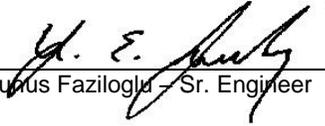




Test Report



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

Report No	ES0621-1
Client	Harman International Industries, Incorporated
Address	30001 Cabot Drive Novi MI 48377
Phone	1-248-785-2513
Items tested	PV602
FCC ID	2AHPN-BE2841
IC	6434C-BE2841
Equipment Type	Part 15 Spread Spectrum Transmitter
Equipment Code	DSS
FCC/IC Rule Parts	CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 2
Test Dates	03/30/2018 to 04/25/2018
Results	As detailed within this report
Prepared by	 Christopher Hamel – EMC Engineer
Authorized by	 Yunus Faziloglu – Sr. Engineer
Issue Date	5/16/2018
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 17 of this report.

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS
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Report REV Sep-08-2017 - YF



Summary

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

The product is the “PV602” automotive infotainment unit with Bluetooth and WLAN. It is a frequency hopping spread spectrum transmitter that operates in the 2402 – 2480 MHz frequency range. This report is for the Bluetooth portion of the device only.

Antenna Type: PCB Trace
Peak Gain: 2.33dBi

There are two variants to the product with the same model number:

HVIN (Model)	FVIN	Remarks
PV602	SOC: BR_RC1_R12.0.0_R18102A	Tested variant
PV602	SOC: NA_18.1.1	No hardware differences from the tested variant above. Only non-RF related software differences as follows: <ul style="list-style-type: none"> • Updated AM/FM tuner range and step size for North American markets • Removal of backup camera from software (external camera will not be connected), rear view mirror will have RVC display instead (not connected to the head unit) • HMI tweaks to follow NHTSA guidelines

Test samples were received in good condition.

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

Issue No.	Reason for change	Date Issued
1	Original Release	May 16, 2018



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, RSS-Gen Issue 4 and ANSI
 C63.10-2013.

Radiated emissions were tested in the installation orientation of the device in a vehicle.
 Emissions were maximized by rotating the device and varying the test antenna’s height and
 polarity.

EUT operating voltage is 13.8V DC from a vehicle battery, therefore AC line conducted
 emissions requirements are 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:		S0621								
Company:		Harman International Industries, Incorporated								
Company Address:		30001 Cabot Drive Novi, MI, 48377								
Contact:		Sarah Rowland								
EUT:		MN PV602			PN			SN		
EUT Description:		Car Stereo Head Unit								
EUT Max Frequency:		5825 MHz								
EUT Min Frequency:		5825 MHz								
EUT Components		MN			SN					
PV602		FCC								
PV602		FCC Conducted								
Support Equipment		MN			SN					
CS Supplied laptop										
USB to Ethernet converter										
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment
Power	other	2	2	other	No	No	1	in	yes	
FM/AM	other	1	1	Coaxial	Yes	No	0.1	in	yes	
Back up camera	other	1	1	other	No	No	1	in	yes	
USB	USB	1	1	USB	Yes	No	1	in	yes	
Vehicle port	other	1	1	other	No	No	1	in	yes	
Software Operating Mode Description:										
EUT will operate in constant TX mode for WiFi spurious emissions via client supplied test mode where channels and data rates are selectable.										
EUT will operate in constant TX mode for BT spurious emissions with a link to CMW communication tester where channels and packet types are selectable.										



Statement of Conformity

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that varies the output power to operate in violation of the regulatory requirements.
	3.1		15.19	The label is shown in the label exhibit.
	4		15.21	Information to the user is shown in the instruction manual exhibit.
			15.27	No special accessories are required for compliance.
3, 6.1			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
8.1			15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
8.3			15.203	EUT employs PCB trace antenna with 2.33dBi peak 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	N/A. Vehicle battery powered only.

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)]

DH1 packet type was found to be the worst case and therefore tested for final measurements.

MEASUREMENTS / RESULTS

Curtis Straus - a Bureau Veritas Company	Work Order - R3763
Radiated Emissions Electric Field 3m Distance	EUT Power Input - 13.8V DC
Top Peaks Horizontal 30-1000MHz	Test Site - CH 2
Operator: Chris Hamel	Conditions - 23.4°C; 32%RH; 1004mBar
Notes:	Witnessed by - N/A
Testing Bluetooth DH1 CH39	EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)	Lim2: FCC_pt15_2 09 (dBµV/m)	Lim2 Margin (dB)	Lim2 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)
30.097	27.6	-1.4	26.2	40	-13.8	PASS		40	-13.8	PASS	
44.599	38.2	-12.2	26	40	-14	PASS		40	-14	PASS	
87.933	38.1	-15	23.1	40	-16.9	PASS		40	-16.9	PASS	
742.514	40.4	-0.4	40	46	-6	PASS	-6	46	-6	PASS	-6
841.502	29.4	1.5	31	46	-15	PASS		46	-15	PASS	
940.49	31.4	2.8	34.2	46	-11.8	PASS		46	-11.8	PASS	

Curtis Straus - a Bureau Veritas Company	Work Order - R3763
Radiated Emissions Electric Field 3m Distance	EUT Power Input - 13.8V DC
Top Peaks Vertical 30-1000MHz	Test Site - CH 2
Operator: Chris Hamel	Conditions - 23.4°C; 32%RH; 1004mBar
Notes:	Witnessed by - N/A
Testing Bluetooth DH1 CH39	EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)	Lim2: FCC_pt15_2 09 (dBµV/m)	Lim2 Margin (dB)	Lim2 Test Results (Pass/Fail)	Worst Margin Lim2 (dB)
30.218	26.7	-1.5	25.2	40	-14.8	PASS		40	-14.8	PASS	
45.181	40.2	-12.6	27.6	40	-12.4	PASS		40	-12.4	PASS	
86.818	39.1	-15.1	24	40	-16	PASS		40	-16	PASS	
90.843	41.4	-14.7	26.7	43.5	-16.8	PASS		43.5	-16.8	PASS	
742.489	37.3	-0.4	36.9	46	-9.1	PASS	-9.1	46	-9.1	PASS	-9.1
940.466	31.5	2.8	34.3	46	-11.7	PASS		46	-11.7	PASS	

30-1000MHz Channel Mid



Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Horizontal Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CHO

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
1669	38.8	31.7	4.9	43.8	74	-30.2	PASS		36.7	54	-17.3	PASS	
1865.8	38.9	31.5	7.6	46.5	74	-27.5	PASS		39.1	54	-14.9	PASS	-14.9
2357.8	39.5	25.7	9.6	49.1	74	-24.9	PASS	-24.9	35.3	54	-18.6	PASS	
3218.6	33.7	25	11.2	44.9	74	-29.1	PASS		36.2	54	-17.8	PASS	
5173.3	35	25.2	13	47.9	74	-26	PASS		38.2	54	-15.8	PASS	
5265.8	34.1	24.8	13.3	47.4	74	-26.6	PASS		38.1	54	-15.9	PASS	

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Vertical Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CHO

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
1865.2	35.7	29.8	7.6	43.3	74	-30.7	PASS		37.4	54	-16.6	PASS	
2357.9	36	25.1	9.6	45.6	74	-28.4	PASS		34.7	54	-19.3	PASS	
4099.1	33.2	24.9	11.7	44.8	74	-29.1	PASS		36.6	54	-17.4	PASS	
5186.6	33.9	25.1	13	46.8	74	-27.1	PASS		38.1	54	-15.9	PASS	
5254.9	35.9	24.8	13.2	49.1	74	-24.8	PASS	-24.8	38	54	-16	PASS	
5744	34.2	25.3	14.3	48.6	74	-25.4	PASS		39.7	54	-14.3	PASS	-14.3

1-6GHz Channel Low



Curtis Straus - a Bureau Veritas Company	Work Order - R3763
Radiated Emissions Electric Field 3m Distance	EUT Power Input - 13.8V DC
1-6GHz Horizontal Data	Test Site - CH2
Operator: CCH	Conditions - 22.3°C; 32%RH; 1000mBar
Notes:	Witnessed by - N/A
Testing Bluetooth DH1 CH39	EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
1669.1	36	29.2	4.9	41	74	-33	PASS		34.1	54	-19.9	PASS	
1865.4	37.2	29.5	7.6	44.8	74	-29.2	PASS		37.1	54	-16.9	PASS	
4883.5	34.5	25.4	12.7	47.1	74	-26.9	PASS		38	54	-16	PASS	
5503.6	33.1	25.4	14	47.1	74	-26.9	PASS		39.4	54	-14.6	PASS	
5662.6	34.6	25.5	14.1	48.7	74	-25.3	PASS	-25.3	39.6	54	-14.4	PASS	-14.4
5805.3	33.5	25	14.4	47.9	74	-26.1	PASS		39.4	54	-14.6	PASS	

Curtis Straus - a Bureau Veritas Company	Work Order - R3763
Radiated Emissions Electric Field 3m Distance	EUT Power Input - 13.8V DC
1-6GHz Vertical Data	Test Site - CH2
Operator: CCH	Conditions - 22.3°C; 32%RH; 1000mBar
Notes:	Witnessed by - N/A
Testing Bluetooth DH1 CH39	EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
1865.1	36.3	29.1	7.6	43.9	74	-30.1	PASS		36.7	54	-17.3	PASS	
2535.8	33.8	25.5	10.3	44.1	74	-29.9	PASS		35.8	54	-18.2	PASS	
5261.2	33.4	24.8	13.3	46.6	74	-27.3	PASS		38	54	-16	PASS	
5751.9	35.1	25.3	14.3	49.5	74	-24.5	PASS	-24.5	39.6	54	-14.4	PASS	-14.4

1-6GHz Channel Mid



Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Horizontal Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CH78

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
1668.9	37.5	31.2	4.9	42.4	74	-31.6	PASS		36.1	54	-17.9	PASS	
1865.3	37	30.6	7.6	44.6	74	-29.4	PASS		38.2	54	-15.8	PASS	
2531	34.7	26.1	10.3	45	74	-28.9	PASS		36.4	54	-17.6	PASS	
5254.6	33.8	24.7	13.2	47.1	74	-26.9	PASS		37.9	54	-16	PASS	
5882.4	34.6	24.9	14.7	49.3	74	-24.7	PASS	-24.7	39.5	54	-14.5	PASS	-14.5

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 3m Distance
 1-6GHz Vertical Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CH78

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
1715.1	32.7	24.1	5.6	38.3	74	-35.7	PASS		29.7	54	-24.3	PASS	
1729.4	32.3	23.9	5.8	38.1	74	-35.9	PASS		29.7	54	-24.3	PASS	
1865.4	37.2	29	7.6	44.8	74	-29.2	PASS		36.5	54	-17.5	PASS	
2521	39.9	25.8	10.3	50.1	74	-23.8	PASS	-23.8	36	54	-17.9	PASS	
5179.3	34.3	25.2	13	47.2	74	-26.7	PASS		38.1	54	-15.8	PASS	-15.8

1-6GHz Channel High



Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Horizontal Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CHO

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
17964.9	39.8	31.2	19.7	59.5	83.5	-24	PASS	-24	50.8	63.5	-12.7	PASS	-12.7

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Vertical Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CHO

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
17967.1	41.3	31.2	19.7	61	83.5	-22.5	PASS	-22.5	50.8	63.5	-12.7	PASS	-12.7

6-18GHz Channel Low

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Horizontal Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CH39

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
16497.1	42.4	31.3	16.6	59	83.5	-24.5	PASS	-24.5	48	63.5	-15.5	PASS	-15.5
17927	40.3	31.3	19.4	59.8	83.5	-23.7	PASS	-23.7	50.7	63.5	-12.8	PASS	-12.8

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Vertical Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CH39

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
17946.7	41.1	31.2	19.6	60.7	83.5	-22.8	PASS	-22.8	50.8	63.5	-12.7	PASS	-12.7

6-18GHz Channel Mid



BUREAU VERITAS



Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Horizontal Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CH78

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
17968.8	42.9	31.1	19.7	62.5	83.5	-21	PASS	-21	50.8	63.5	-12.7	PASS	-12.7

Curtis Straus - a Bureau Veritas Company
 Radiated Emissions Electric Field 1m Distance
 6-18GHz Vertical Data
 Operator: CCH
 Notes:
 Testing Bluetooth DH1 CH78

Work Order - R3763
 EUT Power Input - 13.8V DC
 Test Site - CH2
 Conditions - 22.3°C; 32%RH; 1000mBar
 Witnessed by - N/A
 EUT Maximum Frequency - 5825MHz

Data Taken at April 08, 2018

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)
17936	40.2	31.4	19.5	59.7	83.5	-23.8	PASS	-23.8	50.9	63.5	-12.6	PASS	-12.6

6-18GHz Channel High

Radiated Emissions Table															
Date: 10-Apr-18				Company: Harman International				Work Order: S0621							
Engineer: Chris Hamel				EUT Desc: PV602				EUT Operating Voltage/Frequency: 13.8V DC							
Temp: 22.3°C				Humidity: 32%				Pressure: 1000mBar							
Frequency Range: 18-25GHz								Measurement Distance: 0.1 m							
Notes: No emissions found								EUT Max Freq:							
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)	
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Table Result: Pass				by N/A dB				Worst Freq: N/A MHz							
Test Site: EMI Chamber 2				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 1.017.203								Copyright Curtis-Straus LLC 2000							
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor															

18-25GHz All Channels



Rev. 4/17/2018							
Spectrum Analyzers / Receivers/Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	7/26/2018
2093 MXE EMI Receiver	20Hz-26.5GHz	N9038A	Agilent	MY51210181	2093	I	11/16/2018
Rental MXE EMI Receiver(1170725)	20Hz-26.5GHz	N9038A	Agilent	MY51210151	1170725	I	4/10/2019
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	12/21/2018
EMI Chamber 1	719150	2762A-6	A-0015	1-18GHz	1685	I	12/21/2018
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	1686	I	12/21/2018
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
2443 PA	9KHz-6GHz	BBV 9744	SCWARZBECK	63	2443	I	2/5/2019
2444 PA	9KHz-6GHz	BBV 9744	SCWARZBECK	67	2444	I	2/5/2019
2111 HF Preamp	0.5-18GHz	PAM-118A	COM-POWER	551063	2111	II	11/19/2018
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	II	10/16/2018
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	2/28/2019
Orange Horn	1-18GHz	3115	EMCO	0004-6123	390	I	10/13/2018
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	III	Verify before Use
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/14/2019
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due
Weather Clock (Pressure Only)		BA 928	Oregon Scientific	C3166-1	831	I	4/28/2018
TH A #2084		HTC-1	HDE		2084	II	3/22/2019
TH A #2085		HTC-1	HDE		2085	II	3/22/2019
Cables	Range		Mfr			Cat	Calibration Due
Asset #2456	9KHz-18GHz		MegaPhase			II	10/29/2018
Asset #2458	9KHz-18GHz		MegaPhase			II	10/29/2018
Asset #2459	9KHz-18GHz		MegaPhase			II	10/29/2018
Asset #2480	9KHz-18GHz		MegaPhase			II	10/29/2018
Asset #2323	1-26.5GHz	TM26-S1S1-120	MEGAPHASE	17139101 002	2323	II	8/19/2018
Asset #2466	9KHz-18GHz		MegaPhase			II	10/29/2018

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

Test Equipment Used



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Radiated Band Edge

Radiated Emissions Table														
Date: 08-Apr-18			Company: Harman International						Work Order: S0621					
Engineer: Chris Hamel			EUT Desc: PV602						EUT Operating Voltage/Frequency: 13.8V DC					
Temp: 23.2°C			Humidity: 32%						Pressure: 1000mBar					
Frequency Range: 2.310-2.5GHz									Measurement Distance: 3 m					
Notes: Bluetooth Bandedge DH1									EUT Max Freq:					
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				---	---	---	---	---	---	---	---	---	---	---
V Max	2401.75	89.3		25.5	32.2	3.2	---	---	74.0	---	---	54.0	---	---
H Max	2401.88	92.3		25.5	32.2	3.2	---	---	74.0	---	---	54.0	---	---
H	2390.0	34.9	34.9	25.6	32.2	3.2	44.7	44.7	74.0	-29.3	Pass	54.0	-9.3	Pass
H	2357.9	39.0	25.3	25.6	32.0	3.2	48.6	34.9	74.0	-25.4	Pass	54.0	-19.1	Pass
H	2348.1	37.5	37.5	25.6	32.0	3.1	47.0	47.0	74.0	-27.0	Pass	54.0	-7.0	Pass
High				---	---	---	---	---	---	---	---	---	---	---
V Max	2479.88	87.6		25.4	32.4	3.2	---	---	74.0	---	---	54.0	---	---
H Max	2480.38	90		25.4	32.4	3.2	---	---	74.0	---	---	54.0	---	---
H	2483.5	36.7	36.7	25.4	32.4	3.2	46.9	46.9	74.0	-27.1	Pass	54.0	-7.1	Pass
H	2487.38	40.25	27.4	25.4	32.4	3.2	50.5	37.6	74.0	-23.5	Pass	54.0	-16.4	Pass
Table Result: Pass by -7.0 dB Worst Freq: 2348.1 MHz														
Test Site: EMI Chamber 2			Cable 1: Asset #2458			Cable 2: Asset #2459			Cable 3: ---					
Analyzer: Rental SA#3			Preamp: Asset #2444			Antenna: Blue Horn			Preselector: ---					
CSsoft Radiated Emissions Calculator v 1.017.203 Copyright Curtis-Straus LLC 2000														
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor														

Band edge Measurements

Rev. 4/5/2018										
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	11/16/2018	11/16/2017		
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Asset	Cat	Calibration Due	Calibrated on		
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz	1686	I	12/21/2018	12/21/2016		
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on		
2444 PA	9KHz-6GHz	BBV9744	SCWARZBECK	67	2444	I	2/5/2019	2/5/2018		
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on		
Blue Horn	1-18Ghz	3117	ETS	157647	1861	I	2/14/2019	2/14/2017		
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on		
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016		
TH A#2084		HTC-1	HDE		2084	II	3/22/2019	3/22/2018		
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on		
Asset #2458	9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017		
Asset #2459	9KHz-18GHz		MegaPhase			II	10/29/2018	10/29/2017		

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

Test Equipment Used



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AC Line Conducted Emissions LIMITS

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

*Decreases with the logarithm of the frequency.

[47 CFR 15.207(a)]

MEASUREMENTS / RESULTS

N/A. Vehicle battery powered only.

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 (Ucisp)
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 (Ucisp)
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%
Adjacent channel power	0.3dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	1.9dB	3dB
Conducted emission of receivers	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%

The above reflects a 95% confidence level



Conditions Of Testing

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

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "**BUREAU VERITAS**," "**BUREAU VERITAS CONSUMER PRODUCTS SERVICES**," "**BVCPS**," "**MTL**," "**ACTS**," "**MTL-ACTS**" and "**CURTIS-STRAUS**" (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only where 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.



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

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

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

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

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



ES0621-1 Appendix A

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

DUT Information

DUT Name: PV602
 Manufacturer: Harman International Industries, Inc
 Serial Number: 34670010475
 Software Version: SOC: BR_RC1_R12.0.0_R18102A

Frequencies

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

DUT Settings

No. of transmission chains 1
 Equipment Type Frequency Hopping Spread Spectrum



Antenna Gain:
2400-2500MHz: 2.33dBi Peak

BT Wlan Antenna							
Frequency	Efficiency	Efficiency . dB	Peak Gain	Frequency	Efficiency	Efficiency . dB	Peak Gain
2400	36%	-4.41	0.53	5150	34%	-4.62	1.36
2410	37%	-4.29	0.72	5200	34%	-4.68	0.95
2420	38%	-4.21	0.72	5250	33%	-4.78	0.96
2430	39%	-4.08	0.83	5300	32%	-5.00	0.55
2440	40%	-4.03	0.80	5350	30%	-5.22	1.03
2450	40%	-3.96	1.01	5400	27%	-5.63	1.09
2460	40%	-3.93	1.24	5450	27%	-5.74	1.01
2470	41%	-3.88	1.46	5550	25%	-5.99	1.85
2480	43%	-3.71	1.93	5600	27%	-5.63	2.46
2490	44%	-3.59	2.17	5650	31%	-5.04	3.33
2500	44%	-3.55	2.33	5700	32%	-5.00	3.24
AVG	40%	-3.97	1.25	5750	34%	-4.65	3.61
				5800	34%	-4.74	3.46
				5850	36%	-4.46	3.72
				5900	34%	-4.73	3.64
				5950	32%	-4.96	3.29
				AVG	31%	-5.05	2.22

Test Equipment Used:

Rev. 3/27/2018									
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	6/30/2018	6/30/2017	
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	6/26/2018	6/26/2017	
SMB100A Signal Generator	100KHz-40GHz	SMB100A	ROHDE & SCHWARZ	179846	2434	I	5/30/2018	5/30/2017	
Power/Noise Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
OSP - open switch and control platform	30MHz-18GHz	OSP120	ROHDE & SCHWARZ	101674		I	6/1/2018	6/1/2017	
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on	
DUT1	30MHz-26GHz		Micro-Coax			II	6/21/2018	6/21/2017	
DUT2	30MHz-26GHz		Micro-Coax			II	6/22/2018	6/22/2017	
DUT3	30MHz-26GHz		Micro-Coax			II	6/23/2018	6/23/2017	
DUT4	30MHz-26GHz		Micro-Coax			II	6/24/2018	6/24/2017	
Attenuators / Couplers	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
10dB Attenuator-01 Brown	30MHz-26GHz		Mini Circuits			II	7/13/2018	7/14/2017	
10dB Attenuator-02 Yellow	30MHz-26GHz		Mini Circuits			II	7/13/2018	7/14/2017	
10dB Attenuator-03 Red	30MHz-26GHz		Mini Circuits			II	7/13/2018	7/14/2017	
10dB Attenuator-04 orange	30MHz-26GHz		Mini Circuits			II	7/13/2018	7/14/2017	
API - 30dB 20W Attenuator	9KHz-40GHz	89-30-11	API Weinschel	703	2121	I	3/23/2019	3/23/2018	
Directional Coupler	0.5GHz-18GHz	UDC	AA MCS	001040		II	8/11/2018	8/11/2017	
Communication Tester	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
CMW500 Wideband Radio Communication Tester	DC to 6GHz	CMW500	ROHDE & SCHWARZ	155905		I	6/2/2018	6/2/2017	
Meteorological Meters/Chambers		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Temp/Humidity Chamber #18		EPX-2H	Espec	137664	1645	I	1/5/2019	1/5/2018	

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



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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
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
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
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	---	---	---	---	---	---	---



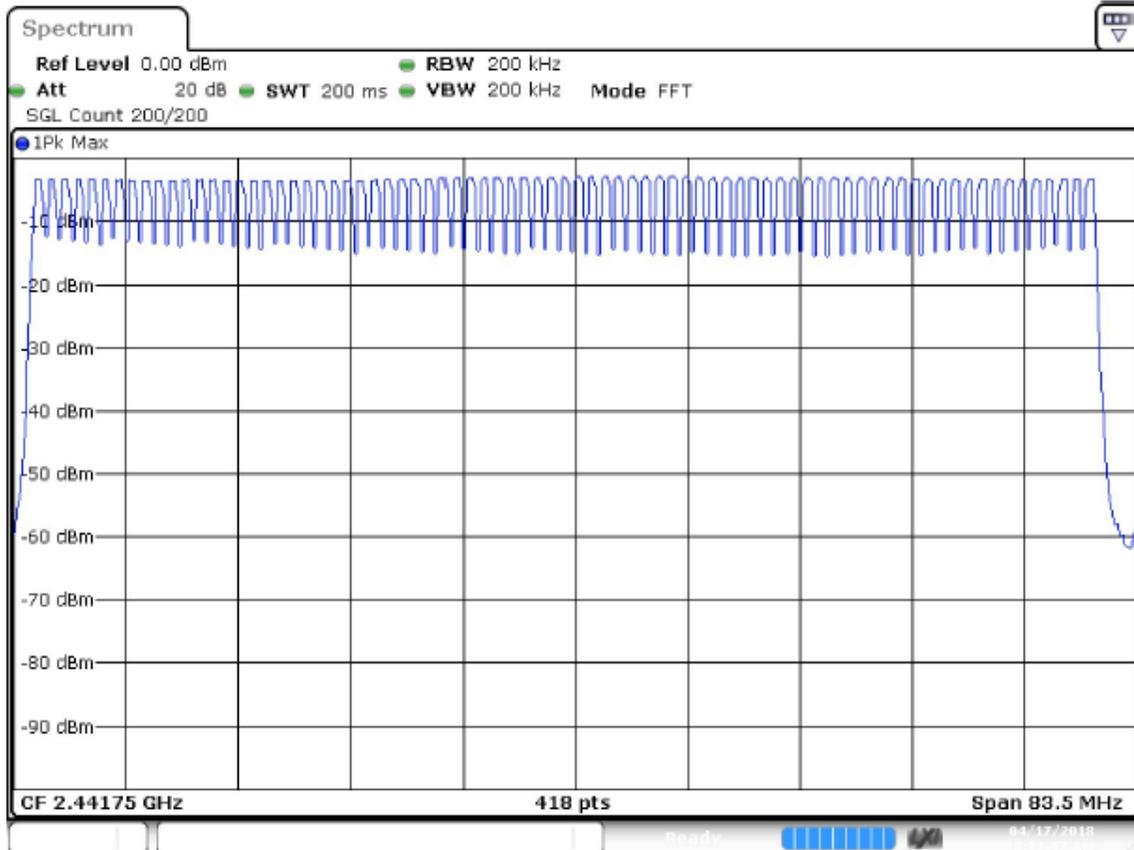
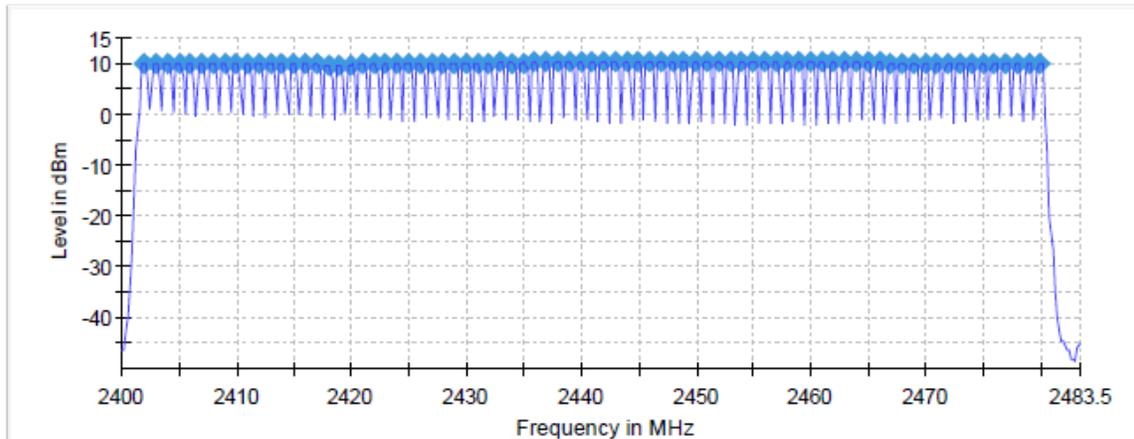
Number of Hopping Frequencies

Test procedure in accordance with ANSI C63.10-2013

Channels

Channels	Limit Min	Result
79	15	PASS

Sequence



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

Inband Peak

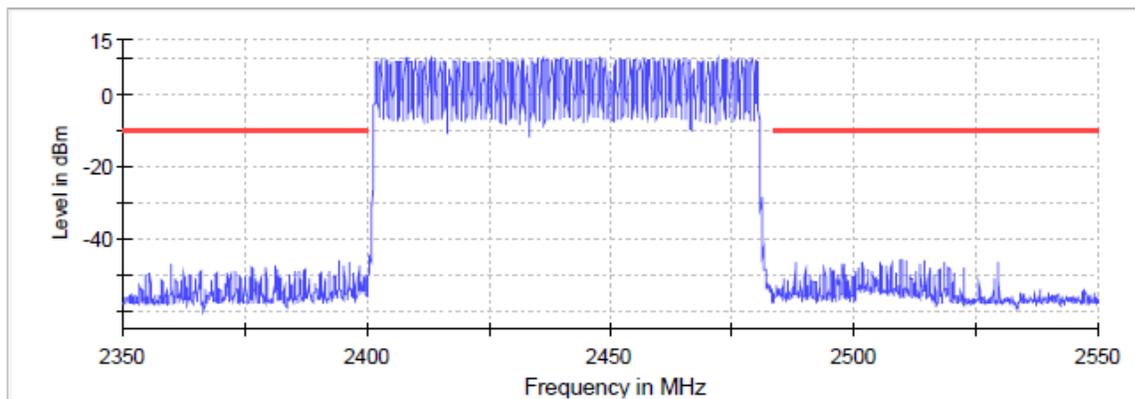
Data Rate	Frequency (MHz)	Level (dBm)
DH1	2444.775000	10.3
DH3	2439.775000	10.2
DH5	2441.125000	10.5
2-DH1	2445.775000	7.3
2-DH3	2462.925000	7.0
2-DH5	2446.075000	7.2
3-DH1	2446.775000	7.5
3-DH3	2441.125000	7.3
3-DH5	2449.125000	7.3

Plots for packet type DH3 shown below.

Measurements

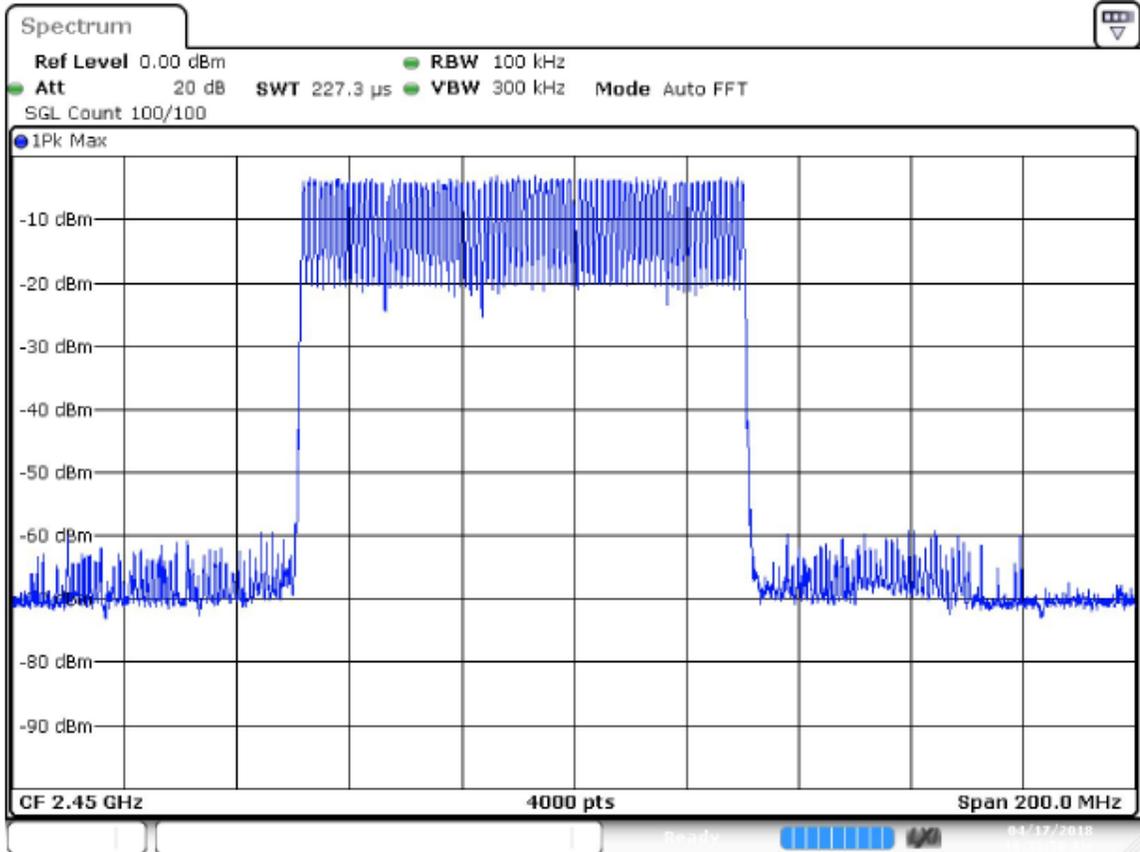
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2514.375000	-45.9	36.1	-9.8	PASS
2509.525000	-45.9	36.1	-9.8	PASS
2510.525000	-46.1	36.2	-9.8	PASS
2509.575000	-46.1	36.2	-9.8	PASS
2510.575000	-46.1	36.3	-9.8	PASS
2394.325000	-46.2	36.4	-9.8	PASS
2396.325000	-46.3	36.5	-9.8	PASS
2501.675000	-46.5	36.6	-9.8	PASS
2487.875000	-46.5	36.6	-9.8	PASS
2501.725000	-46.5	36.7	-9.8	PASS
2529.525000	-46.5	36.7	-9.8	PASS
2518.375000	-46.6	36.8	-9.8	PASS
2514.425000	-46.7	36.8	-9.8	PASS
2396.375000	-46.8	36.9	-9.8	PASS
2359.825000	-46.8	36.9	-9.8	PASS

Band Edge



— Limit — Sum Level × Fail





Carrier Frequency Separation

Test procedure in accordance with ANSI C63.10-2013

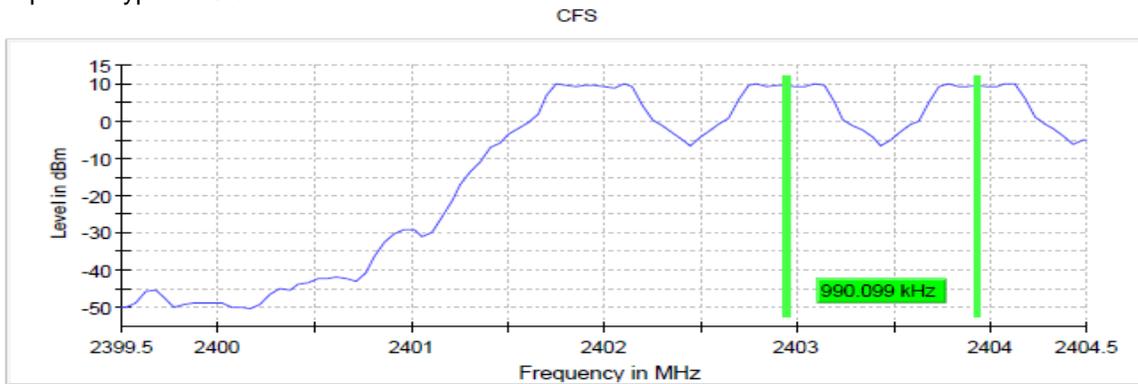
Measurement uncertainty calculated in accordance with ETSI TR 100 028-1. Expanded Uncertainty(k = 2) < 1%

2402 MHz

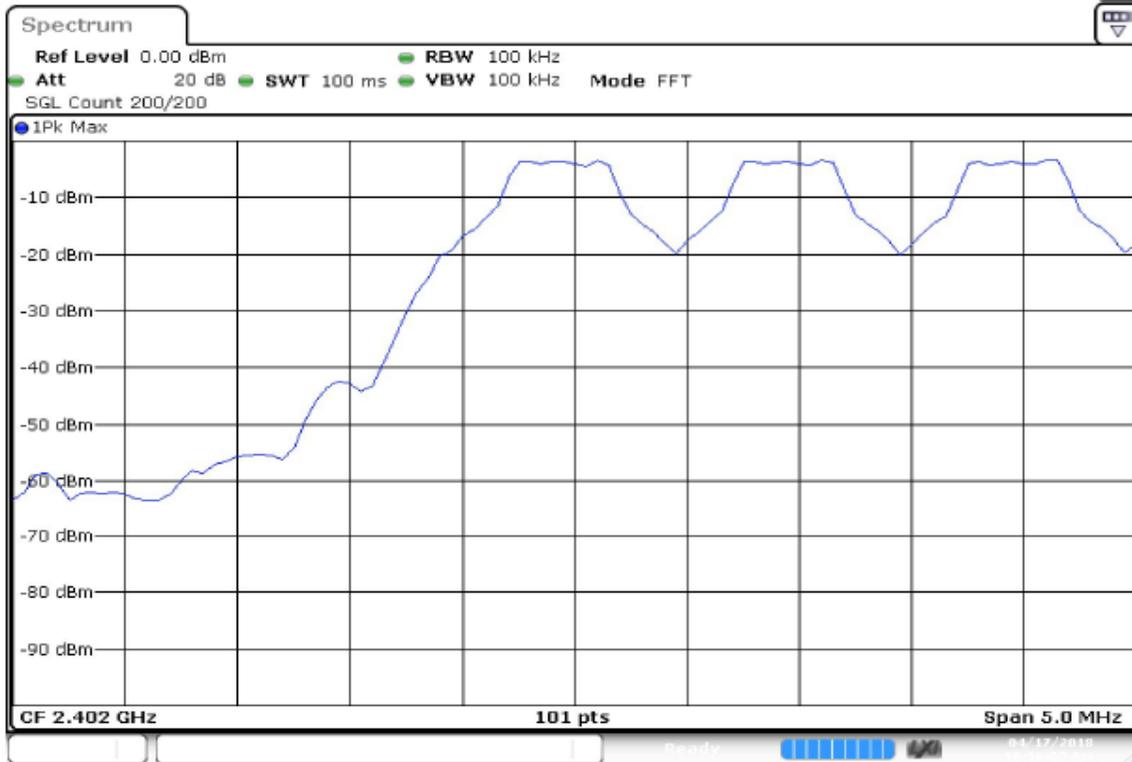
Limit is 2/3 of the 20dB bandwidth measured for the corresponding mode.

Packet Type	DUT Frequency (MHz)	Frequency Separation (MHz)	Minimum Limit (MHz)	Result
DH1	2402.000000	0.990099	0.653465	PASS
DH3	2402.000000	0.990099	0.673267	PASS
DH5	2402.000000	0.990099	0.673267	PASS
2-DH1	2402.000000	0.990099	0.891089	PASS
2-DH3	2402.000000	0.990099	0.910891	PASS
2-DH5	2402.000000	0.990099	0.910891	PASS
3-DH1	2402.000000	0.990099	0.871287	PASS
3-DH3	2402.000000	0.940594	0.891089	PASS
3-DH5	2402.000000	0.940594	0.910891	PASS

Plots for packet type DH3 shown



below.

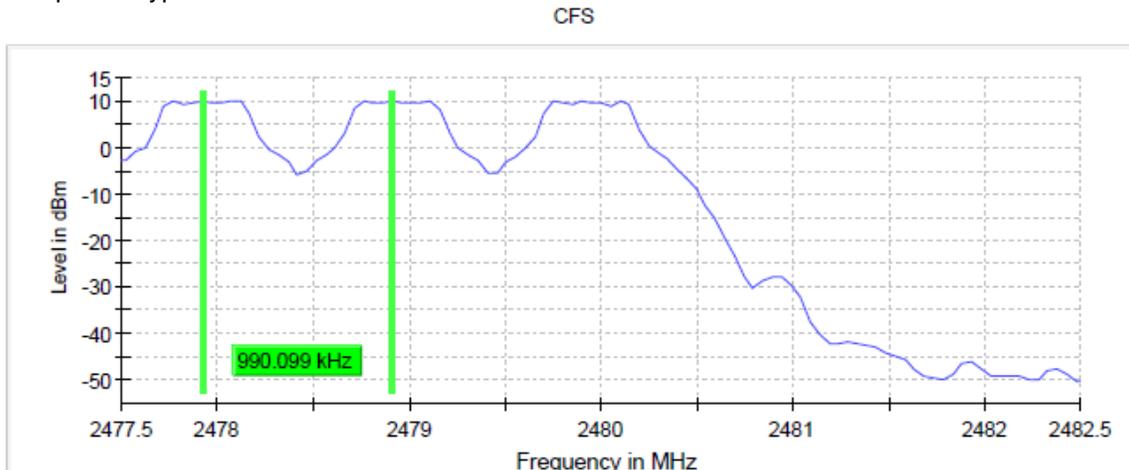


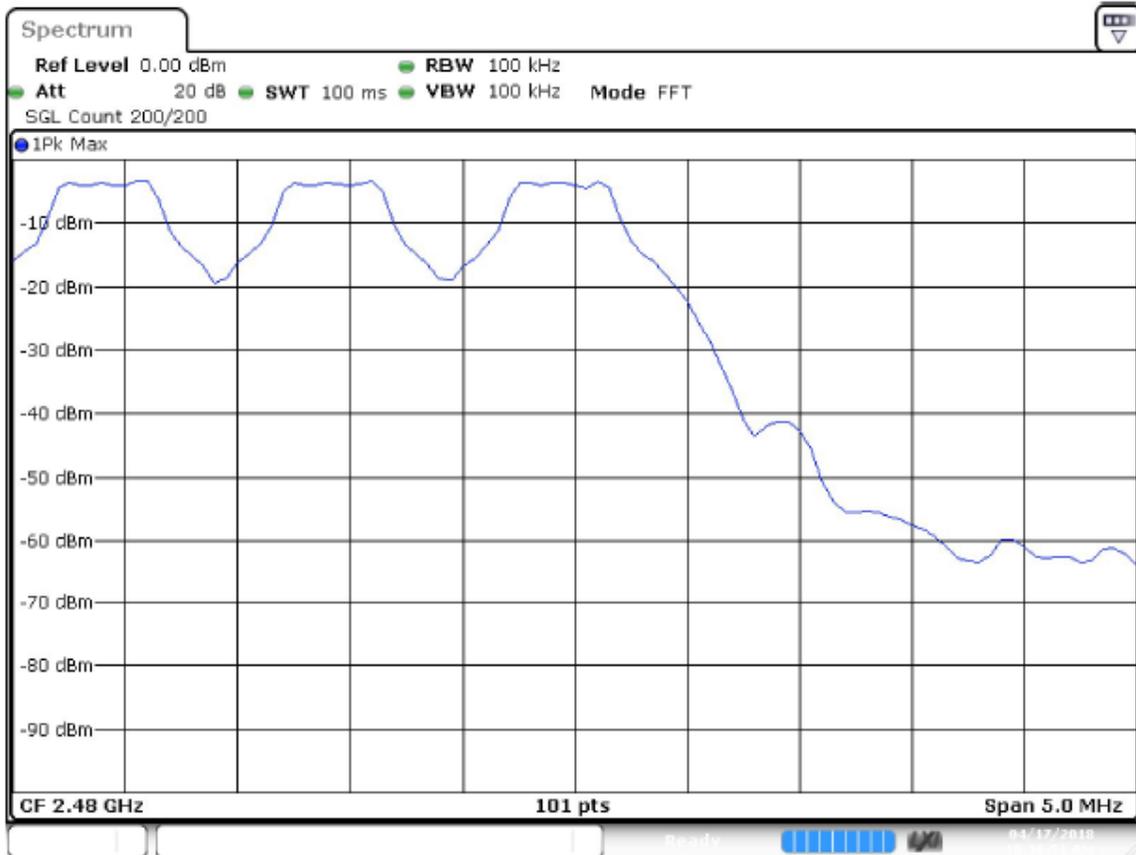
2480 MHz

Limit is 2/3 of the 20dB bandwidth measured for the corresponding mode.

Packet Type	DUT Frequency (MHz)	Frequency Separation (MHz)	Minimum Limit (MHz)	Result
DH1	2480.000000	0.990099	0.653465	PASS
DH3	2480.000000	0.990099	0.673267	PASS
DH5	2480.000000	0.990099	0.673267	PASS
2-DH1	2480.000000	0.990099	0.871287	PASS
2-DH3	2480.000000	0.990099	0.910891	PASS
2-DH5	2480.000000	0.990099	0.910891	PASS
3-DH1	2480.000000	0.940594	0.871287	PASS
3-DH3	2480.000000	0.990099	0.891089	PASS
3-DH5	2480.000000	0.990099	0.910891	PASS

Plots for packet type DH3 shown below.





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%

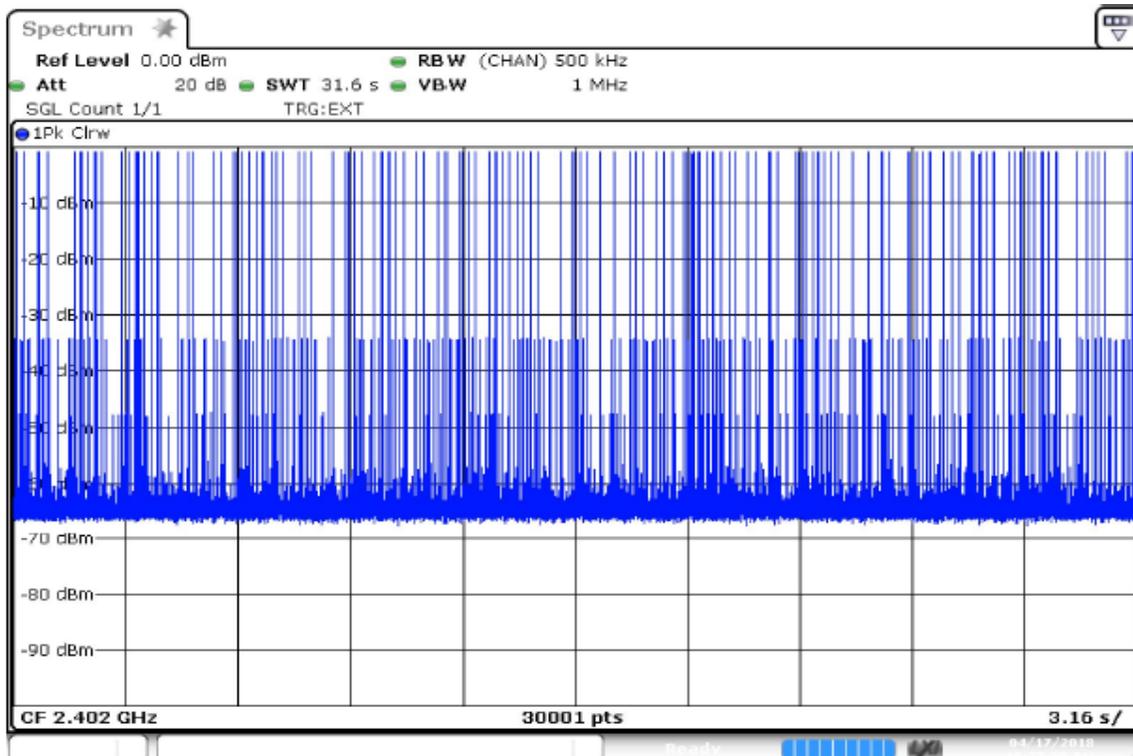
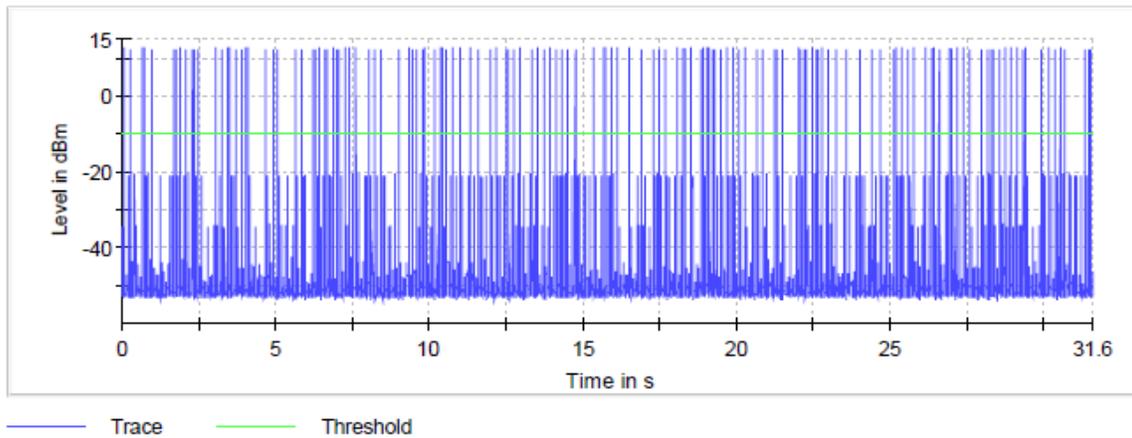
2402 MHz

Data Rate	Time (ms)	Limit Max (ms)	Result
DH1	125.320	400.000	PASS
DH3	252.040	400.000	PASS
DH5	280.890	400.000	PASS
2-DH1	123.350	400.000	PASS
2-DH3	271.620	400.000	PASS
2-DH5	302.560	400.000	PASS
3-DH1	123.590	400.000	PASS
3-DH3	251.240	400.000	PASS
3-DH5	327.380	400.000	PASS

Plots for packet type DH3 shown below.



Time of Channel Occupancy

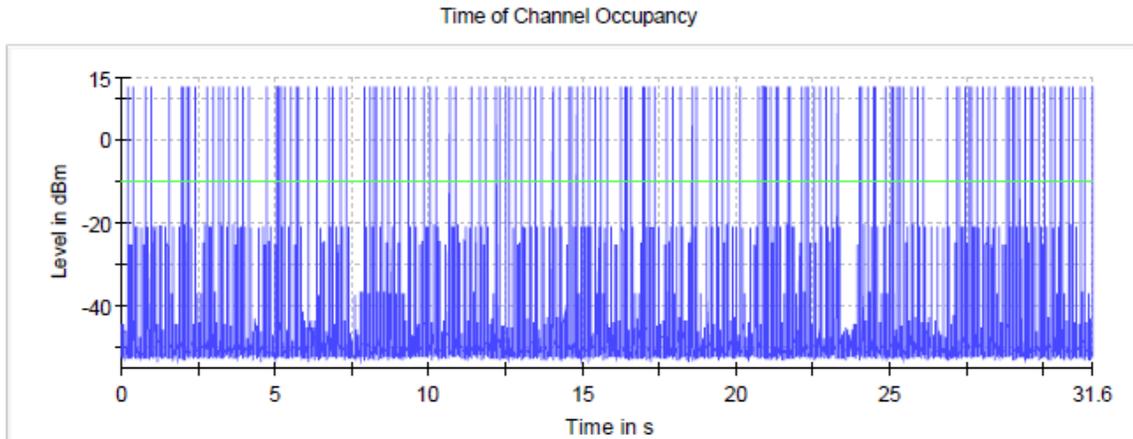


2441 MHz

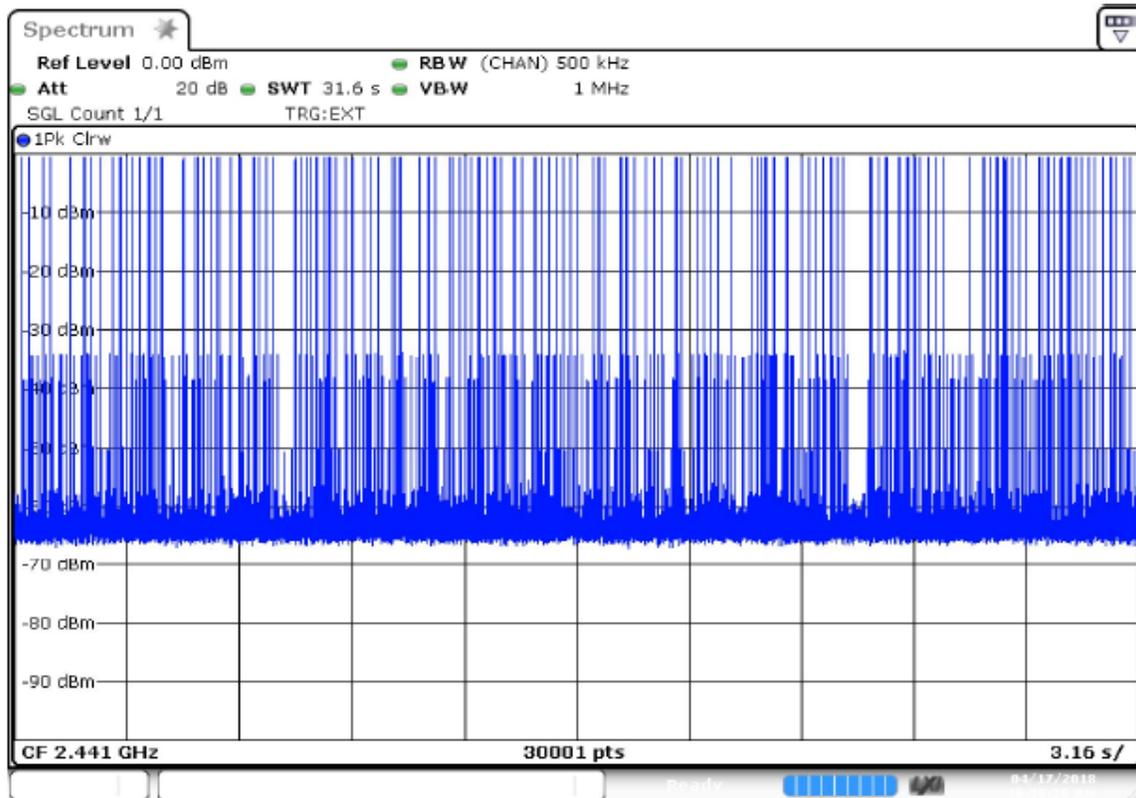
Data Rate	Time (ms)	Limit Max (ms)	Result
DH1	125.470	400.000	PASS
DH3	270.270	400.000	PASS
DH5	289.560	400.000	PASS
2-DH1	123.580	400.000	PASS
2-DH3	239.000	400.000	PASS
2-DH5	300.570	400.000	PASS
3-DH1	123.690	400.000	PASS
3-DH3	252.390	400.000	PASS
3-DH5	311.410	400.000	PASS



Plots for packet type DH3 shown below.



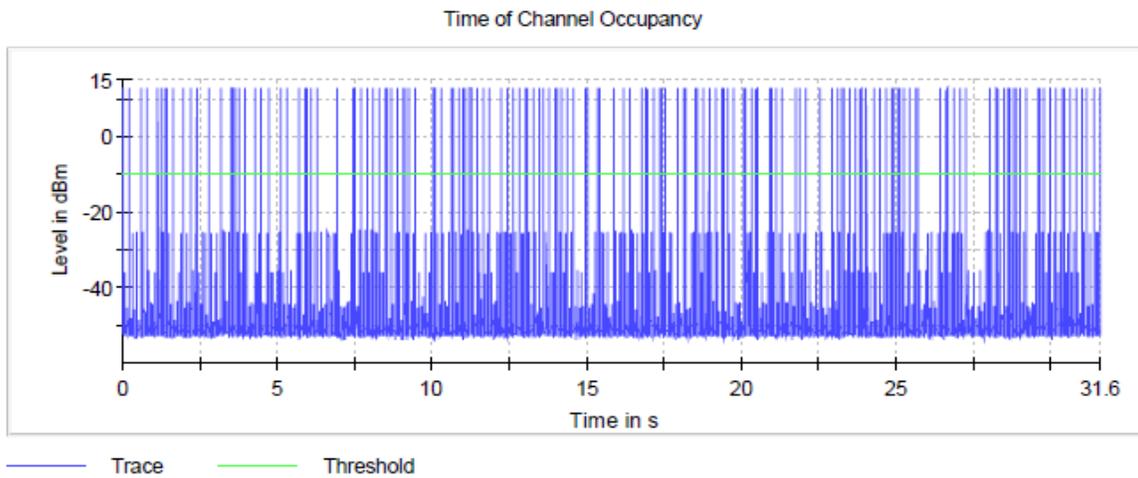
— Trace — Threshold

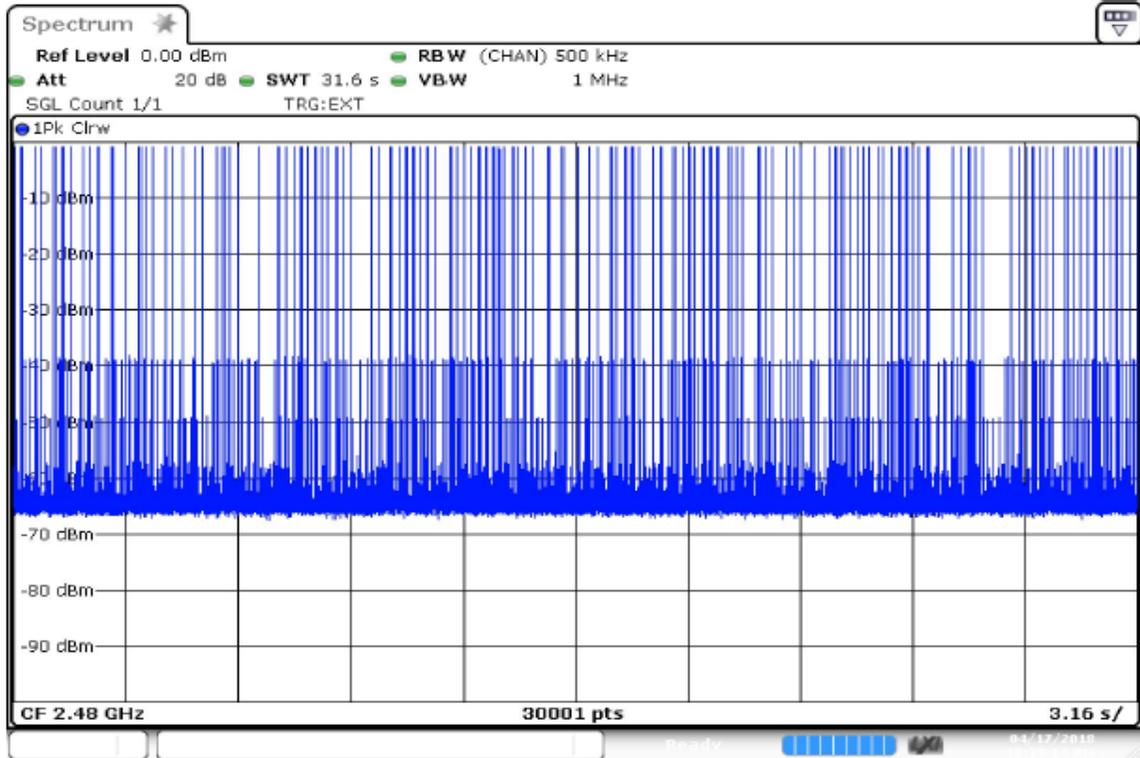


2480 MHz

Data Rate	Time (ms)	Limit Max (ms)	Result
DH1	125.770	400.000	PASS
DH3	270.280	400.000	PASS
DH5	295.350	400.000	PASS
2-DH1	123.430	400.000	PASS
2-DH3	254.520	400.000	PASS
2-DH5	283.240	400.000	PASS
3-DH1	123.510	400.000	PASS
3-DH3	260.710	400.000	PASS
3-DH5	310.760	400.000	PASS

Plots for packet type DH3 shown below.



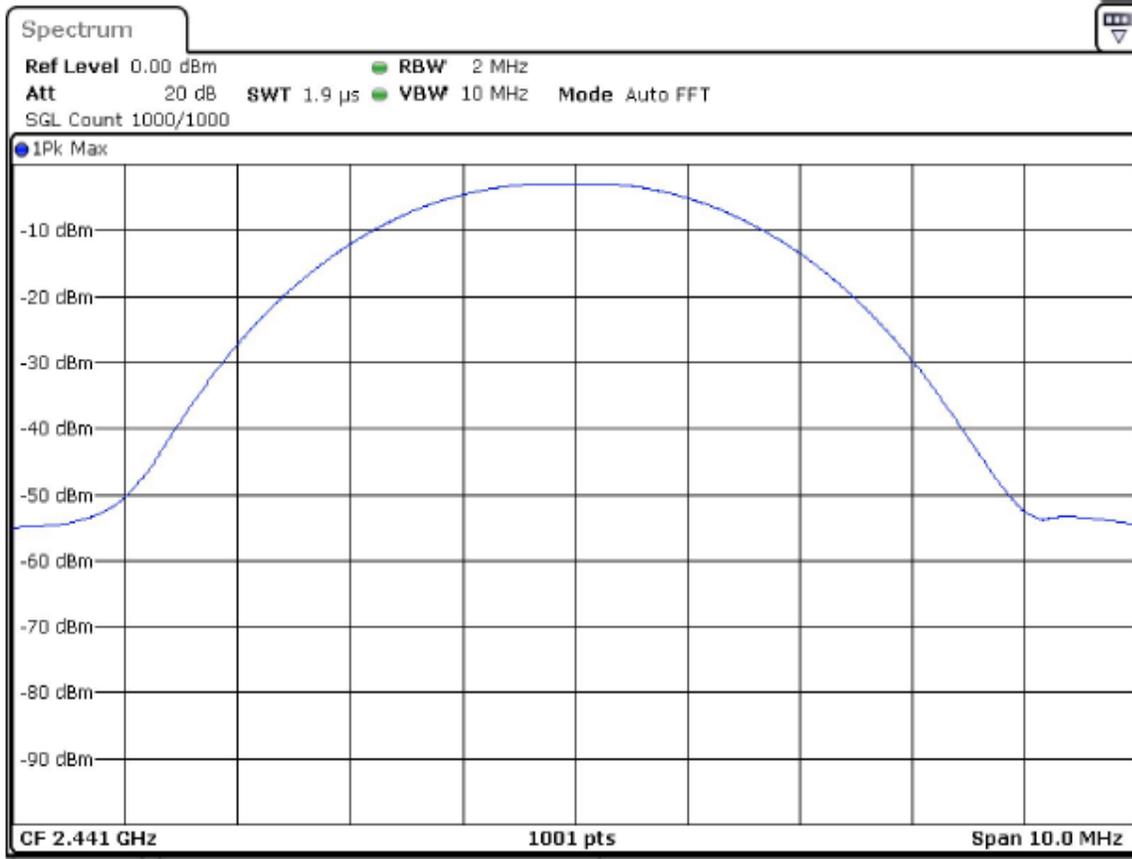


Peak Output Power

Test procedure in accordance with ANSI C63.10-2013

Data Rate	2402MHz	2441MHz	2480MHz	Limit dBm
DH1	10.016	10.331	9.947	30
DH3	10.173	10.554	10.255	30
DH5	9.934	10.242	9.866	30
2-DH1	9.256	9.555	9.329	30
2-DH3	9.312	9.654	9.427	30
2-DH5	9.261	9.578	9.413	30
3-DH1	9.411	9.668	9.456	30
3-DH3	9.718	9.802	9.508	30
3-DH5	9.592	9.883	9.587	30

Plot for packet type DH3 shown below.



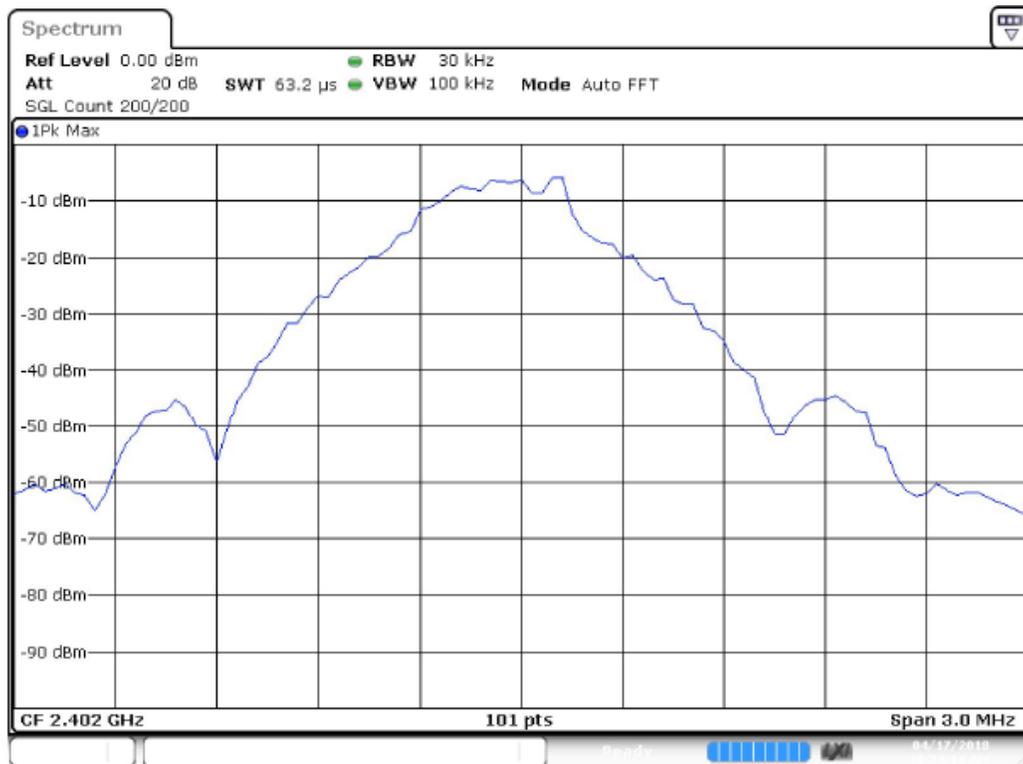
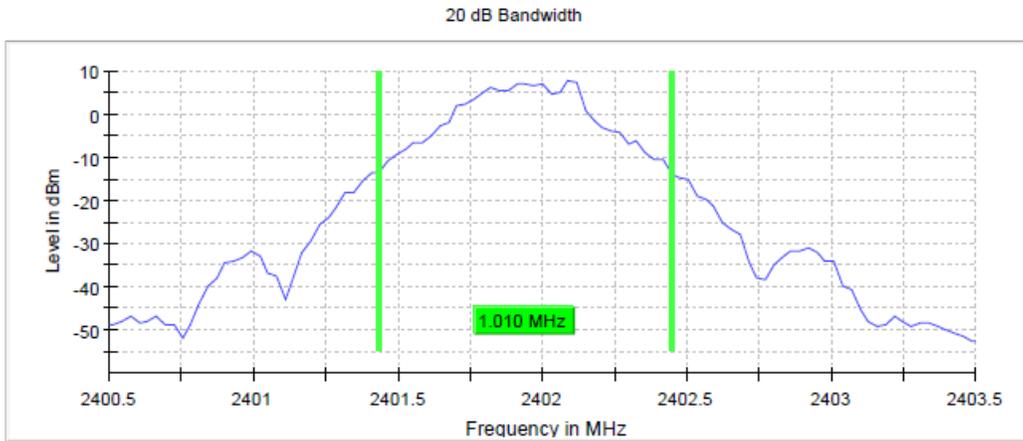
Emission Bandwidth 20 dB

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%

2402 MHz

Data Rate	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
DH1	0.980198	2401.465347	2402.445545	PASS
DH3	1.009901	2401.435644	2402.445545	PASS
DH5	1.009901	2401.435644	2402.445545	PASS
2-DH1	1.336633	2401.257426	2402.594059	PASS
2-DH3	1.366336	2401.257426	2402.623762	PASS
2-DH5	1.366336	2401.257426	2402.623762	PASS
3-DH1	1.306930	2401.287129	2402.594059	PASS
3-DH3	1.336633	2401.257426	2402.594059	PASS
3-DH5	1.366336	2401.257426	2402.623762	PASS

Plots for packet type DH3 shown below.

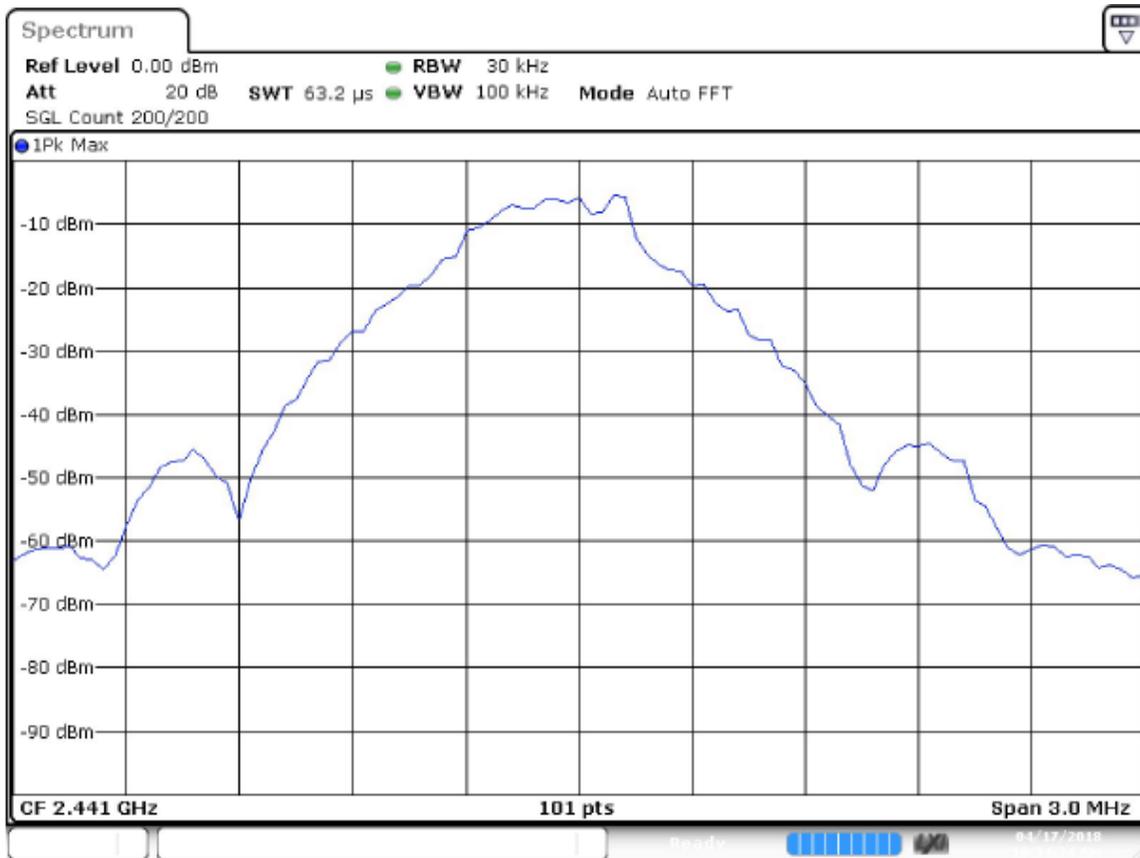
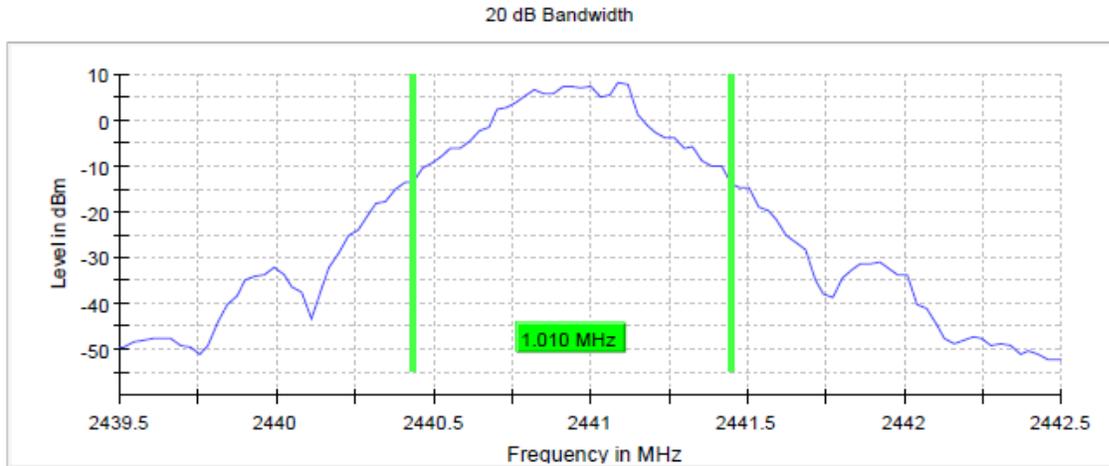


2441 MHz

Data Rate	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
DH1	0.980198	2440.465347	2441.445545	PASS
DH3	1.009901	2440.435644	2441.445545	PASS
DH5	1.009901	2440.435644	2441.445545	PASS
2-DH1	1.306930	2440.287129	2441.594059	PASS
2-DH3	1.336633	2440.287129	2441.623762	PASS
2-DH5	1.336633	2440.287129	2441.623762	PASS
3-DH1	1.306930	2440.287129	2441.594059	PASS
3-DH3	1.336633	2440.257426	2441.594059	PASS
3-DH5	1.366336	2440.257426	2441.623762	PASS

Plots for packet type DH3 shown below.

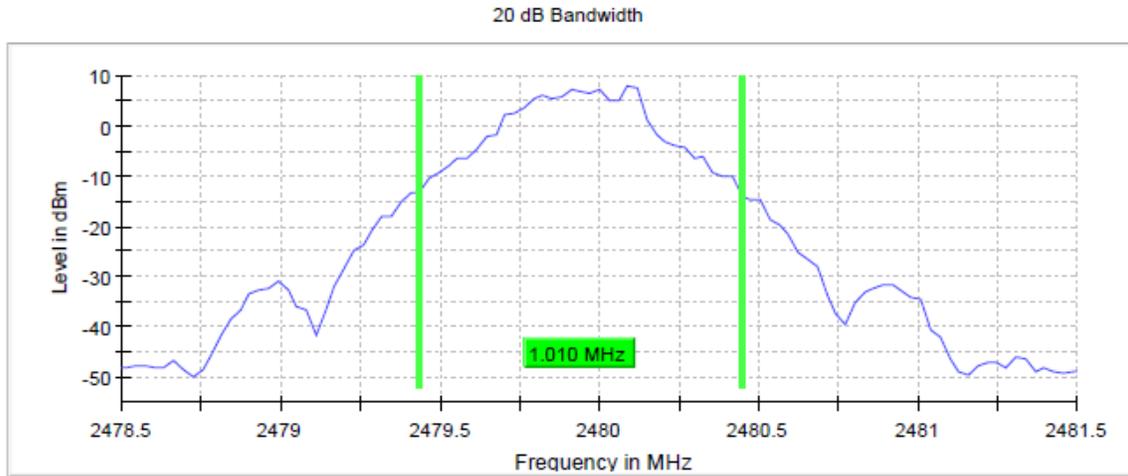




2480 MHz

Data Rate	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
DH1	0.980198	2479.465347	2480.445545	PASS
DH3	1.009901	2479.435644	2480.445545	PASS
DH5	1.009901	2479.435644	2480.445545	PASS
2-DH1	1.306930	2479.287129	2480.594059	PASS
2-DH3	1.366336	2479.257426	2480.623762	PASS
2-DH5	1.366336	2479.257426	2480.623762	PASS
3-DH1	1.306930	2479.287129	2480.594059	PASS
3-DH3	1.336633	2479.257426	2480.594059	PASS
3-DH5	1.366336	2479.257426	2480.623762	PASS

Plots for packet type DH3 shown below.





Band Edge Low (2402 MHz)

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

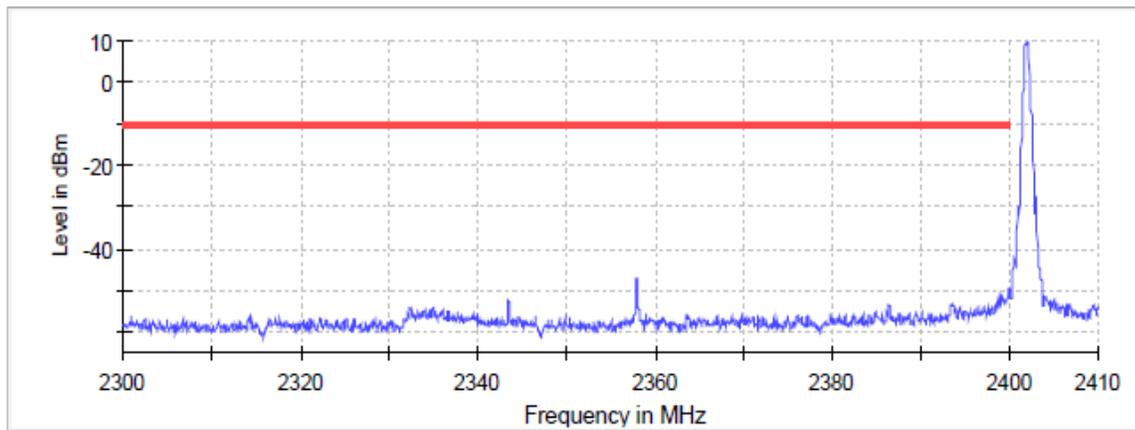
Inband Peak

Data Rate	Frequency (MHz)	Level (dBm)
DH1	2401.77500	9.8
DH3	2402.12500	10.0
DH5	2402.12500	9.9
2-DH1	2401.77500	6.8
2-DH3	2401.92500	6.6
2-DH5	2401.77500	6.8
3-DH1	2401.77500	7.0
3-DH3	2401.92500	6.5
3-DH5	2402.12500	7.0

Plots for packet type DH3 shown below.

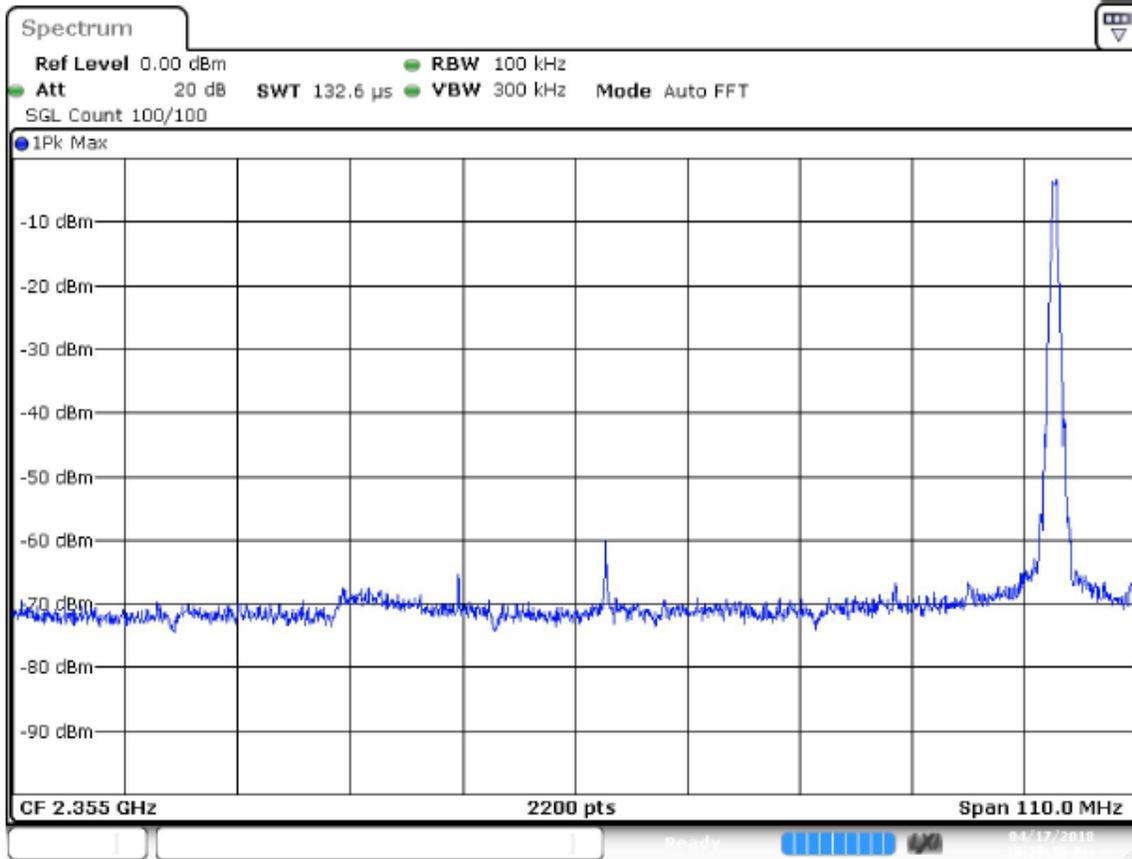
Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2357.925000	-47.1	37.0	-10.0	PASS
2357.975000	-47.1	37.1	-10.0	PASS
2399.975000	-49.6	39.5	-10.0	PASS
2357.875000	-49.7	39.7	-10.0	PASS
2399.925000	-49.7	39.7	-10.0	PASS
2358.025000	-50.5	40.4	-10.0	PASS
2399.775000	-51.1	41.1	-10.0	PASS
2399.125000	-51.4	41.3	-10.0	PASS
2399.725000	-51.5	41.4	-10.0	PASS
2399.175000	-51.5	41.5	-10.0	PASS
2399.875000	-51.5	41.5	-10.0	PASS
2399.225000	-51.6	41.5	-10.0	PASS
2398.875000	-51.9	41.9	-10.0	PASS
2398.625000	-52.0	41.9	-10.0	PASS
2398.825000	-52.0	41.9	-10.0	PASS



— Limit — Sum Level X Fail





Band Edge High (2480 MHz)

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

Inband Peak

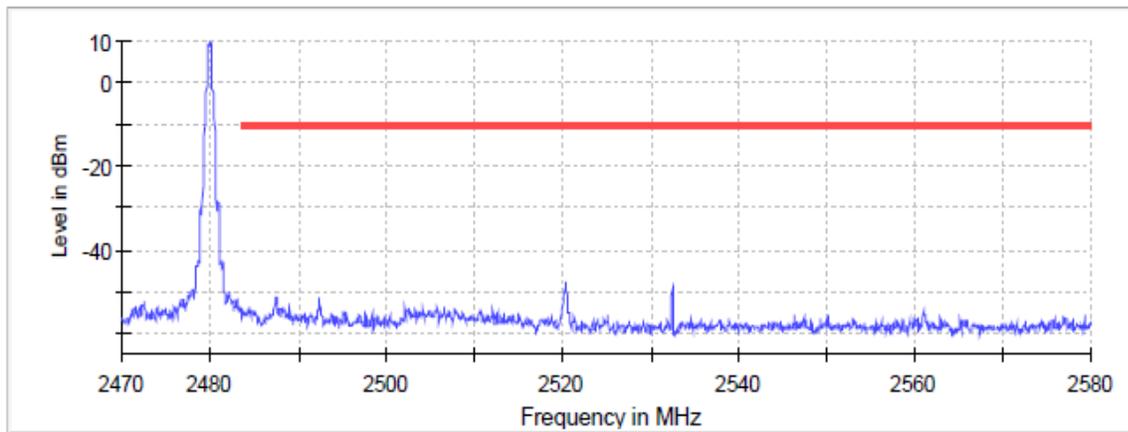
Data Rate	Frequency (MHz)	Level (dBm)
DH1	2480.07500	9.8
DH3	2479.92500	9.8
DH5	2480.07500	9.8
2-DH1	2479.77500	6.9
2-DH3	2479.92500	6.8
2-DH5	2480.07500	6.3
3-DH1	2479.77500	7.0
3-DH3	2480.07500	6.9
3-DH5	2480.07500	7.0

Plots for packet type DH3 shown below.

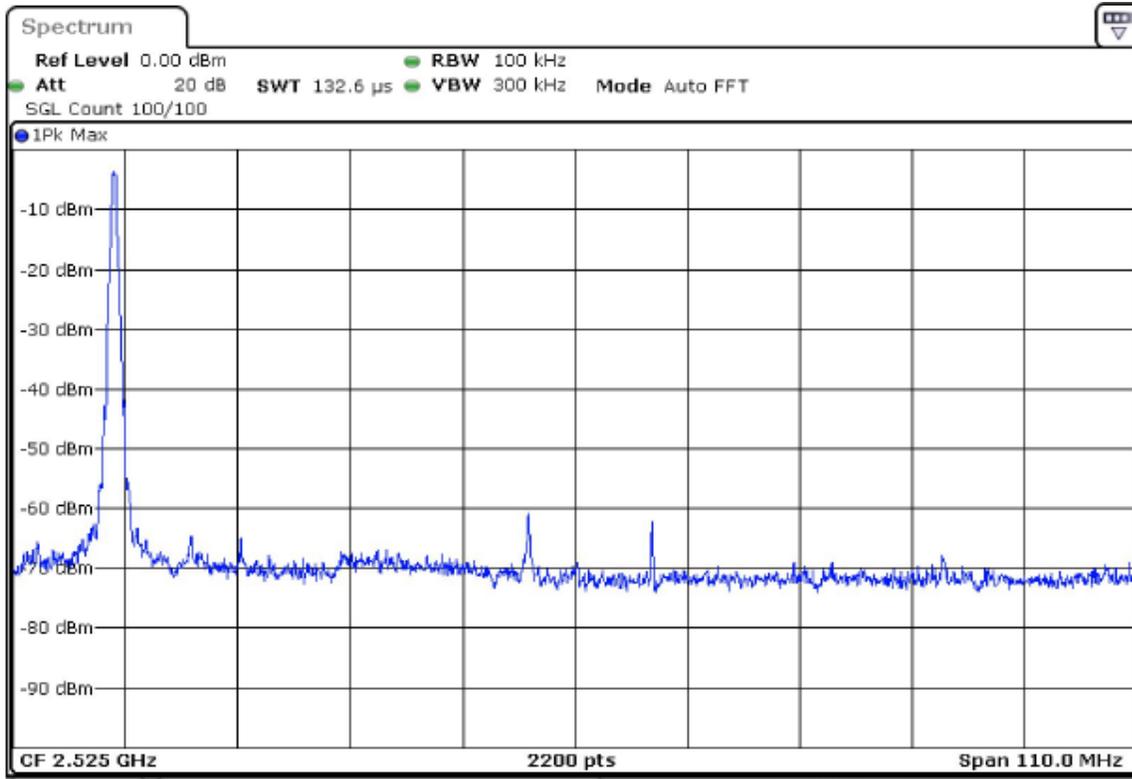


Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2520.375000	-47.5	37.3	-10.2	PASS
2520.425000	-47.6	37.4	-10.2	PASS
2520.325000	-48.0	37.8	-10.2	PASS
2532.525000	-48.9	38.7	-10.2	PASS
2532.475000	-48.9	38.7	-10.2	PASS
2520.275000	-49.0	38.7	-10.2	PASS
2520.475000	-49.4	39.1	-10.2	PASS
2532.575000	-50.5	40.3	-10.2	PASS
2520.225000	-50.6	40.4	-10.2	PASS
2532.425000	-50.7	40.5	-10.2	PASS
2520.525000	-51.1	40.9	-10.2	PASS
2487.475000	-51.3	41.1	-10.2	PASS
2487.525000	-51.4	41.1	-10.2	PASS
2492.375000	-51.6	41.3	-10.2	PASS
2492.325000	-51.8	41.5	-10.2	PASS



— Limit — Sum Level × Fail



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

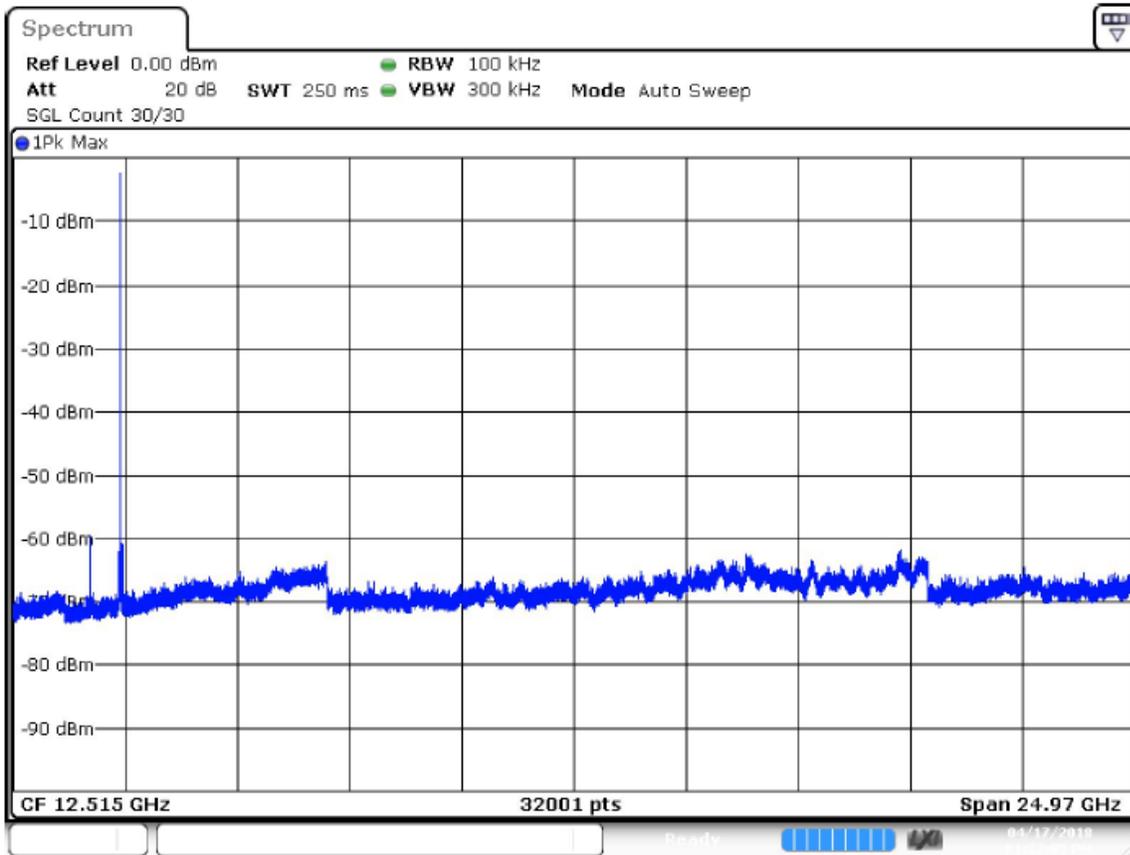
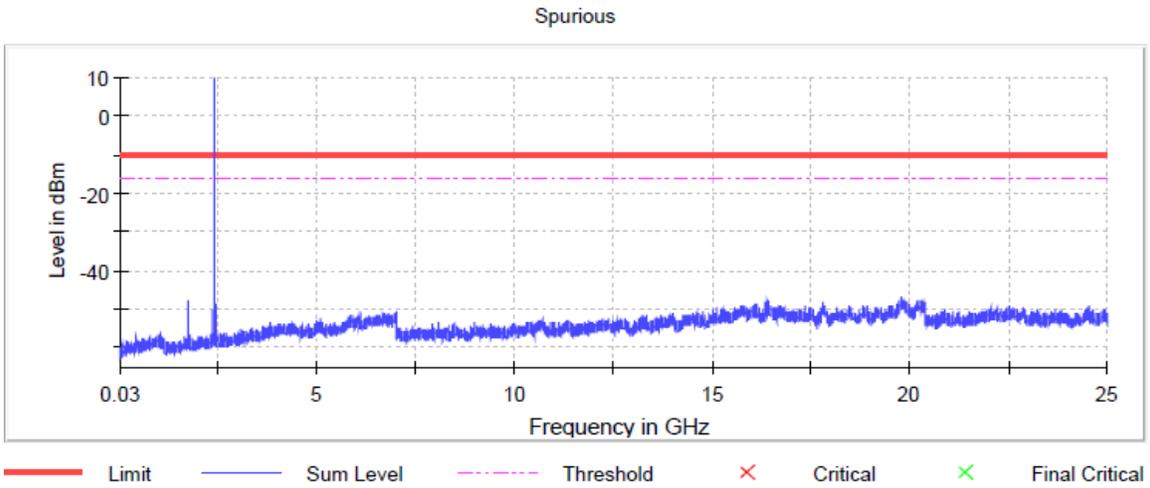
2402 MHz

Plots for packet type DH3 shown below.

Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
19776.361207	-46.6	36.5	-10.1
19760.755445	-46.9	36.8	-10.1
19794.307834	-47.0	36.9	-10.1
19768.558326	-47.2	37.1	-10.1
19774.800631	-47.2	37.1	-10.1
19765.437174	-47.3	37.1	-10.1
19775.580919	-47.3	37.2	-10.1
19777.921784	-47.4	37.2	-10.1
19785.724665	-47.4	37.2	-10.1
19791.186682	-47.5	37.4	-10.1
19769.338614	-47.5	37.4	-10.1
19835.663104	-47.5	37.4	-10.1
20257.798975	-47.6	37.5	-10.1
19778.702072	-47.7	37.5	-10.1
1748.584575	-47.7	37.5	-10.1





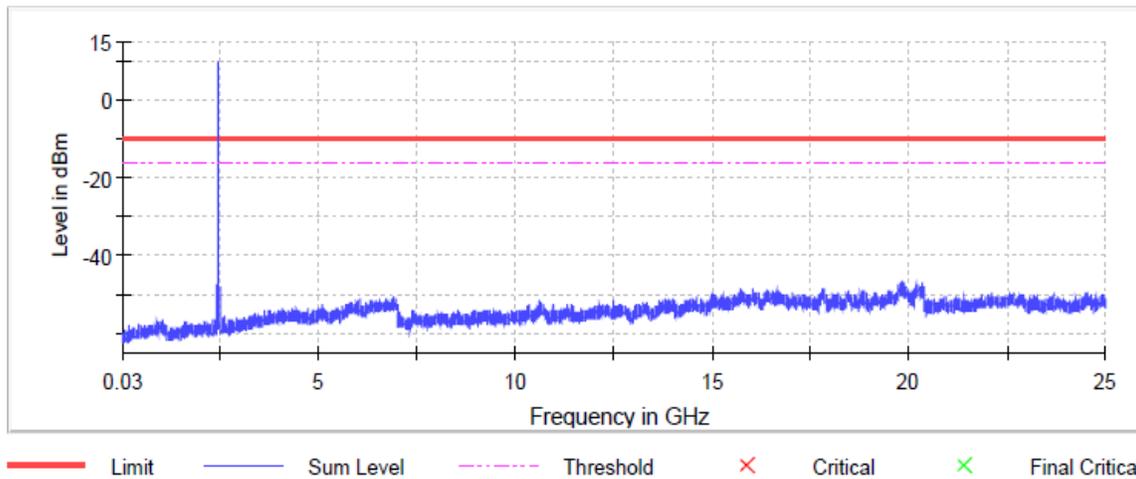
2441 MHz

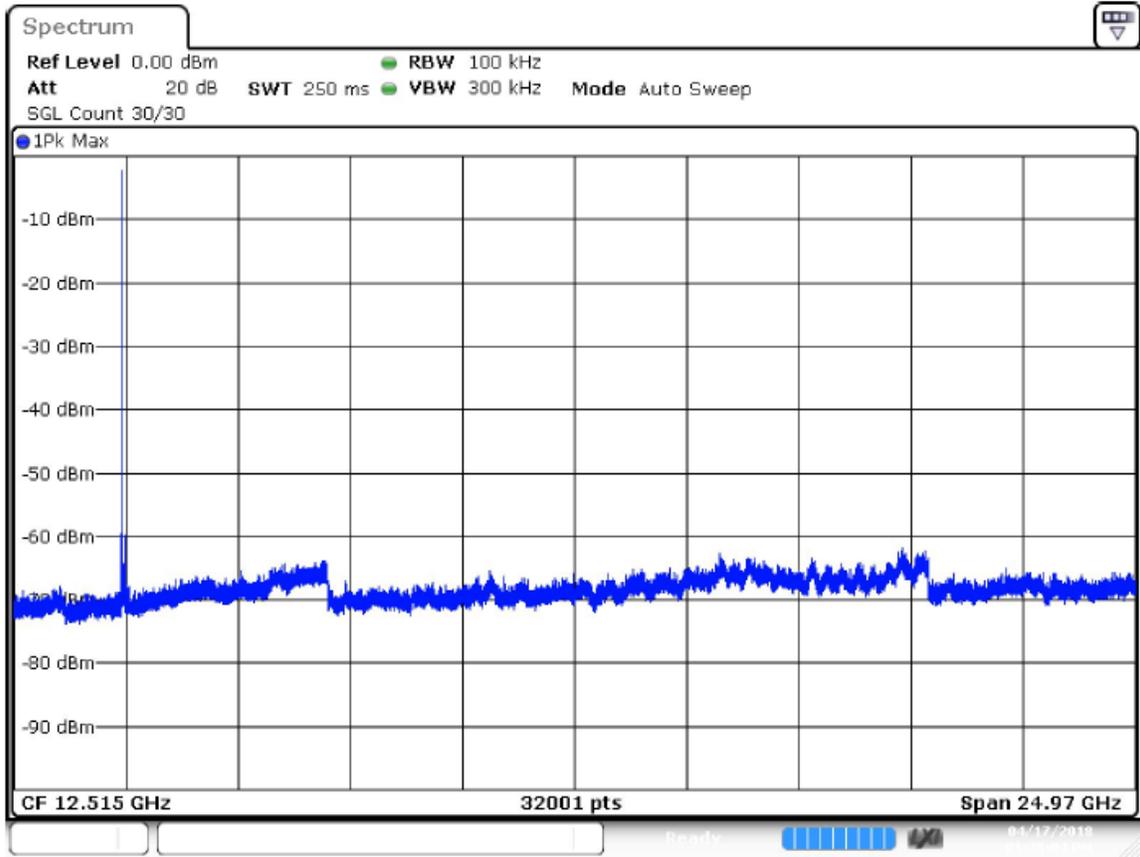
Plots for packet type DH3 shown below.



Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
19821.617918	-46.3	36.3	-9.9
19873.116934	-47.0	37.0	-9.9
19813.815037	-47.0	37.0	-9.9
20337.388363	-47.0	37.0	-9.9
19791.186682	-47.0	37.0	-9.9
19811.474173	-47.1	37.2	-9.9
19790.406394	-47.2	37.2	-9.9
19771.679479	-47.2	37.2	-9.9
20251.556670	-47.4	37.4	-9.9
19841.905409	-47.4	37.4	-9.9
19769.338614	-47.6	37.6	-9.9
19722.521327	-47.6	37.6	-9.9
19728.763632	-47.6	37.6	-9.9
19873.897222	-47.7	37.7	-9.9
19805.231868	-47.7	37.8	-9.9





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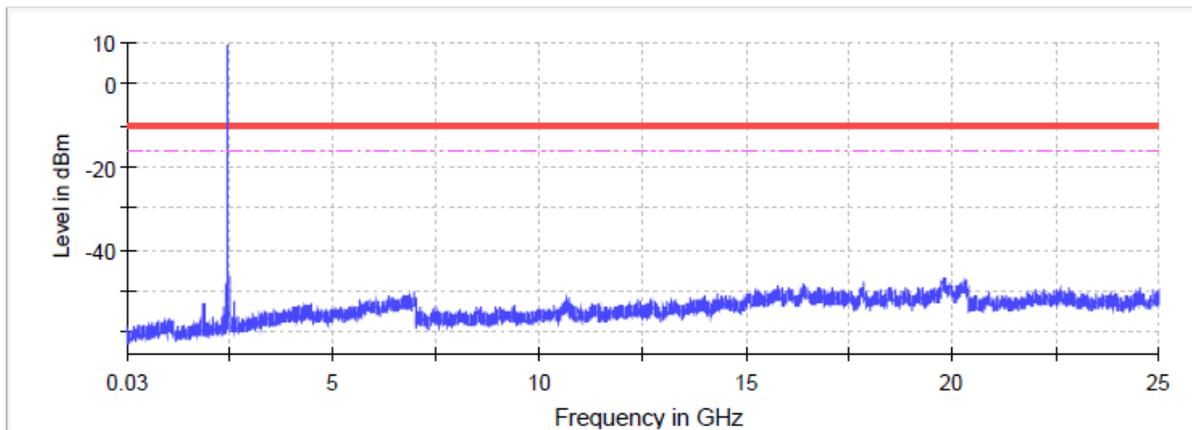


2480 MHz

Plots for packet type DH3 shown below.

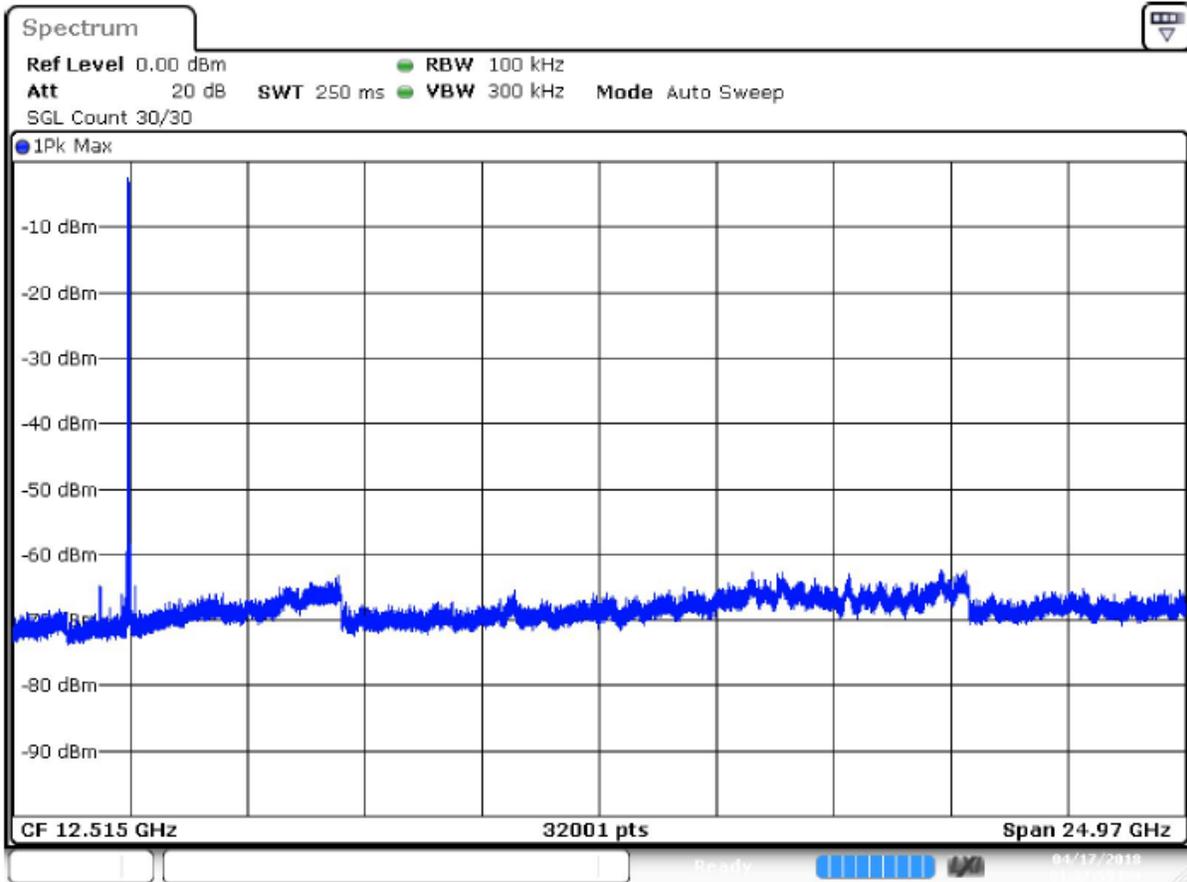
Pre Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)
2520.289522	-46.1	35.9	-10.3
19820.837630	-46.9	36.6	-10.3
19790.406394	-46.9	36.6	-10.3
19820.057342	-47.2	36.9	-10.3
20330.365770	-47.2	37.0	-10.3
19774.800631	-47.4	37.1	-10.3
19770.899191	-47.4	37.2	-10.3
19854.390019	-47.4	37.2	-10.3
19816.155901	-47.4	37.2	-10.3
19794.307834	-47.5	37.2	-10.3
20314.760007	-47.6	37.3	-10.3
19779.482360	-47.6	37.4	-10.3
20267.162432	-47.7	37.4	-10.3
17836.564951	-47.7	37.4	-10.3
19798.209275	-47.7	37.4	-10.3



— Limit
 — Sum Level
 - - - Threshold
 × Critical
 × Final Critical





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