

# FCC Radio Test Report

## FCC ID: XW3DK-3318ZM

This report concerns (check one):  Original Grant  Class II Change

**Project No.** : 1802C172  
**Equipment** : 2.4G Wireless Keyboard  
**Test Model** : DK-3318ZM  
**Series Model** : N/A  
**Applicant** : DongGuan Siliten Electronics Co., Ltd  
**Address** : Sijia Yewu Industrial estate, Shijie Town, Dongguan  
City, Guangdong Province, China

**Date of Receipt** : Feb. 28, 2018  
**Date of Test** : Mar. 02, 2018 ~ Mar. 09, 2018  
**Issued Date** : Apr. 03, 2018  
**Tested by** : BTL Inc.

**Testing Engineer** : Chay Cai  
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# **B T L I N C .**

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### REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1802C172	Original Issue.	Apr. 03, 2018

## 1. CERTIFICATION

Equipment : 2.4G Wireless Keyboard  
Brand Name : N/A  
Test Model : DK-3318ZM  
Series Model : N/A  
Applicant : DongGuan Siliten Electronics Co., Ltd  
Manufacturer : DongGuan Siliten Electronics Co., Ltd  
Address : Sijia Yewu Industrial estate, Shijie Town, Dongguan City, Guangdong Province, China  
Factory Address : DongGuan Siliten Electronics Co., Ltd  
Sijia Yewu Industrial estate, Shijie Town, Dongguan City, Guangdong Province, China  
Date of Test : Mar. 02, 2018 ~ Mar. 09, 2018  
Test Sample : Engineering Sample  
Standard(s) : FCC Part15, Subpart C (15.249) / ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1802C172) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP according to the ISO-17025 quality assessment standard and technical standard(s).

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15, Subpart C (15.249)			
Standard(s) Section	Test Item	Judgment	Remark
15.207(a)	Conducted Emission	N/A	Note(1)
15.205	Restricted Band of Operation	PASS	
15.209 15.249(a)	Radiated Emissions	PASS	
15.215(c)	20dB Bandwidth Test	PASS	

**NOTE:**

(1) "N/A" denotes test is not applicable to this device.

## 2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

BTL's test firm number for FCC: 854385

BTL's designation number for FCC: CN5020

## 2.2 MEASUREMENT UNCERTAINTY

The measurement uncertainty figures shall be calculated according the methods described in the ETSI TR 100 028 and shall correspond to an expansion factor (coverage factor)  $k=1.96$  or  $k=2$  (which provide confidence levels of respectively 90% and 95.45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Measurement Uncertainty for a Level of Confidence of 95 %,  $U=2 \times U_c(y)$ .

The BTL measurement uncertainty as below table:

### A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9KHz~30MHz	V	3.79
		9KHz~30MHz	H	3.57
		30MHz ~ 200MHz	V	3.82
		30MHz ~ 200MHz	H	3.78
		200MHz ~ 1,000MHz	V	4.10
		200MHz ~ 1,000MHz	H	4.06
		1GHz~18GHz	V	3.12
		1GHz~18GHz	H	3.68
		18GHz~40GHz	V	4.15
		18GHz~40GHz	H	4.14

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.



### 3. GENERAL INFORMATION

#### 3.1 DESCRIPTION OF EUT

Equipment	2.4G Wireless Keyboard	
Brand Name	N/A	
Test Model	DK-3318ZM	
Series Model	N/A	
Model Difference	N/A	
Product Description	Operation Frequency	2402 MHz -2480 MHz
	Modulation Technology	GFSK
	Bit Rate of Transmitter	2 Mbps
	Field Strength	78.70 dBuV/m (Peak Max) 45.07 dBuV/m (AVG Max)
Power Source	Supplied from 1*AAA Battery.	
EUT Power Rating	DC 1.5V	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	07	2445	13	2419
02	2426	08	2466	14	2439
03	2441	09	2414	15	2453
04	2463	10	2436	16	2480
05	2407	11	2459		
06	2422	12	2473		

3. Table for Filed Antenna

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed	N/A	1.80

### 3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

For Radiated Test	
Final Test Mode	Description
Mode 1	TX Mode <b>NOTE (1)</b>

Note:

(1) The measurements are performed at the high, middle, low available channels.

### 3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



### 3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
-	-	-	-	-	-

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

Note:

(1) The support equipment was authorized by Declaration of Conformity (DOC).

## 4. EMC EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 -0.50	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 -30.0	60	50

Note:

- (1) The limit of " \* " decreases with the logarithm of the frequency
- (2) The test result calculated as following:  
 Measurement Value = Reading Level + Correct Factor  
 Correct Factor = Insertion Loss + Cable Loss - Amplifier Gain(if use)  
 Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

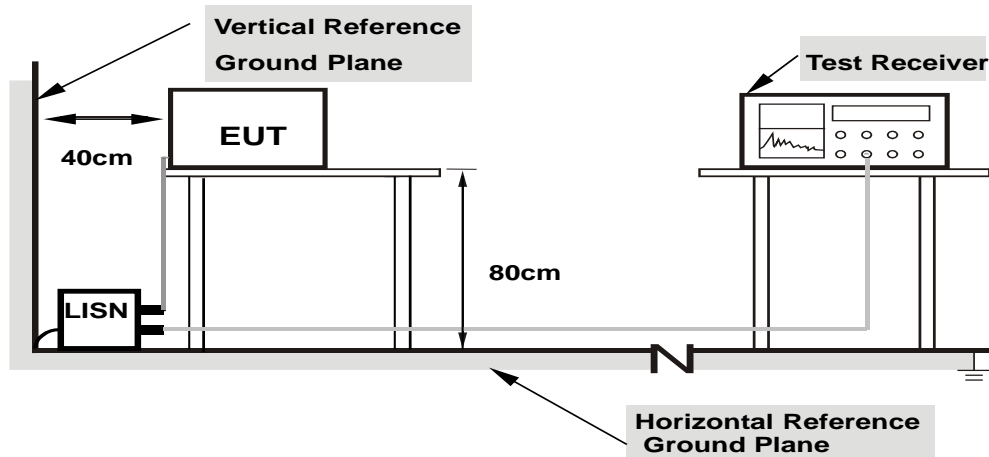
#### 4.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.4 TEST SETUP



- Note:**
- 1.Support units were connected to second LISN.
  - 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical function (as a customer would normally use it), EUT was programmed to be in continuously transmitting/receiving data or hopping on mode.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: N/A  
 Relative Humidity: N/A  
 Test Voltage: N/A

#### 4.1.7 TEST RESULTS

Please refer to the Appendix A.

Remark:

- (1) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform.In this case, a “ \* ” marked in AVG Mode column of Interference Voltage Measured.
- (2) Measuring frequency range from 150KHz to 30MHz.
- (3) “ N/A” denotes test is not applicable to this device.

## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 RADIATED EMISSION LIMITS (FCC 15.209)

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).

### LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.209)

FREQUENCY (MHz)	(dBuV/m) (at 3m)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

### LIMITS OF RADIATED EMISSION MEASUREMENT (FCC Part 15.249)

FCC Part15 (15.249) , Subpart C	
Limit	Frequency Range(MHz)
Field strength of fundamental 50000 $\mu$ V/m (94 dB $\mu$ V/m) @ 3 m	2400-2483.5
Field strength of harmonics 500 $\mu$ V/m (54 dB $\mu$ V/m) @ 3 m	Above 2483.5

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

**DWELL TIME OF PERIODIC OPERATION MEASUREMENT**

Duty Cycle = On Time/Total Time

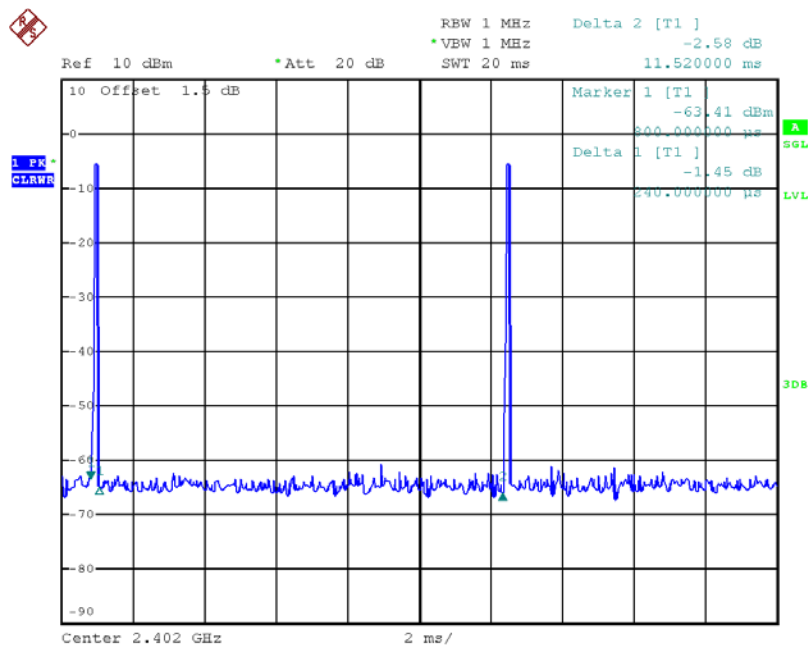
T<sub>ON</sub>: 0.24 ms

T<sub>TOTAL</sub>: 11.52 ms

Duty Cycle = 0.24/11.52=2.08%

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

**On Time & Total Time**



Date: 9.MAR.2018 08:58:20

#### 4.2.2 TEST PROCEDURE

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

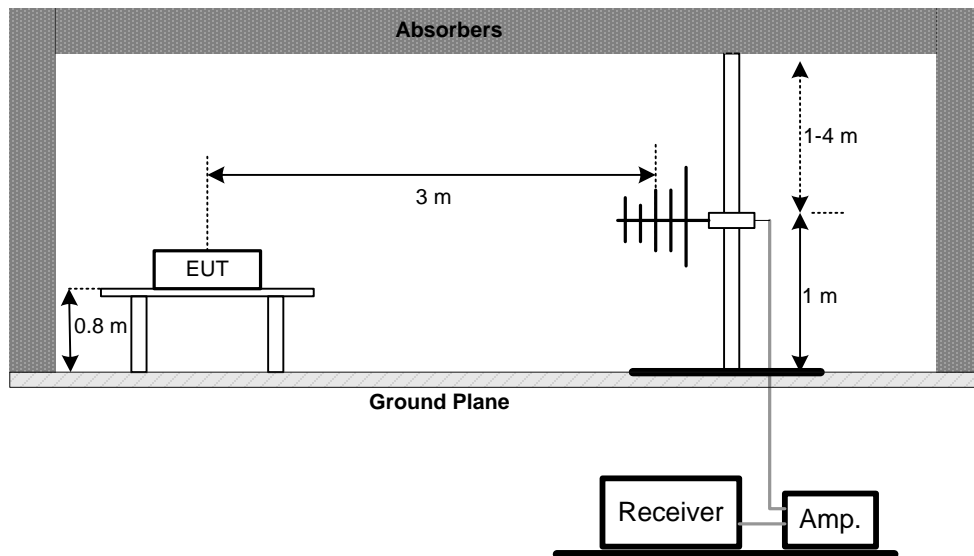
#### 4.2.3 DEVIATION FROM TEST STANDARD

No deviation

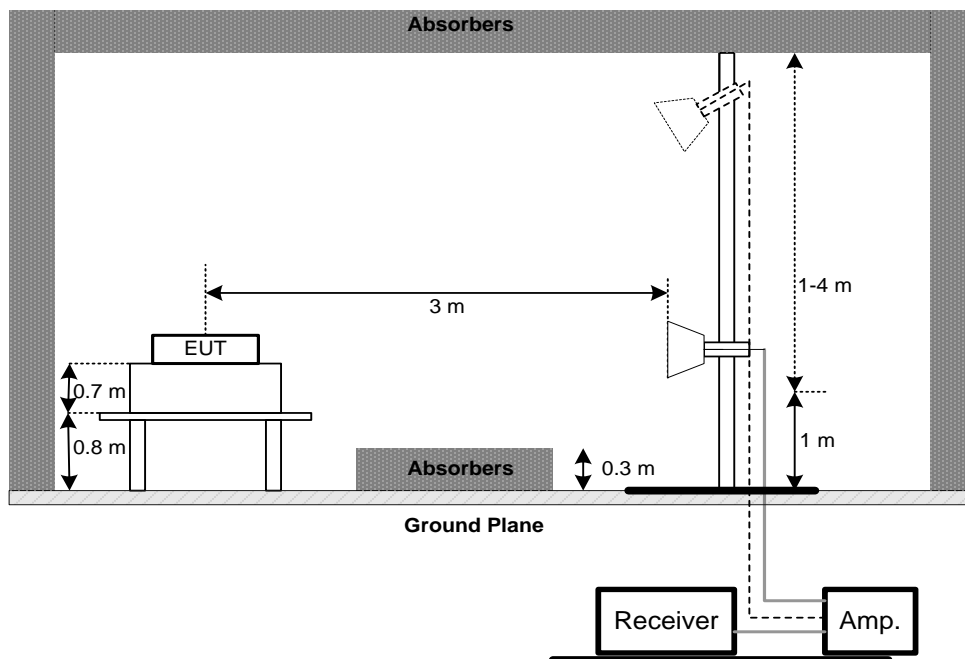


**4.2.4 TEST SETUP**

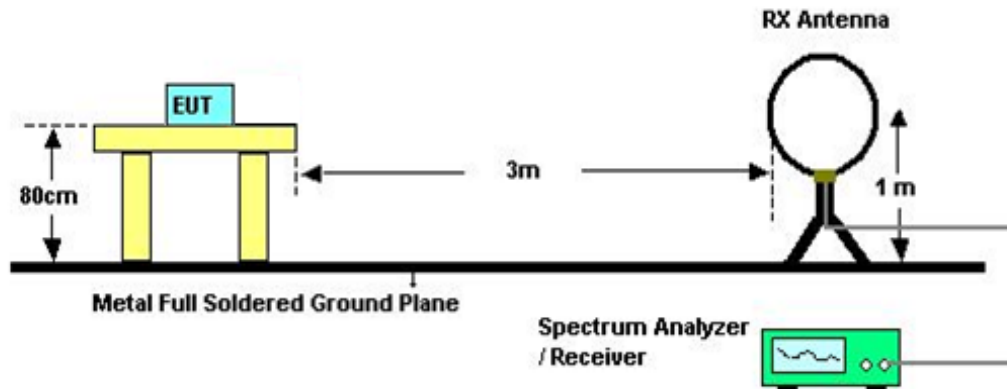
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



(C) For radiated emissions below 30MHz



#### 4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 4.2.6 EUT TEST CONDITIONS

Temperature: 25°C  
 Relative Humidity: 60%  
 Test Voltage: DC 1.5V

#### 4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Appendix B

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

#### 4.2.8 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the Appendix C.

Remark:

- (1) Measuring frequency range from 30MHz to 1000MHz.
- (2) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

#### 4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Appendix D.

Remark:

- (1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (2) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (3) EUT Orthogonal Axis:  
"X" - denotes Laid on Table, "Y" - denotes Vertical Stand, "Z" - denotes Side Stand
- (4) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (5) No limit: This is fundamental signal, the judgment is not applicable.  
For fundamental signal judgment was referred to Peak output test.

## 5. BANDWIDTH TEST

### 5.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

### 5.2 DEVIATION FROM STANDARD

No deviation.

### 5.3 TEST SETUP



### 5.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

### 5.5 EUT TEST CONDITIONS

Temperature: 25°C  
 Relative Humidity: 60%  
 Test Voltage: DC 1.5V

### 5.6 TEST RESULTS

Please refer to the Appendix E.

## 6. MEASUREMENT INSTRUMENTS LIST

Radiated Emission Below 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 26, 2018
2	Amplifier	HP	8447D	2944A09673	Oct. 19, 2018
3	Receiver	Agilent	N9038A	MY52130039	Aug. 20, 2018
4	Cable	emci	LMR-400(30MHz-1 GHz)(8m+5m)	N/A	Jun. 26, 2018
5	Controller	CT	SC100	N/A	N/A
6	Controller	MF	MF-7802	MF780208416	N/A
7	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
8	Antenna	EM	EM-6876-1	230	Mar. 05, 2019

Radiated Emission Above 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 26, 2018
2	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 08, 2018
3	Amplifier	Agilent	8449B	3008A02274	May. 16, 2018
4	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 26, 2018
5	Receiver	Agilent	N9038A	MY52130039	Aug. 20, 2018
6	Antenna	EM	EM-6876-1	230	Mar. 06, 2018
7	Controller	CT	SC100	N/A	N/A
8	Controller	MF	MF-7802	MF780208416	N/A
9	Cable	emci	EMC104-SM-SM-1 2000(12m)	N/A	Jun. 26, 2018
10	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

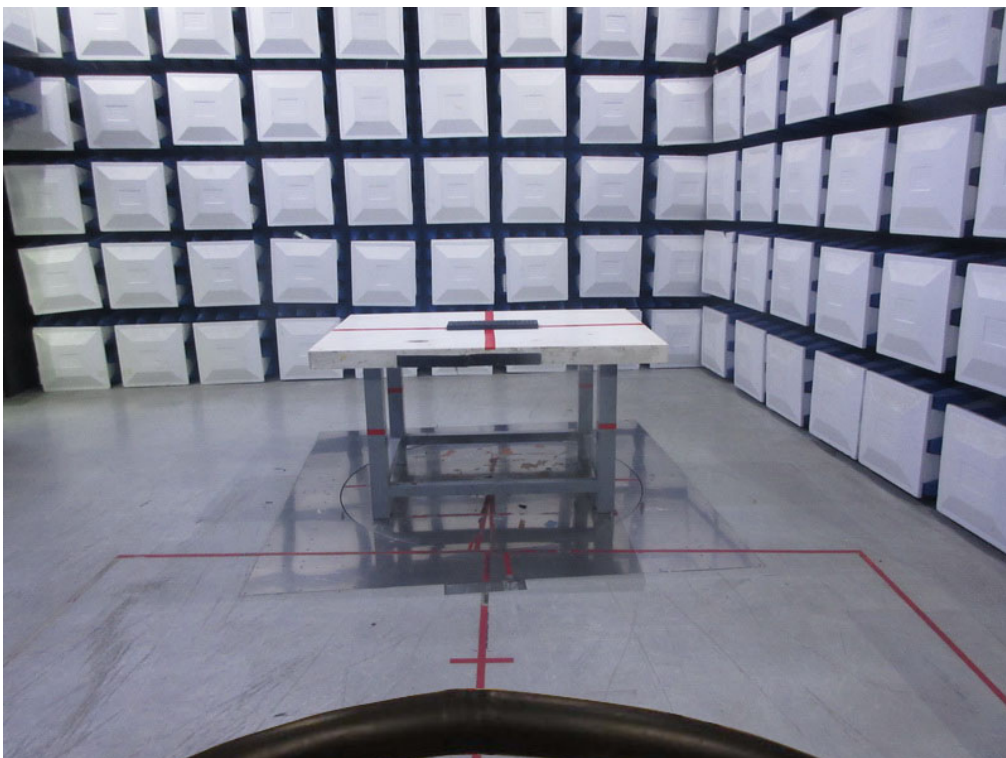
Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Aug. 20, 2018

Remark: "N/A" denotes no model name, serial no. or calibration specified.  
All calibration period of equipment list is one year.

## 7. EUT TEST PHOTO

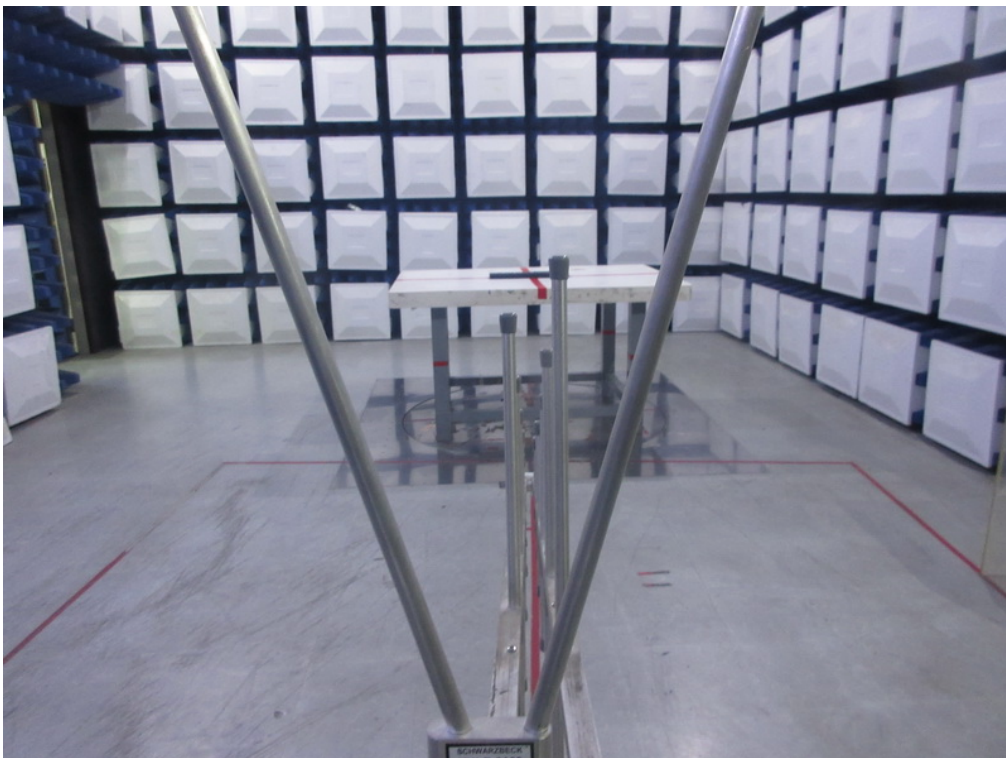
### Radiated Measurement Photos

9KHz to 30MHz



## Radiated Measurement Photos

30MHz to 1000MHz



**Radiated Measurement Photos**

**Above 1000MHz**





## APPENDIX A - CONDUCTED EMISSION

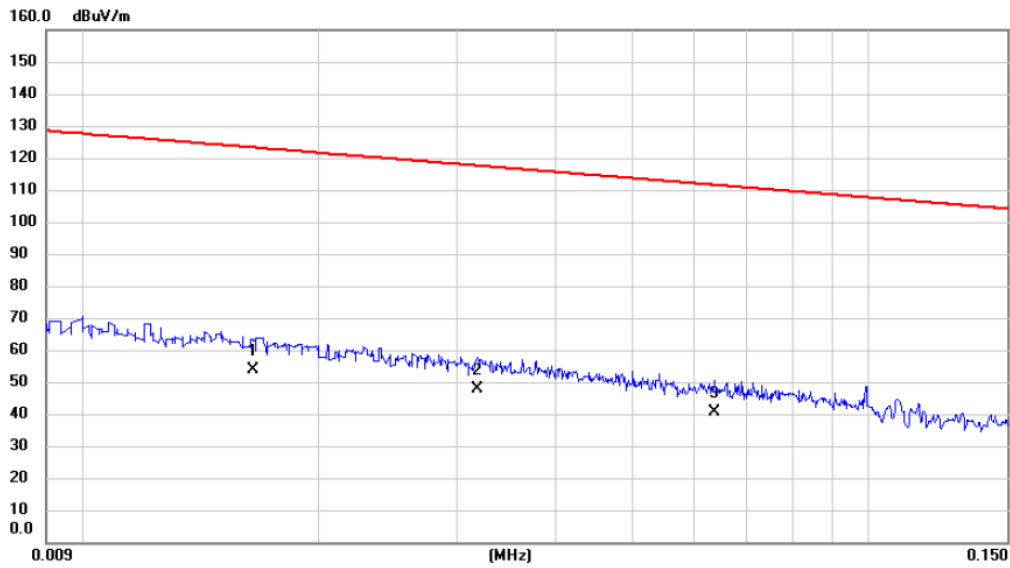
**Test Mode: N/A**

Note: "N/A" denotes test is not applicable to this device.

## APPENDIX B - RADIATED EMISSION (9KHZ TO 30MHZ)

Test Mode: TX Mode

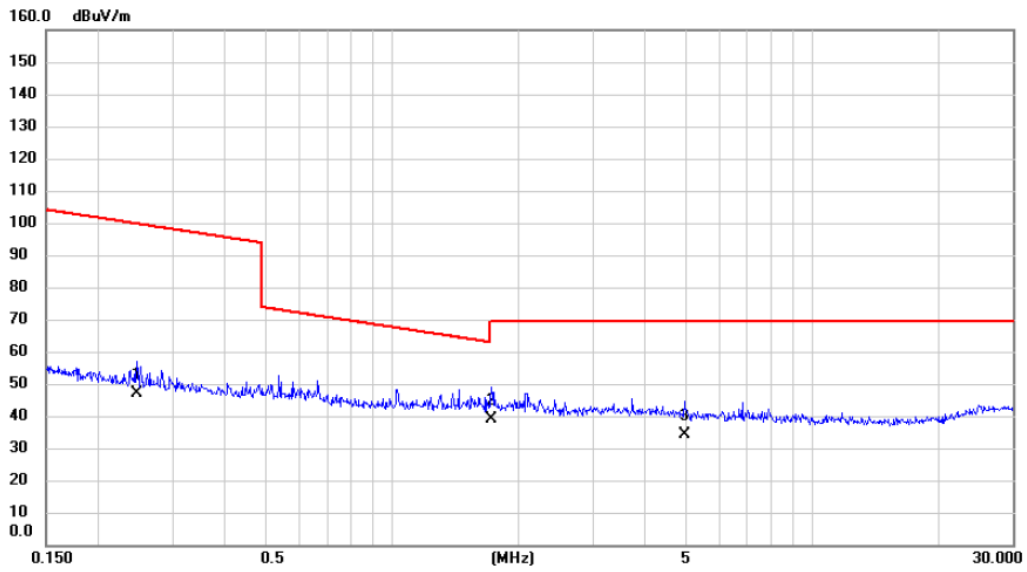
**Ant 0°**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	0.0165	33.73	20.07	53.80	123.26	-69.46	AVG	
2		0.0318	28.56	19.27	47.83	117.56	-69.73	AVG	
3		0.0637	22.16	18.46	40.62	111.52	-70.90	AVG	

Test Mode: TX Mode

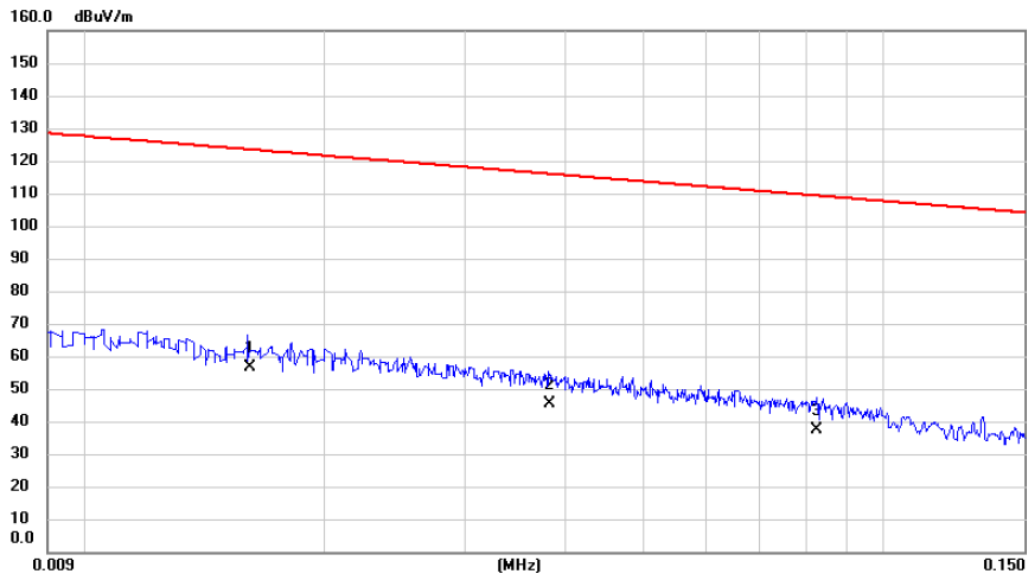
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.2467	30.17	16.67	46.84	99.76	-52.92	AVG	
2	*	1.7253	23.57	15.61	39.18	69.54	-30.36	QP	
3		4.9780	20.02	14.38	34.40	69.54	-35.14	QP	

Test Mode: TX Mode

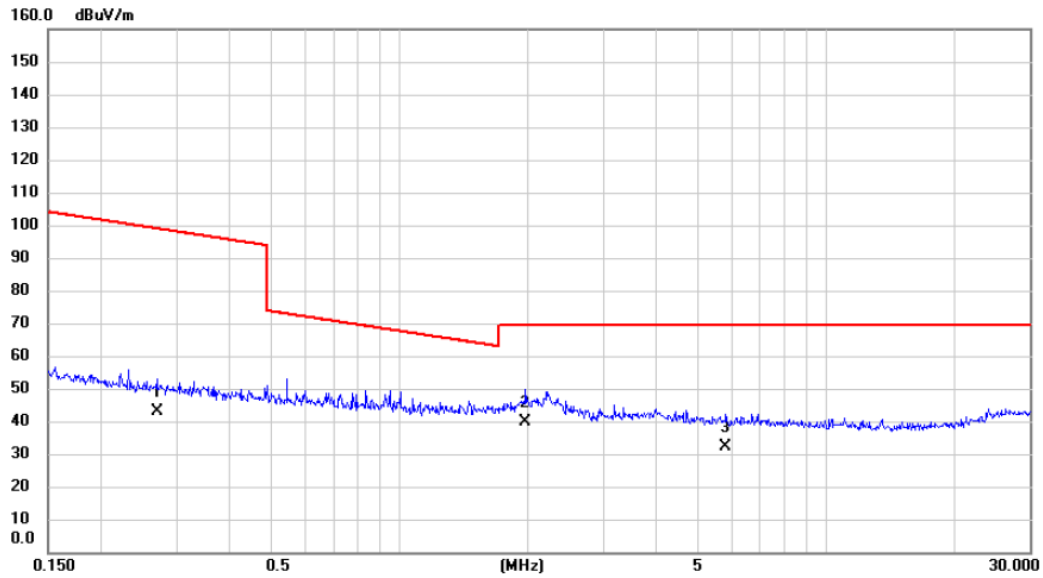
**Ant 90°**



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	0.0161	36.55	20.13	56.68	123.47	-66.79	AVG	
2		0.0382	26.34	19.07	45.41	115.96	-70.55	AVG	
3		0.0826	19.49	18.05	37.54	109.27	-71.73	AVG	

Test Mode: TX Mode

Ant 90°

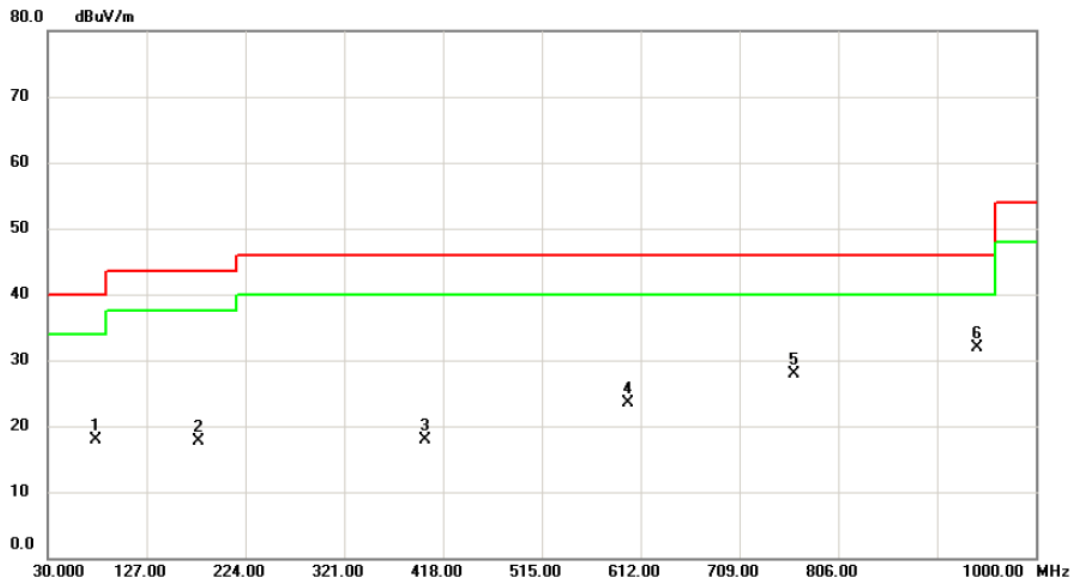


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.2700	26.34	16.64	42.98	98.98	-56.00	AVG	
2	*	1.9697	24.16	15.52	39.68	69.54	-29.86	QP	
3		5.8050	17.93	14.27	32.20	69.54	-37.34	QP	

## APPENDIX C - RADIATED EMISSION (30MHZ TO 1000MHZ)

Test Mode: TX 2402MHz

Vertical

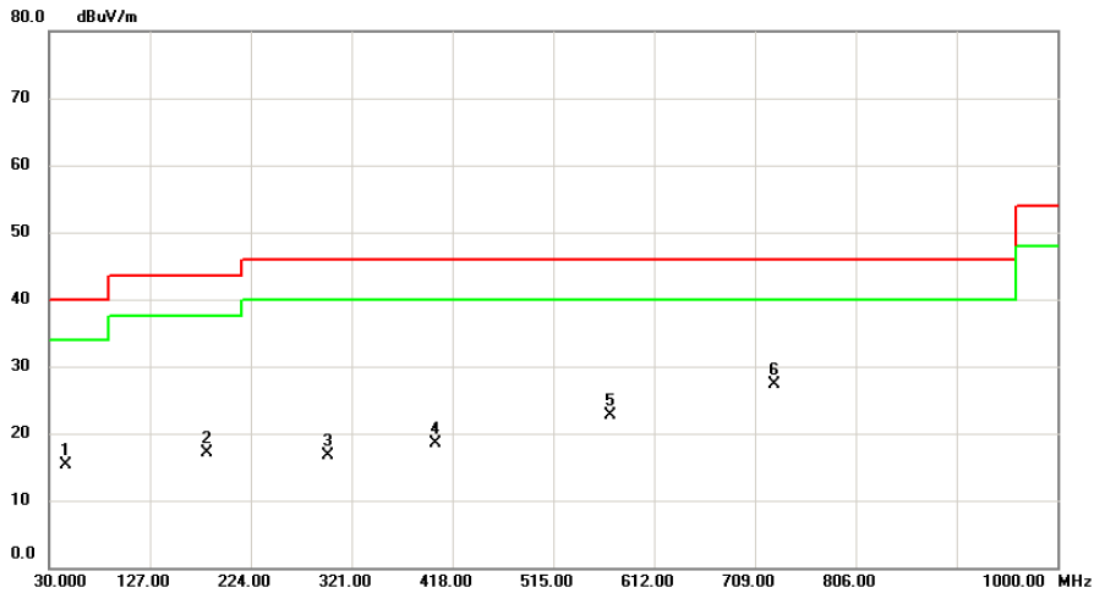


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		77.530	35.55	-17.66	17.89	40.00	-22.11	peak	
2		178.410	29.79	-12.08	17.71	43.50	-25.79	peak	
3		400.540	29.21	-11.34	17.87	46.00	-28.13	peak	
4		599.390	29.96	-6.43	23.53	46.00	-22.47	peak	
5		762.350	30.09	-2.18	27.91	46.00	-18.09	peak	
6	*	942.770	30.11	1.85	31.96	46.00	-14.04	peak	



Test Mode: TX 2402MHz

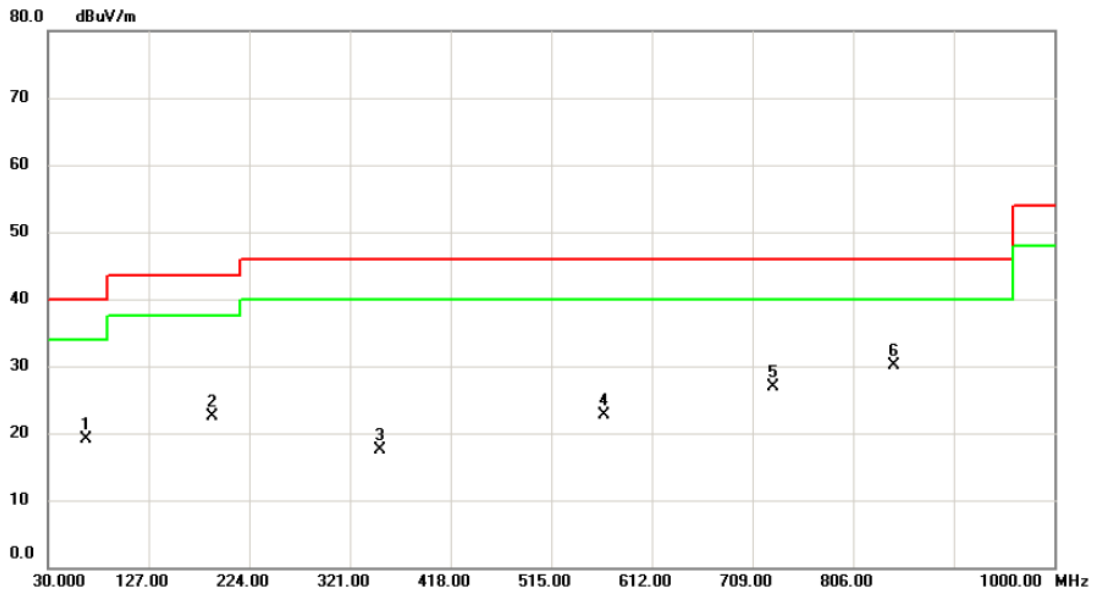
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		45.520	28.30	-13.06	15.24	40.00	-24.76	peak	
2		181.320	29.21	-12.14	17.07	43.50	-26.43	peak	
3		297.720	29.88	-13.14	16.74	46.00	-29.26	peak	
4		401.510	29.73	-11.31	18.42	46.00	-27.58	peak	
5		570.290	29.96	-7.18	22.78	46.00	-23.22	peak	
6	*	727.430	30.43	-3.11	27.32	46.00	-18.68	peak	

Test Mode: TX 2441MHz

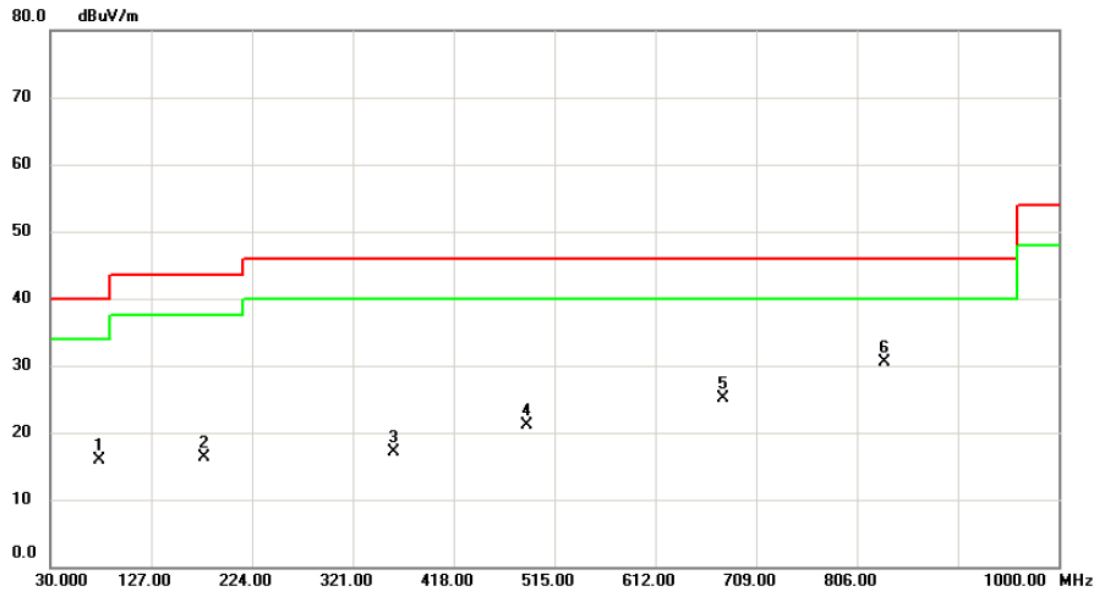
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		66.860	34.74	-15.67	19.07	40.00	-20.93	peak	
2		188.110	35.16	-12.70	22.46	43.50	-21.04	peak	
3		350.100	29.45	-11.96	17.49	46.00	-28.51	peak	
4		566.410	30.06	-7.29	22.77	46.00	-23.23	peak	
5		728.400	29.99	-3.09	26.90	46.00	-19.10	peak	
6	*	844.800	30.30	-0.13	30.17	46.00	-15.83	peak	

Test Mode: TX 2441MHz

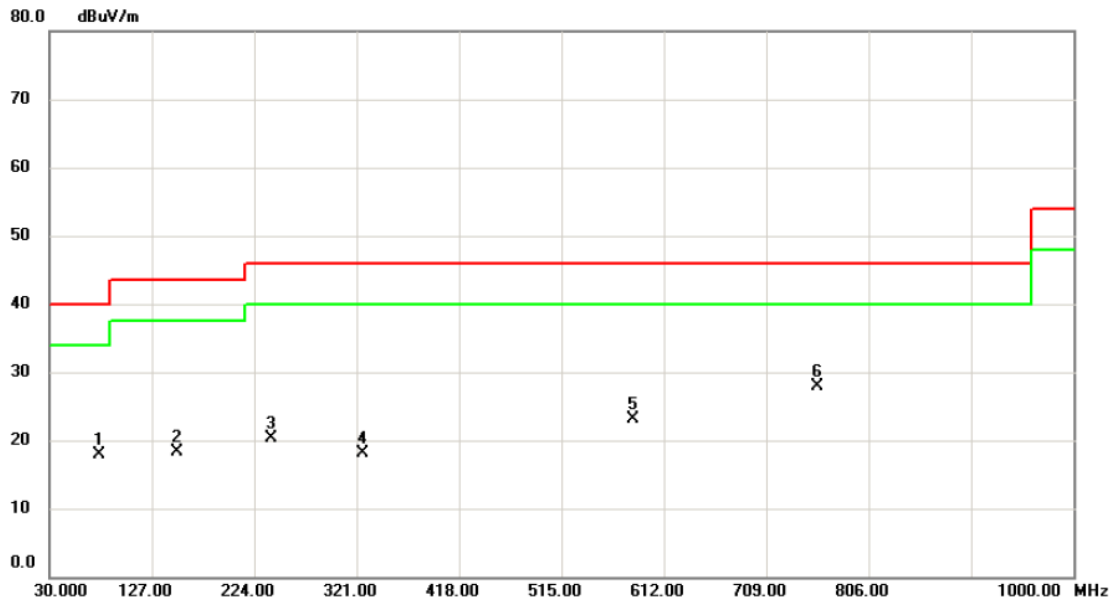
**Horizontal**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		77.530	33.59	-17.66	15.93	40.00	-24.07	peak	
2		178.410	28.41	-12.08	16.33	43.50	-27.17	peak	
3		360.770	28.96	-11.83	17.13	46.00	-28.87	peak	
4		487.840	30.15	-9.02	21.13	46.00	-24.87	peak	
5		676.990	29.72	-4.65	25.07	46.00	-20.93	peak	
6	*	832.190	30.94	-0.49	30.45	46.00	-15.55	peak	

Test Mode: TX 2480MHz

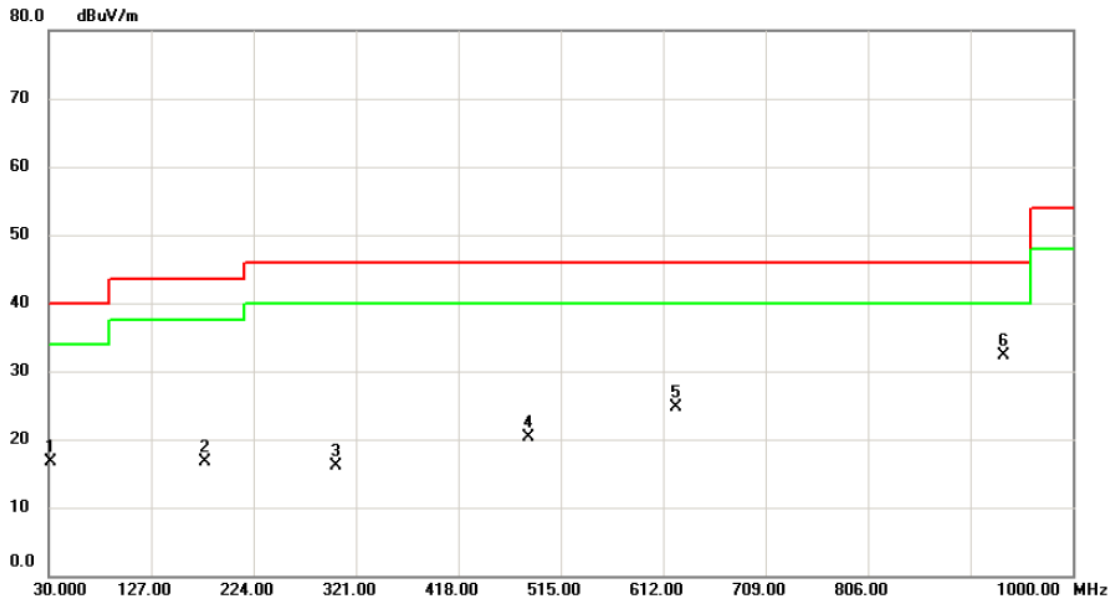
**Vertical**



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	77.530	35.62	-17.66	17.96	40.00	-22.04	peak	
2	151.250	31.78	-13.45	18.33	43.50	-25.17	peak	
3	239.520	34.57	-14.35	20.22	46.00	-25.78	peak	
4	326.820	30.43	-12.36	18.07	46.00	-27.93	peak	
5	582.900	30.06	-6.86	23.20	46.00	-22.80	peak	
6 *	757.500	30.14	-2.29	27.85	46.00	-18.15	peak	

Test Mode: TX 2480MHz

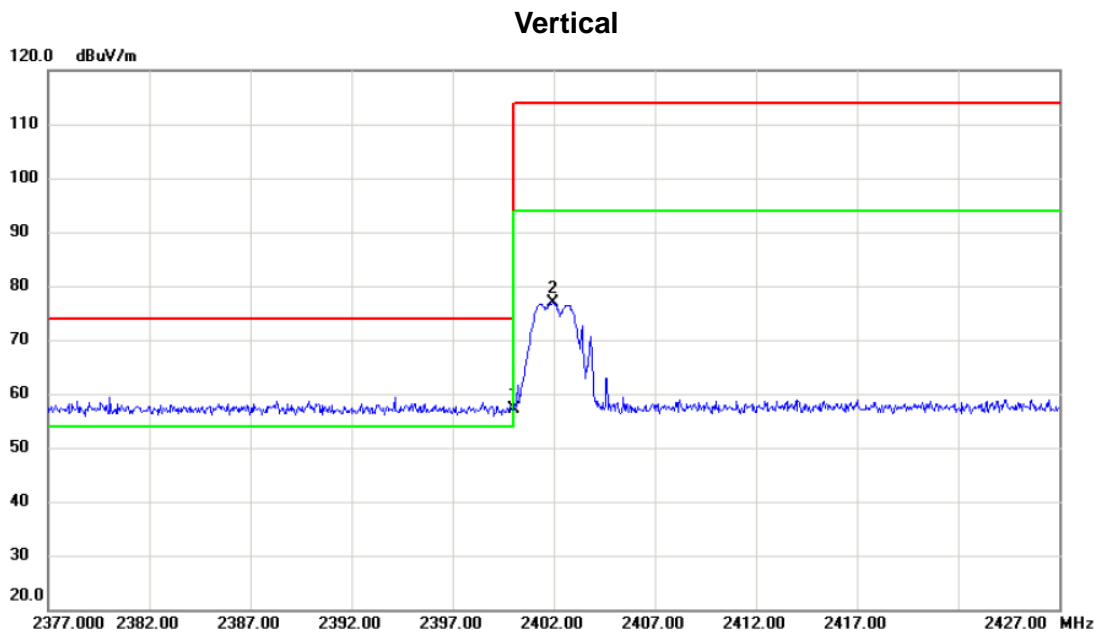
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		31.940	31.76	-15.04	16.72	40.00	-23.28	peak	
2		178.410	28.70	-12.08	16.62	43.50	-26.88	peak	
3		302.570	28.93	-12.79	16.14	46.00	-29.86	peak	
4		483.960	29.49	-9.11	20.38	46.00	-25.62	peak	
5		624.610	30.62	-5.96	24.66	46.00	-21.34	peak	
6	*	934.040	30.59	1.69	32.28	46.00	-13.72	peak	

## APPENDIX D - RADIATED EMISSION (ABOVE 1000MHZ)

Test Mode	TX Mode_2402 MHz
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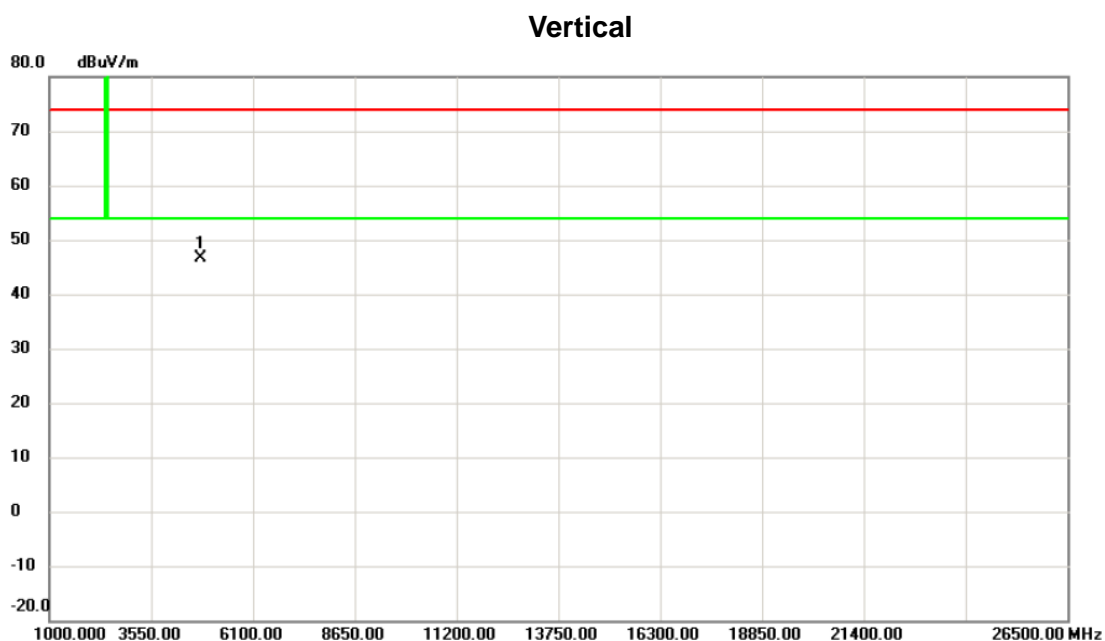
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	2400.000	24.03	33.09	57.12	74.00	-16.88	peak	
2		2401.950	43.77	33.11	76.88	114.00	-37.12	peak	

(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2400.00	57.12	23.49	54	PASS
2401.95	76.88	43.25	94	PASS

Test Mode	TX Mode_2402 MHz
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4803.720	40.16	6.59	46.75	74.00	-27.25	peak	

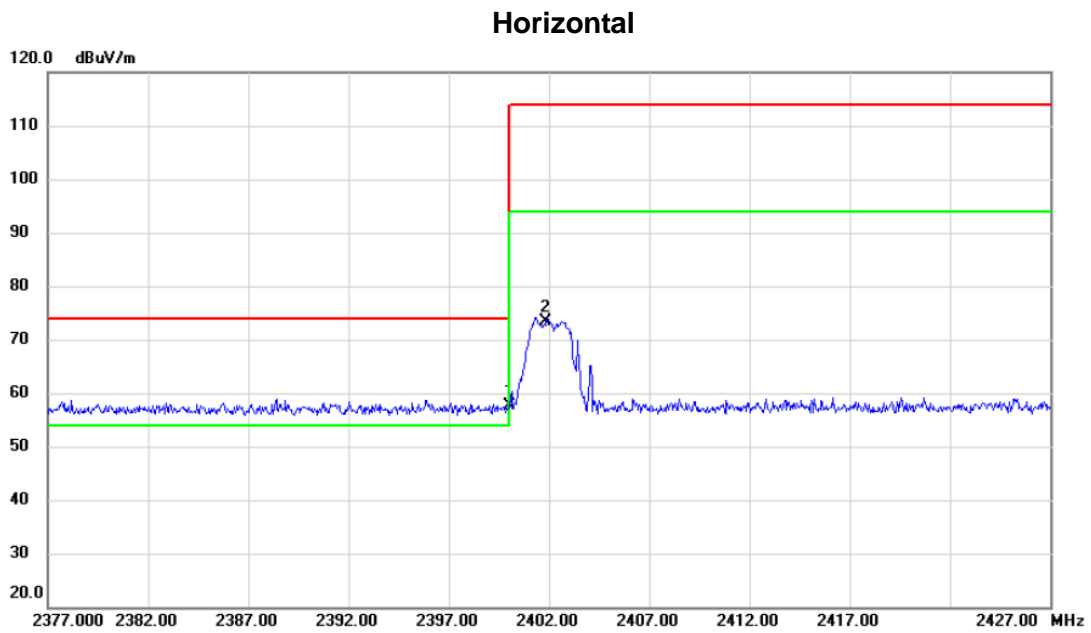
(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4803.72	46.75	13.12	54	PASS



Test Mode TX Mode\_2402 MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2400.000	24.49	33.09	57.58	74.00	-16.42	peak	
2		2401.850	40.35	33.10	73.45	114.00	-40.55	peak	

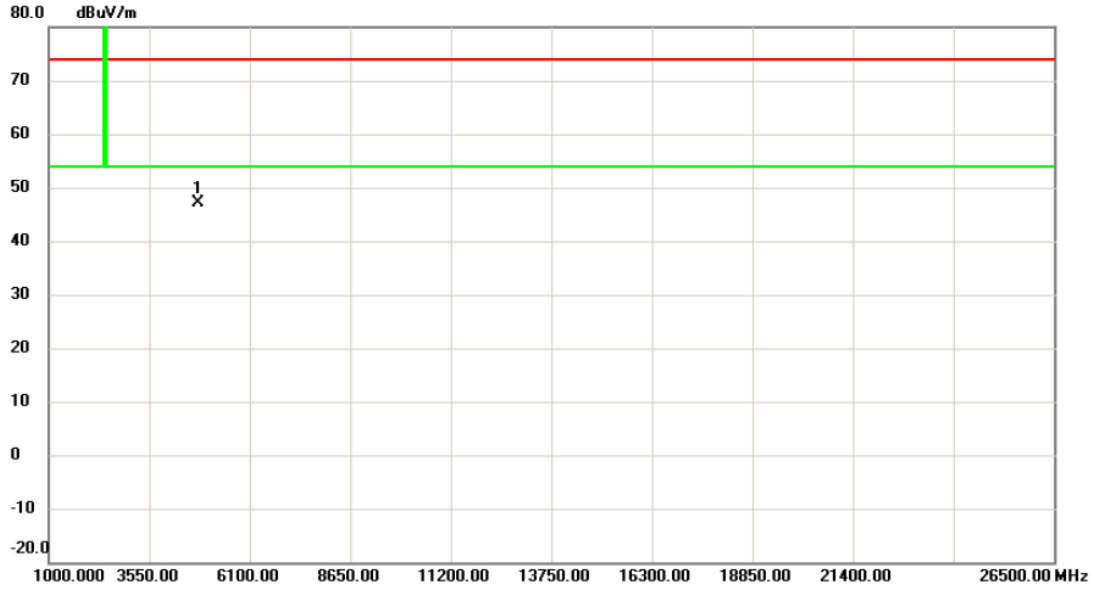
(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2400.00	57.58	23.95	54	PASS
2401.85	73.45	39.82	94	PASS

Test Mode	TX Mode_2402 MHz
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### Horizontal



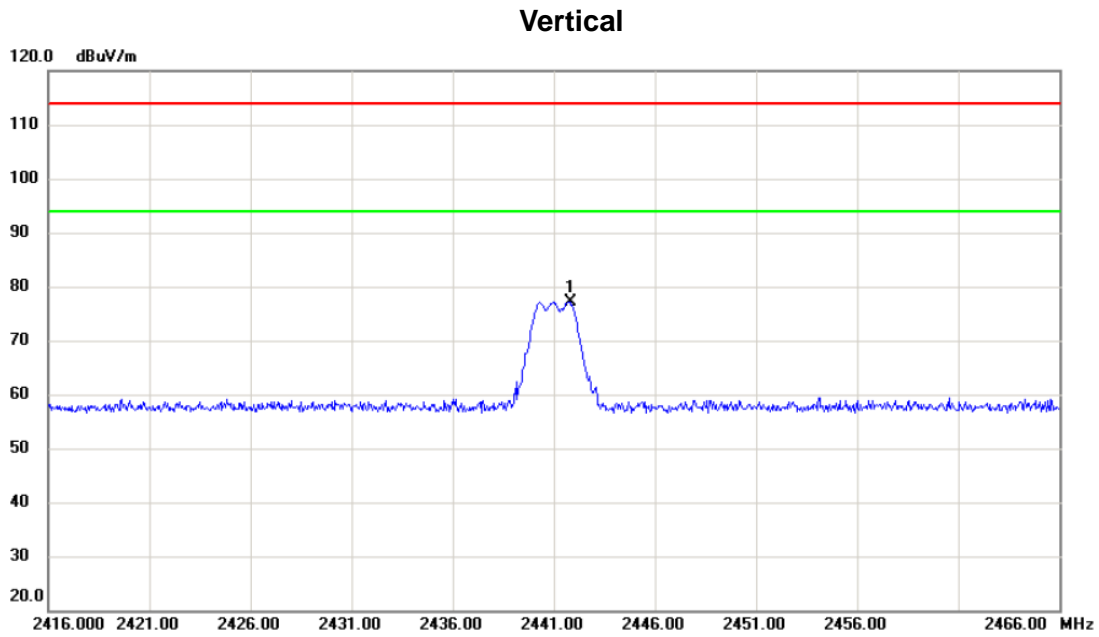
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4802.650	40.50	6.57	47.07	74.00	-26.93	peak	

(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4802.65	47.07	13.44	54	PASS

Test Mode	TX Mode_2441 MHz
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	2441.800	43.95	33.25	77.20	114.00	-36.80	peak	

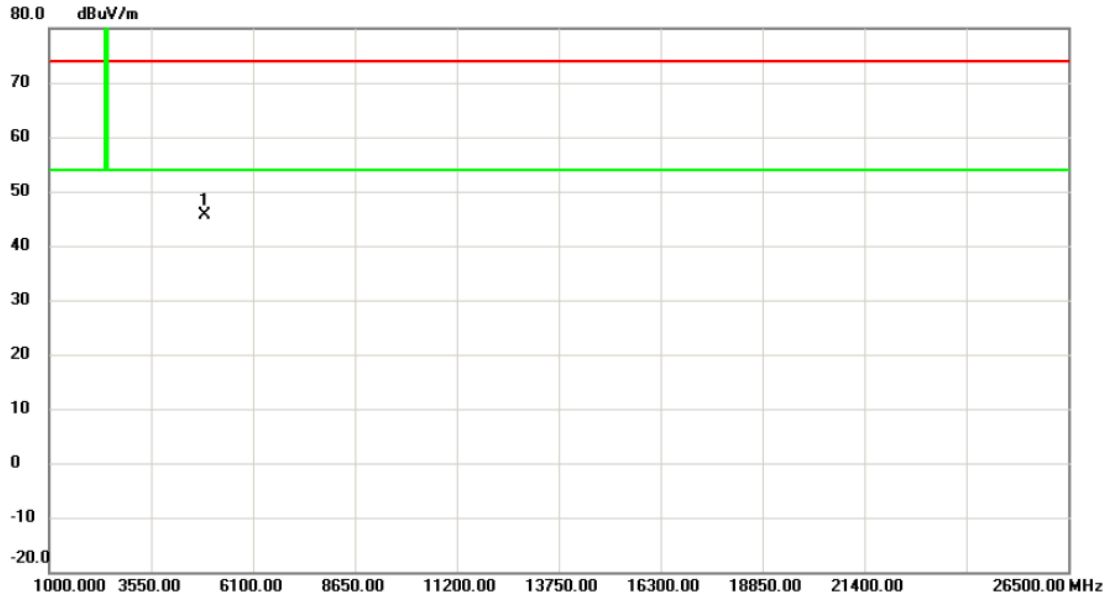
(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2441.80	77.20	43.57	94	PASS

Test Mode	TX Mode_2441 MHz
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### Vertical



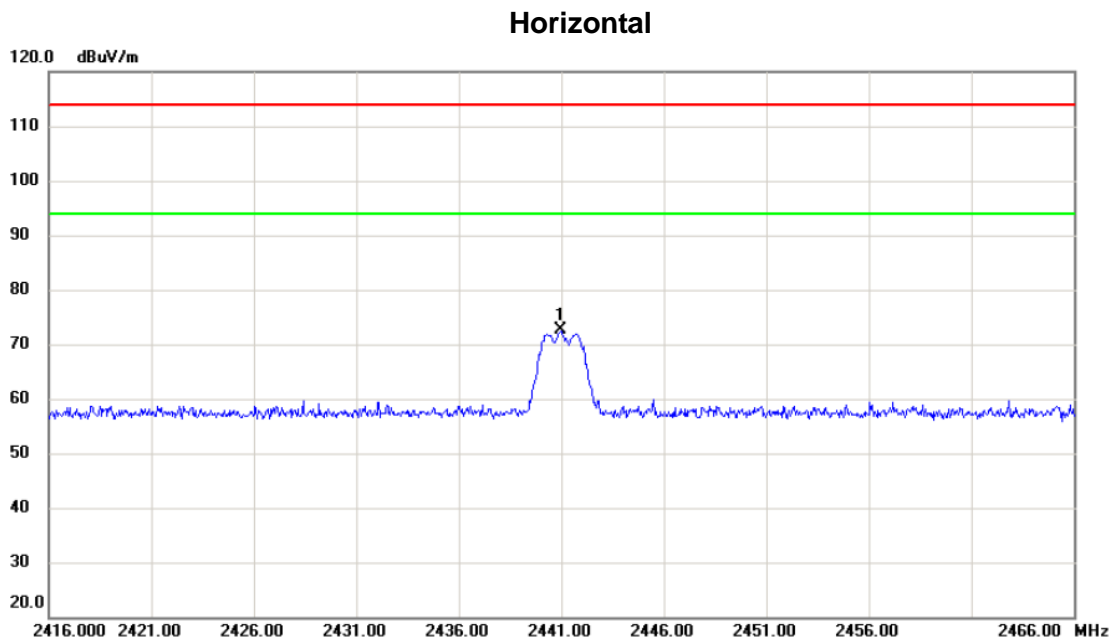
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4882.130	38.81	6.87	45.68	74.00	-28.32	peak	

(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4882.13	45.68	12.05	54	PASS

Test Mode	TX Mode_2441 MHz
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	2440.950	39.30	33.25	72.55	114.00	-41.45	peak	

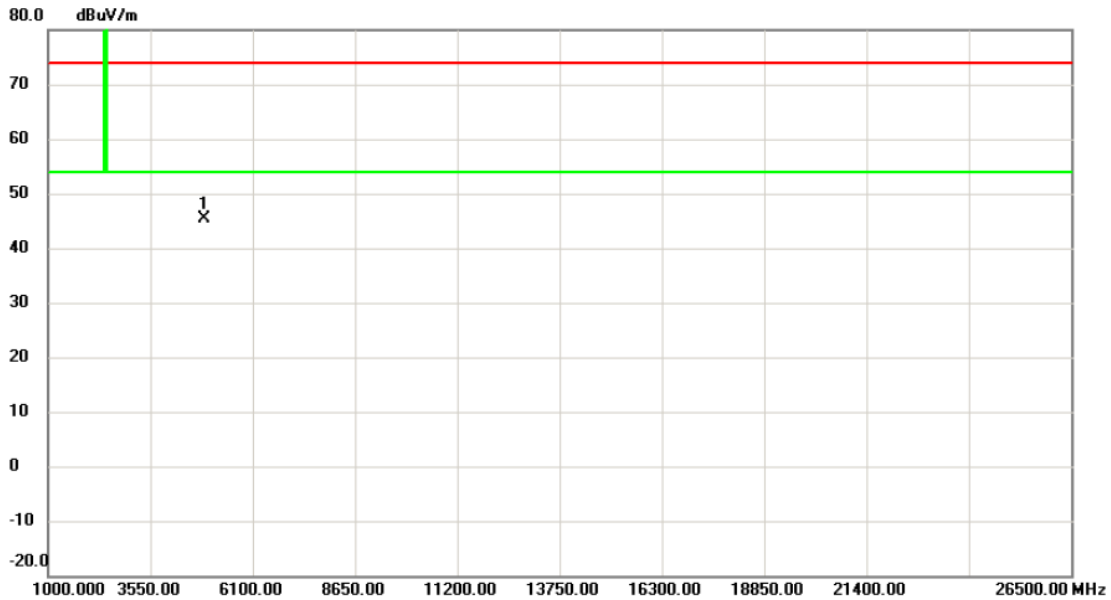
(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2440.95	72.55	38.92	94	PASS

Test Mode	TX Mode_2441 MHz
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### Horizontal



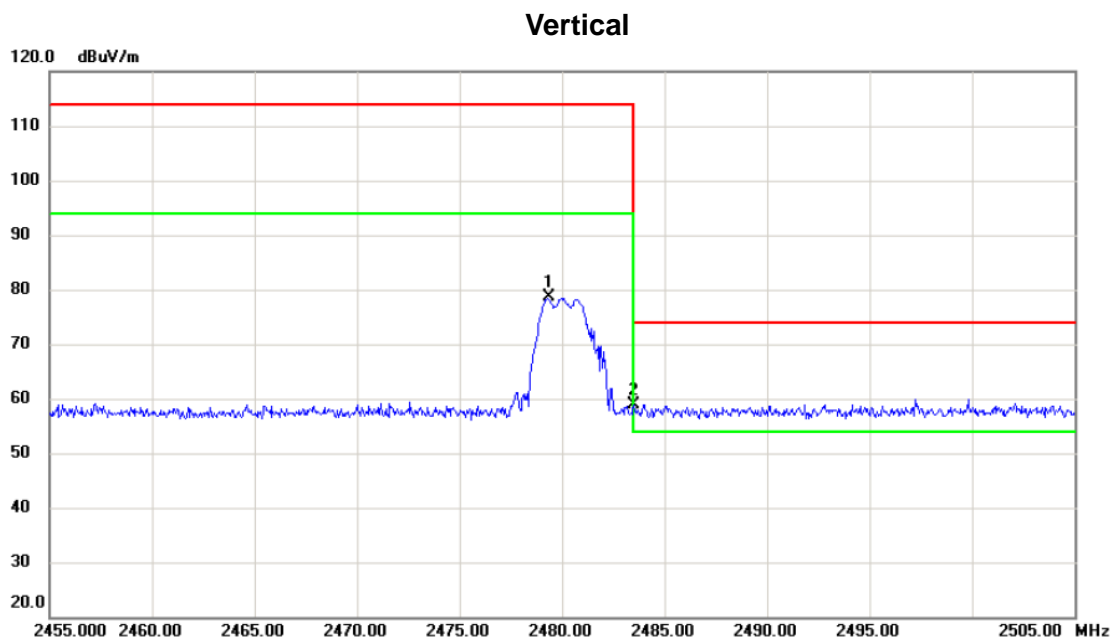
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4881.680	38.44	6.87	45.31	74.00	-28.69	peak	

(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4881.68	45.31	11.68	54	PASS

Test Mode TX Mode\_2480 MHz



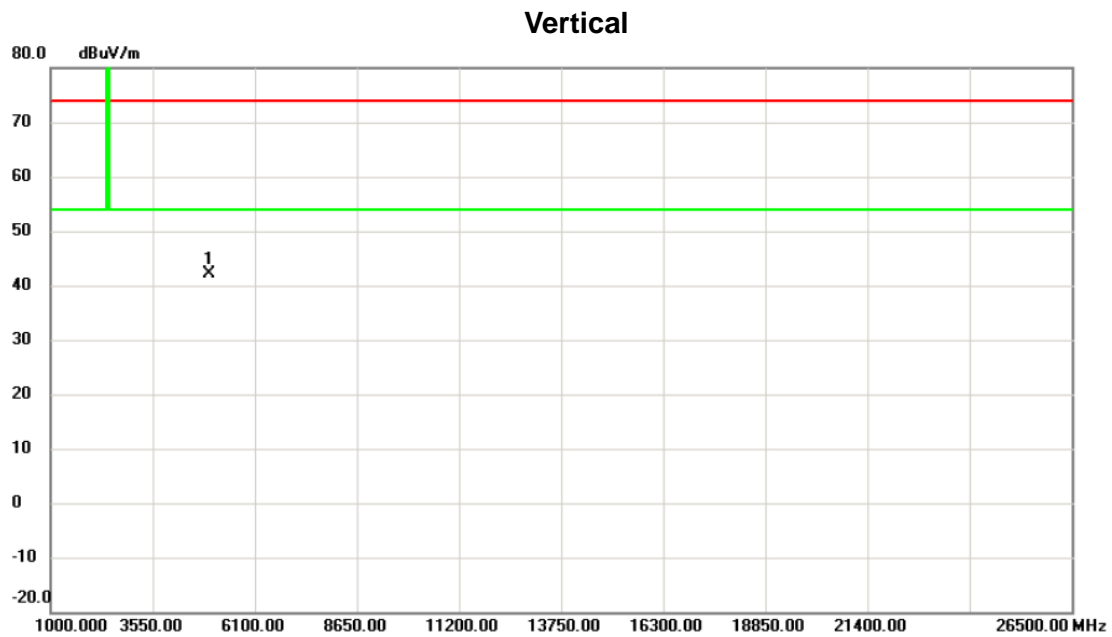
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2479.350	45.30	33.40	78.70	114.00	-35.30	peak	
2	*	2483.500	25.57	33.41	58.98	74.00	-15.02	peak	

(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2479.35	78.70	45.07	94	PASS
2483.50	58.98	25.35	54	PASS

Test Mode	TX Mode_2480 MHz
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4961.780	35.01	7.15	42.16	74.00	-31.84	peak	

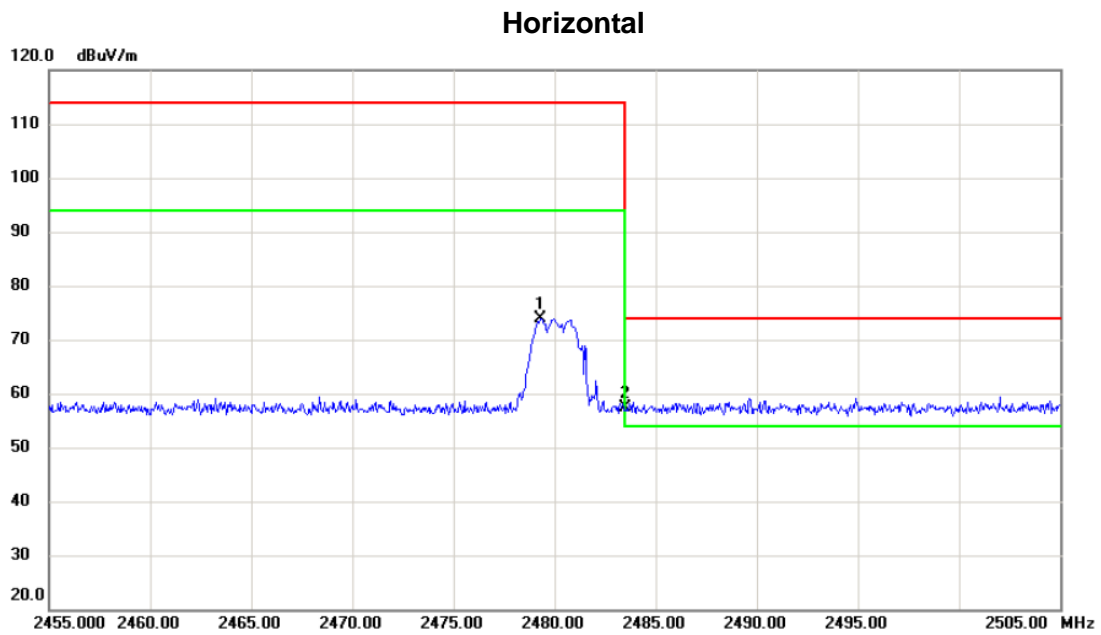
(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4961.78	42.16	8.53	54	PASS



Test Mode TX Mode\_2480 MHz



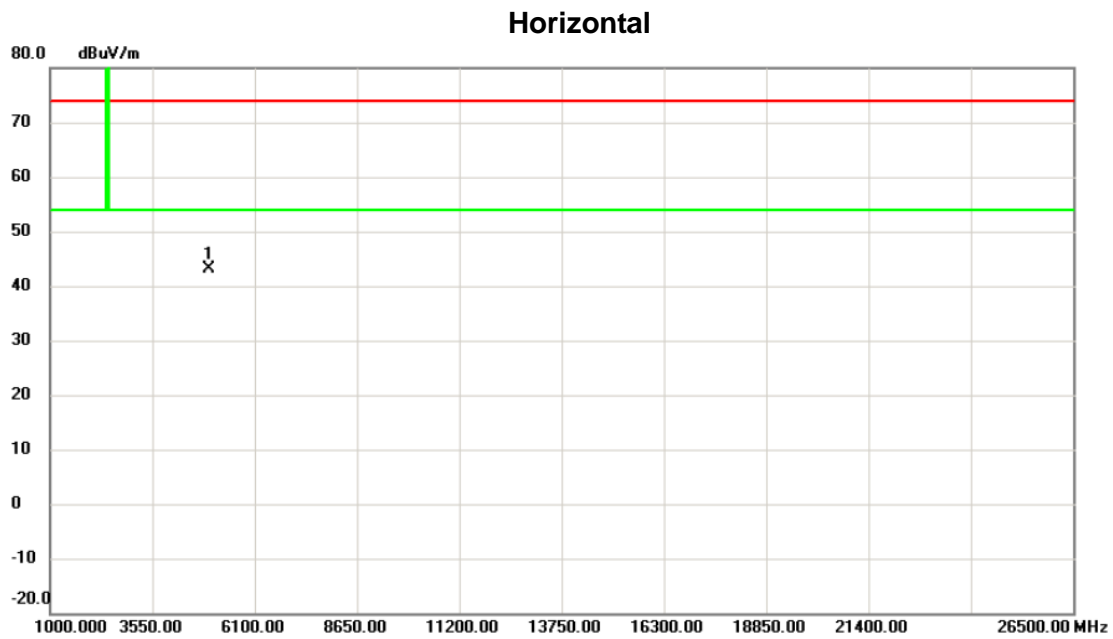
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2479.300	40.58	33.40	73.98	114.00	-40.02	peak	
2	*	2483.500	23.96	33.41	57.37	74.00	-16.63	peak	

(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
2479.30	73.98	40.35	94	PASS
2483.50	57.37	23.74	54	PASS

Test Mode	TX Mode_2480 MHz
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	4958.600	35.89	7.15	43.04	74.00	-30.96	peak	

(1) The AVG value of fundamental frequency is:

Average Reading = Peak value + 20log (Duty cycle) , AV=Peak-33.63

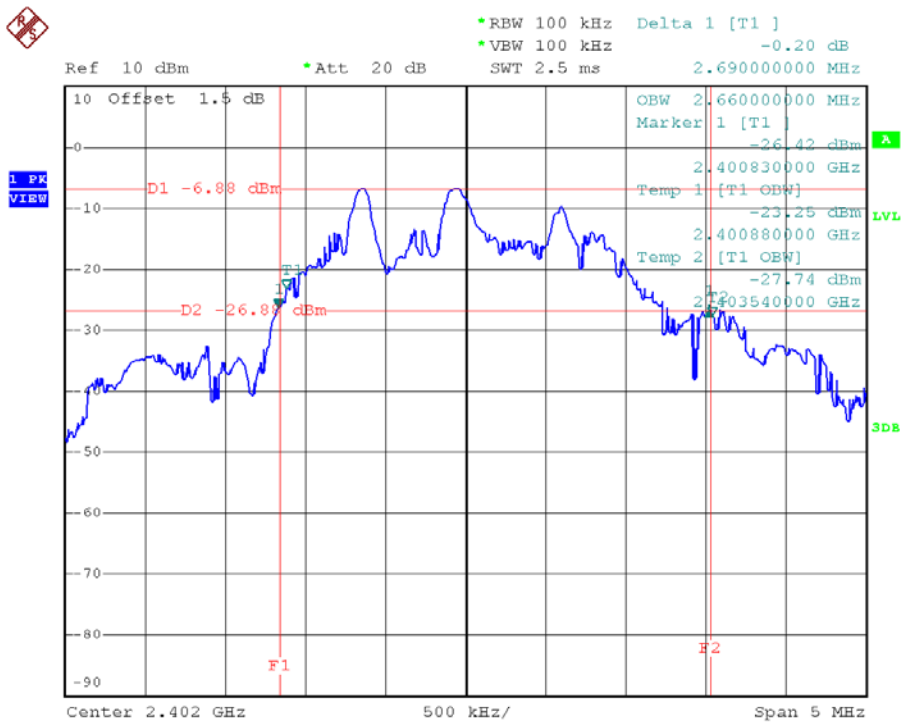
Frequency (MHz)	Peak value (dBuV/m)	AVG value (dBuV/m)	AVG Limit (dBuV/m)	Result
4958.60	43.04	9.41	54	PASS

## APPENDIX E - BANDWIDTH

Test Mode: TX Mode\_2402 MHz/2441 MHz/2480 MHz

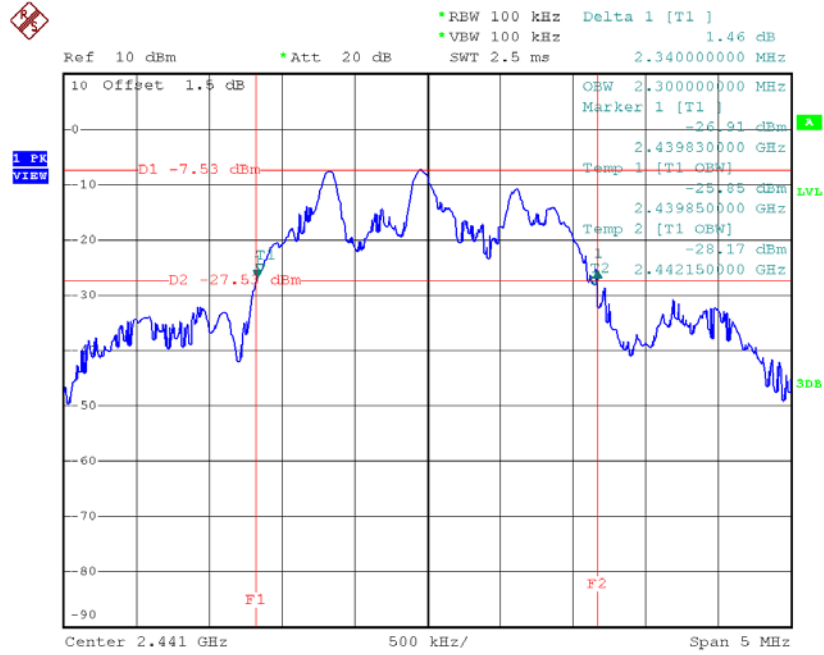
Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)
2402	2.69	2.66
2441	2.34	2.30
2480	2.62	2.78

### TX Mode\_2402 MHz



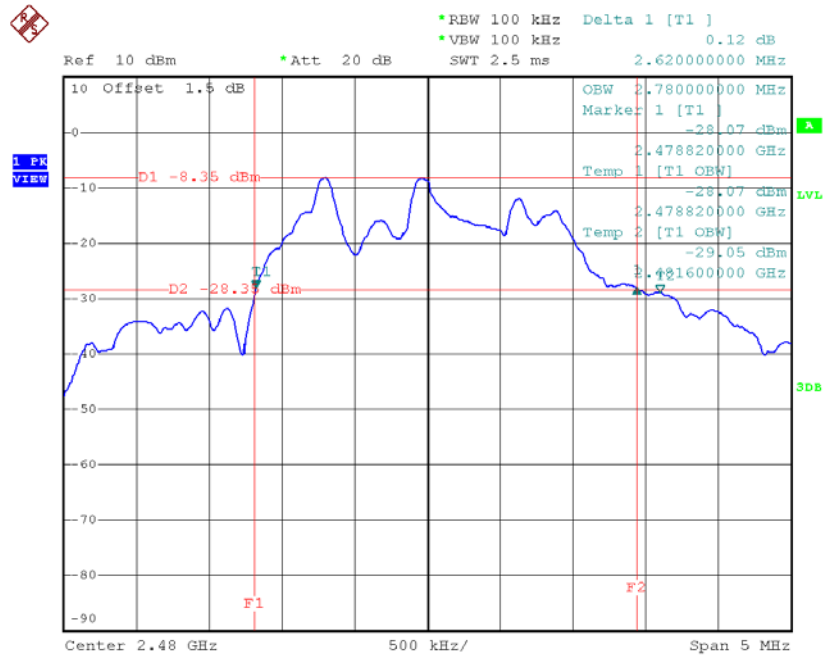
Date: 8.MAR.2018 18:49:40

### TX Mode\_2441 MHz



Date: 8.MAR.2018 18:42:02

### TX Mode\_2480 MHz



Date: 8.MAR.2018 18:34:00