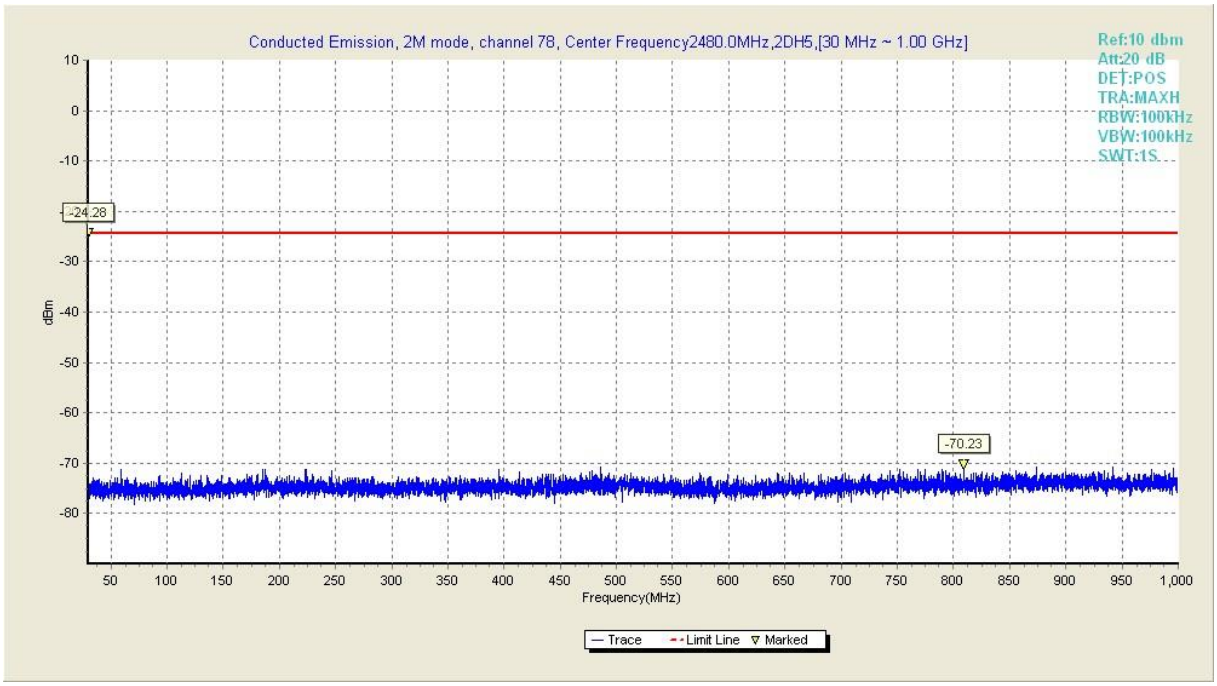


Fig.52 Conducted Emission in 2M mode ,channel 78, (30 MHz ~ 1 GHz)

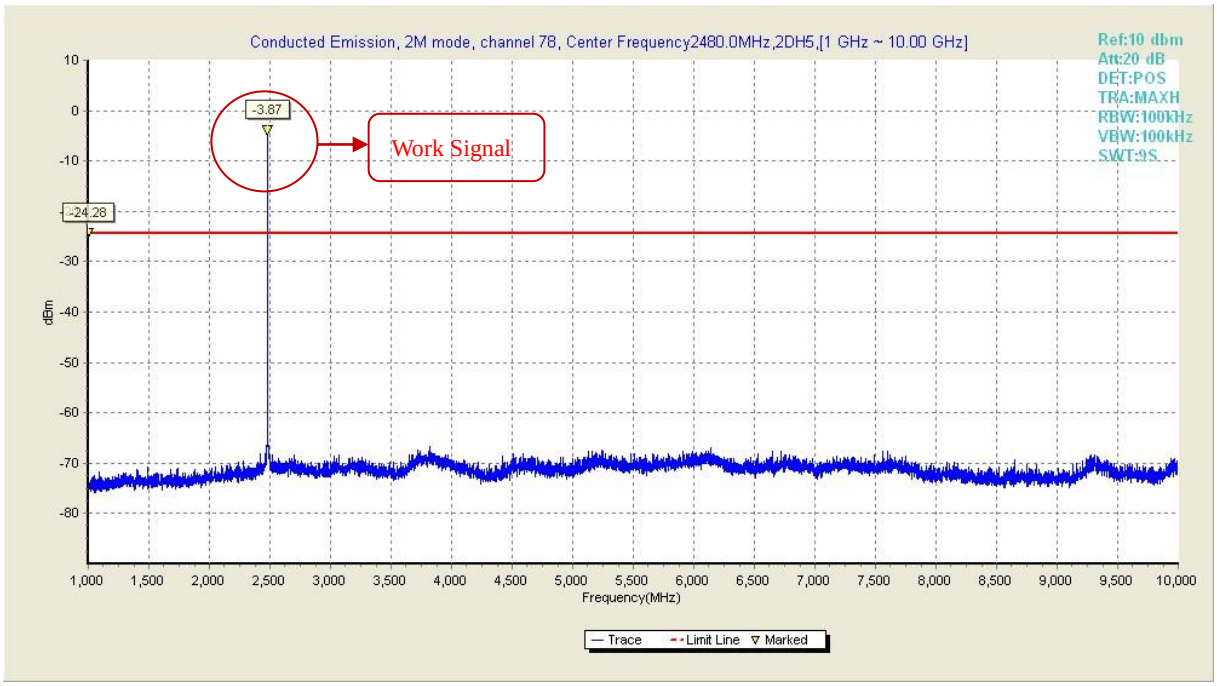


Fig.53 Conducted Emission in 2M mode ,channel 78, (1 GHz ~ 10 GHz)

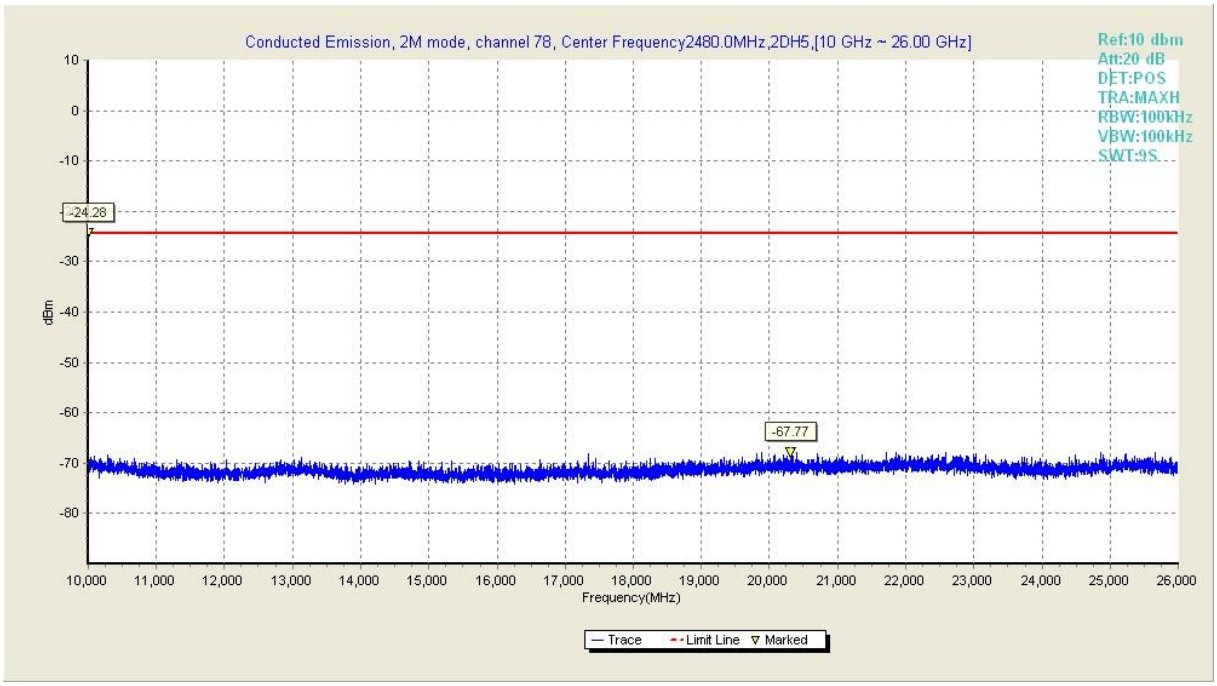


Fig.54 Conducted Emission in 2M mode ,channel 78, (10 GHz ~ 26 GHz)

8DPSK Modulation

Channel	Frequency Range	Test Results	Verdict
0	30MHz ~ 1GHz	Fig.55	Pass
	1GHz ~ 10GHz	Fig.56	Pass
	10GHz ~ 26GHz	Fig.57	Pass
39	30MHz ~ 1GHz	Fig.58	Pass
	1GHz ~ 10GHz	Fig.59	Pass
	10GHz ~ 26GHz	Fig.60	Pass
78	30MHz ~ 1GHz	Fig.61	Pass
	1GHz ~ 10GHz	Fig.62	Pass
	10GHz ~ 26GHz	Fig.63	Pass

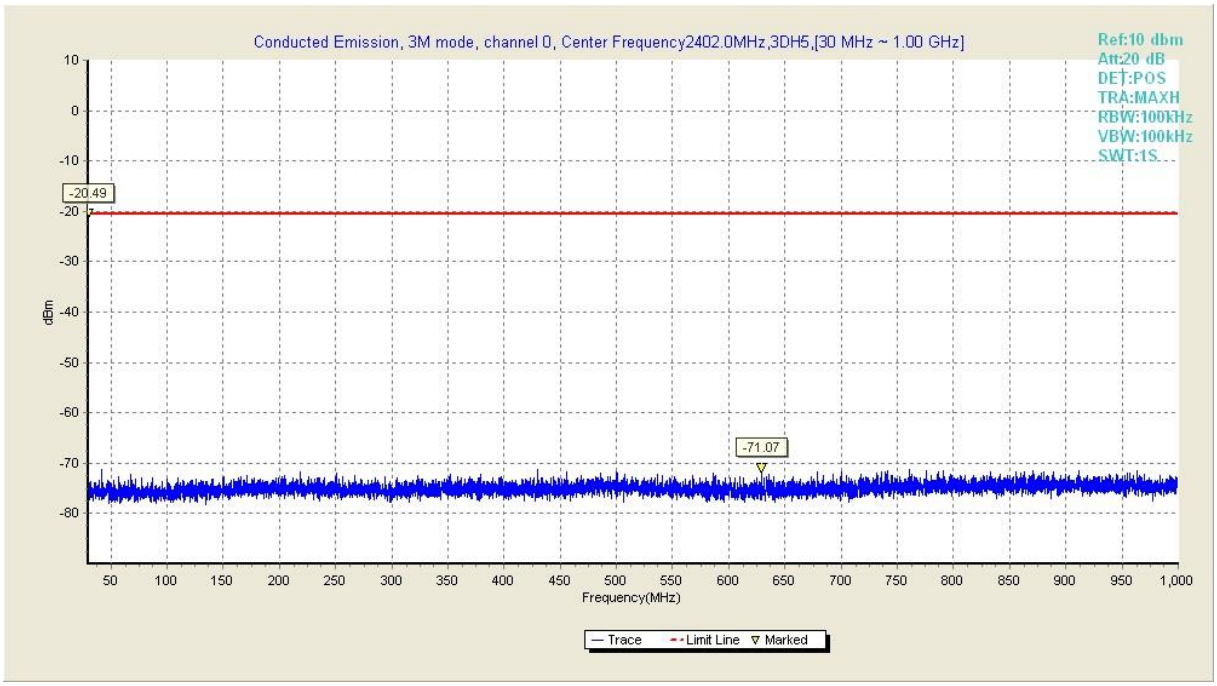


Fig.55 Conducted Emission in 3M mode ,channel 0, (30 MHz ~ 1 GHz)

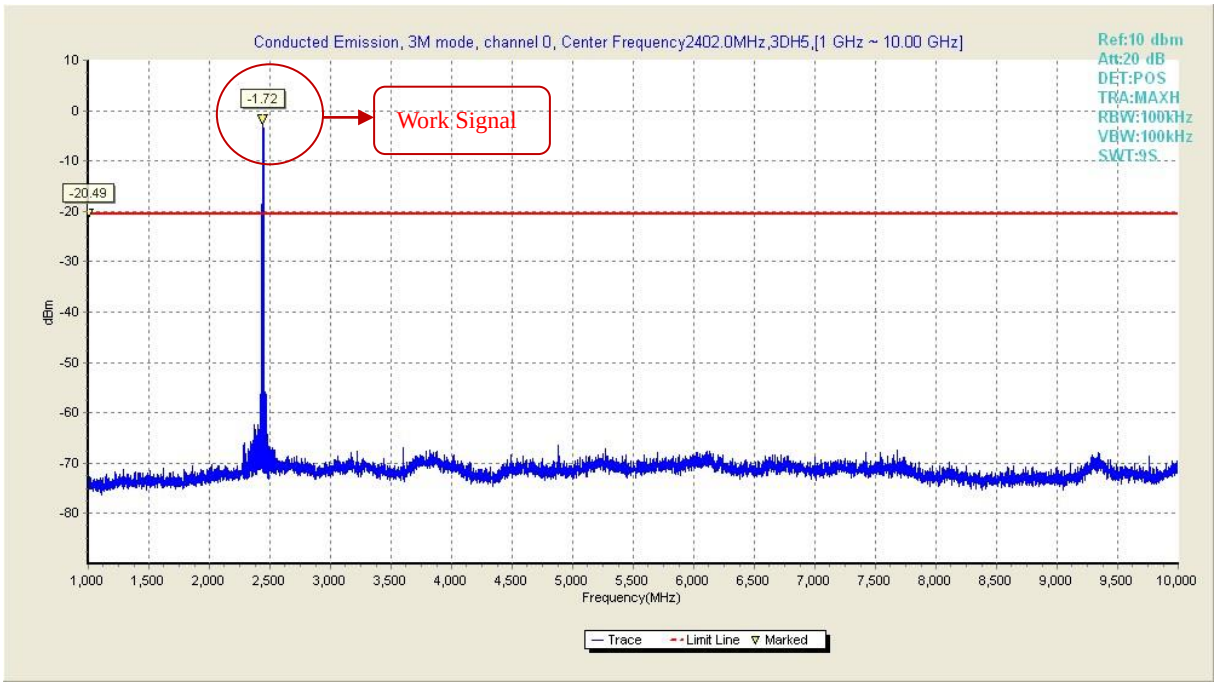


Fig.56 Conducted Emission in 3M mode ,channel 0, (1 GHz ~ 10 GHz)

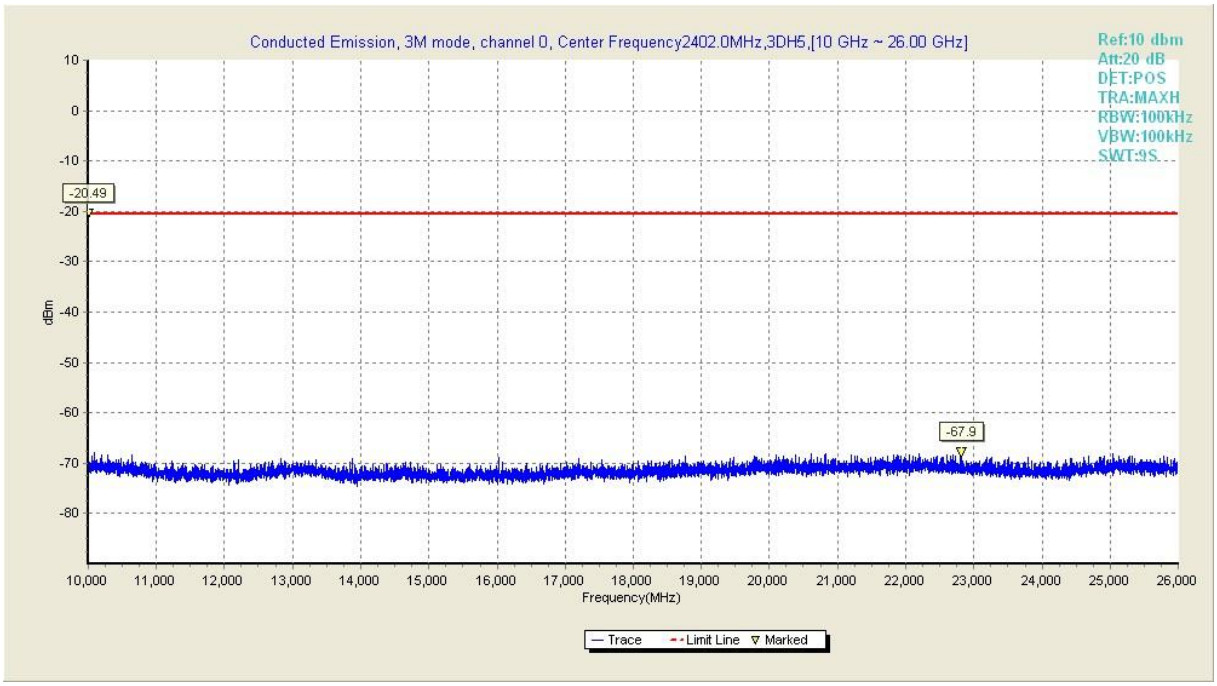


Fig.57 Conducted Emission in 3M mode ,channel 0, (10 GHz ~ 26 GHz)

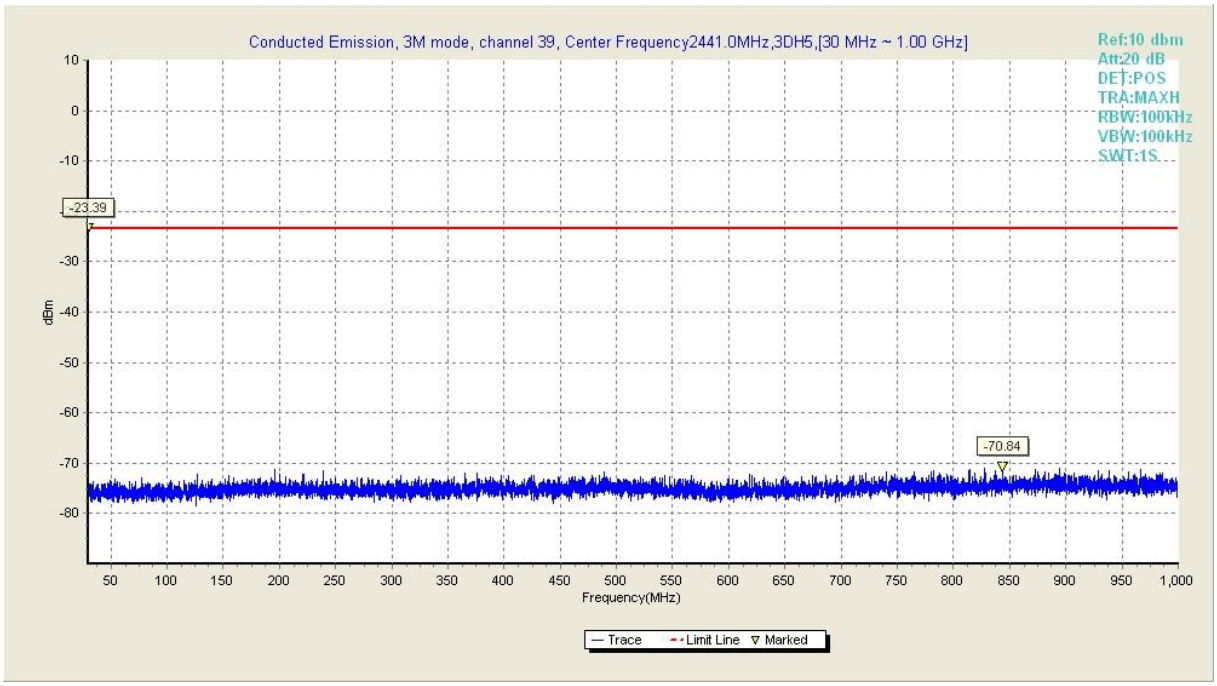


Fig.58 Conducted Emission in 3M mode ,channel 39, (30 MHz ~ 1 GHz)

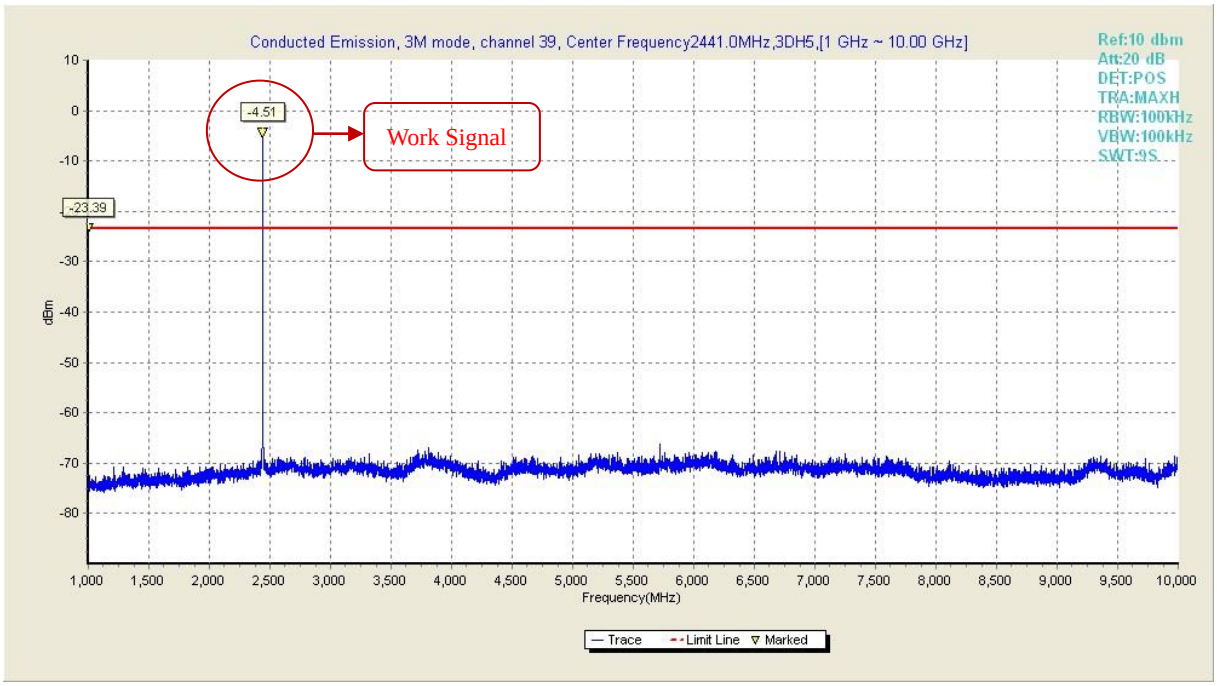


Fig.59 Conducted Emission in 3M mode ,channel 39, (1 GHz ~ 10 GHz)

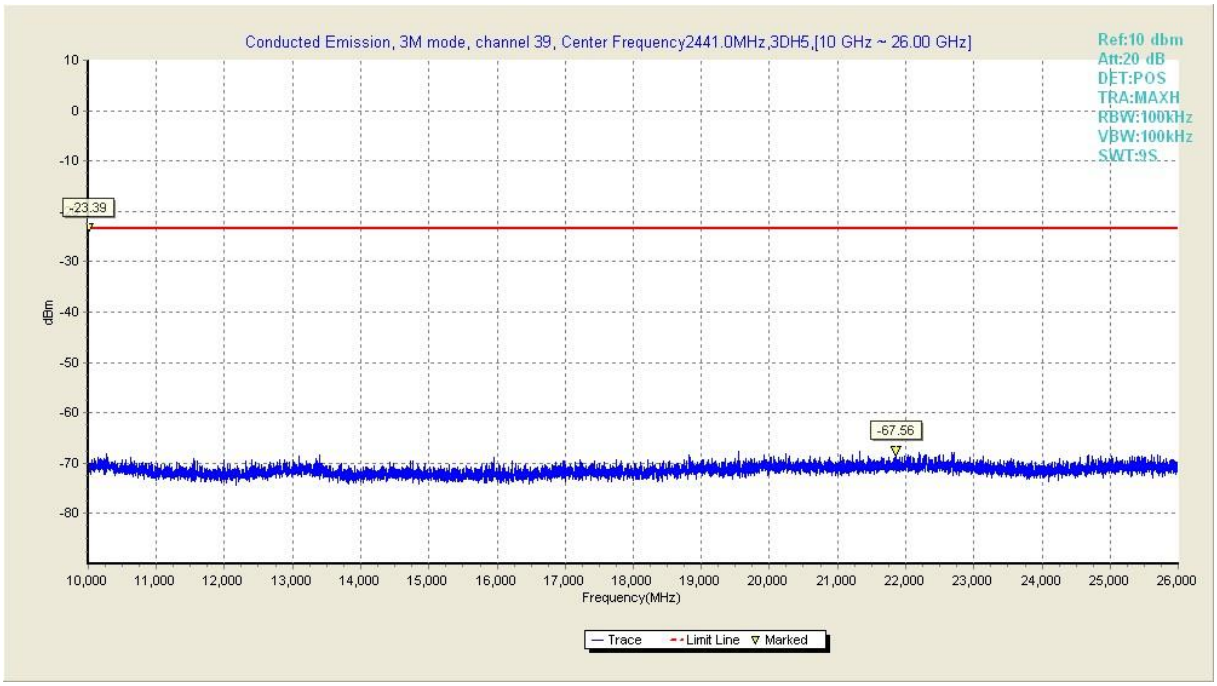


Fig.60 Conducted Emission in 3M mode ,channel 39, (10 GHz ~ 26 GHz)

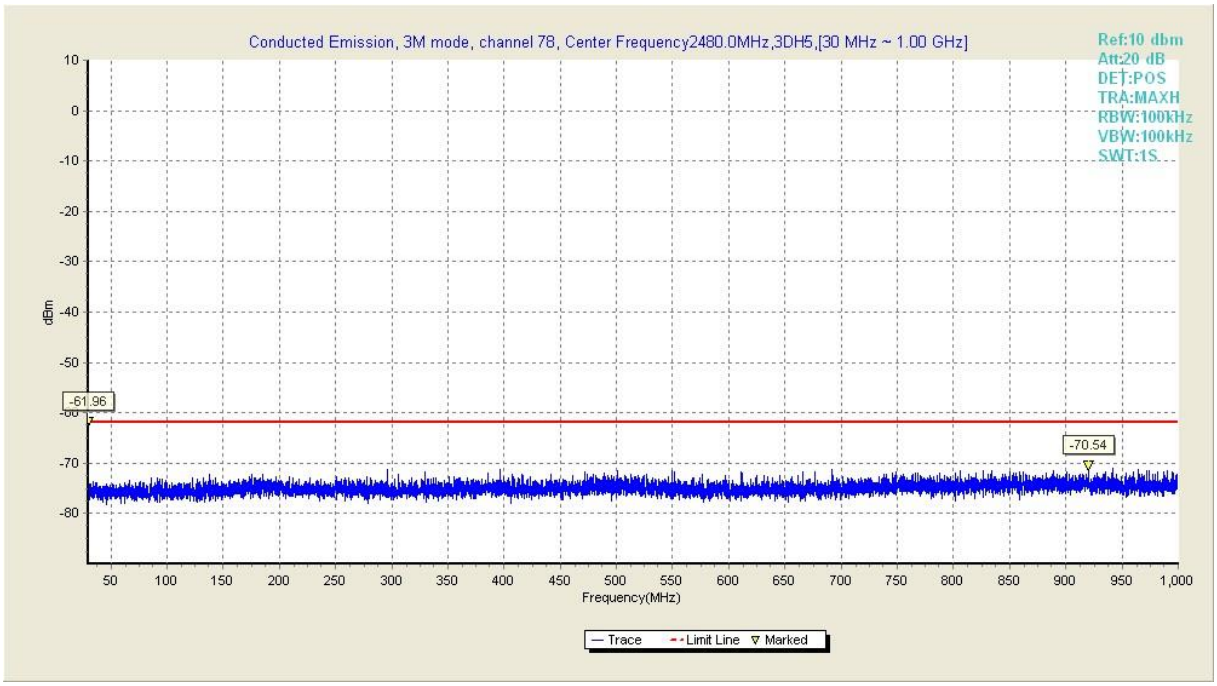


Fig.61 Conducted Emission in 3M mode ,channel 78, (30 MHz ~ 1 GHz)

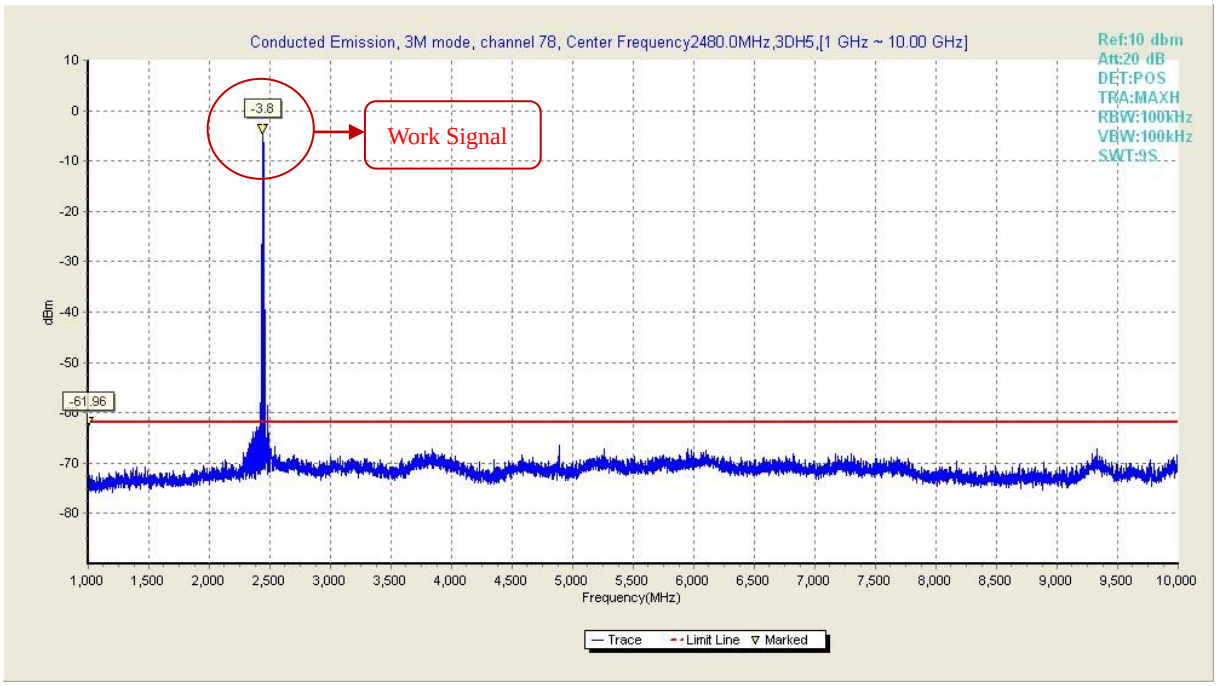


Fig.62 Conducted Emission in 3M mode ,channel 78, (1 GHz ~ 12 GHz)

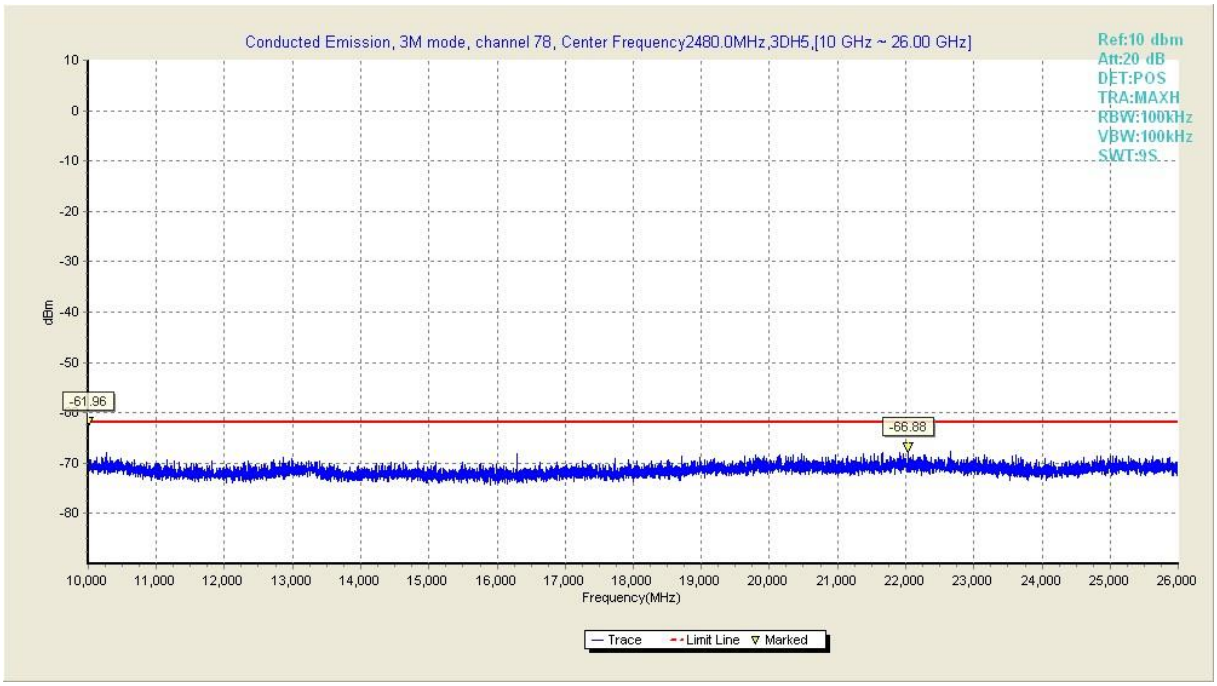


Fig.63 Conducted Emission in 3M mode ,channel 78, (10 GHz ~ 26 GHz)

B.8 AC Conducted Emission

B.8.1 Description

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits

B.8.2 Test Procedure

a) The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.

b) Connect EUT to the power mains through a line impedance stabilization network (LISN).

c) All the support units are connecting to the other LISN.

d) The LISN provides 50 ohm coupling impedance for the measuring instrument.

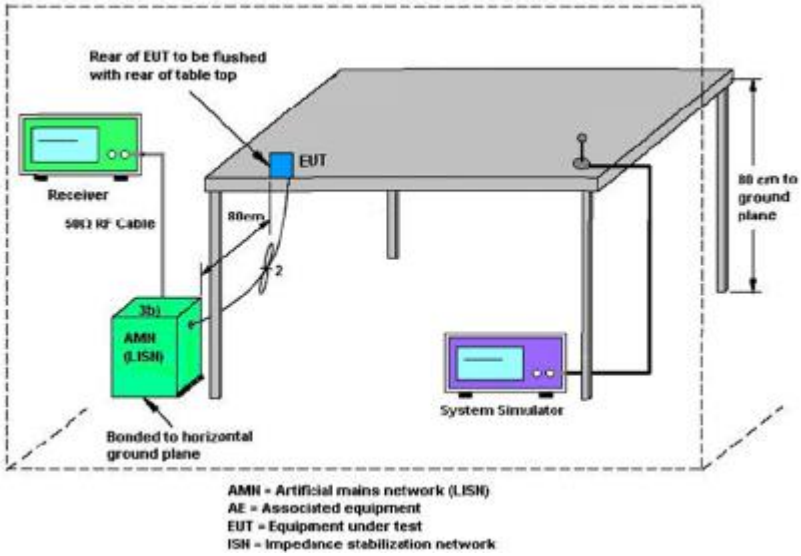
e) The FCC states that a 50 ohm, 50 microhenry LISN should be used.

f) Both sides of AC line were checked for maximum conducted interference.

g) The frequency range from 150 kHz to 30 MHz was searched.

h) Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

B.8.4 Test Setup



B.8.5 Test Results

Limit

Frequency of Emission(MHz)	**Conducted Limit(dBµV)**	
	Quasi –Peak	**Average**
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with logarithm of the frequency		

Line L

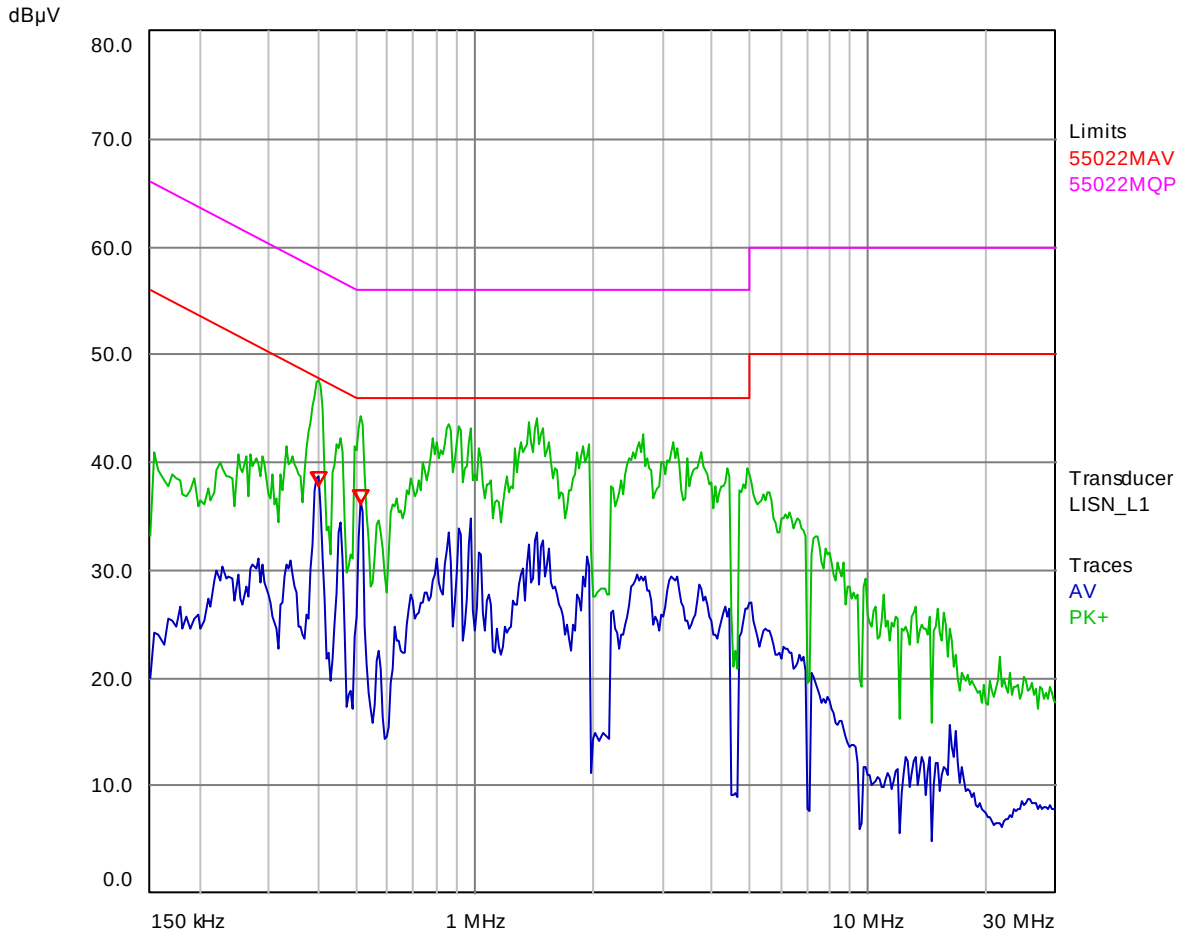
Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	**Stop**	**Step**	**Res BW**	**M-Time**	**Atten**	**Preamp**
150 kHz	30 MHz	4 kHz	9kHz (6dB)	15 ms	Auto	Off

Final Measurement

Detectors:	AV, QP	Meas Time:	2 s
Peaks:	6	Acc. Margin:	10 dB

Pre-measurement Graph



Final Measurement Results

Trace	Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 AV	0.402	37.86	47.81	-9.95		L1 / on
1 AV	0.514	36.06	46.00	-9.94		L1 / on

* = limit exceeded

Line N

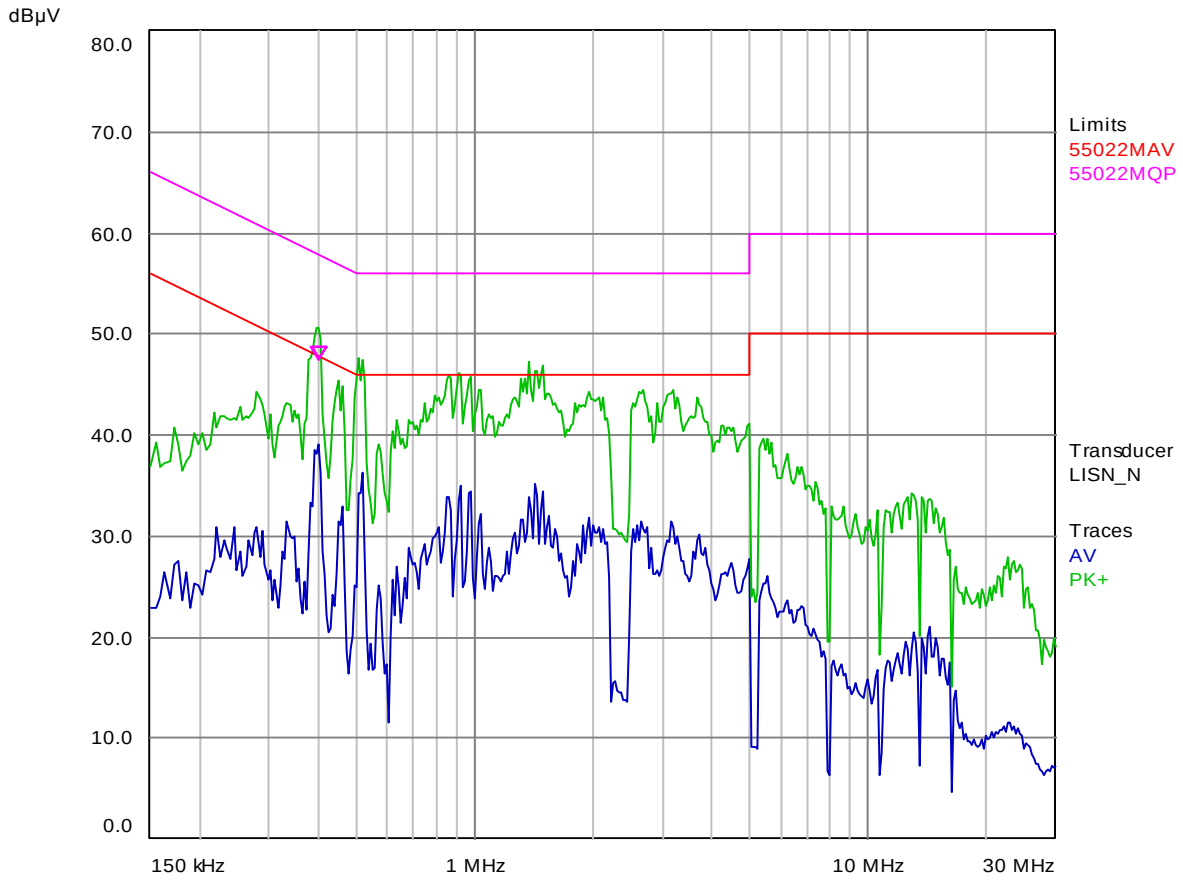
Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	30 MHz	4.5 kHz	9 kHz (6dB)	15 ms	Auto	Off

Final Measurement

Detectors:	AV, QP	Meas Time:	2 s
Peaks:	6	Acc. Margin:	10 dB

Pre-measurement Graph



Final Measurement Results

Trace	Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 AV	0.402					
2 QP	0.402	47.48	57.81	-10.33		N / on
2 QP	0.51					
1 AV	0.519					
2 QP	0.861					
2 QP	0.915					
2 QP	1.3695					

* = limit exceeded

240V/60Hz

LINE L

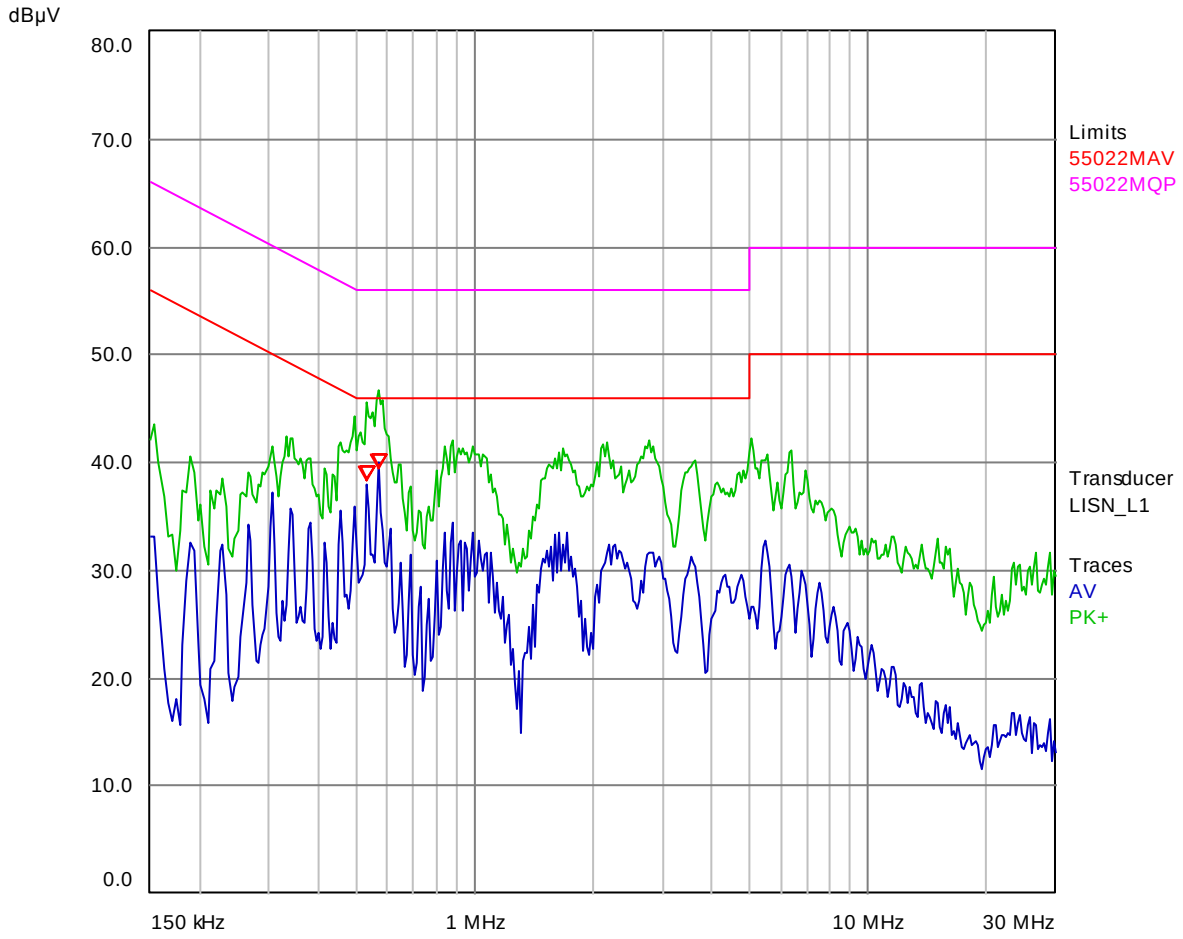
Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	**Stop**	**Step**	**Res BW**	**M-Time**	**Atten**	**Preamp**
150 kHz	30 MHz	4 kHz	9 kHz (6dB)	15 ms	Auto	Off

Final Measurement

Detectors:	AV, QP	Meas Time:	2 s
Peaks:	6	Acc. Margin:	10 dB

Pre-measurement Graph



Final Measurement Results

Trace	Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 AV	0.534	38.34	46.00	-7.66		L1 / on
1 AV	0.574	39.41	46.00	-6.59		L1 / on

* = limit exceeded

LINE N

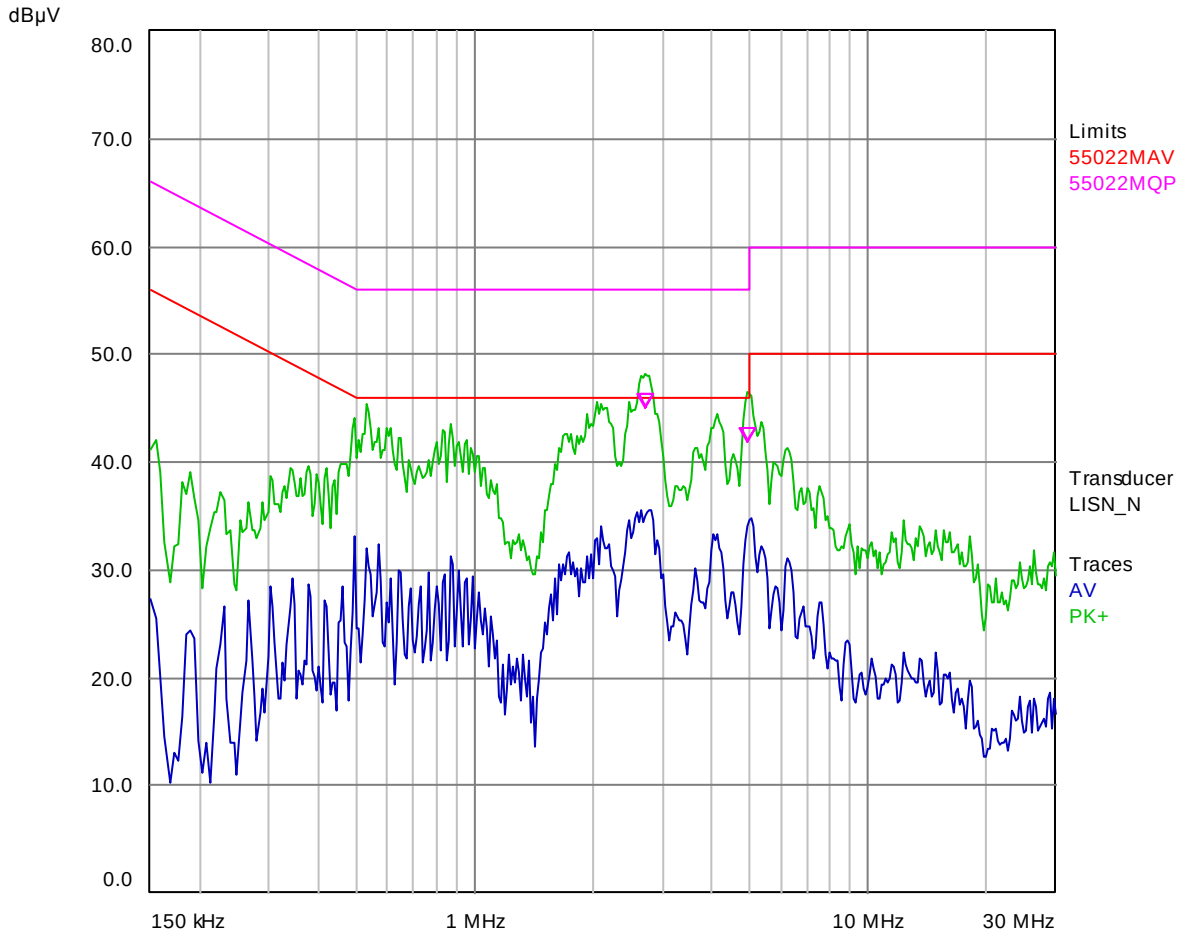
Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	30 MHz	4.5 kHz	9 kHz (6dB)	15 ms	Auto	Off

Final Measurement

Detectors:	AV, QP	Meas Time:	2 s
Peaks:	6	Acc. Margin:	10 dB

Pre-measurement Graph



Final Measurement Results

Trace	Frequency	Level	Limit	Delta Limit	Delta Ref	Comment
	(MHz)	(dBµV)	(dBµV)	(dB)	(dB)	
2 QP	2.7015	44.97	56.00	-11.03		N / on
2 QP	4.9425	41.92	56.00	-14.08		N / on

* = limit exceeded

B.9 Radiated Emission

B.9.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below

Frequency(MHz)	Field Strength(microvolts/meters)	Measurement Distance(Meters)
0.009-0.490	2400/F(kHz)	3000
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
above 960	500	3

B.9.2 Test Procedure

a The EUT was placed on a turntable with 1.5 meter above ground.

b. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

c. The table was rotated 360 degrees to determine the position of the highest radiation.

d. The height of the antenna is varied between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.

e. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower(from 1 m to 4 m)and turntable(from 0 degree to 360 degrees)to find the maximum reading.

f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode. SA setting: Span= wide enough to fully capture the emission being measured; RBW=1MHz (f ＞ 1GHz), RBW=100kHz (f＜1GHz),VBW≥ RBW, Sweep time=auto, Trace= Max hold. Above 18GHz shall be extrapolated to specified distance using an extrapolation factor 20dB/decade from 3m to 1m.

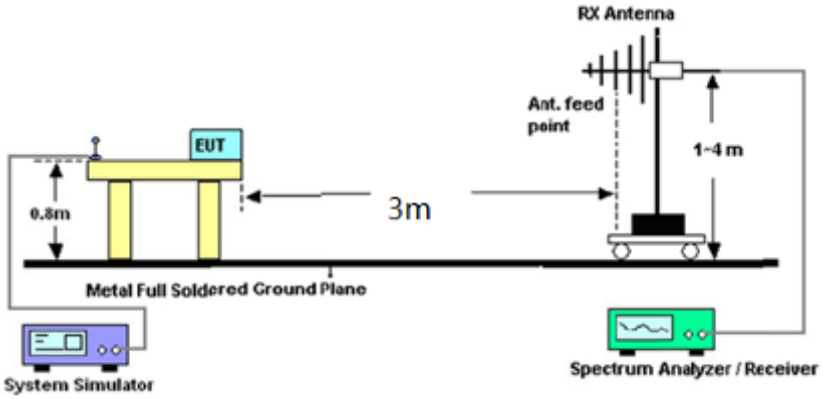
g. If the emission level of the EUT in peak mode was 20dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.

h. Emission level (dBμV/m) = 20 log Emission level (μV/m).

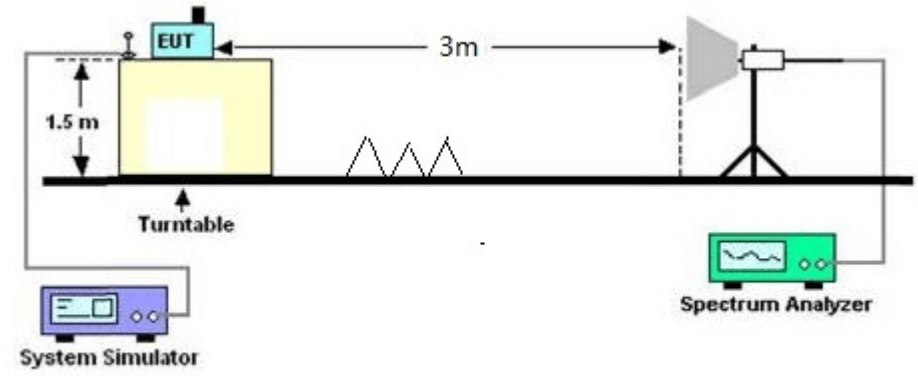
B.9.3 Test Setup

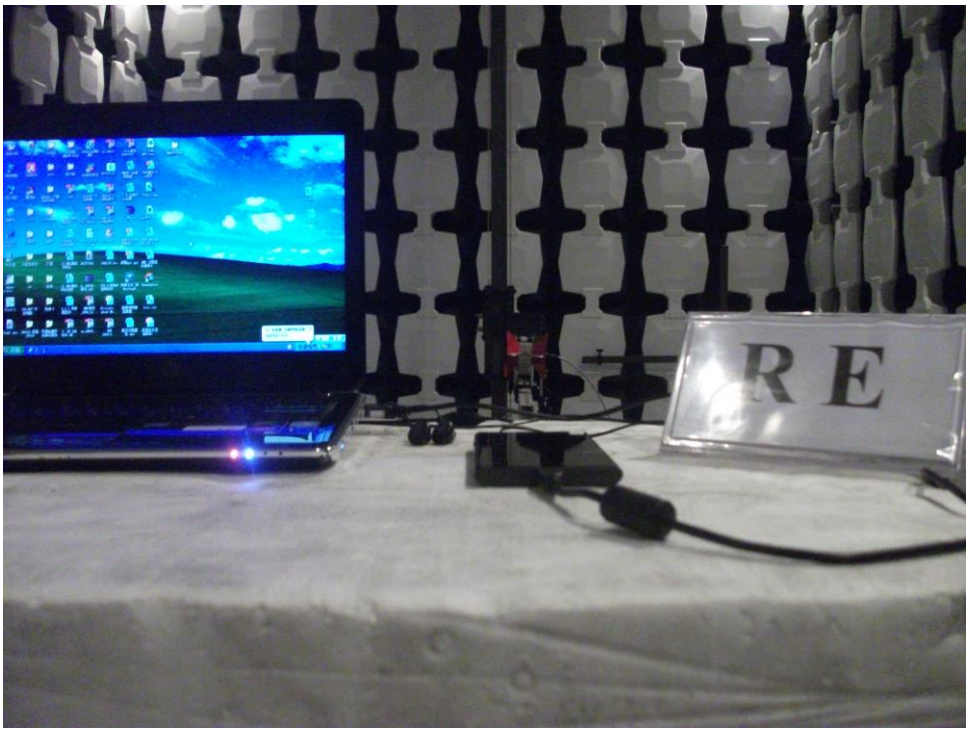
Frequency Band(MHz)	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	100kHz	100kHz
Above 1000	Peak	1MHz	1MHz
	Average	1MHz	10Hz

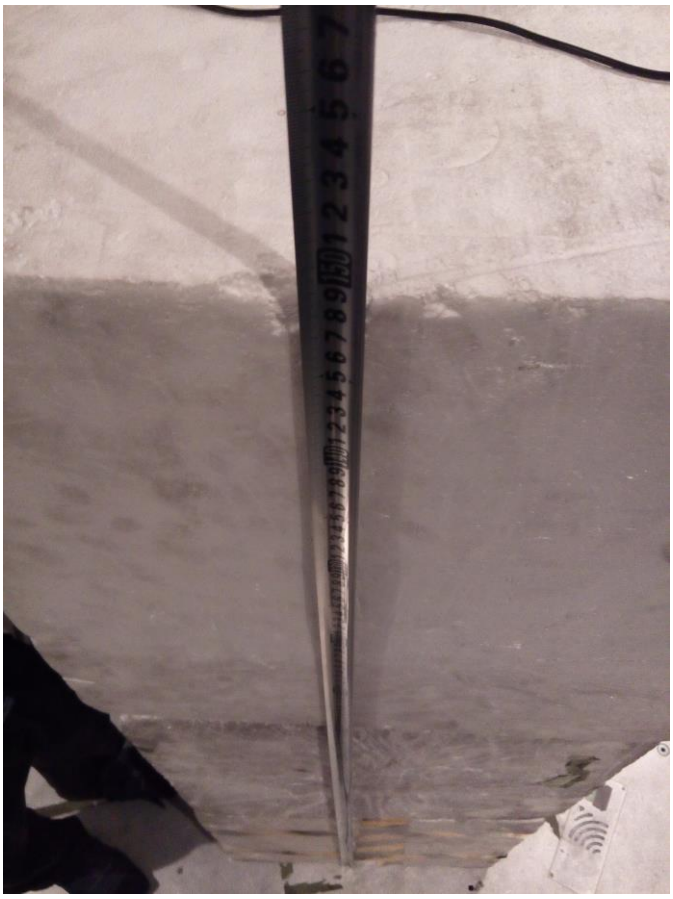
Radiated Emissions Frequency: Below 1GHz

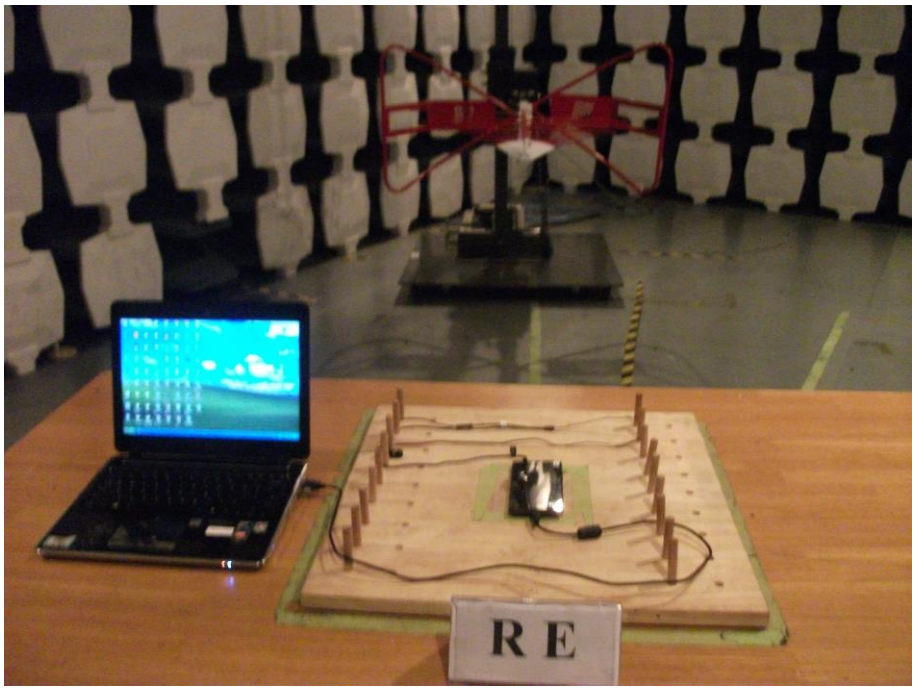


Radiated Emissions Frequency: above 1GHz









B.9.3 Test Results

The low frequency, which started from 9kHz to 30MHz and the high frequency, which started from 18GHz to 26GHz, were pre-scanned and which was 20dB lower than limit line per 15.31(0) were not reported.

Worst case data rate: 1M
Test Mode: Traffic
Verdict: Pass

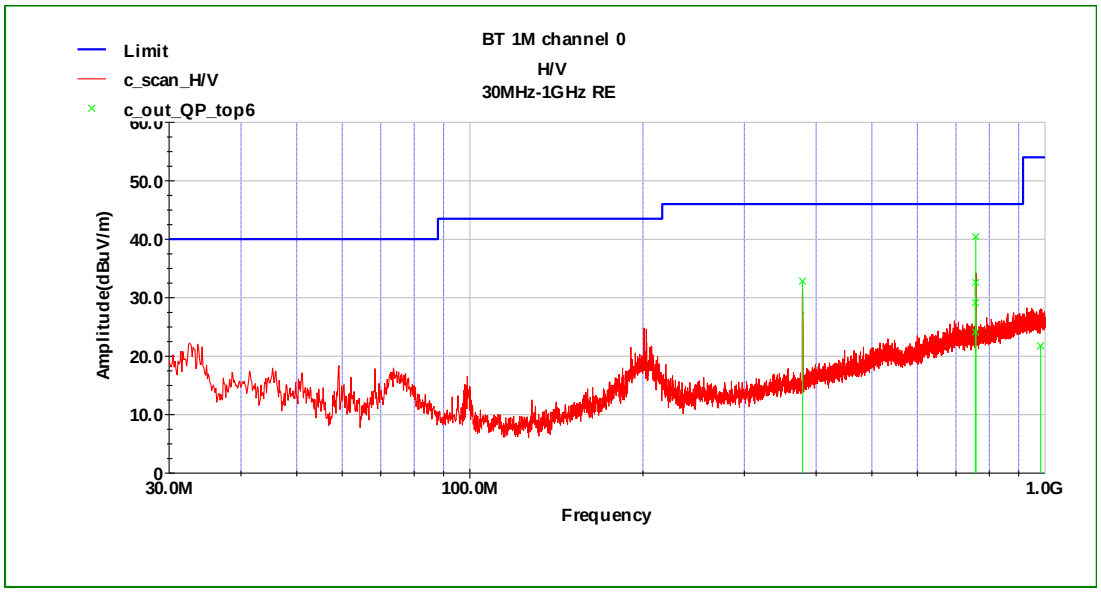


Fig.65 Radiated Emission of channel 0 in 30MHz-1GHz

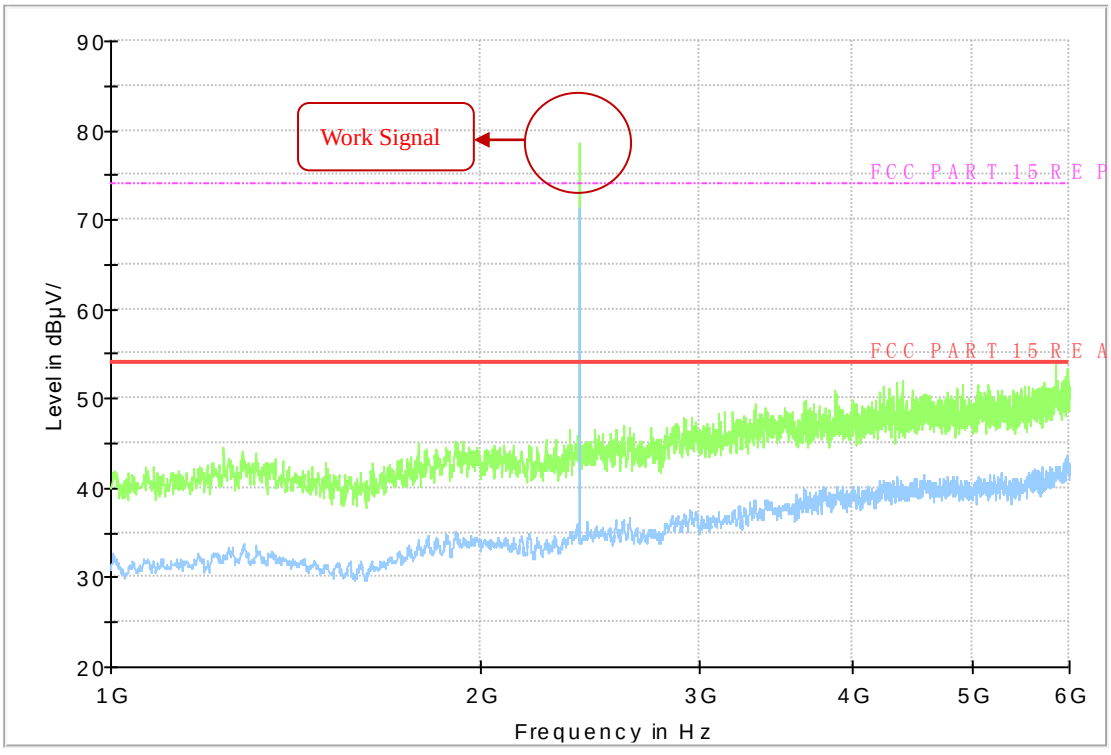


Fig.63 Radiated Emission of channel 0 in 1GHz-6GHz

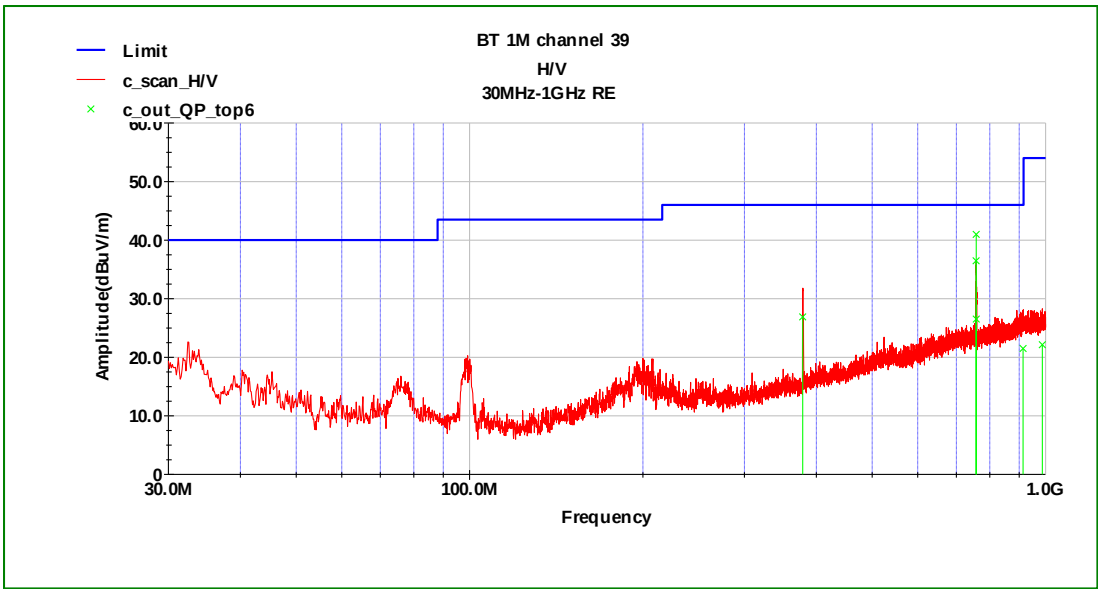


Fig.66 Radiated Emission of channel 39 in 30MHz-1GHz

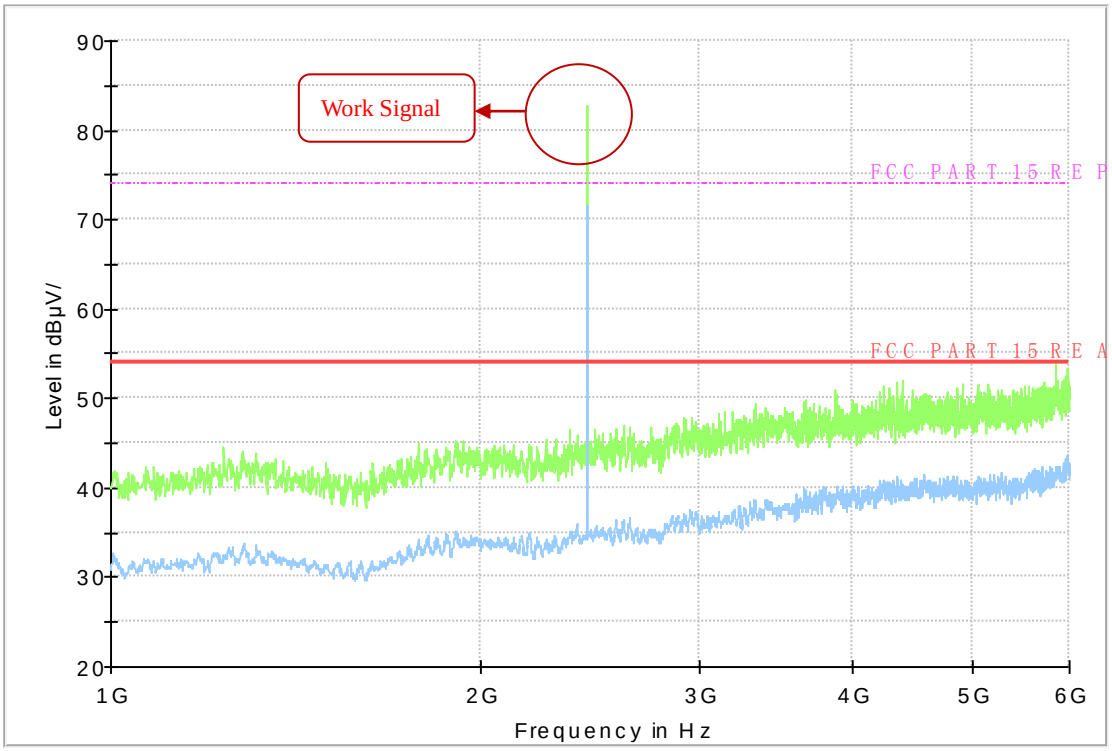


Fig.67 Radiated Emission of channel 39 in 1GHz-6GHz

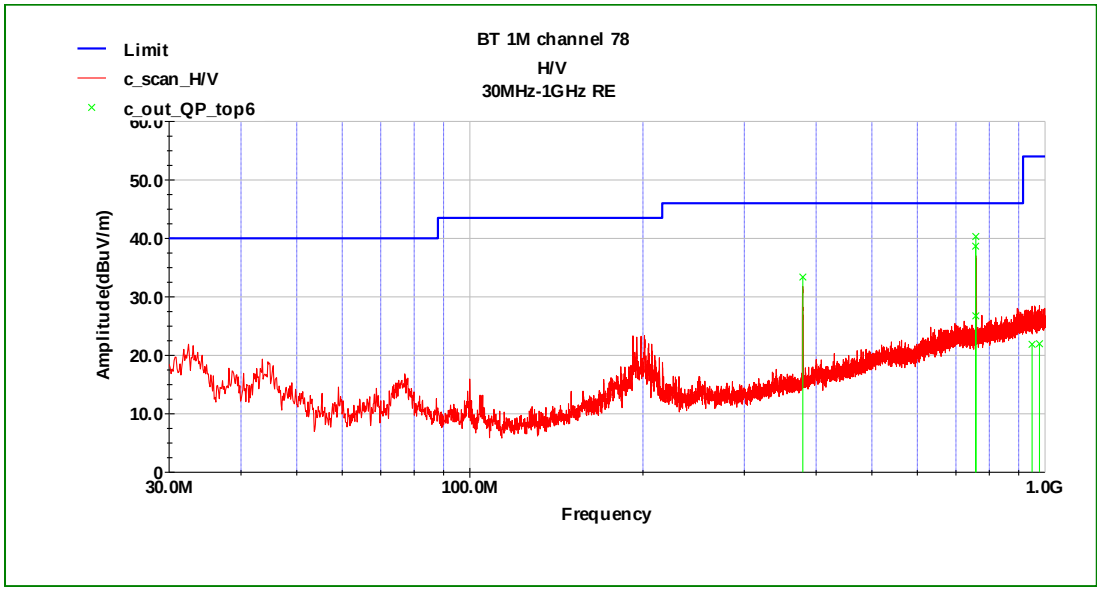


Fig.68 Radiated Emission of channel 78 in 30MHz-1GHz

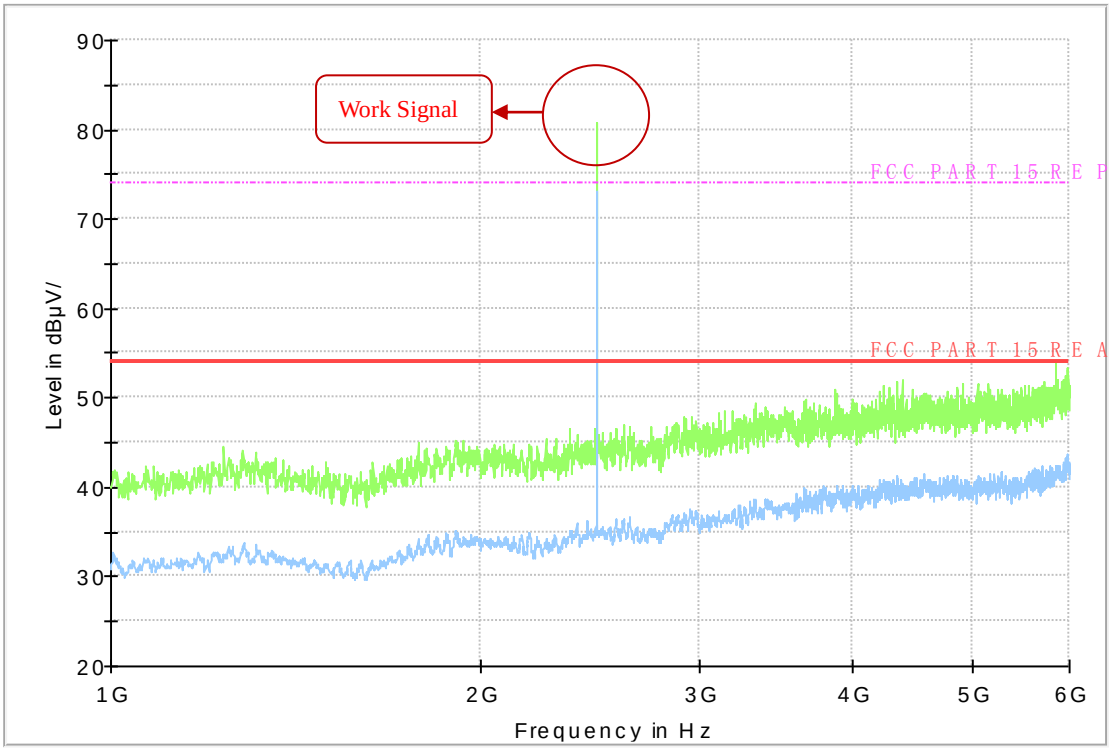


Fig.69 Radiated Emission of channel 78 in 1GHz-6GHz

B.10 Antenna Requirements

B.10.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with

the FCC rule.

B.10.2 Antenna Connected construction

The Antenna type used in this product is PIFA Antenna without connector and it is considered to meet antenna requirement.

B.10.3 Antenna Gain

The antenna peak gain of EUT is less than 6dBi, Therefore, it is not necessary to reduced maximum peak output power limit.

ANNEX C: Report Revision History

Report NO.	Report version	Description	Issue Date
150701-BT	NONE	Original	2015.07.10

END OF REPORT