

FCC Radio Test Report

FCC ID: RWO-RC30021203

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

Project No. : 1612C189
Equipment : Gaming Mouse
Test Model : RC30-021203
Applicant : Razer Inc.
Address : 201 3rd Street, Suite 900, San Francisco, CA 94103

Date of Receipt : Dec. 16, 2016
Date of Test : Dec. 16, 2016 ~ Dec. 27, 2016
Issued Date : Dec. 28, 2016
Tested by : BTL Inc.

Testing Engineer

:

Shawn Xiao

(Shawn Xiao)

Technical Manager

:

David Mao

(David Mao)

Authorized Signatory

:

Steven Lu

(Steven Lu)

B T L I N C .

No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan,
Guangdong, China.

TEL: +86-769-8318-3000 FAX: +86-769-8319-6000

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

BTL's report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **BTL-self**, extracts from the test report shall not be reproduced except in full with **BTL's** authorized written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Table of Contents	Page
1 . CERTIFICATION	6
2 . SUMMARY OF TEST RESULTS	7
2.1 TEST FACILITY	8
2.2 MEASUREMENT UNCERTAINTY	8
3 . GENERAL INFORMATION	9
3.1 DESCRIPTION OF EUT	9
3.2 DESCRIPTION OF TEST MODES	11
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	12
3.5 DESCRIPTION OF SUPPORT UNITS	12
4 . EMC EMISSION TEST	13
4.1 CONDUCTED EMISSION MEASUREMENT	13
4.1.1 POWER LINE CONDUCTED EMISSION LIMITS	13
4.1.2 TEST PROCEDURE	13
4.1.3 DEVIATION FROM TEST STANDARD	13
4.1.4 TEST SETUP	14
4.1.5 EUT OPERATING CONDITIONS	14
4.1.6 EUT TEST CONDITIONS	14
4.1.7 TEST RESULTS	14
4.2 RADIATED EMISSION MEASUREMENT	15
4.2.1 RADIATED EMISSION LIMITS	15
4.2.2 TEST PROCEDURE	17
4.2.3 DEVIATION FROM TEST STANDARD	17
4.2.4 TEST SETUP	18
4.2.5 EUT OPERATING CONDITIONS	19
4.2.6 EUT TEST CONDITIONS	19
4.2.7 TEST RESULTS (9KHZ TO 30MHZ)	19
4.2.8 TEST RESULTS (30MHZ TO 1000MHZ)	19
4.2.9 TEST RESULTS (ABOVE 1000 MHZ)	20
5 . BANDWIDTH TEST	21
5.1 TEST PROCEDURE	21
5.2 DEVIATION FROM STANDARD	21
5.3 TEST SETUP	21
5.4 EUT OPERATION CONDITIONS	21
5.5 EUT TEST CONDITIONS	21
5.6 TEST RESULTS	21
6 . MEASUREMENT INSTRUMENTS LIST	22
ATTACHMENT A - CONDUCTED EMISSION	23

Table of Contents

Page

ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ)	26
ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)	31
ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)	38
ATTACHMENT E - BANDWIDTH	51

REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1612C189	Original Issue.	Dec. 28, 2016

1. CERTIFICATION

Equipment : Gaming Mouse
Brand Name : RAZER
Model Name : RC30-021203
Applicant : Razer Inc.
Manufacturer : Razer (Asia-Pacific) Pte.,Ltd.
Address : 514 Chai Chee Lane #07-01 ~ 06 Singapore 469029
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 Park, Shenzhen 518057, China
Date of Test : Dec. 16, 2016 ~ Dec. 27, 2016
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-1-1612C189) 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, Subpart C (15.249)			
Standard(s) Section	Test Item	Judgment	Remark
15.207(a)	Conducted Emission	PASS	
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: 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 measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

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. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)
DG-C02	CISPR	150 KHz ~ 30MHz	1.94

B. 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	Gaming Mouse	
Brand Name	RAZER	
Model Name	RC30-021203	
Model Difference	The system's model name is RZ01-0212, and the system is contain a Gaming Mouse (Model name: RC30-021203) and USB Dongle (Model name: DGRFG5).	
Product Description	Operation Frequency	2402-2480 MHz
	Modulation Technology	GFSK
	Bit Rate of Transmitter	1 Mbps
	Field Strength	96.69 dBuV/m (Peak Max) 90.78 dBuV/m (AVG Max)
Power Source	#1 Supplied from Lithium Polymer Battery. Model: PL343850 #2 Supplied from USB port for charging.	
EUT Power Rating	#1 DC 3.8V, 800mAh #2 DC 5V, 500mA	

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	28	2429	55	2456
02	2403	29	2430	56	2457
03	2404	30	2431	57	2458
04	2405	31	2432	58	2459
05	2406	32	2433	59	2460
06	2407	33	2434	60	2461
07	2408	34	2435	61	2462
08	2409	35	2436	62	2463
09	2410	36	2437	63	2464
10	2411	37	2438	64	2465
11	2412	38	2439	65	2466
12	2413	39	2440	66	2467
13	2414	40	2441	67	2468
14	2415	41	2442	68	2469
15	2416	42	2443	69	2470
16	2417	43	2444	70	2471
17	2418	44	2445	71	2472
18	2419	45	2446	72	2473
19	2420	46	2447	73	2474
20	2421	47	2448	74	2475
21	2422	48	2449	75	2476
22	2423	49	2450	76	2477
23	2424	50	2451	77	2478
24	2425	51	2452	78	2479
25	2426	52	2453	79	2480
26	2427	53	2454		
27	2428	54	2455		

3. Table for Filed Antenna

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	YAGEO	ANT5320LL24R 2400A	Chip	N/A	1.99

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 Conducted Test	
Final Test Mode	Description
Mode 1	TX Mode

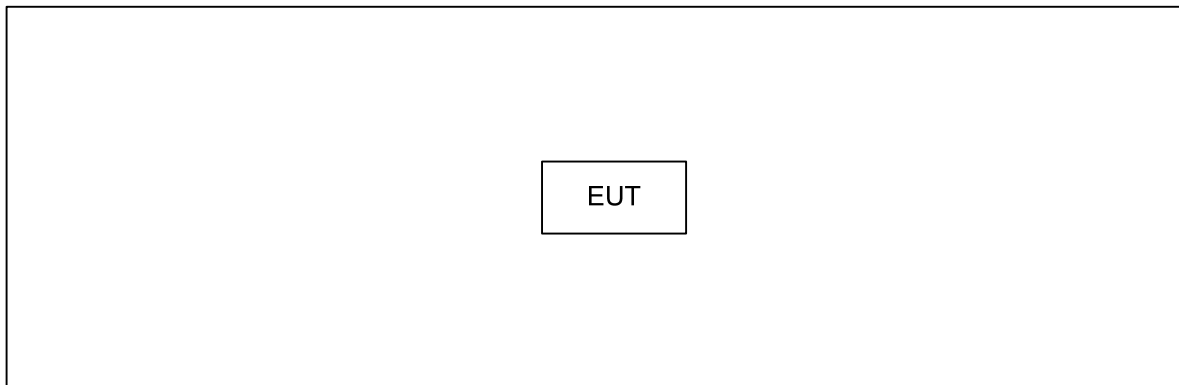
For Radiated Test	
Final Test Mode	Description
Mode 1	TX Mode NOTE (1)

Note:

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

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated TX Mode:



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 (dBμV)	
	Quasi-peak	Average
0.15 -0.	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

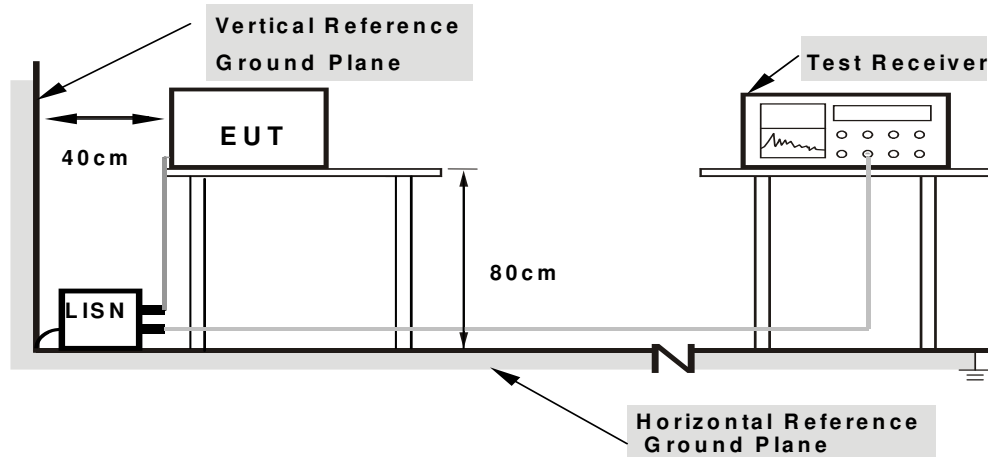
4.1.2 TEST PROCEDURE

- 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 cm 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: 23°C

Relative Humidity: 60%

Test Voltage: AC 120V/60Hz

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 (FCC 15.209)

Frequencies (MHz)	Field Strength (micorvolts/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 μ V/m (94 dB μ V/m) @ 3 m	2400-2483.5
Field strength of harmonics 500 μ V/m (54 dB μ 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

4.2.2 TEST PROCEDURE

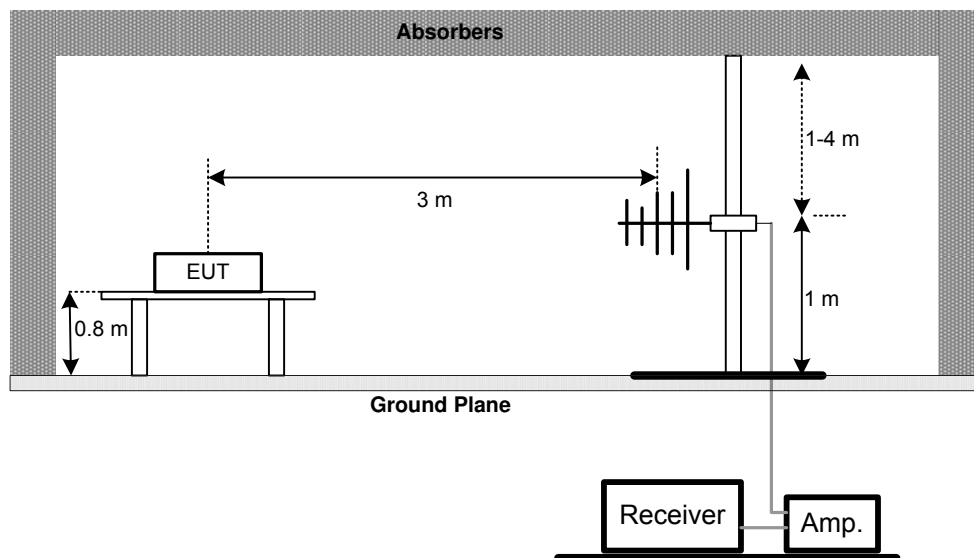
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance 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

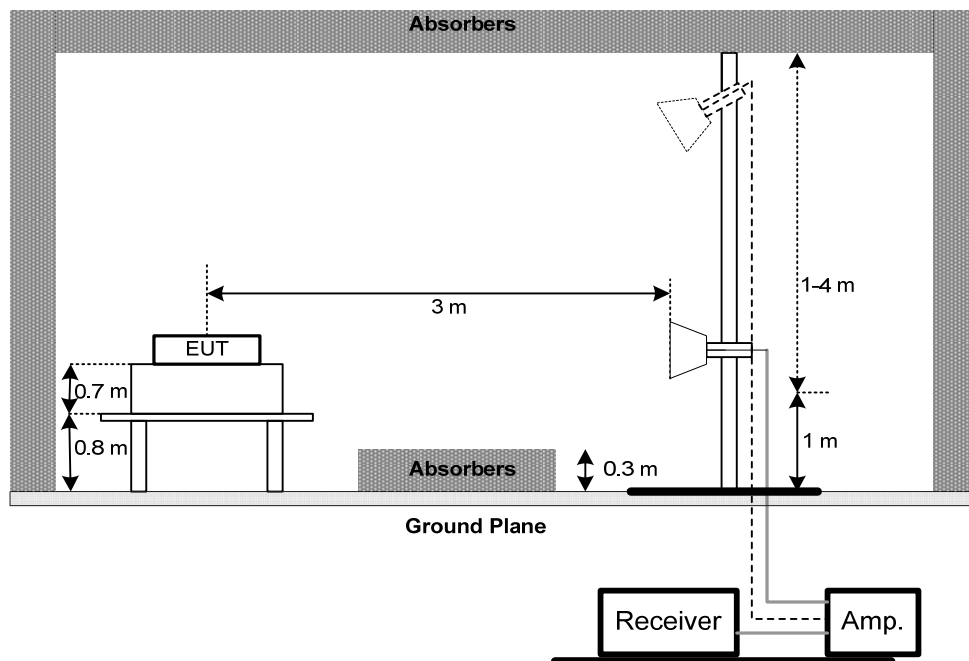
No deviation

4.2.4 TEST SETUP

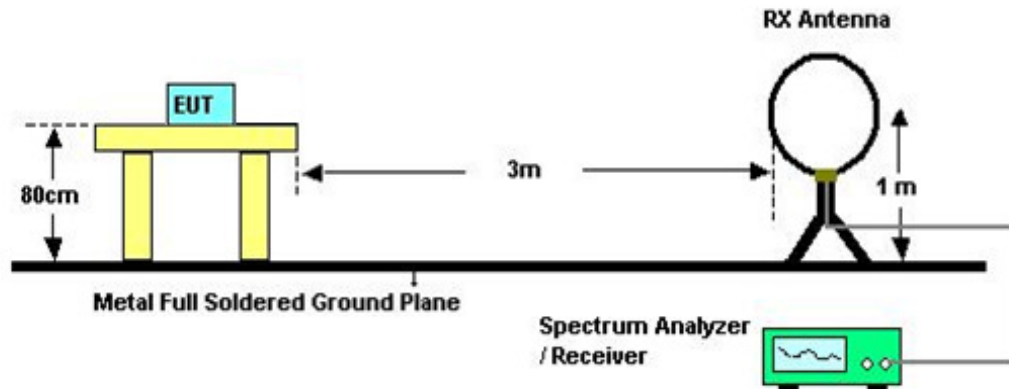
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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 3.8V

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 1000MHZ)

Please refer to the Attachment 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 Attachment 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

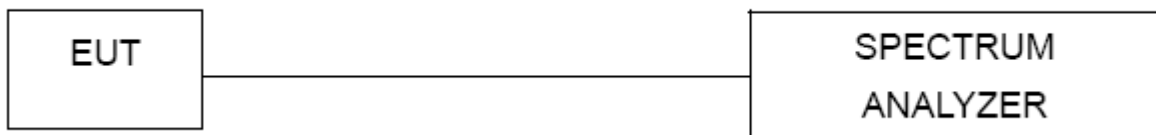
5.1 TEST PROCEDURE

- 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 3.8V

5.6 TEST RESULTS

Please refer to the Attachment E.

6. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	R&S	ESCI	100382	Mar. 27, 2017
2	LISN	EMCO	3816/2	52765	Mar. 27, 2017
3	50Ω Terminator	SHX	TF2-3G-A	8122901	Mar. 27, 2017
4	TWO-LINE V-NETWORK	R&S	ENV216	101447	Mar. 27, 2017
5	Cable	emci	RG223(9KHz-30 MHz)(5m)	N/A	Mar. 10, 2017
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 27, 2017
2	Amplifier	HP	8447D	2944A09673	Oct. 20, 2017
3	Receiver	AGILENT	N9038A	MY52130039	Sep. 04, 2017
4	Test Cable	emci	LMR-400(30MHz-1GHz)	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. 27, 2017
8	Amplifier	Agilent	8449B	3008A02274	Nov. 01, 2017
9	Test Cable	emci	EMC104-SM-S M-10000(1GHz-26.5GHz)	C-68	Jun. 26, 2017
10	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Mar. 27, 2017
11	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 27, 2017
12	EMI Test Receiver	R&S	ESCI	100895	Mar. 27, 2017
13	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 07, 2017

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

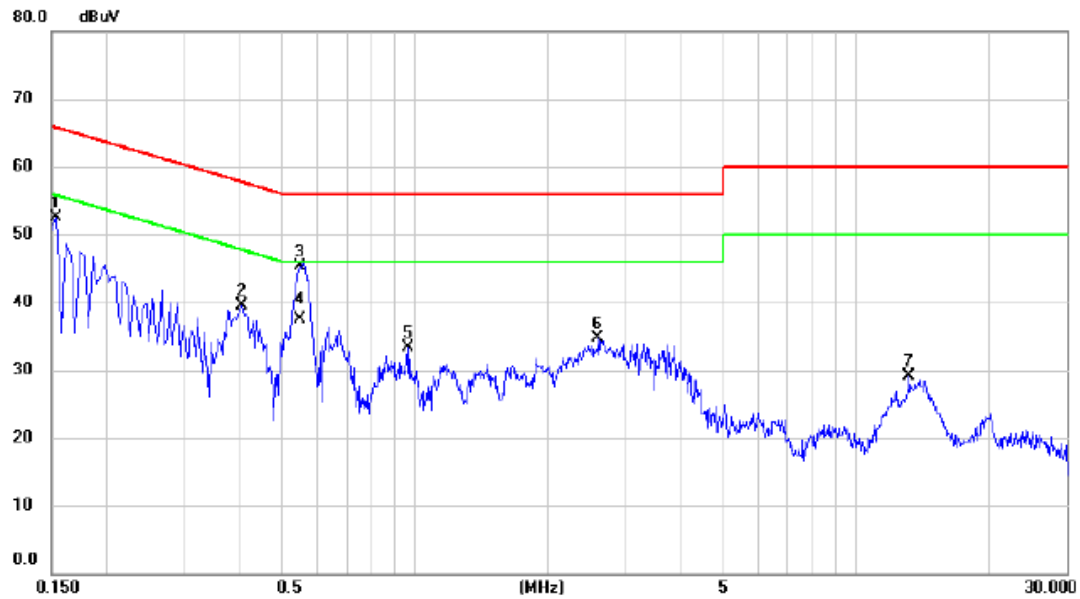
Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.

ATTACHMENT A - CONDUCTED EMISSION

Test Mode: TX MODE

Line



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment			Detector	Comment
1		0.154	42.99	9.52	52.51	65.78	-13.27	peak	
2		0.406	29.93	9.55	39.48	57.73	-18.25	peak	
3		0.550	35.58	9.64	45.22	56.00	-10.78	peak	
4	*	0.550	27.90	9.64	37.54	46.00	-8.46	AVG	
5		0.962	23.45	9.76	33.21	56.00	-22.79	peak	
6		2.598	24.52	10.09	34.61	56.00	-21.39	peak	
7		13.214	18.77	10.30	29.07	60.00	-30.93	peak	

Test Mode: TX MODE

Neutral

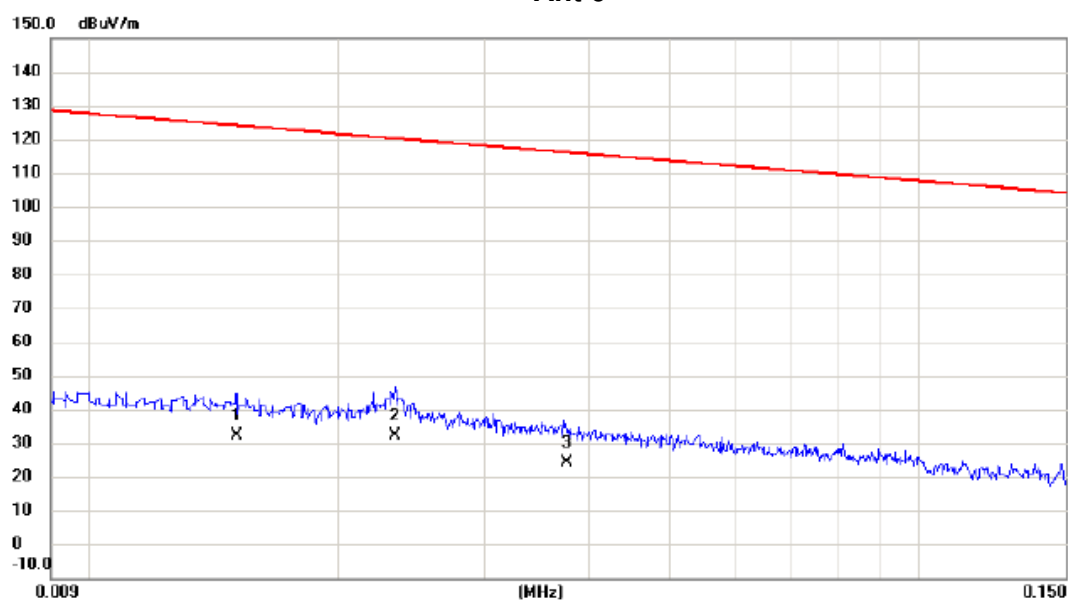


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.150	43.40	9.52	52.92	66.00	-13.08	peak	
2		0.182	37.04	9.47	46.51	64.39	-17.88	peak	
3		0.322	28.75	9.53	38.28	59.66	-21.38	peak	
4		0.558	35.61	9.44	45.05	56.00	-10.95	peak	
5	*	0.558	26.00	9.44	35.44	46.00	-10.56	AVG	
6		2.866	25.76	9.79	35.55	56.00	-20.45	peak	
7		13.726	22.41	10.35	32.76	60.00	-27.24	peak	

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

Test Mode: TX Mode

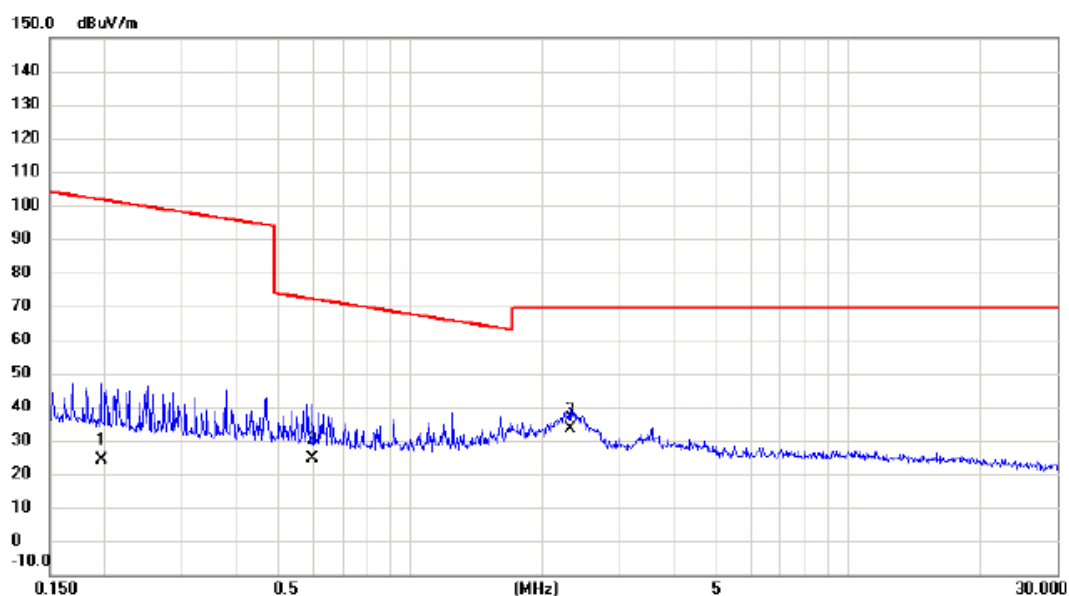
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.0151	32.10	0.02	32.12	124.03	-91.91	AVG	
2	*	0.0234	32.30	0.02	32.32	120.22	-87.90	AVG	
3		0.0376	24.10	0.02	24.12	116.10	-91.98	AVG	

Test Mode: TX Mode

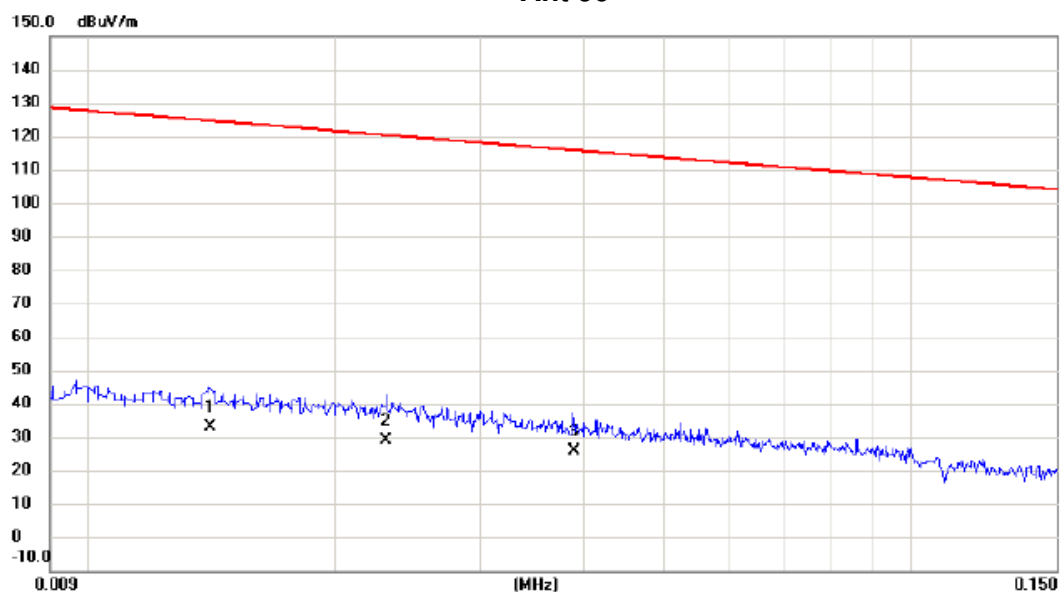
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.1965	24.10	0.04	24.14	101.74	-77.60	AVG	
2		0.5980	24.60	0.07	24.67	72.07	-47.40	QP	
3	*	2.3090	33.40	0.11	33.51	69.54	-36.03	QP	

Test Mode: TX Mode

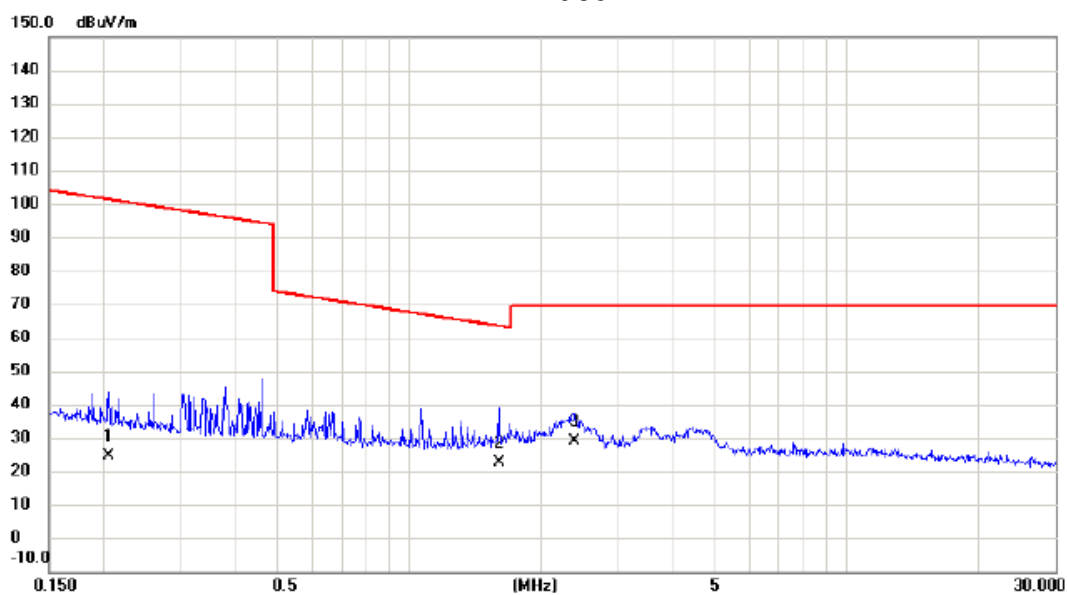
Ant 90°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.0141	32.80	0.02	32.82	124.62	-91.80	AVG	
2		0.0230	29.10	0.02	29.12	120.37	-91.25	AVG	
3	*	0.0390	25.70	0.02	25.72	115.78	-90.06	AVG	

Test Mode: TX Mode

Ant 90°

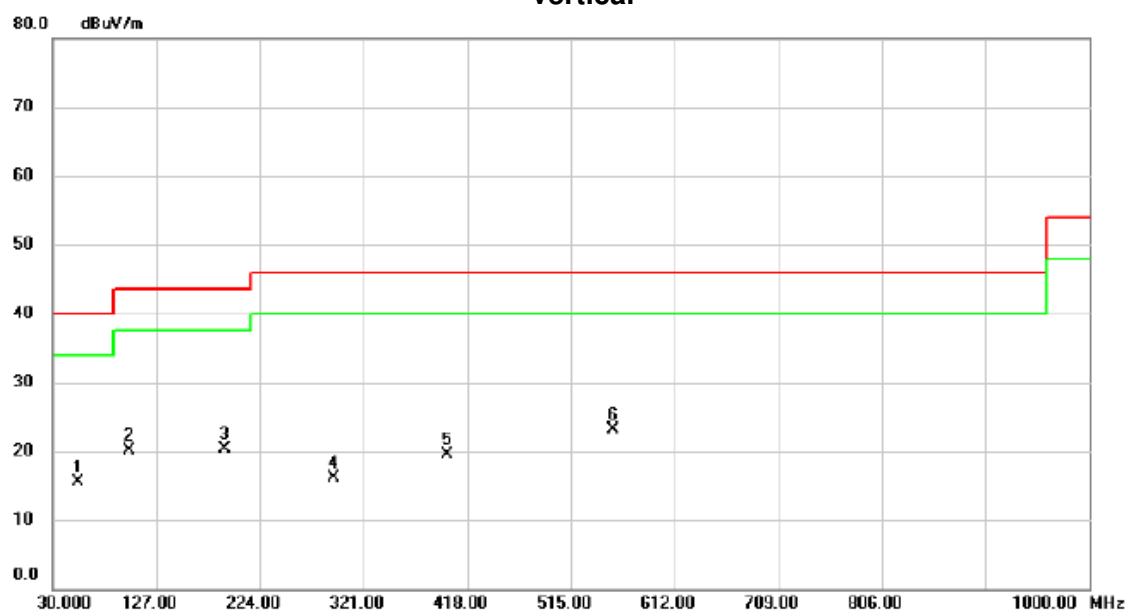


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.2061	24.60	0.04	24.64	101.32	-76.68	AVG	
2		1.6020	22.60	0.10	22.70	63.51	-40.81	QP	
3	*	2.3836	28.80	0.11	28.91	69.54	-40.63	QP	

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

Test Mode: TX 2402MHz

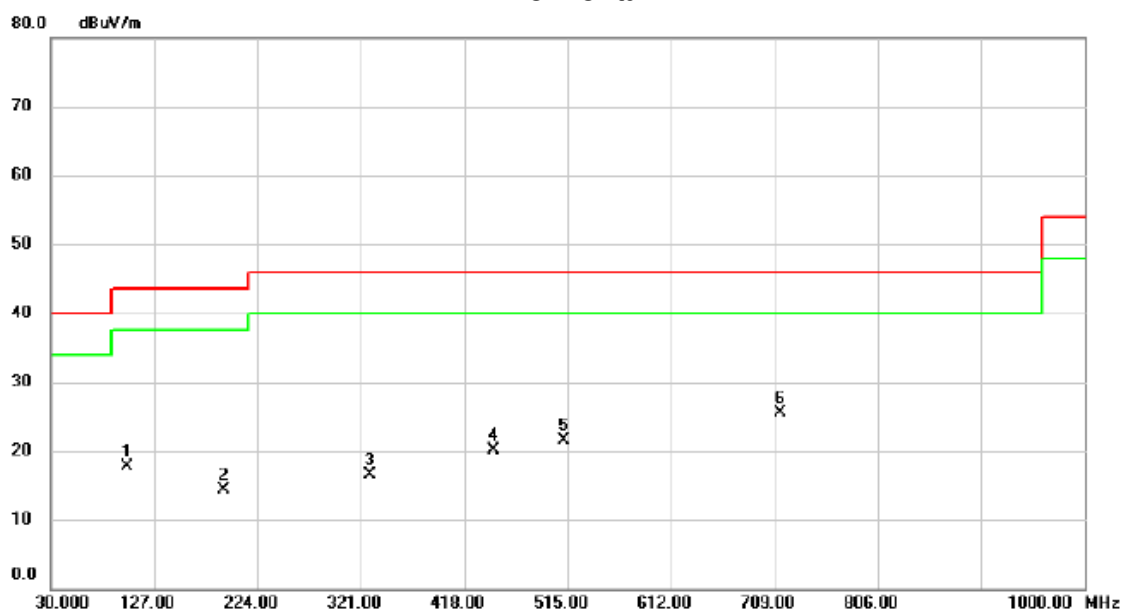
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		54.250	29.05	-13.53	15.52	40.00	-24.48	peak	
2		101.780	35.42	-15.32	20.10	43.50	-23.40	peak	
3		191.020	34.33	-13.99	20.34	43.50	-23.16	peak	
4		292.870	27.11	-10.93	16.18	46.00	-29.82	peak	
5		399.570	27.38	-7.81	19.57	46.00	-26.43	peak	
6 *		554.770	27.93	-4.79	23.14	46.00	-22.86	peak	

Test Mode: TX 2402MHz

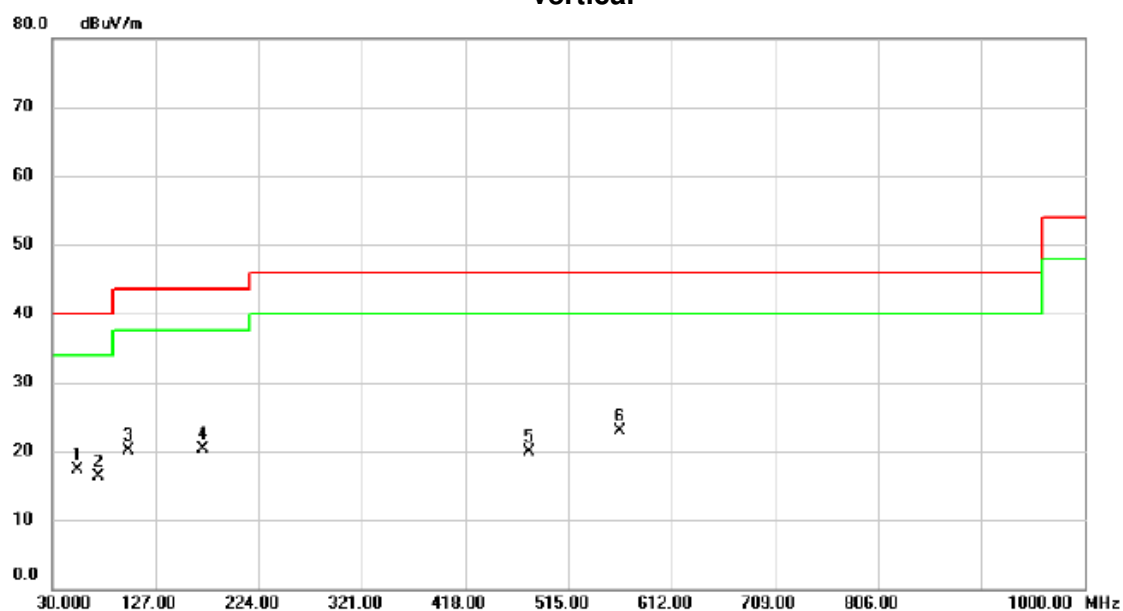
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		101.780	33.02	-15.32	17.70	43.50	-25.80	peak	
2		191.990	28.36	-14.03	14.33	43.50	-29.17	peak	
3		329.730	27.34	-10.78	16.56	46.00	-29.44	peak	
4		446.130	28.07	-7.98	20.09	46.00	-25.91	peak	
5		512.090	30.05	-8.47	21.58	46.00	-24.42	peak	
6	*	714.820	27.63	-2.06	25.57	46.00	-20.43	peak	

Test Mode: TX 2440MHz

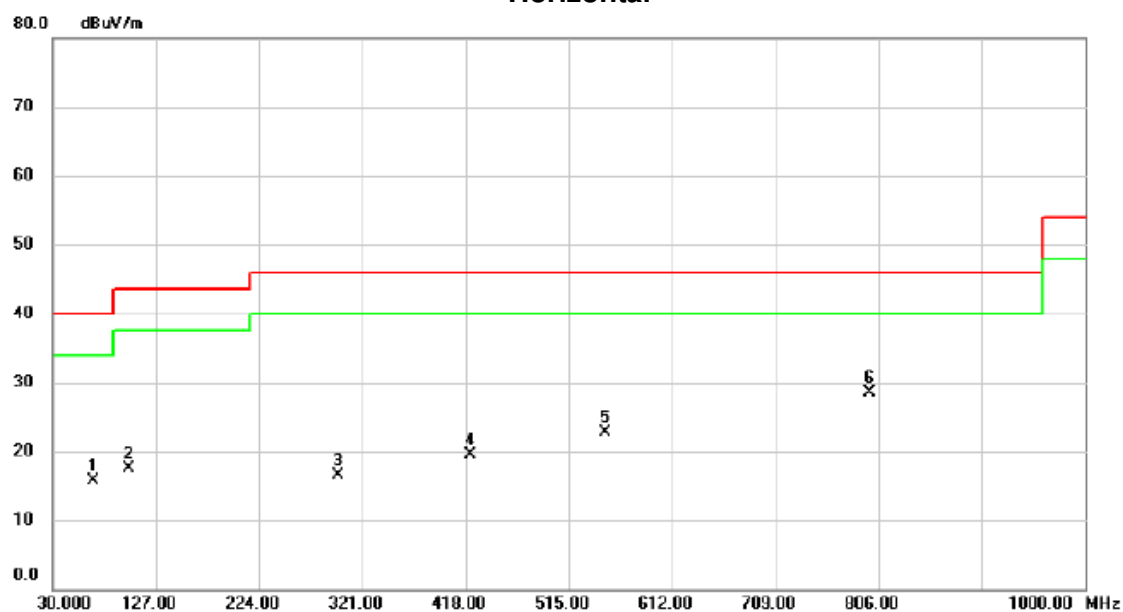
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	54.250	30.86	-13.53	17.33	40.00	-22.67	peak	
2		73.650	32.78	-16.57	16.21	40.00	-23.79	peak	
3		101.780	35.39	-15.32	20.07	43.50	-23.43	peak	
4		171.620	32.55	-12.33	20.22	43.50	-23.28	peak	
5		478.140	28.84	-8.97	19.87	46.00	-26.13	peak	
6		563.500	28.22	-5.22	23.00	46.00	-23.00	peak	

Test Mode: TX 2440MHz

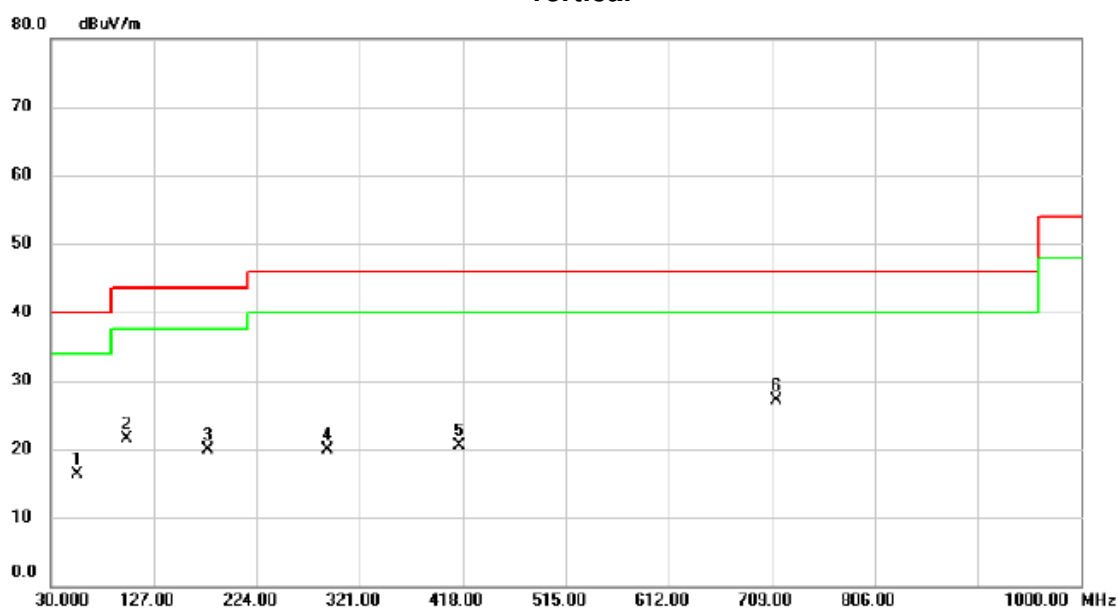
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		67.830	31.71	-15.94	15.77	40.00	-24.23	peak	
2		101.780	32.73	-15.32	17.41	43.50	-26.09	peak	
3		298.690	26.75	-10.30	16.45	46.00	-29.55	peak	
4		421.880	27.31	-7.88	19.43	46.00	-26.57	peak	
5		548.950	27.26	-4.64	22.62	46.00	-23.38	peak	
6	*	797.270	28.35	0.15	28.50	46.00	-17.50	peak	

Test Mode: TX 2480MHz

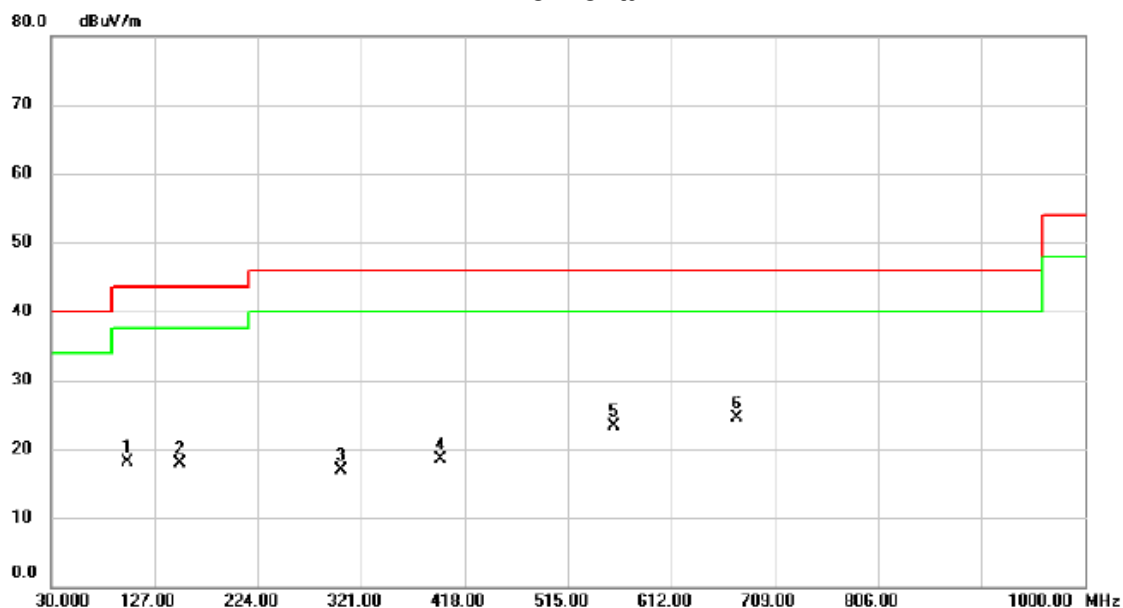
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		55.220	29.68	-13.38	16.30	40.00	-23.70	peak	
2		101.780	36.76	-15.32	21.44	43.50	-22.06	peak	
3		178.410	32.70	-12.75	19.95	43.50	-23.55	peak	
4		290.930	30.99	-11.15	19.84	46.00	-26.16	peak	
5		414.120	28.35	-7.85	20.50	46.00	-25.50	peak	
6 *		713.850	29.25	-2.07	27.18	46.00	-18.82	peak	

Test Mode: TX 2480MHz

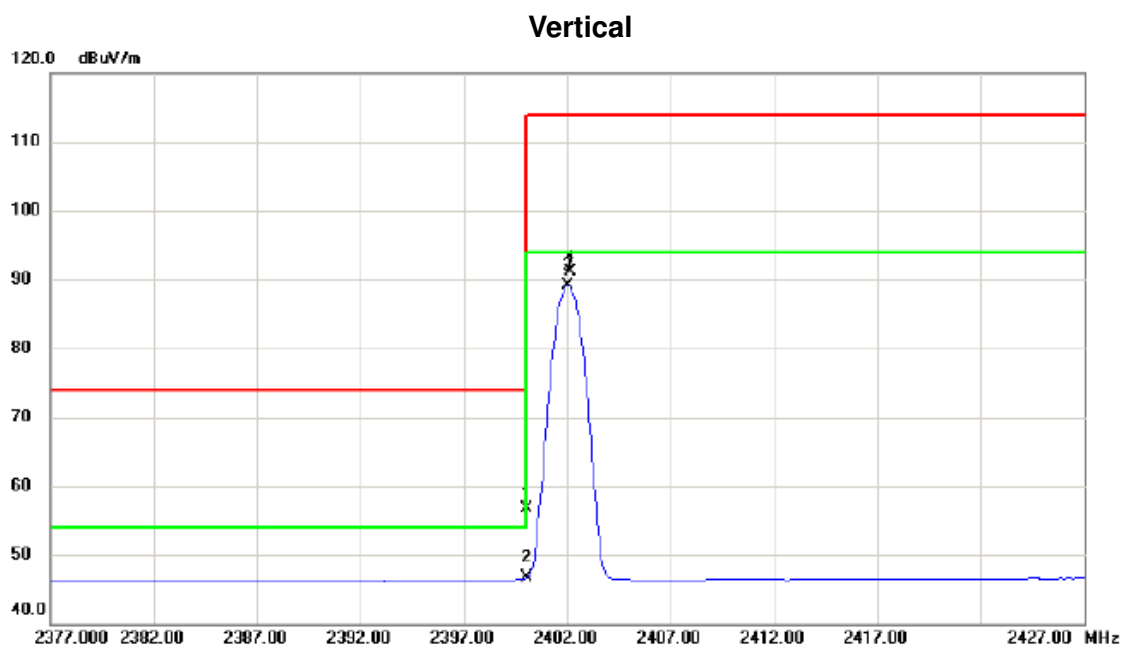
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		101.780	33.37	-15.32	18.05	43.50	-25.45	peak	
2		151.250	30.65	-12.84	17.81	43.50	-25.69	peak	
3		301.600	27.08	-10.19	16.89	46.00	-29.11	peak	
4		394.720	26.71	-8.14	18.57	46.00	-27.43	peak	
5		558.650	28.31	-4.98	23.33	46.00	-22.67	peak	
6	*	673.110	27.71	-3.23	24.48	46.00	-21.52	peak	

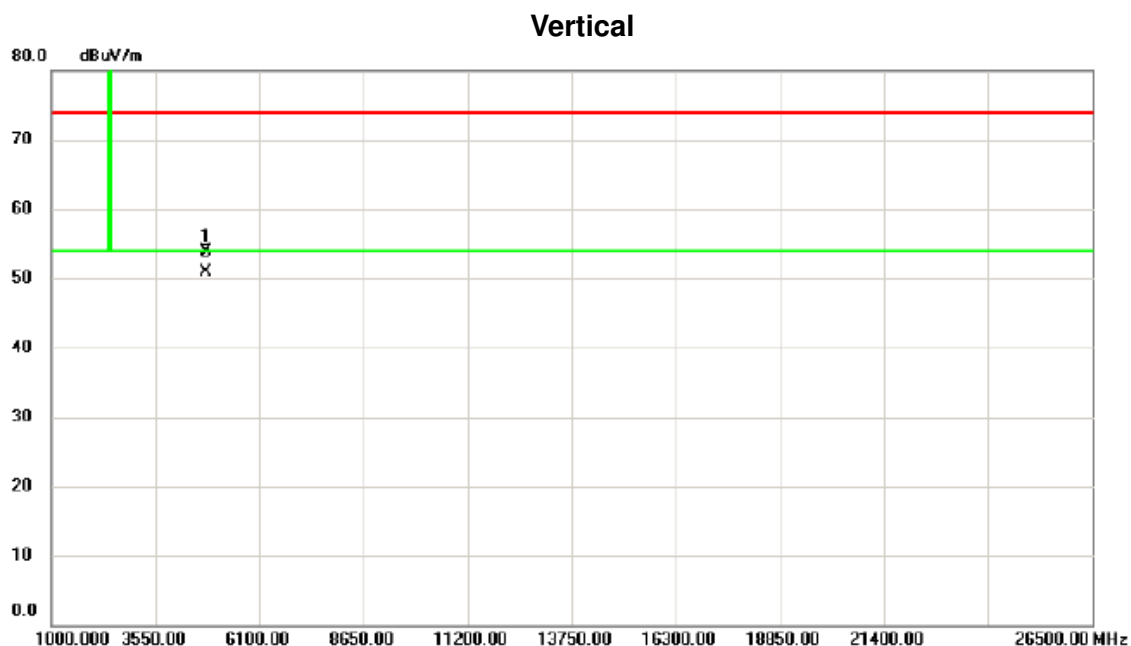
ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

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	23.58	33.05	56.63	74.00	-17.37	peak	
2		2400.000	13.58	33.05	46.63	54.00	-7.37	AVG	
3	*	2402.050	56.12	33.06	89.18	94.00	-4.82	AVG	
4		2402.200	58.05	33.06	91.11	114.00	-22.89	peak	

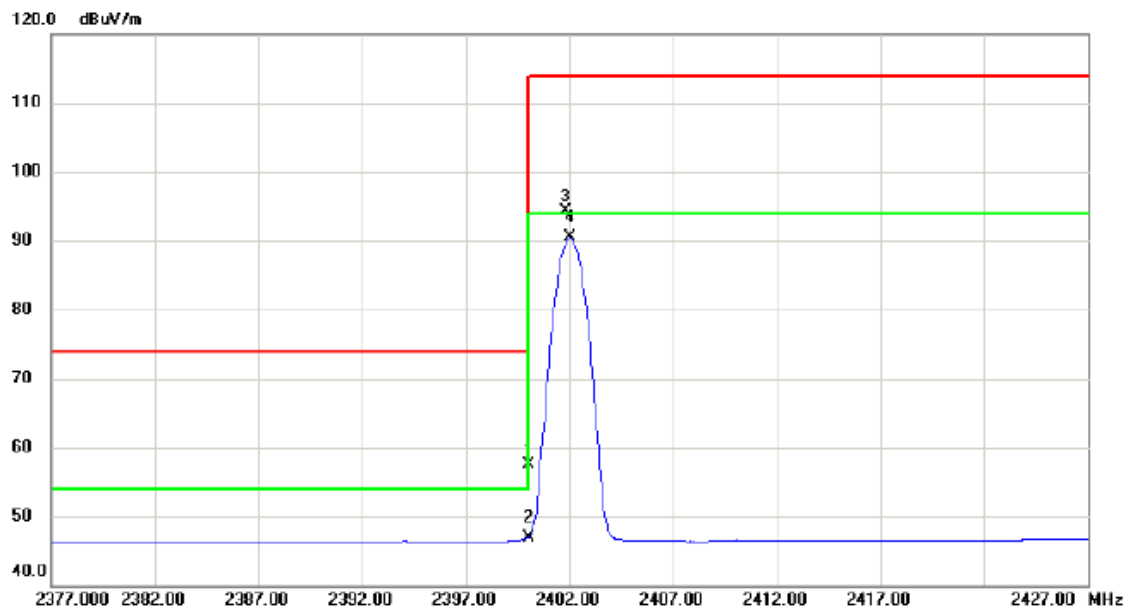
Test Mode	TX Mode_2402 MHz
-----------	------------------



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4804.020	49.04	4.77	53.81	74.00	-20.19	peak	
2	*	4804.020	46.15	4.77	50.92	54.00	-3.08	AVG	

Test Mode TX Mode_2402 MHz

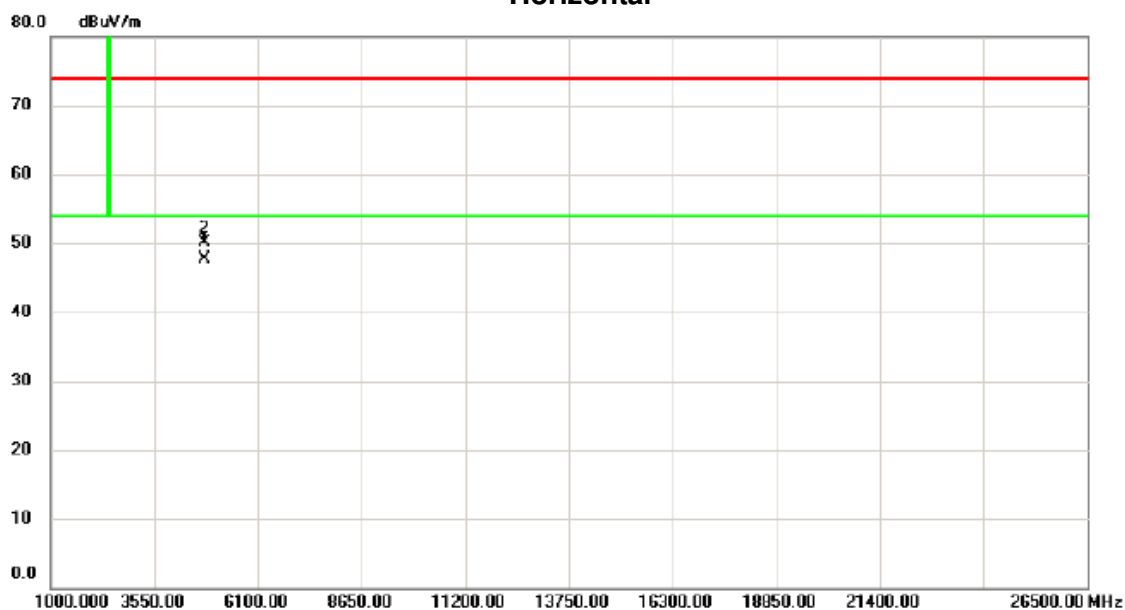
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2400.000	24.38	33.05	57.43	74.00	-16.57	peak	
2		2400.000	13.92	33.05	46.97	54.00	-7.03	AVG	
3		2401.850	61.34	33.06	94.40	114.00	-19.60	peak	
4 *		2402.050	57.40	33.06	90.46	94.00	-3.54	AVG	

Test Mode TX Mode_2402 MHz

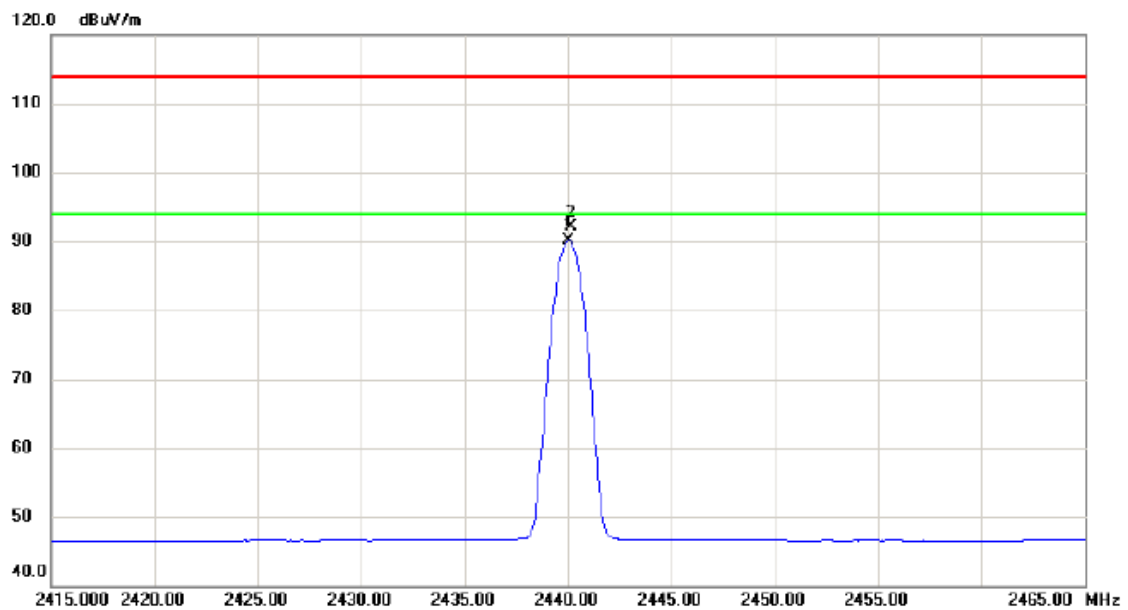
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4804.010	42.87	4.77	47.64	54.00	-6.36	AVG	
2		4804.075	45.27	4.77	50.04	74.00	-23.96	peak	

Test Mode	TX Mode_2440 MHz
-----------	------------------

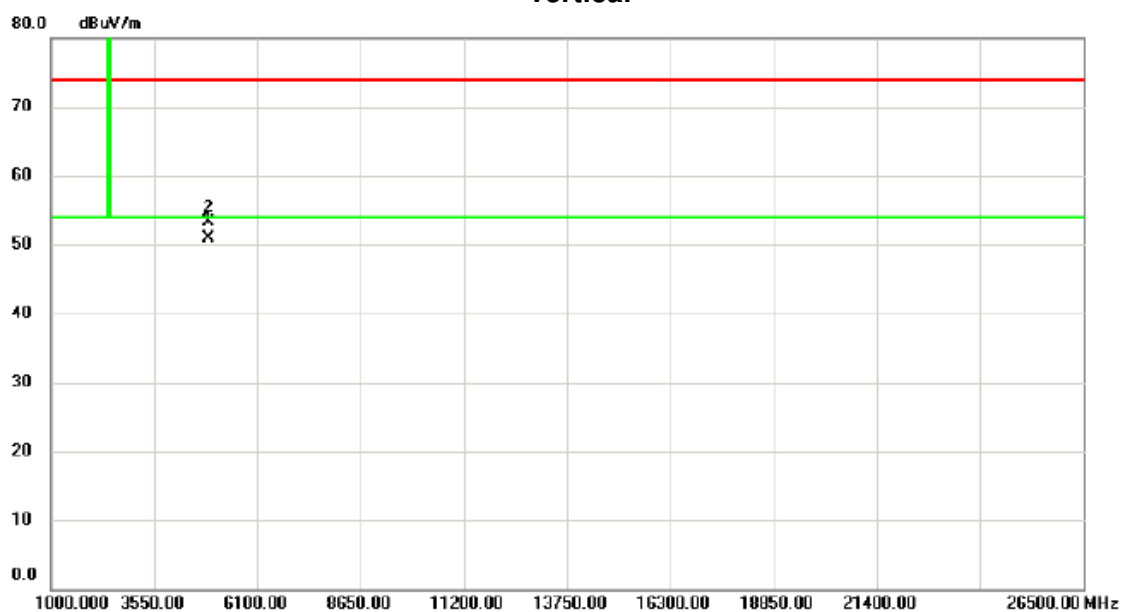
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2440.050	56.87	33.22	90.09	94.00	-3.91	AVG	
2		2440.150	58.85	33.22	92.07	114.00	-21.93	peak	

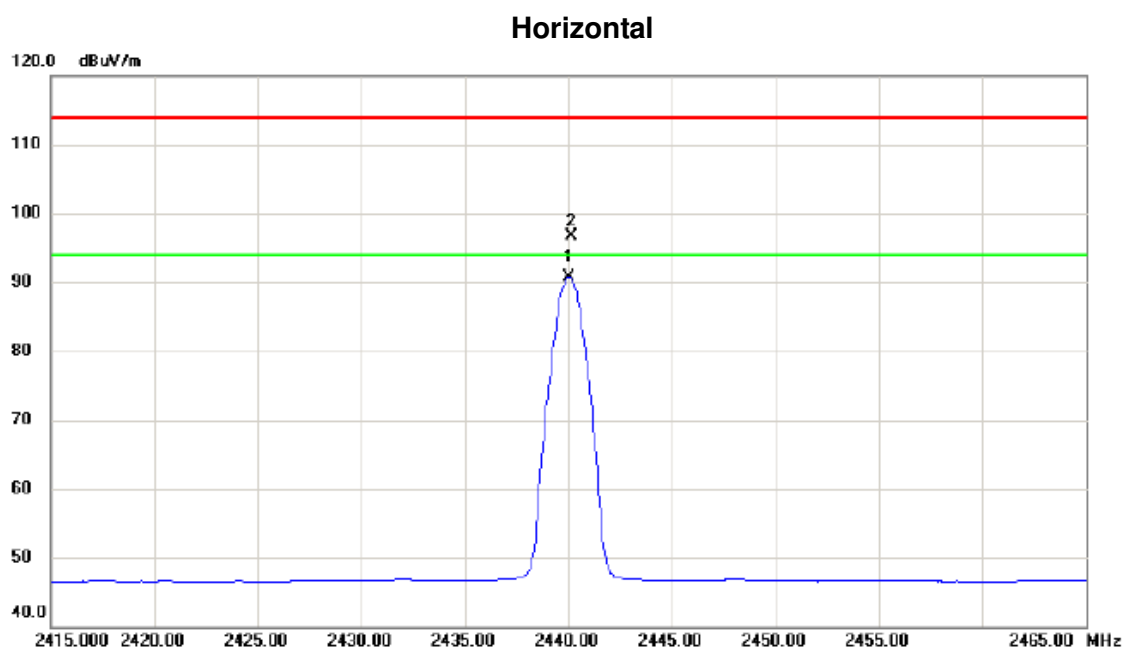
Test Mode	TX Mode_2440 MHz
-----------	------------------

Vertical



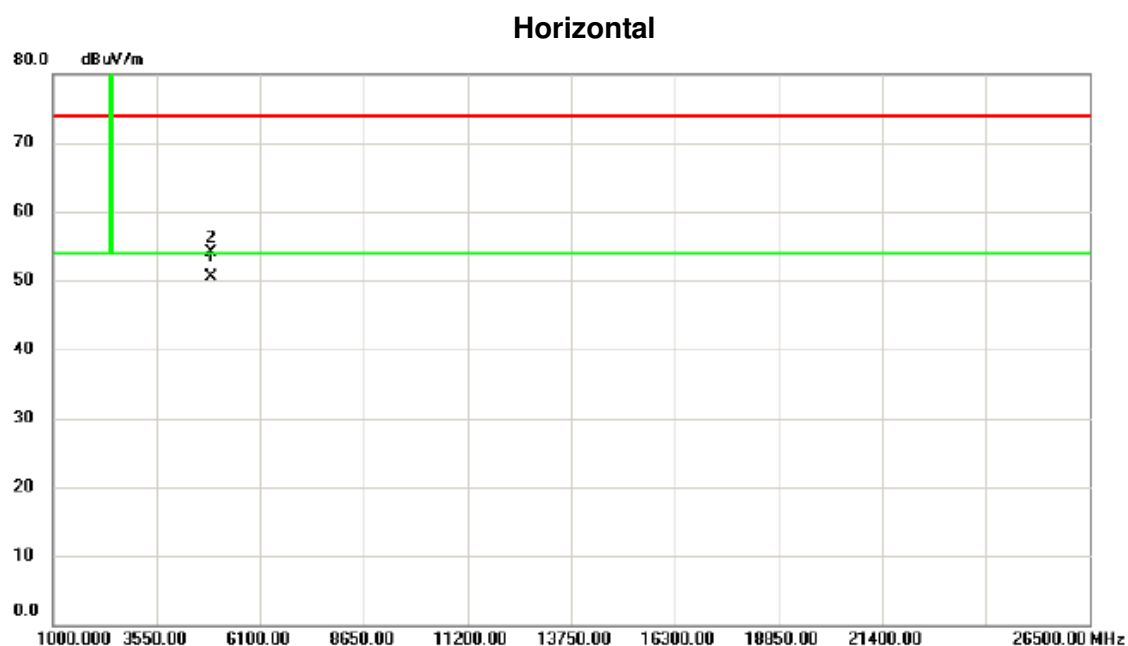
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4880.020	45.81	5.09	50.90	54.00	-3.10	AVG	
2		4880.040	48.24	5.09	53.33	74.00	-20.67	peak	

Test Mode	TX Mode_2440 MHz
-----------	------------------



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2440.050	57.56	33.22	90.78	94.00	-3.22	AVG	
2		2440.200	63.47	33.22	96.69	114.00	-17.31	peak	

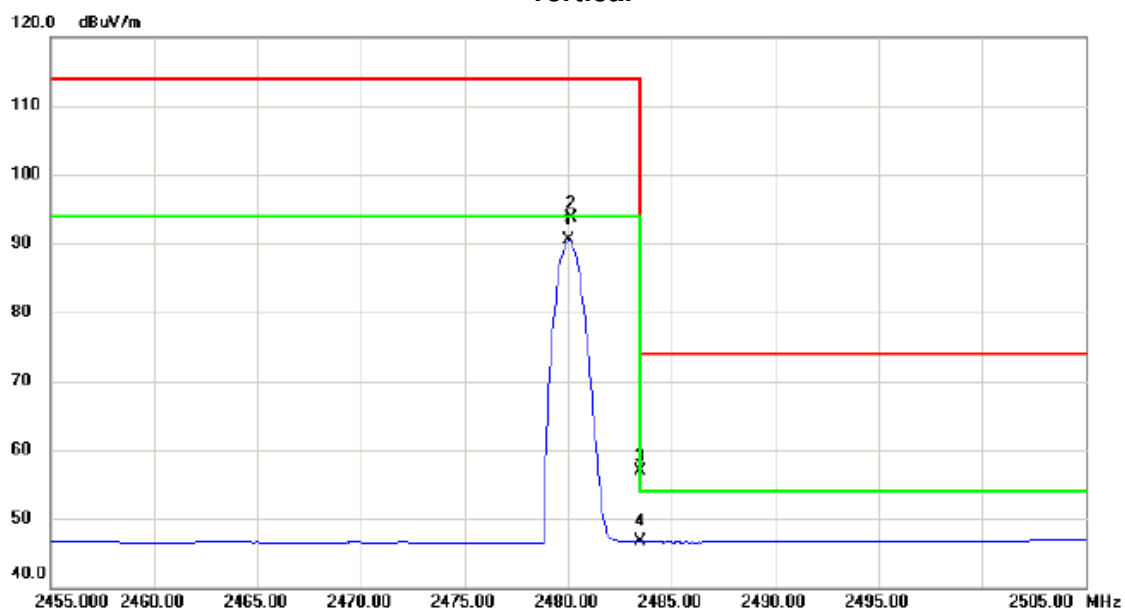
Test Mode	TX Mode_2440 MHz
-----------	------------------



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4880.015	45.41	5.09	50.50	54.00	-3.50	AVG	
2		4880.250	48.92	5.09	54.01	74.00	-19.99	peak	

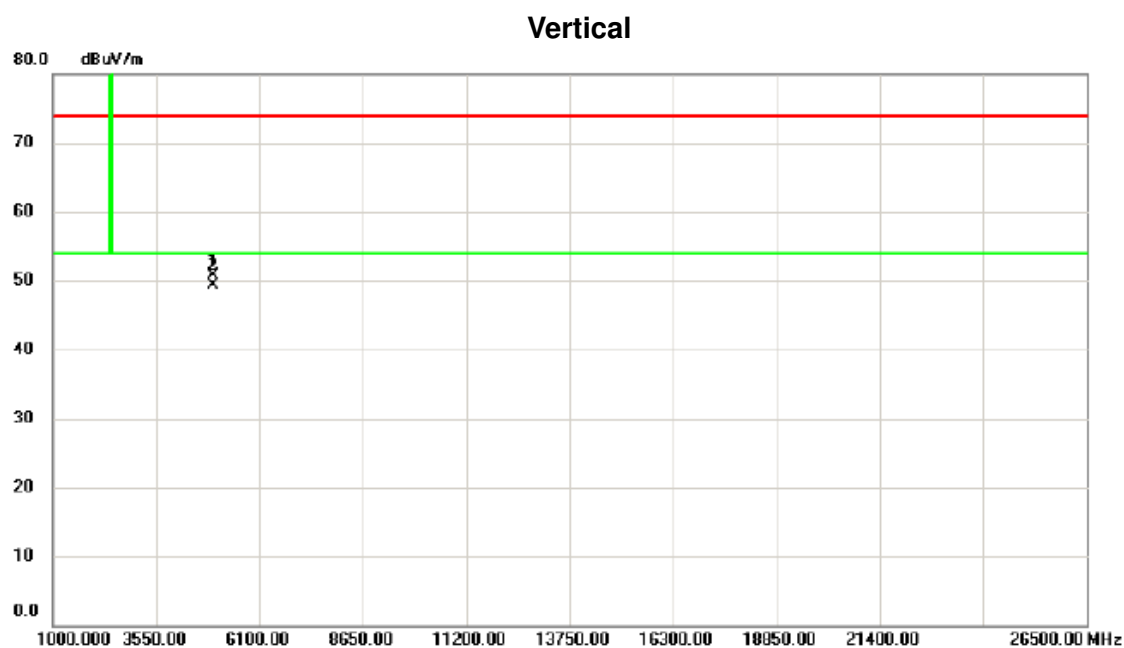
Test Mode TX Mode_2480 MHz

Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2480.050	57.09	33.39	90.48	94.00	-3.52	AVG	
2		2480.200	60.23	33.39	93.62	114.00	-20.38	peak	
3		2483.500	23.55	33.40	56.95	74.00	-17.05	peak	
4		2483.500	13.22	33.40	46.62	54.00	-7.38	AVG	

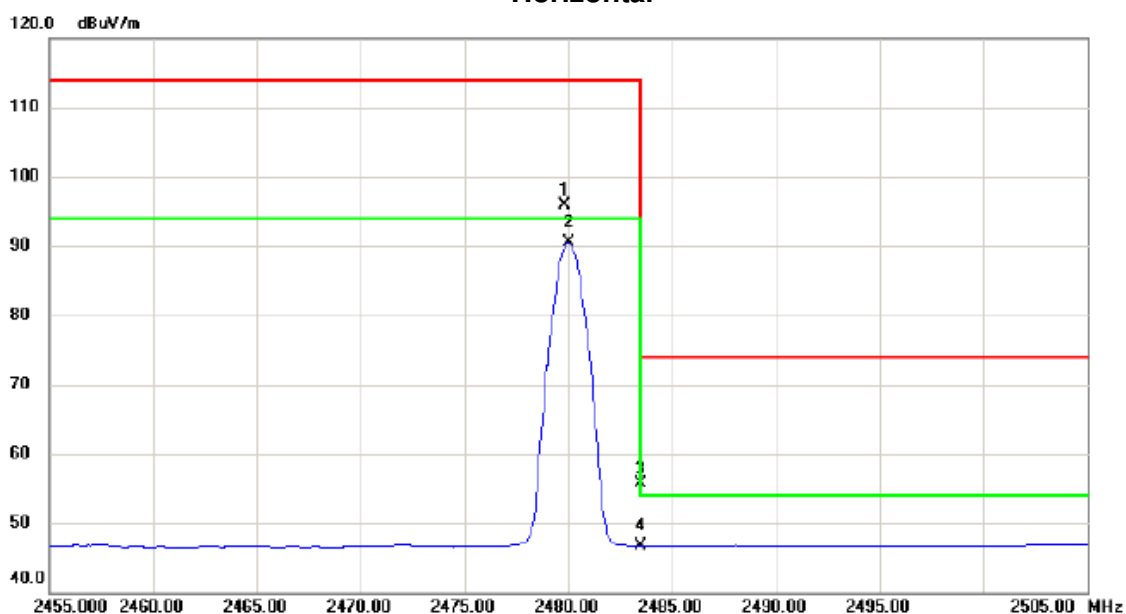
Test Mode	TX Mode_2480 MHz
-----------	------------------



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4959.980	45.31	5.43	50.74	74.00	-23.26	peak	
2	*	4960.020	43.97	5.43	49.40	54.00	-4.60	AVG	

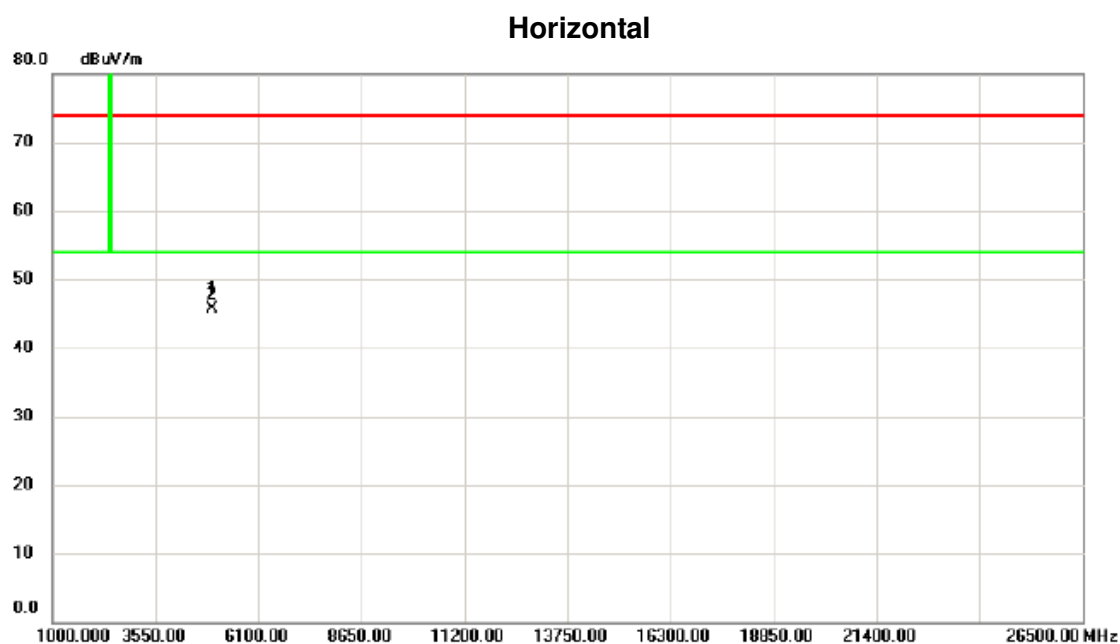
Test Mode TX Mode_2480 MHz

Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2479.850	62.49	33.39	95.88	114.00	-18.12	peak	
2	*	2480.000	57.08	33.39	90.47	94.00	-3.53	AVG	
3		2483.500	22.30	33.40	55.70	74.00	-18.30	peak	
4		2483.500	13.29	33.40	46.69	54.00	-7.31	AVG	

Test Mode	TX Mode_2480 MHz
-----------	------------------



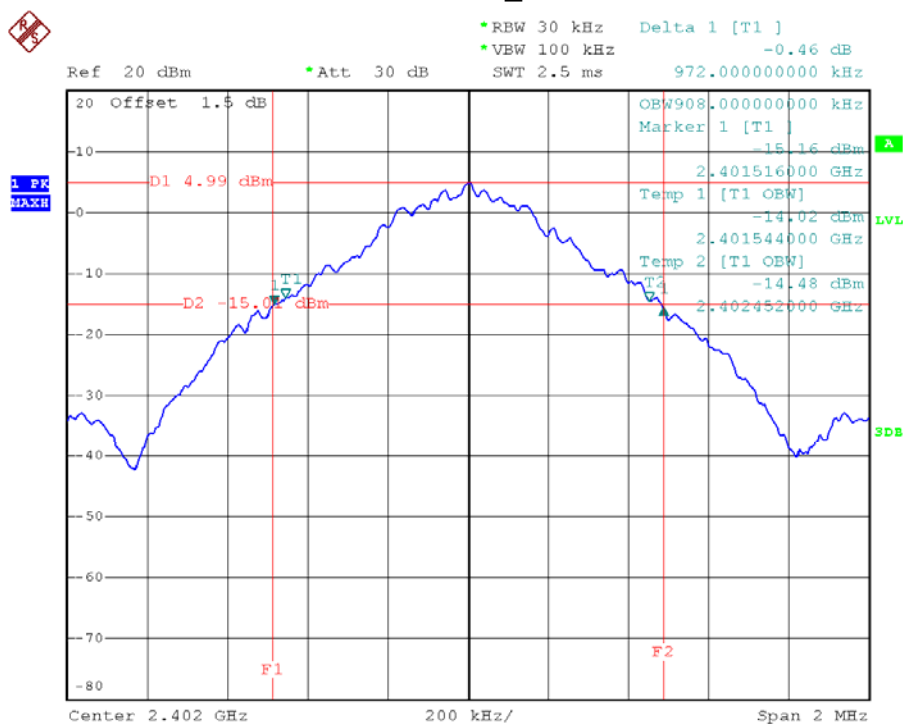
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4960.020	40.23	5.43	45.66	54.00	-8.34	AVG	
2		4960.070	40.24	5.43	45.67	74.00	-28.33	peak	

ATTACHMENT E - BANDWIDTH

Test Mode:	TX Mode_2402 MHz/2440 MHz/2480 MHz
------------	------------------------------------

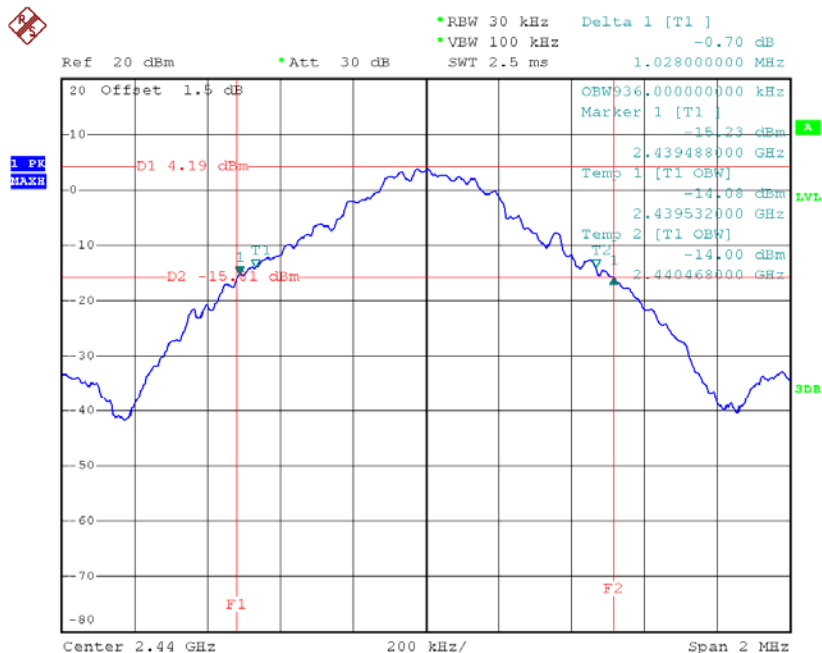
Frequency (MHz)	20dB Bandwidth (MHz)	99% Occupied BW (MHz)
2402	0.972	0.908
2440	1.028	0.936
2480	1.024	0.940

TX Mode_2402 MHz



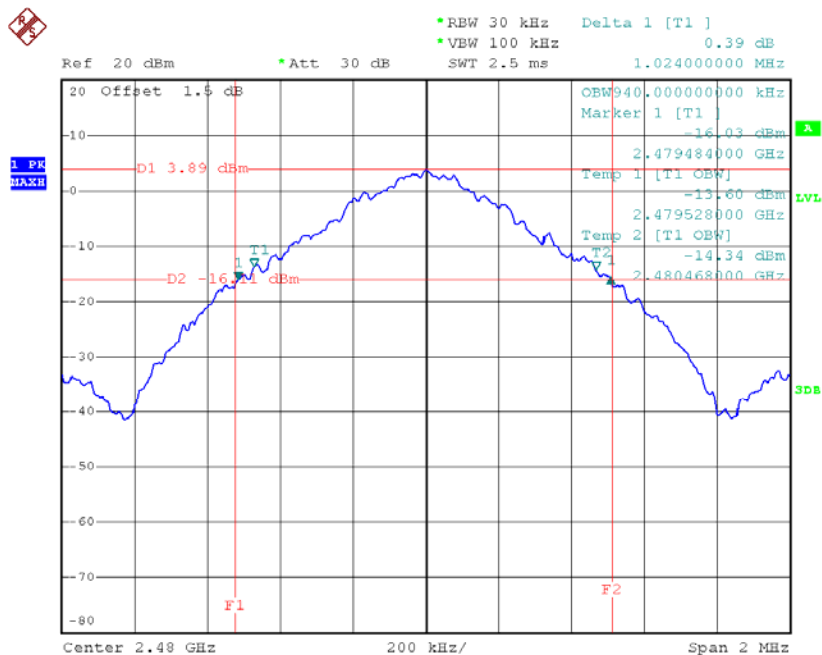
Date: 22.DEC.2016 09:34:27

TX Mode_2440 MHz



Date: 22.DEC.2016 09:37:39

TX Mode_2480 MHz



Date: 22.DEC.2016 09:40:05