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ETC Report #: I28e25a298_FCC Release2

Report date: March 26, 2026

**EMC testing of the Lightwave Technology SecureKey Fob in accordance with
FCC Part 15 Subpart C (15.247(d), 15.209, 15.205)**

ANSI C63.10: 2013 /2020

ANSI C63.4: 2014

FCC ID: 2ABSL-PK626FOB

Test Dates: October 20 to 28, 2025

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Prepared for: Lightwave Technology

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REVISION RECORD

ISSUE	DATE	AUTHOR	REVISIONS
DRAFT 1	2025-10-29	I. Akram	Initial draft submitted for review.
DRAFT 2	2026-01-21	I. Akram	Updated EUT name and FCC ID
Release 1	2026-01-30	I. Akram	Sign Off
Release 2	2026-03-26	I. Akram	Added test lab's registration number and the MRA designation number on page 47.

TABLE OF CONTENTS

1.0	INTRODUCTION	5
1.1	Scope.....	5
1.2	Applicant.....	5
1.3	Test Sample Description	5
1.4	General Test Conditions	5
1.5	Reference Standards	6
1.6	Test Methodology	6
1.6.1	Variations in Test Methodology	6
1.6.2	Test Sample Verification, Configuration & Modifications.....	6
1.6.3	Uncertainty of Measurement:	6
2.0	TEST CONCLUSION	7
2.1	AC Main Power Line Conducted Emissions: N/A	8
2.3	6dB Bandwidth.....	9
2.3.1	Test Guidance: ANSI C63.10-2013/2020, Clause 11.8 / FCC OET KDB 558074.....	9
2.3.2	Deviations From The Standard:	9
2.3.3	Test Equipment	10
2.3.4	Test Sample Verification, Configuration & Modifications.....	10
2.3.5	Channel Bandwidth Data Antenna.....	10
2.4	Max Average Output Power	12
2.4.1	Test Guidance: ANSI C63.10-2013/2020, Clause 11.9.2.2.2/ FCC OET KDB 558074	12
2.4.2	Deviations From The Standard:	12
2.4.3	Test Equipment	13
2.4.4	Test Sample Verification, Configuration & Modifications.....	13
2.4.5	Max Average Output Power Data:	13
2.5	Band Edge Attenuation	16
2.5.1	Test Guidance: ANSI C63.10-2013/2020 Clause 11.11.3 & 6.10.4, 6.10.6 / FCC OET KDB 558074	16
2.5.2	Deviations From The Standard:	16
2.5.3	Test Equipment	17
2.5.4	Test Sample Verification, Configuration & Modifications.....	17
2.5.5	Band Edge Data	17
2.6	Power Spectral Density.....	19
2.6.1	Test Guidance: ANSI C63.10-2013, Clause 11.10.3 / FCC OET KDB 558074.....	19
2.6.2	Deviations From The Standard:	19
2.6.3	Test Equipment	20
2.6.4	Test Sample Verification, Configuration & Modifications.....	20
2.6.5	Average PSD Data	20

2.7	Conducted Spurious Emissions (Non-Restricted Band)	22
2.7.1	Test Guidance: ANSI C63.10-2013/2020, Clause 6.7.....	22
2.7.2	Deviations From The Standard:.....	22
2.7.3	Test Equipment	22
2.7.4	Test Sample Verification, Configuration & Modifications.....	22
2.7.5	Conducted Emissions Data:	23
2.8	EUT Positioning Assessment.....	26
2.9	Radiated Spurious Emissions (within restricted band).....	27
2.9.1	Test Guidance: ANSI C63.10-2013, Clause 13.4.2	28
2.9.2	Deviations From The Standard:.....	28
2.9.3	Test Equipment	28
2.9.4	Test Sample Verification, Configuration & Modifications.....	28
2.9.5	Radiated Emissions Data:	30
2.10	Radiated Emissions (RX Mode)	40
2.10.1	Test Guidance:	40
2.10.2	Deviations From The Standard:	40
2.10.3	Test Equipment	41
2.10.4	Test Sample Verification, Configuration & Modifications.....	41
2.10.5	Radiated Emissions Data:	43
2.11	RF Exposure	46
3.0	TEST FACILITY	47
3.1	Location	47
3.2	Grounding Plan	47
3.3	Power Supply	47
Appendix A – Test Setup Block Diagram		48

1.0 INTRODUCTION

1.1 Scope

The purpose of this report is to present the results of compliance testing performed in accordance with FCC Part 15.247 and ANSI C63.10:2013/2020 to gain FCC new Authorization for Low-Power License-Exempt transmitters.

All test procedures, limits, criteria, and results described in this report apply only to the Lightwave Technology SecureKey Fob test sample, referred to herein as the EUT (Equipment Under Test).

The samples have been provided by the customer and in a good condition.

This report does not imply product endorsement by the Electronics Test Centre, A2LA, nor any Canadian Government agency.

1.2 Applicant

This test report has been prepared for Lightwave Technology, located in Saint-Laurent, QC, Canada.

1.3 Test Sample Description

As provided to ETC (Airdrie) by Lightwave Technology:

Product Name:		SecureKey Fob
Radio		BT
Frequency Band		2400 – 2483.5 MHz
Frequency Range		2402– 2480 MHz
Operating Mode		BLE
Max Transmit Power (Conducted)		-1.48 dBm (0.000711 W)
BLE	Associated internal Antennas (Max. Peak Gain)	2.4GHz Mini Antenna, SMT, P/N: 2450AT18B100, Peak Gain (dBi typ.): 0.5dB
	Detachable/Non Detachable	Non Detachable
Model#		PK626FOB
Serial#		001
Power supply:		VDC (Internal Battery)
Note: The LOW, MID and HIGH channels are analyzed at each axis to select the worse axis for emission. Each channel spurious is performed on the selected worse channel.		

1.4 General Test Conditions

The EUT was set up and exercised using the configurations, modes of operation and arrangements defined in this report only. All inputs and outputs to and from other equipment associated with the EUT were adequately simulated. In order to meet the operational requirements during testing as per KDB 558074 D01 15.247 Meas Guidance v05r02 and ANSI C63.10 the device was programmed with a special firmware to transmit at duty cycle $\geq 98\%$. Special firmware is strictly for testing purpose only and not available to end user. The environmental conditions are recorded during each test, and are reported in the relevant sections of this document. For radio parameter analysis, an SMA connector is soldered at the output of the radio to connect the S/A directly.

1.5 Reference Standards

Standards	Description
FCC, title 47 CFR § 15.247	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
FCC, title 47 CFR § 15.207	Conducted limits for an intentional radiator that is designed to be connected to the public utility (AC) power line.
FCC, title 47 CFR § 15.107	Conducted limits for equipment that is designed to be connected to the public utility (AC) power line.
FCC, title 47 CFR § 15.209	Radiated emission limits; general requirements
FCC, title 47 CFR § 15.109	Radiated emission limits; from unintentional radiators digital devices.
ANSI C63.10:2013/2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
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 9 KHz to 40 GHz
558074 D01 15.247 Meas Guidance v05r02	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	Emissions Testing of Transmitters with Multiple Outputs in the Same Band

1.6 Test Methodology

Test methods are specified in the Basic Standard as referenced and/or modified by the Product Standard in the part of Section 2 of this report associated with each particular test case. EUT is tested in RX mode to cover FCC Part 15 Sub Part B (Digital Circuitry) and the result is included in this test report.

1.6.1 Variations in Test Methodology

Any variance in methodology or deviation from the reference Standard is documented in the part of Section 2 of this report associated with each particular Test Case.

1.6.2 Test Sample Verification, Configuration & Modifications

EUT setup, configuration, protocols for operation and monitoring of EUT functions, and any modifications performed in order to meet the requirements, are detailed in each Test Case of Section 2 of this report.

1.6.3 Uncertainty of Measurement:

The factors contributing to measurement uncertainty are identified and calculated in accordance with CISPR 16-4-2: 2011.

This uncertainty estimate represents an expended uncertainty expressed at approximately 95% confidence using a coverage factor of $k = 2$.

Test Method	Uncertainty
Radiated Emissions Level (9 KHz – 1 GHz)	±5.8 dB
Radiated Emissions Level (1 GHz – 18 GHz)	±4.9 dB
Radiated Emissions Level (18 GHz – 26.5 GHz)	±5.0 dB
Uncertainty Conducted Power level	±0.5 dB
Uncertainty Conducted Spurious emission level	±0.6 dB
Uncertainty for Bandwidth test	±1.5 %

2.0 TEST CONCLUSION

STATEMENT OF COMPLIANCE

The customer equipment referred to in this report was found to comply with the requirements, as summarized below.

The EUT was subjected to the following tests. Compliance status is reported as **Compliant** or **Non-compliant**. **N/A** indicates the test was Not Applicable to the EUT.

The measurement uncertainty is not accounted for determination of the statement of compliance. The statement of compliance is based only on the measurement value recorded.

Equipment under test (EUT) is provided by the customer and in a good condition.

Note: Maintenance of compliance is the responsibility of the Manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the EUT with respect to the standards detailed in this test report.

The following table summarizes the tests performed in terms of the specification, class or performance criterion applied, and the EUT modification state.

Test Case	Test Type	Specification	Test Sample	Modifications	Config.	Result
2.1	AC Main Conducted Emissions	15.207 / 15.109	SecureKey Fob	none	see § 2.1	N/A
2.2	6dB Bandwidth	15.247(a)	SecureKey Fob	none	see § 2.2	Compliant
2.3	Max Output Power	15.247(d)	SecureKey Fob	none	see § 2.3	Compliant
2.4	Band Edge	15.247(d)	SecureKey Fob	none	see § 2.4	Compliant
2.5	Power Spectral Density	15.247(e)	SecureKey Fob	none	see § 2.5	Compliant
2.6	Conducted Spurious Emissions (Non-Restricted Band)	15.247(d)	SecureKey Fob	none	see § 2.6	Compliant
2.7	EUT Position	ANSI C63.4	SecureKey Fob	none	see § 2.7	Assed
2.8	Radiated Spurious Emission (Restricted Band)	15.205, 15.209 15.247(d)	SecureKey Fob	none	see § 2.8	Compliant
2.9	Radiated Emission	15.109	SecureKey Fob	none	see § 2.9	Compliant
2.10	RF Exposure	15.247(i)	SecureKey Fob	none	see § 2.10	Exempt

Refer to the test data for applicable test conditions.

2.1 AC Main Power Line Conducted Emissions: N/A

Test Lab: Electronics Test Centre, Airdrie	EUT: SecureKey Fob Standard: FCC Part 15.207, FCC Part 15.107 Basic Standard: ANSI C63.10 Basic Standard: ANSI C63.4
EUT status: N/A	
Comments: EUT is internal battery powered. No Direct/indirect connection to AC main.	

2.3 6dB Bandwidth

Test Lab: Electronics Test Centre, Airdrie	EUT: SecureKey Fob
Test Personnel: Imran Akram	Standard: FCC PART 15.247
Date: 2025-10-20 (24.2°C, 15.0% RH)	Basic Standard: ANSI C63.10 FCC OET KDB 558074
EUT status: Compliant	

Specification: FCC Part 15.247 (a, 2), FCC 15.215 (c)

Criteria: Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

2.3.1 Test Guidance: ANSI C63.10, Clause 11.8 / FCC OET KDB 558074

This measurement is performed at low, mid and high frequencies, with modulation.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

11.8.1 Option 1 (For DTS)	
The steps for the first option are as follows:	
Span	$\geq (2 * OBW), \leq (5 * OBW)$
Set RBW	Shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
Set the VBW	$\geq [3 \times RBW]$.
Detector	peak
Trace mode	max-hold
Sweep	No faster than coupled (auto) time.
Trace	Allow the trace to stabilize.
Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-6 dB down amplitude”. If a marker is below this “-6 dB down amplitude” value, then it shall be as close as possible to this value.	

2.3.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.3.3 Test Equipment

Testing was performed with the following equipment:

Equipment	Manufacturer	Model #	Asset #	Cal. Date	Cal. Due
Signal Analyzer	R&S	FSV	6996	2025/02/19	2026/02/19
Temp/Humidity	Extech	42270	5871	2025-05-01	2026-05-01
Attenuator (DC to 26 GHz)	Mini-Circuits	BW-S10-2W263+	6933	2025-10-14	2027-10-14
Coaxial Cables (RF)	W.L. GORE	PGR01R01036	7024	2025-01-09	2026-01-09
DC Blocker (9 KHz - 27 GHz)	Centric RF	C0927 SMA	6987	2025-01-19	2026-01-19

2.3.4 Test Sample Verification, Configuration & Modifications

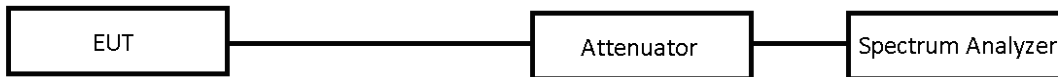
The EUT was set to transmit continuously on a selected channel with test-specific software.

The output was modulated as in normal operation.

The EUT met the requirements without modification.

Test setup diagrams for Occupied Bandwidth testing:

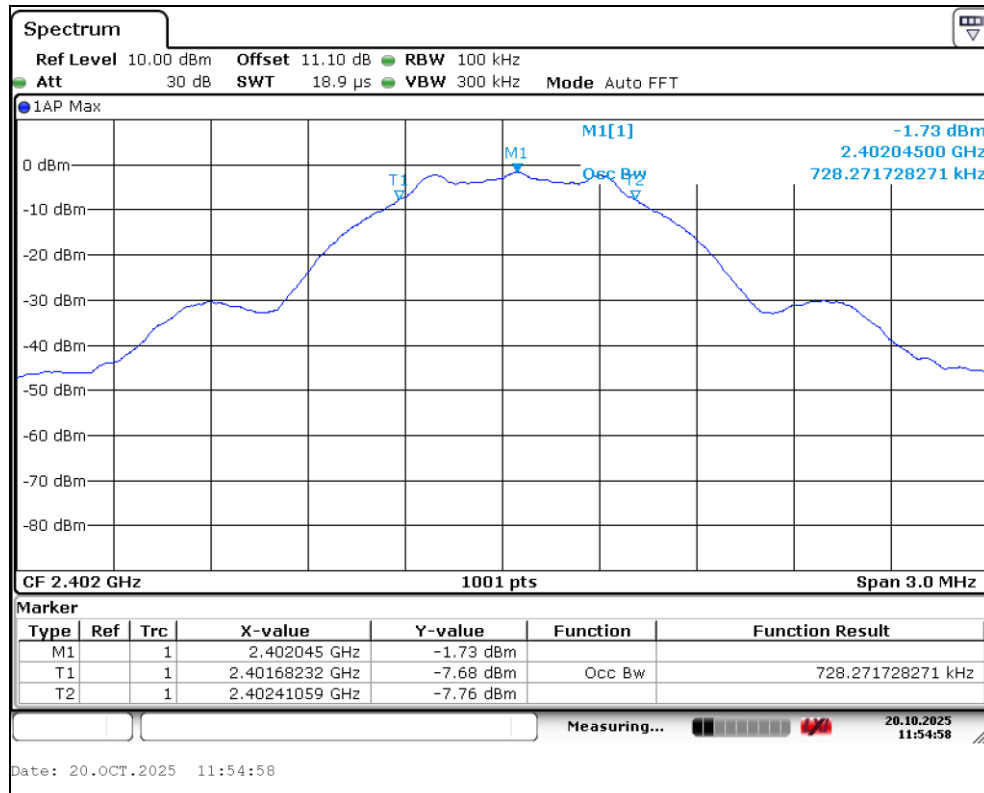
Conducted:



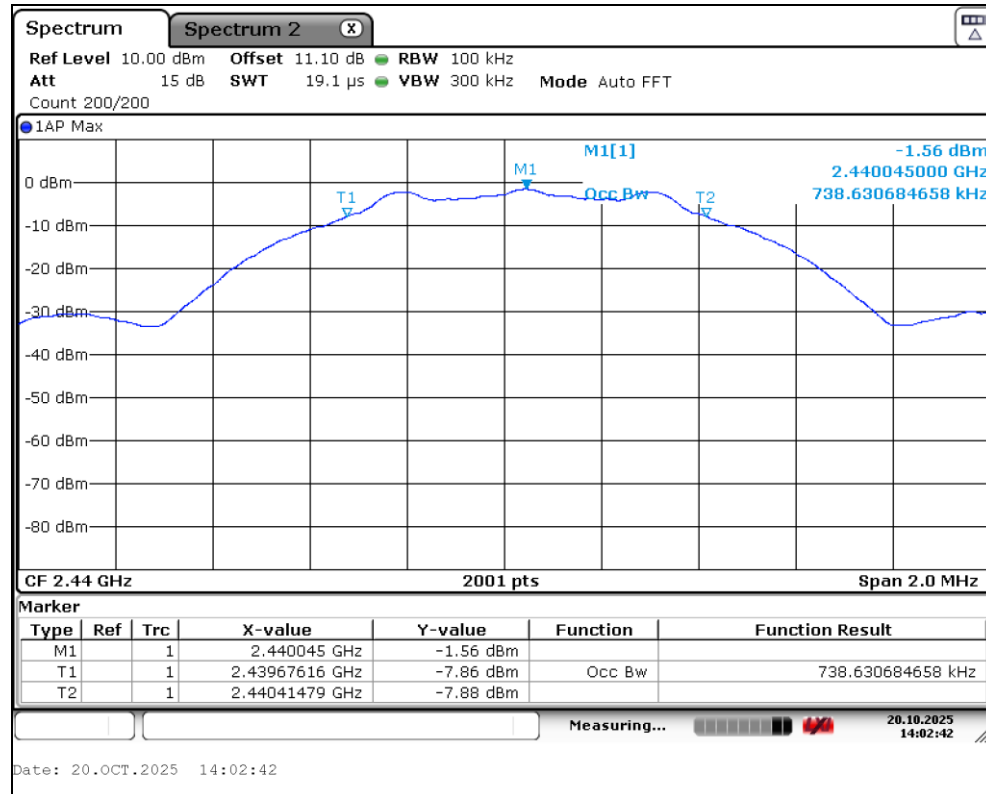
2.3.5 Channel Bandwidth Data Antenna

Mode of operation	Channel	Freq. [MHz]	6 dB BW [KHz]	Limit BW [KHz]
BLE	Low	2402	728.27	≥ 500
	Mid	2440	738.63	
	High	2480	731.63	

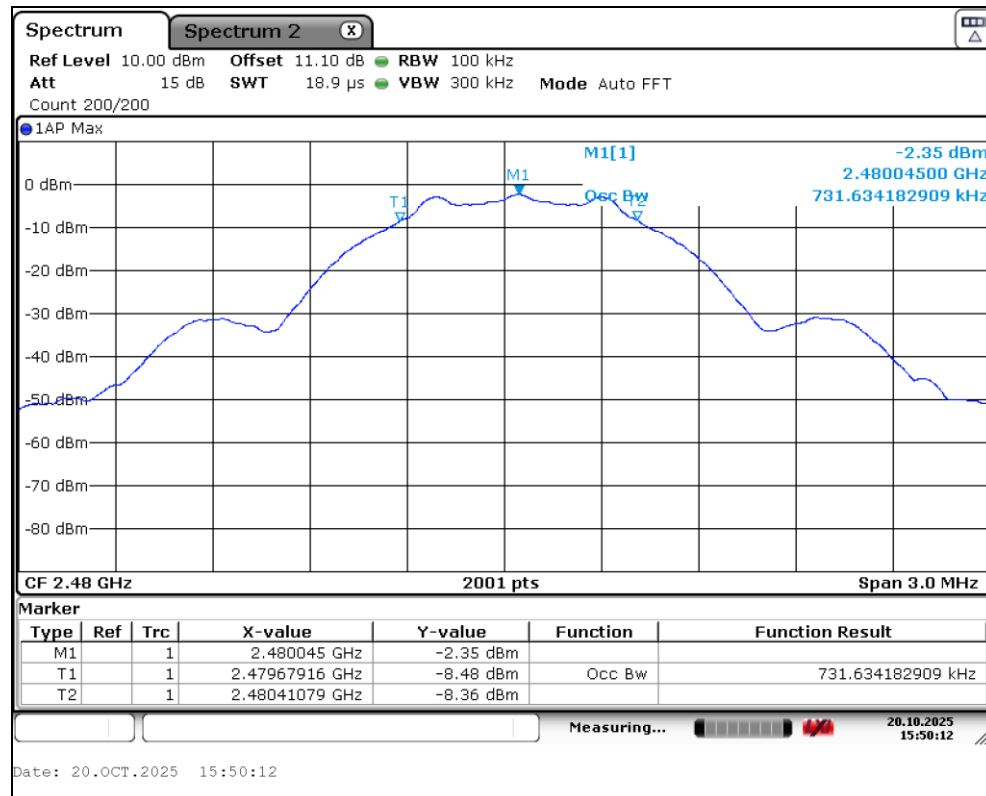
Low Channel



MID Channel



High Channel



2.4 Max Average Output Power

Test Lab: Electronics Test Centre, Airdrie	EUT: SecureKey Fob
Test Personnel: Imran Akram	Standard: FCC PART 15.247
Date: 2025-10-20 (24.2°C, 15.0% RH)	Basic Standard: ANSI C63.10 FCC OET KDB 558074
EUT status: Compliant	

Specification: FCC Part 15.247(b, 3)

Criteria (3) For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

2.4.1 Test Guidance: ANSI C63.10, Clause 11.9.2.2.2/ FCC OET KDB 558074

This measurement is performed at low, mid and high frequencies, with modulation.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections. The EUT transmits continuously (with a D $\geq$ 98%)

Output Power Method AVGSA-1 For DTS	
Measure the duty cycle D of the transmitter output signal	
Span	≥ 1.5 times the OBW
RBW	1 – 5 % of the OBW, ≤ 1 MHz
VBW	$\geq 3 \times$ RBW
Number of Points in sweep	$\geq 2 \times$ Span / RBW
Sweep time	Auto
Detector	RMS (Power Averaging)
Sweep trigger	Free Run (Duty Cycle $\geq$ 98%)
Trace Average	At least 100 traces in power Averaging (RMS)
Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band-edges. If the instrument does not have a band-power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.	

2.4.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.4.3 Test Equipment

Testing was performed with the following equipment:

Equipment	Manufacturer	Model #	Asset #	Cal. Date	Cal. Due
Signal Analyzer	R&S	FSV13 (Firmware:3.70)	6996	2025/02/19	2026/02/19
Temp/Humidity	Extech	42270	5871	2025-05-01	2026-05-01
Attenuator (DC to 26 GHz)	Mini-Circuits	BW-S10-2W263+	6933	2025-10-14	2027-10-14
Coaxial Cables (RF)	W.L. GORE	PGR01R01036	7024	2025-01-09	2026-01-09
DC Blocker (9 KHz - 27 GHz)	Centric RF	C0927 SMA	6987	2025-01-19	2026-01-19

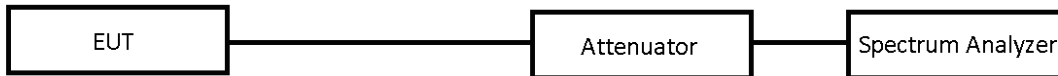
2.4.4 Test Sample Verification, Configuration & Modifications

The EUT was set to a selected channel with test-specific software. The output was modulated as in normal operation.

The EUT met the requirements without modification.

Test setup diagrams for Power testing:

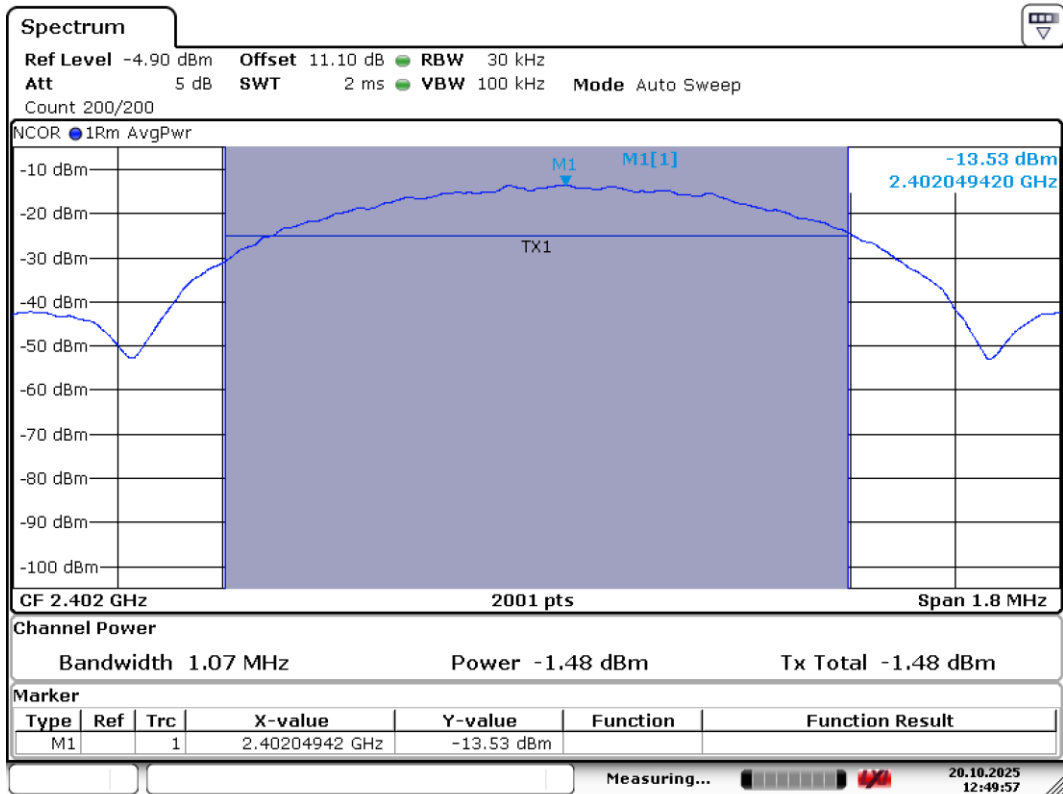
Conducted:



2.4.5 Max Average Output Power Data:

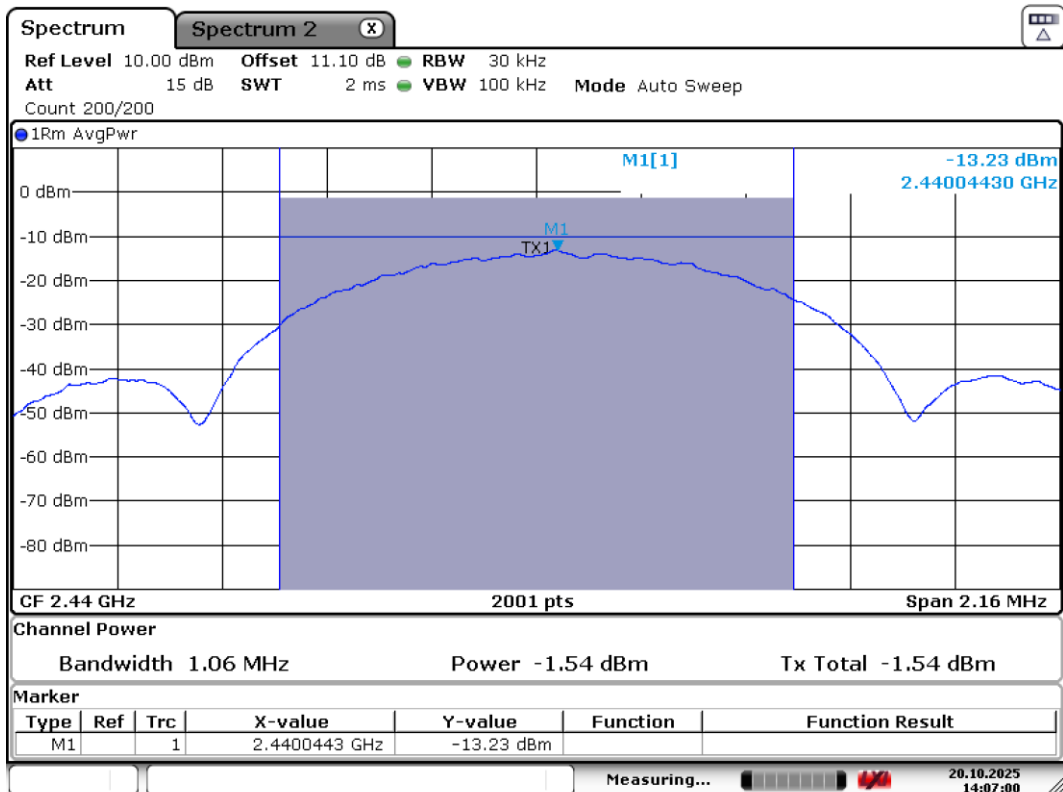
Mode of operation	Channel	Freq. [MHz]	Measured Average Power [dBm]	Limit Power [dBm]
BLE	Low	2402	-1.48	≤ 30 (1Watt)
	Mid	2440	-1.54	
	High	2480	-2.29	

Low Channel



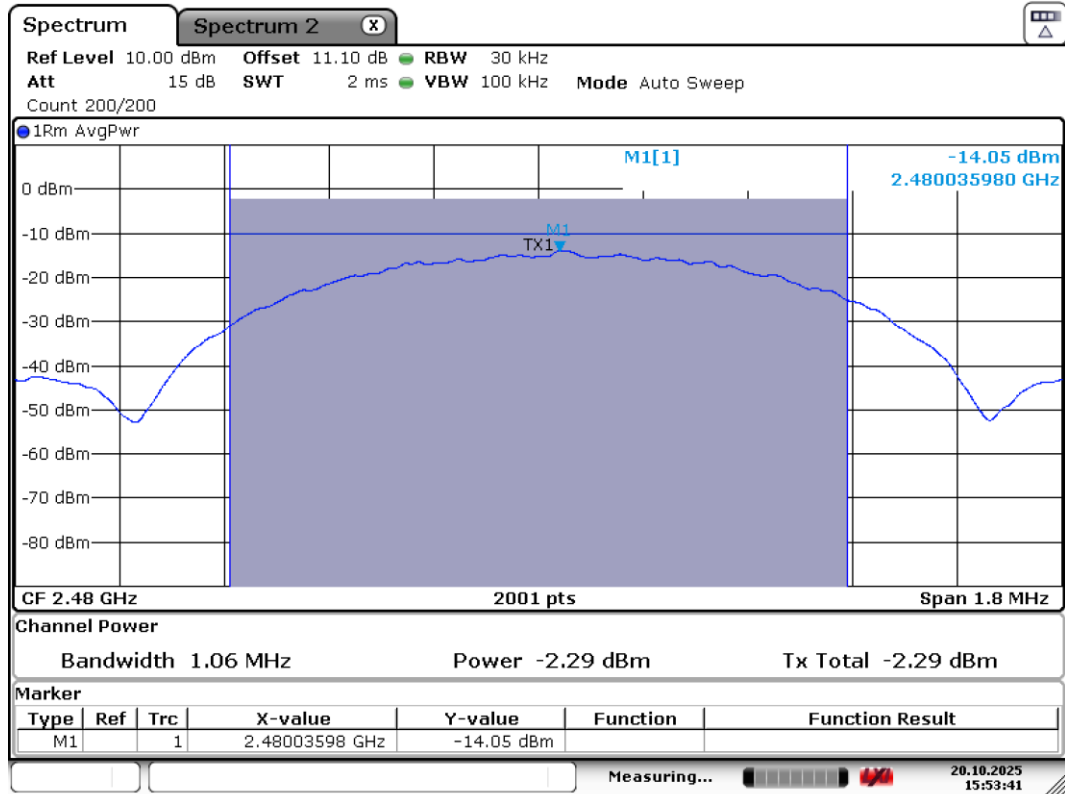
Date: 20.OCT.2025 12:49:57

MID Channel



Date: 20.OCT.2025 14:07:00

High Channel



Date: 20.OCT.2025 15:53:41

2.5 Band Edge Attenuation

Test Lab: Electronics Test Centre, Airdrie

EUT: SecureKey Fob

Test Personnel: Imran Akram

Standard: FCC PART 15.247

Date: 2025-10-20 (24.2°C, 15.0% RH)

Basic Standard: ANSI C63.10
FCC OET KDB 558074

EUT status: Compliant

Specification: FCC Part 15.247(d)

Criteria: 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)).

2.5.1 Test Guidance: ANSI C63.10 Clause 11.11.3 & 6.10.4, 6.10.6 / FCC OET KDB 558074

This measurement is performed at the low and high frequencies, with modulation.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

The spectrum analyzer is set for a frequency span to show the band edge and the nearest channel. The RBW is set to ≥ 100 kHz. The VBW is set to $\geq (\text{RBW} * 3)$. The Peak detector is used, with the trace set to Max Hold.

The attenuation is measured with the Marker Delta function.

2.5.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.5.3 Test Equipment

Testing was performed with the following equipment:

Equipment	Manufacturer	Model #	Asset #	Cal. Date	Cal. Due
Signal Analyzer	R&S	FSV	6996	2025/02/19	2026/02/19
Temp/Humidity	Extech	42270	5871	2025-05-01	2026-05-01
Attenuator (DC to 26 GHz)	Mini-Circuits	BW-S10-2W263+	6933	2025-10-14	2027-10-14
Coaxial Cables (RF)	W.L. GORE	PGR01R01036	7024	2025-01-09	2026-01-09
DC Blocker (9 KHz - 27 GHz)	Centric RF	C0927 SMA	6987	2025-01-19	2026-01-19

2.5.4 Test Sample Verification, Configuration & Modifications

The EUT was set to transmit continuously on a selected channel with test-specific software. The output was modulated as in normal operation.

The EUT met the requirements without modification.

Test setup diagrams for Band Edge Attenuation testing:

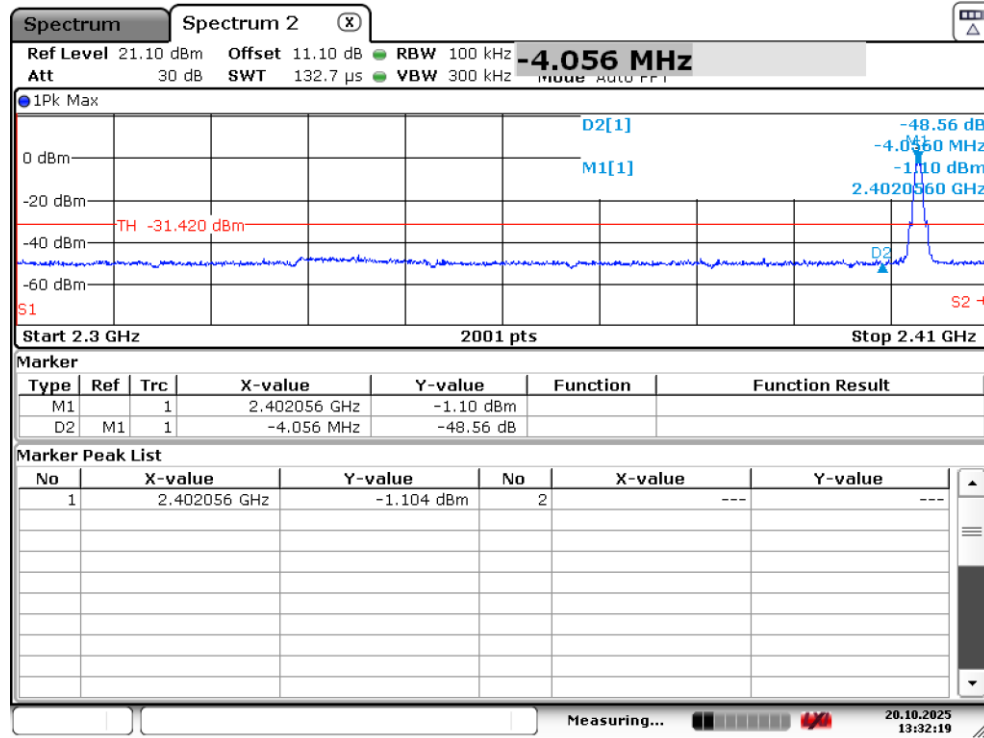
Conducted:



2.5.5 Band Edge Data

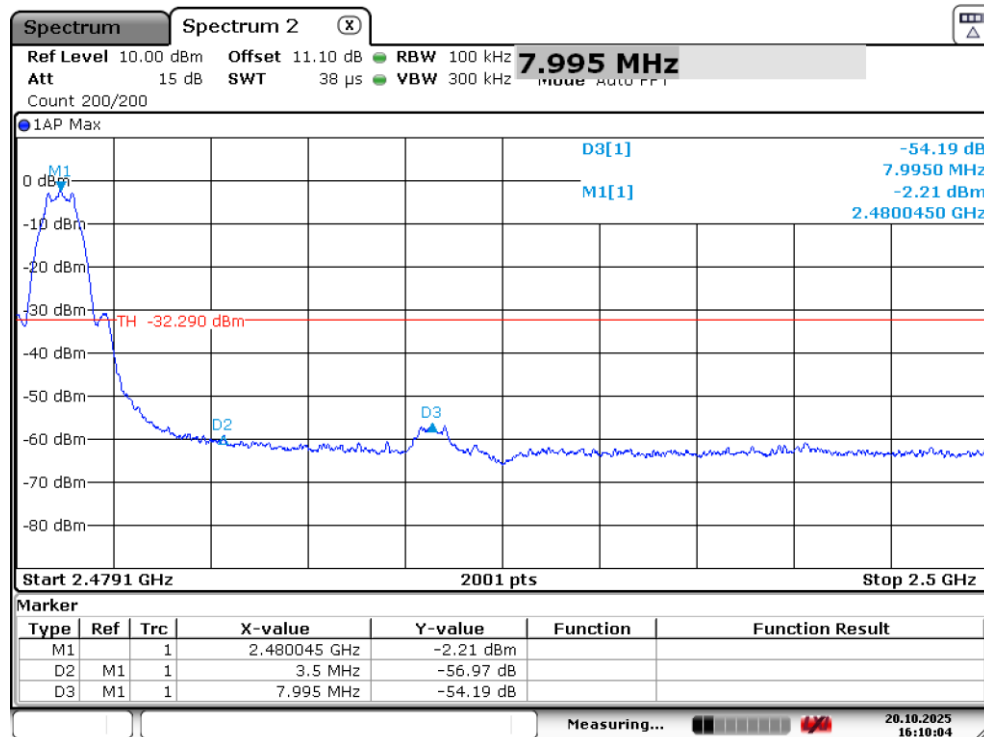
Mode of operation	Channel	Freq. (MHz)	Attenuation at Band Edge	Attenuation Limit at Band Edge
BLE	Low	2402	48.56dBc	≥ 30 dBc
	High	2480	54.19dBc	

Low Channel:



Date: 20.OCT.2025 13:32:19

High Channel:



Date: 20.OCT.2025 16:10:04

2.6 Power Spectral Density

Test Lab: Electronics Test Centre, Airdrie	EUT: SecureKey Fob
Test Personnel: Imran Akram	Standard: FCC PART 15.247
Date: 2025-10-20 (24.2°C, 15.0% RH)	Basic Standard: ANSI C63.10 FCC OET KDB 558074
EUT status: Compliant	

Specification: FCC Part 15.247(e)

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

2.6.1 Test Guidance: ANSI C63.10, Clause 11.10.3 / FCC OET KDB 558074

This measurement is performed at low, mid and high frequencies, in continuous transmission, with modulation.

The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections. The EUT is transmitting continuously ($D \geq 98\%$).

Method AVGPS-1 For DTS	
Method AVGPS-1 uses trace averaging with EUT transmitting at full power throughout each sweep.	
Set instrument center frequency to DTS channel center frequency.	
Span	≥ 1.5 times the OBW
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
VBW	$\geq 3 \times \text{RBW}$
Detector	RMS (Power Averaging)
Number of Points in sweep	$\geq 2 \times \text{Span} / \text{RBW}$
Sweep time	auto couple
Trace Average	Minimum 100 traces in power Averaging (RMS)
PSD measured	Use the peak marker function to determine the maximum amplitude level.
If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this might require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).	

2.6.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.6.3 Test Equipment

Testing was performed with this equipment:

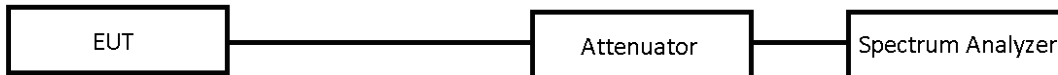
Equipment	Manufacturer	Model #	Asset #	Cal. Date	Cal. Due
Signal Analyzer	R&S	FSV	6996	2025/02/19	2026/02/19
Temp/Humidity	Extech	42270	5871	2025-05-01	2026-05-01
Attenuator (DC to 26 GHz)	Mini-Circuits	BW-S10-2W263+	6933	2025-10-14	2027-10-14
Coaxial Cables (RF)	W.L. GORE	PGR01R01036	7024	2025-01-09	2026-01-09
DC Blocker (9 KHz - 27 GHz)	Centric RF	C0927 SMA	6987	2025-01-19	2026-01-19

2.6.4 Test Sample Verification, Configuration & Modifications

The EUT was set to transmit continuously on a selected channel with test-specific software. The output was modulated as in normal operation.

The EUT met the requirements without modification.

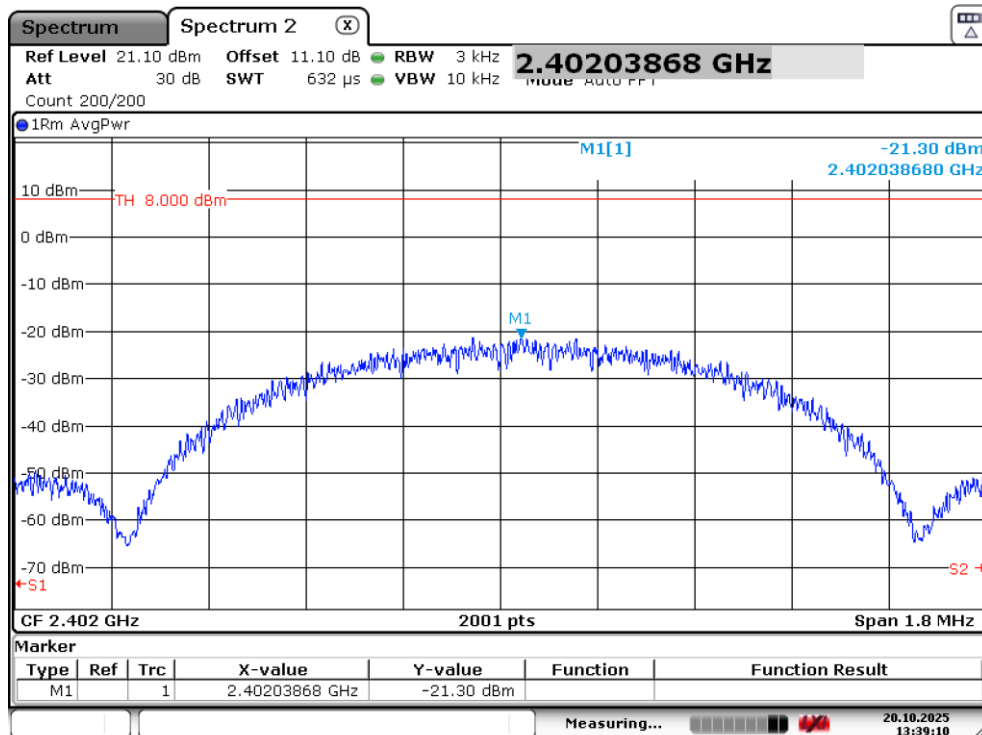
Test setup diagrams for Power Spectral Density testing:
Conducted:



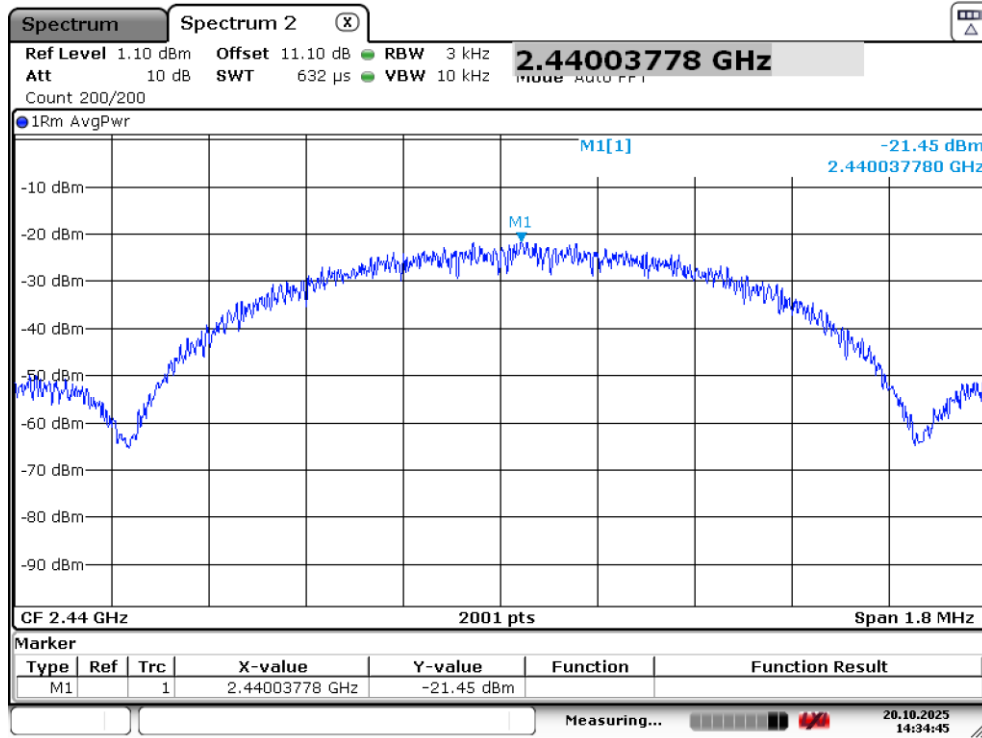
2.6.5 Average PSD Data

Mode	Channel	Frequency (MHz)	Measured Average PSD (dBm)	Limit
BLE	Low	2402	-21.30	≤ 8 dBm/ 3KHz
	Mid	2440	-21.45	
	High	2480	-22.50	

Low Channel:

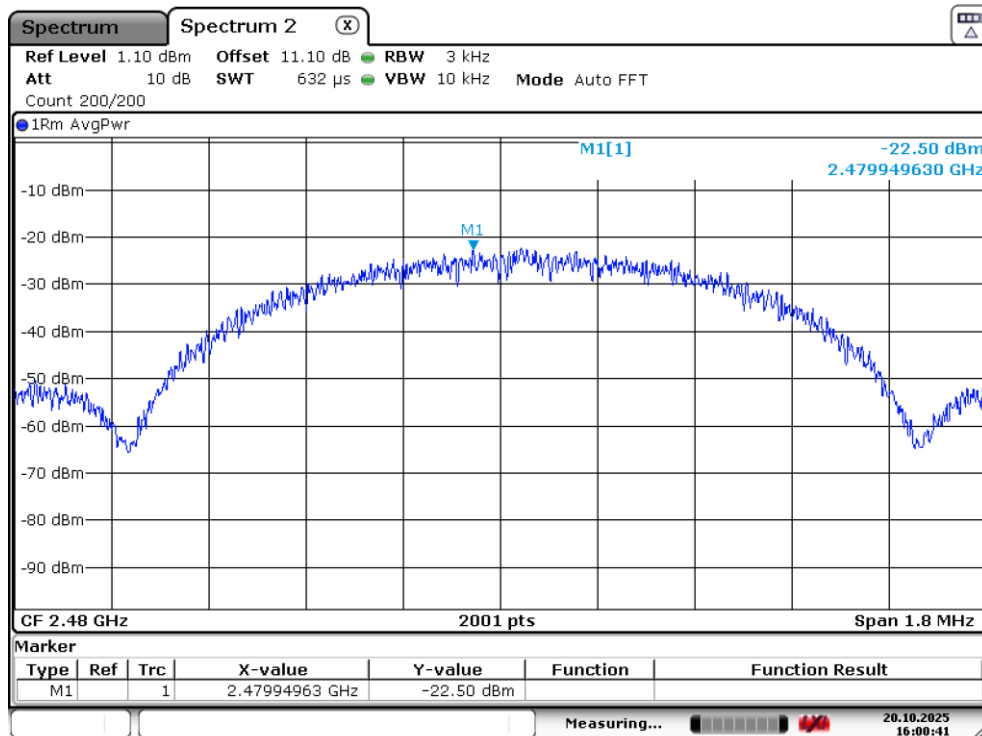


Mid Channel:



Date: 20.OCT.2025 14:34:45

High Channel:



Date: 20.OCT.2025 16:00:41

2.7 Conducted Spurious Emissions (Non-Restricted Band)

Test Lab: Electronics Test Centre, Airdrie	EUT: SecureKey Fob
Test Personnel: Joseph Yumol / Imran Akram	Standard: FCC PART 15.247
	Basic Standard: ANSI C63.10
Date: 2025-10-(20,21,28) (21.4°C, 14.8% RH)	FCC OET KDB 558470 v04 DTS

EUT status: Compliant

Specification: FCC Part 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.

2.7.1 Test Guidance: ANSI C63.10, Clause 6.7

This measurement is performed at the low, mid and high frequencies, with modulation. The RF output of EUT with an antenna connector is fed to the input of the spectrum analyzer through appropriate attenuation. The loss from the cable and the attenuator were added on the analyzer as gain offset setting there by allowing direct measurements, without the need for any further corrections.

The spectrum analyzer is stepped through the spectrum in frequency spans selected to ensure acceptable frequency resolution. The RBW is set to 100 kHz. The VBW is set to ≥ 300 kHz. The Peak detector is used, with the trace set to Max Hold.

2.7.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.7.3 Test Equipment

Testing was performed with the following equipment:

Equipment	Manufacturer	Model #	Asset #	Cal. Date	Cal. Due
Signal Analyzer	R&S	FSV	6996	2025/02/19	2026/02/19
EMI receiver	Agilent	N9038A (FW A.22.08)	6906	2025-01-10	2026-01-10
Temp/Humidity	Extech	42270	5871	2025-05-01	2026-05-01
Attenuator (DC to 26 GHz)	Mini-Circuits	BW-S10-2W263+	6933	2025-10-14	2027-10-14
Coaxial Cables (RF)	W.L. GORE	PGR01R01036	7024	2025-01-09	2026-01-09
DC Blocker (9 KHz - 27 GHz)	Centric RF	C0927 SMA	6987	2025-01-19	2026-01-19

2.7.4 Test Sample Verification, Configuration & Modifications

The EUT was set to a selected channel with test-specific software. The output was modulated as in normal operation.

The EUT met the requirements without modification.

Test setup diagram for Conducted Spurious Emissions testing:



2.7.5 Conducted Emissions Data:

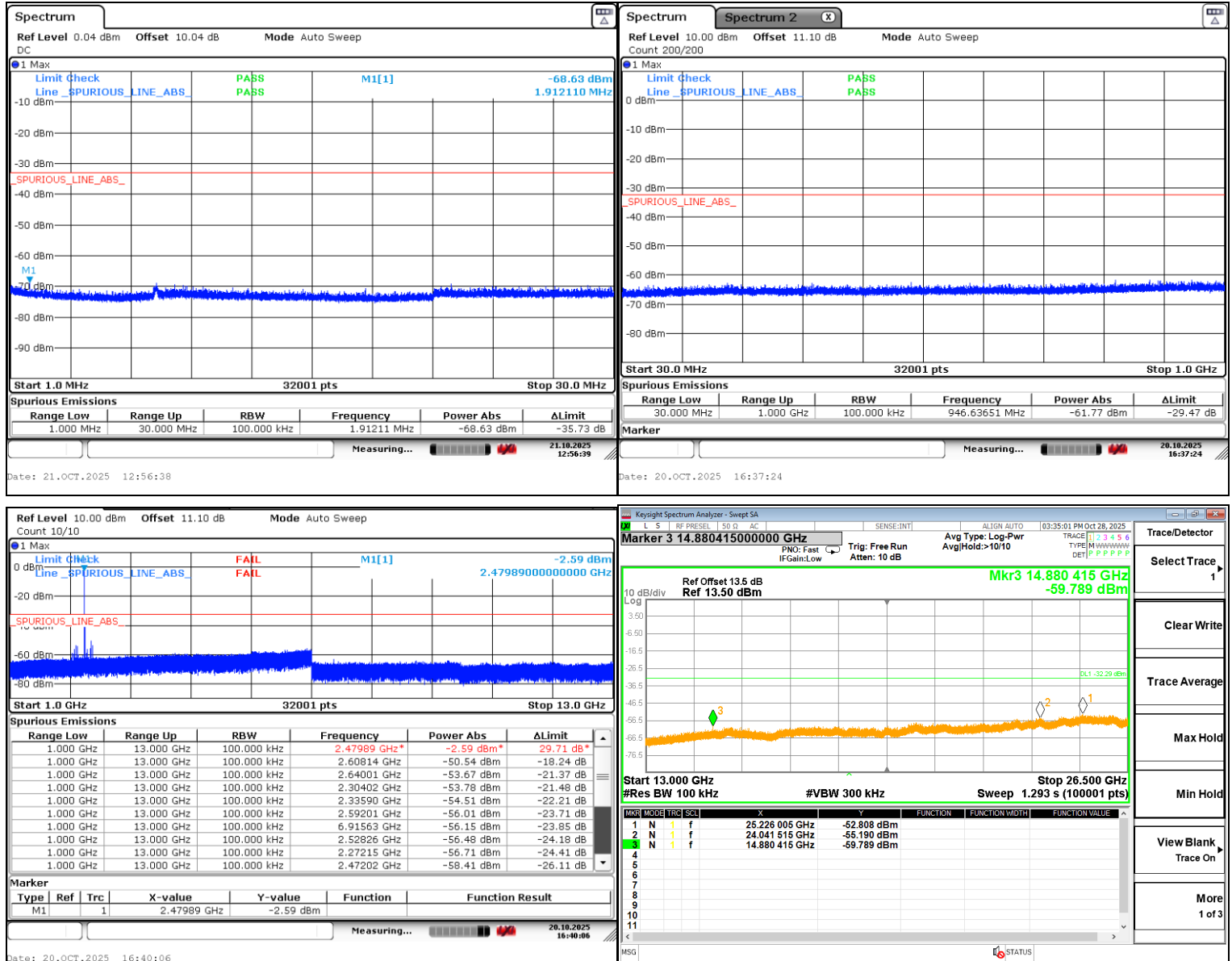
Low Channel



Mid Channel



High Channel



2.8 EUT Positioning Assessment

Test Lab: Electronics Test Centre, Airdrie

EUT: SecureKey Fob

Test Personnel: Imran Akram

Standard: FCC PART 15.247

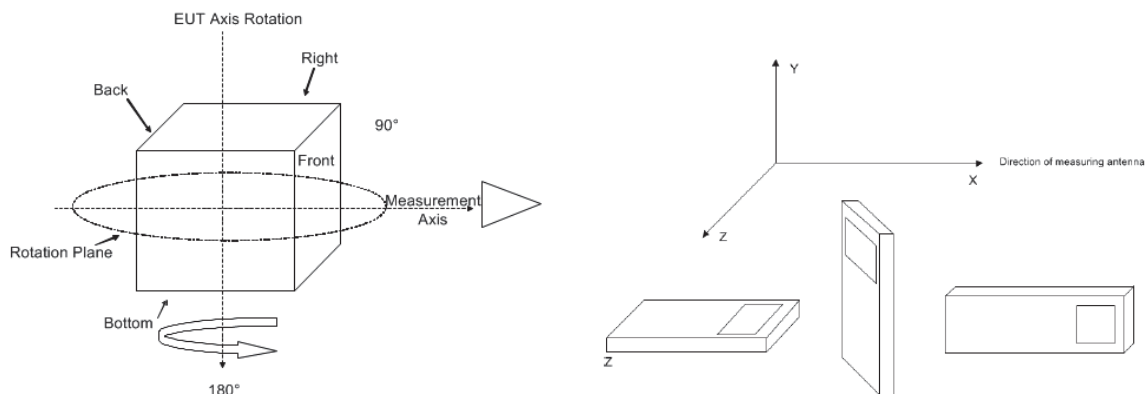
Date: 2025-10-23 (24.2°C, 15.0% RH)

Basic Standard: ANSI C63.4

Comments: Y - Axis is selected as worse axis for emission profile.

Specification: ANSI C63.4, Clause 6.3.2.1

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs (see Figure 6, Figure 7, and Figure 9). For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.



Z - Axis



Y - Axis



X - Axis

2.9 Radiated Spurious Emissions (within restricted band)

Test Lab: Electronics Test Centre, Airdrie	EUT: SecureKey Fob
Test Personnel: Joseph Yumol / Imran Akram	Standard: FCC PART 15.247/15.209
Date: 2025-10-24,27,28 (24.8°C, 15.0% RH)	Basic Standard: ANSI C63.10
EUT status: Compliant	

Specification: FCC PART 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)).

Restricted Bands of Operation:

MHz	MHz	MHz	MHz	MHz	GHz	GHz
0.0900000 – 0.1100000	8.2910000 - 8.2940000	16.804250 - 16.804750	162.01250 - 167.17000	1660.0000 – 1710.0000	3.6000000 – 4.4000000	14.470000 – 14.500000
0.4950000 - 0.5050000	8.3620000 - 8.3660000	25.500000 - 25.670000	167.72000 - 173.20000	1718.8000 – 1722.2000	4.5000000 – 5.1500000	15.350000 – 16.200000
2.1735000 - 2.1905000	8.3762500 - 8.3867500	37.500000 - 38.250000	240.00000 – 285.00000	2200.0000 – 2300.0000	5.3500000 – 5.4600000	17.700000 – 21.400000
4.1250000 - 4.1280000	8.4142500 - 8.4147500	73.000000 - 74.600000	322.00000 - 335.40000	2310.0000 – 2390.0000	7.2500000 – 7.7500000	22.010000 – 23.120000
4.1772500 - 4.1777500	12.2900000 - 12.293000	74.800000 - 75.200000	399.90000 – 410.00000	2483.5000 – 2500.0000	8.0250000 – 8.5000000	23.600000 – 24.000000
4.2072500 - 4.2077500	12.519750 - 12.520250	108.00000 - 121.94000	608.00000 – 614.00000	2655.0000 – 2900.0000	9.0000000 – 9.2000000	31.200000 – 31.800000
5.6770000 - 5.6830000	12.576750 - 12.577250	123.00000 - 138.00000	960.00000 – 1240.0000	3260..0000 – 3267.0000	9.3000000 – 9.5000000	36.430000 – 36.500000
6.2150000 - 6.2180000	13.360000 - 13.410000	149.90000 - 150.05000	1300.0000 – 1427.0000	3332.0000 – 3339.0000	10.600000 – 12.700000	Above 38.600000
6.2677500 - 6.2682500	16.420000 - 16.423000	156.52475- 156.52525	1435.0000 – 1626.5000	3345.8000 – 3358.0000	13.250000 – 13.400000	
6.3117500 - 6.3122500	16.694750 - 16.695250	156.70000 - 156.90000	1645.5000 – 1646.5000	3500.0000 – 3600.0000		

US only Canada 108 – 138 MHz Canada 960 – 1427 MHz Canada only

2.9.1 Test Guidance: ANSI C63.10-2013, Clause 13.4.2

From 9 kHz to 150 kHz (resolution bandwidth of 200 Hz) and from 150 kHz to 30 MHz (resolution bandwidth 9 kHz) measurements are performed with a loop antenna (as per KDB 460108).

From 30 MHz to 1000 MHz, measurements are performed with a broadband biconilog antenna and a resolution bandwidth of 120 kHz.

Above 1000 MHz, measurements are performed with a DRG Horn antenna or a Standard Gain horn, and a resolution bandwidth of 1 MHz The EUT is raised to 150 cm above the ground plane, and the area between the EUT and the antenna mast is covered with RF absorbent material.

The scan is performed at discreet increments of turntable azimuth and antenna height, which are selected in accordance with the applicable standard in order to assure capture of frequencies of interest. Optimization is performed based on the scan data.

Frequencies having peak emissions within 10dB of the limits are optimized. The EUT is rotated in azimuth over 360 degrees and the direction of maximum emission is noted.

Antenna height is varied from 1 – 4 meters at this azimuth to obtain the maximum emission. Then the maximum level is measured with the appropriate detector and recorded. Up to 1 GHz, measurements are performed with a Quasi-Peak detector. Above 1 GHz, measurements are recorded with Peak and/or Average detectors, as applicable.

2.9.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.9.3 Test Equipment

Testing was performed with the following equipment:

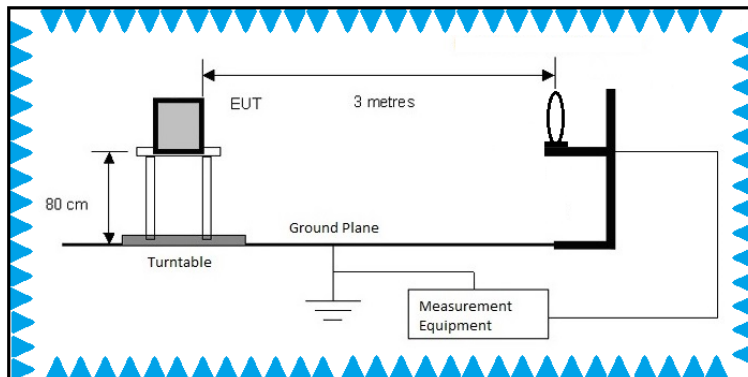
Equipment	Manufacturer	Model #	Asset #	Cal. Date (yyyy-mm-dd)	Cal. Due (yyyy-mm-dd)
EMC Software	UL	Ver. 9.5	SWC 021	N/A	
EMI receiver	Agilent	N9038A (FW A.22.08)	6906	2025-01-10	2026-01-10
Biconilog Antenna (30 – 1000 MHz)	AR	JB1	6905	2023-11-29	2025-11-29
DRG Horn (1 – 18 GHz)	Tensor	4105	9588	2025-07-28	2027-07-28
STD Horn (18-26 GHz)	Quinstar	QWH-KRPS00	6163	2022-10-30	2025-10-30
Humidity/Temp Logger	Extech Ins. Corp.	42270	5892	2025-05-01	2026-05-01
Pre-Amplifier (30 – 1400 MHz)	HP	8447D	9291	2025-01-21	2026-01-21
L.N. Amplifier (1 – 18 GHz)	MITEQ	JS43-01001800-21-5P	4354	2025-01-21	2026-01-21
L.N. Amplifier (18 – 26 GHz)	MITEQ	JS44-01002650-33-3P	6163	2025-01-21	2026-01-21
RE Cable below 1GHz	Insulated Wire Inc.	KPS-1501A-3600- KPA-01102006	4419	2025-01-21	2026-01-21
Re Cable Above 1 GHz	A.H. System Inc.	SAC-26G-8.23	6187	2025-01-21	2026-01-21
2.4GHz Notch Filter	Microtronics	BRM50702	6953	2025-01-09	2026-01-09

2.9.4 Test Sample Verification, Configuration & Modifications

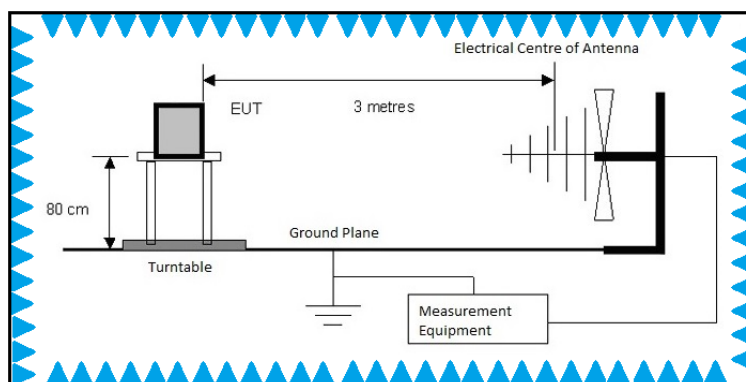
The EUT was set to a selected channel with test-specific software. The output was modulated as in normal operation.

The EUT met the requirements without modification.

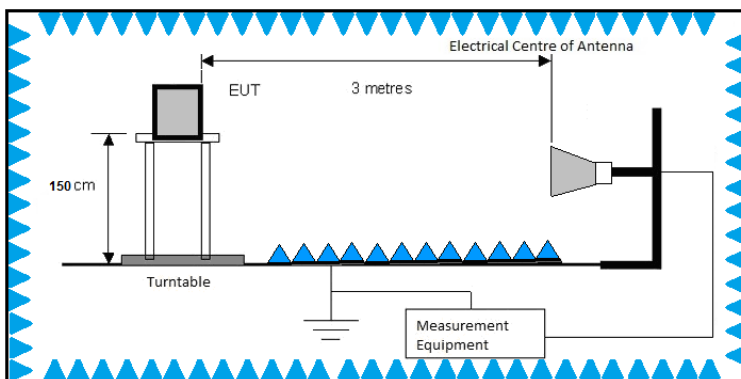
Test setup diagram for Radiated Spurious Emissions testing (below 30 MHz):



Test setup diagram for Radiated Spurious Emissions testing (below 1GHz):



Test setup diagram for Radiated Spurious Emissions testing (above 1GHz):



2.9.5 Radiated Emissions Data:

The emissions data are presented in tabular form, showing turntable azimuth, antenna height and polarization, the uncorrected spectrum analyzer reading, the correction factors applied, the net result, the value of the limit at the frequency investigated, and the Delta between the result and the limit.

Meter Reading in dBμV + Antenna Factor in dB/m + Gain/Loss Factor in dB = Corrected Field Strength in dBμV/m.

Delta = Field Strength – Limit

Notes:

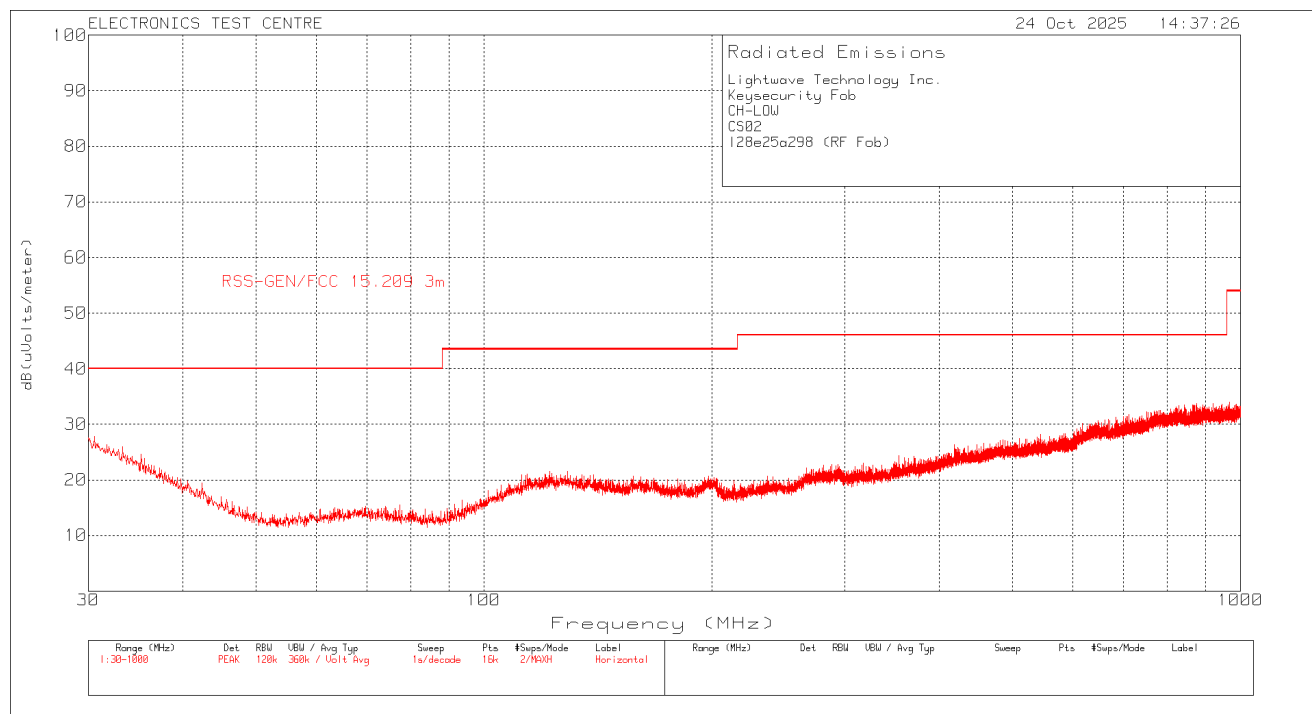
- When a preamp is used, the resulting gain is compensated, producing a negative value for the Cable Loss.
- Measurements reported are the result of adjusting the turntable azimuth and antenna height to obtain the maximum EUT emission. This may produce a different reading than the plot trace. The plot is a Peak Hold function obtained at discreet increments of height and azimuth, while the reported measurement is obtained with the appropriate Quasi Peak or Average detector after the height and azimuth have been adjusted for maximum emission.
- In Transmit mode, the EUT was assessed up to 26.5 GHz.

Negative values for Delta indicate compliance.

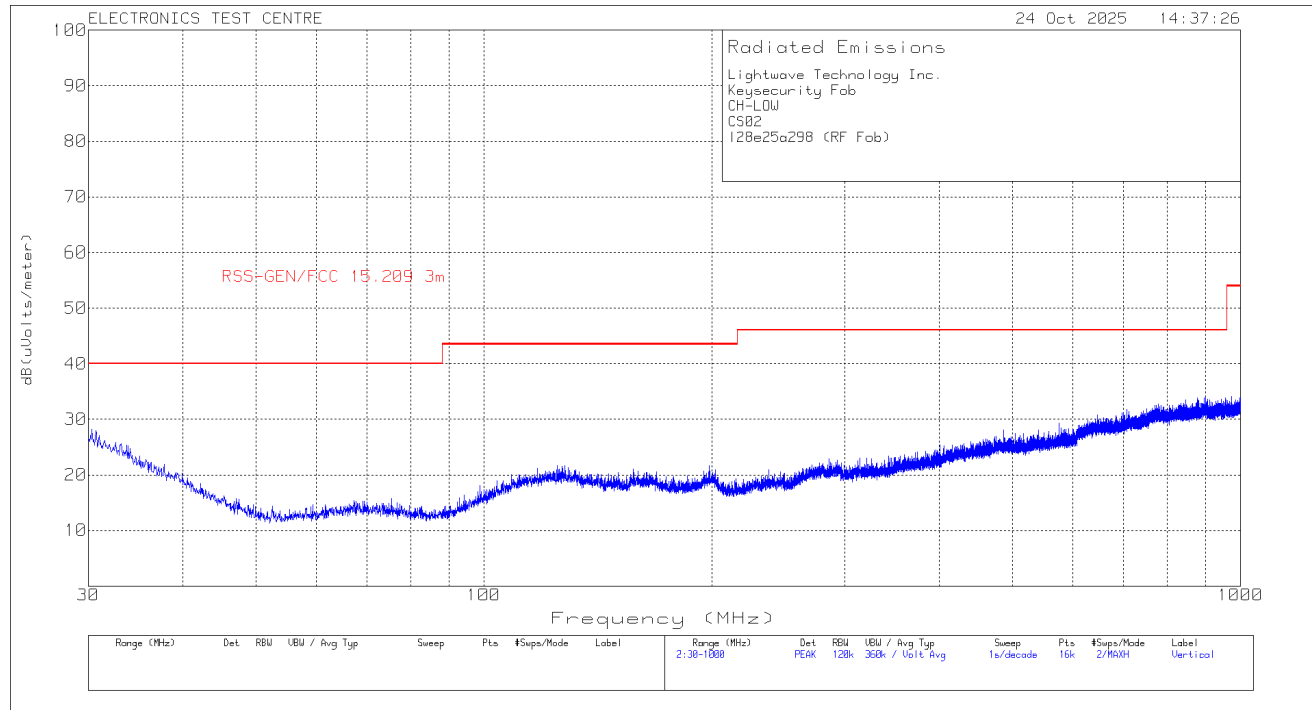
Freq. Marker	Freq. [GHz]	Raw reading [dBµv]	Det	Antenna Factor [dB/m]	Pre amp Gain [dB]	Corrected Reading [dBµv/m]	FCC 15.209 Limit [dBµv/m]	Delta [dB]	Azimuth [Deg]	Height [cm]	Polarization
Channel LOW											
1	4.8046	44.33	PK	32.8	-30.8	46.33	74	-27.67	37	261	Horizontal
		34.44	AV			36.44	54	-17.56			
2	7.2052	38.89	PK	36	-26.6	48.29	74	-25.71	149	106	Horizontal
		28.84	AV			38.24	54	-15.76			
3	4.8047	43.72	PK	32.8	-30.8	45.72	74	-28.28	302	107	Vertical
		33.79	AV			35.79	54	-18.21			
4	7.2054	39.27	PK	36	-26.6	48.67	74	-25.33	242	103	Vertical
		26.62	AV			39.02	54	-14.98			
5	14.5572	27.71	PK	42.5	-21.5	48.71	74	-25.29	1	381	Vertical
		14.04	AV			35.04	54	-18.96			
Channel MID											
1	7.3194	34.41	PK	36.4	-26.7	44.11	74	-29.89	148	108	Horizontal
		28.34	AV			38.04	54	-15.96			
2	14.5064	18.66	PK	42.5	-21.5	39.66	74	-34.34	27	395	Horizontal
		14.64	AV			35.64	54	-18.36			
3	4.8807	34.83	PK	32.9	-30.6	37.13	74	-36.87	124	263	Vertical
		32.21	AV			34.51	54	-19.49			
4	7.3194	34.5	PK	36.4	-26.7	44.2	74	-29.80	216	107	Vertical
		28.25	AV			37.95	54	-16.05			
5	13.969	20.22	PK	41	-22.1	39.12	74	-34.88	8	394	Vertical
		15.44	AV			34.34	54	-19.66			
6	14.3875	18.87	PK	42	-21.3	39.57	74	-34.43	283	380	Vertical
		14.87	AV			35.57	54	-18.43			
Channel MID											
1	4.9596	44.23	PK	33.1	-30.6	46.73	74	-27.27	198	104	Horizontal
		33.89	AV			36.39	54	-17.61			
2	7.4394	39.09	PK	36.6	-26.3	49.39	74	-24.61	46	100	Horizontal
		28.93	AV			39.23	54	-14.77			
3	14.4653	28.52	PK	42.3	-21.4	49.42	74	-24.58	10	400	Horizontal
		14.8	AV			35.7	54	-18.30			
4	4.9598	40.91	PK	33.1	-30.6	43.41	74	-30.59	305	273	Vertical
		30.86	AV			33.36	54	-20.65			
5	7.4394	38.24	PK	36.6	-26.3	48.54	74	-25.46	121	311	Vertical
		28.9	AV			39.2	54	-14.80			

LOW Channel:

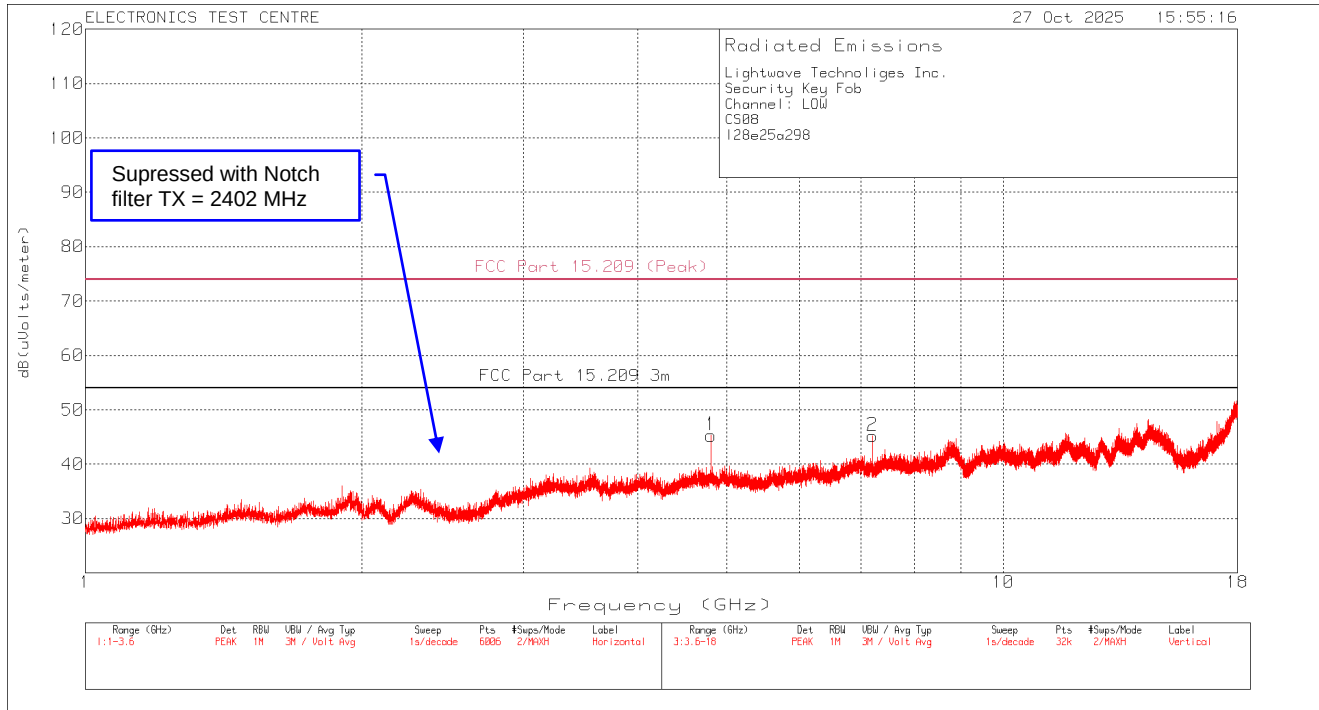
Plot of Radiated Emissions: Horizontal polarization



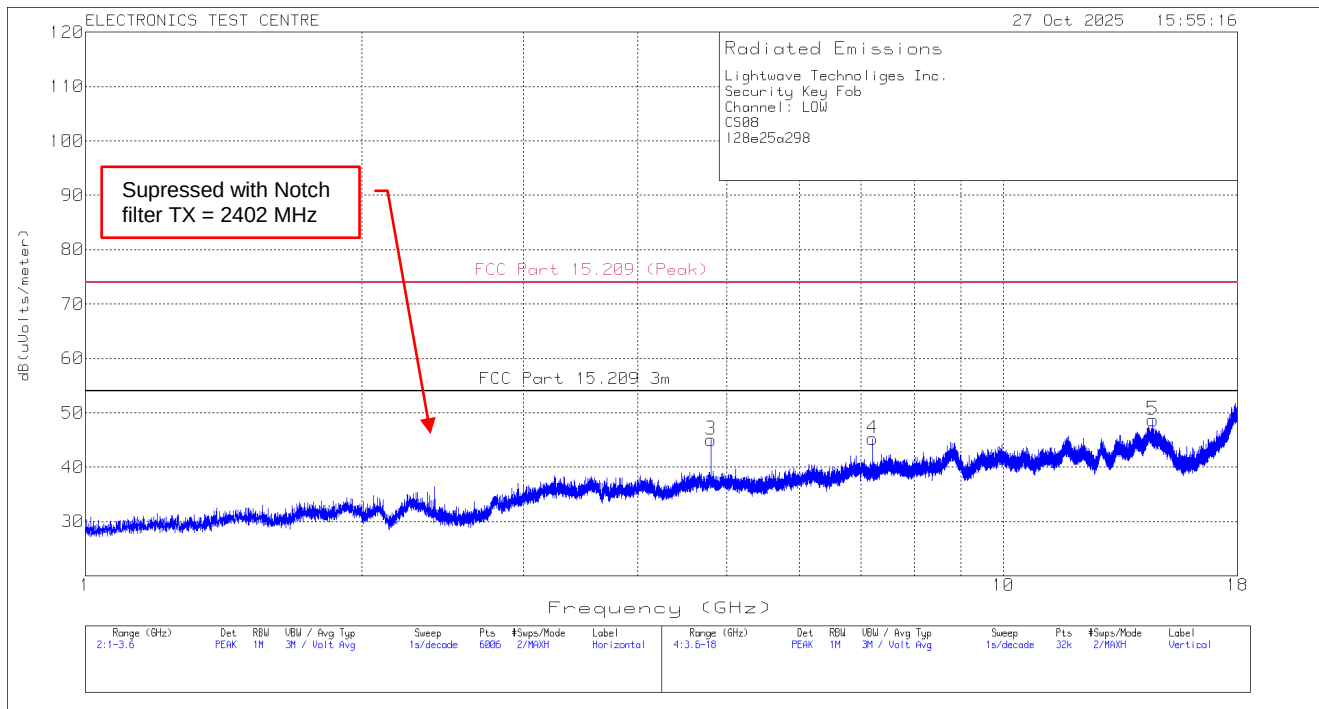
Plot of Radiated Emissions: Vertical polarization



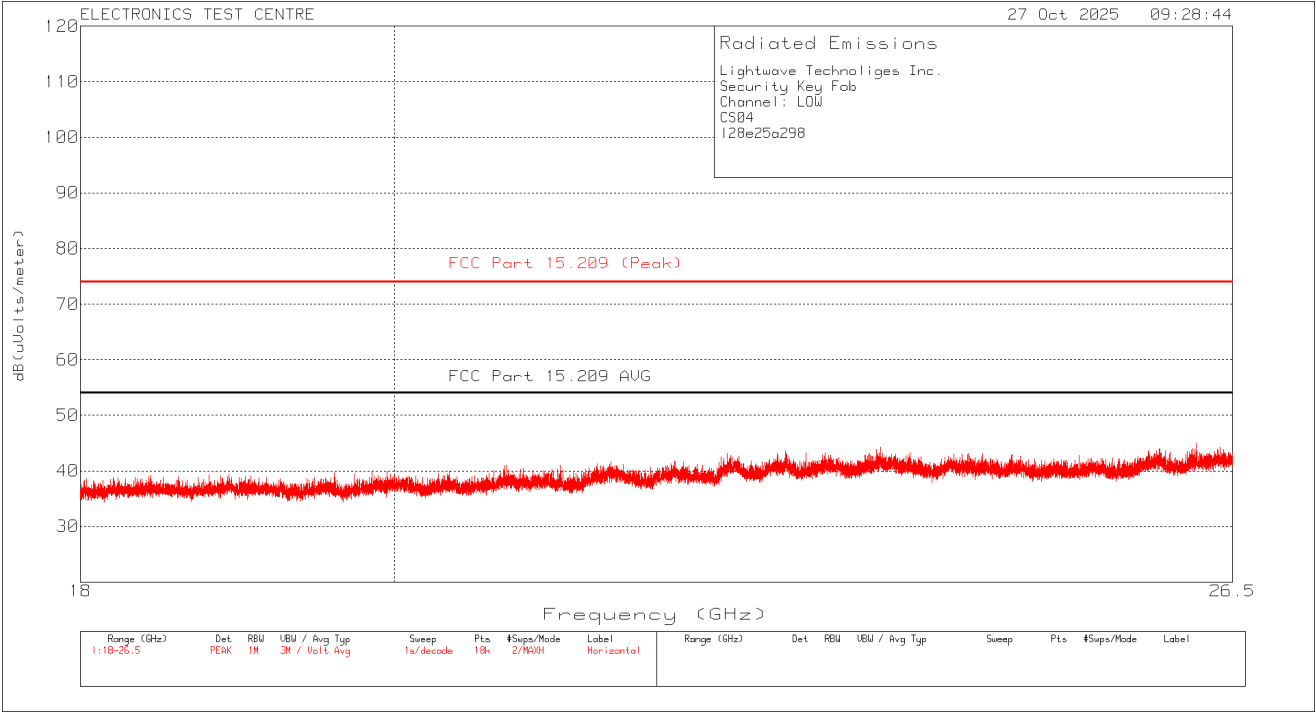
Plot of Radiated Emissions: Horizontal polarization



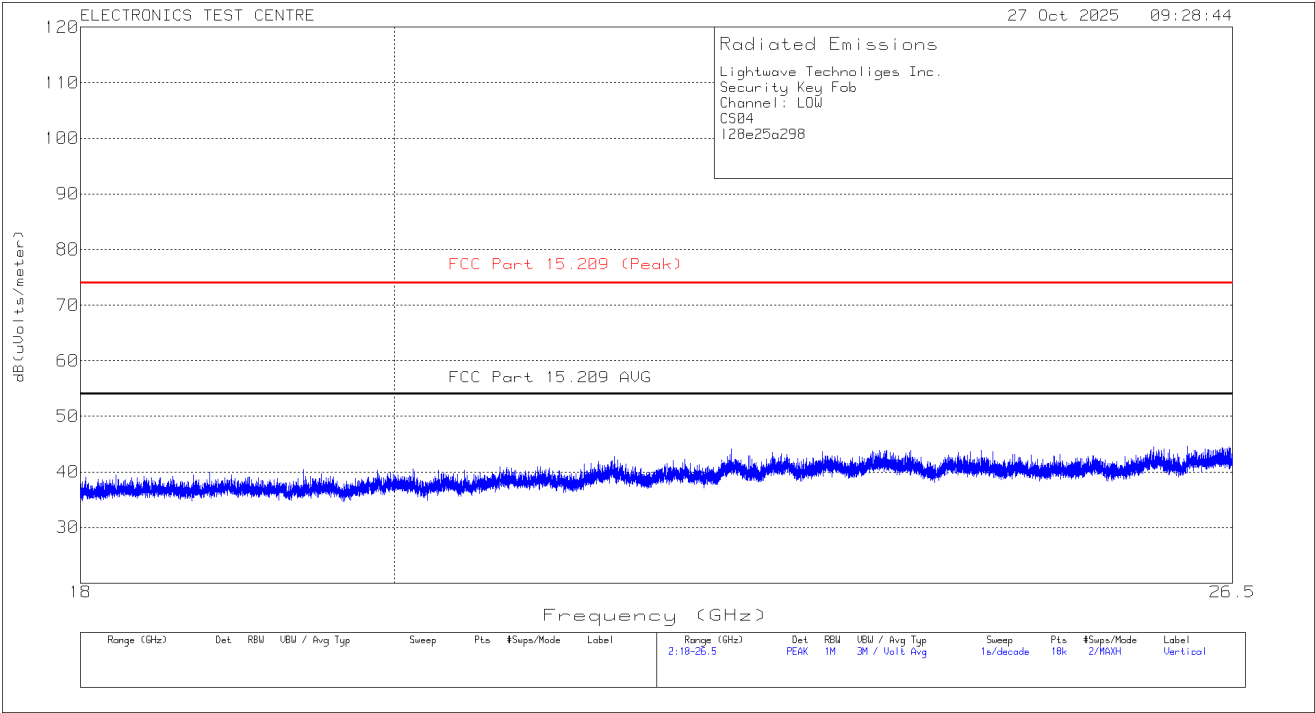
Plot of Radiated Emissions: Vertical polarization



Plot of Radiated Emissions: Horizontal polarization

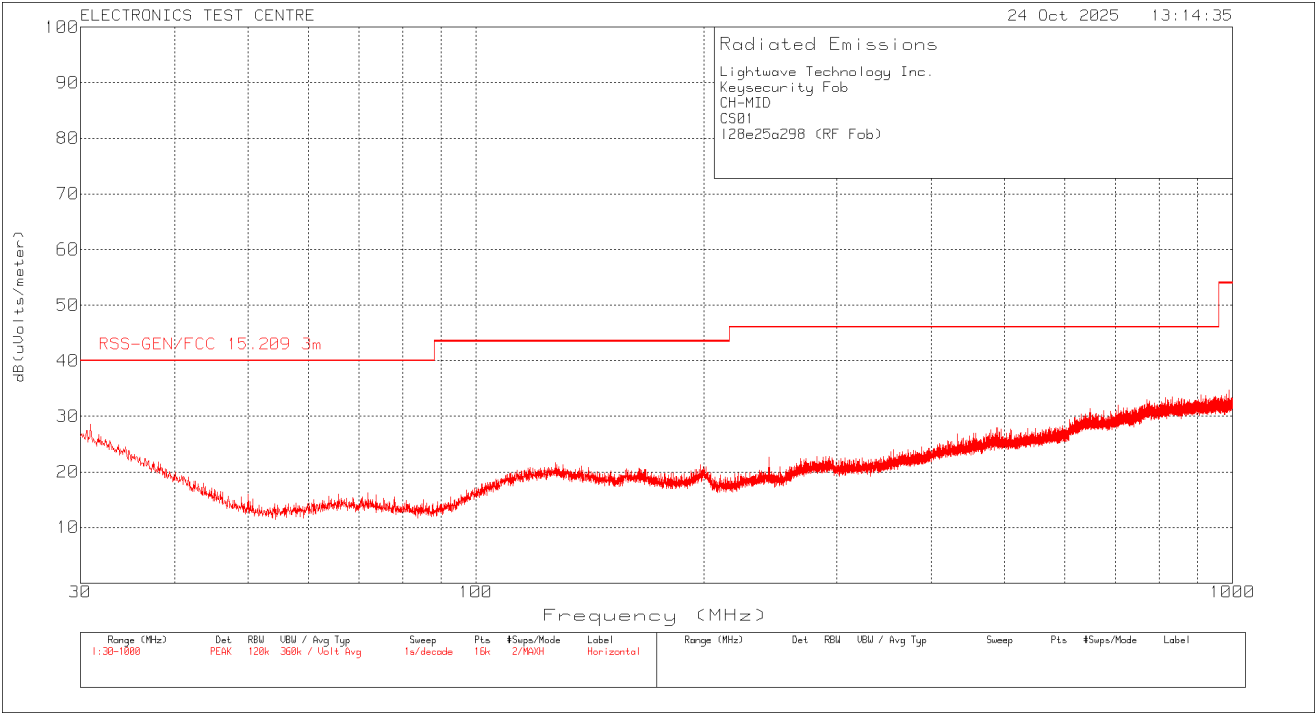


Plot of Radiated Emissions: Vertical polarization

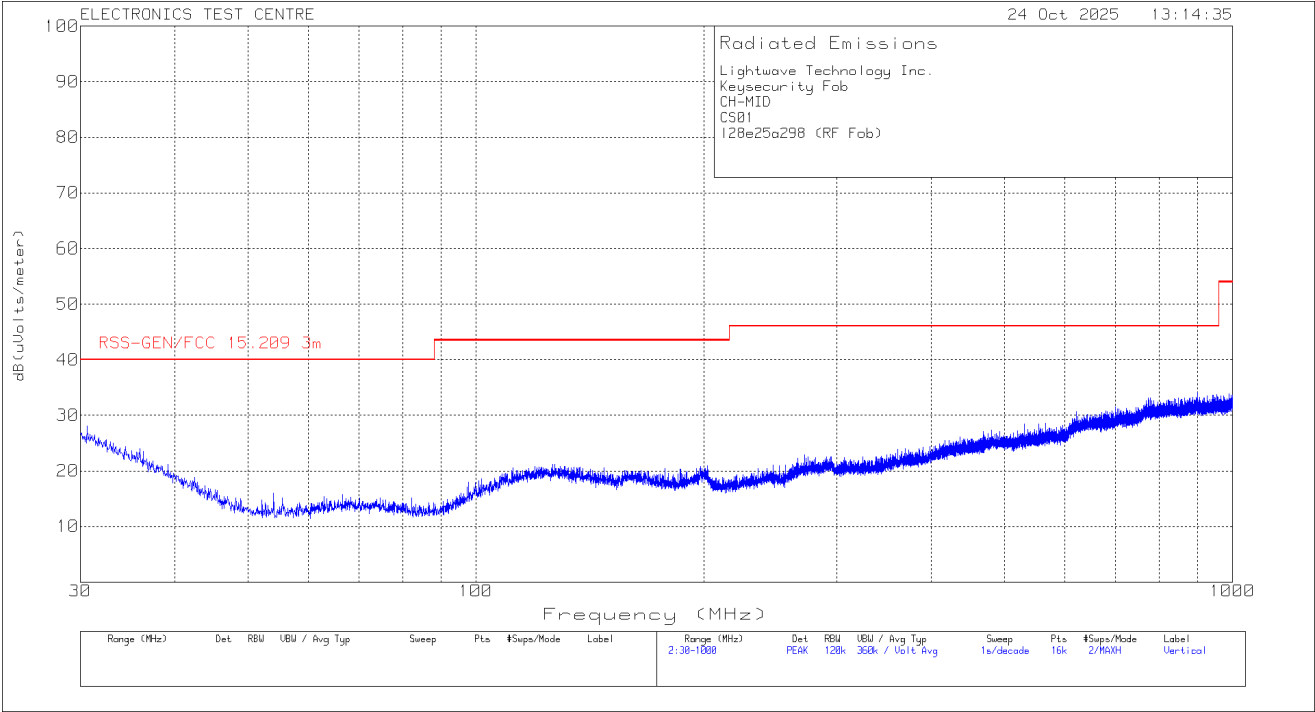


MID Channel:

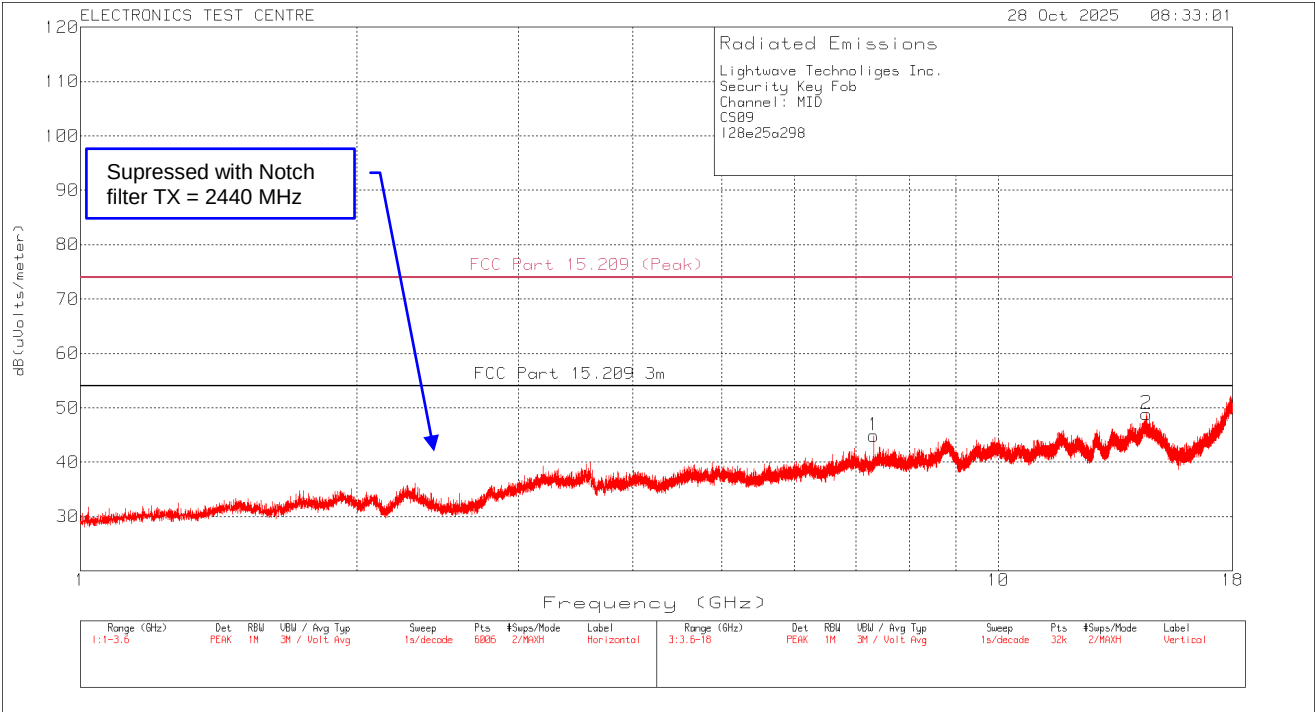
Plot of Radiated Emissions: Horizontal polarization



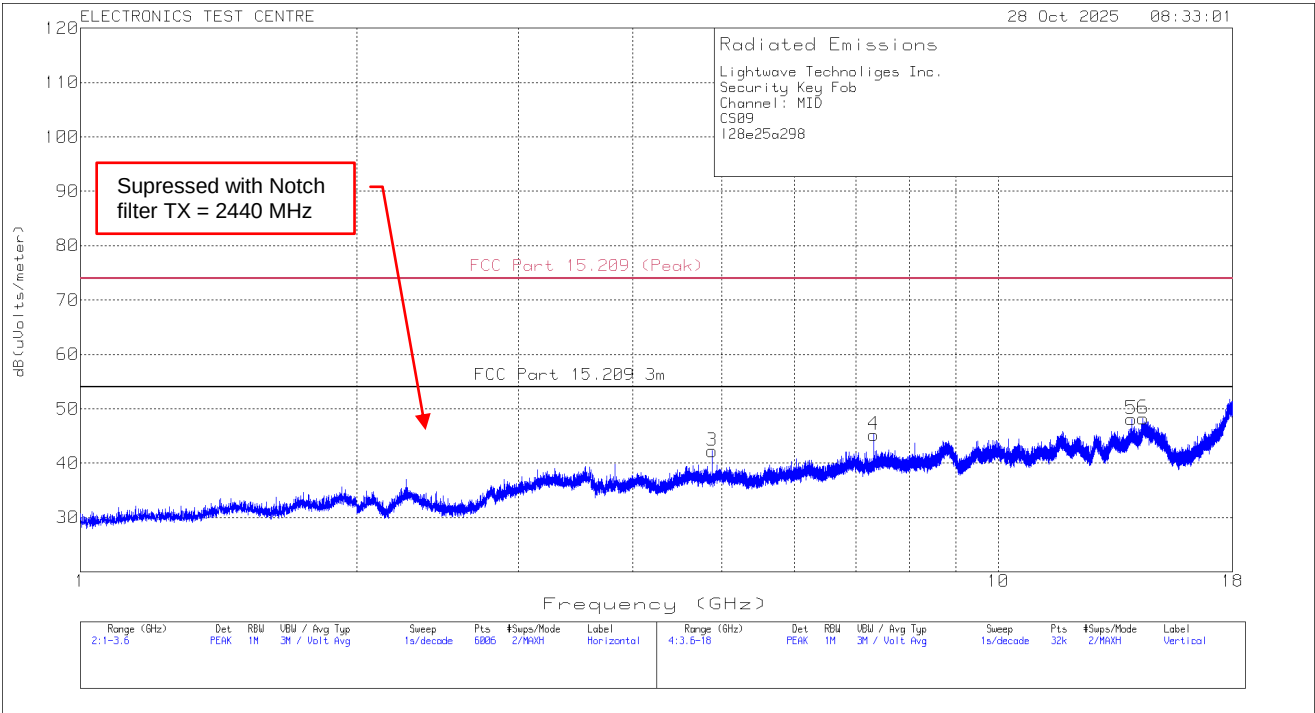
Plot of Radiated Emissions: Vertical polarization



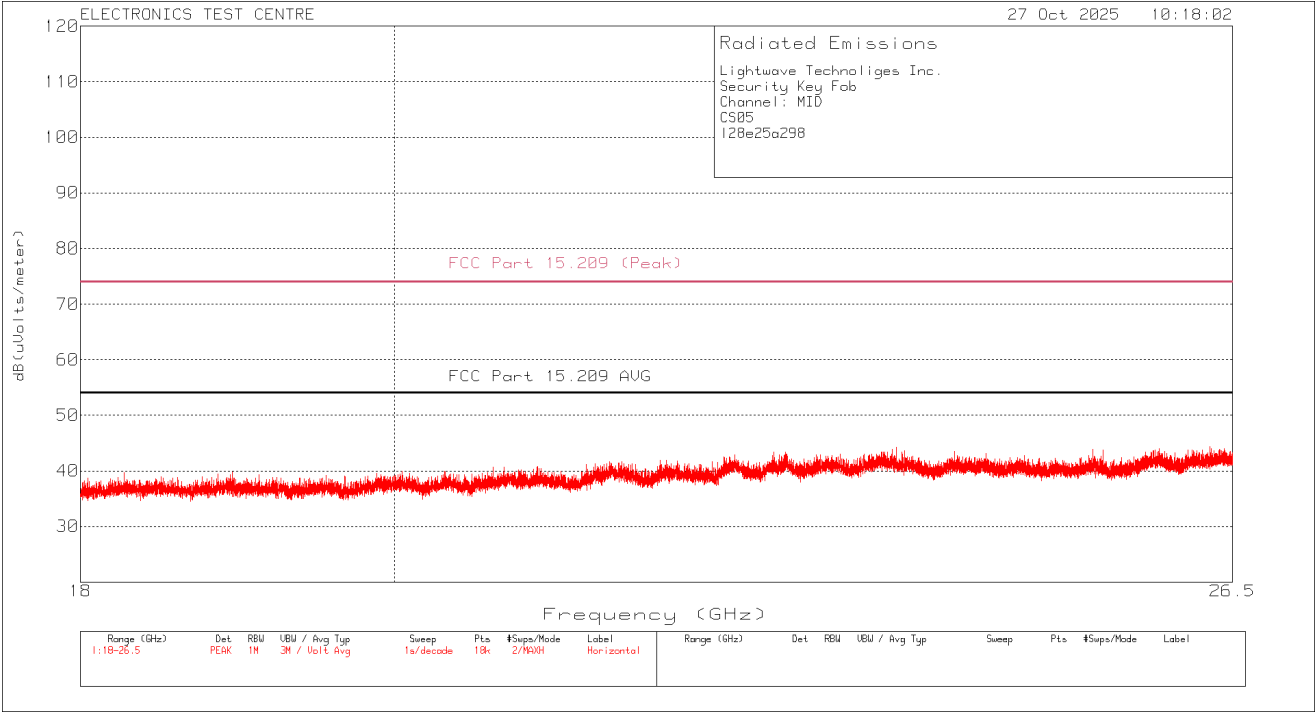
Plot of Radiated Emissions: Horizontal polarization



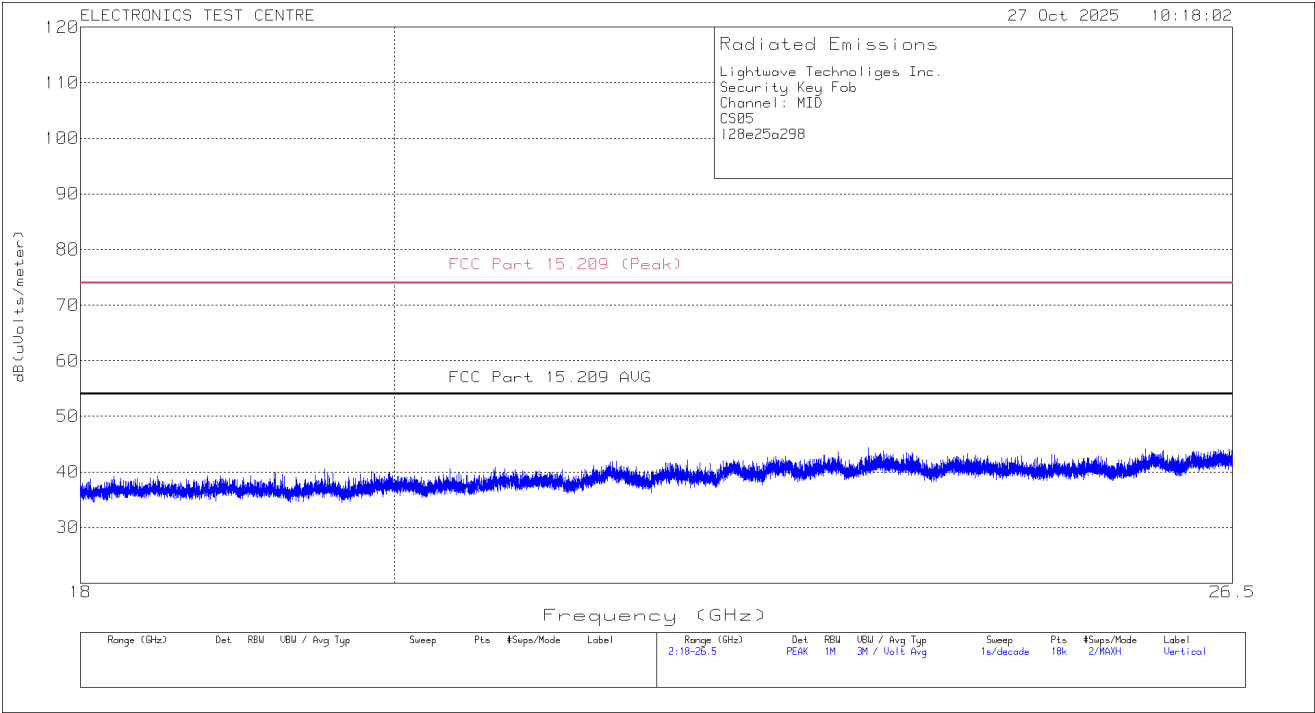
Plot of Radiated Emissions: Vertical polarization



Plot of Radiated Emissions: Horizontal polarization

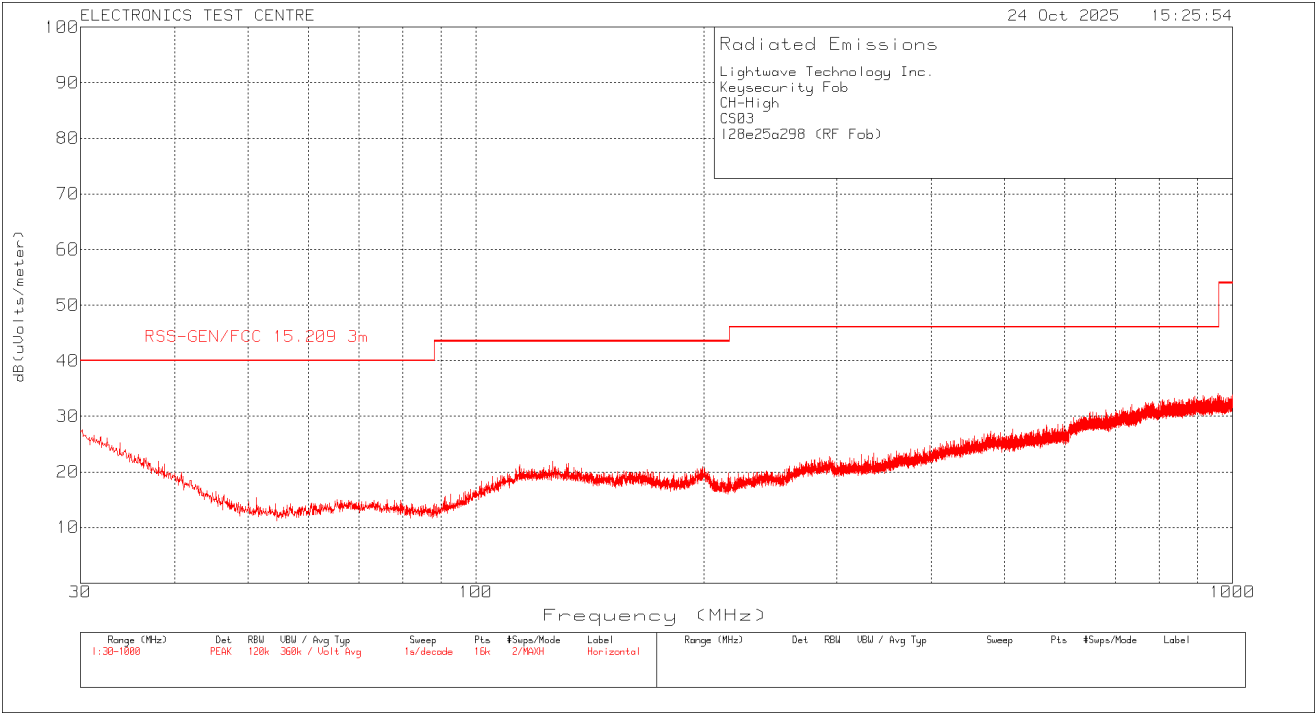


Plot of Radiated Emissions: Vertical polarization

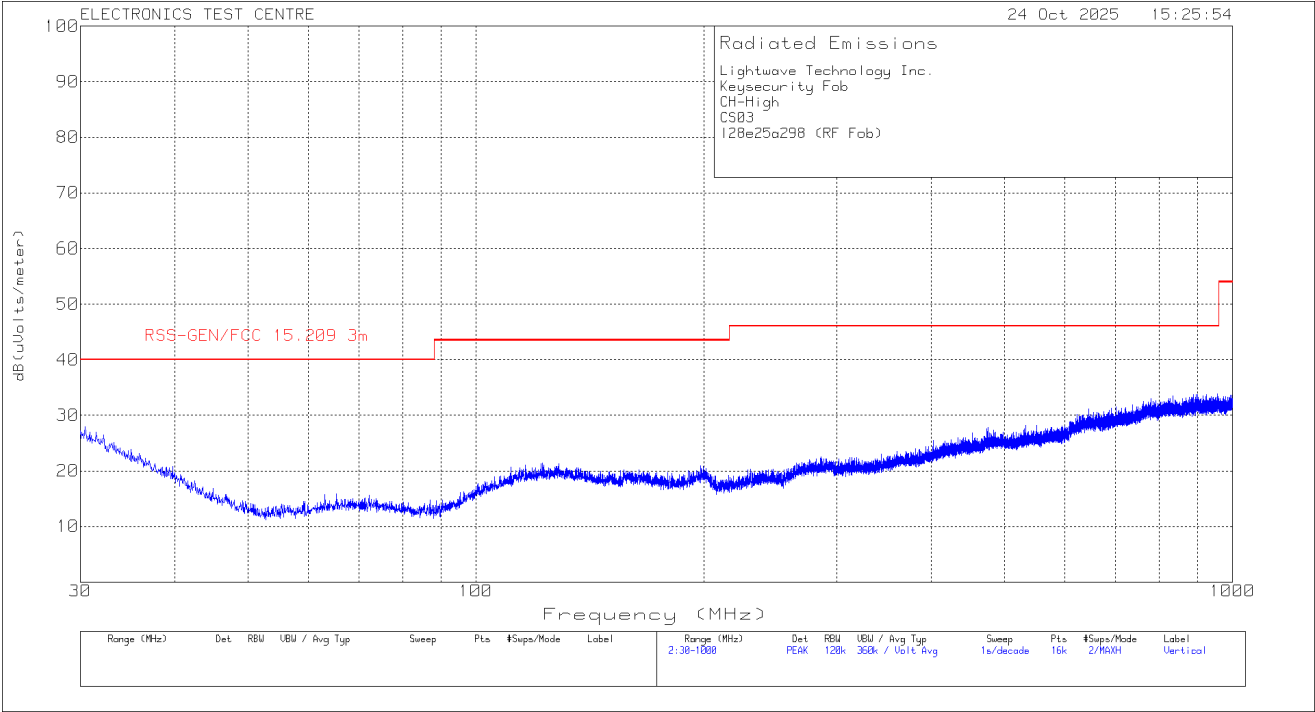


High Channel:

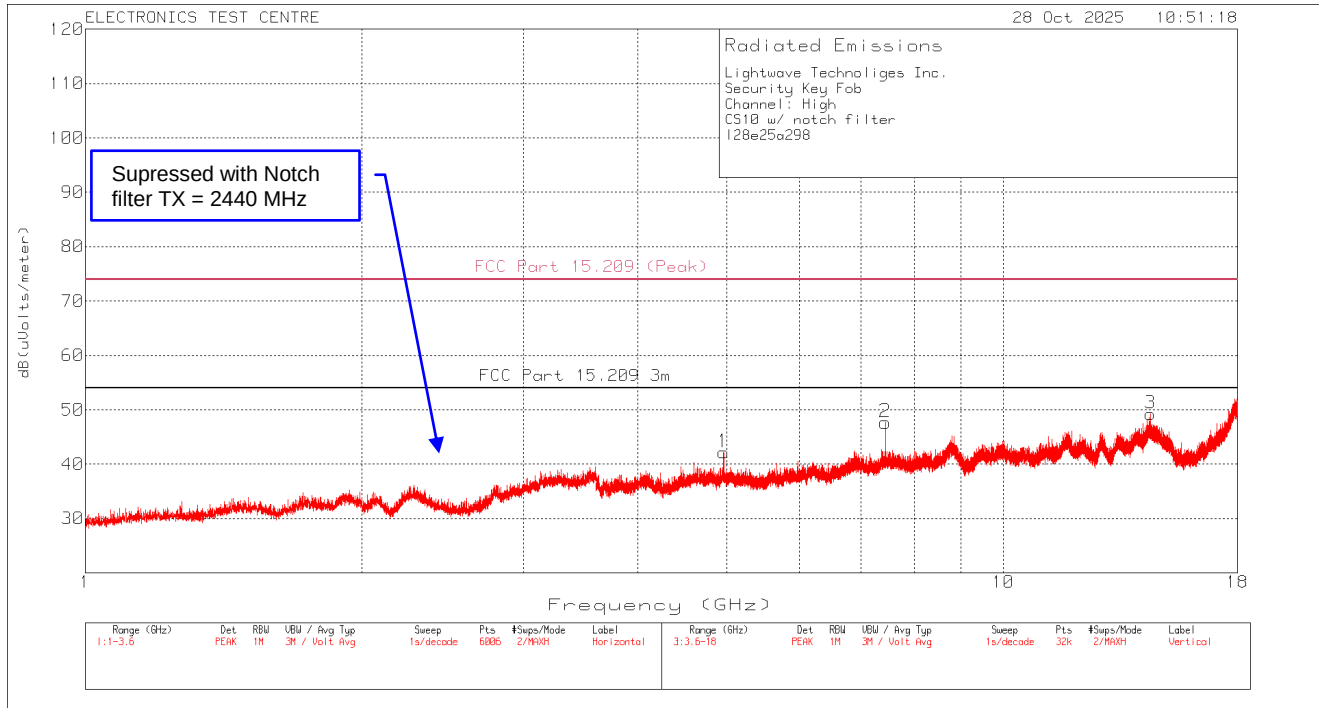
Plot of Radiated Emissions: Horizontal polarization



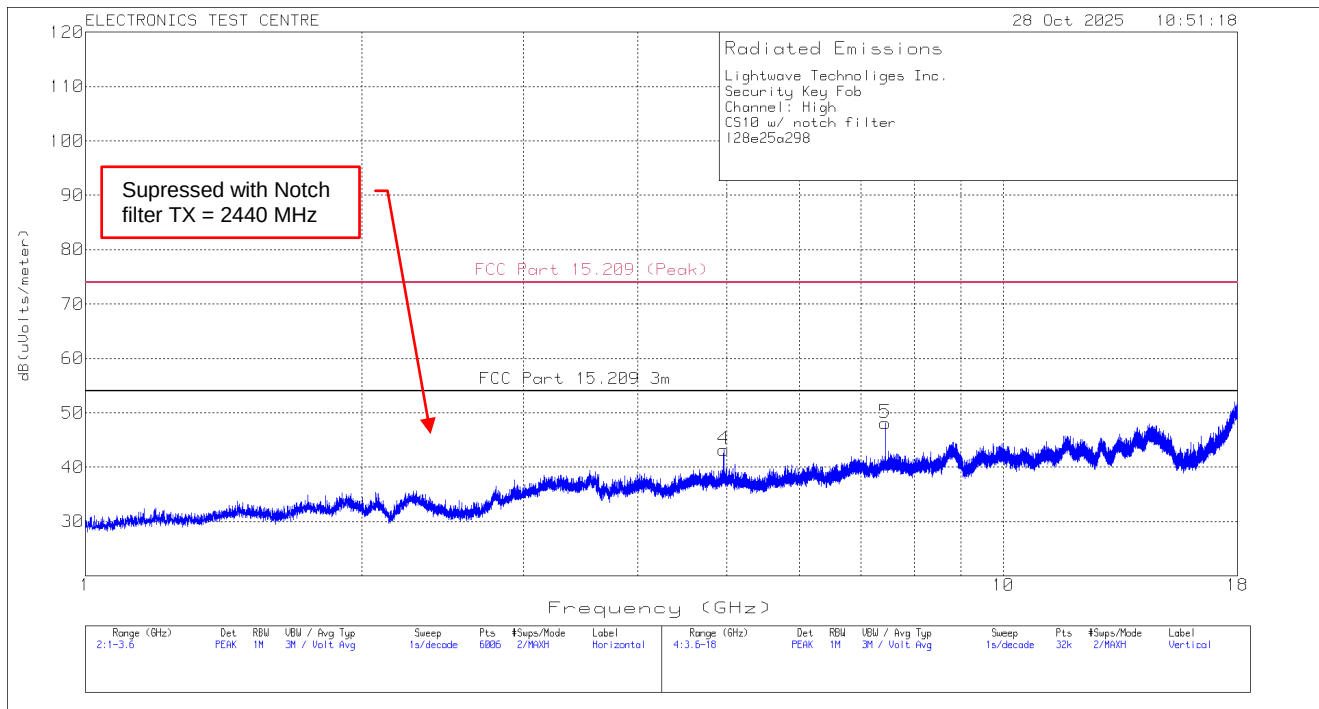
Plot of Radiated Emissions: Vertical polarization



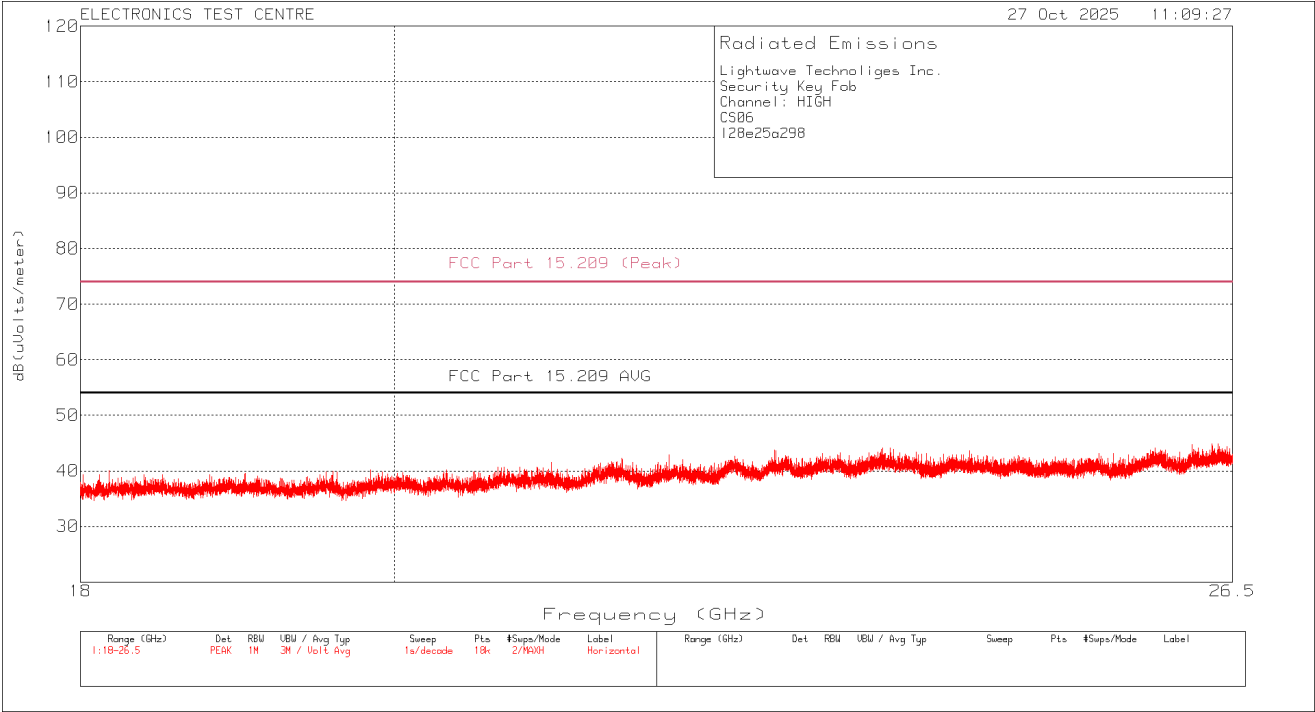
Plot of Radiated Emissions: Horizontal polarization



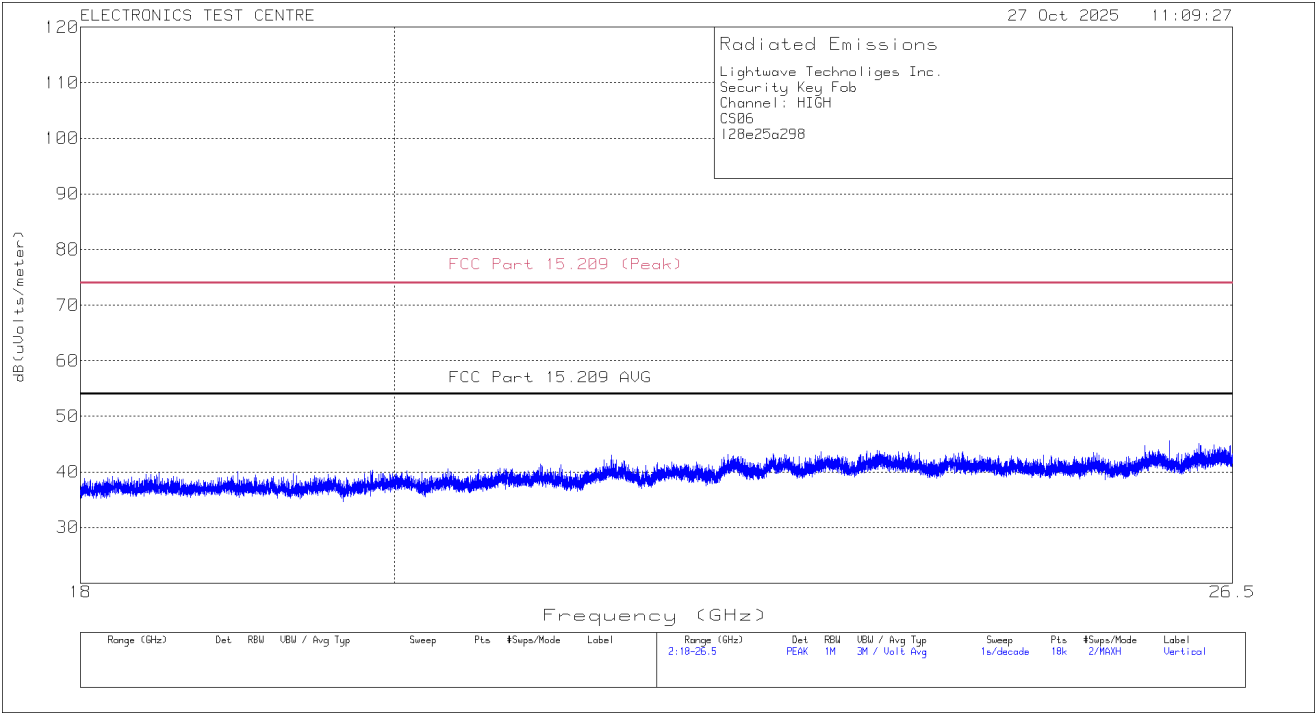
Plot of Radiated Emissions: Vertical polarization



Plot of Radiated Emissions: Horizontal polarization



Plot of Radiated Emissions: Vertical polarization



2.10 Radiated Emissions (RX Mode)

Test Lab: Electronics Test Centre, Airdrie	EUT: SecureKey Fob
Test Personnel: Joseph Yumol / Imran Akram	Standard: FCC Part 15.109
Date: 2025-10-28 (21.4°C, 14.8% RH)	Basic Standard: ANSI C63.4
	Class: B
EUT status: Compliant	

Frequency (MHz)	FCC Part 15.109 Class B Limit (3m)
30 – 88	40 (dBµV/m)
88 – 216	43.52 (dBµV/m)
216 – 960	46.02 (dBµV/m)
Above 960	53.98 (dBµV/m)
Criteria: The radiated emissions produced by a device, measured at a distance of 3 meters, shall not exceed the limits as specified.	

2.10.1 Test Guidance:

From 30 MHz to 1000 MHz, measurements are performed with a broadband biconilog antenna and a resolution bandwidth of 120 kHz.

Above 1000 MHz, measurements are performed with a DRG Horn antenna or a Standard Gain horn, and a resolution bandwidth of 1 MHz.

The scan is performed at discreet increments of turntable azimuth and stepped antenna height, with peak detector and Max Hold function which are selected in accordance with the applicable standard in order to assure capture of frequencies of interest. Optimization is performed based on the scan data.

After the pre-scan is completed, the frequencies of interest are optimized. The EUT is rotated in azimuth over 360 degrees and the direction of maximum emission is noted.

Antenna height is varied from 1 – 4 meters at this azimuth to obtain the maximum emission. Then the maximum level is measured with the appropriate detector and recorded. This may produce a different reading than the pre scan trace. Up to 1 GHz, measurements are performed with a Quasi-Peak detector. Above 1 GHz, measurements are recorded with Peak and/or Average detectors, as applicable.

2.10.2 Deviations From The Standard:

There were no deviations from the EUT setup or methodology specified in the standard.

2.10.3 Test Equipment

Testing was performed with the following equipment:

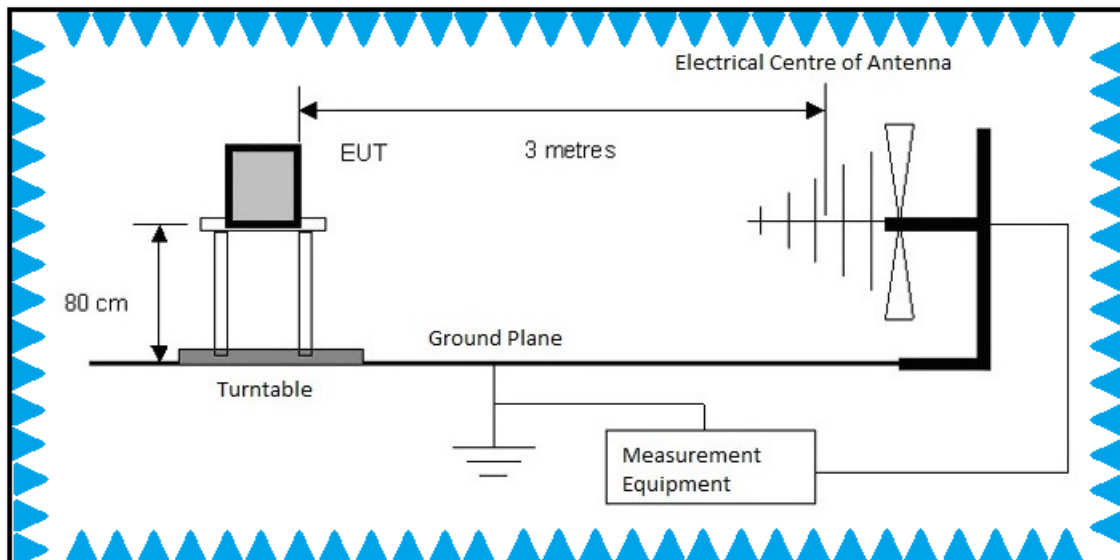
Equipment	Manufacturer	Model #	Asset #	Cal. Date (yyyy-mm-dd)	Cal. Due (yyyy-mm-dd)
EMC Software	UL	Ver. 9.5	SWC 021	N/A	
EMI receiver	Agilent	N9038A (FW A.22.08)	6906	2025-01-10	2026-01-10
Biconilog Antenna (30 – 1000 MHz)	AR	JB1	6905	2023-11-29	2025-11-29
DRG Horn (1000 – 18000 MHz)	Tensor	4105	9588	2025-07-28	2027-07-28
Humidity/Temp Logger	Extech Ins. Corp.	42270	5892	2025-05-01	2026-05-01
Pre-Amplifier (30 – 1400 MHz)	HP	8447D	9291	2025-01-21	2026-01-21
Low Noise Amplifier (1 – 18 GHz)	MITEQ	JS43-01001800-21- 5P	4354	2025-01-21	2026-01-21
RE Cable below 1GHz	Insulated Wire Inc.	KPS-1501A-3600- KPA-01102006	4419	2025-01-21	2026-01-21
Re Cable Above 1 GHz	A.H. System Inc.	SAC-26G-8.23	6187	2025-01-21	2026-01-21

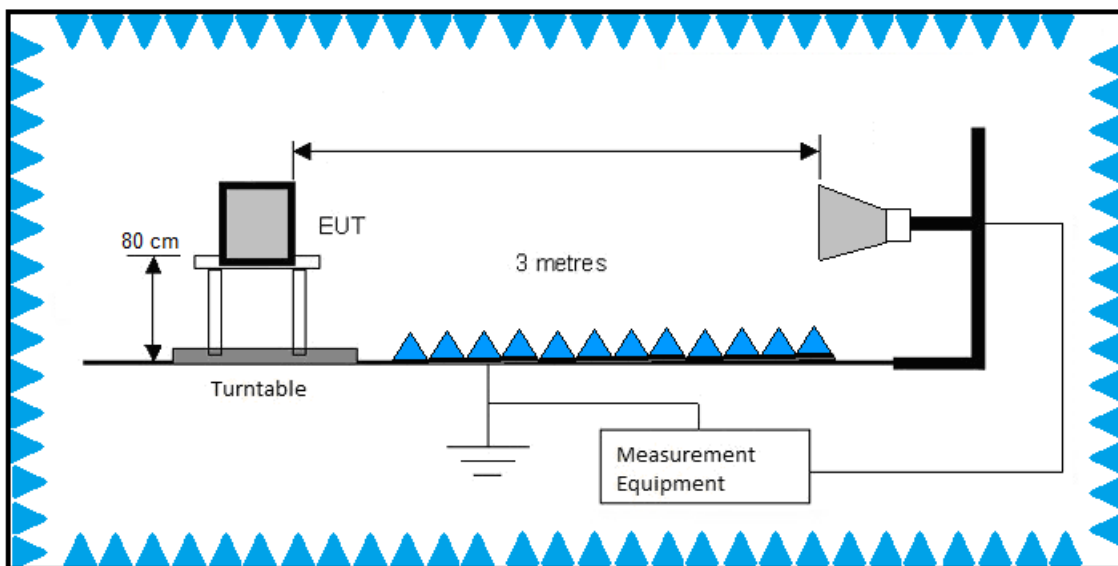
2.10.4 Test Sample Verification, Configuration & Modifications

To cover the unintentional radiated emission. The EUT was configured in receive mode. Unit was placed at the center of turntable in semi-anechoic chamber 80cm above the ground plane and at a distance of 3m from the test receive antenna.

The EUT met the requirements without modification.

EUT RX configuration Block Diagram for Radiated Emissions testing:





2.10.5 Radiated Emissions Data:

The emissions data are presented in tabular form, showing turntable azimuth, antenna height and polarization, the uncorrected spectrum analyzer reading, the correction factors applied, the net result, the value of the limit at the frequency investigated, and the Delta between the result and the limit.

Meter Reading in dBμV + Antenna Factor in dB/m + Gain/Loss Factor in dB = Corrected Field Strength in dBμV/m.

Delta = Field Strength – Limit

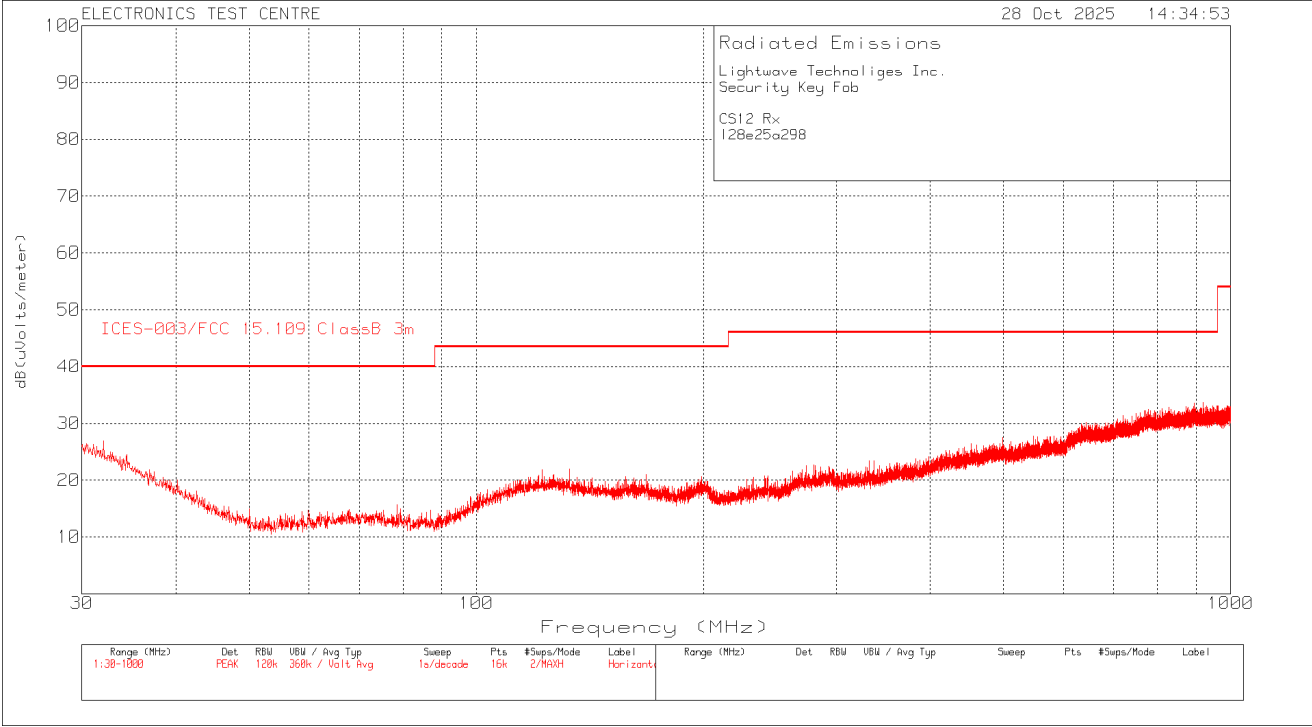
Notes:

- When a preamp is used, the resulting gain is compensated, producing a negative value for the Cable Loss.
- Measurements reported are the result of adjusting the turntable azimuth and antenna height to obtain the maximum EUT emission. This may produce a different reading than the plot trace. The plot is a Peak Hold function obtained at discreet increments of height and azimuth, while the reported measurement is obtained with the appropriate Quasi Peak or Average detector after the height and azimuth have been adjusted for maximum emission.
- In Transmit mode, the EUT was assessed up to 13.0 GHz.

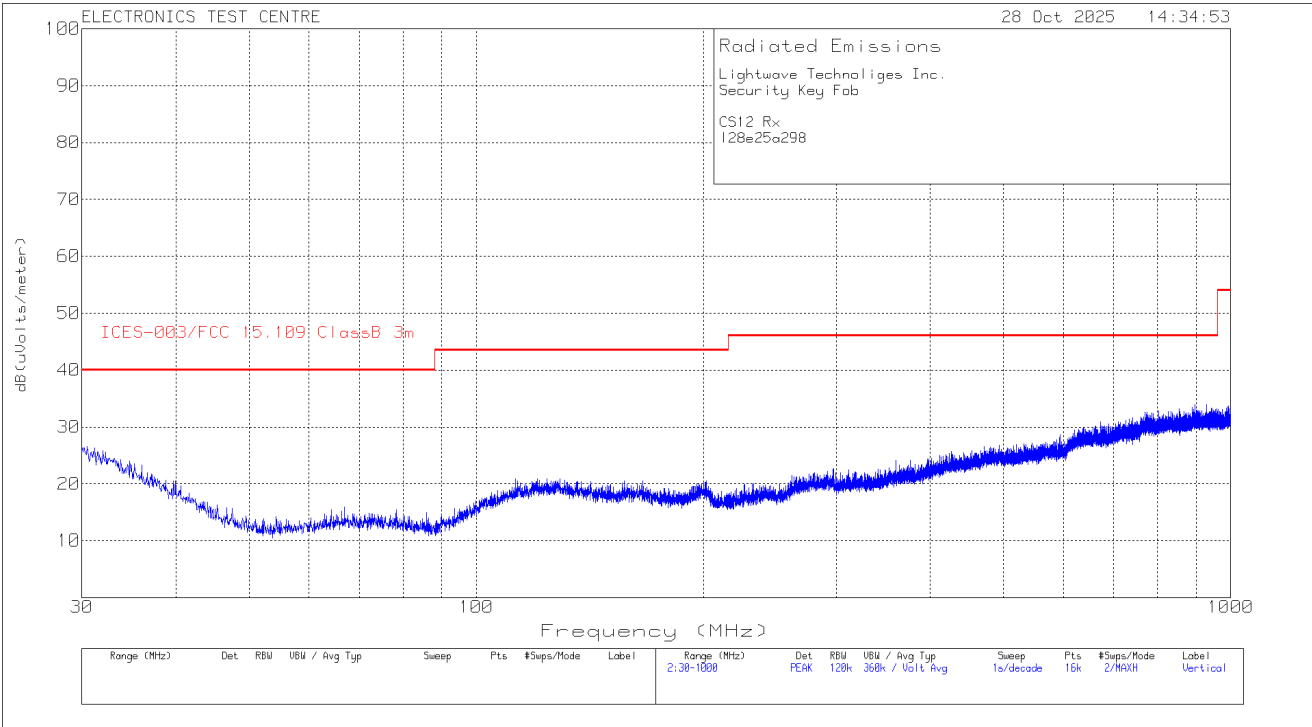
Negative values for Delta indicate compliance.

Freq. Marker	Freq. [GHz]	Raw reading [dBμv]	Det	Antenna Factor [dB/m]	Pre amp Gain [dB]	Corrected Reading [dBμv/m]	FCC 15.109 Class B Limit [dBμv/m]	Delta [dB]	Azimuth [Deg]	Height [cm]	Polarization
1	11.7987	37.75	PK	39.8	-23.3	54.25	74	-19.75	81	393	Vertical
		24.39	AV			4.089	54	-13.11			

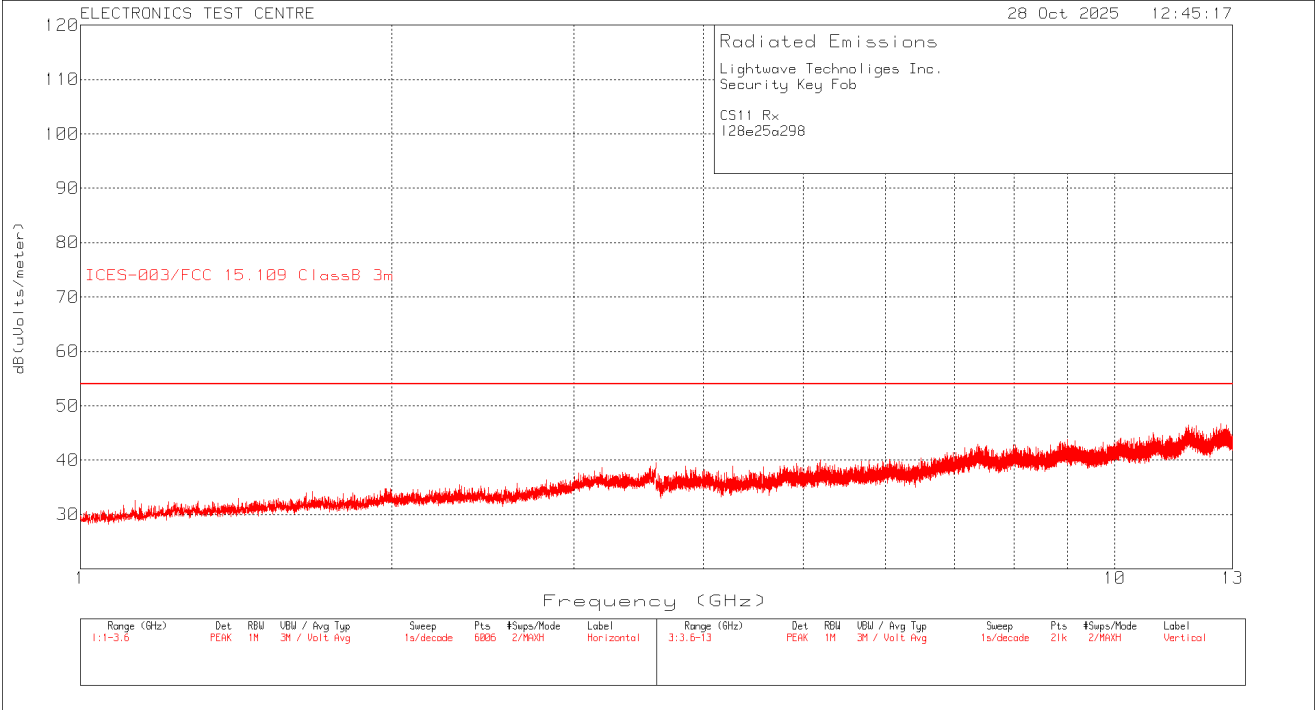
Plot of Radiated Emissions: Horizontal polarization



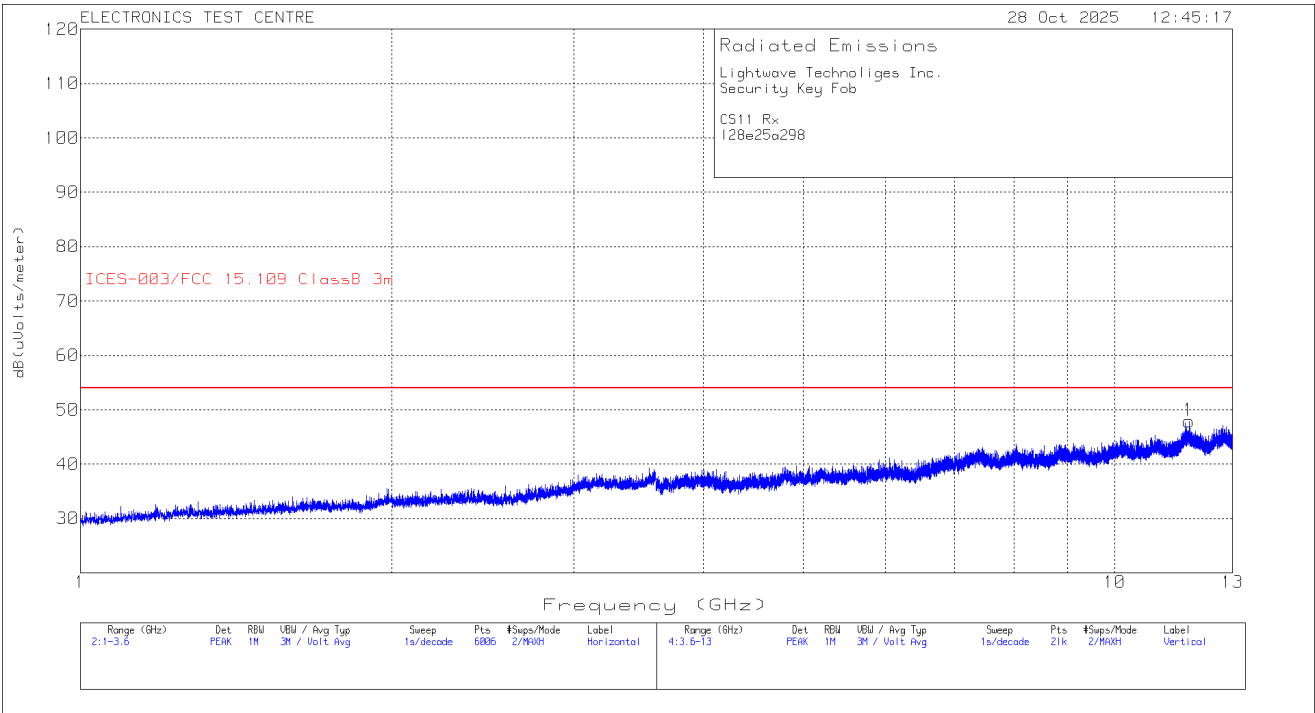
Plot of Radiated Emissions: Vertical polarization



Plot of Radiated Emissions: Horizontal polarization



Plot of Radiated Emissions: Vertical polarization



2.11 RF Exposure

Test Lab: Electronics Test Centre, Airdrie	EUT: SecureKey Fob
Test Personnel:	Standard: FCC PART 15.247
Date:	
EUT status: Exempt from SAR Evaluation	

Compliant: RF exposure assessment to be provided in a separate Exhibit.

3.0 TEST FACILITY

3.1 Location

The SecureKey Fob was tested at the Electronics Test Centre laboratory located in Airdrie, Alberta, Canada. The Radio Frequency Anechoic Chamber (RFAC), identified as Chamber 1, has a usable working space measuring 10.6 m long x 7.3 m wide x 6.5 m high.

The test site is listed with Industry Canada as per registration file # 2046A. This site is also listed with the FCC under Registration Number 175004 and the MRA designation number CA2046.

The floor, walls and ceiling consist of annealed steel panels. The walls and ceiling are covered with ferrite tile, augmented by RF absorbant foam material on the end wall nearest the turntable, and on the adjacent walls and the ceiling. The chamber floor supports a 15 cm high internal floor, constructed of annealed steel panels, that forms the ground plane, and is bonded to the chamber walls.

The 3-m diameter turntable is flush-mounted with the floor. A sub-floor cable-way is provided to route cables between the turntable pit and EUT support equipment located in the Control Room. Cables reach the EUT through an opening in the centre of the turntable.

Test instrumentation and EUT support equipment is located in the Control Room, consisting of two shielded vestibules joined together at the side of the main room. Cables are routed through bulkhead panels between the rooms and the test chamber as required. Power feeds are routed into the main room and vestibules through line filters providing at least 100 dB of attenuation between 10 kHz and 10 GHz.

Either floor mounted or table-top equipment can be tested at this facility.

3.2 Grounding Plan

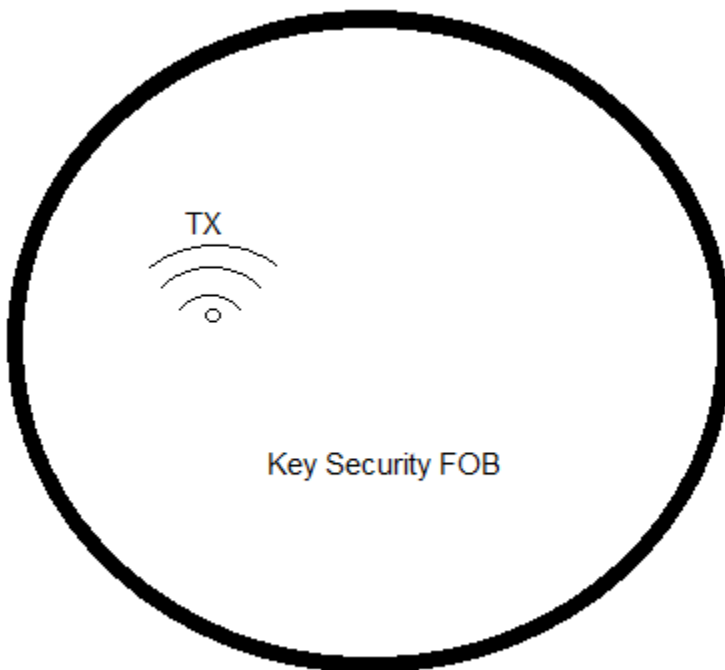
The SecureKey Fob was placed at the center of the test chamber turntable 80-cm high below 1GHz and at 1.5m high above 1 GHz for transmits mode and 80cm high for RX mode from ground reference plane. SecureKey Fob is not grounded.

3.3 Power Supply

Power supplied with fully charged internal battery.

Appendix A – Test Setup Block Diagram

TX MODE:



End of Document