FCC Test Report

Equipment	:	**802.11abgn Wireless USB Module**
Brand Name	:	**SparkLAN**
Model No.	:	**WUBR-507N(M); WUBR-507N(MU)**
FCC ID	:	**RYK-WUBR507N**
Standard	:	**47 CFR FCC Part 15.407**
Operating Band	:	**5725 MHz – 5850 MHz**
FCC Classification	:	**NII**
Applicant **Manufacturer**	:	**SparkLAN Communications, Inc.** 8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493, Taiwan
Function	:	☐ **Outdoor AP** ☐ **Indoor AP** ☐ **Fixed P2P AP** ☒ **Mobile**

The product sample received on Jan. 19, 2016 and completely tested on Jan. 29, 2016. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Kevin Liang / Assistant Manager

Testing Laboratory
1190

Table of Contents

1 GENERAL DESCRIPTION 5

1.1 Information 5
1.2 Support Equipment 8
1.3 Testing Applied Standards 8
1.4 Testing Location Information 8
1.5 Measurement Uncertainty 9

2 TEST CONFIGURATION OF EUT 10

2.1 The Worst Case Modulation Configuration 10
2.2 The Worst Case Power Setting Parameter 10
2.3 The Worst Case Measurement Configuration 11

3 TRANSMITTER TEST RESULT 12

3.1 Emission Bandwidth 12
3.2 RF Output Power 14
3.3 Peak Power Spectral Density 17
3.4 Transmitter Bandedge Emissions 20
3.5 Transmitter Unwanted Emissions 24

4 TEST EQUIPMENT AND CALIBRATION DATA 45

APPENDIX A. TEST PHOTOS

APPENDIX B. PHOTOGRAPHS OF EUT

Summary of Test Result

Conformance Test Specifications			
Report Clause	**Ref. Std. Clause**	**Description**	**Result**
1.1.2	15.203	Antenna Requirement	Complied
3.1	15.407(a)	Emission Bandwidth	Complied
3.2	15.407(a)	RF Output Power (Maximum Conducted Output Power)	Complied
3.3	15.407(a)	Peak Power Spectral Density	Complied
3.4	15.407(b)	Transmitter Bandedge Emissions	Complied
3.5	15.407(b)	Transmitter Unwanted Emissions	Complied

Revision History

Report No.	Version	Description	Issued Date
FR0O1817AN	Rev. 01	Original.	Nov. 10, 2010
FR210523AN	Rev. 01	Reason for change: Additional printed antenna in this report. Therefore, radiation was performed to verify the new components.	Mar. 27, 2012
FR210523-02AN	Rev. 01	1. Update band 4 to 15.407	Feb. 23, 2016

1 General Description

1.1 Information

1.1.1 RF General Information

RF General Information (5725-5850MHz band)					
Frequency Range (MHz)	**IEEE Std. 802.11**	**Ch. Freq. (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**RF Output Power (dBm)**
5725-5850	a	5745-5825	149-165 [5]	1	14.37
5725-5850	n (HT20)	5745-5825	149-165 [5]	2	17.72
5725-5850	n (HT40)	5755-5795	151-159 [2]	2	17.04
Note 1: RF output power specifies that Maximum Conducted Output Power. Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Information

Antenna Category	
☒	Integral antenna (antenna permanently attached)
	☒ Temporary RF connector provided
	☐ No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.
☒	External antenna (dedicated antennas)
	☒ Single power level with corresponding antenna(s).
	☐ Multiple power level and corresponding antenna(s).

Antenna General Information			
Ant. Cat.	Ant. Type	Gain (dBi)	
		2.4GHz	5GHz
External	Dipole	2	2
Remark: 1. This EUT supports 1TX and Port 1 for emission in modulation mode 11a. 2. This EUT supports 2TX in modulation mode 11n.			

1.1.3 Type of EUT

Identify EUT	
EUT Serial Number	N/A
Presentation of Equipment	☒ Production ; ☐ Pre-Production ; ☐ Prototype
Type of EUT	
☒	Stand-alone
☐	Combined (EUT where the radio part is fully integrated within another device) Combined Equipment – Brand Name / Model No.: …
☐	Plug-in radio (EUT intended for a variety of host systems) Host System – Brand Name / Model No.: …
☐	Other:

1.1.4 Test Signal Duty Cycle

Operated Mode for Worst Duty Cycle (5725-5850MHz band)	
☐ Operated normally mode for worst duty cycle	
☒ Operated test mode for worst duty cycle	
Test Signal Duty Cycle (x)	**Power Duty Factor [dB] – (10 log 1/x)**
☒ 100.00% - IEEE 802.11a	0.00
☒ 100.00% - IEEE 802.11n (HT20)	0.00
☒ 100.00% - IEEE 802.11n (HT40)	0.00

1.2 Support Equipment

Support Equipment - RF Conducted				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5540	DoC
2	Adapter for Notebook	DELL	HA65NM130	DoC

Support Equipment - Radiated Emission				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5530	-
2	Adapter for Notebook	DELL	LA65NS2-01	DoC
3	USB Cable	-	-	-

1.3 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- FCC KDB 789033 D02 v01
- FCC KDB 644545 D03 v01
- FCC KDB 662911 D01 v02r01

1.4 Testing Location Information

Testing Location						
☒	HWA YA	ADD :	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.			
		TEL :	886-3-327-3456	FAX :	886-3-327-0973	
Test Site Registration Number: 636805						
Test Condition		**Test Site No.**		**Test Engineer**		**Test Environment**
RF Conducted		TH01-HY		Candy		24°C / 63%
Radiated Emission		03CH09-HY		Joe		21.1°C / 62%

1.5 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty		
Test Item		**Uncertainty**
Emission bandwidth, 26dB bandwidth		±0.5%
RF output power, conducted		±0.1 dB
Power density, conducted		±0.5 dB
Unwanted emissions, conducted	9 – 150 kHz	±0.4 dB
	0.15 – 30 MHz	±0.4 dB
	30 – 1000 MHz	±0.6 dB
	1 – 18 GHz	±0.5 dB
	18 – 40 GHz	±0.5 dB
	40 – 200 GHz	N/A
All emissions, radiated	9 – 150 kHz	±2.5 dB
	0.15 – 30 MHz	±2.3 dB
	30 – 1000 MHz	±2.6 dB
	1 – 18 GHz	±3.6 dB
	18 – 40 GHz	±3.8 dB
	40 – 200 GHz	N/A
Temperature		±0.8 °C
Humidity		±5 %
DC and low frequency voltages		±0.9%
Time		±1.4 %
Duty Cycle		±0.5 %

2 Test Configuration of EUT

2.1 The Worst Case Modulation Configuration

Worst Modulation Used for Conformance Testing			
Modulation Mode	**Transmit Chains (N_{TX})**	**Data Rate / MCS**	**Worst Data Rate / MCS**
11a	1	6-54Mbps	6 Mbps
HT20	2	MCS 8-15	MCS 8
HT40	2	MCS 8-15	MCS 8

2.2 The Worst Case Power Setting Parameter

The Worst Case Power Setting Parameter (5725-5850MHz band)						
Test Software Version	RT3x7xQA					
Modulation Mode	**N_{TX}**	**Test Frequency (MHz)**				
		NCB: 20MHz			**NCB: 40MHz**	
		5745	**5785**	**5825**	**5755**	**5795**
11a	1	0F	0F	0F	-	-
HT20	2	0F/ 0F	0F/ 0F	0F/ 0F	-	-
HT40	2	-	-	-	0F/ 0F	0F/ 0F

2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	RF Output Power, Peak Power Spectral Density, Emission Bandwidth, Peak Excursion, Transmitter Conducted Unwanted Emissions Transmitter Conducted Bandedge Emissions
Test Condition	Conducted measurement at transmit chains
Modulation Mode	11a, HT20, HT40

The Worst Case Mode for Following Conformance Tests			
Tests Item	Transmitter Radiated Unwanted Emissions Transmitter Radiated Bandedge Emissions		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
User Position	☒ EUT will be placed in fixed position.		
	☐ EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes.		
	☐ EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.		
Operating Mode	Operating Mode Description		
Modulation Mode	Transmitter (11a, HT20, HT40)		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
Worst Planes of EUT		V	

3 Transmitter Test Result

3.1 Emission Bandwidth

3.1.1 Emission Bandwidth Limit

Emission Bandwidth Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band, N/A
☐	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
☐	For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
☒	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.

3.1.2 Measuring Instruments

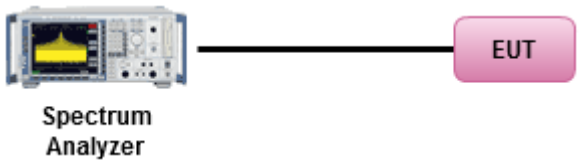
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method			
☒	For the emission bandwidth shall be measured using one of the options below:		
	☒	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.	
	☐	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.	
	☐	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.	
☒	For conducted measurement.		
	☒	The EUT supports single transmit chain and measurements performed on this transmit chain 1.	
	☐	The EUT supports diversity transmitting and the results on transmit chain port 2 is the worst case.	
	☒	The EUT supports multiple transmit chains using options given below:	
		☐	Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 2.
		☒	Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.

3.1.4 Test Setup

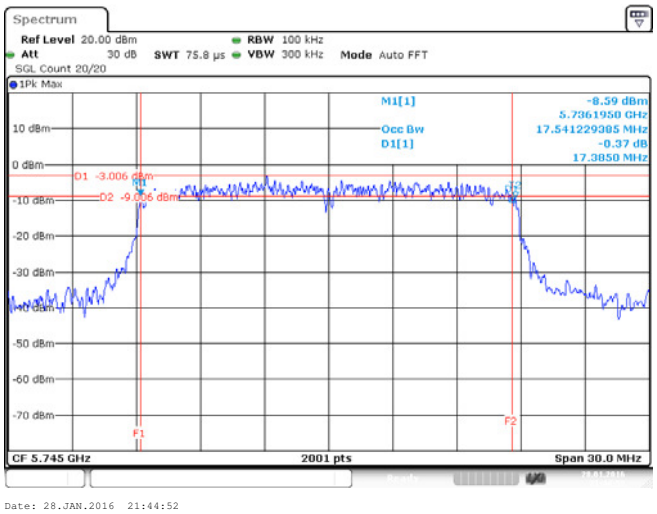
Emission Bandwidth



3.1.5 Test Result of Emission Bandwidth

UNII Emission Bandwidth Result (5725-5850MHz band)						
Condition			Emission Bandwidth (MHz)			
Modulation Mode	N_{TX}	Freq. (MHz)	99% Bandwidth		6dB Bandwidth	
			Chain- Port 1	Chain- Port 2	Chain- Port 1	Chain- Port 2
11a	1	5745	16.38	-	16.47	-
11a	1	5785	16.38	-	16.39	-
11a	1	5825	16.35	-	16.41	-
HT20	2	5745	17.45	17.54	17.41	17.38
HT20	2	5785	17.52	17.55	17.59	17.58
HT20	2	5825	17.52	17.54	17.58	17.59
HT40	2	5755	35.98	35.90	36.32	36.04
HT40	2	5795	35.82	35.86	36.08	36.04
Limit			-		≥ 500 kHz	
Result			Complied			

5725-5850MHz - Worst Emission 6Bandwidth Plots



3.2 RF Output Power

3.2.1 RF Output Power Limit

Maximum Conducted Output Power Limit		
UNII Devices		
☐	For the 5.15-5.25 GHz band:	
	☐	Outdoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6). e.i.r.p. at any elevation angle above 30 degrees ≤ 125mW [21dBm]
	☐	Indoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6)
	☐	Point-to-point AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W If G_{TX} > 23 dBi, then P_{Out} = 30 – (G_{TX} – 23).
	☐	Mobile or Portable Client: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
☐	For the 5.25-5.35 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).	
☐	For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).	
☒	For the 5.725-5.85 GHz band:	
	☒	Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6).
	☐	Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W.
P_{Out} = maximum conducted output power in dBm, **G_{TX}** = the maximum transmitting antenna directional gain in dBi.		

3.2.2 Measuring Instruments

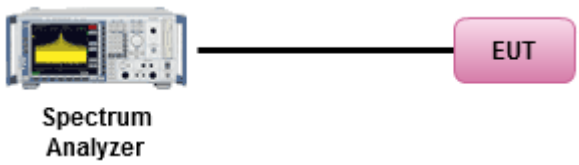
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
☒	Maximum Conducted Output Power
	[duty cycle ≥ 98% or external video / power trigger]
	☒ Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).
	☐ Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)
	duty cycle < 98% and average over on/off periods with duty factor
	☐ Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
	☐ Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
	Wideband RF power meter and average over on/off periods with duty factor
	☐ Refer as FCC KDB 789033, clause E Method PM (using an RF average power meter).
☒	For conducted measurement.
	☒ The EUT supports single transmit chain and measurements performed on transmit chain port 1.
	☐ The EUT supports diversity transmitting and the results on transmit chain port 2 is the worst case.
	☒ The EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
	☒ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.2.4 Test Setup

RF Output Power (Spectrum Analyzer)



3.2.5 Test Result of Maximum Conducted Output Power

Maximum Conducted Output Power (5725-5850MHz band)						
Modulation Mode	N_{TX}	Freq. (MHz)	Output Power (dBm)			Power Limit
			Chain Port 1	Chain Port 2	Sum Chain	
11a	1	5745	14.37	-	14.37	30.00
11a	1	5785	14.36	-	14.36	30.00
11a	1	5825	13.83	-	13.83	30.00
HT20	2	5745	13.13	14.22	16.72	30.00
HT20	2	5785	14.15	14.98	17.60	30.00
HT20	2	5825	14.38	15.01	17.72	30.00
HT40	2	5755	13.48	14.52	17.04	30.00
HT40	2	5795	12.30	13.19	15.78	30.00
Result			Complied			

3.3 Peak Power Spectral Density

3.3.1 Peak Power Spectral Density Limit

Peak Power Spectral Density Limit		
UNII Devices		
☐	For the 5.15-5.25 GHz band:	
	☐	Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 – (G_{TX} – 6).
	☐	Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 – (G_{TX} – 6).
	☐	Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 23 dBi, then P_{Out} = 17 – (G_{TX} – 23).
	☐	Mobile or Portable Client: the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6)..
☐	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6).	
☐	For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6).	
☒	For the 5.725-5.85 GHz band:	
	☒	Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If G_{TX} > 6 dBi, then PPSD= 30 – (G_{TX} – 6).
	☐	Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
PPSD = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz **G_{TX}** = the maximum transmitting antenna directional gain in dBi.		

3.3.2 Measuring Instruments

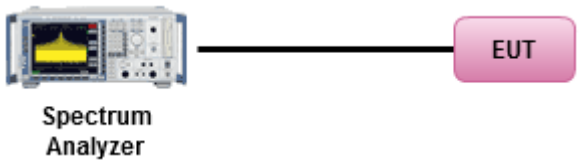
Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method			
☒	Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:		
	☒	Refer as FCC KDB 789033, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth	
	[duty cycle ≥ 98% or external video / power trigger]		
	☒	Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).	
	☐	Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)	
	duty cycle < 98% and average over on/off periods with duty factor		
	☐	Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).	
	☐	Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)	
☒	For conducted measurement.		
	☒	The EUT supports single transmit chain and measurements performed on this transmit chain port 1.	
	☐	The EUT supports diversity transmitting and the results on transmit chain port 2 is the worst case.	
	☒	The EUT supports multiple transmit chains using options given below:	
		☐	Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
		☒	Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
	☐	If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + \ldots + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$	
	☐	Each individually PPSD plots refer as test report clause 3.3.5 with each individually PPSD plots.	

3.3.4 Test Setup

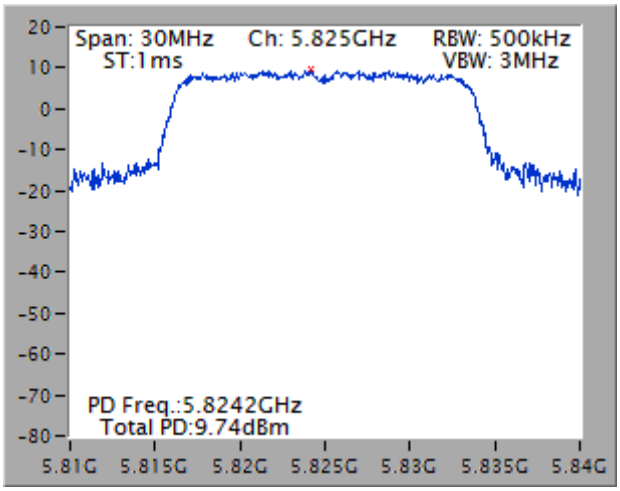
Power Spectral Density



3.3.5 Test Result of Peak Power Spectral Density

Peak Power Spectral Density Result (5725-5850MHz band)				
Modulation Mode	**N_{TX}**	**Freq. (MHz)**	**Peak Power Spectral Density (dBm/500kHz)**	**PSD Limit**
11a	1	5745	7.31	30.00
11a	1	5785	6.97	30.00
11a	1	5825	6.86	30.00
HT20	2	5745	9.33	29.66
HT20	2	5785	9.48	29.66
HT20	2	5825	9.74	29.66
HT40	2	5755	5.73	29.66
HT40	2	5795	4.45	29.66
Result			**Complied**	

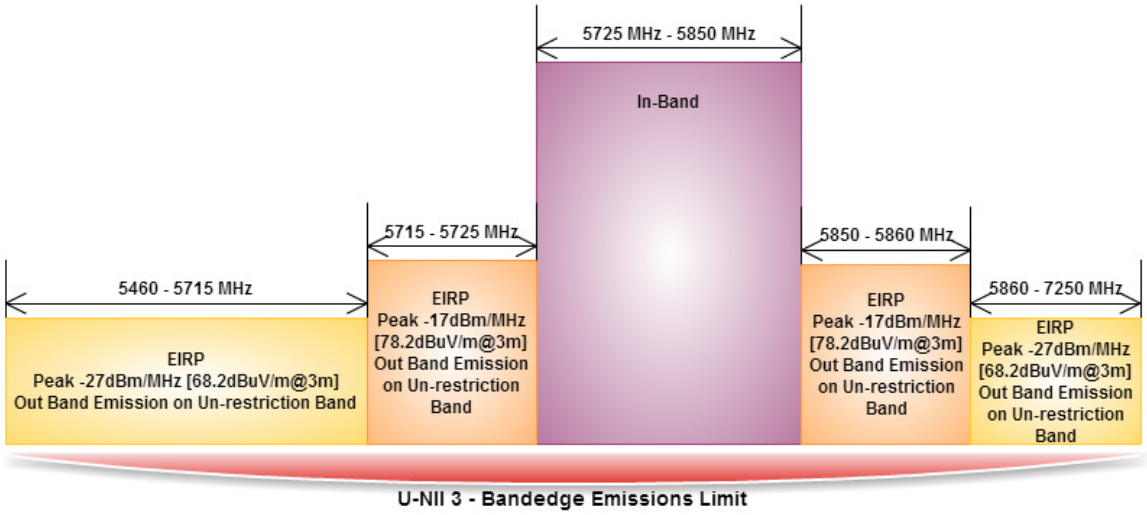
5725-5850MHz - Worst Power Spectral Density Plots



3.4 Transmitter Bandedge Emissions

3.4.1 Transmitter Radiated Bandedge Emissions Limit

Transmitter Radiated Bandedge Emissions Limit for 5.8GHz band: 5.725-5.85 GHz band



Refer as FCC KDB 789033, G)2)c)(i) specifying that if a non-restricted-band out-of-band emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm or -17 dBm peak emission limit. Reason for change: to ensure that emission requirements in the non-restricted bands are not more stringent than those in the restricted bands.

3.4.2 Measuring Instruments

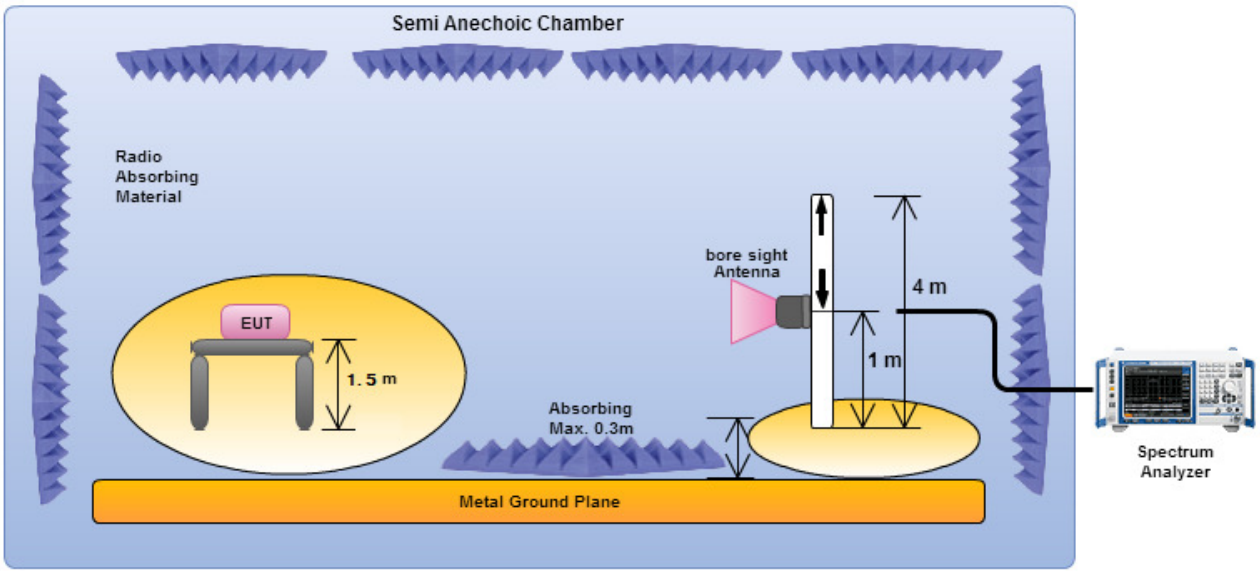
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method			
☒	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
☒	Refer as ANSI C63.10, clause 6.10 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.		
☐	If EUT operate in adjacent contiguous bands, bandedge testing performed at the lowest frequency channel at lower-band and highest frequency channel at higher-band. Transmitter in-band emissions will consist of adjacent contiguous bands (e.g., IEEE 802.11ac VHT160 The lowest frequency channel at lower-band and highest frequency channel at higher-band in-band emissions will consist of two adjacent contiguous bands.)		
	☐	Operating in 5.15-5.25 GHz band (lower-band) and 5.25-5.35 GHz band (higher-band).	
	☐	Operating in 5.47-5.725 GHz band (lower-band) and 5.725-5.85 GHz band (higher-band).	
☐	If EUT operate in individual non-contiguous bands, bandedge testing performed at the lowest frequency channel and highest frequency channel within lower-band and higher-band. (e.g., (e.g., IEEE 802.11ac VHT160)		
	☐	Operating in 5.25-5.35 GHz band (lower-band) and 5.47-5.725 GHz band (higher-band).	
	☐	Operating in 5.15-5.25 GHz band (lower-band) and 5.725-5.85 GHz band (higher-band).	
☒	For the transmitter unwanted emissions shall be measured using following options below:		
	☒	Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.	
	☒	Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.	
		☐	Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
		☐	Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
		☒	Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐	Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
		☒	Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit.
		☐	Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
☒	For the transmitter bandedge emissions shall be measured using following options below:		
	☐	Refer as FCC KDB 789033, clause G)3)d) for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).	
	☒	Refer as ANSI C63.10, clause 6.10 for band-edge testing.	
	☐	Refer as ANSI C63.10, clause 6.10.6.2 for marker-delta method for band-edge measurements.	
☒	For radiated measurement, refer as ANSI C63.10, clause 6.6. Test distance is 3m.		
☒	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements). Measurements in the bandedge are typically made at a closer distance 3m, because the instrumentation noise floor is typically close to the radiated emission limit.		

3.4.4 Test Setup

Transmitter Radiated Bandedge Emissions



Electric field tests shall be performed in transmitter bandedge emissions using a calibrated horn antenna.

3.4.5 Transmitter Radiated Bandedge Emissions (with Antenna)

U-NII 5725-5850MHz Transmitter Radiated Bandedge (with Antenna)							
Modulation Mode	N_{TX}	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Pol.
11a	1	5745	3	5715.00	60.19	68.20	H
11a	1	5825	3	5860.99	60.79	68.20	H
HT20	2	5745	3	5707.54	60.86	68.20	H
HT20	2	5825	3	5862.67	61.76	68.20	H
HT40	2	5755	3	5711.62	67.19	68.20	H
HT40	2	5795	3	5874.10	61.29	68.20	H
Note 1: Measurement worst emissions of receive antenna polarization.							

3.5 Transmitter Unwanted Emissions

3.5.1 Transmitter Radiated Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Un-restricted band emissions above 1GHz Limit	
Operating Band	**Limit**
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.85 GHz	5.715 5.725 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] 5.85 5.86 GHz: e.i.r.p. -17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p. -27 dBm [68.2 dBuV/m@3m]

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

3.5.2 Measuring Instruments

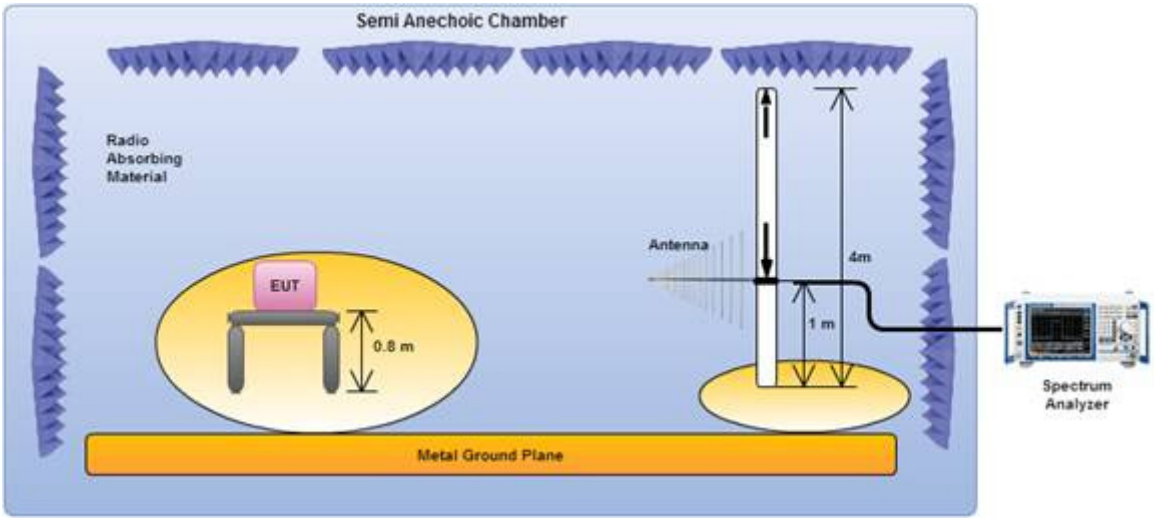
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method			
☒	Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).		
☒	The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
☒	For the transmitter unwanted emissions shall be measured using following options below:		
	☒	Refer as FCC KDB 789033, clause G)2) for unwanted emissions into non-restricted bands.	
	☒	Refer as FCC KDB 789033, clause G)1) for unwanted emissions into restricted bands.	
		☐	Refer as FCC KDB 789033, G)6) Method AD (Trace Averaging).
		☐	Refer as FCC KDB 789033, G)6) Method VB (Reduced VBW).
		☒	Refer as ANSI C63.10, clause 4.1.4.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐	Refer as ANSI C63.10, clause 4.1.4.2.4 average value of pulsed emissions.
		☒	Refer as FCC KDB 789033, clause G)5) measurement procedure peak limit.
		☐	Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
☒	For radiated measurement.		
	☒	Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.	
	☒	Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.	
	☒	Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz. For 1 GHz to 5 GHz, test distance is 3m; For 5 GHz to 40 GHz, test distance is 3m.	
☒	The any unwanted emissions level shall not exceed the fundamental emission level.		
☒	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.		

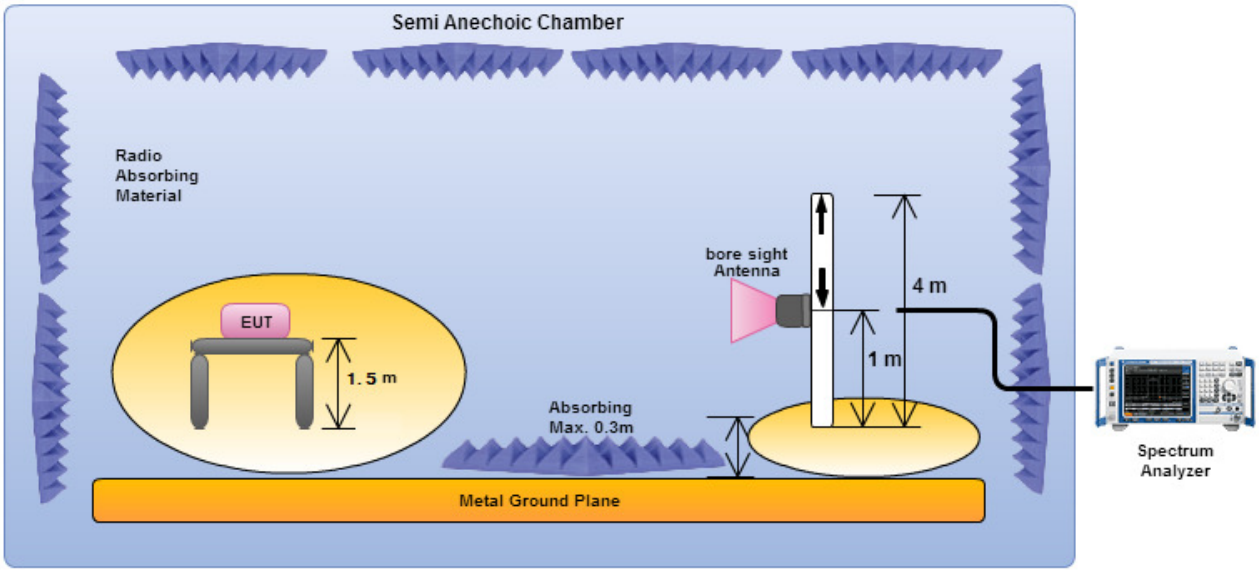
3.5.4 Test Setup

Transmitter Radiated Unwanted Emissions Below 1GHz



Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna. Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna.

Transmitter Radiated Unwanted Emissions Above 1GHz



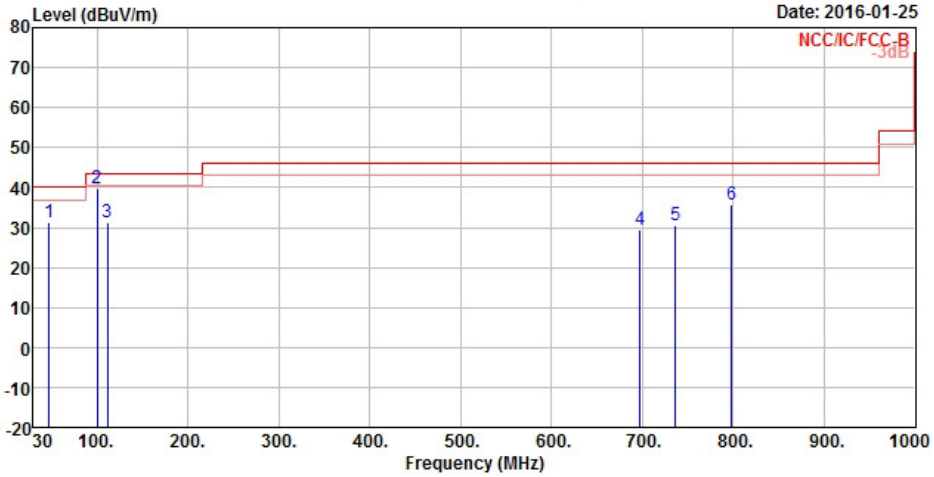
Electric field tests shall be performed in the frequency range of 1 GHz to 10th harmonic of highest fundamental frequency or 40 GHz using a calibrated horn antenna.

3.5.5 Transmitter Radiated Unwanted Emissions-with Antenna (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

3.5.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

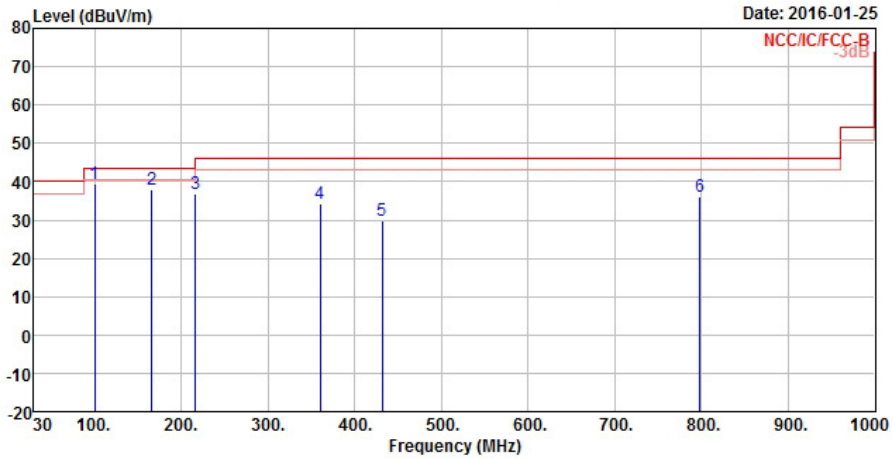
Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Function	Transmitter	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	47.46	31.43	-8.57	40.00	58.10	10.10	0.40	37.17	Peak
2	99.84	39.69	-3.81	43.50	65.48	10.40	0.56	36.75	Peak
3	111.48	31.35	-12.15	43.50	56.09	11.39	0.58	36.71	Peak
4	697.36	29.62	-16.38	46.00	44.70	20.67	1.54	37.29	Peak
5	736.16	30.60	-15.40	46.00	44.93	21.43	1.59	37.35	Peak
6	798.24	35.58	-10.42	46.00	49.29	22.08	1.67	37.46	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Below 1GHz)			
Operating Function	Transmitter	**Polarization**	H

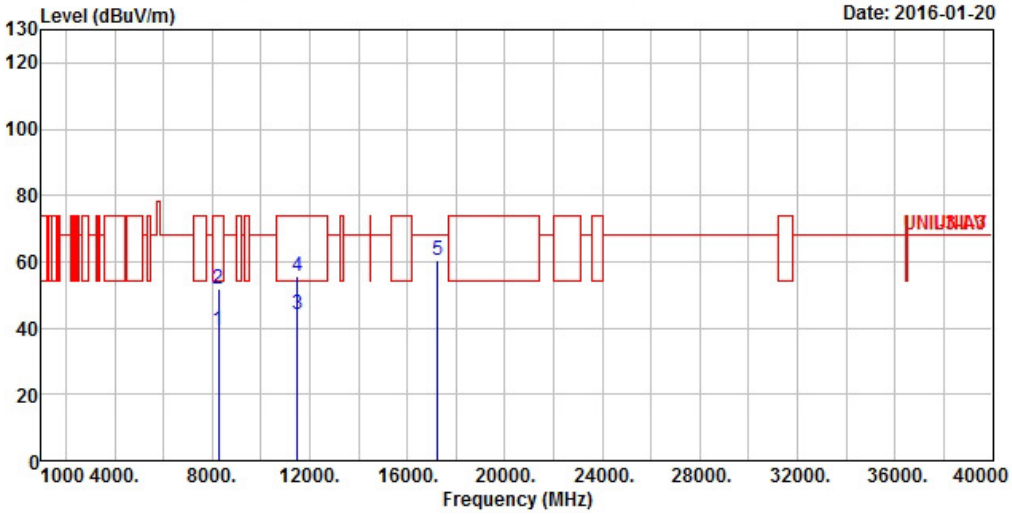


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	99.84	39.42	-4.08	43.50	65.21	10.40	0.56	36.75	Peak
2	165.80	38.08	-5.42	43.50	63.50	10.36	0.72	36.50	Peak
3	216.24	36.88	-9.12	46.00	62.20	10.24	0.82	36.38	Peak
4	359.80	34.14	-11.86	46.00	54.14	15.44	1.06	36.50	Peak
5	431.58	29.84	-16.16	46.00	48.39	16.97	1.17	36.69	Peak
6	798.24	36.09	-9.91	46.00	49.80	22.08	1.67	37.46	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical).
Note 4: No level of unwanted emissions exceeds the level of the fundamental emission.

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5725-5850MHz

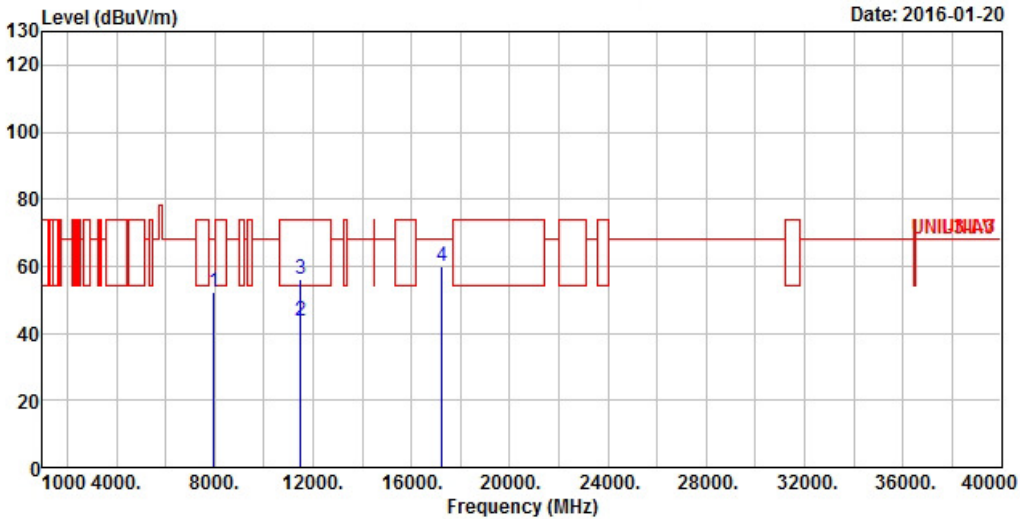
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11a	**Test Freq. (MHz)**	5745
N_{TX}	1	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8263.00	39.26	-14.74	54.00	30.40	36.86	8.14	36.14	Average
2	8263.00	51.59	-22.41	74.00	42.73	36.86	8.14	36.14	Peak
3	11490.00	44.23	-9.77	54.00	32.01	38.38	9.74	35.90	Average
4	11490.00	55.86	-18.14	74.00	43.64	38.38	9.74	35.90	Peak
5	17235.00	60.37	-7.83	68.20	42.62	41.10	11.93	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

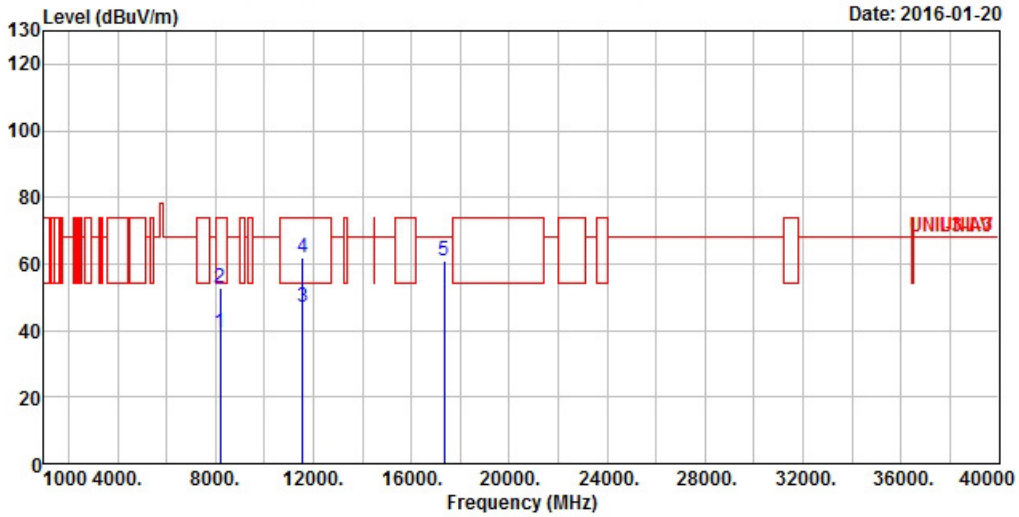
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11a	**Test Freq. (MHz)**	5745
N_{TX}	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7985.00	52.20	-16.00	68.20	43.62	36.72	7.98	36.12	Peak
2	11490.00	43.73	-10.27	54.00	31.51	38.38	9.74	35.90	Average
3	11490.00	56.06	-17.94	74.00	43.84	38.38	9.74	35.90	Peak
4	17235.00	59.78	-8.42	68.20	42.03	41.10	11.93	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

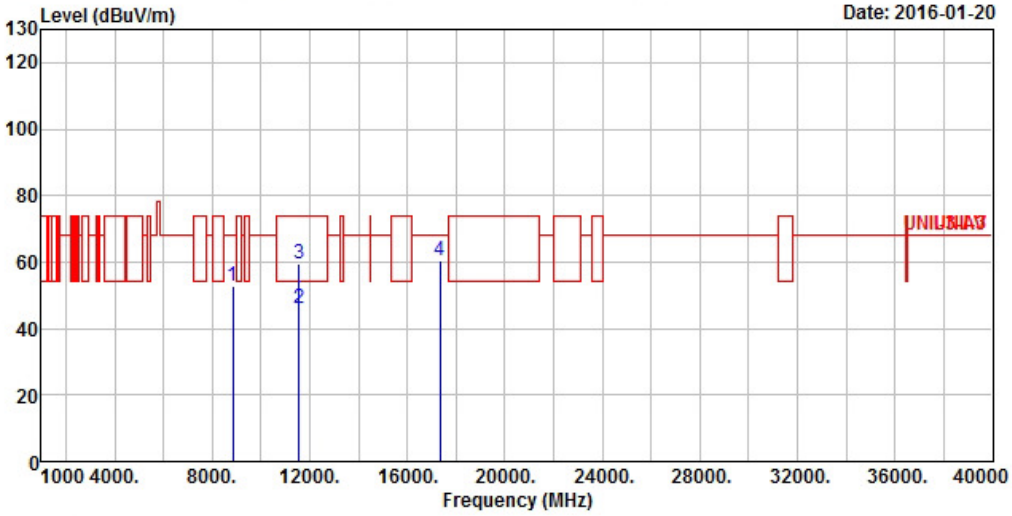
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11a	**Test Freq. (MHz)**	5785
N_{TX}	1	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8196.00	39.43	-14.57	54.00	30.64	36.81	8.11	36.13	Average
2	8196.00	52.65	-21.35	74.00	43.86	36.81	8.11	36.13	Peak
3	11570.00	46.91	-7.09	54.00	34.52	38.52	9.79	35.92	Average
4	11570.00	61.80	-12.20	74.00	49.41	38.52	9.79	35.92	Peak
5	17355.00	61.07	-7.13	68.20	42.98	41.45	11.92	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

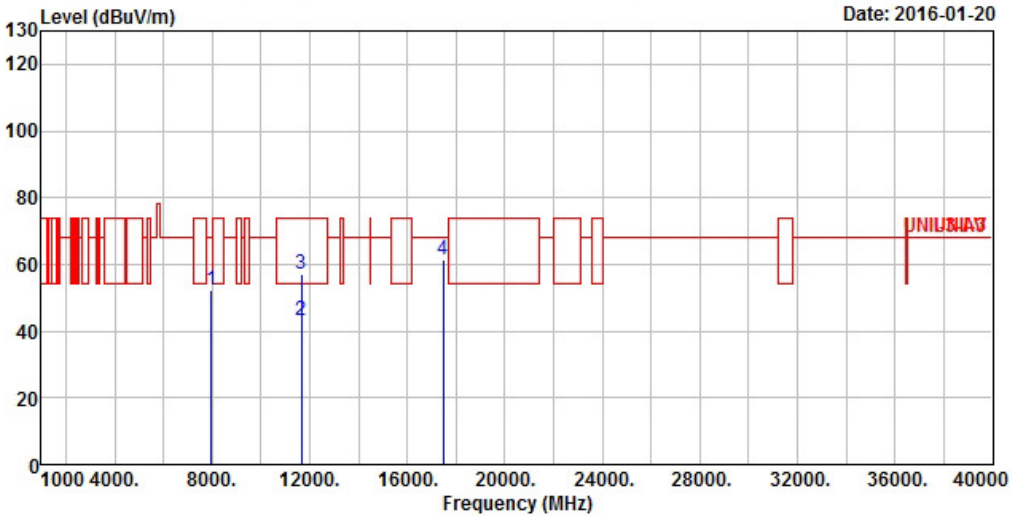
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11a	**Test Freq. (MHz)**	5785
N_{TX}	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8862.00	52.81	-15.39	68.20	43.62	37.07	8.30	36.18	Peak
2	11570.00	46.24	-7.76	54.00	33.85	38.52	9.79	35.92	Average
3	11570.00	59.35	-14.65	74.00	46.96	38.52	9.79	35.92	Peak
4	17355.00	60.49	-7.71	68.20	42.40	41.45	11.92	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

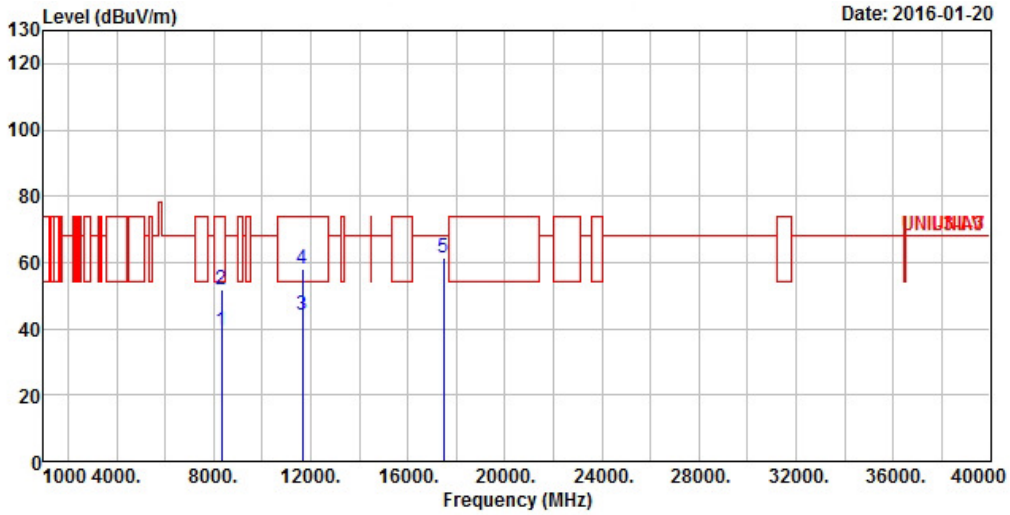
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11a	**Test Freq. (MHz)**	5825
N_{TX}	1	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7985.00	52.43	-15.77	68.20	43.85	36.72	7.98	36.12	Peak
2	11650.00	42.96	-11.04	54.00	30.41	38.65	9.84	35.94	Average
3	11650.00	57.07	-16.93	74.00	44.52	38.65	9.84	35.94	Peak
4	17475.00	61.46	-6.74	68.20	43.05	41.80	11.90	35.29	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

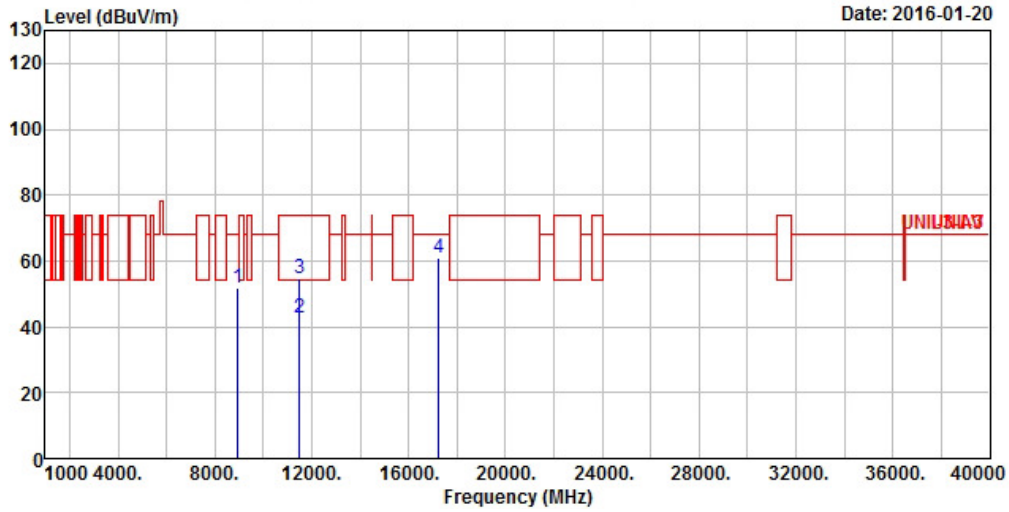
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	11a	**Test Freq. (MHz)**	5825
N_{TX}	1	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8341.00	39.56	-14.44	54.00	30.61	36.91	8.18	36.14	Average
2	8341.00	51.90	-22.10	74.00	42.95	36.91	8.18	36.14	Peak
3	11650.00	44.07	-9.93	54.00	31.52	38.65	9.84	35.94	Average
4	11650.00	57.97	-16.03	74.00	45.42	38.65	9.84	35.94	Peak
5	17475.00	61.43	-6.77	68.20	43.02	41.80	11.90	35.29	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

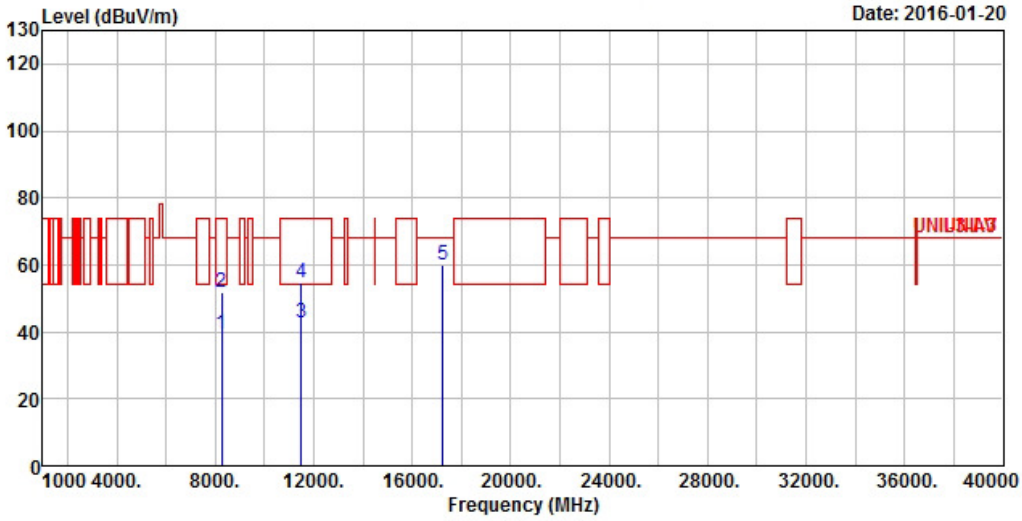
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT20	**Test Freq. (MHz)**	5745
N_{TX}	2	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8942.00	51.83	-16.37	68.20	42.61	37.09	8.31	36.18	Peak
2	11490.00	42.83	-11.17	54.00	30.61	38.38	9.74	35.90	Average
3	11490.00	54.77	-19.23	74.00	42.55	38.38	9.74	35.90	Peak
4	17235.00	61.07	-7.13	68.20	43.32	41.10	11.93	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

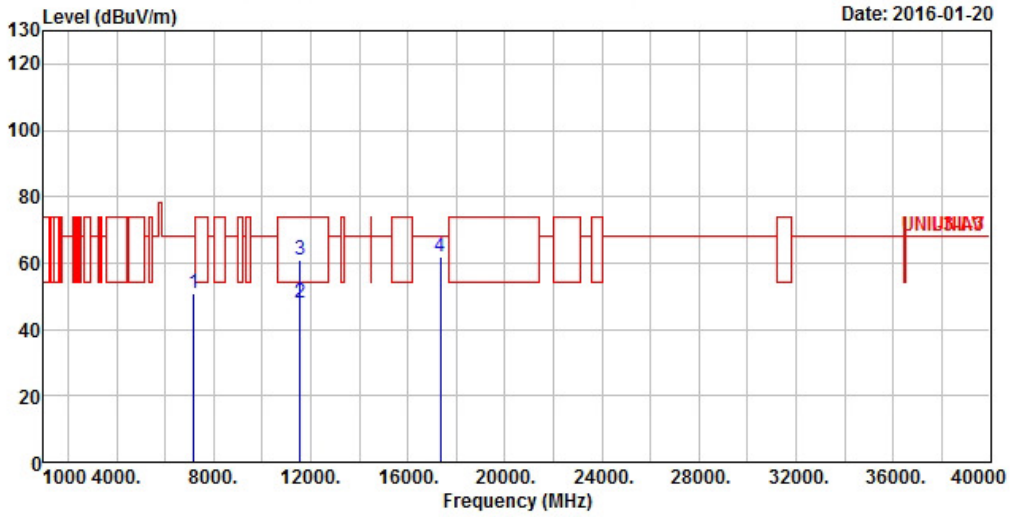
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT20	**Test Freq. (MHz)**	5745
N_{TX}	2	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8263.00	39.37	-14.63	54.00	30.51	36.86	8.14	36.14	Average
2	8263.00	51.86	-22.14	74.00	43.00	36.86	8.14	36.14	Peak
3	11490.00	42.73	-11.27	54.00	30.51	38.38	9.74	35.90	Average
4	11490.00	54.45	-19.55	74.00	42.23	38.38	9.74	35.90	Peak
5	17235.00	60.07	-8.13	68.20	42.32	41.10	11.93	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

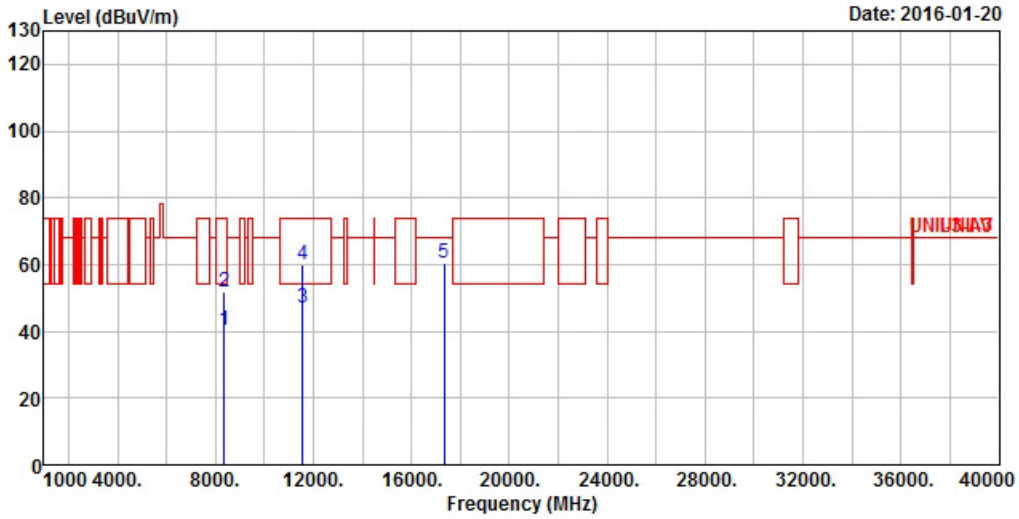
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT20	**Test Freq. (MHz)**	5785
N_{TX}	2	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7201.00	50.97	-17.23	68.20	43.01	36.38	7.56	35.98	Peak
2	11570.00	47.81	-6.19	54.00	35.42	38.52	9.79	35.92	Average
3	11570.00	61.01	-12.99	74.00	48.62	38.52	9.79	35.92	Peak
4	17355.00	61.73	-6.47	68.20	43.64	41.45	11.92	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

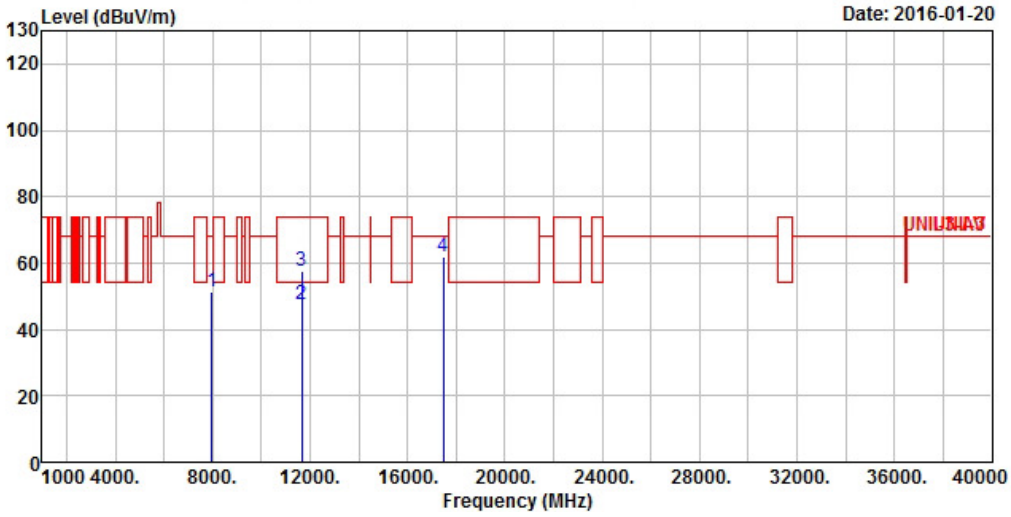
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT20	**Test Freq. (MHz)**	5785
N_{TX}	2	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8362.00	40.50	-13.50	54.00	31.53	36.92	8.20	36.15	Average
2	8362.00	51.59	-22.41	74.00	42.62	36.92	8.20	36.15	Peak
3	11570.00	47.01	-6.99	54.00	34.62	38.52	9.79	35.92	Average
4	11570.00	60.02	-13.98	74.00	47.63	38.52	9.79	35.92	Peak
5	17355.00	60.21	-7.99	68.20	42.12	41.45	11.92	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

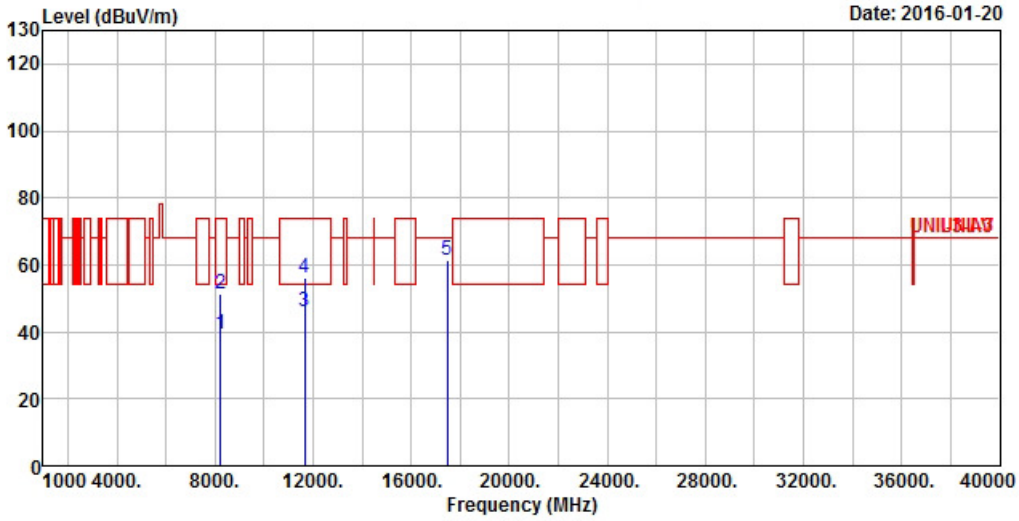
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT20	**Test Freq. (MHz)**	5825
N_{TX}	2	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7962.00	51.23	-16.97	68.20	42.63	36.73	7.98	36.11	Peak
2	11650.00	47.40	-6.60	54.00	34.85	38.65	9.84	35.94	Average
3	11650.00	57.58	-16.42	74.00	45.03	38.65	9.84	35.94	Peak
4	17475.00	62.03	-6.17	68.20	43.62	41.80	11.90	35.29	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

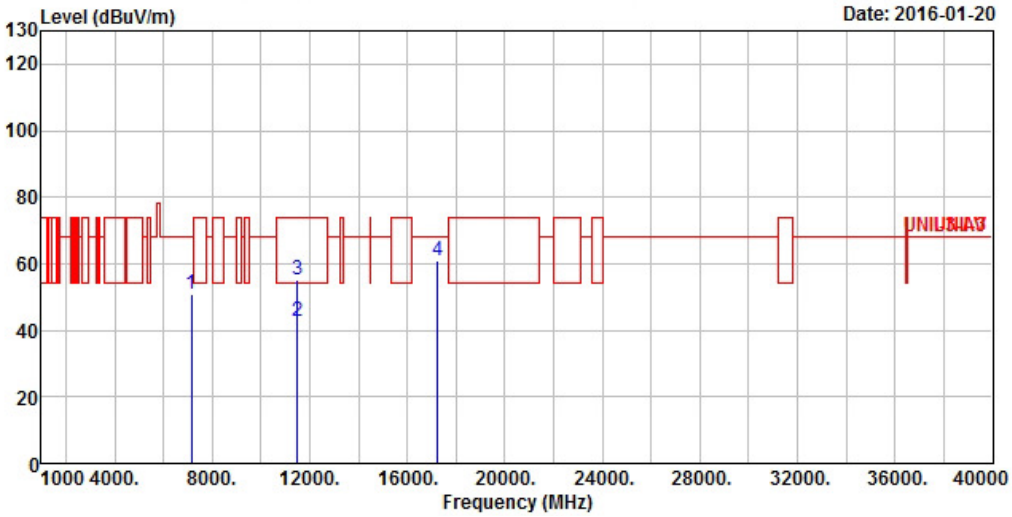
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT20	**Test Freq. (MHz)**	5825
N_{TX}	2	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8245.00	39.46	-14.54	54.00	30.62	36.84	8.14	36.14	Average
2	8245.00	51.45	-22.55	74.00	42.61	36.84	8.14	36.14	Peak
3	11650.00	46.17	-7.83	54.00	33.62	38.65	9.84	35.94	Average
4	11650.00	55.97	-18.03	74.00	43.42	38.65	9.84	35.94	Peak
5	17475.00	61.37	-6.83	68.20	42.96	41.80	11.90	35.29	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

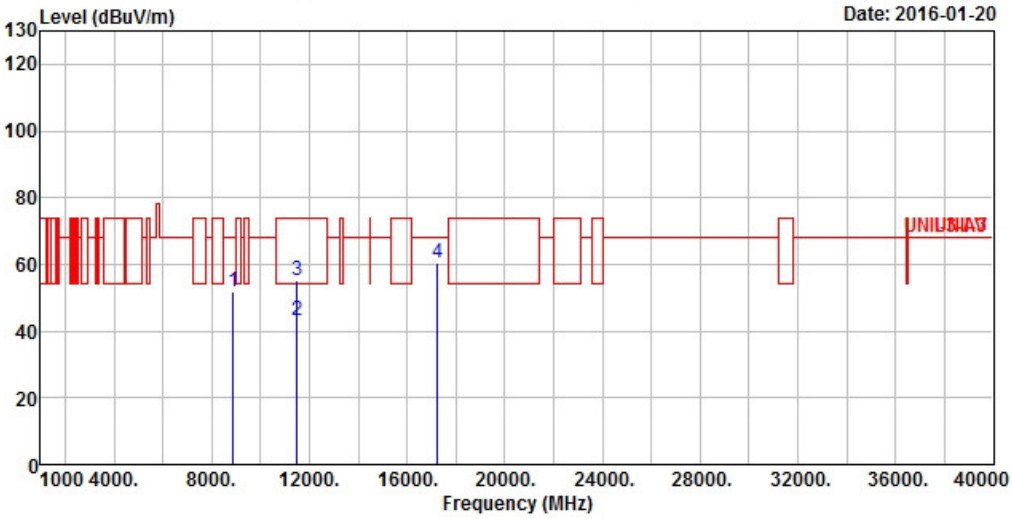
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT40	**Test Freq. (MHz)**	5755
N_{TX}	2	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7163.00	50.87	-17.33	68.20	43.02	36.28	7.55	35.98	Peak
2	11510.00	42.75	-11.25	54.00	30.52	38.40	9.74	35.91	Average
3	11510.00	55.25	-18.75	74.00	43.02	38.40	9.74	35.91	Peak
4	17265.00	60.83	-7.37	68.20	42.99	41.20	11.92	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

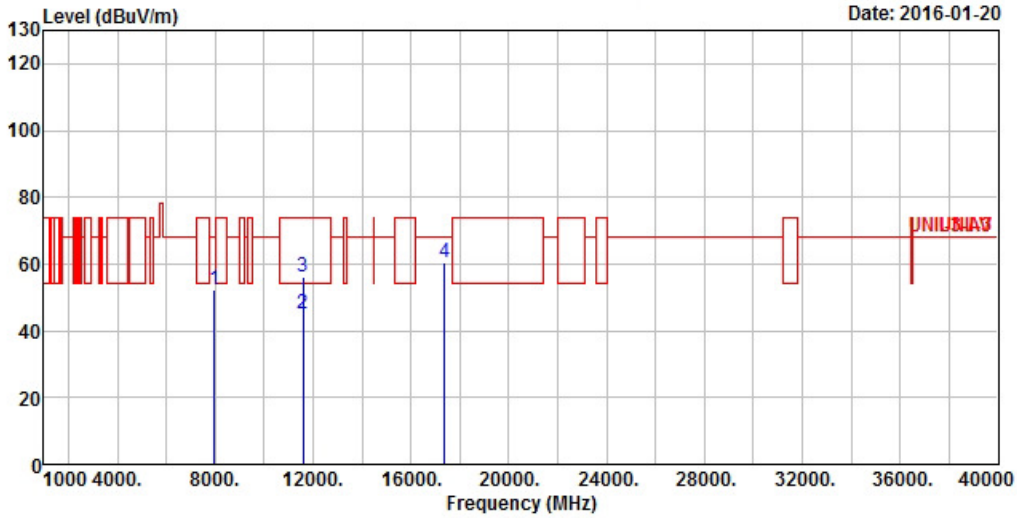
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT40	**Test Freq. (MHz)**	5755
N_{TX}	2	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8896.00	52.04	-16.16	68.20	42.84	37.08	8.30	36.18	Peak
2	11510.00	43.25	-10.75	54.00	31.02	38.40	9.74	35.91	Average
3	11510.00	55.25	-18.75	74.00	43.02	38.40	9.74	35.91	Peak
4	17265.00	60.47	-7.73	68.20	42.63	41.20	11.92	35.28	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

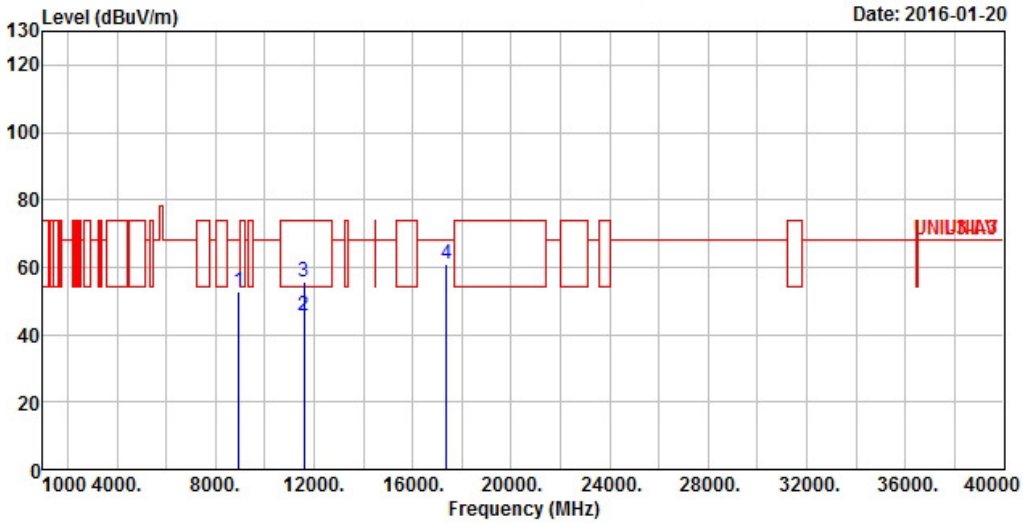
Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT40	**Test Freq. (MHz)**	5795
N_{TX}	2	**Polarization**	V



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7982.00	52.20	-16.00	68.20	43.62	36.72	7.98	36.12	Peak
2	11590.00	44.97	-9.03	54.00	32.51	38.56	9.82	35.92	Average
3	11590.00	56.07	-17.93	74.00	43.61	38.56	9.82	35.92	Peak
4	17385.00	60.35	-7.85	68.20	42.18	41.55	11.91	35.29	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

Transmitter Radiated Unwanted Emissions (Above 1GHz)			
Modulation Mode	HT40	**Test Freq. (MHz)**	5795
N_{TX}	2	**Polarization**	H



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8942.00	52.83	-15.37	68.20	43.61	37.09	8.31	36.18	Peak
2	11590.00	45.47	-8.53	54.00	33.01	38.56	9.82	35.92	Average
3	11590.00	55.86	-18.14	74.00	43.40	38.56	9.82	35.92	Peak
4	17385.00	60.79	-7.41	68.20	42.62	41.55	11.91	35.29	Peak

Note 1: “>20dB” means spurious emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found spurious emissions (No spurious emissions were detected.)
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)
Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
Note 5: For un-restricted bands emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm peak emission limit of 15.407.
Note 6: No level of unwanted emissions exceeds the level of the fundamental emission.

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSV 40	101500	9kHz ~ 40GHz	May 06, 2015	RF Conducted
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Jul. 28, 2015	RF Conducted

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz ~ 1GHz 3m	Jul. 01, 2015	Radiation
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz ~ 18GHz 3m	Jul. 01, 2015	Radiation
Amplifier(Mode 2)	EMC	EMC9135	980209	9kHz ~ 1.0GHz	Dec. 25, 2015	Radiation
Amplifier(Mode 1)	EMC	EMC9135	980232	9kHz ~ 1.0GHz	Jan. 27, 2015	Radiation
Amplifier	Agilent	8449B	3008A02096	1GHz ~ 26.5GHz	Apr. 09, 2015	Radiation
Spectrum	KEYSIGHT	N9010A	MY54200885	10Hz ~ 44GHz	Jul. 15, 2015	Radiation
Bilog Antenna	TESEQ	CBL 6112D	35418	30MHz ~ 1GHz	Mar. 30, 2015	Radiation
Horn Antenna	AARONIA AG	POWERLOG 70180	05192	1GHz ~ 18GHz	Jan. 08, 2016	Radiation
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170614	18GHz ~ 40GHz	Jan. 04, 2016	Radiation
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	Jul. 23, 2015	Radiation
RF Cable-high	Jye Bao	RG142	03CH09-HY	1GHz ~ 40GHz	Jul. 23, 2015	Radiation
Antenna Mast	Chain Tek	MBS-400	1308049	1 ~ 4 m	N/A	Radiation

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	JS44-18004000-33-8P	1840917	18GHz ~ 40GHz	Jun. 02, 2015	Radiation
Loop Antenna	ROHDE&SCHWARZ	HFH2-Z2	100330	9kHz~30MHz	Nov. 10, 2014	Radiation

Note: Calibration Interval of instruments listed above is two years.