

Dates of Tests: April 24 ~ May 28, 2019  
Test Report S/N: LR500111905O  
Test Site : LTA CO., LTD.

## CERTIFICATION OF COMPLIANCE

FCC ID.

**2AKDGD-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 15.407 Subpart E ; ANSI C-63.4-2014 ANSI C-63.10-2013
Frequency Range	:	5745 MHz ~ 5825 MHz (802.11 b/g/n20)
Max. Output Power	:	Max 17.87 dBm – Conducted(802.11 a) Max 17.56 dBm – Conducted(802.11 an20)
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

---

## **TABLE OF CONTENTS**

1. GENERAL INFORMATION	-----	3
2. INFORMATION ABOUT TEST ITEM	-----	4
3. TEST REPORT	-----	5
3.1 SUMMARY OF TESTS	-----	5
3.2 TECHNICAL CHARACTERISTICS TEST	-----	6
3.2.1 6 dB BANDWIDTH	-----	6
3.2.2 PEAK OUTPUT POWER	-----	11
3.2.3 POWER SPECTRAL DENSITY	-----	15
3.2.4 BAND EDGE	-----	19
3.2.5 CONDUCTED SPURIOUS EMISSIONS	-----	22
3.2.6 RADIATED SPURIOUS EMISSIONS	-----	26
3.2.7 AC CONDUCTED EMISSIONS	-----	39
3.3 Measurement Uncertainty	-----	40
 <b>APPENDIX</b>		
APPENDIX TEST EQUIPMENT USED FOR TESTS	-----	41

## 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](mailto: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.



### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Test Condition	Status (note 1)
15.407(e)	6 dB Bandwidth (only for UNII-3)	Conducted	C
15.407(a)	Transmitter Peak Output Power		C
15.407(a)	Transmitter Power Spectral Density		C
15.407(b)	Band Edge		C
15.407 (a)	Transmitter Radiated Spurious Emission	Radiated	C
15.207	AC Conducted Emissions	Conducted	NA
15.203	Antenna requirement	-	C

→ 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, Subpart E(15.407) ; ANSI C-63.4-2014

\*FCC KDB Publication No. 789033 D02 V02r01

## 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 a)

Frequency (MHz)	Test Results	
	Measured Bandwidth (MHz)	Result
5745	17.87	Complies
5785	17.95	Complies
5825	17.32	Complies

(802.11 an20)

Frequency (MHz)	Test Results	
	Measured Bandwidth (MHz)	Result
5745	17.56	Complies
5785	17.53	Complies
5825	17.20	Complies

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

6 dB Bandwidth > 500 kHz

---

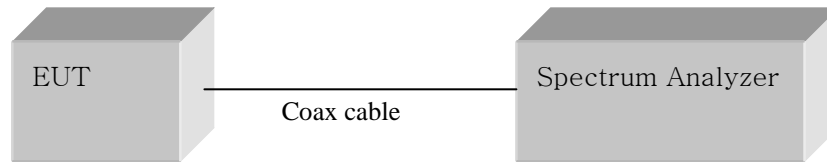
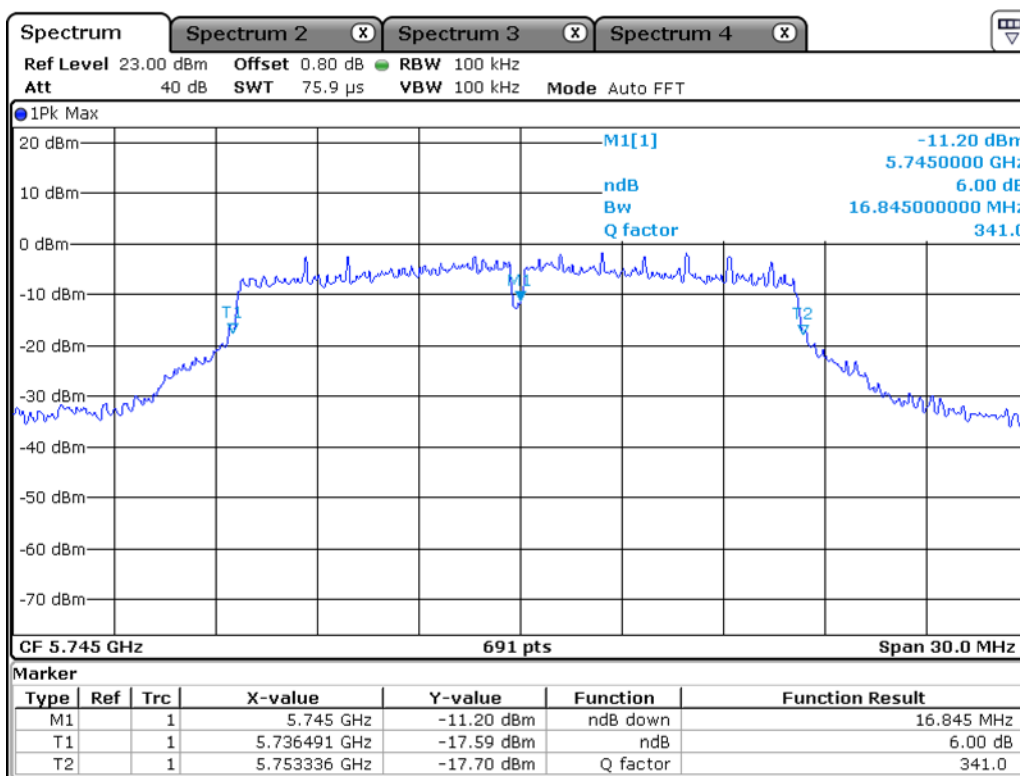
**Measurement Setup**

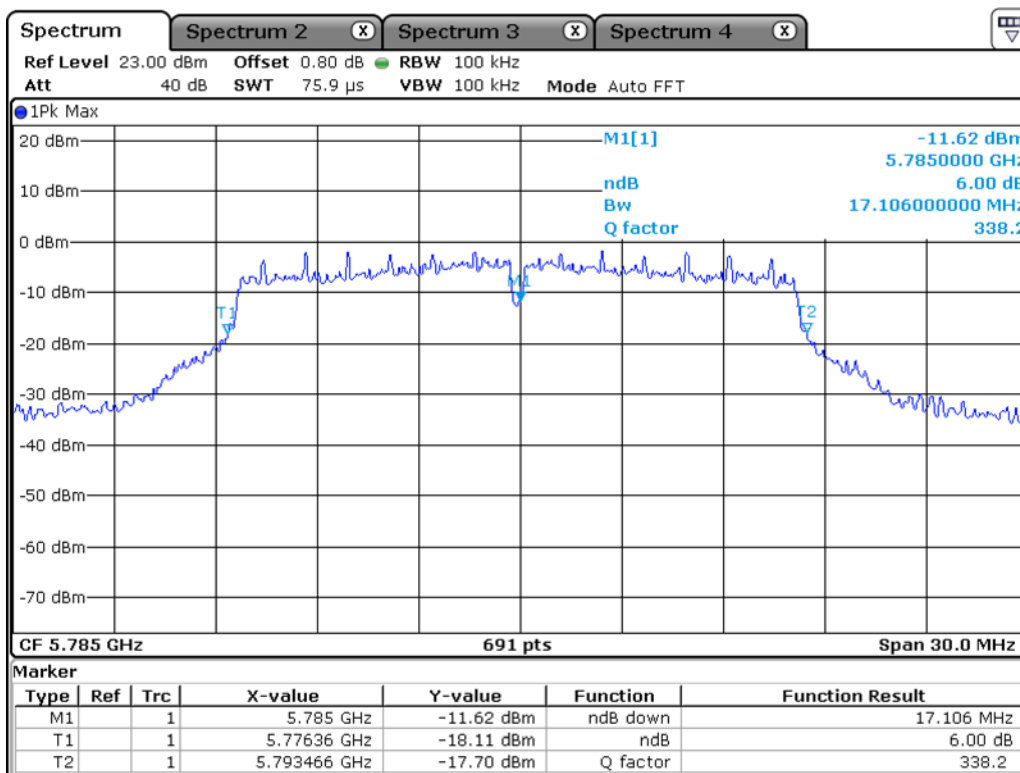
Figure 1: Measurement setup for the carrier frequency separation

## Low Channel – 802.11 a



Date: 27.MAY.2019 16:05:56

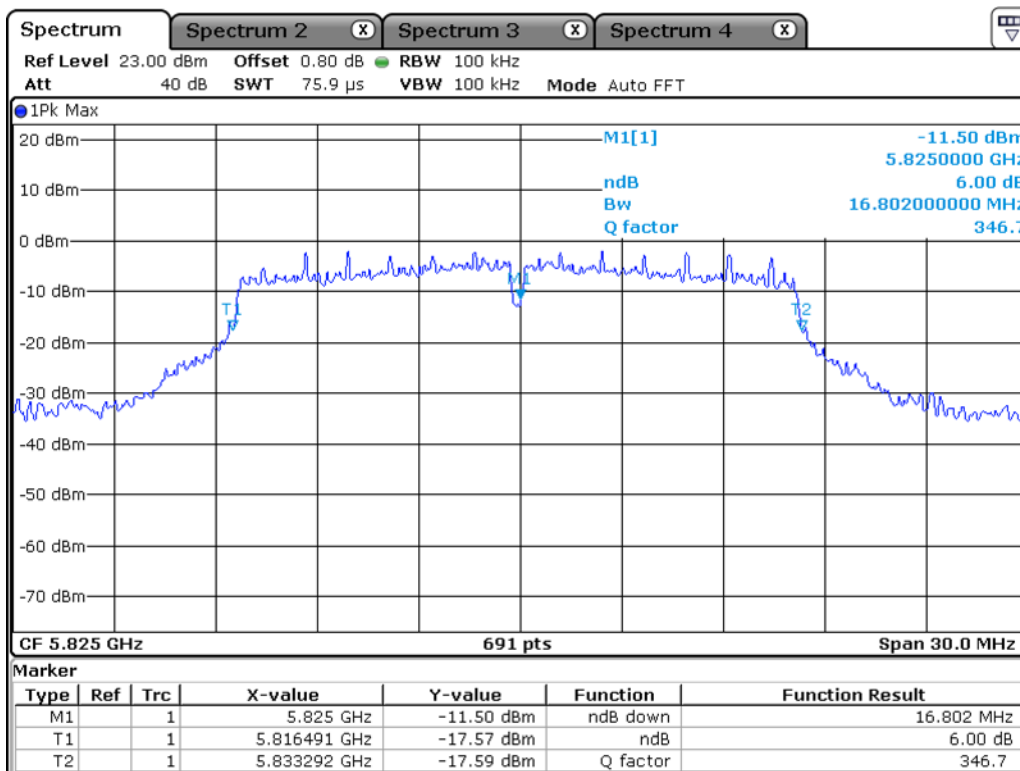
## Middle Channel – 802.11 a



Date: 27.MAY.2019 16:06:32

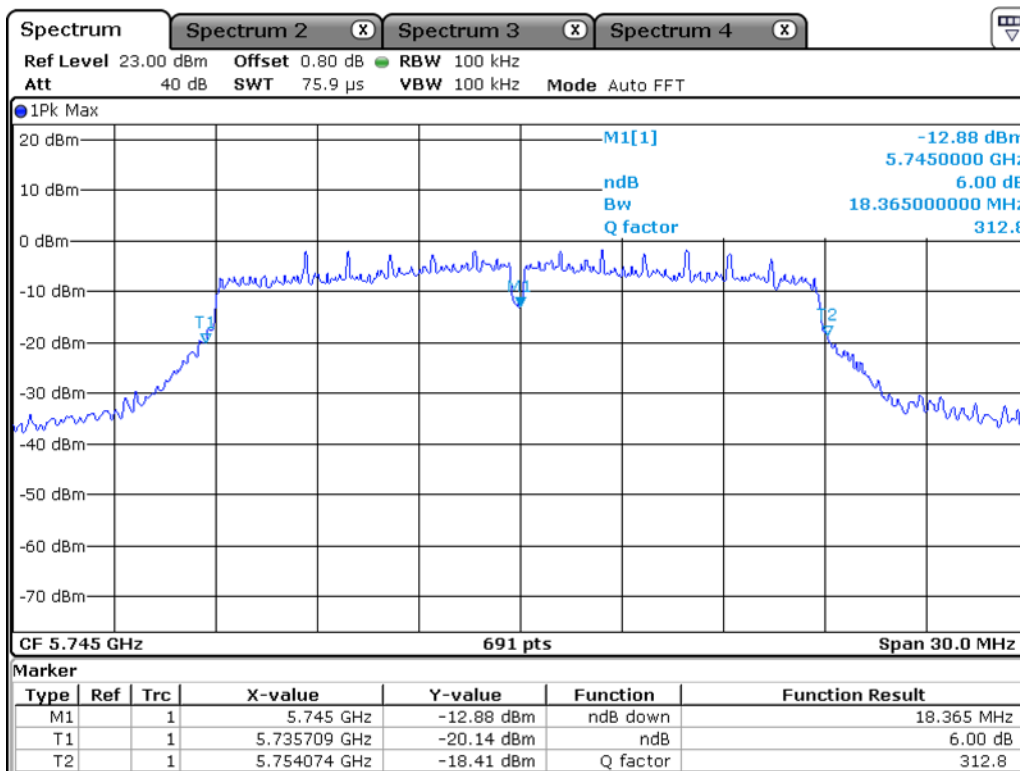


## High Channel – 802.11 a



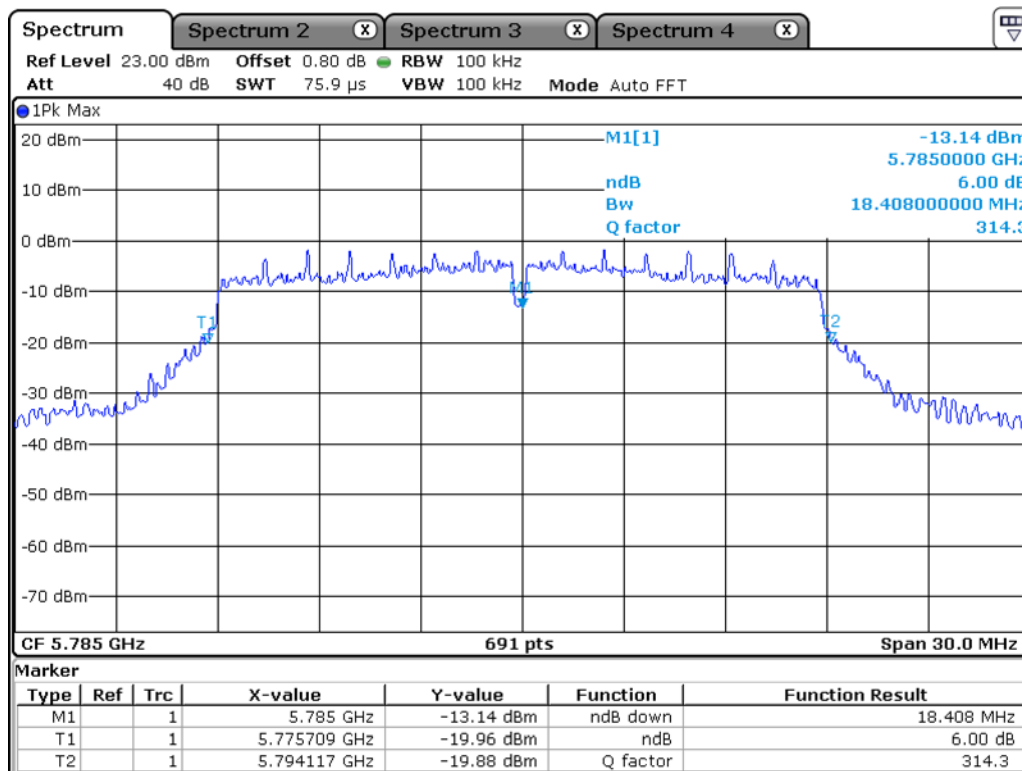
Date: 27.MAY.2019 16:06:50

## Low Channel – 802.11 an20



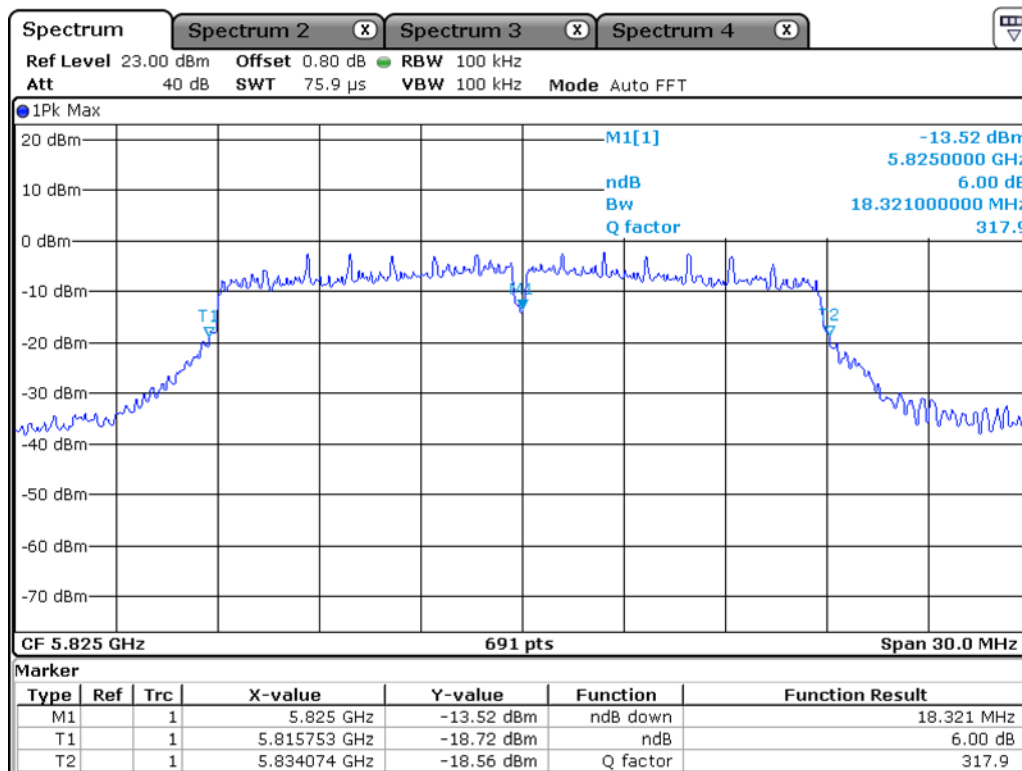
Date: 27.MAY.2019 16:07:09

## Middle Channel – 802.11 an20



Date: 27.MAY.2019 16:07:29

## High Channel – 802.11 an20



Date: 27.MAY.2019 16:07:47

### 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

VBW = 3MHz (VBW  $\geq$  3 \* RBW)

Sweep = auto

Detector function = peak

#### Measurement Data : **Complies**

(802.11 a)

Frequency (MHz)	Test Results		
	dBm	W	Result
5745	17.87	0.06	Complies
5785	17.95	0.06	Complies
5825	17.32	0.05	Complies

(802.11 an20)

Frequency (MHz)	Test Results		
	dBm	W	Result
5745	17.56	0.06	Complies
5785	17.53	0.06	Complies
5825	17.20	0.05	Complies

- See next pages for actual measured spectrum plots.

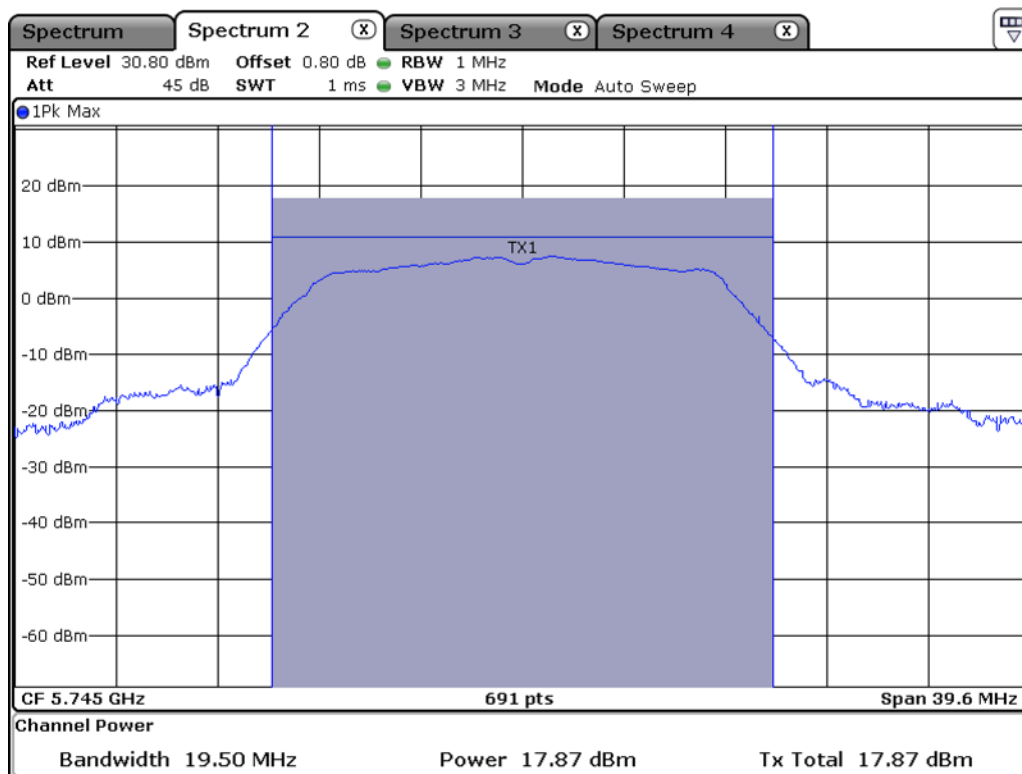
#### Minimum Standard:

Peak output power	< 1 W
-------------------	-------

#### Measurement Setup

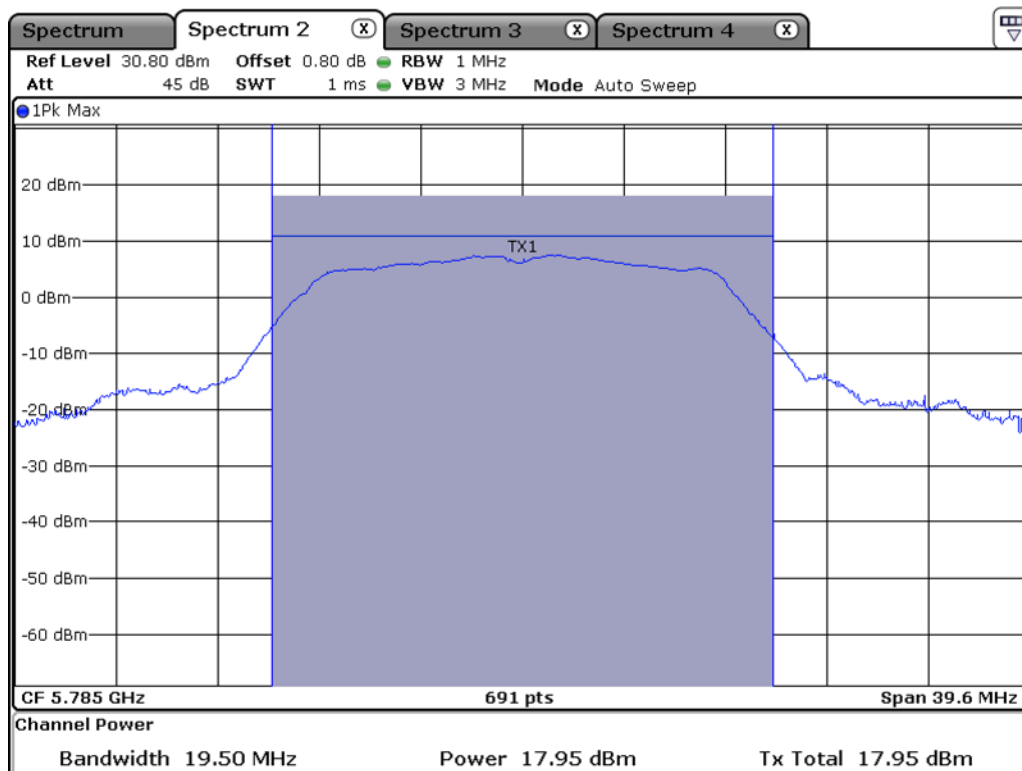
Same as the Chapter 3.2.1 (Figure 1)

## Low Channel – 802.11 a



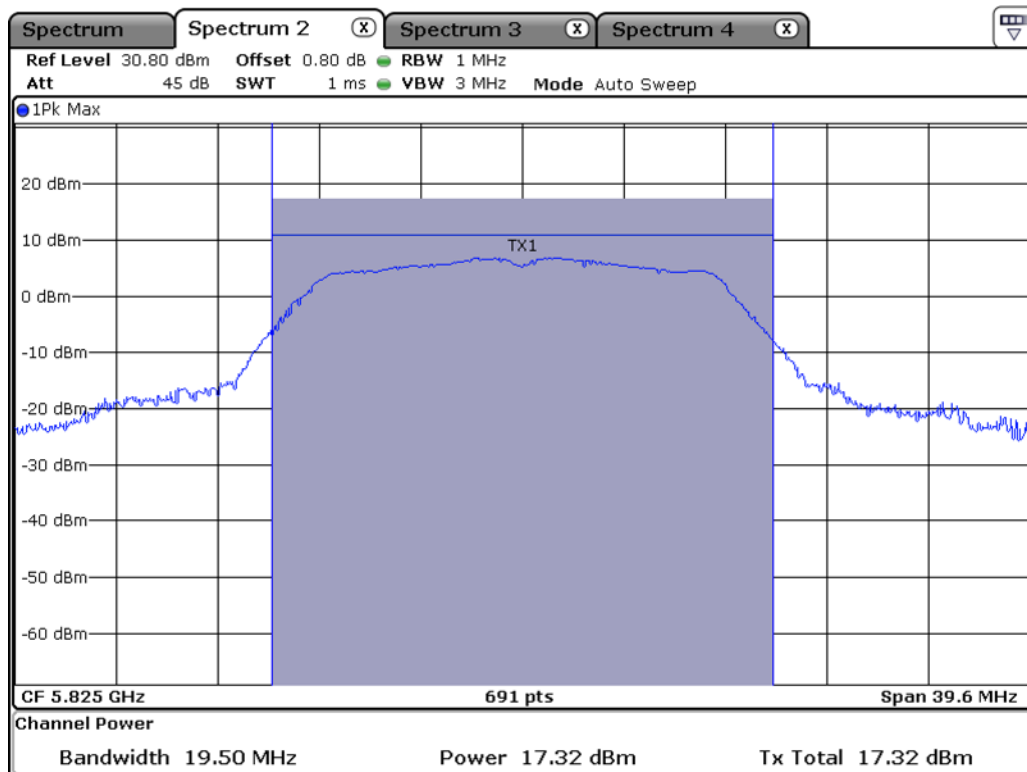
Date: 27.MAY.2019 16:08:08

## Middle Channel – 802.11 a



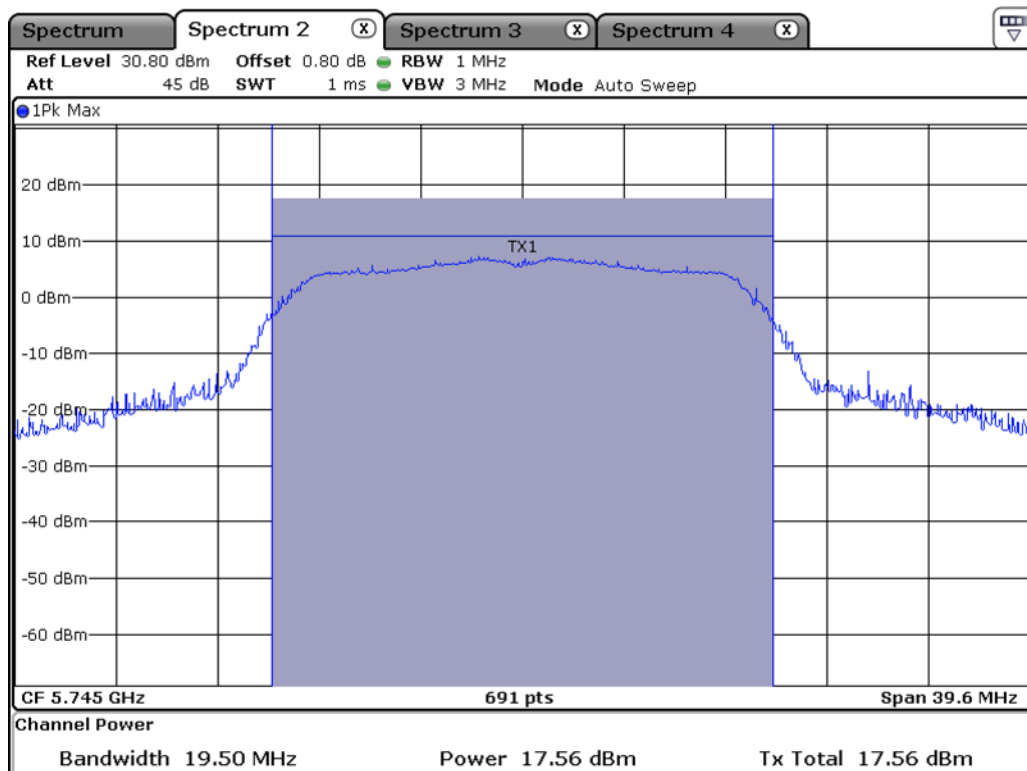
Date: 27.MAY.2019 16:08:30

## High Channel – 802.11 a



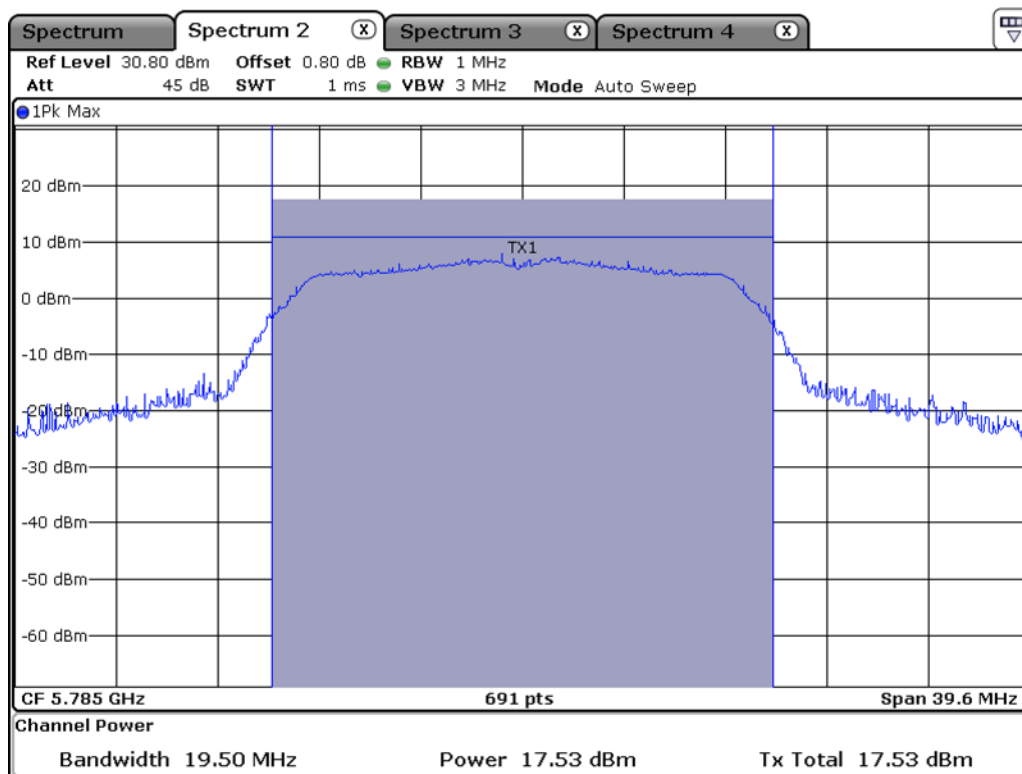
Date: 27.MAY.2019 16:08:50

## Low Channel – 802.11 an20



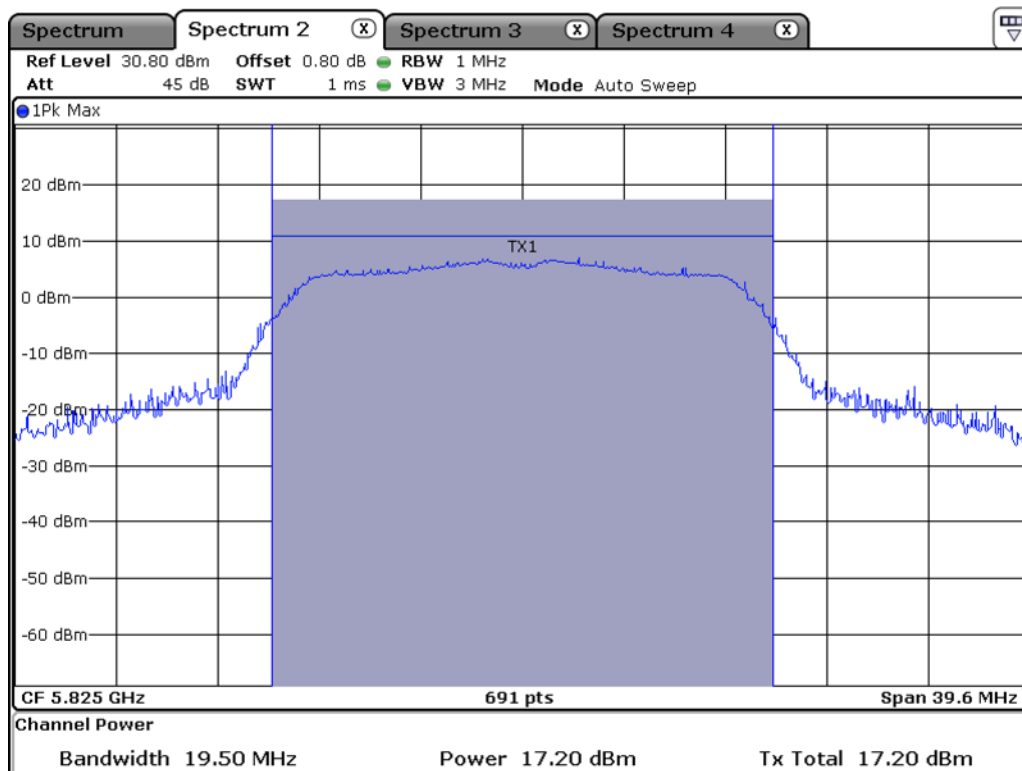
Date: 27.MAY.2019 16:09:08

## Middle Channel – 802.11 an20



Date: 27.MAY.2019 16:09:22

## High Channel – 802.11 an20



Date: 27.MAY.2019 16:09:38

### 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 a)

Frequency (MHz)	Test Results	
	dBm	Result
5745	-14.17	Complies
5785	-14.30	Complies
5825	-14.61	Complies

(802.11 an20)

Frequency (MHz)	Test Results	
	dBm	Result
5745	-14.85	Complies
5785	-14.52	Complies
5825	-15.40	Complies

- See next pages for actual measured spectrum plots.

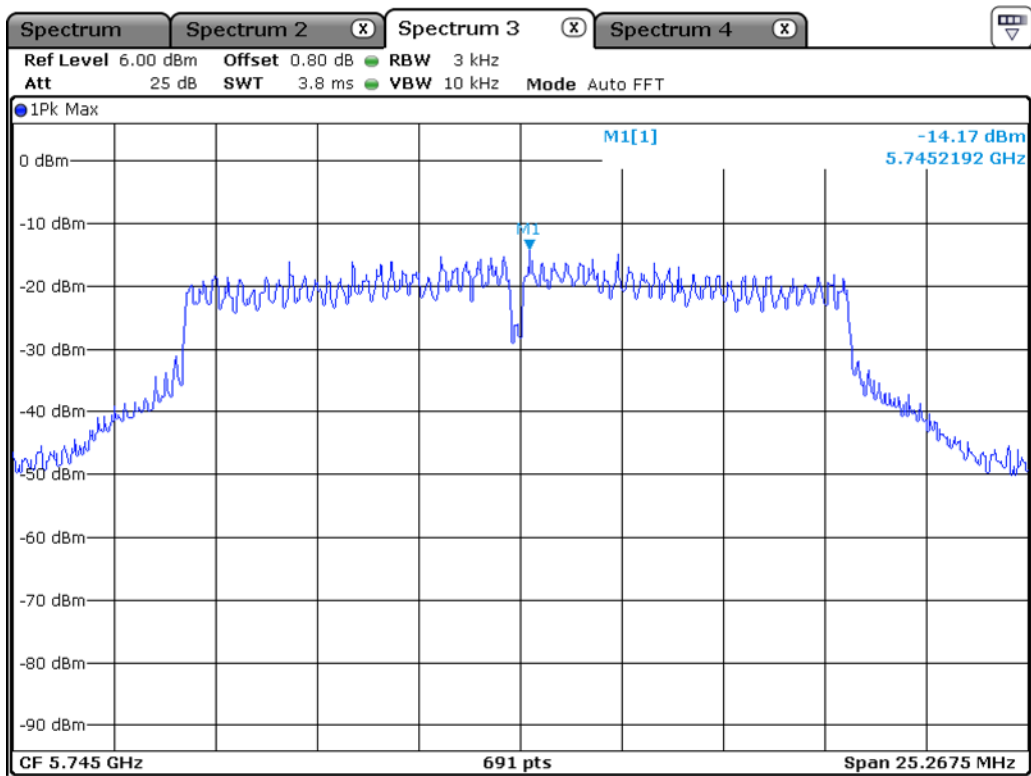
#### Minimum Standard:

Power Spectral Density	< 30 dBm @ 510 kHz BW
------------------------	-----------------------

#### Measurement Setup

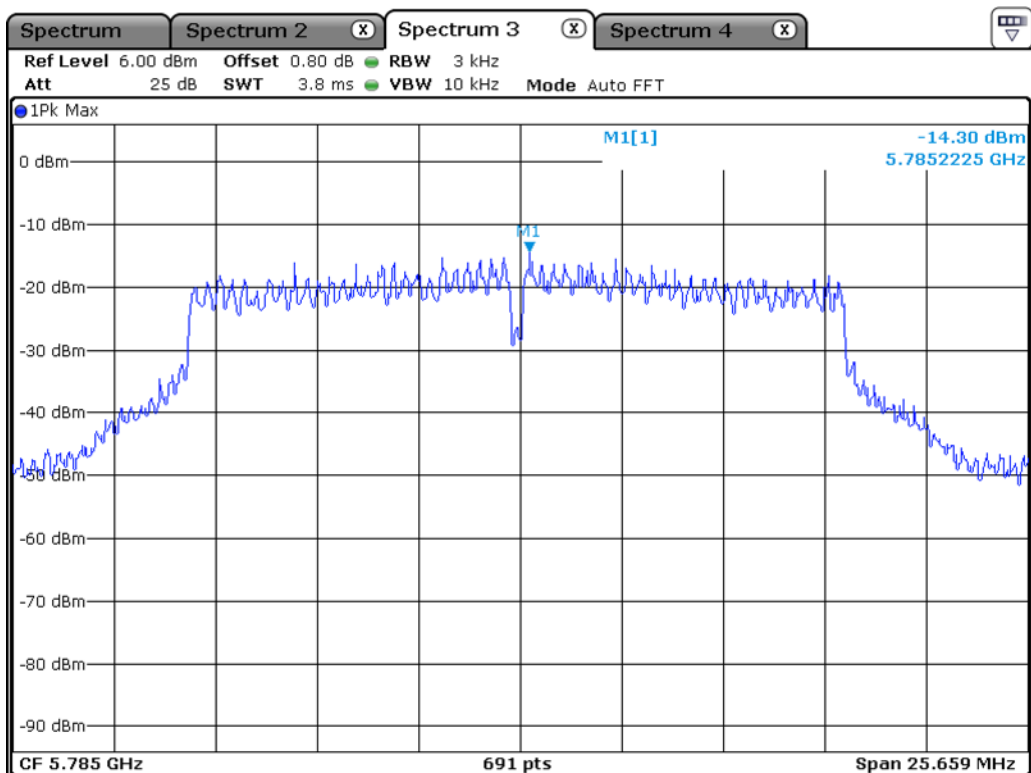
Same as the Chapter 3.2.1 (Figure 1)

## Low Channel – 802.11 a



Date: 27.MAY.2019 16:12:43

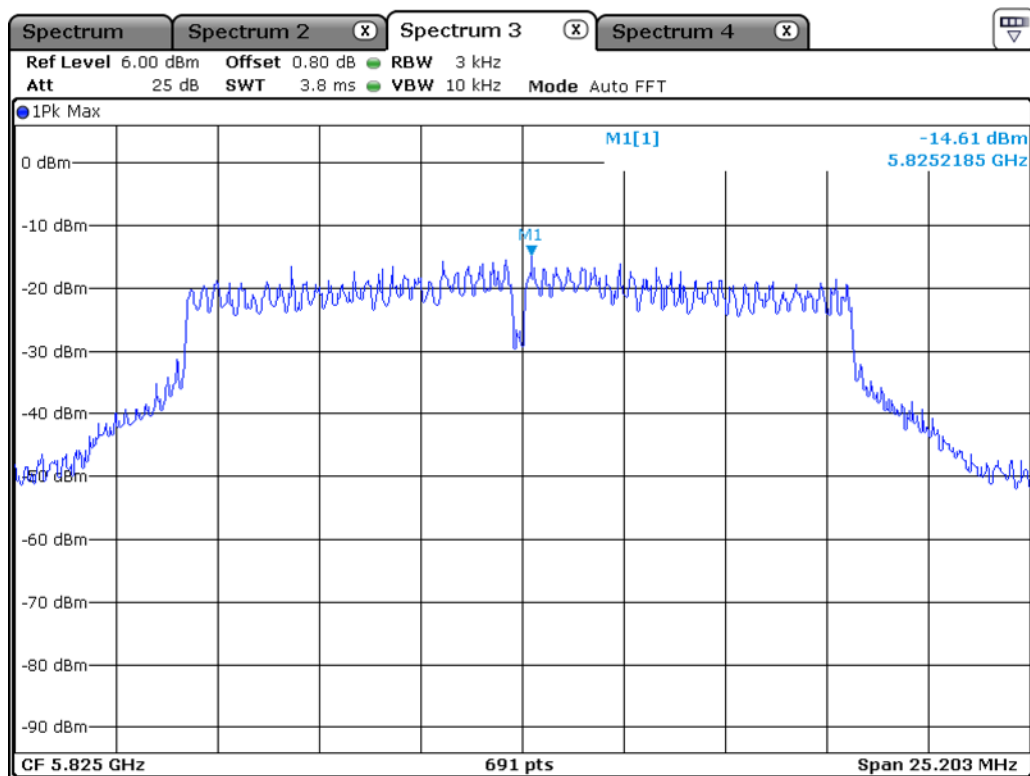
## Middle Channel – 802.11 a



Date: 27.MAY.2019 16:13:33

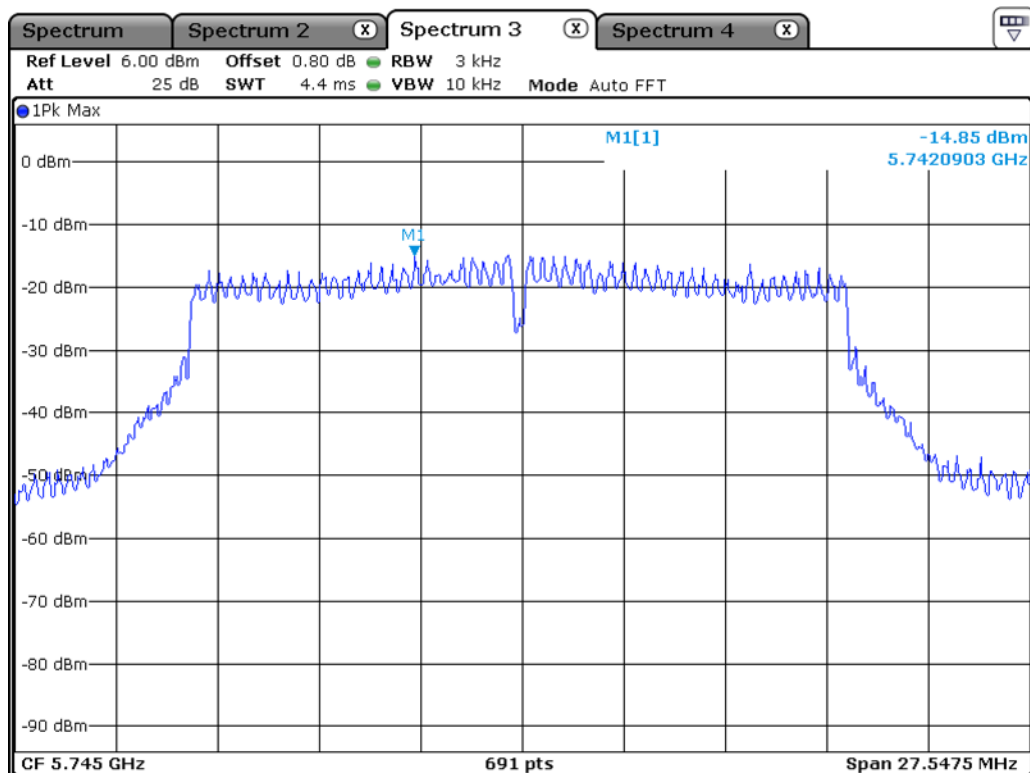


## High Channel – 802.11 a



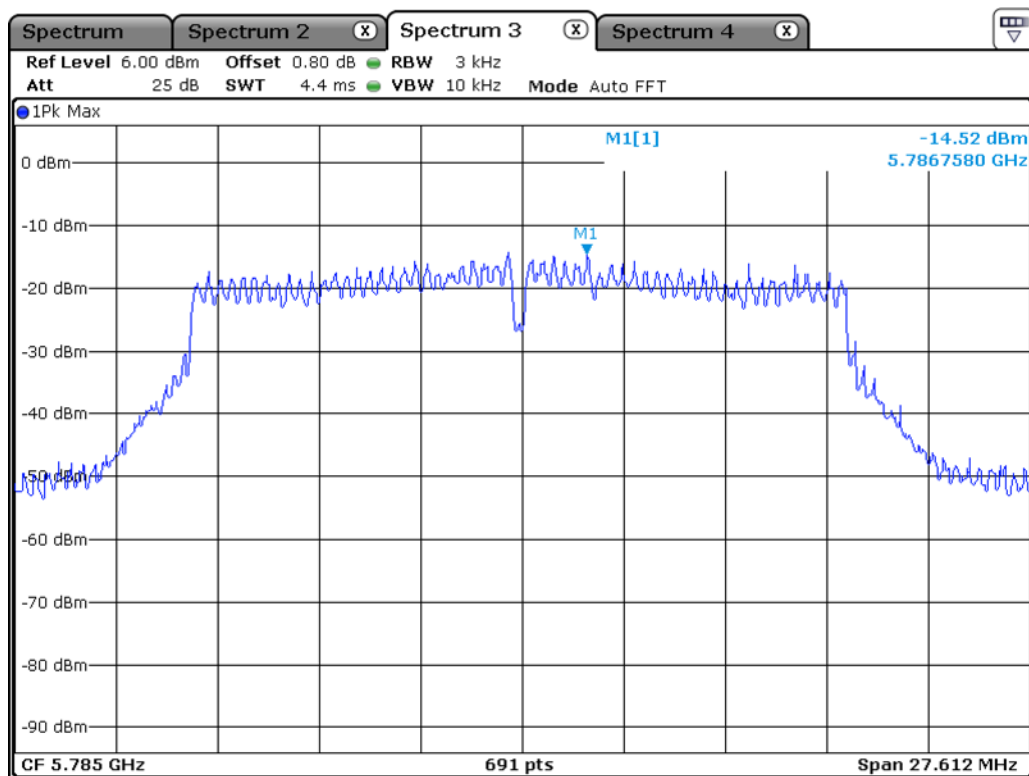
Date: 27.MAY.2019 16:14:08

## Low Channel – 802.11 an20



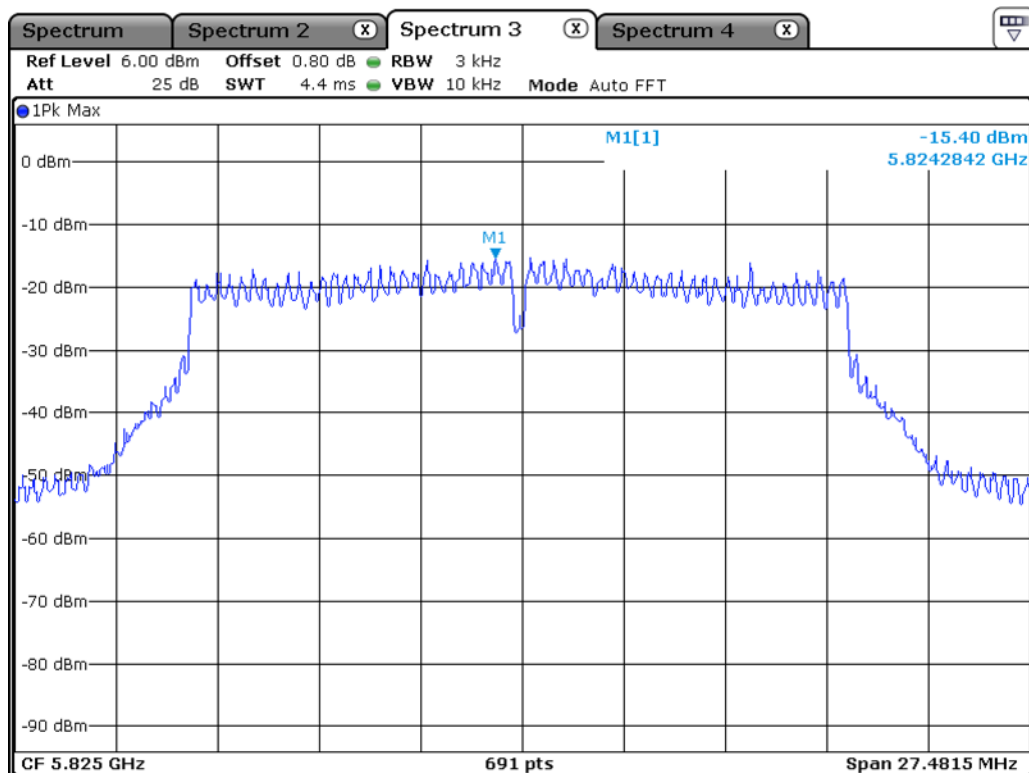
Date: 27.MAY.2019 16:14:47

## Middle Channel – 802.11 an20



Date: 27.MAY.2019 16:15:21

## High Channel – 802.11 an20



Date: 27.MAY.2019 16:15:55

---

### 3.2.4 Band - edge

#### Test Procedure:

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with

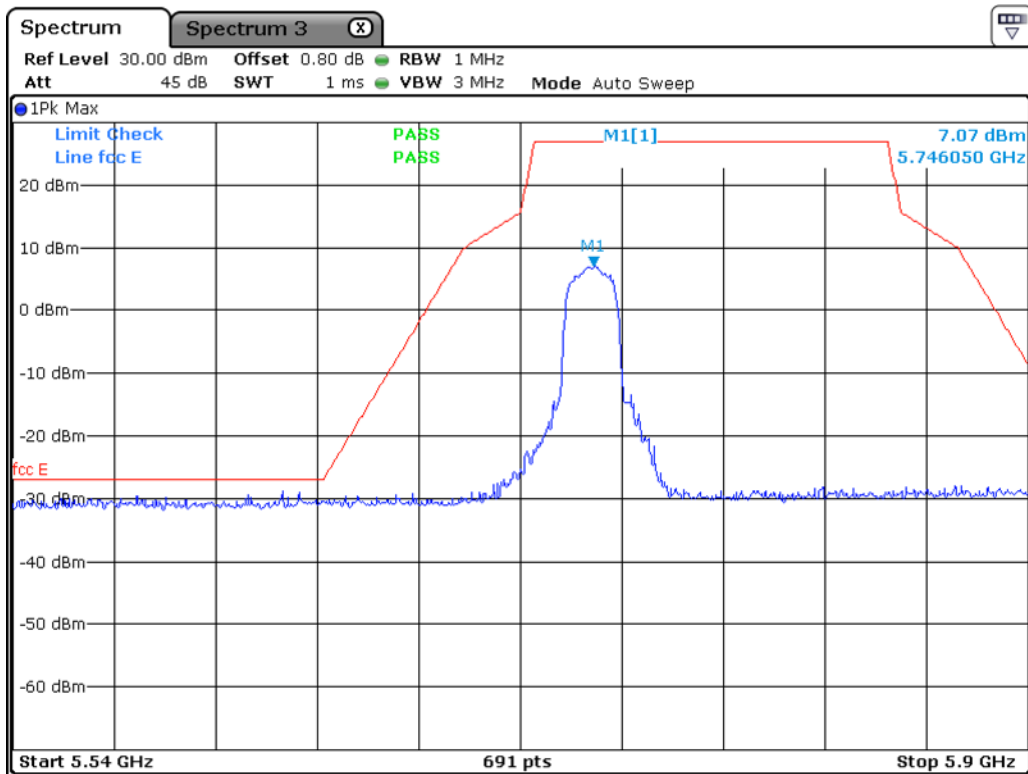
#### Quasi-peak detection.

- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

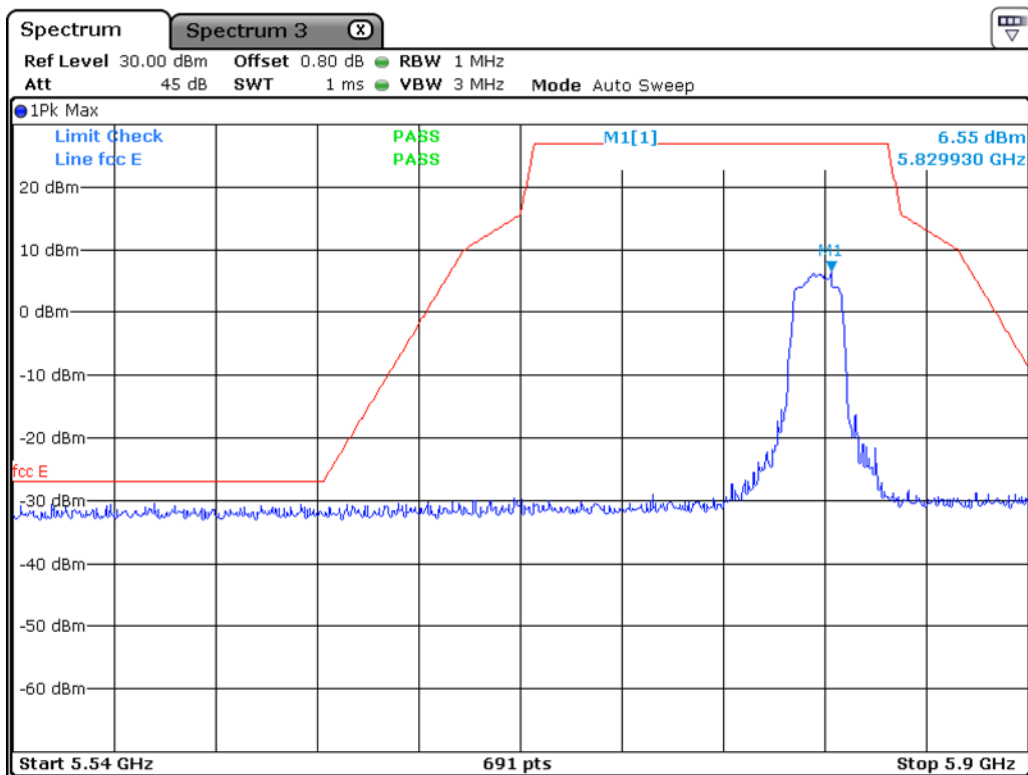
#### Measurement Data: Complies

- See next pages for actual measured spectrum plots.



**Band edge – 802.11an20**

Date: 27.MAY.2019 13:07:56



Date: 27.MAY.2019 13:08:35

### 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.

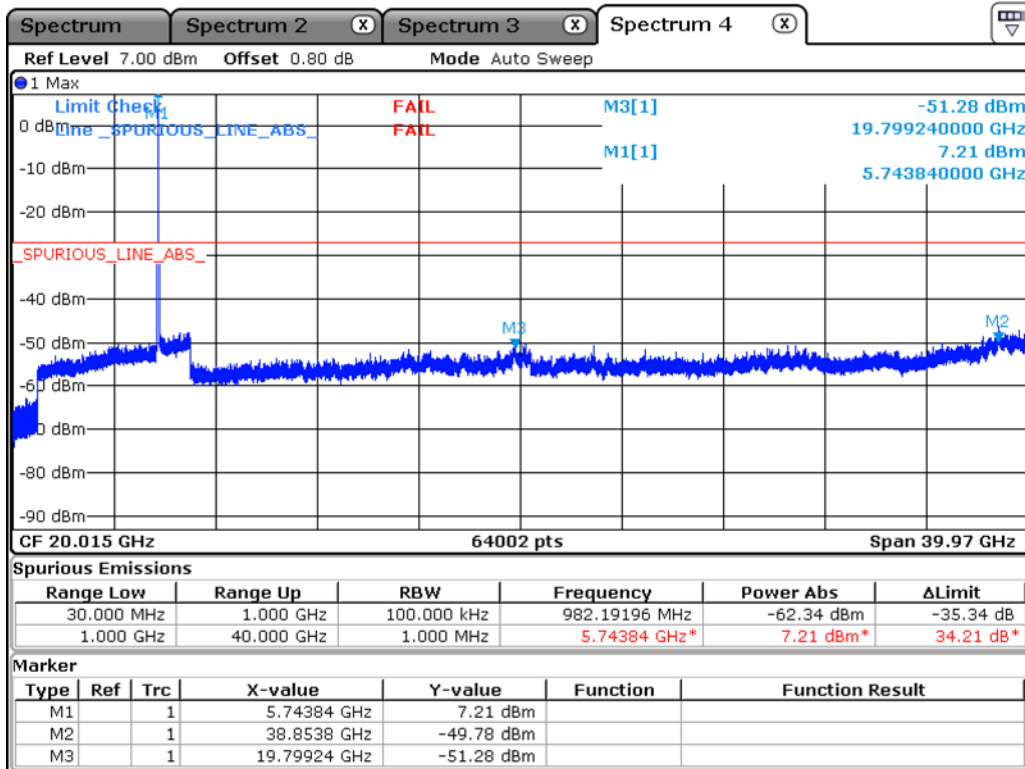
<b>Minimum Standard:</b>	< -27 dBm/MHz
--------------------------	---------------

#### Measurement Setup

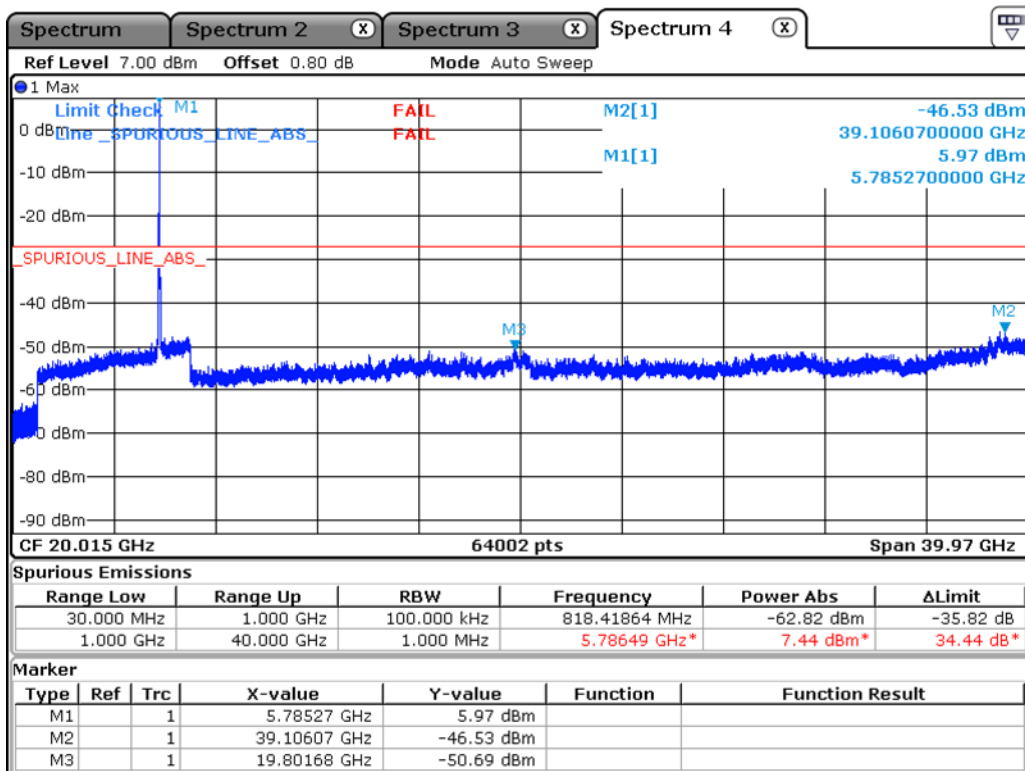
Same as the Chapter 3.2.1 (Figure 1)

**Frequency Range = 30 MHz ~ 40 GHz**

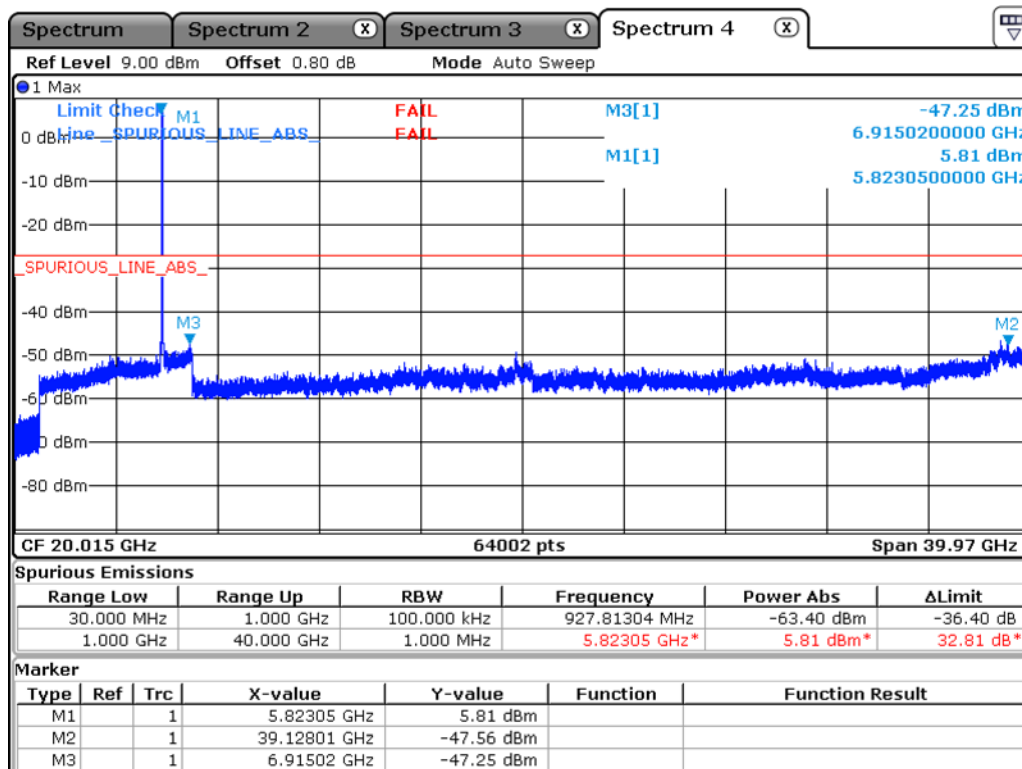
**Unwanted Emission – 802.11 a**



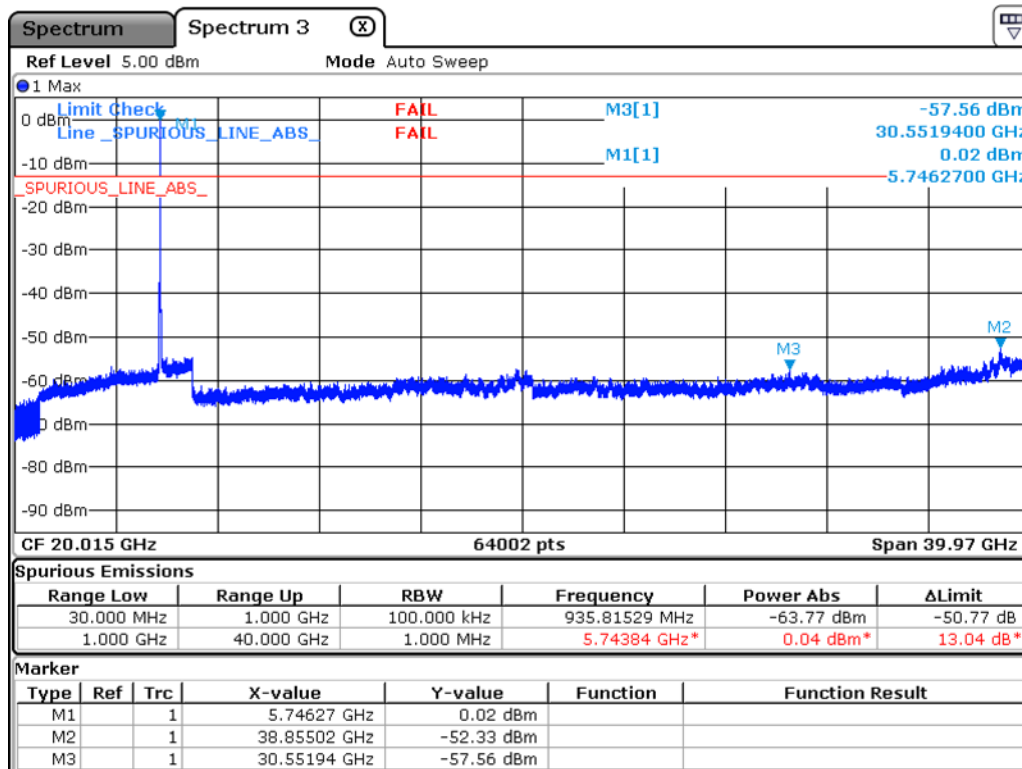
Date: 27.MAY.2019 16:25:30



Date: 27.MAY.2019 16:26:31

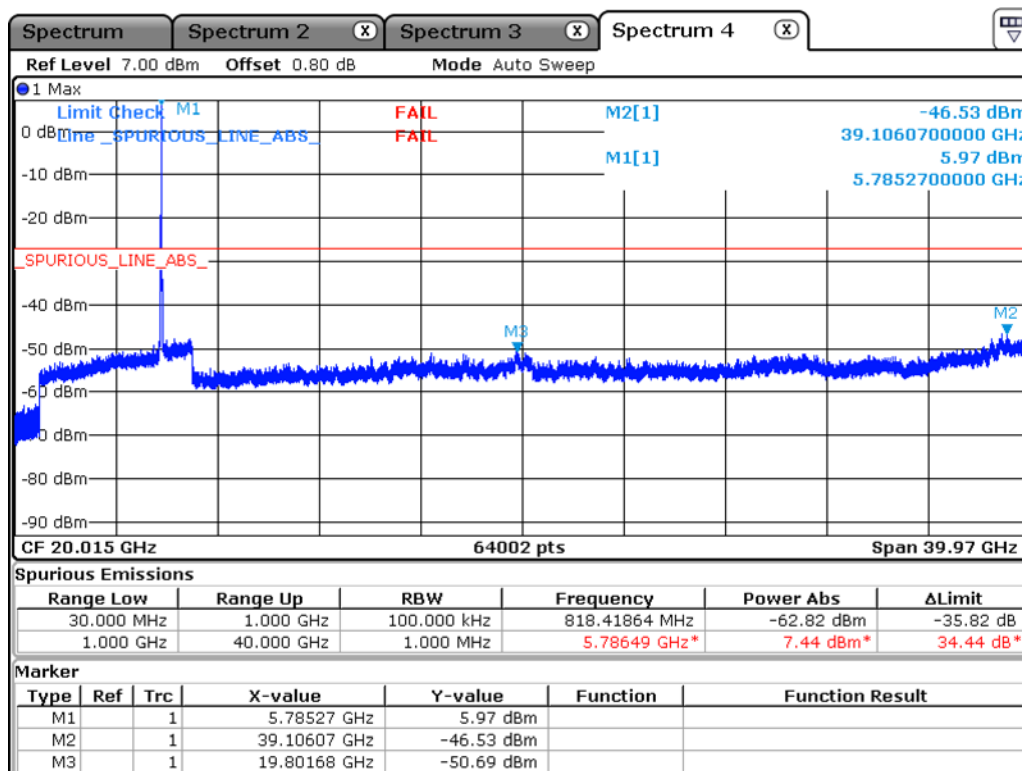


Date: 27.MAY.2019 16:29:09

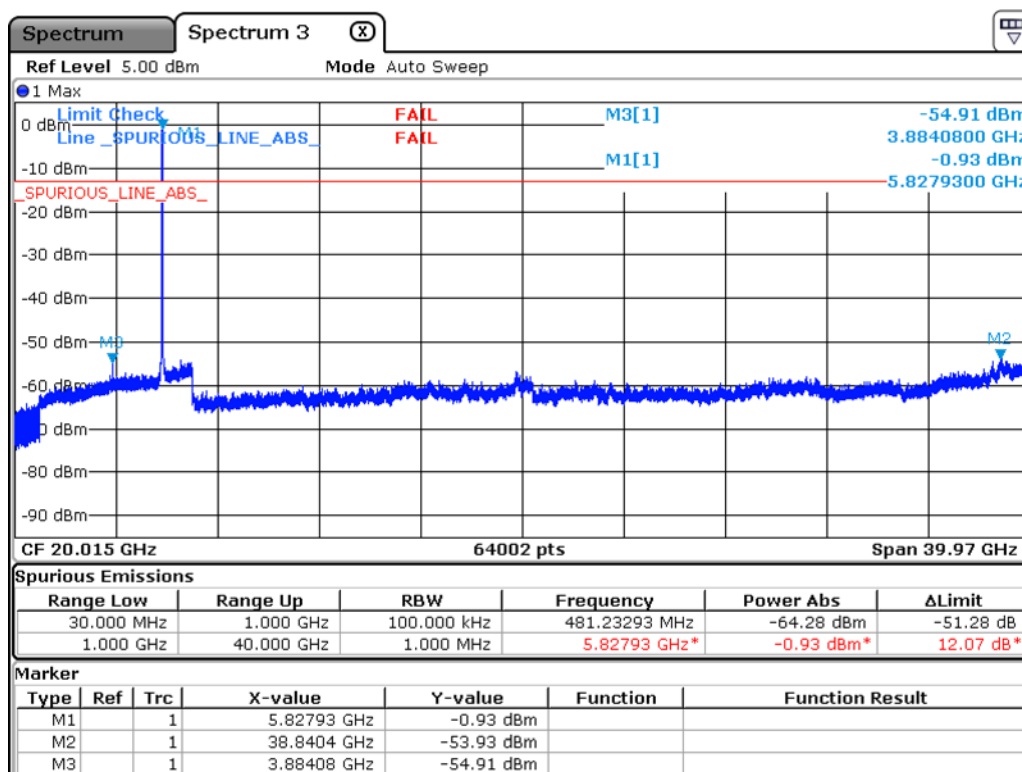
**Frequency Range = 30 MHz ~ 40 GHz****Unwanted Emission – 802.11 an20**

Date: 27.MAY.2019 13:00:45





Date: 27.MAY.2019 16:26:31



Date: 27.MAY.2019 13:02:04

### 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 ~ 10<sup>th</sup> harmonic.

RBW = 100 kHz ( 30 MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

Span = 100 MHz

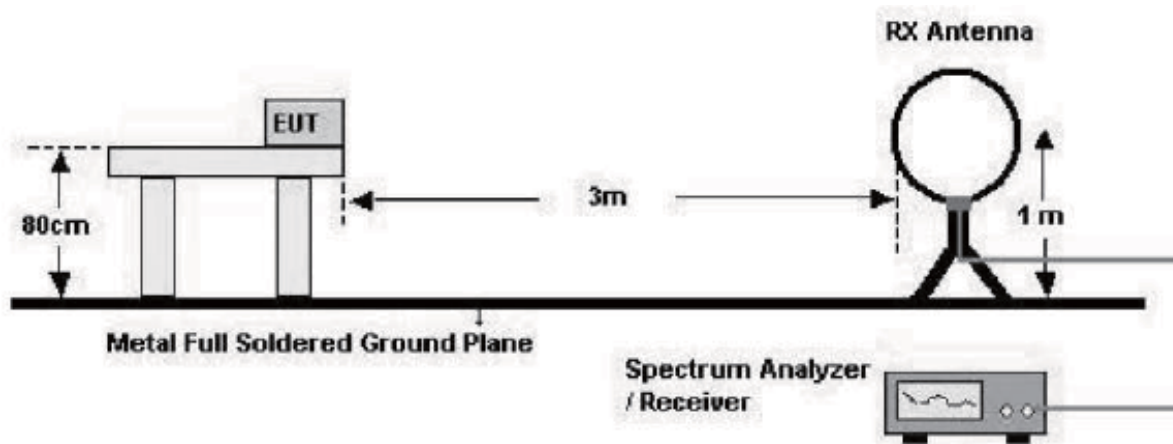
Trace = max hold

VBW  $\geq$  RBW

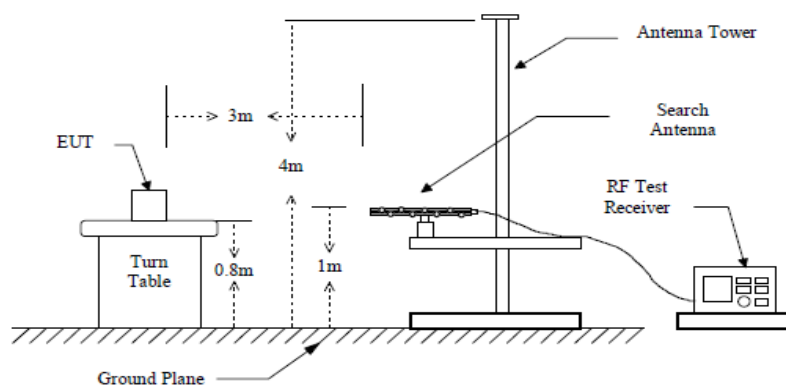
Detector function = peak

Sweep = auto

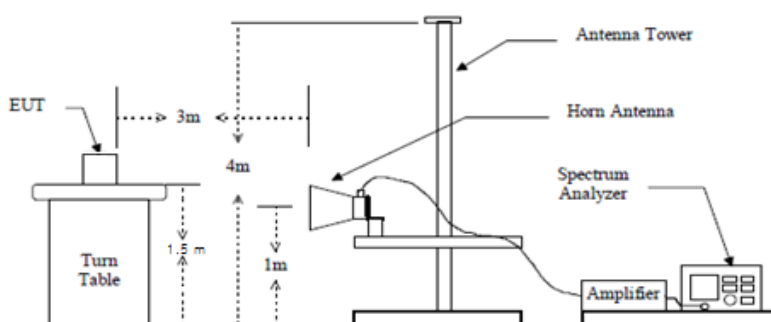
**below 30 MHz**



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 a**

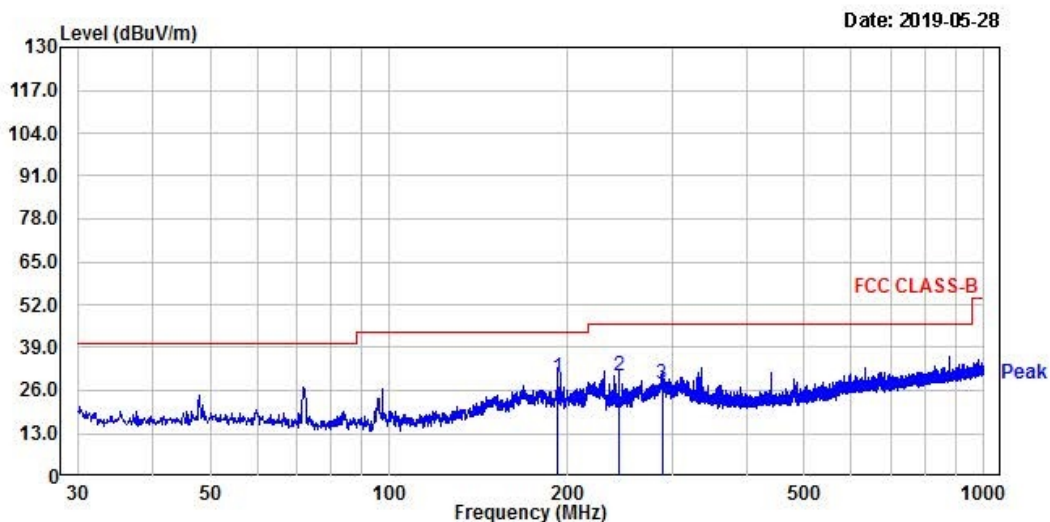
4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless mode

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
191.99	44.83	-15.05	29.78	43.50	13.72	124	178	vertical
243.76	43.60	-13.22	30.38	46.00	15.62	154	147	vertical
288.02	39.16	-11.32	27.84	46.00	18.16	121	92	vertical

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



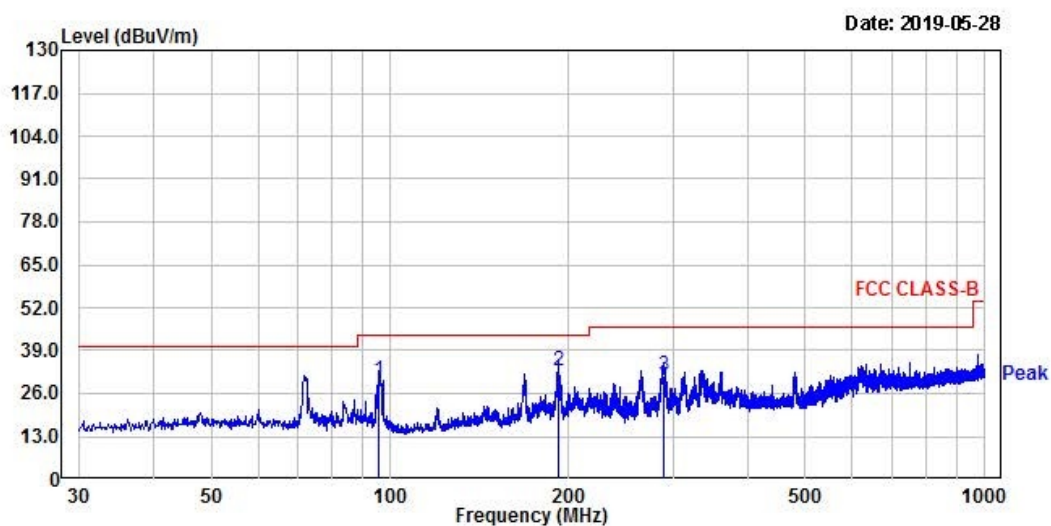
4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless mode

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
95.96	48.35	-18.27	30.08	43.50	13.42	210	360	horizontal
192.23	47.74	-15.05	32.69	43.50	10.81	213	18	horizontal
288.38	42.65	-11.31	31.34	46.00	14.66	124	24	horizontal

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

**Radiated Emissions (Below 1 GHz) – 802.11 an20**

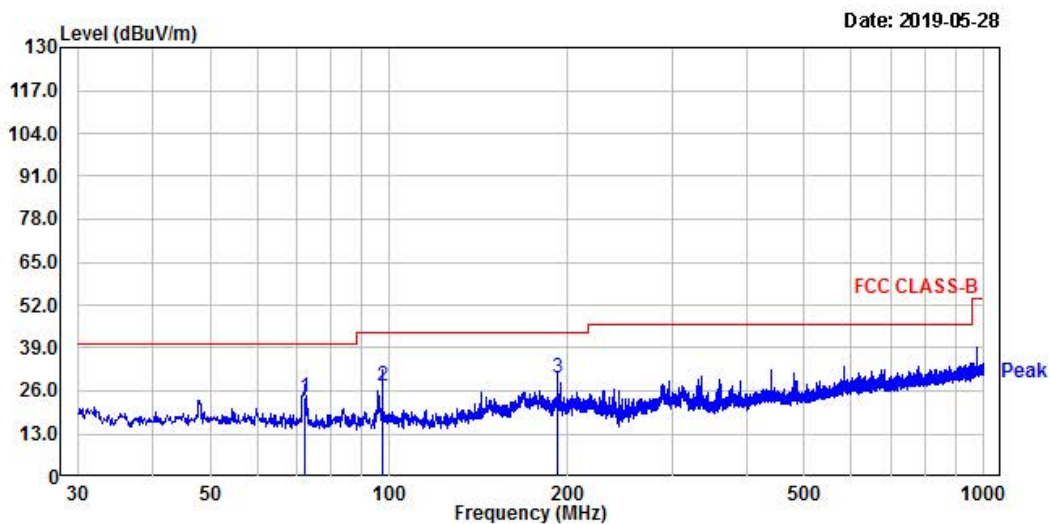
4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless mode

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
72.07	39.62	-15.65	23.97	40.00	16.03	400	290	vertical
97.42	45.44	-17.97	27.47	43.50	16.03	105	93	vertical
191.99	44.94	-15.05	29.89	43.50	13.61	183	127	vertical

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



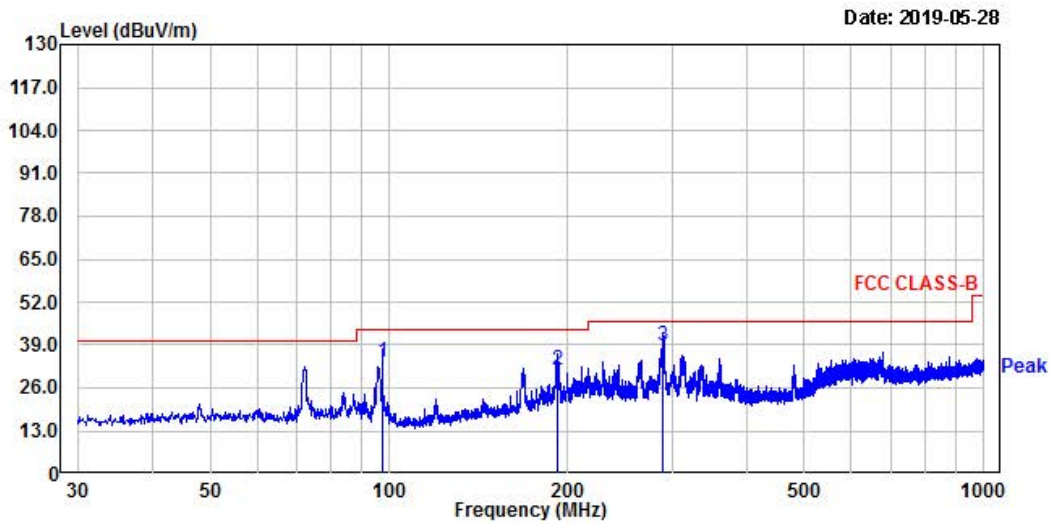
4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 36

Test Mode : Wireless mode

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
97.42	51.74	-17.97	33.77	43.50	9.73	379	127	horizontal
192.23	46.45	-15.05	31.40	43.50	12.10	103	124	horizontal
288.38	49.96	-11.31	38.65	46.00	7.35	100	122	horizontal

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



**Radiated Emissions (Above 1 GHz) – 802.11 a**

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

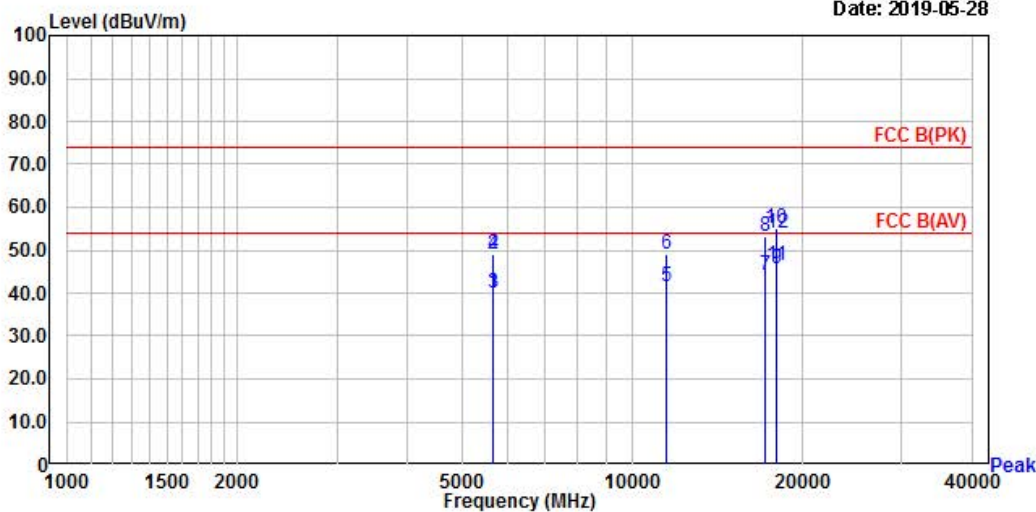
EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless A\_L

Tested by: KWON H C

Date: 2019-05-28



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
5673.42	34.58	5.43	40.01	54.00	13.99	184	195	
5673.42	43.59	5.43	49.02	74.00	24.98	182	122	
5681.38	34.63	5.47	40.10	54.00	13.90	114	172	
5681.38	43.72	5.47	49.19	74.00	24.81	125	74	
11493.00	28.34	13.25	41.59	54.00	12.41	134	59	
11493.00	35.68	13.25	48.93	74.00	25.07	194	181	
17236.02	24.07	20.24	44.31	54.00	9.69	189	172	
17236.02	32.95	20.24	53.19	74.00	20.81	177	108	
17960.45	23.18	22.45	45.63	54.00	8.37	125	196	
17960.45	32.83	22.45	55.28	74.00	18.72	115	231	
17995.00	23.81	22.55	46.36	54.00	7.64	116	174	
17995.00	31.35	22.55	53.90	74.00	20.10	136	155	

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



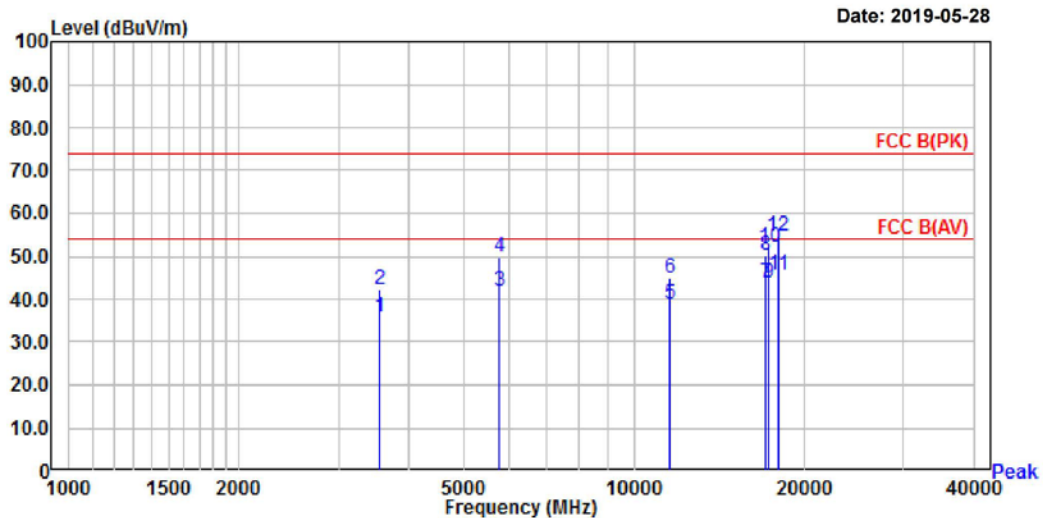
4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless A\_M

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
3542.00	36.10	-0.36	35.74	54.00	18.26	195	147	
3542.00	42.73	-0.36	42.37	74.00	31.63	182	156	
5799.00	35.95	6.03	41.98	54.00	12.02	137	122	
5799.00	43.80	6.03	49.83	74.00	24.17	165	188	
11570.00	25.45	13.39	38.84	54.00	15.16	150	164	
11570.00	31.65	13.39	45.04	74.00	28.96	163	199	
17082.40	24.11	19.77	43.88	54.00	10.12	195	153	
17082.40	30.37	19.77	50.14	74.00	23.86	198	155	
17356.10	23.07	20.61	43.68	54.00	10.32	155	163	
17356.10	31.31	20.61	51.92	74.00	22.08	159	275	
17960.20	23.38	22.45	45.83	54.00	8.17	131	208	
17960.20	32.38	22.45	54.83	74.00	19.17	203	172	

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



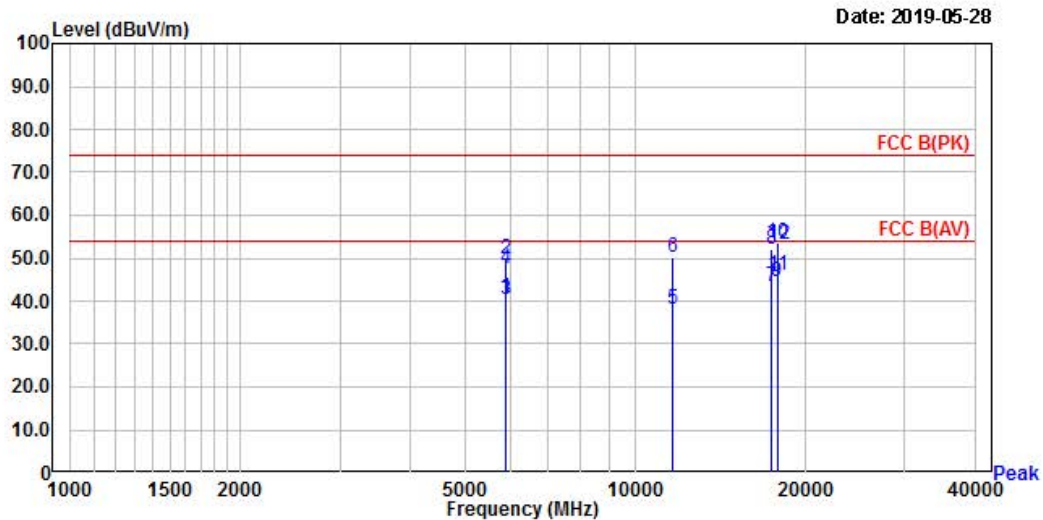
4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless A\_H

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
5896.38	34.16	6.49	40.65	54.00	13.35	153	215	
5896.38	43.24	6.49	49.73	74.00	24.27	160	179	
5898.50	33.71	6.50	40.21	54.00	13.79	130	164	
5898.50	41.03	6.50	47.53	74.00	26.47	141	205	
11650.00	24.72	13.53	38.25	54.00	15.75	156	182	
11650.00	36.57	13.53	50.10	74.00	23.90	140	218	
17476.30	22.35	20.97	43.32	54.00	10.68	126	207	
17476.30	30.97	20.97	51.94	74.00	22.06	154	211	
17839.00	22.33	22.08	44.41	54.00	9.59	132	195	
17839.00	31.47	22.08	53.55	74.00	20.45	144	163	
17885.10	23.96	22.21	46.17	54.00	7.83	154	225	
17885.10	31.03	22.21	53.24	74.00	20.76	166	205	

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

**Radiated Emissions (Above 1 GHz) – 802.11 an20**

4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea

Tel : +82-31-3236008,9

Fax : +82-31-3236010

www.ltalab.com

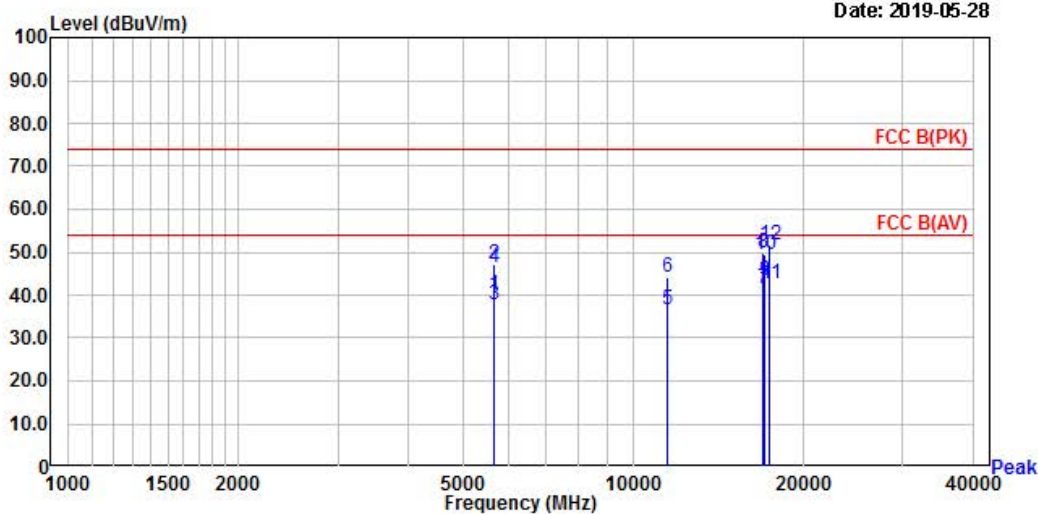
EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless An\_L

Tested by: KWON H C

Date: 2019-05-28



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBUV/m	dBUV/m	dB	cm	deg	
5671.67	34.55	5.42	39.97	54.00	14.03	133	245	
5671.67	41.75	5.42	47.17	74.00	26.83	169	254	
5674.60	32.16	5.44	37.60	54.00	16.40	205	187	
5674.60	40.82	5.44	46.26	74.00	27.74	117	202	
11493.30	23.22	13.25	36.47	54.00	17.53	117	204	
11493.30	31.07	13.25	44.32	74.00	29.68	117	204	
16959.30	22.02	19.34	41.36	54.00	12.64	159	211	
16959.30	30.35	19.34	49.69	74.00	24.31	159	211	
17056.60	23.81	19.69	43.50	54.00	10.50	233	95	
17056.60	29.93	19.69	49.62	74.00	24.38	146	83	
17475.90	21.63	20.97	42.60	54.00	11.40	123	130	
17475.90	30.66	20.97	51.63	74.00	22.37	154	207	

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

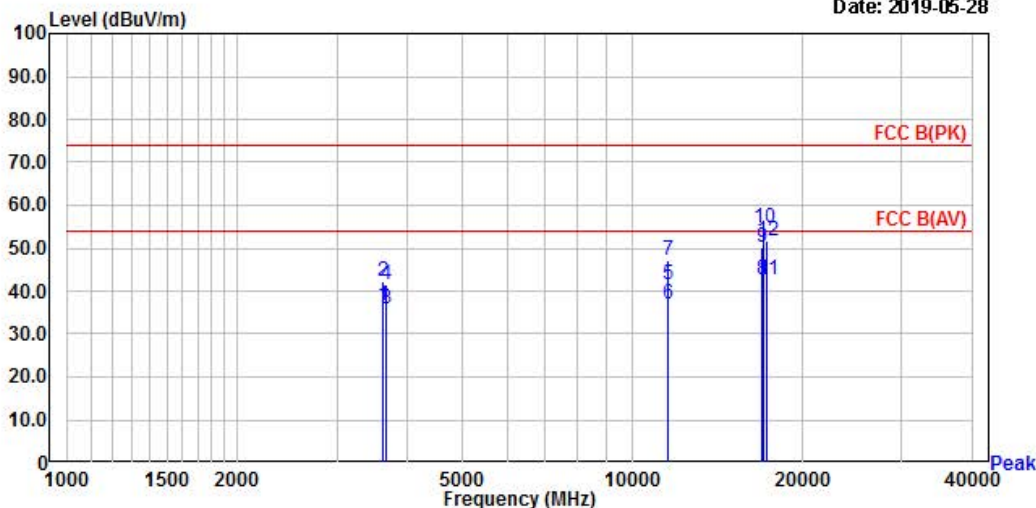
EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless An\_M

Tested by: KWON H C

Date: 2019-05-28



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
3615.20	36.84	-0.05	36.79	54.00	17.21	124	195	
3615.20	42.38	-0.05	42.33	74.00	31.67	154	204	
3666.40	35.73	0.16	35.89	54.00	18.11	159	211	
3666.40	41.28	0.16	41.44	74.00	32.56	161	105	
11570.20	28.10	13.39	41.49	54.00	12.51	159	115	
11570.20	23.53	13.39	36.92	54.00	17.08	131	145	
11570.20	33.74	13.39	47.13	74.00	26.87	161	145	
16959.00	23.23	19.34	42.57	54.00	11.43	129	187	
16959.00	31.04	19.34	50.38	74.00	23.62	143	155	
17064.00	34.82	19.72	54.54	74.00	19.46	143	129	
17355.80	22.08	20.61	42.69	54.00	11.31	118	206	
17355.80	31.11	20.61	51.72	74.00	22.28	134	195	

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





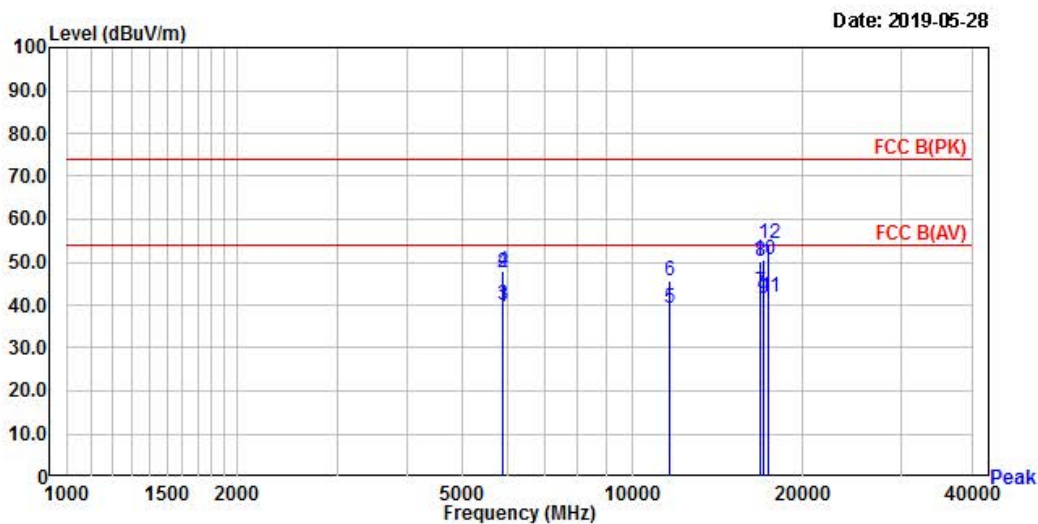
4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: DM-01

Temp/Humi: 23 / 40

Test Mode : Wireless An\_H

Tested by: KWON H C



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV	dB	QP dBuV/m	dBuV/m	dB	cm	deg	
5899.64	33.21	6.50	39.71	54.00	14.29	153	169	
5899.64	41.06	6.50	47.56	74.00	26.44	155	169	
5908.80	33.42	6.55	39.97	54.00	14.03	161	174	
5908.80	41.32	6.55	47.87	74.00	26.13	170	180	
11650.00	25.72	13.53	39.25	54.00	14.75	163	89	
11650.00	32.18	13.53	45.71	74.00	28.29	165	93	
16884.70	24.10	19.01	43.11	54.00	10.89	201	45	
16884.70	31.32	19.01	50.33	74.00	23.67	201	45	
17056.40	21.99	19.69	41.68	54.00	12.32	201	60	
17056.40	31.04	19.69	50.73	74.00	23.27	201	73	
17475.00	20.82	20.96	41.78	54.00	12.22	283	119	
17475.00	33.28	20.96	54.24	74.00	19.76	283	83	

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	$\pm 5$ %
RF output power, conducted	$\pm 1.5$ dB
Power Spectral Density, conducted	$\pm 3$ dB
Unwanted Emissions, conducted	$\pm 3$ dB
All emissions, radiated	$\pm 6$ dB
Temperature	$\pm 1$ °C
Humidity	$\pm 5$ %
DC and low frequency voltages	$\pm 3$ %
Time	$\pm 5$ %
Duty Cycle	$\pm 5$ %



## 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