

Report on the RF Testing of:

KYOCERA Corporation
Mobile Phone, Model: EB1207
FCC ID: JOYEB1207



In accordance with FCC Part 15 Subpart C

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Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Japan Ltd. document control rules.

EXECUTIVE SUMMARY – Result: Complied

A sample of this product was tested and the result above was confirmed in accordance with FCC Part 15 Subpart C.



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1 Summary of Test

1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-24130-0	First Issue	Refer to the cover page

1.2 Standards

CFR47 FCC Part 15 Subpart C

1.3 Test methods

ANSI C63.10-2013,
KDB 558074 D01 15.247 Meas Guidance v05r02

1.4 Deviation from standards

None

1.5 List of applied test(s) of the EUT

Test item section	Test item	Condition	Result	Remark
15.247(a)(2)	6dB Bandwidth	Conducted	PASS	*
15.247(b)(3)	Maximum Peak Output Power	Conducted	PASS	*
15.247(d)	Band Edge Compliance of RF Conducted Emissions	Conducted	PASS	*
15.247(d) 15.205 15.209	Spurious Emissions	Conducted	PASS	*
		Radiated	PASS	*
15.247(d) 15.205 15.209	Restricted Bands of Operation	Radiated	PASS	*
15.247(e)	Transmitter Power Spectral Density	Conducted	PASS	*
15.207	AC Power Line Conducted Emissions	Conducted	PASS	*

1.6 Test information

The only difference with EB1190EM (FCC ID: JOYPC9699) is that EB1207 does not have a Cellular component.

Therefore, this measurement data is the same as that of EB1190EM.

*: Spot check tests were performed. Only the worst case was tested.

1.7 Test set up

Table-top

1.8 Test period

1-May-2024 - 30-May-2024, 24-July-2024, 6-August-2024 - 9-August-2024

2 Equipment Under Test

All information in this chapter was provided by the applicant.

2.1 EUT information

Applicant	KYOCERA Corporation Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi, Kanagawa, Japan Phone: +81-45-943-6253 Fax: +81-45-943-6314
Equipment Under Test (EUT)	Mobile Phone
Model number	EB1190EM, EB1207
Serial number	353343640002991, 353343640002918, 353343640002926, SAR3, SAR2, Radiated added
Trade name	Kyocera
Number of sample(s)	6
EUT condition	Pre-Production
Power rating	Battery: DC 3.87 V
Size	(W) 73.0 mm × (D) 157.0 mm × (H) 11.43 mm
Environment	Indoor and Outdoor use
Terminal limitation	-20 °C to 60 °C
Hardware version	DMT1
Software version	0.151BX.0025.a
Firmware version	Not applicable
RF Specification	
Protocol	Bluetooth 5.4 + EDR
Frequency range	2402 MHz-2480 MHz
Number of RF Channels	40 Channels
Modulation method/Data rate	GFSK (1Mbps, 2Mbps), Long Range S2/S8 (500kbps/125kbps)
Channel separation	2 MHz
Conducted power	4.656 mW
Antenna type	Internal antenna
Antenna gain	0.2 dBi

2.2 Modification to the EUT

The table below details modifications made to the EUT during the test project.

Modification State	Description of Modification	Modification fitted by	Date of Modification
Model: EB1190EM, EB1207 Serial Number: 353343640002991, 353343640002918, 353343640002926, SAR3, SAR2, Radiated added			
0	As supplied by the applicant	Not Applicable	Not Applicable

2.3 Variation of family model(s)

2.3.1 List of family model(s)

Not applicable

2.3.2 Reason for selection of EUT

Not applicable

2.4 Operating channels and frequencies

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

2.5 Operating mode

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Tested Channel	Frequency [MHz]
Low	2402
Middle	2440
High	2480

The pre-test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

Tested Channel	Modulation Type	Data Rate
Low, Middle, High	GFSK	1Mbps, 2Mbps, LongRange S2, LongRange S8

The field strength of spurious emissions was measured at each position of all three axis X, Y and Z to compare the level, and the maximum noise.
The worst emission was found in X-axis and the worst case recorded.
Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.

2.6 Operating flow

[Tx mode]

- i) Test program setup to the Software
- ii) Select a Test mode
Operating frequency: Channel Low: 2402 MHz, Channel Middle: 2440 MHz, Channel High: 2480 MHz
- iii) Start test mode

[Rx mode]

- i) Test program setup to the Software
- ii) Select a Test mode
Operating frequency: Channel Low: 2402 MHz, Channel Middle: 2440 MHz, Channel High: 2480 MHz
- iii) Start test mode

3 Configuration of Equipment

Numbers assigned to equipment on the diagram in “3.3 System configuration” correspond to the list in “3.1 Equipment used” and “3.2 Cable(s) used”.

This test configuration is based on the manufacture’s instruction.

Cabling and setup(s) were taken into consideration and test data was taken under worse case condition.

3.1 Equipment used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Mobile Phone	KYOCERA	EB1190EM	353343640002991, 353343640002918, 353343640002926	JOYPC9699	EUT
	Mobile Phone	KYOCERA	EB1207	SAR3, SAR2, Radiated added	JOYEB1207	EUT (Tested)
2	AC Adapter	KDDI	0602PQA	N/A	N/A	*

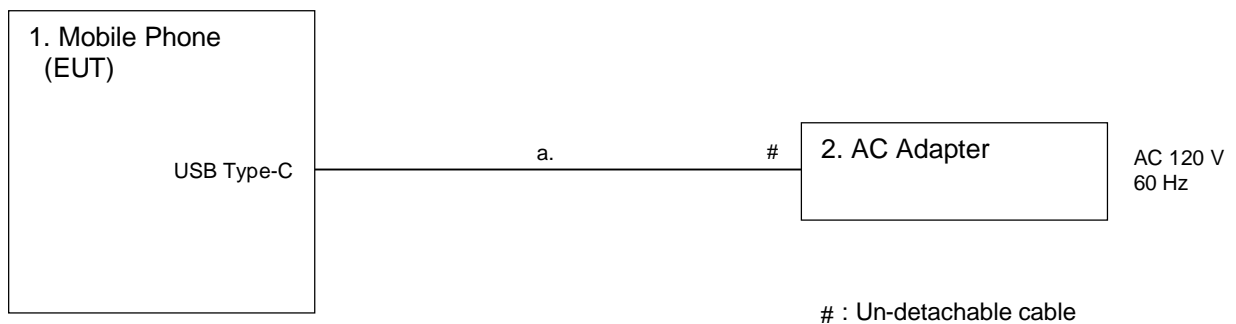
*:AC power line Conducted Emission Test.

3.2 Cable(s) used

No.	Equipment	Length[m]	Shield	Connector	Comment
a	USB cable (for AC Adapter)	1.5	No	Plastic	*

*:AC power line Conducted Emission Test.

3.3 System configuration



4 Test Result

4.1 6dB Bandwidth / Occupied Bandwidth (99%)

4.1.1 Measurement procedure

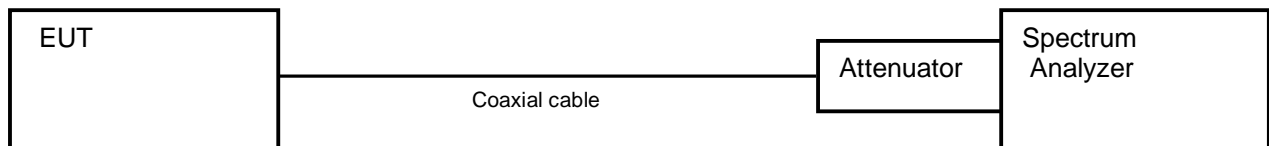
[FCC 15.247(a)(2), KDB558074 D01 v05r02]

The bandwidth at 6 dB down from the highest inband spectral density is measured with spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- a) RBW = 100 kHz
- b) VBW $\geq 3 \times$ RBW
- c) Sweep time = auto-couple
- d) Detector = peak
- e) Trace mode = max hold

- Test configuration



4.1.2 Limit

The minimum permissible 6dB bandwidth is 500kHz.



4.1.3 Measurement result

Date	: 7-May-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 21.4 [°C]		
Humidity	: 45.2 [%]		
Test place	: Shielded room No.4		
Date	: 30-May-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 22.9 [°C]		
Humidity	: 46.7 [%]		
Test place	: Shielded room No.4		
Date	: 6-August-2024	Test engineer	: <u>Kazunori Saito</u>
Temperature	: 23.0 [°C]		
Humidity	: 54.3 [%]		
Test place	: Shielded room No.4		

EB1190EM

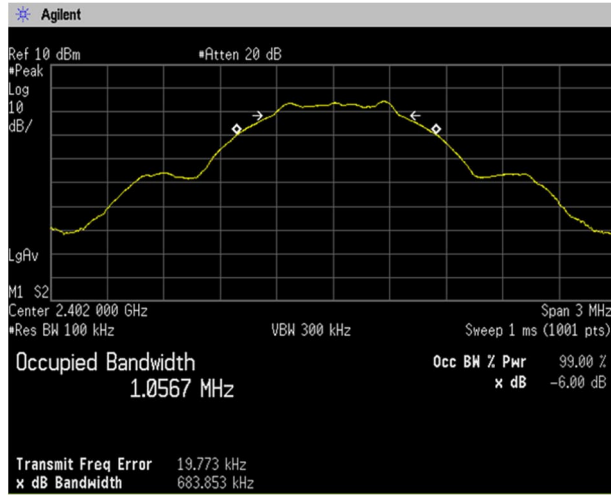
Channel	6dB bandwidth [MHz]			
	BT_LE			
	1Mbps	2Mbps	LongRange S2	LongRange S8
Low	0.684	1.178	0.678	0.701
Middle	0.677	1.184	0.673	0.698
High	0.677	1.182	0.672	0.695

EB1207

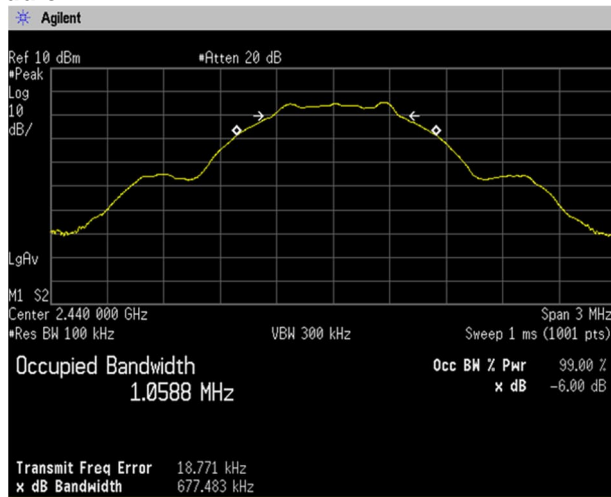
Channel	6dB bandwidth [MHz]			
	BT_LE			
	1Mbps	2Mbps	LongRange S2	LongRange S8
Low	0.677	-	-	-
Middle	0.678	-	-	-
High	0.676	-	-	-

4.1.4 Trace data

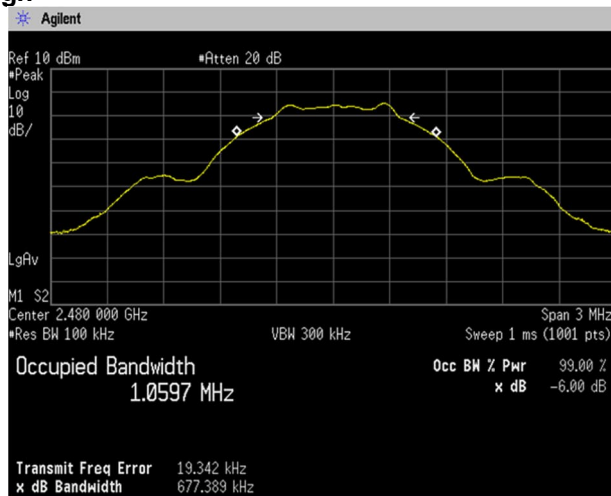
EB1190EM [BT_LE (1Mbps)]
Channel Low



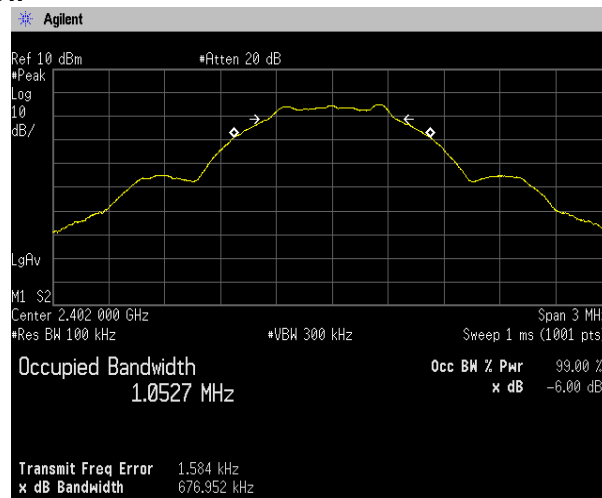
Channel Middle



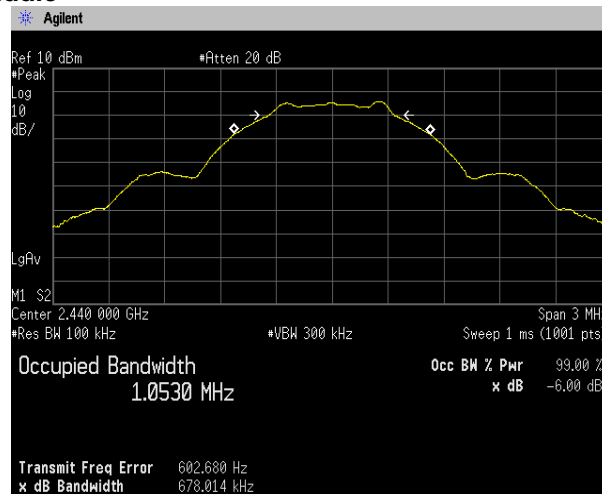
Channel High



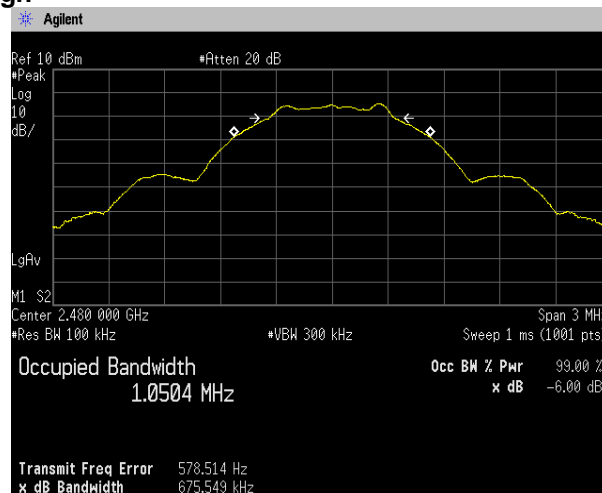
EB1207 [BT_LE (1Mbps)] Channel Low



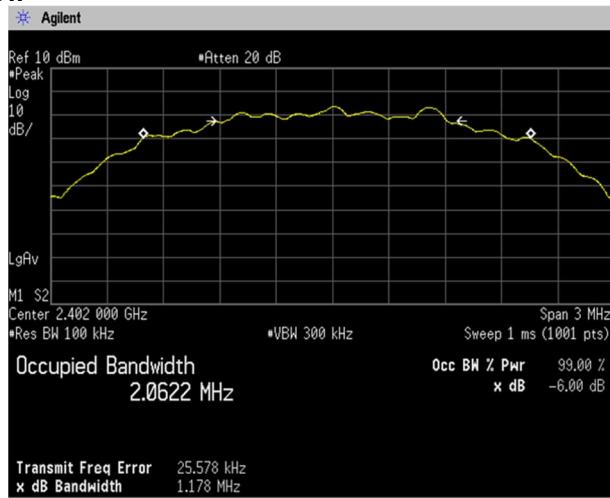
Channel Middle



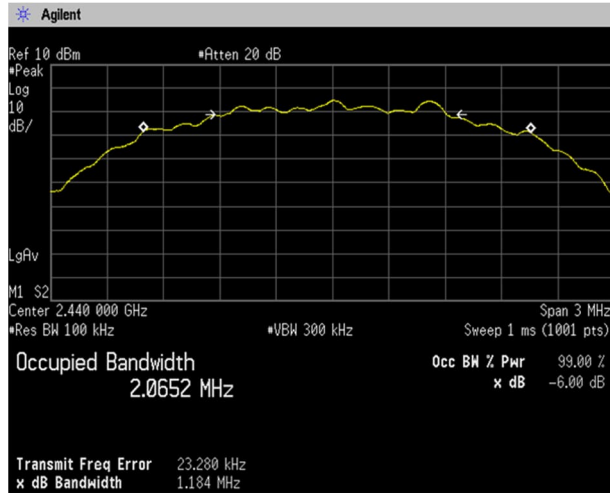
Channel High



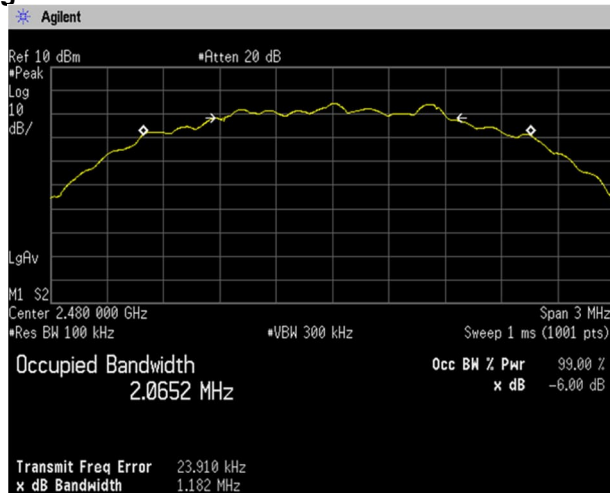
**EB1190EM [BT_LE (2Mbps)]
Channel Low**



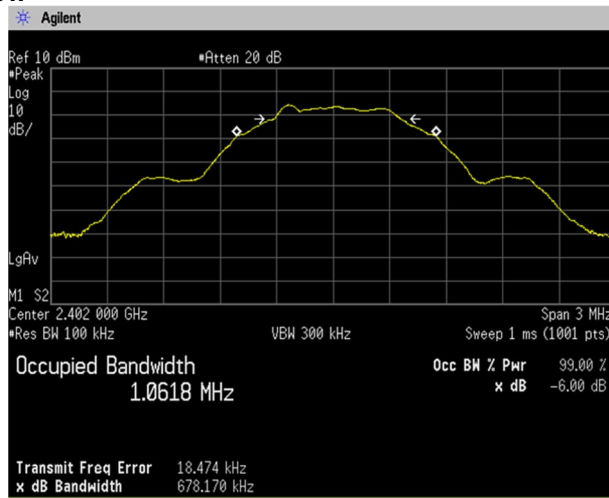
Channel Middle



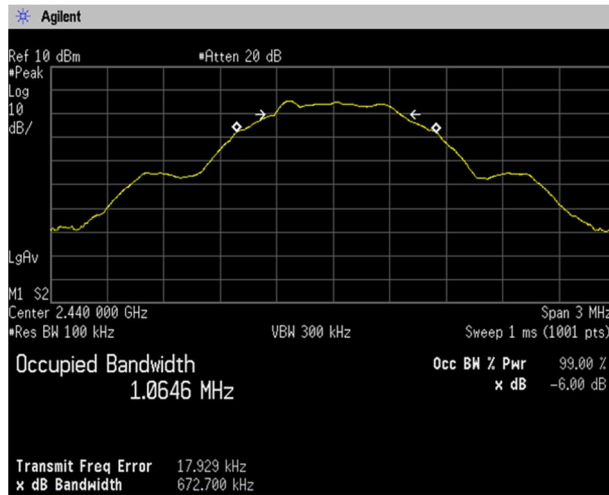
Channel High



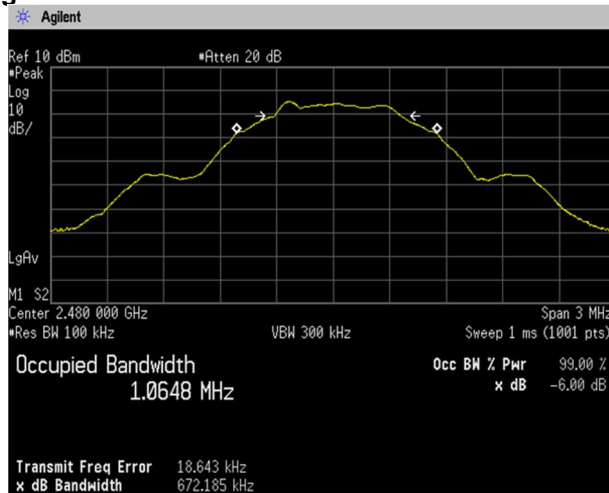
**EB1190EM [BT_LE (LongRange S2)]
Channel Low**



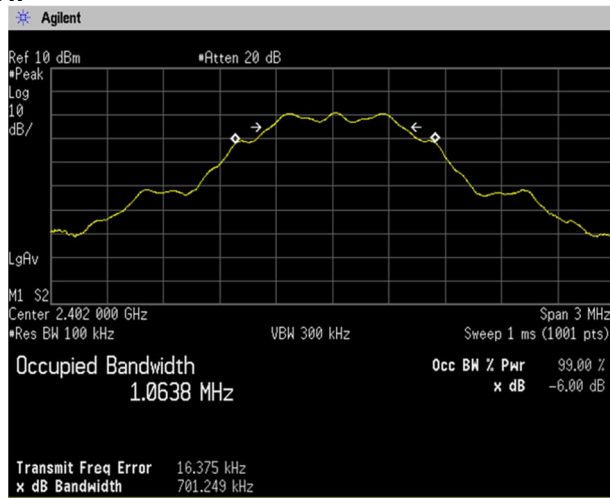
Channel Middle



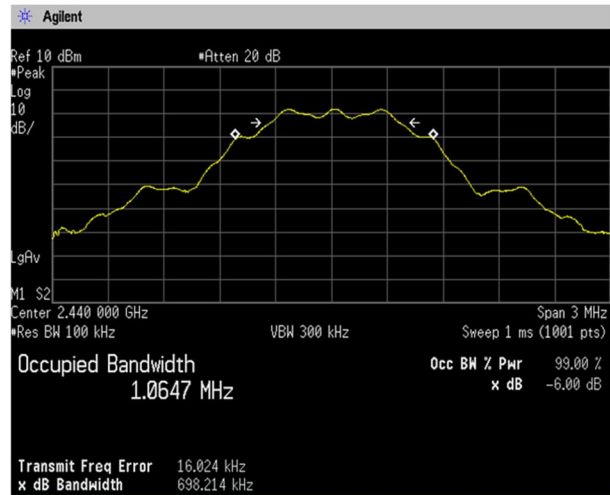
Channel High



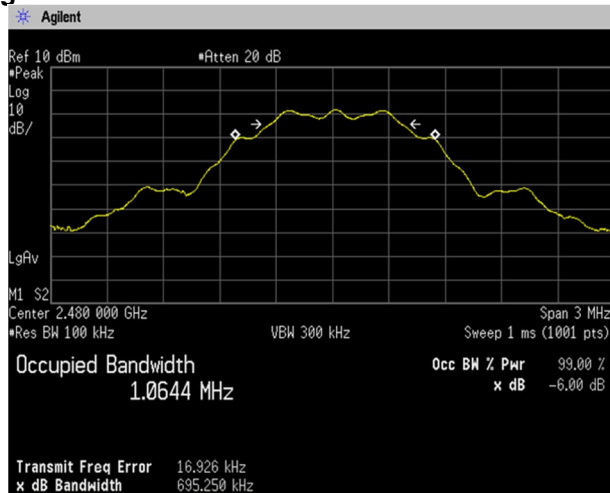
**EB1190EM [BT_LE (LongRange S8)]
Channel Low**



Channel Middle



Channel High



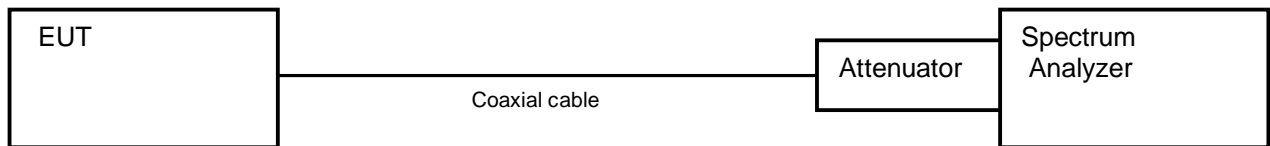
4.2 Maximum Peak Output Power

4.2.1 Measurement procedure

[FCC 15.247(b)(3), KDB558074 D01 v05r02]

The peak power is measured with a power sensor connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

- Test configuration



4.2.2 Limit

1 W (1000 mW) or less

4.2.3 Measurement result

Date : 8-May-2024
 Temperature : 21.4 [°C]
 Humidity : 46.2 [%]
 Test place : Shielded room No.4

Test engineer : Kazunori Saito

Date : 30-May-2024
 Temperature : 22.9 [°C]
 Humidity : 46.7 [%]
 Test place : Shielded room No.4

Test engineer : Kazunori Saito

Date : 24-July-2024
 Temperature : 23.1 [°C]
 Humidity : 56.9 [%]
 Test place : Shielded room No.3

Test engineer : Kazunori Saito

EB1190EM
Battery Full (1Mbps)

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Peak Output Power (mW)	Limit (mW)	Result
Low	2402	-5.43	10.52	5.09	3.228	≤ 1000	PASS
Middle	2440	-4.26	10.52	6.26	4.227	≤ 1000	PASS
High	2480	-4.50	10.52	6.02	3.999	≤ 1000	PASS

EB1207
Battery Full (1Mbps)

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Peak Output Power (mW)	Limit (mW)	Result
Low	2402	-4.73	10.52	5.79	3.793	≤ 1000	PASS
Middle	2440	-3.84	10.52	6.68	4.656	≤ 1000	PASS
High	2480	-4.41	10.52	6.11	4.083	≤ 1000	PASS

1Mbps

Channel	EB1190EM Level (dBm)	EB1207 Level (dBm)	Difference value (dBm)	Result Within ±3 dBm
Low	5.09	5.79	-0.70	PASS
Middle	6.26	6.68	-0.42	PASS
High	6.02	6.11	-0.09	PASS

EB1190EM
Battery Full (2Mbps)

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Peak Output Power (mW)	Limit (mW)	Result
Low	2402	-5.43	10.52	5.09	3.228	≤ 1000	PASS
Middle	2440	-4.30	10.52	6.22	4.188	≤ 1000	PASS
High	2480	-4.52	10.52	6.00	3.981	≤ 1000	PASS

Calculation;

$$\text{Reading (dBm)} + \text{Factor (dB)} = \text{Level (dBm)}$$

$$10 \log P = \text{Level (dBm)}$$

$$P = 10^{(\text{Maximum Peak Output Power} / 10)} \text{ (mW)}$$

EB1190EM**Battery Full (LongRange S2)**

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Peak Output Power (mW)	Limit (mW)	Result
Low	2402	-5.44	10.52	5.08	3.221	≤ 1000	PASS
Middle	2440	-4.27	10.52	6.25	4.217	≤ 1000	PASS
High	2480	-4.52	10.52	6.00	3.981	≤ 1000	PASS

EB1190EM**Battery Full (LongRange S8)**

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Peak Output Power (mW)	Limit (mW)	Result
Low	2402	-5.45	10.52	5.07	3.214	≤ 1000	PASS
Middle	2440	-4.28	10.52	6.24	4.207	≤ 1000	PASS
High	2480	-4.52	10.52	6.00	3.981	≤ 1000	PASS

Calculation;

$$\text{Reading (dBm)} + \text{Factor (dB)} = \text{Level (dBm)}$$

$$10\log P = \text{Level (dBm)}$$

$$P = 10^{(\text{Maximum Peak Output Power} / 10)} \text{ (mW)}$$

4.3 Band Edge Compliance of RF Conducted Emissions

4.3.1 Measurement procedure

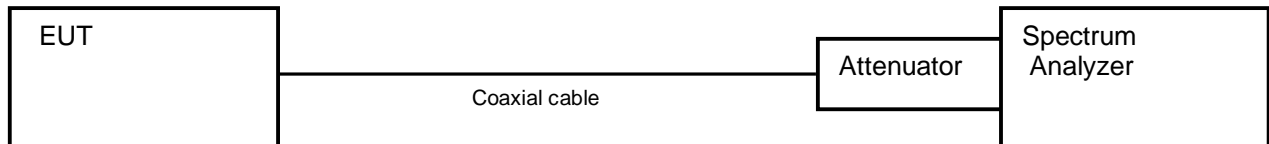
[FCC 15.247(d), KDB558074 D01 v05r02]

The Band Edge is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- a) Span = Arbitrary setting. (Setting suitable for measurement.)
- b) RBW = 100 kHz
- c) VBW $\geq 3 \times$ RBW
- d) Sweep time = auto-couple
- e) Detector = peak
- f) Trace mode = max hold

- Test configuration



4.3.2 Limit

In any 100kHz bandwidth outside the frequency band 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.



4.3.3 Measurement result

Date : 7-May-2024
 Temperature : 21.4 [°C]
 Humidity : 46.2 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 30-May-2024
 Temperature : 22.9 [°C]
 Humidity : 46.7 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

Date : 6-August-2024
 Temperature : 23.0 [°C]
 Humidity : 54.3 [%]
 Test place : Shielded room No.4
 Test engineer : Kazunori Saito

EB1190EM [BT_LE (1Mbps)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402	-6.10	2399.80	-65.00	58.90	At least 20dB below from peak of RF	PASS
High	2480	-5.36	2485.75	-69.00	63.64	At least 20dB below from peak of RF	PASS

EB1207 [BT_LE (1Mbps)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402	-5.53	2399.90	-65.85	60.32	At least 20dB below from peak of RF	PASS
High	2480	-4.71	2484.75	-68.57	63.86	At least 20dB below from peak of RF	PASS

EB1190EM [BT_LE (2Mbps)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402	-6.80	2399.95	-37.59	30.79	At least 20dB below from peak of RF	PASS
High	2480	-5.90	2483.55	-62.99	57.09	At least 20dB below from peak of RF	PASS

EB1190EM [BT_LE (LongRange S2)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402	-5.96	2399.85	-64.84	58.88	At least 20dB below from peak of RF	PASS
High	2480	-5.66	2485.85	-68.81	63.15	At least 20dB below from peak of RF	PASS

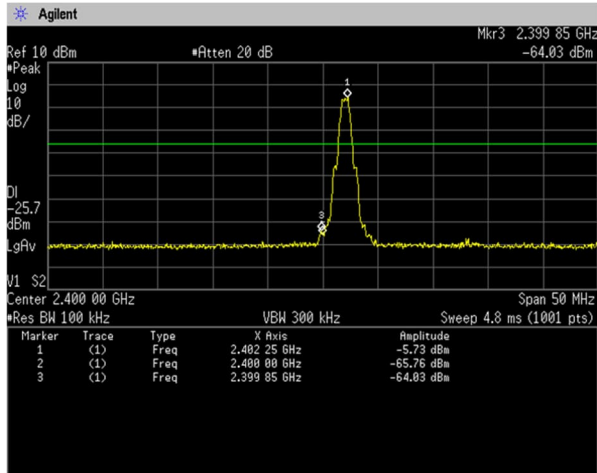
EB1190EM [BT_LE (LongRange S8)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2402	-8.93	2399.90	-66.62	57.69	At least 20dB below from peak of RF	PASS
High	2480	-8.72	2484.50	-69.36	60.64	At least 20dB below from peak of RF	PASS

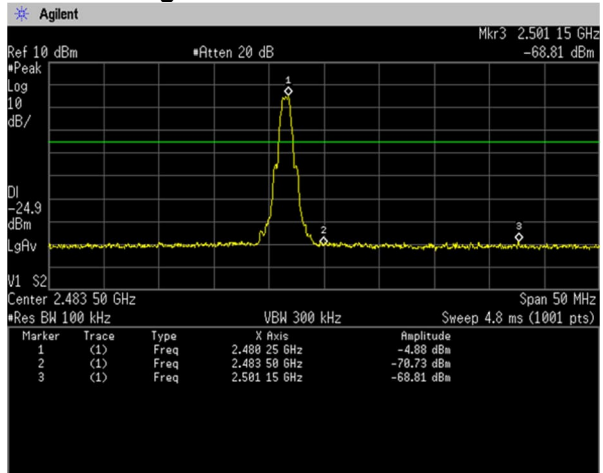
4.3.4 Trace data

EB1190EM [BT_LE (1Mbps)]

Channel: Low

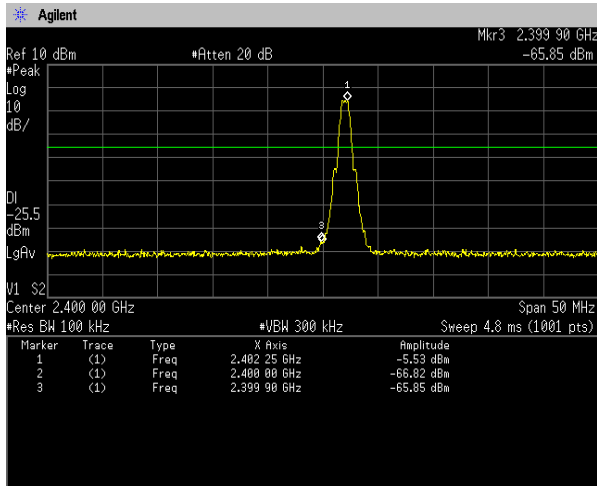


Channel: High

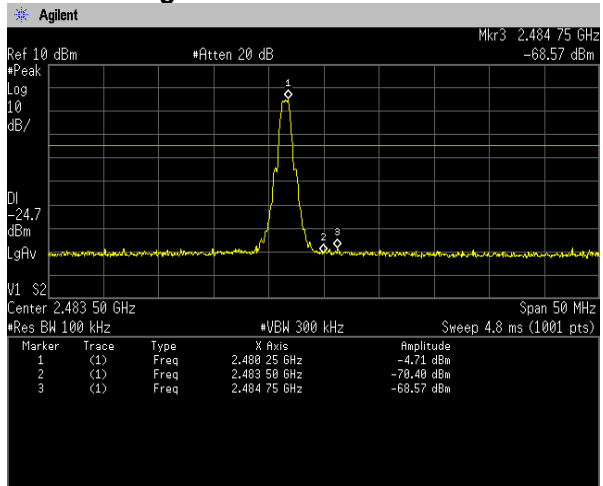


EB1207 [BT_LE (1Mbps)]

Channel: Low



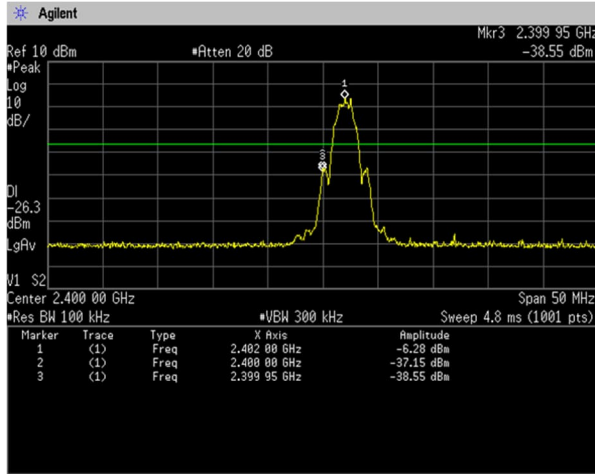
Channel: High



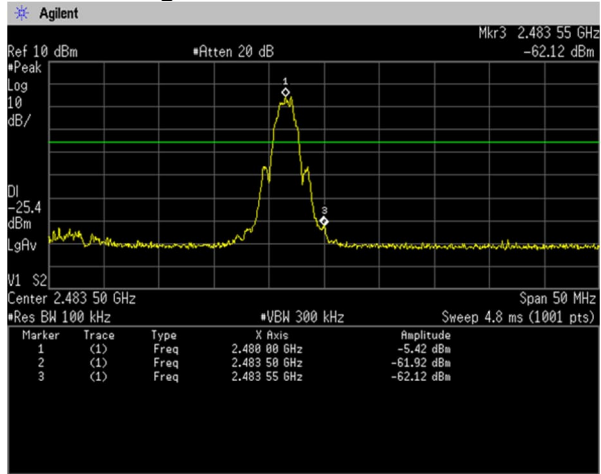
Comparison of the charts of EB1190EM and EB1207 showed that the difference in test results was less than 3 dB.

EB1190EM [BT_LE (2Mbps)]

Channel: Low

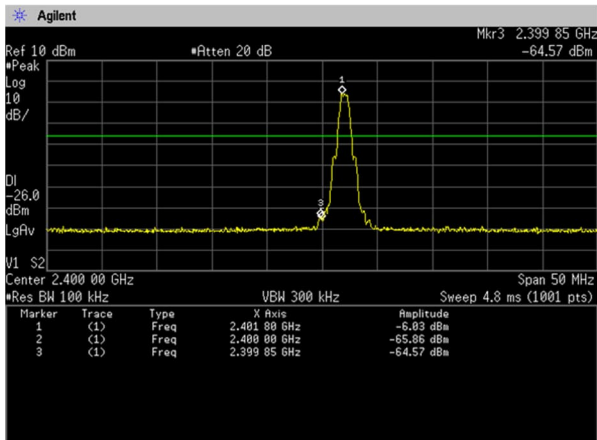


Channel: High

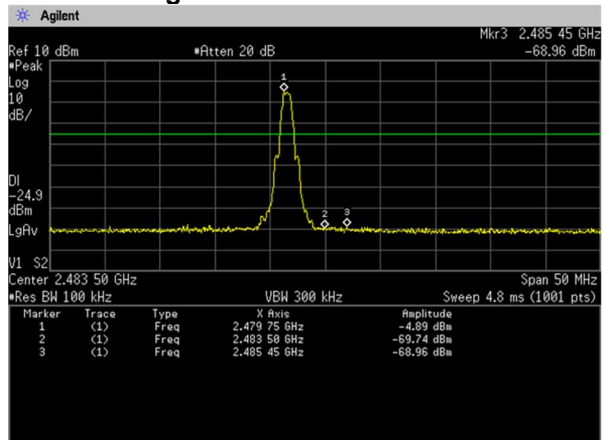


EB1190EM [BT_LE (LongRange S2)]

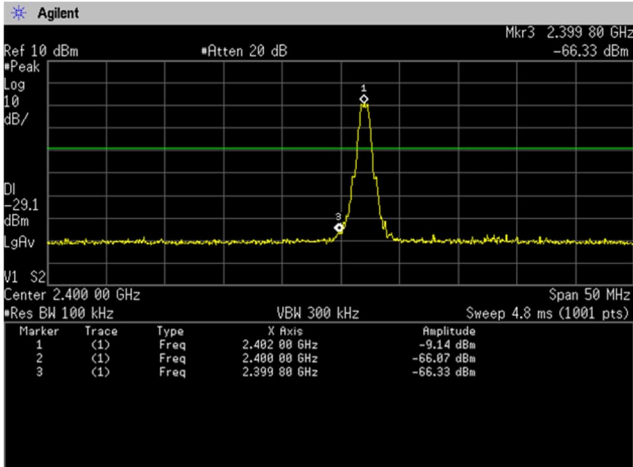
Channel: Low



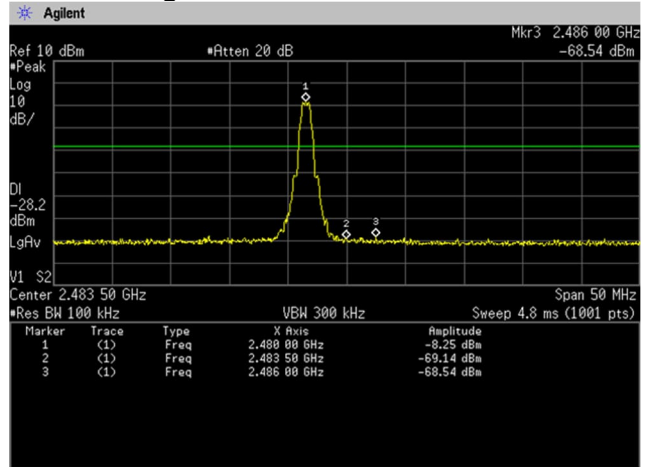
Channel: High



EB1190EM [BT_LE (LongRange S8)]
Channel: Low



Channel: High



4.4 Spurious emissions - Conducted -

4.4.1 Measurement procedure

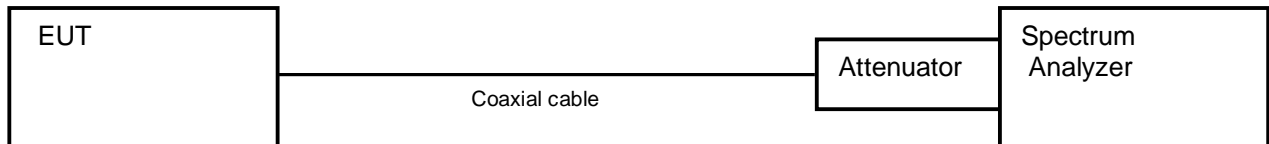
[FCC 15.247(d), KDB558074 D01 v05r02]

The spurious emissions (Conducted) are measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- a) Span = wide enough to fully capture the emission being measured.
- b) RBW = 100 kHz
- c) VBW ≥ RBW
- d) Sweep time = auto-couple
- e) Detector = peak
- f) Trace mode = max hold

- Test configuration



4.4.2 Limit

In any 100kHz bandwidth outside the frequency band 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.

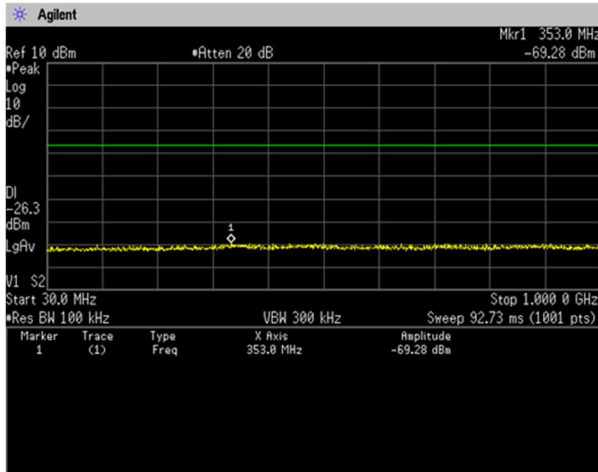
4.4.3 Measurement result

Date	: 7-May-2024	Test engineer	:	<u>Kazunori Saito</u>
Temperature	: 21.4 [°C]			
Humidity	: 45.2 [%]			
Test place	: Shielded room No.4			
Date	: 24-July-2024	Test engineer	:	<u>Kazunori Saito</u>
Temperature	: 23.1 [°C]			
Humidity	: 56.9 [%]			
Test place	: Shielded room No.3			

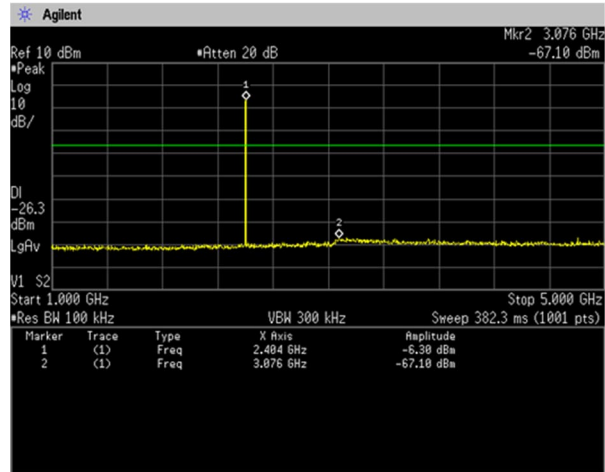
Channel	Frequency [MHz]	Limit [dB]	Results Chart	Result
Low	2402	At least 20dB below from peak of RF	See the trace Data	PASS
Middle	2440	At least 20dB below from peak of RF	See the trace Data	PASS
High	2480	At least 20dB below from peak of RF	See the trace Data	PASS

4.4.4 Trace data

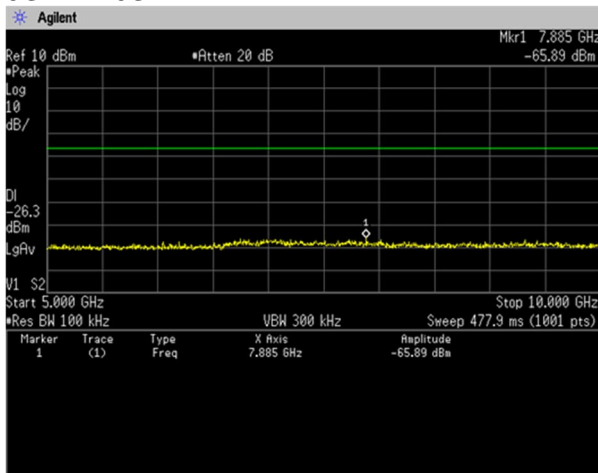
EB1190EM
[BT_LE (1Mbps)]
Channel: Low
30MHz - 1GHz



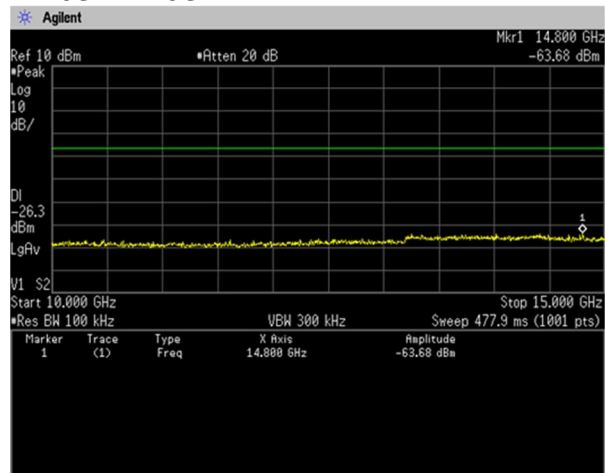
1GHz - 5GHz



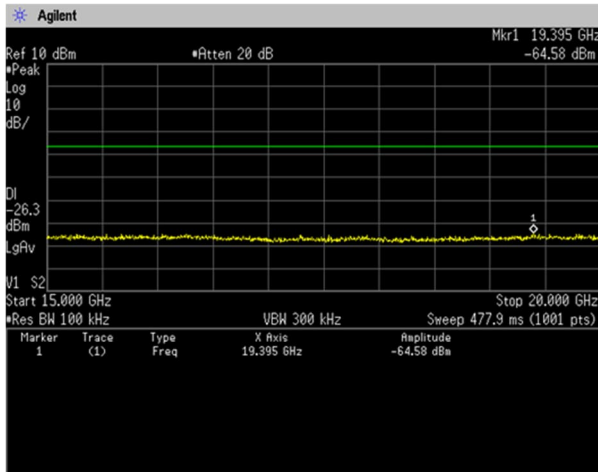
5GHz - 10GHz



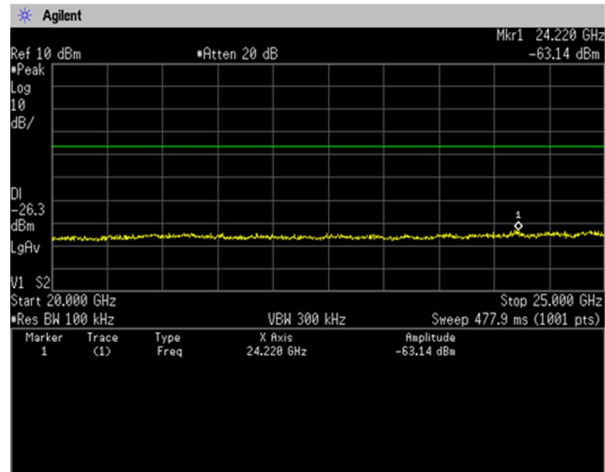
10GHz - 15GHz



15GHz - 20GHz

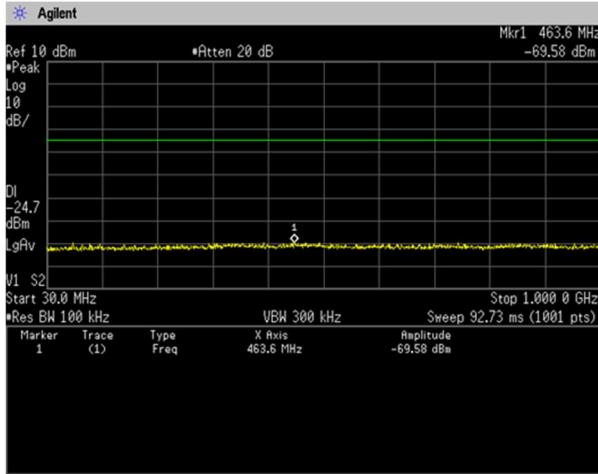


20GHz - 25GHz

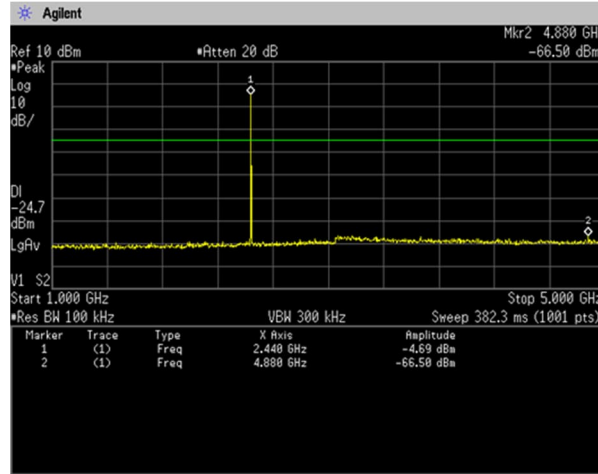




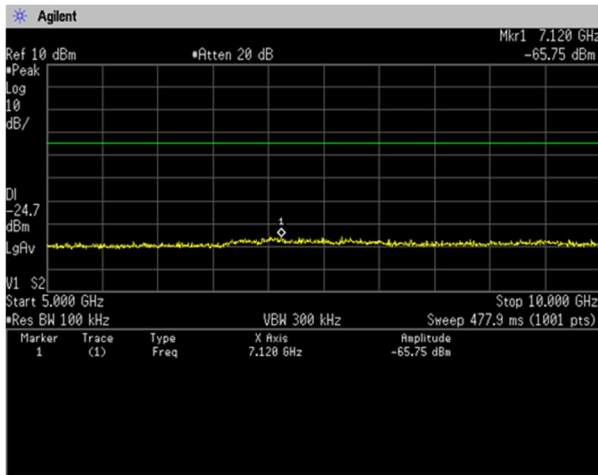
EB1190EM
[BT_LE (1Mbps)]
Channel: Middle
30MHz - 1GHz



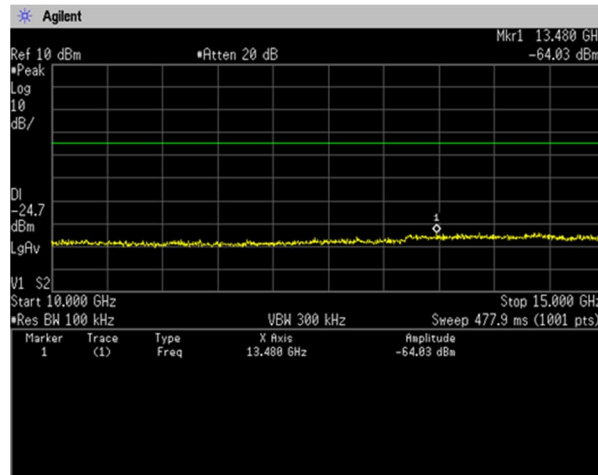
1GHz - 5GHz



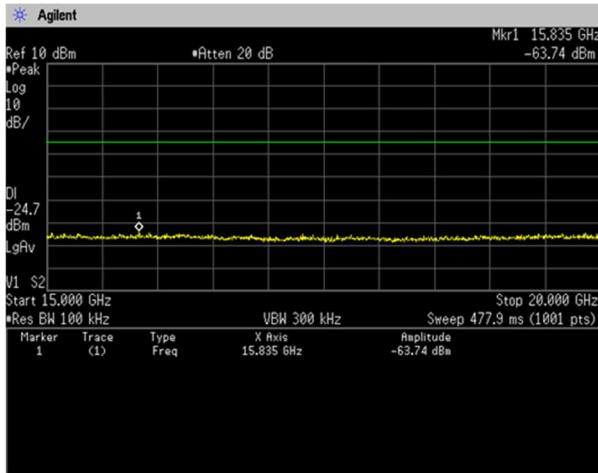
5GHz - 10GHz



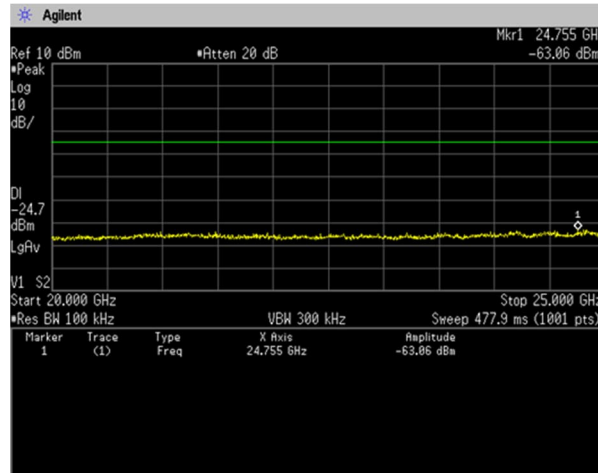
10GHz - 15GHz



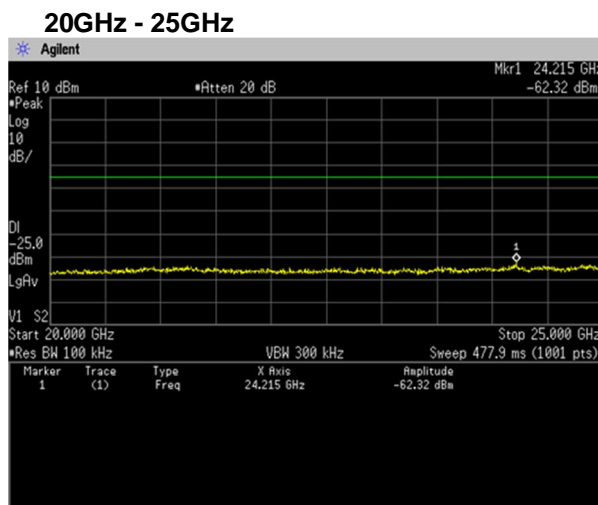
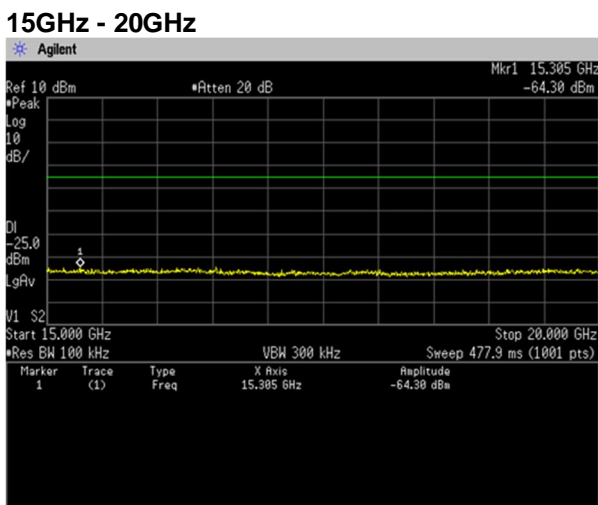
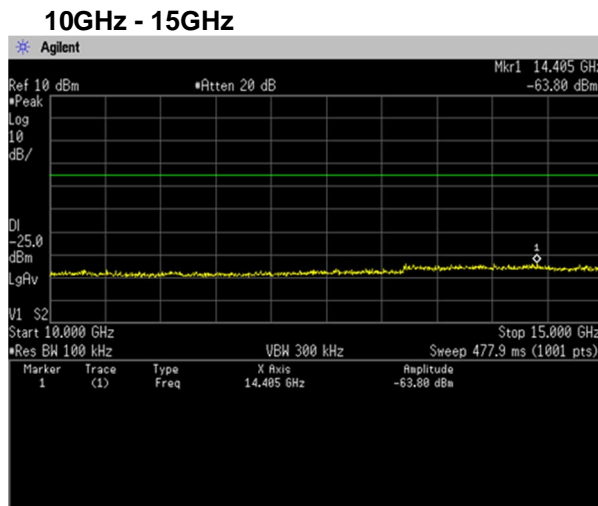
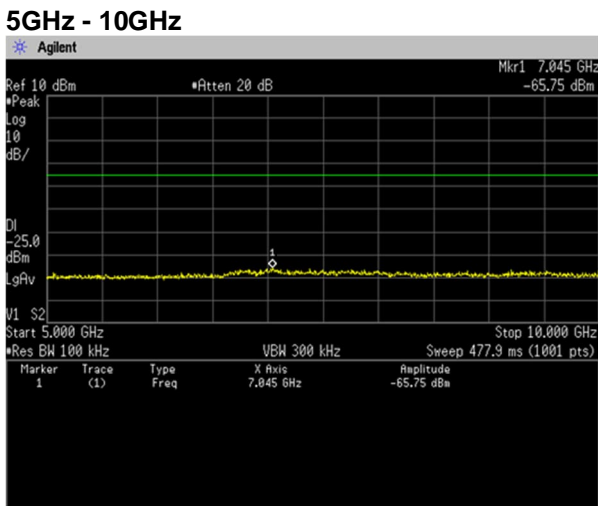
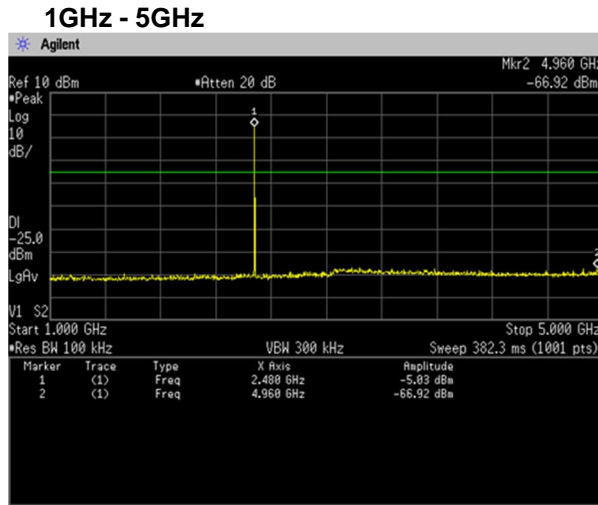
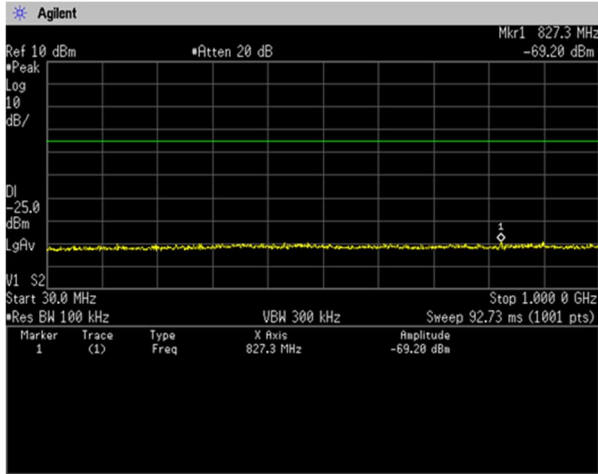
15GHz - 20GHz



20GHz - 25GHz

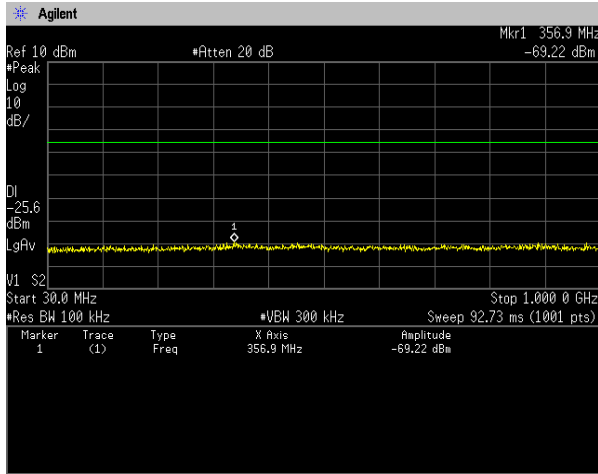


EB1190EM
[BT_LE (1Mbps)]
Channel: High
30MHz - 1GHz

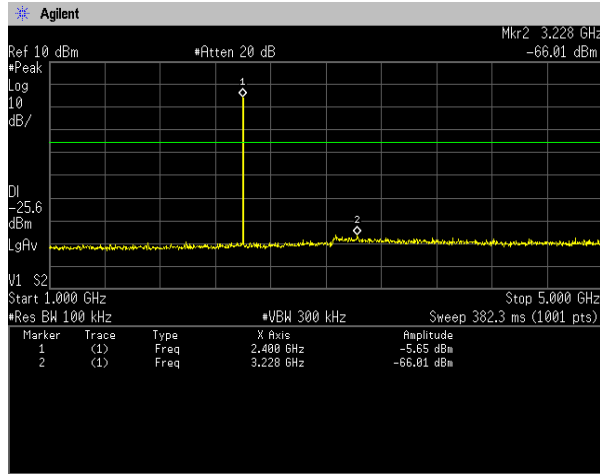




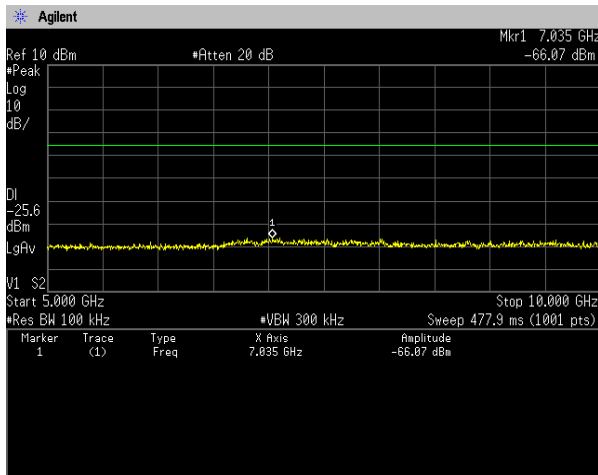
EB1207
[BT_LE (1Mbps)]
Channel: Low
30MHz - 1GHz



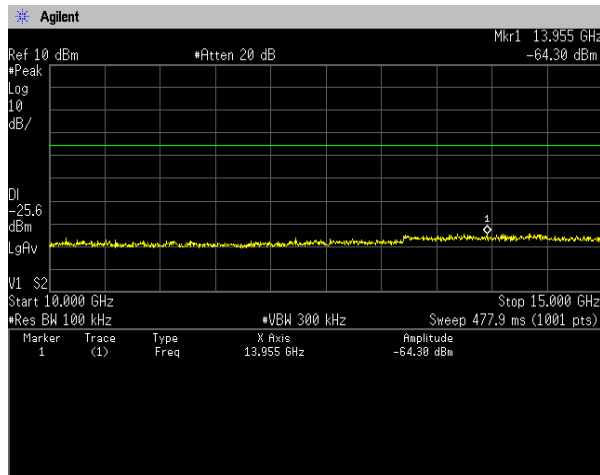
1GHz - 5GHz



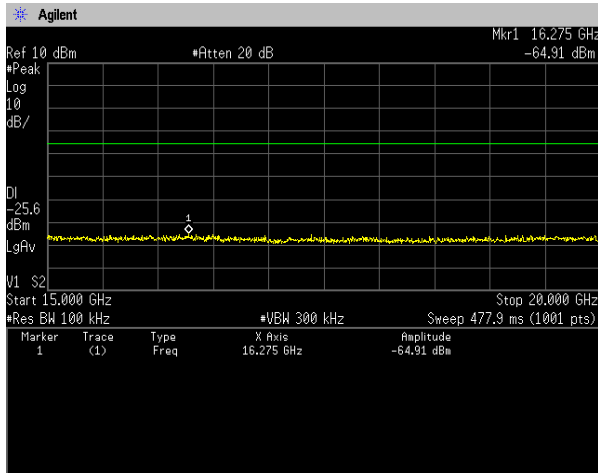
5GHz - 10GHz



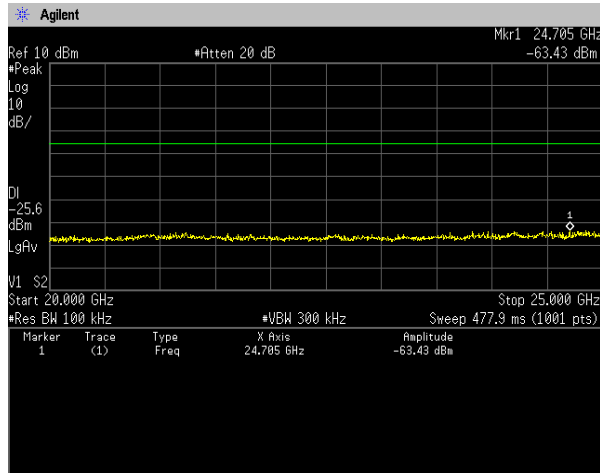
10GHz - 15GHz



15GHz - 20GHz

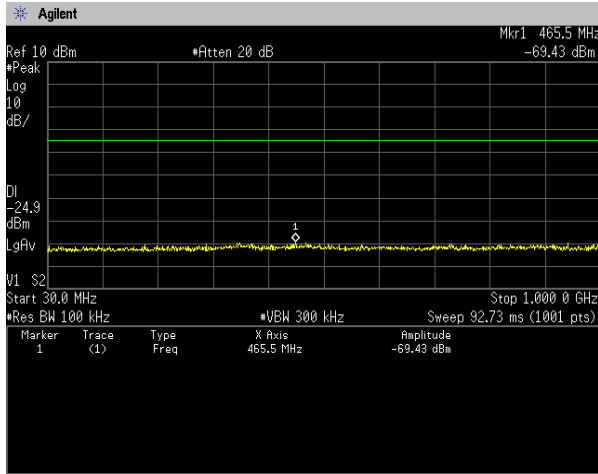


20GHz - 25GHz

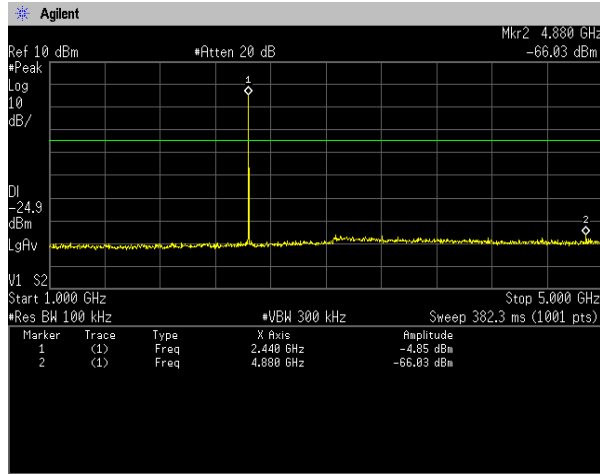




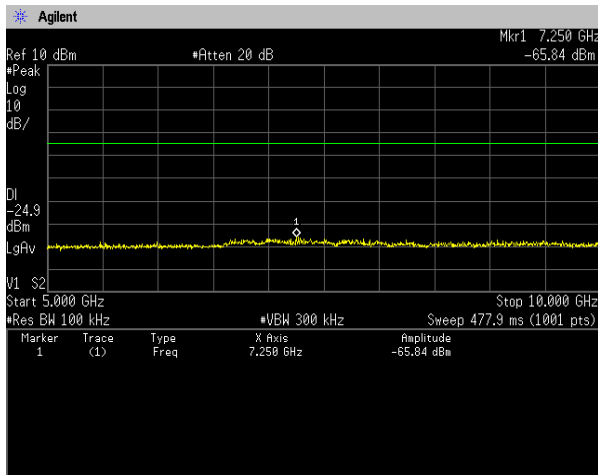
EB1207
[BT_LE (1Mbps)]
Channel: Middle
30MHz - 1GHz



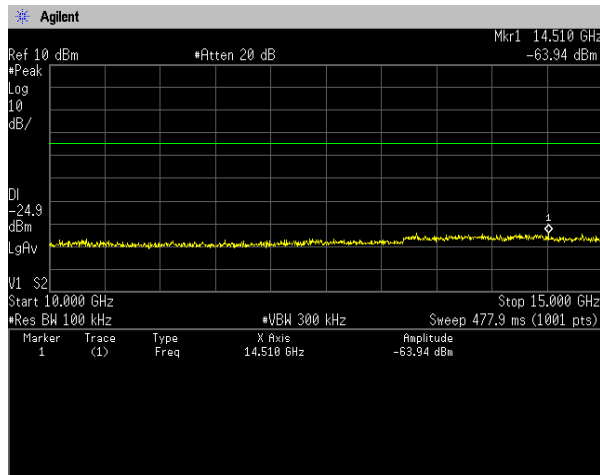
1GHz - 5GHz



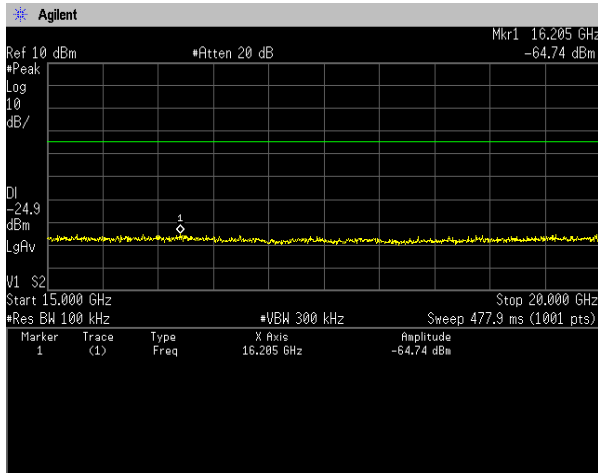
5GHz - 10GHz



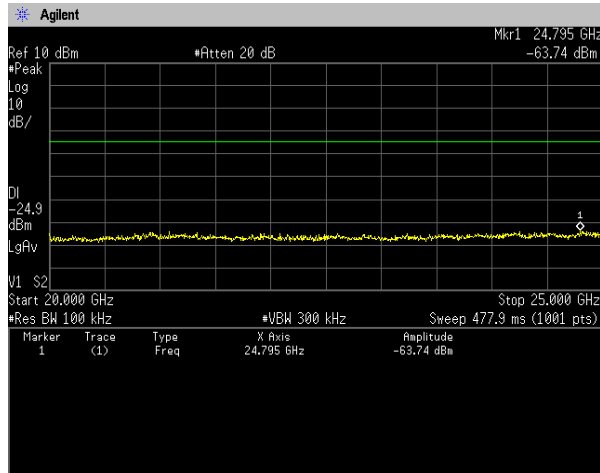
10GHz - 15GHz



15GHz - 20GHz

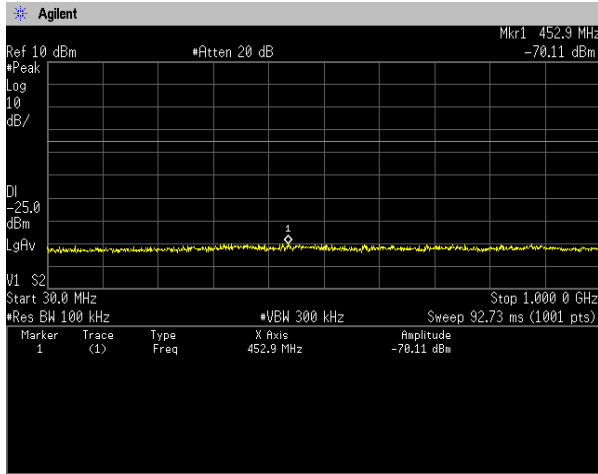


20GHz - 25GHz

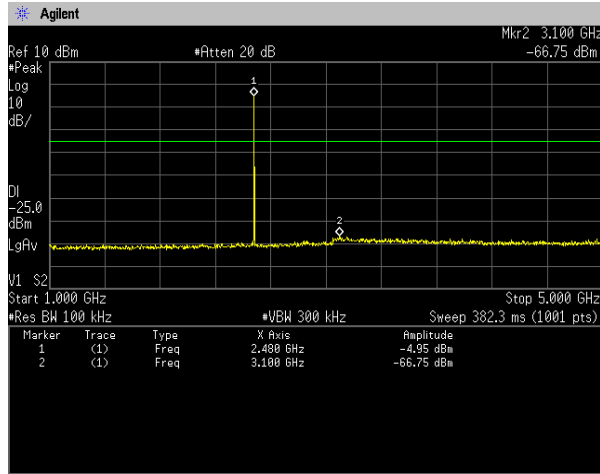




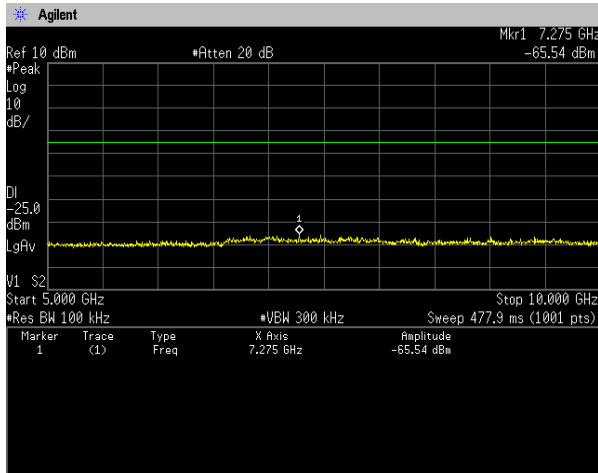
EB1207
[BT_LE (1Mbps)]
Channel: High
30MHz - 1GHz



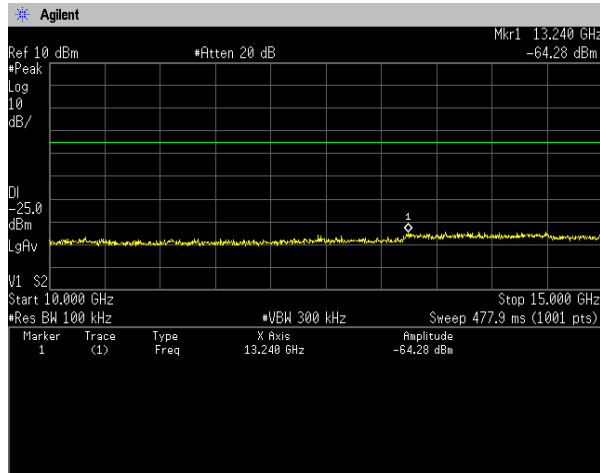
1GHz - 5GHz



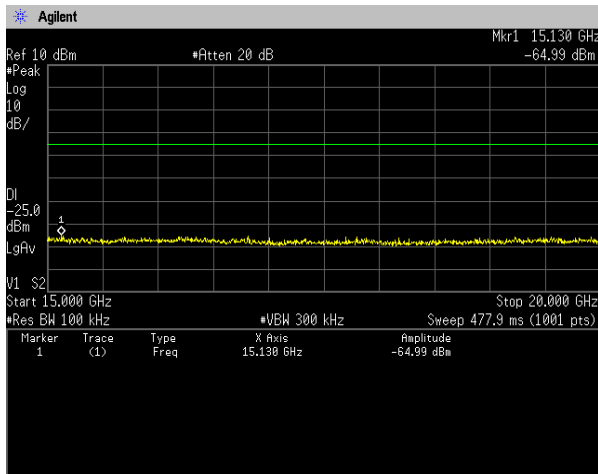
5GHz - 10GHz



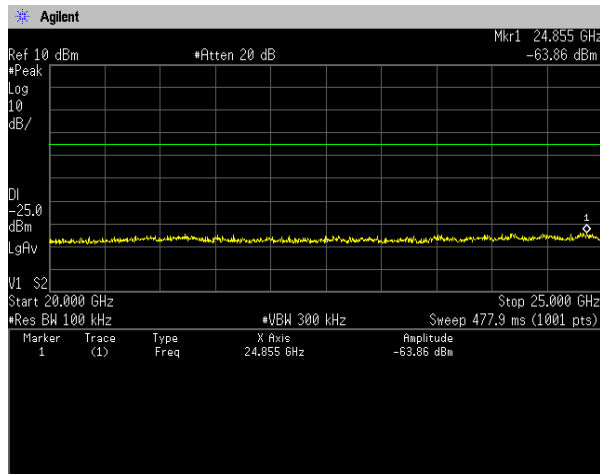
10GHz - 15GHz



15GHz - 20GHz



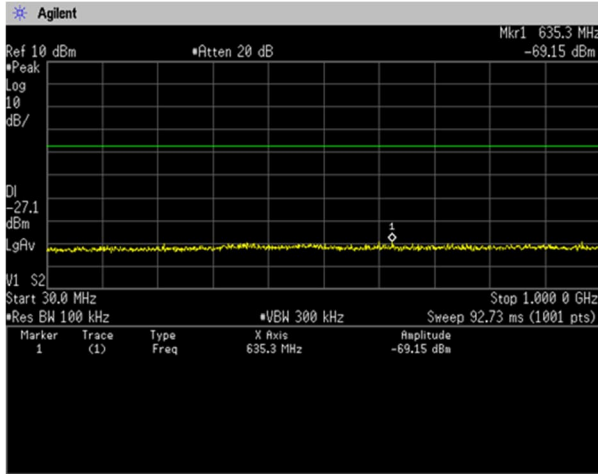
20GHz - 25GHz



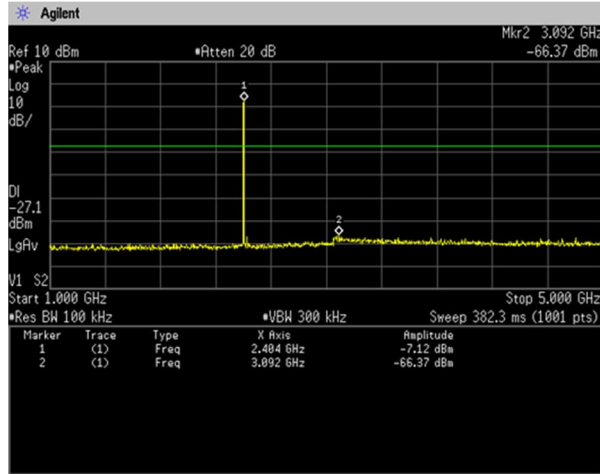
Comparison of the charts of EB1190EM and EB1207 showed that the difference in test results was less than 3 dB.



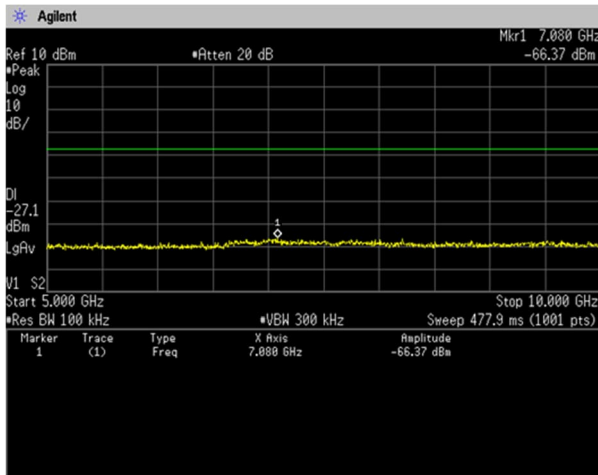
EB1190EM
[BT_LE (2Mbps)]
Channel: Low
30MHz - 1GHz



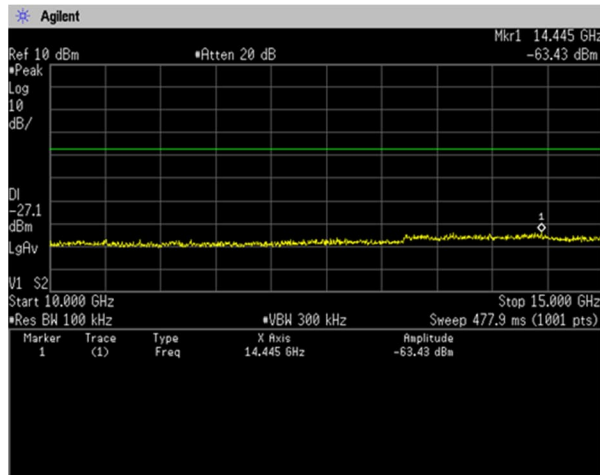
1GHz - 5GHz



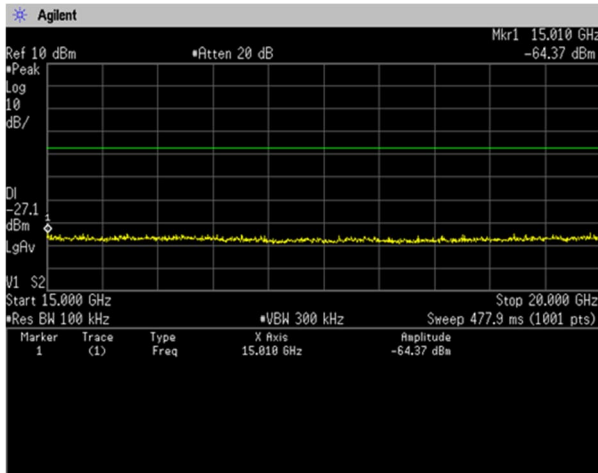
5GHz - 10GHz



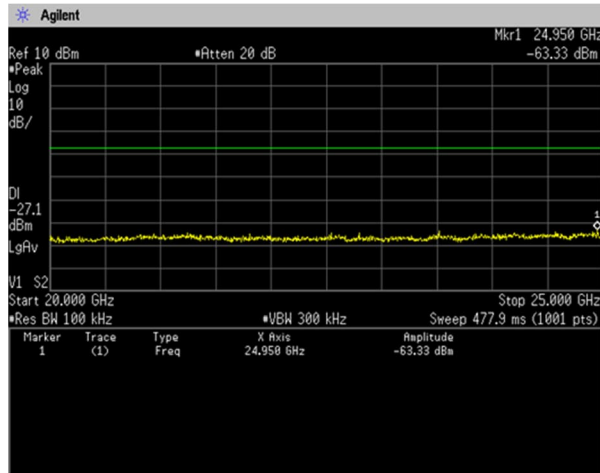
10GHz - 15GHz



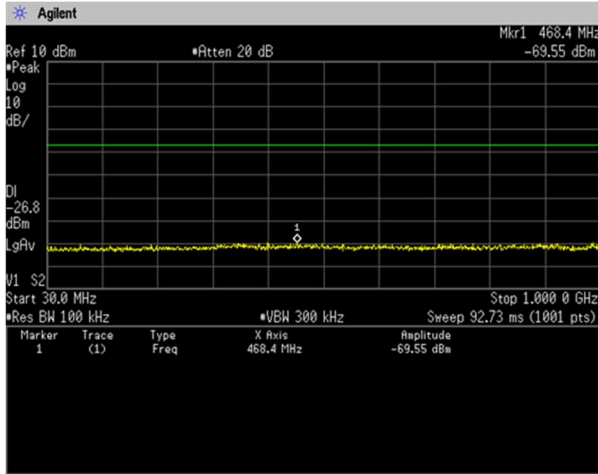
15GHz - 20GHz



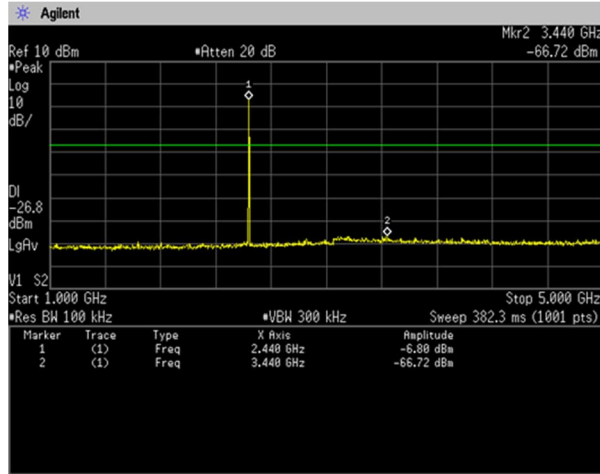
20GHz - 25GHz



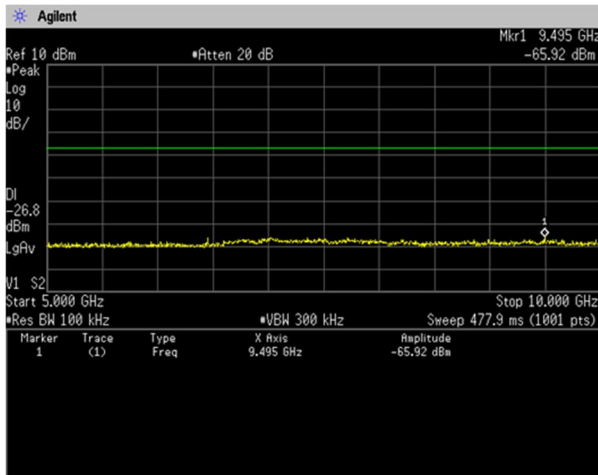
EB1190EM
[BT_LE (2Mbps)]
Channel: Middle
30MHz - 1GHz



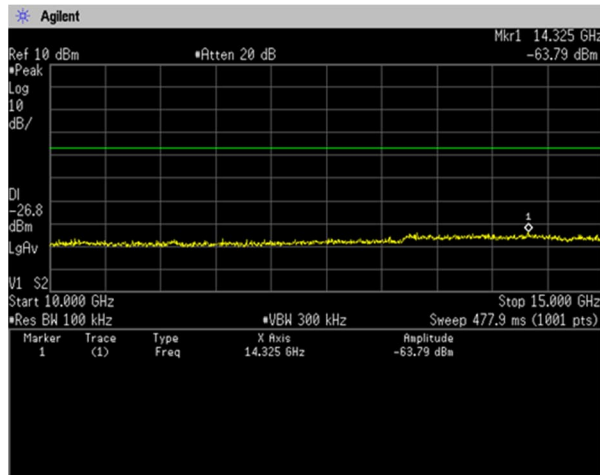
1GHz - 5GHz



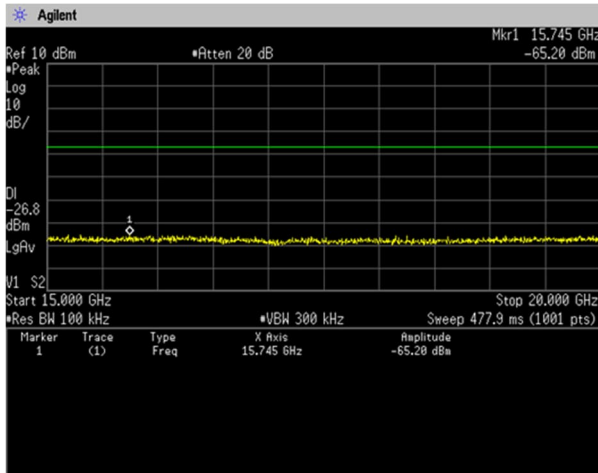
5GHz - 10GHz



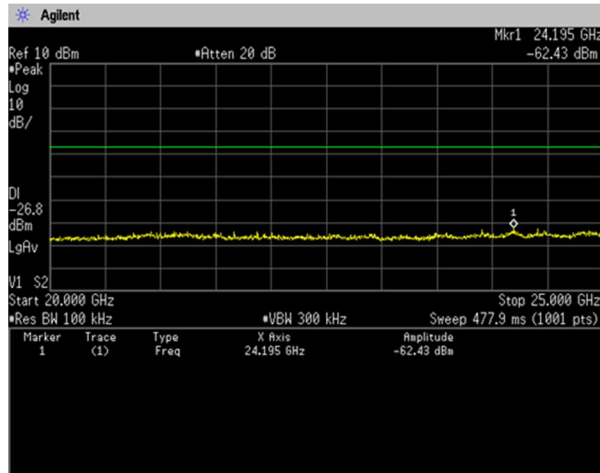
10GHz - 15GHz



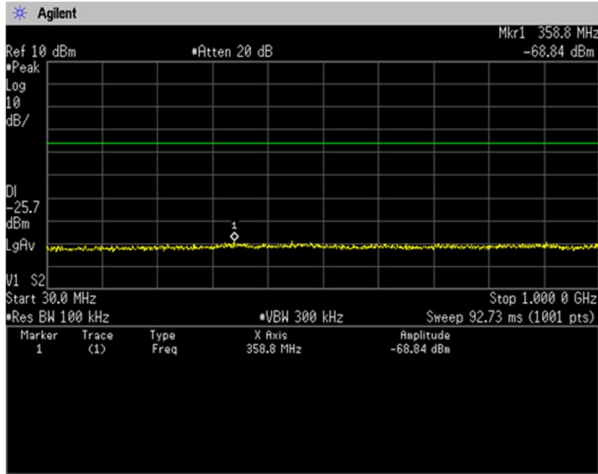
15GHz - 20GHz



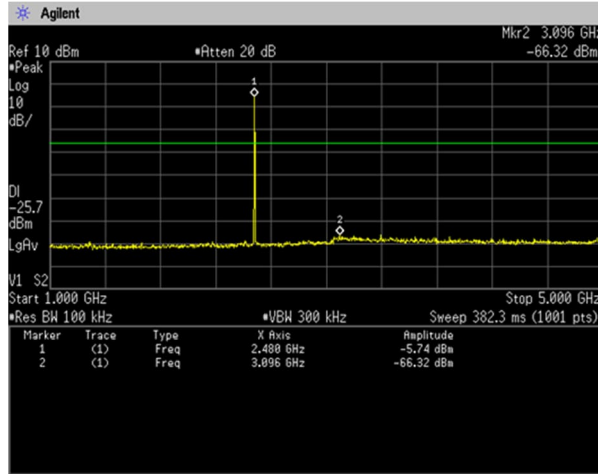
20GHz - 25GHz



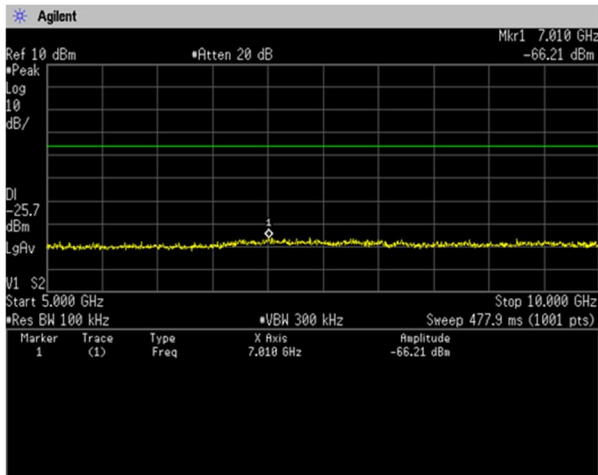
EB1190EM
[BT_LE (2Mbps)]
Channel: High
30MHz - 1GHz



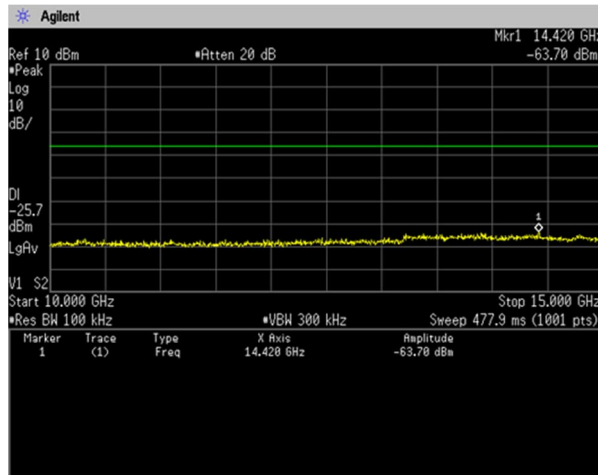
1GHz - 5GHz



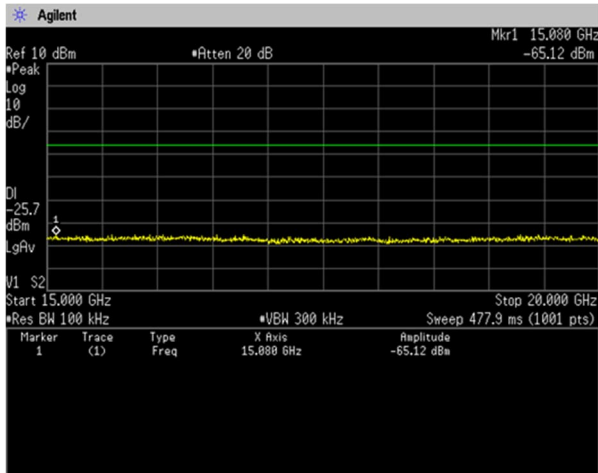
5GHz - 10GHz



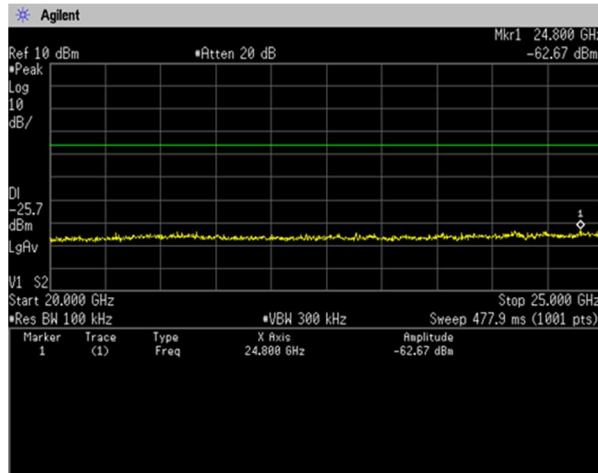
10GHz - 15GHz



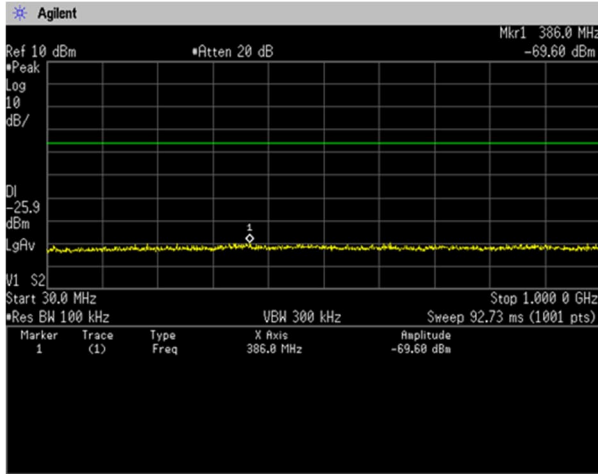
15GHz - 20GHz



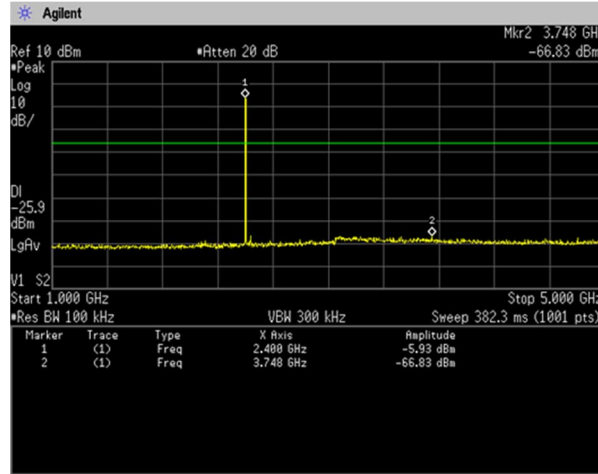
20GHz - 25GHz



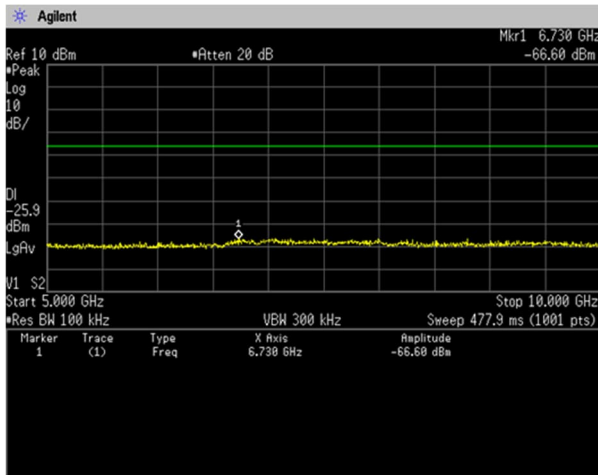
EB1190EM
[BT_LE (LongRange S2)]
Channel: Low
30MHz - 1GHz



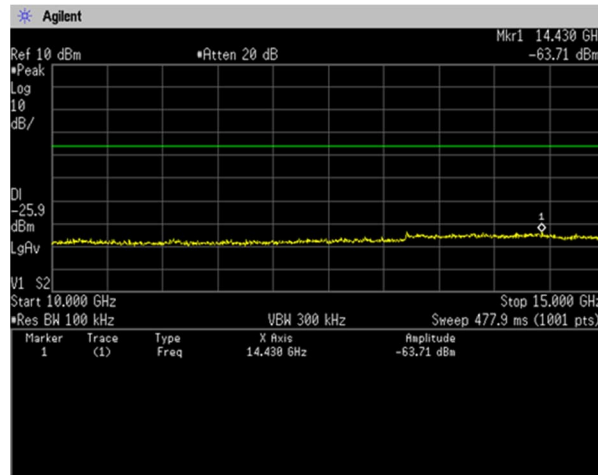
1GHz - 5GHz



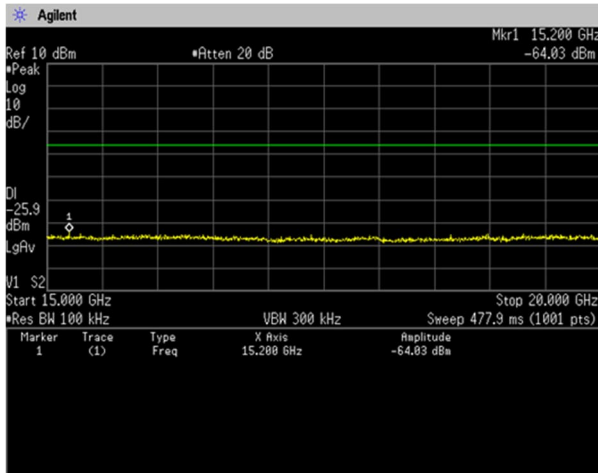
5GHz - 10GHz



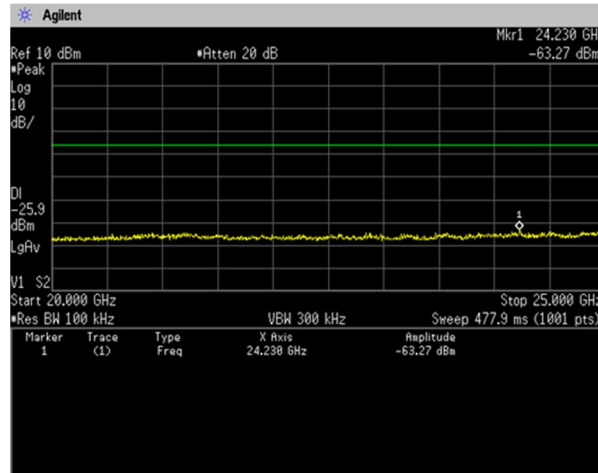
10GHz - 15GHz



15GHz - 20GHz

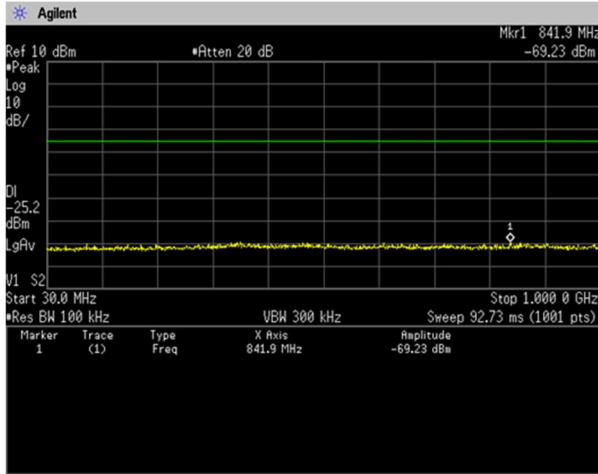


20GHz - 25GHz

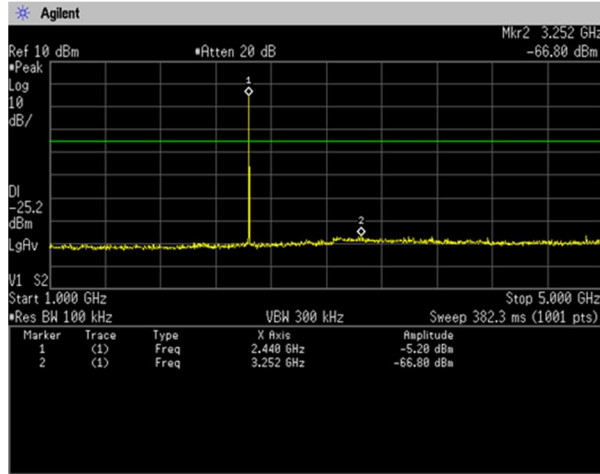




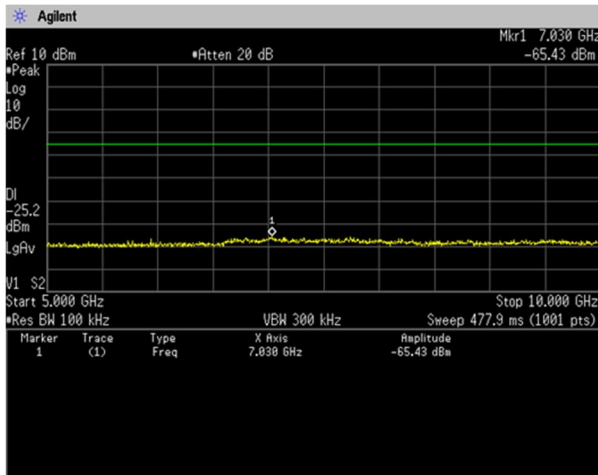
EB1190EM
[BT_LE (LongRange S2)]
Channel: Middle
30MHz - 1GHz



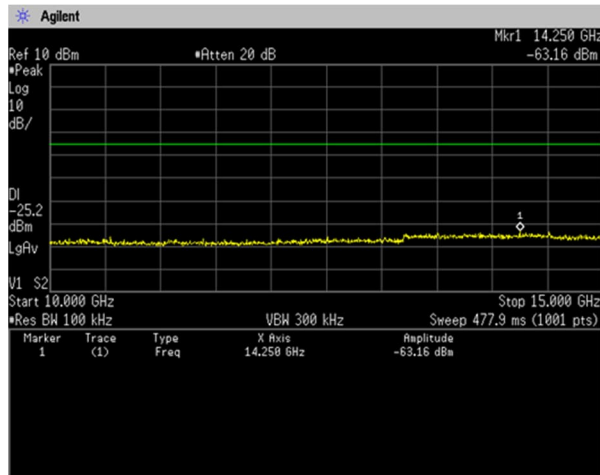
1GHz - 5GHz



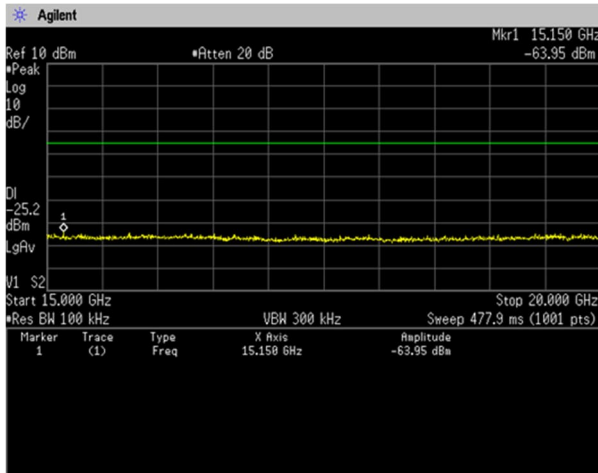
5GHz - 10GHz



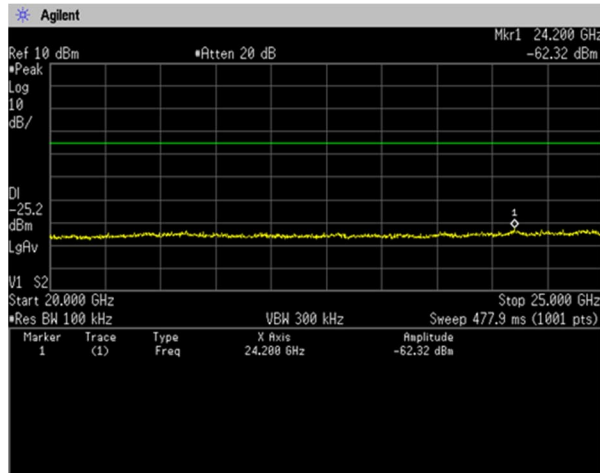
10GHz - 15GHz



15GHz - 20GHz

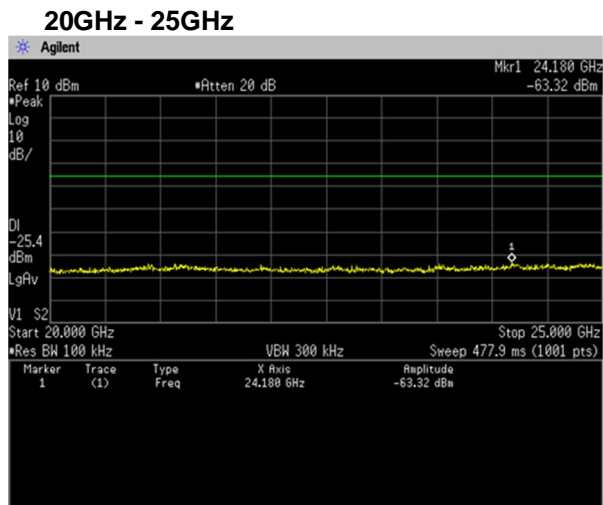
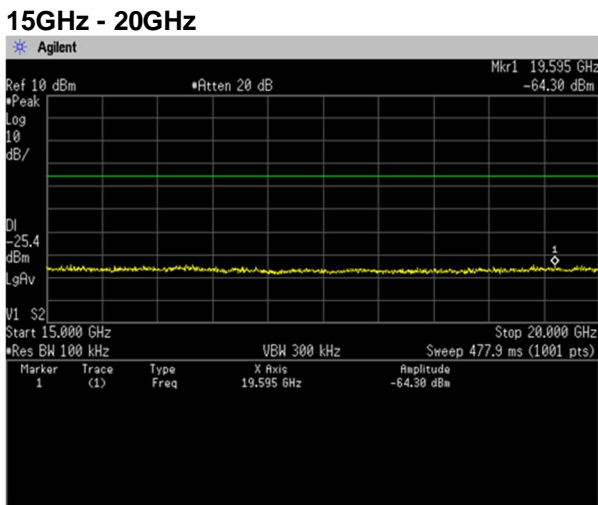
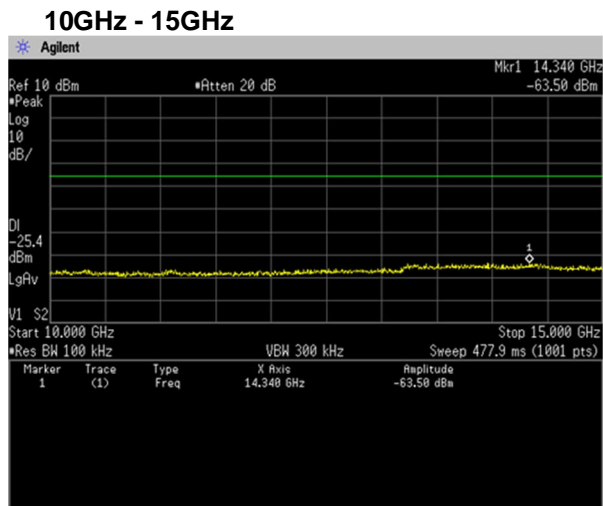
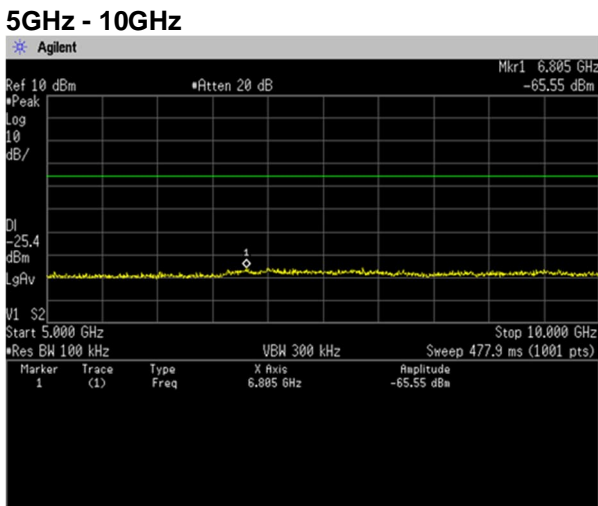
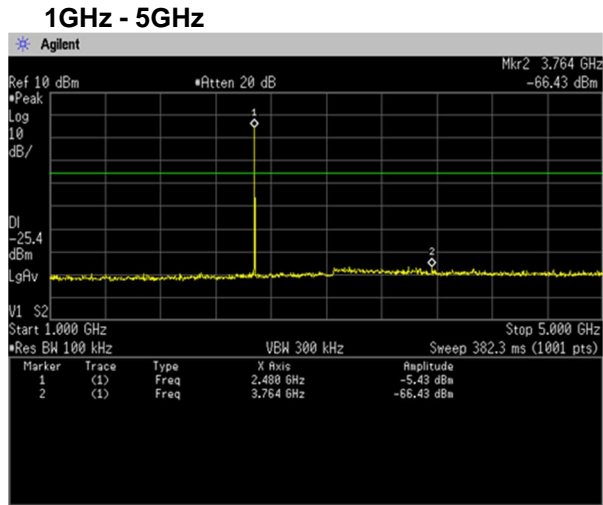
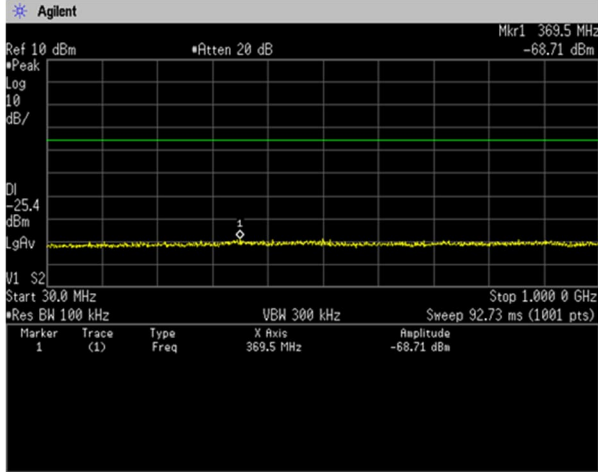


20GHz - 25GHz

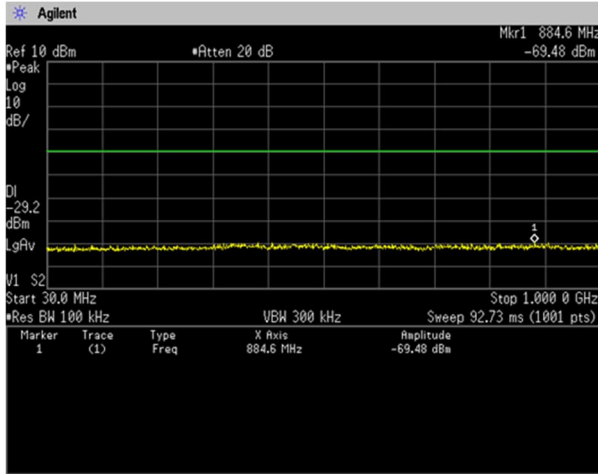




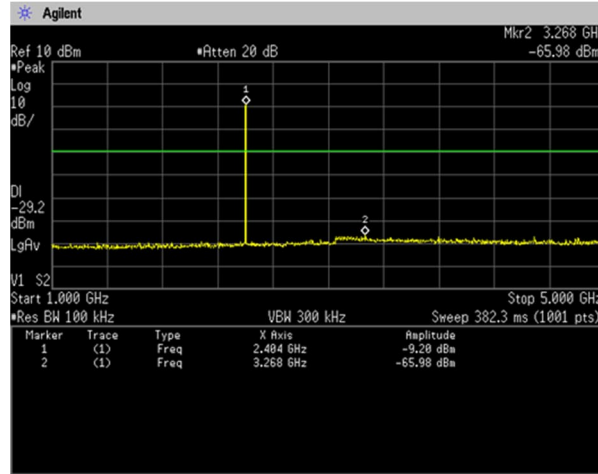
EB1190EM
[BT_LE (LongRange S2)]
Channel: High
30MHz - 1GHz



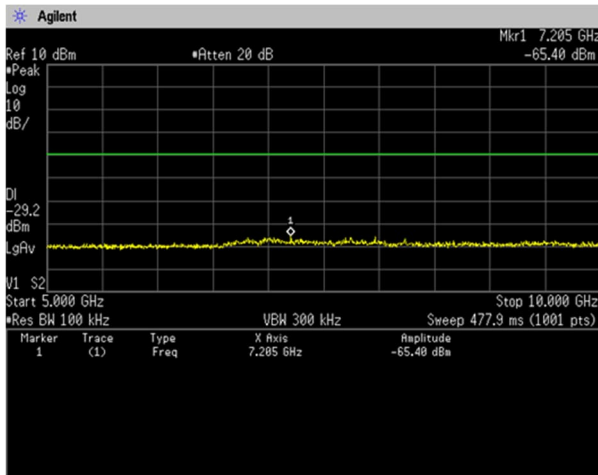
EB1190EM
[BT_LE (LongRange S8)]
Channel: Low
30MHz - 1GHz



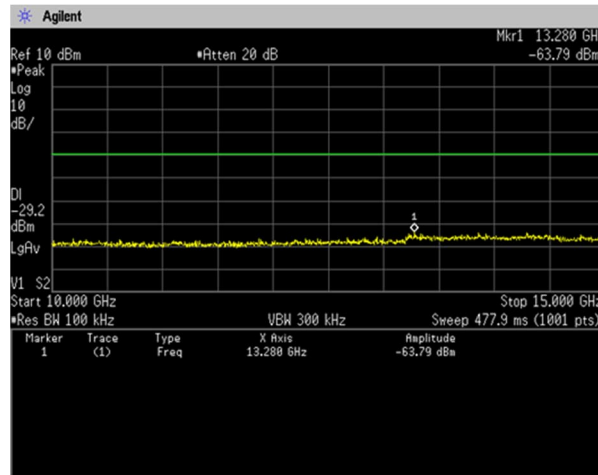
1GHz - 5GHz



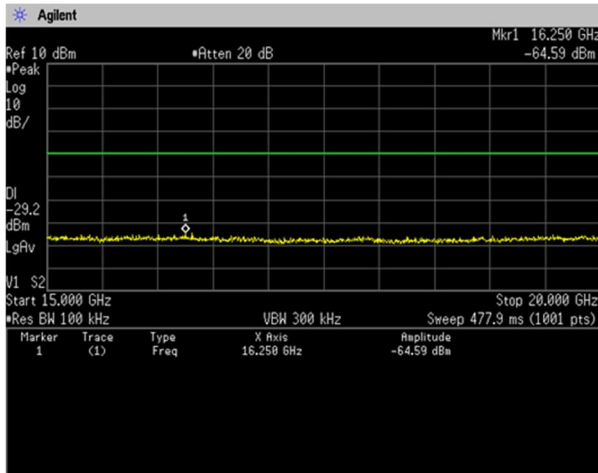
5GHz - 10GHz



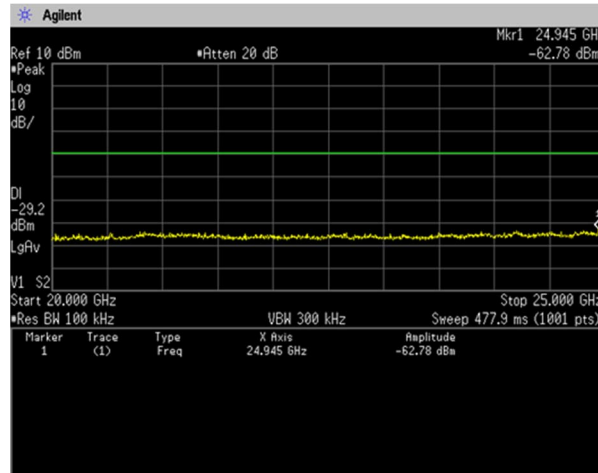
10GHz - 15GHz



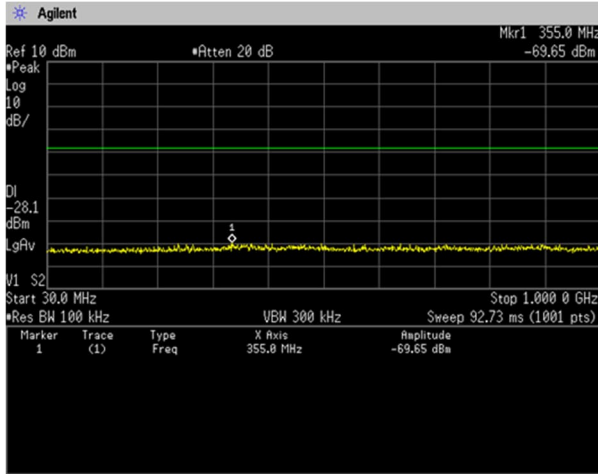
15GHz - 20GHz



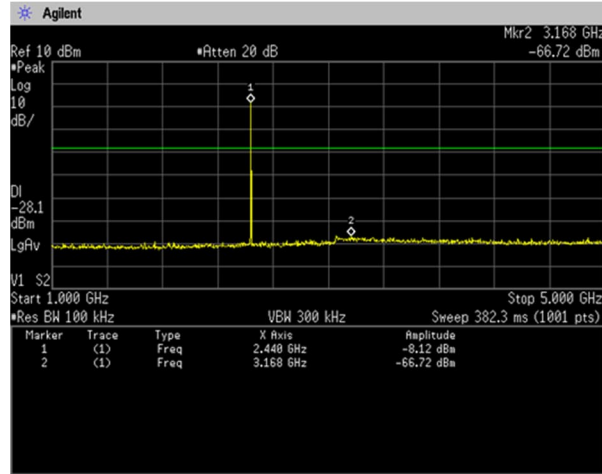
20GHz - 25GHz



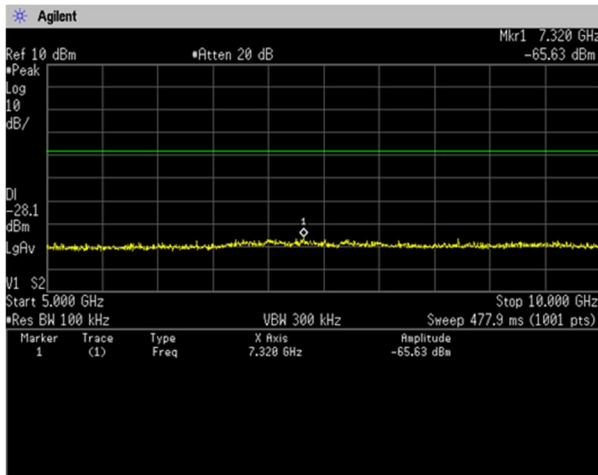
EB1190EM
[BT_LE (LongRange S8)]
Channel: Middle
30MHz - 1GHz



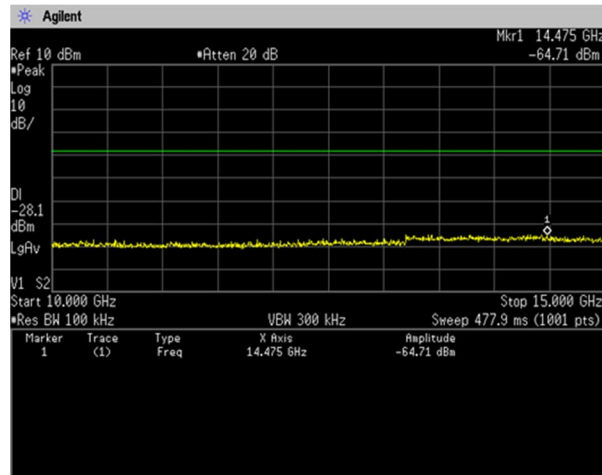
1GHz - 5GHz



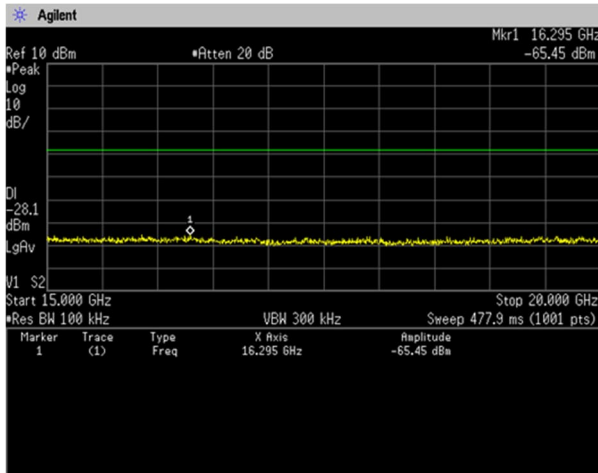
5GHz - 10GHz



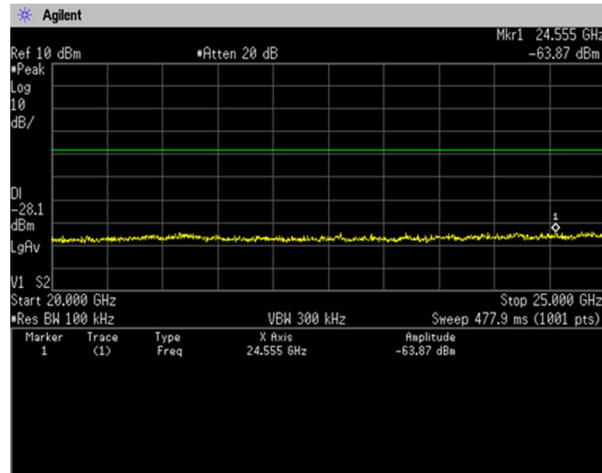
10GHz - 15GHz



15GHz - 20GHz

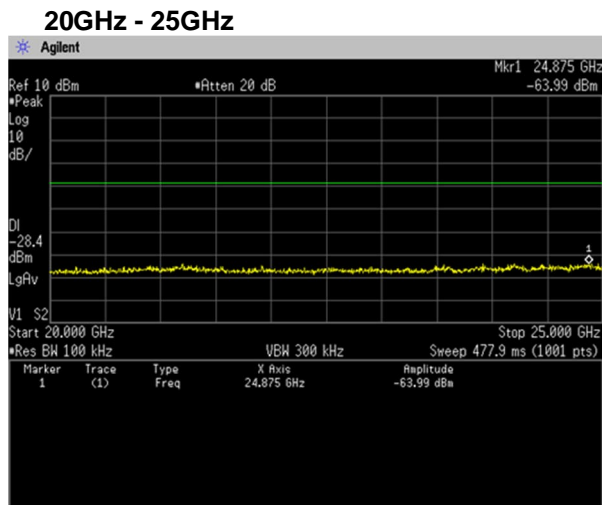
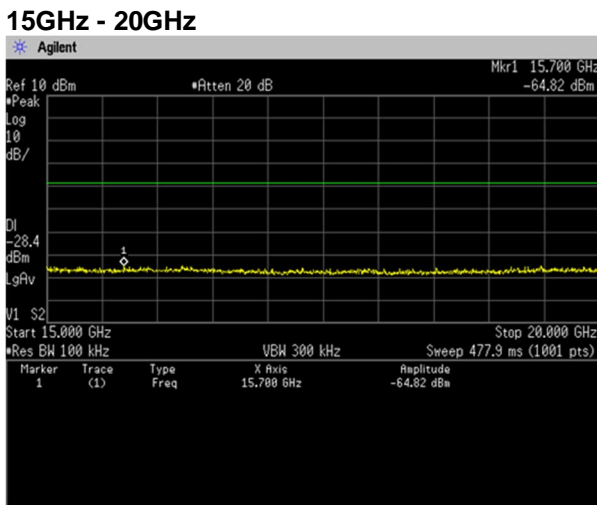
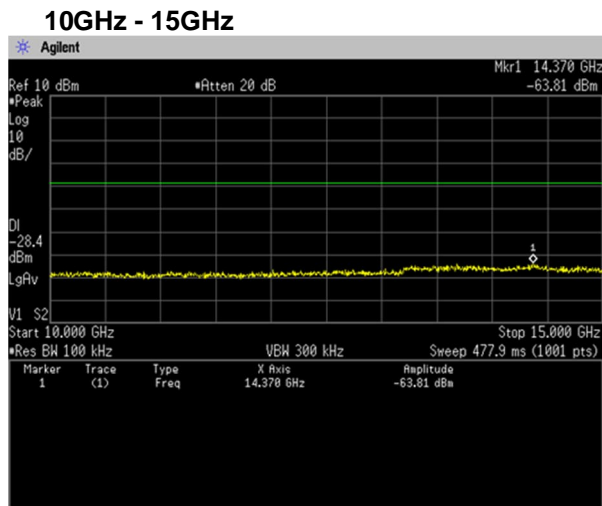
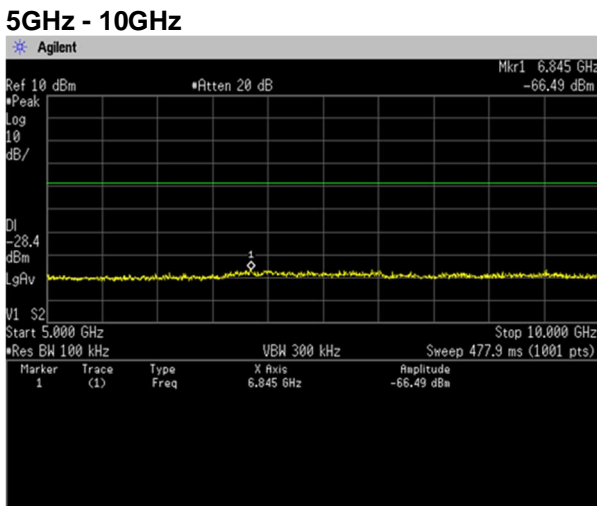
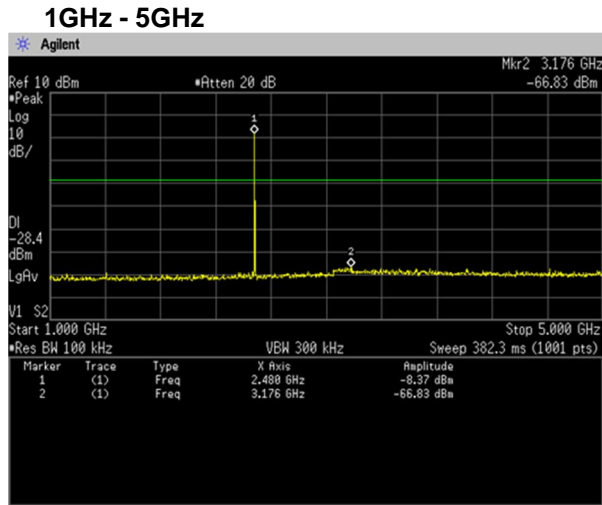
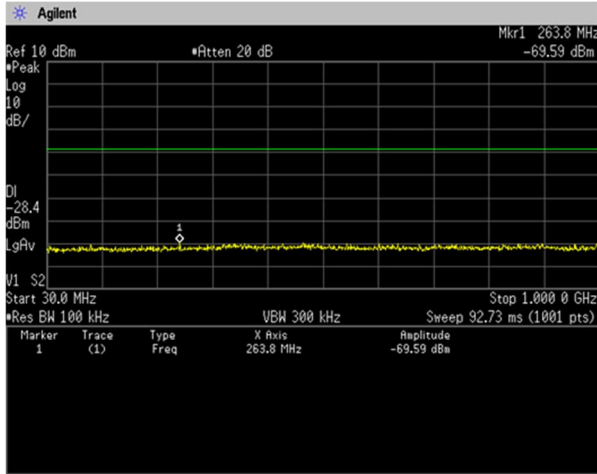


20GHz - 25GHz





EB1190EM
[BT_LE (LongRange S8)]
Channel: High
30MHz - 1GHz



4.5 Spurious Emissions - Radiated -

4.5.1 Measurement procedure

[FCC 15.247(d), 15.205, 15.209, KDB558074 D01 v05r02]

Test was applied by following conditions.

Test method	:	ANSI C63.10
Frequency range	:	9kHz to 25GHz
Test place	:	3m Semi-anechoic chamber
EUT was placed on	:	Styrofoam table / (W)1.0m x (D)1.0m x (H)0.8m (below 1GHz) Styrofoam table / (W)0.6m x (D)0.6m x(H)1.5m (above 1GHz)
Antenna distance	:	3m
Test receiver setting	:	Below 1GHz
- Detector	:	Average (9kHz-90kHz, 110kHz-490kHz), Quasi-peak
- Bandwidth	:	200Hz, 120kHz
Spectrum analyzer setting	:	Above 1GHz
- Peak	:	RBW=1MHz, VBW=3MHz, Span=0Hz, Sweep=auto
- Average	:	RBW=1MHz, VBW=1kHz, Span=0Hz, Sweep=auto Display mode=Linear

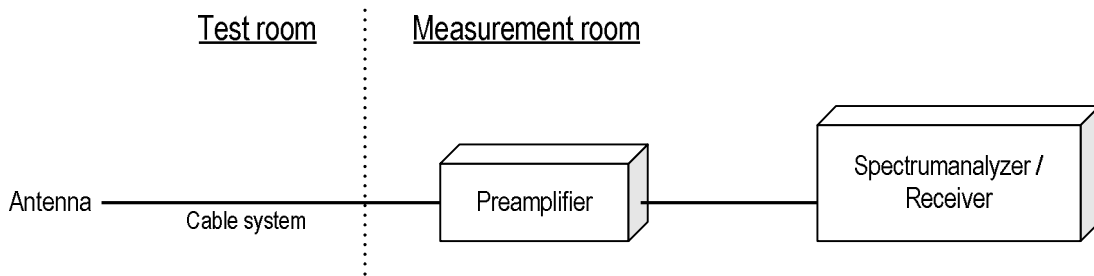
Average Measurement Setting [VBW]

Mode	Duty Cycle (%)	T _{on} (us)	T _{off} (us)	1/T _{on} (kHz)	Determined VBW Setting
Bluetooth 5.4 LE (1Mbps)	84.89	2.124	0.378	0.471	1kHz
Bluetooth 5.4 LE (2Mbps)	57.01	1.069	0.806	0.935	1kHz
Bluetooth 5.4 LE (Long Range S2)	90.98	4.547	0.451	0.220	1kHz
Bluetooth5.4 LE (Long Range S8)	97.48	17.02	0.44	0.059	1kHz

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

Radiated emission measurements are performed at 3m distance with the broadband antenna (Loop antenna, Biconical antenna, Log periodic antenna, Double ridged guide antenna and Broad-band horn Antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1m to 4m and stopped at height producing the maximum emission. As for the Loop antenna, it is positioned with its plane vertical, and the center of the Loop antenna is 1m above the ground plane. The EUT is Placed on a turntable, which is 0.8m/1.5m above ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. The test results represent the worst case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation. Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

- Test configuration



4.5.2 Calculation method

[9kHz to 150kHz]
 Emission level = Reading + (Ant factor + Cable system loss)
 Margin = Limit – Emission level

[150kHz to 25GHz]
 Emission level = Reading + (Ant factor + Cable system loss - Amp. Gain)
 Margin = Limit – Emission level

Example:
 Limit @ 4804.0MHz: 74.0dBuV/m (Peak Limit)
 S.A Reading = 39.9dBuV Cable system loss = 8.3dB
 Result = 39.9 + 8.3 = 48.2dBuV/m
 Margin = 74.0 - 48.2 = 25.8dB

4.5.3 Limit

Frequency [MHz]	Field strength		Distance [m]
	[uV/m]	[dBuV/m]	
0.009-0.490	2400 / F [kHz]	20logE [uV/m]	300
0.490-1.705	24000 / F [kHz]	20logE [uV/m]	30
1.705-30	30	29.5	30
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

- Note:
1. The lower limit shall apply at the transition frequencies.
 2. Emission level [dBuV/m] = 20log Emission [uV/m]
 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition modulation.

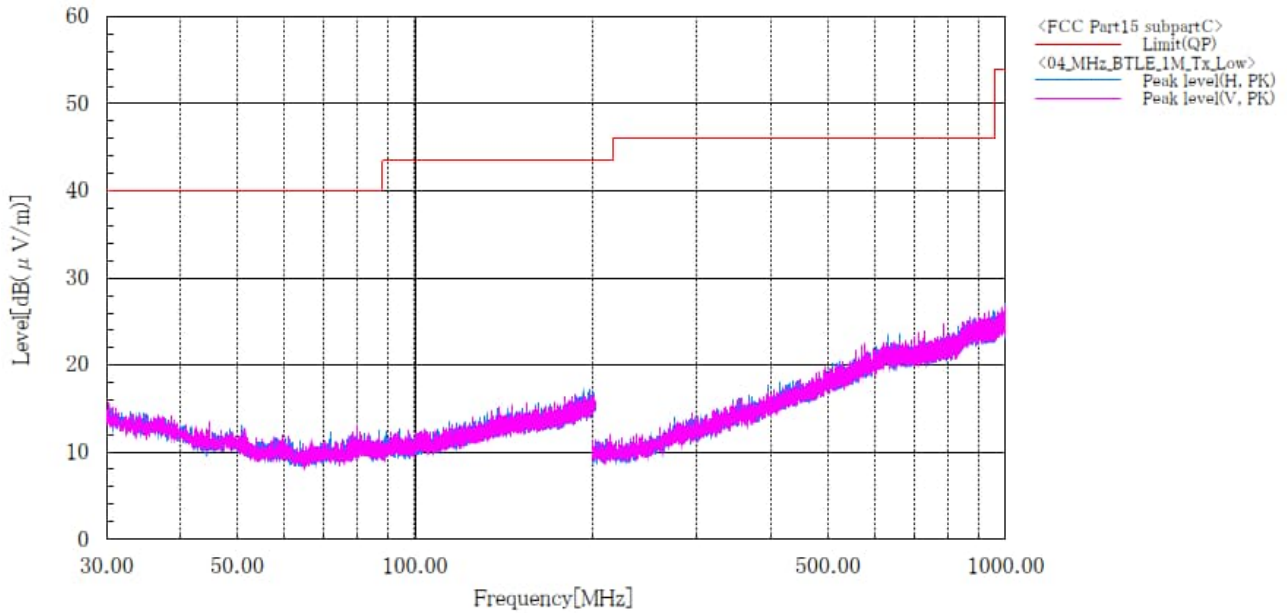
4.5.4 Test data

Date	: 1-May-2024	Test engineer	: <u>Chiaki Kanno</u>
Temperature	: 22.3 [°C]		
Humidity	: 43.4 [%]		
Test place	: 3m Semi-anechoic chamber		
Date	: 14-May-2024	Test engineer	: <u>Chiaki Kanno</u>
Temperature	: 20.9 [°C]		
Humidity	: 40.3 [%]		
Test place	: 3m Semi-anechoic chamber		
Date	: 15-May-2024	Test engineer	: <u>Chiaki Kanno</u>
Temperature	: 21.6 [°C]		
Humidity	: 47.4 [%]		
Test place	: 3m Semi-anechoic chamber		
Date	: 8-August-2024	Test engineer	: <u>Tadahiro Seino</u>
Temperature	: 21.1 [°C]		
Humidity	: 59.4 [%]		
Test place	: 3m Semi-anechoic chamber		
Date	: 9-August-2024	Test engineer	: <u>Tadahiro Seino</u>
Temperature	: 21.9 [°C]		
Humidity	: 58.8 [%]		
Test place	: 3m Semi-anechoic chamber		

[Transmission mode]
EB1190EM [BT_LE (1Mbps)]
Channel: Low
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1190EM
 Serial No. : N/A
 Test mode : BTLE_1M_Tx_CH:Low

Sheet No. : 04
 Standard : FCC Part15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 21.6 [° C], 47.4 [%]
 Note1 :



Final Result

Note:

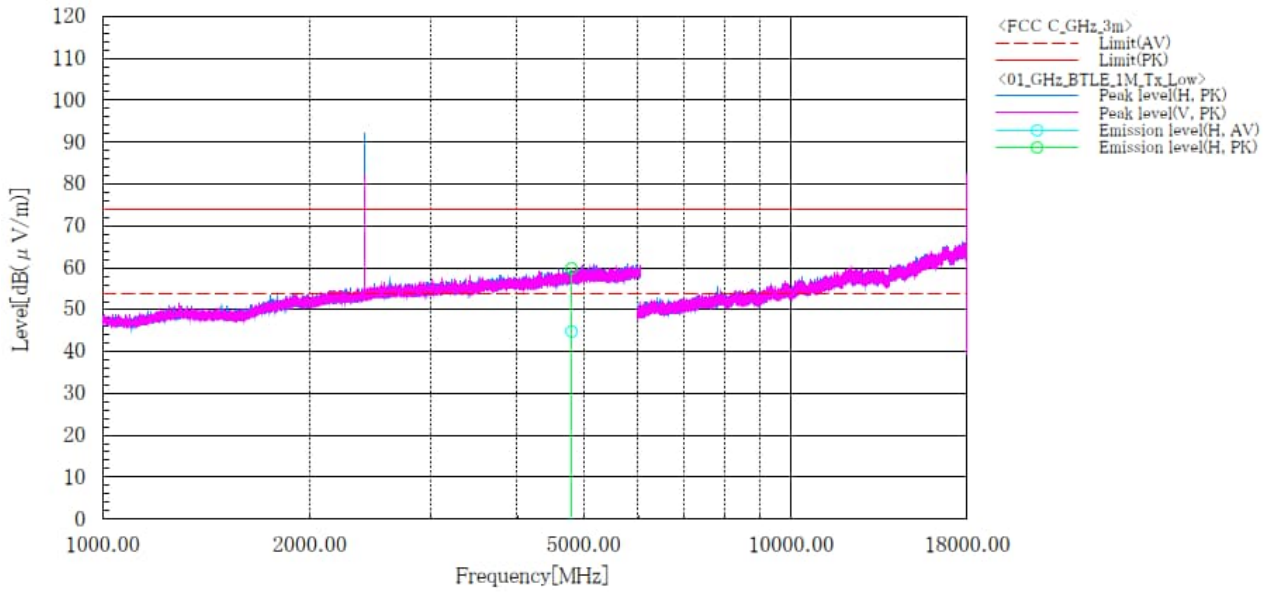
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.



EB1190EM [BT_LE (1Mbps)]
Channel: Low
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1190EM
 Serial No. : N/A
 Test mode : BT LE_1M_Tx

Sheet No. : 01
 Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 22.3 [° C], 43.4 [%]
 Note1 : CH:Low (2402MHz)



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	4804.000	H	32.0	47.1	12.8	44.8	59.9	54.0	74.0	9.2	14.1	100.0	165.0

Note:

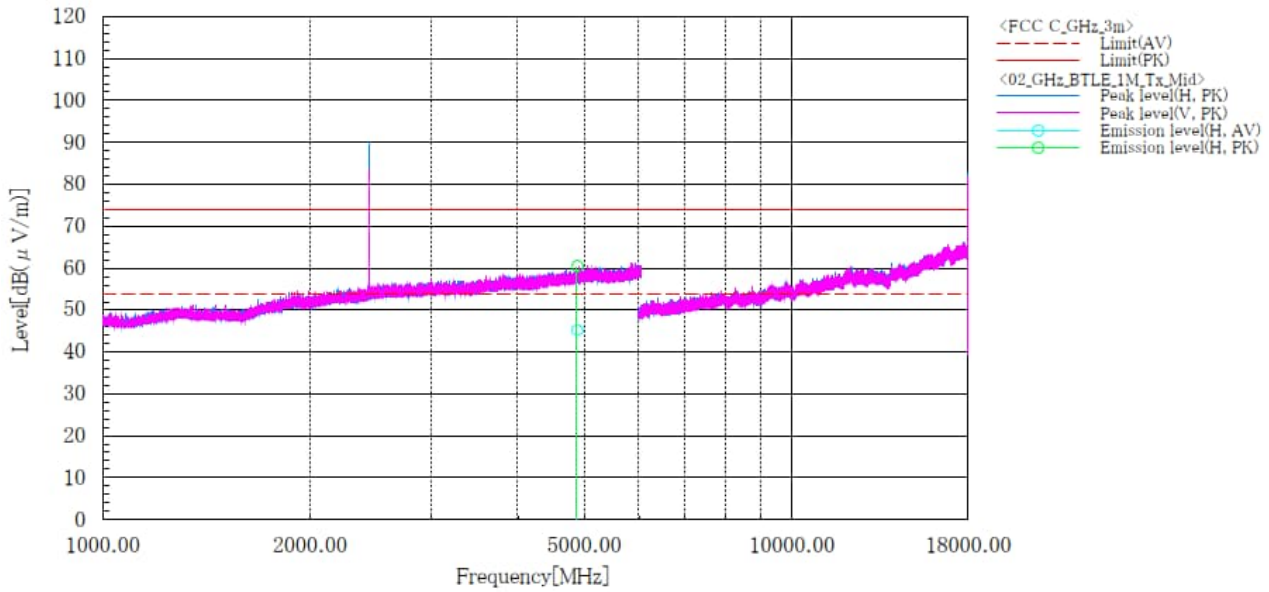
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



EB1190EM [BT_LE (1Mbps)]
Channel: Middle
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1190EM
 Serial No. : N/A
 Test mode : BT LE_1M_Tx

Sheet No. : 02
 Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 22.3 [° C], 43.4 [%]
 Note1 : CH:Mid (2440MHz)



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	4880.000	H	32.2	47.4	13.0	45.2	60.4	54.0	74.0	8.8	13.6	159.0	237.0

Note:

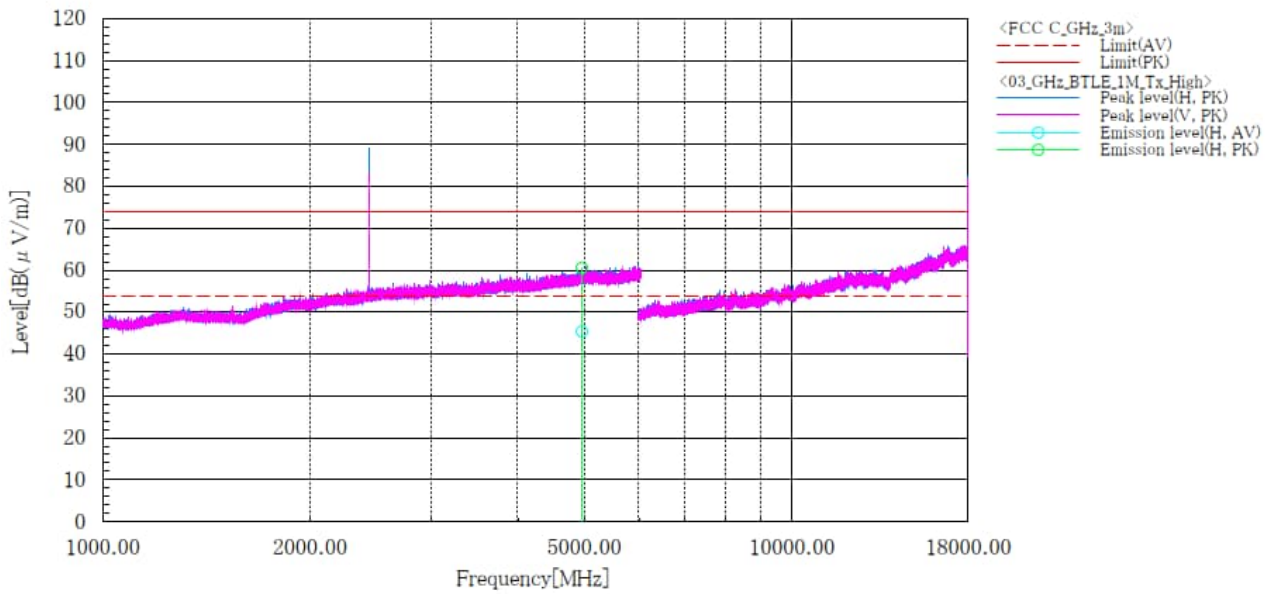
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



EB1190EM [BT_LE (1Mbps)]
Channel: High
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1190EM
 Serial No. : N/A
 Test mode : BT LE_1M_Tx

Sheet No. : 03
 Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 22.3 [° C], 43.4 [%]
 Note1 : CH:High (2480MHz)



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	4960.000	H	32.1	47.3	13.3	45.4	60.6	54.0	74.0	8.6	13.4	165.0	236.0

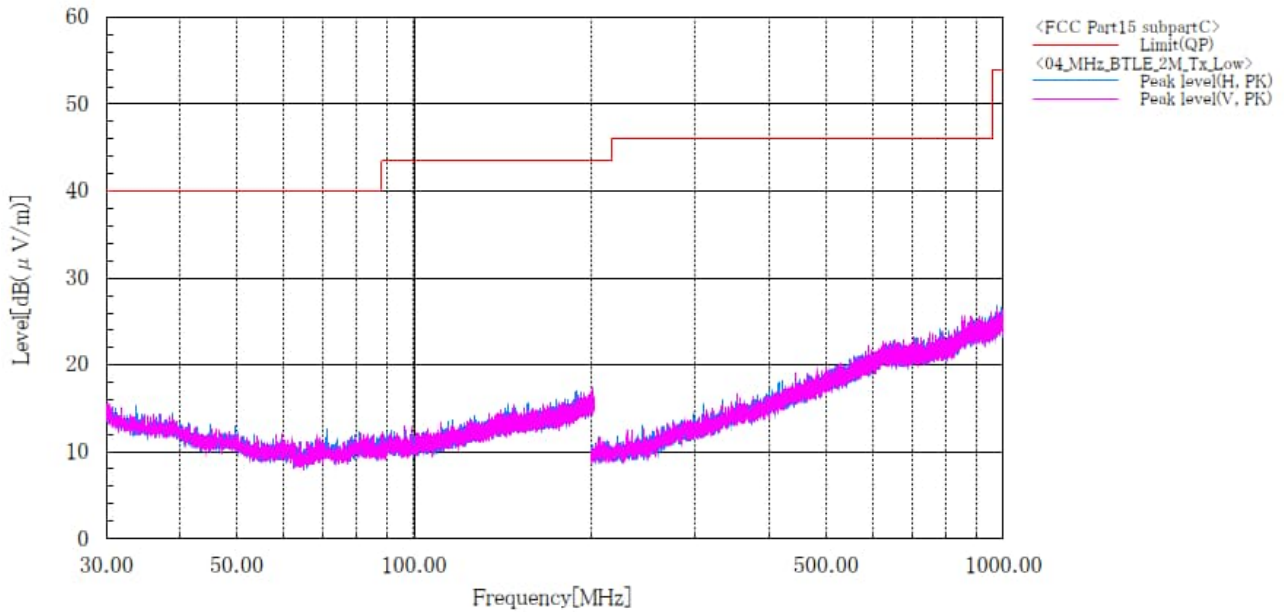
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.

EB1190EM [BT_LE (2Mbps)]
Channel: Low
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1190EM
 Serial No. : N/A
 Test mode : BTLE_2M_Tx_CH:Low

Sheet No. : 04
 Standard : FCC Part15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 21.6 [° C], 47.4 [%]
 Note1 :



Final Result

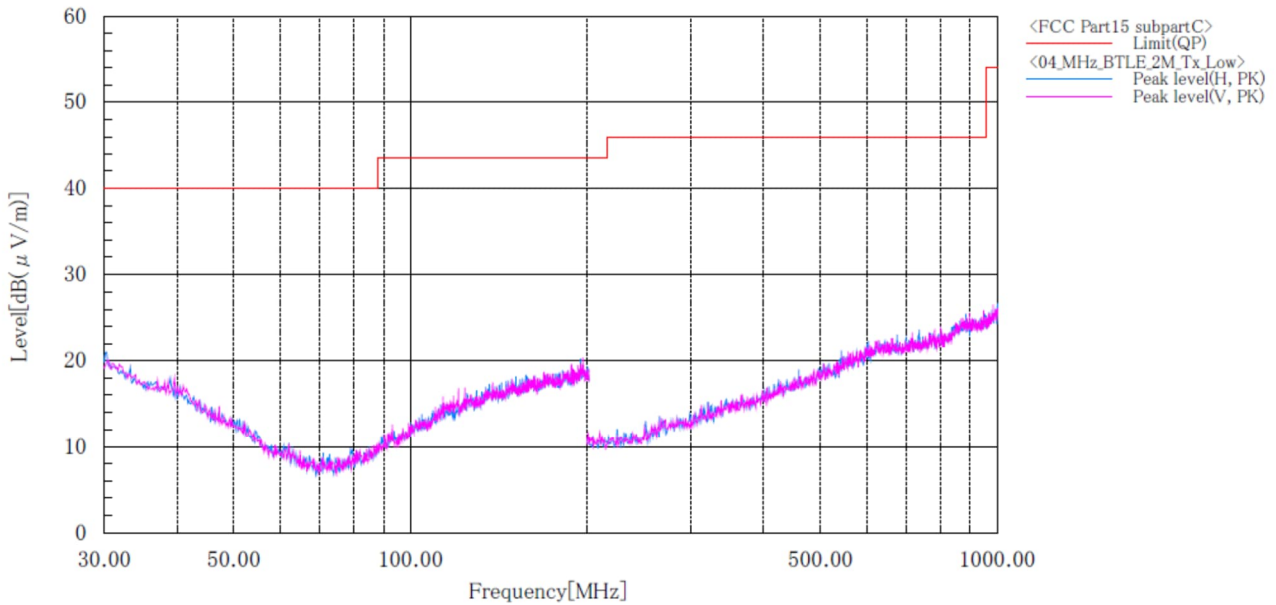
Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

EB1207 [BT_LE (2Mbps)]
Channel: Low
BELOW 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1207
 Serial No. : N/A
 Test mode : BTLE_2M_Tx_CH:Low

Sheet No. : 04
 Standard : FCC Part15 subpart C
 Operator : T.Seino
 Temp,Hum,Atm : 21.9 [° C], 58.8 [%]
 Note1 :



Final Result

Note:

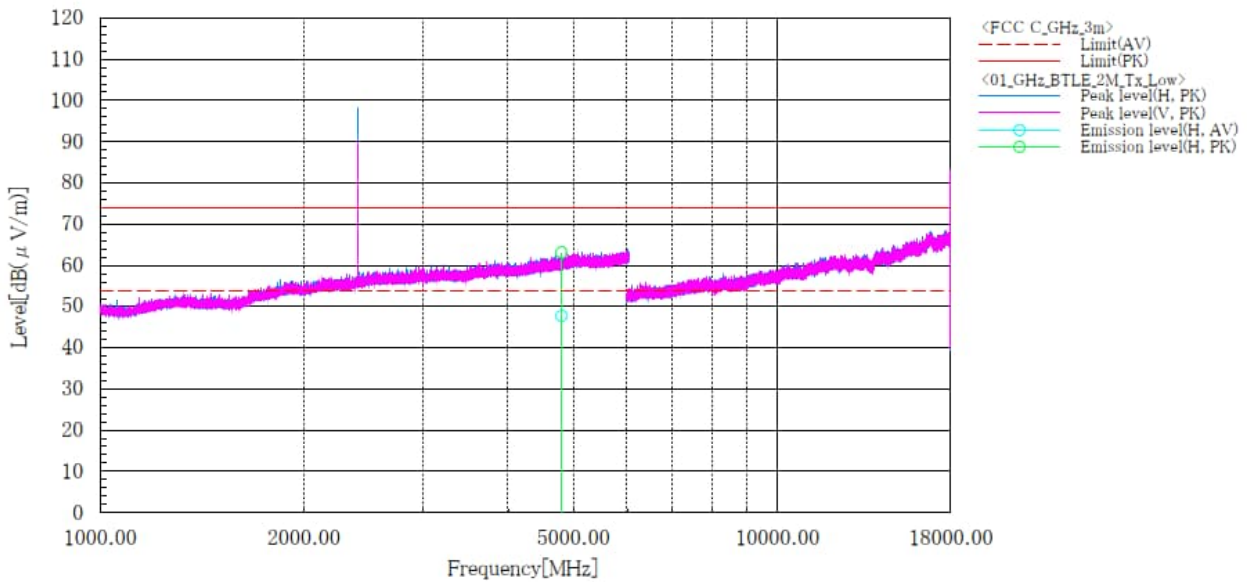
1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]
2. No emission were detected in frequency range 9kHz to 30MHz at the 3 meters distance.

Comparison of the charts of EB1190EM and EB1207 showed that the difference in test results was less than 3 dB.

EB1190EM [BT_LE (2Mbps)]
Channel: Low
ABOVE 1 GHz

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1190EM
 Serial No. : N/A
 Test mode : BT LE_2M_Tx

Sheet No. : 01
 Standard : FCC Part.15 subpart C
 Operator : C.Kanno
 Temp,Hum,Atm : 20.9 [° C], 40.3 [%]
 Note1 : CH:Low (2402MHz)



Final Result

No.	Frequency [MHz]	Pol	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c. f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle R [deg]
1	4804.000	H	32.6	47.9	15.2	47.8	63.1	54.0	74.0	6.2	10.9	155.0	162.0

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]
2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.