Performed by: Charlie Callis

Table 7.2.2-1: Conducted EMI Results – Line 1

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.154000	---	6.96	55.76	48.80	5000.0	9.000	L1	OFF	9.6
0.154000	30.59	---	65.76	35.17	5000.0	9.000	L1	OFF	9.6
0.224000	---	2.57	52.45	49.88	5000.0	9.000	L1	OFF	9.6
0.224000	18.01	---	62.49	44.48	5000.0	9.000	L1	OFF	9.6
0.552000	---	0.60	46.00	45.40	5000.0	9.000	L1	OFF	9.7
0.552000	6.52	---	56.00	49.48	5000.0	9.000	L1	OFF	9.7
0.932000	---	-0.93	46.00	46.93	5000.0	9.000	L1	OFF	9.7
0.932000	4.89	---	56.00	51.11	5000.0	9.000	L1	OFF	9.7
17.542000	---	3.94	50.00	46.06	5000.0	9.000	L1	OFF	10.1
17.542000	12.25	---	60.00	47.75	5000.0	9.000	L1	OFF	10.1
19.842000	---	16.49	50.00	33.51	5000.0	9.000	L1	OFF	10.1
19.842000	24.41	---	60.00	35.59	5000.0	9.000	L1	OFF	10.1
20.038000	---	18.39	50.00	31.61	5000.0	9.000	L1	OFF	10.1
20.038000	25.43	---	60.00	34.57	5000.0	9.000	L1	OFF	10.1
20.194000	---	19.38	50.00	30.62	5000.0	9.000	L1	OFF	10.1
20.194000	27.90	---	60.00	32.10	5000.0	9.000	L1	OFF	10.1
20.362000	---	19.70	50.00	30.30	5000.0	9.000	L1	OFF	10.1
20.362000	28.53	---	60.00	31.47	5000.0	9.000	L1	OFF	10.1
20.522000	---	18.83	50.00	31.17	5000.0	9.000	L1	OFF	10.1
20.522000	26.71	---	60.00	33.29	5000.0	9.000	L1	OFF	10.1

Table 7.2.2-2: Conducted EMI Results – N

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.174000	---	5.02	54.66	49.64	5000.0	9.000	N	OFF	9.6
0.174000	26.35	---	64.68	38.33	5000.0	9.000	N	OFF	9.6
0.220000	---	2.64	52.60	49.96	5000.0	9.000	N	OFF	9.6
0.220000	18.27	---	62.64	44.37	5000.0	9.000	N	OFF	9.6
0.548000	---	0.76	46.00	45.24	5000.0	9.000	N	OFF	9.6
0.548000	6.72	---	56.00	49.28	5000.0	9.000	N	OFF	9.6
1.896000	---	-2.38	46.00	48.38	5000.0	9.000	N	OFF	9.7
1.896000	3.36	---	56.00	52.64	5000.0	9.000	N	OFF	9.7
17.518000	---	7.57	50.00	42.43	5000.0	9.000	N	OFF	10.1
17.518000	14.36	---	60.00	45.64	5000.0	9.000	N	OFF	10.1
19.966000	---	23.56	50.00	26.44	5000.0	9.000	N	OFF	10.1
19.966000	32.72	---	60.00	27.28	5000.0	9.000	N	OFF	10.1
20.118000	---	25.58	50.00	24.42	5000.0	9.000	N	OFF	10.1
20.118000	34.53	---	60.00	25.47	5000.0	9.000	N	OFF	10.1
20.290000	36.13	---	60.00	23.87	5000.0	9.000	N	OFF	10.1
20.290000	---	26.97	50.00	23.03	5000.0	9.000	N	OFF	10.1
20.362000	36.40	---	60.00	23.60	5000.0	9.000	N	OFF	10.1
20.362000	---	27.31	50.00	22.69	5000.0	9.000	N	OFF	10.1
20.510000	---	26.44	50.00	23.56	5000.0	9.000	N	OFF	10.1
20.510000	34.27	---	60.00	25.73	5000.0	9.000	N	OFF	10.1

7.3 6dB / 99% Bandwidth – FCC: 15.247(a)(2); ISED Canada: RSS-247 5.2(a)

7.3.1 Measurement Procedure

The 6dB bandwidth was measured in accordance with the FCC KDB 558074 D01 15.247 Meas Guidance v05. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 100 kHz. The Video Bandwidth (VBW) was set to ≥ 3 times the RBW. The trace was set to max hold with a peak detector active. The marker-delta function of the spectrum analyzer was utilized to determine the 6 dB bandwidth of the emission.

The occupied bandwidth measurement function of the spectrum analyzer was used to measure the 99% bandwidth. The span of the analyzer was set to capture all products of the modulation process, including the emission sidebands. The resolution bandwidth was set to 1% to 5% of the occupied bandwidth. The video bandwidth was set to 3 times the resolution bandwidth.

The widest DTS (6dB) bandwidth was determined based on the worse case data rate, which is SF10.

7.3.2 Measurement Results

Performed by: Ben Ford

Table 7.3.2-1: 6dB / 99% Bandwidth

Frequency (MHz)	6dB Bandwidth (kHz)	99% Bandwidth (kHz)
2405	1581.6	2430.2
2440	1596.4	2452.9
2470	1598.9	2474.2
2475	1571.7	2461.2
2480	1581.9	2465.9

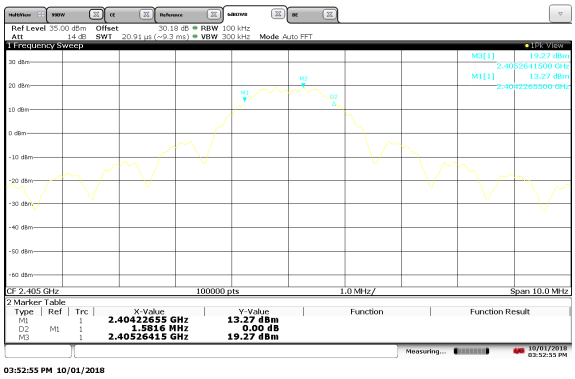

Figure 7.3.2-1: 6dB Bandwidth 2405MHz

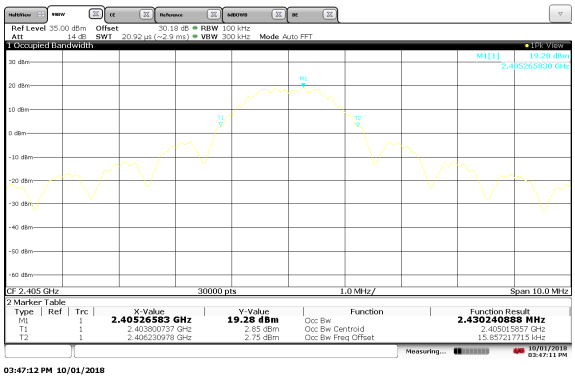

Figure 7.3.2-2: 99% Bandwidth 2405MHz

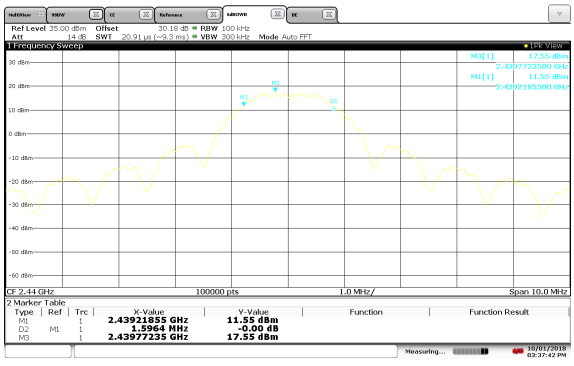

Figure 7.3.2-3: 6dB Bandwidth 2440MHz

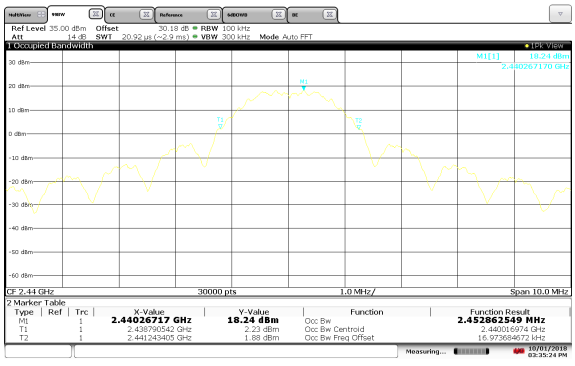

Figure 7.3.2-4: 99% Bandwidth 2440MHz

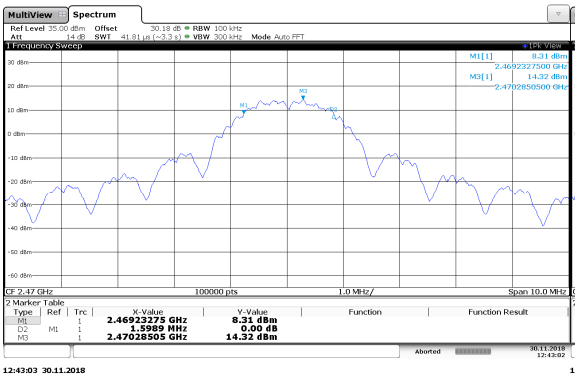

Figure 7.3.2-5: 6dB Bandwidth 2470MHz

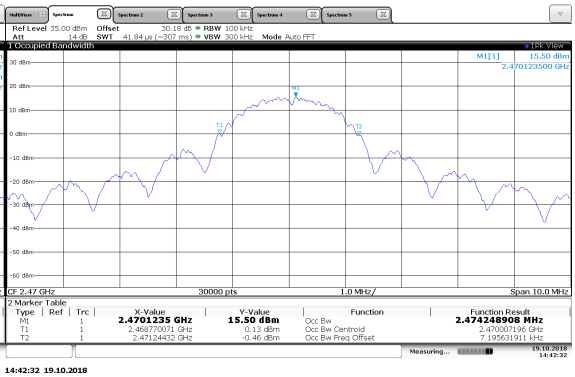

Figure 7.3.2-6: 99% Bandwidth 2470MHz

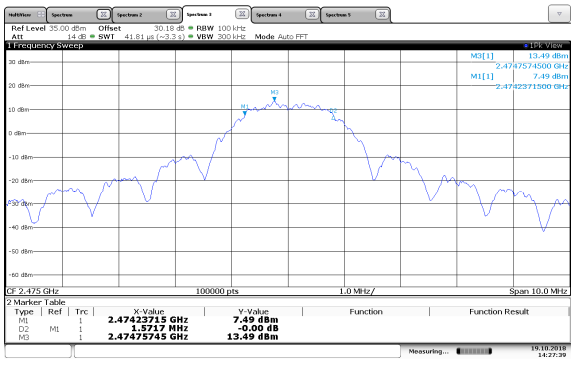

Figure 7.3.2-7: 6dB Bandwidth 2475MHz

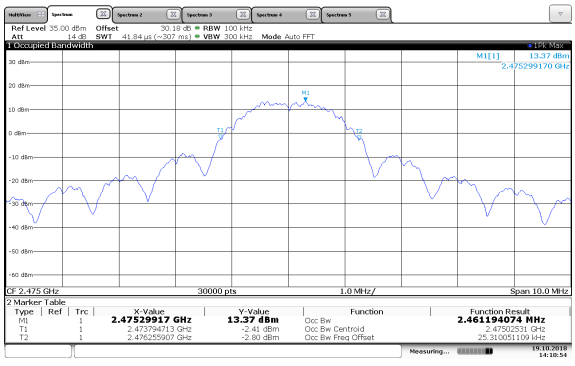

Figure 7.3.2-8: 99% Bandwidth 2475MHz

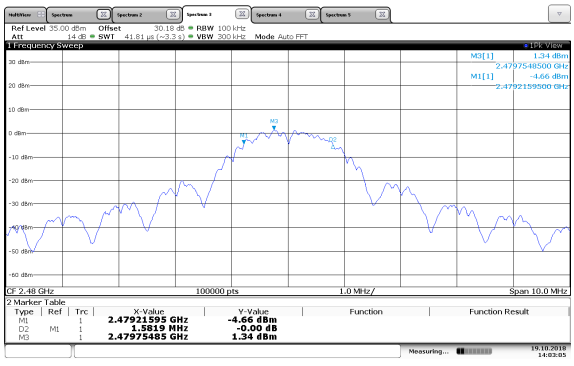

Figure 7.3.2-9: 6dB Bandwidth 2480MHz

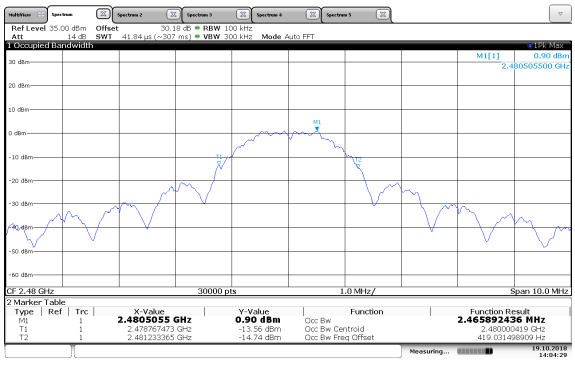

Figure 7.3.2-10: 99% Bandwidth 2480MHz

7.4 Fundamental Emission Output Power – FCC: 15.247(b)(3); ISED Canada: RSS-247 5.4(d)

7.4.1 Maximum peak conducted output power - Measurement Procedure

The maximum peak conducted output power was measured in accordance with FCC KDB 558074 D01 15.247 Meas Guidance v05 utilizing the PKPM1 Peak power meter method. The RF output of the equipment under test was directly connected to the input of the peak power meter applying suitable attenuation.

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7.4.2 Measurement Results

Performed by: Ben Ford

Table 7.4.2-1: Maximum Peak Conducted Output Power

Frequency (MHz)	Output Power (dBm)
2405	23.07
2440	22.20
2470	20.59
2475	18.81
2480	7.00

7.5 Emission Levels – FCC: 15.247(d), 15.205, 15.209; ISED Canada RSS-247 5.5, RSS-Gen 8.9/8.10

7.5.1 Emissions into Non-restricted Frequency Bands

7.5.1.1 Measurement Procedure

The unwanted emissions into non-restricted bands were measured conducted in accordance with FCC KDB 558074 D01 15.247 Meas Guidance v05. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer applying suitable attenuation. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 100 kHz. The Video Bandwidth (VBW) was set to ≥ 300 kHz. Span was set to 1.5 times the DTS bandwidth. The trace was set to max hold with a peak detector active. The resulting spectrum analyzer peak level was used to determine the reference level with respect to the 20 dBc limit. The spectrum span was then adjusted for the measurement of spurious emissions from 30 MHz to 25GHz, 10 times the highest fundamental frequency. Additionally, a prescan was performed from 9 kHz or the lowest frequency generated to 30 MHz.

Band-edge compliance was determined using the conducted marker-delta method in which the radio frequency power that is produced by the EUT is at least 20 dBc below that in the 100 kHz bandwidth within the band that contains the highest level of desired power.

7.5.1.2 Measurement Results

Performed by: Ben Ford

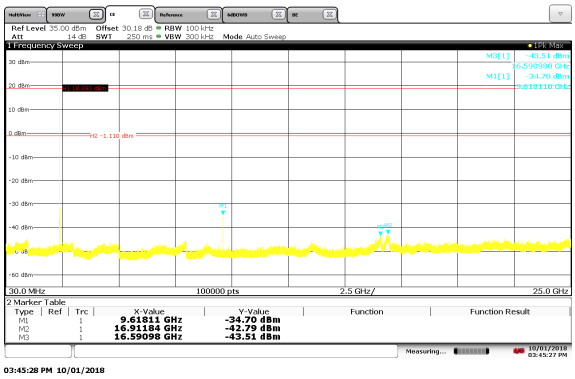

Figure 7.5.1.2-1: 30 MHz – 25 GHz – 2405MHz

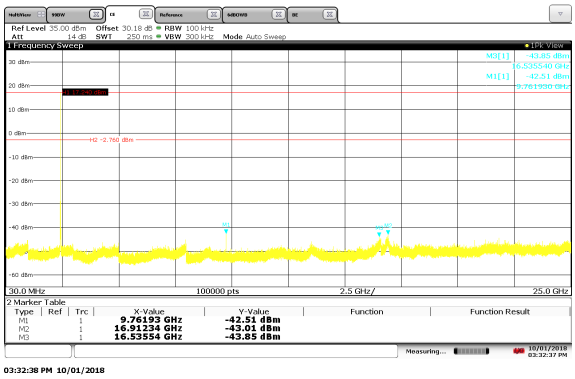

Figure 7.5.1.2-2: 30 MHz – 25 GHz – 2440MHz

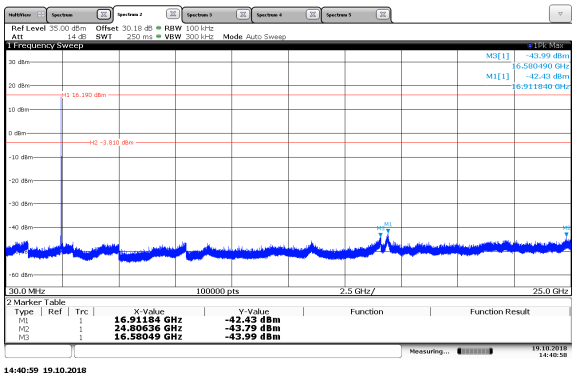

Figure 7.5.1.2-3: 30 MHz – 25 GHz – 2470MHz

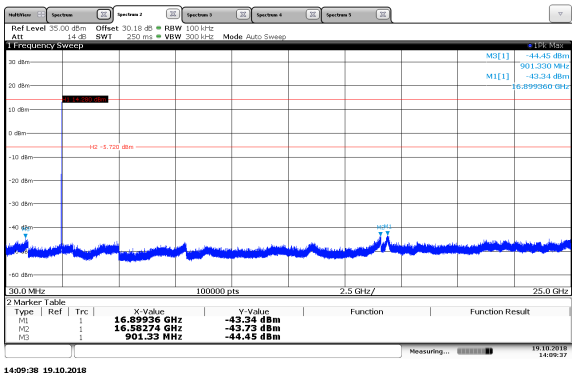

Figure 7.5.1.2-4: 30 MHz – 25 GHz – 2475MHz

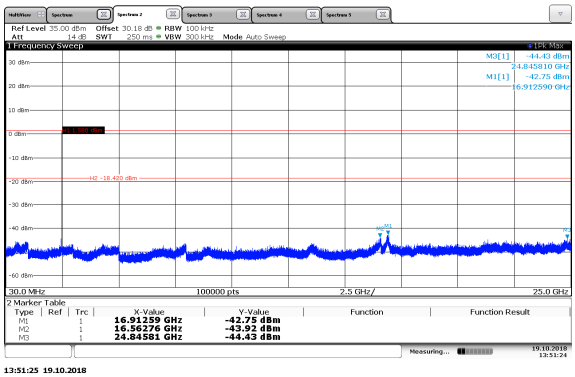

Figure 7.5.1.2-5: 30 MHz – 25 GHz – 2480MHz

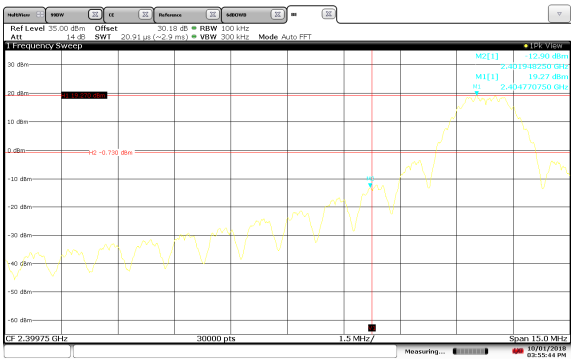

Figure 7.5.1.2-6: Lower Band-edge – 2405MHz

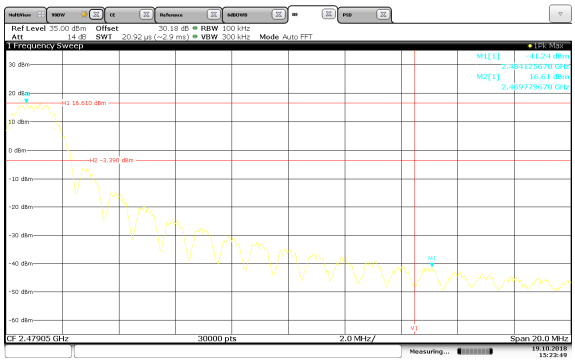

Figure 7.5.1.2-7: Upper Band-edge – 2470MHz

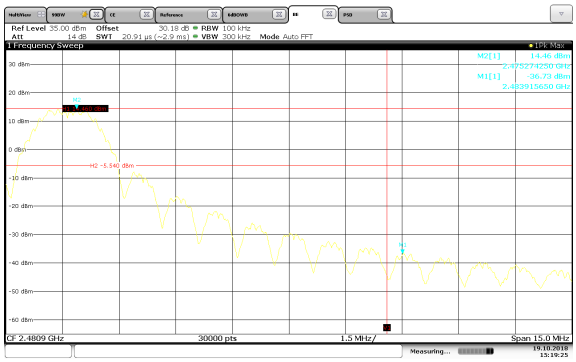

Figure 7.5.1.2-8: Upper Band-edge – 2475MHz

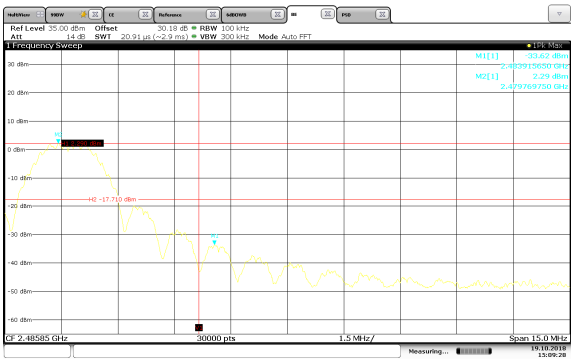

Figure 7.5.1.2-9: Upper Band-edge – 2480MHz

7.6 Emissions into Restricted Frequency Bands

7.6.1.1 Measurement Procedure

The unwanted emissions into restricted bands were measured radiated over the frequency range of 30MHz to 25GHz, 10 times the highest fundamental frequency.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a RBW of 120 kHz and a VBW of 300 kHz. For frequencies above 1000MHz, peak and average measurements were made with RBW and VBW of 1 MHz and 3 MHz respectively.

Each emission found to be in a restricted band as defined by section 15.205, including any emission at the operational band-edge, was compared to the radiated emission limits as defined in section 15.209.

7.6.1.2 Duty Cycle Correction

For average radiated measurements, using a 66% duty cycle, the measured level was reduced by a factor 3.61 dB. The duty cycle correction factor is determined using the formula: 20log (66/100) = - 3.61 dB.

A detailed analysis of the duty cycle timing is provided in the Theory of Operation accompanying the application for certification.

7.6.1.3 Measurement Results

Performed by: Charlie Callis

Table 7.6.1.3-1: Radiated Spurious Emissions Tabulated Data

Frequency (MHz)	Level (dBuV)		Antenna Polarity	Correction Factors	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Avg	(H/V)	(dB)	pk	Avg	pk	Avg	pk	Avg
2405 MHz										
2389.1	59.90	47.20	H	-3.88	56.02	39.71	74.00	54.00	17.98	14.29
2388.6	61.00	47.80	V	-3.88	57.12	40.31	74.00	54.00	16.88	13.69
4810.0	51.70	44.50	H	-2.47	54.17	43.36	74.00	54.00	19.83	10.64
4810.0	50.70	43.30	V	-2.47	53.17	42.16	74.00	54.00	20.83	11.84
12025.0	43.40	33.70	H	12.18	55.58	42.27	74.00	54.00	18.42	11.73
12025.0	43.10	32.90	V	12.18	55.28	41.47	74.00	54.00	18.72	12.53
2440 MHz										
4880.0	48.00	40.20	H	2.43	50.43	39.02	74.00	54.00	23.57	14.98
4880.0	46.10	37.50	V	2.43	48.53	36.32	74.00	54.00	25.47	17.68
7320.0	45.50	36.60	H	7.20	52.70	40.20	74.00	54.00	21.30	13.80
7320.0	45.80	36.90	V	7.20	53.00	40.50	74.00	54.00	21.00	13.50
12200.0	43.50	33.20	H	11.89	55.39	41.48	74.00	54.00	18.62	12.52
12200.0	42.50	32.30	V	11.89	54.39	40.58	74.00	54.00	19.62	13.42
2470 MHz										
2483.8	61.30	47.50	H	-3.66	57.64	40.23	74.00	54.00	16.36	13.77
2485.3	59.40	45.90	V	-3.65	55.75	38.64	74.00	54.00	18.25	15.36
4940.0	40.50	28.30	H	2.40	42.90	27.09	74.00	54.00	31.10	26.91
4940.0	38.60	26.20	V	2.40	41.00	24.99	74.00	54.00	33.00	29.01
7410.0	46.40	37.50	H	7.42	53.82	41.31	74.00	54.00	20.18	12.69
7410.0	44.50	34.90	V	7.42	51.92	38.71	74.00	54.00	22.08	15.29
2475 MHz										
2483.8	62.50	50.70	H	-3.66	58.84	43.43	74.00	54.00	15.16	10.57
2483.6	62.50	49.50	V	-3.66	58.84	42.23	74.00	54.00	15.16	11.77
4950.0	38.50	24.60	H	2.39	40.89	23.38	74.00	54.00	33.11	30.62
4950.0	38.00	24.50	V	2.39	40.39	23.28	74.00	54.00	33.61	30.72
7425.0	41.20	29.50	H	7.46	48.66	33.35	74.00	54.00	25.34	20.65
7425.0	38.90	26.70	V	7.46	46.36	30.55	74.00	54.00	27.64	23.45
2480 MHz										
2483.5	67.00	56.10	H	-3.66	63.34	48.83	74.00	54.00	10.66	5.17
2483.5	65.90	54.80	V	-3.66	62.24	47.53	74.00	54.00	11.76	6.47
4960.0	38.70	24.60	H	2.39	41.09	23.38	74.00	54.00	32.91	30.62
4960.0	39.00	24.60	V	2.39	41.39	23.38	74.00	54.00	32.61	30.62

Note: Duty Cycle correction factor used: 66%

7.6.1.4 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: Peak

Corrected Level: 67 - 3.66 = 63.34 dBuV/m
Margin: 74dBuV/m – 63.34dBuV/m = 10.66dB

Example Calculation: Average

Corrected Level: 56.1 - 3.66 -3.61= 48.83dBuV
Margin: 54dBuV – 48.83dBuV = 5.17dB

7.7 Power Spectral Density – FCC: 15.247(e); ISED Canada: RSS-247 5.2(b)

7.7.1 Measurement Procedure

The power spectral density was measured in accordance with the FCC KDB 558074 D01 15.247 Meas Guidance v05 utilizing the PKPSD (peak PSD) method. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer applying suitable attenuation. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 3 kHz. The Video Bandwidth (VBW) was set to 10 kHz. Span was set to 1.5 times the DTS bandwidth. The trace was set to max hold with a peak detector active.

7.7.2 Measurement Results

Performed by: Randle Sherian

Table 7.7.2-1: Peak Power Spectral Density

Frequency (MHz)	PSD Level (dBm)
2405	7.70
2440	6.44
2470	5.35
2475	2.63
2480	-9.01

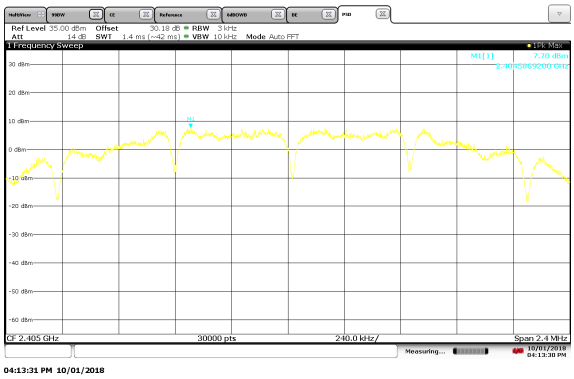

Figure 7.7.2-1: PSD Plot –2405MHz

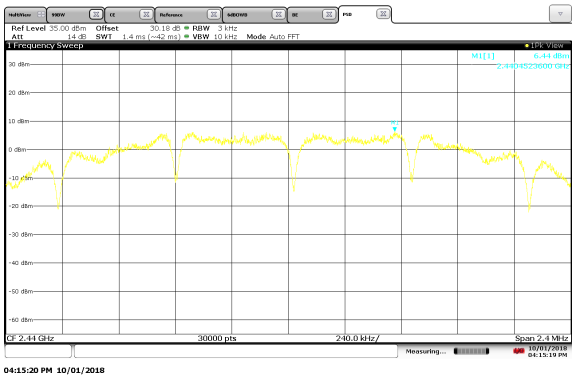

Figure 7.7.2-2: PSD Plot – 2440MHz

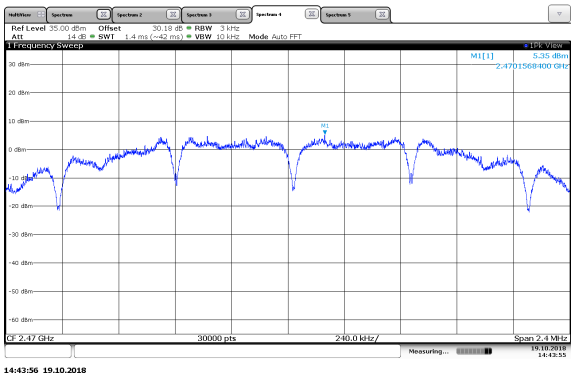

Figure 7.7.2-3: PSD Plot –2470MHz

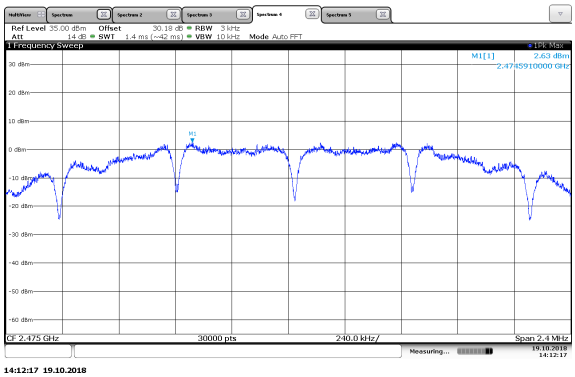

Figure 7.7.2-4: PSD Plot – 2475MHz

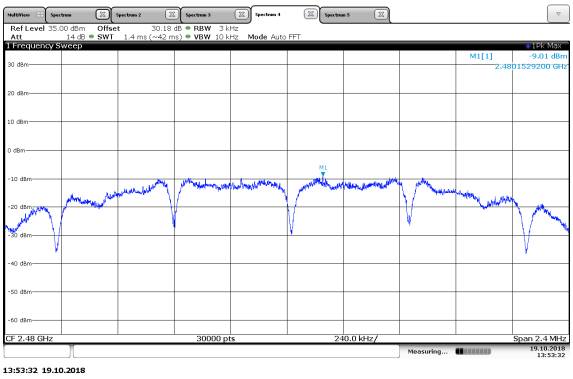

Figure 7.7.2-5: PSD Plot – 2480MHz

8 MEASUREMENT UNCERTAINTY

The expanded laboratory measurement uncertainty figures (U_{Lab}) provided below correspond to an expansion factor (coverage factor) k = 1.96 which provide confidence levels of 95%.

Parameter	U_{lab}
Occupied Channel Bandwidth	± 0.004%
RF Conducted Output Power	± 0.689 dB
Power Spectral Density	±0.5 dB
Antenna Port Conducted Emissions	± 2.717 dB
Radiated Emissions	± 5.877 dB
Temperature	± 0.860 °C
Radio Frequency	±2.832 x 10-8
AC Power Line Conducted Emissions	±2.85

9 CONCLUSION

In the opinion of TÜV SÜD America Inc. the IDTB006, manufactured by Sensus Metering Systems, Inc. meets the requirements of FCC Part 15 subpart C and ISED Canada Radio Standards Specification: RSS-247 for the tests documented herein.

END REPORT