FCC IC Test Report

Report No: FCS202007066

Issued for

Applicant:	CRYPTODATA TECH SRL
Address:	Bucuresti,Sectorul 1,Soldat Gheorghe Buciumat,nr.14 Mansarda,Romania
Product Name:	Laptop
Brand Name:	CryptoData
Model Name:	WHIM Business
Series Model:	Whim Pro, Whim Book, N141
FCC ID:	2AWZ7-WHIM
IC:	26331-WHIM

Issued By: Flux Compliance Service Laboratory
Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong yeWest Road Hi-Tech Industrial, Song shan lake Dongguan
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10.2 Result 43

Revision History

Rev.	Issue Date	Effect Page	Contents
01	07 July 2020	All	Initial Issue

TEST RESULT CERTIFICATION

Applicant's Name ..... :	CRYPTODATA TECH SRL
Address ..... :	Bucuresti,Sectorul 1,Soldat Gheorghe Buciumat,nr.14 Mansarda,Romania
Manufacture's Name ..... :	Shenzhen KEP Technology Co., Ltd
Address ..... :	4th Floor, Building B20, Heng Feng Industrial Area, Xixiang Town, Bao'an District, Shenzhen, Guangdong, China 518126

Product Description

Product Name ..... :	Laptop
Brand Name ..... :	CryptoData
Model Name ..... :	WHIM Business
Series Model ..... :	Whim Pro, Whim Book, N141
Test Standards..... :	FCC Rules and Regulations Part 15 Subpart C RSS-247 Issue 2: February 2017, RSS-Gen Issue 5: March 2019
Test Procedure ..... :	ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test.....:

Date (s) of performance of tests .:	30 June 2020 ~ 07 July 2020
Date of Issue .....:	07 July 2020
Test Result .....:	Pass

Prepared By : Chris chen

(Chris Chen/Engineer)

Approved By : Brown lu

(Brown Lu)

1. Summary of Test Results

Standard Section	Test Item	Judgment	Remark
FCC Part 15.247(a)(2) RSS-Gen clause 6.7 &RSS-247 5.2 a)	6dB Bandwidth 99% Bandwidth	PASS	
FCC Part 15.247(b)(3) RSS-Gen clause 6.12 &RSS-247 5.4 d)	Conducted Output Power	PASS	
FCC Part 15.247(e) RSS-247 5.2 b) & ANSIC63.10: Clause 12.5	Power Spectral Density	PASS	--
FCC Part 15.247(d) RSS-247 5.5	Band-edge and Spurious Emissions (Conducted)	PASS	
FCC Part 15.247(d) FCC Part 15.209 FCC Part 15.205 RSS-Gen 8.9 8.10	Radiated Spurious Emissions	PASS	
FCC Part 15.247(d) FCC Part 15.209 FCC Part 15.205 RSS-Gen 8.9 8.10	Radiated Band Edge Compliance	PASS	
FCC Part 15.207 RSS-Gen clause 8.8	Conducted Emission	PASS	--
FCC Part 15.203 RSS-Gen clause 6.8	Antenna Requirement	PASS	--

NOTE:
(1)" N/A" denotes test is not applicable in this Test Report

1.1 Test Laboratory

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong yeWest Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
A2LA Accreditation No. :	

1.2 Measurement Uncertainty

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

No.	Items	Uncertainty
1	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±2.988 dB
3	Conducted Emission (9KHz-150KHz)	±4.13 dB
4	Conducted Emission (150KHz-30MHz)	±4.74 dB
5	All emissions,radiated(<1G) 30MHz-1000MHz	±5.2 dB
6	All emissions,radiated(>1G) 1000MHz -3000MHz	±4.66 dB
7	All emissions,radiated(<1G) 3000MHz -6000MHz	±5.31 dB

1.3 Test Environment Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature rang:	20-26℃
Humidity range:	40-65%
Pressure range:	86-106Kpa

2. General Information

2.1 General Description of The EUT

Product Name	Laptop
Trade Name	CryptoData
Model Name	WHIM Business
Series Model	Whim Pro, Whim Book, N141
Model Difference	Just different in model name
Operation Frequency	2402 – 2480 MHz
Modulation	GFSK
Antenna Type	FPCB antenna, maximu PK gain: 1.68 dBi
Adapter	WA-65B19R INPUT: 100-240V~ 50/60Hz 1.5A OUTPUT: DC 19V 3.43A
Battery	DC 7.6V 6000mAh Li Battery
Hardware version number	KEP-N141GKR4 MB V11 PCBA SKU1
Software versionnumber	win10_pro_64b_1909_18363.836
Connecting I/O Port(s)	Please refer to the User's Manual
Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.	

2.2 Channel List

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	14	2430	29	2458
01	2404	15	2432	30	2460
02	2406	16	2434	31	2462
03	2408	17	2436	32	2464
04	2410	18	2438	33	2466
05	2412	19	2440	34	2468
06	2414	20	2442	35	2470
07	2416	21	2444	36	2472
08	2418	22	2446	37	2474
09	2420	23	2448	38	2476
10	2422	24	2450	39	2478
11	2424	25	2452	/	/
12	2426	26	2454	/	/
13	2428	27	2456	/	/

2.3 Assistant Equipment Used For Test

Assistant equipment	Manufacturer	Model number
/	/	/
/	/	/

2.4 Description of The 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.

Worst Mode	Description	Data Rate/Modulation
Mode 1	TX CH00	GFSK
Mode 2	TX CH19	GFSK
Mode 3	TX CH39	GFSK

2.5 Block Digram Showing The Configuration of System Tested

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 FHSS

2.6 Equipments List

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2020.05.31	2021.05.30
Signal Analyzer	R&S	FSV40-N	FCS-E012	2020.06.05	2021.06.04
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2020.03.11	2021.03.10
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2020.03.26	2021.03.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2020.05.31	2021.05.30
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2020.05.31	2021.05.30
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2020.05.31	2021.05.30
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2020.03.03	2021.03.02
Temperature & Humidity	HTC-1	victor	FCS-E005	2020.05.31	2021.05.30

Conduction Test equipment

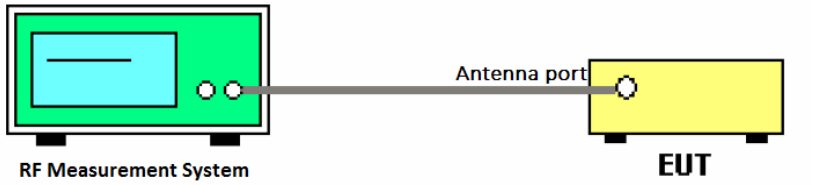
Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2020.05.31	2021.05.30
LISN	R&S	ENV216	FCS-E007	2020.05.15	2021.05.14
LISN	ETS	3810/2NM	FCS-E009	2020.03.15	2021.03.14
Temperature & Humidity	HTC-1	victor	FCS-E008	2020.05.31	2021.05.30

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2020.03.02	2021.03.01

3. 6dB Bandwidth and 99% Occupied Bandwidth

3.1 Block Diagram of Test Setup



3.2 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz

3.3 Test Procedure

(1)Connect EUT's antenna output to spectrum analyzer by RF cable

(2) Set the spectrum analyzer as follows:

RBW	100KHz/30KHz
VBW	300KHz/100KHz
Detector Mode	Peak
Sweep time	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

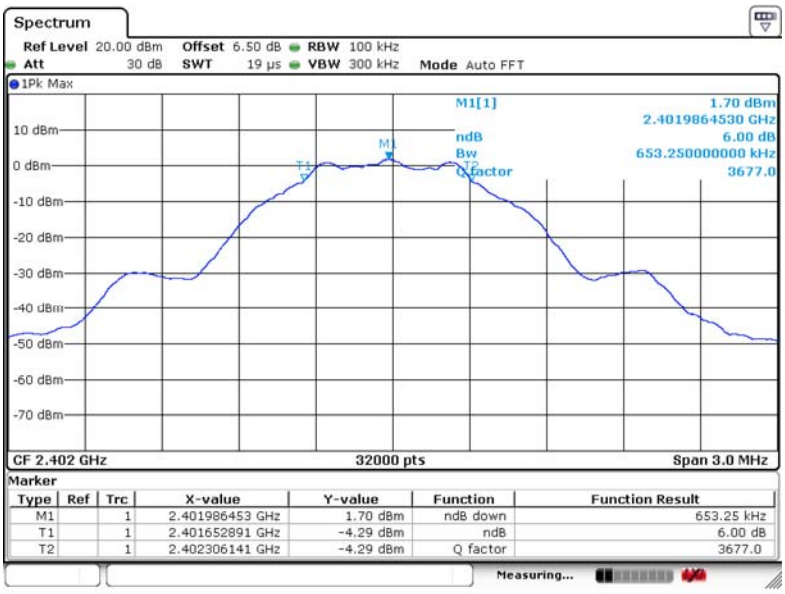
3.4 Test Result

Mode	Frequency(MHz)	6dB bandwidth Result(MHz)	Limit (MHz)	Conclusion
GFSK	2402	0.653	0.5	Pass
	2440	0.650	0.5	Pass
	2480	0.660	0.5	Pass

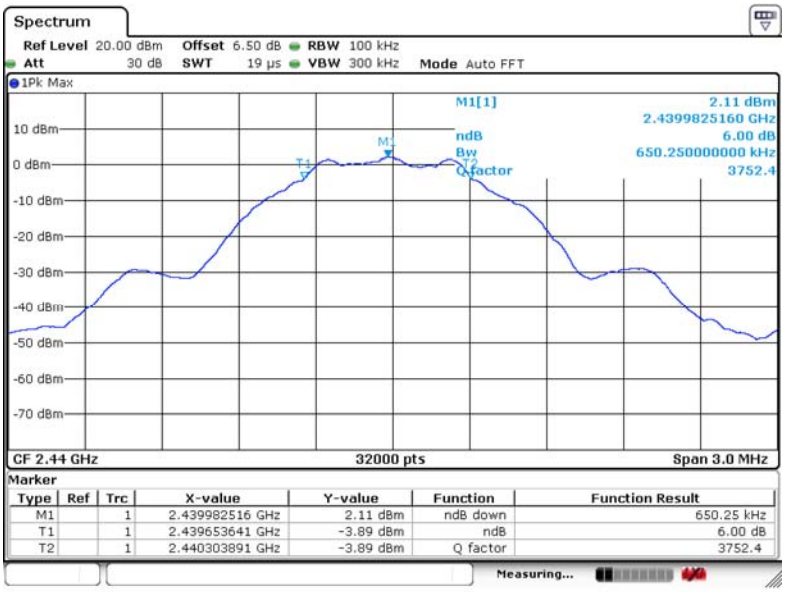
3.5 Original Test data

GFSK

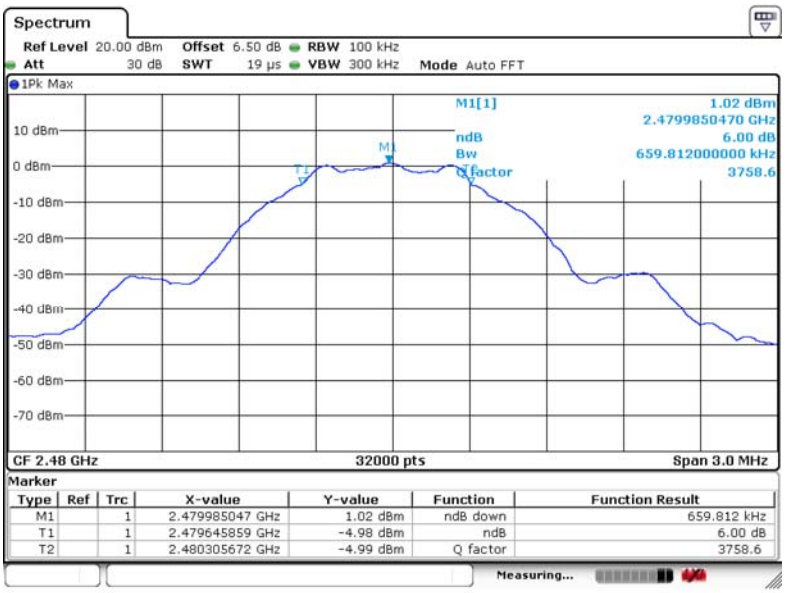
Low CH: 2402MHZ



Middle CH: 2440MHZ



High CH: 2480MHZ

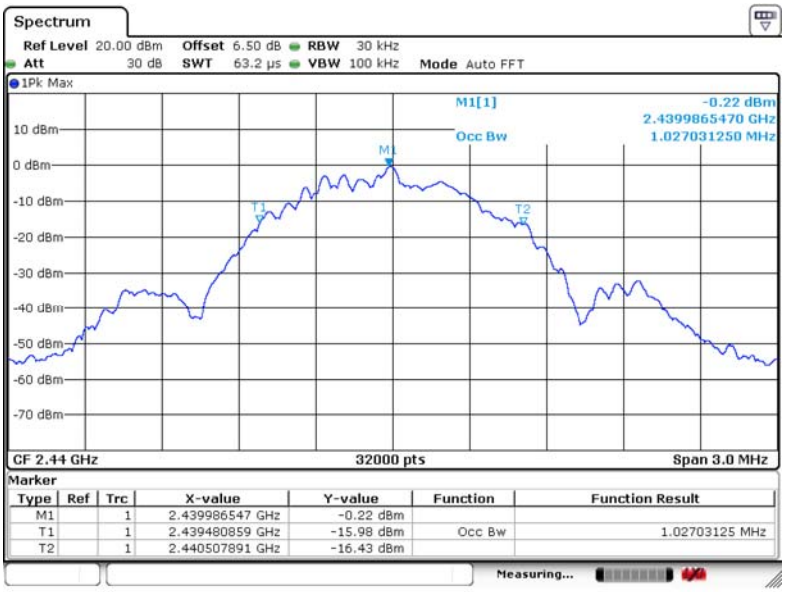


Mode	Frequency(MHz)	99%dB bandwidth Result(MHz)	Limit (MHz)	Conclusion
GFSK	2402	1.027	0.5	Pass
	2440	1.029	0.5	Pass
	2480	1.029	0.5	Pass

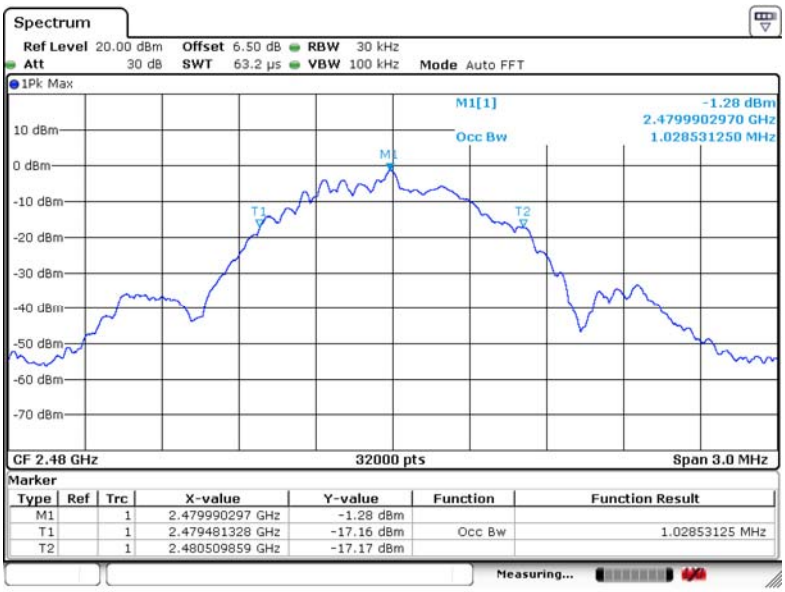
3.5 Original Test data

GFSK

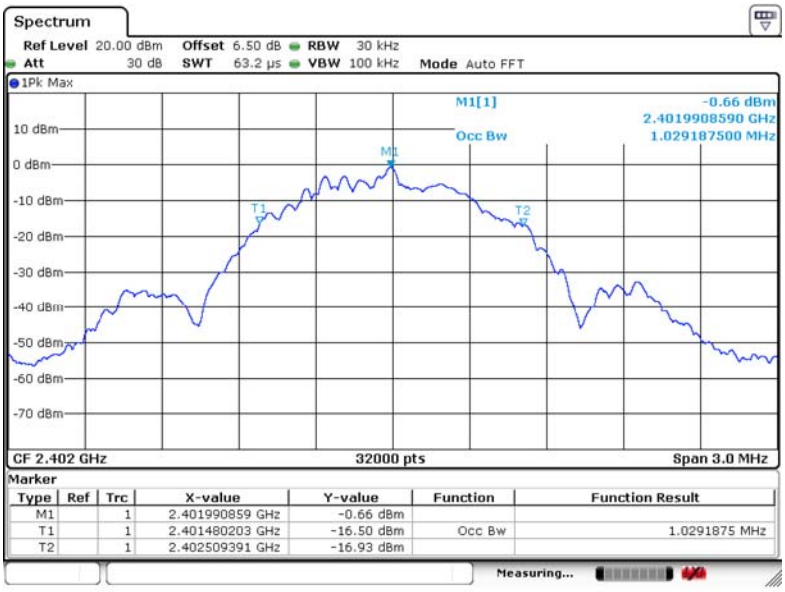
Low CH: 2402MHZ



Middle CH: 2440MHZ

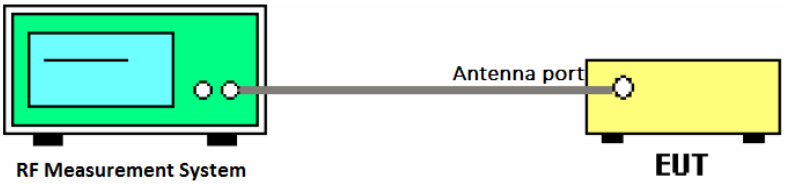


High CH: 2480MHZ



4.Conducted Peak Output Power

4.1 Block Diagram of Test Setup



4.2 Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi

4.3 Test Procedure

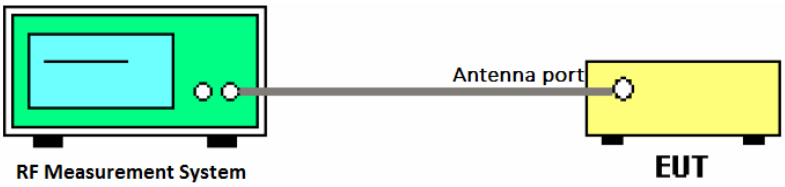
(1)Connect each EUT's antenna output to power sensor by RF cable and attenuator

4.5 Test Result

Mode	Frequency(MHz)	Result(dBm)	Limit(dBm)	Conclusion
GFSK	2412	1.79	30	Pass
	2437	1.22	30	Pass
	2462	1.12	30	Pass

5. Power Spectral Density

5.1Block Diagram of Test Setup



5.2Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.3 Test Procedure

(1)Connect EUT's antenna output to spectrum analyzer by RF cable

(2) Set the spectrum analyzer as follows:

Center frequency	DTS Channel center frequency
RBW	3KHz≤RBW≤100KHz
VBW	≥3RBW
Span	1.5 times the DTS bandwidth
Detector Mode	RMS
Sweep time	Auto
Trace mode	Max hold

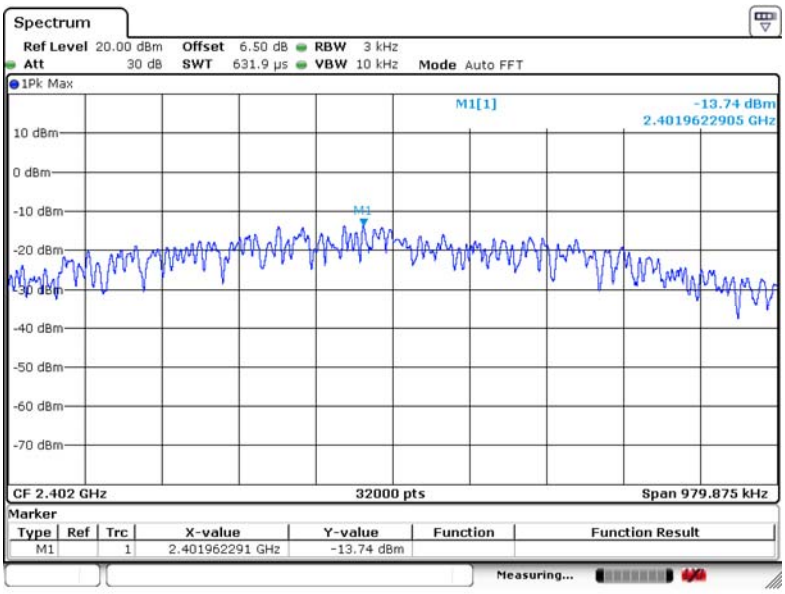
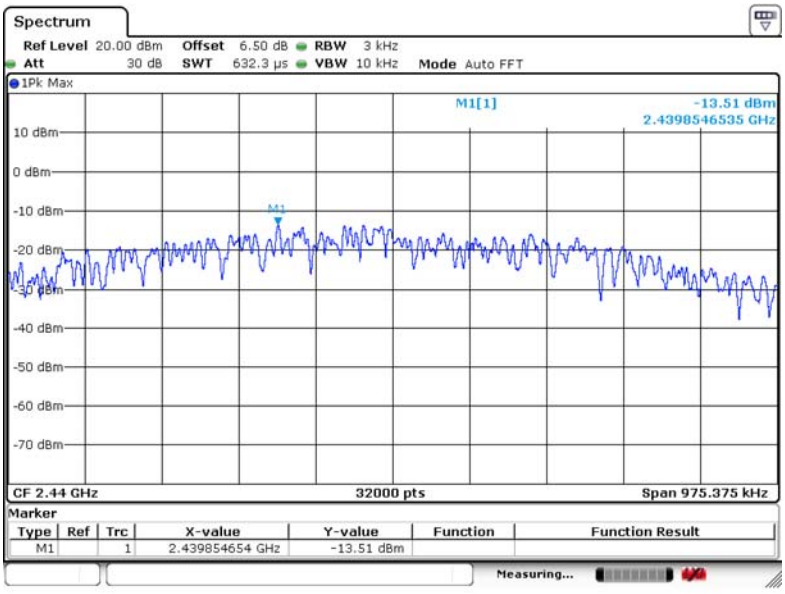
(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.

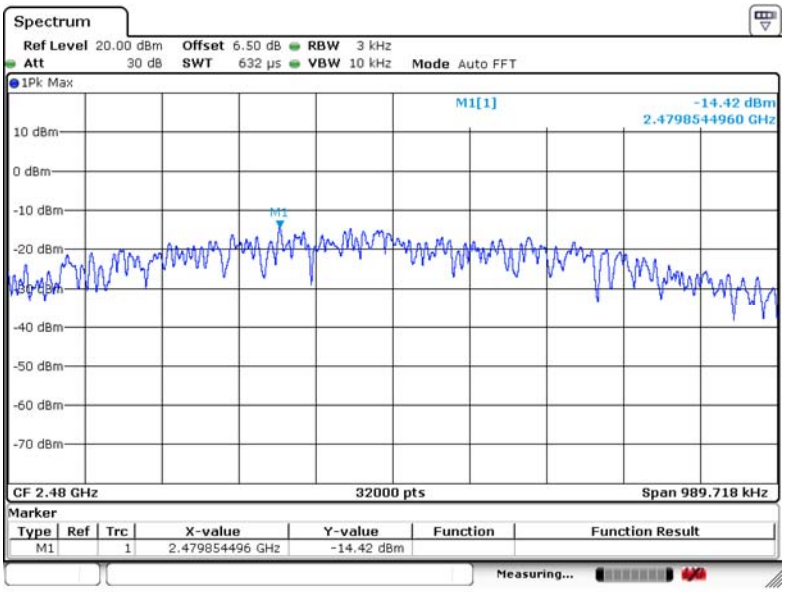
(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.4 Test Result

Mode	Frequency(MHz)	Result (dBm)	Limit (dBm)	Conclusion
GFSK	2402	-13.74	8.00	Pass
	2440	-13.51	8.00	Pass
	2480	-14.42	8.00	Pass

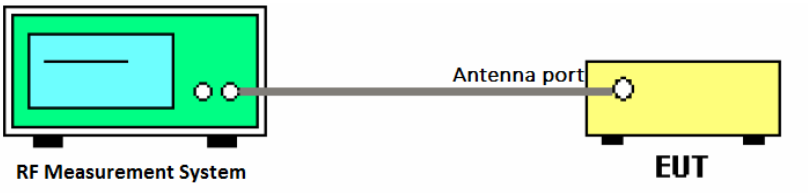
5.5 Original Test data

GFSK	Low CH 2402MHZ  Middle CH 2440MHZ  High CH 2480MHZ


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 3 kHz
Att 30 dB SWT 632 µs VBW 10 kHz Mode Auto FFT
1Pk Max
M1[1] -14.42 dBm
2.4798544960 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 2.48 GHz
32000 pts
Span 989.718 kHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.479854496 GHz -14.42 dBm
Measuring...

6. BandEdge and Spurious Emissions (Conducted)

6.1Block Diagram of Test Setup



6.2Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power

6.3 Test Procedure

(1)Connect EUT's antenna output to spectrum analyzer by RF cable

(2)Establish a reference level by using the following procedure:

Center frequency	DTS Channel center frequency
RBW	100KHz
VBW	300KHz
Span	1.5 times the DTS bandwidth
Detector Mode	Peak
Sweep time	Auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

RBW	100KHz
VBW	300KHz
Span	Encompass frequency range to be measured

Number of measurement points	≥span/RBW
Detector Mode	Peak
Sweep time	Auto
Trace mode	Max hold

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

6.4 Test Result

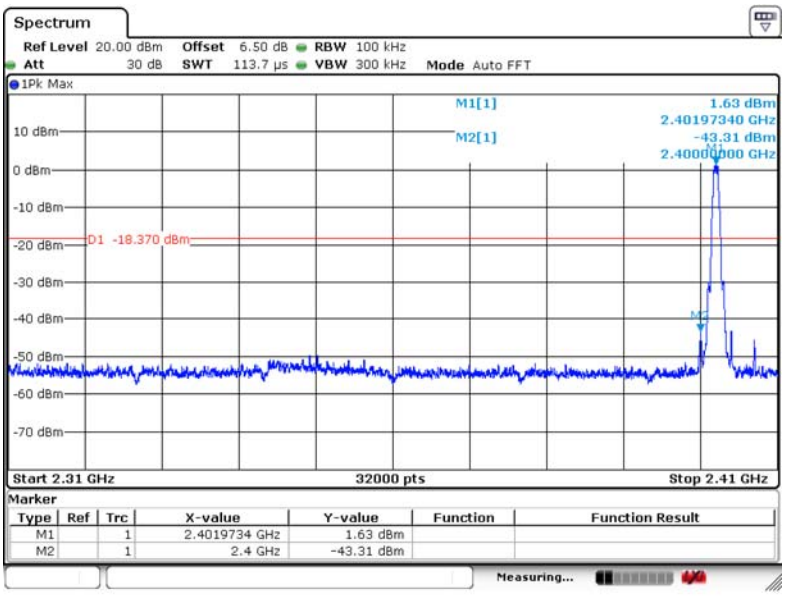
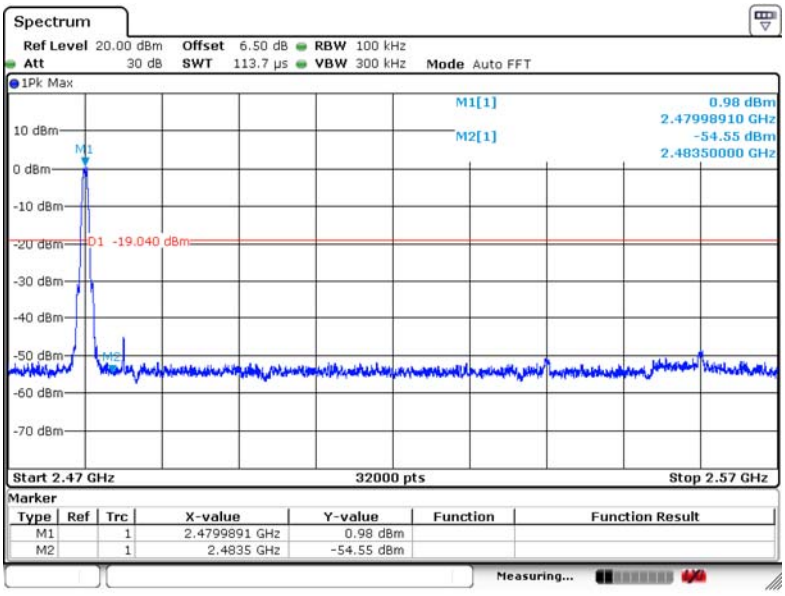
Band Edge

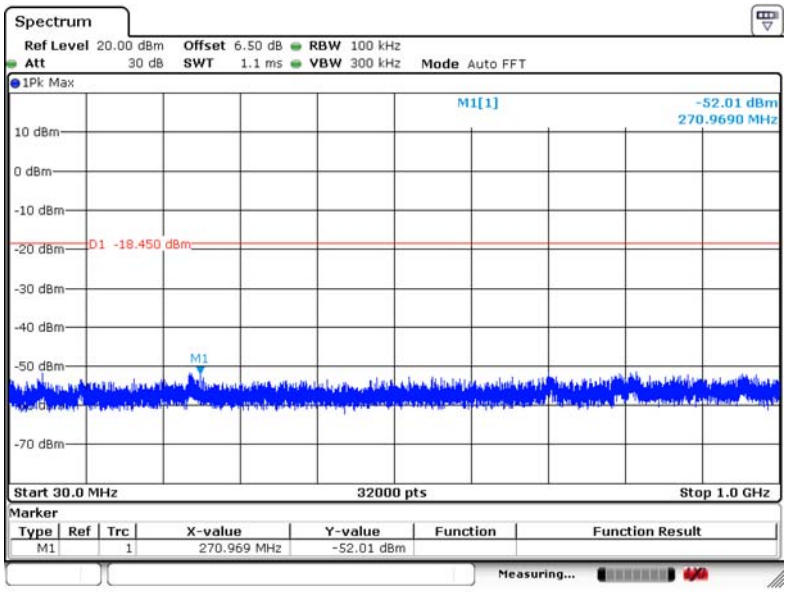
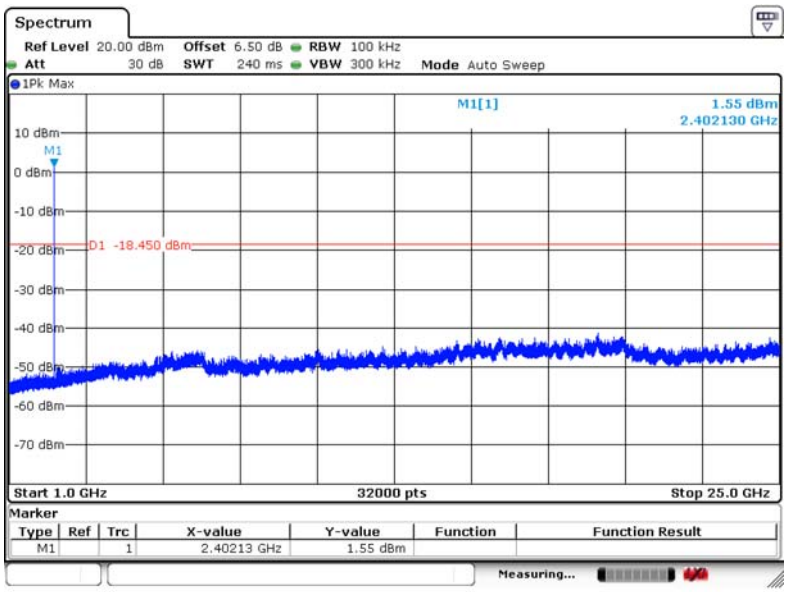
Mode	Frequency(MHz)	Conclusion
GFSK	2402	Pass
	2480	Pass

SPURIOUS EMISSIONS

Mode	Frequency(MHz)	Conclusion
GFSK	2402	Pass
	2440	Pass
	2480	Pass

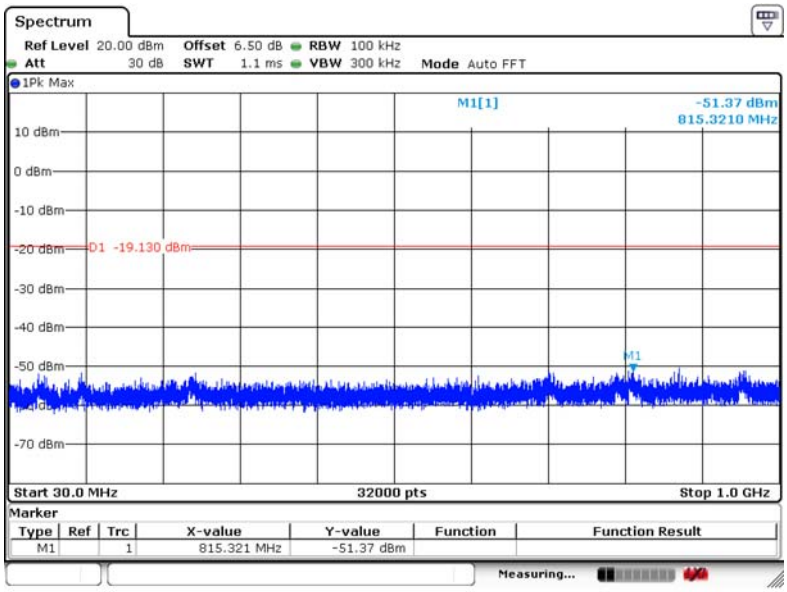
6.5 Original Test data

GFSK	Low CH  High CH 

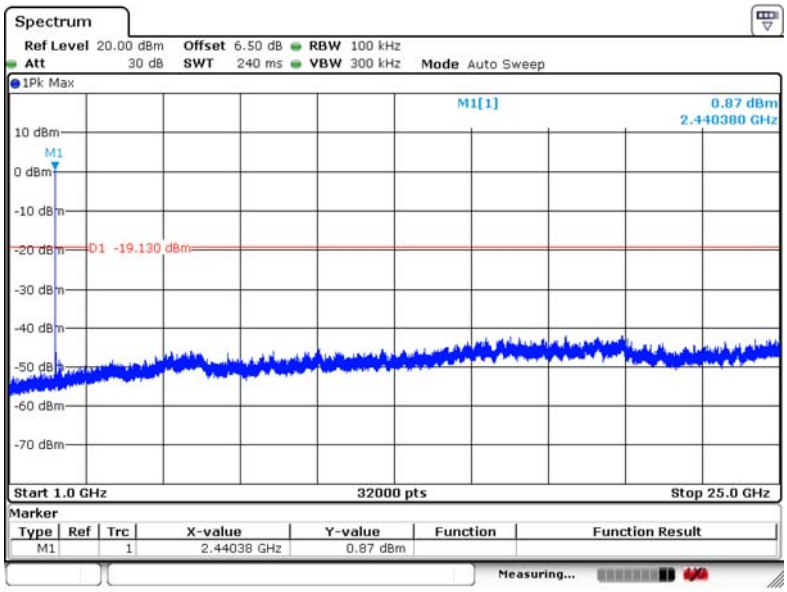
Low 2402MHz	 2402MHz_30~1000  2402MHz_1G~26.5GHz

Middle

2440MHz



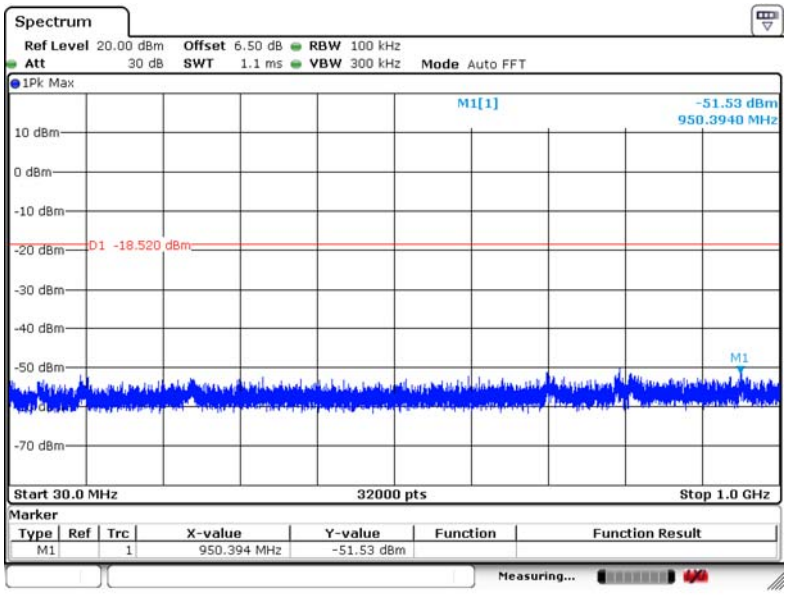
2440MHz_30~1000



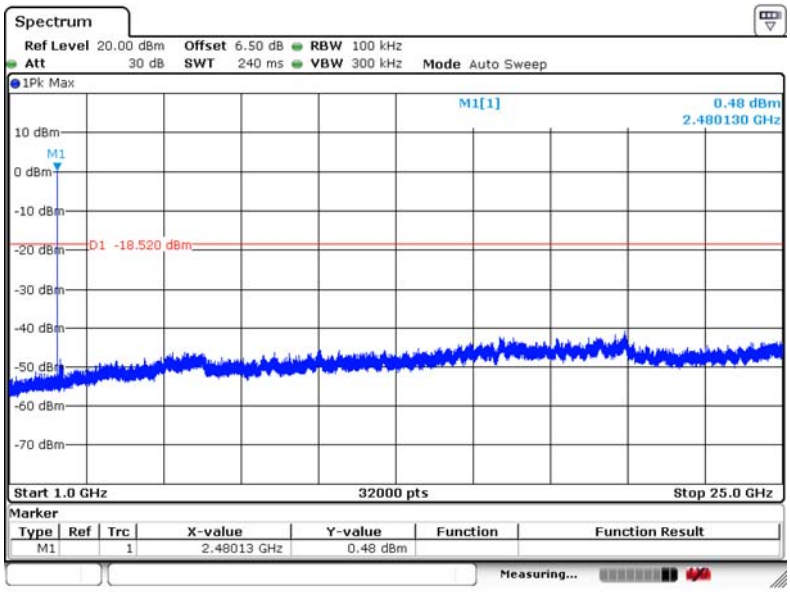
2440MHz_1G~26.5GHz

High

2480MHz



2480MHz_30~1000

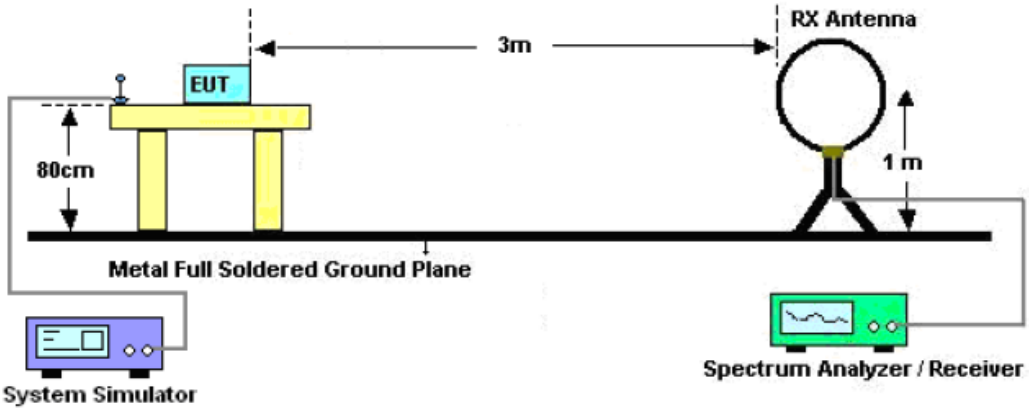


2480MHz_1G~26.5GHz

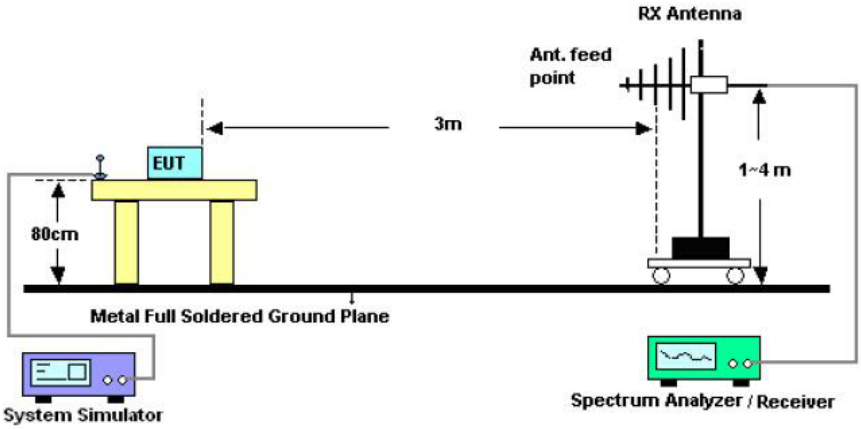
7. Radiated Spurious Emission

7.1Block Diagram of Test Setup

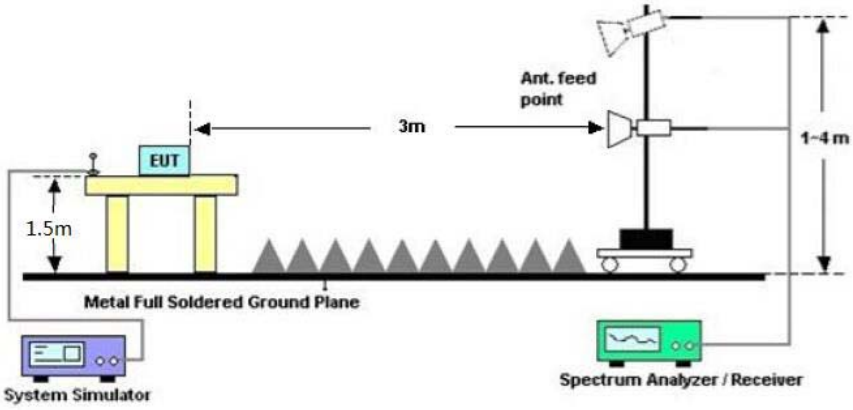
Radiated Emission Test-Setup Frequency Below 30MHz



Radiated Emission Test-Setup Frequency 30MHz-1000MHz



Radiated Emission Test-Setup Frequency Above 1000MHz



7.2 FCC 15.209 Limit

Frequency(MHz)	Distance Meters	Field Strengths Limit	
		μV/m	dB(μV)/m
0.009~0.490	300	2400/F(KHz)	67.6-20log(F)
0.490~1.705	30	24000/F(KHz)	87.6-20log(F)
1.705~30.0	30	30	29.54
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0dBμV/m—Peak 54.0 dBμV/m--Average	

Remark:
(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz, radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

All restriction band should comply with 15.209, other emission should be at least 20dB below the fundamental.

$Limit_{3m}$ (dBuV/m)= $Limit_{30m}$(dBuV/m) + 40Log(30m/3m)

(3) Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions or comply with 15.209 limits

7.3 Test Procedure

(1)EUT was place on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a semi-anechoic chamber for above 1G.

(2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used asbelow table.

Test frequency range	Test antenna used	Test antenna distance
9kHz-30MHz	Active Loop antenna	3m
30MHz-1GHz	Trilog Broadband Antenna	3m
1GHz-18GHz	Double Ridged Horn Antenna(1GHz-18GHz)	3m
18GHz-40GHz	Horn Antenna(18GHz-40GHz)	3m

According ANSI C63.10:2013 clause 6.4.4.2 and 6,5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna alsobe positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m (Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18 GHz to 25 GHz, so below final test was performed with frequency range from 9 kHz to 18 GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.

(5) The emissions from 9 kHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90 kHz, 110-490 kHz, for emissions from 9 kHz-90 kHz,110 kHz-490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW

Frequency band	RBW
9 kHz-150 kHz	200 Hz
150 kHz-30 MHz	9 kHz
30 MHz-1 GHz	120 kHz

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; RBW 1 MHz VBW 10 Hz for Average measure (according ANSI C63.10:2013 clause 4.1.4.2.2 procedure for average measure).

(8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported

7.4 Test Result

Pass

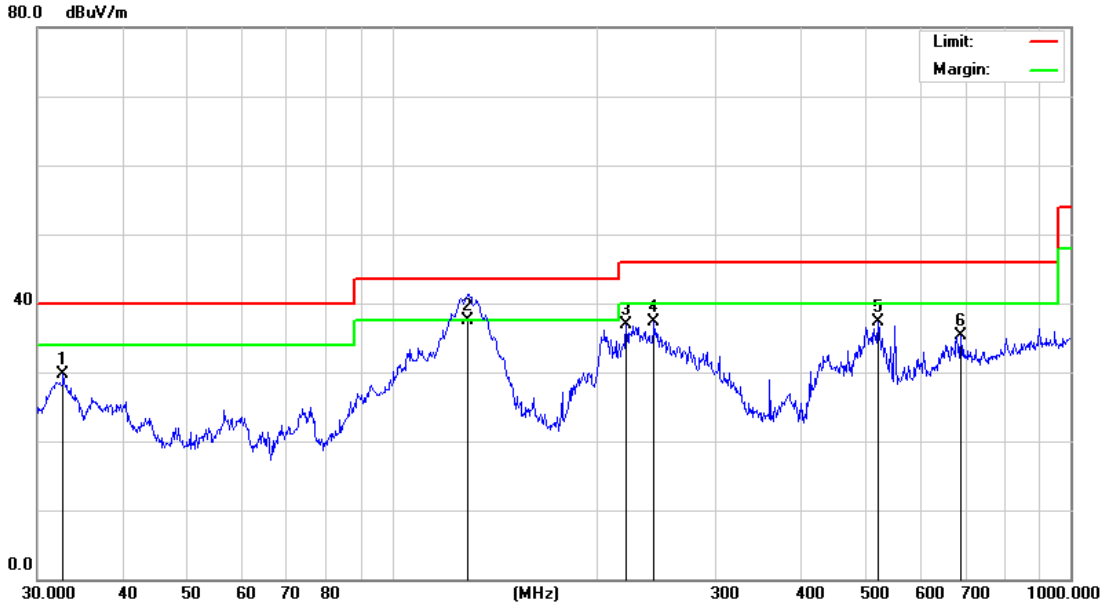
All the emissions except fundamental emission from 9 kHz to 25 GHz were comply with 15.209 limits.

Note1: According exploratory test no any obvious emission was detected from 9 kHz to 30 MHz and 18 GHz to 25 GHz.

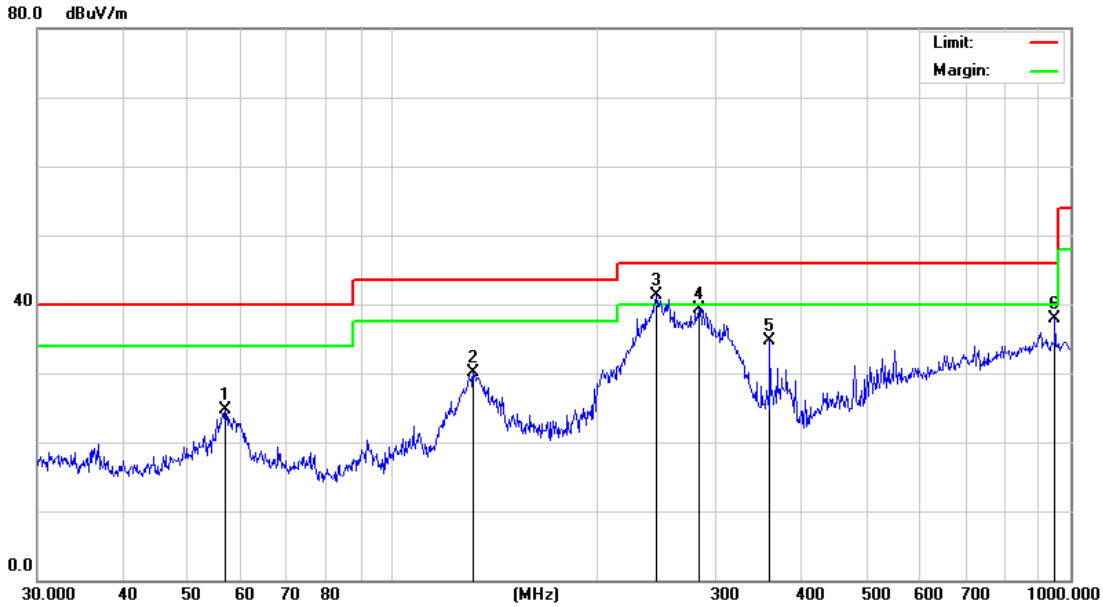
Note2: For emissions below 1GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in 8DPSK, Tx 2441 MHz mode.

Note3: For emissions above 1 GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

Vertical



Horizontal



TEST RESULT AND DATA (BETWEEN 1~25 GHZ)

Power :	7.4V from battery	Pol/Phase :	HORIZONTAL
Test Mode 1 :	TX , CH0	Temperature :	30 °C
Memo :		Humidity :	59 %

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4804.000	47.42	5.06	52.48	74.00	-21.52	peak
4804.000	37.53	5.06	42.59	54.00	-11.41	AVG
7206.000	41.62	7.03	48.65	74.00	-25.35	peak
7206.000	32.45	7.03	39.48	54.00	-14.52	AVG

Power :	7.4V from battery	Pol/Phase :	VERTICAL
Test Mode 1 :	TX , CH0	Temperature :	30 °C
Memo :		Humidity :	59 %

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4804.000	46.27	5.06	51.33	74.00	-22.67	peak
4804.000	36.89	5.06	41.95	54.00	-12.05	AVG
7206.000	41.52	7.03	48.55	74.00	-25.45	peak
7206.000	31.47	7.03	38.50	54.00	-15.50	AVG

Note:
The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

Power :	7.4V from battery	Pol/Phase :	HORIZONTAL
Test Mode 1 :	TX , CH19	Temperature :	30 °C
Memo :		Humidity :	59 %

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4880.000	47.14	5.14	52.28	74.00	-21.72	peak
4880.000	37.63	5.14	42.77	54.00	-11.23	AVG
7320.000	42.25	7.52	49.77	74.00	-24.23	peak
7320.000	32.74	7.52	40.26	54.00	-13.74	AVG

Power :	7.4V from battery	Pol/Phase :	VERTICAL
Test Mode 1 :	TX , CH19	Temperature :	30 °C
Memo :		Humidity :	59 %

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4880.000	47.25	5.14	52.39	74.00	-21.61	peak
4880.000	38.46	5.14	43.60	54.00	-10.40	AVG
7320.000	42.28	7.52	49.80	74.00	-24.20	peak
7320.000	33.21	7.52	40.73	54.00	-13.27	AVG

Note:
The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

Power :	7.4V from battery	Pol/Phase :	HORIZONTAL
Test Mode 1 :	TX , CH39	Temperature :	30 °C
Memo :		Humidity :	59 %

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4960.000	47.01	5.22	52.23	74.00	-21.77	peak
4960.000	37.45	5.22	42.67	54.00	-11.33	AVG
7440.000	41.36	8.06	49.42	74.00	-24.58	peak
7440.000	33.49	8.06	41.55	54.00	-12.45	AVG

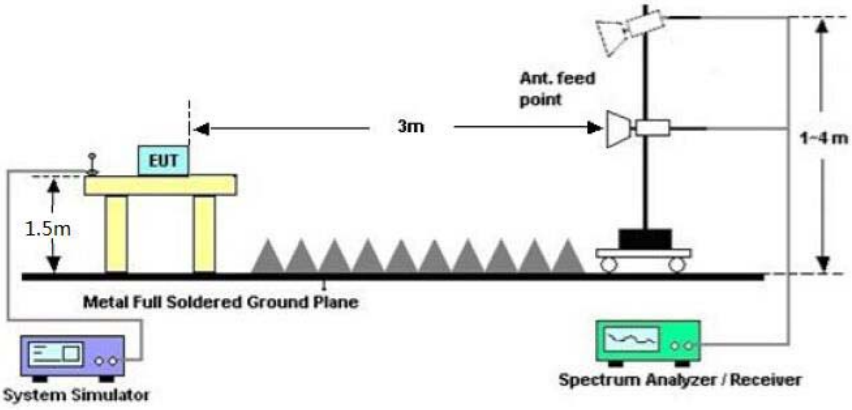
Power :	7.4V from battery	Pol/Phase :	VERTICAL
Test Mode 1 :	TX , CH39	Temperature :	30 °C
Memo :		Humidity :	59 %

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4960.000	47.28	5.22	52.50	74.00	-21.50	peak
4960.000	37.46	5.22	42.68	54.00	-11.32	AVG
7440.000	41.35	8.06	49.41	74.00	-24.59	peak
7440.000	33.14	8.06	41.20	54.00	-12.80	AVG

Note:
The disturbance above 18GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

8. Band Edge Compliance(radiated method)

8.1Block Diagram of Test Setup



8.2Limit

All restriction band should comply with 15.209, other emission should be at least 20dB below the fundamental.

8.3 Test Procedure

Same with clause 7.3 except change investigated frequency range from 2310 MHz to 2410 MHz and 2475 MHz to 2500 MHz.

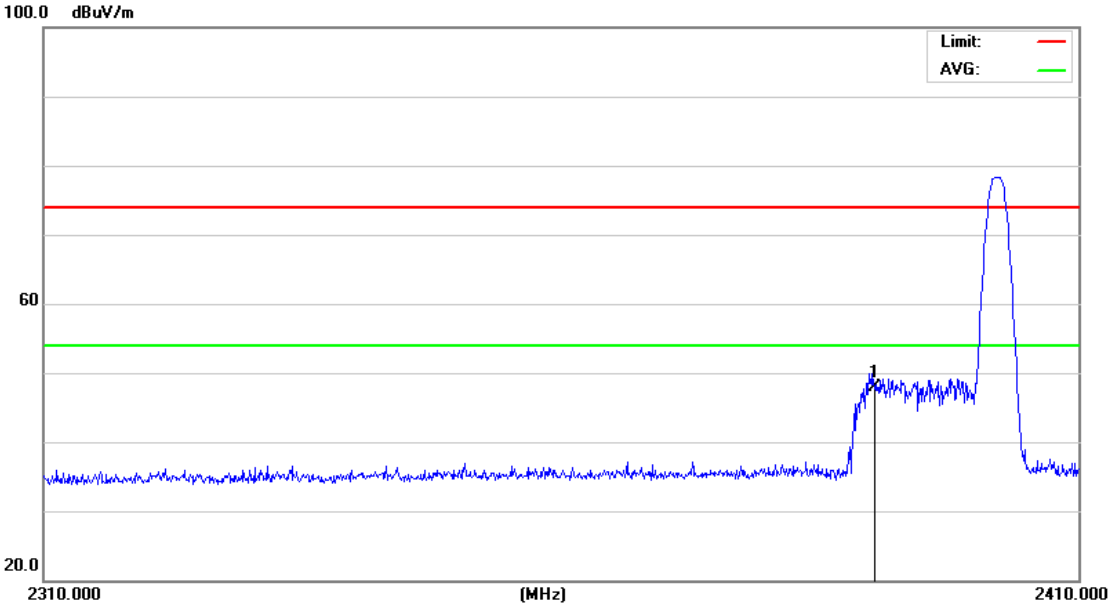
8.4 Test Result

PASS. (See below detailed test result)

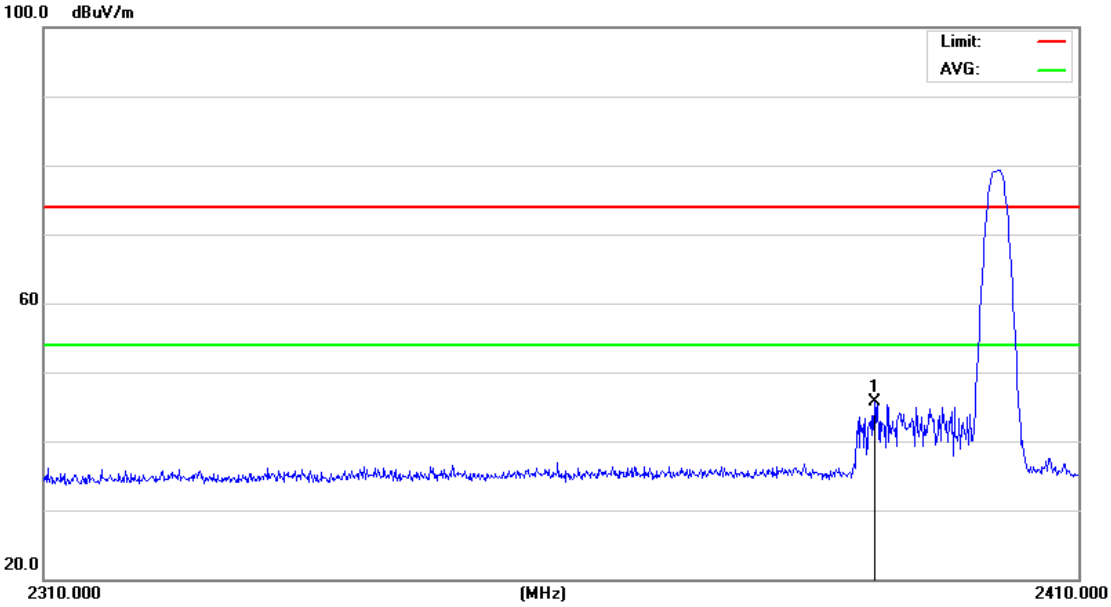
Remark: hopping on and hopping off mode all have been test, hopping off mode is worse and reported only.

8.5 Original Test data

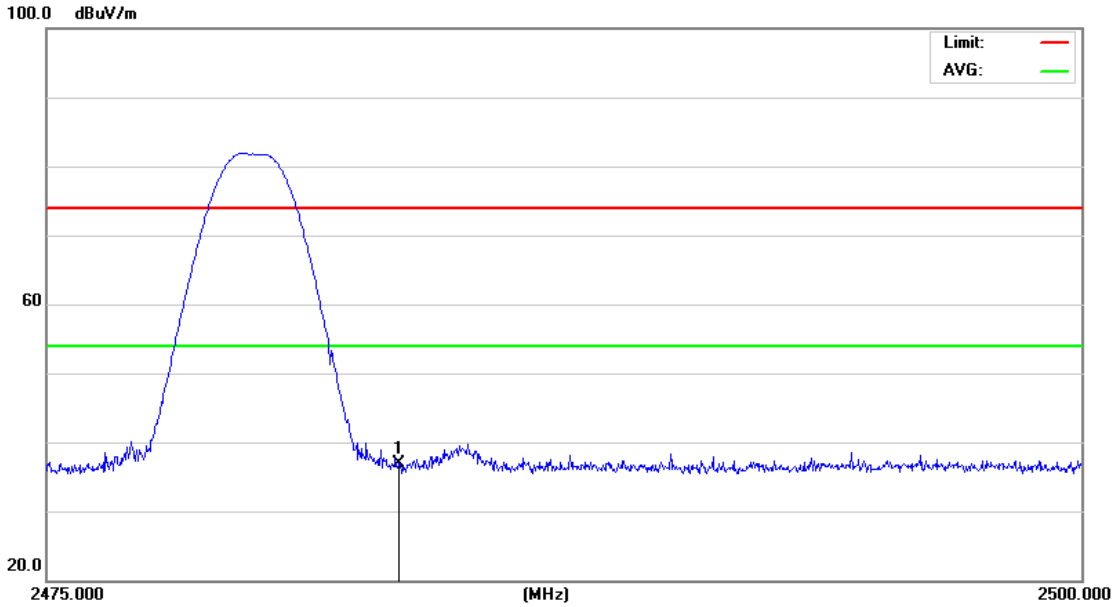
V


100.0 dBuV/m
Limit:
AVG:
60
20.0
1
2310.000
(MHz)
2410.000

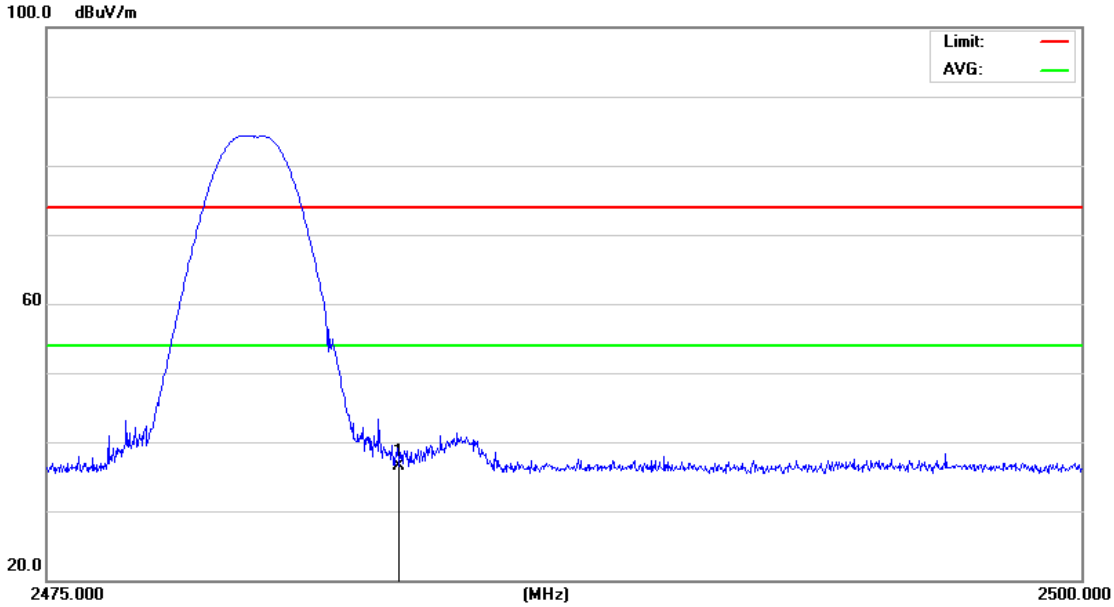
H


100.0 dBuV/m
Limit:
AVG:
60
20.0
1
2310.000
(MHz)
2410.000

V

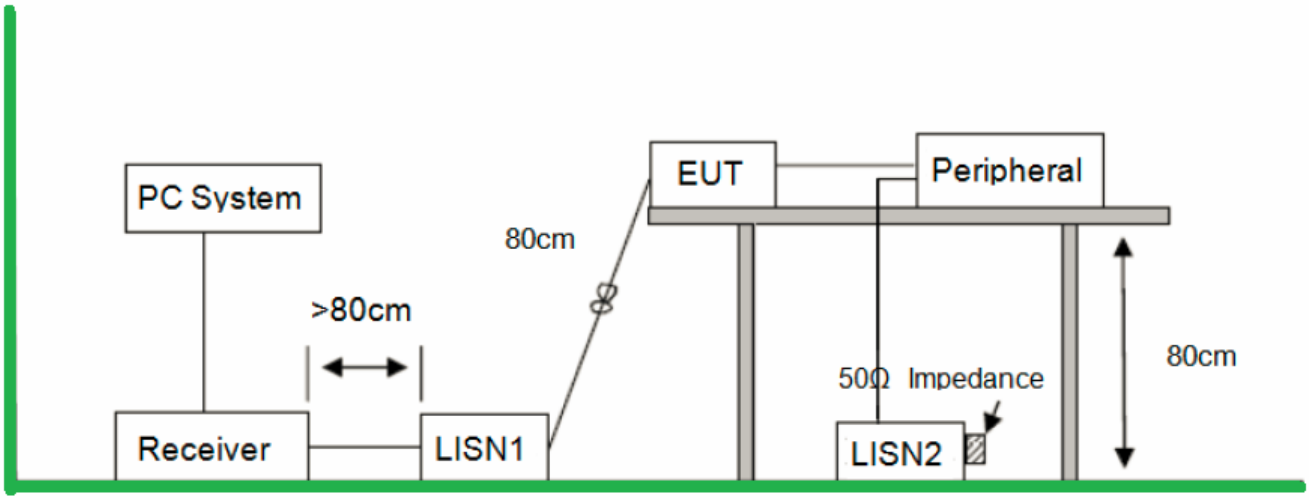

100.0 dBuV/m
Limit:
AVG:
60
20.0
2475.000
(MHz)
2500.000

H


100.0 dBuV/m
Limit:
AVG:
60
20.0
2475.000
(MHz)
2500.000

9. Power Line Conducted Emission

9.1Block Diagram of Test Setup



9.2Limit

Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150KHz-500KHz	66 ~ 56*	56 ~ 46*
500KHz-5MHz	56	46
5MHz-30MHz	60	50

Note 1: * Decreasing linearly with logarithm of frequency.
Note 2: The lower limit shall apply at the transition frequencies

9.3 Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the 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, Neutral and Line, 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.

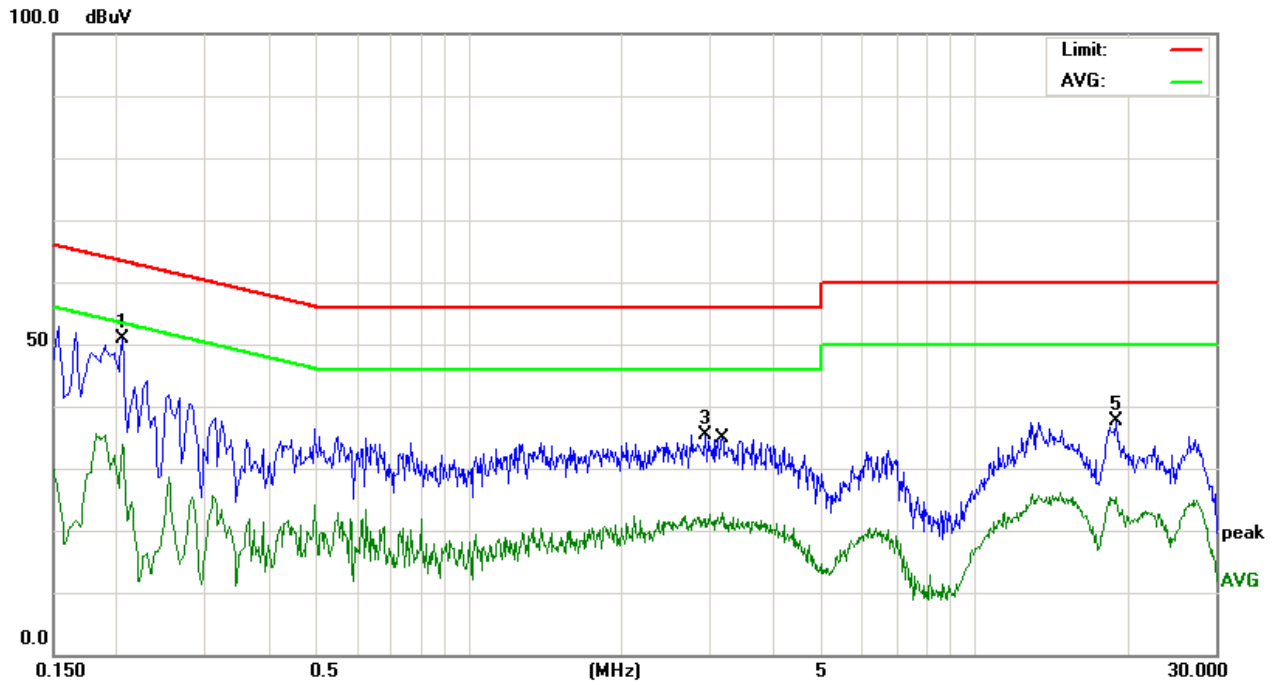
The bandwidth of test receiver is set at 9 kHz.

9.4 Test Result

PASS. (See below detailed test result)

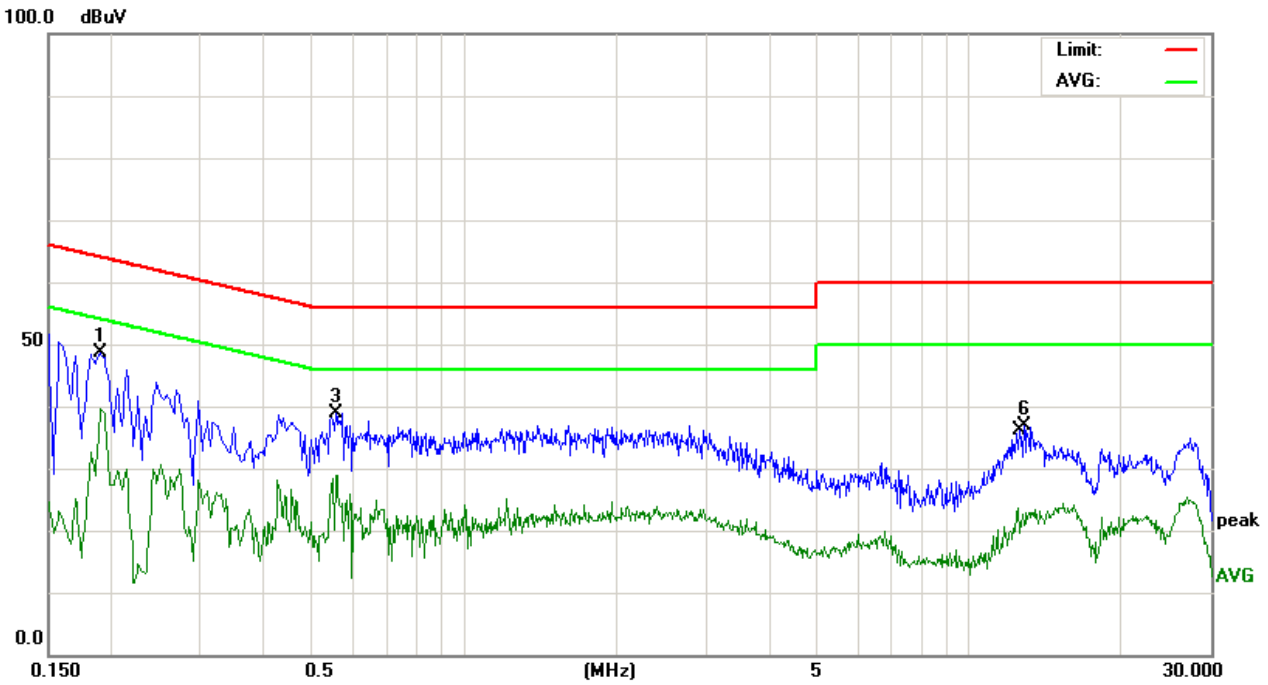
9.5 Original Test data

L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.2060	39.80	11.09	50.89	63.36	-12.47	peak
2		0.2060	22.77	11.09	33.86	53.36	-19.50	AVG
3		2.9300	25.47	9.98	35.45	56.00	-20.55	peak
4		3.1700	12.92	9.99	22.91	46.00	-23.09	AVG
5		19.0700	36.01	1.60	37.61	60.00	-22.39	peak
6		19.0700	23.76	1.60	25.36	50.00	-24.64	AVG

N



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1900	37.37	11.26	48.63	64.03	-15.40	peak
2	*	0.1900	28.48	11.26	39.74	54.03	-14.29	AVG
3		0.5580	28.95	9.97	38.92	56.00	-17.08	peak
4		0.5580	18.89	9.97	28.86	46.00	-17.14	AVG
5		12.4740	22.50	1.23	23.73	50.00	-26.27	AVG
6		12.8060	35.61	1.23	36.84	60.00	-23.16	peak

10. Antenna Requirements

10.1 Limit

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2 Result

The antennas used for this product are integrated antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2.0 dBi.

※※※※※**END OF REPORT**※※※※※