Test Report

Report No	ER1807-2
Client	Honeywell International Inc.
Address	277 West Main Street Niantic, CT 06357
Phone	860-739-4468
Items tested FCC ID IC	e7 Thermostat – Model: 201-528-24-BK, 201-528-24-WH HS9-20152824 573R-20152824
Equipment Type Equipment Code	Digital Transmission System DTS
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	07-20-2017 to 09-06-2017
Results	As detailed within this report
Prepared by	Zachary Johnson – Test Engineer
Authorized by	Jason Haley – Sr. EMC Engineer
Issue Date	10/17/2017
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 22 of this report.

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Report REV Sep-08-2017 - YF

Summary

This test report supports an application for certification of a transmitter operating pursuant to: CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2

The product is the Core Thermostat 24V model. It is a direct sequence spread spectrum transmitter that operates in the 2402MHz to 2480MHz frequency range.

Antenna Type: Surface Mount
Gain: 1.3dBi

We found that the product met the above requirements without modification.

Model tested: Core Thermostat 24V model – Bluetooth Transmitter

Test samples were received in good condition.

Test Methodology

All testing was performed according to the following rules/procedures/documents;
CFR 47 Part 15.247, RSS-247 Issue 2, RSS-Gen Issue 4, FCC KDB 558074 D01 DTS Measurement Guidance v04 and ANSI C63.10-2013.

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) as well as varying the test antenna's height and polarity.

EUT operating voltage is 24V AC.

The following bandwidths were used during radiated spurious and AC line conducted emissions testing.

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz
1-25GHz	1MHz	3MHz

Product Tested - Configuration Documentation

EUT Configuration			
Work Order:	R1807		
Company:	Honeywell International Inc.		
Company Address:	277 West Main Street		
	Niantic, CT, 06357		
Contact:	Ravi Sagar		
	MN	**PN**	**SN**
EUT:	Core Thermostat	--	--
EUT Description:	E7 Thermostat		

Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
H3 RS485	RS-485	1	1	-	No	No	0	in	no	Setup only
H4 BLE	other	1	1	other	No	No	1	in	yes	
5 Pin Mounting plate	other	1	1	other	No	No	0	in	no	Separate from EUT, used for saving settings
Zigbee connector	other	1	1	other	No	No	1	in	yes	
H2 (GND, 12V, and S5 Bus)	--	--	--	--	No	No	2	in	yes	

Software Operating Mode Description:

Thermostat needs to be continuous pinging between 0 and 14 (8) in wire and wireless mode.

Statement of Conformity

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
	3.1		15.19	The label is shown in the label exhibit.
	4		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3, 6.1			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
8.1			15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
8.3			15.203	EUT employs 1.3dBi peak gain surface mount antenna.
8.10			15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-Gen as applicable
8.8			15.207	The unit complies with AC line conducted emissions requirements.

Refer to Appendix A of this report for antenna port conducted measurements.

Test Results

*****All test Data in this report refers to the Bluetooth Low Energy Transmission operating at 24V AC***

Radiated Spurious Emissions

LIMITS

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).
[15.247(d)]

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) and worst case emissions were observed in Y orientation. All the results below are for the worst case orientation only.

MEASUREMENTS / RESULTS

Worst Case Orientation Y used for all Emissions Testing, standing straight up

Curtis Straus - a Bureau Veritas Company					Work Order - R1807				
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 24VAC 60Hz				
30-1000MHz Horizontal Tabular Data					Test Site - CH1				
Operator: Mike Leonard					Temp; Humid; Pres - 24°C; 36%RH; 1007mBar				
BLE Mode 24VAC 60Hz Y Position					EUT Maximum Frequency - 32MHz				
Mid 2440					Req. 1 - FCC CLB				
Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBµV	dB/m	dBµV/m	dbµV/m	dB	Pass/Fail	centimete	degrees	dB
564.526	31.7	-6	25.7	46	-20.3	PASS	198	159	
649.385	27.7	-4.4	23.3	46	-22.7	PASS	225	18	
773.412	21.6	-3.4	18.2	46	-27.8	PASS	125	25	
778.127	21.2	-3.2	18	46	-28	PASS	168	0	
865.84	22.1	-2.4	19.6	46	-26.4	PASS	114	250	
909.124	27.3	-1.4	25.8	46	-20.2	PASS	124	14	-20.2

Curtis Straus - a Bureau Veritas Company					Work Order - R1807				
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 24VAC 60Hz				
30-1000MHz Vertical Tabular Data					Test Site - CH1				
Operator: Mike Leonard					Temp; Humid; Pres - 24°C; 36%RH; 1007mBar				
BLE Mode 24VAC 60Hz Y Position									
Mid 2440					EUT Maximum Frequency - 32MHz				
					Req. 1 - FCC CLB				
Frequency	Raw QP Reading	Correction Factor	Adjusted QP Amplitude	Limit Req 1	Margin Req 1	Test Results Req 1	Antenna Height	EUT Azimuth	Worst Margin Req 1
MHz	dBµV	dB/m	dBµV/m	dBµV/m	dB	Pass/Fail	centimete	degrees	dB
190.098	26.8	-13.2	13.5	43.5	-30	PASS	109	96	
195.725	26.4	-12.5	13.9	43.5	-29.6	PASS	101	340	
476.878	21.6	-7.2	14.3	46	-31.7	PASS	134	160	
648.291	21.5	-4.5	17	46	-29	PASS	225	327	
942.187	21.8	-1.7	20.1	46	-25.9	PASS	100	204	
952.258	23.2	-1.5	21.8	46	-24.3	PASS	175	253	-24.3

30-1000MHz Mid Channel

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 24Vac										
1-6GHz Horizontal Tabular Data					Test Site - CH-1										
Operator: AV					Temp; Humid; Pres - 24°C; 43%RH; 1007mBar										
Low Channel															
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimete	degrees	dB	dB
5963.6	37.8	29.6	5.5	43.3	35.1	74	-30.7	PASS	54	-18.8	PASS	124	206	-30.7	-18.8

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 24Vac										
1-6GHz Vertical Tabular Data					Test Site - CH-1										
Operator: AV					Temp; Humid; Pres - 24°C; 43%RH; 1007mBar										
Low Channel															
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimete	degrees	dB	dB
4803.5	46.7	38.8	2.3	49.1	41.1	74	-24.9	PASS	54	-12.9	PASS	183	172	-24.9	-12.9
5266.9	39.4	29.9	4.6	43.9	34.5	74	-30	PASS	54	-19.5	PASS	283	199		

1-6GHz Low Channel

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 24Vac										
1-6GHz Horizontal Tabular Data					Test Site - CH-1										
Operator: AV					Temp; Humid; Pres - 24°C; 43%RH; 1007mBar										
Center Channel															
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimete	degrees	dB	dB
5276.5	38.5	29.9	4.7	43.1	34.5	74	-30.8	PASS	54	-19.4	PASS	289	76	-30.8	-19.4

Curtis Straus - a Bureau Veritas Company				Work Order - R1807									
Radiated Emissions Electric Field 3m Distance				EUT Power Input - 24Vac									
1-6GHz Vertical Tabular Data				Test Site - CH-1									
Operator: AV				Temp; Humid; Pres - 24°C; 43%RH; 1007mBar									
Center Channel													
Peak readings used for average													
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	dB	dB
5261.5	40	40	4.5	44.5	44.5	74	-29.5	Pass	54	-9.5	Pass	-29.5	-9.5

1-6GHz Mid Channel

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 24Vac										
1-6GHz Horizontal Tabular Data					Test Site - CH-1										
Operator: AV					Temp; Humid; Pres - 24°C; 43%RH; 1007mBar										
High Channel															
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimete	degrees	dB	dB
5655	38.5	29.7	5.6	44	35.3	74	-30	PASS	54	-18.7	PASS	124	125	-30	-18.7

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 3m Distance					EUT Power Input - 24Vac										
1-6GHz Vertical Tabular Data					Test Site - CH-1										
Operator: AV					Temp; Humid; Pres - 24°C; 43%RH; 1007mBar										
High Channel															
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	centimete	degrees	dB	dB
5663.5	38.7	29.8	5.6	44.3	35.4	74	-29.7	PASS	54	-18.6	PASS	298	60	-29.7	-18.6

1-6GHz High Channel

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 1m Distance					EUT Power Input - 24VAC 60Hz										
6-18GHz Horizontal Tabular Data					Test Site - CH1										
Operator: Mike Leonard					Temp; Humid; Pres - 25°C; 50%RH; 1003mBar										
24VAC 60Hz															
BLE 2402MHz Position Y					EUT Maximum Frequency - 32MHz										
					Req. 1 - FCC Class B										
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
7320.5	46.4	38.8	9.6	55.9	48.4	83.5	-27.6	PASS	63.5	-15.1	PASS	177	173		
10587	38.4	28.5	12.2	50.6	40.7	83.5	-32.9	PASS	63.5	-22.8	PASS	182	64		
14147.7	40.2	30.7	17.5	57.6	48.2	83.5	-25.9	PASS	63.5	-15.3	PASS	100	29		
16059.2	37.7	28.8	13.7	51.4	42.5	83.5	-32.1	PASS	63.5	-21	PASS	134	5		
17969.9	32.8	24.8	25.3	58.1	50.1	83.5	-25.4	PASS	63.5	-13.4	PASS	189	224	-25.4	-13.4
Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 1m Distance					EUT Power Input - 24VAC 60Hz										
6-18GHz Vertical Tabular Data					Test Site - CH1										
Operator: Mike Leonard					Temp; Humid; Pres - 25°C; 50%RH; 1003mBar										
24VAC 60Hz															
BLE 2402MHz Position Y					EUT Maximum Frequency - 32MHz										
					Req. 1 - FCC Class B										
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
7319.3	39.4	30.2	9.6	49	39.7	83.5	-34.5	PASS	63.5	-23.8	PASS	109	59		
10586.5	37.9	28.5	12.2	50.1	40.7	83.5	-33.4	PASS	63.5	-22.8	PASS	200	254		
14104.8	39.5	30.4	17.5	57	47.9	83.5	-26.5	PASS	63.5	-15.6	PASS	200	203		
16284.8	36.8	28.5	15	51.9	43.6	83.5	-31.6	PASS	63.5	-19.9	PASS	109	109		
17974.1	34.3	24.7	25.3	59.6	50	83.5	-23.9	PASS	63.5	-13.5	PASS	100	52	-23.9	-13.5

6-18GHz Low Channel

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 1m Distance					EUT Power Input - 24VAC 60Hz										
6-18GHz Horizontal Tabular Data					Test Site - CH1										
Operator: Mike Leonard					Temp; Humid; Pres - 25°C; 50%RH; 1003mBar										
24VAC 60Hz															
BLE 2440MHz Position Y					EUT Maximum Frequency - 32MHz										
					Req. 1 - FCC Class B										
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
7319.1	42.8	34	9.6	52.4	43.5	83.5	-31.1	PASS	63.5	-20	PASS	192	104		
10590.3	44.9	28.5	12.2	57.1	40.7	83.5	-26.4	PASS	63.5	-22.8	PASS	196	133		
12071.1	39.9	29.5	12.5	52.5	42	83.5	-31	PASS	63.5	-21.5	PASS	185	255		
14074	40.3	30.9	17.4	57.7	48.3	83.5	-25.8	PASS	63.5	-15.2	PASS	151	22		
16281.5	36.8	28.4	15	51.8	43.5	83.5	-31.7	PASS	63.5	-20	PASS	145	13		
17715.3	36.6	27.1	24	60.6	51.1	83.5	-22.9	PASS	63.5	-12.4	PASS	124	161	-22.9	-12.4

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 1m Distance					EUT Power Input - 24VAC 60Hz										
6-18GHz Vertical Tabular Data					Test Site - CH1										
Operator: Mike Leonard					Temp; Humid; Pres - 25°C; 50%RH; 1003mBar										
24VAC 60Hz															
BLE 2440MHz Position Y					EUT Maximum Frequency - 32MHz										
					Req. 1 - FCC Class B										
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
7319.3	44.2	36.6	9.6	53.8	46.2	83.5	-29.7	PASS	63.5	-17.3	PASS	153	183		
10589.9	37.4	28.5	12.2	49.6	40.7	83.5	-33.9	PASS	63.5	-22.8	PASS	175	169		
14146	40.7	30.8	17.5	58.1	48.2	83.5	-25.4	PASS	63.5	-15.3	PASS	135	138		
17971.8	36.6	25.5	25.3	61.9	50.8	83.5	-21.6	PASS	63.5	-12.7	PASS	100	51	-21.6	-12.7

6-18GHz Mid Channel

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 1m Distance					EUT Power Input - 24 Vac										
6-18GHz Horizontal Tabular Data					Test Site - Chamber 1										
Operator: Nirak So					Temp; Humid; Pres - 25°C; 45%RH; 1015mBar										
2480MHz BLE Mode in Y positon.															
					EUT Maximum Frequency - 32MHz										
					Req. 1 - FCC Class B										
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Test Results	Average Limit	Average Margin	Average Test Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
14142.3	39.3	30.4	17.5	56.7	47.8	83.5	-26.8	PASS	63.5	-15.7	PASS	175	329		
17898.6	34.5	25.4	25	59.5	50.4	83.5	-24	PASS	63.5	-13.1	PASS	141	214	-24	-13.1

Curtis Straus - a Bureau Veritas Company					Work Order - R1807										
Radiated Emissions Electric Field 1m Distance					EUT Power Input - 24Vac										
6-18GHz Vertical Tabular Data					Test Site - Chamber 1										
Operator: Nirak So					Temp; Humid; Pres - °C; %RH; mBar										
BLE Mode in Y positon.															
					EUT Maximum Frequency - 32MHz										
					Req. 1; Req. 2 - FCC Class B										
Frequency	Raw Peak Reading	Raw Average Reading	Correction Factor	Adjusted Peak Amplitude	Adjusted Average Amplitude	Peak Limit	Peak Margin	Peak Results	Average Limit	Average Margin	Average Results	Antenna Height	EUT Azimuth	Worst Peak Margin	Worst Average Margin
MHz	dBµV	dBµV	dB/m	dBµV/m	dBµV/m	dBµV/m	dB	Pass/Fail	dBµV/m	dB	Pass/Fail	cm	degrees	dB	dB
7440.7	42.5	34.6	9.7	52.3	44.4	83.5	-31.2	PASS	63.5	-19.1	PASS	200	263		
13998.1	39.9	30.2	17.2	57.1	47.4	83.5	-26.4	PASS	63.5	-16.1	PASS	200	288		
17744.7	35.8	26.2	24.1	60	50.3	83.5	-23.5	PASS	63.5	-13.2	PASS	100	15	-23.5	-13.2

6-18GHz High Channel

Radiated Emissions Table

Date: 29-Aug-17 **Company:** Inncom **Work Order:** R1807
Engineer: Zac Johnson **EUT Desc:** Core Thermostat **EUT Operating Voltage/Frequency:** 24V / 60Hz
Temp: 24.2°C **Humidity:** 35% **Pressure:** 999mBar
Frequency Range: 18-25GHz **Measurement Distance:** 0.1 m
Notes: 24V Bluetooth Mode Tested Center Channel **EUT Max Freq:** 2480MHz

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
H / V	No Emissions Found			---	---	---	---	---	---	---	---	---	---	---

Table Result: Pass by --- dB ***Worst Freq:*** --- MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #2328 **Cable 2:** --- **Cable 3:** ---
Analyzer: Brown SA **Preamp:** 18-26.5GHz **Antenna:** 18-26.5GHz Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.188
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

18-25GHz Mid Channel

Radiated Band Edge

Radiated Emissions Table

Date: 18-Jul-17 **Company:** Inncom **Work Order:** R1807
Engineer: Zac Johnson **EUT Desc:** Thermostat **EUT Operating Voltage/Frequency:** 24V / 60Hz
Temp: 25.2C **Humidity:** 47% **Pressure:** 1010
Frequency Range: 2310-2500MHz **Measurement Distance:** 3 m
Notes: Bluetooth Mode **EUT Max Freq:** 2480MHz

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
H	2380.4	22.2	2.2	0.0	32.1	3.4	57.7	37.7	74.0	-16.3	Pass	54.0	-16.3	Pass
H	2390.0	20.5	0.5	0.0	32.2	3.4	56.1	36.1	74.0	-17.9	Pass	54.0	-17.9	Pass
H	2483.5	20.3	0.3	0.0	32.4	3.5	56.2	36.2	74.0	-17.8	Pass	54.0	-17.8	Pass
H	2487.0	23.2	3.2	0.0	32.4	3.5	59.1	39.1	74.0	-14.9	Pass	54.0	-14.9	Pass

Table Result: Pass by -14.9 dB ***Worst Freq:*** 2487.0 MHz

Test Site: EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #2053 **Cable 3:** ---
Analyzer: Rental SA#2 **Preamp:** none **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.188

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Test Equipment Used:

Test Equipment Used								
Rev. 7/29/2017								
Spectrum Analyzers / Receivers /Preselectors	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	8/9/2017	8/9/2016
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/21/2018	12/21/2016
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Green	0.009-2000MHz	ZFL-1000-LN	CS	N/A	802	II	9/19/2017	9/19/2016
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Red-White Bilog	30-2000MHz	JB1	Sunol	A091604-1	1105	I	8/12/2017	8/12/2015
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2084		HTC-1	HDE		2084	II	3/23/2018	3/23/2017
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2051	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2054	9kHz - 18GHz		Florida RF			II	10/30/3017	10/30/2016
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.								

Radiated Emissions 30-1000MHz

Rev. 7/26/2017

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	8/9/2017	8/9/2016
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018	12/21/2016
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
2111 HF Preamp	0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	11/5/2017	11/5/2016
2116 BRF	0.009-18000MHz	BRM50702	Micro-Tronics	G226	2116	II	11/26/2017	11/26/2016
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Black Horn	1-18GHz	3115	EMCO	9703-5148	56	I	8/29/2018	8/29/2016
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2078		HTC-1	HDE		2078	II	3/23/2018	3/23/2017
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #1522	9kHz - 18GHz		Florida RF			II	2/11/2018	2/11/2017
Asset #2051	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2054	9kHz - 18GHz		Florida RF			II	10/30/3017	10/30/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Emissions 1-18GHz

Rev. 8/25/2017

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	7/26/2018	7/26/2017
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	9/16/2017	9/16/2016
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use	date of test
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2084		HTC-1	HDE		2084	II	3/23/2018	3/23/2017
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2328	1 - 26.5GHz	PE350-72	Pasternack	1539		II	2/6/2018	2/6/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Emissions 18-25GHz

Rev. 9/10/2017

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	12/22/2017	12/22/2016
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018	12/21/2016
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/14/2019	2/14/2017
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2078		HTC-1	HDE		2078	II	3/23/2018	3/23/2017
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
Asset #2052	9kHz - 18GHz		Florida RF			II	3/5/2018	3/5/2017
Asset #2053	9kHz - 18GHz		Florida RF			II	10/30/3017	10/30/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Bandedges and Worst Case

AC Line Conducted Emissions

LIMITS

Frequency of emission (MHz)	Quasi-peak limit (dBµV)	Average limit (dBµV)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

[47 CFR 15.207(a)]

MEASUREMENTS / RESULTS

Curtis Straus - a Bureau Veritas Company									Work Order # - R1807			
Conducted Emissions									EUT Power Input - 120VAC/60 Hz			
Peak Detector Tabular Data - Voltage Measurement									Test Site - CEMI-2			
Operator: Michael Mehrmann									Temp; Humid; Pres - 23.4°C;50 %RH;1009 mBar			
EUT Line tested:120 VAC/60Hz; Phase												
									EUT Maximum Freq - 2480MHz			
									Requirement - FCC/CISPR Class B			
Frequency	Raw Peak	Correction	Adjusted I	Quasi-pea	Margin to	Peak to Q	Worst Ma	Average L	Margin to	Peak to Av	Worst Margin	
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB	dBµV	dB	Pass/Fail	dB	
0.51	15.9	20.1	36	56	-20	PASS		46	-10	PASS		
0.638	14.5	20.1	34.6	56	-21.4	PASS		46	-11.4	PASS		
0.766	18.7	20.1	38.8	56	-17.2	PASS	-17.2	46	-7.2	PASS	-7.2	
0.893	16.5	20.1	36.6	56	-19.4	PASS		46	-9.4	PASS		
1.149	14.7	20.1	34.8	56	-21.2	PASS		46	-11.2	PASS		
2.17	14.3	20.2	34.5	56	-21.5	PASS		46	-11.5	PASS		

0.15-30MHz Hot Lead

Curtis Straus - a Bureau Veritas Company						Work Order # - R1807	
Conducted Emissions						EUT Power Input - 120VAC/60 Hz	
Peak Detector Tabular Data - Voltage Measurement						Test Site - CEMI-2	
Operator: Michael Mehrmann						Temp; Humid; Pres - 23.4°C;50 %RH;1009 mBar	
EUT Line tested:120 VAC/60Hz; Neutral							
						EUT Maximum Freq - 32MHz	
						Requirement - FCC/CISPR Class B	
Frequency	Raw Peak	Correction	Adjusted I	Quasi-pea	Margin to	Peak to Q	Worst Margin
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB
0.512	22.7	20.1	42.9	56	-13.1	PASS	
0.766	23.8	20.1	43.9	56	-12.1	PASS	
1.149	22	20.1	42.1	56	-13.9	PASS	
11.664	35.3	20.3	55.6	60	-4.4	PASS	-4.4
11.751	31.3	20.3	51.7	60	-8.3	PASS	
11.837	28	20.3	48.3	60	-11.7	PASS	

0.15-30MHz Neutral Lead Peak

Curtis Straus - a Bureau Veritas Company						Work Order # - R1807				
Conducte	CISPR Average Detector					EUT Power Input - 120VAC/60 Hz				
Final Average Detector Tabular Data - Voltage Measurement						Test Site - CEMI-2				
Operator: Michael Mehrmann						Temp; Humid; Pres - 23.4°C;50 %RH;1009 mBar				
EUT Line tested:120 VAC/60Hz; Neutral										
						EUT Maximum Freq - 32MHz				
						Requirement - FCC/CISPR Class B				
Frequency	Raw Avera	Correctior	Adjusted /	Average L	Average M	Average R	Worst Average Margin			
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail	dB			
0.511	21.5	20.1	41.6	46	-4.4	PASS				
0.639	19	20.1	39.1	46	-6.9	PASS				
0.767	22.5	20.1	42.6	46	-3.4	PASS	-3.4			
1.15	20	20.1	40.1	46	-5.9	PASS				
1.791	17.1	20.1	37.2	46	-8.8	PASS				
1.917	18.3	20.2	38.4	46	-7.6	PASS				

0.15-30MHz Neutral Lead Average

Test Equipment Used:

Rev. 9/10/2017

Spectrum Analyzers / Receivers /Preselectors	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Rental EXA Signal Analyzer(1118473)	9KHz-26.5GHz	N9010A-526;N	AT	MY51170076	1118473	I	5/19/2018	5/19/2017
LISNs/Measurement Probes	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
LISN Asset 1791	9KHz-30MHz	NNLK 8121	Schwarzbeck	NNLK 8121-603	1791	I	6/28/2018	6/28/2017
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI 2	719150		A-0015			III	NA	N/A
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2079		HTC-1	HDE		2079	II	3/23/2018	3/23/2017
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**	**Calibrated on**
CEMI-14	9kHz - 2GHz		C-S			II	10/2/2017	1/2/2016
Attenuators	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
20dB Attenuator-05	9kHz-2GHz	2	Aeroflex/Weinschel	BS9092		II	8/8/2018	8/8/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz) NIST CISPR	 5.6dB 4.6dB	 N/A 5.2dB (Ucispr)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions NIST CISPR	 3.9dB 3.6dB	 N/A 3.6dB (Ucispr)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation: • Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	 3.4% 0.3dB	 5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		

Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("Client"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "Conditions"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "**BUREAU VERITAS," "BUREAU VERITAS CONSUMER PRODUCTS SERVICES," "BVCPS", "MTL", "ACTS", "MTL-ACTS" and CURTIS-STRAUS** (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only were such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.
13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.
14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.

15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B)NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request.
Rev.160009121(2)_#684340 v14CS

Appendix A:

Summary and Test Methodology

This test report is an Appendix to Curtis-Straus Test Report ER1807-2 and includes antenna port RF conducted measurement data to demonstrate compliance with the following rules sections:

CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2

We found that the product met the above requirements without modification.

All testing was performed according to the following rules/procedures/documents;
CFR 47 Part 15.247, RSS-247 Issue 2, RSS-Gen Issue 4, FCC KDB 558074 D01 DTS Measurement Guidance v04 and ANSI C63.10-2013.

Test samples were received in good condition.

Test Results

CFR Title 47 FCC Part §15.247 2400-2483.5 MHz

DUT Information

DUT Name:	24Vac - E7 Thermostat
Manufacturer:	Honeywell International Inc.
Model:	201-528-24-BK, 201-528-24-WH
Comment:	BLE

Frequencies

BLE CH 0 (2402 MHz) BLE CH 19 (2440 MHz) BLE CH 39 (2480 MHz)

Bandwidths

1 MHz

Power

Power Setting 1 (Max Power)

Beamforming Gain

N/A

Antenna Gain

Chip Antenna (1.3dBi)

DUT Settings

No. of transmission chains	1
Digital Modulation	Yes
Frequency Hopping	No
Equipment Type	Other

Hardware Setup: WMS Measurements\TS8997 Hardware Setup

Rev. 9/17/2017

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
FSV40 Spectrum Analyzer	10Hz-40GHz	FSV40	ROHDE & SCHWARZ	101551	2200	I	6/30/2018	6/30/2017

Cables	Range	Mfr	Cat	Calibration Due	Calibrated on
DUT1	30MHz-26GHz	Micro-Coax	II	6/21/2018	6/21/2017

Attenuators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
10dB Attenuator-01 Brown	30MHz-26GHz		Mini Curcuits			II	7/13/2018	7/14/2017

Power/Noise Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
OSP - open switch and control platform	30MHz-18GHz	OSP120	ROHDE & SCHWARZ	101674		I	6/1/2018	6/1/2017

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Summary (2402MHz, Channel 0)

Test	Frequency (MHz)	Result
RF average output power	2402.000	PASS
Peak Power Spectral Density	2402.000	PASS
Minimum Emission Bandwidth 6 dB	2402.000	PASS
Band Edge low	2402.000	PASS
Band Edge high	2402.000	PASS
Tx Spurious Emission	2402.000	PASS

RF average output power (2402 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Combined Uncertainty of absolute Level Measurement (K=2) < 1 dB

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2402.000000	4.5	30.0	5.8	100.000	PASS

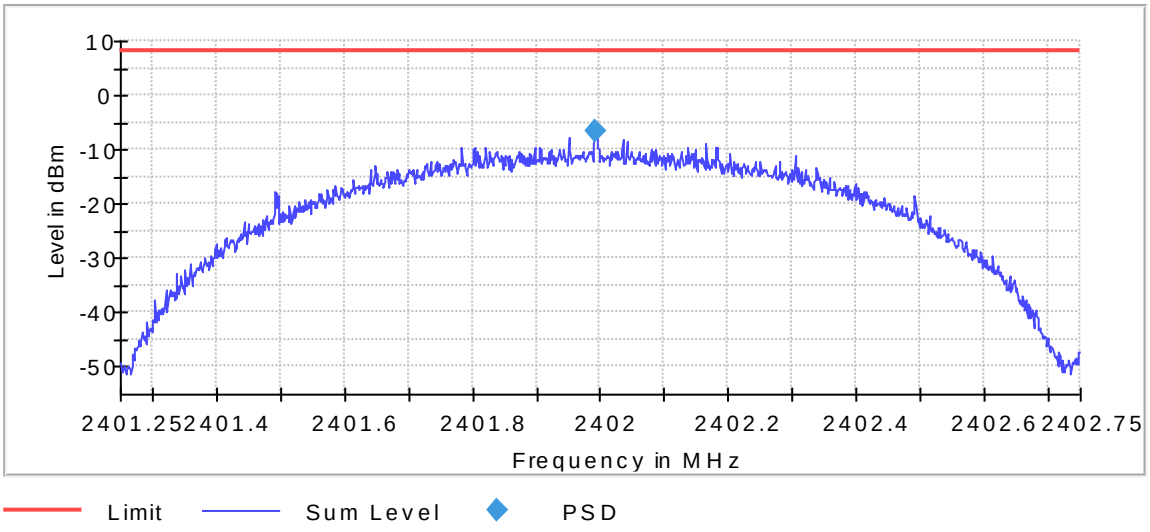
Peak Power Spectral Density (2402 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

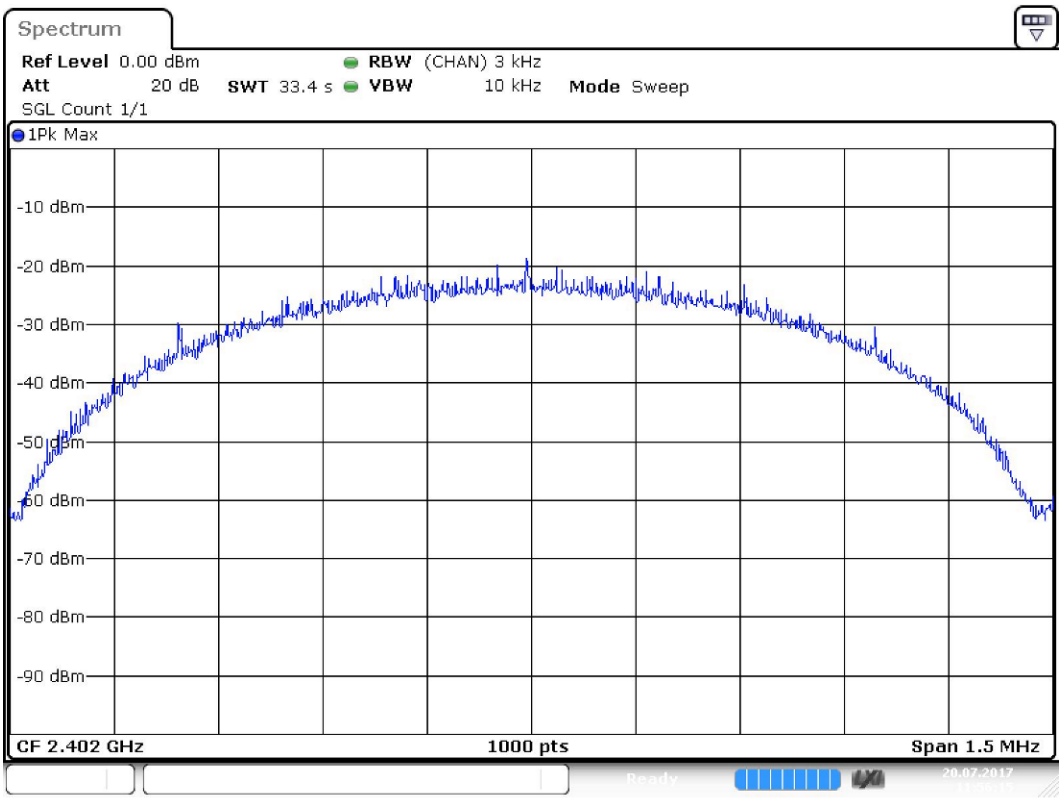
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.3 dB

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2402.000000	2401.992507	-6.508	8.0	PASS



PSD Connector 1



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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40125 GHz	2.40125 GHz
Stop Frequency	2.40275 GHz	2.40275 GHz
Span	1.500 MHz	1.500 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	1000	~ 1000
Sweeptime	33.400 s	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

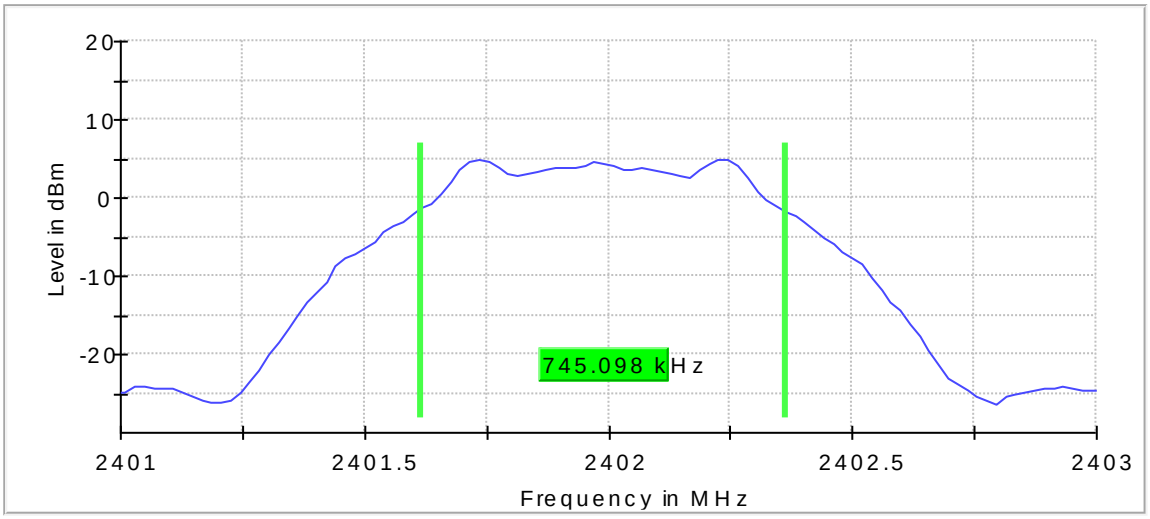
Minimum Emission Bandwidth 6 dB (2402 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

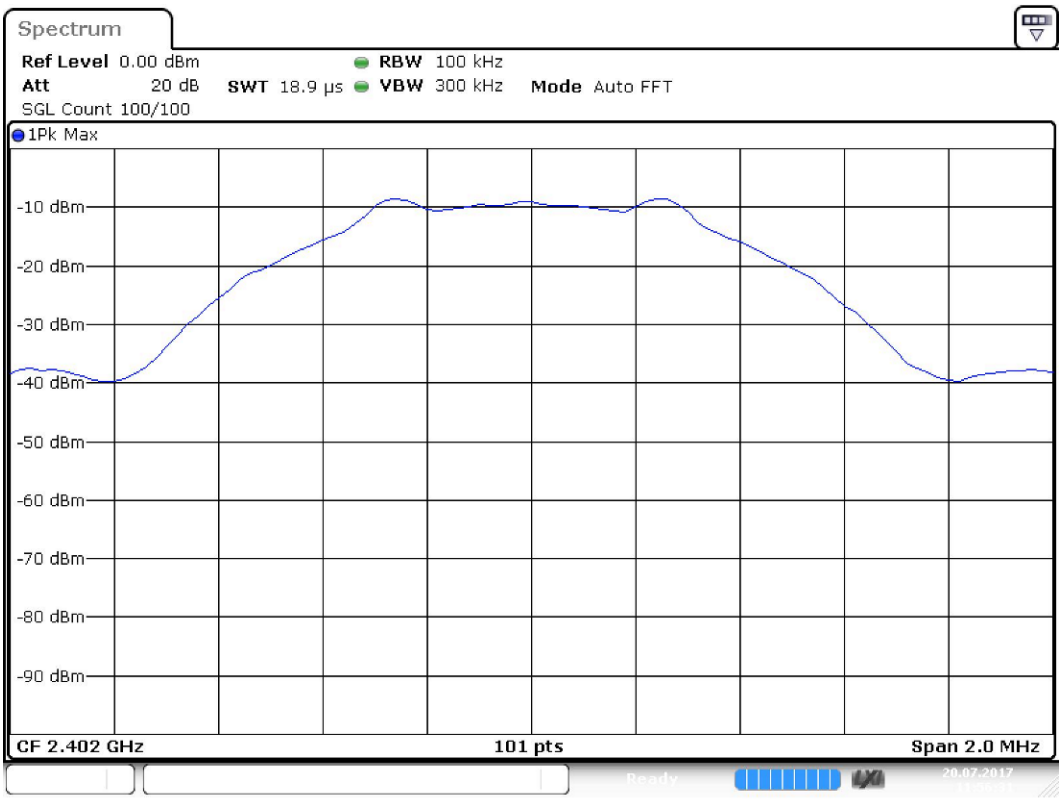
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 2%

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2402.000000	0.745098	0.500000	---	2401.617647	2402.362745	4.9	PASS



Bandwidth



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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 20
Sweeptime	18.938 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	30 / max. 150	max. 150
Stable	15 / 15	15
Max Stable Difference	0.00 dB	0.50 dB

Band Edge low (2402 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.8 dB

Result

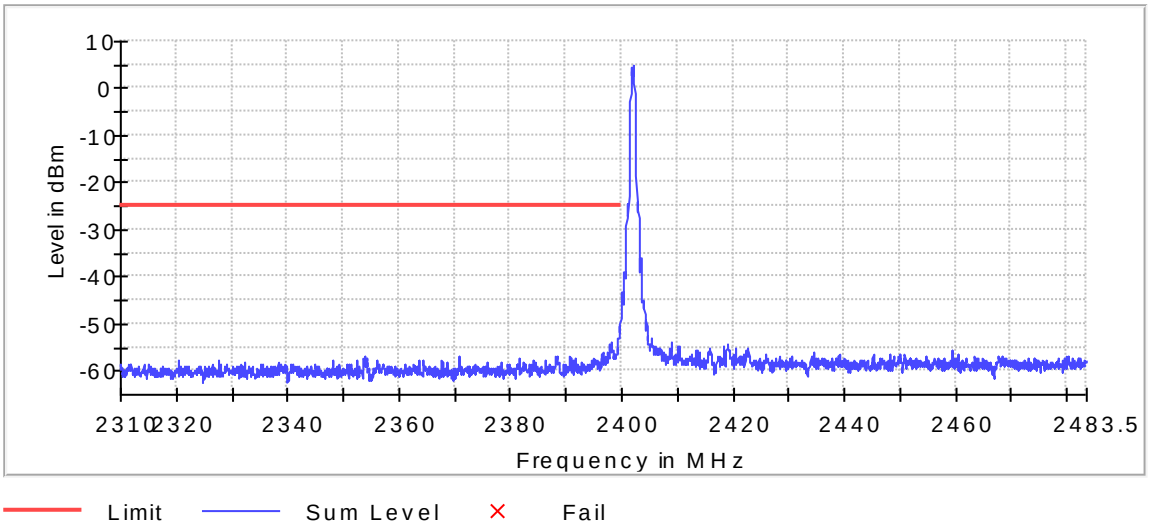
DUT Frequency (MHz)	Result
2402.000000	PASS

Inband Peak

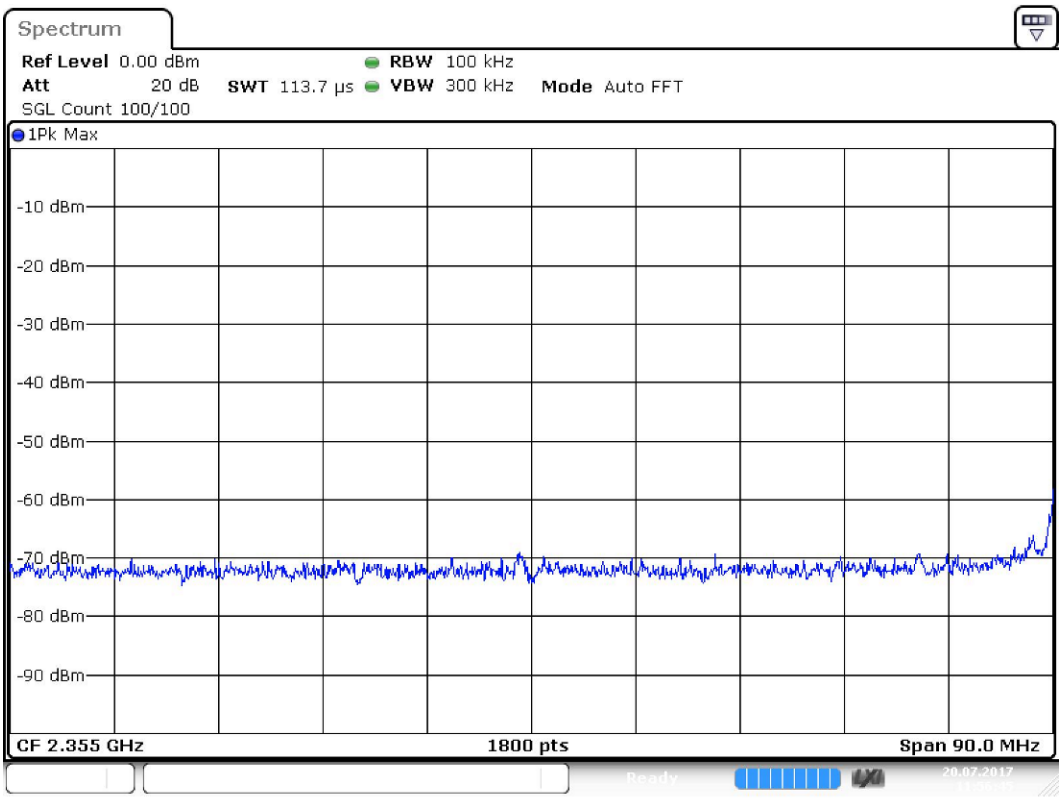
Frequency (MHz)	Level (dBm)
2402.223668	5.1

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.925042	-45.9	21.0	-24.9	PASS
2399.875069	-46.8	21.9	-24.9	PASS
2399.825097	-48.8	23.8	-24.9	PASS
2399.775125	-50.1	25.2	-24.9	PASS
2399.625208	-50.4	25.5	-24.9	PASS
2399.725153	-50.8	25.9	-24.9	PASS
2399.575236	-51.0	26.1	-24.9	PASS
2399.675180	-51.7	26.7	-24.9	PASS
2399.525264	-52.6	27.7	-24.9	PASS
2399.475292	-52.9	28.0	-24.9	PASS
2399.425319	-53.0	28.1	-24.9	PASS
2398.225986	-54.0	29.1	-24.9	PASS
2399.375347	-54.1	29.2	-24.9	PASS
2398.176013	-54.4	29.5	-24.9	PASS
2397.926152	-54.5	29.6	-24.9	PASS



Band Edge Connector 1_0



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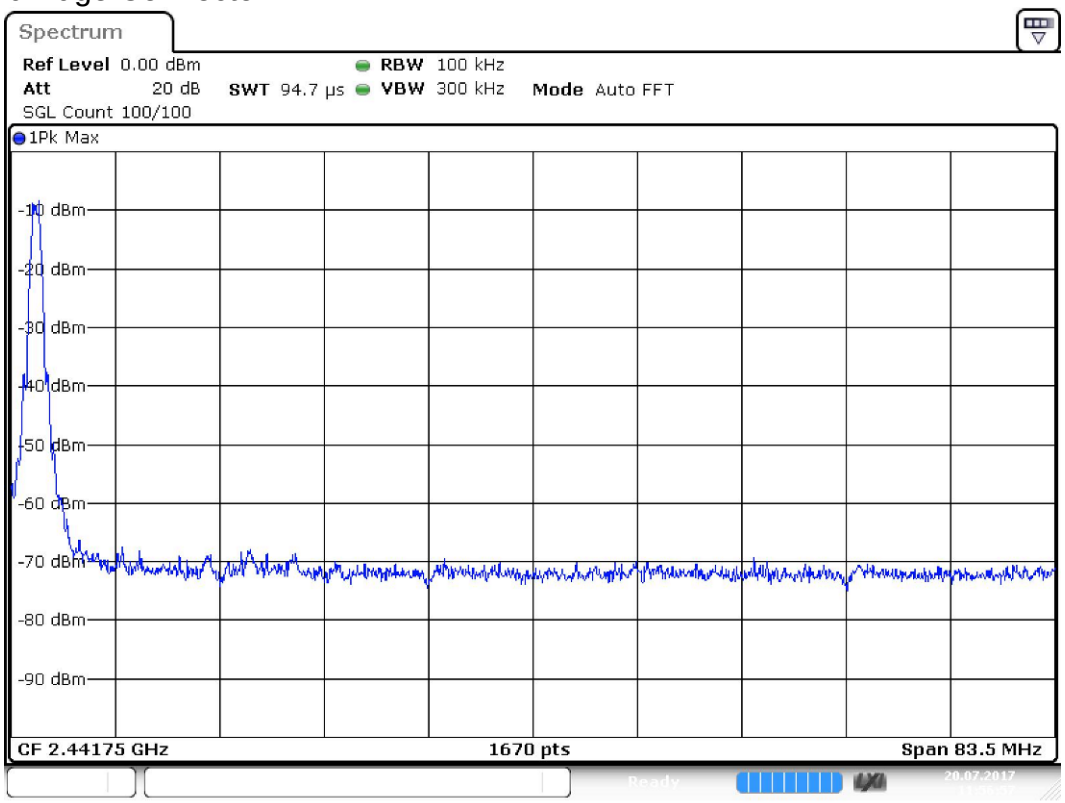
Band Edge Connector



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1_1

Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	5 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.35 dB	0.50 dB

Measurement 2

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.47 dB	0.50 dB

Band Edge high (2402 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.8 dB

Result

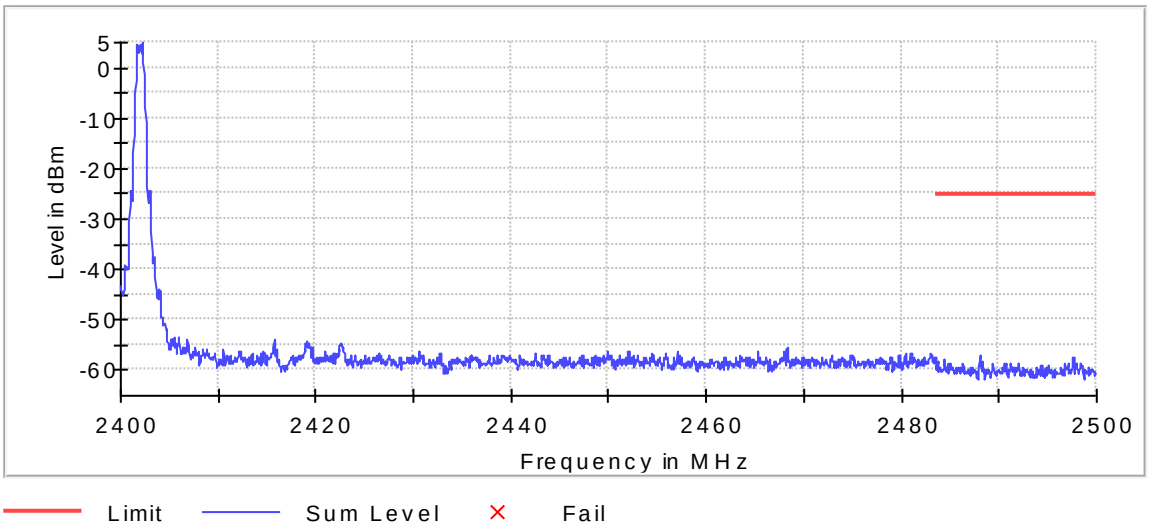
DUT Frequency (MHz)	Result
2402.000000	PASS

Inband Peak

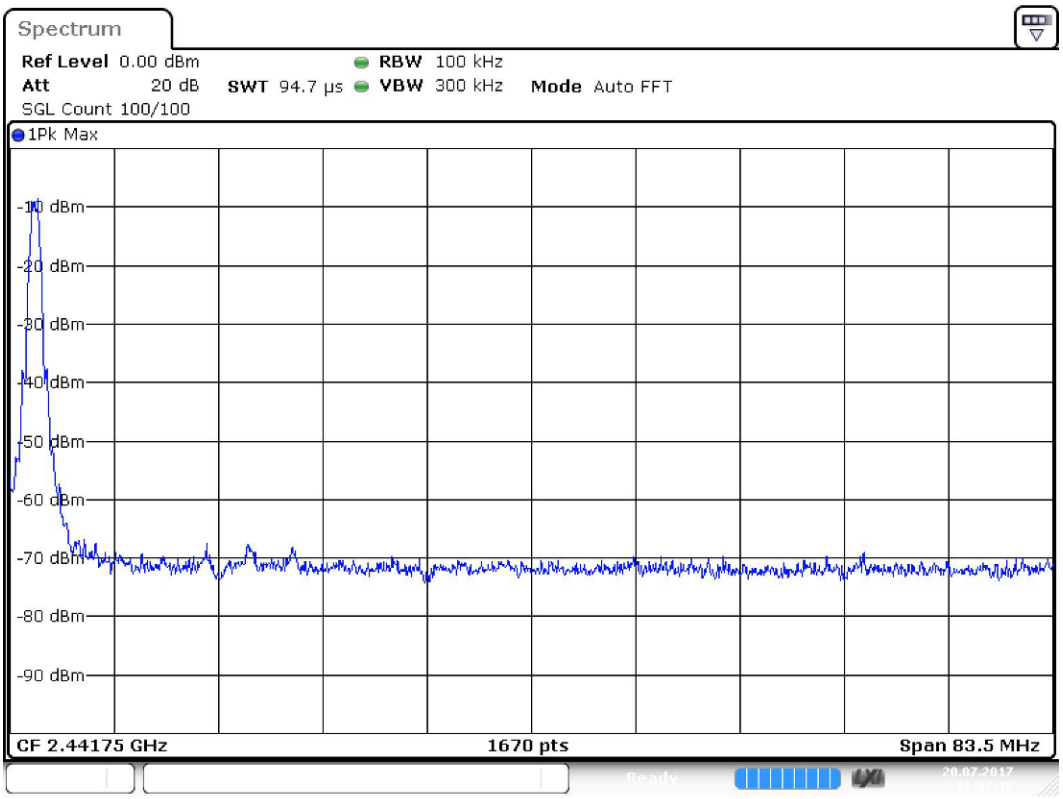
Frequency (MHz)	Level (dBm)
2402.223668	5.0

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2488.061178	-57.1	32.1	-25.0	PASS
2488.011329	-57.3	32.3	-25.0	PASS
2497.682024	-57.5	32.5	-25.0	PASS
2497.632175	-57.6	32.5	-25.0	PASS
2488.111027	-57.6	32.5	-25.0	PASS
2484.372356	-57.9	32.9	-25.0	PASS
2484.422205	-58.1	33.1	-25.0	PASS
2488.310423	-58.4	33.4	-25.0	PASS
2483.774169	-58.4	33.4	-25.0	PASS
2490.553625	-58.5	33.4	-25.0	PASS
2491.151813	-58.5	33.5	-25.0	PASS
2491.999245	-58.5	33.5	-25.0	PASS
2483.724320	-58.5	33.5	-25.0	PASS
2491.201662	-58.5	33.5	-25.0	PASS
2497.981118	-58.5	33.5	-25.0	PASS



Band Edge Connector 1_0



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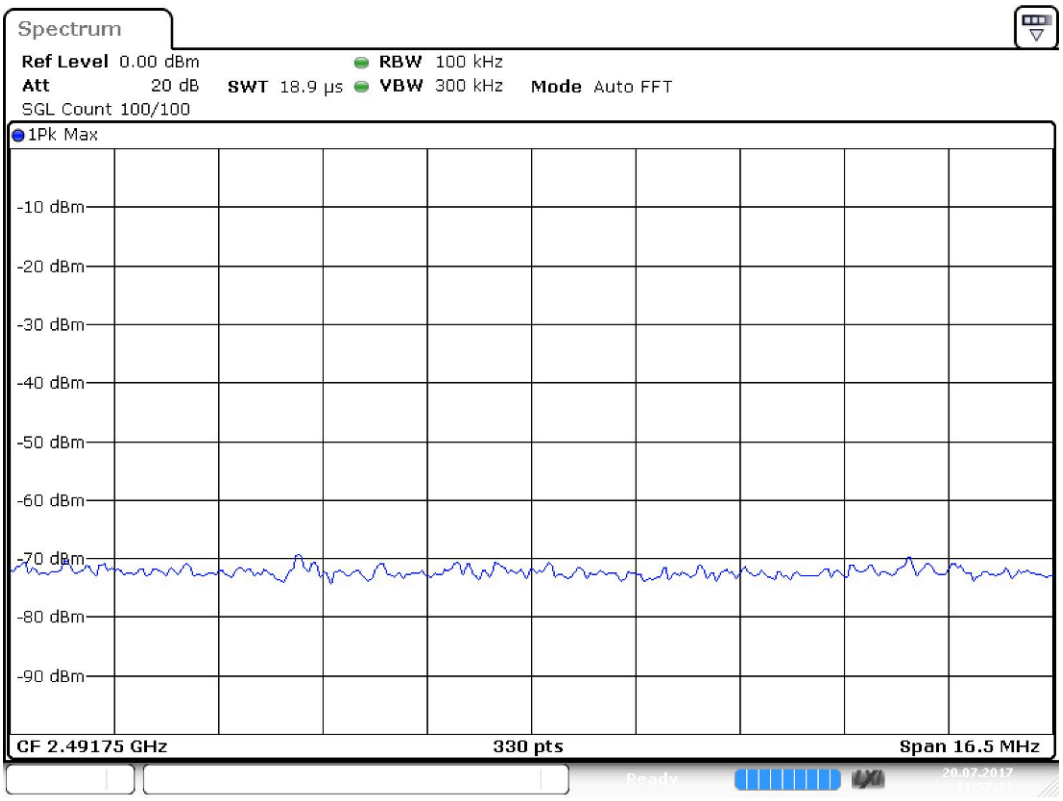
Band Edge Connector 1_1



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Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	9 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.10 dB	0.50 dB

Measurement 2

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	330	~ 330
Sweeptime	18.945 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Tx Spurious Emission (2402 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.8 dB

Result

DUT Frequency (MHz)	Result
2402.000000	PASS

Final measurements

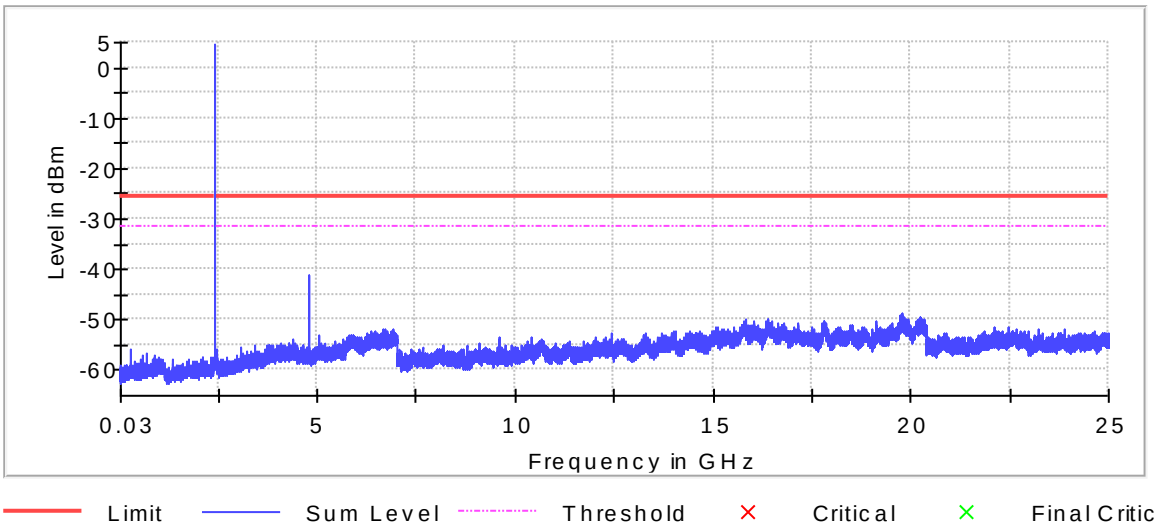
Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

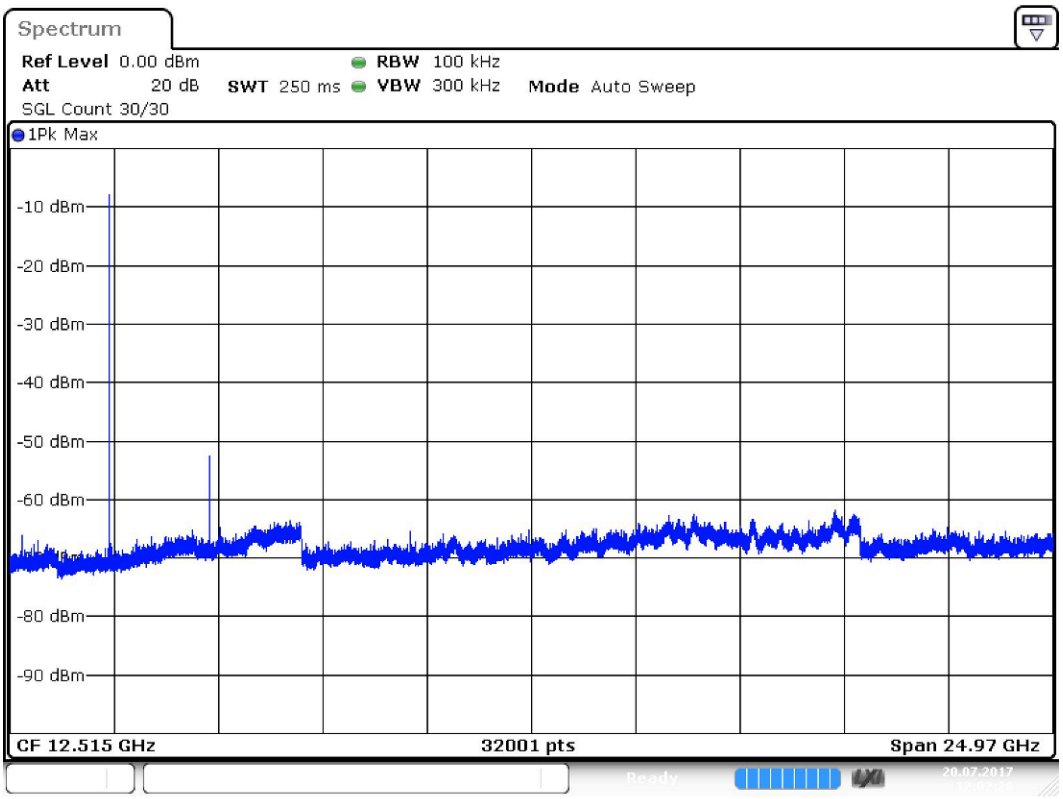
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4804.043654	-41.1	15.5	-25.5
4803.263390	-41.1	15.6	-25.5
4804.823917	-45.7	20.2	-25.5
19774.963909	-48.6	23.0	-25.5
19770.282326	-48.9	23.4	-25.5
19764.040216	-49.0	23.5	-25.5
19751.555997	-49.3	23.7	-25.5
20218.153709	-49.4	23.9	-25.5
19785.887601	-49.5	24.0	-25.5
19819.438941	-49.6	24.0	-25.5
19769.502062	-49.6	24.1	-25.5
20262.628742	-49.6	24.1	-25.5
19926.335073	-49.7	24.2	-25.5
20279.794544	-49.8	24.2	-25.5
19735.170458	-49.8	24.2	-25.5

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	25000.000000	1	1



Spurious Connector 1_0



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Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	32001	~ 320001
Sweeptime	250.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	9 / max. 10	max. 10
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Summary (2440MHz, Channel 19)

Test	Frequency (MHz)	Result
RF average output power	2440.000	PASS
Peak Power Spectral Density	2440.000	PASS
Minimum Emission Bandwidth 6 dB	2440.000	PASS
Band Edge low	2440.000	PASS
Band Edge high	2440.000	PASS
Tx Spurious Emission	2440.000	PASS

RF average output power (2440 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Combined Uncertainty of absolute Level Measurement (K=2) < 1 dB

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2440.000000	4.3	30.0	5.6	100.000	PASS

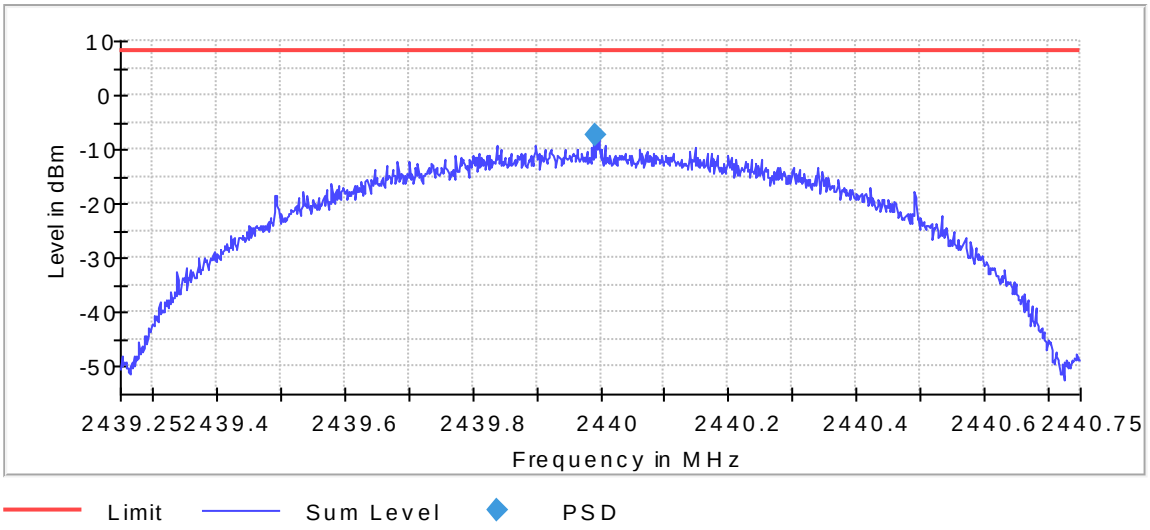
Peak Power Spectral Density (2440 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

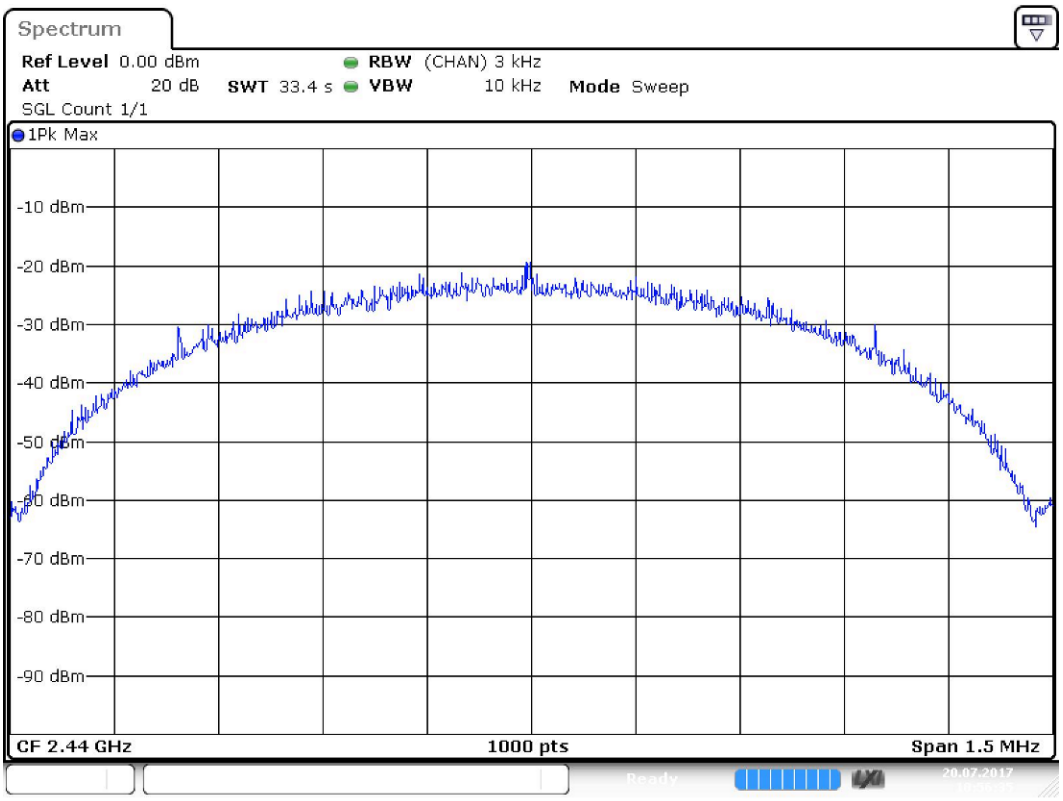
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.3 dB

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2440.000000	2439.992507	-7.219	8.0	PASS



PSD Connector 1



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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43925 GHz	2.43925 GHz
Stop Frequency	2.44075 GHz	2.44075 GHz
Span	1.500 MHz	1.500 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	1000	~ 1000
Sweeptime	33.400 s	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

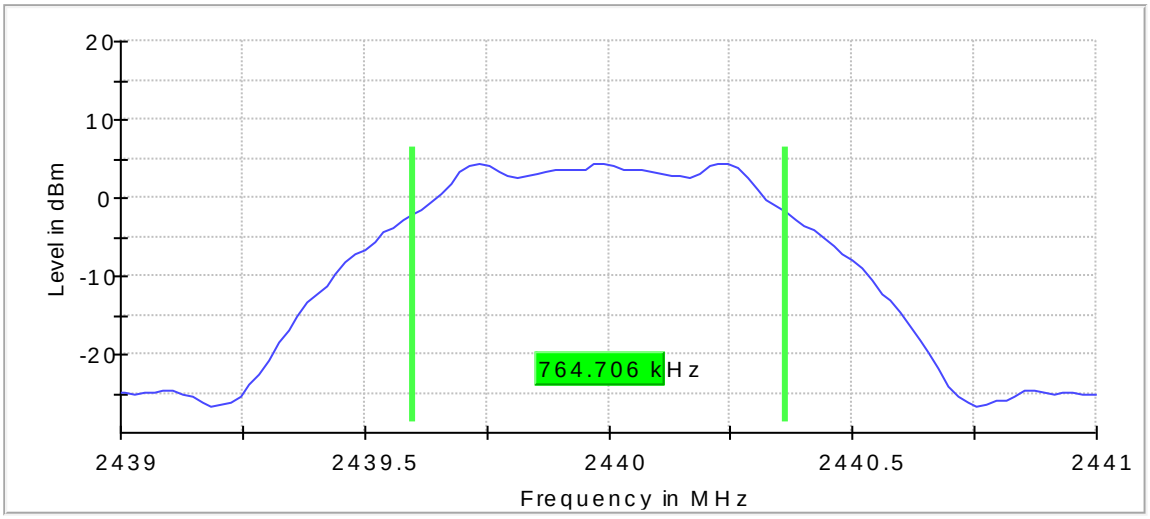
Minimum Emission Bandwidth 6 dB (2440 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

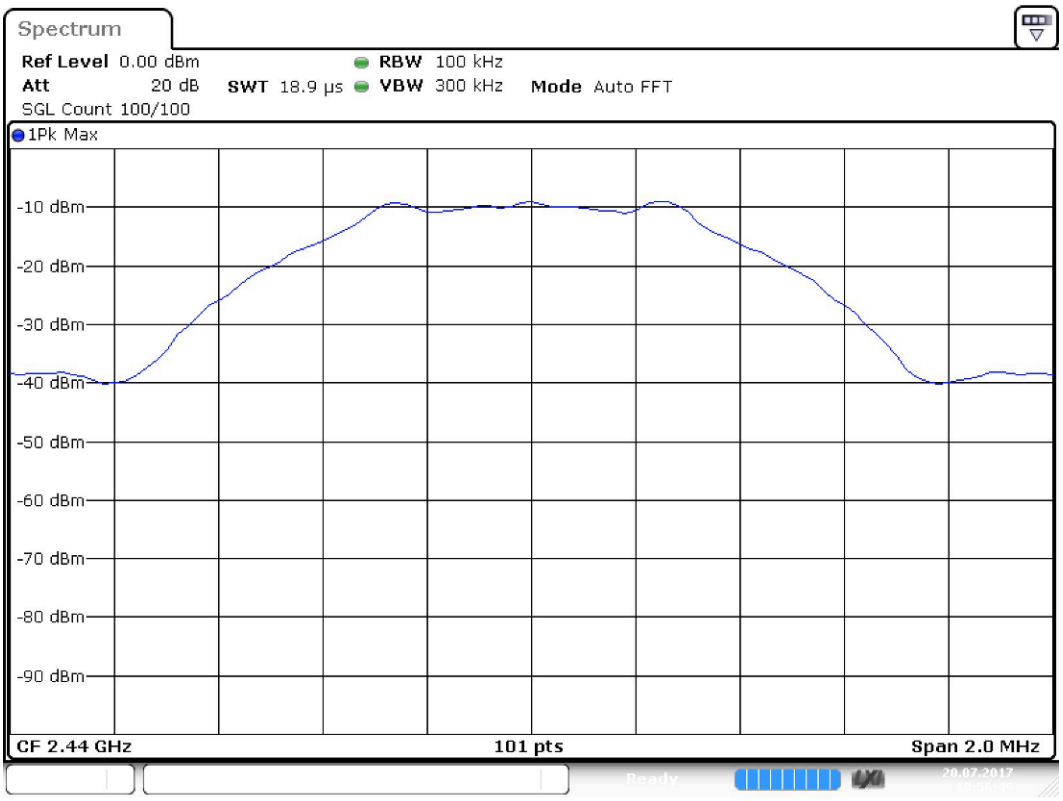
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 2%

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2440.000000	0.764706	0.500000	---	2439.598039	2440.362745	4.5	PASS



Bandwidth



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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.43900 GHz	2.43900 GHz
Stop Frequency	2.44100 GHz	2.44100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 20
Sweeptime	18.938 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	20 / max. 150	max. 150
Stable	15 / 15	15
Max Stable Difference	0.00 dB	0.50 dB

Band Edge low (2440 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.8 dB

Result

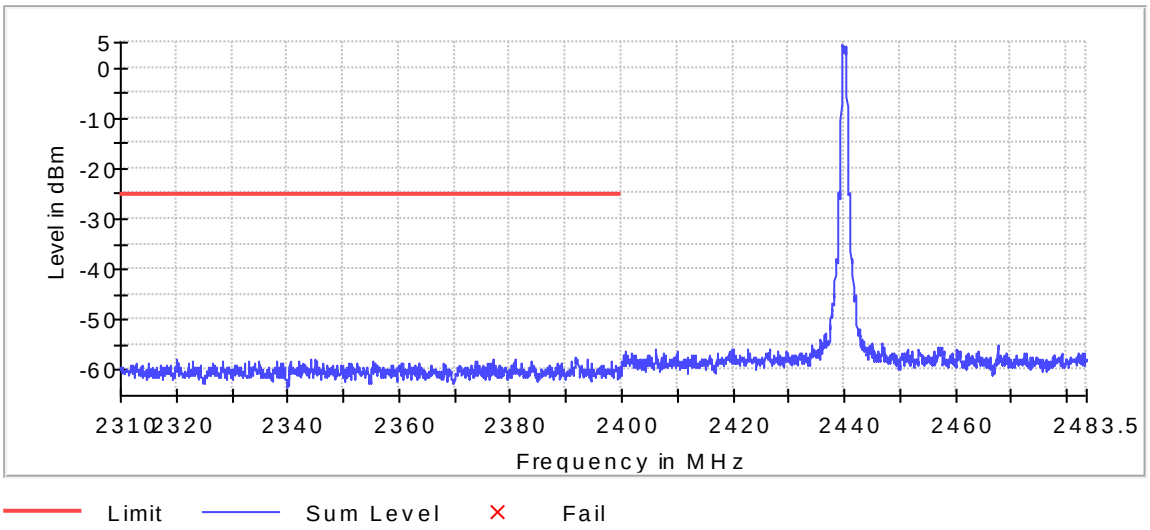
DUT Frequency (MHz)	Result
2440.000000	PASS

Inband Peak

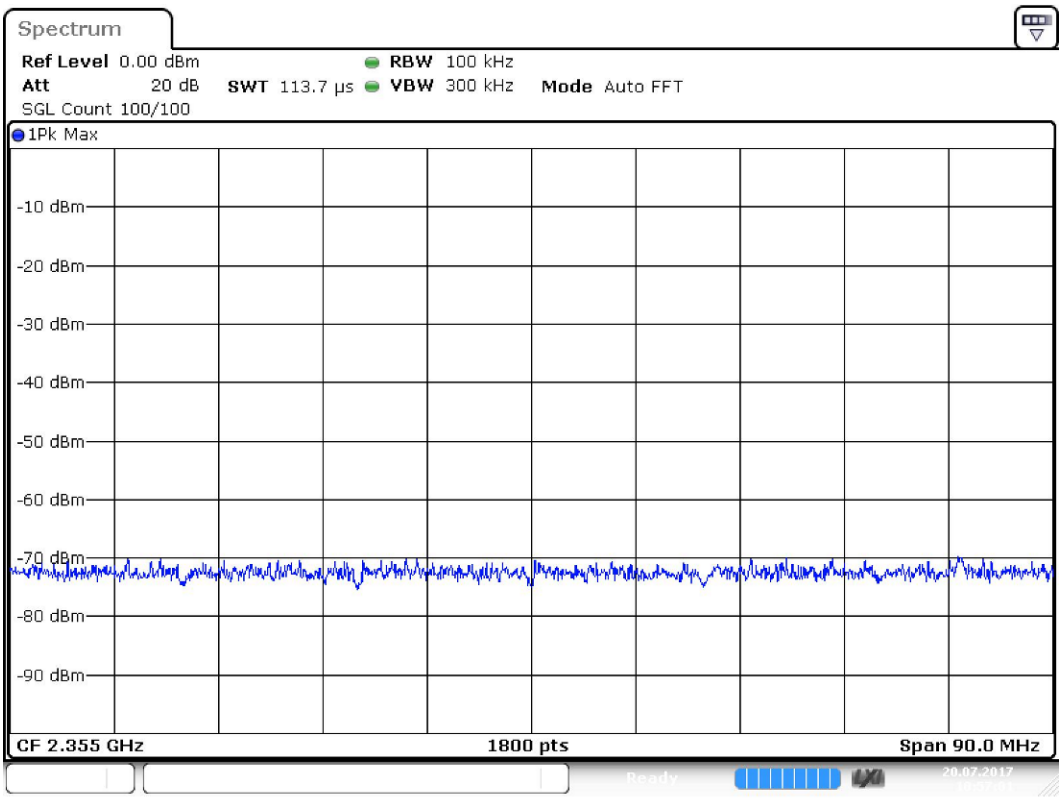
Frequency (MHz)	Level (dBm)
2439.701227	4.7

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2391.729595	-57.6	32.3	-25.3	PASS
2391.679622	-57.6	32.3	-25.3	PASS
2391.929484	-57.7	32.4	-25.3	PASS
2392.029428	-57.7	32.4	-25.3	PASS
2376.937812	-57.7	32.4	-25.3	PASS
2392.079400	-57.8	32.5	-25.3	PASS
2391.979456	-57.9	32.5	-25.3	PASS
2344.156024	-57.9	32.6	-25.3	PASS
2380.885619	-57.9	32.6	-25.3	PASS
2320.169350	-57.9	32.6	-25.3	PASS
2391.879511	-57.9	32.6	-25.3	PASS
2393.928373	-58.0	32.6	-25.3	PASS
2320.119378	-58.0	32.7	-25.3	PASS
2345.055525	-58.0	32.7	-25.3	PASS
2376.887840	-58.0	32.7	-25.3	PASS



Band Edge Connector 1_0



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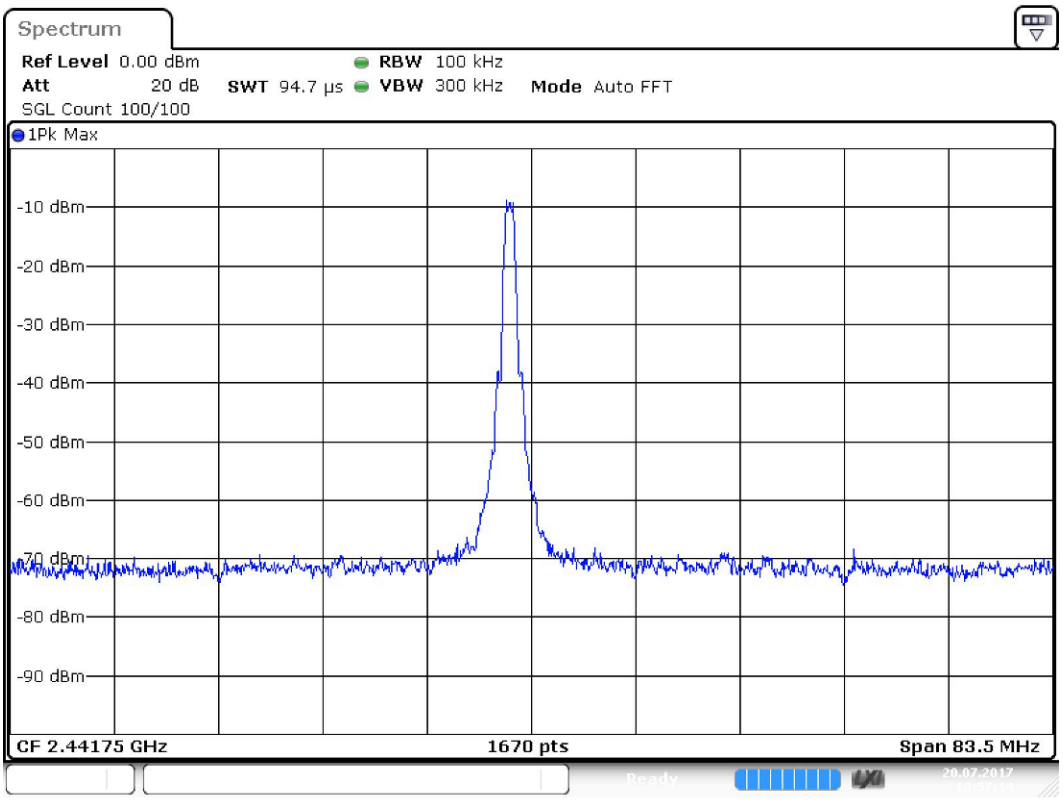
Band Edge Connector 1_1



Date: 20.JUL.2017 10:57:14

Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Measurement 2

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.43 dB	0.50 dB

Band Edge high (2440 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.8 dB

Result

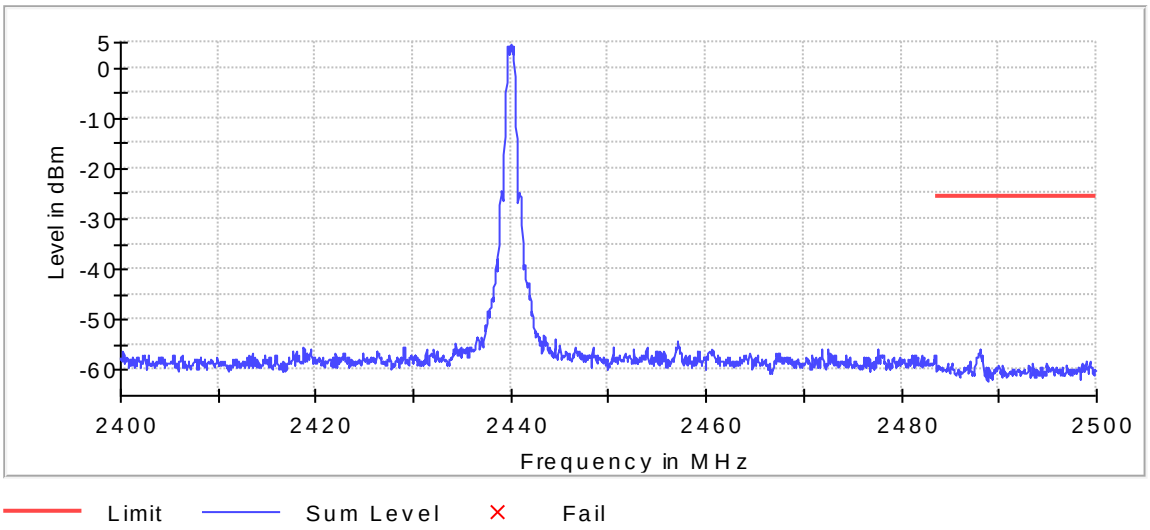
DUT Frequency (MHz)	Result
2440.000000	PASS

Inband Peak

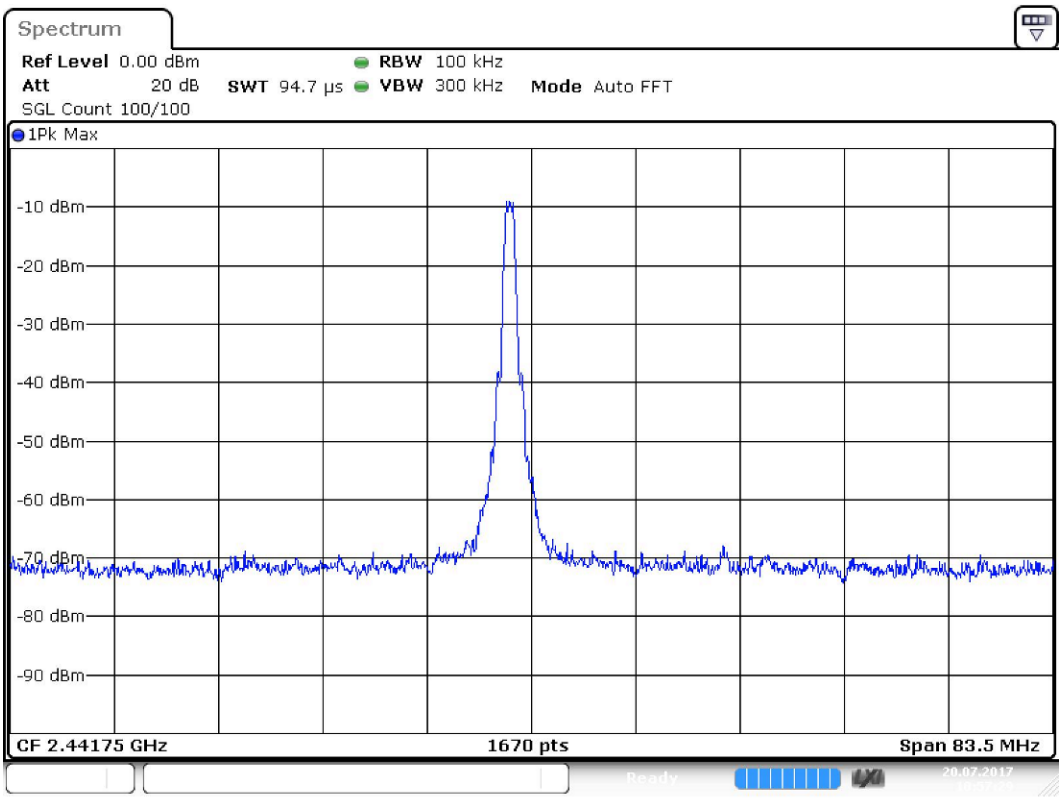
Frequency (MHz)	Level (dBm)
2439.951077	4.5

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2488.061178	-55.9	30.5	-25.5	PASS
2488.011329	-56.6	31.1	-25.5	PASS
2487.911631	-56.6	31.1	-25.5	PASS
2487.961480	-56.6	31.1	-25.5	PASS
2487.861782	-56.7	31.2	-25.5	PASS
2488.111027	-56.9	31.4	-25.5	PASS
2488.310423	-57.0	31.6	-25.5	PASS
2488.160876	-57.2	31.8	-25.5	PASS
2487.762085	-57.6	32.1	-25.5	PASS
2487.811934	-57.6	32.1	-25.5	PASS
2488.260574	-57.7	32.2	-25.5	PASS
2488.360272	-57.7	32.3	-25.5	PASS
2487.712236	-57.8	32.4	-25.5	PASS
2487.662387	-57.9	32.4	-25.5	PASS
2487.014350	-58.1	32.7	-25.5	PASS



Band Edge Connector 1_0



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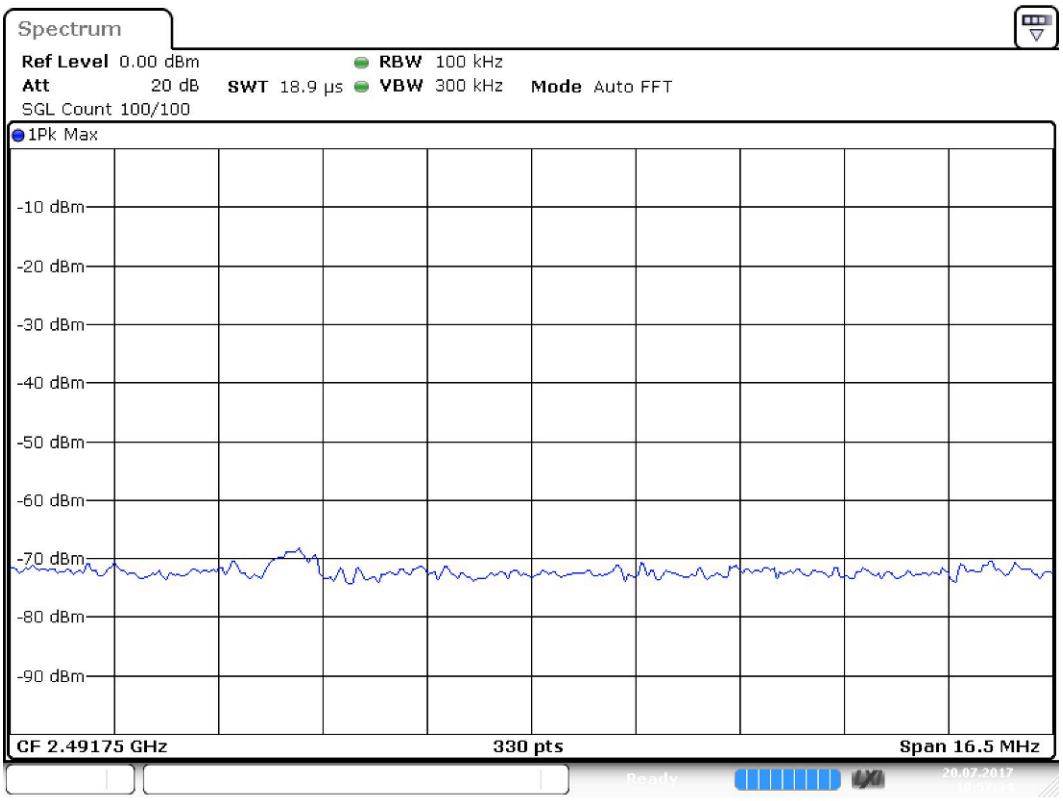
Band Edge Connector 1_1



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Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	6 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.28 dB	0.50 dB

Measurement 2

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	330	~ 330
Sweeptime	18.945 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Tx Spurious Emission (2440 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.8 dB

Result

DUT Frequency (MHz)	Result
2440.000000	PASS

Final measurements

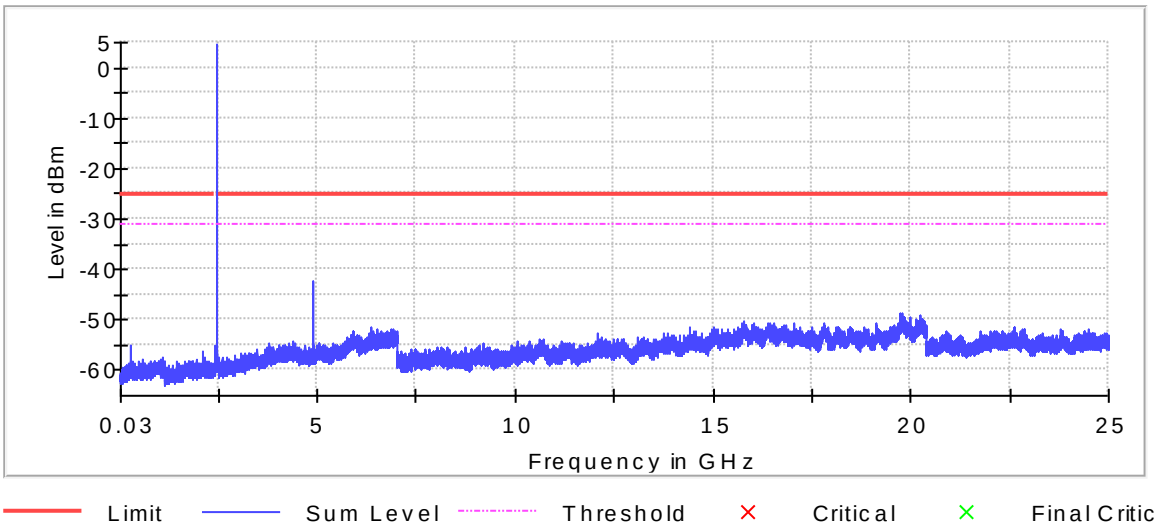
Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

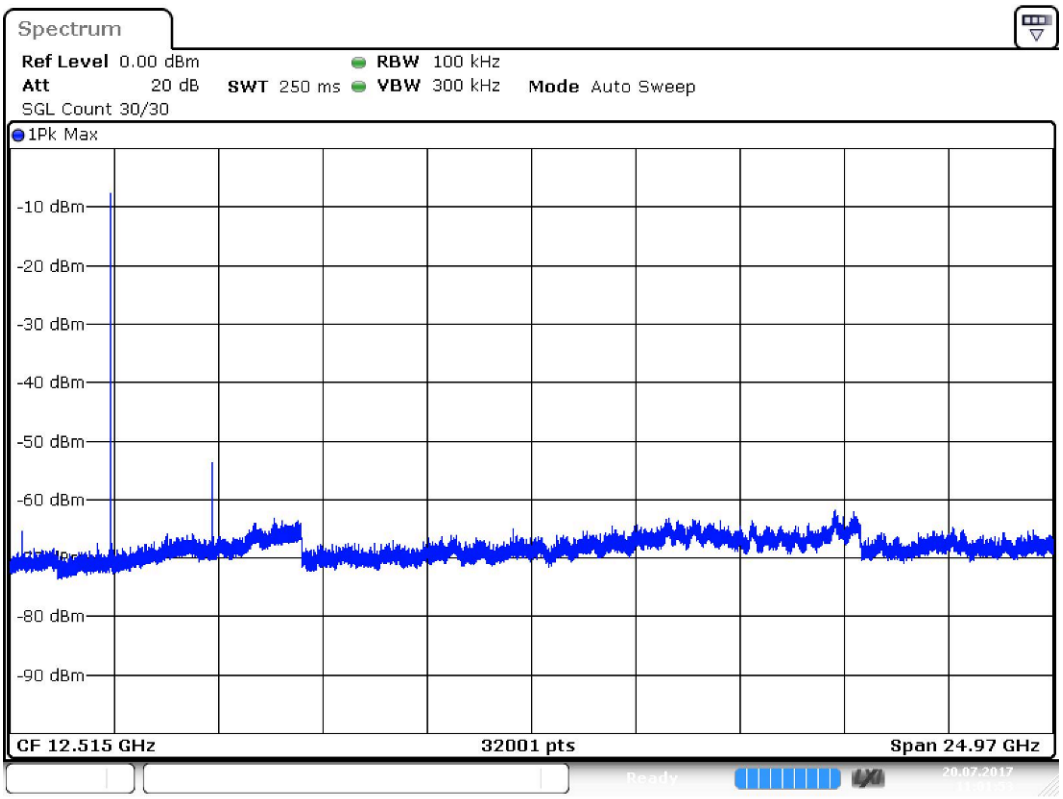
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4879.729236	-42.2	16.9	-25.3
4880.509499	-42.2	16.9	-25.3
4878.948972	-44.2	18.9	-25.3
19774.963909	-48.6	23.3	-25.3
19737.511249	-48.6	23.3	-25.3
20230.637929	-49.1	23.8	-25.3
19753.896788	-49.1	23.8	-25.3
19753.116524	-49.4	24.1	-25.3
19832.703425	-49.5	24.2	-25.3
19769.502062	-49.6	24.3	-25.3
19963.787732	-49.6	24.3	-25.3
19810.856040	-49.7	24.3	-25.3
19799.152084	-49.7	24.4	-25.3
19810.075777	-49.7	24.4	-25.3
20286.036654	-49.8	24.5	-25.3

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	25000.000000	1	1



Spurious Connector 1_0



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Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	32001	~ 320001
Sweeptime	250.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 10	max. 10
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Summary (2480MHz, Channel 39)

Test	Frequency (MHz)	Result
RF average output power	2480.000	PASS
Peak Power Spectral Density	2480.000	PASS
Minimum Emission Bandwidth 6 dB	2480.000	PASS
Band Edge low	2480.000	PASS
Band Edge high	2480.000	PASS
Tx Spurious Emission	2480.000	PASS

RF average output power (2480 MHz)

Test according to FCC title 47 part 15 §15.247(b), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Combined Uncertainty of absolute Level Measurement (K=2) < 1 dB

Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
2480.000000	4.2	30.0	5.5	100.000	PASS

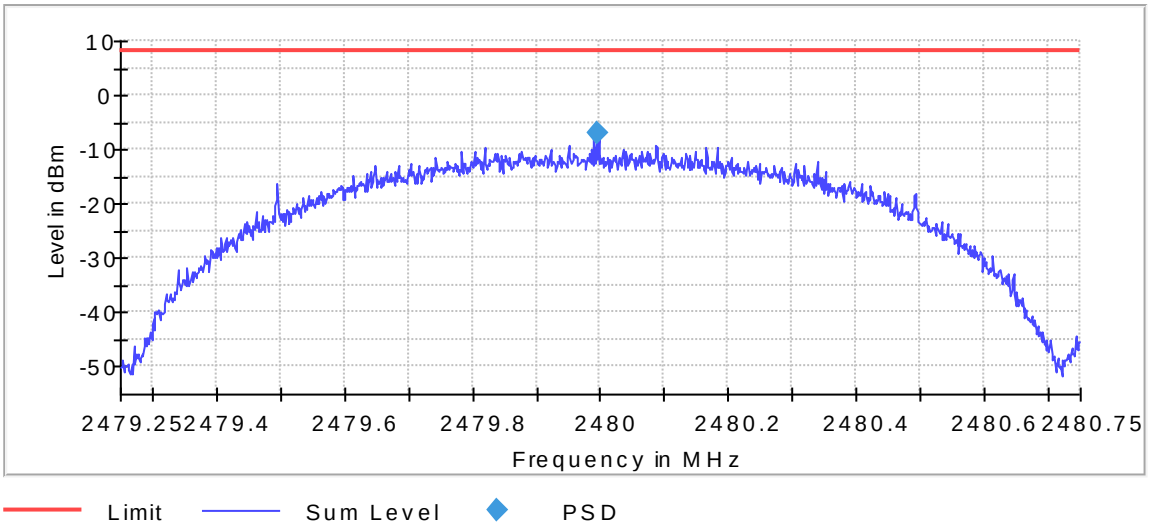
Peak Power Spectral Density (2480 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

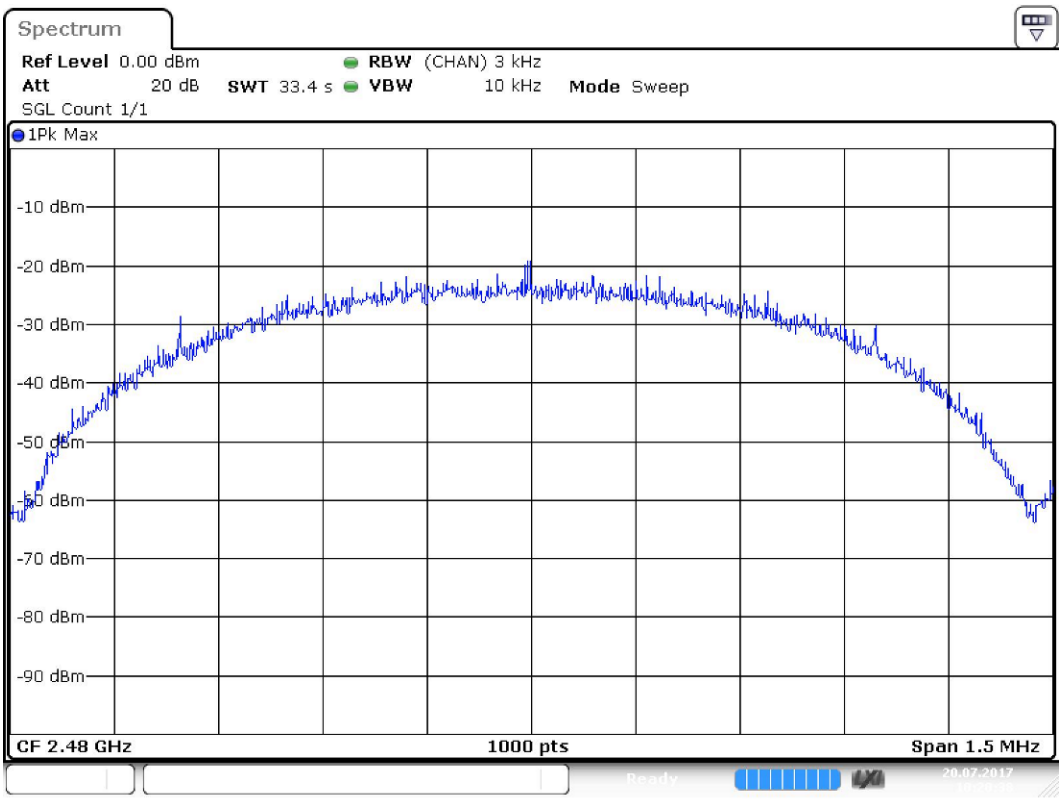
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.3 dB

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2480.000000	2479.994006	-6.827	8.0	PASS



PSD Connector 1



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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47925 GHz	2.47925 GHz
Stop Frequency	2.48075 GHz	2.48075 GHz
Span	1.500 MHz	1.500 MHz
RBW	3.000 kHz	<= 3.000 kHz
VBW	10.000 kHz	>= 9.000 kHz
SweepPoints	1000	~ 1000
Sweeptime	33.400 s	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	Sweep
Preamp	off	off

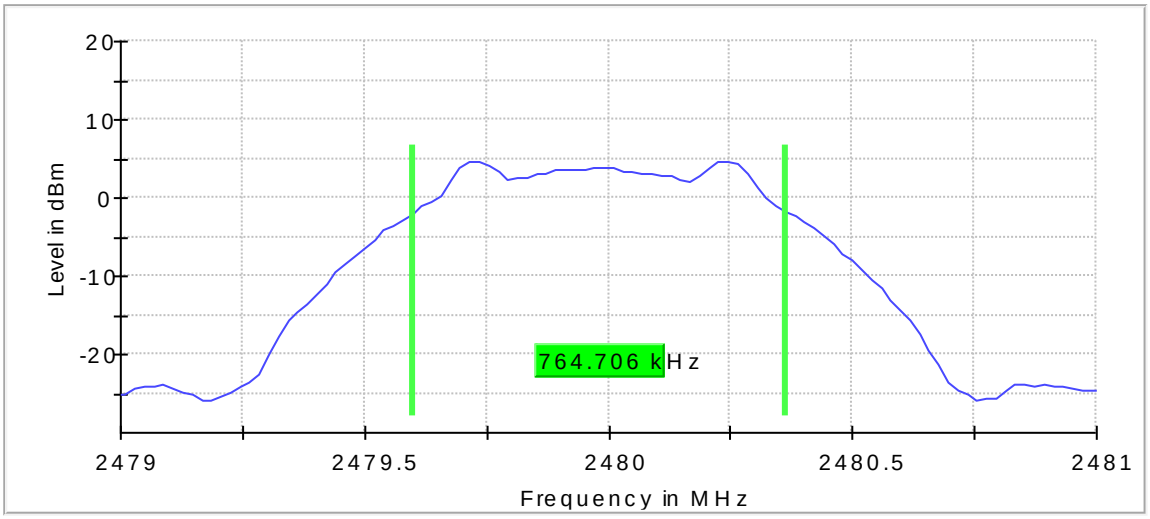
Minimum Emission Bandwidth 6 dB (2480 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

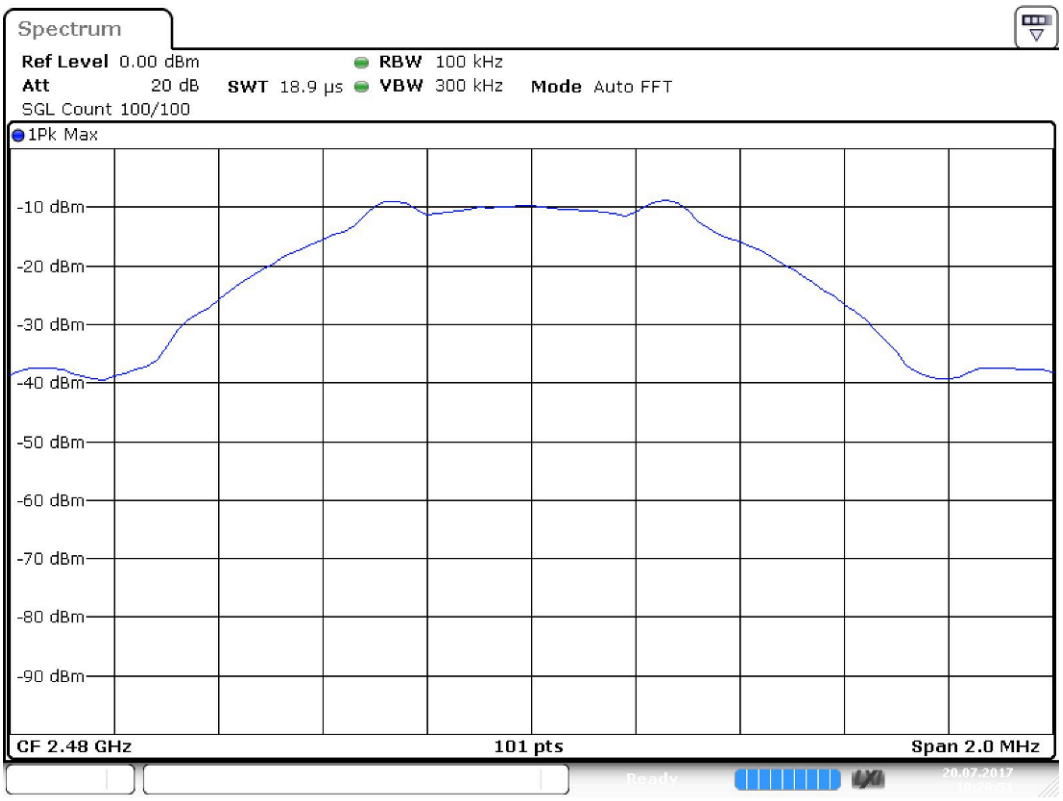
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 2%

6 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)	Result
2480.000000	0.764706	0.500000	---	2479.598039	2480.362745	4.7	PASS



Bandwidth



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Measurement

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	100.000 kHz	~ 100.000 kHz
VBW	300.000 kHz	~ 300.000 kHz
SweepPoints	101	~ 20
Sweeptime	18.938 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	23 / max. 150	max. 150
Stable	15 / 15	15
Max Stable Difference	0.11 dB	0.50 dB

Band Edge low (2480 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.8 dB

Result

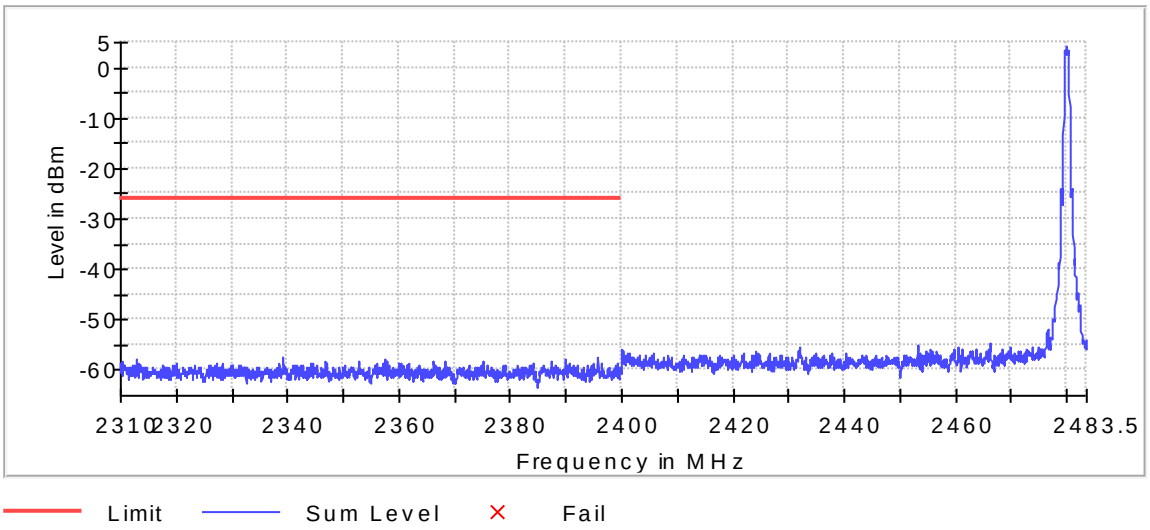
DUT Frequency (MHz)	Result
2480.000000	PASS

Inband Peak

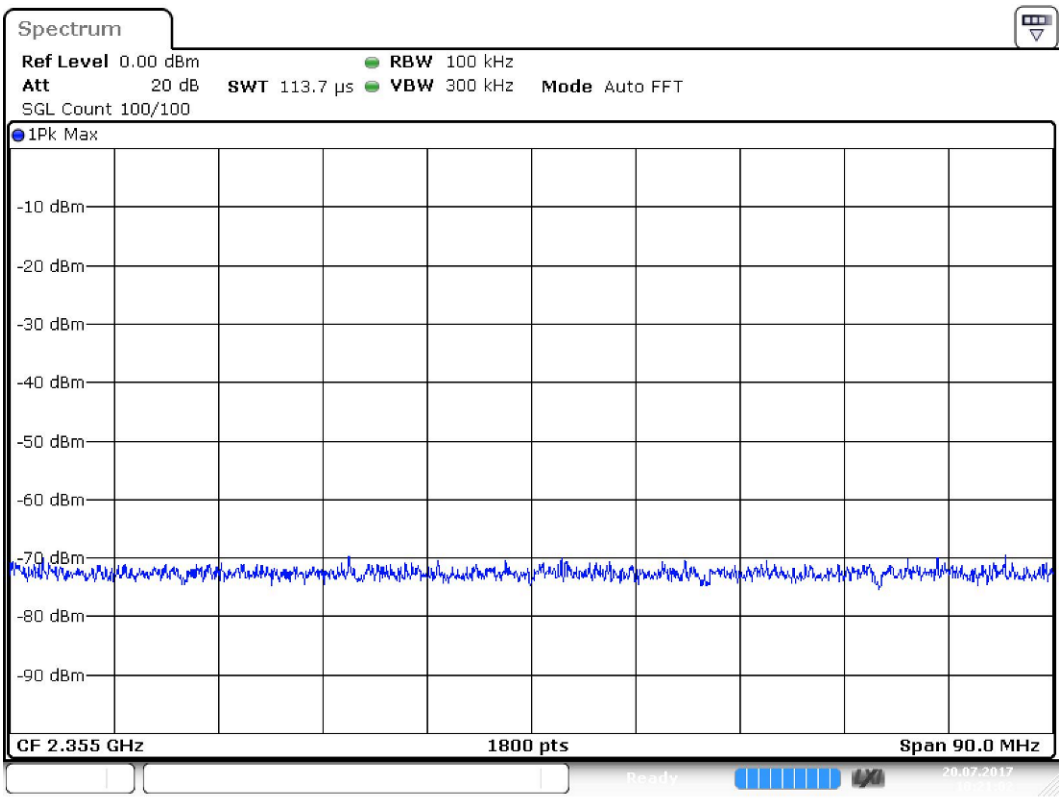
Frequency (MHz)	Level (dBm)
2479.927139	4.1

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2395.777346	-57.4	31.6	-25.9	PASS
2339.258745	-57.6	31.7	-25.9	PASS
2395.827318	-57.6	31.7	-25.9	PASS
2339.208773	-57.6	31.8	-25.9	PASS
2389.930594	-57.7	31.9	-25.9	PASS
2389.980566	-57.8	32.0	-25.9	PASS
2312.823431	-57.9	32.0	-25.9	PASS
2357.548584	-57.9	32.0	-25.9	PASS
2387.431982	-58.1	32.3	-25.9	PASS
2312.873404	-58.2	32.3	-25.9	PASS
2346.854525	-58.2	32.3	-25.9	PASS
2357.498612	-58.2	32.4	-25.9	PASS
2368.192671	-58.3	32.4	-25.9	PASS
2375.188784	-58.3	32.4	-25.9	PASS
2387.382010	-58.3	32.4	-25.9	PASS



Band Edge Connector 1_0



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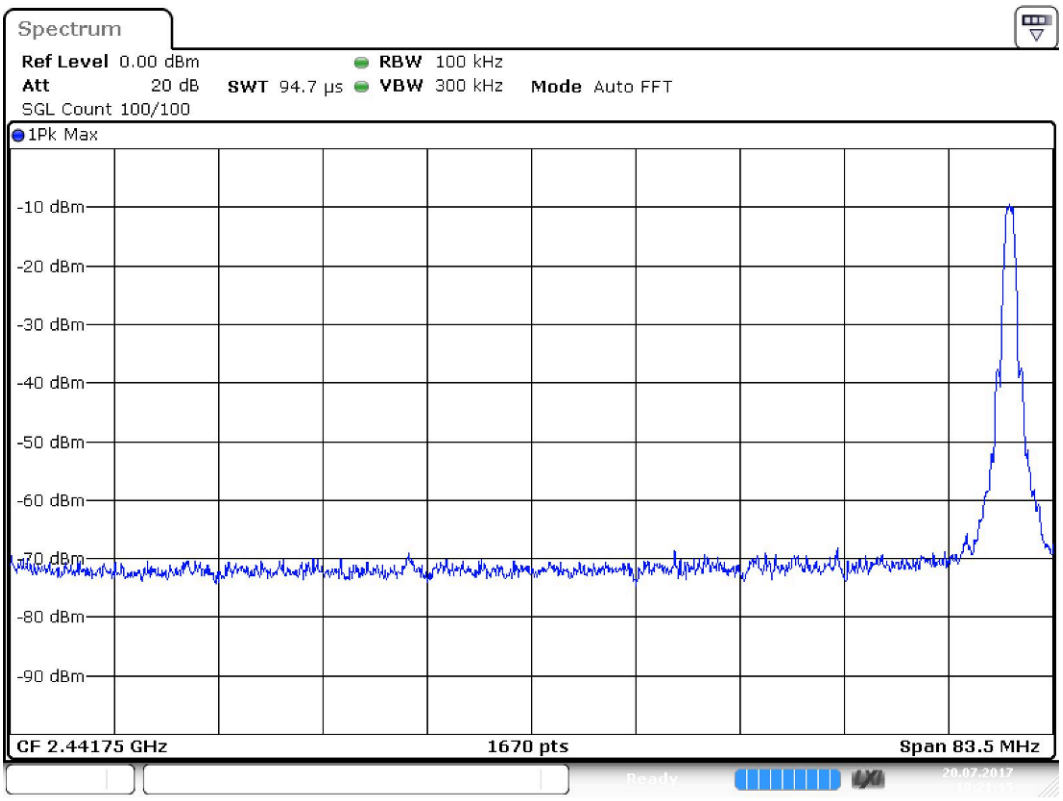
Band Edge Connector 1_1



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Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1800	~ 1800
Sweeptime	113.672 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Measurement 2

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.29 dB	0.50 dB

Band Edge high (2480 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.8 dB

Result

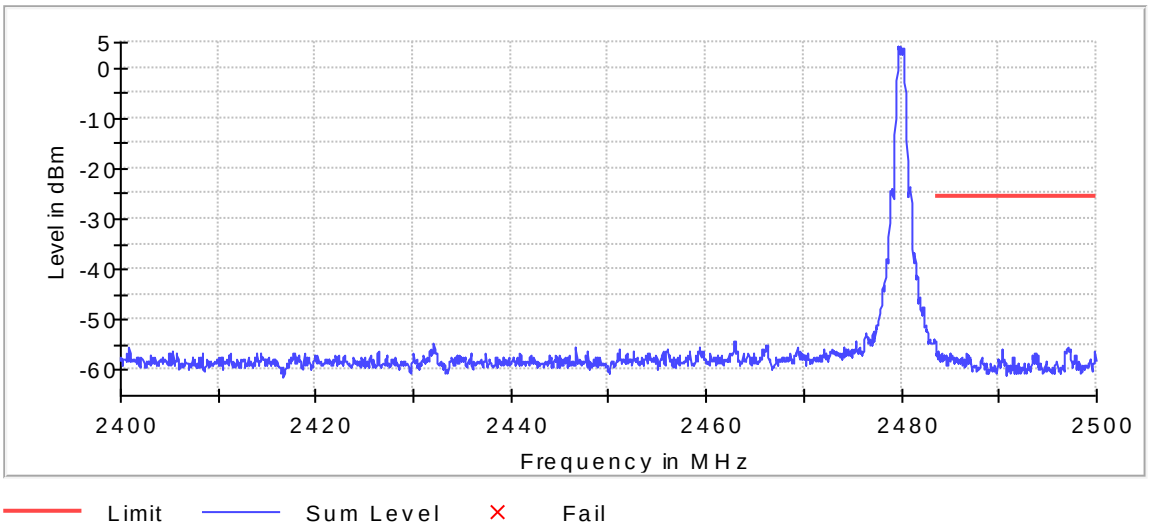
DUT Frequency (MHz)	Result
2480.000000	PASS

Inband Peak

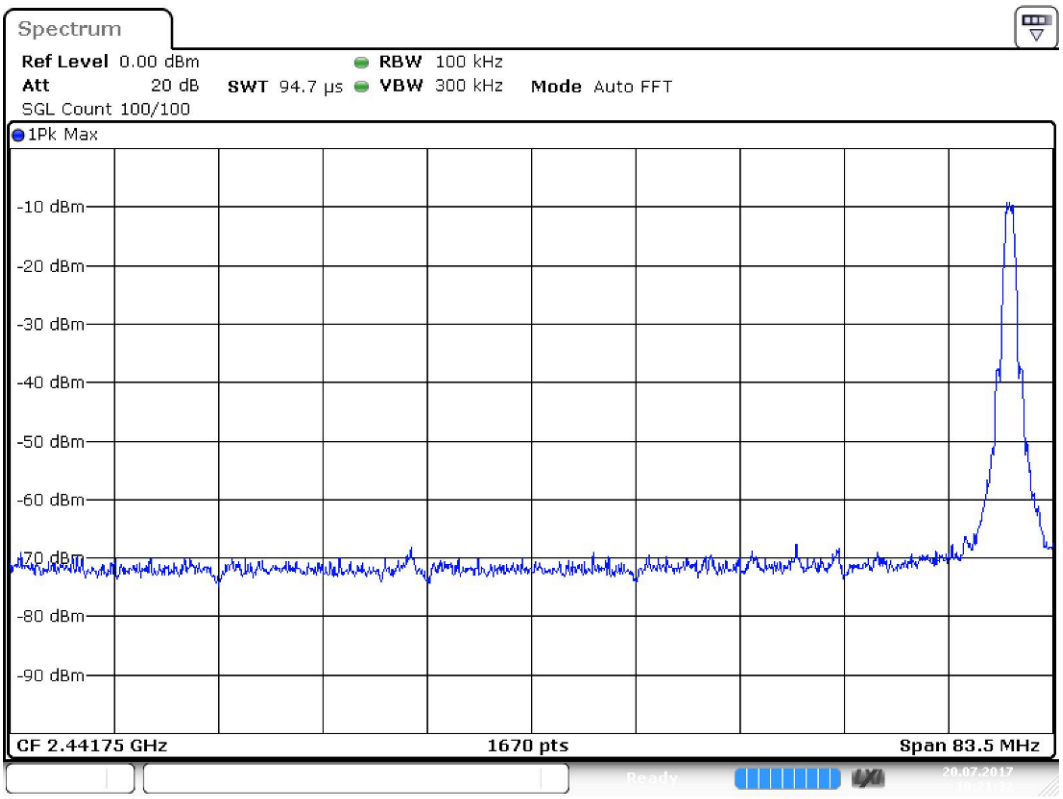
Frequency (MHz)	Level (dBm)
2479.927139	4.4

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2497.033988	-55.3	29.7	-25.6	PASS
2483.524924	-55.6	29.9	-25.6	PASS
2497.083837	-55.6	30.0	-25.6	PASS
2497.283233	-55.8	30.1	-25.6	PASS
2490.304381	-55.8	30.1	-25.6	PASS
2496.984139	-55.8	30.2	-25.6	PASS
2490.354230	-55.9	30.2	-25.6	PASS
2497.133686	-56.0	30.3	-25.6	PASS
2496.934290	-56.1	30.4	-25.6	PASS
2496.784743	-56.1	30.5	-25.6	PASS
2497.233384	-56.2	30.6	-25.6	PASS
2496.734894	-56.3	30.6	-25.6	PASS
2496.884441	-56.3	30.7	-25.6	PASS
2497.333082	-56.4	30.7	-25.6	PASS
2497.183535	-56.4	30.7	-25.6	PASS



Band Edge Connector 1_0



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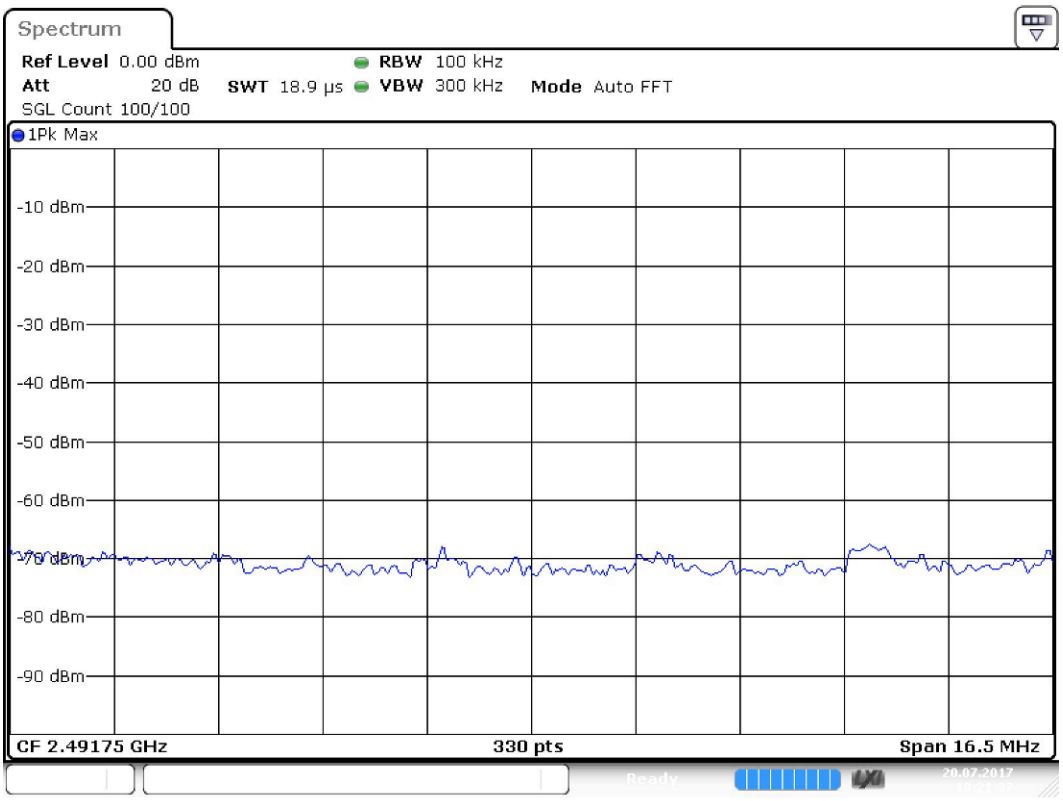
Band Edge Connector 1_1



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Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	1670	~ 1670
Sweeptime	94.727 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	9 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Measurement 2

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	330	~ 330
Sweeptime	18.945 µs	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

Tx Spurious Emission (2480 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v04 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.8 dB

Result

DUT Frequency (MHz)	Result
2480.000000	PASS

Final measurements

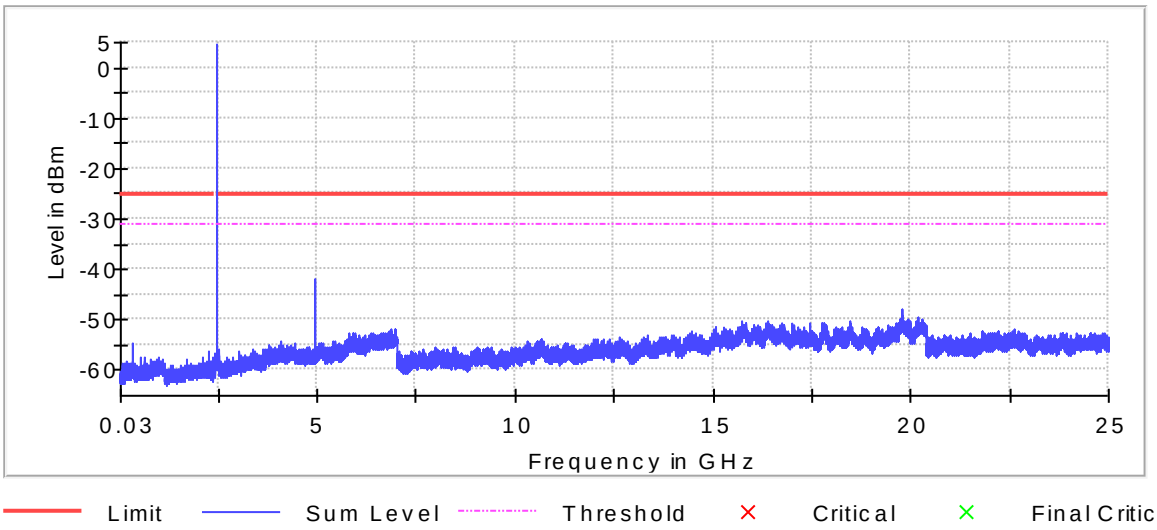
Frequency (MHz)	Level Pre Measurement (dBm)	level (dBm)	Limit (dBm)	Margin (dB)	Result
---	---	---	---	---	---

Pre Measurements

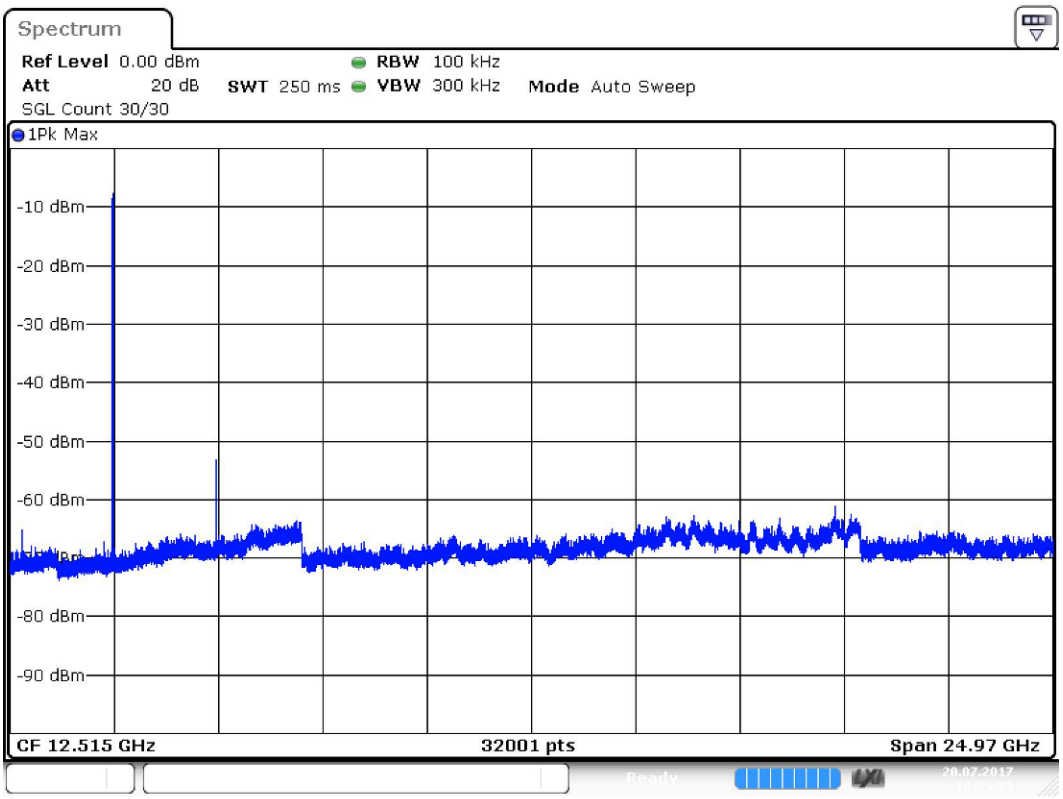
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
4960.096400	-41.8	16.5	-25.2
4959.316136	-42.2	17.0	-25.2
19771.842854	-47.9	22.7	-25.2
4960.876664	-48.3	23.1	-25.2
19798.371821	-49.1	23.8	-25.2
19773.403381	-49.5	24.2	-25.2
20176.799731	-49.5	24.3	-25.2
19766.381007	-49.6	24.4	-25.2
19789.008656	-49.7	24.5	-25.2
19760.138898	-49.8	24.5	-25.2
19751.555997	-49.8	24.6	-25.2
20293.059028	-49.9	24.7	-25.2
19732.049403	-49.9	24.7	-25.2
19717.224392	-50.0	24.7	-25.2
19765.600744	-50.0	24.8	-25.2

Measurement Settings

Start Frequency (MHz)	Stop Frequency (MHz)	Pre Measurement	Final Measurement
30.000000	25000.000000	1	1



Spurious Connector 1_0



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Pre Measurement 1

Setting	Instrument Value	Target Value
RBW	100.000 kHz	<= 100.000 kHz
VBW	300.000 kHz	>= 300.000 kHz
SweepPoints	32001	~ 320001
Sweeptime	250.000 ms	AUTO
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	30	30
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	6 / max. 10	max. 10
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB