

FCC Radio Test Report

FCC ID:RWO-RZ150124

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

Project No. : 1408C201
Equipment : Wireless Smartband
Model Name : RZ15-0124
Applicant : Razer Inc.
Address : 2035 Corte Del Nogal, Suite 101. Carlsbad California
92011. USA

Date of Receipt : Aug. 28, 2014
Date of Test : Aug. 28, 2014~Oct. 14, 2014
Issued Date : Oct. 15, 2014
Tested by : BTL Inc.

Testing Engineer : David Mao
(David Mao)

Technical Manager : Leo My
(Leo Hung)

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 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.

BTL's reports must not be used by the client to claim product endorsement by the authorities or any agency of the 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 GENERAL DESCRIPTION OF EUT	9
3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	11
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	16
4.2.3 DEVIATION FROM TEST STANDARD	16
4.2.4 TEST SETUP	17
4.2.5 EUT OPERATING CONDITIONS	18
4.2.6 EUT TEST CONDITIONS	18
4.2.7 TEST RESULTS (9KHZ TO 30MHZ)	18
4.2.8 TEST RESULTS (BETWEEN 30MHZ TO 1000 MHZ)	19
4.2.9 TEST RESULTS (ABOVE 1000 MHZ)	19
5 . BANDWIDTH TEST	20
5.1 APPLIED PROCEDURES / LIMIT	20
5.1.1 TEST PROCEDURE	20
5.1.2 DEVIATION FROM STANDARD	20
5.1.3 TEST SETUP	20
5.1.4 EUT OPERATION CONDITIONS	20
5.1.5 EUT TEST CONDITIONS	20
5.1.6 TEST RESULTS	20
6 . MAXIMUM OUTPUT POWER TEST	21
6.1 APPLIED PROCEDURES / LIMIT	21

Table of Contents	Page
6.1.1 TEST PROCEDURE	21
6.1.2 DEVIATION FROM STANDARD	21
6.1.3 TEST SETUP	21
6.1.4 EUT OPERATION CONDITIONS	21
6.1.5 EUT TEST CONDITIONS	21
6.1.6 TEST RESULTS	21
7 . ANTENNA CONDUCTED SPURIOUS EMISSION	22
7.1 APPLIED PROCEDURES / LIMIT	22
7.1.1 TEST PROCEDURE	22
7.1.2 DEVIATION FROM STANDARD	22
7.1.3 TEST SETUP	22
7.1.4 EUT OPERATION CONDITIONS	22
7.1.5 EUT OPERATION CONDITIONS	22
7.1.6 TEST RESULTS	22
8 . POWER SPECTRAL DENSITY TEST	23
8.1 APPLIED PROCEDURES / LIMIT	23
8.1.1 TEST PROCEDURE	23
8.1.2 DEVIATION FROM STANDARD	23
8.1.3 TEST SETUP	23
8.1.4 EUT OPERATION CONDITIONS	23
8.1.5 EUT TEST CONDITIONS	23
8.1.6 TEST RESULTS	23
9 . MEASUREMENT INSTRUMENTS LIST	24
ATTACHMENT A - CONDUCTED EMISSION	26
ATTACHMENT B - RADIATED EMISSION (9KHZ-30MHZ)	29
ATTACHMENT C - RADIATED EMISSION BETWEEN 30MHZ AND 1000MHZ)	31
ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)	38
ATTACHMENT E - BANDWIDTH	51
ATTACHMENT F - MAXIMUM OUTPUT POWER TEST	54
ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION	55
ATTACHMENT H - POWER SPECTRAL DENSITY TEST	59

REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1408C201	Original Issue.	Oct. 15, 2014

1. CERTIFICATION

Equipment : Wireless Smartband
Brand Name : RAZER
Model Name : RZ15-0124
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 : Aug. 28, 2014~Oct. 14, 2014
Test Sample : ENGINEERING SAMPLE
Standard(s) : FCC Part15, Subpart C :2013 (15.247) / ANSI C63.4-2009

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-1-1408C201) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

Applied Standard(s): FCC Part15 (15.247) , Subpart C				
Standard(s)	Section	Test Item	Judgment	Remark
15.207		Conducted Emission	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 v03r02 (Measurement Guidelines of DTS)

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-C02/DG-CB03** at the location of No.3,Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.523792
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 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	3.4	

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	

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless Smartband	
Brand Name	RAZER	
Model Name	RZ15-0124	
Model Difference	N/A	
Product Description	Operation Frequency	2402~2480 MHz
	Modulation Technology	GFSK(1Mbps)
	Bit Rate of Transmitter	
	Output Power (Max.)	-0.67 dBm (1Mbps)
Power Source	#1 Supplied from USB Port #2 Supplied from battery	
Power Rating	#1 DC 5V 170mAh #2 DC 3.7V 100mAh	

Note:

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

2.

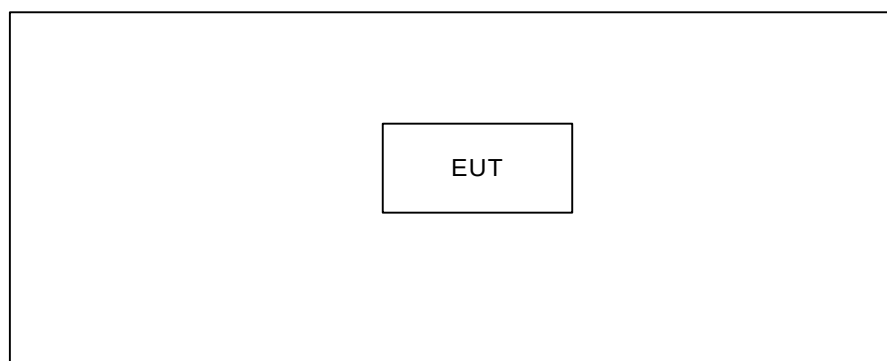
Channel List			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
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)	Note
1	GainForce Technology Co.,Ltd	N/A	printed	N/A	2.20	

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/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

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

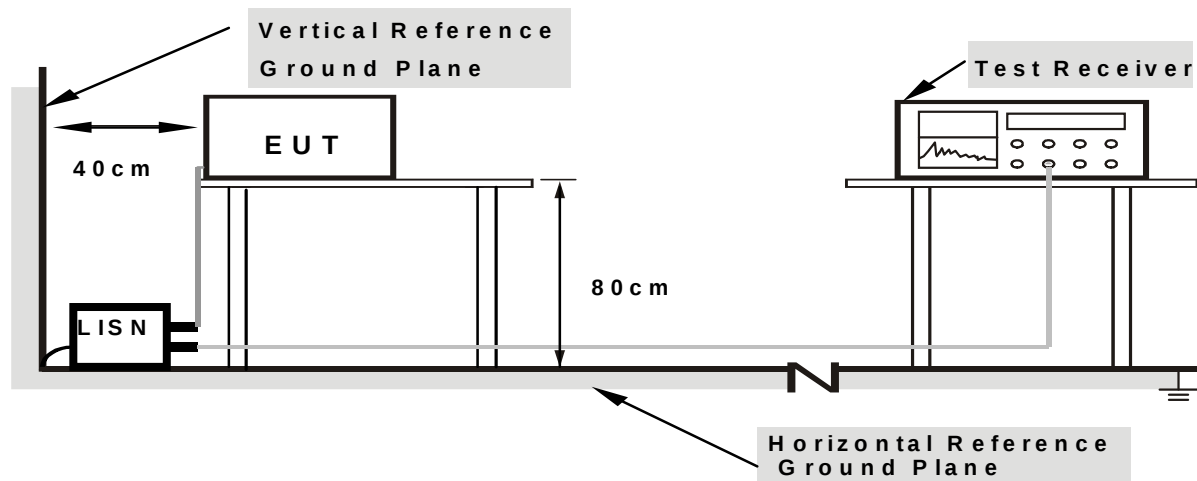
4.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- 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: 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 (Frequency Range 9KHz-1000MHz)

20dBc 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.

Frequencies (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

Section 15.33 Frequency range of radiated measurements.

Unless otherwise noted in the specific rule section under which the equipment operates for an intentional radiator the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules
- (4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

4.2.2 TEST PROCEDURE

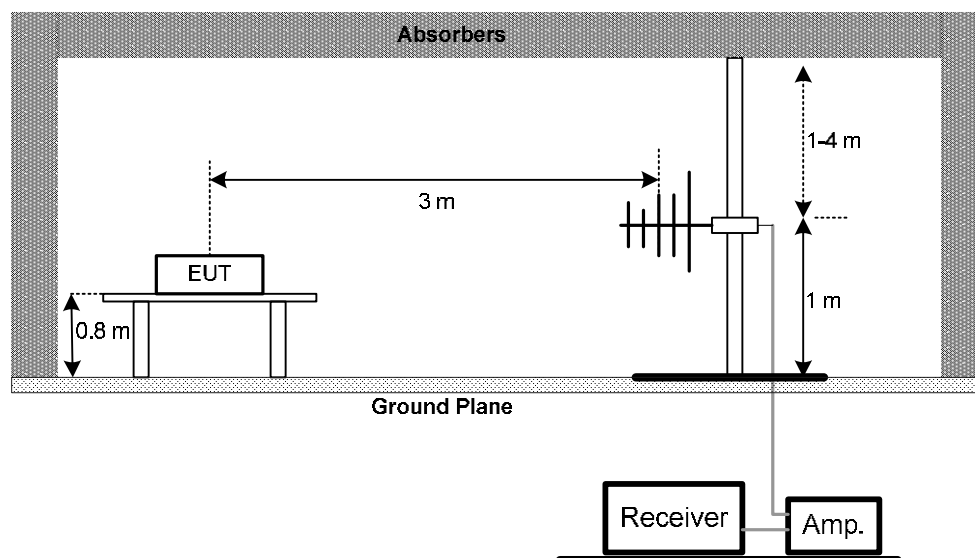
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- 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.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

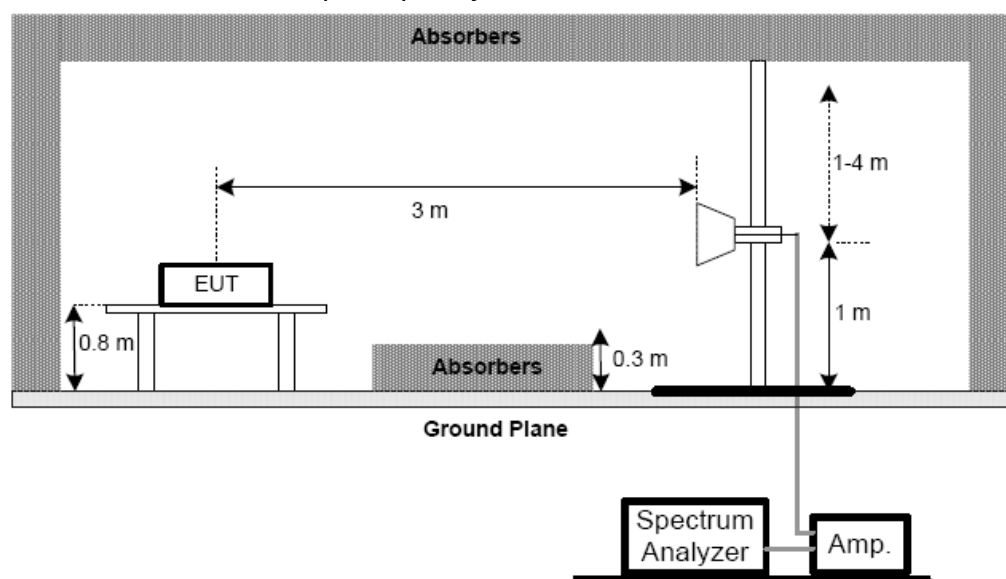
No deviation

4.2.4 TEST SETUP

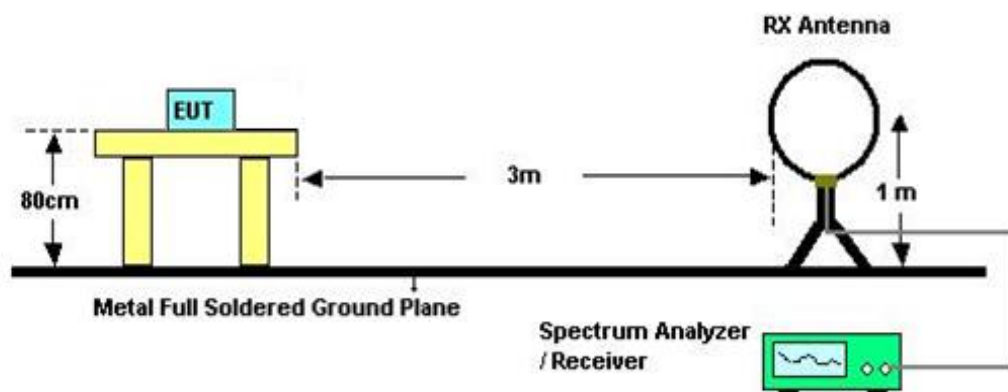
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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 **4.1.6** 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 3.7V

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 (BETWEEN 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.

4.2.9 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

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 4.1.6 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 3.7V

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

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- The maximum peak conducted output power was performed in accordance with method 9.3.1 of FCC KDB 558074

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 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.
 Transmit output power was measured while the host equipment supply voltage was varied from 85 % to 115 % of the nominal rated supply voltage. No change in transmit output power was observed.

6.1.5 EUT TEST CONDITIONS

Temperature: 25°C
 Relative Humidity: 55%
 Test Voltage: DC 3.7V

6.1.6 TEST RESULTS

Please refer to the Attachment F.

7. ANTENNA CONDUCTED SPURIOUS EMISSION

7.1 Applied procedures / limit

20dB in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

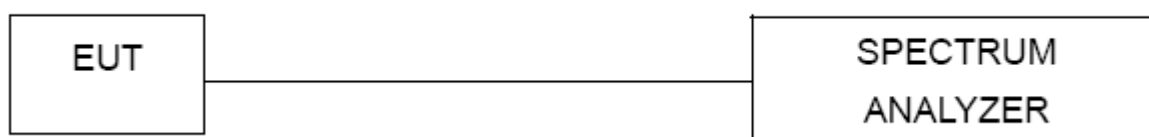
7.1.1 TEST PROCEDURE

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

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 4.1.6 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 3.7V

7.1.6 TEST RESULTS

Please refer to the Attachment G.

8. POWER SPECTRAL DENSITY TEST

8.1 Applied procedures / limit

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

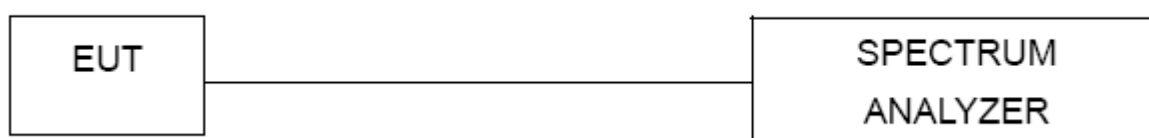
8.1.1 TEST PROCEDURE

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

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 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 3.7V

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. 29, 2015
2	LISN	R&S	ENV216	101447	Mar. 29, 2015
3	Test Cable	N/A	C_17	N/A	Mar. 14, 2015
4	EMI TEST RECEIVER	R&S	ESCS30	833364/017	Mar. 29, 2015
5	50Ω Terminator	SHX	TF2-3G-A	08122902	Mar. 29, 2015
6	Measurement Software	Fara	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. 29, 2015
2	Amplifier	HP	8447D	2944A0967 3	Mar. 29, 2015
3	Receiver	AGILENT	N9038A	MY521300 39	Sep. 30, 2015
4	Test Cable	N/A	C-01_CB03	N/A	Jul. 01, 2015
5	Controller	CT	SC100	N/A	N/A
6	Measurement Software	Fara	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	Antenna	ETS	3115	00075789	Mar. 29, 2015
8	Amplifier	Agilent	8449B	3008A0227 4	Mar. 29, 2015
9	Receiver	AGILENT	N9038A	MY521300 39	Sep. 30, 2015
10	Test Cable	HUBER+SUHNER	C-48	N/A	Apr. 30, 2015
11	Controller	CT	SC100	N/A	N/A
12	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Feb. 22, 2015
13	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 22, 2015
14	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Mar. 29, 2015

6dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 11, 2014

Peak Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	P-series Power meter	Agilent	N1911A	MY45100473	Mar. 29, 2015
2	Wireband Power sensor	Agilent	N1921A	MY51100041	Mar. 29, 2015

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. 11, 2014

Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov. 11, 2014

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

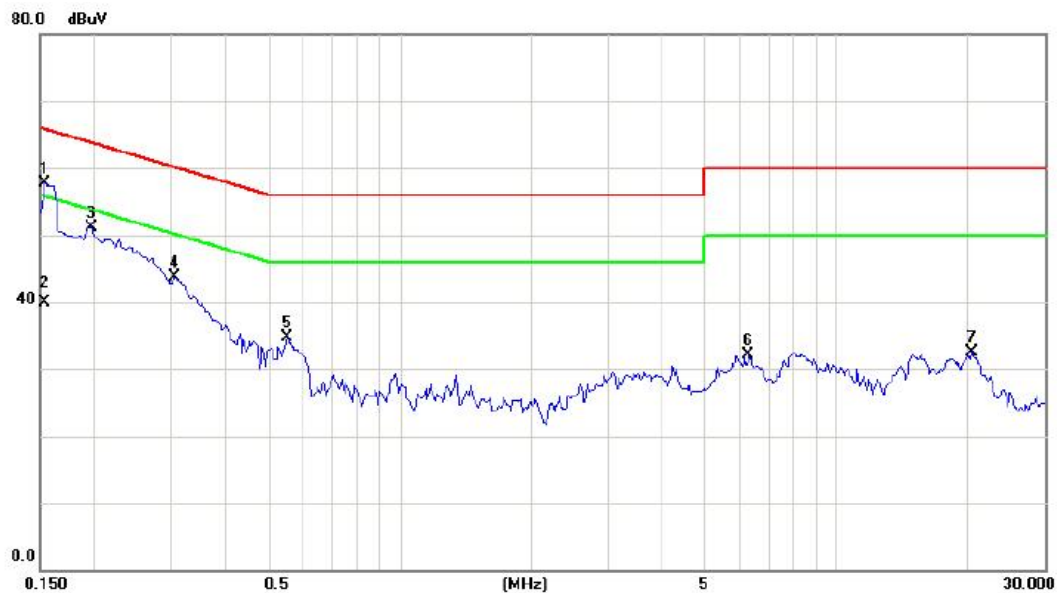
Line



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1891	44.71	9.54	54.25	64.08	-9.83	peak	
2		0.1891	27.50	9.54	37.04	54.08	-17.04	AVG	
3		0.2594	37.98	9.58	47.56	61.45	-13.89	peak	
4		0.3336	34.12	9.61	43.73	59.36	-15.63	peak	
5		4.9375	26.92	9.87	36.79	56.00	-19.21	peak	
6		15.1875	28.11	10.23	38.34	60.00	-21.66	peak	
7		20.2422	28.97	10.46	39.43	60.00	-20.57	peak	

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	*	0.1548	48.03	9.63	57.66	65.74	-8.08	peak	
2		0.1556	30.20	9.63	39.83	55.70	-15.87	AVG	
3		0.1970	41.59	9.61	51.20	63.74	-12.54	peak	
4		0.3063	34.00	9.62	43.62	60.07	-16.45	peak	
5		0.5523	24.97	9.65	34.62	56.00	-21.38	peak	
6		6.2970	22.11	9.93	32.04	60.00	-27.96	peak	
7		20.4844	21.94	10.47	32.41	60.00	-27.59	peak	

ATTACHMENT B - RADIATED EMISSION (9KHZ-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
0.0143	0°	14.52	24.66	39.18	104.50	-65.32	AVG
0.0143	0°	13.23	24.66	37.89	124.50	-86.61	PEAK
0.0351	0°	8.51	23.34	31.85	96.70	-64.84	AVG
0.0351	0°	7.63	23.34	30.97	116.70	-85.72	PEAK
0.0369	0°	5.82	23.23	29.05	96.26	-67.21	AVG
0.0369	0°	3.37	23.23	26.60	116.26	-89.66	PEAK
0.0389	0°	2.59	23.10	25.69	95.81	-70.11	AVG
0.0389	0°	0.55	23.10	23.65	115.81	-92.15	PEAK
2.0546	0°	30.87	19.47	50.34	69.54	-19.20	QP
3.3192	0°	21.36	18.93	40.29	69.54	-29.25	QP

Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit(QP) (dBuV/m)	Margin (dB)	Note
0.0129	90°	14.49	24.30	38.79	125.39	-86.60	AVG
0.0129	90°	13.63	24.30	37.93	145.39	-107.46	PEAK
0.0353	90°	8.51	23.33	31.84	116.65	-84.81	AVG
0.0353	90°	6.96	23.33	30.29	136.65	-106.36	PEAK
0.0367	90°	5.44	23.24	28.68	116.31	-87.63	AVG
0.0367	90°	3.27	23.24	26.51	136.31	-109.80	PEAK
0.0439	90°	2.34	22.79	25.13	114.75	-89.63	AVG
0.0557	90°	0.89	22.79	23.68	134.75	-111.08	PEAK
2.1340	90°	30.27	19.42	49.69	69.54	-19.85	QP
3.1571	90°	21.73	18.92	40.65	69.54	-28.89	QP

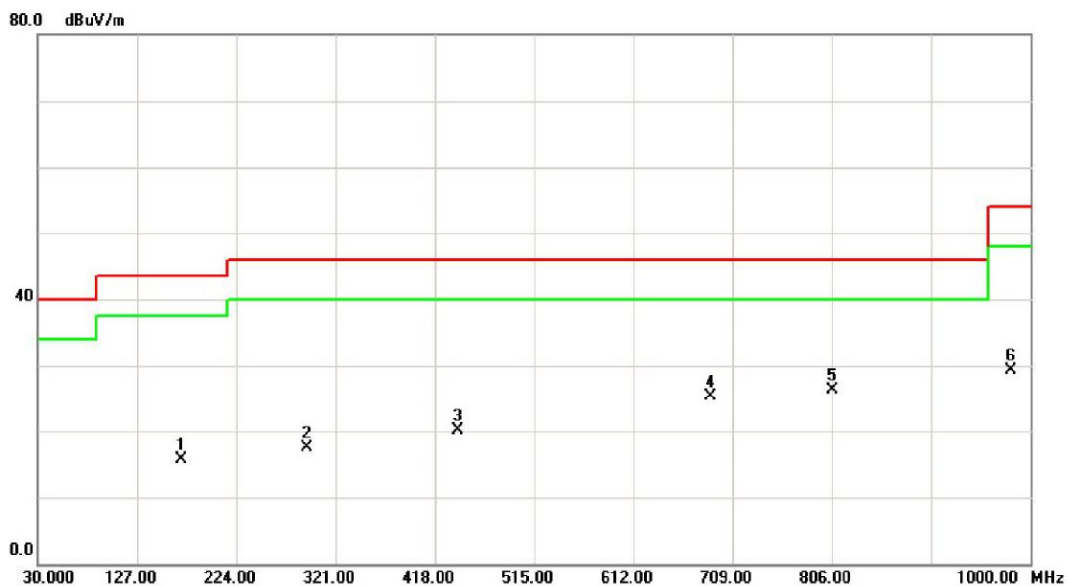
Remark:

- (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.

ATTACHMENT C - RADIATED EMISSION BETWEEN 30MHZ AND 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	Over dB	Detector	Comment
1		170.6500	28.45	-12.76	15.69	43.50	-27.81	peak	
2		292.8700	28.72	-11.12	17.60	46.00	-28.40	peak	
3		440.3100	28.84	-8.79	20.05	46.00	-25.95	peak	
4		687.6600	30.21	-4.98	25.23	46.00	-20.77	peak	
5	*	806.0000	29.28	-2.92	26.36	46.00	-19.64	peak	
6		981.5700	29.55	-0.33	29.22	54.00	-24.78	peak	

Test Mode: TX 2402MHz -CH00 -1Mbps

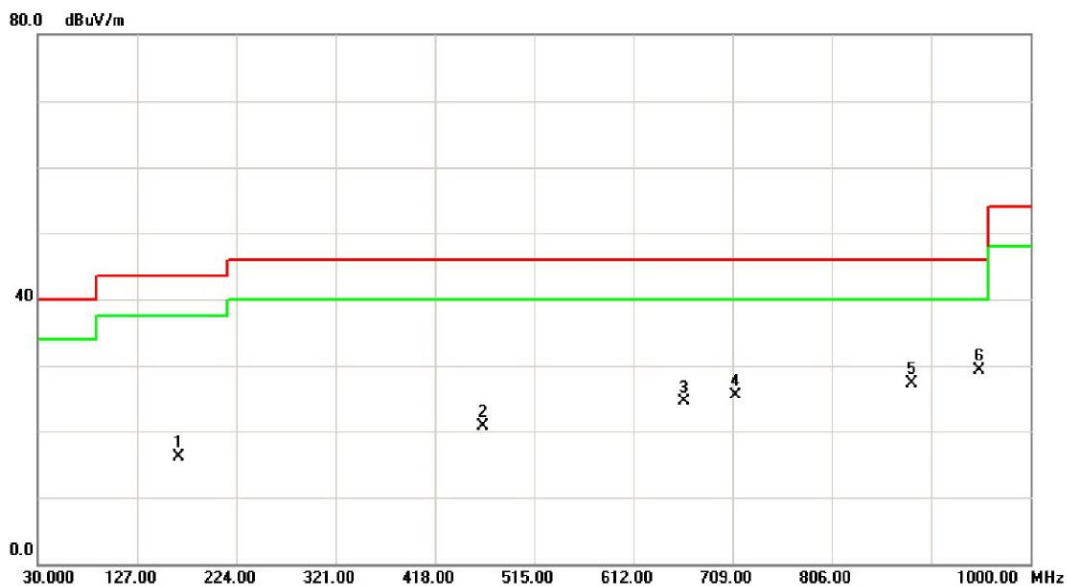
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		100.8100	39.04	-16.30	22.74	43.50	-20.76	peak	
2		439.3400	29.01	-8.82	20.19	46.00	-25.81	peak	
3		555.7400	29.85	-7.93	21.92	46.00	-24.08	peak	
4		699.3000	30.16	-4.93	25.23	46.00	-20.77	peak	
5	*	847.7100	30.32	-3.14	27.18	46.00	-18.82	peak	
6		986.4200	29.12	-0.35	28.77	54.00	-25.23	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	Over dB	Detector	Comment
1		167.7400	29.12	-13.00	16.12	43.50	-27.38	peak	
2		464.5600	29.88	-9.18	20.70	46.00	-25.30	peak	
3		661.4700	29.66	-5.10	24.56	46.00	-21.44	peak	
4		711.9100	30.32	-4.87	25.45	46.00	-20.55	peak	
5		884.5700	29.42	-2.03	27.39	46.00	-18.61	peak	
6	*	949.5600	29.51	-0.22	29.29	46.00	-16.71	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	Over dB	Detector	Comment
1		168.7100	28.54	-12.89	15.65	43.50	-27.85	peak	
2		293.8400	29.35	-11.10	18.25	46.00	-27.75	peak	
3		448.0700	29.23	-8.66	20.57	46.00	-25.43	peak	
4		702.2100	30.34	-4.93	25.41	46.00	-20.59	peak	
5	*	747.8000	35.35	-4.63	30.72	46.00	-15.28	peak	
6		959.2600	28.97	-0.24	28.73	46.00	-17.27	peak	

Test Mode: TX 2480MHz -CH39 -1Mbps

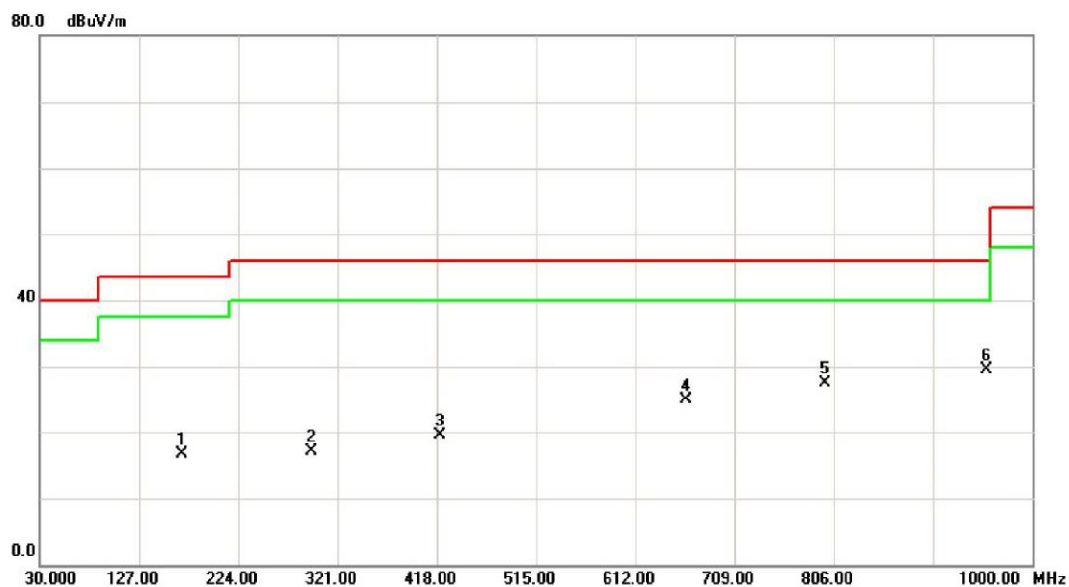
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		176.4700	28.72	-12.90	15.82	43.50	-27.68	peak	
2		286.0800	29.25	-11.62	17.63	46.00	-28.37	peak	
3		456.8000	28.83	-8.88	19.95	46.00	-26.05	peak	
4		644.9800	30.11	-5.43	24.68	46.00	-21.32	peak	
5		798.2400	29.79	-2.95	26.84	46.00	-19.16	peak	
6	*	941.8000	28.93	-0.42	28.51	46.00	-17.49	peak	

Test Mode: TX 2480MHz -CH39 -1Mbps

Horizontal

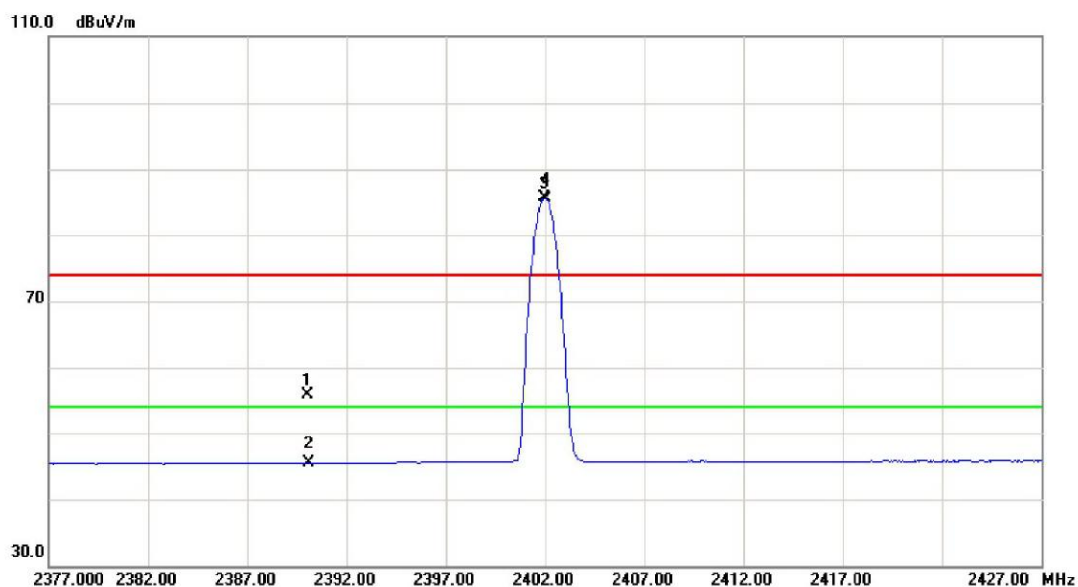


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		168.7100	29.66	-12.89	16.77	43.50	-26.73	peak	
2		295.7800	28.26	-11.07	17.19	46.00	-28.81	peak	
3		420.9100	28.71	-9.16	19.55	46.00	-26.45	peak	
4		661.4700	30.01	-5.10	24.91	46.00	-21.09	peak	
5		797.2700	30.49	-2.99	27.50	46.00	-18.50	peak	
6	*	955.3800	29.72	-0.23	29.49	46.00	-16.51	peak	

ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

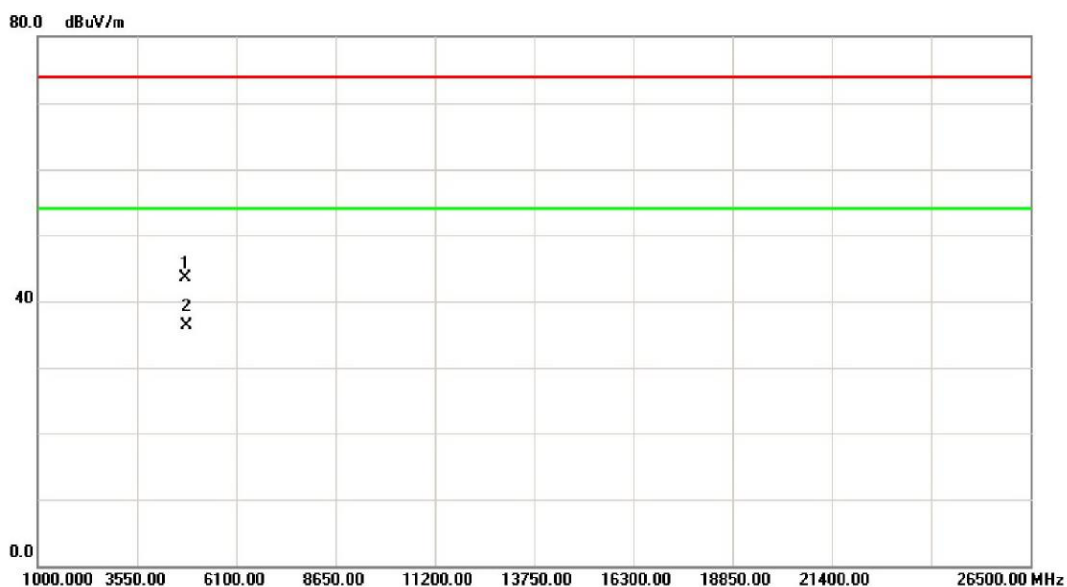
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	24.09	31.88	55.97	74.00	-18.03	peak	
2		2390.000	13.61	31.88	45.49	54.00	-8.51	AVG	
3	X	2401.950	53.72	31.89	85.61	74.00	11.61	peak	no limit
4	*	2402.000	53.59	31.89	85.48	54.00	31.48	AVG	no limit

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

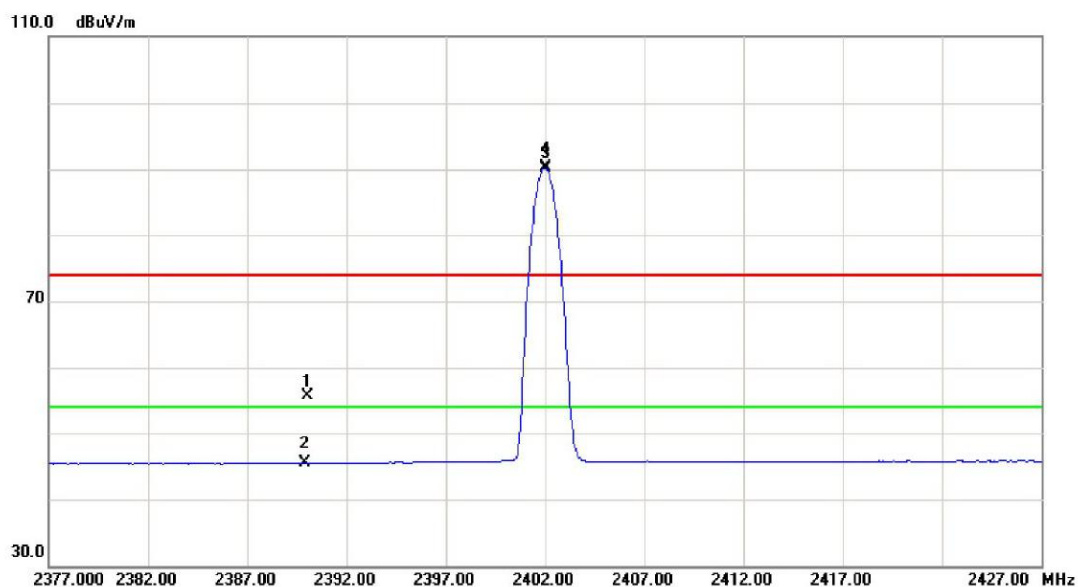
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4803.940	39.99	3.58	43.57	74.00	-30.43	peak	
2	*	4803.940	32.71	3.58	36.29	54.00	-17.71	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2402MHz_CH00_1Mbps

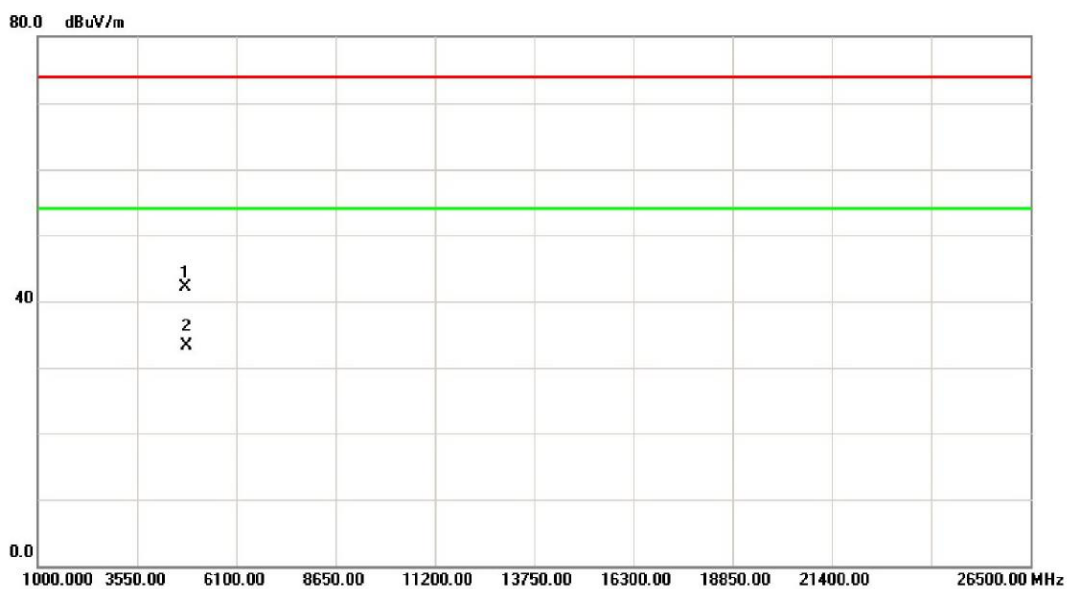
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	23.90	31.88	55.78	74.00	-18.22	peak	
2		2390.000	13.61	31.88	45.49	54.00	-8.51	AVG	
3	X	2402.000	58.34	31.89	90.23	74.00	16.23	peak	no limit
4	*	2402.000	58.30	31.89	90.19	54.00	36.19	AVG	no limit

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00_1Mbps

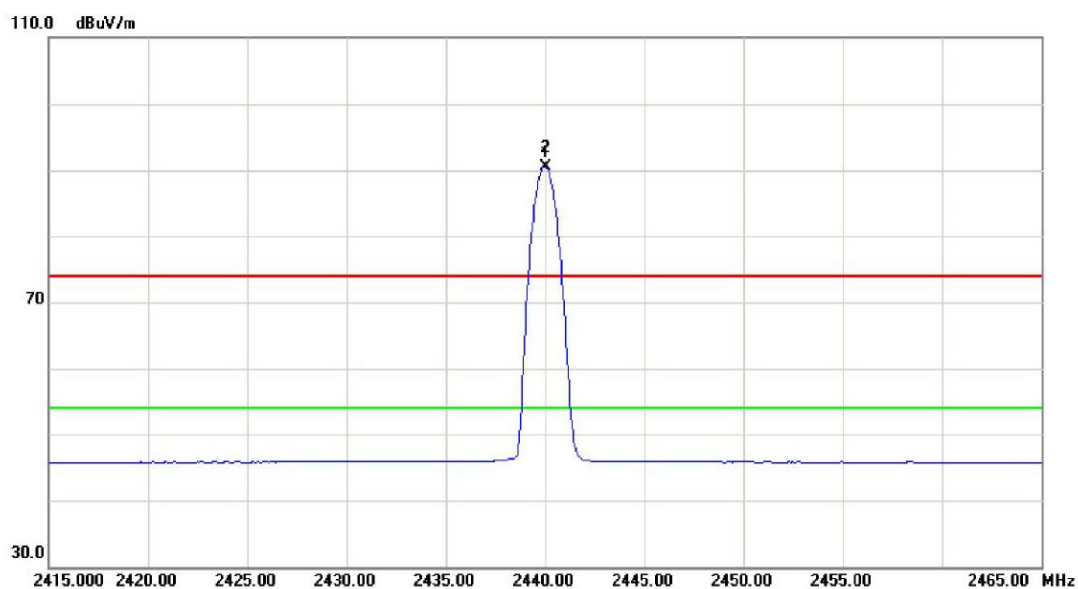
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4803.940	38.48	3.58	42.06	74.00	-31.94	peak	
2	*	4803.940	29.65	3.58	33.23	54.00	-20.77	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz_CH19_1Mbps

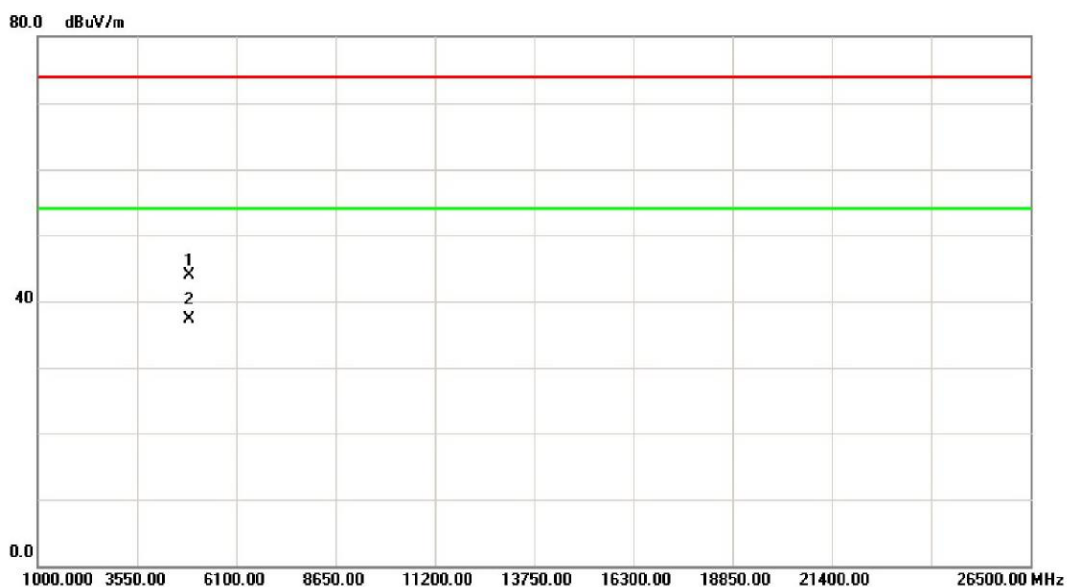
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2440.000	58.64	31.95	90.59	74.00	16.59	peak	no limit
2	*	2440.000	58.59	31.95	90.54	54.00	36.54	AVG	no limit

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

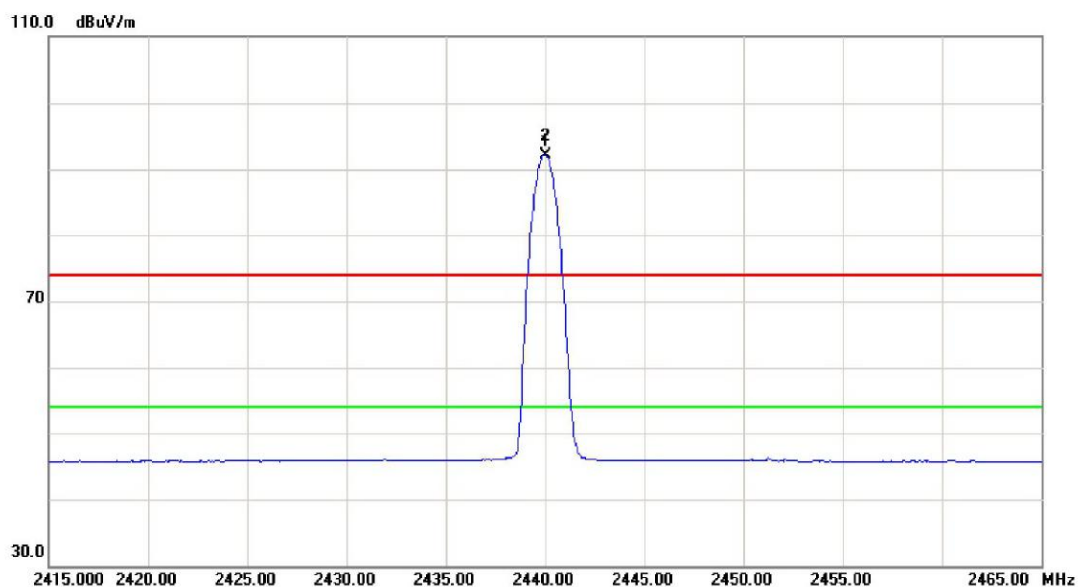
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4879.940	40.25	3.73	43.98	74.00	-30.02	peak	
2	*	4879.940	33.64	3.73	37.37	54.00	-16.63	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

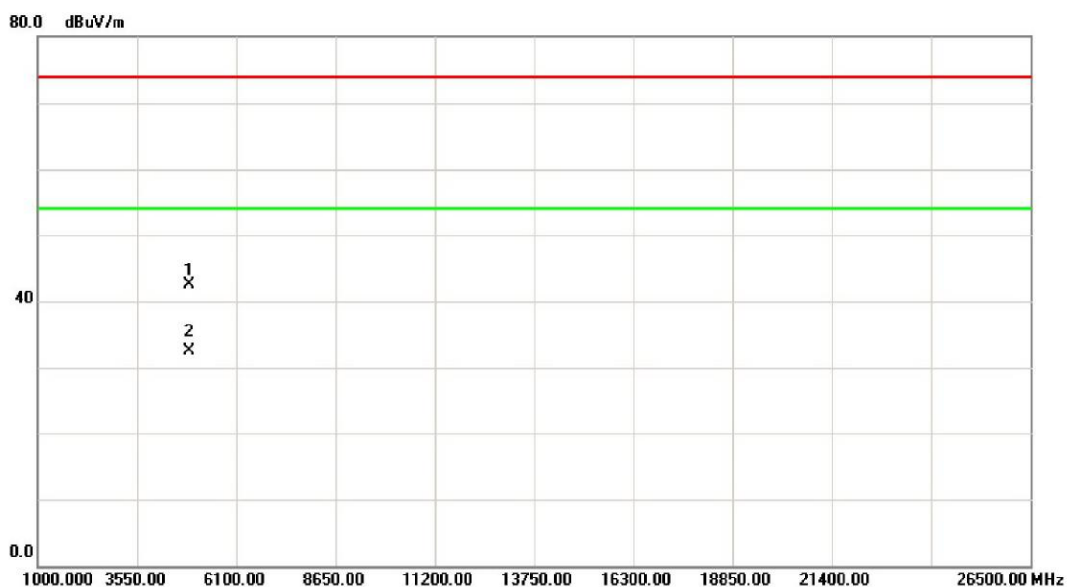
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2440.000	60.14	31.95	92.09	74.00	18.09	peak	no limit
2	*	2440.000	60.17	31.95	92.12	54.00	38.12	AVG	no limit

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19_1Mbps

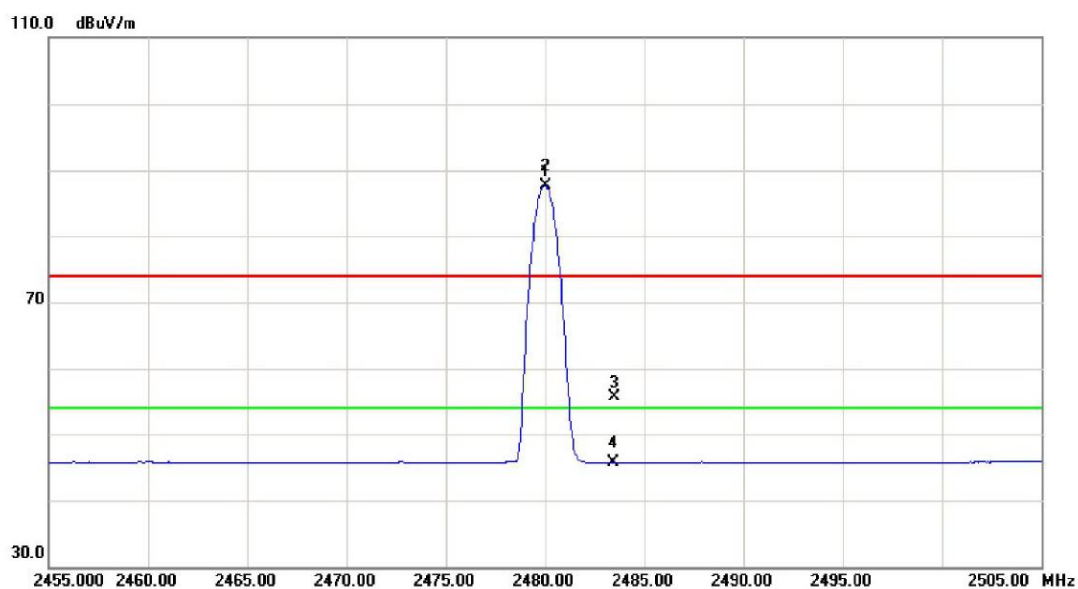
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4879.940	38.72	3.73	42.45	74.00	-31.55	peak	
2	*	4879.940	28.74	3.73	32.47	54.00	-21.53	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz_CH39_1Mbps

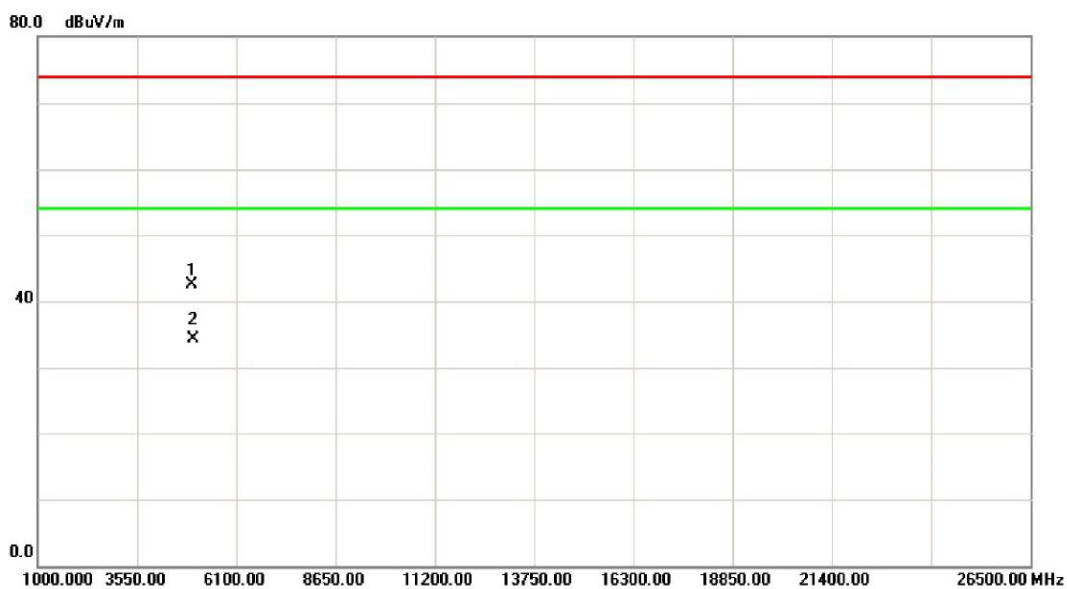
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	55.76	32.00	87.76	74.00	13.76	peak	no limit
2	*	2480.000	55.65	32.00	87.65	54.00	33.65	AVG	no limit
3		2483.500	23.73	32.01	55.74	74.00	-18.26	peak	
4		2483.500	13.68	32.01	45.69	54.00	-8.31	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

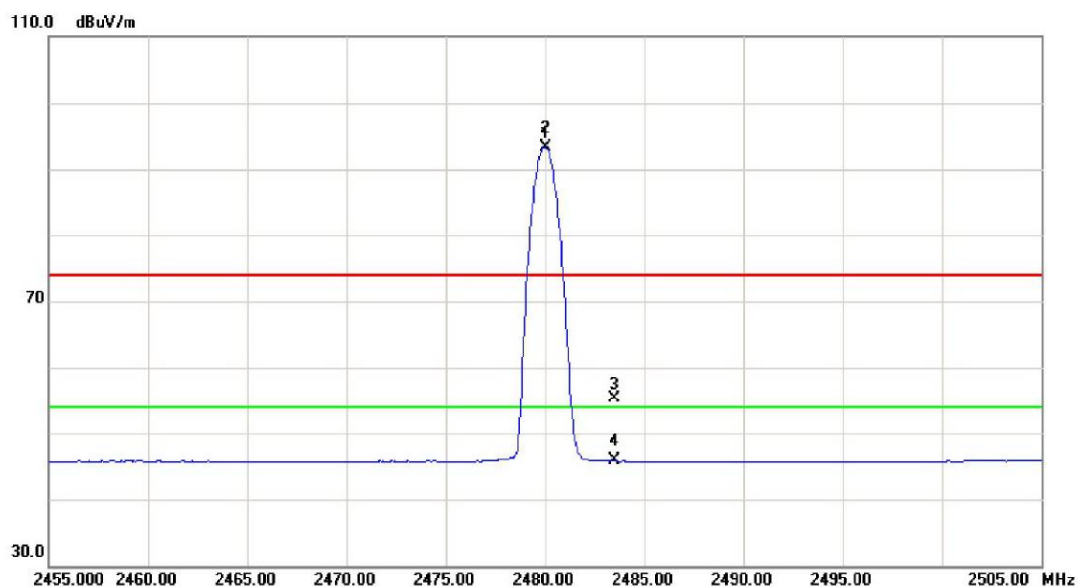
Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4959.960	38.64	3.88	42.52	74.00	-31.48	peak	
2	*	4959.960	30.34	3.88	34.22	54.00	-19.78	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

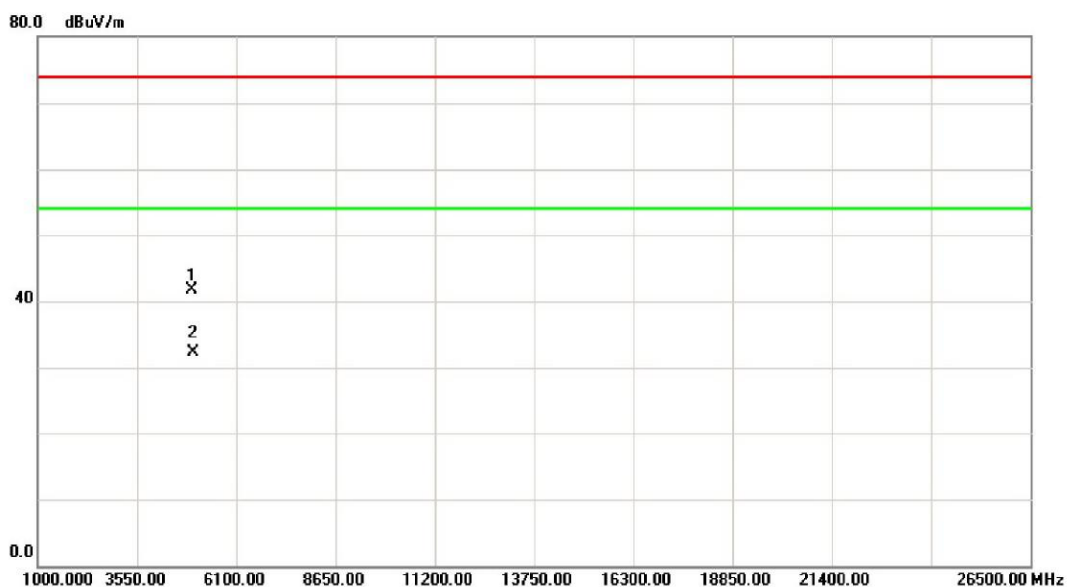
Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2480.000	61.28	32.00	93.28	74.00	19.28	peak	no limit
2	*	2480.000	61.30	32.00	93.30	54.00	39.30	AVG	no limit
3		2483.500	23.37	32.01	55.38	74.00	-18.62	peak	
4		2483.500	13.82	32.01	45.83	54.00	-8.17	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39_1Mbps

Horizontal

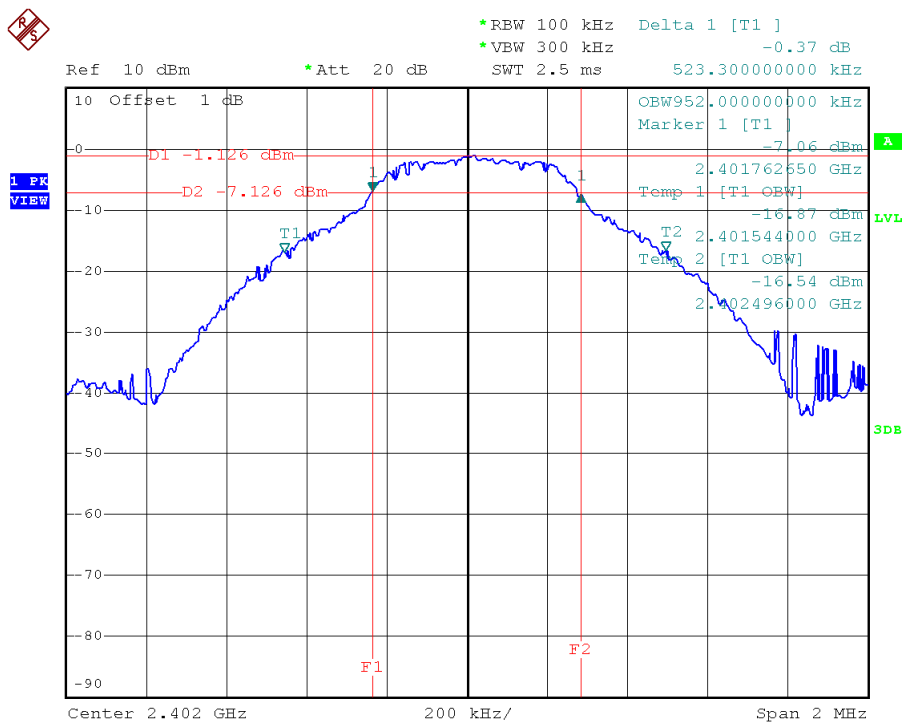


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		4959.960	37.83	3.88	41.71	74.00	-32.29	peak	
2	*	4959.960	28.48	3.88	32.36	54.00	-21.64	AVG	

ATTACHMENT E - BANDWIDTH

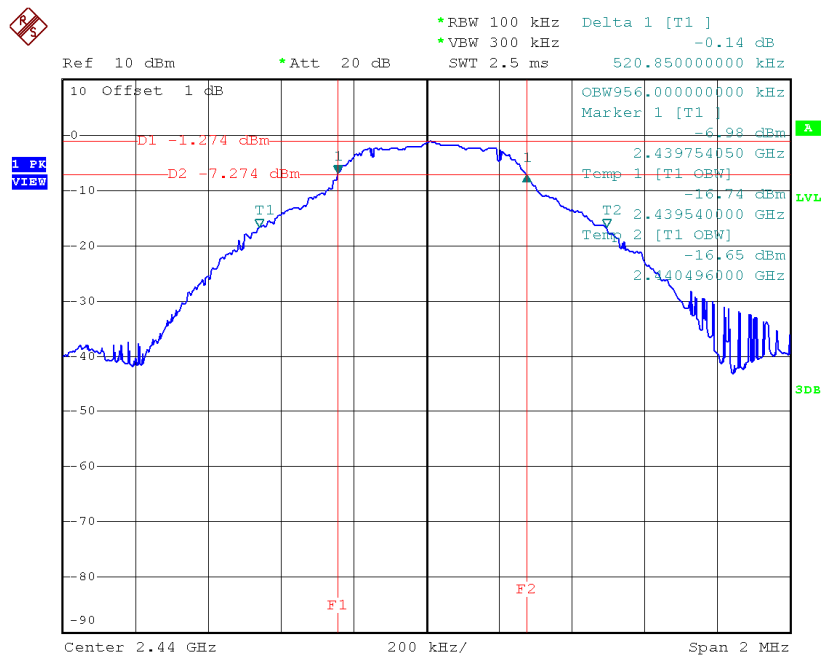
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
2402	0.523	0.952	500	Complies
2440	0.521	0.956	500	Complies
2480	0.512	0.964	500	Complies

TX CH00



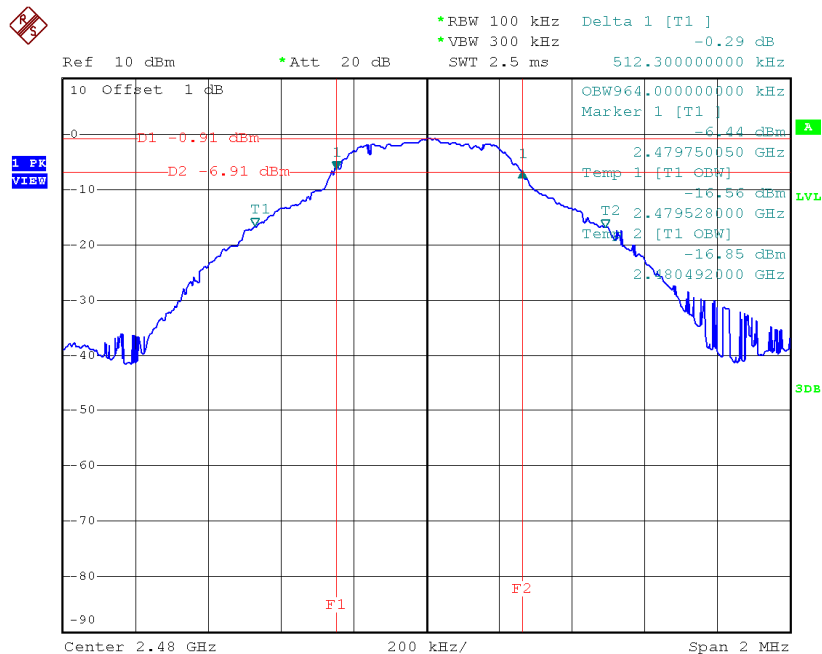
Date: 5.SEP.2014 09:59:49

TX CH19



Date: 5.SEP.2014 10:01:24

TX CH39



Date: 5.SEP.2014 10:02:04

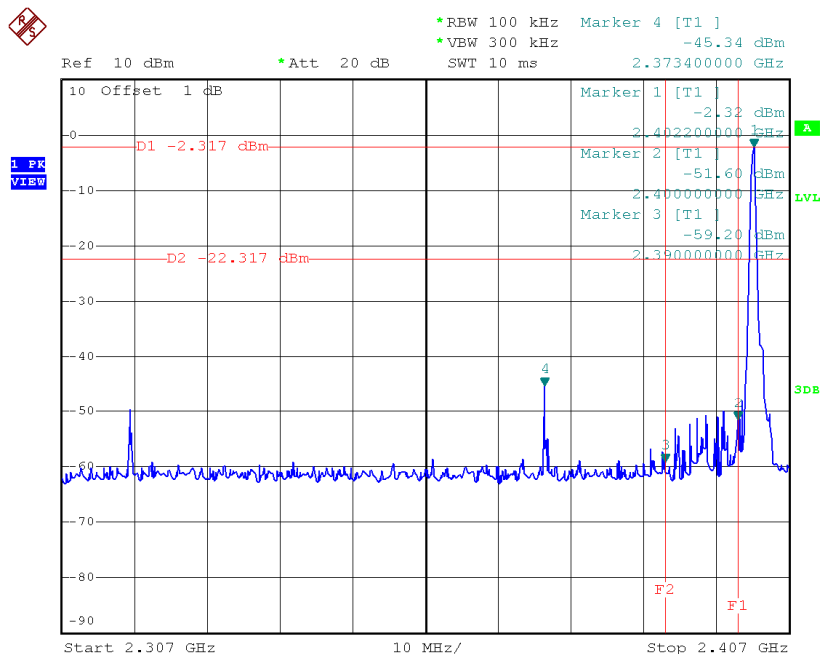
ATTACHMENT F - MAXIMUM OUTPUT POWER TEST

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	-1.17	0.0008	30.00	1.00	Complies
2440	-1.00	0.0008	30.00	1.00	Complies
2480	-0.67	0.0009	30.00	1.00	Complies

ATTACHMENT G - ANTENNA CONDUCTED SPURIOUS EMISSION

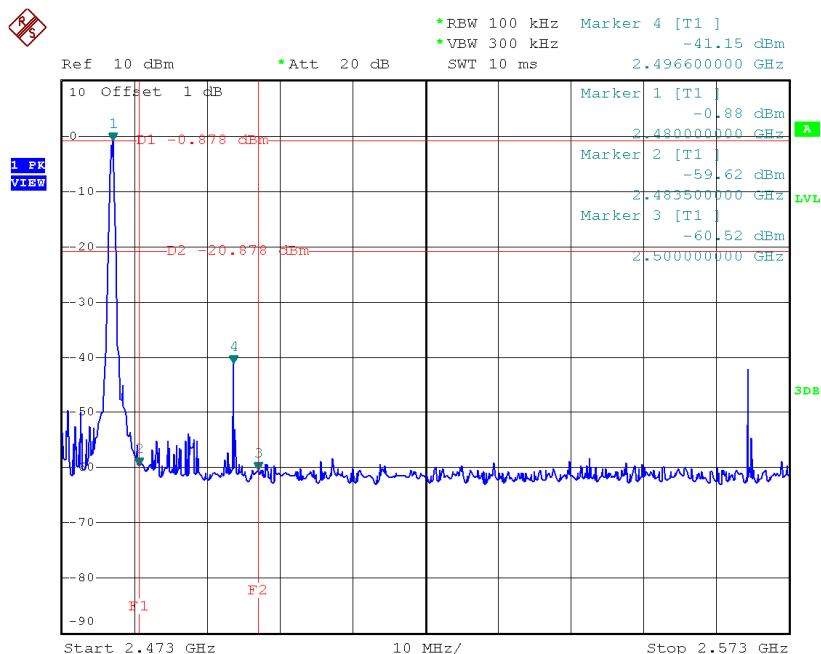
Test Mode : CH00, CH19 , CH39 - 1Mbps

CH00 (Lower) - 1Mbps



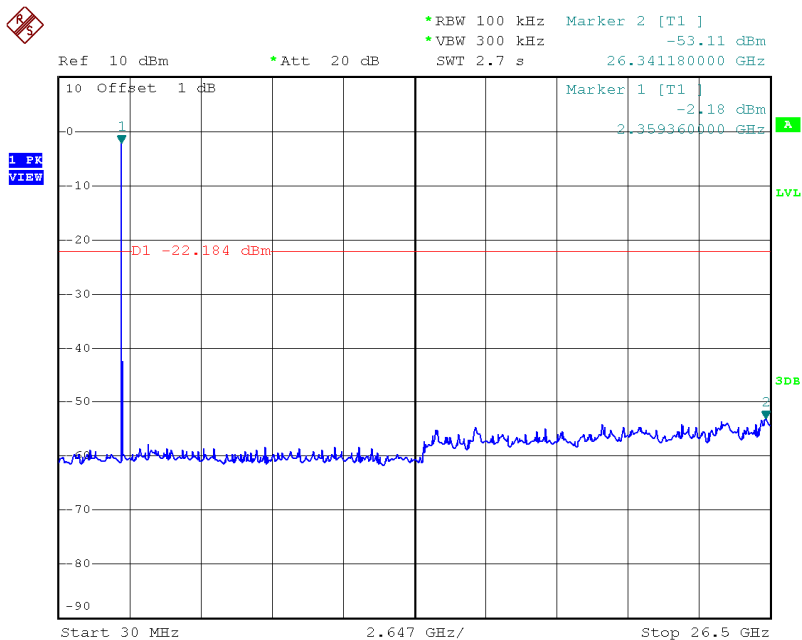
Date: 14.OCT.2014 11:47:03

CH39 (upper) - 1Mbps



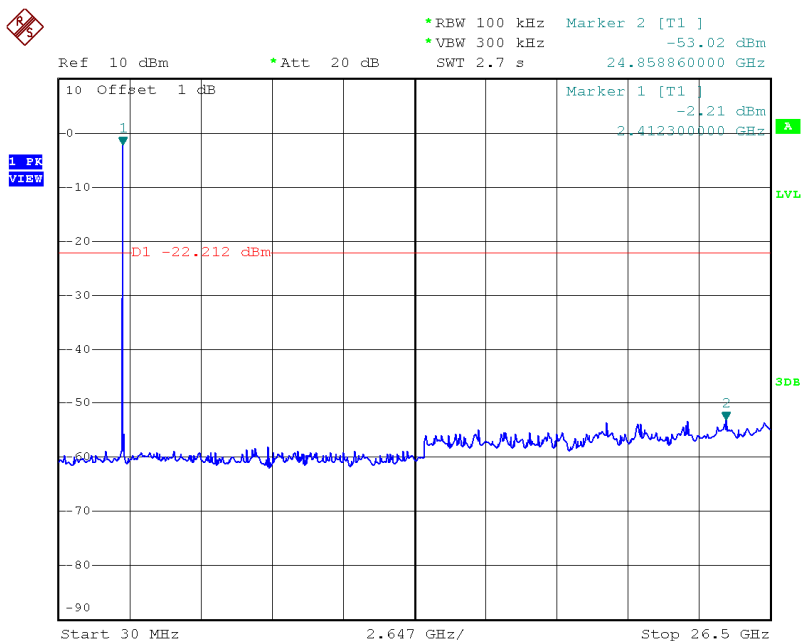
Date: 14.OCT.2014 11:47:31

CH00 (10 Harmonic of the frequency)



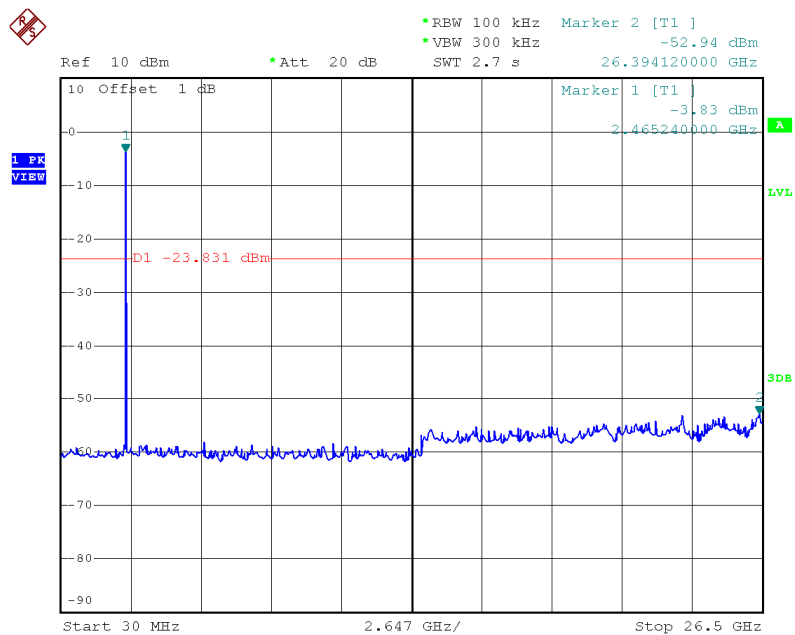
Date: 5.SEP.2014 10:00:00

CH19 (10 Harmonic of the frequency)



Date: 5.SEP.2014 10:01:34

CH39 (10 Harmonic of the frequency)



Date: 5.SEP.2014 10:02:15

ATTACHMENT H - POWER SPECTRAL DENSITY TEST

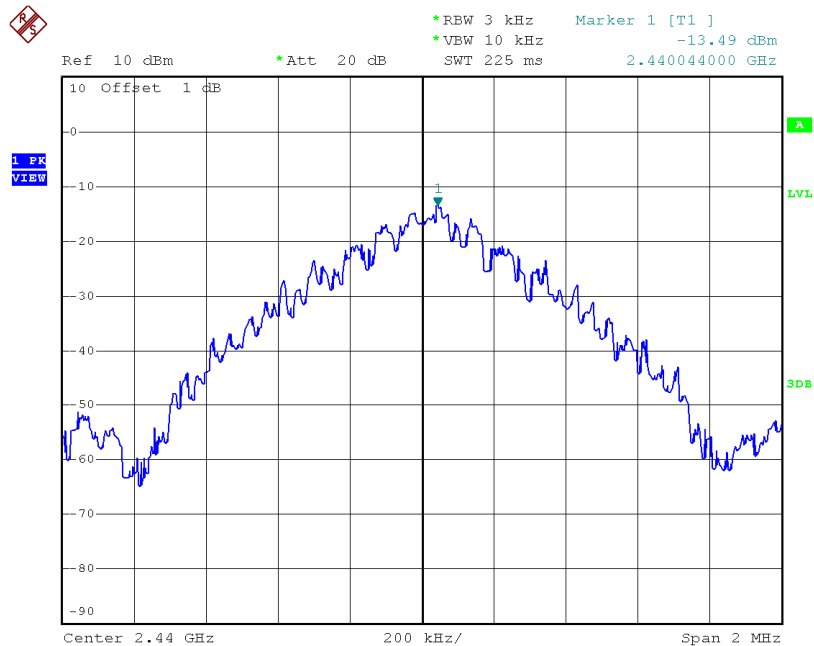
Frequency (MHz)	Power Density (dBm)	Max. Limit (dBm)	Result
2402	-14.46	8	Complies
2440	-13.49	8	Complies
2480	-13.30	8	Complies

TX CH00



Date: 5.SEP.2014 10:00:16

TX CH19



Date: 5.SEP.2014 10:01:41

TX CH39



Date: 5.SEP.2014 10:02:32