



# FCC PART 15C TEST REPORT No. 2012TAR498

for

**Sony Mobile Communications AB**

**GSM 850/900/1800/1900 quad bands and CDMA2000 850/1900 dual**

**bands mobile phone**

**Type: PM-0150-BV**

**With**

**FCC ID: PY7PM-0150**

**Hardware Version: A**

**Software Version: 9.0.E.0.62**

**Issued Date: 2012-10-31**



**No. DGA-PL-114/01-02**

*DAR accreditation (DIN EN ISO/IEC 17025): No. DGA-PL-114/01-02*

*FCC 2.948 Listed: No.733176*

*IC O.A.T.S listed: No.6629A-1*

**Note:**The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

**Test Laboratory:**

TMC Beijing, Telecommunication Metrology Center of the Ministry of Industry and Information Technology

Shouxiang Science Building, No 51, Xueyuan Road, Haidian District, Beijing, P.R.China 100191

Tel:+86(0)10-62304633, Fax:+86(0)10-62304633 Email:welcome@emcite.com. [www.emcite.com](http://www.emcite.com)

## **CONTENTS**

<b>CONTENTS .....</b>	<b>2</b>
<b>1. TEST LABORATORY .....</b>	<b>4</b>
1.1. TESTING LOCATION .....	4
1.2. TESTING ENVIRONMENT.....	4
1.3. PROJECT DATA .....	4
1.4. SIGNATURE .....	4
<b>2. CLIENT INFORMATION.....</b>	<b>5</b>
2.1. APPLICANT INFORMATION .....	5
2.2. MANUFACTURER INFORMATION.....	5
<b>3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) .....</b>	<b>6</b>
3.1. ABOUT EUT .....	6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST .....	6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	6
3.4. GENERAL DESCRIPTION.....	7
<b>4. REFERENCE DOCUMENTS .....</b>	<b>8</b>
4.1. DOCUMENTS SUPPLIED BY APPLICANT .....	8
4.2. REFERENCE DOCUMENTS FOR TESTING.....	8
<b>5. LABORATORY ENVIRONMENT .....</b>	<b>9</b>
<b>6. SUMMARY OF TEST RESULTS .....</b>	<b>10</b>
6.1. SUMMARY OF TEST RESULTS .....	10
6.2. STATEMENTS.....	10
6.3. TEST CONDITIONS .....	10
<b>7. TEST EQUIPMENTS UTILIZED .....</b>	<b>12</b>
<b>ANNEX A: MEASUREMENT RESULTS.....</b>	<b>13</b>
A.1. MEASUREMENT METHOD .....	13
A.2. PEAK OUTPUT POWER .....	14
A.2.1 Antenna gain .....	14
A.2.2 Conducted Output Power .....	14
A.2.3 Radiated Output Power .....	14
A.3. FREQUENCY BAND EDGES .....	15
A.4. CONDUCTED EMISSION.....	17
A.5. RADIATED EMISSION.....	26
A.6. 6dB BANDWIDTH.....	34
A.7. MAXIMUM POWER SPECTRAL DENSITY LEVEL .....	36
A.8. TIME OF OCCUPANCY (DWELL TIME) .....	38
A.9. CARRIER FREQUENCY SEPARATION .....	40
A.10. NUMBER OF HOPPING CHANNELS.....	41

A.11. 20DB BANDWIDTH.....	42
A.12. AC POWERLINE CONDUCTED EMISSION .....	44
A.13 RECEIVER RADIATION EMISSION.....	47
<b>ANNEX B: PHOTOGRAPHS OF THE TEST SET-UP .....</b>	<b>49</b>
<b>ANNEX C: PHOTOGRAPHS OF THE EUT .....</b>	<b>50</b>

## 1. Test Laboratory

### 1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT  
Address: Shouxiang Science Building, No 51, Xueyuan Road, Haidian District,  
Beijing, P.R.China  
Postal Code: 100191  
Telephone: 00861062304633  
Fax: 00861062304633

### 1.2. Testing Environment

Normal Temperature: 15-35°C  
Extreme Temperature: -20/+55°C  
Relative Humidity: 30-60%  
Air Pressure 990hPa-1040hPa

Note: The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

### 1.3. Project data

Project Leader: Zi Xiaogang  
Testing Start Date: 2012-09-18  
Testing End Date: 2012-10-10

### 1.4. Signature



---

Zi Xiaogang

(Prepared this test report)



---

Sun Xiangqian

(Reviewed this test report)



---

Song Chongwen

Deputy Director of the laboratory  
(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Sony Mobile Communications (China) Co. Ltd  
Address /Post: Sony Mobile R&D Center, No. 16, Guangshun South Street,  
Chaoyang District  
City: Beijing  
Postal Code: 100102  
Country: China  
Contact: Ma, Gang  
Telephone: +86-10-58656312  
Fax: +86-10-58659049

### **2.2. Manufacturer Information**

Company Name: Sony Mobile Communications AB  
Address /Post: Nya Vattentornet, 22188 Lund, Sweden  
City: Lund  
Postal Code: 22188  
Country: Sweden  
Contact: Nordlof, Anders  
Telephone: +46-10-802 3919  
Fax: +46-10-800 2441

### 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

Description	GSM 850/900/1800/1900 quad bands and CDMA2000 850/1900 dual bands mobile phone
Model Name	PM-0150-BV
FCC ID	PY7PM-0150
Frequency Range	ISM 2400MHz~2483.5MHz
Type of Modulation	GFSK
Number of Channels	40
Cellular Frequency Band	GSM 850/900/1800/1900 and CDMA2000 850/1900
Support Functions	MP3, camera, FM radio, USB memory, GPS receiver, Mobile High-Definition Link (MHL),Bluetooth (EDR and Bluetooth 4.0), WLAN (802.11 b/g/n) and Wi-Fi hotspot
Antenna	Integral Antenna
MAX Radiated Power	1.24dBm EIRP
MAX Conducted Power	-1.51dBm
Power Supply	3.7V DC by Battery

Note: Photographs of EUT are shown in ANNEX D of this test report.

#### 3.2. Internal Identification of EUT used during the test

EUT ID*	S/N	IMEI	HW Version	SW Version
#22863	CB5A1KF4NF	004402145893594	A	9.0.E.0.62
#22861	CB5A1KF4SB	004402145893834	A	9.0.E.0.62

\*EUT ID: is used to identify the test sample in the lab internally.

#### 3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Revision
AE1	Battery	001374SWSGNS	1
#22579	Travel Charger	5800129	1A
#22530	USB Cable	121607D10003C2E	SP1

AE1

Type	AB-0400
Commercial name	BA800
Manufacturer	Sony Mobile
Minimum Capacitance	1700mAh
Nominal Voltage	3.7V

#22579

Type	AC-0400-CN
------	------------

Manufacturer	SALCOMP
Length of cable	98 cm (length of USB cable)

#22530

Commercial Name	EC801
Manufacturer	Sony Mobile
Length of cable	98 cm

\*AE ID: is used to identify the test sample in the lab internally.

### 3.4. General Description

The Equipment Under Test (EUT) is a model of GSM 850/900/1800/1900 quad bands and CDMA2000 850/1900 dual bands mobile phone with integrated antenna.

The EUT supports GSM 850/900/1800/1900MHz bands and CDMA2000 850/1900MHz bands. It also supports GPRS service with multi-slots class 12 and EGPRS service with multi-slots class 12 too.

It has MP3, camera, FM radio, USB memory, GPS receiver, Mobile High-Definition Link (MHL),Bluetooth (EDR and Bluetooth 4.0), WLAN (802.11 b/g/n) and Wi-Fi hotspot functions.

It consists of normal options: travel charger and Bluetooth headset.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

#### **4. Reference Documents**

##### **4.1. Documents supplied by applicant**

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

##### **4.2. Reference Documents for testing**

The following documents listed in this section are referred for testing.

	FCC CFR 47, Part 15, Subpart C:	
	15.205 Restricted bands of operation;	Oct,10
FCC Part15	15.209 Radiated emission limits, general requirements;	2009
	15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz.	Edition
ANSI C63.10	Procedures for testing compliance of a wide variety of unlicensed wireless devices	2009
KDB 558074	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247	V01



## 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber** (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.2 dB, 10 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 2000 MHz

**Control room/ conducted chamber** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

**Fully-anechoic chamber1** (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

**Fully-anechoic chamber2** (8.6 meters×6.1 meters×3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

**Fully-anechoic chamber3** (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz

**Additional Humidity Requirements for Electrostatic Discharge Test:** Min. = 30%, Max. = 60%.

## 6. SUMMARY OF TEST RESULTS

### 6.1. Summary of Test Results

Abbreviations used in this clause:

- P** Pass, The EUT complies with the essential requirements in the standard.
- F** Fail, The EUT does not comply with the essential requirements in the standard
- NA** Not Applicable, The test was not applicable
- NP** Not Performed, The test was not performed by TMC

SUMMARY OF MEASUREMENT RESULTS	Sub-clause	Verdict
Peak Output Power - Conducted	15.247 (b)(1)	<b>P</b>
Frequency Band Edges	15.247 (d)	<b>P</b>
Conducted Emission	15.247 (d)	<b>P</b>
Radiated Emission	15.247, 15.205, 15.209	<b>P</b>
6dB Bandwidth	15.247 (a)(2)	<b>P</b>
Maximum Power Spectral Density Level	15.247(e)	<b>P</b>
Time of occupancy (dwell time)	15.247(a)(1) (iii)	<b>P</b>
Carrier frequency separation	15.247(a)(1)	<b>P</b>
Number of hopping channels	15.247(a)(1)	<b>P</b>
20dB Bandwidth	15.247 (a)(1)	<b>P</b>
AC Powerline Conducted Emission	15.107, 15.207	<b>P</b>

Please refer to **ANNEX A** for detail.

The measurement is made according to KDB 558074 and ANSI C63.10.

### 6.2. Statements

TMC has evaluated the test cases requested by the applicant /manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.2

### 6.3. Test Conditions

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage
V min	Low Voltage
V max	High Voltage
H nom	Norm Humidity
A nom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	T nom	25°C
Voltage	V nom	3.7V(By battery)
Humidity	H nom	39%
Air Pressure	A nom	1020hPa

## 7. Test Equipments Utilized

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Vector Signal Analyzer	FSU26	200030	Rohde & Schwarz	2013-06-19
2	Bluetooth Tester	CBT32	100649	Rohde & Schwarz	2013-02-03

### Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	2012-11-08
2	EMI Antenna	3117	00139065	ETS-Lindgren	2014-07-31
3	EMI Antenna	VULB 9163	514	Schwarzbeck	2014-11-10
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	2014-6-30
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	2014-6-30
6	Universal Radio Communication Tester	CMU200	109914	Rohde & Schwarz	2013-04-19
7	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2013-06-08
8	Pre-amplifier(18GHz)	/	1005277	Rohde & Schwarz	/
9	Pre-amplifier(26.5GHz)	/	1005277	Rohde & Schwarz	/

### Anechoic chamber

Fully anechoic chamber by Frankonia German.

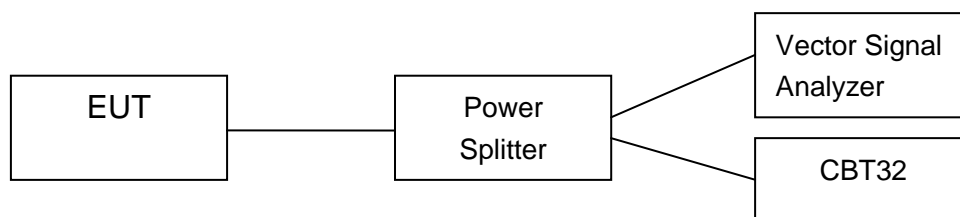
## ANNEX A: MEASUREMENT RESULTS

### A.1. Measurement Method

#### A.1.1. Conducted Measurements

The measurement is made according to Public notice KDB 558074 and ANSI C63.10.

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).
- 3). Set the EUT to the required channel.
- 4). Set the EUT hopping mode (hopping or hopping off).
- 5). Set the spectrum analyzer to start measurement.
- 6). Record the values. Vector Signal Analyzer



#### A.1.2. Radiated Emission Measurements

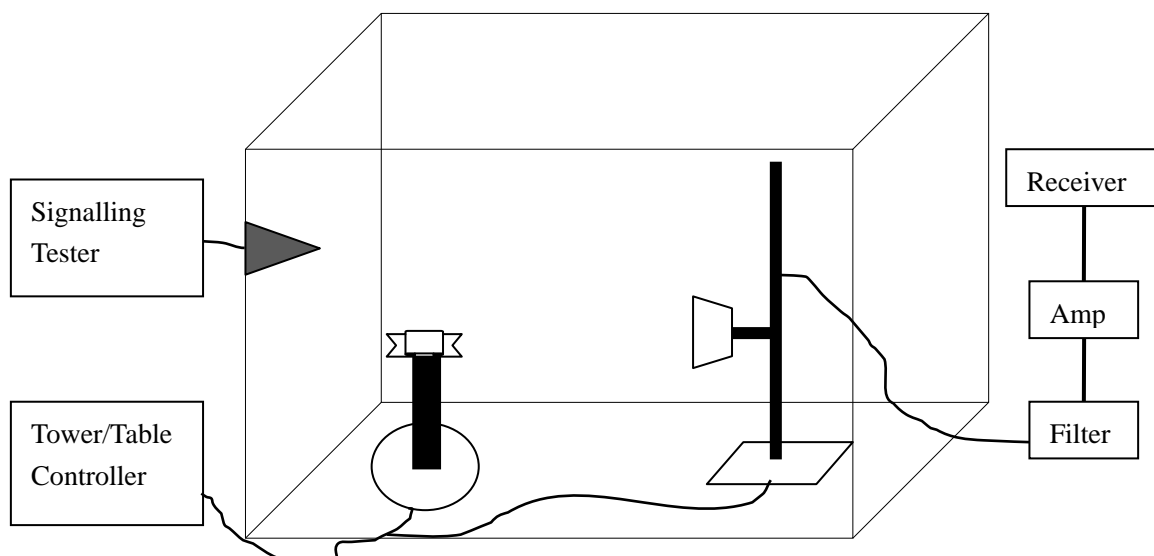
The measurement is made according to Public notice KDB 558074 and ANSI C63.10

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 1MHz;



## A.2. Peak Output Power

### Measurement Limit:

Standard	Limit (dBm)
FCC Part 15.247(b)(1)	< 30

The measurement is made according to KDB 558074 and ANSI C63.10.

### Measurement Results:

#### A.2.1 Antenna gain

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the EUT.

Frequency	2402 MHz	2440 MHz	2480 MHz
GFSK (Conducted)	-2.21	-2.43	-1.51
GFSK (Radiated)	-1.17	-0.87	-0.01
Gain(dBi)	1.04	1.56	1.50

**Conclusion: PASS**

#### A.2.2 Conducted Output Power

EUT ID: #22863

Peak(RBW=1MHz;VBW=5MHz;SPAN=0;Detector:Peak)

Frequency	2402 MHz	2440 MHz	2480 MHz	Conclusion
GFSK (dBm)	-2.21	-2.43	-1.51	P

Average(RBW=1MHz;VBW=5MHz;SPAN=0;Detector:RMS)

Frequency	2402 MHz	2440 MHz	2480 MHz	Conclusion
GFSK (dBm)	-2.97	-2.94	-1.82	P

**Measurement Uncertainty: ±1.17dB**

**Conclusion: PASS**

#### A.2.3 Radiated Output Power

EUT ID: #22861

Peak(RBW=1MHz;VBW=5MHz;SPAN=0;Detector:Peak)

Frequency	2402 MHz	2440 MHz	2480 MHz	Conclusion
GFSK (dBm)	-1.17	-0.87	-0.01	P

Average

Frequency	2402 MHz	2440 MHz	2480 MHz	Conclusion
GFSK * (dBm)	-1.93	-1.38	-0.32	P

Note:\* These values are calculated with the antenna gain

**Measurement Uncertainty: ±1.98dB**

**Conclusion: PASS**

### A.3. Frequency Band Edges

**Measurement Limit:**

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	<-20  Note: The measurement results are calculated as power measured in any 100KHz bandwidth outside the frequency band in dBm minus power measured in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

The measurement is made according to KDB 558074 and ANSI C63.10.

**Measurement Condition:**

RBW=VBW=100KHz; SPAN=8MHz; Detector: peak

**Measurement Result:**

**EUT ID: #22863**

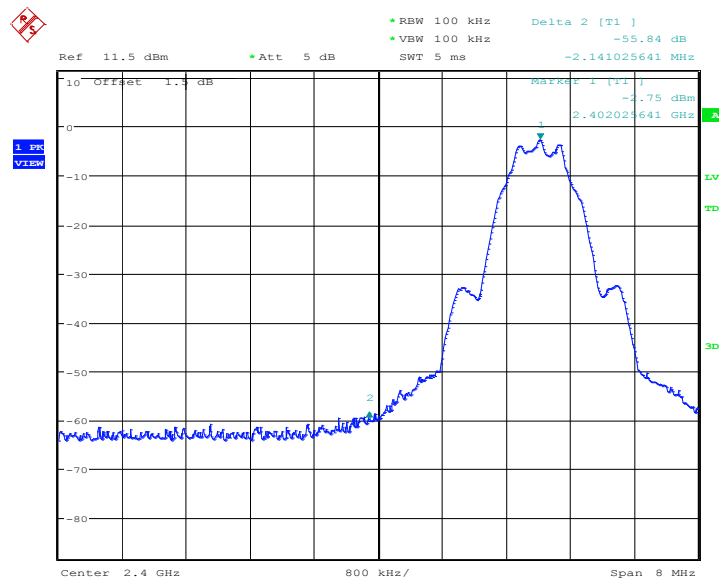
**For GFSK**

Frequency	Hopping	Band Edge Power ( dBc)		Conclusion
2402MHz	Hopping OFF	Fig.1	-55.84	P
2480MHz	Hopping OFF	Fig.2	-58.72	P

**Measurement Uncertainty: ±1.37dB**

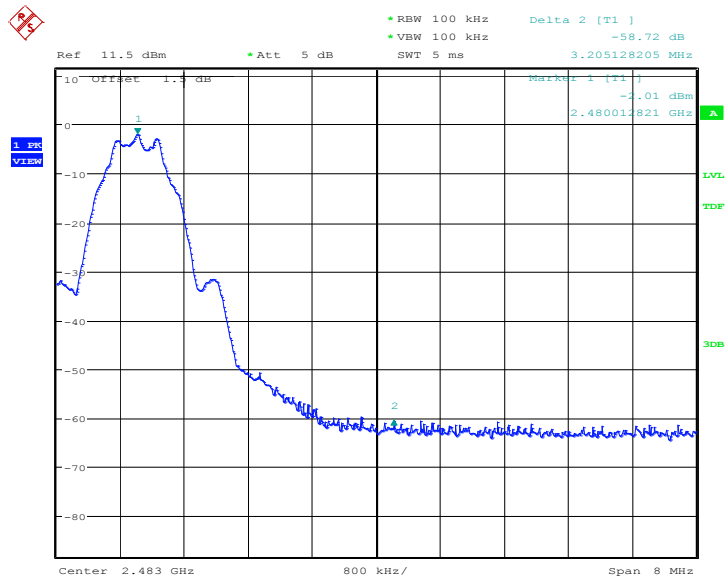
**Conclusion: PASS**

**Test graphs as below**



Date: 18.SEP.2012 07:19:01

Fig.1. Frequency Band Edges: GFSK, 2402 MHz, Hopping Off



Date: 18.SEP.2012 07:06:54

Fig.2. Frequency Band Edges: GFSK, 2480 MHz, Hopping Off



#### A.4. Conducted Emission

##### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

The measurement is made according to KDB 558074 and ANSI C63.10

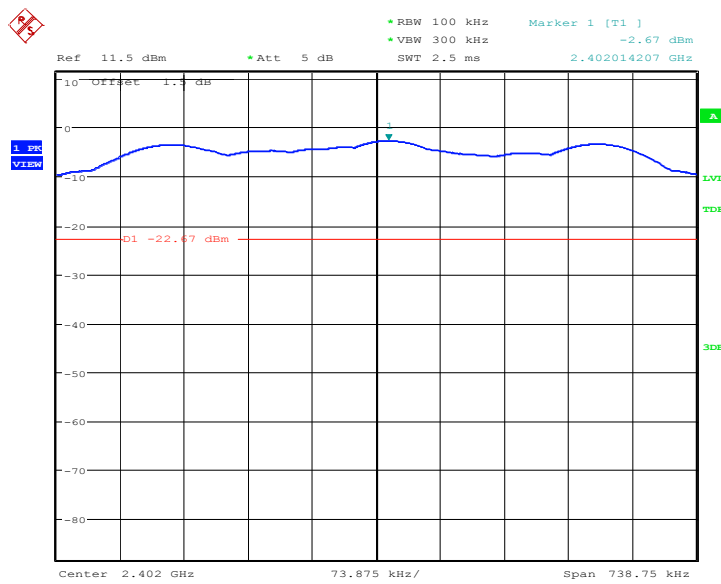
##### Measurement Results:

##### For GFSK

Frequency	Frequency Range	Test Results	Conclusion
2402 MHz	Center Frequency	Fig.3	P
	30 MHz ~ 1 GHz	Fig.4	P
	1 GHz ~ 3 GHz	Fig.5	P
	3 GHz ~ 10 GHz	Fig.6	P
	10 GHz ~ 26 GHz	Fig.7	P
2440 MHz	Center Frequency	Fig.8	P
	30 MHz ~ 1 GHz	Fig.9	P
	1 GHz ~ 3 GHz	Fig.10	P
	3 GHz ~ 10 GHz	Fig.11	P
	10 GHz ~ 26 GHz	Fig.12	P
2480 MHz	Center Frequency	Fig.13	P
	30 MHz ~ 1 GHz	Fig.14	P
	1 GHz ~ 3GHz	Fig.15	P
	3 GHz ~ 10 GHz	Fig.16	P
	10 GHz ~ 26 GHz	Fig.17	P

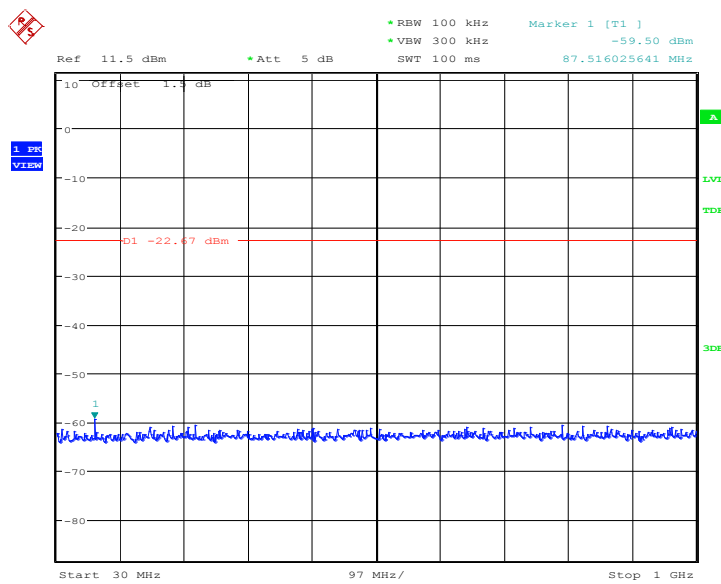
**Conclusion: PASS**

**Test graphs as below**



Date: 18.SEP.2012 07:17:20

Fig.3. Conducted spurious emission: GFSK,2402MHz



Date: 18.SEP.2012 07:17:37

Fig.4. Conducted spurious emission: GFSK, 2402 MHz, 30MHz - 1GHz

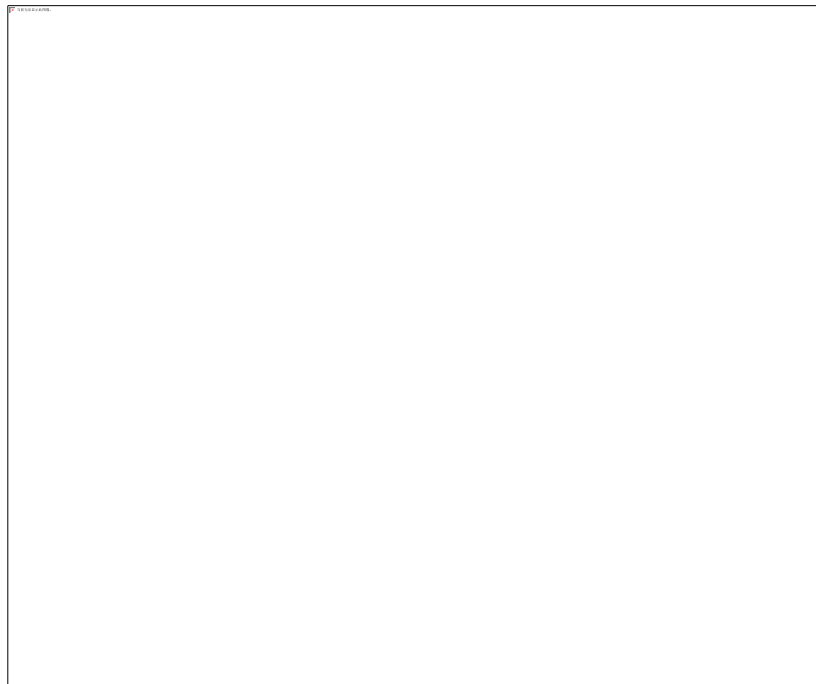
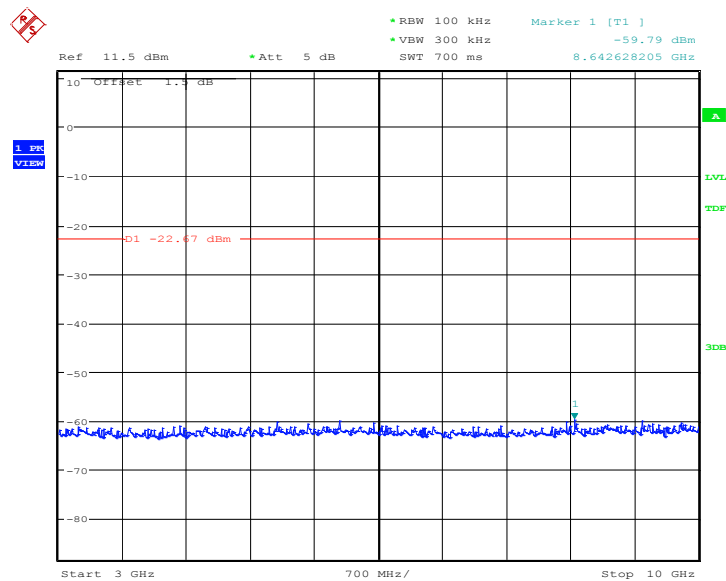
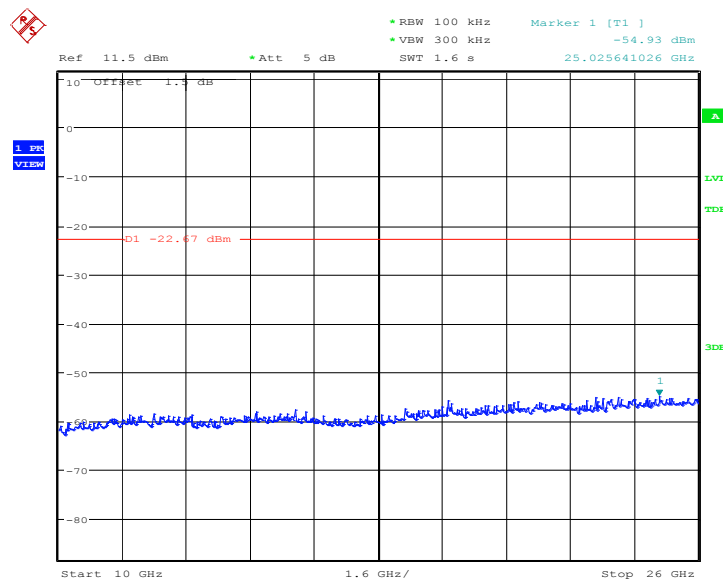


Fig.5. Conducted spurious emission: GFSK, 2402 MHz,1GHz - 3GHz



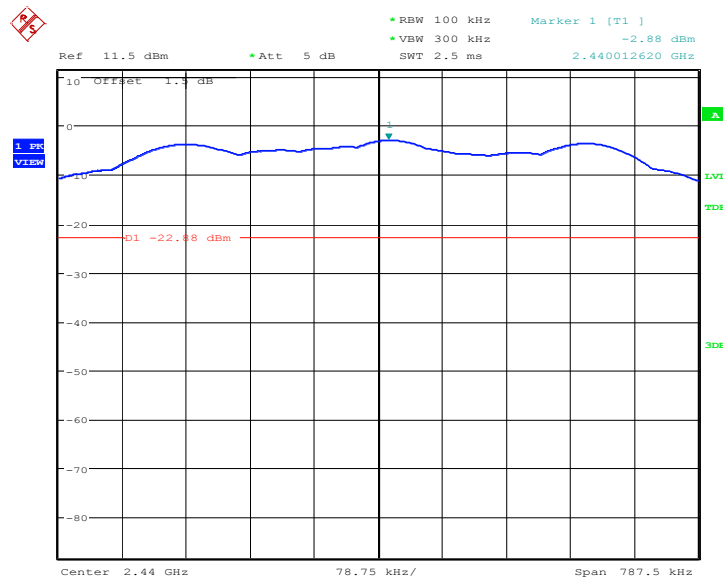
Date: 18.SEP.2012 07:18:25

Fig.6. Conducted spurious emission: GFSK, 2402 MHz,3GHz - 10GHz



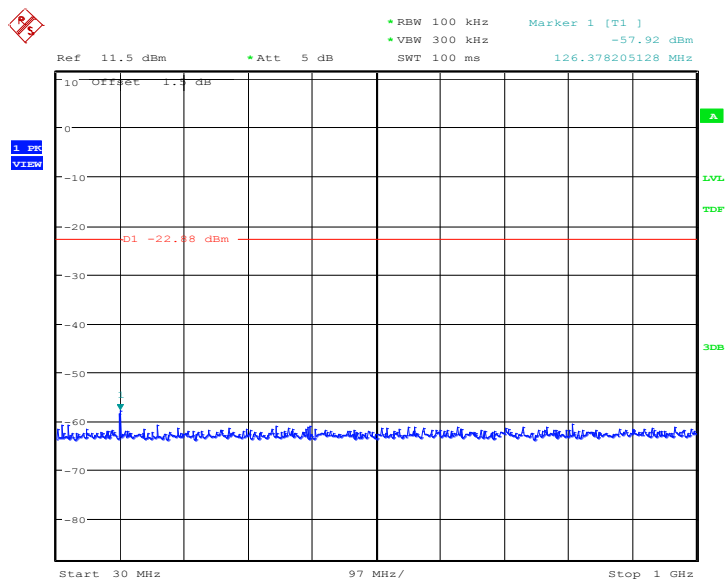
Date: 18.SEP.2012 07:18:42

Fig.7. Conducted spurious emission: GFSK, 2402 MHz,10GHz - 26GHz



Date: 18.SEP.2012 07:12:19

Fig.8. Conducted spurious emission: GFSK, 2440MHz



Date: 18.SEP.2012 07:12:36

Fig.9. Conducted spurious emission: GFSK, 2440 MHz, 30MHz - 1GHz

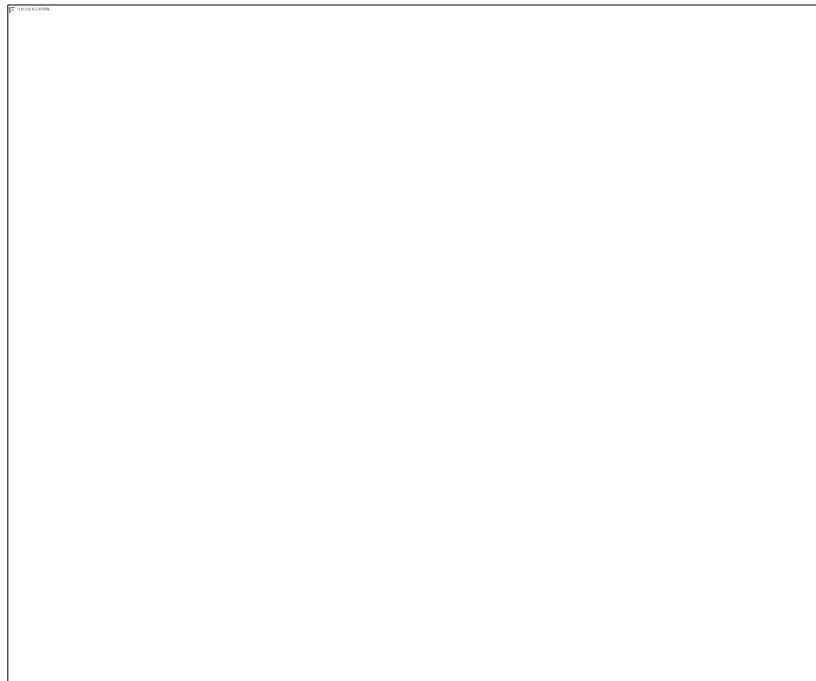
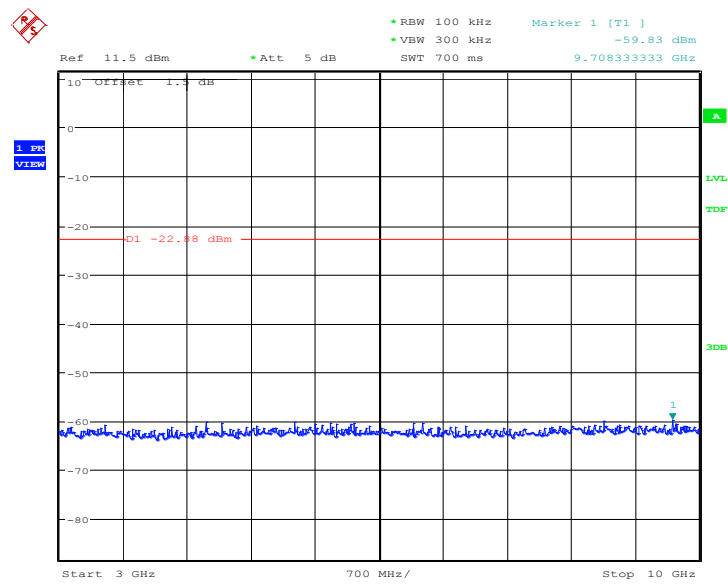
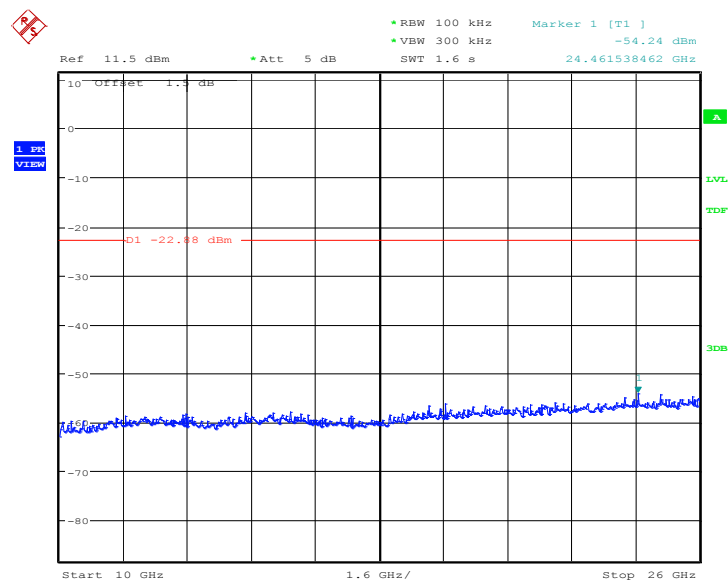


Fig.10. Conducted spurious emission: GFSK, 2440 MHz, 1GHz – 3GHz



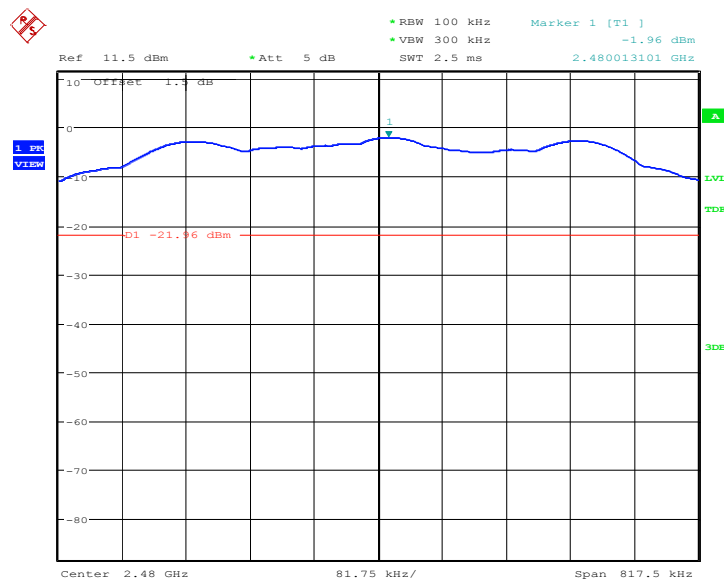
Date: 18.SEP.2012 07:13:24

Fig.11. Conducted spurious emission: GFSK, 2440 MHz, 3GHz – 10GHz



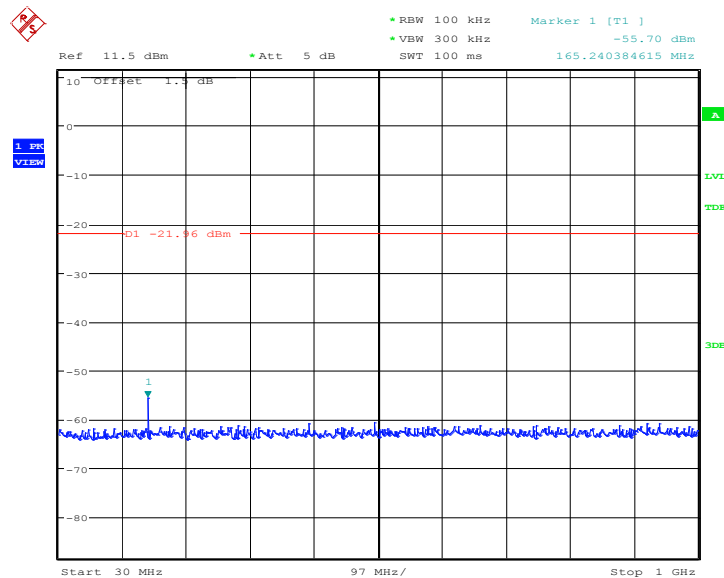
Date: 18.SEP.2012 07:13:41

Fig.12. Conducted spurious emission: GFSK, 2440 MHz, 10GHz – 26GHz



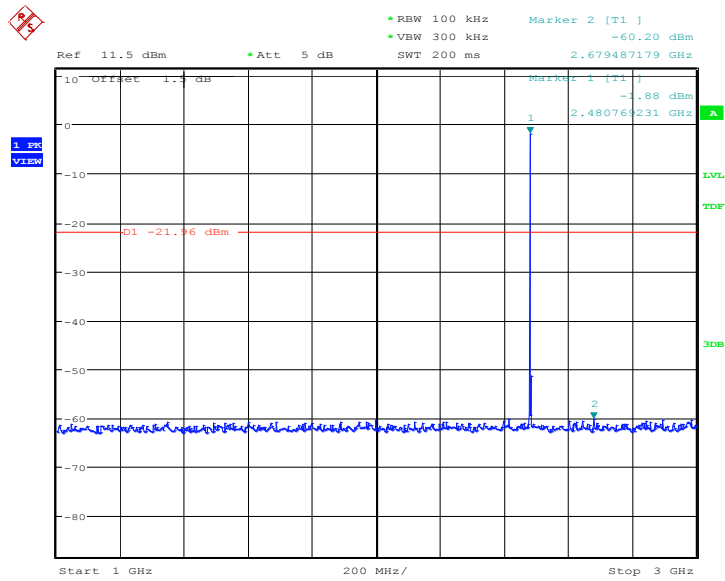
Date: 18.SEP.2012 07:05:13

Fig.13. Conducted spurious emission: GFSK, 2480 MHz



Date: 18.SEP.2012 07:05:30

Fig.14. Conducted spurious emission: GFSK, 2480 MHz, 30MHz - 1GHz



Date: 18.SEP.2012 07:06:02

Fig.15. Conducted spurious emission: GFSK, 2480 MHz, 1GHz - 3GHz

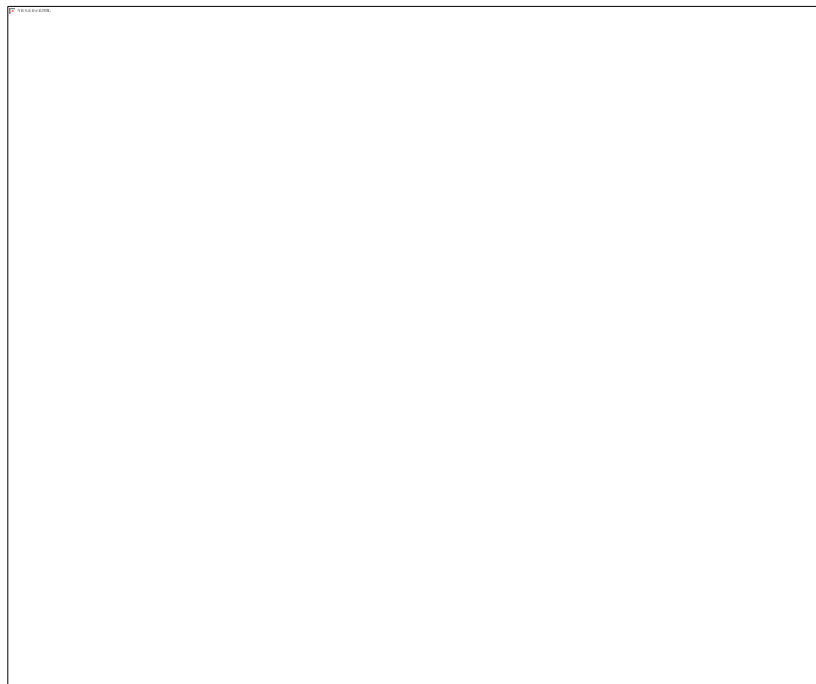
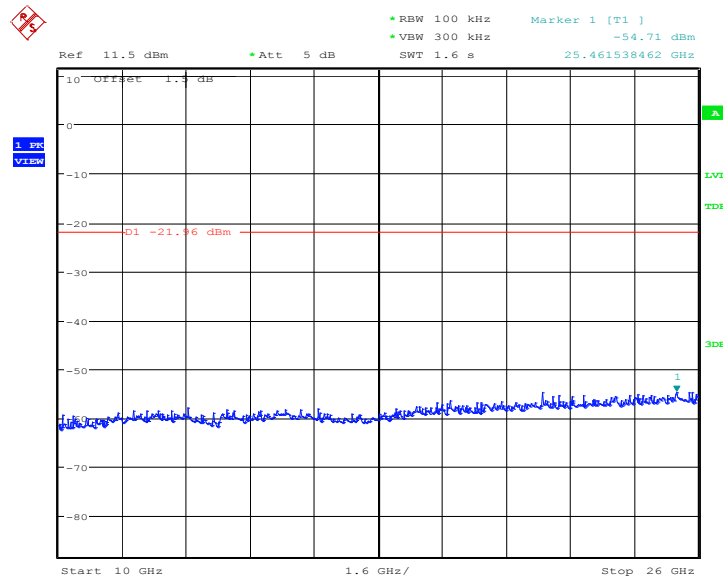


Fig.16. Conducted spurious emission: GFSK, 2480 MHz, 3GHz - 10GHz





Date: 18.SEP.2012 07:06:35

Fig.17. Conducted spurious emission: GFSK, 2480 MHz, 10GHz - 26GHz

### A.5. Radiated Emission

#### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	Listed as follows

Frequency (MHz) Field strength	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

The measurement is made according to Public notice KDB 558074 and ANSI C63.10.

#### Limit in restricted band:

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

#### Test Condition

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
0.009-30	100KHz/300KHz	5
30-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15
4000-18000	1MHz/1MHz	40
18000-26500	1MHz/1MHz	20

#### Measurement Results:

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable los.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}}$$

For GFSK

Frequency	Frequency Range	Test Results	Conclusion
2402MHz	30 MHz ~ 1 GHz	Fig.18	P
	1 GHz ~ 3 GHz	Fig.19	P
	3 GHz ~ 18 GHz	Fig.20	P
2440 MHz	30 MHz ~ 1 GHz	Fig.21	P
	1 GHz ~ 3 GHz	Fig.22	P
	3 GHz ~ 18 GHz	Fig.23	P
2480 MHz	30 MHz ~ 1 GHz	Fig.24	P
	1 GHz ~ 3 GHz	Fig.25	P
	3 GHz ~ 18 GHz	Fig.26	P
Power	2.38GHz~2.4GHz---L	Fig.27	P
Power	2.45GHz~2.5GHz---H	Fig.28	P
For all channels	18 GHz ~ 26 GHz	Fig.29	P

**Conclusion: PASS**

Test graphs as below:

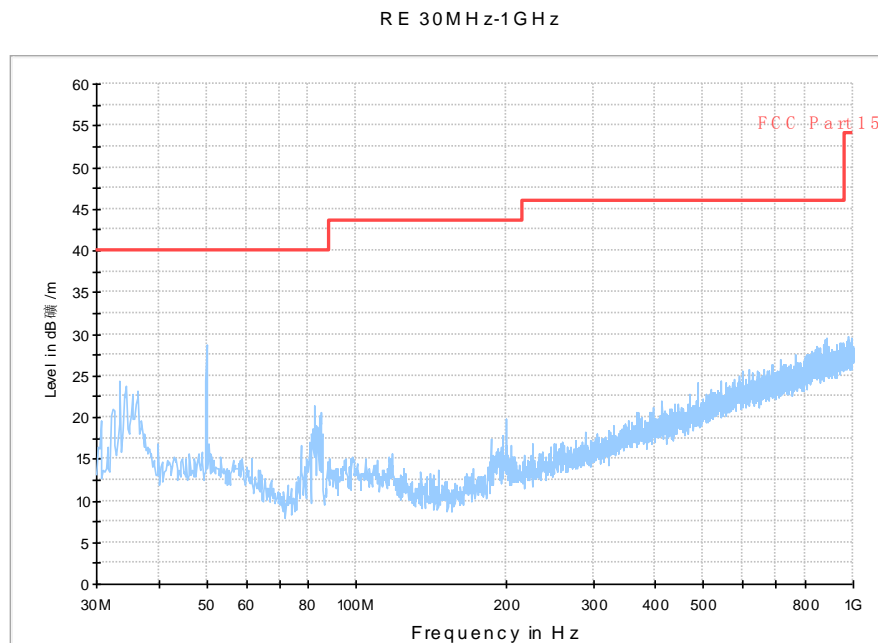


Fig.18. Radiated emission: GFSK, 2402MHz, 30 MHz - 1 GHz

RE - 1GHz-3GHz

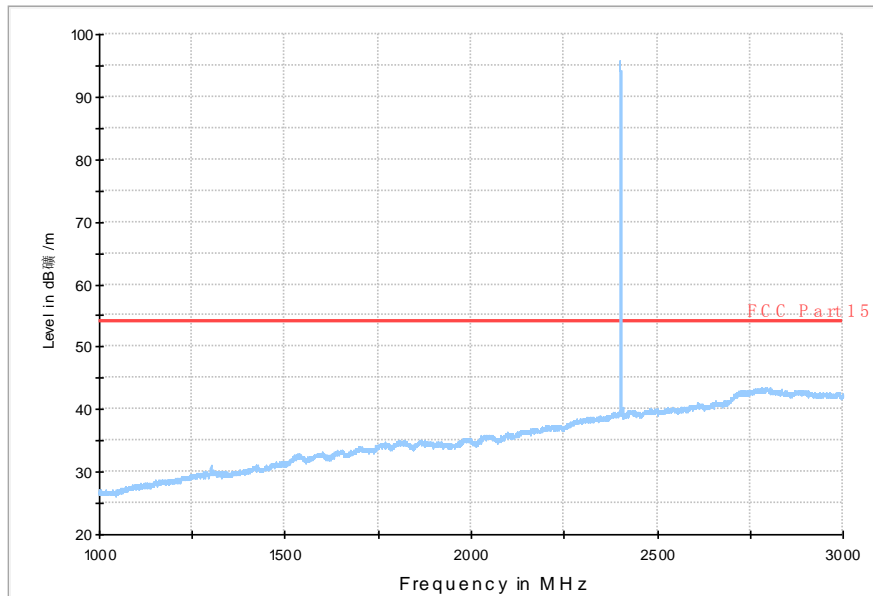


Fig.19. Radiated emission: GFSK, 2402MHz, 1 GHz - 3 GHz

RE - 3GHz-18GHz

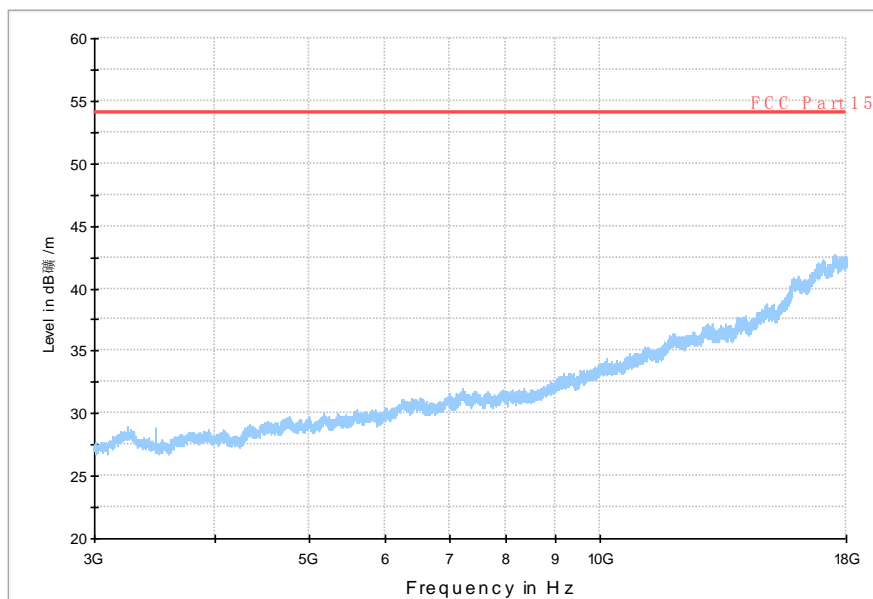


Fig.20. Radiated emission: GFSK, 2402MHz, 3 GHz - 18 GHz

RE 30MHz-1GHz

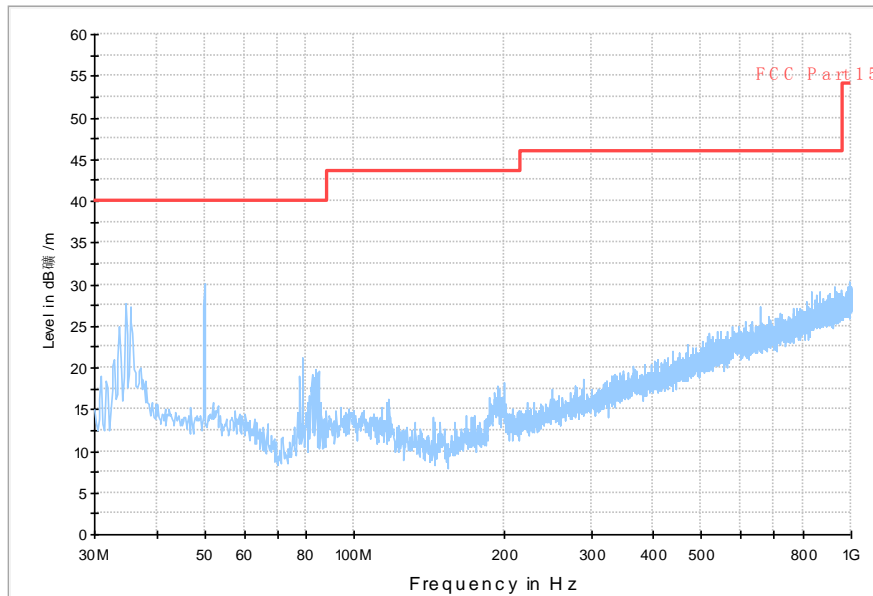


Fig.21. Radiated emission: GFSK, 2440MHz, 30 MHz - 1 GHz

RE - 1GHz-3GHz

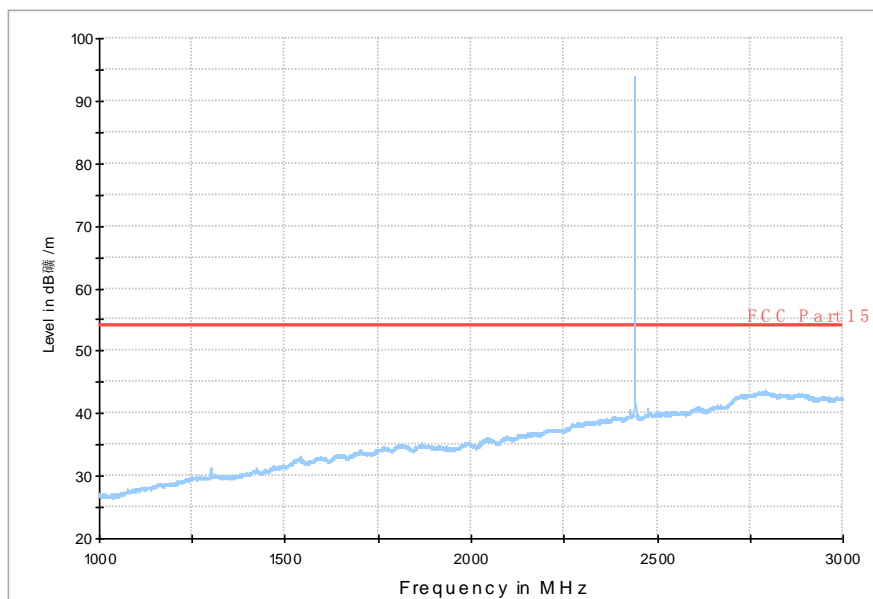


Fig.22. Radiated emission: GFSK, 2440MHz, 1 GHz - 3 GHz

RE - 3GHz-18GHz

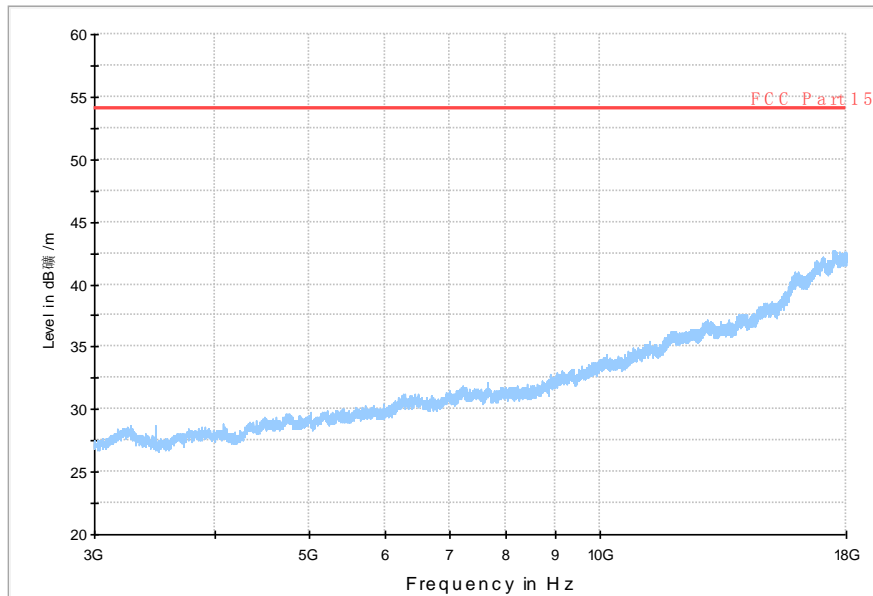


Fig.23. Radiated emission: GFSK, 2440MHz, 3 GHz - 18 GHz

RE 30MHz-1GHz

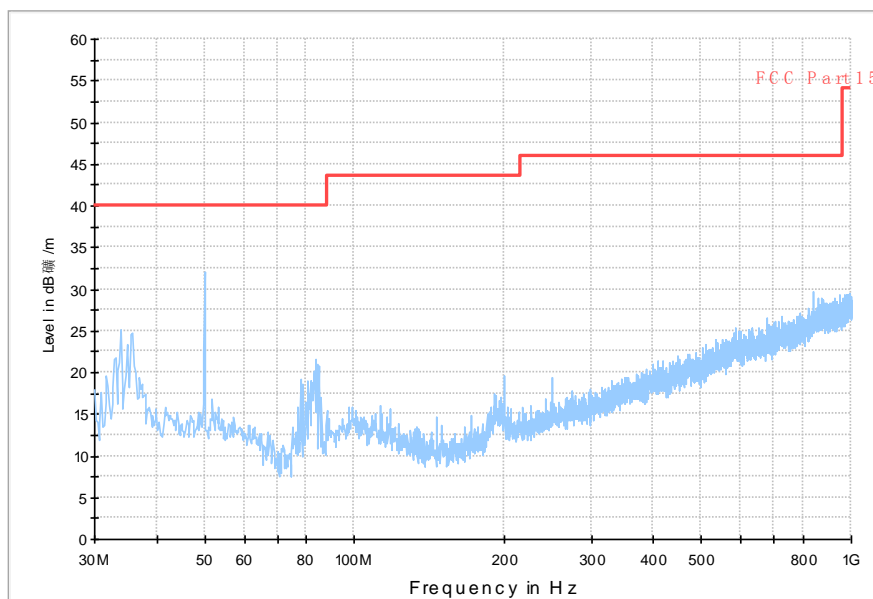


Fig.24. Radiated emission: GFSK, 2480MHz, 30 MHz - 1 GHz

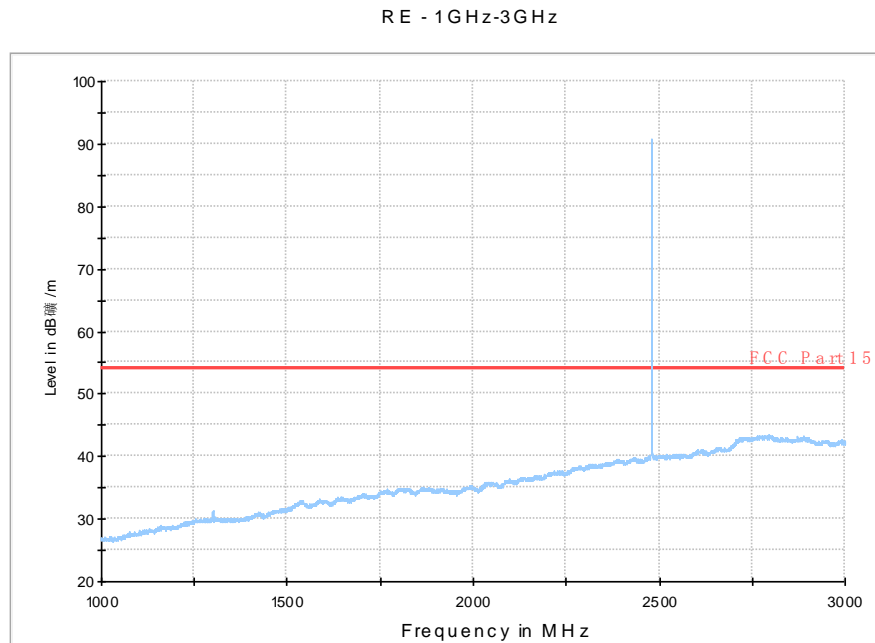


Fig.25. Fig.47 Radiated emission: GFSK, 2480MHz, 1 GHz - 3 GHz

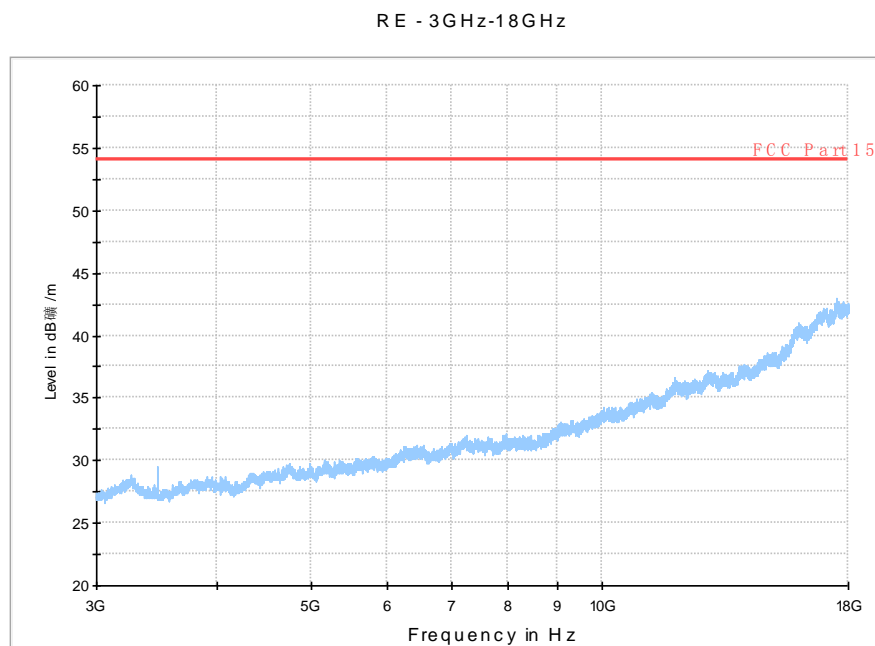


Fig.26. Radiated emission: GFSK, 2480MHz, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz

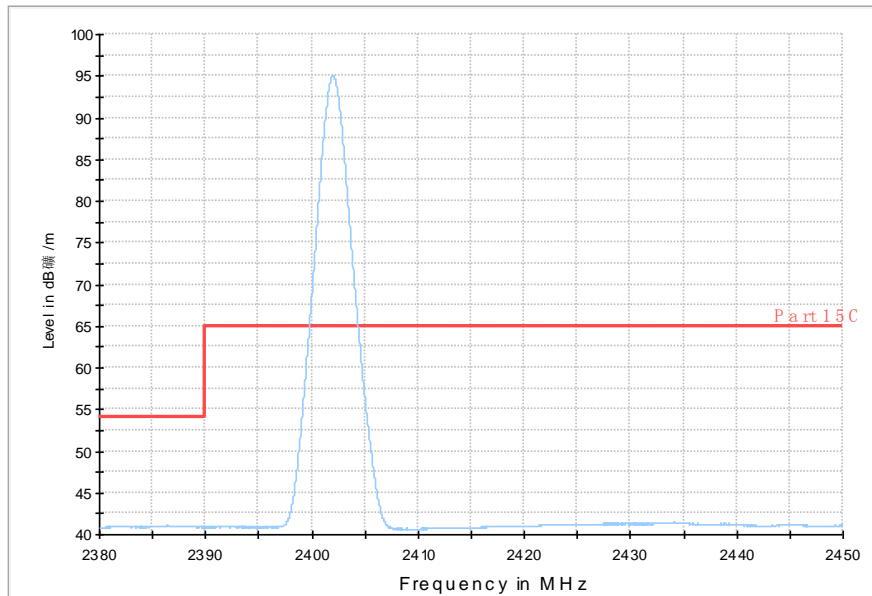


Fig.27. Radiated emission (Power): GFSK, low channel

RE - Power-2.45GHz-2.5GHz

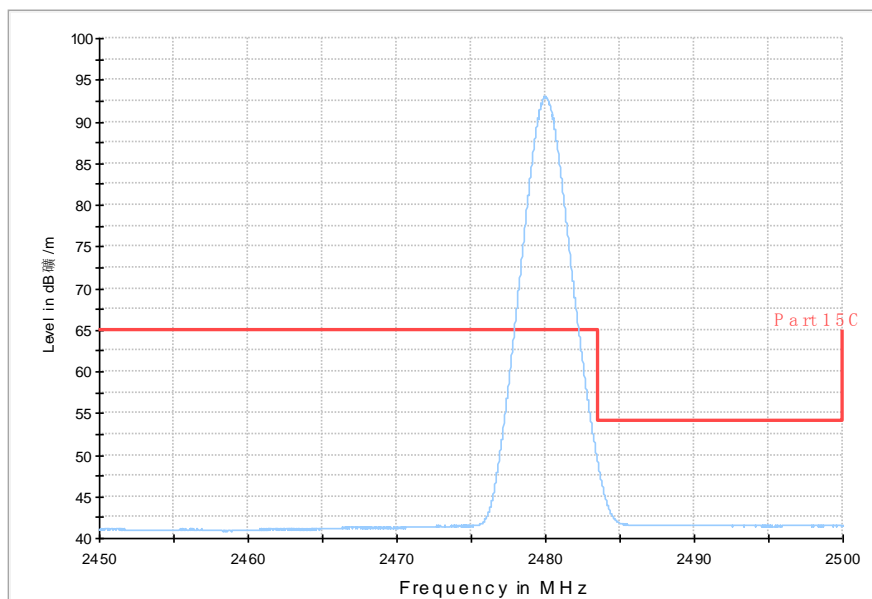


Fig.28. Radiated emission (Power) GFSK, high channel



FCC 18-26.5G

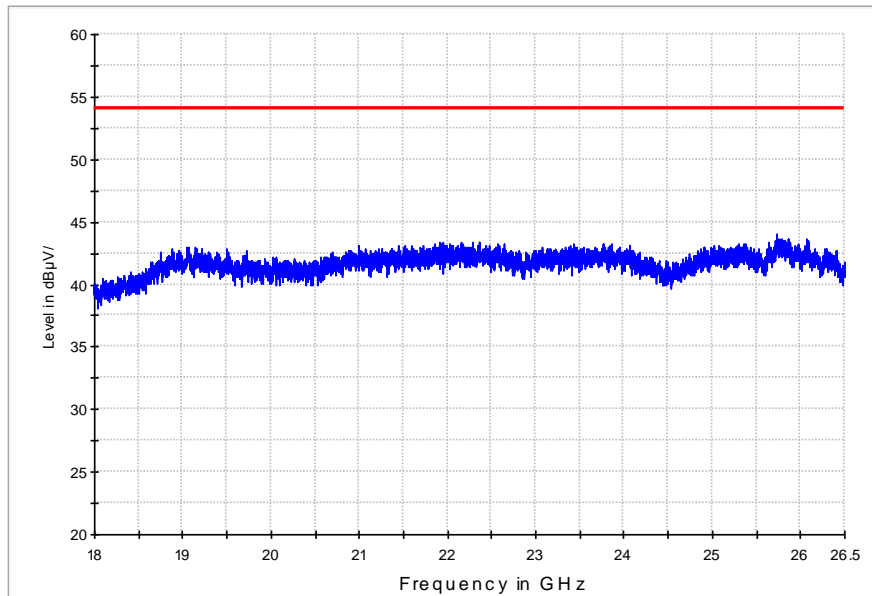


Fig.29. Radiated emission: GFSK, 18 GHz - 26 GHz

### A.6. 6dB Bandwidth

#### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)(2)	$\geq 500\text{KHz}$

The measurement is made according to KDB 558074 and ANSI C63.10

#### Measurement Condition:

RBW=10KHz; VBW=30KHz; SPAN=2MHz; Detector: peak

#### Measurement Results:

EUT ID: #22863

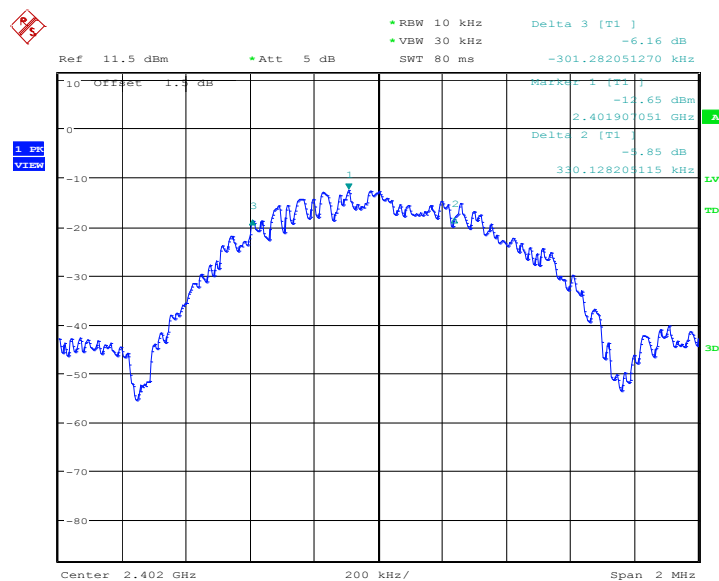
For GFSK

Channel	6dB Bandwidth (kHz)		Conclusion
2402MHz	Fig.30.	631.41	P
2440MHz	Fig.31.	673.08	P
2480MHz	Fig.32.	698.72	P

Measurement Uncertainty: $\pm 1.1\text{KHz}$

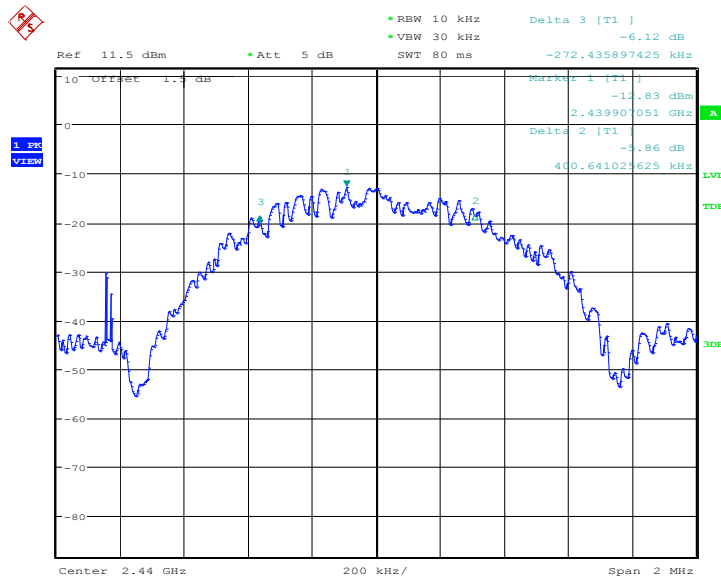
Conclusion:PASS

Test graphs as below:



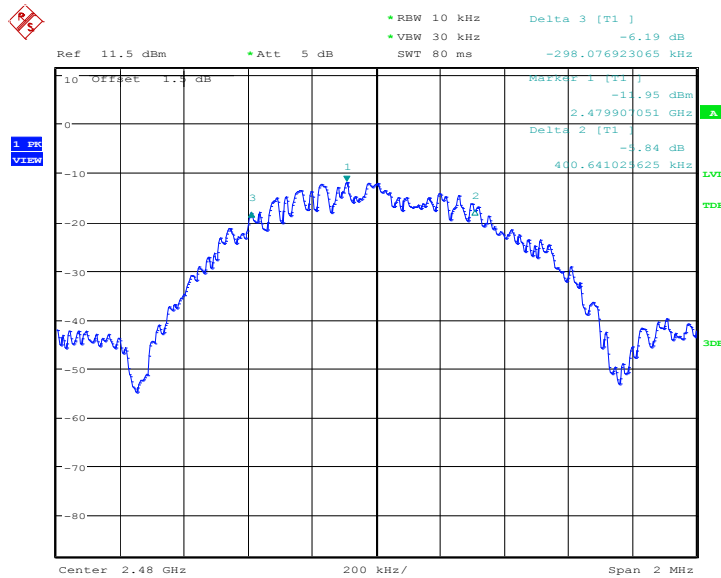
Date: 18.SEP.2012 07:16:34

Fig.30. 6dB Bandwidth: GFSK, 2402 MHz



Date: 18.SEP.2012 07:11:34

Fig.31. 6dB Bandwidth: GFSK, 2440 MHz



Date: 18.SEP.2012 07:04:27

Fig.32. 6dB Bandwidth: GFSK, 2480 MHz

### A.7. Maximum Power Spectral Density Level

#### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(e)	<=8.0dBm

The measurement is made according to the section 5.3.1 of KDB 558074: Use the peak marker function of spectrum analyzer to determine the maximum power level in any 100 kHz band. Then Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3\text{ kHz}/100\text{kHz} = -15.2\text{ dB})$

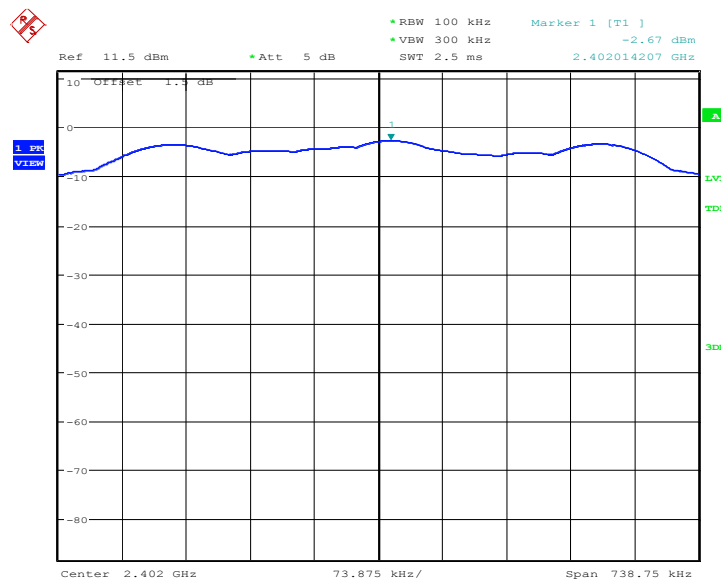
#### Measurement Results:

EUT ID: #22863

For GFSK

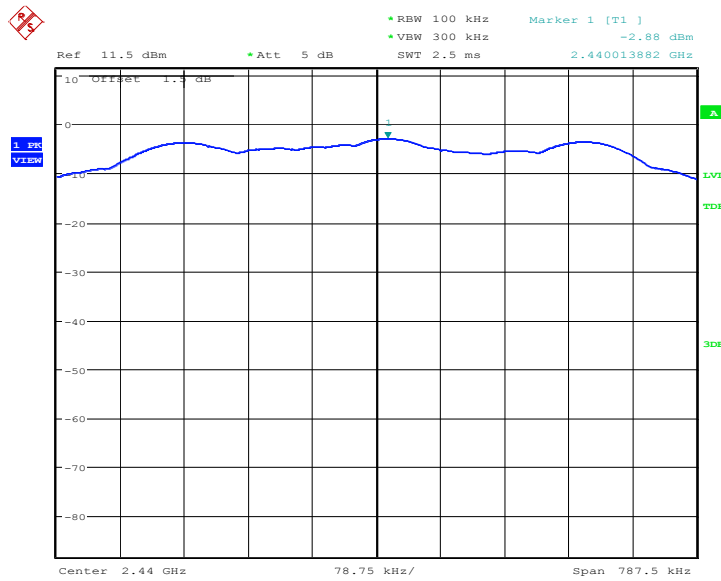
Frequency	Maximum Power Spectral Density Level(dBm)	Conclusion
2402MHz	Fig.33.	P
2440MHz	Fig.34.	P
2480MHz	Fig.35.	P

Test graphs as below:



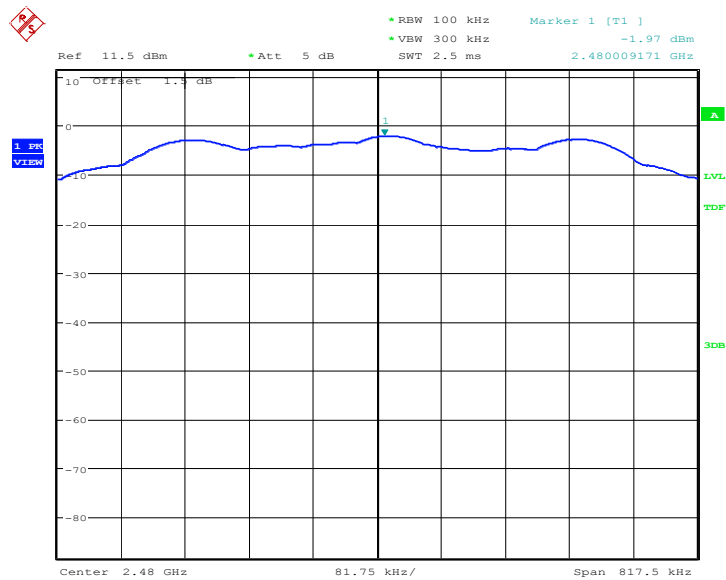
Date: 18.SEP.2012 07:17:02

Fig.33. Maximum Power Spectral Density Level Function: GFSK, 2402 MHz



Date: 18.SEP.2012 07:12:01

Fig.34. Maximum Power Spectral Density Level Function: GFSK, 2440 MHz



Date: 18.SEP.2012 07:04:55

Fig.35. Maximum Power Spectral Density Level Function: GFSK, 2480 MHz

### A.8. Time of Occupancy (Dwell Time)

**Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247(a) (1)(iii)	< 400 ms

**Measurement Condition:**

RBW=1MHz; VBW=1MHz; SPAN=0; Detector: peak

**Measurement Results:**

**EUT ID: #22863**

**For GFSK**

Channel	Packet	Pulse Time(μs)		Conclusion
		Fig.36		
2440MHz	DH1	Fig.36	397.44	<b>P</b>

Time slot length: 625us

Number of channels: 40

Number of time slots per second: 1600/s

Number of transmitter's time slots per second: 1600/2/s

Max. number of transmissions per channel in 1s:  $1600/2/s / 40 = 20$

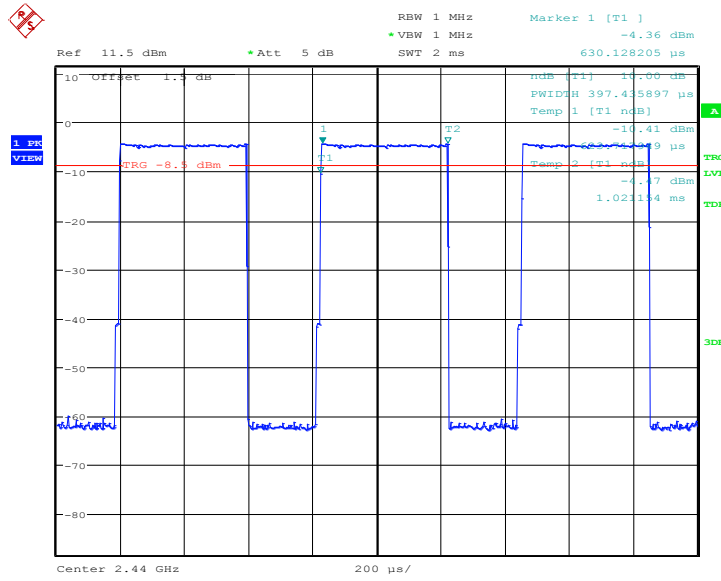
Period: Number of channels  $\times$  0.4s =  $40 \times 0.4s = 16s$

Max. number of transmissions per channel in 16s:  $20 \times 16 = 320$

**Dwell time = Pulse Time  $\times$  number of transmission per channel in 16 seconds =  $0.39744 \times (1600/2/40) \times 0.4 \times 40 = 127.18$  ms**

**See test graphs as following.**

**Conclusion: PASS**



Date: 10.OCT.2012 05:57:53

Fig.36. Pulse Time Measurement at 2440MHz

### A.9. Carrier Frequency Separation

**Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247(a)(1)	over 25 kHz or (2/3) * 20dB bandwidth

**Measurement Condition:**

RBW=300KHz; VBW=300KHz; SPAN=6MHz; Detector: peak

**Measurement Results:**

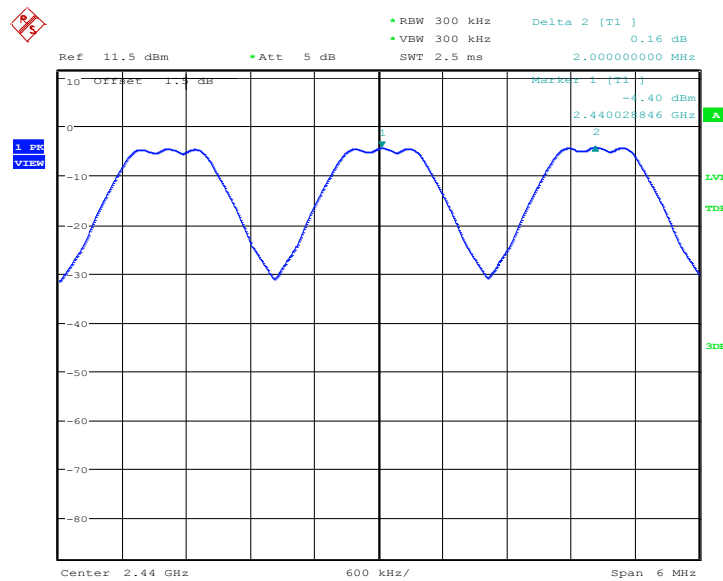
EUT ID: #22863

For GFSK

Channel	Carrier frequency separation (kHz)	Conclusion
2440MHz	Fig.37	P

See test graphs as following.

Conclusion: PASS



Date: 10.OCT.2012 06:01:26

Fig.37. Carrier frequency separation



### A.10. Number of Hopping Channels

**Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247(a)(1)	At least 15 non-overlapping channels

**Measurement Condition:**

RBW=500KHz; VBW=500KHz; Start Frequency=2400MHz; Stop Frequency=2485MHz;  
Detector: peak

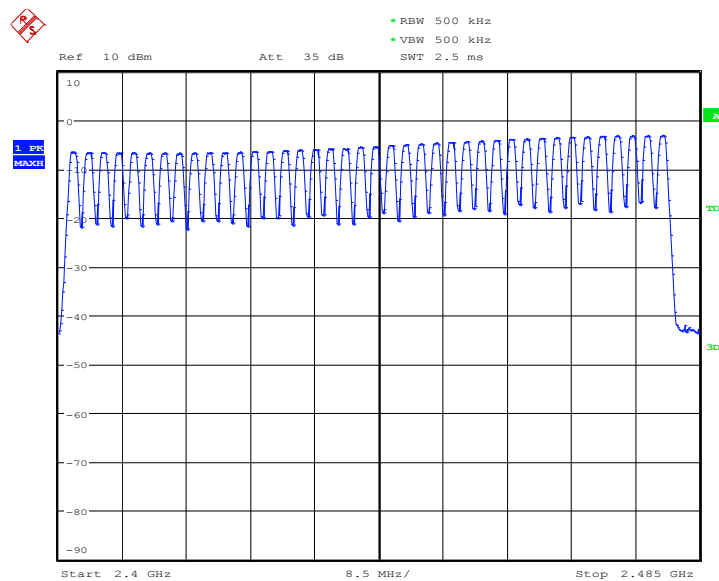
**Measurement Results:**

EUT ID: #22863

For GFSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.38	40	<b>P</b>

**Conclusion: Pass**



Date: 10.OCT.2012 06:19:17

Fig.38. Number of hopping frequencies, Channel 0 ~39

### A.11. 20dB Bandwidth

#### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)(1)	Bandwidth < 3/2 * Channel spacing

#### Measurement Condition:

RBW=30KHz; VBW=30KHz; SPAN = 2MHz; Detector:peak

#### Measurement Results:

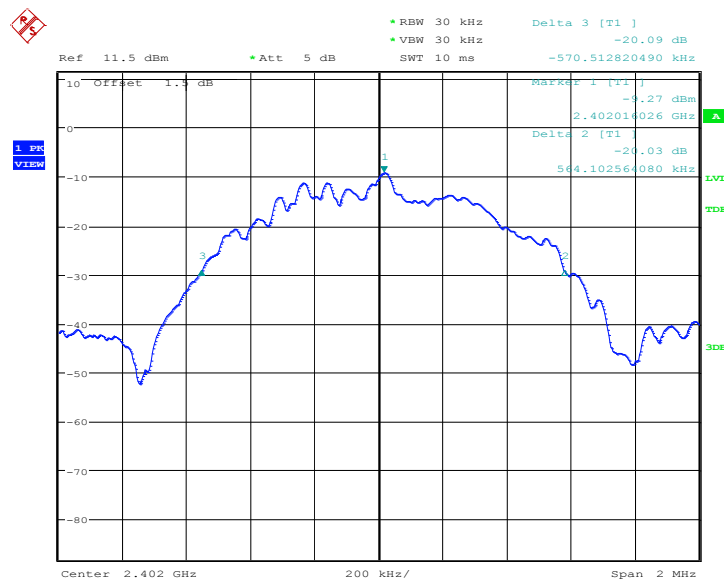
EUT ID: #22863

For GFSK

Channel	20dB Bandwidth (kHz)	Conclusion
2402MHz	Fig.39.	P
2440MHz	Fig.40.	P
2480MHz	Fig.41.	P

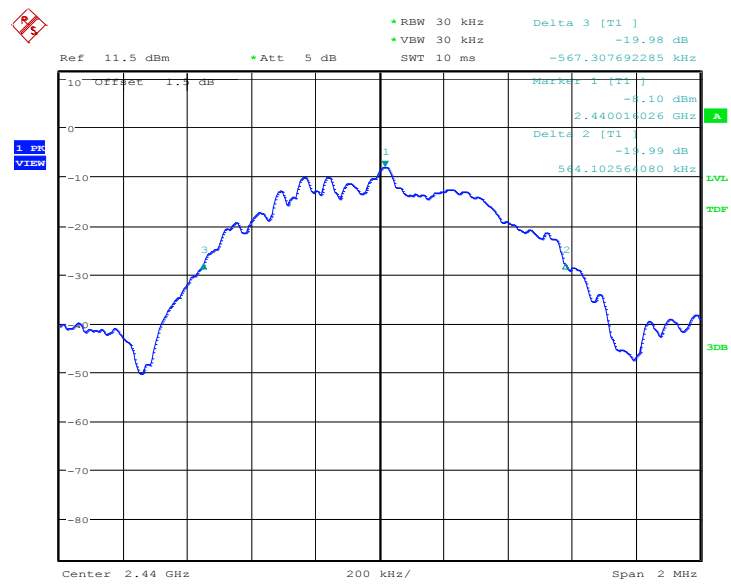
Conclusion:PASS

Test graphs as below:



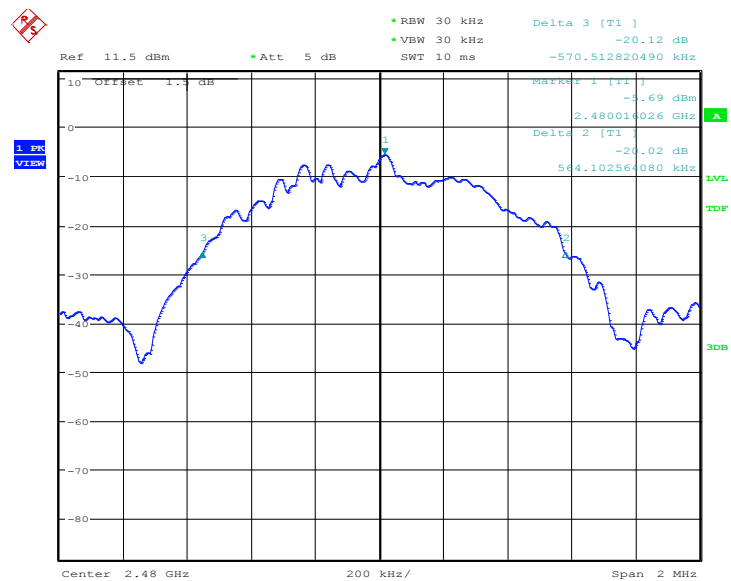
Date: 10.OCT.2012 08:31:07

Fig.39. 20dB Bandwidth: GFSK, 2402 MHz



Date: 10.OCT.2012 08:36:06

Fig.40. 20dB Bandwidth: GFSK, 2440 MHz



Date: 10.OCT.2012 08:41:22

Fig.41. 20dB Bandwidth: GFSK, 2480 MHz

### A.12. AC Powerline Conducted Emission

Standard
FCC 47 CFR Part 15.107, 15.207

#### Test Condition

Voltage (V)	Frequency (Hz)
120	60

#### Measurement Result and limit:

EUT ID: #22861

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		With Charger		
0.15 to 0.5	66 o 56	Fig.42. (TX Mode)	Fig.43. (Idle Mode)	<b>P</b>
0.5 to 5	56			
5 to 30	60			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Bluetooth (Average Limit)

Frequency range (MHz)	Average Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		With Charger		
0.15 to 0.5	56 to 46	Fig.42 (TX Mode)	Fig.43 (Idle Mode)	<b>P</b>
0.5 to 5	46			
5 to 30	50			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to KDB 558074 and ANSI C63.10

Note: the graphic result above is the maximum of the measurements for both phase line and neutral line.

**Conclusion: PASS**

**Test graphs as below:**

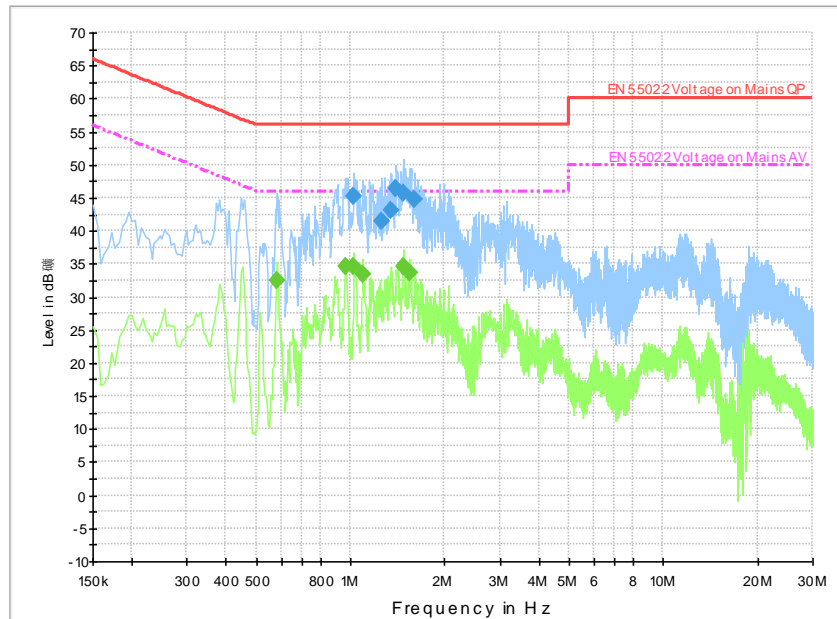


Fig.42 AC Powerline Conducted Emission with charger-TX Mode

### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.027500	45.3	GND	L1	10.0	10.7	56.0
1.252500	41.4	GND	L1	10.0	14.6	56.0
1.351500	43.0	GND	L1	10.0	13.0	56.0
1.401000	46.3	GND	L1	10.0	9.7	56.0
1.473000	45.6	GND	L1	10.0	10.4	56.0
1.599000	44.7	GND	L1	10.0	11.3	56.0

### Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.582000	32.4	GND	L1	10.0	13.6	46.0
0.960000	34.7	GND	L1	10.0	11.3	46.0
1.027500	34.6	GND	L1	10.0	11.4	46.0
1.095000	33.4	GND	L1	10.0	12.6	46.0
1.473000	34.6	GND	L1	10.0	11.4	46.0
1.540500	33.7	GND	L1	10.0	12.3	46.0

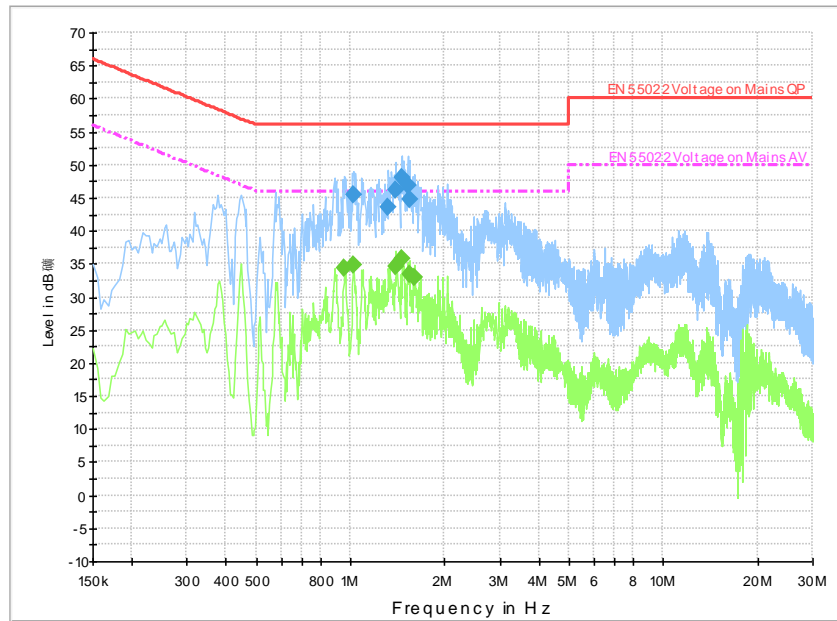


Fig.43 AC Powerline Conducted Emission with charger-Idle Mode

### Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.023000	45.4	GND	L1	10.0	10.6	56.0
1.320000	43.5	GND	L1	10.0	12.5	56.0
1.396500	46.1	GND	L1	10.0	9.9	56.0
1.459500	48.1	GND	L1	10.0	7.9	56.0
1.522500	46.9	GND	L1	10.0	9.1	56.0
1.549500	44.8	GND	L1	10.0	11.2	56.0

### Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.955500	34.4	GND	L1	10.0	11.6	46.0
1.023000	34.8	GND	L1	10.0	11.2	46.0
1.396500	34.5	GND	L1	10.0	11.5	46.0
1.459500	35.8	GND	L1	10.0	10.2	46.0
1.540500	33.3	GND	L1	10.0	12.7	46.0
1.599000	33.0	GND	L1	10.0	13.0	46.0

### A.13 Receiver Radiation Emission

#### Reference

FCC: CFR Part 15.109, 2.1053

#### A.13.1 Method of Measurement

The measurement procedure in ANSI C64.4-2003 is used. The EUT is placed on a 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10m. For frequency range above 1GHz, the measurement distance is 3m.

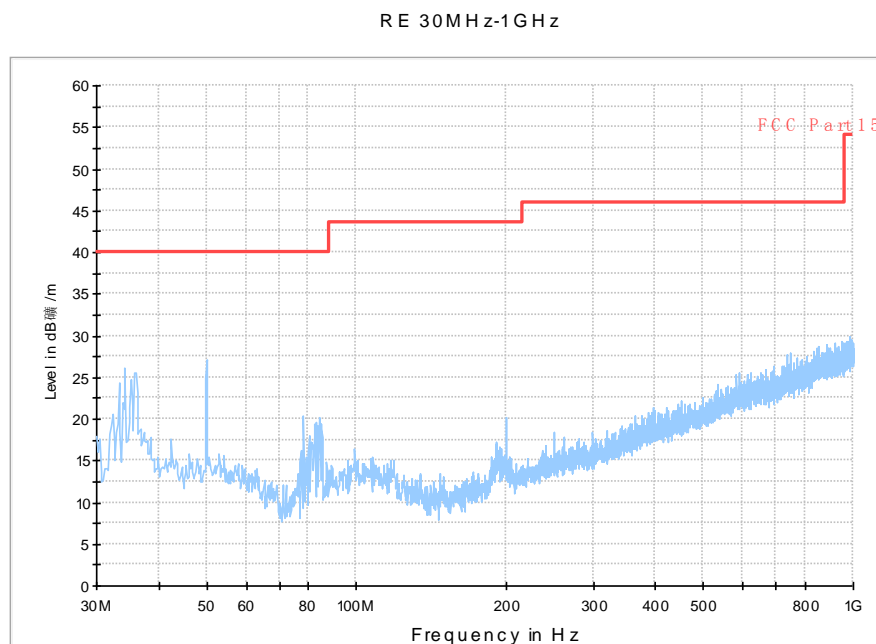
The EUT is measured with travel charger and the operating mode is idle without CMU200's signaling.

#### A.13.2 Method of Measurement

Frequency of Emission (MHz)	Limit (dB $\mu$ V/m)	Measurement Distance (m)
30-88	30	10
88-216	33.5	10
216-960	36	10
960-1000	44	10
>1000	54	3

#### A. 13.3 Measurement results

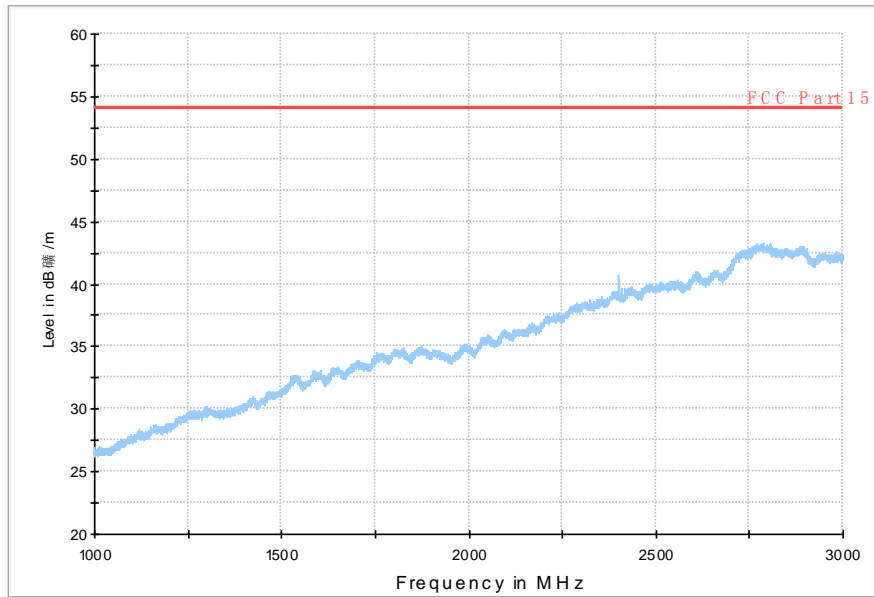
IF bandwidth: 120 kHz



**Idle Mode: 30MHz-1GHz**

RBW / VBW 1 MHz

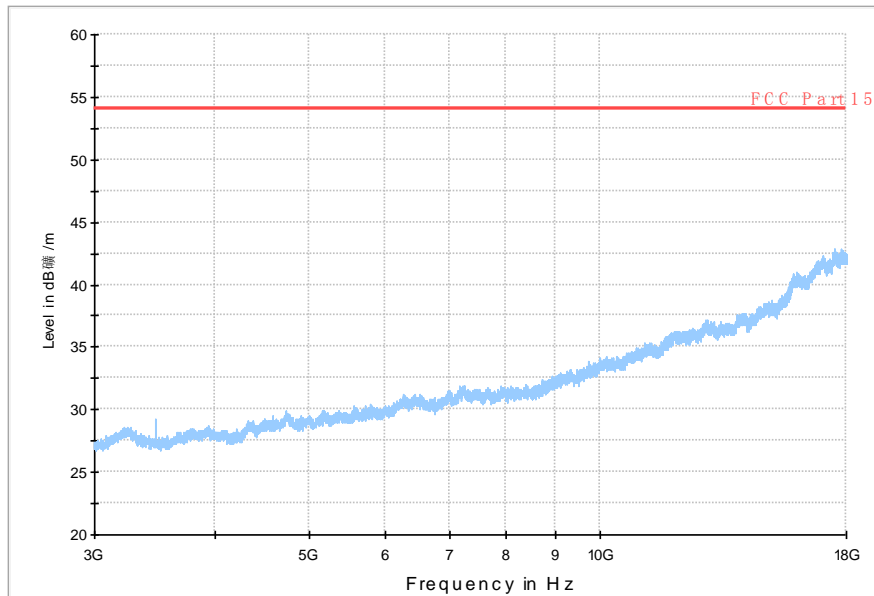
RE - 1GHz-3GHz



**Idle Mode: 1GHz-3GHz**

RBW / VBW 1 MHz

RE - 3GHz-18GHz



**Idle Mode: 3GHz-18GHz**