

FCC Radio Test Report

FCC ID: RWO-RC30021702

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

Project No. : 1704C344
Equipment : Wireless Mouse
Model Name : RC30-021702
Applicant : Razer Inc.
Address : 201 3rd Street, Suite 900, San Francisco, CA 94103

Date of Receipt : May 02, 2017
Date of Test : May 02, 2017 ~ Jun. 14, 2017
Issued Date : Jun. 15, 2017
Tested by : BTL Inc.

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-3-1704C344	Original Issue.	Jun. 15, 2017

1. CERTIFICATION

Equipment : Wireless Mouse
Brand Name : RAZER
Model Name : RC30-021702
Applicant : Razer Inc.
Manufacturer : Razer (Asia-Pacific) Pte.,Ltd.
Address : 201 3rd Street, Suite 900, San Francisco, CA 94103
Factory : RAZER TECHNOLOGY AND DEVELOPMENT (SHENZHEN) CO., LTD
Address : East Wing, 3rd Floor, Block 2, Phase 1 of Vision Shenzhen Business Park Keji
South Road, Hi-Tech Industrial
Date of Test : May 02, 2017 ~ Jun. 14, 2017
Test Sample : Engineering Sample
Standard(s) : FCC Part15, Subpart C (15.247) / 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-3-1704C1344) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF 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 (15.247) , Subpart C			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247(a)(2)	6dB Bandwidth	PASS	
15.247(b)(3)	AVG Power	PASS	
15.247(e)	Power Spectral Density	PASS	
15.203	Antenna Requirement	PASS	
15.209/15.205	Transmitter Radiated Emissions	PASS	
RSS-247 5.5	Band Edge Emissions	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: 319330

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

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 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Mouse	
Brand Name	RAZER	
Model Name	RC30-021702	
Model Difference	The System's model name is RZ01-0217 and the system contains of a Wireless mouse (Model Name: RC30-021702) and the USB Dongle (Model Name: DGRFG5).	
Product Description	Operation Frequency	2403-2479 MHz
	Modulation Technology	GFSK (2 Mbps)
	Bit Rate of Transmitter	
	AVG Power (Max.)	5.27dBm
Power Source	Supplied from 2*AA battery.	
Power Rating	DC 3V	

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	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453		
25	2427	52	2454		
26	2428	53	2455		
27	2429	54	2456		

3. Table for Filed Antenna:

Ant.	Manufacturer	Model Name	Antenna Type	Connector	Gain (dBi)
1	GainForce	AT3216	Chip	N/A	0.5

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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 NOTE (1)

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 NOTE (1)

Note:

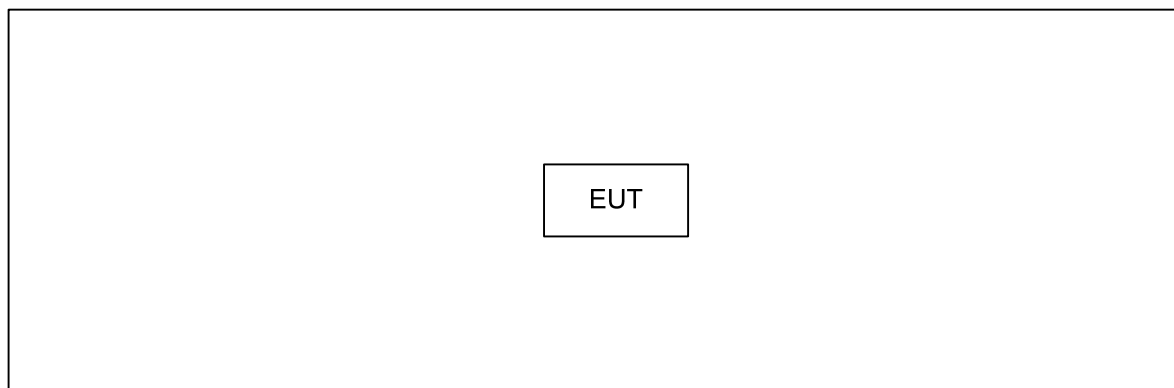
(1) The measurements are performed at the high, middle, low available channels.

3.3 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN

Test Software Version	N/A		
Frequency (MHz)	2403	2440	2479
-	N/A	N/A	N/A

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) For detachable type I/O cable should be specified the length in m in 『Length』 column.

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 (dBμV)	
	Quasi-peak	Average
0.15 -0.5	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 + Attenuator Factor(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

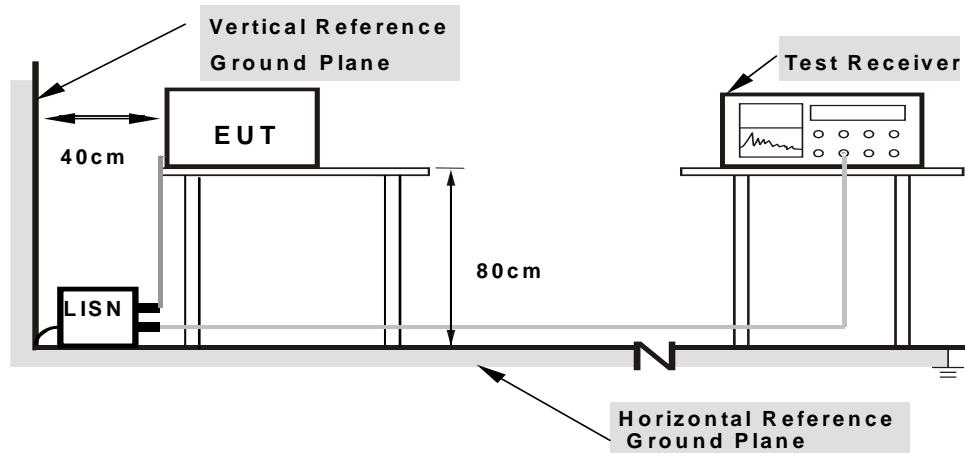
4.1.2 TEST PROCEDURE

- 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 cm from other units and other metal planes

4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

4.1.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 53% Test Voltage: N/A

4.1.7 TEST RESULTS

Please refer to the Attachment 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

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9KHz-1000MHz)

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
960~1000	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	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).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	RBW 1MHz VBW 3MHz peak detector for Pk value RMS detector for AV value

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

4.2.2 TEST PROCEDURE

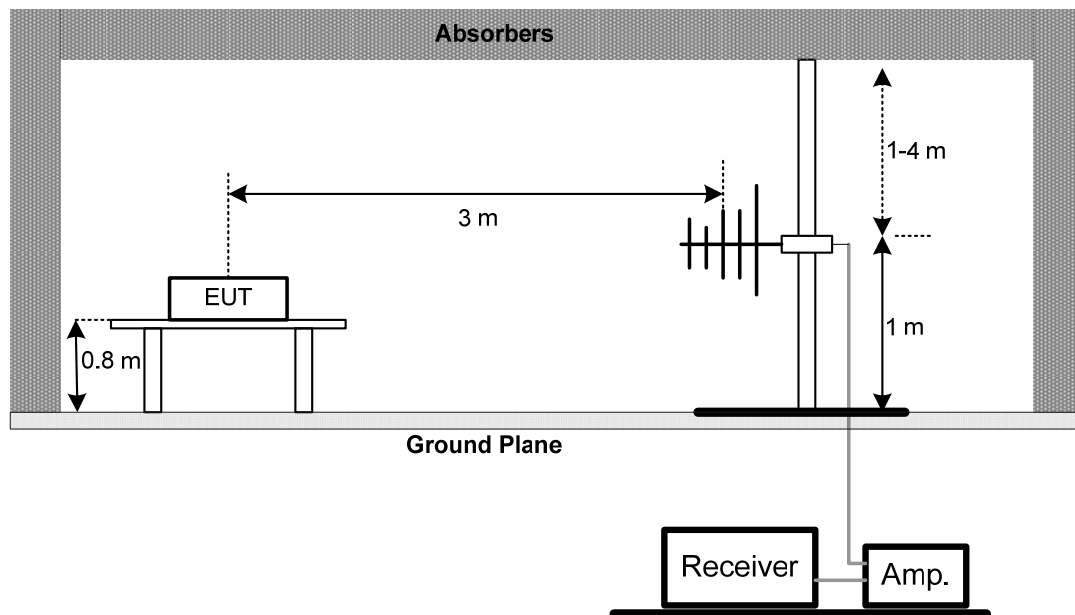
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 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)
- The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, 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.
- 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.
- 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)
- 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)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

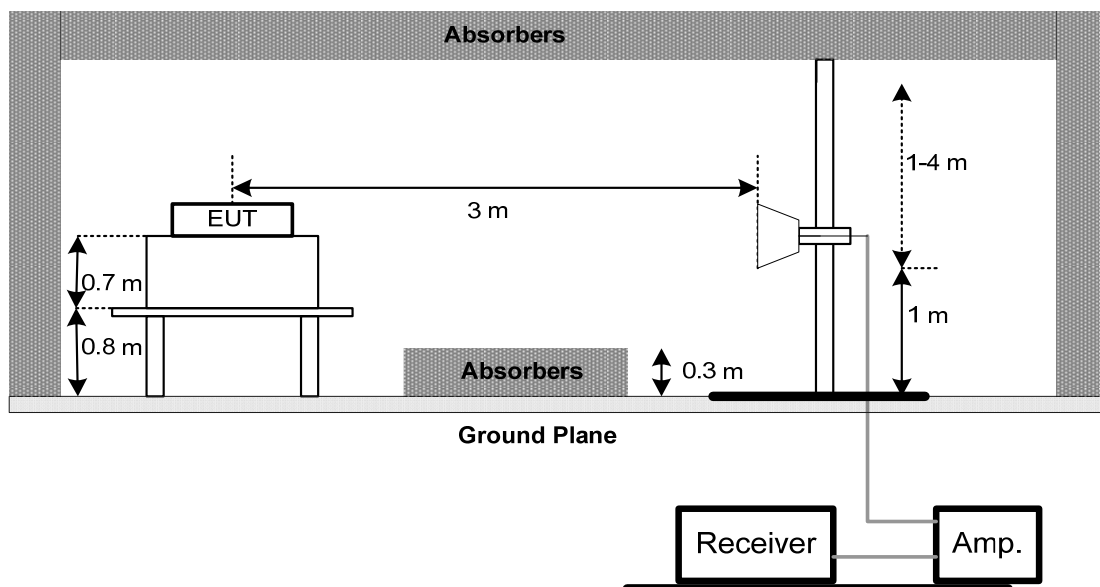
No deviation

4.2.4 TEST SETUP

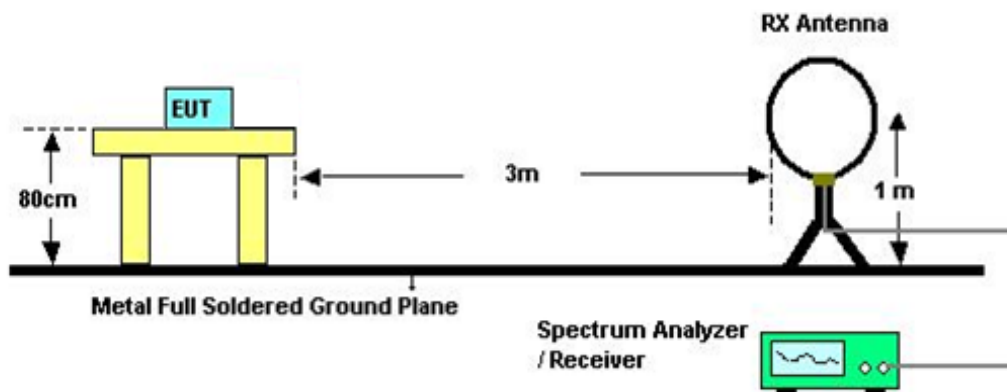
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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 3V

4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Attachment 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 1000 MHZ)

Please refer to the Attachment C.

Remark:

- (1) 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.
- (2) Measuring frequency range from 30MHz to 1000MHz.
- (3) 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 Attachment D.

Remark:

- (1) 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.
- (2) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission
- (3) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (4) EUT Orthogonal Axis:
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (5) 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
- (6) 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 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)	2400-2483.5	PASS

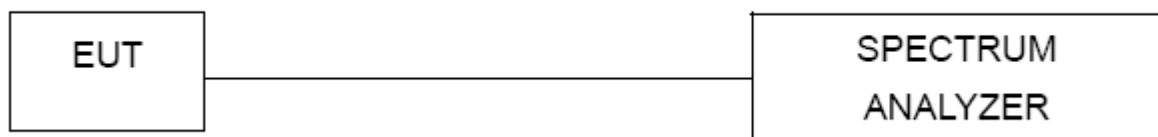
5.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION 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.

5.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 60% Test Voltage: DC 3V

5.1.6 TEST RESULTS

Please refer to the Attachment E.

6. CONDUCTED OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Maximum Output Power	1 watt or 30dBm	2400-2483.5	PASS

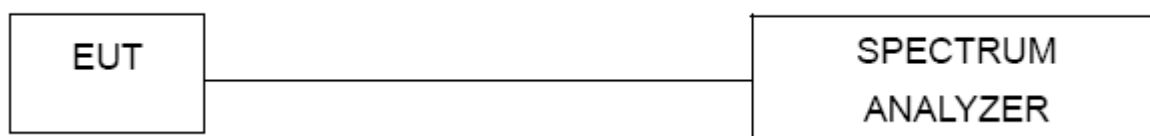
6.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- The maximum peak conducted output power was performed in accordance with method 9.2 of FCC KDB 558074 D01 DTS Meas Guidance v03r05.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION 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.

6.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 60% Test Voltage: DC 3V

6.1.6 TEST RESULTS

Please refer to the Attachment F.

7. ANTENNA CONDUCTED SPURIOUS EMISSION

7.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz 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 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 that the transmitter demonstrates compliance with the peak conducted power limits.

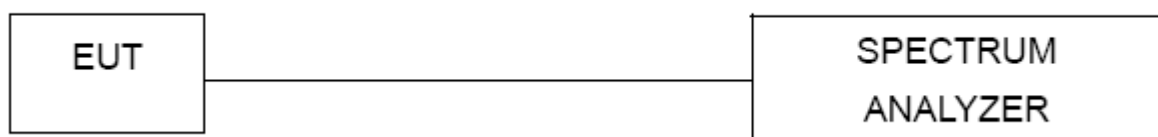
7.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 10 ms.
- Offset=antenna gain+cable loss

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION 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.

7.1.5 EUT OPERATION CONDITIONS

Temperature: 25°C Relative Humidity: 60% Test Voltage: DC 3V

7.1.6 TEST RESULTS

Please refer to the Attachment G.

8. POWER SPECTRAL DENSITY TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

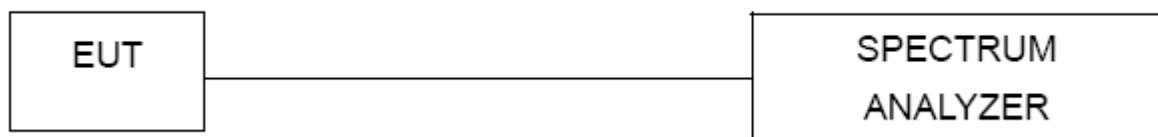
8.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW=3KHz, VBW=10 KHz, Sweep time = auto.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION 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.

8.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 60% Test Voltage: DC 3V

8.1.6 TEST RESULTS

Please refer to the Attachment H.

9. MEASUREMENT INSTRUMENTS LIST

Radiated Emission Measurement					
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. 20, 2017
3	Receiver	AGILENT	N9038A	MY52130039	Sep. 04, 2017
4	Test Cable	emci	LMR-400(30MHz-1 GHz)	C-01	Jun. 26, 2017
5	Controller	CT	SC100	N/A	N/A
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	Antenna	ETS	3115	00075789	Mar. 26, 2018
8	Amplifier	Agilent	8449B	3008A02274	Nov. 01, 2017
9	Test Cable	emci	EMC104-SM-SM-1 0000(1GHz-26.5G Hz)	C-68	Jun. 26, 2017
10	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Apr. 22, 2018
11	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 26, 2018
12	EMI Test Receiver	R&S	ESCI	100895	Mar. 26, 2018
13	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 07, 2017

6dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017

Conducted Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017

Antenna Conducted Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017

Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP40	100185	Sep. 04, 2017

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

ATTACHMENT A - CONDUCTED EMISSION

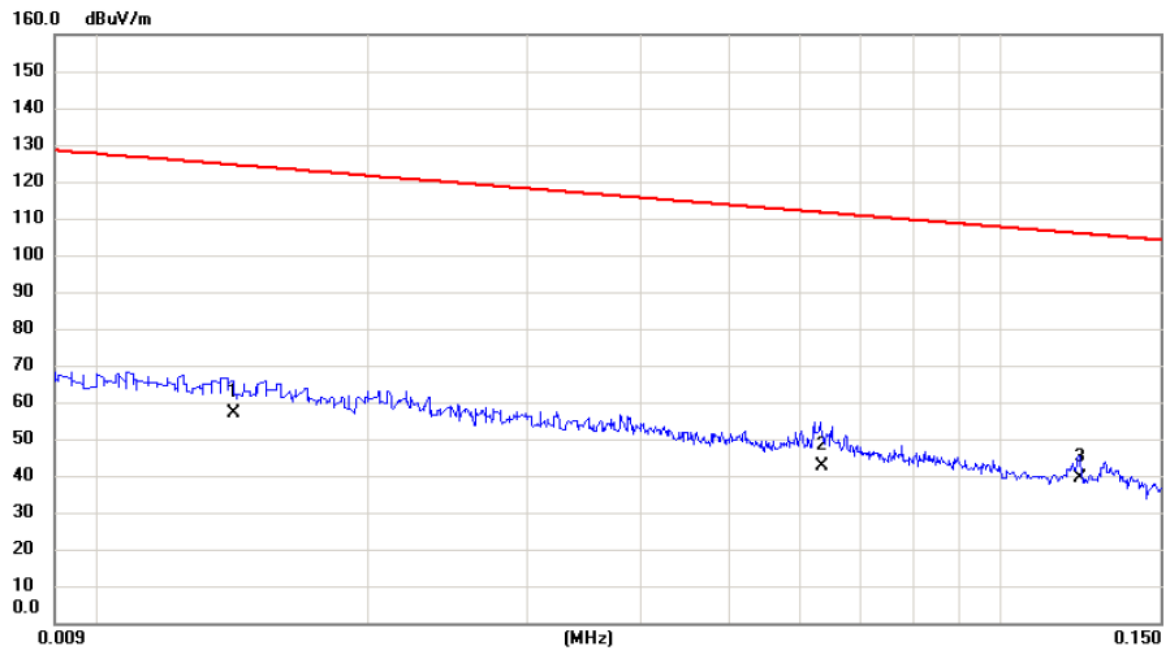
Test Mode: N/A

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

ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ)

Test Mode: TX Mode

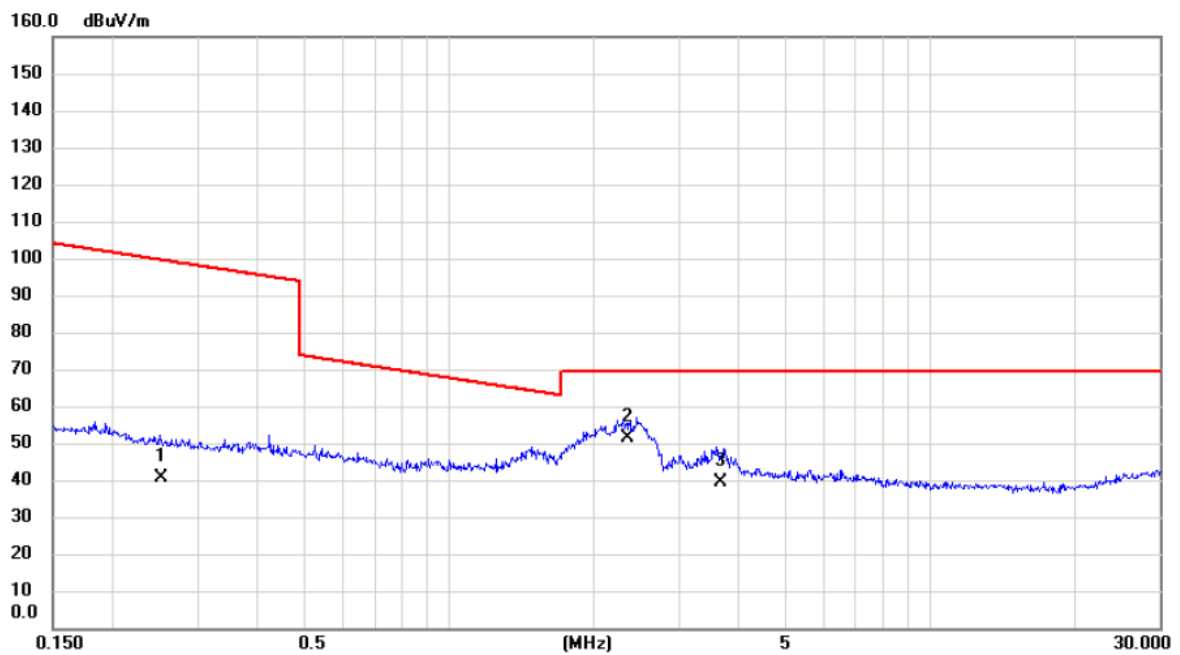
Ant 0°



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	dBuV	Factor	ment			Detector	Comment
1		0.014	36.83	20.37	57.20	124.56	-67.36	AVG	
2		0.063	24.30	18.46	42.76	111.58	-68.82	AVG	
3	*	0.122	22.21	17.32	39.53	105.87	-66.34	AVG	

Test Mode: TX Mode

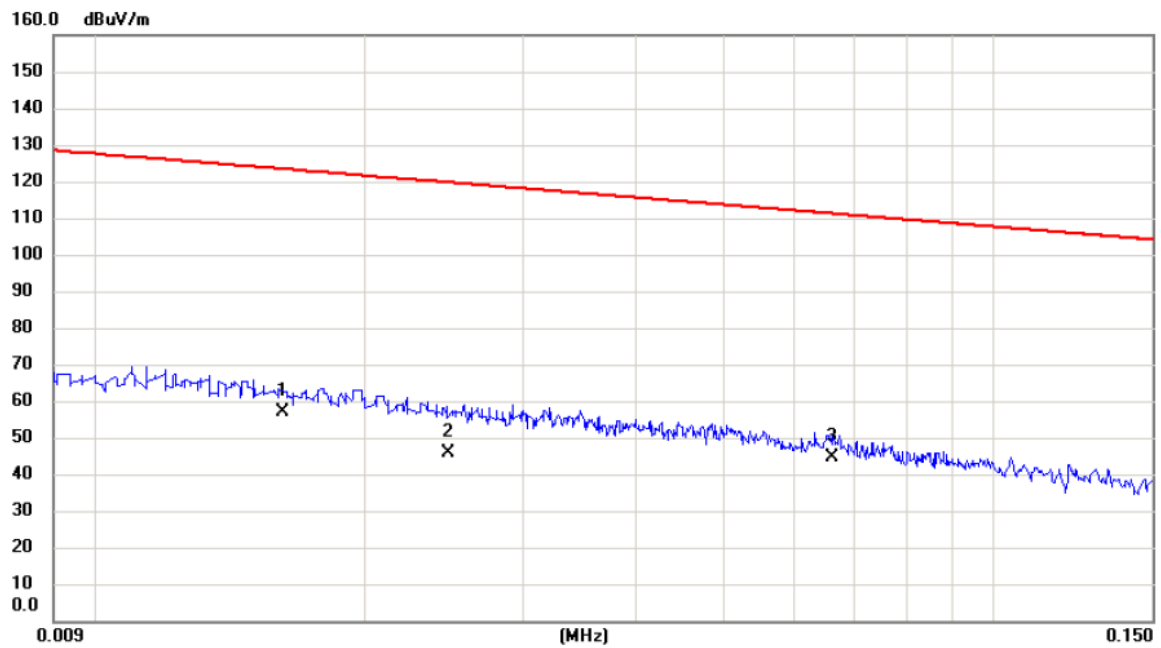
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.253	23.94	16.65	40.59	99.55	-58.96	AVG	
2	*	2.346	36.09	15.41	51.50	69.54	-18.04	QP	
3		3.662	24.26	15.05	39.31	69.54	-30.23	QP	

Test Mode: TX Mode

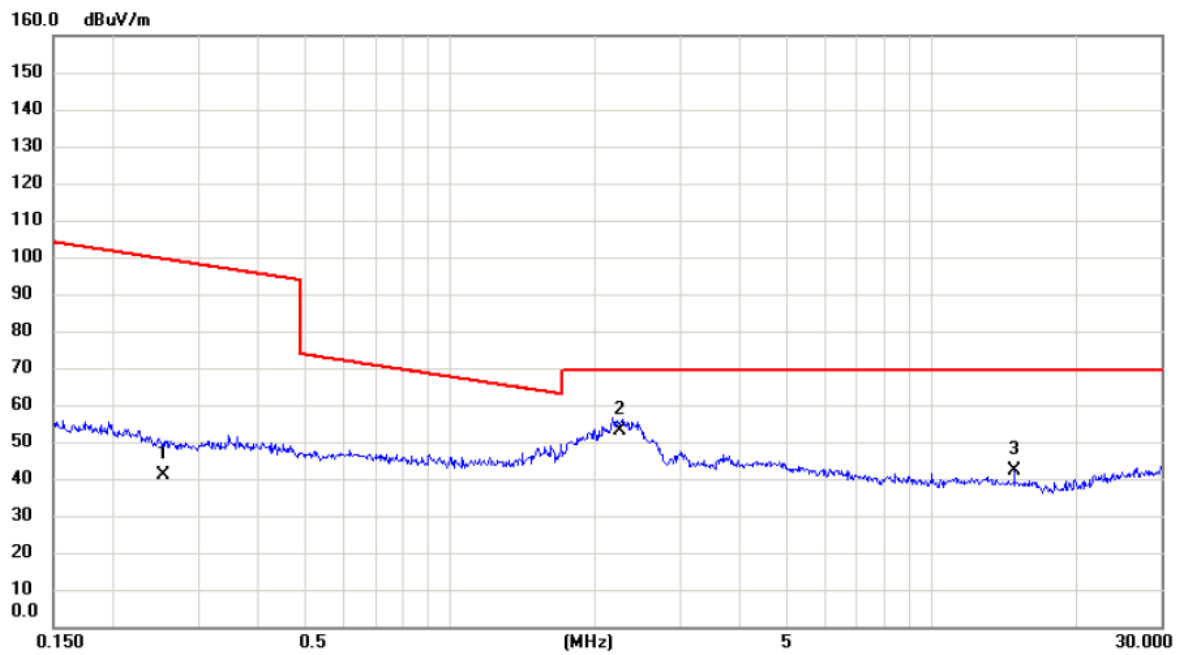
Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.016	36.81	20.11	56.92	123.41	-66.49	AVG	
2		0.025	26.51	19.48	45.99	119.75	-73.76	AVG	
3		0.066	26.17	18.41	44.58	111.19	-66.61	AVG	

Test Mode: TX Mode

Ant 90°

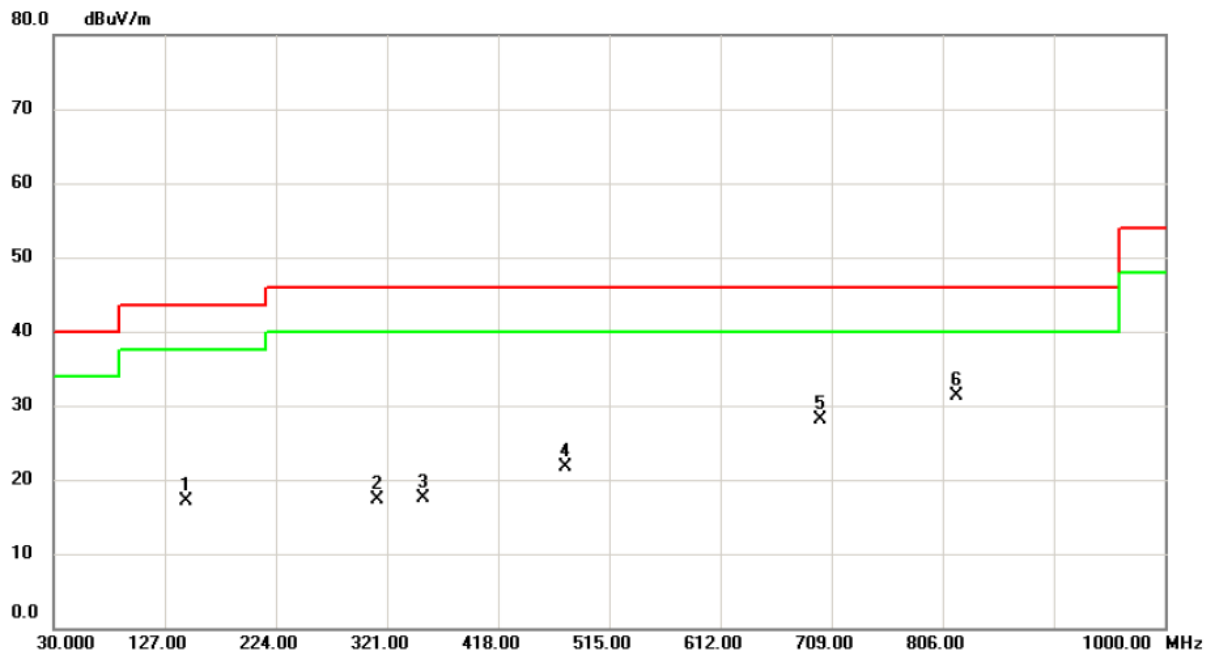


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.253	24.37	16.65	41.02	99.53	-58.51	AVG	
2	*	2.247	37.71	15.44	53.15	69.54	-16.39	QP	
3		14.834	28.21	14.08	42.29	69.54	-27.25	QP	

ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)

Test Mode: TX Mode_2403MHz

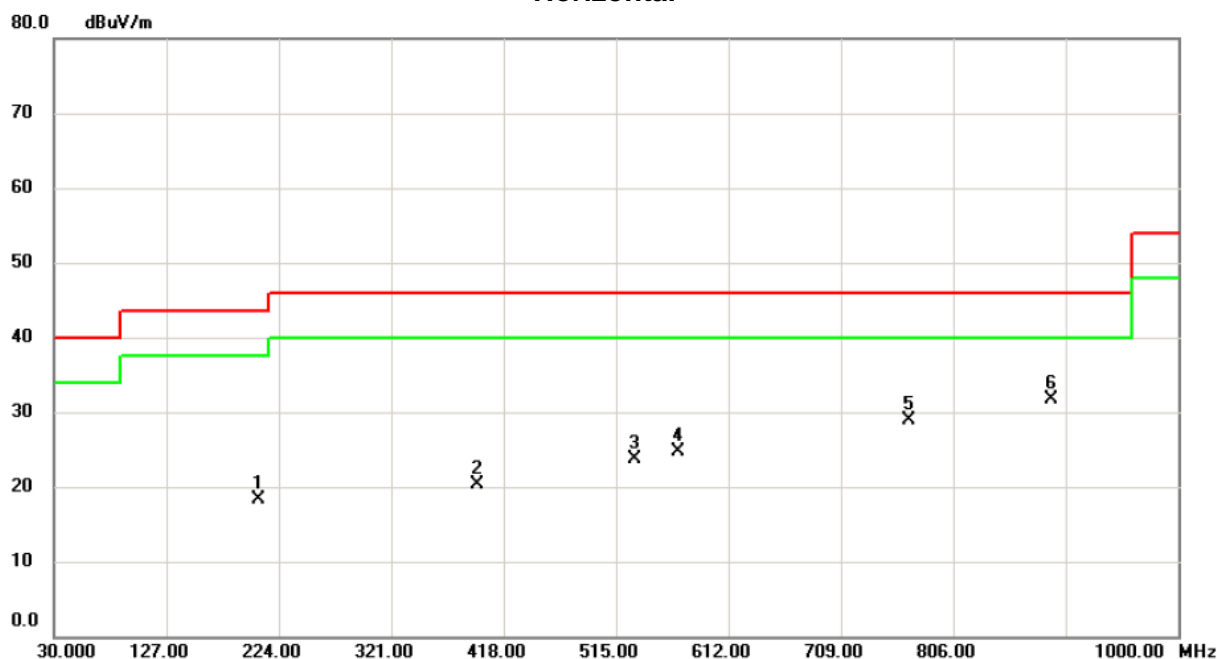
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		145.4300	30.44	-13.32	17.12	43.50	-26.38	peak	
2		312.2700	27.72	-10.42	17.30	46.00	-28.70	peak	
3		353.0100	28.60	-11.02	17.58	46.00	-28.42	peak	
4		477.1700	30.65	-8.93	21.72	46.00	-24.28	peak	
5		699.3000	30.29	-2.13	28.16	46.00	-17.84	peak	
6	*	817.6400	31.48	-0.27	31.21	46.00	-14.79	peak	

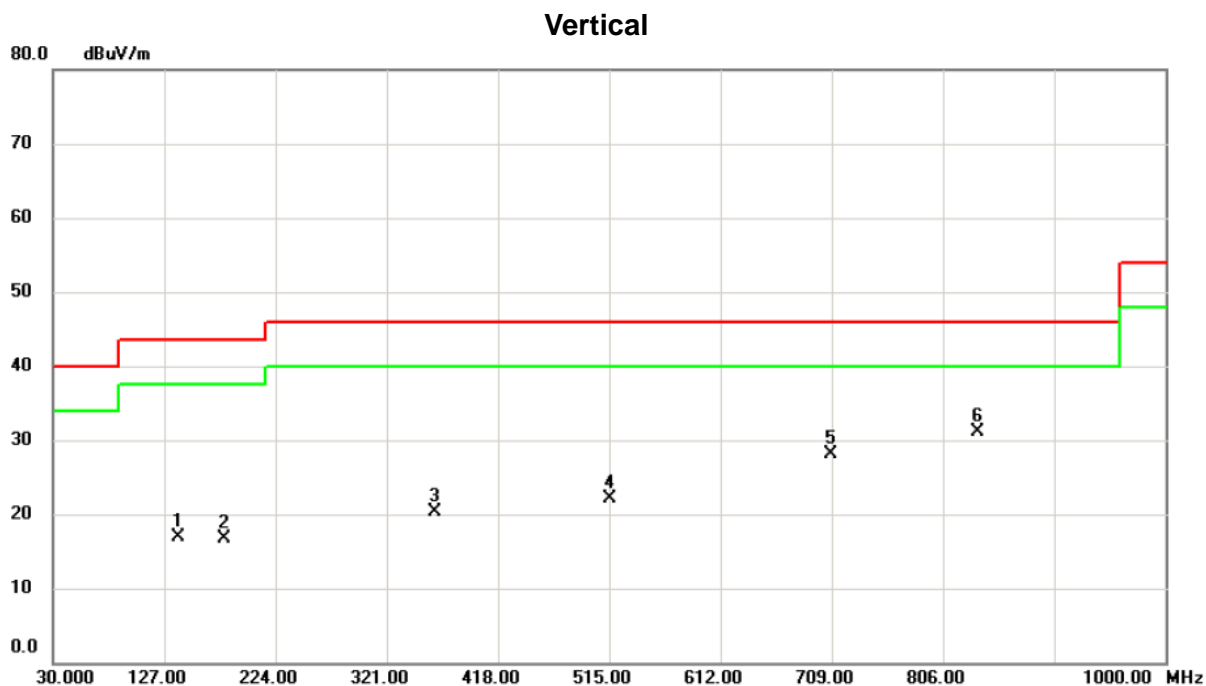
Test Mode: TX Mode_2403MHz

Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		206.5400	32.93	-14.58	18.35	43.50	-25.15	peak	
2		394.7200	28.49	-8.14	20.35	46.00	-25.65	peak	
3		530.5200	30.24	-6.56	23.68	46.00	-22.32	peak	
4		568.3500	30.23	-5.46	24.77	46.00	-21.23	peak	
5		768.1700	30.10	-1.16	28.94	46.00	-17.06	peak	
6	*	890.3900	29.82	1.90	31.72	46.00	-14.28	peak	

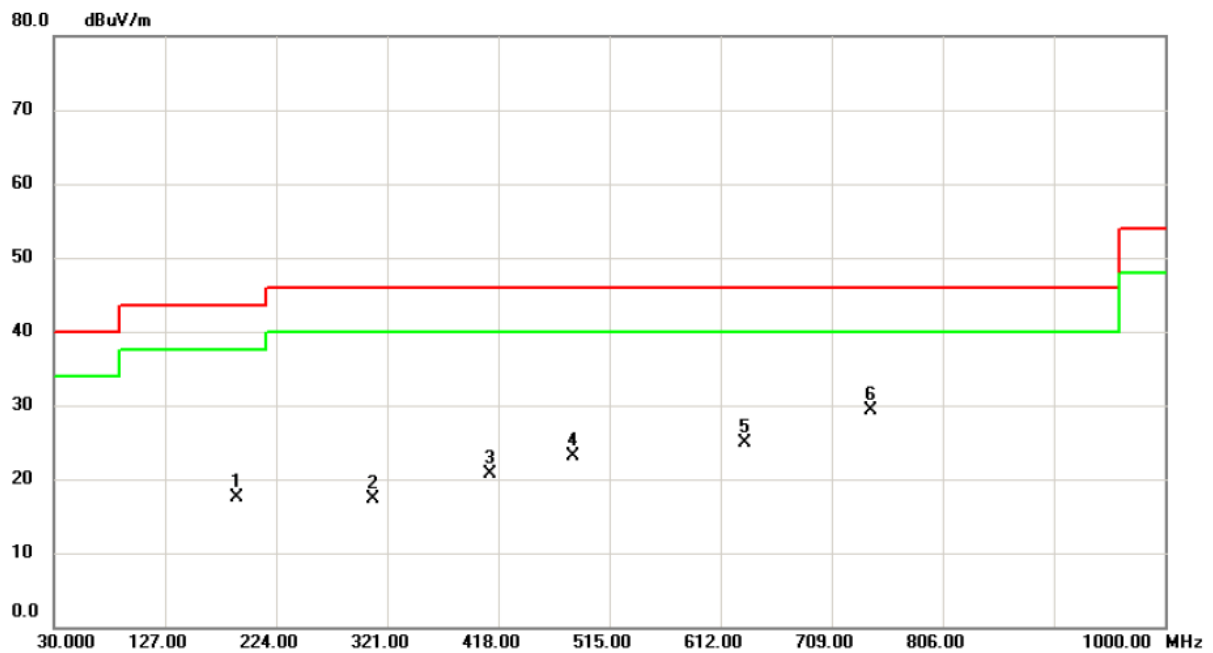
Test Mode: TX Mode_2440MHz



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		139.6100	30.56	-13.69	16.87	43.50	-26.63	peak	
2		179.3800	29.58	-12.80	16.78	43.50	-26.72	peak	
3		362.7100	30.64	-10.34	20.30	46.00	-25.70	peak	
4		515.9700	30.26	-8.06	22.20	46.00	-23.80	peak	
5		708.0300	30.24	-2.08	28.16	46.00	-17.84	peak	
6	*	836.0700	31.85	-0.83	31.02	46.00	-14.98	peak	

Test Mode: TX Mode_2440MHz

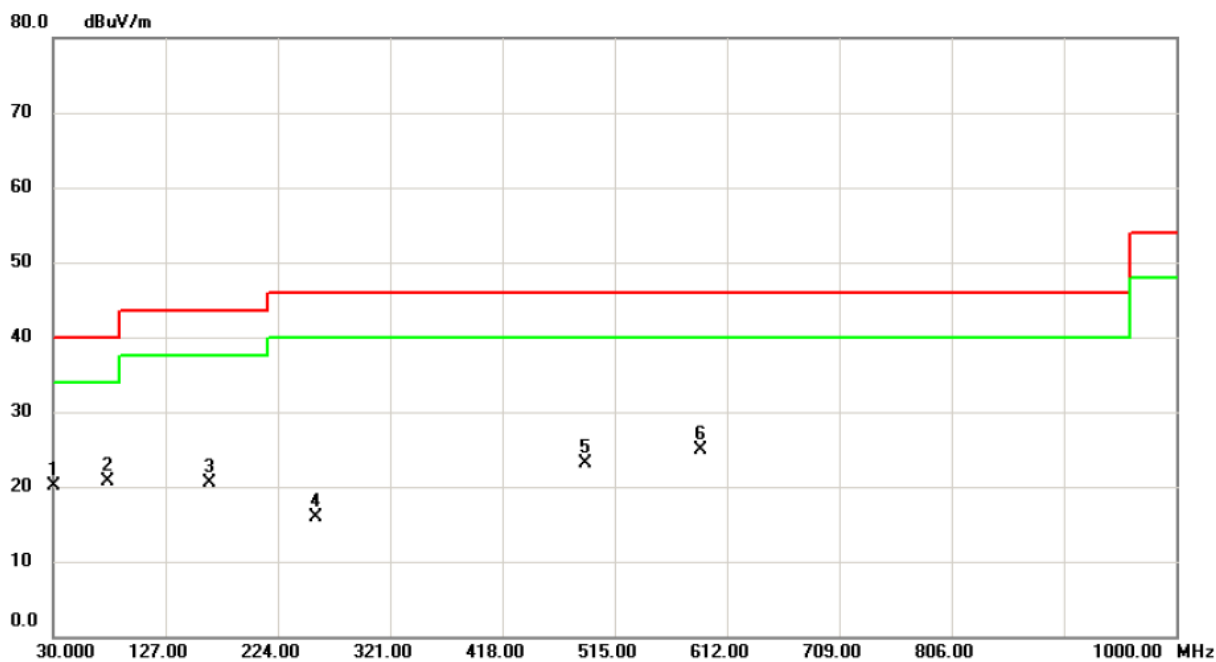
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		189.0800	31.31	-13.83	17.48	43.50	-26.02	peak	
2		308.3900	27.67	-10.34	17.33	46.00	-28.67	peak	
3		411.2100	28.48	-7.82	20.66	46.00	-25.34	peak	
4		482.9900	32.29	-9.13	23.16	46.00	-22.84	peak	
5		633.3400	30.00	-5.14	24.86	46.00	-21.14	peak	
6	*	742.9500	31.28	-1.99	29.29	46.00	-16.71	peak	

Test Mode: TX Mode_2479MHz

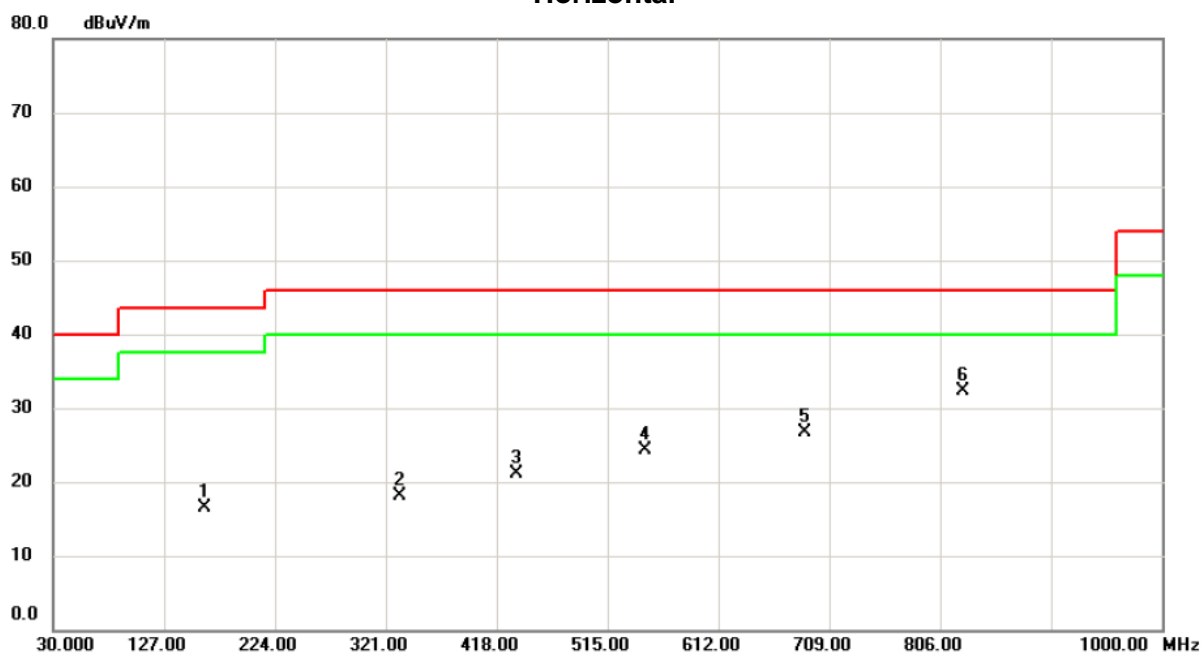
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		30.0000	34.15	-14.03	20.12	40.00	-19.88	peak	
2	*	77.5300	37.09	-16.31	20.78	40.00	-19.22	peak	
3		164.8300	32.64	-12.20	20.44	43.50	-23.06	peak	
4		256.9800	30.11	-14.21	15.90	46.00	-30.10	peak	
5		489.7800	32.41	-9.37	23.04	46.00	-22.96	peak	
6		588.7200	31.33	-6.49	24.84	46.00	-21.16	peak	

Test Mode: TX Mode_2479MHz

Horizontal

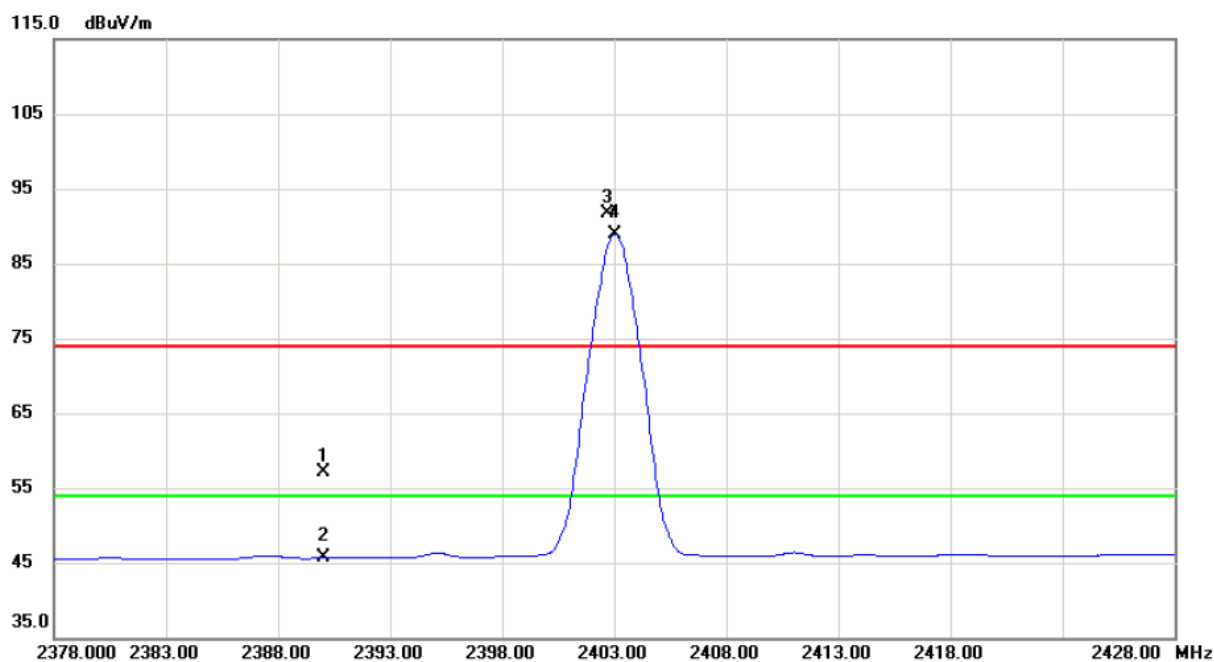


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		161.9200	28.61	-12.16	16.45	43.50	-27.05	peak	
2		333.6100	28.94	-10.87	18.07	46.00	-27.93	peak	
3		435.4600	29.10	-7.93	21.17	46.00	-24.83	peak	
4		547.9800	29.11	-4.75	24.36	46.00	-21.64	peak	
5		687.6600	29.29	-2.61	26.68	46.00	-19.32	peak	
6	*	825.4000	32.84	-0.51	32.33	46.00	-13.67	peak	

ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

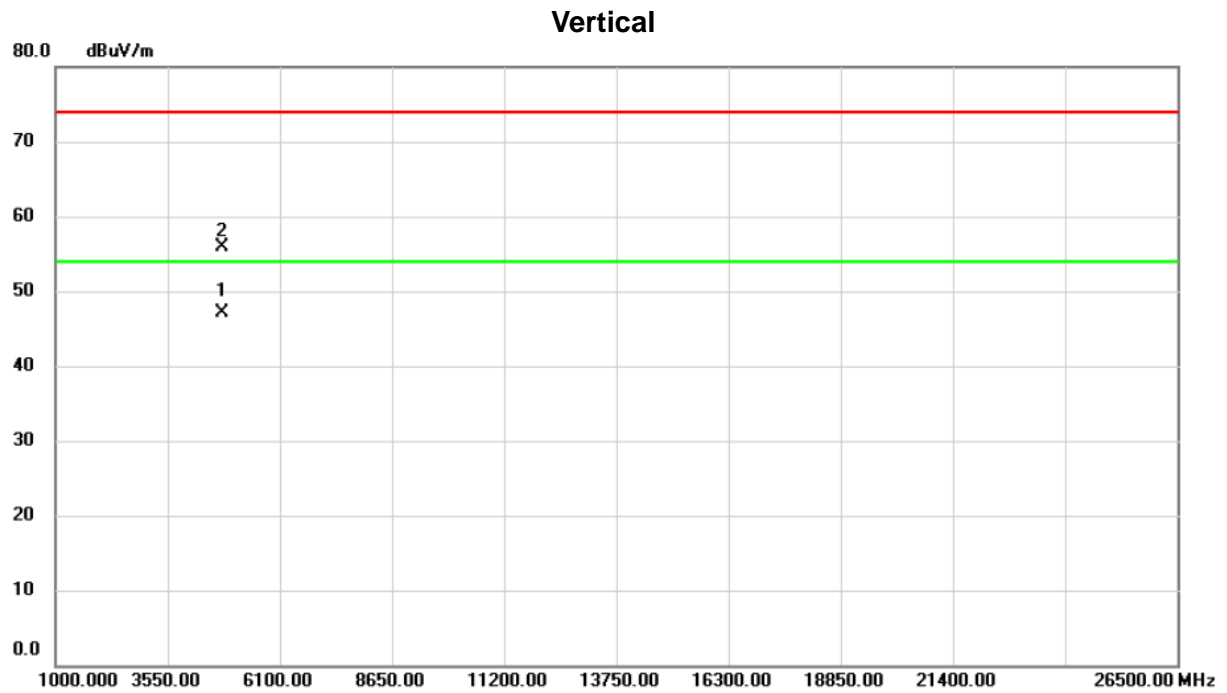
Test Mode	TX Mode_2403 MHz
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Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2390.000	24.69	32.37	57.06	74.00	-16.94	peak	
2		2390.000	13.24	32.37	45.61	54.00	-8.39	AVG	
3	X	2402.700	59.36	32.42	91.78	74.00	17.78	peak	No limit
4	*	2403.050	56.51	32.42	88.93	54.00	34.93	AVG	No limit

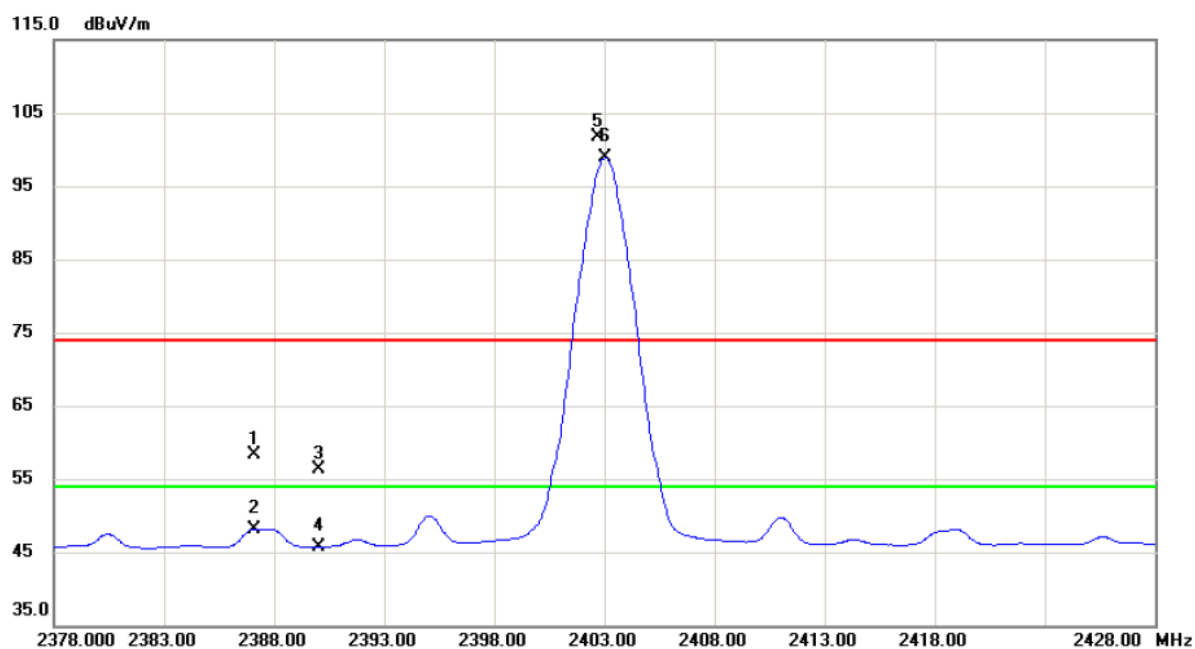
Test Mode	TX Mode_2403 MHz
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4805.500	42.38	4.78	47.16	54.00	-6.84	AVG	
2		4805.907	51.17	4.77	55.94	74.00	-18.06	peak	

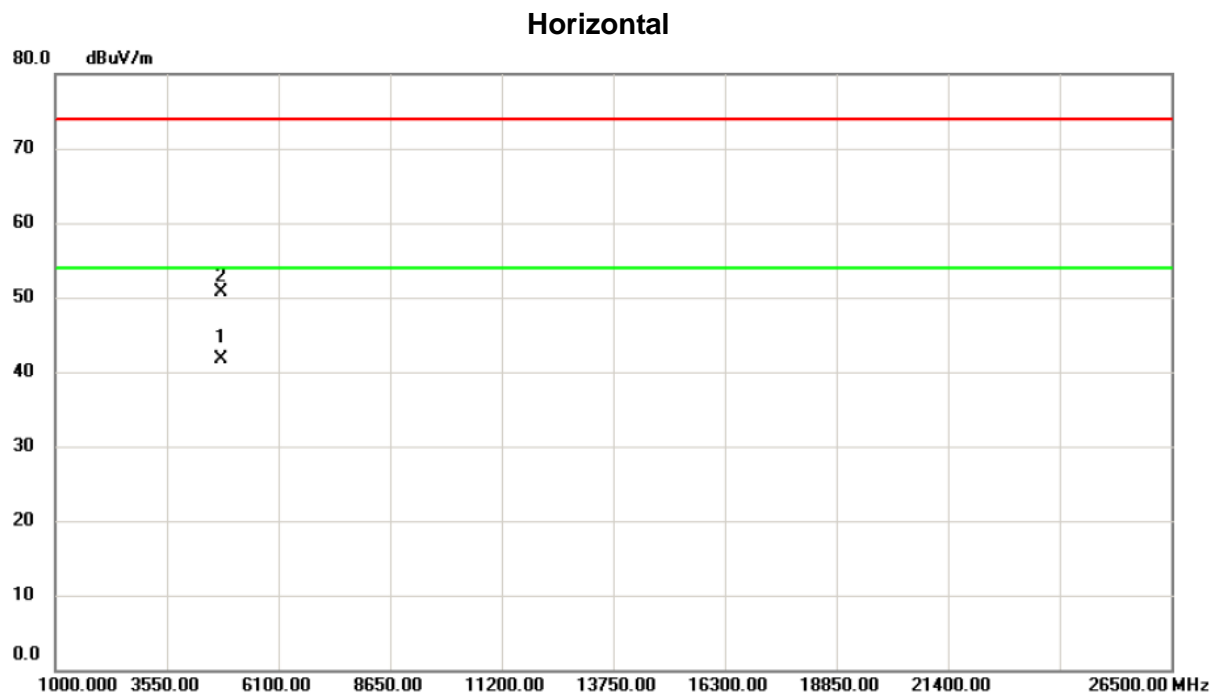
Test Mode	TX Mode_2403 MHz
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Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2387.100	26.02	32.37	58.39	74.00	-15.61	peak	
2		2387.100	15.82	32.37	48.19	54.00	-5.81	AVG	
3		2390.000	23.95	32.37	56.32	74.00	-17.68	peak	
4		2390.000	13.35	32.37	45.72	54.00	-8.28	AVG	
5	X	2402.700	69.21	32.42	101.63	74.00	27.63	peak	No limit
6	*	2403.050	66.47	32.42	98.89	54.00	44.89	AVG	No limit

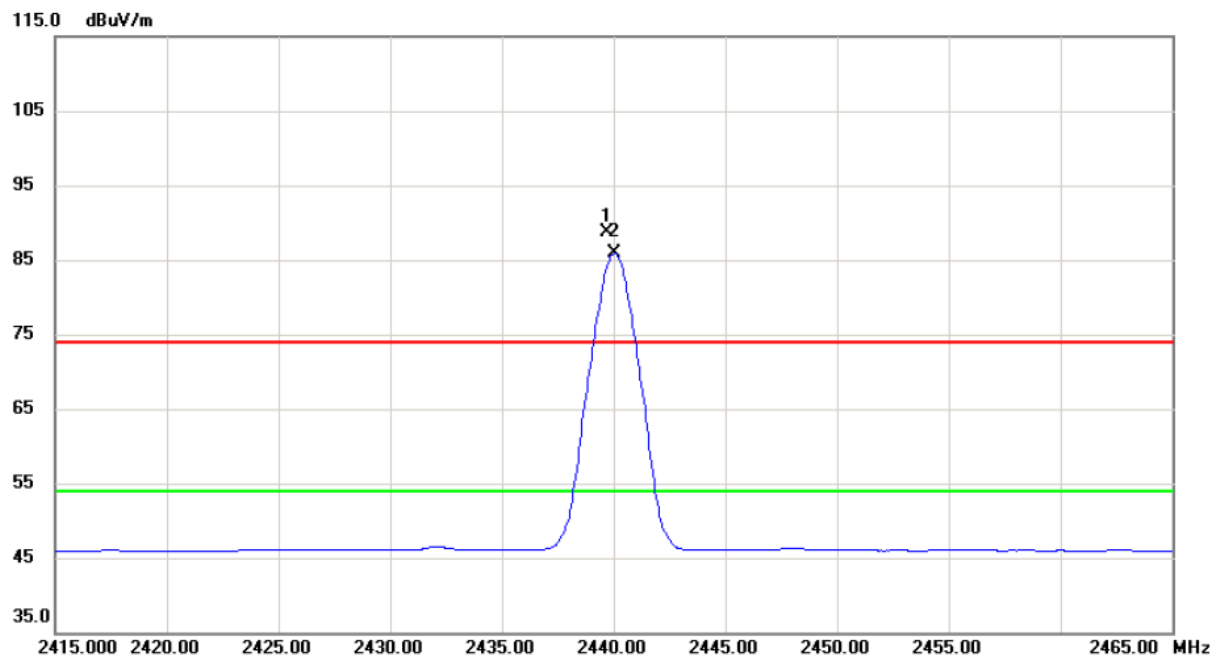
Test Mode	TX Mode_2403 MHz
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No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4805.224	36.88	4.78	41.66	54.00	-12.34	AVG	
2		4805.532	46.02	4.78	50.80	74.00	-23.20	peak	

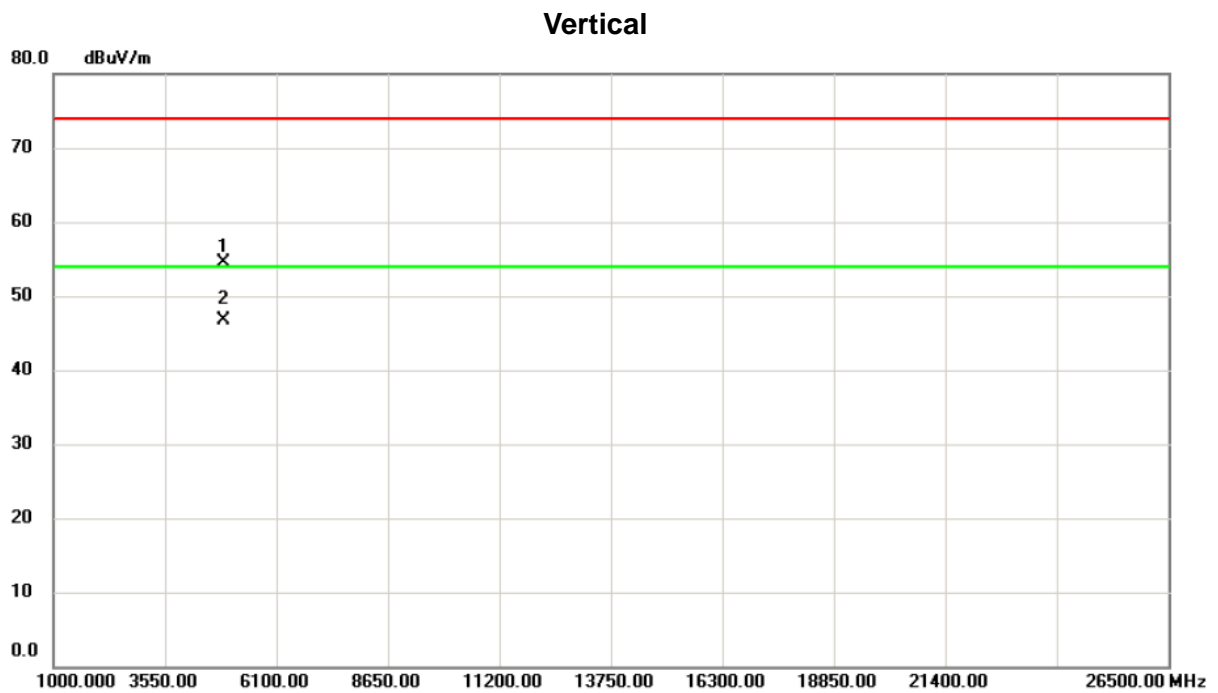
Test Mode	TX Mode_2440 MHz
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Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2439.700	56.15	32.55	88.70	74.00	14.70	peak	No limit
2	*	2440.050	53.32	32.55	85.87	54.00	31.87	AVG	No limit

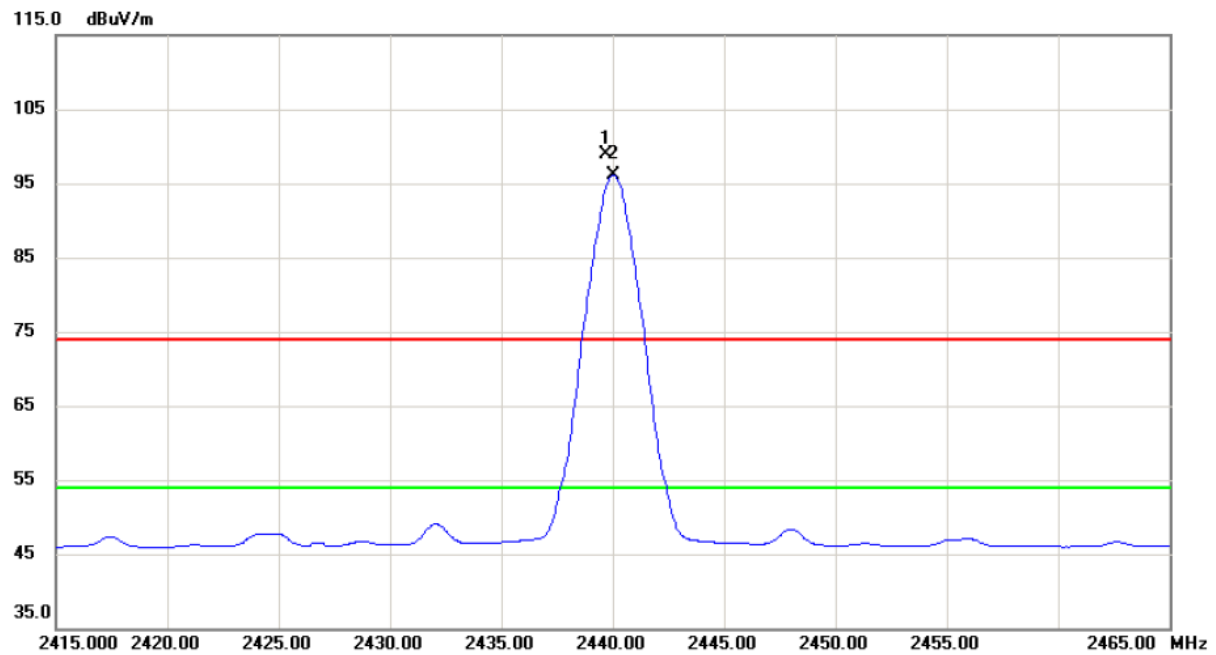
Test Mode	TX Mode_2440 MHz
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4879.324	49.39	5.09	54.48	74.00	-19.52	peak	
2	*	4879.572	41.62	5.09	46.71	54.00	-7.29	AVG	

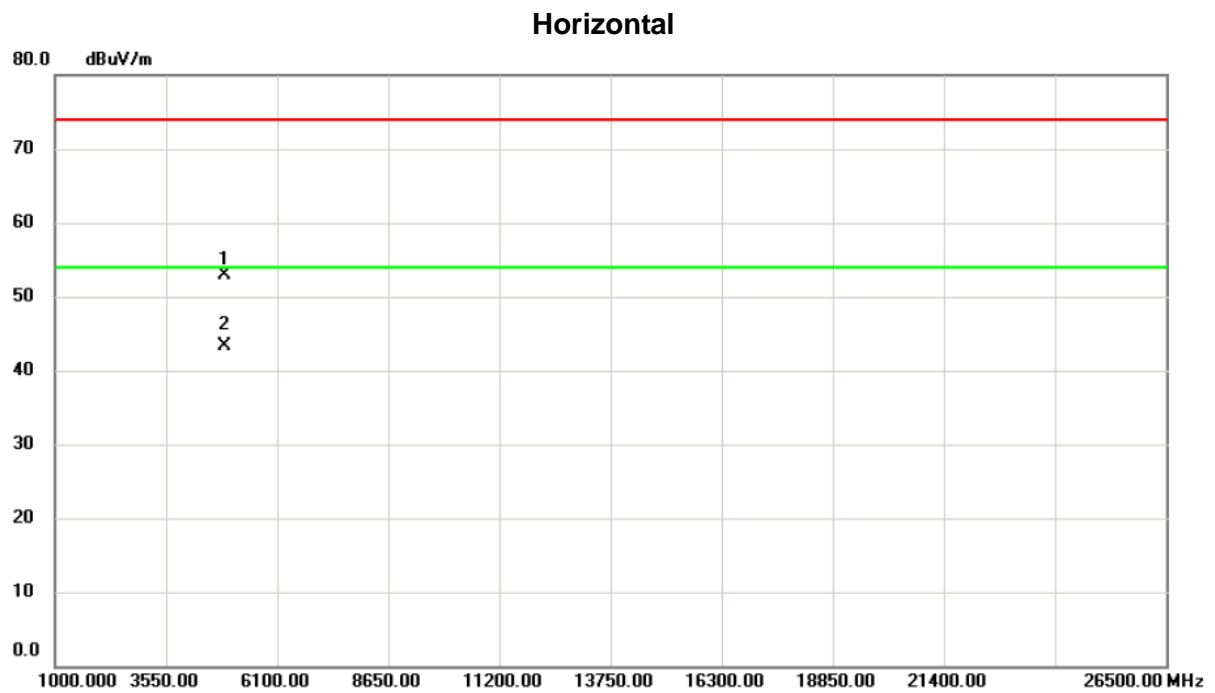
Test Mode TX Mode_2440 MHz

Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2439.700	66.36	32.55	98.91	74.00	24.91	peak	No limit
2	*	2440.050	63.58	32.55	96.13	54.00	42.13	AVG	No limit

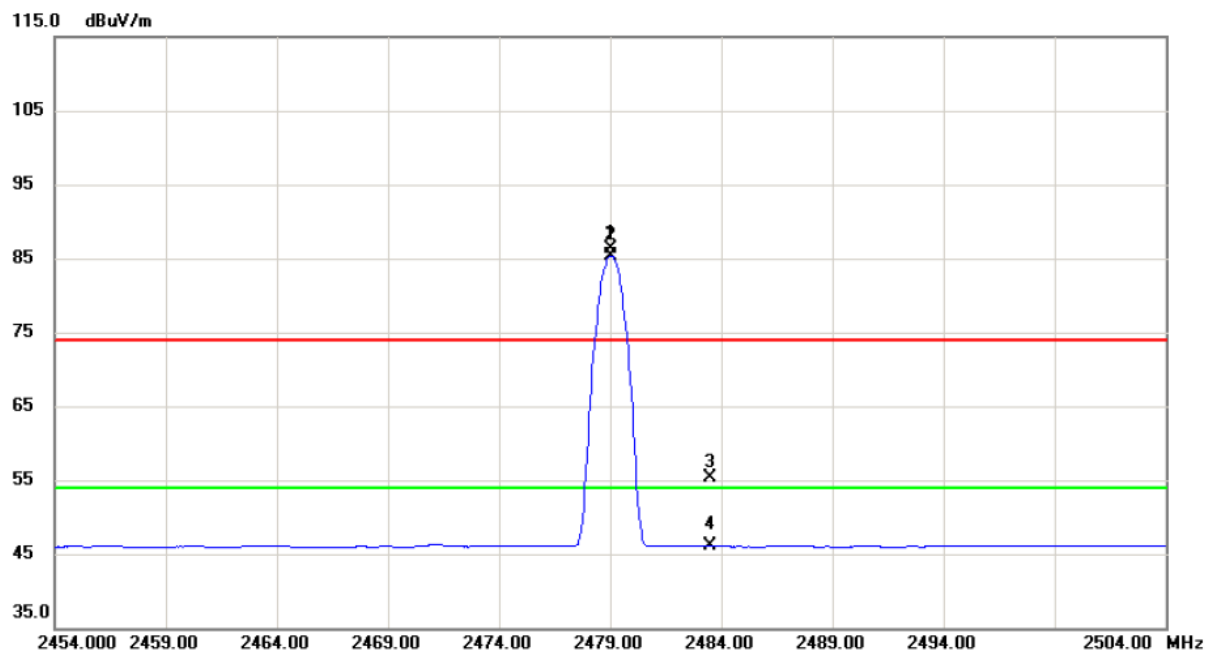
Test Mode	TX Mode_2440 MHz
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4879.292	47.76	5.09	52.85	74.00	-21.15	peak	
2	*	4880.857	38.21	5.09	43.30	54.00	-10.70	AVG	

Test Mode	TX Mode_2479 MHz
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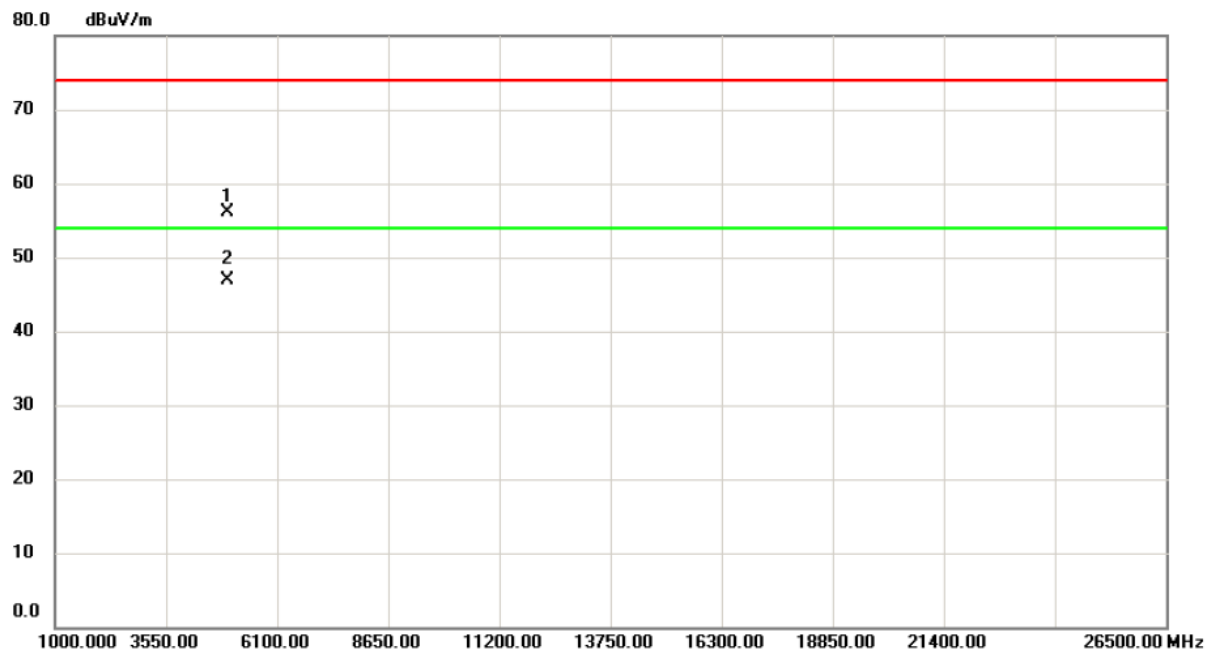
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2479.000	53.64	32.70	86.34	74.00	12.34	peak	No Limit
2	*	2479.050	52.69	32.70	85.39	54.00	31.39	AVG	No limit
3		2483.500	22.59	32.71	55.30	74.00	-18.70	peak	
4		2483.500	13.31	32.71	46.02	54.00	-7.98	AVG	

Test Mode	TX Mode_2479 MHz
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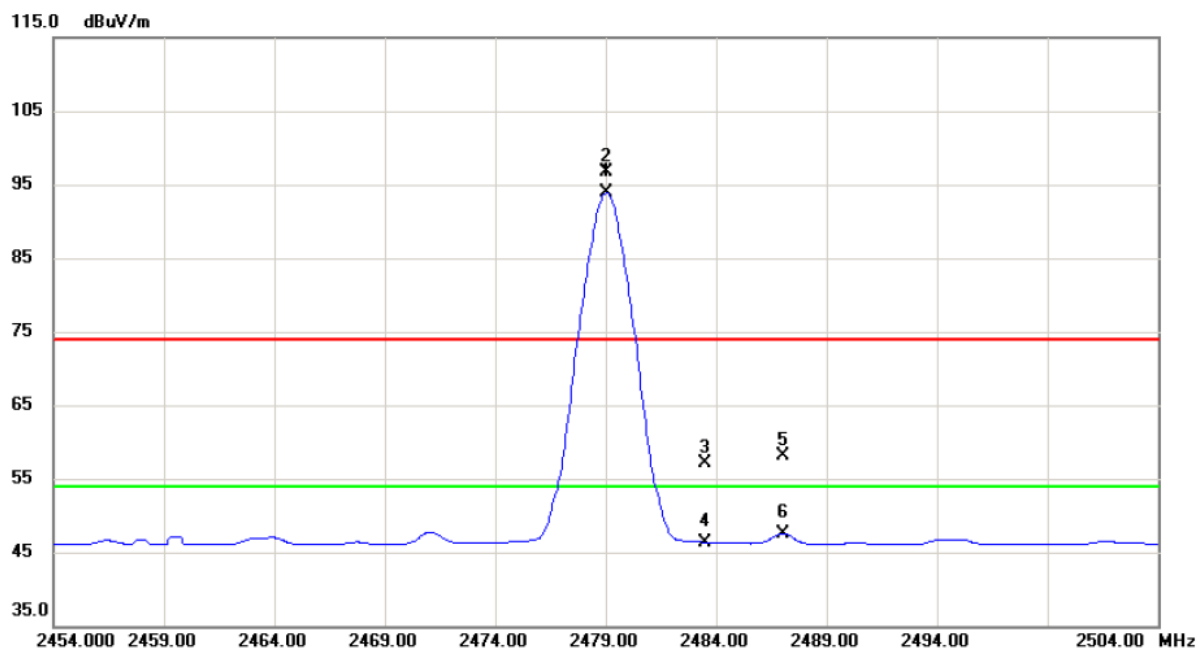
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4958.152	50.66	5.43	56.09	74.00	-17.91	peak	
2	*	4958.985	41.49	5.43	46.92	54.00	-7.08	AVG	

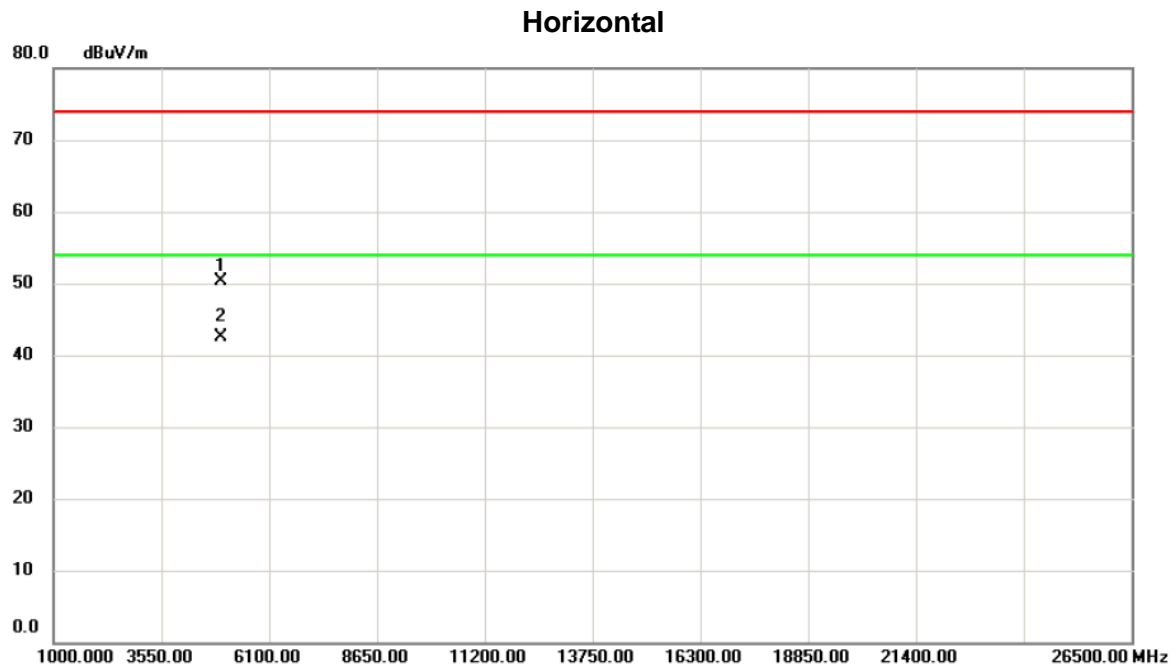
Test Mode TX Mode_2479 MHz

Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2479.000	61.15	32.70	93.85	54.00	39.85	AVG	No Limit
2	X	2479.050	63.94	32.70	96.64	74.00	22.64	peak	No Limit
3		2483.500	24.42	32.71	57.13	74.00	-16.87	peak	
4		2483.500	13.65	32.71	46.36	54.00	-7.64	AVG	
5		2487.000	25.43	32.73	58.16	74.00	-15.84	peak	
6		2487.000	14.83	32.73	47.56	54.00	-6.44	AVG	

Test Mode	TX Mode_2479 MHz
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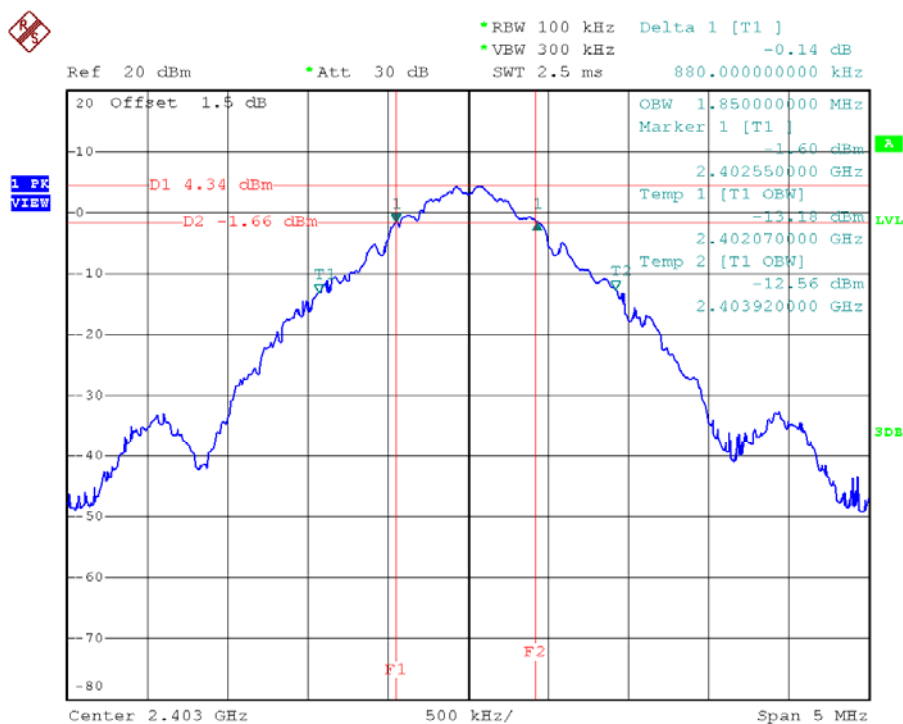
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4958.030	44.94	5.43	50.37	74.00	-23.63	peak	
2	*	4958.965	37.15	5.43	42.58	54.00	-11.42	AVG	

ATTACHMENT E - BANDWIDTH

Test Mode:	TX Mode
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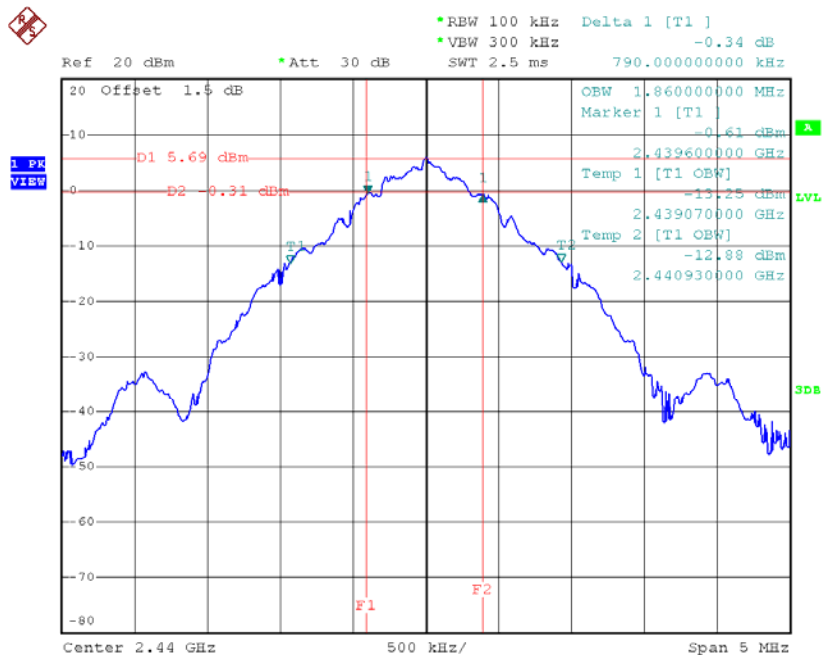
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2403	0.88	1.85	500	Complies
2440	0.79	1.86	500	Complies
2479	0.78	1.87	500	Complies

TX CH01



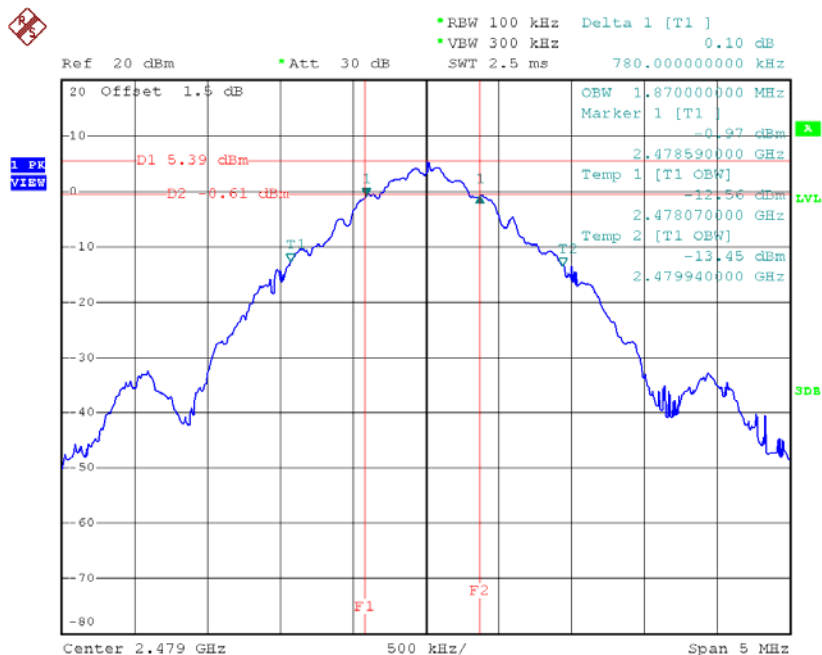
Date: 26.MAY.2017 14:18:26

TX CH38



Date: 26.MAY.2017 14:19:21

TX CH77

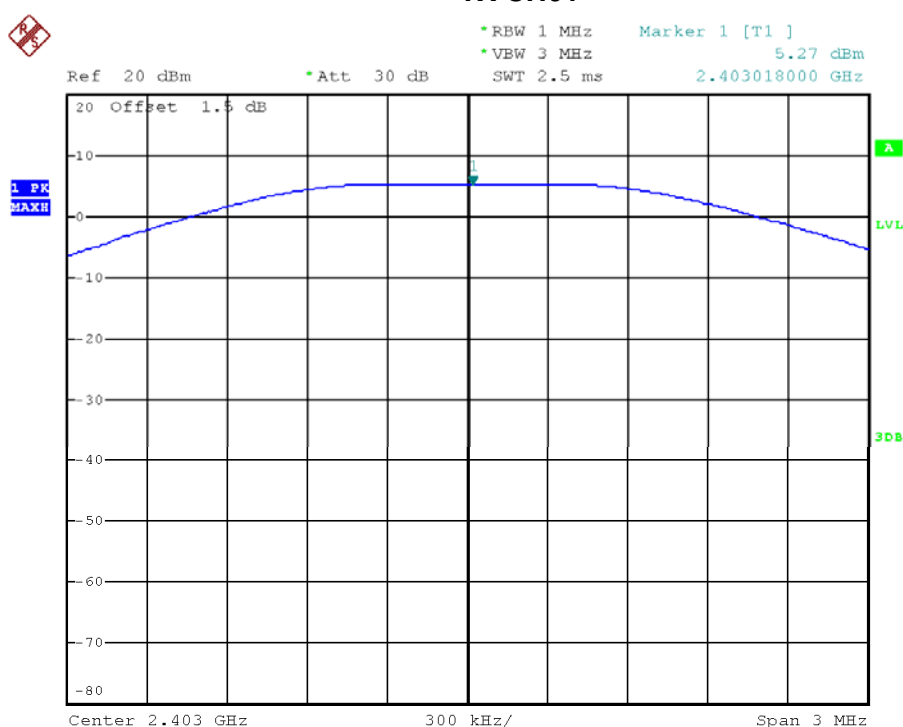


Date: 26.MAY.2017 14:20:15

ATTACHMENT F – CONDUCTD OUTPUT POWER TEST

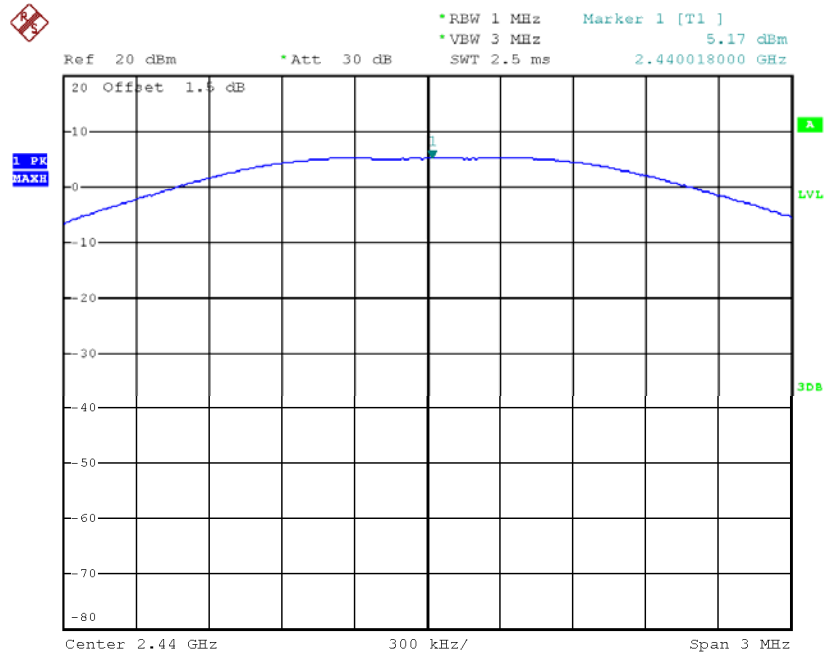
Test Mode					
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Result
2403	5.27	0.0034	30.00	1.00	Complies
2440	5.17	0.0033	30.00	1.00	Complies
2479	5.15	0.0033	30.00	1.00	Complies

TX CH01



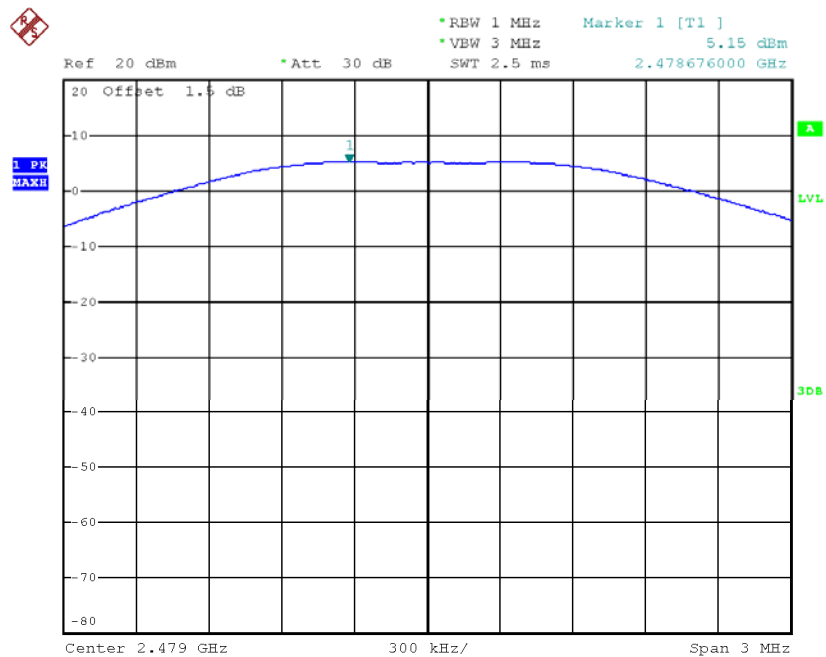
Date: 14.JUN.2017 16:17:34

TX CH38



Date: 14.JUN.2017 16:17:52

TX CH77

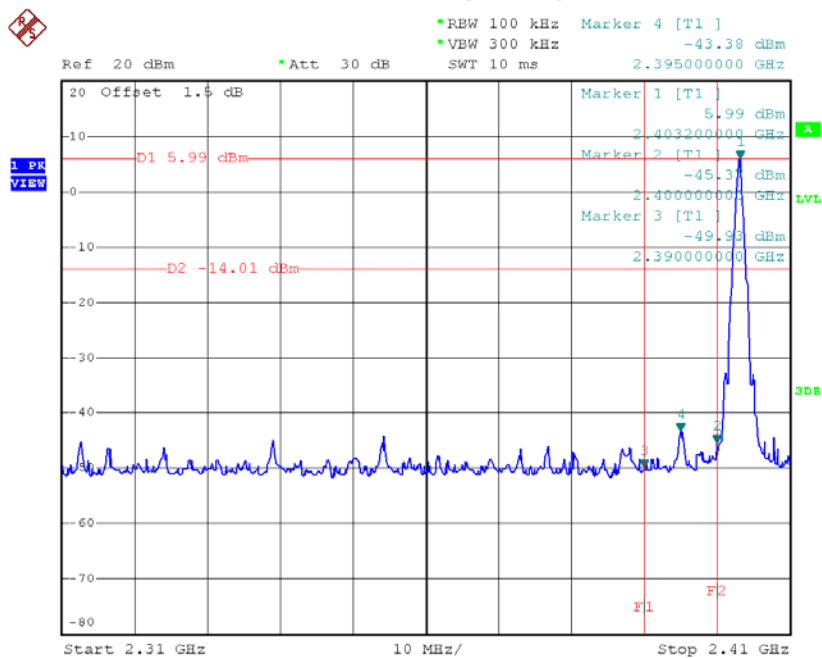


Date: 14.JUN.2017 16:18:39

ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION

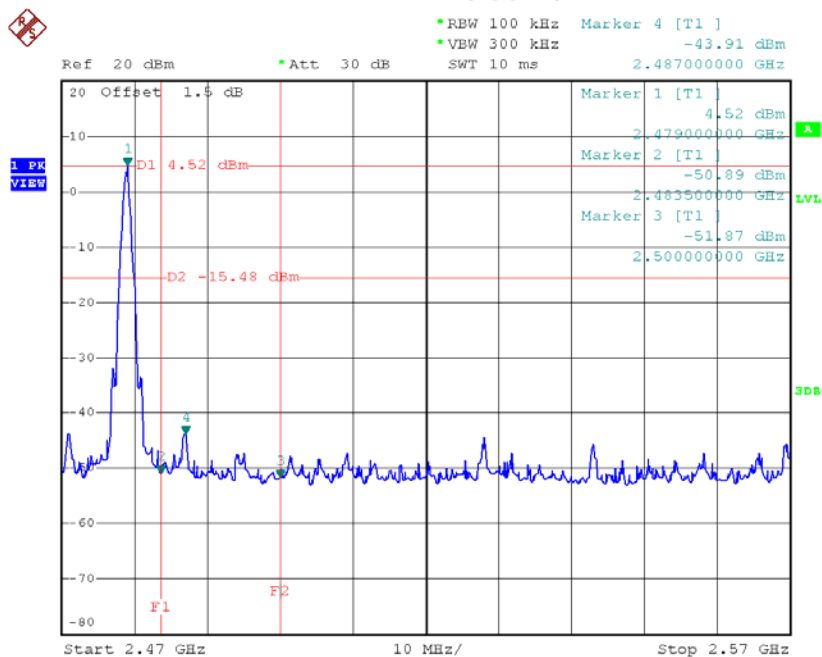
Test Mode : CH01, CH38 , CH77

CH01 (Lower)



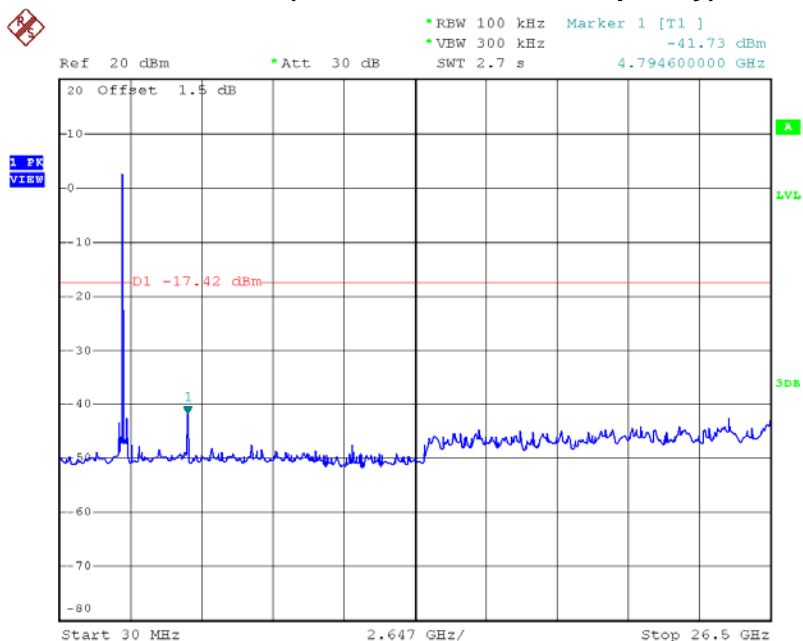
Date: 26.MAY.2017 14:22:43

CH77 (upper)



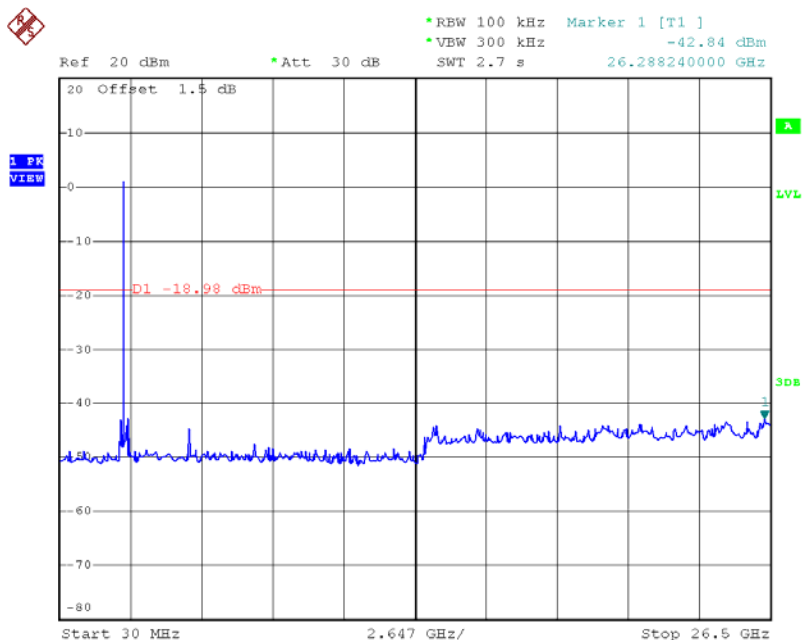
Date: 26.MAY.2017 14:28:38

CH01 (10 Harmonic of the frequency)



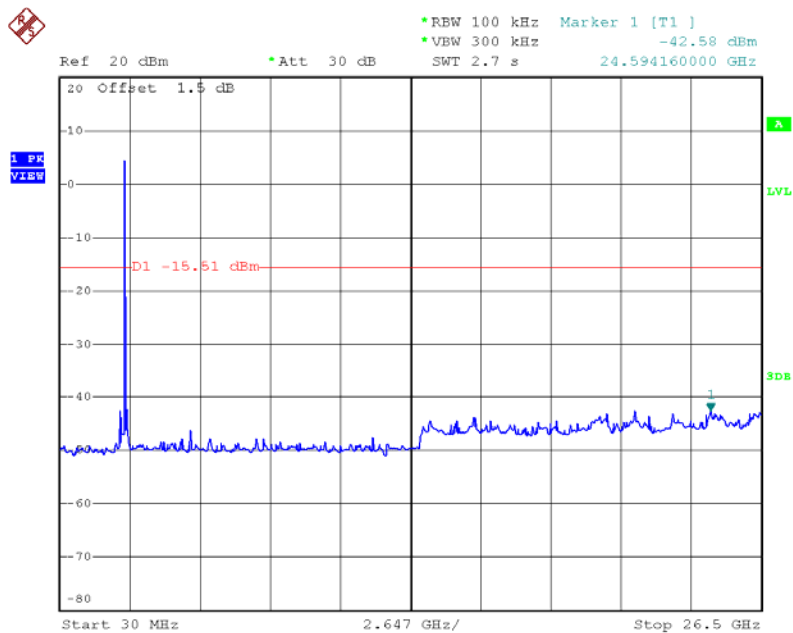
Date: 26.MAY.2017 14:30:43

CH39 (10 Harmonic of the frequency)



Date: 26.MAY.2017 14:31:06

CH79 (10 Harmonic of the frequency)



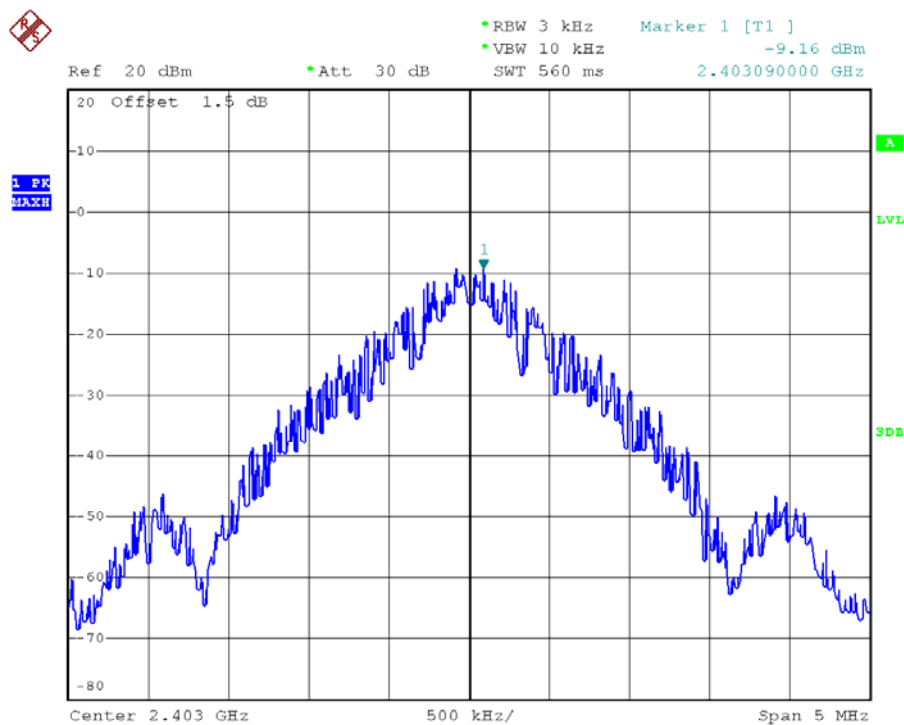
Date: 26.MAY.2017 14:30:16

ATTACHMENT H - POWER SPECTRAL DENSITY TEST

Test Mode:	TX Mode
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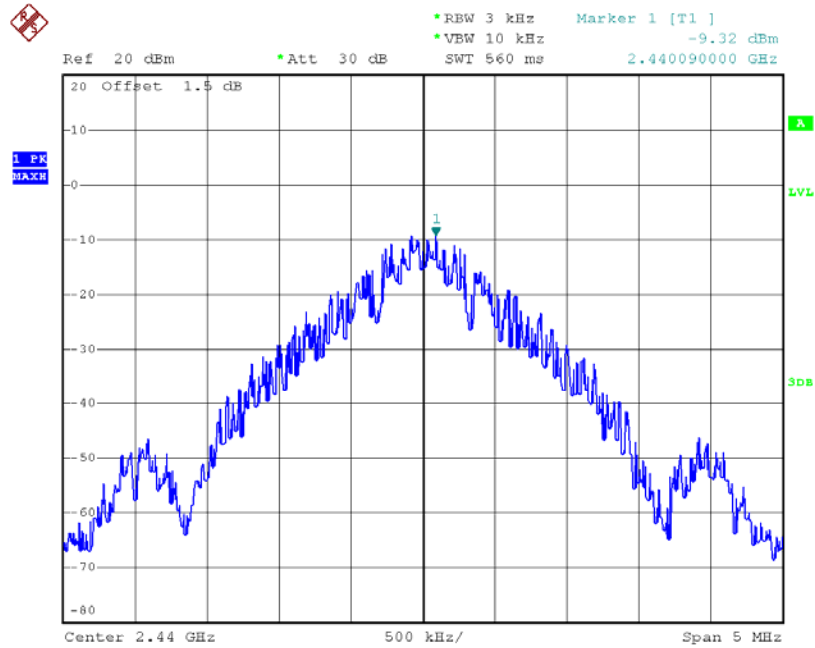
Frequency (MHz)	Power Density (dBm/3kHz)	Power Density (mW/3kHz)	Max. Limit (dBm/3kHz)	Result
2403	-9.16	0.12	8.00	Complies
2440	-9.32	0.12	8.00	Complies
2479	-9.15	0.12	8.00	Complies

TX CH01



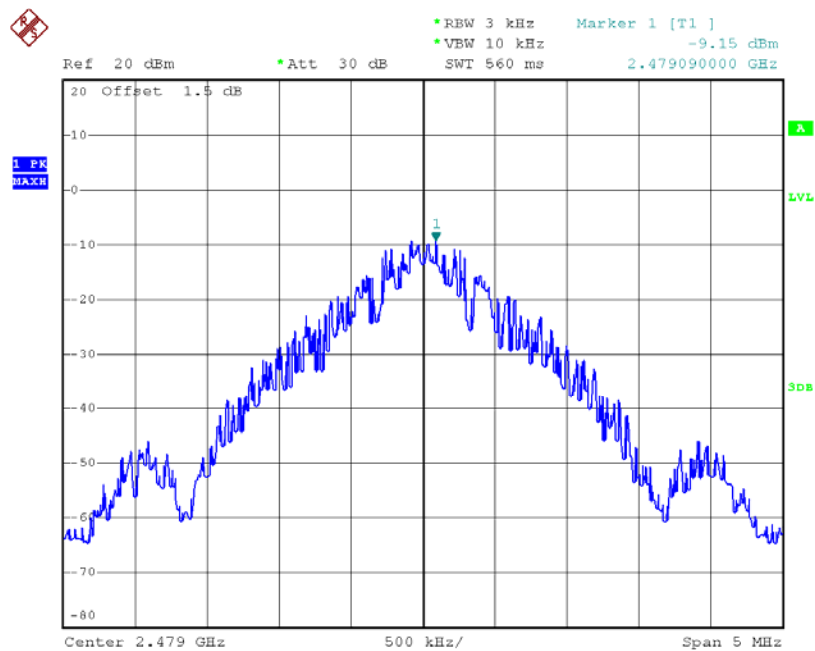
Date: 26.MAY.2017 14:11:25

TX CH38



Date: 26.MAY.2017 14:11:32

TX CH77



Date: 26.MAY.2017 14:11:19