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Bureau Veritas Consumer Product Services Inc.

Test Report

Report No	EU0207-4
Client	Aptiv Services US, LLC
Address	2151 East Lincoln Road Kokomo, Indiana 46902 USA
Phone	(915) 612 8967
Items tested FCC ID IC	RADIO GP – AM/FM L2C0080TR 3432A-0080TR
Equipment Type Equipment Code	Part 15 Spread Spectrum Transmitter DSS
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	April 19,2019 to
Results	As detailed within this report
Prepared by	<u>Xiaoyu Zhu</u> Xiaoyu Zhu – EMC Engineer
Authorized by	<u>Anna Vancheva</u> Anna Vancheva – EMC Engineer
Issue Date	<u>6/12/2020</u>
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 18 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 tested is the Radio GP-AM/FM, DAB. It is a frequency hopping spread spectrum transmitter that operates in the 2402 – 2480 MHz frequency range.

Antenna Type: Non-detachable internal PCB trace

Gain: 2.3dBi

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

The products tested in this report are provided as representative of the family it belongs to. See the table below for clarification of the specific variations between family models and the relationship between the model tested and the additional model.

MODEL	AM/FM	SXM	BT	24V	Internal Mic	DAB	30 day clock	Bi-color LED	Front USB	Rear USB	Bordeau PWR Fakra	iPad Charging	IR Receiver	PA
RDO ASM DEA700	X						X							X
RDO-ASM DEA705	X						X				X			
RDO ASM DEA707	X		X						X					X
RDO ASM DEA710	X		X				X		X					X
RDO-ASM DEA712	X		X		X		X		X			X		
RDO-ASM DEA725	X		X				X			X	X	X		
RDO-ASM DEA730	X	X	X				X		X			X	X	
RDO-ASM DEA732	X	X	X		X		X		X			X		
RDO-ASM DEA737	X	X	X				X		X					
RDO-ASM DEA739	X	X	X				X	X				X	X	
RDO-ASM DEA745	X	X	X				X			X	X	X		

MODEL	AM/FM	XM	BT	24V	Internal Mic	DAB	30 day clock	Bi-color LED	Front USB	Rear USB	Violet/Bordeau Fakra	iPad Charging	IR Receiver	PA
RDO-ASM DEA750	X		X			X	X		X			X	X	
RDO-ASM DEA752	X		X		X	X	X		X			X		
RDO-ASM DEA765	X		X			X	X			X	X	X		

MODEL	AM/FM	XM	BT	24V	Internal Mic	DAB	30 day clock	Bi-color LED	Front USB	Rear USB	Violet/Bordeau Fakra	iPad Charging	IR Receiver	PA
RDO-ASM DEA711	X		X	X	X		X		X			X		
RDO-ASM DEA731	X	X	X	X	X		X		X			X		

MODEL	AM/FM	XM	BT	24V	Internal Mic	DAB	30 day clock	Bi-color LED	Front USB	Rear USB	Violet/Bordeau Fakra	iPad Charging	IR Receiver	PA
RDO-ASM DEA751					X	X	X	X		X			X	

Test samples were received in good condition.



Test Methodology

All testing was performed according to the following rules/procedures/documents;
CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2, ISED Canada RSS-Gen Issue 5, FCC KDB 558074 D01 15.247 Measurement Guidance v05r01 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 DC from a vehicle battery, therefore AC line conducted emissions testing is not applicable.

Following bandwidths were used during radiated spurious emissions testing.

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



Product Tested - Configuration Documentation

EUT Configuration										
Work Order:		U0207								
Company:		Aptiv Services US, LLC								
Company Address:		2151 East Lincoln Road Kokomo, Indiana 46902 USA								
Contact:		Manuel R. Ramirez								
		MN			PN			SN		
EUT:		Radio GP-AM/FM, DAB								
EUT Description:		Vehicle infotainment system with Bluetooth								
EUT Max Frequency:		2480 MHz								
EUT Min Frequency:		2480 MHz								
EUT Components		MN			SN					
Head Unit		DEA731, DEA 737, DEA 750, DEA751			0017,0003, 0021, 0016					
Support Equipment		MN			SN					
Saint 2 Box										
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
AM/FM	other	1	1	Coaxial	Yes	No	2	in	yes	
Harness	other	1	1	other	No	No	1	in	yes	
SXM	other	1	1	Coaxial	Yes	No	2	in	yes	
Operating Mode Description:										
Client provided test mode. EUT can transmit different BT packet types on 3 channels. Hopping can be enabled and disabled.										



Statement of Conformity

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.4			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.
	3.2		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3.2			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13.2			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
6.13.1			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.
6.8			15.203	EUT employs a non-detachable internal PCB trace antenna with 2.3dBi gain.
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 is battery powered only. AC line conducted emission is not applicable.
			15.247	The unit complies with the requirements of 15.247
		RSS 247		The unit complies with the requirements of RSS-247

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



Test Results

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 observed in installed orientation. All the results below are for the worst case orientation only.

MEASUREMENTS / RESULTS

Bluetooth DH1 was identified as the worst case packet type.

DEA-731

Curtis Straus - a Bureau Veritas Company	Work Order - T0487
Radiated Emissions Electric Field 3m Distance	EUT Power Input - 26.2V DC
30-1000MHz Vertical Data	Test Site - CH1
Operator: CCH	Conditions - 23.5°C; 31%RH; 1002mBar
Notes:	EUT Maximum Frequency - 2480MHz
BT TX DH1 Low channel	0

Data Taken at April 24, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
40.249	42.5	-11.2	31.2	40	-8.8	PASS	
47.894	48.2	-16.2	32.1	40	-7.9	PASS	
51.904	50.3	-17.2	33.1	40	-6.9	PASS	
547.538	46.1	-5.8	40.3	46	-5.7	PASS	
550.019	49.1	-5.8	43.4	46	-2.6	PASS	-2.6
552.463	45.3	-5.7	39.6	46	-6.4	PASS	



Curtis Straus - a Bureau Veritas Company Work Order - T0487
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 26.2V DC
 30-1000MHz Horizontal Data Test Site - CH1
 Operator: CCH Conditions - 23.5°C; 31%RH; 1002mBar
 Notes: EUT Maximum Frequency - 2480MHz
 BT TX DH1 Low channel 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
182.43	35.9	-13.5	22.4	43.5	-21.1	PASS	
482.454	34.1	-6.6	27.5	46	-18.5	PASS	
500.006	40.8	-6.2	34.5	46	-11.5	PASS	
547.56	38.1	-5.8	32.3	46	-13.7	PASS	
550.018	43.5	-5.8	37.7	46	-8.3	PASS	-8.3
552.512	37.9	-5.7	32.2	46	-13.8	PASS	

30-1000MHz Low channel

Curtis Straus - a Bureau Veritas Company Work Order - T0487
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 26.2V DC
 30-1000MHz Vertical Data Test Site - CH1
 Operator: CCH Conditions - 23.5°C; 31%RH; 1002mBar
 Notes: EUT Maximum Frequency - 2480MHz
 BT TX DH1 Mid channel 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
39.917	45.3	-11	34.4	40	-5.6	PASS	-5.6
47.219	46.6	-15.9	30.6	40	-9.4	PASS	
49.266	48	-16.7	31.4	40	-8.6	PASS	
182.49	47.8	-13.5	34.3	43.5	-9.2	PASS	
549.963	45.1	-5.8	39.3	46	-6.7	PASS	
552.415	40.8	-5.7	35.1	46	-10.9	PASS	



Curtis Straus - a Bureau Veritas Company Work Order - T0487
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 26.2V DC
 30-1000MHz Horizontal Data Test Site - CH1
 Operator: CCH Conditions - 23.5°C; 31%RH; 1002mBar
 Notes: EUT Maximum Frequency - 2480MHz
 BT TX DH1 Mid channel 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
30.839	23.8	-3.9	19.9	40	-20.1	PASS	
62.034	27.6	-17.4	10.1	40	-29.9	PASS	
63.656	24.2	-17.4	6.8	40	-33.2	PASS	
94.168	24.1	-15.9	8.2	43.5	-35.3	PASS	
130.192	23.7	-10.9	12.8	43.5	-30.7	PASS	
549.911	35.6	-5.8	29.8	46	-16.2	PASS	-16.2

30-1000MHz Middle channel

Curtis Straus - a Bureau Veritas Company Work Order - T0487
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 26.2V DC
 30-1000MHz Vertical Data Test Site - CH1
 Operator: CCH Conditions - 23.5°C; 31%RH; 1002mBar
 Notes: EUT Maximum Frequency - 2480MHz
 BT TX DH1 High channel 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
39.262	44.5	-10.5	34	40	-6	PASS	
40.169	43.7	-11.2	32.5	40	-7.5	PASS	
48.054	53.1	-16.2	36.9	40	-3.1	PASS	-3.1
51.145	49.5	-17.1	32.4	40	-7.6	PASS	
76.812	32	-17.1	14.9	40	-25.1	PASS	
549.982	42.5	-5.8	36.7	46	-9.3	PASS	



Curtis Straus - a Bureau Veritas Company Work Order - T0487
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 26.2V DC
 30-1000MHz Horizontal Data Test Site - CH1
 Operator: CCH Conditions - 23.5°C; 31%RH; 1002mBar
 Notes: EUT Maximum Frequency - 2480MHz
 BT TX DH1 High channel 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dbµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)
30.433	23.7	-3.6	20	40	-20	PASS	
40.045	29.7	-11.1	18.6	40	-21.4	PASS	
40.25	28.7	-11.2	17.4	40	-22.6	PASS	
259.977	24.8	-12.1	12.7	46	-33.3	PASS	
550.011	43.2	-5.8	37.4	46	-8.6	PASS	-8.6
552.421	38	-5.7	32.3	46	-13.7	PASS	

30-1000MHz High channel

Curtis Straus - a Bureau Veritas Company Work Order - T0487
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 26.2V DC
 1-6GHz Vertical Data Test Site - CH1
 Operator: CCH Conditions - 23.5°C; 31%RH; 1002mBar
 Notes: EUT Maximum Frequency - 2480MHz
 BT TX DH1 Low channel 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
2171.3	44.2	34.8	-1.2	43	74	-31	PASS		33.6	54	-20.4	PASS	
2879.8	51.9	49	0	51.9	74	-22.1	PASS	-22.1	49	54	-5	PASS	-5
3195.1	44.2	35	-0.5	43.7	74	-30.3	PASS		34.5	54	-19.5	PASS	
4609.2	41.6	33.2	0	41.6	74	-32.4	PASS		33.2	54	-20.8	PASS	
5828.5	41	32.3	1.7	42.6	74	-31.4	PASS		33.9	54	-20.1	PASS	



Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Horizontal Data
 Operator: CCH
 Notes:
 BT TX DH1 Low channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1255.1	44	35	-7.2	36.8	74	-37.2	PASS		27.8	54	-26.2	PASS	
2160.3	44.3	34.9	-1.3	43	74	-31	PASS		33.7	54	-20.3	PASS	
2880.1	47.6	38.1	0	47.6	74	-26.4	PASS	-26.4	38.1	54	-15.9	PASS	-15.9
4631.7	43.3	33.2	-0.2	43.1	74	-30.9	PASS		33	54	-21	PASS	
5721.1	42.1	32.5	1.6	43.8	74	-30.2	PASS		34.2	54	-19.8	PASS	

1-6GHz Low channel

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Vertical Data
 Operator: CCH
 Notes:
 BT TX DH1 Mid channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
1728.3	48.6	34.5	-5.5	43	74	-31	PASS		29	54	-25	PASS	
2184	43	34.3	-1.1	41.9	74	-32.1	PASS		33.2	54	-20.8	PASS	
2879.9	52.9	50.1	0	52.9	74	-21.1	PASS	-21.1	50.1	54	-3.9	PASS	-3.9
4640.5	42.3	33.2	-0.3	42	74	-32	PASS		32.9	54	-21.1	PASS	
5759.2	43	32.4	1.8	44.8	74	-29.2	PASS		34.2	54	-19.8	PASS	

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Horizontal Data
 Operator: CCH
 Notes:
 BT TX DH1 Mid channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	PK Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1725.9	43.2	34.8	-5.6	37.7	74	-36.3	PASS		29.2	54	-24.8	PASS	
2145.6	42.7	34.7	-1.4	41.2	74	-32.8	PASS		33.2	54	-20.8	PASS	
2880.3	44.5	37.9	0	44.5	74	-29.5	PASS	-29.5	37.9	54	-16.1	PASS	-16.1
4656.3	41.7	33	-0.4	41.2	74	-32.8	PASS		32.6	54	-21.4	PASS	
5872.1	42.1	32.4	1.6	43.8	74	-30.2	PASS		34	54	-20	PASS	

1-6GHz Middle Channel



Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Vertical Data
 Operator: CCH
 Notes:
 BT TX DH1 High channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
2176.6	42.3	34.6	-1.1	41.2	74	-32.8	PASS		33.4	54	-20.6	PASS	
2880.1	51.6	48.8	0	51.6	74	-22.4	PASS	-22.4	48.8	54	-5.2	PASS	-5.2
3969	41.5	32.7	-0.7	40.9	74	-33.1	PASS		32	54	-22	PASS	
5065.9	40.8	32.7	0.7	41.5	74	-32.5	PASS		33.4	54	-20.6	PASS	
5680.7	44.1	32.5	1.5	45.5	74	-28.5	PASS		34	54	-20	PASS	

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Horizontal Data
 Operator: CCH
 Notes:
 BT TX DH1 High channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)
1143.6	46.3	36.2	-8.4	37.9	74	-36.1	PASS		27.8	54	-26.2	PASS	
1263.5	45.5	35.3	-7.1	38.3	74	-35.7	PASS		28.2	54	-25.8	PASS	
2155.4	43.2	34.7	-1.3	41.8	74	-32.2	PASS		33.4	54	-20.6	PASS	
2879.8	49.2	44.9	0	49.2	74	-24.8	PASS	-24.8	44.9	54	-9.1	PASS	-9.1
4609.2	41.6	33.1	0	41.6	74	-32.4	PASS		33.1	54	-20.9	PASS	
5727.4	42.2	32.5	1.7	43.9	74	-30.1	PASS		34.2	54	-19.8	PASS	

1-6GHz High channel

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Vertical Data
 Operator: CCH
 Notes:
 BT TX DH1 Low channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
7912.4	41	33	3.9	45	83.5	-38.5	PASS		37	63.5	-26.5	PASS	
10531.6	42.4	33.1	7.1	49.5	83.5	-34	PASS		40.2	63.5	-23.3	PASS	
10590.7	48.7	33.3	6.8	55.5	83.5	-28	PASS		40.2	63.5	-23.3	PASS	
17953.3	43	34.4	14.6	57.6	83.5	-25.9	PASS	-25.9	49	63.5	-14.5	PASS	-14.5



Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Horizontal Data
 Operator: CCH
 Notes:
 BT TX DH1 Low channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
10532.2	42.2	33.2	7.1	49.3	83.5	-34.2	PASS		40.3	63.5	-23.2	PASS	
10590.3	41.9	33.3	6.8	48.7	83.5	-34.8	PASS		40.1	63.5	-23.4	PASS	
12636.5	42.3	33	10.1	52.4	83.5	-31.1	PASS		43.1	63.5	-20.4	PASS	
17968.8	42.4	34.4	14.6	57	83.5	-26.5	PASS	-26.5	49	63.5	-14.5	PASS	-14.5

6-18GHz Low channel

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Vertical Data
 Operator: CCH
 Notes:
 BT TX DH1 Mid channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
7908.9	40.5	33	4	44.5	83.5	-39	PASS		37	63.5	-26.5	PASS	
10532.9	43.4	33.2	7.1	50.5	83.5	-33	PASS		40.3	63.5	-23.2	PASS	
12740.8	42.5	32.9	10.2	52.7	83.5	-30.8	PASS		43.2	63.5	-20.3	PASS	
16782.6	42.1	33.7	12.8	54.8	83.5	-28.7	PASS		46.5	63.5	-17	PASS	
17847.2	43.6	34.4	14.5	58.1	83.5	-25.4	PASS	-25.4	49	63.5	-14.5	PASS	-14.5

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Horizontal Data
 Operator: CCH
 Notes:
 BT TX DH1 Mid channel

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.5°C; 31%RH; 1002mBar
 EUT Maximum Frequency - 2480MHz
 0

Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
10533.4	42.4	33.2	7.1	49.5	83.5	-34	PASS		40.3	63.5	-23.2	PASS	
12724.5	42	32.9	10.2	52.2	83.5	-31.3	PASS		43.1	63.5	-20.4	PASS	
17945.9	44.8	34.3	14.6	59.5	83.5	-24	PASS	-24	48.9	63.5	-14.6	PASS	-14.6

6-18GHz Middle channel



Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 1m Distance 6-18GHz Vertical Data Operator: CCH Notes: BT TX DH1 High channel	Work Order - T0487 EUT Power Input - 26.2V DC Test Site - CH1 Conditions - 23.5°C; 31%RH; 1002mBar EUT Maximum Frequency - 2480MHz 0
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Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)
10532.2	40.6	33.2	7.1	47.7	83.5	-35.8	PASS		40.3	63.5	-23.2	PASS	
10590.6	44.7	33.3	6.8	51.5	83.5	-32	PASS		40.1	63.5	-23.4	PASS	
12294.5	42	33.7	9.2	51.2	83.5	-32.3	PASS		42.9	63.5	-20.6	PASS	
17953.1	44.1	34.4	14.6	58.7	83.5	-24.8	PASS	-24.8	49	63.5	-14.5	PASS	-14.5

Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 1m Distance 6-18GHz Horizontal Data Operator: CCH Notes: BT TX DH1 High channel	Work Order - T0487 EUT Power Input - 26.2V DC Test Site - CH1 Conditions - 23.5°C; 31%RH; 1002mBar EUT Maximum Frequency - 2480MHz 0
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Data Taken at April 24, 2019

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)
10534.1	42.2	33.2	7.1	49.3	83.5	-34.2	PASS		40.3	63.5	-23.2	PASS	
10593	46.2	33.3	6.8	53	83.5	-30.5	PASS		40.1	63.5	-23.4	PASS	
12391.1	42.8	33.5	9.5	52.3	83.5	-31.2	PASS		43	63.5	-20.5	PASS	
17920.2	42	33.8	14.7	56.7	83.5	-26.8	PASS	-26.8	48.5	63.5	-15	PASS	-15

6-18GHz High channel

Radiated Emissions Table

Date: 24-Apr-19		Engineer: Chris Hamel		Temp: 23.5°C		Humidity: 34%		Pressure: 1010mBar		Work Order: T0487							
EUT Operating Voltage/Frequency: 24V DC																	
Frequency Range: 18-26.5GHz						Measurement Distance: 0.1 m											
Notes: No emissions found. BT high mid and low channels DH1										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)			
No emissions found																	
Table Result:				Pass				by				N/A dB		Worst Freq:		N/A MHz	
Test Site: EMI Chamber 1				Cable 1: Asset #2323				Cable 2: ---				Cable 3: ---					
Analyzer: Rental SA#3				Preamp: 18-26.5GHz				Antenna: 18-26.5GHz Horn				Preselector: ---					
CSsoft Radiated Emissions Calculator v 1.017.214																	
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor																	
Copyright Curtis-Straus LLC 2000																	

18-26.5GHz Low, Middle and High Channel



DEA-737

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Vertical 30-1000MHz Notes: FCC, TX mode Low Channel.	Work Order - U0288 EUT Power Input - 12Vdc Test Site - CH2 Conditions - 23°C;35 %RH; 1010mBar Test Engineer - Ahmed Ahmed EUT Maximum Frequency - 2480MHz
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Data Taken at 07:54:30 PM, Friday, May 22, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
32.789	34.7	0.3	35	40	-5	PASS		100	180
39.361	43.9	-4.6	39.2	40	-0.8	PASS		100	135
45.859	48.7	-9	39.7	40	-0.3	PASS	-0.3	100	90
48.357	48	-10.3	37.6	40	-2.4	PASS		100	315
96.615	44.7	-9.5	35.2	43.5	-8.3	PASS		150	0
549.968	38.3	1.4	39.7	46	-6.3	PASS		100	90

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Horizontal 30-1000MHz Notes: FCC, TX mode Low Channel.	Work Order - U0288 EUT Power Input - 12Vdc Test Site - CH2 Conditions - 23°C;35 %RH; 1010mBar Test Engineer - Ahmed Ahmed EUT Maximum Frequency - 2480MHz
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Data Taken at 07:54:30 PM, Friday, May 22, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
192.329	39.3	-6.1	33.2	43.5	-10.3	PASS		250	225
194.488	38.8	-5.9	32.9	43.5	-10.6	PASS		150	225
196.719	38.7	-5.4	33.3	43.5	-10.2	PASS		150	225
198.901	38.6	-4.9	33.6	43.5	-9.9	PASS		150	225
549.944	36.8	1.4	38.2	46	-7.8	PASS	-7.8	150	90
882.024	30.8	6.8	37.6	46	-8.4	PASS		250	270

30 – 1000MHz Low Channel



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 30-1000MHz Vertical Data Notes: TX mode, mid channel	Work Order - U0288 EUT Power Input - 12VDC Test Site - CH1 Conditions - 23.3°C; 49.4%RH; 1004mBar Test Engineer - Xiaoyu Zhu EUT Maximum Frequency - 2480MHz
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Data Taken at 11:16:29 AM, Friday, June 05, 2020

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
43.688	52.3	-13.3	39.1	40	-0.9	PASS	-0.9	125	1
58.938	55.4	-17.4	38	40	-2	PASS		125	15
187.862	48.4	-12	36.4	43.5	-7.1	PASS		119	290
190.002	49.7	-11.8	37.9	43.5	-5.6	PASS		100	265
495.227	40.2	-4.4	35.8	46	-10.2	PASS		174	306
499.952	48.8	-4.4	44.4	46	-1.6	PASS		217	303

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 30-1000MHz Horizontal Data Notes: TX mode, mid channel	Work Order - U0288 EUT Power Input - 12VDC Test Site - CH1 Conditions - 23.3°C; 49.4%RH; 1004mBar Test Engineer - Xiaoyu Zhu EUT Maximum Frequency - 2480MHz
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Data Taken at 12:09:26 PM, Friday, June 05, 2020

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
174.689	51.7	-12.5	39.3	43.5	-4.3	PASS		205	260
181.237	52.3	-12.6	39.7	43.5	-3.8	PASS		125	7
183.559	53.7	-12.4	41.3	43.5	-2.2	PASS	-2.2	124	3
190.054	51.3	-11.8	39.4	43.5	-4.1	PASS		125	263
192.167	53	-11.8	41.2	43.5	-2.3	PASS		174	293
194.394	49.8	-11.5	38.3	43.5	-5.2	PASS		175	256

30 – 1000MHz Mid Channel



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Vertical 30-1000MHz Notes: FCC, TX mode. High Channel.	Work Order - U0288 EUT Power Input - 12Vdc Test Site - CH2 Conditions - 23°C;35 %RH; 1010mBar Test Engineer - Ahmed Ahmed EUT Maximum Frequency - 2480MHz
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Data Taken at 07:13:16 PM, Friday, May 22, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
40.088	43.7	-5.1	38.6	40	-1.4	PASS		100	90
45.253	47.5	-8.7	38.8	40	-1.2	PASS	-1.2	100	135
48.333	47.1	-10.3	36.9	40	-3.1	PASS		100	225
190.196	42.7	-6.3	36.4	43.5	-7.1	PASS		200	0
214.106	42.7	-6.4	36.2	43.5	-7.3	PASS		100	180
550.017	39.1	1.4	40.4	46	-5.6	PASS		100	135

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Horizontal 30-1000MHz Notes: FCC, TX mode. High Channel.	Work Order - U0288 EUT Power Input - 12Vdc Test Site - CH2 Conditions - 23°C;35 %RH; 1010mBar Test Engineer - Ahmed Ahmed EUT Maximum Frequency - 2480MHz
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Data Taken at 07:13:16 PM, Friday, May 22, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
185.782	42	-6.7	35.3	43.5	-8.2	PASS		250	90
187.964	41.6	-6.5	35.1	43.5	-8.4	PASS		200	90
190.147	40.5	-6.3	34.2	43.5	-9.3	PASS		200	90
211.899	41.1	-6.7	34.4	43.5	-9.1	PASS		150	45
549.968	37.7	1.4	39.1	46	-6.9	PASS	-6.9	150	90
941.727	28.9	8.1	37.1	46	-8.9	PASS		100	0

30 – 1000MHz High Channel



Bureau Veritas Consumer Product Services Inc. Work Order - U0288
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12Vdc
 Top Peaks Vertical 1-6GHz Test Site - CH2
 Notes: Conditions - 23°C;35 %RH; 1010mBar
 TX mode Test Engineer - Ahmed Ahmed
 Low Channel. EUT Maximum Frequency - 2480MHz

Data Taken at 01:38:10 PM, Tuesday, June 02, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_1 09_ClassB_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_1 09_ClassB_AVG (dBµV/m)	Margin to Average Limit (dB)	Average Limit Test Result (Pass/Fail)	Average Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1598.75	54.5	-4.4	50.1	74	-23.8	PASS		54	-3.8	PASS		100	93
2169.88	46.9	2.7	49.6	74	-24.4	PASS		54	-4.4	PASS		300	315
3196.25	46.8	4.1	50.9	74	-23.1	PASS		54	-3.1	PASS		300	93
3545	46.6	4	50.6	74	-23.3	PASS		54	-3.3	PASS		300	190
4286.75	44.7	6.3	51.1	74	-22.9	PASS		54	-2.9	PASS		100	254
5842.75	44.9	8.9	53.8	74	-20.1	PASS	-20.1	54	-0.1	PASS	-0.1	200	0

Bureau Veritas Consumer Product Services Inc. Work Order - U0288
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12Vdc
 1-6GHz Vertical Data Test Site - CH2
 Notes: Conditions - 23°C;35 %RH; 1010mBar
 TX mode Test Engineer - Ahmed Ahmed
 Low Channel. EUT Maximum Frequency - 2480MHz

Data Taken at 01:42:01 PM, Tuesday, June 02, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_1 09_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_1 09_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1598.2	43.2	35.2	-4.3	38.9	74	-35.1	PASS		30.9	54	-23.1	PASS		115	196
2880	44.2	34.1	4	48.2	74	-25.8	PASS	-25.8	38.1	54	-15.8	PASS	-15.8	198	137

Bureau Veritas Consumer Product Services Inc. Work Order - U0288
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12Vdc
 Top Peaks Horizontal 1-6GHz Test Site - CH2
 Notes: Conditions - 23°C;35 %RH; 1010mBar
 TX mode Test Engineer - Ahmed Ahmed
 Low Channel. EUT Maximum Frequency - 2480MHz

Data Taken at 01:38:10 PM, Tuesday, June 02, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_1 09_ClassB_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_1 09_ClassB_AVG (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Test Result (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1002.25	49.3	-6.4	42.9	74	-31.1	PASS		54	-11.1	PASS		300	293
1325.88	48.7	-4.5	44.2	74	-29.7	PASS		54	-9.7	PASS		200	0
2015.25	46.7	2.3	48.9	74	-25	PASS		54	-5	PASS		200	0
2880.13	47	4	51	74	-23	PASS		54	-3	PASS		200	60
4638.88	45.5	6.5	52	74	-22	PASS		54	-2	PASS		300	159
5987.88	44.7	9.3	53.9	74	-20.1	PASS	-20.1	54	-0.1	PASS	-0.1	100	224



Bureau Veritas Consumer Product Services Inc. Work Order - U0288
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12Vdc
 1-6GHz Horizontal Data Test Site - CH2
 Notes: Conditions - 23°C; 35 %RH; 1010mBar
 TX mode Test Engineer - Ahmed Ahmed
 Low Channel. EUT Maximum Frequency - 2480MHz

Data Taken at 01:42:01 PM, Tuesday, June 02, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_1 09_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_1 09_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2880	46.2	39.3	4	50.3	74	-23.7	PASS	-23.7	43.4	54	-10.6	PASS	-10.6	182	62

1 – 6GHz Low Channel

Bureau Veritas Consumer Product Services Inc. Work Order - U0288
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12VDC
 1-6GHz Vertical Data Test Site - CH1
 Notes: Conditions - 23.3°C; 49.4%RH; 1004mBar
 TX mode, mid channel Test Engineer - Xiaoyu Zhu
 EUT Maximum Frequency - 2480MHz

Data Taken at 02:32:16 PM, Friday, June 05, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_1 09_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_1 09_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1599.7	54	41.3	-4.4	49.6	74	-24.4	PASS		36.9	54	-17.1	PASS		125	262
2141.5	46	36.9	3	49	74	-25	PASS		39.9	54	-14.1	PASS		106	13
3070.3	45.8	36	3.9	49.6	74	-24.3	PASS		39.8	54	-14.1	PASS		112	145
5287.6	45.4	34.8	7.9	53.3	74	-20.7	PASS	-20.7	42.7	54	-11.3	PASS		193	175
5315.8	44.3	35.3	7.9	52.3	74	-21.7	PASS		43.3	54	-10.7	PASS		125	70
5764.3	43.3	34.7	8.9	52.2	74	-21.8	PASS		43.6	54	-10.4	PASS	-10.4	125	165

Bureau Veritas Consumer Product Services Inc. Work Order - U0288
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12VDC
 1-6GHz Horizontal Data Test Site - CH1
 Notes: Conditions - 23.3°C; 49.4%RH; 1004mBar
 TX mode, mid channel Test Engineer - Xiaoyu Zhu
 EUT Maximum Frequency - 2480MHz

Data Taken at 02:32:16 PM, Friday, June 05, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_1 09_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_1 09_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1000.8	47.3	38.2	-6.5	40.8	74	-33.2	PASS		31.7	54	-22.3	PASS		298	221
2166.1	47.4	36.9	3.1	50.5	74	-23.5	PASS		40	54	-14	PASS		295	251
2880.1	49.5	43.7	4.7	54.2	74	-19.7	PASS	-19.7	48.4	54	-5.6	PASS	-5.6	105	19
5281.2	42.8	34.8	7.8	50.6	74	-23.4	PASS		42.6	54	-11.3	PASS		212	226
5319.9	43.7	35.2	8	51.7	74	-22.3	PASS		43.2	54	-10.8	PASS		125	244
5769.9	43.7	34.7	8.9	52.7	74	-21.3	PASS		43.6	54	-10.4	PASS	-10.4	125	204

1 – 6GHz Mid Channel



Bureau Veritas Consumer Product Services Inc. Work Order - U0288
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12Vdc
 1-6GHz Vertical Data Test Site - CH2
 Notes: Conditions - 23°C; 35 %RH; 1010mBar
 Tx Mode Test Engineer - Ahmed Ahmed
 High Channel. EUT Maximum Frequency - 2480MHz

Data Taken at 02:04:54 PM, Tuesday, June 02, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_1 09_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_1 09_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1598.9	45.7	36	-4.4	41.4	74	-32.6	PASS		31.6	54	-22.4	PASS		175	67
2008	43.5	34.5	2.3	45.9	74	-28.1	PASS		36.8	54	-17.2	PASS		300	248
2880.1	48.5	42.6	4	52.5	74	-21.5	PASS	-21.5	46.6	54	-7.4	PASS	-7.4	125	3
5260.1	41.1	32.4	7.7	48.8	74	-25.1	PASS		40.2	54	-13.8	PASS		108	37
5273.1	42	32.5	7.8	49.8	74	-24.1	PASS		40.3	54	-13.7	PASS		125	264
5972.3	40.9	32.9	9.2	50.2	74	-23.8	PASS		42.1	54	-11.8	PASS		216	247

Bureau Veritas Consumer Product Services Inc. Work Order - U0288
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12Vdc
 1-6GHz Horizontal Data Test Site - CH2
 Notes: Conditions - 23°C; 35 %RH; 1010mBar
 Tx Mode Test Engineer - Ahmed Ahmed
 High Channel. EUT Maximum Frequency - 2480MHz

Data Taken at 02:04:54 PM, Tuesday, June 02, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_1 09_ClassB_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_1 09_ClassB_AVG (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2044.7	44.4	35.1	2.1	46.5	74	-27.5	PASS		37.2	54	-16.8	PASS		183	25
2880.2	48.1	40.4	4	52.2	74	-21.8	PASS	-21.8	44.4	54	-9.6	PASS	-9.6	108	299
4613.6	41.7	33.3	6.5	48.2	74	-25.8	PASS		39.8	54	-14.2	PASS		194	177
5262.2	41.4	32.5	7.7	49.1	74	-24.9	PASS		40.2	54	-13.8	PASS		196	3
5279.3	42.6	32.5	7.8	50.5	74	-23.5	PASS		40.3	54	-13.7	PASS		125	174
5782.1	41.2	32.4	8.9	50.1	74	-23.8	PASS		41.3	54	-12.7	PASS		291	43

1 – 6GHz High Channel

Radiated Emissions Table														
Date: 07-Jun-20					Company: Aptiv					Work Order: U0288				
Engineer: Ahmed Ahmed					EUT Desc: DEA-737					EUT Operating Voltage/Frequency: 13.8V DC				
Temp: 23°C					Humidity: 35%					Pressure: 1010mBar				
Frequency Range: 6-18GHz										Measurement Distance: 0.1 m				
Notes: Model#737 Tested at Low, Mid, and High Channels.										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)
No emissions found														
Table Result: Pass by N/A dB Worst Freq: N/A MHz														
Test Site: EMI Chamber 1			Cable 1: Asset #2455			Cable 2: Asset #2456			Cable 3: #2467					
Analyzer: 2093			Preamp: 8447F			Antenna: 1861			Preselector: ---					
CSsoft Radiated Emissions Calculator v 1.017.211										Copyright Curtis-Straus LLC 2000				
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

6 – 18GHz Low, Middle and High Channels



Radiated Emissions Table												
Date: 17-May-20			Company: Aptiv Automotive				Work Order: U0288					
Engineer: Ahmed Ahmed			EUT Desc: DEA700				EUT Operating Voltage/Frequency: 12Vdc					
Temp: 26°			Humidity: 30%				Pressure: 1010mBar					
Frequency Range: 18-26.5GHz							Measurement Distance: 0.1 m					
Notes: Tested at Low, Mid, and High Channels. EUT Max Freq: 2480MHz												
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted 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)
NO EMISSION FOUND												
Table Result: --- by --- dB Worst Freq: --- MHz												
Test Site: EMI Chamber 2			Cable 1: Asset #2323				Antenna: 18-26.5GHz Horn					
Analyzer: Gold			Preamp: 18-26.5GHz									
<small>CSsoft Radiated Emissions Calculator v 1.017.216 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor</small>												
<small>Copyright Curtis-Straus LLC. 2000</small>												

18 – 26.5GHz Low, Middle and High Channels



DEA-750

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Vertical 30-1000MHz Notes: BT Tx DH1 Low channel	Work Order - U0286 EUT Power Input - 13.8V DC Test Site - CH 2 Conditions - 23.5°C; 35%RH; 1002mBar Test Engineer - AV EUT Maximum Frequency - 2480MHz
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Data Taken at 10:49:17 AM, Tuesday, May 12, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
182.823	40.9	-6.9	34	43.5	-9.5	PASS		100	0
187.213	40.6	-6.7	33.9	43.5	-9.6	PASS		100	0
189.371	42	-6.5	35.5	43.5	-8	PASS		100	0
191.602	42.8	-6.4	36.4	43.5	-7.1	PASS	-7.1	100	0
193.809	41.2	-6.3	34.9	43.5	-8.6	PASS		100	45
940.224	30.4	7.6	38	46	-8	PASS		150	270

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 30-1000MHz Horizontal Data Notes: BT Tx DH1 Low channel	Work Order - U0286 EUT Power Input - 13.8V DC Test Site - CH 2 Conditions - 23.5°C; 35%RH; 1002mBar Test Engineer - AV EUT Maximum Frequency - 2480MHz
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Data Taken at 10:49:17 AM, Tuesday, May 12, 2020

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
189.385	42.9	-6.5	36.4	43.5	-7.1	PASS		100	250
191.597	43.9	-6.4	37.5	43.5	-6	PASS	-6	125	228
193.804	42.9	-6.3	36.7	43.5	-6.8	PASS		108	236
195.965	39.7	-5.9	33.8	43.5	-9.7	PASS		125	250
200.327	40.4	-5.1	35.3	43.5	-8.2	PASS		159	238
944.262	23	7.8	30.8	46	-15.2	PASS		252	97

30 – 1000MHz Low channel



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 30-1000MHz Vertical Data Notes: BT Tx DH1 Mid channel	Work Order - U0286 EUT Power Input - 13.8V DC Test Site - CH 2 Conditions - 24.9°C; 32%RH; 1002mBar Test Engineer - BP EUT Maximum Frequency - 2480MHz
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Data Taken at 11:56:24 AM, Tuesday, May 12, 2020

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
191.686	41.6	-6.4	35.2	43.5	-8.3	PASS		100	119
495.119	28.6	0.4	29	46	-17	PASS		125	60
499.96	42.2	0.4	42.6	46	-3.4	PASS	-3.4	100	57
502.445	32.4	0.5	33	46	-13	PASS		100	70
509.852	34.2	0.3	34.5	46	-11.5	PASS		100	44
950.33	23	7.9	30.9	46	-15.1	PASS		175	160

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance 30-1000MHz Horizontal Data Notes: BT Tx DH1 Mid channel	Work Order - U0286 EUT Power Input - 13.8V DC Test Site - CH 2 Conditions - 24.9°C; 32%RH; 1002mBar Test Engineer - BP EUT Maximum Frequency - 2480MHz
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Data Taken at 11:56:24 AM, Tuesday, May 12, 2020

Frequency (MHz)	Raw QP Reading (dBµV)	Correction Factor (dB/m)	Adjusted QP Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Margin to Lim1 (dB)	Test Results Lim1 (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
189.47	43.9	-6.5	37.4	43.5	-6.1	PASS		125	229
191.621	43.5	-6.4	37.1	43.5	-6.4	PASS		160	250
499.995	44	0.4	44.5	46	-1.5	PASS	-1.5	152	51
502.726	31.9	0.5	32.4	46	-13.6	PASS		172	100
509.771	35.7	0.3	36	46	-10	PASS		225	212
525.002	34.9	0.5	35.4	46	-10.6	PASS		125	70

30 – 1000MHz Middle channel



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Vertical 30-1000MHz Notes: BT Tx DH1 High channel	Work Order - U0286 EUT Power Input - 13.8V DC Test Site - CH 2 Conditions - 24.9°C; 32%RH; 1002mBar Test Engineer - BP EUT Maximum Frequency - 2480MHz
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Data Taken at 02:17:35 PM, Tuesday, May 12, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
189.468	42	-6.5	35.5	43.5	-8	PASS		150	315
191.675	42.5	-6.4	36.1	43.5	-7.4	PASS		100	135
499.989	40	0.4	40.4	46	-5.6	PASS	-5.6	100	45
550.041	34.6	1.3	35.8	46	-10.2	PASS		100	45
950.966	29	7.9	36.9	46	-9.1	PASS		100	315
975.241	28.9	8.2	37.1	54	-16.9	PASS		200	225

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Horizontal 30-1000MHz Notes: BT Tx DH1 High channel	Work Order - U0286 EUT Power Input - 13.8V DC Test Site - CH 2 Conditions - 24.9°C; 32%RH; 1002mBar Test Engineer - BP EUT Maximum Frequency - 2480MHz
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Data Taken at 02:17:35 PM, Tuesday, May 12, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_2 09 (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
189.419	44.2	-6.5	37.7	43.5	-5.8	PASS		100	225
191.554	44.4	-6.4	38	43.5	-5.5	PASS	-5.5	100	225
499.989	38.4	0.4	38.9	46	-7.1	PASS		150	0
549.968	38.1	1.3	39.4	46	-6.6	PASS		150	45
650	35.1	2.9	38	46	-8	PASS		100	90
960.521	29.5	7.9	37.4	54	-16.6	PASS		150	135

30 – 1000MHz High channel



Bureau Veritas Consumer Product Services Inc. Work Order - U0286
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 13.8V DC
 1-6GHz Vertical Data Test Site - CH 2
 Notes: Conditions - 23.5°C; 35%RH; 1002mBar
 BT Tx DH1 Low channel Test Engineer - AV
 EUT Maximum Frequency - 2480MHz

Data Taken at 03:19:12 PM, Wednesday, May 13, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1711	46.1	35.6	-6.2	39.9	74	-34.1	PASS		29.5	54	-24.5	PASS		100	25
1728.9	44.2	36.1	-5.6	38.6	74	-35.4	PASS		30.5	54	-23.5	PASS		124	173
2411.6	45.5	37	-2.6	42.9	74	-31.1	PASS		34.4	54	-19.6	PASS		175	67
5990.1	47.4	36.3	4.9	52.3	74	-21.7	PASS	-21.7	41.3	54	-12.7	PASS	-12.7	108	23

Bureau Veritas Consumer Product Services Inc. Work Order - U0286
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 13.8V DC
 1-6GHz Horizontal Data Test Site - CH 2
 Notes: Conditions - 23.5°C; 35%RH; 1002mBar
 BT Tx DH1 Low channel Test Engineer - AV
 EUT Maximum Frequency - 2480MHz

Data Taken at 03:19:12 PM, Wednesday, May 13, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1728.9	43.6	38.1	-5.6	38	74	-36	PASS		32.5	54	-21.5	PASS		225	64
1903.7	44.6	35.8	-3.1	41.4	74	-32.6	PASS		32.6	54	-21.4	PASS		275	102
2407	45	36.9	-2.6	42.4	74	-31.6	PASS		34.3	54	-19.7	PASS		175	86
2482.4	44.9	36.5	-2.3	42.6	74	-31.4	PASS		34.2	54	-19.8	PASS		194	203
5771.1	45.3	36.4	4.5	49.9	74	-24.1	PASS	-24.1	41	54	-13	PASS	-13	204	191

1 – 6GHz Low channel



Bureau Veritas Consumer Product Services Inc. Work Order - U0286
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 13.8V DC
 1-6GHz Vertical Data Test Site - CH 2
 Notes: Conditions - 24.9°C; 32%RH; 1002mBar
 BT Tx DH1 Mid channel Test Engineer - BP
 EUT Maximum Frequency - 2480MHz

Data Taken at 04:08:08 PM, Wednesday, May 13, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1728.1	44.8	36.3	-5.6	39.2	74	-34.8	PASS		30.6	54	-23.4	PASS		275	260
2407.6	46.4	36.6	-2.6	43.8	74	-30.2	PASS		34	54	-20	PASS		284	248
2438.5	45.5	36.4	-2.4	43	74	-31	PASS		34	54	-20	PASS		108	281
2472.8	46.9	36.4	-2.3	44.6	74	-29.4	PASS		34.1	54	-19.9	PASS		225	12
5764	47	36.4	4.5	51.5	74	-22.5	PASS	-22.5	40.9	54	-13.1	PASS	-13.1	300	198

Bureau Veritas Consumer Product Services Inc. Work Order - U0286
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 13.8V DC
 1-6GHz Horizontal Data Test Site - CH 2
 Notes: Conditions - 24.9°C; 32%RH; 1002mBar
 BT Tx DH1 Mid channel Test Engineer - BP
 EUT Maximum Frequency - 2480MHz

Data Taken at 04:08:08 PM, Wednesday, May 13, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1713.8	44.2	35.6	-6.1	38.1	74	-35.9	PASS		29.5	54	-24.5	PASS		275	43
1727	44.8	36.3	-5.7	39.1	74	-34.9	PASS		30.6	54	-23.4	PASS		275	21
2412.7	44.5	36.6	-2.6	41.9	74	-32.1	PASS		34	54	-20	PASS		196	102
2430.7	44.5	36.4	-2.5	42.1	74	-31.9	PASS		33.9	54	-20.1	PASS		275	158
5765.3	44.3	36.7	4.5	48.8	74	-25.2	PASS	-25.2	41.2	54	-12.8	PASS	-12.8	299	216

1 – 6GHz Middle channel



Bureau Veritas Consumer Product Services Inc. Work Order - U0286
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 13.8V DC
 1-6GHz Vertical Data Test Site - CH 2
 Notes: Conditions - 24.9°C; 32%RH; 1002mBar
 BT Tx DH1 High channel Test Engineer - BP
 EUT Maximum Frequency - 2480MHz

Data Taken at 04:59:05 PM, Wednesday, May 13, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1729.5	44.5	35.7	-5.6	38.9	74	-35.1	PASS		30.1	54	-23.9	PASS		124	63
2411.4	45.6	36.8	-2.6	43	74	-31	PASS		34.2	54	-19.8	PASS		216	46
2457.5	46.7	36.7	-2.4	44.4	74	-29.6	PASS		34.3	54	-19.7	PASS		225	116
5750.9	44.5	36.4	4.5	49	74	-25	PASS		40.9	54	-13.1	PASS		275	172
5762.3	46.1	36.5	4.5	50.6	74	-23.4	PASS	-23.4	41	54	-13	PASS	-13	275	189
5772.2	45.1	36.4	4.5	49.6	74	-24.4	PASS		41	54	-13	PASS		225	73

Bureau Veritas Consumer Product Services Inc. Work Order - U0286
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 13.8V DC
 1-6GHz Horizontal Data Test Site - CH 2
 Notes: Conditions - 24.9°C; 32%RH; 1002mBar
 BT Tx DH1 High channel Test Engineer - BP
 EUT Maximum Frequency - 2480MHz

Data Taken at 04:59:05 PM, Wednesday, May 13, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1726.9	43.9	42.4	-5.7	38.2	74	-35.8	PASS		36.7	54	-17.3	PASS		104	222
2406.1	45.3	36.7	-2.6	42.7	74	-31.3	PASS		34.1	54	-19.9	PASS		175	289
2424.2	45.7	36.4	-2.5	43.2	74	-30.8	PASS		33.9	54	-20.1	PASS		284	239
2460.8	45.3	36.6	-2.3	43	74	-31	PASS		34.3	54	-19.7	PASS		275	93
2478.2	44.3	36.5	-2.3	42	74	-32	PASS		34.2	54	-19.8	PASS		275	30
5761.8	45.5	36.4	4.5	50	74	-24	PASS	-24	40.9	54	-13.1	PASS	-13.1	275	27

1 – 6GHz High channel



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 1m Distance 6-18GHz Vertical Data Notes: BT Tx DH1 Low channel	Work Order - U0286 EUT Power Input - 13.8V DC Test Site - CH 2 Conditions - 23.5°C; 35%RH; 1002mBar Test Engineer - AV EUT Maximum Frequency - 2480MHz
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Data Taken at 03:01:02 PM, Thursday, May 14, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
10531.4	44.5	36.5	12.9	57.4	83.5	-26.1	PASS		49.4	63.5	-14.1	PASS		127	148
10586.3	44.4	35.4	12.9	57.3	83.5	-26.2	PASS		48.3	63.5	-15.2	PASS		200	321
12778.9	45.4	36	17.8	63.2	83.5	-20.3	PASS		53.7	63.5	-9.8	PASS		186	187
17987.6	42.7	34.1	24.9	67.6	83.5	-15.9	PASS	-15.9	59	63.5	-4.5	PASS	-4.5	200	270

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 1m Distance 6-18GHz Horizontal Data Notes: BT Tx DH1 Low channel	Work Order - U0286 EUT Power Input - 13.8V DC Test Site - CH 2 Conditions - 23.5°C; 35%RH; 1002mBar Test Engineer - AV EUT Maximum Frequency - 2480MHz
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Data Taken at 03:20:57 PM, Thursday, May 14, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
10531.3	55.4	36.5	12.9	68.3	83.5	-15.2	PASS		49.4	63.5	-14.1	PASS		124	50
10587.4	45.5	35.3	12.9	58.4	83.5	-25.1	PASS		48.2	63.5	-15.3	PASS		188	222
12717.2	46.1	36.3	17.7	63.9	83.5	-19.6	PASS		54	63.5	-9.5	PASS		188	149
17828.1	43.4	34.2	25	68.4	83.5	-15.1	PASS	-15.1	59.2	63.5	-4.3	PASS	-4.3	108	123

6 – 18GHz Low channel



Bureau Veritas Consumer Product Services Inc.	Work Order - U0286
Radiated Emissions Electric Field 1m Distance	EUT Power Input - 13.8V DC
6-18GHz Vertical Data	Test Site - CH 2
Notes:	Conditions - 24.9°C; 32%RH; 1002mBar
BT Tx DH1 Mid channel	Test Engineer - BP
	EUT Maximum Frequency - 2480MHz

Data Taken at 03:42:16 PM, Thursday, May 14, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
10532.5	45.3	36.5	12.9	58.2	83.5	-25.3	PASS		49.4	63.5	-14.1	PASS		100	21
12750.6	46.3	36.2	17.9	64.2	83.5	-19.3	PASS		54.1	63.5	-9.4	PASS		182	161
17857.4	44.2	34.2	25	69.1	83.5	-14.4	PASS	-14.4	59.2	63.5	-4.3	PASS	-4.3	199	242

Bureau Veritas Consumer Product Services Inc.	Work Order - U0286
Radiated Emissions Electric Field 1m Distance	EUT Power Input - 13.8V DC
6-18GHz Horizontal Data	Test Site - CH 2
Notes:	Conditions - 24.9°C; 32%RH; 1002mBar
BT Tx DH1 Mid channel	Test Engineer - BP
	EUT Maximum Frequency - 2480MHz

Data Taken at 04:06:17 PM, Thursday, May 14, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Test Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Test Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
10531.2	45.1	36.5	12.9	58	83.5	-25.5	PASS		49.4	63.5	-14.1	PASS		187	86
10586.1	46.9	35.4	12.9	59.8	83.5	-23.7	PASS		48.3	63.5	-15.2	PASS		150	317
12778.3	45.7	35.9	17.8	63.5	83.5	-20	PASS		53.7	63.5	-9.8	PASS		125	50
17890	43.3	33.9	25.1	68.4	83.5	-15.1	PASS	-15.1	58.9	63.5	-4.6	PASS	-4.6	125	51

6 – 18GHz Middle channel



Radiated Emissions Table															
Date: 07-Jun-20				Company: Aptiv				Work Order: U0286							
Engineer: Ahmed Ahmed				EUT Desc: DEA-751				EUT Operating Voltage/Frequency: 13.8V DC							
Temp: 23°C				Humidity: 35%				Pressure: 1010mBar							
Frequency Range: 6-18GHz							Measurement Distance: 0.1 m								
Notes: Model#750 Mid channel, Vertical and Horizontal antenna orientation.										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)	
No emissions found				---	---	---	---	---	---	---	---	---	---	---	
Table Result:		Pass		by		N/A		dB		Worst Freq:		N/A		MHz	
Test Site: EMI Chamber 1				Cable 1: Asset #2455				Cable 2: Asset #2456				Cable 3:#2467			
Analyzer: 2093				Preamp: 8447F				Antenna: 1861				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.211										Copyright Curtis-Straus LLC 2000					
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

6 – 18GHz High channel

Radiated Emissions Table															
Date: 17-May-20				Company: Aptiv Automotive				Work Order: U0286							
Engineer: Ahmed Ahmed				EUT Desc: DEA750				EUT Operating Voltage/Frequency: 12Vdc							
Temp: 26°				Humidity: 30%				Pressure: 1010mBar							
Frequency Range: 18-26.5GHz							Measurement Distance: 0.1 m								
Notes: Tested at Low, Mid, and High Channels.										EUT Max Freq: 2480MHz					
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted 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)			
NO EMISSION FOUND				---	---	---	---	---	---	---	---	---	---		
Table Result:		---		by		---		dB		Worst Freq:		---		MHz	
Test Site: EMI Chamber 2				Cable 1: Asset #2323				Antenna: 18-26.5GHz Horn				Copyright Curtis-Straus LLC 2000			
Analyzer: Gold				Preamp: 18-26.5GHz											
CSsoft Radiated Emissions Calculator v 1.017.216															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

18 – 26.5GHz Low, Middle and High Channels



DEA-751

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Vertical 30-1000MHz Notes: BT TX DH1 Low channel	Work Order - T2142 EUT Power Input - 26.6 VDC Test Site - Chamber 1 Conditions - 22.3°C; 27.8%RH; 998mBar Test Engineer - LN EUT Maximum Frequency - 2480 MHz
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Data Taken at 02:54:42 PM, Thursday, January 16, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
182.508	46.9	-7.7	39.2	43.5	-4.3	PASS	-4.3	100	0
449.962	40.6	-2.1	38.5	46	-7.5	PASS		100	0
535.128	37	-0.3	36.7	46	-9.4	PASS		100	0
549.993	40.9	-0.1	40.8	46	-5.2	PASS		100	45
940.49	30.6	5.7	36.3	46	-9.7	PASS		100	90
993.089	30.1	6.3	36.5	54	-17.5	PASS		150	90

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Horizontal 30-1000MHz Notes: BT TX DH1 Low channel	Work Order - T2142 EUT Power Input - 26.6 VDC Test Site - Chamber 1 Conditions - 22.3°C; 27.8%RH; 998mBar Test Engineer - LN EUT Maximum Frequency - 2480 MHz
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Data Taken at 02:54:42 PM, Thursday, January 16, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
474.988	34.9	-0.8	34.1	46	-11.9	PASS		150	0
547.543	34.2	-0.1	34.1	46	-11.9	PASS		100	315
549.968	38.2	-0.1	38.1	46	-7.9	PASS	-7.9	100	315
600.02	33.3	0.7	34	46	-12.1	PASS		200	135
928.899	30.4	5.6	36	46	-10	PASS		150	90
989.985	30.1	6.2	36.3	54	-17.7	PASS		250	45

30 – 1000MHz Low Channel



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Vertical 30-1000MHz Notes: BT TX DH1 Mid channel	Work Order - T2142 EUT Power Input - 26.6 VDC Test Site - Chamber 1 Conditions - 22.3°C; 27.8%RH; 998mBar Test Engineer - LN EUT Maximum Frequency - 2480 MHz
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Data Taken at 03:16:01 PM, Thursday, January 16, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
249.996	42.3	-6.5	35.8	46	-10.2	PASS		100	0
399.982	37	-2.5	34.5	46	-11.6	PASS		100	45
527.416	36	-0.7	35.3	46	-10.7	PASS		100	0
533.188	35.1	-0.4	34.7	46	-11.3	PASS		100	0
549.968	40.5	-0.1	40.5	46	-5.6	PASS	-5.6	100	45
924.874	30.4	5.6	36	46	-10.1	PASS		200	270

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Horizontal 30-1000MHz Notes: BT TX DH1 Mid channel	Work Order - T2142 EUT Power Input - 26.6 VDC Test Site - Chamber 1 Conditions - 22.3°C; 27.8%RH; 998mBar Test Engineer - LN EUT Maximum Frequency - 2480 MHz
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Data Taken at 03:16:01 PM, Thursday, January 16, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
543.057	34.4	-0.2	34.2	46	-11.8	PASS		100	315
549.968	38.8	-0.1	38.7	46	-7.3	PASS		100	315
819.604	37.2	3.8	41	46	-5.1	PASS	-5.1	250	135
820.841	35.2	3.8	39	46	-7.1	PASS		200	135
822.757	35.4	3.8	39.2	46	-6.8	PASS		200	135
992.507	29.3	6.3	35.6	54	-18.4	PASS		250	270

30 – 1000MHz Middle Channel



Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Vertical 30-1000MHz Notes: BT TX DH1 high channel	Work Order - T2142 EUT Power Input - 26.6 VDC Test Site - Chamber 1 Conditions - 22.3°C; 27.8%RH; 998mBar Test Engineer - LN EUT Maximum Frequency - 2480 MHz
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Data Taken at 04:12:15 PM, Thursday, January 16, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	Turntable Azimuth (degrees)
250.02	42.3	-6.5	35.8	46	-10.2	PASS		100	0
399.982	36.3	-2.5	33.8	46	-12.2	PASS		100	45
550.017	39	-0.1	39	46	-7.1	PASS	-7.1	100	45
552.442	33.6	-0.1	33.5	46	-12.5	PASS		100	0
932.609	29.4	5.6	35	46	-11	PASS		200	180
972.064	29.4	6	35.4	54	-18.6	PASS		200	180

Bureau Veritas Consumer Product Services Inc. Radiated Emissions Electric Field 3m Distance Top Peaks Horizontal 30-1000MHz Notes: BT TX DH1 high channel	Work Order - T2142 EUT Power Input - 26.6 VDC Test Site - Chamber 1 Conditions - 22.3°C; 27.8%RH; 998mBar Test Engineer - LN EUT Maximum Frequency - 2480 MHz
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Data Taken at 04:12:15 PM, Thursday, January 16, 2020

Frequency (MHz)	Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Lim1: FCC_pt15_1 09_Class_B (dBµV/m)	Lim1 Margin (dB)	Lim1 Test Results (Pass/Fail)	Worst Margin Lim1 (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
499.965	34.6	-0.8	33.8	46	-12.2	PASS		100	315
549.968	36.9	-0.1	36.9	46	-9.2	PASS		200	315
819.992	37.6	3.8	41.4	46	-4.6	PASS		250	90
821.181	36.6	3.8	40.4	46	-5.6	PASS		250	135
823.12	38.5	3.8	42.3	46	-3.7	PASS	-3.7	250	135
997.284	29.8	6.4	36.2	54	-17.8	PASS		150	315

30 – 1000MHz High Channel



Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 Top Peaks Vertical 1-6GHz
 Notes:
 BT TX low DH1

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.8C; 38%RH; 998mBar
 EUT Maximum Frequency - 2480MHz

Data Taken at 10:42:57 AM, Sunday, June 07, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Average Limit (dB)	Average Limit Test Result (Pass/Fail)	Average Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2047.13	48	-2.9	45.1	74	-28.9	PASS		54	-8.9	PASS		300	310
2157.75	46.9	-1.3	45.6	74	-28.4	PASS		54	-8.4	PASS		100	0
2879.88	47.3	0	47.3	74	-26.7	PASS	-26.7	54	-6.7	PASS	-6.7	100	152
3918.88	46.9	-0.9	46.1	74	-27.9	PASS		54	-7.9	PASS		200	46
4593.63	45.6	0.1	45.7	74	-28.3	PASS		54	-8.3	PASS		100	192
5615.75	45.4	1.3	46.7	74	-27.3	PASS		54	-7.3	PASS		100	271

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 Top Peaks Horizontal 1-6GHz
 Notes:
 BT TX low DH1

Work Order - T0487
 EUT Power Input - 26.2V DC
 Test Site - CH1
 Conditions - 23.8C; 38%RH; 998mBar
 EUT Maximum Frequency - 2480MHz

Data Taken at 10:42:57 AM, Sunday, June 07, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2144.63	47	-1.5	45.5	74	-28.5	PASS		54	-8.5	PASS		200	42
2315.63	48	-103.4	-55.5	74	-129.5	PASS		54	-109.5	PASS		200	42
2414.5	50.5	-102.9	-52.4	74	-126.4	PASS		54	-106.4	PASS		100	192
2577.5	48.9	-102.6	-53.7	74	-127.7	PASS		54	-107.7	PASS		200	202
3120.13	47.7	-0.5	47.2	74	-26.8	PASS	-26.8	54	-6.8	PASS	-6.8	100	74
5839	45	1.6	46.6	74	-27.4	PASS		54	-7.4	PASS		100	114

1 – 6GHz Low Channel

Bureau Veritas Consumer Product Services Inc.
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Vertical Data
 Notes:
 RX mode.
 Mid Channel.

Work Order - U0211
 EUT Power Input - 12Vdc
 Test Site - Chamber 1
 Conditions - 23°C; 35%RH; 1010mBar
 Test Engineer - Ahmed Ahmed
 EUT Maximum Frequency - 2480

Data Taken at 02:37:15 PM, Sunday, June 07, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Avg Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
1849	45.1	36.6	1.1	46.2	74	-27.8	PASS		37.7	54	-16.3	PASS		125	29
1986.7	44.9	36.9	2.4	47.3	74	-26.7	PASS		39.4	54	-14.6	PASS		179	238
2687.5	47.1	37.8	-97.7	-50.6	74	-124.6	PASS		-59.9	54	-113.9	PASS		100	267
2917.4	44.9	35.8	4.7	49.6	74	-24.4	PASS		40.5	54	-13.5	PASS		196	218
5318.9	43.4	34.7	8	51.3	74	-22.7	PASS	-22.7	42.7	54	-11.3	PASS		193	233
5769.2	41.8	34.6	8.9	50.7	74	-23.3	PASS		43.5	54	-10.5	PASS	-10.5	182	28



Bureau Veritas Consumer Product Services Inc. Work Order - U0211
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 12Vdc
 1-6GHz Horizontal Data Test Site - Chamber 1
 Notes: Conditions - 23°C; 35%RH; 1010mBar
 RX mode. Test Engineer - Ahmed Ahmed
 Mid Channel. EUT Maximum Frequency - 2480

Data Taken at 02:37:15 PM, Sunday, June 07, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Raw Avg Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Peak Margin (dB)	Peak Results (Pass/Fail)	Worst Peak Margin (dB)	Adjusted Avg Amplitude (dBµV/m)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Avg Margin (dB)	Avg Results (Pass/Fail)	Worst Average Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2135.2	45.3	36.4	3	48.3	74	-25.7	PASS		39.3	54	-14.7	PASS		275	14
2683	47.3	37.8	-97.7	-50.4	74	-124.4	PASS		-59.9	54	-113.9	PASS		299	246
2952.4	45.1	35.7	4.3	49.4	74	-24.6	PASS		40	54	-14	PASS		225	184
5318.2	44.2	34.7	8	52.2	74	-21.8	PASS		42.7	54	-11.3	PASS		275	112
5938.6	43.8	34.4	9.3	53.1	74	-20.9	PASS	-20.9	43.7	54	-10.3	PASS	-10.3	204	190

1 – 6GHz Middle Channel

Curtis Straus - a Bureau Veritas Company Work Order - T0487
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 26.2V DC
 Top Peaks Vertical 1-6GHz Test Site - CH1
 Notes: Conditions - 23.8C; 38%RH; 998mBar
 BT TX High DH1 EUT Maximum Frequency - 2480MHz

Data Taken at 10:50:49 AM, Sunday, June 07, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Average Limit (dB)	Average Limit Test Result (Pass/Fail)	Average Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2179.25	47.5	-1.1	46.4	74	-27.6	PASS		54	-7.6	PASS		200	283
2415.38	50.6	-102.9	-52.3	74	-126.3	PASS		54	-106.3	PASS		100	190
3055.88	47.2	-0.7	46.5	74	-27.5	PASS		54	-7.5	PASS		100	151
4593.75	45.7	0.1	45.8	74	-28.2	PASS		54	-8.2	PASS		300	112
4960	48.6	0.3	49	74	-25	PASS	-25	54	-5	PASS	-5	200	283
5294.75	47.6	1.2	48.8	74	-25.2	PASS		54	-5.2	PASS		100	73

Curtis Straus - a Bureau Veritas Company Work Order - T0487
 Radiated Emissions Electric Field 3m Distance EUT Power Input - 26.2V DC
 Top Peaks Horizontal 1-6GHz Test Site - CH1
 Notes: Conditions - 23.8C; 38%RH; 998mBar
 BT TX High DH1 EUT Maximum Frequency - 2480MHz

Data Taken at 10:50:49 AM, Sunday, June 07, 2020

Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
2173.13	47.1	-1.2	46	74	-28	PASS		54	-8	PASS		200	7
2412.5	50.1	-102.9	-52.8	74	-126.8	PASS		54	-106.8	PASS		100	34
2644.63	48.4	-102.6	-54.3	74	-128.3	PASS		54	-108.3	PASS		200	45
3236.38	47.4	-0.7	46.7	74	-27.3	PASS		54	-7.3	PASS		200	124
4960.13	46.9	0.3	47.2	74	-26.8	PASS		54	-6.8	PASS		100	310
5465.5	45.8	1.7	47.5	74	-26.5	PASS	-26.5	54	-6.5	PASS	-6.5	200	283

1 – 6GHz High Channel



Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 1m Distance Top Peaks Vertical 6-18GHz Notes: BT TX low DH1							Work Order - T0487 EUT Power Input - 26.2V DC Test Site - CH1 Conditions - 23.8C; 38%RH; 998mBar EUT Maximum Frequency - 2480MHz						
Data Taken at 10:47:56 AM, Sunday, June 07, 2020													
Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Test Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
12744.15	46.2	10.2	56.4	83.5	-27.1	PASS	-27.1	63.5	-7.1	PASS	-7.1	150	309

Curtis Straus - a Bureau Veritas Company Radiated Emissions Electric Field 1m Distance Top Peaks Horizontal 6-18GHz Notes: BT TX low DH1							Work Order - T0487 EUT Power Input - 26.2V DC Test Site - CH1 Conditions - 23.8C; 38%RH; 998mBar EUT Maximum Frequency - 2480MHz						
Data Taken at 10:47:57 AM, Sunday, June 07, 2020													
Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Test Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
10533.55	48.7	7.1	55.8	83.5	-27.7	PASS	-27.7	63.5	-7.7	PASS	-7.7	175	315
12853	45.5	10.5	56	83.5	-27.5	PASS	-27.5	63.5	-7.5	PASS	-7.5	200	73

6 – 18GHz Low Channel

Radiated Emissions Table															
Date: 07-Jun-20					Company: Aptiv					Work Order: U0211					
Engineer: Ahmed Ahmed					EUT Desc: DEA-751					EUT Operating Voltage/Frequency: 13.8V DC					
Temp: 23°C					Humidity: 35%					Pressure: 1010mBar					
Frequency Range: 6-18GHz										Measurement Distance: 0.1 m					
Notes: Model#751 Mid channel, Vertical and Horizontal antenna orientation.										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)	
No emissions found				---	---	---	---	---	---	---	---	---	---	---	---
Table Result:		Pass		by		N/A dB		Worst Freq:		N/A MHz					
Test Site: EMI Chamber 1			Cable 1: Asset #2455			Cable 2: Asset #2456			Cable 3: #2467						
Analyzer: 2093			Preamp: 8447F			Antenna: 1861			Preselector: ---						
CSsoft Radiated Emissions Calculator v 1.017.211								Copyright Curtis-Straus LLC 2000							
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

6 – 18GHz Middle Channel



Curtis Straus - a Bureau Veritas Company				Work Order - T0487									
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 26.2V DC									
Top Peaks Vertical 6-18GHz				Test Site - CH1									
Notes:				Conditions - 23.8C; 38%RH; 998mBar									
BT TX High DH1				EUT Maximum Frequency - 2480MHz									
Data Taken at 10:52:47 AM, Sunday, June 07, 2020													
Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Test Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7923.6	47	3.9	51	83.5	-32.5	PASS		63.5	-12.5	PASS		150	34
12309.27	46.7	9.2	55.9	83.5	-27.6	PASS	-27.6	63.5	-7.6	PASS	-7.6	100	0

Curtis Straus - a Bureau Veritas Company				Work Order - T0487									
Radiated Emissions Electric Field 1m Distance				EUT Power Input - 26.2V DC									
Top Peaks Vertical 6-18GHz				Test Site - CH1									
Notes:				Conditions - 23.8C; 38%RH; 998mBar									
BT TX High DH1				EUT Maximum Frequency - 2480MHz									
Data Taken at 10:52:47 AM, Sunday, June 07, 2020													
Frequency (MHz)	Raw Peak Reading (dBµV)	Correction Factor (dB/m)	Adjusted Peak Amplitude (dBµV/m)	Pk Lim: FCC_pt15_2 09_Peak (dBµV/m)	Margin to Peak Limit (dB)	Peak Limit Test Results (Pass/Fail)	Peak Limit Worst Margin (dB)	Av Lim: FCC_pt15_2 09_Average (dBµV/m)	Margin to Avg Limit (dB)	Avg Limit Test Results (Pass/Fail)	Avg Limit Worst Margin (dB)	Antenna Height (cm)	EUT Azimuth (degrees)
7923.6	47	3.9	51	83.5	-32.5	PASS		63.5	-12.5	PASS		150	34
12309.27	46.7	9.2	55.9	83.5	-27.6	PASS	-27.6	63.5	-7.6	PASS	-7.6	100	0

6 – 18GHz High Channel

Radiated Emissions Table													
Date: 17-May-20				Company: Aptiv Automotive				Work Order: U0211					
Engineer: Ahmed Ahmed				EUT Desc: vehicle infotainment system with Bluetooth				EUT Operating Voltage/Frequency: 26.2Vdc					
Temp: 26°				Humidity: 30%				Pressure: 1010mBar					
Frequency Range: 18-26.5GHz								Measurement Distance: 0.1 m					
Notes: Tested at Low, Mid, and High Channels.								EUT Max Freq: 2480MHz					
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted 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)	
NO EMISSION FOUND													
Table Result: --- by --- dB Worst Freq: --- MHz													
Test Site: EMI Chamber 2				Cable 1: Asset #2323				Antenna: 18-26.5GHz Horn					
Analyzer: Gold				Preamp: 18-26.5GHz									
CSsoft Radiated Emissions Calculator v1.017.216 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor													
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18 – 26.5GHz Low, Middle and High Channel



TEU

Rev. 4/29/2019

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/21/2019
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/7/2020
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/7/2020
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
8449B HF Preamp	1-18GHz	8449B	Agilent	1149055		II	11/26/2019
185710 Rental PA	9KHz-1GHz	310	SONOMA INSTRUMENT	185710		II	4/16/2020
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	10/24/2019
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red-White Bilog	30-2000MHz	JB1	Sunol	A091604-1	1105	I	8/21/2019
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758		III	Verify before Use
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	3/9/2021
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020
Asset #2657		1235C97	Control Company	181683806	2657	I	4/3/2020
Cables	Range		Mfr			Cat	Calibration Due
Asset #2456	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2467	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2606	9KHz-18GHz		MegaPhase			II	4/2/2020
Asset #2323	1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 002	2323	II	8/9/2019

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

Rev. 5/3/2020

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	12/31/2020
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	5/30/2020
EMI Chamber 1	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	1685	I	12/7/2020
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	12/7/2020
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
8447F Rental PA	0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	10/14/2020
	9KHz-1.3GHz	84477F	HP	3113A05395		II	6/18/2020
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red-Brown Bilog	30-2000MHz	JB1	Sunol	A0032406	1218	I	3/11/2021
	1-18Ghz	3117	ETS	157647	1861	I	3/9/2021
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	11/15/2020
Asset #2655		1235C97	Control Company	181683829	2655	I	10/3/2020
Cables	Range		Mfr			Cat	Calibration Due
Asset #2455	9KHz-18GHz		MegaPhase			II	11/2/2020
Asset #2456	9KHz-18GHz		MegaPhase			II	11/2/2020
Asset #2467	9KHz-18GHz		MegaPhase			II	11/2/2020
Asset #2468	9KHz-18GHz		MegaPhase			II	11/2/2020
	9KHz-18GHz		Pasternack			II	7/10/2020

using standards traceable to NIST or other nationally recognized calibration standard.



Rev. 5/16/2020

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	12/31/2020	12/31/2019
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on
EMI Chamber 2		719150	2762A-7	A-0015	30-1000MHz	1686	I	12/7/2020	12/7/2018
EMI Chamber 2		719150	2762A-7	A-0015	1-18GHz	1686	I	12/7/2020	12/7/2018
Preamps / Couplers Attenuators / Filters		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
8449B HF Preamp		1-18GHz	8449B	Agilent	1149055		II	11/24/2020	11/24/2019
8447F Rental PA		9KHz-1.3GHz	84477F	HP	3113A05395		II	6/18/2020	6/18/2019
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Brown Bilog		30-2000MHz	JB1	Sunol	A0032406	1218	I	3/11/2021	3/11/2019
Blue Horn		1-18Ghz	3117	ETS	157647	1861	I	3/9/2021	3/9/2019
Meteorological Meters/Chambers			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)			BA928	Oregon Scient	C3166-1	831	I	11/15/2020	5/15/2018
Asset #2654			1235C97	Control Comp	181683816	2654	I	10/3/2020	4/3/2019
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2580		9KHz-18GHz		MegaPhase			II	1/31/2021	1/31/2020
Asset #2467		9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019
Asset #2681		9KHz-18GHz		MegaPhase			II	1/31/2021	1/31/2020

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

Rev. 5/16/2020

Spectrum Analyzers / Receivers / Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown		9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	10/22/2020	4/22/2019
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	12/7/2020	12/7/2018
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	10/24/2020	10/24/2018
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/Chambers			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	11/15/2020	5/15/2018
Asset #2654			1235C97	Control Company	181683816	2654	I	10/3/2020	4/3/2019
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2323		1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 002	2323	II	7/24/2020	7/24/2019

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

Rev. 5/31/2020

Spectrum Analyzers / Receivers / Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental MXE EMI Receiver(1168255)		20Hz-8.4GHz	N9038A	Agilent	MY53290009	1168255	I	9/25/2020	9/25/2019
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	12/7/2020	12/7/2018
EMI Chamber 1		719150	2762A-6	A-0015	1-18GHz	1685	I	12/7/2020	12/7/2018
Preamps / Couplers Attenuators / Filters		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
8449B HF Preamp		1-18GHz	8449B	Agilent	1149055		II	11/24/2020	11/24/2019
185710 Rental PA		9KHz-1GHz	310	SONOMA INSTRUMENT	185710		II	5/3/2021	5/3/2020
2116 BRF		0.009-18000MHz	BRM50702	Micro-Tronics	G226	2116	II	11/11/2020	11/11/2019
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-White Bilog		30-2000MHz	JB1	Sunol	A091604-1	1105	I	9/11/2021	9/11/2019
Blue Horn		1-18Ghz	3117	ETS	157647	1861	I	3/9/2021	3/9/2019
Meteorological Meters/Chambers			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)			BA928	Oregon Scientific	C3166-1	831	I	11/15/2020	5/15/2018
Asset #2658			1235C97	Control Company	181683808	2658	I	10/3/2020	4/3/2019
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2456		9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019
Asset #2467		9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019
Asset #2606		9KHz-18GHz		Pasternack			II	5/16/2021	5/16/2020

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



Radiated Band Edge

DEA-731

Radiated Emissions Table															
Date: 24-Apr-19										Work Order: T0487					
Engineer: Chris Hamel										EUT Operating Voltage/Frequency: 24V DC					
Temp: 23.5°C										Humidity: 34%		Pressure: 1010mBar			
Frequency Range: 2.3-2.5GHz										Measurement Distance: 3 m					
Notes: Bluetooth DH1										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)	
Low Channel															
V	2390.0	14.7	4.1	0.0	32.2	0.8	47.7	37.1	74.0	-26.3	Pass	54.0	-16.9	Pass	
V	2326.2	16.5	4.4	0.0	31.9	0.7	49.1	37.0	74.0	-24.9	Pass	54.0	-17.0	Pass	
V	2356.7	18.6	4.8	0.0	32.0	0.8	51.4	37.6	74.0	-22.6	Pass	54.0	-16.4	Pass	
Low edge hopping															
V	2390.0	14.7	4.1	0.0	32.2	0.8	47.7	37.1	74.0	-26.3	Pass	54.0	-16.9	Pass	
V	2383.8	16.0	4.2	0.0	32.2	0.8	49.0	37.2	74.0	-25.0	Pass	54.0	-16.8	Pass	
High Channel															
V	2483.5	16.1	5.3	0.0	32.4	0.8	49.3	38.5	74.0	-24.7	Pass	54.0	-15.5	Pass	
V	2490.2	16.8	5.4	0.0	32.4	0.8	50.0	38.6	74.0	-24.0	Pass	54.0	-15.4	Pass	
High edge hopping															
V	2483.5	16.2	5.2	0.0	32.4	0.8	49.4	38.4	74.0	-24.6	Pass	54.0	-15.6	Pass	
V	2491.4	16.6	5.4	0.0	32.4	0.8	49.8	38.6	74.0	-24.2	Pass	54.0	-15.4	Pass	
Table Result: Pass by -15.4 dB Worst Freq: 2490.2 MHz															
Test Site: EMI Chamber 1				Cable 1: Asset #2456				Cable 2: Asset #2606				Cable 3: ---			
Analyzer: Rental SA#3				Preamp: None				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.214															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

DEA-737

Radiated Emissions Table															
Date: 12-Jun-20										Work Order: U0288					
Engineer: AV										EUT Operating Voltage/Frequency: 12V DC					
Temp: 23.5°C										Humidity: 34%		Pressure: 1010mBar			
Frequency Range: 2.3-2.5GHz										Measurement Distance: 3 m					
Notes: Bluetooth DH1 DEA737										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)	
Low Channel															
V	2390.0	40.193	---	38.90	32.2	0.8	34.3	---	74.0	-39.7	Pass	54.0	-19.7	Pass	
V	2389.693	43.653	---	38.90	31.9	0.7	37.4	---	74.0	-36.7	Pass	54.0	-16.7	Pass	
H	2390.0	38.353	---	38.90	31.9	0.8	32.2	---	74.0	-41.9	Pass	54.0	-21.9	Pass	
High Channel															
V	2483.5	36.352	---	38.90	32.4	0.8	30.6	---	74.0	-43.4	Pass	54.0	-23.4	Pass	
V	2483.717	38.803	---	38.90	32.4	0.8	33.1	---	74.0	-40.9	Pass	54.0	-20.9	Pass	
H	2483.5	36.058	---	38.90	32.4	0.8	30.4	---	74.0	-43.6	Pass	54.0	-23.6	Pass	
Table Result: Pass by -16.7 dB Worst Freq: 2389.693 MHz															
Test Site: EMI Chamber 1				Cable 1: Asset #2456				Cable 2: Asset #2682				Cable 3: Asset #2467			
Analyzer: 1170725				Preamp: 8449B				Antenna: Blue Horn				Preselector: ---			
CSsoft Radiated Emissions Calculator v 1.017.214															
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															



DEA-750

Radiated Emissions Table														
Date: 12-Jun-20 Engineer: AV Temp: 23.5°C										Work Order: U0286 EUT Operating Voltage/Frequency: 12V DC Humidity: 34% Pressure: 1010mBar				
Frequency Range: 2.3-2.5GHz										Measurement Distance: 3 m				
Notes: Bluetooth DH1 DEA750										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)
Low Channel														
V	2390.0	37.672	---	38.90	32.2	0.8	31.8	---	74.0	-42.2	Pass	54.0	-22.2	Pass
H	2389.763	38.615	---	38.90	32.2	0.8	32.7	---	74.0	-41.3	Pass	54.0	-21.3	Pass
H	2390.0	36.791	---	38.90	31.9	0.8	30.6	---	74.0	-43.4	Pass	54.0	-23.4	Pass
High Channel														
V	2483.5	36.243	---	38.90	32.4	0.8	30.5	---	74.0	-43.5	Pass	54.0	-23.5	Pass
V	2483.726	38.089	---	38.90	32.4	0.8	32.4	---	74.0	-41.6	Pass	54.0	-21.6	Pass
H	2483.5	36.189	---	38.90	32.4	0.8	30.5	---	74.0	-43.5	Pass	54.0	-23.5	Pass
H	2483.69	37.029	---	38.9	32.4	0.8	31.3	---	74.0	-42.7	Pass	54.0	-22.7	Pass
Table Result: Pass by -21.3 dB Worst Freq: 2389.763 MHz														
Test Site: EMI Chamber 1					Cable 1: Asset #2456					Cable 2: Asset #2682			Cable 3: Asset #2467	
Analyzer: 1170725					Preamp: 8449B					Antenna: Blue Horn			Preselector: ---	
CSsoft Radiated Emissions Calculator v 1.017.214 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														
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DEA-751

Radiated Emissions Table														
Date: 12-Jun-20 Engineer: AV Temp: 23.5°C										Work Order: U0211 EUT Operating Voltage/Frequency: 24VDC Humidity: 34% Pressure: 1010mBar				
Frequency Range: 2.3-2.5GHz										Measurement Distance: 3 m				
Notes: Bluetooth DH1 DEA751										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)
Low Channel														
V	2390.0	37.146	---	38.90	32.2	0.8	31.2	---	74.0	-42.8	Pass	54.0	-22.8	Pass
V	2389.964	38.307	---	38.90	31.9	0.7	32.0	---	74.0	-42.0	Pass	54.0	-22.0	Pass
H	2389.908	38.203	---	38.90	32.0	0.8	32.1	---	74.0	-41.9	Pass	54.0	-21.9	Pass
H	2390.0	37.347	---	38.90	31.9	0.8	31.1	---	74.0	-42.9	Pass	54.0	-22.9	Pass
High Channel														
V	2483.5	36.538	---	38.90	32.4	0.8	30.8	---	74.0	-43.2	Pass	54.0	-23.2	Pass
V	2483.67	38.031	---	38.90	32.4	0.8	32.3	---	74.0	-41.7	Pass	54.0	-21.7	Pass
H	2483.5	36.85	---	38.90	32.4	0.8	31.1	---	74.0	-42.9	Pass	54.0	-22.9	Pass
H	2483.715	37.682	---	38.9	32.4	0.8	32.0	---	74.0	-42.0	Pass	54.0	-22.0	Pass
Table Result: Pass by -21.7 dB Worst Freq: 2483.67 MHz														
Test Site: EMI Chamber 1					Cable 1: Asset #2456					Cable 2: Asset #2682			Cable 3: Asset #2467	
Analyzer: 1170725					Preamp: 8449B					Antenna: Blue Horn			Preselector: ---	
CSsoft Radiated Emissions Calculator v 1.017.214 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														
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Rev. 4/29/2019

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/21/2019
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/7/2020
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	3/9/2021
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020
Asset #2657		1235C97	Control Company	181683806	2657	I	4/3/2020
Cables	Range		Mfr			Cat	Calibration Due
Asset #2456	9KHz-18GHz		MegaPhase			II	10/31/2019
Asset #2606	9KHz-18GHz		MegaPhase			II	4/2/2020

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

Rev. 6/14/2020

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	11/30/2020	5/30/2019
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	12/7/2020	12/7/2018
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
8449B HF Preamp	1-18GHz	8449B	Agilent	1149055		II	11/24/2020	11/24/2019
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	3/9/2021	3/9/2019
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	11/15/2020	5/15/2018
Asset #2656		1235C97	Control Company	181683818	2656	I	10/3/2020	4/3/2019
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2456	9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019
Asset #2467	9KHz-18GHz		MegaPhase			II	11/2/2020	11/2/2019
Asset #2682	9KHz-18GHz		Pasternack			II	1/31/2021	1/31/2020

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

TEU



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	5.6dB	N/A
CISPR	4.6dB	5.2dB (Ucisprr)
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	3.9dB	N/A
CISPR	3.6dB	3.6dB (Ucisprr)
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%	5%
	0.3dB	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 **BUREAU VERITAS CONSUMER PRODUCT SERVICES INC.** (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 Bureau Veritas Consumer Product Services Inc. may use to delegate the performance of work can be provided upon request.

Rev.160009121(2)_#684340 v14CS



Appendix A**CFR Title 47 FCC Part §15.247 and ISED Canada RSS-247 Issue 2****DUT Information**

Model Number: DEA731
 Manufacturer: Aptiv Services US, LLC.
 Serial Number: 0012

79 channels are provided for Bluetooth BR/EDR:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

Notes: Channels 0, 39 and 78 were selected as representative test channels.

Modulation	Data Rate	Packet Types
GFSK	1Mbps	BR: DH1, DH3, DH5
$\pi/4$ -DQPSK	2Mbps	EDR: 2-DH1, 2-DH3, 2-DH5
8DPSK	3Mbps	EDR: 3-DH1, 3-DH3, 3-DH5



Antenna type	Non-detachable internal PCB trace
Antenna gain	2.3dBi Peak
Number of transmit chains	1
Equipment type	Frequency Hopping Spread Spectrum

Test Equipment Used

Rev. 04/10/2019									
Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
FSV40 Signal/Spectrum Analyzer	10Hz-40GHz	FSV40	ROHDE & SCHWARZ	101551	2200	I	10/1/2019	10/1/2018	
Signal Generators/Comparison Noise Emitter	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
SMBV100A Vector Signal Generator	9KHz-6GHz	SMBV100A	ROHDE & SCHWARZ	261919	2201	I	10/1/2019	10/1/2018	
SMB100A Signal Generator	100kHz-40GHz	SMB100A	ROHDE & SCHWARZ	179884	2557	I	10/1/2019	10/1/2018	
Power/Noise Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
OSP - open switch and control platform	30MHz-18GHz	OSP-B157W8	ROHDE & SCHWARZ	1527.1144.02-100955-Ck	2558	I	3/14/2020	3/14/2019	
Cables	Range		Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
DUT1	30MHz-40GHz		Micro-Coax	UFB142A-1-0787-200200	2593	I	3/13/2020	3/13/2019	
DUT2	30MHz-40GHz		Micro-Coax	UFB142A-1-0787-200200	2594	I	3/13/2020	3/13/2019	
DUT3	30MHz-40GHz		Micro-Coax	UFB142A-1-0787-200200	2595	I	3/13/2020	3/13/2019	
DUT4	30MHz-40GHz		Micro-Coax	UFB142A-1-0787-200200	2596	I	3/13/2020	3/13/2019	
Attenuators / Couplers	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
10dB Attenuator-01 Brown	30MHz-18GHz		Mini Circuits	BW-S10W2+		I	3/13/2020	3/13/2019	
10dB Attenuator-02 Yellow	30MHz-18GHz		Mini Circuits	BW-S10W2+		I	3/13/2020	3/13/2019	
10dB Attenuator-03 Red	30MHz-18GHz		Mini Circuits	BW-S10W2+		I	3/13/2020	3/13/2019	
10dB Attenuator-04 orange	30MHz-18GHz		Mini Circuits	BW-S10W2+		I	3/13/2020	3/13/2019	
API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	II	3/23/2020	3/23/2019	
Directional Coupler	0.5GHz-18GHz	UDC	AA MCS	001040	2434	I	8/8/2019	8/9/2018	
Communication Tester	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
CMW270 Wideband Radio Communication Tester	DC to 6GHz	CMW270	ROHDE & SCHWARZ	1201.0002K75-101066-MV	2559	I	2/14/2020	2/14/2019	
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Temp/Humidity Chamber #18		EPX-2H	Espec	137664	1645	I	1/2/2020	1/2/2019	
Weather Clock (Pressure only)		BA928	Oregon Scientific	C3166-1	831	I	5/15/2020	5/15/2018	
TH A#2086		HTC-1	HDE		2086	II	3/23/2020	3/23/2019	

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

Rohde&Schwarz Test System TS8997					
Test Equipment	Manufacturer	Model Number	Serial Number	Firmware Version	Software Version
Spectrum Analyzer	Rohde&Schwarz	FSV40	101551	3.40	N/A
Signal Generator	Rohde&Schwarz	SMB100A	179884	3.20.390.24 / Drv:Rev 2.21.0, 07/2016, CVI 2015	N/A
Vector Signal Generator	Rohde&Schwarz	SMBV100A	261919	3.1.19.15 - 3.50.082.47	N/A
Switching Platform	Rohde&Schwarz	OSP-B157W	100955	1.23.0.2	N/A
Wireless Connectivity Tester	Rohde&Schwarz	CMW270	101066	3.7	N/A
Test Software	Rohde&Schwarz	WMS32	N/A	N/A	V10.50.00



Summary

Test	Frequency (MHz)	DH1 Result	DH3 Result	DH5 Result	2-DH1 Result	2-DH3 Result	2-DH5 Result	3-DH1 Result	3-DH3 Result	3-DH5 Result
Hopping Frequencies	(hopping)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Band Edge (during hopping)	(hopping)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Carrier Frequency Separation	2402.000 (hopping)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Carrier Frequency Separation	2480.000 (hopping)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Time of Channel Occupancy	2402.000 (hopping)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Time of Channel Occupancy	2441.000 (hopping)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Time of Channel Occupancy	2480.000 (hopping)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Emission Bandwidth 20 dB	2402.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Occupied Channel Bandwidth 99%	2402.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Band Edge low	2402.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Peak output power	2402.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Conducted Spurious Emissions	2402.000 (single)	-----	PASS	-----	-----	-----	-----	-----	-----	-----
Emission Bandwidth 20 dB	2441.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Occupied Channel Bandwidth 99%	2441.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Peak output power	2441.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Conducted Spurious Emissions	2441.000 (single)	-----	PASS	-----	-----	-----	-----	-----	-----	-----
Emission Bandwidth 20 dB	2480.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Occupied Channel Bandwidth 99%	2480.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Band Edge high	2480.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Peak output power	2480.000 (single)	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Conducted Spurious Emissions	2480.000 (single)	-----	PASS	-----	-----	-----	-----	-----	-----	-----



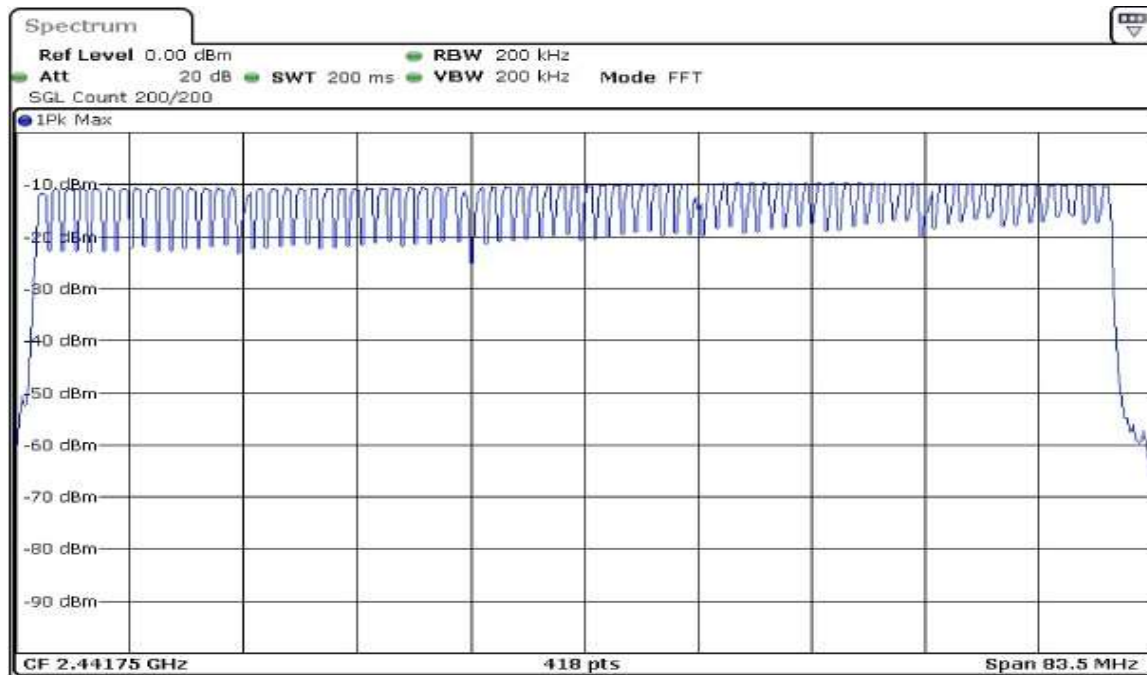
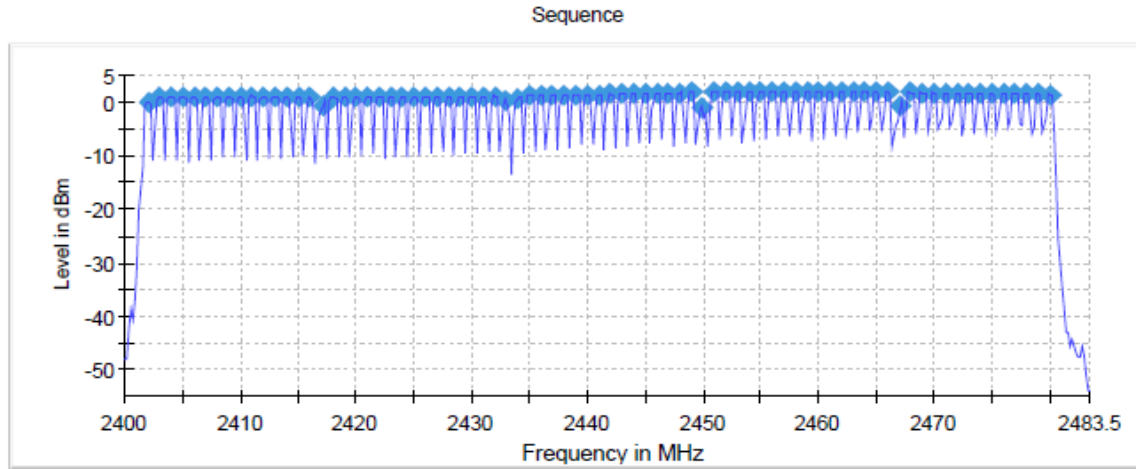
Number of Hopping Frequencies

Test procedure in accordance with ANSI C63.10-2013

Channels

Channels	Limit Min	Result
79	15	PASS

Plot for packet type DH3 shown below.



Band Edge (during hopping)

Test procedure in accordance with ANSI C63.10-2013

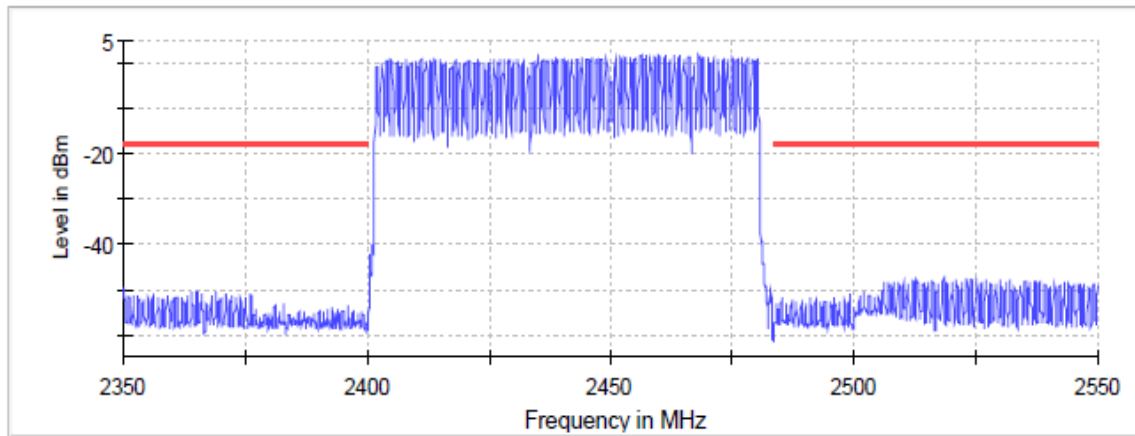
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty (K=2) < 0.8 dB

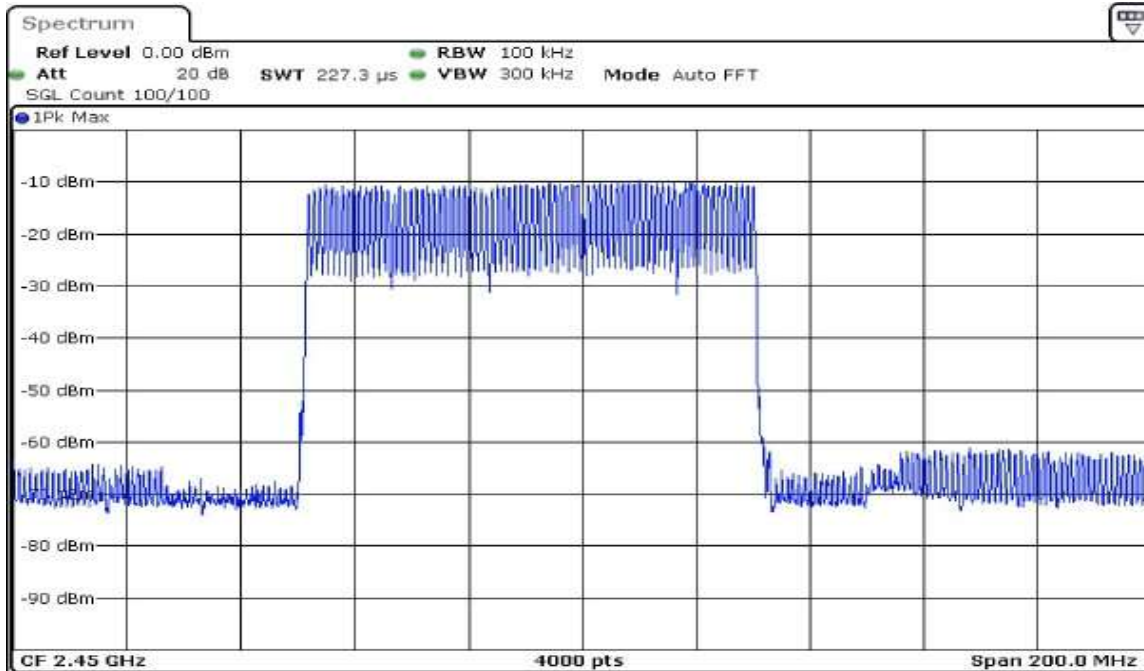
In-band Peak

Data Rate	Frequency (MHz)	Level (dBm)
DH1	2454.825000	2.1
DH3	2459.825000	2.1
DH5	2455.175000	1.9
2-DH1	2453.975000	-0.7
2-DH3	2455.025000	-0.7
2-DH5	2460.825000	-0.5
3-DH1	2456.825000	-0.6
3-DH3	2453.175000	-0.8
3-DH5	2453.975000	-0.7

Plots for packet type DH3 shown below.

Band Edge





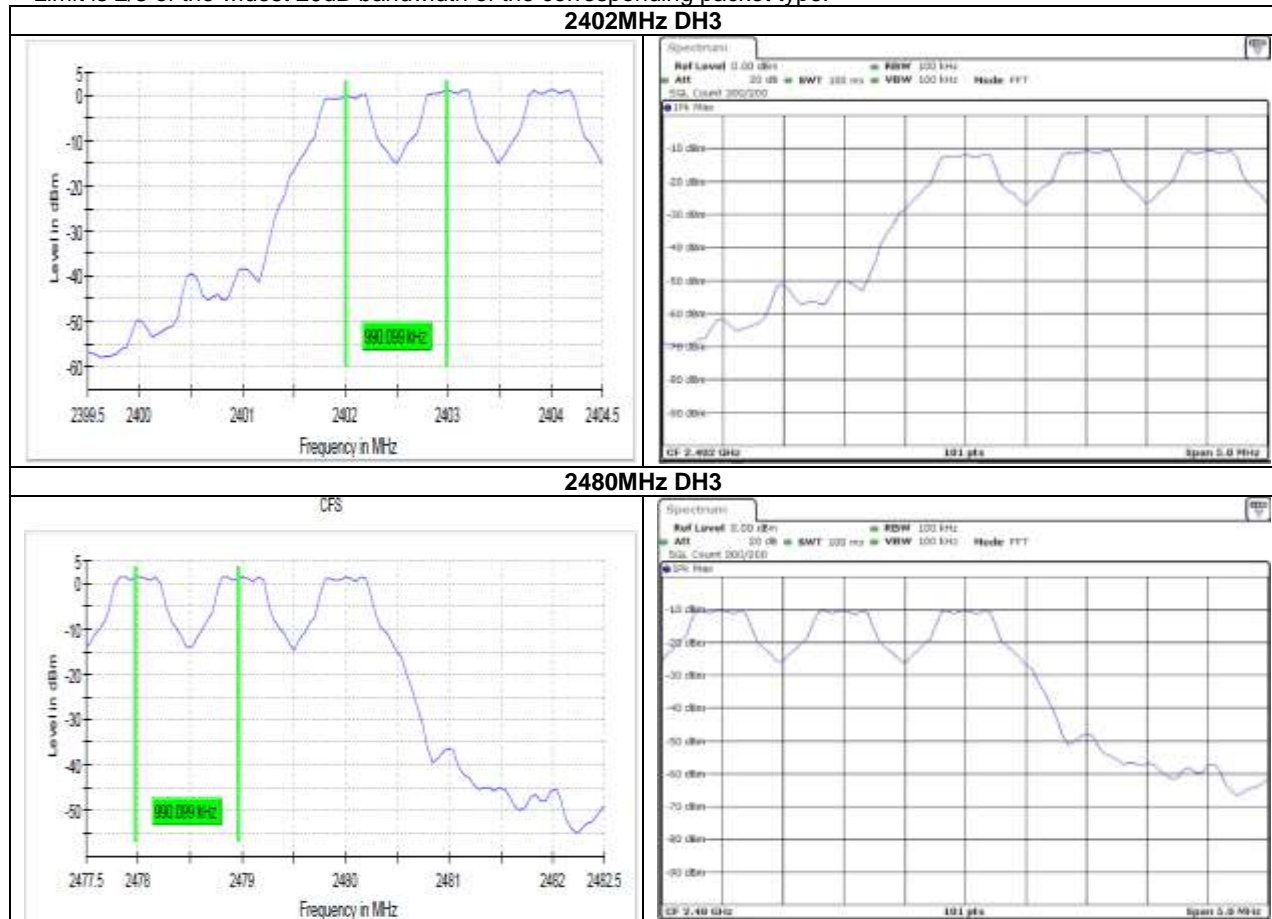
Carrier Frequency Separation

Test procedure in accordance with ANSI C63.10-2013

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

Hopping Mode				
Packet Type	2402MHz		2480MHz	
	Frequency Separation (MHz)	Minimum Limit (MHz)	Frequency Separation (MHz)	Minimum Limit (MHz)
DH1	0.990099	0.653465	0.990099	0.613862
DH3	0.990099	0.653465	0.990099	0.673267
DH5	0.990099	0.673267	0.990099	0.673267
2-DH1	0.990099	0.871287	0.990099	0.871287
2-DH3	0.990099	0.910891	0.990099	0.910891
2-DH5	0.990099	0.910891	0.990099	0.910891
3-DH1	0.990099	0.871287	0.990099	0.871287
3-DH3	0.990099	0.891089	0.990099	0.891089
3-DH5	0.990099	0.891089	0.990099	0.910891

*Limit is 2/3 of the widest 20dB bandwidth of the corresponding packet type.

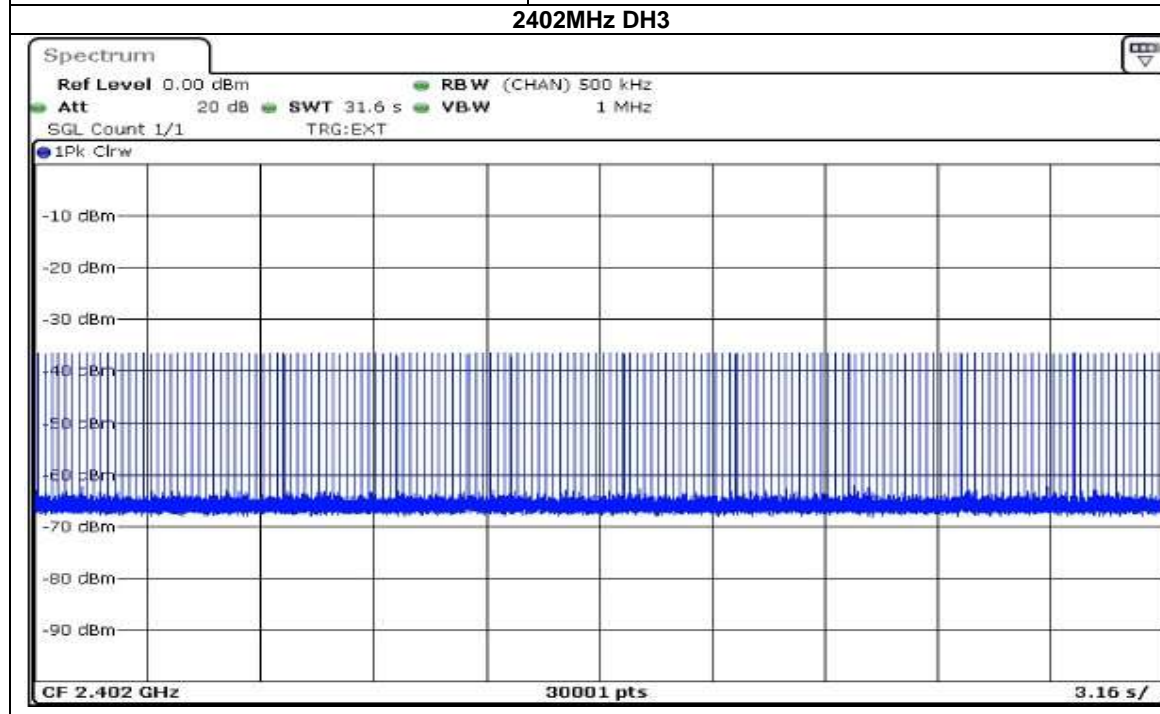


Time of Channel Occupancy (Dwell Time)

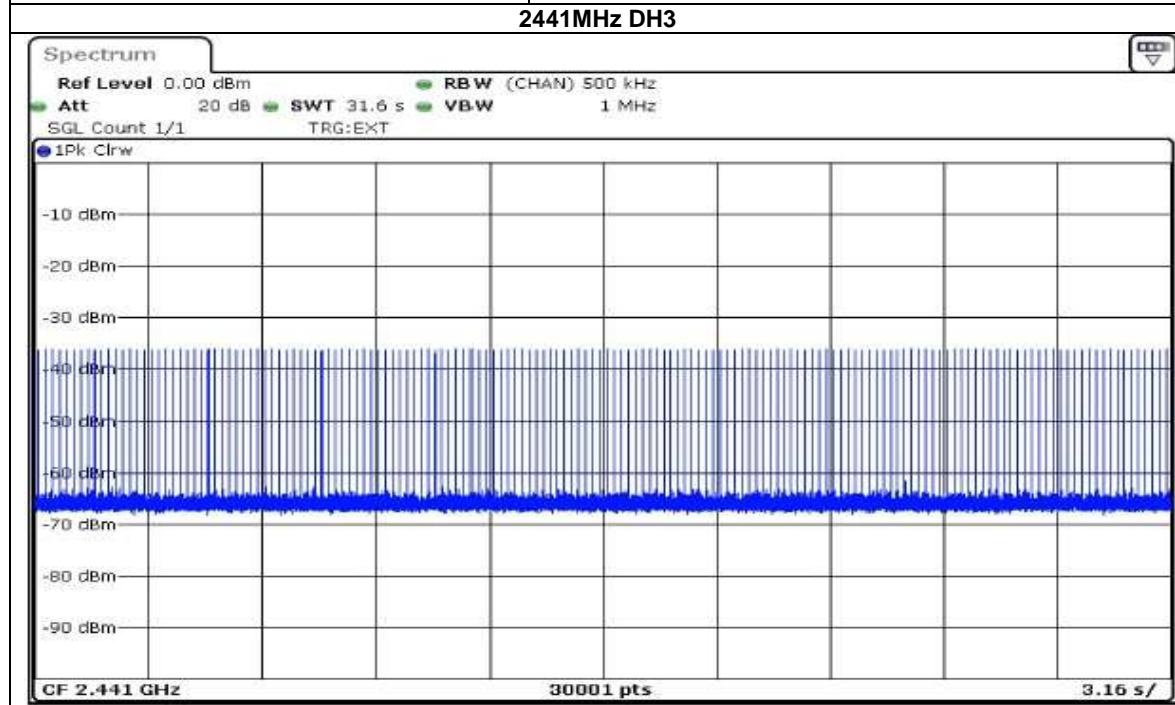
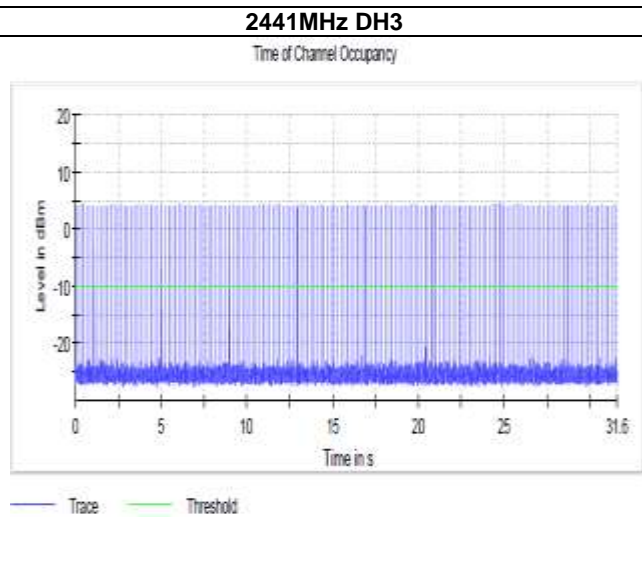
Test procedure in accordance with ANSI C63.10-2013

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

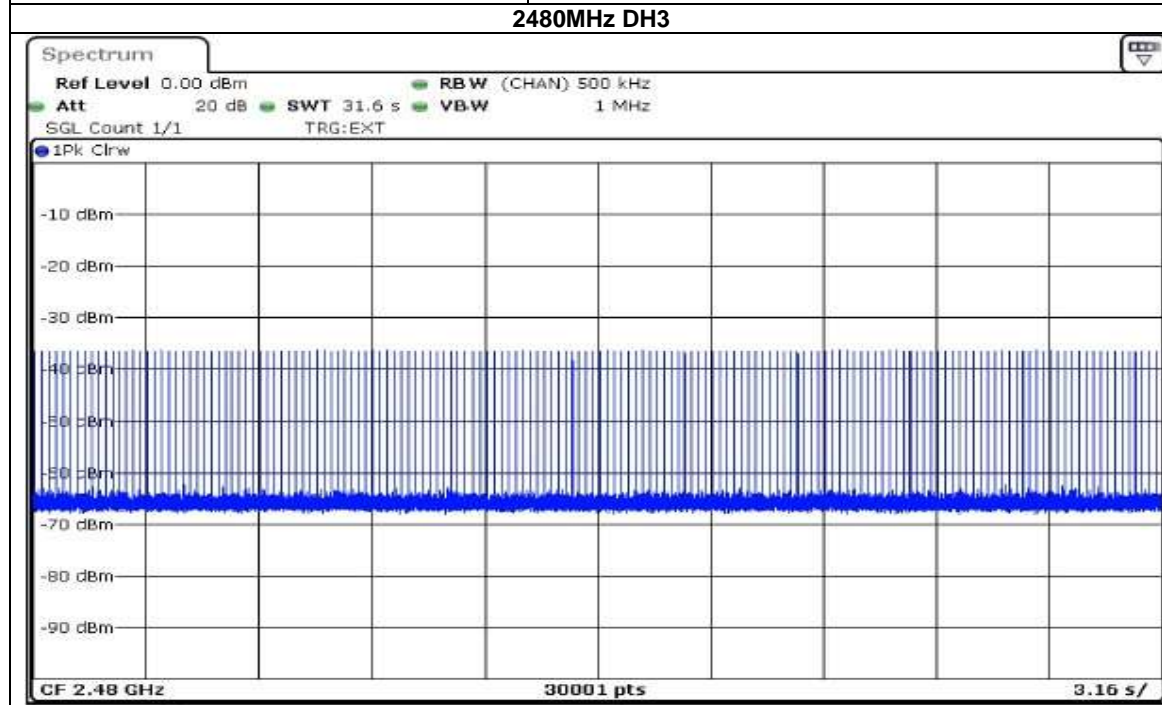
2402MHz				2402MHz DH3
Data Rate	Time (ms)	Limit Max (ms)	Result	
DH1	128.460	400.000	PASS	
DH3	265.150	400.000	PASS	
DH5	310.850	400.000	PASS	
2-DH1	127.130	400.000	PASS	
2-DH3	255.740	400.000	PASS	
2-DH5	295.970	400.000	PASS	
3-DH1	125.680	400.000	PASS	
3-DH3	253.190	400.000	PASS	
3-DH5	292.880	400.000	PASS	



2441MHz			
Data Rate	Time (ms)	Limit Max (ms)	Result
DH1	128.480	400.000	PASS
DH3	265.170	400.000	PASS
DH5	310.860	400.000	PASS
2-DH1	127.820	400.000	PASS
2-DH3	256.850	400.000	PASS
2-DH5	300.190	400.000	PASS
3-DH1	127.210	400.000	PASS
3-DH3	255.150	400.000	PASS
3-DH5	298.040	400.000	PASS

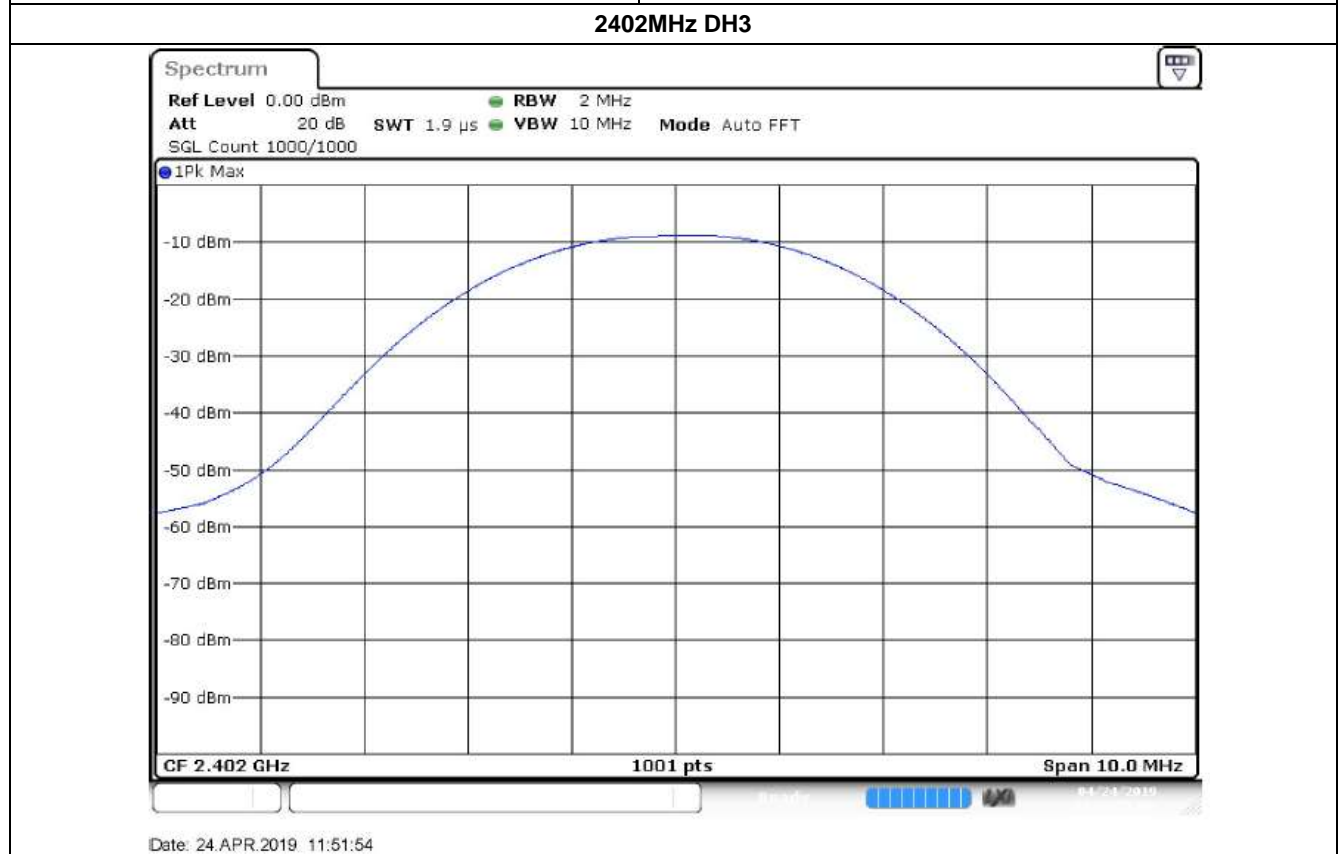
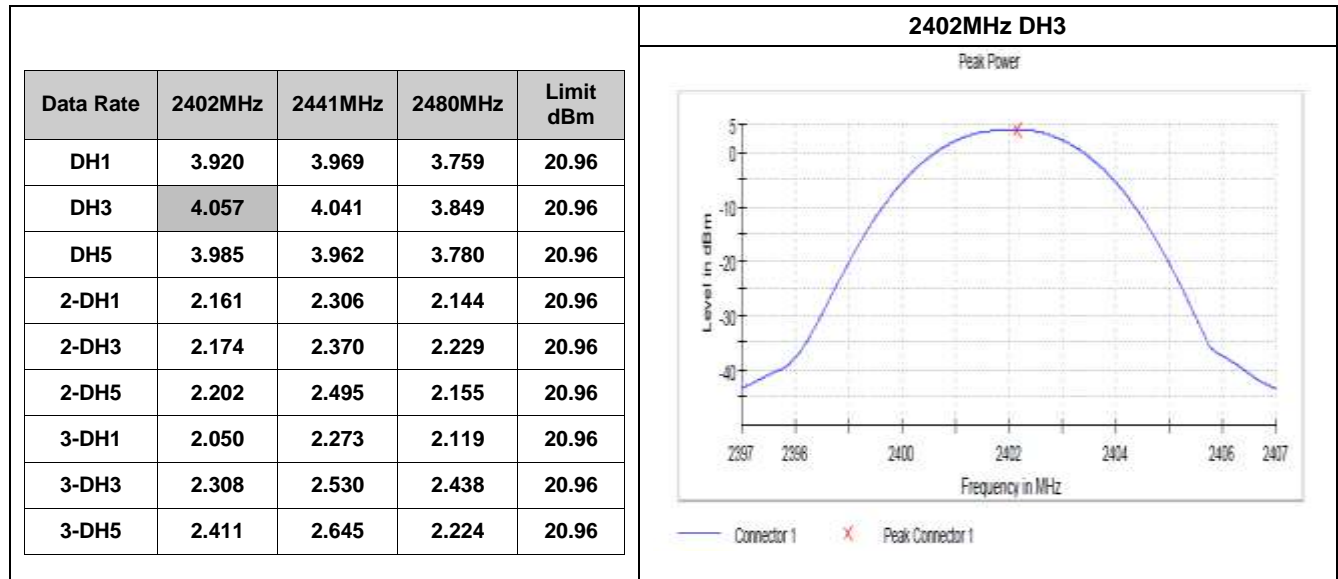


2480MHz				2480MHz DH3
Data Rate	Time (ms)	Limit Max (ms)	Result	<p>Time of Channel Occupancy</p> <p>Level in dBm</p> <p>Time in s</p> <p>Trace Threshold</p>
DH1	128.380	400.000	PASS	
DH3	265.150	400.000	PASS	
DH5	310.920	400.000	PASS	
2-DH1	126.950	400.000	PASS	
2-DH3	255.850	400.000	PASS	
2-DH5	299.260	400.000	PASS	
3-DH1	125.980	400.000	PASS	
3-DH3	253.670	400.000	PASS	
3-DH5	292.440	400.000	PASS	



Peak Output Power

Test procedure in accordance with ANSI C63.10-2013



Emission Bandwidth 20 dB

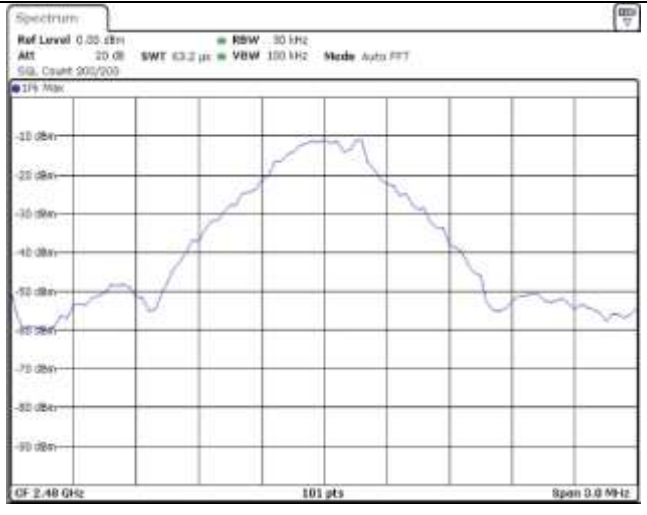
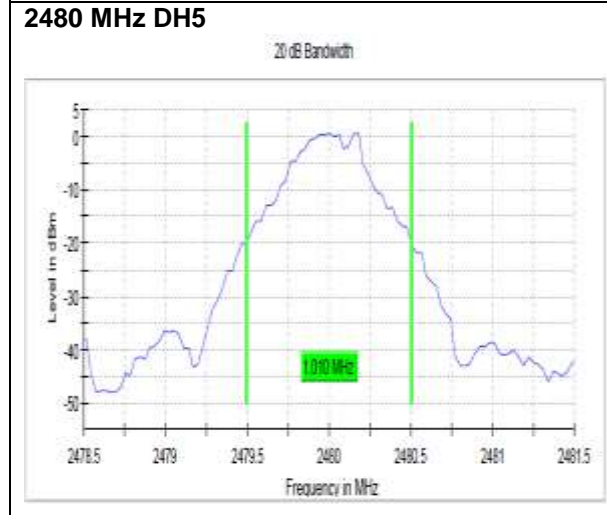
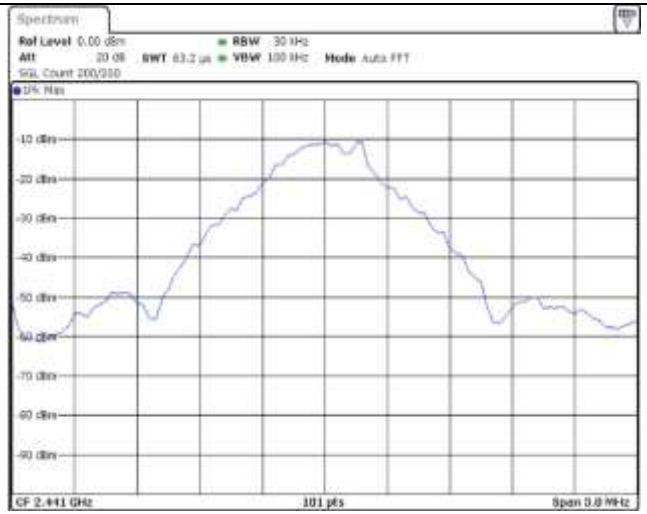
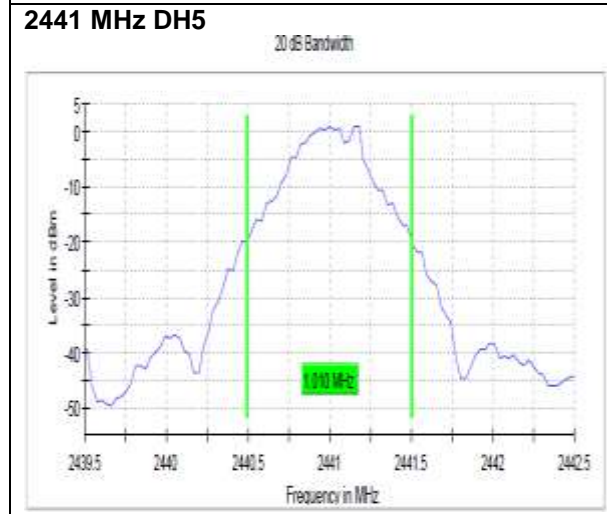
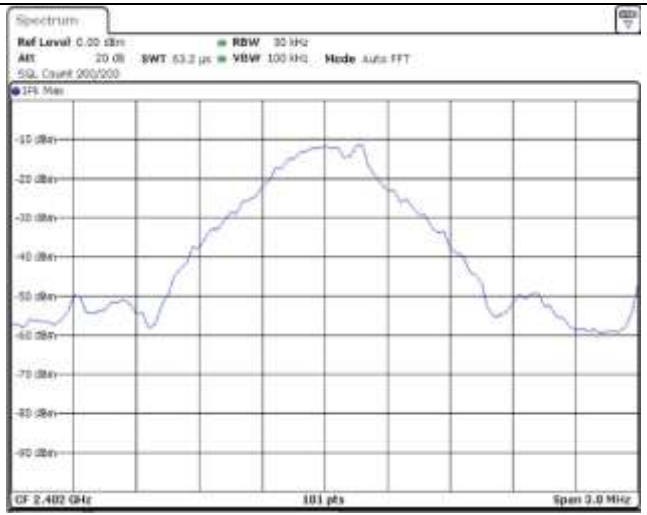
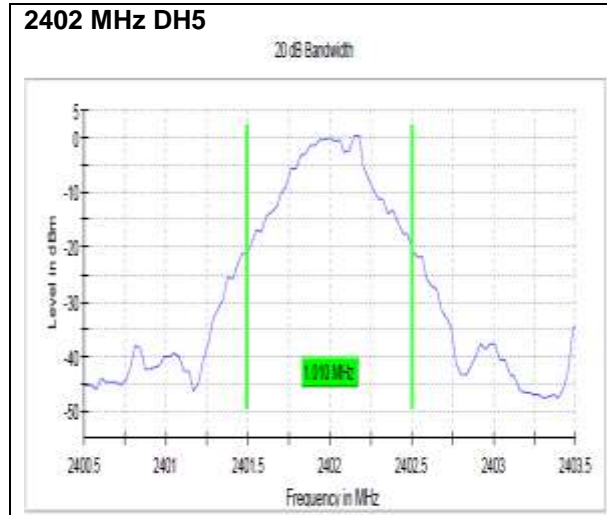
Test procedure in accordance with ANSI C63.10-2013

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

Modulation: GFSK

Channel	Data Rate	20dB Bandwidth (MHz)
0	DH1	0.980198
	DH3	0.980198
	DH5	1.009900
39	DH1	0.920793
	DH3	1.009900
	DH5	1.009900
78	DH1	0.920793
	DH3	1.009900
	DH5	1.009900

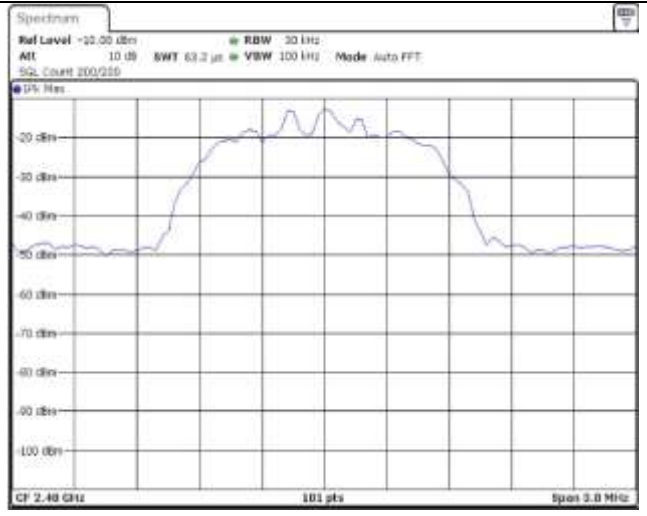
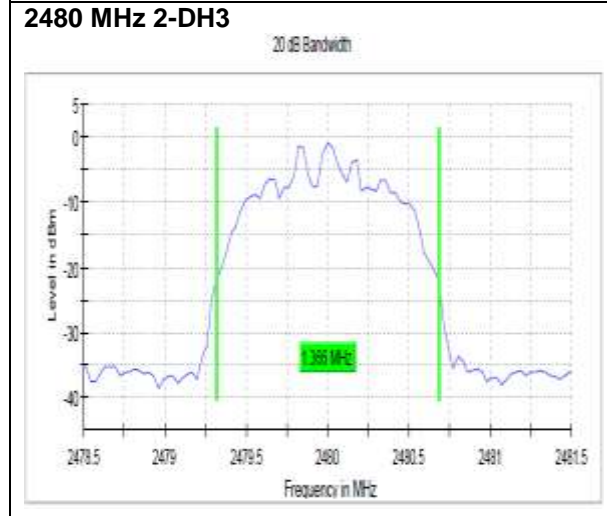
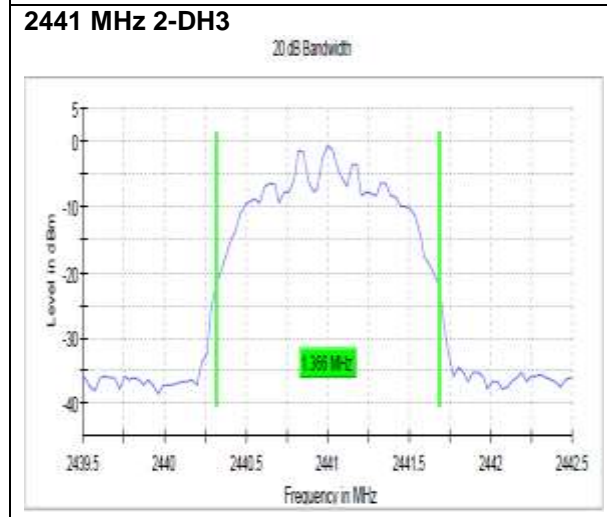
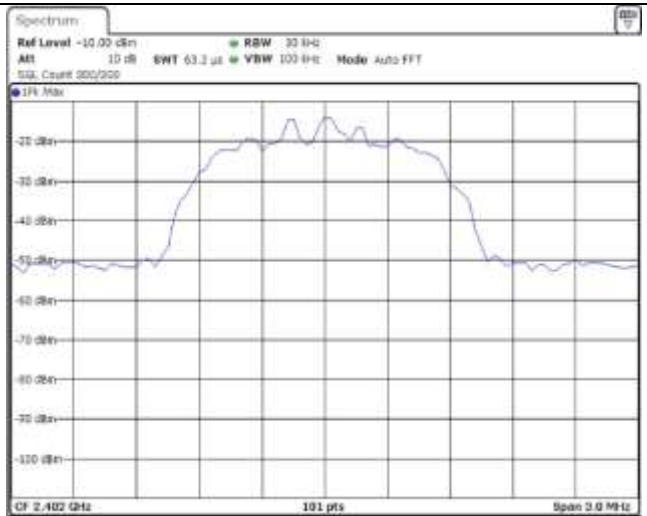
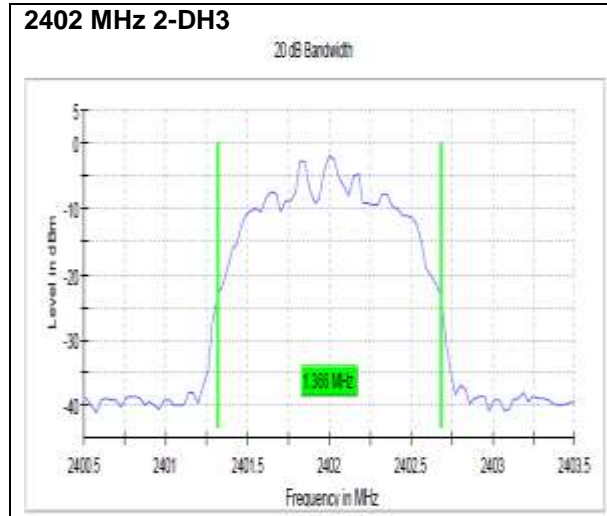




Modulation: $\pi/4$ -DQPSK

Channel	Data Rate	20dB Bandwidth (MHz)
0	2-DH1	1.306930
	2-DH3	1.366336
	2-DH5	1.366336
39	2-DH1	1.306930
	2-DH3	1.366336
	2-DH5	1.366336
78	2-DH1	1.306930
	2-DH3	1.366336
	2-DH5	1.366336

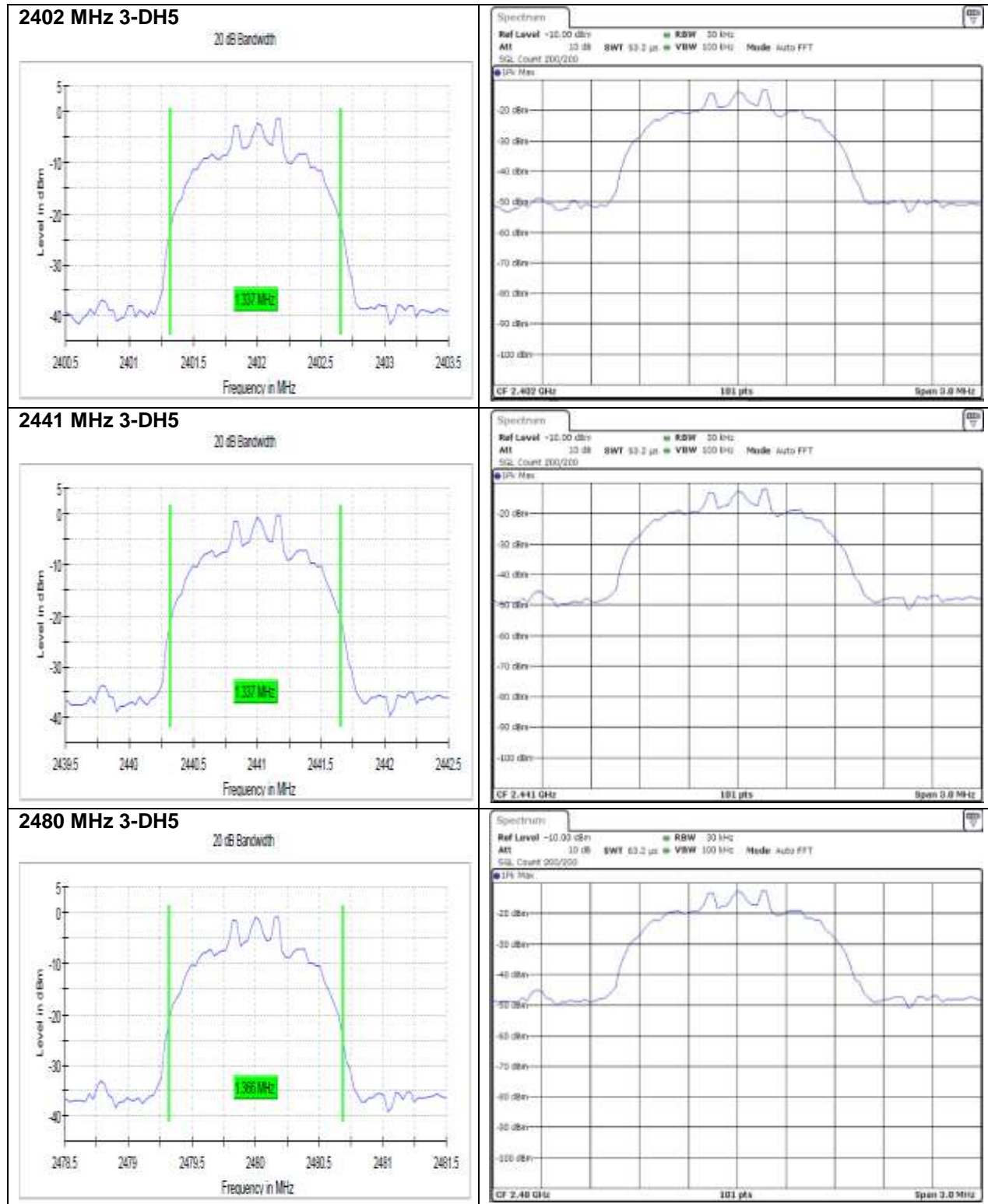




Modulation: 8DPSK

Channel	Data Rate	20dB Bandwidth (MHz)
0	3-DH1	1.306930
	3-DH3	1.336633
	3-DH5	1.336633
39	3-DH1	1.306930
	3-DH3	1.366336
	3-DH5	1.336633
78	3-DH1	1.306930
	3-DH3	1.336633
	3-DH5	1.366336





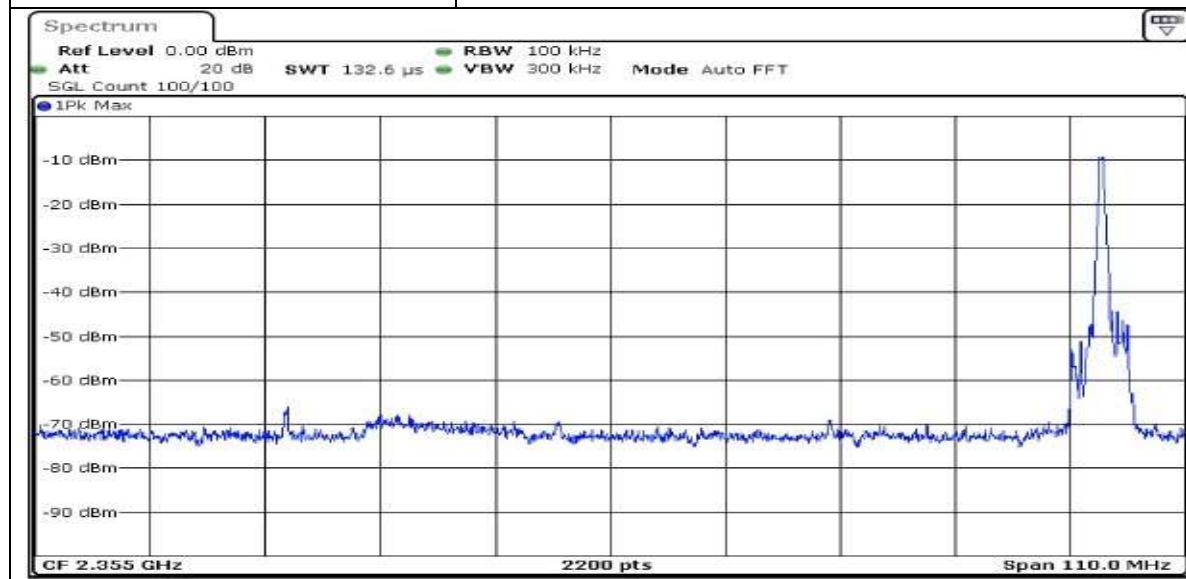
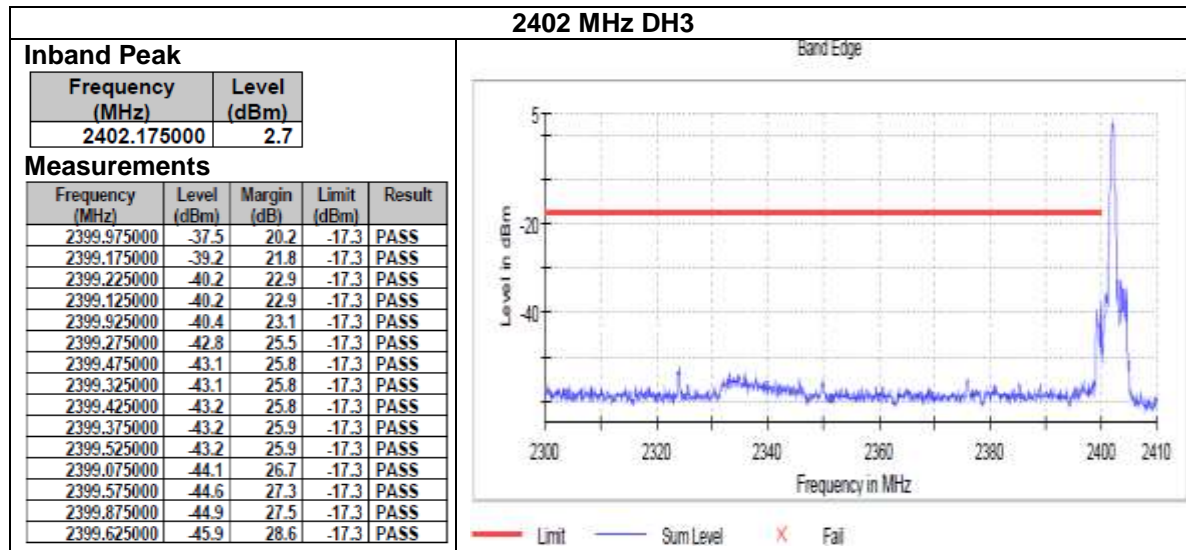
Band Edge Low

Test procedure in accordance with ANSI C63.10-2013

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

In-band Peak

Channel	Inband Peak	DH1	DH3	DH5	2-DH1	2-DH3	2-DH5	3-DH1	3-DH3	3-DH5
0	Frequency (MHz)	2401.825	2402.175	2402.175	2402.025	2402.025	2402.025	2402.025	2402.025	2402.025
	Level (dBm)	2.6	2.7	2.7	0.3	0.3	0.3	0.3	0.3	0.4



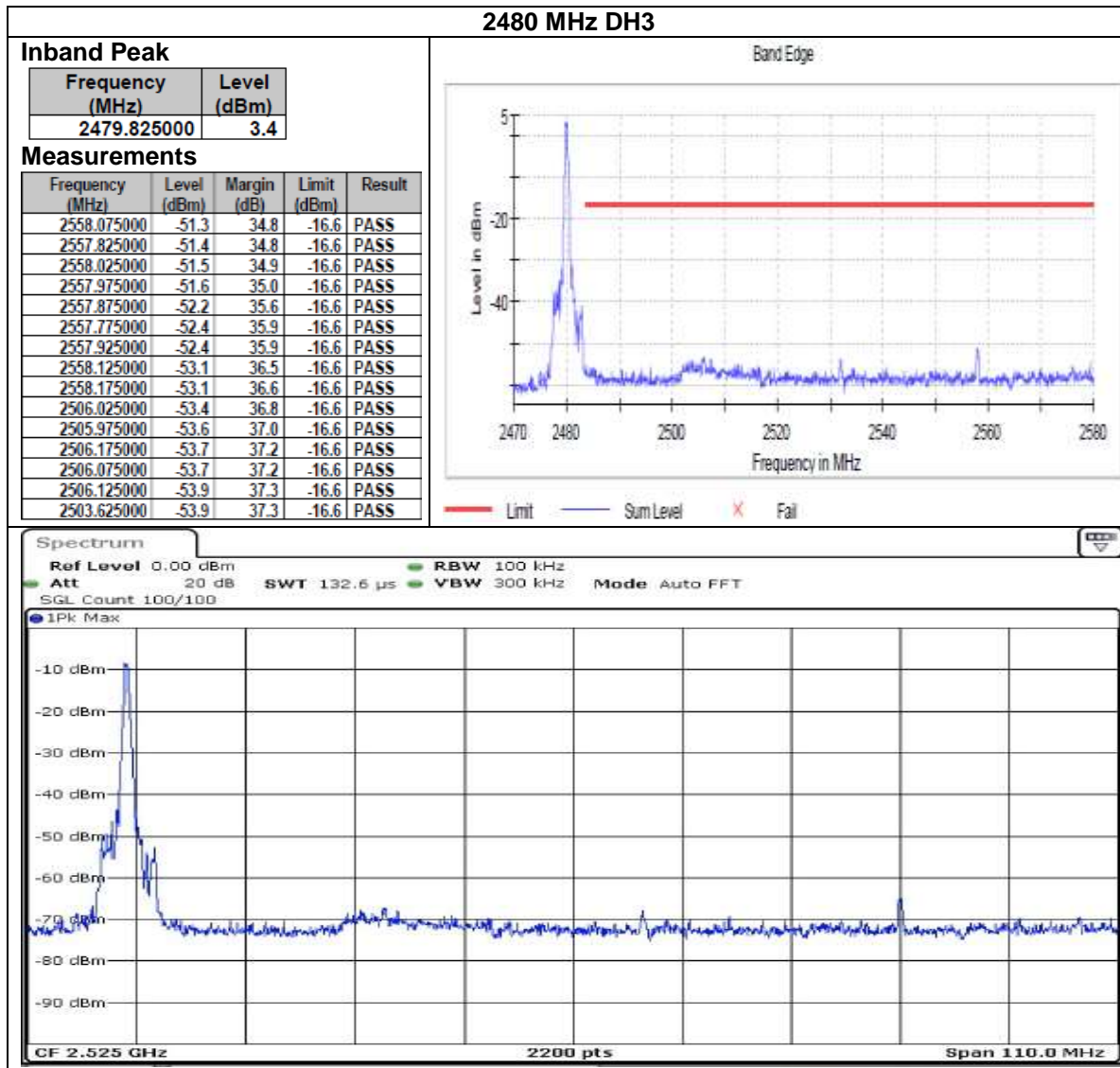
Band Edge High

Test procedure in accordance with ANSI C63.10-2013

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

In-band Peak

Channel	Inband Peak	DH1	DH3	DH5	2-DH1	2-DH3	2-DH5	3-DH1	3-DH3	3-DH5
78	Frequency (MHz)	2479.825	2479.825	2479.975	2479.975	2479.825	2480.025	2479.975	2480.025	2479.825
	Level (dBm)	3.4	3.4	3.3	1.6	1.6	1.5	1.6	1.6	1.7



Occupied Channel Bandwidth 99%

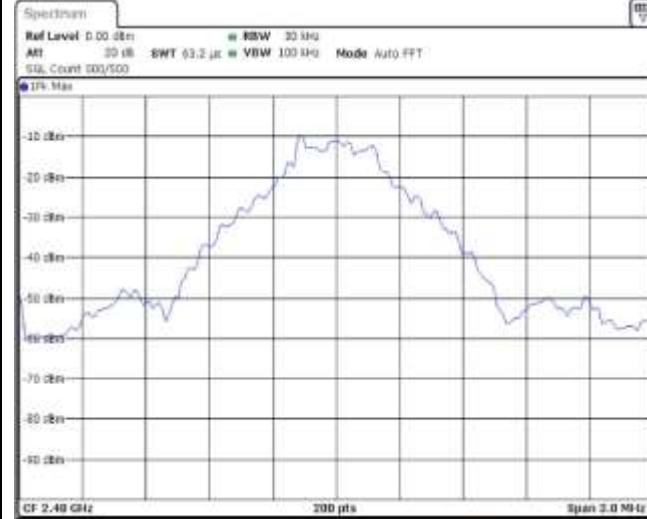
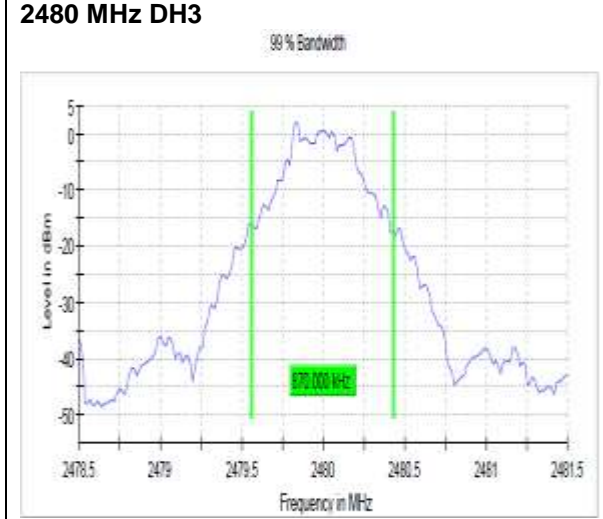
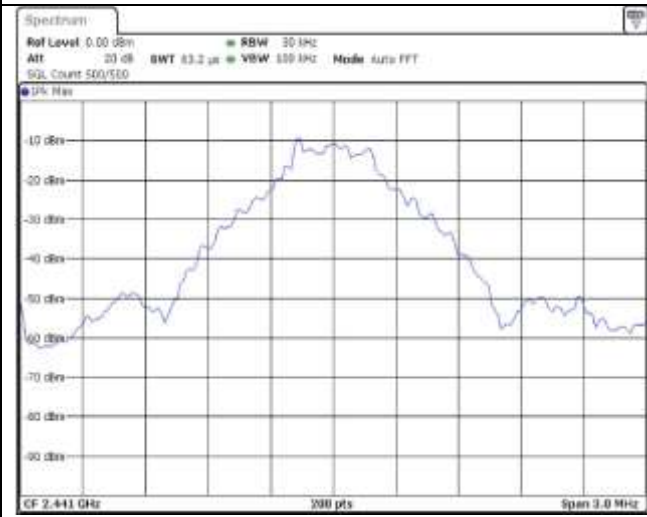
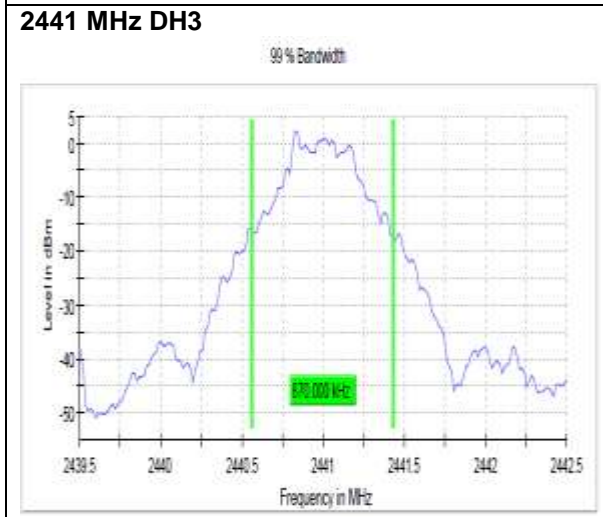
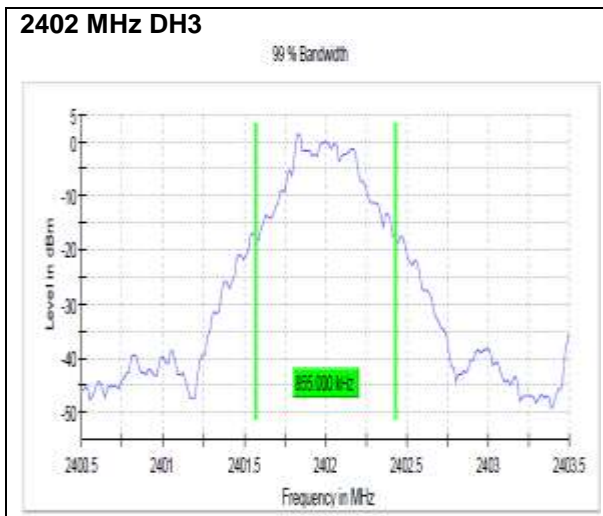
Test procedure in accordance with RSS-Gen Issue 5 Section 6.7.

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

Modulation: GFSK

Channel	Data Rate	Occupied Channel Bandwidth 99% (MHz)
0	DH1	0.855000
	DH3	0.855000
	DH5	0.855000
39	DH1	0.840000
	DH3	0.870000
	DH5	0.870000
78	DH1	0.840000
	DH3	0.870000
	DH5	0.870000

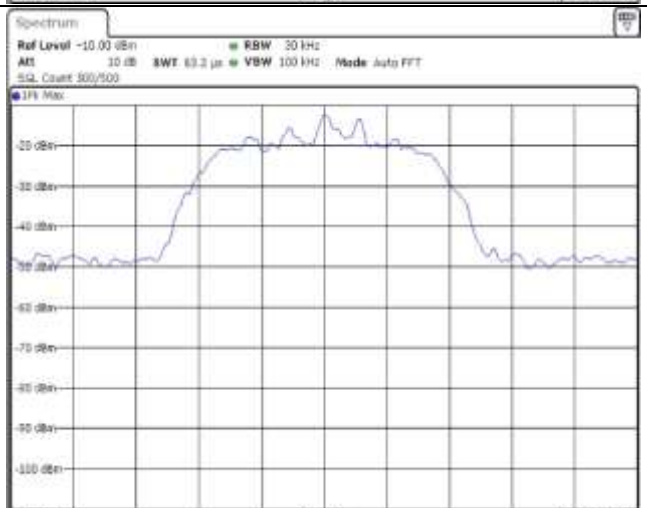
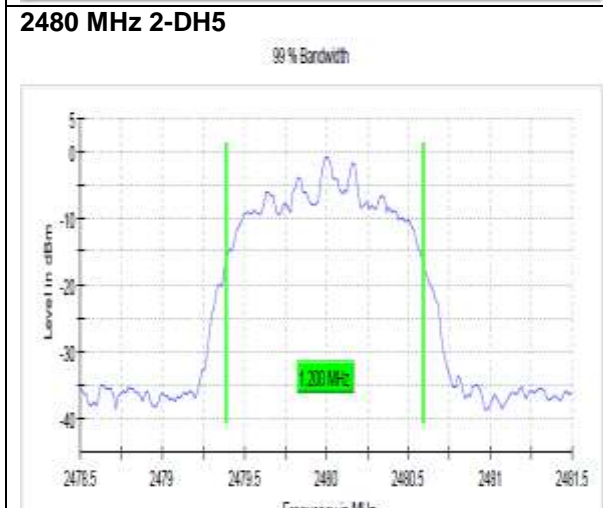
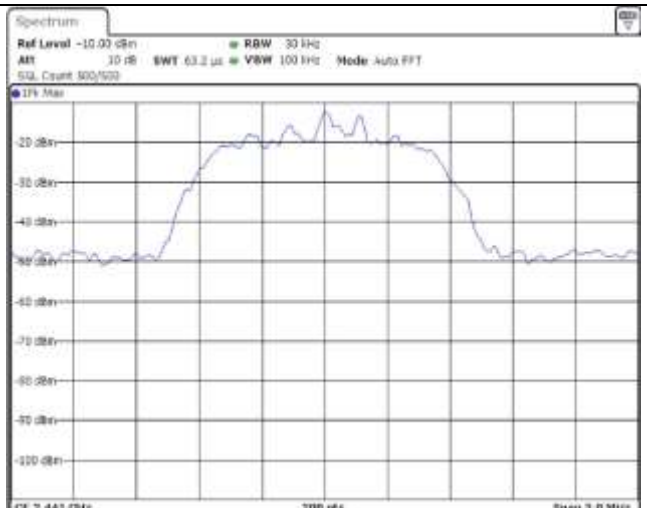
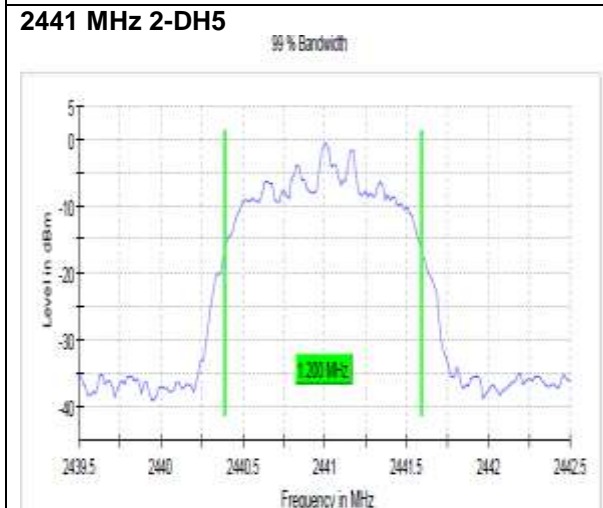
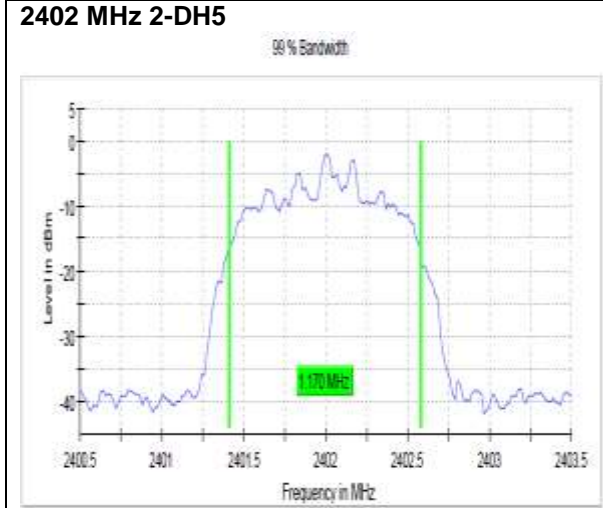




Modulation: $\pi/4$ -DQPSK

Channel	Data Rate	Occupied Channel Bandwidth 99% (MHz)
0	2-DH1	1.170000
	2-DH3	1.170000
	2-DH5	1.170000
39	2-DH1	1.185000
	2-DH3	1.200000
	2-DH5	1.200000
78	2-DH1	1.185000
	2-DH3	1.200000
	2-DH5	1.200000



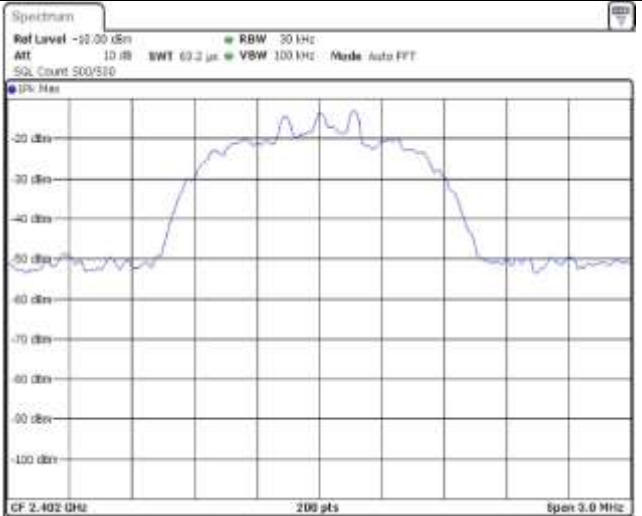
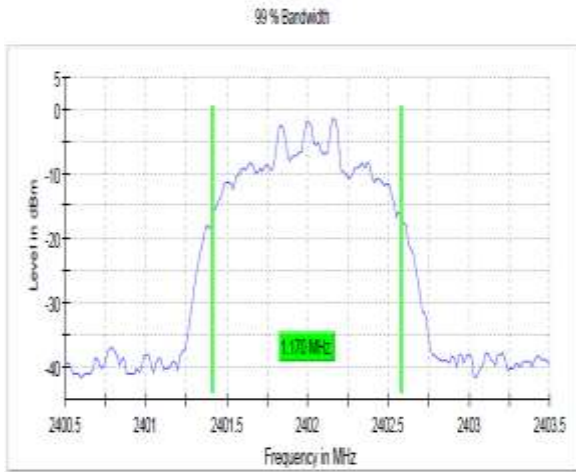


Modulation: 8DPSK

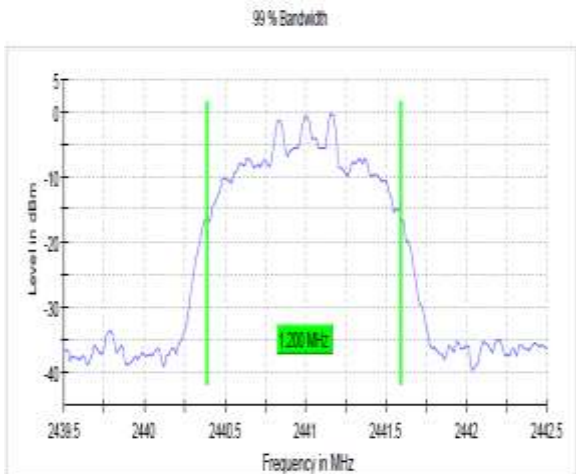
Channel	Data Rate	Occupied Channel Bandwidth 99% (MHz)
0	3-DH1	1.170000
	3-DH3	1.200000
	3-DH5	1.170000
39	3-DH1	1.170000
	3-DH3	1.200000
	3-DH5	1.200000
78	3-DH1	1.170000
	3-DH3	1.200000
	3-DH5	1.200000



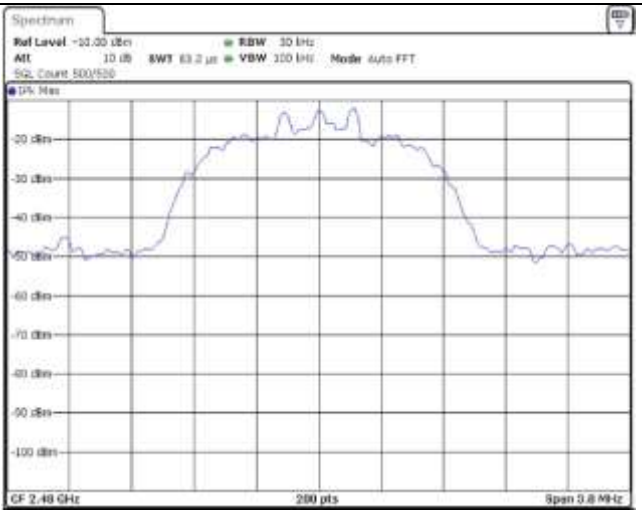
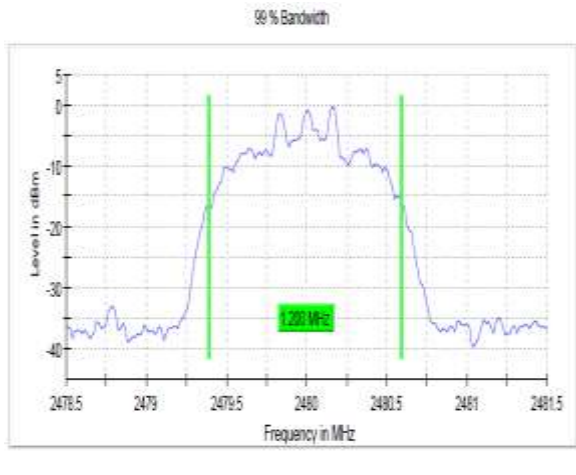
2402 MHz 3-DH5



2441 MHz 3-DH5



2480 MHz 3-DH5



Conducted Spurious Emissions

Test procedure in accordance with ANSI C63.10-2013

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

