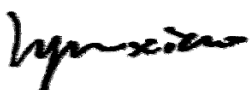
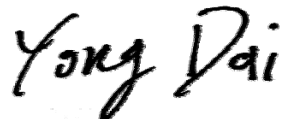




TEST REPORT

Report No.:	EM201500408-1	Application No.:	ZJ20150201-E-1
Client:	Twin-Star International Inc		
Address:	1690 South Congress Ave., Suite 210 Delray Beach, FL 33445 United States		
Sample Description:	Heater		
Model:	CFI-100-1		
Adding Model:	/		
FCC ID	QCD-CFI-100-1		
Test Specification:	FCC Part 15, Subpart C:2015		
Test Date:	2015-05-20 to 2015-06-09		
Issue Date:	2015-06-09		
Test Result:	Pass.		
Prepared By:	Reviewed By:	Approved By:	
Brian Xiao / Test Engineer	Lynn Xiao / Technical Manager	Yong Dai / Manager	
			
Date: 2015-06-09	Date: 2015-06-09	Date: 2015-06-09	
Other Aspects:			
/			
Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable			
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.			

DIRECTIONS OF TEST

1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.
2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.
3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.

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1. TEST RESULT SUMMARY

Section B of FCC Part 15.247:2013			
Standard	Item	Limit / Severity	Result
FCC Part 15, Subpart C (15.247)	Antenna Requirement	§15.203	PASS
	Conducted Emissions	§15.207 (a)	PASS
	Radiated Electromagnetic Disturbance	§15.247(d)	PASS
	6 Db Bandwidth	§15.247 (a)(2)	PASS
	Maximum Peak Output Power	§15.247(b)(3)	PASS
	Power Spectral Density	§15.247(e)	PASS
	Emissions In Non-Rest ricted Frequency Bands	§15.247(d)	PASS
	Emissions In Restricted Frequency Bands	§15.205	PASS
	Band-Edge Measurements	§15.247(d)	PASS

2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name: Twin-Star International Inc
Address: 1690 South Congress Ave., Suite 210 Delray Beach, FL 33445 United States

2.2 MANUFACTURER

Name: Twin-Star International Inc
Address: 1690 South Congress Ave., Suite 210 Delray Beach, FL 33445 United States

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: Heater
Model No.: CFI-100-1
Trade Name: /
Power supply AC 120V/60Hz
Frequency Range 2402MHz~2480MHz
Type of Modulation GFSK
Channels: Channels with 2MHz step
Antenna Type: PCB Antenna
Antenna Gain: 0 dBi

3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests and measurements refer to this report were performed by Guangzhou GRG Metrology and Test CO., LTD.

Add. : 163 Pingyun Rd, West of Huangpu Ave, Guangzhou, 510656, P. R. China

Telephone: +86-20-38699959, 38699960, 38699961

Fax : +86-20-38695185

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC Listed Lab (No. 688188)
Canada	Registration No.:8355A-1

3.3 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:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	30MHz~1000MHz	4.2dB
		1GHz~26.5GHz	4.2dB
	Vertical	30MHz~1000MHz	4.4dB
		1GHz~26.5GHz	4.4dB
Conducted Emission		9kHz~30MHz	3.1 dB

This uncertainty represents an expanded uncertainty factor of $k=2$ and the Confidence Level is 95%.

3.4 LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
6 dB bandwidth/ maximum peak output power/100kHz bandwidth of frequency band edge/ Power Spectral Density/ Restricted Bands				
Receiver	R&S	ESU26	100526	2016-03-08
Conducted Emissions				
EMI Receiver	R&S	ESCI	100529	2016-03-24
L.I.S.N	SCHWARZBECK	NSLK 8127	8127450	2015-08-18
Radiated Spurious Emissions				
Receiver	R&S	ESU26	100526	2016-03-08
Loop antenna	R&S	HFH2-Z2	881058/58	2016-04-17
Biconical Log-periodic Antenna	ETS.LINDGREN	3142C	00075971	2016-04-17
Horn antenna	SCHWARZBECK	BBHA9120D	D752	2017-03-03
Per-Amplifier (0.1-26.5GHz)	Compliance Directions systems Inc.	PAP-0126	25002	2016-01-03

4. TEST RESULTS

4.1 E.U.T. TEST CONDITIONS

Type of antenna: PCB
Temperature: 22.0 °C
Humidity: 54 % RH
Atmospheric Pressure: 1011 mbar
Test frequencies: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

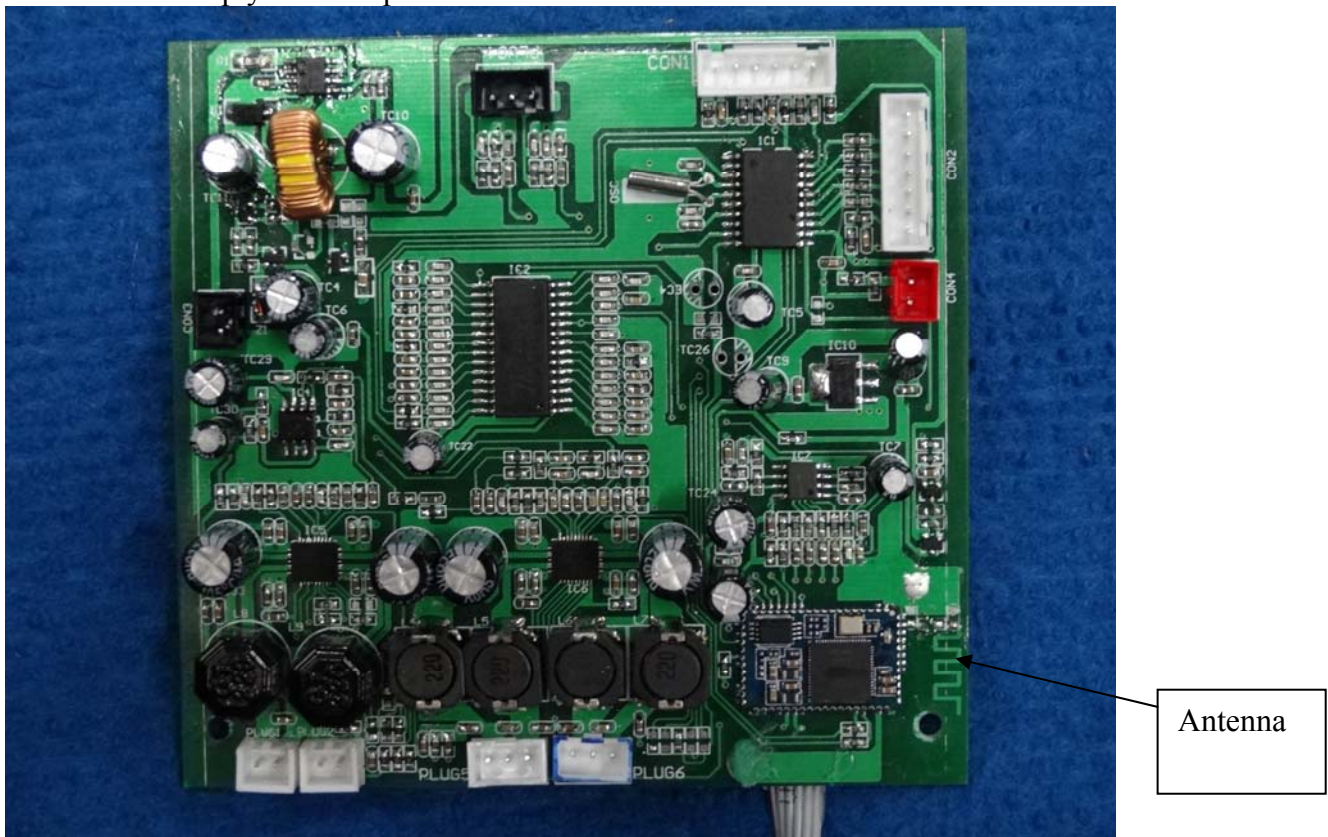
EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	28	2458
1	2404	15	2432	29	2460
2	2406	16	2434	30	2462
3	2408	17	2436	31	2464
4	2410	18	2438	32	2466
5	2412	19	2440	33	2468
6	2414	20	2442	34	2470
7	2416	21	2444	35	2472
8	2418	22	2446	36	2474
9	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454	/	/
13	2428	27	2456	/	/

Test frequency is the lowest channel: 0 channel(2402MHz), middle channel: 19 channel(2440MHz) and highest channel: 39 channel(2480MHz)

4.2 ANTENNA REQUIREMENT

The EUT antenna is ceramic antenna. Antenna gain is 0dBi .which accordance 15.203 is considered sufficient to comply with the provisions of this section.



5. CONDUCTED EMISSION MEASUREMENT

5.1 LIMITS

Frequency range	Limits (dB μ V)	
	Quasi-peak	Average
150kHz $\sim$ 0.5MHz	66 $\sim$ 56	56 $\sim$ 46
0.5 MHz $\sim$ 5 MHz	56	46
5 MHz $\sim$ 30 MHz	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 150 kHz to 0.5MHz.

5.2 TEST PROCEDURES

Procedure of Preliminary Test

Test procedures follow ANSI C63.4:2009.

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

- Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

- 1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

- 2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

- All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

- The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

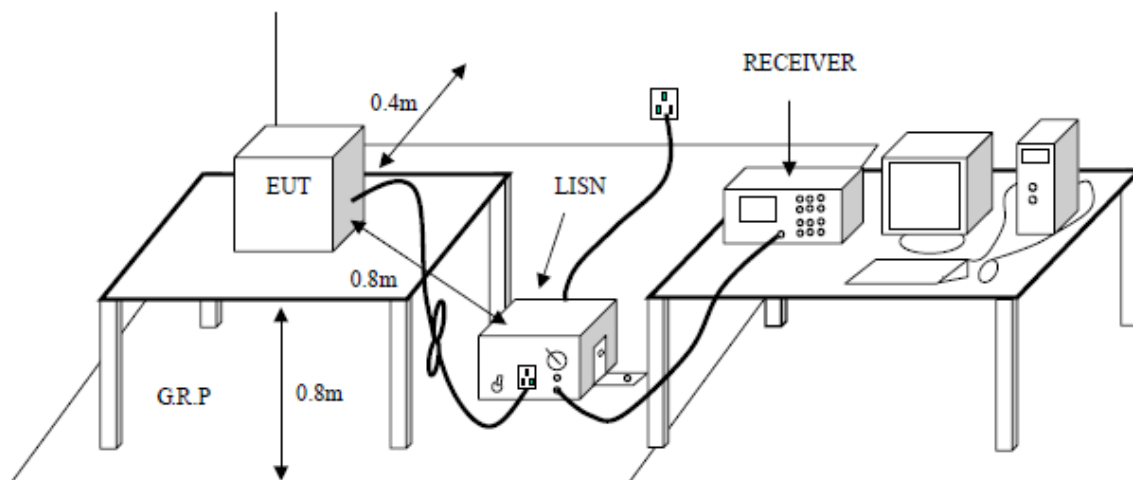
- I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

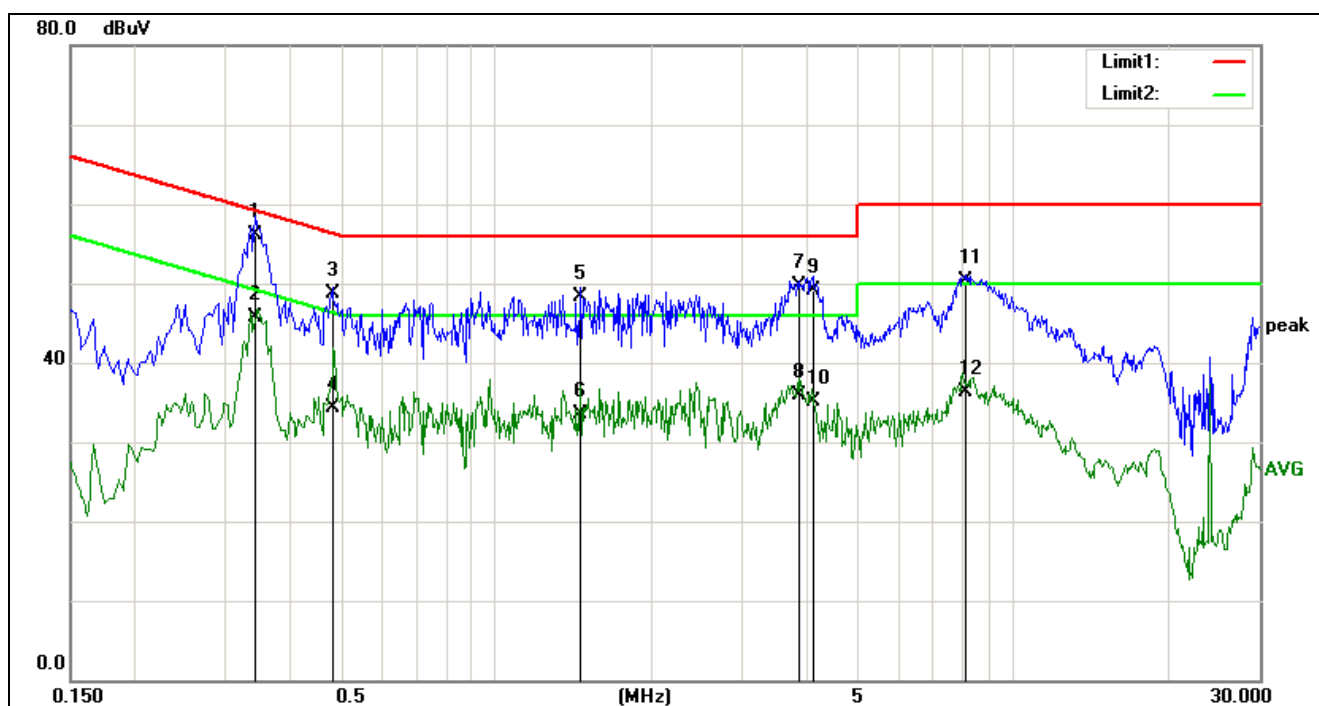
5.3 TEST SETUP



5.4 TEST RESULTS

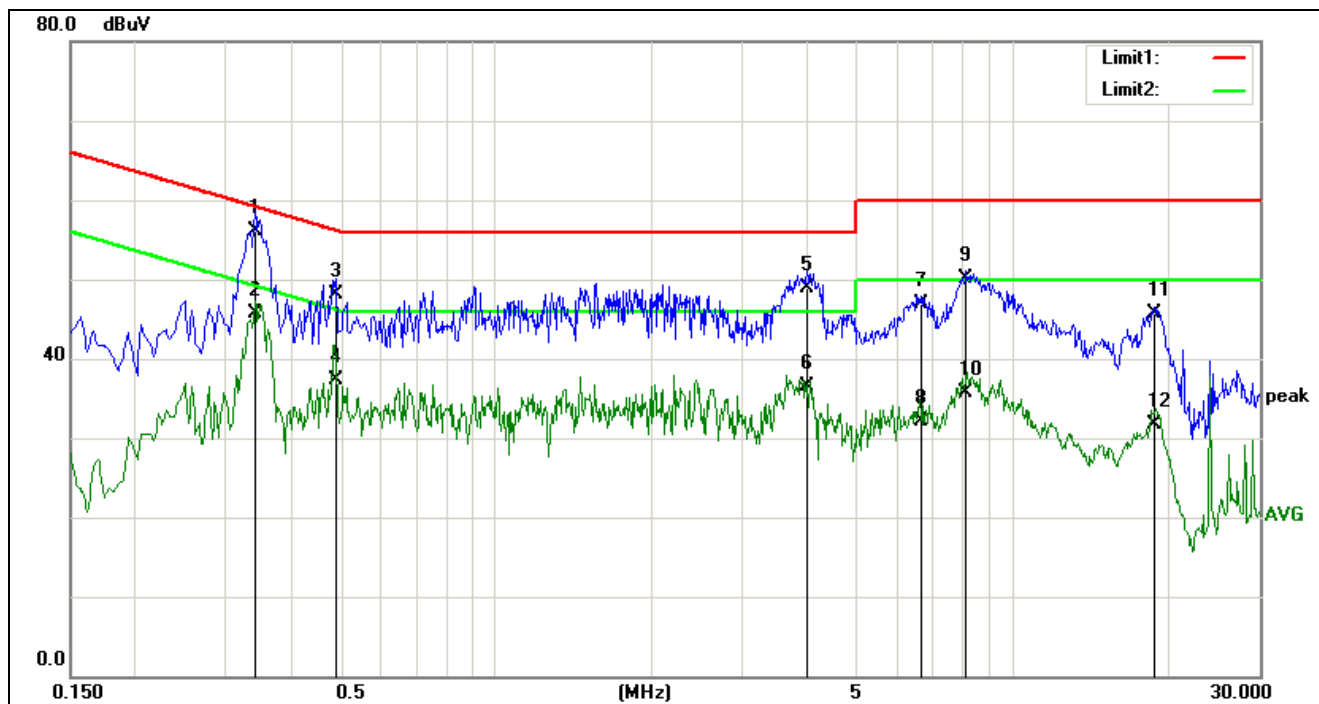
Pre-test the low channel, middle channel and high channel to find GFSK 2480 is worse case, so only record GFSK 2480 test data.

Project No.:	ZJ20150201-E-1	Probe:	L1
Standard:	(CE)FCC PART 15 class B_QP	Power Source:	120V/60Hz
Test item:	Conduction Test	Date:	2015-6-8
Temp./Hum.(%RH):	22.2/53%RH	Time:	17:17:11
EUT:	Heater		
Model:	CFI-100-1	Test Result:	Pass
Note:	GFSK 2480		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3420	49.70	6.50	56.20	59.15	-2.95	QP
2	0.3420	39.20	6.50	45.70	49.15	-3.45	AVG
3	0.4820	42.18	6.52	48.70	56.30	-7.60	QP
4	0.4820	27.88	6.52	34.40	46.30	-11.90	AVG
5	1.4580	41.74	6.56	48.30	56.00	-7.70	QP
6	1.4580	26.94	6.56	33.50	46.00	-12.50	AVG
7	3.8500	43.18	6.62	49.80	56.00	-6.20	QP
8	3.8500	29.28	6.62	35.90	46.00	-10.10	AVG
9	4.0979	42.40	6.70	49.10	56.00	-6.90	QP
10	4.0979	28.50	6.70	35.20	46.00	-10.80	AVG
11	8.1139	43.48	6.82	50.30	60.00	-9.70	QP
12	8.1139	29.58	6.82	36.40	50.00	-13.60	AVG

Project No.:	ZJ20150201-E-1	Probe:	N
Standard:	(CE)FCC PART 15 class B_QP	Power Source:	120V/60Hz
Test item:	Conduction Test	Date:	2015-6-8
Temp./Hum.(%RH):	22.2/53%RH	Time:	17:11:28
EUT:	Heater	Test Result:	Pass
Model:	CFI-100-1		
Note:	GFSK 2480		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3420	49.60	6.50	56.10	59.15	-3.05	QP
2	0.3420	39.30	6.50	45.80	49.15	-3.35	AVG
3	0.4900	41.58	6.52	48.10	56.17	-8.07	QP
4	0.4900	30.78	6.52	37.30	46.17	-8.87	AVG
5	4.0060	42.34	6.66	49.00	56.00	-7.00	QP
6	4.0060	29.84	6.66	36.50	46.00	-9.50	AVG
7	6.6499	40.14	6.76	46.90	60.00	-13.10	QP
8	6.6499	25.34	6.76	32.10	50.00	-17.90	AVG
9	8.1419	43.30	6.80	50.10	60.00	-9.90	QP
10	8.1419	28.90	6.80	35.70	50.00	-14.30	AVG
11	18.7339	38.63	7.07	45.70	60.00	-14.30	QP
12	18.7339	24.73	7.07	31.80	50.00	-18.20	AVG

6. RADIATED ELECTROMAGNETIC DISTURBANCE

6.1 LIMITS

Frequency (MHz)	Quasi-peak(dB μ V/m)
30 ~ 88	40
88~216	43.5
216 ~ 960	46
Above 960	54

NOTE: (1) The lower limit shall apply at the transition frequencies.

Frequency (GHz)	Quasi-peak(dB μ V/m)
1 ~ 26.5	74
1~ 26.5	54

6.2 TEST PROCEDURES

Test procedures follow ANSI C63.4:2009.

Procedure of Preliminary Test

Radiated emission tests shall be made with the receive or transmit antenna located at a horizontal distance of 3 m plus half of the maximum width of the EUT being tested, measured from the centre of the EUT. The tests shall be performed with the equipment configured as closely as possible to its typical, practical operation. Unless stated otherwise, cables and wiring shall be as specified by the manufacturer and the equipment shall be in its housing (or cabinet) with all covers and access panels in place. Any deviation from normal EUT operating conditions shall be included in the test report.

The EUT (on a non-conductive support structure, where applicable) shall be placed on a remotely operated turntable, to allow the EUT to be rotated. The height of the EUT above the ground plane shall be according to the following requirements.

- Table-top equipment is placed on a non-conductive set-up table with height $0.8\text{ m} \pm 0.01\text{ m}$, ANSI C63.4 specifies the method to determine the impact of the non-conductive set-up table on test results.
- Floor-standing equipment is placed on a non-conductive support, as specified in the applicable product standard. If there are no EUT height placement requirements in the product standard, the EUT shall be placed on a non-conductive support at a height of 5 cm to 15 cm above the ground plane.

Interface cables, loads, and devices should be connected to at least one of each type of the interface ports of the EUT and, where practical, each cable shall be terminated in a device typical for its actual use. Where there are multiple interface ports of the same type, a typical number of these devices shall be connected to devices or loads. It is sufficient to connect only one of the loads, provided that it can be shown, for example by preliminary testing, that the connection of further ports would not significantly increase the level of disturbance (that is, more than 2 dB) or significantly degrade the immunity level.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable

position of the above highest emission level were recorded for the final test.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test. The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only QP reading is presented. The test data of the worst-case condition(s) was recorded.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

6.3 TEST SETUP

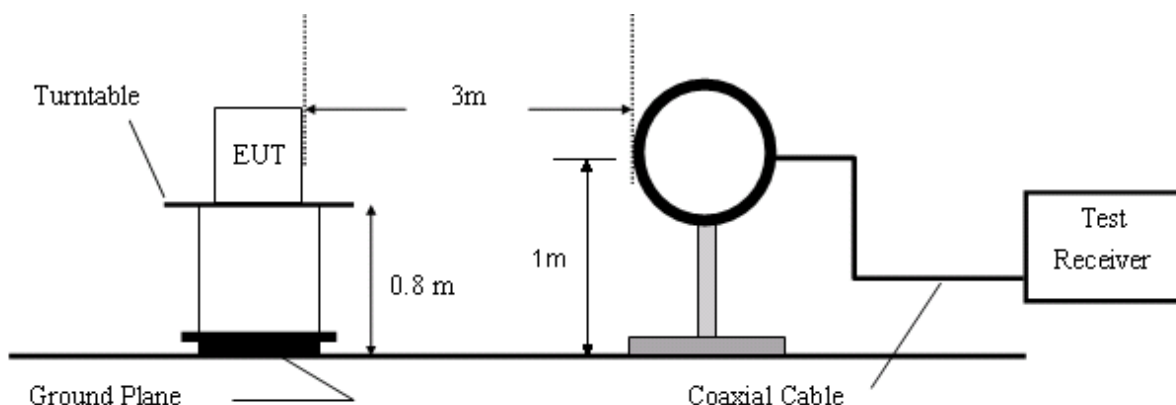


Figure 1. 9KHz to 30MHz radiated emissions test configuration

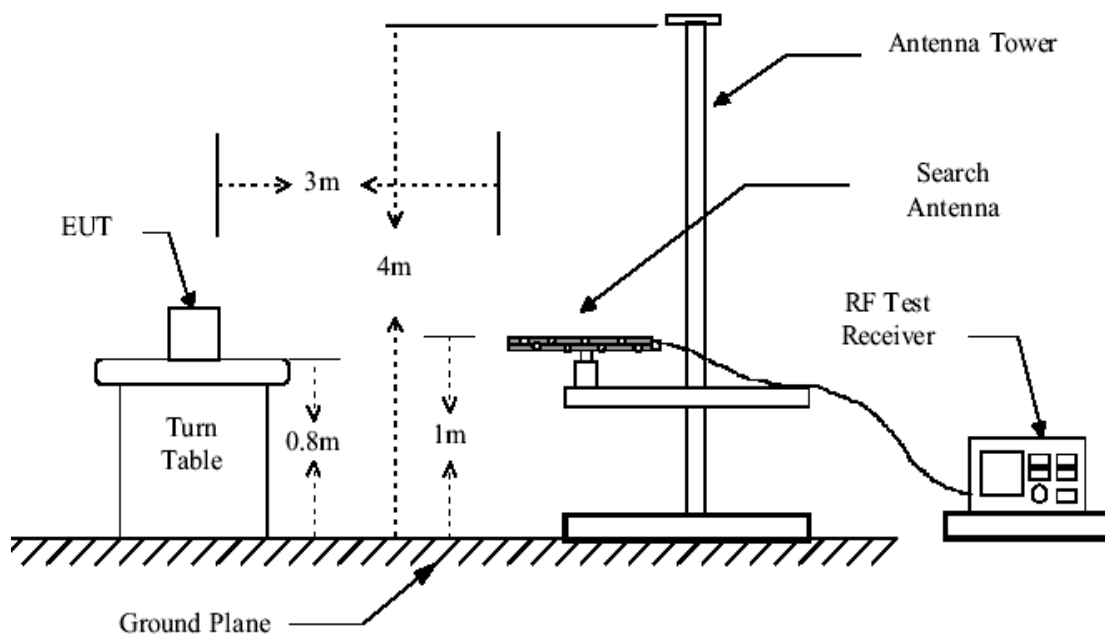


Figure 2. 30MHz to 1GHz radiated emissions test configuration

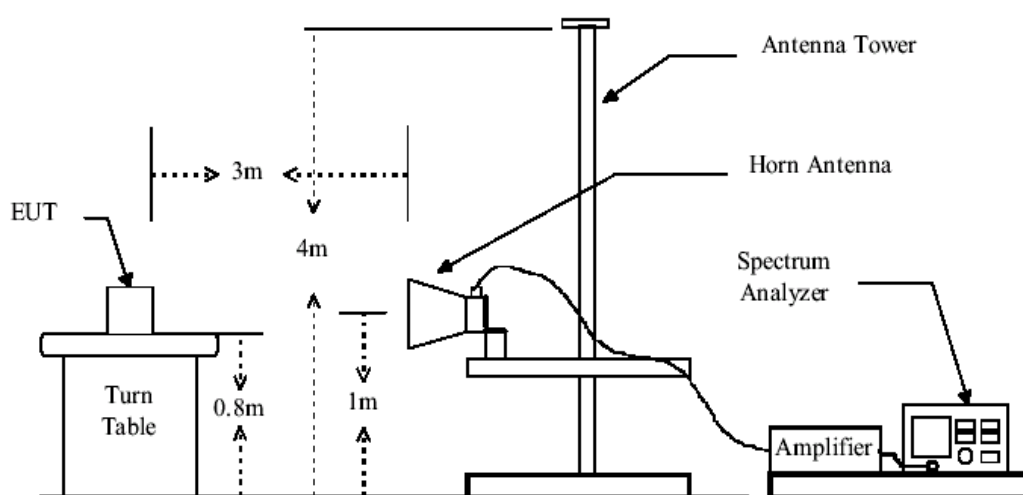
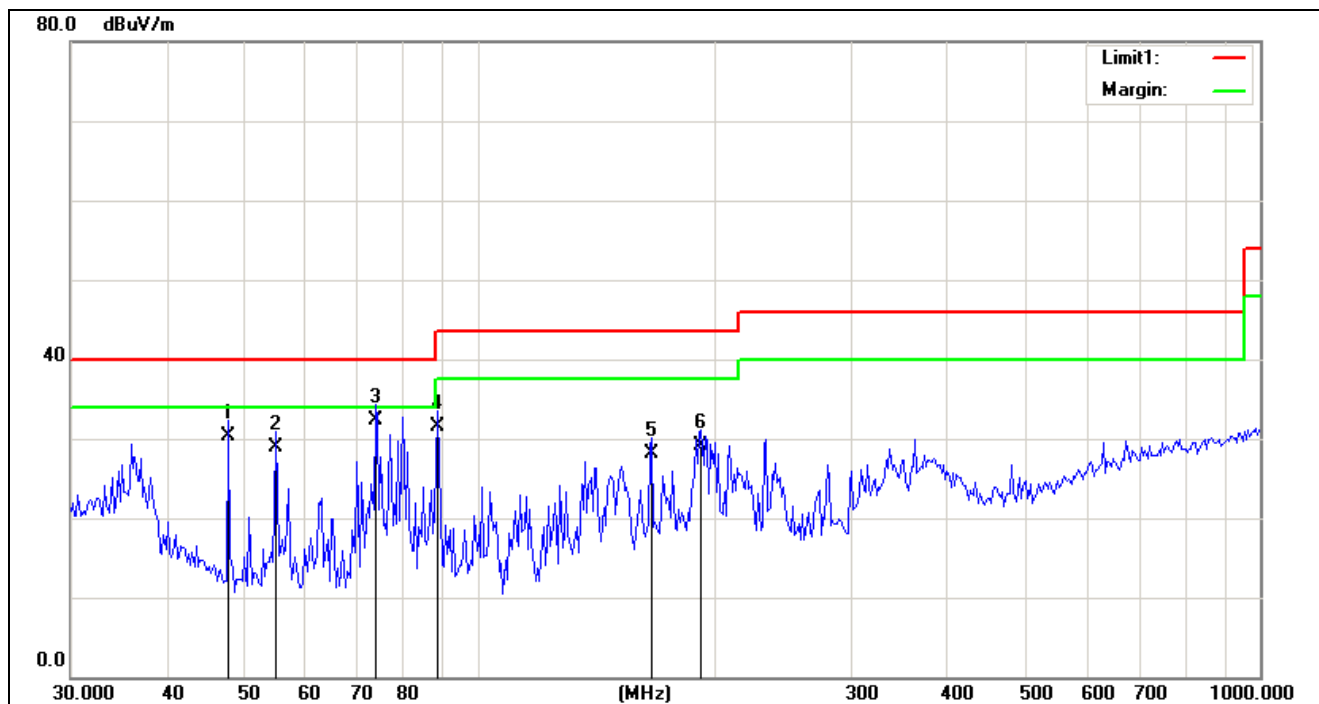


Figure 3. Above 1GHz radiated emissions test configuration

6.4 TEST RESULTS

Project No.:	ZJ20150201-E-1	Polarization:	Vertical
Standard:	(RE)FCC PART 15 class B 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	8:31:05
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass
Note:	GFSK-2402(BT4.0)		

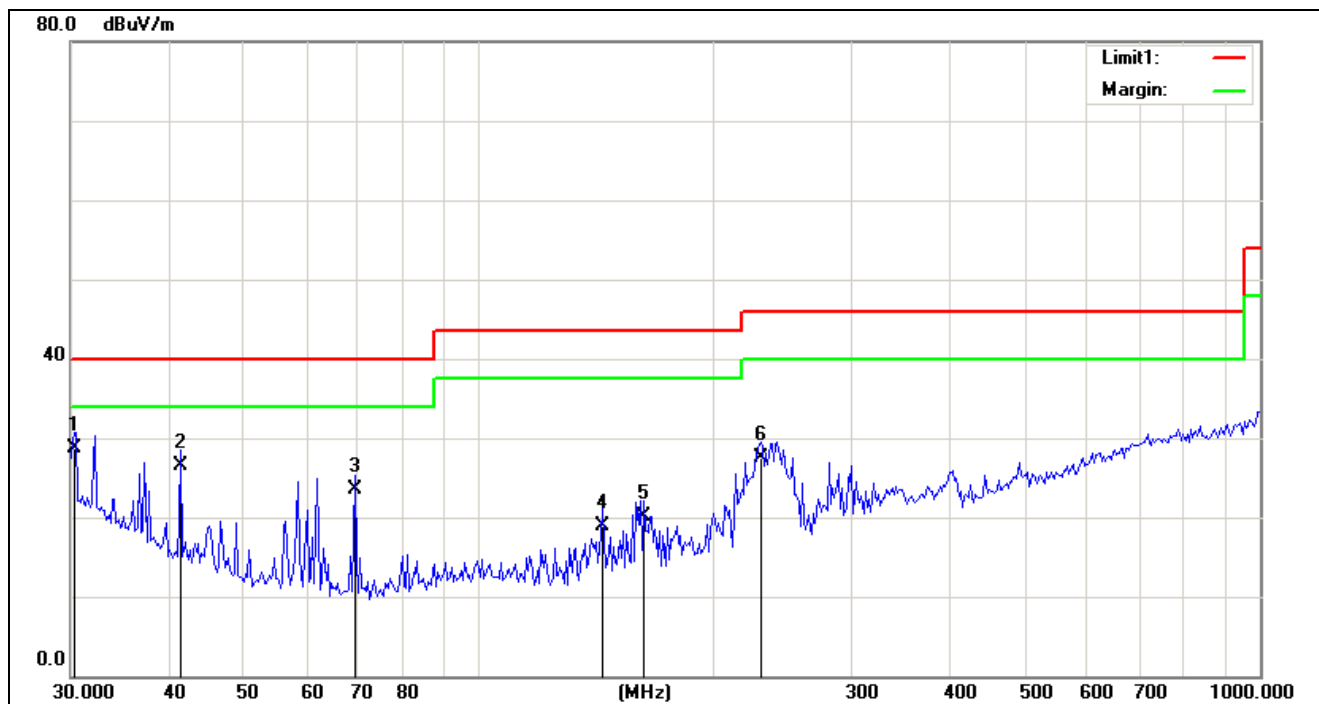


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	47.8282	19.78	10.52	30.30	40.00	-9.70	QP
2	55.0422	20.03	8.87	28.90	40.00	-11.10	QP
3	73.7229	24.32	7.98	32.30	40.00	-7.70	QP
4	88.7442	22.01	9.49	31.50	43.50	-12.00	QP
5	166.5241	17.52	10.58	28.10	43.50	-15.40	QP
6	192.7215	17.66	11.44	29.10	43.50	-14.40	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4797.861	34.49	10.80	45.29	74.00	-28.71	peak
2	11296.283	27.62	17.22	44.84	74.00	-29.16	peak
3	11591.430	27.54	17.40	44.94	74.00	-29.06	peak
4	12917.637	26.15	19.46	45.61	74.00	-28.39	peak
5	17694.597	28.06	17.64	45.70	74.00	-28.30	peak
6	21975.198	26.59	21.29	47.88	74.00	-26.12	peak

Project No.:	ZJ20150201-E-1	Polarization:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	8:34:35
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass
Note:	GFSK-2402(BT4.0)		

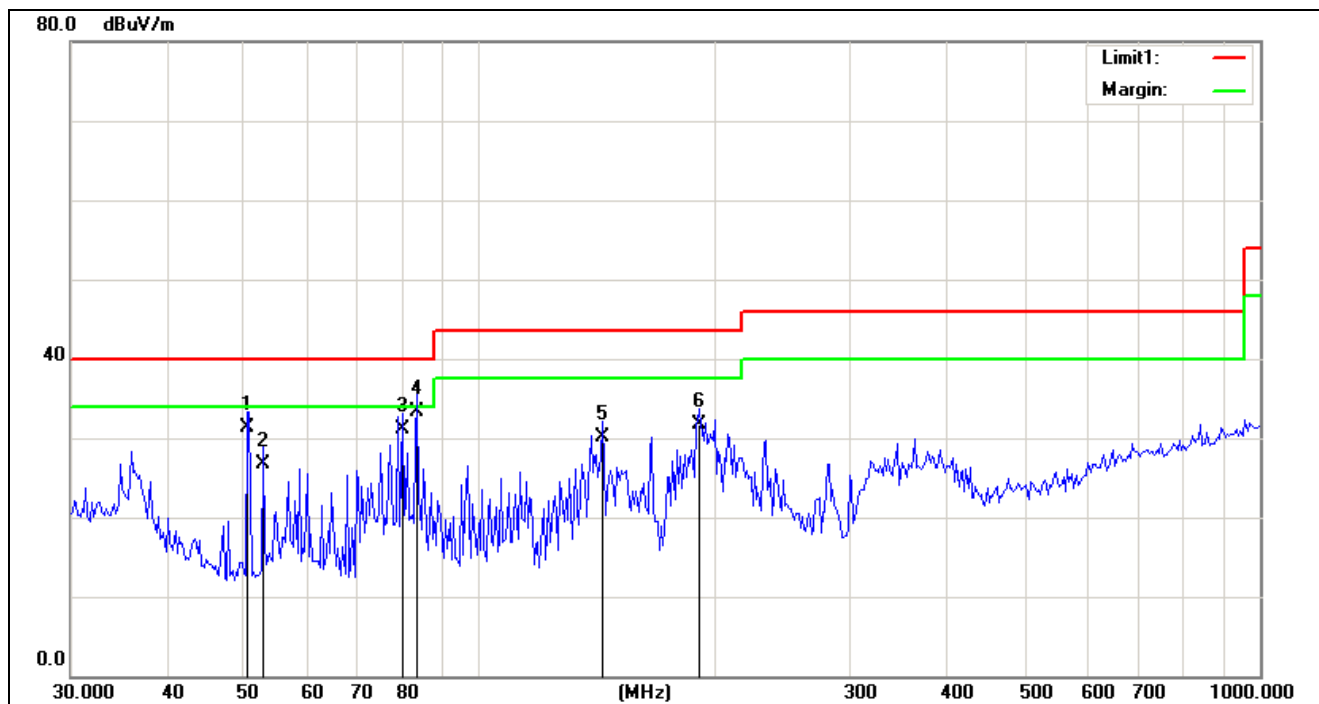


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.3390	9.48	19.22	28.70	40.00	-11.30	QP
2	41.5596	13.73	12.77	26.50	40.00	-13.50	QP
3	69.3038	15.83	7.67	23.50	40.00	-16.50	QP
4	143.8876	9.45	9.55	19.00	43.50	-24.50	QP
5	162.8226	9.45	10.65	20.10	43.50	-23.40	QP
6	229.3961	14.59	12.91	27.50	46.00	-18.50	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6640.272	30.03	13.23	43.26	74.00	-30.74	peak
2	7954.190	28.74	14.00	42.74	74.00	-31.26	peak
3	11065.586	27.21	17.01	44.22	74.00	-29.78	peak
4	12851.174	27.22	19.21	46.43	74.00	-27.57	peak
5	18063.497	27.96	19.15	47.11	74.00	-26.89	peak
6	25000.000	26.19	24.00	50.19	74.00	-23.81	peak

Project No.:	ZJ20150201-E-1	Polarization:	Vertical
Standard:	(RE)FCC PART 15 class B 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	8:40:36
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass
Note:	GFSK-2442(BT4.0)		

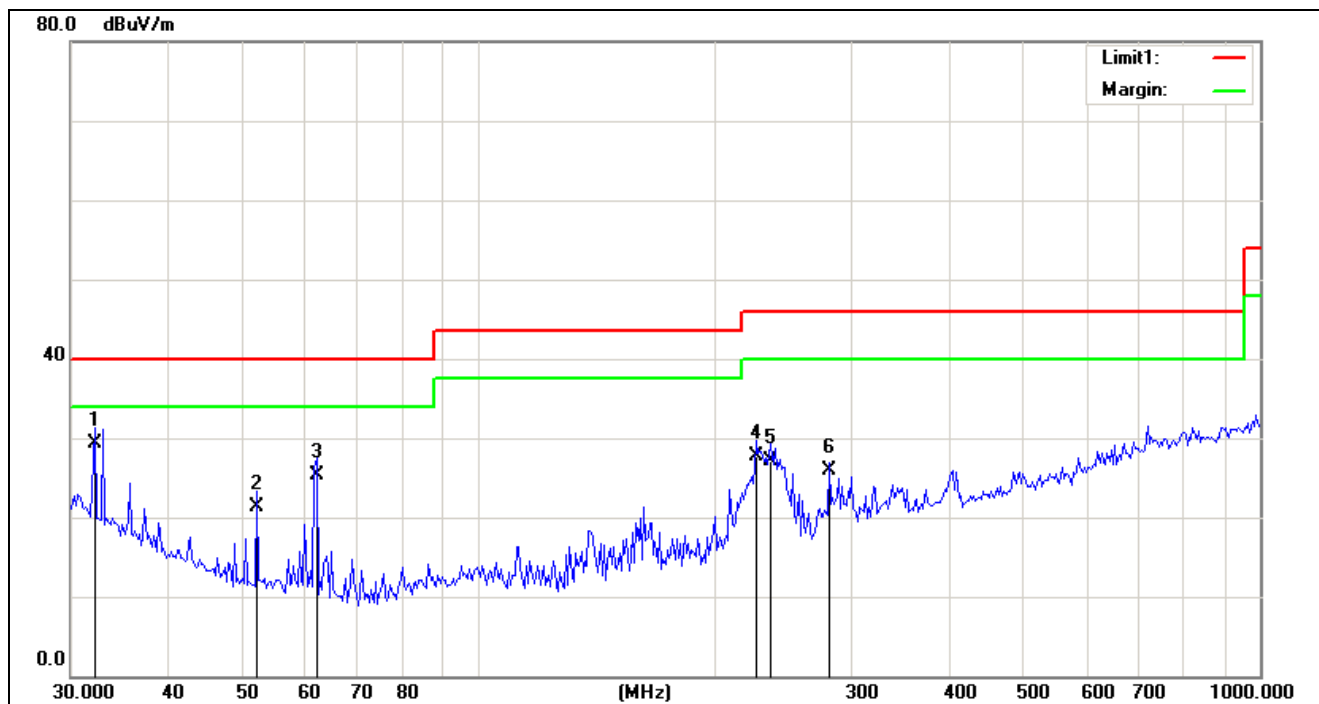


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	50.5927	21.67	9.63	31.30	40.00	-8.70	QP
2	52.9191	17.56	9.24	26.80	40.00	-13.20	QP
3	79.7570	22.56	8.54	31.10	40.00	-8.90	QP
4	83.4244	24.47	8.93	33.40	40.00	-6.60	QP
5	143.8874	20.55	9.55	30.10	43.50	-13.40	QP
6	191.6416	20.35	11.45	31.80	43.50	-11.70	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6114.223	29.38	12.94	42.32	74.00	-31.68	peak
2	7954.190	27.45	14.00	41.45	74.00	-32.55	peak
3	10241.654	28.23	15.24	43.47	74.00	-30.53	peak
4	11180.340	26.63	17.11	43.74	74.00	-30.26	peak
5	13051.597	27.62	19.83	47.45	74.00	-26.55	peak
6	18250.821	27.13	19.02	46.15	74.00	-27.85	peak

Project No.:	ZJ20150201-E-1	Polarization:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	8:45:47
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass
Note:	GFSK-2442(BT4.0)		

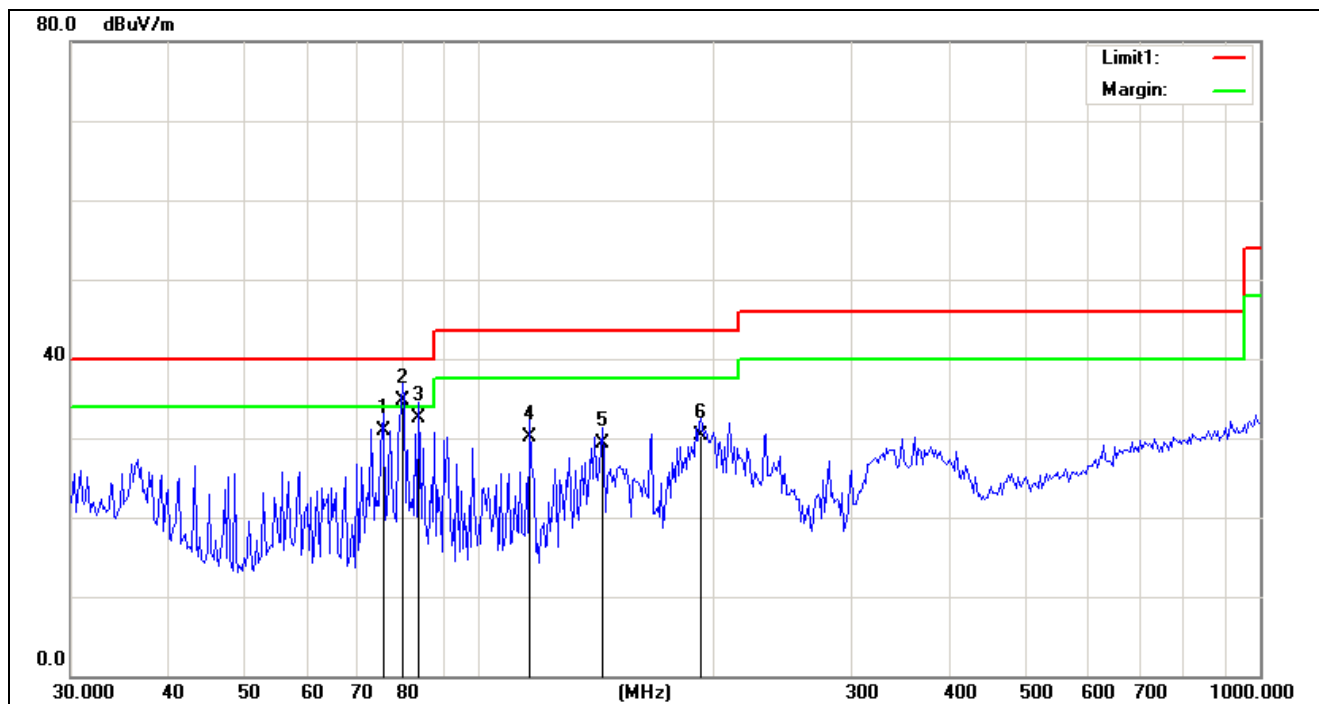


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	32.2736	11.26	18.04	29.30	40.00	-10.70	QP
2	52.0345	11.91	9.39	21.30	40.00	-18.70	QP
3	61.9366	17.44	7.96	25.40	40.00	-14.60	QP
4	226.8324	14.99	12.81	27.80	46.00	-18.20	QP
5	235.9330	14.06	13.14	27.20	46.00	-18.80	QP
6	280.8307	11.43	14.47	25.90	46.00	-20.10	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	6339.037	30.56	13.14	43.70	74.00	-30.30	peak
2	12785.052	27.09	18.97	46.06	74.00	-27.94	peak
3	13531.492	26.42	20.17	46.59	74.00	-27.41	peak
4	16377.076	26.66	17.99	44.65	74.00	-29.35	peak
5	21975.198	27.48	21.29	48.77	74.00	-25.23	peak
6	24113.374	26.11	23.29	49.40	74.00	-24.60	peak

Project No.:	ZJ20150201-E-1	Polarization:	Vertical
Standard:	(RE)FCC PART 15 class B 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	8:51:28
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass
Note:	GFSK-2480(BT4.0)		

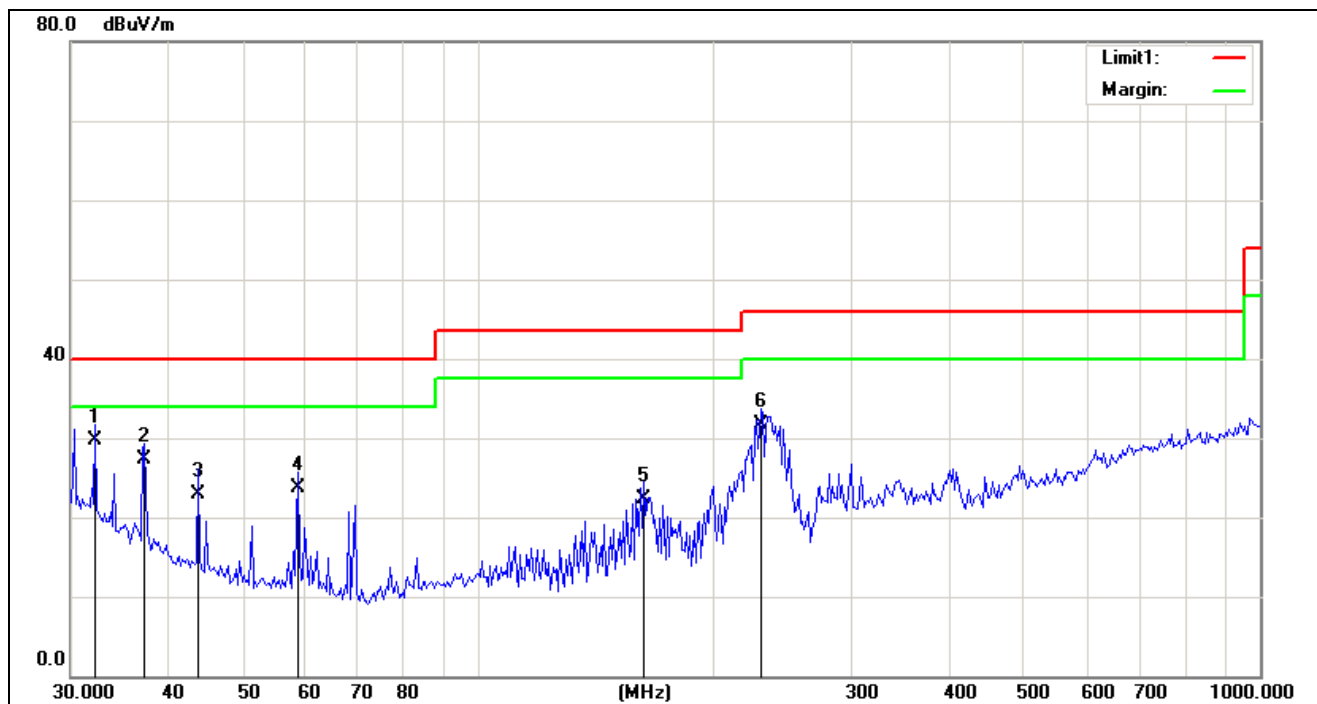


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	75.3988	22.85	8.15	31.00	40.00	-9.00	QP
2	79.7571	26.26	8.54	34.80	40.00	-5.20	QP
3	83.8947	23.52	8.98	32.50	40.00	-7.50	QP
4	116.2209	21.07	9.13	30.20	43.50	-13.30	QP
5	143.8876	19.85	9.55	29.40	43.50	-14.10	QP
6	192.7215	18.96	11.44	30.40	43.50	-13.10	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	8120.020	27.73	13.88	41.61	74.00	-32.39	peak
2	13323.699	25.91	20.11	46.02	74.00	-27.98	peak
3	14924.891	28.11	17.36	45.47	74.00	-28.53	peak
4	15714.988	28.11	17.52	45.63	74.00	-28.37	peak
5	18440.088	26.93	18.90	45.83	74.00	-28.17	peak
6	25000.000	26.02	24.00	50.02	74.00	-23.98	peak

Project No.:	ZJ20150201-E-1	Polarization:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	8:59:50
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass
Note:	GFSK-2480(BT4.0)		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	32.2736	11.76	18.04	29.80	40.00	-10.20	QP
2	37.3509	12.37	14.93	27.30	40.00	-12.70	QP
3	43.7155	10.88	12.02	22.90	40.00	-17.10	QP
4	58.5520	15.44	8.26	23.70	40.00	-16.30	QP
5	162.8227	11.75	10.65	22.40	43.50	-21.10	QP
6	229.3962	18.79	12.91	31.70	46.00	-14.30	QP

Emission above 1GHz:

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4283.131	29.61	10.38	39.99	74.00	-34.01	peak
2	6177.629	29.84	12.99	42.83	74.00	-31.17	peak
3	7872.549	27.79	14.04	41.83	74.00	-32.17	peak
4	11711.637	27.95	17.42	45.37	74.00	-28.63	peak
5	12785.052	26.92	18.97	45.89	74.00	-28.11	peak
6	22317.917	26.26	21.58	47.84	74.00	-26.16	peak

7. 6dB BANDWIDTH TESTING

7.1 LIMITS

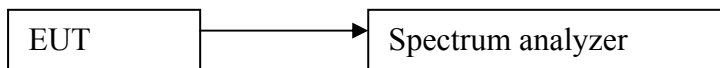
Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2 TEST PROCEDURES

Test procedures follow ANSI C63.4:2009 and KDB 558074 D01 DTS Measurement Guidance v03r01.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Set resolution bandwidth (RBW) = 100kHz. Set the video bandwidth (VBW) $\geq 3 \times$ RBW. Detector = Peak. Trace mode = max hold. Sweep = auto couple. Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer.
5. Repeat above procedures until all frequencies measured were complete.

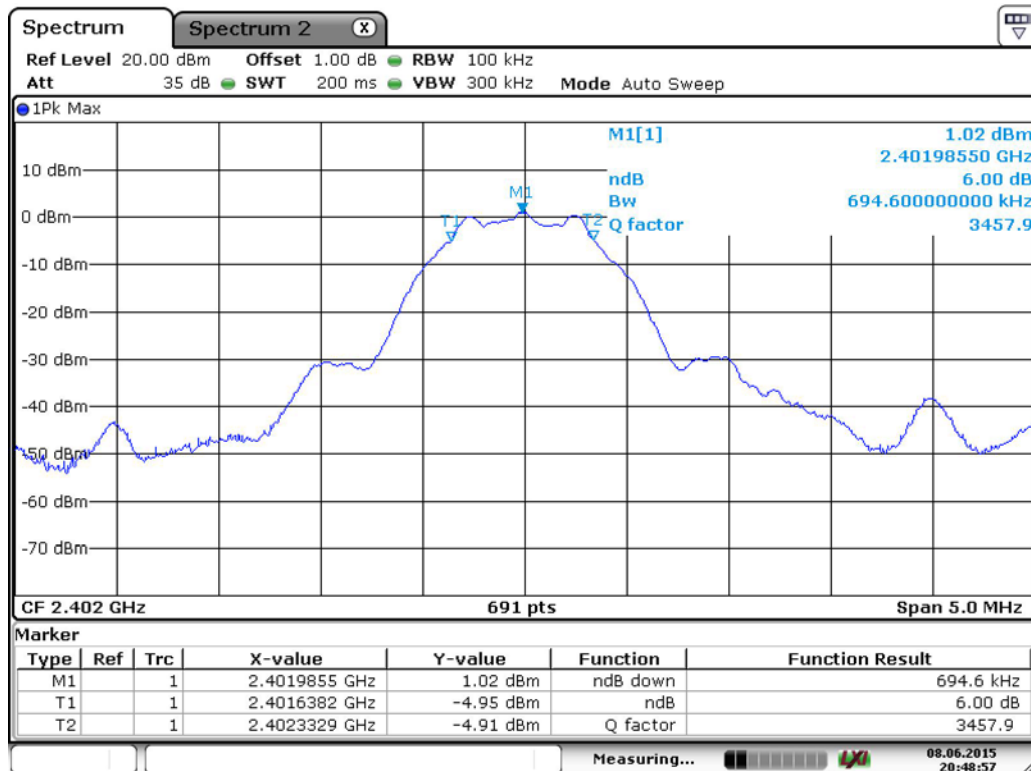
7.3 TEST SETUP



7.4 TEST RESULTS

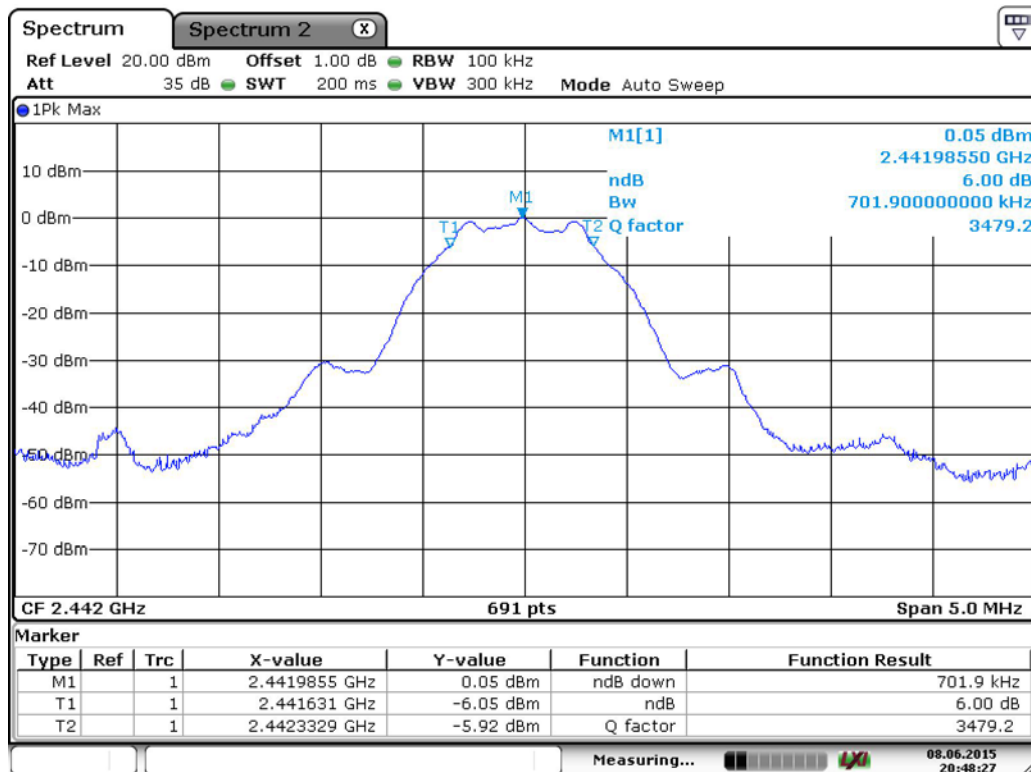
Channel	Channel Frequency (MHz)	6dB Bandwidth (KHz)	Limit (kHz)
Low Channel	2402	694.60	> 500
Middle Channel	2442	701.90	> 500
High Channel	2480	701.90	> 500

Channel 0 2402MHz:



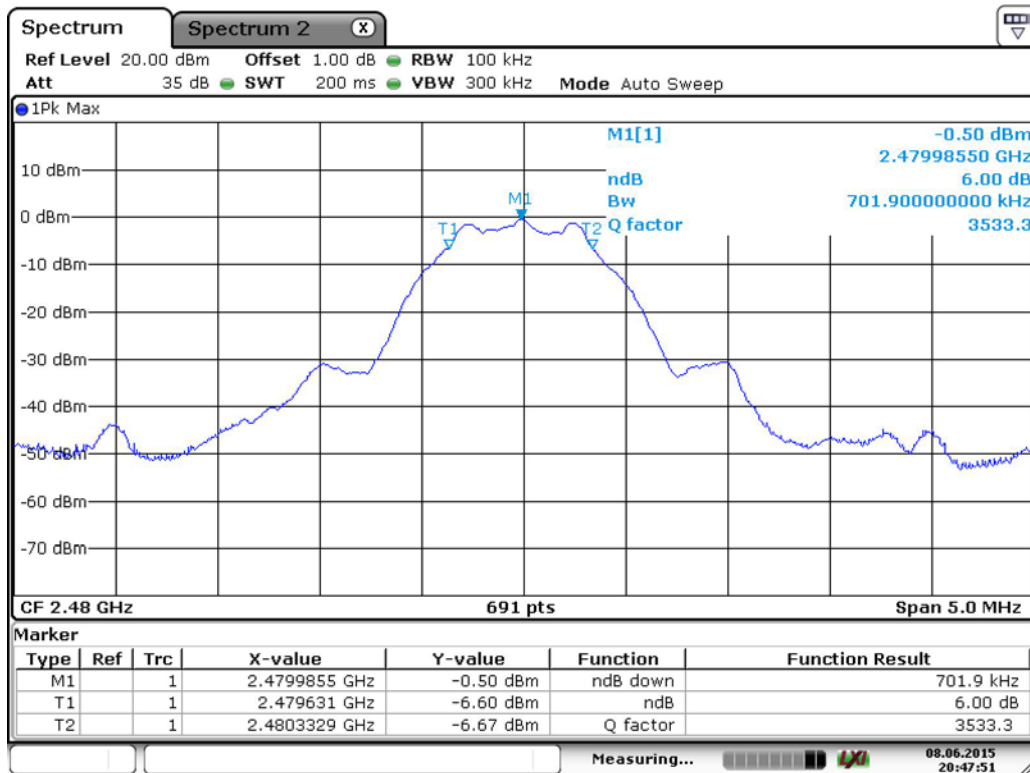
Date: 8.JUN.2015 20:48:57

Channel 20 2442MHz:



Date: 8.JUN.2015 20:48:27

Channel 39 2480MHz:



Date: 8 JUN 2015 20:47:52

8. MAXIMUM PEAK OUTPUT POWER

8.1 LIMITS

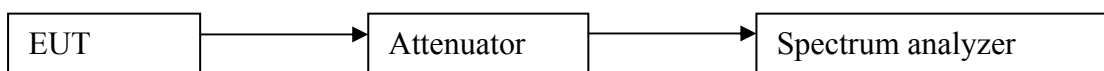
The maximum Peak output power measurement is 1W

8.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v03r01.

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. The spectrum analyzer resolution bandwidth that is $\leq$ EBW. So we test the Maximum Conducted Output Power
4. Set the analyzer span $\geq 1.5 \times$ DTS bandwidth. Set the RBW = 3 MHz. Set the VBW ≥ 3 MHz. Sweep time = auto couple. Detector = peak. Allow trace to fully stabilize.

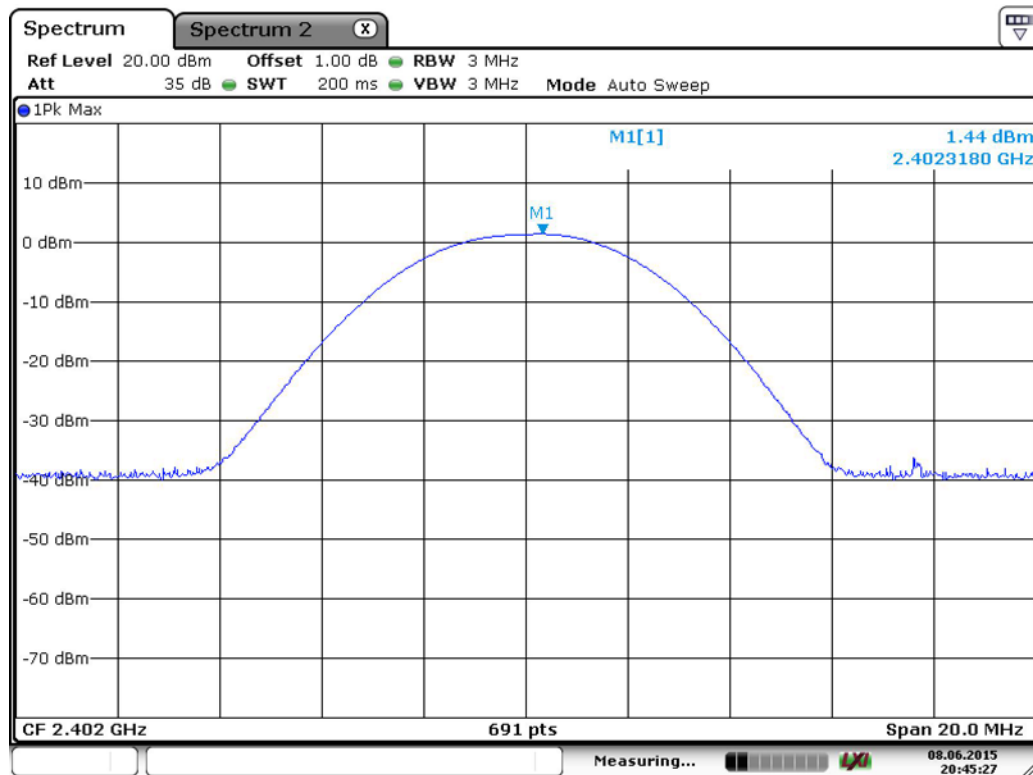
8.3 TEST SETUP



8.4 TEST RESULTS

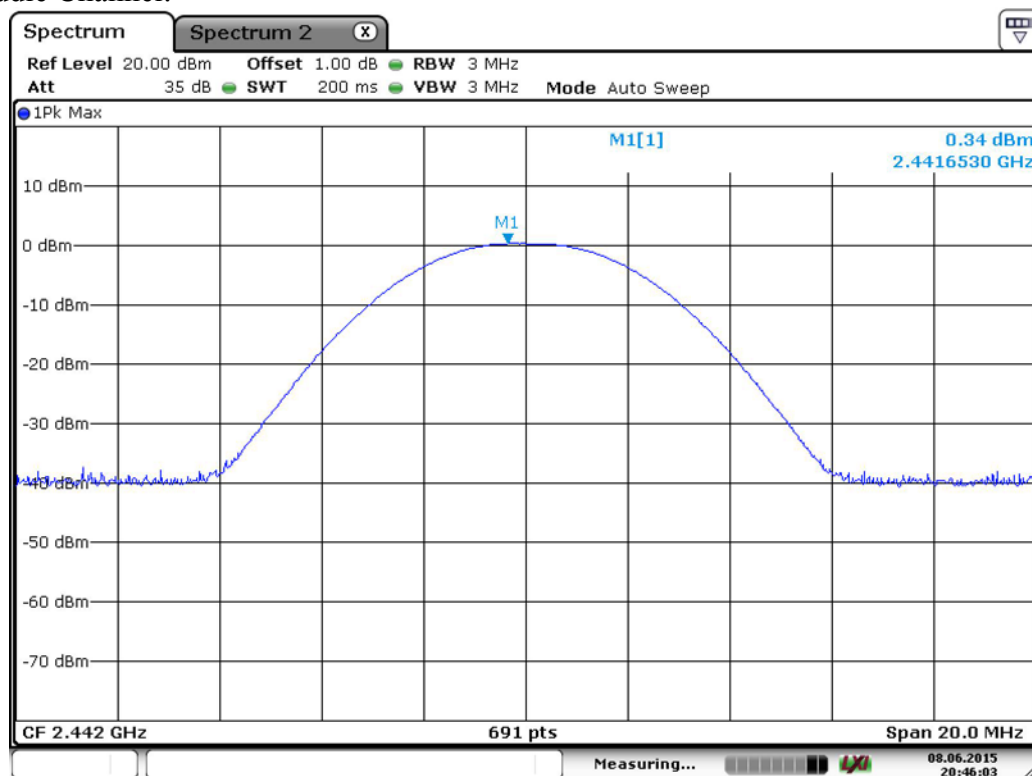
Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Pass/Fail
Lowest	2.402	1.44	30.0	Pass
Middle	2.442	0.34	30.0	Pass
Highest	2.480	-0.20	30.0	Pass

GFSK Lowest Channel:



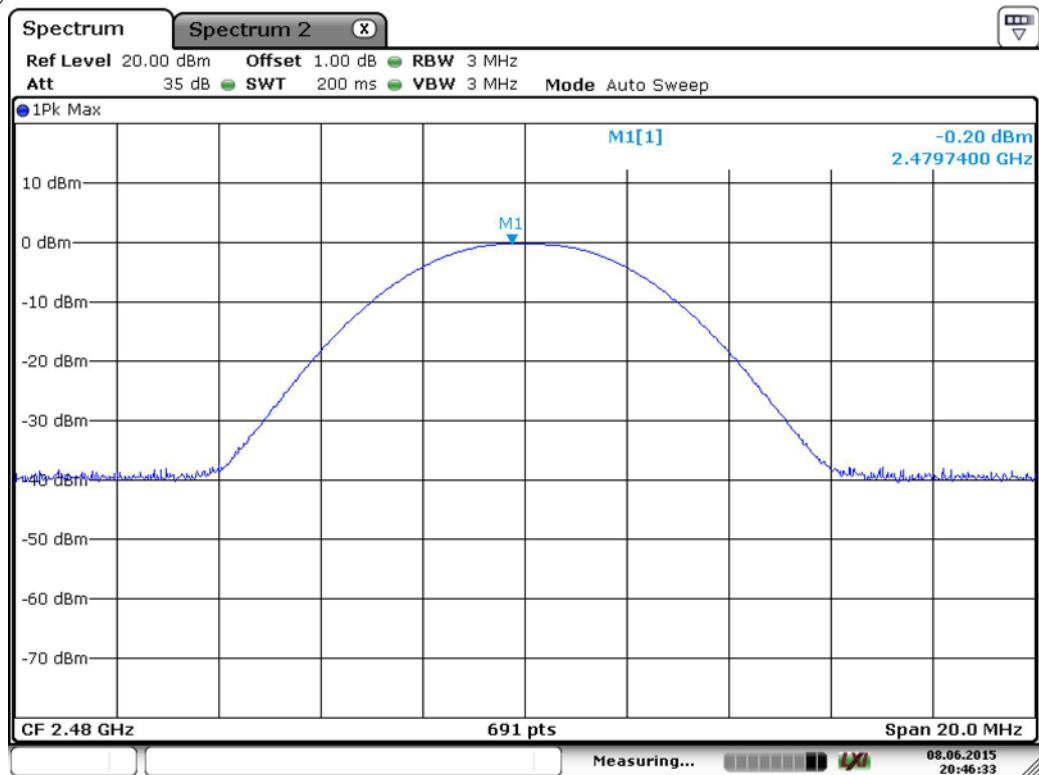
Date: 8 JUN.2015 20:45:28

GFSK Middle Channel:



Date: 8 JUN.2015 20:46:03

GFSK Highest Channel:



Date: 8 JUN 2015 20:46:33

9. POWER SPECTRAL DENSITY

9.1 LIMITS

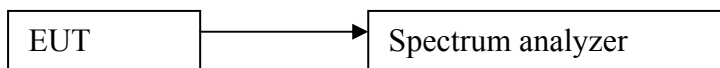
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

9.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v03r01.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the analyzer span to 1.5 times the DTS bandwidth. Set the RBW = 3 kHz. Set the VBW ≥ 3 RBW. Detector = peak. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$ (use of a greater number of measurement points than this minimum requirement is recommended).
4. Repeat above procedures until all frequencies measured were complete.

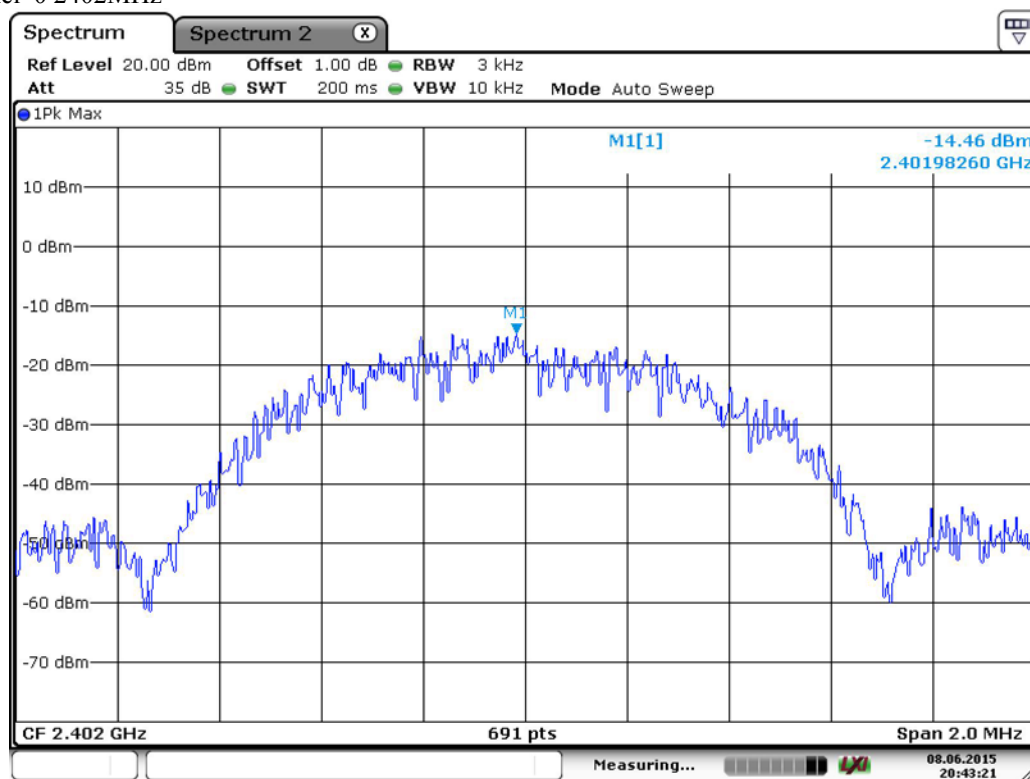
9.3 TEST SETUP



9.4 TEST RESULTS

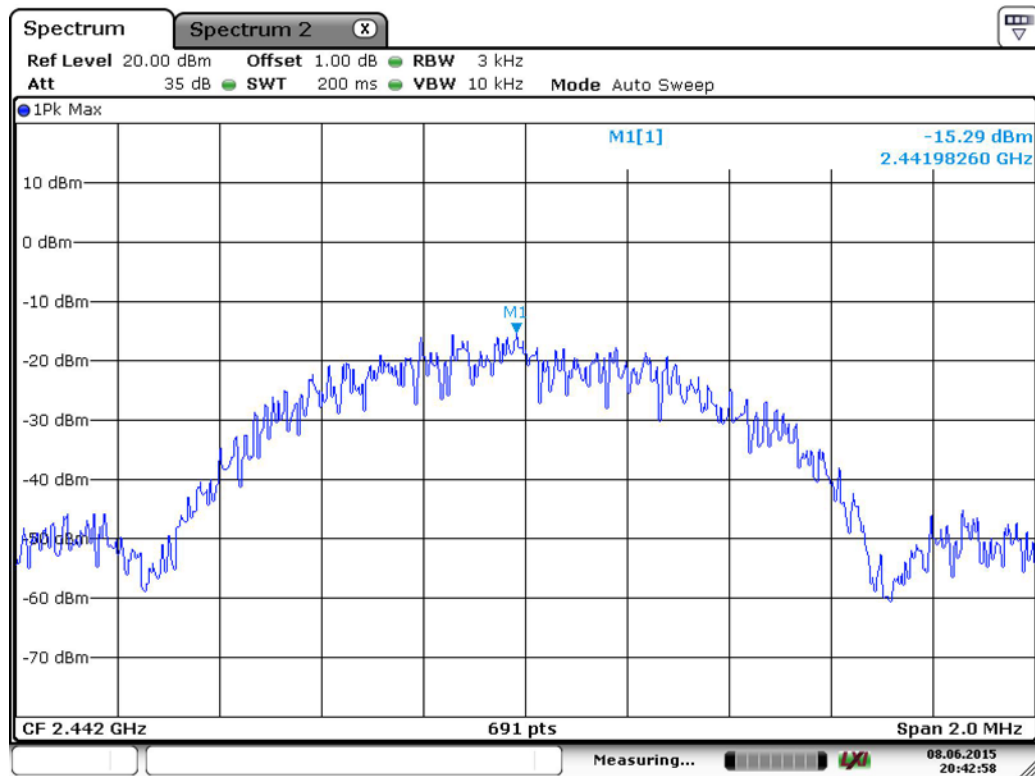
Channel No.	Frequency (MHz)	Mode	PSD (dBm/3KHz)	Limit	Result
0	2402	BLE	-14.46	8dBm/3KHz	Pass
20	2442		-15.29		Pass
39	2480		-15.87		Pass

Channel 0 2402MHz



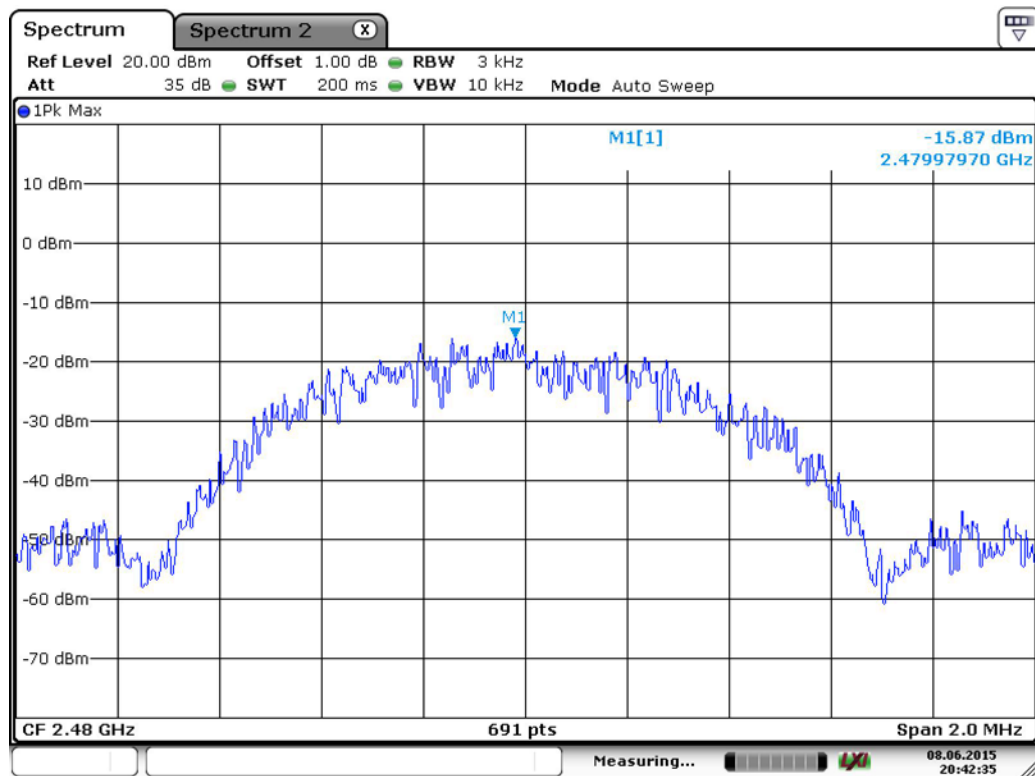
Date: 8.JUN.2015 20:43:21

Channel 20 2442MHz



Date: 8 JUN.2015 20:42:58

Channel 39 2480MHz



Date: 8 JUN.2015 20:42:35

10. EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

10.1 LIMITS

FCC 15.247(d) & 15.209

10.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v03r01.

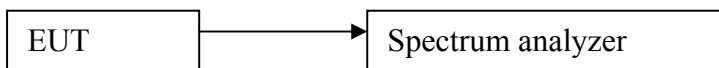
Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.

1. Reference level measurement

Below 1GHz Set the spectrum analyzer: RBW =100KHz VBW $\geq 3 \times$ RBW, Set the span to ≥ 1.5 times the DTS bandwidth. Sweep = auto; Detector Function = peak. Trace = Max-hold. Allow the trace to stabilize.

2. Set the spectrum analyzer: RBW =100KHz VBW $\geq 3 \times$ RBW, Set the span to ≥ 1.5 times the DTS bandwidth. Sweep = auto; Detector Function = peak. Trace = Max-hold. Allow the trace to stabilize.

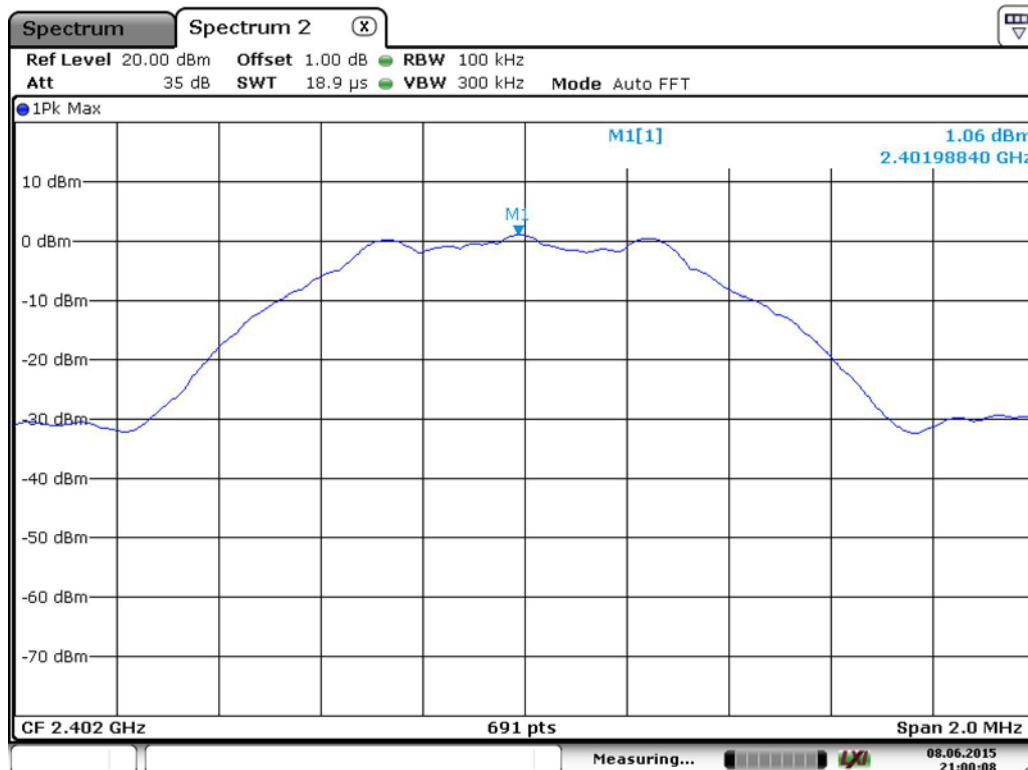
10.3 TEST SETUP



10.4 TEST RESULTS

Channel 0 2402MHz

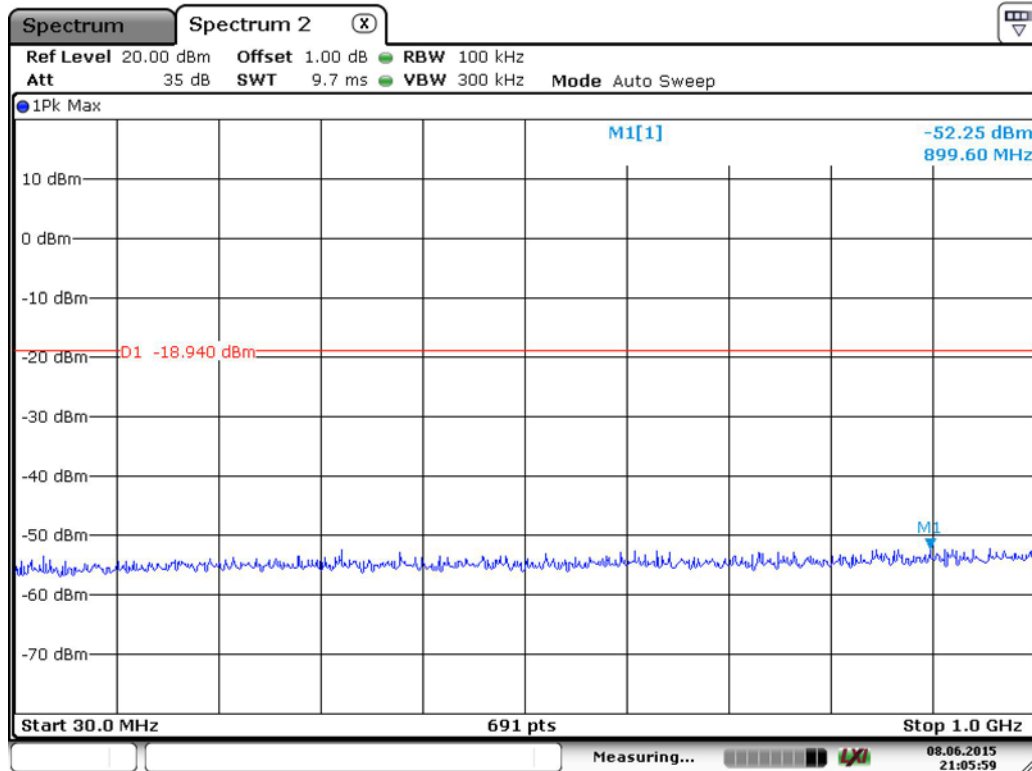
reference level:



Date: 8.JUN.2015 21:00:08

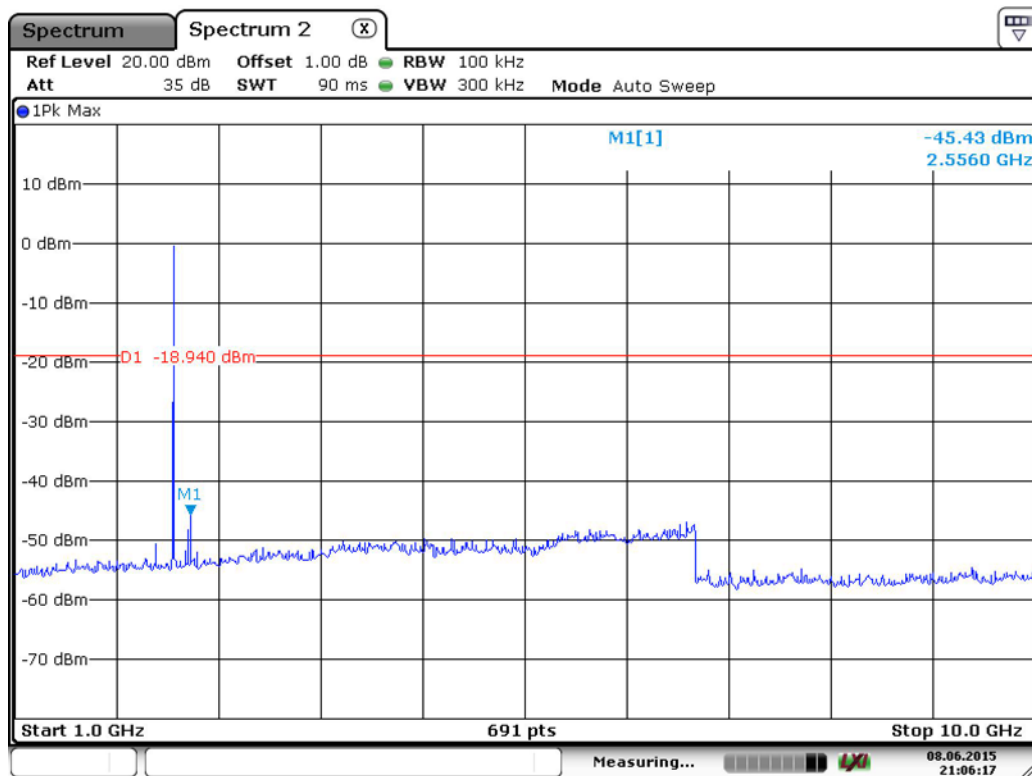
So limit is -18.94dBm

30M-1G



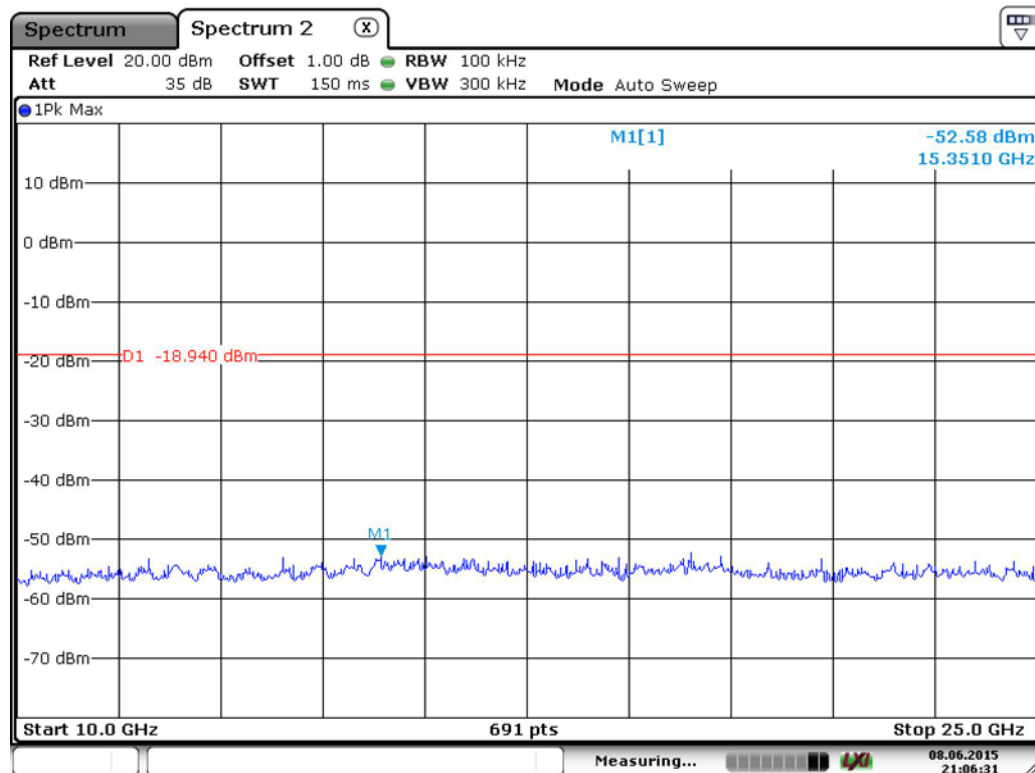
Date: 8.JUN.2015 21:05:59

1G-10G



Date: 8.JUN.2015 21:06:17

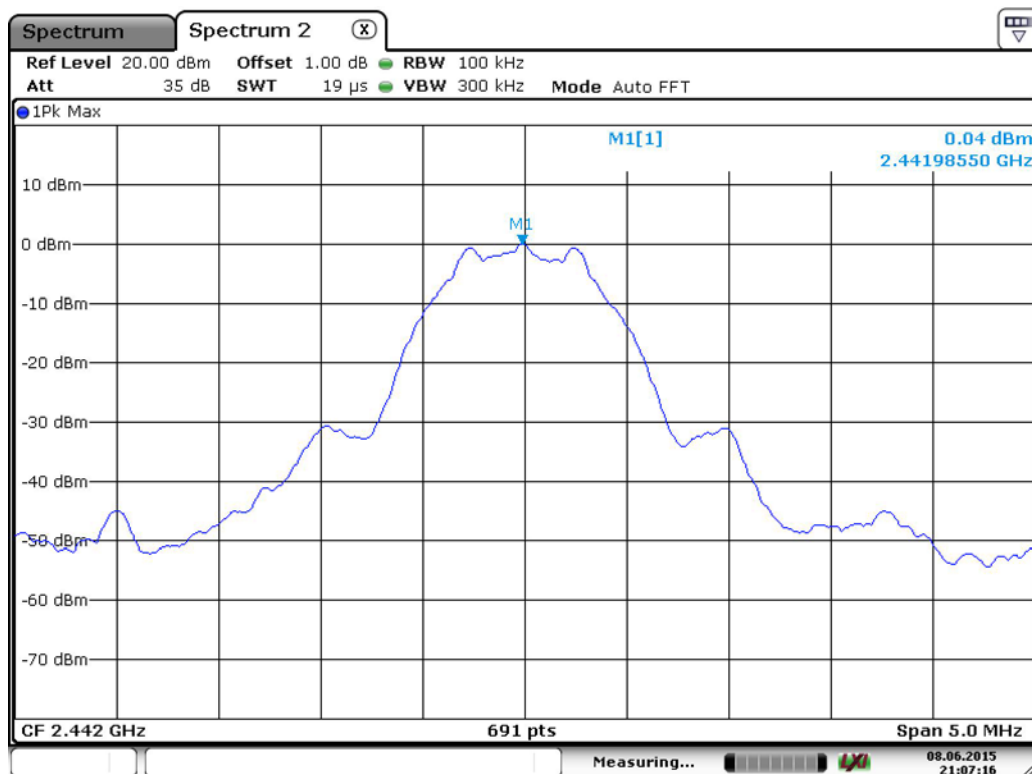
10G-25G



Date: 8.JUN.2015 21:06:31

Channel 20 2442MHz

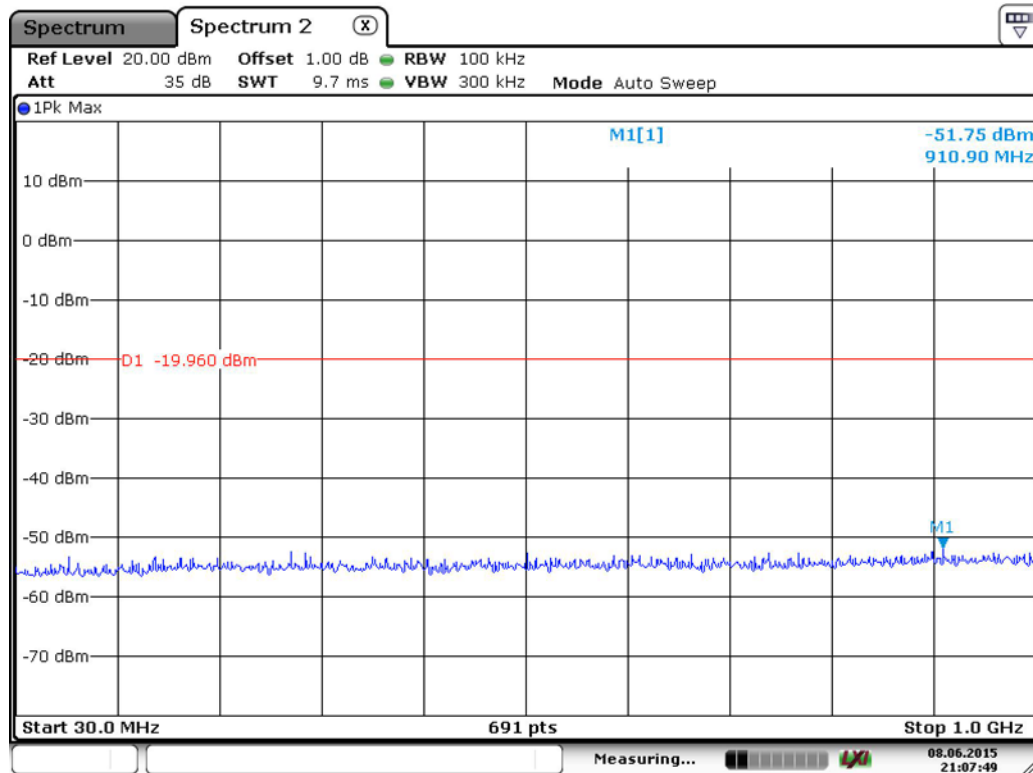
Reference level



Date: 8.JUN.2015 21:07:17

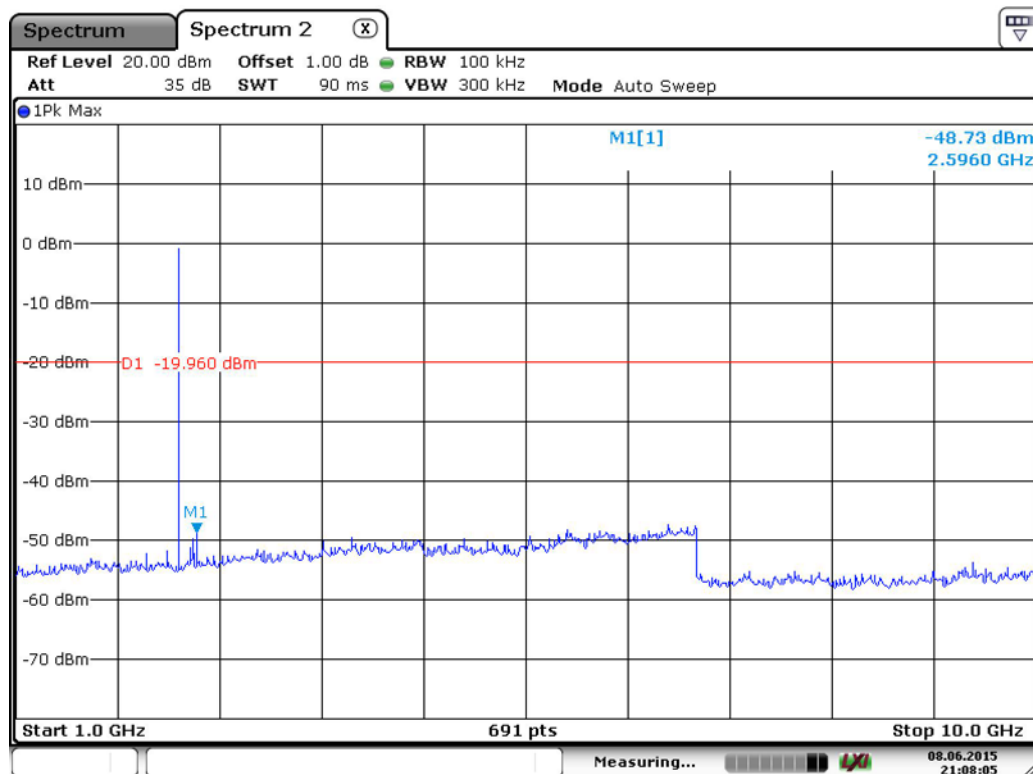
So the limit is -19.96dBm

30M-1G



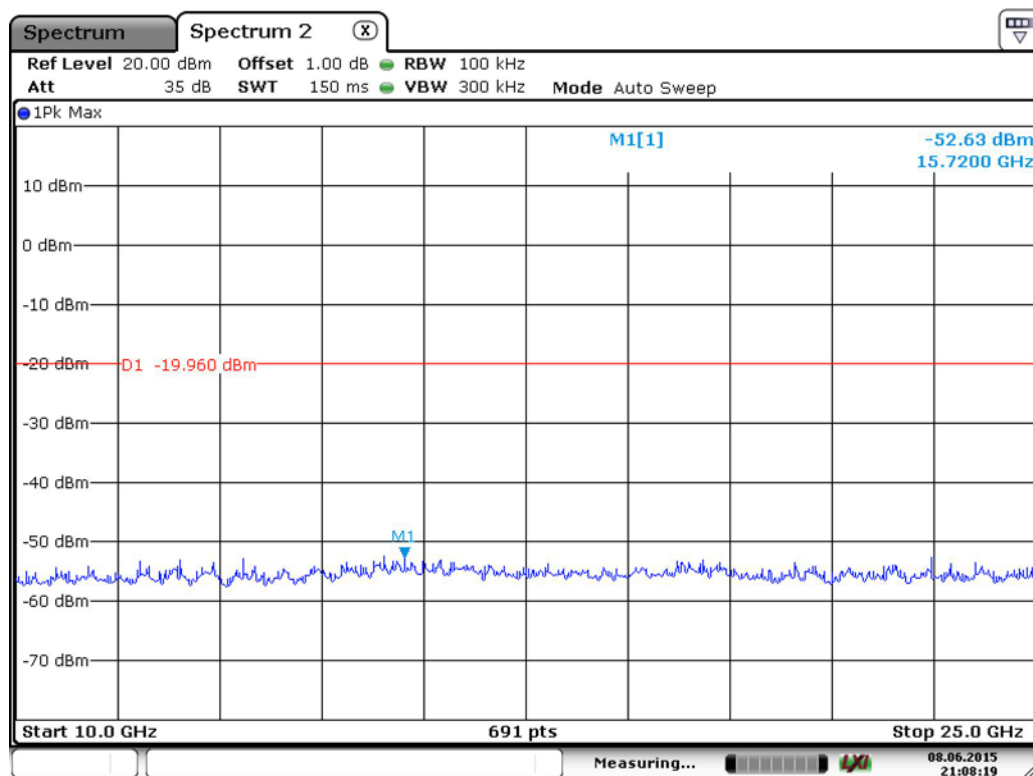
Date: 8.JUN.2015 21:07:49

1G-10G



Date: 8.JUN.2015 21:08:06

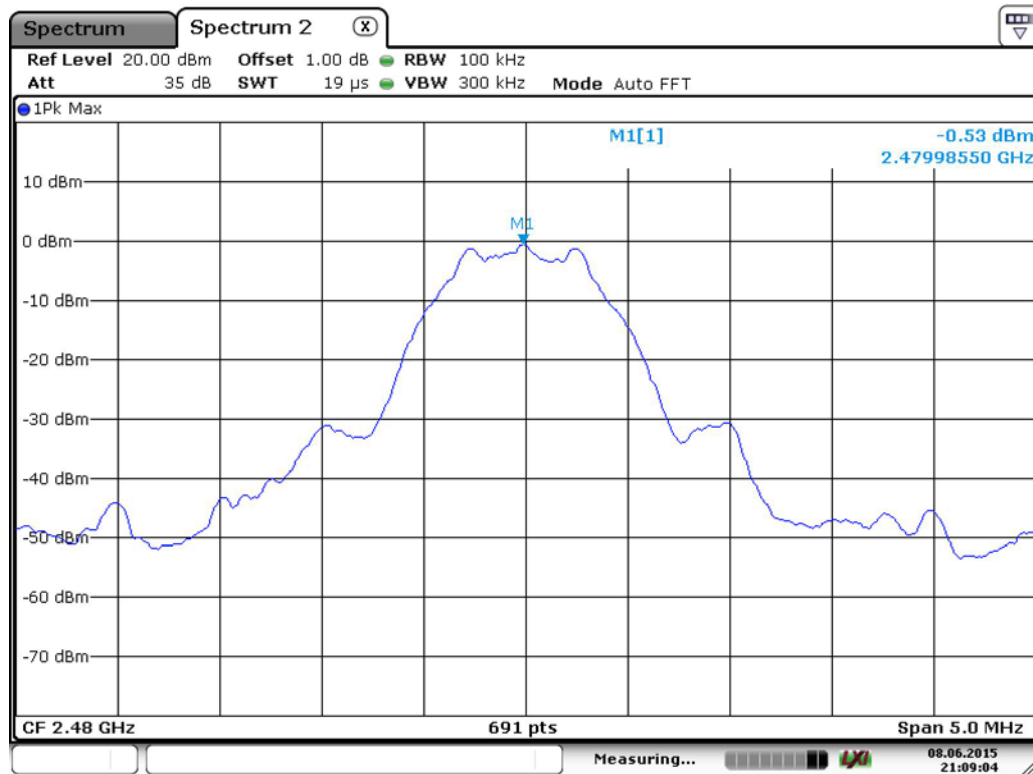
10G-25GHz



Date: 8.JUN.2015 21:08:19

Channel 39 2480MHz

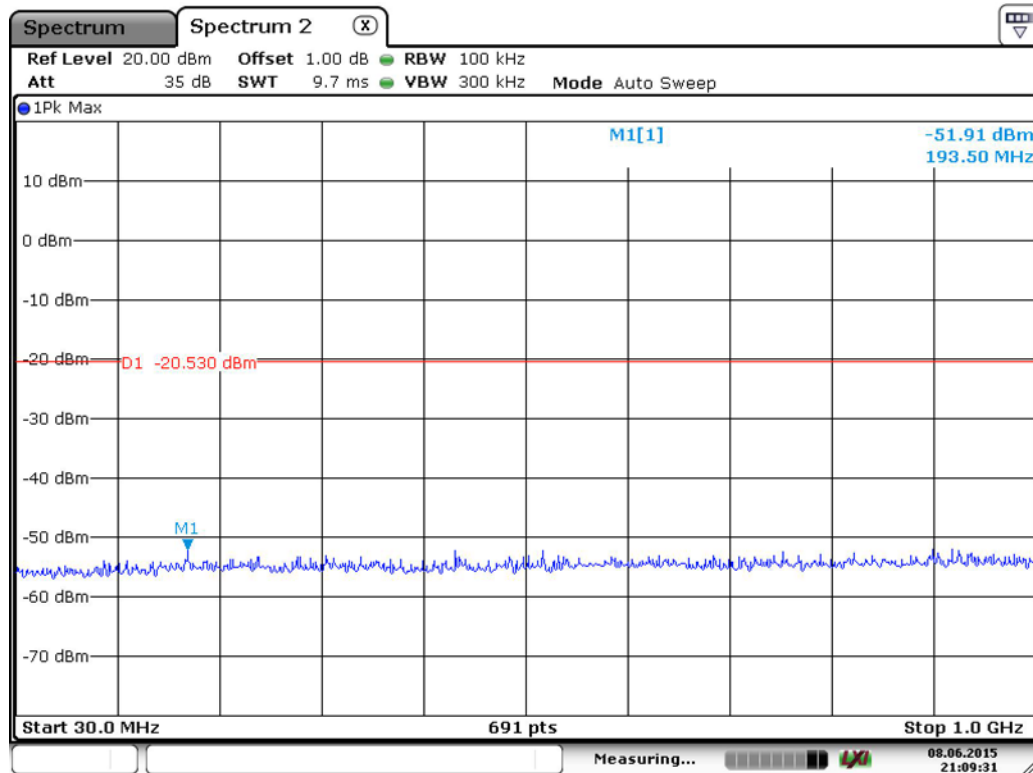
Reference level



Date: 8.JUN.2015 21:09:04

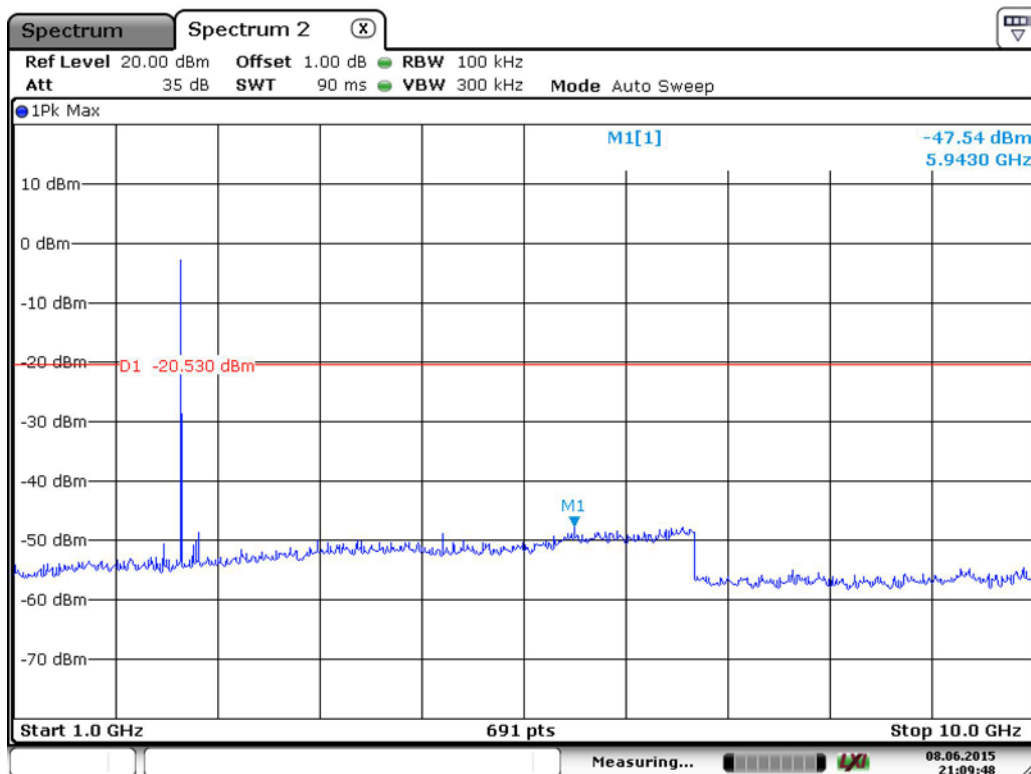
So the limit is -20.53dBm

30M-1G



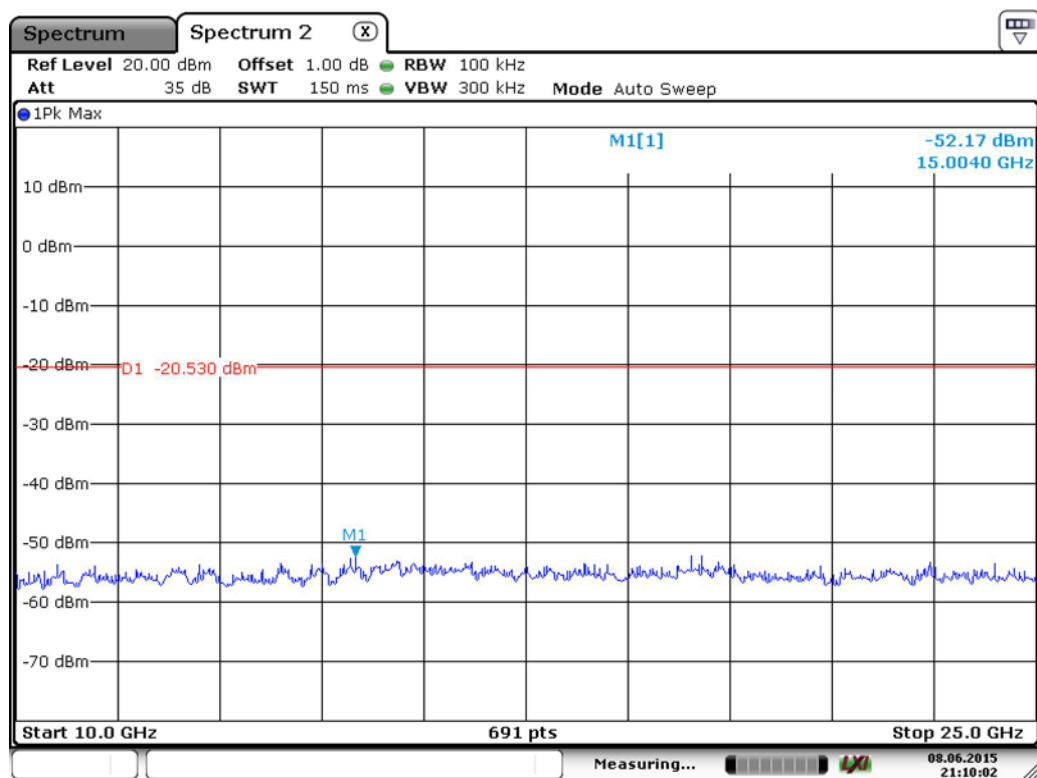
Date: 8.JUN.2015 21:09:31

1G-10G



Date: 8.JUN.2015 21:09:48

10G-25G



Date: 8.JUN.2015 21:10:02

11. EMISSIONS IN RESTRICTED FREQUENCY BANDS

11.1 LIMITS

The DTS rules specify that emissions which fall into restricted frequency bands shall comply with the general radiated emission limits..

11.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Meas Guidance v03r01.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the analyzer span to encompass the entire unwanted emission bandwidth above the measurement system noise level.
4. When Detector = peak, Set the RBW = 1 MHz. Set the VBW $\geq$ 3 MHz. Ensure that the number of measurement points in the sweep $\geq 2 \times (\text{span/RBW})$. Set sweep time = auto couple. When Detector = average. Set the RBW = 1 MHz. Set the VBW = 10Hz. Ensure that the number of measurement points in the sweep $\geq 2 \times (\text{span/RBW})$. Set sweep time = auto couple. Employ trace averaging over a minimum of 100 traces.
5. Use the peak marker function to determine the maximum average power level in any 1 MHz of the unwanted emission.
6. Repeat above procedures until all measured frequencies were complete.

11.3 TEST SETUP

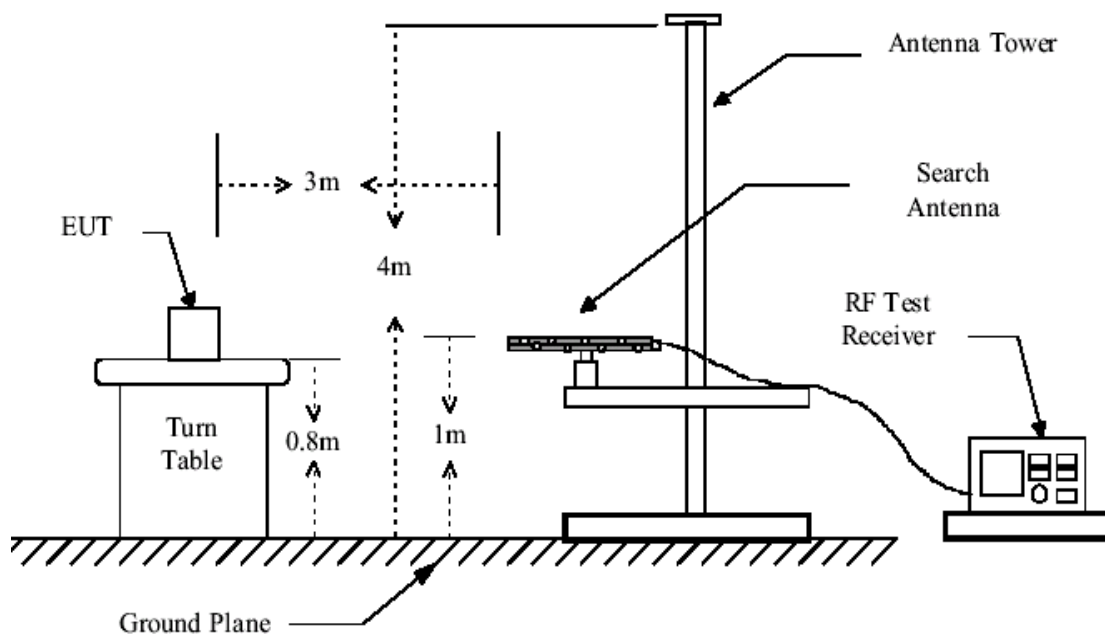


Figure 1. 30MHz to 1GHz radiated emissions test configuration

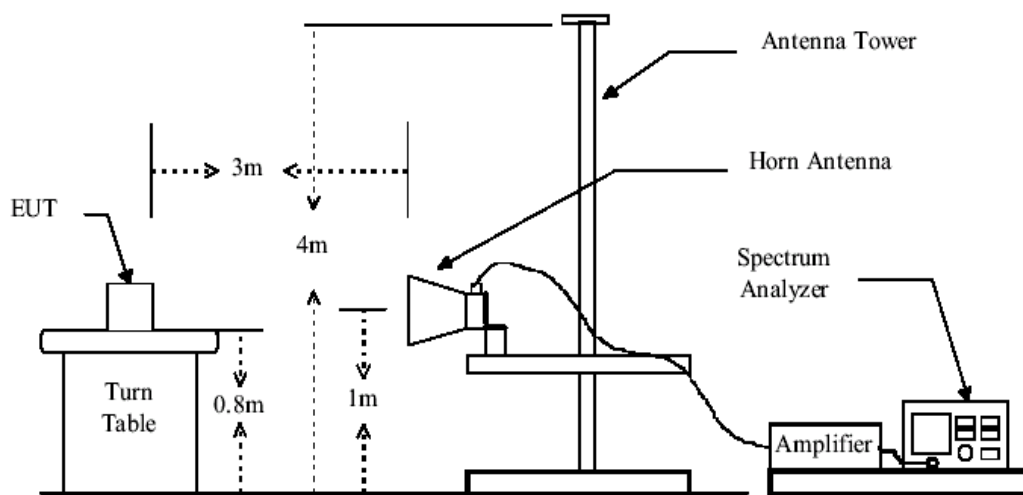
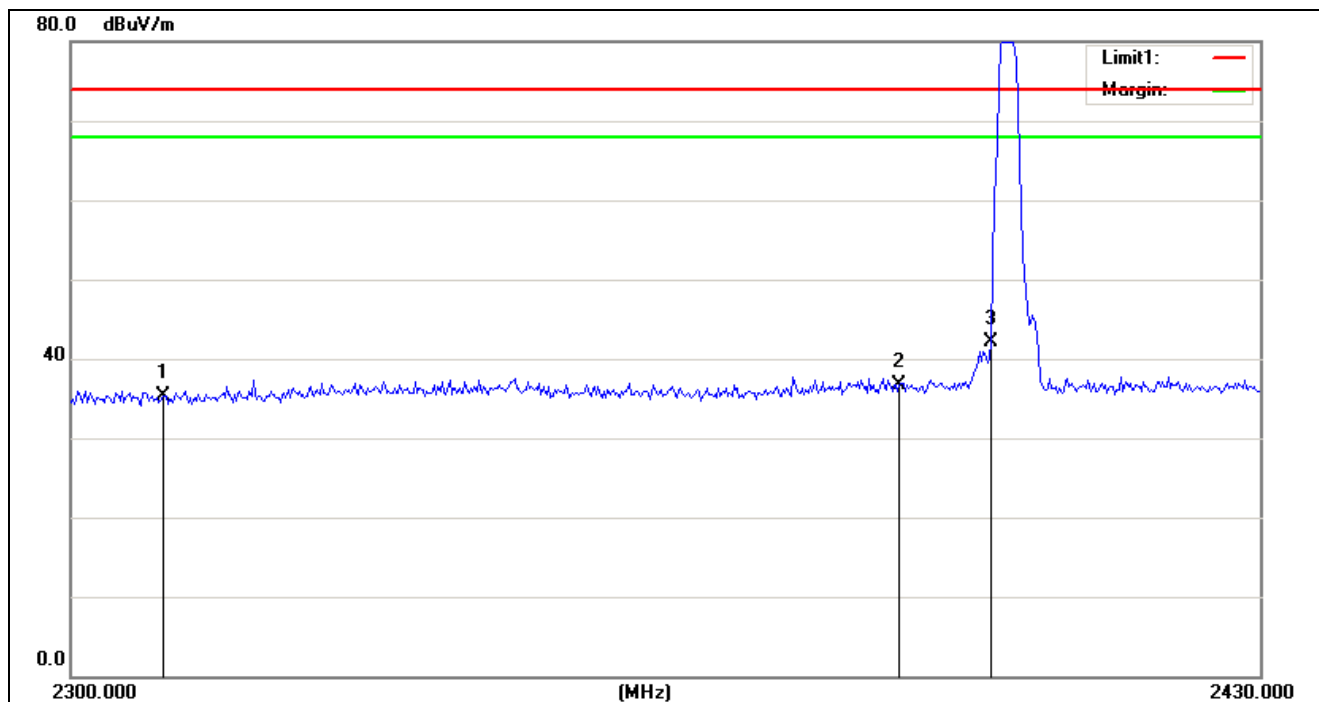


Figure 2. Above 1GHz radiated emissions test configuration

11.4 TEST RESULTS

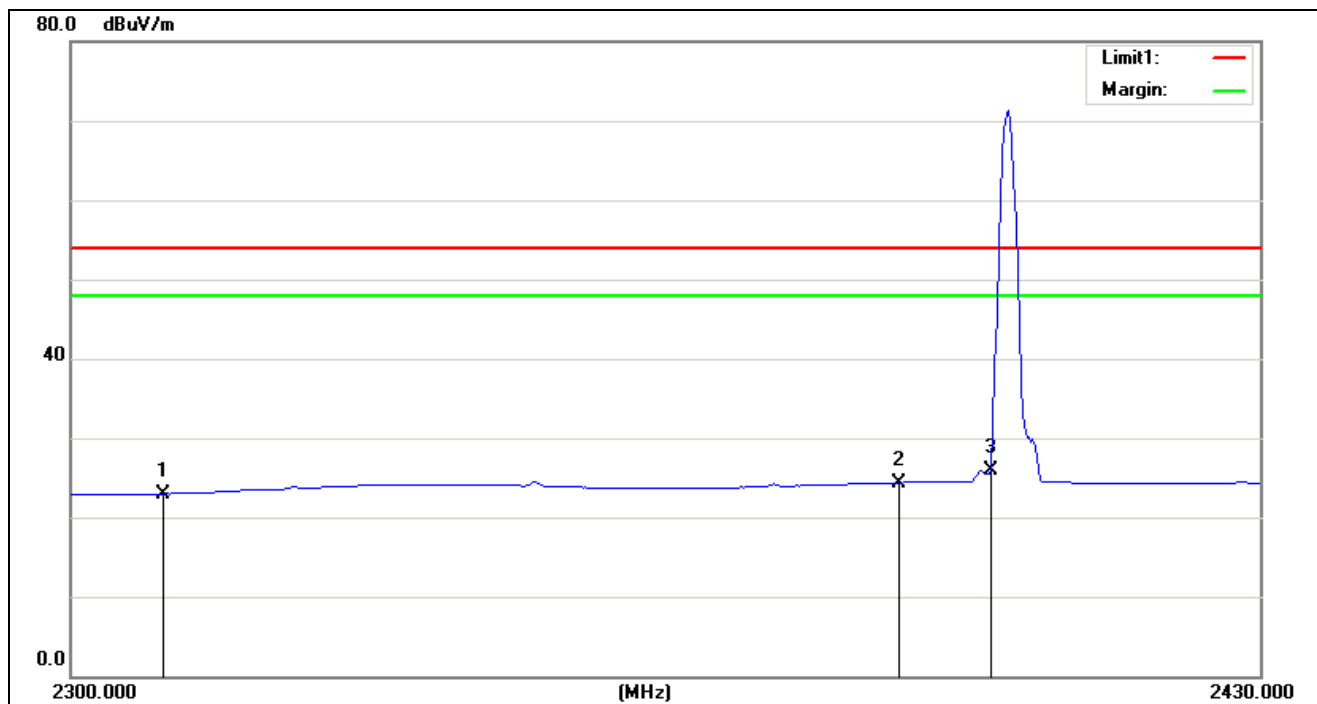
Project No.:	ZJ20150201-E-1	Polarization:	Vertical
Standard:	(RE)FCC PART 15 class B 3m_PEAK	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	9:18:49
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass
Note:			



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	28.35	6.94	35.29	74.00	-38.71	peak
2	2390.000	29.26	7.41	36.67	74.00	-37.33	peak
3	2400.000	34.72	7.46	42.18	74.00	-31.82	peak

Project No.:	ZJ20150201-E-1	Polarization:	Vertical
Standard:	(RE)FCC PART 15 class B 3m_AVG	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	9:21:46
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass

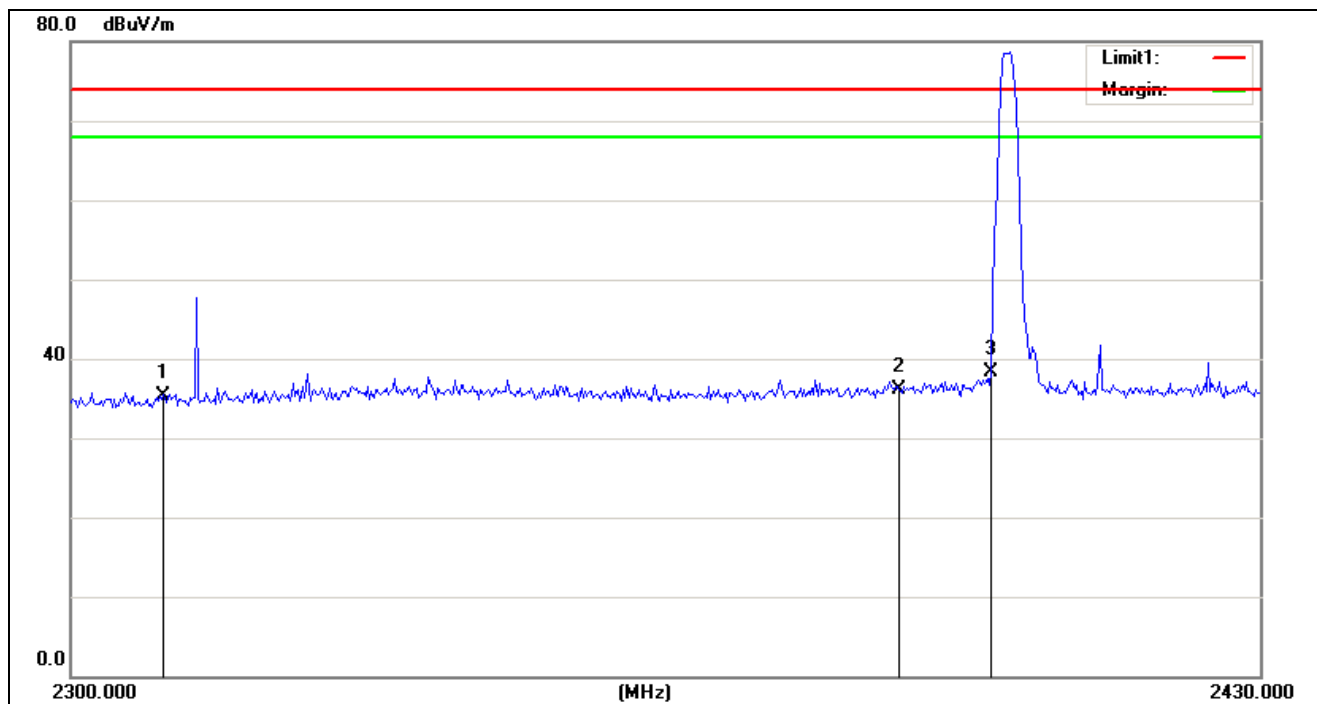
Note:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	16.06	6.94	23.00	54.00	-31.00	AVG
2	2390.000	16.97	7.41	24.38	54.00	-29.62	AVG
3	2400.000	18.50	7.46	25.96	54.00	-28.04	AVG

Project No.:	ZJ20150201-E-1	Polarization:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m_PEAK	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	9:19:55
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass

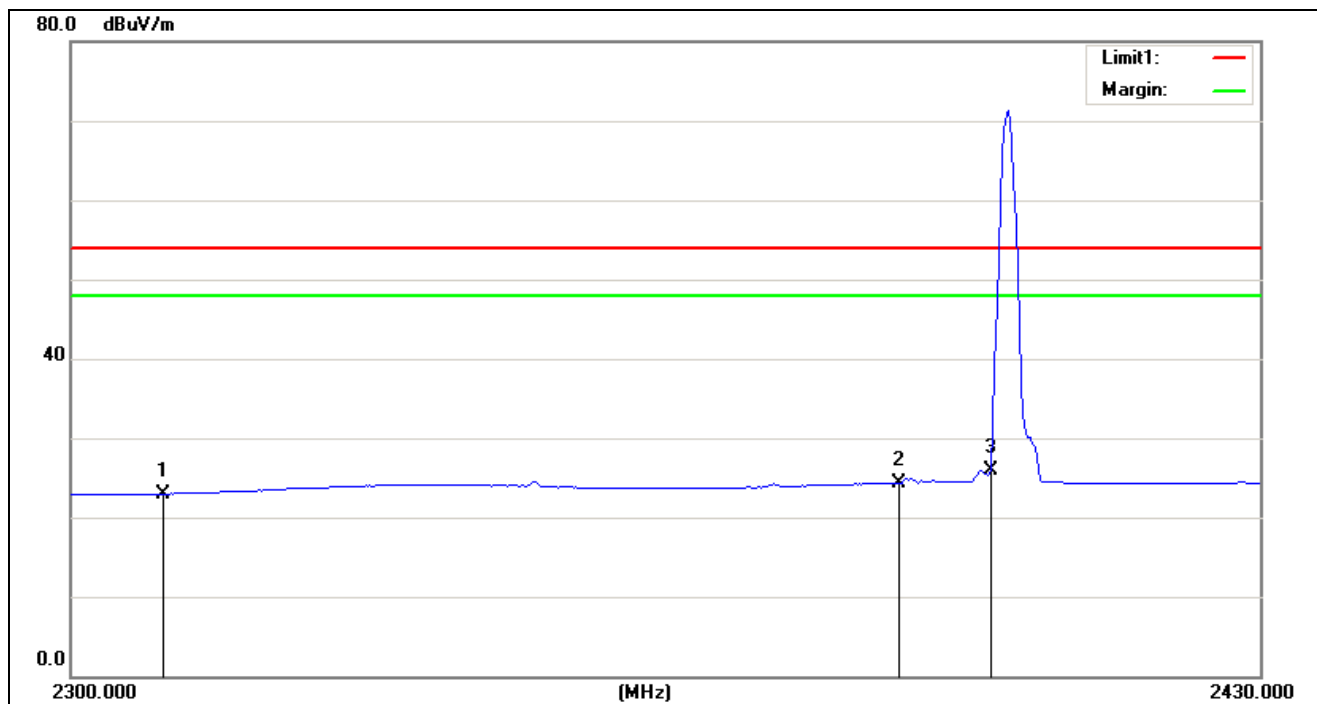
Note:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	28.46	6.94	35.40	74.00	-38.60	peak
2	2390.000	28.75	7.41	36.16	74.00	-37.84	peak
3	2400.000	30.87	7.46	38.33	74.00	-35.67	peak

Project No.:	ZJ20150201-E-1	Polarization:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m_AVG	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	9:23:22
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass

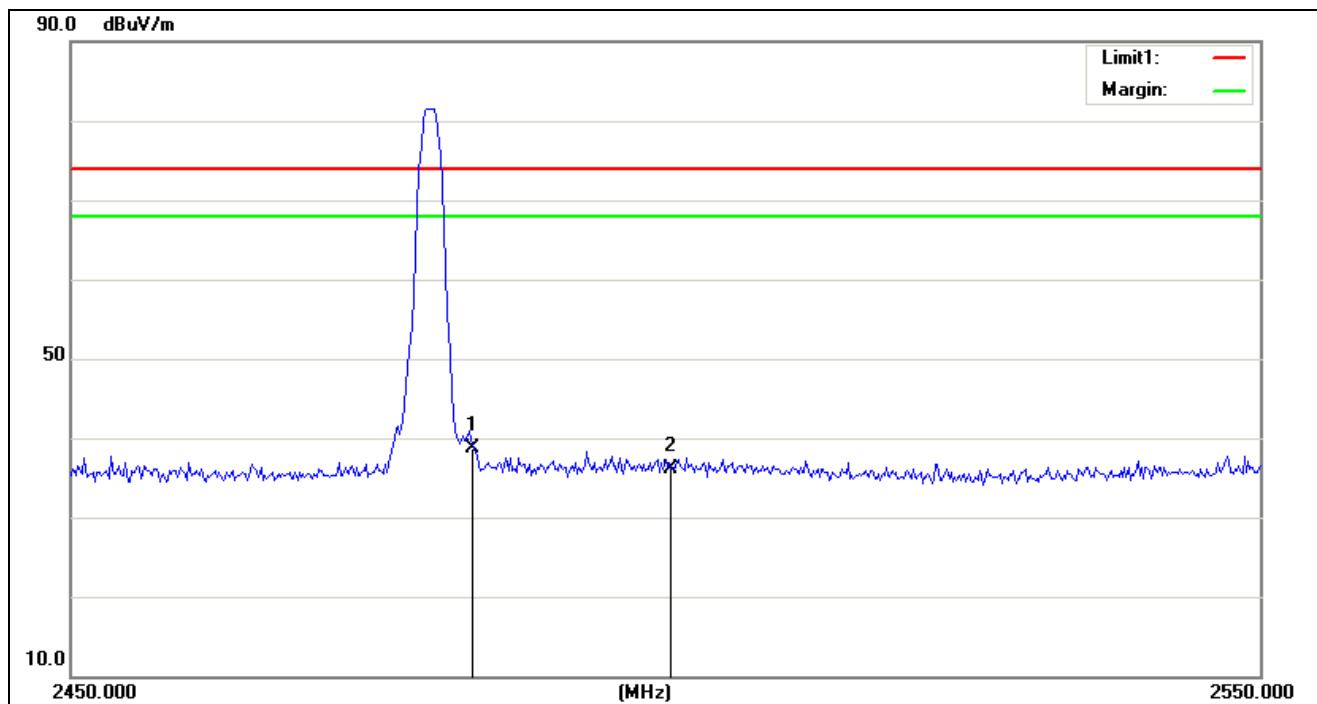
Note:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	16.03	6.94	22.97	54.00	-31.03	AVG
2	2390.000	16.95	7.41	24.36	54.00	-29.64	AVG
3	2400.000	18.47	7.46	25.93	54.00	-28.07	AVG

Project No.:	ZJ20150201-E-1	Polarization:	Vertical
Standard:	(RE)FCC PART 15 class B 3m_PEAK	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	9:08:57
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass

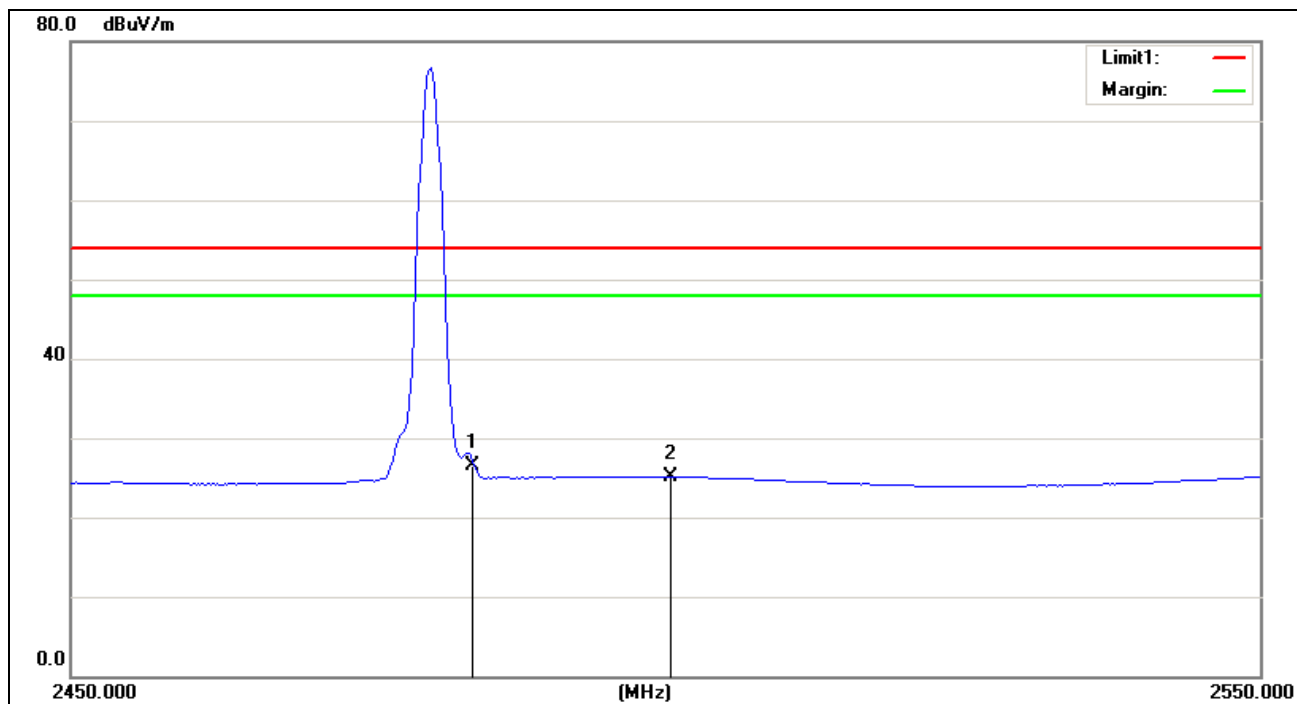
Note:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	30.81	7.87	38.68	74.00	-35.32	peak
2	2500.000	28.16	7.95	36.11	74.00	-37.89	peak

Project No.:	ZJ20150201-E-1	Polarization:	Vertical
Standard:	(RE)FCC PART 15 class B 3m_AVG	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	9:12:40
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass

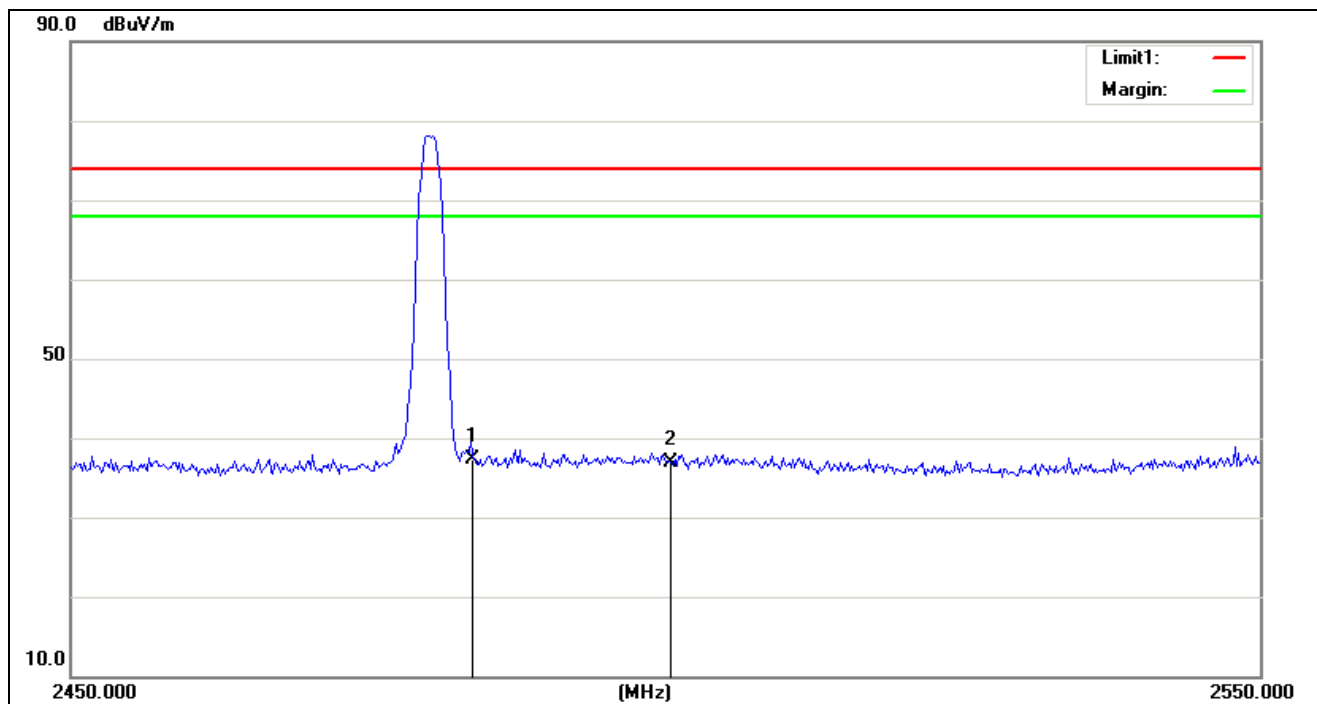
Note:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	18.62	7.87	26.49	54.00	-27.51	AVG
2	2500.000	17.19	7.95	25.14	54.00	-28.86	AVG

Project No.:	ZJ20150201-E-1	Polarization:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m_PEAK	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	9:10:16
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass

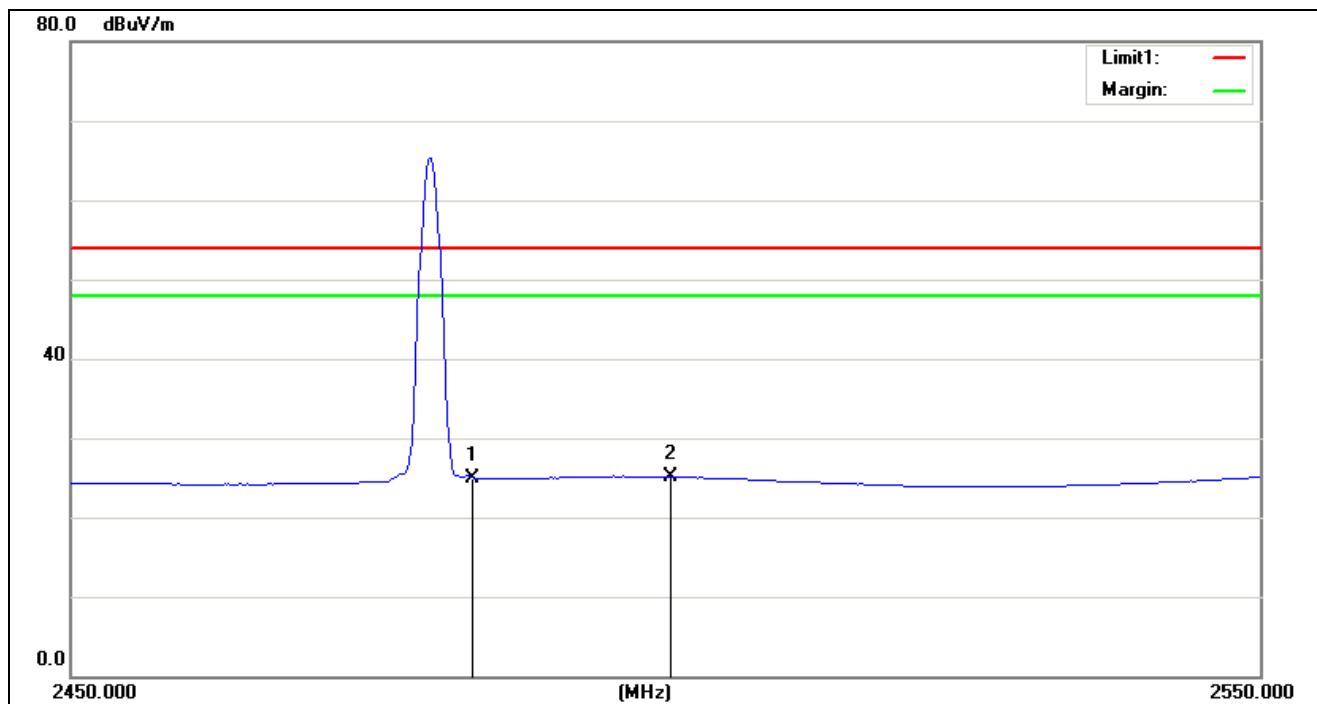
Note:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	29.40	7.87	37.27	74.00	-36.73	peak
2	2500.000	28.91	7.95	36.86	74.00	-37.14	peak

Project No.:	ZJ20150201-E-1	Polarization:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m_AVG	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2015-6-9
Temp./Hum.(%RH):	21.5/54%RH	Time:	9:14:19
EUT:	Heater	Distance:	3m
Model:	CFI-100-1	Test Result:	Pass

Note:



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	17.11	7.87	24.98	54.00	-29.02	AVG
2	2500.000	17.17	7.95	25.12	54.00	-28.88	AVG

12. BAND-EDGE MEASUREMENTS

12.1 LIMITS

FCC 15.247(d) & 15.209

12.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v03r01.

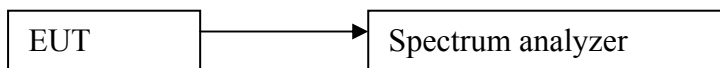
Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.

1. Reference level measurement

Below 1GHz Set the spectrum analyzer: RBW =100KHz VBW $\geq$ 3*RBW, Set the span to $\geq$ 1.5 times the DTS bandwidth. Sweep = auto; Detector Function = peak. Trace = Max-hold. Allow the trace to stabilize.

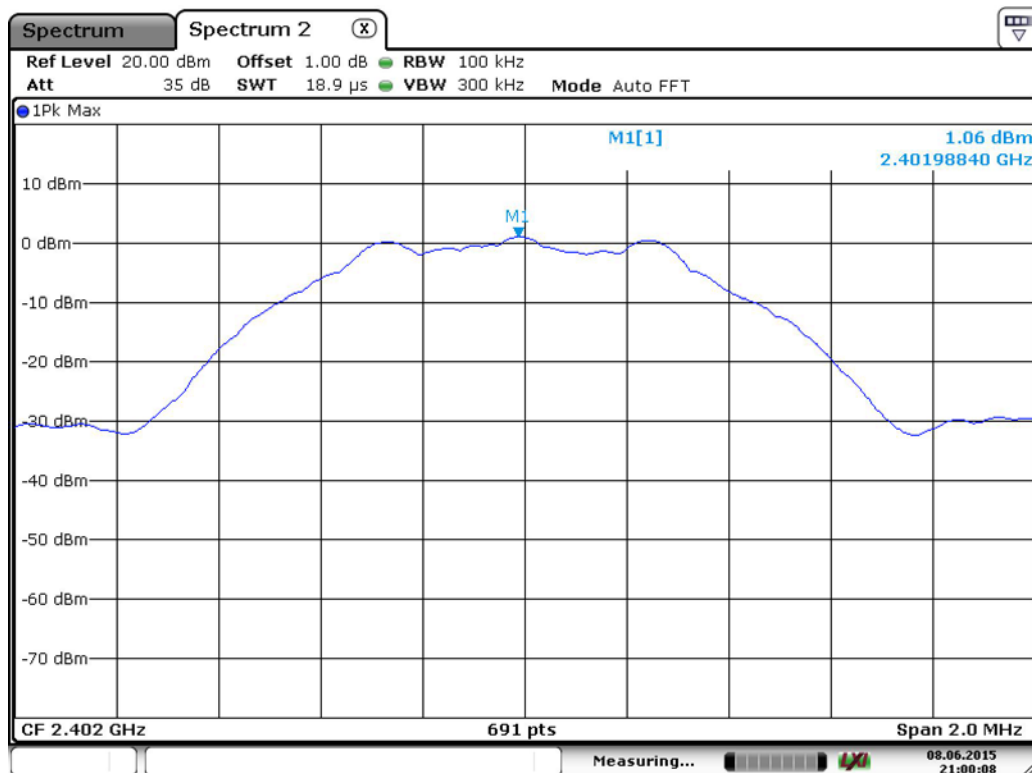
2. Set the spectrum analyzer: RBW =100KHz VBW $\geq$ 3*RBW, Set the span to $\geq$ 1.5 times the DTS bandwidth. Sweep = auto; Detector Function = peak. Trace = Max-hold. Allow the trace to stabilize.

12.3 TEST SETUP



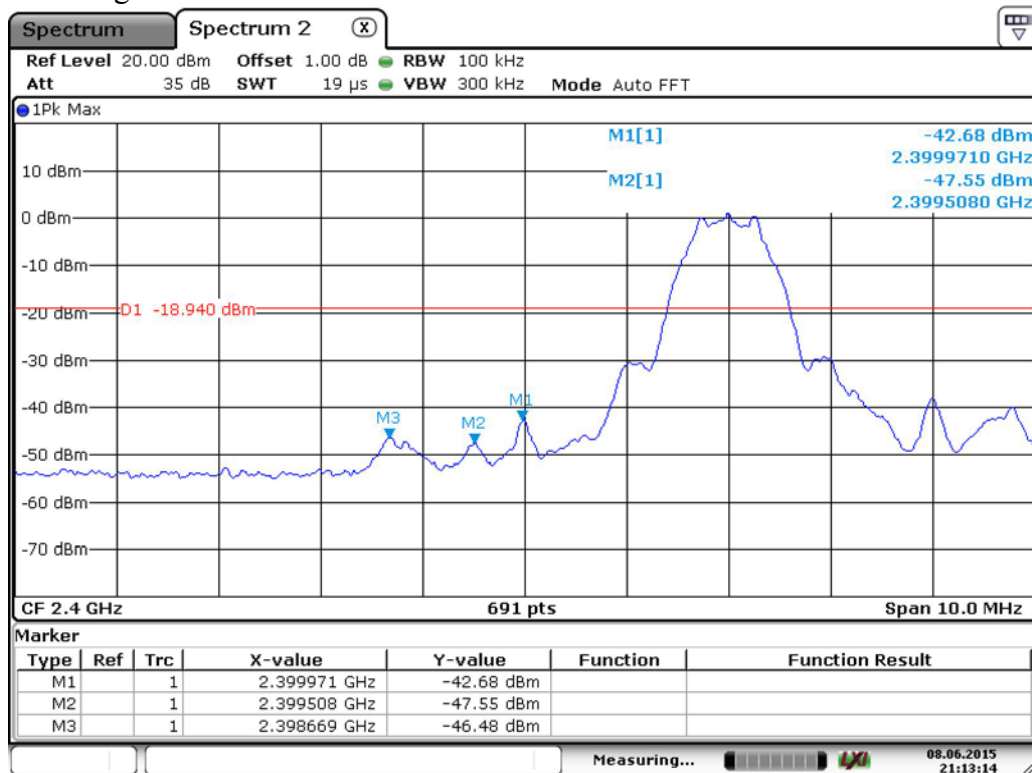
12.4 TEST RESULTS

Channel 0 2402MHz
reference level:



Date: 8.JUN.2015 21:00:08

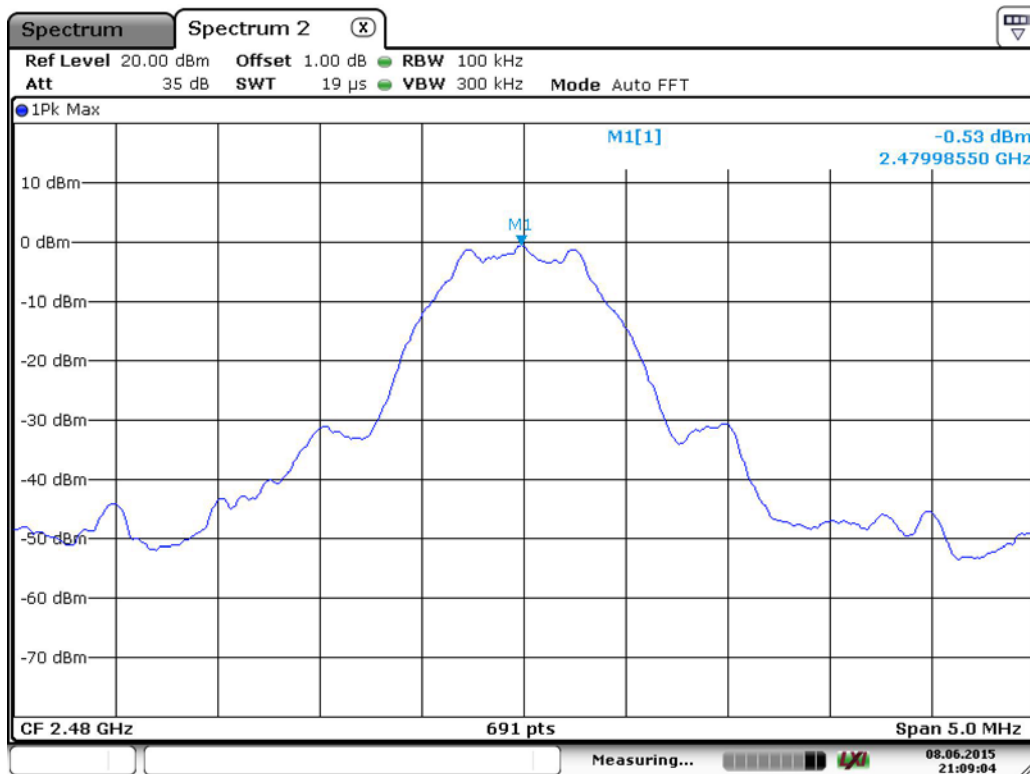
Band edge:



Date: 8.JUN.2015 21:13:15

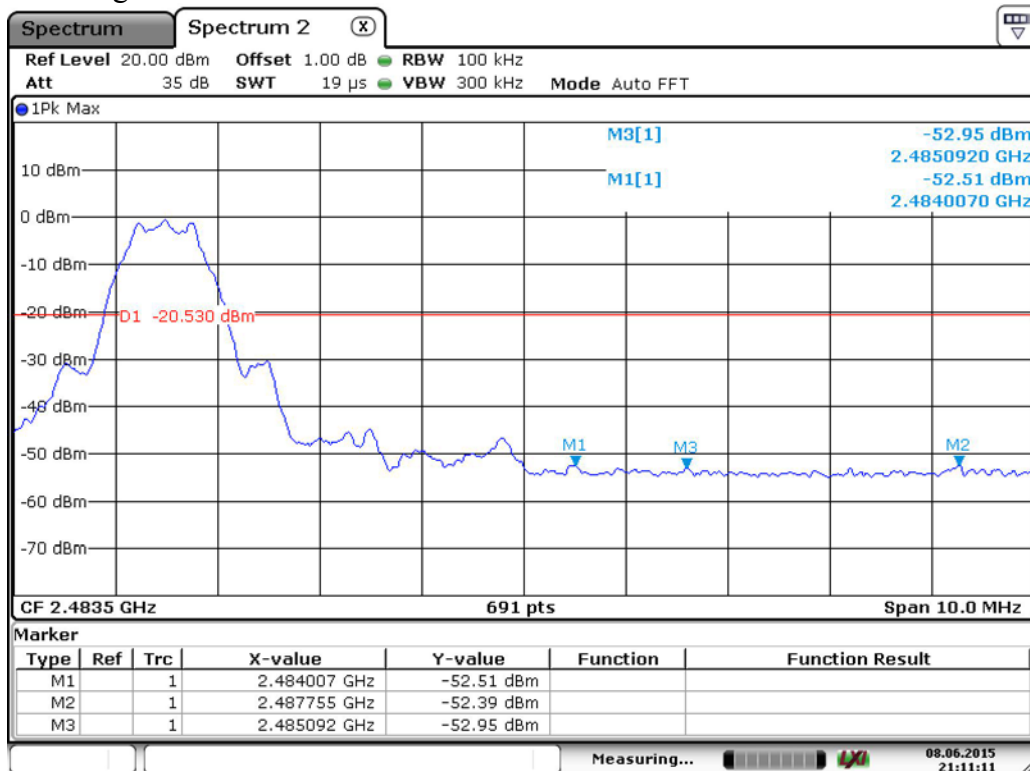
Channel 39 2480MHz

reference level:



Date: 8.JUN.2015 21:09:04

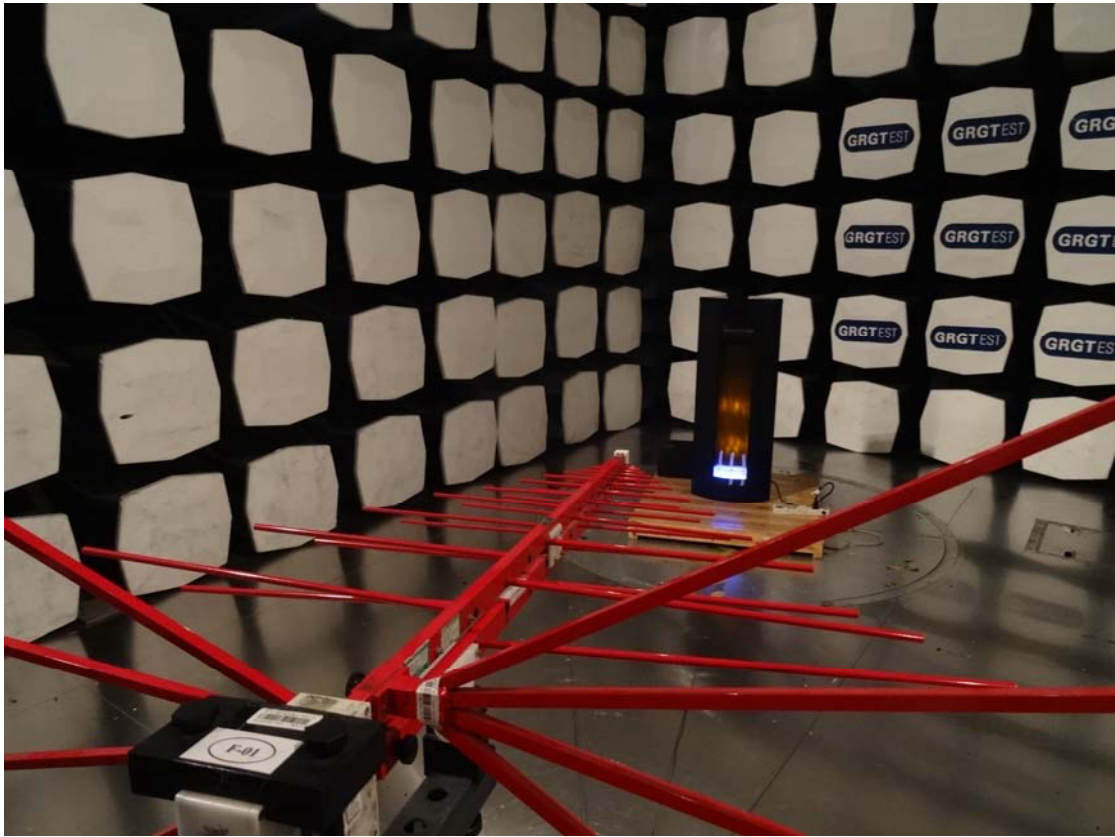
Band edge:



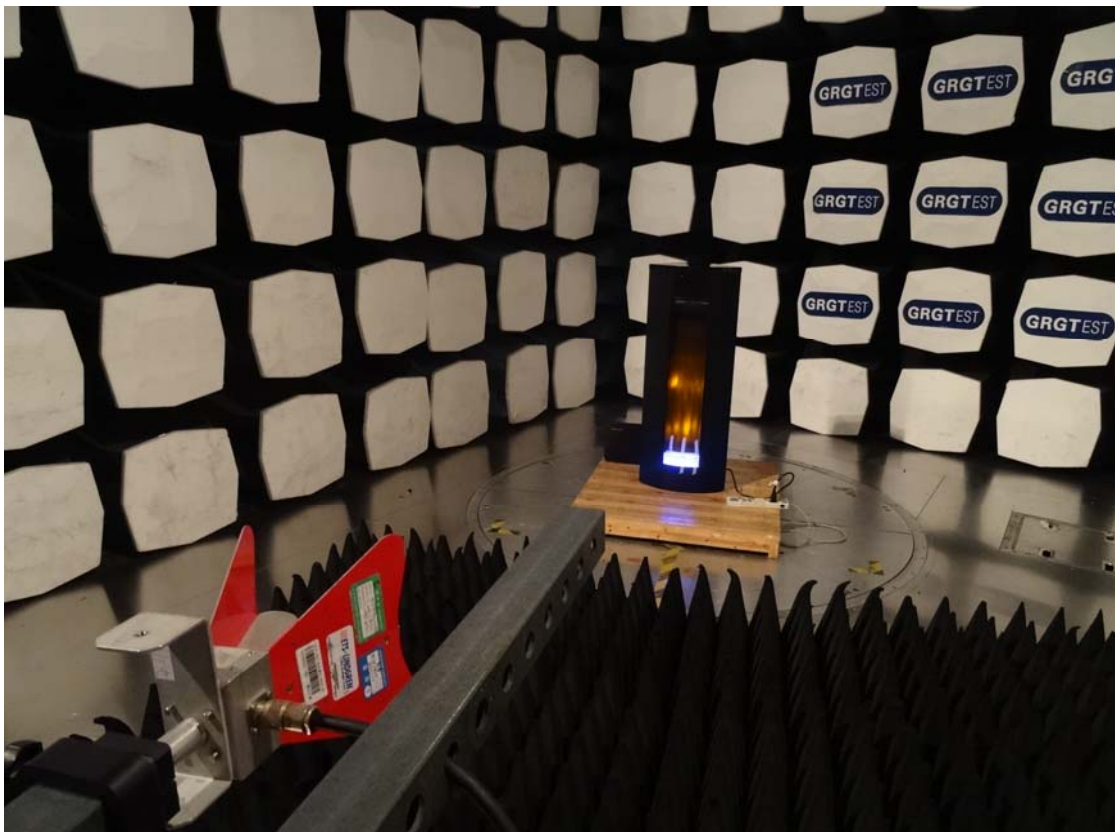
Date: 8.JUN.2015 21:11:11

APPENDIX A: PHOTOGRAPH OF THE TEST ARRANGEMENT

RSE (Below 1GHz)



RSE (Above 1GHz)



CE



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