

# Test Report

**Report No.:** MTi230804002-04E1

**Date of issue:** 2023-09-04

**Applicant:** Tatwah SA

**Product:** M\_26 IT001 TAG

**Model(s):** IT001, IT002, KF001, IT003, IT004, IT006, IT014, KF500

**FCC ID:** 2AWJD-IT001A

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

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<b>Test Result Certification</b>	
<b>Applicant:</b>	Tatwah SA
<b>Address:</b>	Rue de Lausanne 47, CH-1110 Morges, Switzerland
<b>Manufacturer:</b>	Tatwah Technology Co., Ltd
<b>Address:</b>	No.9 Shuiyi South Road Taifeng industrial Park, Xiaolan Town, Zhongshan City, Guangdong, China
<b>Product description</b>	
<b>Product name:</b>	M_26 IT001 TAG
<b>Trademark:</b>	Mango
<b>Model name:</b>	IT001
<b>Series Model:</b>	IT002, KF001, IT003, IT004, IT006, IT014, KF500
<b>Standards:</b>	47 CFR Part 15.247
<b>Test Method:</b>	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02
<b>Date of Test</b>	
<b>Date of test:</b>	2023-08-30 to 2023-09-03
<b>Test result:</b>	Pass

<b>Test Engineer</b>	:	<i>Letter Lan.</i>
		(Letter Lan)
<b>Reviewed By</b>	:	<i>Leon Chen</i>
		(Leon Chen)
<b>Approved By</b>	:	<i>Tom Xue</i>
		(Tom Xue)

## 1 General Description

### 1.1 Description of the EUT

Product name:	M_26 IT001 TAG
Model name:	IT001
Series Model:	IT002, KF001, IT003, IT004, IT006, IT014, KF500
Model difference:	All the models are the same circuit and module, except the model name and appearance.
Electrical rating:	Input: DC 3V 800nA Battery: 3V
Accessories:	N/A
Hardware version:	M_26
Software version:	radio_test_M26V2.hex
Test sample(s) number:	MTi230804002-04S1001 MTi230804002-04S1002 MTi230804002-04S1003 MTi230804002-04S1004 MTi230804002-04S1005 MTi230804002-04S1006 MTi230804002-04S1007 MTi230804002-04S1008
<b>RF specification</b>	
Bluetooth version:	V5.0
Operating frequency range:	2402-2480
Channel number:	40
Modulation type:	GFSK
Antenna(s) type:	PCB Antenna
Antenna(s) gain:	0 dBi

### 1.2 Description of test modes

No.	Emission test modes
Mode1	TX-GFSK-1Mbps

#### 1.2.1 Operation channel list

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472

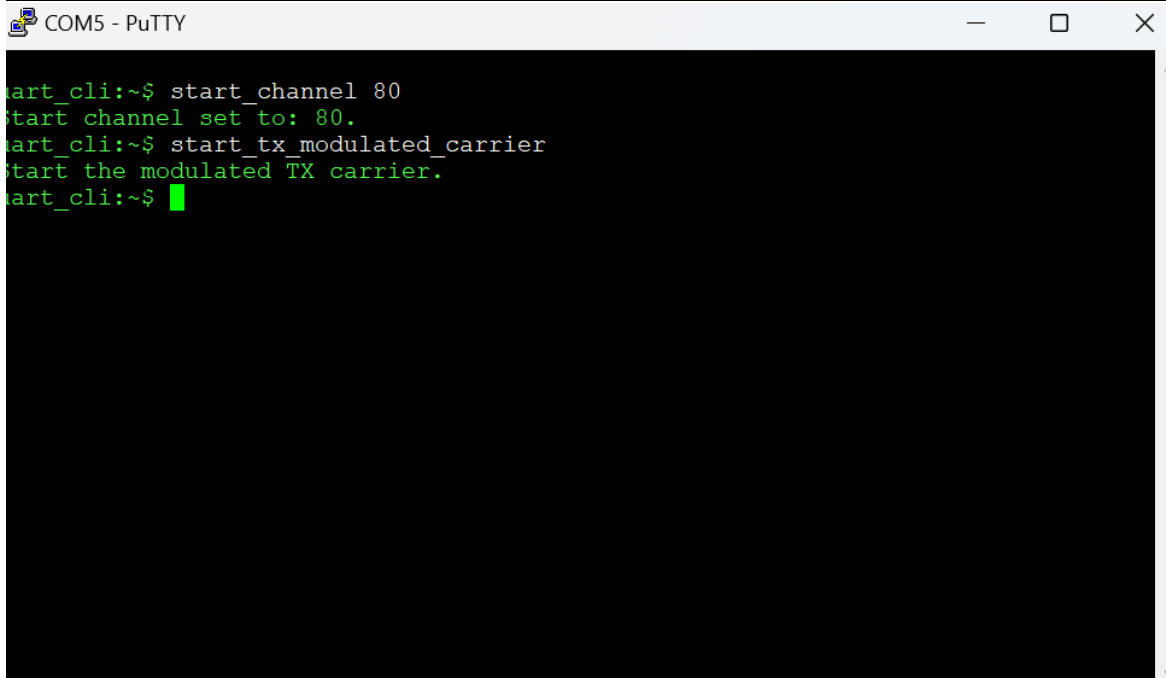
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

Note: The test software provided by manufacturer is used to control EUT for working in engineering mode, that enables selectable channel, and capable of continuous transmitting mode.

### Test Software: PuTTY

For power setting, refer to below table.

Mode	2402MHz	2440MHz	2480MHz
GFSH (1M)	default	default	default



```

COM5 - PuTTY
art_cli:~$ start_channel 80
start channel set to: 80.
art_cli:~$ start_tx_modulated_carrier
start the modulated TX carrier.
art_cli:~$ █
    
```

### 1.3 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15°C ~ 35°C
Humidity:	20% RH ~ 75% RH
Atmospheric pressure:	98 kPa ~ 101 kPa

### 1.4 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.

Support equipment list			
Description	Model	Serial No.	Manufacturer
/	/	/	/

Support cable list			
Description	Length (m)	From	To
/	/	/	/

### 1.5 Measurement uncertainty

Measurement	Uncertainty
Occupied channel bandwidth	±3 %
RF output power, conducted	±1 dB
Power Spectral Density, conducted	±1 dB
Unwanted Emissions, conducted	±1 dB
Radiated spurious emissions (above 1GHz)	±5.3dB
Radiated spurious emissions (9kHz~30MHz)	±4.3dB
Radiated spurious emissions (30MHz~1GHz)	±4.7dB
Temperature	±1 °C
Humidity	± 5 %

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 2 Summary of Test Result

No.	Item	Standard	Requirement	Result
1	Antenna requirement	47 CFR Part 15.247	47 CFR 15.203	Pass
2	Occupied Bandwidth	47 CFR Part 15.247	47 CFR 15.247(a)(1)	Pass
3	Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(3)	Pass
4	Power Spectral Density	47 CFR Part 15.247	47 CFR 15.247(e)	Pass
5	RF conducted spurious emissions and band edge measurement	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
6	Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
7	Radiated emissions (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
8	Radiated emissions (above 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass

Note: The device is a DC power supply and does not apply to conducted emissions.



### 3 Test Facilities and accreditations

#### 3.1 Test laboratory

Test laboratory:	Shenzhen Microtest Co., Ltd.
Test site location:	101, No.7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Telephone:	(86-755)88850135
Fax:	(86-755)88850136
CNAS Registration No.:	CNAS L5868
FCC Registration No.:	448573
IC Registration No.:	21760
CABID:	CN0093

#### 4 List of test equipment

No.	Equipment	Manufacturer	Model	Serial No.	Cal. date	Cal. Due
Maximum Conducted Output Power Power Spectral Density Unwanted emission Occupied Bandwidth						
1	Wideband Radio Communication Tester	Rohde&schwarz	CMW500	149155	2023-04-26	2024-04-25
2	ESG Series Analog Ssignal Generator	Agilent	E4421B	GB40051240	2023-04-25	2024-04-24
3	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2023-04-25	2024-04-24
4	Synthesized Sweeper	Agilent	83752A	3610A01957	2023-04-25	2024-04-24
5	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2023-04-26	2024-04-25
6	RF Control Unit	Tonscend	JS0806-1	19D8060152	2023-04-26	2024-04-25
7	Band Reject Filter Group	Tonscend	JS0806-F	19D8060160	2023-05-05	2024-05-04
8	ESG Vector Signal Generator	Agilent	N5182A	MY50143762	2023-04-25	2024-04-24
9	DC Power Supply	Agilent	E3632A	MY40027695	2023-05-05	2024-05-04
Band edge emissions (Radiated) Emissions in frequency bands (above 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2023-04-26	2024-04-25
2	Double Ridged Broadband Horn Antenna	schwarabeck	BBHA 9120 D	2278	2023-05-26	2024-05-25
3	Amplifier	Agilent	8449B	3008A01120	2023-06-26	2024-06-25
4	Multi-device Controller	TuoPu	TPMDC	/	2023-05-04	2024-05-03
5	MXA signal analyzer	Agilent	N9020A	MY54440859	2023-05-05	2024-05-04
Emissions in frequency bands (below 1GHz)						
1	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2023-04-26	2024-04-25
2	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-1338	2023-06-11	2025-06-10
3	Amplifier	Hewlett-Packard	8447F	3113A06184	2023-06-26	2024-06-25
4	Multi-device Controller	TuoPu	TPMDC	/	2023-05-04	2024-05-03
5	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00066	2021/05/30	2024/05/29

## 5 Evaluation Results (Evaluation)

### 5.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
Description of the antenna of EUT:	The antenna of the EUT is permanently attached.
Conclusion:	The EUT complies with the requirement of FCC PART 15.203.

## 6 Radio Spectrum Matter Test Results (RF)

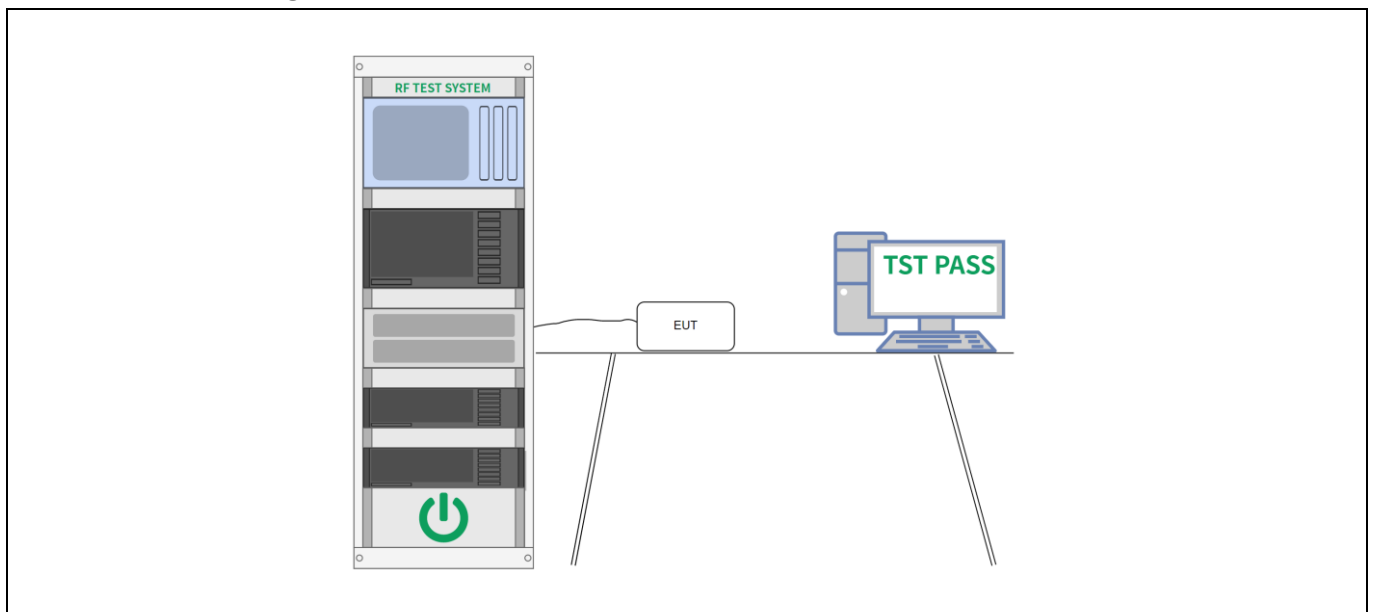
### 6.1 Occupied Bandwidth

Test Requirement:	47 CFR 15.247(a)(1)
Test Limit:	Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	ANSI C63.10-2013, section 11.8 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	a) Set RBW = 100 kHz. b) Set the VBW $\geq$ [3 × RBW]. c) Detector = peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### 6.1.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.7 °C	Humidity:	59.1 %	Atmospheric Pressure:	98 kPa
Test mode:	Mode1				

#### 6.1.2 Test Setup Diagram:



**6.1.3 Test Data:**

Please Refer to Appendix for Details.

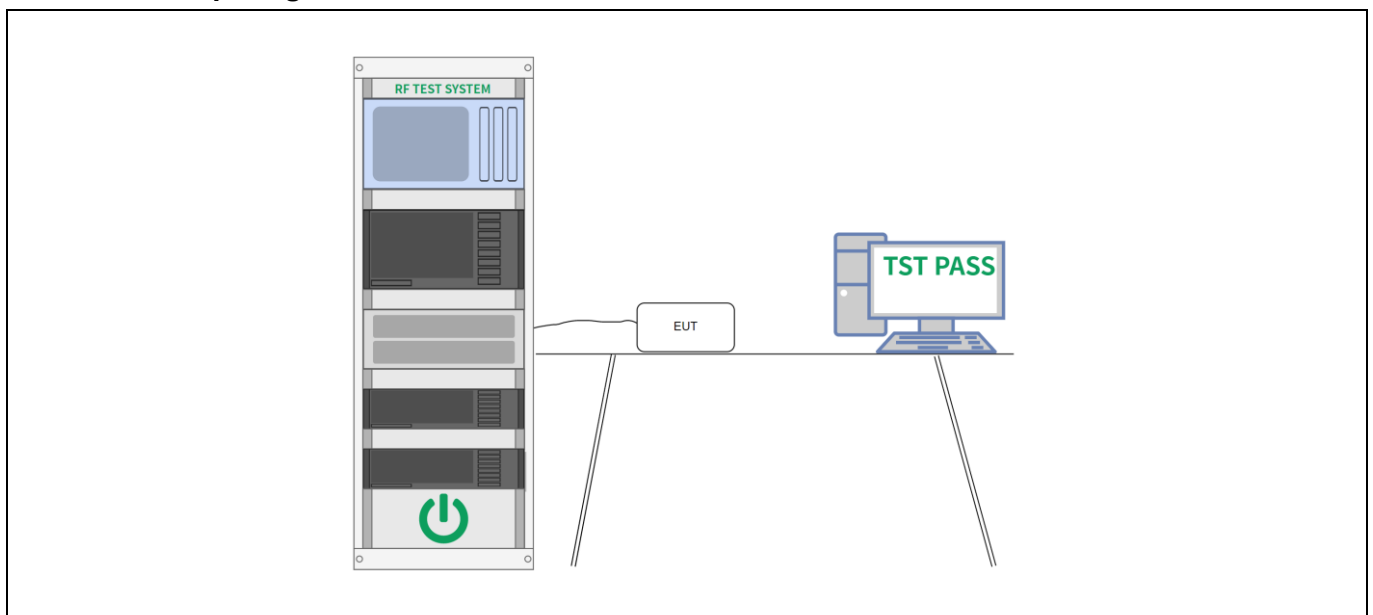
## 6.2 Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(3)
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	ANSI C63.10-2013, section 11.9.1 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013, section 11.9.1 Maximum peak conducted output power

### 6.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.7 °C	Humidity:	59.1 %	Atmospheric Pressure:	98 kPa
Test mode:	Mode1				

### 6.2.2 Test Setup Diagram:



### 6.2.3 Test Data:

Please Refer to Appendix for Details.

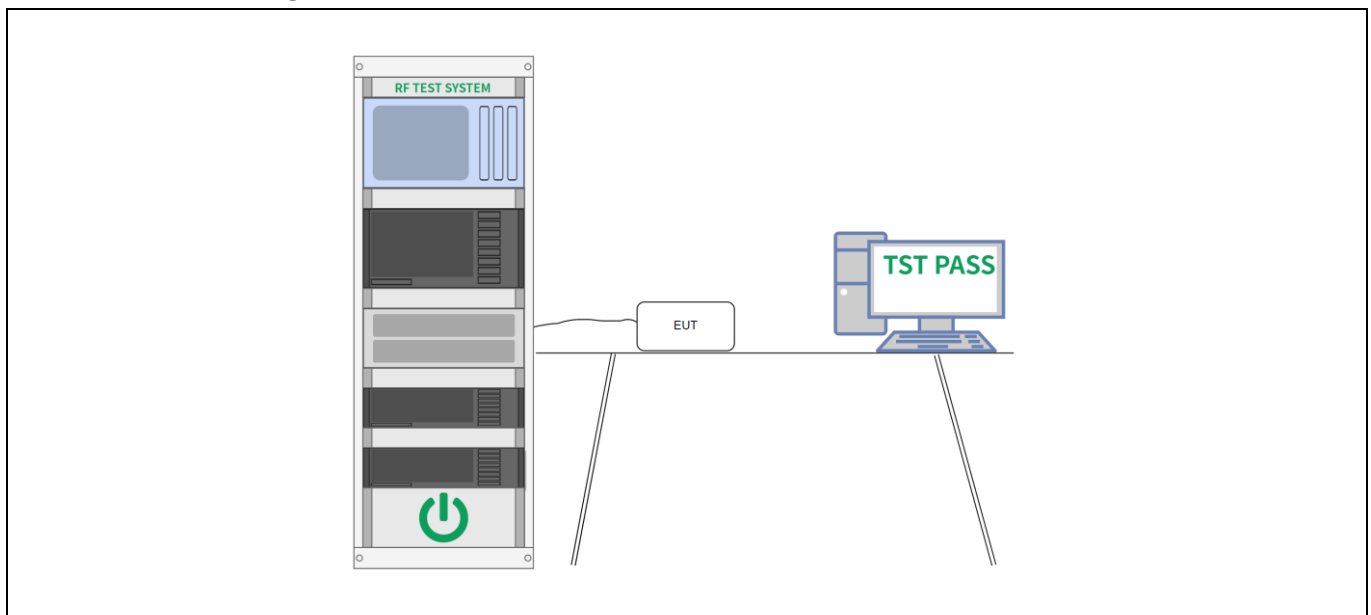
### 6.3 Power Spectral Density

Test Requirement:	47 CFR 15.247(e)
Test Limit:	Refer to 47 CFR 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	ANSI C63.10-2013, section 11.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013, section 11.10, Maximum power spectral density level in the fundamental emission

#### 6.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.7 °C	Humidity:	59.1 %	Atmospheric Pressure:	98 kPa
Test mode:	Mode1				

#### 6.3.2 Test Setup Diagram:



#### 6.3.3 Test Data:

Please Refer to Appendix for Details.

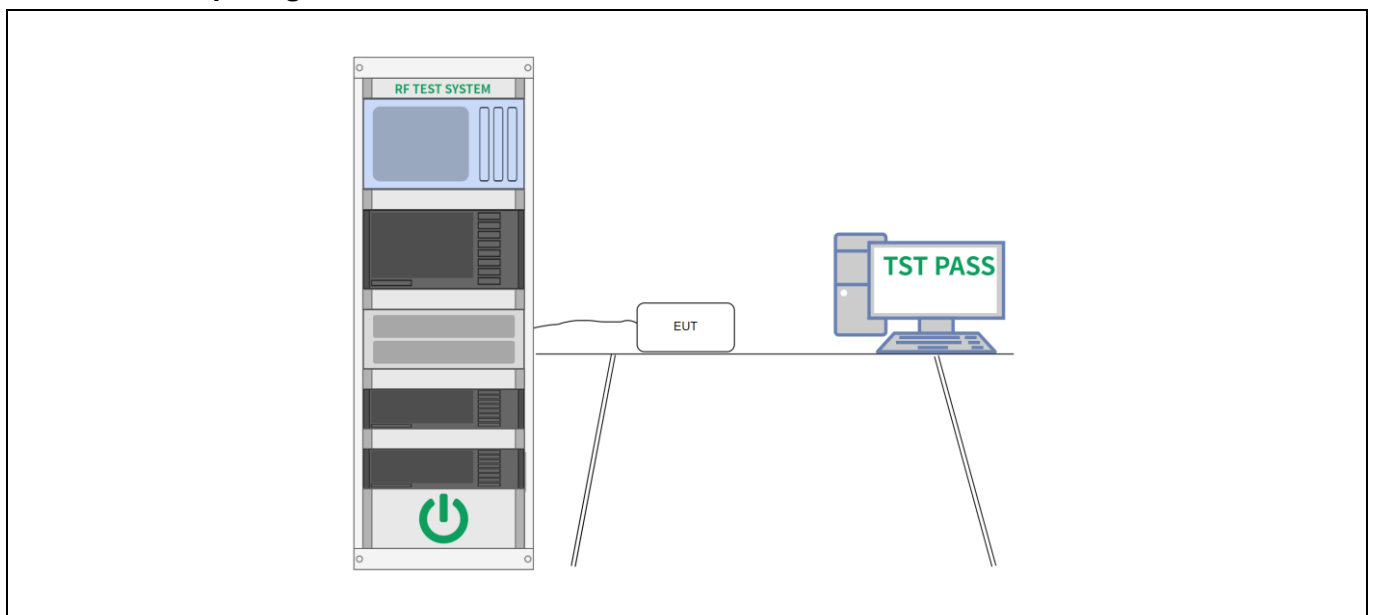
#### 6.4 RF conducted spurious emissions and band edge measurement

Test Requirement:	47 CFR 15.247(d)
Test Limit:	Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Test Method:	ANSI C63.10-2013 section 11.11 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2013 Section 11.11.1, Section 11.11.2, Section 11.11.3

##### 6.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.7 °C	Humidity:	59.1 %	Atmospheric Pressure:	98 kPa
Test mode:	Mode1				

##### 6.4.2 Test Setup Diagram:



##### 6.4.3 Test Data:

Please Refer to Appendix for Details.

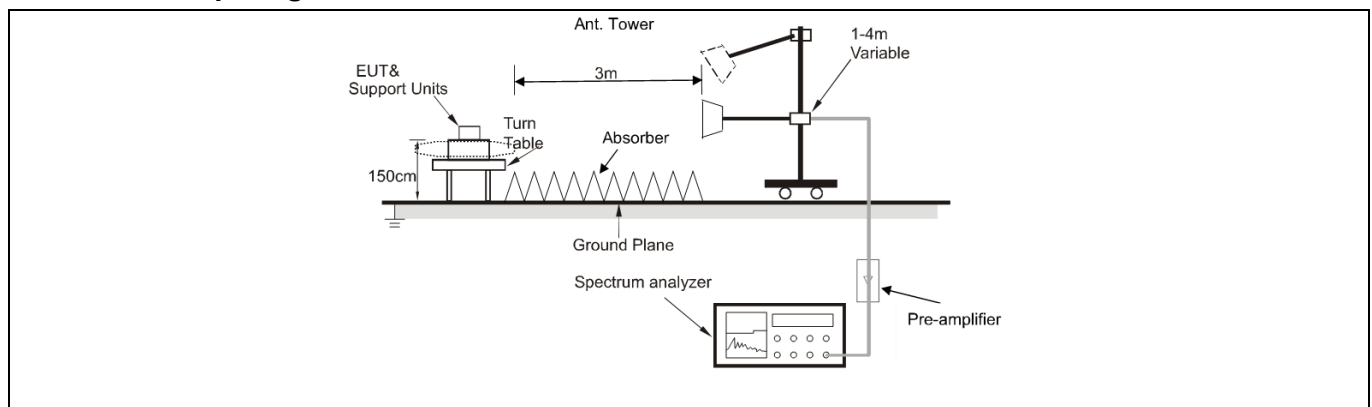
### 6.5 Band edge emissions (Radiated)

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Limit:	Frequency (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
	Above 960	500	3
	** Except as provided in paragraph (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.		
Test Method:	ANSI C63.10-2013 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02		
Procedure:	ANSI C63.10-2013 section 6.10.5.2		

#### 6.5.1 E.U.T. Operation:

Operating Environment:			
Temperature:	27 °C	Humidity:	27.8 %
		Atmospheric Pressure:	99 kPa
Test mode:	Mode1		
Note:	The amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported.		

#### 6.5.2 Test Setup Diagram:





**6.5.3 Test Data:**

Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 2 / CH: 2402

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		2310.000	53.35	-2.66	50.69	74.00	-23.31	peak
2	*	2310.000	40.29	-2.66	37.63	54.00	-16.37	AVG
3		2390.000	47.74	-2.03	45.71	74.00	-28.29	peak
4		2390.000	38.42	-2.03	36.39	54.00	-17.61	AVG

Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 2 / CH: 2402

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		2310.000	48.06	-2.66	45.40	74.00	-28.60	peak
2		2310.000	37.18	-2.66	34.52	54.00	-19.48	AVG
3		2390.000	46.79	-2.03	44.76	74.00	-29.24	peak
4	*	2390.000	37.49	-2.03	35.46	54.00	-18.54	AVG

Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 2 / CH: 2480

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		2483.500	49.97	-1.91	48.06	74.00	-25.94	peak
2	*	2483.500	40.49	-1.91	38.58	54.00	-15.42	AVG
3		2500.000	47.01	-1.80	45.21	74.00	-28.79	peak
4		2500.000	37.82	-1.80	36.02	54.00	-17.98	AVG

Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 2 / CH: 2480

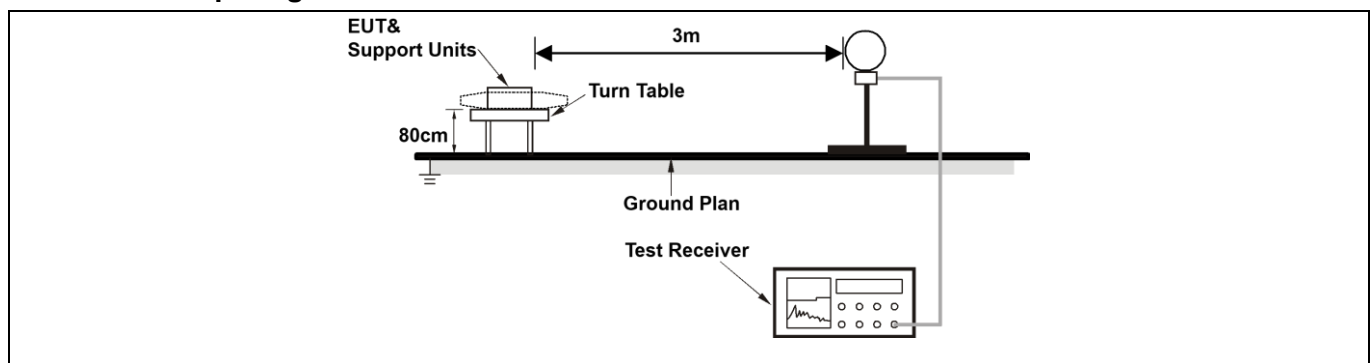
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		2483.500	47.02	-1.91	45.11	74.00	-28.89	peak
2		2483.500	37.33	-1.91	35.42	54.00	-18.58	AVG
3		2500.000	46.72	-1.80	44.92	74.00	-29.08	peak
4	*	2500.000	37.27	-1.80	35.47	54.00	-18.53	AVG

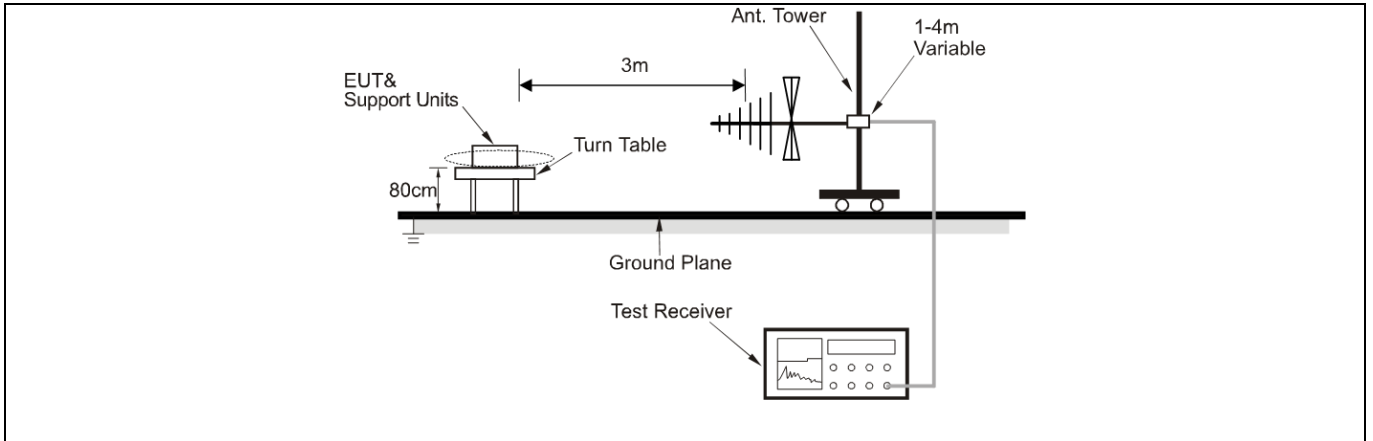
**6.6 Radiated emissions (below 1GHz)**

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Limit:	Frequency (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
	Above 960	500	3
	** Except as provided in paragraph (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.		
Test Method:	ANSI C63.10-2013 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02		
Procedure:	ANSI C63.10-2013 section 6.6.4		

**6.6.1 E.U.T. Operation:**

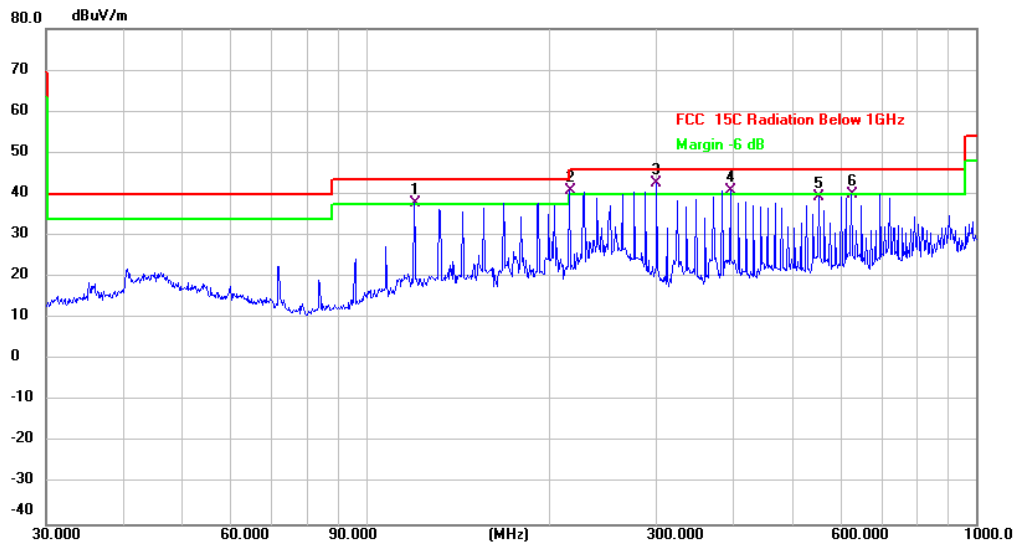
Operating Environment:			
Temperature:	27 °C	Humidity:	27.8 %
Atmospheric Pressure:		99 kPa	
Test mode:	Mode1		
Note: The amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported. All modes of operation of the EUT were investigated, and only the worst-case results are reported. There were no emissions found below 30MHz within 20dB of the limit.			

**6.6.2 Test Setup Diagram:**




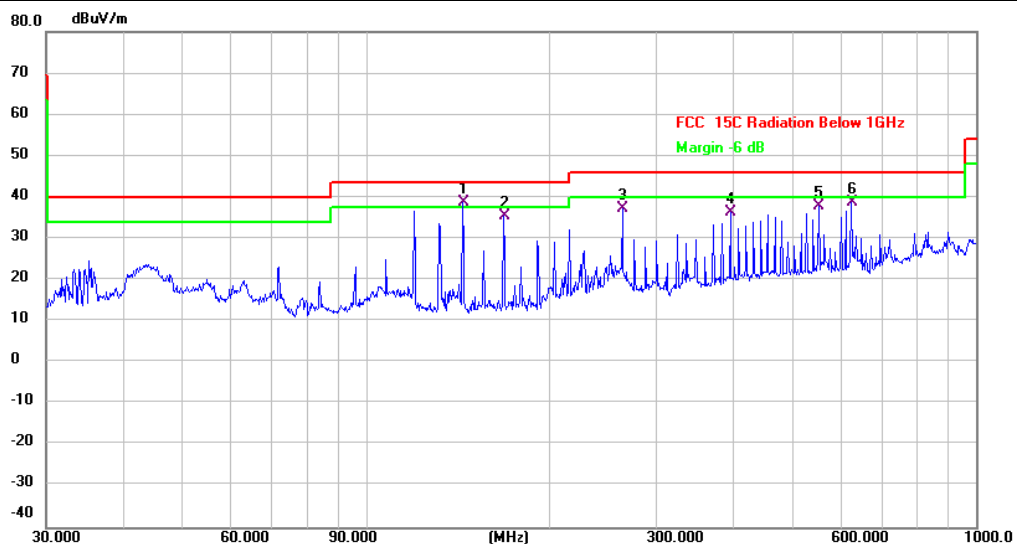
**6.6.3 Test Data:**

Mode1 / Polarization: Horizontal / CH: 2480/ Modle: IT001



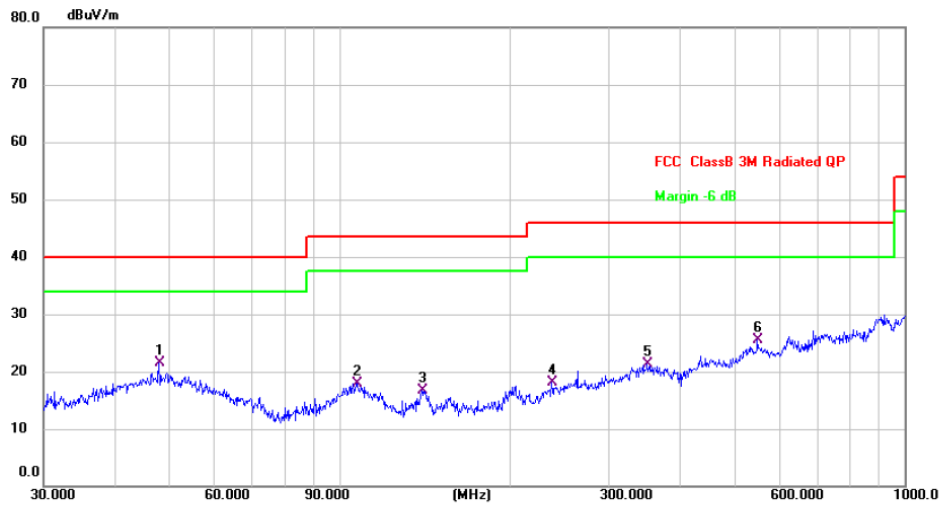
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	!	119.8556	47.18	-9.22	37.96	43.50	-5.54	QP	
2	!	216.0239	49.88	-8.98	40.90	46.00	-5.10	QP	
3	*	300.3672	47.32	-4.75	42.57	46.00	-3.43	QP	
4	!	396.2415	45.96	-4.97	40.99	46.00	-5.01	QP	
5		552.8832	41.70	-2.49	39.21	46.00	-6.79	QP	
6		625.0780	39.89	-0.05	39.84	46.00	-6.16	QP	

Mode1 / Polarization: Vertical / CH: 2480/ Modle: IT001



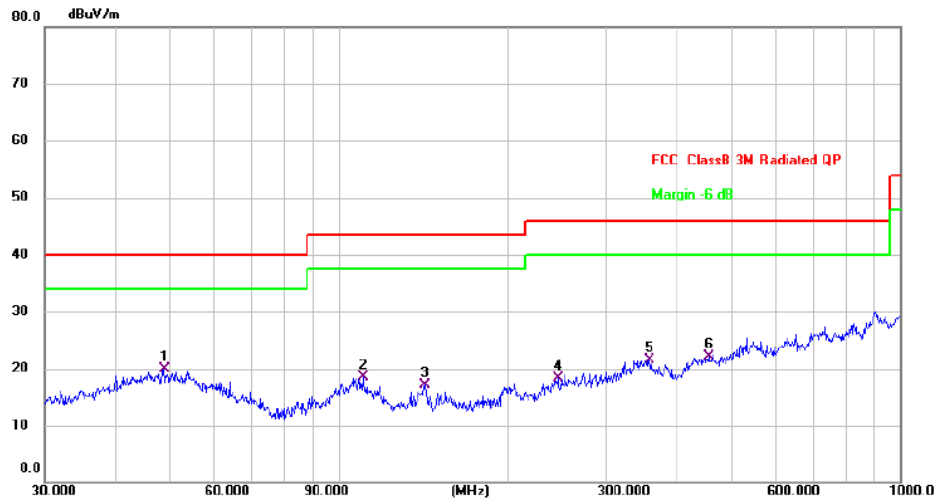
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	143.8295	49.34	-10.56	38.78	43.50	-4.72	QP	
2		167.8242	46.41	-11.01	35.40	43.50	-8.10	QP	
3		263.8190	44.62	-7.39	37.23	46.00	-8.77	QP	
4		396.2415	41.26	-4.97	36.29	46.00	-9.71	QP	
5		552.8832	40.39	-2.49	37.90	46.00	-8.10	QP	
6		625.0780	38.84	-0.05	38.79	46.00	-7.21	QP	

Mode1 / Polarization: Horizontal / Modle: IT002 / CH: 2480



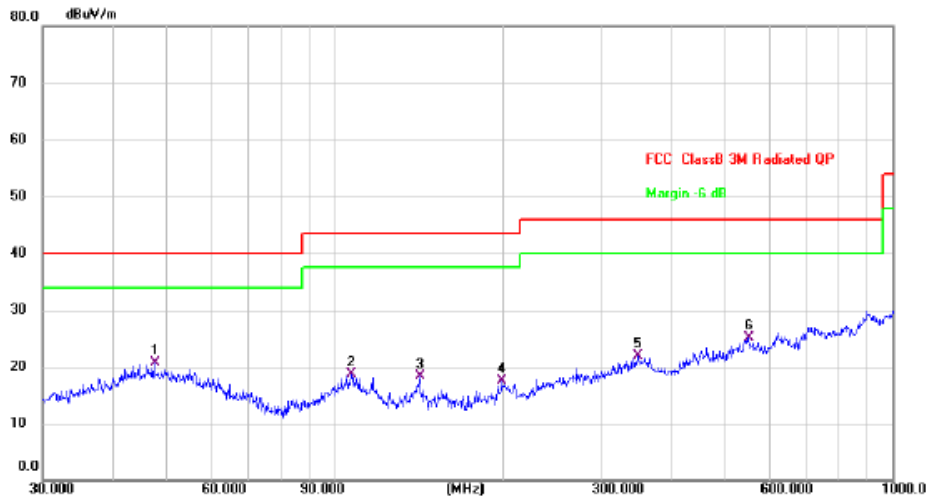
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	47.9940	28.44	-6.98	21.46	40.00	-18.54	QP	
2		107.5101	25.30	-7.34	17.96	43.50	-25.54	QP	
3		139.8508	25.87	-9.08	16.79	43.50	-26.71	QP	
4		237.4760	25.13	-7.11	18.02	46.00	-27.98	QP	
5		350.4768	25.49	-4.22	21.27	46.00	-24.73	QP	
6		549.0195	27.00	-1.48	25.52	46.00	-20.48	QP	

Mode1 / Polarization: Vertical / Modle: IT002 / CH: 2480



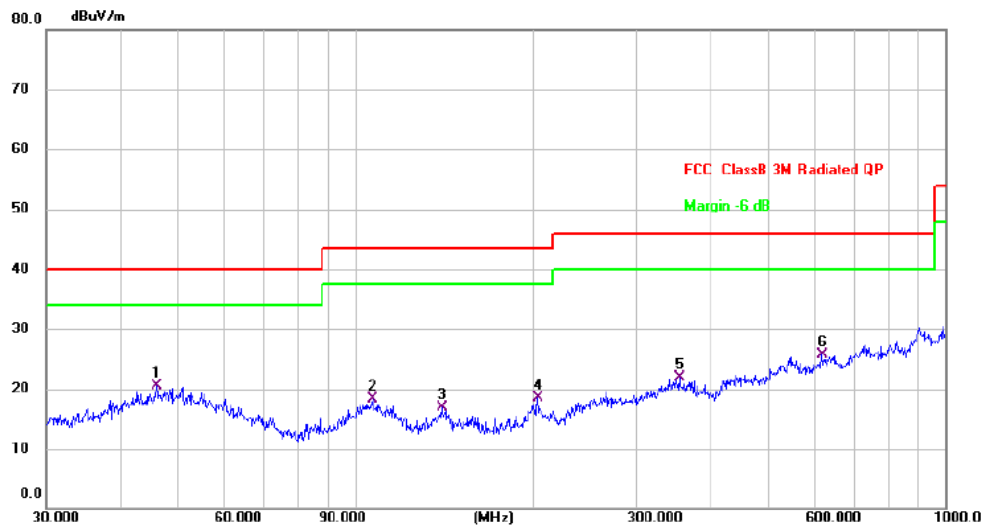
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	48.8429	26.58	-6.73	19.85	40.00	-20.15	QP	
2		110.5687	26.60	-8.09	18.51	43.50	-24.99	QP	
3		142.3243	26.17	-9.07	17.10	43.50	-26.40	QP	
4		245.9509	25.12	-6.79	18.33	46.00	-27.67	QP	
5		356.6758	25.54	-4.07	21.47	46.00	-24.53	QP	
6		455.9058	25.38	-3.31	22.07	46.00	-23.93	QP	

Mode1 / Polarization: Horizontal / Modle: KF001 / CH: 2480



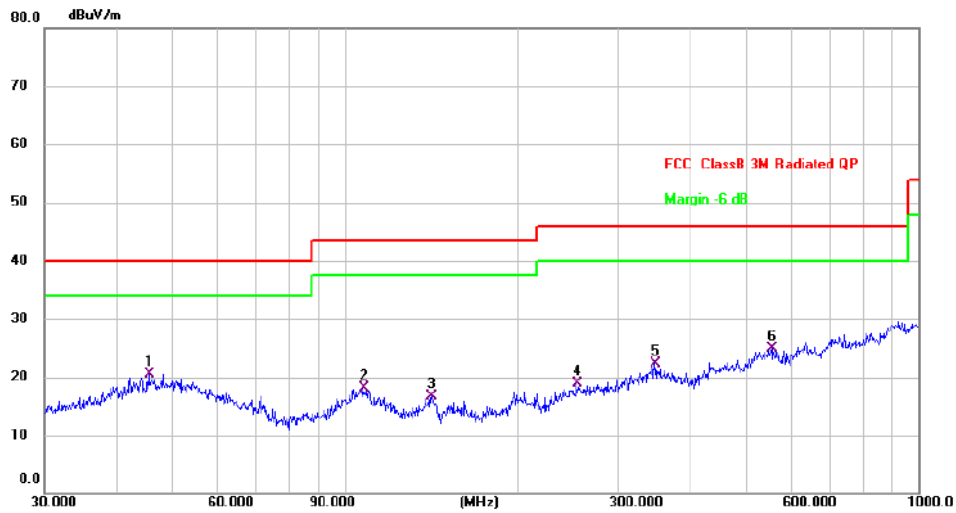
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	47.4918	27.55	-6.93	20.62	40.00	-19.38	QP	
2		107.1337	25.90	-7.23	18.67	43.50	-24.83	QP	
3		142.3243	27.47	-9.07	18.40	43.50	-25.10	QP	
4		199.2855	24.63	-7.06	17.57	43.50	-25.93	QP	
5		349.2500	26.09	-4.24	21.85	46.00	-24.15	QP	
6		550.9480	26.49	-1.42	25.07	46.00	-20.93	QP	

Mode1 / Polarization: Vertical / Modle: KF001 / CH: 2480



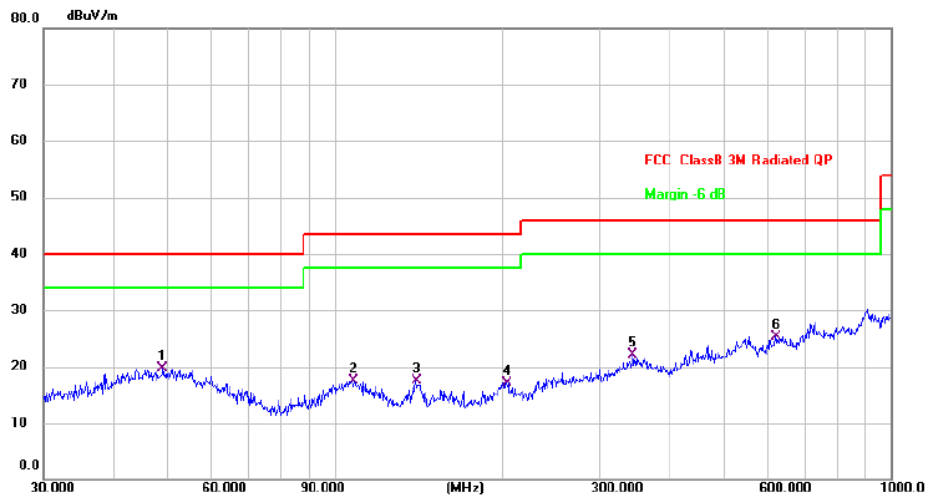
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	46.1779	27.15	-6.72	20.43	40.00	-19.57	QP	
2		107.1337	25.50	-7.23	18.27	43.50	-25.23	QP	
3		140.3421	26.06	-9.07	16.99	43.50	-26.51	QP	
4		203.5228	25.76	-7.22	18.54	43.50	-24.96	QP	
5		354.1831	25.99	-4.09	21.90	46.00	-24.10	QP	
6		616.3718	26.09	-0.43	25.66	46.00	-20.34	QP	

Mode1 / Polarization: Horizontal / Modle: IT003 / CH: 2480



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	45.6948	27.27	-6.74	20.53	40.00	-19.47	QP	
2		107.8877	25.59	-7.46	18.13	43.50	-25.37	QP	
3		141.8262	25.69	-9.07	16.62	43.50	-26.88	QP	
4		253.8367	25.35	-6.52	18.83	46.00	-27.17	QP	
5		346.8092	26.63	-4.23	22.40	46.00	-23.60	QP	
6		554.8254	26.29	-1.34	24.95	46.00	-21.05	QP	

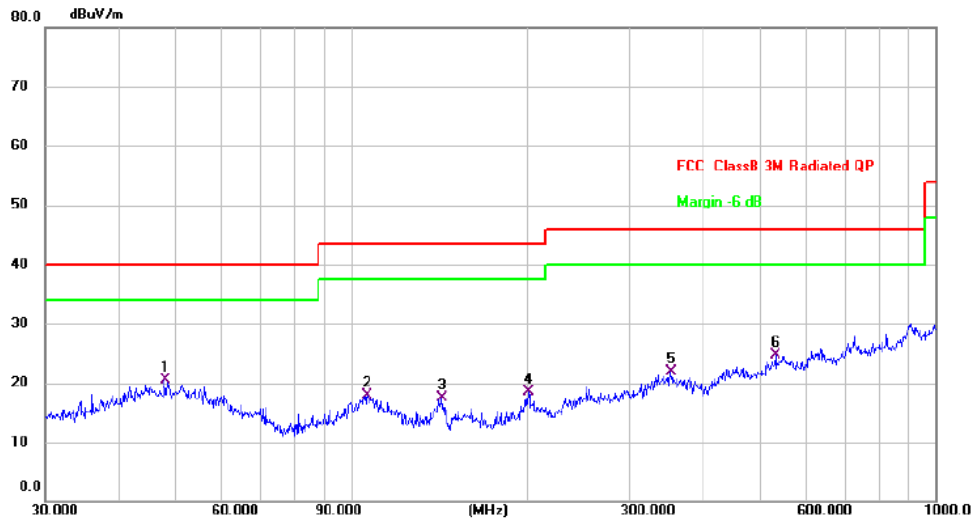
Mode1 / Polarization: Vertical / Modle: IT003 / CH: 2480



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	49.1865	26.47	-6.70	19.77	40.00	-20.23	QP	
2		107.8877	24.90	-7.46	17.44	43.50	-26.06	QP	
3		139.8508	26.60	-9.08	17.52	43.50	-25.98	QP	
4		203.5228	24.42	-7.22	17.20	43.50	-26.30	QP	
5		343.1800	26.37	-4.26	22.11	46.00	-23.89	QP	
6		618.5369	25.69	-0.29	25.40	46.00	-20.60	QP	

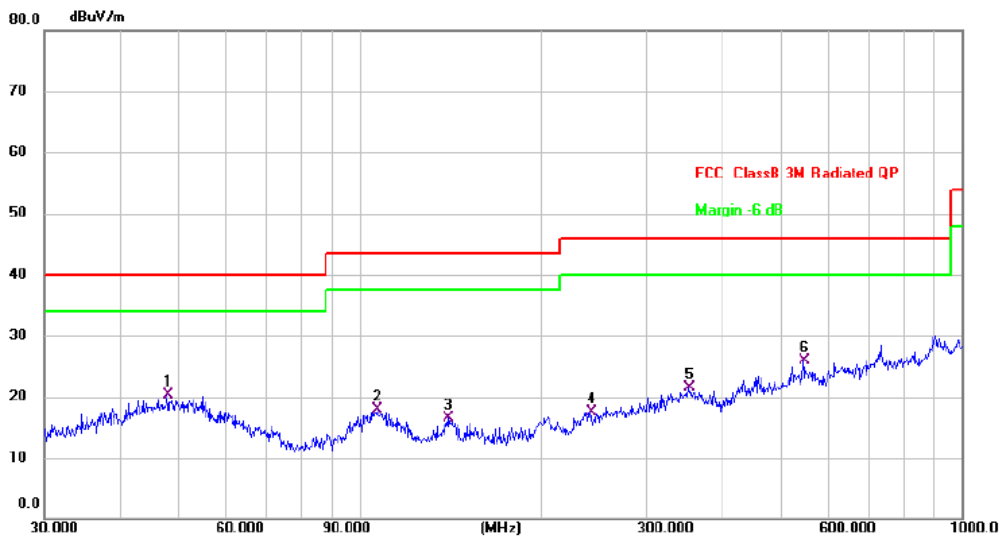


Mode1 / Polarization: Horizontal / Modle: IT004 / CH: 2480



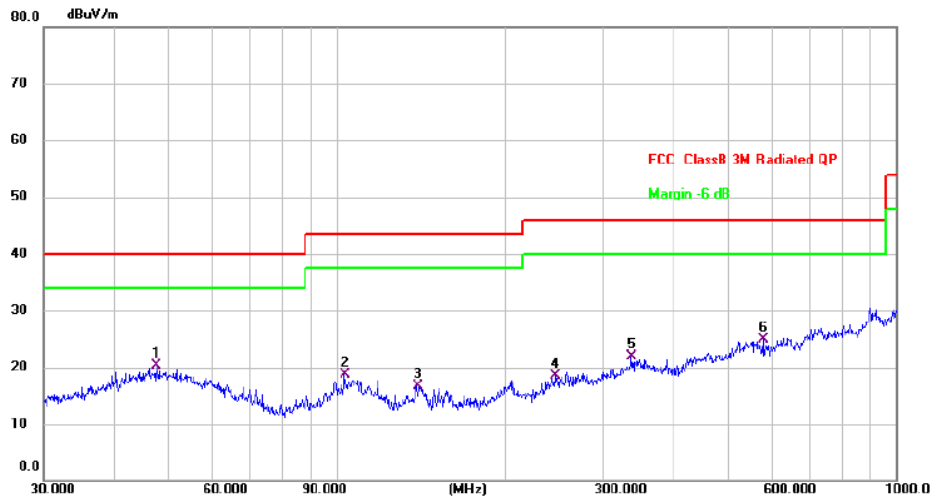
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1 *	47.9940	27.42	-6.98	20.44	40.00	-19.56	QP	
2	106.7587	25.08	-7.25	17.83	43.50	-25.67	QP	
3	142.8243	26.62	-9.07	17.55	43.50	-25.95	QP	
4	201.3930	25.71	-7.12	18.59	43.50	-24.91	QP	
5	351.7079	26.07	-4.18	21.89	46.00	-24.11	QP	
6	531.9635	26.93	-2.25	24.68	46.00	-21.32	QP	

Mode1 / Polarization: Vertical / Modle: IT004 / CH: 2480



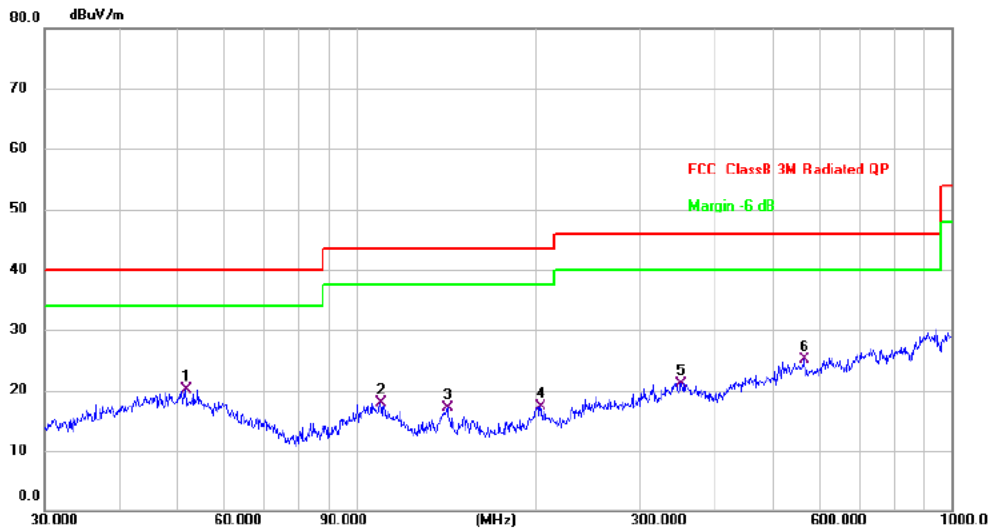
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1 *	47.9940	27.21	-6.98	20.23	40.00	-19.77	QP	
2	107.1337	25.11	-7.23	17.88	43.50	-25.62	QP	
3	140.3421	25.61	-9.07	16.54	43.50	-26.96	QP	
4	241.6763	24.40	-6.92	17.48	46.00	-28.52	QP	
5	351.7079	25.63	-4.18	21.45	46.00	-24.55	QP	
6	545.1826	27.61	-1.64	25.97	46.00	-20.03	QP	

Mode1 / Polarization: Horizontal / Modle: IT006 / CH: 2480



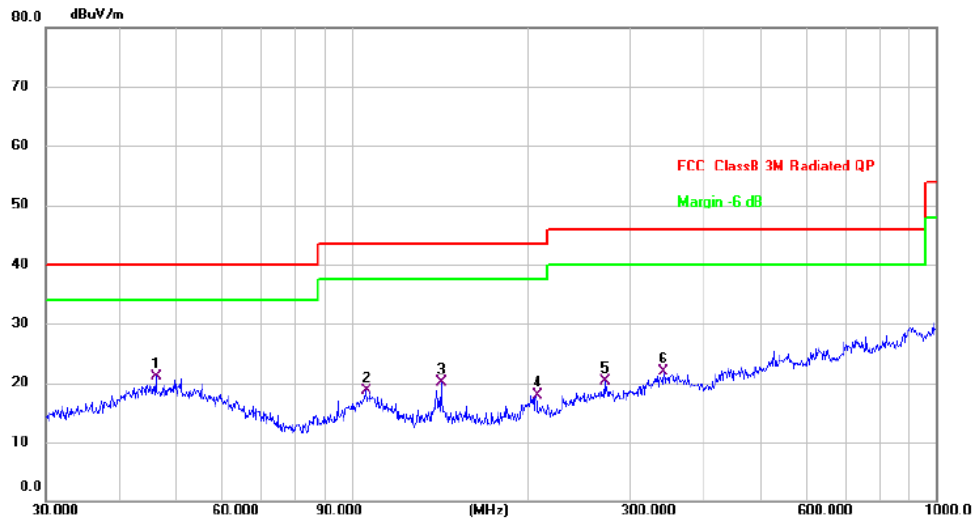
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1 *	47.6586	27.23	-6.95	20.28	40.00	-19.72	QP	
2	103.4421	26.60	-7.97	18.63	43.50	-24.87	QP	
3	139.3613	25.77	-9.08	16.69	43.50	-26.81	QP	
4	245.9509	25.27	-6.79	18.48	46.00	-27.52	QP	
5	336.0352	26.44	-4.53	21.91	46.00	-24.09	QP	
6	578.6699	25.76	-0.79	24.97	46.00	-21.03	QP	

Mode1 / Polarization: Vertical / Modle: IT006 / CH: 2480



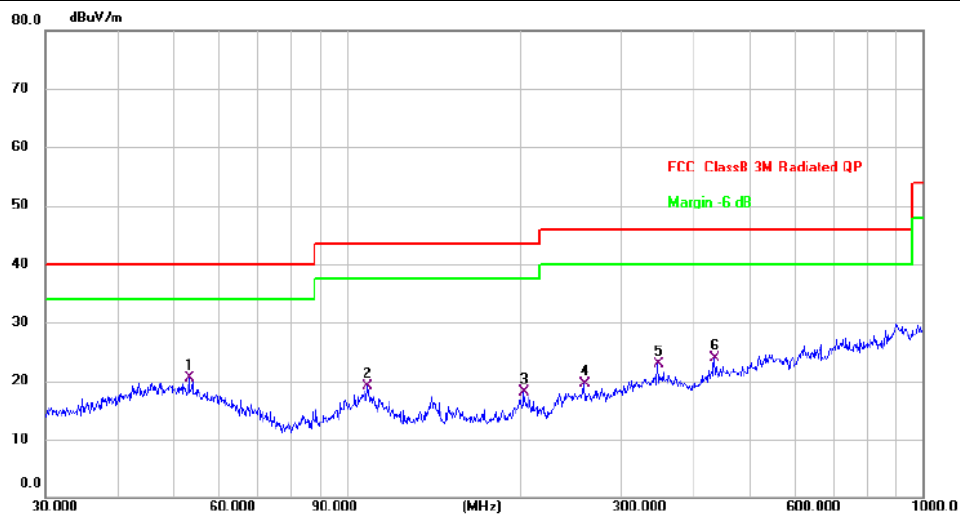
No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1 *	51.6616	27.04	-6.86	20.18	40.00	-19.82	QP	
2	109.7960	25.87	-7.88	17.99	43.50	-25.51	QP	
3	142.3243	26.08	-9.07	17.01	43.50	-26.49	QP	
4	203.5228	24.43	-7.22	17.21	43.50	-26.29	QP	
5	350.4768	25.32	-4.22	21.10	46.00	-24.90	QP	
6	564.6389	26.17	-1.14	25.03	46.00	-20.97	QP	

## Mode1 / Polarization: Horizontal / Modle: IT014 / CH: 2480



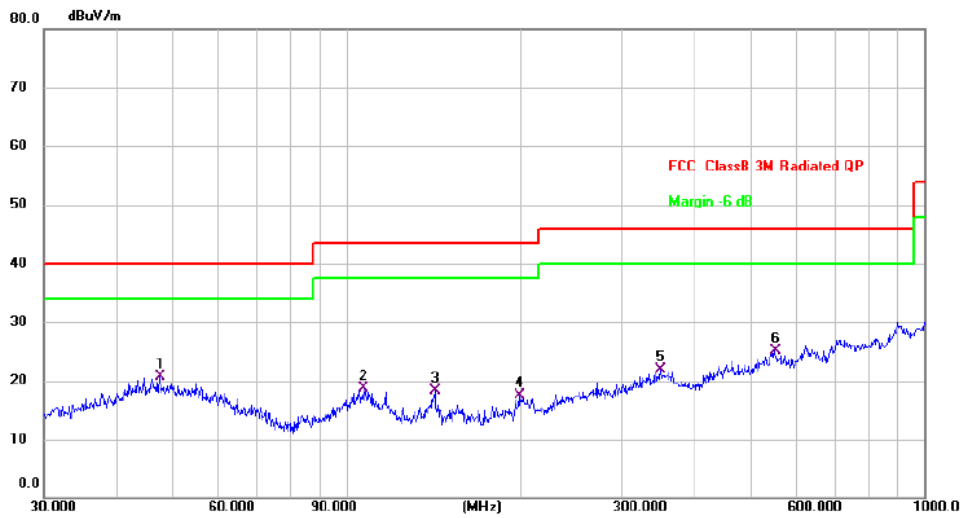
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	46.3402	27.76	-6.75	21.01	40.00	-18.99	QP	
2		105.6415	26.23	-7.44	18.79	43.50	-24.71	QP	
3		142.3243	29.20	-9.07	20.13	43.50	-23.37	QP	
4		207.1226	25.51	-7.63	17.88	43.50	-25.62	QP	
5		271.3246	26.48	-6.09	20.39	46.00	-25.61	QP	
6		341.9786	26.25	-4.27	21.98	46.00	-24.02	QP	

## Mode1 / Polarization: Vertical / Modle: IT014 / CH: 2480



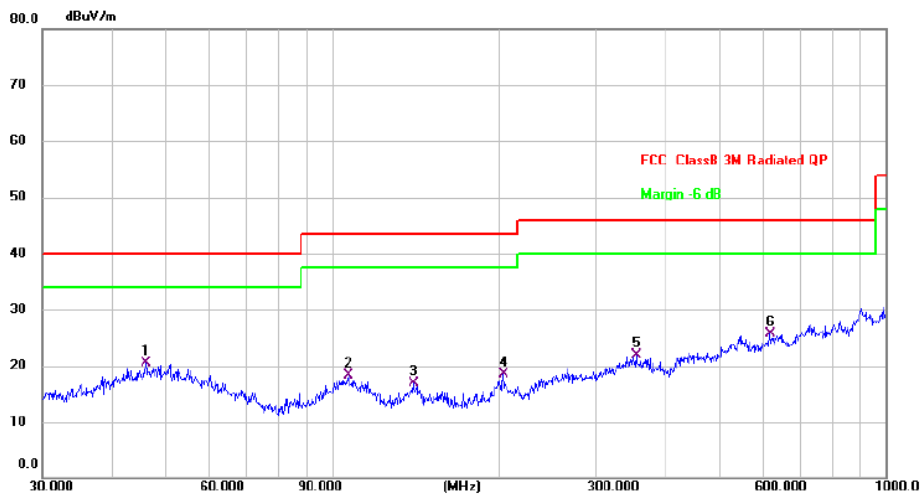
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	53.3179	27.45	-7.01	20.44	40.00	-19.56	QP	
2		108.6470	26.63	-7.49	19.14	43.50	-24.36	QP	
3		202.8104	25.33	-7.19	18.14	43.50	-25.36	QP	
4		258.3264	25.79	-6.35	19.44	46.00	-26.56	QP	
5		346.8092	27.17	-4.23	22.94	46.00	-23.06	QP	
6		434.0651	27.22	-3.33	23.89	46.00	-22.11	QP	

## Mode1 / Polarization: Horizontal / Modle: KF500 / CH: 2480



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	47.4918	27.55	-6.93	20.62	40.00	-19.38	QP	
2		107.1337	25.90	-7.23	18.67	43.50	-24.83	QP	
3		142.3243	27.47	-9.07	18.40	43.50	-25.10	QP	
4		199.2855	24.63	-7.06	17.57	43.50	-25.93	QP	
5		349.2500	26.09	-4.24	21.85	46.00	-24.15	QP	
6		550.9480	26.49	-1.42	25.07	46.00	-20.93	QP	

## Mode1 / Polarization: Vertical / Modle: KF500 / CH: 2480



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	46.1779	27.15	-6.72	20.43	40.00	-19.57	QP	
2		107.1337	25.50	-7.23	18.27	43.50	-25.23	QP	
3		140.3421	26.06	-9.07	16.99	43.50	-26.51	QP	
4		203.5228	25.76	-7.22	18.54	43.50	-24.96	QP	
5		354.1831	25.99	-4.09	21.90	46.00	-24.10	QP	
6		616.3718	26.09	-0.43	25.66	46.00	-20.34	QP	

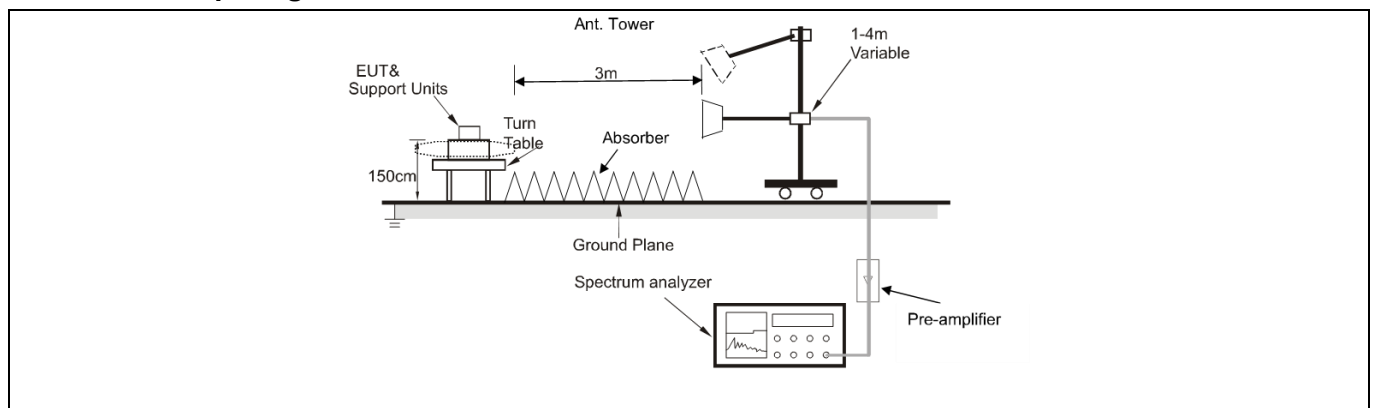
### 6.7 Radiated emissions (above 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Limit:	Frequency (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
	Above 960	500	3
	** Except as provided in paragraph (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.		
Test Method:	ANSI C63.10-2013 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02		
Procedure:	ANSI C63.10-2013 section 6.6.4		

#### 6.7.1 E.U.T. Operation:

Operating Environment:			
Temperature:	27 °C	Humidity:	27.8 %
Atmospheric Pressure:		99 kPa	
Test mode:	Mode1		
Note: Test frequency are from 1GHz to 25GHz, the amplitude of spurious emissions which are attenuated more than 20 dB below the limits are not reported. All modes of operation of the EUT were investigated, and only the worst-case results are reported.			

#### 6.7.2 Test Setup Diagram:



**6.7.3 Test Data:**

Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 2 / CH: 2402

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4804.000	45.02	2.74	47.76	74.00	-26.24	peak
2		4804.000	40.85	2.74	43.59	54.00	-10.41	AVG
3		7206.000	48.24	9.34	57.58	74.00	-16.42	peak
4	*	7206.000	42.88	9.34	52.22	54.00	-1.78	AVG
5		9608.000	40.24	10.49	50.73	74.00	-23.27	peak
6		9608.000	36.03	10.49	46.52	54.00	-7.48	AVG

Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 2 / CH: 2402

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4804.000	44.88	2.74	47.62	74.00	-26.38	peak
2		4804.000	38.48	2.74	41.22	54.00	-12.78	AVG
3		7206.000	43.76	9.34	53.10	74.00	-20.90	peak
4	*	7206.000	37.09	9.34	46.43	54.00	-7.57	AVG
5		9608.000	41.53	10.49	52.02	74.00	-21.98	peak
6		9608.000	35.51	10.49	46.00	54.00	-8.00	AVG

Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 2 / CH: 2440

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4880.000	43.67	3.05	46.72	74.00	-27.28	peak
2		4880.000	39.10	3.05	42.15	54.00	-11.85	AVG
3		7320.000	46.87	9.02	55.89	74.00	-18.11	peak
4	*	7320.000	42.37	9.02	51.39	54.00	-2.61	AVG
5		9760.000	40.82	12.01	52.83	74.00	-21.17	peak
6		9760.000	35.15	12.01	47.16	54.00	-6.84	AVG

Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 2 / CH: 2440

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4880.000	42.75	3.05	45.80	74.00	-28.20	peak
2		4880.000	36.69	3.05	39.74	54.00	-14.26	AVG
3		7320.000	43.71	9.02	52.73	74.00	-21.27	peak
4	*	7320.000	37.50	9.02	46.52	54.00	-7.48	AVG
5		9760.000	40.41	12.01	52.42	74.00	-21.58	peak
6		9760.000	34.21	12.01	46.22	54.00	-7.78	AVG

Mode1 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 2 / CH: 2480

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4960.000	44.25	3.52	47.77	74.00	-26.23	peak
2		4960.000	39.13	3.52	42.65	54.00	-11.35	AVG
3		7440.000	46.33	9.16	55.49	74.00	-18.51	peak
4	*	7440.000	40.84	9.16	50.00	54.00	-4.00	AVG
5		9920.000	41.77	11.74	53.51	74.00	-20.49	peak
6		9920.000	36.45	11.74	48.19	54.00	-5.81	AVG

Mode1 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 2 / CH: 2480

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1		4960.000	42.96	3.52	46.48	74.00	-27.52	peak
2		4960.000	37.73	3.52	41.25	54.00	-12.75	AVG
3		7440.000	42.56	9.16	51.72	74.00	-22.28	peak
4		7440.000	37.42	9.16	46.58	54.00	-7.42	AVG
5		9920.000	41.04	11.74	52.78	74.00	-21.22	peak
6	*	9920.000	35.67	11.74	47.41	54.00	-6.59	AVG



## Photographs of the test setup

Refer to Appendix - Test Setup Photos

## Photographs of the EUT

Refer to Appendix - EUT Photos

# Appendix

## Appendix A: DTS Bandwidth

Test Result

Test Mode	Antenna	Frequency [MHz]	DTS BW [MHz]	Limit [MHz]	Verdict
BLE_1M	Ant1	2402	0.744	0.5	PASS
		2440	0.724	0.5	PASS
		2480	0.744	0.5	PASS

## Test Graphs

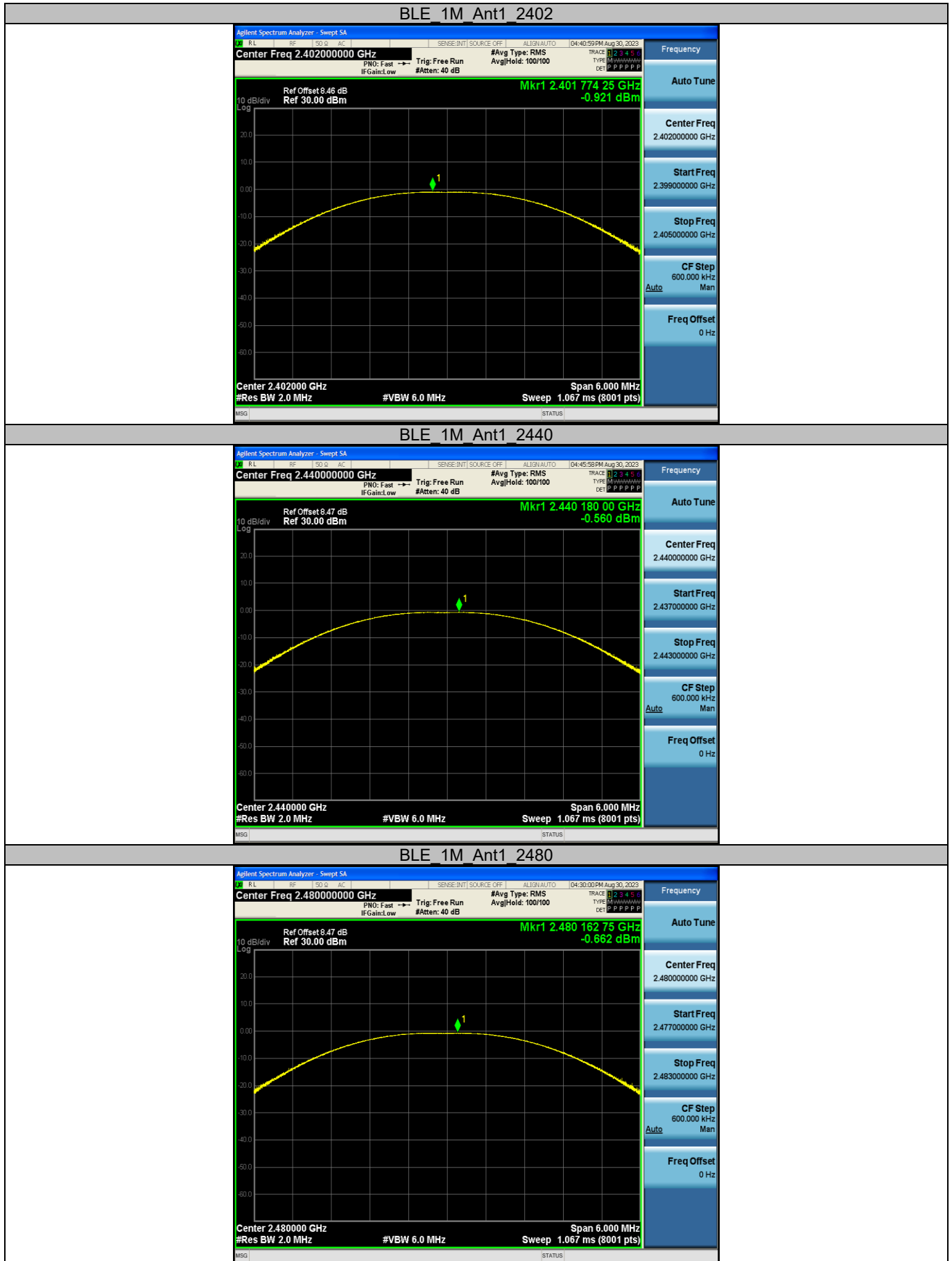


## Appendix B: Maximum conducted output power

### Test Result-Peak

Test Mode	Antenna	Frequency [MHz]	Conducted Peak Power [dBm]	Limit [dBm]	Verdict
BLE_1M	Ant1	2402	-0.92	≤30	PASS
		2440	-0.56	≤30	PASS
		2480	-0.66	≤30	PASS

## Test Graphs

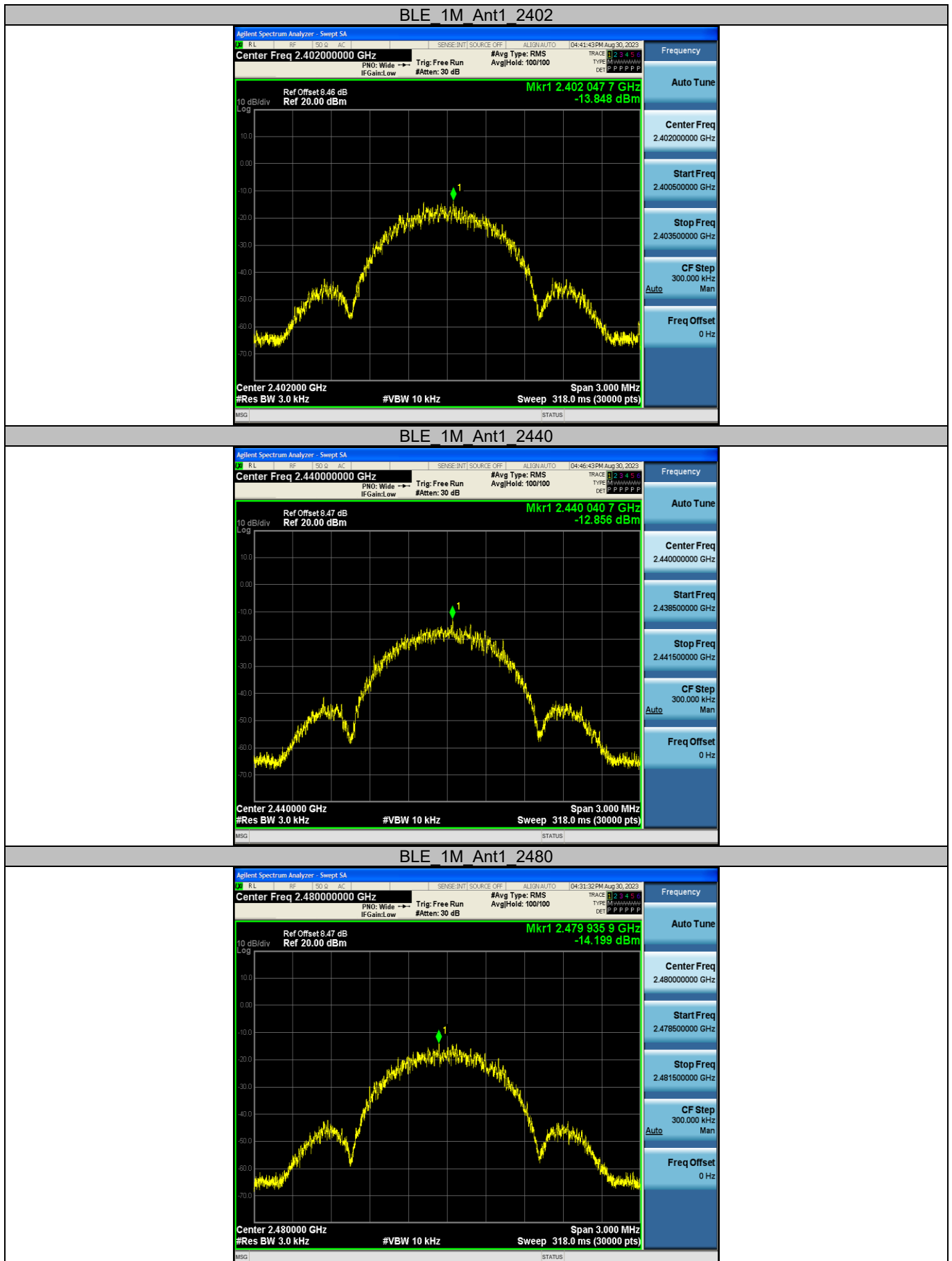


## Appendix C: Maximum power spectral density

### Test Result

Test Mode	Antenna	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-13.85	≤8.00	PASS
		2440	-12.86	≤8.00	PASS
		2480	-14.2	≤8.00	PASS

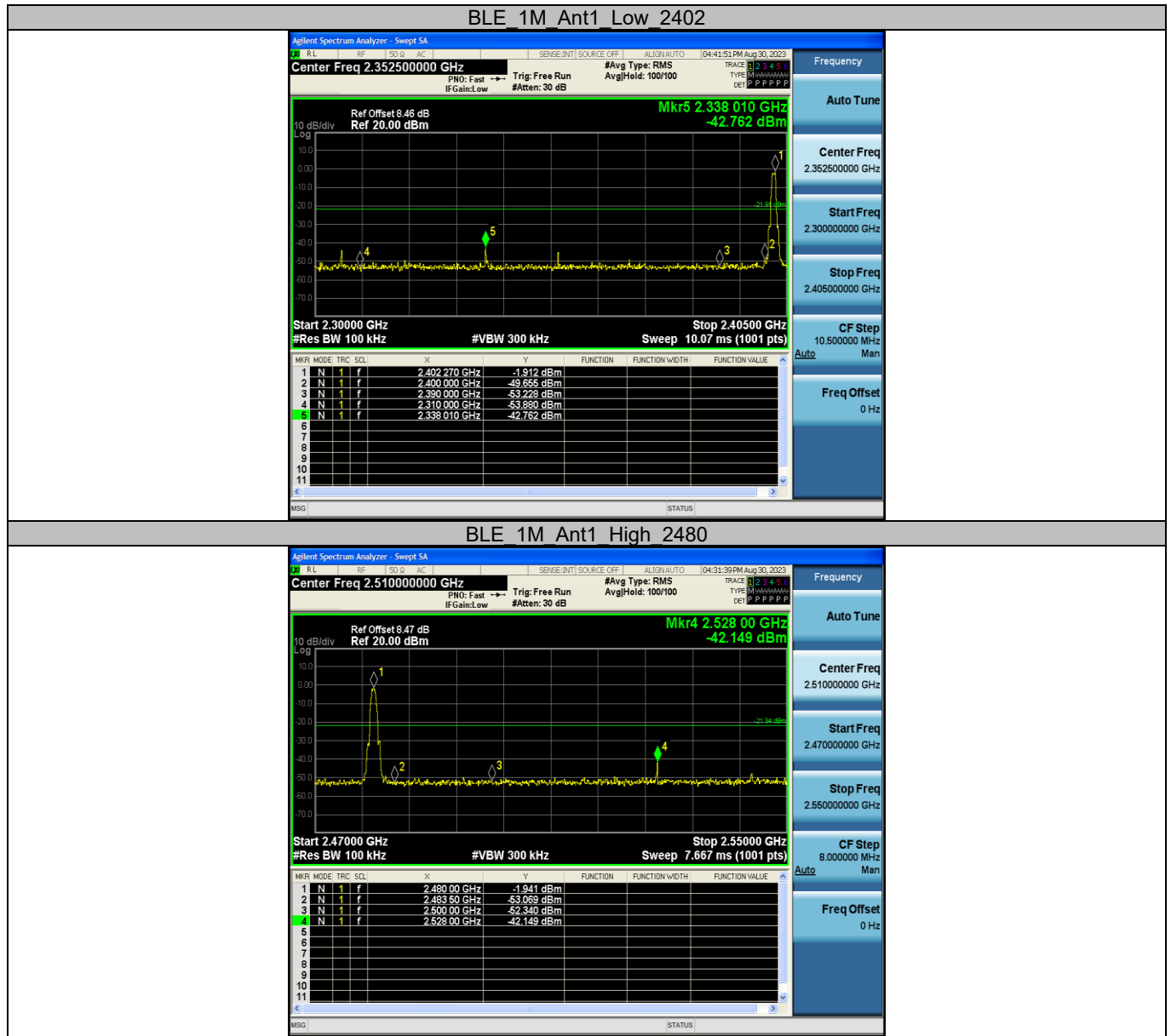
## Test Graphs





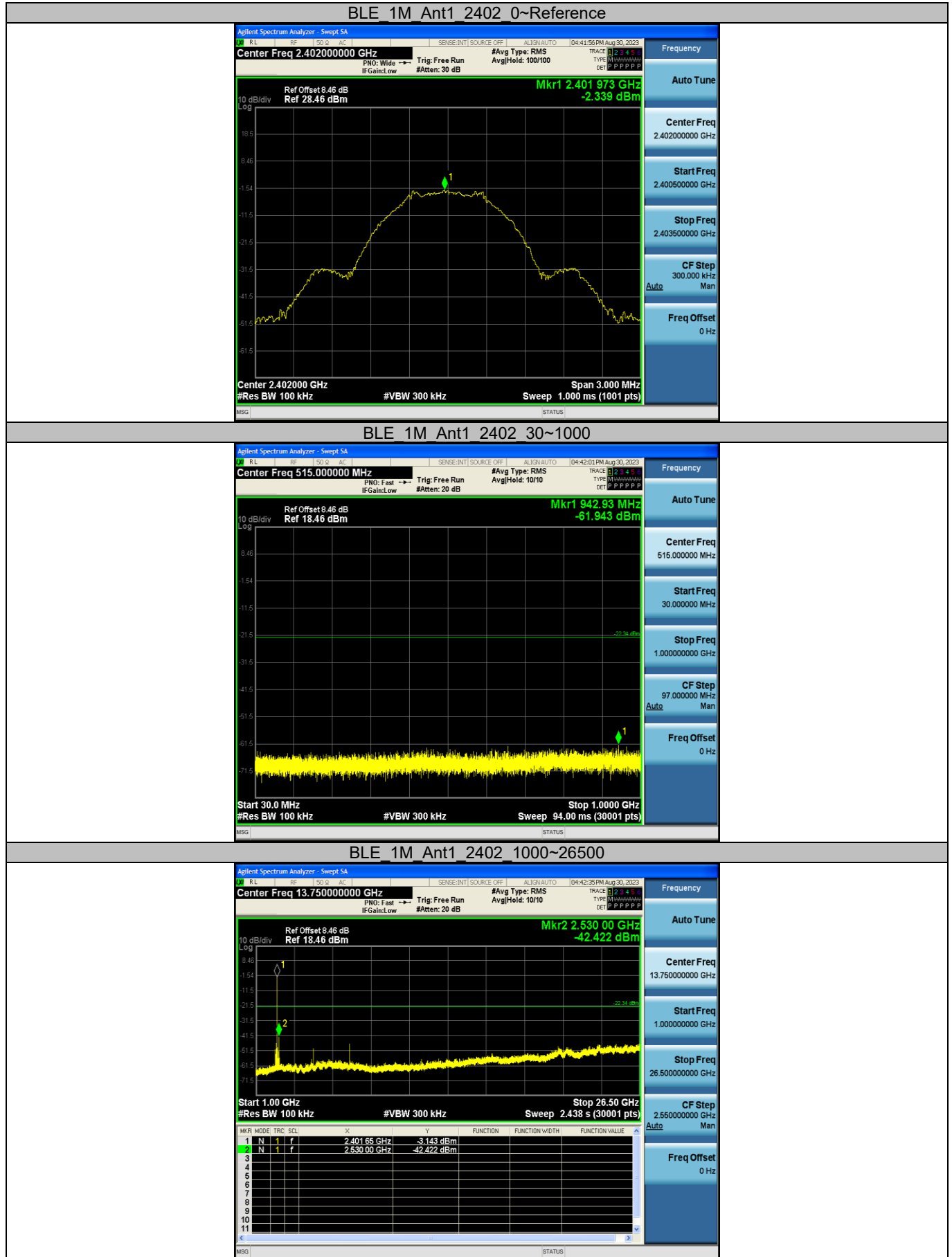
## Appendix D: Band edge measurements

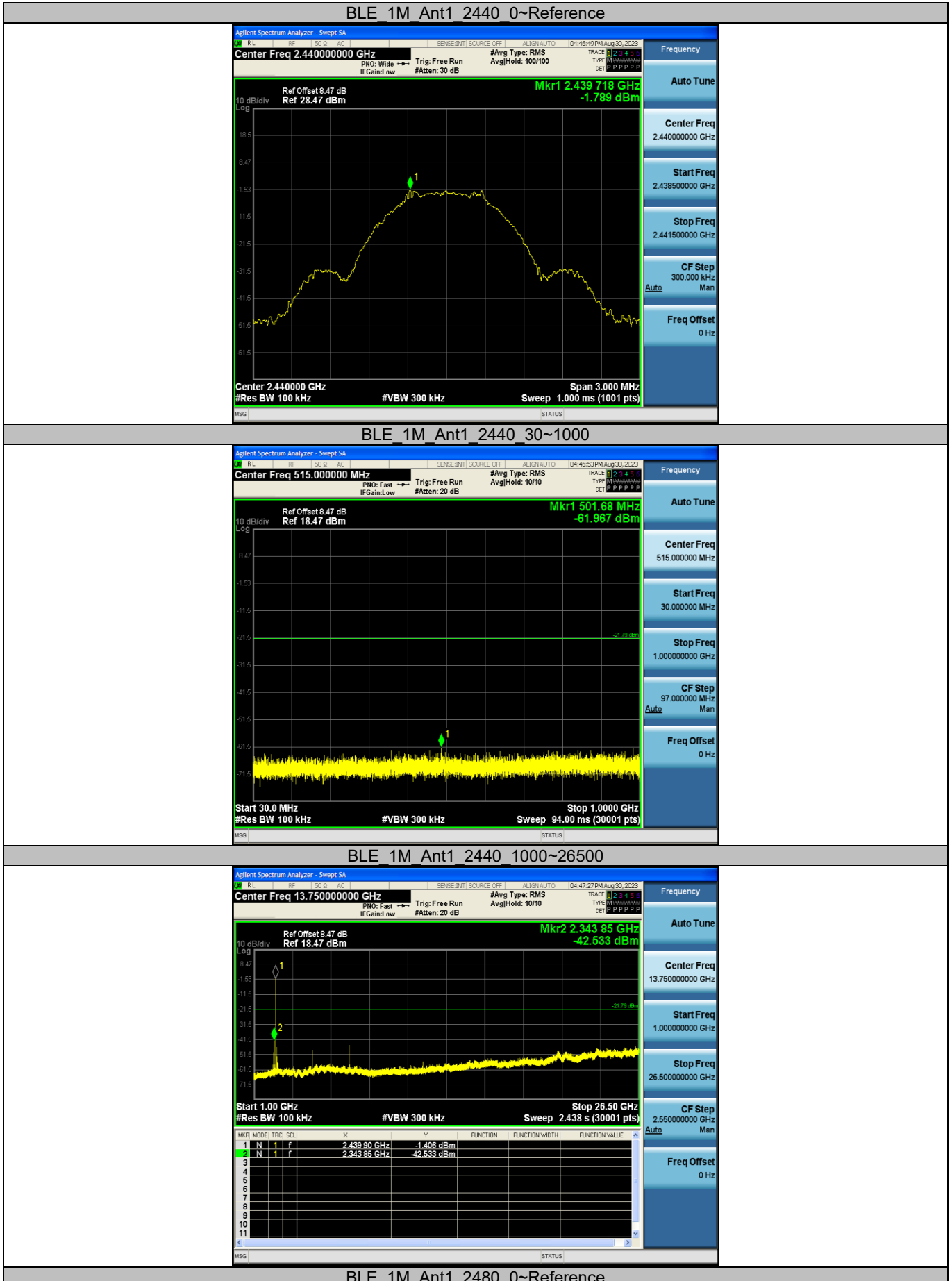
### Test Graphs

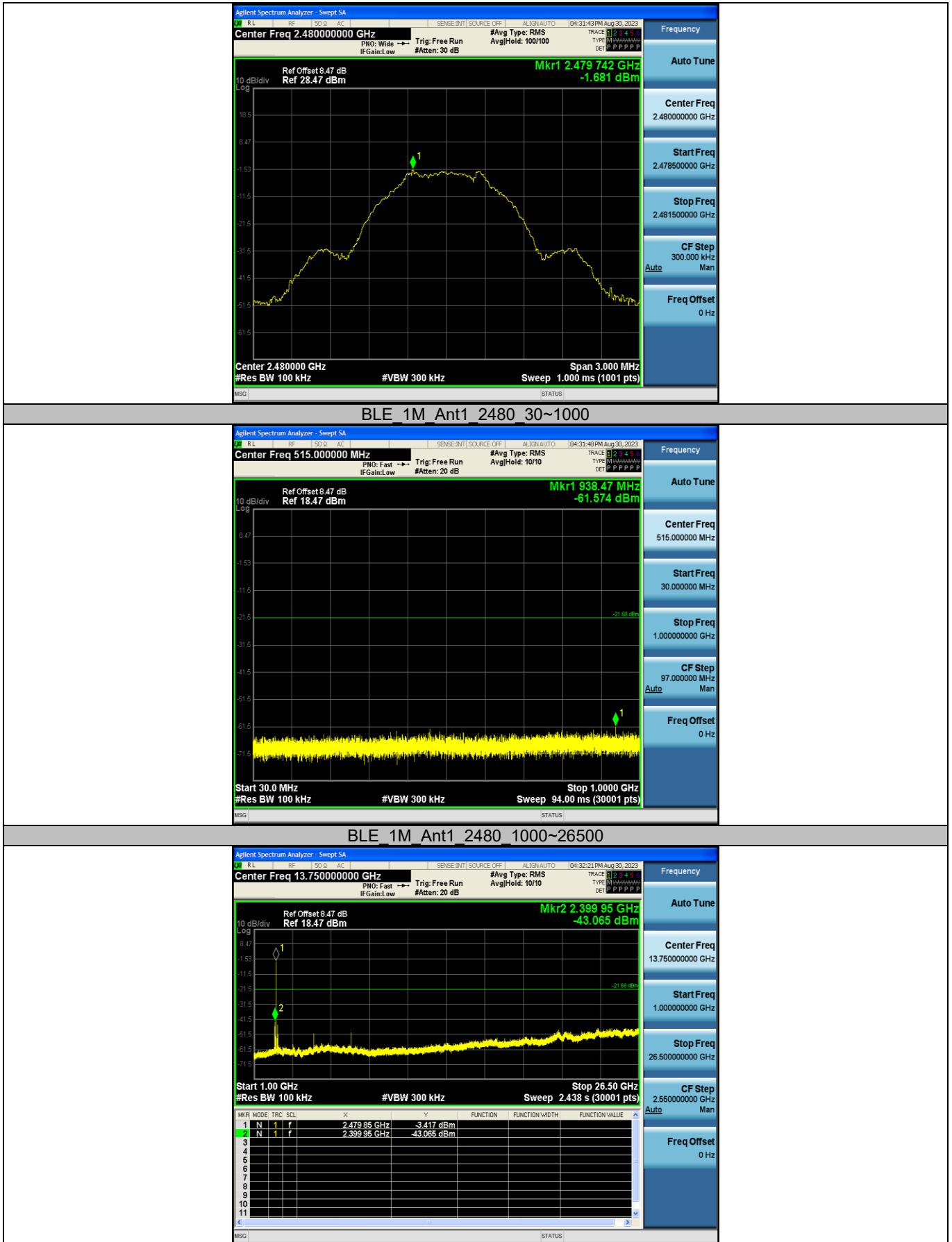


## Appendix E: Conducted Spurious Emission

### Test Graphs





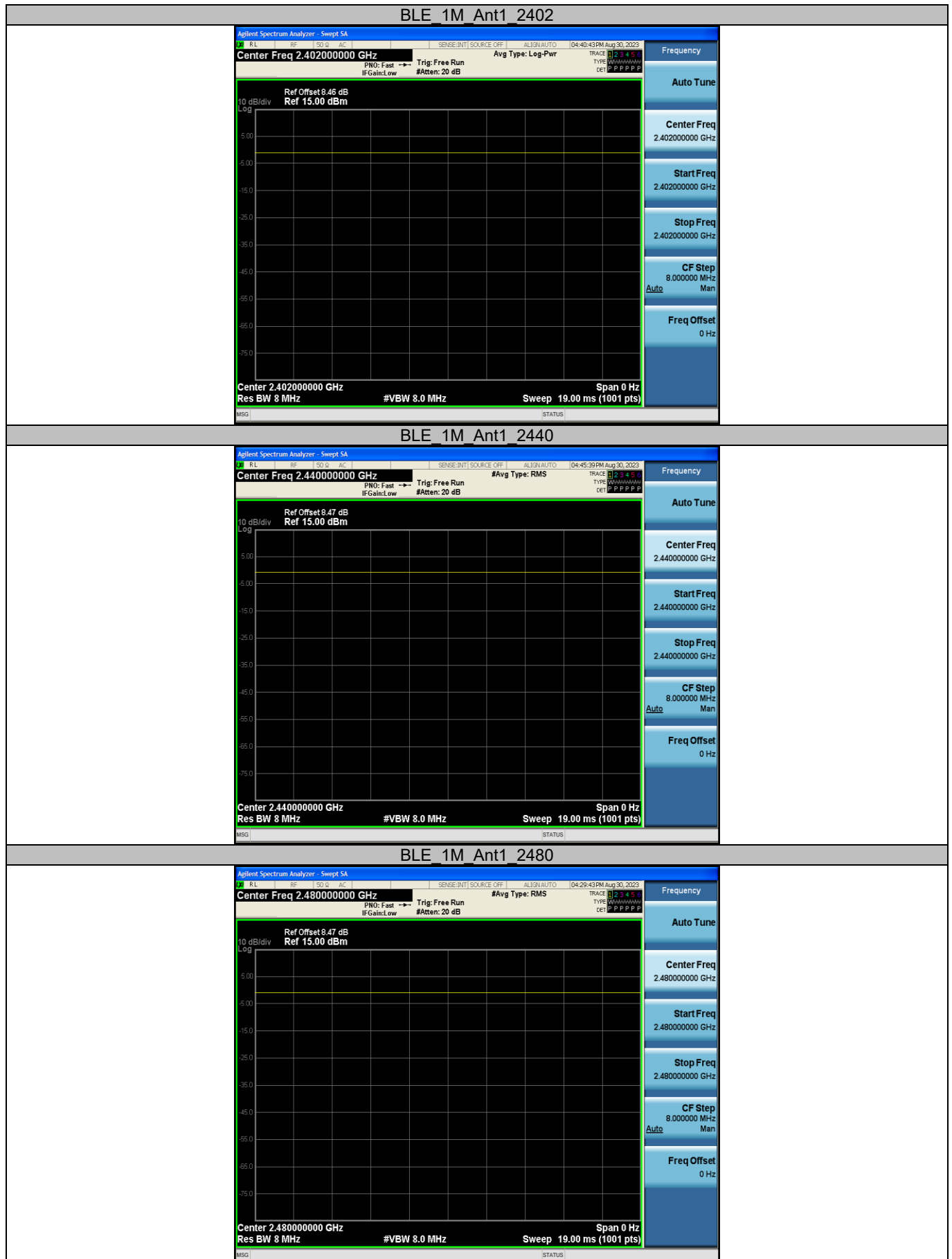


## Appendix F: Duty Cycle

### Test Result

Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
BLE_1M	Ant1	2402	19.00	19.00	100	0.0
		2440	19.00	19.00	100	0.0
		2480	19.00	19.00	100	0.0

## Test Graphs



----End of Report----