Korea Standard Testlab
107-25, Jangdeokdong-gil, Namyang-eup, Hwaseong-si, Gyeonggi-do, Korea
Tel : +82-31-356-7333 FAX : +82-31-356-7303

FCC TEST REPORT

Applicant Name	: DIATEC CORPORATION
Brand Name	: DIATEC CORPORATION
Applicant Address	: 4F Kairaku Bldg. (Soto-kanda), 6-5-4, Sotokanda,Chiyoda-ku, Tokyo, 101-0021,JAPAN
FCC ID	: XS8-CONV3XFULL
Products Name	: Majestouch Convertible 3X
Model No.	: FILCKFBT2-33X
Variant Model No.	:
Products Manufacturer	: Datacomp Electronics Co., Ltd
Test Standard	: FCC CFR 47 Part 15 Subpart C
Test Method	: ANSI C63.10:2013
Test Result	: PASS
Dates of Test	: April 8, 2024 to April 9, 2024
Date of Issue	: April 15, 2024
Test Laboratory	: Korea Standard Testlab FCC Registration No. : 0035270164

Tested by

Chi Yeon Lee
Test Engineer

Approved by

Kidong Kim
Technical Manager

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1. General Information

1.1. Client Information

Applicant	:	DIATEC CORPORATION
Address of Applicant	:	4F Kairaku Bldg. (Soto-kanda), 6-5-4, Sotokanda,Chiyoda-ku, Tokyo, 101-0021,JAPAN

1.2. General Description of E.U.T.

Product Name	:	Majestouch Convertible 3X
Model No.	:	FILCKFBT2-33X

1.3. Details of E.U.T.

Operating Frequency	:	2402 MHz to 2480 MHz
Type of Modulation	:	GFSK
Number of Channels	:	79 Channels
Channel Separation	:	1 MHz
Duty Cycle	:	Continuous operation possible for testing purposes
Antenna Type	:	PCB Pattern Antenna
Antenna gain	:	2.78 dBi
Speciality	:	Bluetooth specification version (BDR)
Power Supply	:	Working voltage
Normal Test Voltage	:	DC 5.0 V

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1.4. Test Facility

The test site and measurement facilities used to collect the radiated and conducted data are located at #107-25, Jangdeokdong-gil, Namyang-eup, Hwaseong-si, Gyeonggi-do, Korea.

-. Address

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-. Laboratory Acceditations and Listings

KC Designation No. : KR0155
FCC Registration No. : 0019169788

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2. Test Equipment and Ancillaries used for Tests

No.	Used	Equipment Name	Model Name	Manufacture	Serial Number	Next Cal. Date
1	■	Spectrum Analyzer	E4440A	Agilent	MY45304715	24.10.05
2	■	Frequency Counter	5350B	HP	3049A05530	24.05.16
3	■	DC Power Supply	TS605A	TOYOTECH	19100039	24.05.18
4	■	SYNTHESIZED SWEEPER	8340B	HP	2804A00830	24.05.18
5	□	Function Generator	SG-4105	IWATSU	62372780	24.05.18
6	□	Low Noise Amplifier	TK-PA06S	Test-ek	190018-L	24.05.18
7	■	Attenuator	RL2W40G-10(1)	BROADTEK	N/A	24.05.15
8	■	Bi-log Antenna	VULB9160	SCHWARZBECK	3311	26.02.28
9	□	TestReceiver	ESR7	ROHDE & SCHWARZ	102112	25.02.21
10	■	Power Meter	E4419B	Agilent	GB41293611	24.05.18
11	■	Power Sensor	8485A	HP	3316A14708	24.05.18
12						
13						

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3. Summary of Test Results

No	Test	Standard Sub-Class	Result
0	Antenna Requirement	§15.203	Compliant
1	20dB Bandwidth	§15.247(a)	Compliant
2	Channel Separation	§15.247(a)	Compliant
3	Conducted Peak Transmitter Output Power	§15.247(b)	Compliant
4	Band-edge	§15.247(d)	Compliant
5	DWELL TIME	§15.247(a)	Compliant
6	Conducted out of band emission measurement	§15.247(d)	Compliant
7	Number of hopping Frequency	§15.247(a)	Compliant
8	Spurios Radiated Emissions	§15.205,15.209	Compliant

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4. Test Results

4.1. E.U.T. test conditions

Test Voltage:	DC 5 V
Temperature:	25 ℃
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 2 441 MHz, High channel is 2 480 MHz, BDR Mode, Total channel is 79.

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4.1.1. EUT channels and frequencies list

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

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(f1)	Middle channel(f2)	High channel(f3)
Transmitting	2 402 MHz	2 441 MHz	2 480 MHz

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4.2. Antenna

4.2.1. Requirement

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.
The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section.
The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.
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.

4.2.2. Test Result

The transmitter has an integral Chip antenna. The directional gain of the antenna is 2.78 dBi

Test result : Pass

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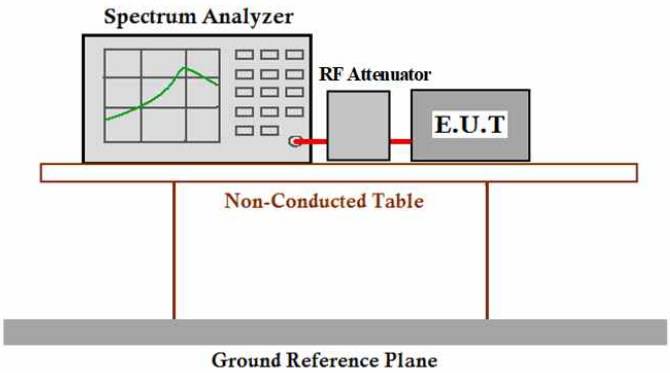
4.3. 20dB Bandwidth

4.3.1. Requirement & Test method

Test Standard :FCC Part15 Section 15.207(a)(1)

4.3.2. Test Configuration



4.3.3. Test Procedure

1) Using the following spectrum analyzer settings;

a) Span = approximately 2 to 3 times the 20dB BW, centered on a hopping channel.

b) Set the RBW = 30 kHz.

c) Set the VBW = 100 kHz.

d) Detector function = peak.

e) Trace mode = max hold.

f) Allow trace to fully stabilize.

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4.3.4. Test result

	20dB Occupy Bandwidth Test			
Mode	Channel	Frequency(Mhz)	20dB Down BW(Khz)	Test result
BT BDR	Low(F1)	2402.00	950.97	PASS
	Middle(F2)	2441.00	949.05	PASS
	High(F3)	2480.00	949.15	PASS

Low(F1)

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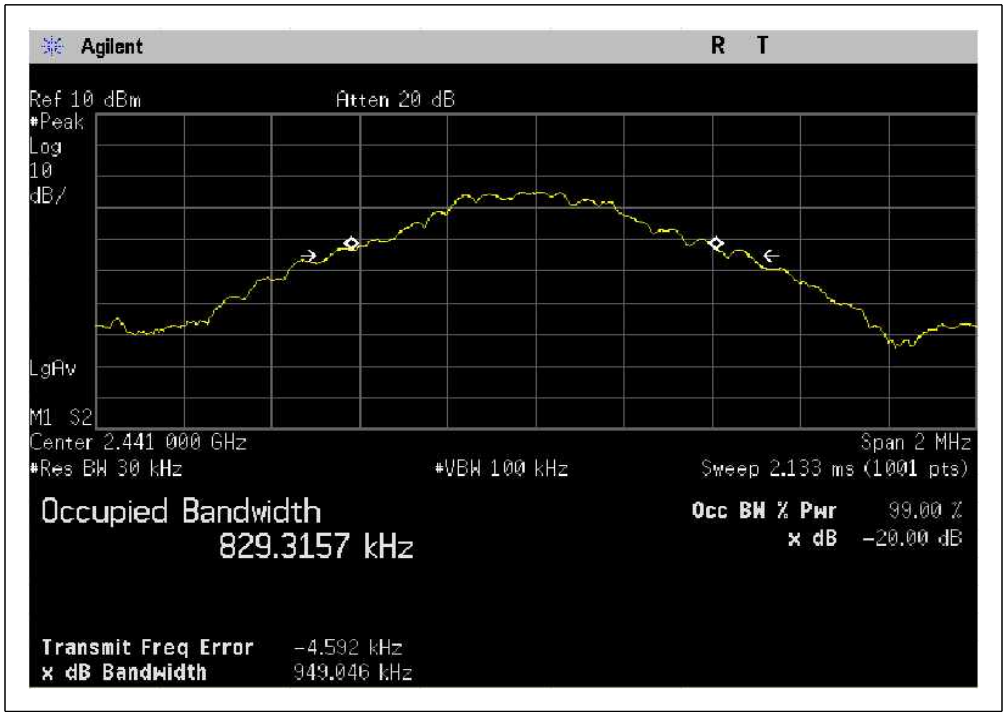
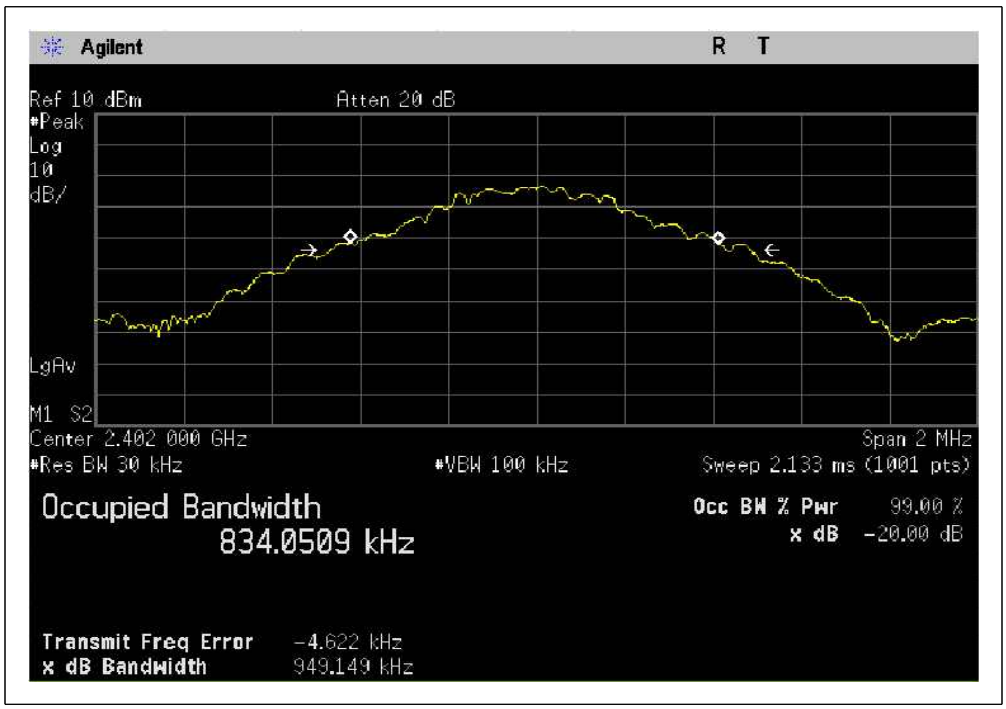
Middle(F2)



High(F3)



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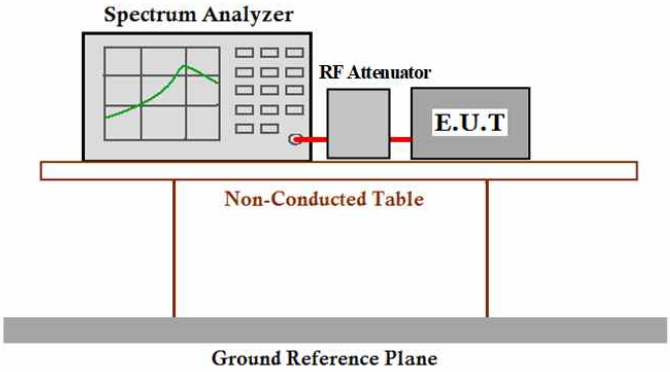
4.4. Channel Separation

4.4.1. Requirement & Test method

Test Standard :FCC Part15 C Section 15.247(a)(1)

Test Limit :25KHz or two-thirds of the 20dB BW

4.4.2. Test Configuration



4.4.3. Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer settings:

a) Span= Wide enough to capture the peaks of two adjacent channels

b) Set the RBW = 30 kHz.

c) Set the VBW = 100 kHz.

d) Sweep time = auto couple.

e) Detector function = peak.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

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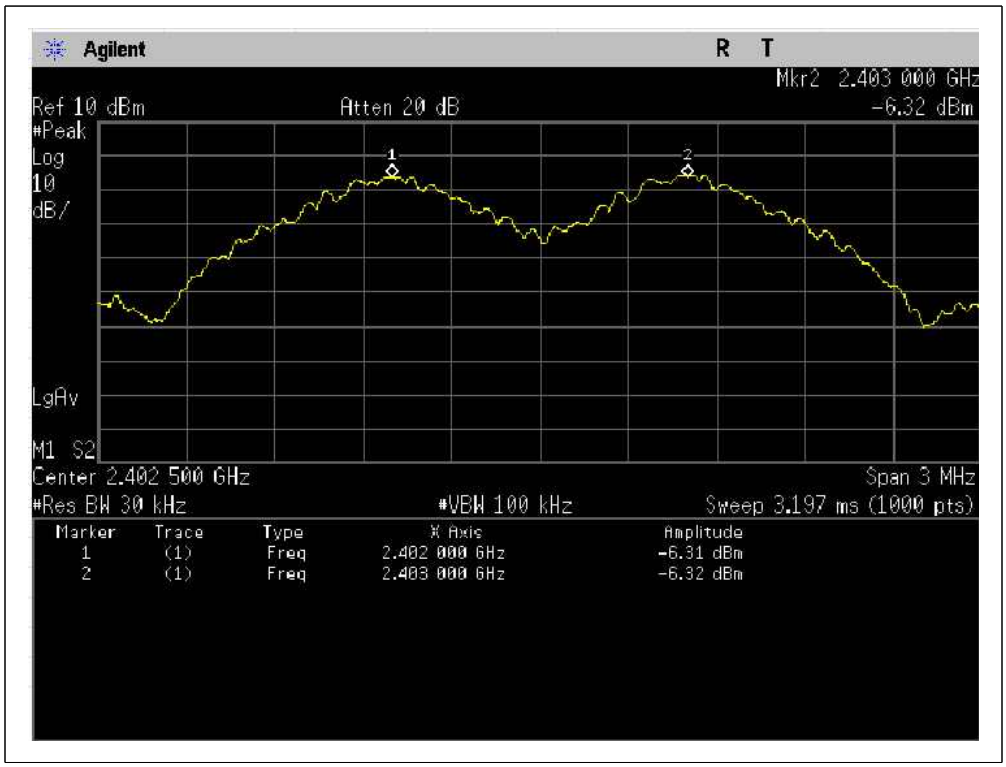
4.4.4. Test result

	Channel Separation				
Mode	Channel	Frequency (Mhz)	Separation Read Value(kHz)	Limit (Khz)	Test result
BT BDR	Low(F1)	2402.00	1000	633.98	PASS
	Middle(F2)	2441.00	1000	632.70	PASS
	High(F3)	2480.00	1000	632.77	PASS

Low(F1)



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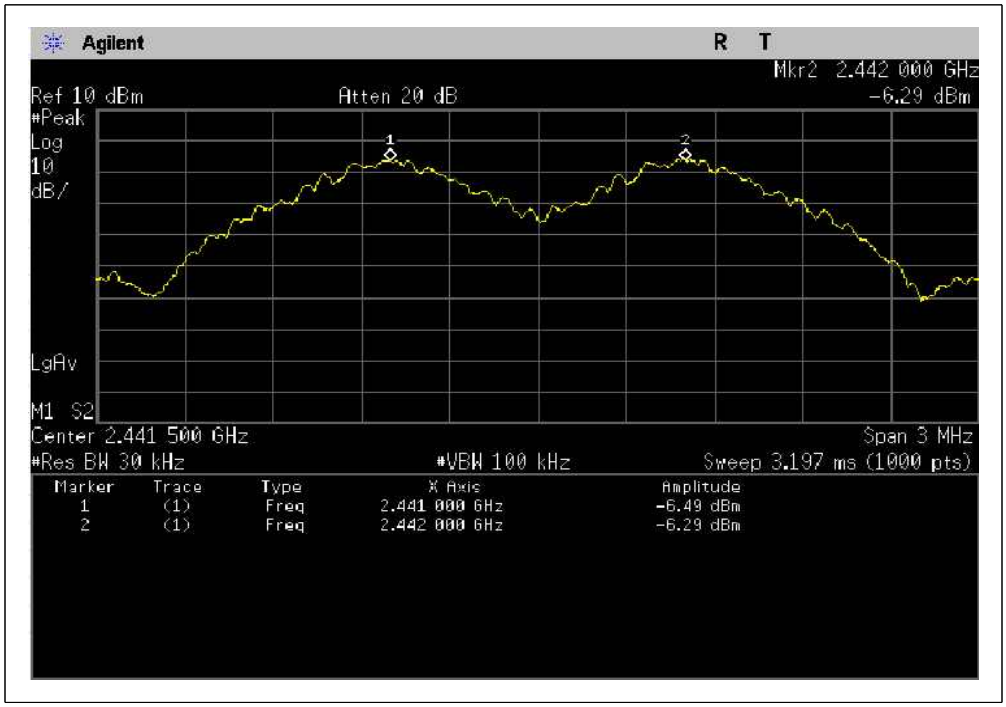
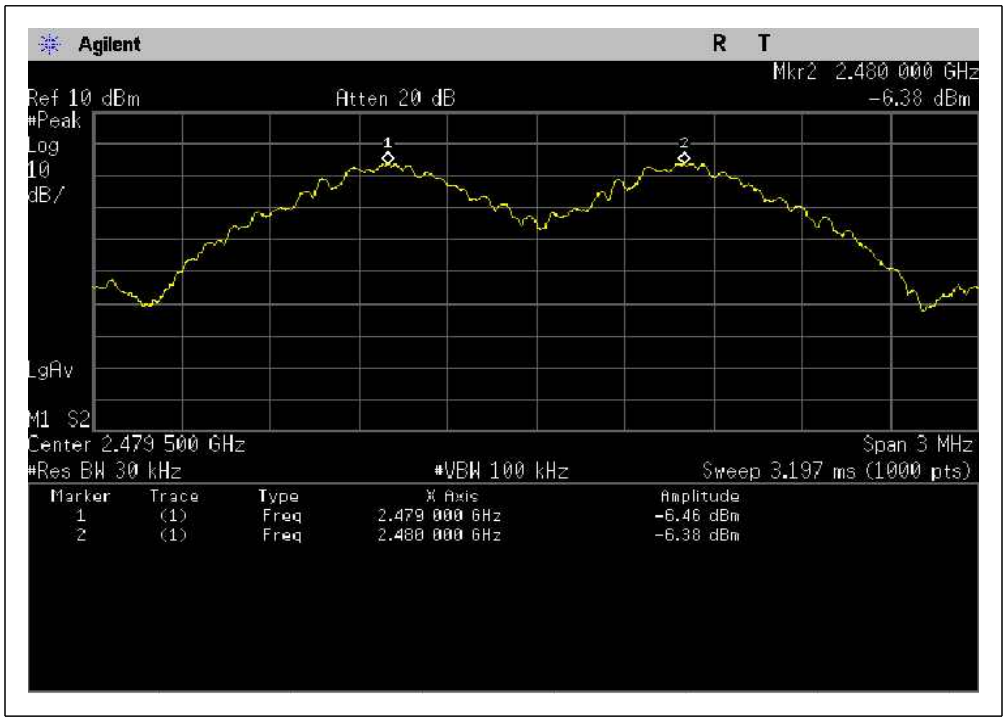
Middle(F2)



High(F3)



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KSTFR-P30-09(Rev.3.0)

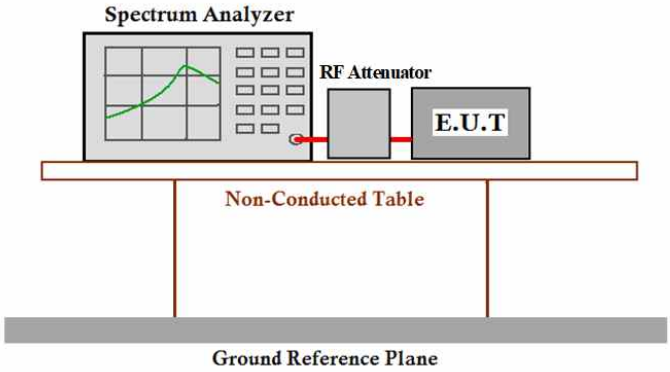
4.5. Conducted Maximum Output Power

4.5.1. Requirement & Test Method

Test Standard :FCC Part15 C Section 15.247(b)(3)

Test Limit :1W or 125mW

4.5.2. Test Configuration



4.5.3. Test Procedure

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above,

a) Spectrum Setting:

RBW>the 20 dB bandwidth of the emission being measured

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

VBW ≥RBW

Sweep = auto

Detector function = peak

Trace=max hold

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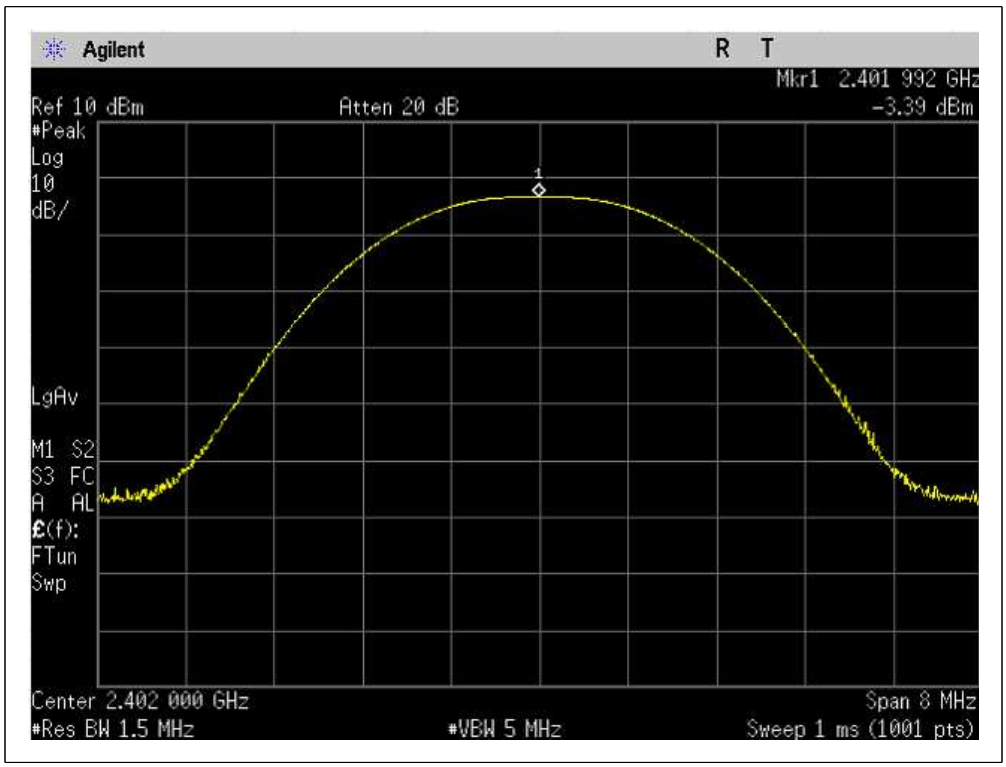
4.5.4. Test result

	Conducted Maximum Output Power				
Mode	Channel	Frequency (Mhz)	Separation Read Value(kHz)	Limit (dBm)	Test result
BT BDR	Low(F1)	2402.00	-3.39	30.00	PASS
	Middle(F2)	2441.00	-3.50	30.00	PASS
	High(F3)	2480.00	-3.86	30.00	PASS

Low(F1)



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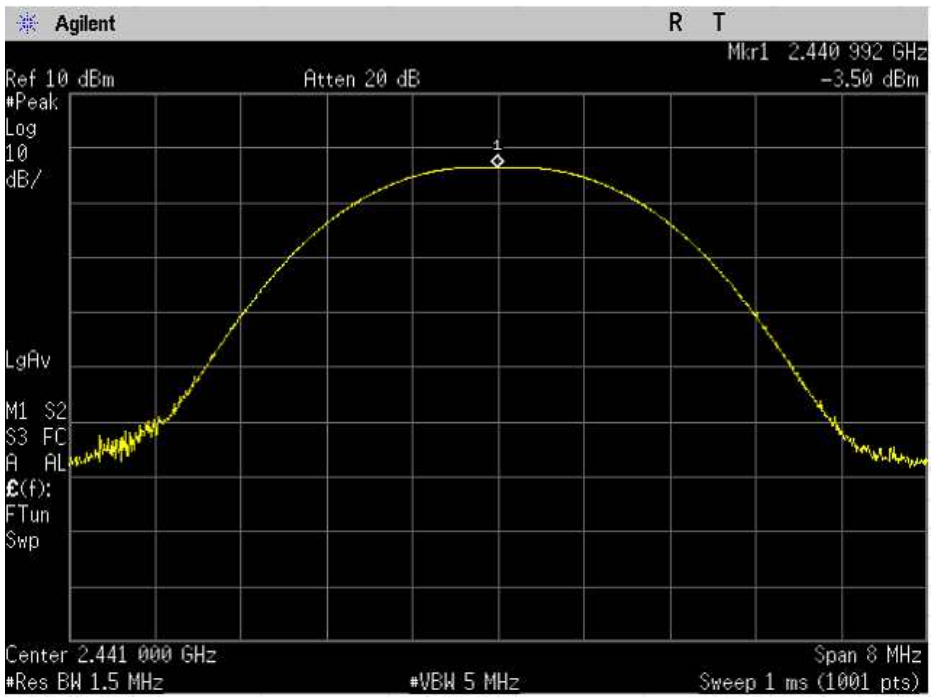
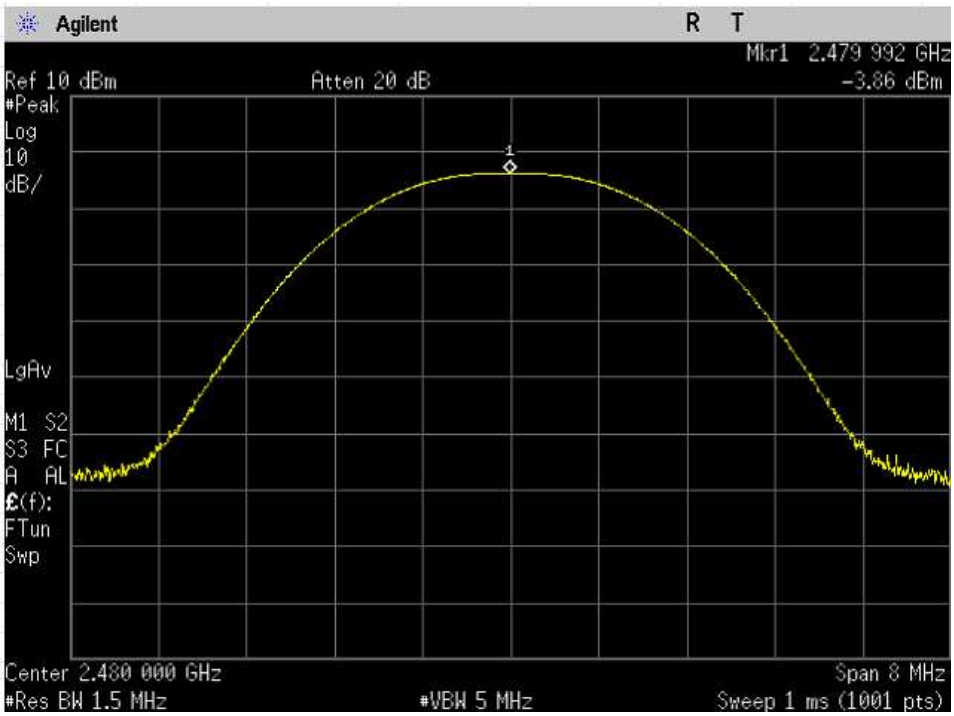
Middle(F2)



High(F3)



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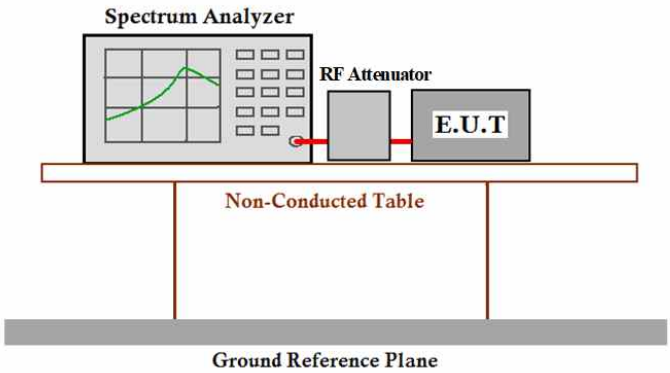
4.6. Band Edge

4.6.1. Requirement & Test method

Test Standard : FCC Part 15 C Section 15.247 (d)

Test Limit : in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, 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).

4.6.2. Test Configuration



4.6.3. Test Procedure

The EUT must have its hopping/Non-hopping function enabled. Using the following spectrum analyzer setting

a) Set the RBW = 100kHz.
b) Set the VBW = 300kHz.
c) Sweep time = auto couple.
d) Detector function = peak.
e) Trace mode = max hold.
f) Allow trace to fully stabilize.

4.6.4. Test result

	Band-edge			
Mode	Channel	Frequency(Mhz)	Measured Power (dBm)	Test result
BT BDR	Lowest 2402Mhz	2402.00	-65.08	PASS
	Highest 2480Mhz	2480.00	-68.56	PASS

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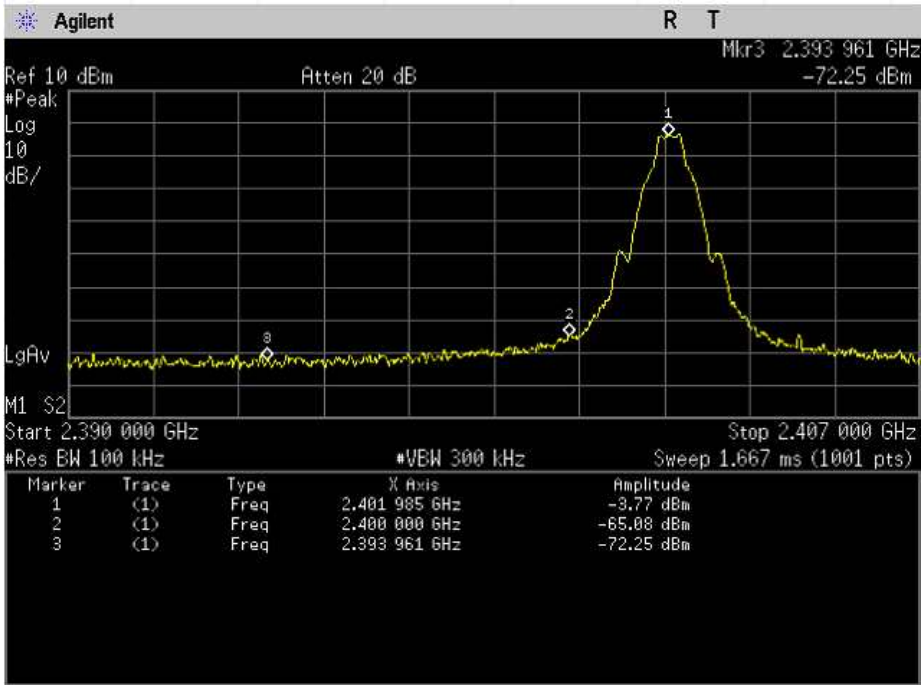
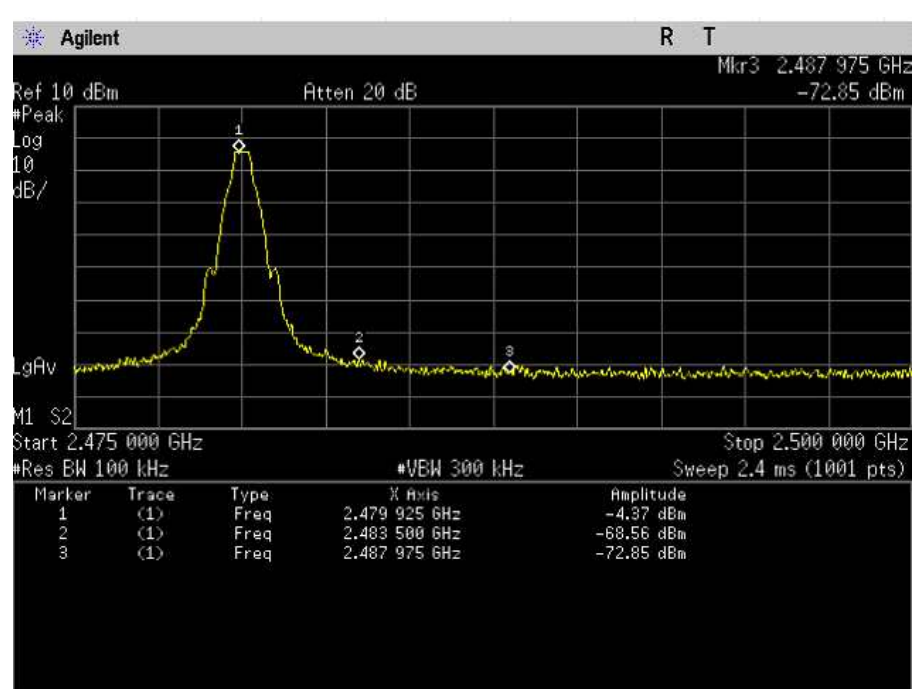
Lowest 2402Mhz



Highest 2480Mhz



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4.7. Radiated Band Edge

4.7.1. Requirement & Test Method

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)).

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

4.7.2. Test Configuration

Same as Radiated Spurious Emission.

4.7.3. Test Procedure

Same as Radiated Spurious Emission.

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4.7.4. Test result

Test mode : CH00				Test Channel : Lowest				
Peak Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
2390.00	44.48	27.6	9.44	37.77	43.75	74	-30.25	H
2390.00	44.79	27.6	9.44	37.77	44.06	74	-29.94	V
Average Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
2390.00	34.57	27.6	9.44	37.77	33.84	54	-20.16	H
2390.00	34.72	27.6	9.44	37.77	33.99	54	-20.01	V

Test mode : CH78				Test Channel : Highest				
Peak Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
2483.50	44.65	27.6	9.44	37.77	43.92	74	-30.08	H
2483.50	39.98	27.6	9.44	37.77	39.25	74	-34.75	V
Average Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
2483.50	34.35	27.6	9.44	37.77	33.62	54	-20.38	H
2483.50	34.28	27.6	9.44	37.77	33.55	54	-20.45	V

remark :

※ Ant. Pol : Antenna Polarization

※ Level = Receiver Read level + Antenna Factor + Cable Loss − Preamplifier Factor

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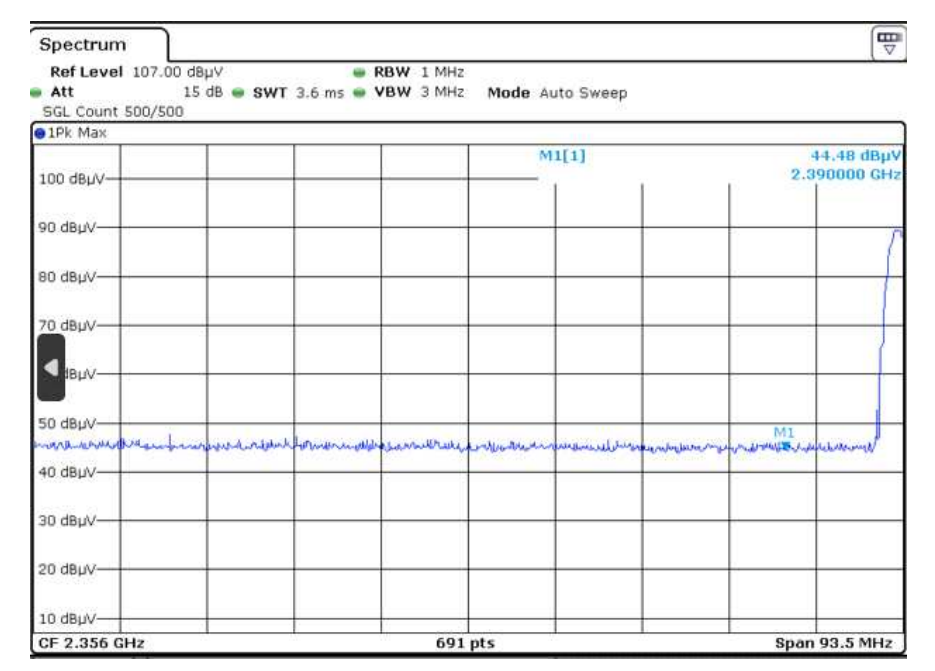
CH0-H-AV

CH0-H-PK



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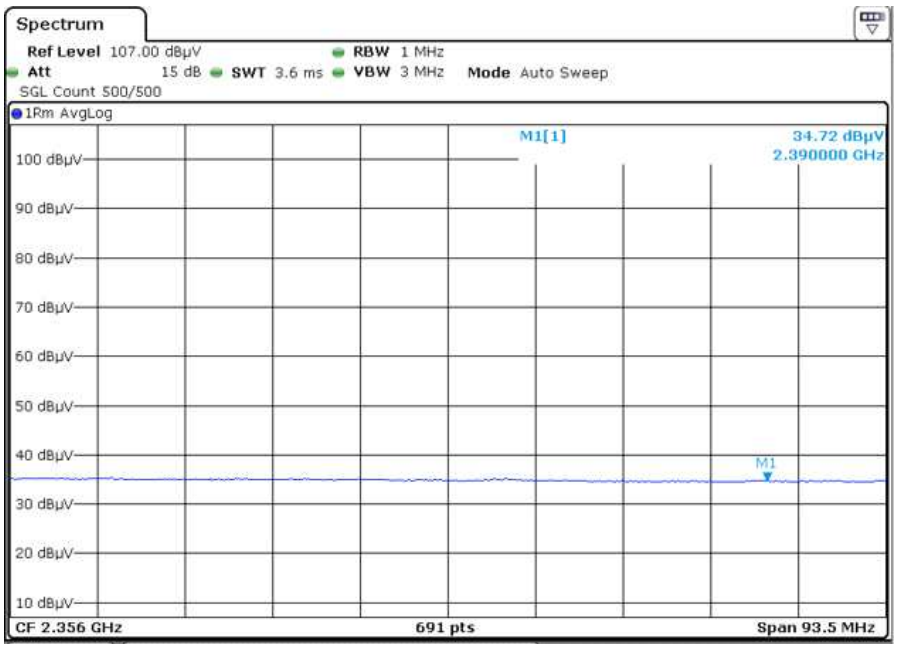
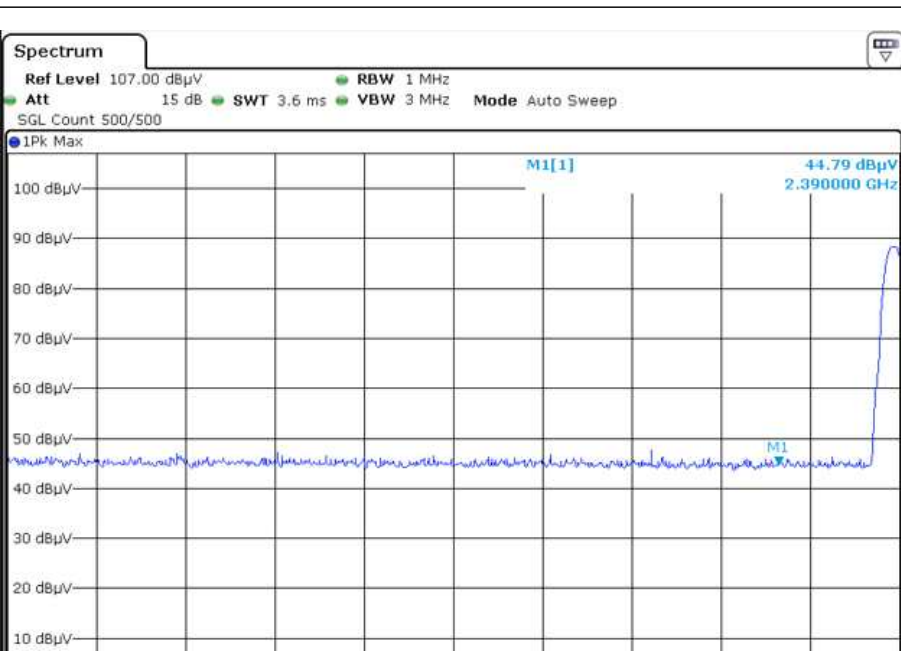
CH0-V-AV



CH0-V-PK



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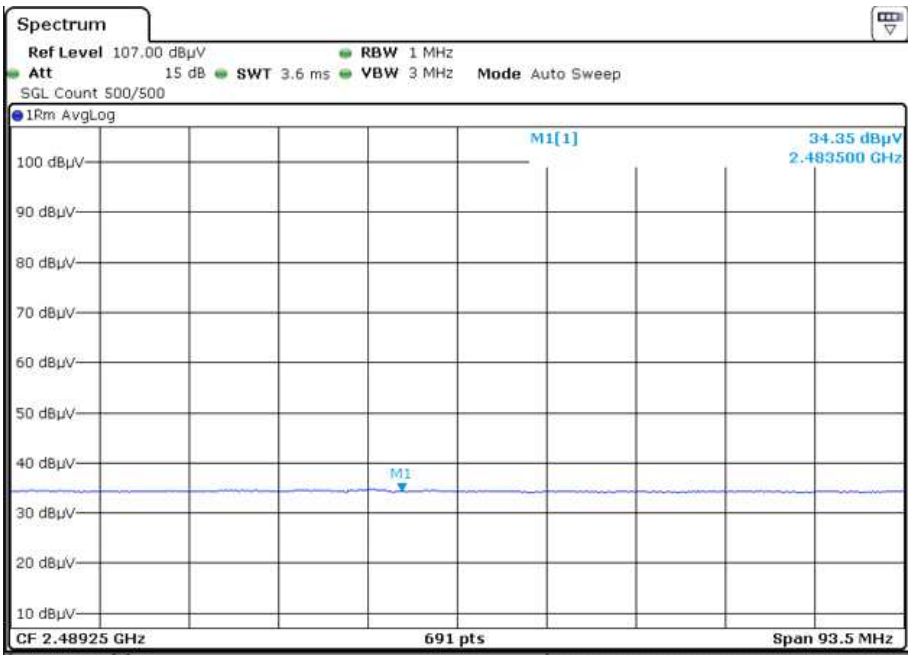
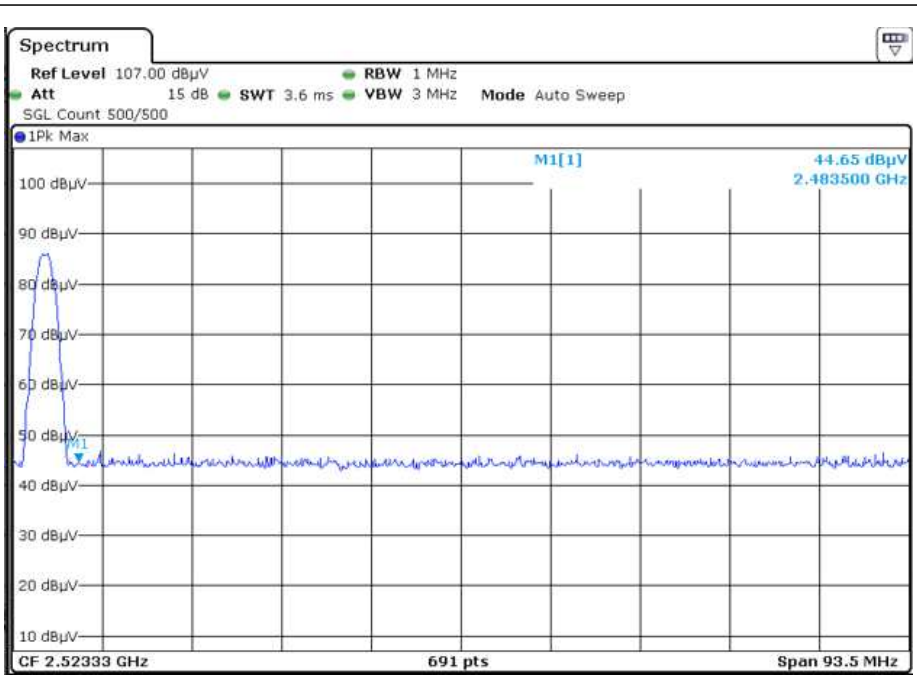
CH78-H-AV



CH78-H-PK



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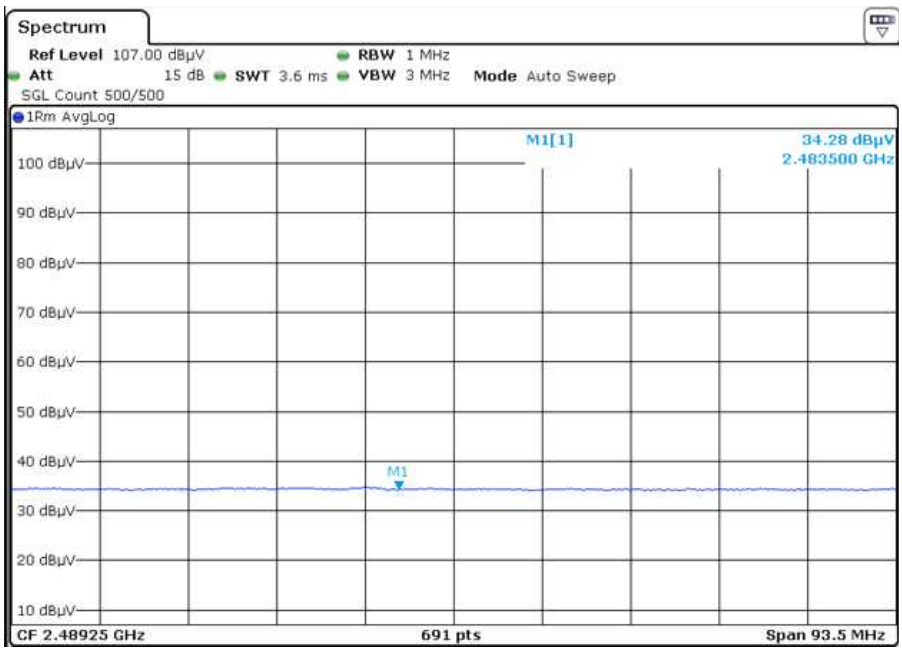
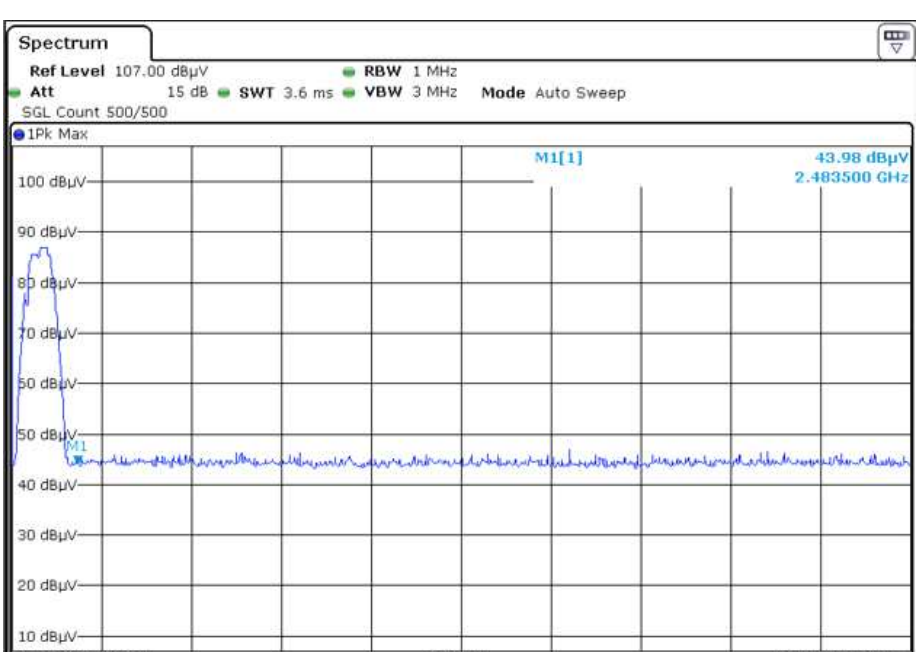
CH78-V-AV



CH78-V-PK



The test results presented in this report apply only to the specific sample(s) tested and described in the report itself. This Report shall not be reproduced partially or in its entirety without the written approval of KST

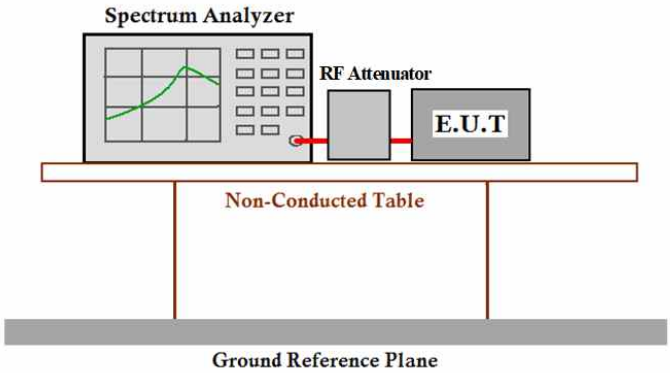
4.8. DWELL TIME

4.8.1. Requirement & Test Method

Test Standard :FCC Part15 C Section 15.247(a)(1)

Test Limit :0.4 sec

4.8.2. Test Configuration



4.8.3. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

a) Span= zero span, centered on a hopping channel

b) Set the RBW = 1 MHz.

c) Set the VBW = 1 MHz.

d) Sweep time = as necessary to capture the entire dwell time per hopping channel.

e) Detector function = peak.

f) Trace mode = max hold.

g) Allow trace to fully stabilize

4.8.4. Test result

Package Type	Pulse width (ms)	Time Slot Length(ms)	Modulation
DH1	0.368	TSL*1600/2/79*31.6	BDR
DH3	1.617	TSL*1600/4/79*31.6	BDR
DH5	*refer to the test data*	*TSL*1600/6/79*31.6*	*BDR*

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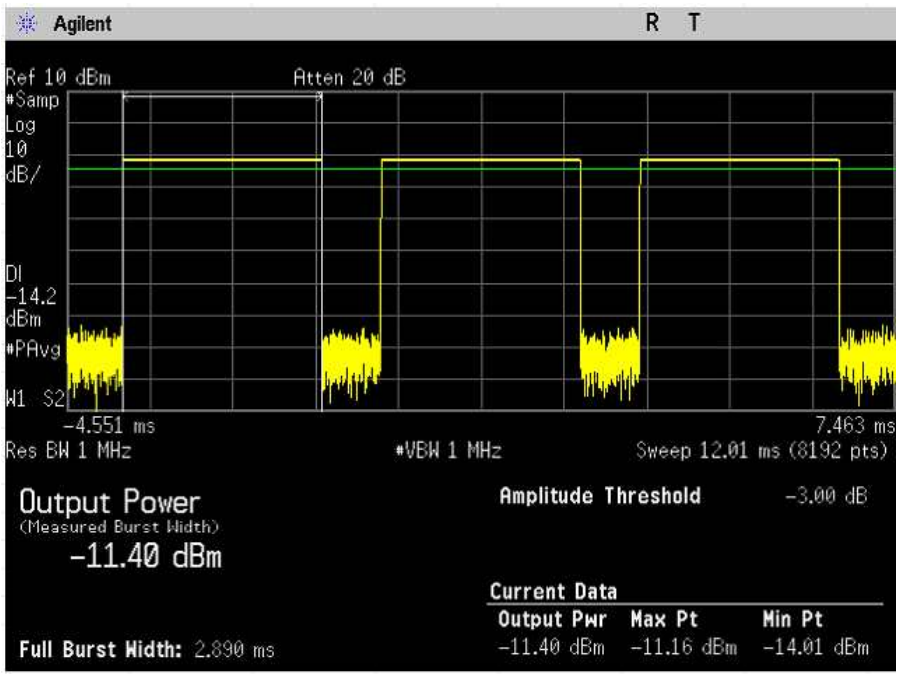
	DWELL TIME				
Modulation Type	Channel	Frequency (Mhz)	Pulse width(ms)	dwell time(ms)	Test result <0.4sec
BT BDR(DH5)	Low(F1)	2402.00	2.890	308.27	PASS
	Middle(F2)	2441.00	2.889	308.16	PASS
	High(F3)	2480.00	2.889	308.16	PASS

Low(F1)-DH5



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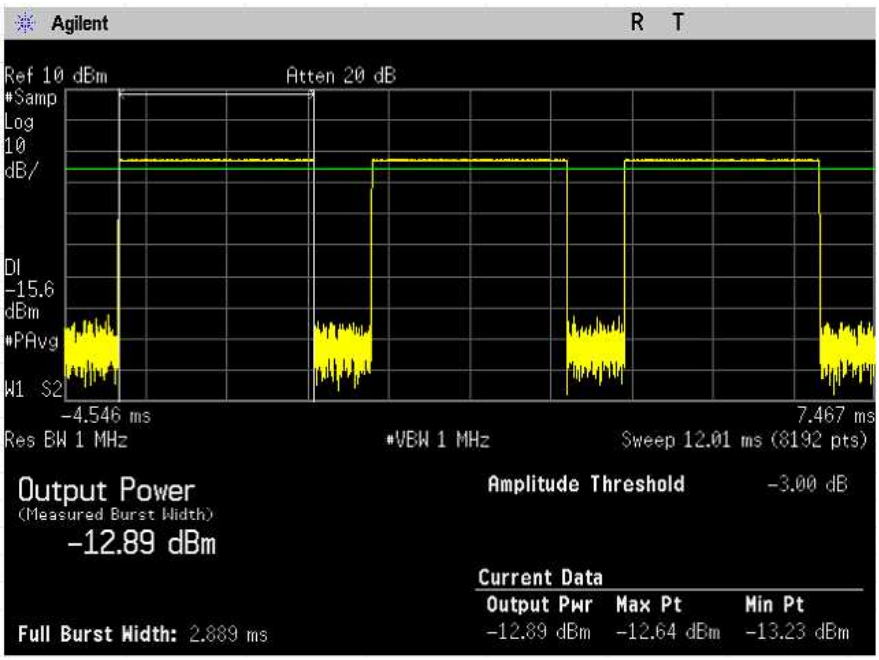
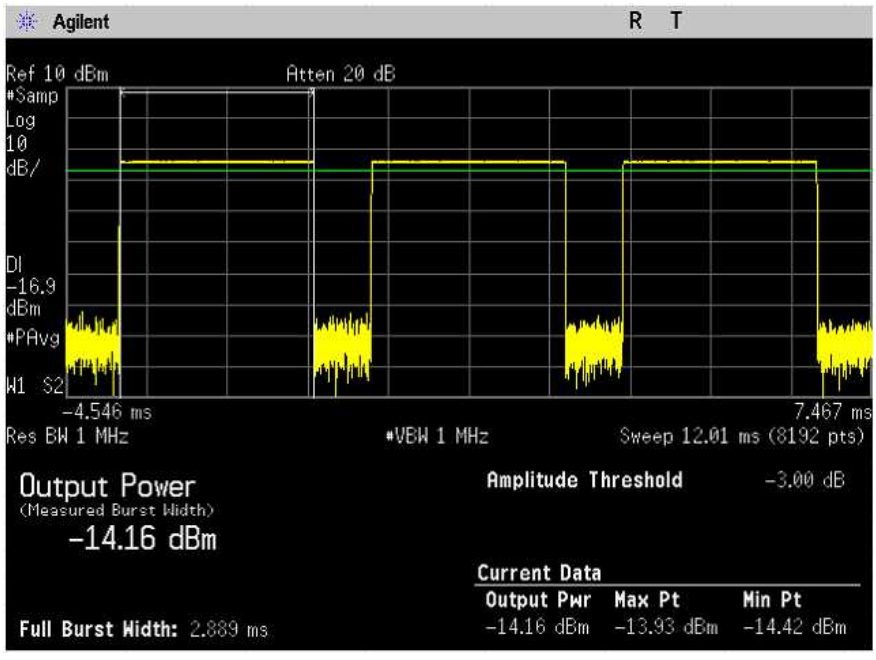
Middle(F2)-DH5



High(F3)-DH5



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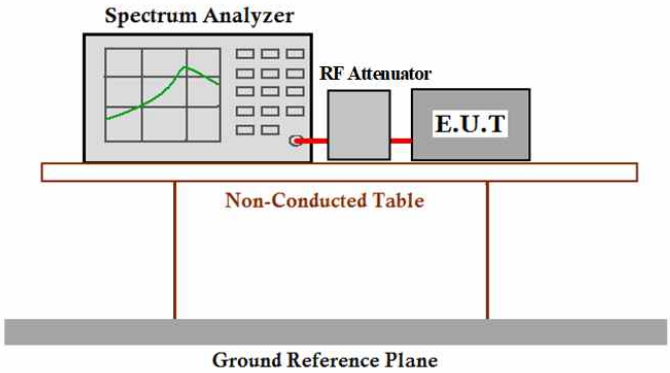
4.9. Number of hopping Frequency

4.9.1. Requirement & Test Method

Test Standard :FCC Part15 C Section 15.247(a)(1)

Test Limit : >15 channels

4.9.2. Test Configuration



4.9.3. Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer setting:

a) Span= the frequency band of operation

b) Set the RBW = 100kHz.

c) Set the VBW = 300kHz.

d) Sweep time = auto couple. 5. Detector function = peak.

e) Trace mode = max hold.

f) Allow trace to fully stabilize.

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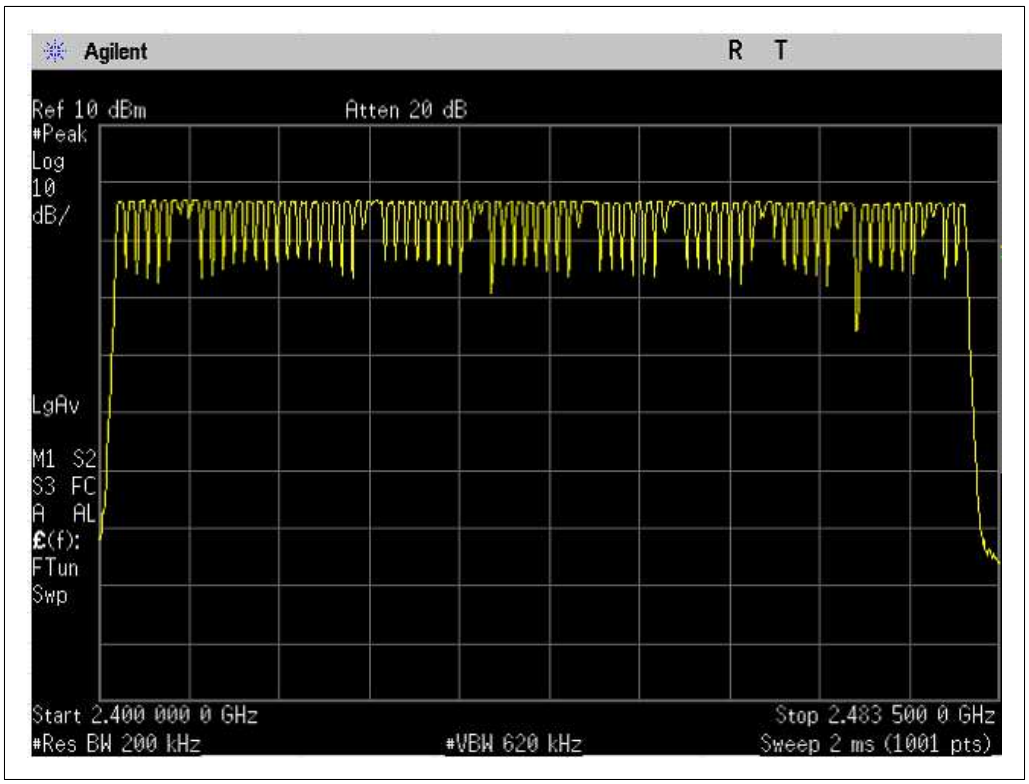
4.9.4. Test result

	Number of hopping Frequency			
Mode	Channel	Frequency(Mhz)	Number of Hopping channel	Test result
BT BDR	Low(F1)~High(F3)	2402~2480	79	PASS

Low(F1)~High(F3) 2402~2480Mhz



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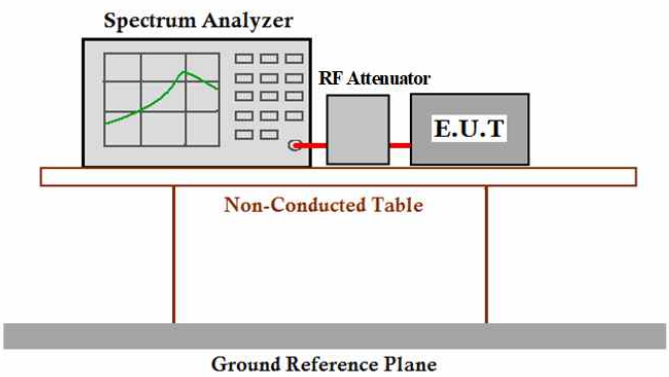
4.10. Conducted Spurious Emission

4.10.1. Requirement & Test Method

CC 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. KDB 558074 v05r02 and ANSI C63.10:2013

4.10.2. Test Configuration



4.10.3. Test Procedure

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

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.

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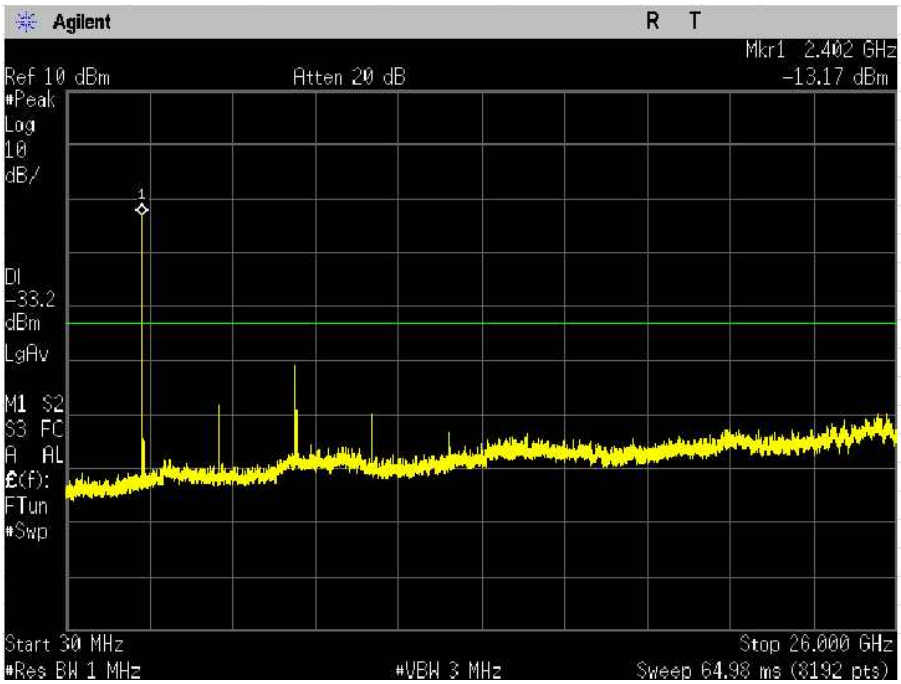
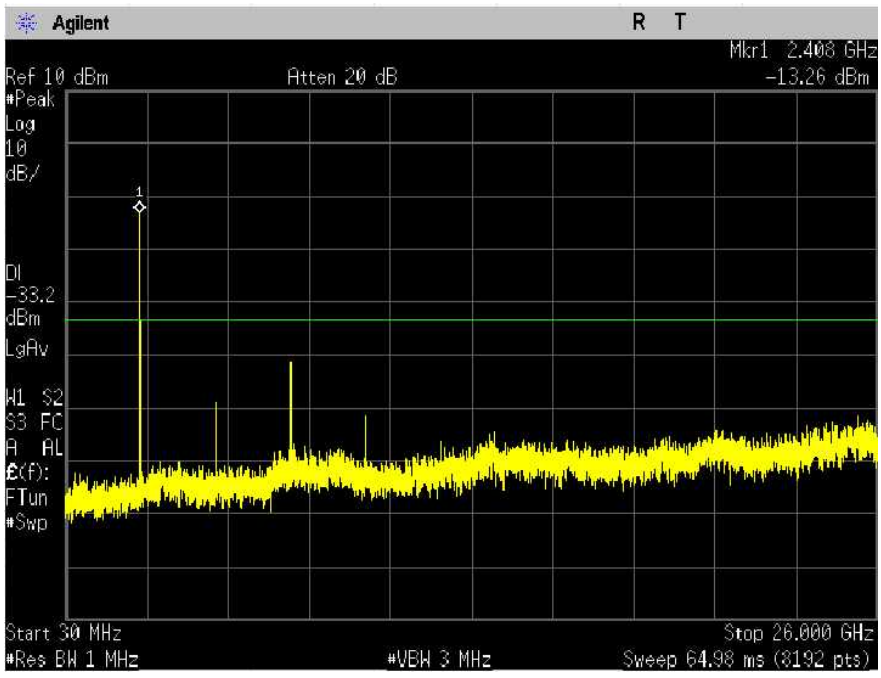
4.10.4. Test Result

Low(F1)



Middle(F2)



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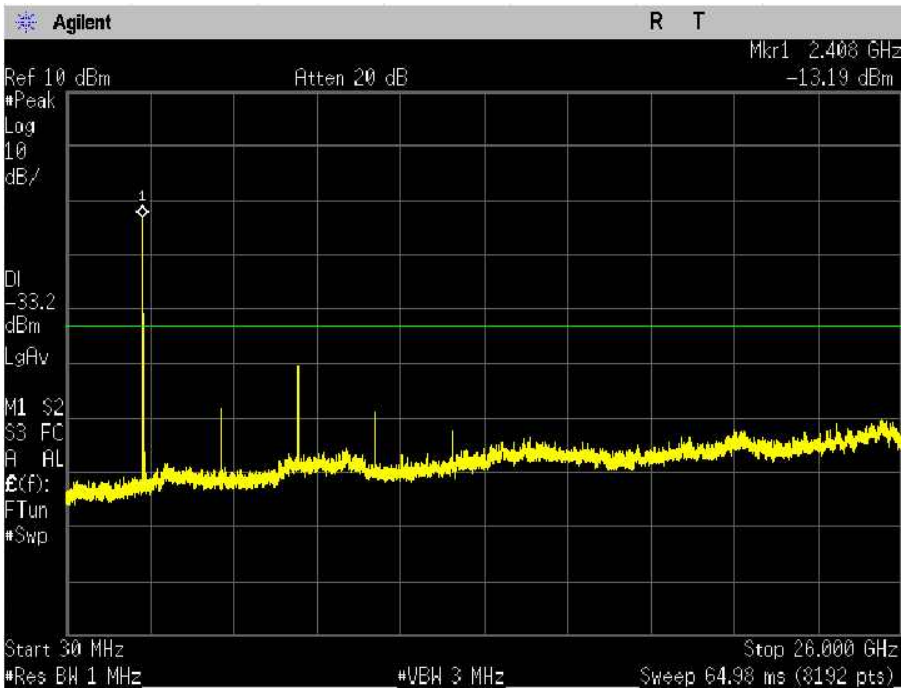
High(F3)



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4.11. Radiated Spurious Emission

4.11.1. Requirement & Test Method

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)).

ANSI C63.10:2013

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

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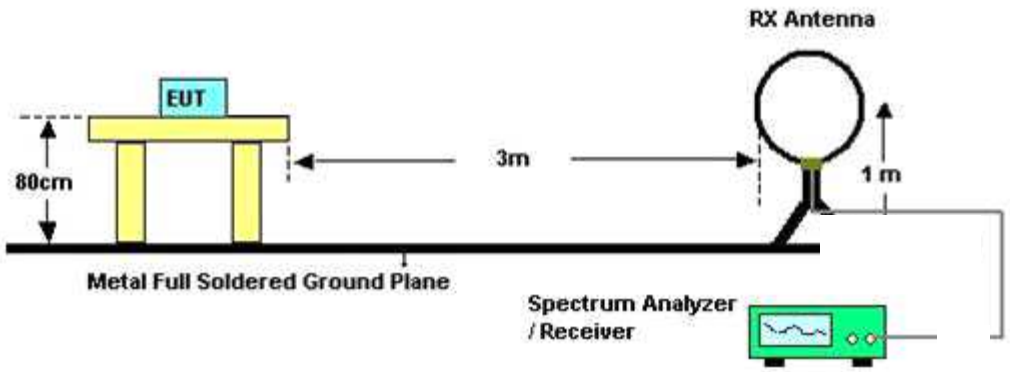
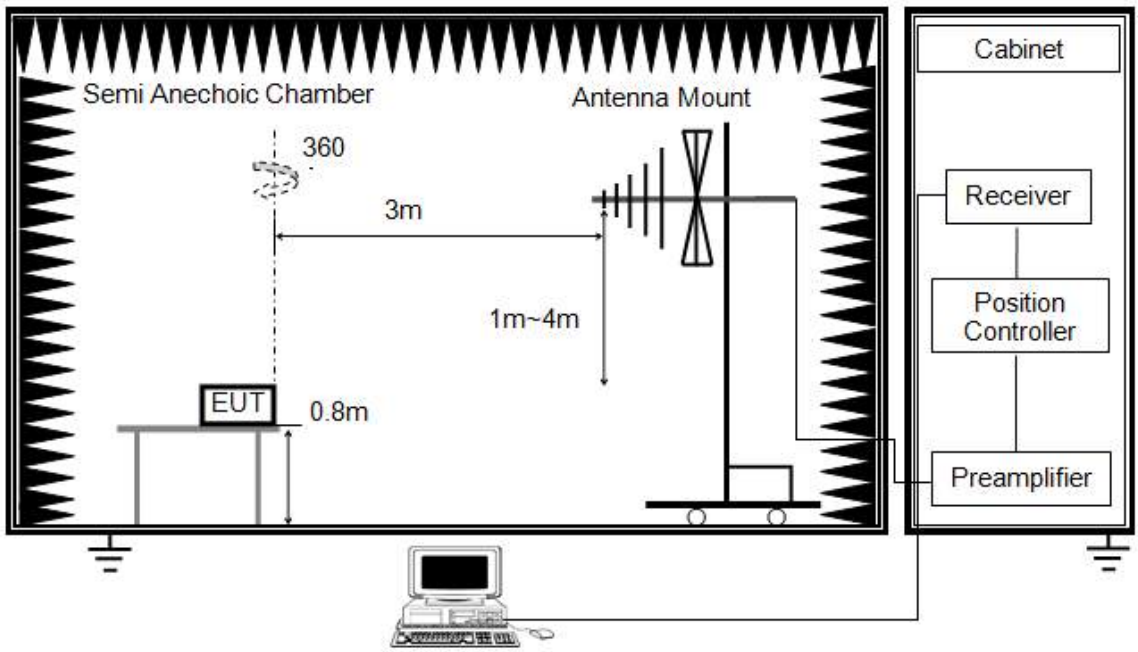
4.11.2. Test Configuration

1) 9 kHz to 30 MHz emissions:



2) 30 MHz to 1 GHz emissions:



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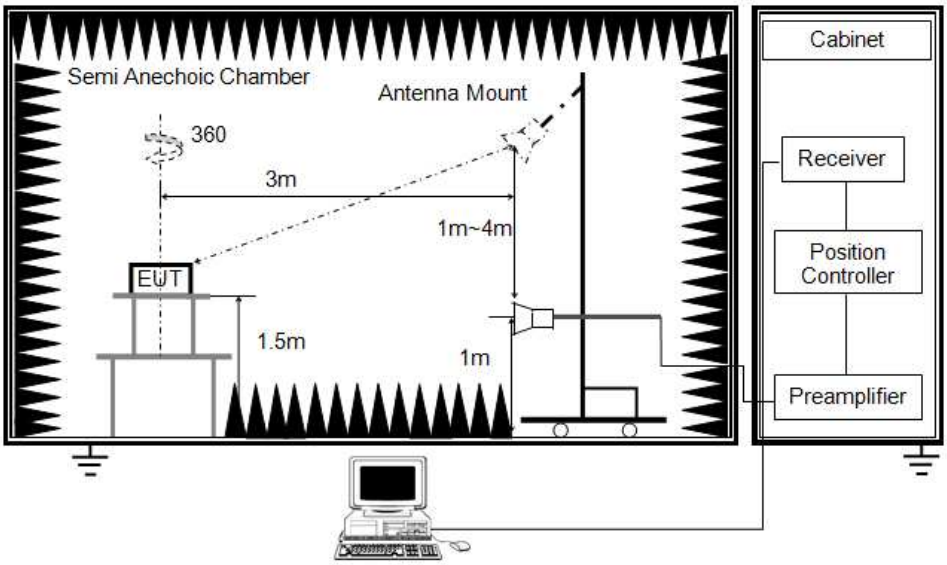
3) 1 GHz to 26.5 GHz emissions:



4.11.3. 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.

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4.11.4. Test result

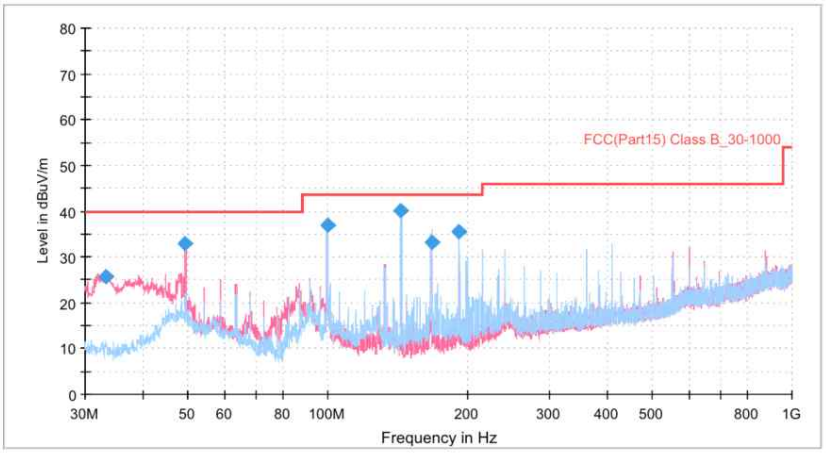
1) Test at low Channel (2 402 MHz) in transmitting status

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) Below 1GHz

Horizontal and Vertical:



Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
33.179444	25.74	40.00	14.26	100.0	V	247.0	-31.6
49.346111	33.00	40.00	7.00	125.0	V	238.0	-27.9
99.947778	37.01	43.50	6.49	280.0	H	185.0	-29.5
143.975000	40.23	43.50	3.27	225.0	H	354.0	-32.9
167.955556	33.24	43.50	10.26	199.0	H	171.0	-32.1
191.990000	35.54	43.50	7.96	107.0	H	346.0	-29.8

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c) Above 1GHz

Test mode : CH00					Test Channel : Lowest			
Peak Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
4804.00	46.87	31.3	12.39	37.53	53.03	74	-20.97	V
7206.00	47.28	36.2	14.86	37.33	61.01	74	-12.99	V
9608.00	47.36	38.9	17.23	37.80	65.69	74	-8.31	V
4804.00	44.44	31.3	12.39	37.53	50.60	74	-23.40	H
7206.00	47.15	36.2	14.86	37.33	60.88	74	-13.12	H
9608.00	47.26	38.9	17.23	37.80	65.59	74	-8.41	H
Average Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
4804.00	34.85	31.3	12.39	37.53	41.01	54	-12.99	V
7206.00	35.17	36.2	14.86	37.33	48.90	54	-5.10	V
9608.00	35.38	38.9	17.23	37.80	53.71	54	-0.29	V
4804.00	34.99	31.3	12.39	37.53	41.15	54	-12.85	H
7206.00	35.12	36.2	14.86	37.33	48.85	54	-5.15	H
9608.00	35.35	38.9	17.23	37.80	53.68	54	-0.32	H

remark :

※ Ant. Pol : Antenna Polarization

※ Level = Receiver Read level + Antenna Factor + Cable Loss − Preamplifier Factor

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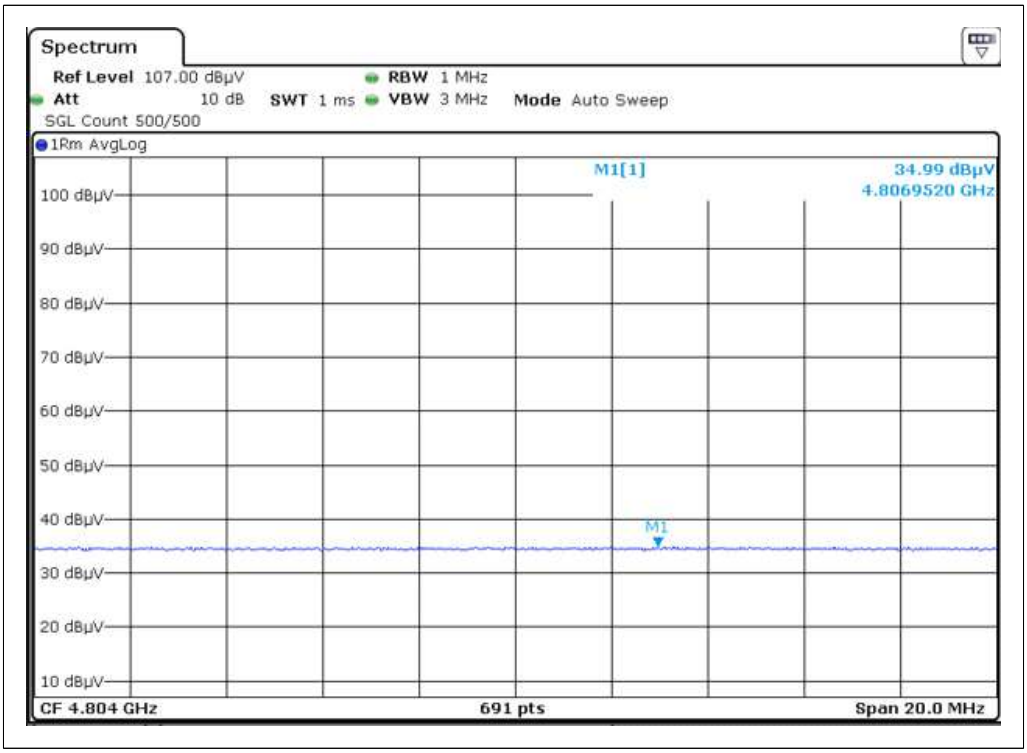
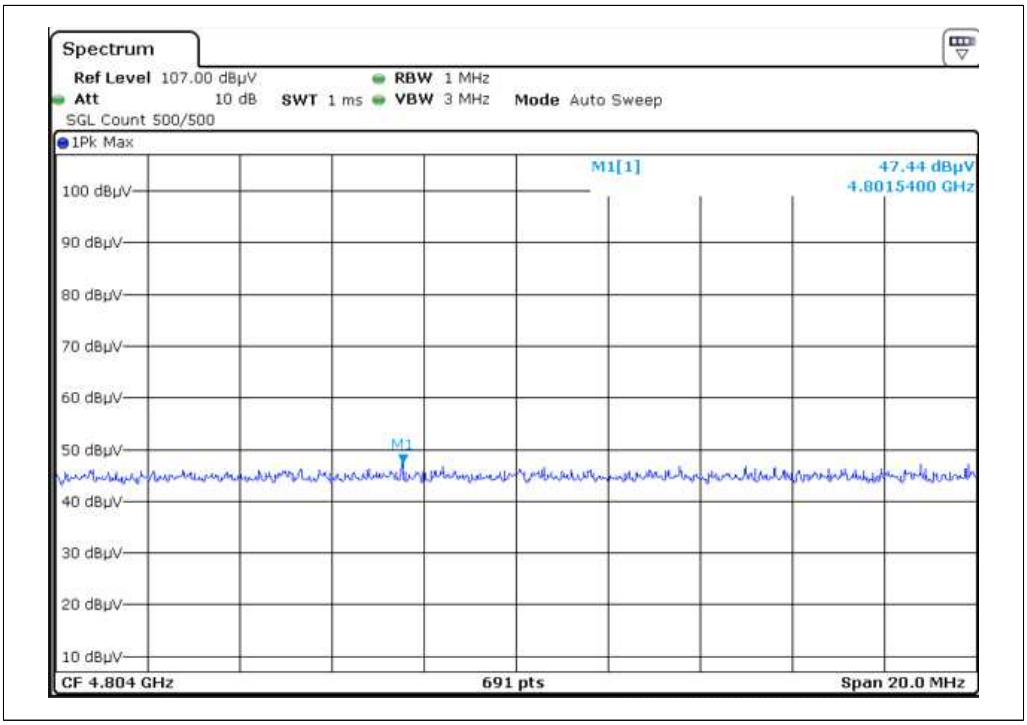
Ch00-2rd-H-AV



Ch00-2rd-H-PK



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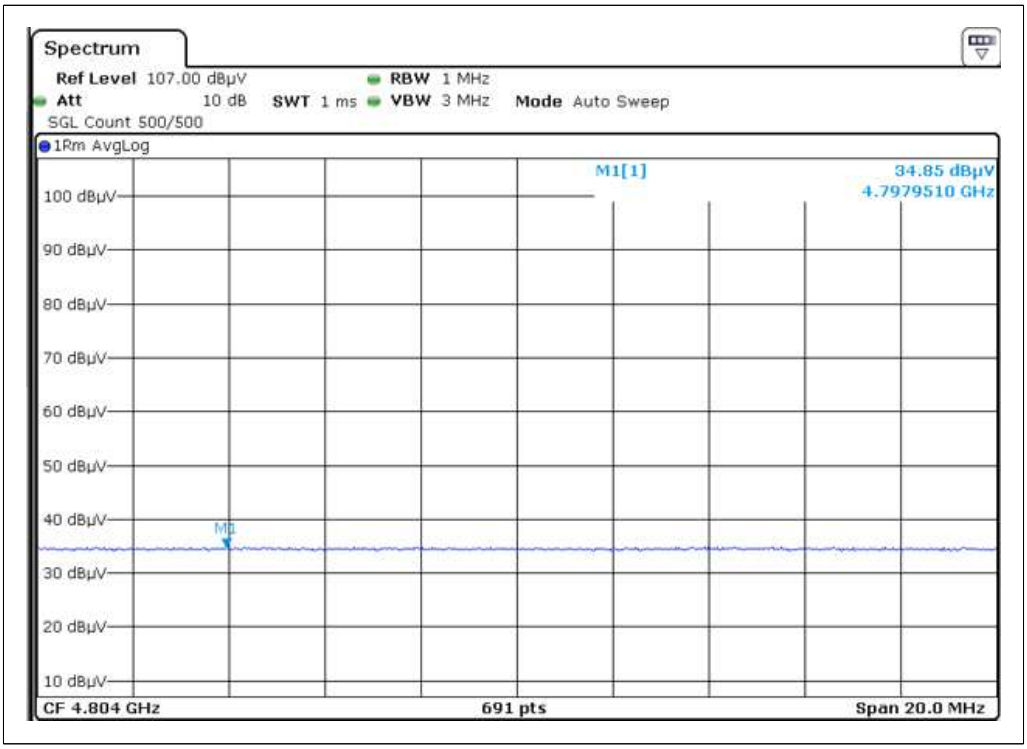
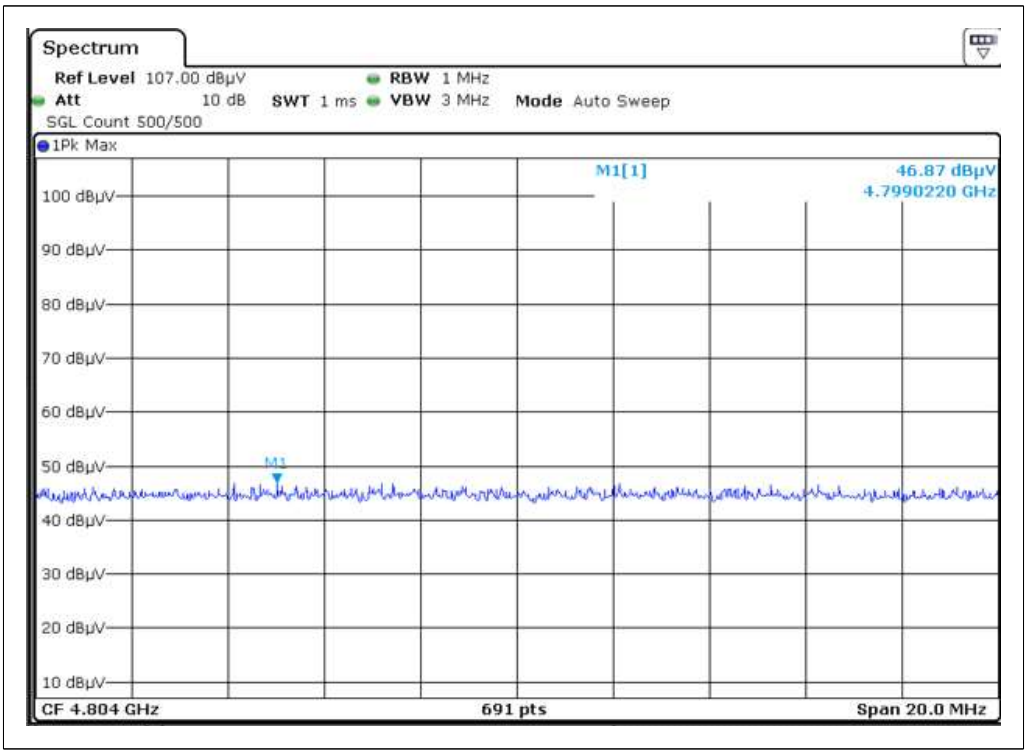
Ch00-2rd-V-AV



Ch00-2rd-V-PK



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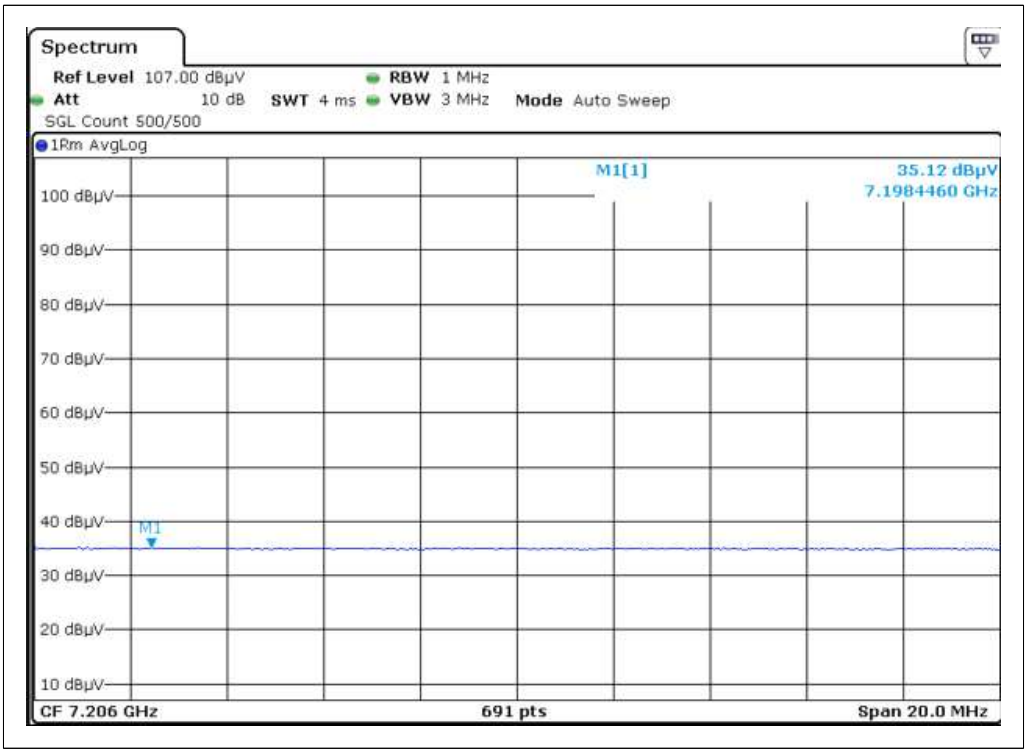
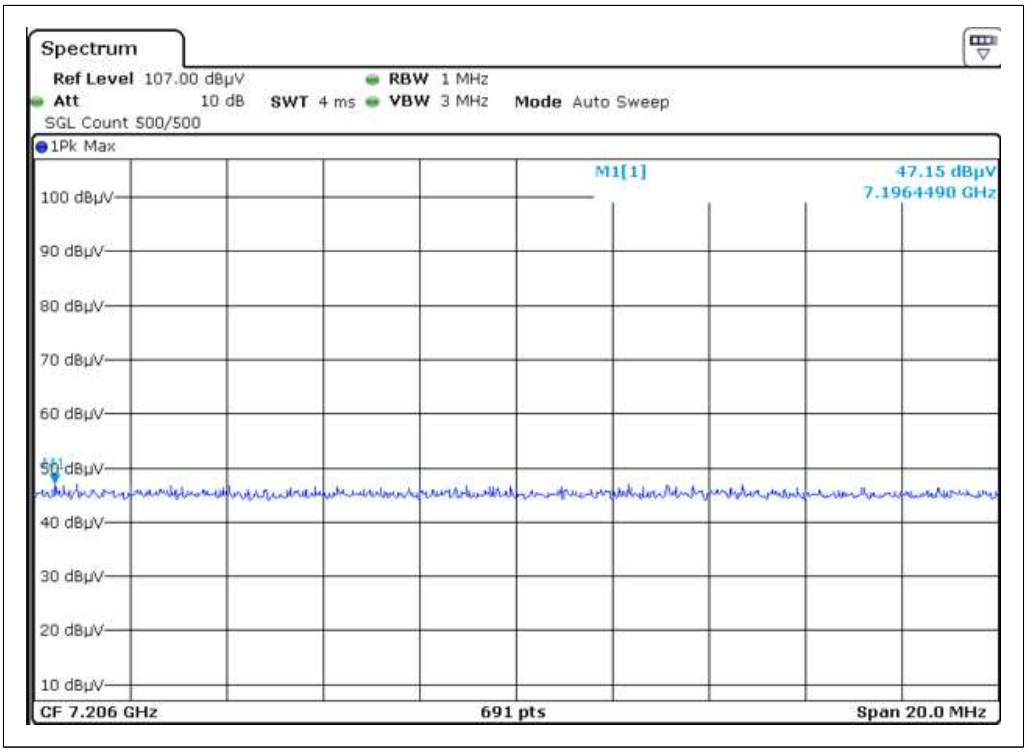
Ch00-3rd-H-AV



Ch00-3rd-H-PK



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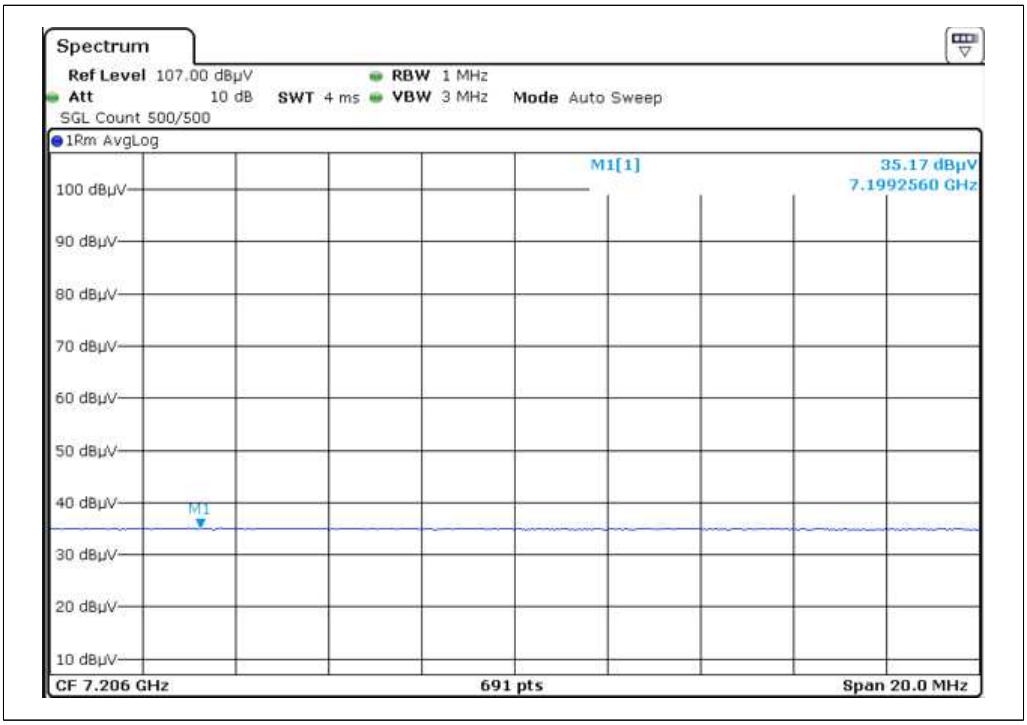
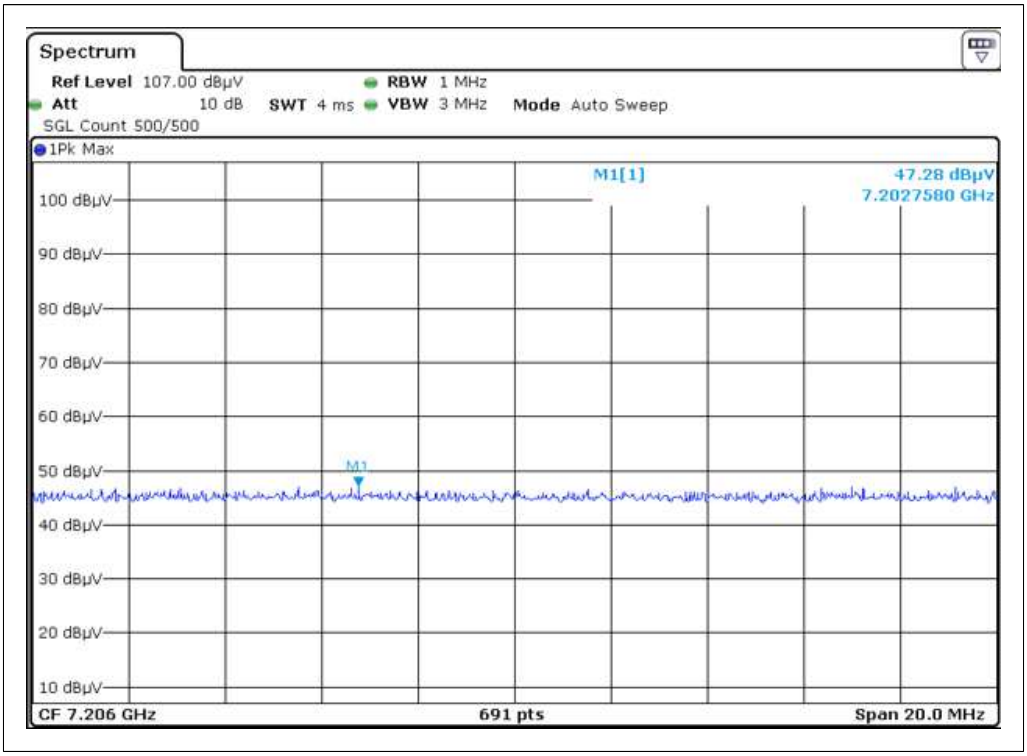
Ch00-3rd-V-AV



Ch00-3rd-V-PK



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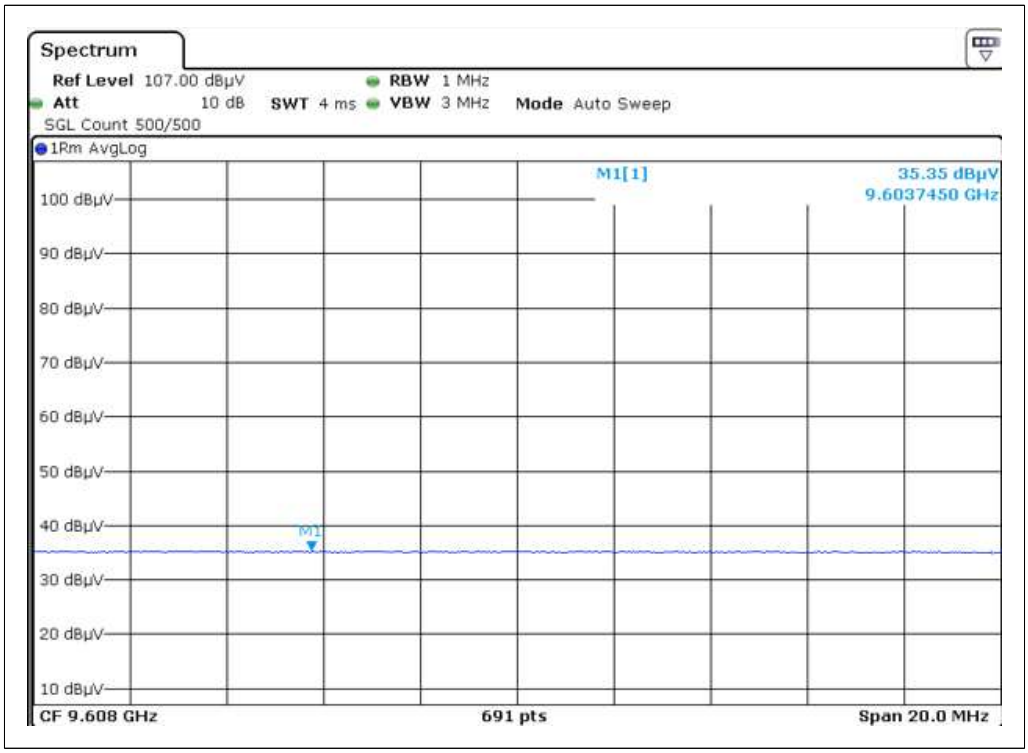
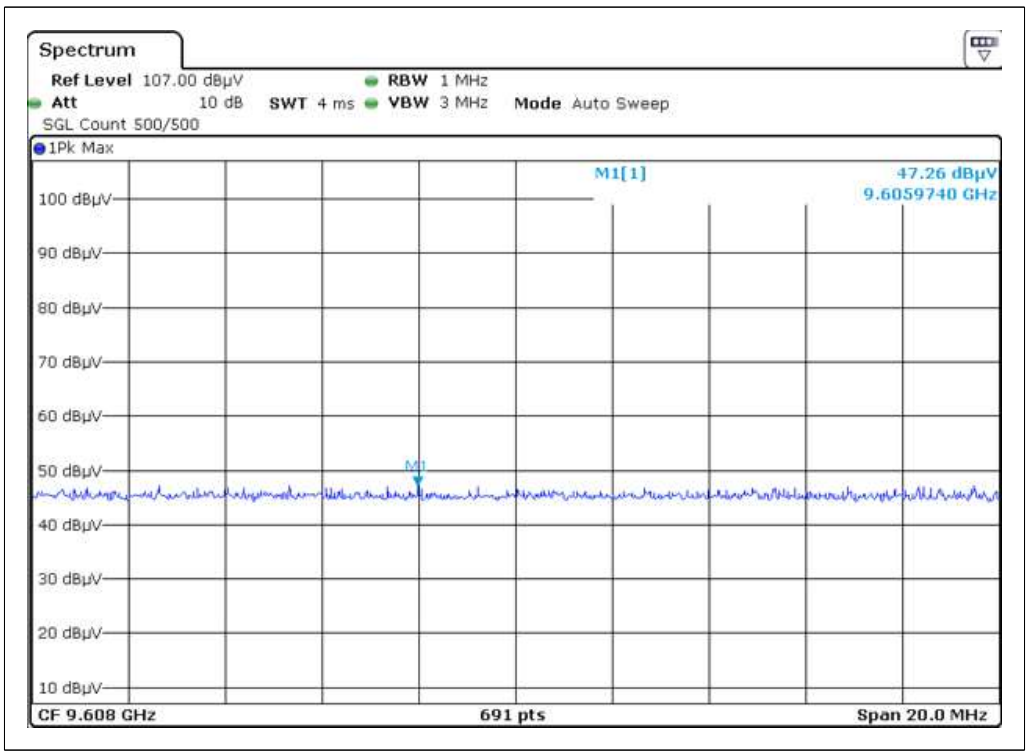
Ch00-4rd-H-AV



Ch00-4rd-H-PK



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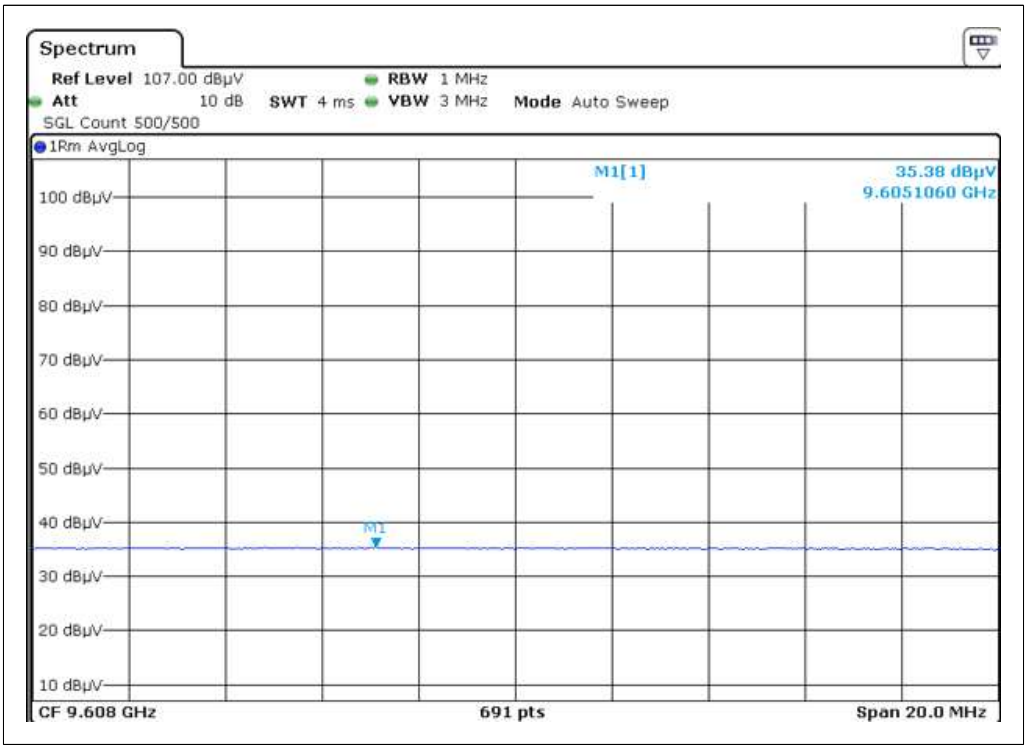
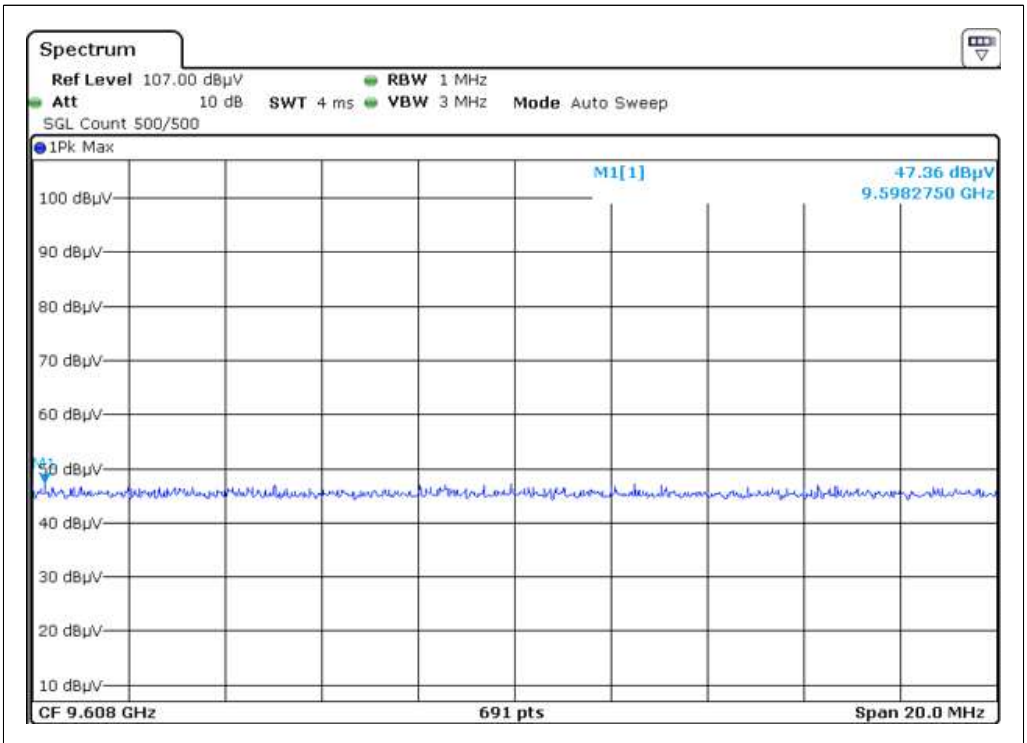
Ch00-4rd-V-AV



Ch00-4rd-V-PK



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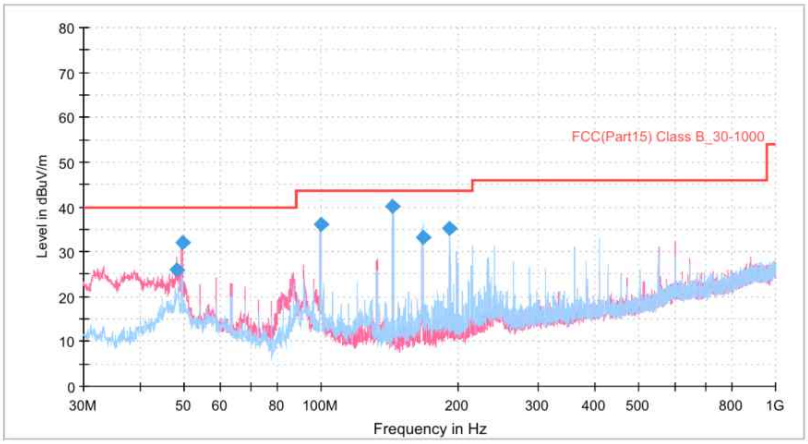
2) Test at middle Channel (2 441 MHz)in transmitting status

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) Below 1GHz

Horizontal and Vertical:



Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.106667	25.86	40.00	14.14	108.0	V	244.0	-27.9
49.400000	32.08	40.00	7.92	100.0	V	239.0	-27.8
99.570556	36.03	43.50	7.47	284.0	H	194.0	-29.6
143.975000	40.20	43.50	3.30	225.0	H	354.0	-32.9
167.955556	33.10	43.50	10.40	183.0	H	152.0	-32.1
191.990000	35.33	43.50	8.17	125.0	H	352.0	-29.8

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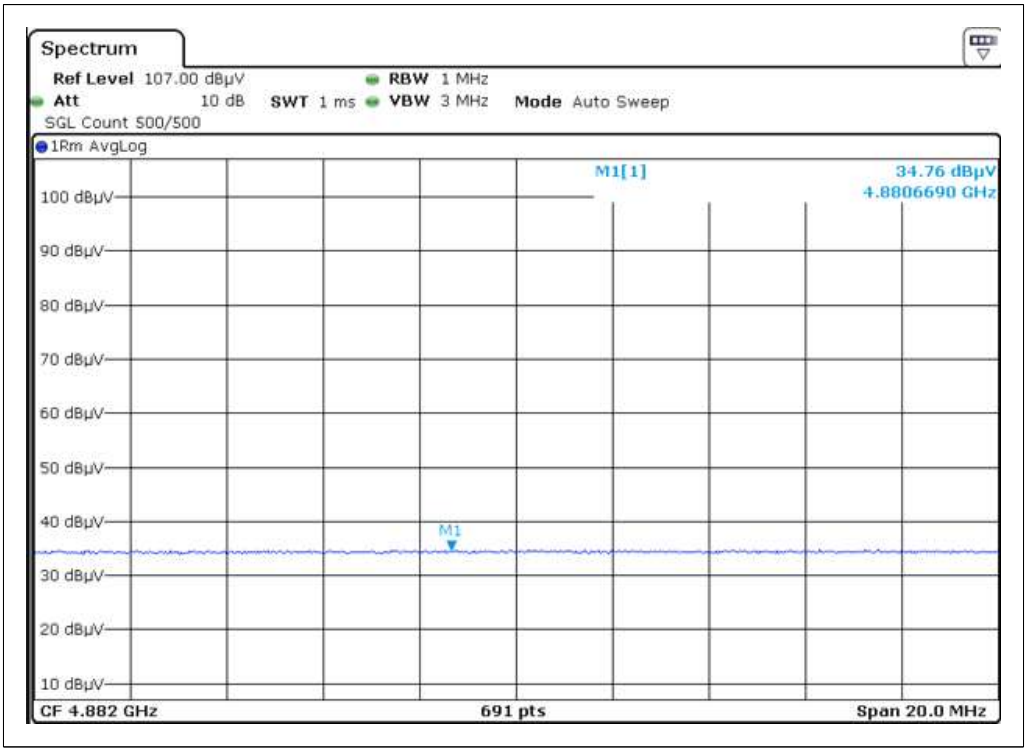
c) Above 1GHz

Test mode : CH39					Test Channel : Middle			
Peak Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
4804.00	46.87	31.3	12.39	37.53	53.04	74	-20.96	V
7206.00	47.28	36.2	14.86	37.33	59.91	74	-14.09	V
9608.00	47.36	38.9	17.23	37.80	65.29	74	-8.71	V
4804.00	44.44	31.3	12.39	37.53	53.51	74	-20.49	H
7206.00	47.15	36.2	14.86	37.33	60.23	74	-13.77	H
9608.00	47.26	38.9	17.23	37.80	65.88	74	-8.12	H
Average Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
4804.00	34.85	31.3	12.39	37.53	40.88	54	-13.12	V
7206.00	35.17	36.2	14.86	37.33	48.34	54	-5.66	V
9608.00	35.38	38.9	17.23	37.80	53.50	54	-0.50	V
4804.00	34.99	31.3	12.39	37.53	40.92	54	-13.08	H
7206.00	35.12	36.2	14.86	37.33	48.46	54	-5.54	H
9608.00	35.35	38.9	17.23	37.80	53.42	54	-0.58	H

Ch39-2rd-H-AV



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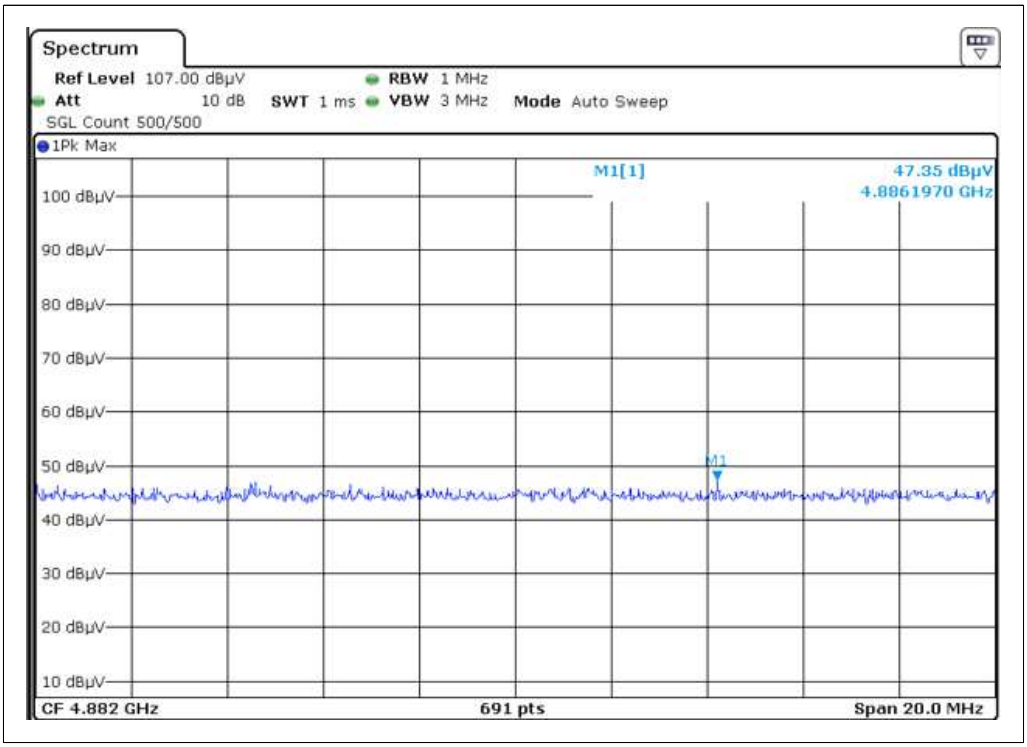
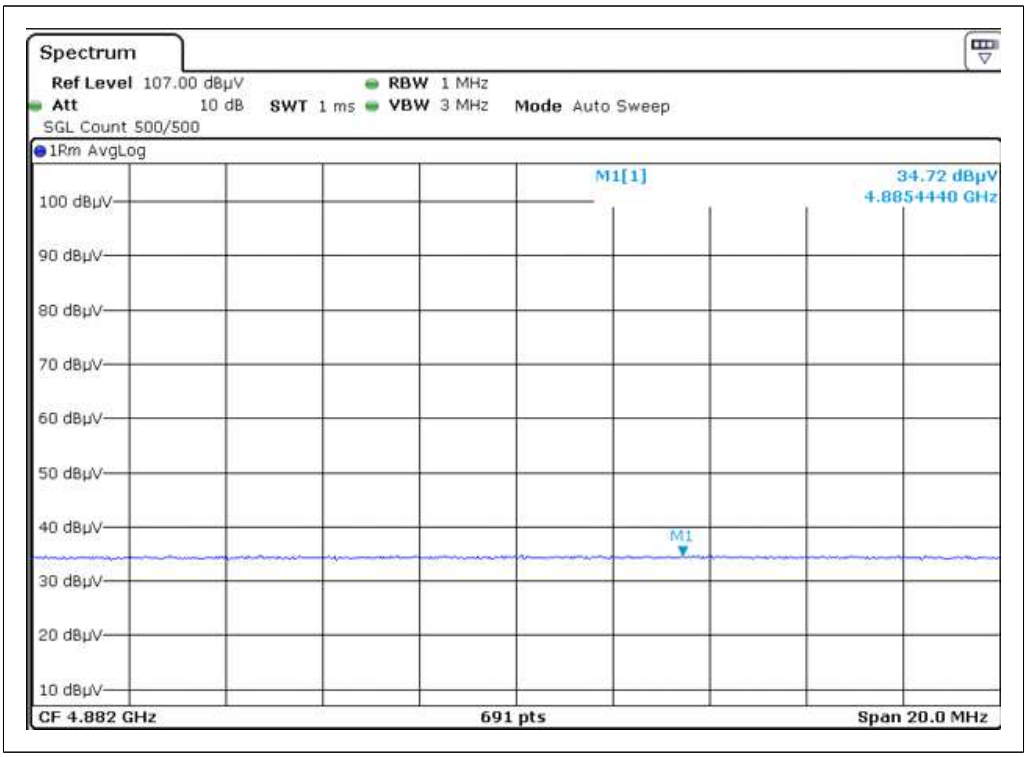
Ch39-2rd-H-PK



Ch39-2rd-V-AV



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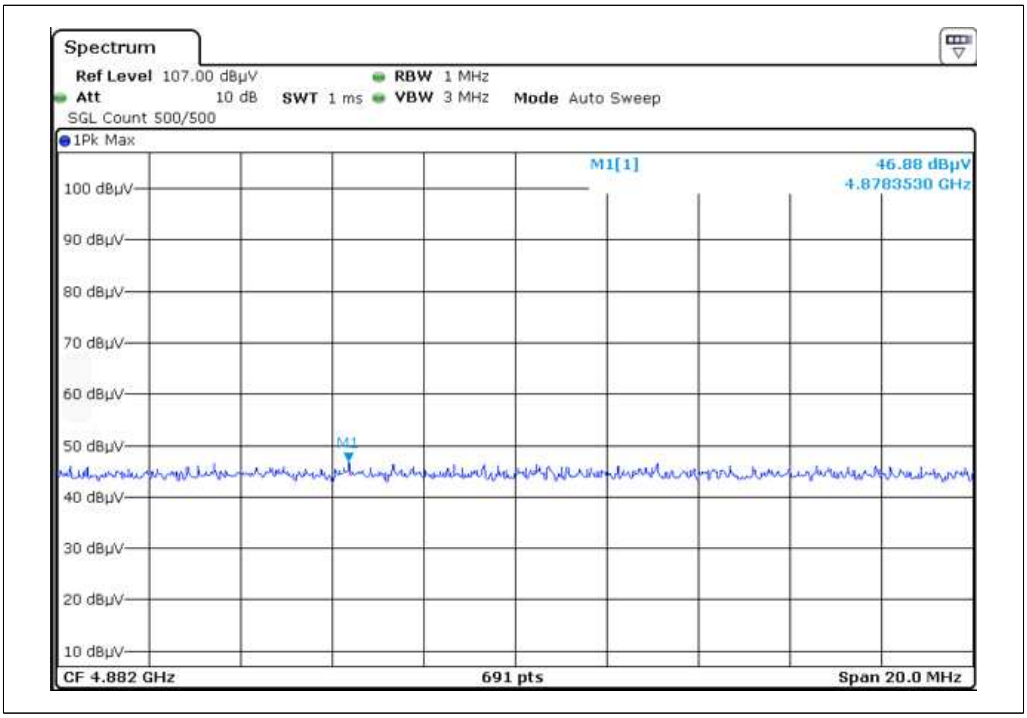
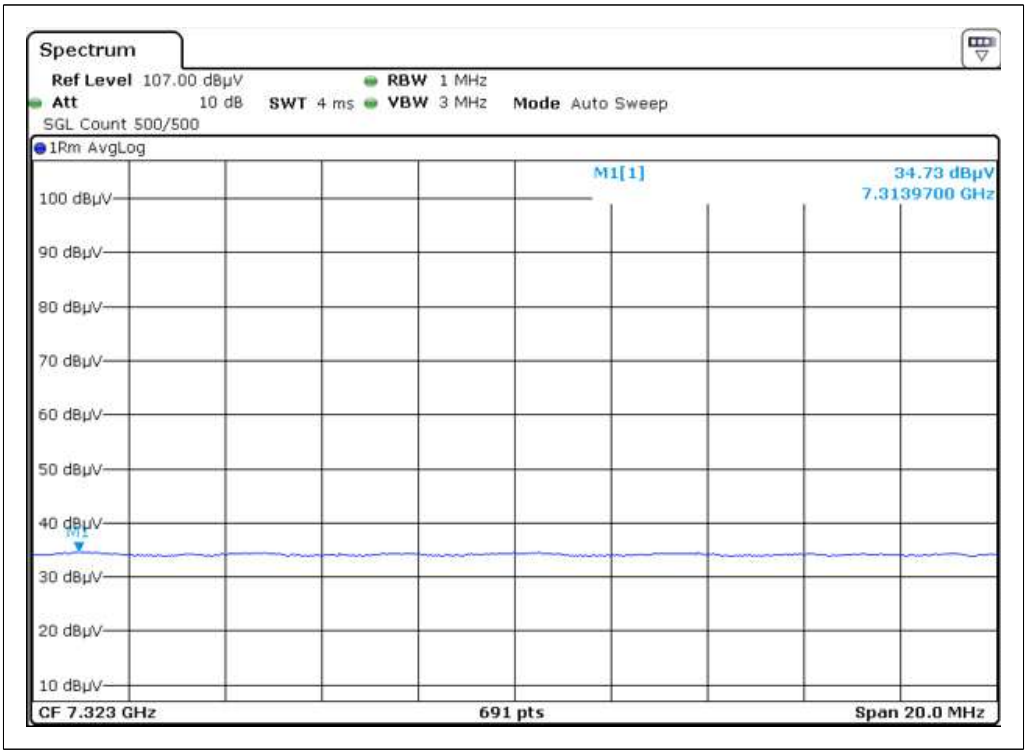
Ch39-2rd-V-PK



Ch39-3rd-H-AV



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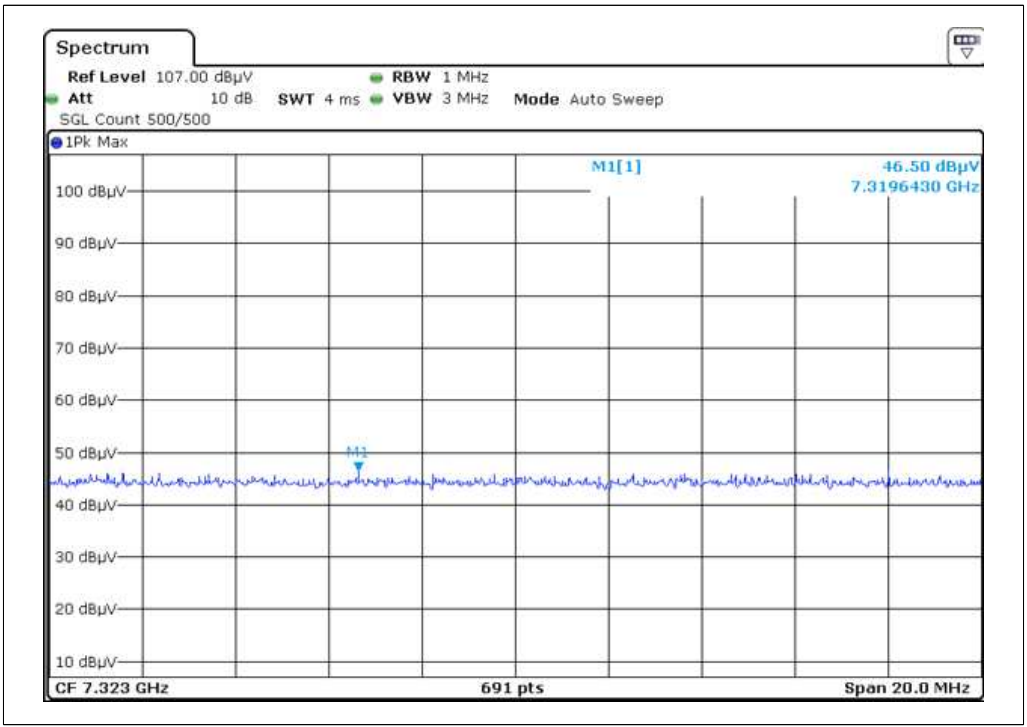
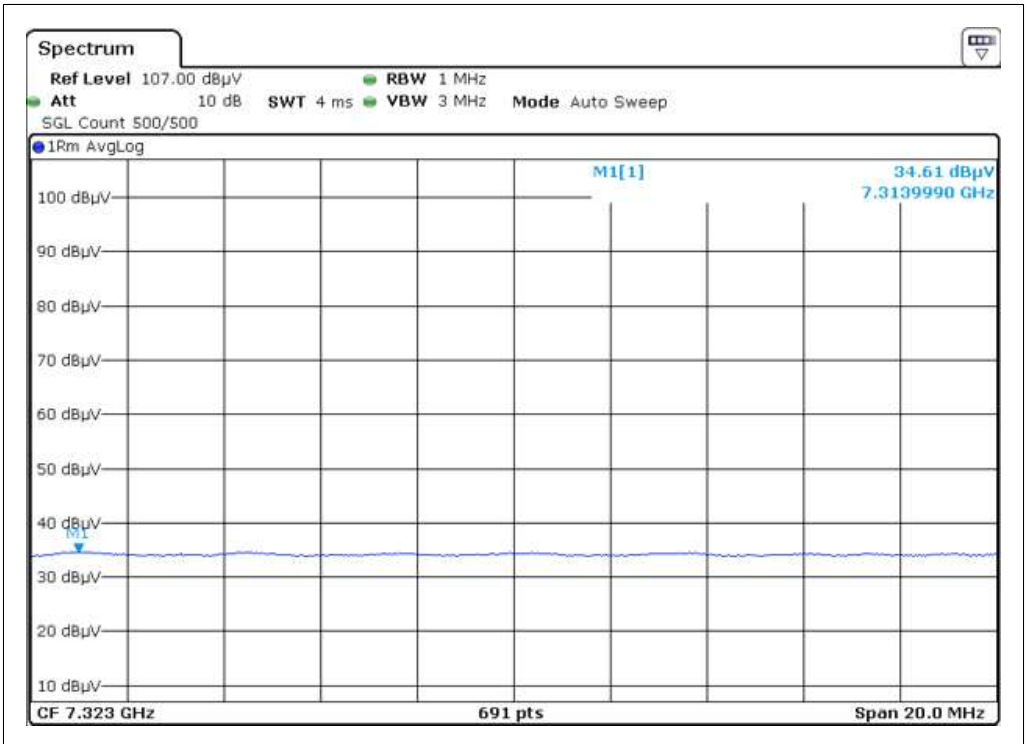
Ch39-3rd-H-PK



Ch39-3rd-V-AV



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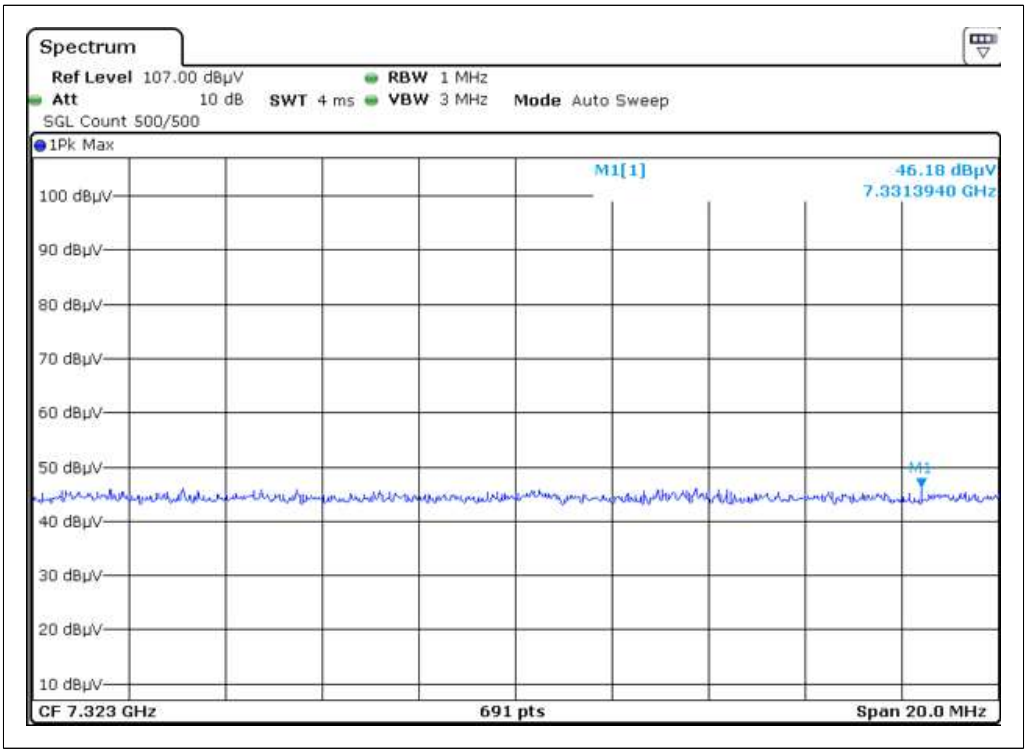
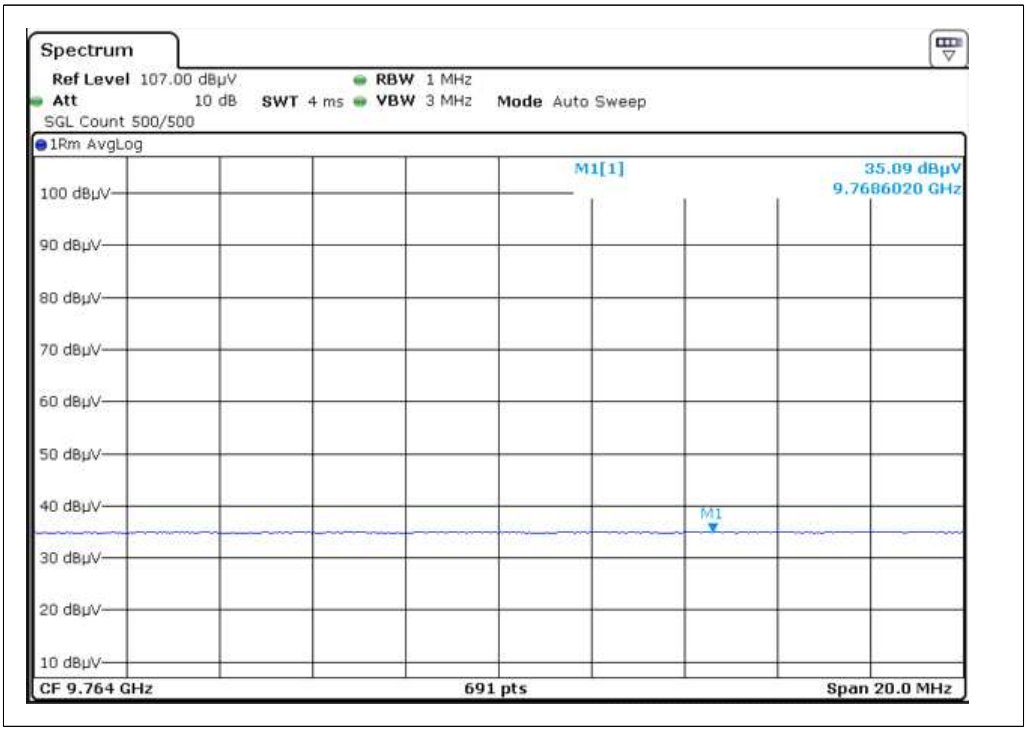
Ch39-3rd-V-PK



Ch39-4rd-H-AV



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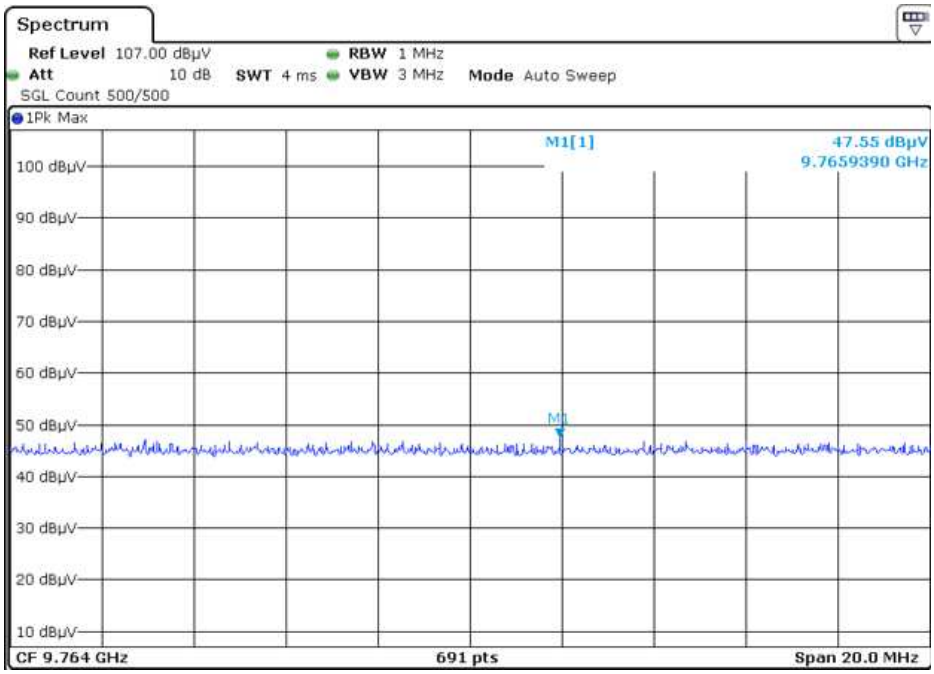
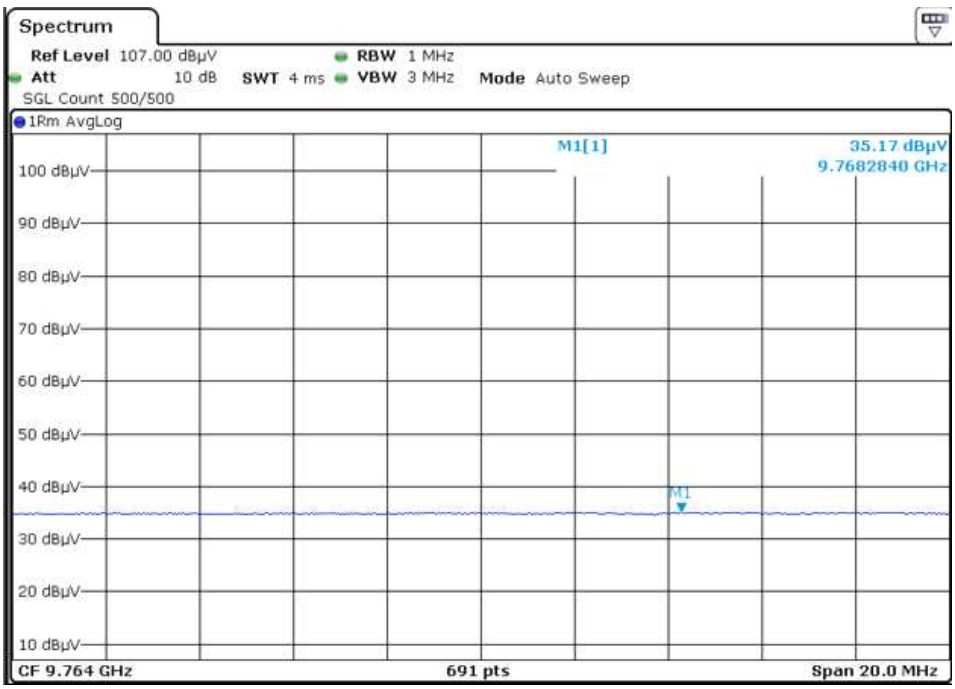
Ch39-4rd-H-PK



Ch39-4rd-V-AV



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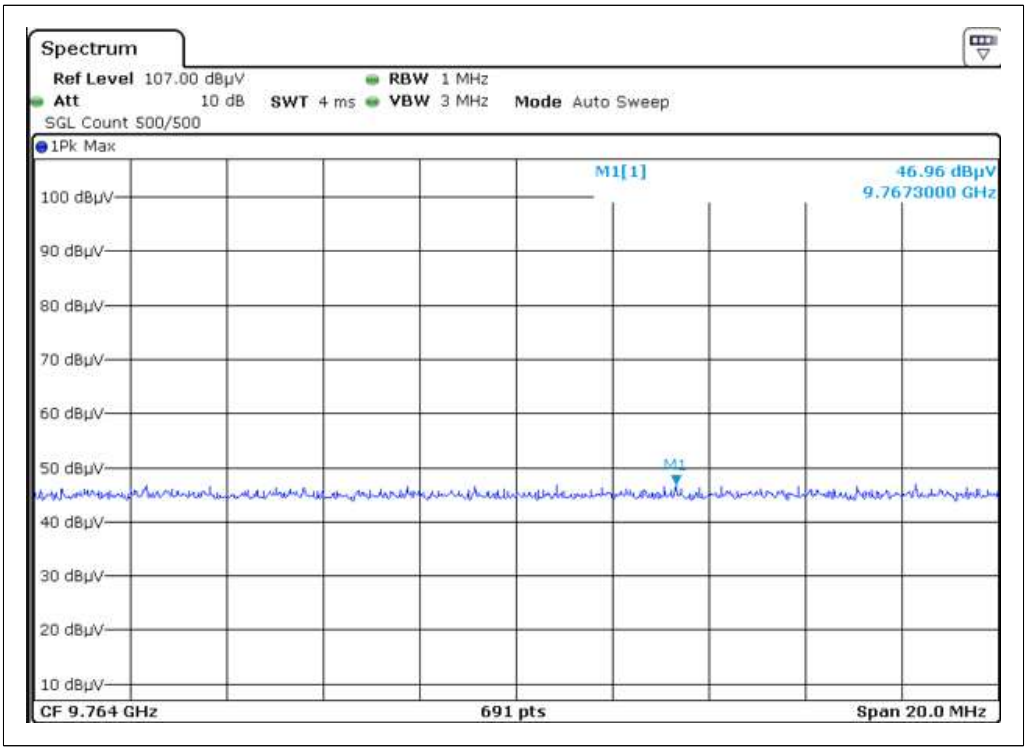
Ch39-4rd-V-PK



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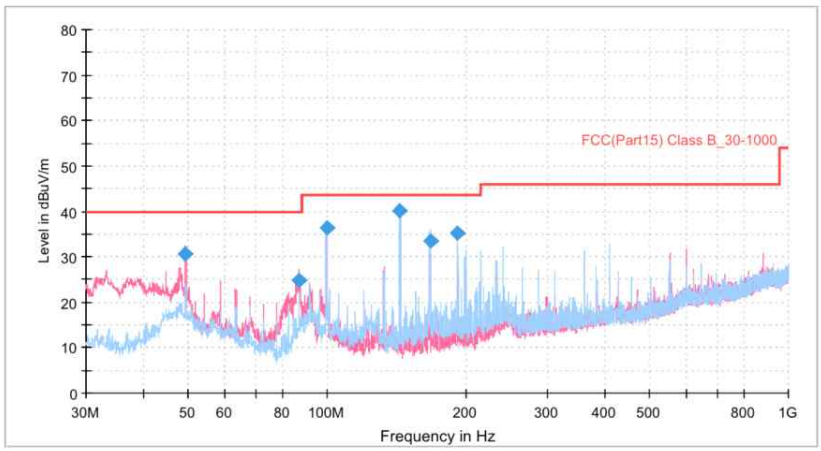
3) Test at high Channel (2 480 MHz) in transmitting status

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) Below 1GHz

Horizontal and Vertical:



Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.346111	30.50	40.00	9.50	104.0	V	255.0	-27.9
87.014444	24.83	40.00	15.17	100.0	V	301.0	-32.4
99.947778	36.39	43.50	7.11	225.0	H	185.0	-29.5
143.975000	40.18	43.50	3.32	225.0	H	-3.0	-32.9
167.955556	33.55	43.50	9.95	189.0	H	166.0	-32.1
191.990000	35.35	43.50	8.15	105.0	H	192.0	-29.8

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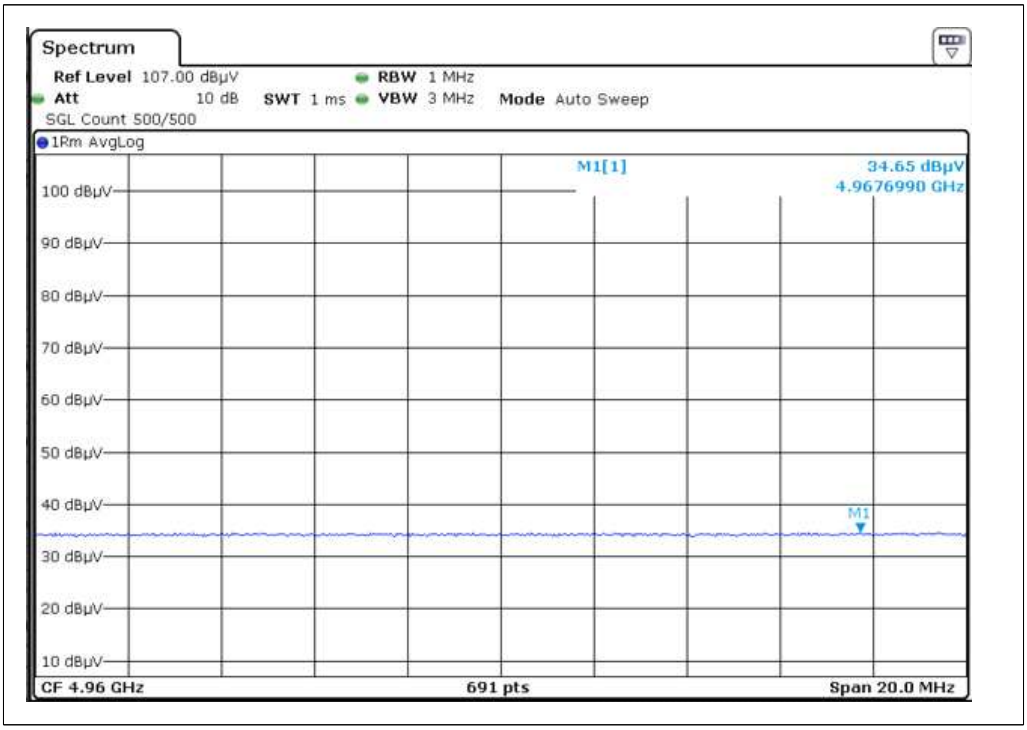
c) Above 1GHz

Test mode : CH78					Test Channel : Highest			
Peak Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
4804.00	46.87	31.3	12.39	37.53	52.71	74	-21.29	V
7206.00	47.28	36.2	14.86	37.33	60.46	74	-13.54	V
9608.00	47.36	38.9	17.23	37.80	66.15	74	-7.85	V
4804.00	44.44	31.3	12.39	37.53	52.6	74	-21.40	H
7206.00	47.15	36.2	14.86	37.33	60.66	74	-13.34	H
9608.00	47.26	38.9	17.23	37.80	65.69	74	-8.31	H
Average Value								
Frequency(Mhz)	Read Level(dBuV)	Ant.Factor(dB/m)	Cable Loss(dB)	Preamp Factor	Level(dBuV/m)	Limit (dBuV/m)	Over Limit(dB)	Pol.
4804.00	34.85	31.3	12.39	37.53	40.81	54	-13.19	V
7206.00	35.17	36.2	14.86	37.33	48.73	54	-5.27	V
9608.00	35.38	38.9	17.23	37.80	53.85	54	-0.15	V
4804.00	34.99	31.3	12.39	37.53	40.80	54	-13.20	H
7206.00	35.12	36.2	14.86	37.33	48.55	54	-5.45	H
9608.00	35.35	38.9	17.23	37.80	53.84	54	-0.16	H

Ch78-2rd-H-AV



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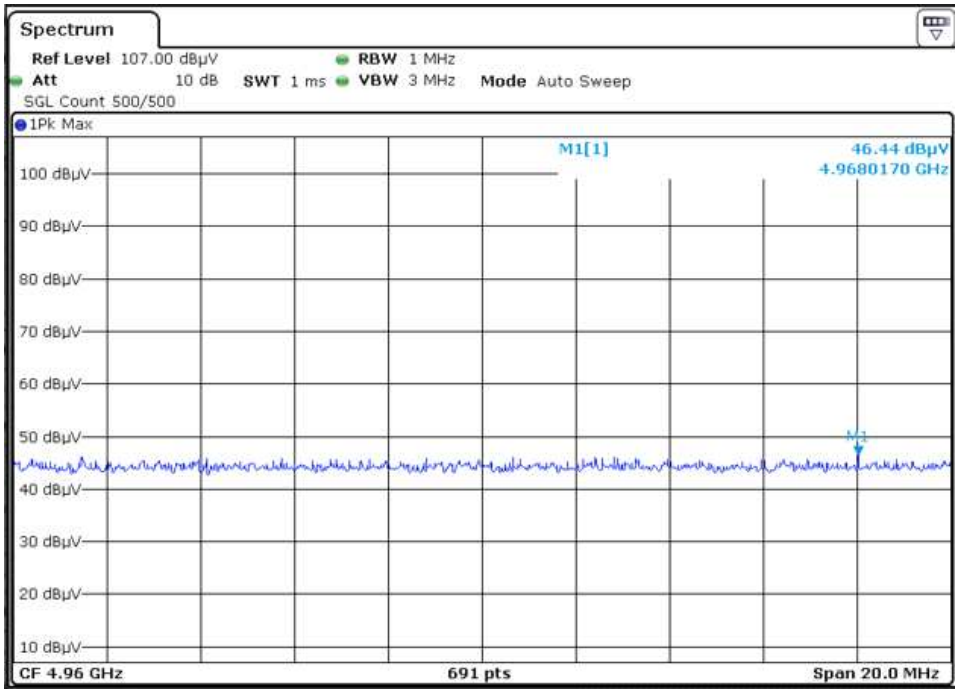
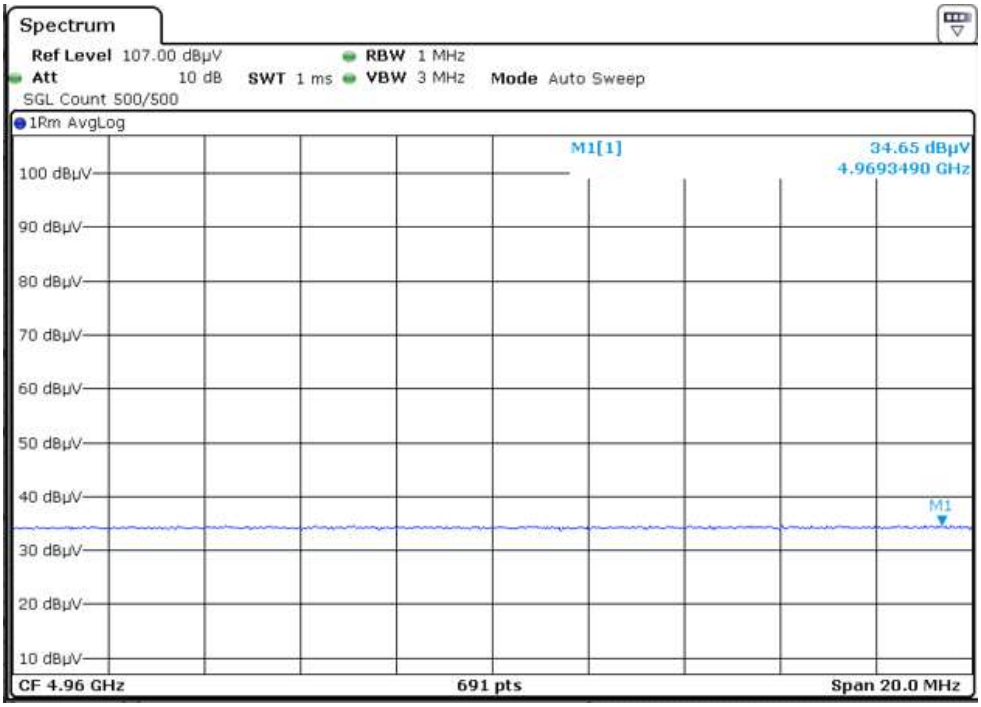
Ch78-2rd-H-PK



Ch78-2rd-V-AV



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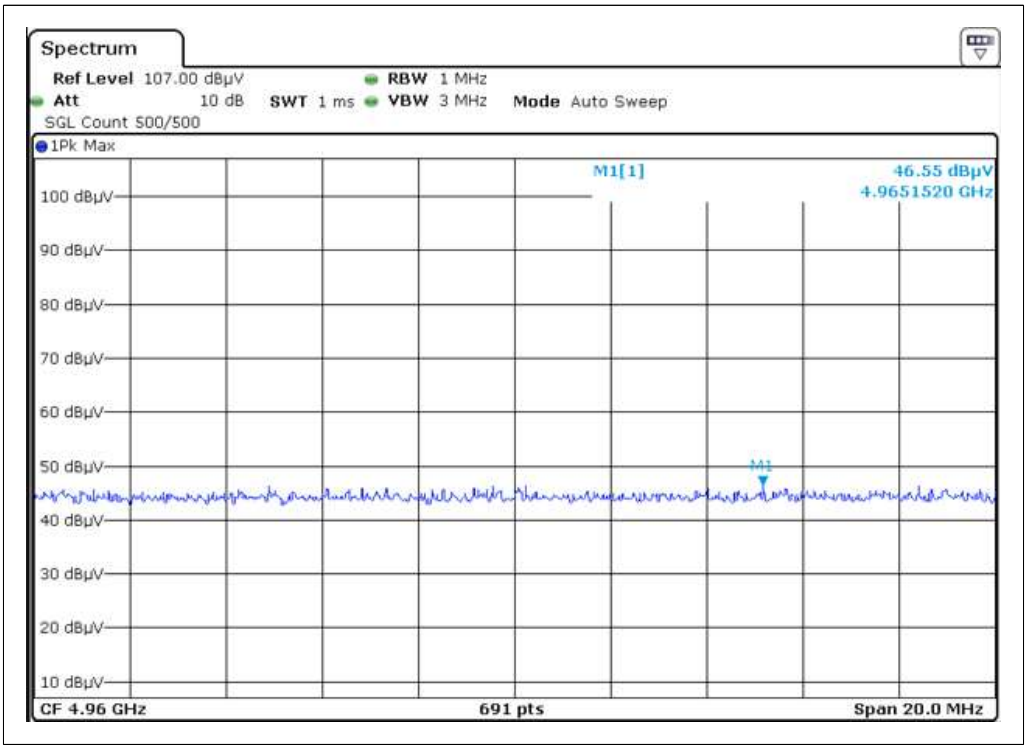
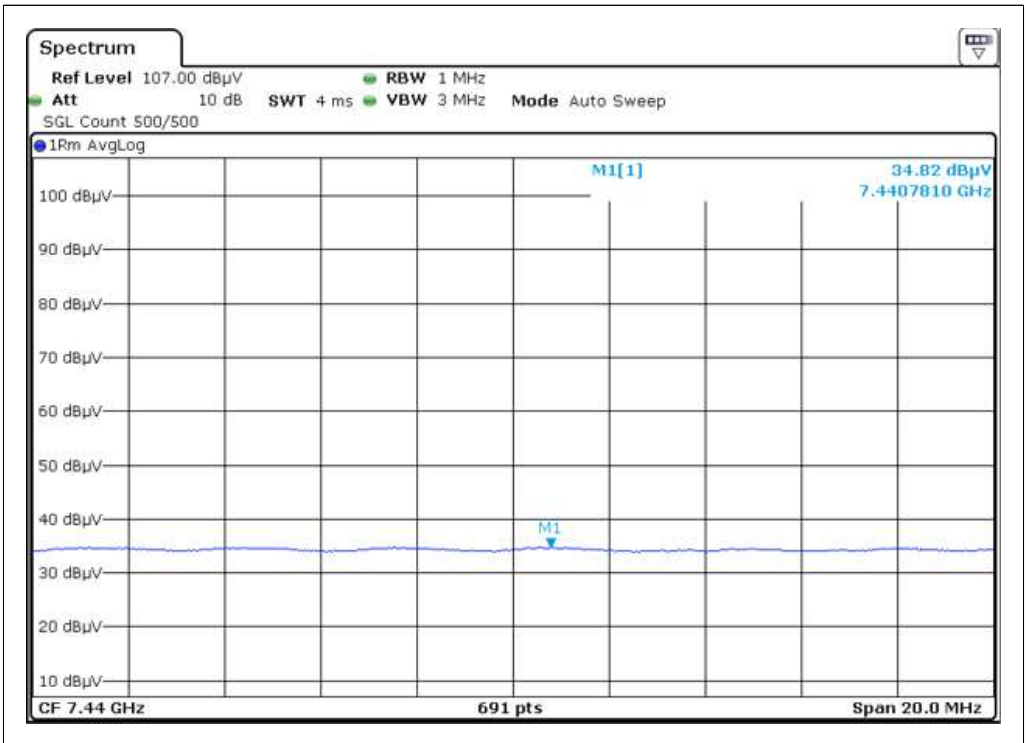
Ch78-2rd-V-PK



Ch78-3rd-H-AV



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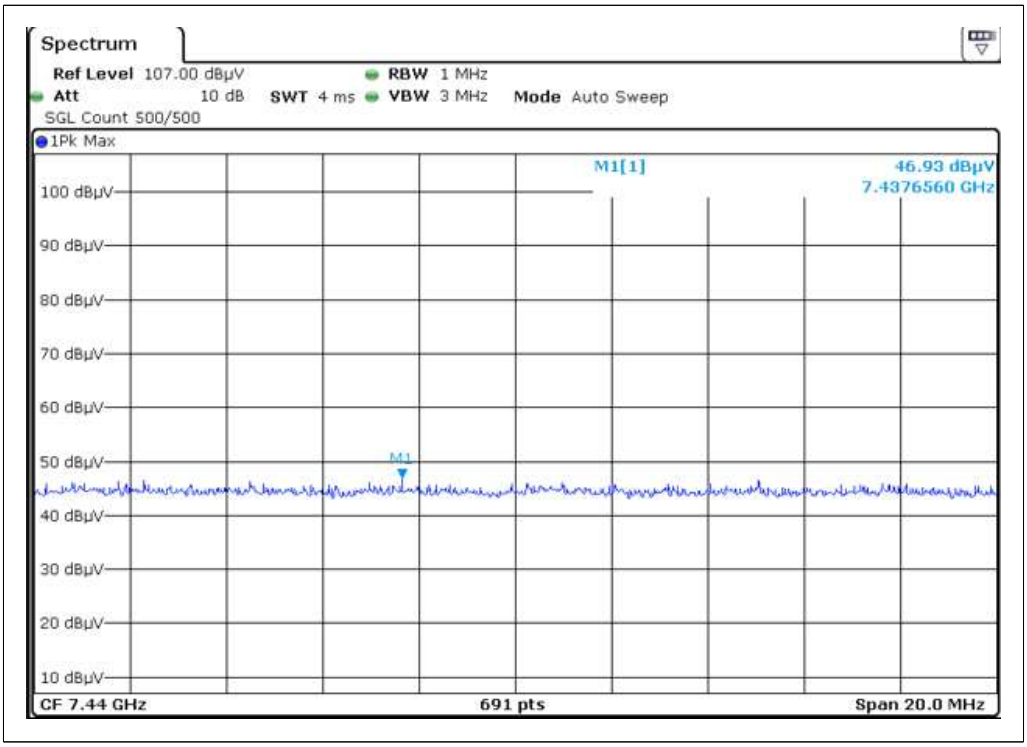
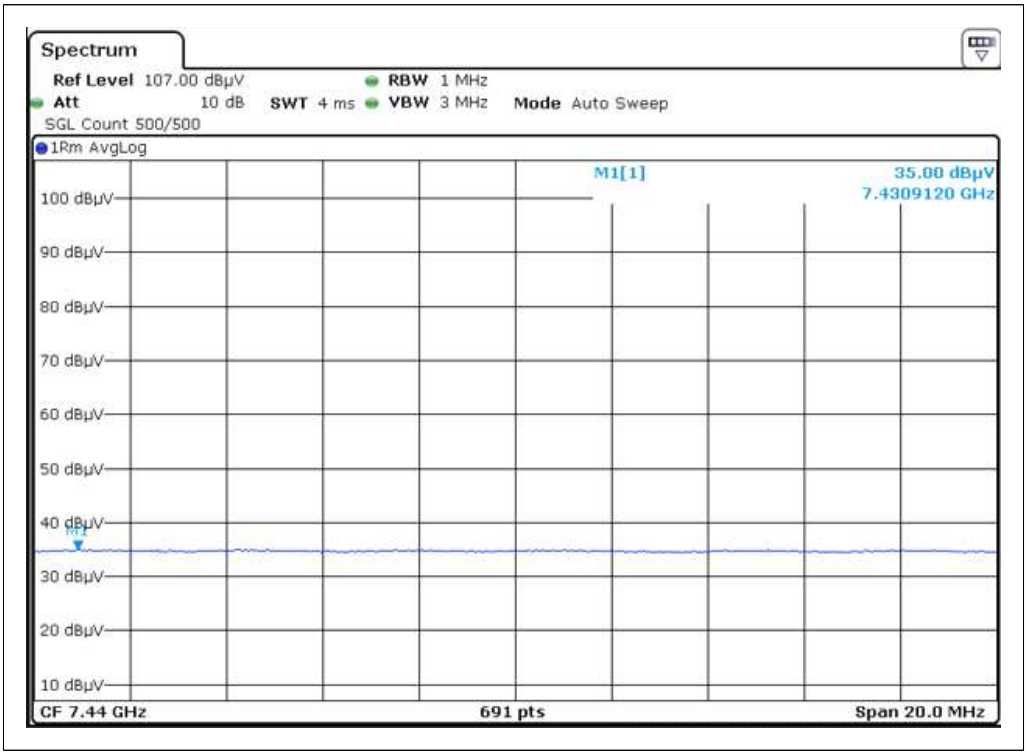
Ch78-3rd-H-PK



Ch78-3rd-V-AV



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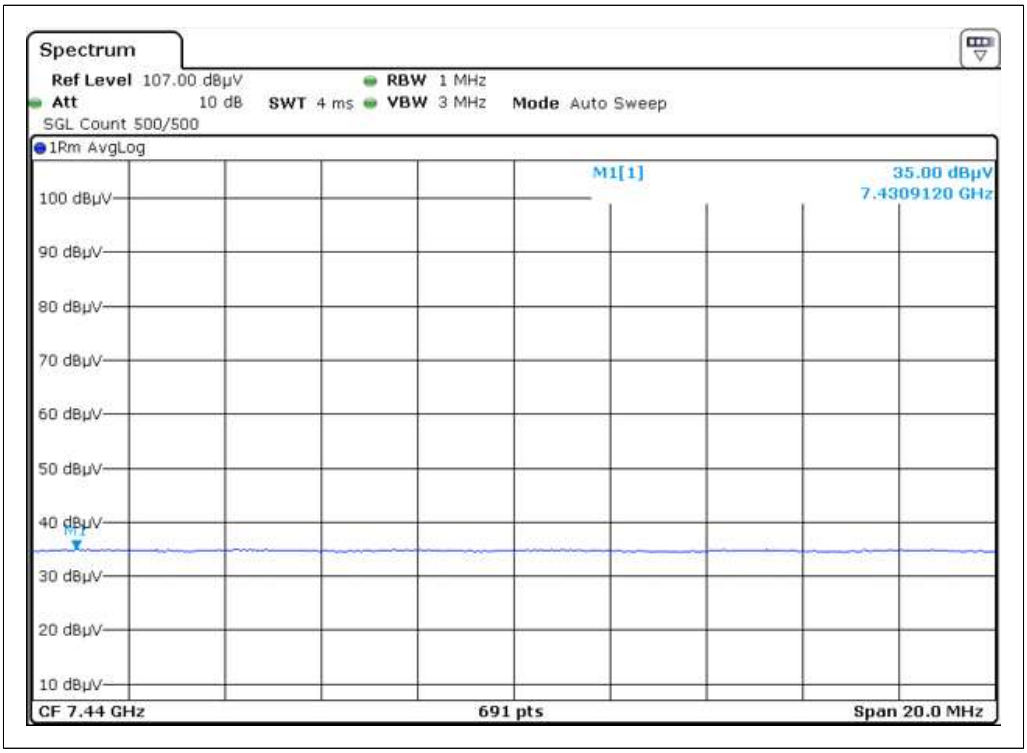
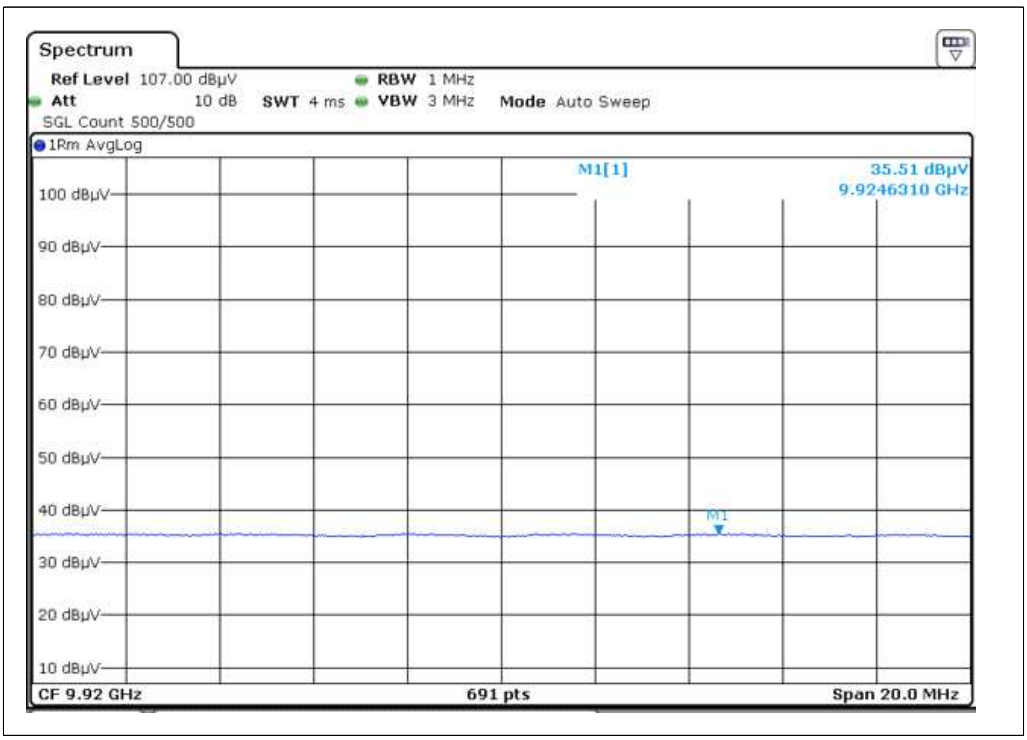
Ch78-3rd-V-PK



Ch78-4rd-H-AV



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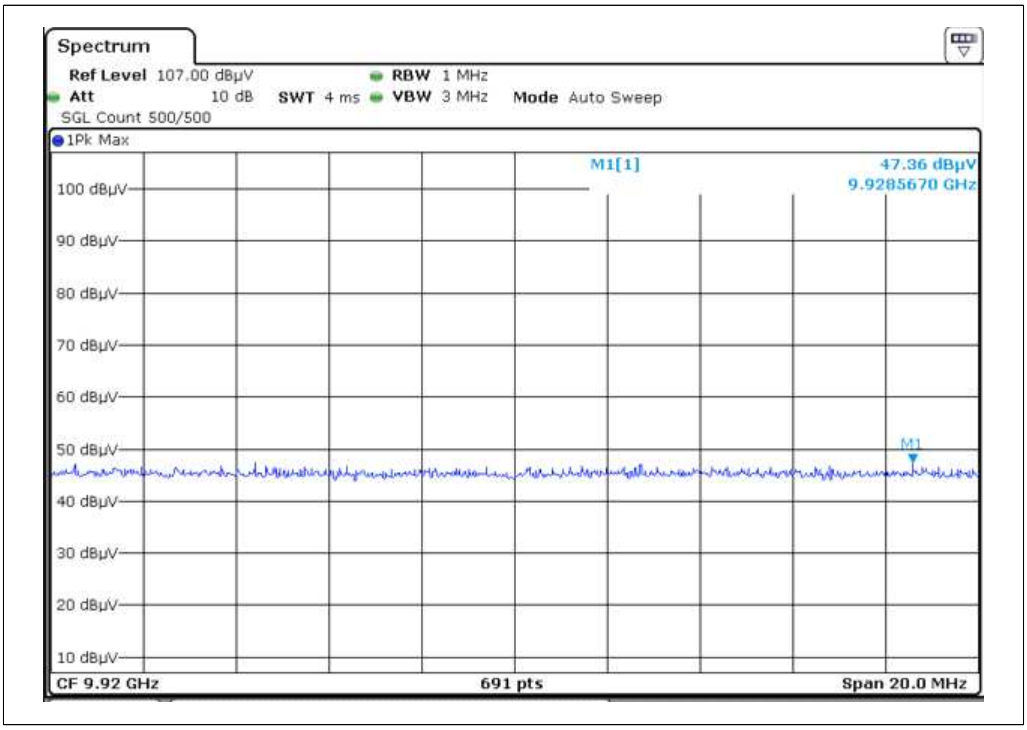
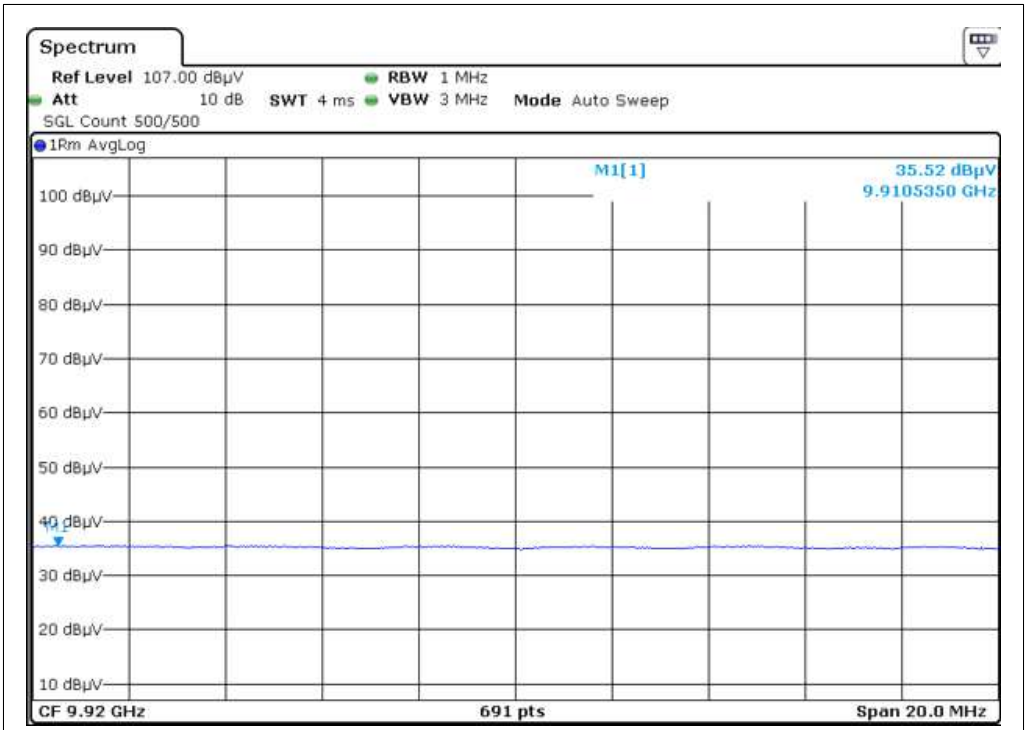
Ch78-4-H-PK



Ch78-4rd-V-AV



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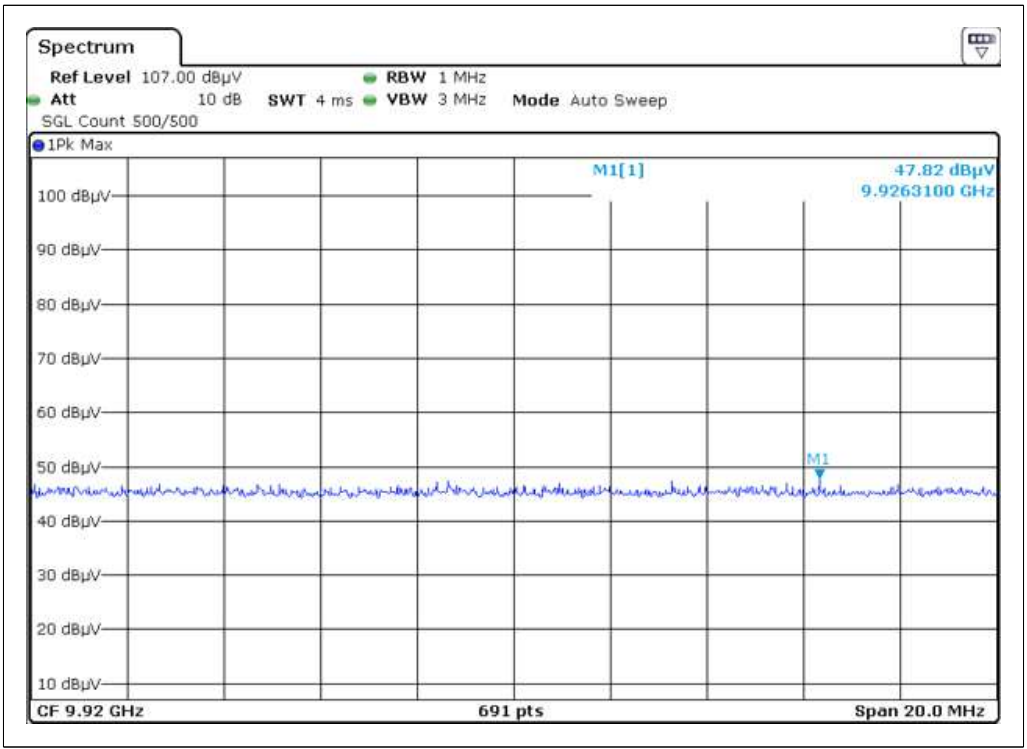
Ch78-4rd-V-PK



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4.12. Power Line Conducted Emission

4.12.1. Requirement & Test Method

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50uH / 50 ohms line impedance stabilization network (LISN).

1) Limit

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[(a)]	56 to 46[(a)]
0.50 to 5	56	46
5 to 30	60	50

[(a)]Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

2) Test Frequeny Range 150 kHz ~ 30 MHz

4.12.2. Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

4.12.3. Test Procedure

1) The EUT is placed on a wooden table 80 cm above the reference ground plane.

2) The EUT is connected via LISN to a test power supply.

3) The measurement results are obtained as described below.

4) Detectors : Quasi-peak and Average Detector.

- Quasi-peak = Measured Value + Correction Factor 5) The EUT is the device operation below 30 MHz.

- For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected

- For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

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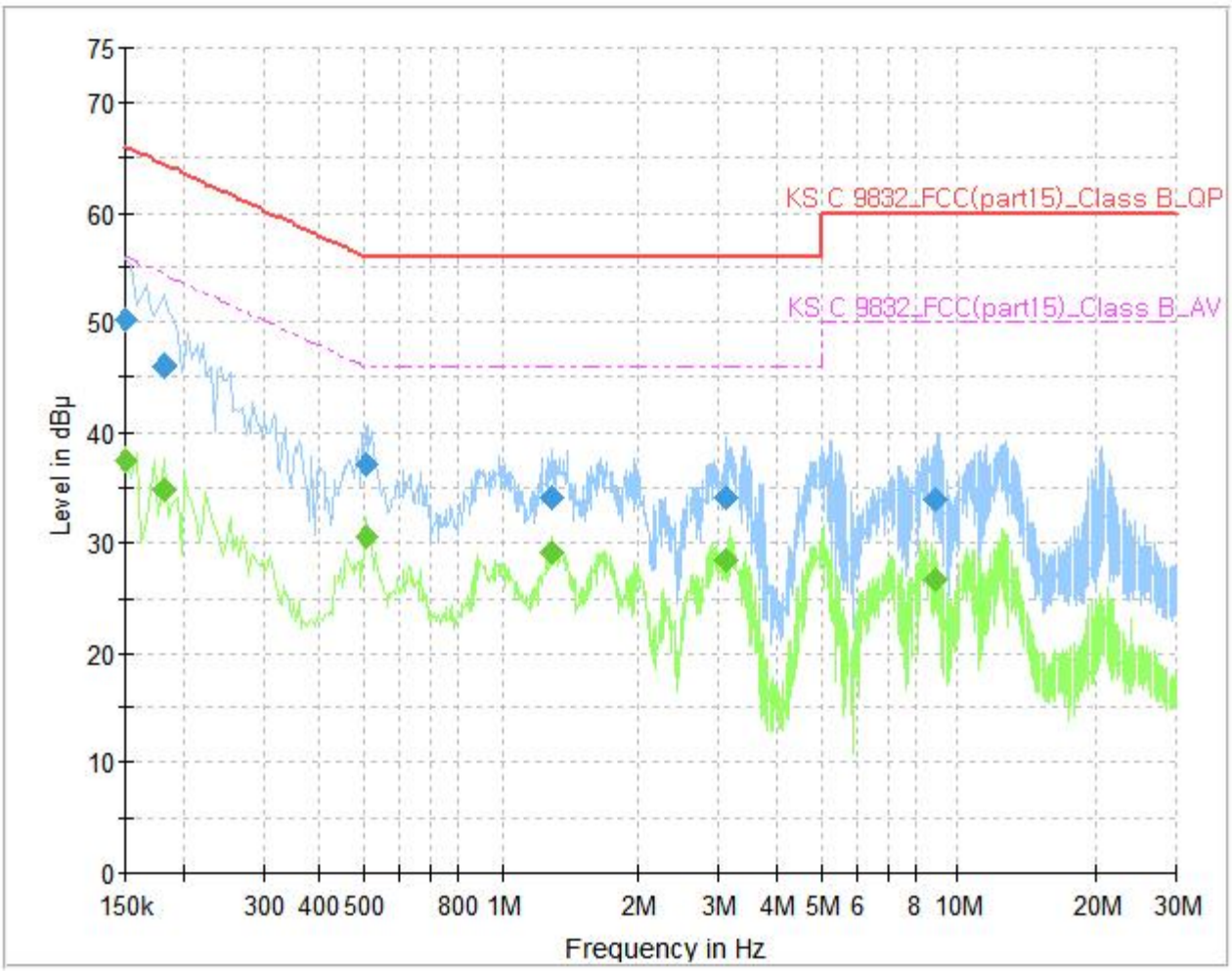
4.12.4. Test result

Line (150 kHz ~ 30 MHz)



Final_Result

Frequency (MHz)	QuasiPeak (dB¥iV)	CAverage (dB¥iV)	Limit (dB¥iV	Margin (dB)	Line	Corr. (dB)
0.150000	---	37.47	56.00	18.53	L1	9.8
0.150000	50.22	---	66.00	15.78	L1	9.8
0.182000	---	34.86	54.39	19.53	L1	10.0
0.182000	46.08	---	64.39	18.31	L1	10.0
0.506000	---	30.49	46.00	15.51	L1	9.9
0.506000	37.01	---	56.00	18.99	L1	9.9
1.286000	---	29.15	46.00	16.85	L1	9.8
1.286000	34.14	---	56.00	21.86	L1	9.8
3.086000	---	28.43	46.00	17.57	L1	9.8
3.086000	34.15	---	56.00	21.85	L1	9.8
8.938000	---	26.68	50.00	23.32	L1	10.0
8.938000	33.95	---	60.00	26.05	L1	10.0

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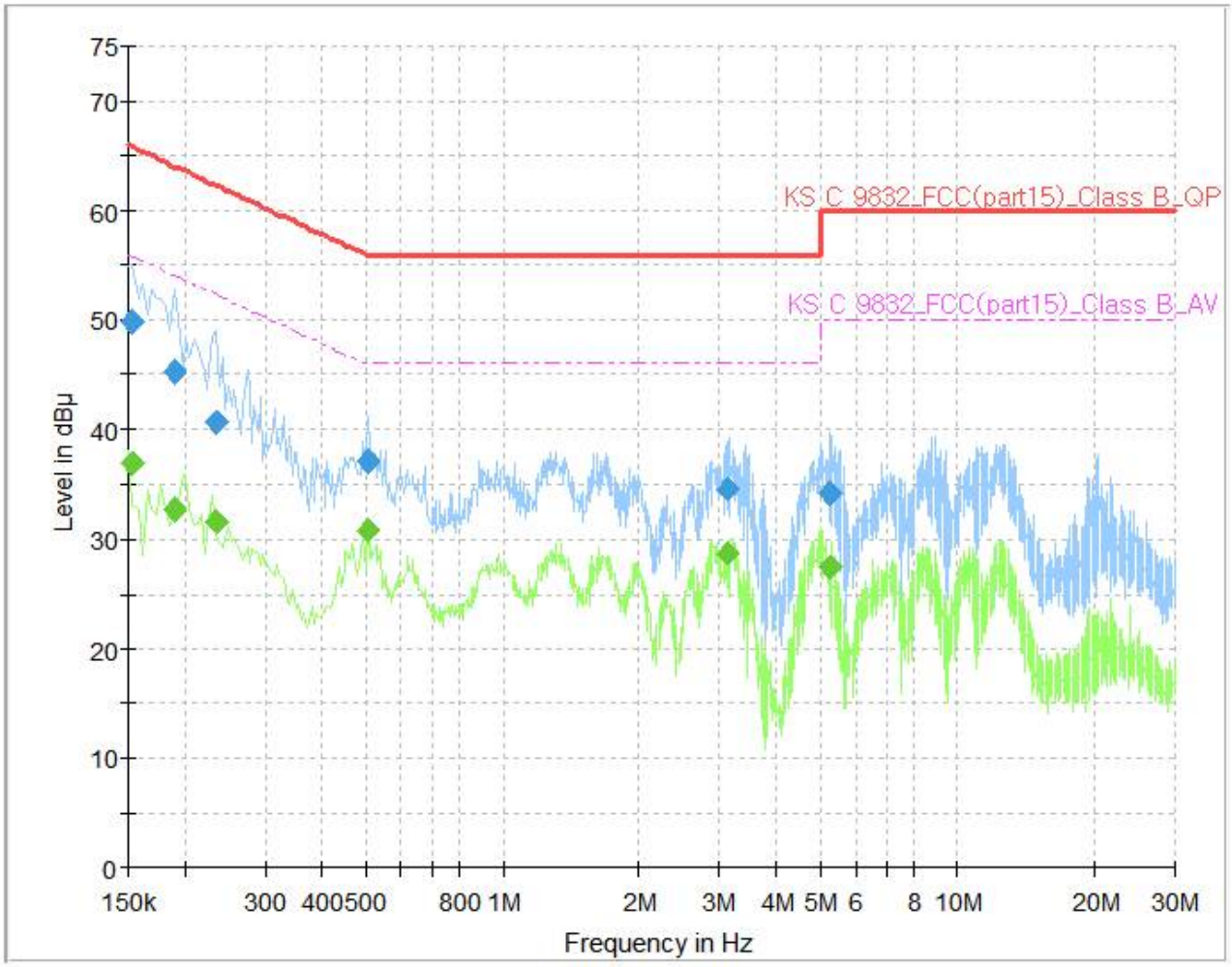

Final_Result

Frequency (MHz)	QuasiPeak (dB¥iV)	CAverage (dB¥iV)	Limit (dB¥iV	Margin (dB)	Line	Corr. (dB)
0.154000	---	36.85	55.78	18.93	N	9.8
0.154000	49.85	---	65.78	15.93	N	9.8
0.190000	---	32.64	54.04	21.39	N	9.9
0.190000	45.28	---	64.04	18.75	N	9.9
0.234000	---	31.68	52.31	20.63	N	9.7
0.234000	40.72	---	62.31	21.59	N	9.7
0.506000	---	30.77	46.00	15.24	N	9.9
0.506000	37.06	---	56.00	18.94	N	9.9
3.138000	---	28.80	46.00	17.20	N	9.8
3.138000	34.50	---	56.00	21.50	N	9.8
5.234000	---	27.35	50.00	22.65	N	9.9
5.234000	34.09	---	60.00	25.91	N	9.9

Neutral (150 kHz ~ 30 MHz)

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4.13. Power Line Conducted Emission

4.13.1. Requirement & Test Method

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.

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4.13.2. Conclusion

1) Maximum Measured Transmitter Power:

Channel Frequency (MHz)	Conducted Maximum Output Power		Max Antenna Gain (dBi)	Numeric antenna gain
	(dBm)	(mW)		
2 441	-3.50	0.45	2.78	1.90

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]

· [√f(GHz)] = 0.45/5*√2.441 = 0.14 ≤ 3.0

Threshold at which no SAR required is 48 mW and ≤ 3.0 for 1-g SAR, Separation distance is 5 mm.

2) Conclusion : The SAR measurement is exempt.

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