FCC&IC Radio Test Report

FCC ID: PVBGETTOGETHER

IC: 10613A-GETT

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

Project No.	**:**	1507C123
Equipment	**:**	Portable Bluetooth Audio System
Model	:	EM-JA006
Applicant	**:**	The House of Marley, LLC
Address	**:**	3000 Pontiac Trail Commerce Township MI-48390, USA

Date of Receipt	**:**	Jul. 13, 2015
Date of Test	**:**	Jul. 13, 2015 ~ Jul. 24, 2015
Issued Date	**:**	Jul. 27, 2015
Tested by	**:**	BTL Inc.

Testing Engineer : David Mao
(David Mao)

Technical Manager : Leo Hung
(Leo Hung)

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(Steven Lu)

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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 the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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.

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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

Table of Contents Page

REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FICP-2-1507C123	Original Issue.	Jul. 27, 2015

1. CERTIFICATION

Equipment	:	Portable Bluetooth Audio System
Brand Name	:	Marley
Model	:	EM-JA006
Applicant	:	The House of Marley, LLC
Manufacturer	:	The House of Marley, LLC
Address	:	3000 Pontiac Trail Commerce Township MI-48390, USA
Date of Test	:	Premium Loudspeakers (HuiZhou) Co. Ltd
Test Sample	:	ENGINEERING SAMPLE
Standard(s)	:	FCC Part15, Subpart C :2014 (15.247) / ANSI C63.10-2013 Canada RSS-247 Issue 1, May 2015 RSS-GEN Issue 4, Nov 2014

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-FICP-2-1507C123) 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: 2014 **Canada RSS-247 Issue 1, May 2015, RSS-GEN Issue 4, Nov 2014**				
Standard(s) Section		Test Item	Judgment	Remark
15.207	RSS-GEN 8.8	Conducted Emission	PASS	
15.247(d)	RSS-247 5.5	Antenna conducted Spurious Emission	PASS	
15.247(a)(2)	RSS-247 5.2 (1)	6dB Bandwidth	PASS	
15.247(b)(3)	RSS-247 5.4 (4)	Peak Output Power	PASS	
15.247(e)	RSS-247 5.2 (2)	Power Spectral Density	PASS	
15.203	-	Antenna Requirement	PASS	
15.209/15.205	RSS-247 5.5	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
BTL 's test firm number for IC: 4428B-1

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** ± **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. H / V	U,(dB)	Note
DG-CB03	CISPR	9KHz~30MHz	V	3.79	
		9KHz~30MHz	H	3.57	
		30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
		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	Portable Bluetooth Audio System	
Brand Name	Marley	
Model	EM-JA006	
Model Difference	N/A	
Product Description	Operation Frequency	2402~2480 MHz
	Modulation Technology	GFSK(1Mbps)
	Bit Rate of Transmitter	
	Output Power (Max.)	3.33 dBm (1Mbps)
Power Source	#1 DC voltage supplied from AC/DC adapter. Brand/Model: DYS/DYS242-150160W-1 #2 Battery supplied. Model: ICR18650-2000	
Power Rating	#1 I/P: AC 100-240V 50/60Hz 0.75A MAX O/P: DC 15V 1.6A #2 DC 11.1V 22.2Wh	

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	PIFA	N/A	2.27

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 **NOTE (1)**
Mode 2	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 2	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.

(2) Both adapter and battery are evaluated, operated the battery is the worst and recorded as below test data

(3) The EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test

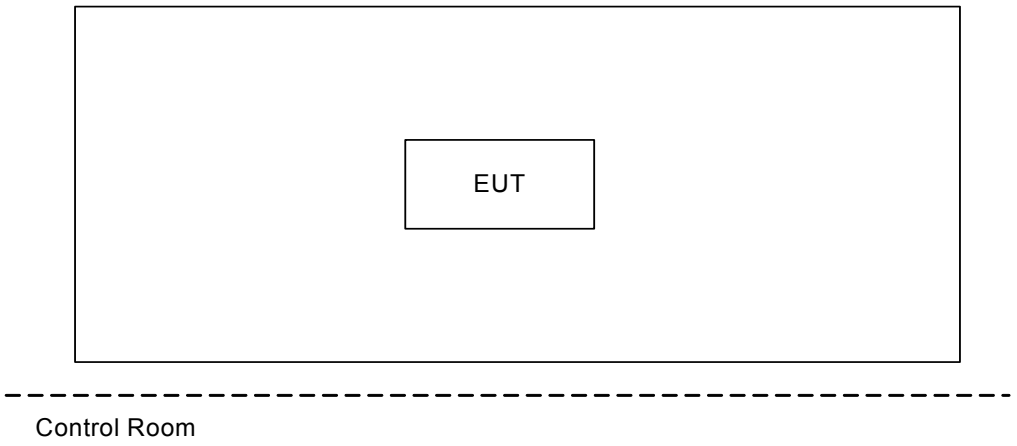
3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

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

1Mbps

Test Software Version	Bluetest3		
Frequency (MHz)	2402	2440	2480
BT LE	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/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 (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

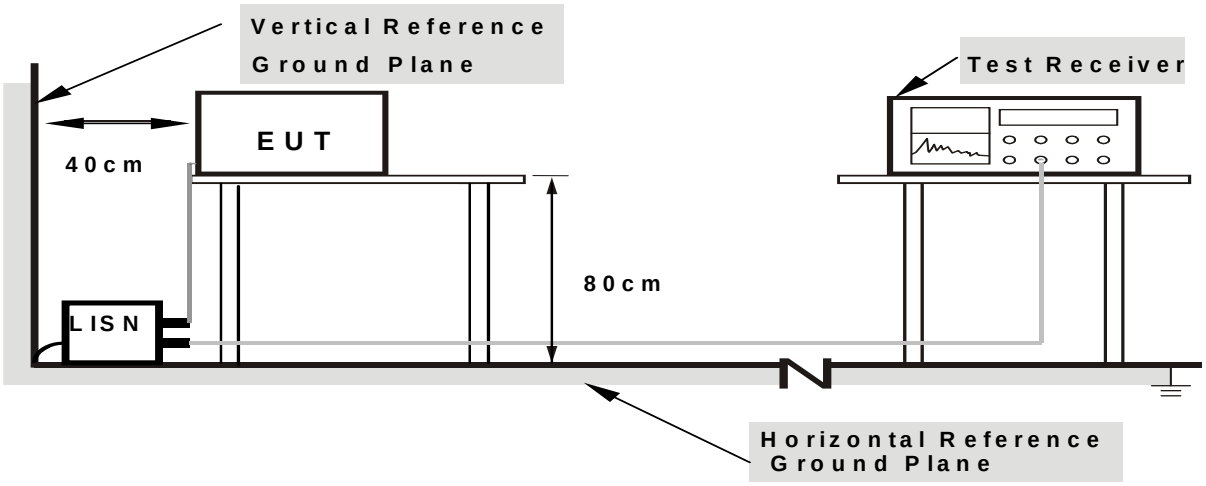
4.1.2 TEST PROCEDURE

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 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) & RSS-247 5.5, then the 15.209(a)& RSS-Gen 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& RSS-247.

(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

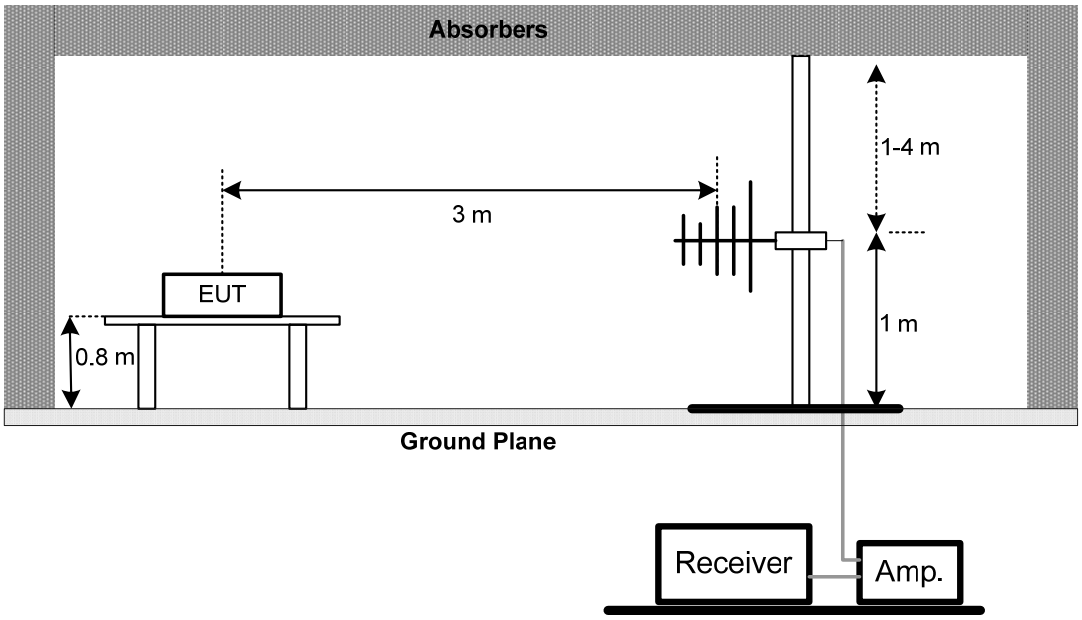
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 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

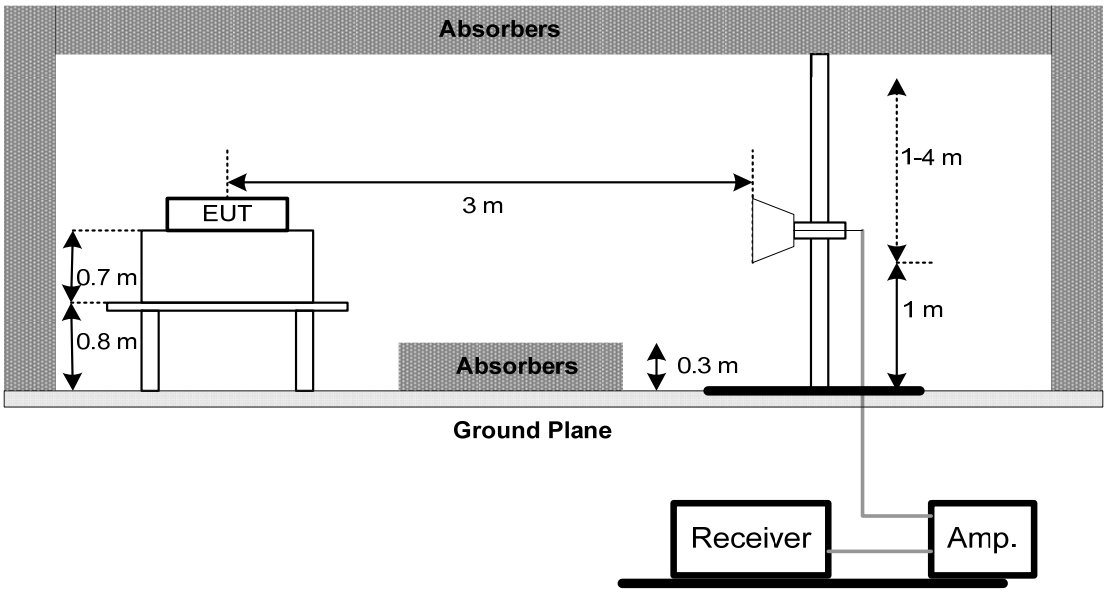
No deviation

4.2.4 TEST SETUP

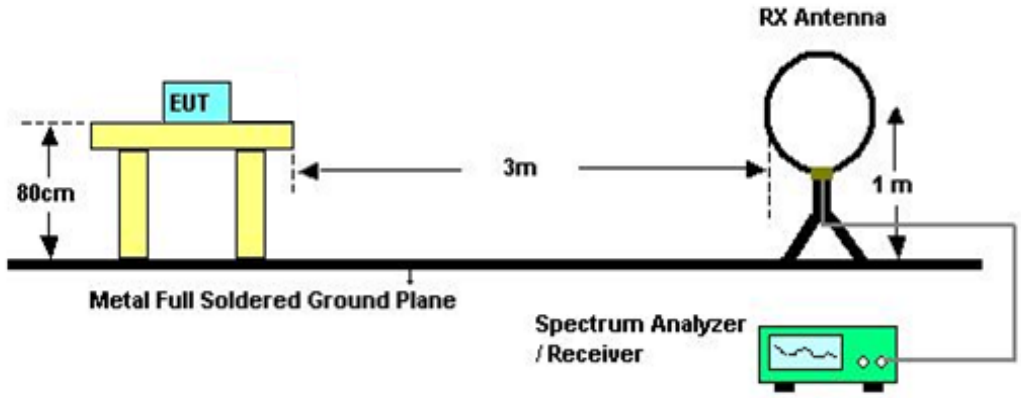
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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: DC 11V

4.2.7TEST 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 (specific distance / test distance) (dB).
(3) Limit line = specific limits (dBuV) + distance extrapolation factor.

4.2.8TEST RESULTS (30MHZ TO 1000 MHZ)

Please refer to the Attachment C.

Remark:

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz；SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz.
(2) 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.
(3) Measuring frequency range from 30MHz to 1000MHz.
(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

4.2.9TEST 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/ RSS-GEN and RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2) RSS-GEN section 6.6 RSS-247 5.2 (1)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

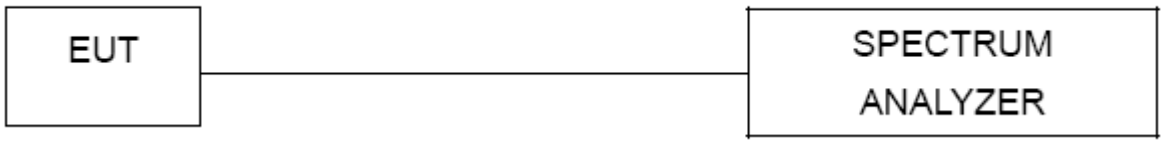
5.1.1 TEST PROCEDURE

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 = 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: DC 11V

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/ RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3) RSS-247 5.4 (4)	Maximum Output Power	1 watt or 30dBm	2400-2483.5	PASS

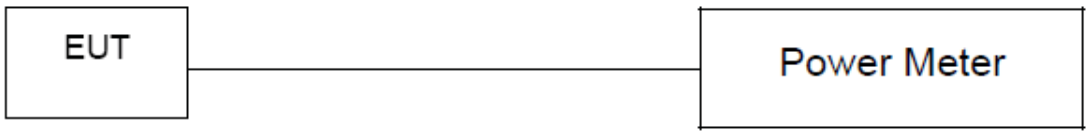
6.1.1 TEST PROCEDURE

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: DC 11V

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.

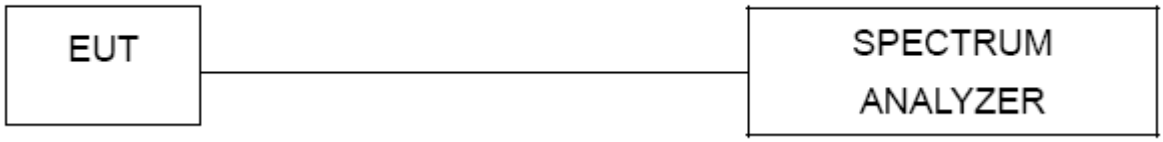
7.1.1 TEST PROCEDURE

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: DC 11V

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 / RSS-247				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e) RSS-247 5.2 (2)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

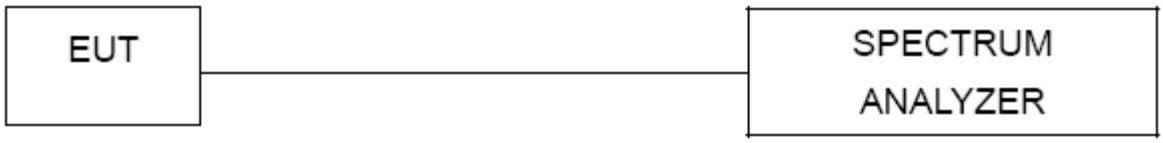
8.1.1 TEST PROCEDURE

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: DC 11V

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	N/A	C_17	N/A	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

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	Test Receiver	R&S	ESCI	100382	Mar. 28, 2016
4	Test Cable	N/A	C-01_CB03	N/A	Jun. 30, 2016
5	Antenna	ETS	3115	00075789	Mar. 28, 2016
6	Amplifier	Agilent	8449B	3008A02274	Mar. 28, 2016
7	Spectrum	Agilent	E4408B	US39240143	Nov. 10, 2015
8	Test Cable	HUBER+SUHNER	C-45	N/A	Mar. 28, 2016
9	Controller	CT	SC100	N/A	N/A
10	Horn Antenna	EMCO	3115	9605-4803	Mar. 28, 2016
11	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Mar. 28, 2016
12	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct. 21, 2015

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

Peak Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	P-series Power meter	Agilent	N1911A	MY45100473	Mar. 28, 2016
2	Wireband Power sensor	Agilent	N1921A	MY51100041	Mar. 28, 2016

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

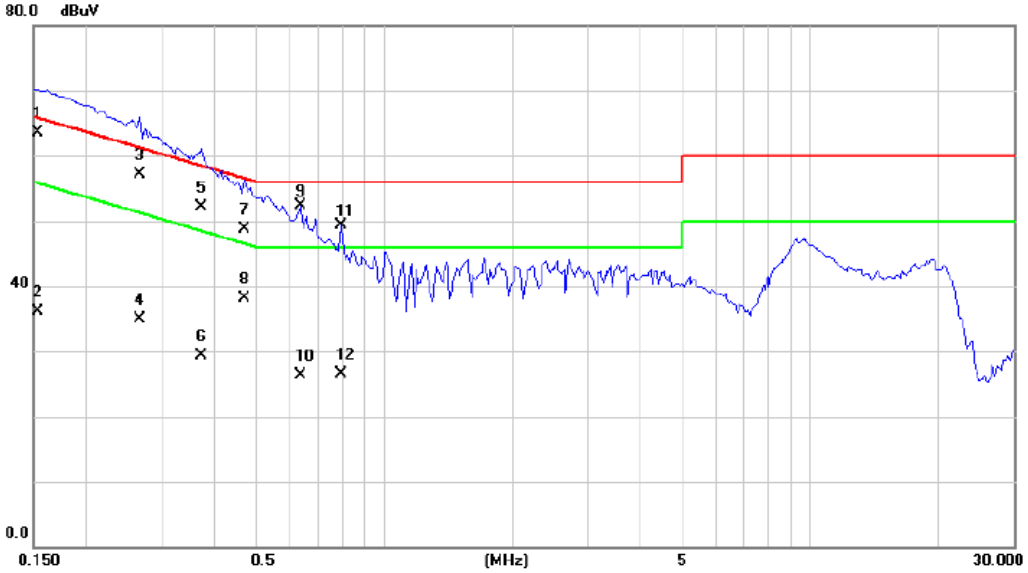
Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 02, 2015

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

ATTACHMENT A - CONDUCTED EMISSION

Test Mode:	TX Mode

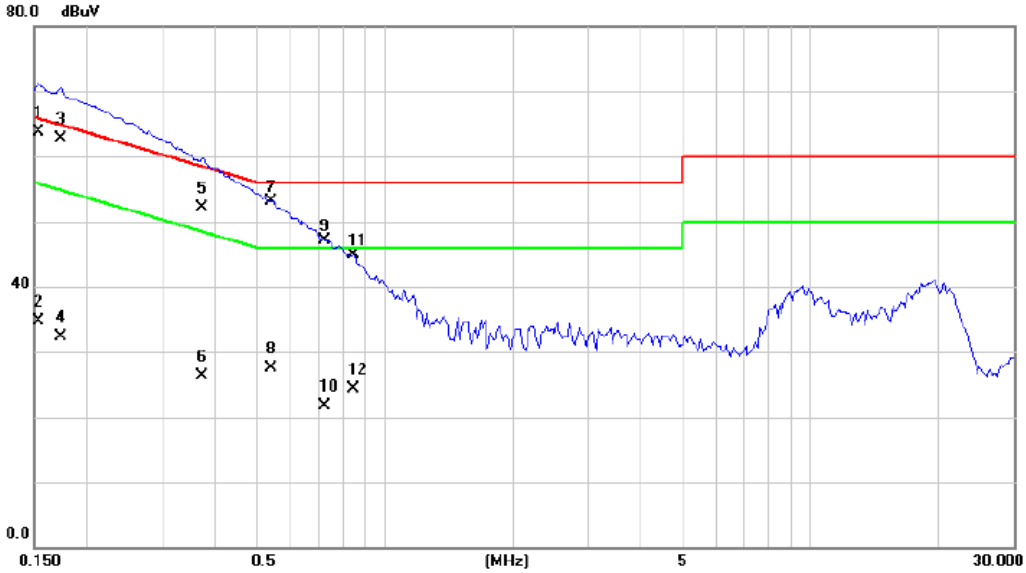
Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1540	53.90	9.54	63.44	65.78	-2.34	QP	
2		0.1540	26.60	9.54	36.14	55.78	-19.64	AVG	
3		0.2672	47.50	9.62	57.12	61.20	-4.08	QP	
4		0.2672	25.30	9.62	34.92	51.20	-16.28	AVG	
5		0.3727	42.40	9.66	52.06	58.44	-6.38	QP	
6		0.3727	19.70	9.66	29.36	48.44	-19.08	AVG	
7		0.4703	39.00	9.68	48.68	56.51	-7.83	QP	
8		0.4703	28.50	9.68	38.18	46.51	-8.33	AVG	
9		0.6344	42.50	9.73	52.23	56.00	-3.77	peak	
10		0.6344	16.60	9.73	26.33	46.00	-19.67	AVG	
11		0.7906	39.58	9.75	49.33	56.00	-6.67	peak	
12		0.7906	16.80	9.75	26.55	46.00	-19.45	AVG	

Test Mode:	TX Mode

Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1540	54.20	9.49	63.69	65.78	-2.09	QP	
2		0.1540	25.30	9.49	34.79	55.78	-20.99	AVG	
3		0.1734	53.20	9.48	62.68	64.80	-2.12	QP	
4		0.1734	22.90	9.48	32.38	54.80	-22.42	AVG	
5		0.3727	42.50	9.54	52.04	58.44	-6.40	QP	
6		0.3727	16.80	9.54	26.34	48.44	-22.10	AVG	
7		0.5406	43.62	9.56	53.18	56.00	-2.82	peak	
8		0.5406	18.00	9.56	27.56	46.00	-18.44	AVG	
9		0.7236	37.62	9.54	47.16	56.00	-8.84	peak	
10		0.7236	12.10	9.54	21.64	46.00	-24.36	AVG	
11		0.8453	35.37	9.57	44.94	56.00	-11.06	peak	
12		0.8453	14.80	9.57	24.37	46.00	-21.63	AVG	

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

Test Mode:	TX Mode

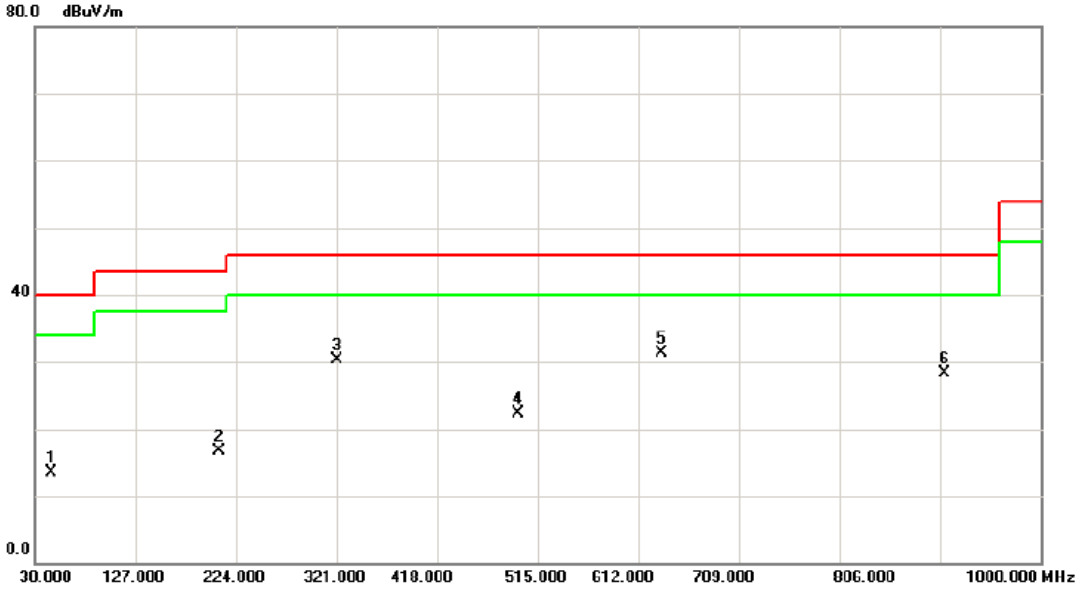
Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit(QP) (dBuV/m)	Margin (dB)	Note
0.0102	0°	13.42	24.92	38.34	127.43	-89.09	AVG
1.0102	0°	14.55	24.92	39.47	147.43	-107.96	PEAK
0.0254	0°	6.72	23.96	30.68	119.51	-88.83	AVG
0.0254	0°	8.24	23.96	32.20	139.51	-107.31	PEAK
0.0342	0°	3.29	23.40	26.69	116.92	-90.23	AVG
0.0342	0°	5.72	23.40	29.12	136.92	-107.80	PEAK
0.0451	0°	1.26	22.71	23.97	114.52	-90.55	AVG
0.0451	0°	2.68	22.71	25.39	134.52	-109.13	PEAK
0.4943	0°	19.53	19.81	39.34	73.72	-34.38	QP
1.7172	0°	23.69	19.53	43.22	69.54	-26.32	QP

Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit(QP) (dBuV/m)	Margin (dB)	Note
0.0096	90°	13.26	24.30	37.56	127.94	-90.38	AVG
0.0096	90°	14.93	24.30	39.23	147.94	-108.71	PEAK
0.0283	90°	7.46	23.77	31.23	118.57	-87.33	AVG
0.0283	90°	8.84	23.77	32.61	138.57	-105.95	PEAK
0.0346	90°	5.49	23.38	28.87	116.82	-87.96	AVG
0.0346	90°	6.21	23.38	29.59	136.82	-107.24	PEAK
0.0432	90°	1.61	22.83	24.44	114.89	-90.45	AVG
0.0432	90°	2.76	22.83	25.59	134.89	-109.30	PEAK
0.4924	90°	22.31	19.82	42.13	73.76	-31.63	QP
1.7134	90°	24.43	19.53	43.96	69.54	-25.58	QP

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

Test Mode:	TX 2402MHz -CH00 -1Mbps

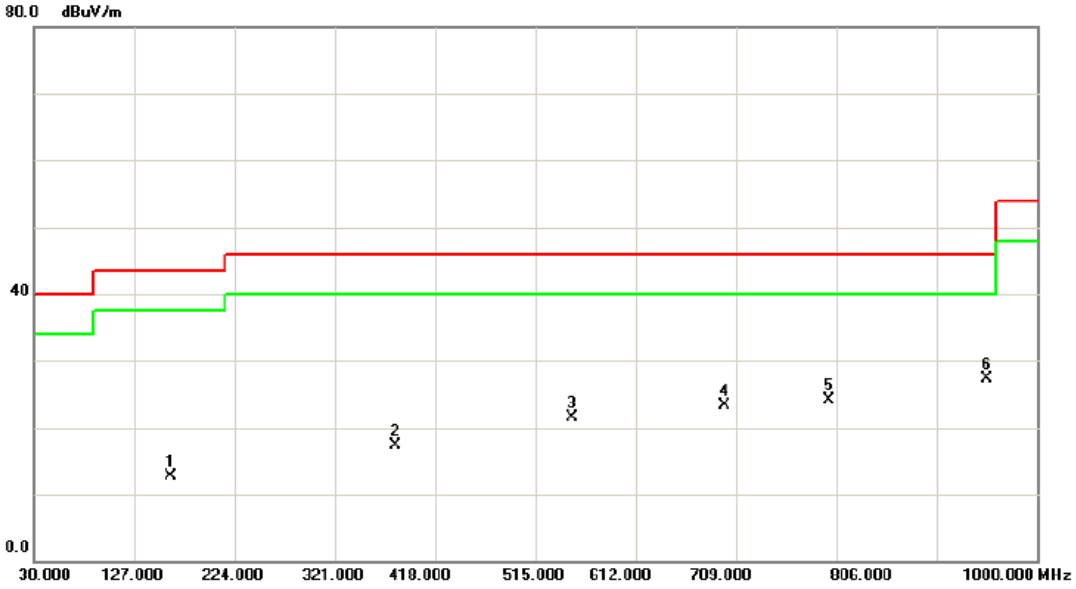
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		45.5200	26.80	-13.25	13.55	40.00	-26.45	peak	
2		207.5100	31.55	-14.92	16.63	43.50	-26.87	peak	
3		321.0000	41.23	-10.85	30.38	46.00	-15.62	peak	
4		495.6000	32.22	-9.82	22.40	46.00	-23.60	peak	
5	*	634.3100	37.25	-5.98	31.27	46.00	-14.73	peak	
6		906.8800	27.99	0.37	28.36	46.00	-17.64	peak	

Test Mode:	TX 2402MHz -CH00 -1Mbps

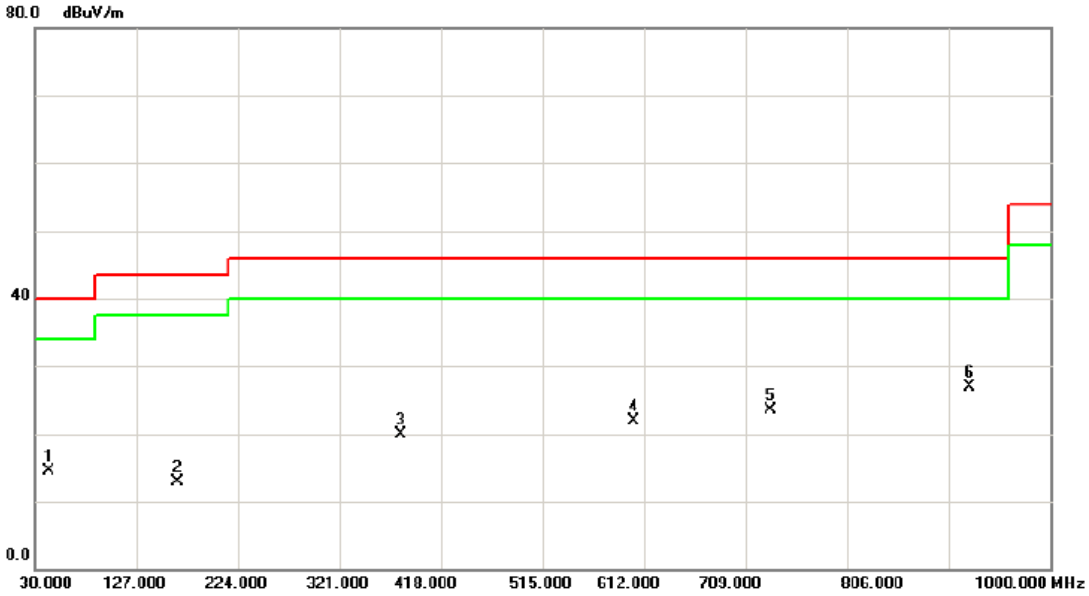
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		161.9200	25.22	-12.52	12.70	43.50	-30.80	peak	
2		380.1700	27.42	-10.11	17.31	46.00	-28.69	peak	
3		550.8900	26.61	-5.19	21.42	46.00	-24.58	peak	
4		697.3600	27.62	-4.24	23.38	46.00	-22.62	peak	
5		798.2400	26.18	-2.16	24.02	46.00	-21.98	peak	
6	*	951.5000	27.50	-0.20	27.30	46.00	-18.70	peak	

Test Mode:	TX 2440MHz -CH19 -1Mbps

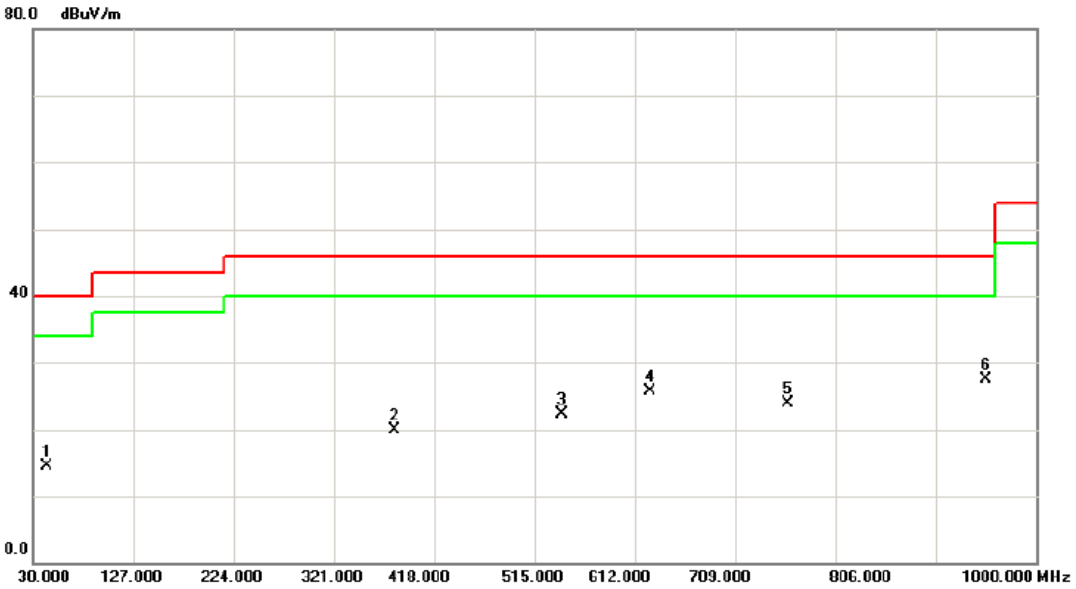
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		43.5800	28.05	-13.53	14.52	40.00	-25.48	peak	
2		166.7700	25.68	-12.73	12.95	43.50	-30.55	peak	
3		380.1700	29.99	-10.11	19.88	46.00	-26.12	peak	
4		602.3000	29.68	-7.73	21.95	46.00	-24.05	peak	
5		733.2500	27.99	-4.46	23.53	46.00	-22.47	peak	
6	*	922.4000	26.79	0.16	26.95	46.00	-19.05	peak	

Test Mode:	TX 2440MHz -CH19 -1Mbps

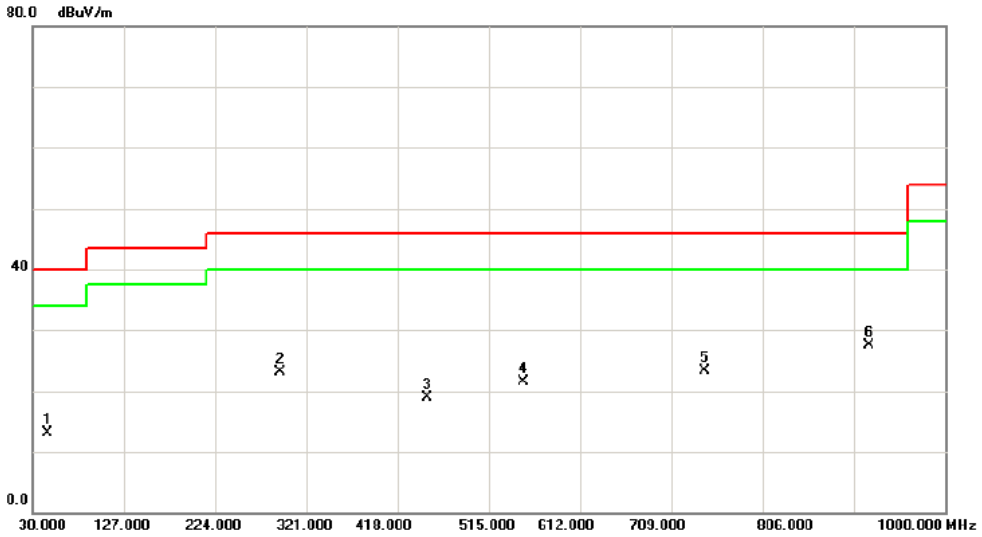
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		43.5800	28.05	-13.53	14.52	40.00	-25.48	peak	
2		380.1700	29.99	-10.11	19.88	46.00	-26.12	peak	
3		541.1900	28.23	-6.00	22.23	46.00	-23.77	peak	
4		626.5500	32.12	-6.39	25.73	46.00	-20.27	peak	
5		760.4100	27.91	-4.07	23.84	46.00	-22.16	peak	
6	*	951.5000	27.64	-0.20	27.44	46.00	-18.56	peak	

Test Mode:	TX 2480MHz -CH39 -1Mbps

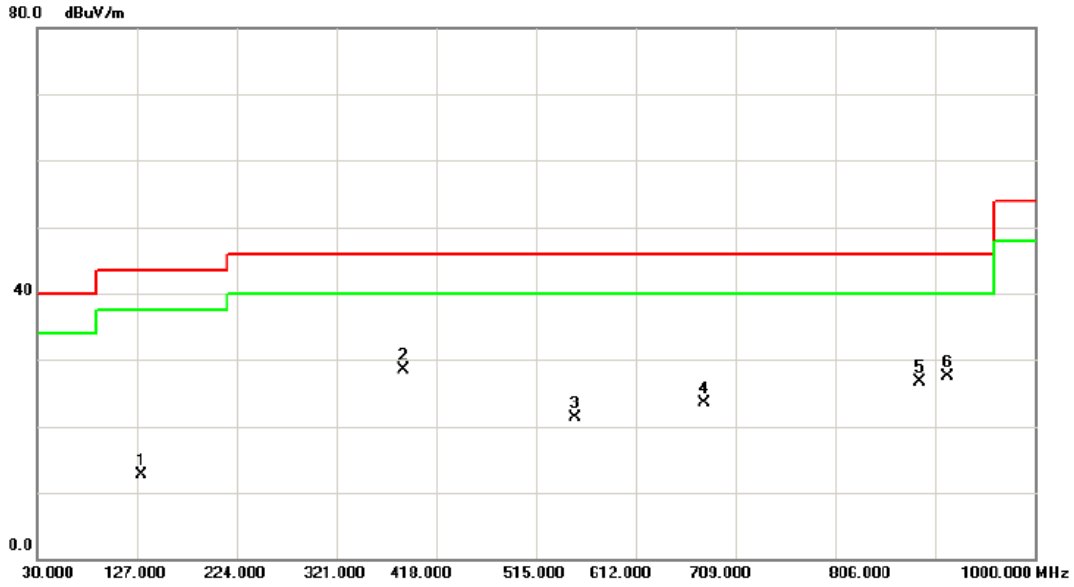
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		45.5200	26.31	-13.25	13.06	40.00	-26.94	peak	
2		292.8700	34.00	-10.86	23.14	46.00	-22.86	peak	
3		449.0400	26.91	-8.08	18.83	46.00	-27.17	peak	
4		551.8600	26.69	-5.25	21.44	46.00	-24.56	peak	
5		744.8900	27.86	-4.56	23.30	46.00	-22.70	peak	
6	*	918.5200	27.37	0.21	27.58	46.00	-18.42	peak	

Test Mode:	TX 2480MHz -CH39 -1Mbps

Horizontal

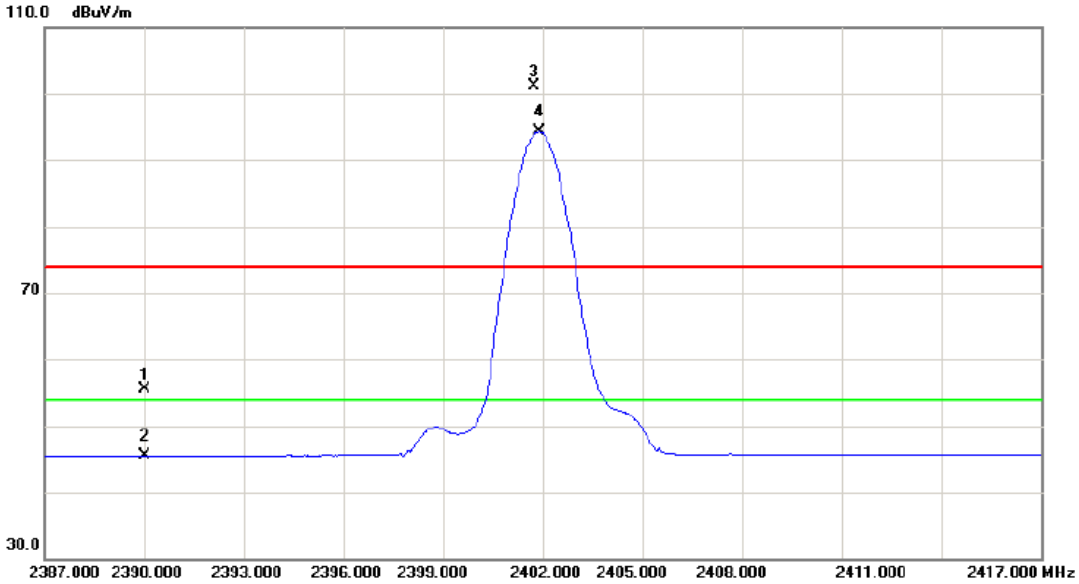


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		130.8800	25.79	-13.16	12.63	43.50	-30.87	peak	
2	*	385.9900	38.47	-9.88	28.59	46.00	-17.41	peak	
3		552.8300	26.58	-5.29	21.29	46.00	-24.71	peak	
4		677.9600	28.16	-4.59	23.57	46.00	-22.43	peak	
5		888.4500	27.38	-0.59	26.79	46.00	-19.21	peak	
6		915.6100	27.31	0.26	27.57	46.00	-18.43	peak	

ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

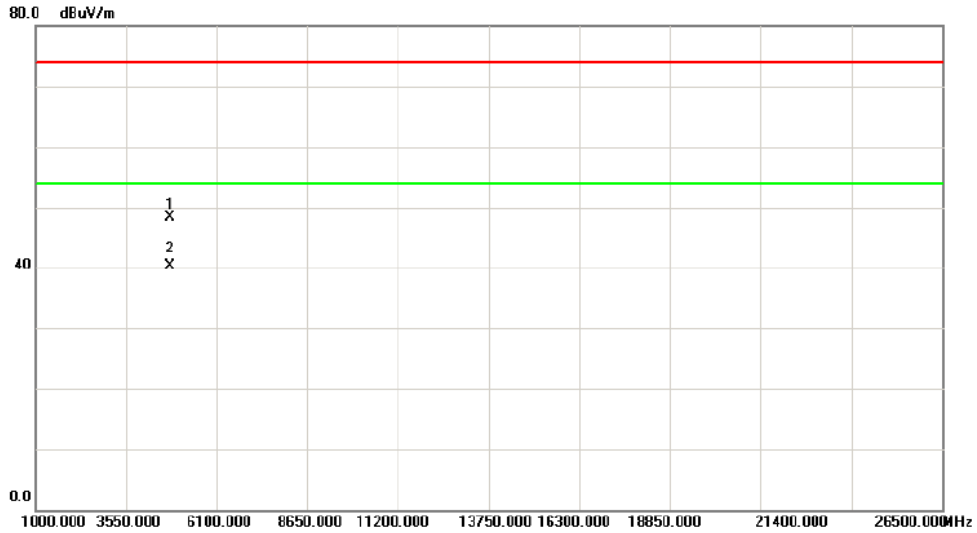
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	23.72	31.88	55.60	74.00	-18.40	peak	
2		2390.000	13.62	31.88	45.50	54.00	-8.50	AVG	
3	X	2401.730	69.17	31.89	101.06	74.00	27.06	peak	NO LIMIT
4	*	2401.880	62.33	31.89	94.22	54.00	40.22	AVG	NO LIMIT

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

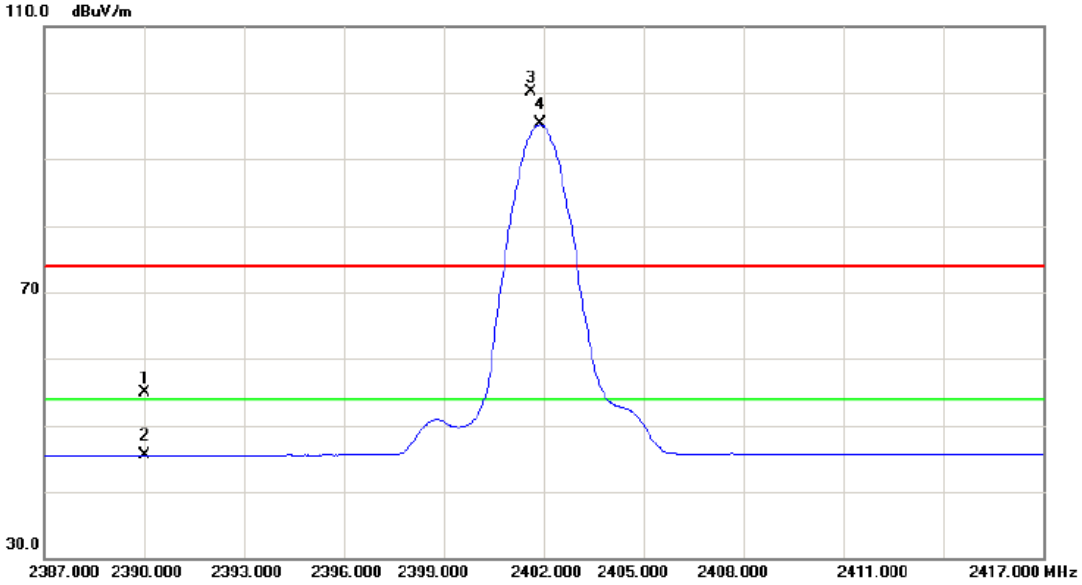
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4803.280	44.80	3.58	48.38	74.00	-25.62	peak	
2	*	4803.740	36.64	3.58	40.22	54.00	-13.78	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

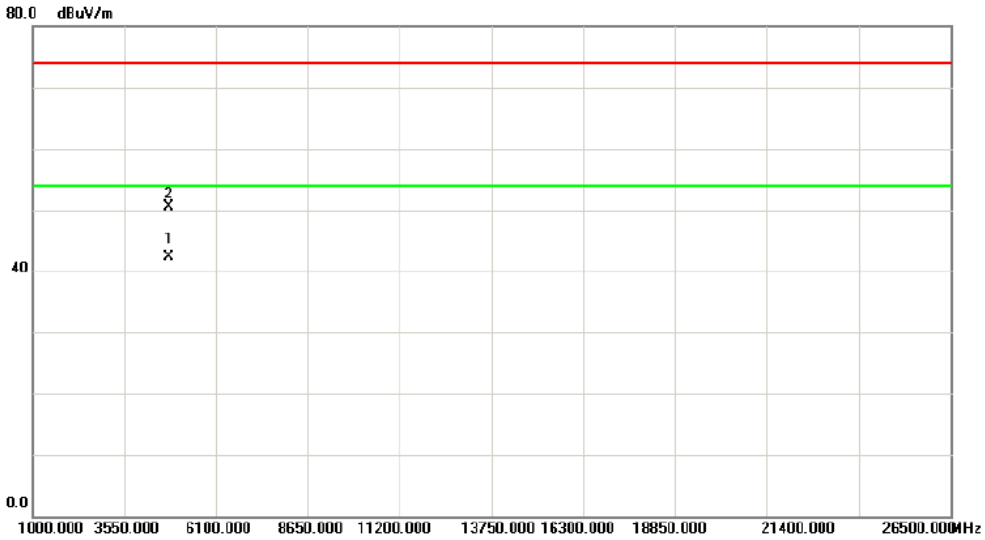
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	22.99	31.88	54.87	74.00	-19.13	peak	
2		2390.000	13.62	31.88	45.50	54.00	-8.50	AVG	
3	X	2401.640	68.12	31.89	100.01	74.00	26.01	peak	NO LIMIT
4	*	2401.880	63.33	31.89	95.22	54.00	41.22	AVG	NO LIMIT

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

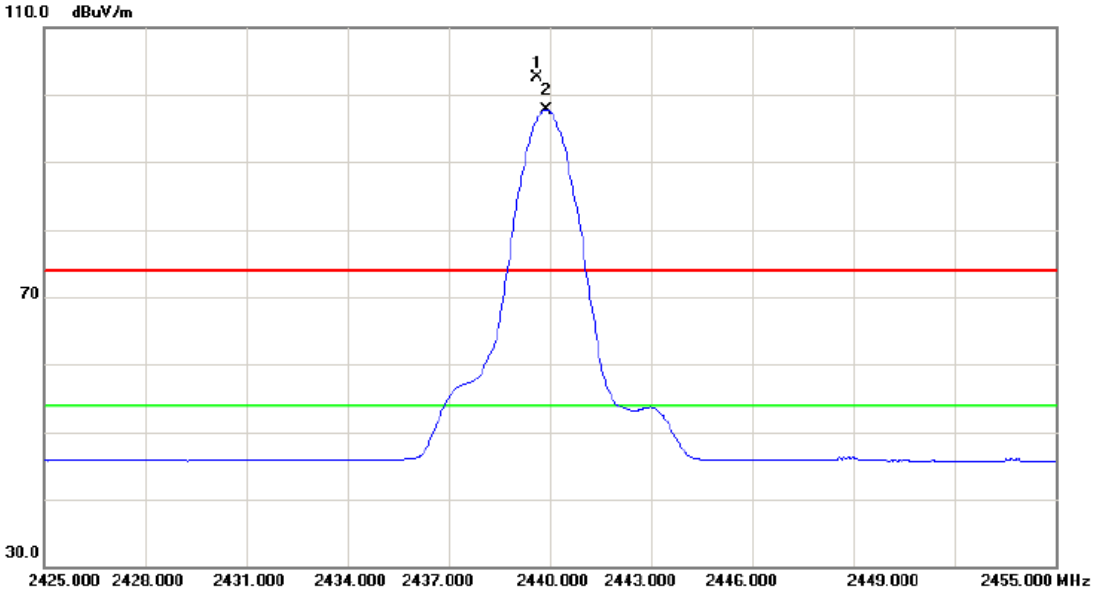
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4803.760	38.75	3.58	42.33	54.00	-11.67	AVG	
2		4804.300	46.88	3.58	50.46	74.00	-23.54	peak	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

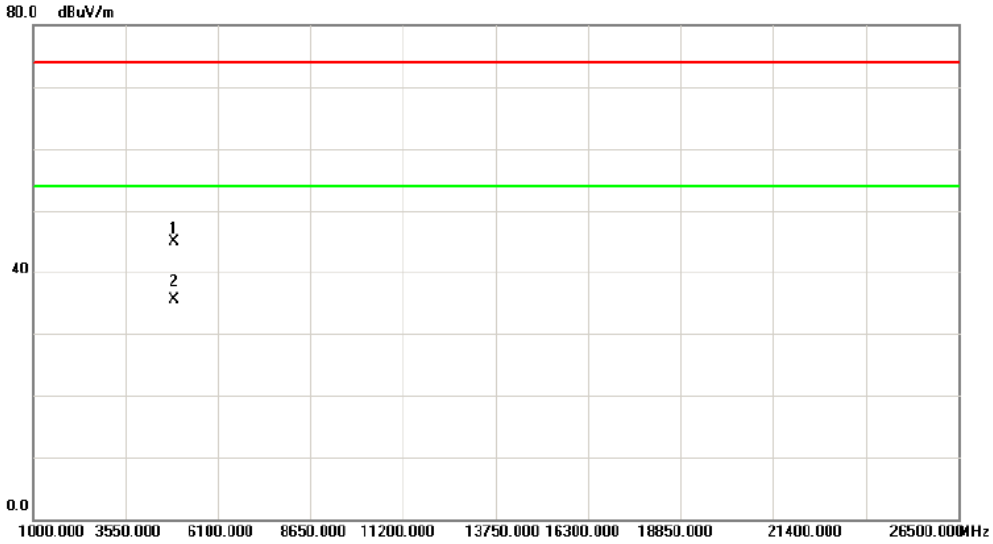
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2439.610	70.52	31.94	102.46	74.00	28.46	peak	NO LIMIT
2	*	2439.880	65.73	31.95	97.68	54.00	43.68	AVG	NO LIMIT

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

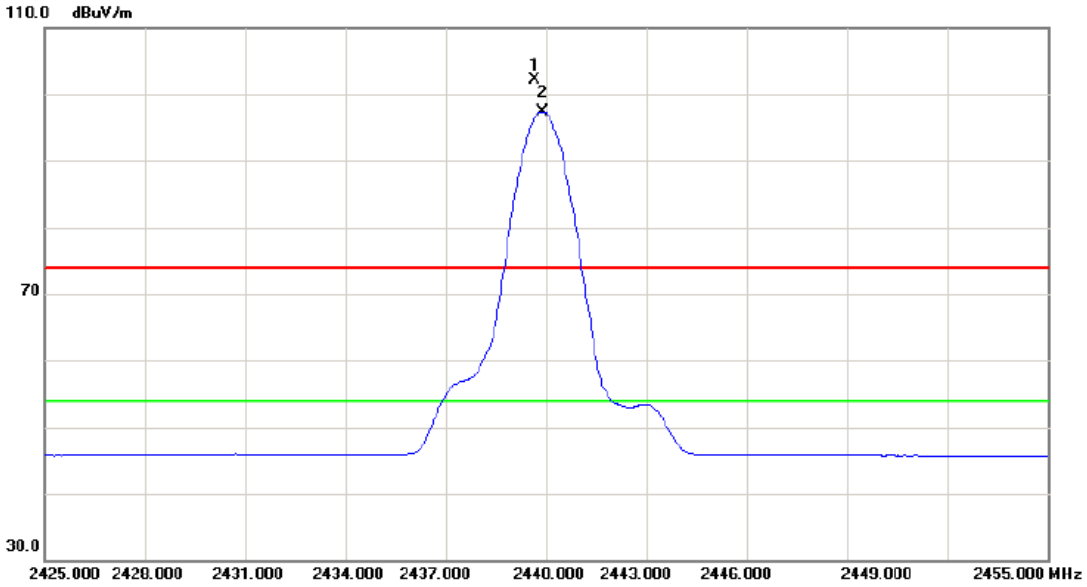
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4879.460	41.09	3.73	44.82	74.00	-29.18	peak	
2	*	4879.760	31.68	3.73	35.41	54.00	-18.59	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

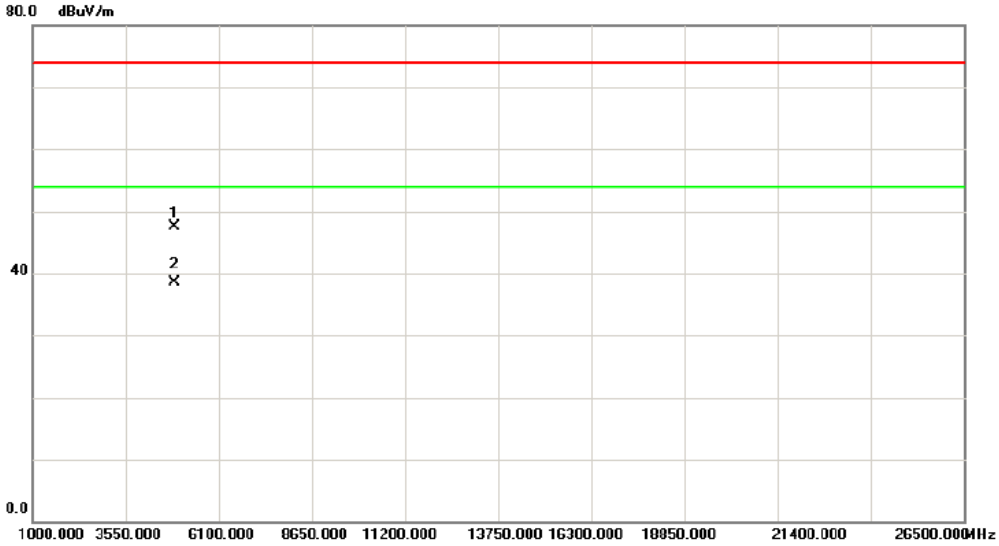
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2439.670	70.20	31.95	102.15	74.00	28.15	peak	NO LIMIT
2	*	2439.880	65.44	31.95	97.39	54.00	43.39	AVG	NO LIMIT

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

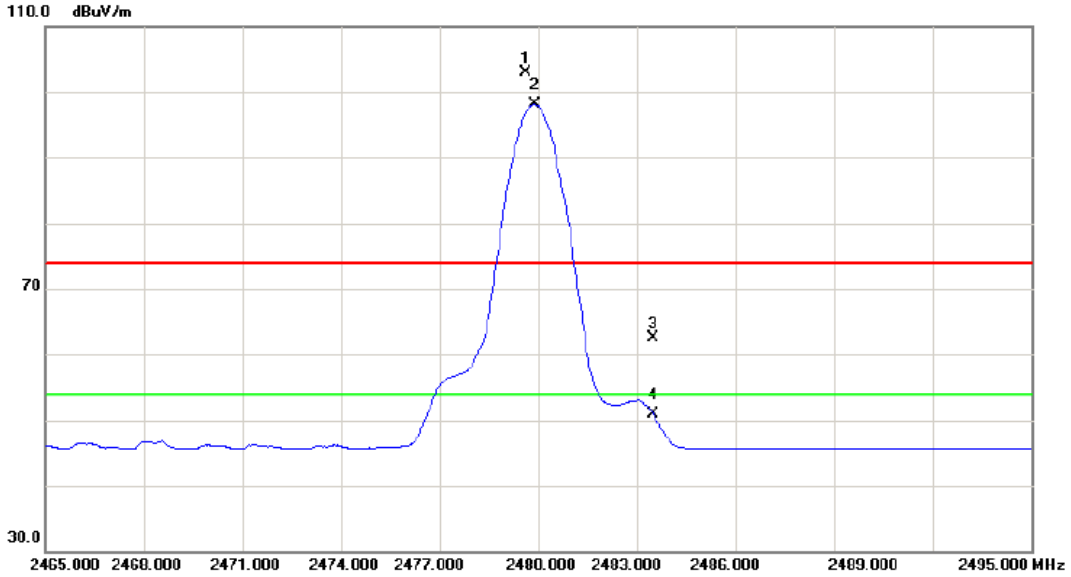
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4879.080	43.76	3.73	47.49	74.00	-26.51	peak	
2	*	4879.720	34.69	3.73	38.42	54.00	-15.58	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

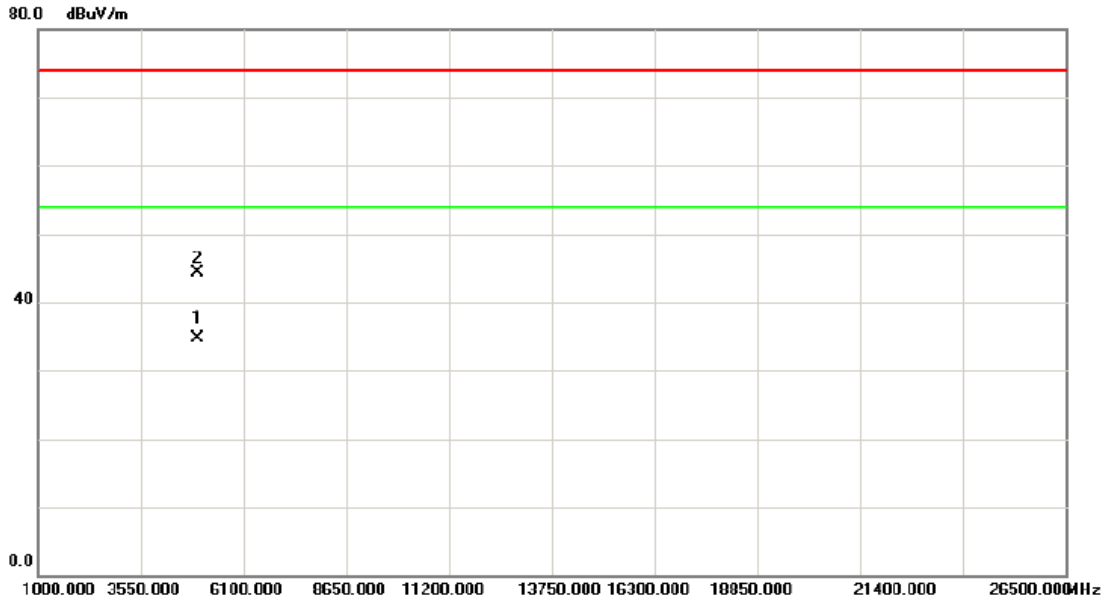
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2479.640	70.88	32.00	102.88	74.00	28.88	peak	NO LIMIT
2	*	2479.880	66.03	32.00	98.03	54.00	44.03	AVG	NO LIMIT
3		2483.500	30.59	32.01	62.60	74.00	-11.40	peak	
4		2483.500	18.84	32.01	50.85	54.00	-3.15	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

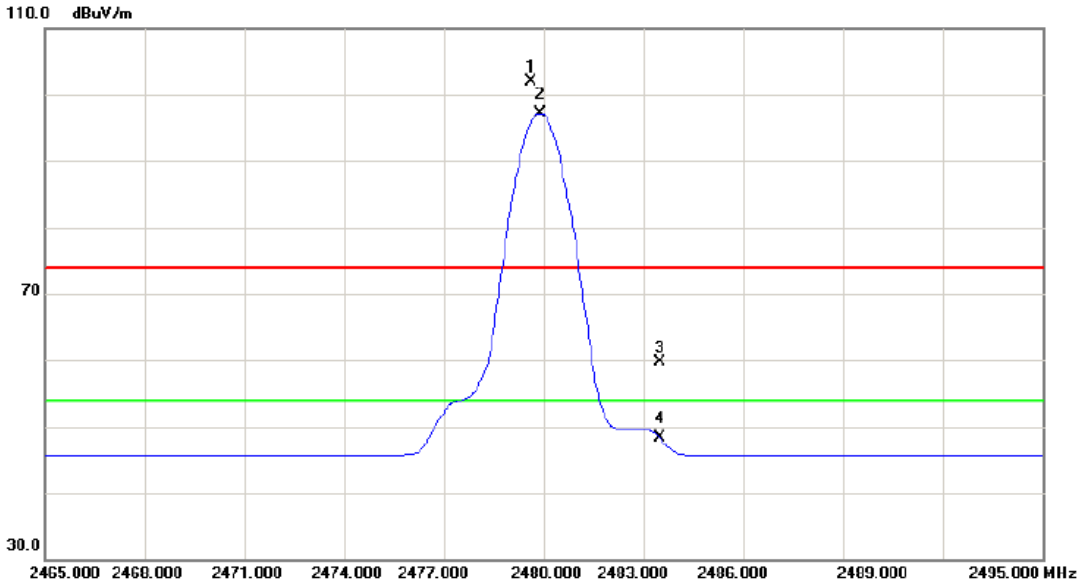
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	4959.820	30.77	3.88	34.65	54.00	-19.35	AVG	
2		4959.300	40.52	3.87	44.39	74.00	-29.61	peak	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

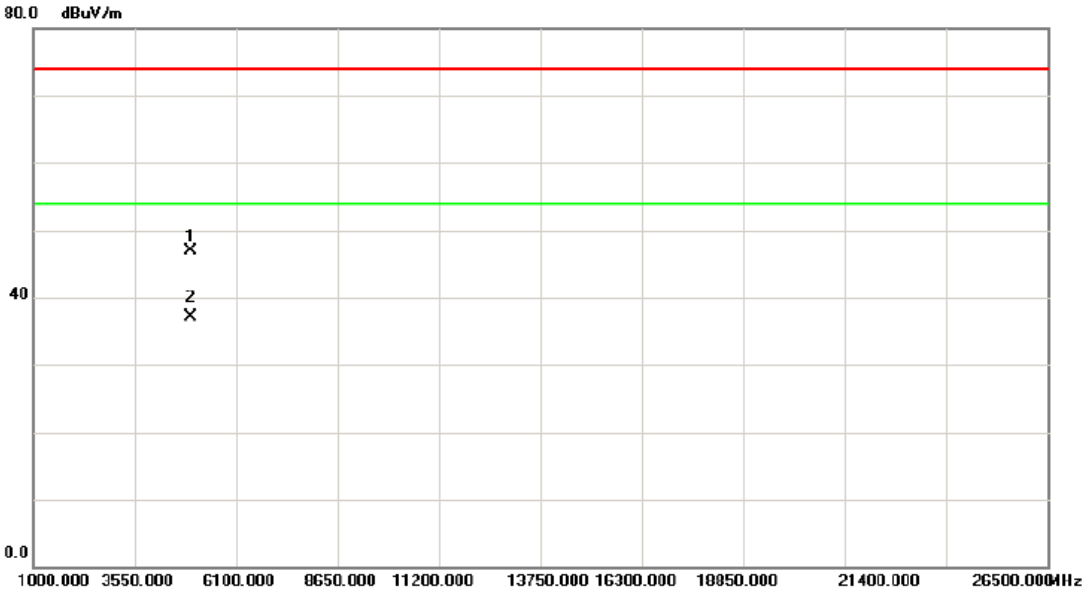
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2479.610	69.98	32.00	101.98	74.00	27.98	peak	NO LIMIT
2	*	2479.880	65.18	32.00	97.18	54.00	43.18	AVG	NO LIMIT
3		2483.500	27.62	32.01	59.63	74.00	-14.37	peak	
4		2483.500	16.24	32.01	48.25	54.00	-5.75	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

Horizontal

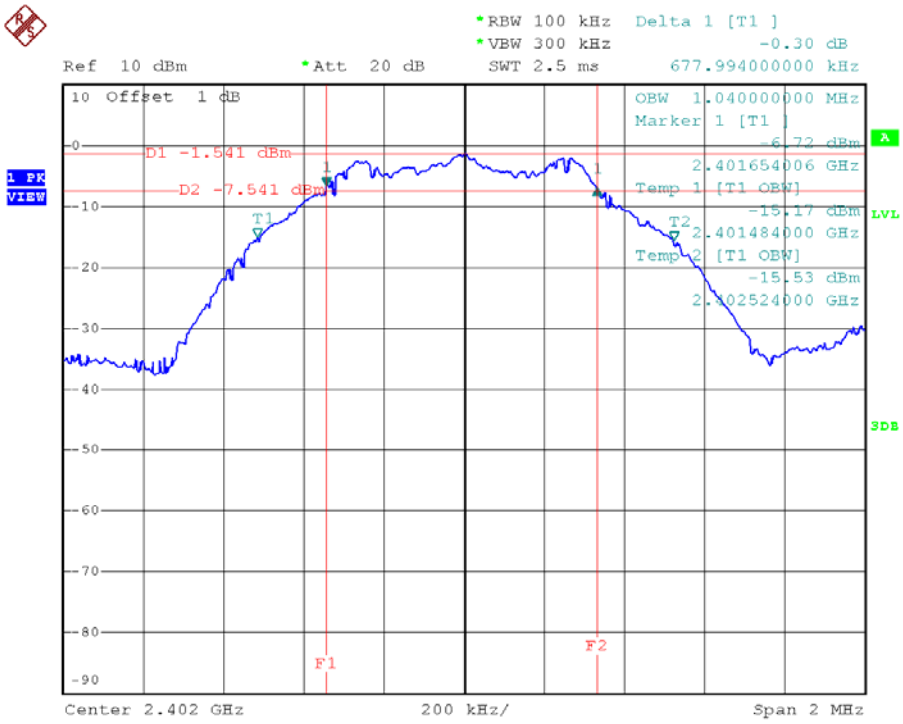


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4959.640	42.96	3.88	46.84	74.00	-27.16	peak	
2	*	4959.780	33.31	3.88	37.19	54.00	-16.81	AVG	

ATTACHMENT E - BANDWIDTH

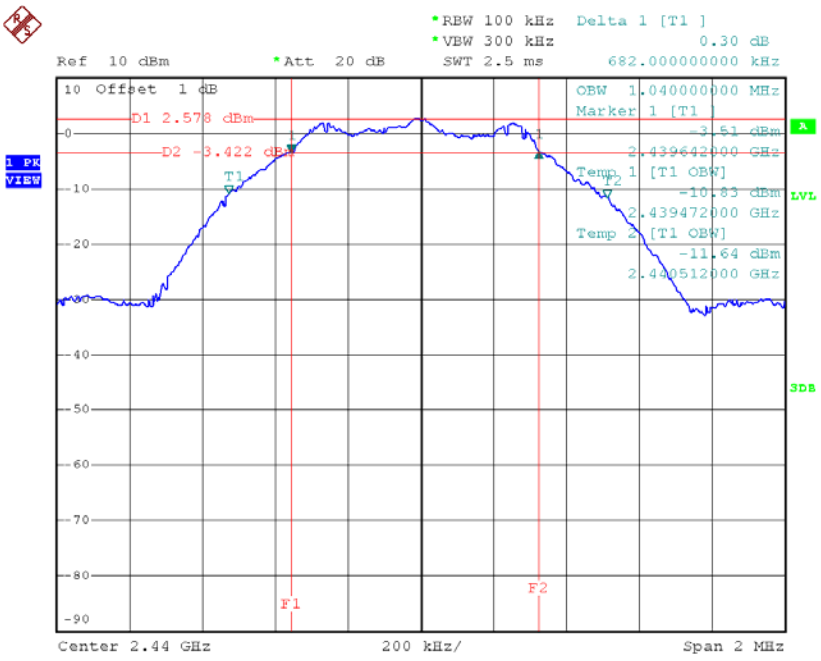
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2402	0.678	1.040	500	Complies
2440	0.682	1.040	500	Complies
2480	0.686	1.040	500	Complies

TX CH00



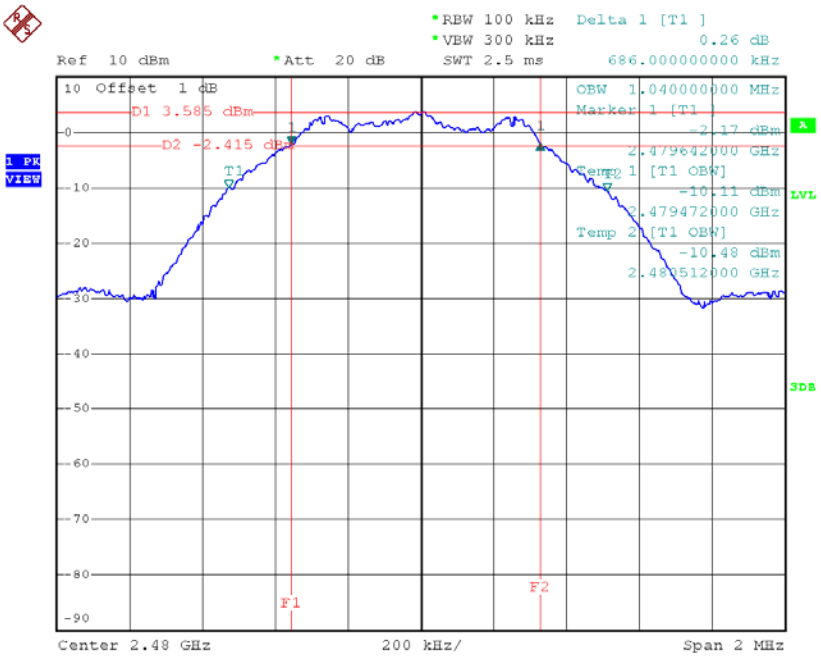
Date: 21.JUL.2015 20:07:39

TX CH19



Date: 21.JUL.2015 20:09:36

TX CH39



Date: 21.JUL.2015 20:10:40

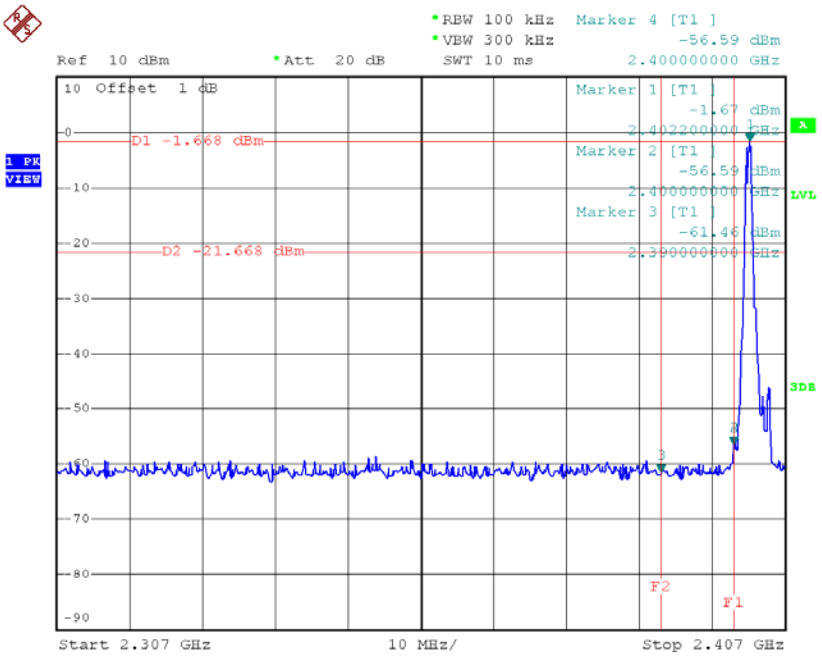
ATTACHMENT F - MAXIMUM OUTPUT POWER TEST

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watt)	Max. Limit (dBm)	Max. Limit (Watt)	Test Result
2402	-1.34	0.0007	30.00	1.00	Complies
2440	2.39	0.0017	30.00	1.00	Complies
2480	3.33	0.0022	30.00	1.00	Complies

ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION

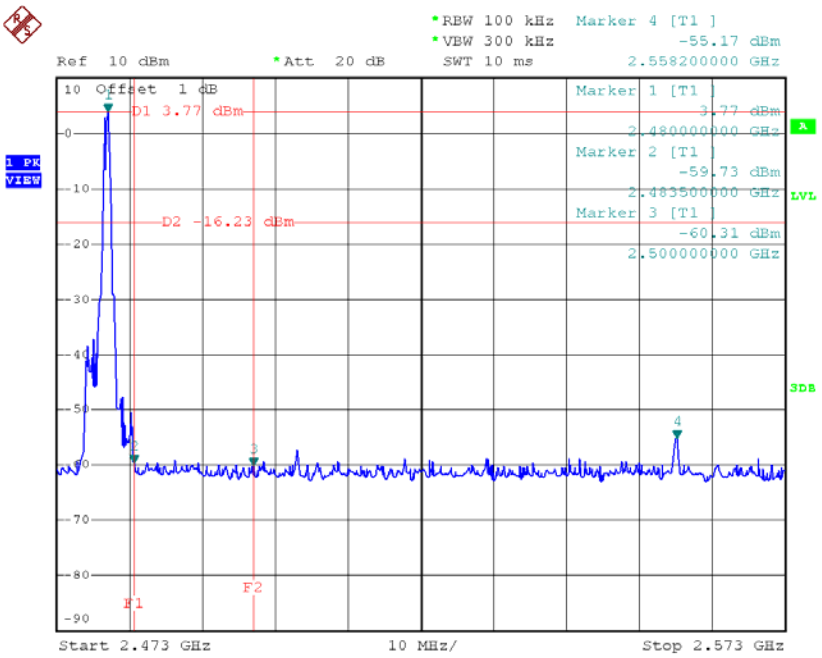
Test Mode :	CH00, CH19 , CH39 - 1Mbps

CH00 (Lower) - 1Mbps



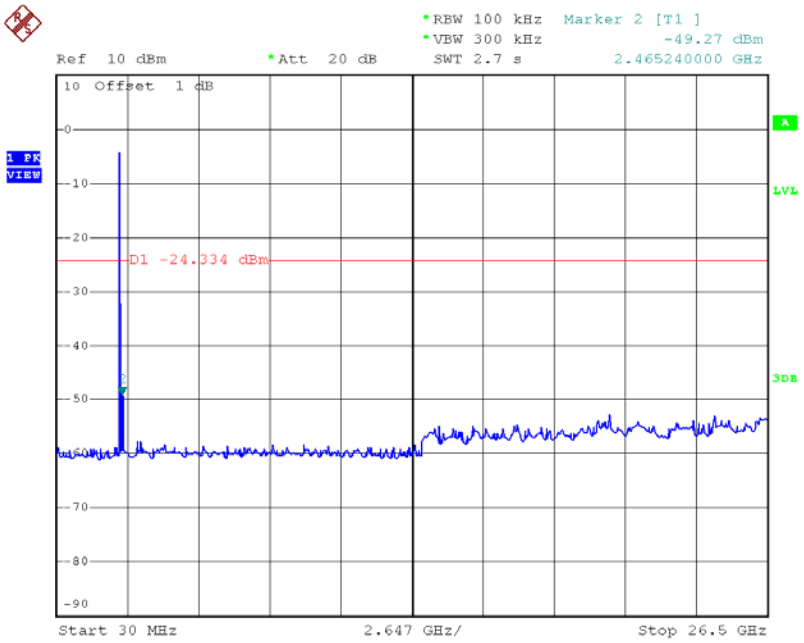
Date: 21.JUL.2015 20:07:47

CH39 (upper) - 1Mbps



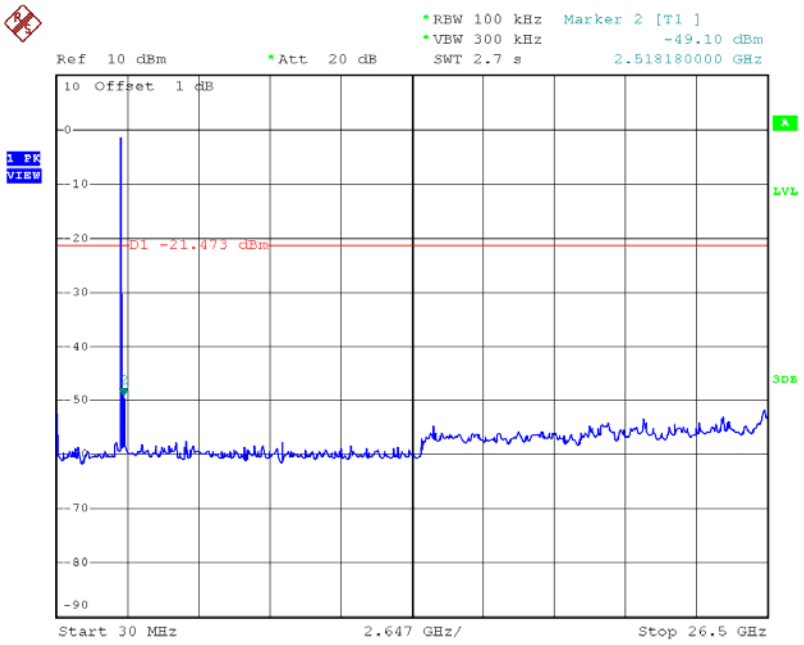
Date: 21.JUL.2015 20:10:48

CH00 (10 Harmonic of the frequency)



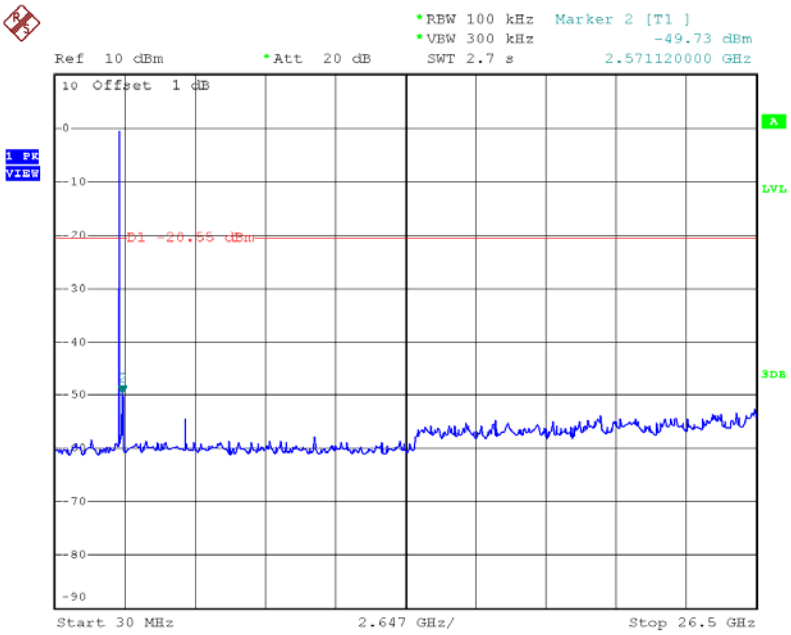
Date: 21.JUL.2015 20:08:04

CH19 (10 Harmonic of the frequency)



Date: 21.JUL.2015 20:09:50

CH39 (10 Harmonic of the frequency)

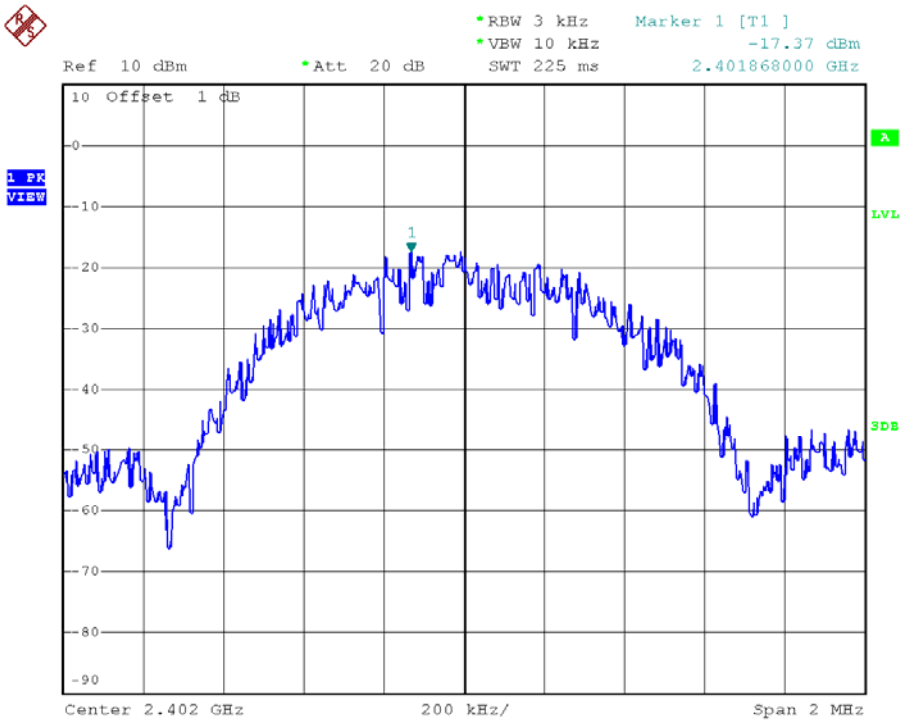


Date: 21.JUL.2015 20:11:02

ATTACHMENT H - POWER SPECTRAL DENSITY TEST

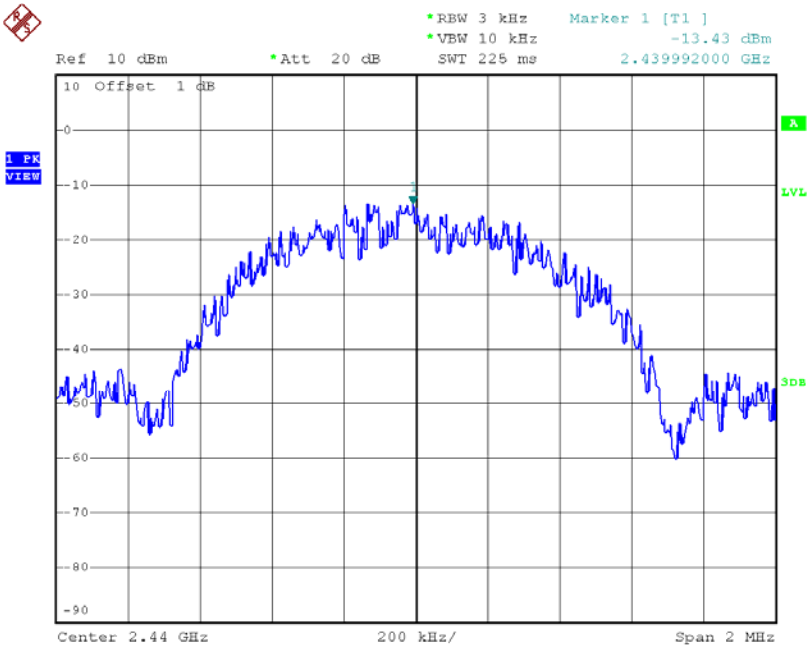
Frequency (MHz)	Power Density (dBm)	Max. Limit (dBm)	Result
2402	-17.37	8	Complies
2440	-13.43	8	Complies
2480	-12.00	8	Complies

TX CH00



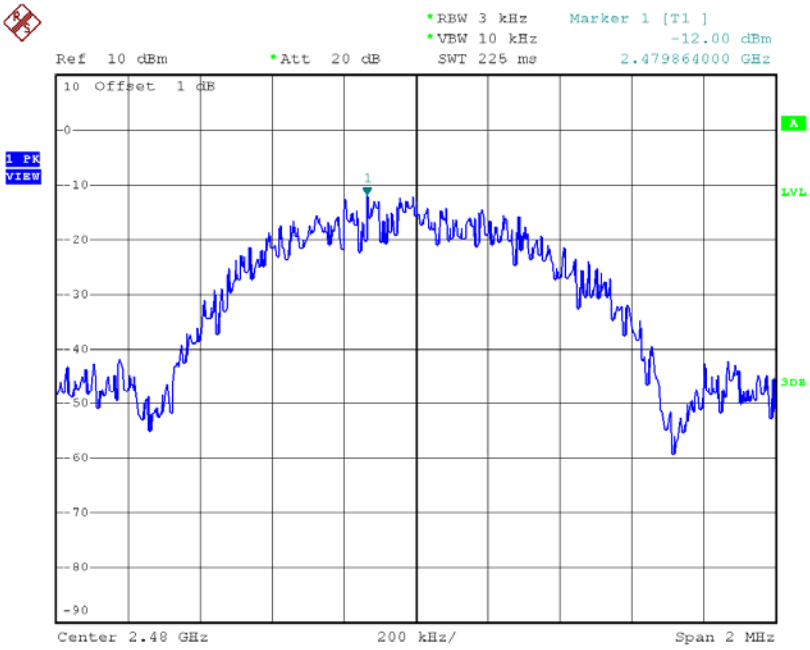
Date: 21.JUL.2015 20:08:10

TX CH19



Date: 21.JUL.2015 20:09:56

TX CH39



Date: 21.JUL.2015 20:11:08