

# FCC Radio Test Report

## FCC ID:ZVAPS000019

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

**Project No.** : 1503C087A  
**Equipment** : SHOUT Dual Mode WiFi/Bluetooth Smart Speaker  
**Model Name** : IS0101  
**Applicant** : TCL Technoly Electronics(Huizhou) Co.,Ltd.  
**Address** : Section 37, Zhongkai High-tech Development Zone,  
Huizhou City, Guang Dong Province, China, 516006.

**Date of Receipt** : Aug. 03, 2015  
**Date of Test** : Aug. 03, 2015 ~ Aug. 10, 2015  
**Issued Date** : Aug. 11, 2015  
**Tested by** : BTL Inc.

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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.

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## REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1503C087A	Original Issue.	Aug. 11, 2015

## 1. CERTIFICATION

Equipment : SHOUT Dual Mode WiFi/Bluetooth Smart Speaker  
Brand Name : RockLava  
Model Name : IS0101  
Applicant : TCL Technoly Electronics(Huizhou) Co.,Ltd.  
Manufacturer : TCL Technoly Electronics(Huizhou) Co.,Ltd  
Address : Section 37, ZhongkaiHigh-tech Development Zone, Huizhou City, Guangdong  
Province, China, 516006.  
Date of Test : Aug. 03, 2015 ~ Aug. 10, 2015  
Test Sample : ENGINEERING SAMPLE  
Standard(s) : FCC Part15, Subpart C :2014 (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-1-1503C087A) 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):

<b>Applied Standard(s): FCC Part15 (15.247) , Subpart C: 2014</b>			
Standard(s) Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(d)	Antenna conducted Spurious Emission	PASS	
15.247(a)(2)	6dB Bandwidth	PASS	
15.247(b)(3)	Peak Output Power	PASS	
15.247(e)	Power Spectral Density	PASS	
15.203	Antenna Requirement	PASS	
15.209/15.205	Transmitter Radiated Emissions	PASS	

**NOTE:**

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

(2) The test follows FCC KDB Publication No. 558074 D01 DTS Meas Guidance v03r03 (Measurement Guidelines of DTS)

## 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  $U_{\text{CISPR}}$  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. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U,(dB)	Note
DG-C02	CISPR	150 kHz ~ 30MHz	2.32	

### B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant.	U,(dB)	Note
DG-CB03 (3m)	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	

Test Site	Method	Measurement Frequency Range	Ant.	U,(dB)	Note
DG-CB03 (3m)	CISPR	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	SHOUT Dual Mode WiFi/Bluetooth Smart Speaker	
Brand Name	RockLava	
Model Name	IS0101	
Model Difference	N/A	
Product Description	Operation Frequency	2402~2480 MHz
	Modulation Technology	GFSK(1Mbps)
	Bit Rate of Transmitter	
	Output Power (Max.)	7.45 dBm
Power Source	#1 DC Voltage supplied from AC adapter. Model: IU018A120150A #2 Supplied from battery	
Power Rating	#1 I/P: 100-240V~ 50/60Hz 0.6A O/P: DC 12V 1.5A #2 DC 7.4V 4500mAh 33.3Wh	

**Note:**

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

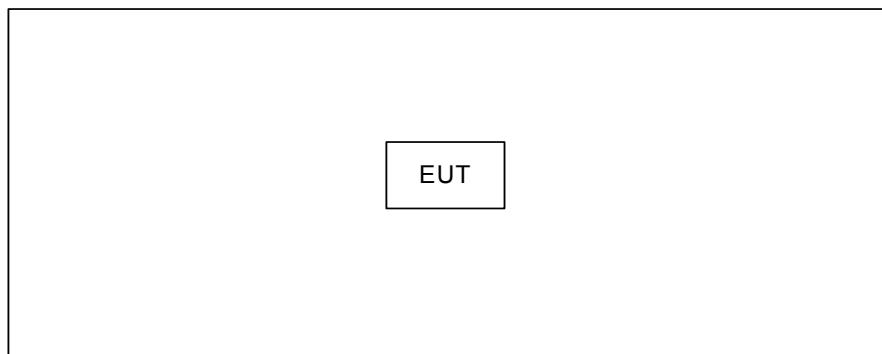
2.

Channel List			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

3. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Internal	N/A	3.97

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



### 3.3 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/IC	Series No.	Note
-	-	-	-	-	-	

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 (dB $\mu$ V)	
	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

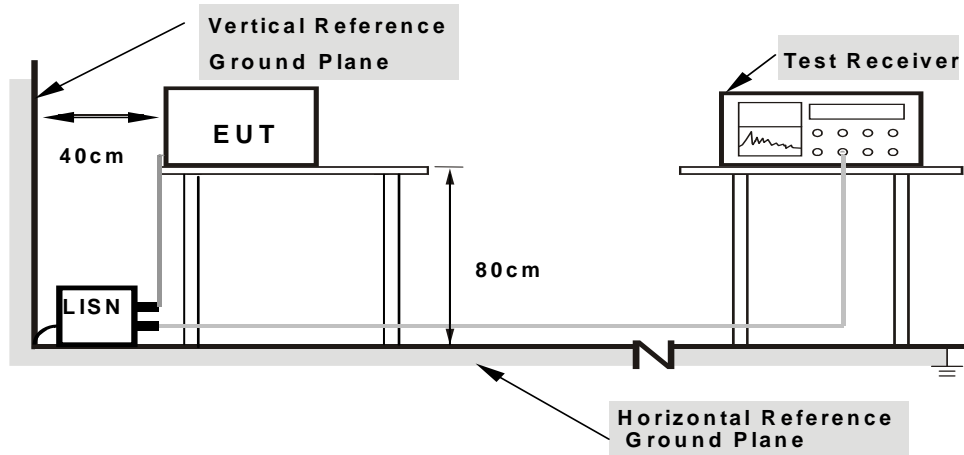
#### 4.1.2 TEST PROCEDURE

- 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: 55%  
 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

20dB in any 100 KHz bandwidth outside the operating frequency band. 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

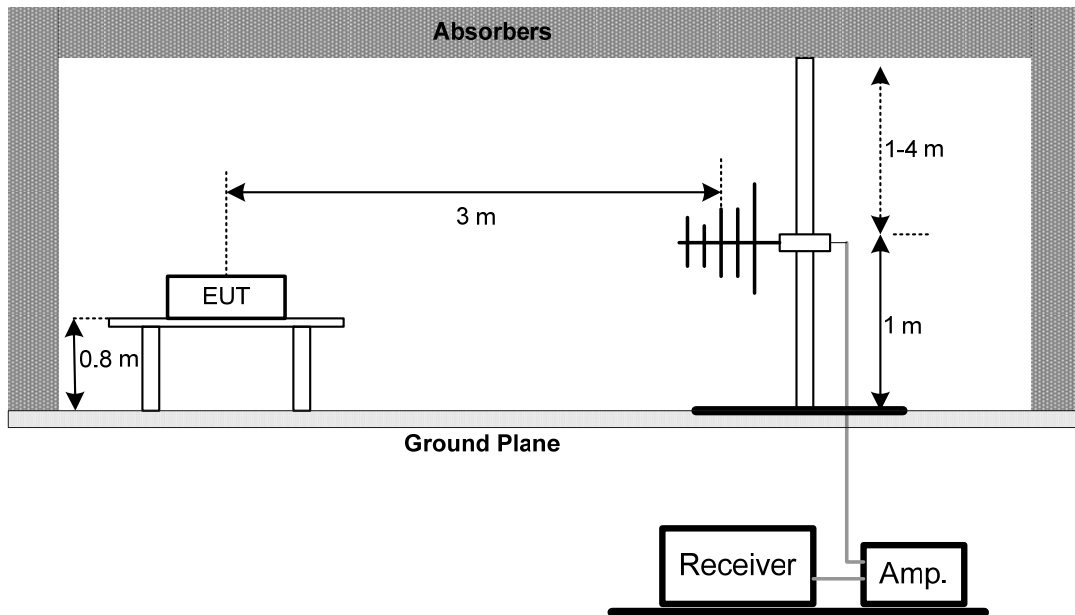
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-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. The initial step in collecting conducted 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.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.2.3 DEVIATION FROM TEST STANDARD

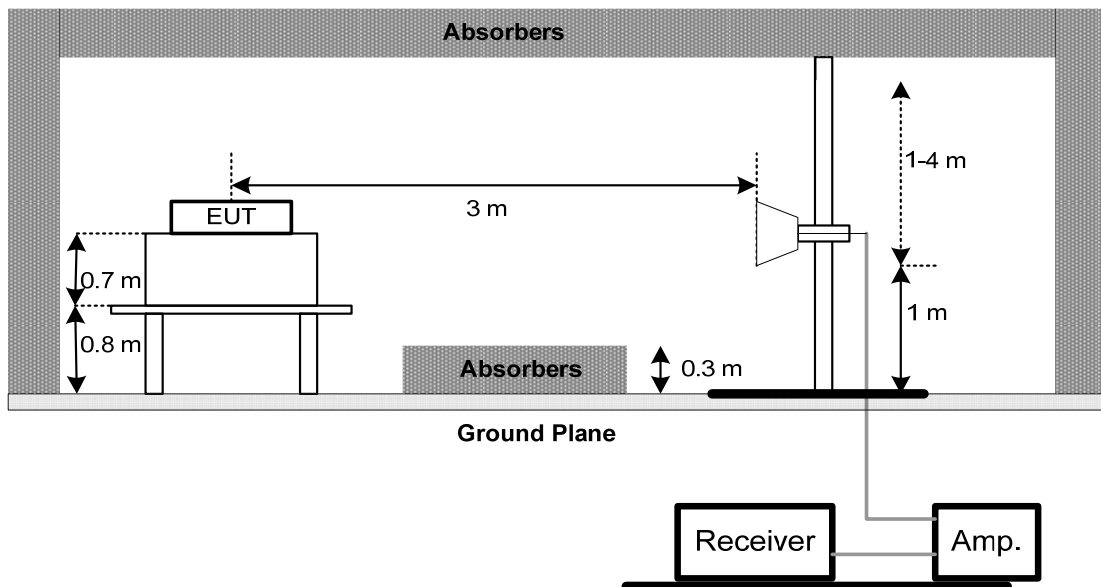
No deviation

#### 4.2.4 TEST SETUP

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

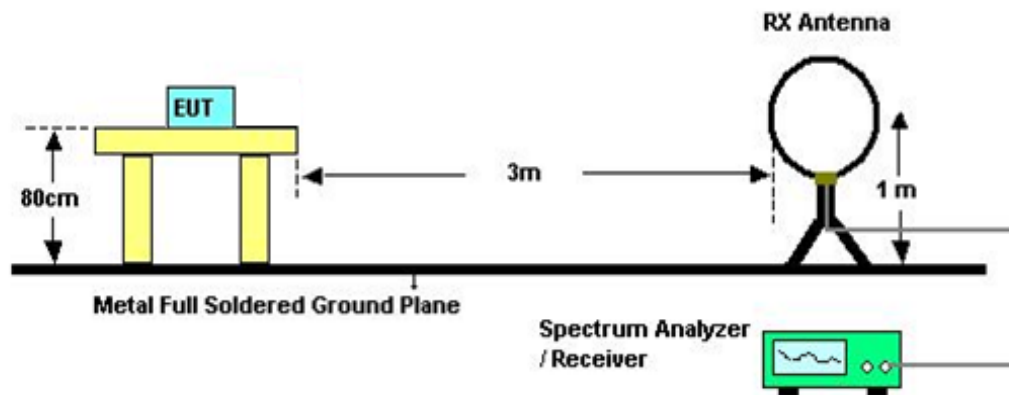


(B) Radiated Emission Test Set-Up Frequency Above 1 GHz





(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: 55%

**Test Voltage:** AC 120V/60Hz

#### 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: 55%  
 Test Voltage: AC 120V/60Hz

#### 5.1.6 TEST RESULTS

Please refer to the Attachment E.

## 6. MAXIMUM 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

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- b. The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance v03r03.

#### 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: 55%  
 Test Voltage: AC 120V/60Hz

#### 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

- 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=300KHz, Sweep time = 10 ms.

#### 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: 55%  
Test Voltage: AC 120V/60Hz

#### 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

- 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=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: 55%  
 Test Voltage: AC 120V/60Hz

#### 8.1.6 TEST RESULTS

Please refer to the Attachment H.

## 9. MEASUREMENT INSTRUMENTS LIST

Conducted Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	Mar. 28, 2016
2	LISN	R&S	ENV216	101447	Mar. 28, 2016
3	Test Cable	emci	RG223(9KHz-30 MHz)	C_17	Mar. 13, 2016
4	EMI TEST RECEIVER	R&S	ESCS30	833364/017	Mar. 28, 2016
5	50Ω Terminator	SHX	TF2-3G-A	08122902	Mar. 28, 2016
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. 28, 2016
2	Amplifier	HP	8447D	2944A09673	Nov. 17, 2015
3	Receiver	AGILENT	N9038A	MY52130039	Sep. 30, 2015
4	Test Cable	emci	LMR-400(30MHz-1GHz)	C-01	Jun. 28, 2016
5	Controller	CT	SC100	N/A	N/A
6	Antenna	ETS	3115	00075789	Mar. 28, 2016
7	Amplifier	Agilent	8449B	3008A02274	Nov. 02, 2015
8	Receiver	AGILENT	N9038A	MY52130039	Sep. 30, 2015
9	Test Cable	emci	EMC104-SM-S M-10000(1GHz-26.5GHz)	C-68	Jun. 28, 2016
10	Controller	CT	SC100	N/A	N/A
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Mar. 28, 2016
12	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Aug. 16, 2015
13	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

6dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 02, 2015

<b>Peak Output Power Measurement</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	ANRITSU	ML2495A	1128009	Mar. 28, 2016
2	Pulse Power Sensor	ANRITSU	MA 2411B	1027500	Mar. 28, 2016

<b>Antenna Conducted Spurious Emission Measurement</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 02, 2015

<b>Power Spectral Density Measurement</b>					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 02, 2015

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



**10. EUT TEST PHOTO****Conducted Measurement Photos**

## Radiated Measurement Photos

9KHz to 30MHz



## Radiated Measurement Photos

30M to 1000MHz





## Radiated Measurement Photos

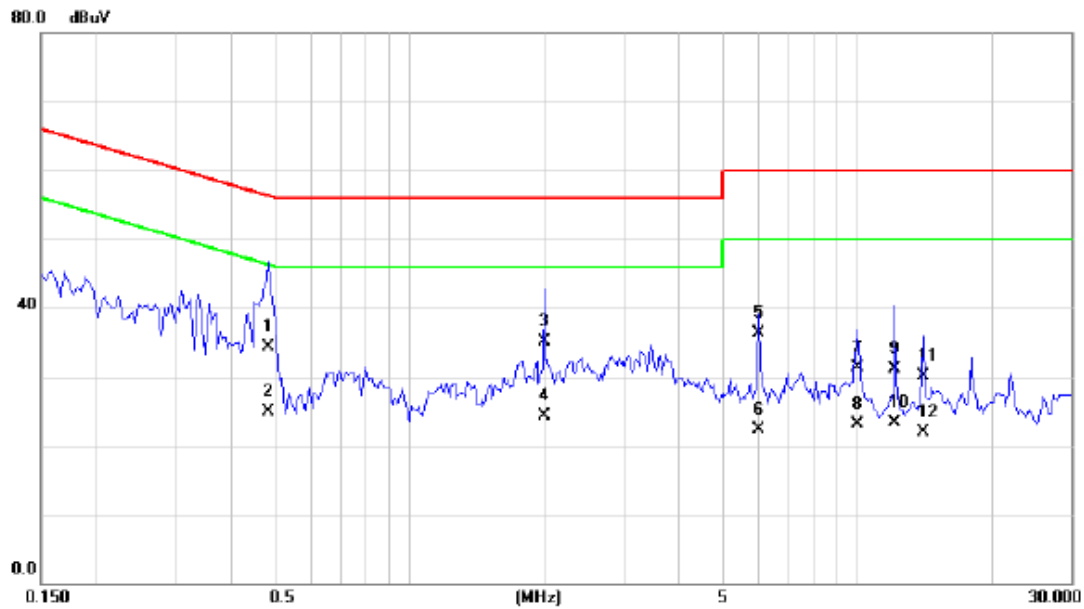
Above 1000MHz



## ATTACHMENT A - CONDUCTED EMISSION

Test Mode: TX Mode

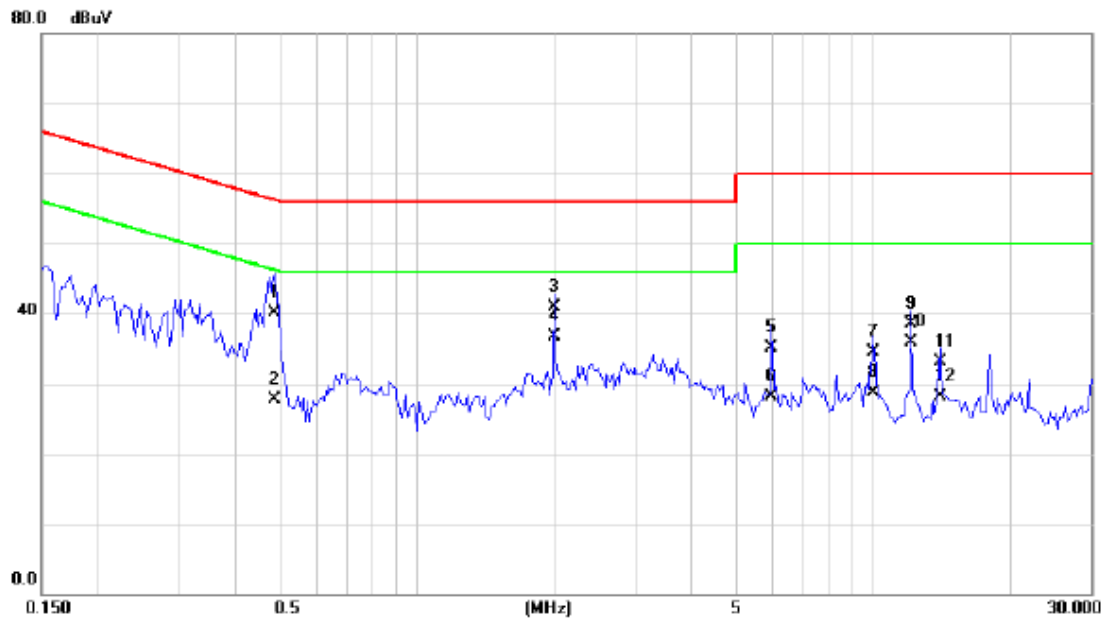
### Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.4820	24.70	9.68	34.38	56.30	-21.92	QP	
2		0.4820	15.20	9.68	24.88	46.30	-21.42	AVG	
3	*	1.9977	25.20	9.92	35.12	56.00	-20.88	QP	
4		1.9977	14.30	9.92	24.22	46.00	-21.78	AVG	
5		6.0000	26.30	9.95	36.25	60.00	-23.75	QP	
6		6.0000	12.40	9.95	22.35	50.00	-27.65	AVG	
7		9.9922	21.40	9.88	31.28	60.00	-28.72	QP	
8		9.9922	13.20	9.88	23.08	50.00	-26.92	AVG	
9		12.1172	21.30	9.86	31.16	60.00	-28.84	QP	
10		12.1172	13.40	9.86	23.26	50.00	-26.74	AVG	
11		14.0000	20.20	9.83	30.03	60.00	-29.97	QP	
12		14.0000	12.10	9.83	21.93	50.00	-28.07	AVG	

Test Mode: TX Mode

### Neutral



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.4860	30.50	9.56	40.06	56.24	-16.18	QP	
2		0.4860	18.20	9.56	27.76	46.24	-18.48	AVG	
3		1.9977	31.10	9.72	40.82	56.00	-15.18	QP	
4	*	1.9977	27.00	9.72	36.72	46.00	-9.28	AVG	
5		5.9922	25.30	9.88	35.18	60.00	-24.82	QP	
6		5.9922	18.20	9.88	28.08	50.00	-21.92	AVG	
7		9.9922	24.70	9.85	34.55	60.00	-25.45	QP	
8		9.9922	18.80	9.85	28.65	50.00	-21.35	AVG	
9		12.1172	28.60	9.88	38.48	60.00	-21.52	QP	
10		12.1172	26.10	9.88	35.98	50.00	-14.02	AVG	
11		13.9961	23.20	9.91	33.11	60.00	-26.89	QP	
12		13.9961	18.20	9.91	28.11	50.00	-21.89	AVG	

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



Test Mode:	TX Mode
------------	---------

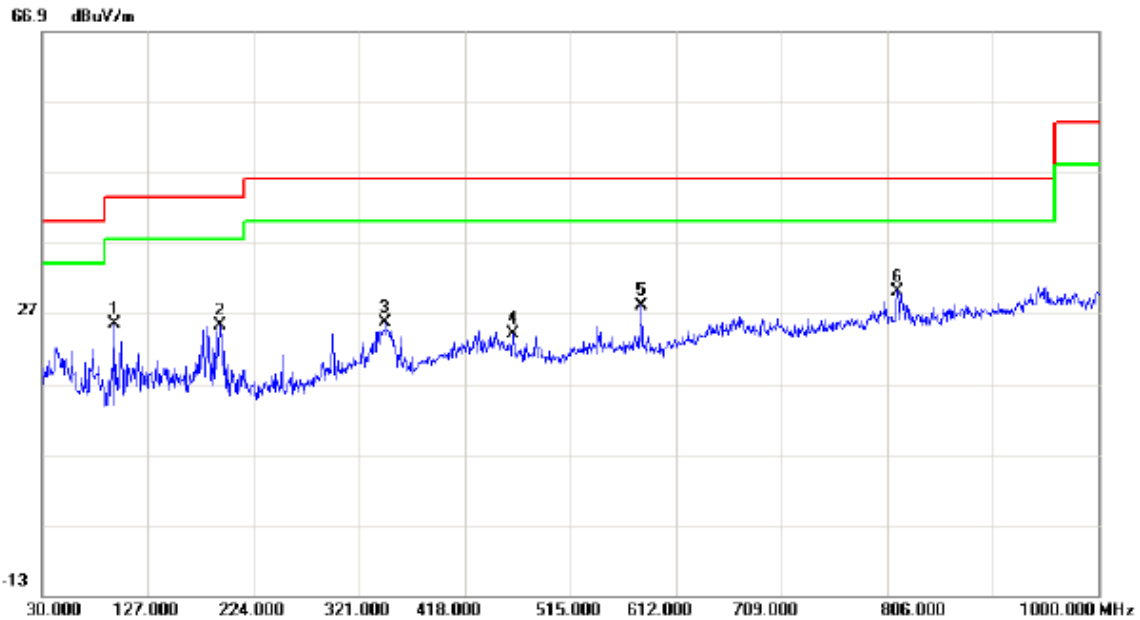
Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0094	0°	13.29	24.97	38.26	128.14	-89.88	AVG
0.0094	0°	14.34	24.97	39.31	148.14	-108.83	PEAK
0.0230	0°	6.83	24.11	30.94	120.37	-89.43	AVG
0.0230	0°	8.10	24.11	32.21	140.37	-108.16	PEAK
0.0316	0°	3.23	23.57	26.80	117.61	-90.82	AVG
0.0316	0°	5.62	23.57	29.19	137.61	-108.43	PEAK
0.0433	0°	1.22	22.82	24.04	114.87	-90.83	AVG
0.0433	0°	2.60	22.82	25.42	134.87	-109.45	PEAK
0.4954	0°	19.34	19.81	39.15	73.71	-34.55	QP
1.7137	0°	23.68	19.53	43.21	69.54	-26.33	QP

Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0094	90°	13.21	24.30	37.51	128.11	-90.60	AVG
0.0094	90°	14.92	24.30	39.22	148.11	-108.89	PEAK
0.0257	90°	7.31	23.94	31.25	119.41	-88.16	AVG
0.0257	90°	9.01	23.94	32.95	139.41	-106.46	PEAK
0.0316	90°	5.34	23.57	28.91	117.61	-88.71	AVG
0.0316	90°	5.97	23.57	29.54	137.61	-108.08	PEAK
0.0442	90°	1.49	22.77	24.26	114.70	-90.44	AVG
0.0442	90°	2.92	22.77	25.69	134.70	-109.01	PEAK
0.4943	90°	22.30	19.81	42.11	73.72	-31.61	QP
1.7187	90°	24.66	19.53	44.19	69.54	-25.35	QP

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

Test Mode: TX 2402MHz -CH00 -1Mbps

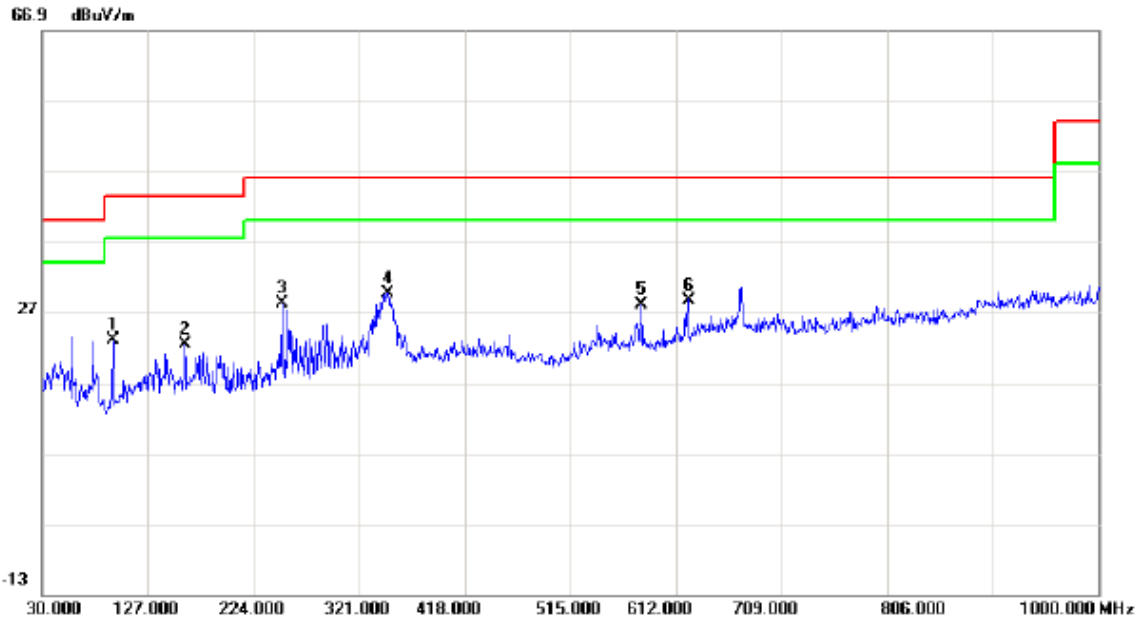
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		95.9600	40.80	-15.35	25.45	43.50	-18.05	peak	
2		193.9300	38.51	-13.22	25.29	43.50	-18.21	peak	
3		345.2500	35.52	-9.89	25.63	46.00	-20.37	peak	
4		462.6200	30.35	-6.27	24.08	46.00	-21.92	peak	
5		579.9900	32.58	-4.64	27.94	46.00	-18.06	peak	
6	*	815.7000	29.96	0.14	30.10	46.00	-15.90	peak	

Test Mode: TX 2402MHz -CH00 -1Mbps

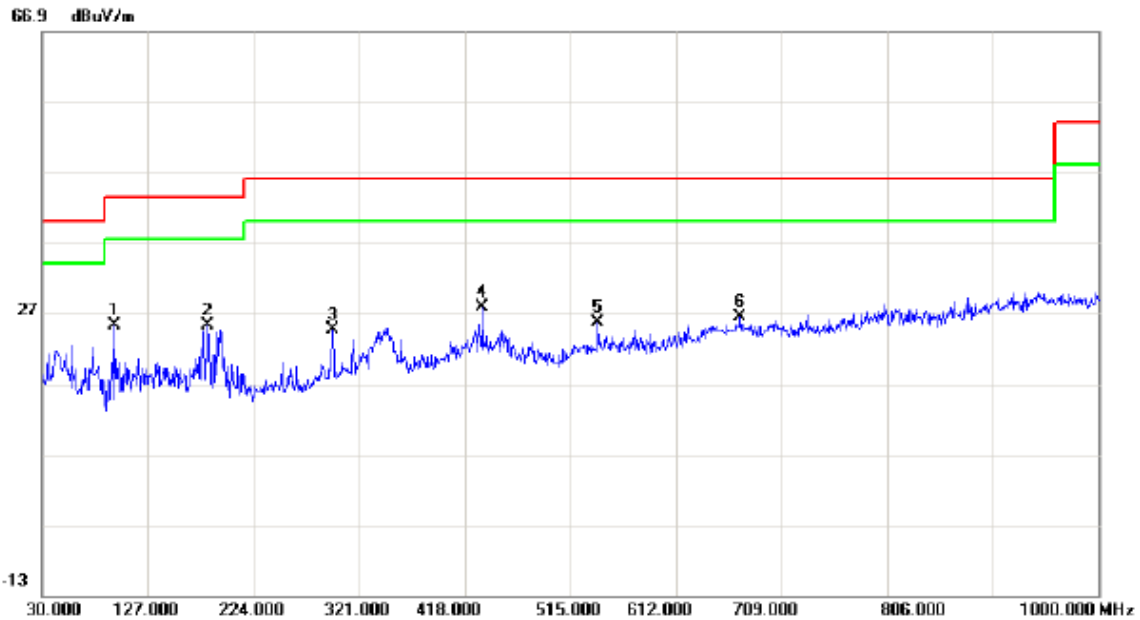
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		94.9900	38.59	-15.51	23.08	43.50	-20.42	peak	
2		160.9500	34.62	-12.16	22.46	43.50	-21.04	peak	
3		250.1900	40.84	-12.67	28.17	46.00	-17.83	peak	
4	*	347.1900	39.46	-9.90	29.56	46.00	-16.44	peak	
5		579.9900	32.71	-4.64	28.07	46.00	-17.93	peak	
6		623.6400	31.92	-3.22	28.70	46.00	-17.30	peak	

Test Mode: TX 2440MHz -CH19 -1Mbps

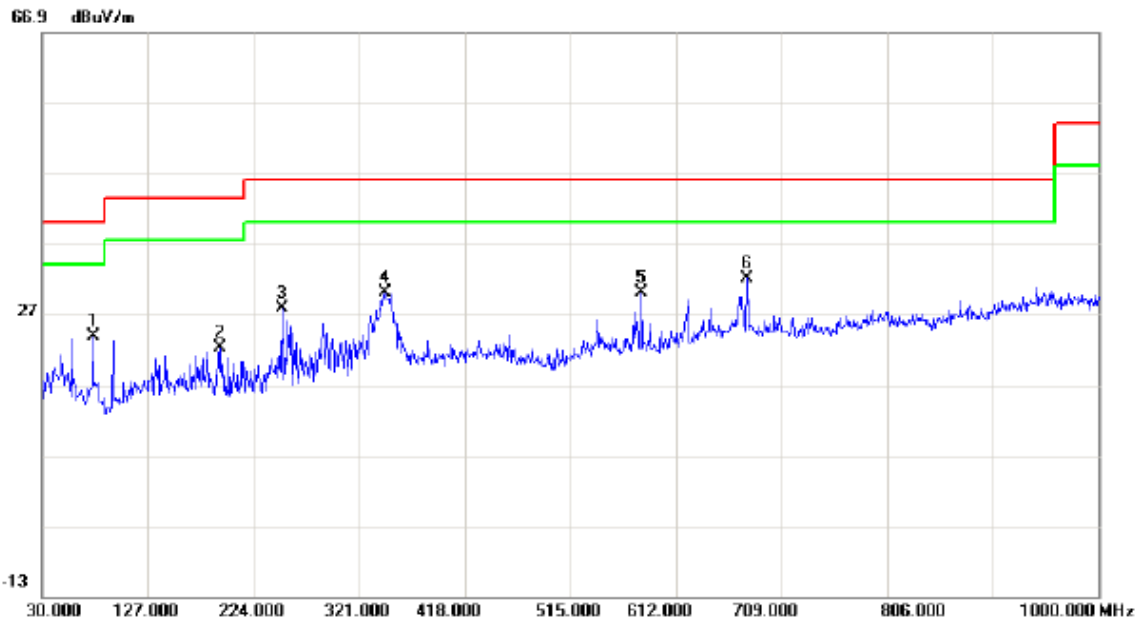
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		95.9600	40.59	-15.35	25.24	43.50	-18.26	peak	
2		182.2900	36.93	-11.82	25.11	43.50	-18.39	peak	
3		296.7500	34.33	-9.66	24.67	46.00	-21.33	peak	
4	*	434.4900	34.15	-6.32	27.83	46.00	-18.17	peak	
5		540.2200	30.74	-5.17	25.57	46.00	-20.43	peak	
6		671.1700	27.96	-1.58	26.38	46.00	-19.62	peak	

Test Mode: TX 2440MHz -CH19 -1Mbps

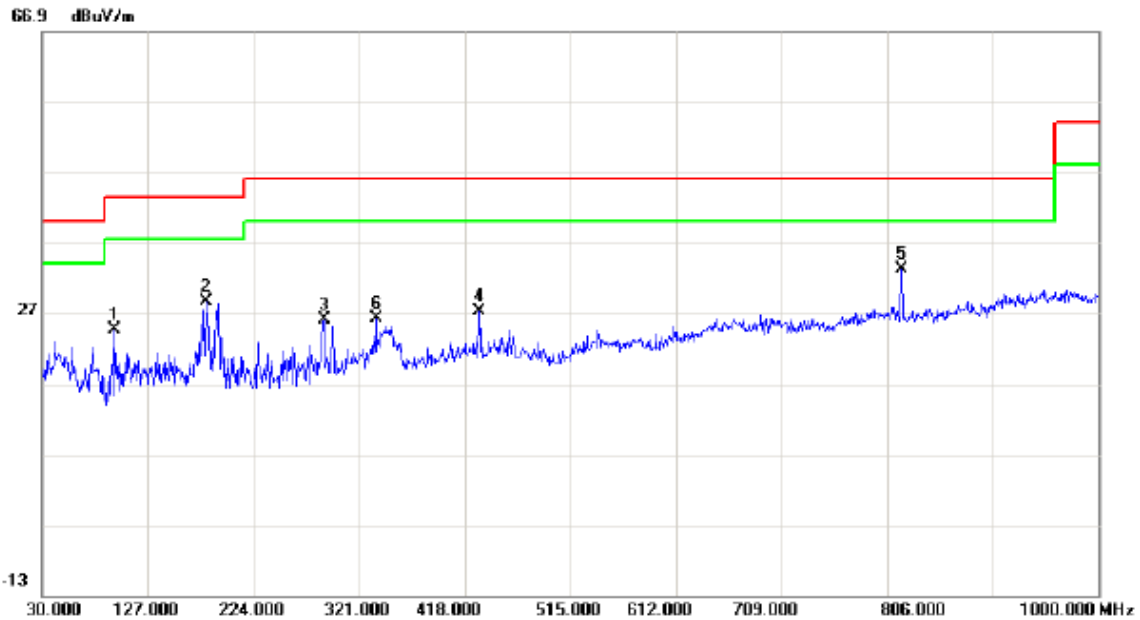
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		76.5600	39.12	-15.40	23.72	40.00	-16.28	peak	
2		193.9300	35.43	-13.22	22.21	43.50	-21.29	peak	
3		250.1900	40.46	-12.67	27.79	46.00	-18.21	peak	
4		344.2800	39.95	-9.89	30.06	46.00	-15.94	peak	
5		579.9900	34.73	-4.64	30.09	46.00	-15.91	peak	
6	*	676.9900	33.50	-1.55	31.95	46.00	-14.05	peak	

Test Mode: TX 2480MHz -CH39 -1Mbps

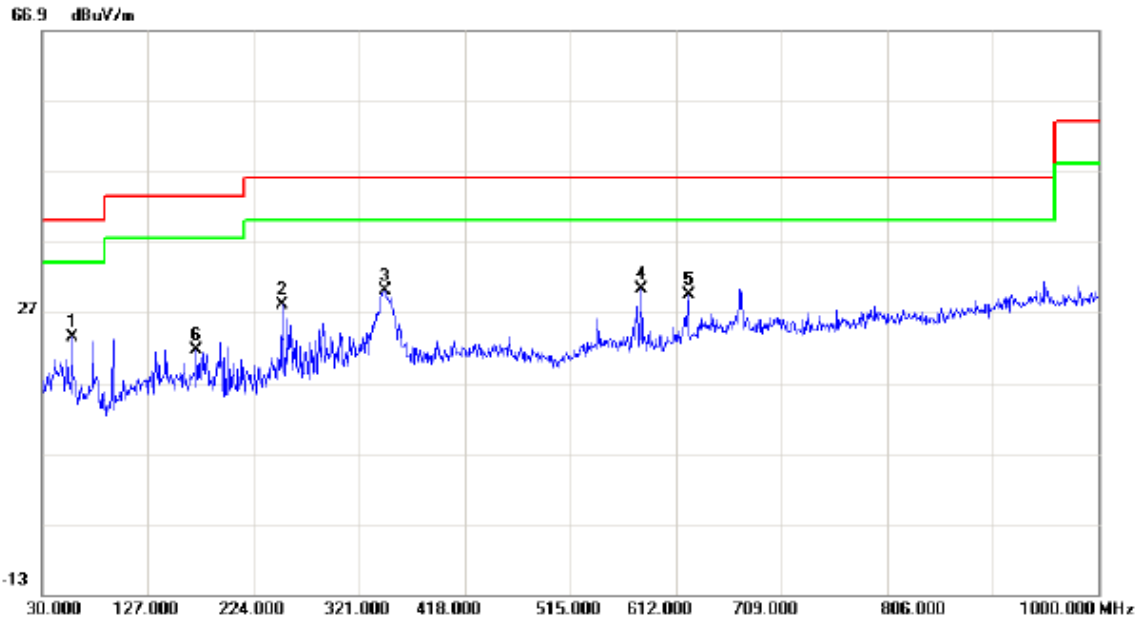
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		95.9600	39.97	-15.35	24.62	43.50	-18.88	peak	
2		180.3500	40.05	-11.53	28.52	43.50	-14.98	peak	
3		288.9900	36.02	-9.94	26.08	46.00	-19.92	peak	
4		431.5800	33.60	-6.40	27.20	46.00	-18.80	peak	
5	*	819.5800	33.12	0.14	33.26	46.00	-12.74	peak	
6		336.5200	35.98	-9.83	26.15	46.00	-19.85	peak	

Test Mode: TX 2480MHz -CH39 -1Mbps

### Horizontal



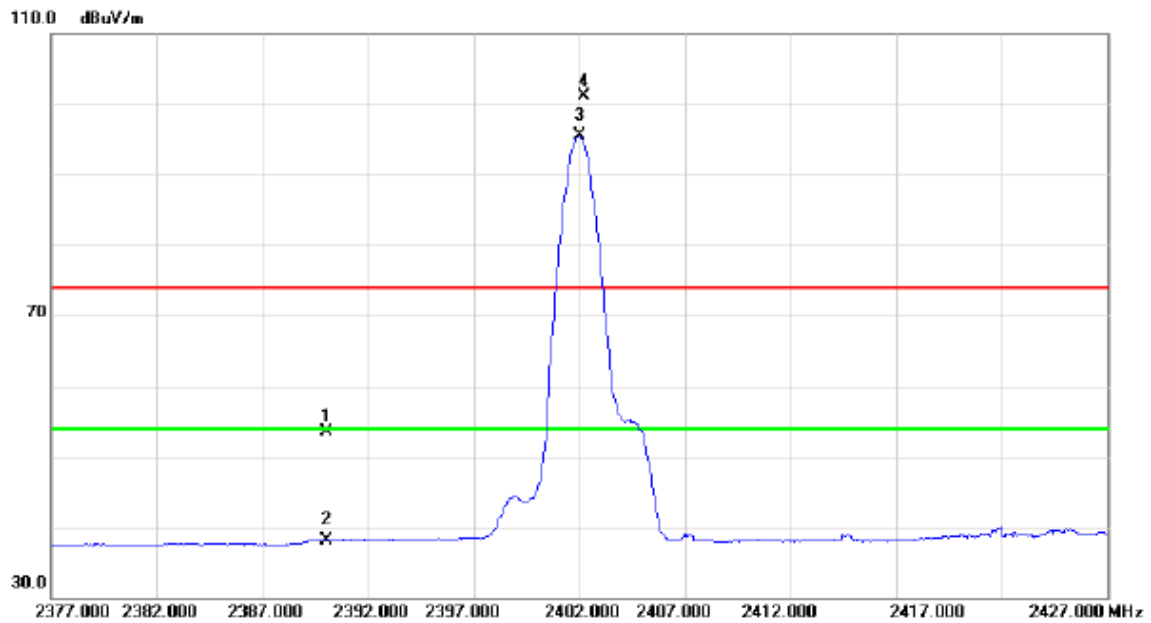
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		57.1600	36.46	-13.03	23.43	40.00	-16.57	peak	
2		250.1900	40.69	-12.67	28.02	46.00	-17.98	peak	
3		344.2800	39.94	-9.89	30.05	46.00	-15.95	peak	
4	*	579.9900	34.85	-4.64	30.21	46.00	-15.79	peak	
5		623.6400	32.65	-3.22	29.43	46.00	-16.57	peak	
6		171.6200	32.69	-11.17	21.52	43.50	-21.98	peak	



**ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)**

Orthogonal Axis :	X
Test Mode :	TX 2402MHz_CH00_1Mbps

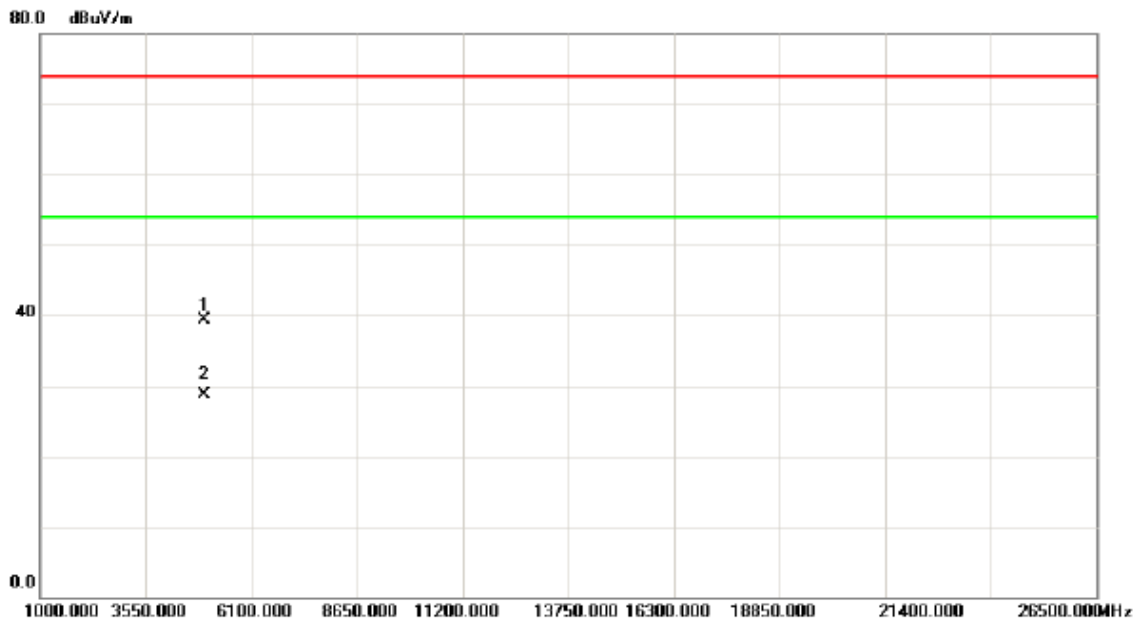
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2390.000	19.35	34.23	53.58	74.00	-20.42	peak	
2		2390.000	3.90	34.23	38.13	54.00	-15.87	AVG	
3	*	2402.000	61.14	34.30	95.44	54.00	41.44	AVG	No Limit
4	X	2402.250	66.82	34.30	101.12	74.00	27.12	peak	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

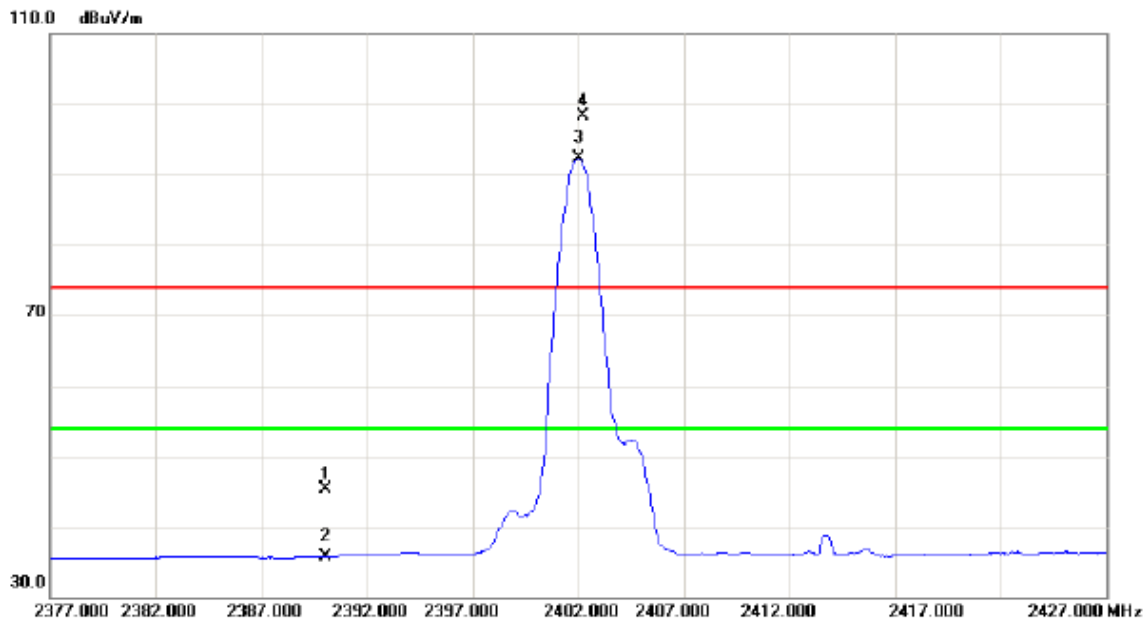
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4959.660	36.21	3.07	39.28	74.00	-34.72	peak	
2	*	4959.940	25.66	3.07	28.73	54.00	-25.27	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

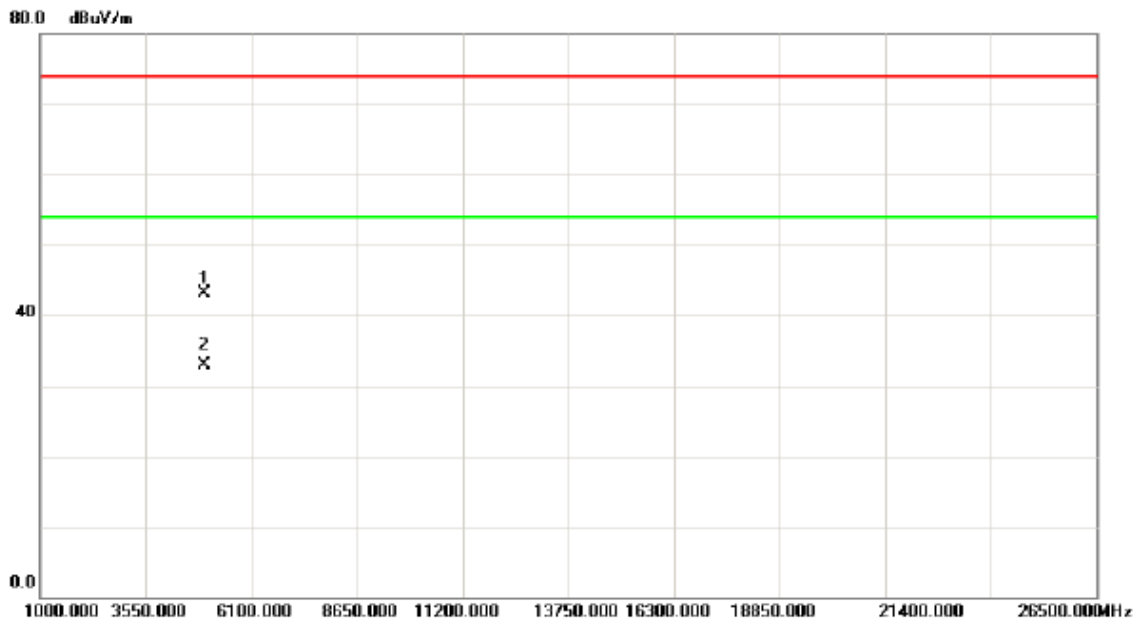
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2390.000	10.97	34.23	45.20	74.00	-28.80	peak	
2		2390.000	1.55	34.23	35.78	54.00	-18.22	AVG	
3	*	2402.000	58.02	34.30	92.32	54.00	38.32	AVG	No Limit
4	X	2402.250	64.03	34.30	98.33	74.00	24.33	peak	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

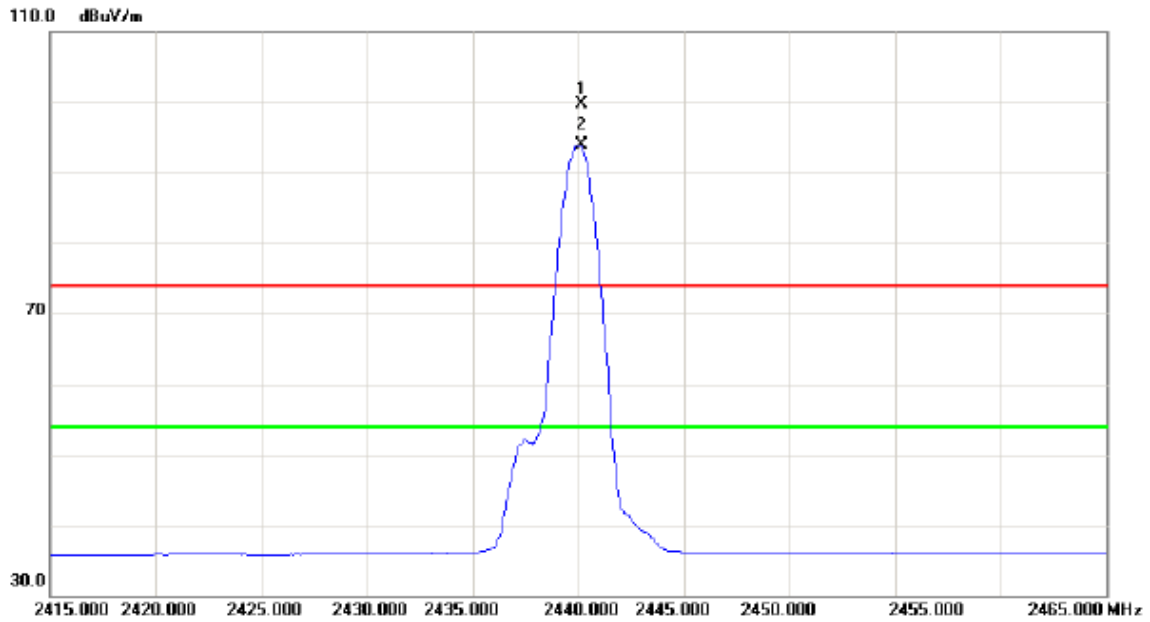
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4959.880	39.98	3.07	43.05	74.00	-30.95	peak	
2	*	4960.020	29.77	3.07	32.84	54.00	-21.16	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz_CH19_1Mbps

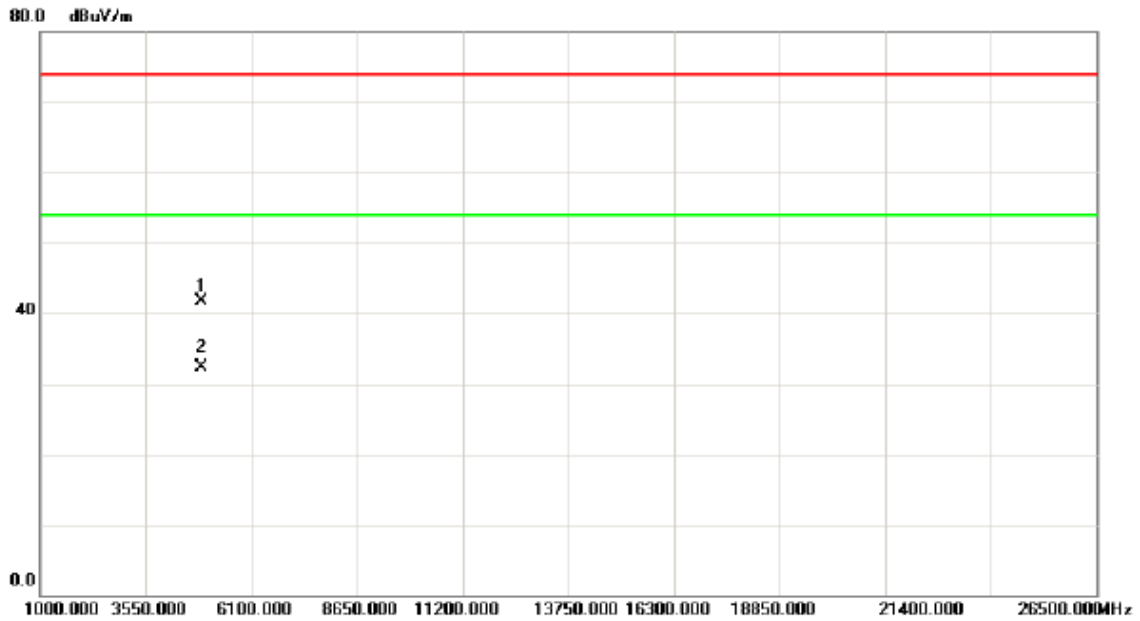
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2440.150	65.27	34.52	99.79	74.00	25.79	peak	No Limit
2	*	2440.150	59.45	34.52	93.97	54.00	39.97	AVG	No Limit

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

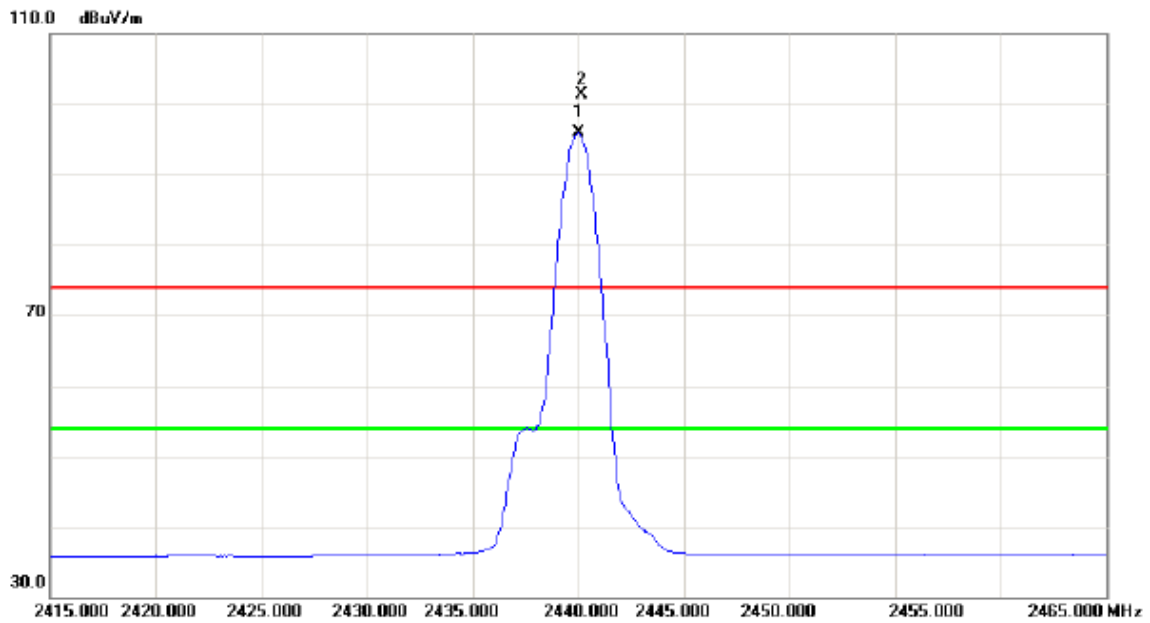
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		4879.600	38.74	3.02	41.76	74.00	-32.24	peak	
2	*	4879.940	29.29	3.02	32.31	54.00	-21.69	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

### Horizontal

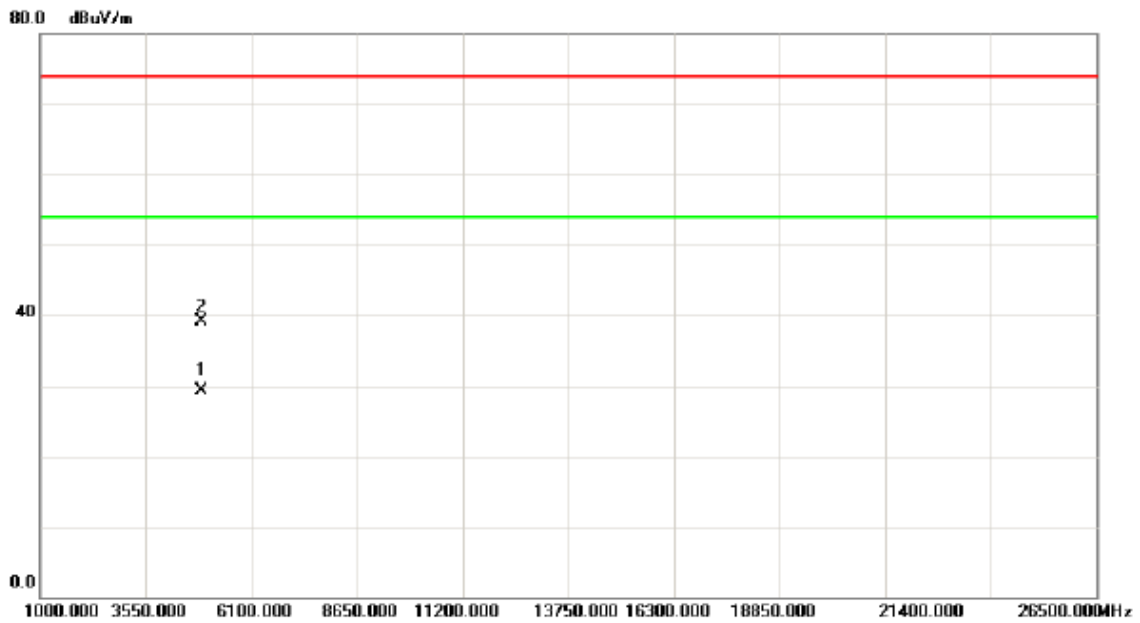


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	2440.000	61.37	34.52	95.89	54.00	41.89	AVG	No Limit
2	X	2440.150	66.83	34.52	101.35	74.00	27.35	peak	No Limit



Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

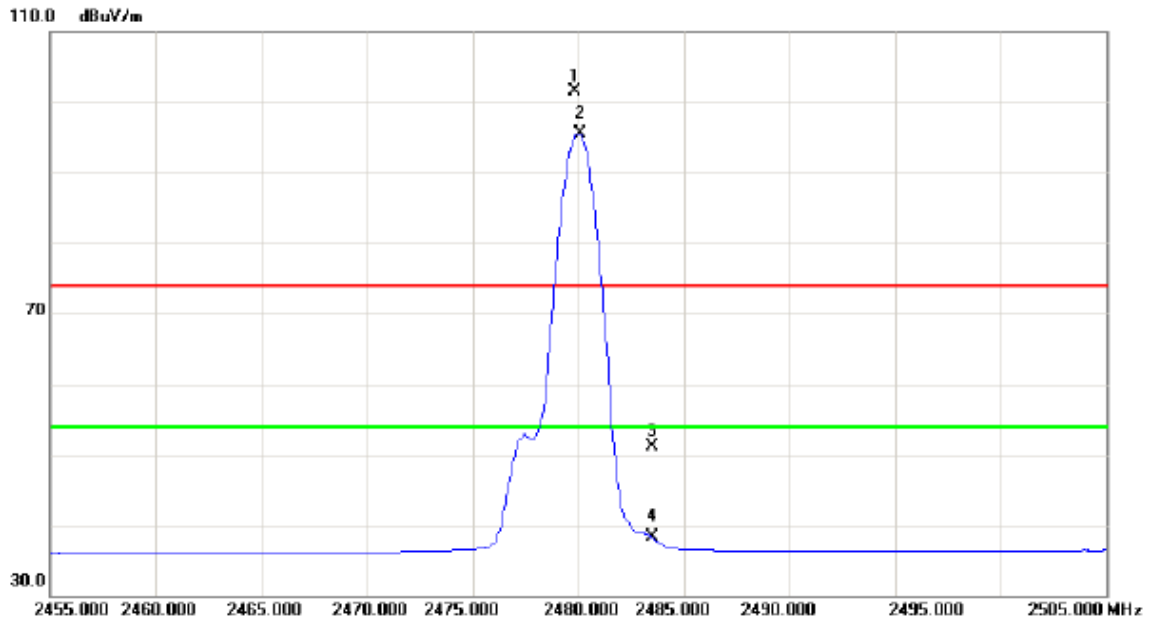
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4879.940	26.22	3.02	29.24	54.00	-24.76	AVG	
2		4879.480	36.15	3.02	39.17	74.00	-34.83	peak	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz_CH39_1Mbps

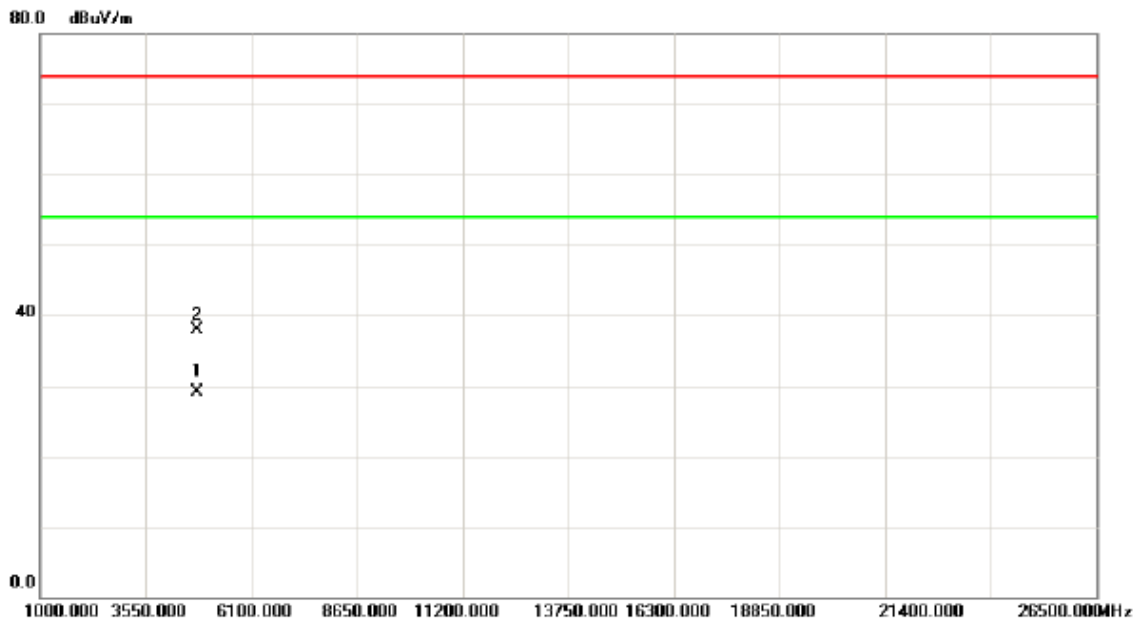
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2479.800	66.70	34.75	101.45	74.00	27.45	peak	No Limit
2	*	2480.100	60.79	34.75	95.54	54.00	41.54	AVG	No Limit
3		2483.500	16.26	34.78	51.04	74.00	-22.96	peak	
4		2483.500	3.45	34.78	38.23	54.00	-15.77	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

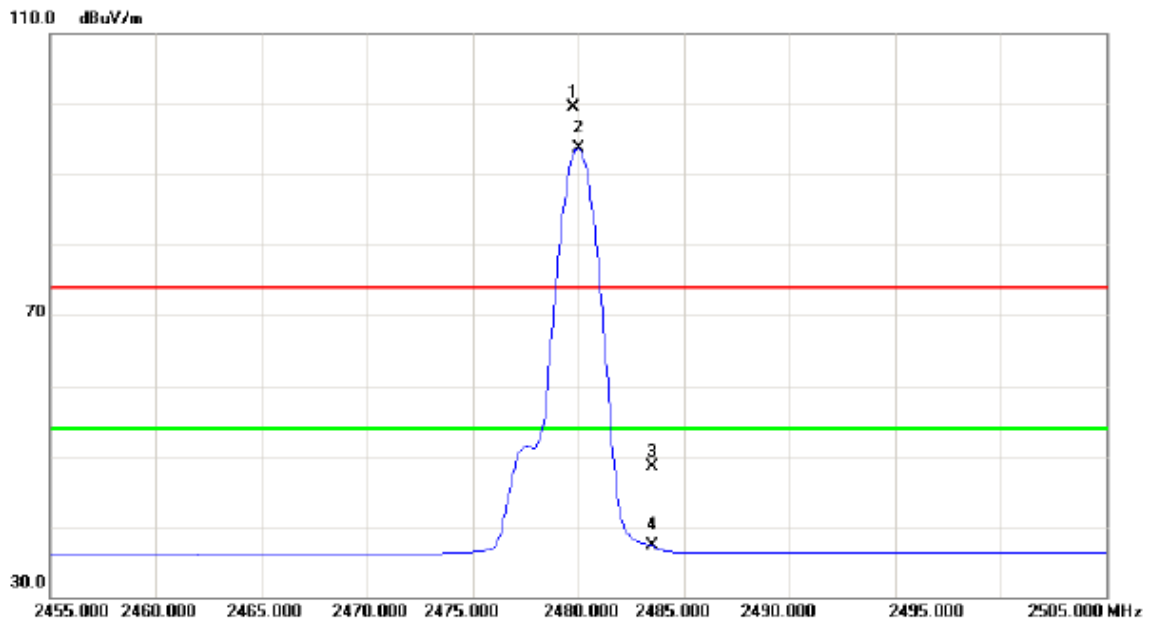
### Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4803.980	26.06	3.00	29.06	54.00	-24.94	AVG	
2		4804.360	34.98	3.00	37.98	74.00	-36.02	peak	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

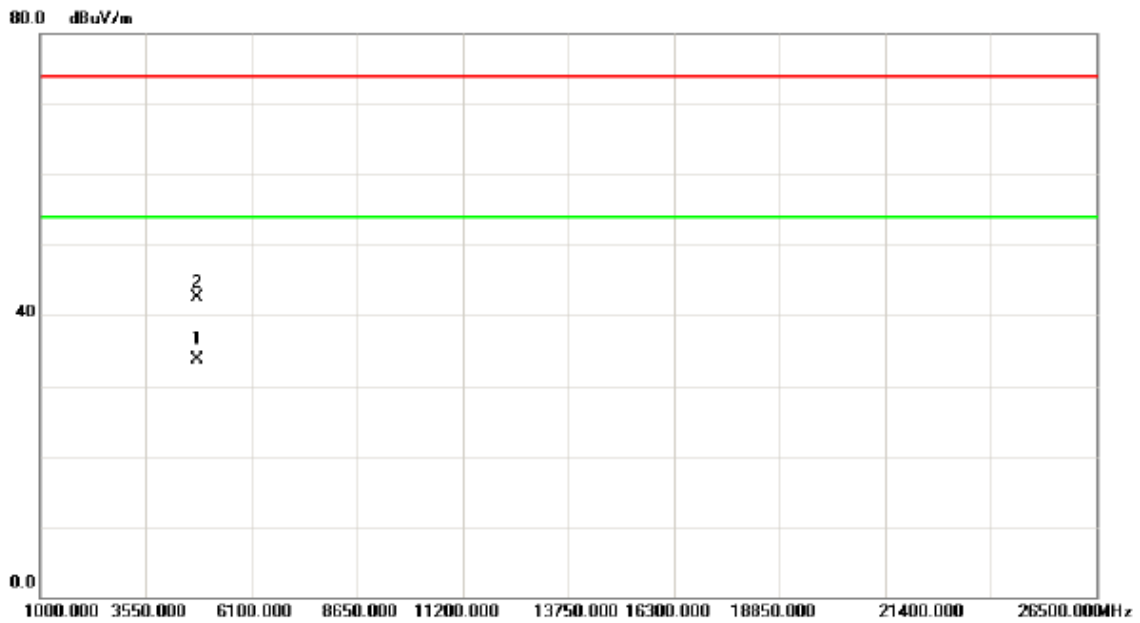
### Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	X	2479.750	64.76	34.75	99.51	74.00	25.51	peak	No Limit
2	*	2480.050	58.98	34.75	93.73	54.00	39.73	AVG	No Limit
3		2483.500	13.63	34.78	48.41	74.00	-25.59	peak	
4		2483.500	2.48	34.78	37.26	54.00	-16.74	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

### Horizontal

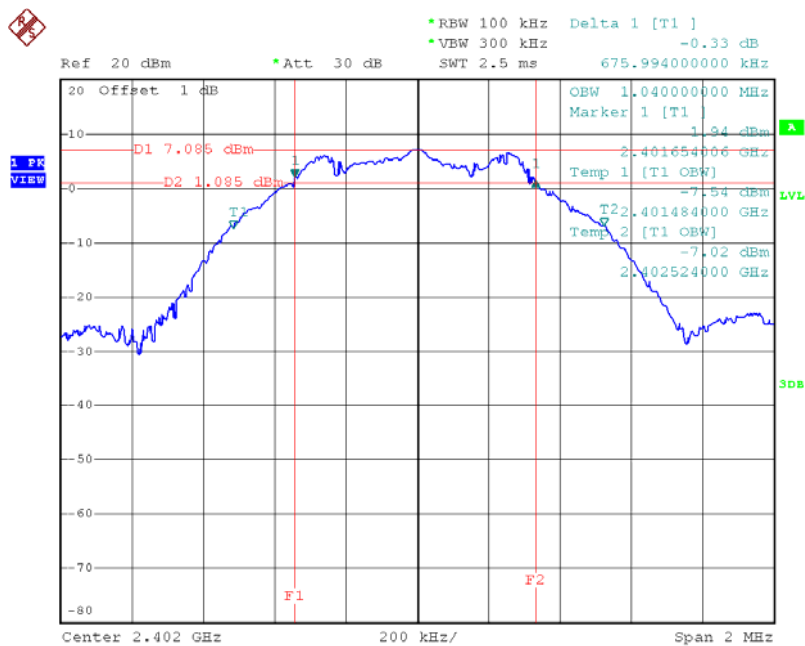


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	*	4803.980	30.74	3.00	33.74	54.00	-20.26	AVG	
2		4804.620	39.41	3.00	42.41	74.00	-31.59	peak	

## ATTACHMENT E - BANDWIDTH

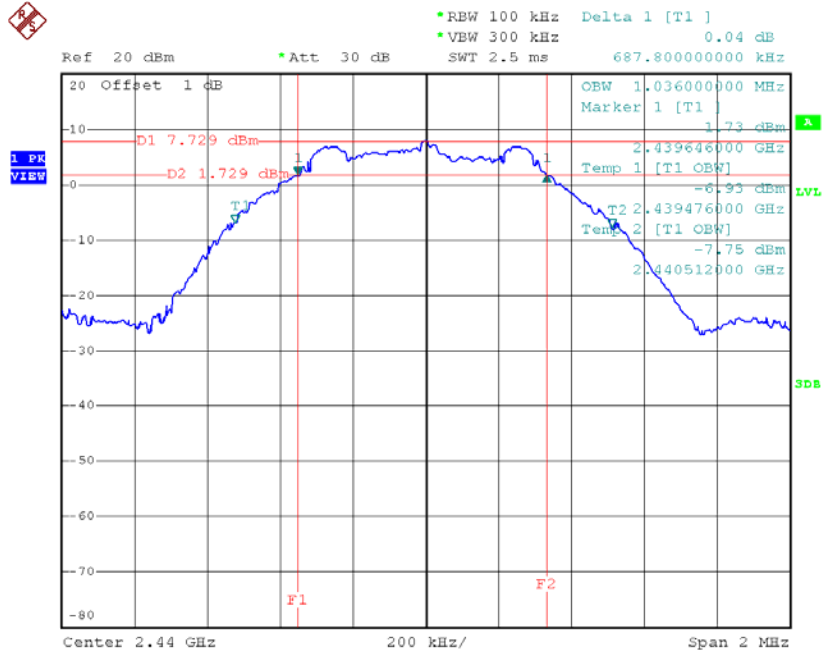
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2402	0.676	1.040	500	Complies
2440	0.688	1.036	500	Complies
2480	0.688	1.040	500	Complies

### TX CH00



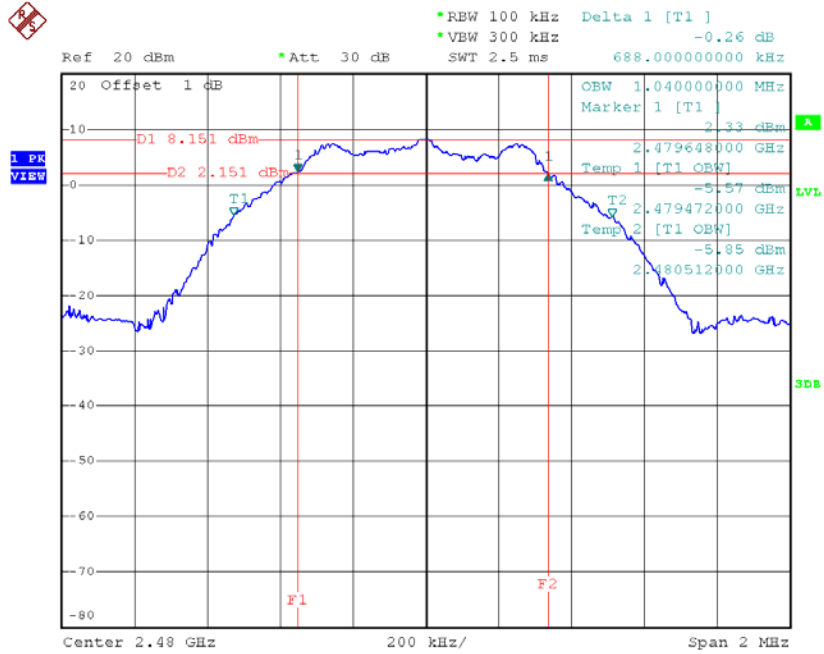
Date: 10.AUG.2015 14:33:52

### TX CH19



Date: 10.AUG.2015 14:36:00

### TX CH39



Date: 10.AUG.2015 14:37:12



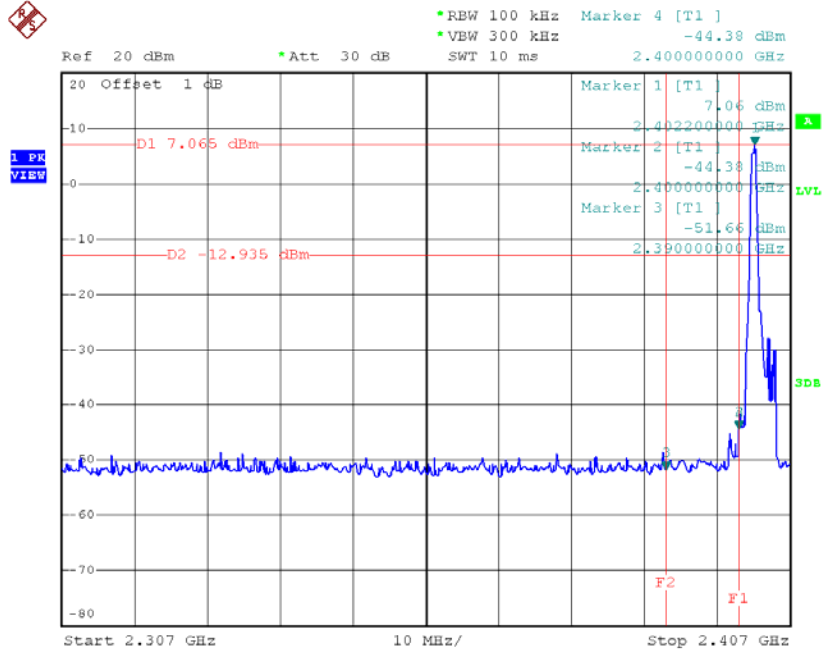
## ATTACHMENT F - MAXIMUM OUTPUT POWER TEST

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watt)	Max. Limit (dBm)	Max. Limit (Watt)	Test Result
2402	6.24	0.0042	30.00	1.00	Complies
2440	6.96	0.0050	30.00	1.00	Complies
2480	7.45	0.0056	30.00	1.00	Complies

**ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS  
EMISSION**

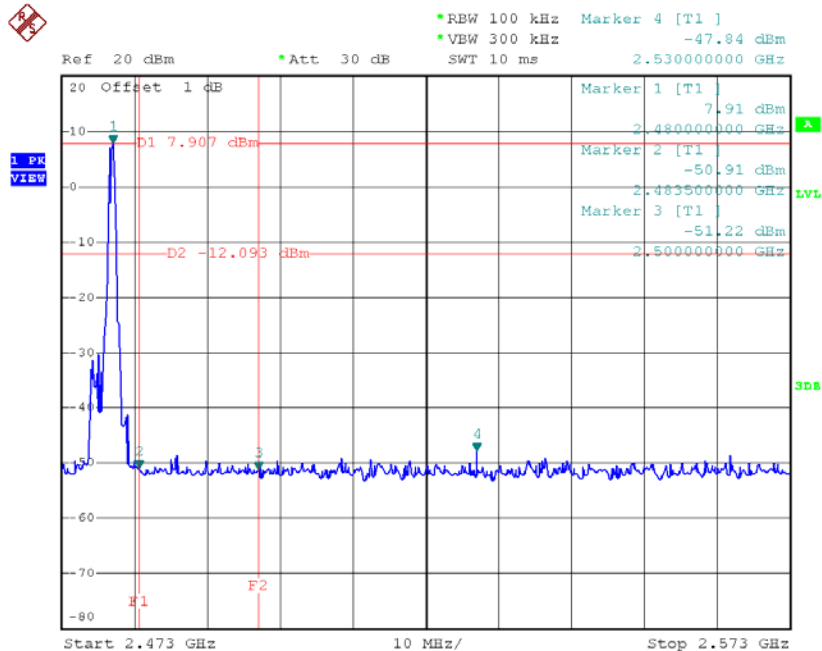
Test Mode : CH00, CH19 , CH39 - 1Mbps

### CH00 (Lower) - 1Mbps



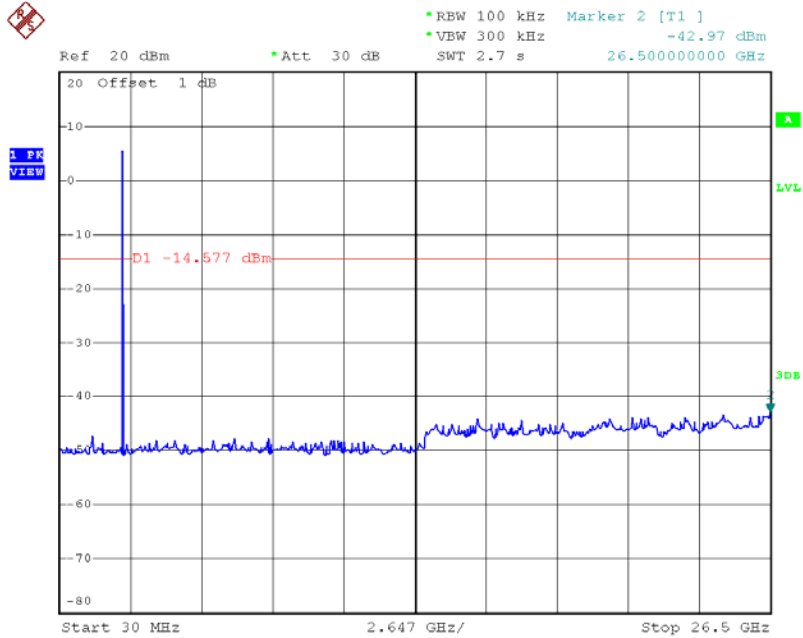
Date: 10.AUG.2015 14:34:01

### CH39 (upper) - 1Mbps



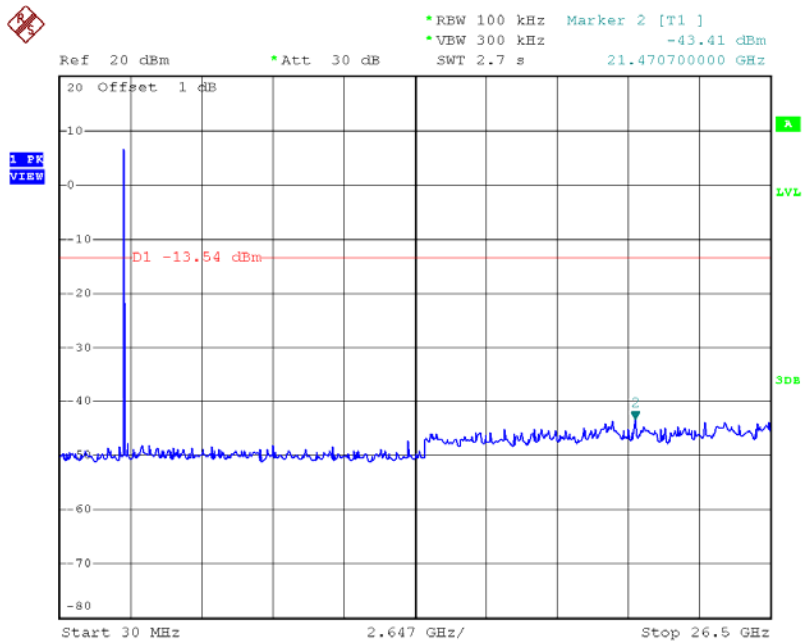
Date: 10.AUG.2015 14:37:20

### CH00 (10 Harmonic of the frequency)



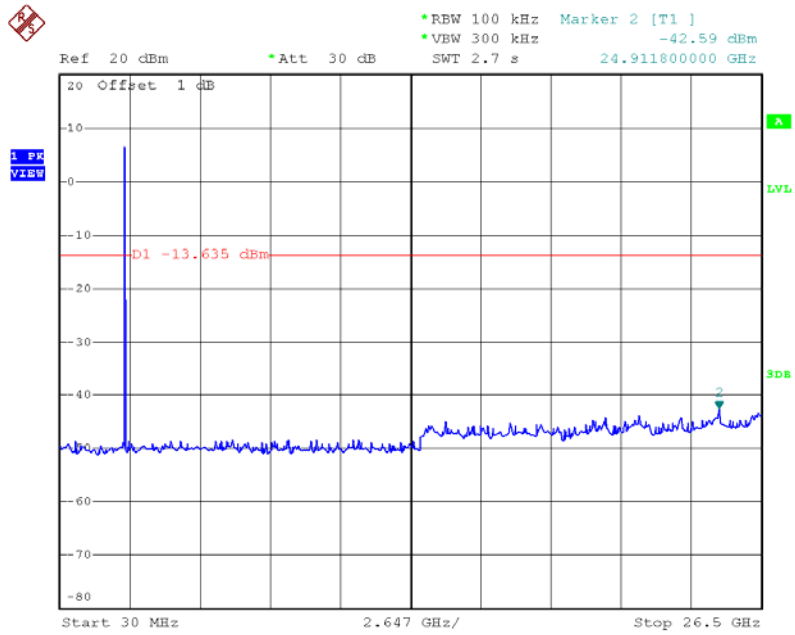
Date: 10.AUG.2015 14:34:22

### CH19 (10 Harmonic of the frequency)



Date: 10.AUG.2015 14:36:14

### CH39 (10 Harmonic of the frequency)

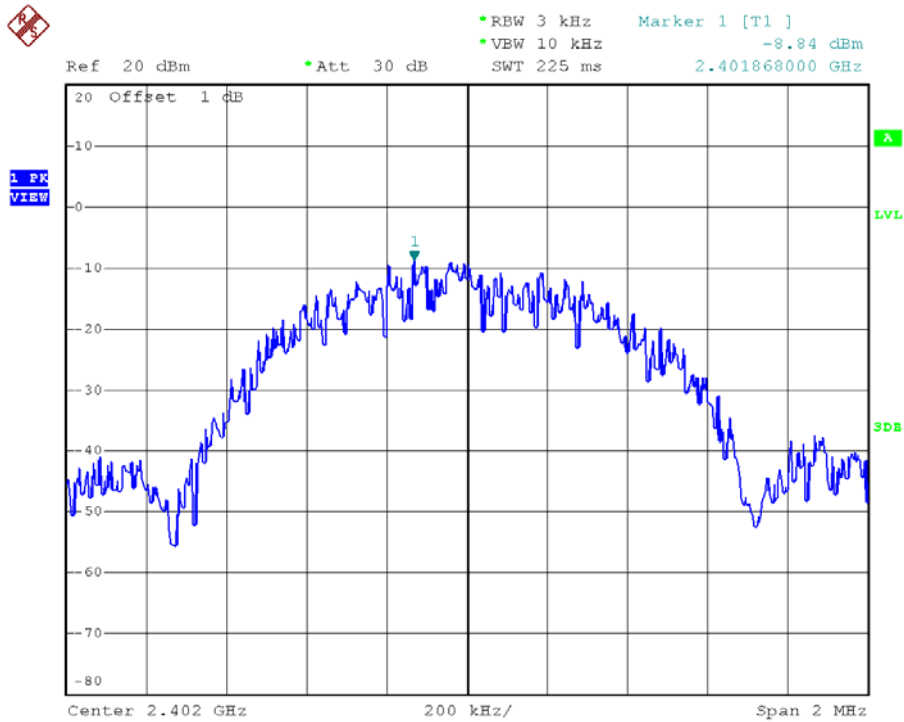


Date: 10.AUG.2015 14:37:34

## ATTACHMENT H - POWER SPECTRAL DENSITY TEST

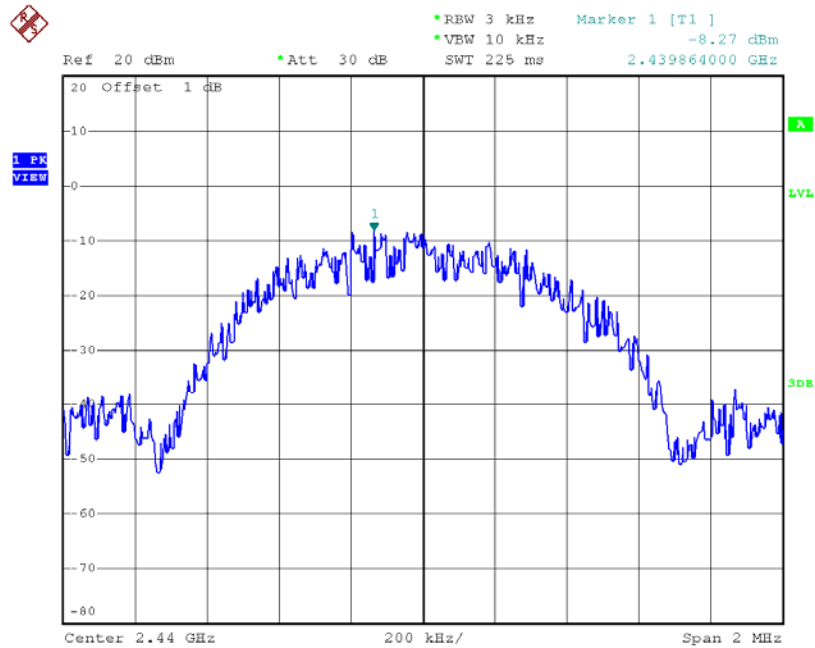
Frequency (MHz)	Power Density (dBm)	Max. Limit (dBm)	Result
2402	-8.84	8	Complies
2440	-8.27	8	Complies
2480	-7.86	8	Complies

### TX CH00



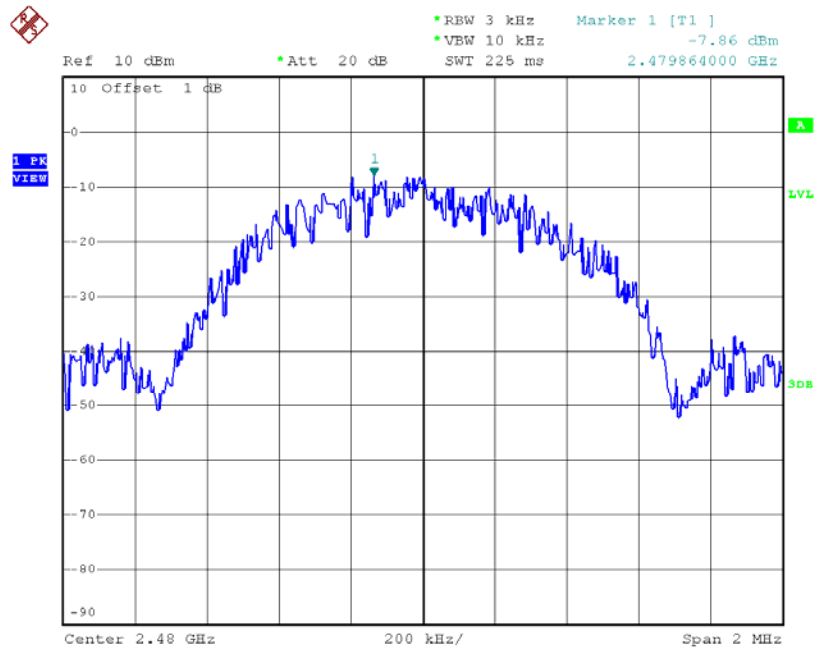
Date: 10.AUG.2015 14:34:28

### TX CH19



Date: 10.AUG.2015 14:36:20

### TX CH39



Date: 10.AUG.2015 15:25:04