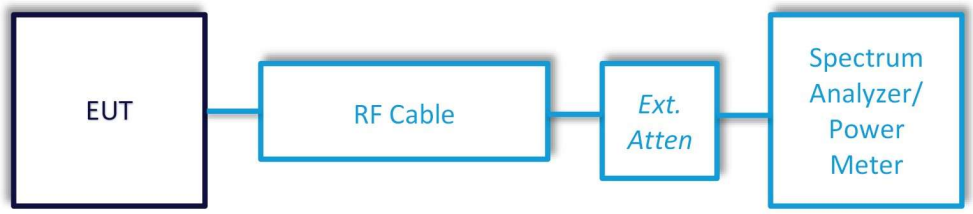
5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter. The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.
Example Calculations	Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm) Margin (dB) = Limit (dBm) – Corrected Reading (dBm)

Block Diagram



5.1.1 Antenna Port Conducted Emissions – RF Output Power

Operator	Anthony Smith	**QA**	Adam Alger
Temperature	20.7°C	**R.H. %**	29.4%
Test Date	3/9/2023	**Location**	Conducted RF Bench
Requirement	FCC 15.247 RSS-247	**Method**	ANSI C63.10

Limits: <30dBm

Test Parameters

Frequency	2400-2483.5 MHz	**Setup**	Conducted
RBW	3 MHz	**VBW**	50 MHz
Detector(s)	Peak	**Settings**	Trace Max Hold

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960173	Cable	A.H. Systems, Inc.	SAC-26G-1	388	6/13/2023	6/12/2024	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/11/2023	4/11/2024	Active Calibration

EUT Parameters

Input Power	12VDC	**Mode**	802.15.4 250kbit
Frequency	2405, 2440, 2475, 2480 MHz	**Channel**	11, 18, 25, 26
Notes	Power Index: 7 for channels 11, 18, and 25; -8 for channel 26		

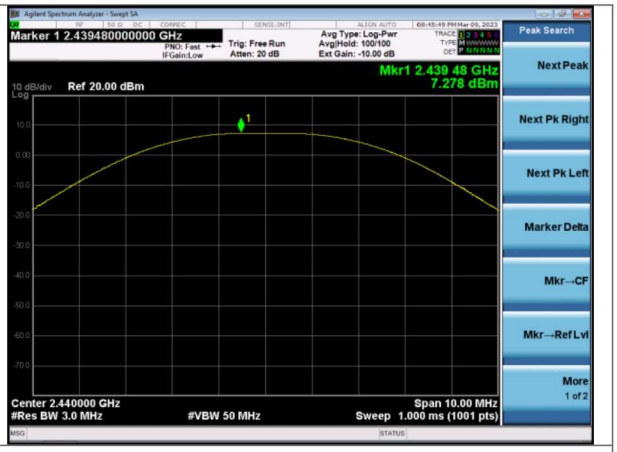
Data

Table

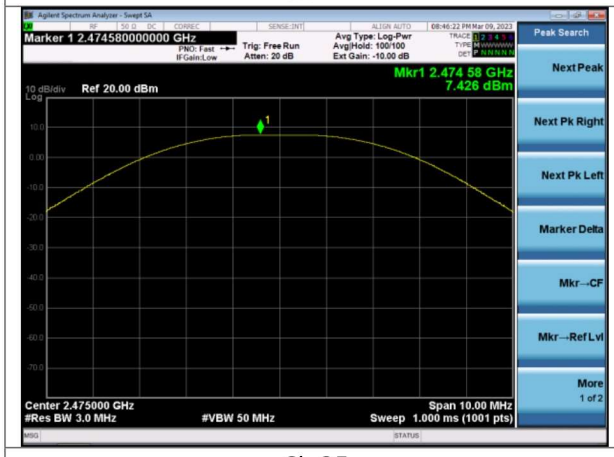
Channel	Mode	Peak Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Transmit Power Setting
11	Zigbee	7.1	30.0	22.9	7
18	Zigbee	7.3	30.0	22.7	7
25	Zigbee	7.4	30.0	22.6	7
26	Zigbee	-7.4	30.0	37.4	-8

Plots

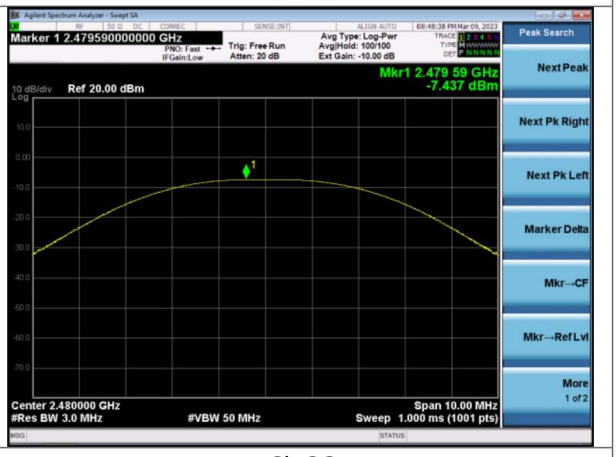
Ch 11



Ch 18



Ch 25



Ch 26

5.1.2 Antenna Port Conducted Emissions – Emissions in Restricted Frequency Bands

Operator	Anthony Smith	**QA**	Adam Alger
Temperature	22.8	**R.H. %**	21.20%
Test Date	3/20/2023	**Location**	Bench
Requirement	FCC 15.247	**Method**	ANSI C63.10 § 11.12.2 Cabinet Radiation method

Limits:

Frequency (MHz)	Quasi Peak Limit (dBµV/m)	Average Limit (dBµV/m)	Peak Limit (dBµV/m)
30-88	40.0	-	-
88-216	43.5	-	-
216-960	46.0	-	-
960-1000	54.0	-	-
1000-25000	-	54.0	74.0

Test Parameters

Frequency	1-25 GHz	**Setup**	Conducted
RBW	1 MHz	**VBW**	3 MHz
Detector(s)	Peak, Average	**Settings**	Peak – Max Hold Average – Trace Average

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960172	Cable	A.H. Systems, Inc.	SAC-26G-1	387	6/13/2023	6/12/2024	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/11/2023	4/11/2024	Active Calibration

EUT Parameters

Input Power	12VDC	**Mode**	802.15.4 250kbit
Frequency	2405, 2440, 2475, 2480 MHz	**Channel**	11, 18, 25, 26
Notes	Power Index: 7 for channels 11, 18, and 25; -8 for channel 26 100% Duty Cycle		

Data

Table

Peak

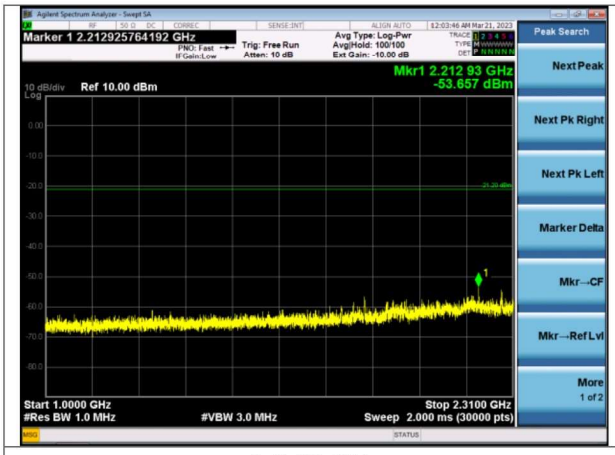
Mode/Channel	Freq (MHz)	Meas. (dBm)	Ant. Gain (dBi)	Corrected Meas. (dBm)	Limit (dBm)	Margin (dB)
11	2341.6	-50.4	3.1	-47.3	-21.2	26.1
25	2483.6	-43.9	3.1	-40.8	-21.2	19.6
26	2483.7	-42.2	3.1	-39.1	-21.2	17.9
25	7423.9	-46.7	3.1	-43.6	-21.2	22.4
18	7318.9	-47.3	3.1	-44.2	-21.2	23.0
11	4809.3	-46.3	3.1	-43.2	-21.2	22.0

Average

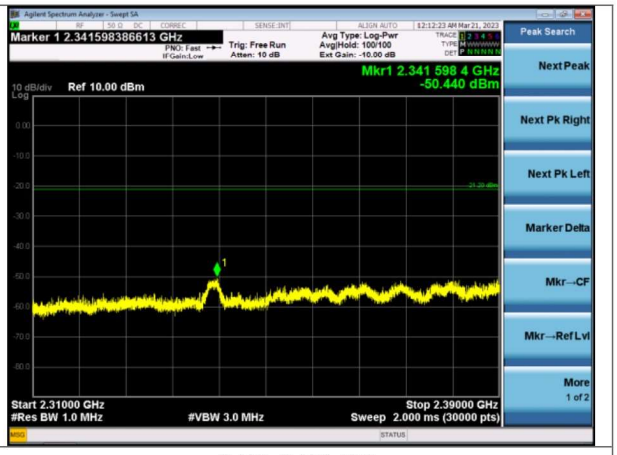
Mode/Channel	Freq (MHz)	Meas. (dBm)	Ant. Gain (dBi)	Corrected Meas. (dBm)	Limit (dBm)	Margin (dB)
11	2341.1	-57.2	3.1	-54.1	-41.2	12.9
25	2483.6	-54.3	3.1	-51.2	-41.2	10.0
26	2483.5	-48.3	3.1	-45.2	-41.2	4.0
25	7426.8	-52.1	3.1	-49.0	-41.2	7.8
18	7318.7	-53.2	3.1	-50.1	-41.2	8.9
11	4809.3	-51.6	3.1	-48.5	-41.2	7.3

Plots

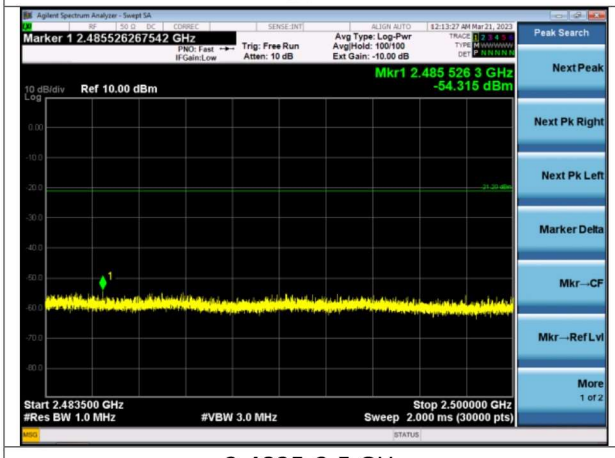
Peak – Worst Case 1-25 GHz, no change in 30-1000 MHz



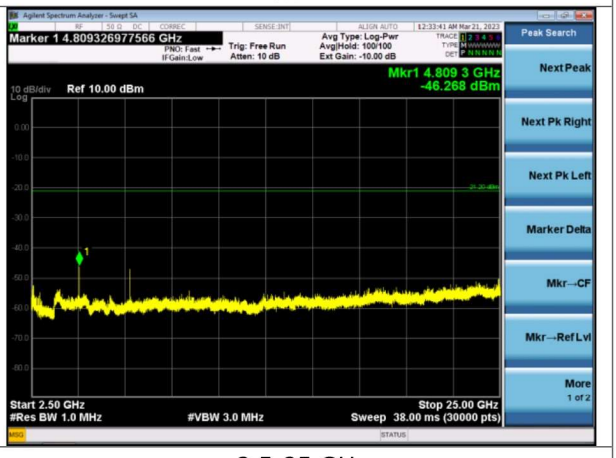
1-2.31 GHz
Ch 11



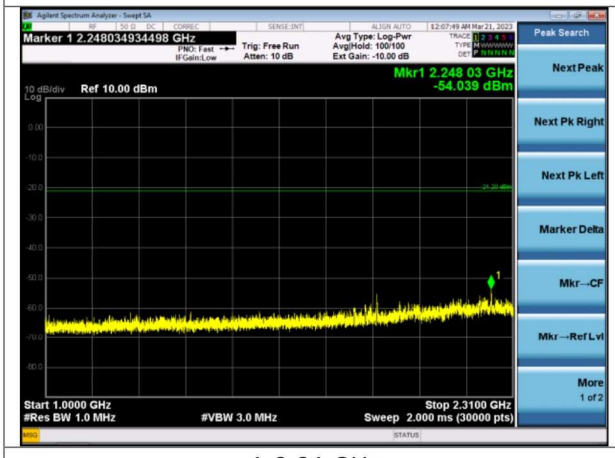
2.31-2.39 GHz
Ch 11



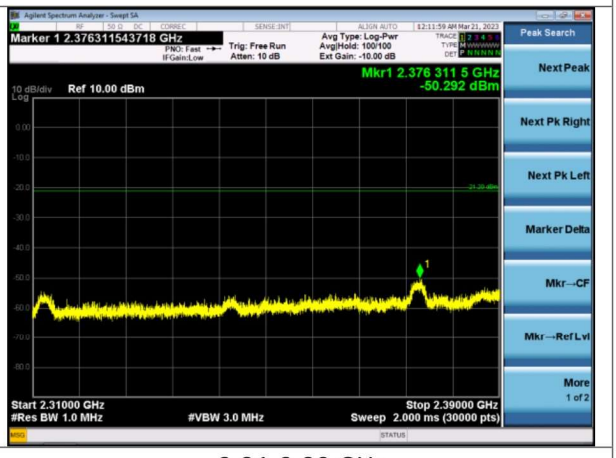
2.4835-2.5 GHz
Ch 11



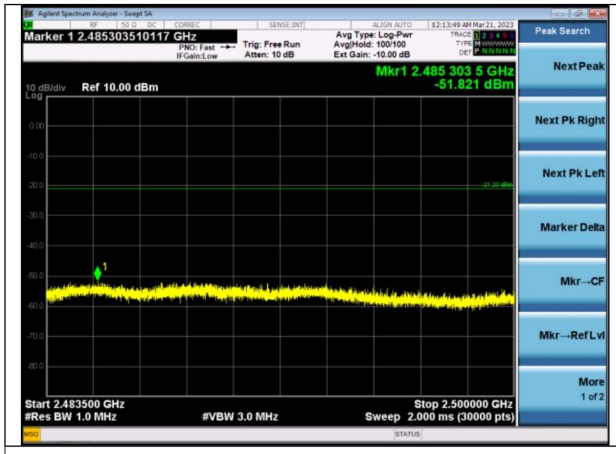
2.5-25 GHz
Ch 11



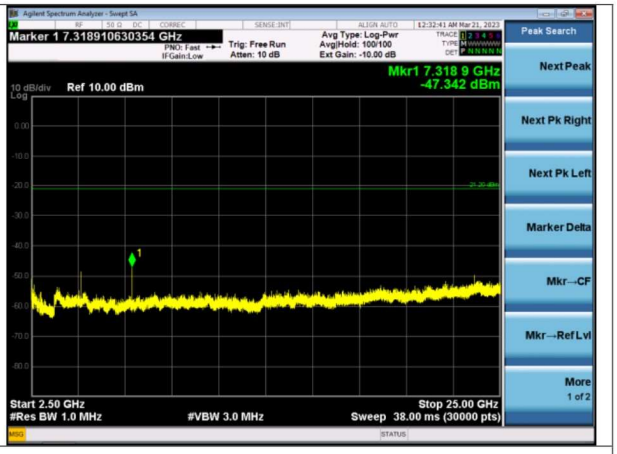
1-2.31 GHz
Ch 18



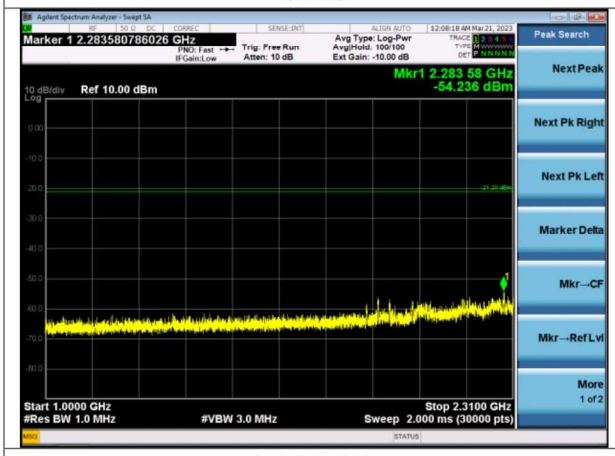
2.31-2.39 GHz
Ch 18



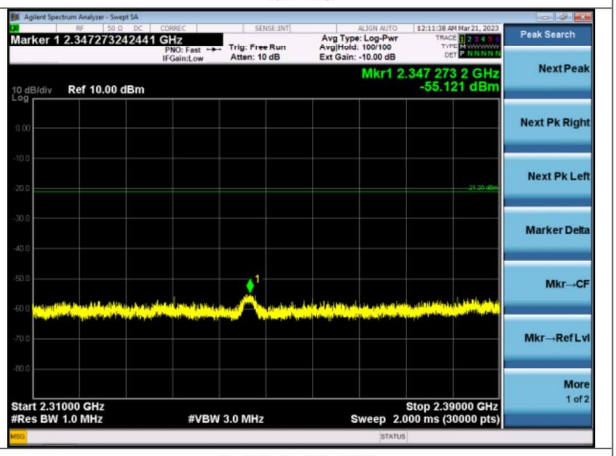
2.4835-2.5 GHz
Ch 18



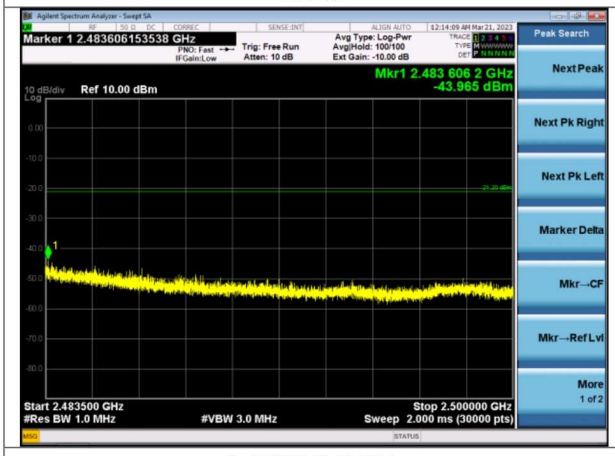
2.5-25 GHz
Ch 18



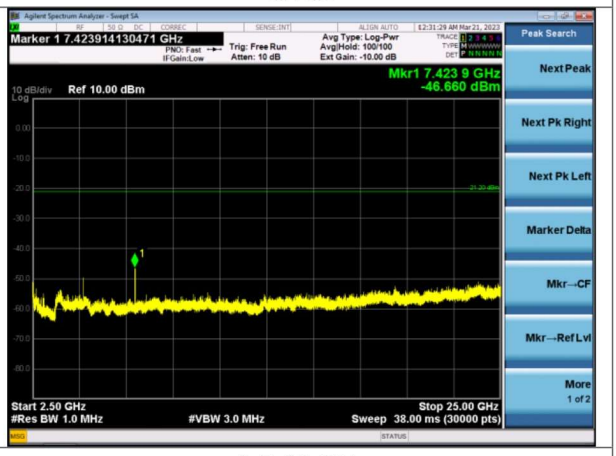
1-2.31 GHz
Ch 25



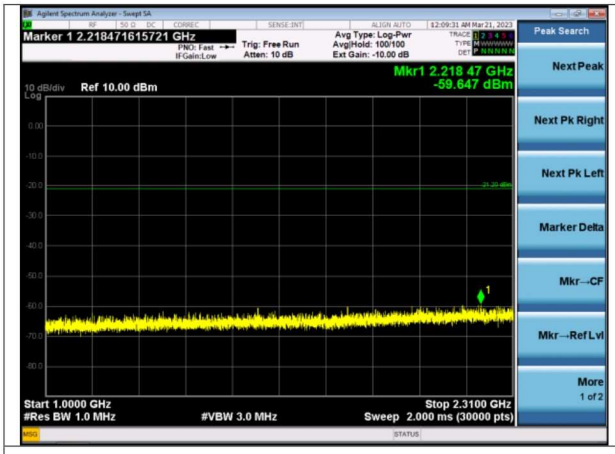
2.31-2.39 GHz
Ch 25



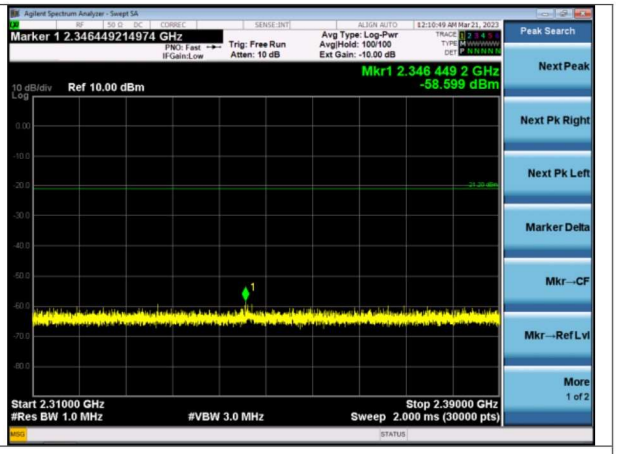
2.4835-2.5 GHz
Ch 25



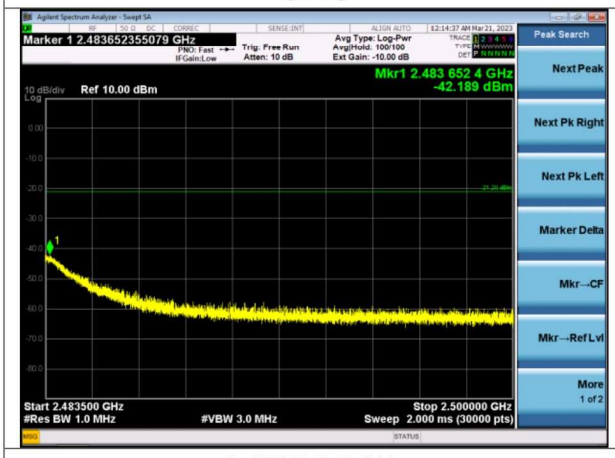
2.5-25 GHz
Ch 25



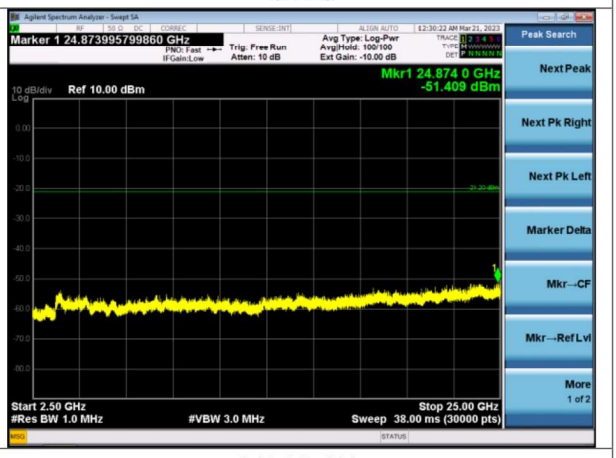
1-2.31 GHz
Ch 26



2.31-2.39 GHz
Ch 26



2.4835-2.5 GHz
Ch 26



2.5-25 GHz
Ch 26