SGS-CSTC Standards Technical Services Co., Ltd.

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technological Development District, Guangzhou, China 510663
Telephone: +86 (0) 20 82155555
Fax: +86 (0) 20 82075059
Email: ee.guangzhou@sgs.com

TEST REPORT

Application No.:	GZEM1411005887ME
Applicant:	Design Manufacture Distribution LLC
Manufacturer:	Greater Goods, LLC
FCC ID:	2ADUL0380
Product Name:	Bluetooth Module
Product Description:	Wireless control Body Fat Analyzer with 2.4 GHz as carrier.
Model No.:	AW8001
Product Name of Host:	Glass Body Fat Analyzer
Product Description of Host:	Glass Body Fat Analyzer with 2.4 GHz as carrier
Model No. of Host:	0376, 0375♣
♣	Please refer to section 3 of this report for details
Standards:	CFR 47 FCC PART 15 Subpart C: 2013 section 15.247
Date of Receipt:	2014-9-18
Date of Test:	2014-10-16 to 2014-10-21
Date of Issue:	2014-12-12 (for the original report GZEM140900500401) 2015-01-12 (for the updated report GZEM140900500403)
Test Result :	**Pass***

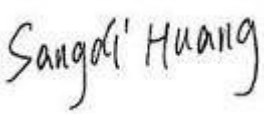
* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 3 of this report for further detail.

Authorized Signature:

Jerry Chan
Manager

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2014-12-12		Original
01		2015-01-12		Change the applicant and model number. Add Manufacturer.

Authorized for issue by:				
Tested By		 **(Sangdi Huang) /Project Engineer**		2014-10-16 to 2014-10-21 **Date**
Prepared By		 **(June Chen) /Clerk**		2014-10-31 **Date**
Checked By		 **(Jerry Chan)/Reviewer**		2014-10-31 **Date**

3 Test Summary

TEST	TEST REQUIREMENT	TEST METHOD	RESULT
Antenna Requirement	FCC PART 15 C section 15.247 (c) and Section 15.203	FCC PART 15 C section 15.247 (c) and Section 15.203	PASS
6 dB Bandwidth	FCC PART 15 C section 15.247 (a)(2)	ANSI C63.10: Clause 6.9.1	N/A
Maximum Peak Output Power	FCC PART 15 C section 15.247(b)(3)	FCC/KDB-558074 D01 v03r01 Clause 9.1.1	PASS
Peak Power Spectral Density	FCC PART 15 C section 15.247(e)	ANSI C63.10: Clause 6.11.2.3	N/A
Conducted Spurious Emission	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10: Clause 6.7	PASS
Radiated Spurious Emission	FCC PART 15 C section 15.209 &15.247(d)	ANSI C63.10: Clause 6.4, 6.5 and 6.6	PASS
Band Edges Measurement	FCC PART 15 C section 15.247 (d) &15.205	FCC/KDB-558074 D01 v03r01 Clause 13.3.1	N/A

Remark1:

N/A: not applicable. It means that it has been tested. The result refers to report GZEM130500178601of FCC ID: OU9AW8001-LS EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

ANSI C63.10: the detail version is ANSI C63.10:2009 in the whole report.

♣Model No.: LS203-B, LS202-B5, LS202-B, LS202-B1, LS202-B1 Plus, LS202-B6, LS202-B6 Plus, LS203-B6, LS203-B6 Plus, LS102-B

According to the confirmation from the applicant, since the electrical circuit design, layout, wireless module, components used and internal wiring were identical for the above models, only difference being the appearance, model name, shell and software.

Therefore only model **LS202-B1** was tested in this report.

♣ Remark for the report GZEM140900500403:

This report GZEM140900500403 is a supplement report based on the original report GZEM140900500401. Only change applicant, address of applicant and model number.

1. Change the applicant to Design Manufacture Distribution LLC

2. Change the model number from LS203-B, LS202-B1 to 0376, 0375

3. Add Manufacturer. Greater Goods, LLC

According to the declaration from the applicant, the models 0376, 0375 in this report and model LS203-B, LS202-B1 in the original report were identical, only difference being the model name.

Therefore the original test data were kept in this report GZEM140900500403.

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5 General Information

5.1 Client Information

Applicant:	Design Manufacture Distribution LLC
Address of Applicant:	125N.main Street, Ste 202,Saint Charles MO 63301
Manufacturer:	Greater Goods, LLC
Address of Manufacturer:	125N.main Street, Ste 202,Saint Charles MO 63301

5.2 General Description of E.U.T.

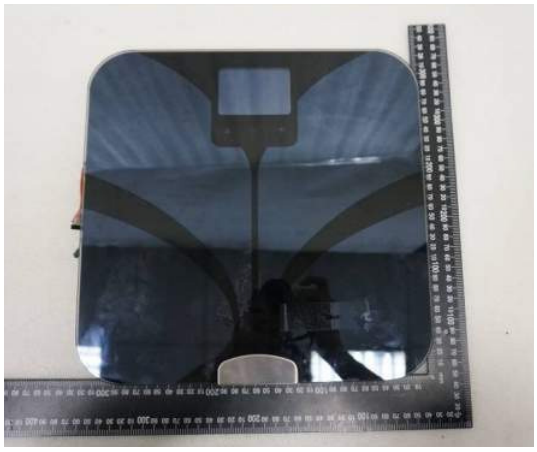
Product Name:	Bluetooth Module
Product Description:	Wireless control Body Fat Analyzer with 2.4 GHz as carrier.
Product Name of Host::	Glass Body Fat Analyzer
Model No. of Host:	LS202-B1

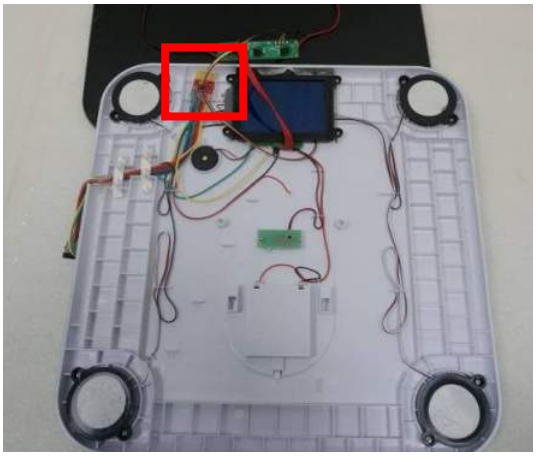
5.3 Details of E.U.T.

Operating Frequency	2402 MHz to 2480 MHz
Type of Modulation:	GFSK
Equipment types:	DSSS with Adaptive (LBT based DAA) Only one adaptive mode is implemented and could not operate in a non-adaptive mode.
Number of Channels	40 Channels
Channel Separation:	2 MHz
Duty Cycle:	Continuous operation possible for testing purposes
Antenna Type	Integral antenna
Antenna gain:	0 dBi
Speciality:	Bluetooth 4.0 Smart (Single mode)
Function:	Body Fat Analyzer with BT function to transmit and receive radio signal.
Power Supply:	Working voltage: DC 6V = 4 x 1.5V size ‘AAA’ batteries
Normal Test Voltage:	DC 6V
Power cord:	N/A

5.4 Description of Support Units

The EUT should be put inside the host. During test the transferred board was used for finding the fixed frequency. The information of the support units is shown as below:





5.5 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

5.6 Abnormalities from Standard Conditions

None.

5.7 Other Information Requested by the Customer

None.

5.8 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663
Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

5.9 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

  The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

  Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC (Registration No.: 282399)**

  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **Industry Canada (Registration No.: 4620B-1)**

  The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

- **VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)**

  The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co. Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460, C-2584，G-449 and T-1179 respectively.

- **CBTL (Lab Code: TL129)**

  SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01:2006-10 and Rules of procedure IECEE 02:2006-10, and the relevant IECEE CB-Scheme Operational documents.

6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date (YYYY-MM-DD)	Cal.Due date (YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2014-12-5	2015-12-5
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2014-04-19	2015-04-19
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2014-03-03	2015-03-03
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2014-05-09	2015-05-09
EMC2025	Trilog Broadband Antenna 30-1000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9160	9160-3372	2014-07-14	2017-07-14
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2013-08-31	2016-08-31
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2014-05-04	2017-05-04
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2013-08-31	2016-08-31
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2012-07-01	2015-07-01
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2014-03-03	2015-03-03
EMC2065	Amplifier	HP	8447F	N/A	2014-08-25	2015-08-25
EMC0075	310N Amplifier	Sonama	310N	272683	2014-03-03	2015-03-03
EMC0523	Active Loop Antenna	EMCO	6502	42963	2014-03-03	2016-03-03
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONI	BBHA 9170	9170-375	2014-05-26	2017-05-26
EMC2079	High Pass Filter(915MHz)	FSY MICROWAVE	HM1465-9SS	009	2014-03-28	2015-03-28
EMC2069	2.4GHz filter	Micro-Tronics	BRM 50702	149	2014-04-19	2015-04-19
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-05-03	2016-05-03

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date (YYYY-MM-DD)	Cal.Due date (YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2014-09-15	2015-09-15
EMC0007	DMM	Fluke	73	70671122	2014-09-15	2015-09-15

7 Test Results

7.1 E.U.T. test conditions

Test Voltage:	DC 6V
Temperature:	20.0 -25.0 °C
Humidity:	38-50 % RH
Atmospheric Pressure:	1000 -1010 mbar
Requirements:	**15.31(e):** For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery. **15.32:** Power supplies and CPU boards used with personal computers and for which separate authorizations are required to be obtained shall be tested as follows: Testing shall be in accordance with the procedures specified in Section 15.31 of this part.
Test frequencies and frequency range:	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: According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz 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

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	27	2456
1	2404	28	2458
2	2406	29	2460
3	2408	30	2462
4	2410	31	2464
5	2412	32	2466
6	2414	33	2468
7	2416	34	2470
8	2418	35	2472
9	2420	36	2474
10	2422	37	2476
11	2424	38	2478
12	2426	39	2480
13	2428	40	/
14	2430	41	/
15	2432	42	/
16	2434	43	/
17	2436	44	/
18	2438	45	/
19	2440	46	/
20	2442	47	/
21	2444	48	/
22	2446	49	/
23	2448	50	/
24	2450	51	/
25	2452	52	/
26	2454	53	/

Test frequencies are the lowest channel: 0 channel(2402MHz), middle channel: 20 channel(2442 MHz) and highest channel: 39 channel(2480 MHz)

7.2 Antenna Requirement

Standard requirement

15.203 requirement:

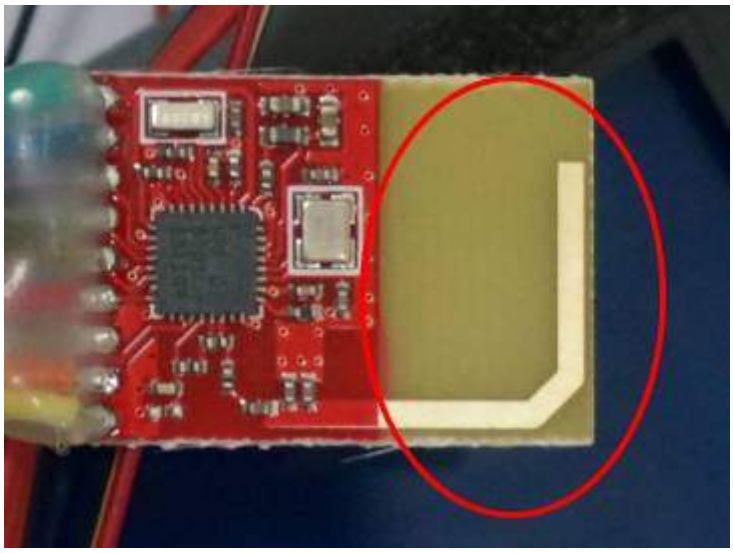
For intentional device. According to 15.203. an intentional radiator shall be designed to Ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz bands that are used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna

The antenna is Integral antenna and no consideration of replacement. The best case gain of the antenna is 0 dBi.



Test result: The unit does meet the FCC requirements.

7.3 Maximum Peak Output Power

Test Requirement: FCC Part 15 C section 15.247

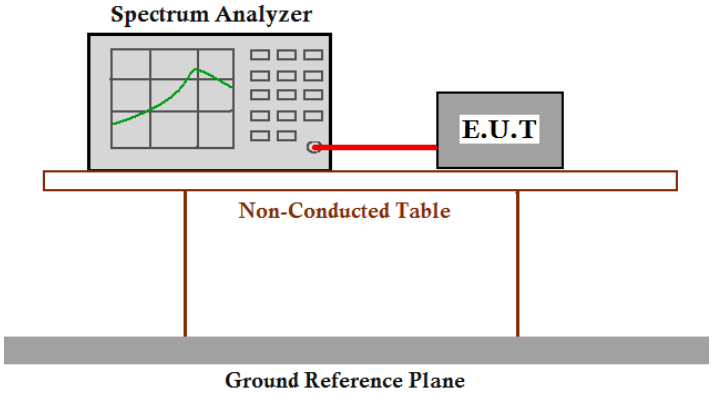
(b)(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

Except as shown in paragraph (c) of this section, 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 in paragraphs (b) (1), (b) (2), and (b) (3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Method: FCC/KDB-558074 D01 v03r01 9.1.1 RBW≥DTS bandwidth

Test Status: Enter test mode for the product. Test in Channel lowest (2402MHz), middle (2442MHz) and highest (2480MHz), keep in continuously transmitting status.

Test Configuration:



Test Procedure:

1. Remove the antenna from the EUT and then connect a low attention attenuation RF cable (Cable loss =1.5dB) from the antenna port to the spectrum.
2. Set the RBW≥DTS bandwidth
3. Set the VBW ≥ 3 x RBW
4. Set the span ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Use peak marker function to determine the peak amplitude level.
9. Report the worse case.

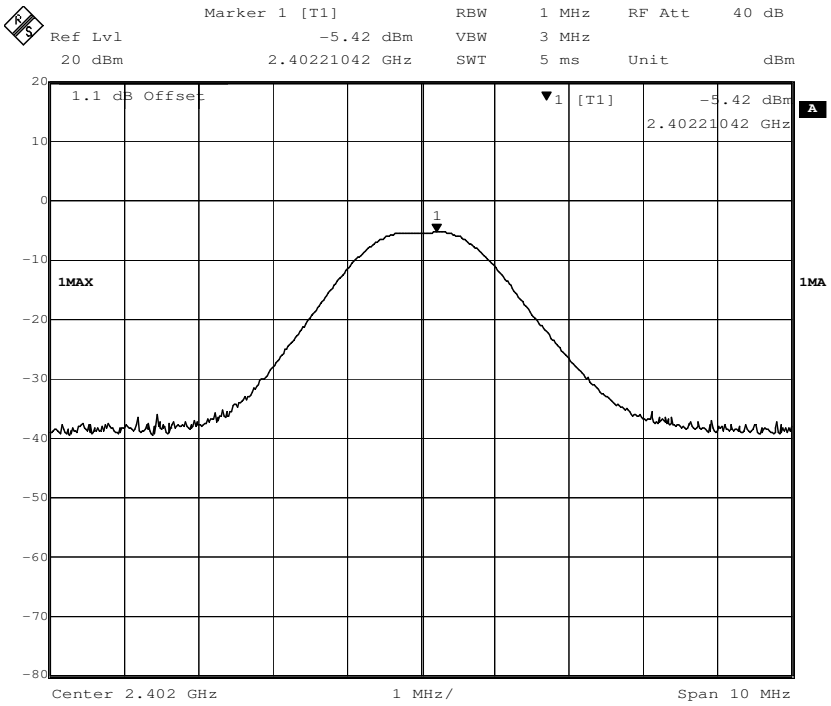
Test result:

Channel No.	Frequency (MHz)	Mode	Data Rate	Measured Channel Power (dBm)	Limit	Result
0	2402	GFSK	1Mbps	-5.42	1W(30dBm)	Pass
20	2442		1Mbps	-4.15		Pass
39	2480		1Mbps	-3.91		Pass

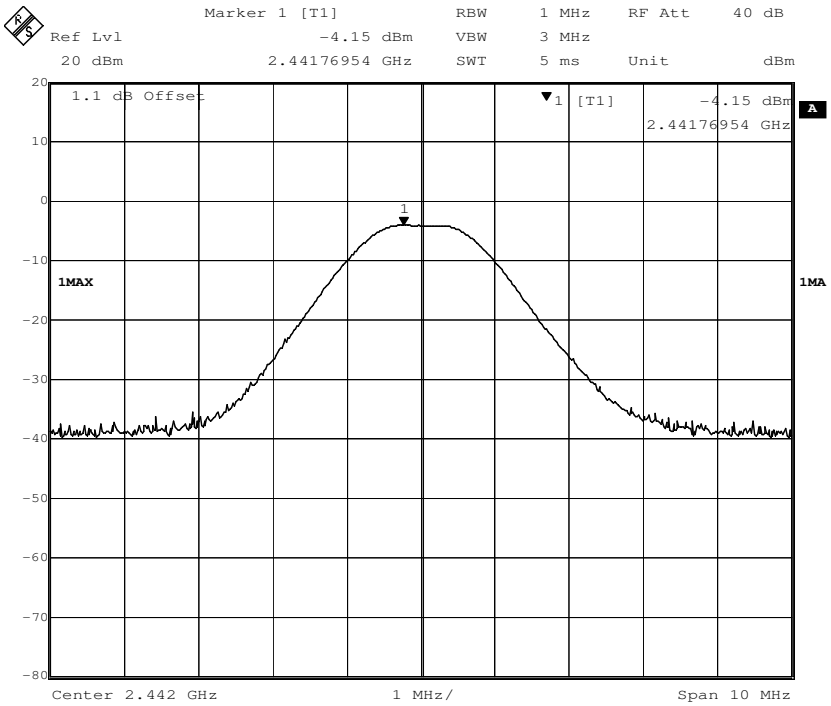
Remark: Level = Read Level + Cable Loss.
The unit does meet the FCC requirements.

Result plot as follows:

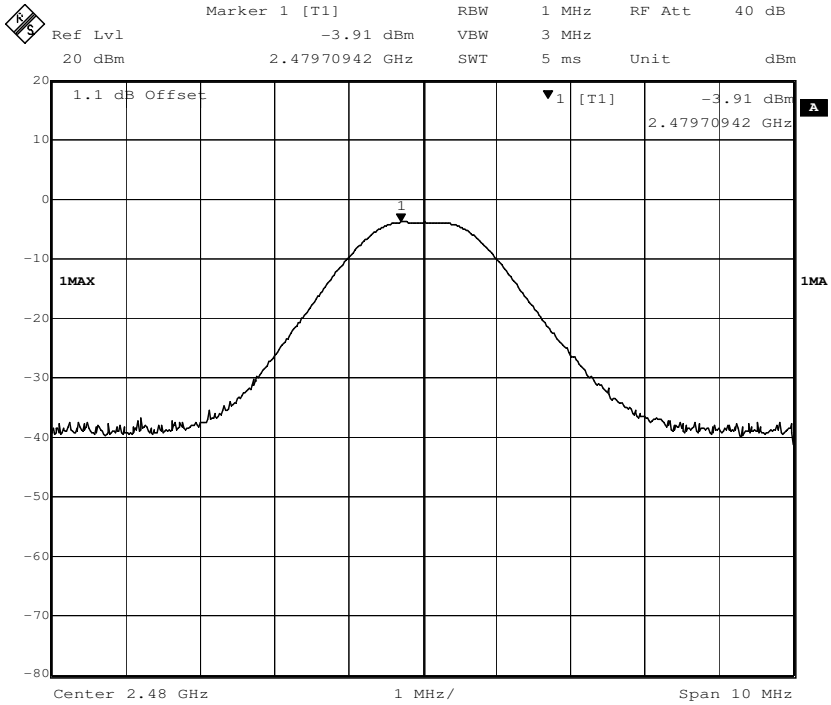
Channel 0:2.402GHz:



Channel 20:2.442GHz:



Channel 39:2.480GHz:



7.4 Conducted Spurious Emissions

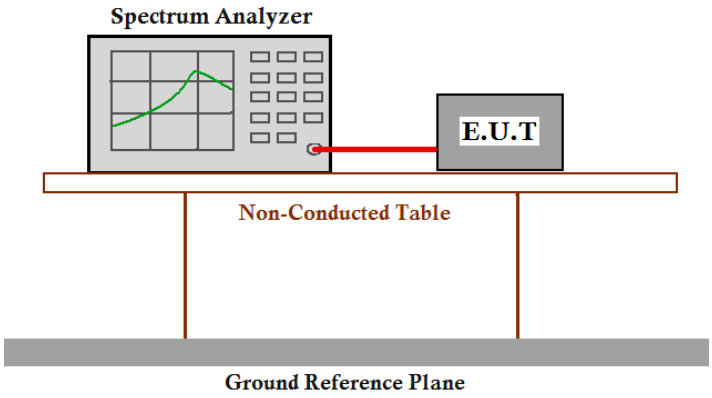
Test Requirement: FCC Part 15 C section 15.247

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Based on either an RF conducted or a radiated measurement. Provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Method: ANSI C63.10: Clause 6.7

Test Status: Enter test mode for the product. Test in lowest Channel 2402MHz, middle Channel 2442MHz and highest Channel 2480MHz, keep in continuously transmitting status.

Test Configuration:



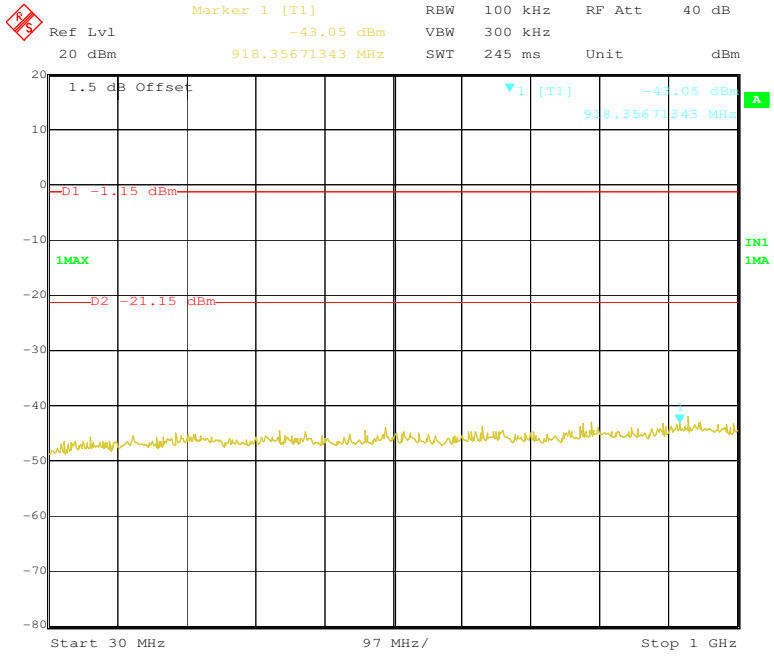
Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.
2. Set the spectrum analyzer: RBW=100 KHz, VBW = 300KHz. Sweep = auto; Detector Function = Peak. Trace = Max Hold, Scan up through 10th harmonic.
3. Measure the Conducted Spurious Emissions of the test frequency with special test status.
4. Repeat until all the test status is investigated.
5. Report the worse case.

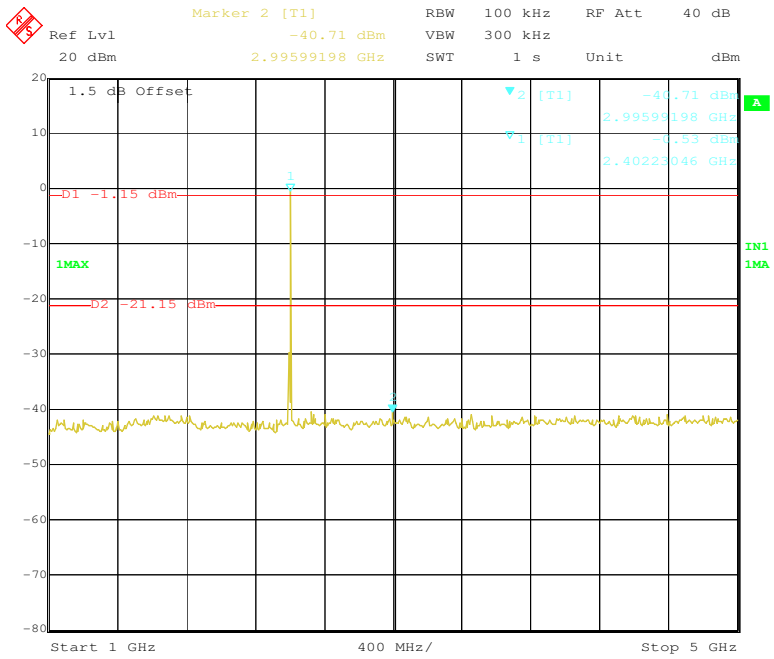
Result plot as follows:

Channel 0: 2.402 GHz

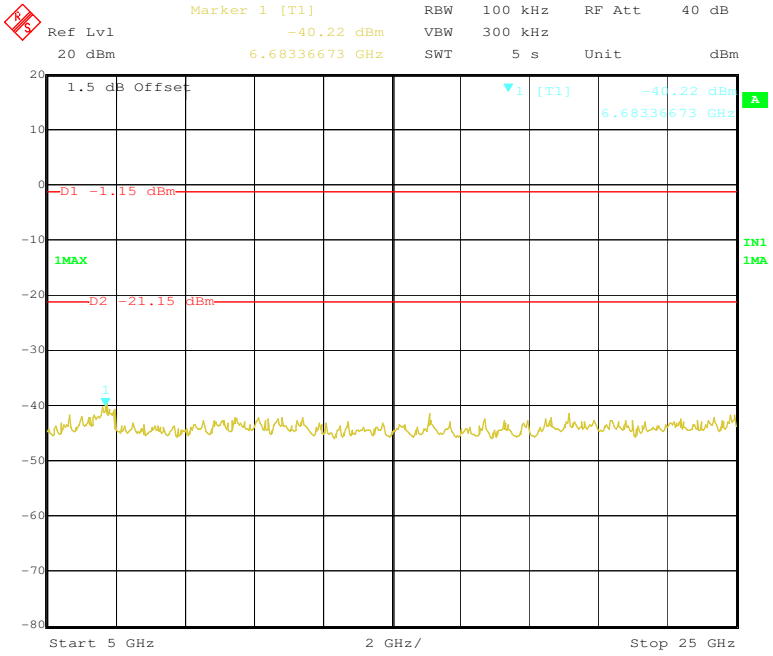
30 MHz to 1GHz



1GHz to 5GHz

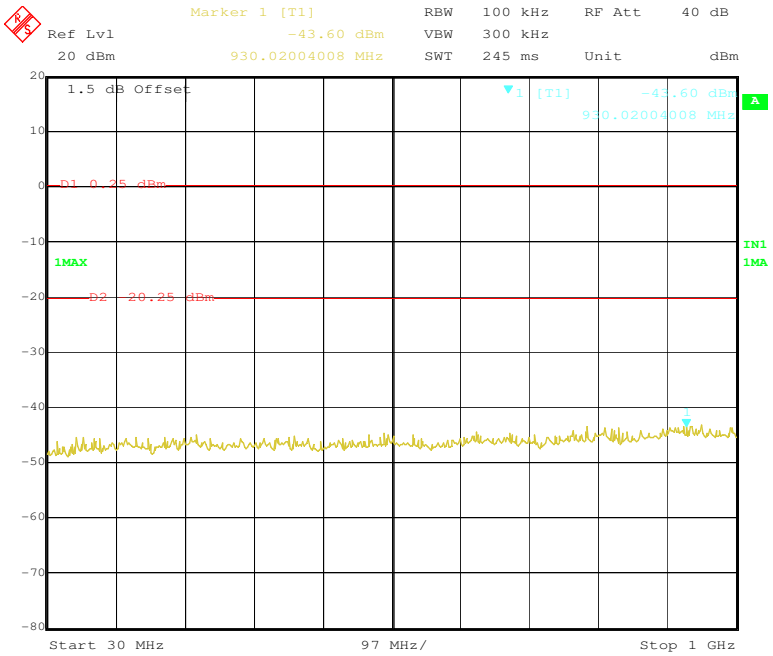


5GHz to 25GHz

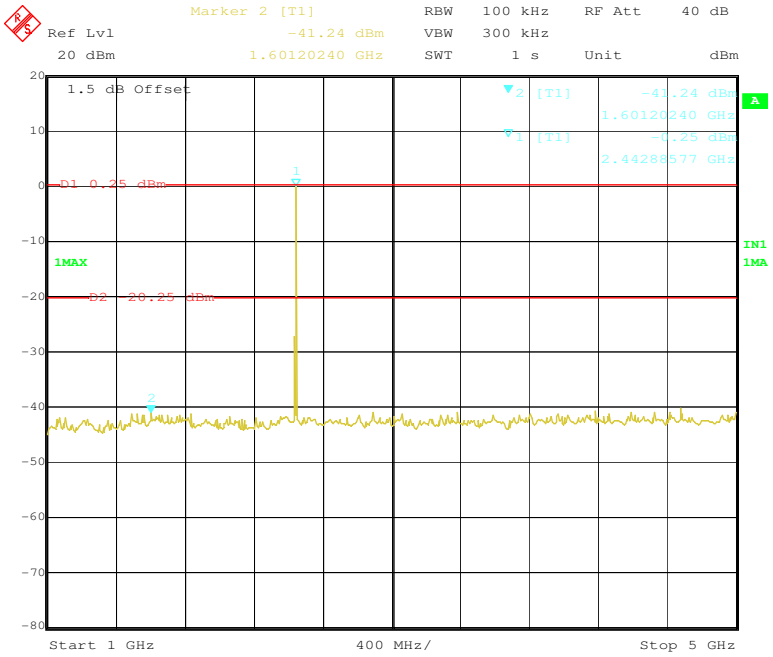


Channel 20:2.442GHz

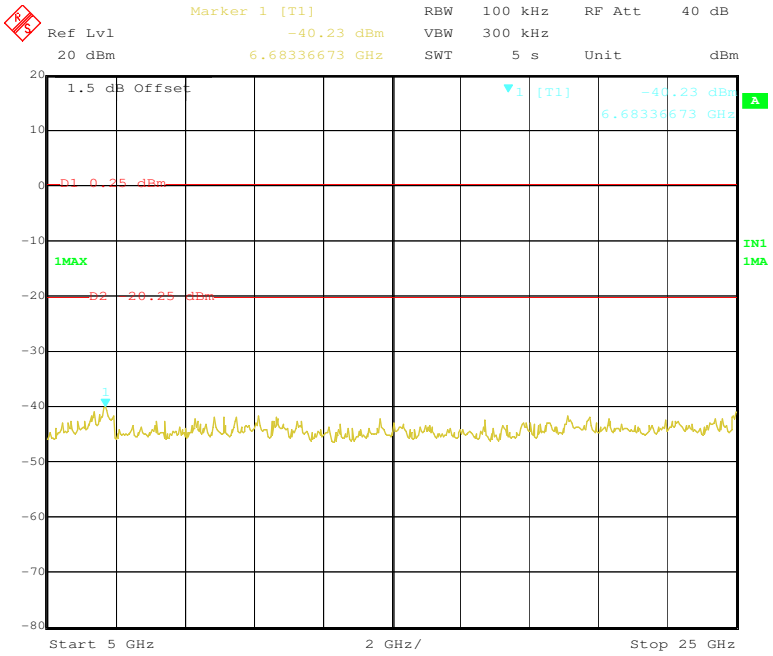
30 MHz to 1GHz



1GHz to 5GHz

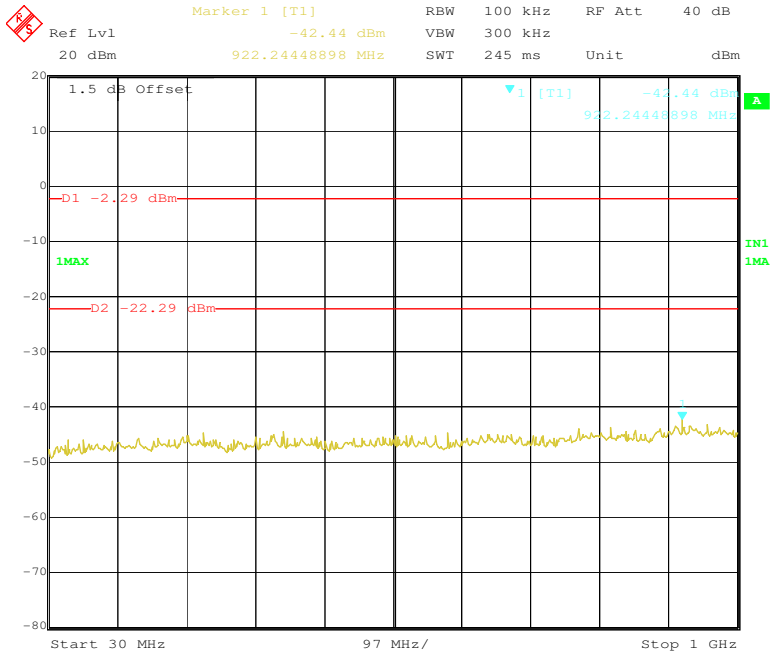


5GHz to 25GHz

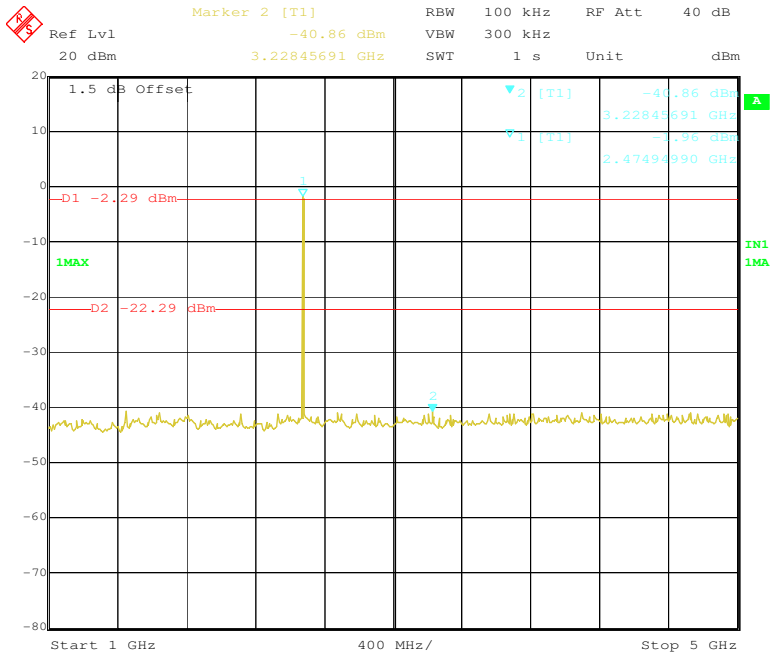


Channel 39:2.480GHz

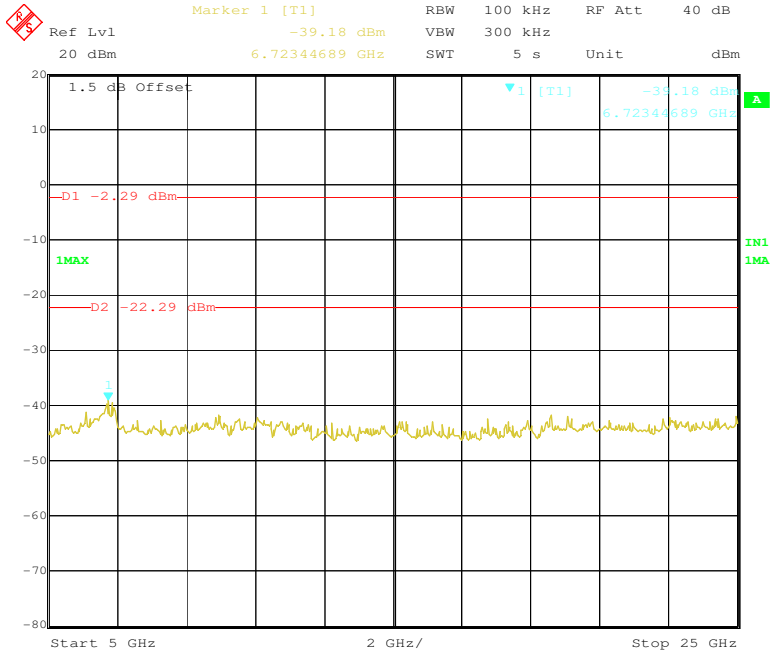
30 MHz to 1GHz



1GHz to 5GHz



5GHz to 25GHz

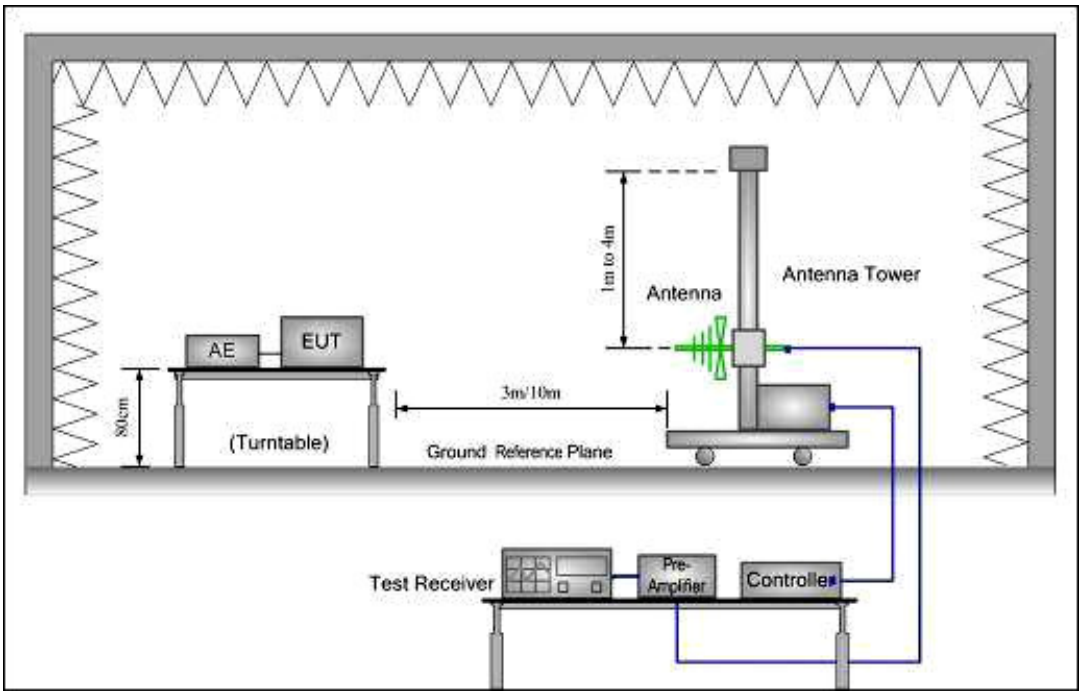


7.5 Radiated Spurious Emissions

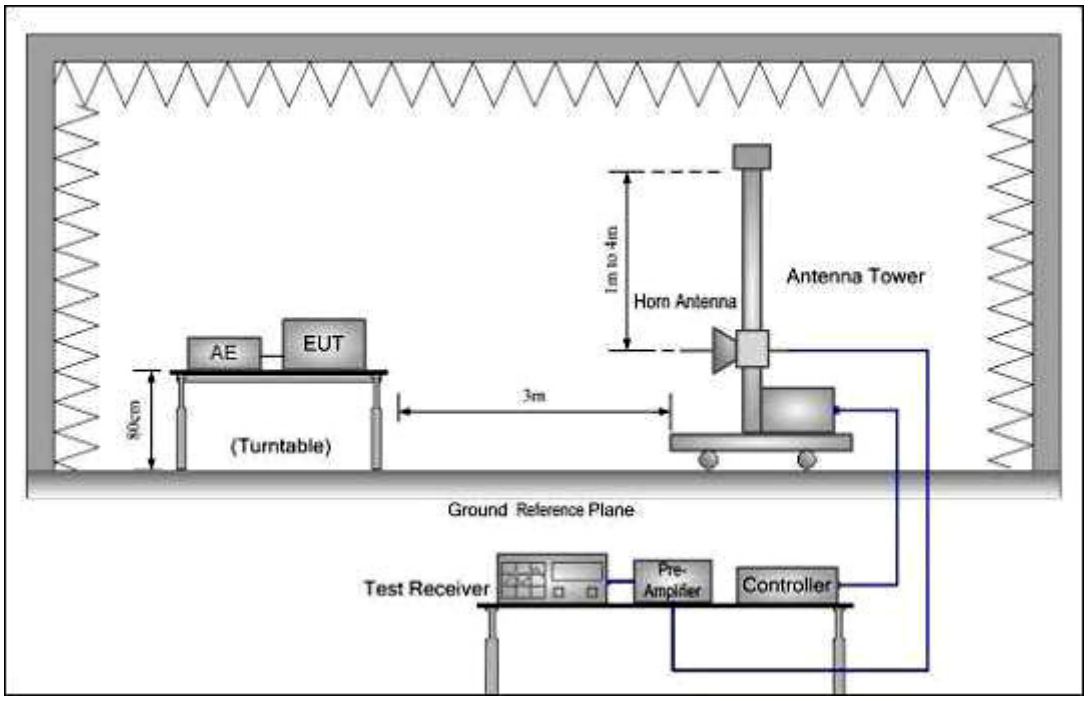
Test Requirement:	FCC Part 15 C section 15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that Contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, and provided the transmitter demonstrates compliance with the peak conducted power limits.
Test Method:	ANSI C63.10: Clause 6.4, 6.5 and 6.6
Test Status:	Enter test mode for the product. Test in lowest channel 2402 MHz and highest channel 2480 MHz, keep in continuously transmitting status with GFSK modulation.
Detector:	For PK value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW ≥ RBW Sweep = auto Detector function = peak Trace = max hold For AV value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW =10Hz Sweep = auto Detector function = peak Trace = max hold
15.209 Limit:	40.0 dBμV/m between 30MHz & 88MHz 43.5 dBμV/m between 88MHz & 216MHz 46.0 dBμV/m between 216MHz & 960MHz 54.0 dBμV/m above 960MHz

Test Configuration:

1) 30 MHz to 1 GHz emissions:



2) 1 GHz to 40 GHz emissions:



Test Procedure:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2007 was used to perform radiated emission test above 1 GHz.

The receiver scanned from the lowest frequency generated within the EUT to 25GHz.When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

From 30MHz to 1GHz, read the Quasi-Peak field strength of the emissions with receiver QP detector RBW=120KHz.

Above 1GHz, read the Peak field strength and Average field strength.

Read the Peak field strength through RBW=1MHz,VBW=3MHz in spectrum analyzer setting;

Read the Average field strength through RBW=1MHz,VBW=10Hz in spectrum analyzer setting;

While maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the average field strength reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit.

7.5.1 Harmonic and other spurious emissions

Test at Channel 0 (2.402 GHz) in transmitting status

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

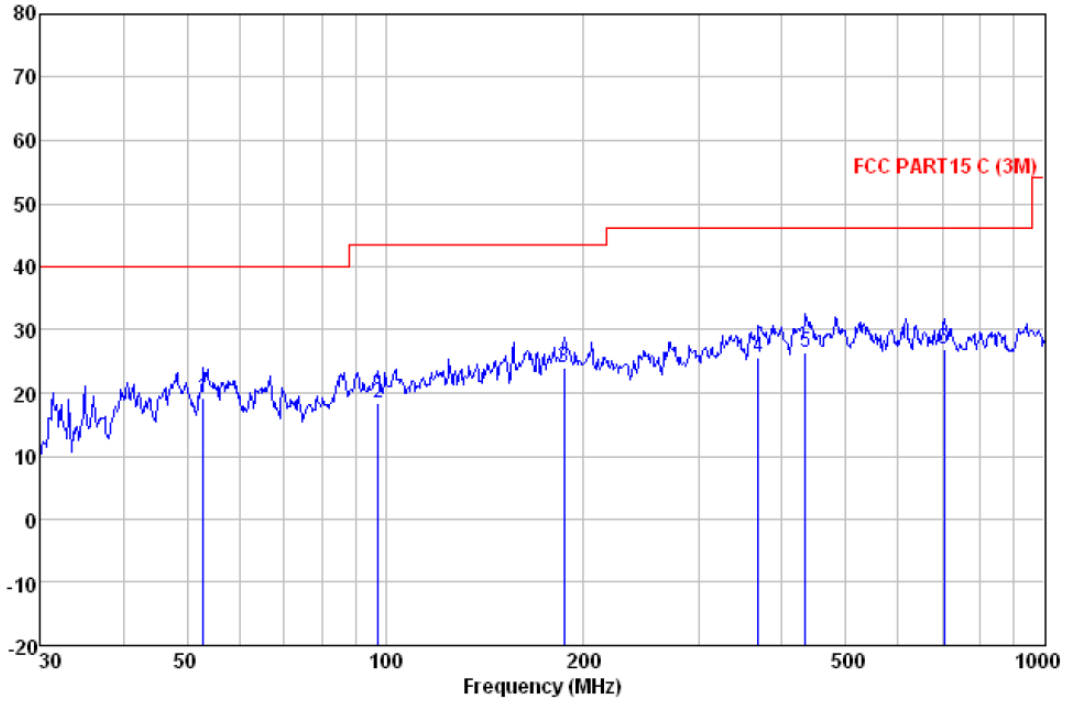
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



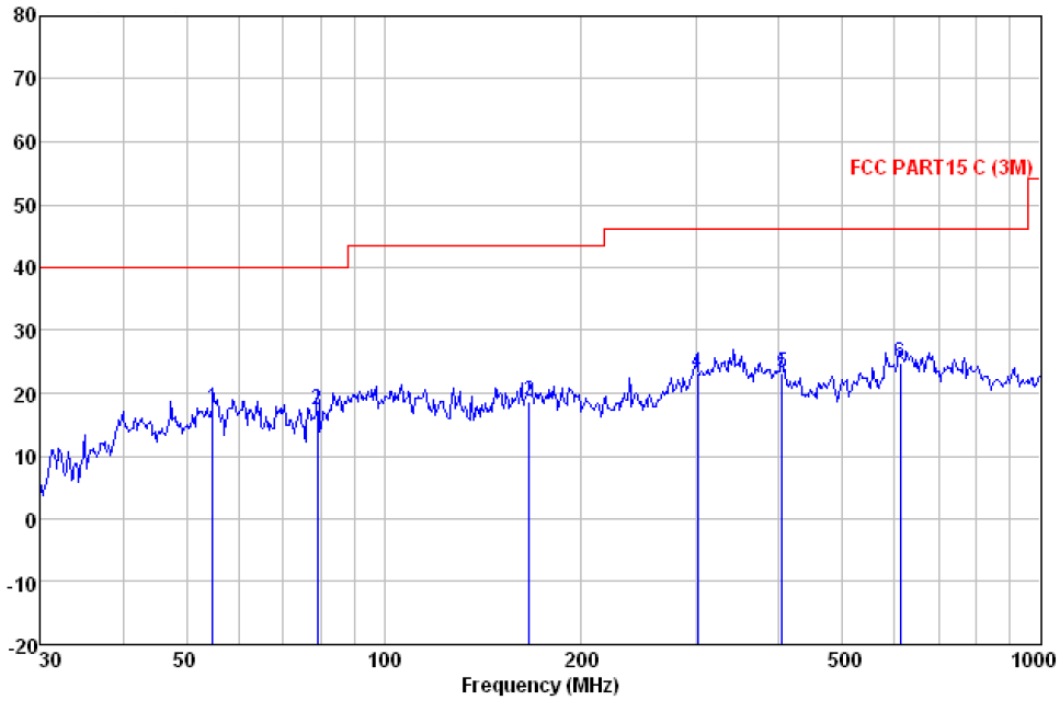
Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
52.945	36.53	13.11	1.04	31.60	19.08	40.00	-20.92	QP
97.456	35.55	13.00	1.41	31.60	18.36	43.50	-25.14	QP
186.441	43.11	10.24	1.84	31.32	23.87	43.50	-19.63	QP
368.112	39.68	14.49	2.62	31.14	25.65	46.00	-20.35	QP
434.065	39.20	15.53	2.86	31.14	26.45	46.00	-19.55	QP
704.226	35.59	18.86	3.55	31.20	26.80	46.00	-19.20	QP

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
54.835	35.09	13.02	1.06	31.60	17.57	40.00	-22.43	QP
79.243	39.23	8.43	1.29	31.60	17.35	40.00	-22.65	QP
166.651	39.33	8.87	1.77	31.35	18.62	43.50	-24.88	QP
300.367	39.14	13.06	2.35	31.30	23.25	46.00	-22.75	QP
404.667	36.29	15.18	2.73	31.10	23.10	46.00	-22.90	QP
612.064	34.25	18.50	3.32	31.29	24.78	46.00	-21.22	QP

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4804.00	31.53	11.11	38.57	46.17	50.24	74.00	V
7206.00	36.47	12.90	38.84	40.50	51.03	74.00	V
9608.00	38.08	15.16	39.70	40.07	53.61	74.00	V
4804.00	31.53	11.11	38.57	49.13	53.20	74.00	H
7206.00	36.47	12.90	38.84	42.08	52.61	74.00	H
9608.00	38.08	15.16	39.70	44.87	58.41	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4804.00	31.53	11.11	38.57	40.67	44.74	54.00	V
7206.00	36.47	12.90	38.84	35.11	45.64	54.00	V
9608.00	38.08	15.16	39.70	34.29	47.83	54.00	V
4804.00	31.53	11.11	38.57	42.66	46.73	54.00	H
7206.00	36.47	12.90	38.84	38.69	49.22	54.00	H
9608.00	38.08	15.16	39.70	34.83	48.37	54.00	H

Test at Channel20 (2.442 GHz) in transmitting status

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

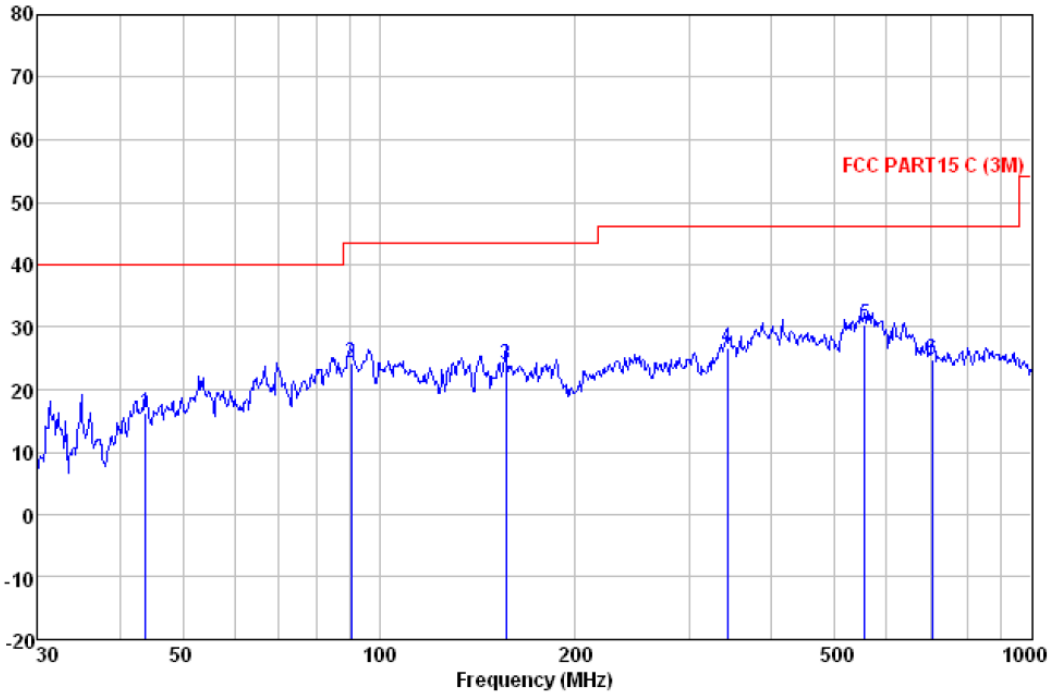
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



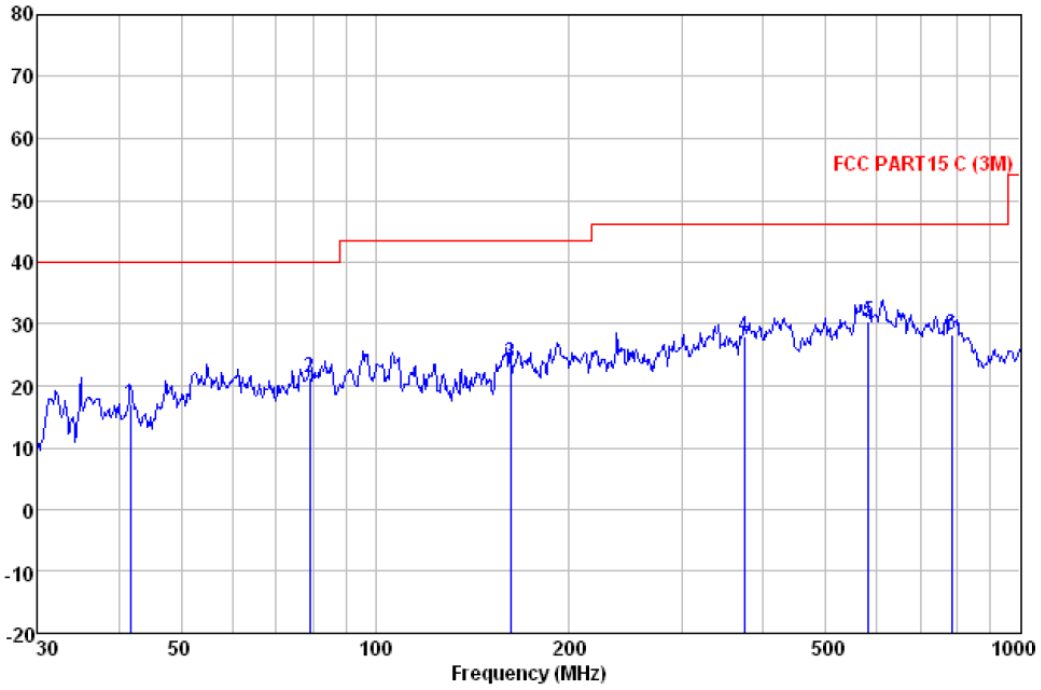
Quasi-peak measurement

Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
43.812	33.35	13.56	0.96	31.60	16.27	40.00	-23.73	QP
90.537	42.48	12.07	1.34	31.60	24.29	43.50	-19.21	QP
156.458	45.03	8.51	1.73	31.39	23.88	43.50	-19.62	QP
341.979	41.31	14.15	2.53	31.20	26.79	46.00	-19.21	QP
554.825	40.82	17.67	3.11	31.26	30.34	46.00	-15.66	QP
704.226	33.59	18.86	3.55	31.20	24.80	46.00	-21.20	QP

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
41.713	34.11	13.57	0.94	31.60	17.02	40.00	-22.98	QP
79.243	43.23	8.43	1.29	31.60	21.35	40.00	-18.65	QP
162.041	44.51	8.72	1.76	31.37	23.62	43.50	-19.88	QP
373.311	41.88	14.54	2.63	31.14	27.91	46.00	-18.09	QP
582.743	40.22	18.14	3.22	31.29	30.29	46.00	-15.71	QP
782.345	35.77	19.82	3.84	31.20	28.23	46.00	-17.77	QP

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4884.000	31.58	11.19	38.56	43.31	47.52	74.00	V
7326.000	36.50	13.37	38.88	39.89	50.88	74.00	V
9768.000	38.53	14.77	39.75	43.17	56.72	74.00	V
4884.000	31.58	11.19	38.56	43.21	47.42	74.00	H
7326.000	36.50	13.37	38.88	40.24	51.23	74.00	H
9768.000	38.53	14.77	39.75	41.60	55.15	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4884.000	31.58	11.19	38.56	33.75	37.96	54.00	V
7326.000	36.50	13.37	38.88	32.72	43.71	54.00	V
9768.000	38.53	14.77	39.75	34.84	48.39	54.00	V
4884.000	31.58	11.19	38.56	31.50	35.71	54.00	H
7326.000	36.50	13.37	38.88	33.63	44.62	54.00	H
9768.000	38.53	14.77	39.75	31.88	45.43	54.00	H

Test at Channel39 (2.480 GHz) in transmitting status

9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

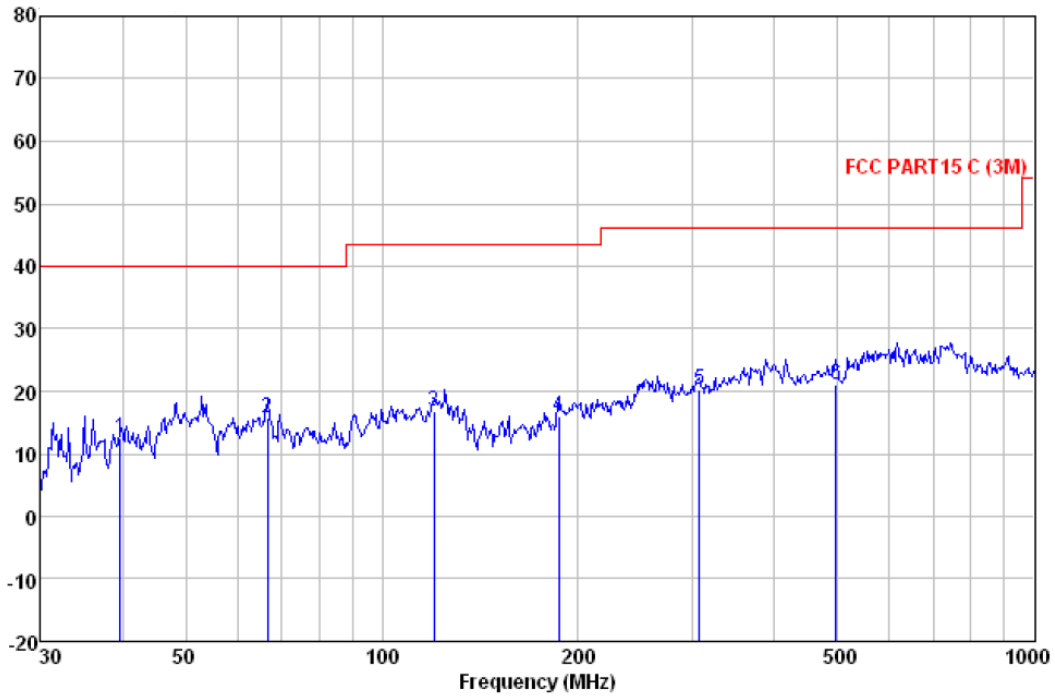
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~1 GHz Spurious Emissions .Quasi-Peak Measurement

Vertical:

Peak scan

Level (dBμV/m)



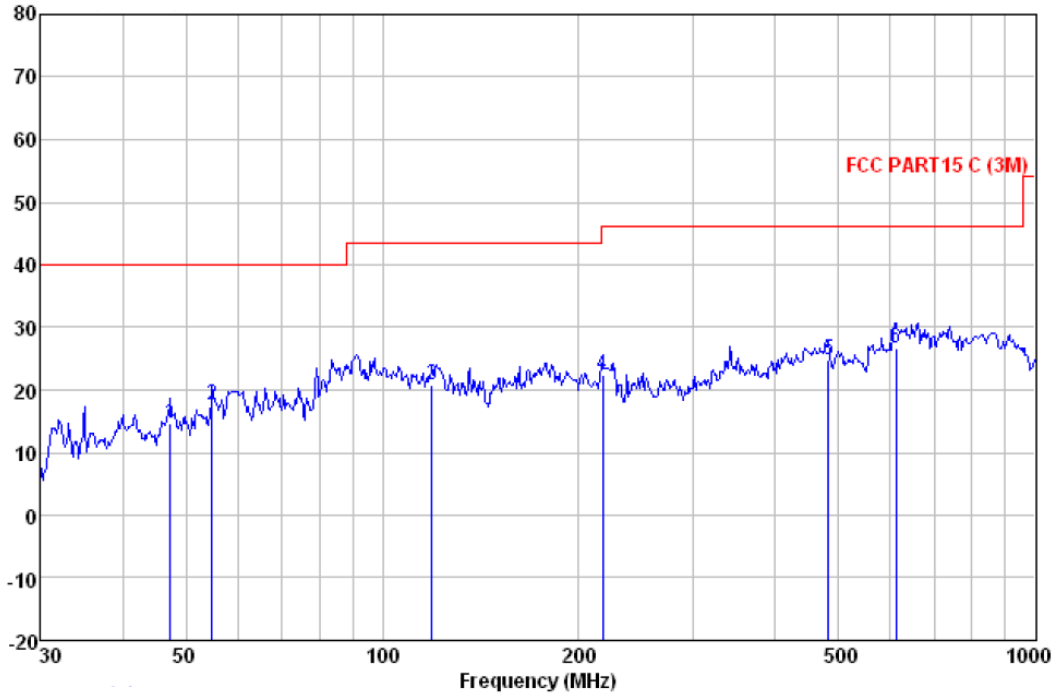
Quasi-peak measurement

Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
39.715	29.81	13.49	0.93	31.60	12.63	40.00	-27.37	QP
66.733	35.99	10.02	1.20	31.60	15.61	40.00	-24.39	QP
120.277	36.38	10.38	1.56	31.54	16.78	43.50	-26.72	QP
186.441	35.11	10.24	1.84	31.32	15.87	43.50	-27.63	QP
306.754	36.02	13.15	2.38	31.29	20.26	46.00	-25.74	QP
495.934	32.55	16.52	3.08	31.20	20.95	46.00	-25.05	QP

Horizontal:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
47.326	31.88	13.41	0.98	31.60	14.67	40.00	-25.33	QP
54.835	35.09	13.02	1.06	31.60	17.57	40.00	-22.43	QP
119.018	40.23	10.69	1.55	31.55	20.92	43.50	-22.58	QP
217.544	40.57	11.10	1.98	31.30	22.35	46.00	-23.65	QP
482.216	36.80	16.13	3.04	31.19	24.78	46.00	-21.22	QP
612.064	36.25	18.50	3.32	31.29	26.78	46.00	-19.22	QP

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4960.00	31.70	11.39	38.56	47.86	52.39	74.00	V
7440.00	36.60	13.60	38.91	42.32	53.61	74.00	V
9920.00	38.65	14.92	39.78	41.61	55.40	74.00	V
4960.00	31.70	11.39	38.56	46.49	51.02	74.00	H
7440.00	36.60	13.60	38.91	42.80	54.09	74.00	H
9920.00	38.65	14.92	39.78	43.31	57.10	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4960.00	31.70	11.39	38.56	41.00	45.53	54.00	V
7440.00	36.60	13.60	38.91	36.73	48.02	54.00	V
9920.00	38.65	14.92	39.78	34.66	48.45	54.00	V
4960.00	31.70	11.39	38.56	40.31	44.84	54.00	H
7440.00	36.60	13.60	38.91	35.10	46.39	54.00	H
9920.00	38.65	14.92	39.78	35.49	49.28	54.00	H

Remark:

1). The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Loss –Preamplifier Factor.

2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Test result: The unit does meet the FCC requirements.

7.5.2 Radiated Emissions which fall in the restricted bands

Test Requirement:	FCC Part 15 C section 15.247 (d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	ANSI C63.10: Clause 6.4, 6.5 and 6.6
Test Status:	Enter test mode for the product. Test in lowest channel 2402 MHz and highest channel 2480 MHz, keep in continuously transmitting status with GFSK modulation. Pre-test the EUT in AC mode and B/O mode, find worse case in AC mode.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	40.0 dBμV/m between 30MHz & 88MHz; 43.5 dBμV/m between 88MHz & 216MHz; 46.0 dBμV/m between 216MHz & 960MHz; 54.0 dBμV/m above 960MHz.
Detector:	For PK value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW ≥ RBW Sweep = auto Detector function = peak Trace = max hold For AV value: RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz VBW =10Hz Sweep = auto Detector function = peak Trace = max hold

Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section. only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

Test Result:

Test at lowest Channel (2.402 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.00	27.93	8.02	38.23	44.28	42.00	74.00	Vertical
2390.00	27.63	8.17	38.25	45.31	42.86	74.00	V
2483.50	27.55	8.28	38.26	45.72	43.29	74.00	V
2500.00	27.55	8.30	38.26	46.89	44.48	74.00	V
2310.00	27.93	8.02	38.23	48.27	45.99	74.00	Horizontal
2390.00	27.63	8.17	38.25	45.36	42.91	74.00	H
2483.50	27.55	8.28	38.26	46.25	43.82	74.00	H
2500.00	27.55	8.30	38.26	47.28	44.87	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.00	27.93	8.02	38.23	38.86	36.58	54.00	Vertical
2390.00	27.63	8.17	38.25	37.93	35.48	54.00	V
2483.50	27.55	8.28	38.26	41.26	38.83	54.00	V
2500.00	27.55	8.30	38.26	41.74	39.33	54.00	V
2310.00	27.93	8.02	38.23	43.53	41.25	54.00	Horizontal
2390.00	27.63	8.17	38.25	43.72	41.27	54.00	H
2483.50	27.55	8.28	38.26	41.87	39.44	54.00	H
2500.00	27.55	8.30	38.26	41.33	38.92	54.00	H

Test at middle Channel(2.442 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.00	27.93	8.02	38.23	46.35	44.07	74.00	Vertical
2390.00	27.63	8.17	38.25	47.19	44.74	74.00	V
2483.50	27.55	8.28	38.26	45.87	43.44	74.00	V
2500.00	27.55	8.30	38.26	46.53	44.12	74.00	V
2310.00	27.93	8.02	38.23	46.26	43.98	74.00	Horizontal
2390.00	27.63	8.17	38.25	47.45	45.00	74.00	H
2483.50	27.55	8.28	38.26	46.59	44.16	74.00	H
2500.00	27.55	8.30	38.26	45.23	42.82	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.00	27.93	8.02	38.23	43.21	40.93	54.00	Vertical
2390.00	27.63	8.17	38.25	42.49	40.04	54.00	V
2483.50	27.55	8.28	38.26	43.77	41.34	54.00	V
2500.00	27.55	8.30	38.26	43.86	41.45	54.00	V
2310.00	27.93	8.02	38.23	42.54	40.26	54.00	Horizontal
2390.00	27.63	8.17	38.25	44.93	42.48	54.00	H
2483.50	27.55	8.28	38.26	42.16	39.73	54.00	H
2500.00	27.55	8.30	38.26	42.30	39.89	54.00	H

Test at highest Channel (2.480 GHz) in transmitting status

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.00	27.93	8.02	38.23	47.11	44.83	74.00	Vertical
2390.00	27.63	8.17	38.25	45.52	43.07	74.00	V
2483.50	27.55	8.28	38.26	46.25	43.82	74.00	V
2500.00	27.55	8.30	38.26	47.38	44.97	74.00	V
2310.00	27.93	8.02	38.23	45.17	42.89	74.00	Horizontal
2390.00	27.63	8.17	38.25	46.23	43.78	74.00	H
2483.50	27.55	8.28	38.26	47.42	44.99	74.00	H
2500.00	27.55	8.30	38.26	46.85	44.44	74.00	H

Average Measurement:

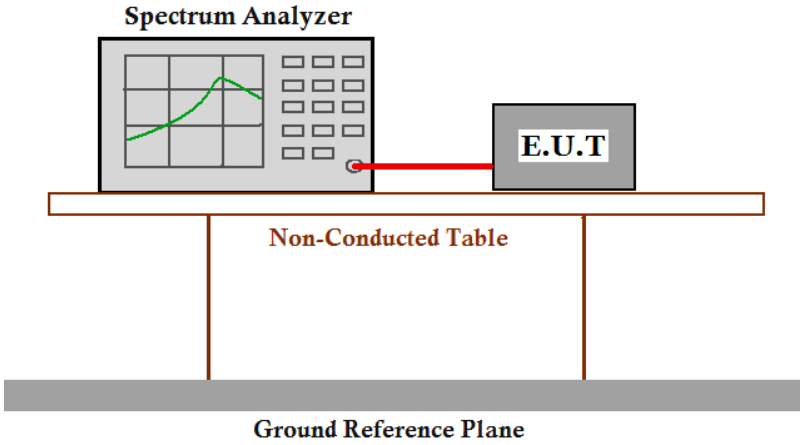
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2310.00	27.93	8.02	38.23	43.19	40.91	54.00	Vertical
2390.00	27.63	8.17	38.25	42.36	39.91	54.00	V
2483.50	27.55	8.28	38.26	41.89	39.46	54.00	V
2500.00	27.55	8.30	38.26	42.22	39.81	54.00	V
2310.00	27.93	8.02	38.23	43.74	41.46	54.00	Horizontal
2390.00	27.63	8.17	38.25	43.58	41.13	54.00	H
2483.50	27.55	8.28	38.26	42.14	39.71	54.00	H
2500.00	27.55	8.30	38.26	42.65	40.24	54.00	H

Remark: above table only record the worse data of emissions in restricted frequency bands.

Test result: The unit does meet the FCC requirements.

7.6 Band Edges Requirement

Test Requirement:	FCC Part 15 C section 15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating. The radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Based on either an RF conducted or a radiated measurement. Provided the transmitter demonstrates compliance with the peak conducted power limits.
Frequency Band:	2400 MHz to 2483.5 MHz
Test Method:	FCC/KDB-558074 D01 v03r01 Clause 13.3.1
Test Status:	Enter test mode for the product. Test in lowest channel 2402 MHz and highest channel 2480 MHz, keep in continuously transmitting status with GFSK modulation.
Test Configuration:	



Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer or power meter.
2. Set instrument center frequency to the frequency of the emission to be measured(must be within 2MHz of the authorized band edge).
3. Set span to 2MHz,
4. RBW=100kHz,
5. VBW≥3×RBW
6. Detector=peak
7. Sweep time =auto,
8. Trace mode=max hold.
9. Allow sweep to continue until the trace stabilizes(required measurement time may increase for low duty cycle applications)
10. Compute the power by integrating the spectrum over 1MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency($f_{emission}$)±0.5MHz.If the instrument does not have a band power function,the sum the amplitude levels(in power units) at 100kHz intervals extending across the 1MHz spectrum defined by femission±0.5MHz.

Test result with plots as follows:

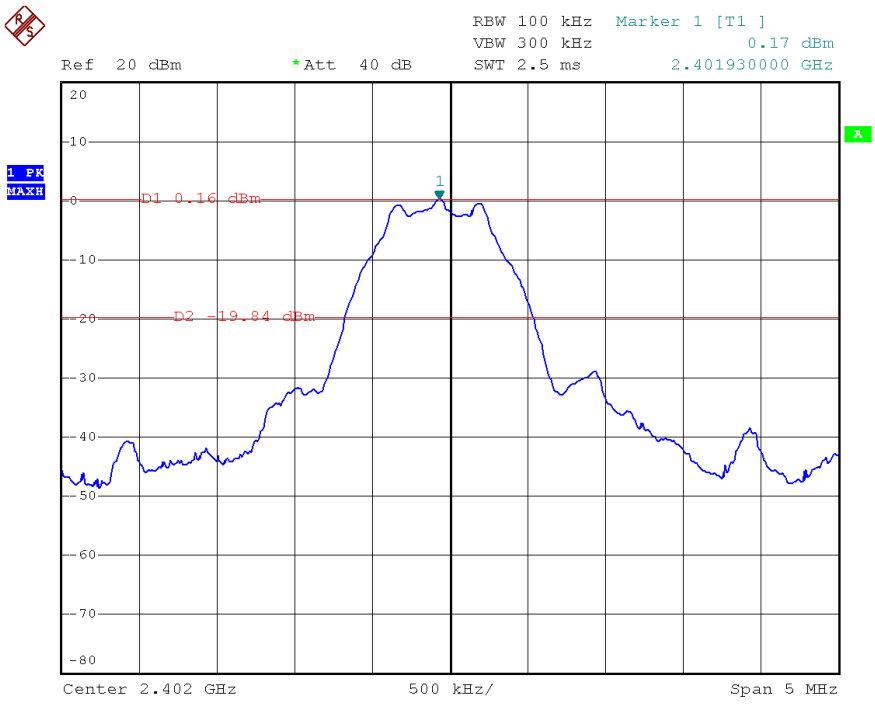
Compare with the output power of the lowest frequency, the Lower Edges attenuated more than 20dB

Compare with the output power of the highest frequency, the Upper Edges attenuated more than 20dB.

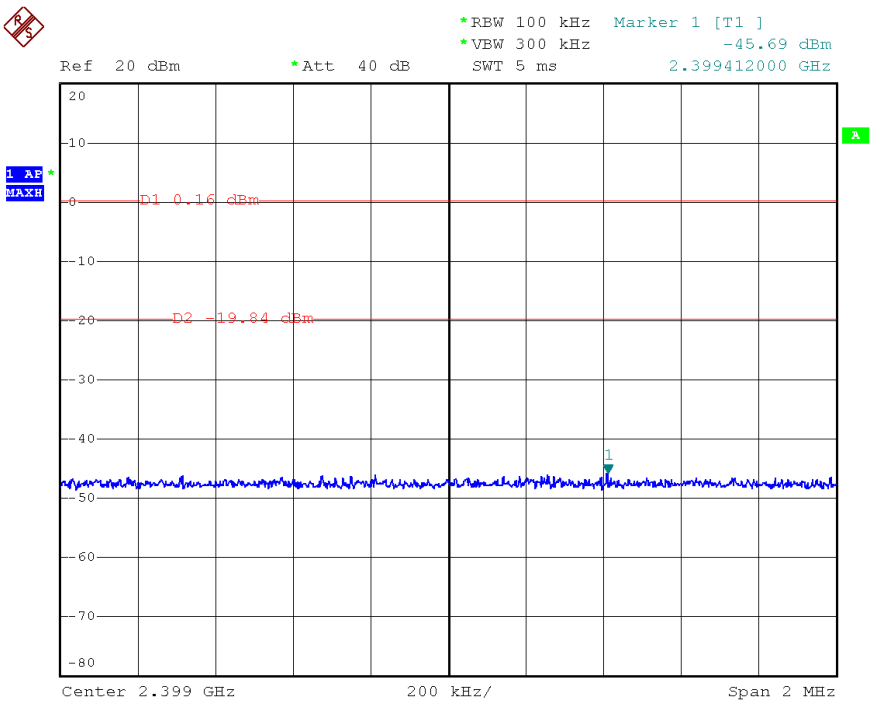
Result plot as follows:

Channel 0: 2.402 GHz

Step 1

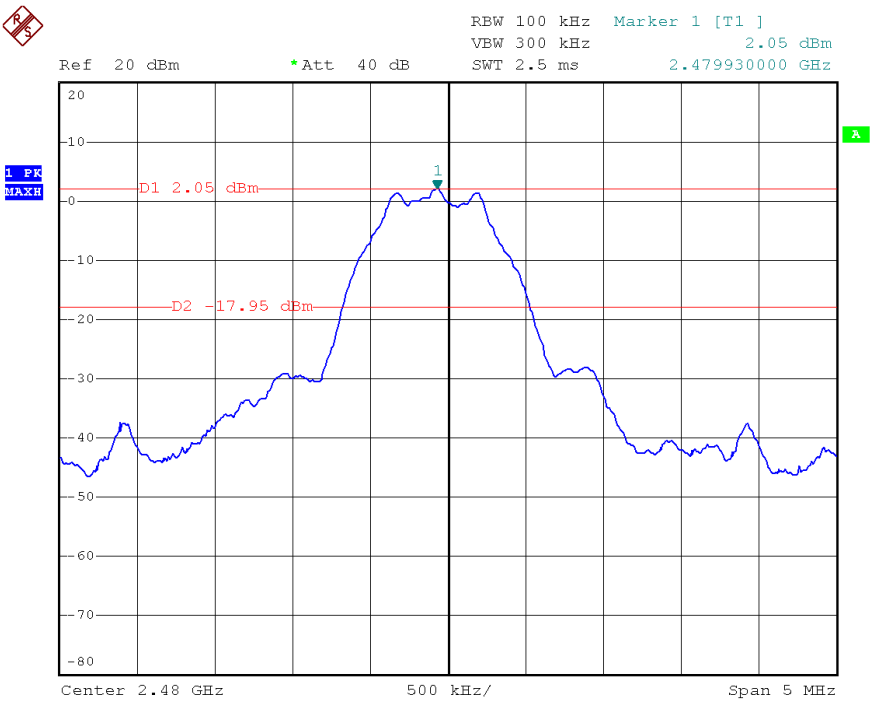


Step 2

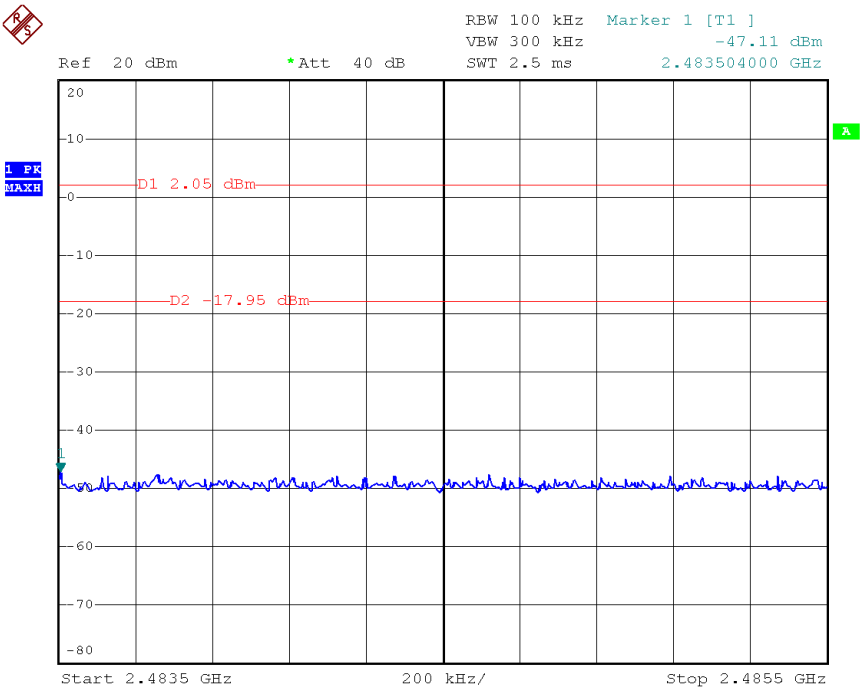


Channel 39: 2.480GHz

Step 1



Step 2



--End of Report--