FCC Radio Test Report

FCC ID: 2ABZ6BT003

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

Project No.	:	1401C186B
Equipment	:	Bluetooth Smart Bike Speed and Cadence Sensor
Model Name	:	BT003
Applicant	:	R.E.A.C ELECTRONIC CO., LTD.
Address	:	7/F., O.T.B. Building, 259-265 Des Voeux Road Central, Hong Kong

Date of Receipt	:	Jun. 22, 2016
Date of Test	:	Jun. 22, 2016 ~ Jun. 29, 2016
Issued Date	:	Jun. 30, 2016
Tested by	:	BTL Inc.

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Declaration

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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-1-1401C186B	Original Issue.	Jun. 29, 2016

1. CERTIFICATION

Equipment	:	Bluetooth Smart Bike Speed and Cadence Sensor
Brand Name	:	N/A
Model Name	:	BT003
Applicant		R.E.A.C ELECTRONIC CO., LTD.
Manufacturer	:	REAC INDUSTRIAL CO., LTD.
Address	:	ZHONGFANG GONG YE QU, SHATOU GUAN LI QU, CHANGAN TOWN, DONGGUAN CITY, GUANGDONG, CHINA
Factory	:	REAC INDUSTRIAL CO., LTD.
Address	:	ZHONGFANG GONG YE QU, SHATOU GUAN LI QU, CHANGAN TOWN, DONGGUAN CITY, GUANGDONG, CHINA
Date of Test	:	Jun. 22, 2016 ~ Jun. 29, 2016
Test Sample	:	Engineering Sample
Standard(s)	:	FCC Part15, Subpart C (15.247) / ANSI C63.10-2013

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1401C186B) 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
15.207	Conducted Emission	N/A
15.247(d)	Antenna conducted Spurious Emission	PASS
15.247(a)(2)	6dB Bandwidth	PASS
15.247(b)(3)	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.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.
BTL's test firm number for FCC: 319330

2.2 MEASUREMENT UNCERTAINTY

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

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

A. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U, (dB)
DG-CB03	CISPR	9KHz~30MHz	V	3.79
		9KHz~30MHz	H	3.57
		30MHz ~ 200MHz	V	3.82
		30MHz ~ 200MHz	H	3.78
		200MHz ~ 1,000MHz	V	4.10
		200MHz ~ 1,000MHz	H	4.06
		1GHz~18GHz	V	3.12
		1GHz~18GHz	H	3.68
		18GHz~40GHz	V	4.15
		18GHz~40GHz	H	4.14

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Bluetooth Smart Bike Speed and Cadence Sensor	
Brand Name	N/A	
Model Name	BT003	
Model Difference	N/A	
Product Description	Operation Frequency	2402~2480 MHz
	Modulation Technology	GFSK (1Mbps)
	Bit Rate of Transmitter	
	Output Power (Max.)	-4.86dBm
Power Source	Supplied from battery. Model:CR2032	
Power Rating	DC 3V	

Note:

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

2. Channel List:

Channel 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:

Original Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed	N/A	-3

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)**

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

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

Note:

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

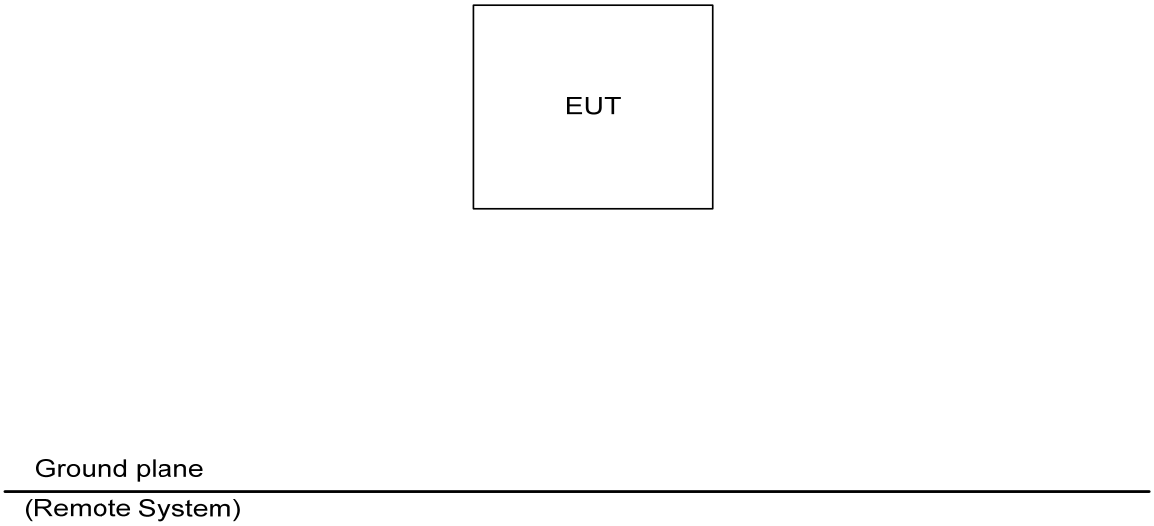
(2) The EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test

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

Test Software Version	N/A		
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	Series No.
-	-	-	-	-	-

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

Note:

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

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION LIMITS (Frequency Range 150KHz-30MHz)

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 -0.5	66 to 56*	56 to 46*
0.50 -5.0	56	46
5.0 30.0	60	50

Note:

(1) The limit of " * " decreases with the logarithm of the frequency

(2) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)
Margin Level = Measurement Value - Limit Value

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

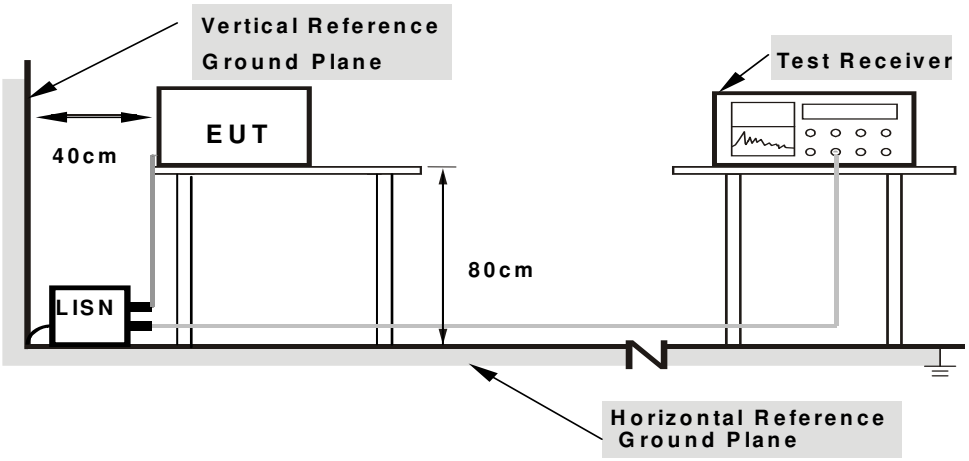
4.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 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: N/A°C
Relative Humidity: N/A %
Test Voltage: N/A

4.1.7 TEST RESULTS

Please refer to the Attachment A.

Remark:

(1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform.In this case, a " * " marked in AVG Mode column of Interference Voltage Measured.

(2) Measuring frequency range from 150KHz to 30MHz.

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS

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

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

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

Frequency (MHz)	(dBuV/m) (at 3 meters)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value

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

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

4.2.2 TEST PROCEDURE

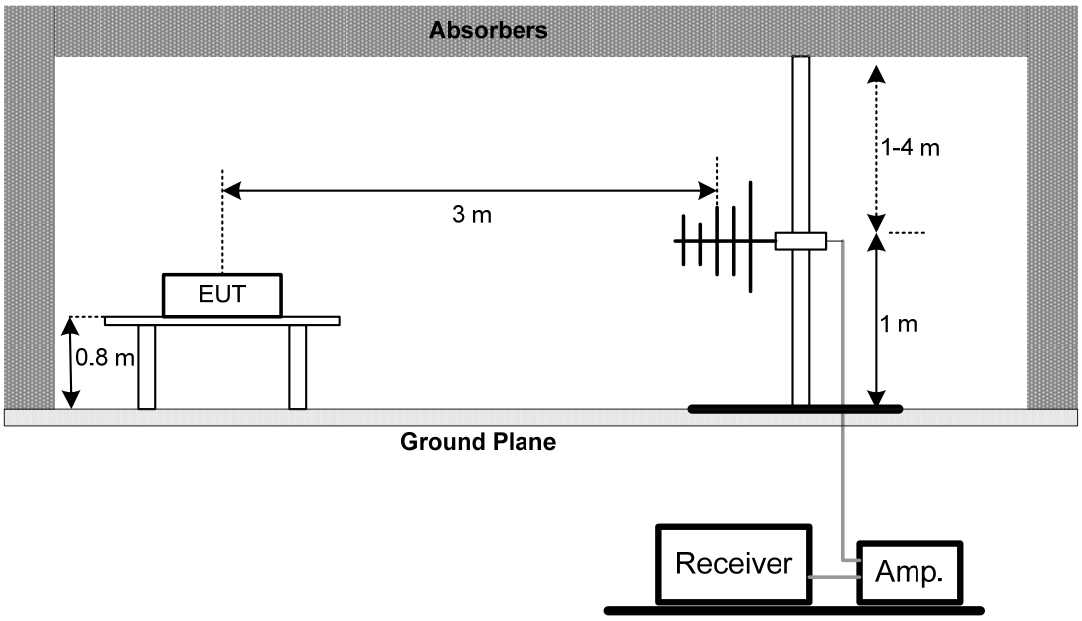
a. The measuring distance of at 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance of at 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1GHz)
i. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.2.3 DEVIATION FROM TEST STANDARD

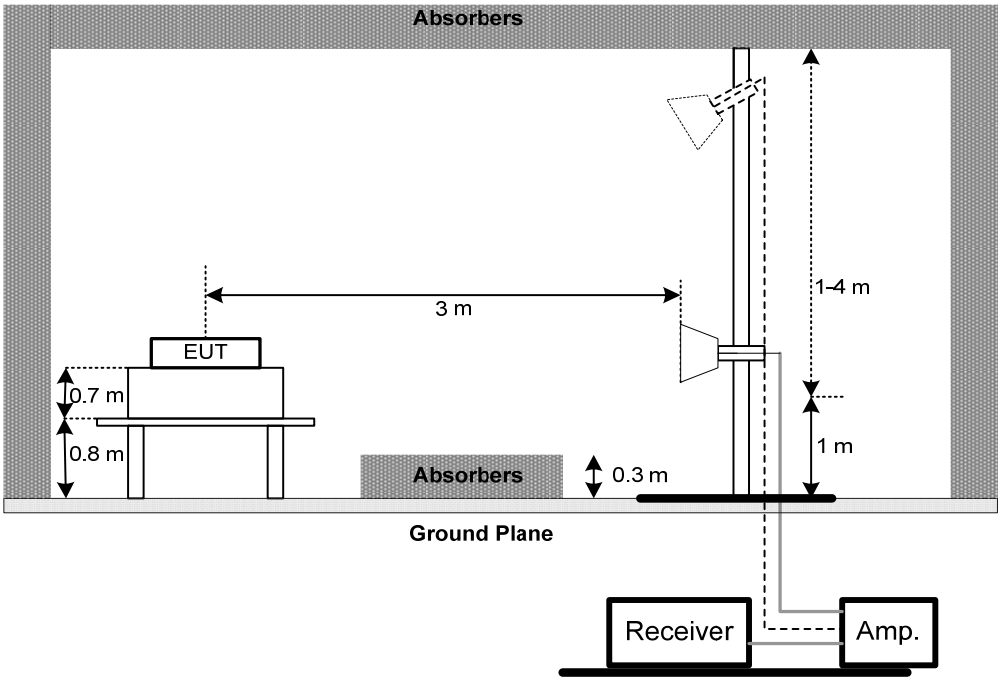
No deviation

4.2.4 TEST SETUP

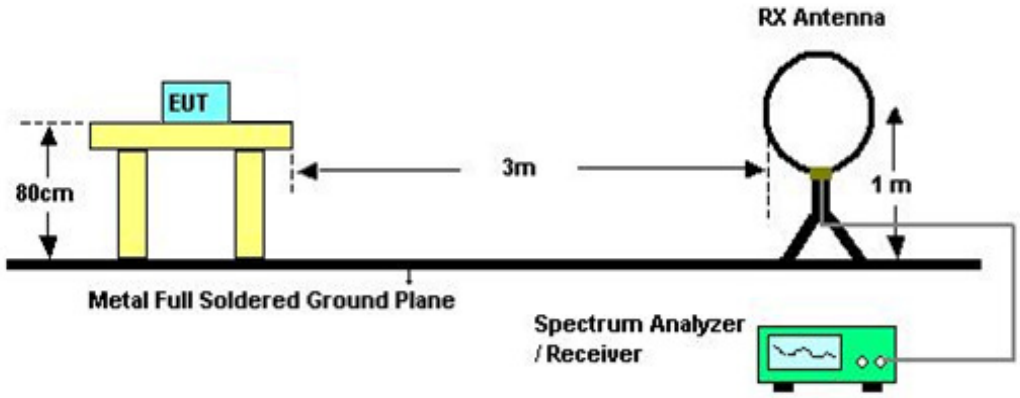
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For radiated emissions below 30MHz



4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

4.2.6 EUT TEST CONDITIONS

Temperature: 22°C
Relative Humidity: 56%
Test Voltage: AC 120V/60Hz

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) 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.

4.2.9TEST 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				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	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: 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

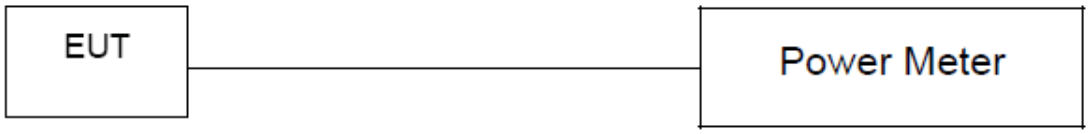
6.1.1 TEST PROCEDURE

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 v03r05.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 EUT TEST CONDITIONS

Temperature: 25°C
Relative Humidity: 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.

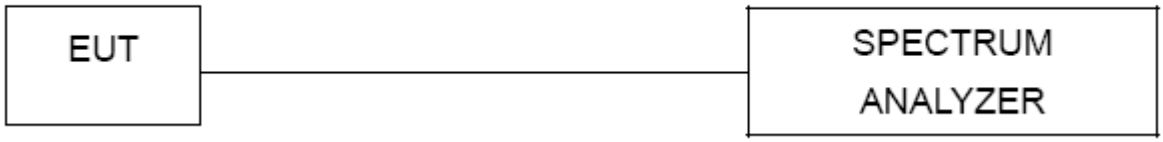
7.1.1 TEST PROCEDURE

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.
c. Offset=antanna gain + cable loss

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.5 unless otherwise a special operating condition is specified in the follows during the testing.

7.1.5 EUT TEST 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

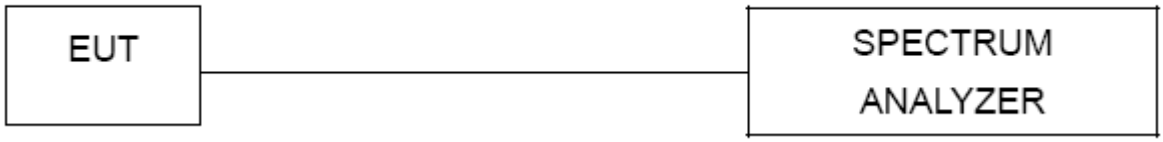
8.1.1 TEST PROCEDURE

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

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Mar. 27, 2017
2	Amplifier	HP	8447D	2944A09673	Nov. 09, 2016
3	Receiver	AGILENT	N9038A	MY52130039	Oct. 11, 2016
4	Test Cable	emci	LMR-400(30MHz-1GHz)	C-01	Jun. 27, 2017
5	Controller	CT	SC100	N/A	N/A
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	Antenna	ETS	3115	00075789	Mar. 27, 2017
8	Amplifier	Agilent	8449B	3008A02274	Nov. 01, 2016
9	Receiver	AGILENT	N9038A	MY52130039	Oct. 11, 2016
10	Test Cable	emci	EMC104-SM-SM-10000(1GHz－26.5GHz)	C-68	Jun. 27, 2017
11	Controller	CT	SC100	N/A	N/A
12	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Mar. 27, 2017
13	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 27, 2017
14	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Sep. 07, 2016

6dB Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

Peak Output Power Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Meter	ANRITSU	ML2495A	1128009	Mar. 27, 2017
2	Pulse Power Sensor	ANRITSU	MA 2411B	1027500	Mar. 27, 2017

Antenna Conducted Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

Power Spectral Density Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Oct. 11, 2016

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

Radiated Measurement Photos

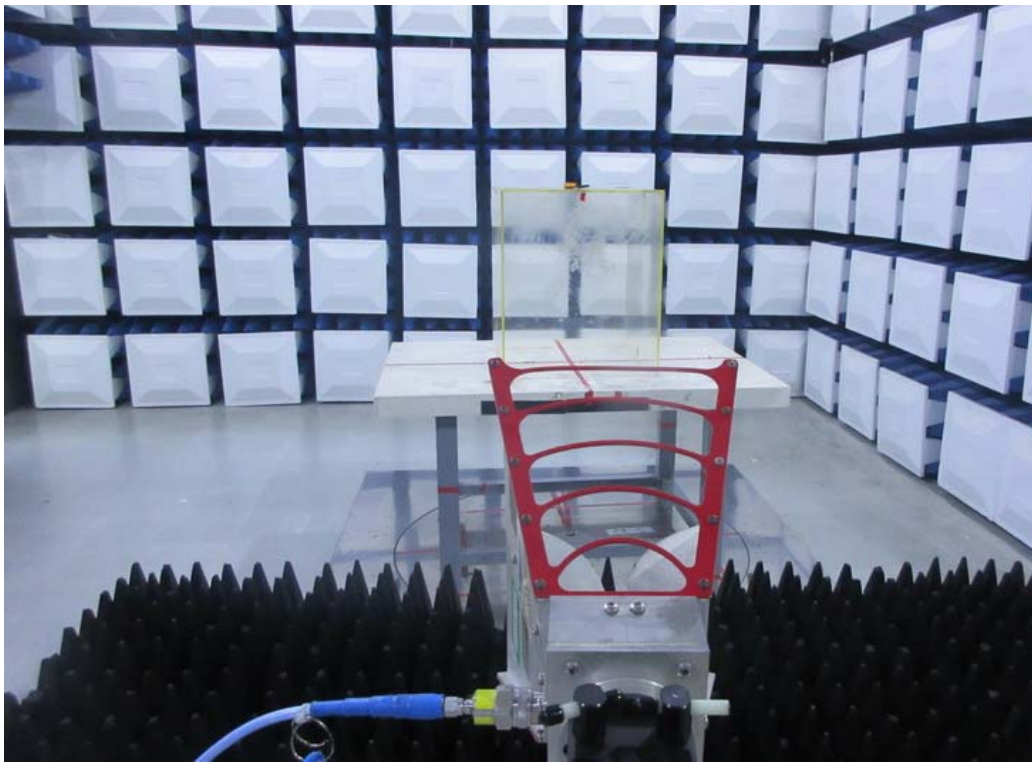
9KHz to 30MHz

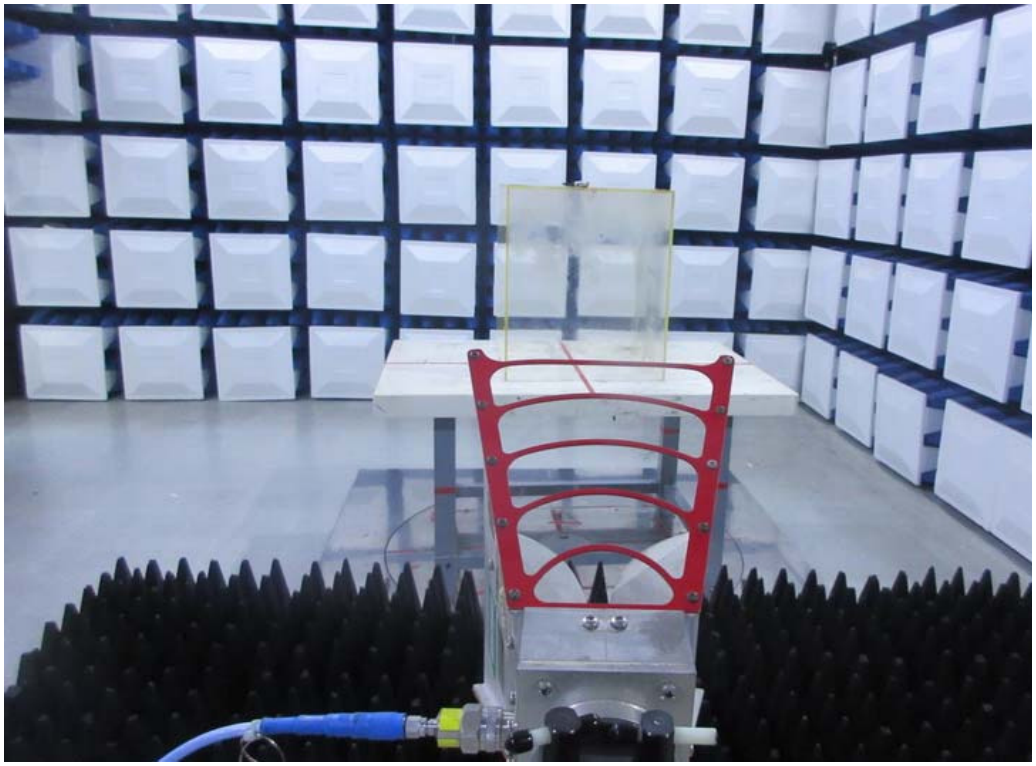
Radiated Measurement Photos

30MHz to 1000MHz

Radiated Measurement Photos

Above 1000MHz





ATTACHMENT A - CONDUCTED EMISSION

Test Mode: N/A

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

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

Test Mode:	TX Mode

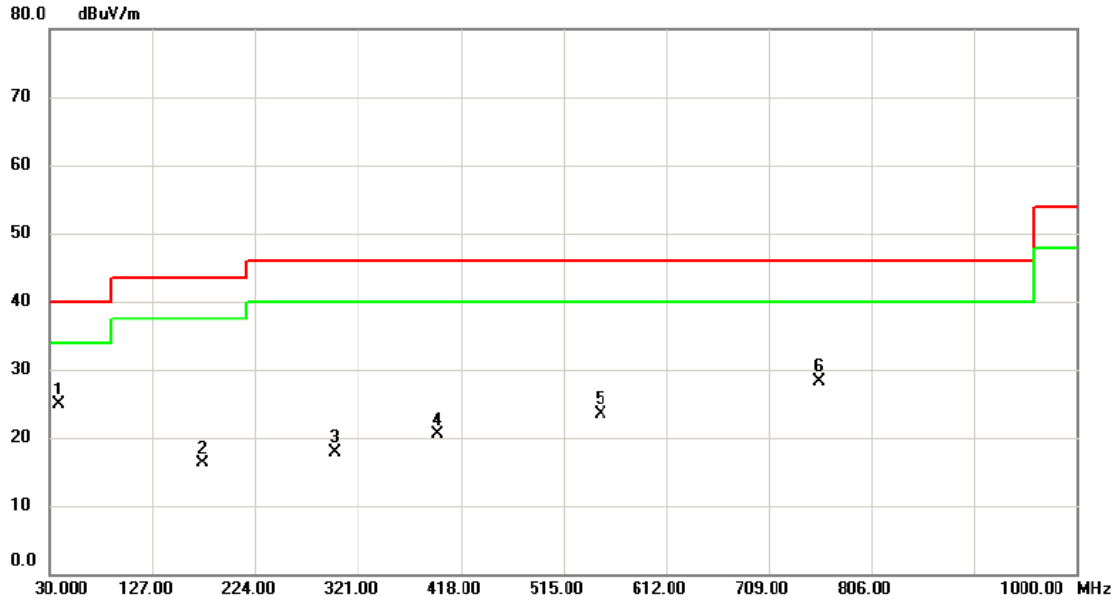
Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0094	0°	13.40	24.97	38.37	128.14	-89.77	AVG
0.0094	0°	14.29	24.97	39.26	148.14	-108.88	PEAK
0.0281	0°	6.68	23.79	30.47	118.63	-88.16	AVG
0.0281	0°	8.24	23.79	32.03	138.63	-106.60	PEAK
0.0367	0°	3.37	23.24	26.61	116.31	-89.70	AVG
0.0367	0°	5.55	23.24	28.79	136.31	-107.52	PEAK
0.0582	0°	1.17	22.24	23.41	112.31	-88.90	AVG
0.0582	0°	2.52	22.24	24.76	132.31	-107.55	PEAK
0.7290	0°	19.41	20.53	39.94	70.35	-30.41	QP
1.9523	0°	23.70	19.50	43.20	69.54	-26.34	QP

Frequency (MHz)	Ant 0°/90°	Read level dBuV/m	Factor (dB)	Measured(FS) (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Note
0.0120	90°	13.27	24.30	37.57	126.02	-88.45	AVG
0.0120	90°	14.81	24.30	39.11	146.02	-106.91	PEAK
0.0262	90°	7.28	23.91	31.19	119.24	-88.05	AVG
0.0262	90°	8.90	23.91	32.81	139.24	-106.43	PEAK
0.0434	90°	5.24	22.82	28.06	114.85	-86.80	AVG
0.0434	90°	6.17	22.82	28.99	134.85	-105.87	PEAK
0.0582	90°	1.50	22.24	23.74	112.31	-88.57	AVG
0.0582	90°	2.82	22.24	25.06	132.31	-107.25	PEAK
0.6217	90°	22.25	20.19	42.44	71.73	-29.29	QP
2.0542	90°	24.51	19.47	43.98	69.54	-25.56	QP

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

Test Mode:	TX 2402MHz -CH00

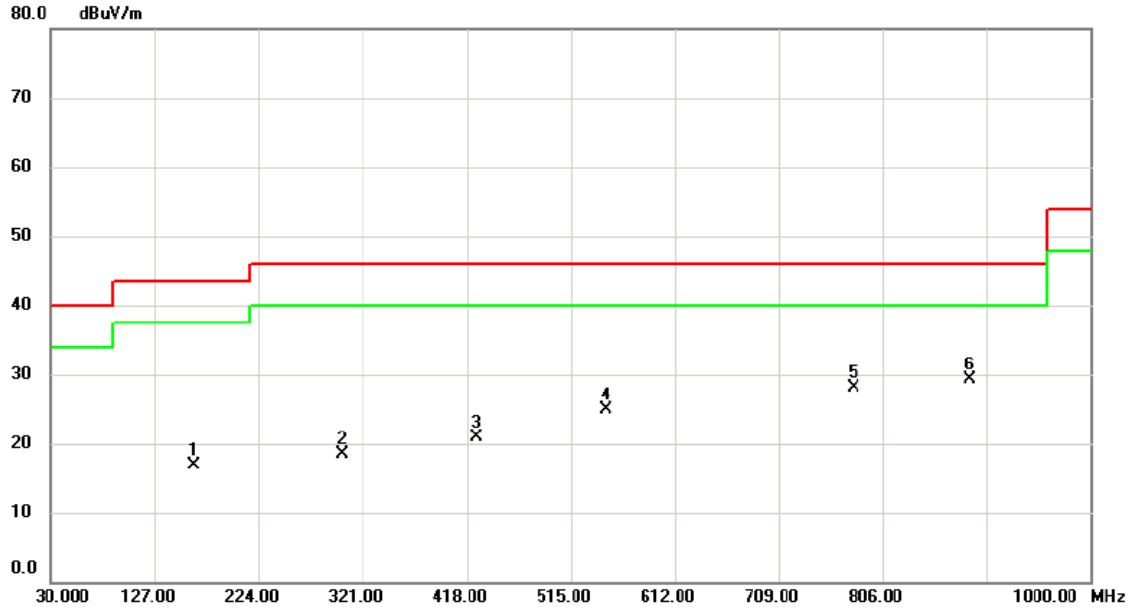
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	38.2450	38.90	-14.06	24.84	40.00	-15.16	peak	
2		173.5600	28.87	-12.53	16.34	43.50	-27.16	peak	
3		300.1450	28.30	-10.46	17.84	46.00	-28.16	peak	
4		396.1750	29.09	-8.53	20.56	46.00	-25.44	peak	
5		550.4050	28.82	-5.30	23.52	46.00	-22.48	peak	
6		757.0150	30.86	-2.61	28.25	46.00	-17.75	peak	

Test Mode:	TX 2402MHz -CH00

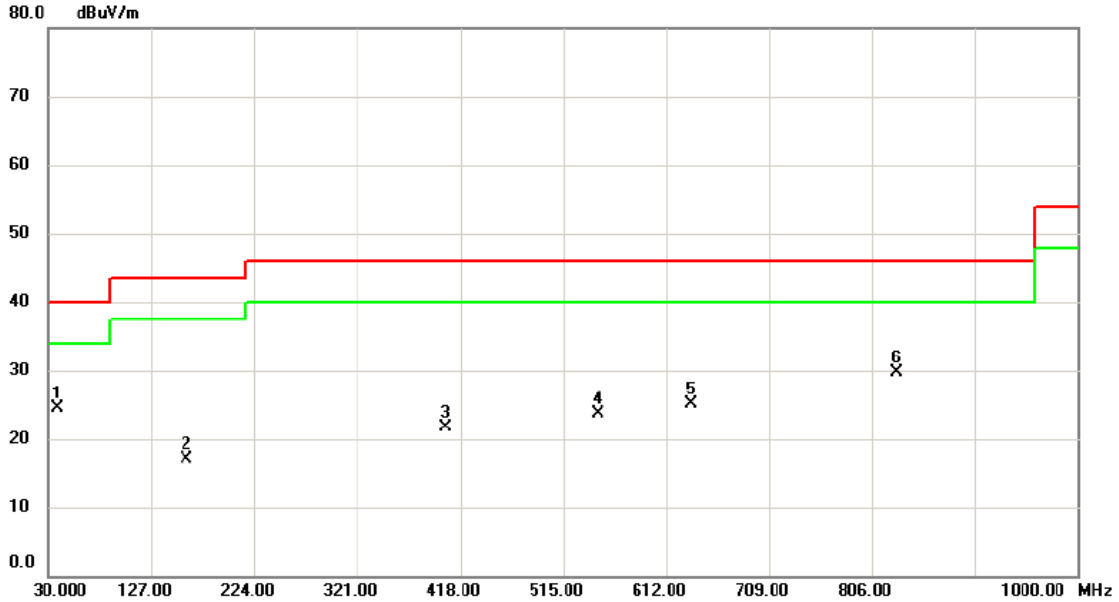
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		164.3450	29.11	-12.24	16.87	43.50	-26.63	peak	
2		301.6000	28.91	-10.49	18.42	46.00	-27.58	peak	
3		427.7000	29.37	-8.43	20.94	46.00	-25.06	peak	
4		547.4950	30.49	-5.53	24.96	46.00	-21.04	peak	
5		779.3250	29.70	-1.65	28.05	46.00	-17.95	peak	
6	*	887.9650	28.62	0.63	29.25	46.00	-16.75	peak	

Test Mode:	TX 2440MHz -CH19

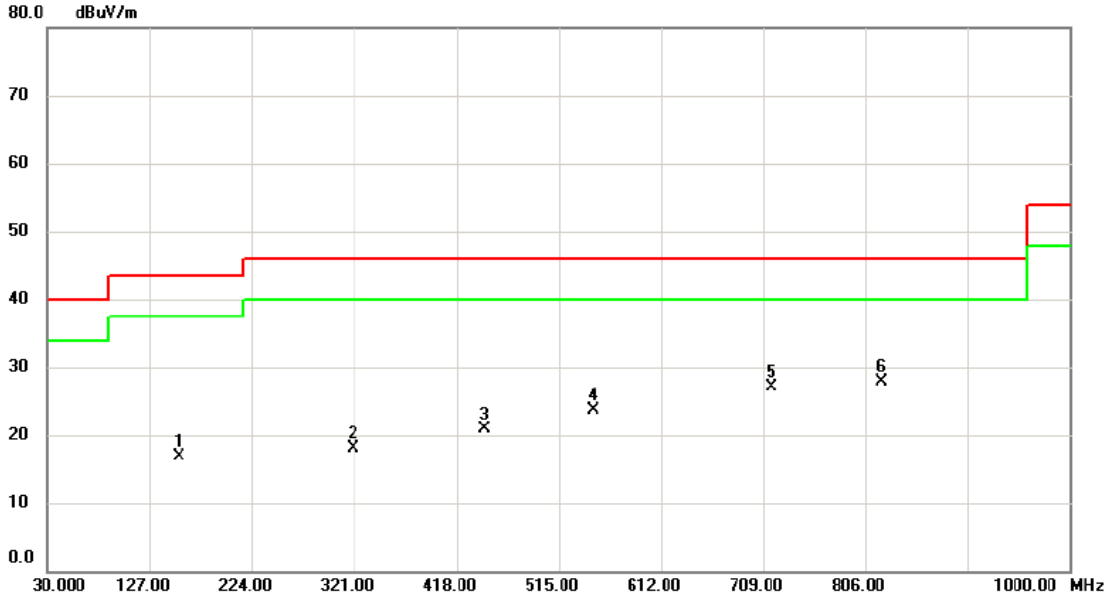
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	38.2450	38.50	-14.06	24.44	40.00	-15.56	peak	
2		159.4950	29.28	-12.23	17.05	43.50	-26.45	peak	
3		404.4200	29.96	-8.30	21.66	46.00	-24.34	peak	
4		548.4650	29.20	-5.43	23.77	46.00	-22.23	peak	
5		635.2800	30.96	-5.87	25.09	46.00	-20.91	peak	
6		830.2500	31.37	-1.68	29.69	46.00	-16.31	peak	

Test Mode:	TX 2440MHz -CH19

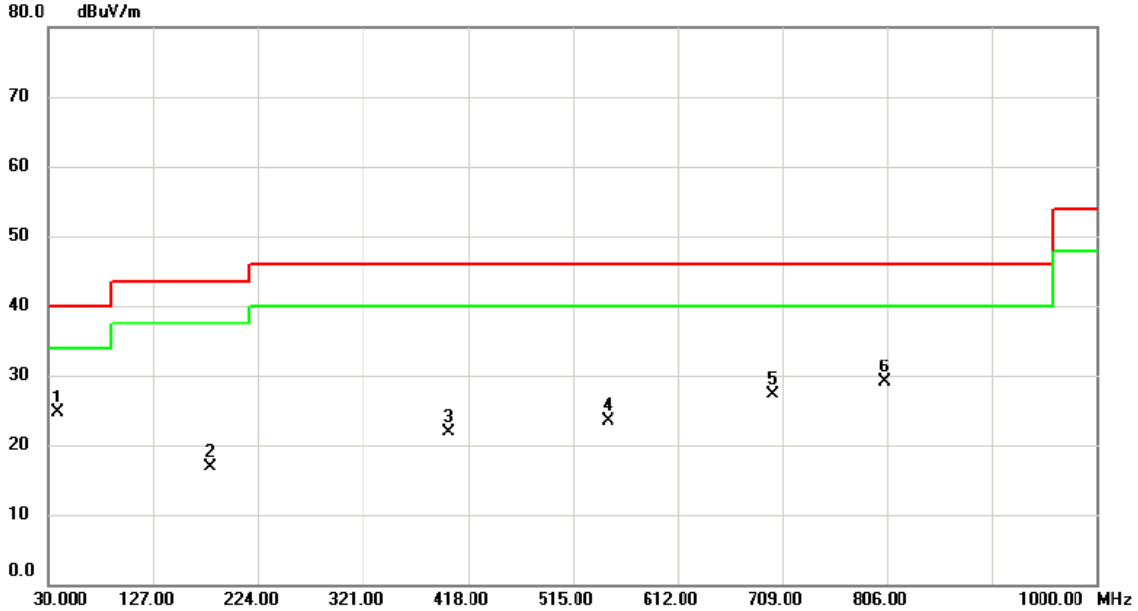
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		154.6450	29.45	-12.61	16.84	43.50	-26.66	peak	
2		320.0300	29.07	-10.92	18.15	46.00	-27.85	peak	
3		444.1900	29.48	-8.54	20.94	46.00	-25.06	peak	
4		548.4650	29.16	-5.43	23.73	46.00	-22.27	peak	
5		716.7600	30.04	-2.99	27.05	46.00	-18.95	peak	
6	*	821.5200	29.27	-1.41	27.86	46.00	-18.14	peak	

Test Mode:	TX 2480MHz -CH39

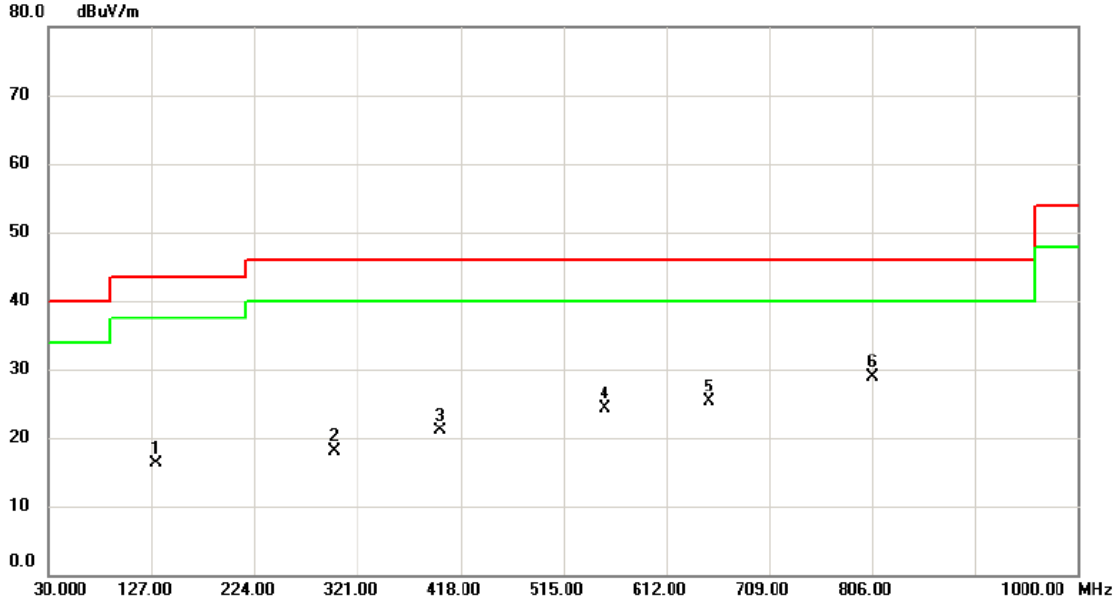
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	38.2450	38.84	-14.06	24.78	40.00	-15.22	peak	
2		178.8950	29.84	-12.84	17.00	43.50	-26.50	peak	
3		400.5400	30.19	-8.27	21.92	46.00	-24.08	peak	
4		548.4650	29.02	-5.43	23.59	46.00	-22.41	peak	
5		700.7550	30.37	-3.01	27.36	46.00	-18.64	peak	
6		804.5450	30.02	-0.88	29.14	46.00	-16.86	peak	

Test Mode:	TX 2480MHz -CH39

Horizontal

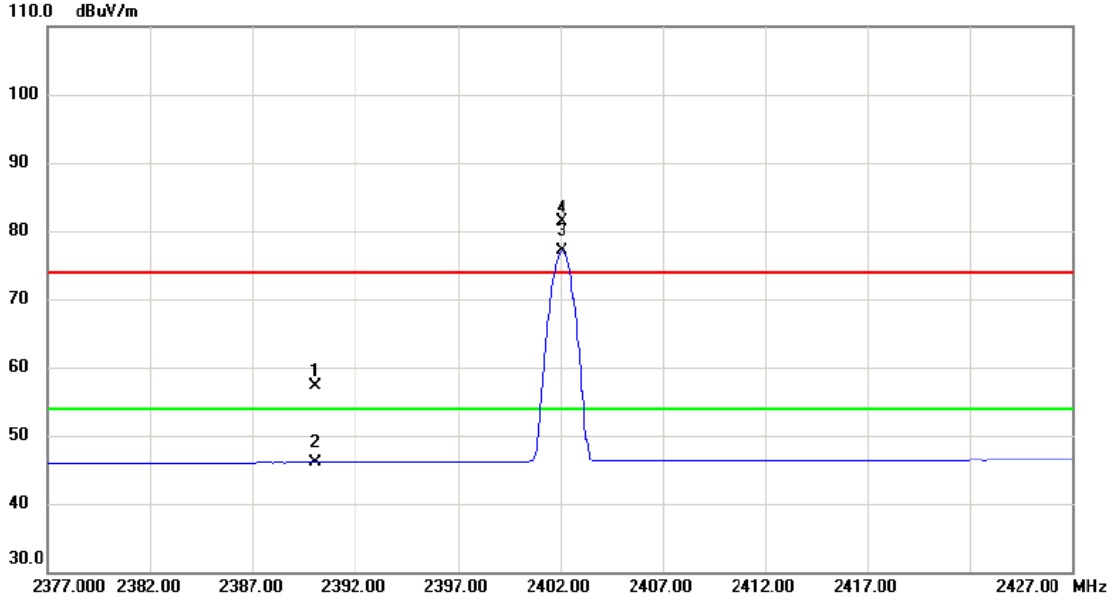


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		130.8800	28.83	-12.49	16.34	43.50	-27.16	peak	
2		300.1450	28.57	-10.46	18.11	46.00	-27.89	peak	
3		399.0850	29.42	-8.32	21.10	46.00	-24.90	peak	
4		554.7700	29.83	-5.53	24.30	46.00	-21.70	peak	
5		652.7400	30.23	-4.93	25.30	46.00	-20.70	peak	
6	*	806.9700	29.95	-0.95	29.00	46.00	-17.00	peak	

ATTACHMENT C - RADIATED EMISSION (ABOVE 1000MHZ)

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00

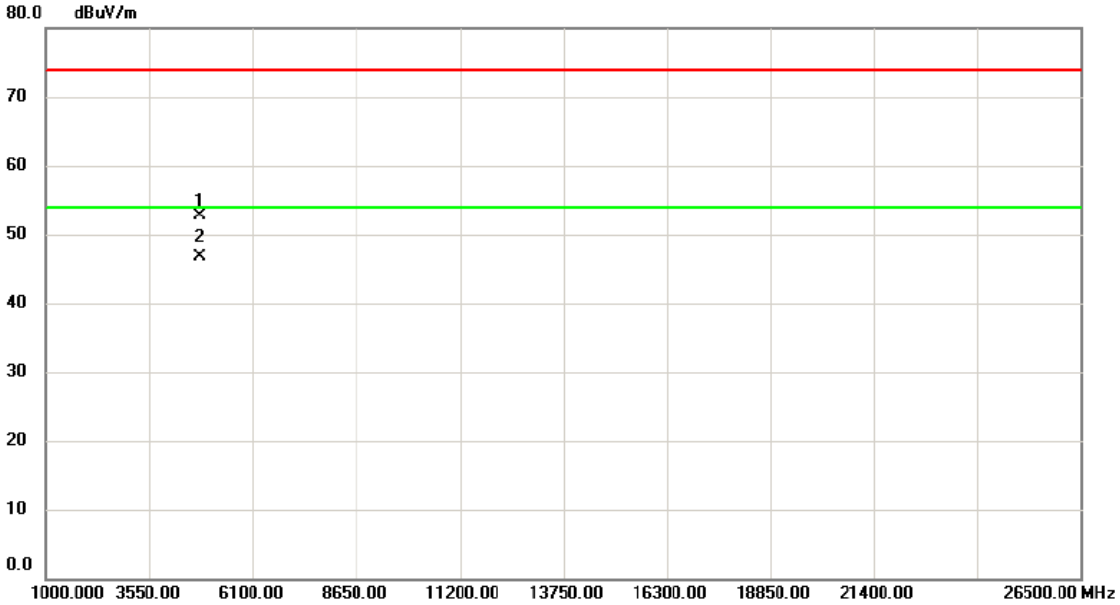
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	24.61	32.77	57.38	74.00	-16.62	peak	
2		2390.000	13.26	32.77	46.03	54.00	-7.97	AVG	
3	*	2402.075	44.30	32.82	77.12	54.00	23.12	AVG	NO LIMIT
4	X	2402.100	48.42	32.82	81.24	74.00	7.24	peak	NO LIMIT

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00

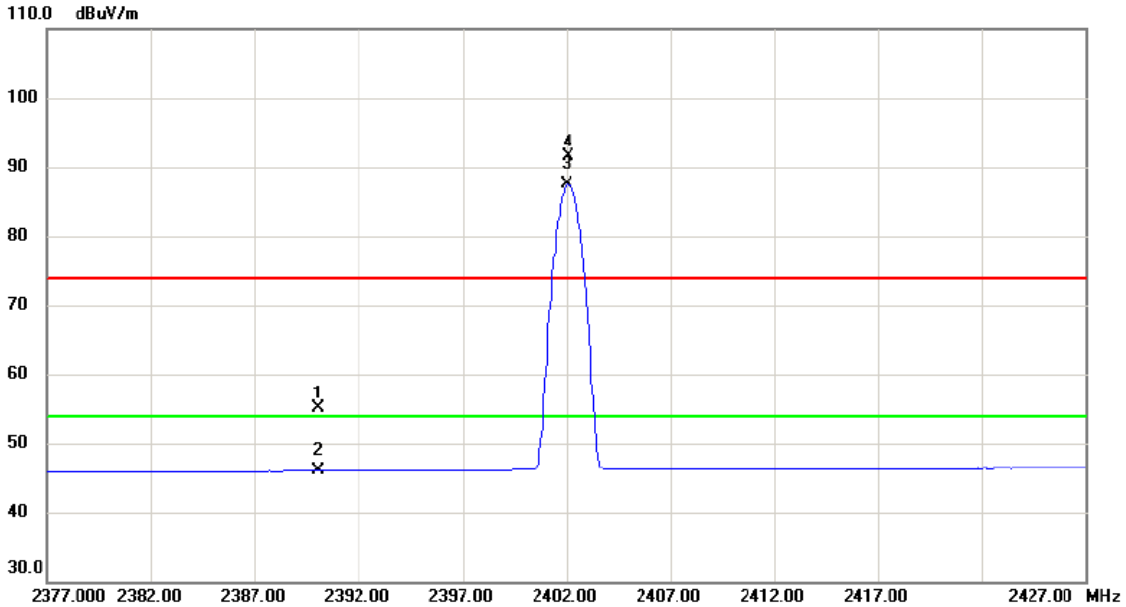
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.630	48.11	4.63	52.74	74.00	-21.26	peak	
2	*	4806.250	42.02	4.62	46.64	54.00	-7.36	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00

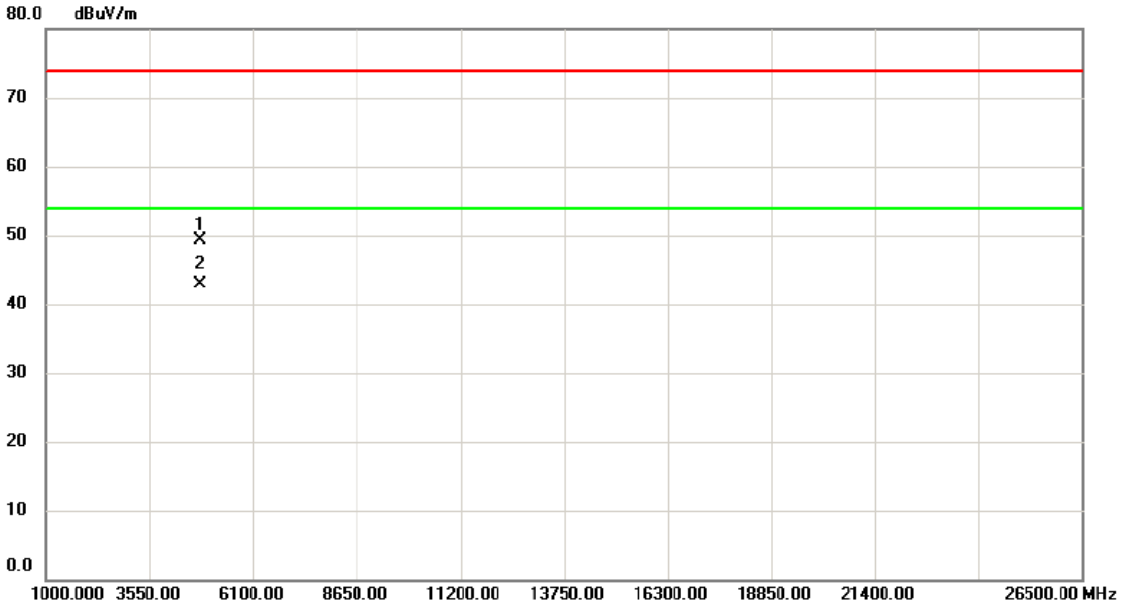
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2390.000	22.38	32.77	55.15	74.00	-18.85	peak	
2		2390.000	13.25	32.77	46.02	54.00	-7.98	AVG	
3	*	2402.000	54.66	32.82	87.48	54.00	33.48	AVG	NO LIMIT
4	X	2402.100	58.61	32.82	91.43	74.00	17.43	peak	NO LIMIT

Orthogonal Axis :	X
Test Mode :	TX 2402MHz _CH00

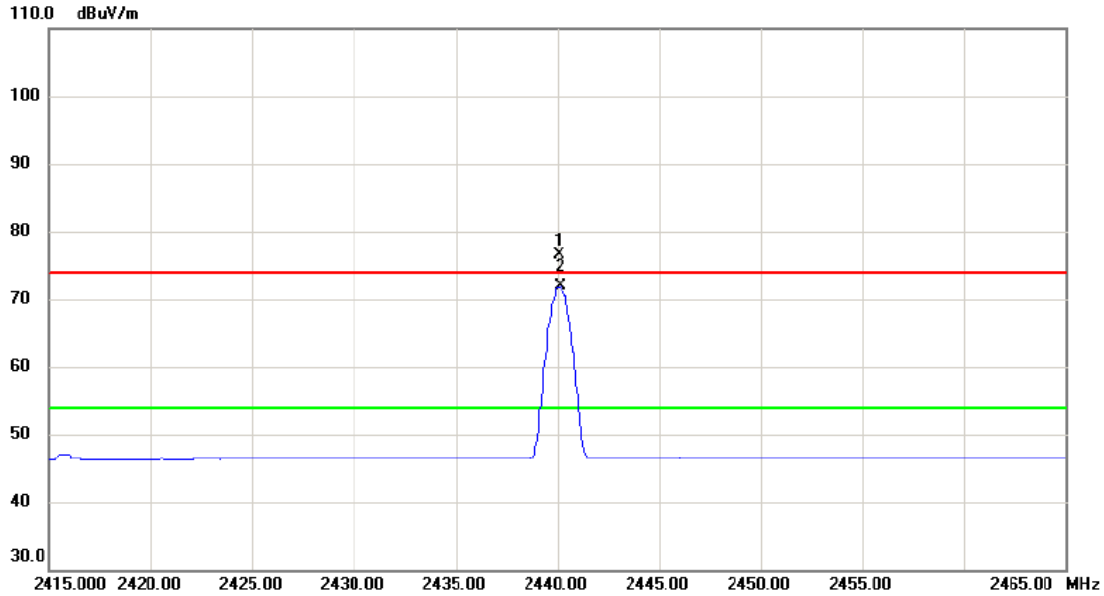
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4806.190	44.69	4.62	49.31	74.00	-24.69	peak	
2	*	4806.220	38.22	4.62	42.84	54.00	-11.16	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19

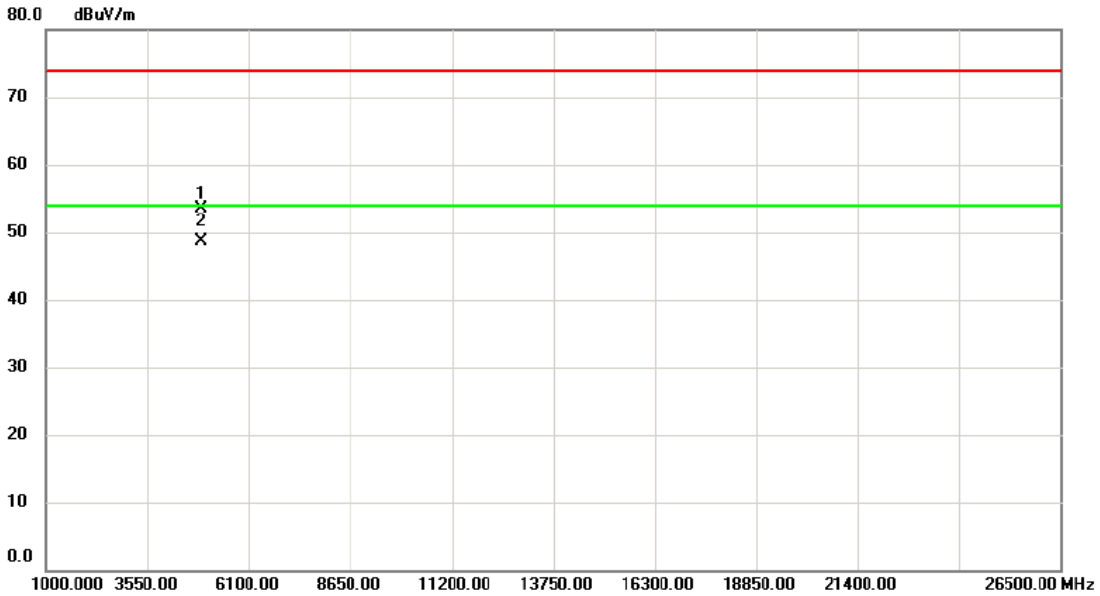
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2440.125	43.51	32.97	76.48	74.00	2.48	peak	NO LIMIT
2	*	2440.175	38.96	32.97	71.93	54.00	17.93	AVG	NO LIMIT

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19

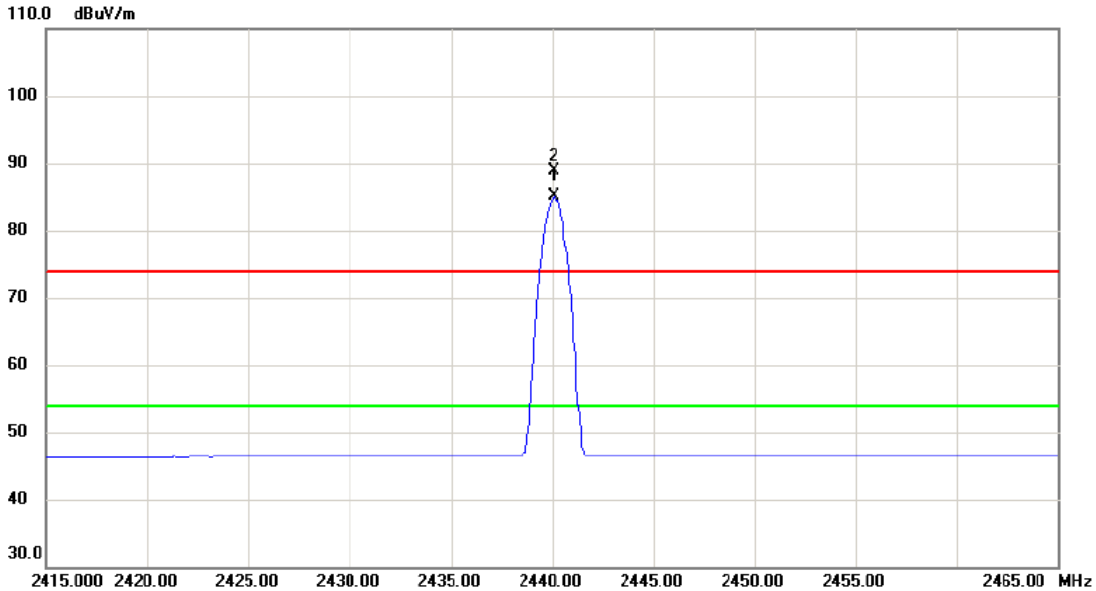
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.120	48.66	4.92	53.58	74.00	-20.42	peak	
2	*	4882.190	43.77	4.92	48.69	54.00	-5.31	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19

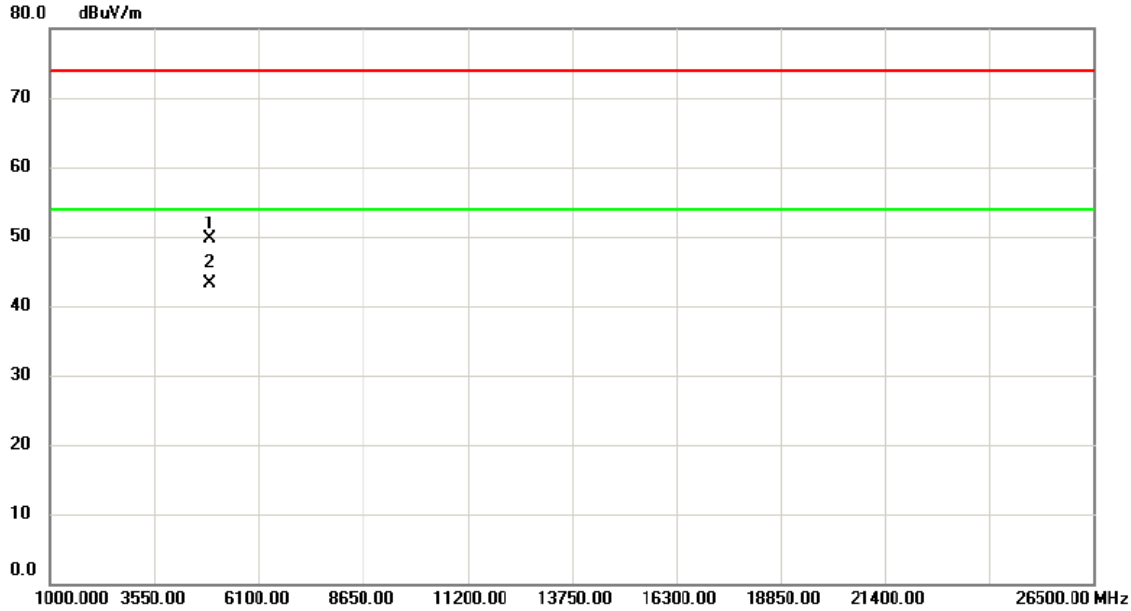
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2440.075	52.04	32.97	85.01	54.00	31.01	AVG	NO LIMIT
2	X	2440.125	55.91	32.97	88.88	74.00	14.88	peak	NO LIMIT

Orthogonal Axis :	X
Test Mode :	TX 2440MHz _CH19

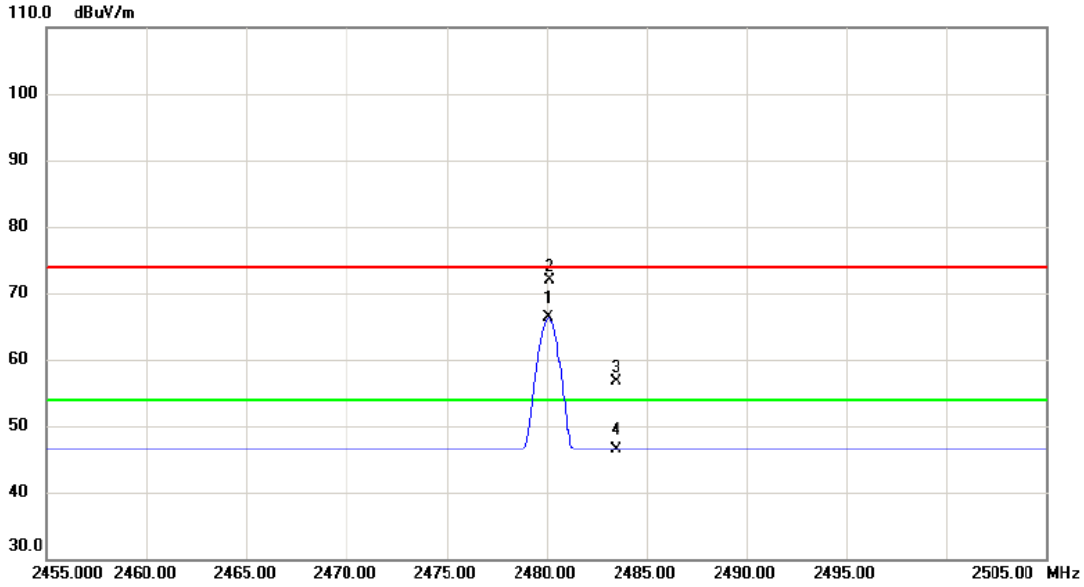
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4882.080	44.83	4.92	49.75	74.00	-24.25	peak	
2	*	4882.200	38.44	4.92	43.36	54.00	-10.64	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39

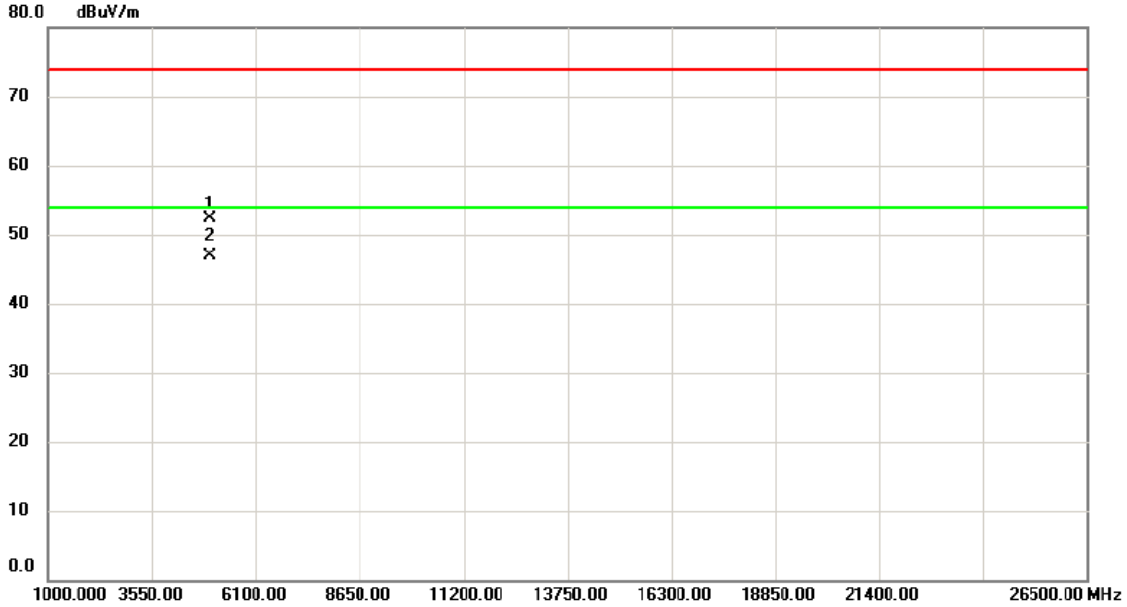
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2480.075	33.13	33.14	66.27	54.00	12.27	AVG	NO LIMIT
2		2480.150	38.77	33.14	71.91	74.00	-2.09	peak	NO LIMIT
3		2483.500	23.58	33.15	56.73	74.00	-17.27	peak	
4		2483.500	13.30	33.15	46.45	54.00	-7.55	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39

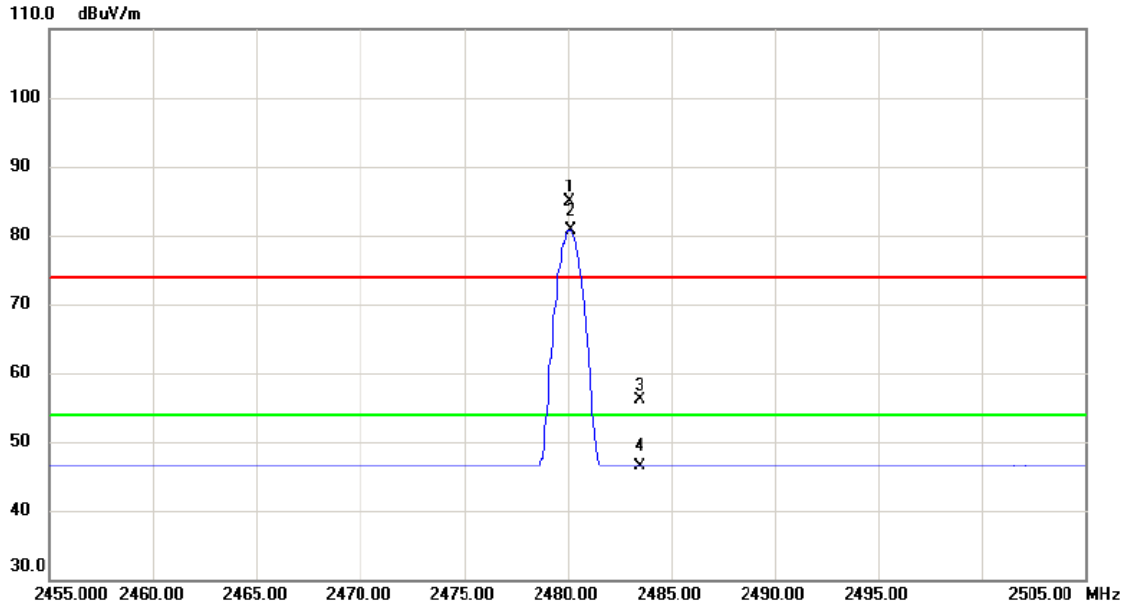
Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4958.130	47.00	5.22	52.22	74.00	-21.78	peak	
2	*	4958.240	41.71	5.22	46.93	54.00	-7.07	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39

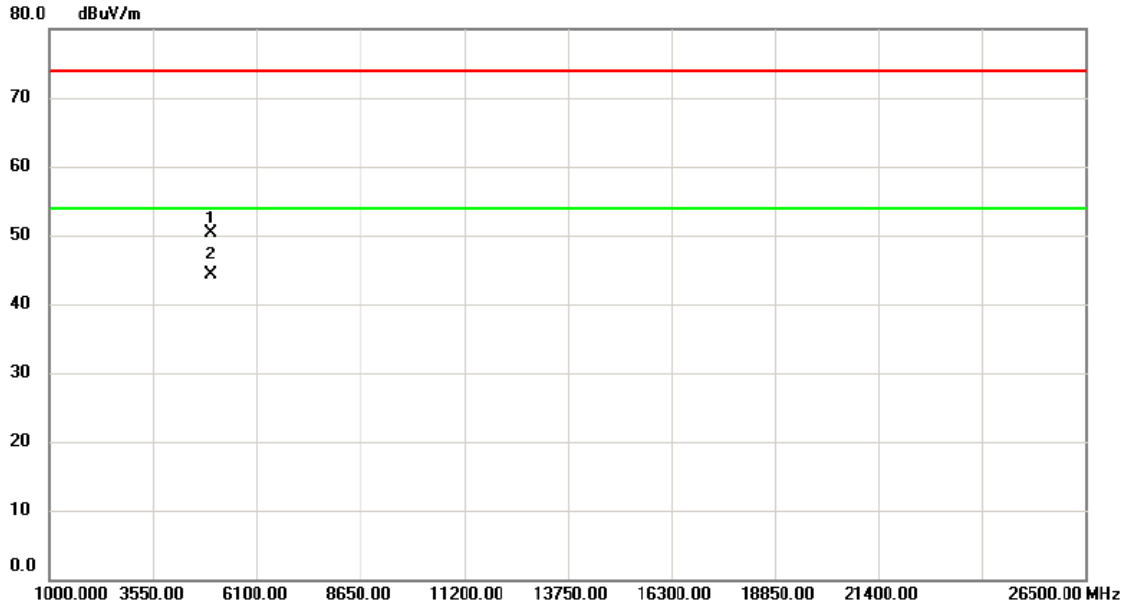
Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2480.100	51.74	33.14	84.88	74.00	10.88	peak	NO LIMIT
2	*	2480.175	47.66	33.14	80.80	54.00	26.80	AVG	NO LIMIT
3		2483.500	23.00	33.15	56.15	74.00	-17.85	peak	
4		2483.500	13.30	33.15	46.45	54.00	-7.55	AVG	

Orthogonal Axis :	X
Test Mode :	TX 2480MHz _CH39

Horizontal



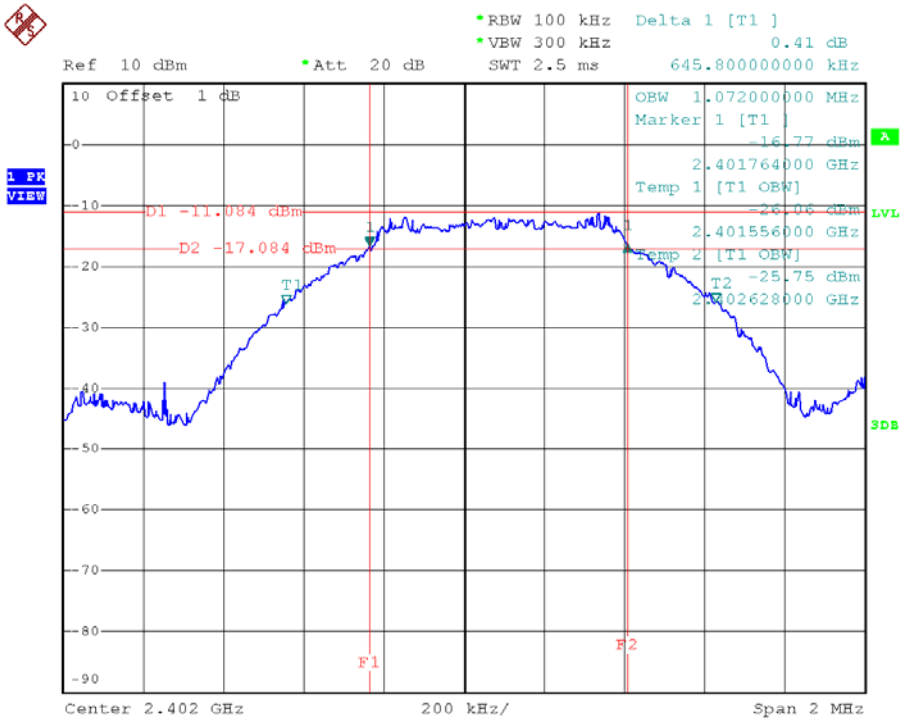
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4958.100	45.11	5.22	50.33	74.00	-23.67	peak	
2	*	4958.180	39.07	5.22	44.29	54.00	-9.71	AVG	

ATTACHMENT D - BANDWIDTH

Test Mode :	CH00, CH19 , CH39

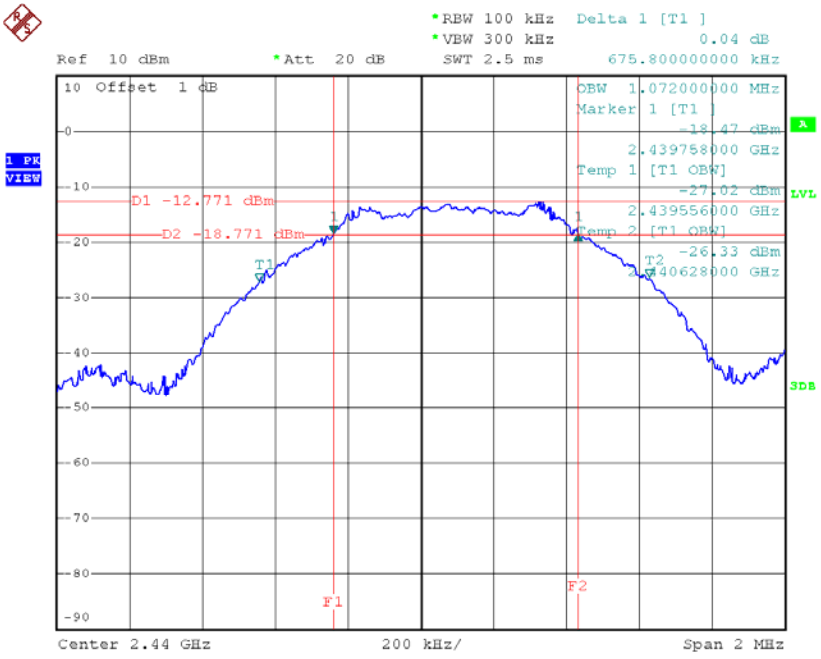
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
2402	0.646	1.072	500	Complies
2440	0.676	1.072	500	Complies
2480	0.688	1.096	500	Complies

TX CH00



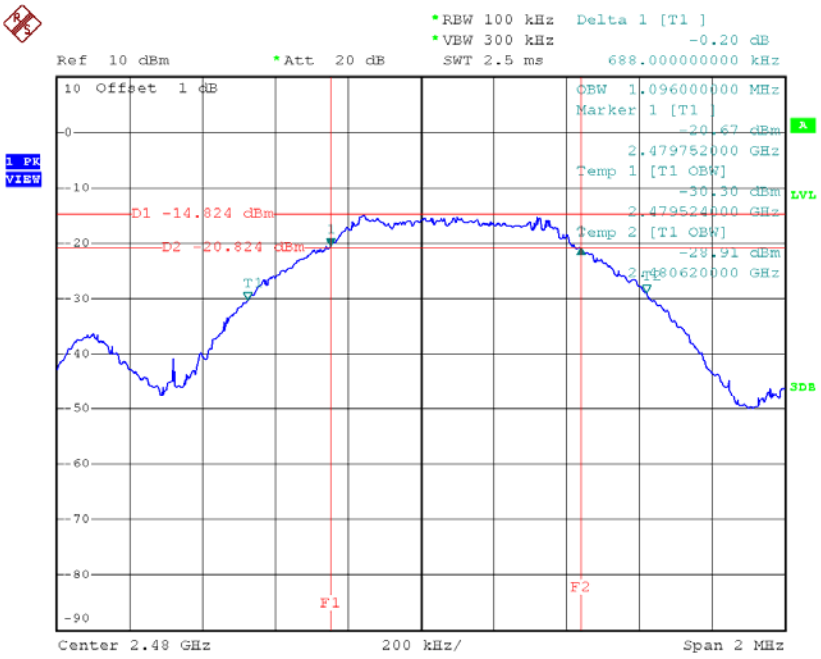
Date: 27.JUN.2016 11:48:47

TX CH19



Date: 27.JUN.2016 11:50:34

TX CH39



Date: 27.JUN.2016 11:51:48

ATTACHMENT E - MAXIMUM OUTPUT POWER TEST

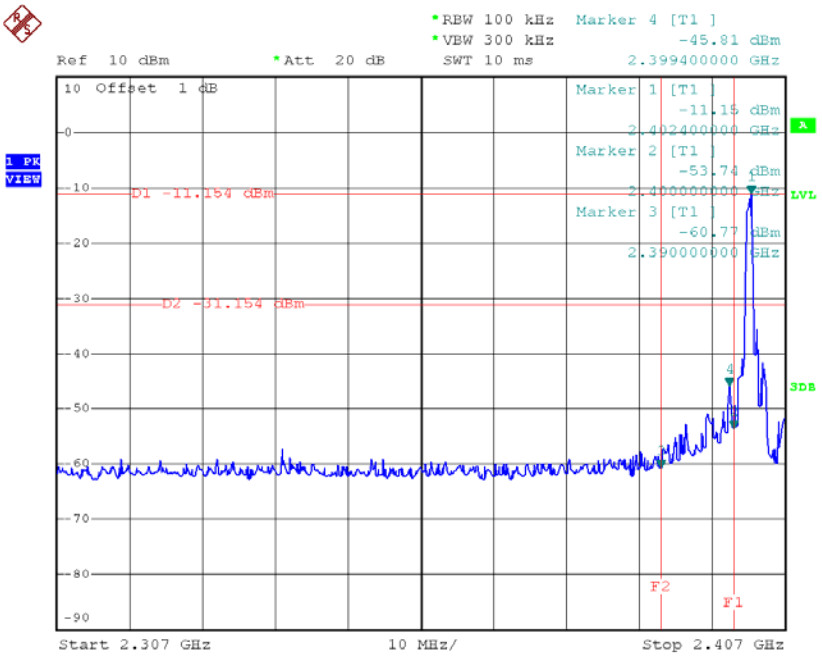
Test Mode :	CH00, CH19 , CH39

Frequency	Conducted Power (dBm)	Conducted Power (W)	Max. Limit(dBm)	Max. Limit(W)	Result
2402 MHz	-4.86	0.0003	30.00	1.0000	Complies
2440 MHz	-5.67	0.0003	30.00	1.0000	Complies
2480 MHz	-5.38	0.0003	30.00	1.0000	Complies

ATTACHMENT F - ANTENNA CONDUCTED SPURIOUS EMISSION

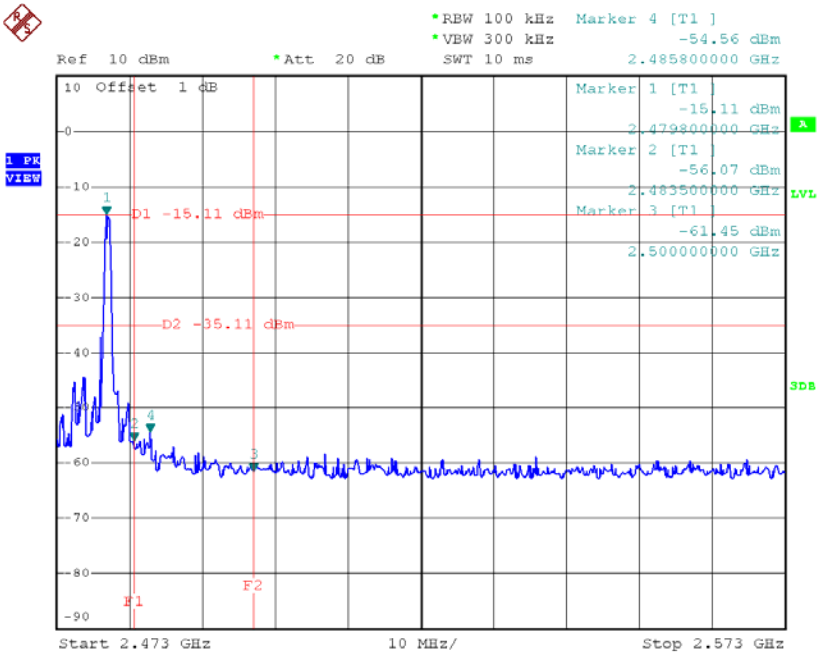
Test Mode :	CH00, CH19 , CH39

CH00 (Lower)



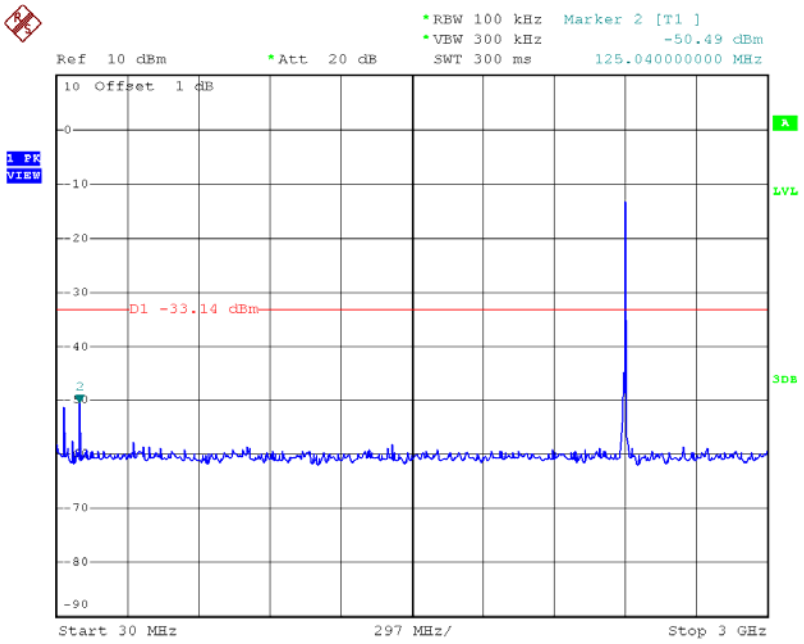
Date: 27.JUN.2016 11:48:55

CH39 (upper) - 1Mbps



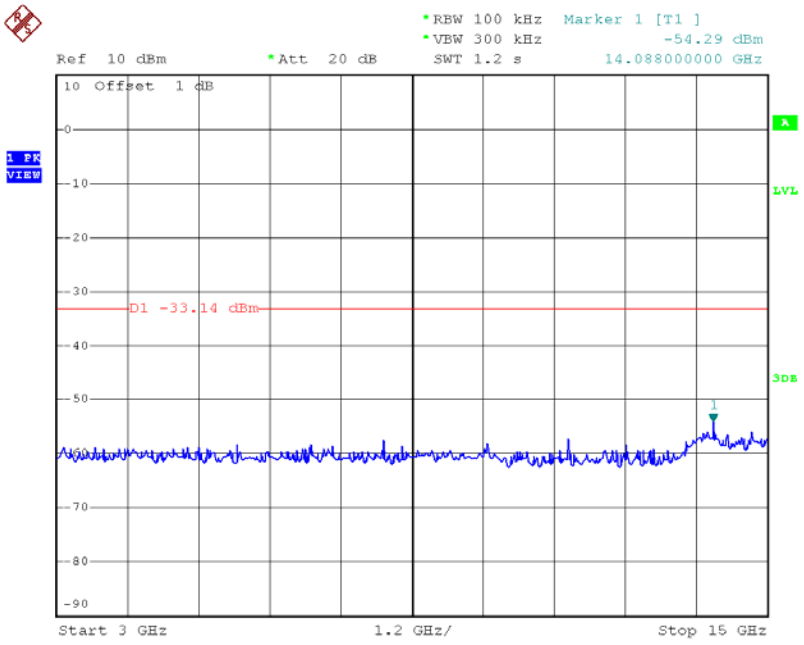
Date: 27.JUN.2016 11:51:56

CH00 (10 Harmonic of the frequency)-1



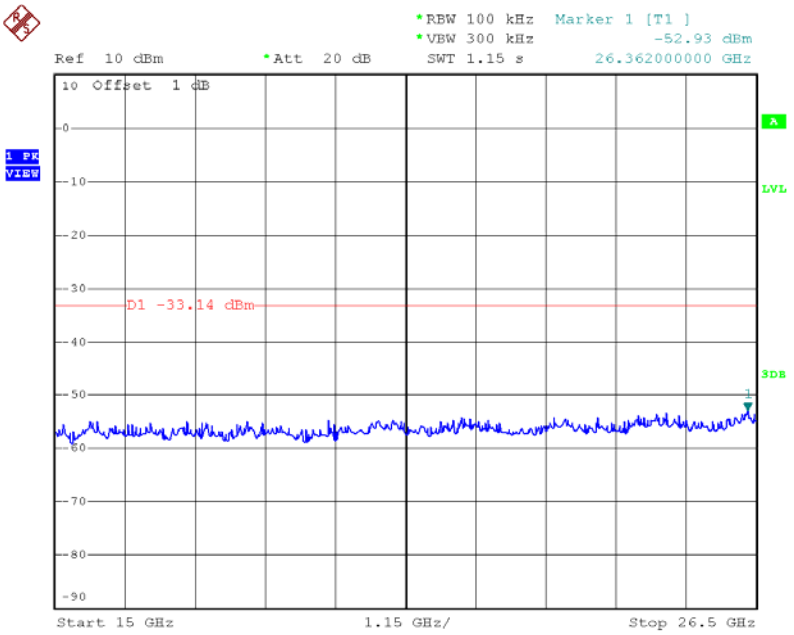
Date: 27.JUN.2016 11:49:09

CH00 (10 Harmonic of the frequency)-2



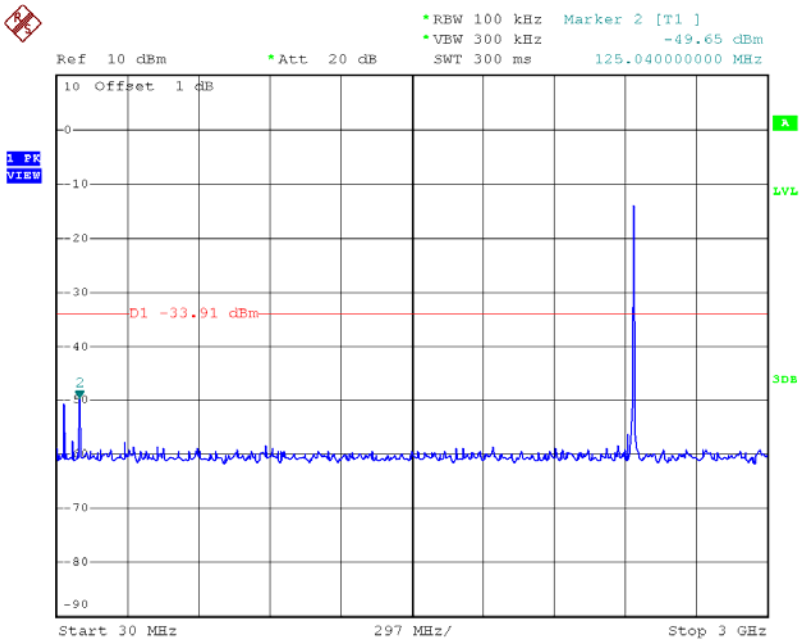
Date: 27.JUN.2016 11:49:17

CH00 (10 Harmonic of the frequency)-3



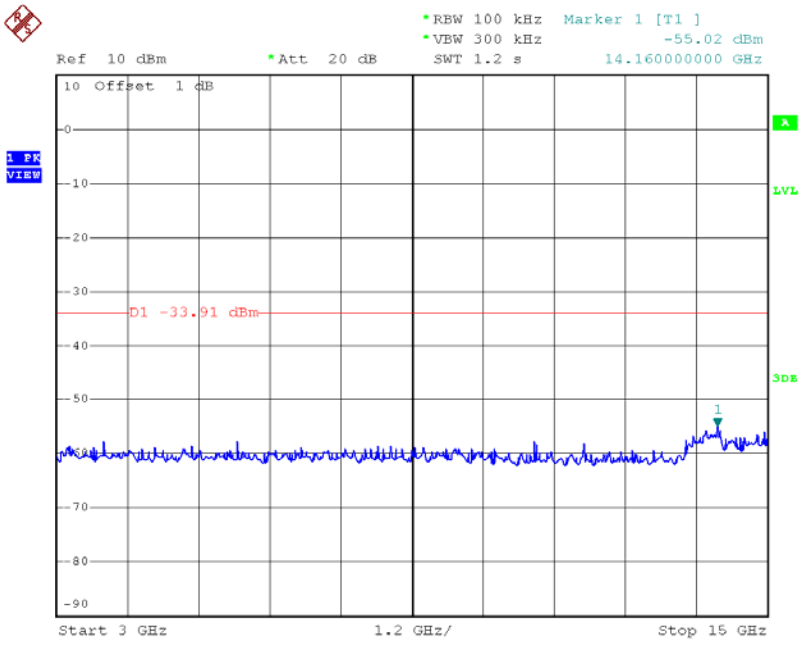
Date: 27.JUN.2016 11:49:26

CH19 (10 Harmonic of the frequency)-1



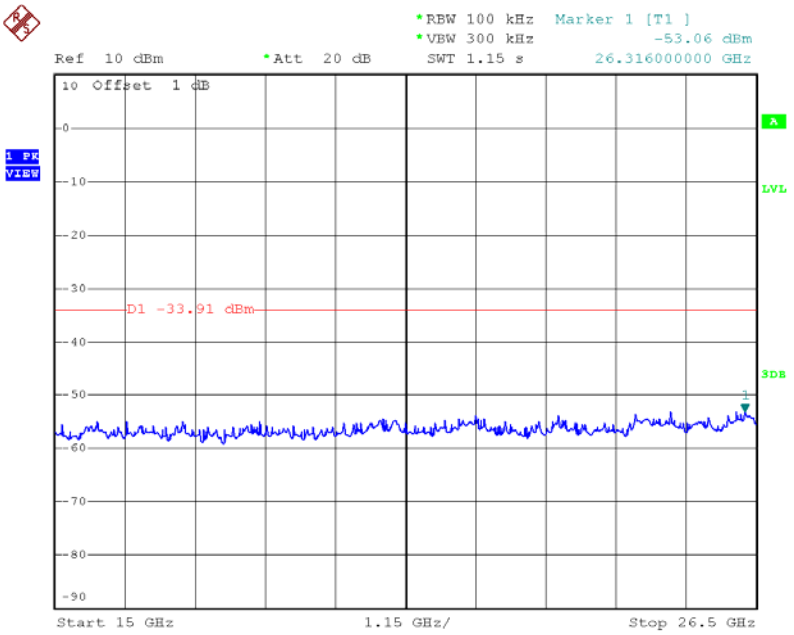
Date: 27.JUN.2016 11:50:48

CH19 (10 Harmonic of the frequency)-2



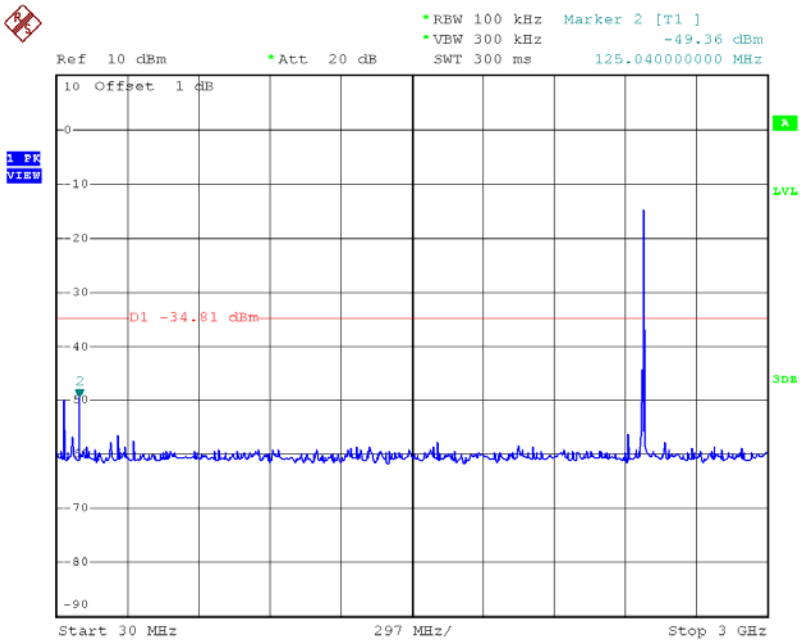
Date: 27.JUN.2016 11:50:56

CH19 (10 Harmonic of the frequency)-3



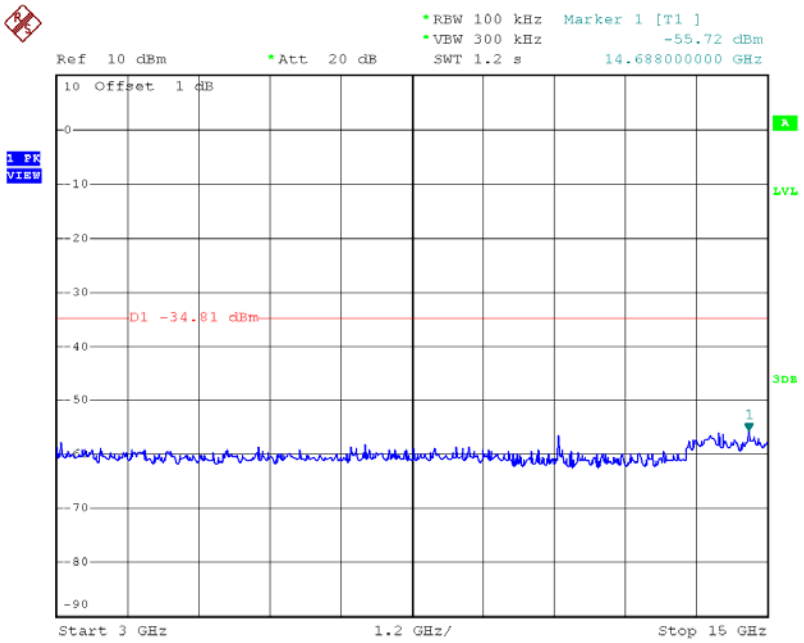
Date: 27.JUN.2016 11:51:05

CH39 (10 Harmonic of the frequency)-1



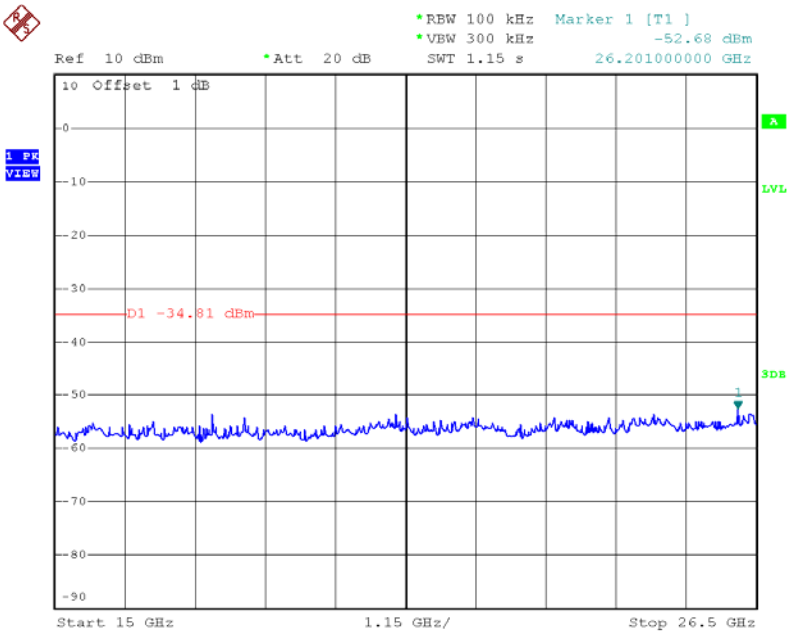
Date: 27.JUN.2016 11:52:10

CH39 (10 Harmonic of the frequency)-2



Date: 27.JUN.2016 11:52:18

CH39 (10 Harmonic of the frequency)-3



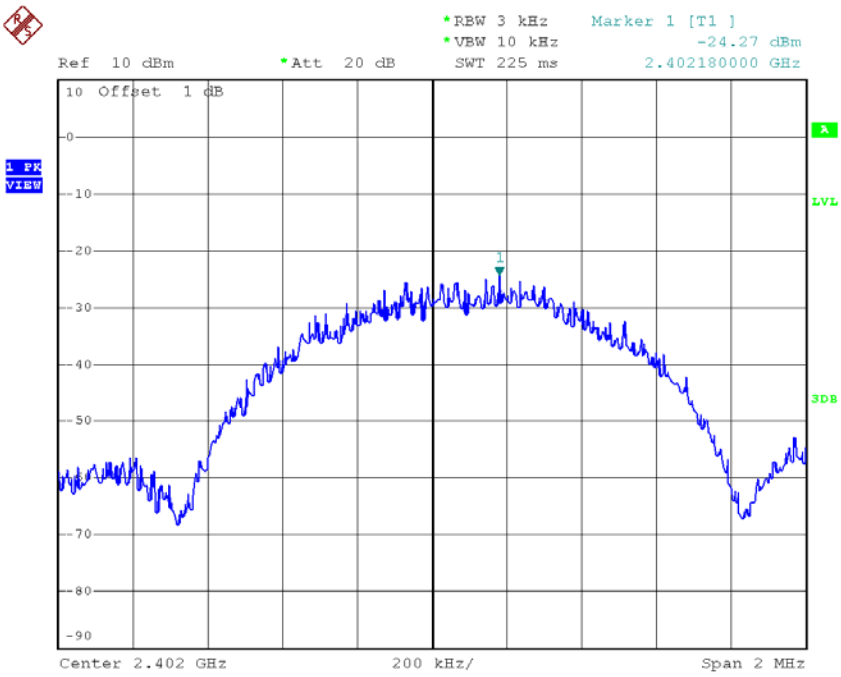
Date: 27.JUN.2016 11:52:26

ATTACHMENT G - POWER SPECTRAL DENSITY TEST

Test Mode :	CH00, CH19 , CH39

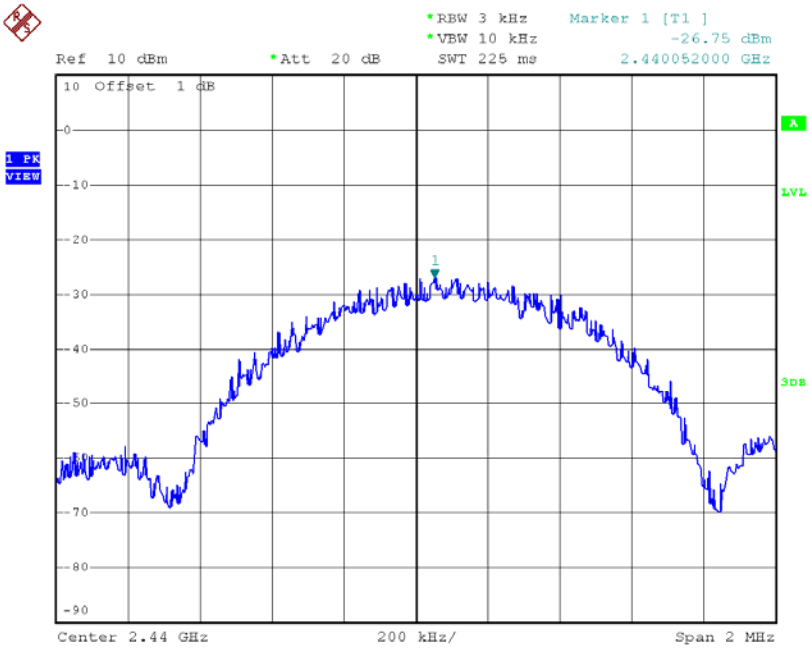
Frequency (MHz)	Power Density (dBm)	Max. Limit (dBm)	Result
2402	-24.27	8	Complies
2440	-26.75	8	Complies
2480	-27.68	8	Complies

TX CH00



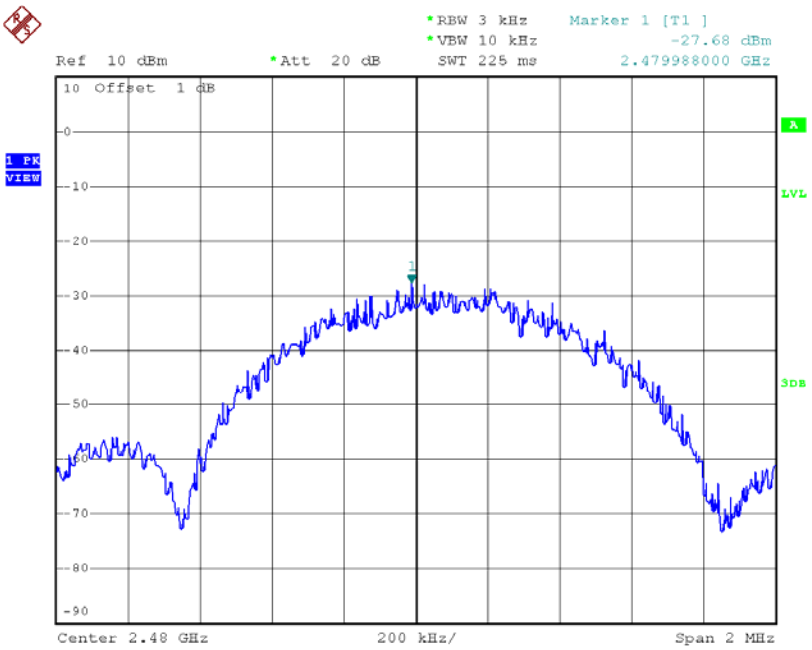
Date: 27.JUN.2016 11:49:32

TX CH19



Date: 27.JUN.2016 11:51:11

TX CH39



Date: 27.JUN.2016 11:52:32