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Dates of Tests: June 11 ~ June 20, 2020  
Test Report S/N: LR500112007H  
Test Site : LTA CO., LTD.

## CERTIFICATION OF COMPLIANCE

FCC ID.

**2AU8YREBE-TZ42F**

APPLICANT

**ATECAP Co.,LTD.**

<b>Equipment Class</b>	:	<b>Digital Transmission System (DTS)</b>
<b>Manufacturing Description</b>	:	<b>Electronic Shelf Lable</b>
<b>Manufacturer</b>	:	<b>ATECAP Co.,LTD.</b>
<b>Model name</b>	:	<b>REBE-TZ42F</b>
<b>Variant Model name</b>	:	<b>REBE-TZ42L</b>
<b>Test Device Serial No.:</b>	:	<b>Identical prototype</b>
<b>Rule Part(s)</b>	:	<b>FCC Part 15.247 Subpart C ; ANSI C-63.10-2013</b>
<b>Frequency Range</b>	:	<b>2405 ~ 2480 MHz</b>
<b>Max. Output Power</b>	:	<b>Max 6.01 dBm – Conducted</b>
<b>Date of issue</b>	:	<b>July 20, 2020</b>

This test report is issued under the authority of:

The test was supervised by:

*JaBeom.Koo*

*고경훈*

Ja-Beom, Koo / Manager

Gyeong Hun Ko / 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. 17159  
 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	2021-04-11	FCC CAB
VCCI	JAPAN	C-4948,	2020-09-10	VCCI registration
VCCI	JAPAN	T-2416,	2020-09-10	VCCI registration
VCCI	JAPAN	R-4483(10 m),	2020-10-15	VCCI registration
VCCI	JAPAN	G-847	2021-12-13	VCCI registration
IC	CANADA	5799A-1	2019-11-07	IC filing
KOLAS	KOREA	NO.551	2021-08-20	KOLAS accredited Lab.
NVLAP	U.S.A	200723-0	2021-08-20	ECT accredited Lab.

**2. Information about test item****2-1 Client & Manufacturer**

Company name : ATECAP Co.,LTD.  
 Address : 53-94, Jinwisandan-ro, jinwi-myeon, Pyeongteak-si  
 Tel / Fax : TEL No : +82-10-5790-6171 / FAX No : +82-31-696-1534

**2-2 Equipment Under Test (EUT)**

Trade name : ATECAP Co.,LTD.  
 Model name : REBE-TZ42F  
 Variant Model name : REBE-TZ42L  
 Serial number : Identical prototype  
 Date of receipt : July 20, 2020  
 EUT condition : Pre-production, not damaged  
 Antenna type : Patten Antenna (Max Gain : -4.72 dBi)  
 Frequency Range : 2405 ~ 2480 MHz  
 RF output power : Max 6.01 dBm – Conducted  
 Number of channels : 16  
 Type of Modulation : QPSK  
 Power Source : 3.0 Vdc

**2-3 Tested frequency**

	LOW	MID	HIGH
Frequency (MHz)	2405	2445	2480

**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(e)	Transmitter Power Spectral Density	< 8 dBm @ 3 kHz		C
15.247(d)	Band Edge	> 20 dBc		C
	Conducted Spurious Emissions	> 20 dBc		C
15.209(a)	Radiated Spurious Emissions	On page 23	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:* This product operates only with battery

The above equipment was tested by LTA Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 15.247 The test results of this report relate only to the tested sample identified in this report.

→ Antenna Requirement

The **ATECAP Co.,LTD.** FCC ID: **2AU8YREBE-TZ42F** unit complies with the requirement of §15.203.

The antenna type is Patten Antenna.

※ This product has a 2.4 GHz diversity antenna and is marked in the Photo External & Internal data.

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**3.2 MEASUREMENT METHODS**

<b>Parameter</b>	<b>METHODS</b>
6 dB Bandwidth	KDB 558074 D01 v05r02, Section 8.2
Transmitter Peak Output Power	KDB 558074 D01 v05r02, Section 8.3.1.1
Transmitter Power Spectral Density	KDB 558074 D01 v05r02, Section 8.4.
Band Edge	KDB 558074 D01 v05r02, Section 8.7
Conducted Spurious Emissions	KDB 558074 D01 v05r02, Section 8.5
Radiated Spurious Emissions	KDB 558074 D01 v05r02, Section 8.6
AC Conducted Emissions	ANSI C63.10-2013, Section 6.2.

## 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

VBW = 300 kHz (VBW  $\geq$  3\*RBW)

Sweep = auto

Trace = max hold

Detector function = peak

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

Frequency (MHz)	Test Results	
	Measured Bandwidth (MHz)	Result
2405	1.954	Complies
2445	1.954	Complies
2480	1.910	Complies

- See next pages for actual measured spectrum plots.

#### Minimum Standard:

6 dB Bandwidth > 500 kHz

#### Measurement Setup

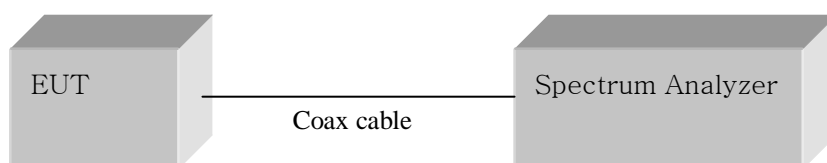
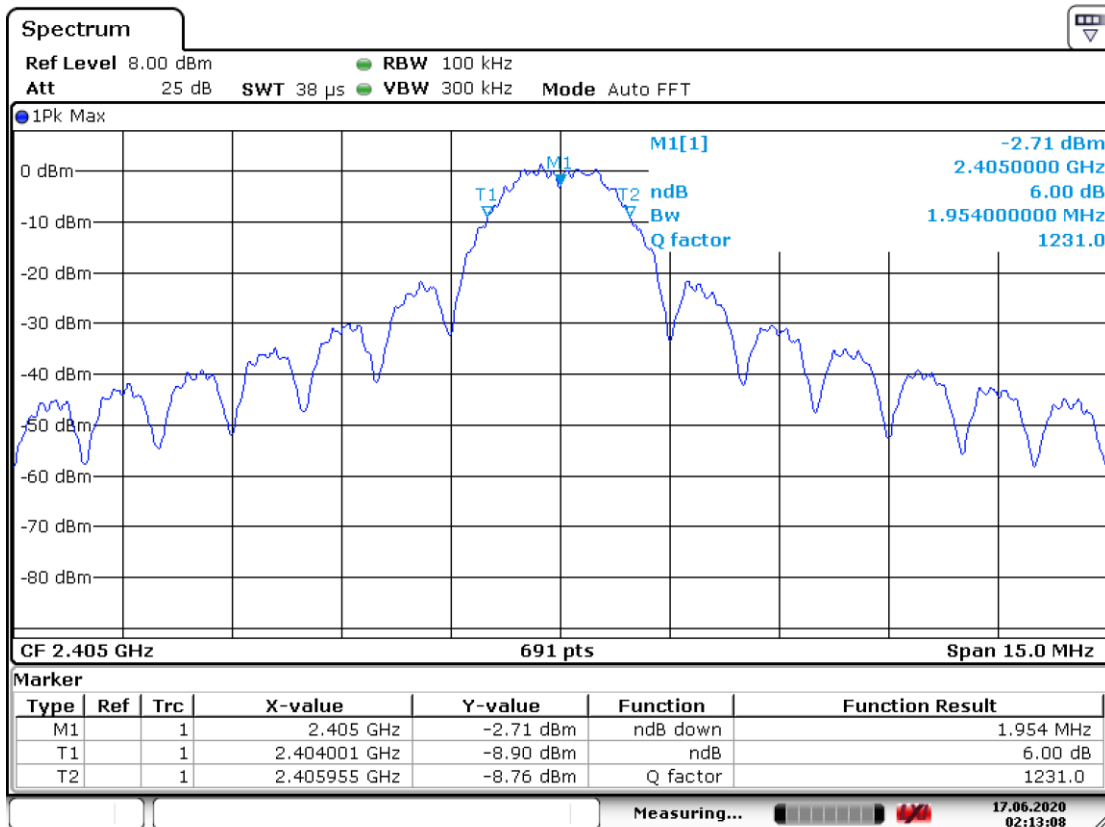


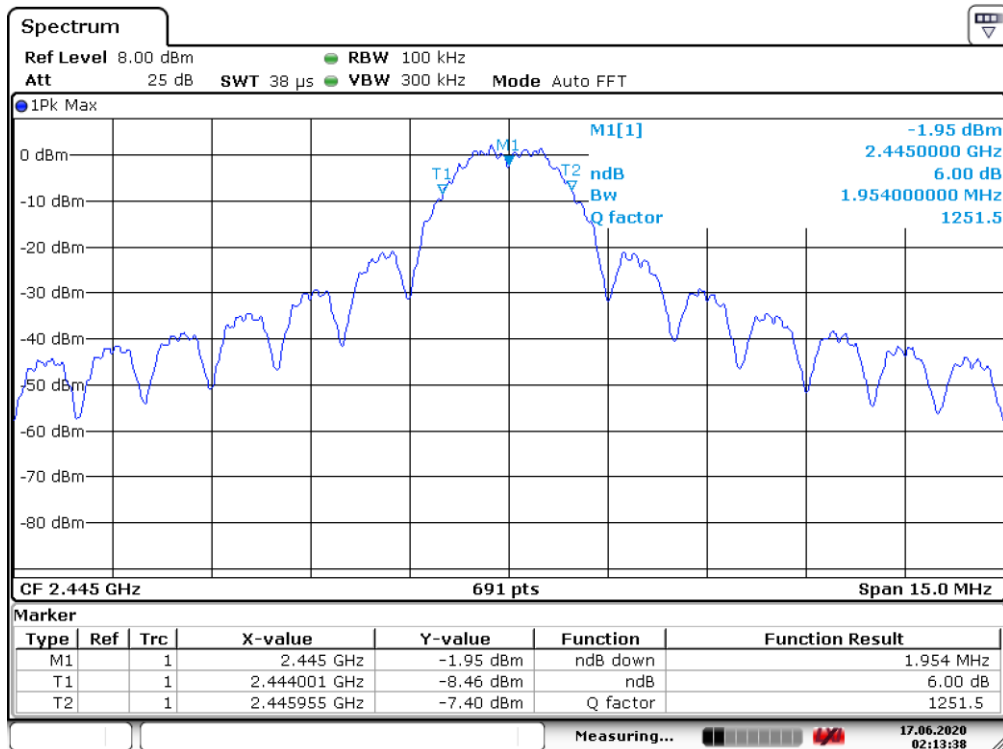
Figure 1: Measurement setup for the carrier frequency separation

### Low Channel



Date: 17.JUN.2020 02:13:08

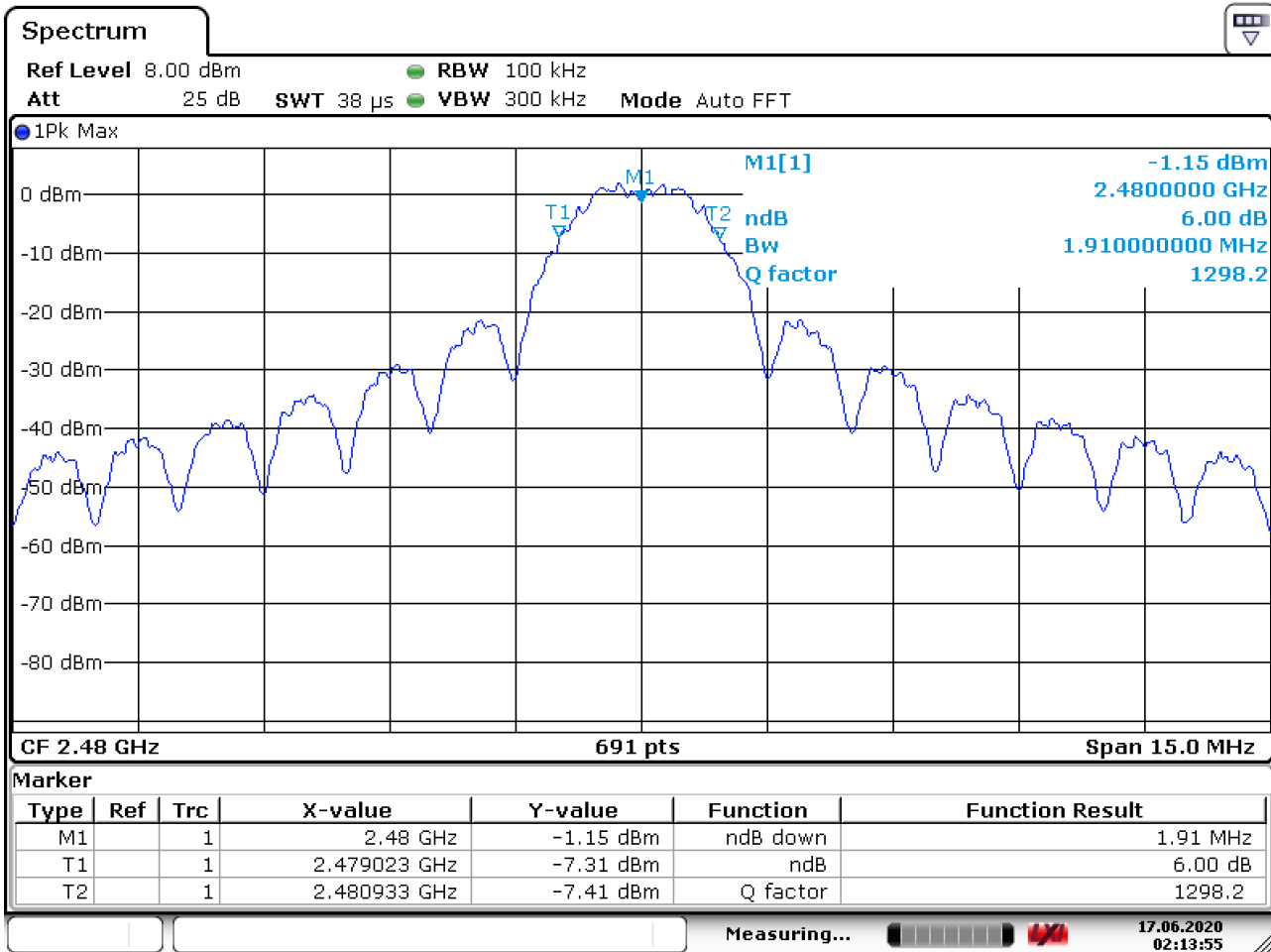
### Middle Channel



Date: 17.JUN.2020 02:13:38



### High Channel



Date: 17.JUN.2020 02:13:55

### 3.2.2 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(Peak):

Center frequency = the highest, middle and the lowest channels

RBW = 2 MHz

Span = auto

VBW = 5 MHz (VBW  $\geq$  3 \* RBW)

Sweep = auto

Detector function = peak

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

Frequency (MHz)	Test Results		
	dBm	mW	Result
2405	5.54	3.58	Complies
2445	5.99	3.97	Complies
2480	6.01	3.99	Complies

- See next pages for actual measured spectrum plots.

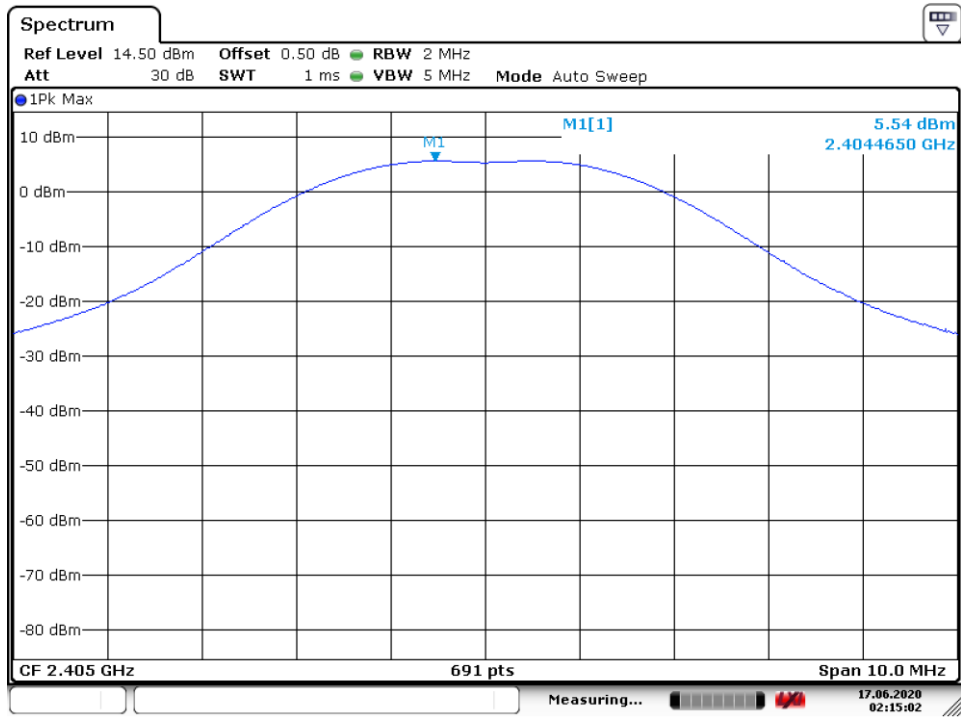
#### Minimum Standard:

Peak output power	< 1 W
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#### Measurement Setup

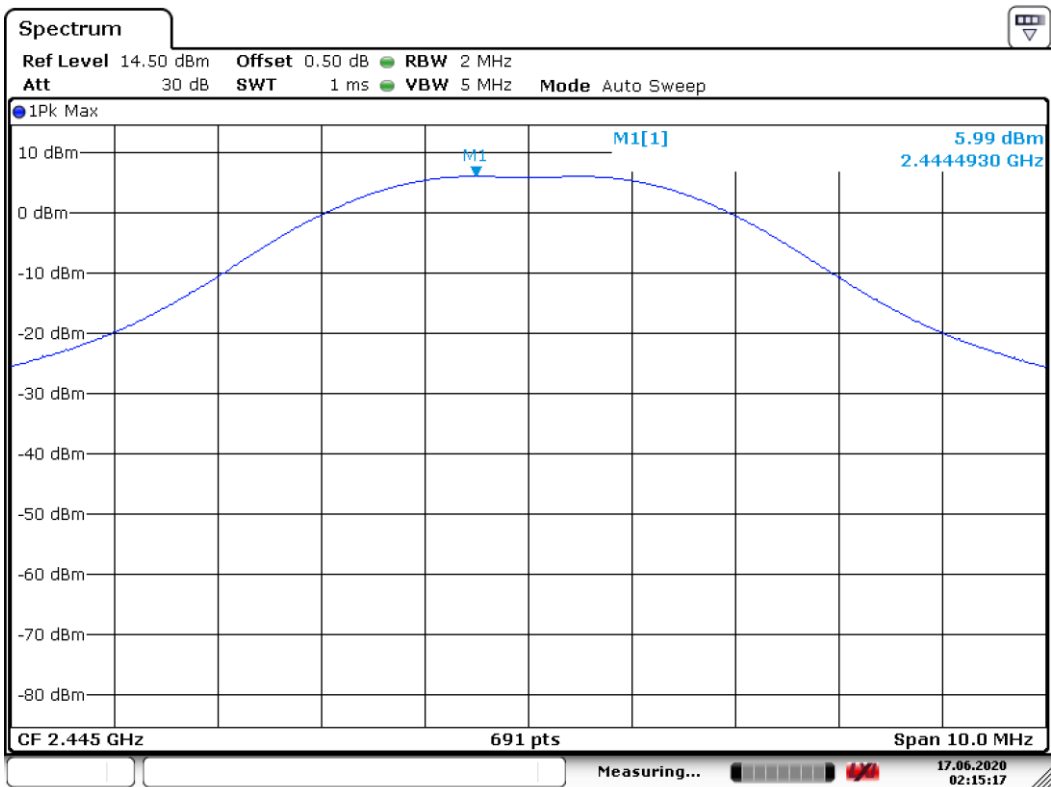
Same as the Chapter 3.2.1 (Figure 1)

### Low Channel



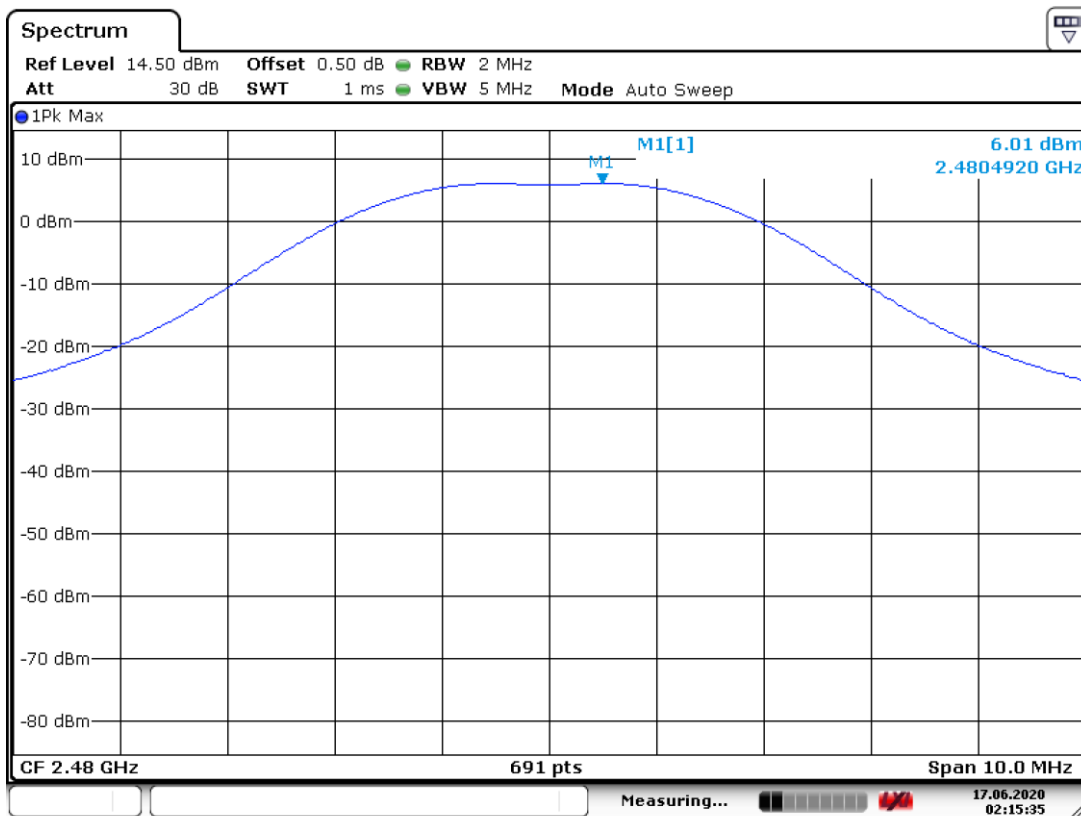
Date: 17.JUN.2020 02:15:02

### Middle Channel



Date: 17.JUN.2020 02:15:17

### High Channel(Peak)



Date: 17.JUN.2020 02:15:35

### 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**

Frequency (MHz)	Test Results	
	dBm	Result
2405	-9.04	Complies
2445	-7.62	Complies
2480	-7.66	Complies

- See next pages for actual measured spectrum plots.

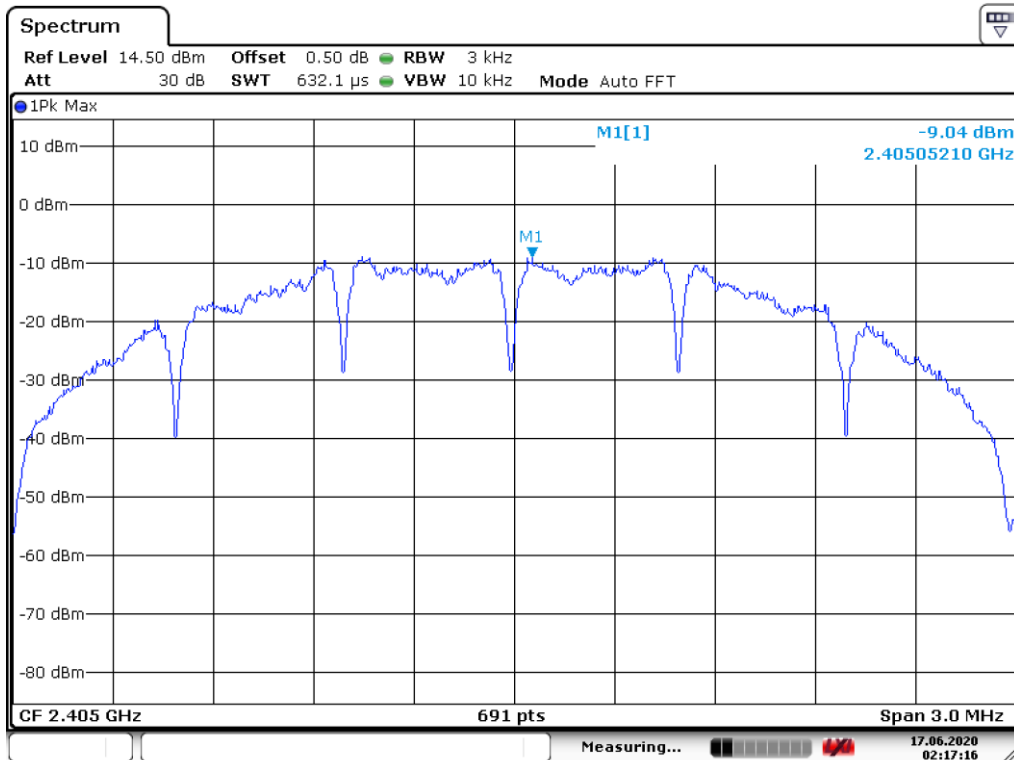
#### Minimum Standard:

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

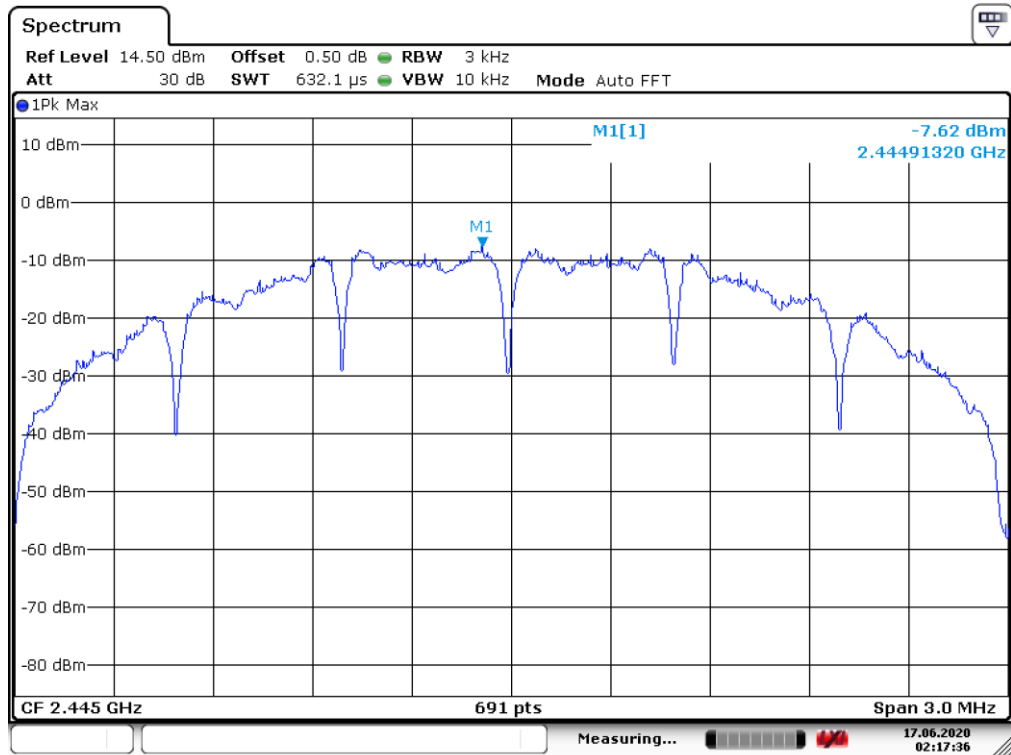
Same as the Chapter 3.2.1 (Figure 1)

## Power Density Measurement Low Channel



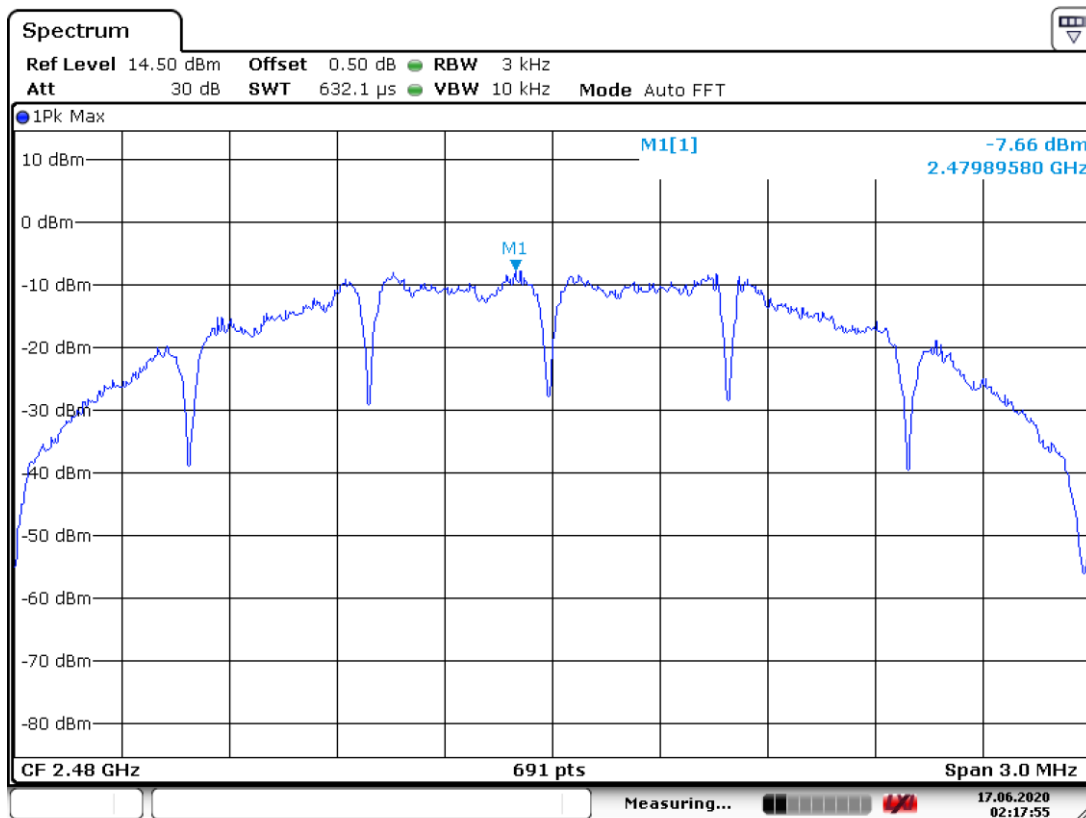
Date: 17.JUN.2020 02:17:17

## Middle Channel



Date: 17.JUN.2020 02:17:36

# High Channel



Date: 17.JUN.2020 02:17:55

### 3.2.4 Band Edge

**Procedure:**

The Unwanted emission from the EUT were measured according to the dictates PKPSD measurement procedure in section 11.11 of ANSI C63.10-2013.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating the RF power that is produced shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or radiated measurement,

Provided that the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under 5.4(4), the attenuation required shall be 30dB instead of 20dB

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW  $\geq$  3 X RBW

Span = 40 MHz, 100 MHz

Detector function = peak

Trace = max hold

Sweep = auto

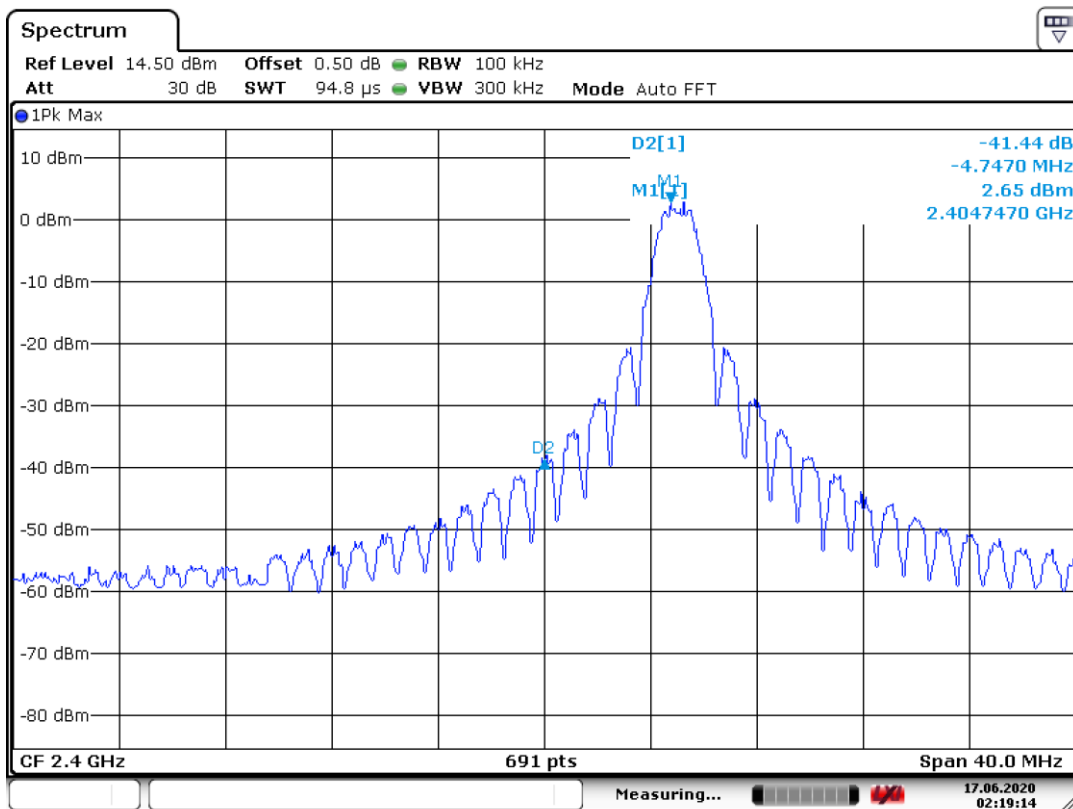
**Measurement Data: Complies**

- 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>	$\leq$ 20 dBc
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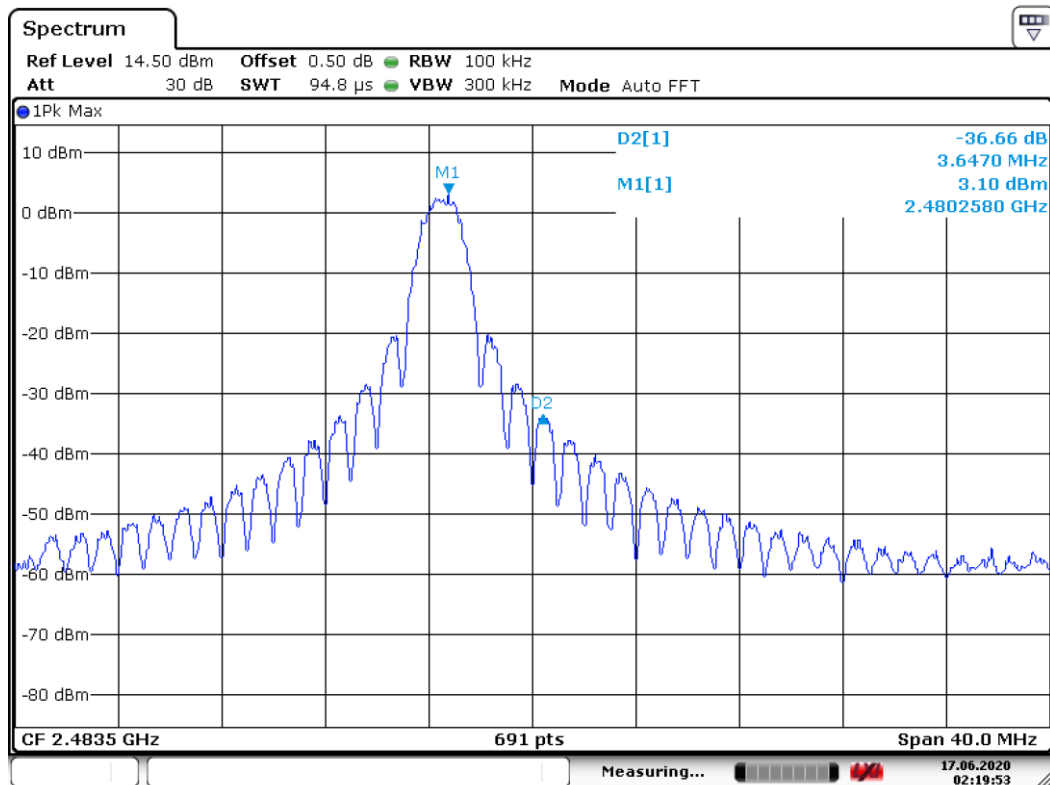


### Lower edge



Date: 17. JUN.2020 02:19:14

### Upper edge



Date: 17. JUN.2020 02:19:53

### 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**

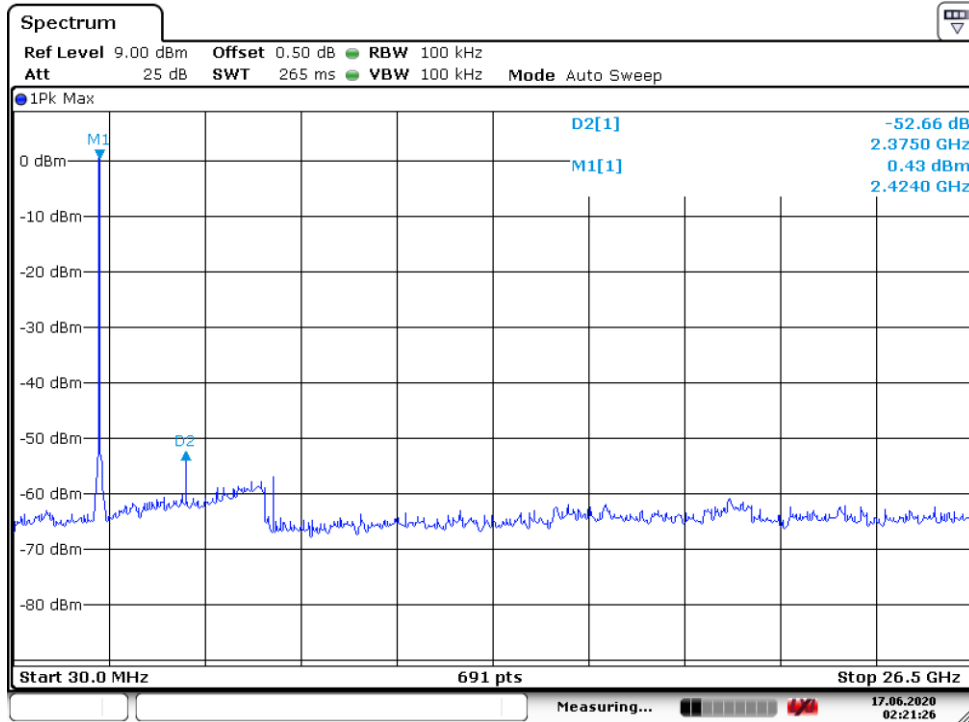
- All conducted emission in any 100 kHz bandwidth outside of the spread spectrum band was at least 20 dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

<b>Minimum Standard:</b>	> 20 dBc
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**Measurement Setup**

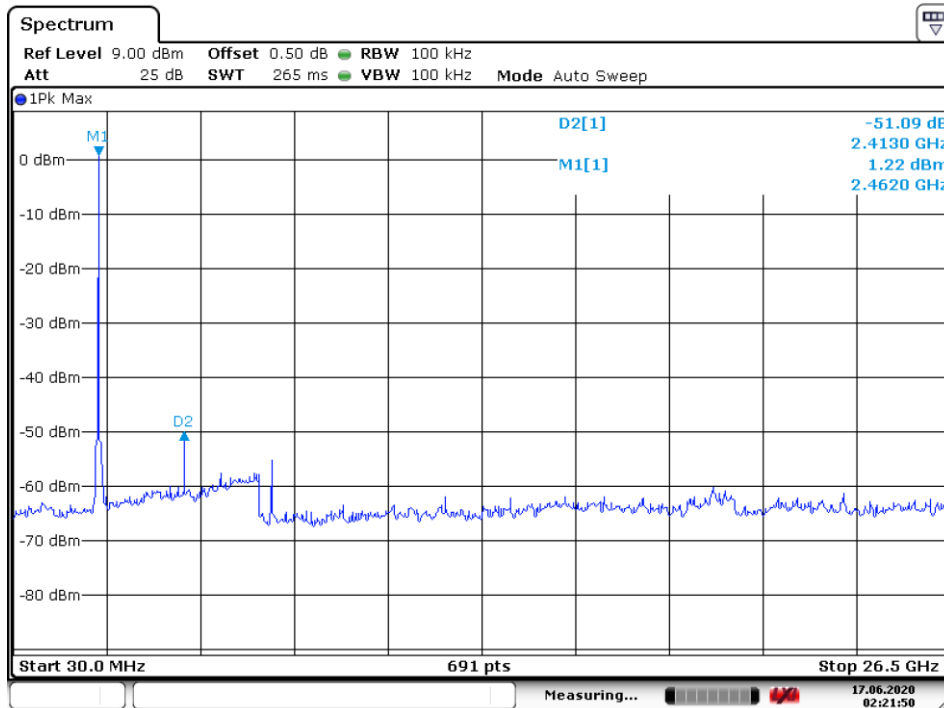
Same as the Chapter 3.2.1 (Figure 1)

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



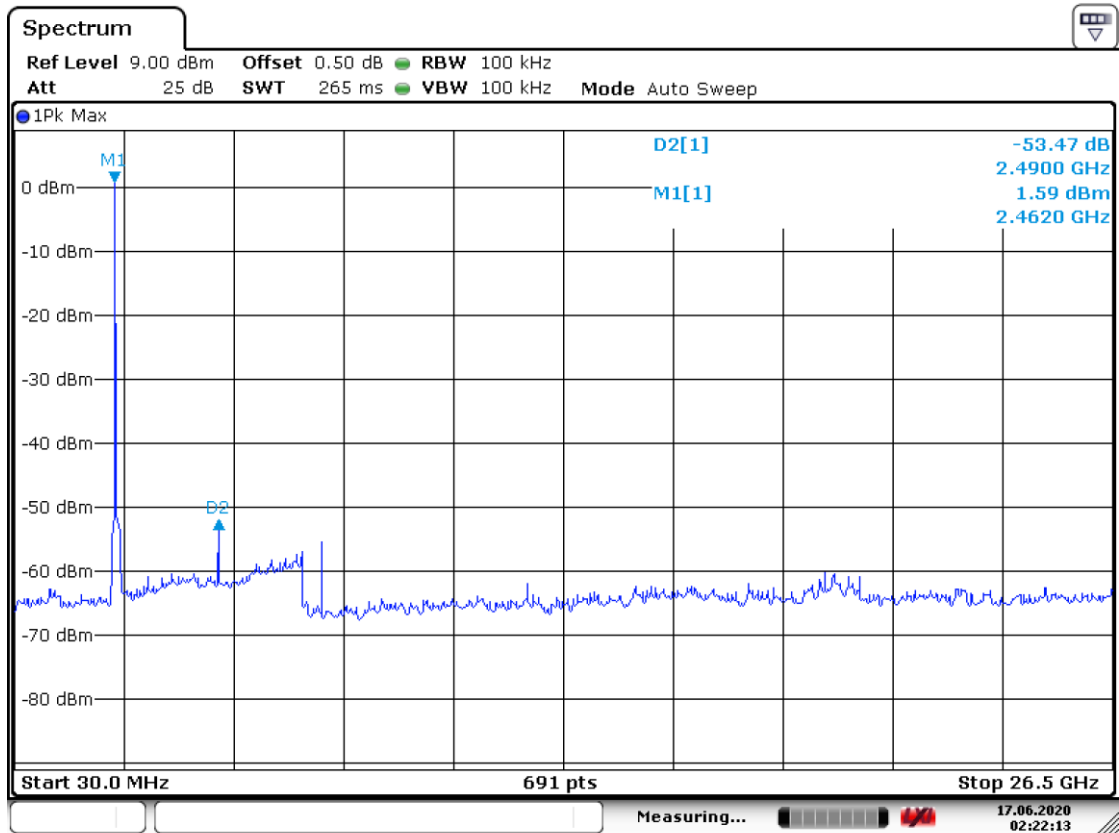
Date: 17. JUN.2020 02:21:26

**Unwanted Emission – Middle Channel**  
**Frequency Range = 30 MHz ~ 26.5 GHz**



Date: 17. JUN.2020 02:21:51

**Unwanted Emission – High Channel**  
**Frequency Range = 30 MHz ~ 26.5 GHz**



Date: 17.JUN.2020 02:22:13

### 3.2.6 Radiated Spurious Emissions

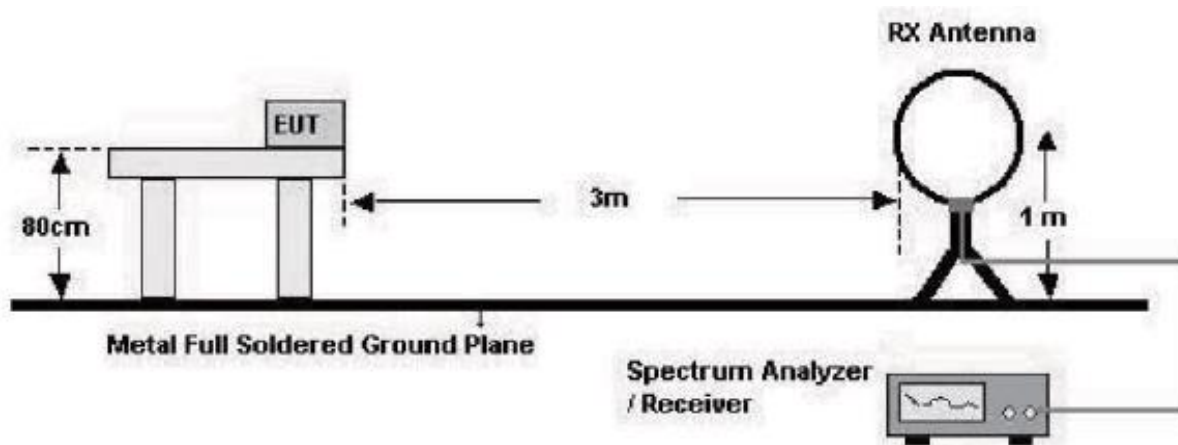
#### Procedure:

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.10-2013.

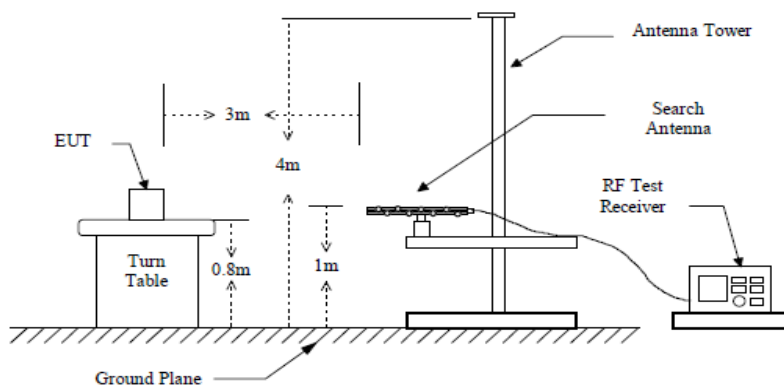
The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.

The EUT configureal to transmit continuously( $D \geq 98\%$ )/ Duty Factor = 0

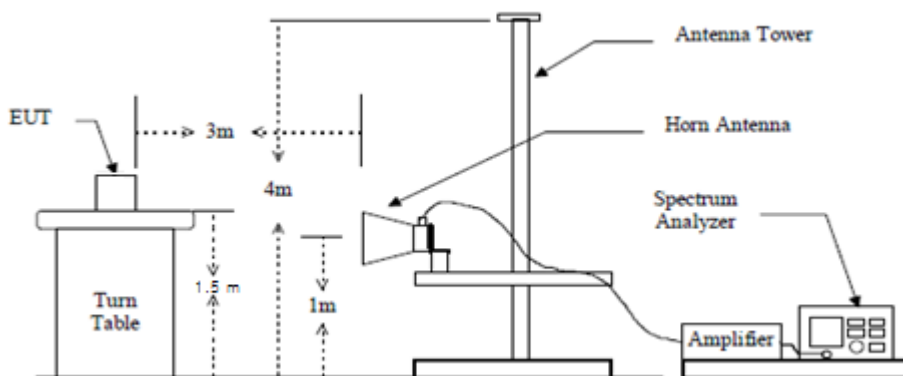
below 30 MHz



below 1 GHz (30 MHz to 1 GHz)



above 1 GHz



Measurement Data: **Complies**

- See next pages for actual measured data.
- 30 MHz or less Although these tests were performed other than open field test site, adequate comparison on measurements were confirmed against 10m open field test site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlated with the one of tests made in an open field site based on KDB 414788.
- No other emissions were detected at a level greater than 20 dB below limit include from 9 kHz to 30MHz.

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

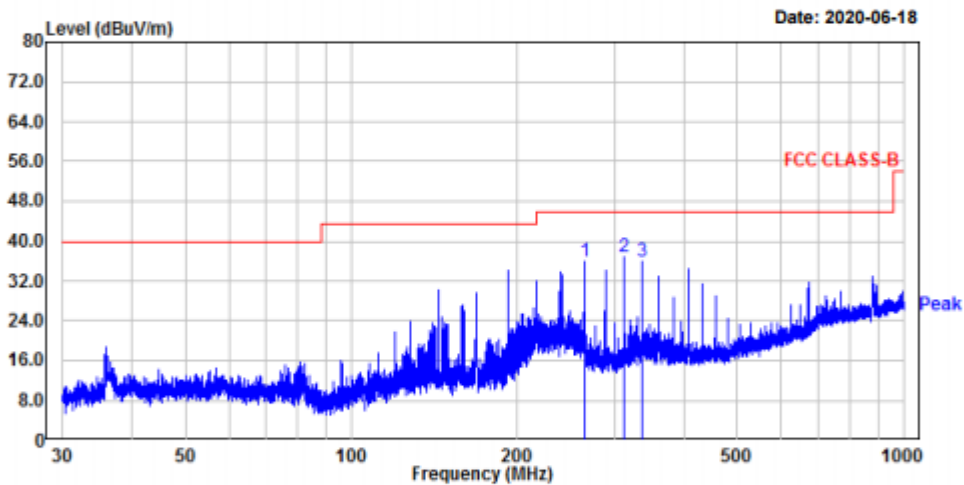
\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part,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

**Radiated Emissions**



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EUT/Model No.: \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE LOW \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



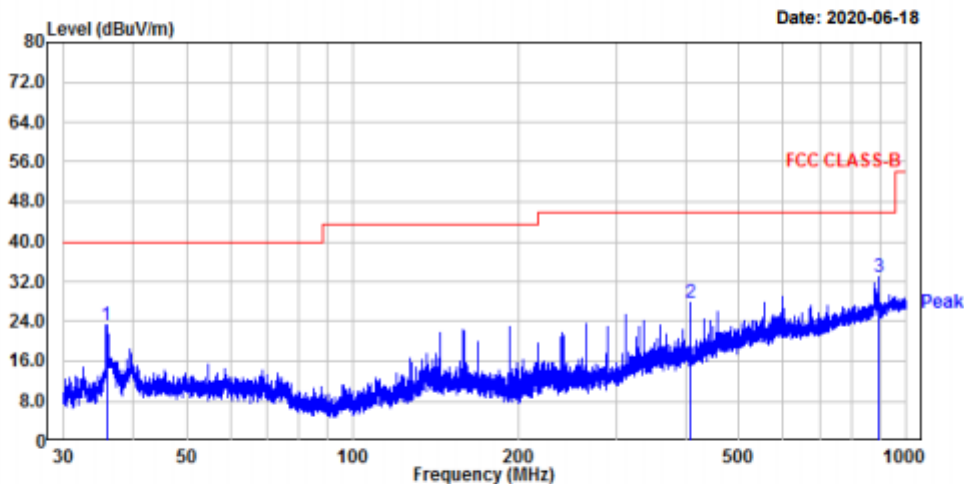
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	264.05	48.13	-12.13	36.00	46.00	10.00	100	357	horizontal
2.	312.04	47.21	-10.41	36.80	46.00	9.20	100	227	horizontal
3.	336.04	45.81	-9.88	35.93	46.00	10.07	100	205	horizontal

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



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 www.ltalab.com

EUT/Model No. : \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE LOW \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



No.	Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
1.	35.84	37.88	-14.53	23.35	40.00	16.65	100	0	vertical
2.	408.05	36.38	-8.56	27.82	46.00	18.18	100	179	vertical
3.	893.07	32.31	0.70	33.01	46.00	12.99	100	0	vertical

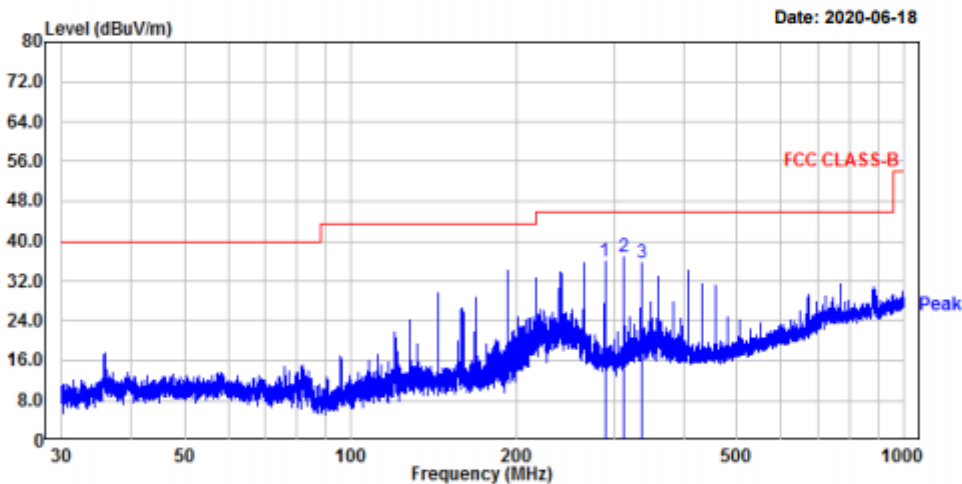
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain





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EUT/Model No.: \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE MID \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



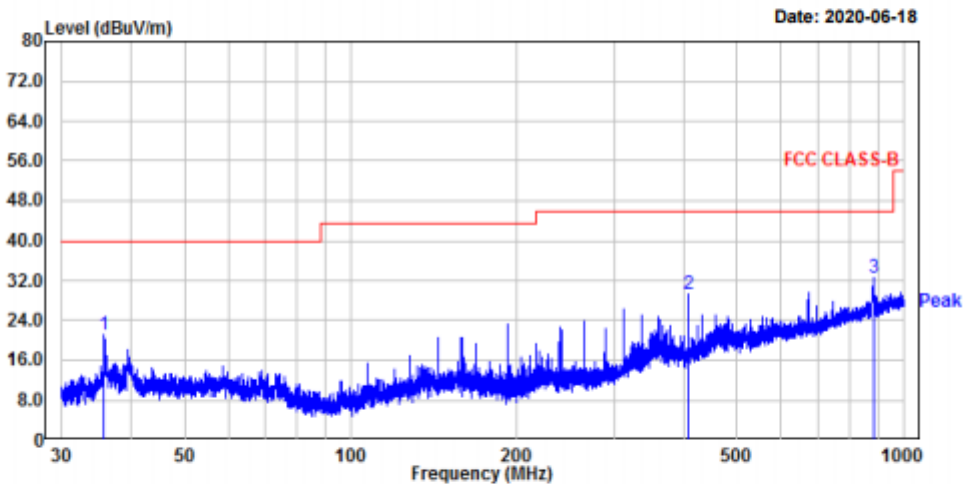
No.	Freq MHz	Reading dBµV	C.F dB	Result QP dBµV/m	Limit dBµV/m	Margin dB	Height cm	Angle deg	Polarity
1.	287.99	47.10	-11.16	35.94	46.00	10.06	100	336	horizontal
2.	312.04	47.10	-10.41	36.69	46.00	9.31	100	346	horizontal
3.	336.04	45.64	-9.88	35.76	46.00	10.24	100	240	horizontal

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



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EUT/Model No.: \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE MID \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



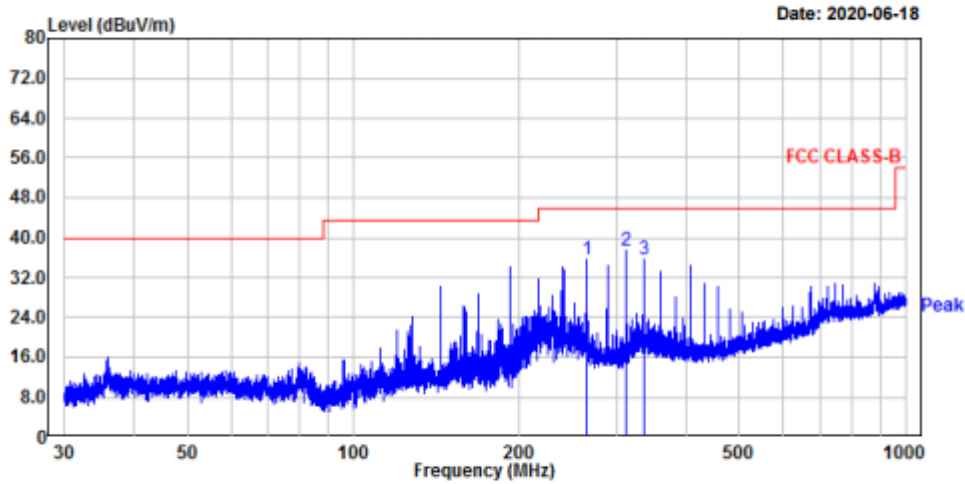
No.	Freq MHz	Reading dBUV	C.F dB	Result QP dBUV/m	Limit dBUV/m	Margin dB	Height cm	Angle deg	Polarity
1.	35.81	35.59	-14.53	21.06	40.00	18.94	100	167	vertical
2.	408.05	37.93	-8.56	29.37	46.00	16.63	100	238	vertical
3.	882.95	32.09	0.56	32.65	46.00	13.35	100	167	vertical

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



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EUT/Model No. : \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE HIGH \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



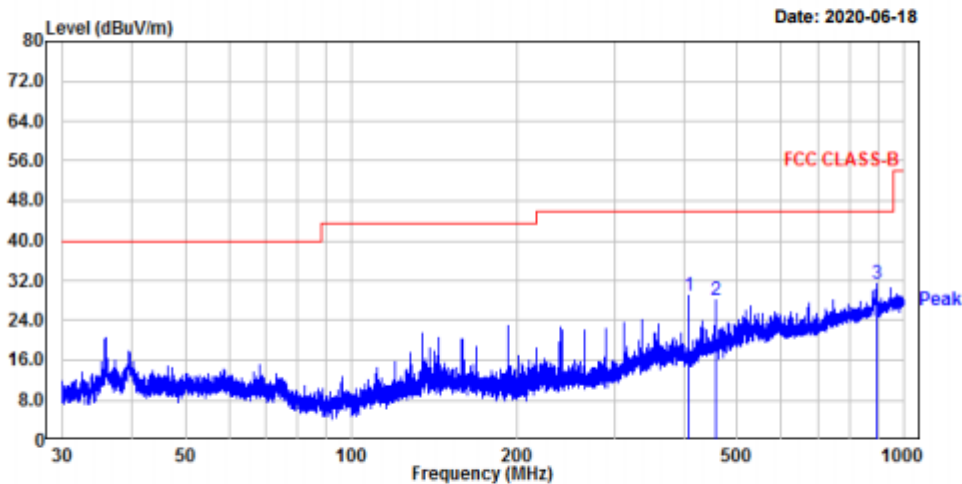
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	264.05	47.79	-12.13	35.66	46.00	10.34	100	0	horizontal
2.	312.04	47.84	-10.41	37.43	46.00	8.57	100	336	horizontal
3.	336.04	45.60	-9.88	35.72	46.00	10.28	100	250	horizontal

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



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EUT/Model No. : \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE HIGH \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



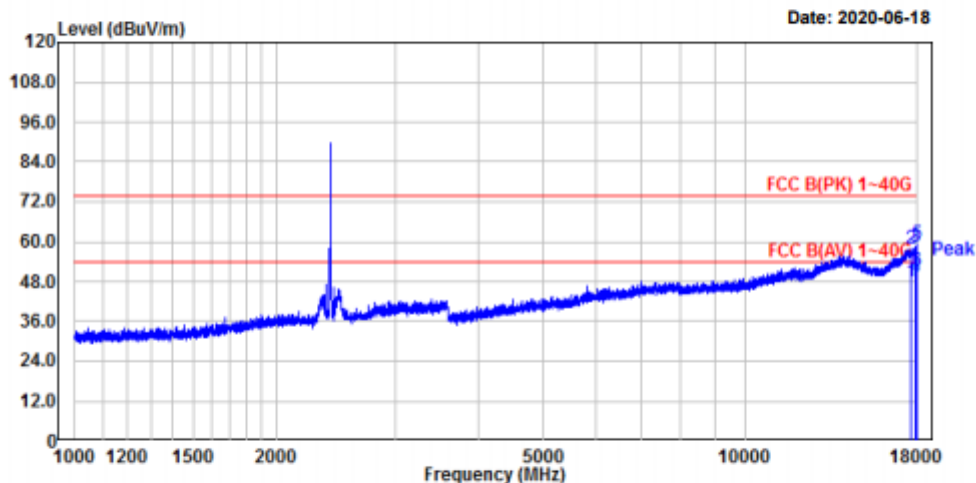
No.	Freq MHz	Reading dBµV	C.F dB	Result QP dBµV/m	Limit dBµV/m	Margin dB	Height cm	Angle deg	Polarity
1.	408.05	37.43	-8.56	28.87	46.00	17.13	100	214	vertical
2.	456.11	35.91	-7.75	28.16	46.00	17.84	100	226	vertical
3.	893.47	30.55	0.71	31.26	46.00	14.74	100	191	vertical

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



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 Test Mode : ZIGBEE LOW \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



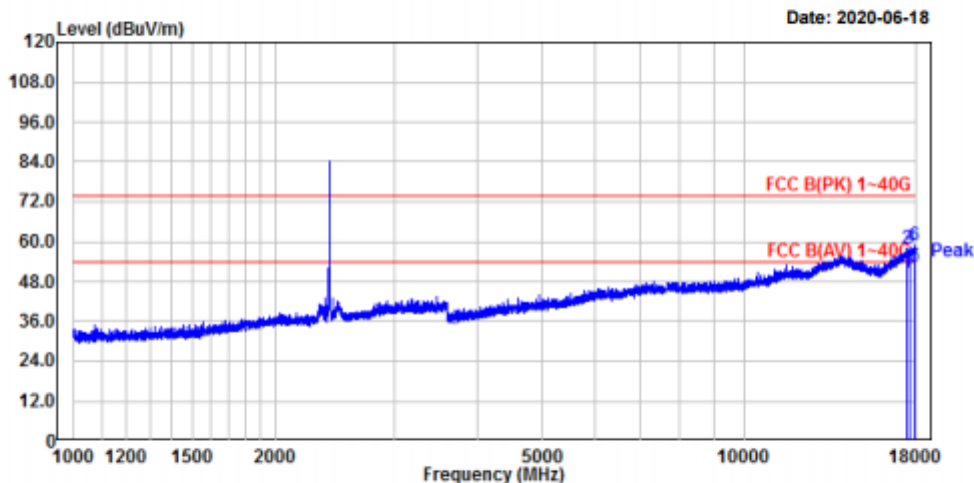
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	17626.73	31.26	16.76	48.02	54.00	5.98	100	360	horizontal
2.	17626.73	41.27	16.76	58.03	74.00	15.97	100	360	horizontal
3.	17922.13	41.14	17.26	58.40	74.00	15.60	100	188	horizontal
4.	17922.13	32.07	17.26	49.33	54.00	4.67	100	188	horizontal
5.	17987.00	41.96	17.37	59.33	74.00	14.67	100	200	horizontal
6.	17987.00	33.72	17.37	51.09	54.00	2.91	100	200	horizontal

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



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EUT/Model No. : \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE LOW \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



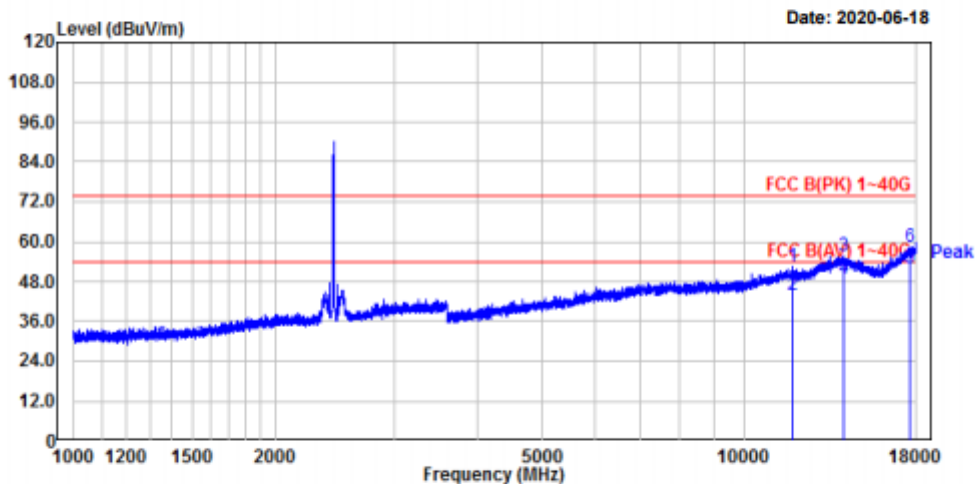
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	17499.82	34.19	16.54	50.73	54.00	3.27	100	357	vertical
2.	17499.82	41.29	16.54	57.83	74.00	16.17	100	357	vertical
3.	17664.98	35.39	16.82	52.21	54.00	1.79	100	159	vertical
4.	17664.98	41.71	16.82	58.53	74.00	15.47	100	159	vertical
5.	17883.32	35.51	17.17	52.68	54.00	1.32	100	360	vertical
6.	17883.32	41.61	17.17	58.78	74.00	15.22	100	360	vertical

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



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EUT/Model No.: \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE MID \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



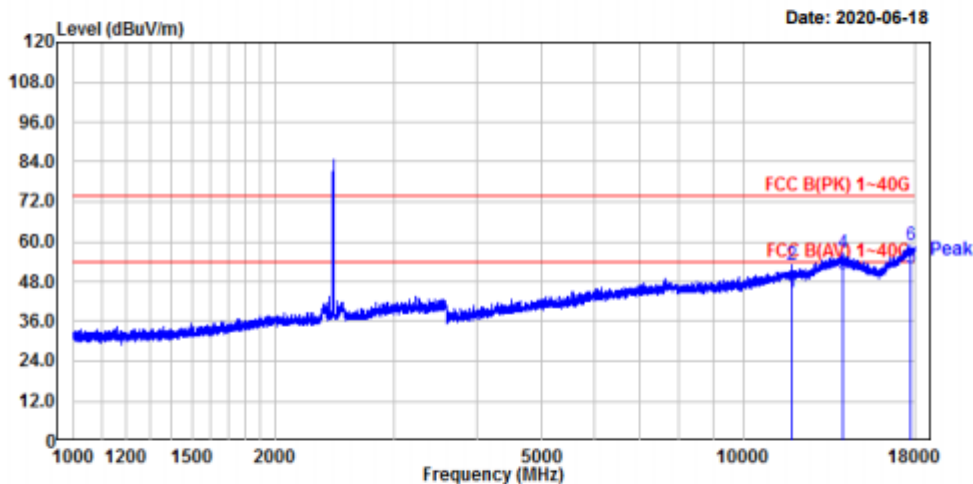
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	11799.02	42.24	10.27	52.51	74.00	21.49	100	360	horizontal
2.	11799.02	33.73	10.27	44.00	54.00	10.00	100	360	horizontal
3.	14028.31	41.36	14.46	55.82	74.00	18.18	100	130	horizontal
4.	14028.31	34.26	14.46	48.72	54.00	5.28	100	130	horizontal
5.	17652.22	35.38	16.80	52.18	54.00	1.82	100	352	horizontal
6.	17652.22	41.75	16.80	58.55	74.00	15.45	100	352	horizontal

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



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 Test Mode : ZIGBEE MID \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	11769.21	34.77	10.28	45.05	54.00	8.95	100	2	vertical
2.	11769.21	42.54	10.28	52.82	74.00	21.18	100	2	vertical
3.	14079.08	35.82	14.34	50.16	54.00	3.84	100	71	vertical
4.	14079.08	42.10	14.34	56.44	74.00	17.56	100	71	vertical
5.	17728.92	34.98	16.93	51.91	54.00	2.09	100	58	vertical
6.	17728.92	41.80	16.93	58.73	74.00	15.27	100	58	vertical

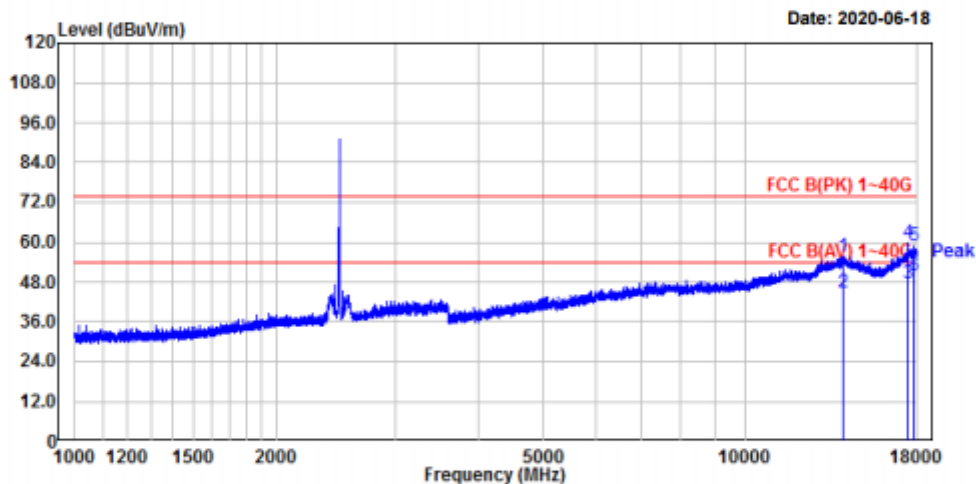
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain





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 Test Mode : ZIGBEE HIGH \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



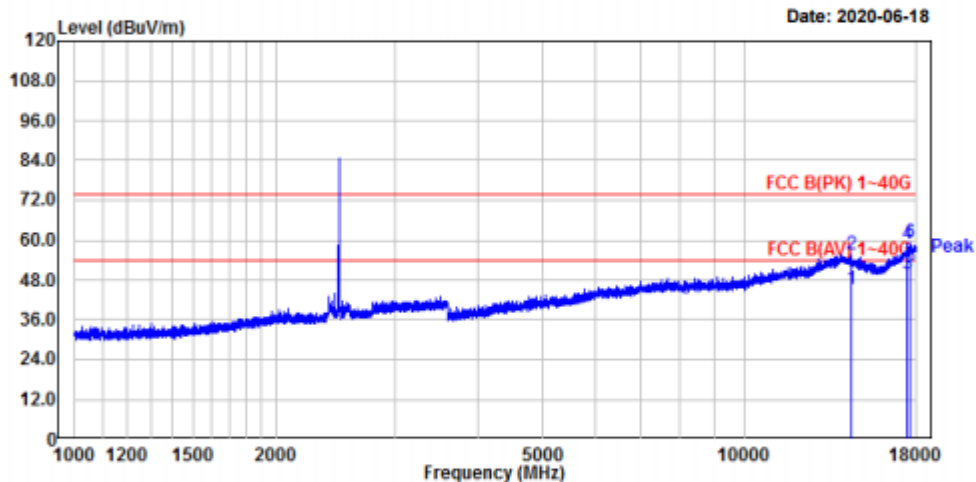
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	13987.82	41.25	14.50	55.75	74.00	18.25	100	360	horizontal
2.	13987.82	30.23	14.50	44.73	54.00	9.27	100	360	horizontal
3.	17506.14	30.96	16.55	47.51	54.00	6.49	100	179	horizontal
4.	17506.14	43.32	16.55	59.87	74.00	14.13	100	179	horizontal
5.	17863.95	41.88	17.15	59.03	74.00	14.97	100	354	horizontal
6.	17863.95	32.55	17.15	49.70	54.00	4.30	100	354	horizontal

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



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 Test Mode : ZIGBEE HIGH \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



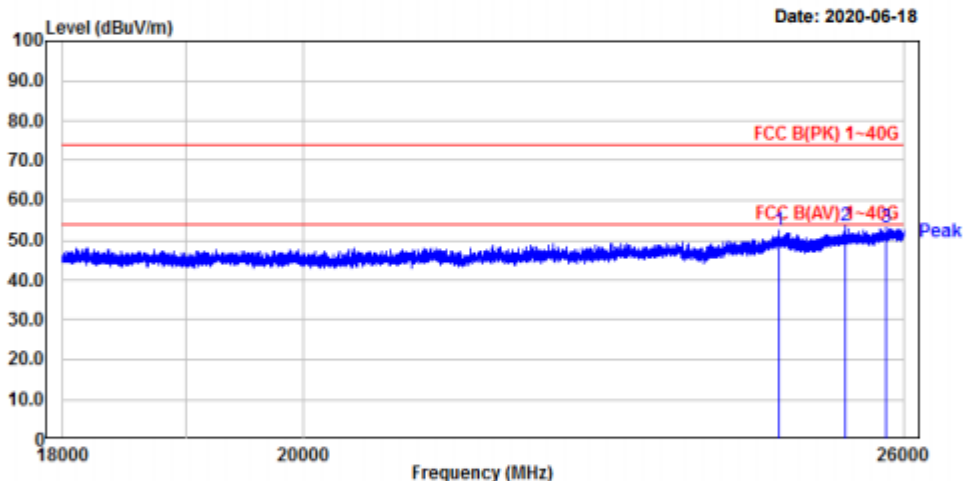
No.	Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
1.	14455.35	31.86	13.40	45.26	54.00	8.74	100	357	vertical
2.	14455.35	42.47	13.40	55.87	74.00	18.13	100	357	vertical
3.	17506.14	33.42	16.55	49.97	54.00	4.03	100	349	vertical
4.	17506.14	42.14	16.55	58.69	74.00	15.31	100	349	vertical
5.	17690.53	35.37	16.87	52.24	54.00	1.76	100	0	vertical
6.	17690.53	42.59	16.87	59.46	74.00	14.54	100	0	vertical

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



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EUT/Model No. : \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE MID \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



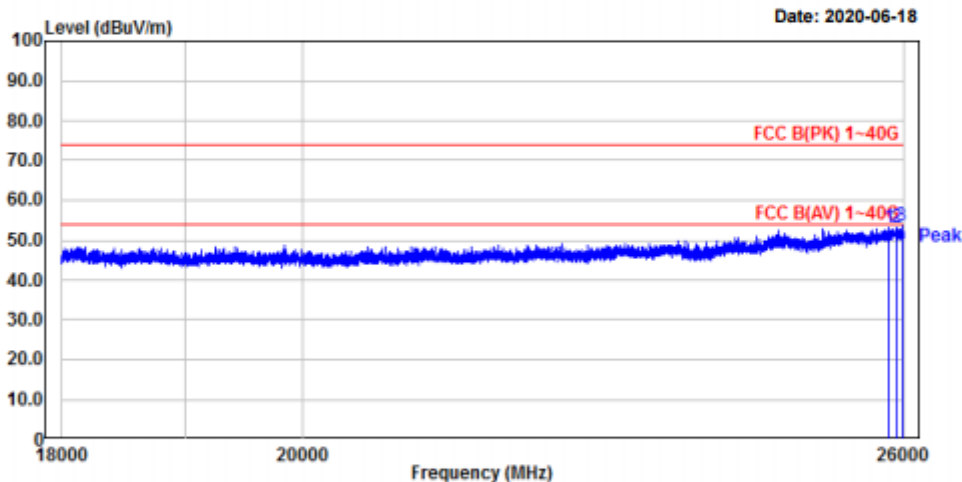
No.	Freq MHz	Reading dBuV	C.F dB	Result QP dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Polarity
1.	24628.47	35.36	17.12	52.48	74.00	21.52	100	123	horizontal
2.	25336.95	36.01	17.73	53.74	74.00	20.26	100	338	horizontal
3.	25803.55	34.96	18.28	53.24	74.00	20.76	100	186	horizontal

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



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 Test Mode : ZIGBEE MID \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



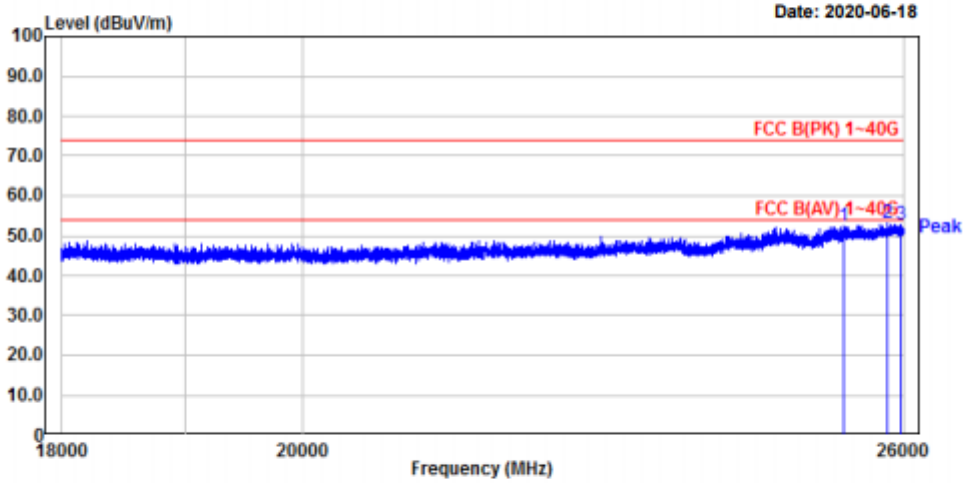
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	25833.22	34.91	18.26	53.17	74.00	20.83	100	360	vertical
2.	25921.24	35.04	18.18	53.22	74.00	20.78	100	185	vertical
3.	25977.30	35.35	18.19	53.54	74.00	20.46	100	149	vertical

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



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EUT/Model No. : \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE LOW \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



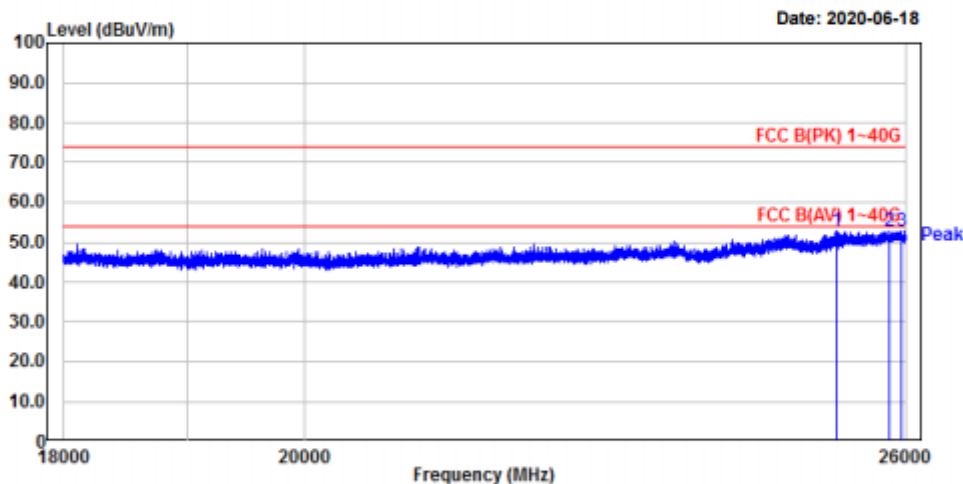
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	25322.98	34.76	17.70	52.46	74.00	21.54	100	323	horizontal
2.	25817.79	35.05	18.27	53.32	74.00	20.68	100	167	horizontal
3.	25973.72	34.80	18.19	52.99	74.00	21.01	100	356	horizontal

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



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 Test Mode : ZIGBEE LOW \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



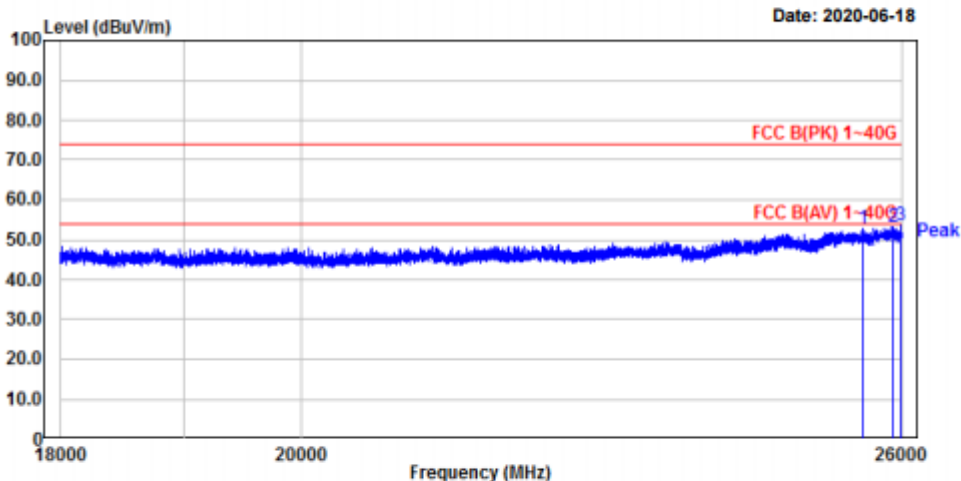
No.	Freq MHz	Reading dBµV	C.F dB	Result QP dBµV/m	Limit dBµV/m	Margin dB	Height cm	Angle deg	Polarity
1.	25227.71	35.35	17.41	52.76	74.00	21.24	100	360	vertical
2.	25815.42	34.40	18.27	52.67	74.00	21.33	100	209	vertical
3.	25959.40	34.71	18.19	52.90	74.00	21.10	100	186	vertical

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



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 Test Mode : ZIGBEE HIGH \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



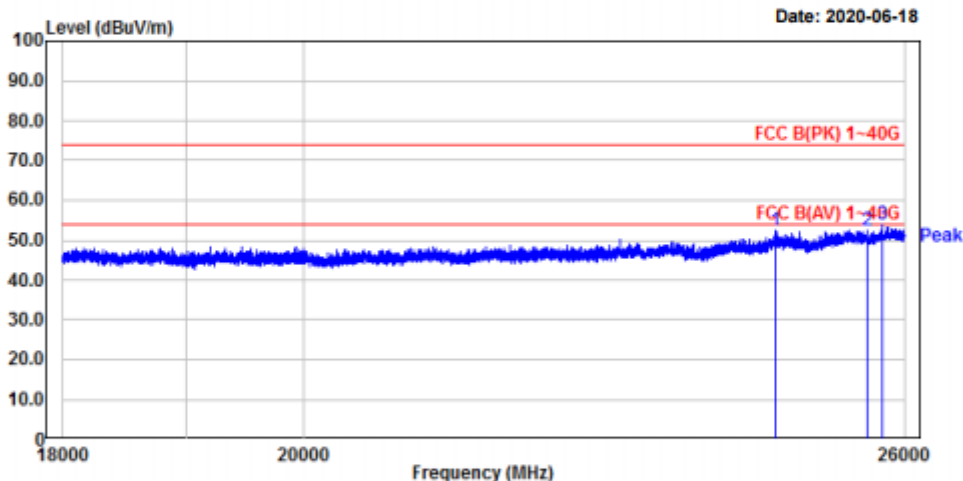
No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	25569.78	34.78	18.12	52.90	74.00	21.10	100	178	horizontal
2.	25903.38	35.05	18.19	53.24	74.00	20.76	100	320	horizontal
3.	25991.63	35.25	18.19	53.44	74.00	20.56	100	204	horizontal

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



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EUT/Model No. : \_\_\_\_\_ Temp/Humi: 23 'C / 38 % R.H.  
 Test Mode : ZIGBEE HIGH \_\_\_\_\_ Tested by: \_\_\_\_\_  
 Power : \_\_\_\_\_



No.	Freq MHz	Reading dBμV	C.F dB	Result QP dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Polarity
1.	24570.80	35.15	17.13	52.28	74.00	21.72	100	360	vertical
2.	25570.95	34.46	18.12	52.58	74.00	21.42	100	346	vertical
3.	25752.60	35.62	18.23	53.85	74.00	20.15	100	357	vertical

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



### 3.2.7 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: NT****Minimum Standard: FCC Part 15.207(a) / EN 55022**

Frequency Range	quasi-peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

\* Note: This product operates only with battery

**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	2019-09-06
2		SYNTHESIZED CW GENERATOR	83711B	US34490456	HP	1 year	2020-03-16
3		Attenuator (3 dB)	8491A	37822	HP	1 year	2019-09-07
4		Attenuator (10 dB)	8491A	63196	HP	1 year	2019-09-07
5	■	EMI Test Receiver (~7 GHz)	ESCI7	100722	R&S	1 year	2019-09-07
6		RF Amplifier (~1.3 GHz)	8447D OPT 010	2944A07684	HP	1 year	2019-09-07
7	■	RF Amplifier (1~26.5 GHz)	8449B	3008A02126	HP	1 year	2020-03-21
8	■	Horn Antenna (1~18 GHz)	3115	00114105	ETS	2 year	2018-09-26
9		DRG Horn (Small)	3116B	81109	ETS-Lindgren	2 year	2020-05-03
10		DRG Horn (Small)	3116B	133350	ETS-Lindgren	2 year	2020-05-03
11	■	TRILOG Antenna	VULB 9160	9160-3237	SCHWARZBECK	2 year	2019-04-17
12		Temp.Humidity Data Logger	SK-L200TH II A	00801	SATO	1 year	2019-11-23
13	■	DC Power Supply	6674A	3637A01657	Agilent	-	-
14		AC Power Supply	HK-80	LR001	DAERIMTECH	-	-
15	■	Power Meter	EPM-441A	GB32481702	HP	1 year	2020-03-20
16	■	Power Sensor	8481A	3318A94972	HP	1 year	2019-12-26
17		Audio Analyzer	8903B	3729A18901	HP	1 year	2019-09-07
18		Modulation Analyzer	8901B	3749A05878	HP	1 year	2019-09-07
19	■	TEMP & HUMIDITY Chamber	YJ-500	LTAS06041	JinYoung Tech	1 year	2019-09-07
20		Stop Watch	HS-3	812Q08R	CASIO	2 year	2020-03-21
21		LISN	KNW-407	8-1430-1	Kyoritsu	1 year	2019-09-07
22		Two-Lime V-Network	ESH3-Z5	893045/017	R&S	1 year	2020-03-20
23		Highpass Filter	WHKX1.5/15G-10SS	74	Wainwright Instruments	1 year	2020-03-19
24		Highpass Filter	WHKX3.0/18G-10SS	118	Wainwright Instruments	1 year	2020-03-19
25		OSP120 BASE UNIT	OSP120	101230	R&S	1 year	2020-03-21
26	■	Signal Generator(100 kHz ~ 40 GHz)	SMB100A	177621	R&S	1 year	2020-03-20
27		Vector Signal Generator(9kHz ~ 6 GHz)	SMBV100A	255081	R&S	1 year	2020-03-20
28	■	Signal Analyzer (10 Hz ~ 40 GHz)	FSV40	101367	R&S	1 year	2020-03-20