



243 Jubug-Ri, Yangji-Myeon, Yongin-Si, Gyeonggi-Do, Korea 17159
 Tel: +82-31-323-6008 Fax: +82-31-323-6010
<http://www.ltalab.com>

Dates of Tests: April 24 ~ May 28, 2019
 Test Report S/N: LR5001119050
 Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID.

2AKDGDM-01

APPLICANT

dot incorporation

Equipment Class	:	Digital Transmission System (DTS)
Manufacturing Description	:	Braille device
Manufacturer	:	dot incorporation
Model name	:	DM-01
Test Device Serial No.:	:	Identical prototype
Rule Part(s)	:	FCC Part 15.247 Subpart C ; ANSI C-63.4-2014 ANSI C-63.10-2013
Frequency Range	:	2412 MHz ~ 2462 MHz (802.11 b/g/n20)
Max. Output Power	:	Max 14.43 dBm – Conducted(802.11 b) Max 19.44 dBm – Conducted(802.11 g) Max 18.10 dBm – Conducted(802.11 n20)
Data of issue	:	May 28, 2019

This test report is issued under the authority of:

Ja-Beom, Koo / Director

The test was supervised by:

Hee-Cheon, Kwon / Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

NVLAP LAB Code.: 200723-0

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1. General information

1-1 Test Performed

Company name : LTA Co., Ltd.
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
 Web site : <http://www.ltalab.com>
 E-mail : chahn@ltalab.com
 Telephone : +82-31-323-6008
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2019-09-30	ECT accredited Lab.
RRA	KOREA	KR0049	-	EMC accredited Lab.
FCC	U.S.A	649054	Updating	FCC CAB
VCCI	JAPAN	C-4948	2020-09-10	VCCI registration
VCCI	JAPAN	T-2416	2020-09-10	VCCI registration
VCCI	JAPAN	R-4483(10m)	2020-10-15	VCCI registration
VCCI	JAPAN	G-847	2022-06-13	VCCI registration
IC	CANADA	5799A-1	2019-06-15	IC filing
KOLAS	KOREA	NO.551	2021-08-20	KOLAS accredited Lab.

2. Information about test item

2-1 Client & Manufacturer

Company name : Dot incorporation
 Address : (Ace Highend Tower 7th 2002), 67, Gasan digital 2-ro, Geumcheon-gu, Seoul, South Korea
 Tel / Fax : TEL No : +82-2-864-1113 / FAX No : +82-2-864-1989

:

:

2-2 Equipment Under Test (EUT)

Model name	:	DM-01
Serial number	:	Identical prototype
Date of receipt	:	April 24, 2019
EUT condition	:	Pre-production, not damaged
Antenna type	:	FPCB Antenna: -8.0 dBi
Frequency Range	:	2412 MHz ~ 2462 MHz (802.11 b/g/n)
RF output power	:	Max 14.43 dBm – Conducted (802.11 b) Max 19.44 dBm – Conducted (802.11 g) Max 18.10 dBm – Conducted (802.11 n20)
Number of channels	:	11 (802.11 b/g/n20)
Type of Modulation	:	802.11 b : DSSS (CCK,DQPSK,DBPSK) 802.11 g : OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11 n20 : OFDM (64QAM, 16QAM, QPSK, BPSK)
Power Source	:	DC 3.7 V
Firmware Version	:	V1.0.0

2-3 Tested frequency

802.11 b/g/n20	LOW	MID	HIGH
Frequency (MHz)	2412	2442	2462

2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Notebook	CR720	MS-1736	MSI

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	Transmitter Peak Output Power	< 1 Watt		C
15.247(d)	Transmitter Power Spectral Density	< 8 dBm @ 3 kHz		C
15.247(d)	Band Edge	> 20 dBc		C
15.209	Field Strength of Harmonics	Emission	Radiated	C
15.207	AC Conducted Emissions	Emissions	Conducted	NA
15.203	Antenna requirement	-	-	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

→ Antenna Requirement

dot incorporation. **FCC ID: 2AKDGDM-01** unit complies with the requirement of §15.203.

The antenna type is FPCB Antenna

The sample was tested according to the following specification:

*FCC Parts 15.247; ANSI C-63.4-2014

*FCC KDB Publication No. 558074 D01 v05r02

*FCC TCB Workshop 2012, April

3.2 Technical Characteristics Test

3.2.1 6 dB Bandwidth

Procedure:

The bandwidth at 6 dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

Span = 5 MHz, 30 MHz

VBW = 100 kHz (VBW \geq RBW)

Sweep = auto

Trace = max hold

Detector function = peak

Measurement Data : Complies

(802.11 b)

Frequency (MHz)	Test Results	
	Measured Bandwidth (MHz)	Result
2412	10.68	Complies
2442	10.68	Complies
2462	10.68	Complies

(802.11 g)

Frequency (MHz)	Test Results	
	Measured Bandwidth (MHz)	Result
2412	17.106	Complies
2442	16.932	Complies
2462	16.802	Complies

(802.11 n20)

Frequency (MHz)	Test Results	
	Measured Bandwidth (MHz)	Result
2412	18.365	Complies
2442	18.365	Complies
2462	18.321	Complies

- See next pages for actual measured spectrum plots.

Minimum Standard:

6 dB Bandwidth > 500 kHz

Measurement Setup

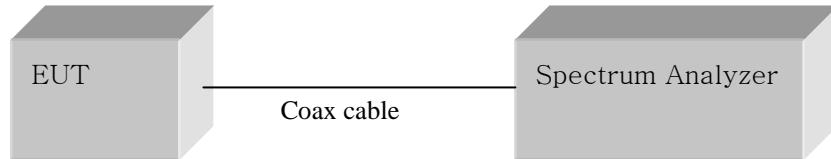
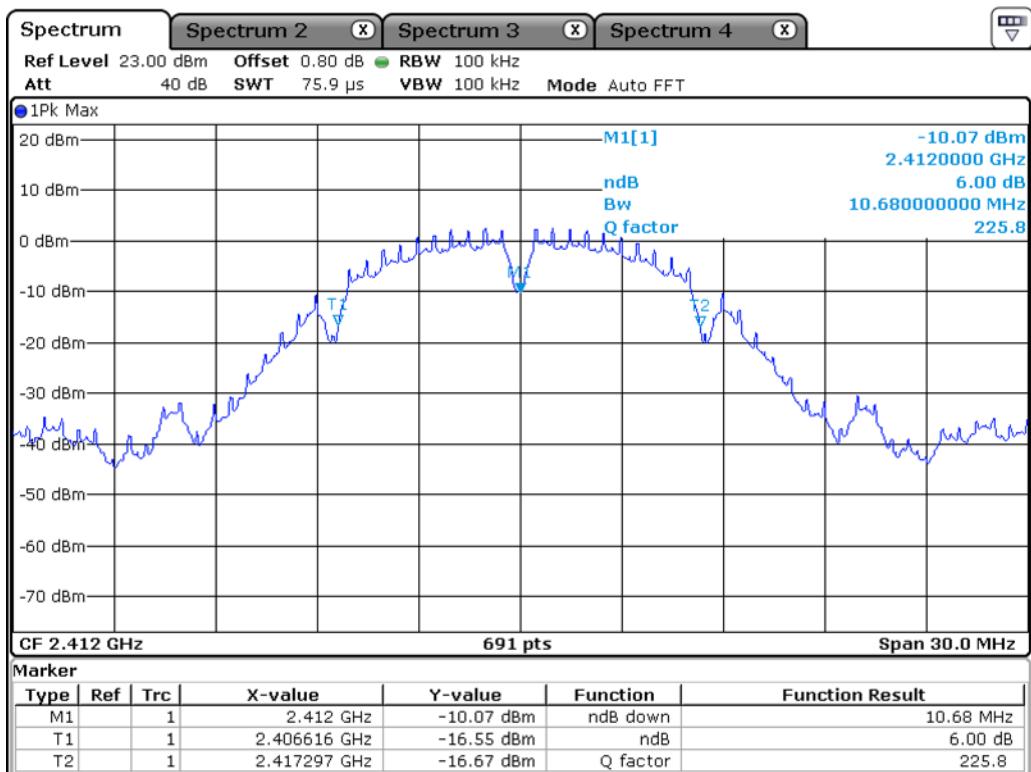


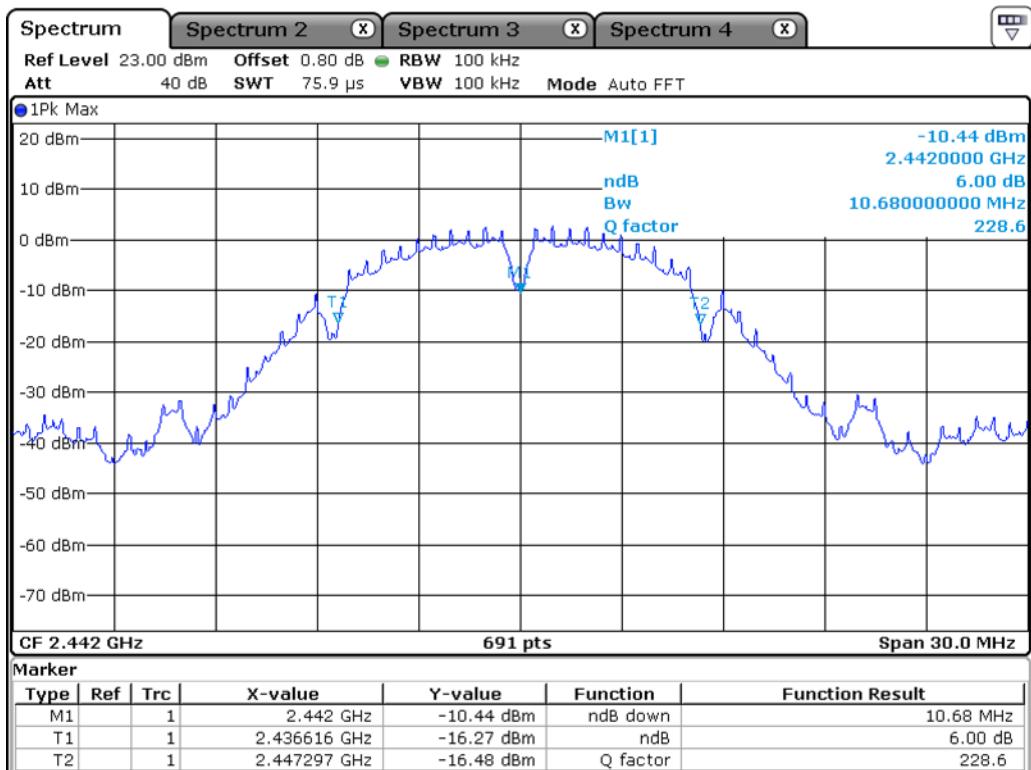
Figure 1: Measurement setup for the carrier frequency separation

Low Channel – 802.11 b



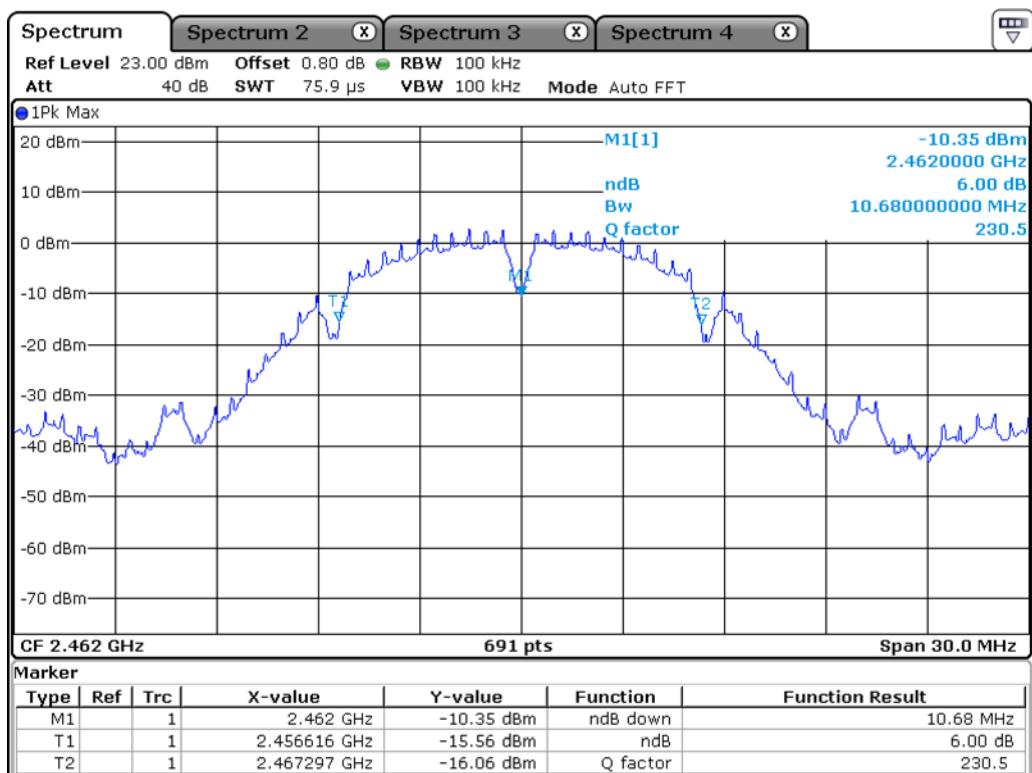
Date: 27.MAY.2019 14:57:24

Middle Channel – 802.11 b



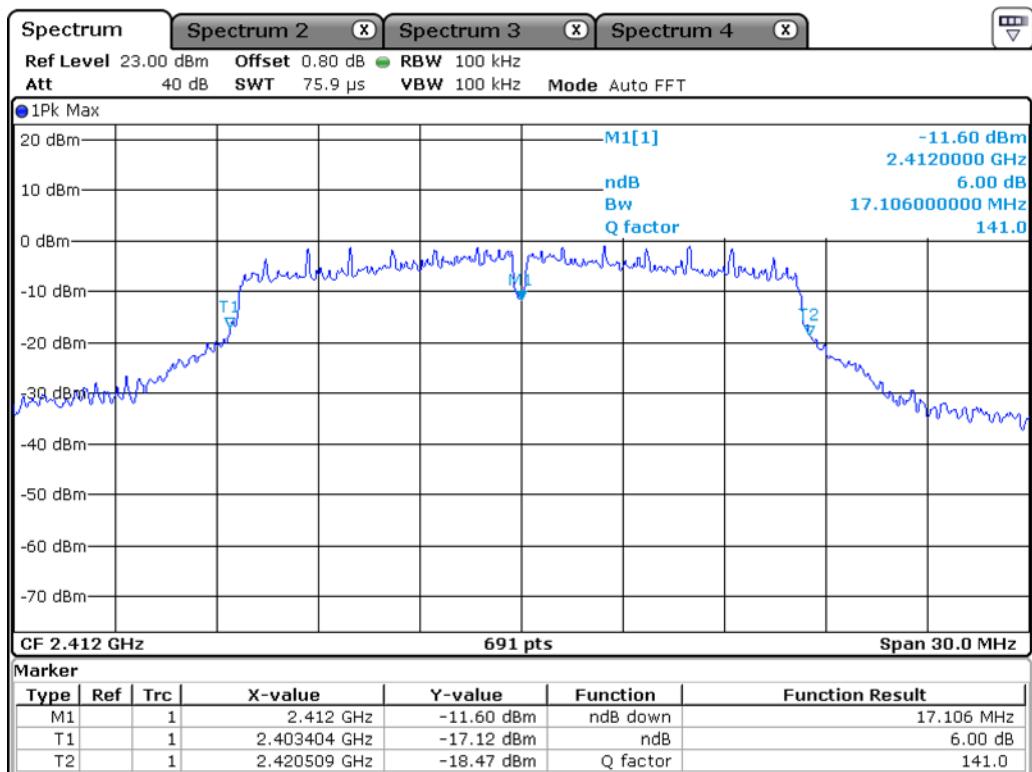
Date: 27.MAY.2019 14:57:55

High Channel – 802.11 b



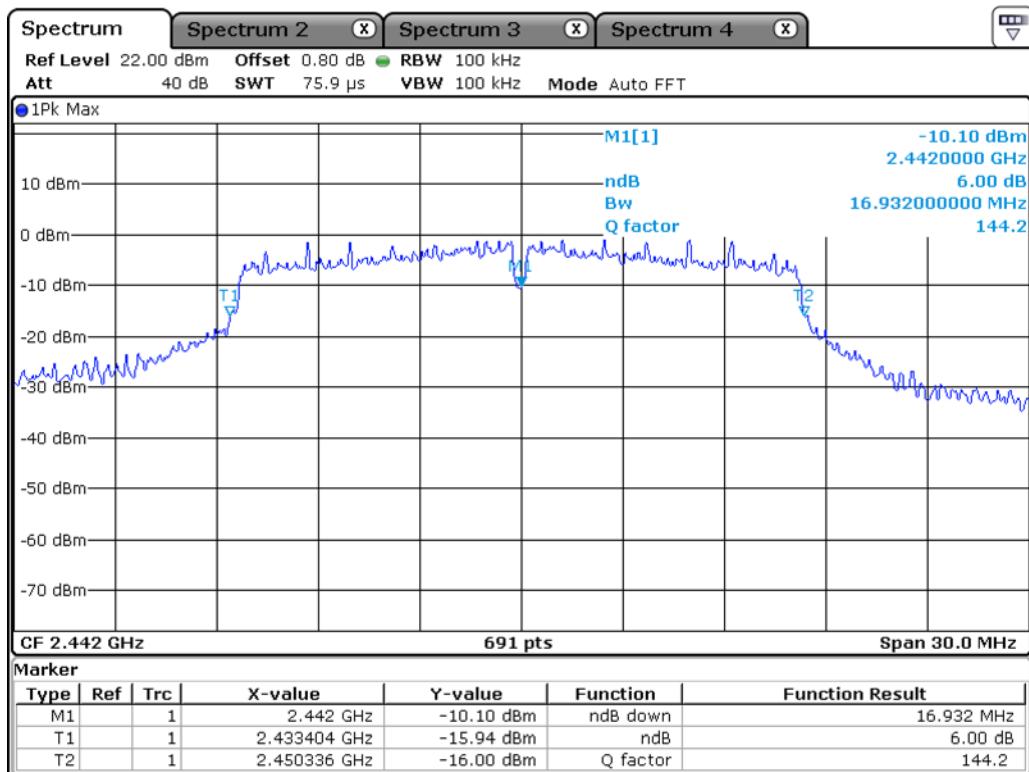
Date: 27.MAY.2019 14:58:14

Low Channel – 802.11 g



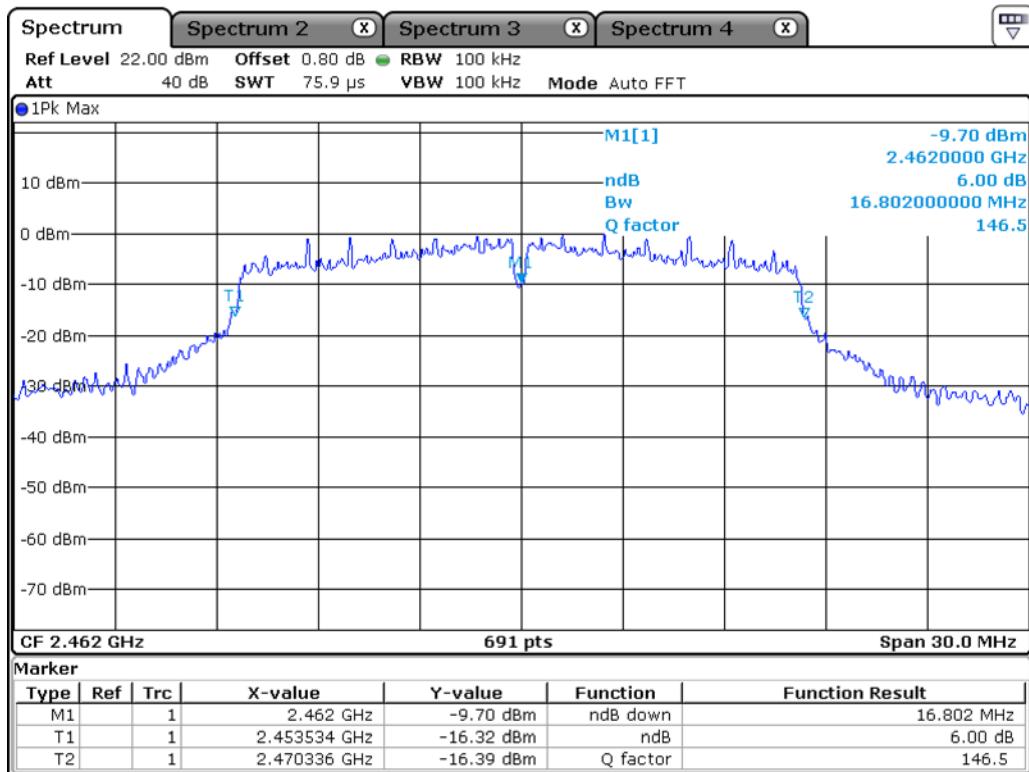
Date: 27.MAY.2019 14:58:37

Middle Channel – 802.11 g



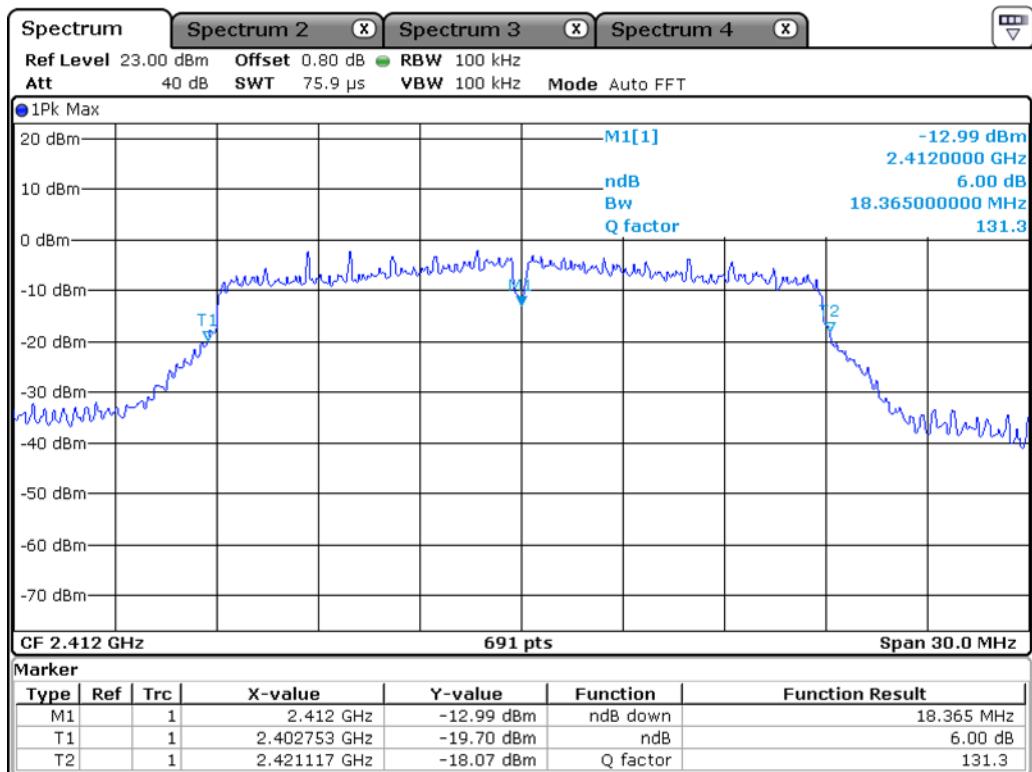
Date: 27.MAY.2019 14:58:57

High Channel – 802.11 g



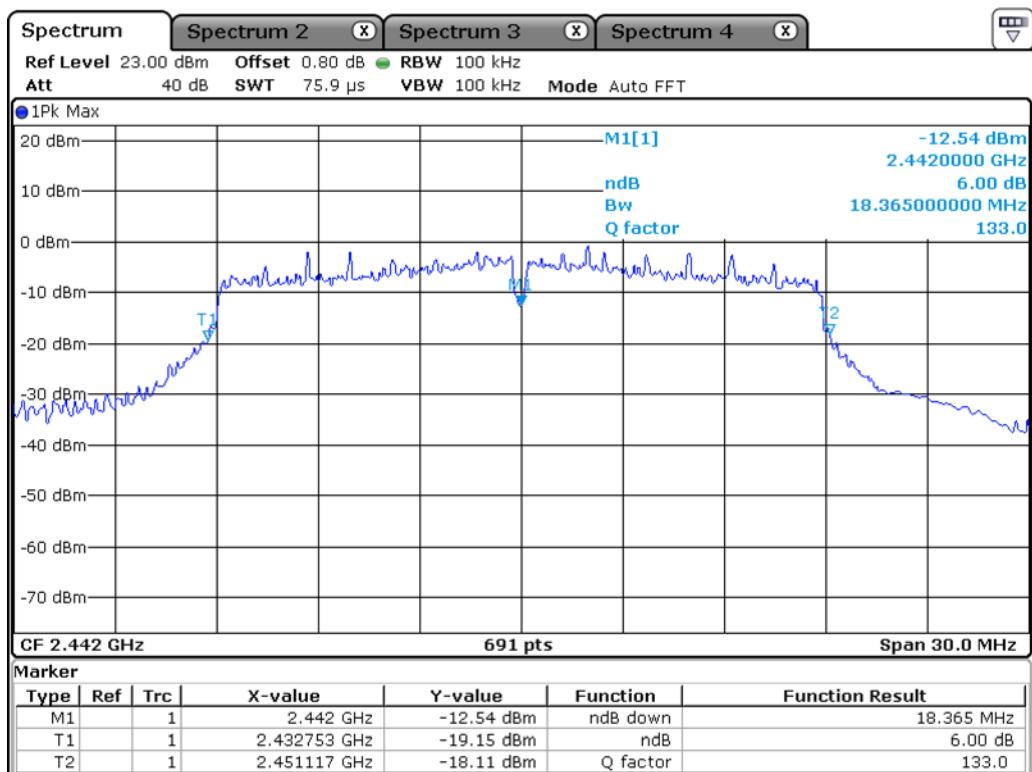
Date: 27.MAY.2019 14:59:15

Low Channel – 802.11 n20



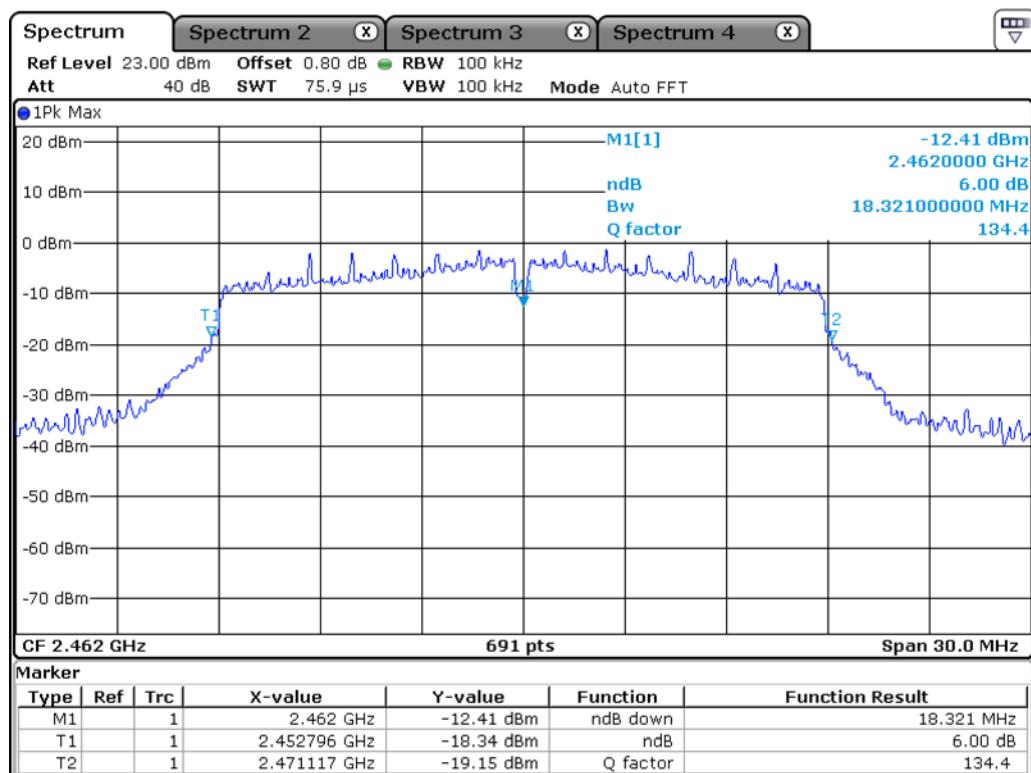
Date: 27.MAY.2019 14:59:38

Middle Channel – 802.11 n20



Date: 27.MAY.2019 14:59:58

High Channel – 802.11 n20



Date: 27.MAY.2019 15:00:15

3.2.2 Peak Output Power Measurement

Procedure:

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 1MHz	Span = auto
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VBW = 3MHz (VBW \geq 3 * RBW)	Sweep = auto
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Detector function = peak

Measurement Data : Complies

(802.11 b)

Frequency (MHz)	Test Results		
	dBm	W	Result
2412	13.87	0.02	Complies
2442	14.17	0.03	Complies
2462	14.43	0.03	Complies

(802.11 g)

Frequency (MHz)	Test Results		
	dBm	W	Result
2412	18.83	0.08	Complies
2442	19.30	0.09	Complies
2462	19.44	0.09	Complies

(802.11 n20)

Frequency (MHz)	Test Results		
	dBm	W	Result
2412	17.59	0.06	Complies
2442	17.68	0.06	Complies
2462	18.10	0.06	Complies

- See next pages for actual measured spectrum plots.

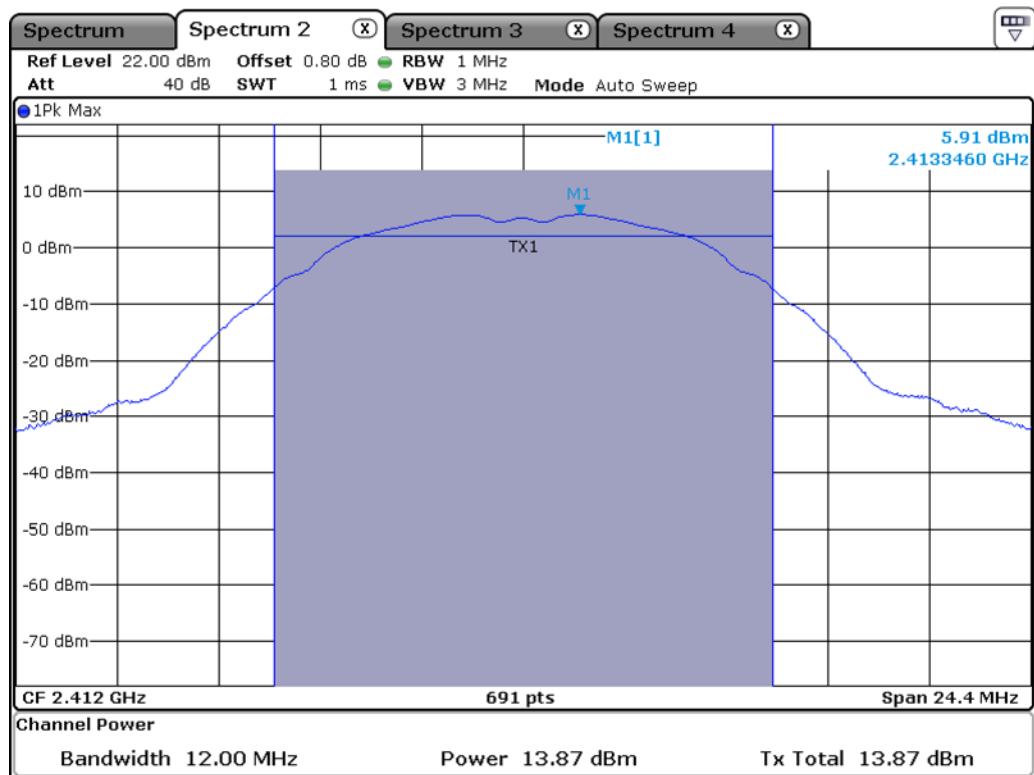
Minimum Standard:

Peak output power	< 1 W
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Measurement Setup

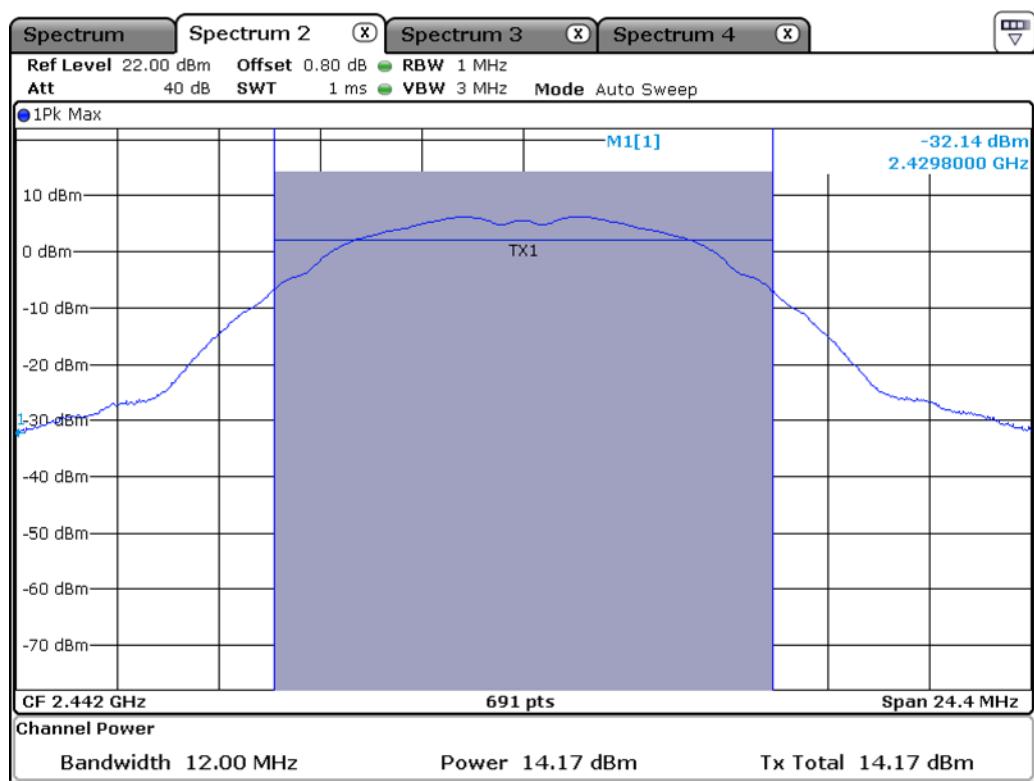
Same as the Chapter 3.2.1 (Figure 1)

Low Channel – 802.11 b



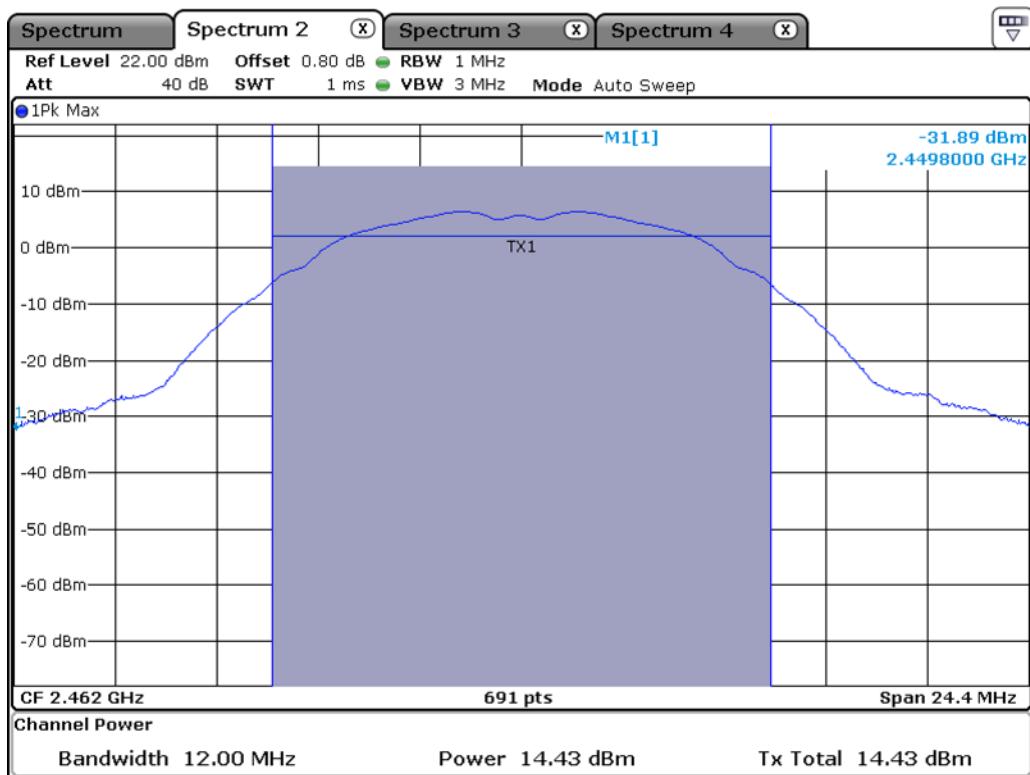
Date: 27.MAY.2019 15:01:33

Middle Channel – 802.11 b



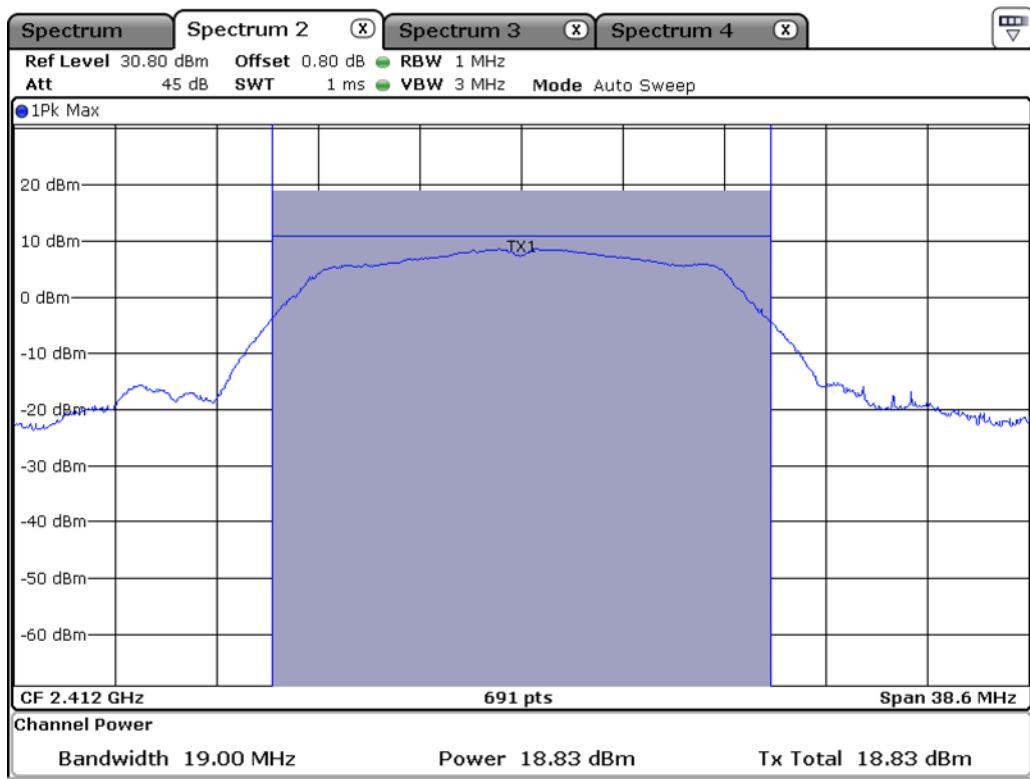
Date: 27.MAY.2019 15:01:51

High Channel – 802.11 b

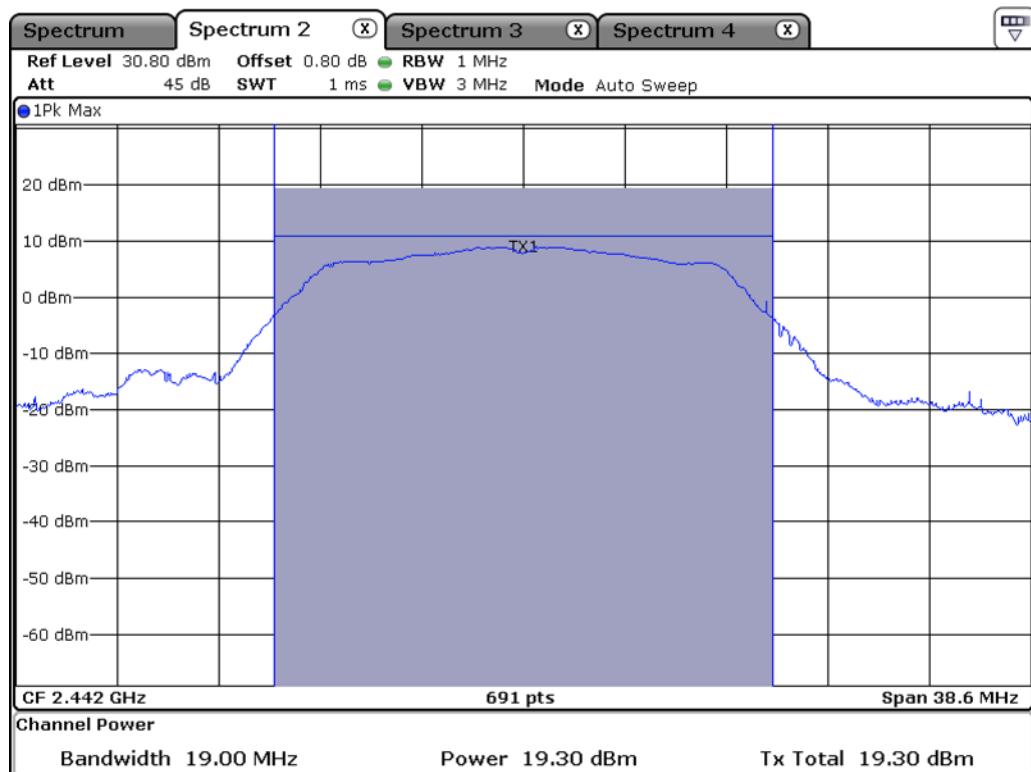


Date: 27.MAY.2019 15:02:04

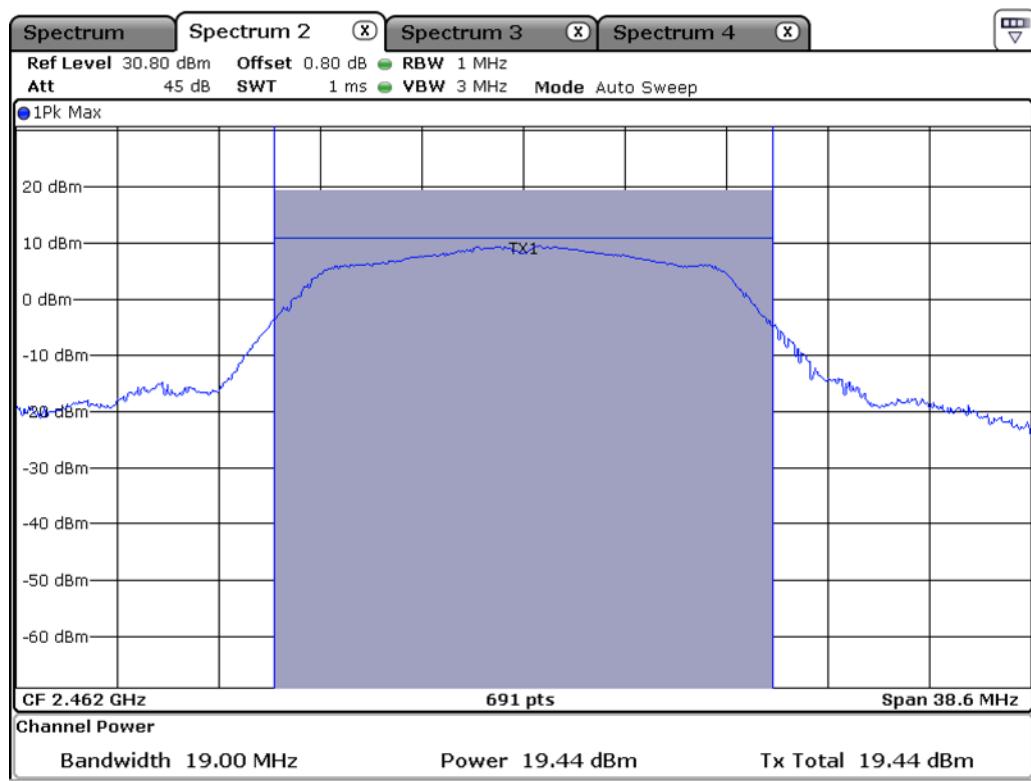
Low Channel – 802.11 g



Date: 27.MAY.2019 15:03:01

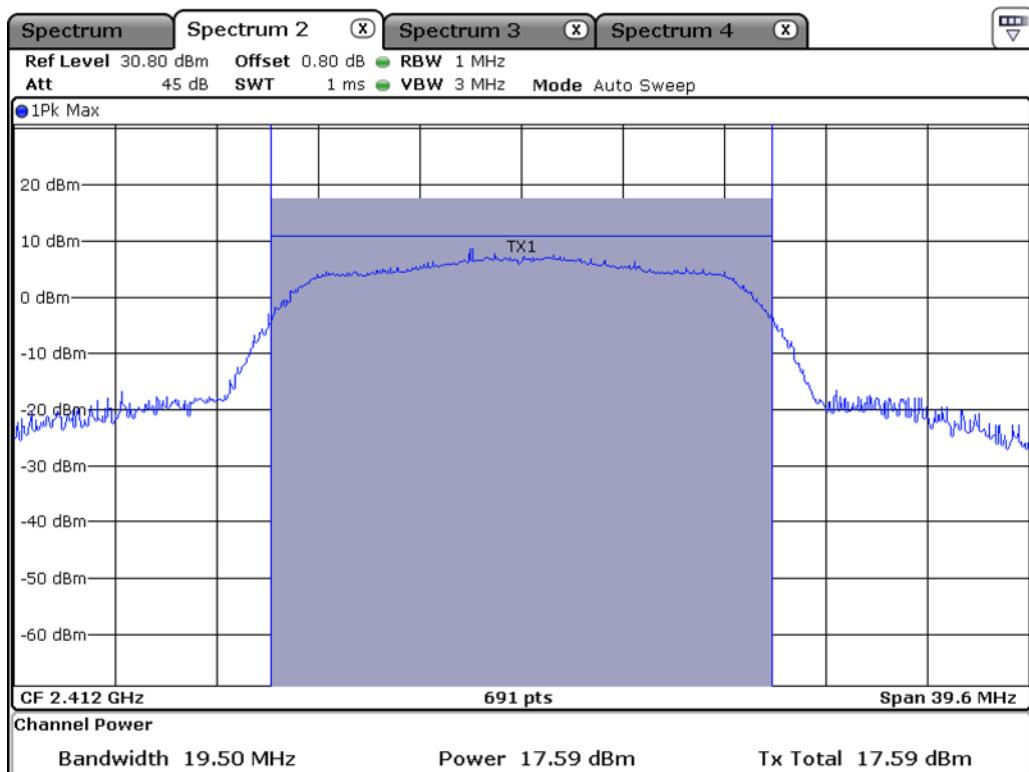
Middle Channel – 802.11 g

Date: 27.MAY.2019 15:03:18

High Channel – 802.11 g

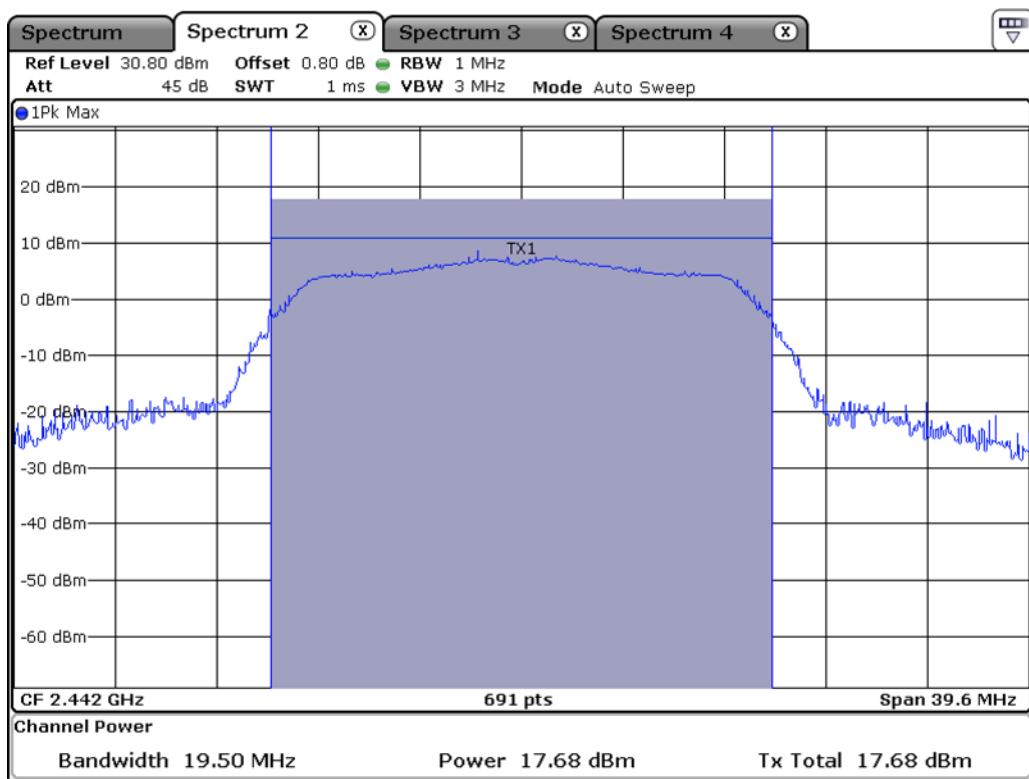
Date: 27.MAY.2019 15:03:30

Low Channel – 802.11 n20



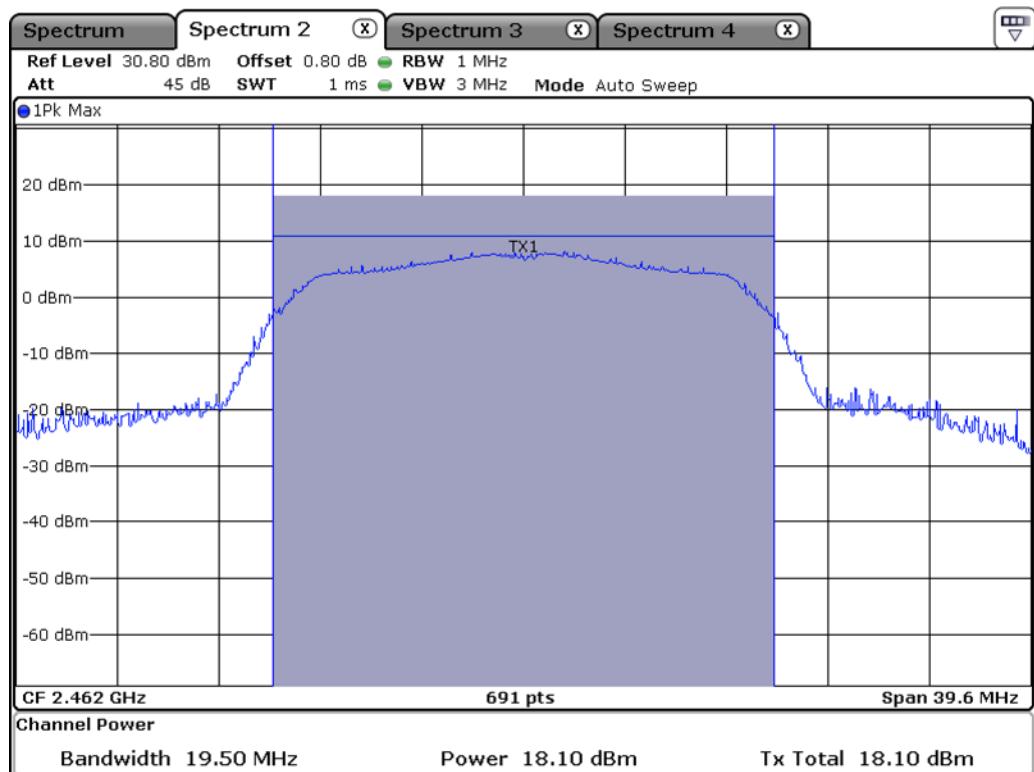
Date: 27.MAY.2019 15:04:07

Middle Channel – 802.11 n20



Date: 27.MAY.2019 15:04:23

High Channel – 802.11 n20



3.2.3 Power Spectral Density

Procedure:

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The spectrum analyzer is set to:

RBW = 3 kHz ($3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$) Span = 1.5 times the DTS bandwidth

VBW = 10 kHz ($3 * \text{RBW}$) Sweep = auto

Detector function = peak Trace = max hold

Measurement Data : Complies

(802.11 b)

Frequency (MHz)	Test Results	
	dBm	Result
2412	-10.77	Complies
2442	-10.81	Complies
2462	-10.58	Complies

(802.11 g)

Frequency (MHz)	Test Results	
	dBm	Result
2412	-12.82	Complies
2442	-12.32	Complies
2462	-11.91	Complies

(802.11 n20)

Frequency (MHz)	Test Results	
	dBm	Result
2412	-14.64	Complies
2442	-13.81	Complies
2462	-13.92	Complies

- See next pages for actual measured spectrum plots.

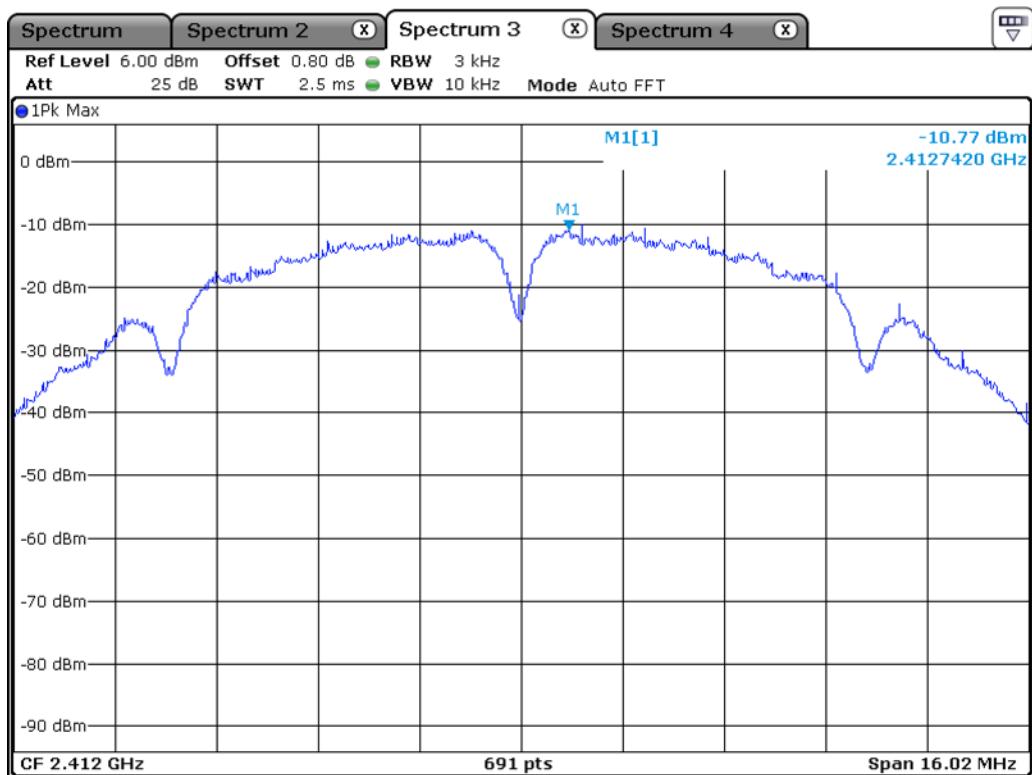
Minimum Standard:

Power Spectral Density	< 8 dBm @ 3 kHz BW
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Measurement Setup

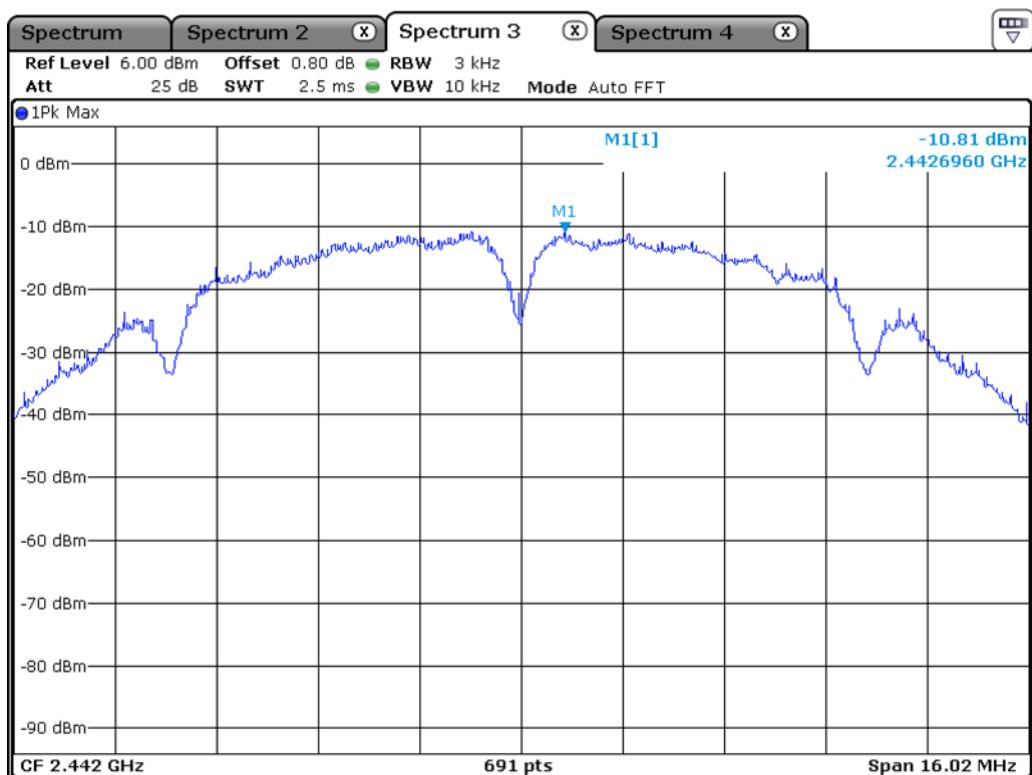
Same as the Chapter 3.2.1 (Figure 1)

Low Channel – 802.11 b



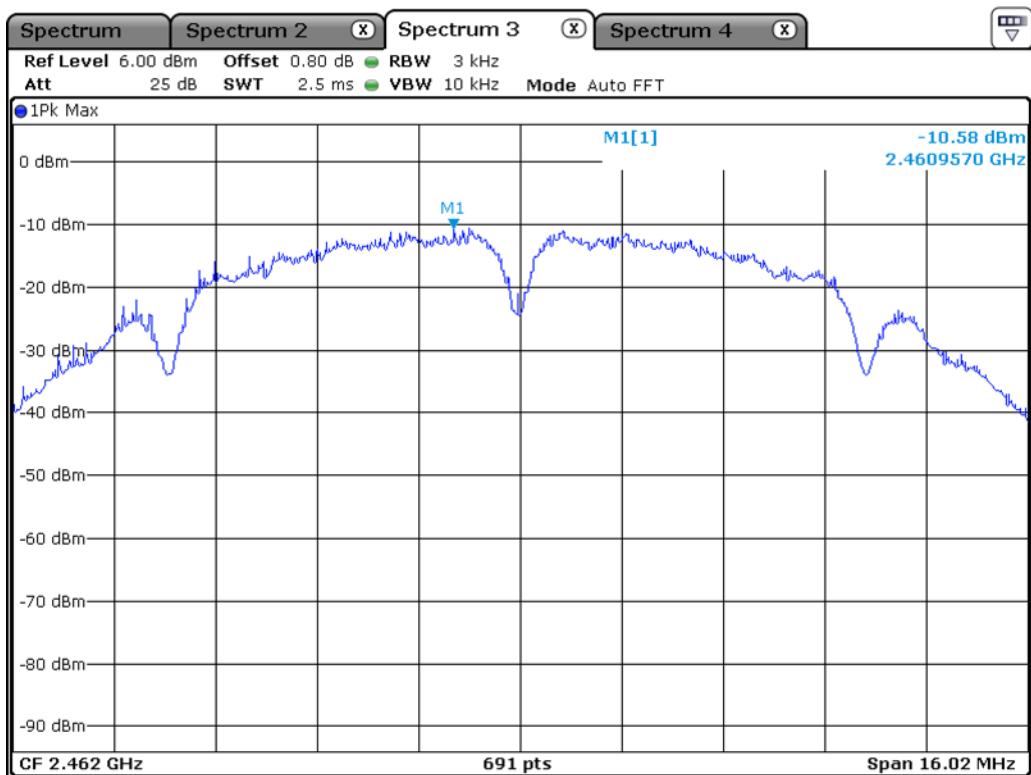
Date: 27.MAY.2019 15:06:46

Middle Channel – 802.11 b



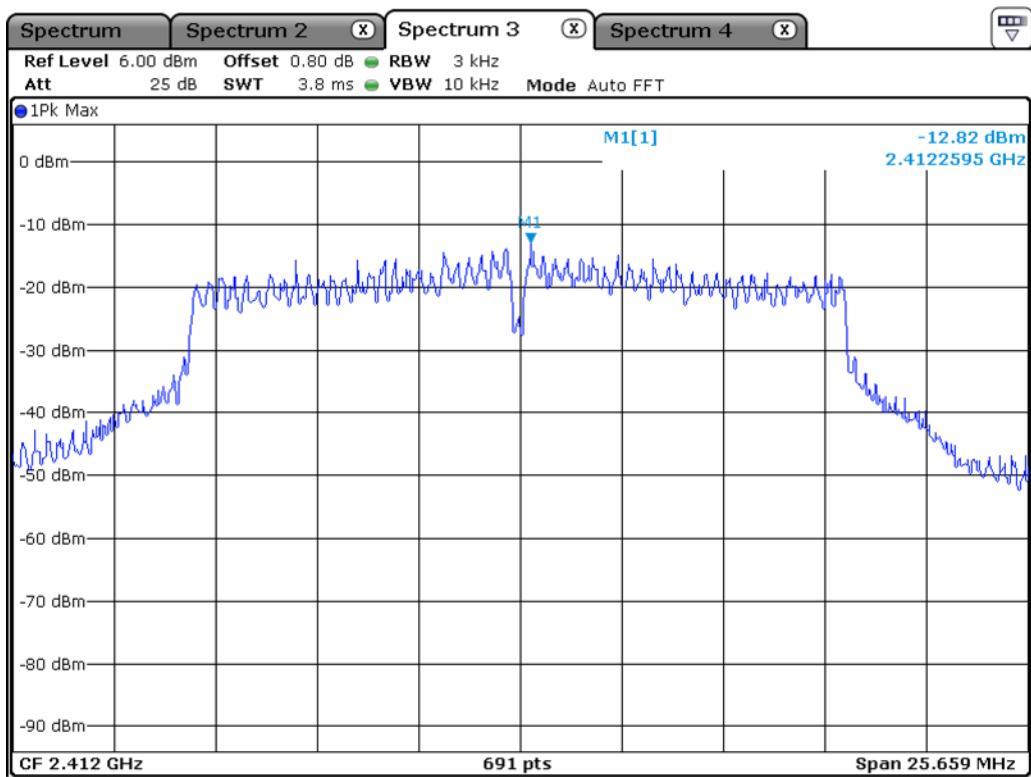
Date: 27.MAY.2019 15:07:46

High Channel – 802.11 b



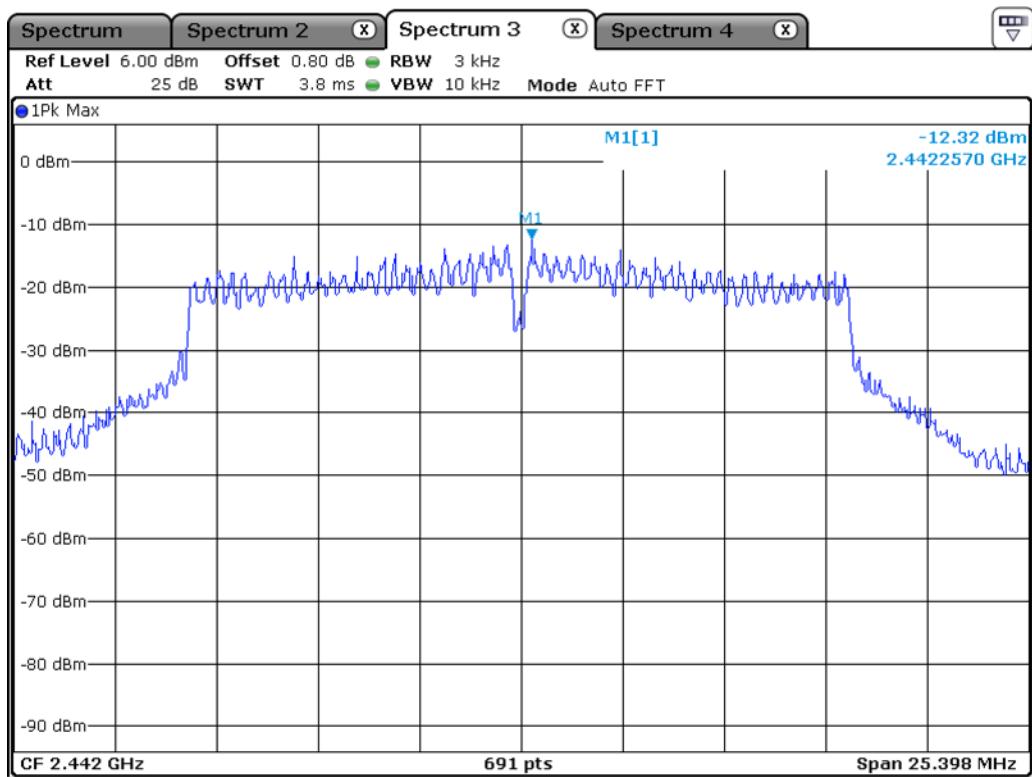
Date: 27.MAY.2019 15:08:07

Low Channel – 802.11 g



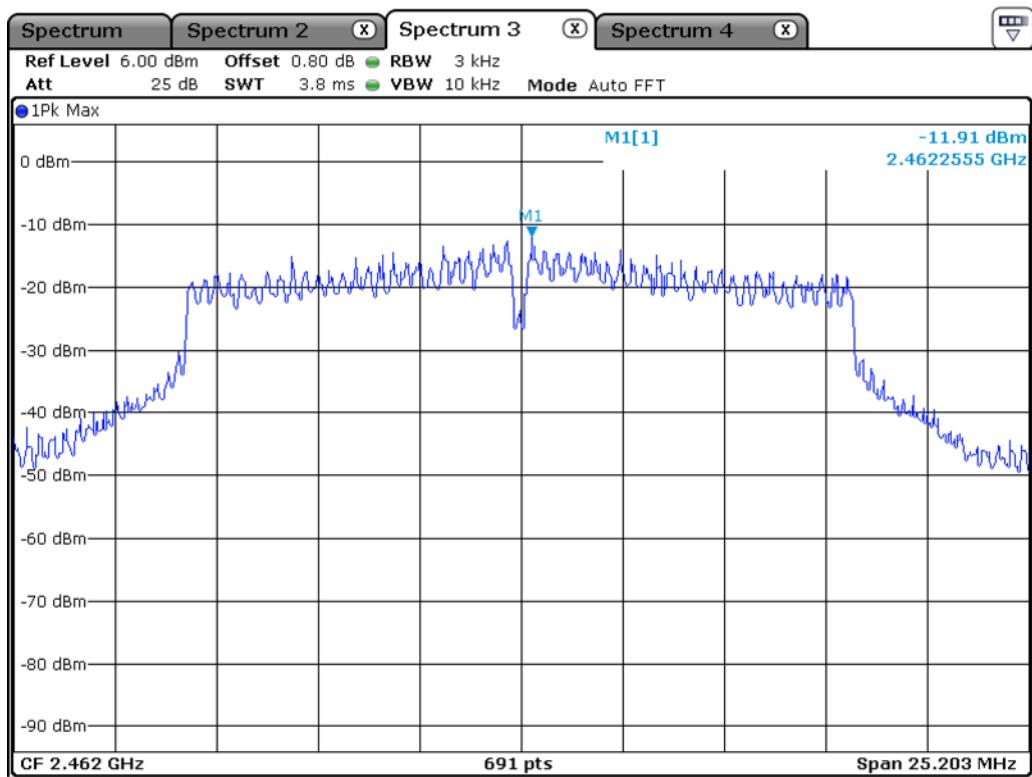
Date: 27.MAY.2019 15:08:43

Middle Channel – 802.11 g



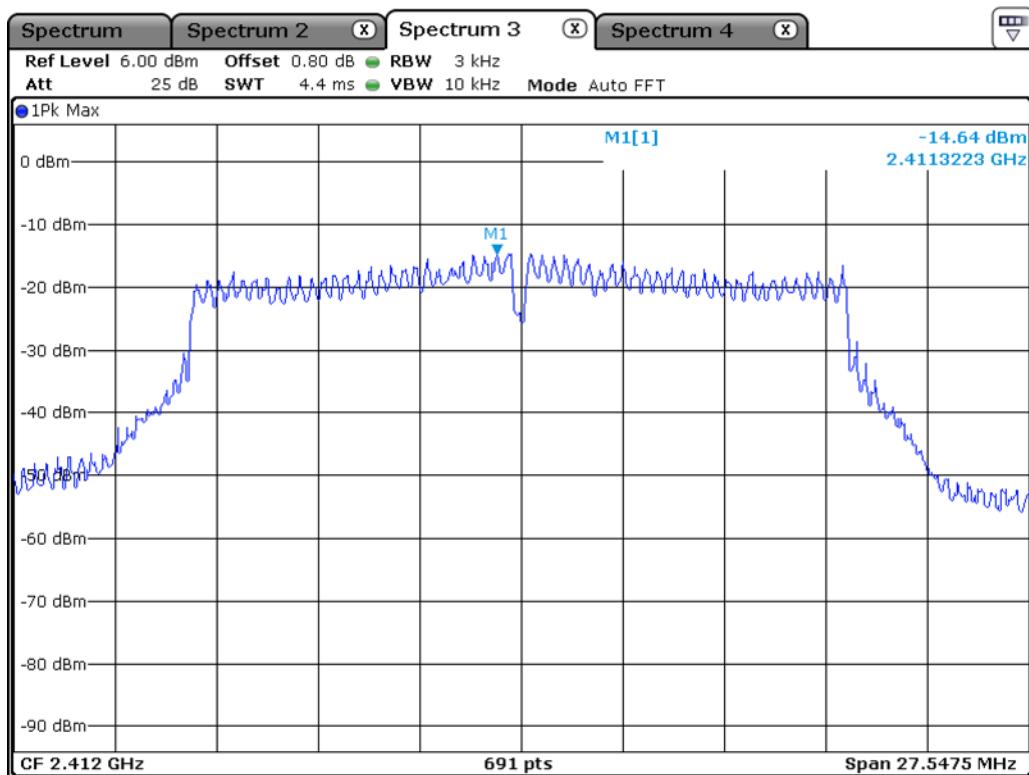
Date: 27.MAY.2019 15:09:22

High Channel – 802.11 g



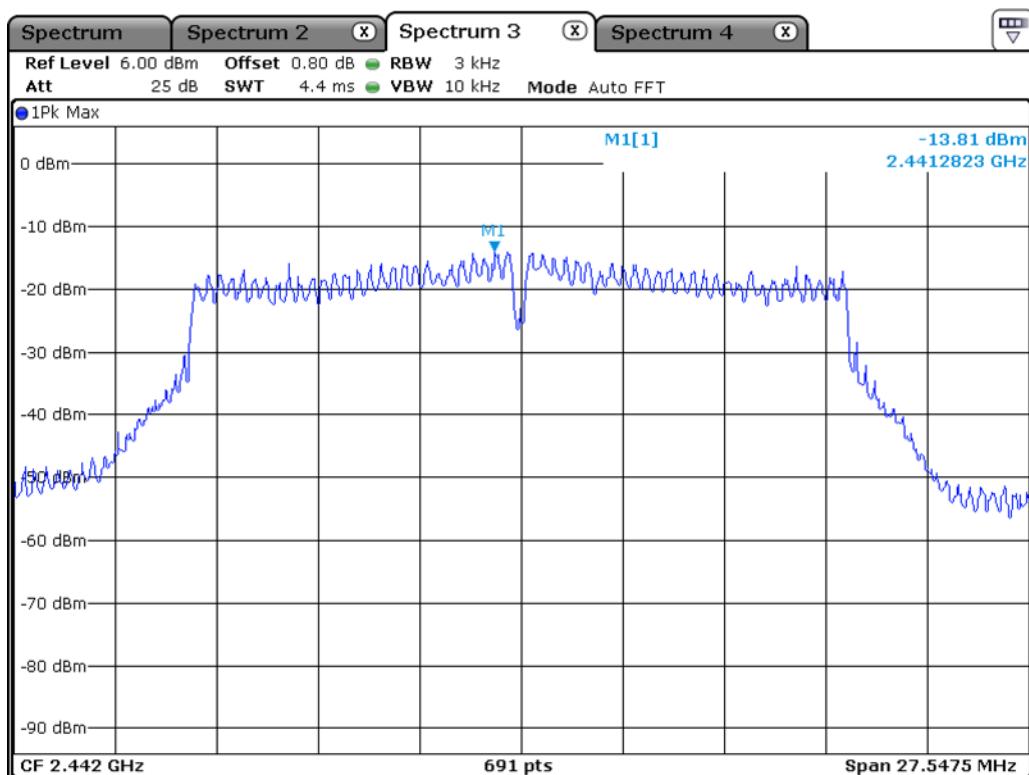
Date: 27.MAY.2019 15:10:09

Low Channel – 802.11 n



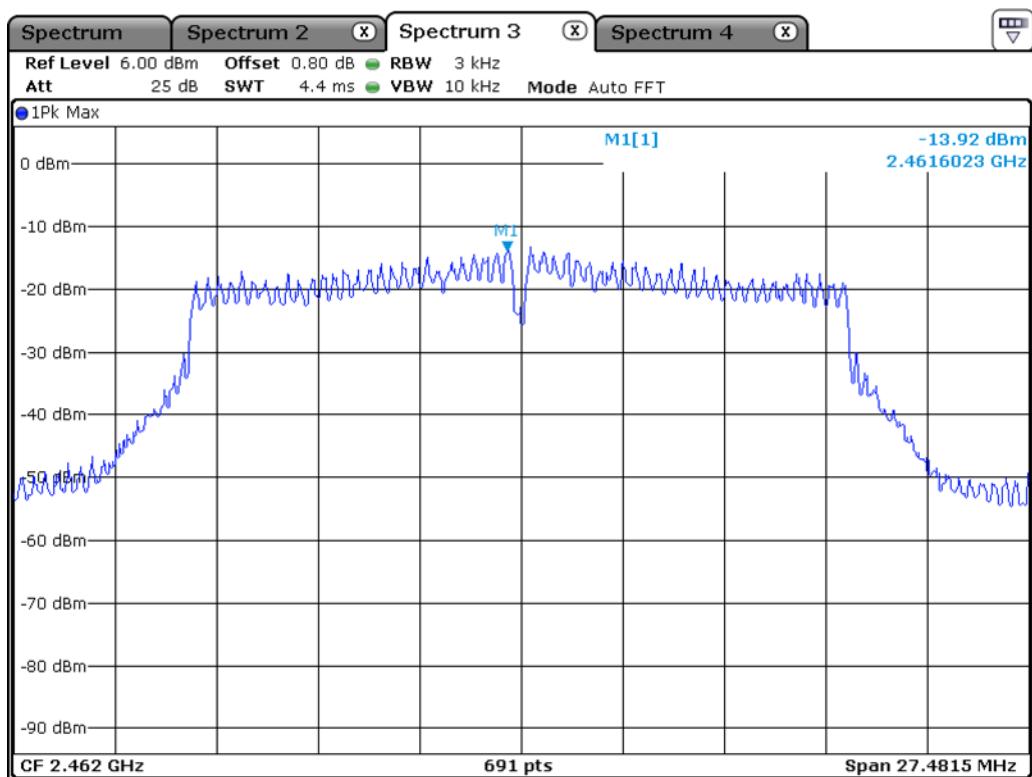
Date: 27.MAY.2019 15:10:56

Middle Channel – 802.11 n



Date: 27.MAY.2019 15:11:28

High Channel – 802.11 n



Date: 27.MAY.2019 15:12:00

3.2.4 Band - edge

Procedure:

The bandwidth at 20 dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz VBW = 100 kHz

Span = 40 MHz, 80 MHz Detector function = peak

Trace = max hold Sweep = auto

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

The spectrum analyzer is set to:

Center frequency = the highest, the lowest channels

PEAK: RBW = VBW = 1 MHz, Sweep=Auto

Average: RBW = 1 MHz, VBW=10 Hz, Sweep=Auto

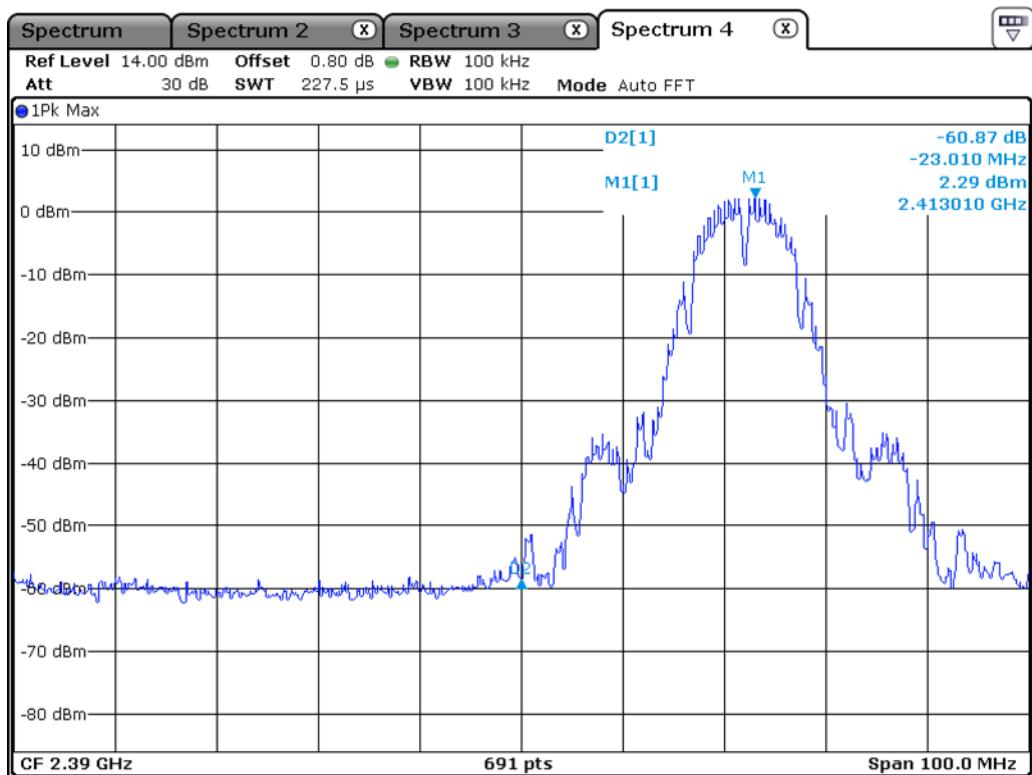
Measurement Distance: 3 m

Polarization: Horizontal / Vertical

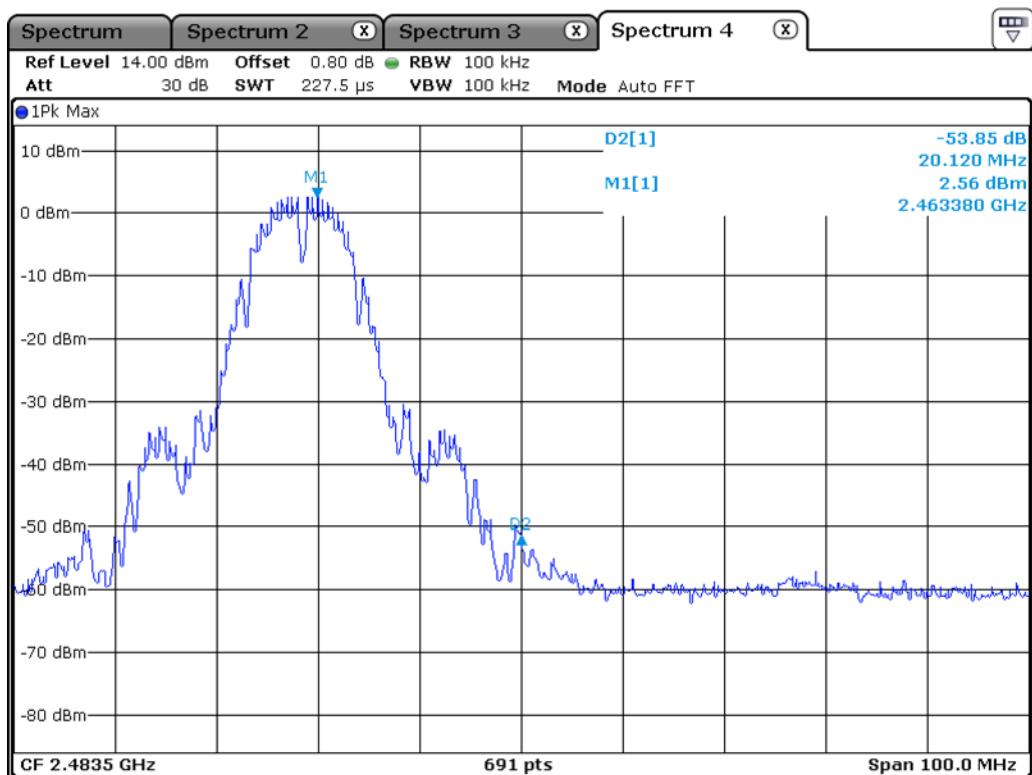
Measurement Data: Complies

- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 20 dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

Minimum Standard:	> 20 dBc
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Band edge – 802.11bLower edge

Date: 27.MAY.2019 15:16:12

Upper edge

Date: 27.MAY.2019 15:17:00

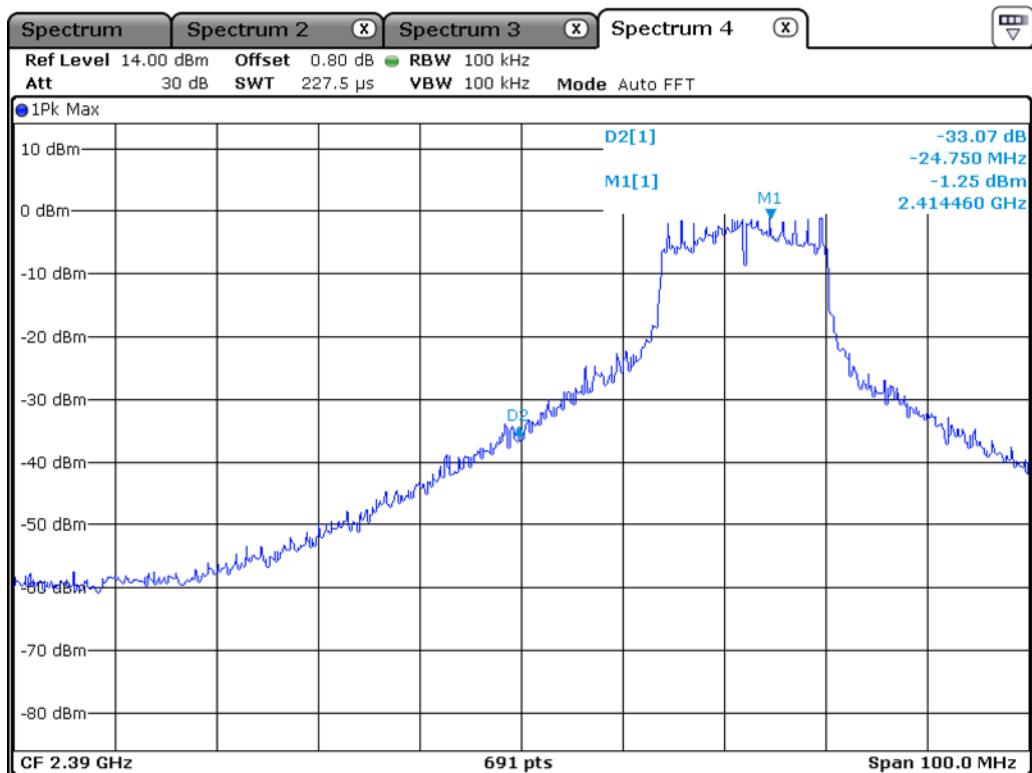
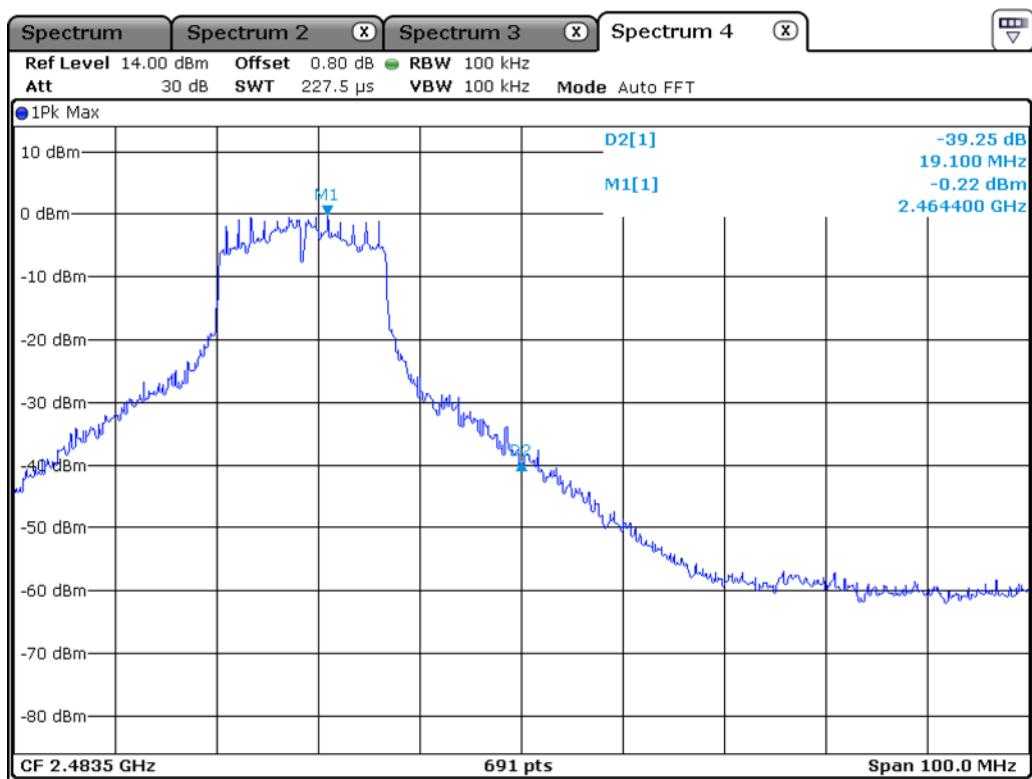
Radiated Band-edges in the restricted band 2310-2390 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
			Antenna	Amp. Gain + Cable Loss		AV / Peak	AV / Peak	AV / Peak	AV / Peak
2342.3	20.71 27.44	H	27.9	8.75	54 74	39.86 44.59	14.14 29.41		

Radiated Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
			Antenna	Amp. Gain + Cable Loss		AV / Peak	AV / Peak	AV / Peak	AV / Peak
2524.5	22.83 27.91	H	27.95	8.59	54 74	42.19 47.27	11.81 26.73		

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

Band edge – 802.11gLower edgeUpper edge

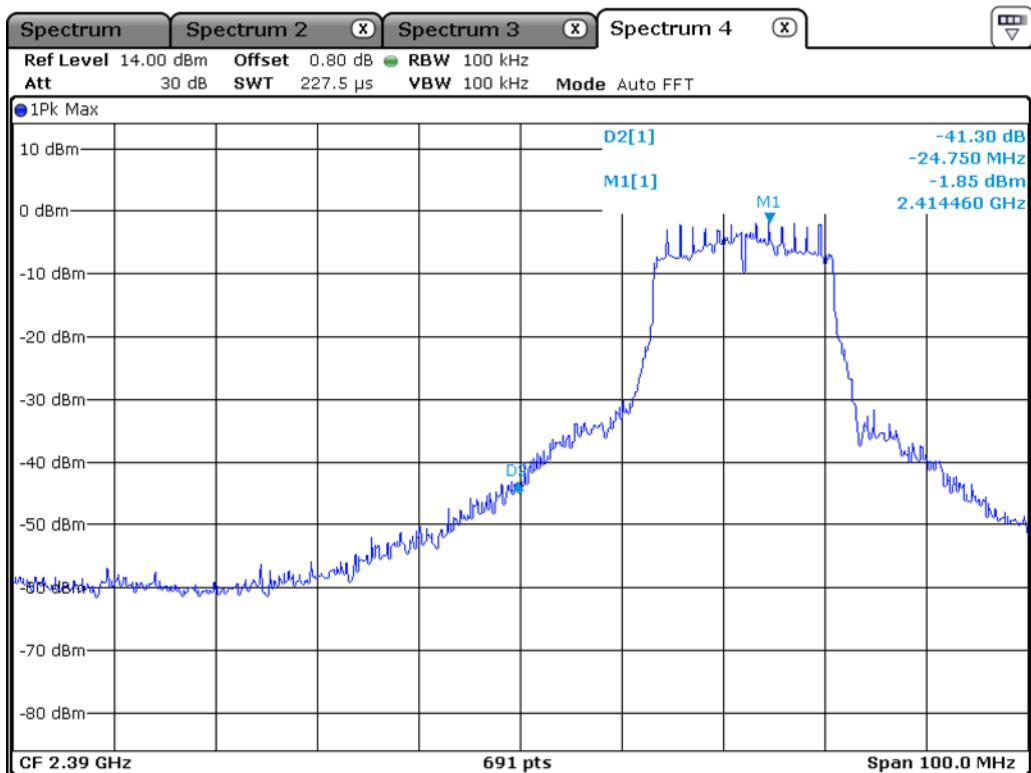
Radiated Band-edges in the restricted band 2310-2390 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
			Antenna	Amp. Gain + Cable Loss		AV / Peak	AV / Peak	AV / Peak	AV / Peak
2359.7	24.75 28.17	H	27.9	8.75	54 74	43.90 47.32	10.10 26.68		

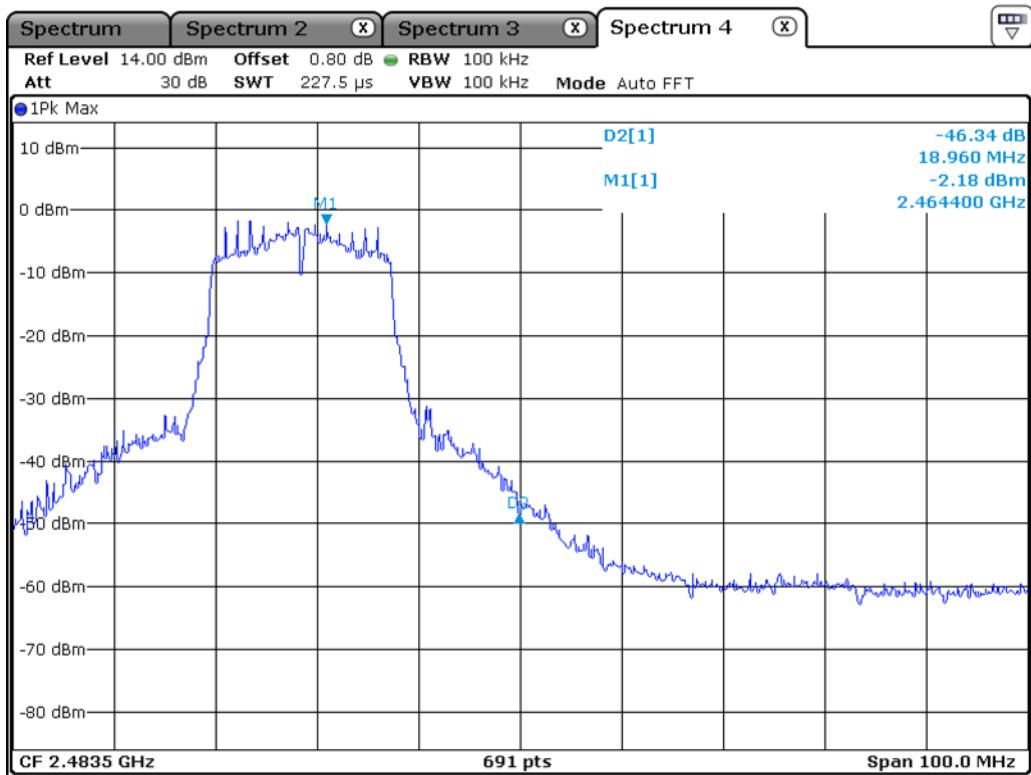
Radiated Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
			Antenna	Amp. Gain + Cable Loss		AV / Peak	AV / Peak	AV / Peak	AV / Peak
2486.9	23.12 28.03	H	28.08	8.77	54 74	42.43 47.34	11.57 26.66		

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

Band edge – 802.11n20Lower edge

Date: 27.MAY.2019 15:18:54

Upper edge

Date: 27.MAY.2019 15:19:18

Radiated Band-edges in the restricted band 2310-2390 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
			Antenna	Amp. Gain + Cable Loss		AV / Peak	AV / Peak	AV / Peak	AV / Peak
2347.5	21.37 24.42	H	27.9	8.75	54 74	40.52 43.57	13.48 30.43		

Radiated Band-edges in the restricted band 2483.5-2500 MHz measurement

Frequency [MHz]	Reading [dBuV/m] AV / Peak	Pol.	Correction Factor		Limits [dBuV/m] AV / Peak	Result [dBuV/m] AV / Peak		Margin [dB] AV / Peak	
			Antenna	Amp. Gain + Cable Loss		AV / Peak	AV / Peak	AV / Peak	AV / Peak
2486.1	22.99 27.73	H	28.08	8.77	54 74	42.30 47.04	11.70 26.96		

Note : This EUT was tested in 3 orthogonal positions and the worst-case data was presented

3.2.5 Conducted Spurious Emissions

Procedure:

The test follows KDB558074. The conducted spurious emissions were measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels..

After the trace being stable, set the marker on the peak of any spurious emission recorded.

The spectrum analyzer is set to:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions

RBW = 100 kHz Sweep = auto

VBW = 100 kHz Detector function = peak

Trace = max hold

Measurement Data: Complies

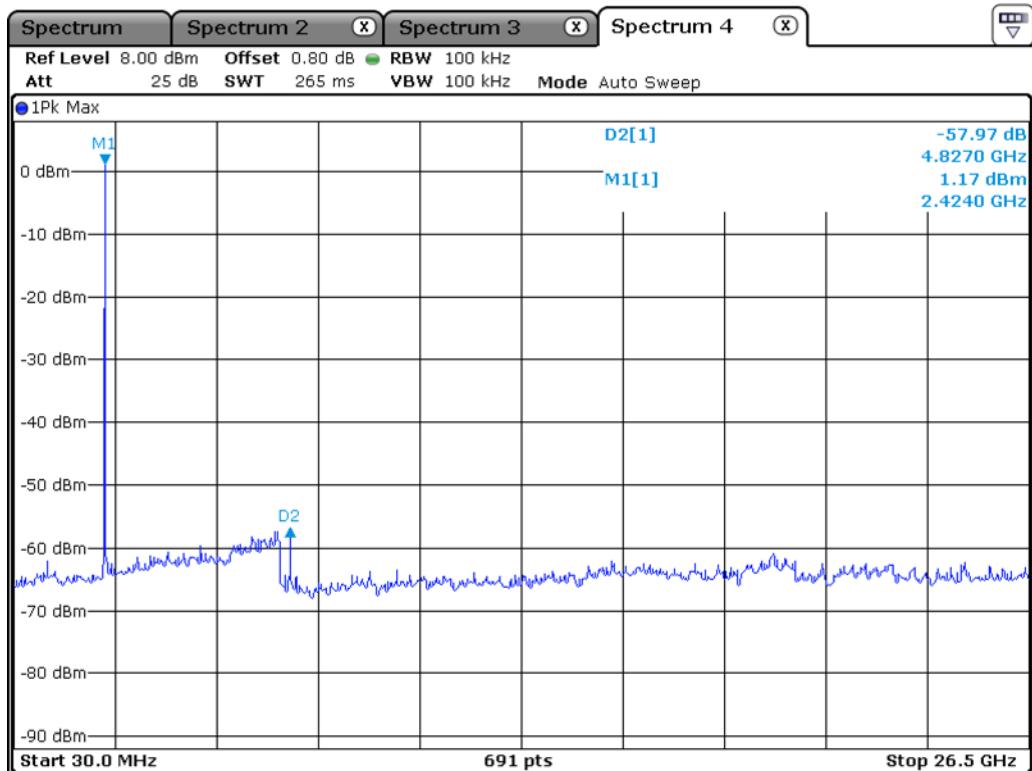
- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 20 dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

Minimum Standard:	> 20 dBc
--------------------------	----------

Measurement Setup

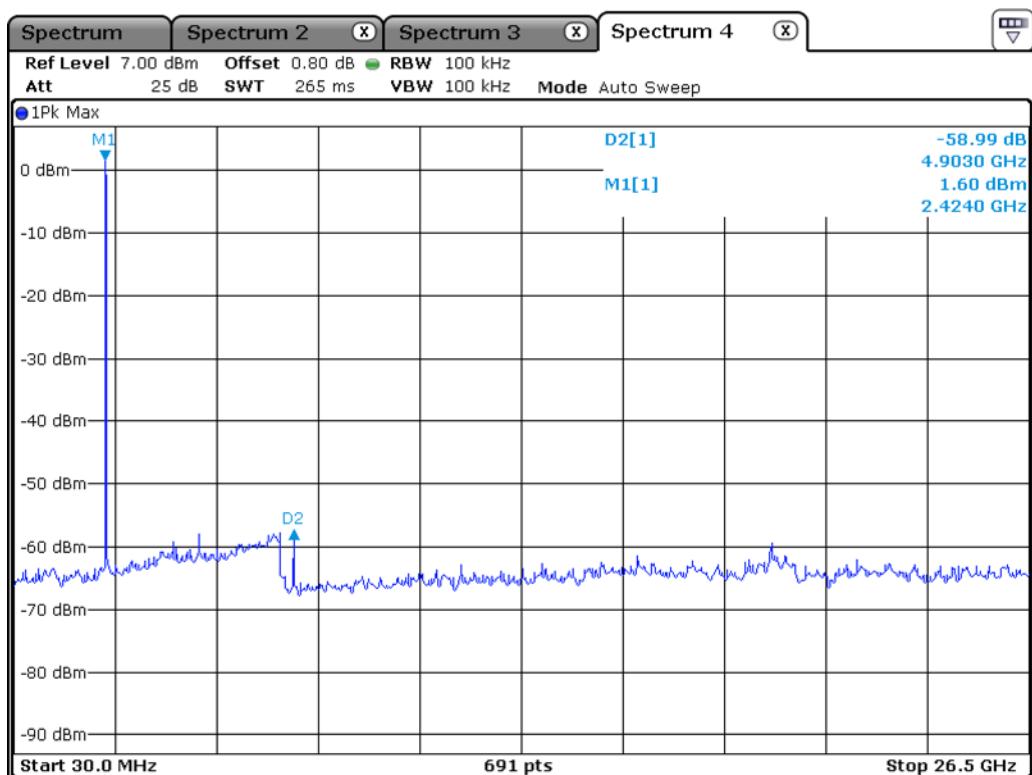
Same as the Chapter 3.2.1 (Figure 1)

Frequency Range = 30 MHz ~ 26.5 GHz
Unwanted Emission – Low Channel – 802.11 b

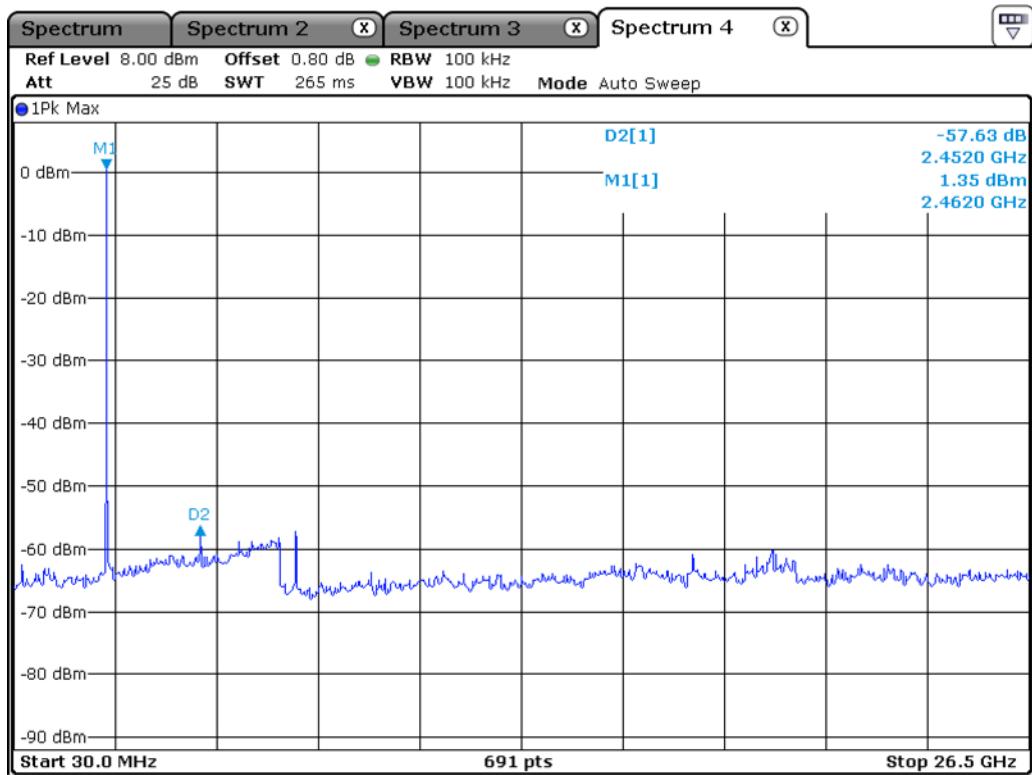


Date: 27.MAY.2019 15:20:11

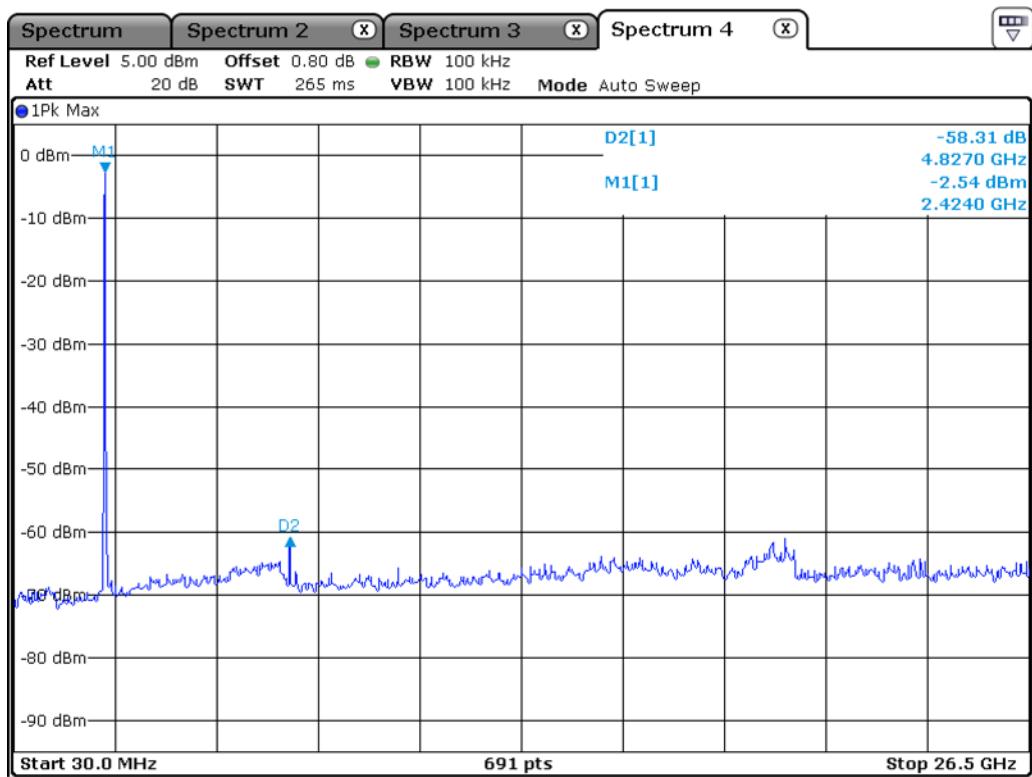
Middle Channel – 802.11 b



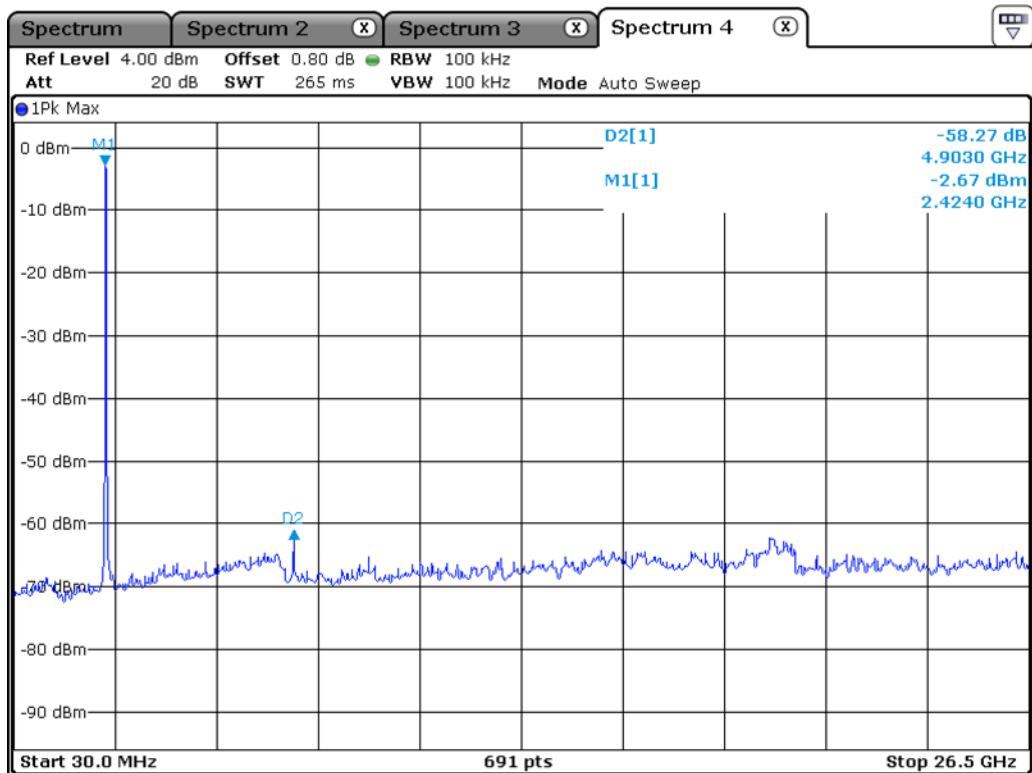
Date: 27.MAY.2019 15:20:34

High Channel – 802.11 b

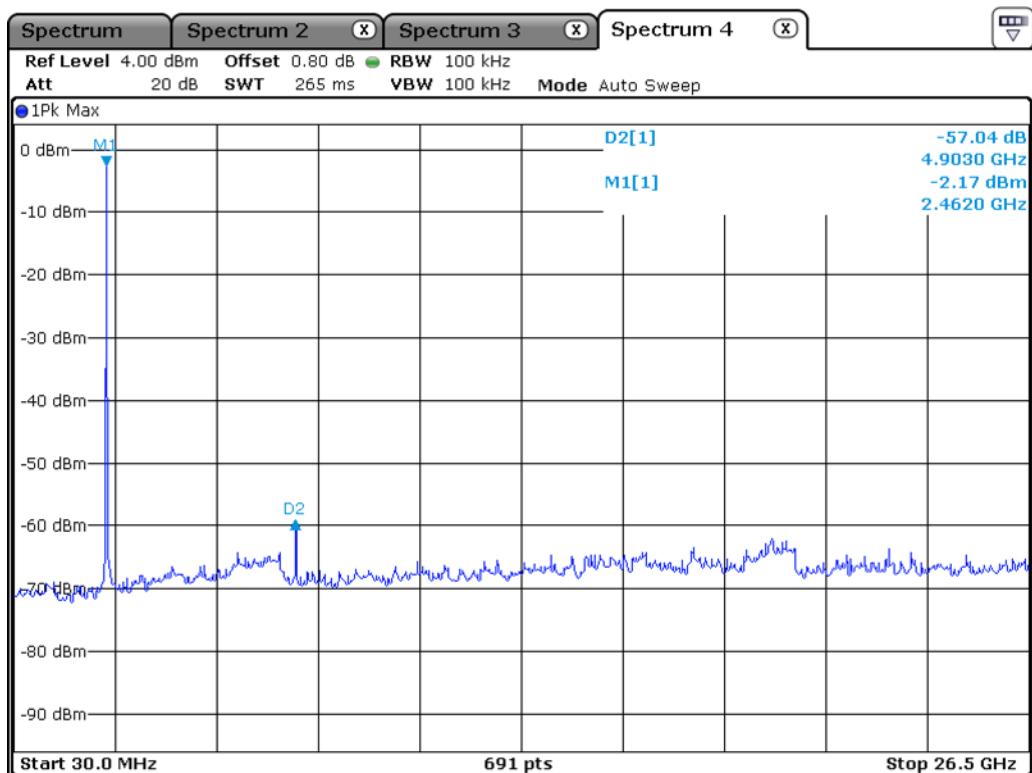
Date: 27.MAY.2019 15:20:57

Frequency Range = 30 MHz ~ 26.5 GHz
Unwanted Emission – Low Channel – 802.11 g

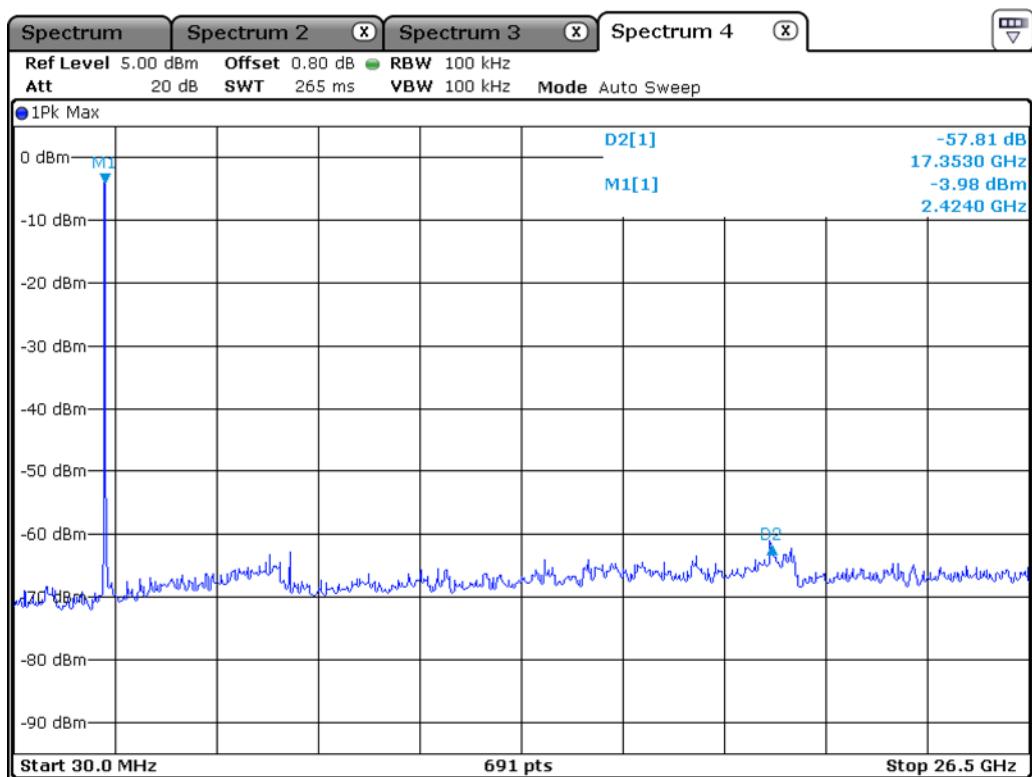
Date: 27.MAY.2019 15:21:28

Middle Channel – 802.11 g

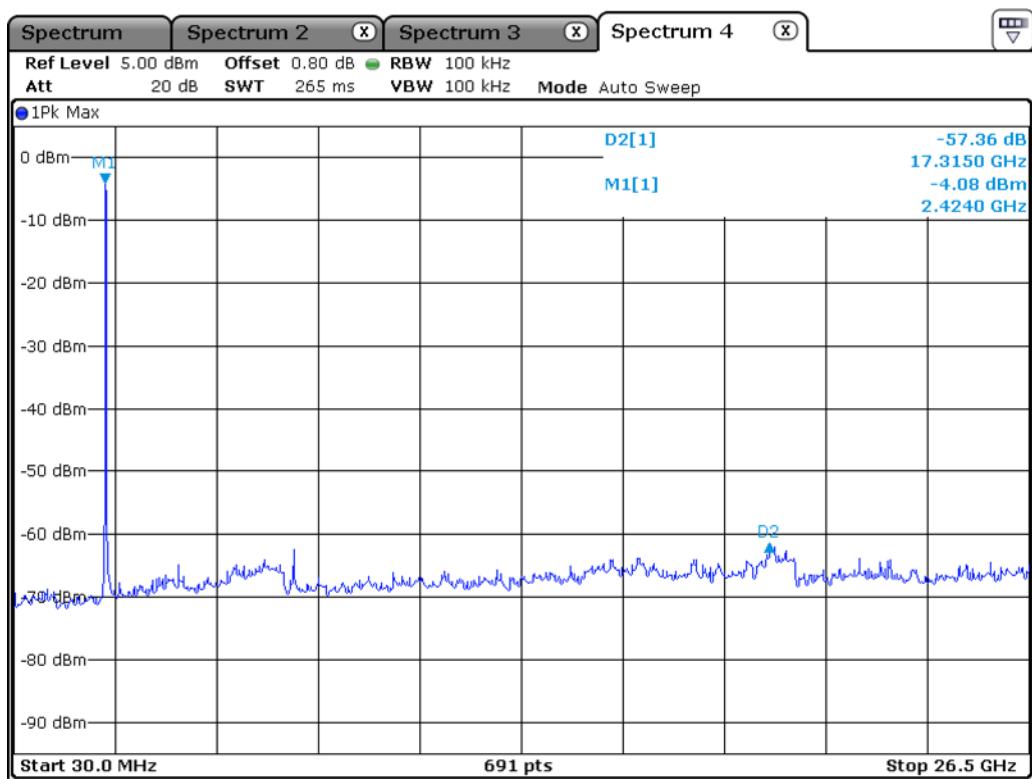
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High Channel – 802.11 g

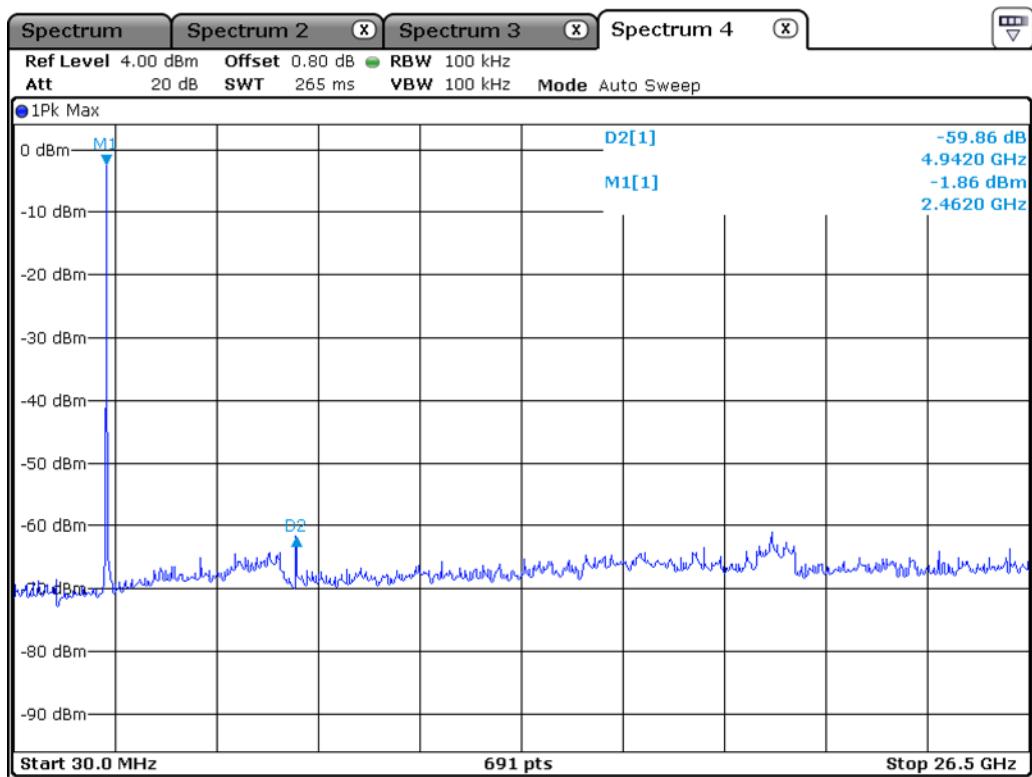
Date: 27.MAY.2019 15:22:04

Frequency Range = 30 MHz ~ 26.5 GHz**Unwanted Emission – Low Channel – 802.11 n20**

Date: 27.MAY.2019 15:22:43

Middle Channel – 802.11 n20

Date: 27.MAY.2019 15:23:03

High Channel – 802.11 n20

Date: 27.MAY.2019 15:23:23

3.2.6 Radiated Spurious Emissions

Procedure:

The EUT was placed on a 0.8 m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 9 kHz ~ 10th harmonic.

RBW = 100 kHz (30 MHz ~ 1 GHz) VBW ≥ RBW

= 1 MHz (1 GHz ~ 10th harmonic)

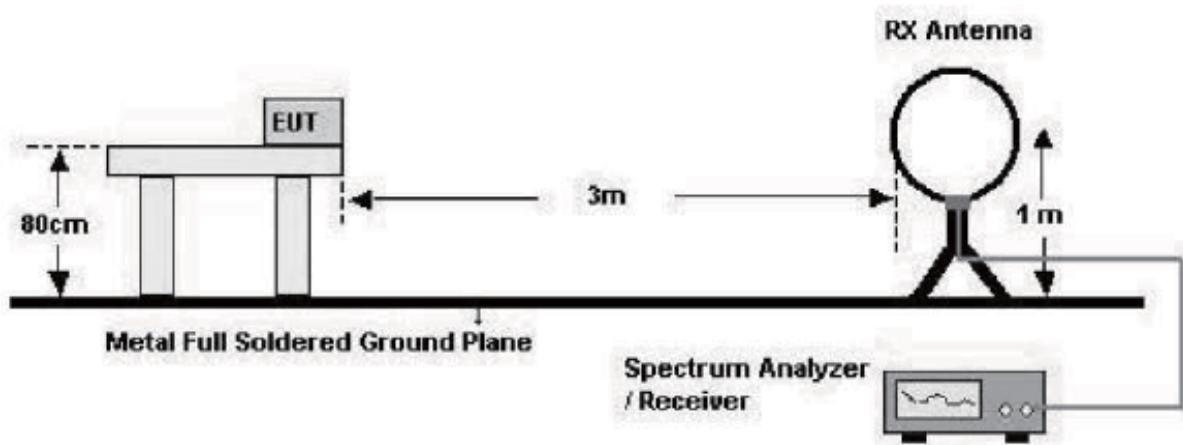
Span = 100 MHz

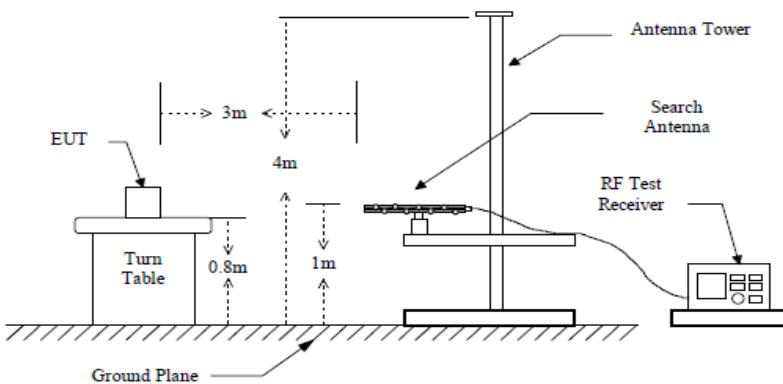
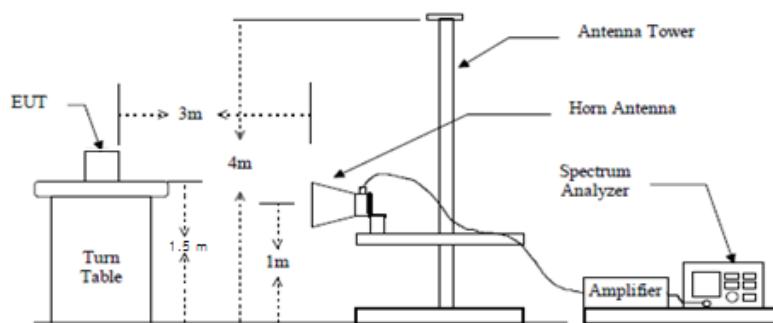
Detector function = peak

Trace = max hold

Sweep = auto

below 30 MHz



below 1 GHz (30 MHz to 1 GHz)**above 1 GHz****Measurement Data: Complies**

- See next pages for actual measured data.
- No other emissions were detected at a level greater than 20 dB below limit include from 9 kHz to 30 MHz.

Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3 m
0.009 ~ 0.490	2400/F(kHz) (@ 300 m)
0.490 ~ 1.705	24000/F(kHz) (@ 30 m)
1.705 ~ 30	30(@ 30 m)
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Measurement Data: (9 kHz – 30 MHz)

Frequency [MHz]	Reading [dBuV/m]		Pol.	Correction Factor		Limits [dBuV/m]		Result [dBuV/m]		Margin [dB]	
	AV	Peak		Antenna	Amp.Gain+Cable	AV	Peak	AV	Peak	AV	Peak
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
*No emissions were detected at a level greater than 20 dB below limit.											
-	-	-	-	-	-	-	-	-	-	-	-

*No emissions were detected at a level greater than 20 dB below limit.

Radiated Emissions (Below 1 GHz) – 802.11 b

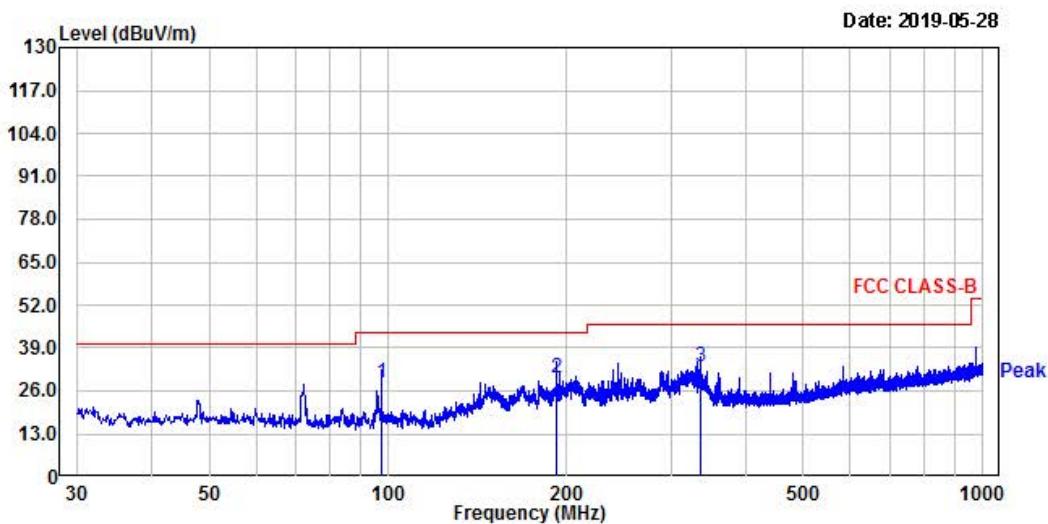
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Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless b mode

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
97.42	46.44	-17.97	28.47	43.50	15.03	102	93	vertical
191.99	44.94	-15.05	29.89	43.50	13.61	183	187	vertical
336.04	43.60	-10.08	33.52	46.00	12.48	108	19	vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



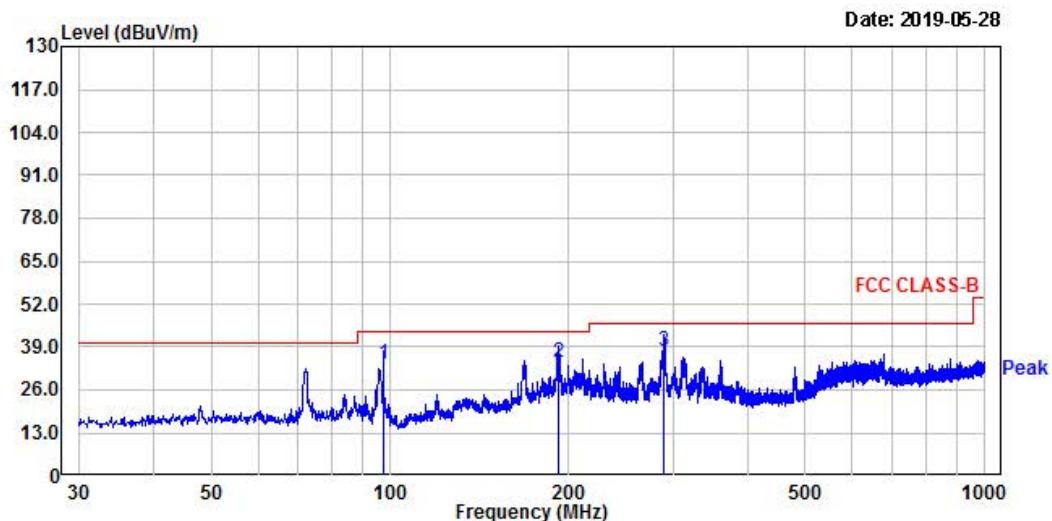
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www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless b mode

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
97.42	51.74	-17.97	33.77	43.50	9.73	379	123	horizontal
192.23	49.45	-15.05	34.40	43.50	9.10	127	185	horizontal
288.38	48.96	-11.31	37.65	46.00	8.35	100	154	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) – 802.11 g

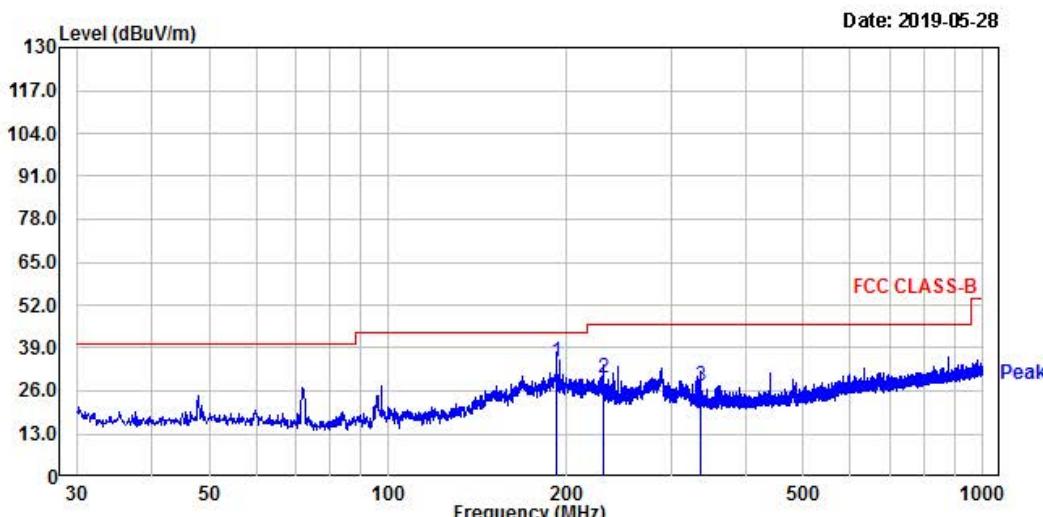
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EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless g mode

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
191.99	49.83	-15.05	34.78	43.50	8.72	153	23	vertical
230.91	44.41	-14.48	29.93	46.00	16.07	209	360	vertical
336.04	37.79	-10.08	27.71	46.00	18.29	127	183	vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



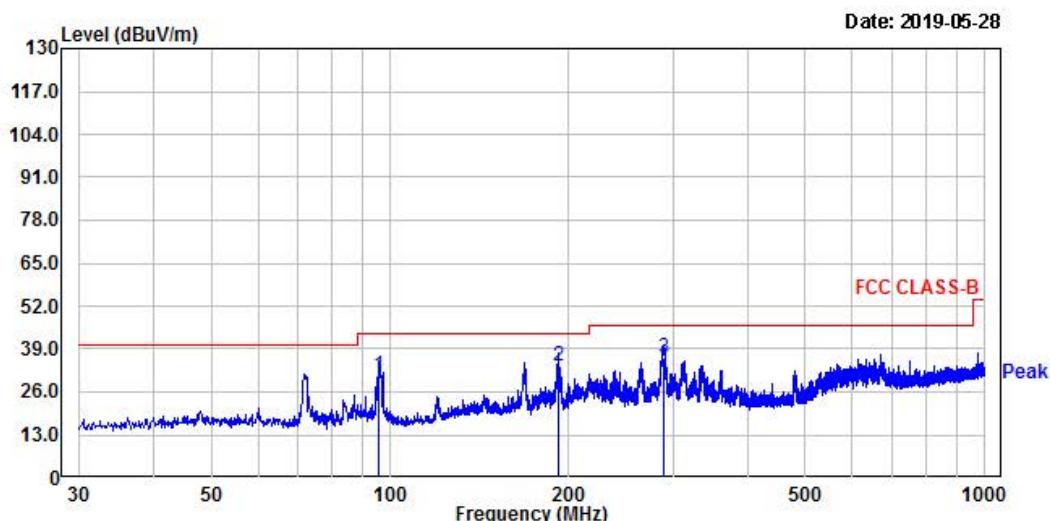
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EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless g mode

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
								QP
95.96	49.35	-18.27	31.08	43.50	12.42	210	327	horizontal
192.23	48.74	-15.05	33.69	43.50	9.81	100	35	horizontal
288.38	47.65	-11.31	36.34	46.00	9.66	127	24	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Below 1 GHz) – 802.11 n20

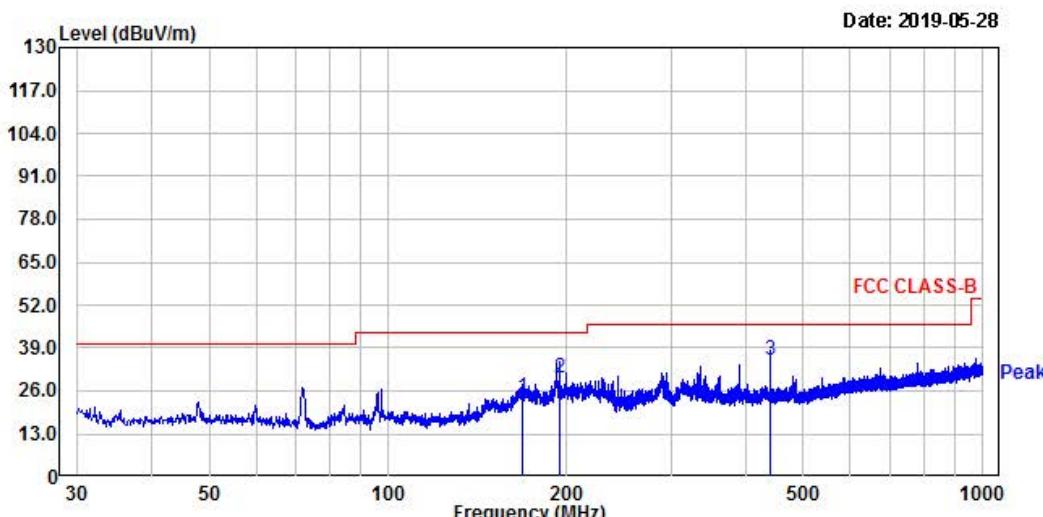
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EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless n mode

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	deg	
168.10	36.78	-12.68	24.10	43.50	19.40	100	20	vertical
195.02	45.12	-15.22	29.90	43.50	13.60	100	123	vertical
438.73	43.42	-7.98	35.44	46.00	10.56	100	92	vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



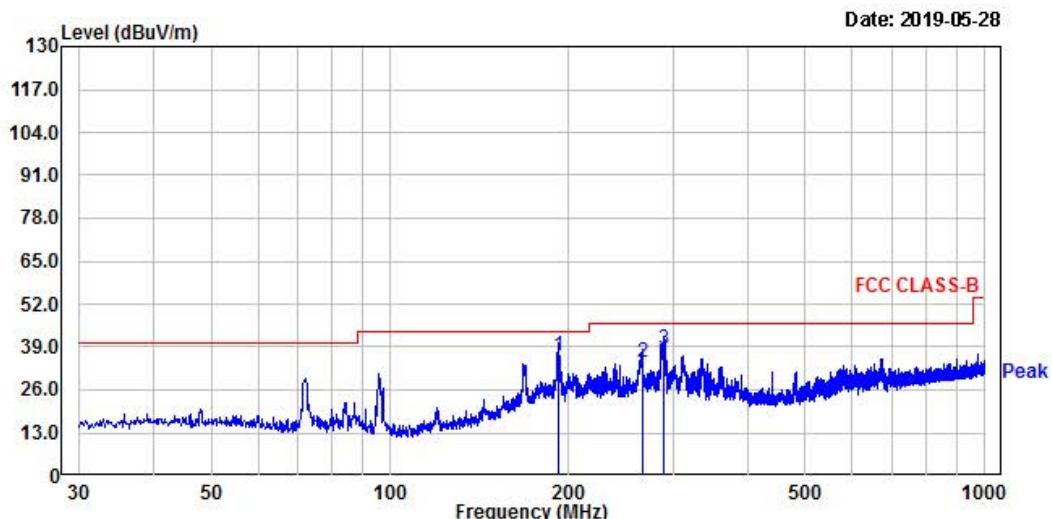
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Temp/Humi: 23 / 36

Test Mode : Wireless n mode

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
QP								
192.11	51.37	-15.05	36.32	43.50	7.18	124	24	horizontal
265.71	46.85	-12.36	34.49	46.00	11.51	100	141	horizontal
288.14	49.74	-11.32	38.42	46.00	7.58	100	166	horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 802.11 b (LOW)

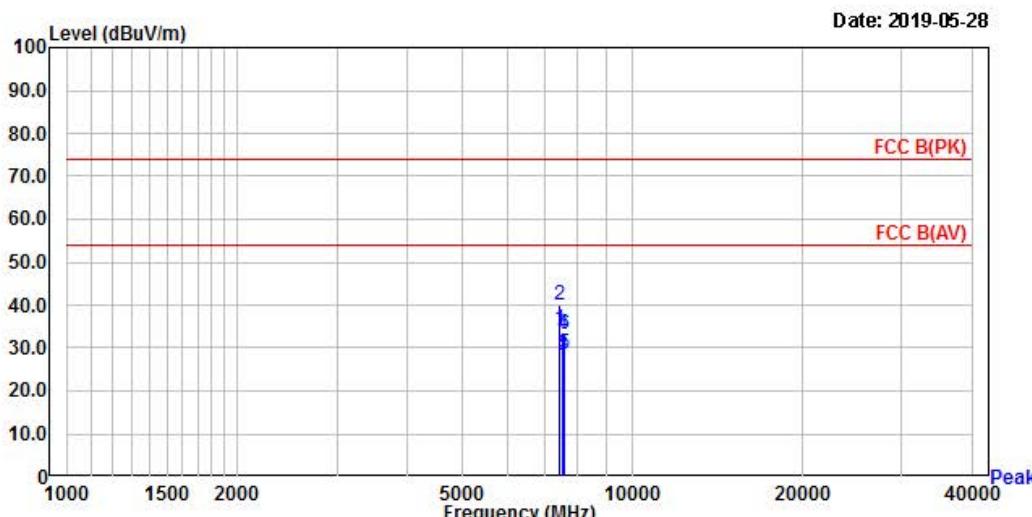
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless b(low)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result Q.P dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
7430.16	25.37	8.89	34.26	54.00	19.74	100	38	Vertical
7430.16	30.96	8.89	39.85	74.00	34.15	100	38	Vertical
7533.64	19.37	8.87	28.24	54.00	25.76	100	87	Vertical
7533.64	24.16	8.87	33.03	74.00	40.97	100	87	Vertical
7578.41	19.73	8.82	28.55	54.00	25.45	100	237	Vertical
7578.41	24.31	8.82	33.13	74.00	40.87	100	237	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



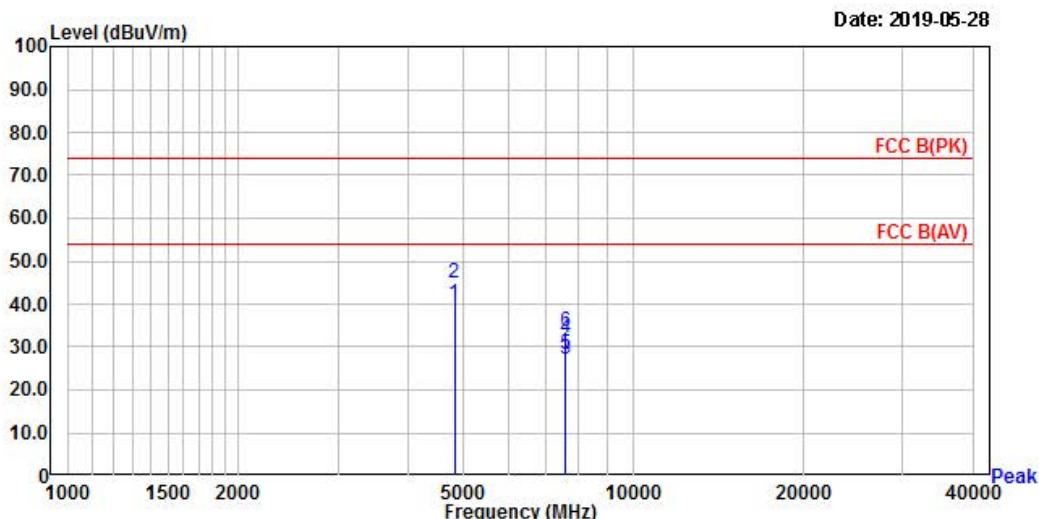
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless b(low)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
								QP
4825.51	36.72	3.12	39.84	54.00	14.16	100	38	Horizontal
4825.51	41.68	3.12	44.80	74.00	29.20	100	38	Horizontal
7587.25	18.54	8.81	27.35	54.00	26.65	100	274	Horizontal
7587.25	23.24	8.81	32.05	74.00	41.95	100	274	Horizontal
7595.49	19.34	8.79	28.13	54.00	25.87	100	178	Horizontal
7595.49	24.69	8.79	33.48	74.00	40.52	100	178	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



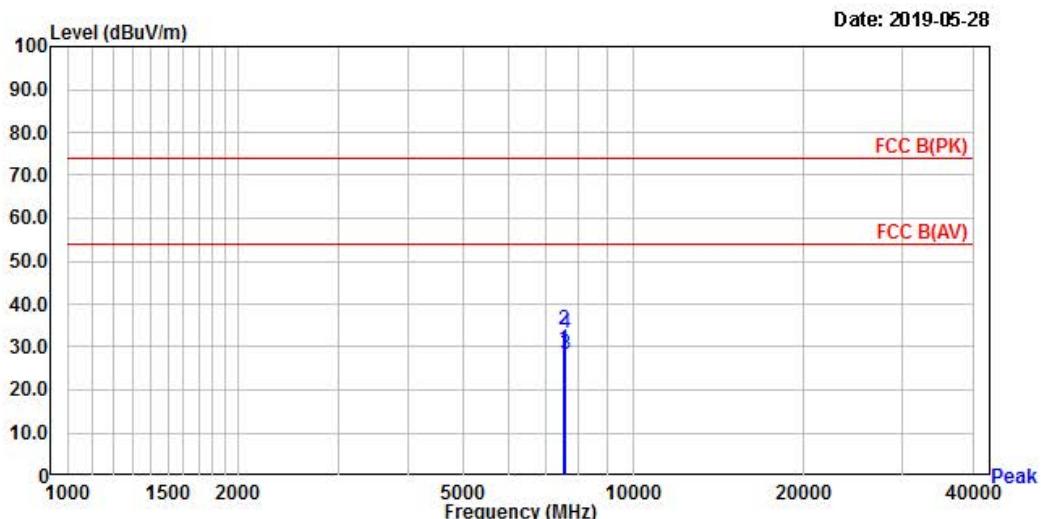
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless b(mid)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
								QP
7535.71	20.53	8.87	29.40	54.00	24.60	100	83	Vertical
7535.71	25.28	8.87	34.15	74.00	39.85	100	83	Vertical
7580.60	19.36	8.82	28.18	54.00	25.82	100	144	Vertical
7580.60	24.56	8.82	33.38	74.00	40.62	100	144	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



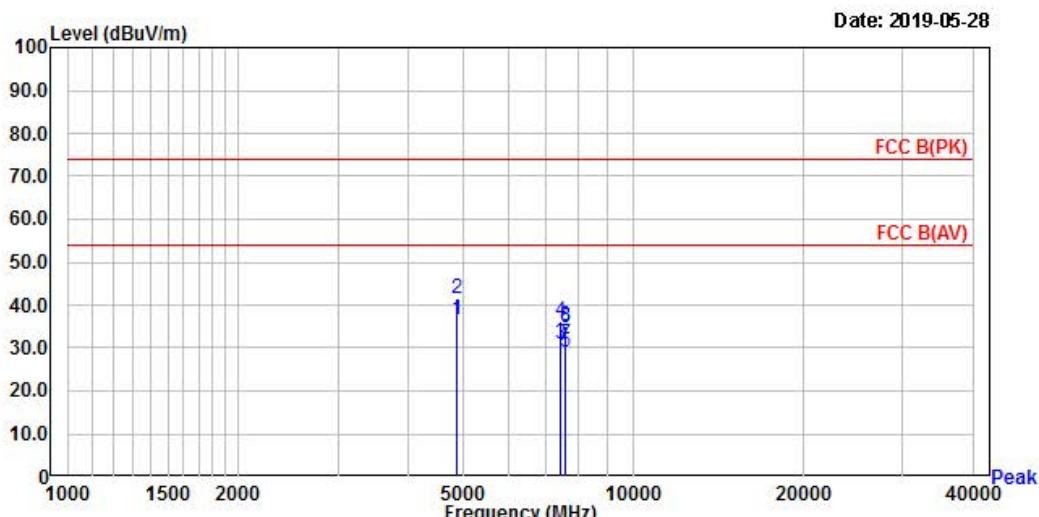
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless b(mid)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
		QP						
4884.81	33.21	3.29	36.50	54.00	17.50	100	87	Horizontal
4884.81	38.21	3.29	41.50	74.00	32.50	100	87	Horizontal
7427.45	22.15	8.89	31.04	54.00	22.96	100	132	Horizontal
7427.45	27.15	8.89	36.04	74.00	37.96	100	132	Horizontal
7588.41	20.32	8.81	29.13	54.00	24.87	100	187	Horizontal
7588.41	25.77	8.81	34.58	74.00	39.42	100	187	Horizontal
7594.68	21.99	8.79	30.78	54.00	23.22	100	233	Horizontal
7594.68	26.24	8.79	35.03	74.00	38.97	100	233	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 802.11 b (HIGH)

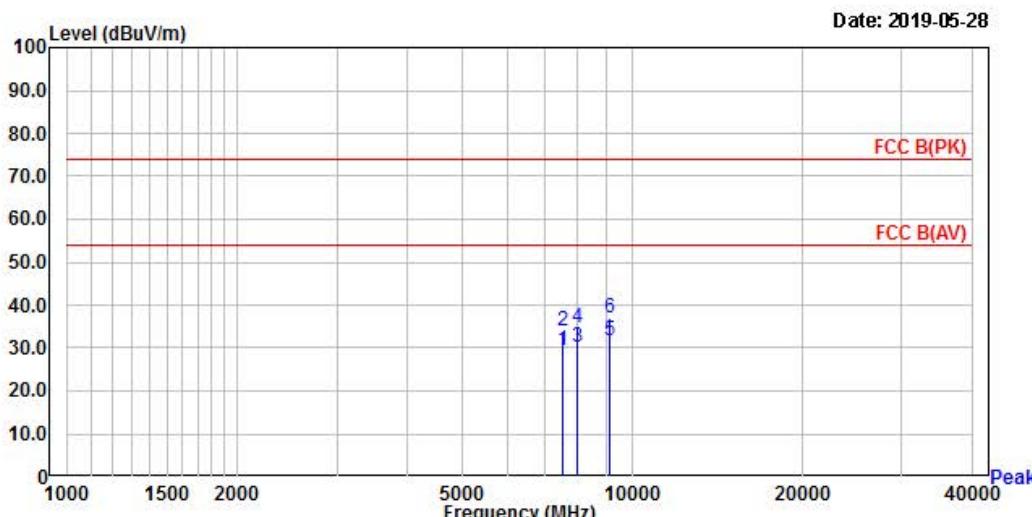
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless b(high)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result Q.P dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
7548.51	20.40	8.86	29.26	54.00	24.74	100	74	Horizontal
7548.51	25.10	8.86	33.96	74.00	40.04	100	74	Horizontal
8003.04	21.68	8.32	30.00	54.00	24.00	100	182	Horizontal
8003.04	26.34	8.32	34.66	74.00	39.34	100	182	Horizontal
9152.47	22.33	9.48	31.81	54.00	22.19	100	241	Horizontal
9152.47	27.53	9.48	37.01	74.00	36.99	100	241	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



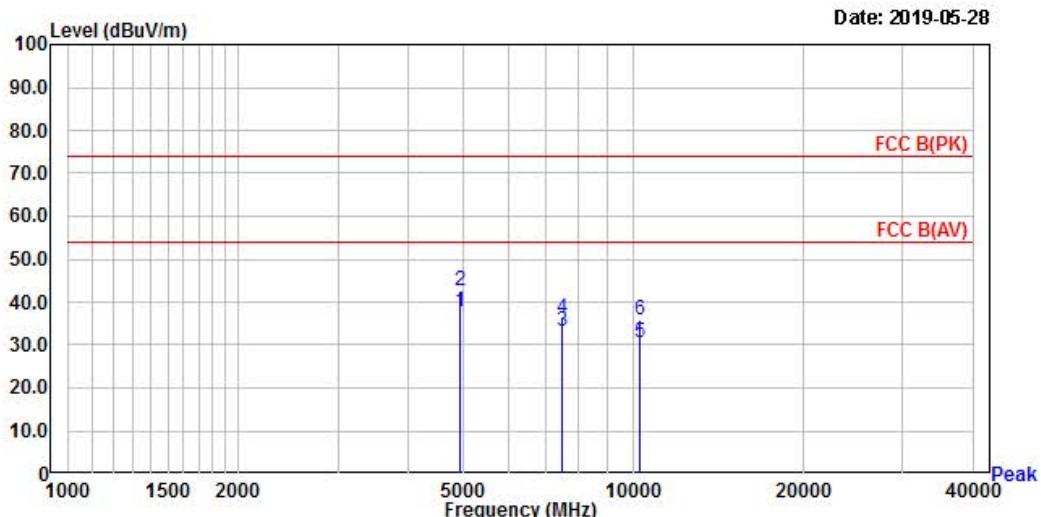
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless b(high)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
								QP
4943.88	34.23	3.47	37.70	54.00	16.30	100	99	Vertical
4943.88	39.23	3.47	42.70	74.00	31.30	100	99	Vertical
7463.33	24.16	8.90	33.06	54.00	20.94	100	128	Vertical
7463.33	27.16	8.90	36.06	74.00	37.94	100	128	Vertical
10257.42	19.63	11.07	30.70	54.00	23.30	100	215	Vertical
10257.42	24.83	11.07	35.90	74.00	38.10	100	215	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 802.11 g (LOW)

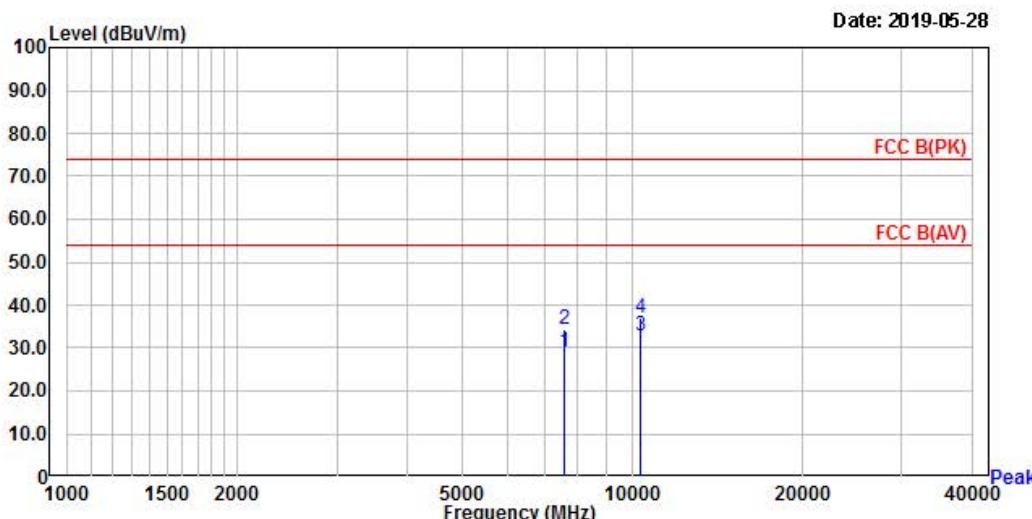
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless g(low)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
QP								
7585.46	20.41	8.81	29.22	54.00	24.78	100	95	Vertical
7585.46	25.48	8.81	34.29	74.00	39.71	100	95	Vertical
10332.66	21.72	11.21	32.93	54.00	21.07	100	128	Vertical
10332.66	25.72	11.21	36.93	74.00	37.07	100	128	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



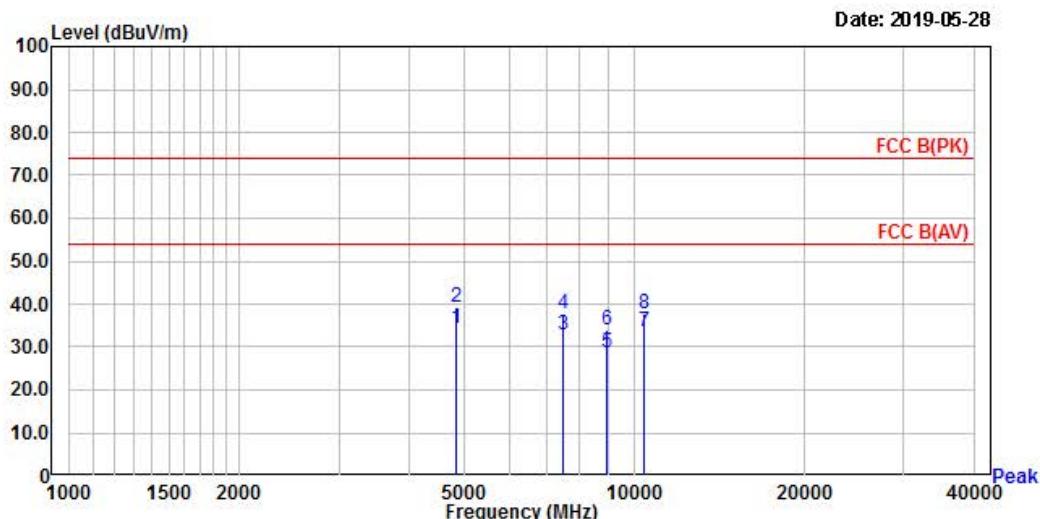
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless g(low)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
4826.03	31.39	3.12	34.51	54.00	19.49	100	55	Horizontal
4826.03	36.23	3.12	39.35	74.00	34.65	100	55	Horizontal
7486.61	23.94	8.91	32.85	54.00	21.15	100	328	Horizontal
7486.61	28.94	8.91	37.85	74.00	36.15	100	328	Horizontal
8965.52	19.33	9.37	28.70	54.00	25.30	100	88	Horizontal
8965.52	24.75	9.37	34.12	74.00	39.88	100	88	Horizontal
10415.68	22.20	11.37	33.57	54.00	20.43	100	127	Horizontal
10415.68	26.20	11.37	37.57	74.00	36.43	100	127	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 802.11 g(MID)

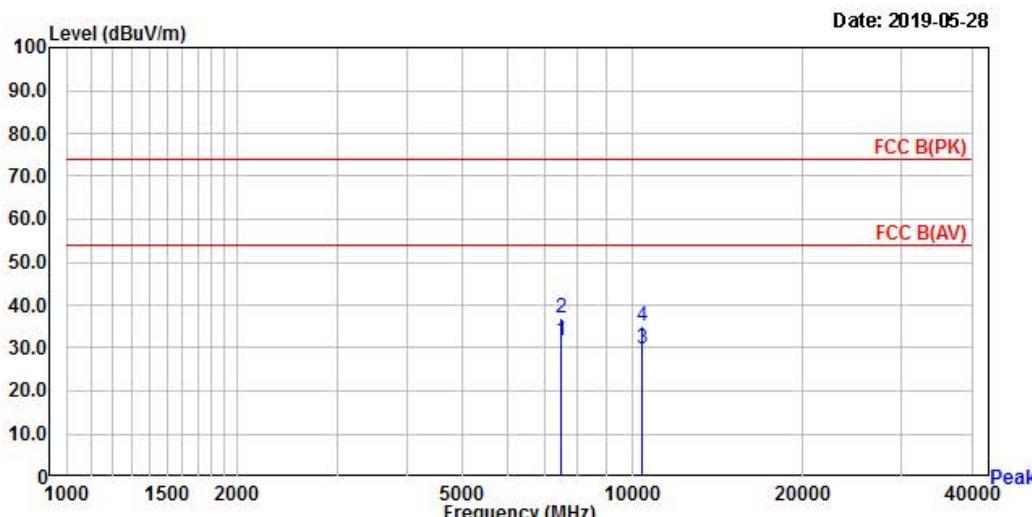
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless g(mid)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	QP Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
7499.32	22.75	8.91	31.66	54.00	22.34	100	216	Vertical
7499.32	27.98	8.91	36.89	74.00	37.11	100	216	Vertical
10394.50	18.31	11.32	29.63	54.00	24.37	100	336	Vertical
10394.50	23.71	11.32	35.03	74.00	38.97	100	336	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



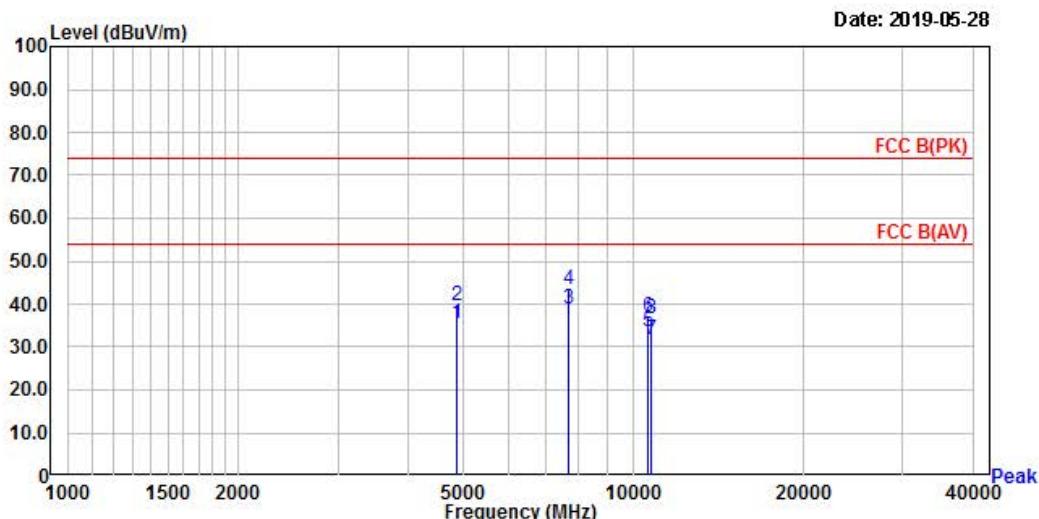
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless g(mid)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
QP								
4884.93	32.11	3.29	35.40	54.00	18.60	100	125	Horizontal
4884.93	36.37	3.29	39.66	74.00	34.34	100	125	Horizontal
7680.14	30.12	8.70	38.82	54.00	15.18	100	154	Horizontal
7680.14	34.66	8.70	43.36	74.00	30.64	100	154	Horizontal
10641.37	21.89	11.76	33.65	54.00	20.35	100	187	Horizontal
10641.37	25.17	11.76	36.93	74.00	37.07	100	187	Horizontal
10775.21	19.72	12.01	31.73	54.00	22.27	100	218	Horizontal
10775.21	24.58	12.01	36.59	74.00	37.41	100	218	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 802.11 g(HIGH)

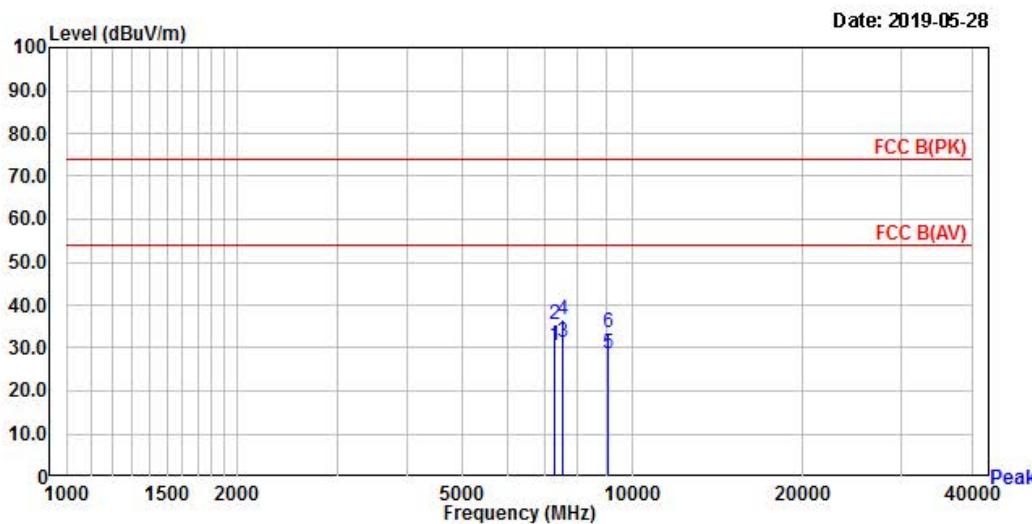
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
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Fax : +82-31-3236010
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless g(high)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
QP								
7270.88	21.71	8.85	30.56	54.00	23.44	100	193	Vertical
7270.88	26.71	8.85	35.56	74.00	38.44	100	193	Vertical
7531.64	22.43	8.87	31.30	54.00	22.70	100	218	Vertical
7531.64	27.65	8.87	36.52	74.00	37.48	100	218	Vertical
9043.50	19.16	9.43	28.59	54.00	25.41	100	275	Vertical
9043.50	24.16	9.43	33.59	74.00	40.41	100	275	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



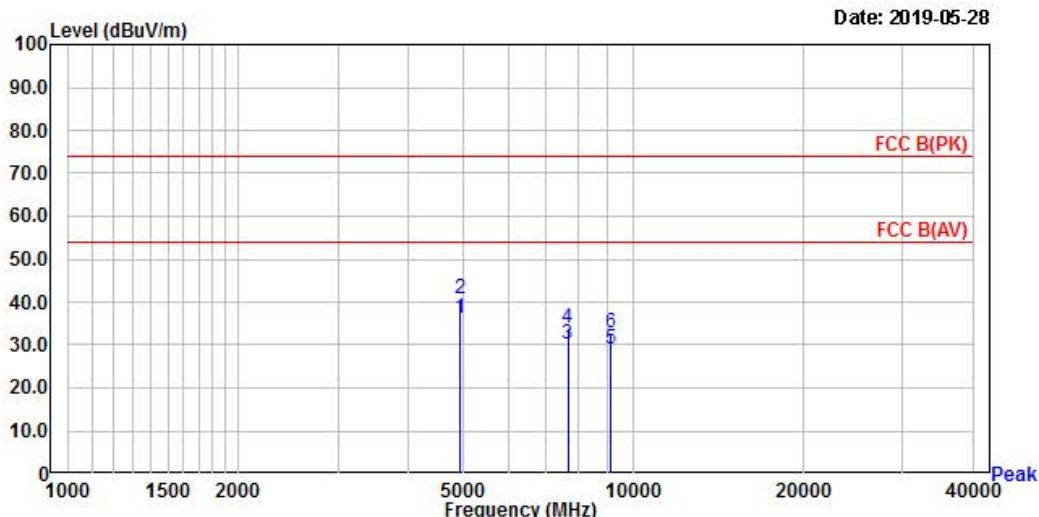
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless g(high)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
								QP
4945.02	32.66	3.48	36.14	54.00	17.86	100	32	Horizontal
4945.02	37.18	3.48	40.66	74.00	33.34	100	32	Horizontal
7660.42	21.29	8.72	30.01	54.00	23.99	100	28	Horizontal
7660.42	25.32	8.72	34.04	74.00	39.96	100	28	Horizontal
9115.37	19.52	9.46	28.98	54.00	25.02	100	298	Horizontal
9115.37	23.52	9.46	32.98	74.00	41.02	100	298	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 802.11 n20 (LOW)

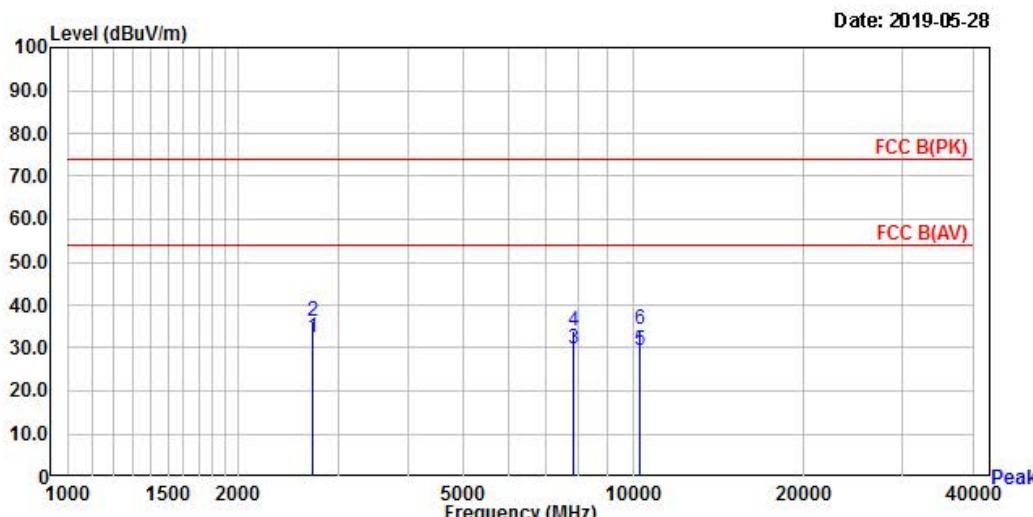
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless n20(low)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
		QP						
2715.16	36.15	-3.78	32.37	54.00	21.63	100	127	Vertical
2715.16	40.15	-3.78	36.37	74.00	37.63	100	127	Vertical
7825.69	21.33	8.52	29.85	54.00	24.15	100	183	Vertical
7825.69	25.42	8.52	33.94	74.00	40.06	100	183	Vertical
10292.90	18.33	11.15	29.48	54.00	24.52	100	258	Vertical
10292.90	23.13	11.15	34.28	74.00	39.72	100	258	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



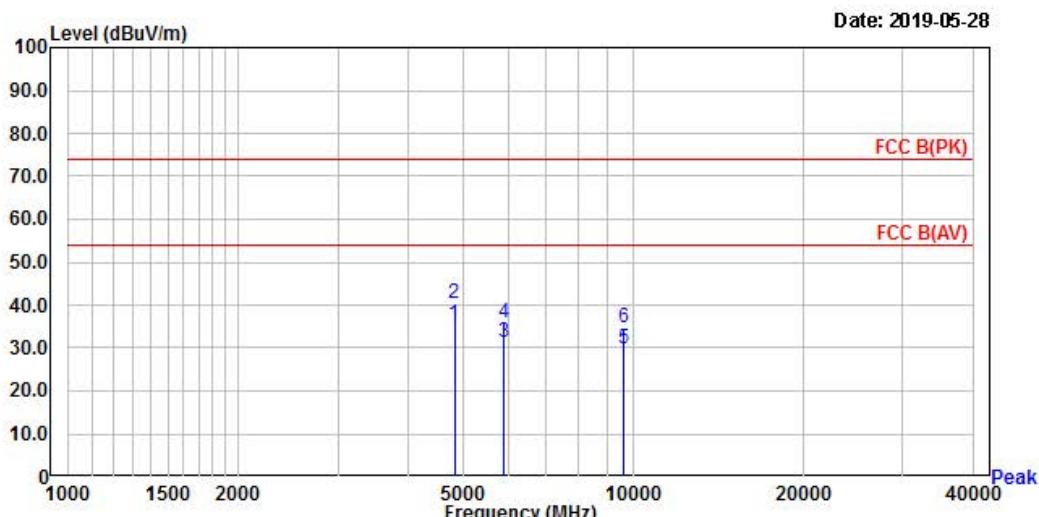
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
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Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless n20(low)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
		Q.P						
4824.59	32.39	3.12	35.51	54.00	18.49	100	215	Horizontal
4824.59	37.39	3.12	40.51	74.00	33.49	100	215	Horizontal
5906.41	24.73	6.54	31.27	54.00	22.73	100	177	Horizontal
5906.41	29.49	6.54	36.03	74.00	37.97	100	177	Horizontal
9615.51	19.89	9.85	29.74	54.00	24.26	100	211	Horizontal
9615.51	24.89	9.85	34.74	74.00	39.26	100	211	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 802.11 n20(MID)

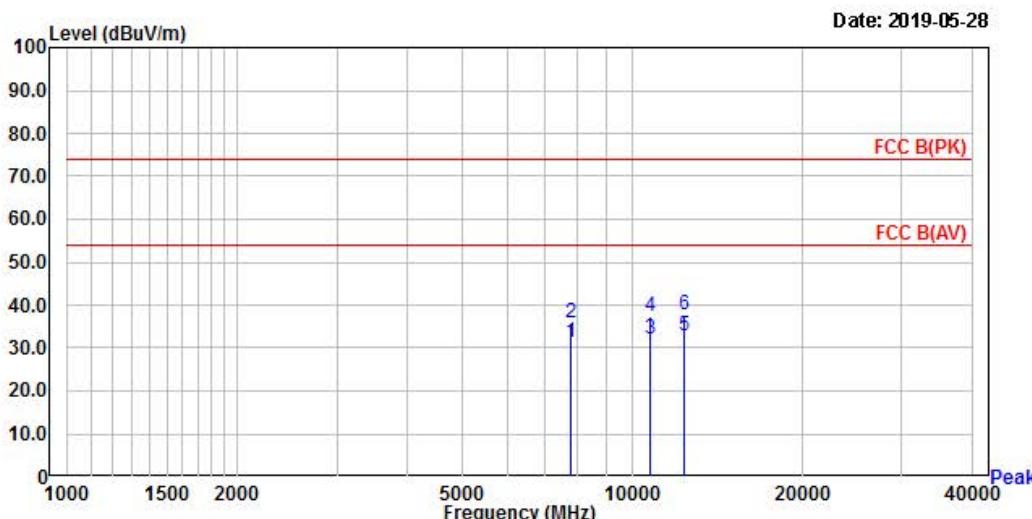
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-3236008,9
Fax : +82-31-3236010
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless n20(mid)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result Q.P dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
7779.75	22.70	8.57	31.27	54.00	22.73	100	165	Vertical
7779.75	27.43	8.57	36.00	74.00	38.00	100	165	Vertical
10793.46	20.19	12.03	32.22	54.00	21.78	100	125	Vertical
10793.46	25.49	12.03	37.52	74.00	36.48	100	125	Vertical
12330.67	18.38	14.43	32.81	54.00	21.19	100	181	Vertical
12330.67	23.48	14.43	37.91	74.00	36.09	100	181	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



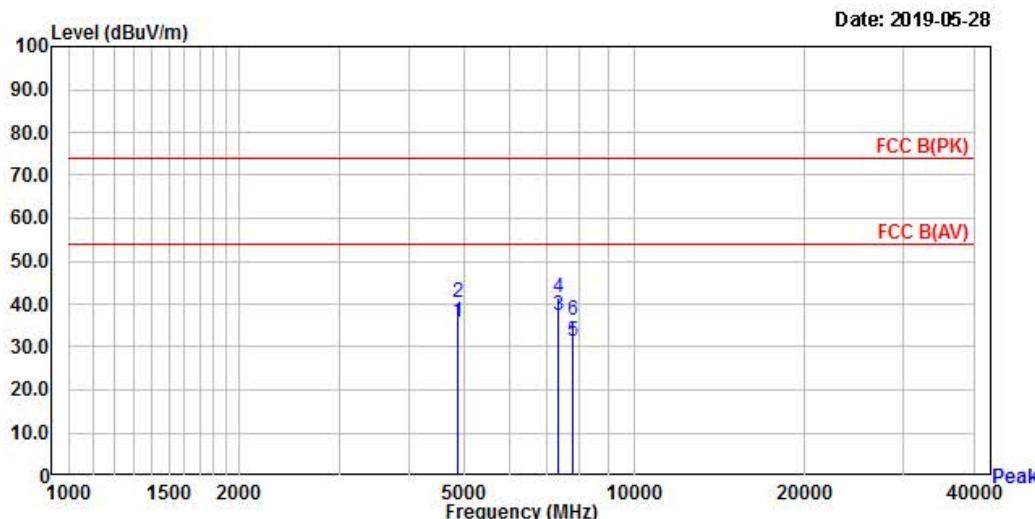
4, Songjuro 236Beon-gil, yanggi-myeon,
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www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless n20(mid)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
QP								
4884.26	32.56	3.29	35.85	54.00	18.15	100	87	Horizontal
4884.26	37.06	3.29	40.35	74.00	33.65	100	87	Horizontal
7331.15	28.55	8.86	37.41	54.00	16.59	100	98	Horizontal
7331.15	32.55	8.86	41.41	74.00	32.59	100	98	Horizontal
7783.76	22.60	8.57	31.17	54.00	22.83	100	128	Horizontal
7783.76	27.60	8.57	36.17	74.00	37.83	100	128	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

Radiated Emissions (Above 1 GHz) – 802.11 n20(HIGH)

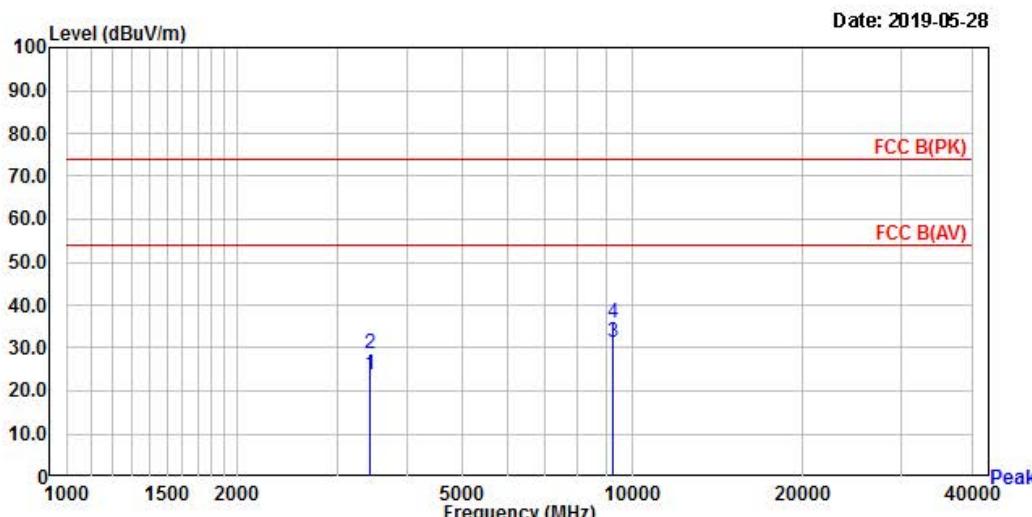
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
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www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless n20(high)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F dB	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
QP								
3440.98	24.63	-0.80	23.83	54.00	30.17	100	36	Vertical
3440.98	29.63	-0.80	28.83	74.00	45.17	100	36	Vertical
9234.26	21.77	9.51	31.28	54.00	22.72	100	129	Vertical
9234.26	26.49	9.51	36.00	74.00	38.00	100	129	Vertical

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain



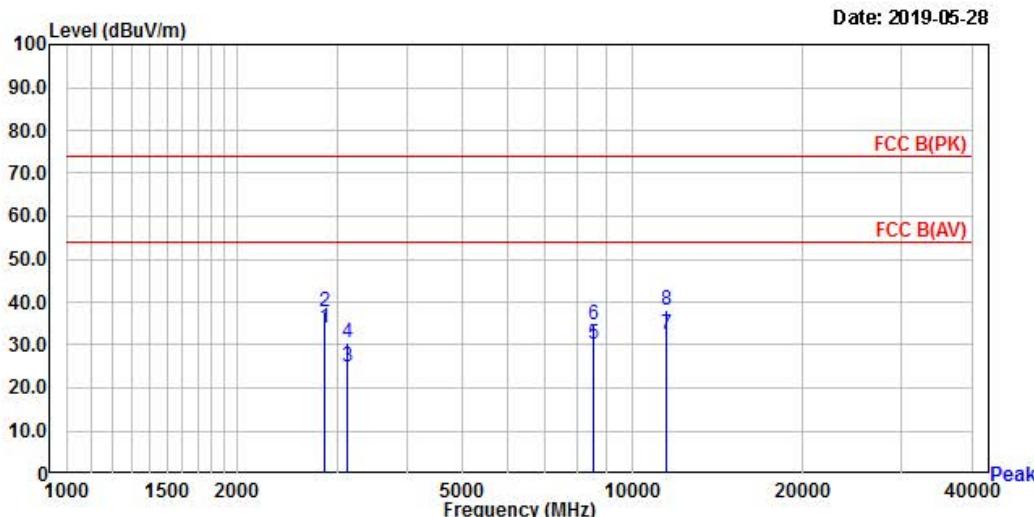
4, Songjuro 236Beon-gil, yanggi-myeon,
Yongin-si, Gyeonggi-do, Korea
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Fax : +82-31-3236010
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EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless n20(high)

Tested by: KWON H C



Freq MHz	Reading dBuV	C.F. dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
2848.11	37.32	-3.33	33.99	54.00	20.01	100	48	Horizontal
2848.11	41.02	-3.33	37.69	74.00	36.31	100	48	Horizontal
3122.76	27.12	-2.24	24.88	54.00	29.12	100	121	Horizontal
3122.76	32.92	-2.24	30.68	74.00	43.32	100	121	Horizontal
8522.29	21.31	8.95	30.26	54.00	23.74	100	136	Horizontal
8522.29	25.74	8.95	34.69	74.00	39.31	100	136	Horizontal
11481.53	19.17	13.23	32.40	54.00	21.60	100	218	Horizontal
11481.53	24.97	13.23	38.20	74.00	35.80	100	218	Horizontal

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

3.2.6 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: NA

Minimum Standard: FCC Part 15.207(a) / EN 55022

Class B

Frequency Range	quasi-peak	Average
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

3.3 Measurement Uncertainty

Parameter	Uncertainty
Centre Frequency	$\pm 1 \times 10^{-5}$ MHz
Occupied Channel Bandwidth	± 5 %
RF output power, conducted	± 1.5 dB
Power Spectral Density, conducted	± 3 dB
Unwanted Emissions, conducted	± 3 dB
All emissions, radiated	± 6 dB
Temperature	± 1 °C
Humidity	± 5 %
DC and low frequency voltages	± 3 %
Time	± 5 %
Duty Cycle	± 5 %

APPENDIX
TEST EQUIPMENT USED FOR TESTS

	Use	Description	Model No.	Serial No.	Manufacturer	Interval	Last Cal. Date
1	■	Signal Analyzer (9 kHz ~ 30 GHz)	FSV30	100757	R&S	1 year	2018-09-06
2		SYNTHESIZED CW GENERATOR	83711B	US34490456	HP	1 year	2019-03-16
3		Attenuator (3 dB)	8491A	37822	HP	1 year	2018-09-06
4		Attenuator (10 dB)	8491A	63196	HP	1 year	2018-09-06
5	■	EMI Test Receiver (~7 GHz)	ESCI7	100722	R&S	1 year	2018-09-06
6	■	RF Amplifier (~1.3 GHz)	8447D OPT 010	2944A07684	HP	1 year	2018-09-06
7	■	RF Amplifier (1~26.5 GHz)	8449B	3008A02126	HP	1 year	2019-03-16
8	■	Horn Antenna (1~18 GHz)	3115	00114105	ETS	2 year	2018-09-26
9		DRG Horn (Small)	3116B	81109	ETS-Lindgren	2 year	2018-05-03
10	■	DRG Horn (Small)	3116B	133350	ETS-Lindgren	2 year	2018-05-03
11	■	TRILOG Antenna	VULB 9160	9160-3237	SCHWARZBECK	2 year	2019-03-23
12		Temp.Humidity Data Logger	SK-L200TH II A	00801	SATO	1 year	2018-09-06
13	■	DC Power Supply	6674A	3637A01657	Agilent	-	-
14	■	Power Meter	EPM-441A	GB32481702	HP	1 year	2019-03-16
15	■	Power Sensor	8481A	3318A94972	HP	1 year	2018-09-06
16		Audio Analyzer	8903B	3729A18901	HP	1 year	2018-09-06
17		Modulation Analyzer	8901B	3749A05878	HP	1 year	2018-09-06
18		TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2018-09-06
19		Stop Watch	HS-3	812Q08R	CASIO	2 year	2019-03-16
20		LISN	KNW-407	8-1430-1	Kyoritsu	1 year	2018-09-06
21		Two-Lime V-Network	ESH3-Z5	893045/017	R&S	1 year	2019-03-16
22		Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	1 year	2019-03-16
23		Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	1 year	2019-03-16
24		OSP120 BASE UNIT	OSP120	101230	R&S	1 year	2019-03-16
25	■	Signal Generator(100 kHz ~ 40 GHz)	SMB100A	177621	R&S	1 year	2019-03-16
26		Vector Signal Generator(9kHz ~ 6 GHz)	SMBV100A	255081	R&S	1 year	2019-03-16
27		Signal Analyzer (10 Hz ~ 40 GHz)	FSV40	101367	R&S	1 year	2019-03-16