Korea Standard Testlab
107-27, Jangdeokdong-gil, Namyang-eup, Hwaseong-si, Gyeonggi-do, Korea
Tel : +82-31-356-7333 FAX : +82-31-356-7303

FCC TEST REPORT

Applicant Name	: ONESOFTDIGM. Co., Ltd.
Brand Name	: N/A
Applicant Address	: Jigok Research Bldg., 64, Jigok-ro, Nam-gu, Pohang-si, Gyeongsangbuk-do, 37666, Republic of Korea
FCC ID	: 2AKLA-FRA-W10
Products Name	: Body Component Meter
Model No.	: FRA-W10
Variant Model No.	: Fitrus_A
Products Manufacturer	: BYMTECH
Test Standard	: FCC CFR 47 Part 15 Subpart C
Test Method	: KDB 558074 D01 v05 and ANSI C63.10:2013
Test Result	: PASS
Dates of Test	: DEC 11, 2019 to DEC 12, 2019
Date of Issue	: JAN 07, 2020
Test Laboratory	: Korea Standard Testlab FCC Registration No. : 829397

Tested by

Seungho Baek
Test Engineer

Approved by

Dongin Youn
Technical Manager

TABLE OF CONTENTS

1. General Information

1.1. Client Information

Applicant	:	ONESOFTDIGM. Co., Ltd.
Address of Applicant	:	Jigok Research Bldg., 64, Jigok-ro, Nam-gu, Pohang-si, Gyeongsangbuk-do, 37666, Republic of Korea

1.2. General Description of E.U.T.

Product Name	:	Body Component Meter
Model No.	:	FRA-W10

1.3. Details of E.U.T.

Operating Frequency	:	2402 MHz to 2480 MHz
Type of Modulation	:	GFSK
Number of Channels	:	40 Channels
Channel Separation	:	2 MHz
Duty Cycle	:	Continuous operation possible for testing purposes
Antenna Type	:	Chip Antenna
Antenna gain	:	0.5 dBi
Speciality	:	Bluetooth specification version 4.0 (BLE)
Power Supply	:	Working voltage
Normal Test Voltage	:	DC 3.7 V

1.4. Test Facility

Korea Standard Testlab has been accredited as a designated testing laboratory by National Radio Research Agency in Korea under ISO/IEC 17025.

-. Address

Korea Standard Testlab
#107-27, Jangdeokdong-gil, Namyang-eup, Hwaseong-si, Gyeonggi-do, Korea
Tel : +82-31-356-7333
FAX : +82-31-356-7303

-. Laboratory Acceditations and Listings

KC Designation No. : KR0155
FCC Registration No. : 0028220721

2. Test Equipment and Ancillaries used for Tests

No.	Test Equipment	Manufacturer	Model No.	Serial No.	Next Cal. Data	Used equipment
1	Spectrum Analyzer	Agilent	E4440A	MY45304715	20.10.01	■
2	Frequency Counter	HP	5350B	3049A05530	20.05.30	□
3	DC Power Supply	KEYSIGHT	U8002A	MY5813082	20.02.25	■
4	Signal Generator	Leader Electronics	3220	137231	20.05.28	■
5	Synthesized CW Generator	HP	83711B	US34490158	20.05.28	■
6	SYNTHESIZED SWEEPER	HP	8340B	2804A00830	20.05.28	□
7	Function Generator	IWATSU	SG-4105	62372780	20.05.27	□
8	Modulation Analyzer	Agilent	8901B	3438A05099	20.05.28	□
9	Audio Analyaer	Agilent	8903B	3279A18576	20.05.27	□
10	Power Meter	Agilent	E4418B	GB43312894	20.05.27	□
11	Power Sensor	HP	8485A	3316A14708	20.05.27	□
12	Power Sensor	Agilent	8482B	2703703543	20.05.27	□
13	Pre Amplifier	GTC	GA-1825A	GT0929/003	20.02.22	□
14	Pre Amplifier	8449B	HP	3008A00224	20.06.18	■
15	Attenuator	Weinsche	53-30-33	MG906	20.05.27	□
16	Step Attenuator	Agilent	8494B	MY41110204	20.05.27	□
17	Step Attenuator	Agilent	8495B	3308A17660	20.05.27	□
18	Step Attenuator	Agilent	8496B	US40152183	20.05.27	□
19	Attenuator	HP	30dB	N/A	20.05.27	□
20	Attenuator	TAE SUNG	SMA-1	N/A	20.05.27	□
21	Attenuator	TAE SUNG	SMA-2	N/A	20.05.27	□
22	Termination	KWANG YEOK	KYTE-NJ-150W	2040004	20.05.27	□
23	Bluetooth Tester	TESCOM	TC-3000A	3000A590236	20.05.27	□
24	Loop ANT.	Com-Power	AL-130	121010	21.06.10	■

25	Horn ANT.	SCHWARZBECK	BBHA 9120D	831	20.07.23	■
26	Temp & Humidity Chamber	Seoksan Tech	SE-CT-02	S7400JD5340618	20.05.27	□
27	Test Receiver	LIG Nex1	LSA-265	L07098033	20.10.01	□
28	Test Receiver	ROHDE&SCHWARZ	ESPI	101014	20.05.28	□
29	Bi-log Antenna	SCHWARZBECK	VULB9163	760	21.04.09	■
30	EMI TEST Receiver	ESI	ROHD & SCHWARZ	838786	20.02.20	■

3. Summary of Test Results

No	Test	Standard Sub-Class	Result
0	Antenna Requirement	§15.203,§15.247(c)	Compliant
1	Maximum Peak Output Power	§15.247(b)	Compliant
2	Peak Power Spectral Density	§15.247(e)	Compliant
3	Occupied 6dB Bandwidth	§15.247(a)	Compliant
4	Band Edges Compliance	§15.247(d)	Compliant
5	Conducted Spurious Emission	§15.247(d)	Compliant
6	Radiated Spurious Emission	§15.247, §15.205, §15.209	Compliant
7	Radio Frequency Exposure Procedures	§2.1093	Compliant

4. Test Results

4.1. E.U.T. test conditions

Test Voltage:	DC 3.7 V (Battery)
Temperature:	25 °C
Humidity:	50 % RH
Atmospheric Pressure:	1 006 mbar
Test frequencies and frequency range:	Test frequencies are 2 402 MHz to 2 480 MHz. Low channel is 2 402 MHz, Middle channel is 2 440 MHz, High channel is 2 480 MHz, BLE Mode, Total channel is 40.

4.1.1. EUT channels and frequencies list

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2 402	20	2 442
1	2 404	21	2 444
2	2 406	22	2 446
3	2 408	23	2 448
4	2 410	24	2 450
5	2 412	25	2 452
6	2 414	26	2 454
7	2 416	27	2 456
8	2 418	28	2 458
9	2 420	29	2 460
10	2 422	30	2 462
11	2 424	31	2 464
12	2 426	32	2 466
13	2 428	33	2 468
14	2 430	34	2 470
15	2 432	35	2 472
16	2 434	36	2 474
17	2 436	37	2 476
18	2 438	38	2 478
19	2 440	39	2 480

4.1.2. Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Low channel	Middle channel	High channel
Transmitting	2 402 MHz	2 440 MHz	2 480 MHz

4.2. Antenna

4.2.1. Requirement

FCC Part 15 C section 15.203

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.

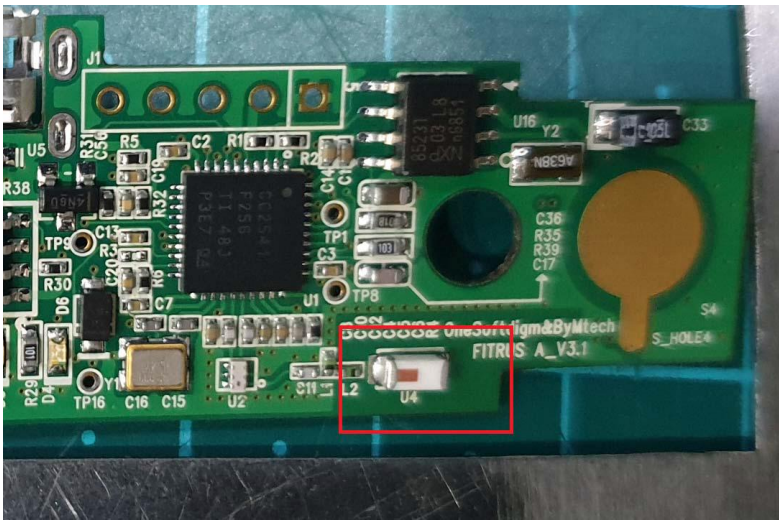
FCC Part 15 C section 15.247(c) (1)(i)

(i) Systems operating in the 2 400 ~ 2 483.5 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.

4.2.2. Test Result

The antenna is Chip antenna and no consideration of replacement. The directional gain of the antenna is 0.5 dBi. Please refer to the EUT internal photos.



Test result : The unit does meet the FCC requirements.

4.3. Occupied 6 dB Bandwidth

4.3.1. Requirement

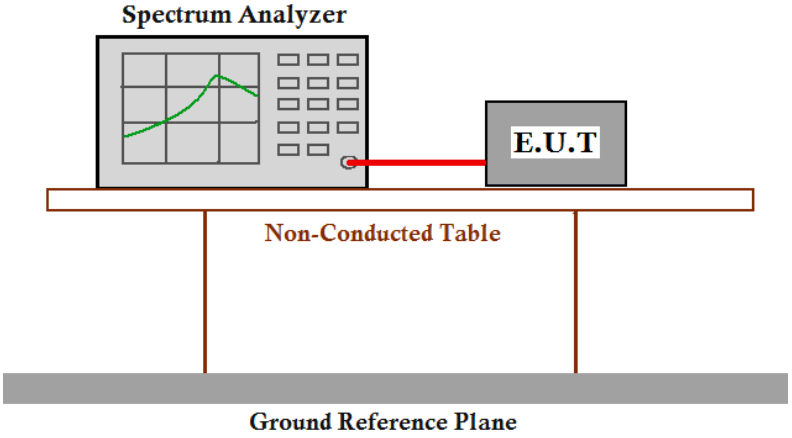
FCC Part 15 C section 15.247

(a)(2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2 400 ~ 2 483.5 MHz, and 5 725 ~ 5 850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.3.2. Test method

KDB 558074 D01 v05 and ANSI C63.10

4.3.3. Test Configuration



4.3.4. Test Procedure

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

2) Set the spectrum analyzer :

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 × RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) 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.

4.3.5. Test result

BLE mode

Test Channel	Frequency (MHz)	6 dB Bandwidth (kHz)	Limit (kHz)	Result
Low	2 402	812.03	≥500	Pass
Middle	2 440	807.33	≥500	Pass
High	2 480	778.59	≥500	Pass

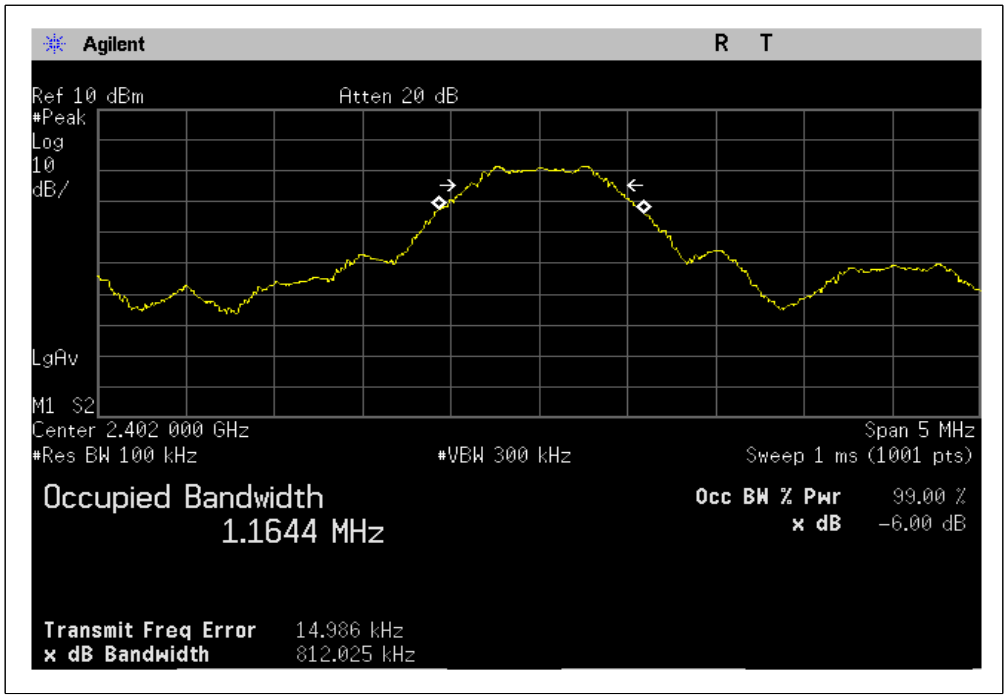
Test Channel	Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Result
Low	2 402	1 164.40	N/A	N/A
Middle	2 440	1 157.60	N/A	N/A
High	2 480	1 133.80	N/A	N/A

Test result : The unit does meet the FCC requirements.

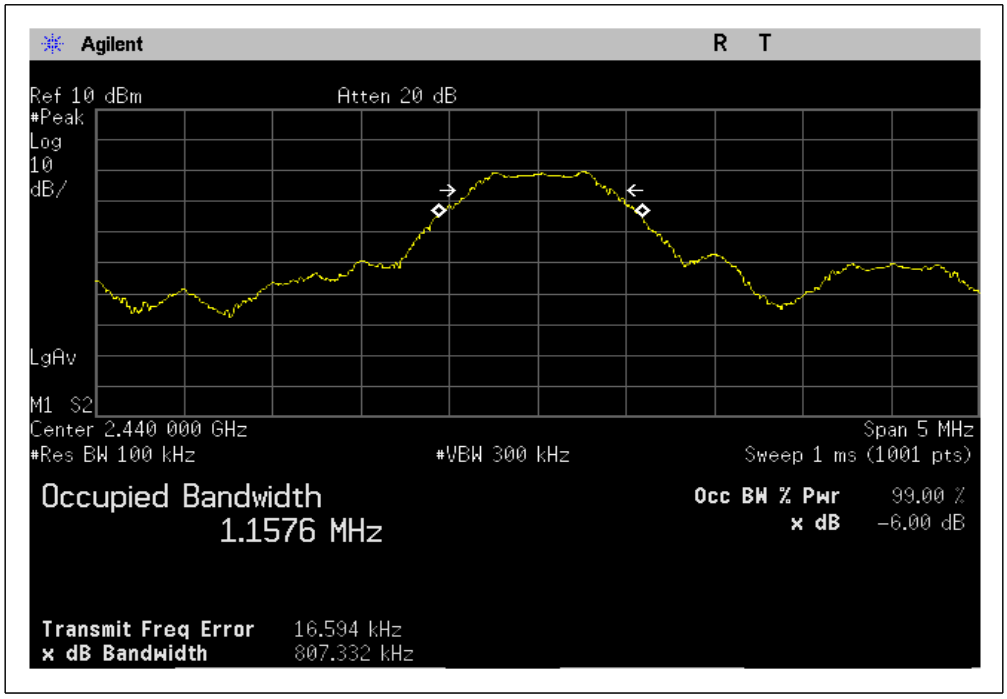
Please refer to the following test plots:

For BLE

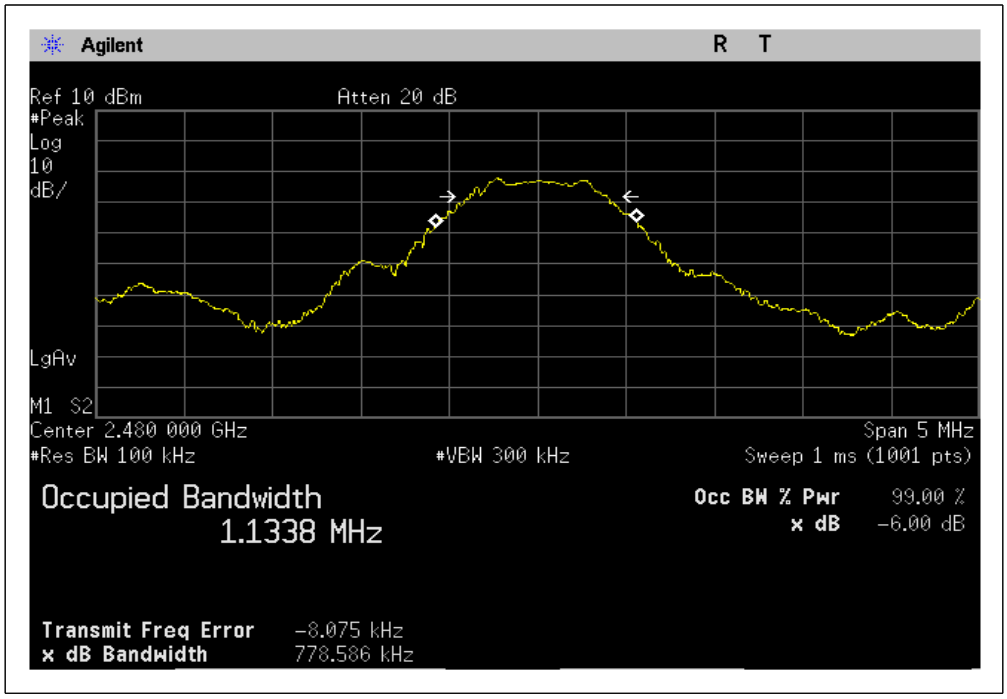
Low Channel(2 402 MHz):



Middle Channel(2 440 MHz):



High Channel(2 480 MHz):



4.4. Maximum Peak Output Power

4.4.1. Requirement

FCC Part 15 C section 15.247

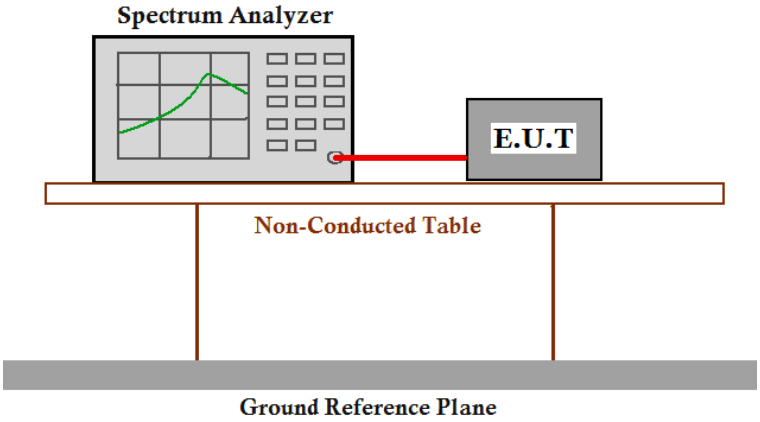
(b)(3) For systems using digital modulation in the 902 ~ 928 MHz, 2 400 ~ 2 483.5 MHz, and 5 725 ~ 5 850 MHz bands: 1 Watt.

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

4.4.2. Test Method

KDB 558074 D01 v05 and ANSI C63.10

4.4.3. Test Configuration



4.4.4. Test Procedure

1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
2) Set the spectrum analyzer:
   a) Set RBW ≥ DTS bandwidth
   b) Set the video bandwidth (VBW) ≥ 3 × RBW.
   c) Set span ≥ 3 × RBW.
   d) Sweep time = auto couple.
   e) Detector = Peak.
   f) Trace mode = max hold.
   g) Allow the trace to stabilize.
   h) Use peak marker function to determine the peak amplitude level.

4.4.5. Test result

BLE mode

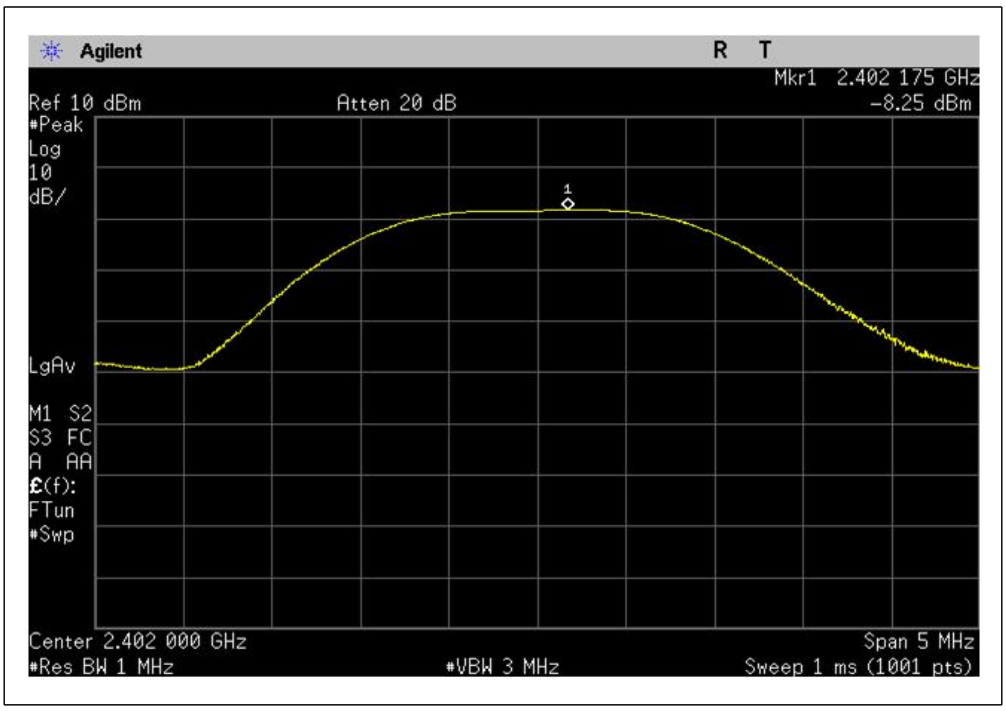
Test Channel	Frequency (MHz)	Measured Channel Power (dBm)	Measured Channel Power (mW)	Limit (mW)	Result
Low	2 402	-8.25	0.15	1000.00	Pass
Middle	2 440	-10.09	0.10	1000.00	Pass
High	2 480	-12.00	0.06	1000.00	Pass

This unit does meet the FCC requirements.

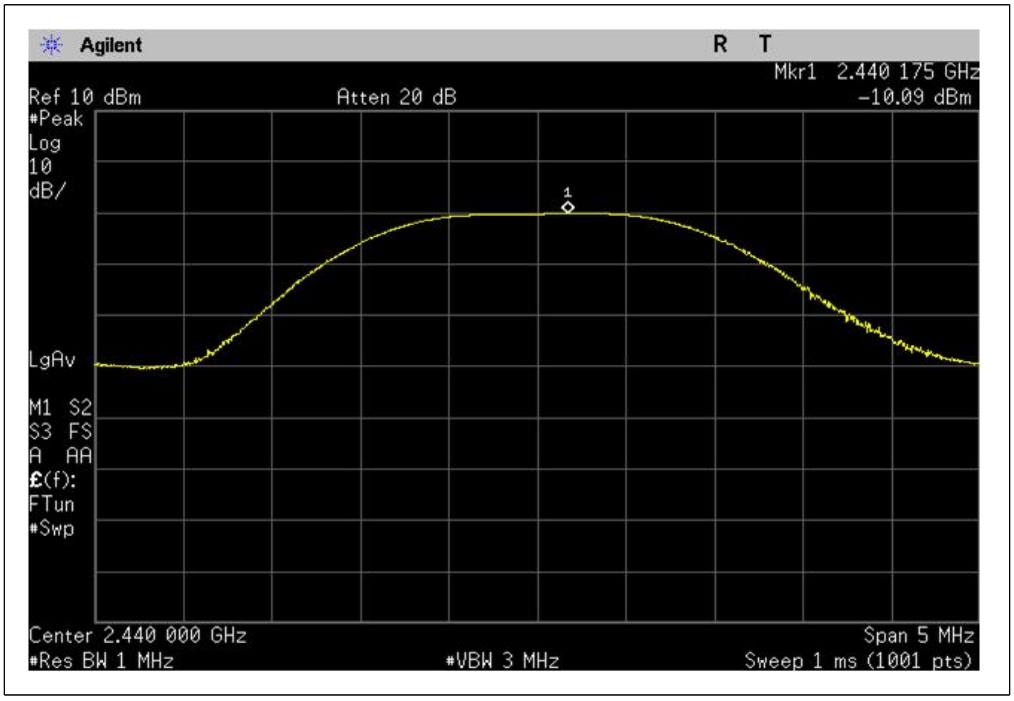
Please refer to the following test plots:

For BLE

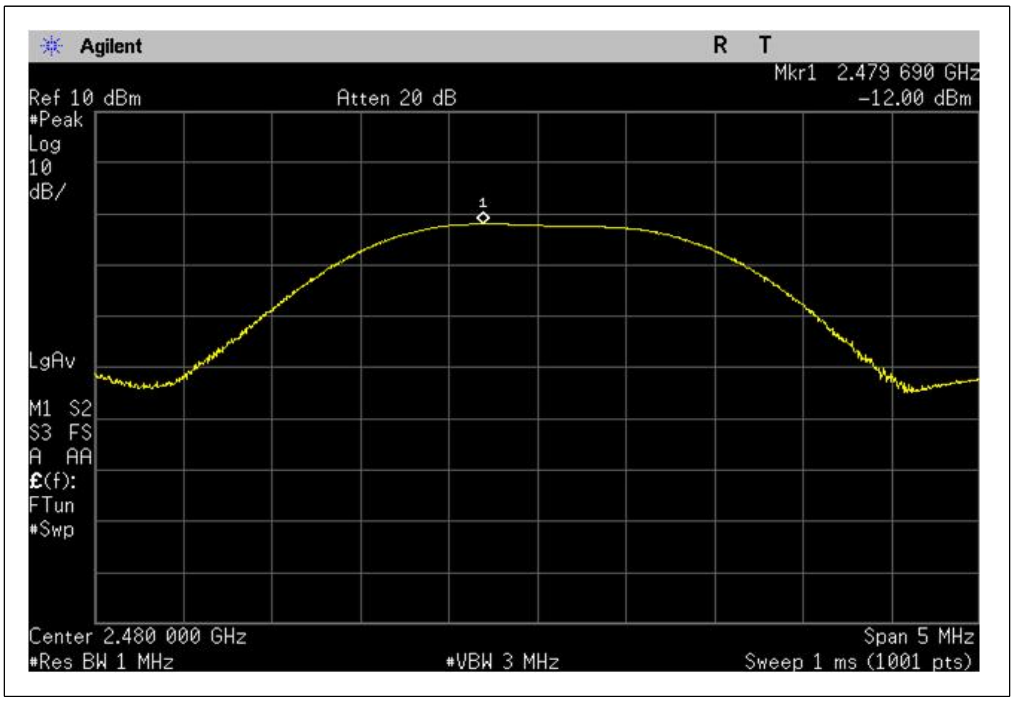
Low Channel(2 402 MHz):



Middle Channel(2 440 MHz):



High Channel(2 480 MHz):



4.5. Peak Power Spectral Density

4.5.1. Requirement

FCC Part 15 C section 15.247

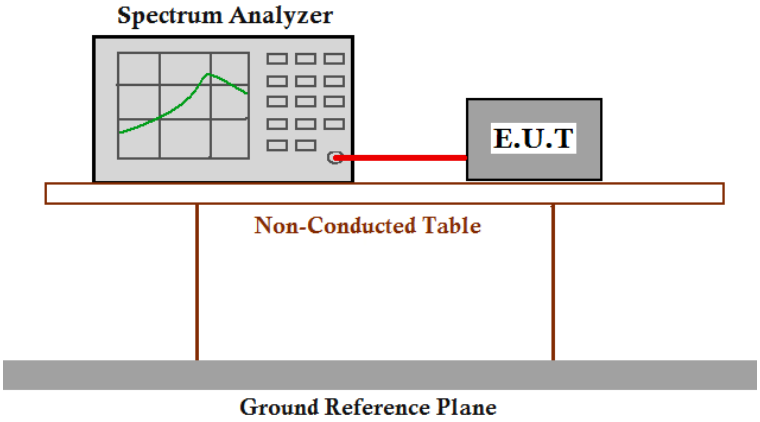
(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

4.5.2. Test Method

KDB 558074 D01 v05 and ANSI C63.10

4.5.3. Test Configuration



4.5.4. Test Procedure

1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
2) Set the spectrum analyzer:
   a) Set analyzer center frequency to DTS channel center frequency.
   b) Set the span to 1.5 times the DTS bandwidth.
   c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
   d) Set the VBW ≥ 3 × RBW.
   e) Detector = peak.
   f) Sweep time = auto couple.
   g) Trace mode = max hold.
   h) Allow trace to fully stabilize.
   i) Use the peak marker function to determine the maximum amplitude level within the RBW.

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

4.5.5. Test result

BLE mode:

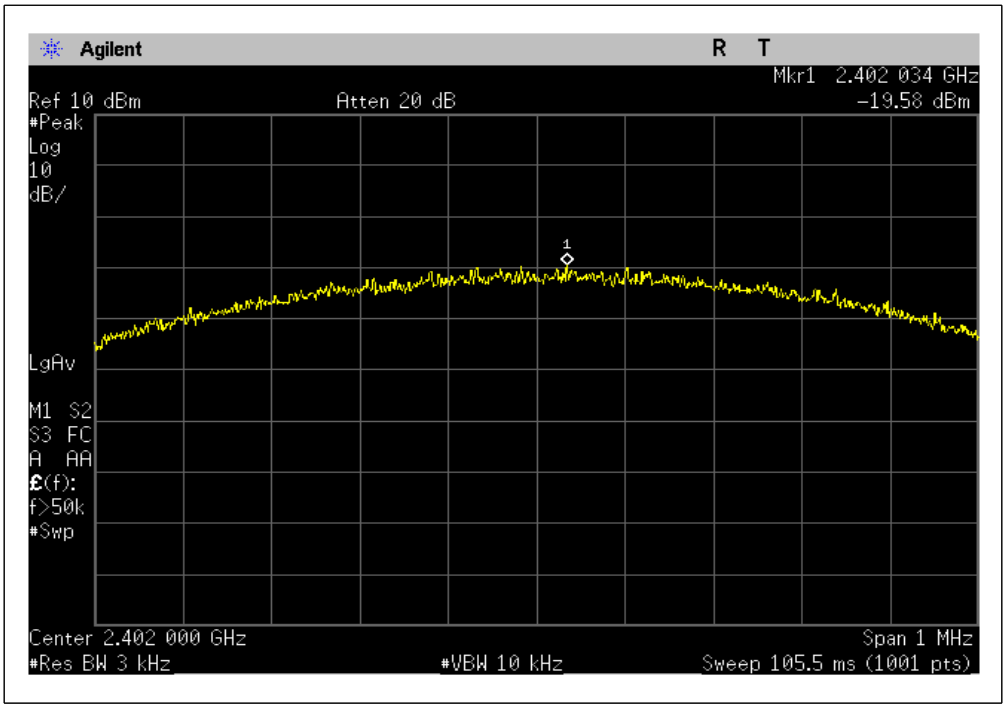
Test Channel	Frequency (MHz)	Measured Peak Power Spectral Density (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
Low	2 402	-19.58	8	Pass
Middle	2 441	-21.44	8	Pass
High	2 480	-23.54	8	Pass

This unit does meet the FCC requirements.

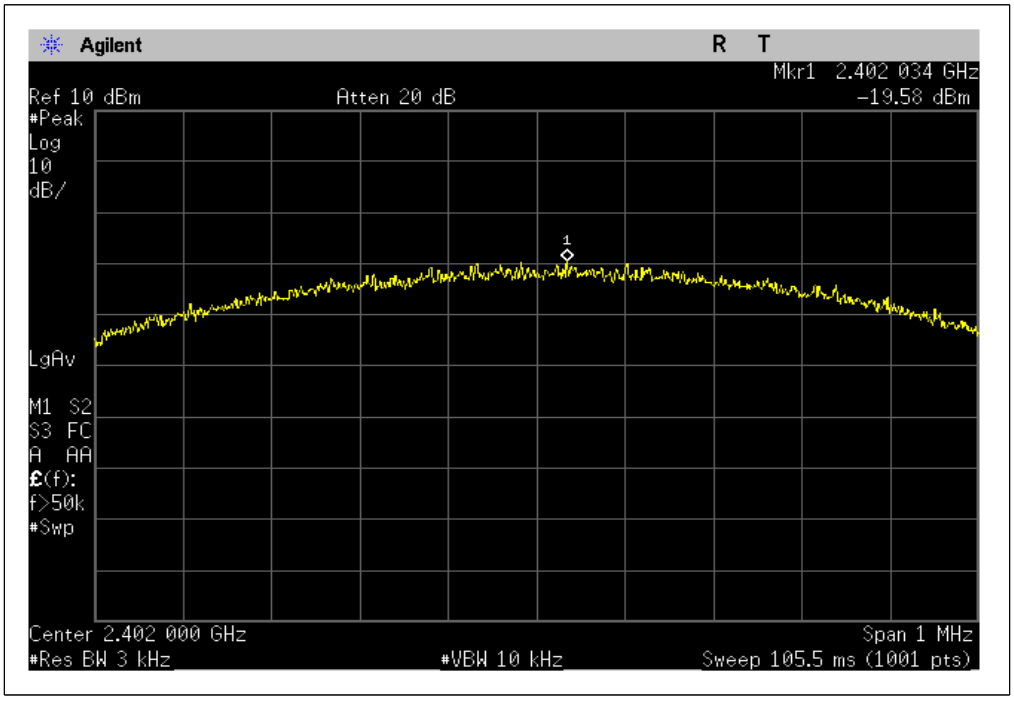
Please refer to the following test plots:

For BLE

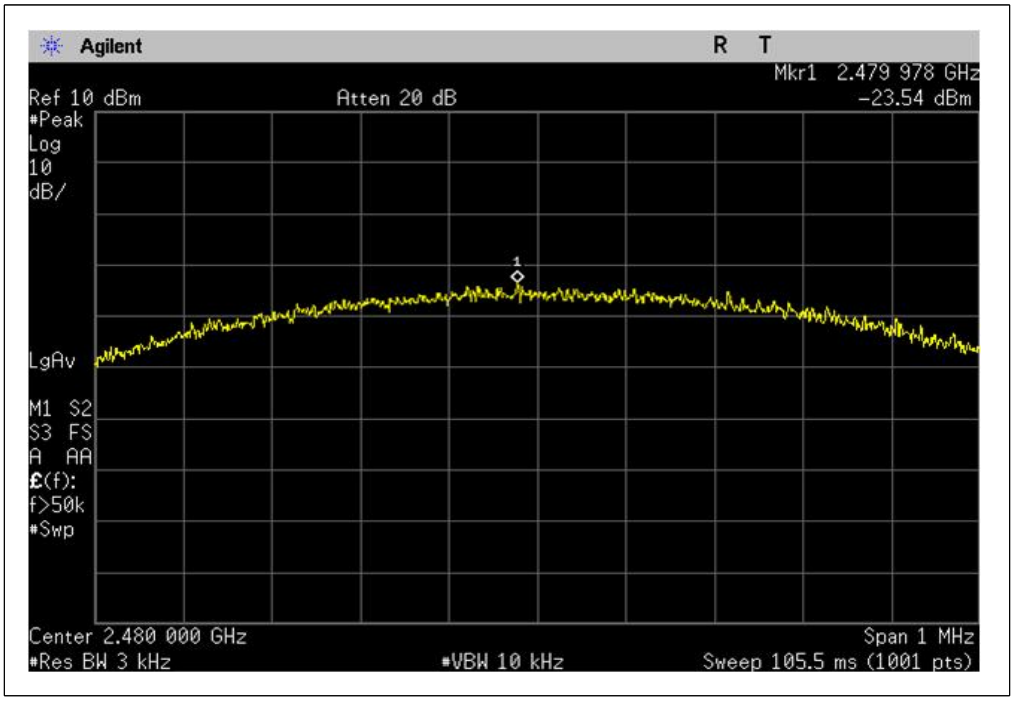
Low Channel(2 402 MHz):



Middle Channel(2 440 MHz):



High Channel(2 480 MHz):



4.6. Conducted Spurious Emissions

4.6.1. Requirement

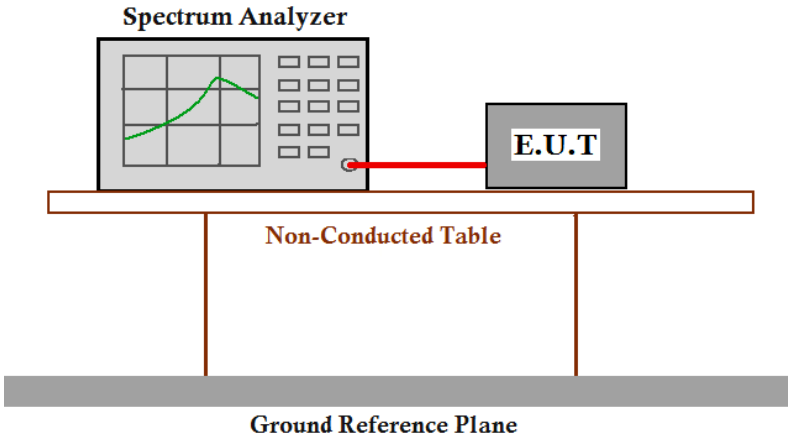
FCC Part15 C section 15.247

(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.

4.6.2. Test Method

KDB 558074 D01 v03r05 and ANSI C63.10

4.6.3. Test Configuration

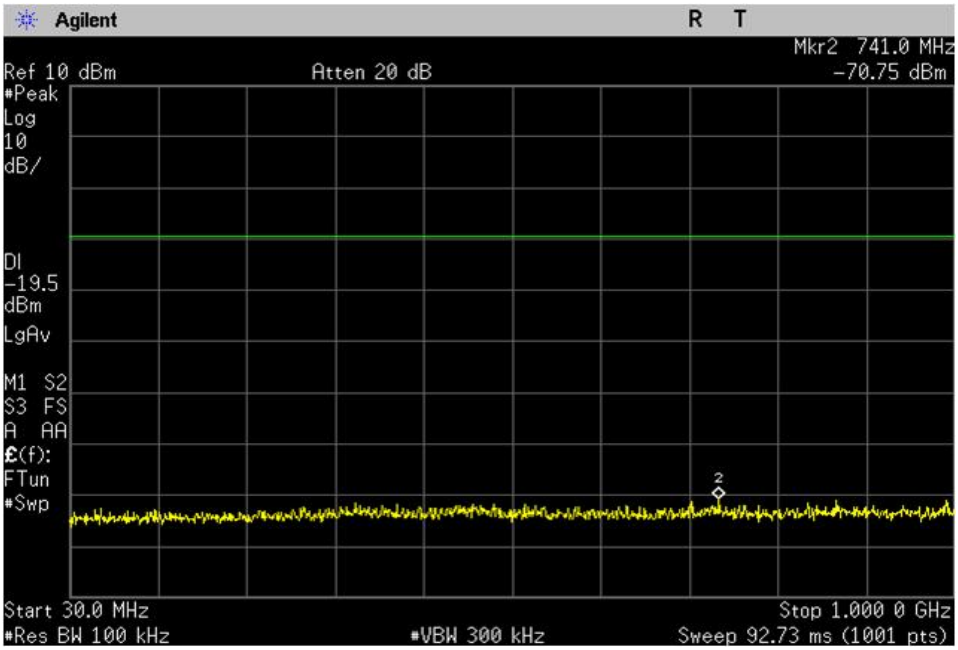


4.6.4. Test Procedure

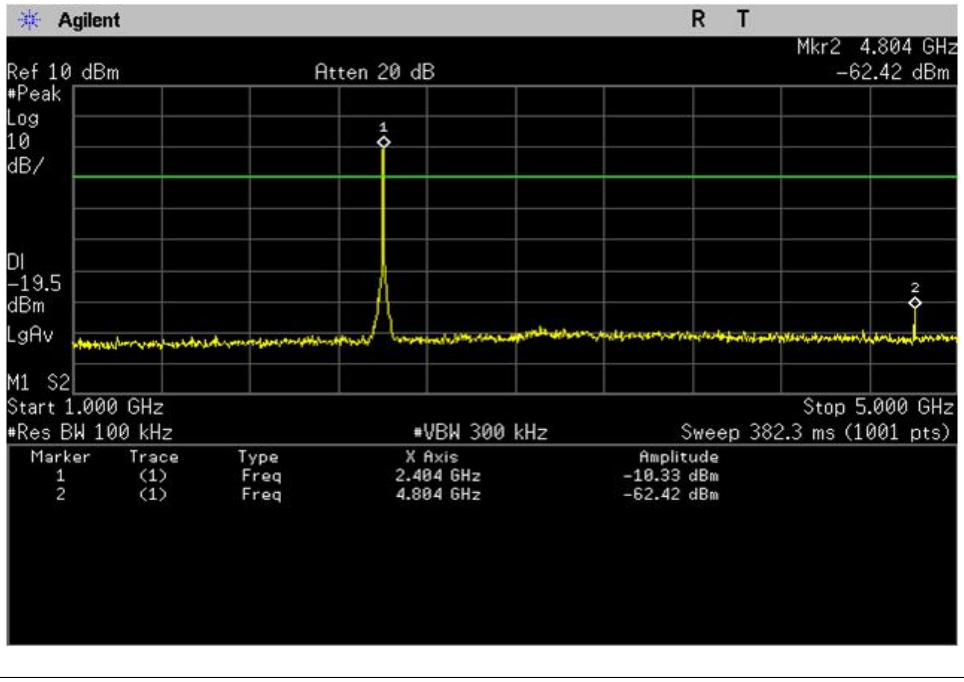
1) Remove the antenna from the EUT and then connect a low attenuation RF cable from the antenna port to the spectrum.
2) Set the spectrum analyzer:
   a) Set the RBW = 100 kHz.
   b) Set the VBW = 300 kHz.
   c) Detector = peak.
   d) Sweep time = auto couple.
   e) Trace mode = max hold.
   f) Scan up through 10th harmonic.

4.6.5. Test result

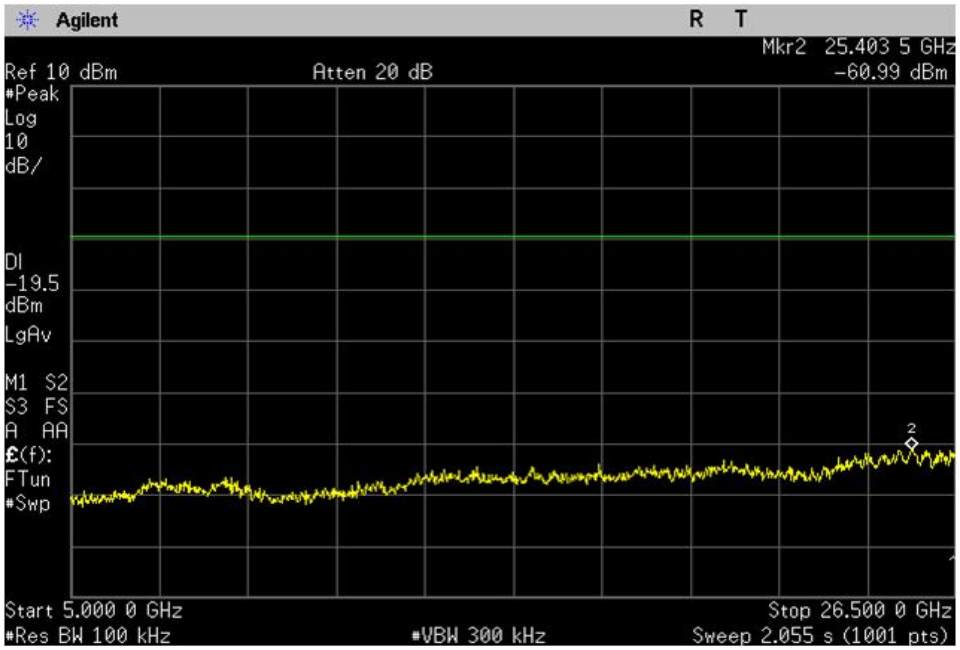
Low Channel(2 402 MHz) : 30 MHz to 1 GHz



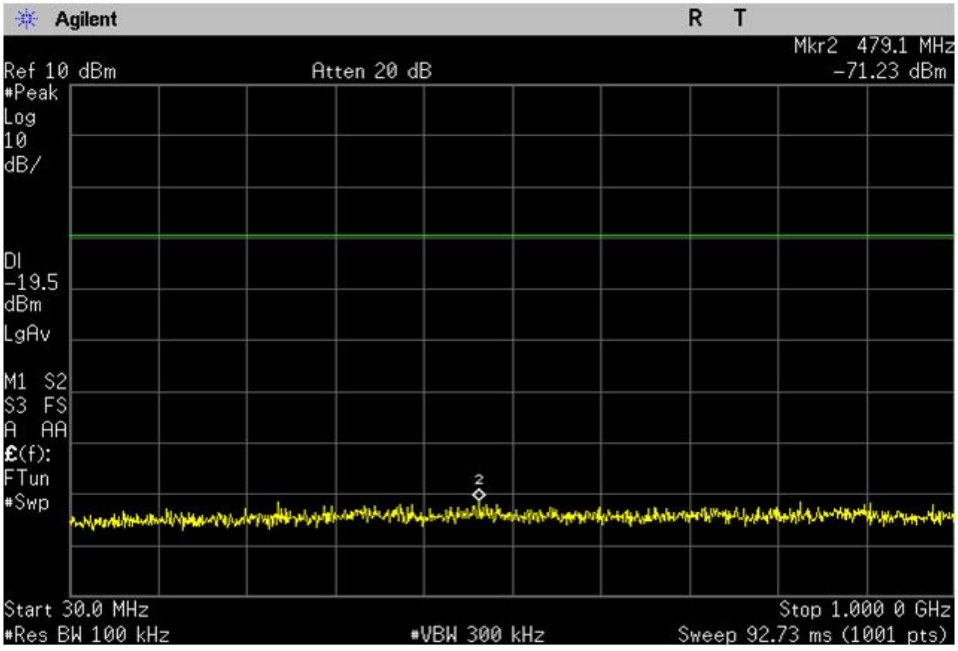
Low Channel(2 402 MHz) : 1 GHz to 5 GHz



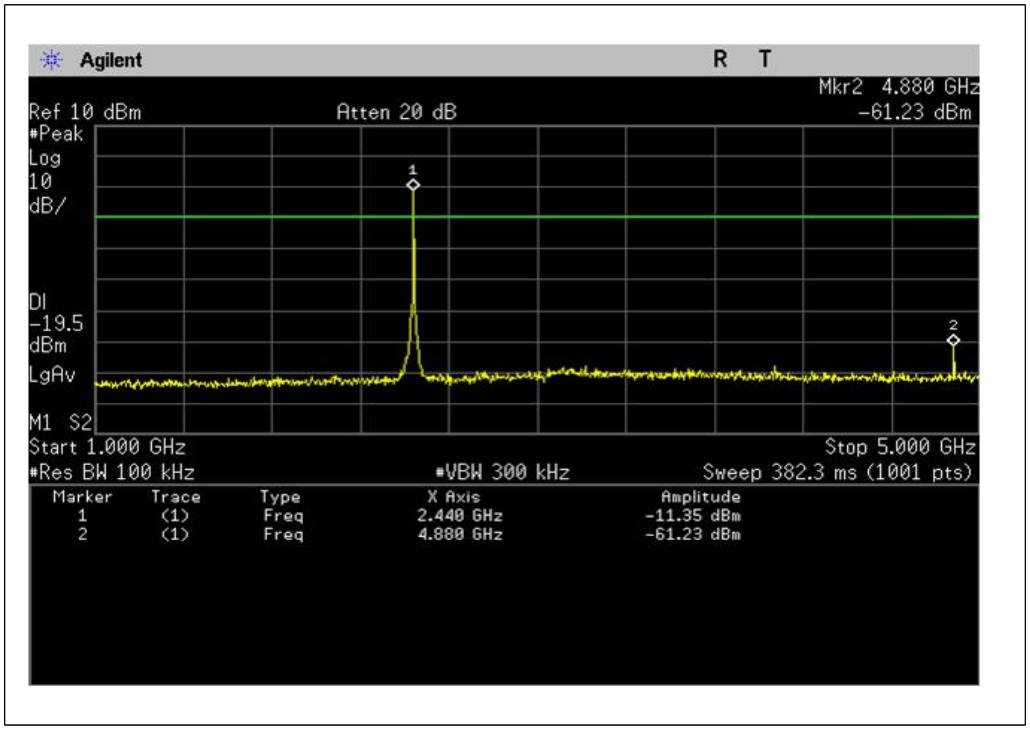
Low Channel(2 402 MHz) : 5 GHz to 26.5 GHz



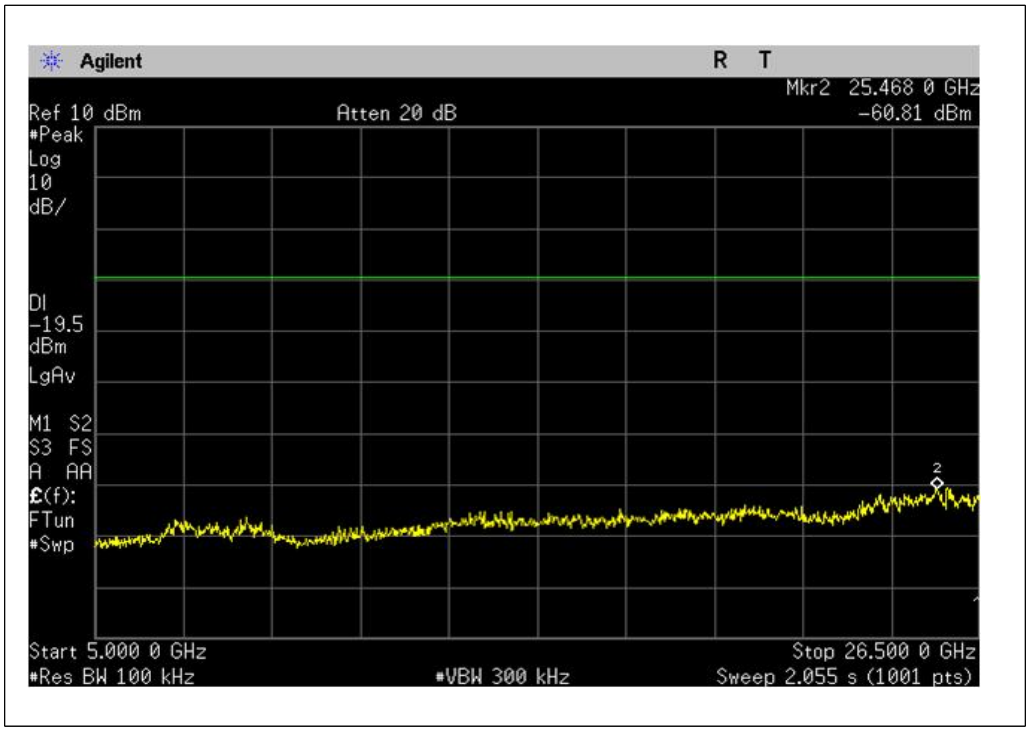
Middle Channel(2 440 MHz) : 30 MHz to 1 GHz



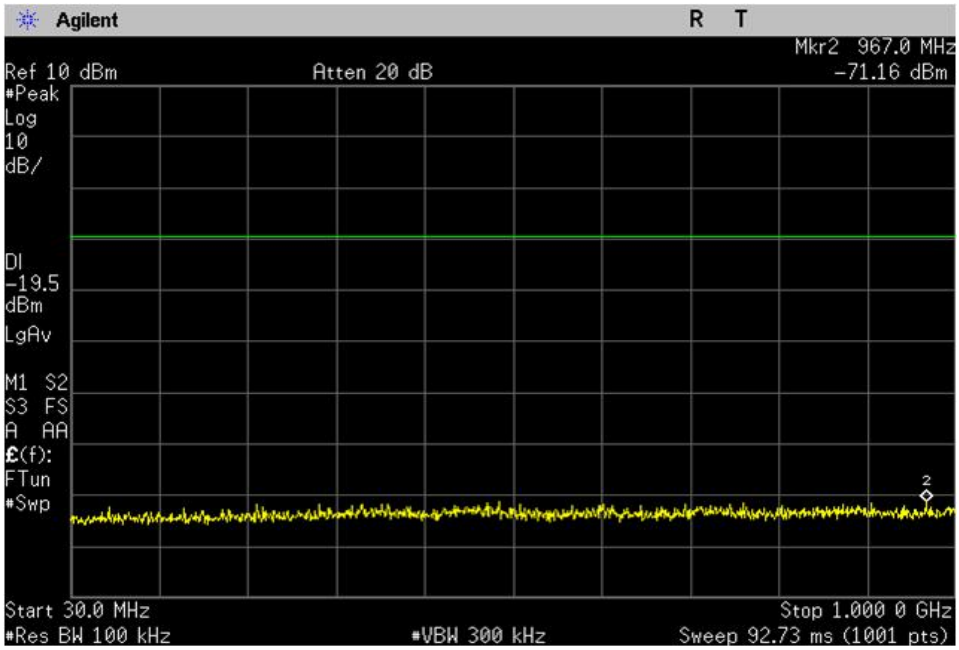
Middle Channel(2 440 MHz) : 1 GHz to 5 GHz



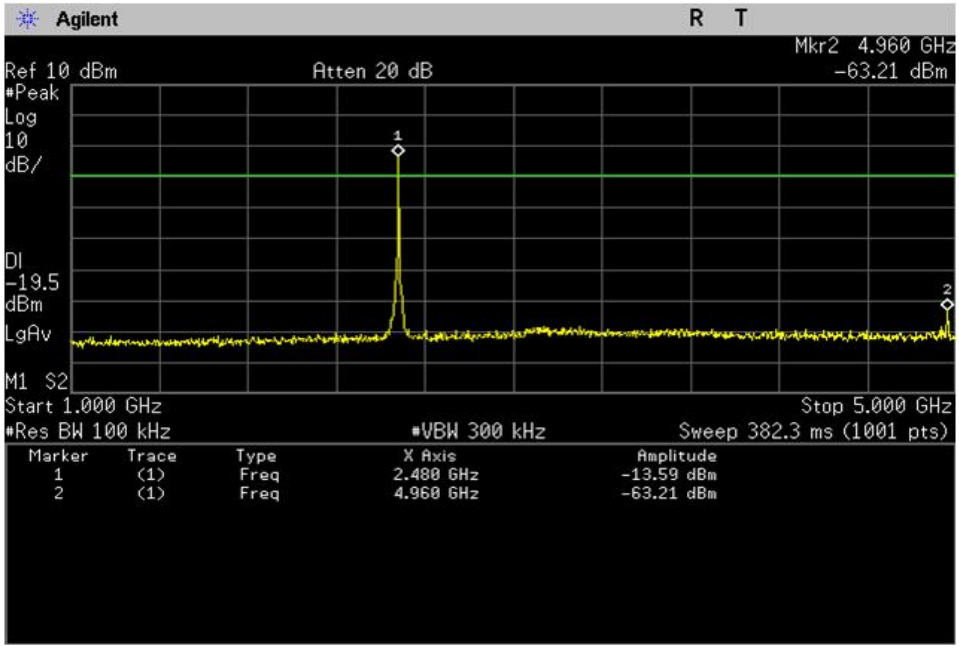
Middle Channel(2 440 MHz) : 5 GHz to 26.5 GHz



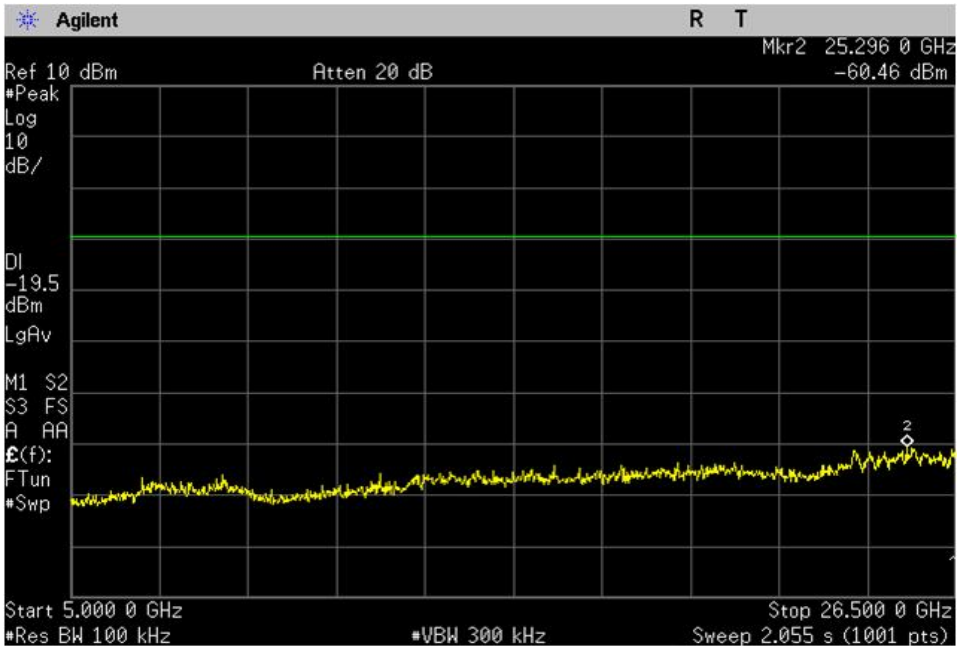
High Channel(2 480 MHz) : 30 MHz to 1 GHz



High Channel(2 480 MHz) : 1 GHz to 5 GHz



High Channel(2 480 MHz) : 5 GHz to 26.5 GHz



4.7. Radiated Spurious Emission

4.7.1. Requirement

FCC Part15 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 limited specified in Section 15.209(a) (see Section 15.205(c)).

4.7.2. Test Method

ANSI C63.10

1) Test site

Measurement Distance : 3 m (Semi-Anechoic Chamber)

2) Receiver setup

Frequency	Detector	RBW	VBW	Remark
30 MHz~1 GHz	Quasi-peak	120 KHz	300 KHz	Quasi-peak Value
Above 1 GHz	Peak	1 MHz	3 MHz	Peak Value
	RMS	1 MHz	3 MHz	Average Vaile

3) Limit

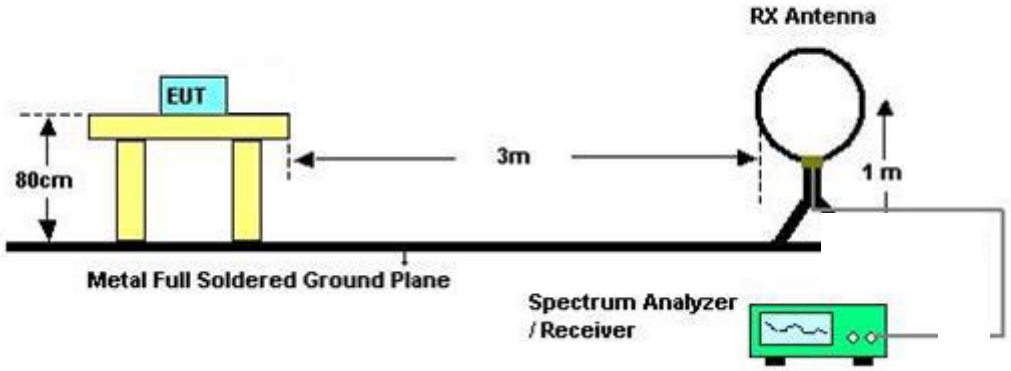
Frequency	Limit(dBμV/m @ 3m)	Remark
30 MHz ~ 88 MHz	40.0	Quasi-peak Vaule
88 MHz ~ 216 MHz	43.5	Quasi-peak Vaule
216 MHz ~ 960 MHz	46.0	Quasi-peak Vaule
960 MHz ~ 1 GHz	54.0	Quasi-peak Vaule
Above 1 GHz	54.0	Average Value
	74.0	Peak Value

4) Test Frequency Range

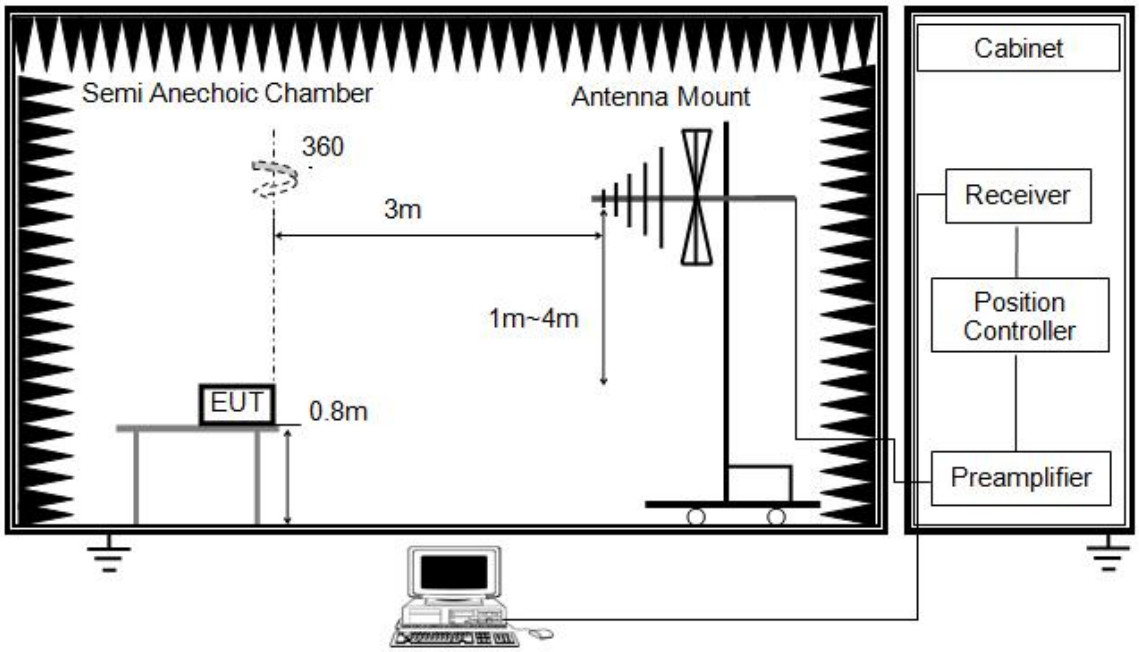
30 MHz ~ 26.5 GHz

4.7.3. Test Configuration

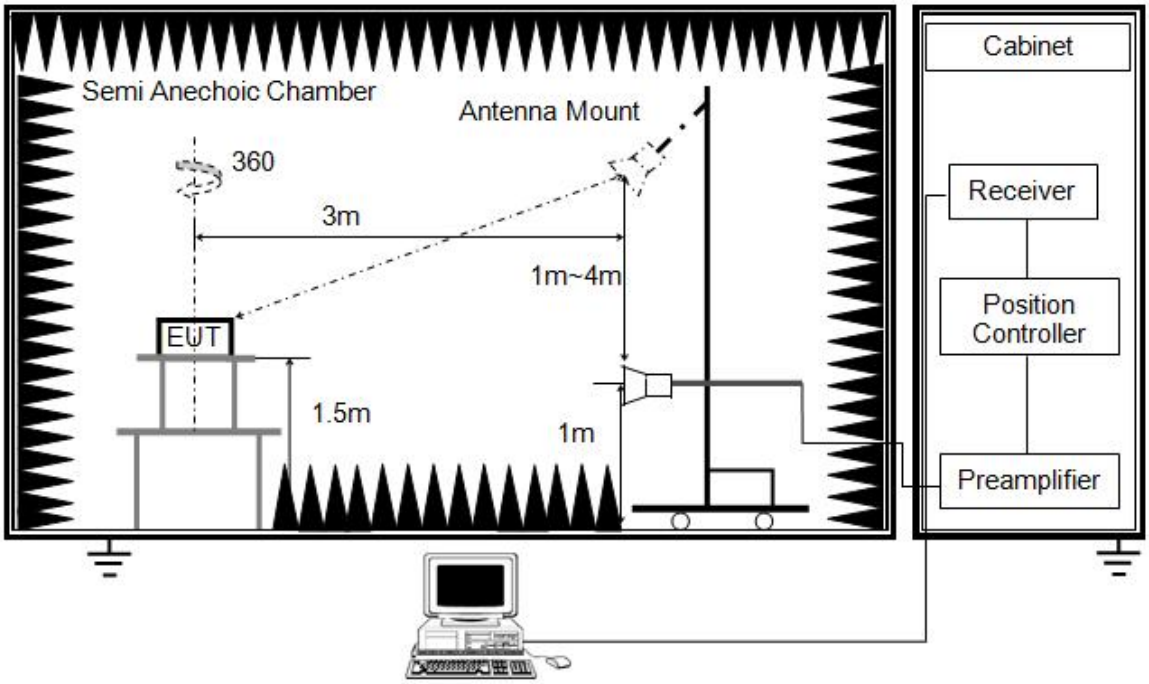
1) 9 kHz to 30 MHz emissions:



2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 26.5 GHz emissions:



4.7.4. Test Procedure

1) The EUT is placed on a turntable. For below 1 GHz, the EUT is 0.8 m above ground plane; For above 1 GHz, the EUT is 1.5m above ground plane.
2) The turn turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3) EUT is set 3 m away from the receiving antenna, which is move from 1m to 4 m to find out the maximum emissions. The spectrum was investigated from the lowest radio highest fundamental frequency or to 40 GHz, whichever is lower.
4) Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6) Repeat above procedures until the measurements for all frequencies are complete.

4.7.5. Test result

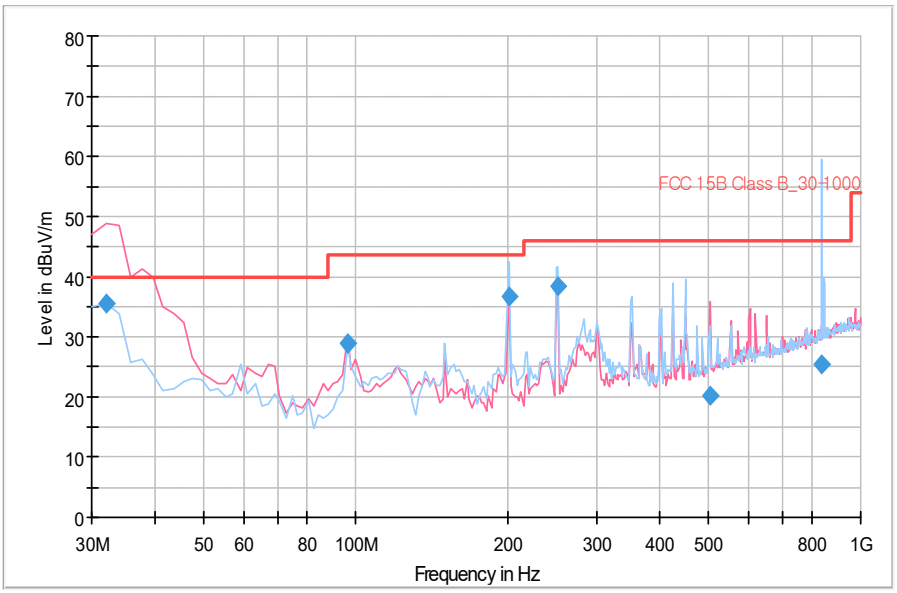
1) Test at low Channel (2 402 MHz) in transmitting status

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

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

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

Horizontal and Vertical: Level (dBμV/m)



Quasi-peak measurement

Frequency (MHz)	Detect Mode	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
31.94	QP	V	35.65	40.00	4.35
96.09	QP	V	28.86	43.50	14.64
201.06	QP	H	36.62	43.50	6.88
251.60	QP	H	38.35	46.00	7.65
504.31	QP	V	20.25	46.00	25.75
838.66	QP	H	25.41	46.00	20.59

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain"

c) 1~26.5 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 579.16	H	41.79	74.00	32.21
1 715.43	V	42.13	74.00	31.87
4 815.63	H	49.96	74.00	24.04
4 917.84	V	50.70	74.00	23.30
14 695.39	H	54.12	74.00	19.88
15 002.00	V	53.82	74.00	20.18

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain"
3) As shown in Section, for frequencies above 1 000 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.
4) The test only perform the EUT in transmitting status since the test frequencies were over 1 GHz only required transmitting status.

Average Measurement:

Frequency (MHz)	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 579.16	H	29.03	54.00	24.97
1 715.43	V	29.62	54.00	24.38
4 815.63	H	37.11	54.00	16.89
4 917.84	V	40.07	54.00	13.93
14 695.39	H	41.25	54.00	12.75
15 002.00	V	41.71	54.00	12.29

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain"
3) As shown in Section, for frequencies above 1 000 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.
4) The test only perform the EUT in transmitting status since the test frequencies were over 1 GHz only required transmitting status.

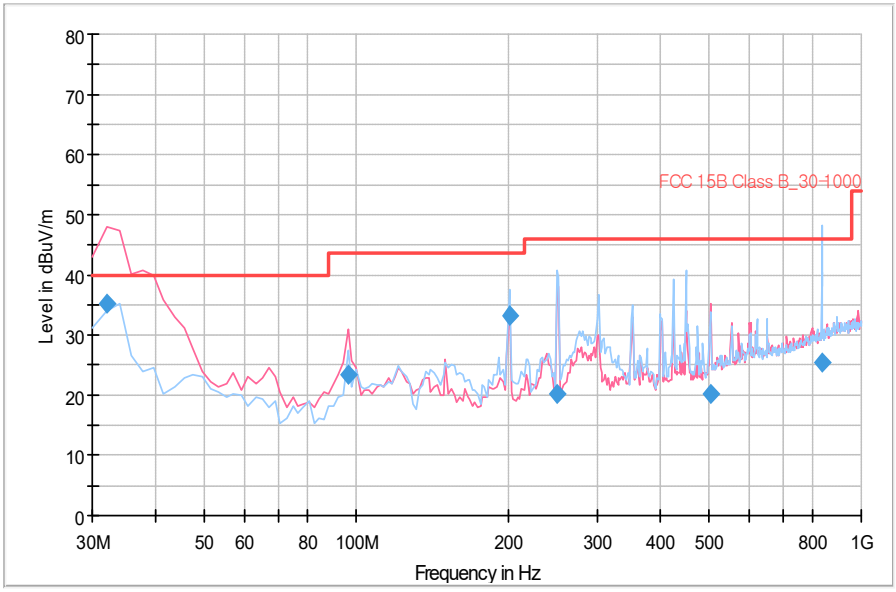
2) Test at middle Channel (2 440 MHz)in transmitting status

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

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

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

Horizontal and Vertical: Level (dBμV/m)



Quasi-peak measurement

Frequency (MHz)	Detect Mode	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
31.94	QP	V	35.37	40.00	4.63
96.09	QP	V	23.53	43.50	19.97
201.06	QP	H	33.08	43.50	10.42
249.66	QP	H	20.12	46.00	25.88
504.31	QP	V	20.20	46.00	25.80
838.66	QP	H	25.41	46.00	20.59

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain".

c) 1~26.5 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 613.23	H	41.95	74.00	32.05
1 681.36	V	42.39	74.00	31.61
11 152.30	H	53.30	74.00	20.71
11 424.85	V	53.04	74.00	20.96
14 422.85	V	53.42	74.00	20.58
14 831.66	H	53.59	74.00	20.41

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain"
3) As shown in Section, for frequencies above 1 000 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.
4) The test only perform the EUT in transmitting status since the test frequencies were over 1 GHz only required transmitting status.

Average Measurement:

Frequency (MHz)	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 613.23	H	28.92	54.00	25.08
1 681.36	V	29.27	54.00	24.73
11 152.30	H	39.65	54.00	14.35
11 424.85	V	42.51	54.00	11.49
14 422.85	V	41.93	54.00	12.07
14 831.66	H	41.40	54.00	12.60

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain"
3) As shown in Section, for frequencies above 1 000 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.
4) The test only perform the EUT in transmitting status since the test frequencies were over 1 GHz only required transmitting status.

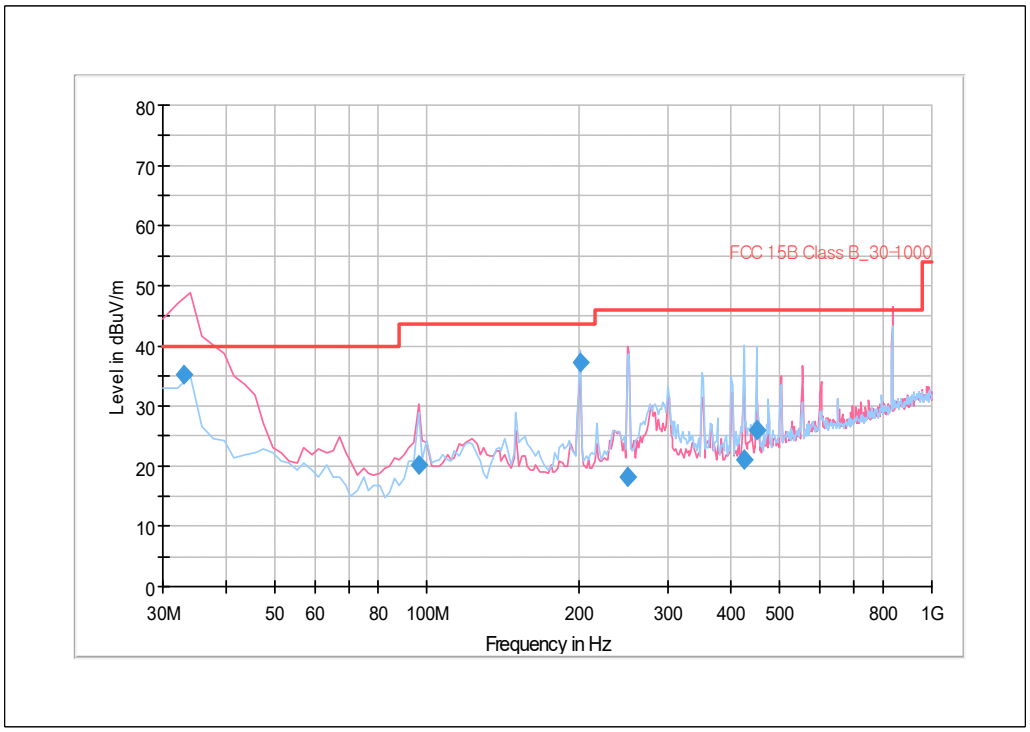
3) Test at high Channel (2 480 MHz) in transmitting status

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

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

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

Horizontal and Vertical: Level (dBμV/m)



Quasi-peak measurement

Frequency (MHz)	Detect Mode	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
33.00	QP	V	35.11	40.00	4.89
96.09	QP	V	20.27	43.50	23.23
201.06	QP	H	37.15	43.50	6.35
249.66	QP	V	18.08	46.00	27.92
424.61	QP	H	21.15	46.00	24.85
449.88	QP	H	26.03	46.00	19.97

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain".

c) 1~26.5 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 579.16	H	41.24	74.00	32.76
1 647.29	V	42.51	74.00	31.49
10 300.60	H	52.41	74.00	21.59
10 913.83	V	53.23	74.00	20.77
13 877.76	V	53.44	74.00	20.56
14 831.66	H	53.22	74.00	20.78

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain"
3) As shown in Section, for frequencies above 1 000 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.
4) The test only perform the EUT in transmitting status since the test frequencies were over 1 GHz only required transmitting status.

Average Measurement:

Frequency (MHz)	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1 579.16	H	28.70	54.00	25.30
1 647.29	V	29.41	54.00	24.59
10 300.60	H	41.60	54.00	12.40
10 913.83	V	40.20	54.00	13.80
13 877.76	V	40.78	54.00	13.22
14 831.66	H	41.98	54.00	12.02

* Remark:
1) The Emission Level values are included "Correction Factor"
2) Correction Factor = "Antenna Factor" + "Cable Loss" - "Amp. Gain"
3) As shown in Section, for frequencies above 1 000 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.
4) The test only perform the EUT in transmitting status since the test frequencies were over 1 GHz only required transmitting status.

4.8. Band Edges Compliance

4.8.1. Requirement

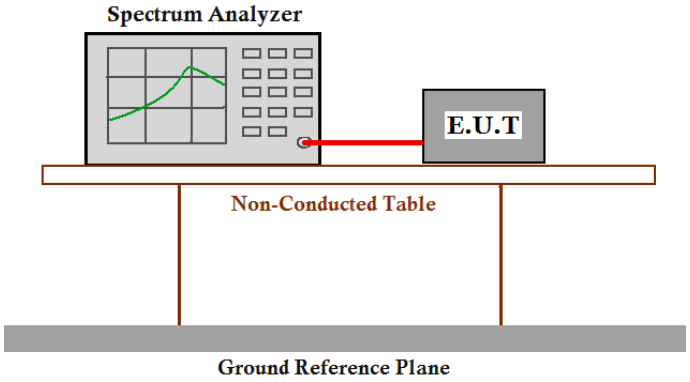
FCC Part15 C section 15.247

(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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. 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)).

4.8.2. Test Method

KDB 558074 D01 v03r05 and ANSI C63.10

4.8.3. Test Configuration



4.8.4. Test Procedure

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

2) Set the spectrum analyzer:

a) Set start frequency to DTS channel edge frequency.

b) Set stop frequency so as to encompass the spectrum to be examined.

c) Set RBW = 100 kHz.

d) Set VBW ≥ 300 kHz.

e) Detector = peak.

f) Trace Mode = max hold.

g) Sweep = auto couple.

h) Allow the trace to stabilize (this may take some time, depending on the extent of the span).

i) Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

4.8.5. Test result

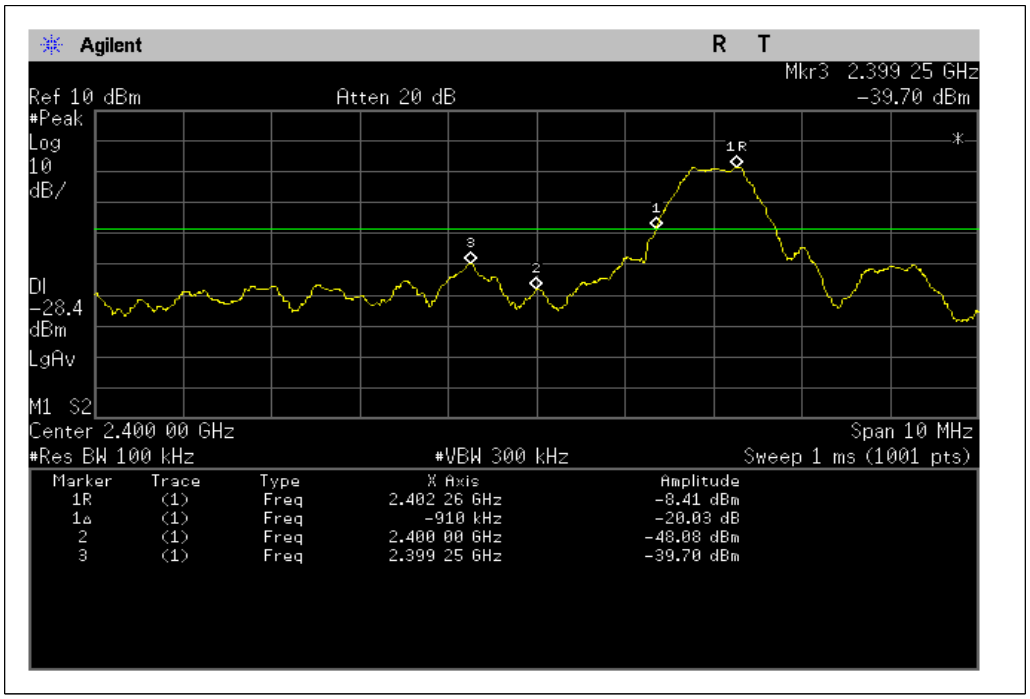
Compare with the output power of the lowest frequency, the Lower Edges attenuated more than 20 dB.

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

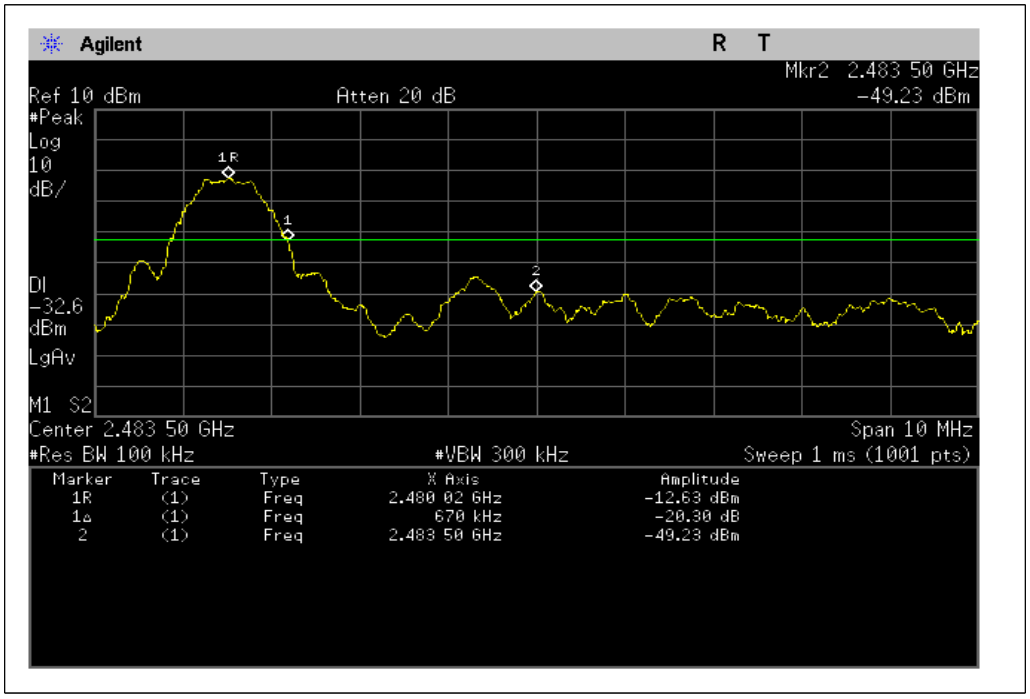
Result plot as follows:

BLE mode:

Low Channel(2 402 MHz):



Highest Channel(2 480 MHz):



4.9. Radio Frequency Exposure Procedures

4.9.1. Requirement

According to §15.247(i) and § 1.1307(b)(1) , systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

KDB 447498 D01: Approximate SAR test exclusion power thresholds at selected frequencies and test separation distances are illustrated in the following table:

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1 500	12	24	37	49	61	
1 900	11	22	33	44	54	
2 450	10	19	29	38	48	
3 600	8	16	24	32	40	
5 200	7	13	20	26	33	
5 400	6	13	19	26	32	
5 800	6	12	19	25	31	

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by: [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

4.9.2. Conclusion

1) Maximum Measured Transmitter Power:

Channel Frequency (MHz)	Maximum Peak Conducted Output Power		Max Antenna Gain (dBi)	Numeric antenna gain (mW)
	(dBm)	(mW)		
2 402	-8.25	0.15	0.5	1.12

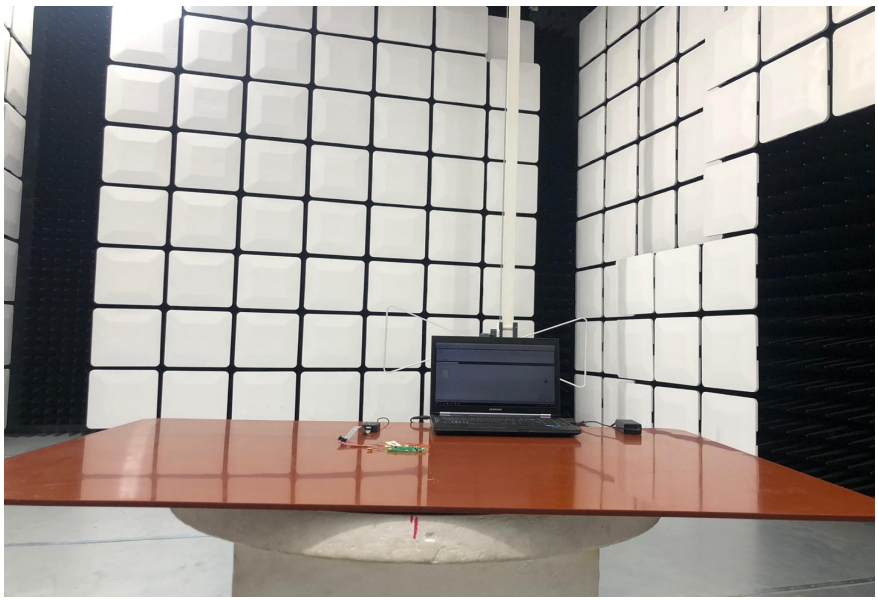
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] = 0.15/25*√2.402 = 0.009 ≤ 3.0

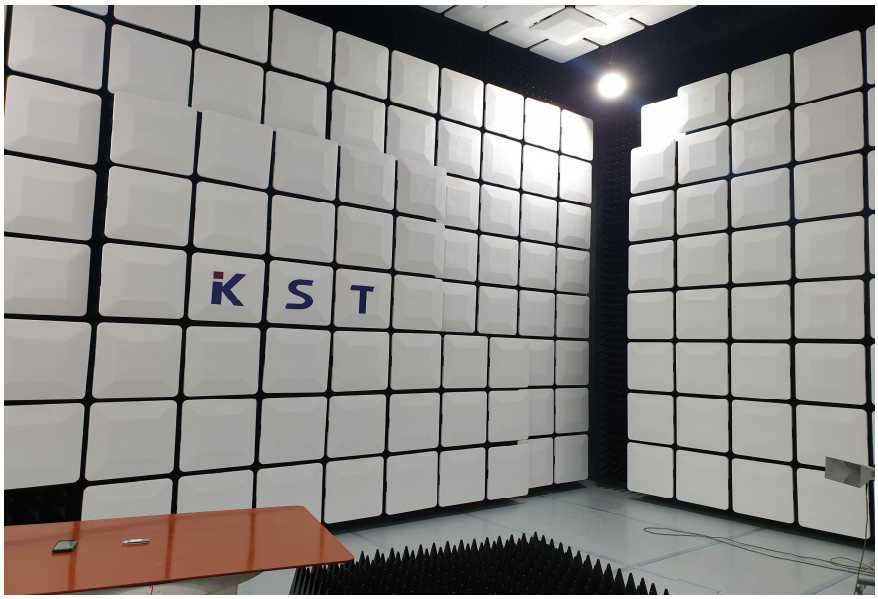
Threshold at which no SAR required is 48 mW and ≤ 3.0 for 1-g SAR, Separation distance is 25 mm.

2) Conclusion : The SAR measurement is exempt.

APPENDIX A : Photographs of Test Setup

1. Radiated Spurious Emission





APPENDIX B : Photographs of EUT

1. EUT photo